

Disclaimer: Information contained in the report addresses environmental conditions only and is not the official South Florida Water Management District operations recommendation or decision.

## **M E M O R A N D U M**

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

**FROM:** SFWMD Staff Environmental Advisory Team

**DATE:** April 17, 2018

**SUBJECT:** Weekly Environmental Conditions for Systems Operations

### **Summary**

#### **Weather Conditions and Forecast**

Dry weather will persist across the District through Thursday thanks to the influence of high pressure. A weak cold front should arrive over the northern part of the area on Friday and become diffuse over central Florida by Saturday. Increasing low-level moisture near and ahead of this feature should result in greater rain chances across the District this weekend. Without much atmospheric instability on Saturday, the rain that falls should come mainly from scattered showers, especially over the eastern half of the region where 0.05 to 0.1 inches areal averages are likely; the far north should see little to no activity. On Sunday greater instability and plentiful moisture should lead to an expansion of shower activity and a chance of thunderstorms over all areas, but like Saturday, the greatest rain chances and heaviest rains should generally be over the eastern half of the District. Over this area areal average rainfall of 0.1 to 0.25 inches is forecast. Early next week there is the potential for moderate to heavy rains District-wide in association with broad low pressure and an associated cold front moving slowly through the region. While our confidence in significant rains over a large portion of the District is moderate to high, confidence with regard to the timing, location and overall rainfall accumulations is somewhat low at this time range. Nevertheless, model guidance is indicating the greatest areal average rainfall over the northern and eastern parts of the District with lesser amounts over the far south and Keys. Rainfall maxima Monday into Tuesday next week could locally be as high as 2 to 4 inches. There is some chance that the heavy rains could extend into at least mid-week, adding to the already copious rains falling Monday-Tuesday.

#### **Kissimmee**

Tuesday morning stages were 56.0 feet NGVD (0.8 feet below schedule) in East Lake Toho, 53.0 feet NGVD (0.8 feet below schedule) in Toho, and 49.5 feet NGVD (1.0 feet below schedule) in Kissimmee-Cypress-Hatchineha; headwater stages were 46.4 feet NGVD at S-65A and 25.7 feet NGVD at S-65D. Mean recession rates for the last week were 0.16 and 0.13 feet per week in East Lake Toho and Toho, respectively (preferred range of 0.15-0.2 feet per week) and 0.01 feet per week in Kissimmee-Cypress-Hatchineha (preferred rate is to not exceed 0.2 feet per week). Tuesday morning discharges were: 385 cfs at S-65, 271 cfs at S-65A, and 355 cfs at S-65E. Dissolved oxygen concentration in the Kissimmee River averaged 6.1 mg/L for the week. Kissimmee River mean floodplain depth on Sunday was 0.07 feet.

## **Lake Okeechobee**

Lake Okeechobee stage is 13.41 feet NGVD having decreased 0.16 feet over the past week and 0.90 feet over the last month. Lake stages have receded approximately 1.75 feet over the past two months, a recession rate that is quickly drying available habitat around some wading bird colonies. However, fast recessions will also hasten the return of light penetration to the sediments in the nearshore region for important vegetation recovery and will help avoid higher stages in the summer that are correlated with algal blooms on the Lake.

## **Estuaries**

Total inflow to the St. Lucie Estuary averaged 349 cfs over the past week with no flow coming from Lake Okeechobee. Salinity remained 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 3.99 – 10.74 µg/L in the South Fork. Total inflow to the Caloosahatchee Estuary averaged 763 cfs over the past week with 550 cfs coming from the Lake. Salinity slightly decreased throughout the estuary. The 30-day moving average surface salinity is 4.3 at Val I-75 and 12.6 at Ft. Myers. The 30-day moving average salinity at Val I-75 is forecast to be 5.7 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 in the fair range at Shell Point. Chlorophyll *a* concentrations over the last week were relatively low to medium near Beautiful Island (5.02 – 15.42 µg/L), Ft. Myers (6.11 – 26.27 µg/L), and Shell Point (1.25 – 73.39 µg/L). Dissolved oxygen levels at Beautiful Island were 4.49 – 7.73 mg/L, at Ft. Myers were 4.43 – 7.63 mg/L, and at Shell Point were 4.27 – 11.19 mg/L. The 2008 LORS recommends up to 450 cfs at S-79 and up to 200 cfs at S-80. The District recommends that the USACE follow the 2008 LORS schedule.

## **Stormwater Treatment Areas**

Over the past week, the STAs/FEBs received approximately 6,200 acre-feet of Lake releases. The total amount of Lake releases sent to the STAs/FEBs in WY2018 (since May 1, 2017) is approximately 130,600 acre-feet. Most STA cells are at or above target depths, except many of the STA-5/6 EAV cells which are drying out. 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 Lake releases are sent to the WCAs, they will be sent to STA-1E Eastern Flow-way, STA-2 Flow-way 4 and the A-1 FEB/STA-3/4 Western Flow-way.

## **Everglades**

Water management resulting in the recommended recession rates would generate the most pronounced ecological benefit for wildlife in Rotenberger Wildlife Management Area and southern WCA-2A. Wading bird foraging within the sloughs in the southern portions of WCA-2A is building and that area is predicted to be even more important for wading bird foraging in the coming weeks. Moderating the recession rates there would prolong conditions favorable for foraging. Many of the ibis chicks at the Alley North colony have become large enough to protect themselves as the depths around the island have gone dry around the northern perimeter. Over drying in the northern portions of WCA-2A and WCA-3A puts those regions' peat soils at risk and increases the likelihood of damaging wild fires. Inflows into those areas continue to provide ecological benefit and there is little risk of a negative impact to wading bird foraging conditions. Water depths in Taylor Slough range from -0.75 feet to +0.77 feet and are within 2 inches of the historical averages. Salinities in Florida Bay increased 0.8 psu on average this past week and are within 3 psu of the historical average for this time of year. Mangrove zone 30-day moving average rose 1.2 psu over last week to 14.0 psu. At this time of the year, salinity will continue to increase until the rains start.

## Supporting Information

### KISSIMMEE BASIN

#### Kissimmee Basin Rainfall

The Upper Kissimmee Basin received 1.50 inches of rainfall in the past week and the Lower Basin received 1.09 inches (SFWMD Daily Rainfall Report 4/17/2018).

#### 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: 4/17/2018**

Water Body	Structure	7-day Average Discharge (cfs) <sup>1</sup>	Stage Monitoring Site <sup>2</sup>	Lake Stage (feet)	Schedule Type <sup>3</sup>	Schedule Stage (feet)	Daily Departure (feet)						
							4/15/18	4/8/18	4/1/18	3/25/18	3/18/18	3/11/18	3/4/18
Lakes Hart and Mary Jane	S62	31	LKMJ	60.2	R	60.4	-0.2	-0.3	-0.3	-0.4	-0.5	-0.4	-0.3
Lakes Myrtle, Preston, and Joel	S57	0	S57	60.5	R	60.5	0.0	-0.2	-0.2	-0.2	-0.1	-0.1	-0.1
Alligator Chain	S60	50	ALLI	63.2	R	63.2	0.0	-0.1	-0.2	-0.4	-0.5	-0.4	-0.3
Lake Gentry	S63	65	LKGT	60.8	R	60.7	0.1	0.0	-0.1	-0.2	-0.3	-0.2	-0.1
East Lake Toho	S59	154	TOHOE	56.0	R	56.8	-0.8	-0.9	-1.1	-1.2	-1.2	-1.2	-1.1
Lake Toho	S61	444	TOHOW, S61	53.1	R	53.8	-0.7	-0.9	-1.1	-1.2	-1.2	-1.2	-1.1
Lakes Kissimmee, Cypress, and Hatchineha	S65	406	KUB011, LKIS5B	49.5	R	50.5	-1.0	-1.3	-1.4	-1.2	-1.2	-1.1	-0.8

<sup>1</sup> Seven-day average of weighted daily means through midnight.

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

<sup>3</sup> 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.  
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: 4/17/2018**

Metric	Location	1-Day Average		Average for the Preceding 7-Days <sup>1</sup>								
		4/15/2018	4/15/18	4/8/18	4/1/18	3/25/18	3/18/18	3/11/18	3/4/18	2/25/18	2/18/18	2/11/18
Discharge (cfs)	S-65	460	406	340	376	361	400	461	715	968	1,000	810
Discharge (cfs)	S-65A	329	313	257	246	245	258	319	539	764	796	647
Discharge (cfs)	S-65D <sup>2</sup>	329	384	301	324	329	343	430	730	1,047	1,018	940
Stage (feet NGVD)	S-65D <sup>2</sup>	25.80	25.86	25.77	25.86	25.80	25.66	25.73	25.67	25.79	25.87	25.80
Discharge (cfs)	S-65E <sup>2</sup>	329	355	297	325	348	317	441	733	1,088	1,059	978
Discharge (cfs)	S-67	0	1	0	0	0	0	0	0	133	389	350
DO (mg/L) <sup>3</sup>	Phase I river channel	6.1	6.1	6.8	7.5	8.2	8.3	7.0	5.9	6.0	6.2	7.8
Mean depth (feet) <sup>4</sup>	Phase I floodplain	0.07	0.07	0.06	0.07	0.09	0.07	0.09	0.14	0.19	0.22	0.23

<sup>1</sup> Seven-day average of weighted daily means through Sunday midnight.

<sup>2</sup> S-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.

<sup>3</sup> DO is the average for sondes at PC62 and PC33.

<sup>4</sup> 1-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)

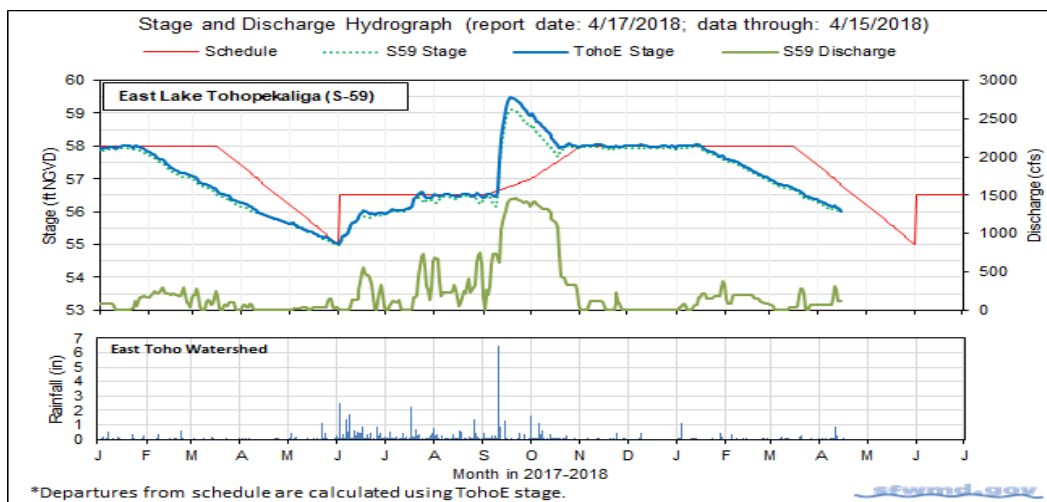


Figure 1.

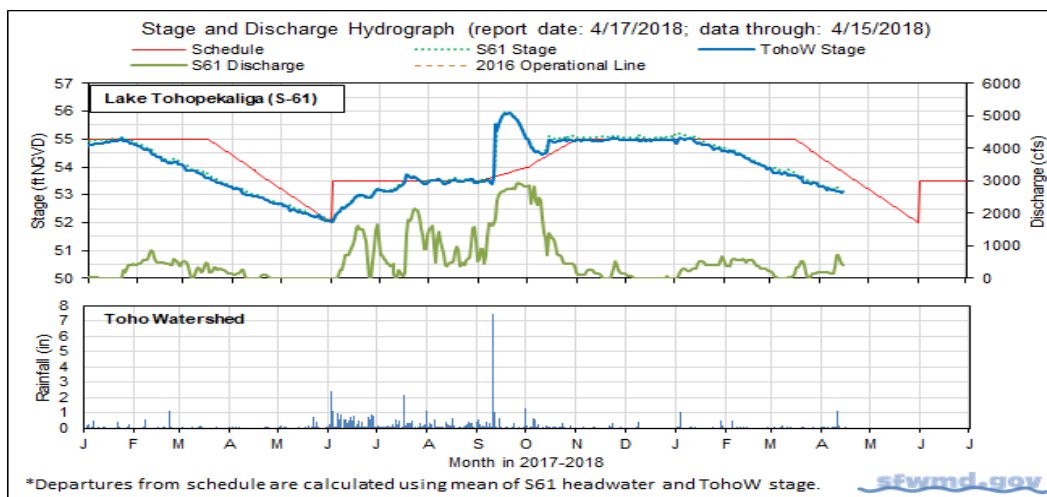


Figure 2.

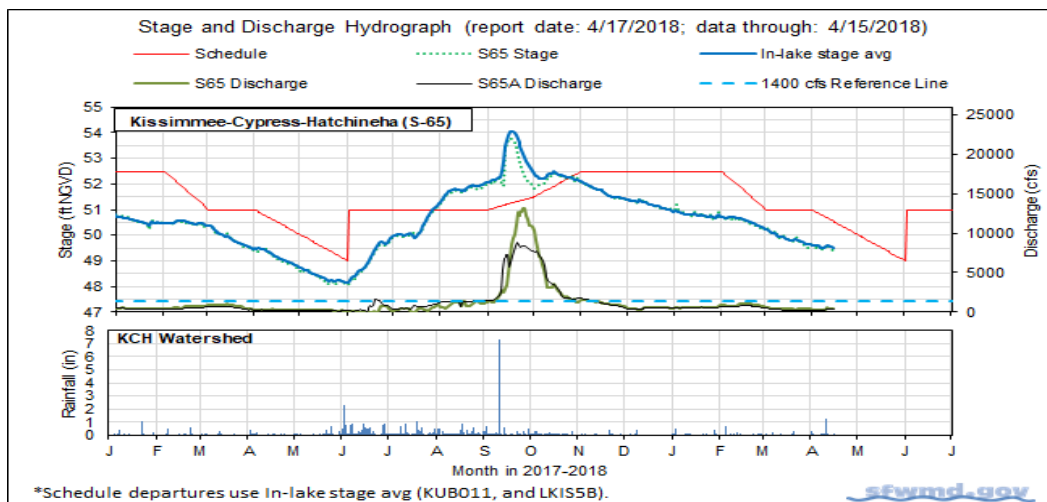


Figure 3.

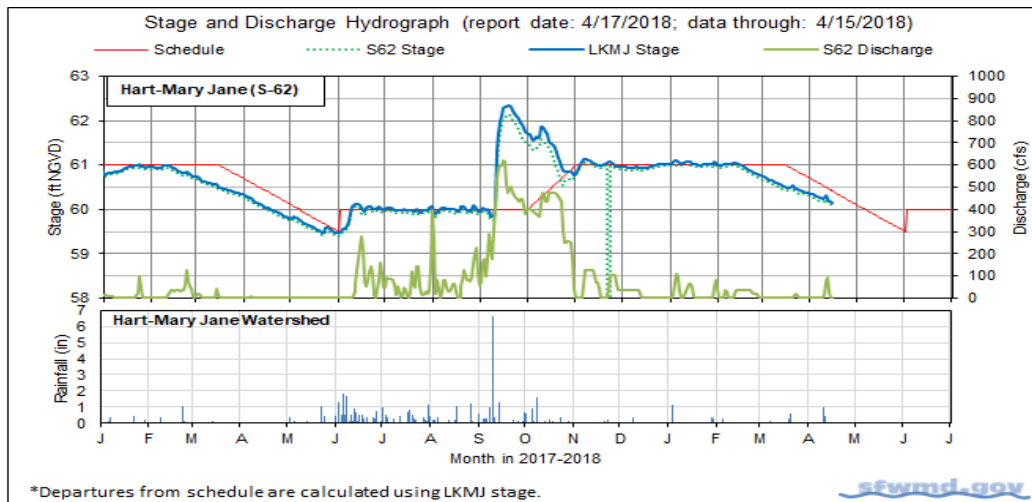


Figure 4.

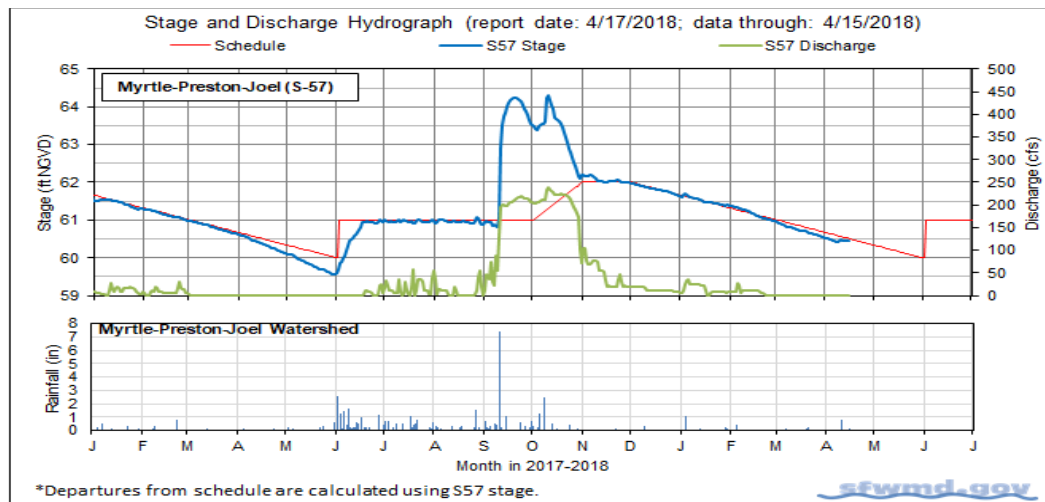


Figure 5.

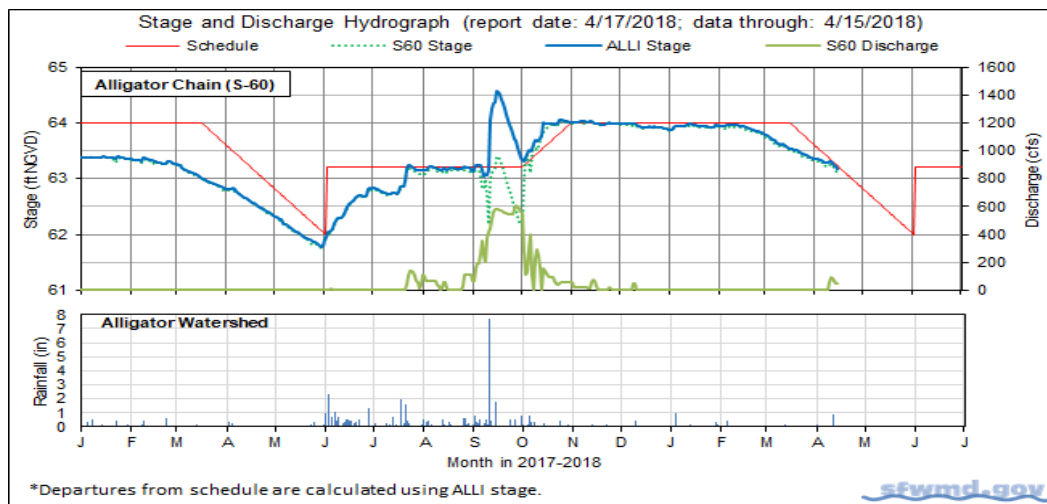


Figure 6.

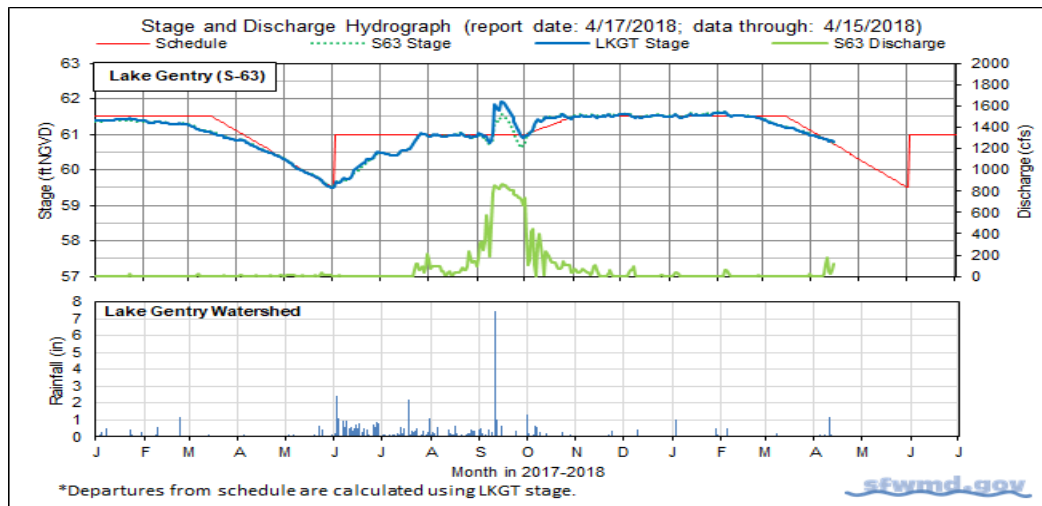


Figure 7.

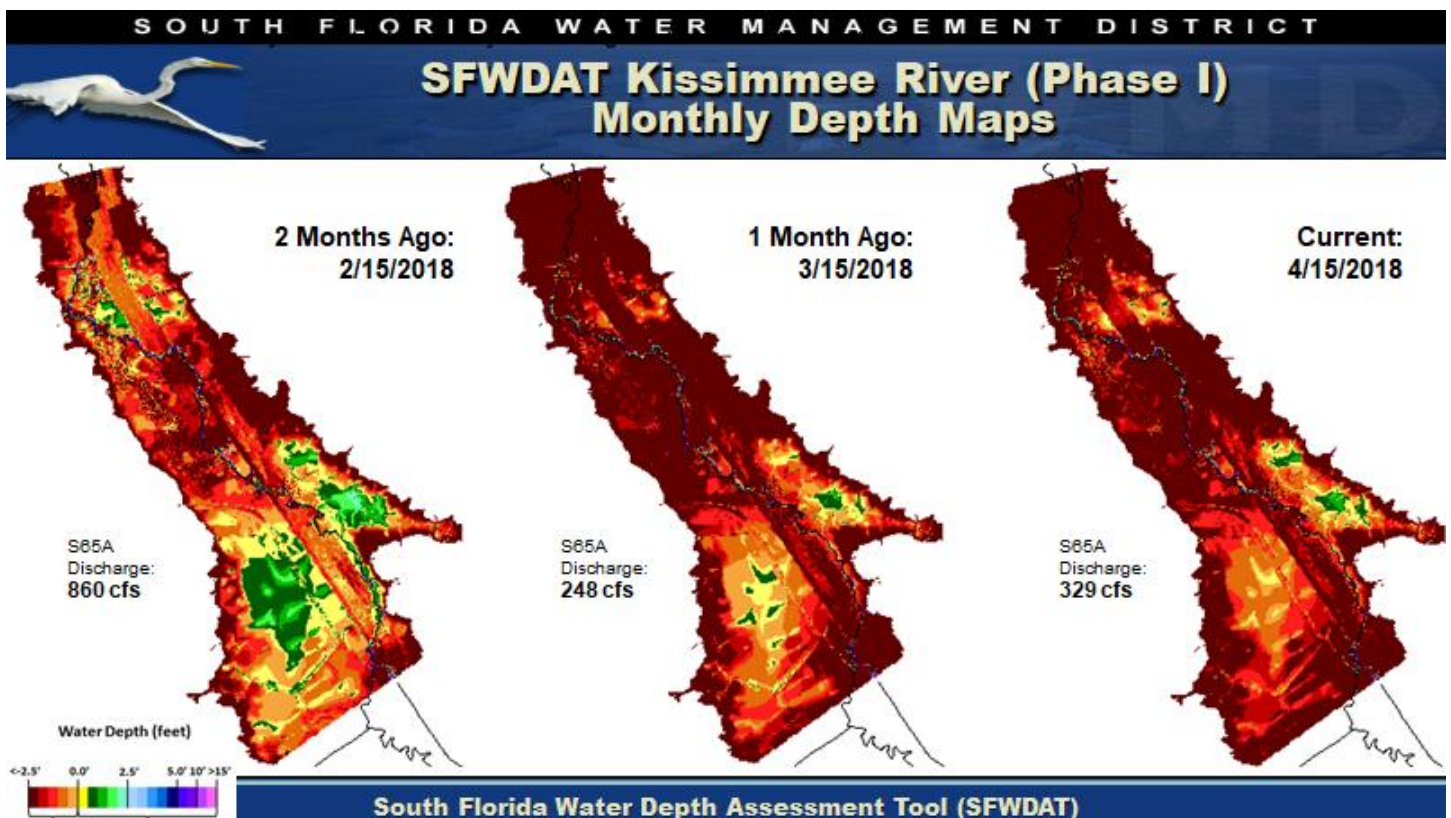
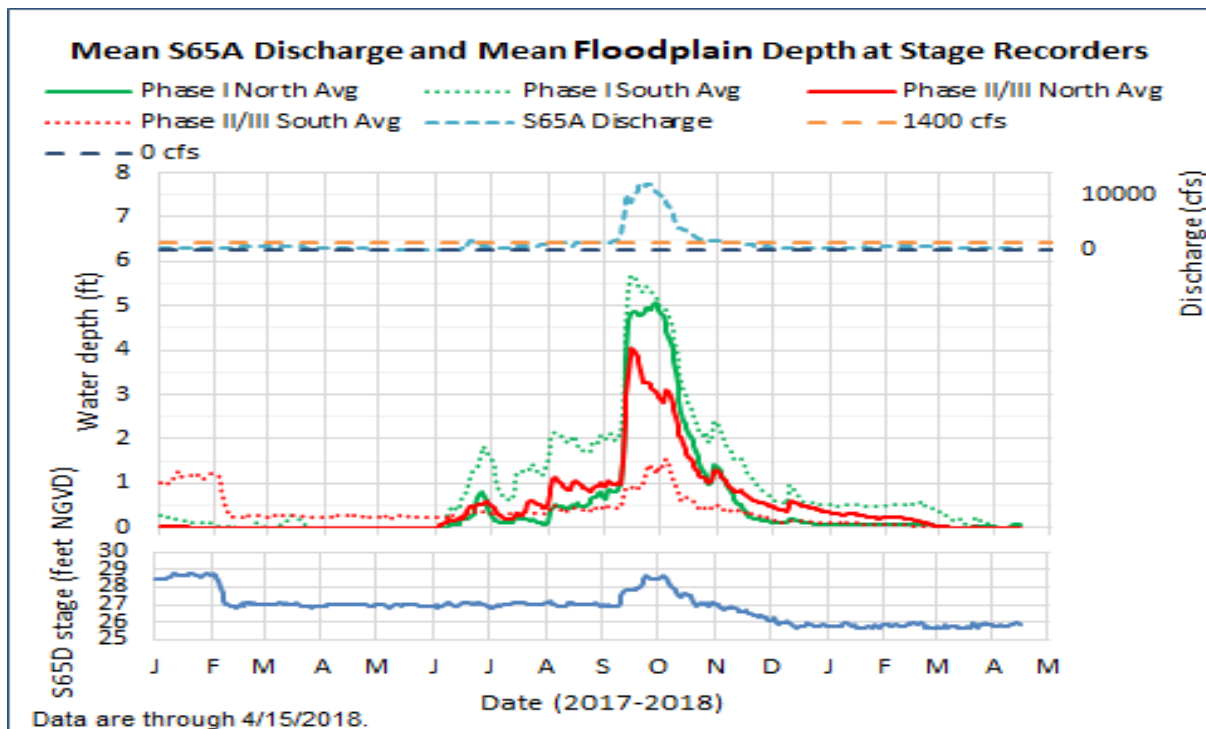
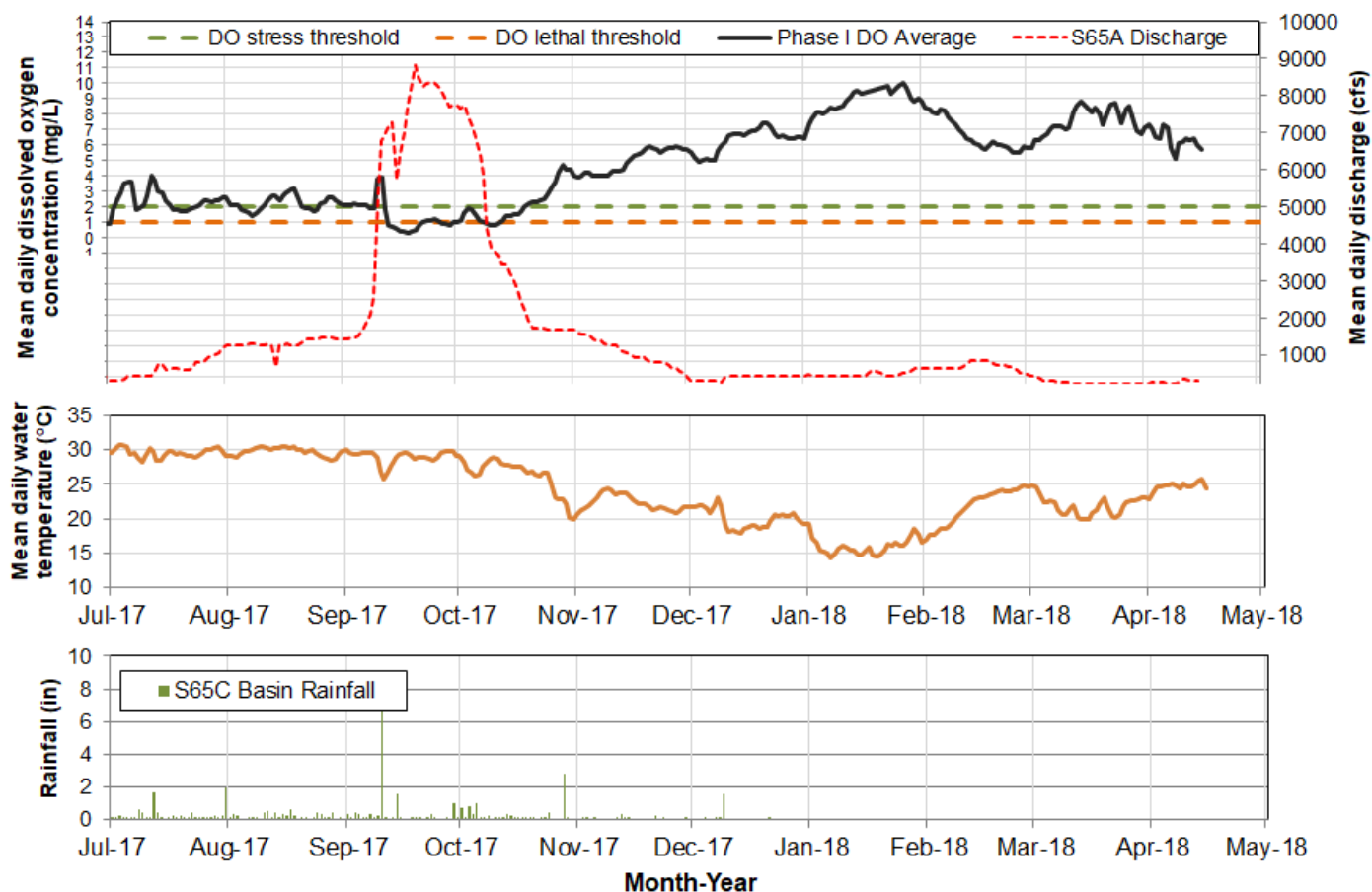


Figure 8. Phase I area floodplain water depths for this week, one month ago, and two months ago. Note that the WDAT color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to January 16, 2012.



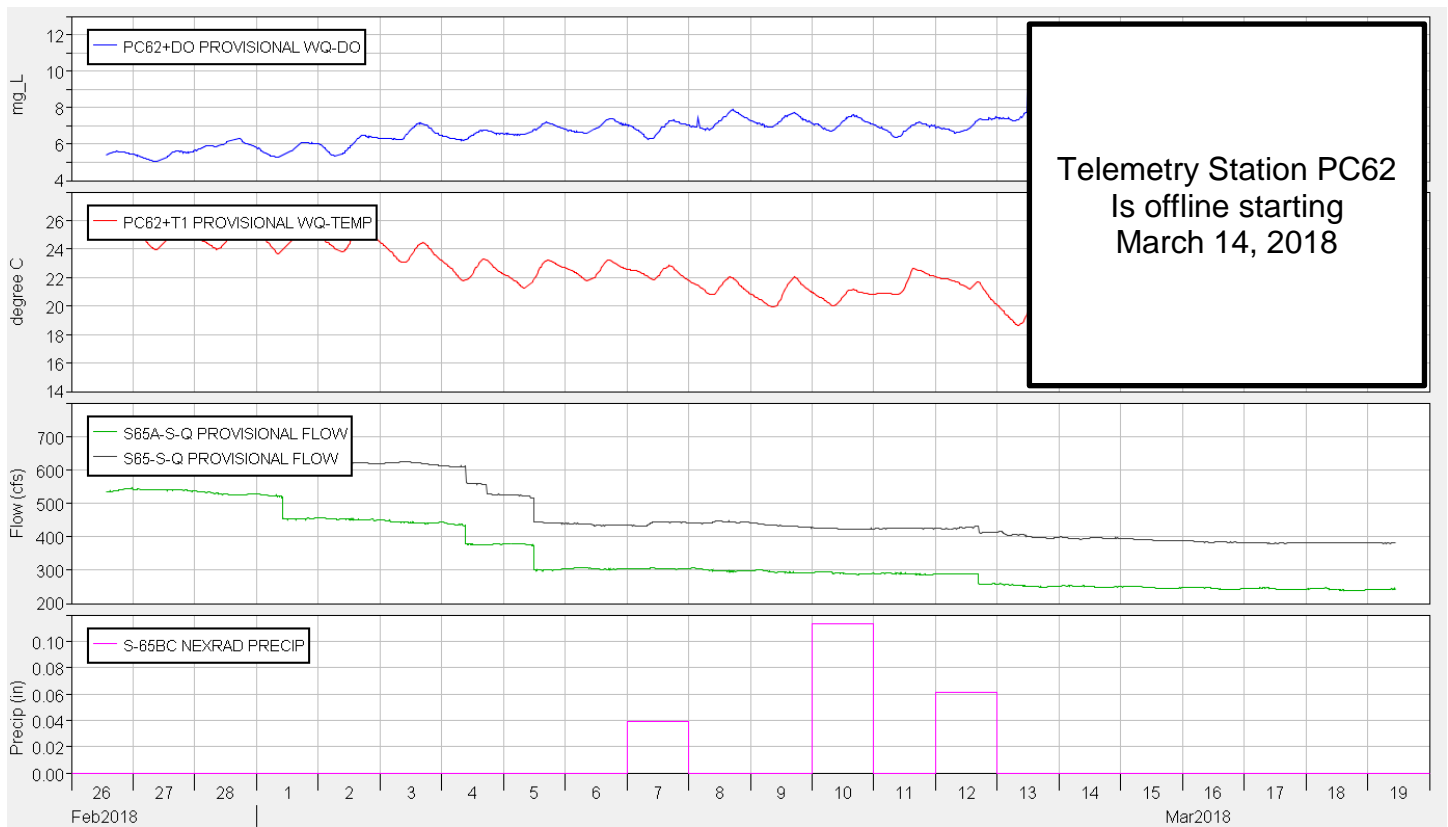


**Figure 9.** Mean water depth at stage recorders in the northern Phase I, southern Phase I, northern Phase II/III, and southern Phase II/III areas in relation to the S65A discharge and S65D headwater stage.



Report Date: 4/17/2018; data are through: 4/15/2018.

**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

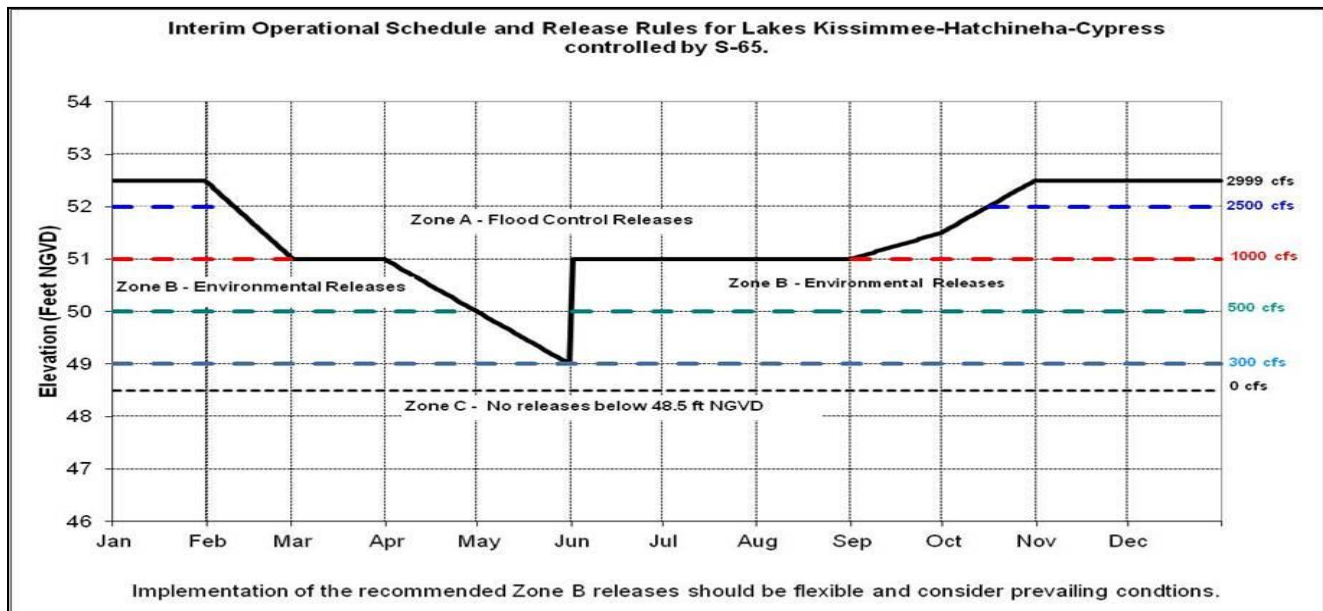
### Kissimmee Basin Adaptive Recommendations and Operational Actions

Date	Recommendation	Purpose	Outcome	Source
4/17/2018	No new recommendations.		N/A	
4/10/2018	No new recommendations.		N/A	
4/3/2018	No new recommendations.		N/A	
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	

## 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 13.41 feet NGVD for the period ending at midnight on April 16, 2018. 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). The Lake is now 0.90 feet lower than it was a month ago, 3.6 feet lower than its peak in mid-October, and 1.45 feet higher than a year ago (Figure 1). The Lake is now in the Base Flow sub-band (Figure 2). According to RAINДАР, 0.62 inches of rain fell over the Lake during the week April 10, 2018 – April 16, 2018 with most of the watershed receiving more rainfall, between 1.0 – 1.5 inches (Figure 3).

Average daily inflows to the Lake were slightly higher than previous week at 485 cfs vs 401 cfs, primarily due to slight increases in Kissimmee River discharges. Those discharges went from 296 cfs the previous week to 368 cfs this past week. The S-71 and S-72 structures and Fisheating Creek contributed a combined 118 average daily cfs, similar to the previous week.

Average daily outflows for the Lake decreased significantly from the previous week, primarily through decreases in flows south through the S-350 structures. Discharges went from 4,695 cfs the previous week to just 2,289 cfs this past week. Discharges through the S-77 decreased slightly from 1,090 cfs the previous week to 974 cfs this past week, while discharges through the S-308 were similar at 217 cfs. Discharges south through the S-350 structures decreased substantially, from an average of 3,126 cfs the previous week to 874 cfs this past week. Discharges to the L-8 canal via Culvert 10A declined slightly from the previous week, from 272 average daily cfs to 223 cfs. The corrected average daily evapotranspiration value for the week based on the L006 weather platform solar radiation data increased slightly to 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 3,000 acres in habitat with suitable foraging depths for long-legged wading birds from the previous week, with 32,335 acres of suitable depth on April 16. There was also a loss of roughly 2,400 acres of suitable foraging depths for short or long-legged wading birds, going from 18,572 acres the previous week to 16,110 acres this past week as foraging habitats continue to dry out (Figure 5). The April 12 survey found 8,130 foraging wading birds on the Lake, down just slightly from last year's mid-April survey, and up slightly from the last two surveys in March (Figure 6)

**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	368	0.2
S71 & 72	96	0.0
S84 & 84X	9	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	0	0.0
S3 P	0	0.0
S4 P	0	0.0
C5	0	0.0
Rainfall	1695	0.6
<b>Total</b>	<b>2180</b>	<b>0.8</b>

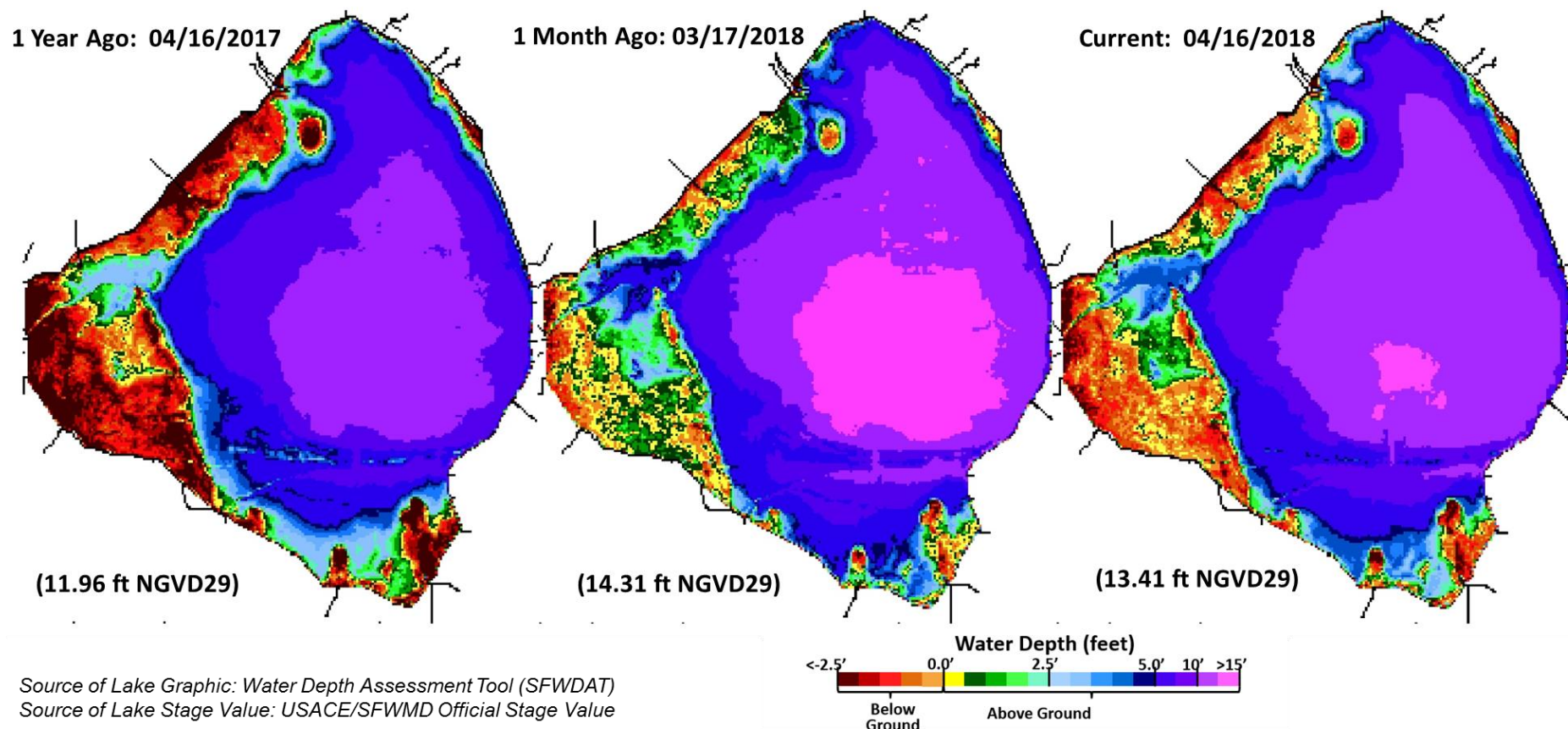
OUTFLOWS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)
S77	974	0.4
S308	217	0.1
S351	214	0.1
S352	192	0.1
S354	468	0.2
L8	223	0.1
ET	3197	1.4
<b>Total</b>	<b>5486</b>	<b>2.3</b>

PROVISIONAL DATA

### Water Management Recommendations

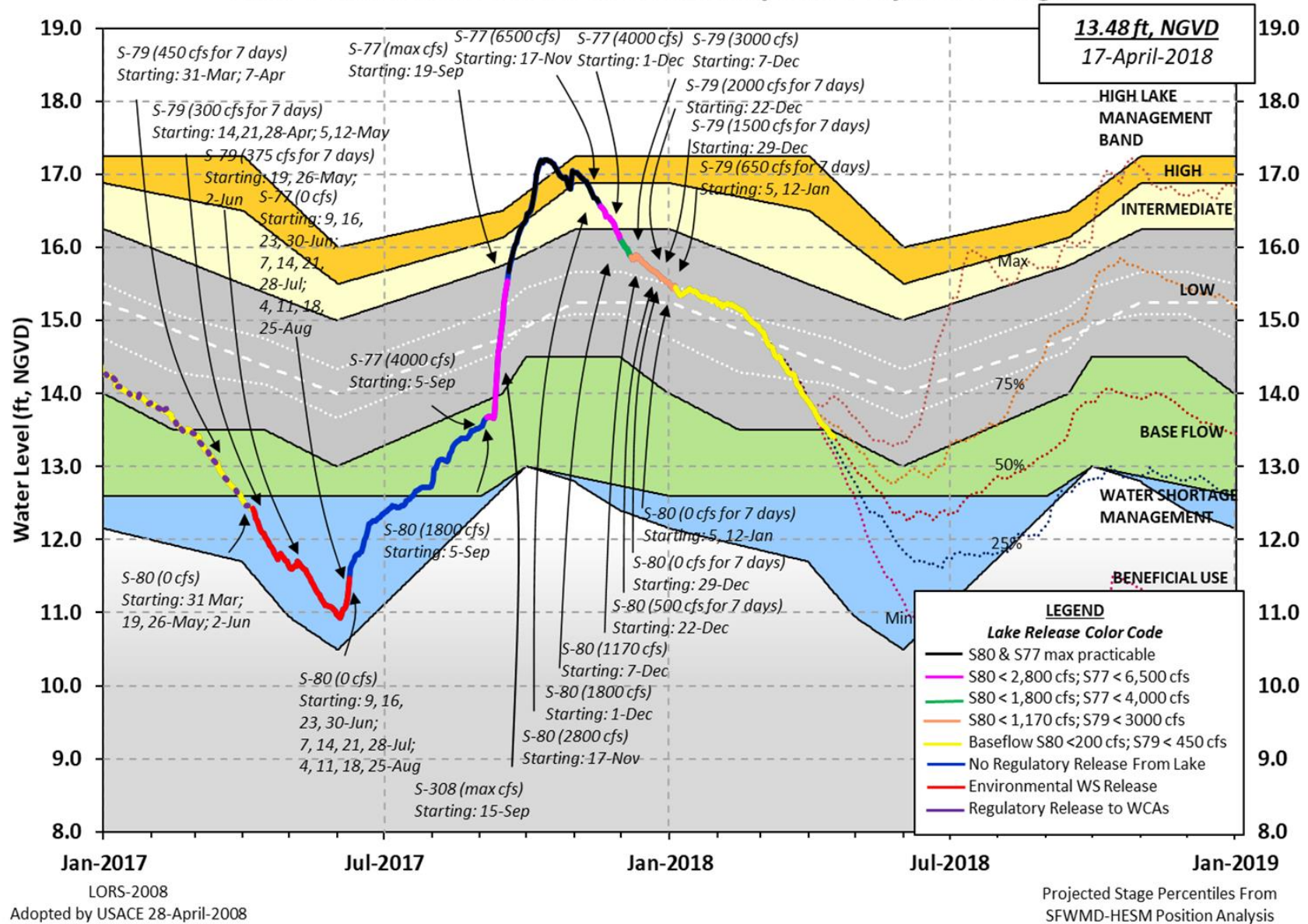
Lake Okeechobee stage is 13.41 feet NGVD having decreased 0.16 feet over the past week and 0.90 feet over the last month. Lake stages have receded approximately 1.75 feet over the past two months, a recession rate that is quickly drying available habitat around some wading bird colonies. However, fast recessions will hasten the return of light penetration to the sediments in the nearshore region for important vegetation recovery and help avoid higher stages in the summer that 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.





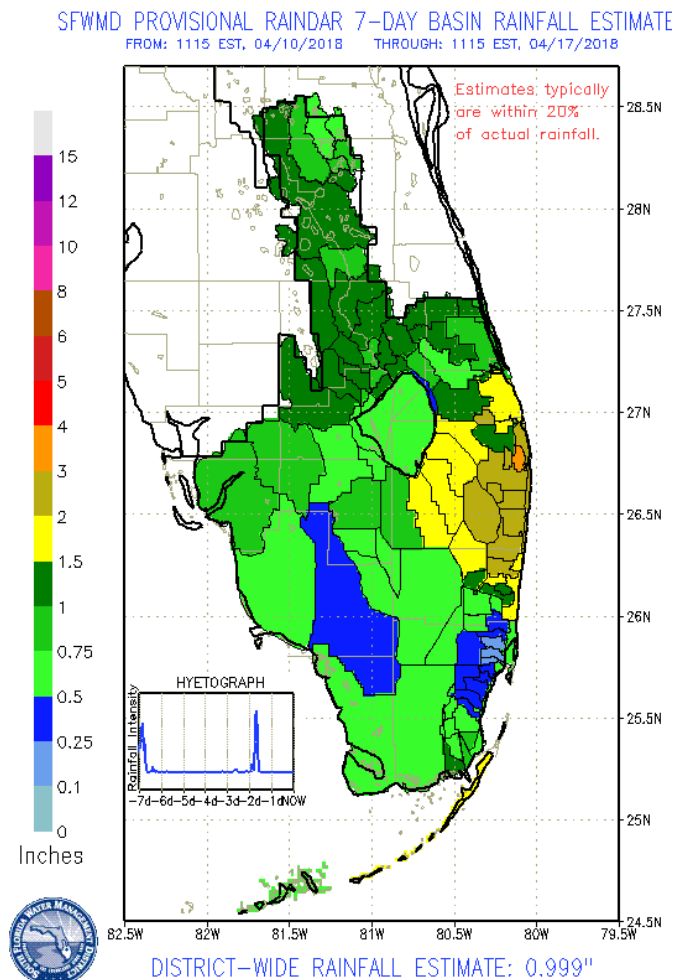
**Figure 1.** Water depth estimates on Lake Okeechobee based on the South Florida Water Depth Assessment Tool.

## Lake Okeechobee Water Level History and Projected Stages

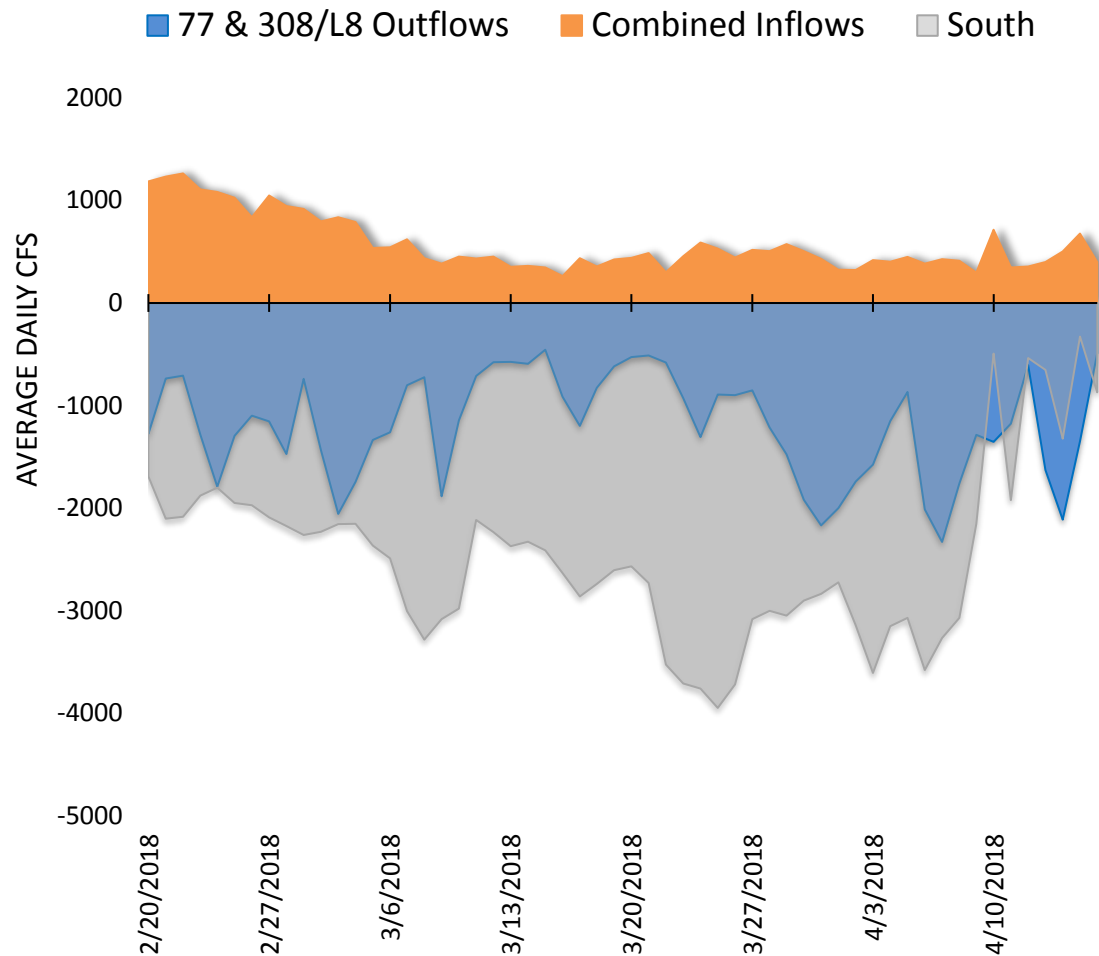


**Figure 2.** Recent Lake Okeechobee stage and releases, with projected stages based on a dynamic position analysis.

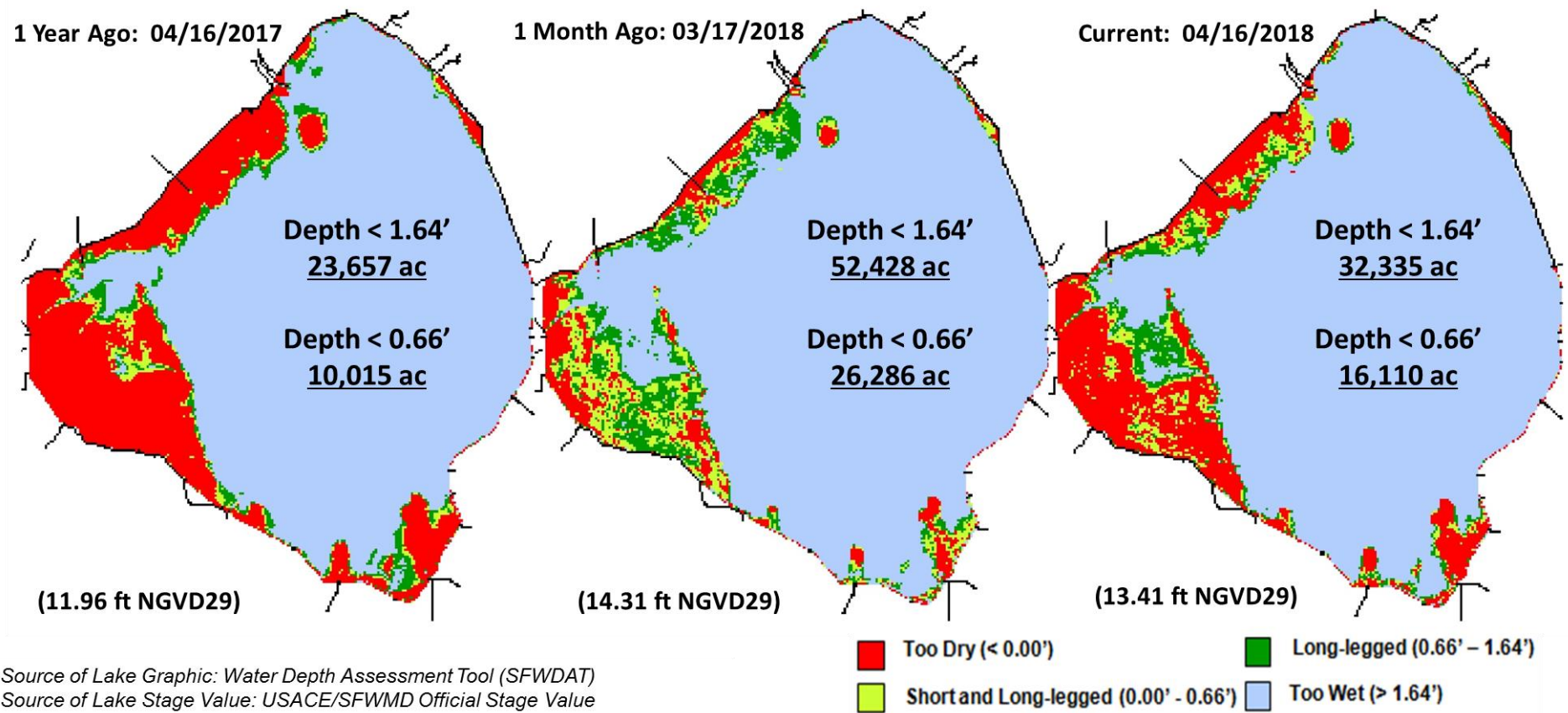




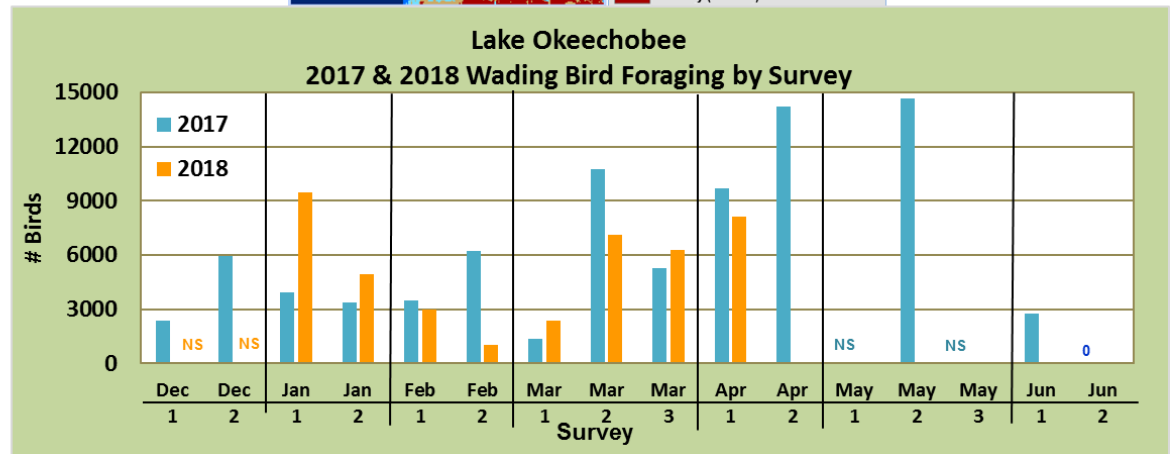
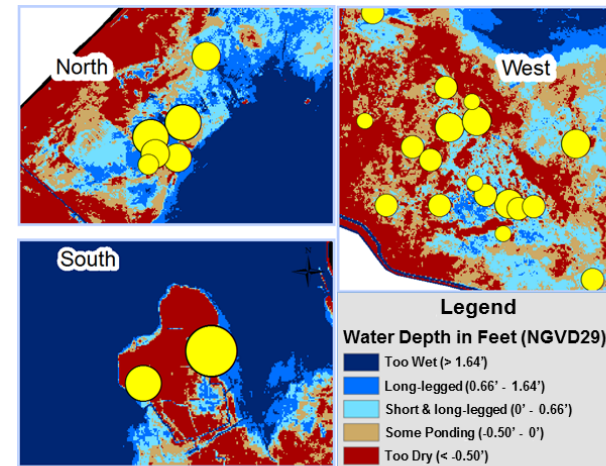
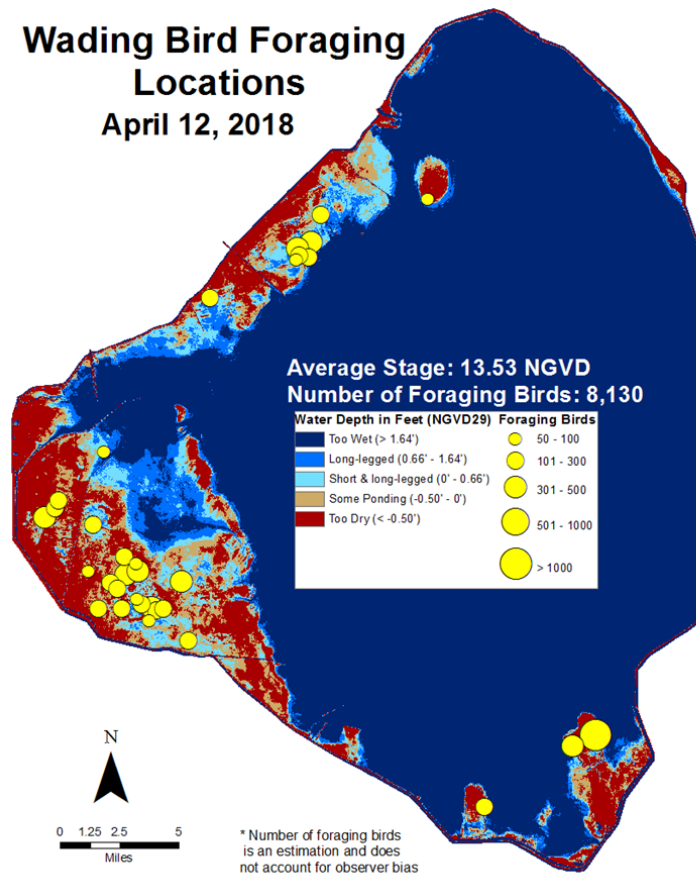
**Figure 3.** Rainfall estimates by basin.



**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.



**Figure 6.** Locations of foraging flocks of wading birds observed during a monitoring flight on April 12, 2018 are shown in yellow, with circle sizes representing the size of the flocks. Previous survey totals from this season and from 2017 are compared in the bar graph.

## LAKE ISTOKPOGA

Lake Istokpoga stage is 39.0 feet NGVD as of midnight April 16, 2018 and is currently 0.19 feet below its regulation schedule to accommodate construction on downstream structures (Figure 7). Average daily inflows to the lake from Josephine and Arbuckle Creeks for the week April 10 – April 16, 2018 increased slightly from the previous week, going from 68 cfs to 92 cfs this past week. Discharges via the S68 and S68X structures were again minimal, at just 15 average daily cfs. According to RAINDAR, approximately 1.17 inches of rain fell in the Lake Istokpoga basin over the past week.

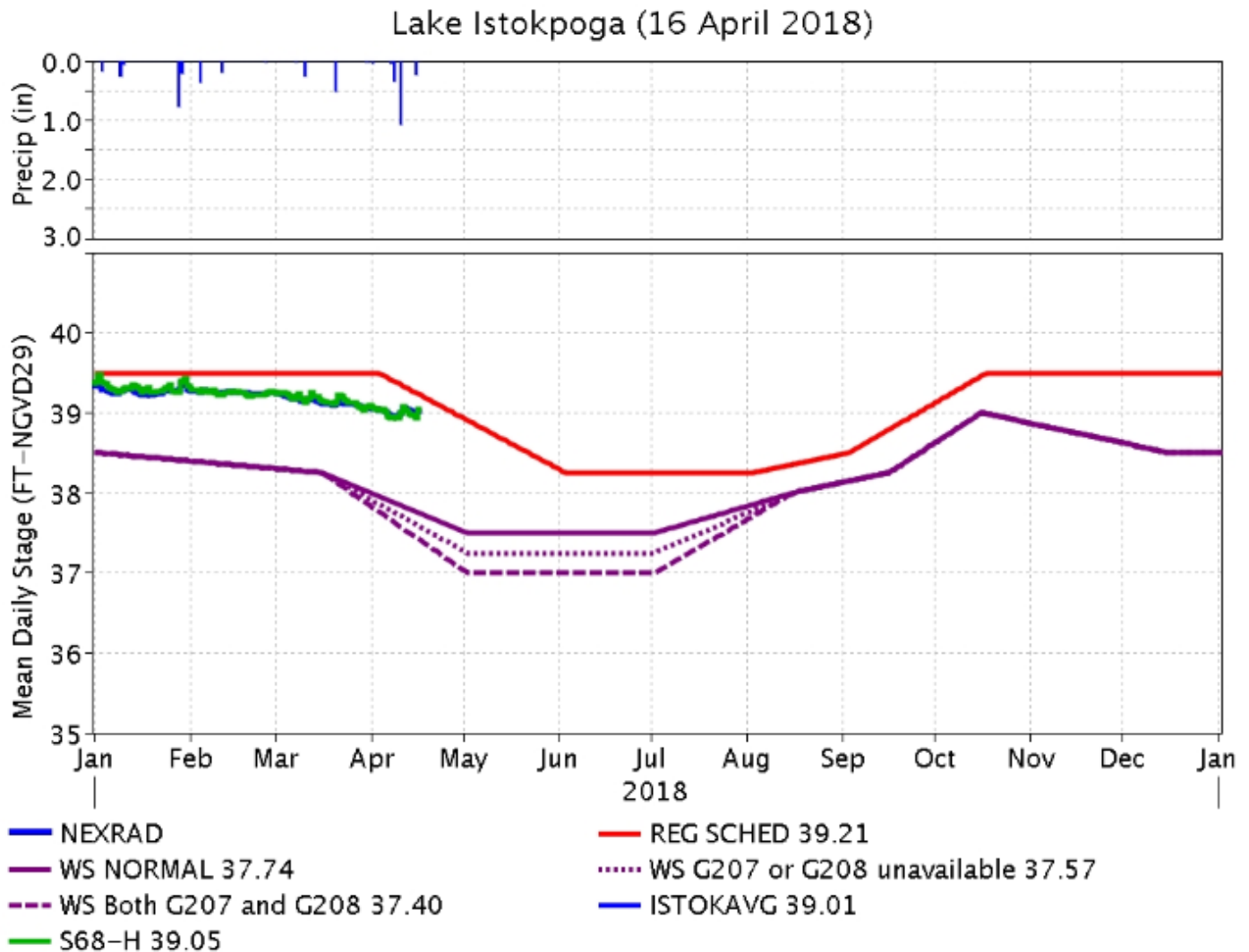


Figure 7. Recent stages on Lake Istokpoga.

## ESTUARIES

### St. Lucie Estuary:

Last week total inflow to the St. Lucie Estuary averaged about 349 cfs (Figures 1 and 2) and last month inflow averaged about 217 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	239
S-80	0
S-308	217
S-49 on C-24	0
S-97 on C-23	34
Gordy Rd. structure on Ten Mile Creek	76

Over the past week, salinity slightly decreased 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 estimated to be 26.4. 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)	<b>24.5</b> (24.8)	<b>25.4</b> (26.4)	NA <sup>1</sup>
US1 Bridge	<b>NR</b> (NR)	<b>26.9</b> (27.5)	10.0-26.0
A1A Bridge	<b>31.2</b> (31.4)	<b>32.4</b> (32.7)	NA <sup>1</sup>

<sup>1</sup>Envelope not applicable, NR=not reporting

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	2.67	3.99 - 10.74	0.99	0.34	1.88
SF	1.57	3.07 - 8.76	6.62	5.12	8.56
NF	1.97	2.76 - 9.20	6.65	5.47	8.66
ME	1.85	2.61 - 7.99	6.51	5.70	8.06
IRL-SLE	3.60	0.30 - 3.22	6.45	5.99	7.04

NOAA satellite imagery indicates no visible cyanobacteria bloom potential in the St. Lucie Estuary this week (Figure 6).

### Caloosahatchee Estuary:

Last week total inflow to the Caloosahatchee Estuary averaged about 814 cfs (Figures 7 and 8) and last month inflow averaged about 763 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	919
S-78	597
S-79	672
Tidal Basin Inflow	142

Over the past week, salinity slightly decreased throughout the estuary (Table 5, Figures 9 & 10). The seven-day average salinity values are in the good range for adult eastern oysters at Cape Coral and in the fair range at Shell Point (Figure 11). Salinity data were not available at Sanibel. The 30-day moving average surface salinity is 4.3 at Val I-75 and 12.6 at Ft. Myers. With no flow through S-79, daily salinity at Val I-75 is forecast in two weeks to be 8.4, and the 30-day moving average is forecast to be 5.7 (Figure 13). 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)	<b>2.9</b> (3.4)	<b>3.2</b> (3.6)	NA <sup>1</sup>
*Val I75	<b>4.1</b> (4.8)	<b>7.3</b> (7.9)	0.0-5.0 <sup>2</sup>
Ft. Myers Yacht Basin	<b>12.3</b> (13.3)	<b>14.1</b> (14.8)	NA
Cape Coral	<b>22.1</b> (22.4)	<b>22.3</b> (22.6)	10.0-30.0
Shell Point	<b>30.7</b> (31.4)	<b>29.4</b> (30.6)	10.0-30.0
Sanibel	<b>NR</b> <sup>3</sup> (NR)	<b>NR</b> (NR)	10.0-30.0

<sup>1</sup>Envelope not applicable, <sup>2</sup>Envelope is based on a 30-day average, and <sup>3</sup>Not 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)	5.02 – 15.42	6.11 – 26.27	1.25 – 73.39
Dissolved Oxygen (mg/l)	4.49 – 7.73	4.43 – 7.63	4.27 – 11.19

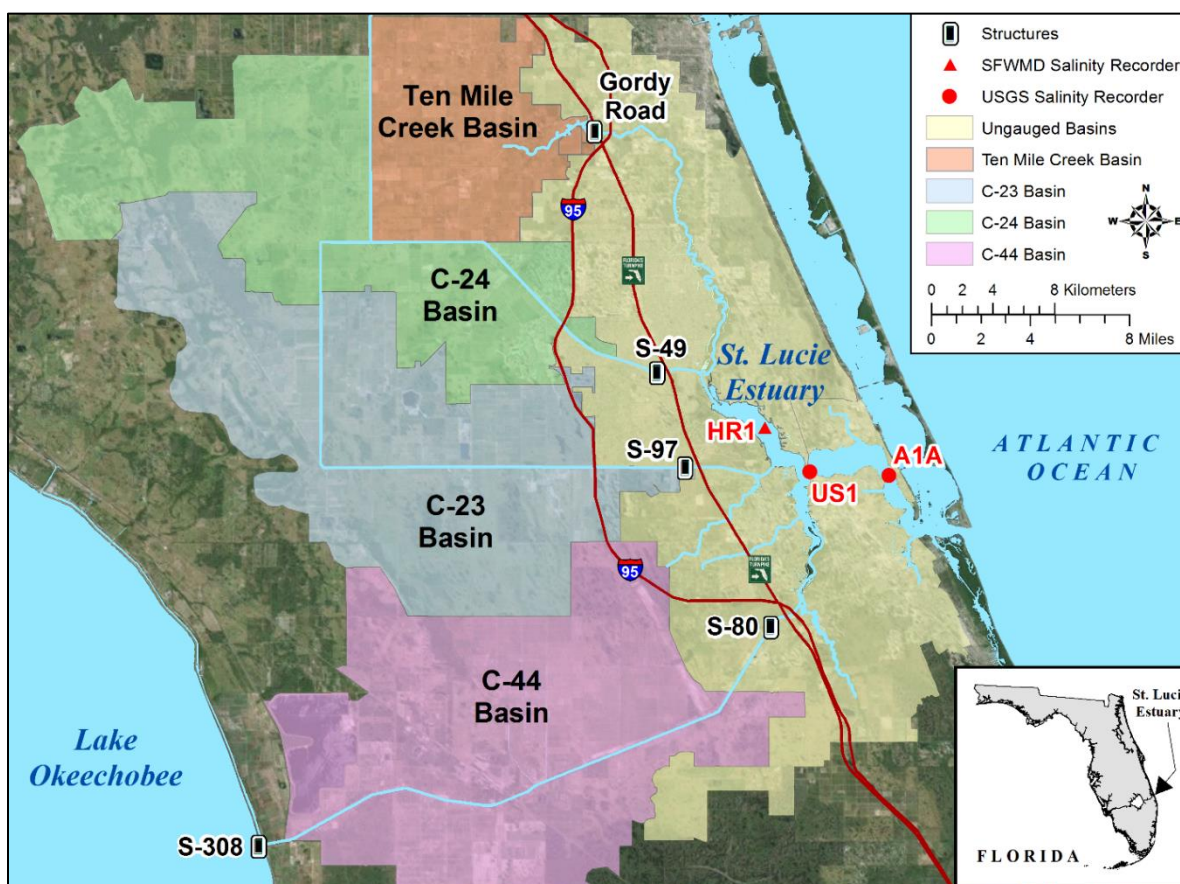


The Florida Fish and Wildlife Research Institute reported on April 13, 2018, that *Karenia brevis*, the Florida red tide dinoflagellate, was observed at very low to medium concentrations in 10 samples collected from Lee County. Fish kills and respiratory irritation were reported in Lee County over the past week.

NOAA satellite imagery indicates low to medium cyanobacterial bloom potential this week in a few locations in the Caloosahatchee Estuary between Ft. Myers and Cape Coral (Figure 12).

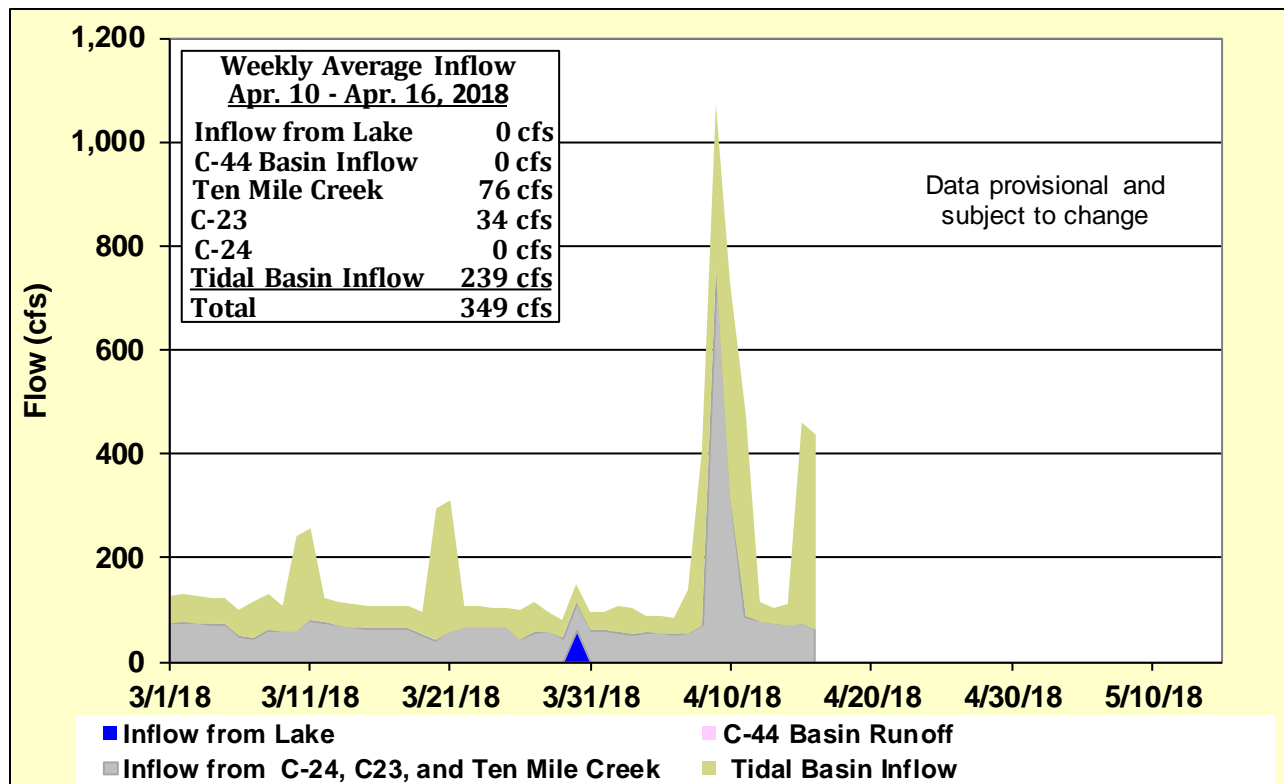
### **Water Management Recommendations**

Lake stage is in the Base Flow Sub-Band of 2008 LORS. Tributary hydrological conditions are dry. The 2008 LORS recommends up to 450 cfs at S-79 and up to 200 cfs at S-80. The District recommends that the USACE follow the 2008 LORS schedule.

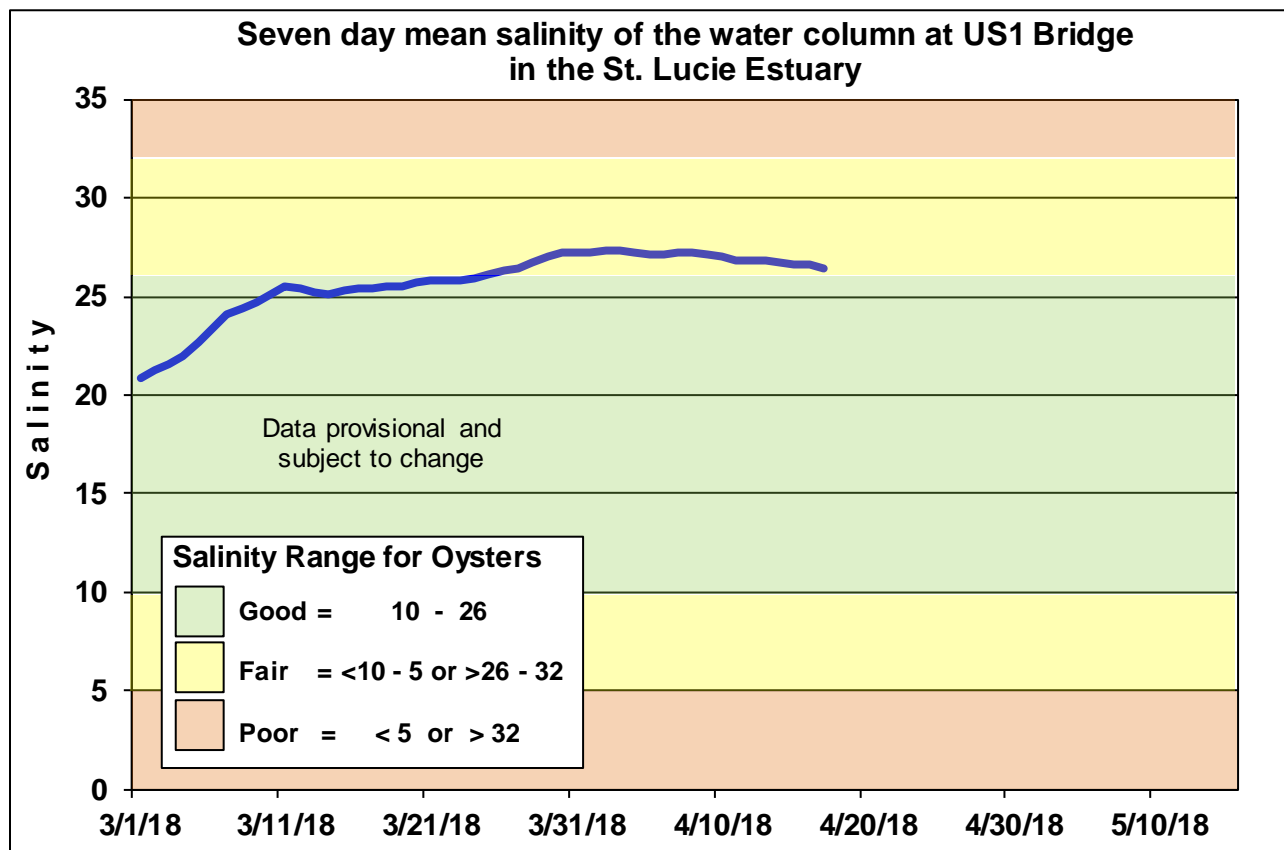


**Figure 1.** Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

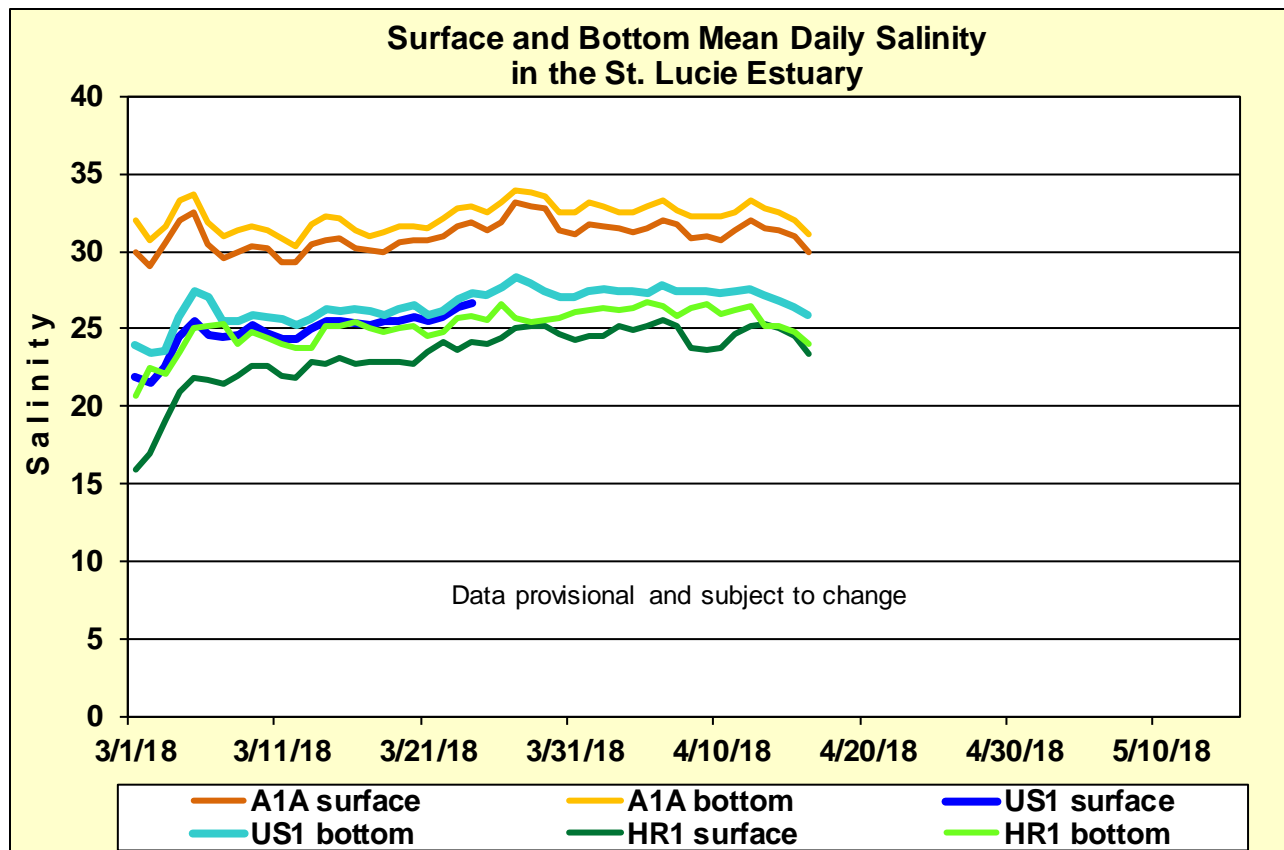




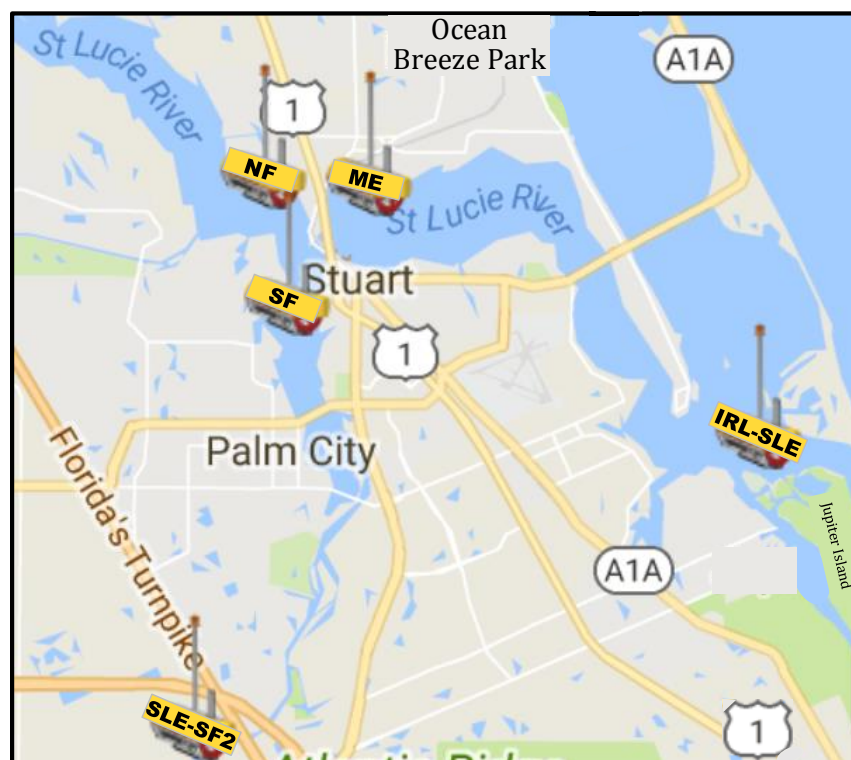
**Figure 2.** Estimated surface freshwater inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basins into the St. Lucie Estuary.



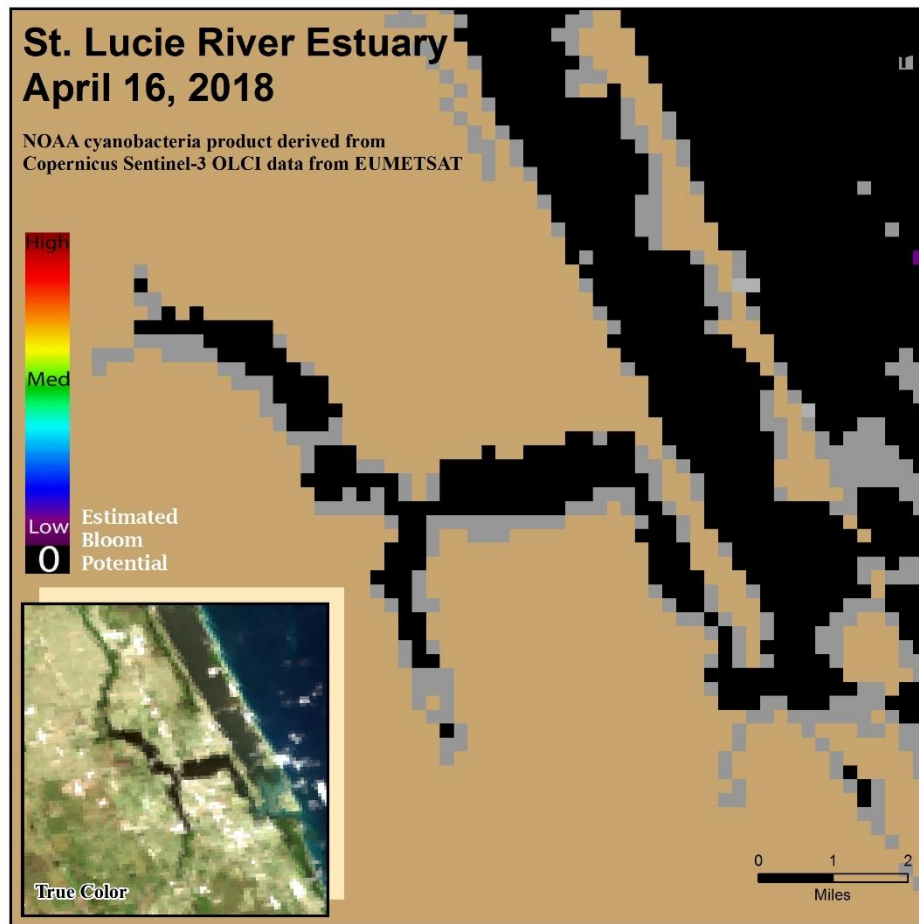
**Figure 3.** Seven-day mean salinity of the water column at the US1 Bridge.



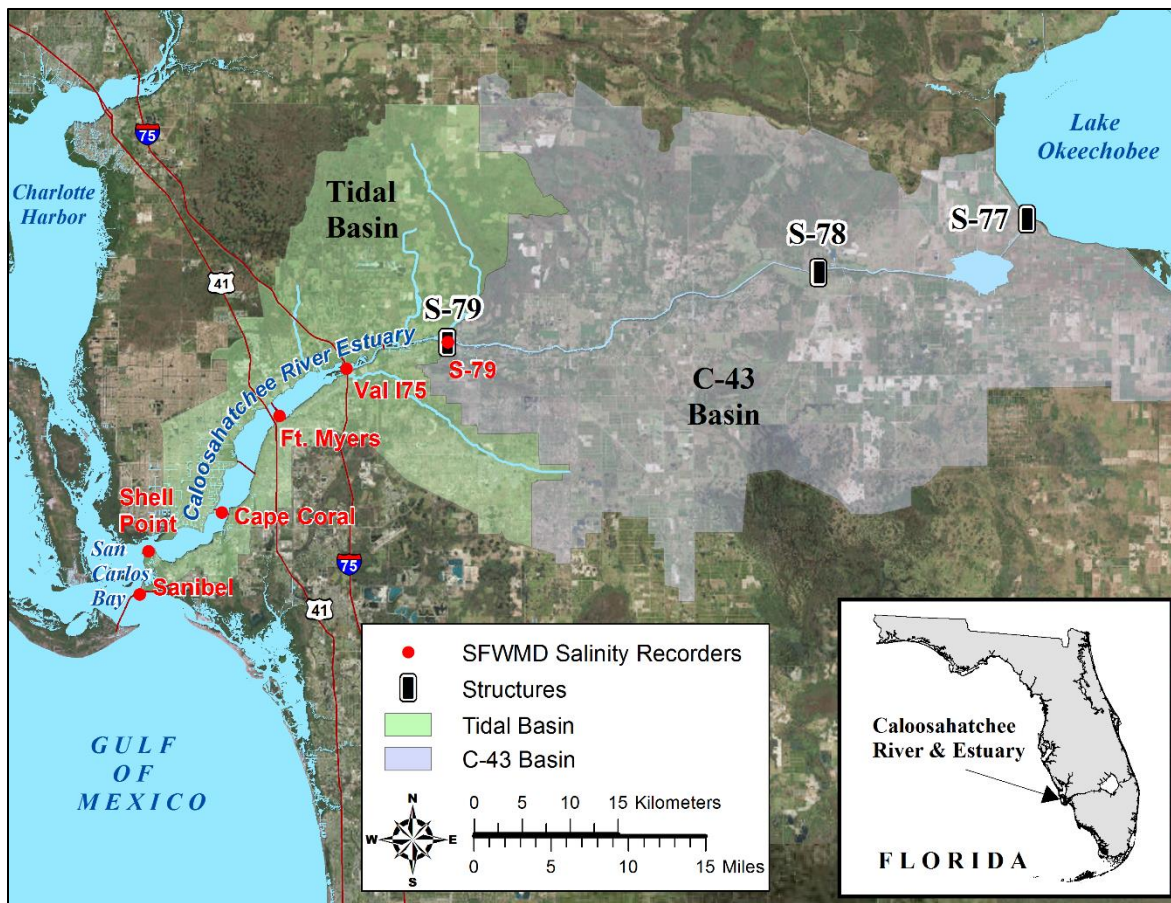
**Figure 4.** Daily mean salinity at the A1A, US1 and estimated HR1 stations.



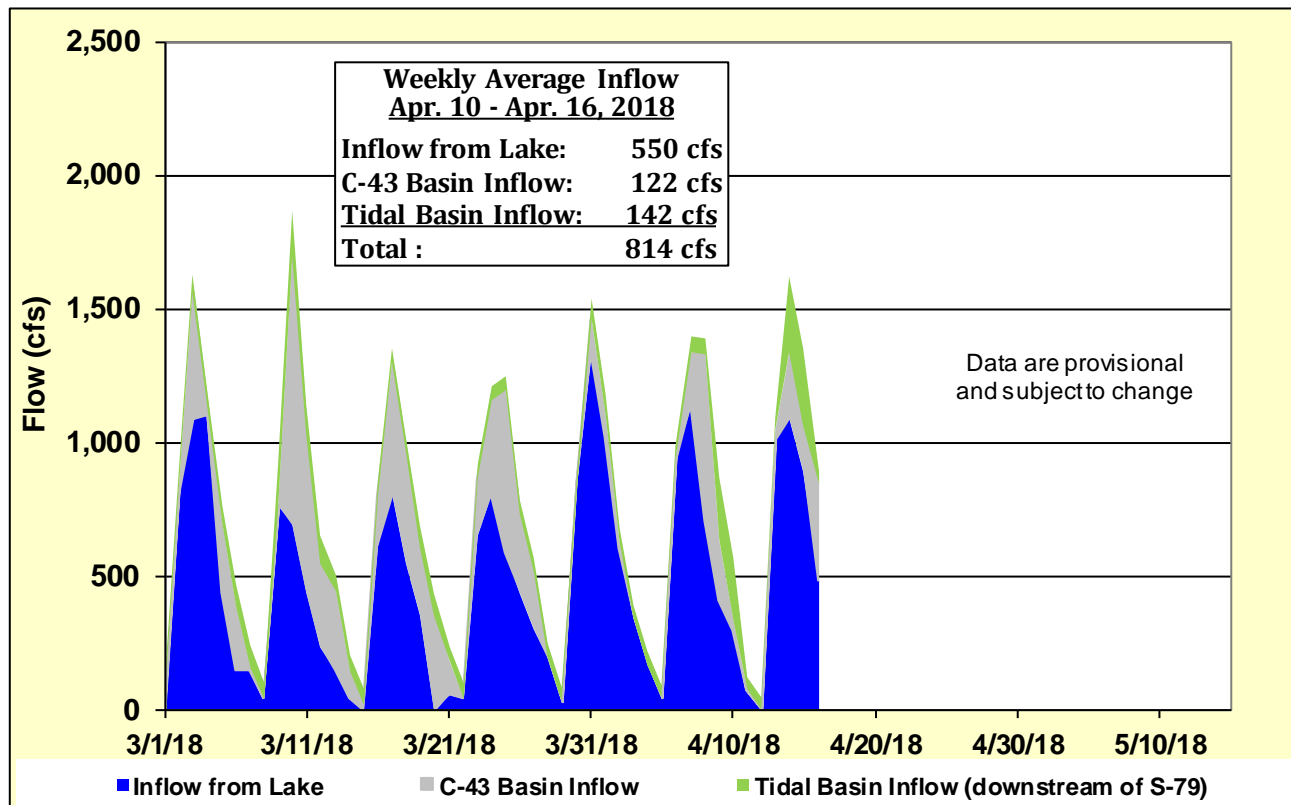
**Figure 5.** Location of FAU-HBOI LOBO water quality stations in the St. Lucie Estuary.



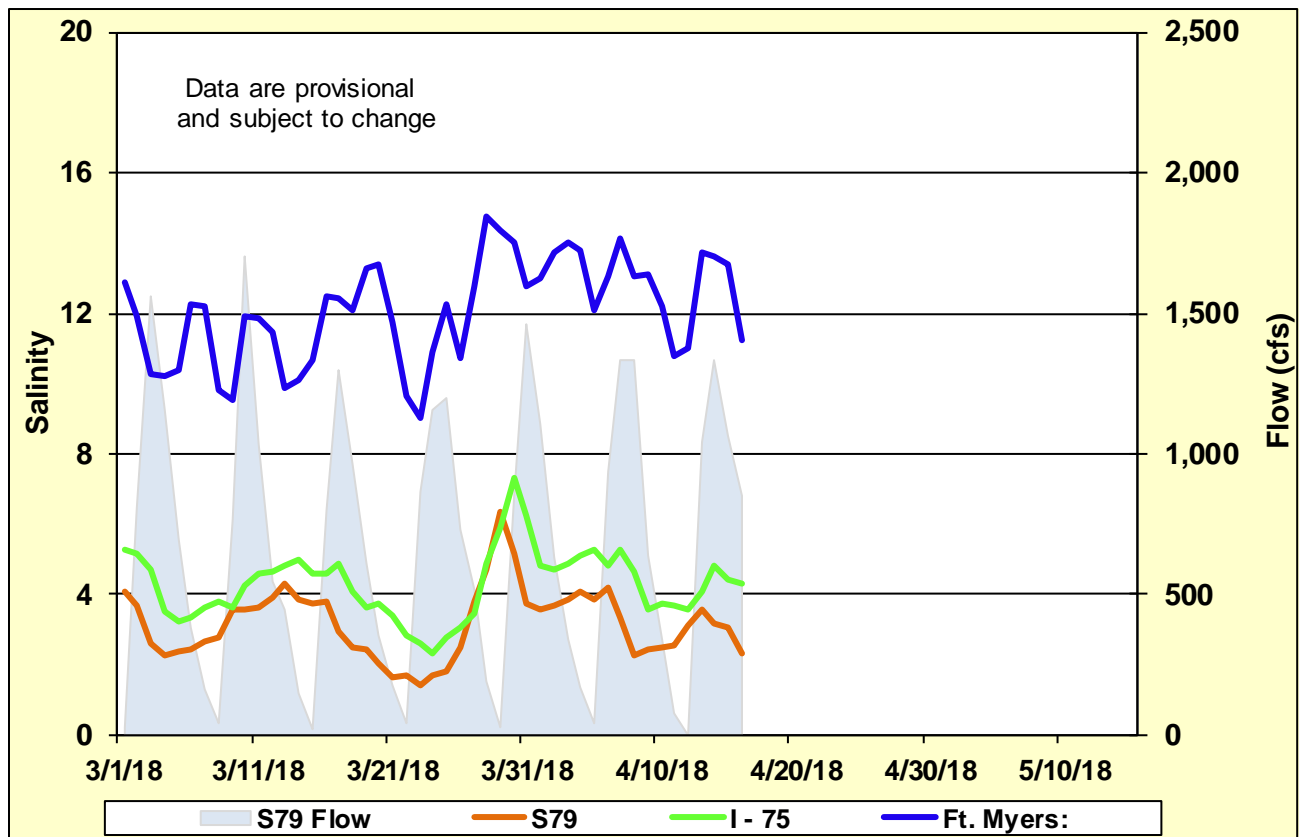
**Figure 6.** Sentinel 3a Satellite imagery provided by NOAA uses Ocean and Land Color Instrument (OLCI) to estimate cyanobacteria bloom potential in St. Lucie Estuary.



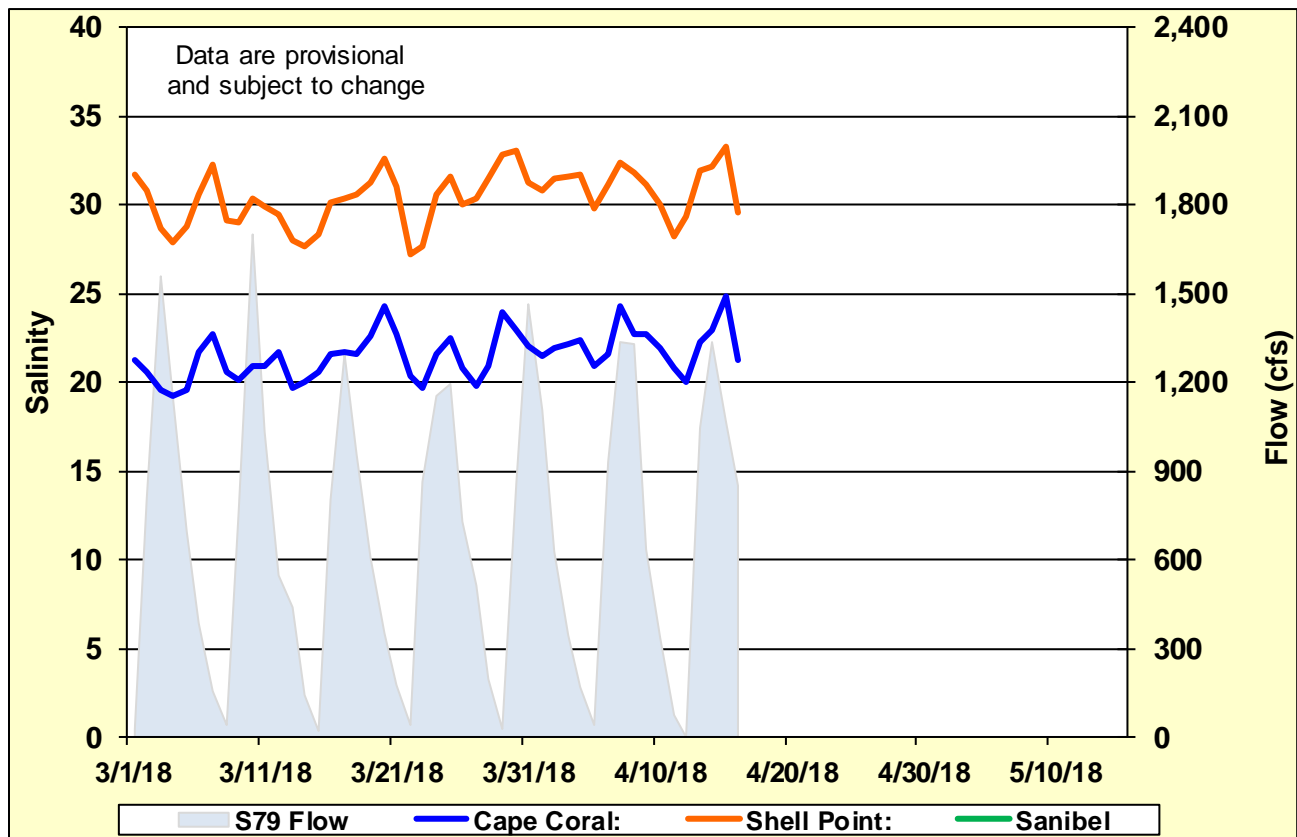
**Figure 7.** Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.



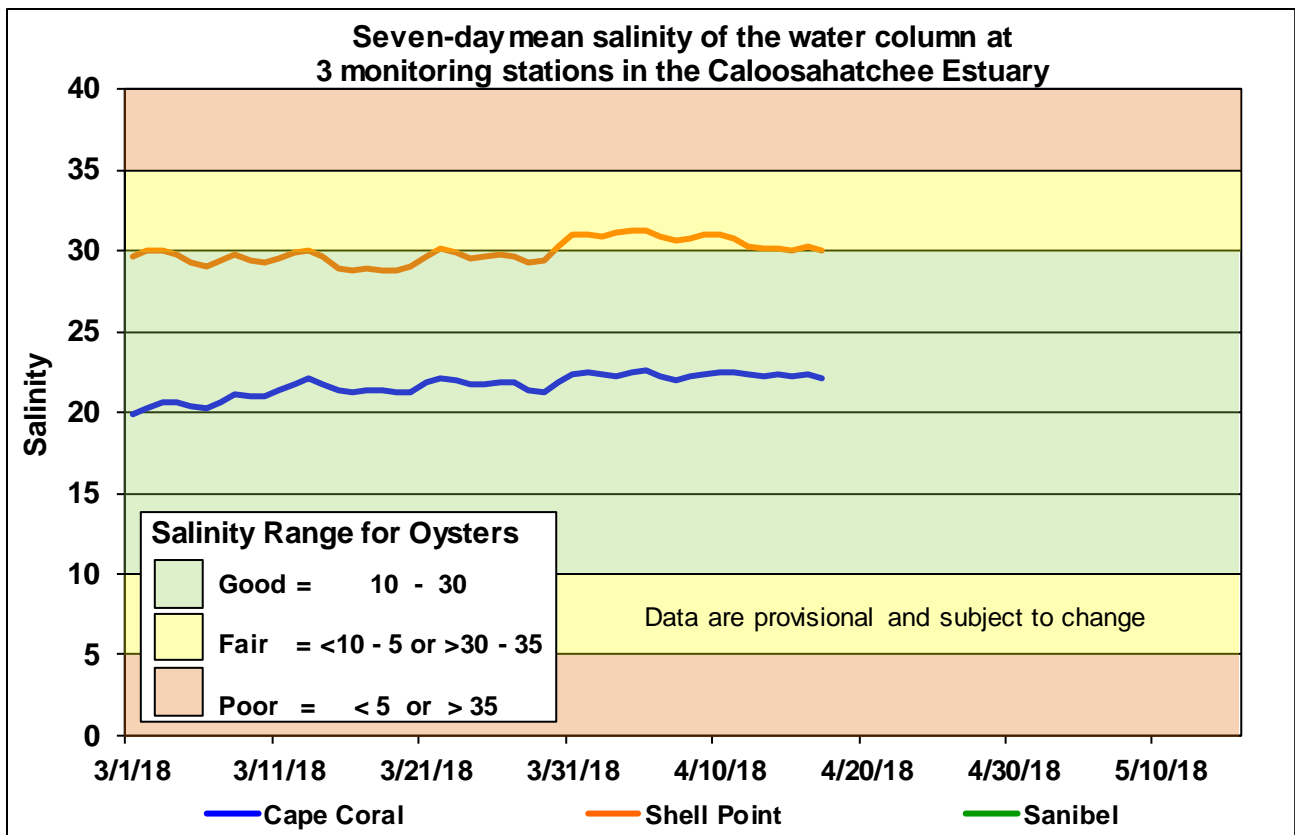
**Figure 8.** Freshwater inflows from Lake Okeechobee, runoff from the C-43 basin, and tributaries in the tidal basin into the Caloosahatchee River Estuary.



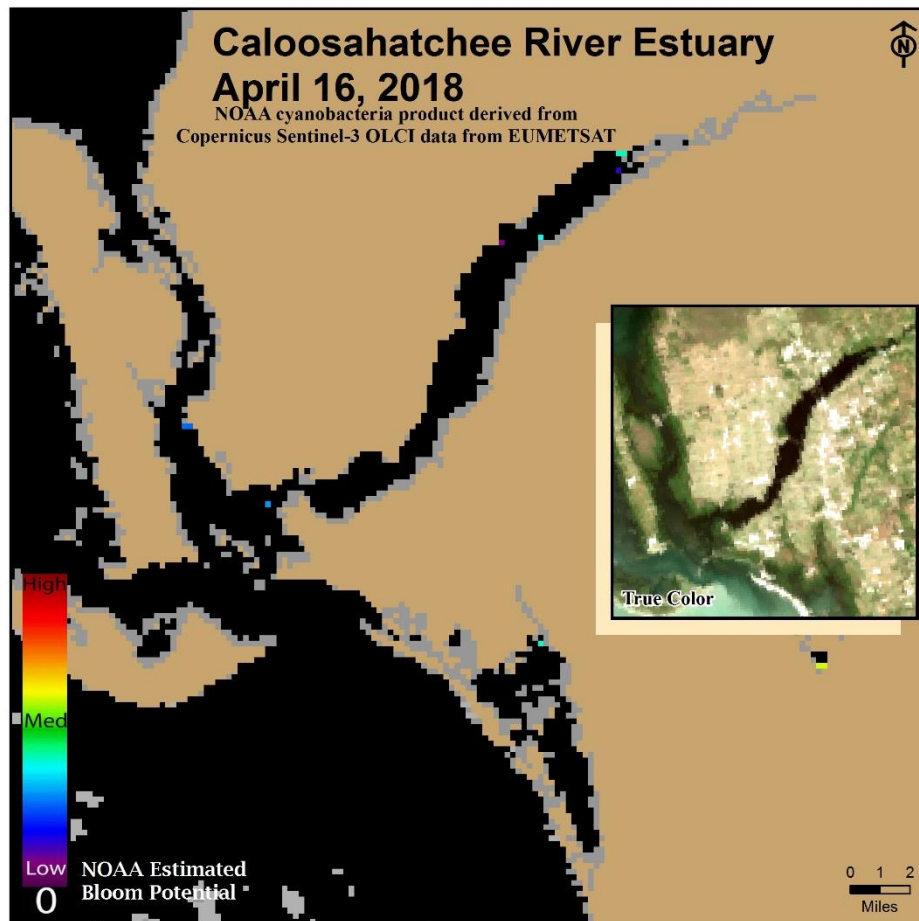
**Figure 9.** Daily mean flows at S-79 and salinity at upper estuary monitoring stations.



**Figure 10.** Daily mean flows at S-79 and salinity at lower estuary stations.

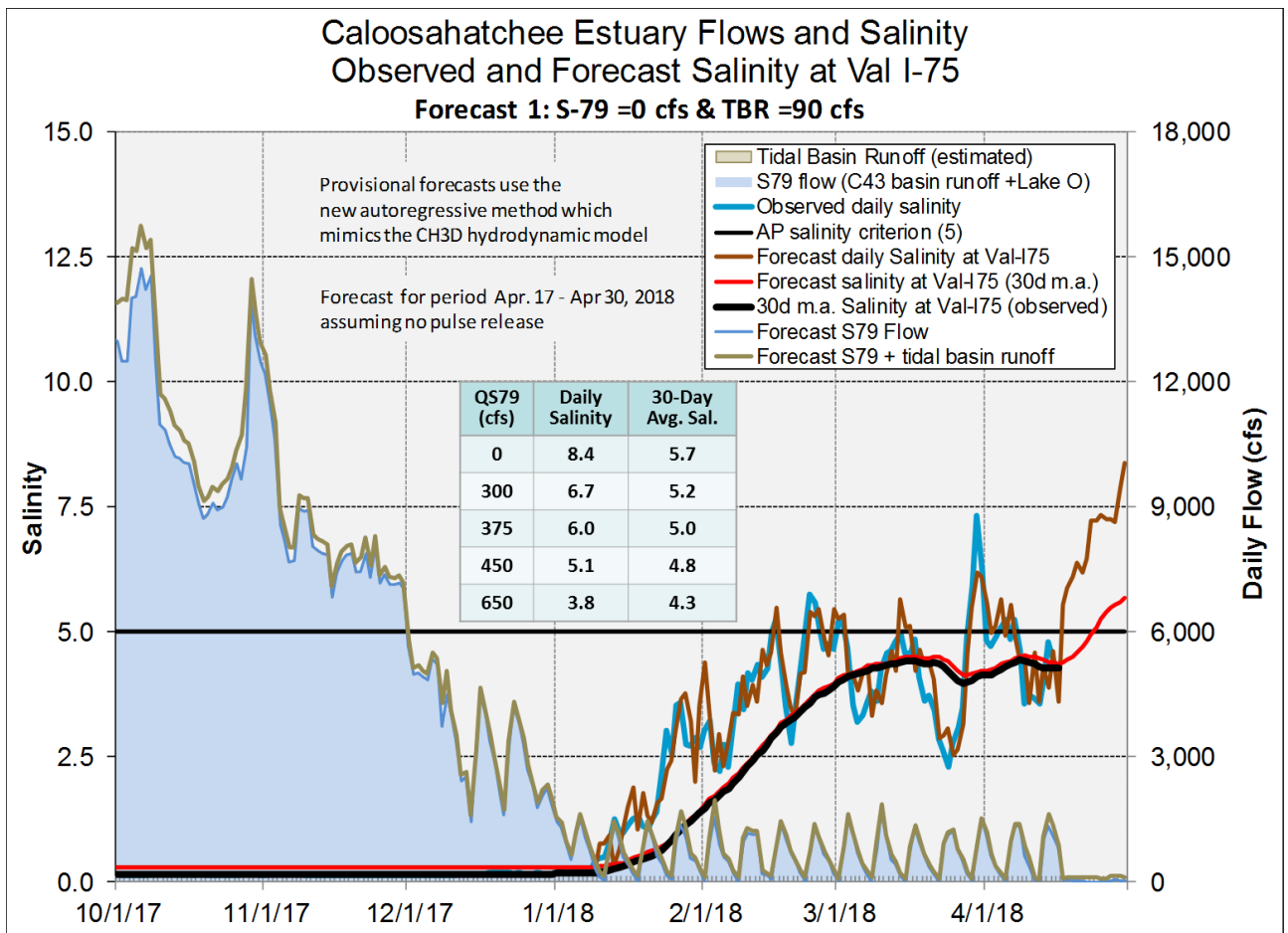


**Figure 11.** Seven-day mean salinity at Cape Coral Bridge, Shell Point, and Sanibel Bridge monitoring stations.



**Figure 12.** Sentinel 3a Satellite imagery provided by NOAA uses Ocean and Land Color Instrument (OLCI) to estimate cyanobacteria bloom potential in St. Lucie Estuary.





**Figure 13.** 14-day salinity forecast at Val I-75 assuming no releases at S-79.

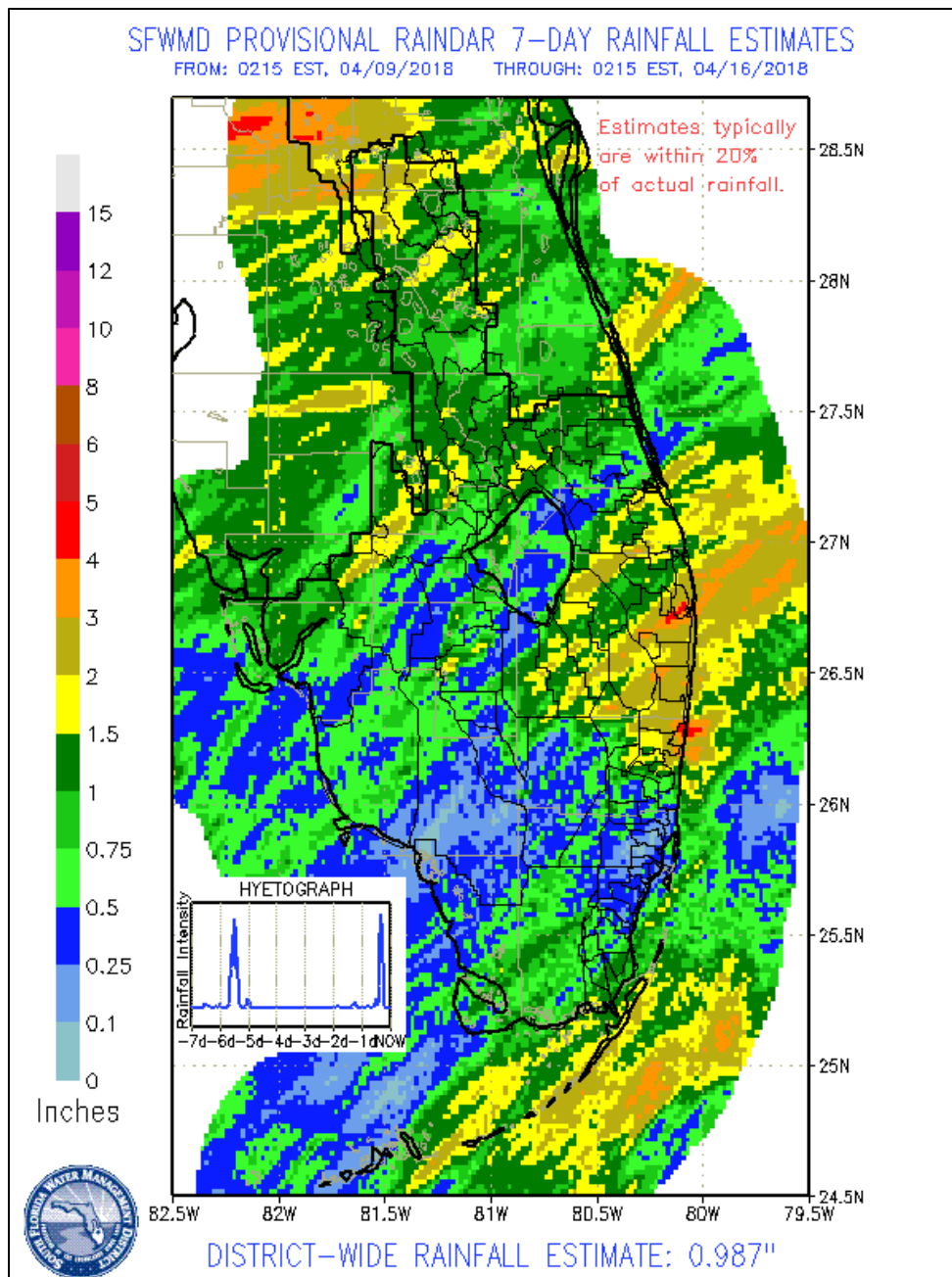
## **EVERGLADES**

At the gauges monitored for this report, the water depth across the northern WCAs rose an average of 0.07 feet last week, while WCA-3A, WCA-3B and Everglades National Park fell an average of 0.09 feet. Individual gauge changes in the WCAs ranged from +0.21 feet (WCA-1) to -0.19 feet (WCA-3A NW). Pan evaporation increased again and was estimated at 2.81 inches last week.

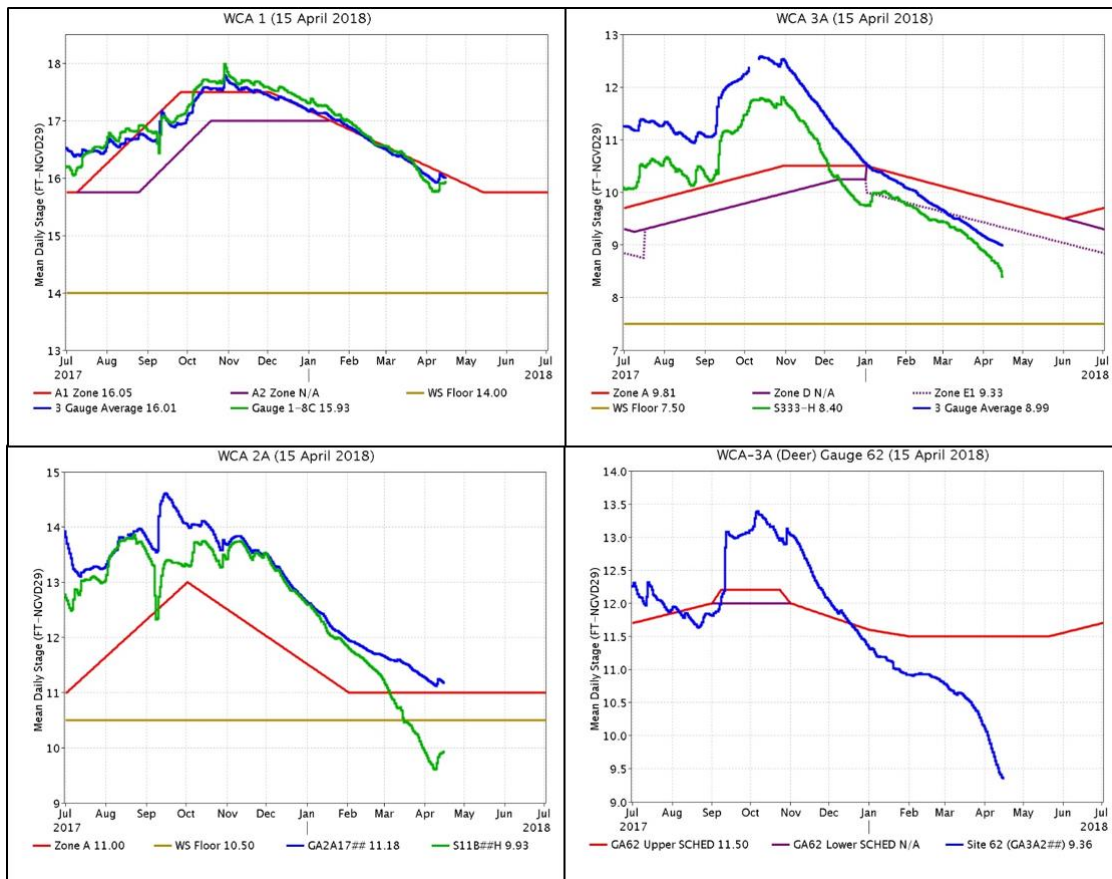
Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	2.13	+0.17
WCA-2A	1.45	+0.07
WCA-2B	1.20	-0.08
WCA-3A	0.48	-0.09
WCA-3B	0.50	-0.07
ENP	0.68	-0.09

	Good
	Fair
	Poor





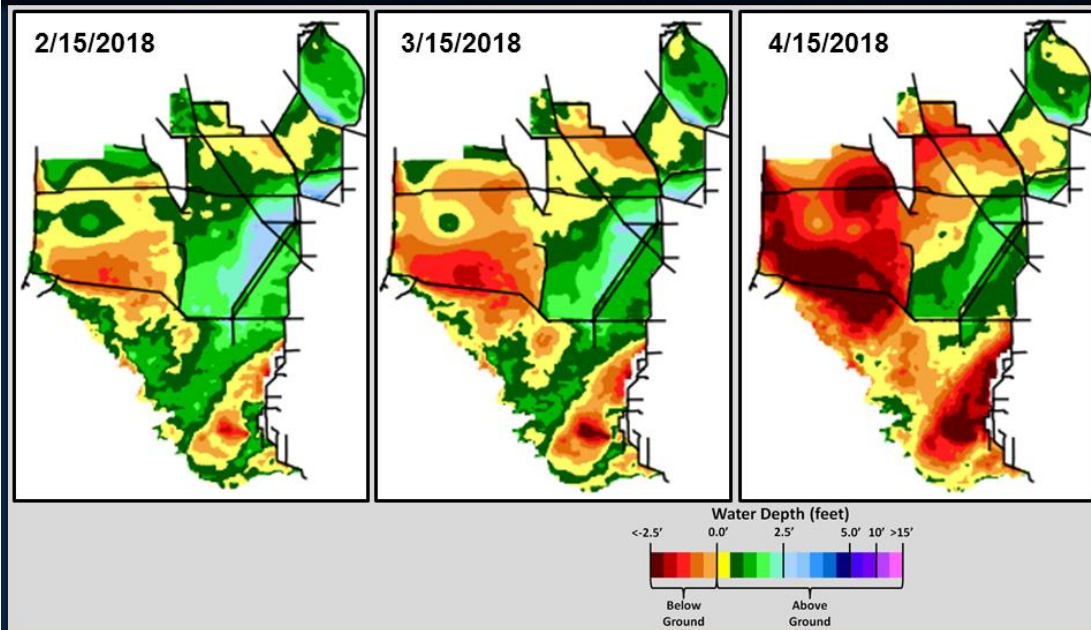
Regulation Schedules: WCA-1 three-gauge average is 0.04 feet below Zone A1. WCA-2A canal stage at gauge S11B is 1.07 feet below the WS Floor. WCA-3A three-gauge average stage is 0.34 feet below Zone E1 and continues to fall away from the regulation line. WCA-3A at gauge 62 (northwest corner) stage is 2.14 feet below the upper schedule and continues to trend sharply downward from the 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 than the rest of the Everglades with a significant portion of that region with water levels between 1.0 to 1.5 feet below ground and the extreme northwestern corner now greater than 1.5 feet below ground. Comparing WDAT water levels from present, last week water levels dropped slightly across most of WCA-3A but rose slightly in the northeastern portion of that basin (which contains the important Alley North wading bird colony). Depths in the northern half of WCA-2A rose slightly while depths along the southern perimeter fell. The southwestern half of WCA-2A is drier than it was a year ago.



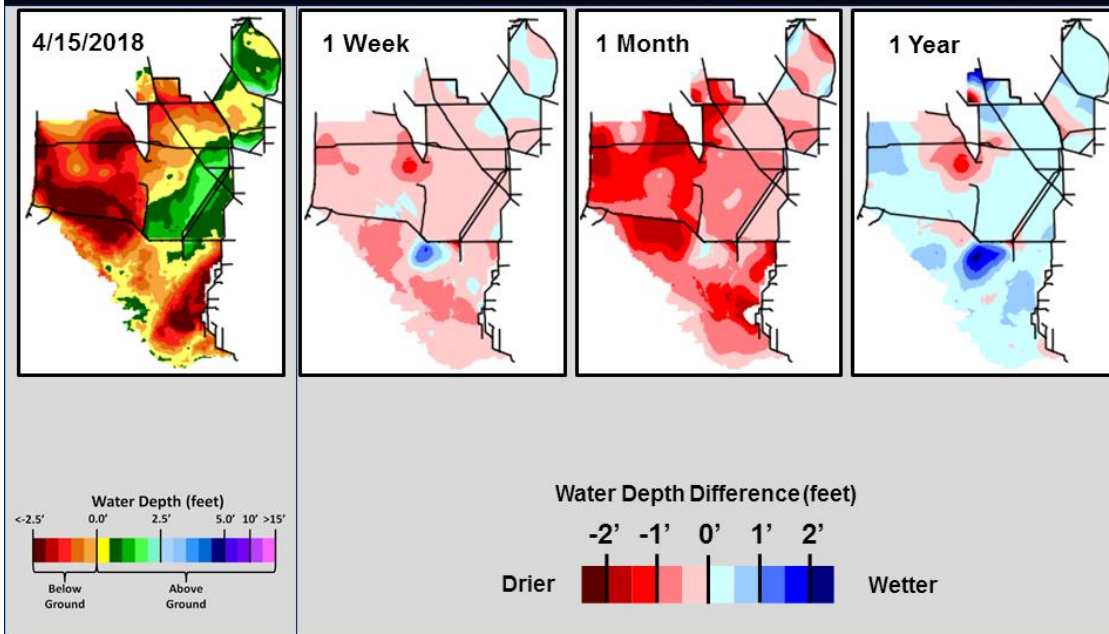
## SFWDAT Water Depth Monthly Snapshots



South Florida Water Depth Assessment Tool (SFWDAT)



## SFWDAT Everglades Difference Maps (Present - Past)



South Florida Water Depth Assessment Tool (SFWDAT)

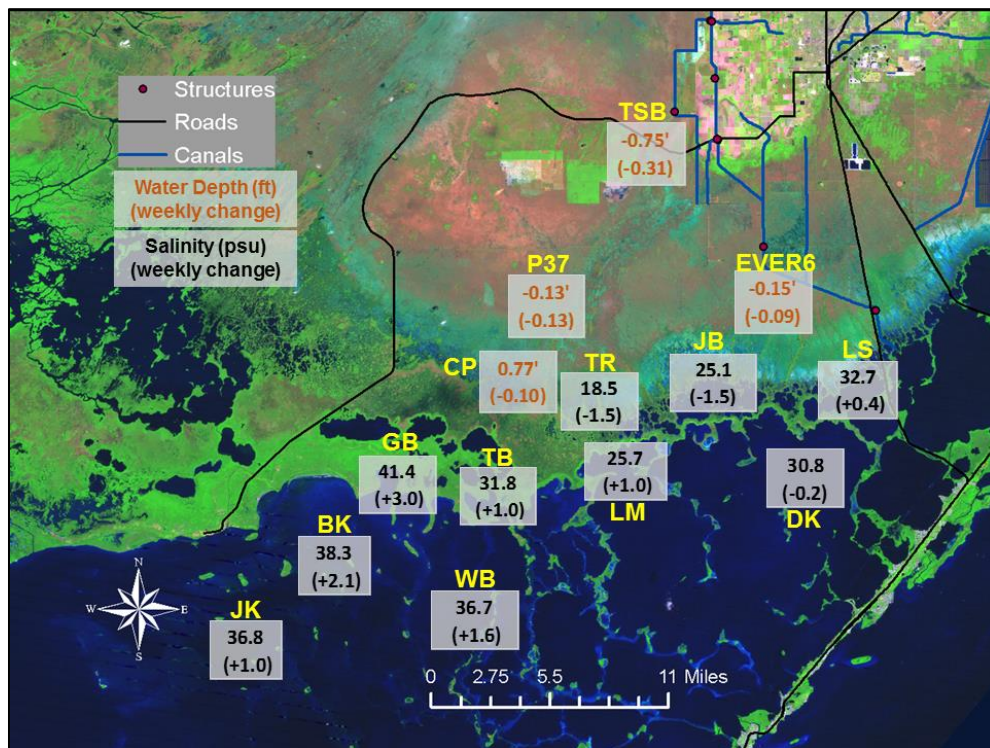


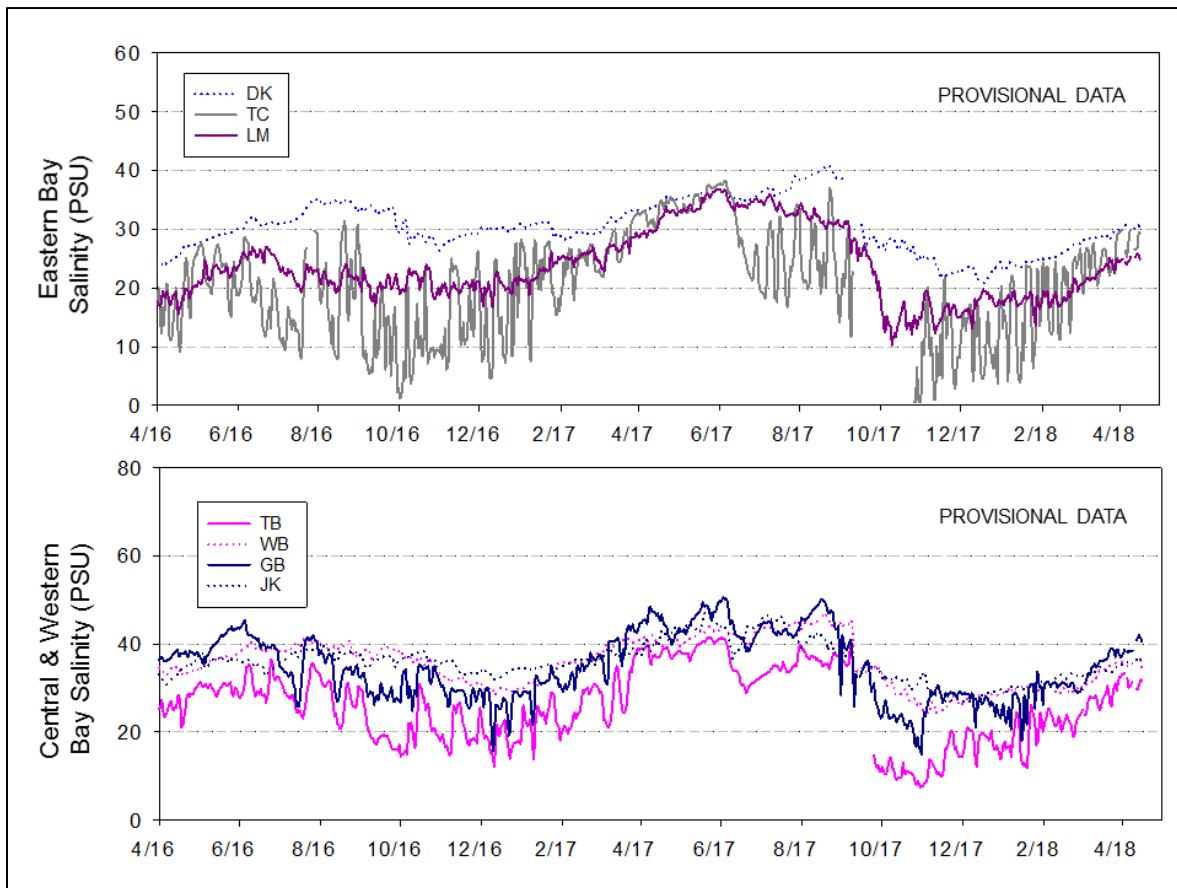
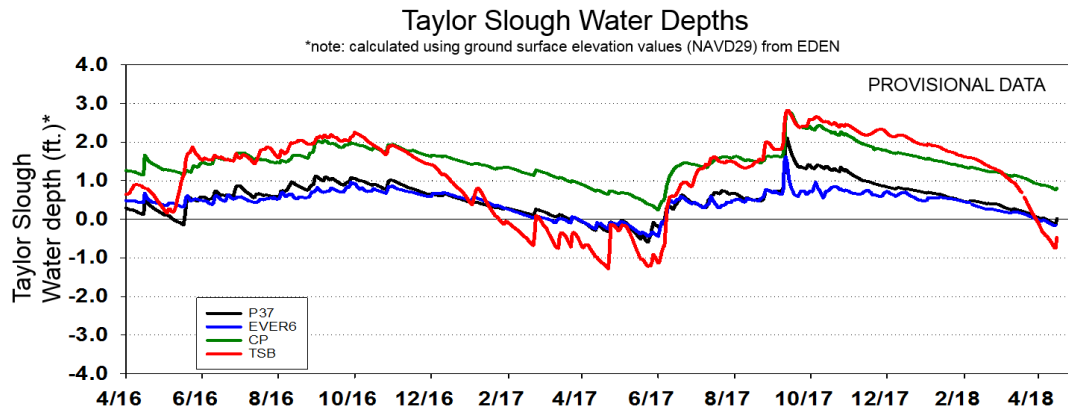
Wading bird flight conducted by SFWMD on April 16, 2018:

- Lower number of birds foraging in WCA-1 than expected
- Large mixed flocks feeding near the Alley North colony and in WCA-3A South, with relatively smaller number of birds foraging in southern WCA-2A
- 18,000+ white ibis nesting in Alley North colony and ibis chicks are starting to hatch
- Recent reversal had little impact on foraging or nesting conditions

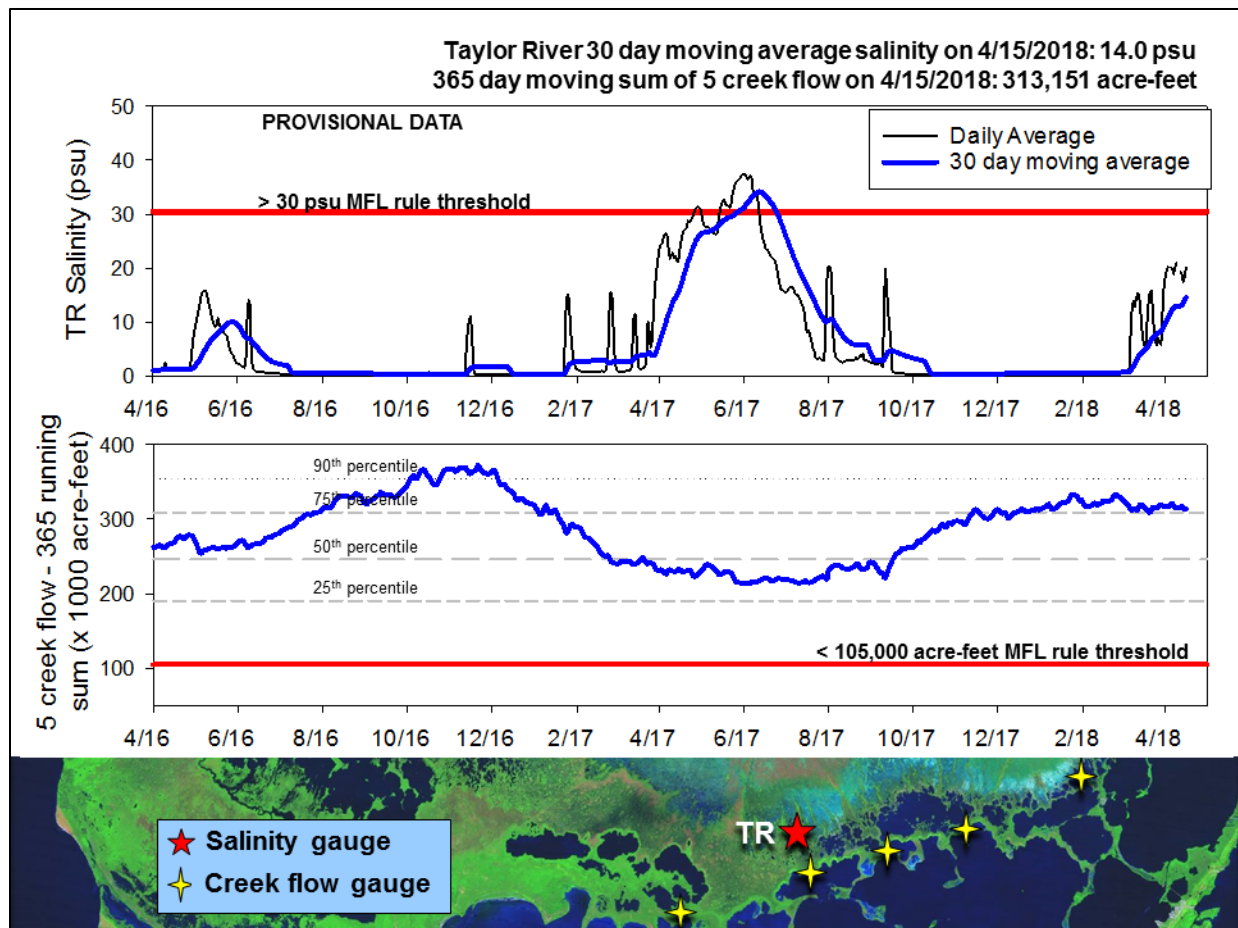
Taylor Slough Stages: Sunday night brought an average of 1.3 inches of rain to Taylor Slough and the Everglades National Park panhandle, but that is not yet captured in the stage data. Stages continued to decrease this past week, averaging a 0.1-foot loss. Water depths range from -0.75 feet to +0.77 feet and are 2 inches below to 2 inches above the historical averages.

Florida Bay Salinities: Salinities in Florida Bay increased 0.8 psu on average this past week with individual station changes ranging from -1.5 psu to +3.0 psu. Salinities ranged from 25 psu in the northeast to 41 psu in the western nearshore. This range is average to 3 psu above the historical averages.





Florida Bay MFL: Mangrove zone daily average salinity decreased slightly to 17 psu and then rose back to 19 psu this past week. The 30-day moving average rose to 14.0 psu. At this time of the year, salinity will continue to increase until the rains start. The weekly cumulative flow from the five creeks denoted by yellow stars on the map totaled about 580 acre-feet for the last week. The 365-day moving sum of flow from the five creeks decreased another 2,500 acre-feet over the last week to end at 313,151 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 maintains the current recession rates along the regulation schedule or slightly above in Rotenberger Wildlife Management Area has great ecological benefit for wildlife. Water management that moderates the current recession rates along the southern perimeter of WCA-2A could extend the period of optimum foraging conditions for wading birds, especially the record breaking number of white ibis currently nesting in the Alley North colony. The continuation of inflows that hydrate the northern sections of WCA-2A and WCA-3A provides ecological benefit by protecting those areas' peat soils and lessening the risk of damaging wildfires. 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, April 17th, 2018 (red is new)

Area	Weekly change	Cause(s)	Recommendation	Reasons
WCA-1	Stage increased by 0.17'	Rainfall, ET, management	Maintain current recession rates, following regulation schedule.	Foster conditions for wildlife and optimal wading bird foraging.
WCA-2A	Stage increased by 0.07'	Rainfall, ET, management	Maintain inflows to the northern region and raise southern canal stage	Protect peat soils and foster conditions for optimal wading bird foraging.
WCA-2B	Stages decreased by 0.08'	Rainfall, ET, management	Maintain depths at regulation schedule.	Protect upstream/downstream habitat and wildlife. Foster conditions for wading bird foraging.
WCA-3A NE	NA	Rainfall, ET, management	Maintain current recession rates, water management that provides inflows generates ecological benefit	Protect peat soils and lower the risk of damaging wildfires.
WCA-3A NW	Stages decreased by 0.19'	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 0.10'	Rainfall, ET, management	Maintain current recession rates near 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 0.08'	Rainfall, ET, management		
WCA-3B	Stages decreased by 0.07'	Rainfall, ET, management	Maintain depths at regulation schedule.	Protect habitat and wildlife.
ENP-SRS	Stages decreased by 0.09'	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 -0.09' to -0.31'	Rain, ET, inflows	Move water southward as possible	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged -1.5 to +3.0 psu.	Rain, ET, inflows, wind	Move water southward as possible	When available, provide freshwater to maintain low salinity buffer and promote water movement.