

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:** February 6, 2018

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

### **Summary**

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

Forecast is for mainly dry and warm weather into the weekend. High pressure will dominate the skies over the peninsula through the weekend. A weak cold front will slide into central Florida on Thursday, but showers will be very limited. We may see some weak sea breeze activity late tomorrow as temperatures reach the 80s. The next chance for widespread, appreciable rainfall is about a week away.

#### **Kissimmee**

Tuesday morning stages were 57.6 feet NGVD (0.4 feet below schedule) in East Lake Toho, 54.6 feet NGVD (0.4 feet below schedule) in Toho, and 50.7 feet NGVD (1.6 feet below schedule) in Kissimmee-Cypress-Hatchineha; headwater stages were 46.3 feet NGVD at S65A and 25.8 feet NGVD at S65D. Mean recession rates for the last seven days in East Lake Toho, Toho and Kissimmee-Cypress-Hatchineha were 0.13, 0.08 and 0.01 feet per week, respectively (preferred maximum rate is 0.2 feet per week). Tuesday morning discharges were: 817 cfs at S65, 650 cfs at S65A, and 891 cfs at S65E. Dissolved oxygen concentration in the Kissimmee River averaged 8.9 milligrams per liter (mg/L) for the week. Kissimmee River mean floodplain depth on Sunday was 0.26 feet.

#### **Lake Okeechobee**

Lake Okeechobee stage is 15.23 feet NGVD having decreased 0.06 feet over the past week and 0.13 feet over the last month. Following Hurricane Irma, stages exceeded 16.0 feet NGVD for 72 days, the longest period since late 2004, which was 73 days. Stages also exceeded 15.5 feet NGVD for 105 days, the longest period at these stages since late 2004. The submerged aquatic and emergent vegetation coverage in the nearshore areas of the Lake are expected to decline over the coming months and possibly years due to the high water and turbidity from resuspended lake sediment. The average turbidity and total phosphorus values across the pelagic stations in mid-January 2018 were the highest recorded since February 2005, after Hurricanes Frances and Jeanne passed near the Lake in late 2004. The higher Lake stages and high surface water total phosphorus concentrations could lead to algal blooms as turbidity declines and water temperatures rise later in the spring.

#### **Estuaries**

Total inflow to the St. Lucie Estuary averaged 246 cfs over the past week with no flow from Lake Okeechobee. Salinity increased throughout the estuary. The seven-day average salinity at the US1 Bridge is in the good range for adult oysters. Average weekly dissolved oxygen levels at HR1 station in the North Fork were 6.48 mg/L near the surface and 4.86 mg/L near the bottom. The highest weekly ranges of chlorophyll a were between 6.11 – 14.17 µg/L in the South Fork.

Total inflow to the Caloosahatchee Estuary averaged 878 cfs over the past week with 454 cfs from the Lake. Salinity increased in the lower part of the estuary and stayed at the same level as last week in the upper part. The 30-day moving average surface salinity is 1.8 at Val I-75 and 6.2 at Ft. Myers. The 30-day moving average salinity at Val I-75 is forecast to be 3.8 in two weeks with no flow through S-79. Salinity conditions between Val I-75 and Ft. Myers are at good level for tape grass. Salinity conditions are in the good range for adult oysters at Shell Point and at Cape Coral. Chlorophyll a concentrations near Ft. Myers and Shell Point were low (4.24 – 8.06 µg/L) over the last week. Dissolved oxygen levels at Ft. Myers were 7.24 – 8.82 mg/L and at Shell Point 1.86 – 4.12 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 8,800 acre-feet of Lake regulatory releases. The total amount of Lake releases sent to the STAs/FEBs in WY2018 (since May 1, 2017) is approximately 50,000 acre-feet. Most STA cells are at or near target depths, except many of the STA-5/6 cells which are below target. Operational restrictions are in place for vegetation rehabilitation in STA-1E and STA-2. This week, if 2008 LORS recommends Lake releases to the WCAs and the conditions allow, releases will be sent to STA-1E Eastern Flow-way, and STA-2 Flow-ways 1, 4, and 5.

### **Everglades**

There continues to be concern regarding the higher than average water depths in the southern part of WCA-3A, however in the northern regions of that basin, depths have reached levels of ecological importance and the northeastern region of that basin would benefit from a slower recession rate. In the northeastern region, at gauge 63, depths fell 0.13 feet last week and 0.54 feet last month (0.13 feet per week). WCA-2A is currently experiencing a recession rate that falls within the fair range for wading bird foraging. Within that basin, water depths at gauge 2-17 dropped 0.12 feet last week, and 0.59 feet over the last month (0.15 feet per week). Recession rates at both gauge 63 and 2-17 slowed compared to the week prior. Keeping recession rates between 0.05 and 0.09 feet per week is important to maintain optimal wading bird foraging conditions. Keeping depths below 2.5 feet at gauge 65 in WCA-3A is important to moderate the stress to tree islands caused by flooding when durations last longer than 60-90 days. The depth on Sunday at that location decreased to 2.53 feet, and has exceeded 2.5 feet for 234 days. Water levels are decreasing in Taylor Slough but are still 2 to 16 inches above the historical average for this time of year. Current salinities in Florida Bay range from 12 psu to 32 psu which is 3 psu below to 2 psu above historical average.

## Supporting Information

### KISSIMMEE BASIN

#### Kissimmee Basin Rainfall

The Upper Kissimmee Basin received 0.62 inches of rainfall in the past week and the Lower Basin received 0.47 inches (SFWMD Daily Rainfall Report 2/5/2018).

#### 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: 2/6/2018**

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)						
							2/4/18	1/28/18	1/21/18	1/14/18	1/7/18	12/31/17	12/24/17
Lakes Hart and Mary Jane	S62	24	LKMJ	61.0	R	61.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Lakes Myrtle, Preston, and Joel	S57	7	S57	61.4	R	61.3	0.1	0.0	0.1	0.0	0.0	0.0	0.0
Alligator Chain	S60	0	ALLI	63.9	R	64.0	-0.1	-0.1	-0.1	0.0	-0.1	-0.1	-0.1
Lake Gentry	S63	0	LKGT	61.6	R	61.5	0.1	0.1	0.0	0.1	0.0	0.0	0.0
East Lake Toho	S59	213	TOHOE	57.6	R	58.0	-0.4	-0.3	-0.1	0.1	0.0	0.0	0.0
Lake Toho	S61	484	TOHOW, S61	54.6	R	55.0	-0.4	-0.3	-0.2	0.0	0.1	0.0	0.0
Lakes Kissimmee, Cypress, and Hatchineha	S65	785	KUB011, LKIS5B	50.7	R	52.3	-1.6	-1.8	-1.8	-1.7	-1.7	-1.6	-1.4

<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: 2/6/2018**

Metric	Location	1-Day Average		Average for the Preceding 7-Days <sup>1</sup>								
		2/4/2018	2/4/18	1/28/18	1/21/18	1/14/18	1/7/18	12/31/17	12/24/17	12/17/17	12/10/17	12/3/17
Discharge (cfs)	S-65	820	785	583	572	567	540	517	553	540	368	586
Discharge (cfs)	S-65A	657	625	468	506	446	452	443	446	441	306	486
Discharge (cfs)	S-65D <sup>2</sup>	660	833	632	692	764	696	718	770	796	595	989
Stage (feet NGVD)	S-65D <sup>2</sup>	25.87	25.82	25.77	25.72	25.85	25.74	25.77	25.82	25.77	25.97	26.16
Discharge (cfs)	S-65E <sup>2</sup>	660	882	679	730	837	751	777	857	865	658	980
Discharge (cfs)	S-67	345	346	241	97	405	396	399	322	0	0	0
DO (mg/L) <sup>3</sup>	Phase I river channel	8.4	8.9	9.7	9.5	8.8	7.7	6.5	7.1	6.6	5.2	5.7
Mean depth (feet) <sup>4</sup>	Phase I floodplain	0.27	0.26	0.19	0.21	0.24	0.22	0.23	0.27	0.31	0.26	0.34

<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)

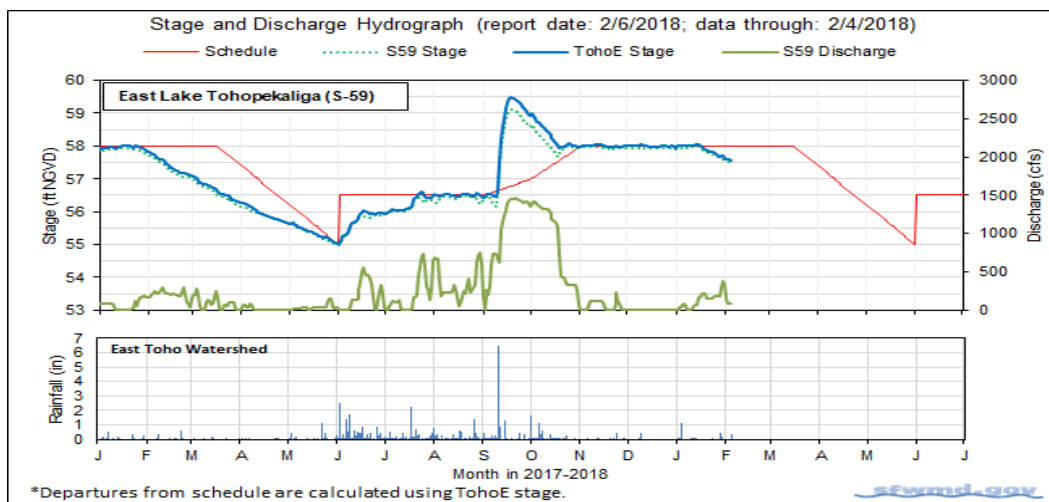


Figure 1.

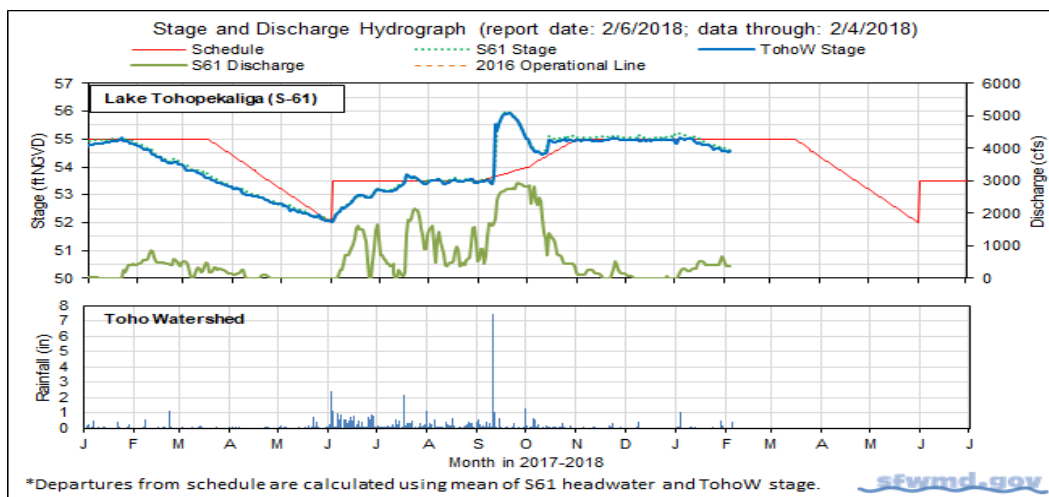


Figure 2.

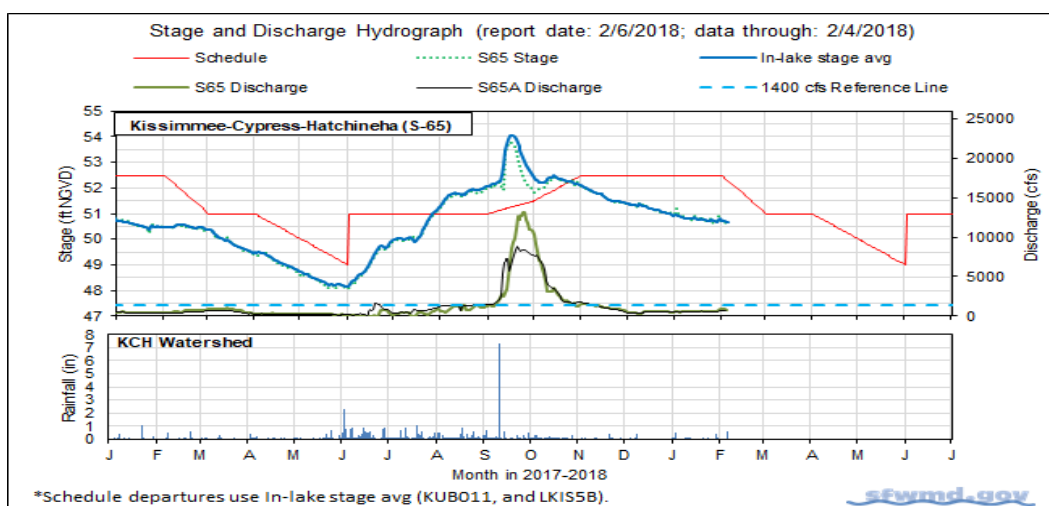


Figure 3.

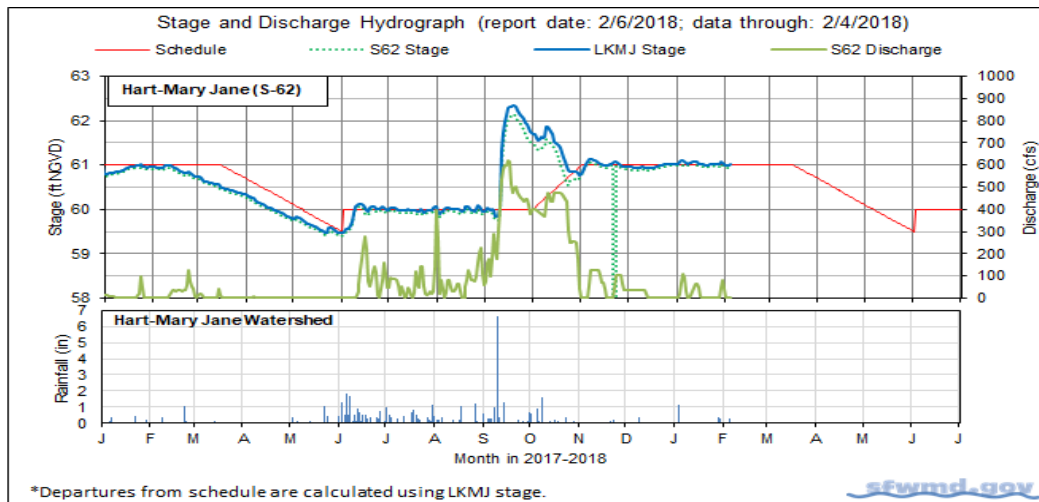


Figure 4.

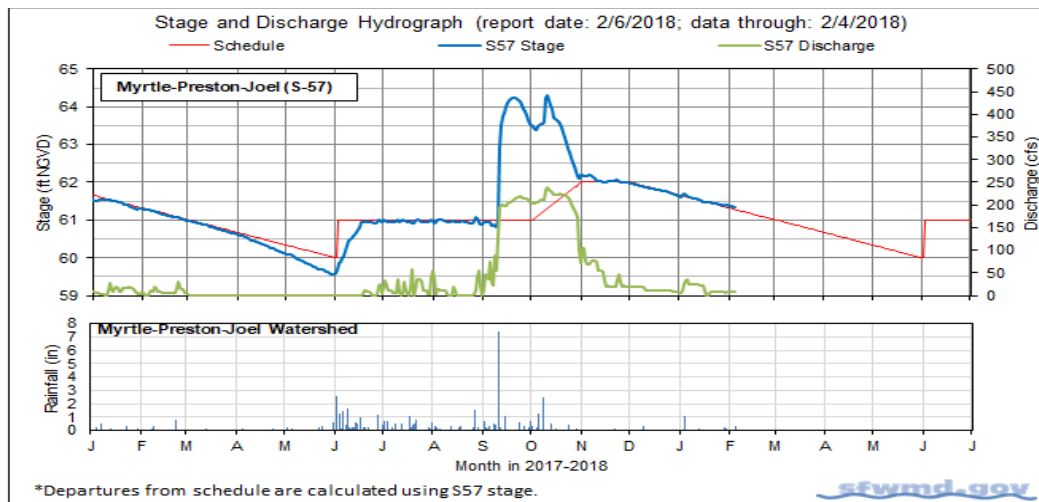


Figure 5.

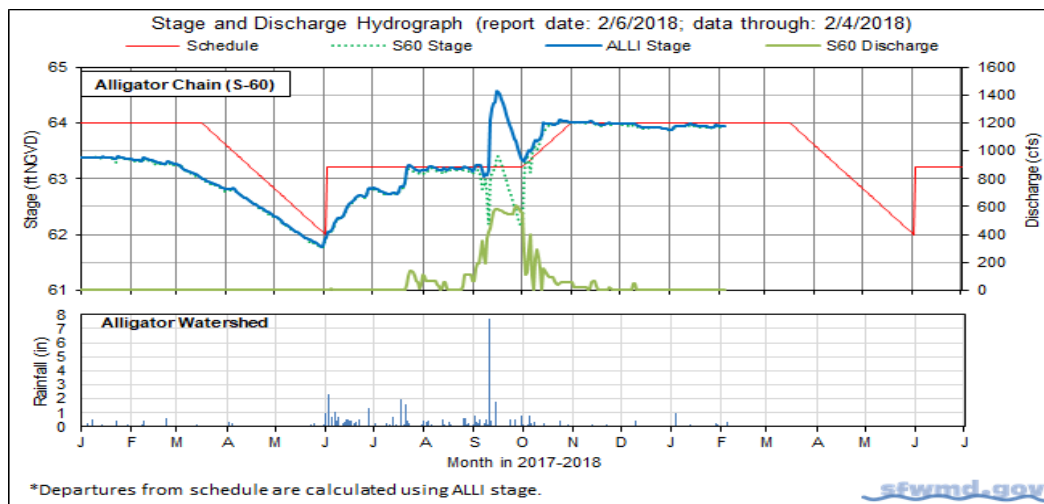


Figure 6.

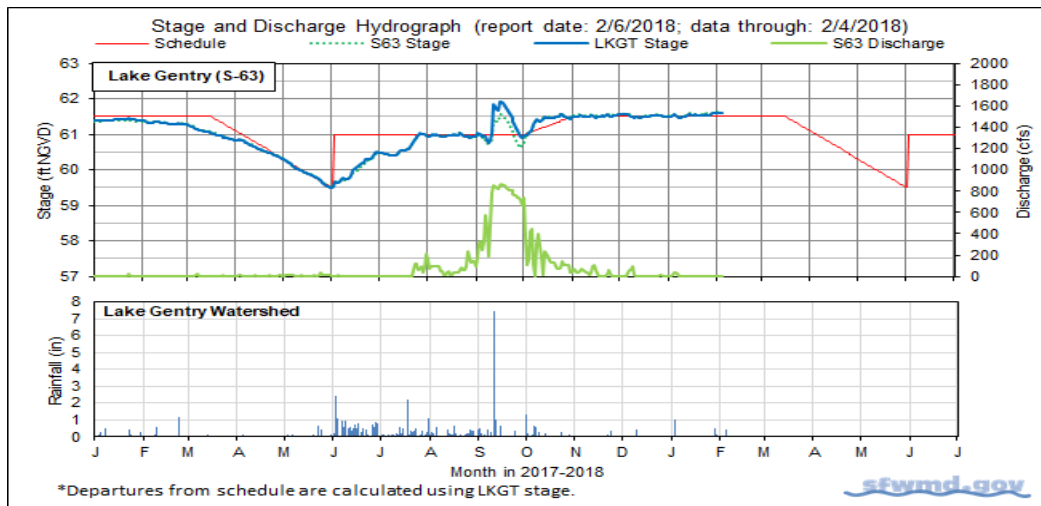
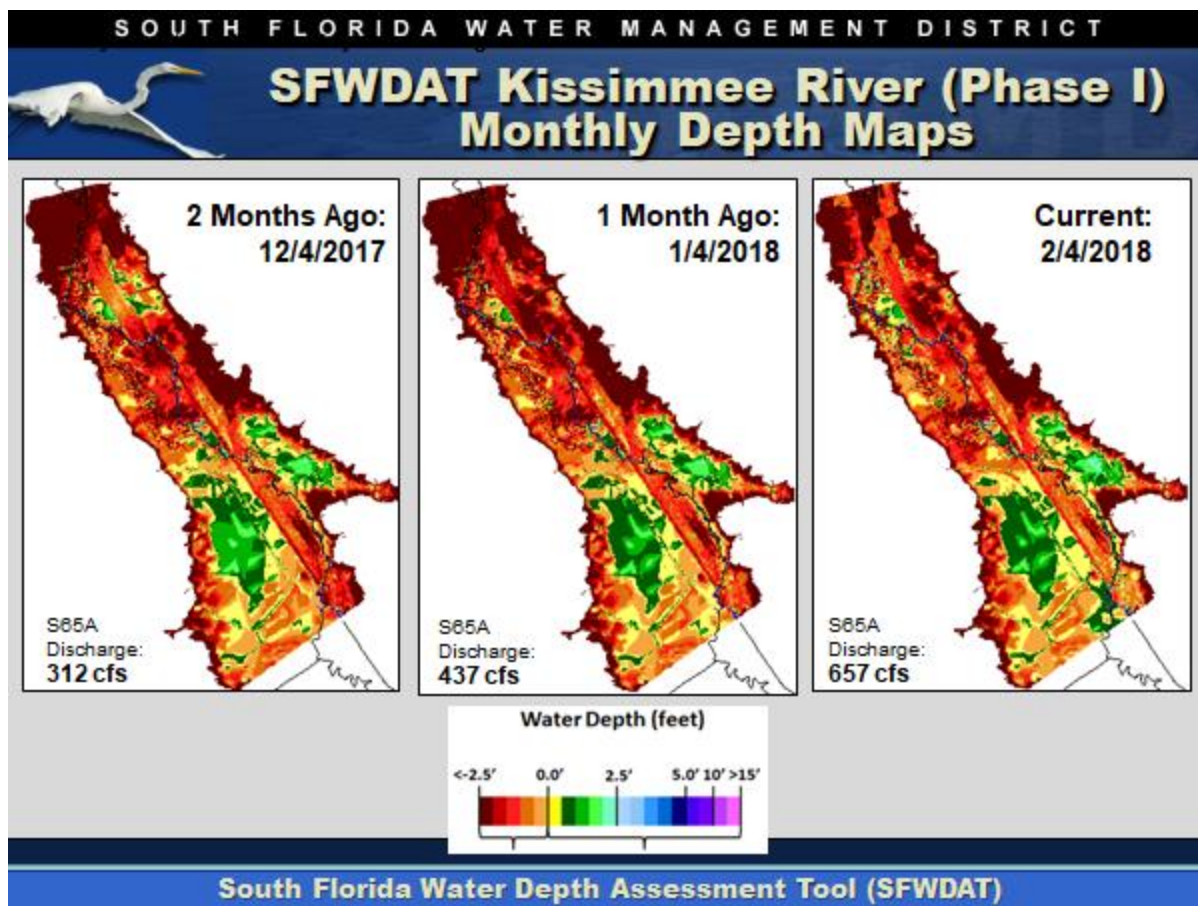
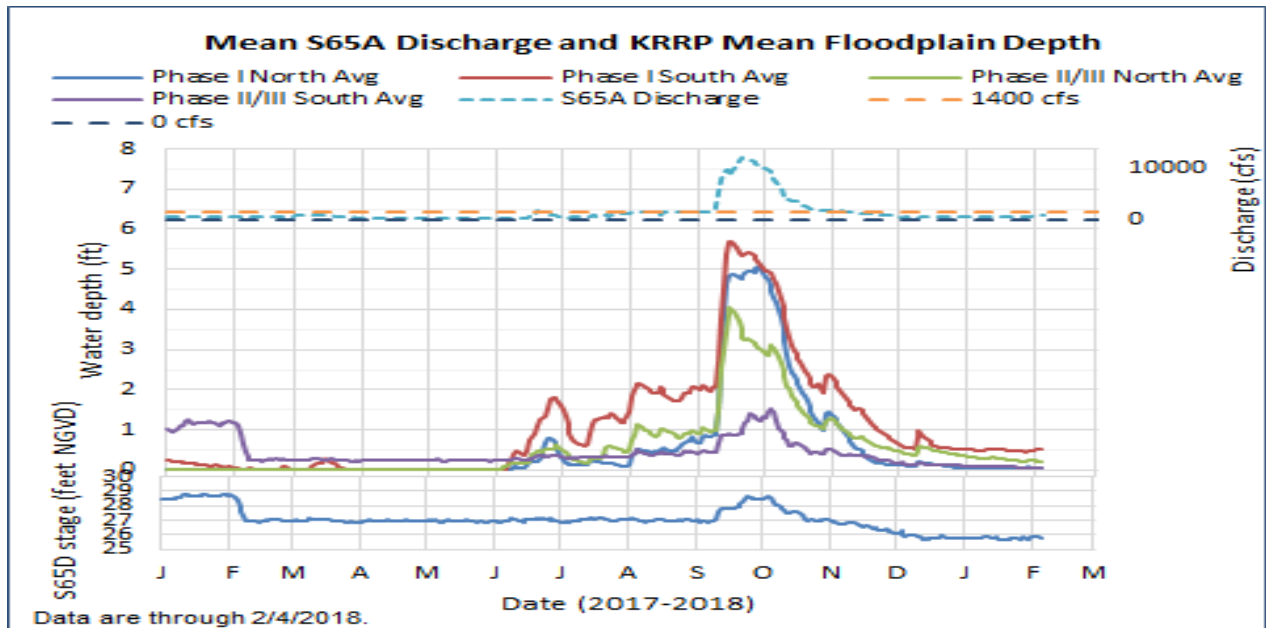


Figure 7.

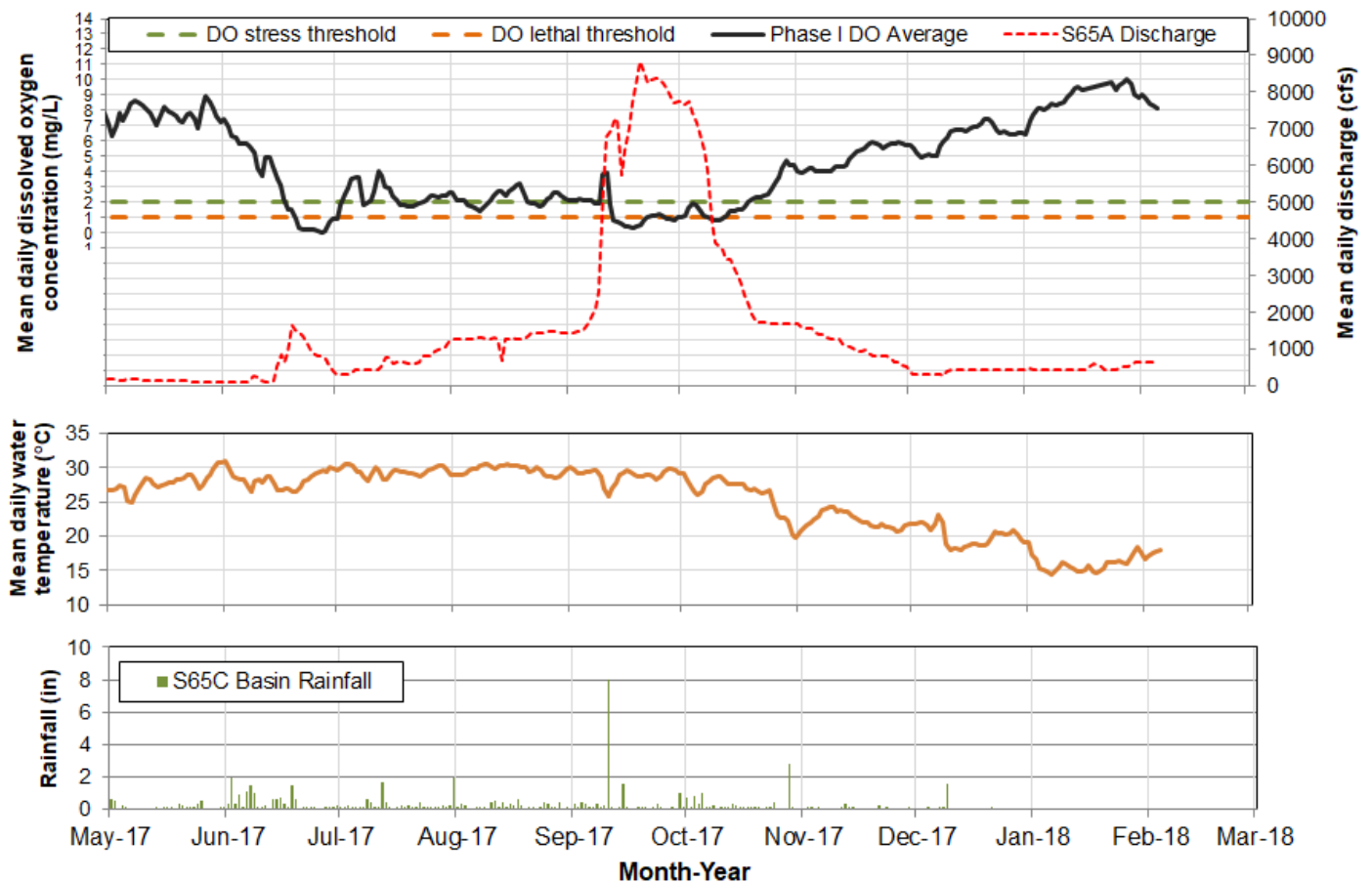


**Figure 8.** Phase I area floodplain water depths for this week, one month ago, and two months ago. Note that the WDAT color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to January 16, 2012.



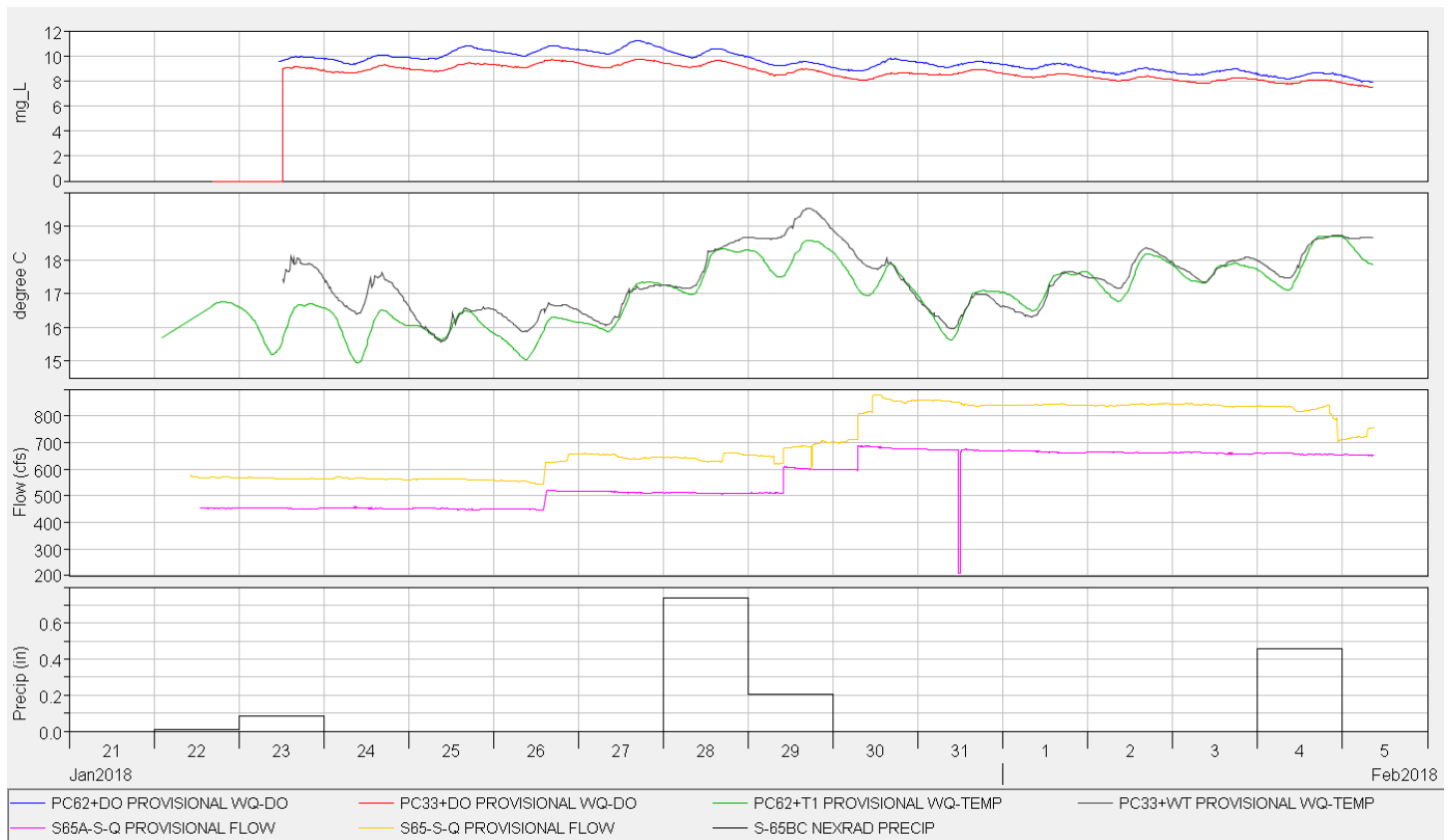


**Figure 9.** Mean water depth in the northern Phase I, southern Phase I, northern Phase II/III, and southern Phase II/III areas in relation to the S65A discharge and S65D headwater stage.



Report Date: 2/6/2018; data are through: 2/4/2018.

**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

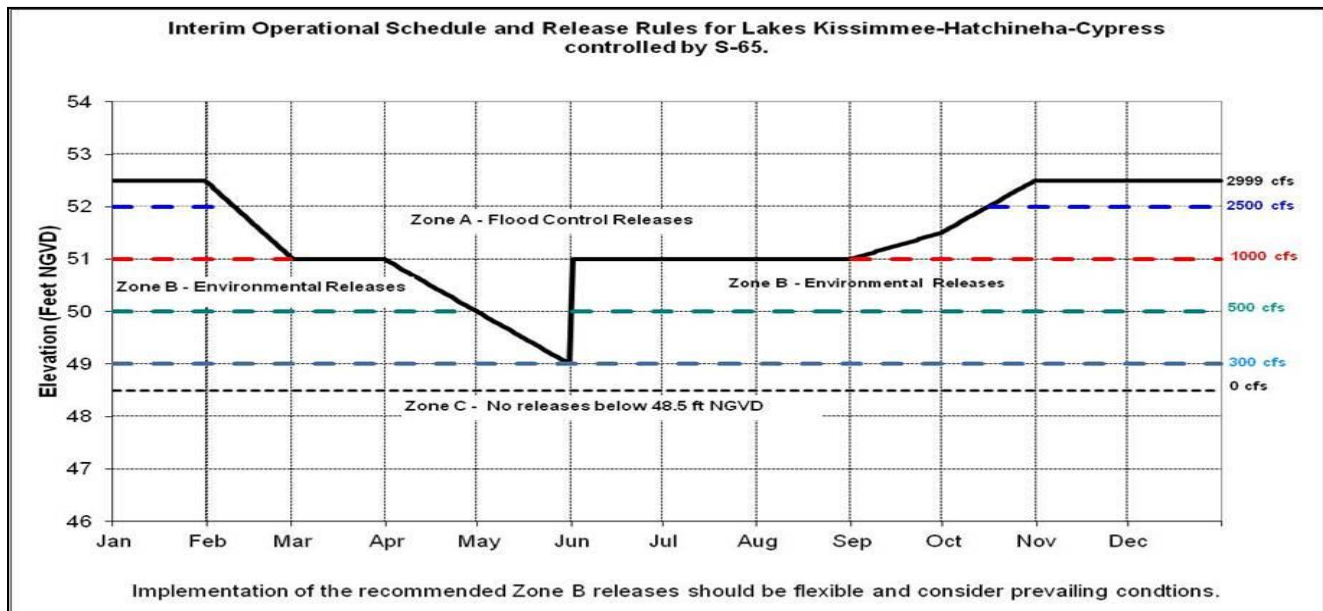
### Kissimmee Basin Adaptive Recommendations and Operational Actions

Date	Recommendation	Purpose	Outcome	Source
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 15.23 feet NGVD for the period ending at midnight on February 05, 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). Lake stage last peaked at 17.20 feet NGVD on October 13, 2017 before declining to 16.8 feet NGVD on October 28, 2017 and then back up to 17.02 feet NGVD. The Lake is now 0.13 feet lower than it was a month ago, but 1.43 feet higher than a year ago (Figure 1). The Lake is now in the Low sub-band (Figure 2). According to RAINДАР, 0.47 inches of rain fell over the Lake during the week January 30, 2018 – February 05, 2018 with most of the watershed receiving 0.25 – 0.75 inches (Figure 3).

Average daily inflows to the Lake increased again from the previous week, from 920 cfs to 1,435 cfs. Most of the inflows were from the Kissimmee River via the S65E structures, averaging 933 cfs daily, with another 351 cfs from the S84 structures. The S71 and S72 structures, along with Fisheating Creek and the northern pumps, contributed a combined 141 average daily cfs as well.

Average daily outflows for the Lake decreased also increased from the previous week, going from 1,365 cfs to 2,232 cfs, primarily through increases in discharges at the S77 structure and south through the S350 structures. S77 discharges went from 171 cfs the previous week to 647 cfs this past week, while S308 discharges remained near zero. Discharges south through the S350 structures increased from an average of 1,009 cfs the previous week to 1,398 cfs this past week. Discharges to the L8 canal via Culvert 10A this week averaged 187 daily cfs compared to 184 daily cfs last week. The corrected evapotranspiration value based on the L006 weather platform solar radiation data was 0.12 inches for the past week.

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.

The turbidity (ntu) and total phosphorus (ppb) levels in mid-January 2018 were very high, exceeding post-Hurricane Irma values in both the pelagic zone and for the Lake-wide average, while values in the nearshore zone were similar to September 2017 values (Figure 5). The average turbidity and total phosphorus values across the pelagic stations in mid-January were the highest recorded since February 2005, after Hurricanes Frances and Jeanne passed near the Lake in late 2004. The average pelagic turbidity had fallen from 86 ntu in September 2017, following Hurricane Irma, to 50 ntu by December 2017, before jumping to 185 ntu in mid-January 2018. The Lake-wide average for total phosphorus had gone from 238 ppb in September 2017 to 178 ppb in December 2017, before jumping to 308 ppb in mid-January 2018. The higher Lake stages and high values of total phosphorus could lead to algal blooms as turbidity declines and water temperatures rise later in the spring.



**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	933	0.4
S71 & 72	86	0.0
S84 & 84X	351	0.1
Fisheating Creek	33	0.0
S154	0	0.0
S191	0	0.0
S133 P	20	0.0
S127 P	5	0.0
S129 P	5	0.0
S131 P	1	0.0
S135 P	0	0.0
S2 P	0	0.0
S3 P	2	0.0
S4 P	0	0.0
C5	0	0.0
Rainfall	1290	0.5
<b>Total</b>	<b>2724</b>	<b>1.0</b>

OUTFLOWS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)
S77	647	0.3
S308	1	0.0
S351	986	0.4
S352	224	0.1
S354	188	0.1
L8	187	0.1
ET	2232	0.9
<b>Total</b>	<b>4464</b>	<b>1.7</b>

PROVISIONAL DATA

Chlorophyll *a* (Chla) and microcystin values remained low throughout the lake despite dramatic increases in total phosphorus, likely due to cool temperatures and high turbidity (Figure 6). The most recent satellite imagery using the cyanobacteria monitoring product derived from NOAA's OLCI satellite sensor showed cyano bloom potential has remained very low over the past four months. Potential for elevated cyanobacterial levels were last observed in the northern portion of the Lake in early September 2017 (Figure 7).

Based on the Lake Okeechobee wading bird habitat suitability index, there are approximately 46,683 acres of suitable foraging habitat for long-legged birds and 10,818 acres for long and short legged birds on the Lake, as of February 5 (Figure 8). A helicopter survey of foraging wading bird flocks on February 1 found approximately 2,892 individuals, which was a decrease from nearly 9,500 in early January and 4,900 in late January (Figure 9)

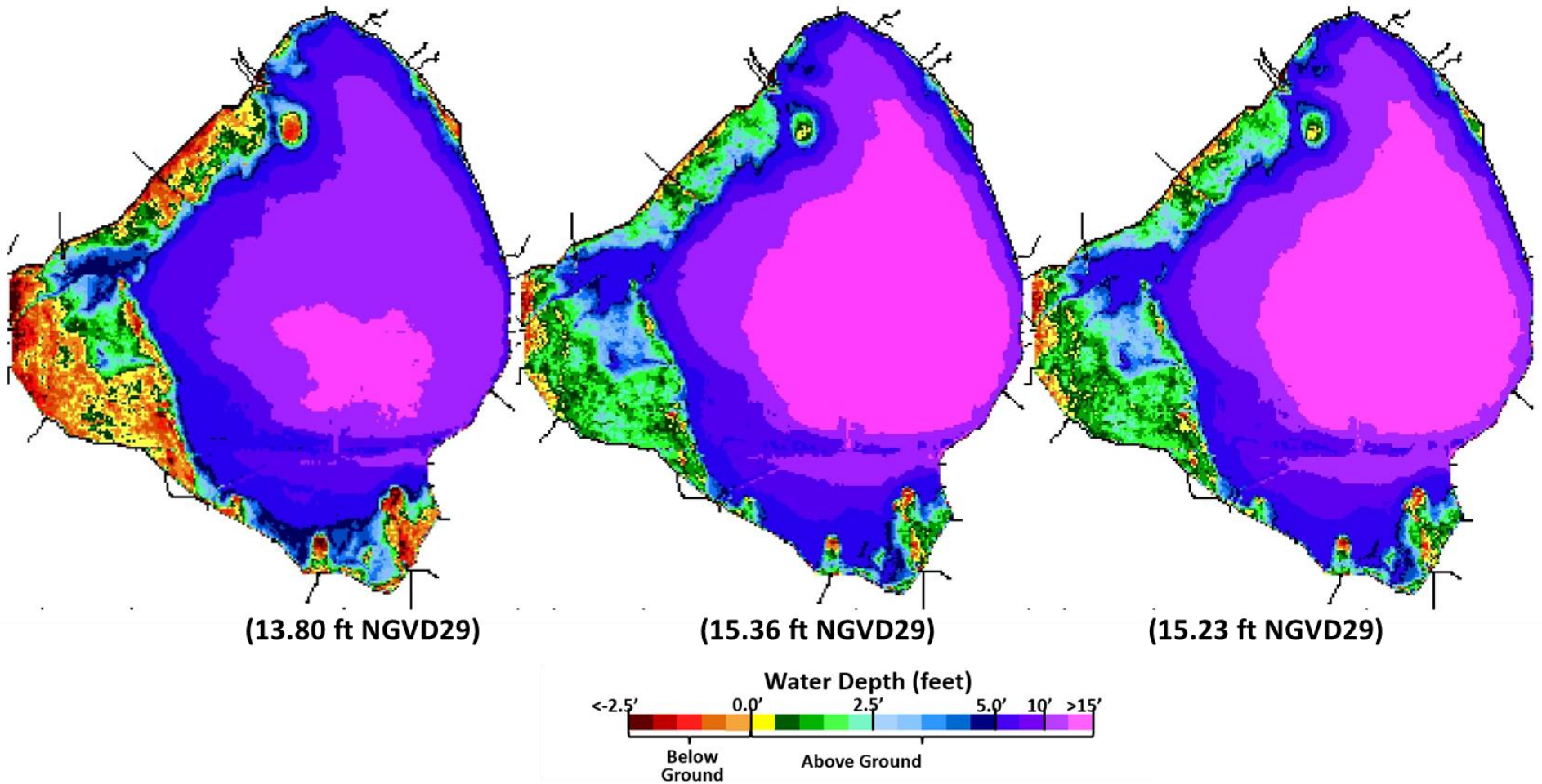
### **Water Management Recommendations**

The Lake stage is 15.29 feet NGVD having decreased 0.02 feet from the week prior and 0.23 feet over the past month. Submerged and emergent vegetation communities in the nearshore region have experienced stages >16.0 feet NGVD three times in less than two years, and stages >15.5 feet NGVD for 105 consecutive days this water year, the longest period since late 2004 (112 consecutive days). These stages, combined with turbid conditions from Hurricane Irma's winds, will likely cause substantial declines in these communities over the coming months and/or years. Lower Lake stages near the end of WY2018 would help to recover these important communities, and long, steady recessions of water levels throughout the dry season may help promote another productive year for wading birds on the Lake as well.

1 Year Ago: 02/05/2017

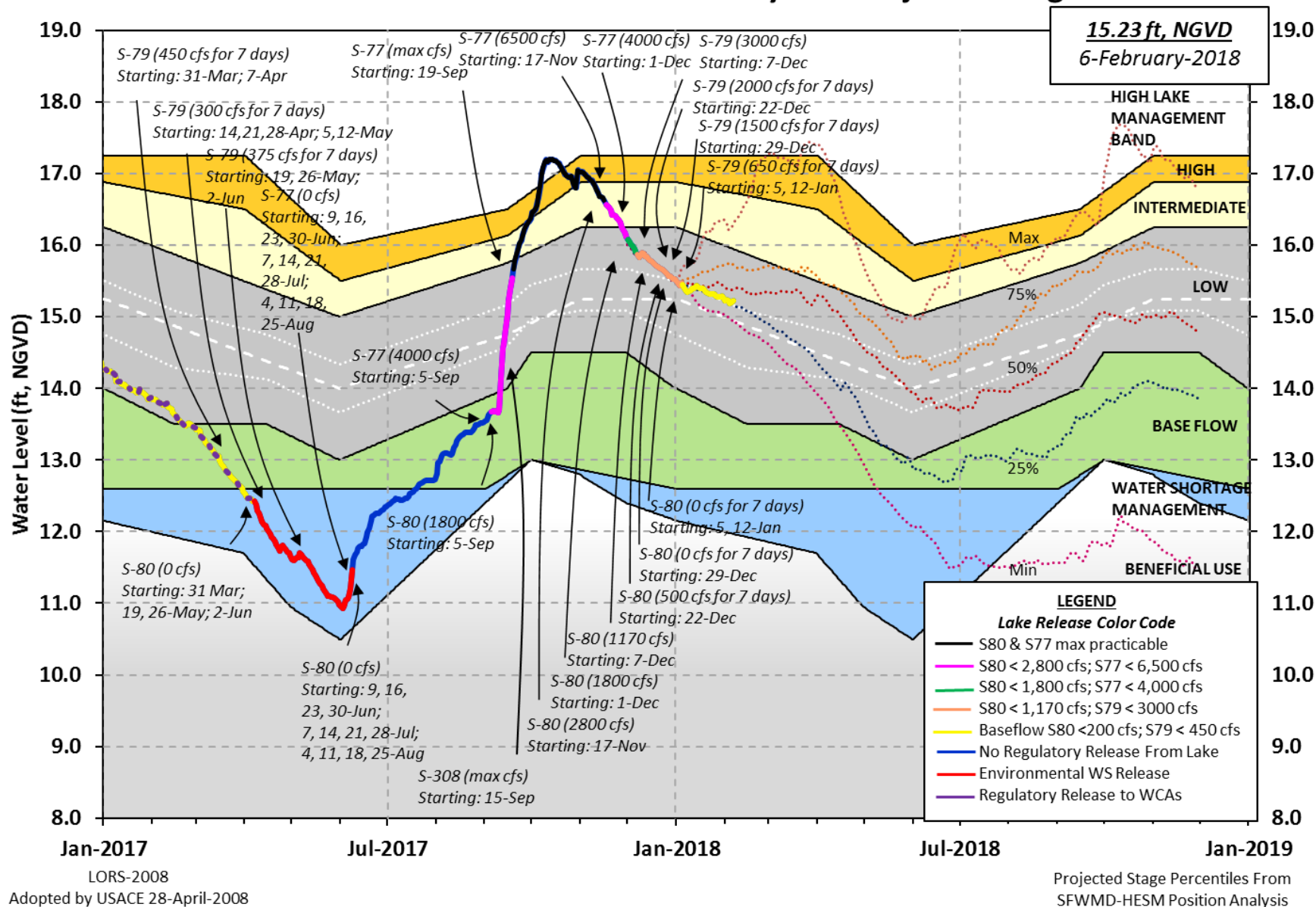
1 Month Ago: 01/06/2018

Current: 02/05/2018



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

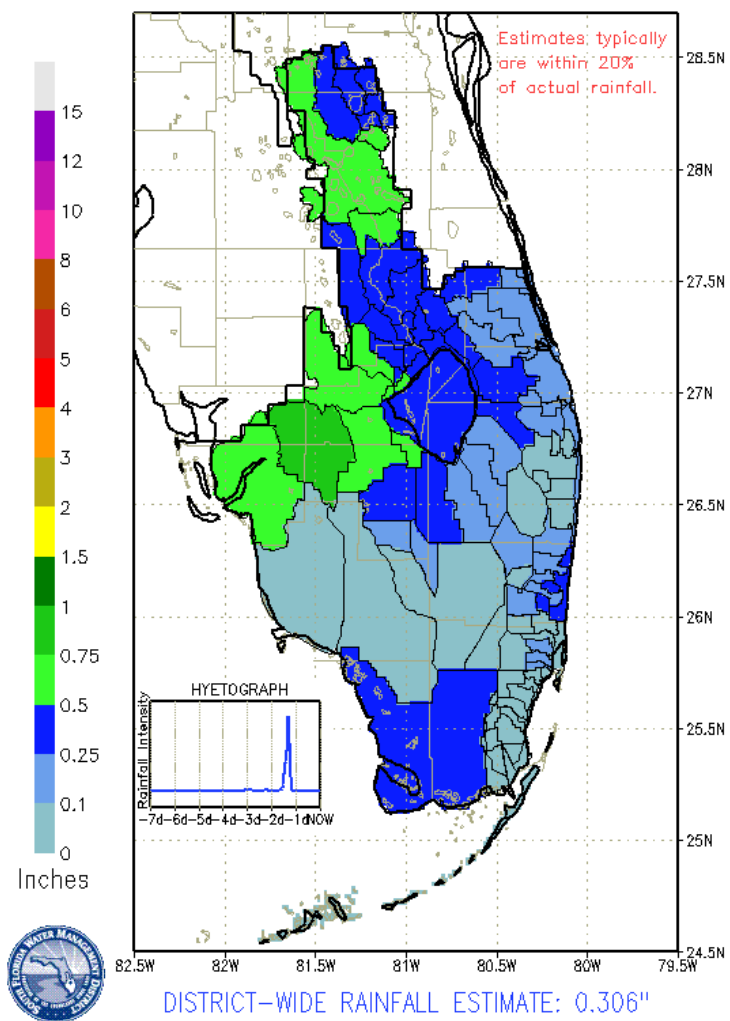
## Lake Okeechobee Water Level History and Projected Stages



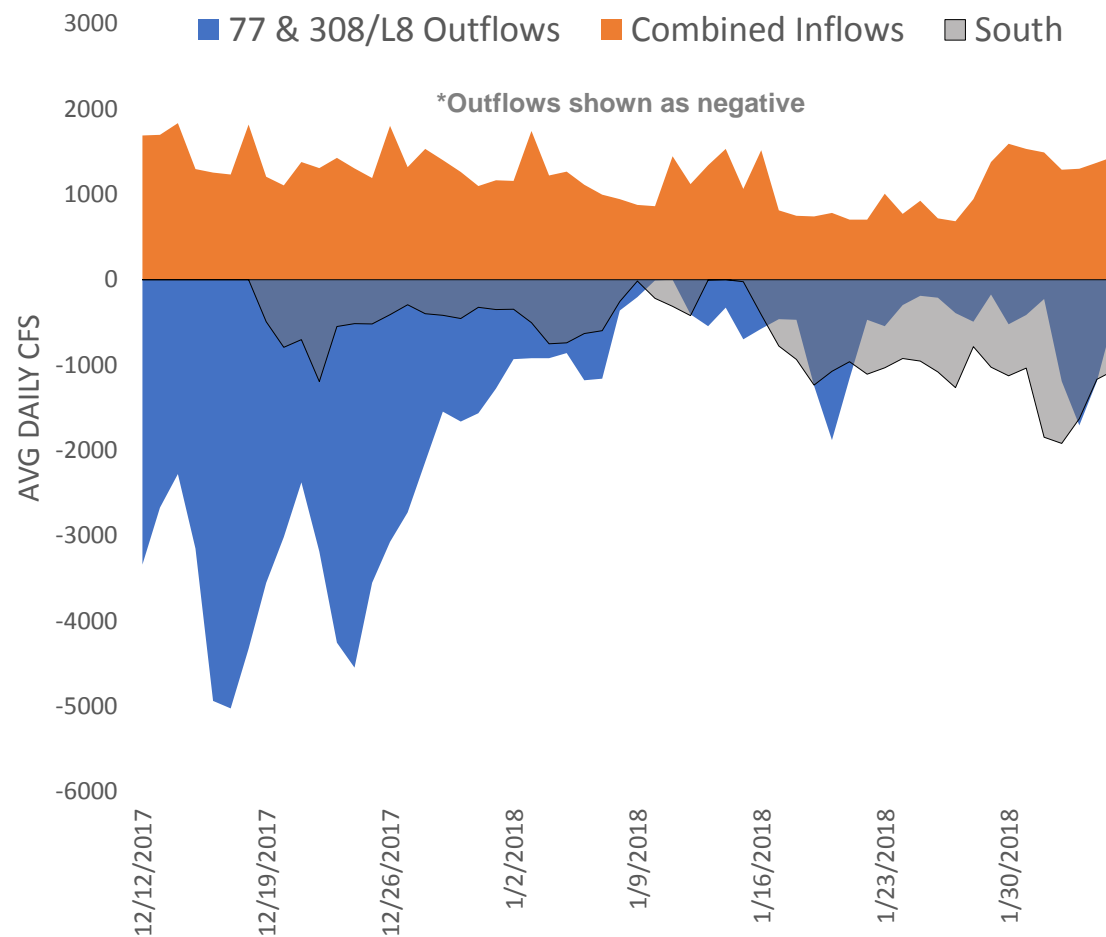
**Figure 2.** Recent Lake Okeechobee stage and releases, with projected stages based on a dynamic position analysis.



SFWMD PROVISIONAL RAINDAR 7-DAY BASIN RAINFALL ESTIMATES  
FROM: 0615 EST, 01/30/2018 THROUGH: 0615 EST, 02/06/2018

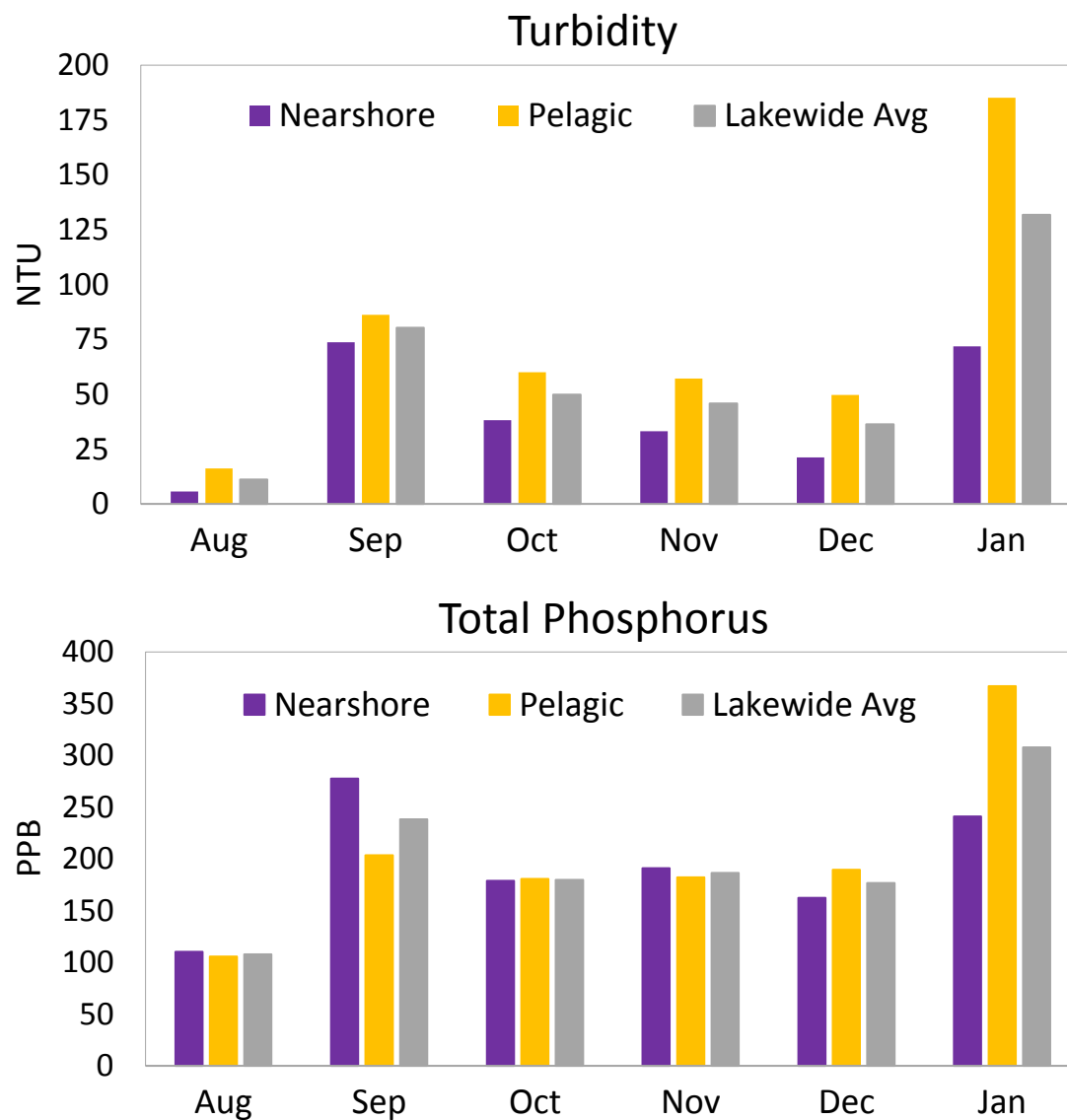
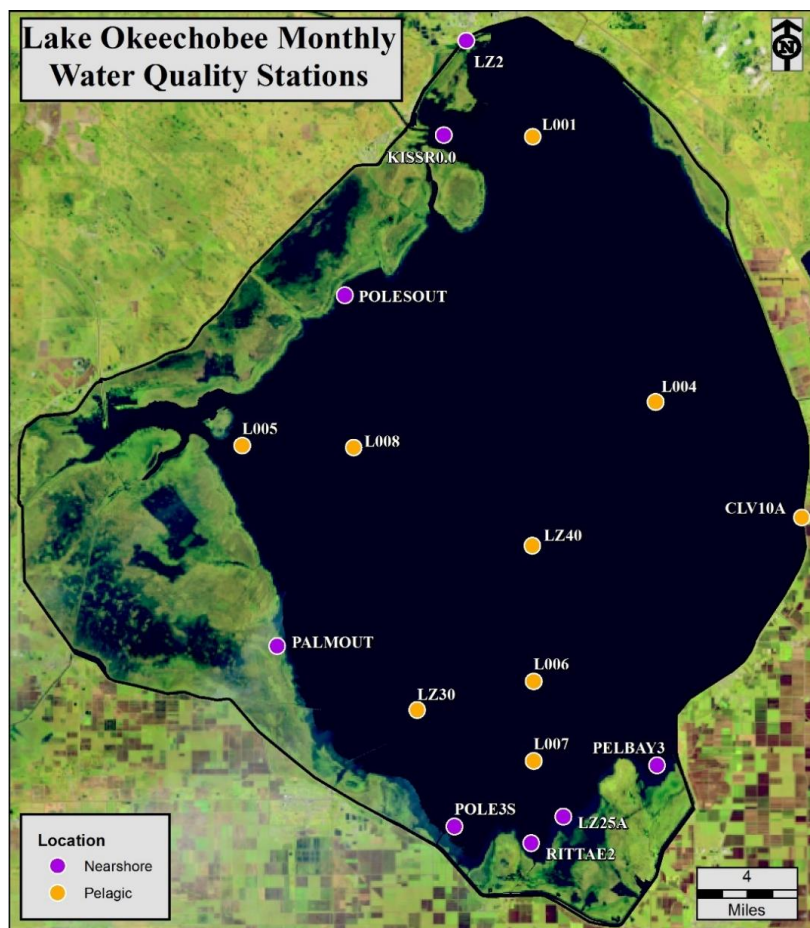


**Figure 3.** Rainfall estimates by basin.



PROVISIONAL DATA

**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.



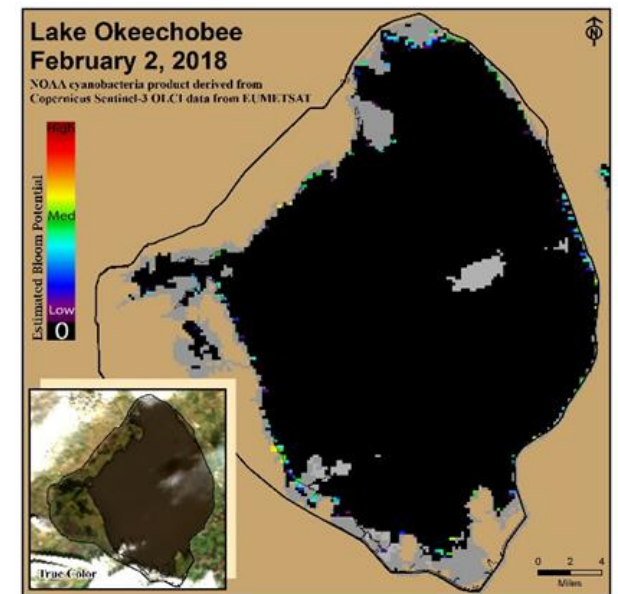
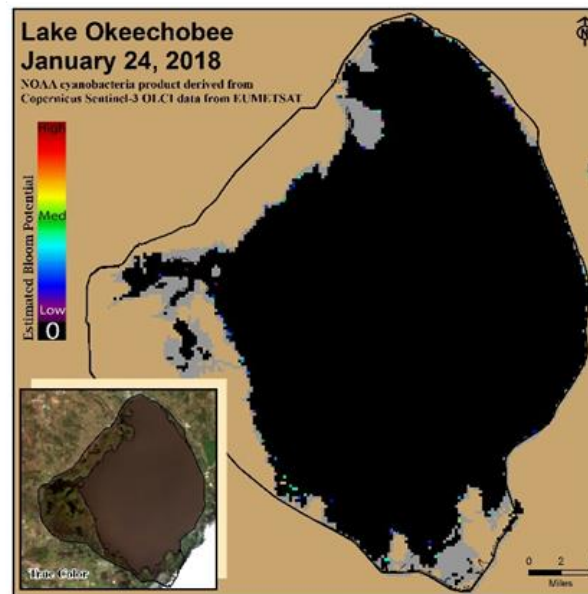
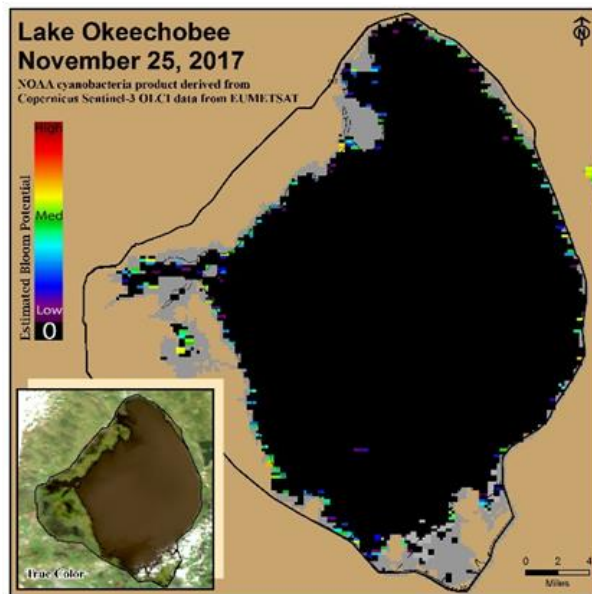
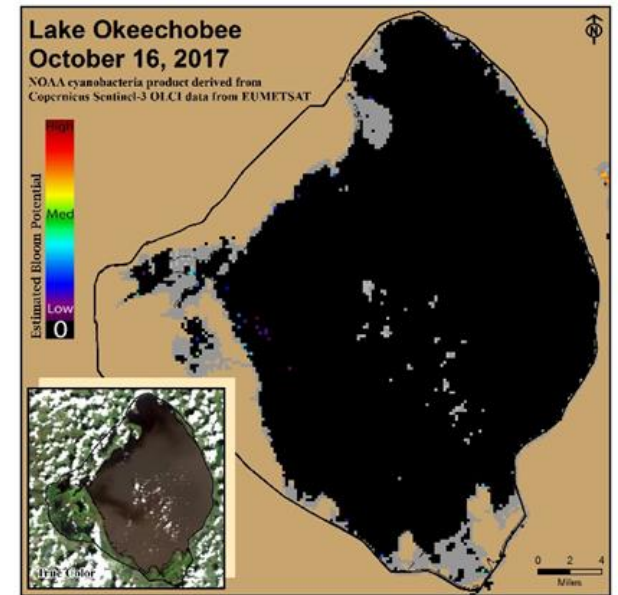
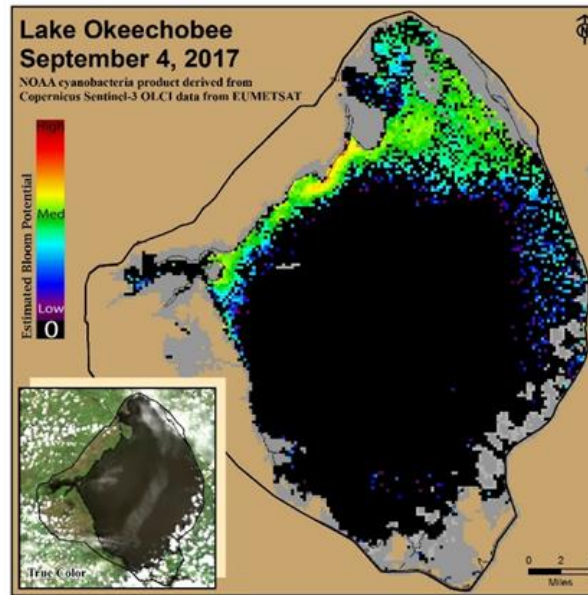
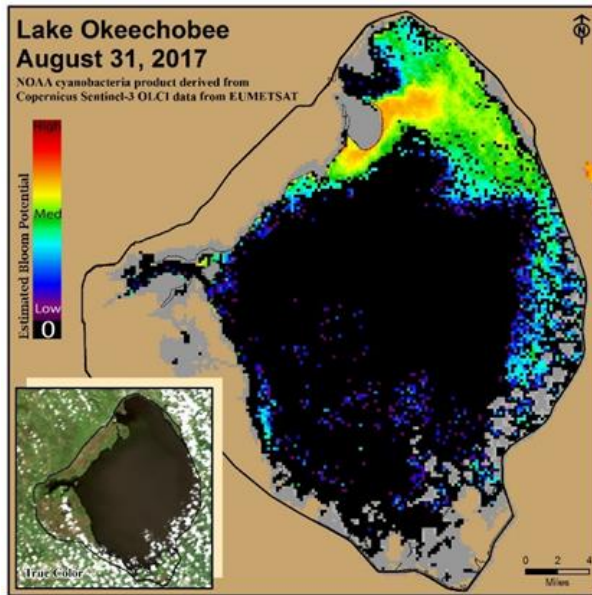
**Figure 5.** Turbidity (ntu) and total phosphorus (ppb) values from mid-January for nearshore (purple), pelagic (yellow), and lake-wide average (gray). Fisheating Bay stations were not included due to sporadic sampling across the period of record.

January 17 - 18, 2018		
Site	Chlorophyll <i>a</i> (µg/L)	Microcystin (µg/L)
<b>Nearshore Stations</b>		
FEBIN		
FEBOUT		
KISSR0.0	6.9	BDL
LZ2	5.3	BDL
LZ25A	6.8	
PALMOUT	10.4	
PELBAY3	6.3	
POLE3S	10.2	
POLESOUT	5.7	BDL
RITTAE2	9.2	
<b>Pelagic Stations</b>		
L001	3.2	
L004	3.9	
L005	4.3	BDL
L006	5.8	
L007	5.9	
L008	8.3	
LZ30	7.3	BDL
LZ40	7.8	
CLV10A	5.9	BDL



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



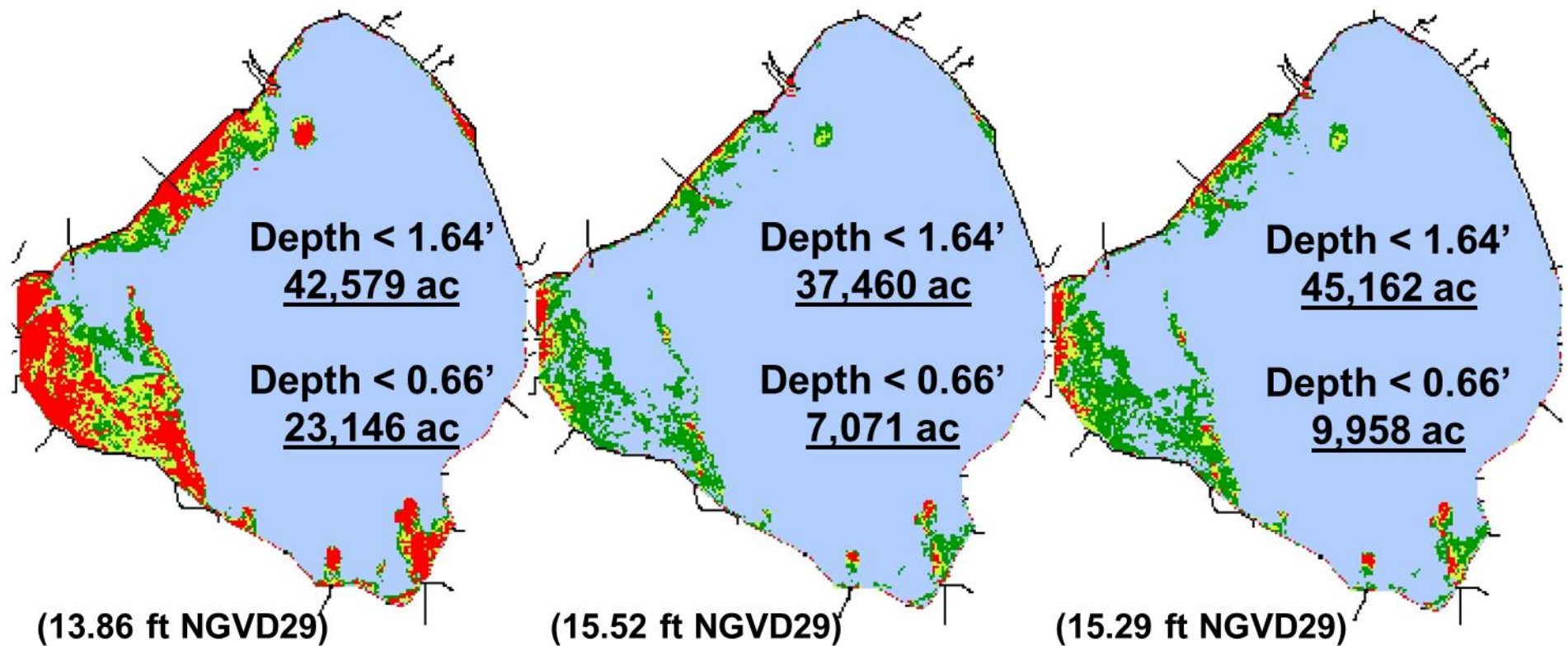


**Figure 7.** Potential for cyanobacterial blooms on Lake Okeechobee based on NOAA's harmful algal bloom monitoring system derived from Copernicus Sentinel-3 OLCI data from EUMETSAT.

1 Year Ago: 01/29/2017

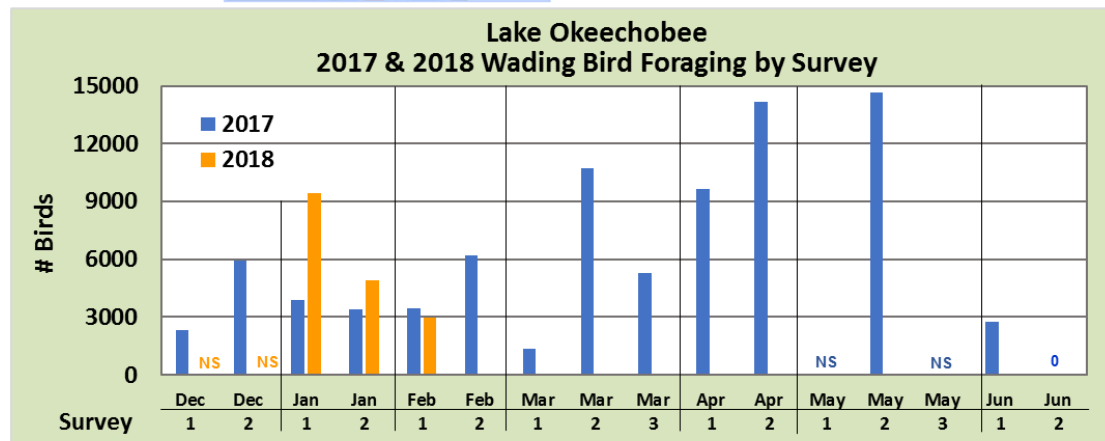
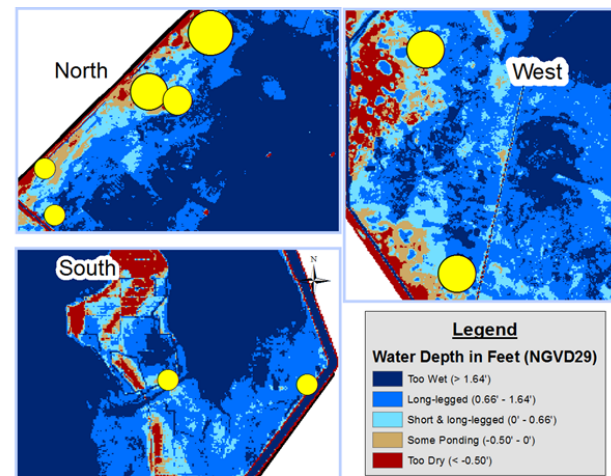
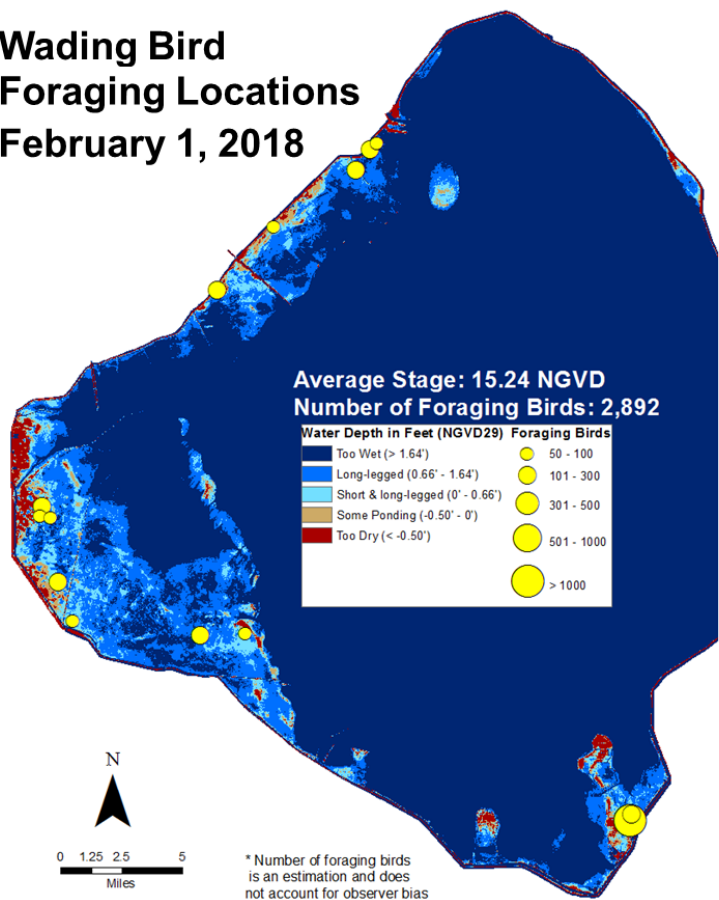
1 Month Ago: 12/30/2017

Current: 01/29/2018



**Figure 8.** Wading bird habitat suitability index for Lake Okeechobee based on the South Florida Water Depth Assessment Tool.

# Wading Bird Foraging Locations February 1, 2018

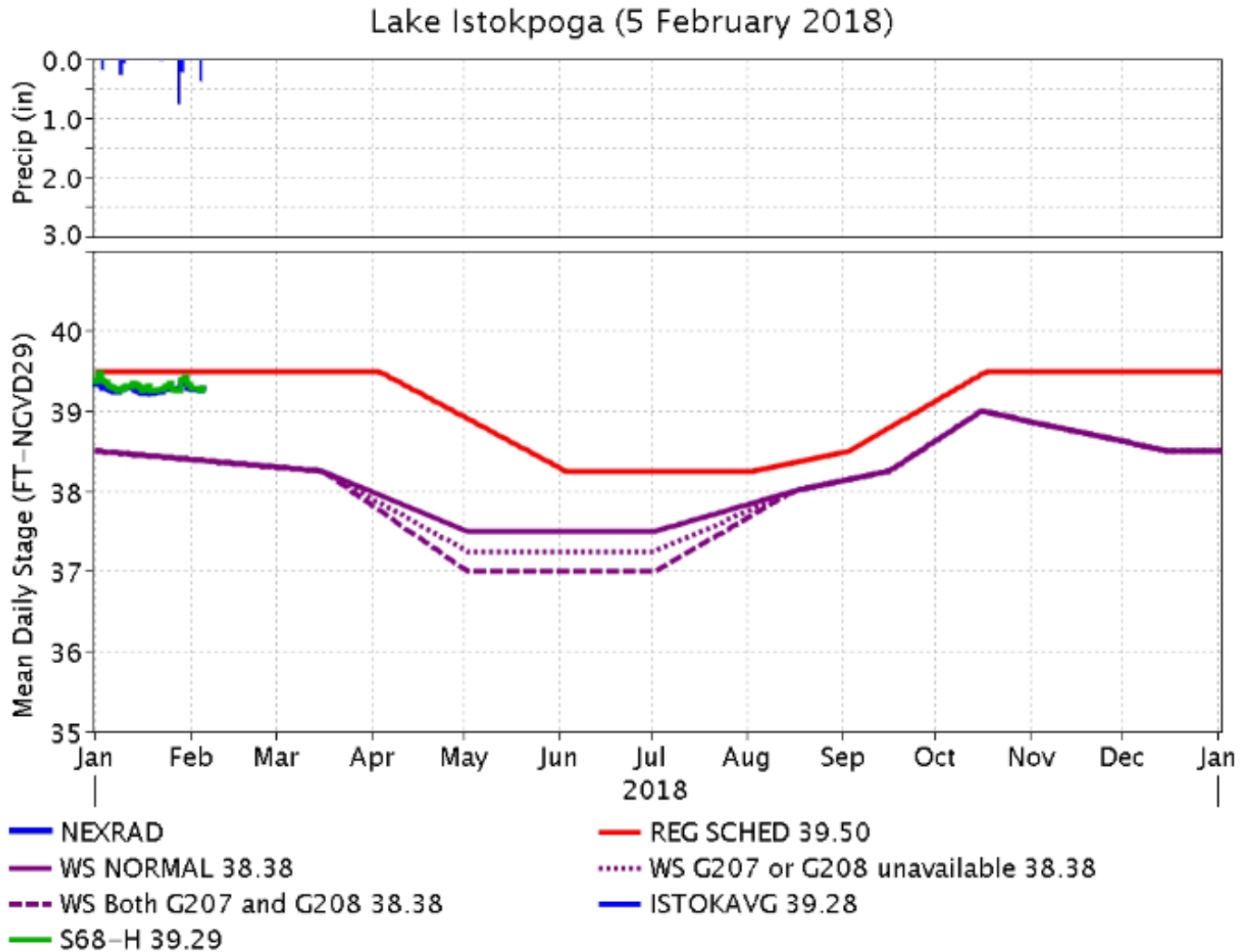


**Figure 9.** Wading bird foraging locations on February 1, 2018, and numbers per survey from December 2017 through February 1, 2018.



## LAKE ISTOKPOGA

Lake Istokpoga stage is 39.28 feet NGVD as of midnight February 05, 2018 and is currently 0.22 feet below its regulation schedule to accommodate construction on downstream structures (Figure 10). Average daily flows into the lake from Josephine Creek for the week January 30, 2018 – February 05 increased slightly, from 45 cfs the previous week to 66 cfs this past week. No data have been reported for Arbuckle Creek since July 4, 2017 as the gauge is being recalibrated after construction in the area. Average daily discharge from S68 and S68X increased from the previous week, going from 66 cfs to 426 cfs this past week. According to RAINDAR, 0.43 inches of rain fell in the Lake Istokpoga basin over the past week.



**Figure 10.** Recent stages on Lake Istokpoga.



## **ESTUARIES**

### **St. Lucie Estuary:**

Last week total inflow into the St. Lucie Estuary averaged about 246 cfs (Figures 1 and 2) and last month inflow averaged about 404 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).

<b>Location</b>	<b>Flow (cfs)</b>
Tidal Basin Inflow	107
S-80	0
S-308	0
S-49 on C-24	39
S-97 on C-23	18
Gordy Rd. structure on Ten Mile Creek	82

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 19.4. Salinity conditions in the middle estuary are in the good 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.

<b>Sampling Site</b>	<b>Surface</b>	<b>Bottom</b>	<b>Envelope</b>
HR1 (North Fork)	<b>14.2</b> (13.3)	<b>17.3</b> (14.5)	NA <sup>1</sup>
US1 Bridge	<b>18.5</b> (16.6)	<b>20.2</b> (18.0)	10.0-26.0
A1A Bridge	<b>27.6</b> (26.1)	<b>29.8</b> (28.2)	NA <sup>1</sup>

<sup>1</sup>Envelope not applicable.

Continuous monitoring of water quality is conducted at HR1 in the North Fork. Weekly dissolved oxygen data are summarized in Table 3.

**Table 3.** Weekly dissolved oxygen conditions at HR1 in the North Fork of the St. Lucie Estuary.

<b>Location</b>	<b>Depth</b>	<b>Average DO (mg/l)</b>	<b>Minimum DO (mg/l)</b>	<b>Maximum DO (mg/l)</b>
HR1	surface	6.48	4.55	8.53
HR1	bottom	4.86	2.41	6.76

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 4 and station location map is shown in Figure 5.

**Table 4.** 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	2.71	6.11 - 14.17	4.85	3.71	5.90
SF	1.57	4.37 - 11.77	8.51	7.39	9.48
NF	2.07	3.47 - 6.84	7.71	6.61	8.83
ME	1.89	3.7 - 11.23	7.70	7.10	8.30
IRL-SLE	3.49	1.32 - 3.44	6.28	5.94	6.69

NOAA satellite imagery is unavailable this week.

#### **Caloosahatchee Estuary:**

Last week total inflow into the Caloosahatchee Estuary averaged about 878 cfs (Figures 6 and 7) and last month inflow averaged about 807 cfs. Last week's provisional averaged inflows from the structures are shown in Table 5.

**Table 5.** Weekly average inflows (data is provisional).

Location	Flow (cfs)
S-77	594
S-78	547
S-79	705

Over the past week in the estuary, surface salinity increased downstream of S-79 (Table 6, Figures 8 & 9). The seven-day average salinity values are within 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 1.8 at Val I-75 and 6.2 at Ft. Myers. With no flow through S-79, daily salinity at Val I-75 is forecast in two weeks to be 6.1, and the 30-day moving average is forecast to be 3.8 (Figure 11). Salinity conditions between Val I-75 and Ft. Myers are good for tape grass.

**Table 6.** 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>1.8</b> (2.3)	<b>1.9</b> (2.5)	NA <sup>1</sup>
*Val I75	<b>2.7</b> (2.9)	<b>4.5</b> (4.6)	0.0-5.0 <sup>2</sup>
Ft. Myers Yacht Basin	<b>8.8</b> (8.3)	<b>10.8</b> (10.5)	NA
Cape Coral	<b>17.1</b> (15.5)	<b>18.4</b> (17.4)	10.0-30.0
Shell Point	<b>26.4</b> (25.9)	<b>26.0</b> (25.6)	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 7 as concentration ranges of chlorophyll *a* and dissolved oxygen at Beautiful Island, Ft. Myers, and Shell Point in the Caloosahatchee Estuary.

**Table 7.** 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.

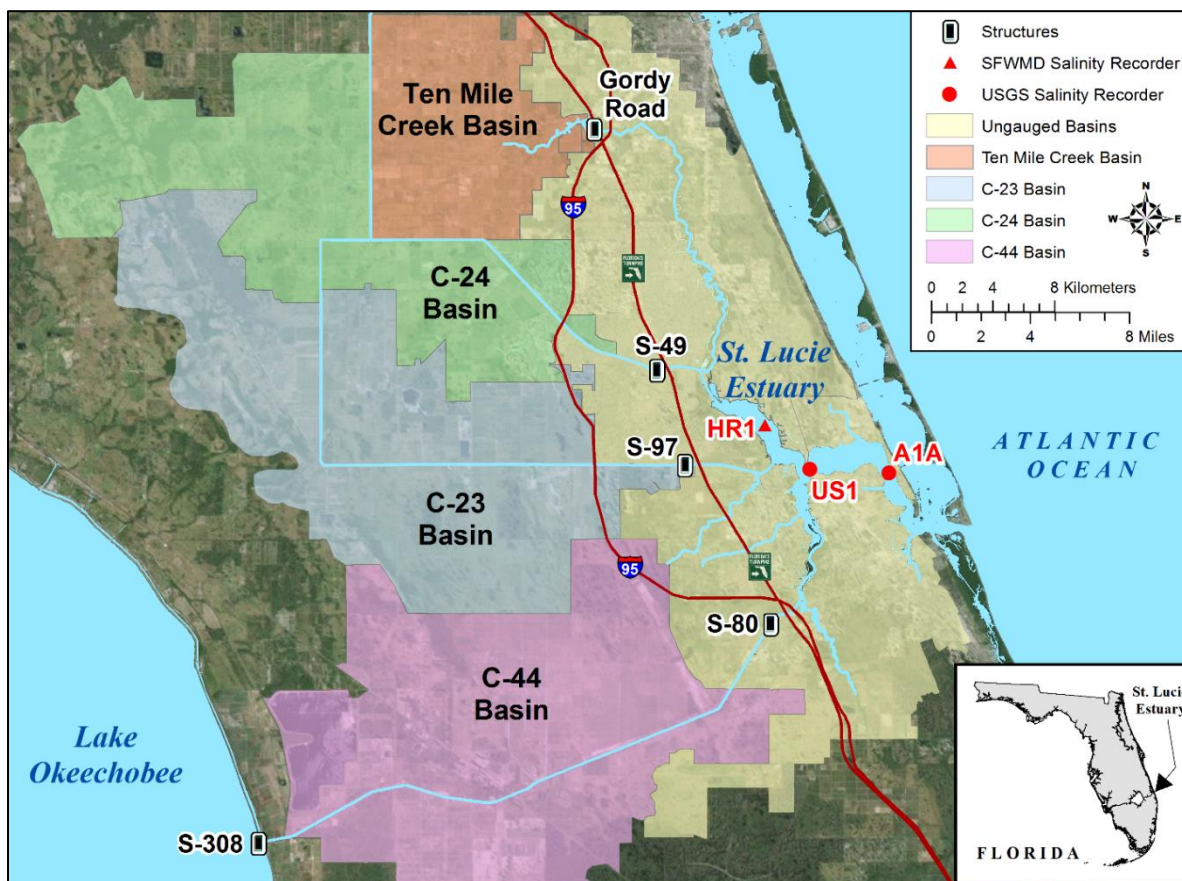
Parameter Name	RECON Monitoring Stations		
	Beautiful Island	Ft. Myers	Shell Point
Chlorophyll <i>a</i> (µg/l)	Down since 07/11/17	4.24 – 8.06	4.24 – 8.06
Dissolved Oxygen (mg/l)	Down since 07/11/17	7.24 – 8.82	1.86 – 4.12

The Florida Fish and Wildlife Research Institute reported on February 2, 2018, that *Karenia brevis*, the *Florida red tide dinoflagellate*, was observed in background concentrations in one sample collected from Lee County. A fish kill was reported in Lee County at Bowman's Beach (01/25/18 - 01/29/18). Slight respiratory irritation was reported in Lee County at Causeway Islands Park (01/28/18 and 01/29/18).

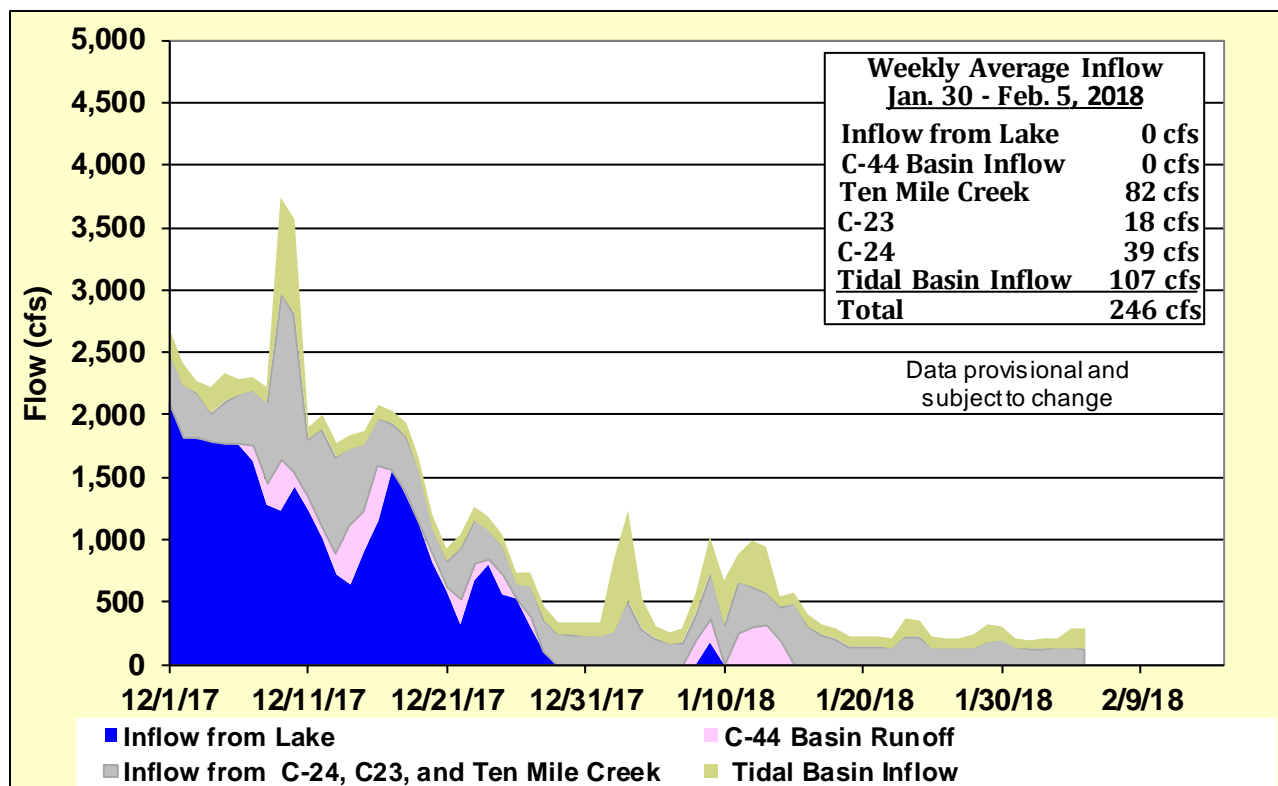
NOAA satellite imagery is unavailable this week.

### **Water Management Recommendations**

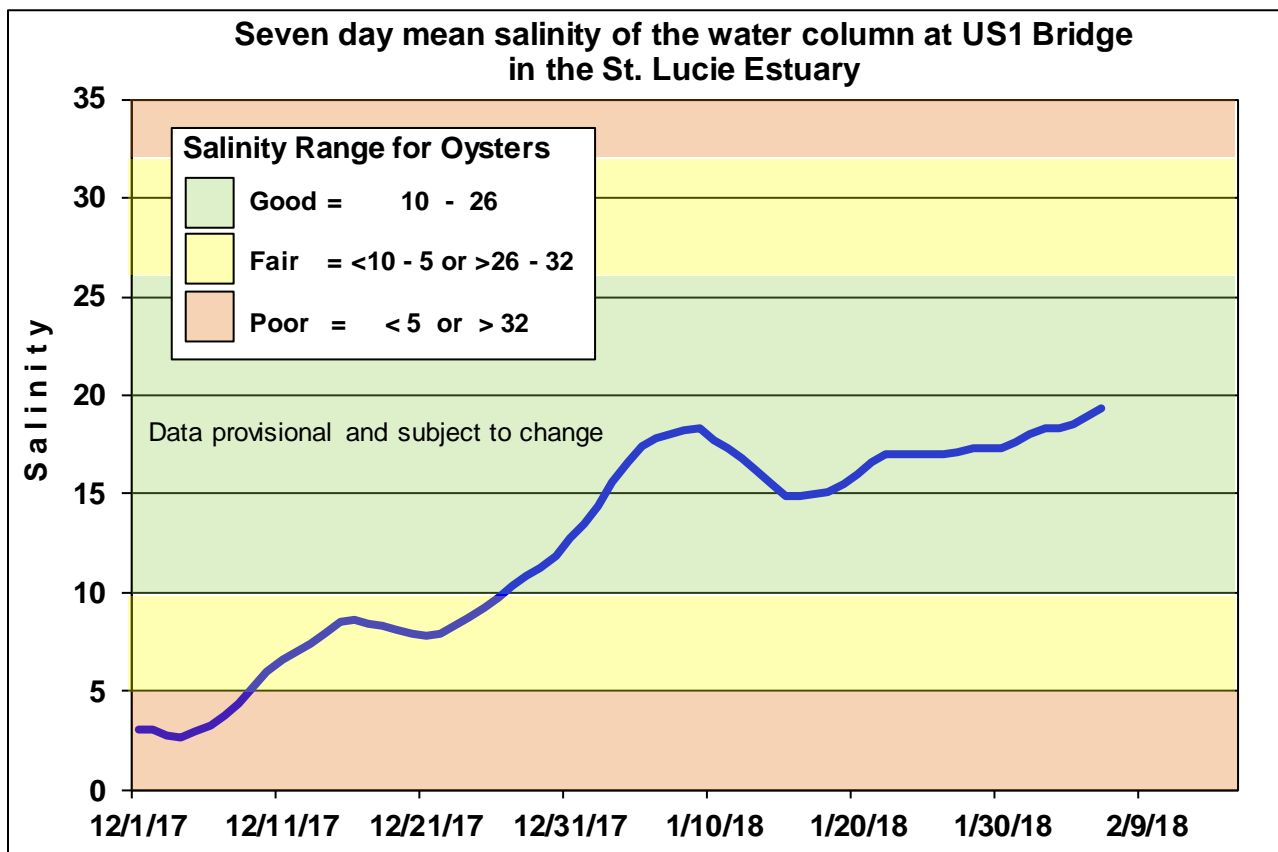
Lake stage is in the Low sub-band of 2008 LORS. Tributary hydrological conditions are normal. The 2008 LORS recommends up to 450 cfs at S-79 and up to 200 cfs at S-80. Given the current estuarine conditions, there are no ecological benefits associated with freshwater releases from Lake Okeechobee.



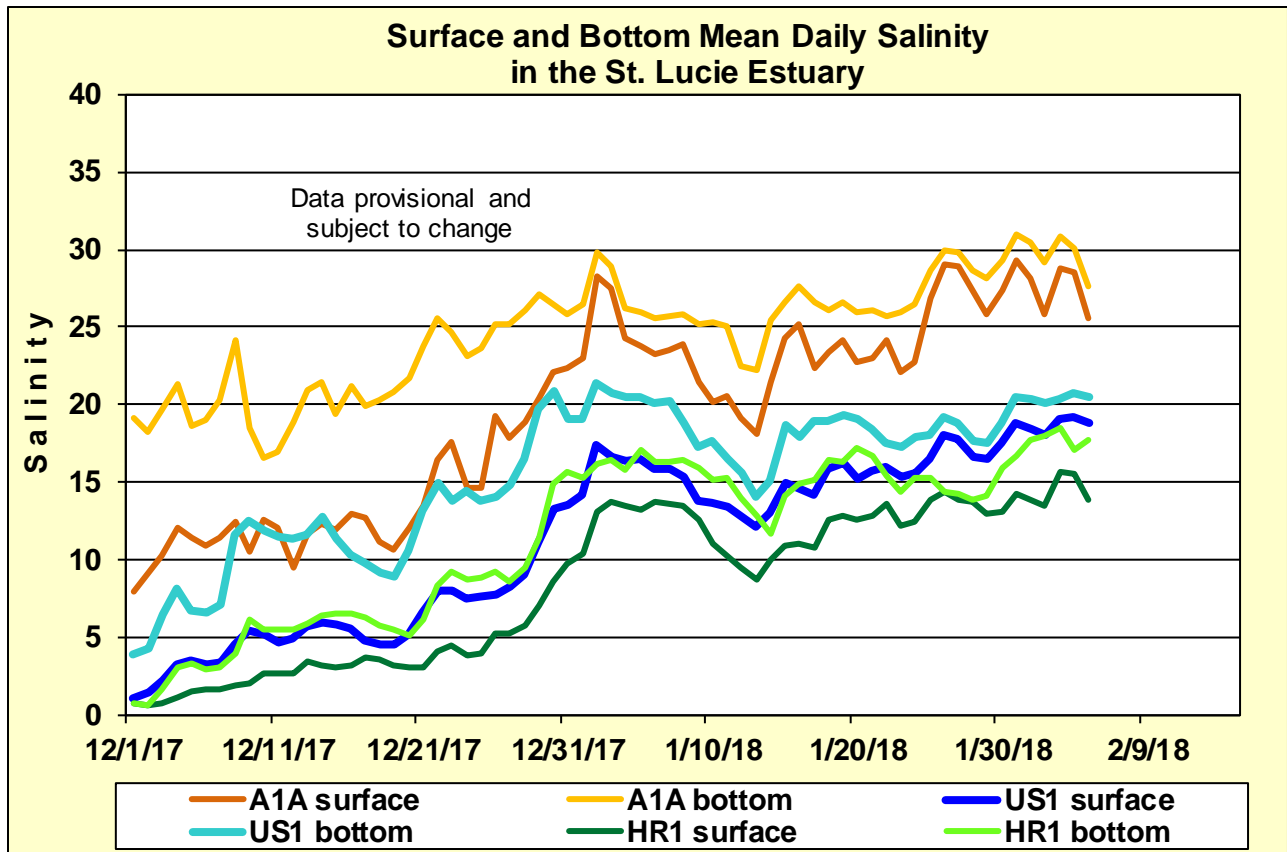
**Figure 1.** Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.



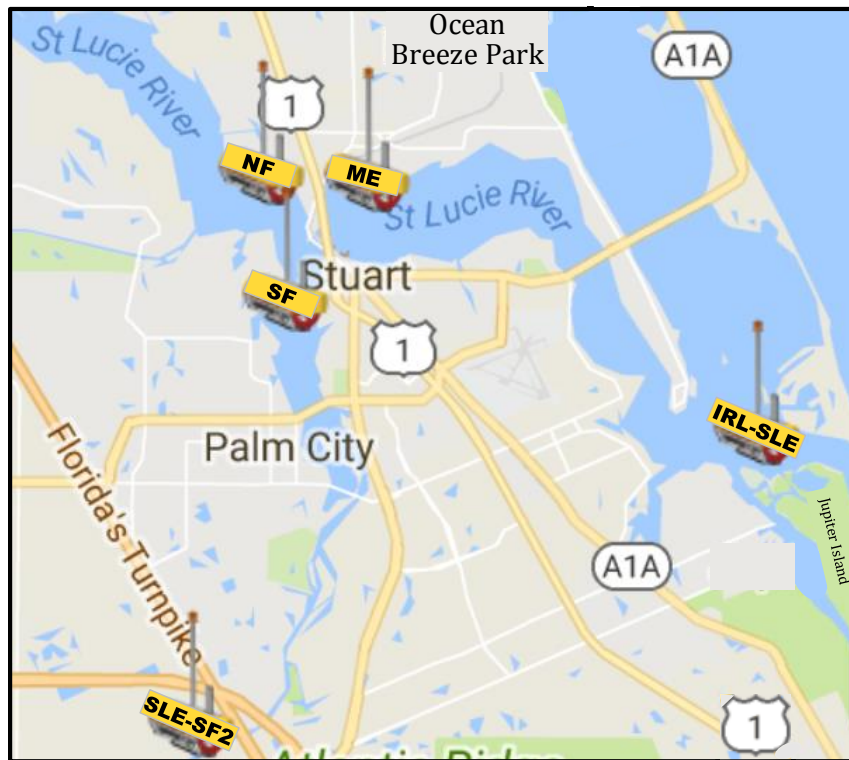
**Figure 2.** Estimated surface freshwater inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basins into the St. Lucie Estuary.



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

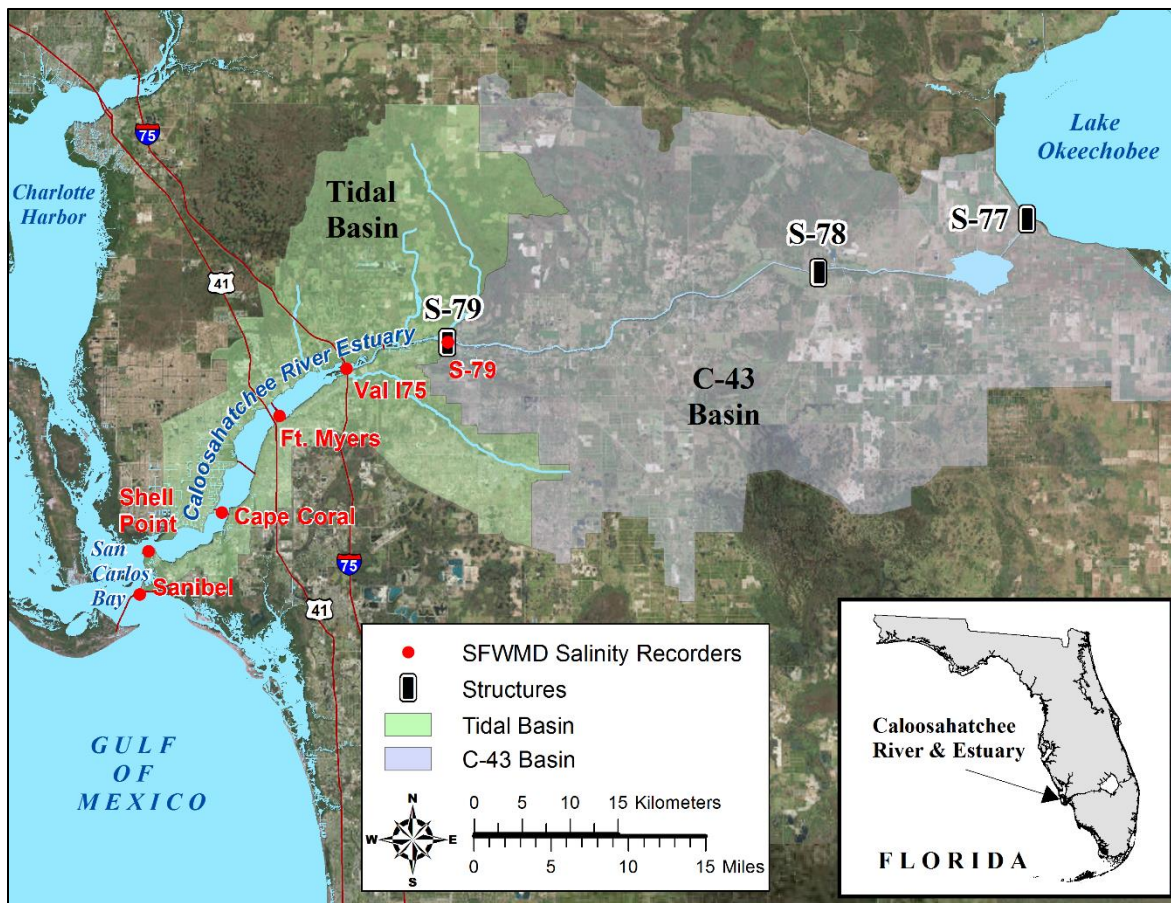


**Figure 4.** Daily mean salinity at the A1A, US1 and estimated HR1 stations.

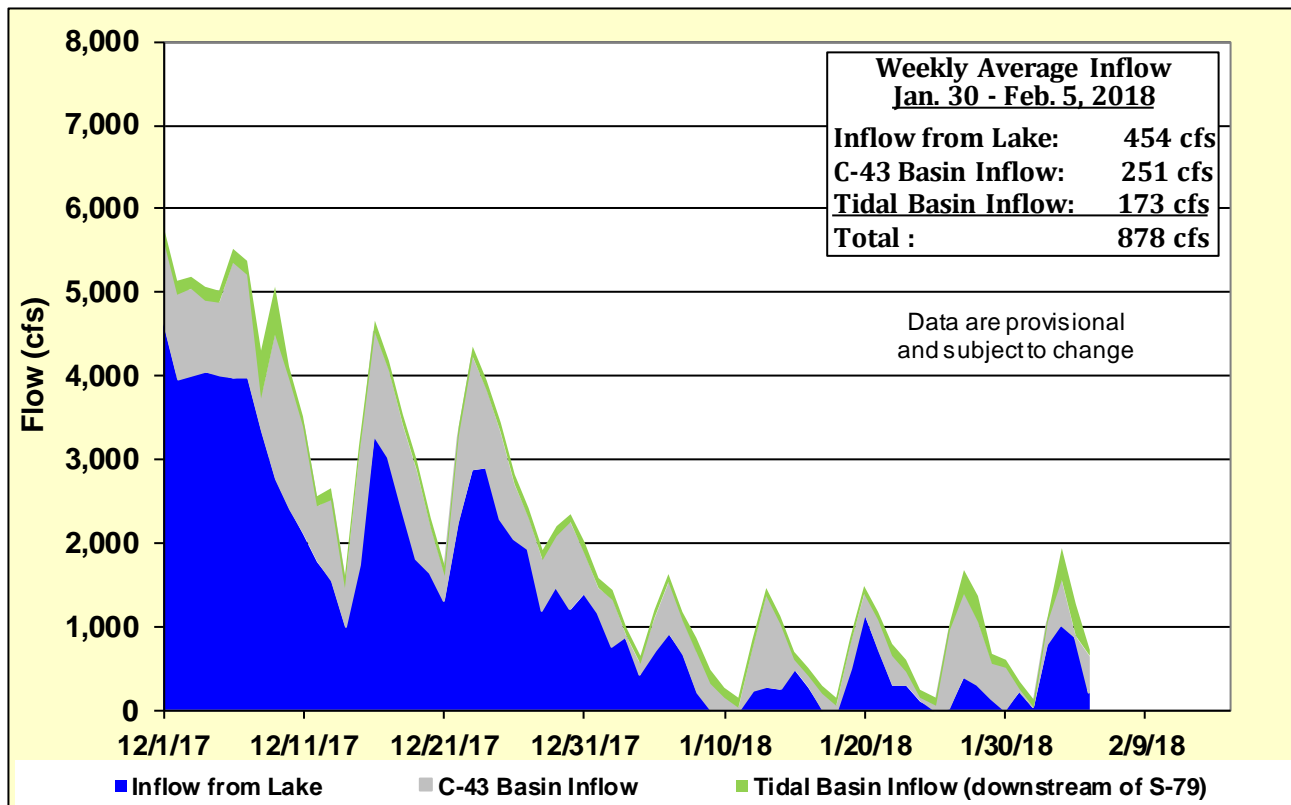


**Figure 5.** Location of FAU-HBOI LOBO water quality stations in the St. Lucie Estuary.

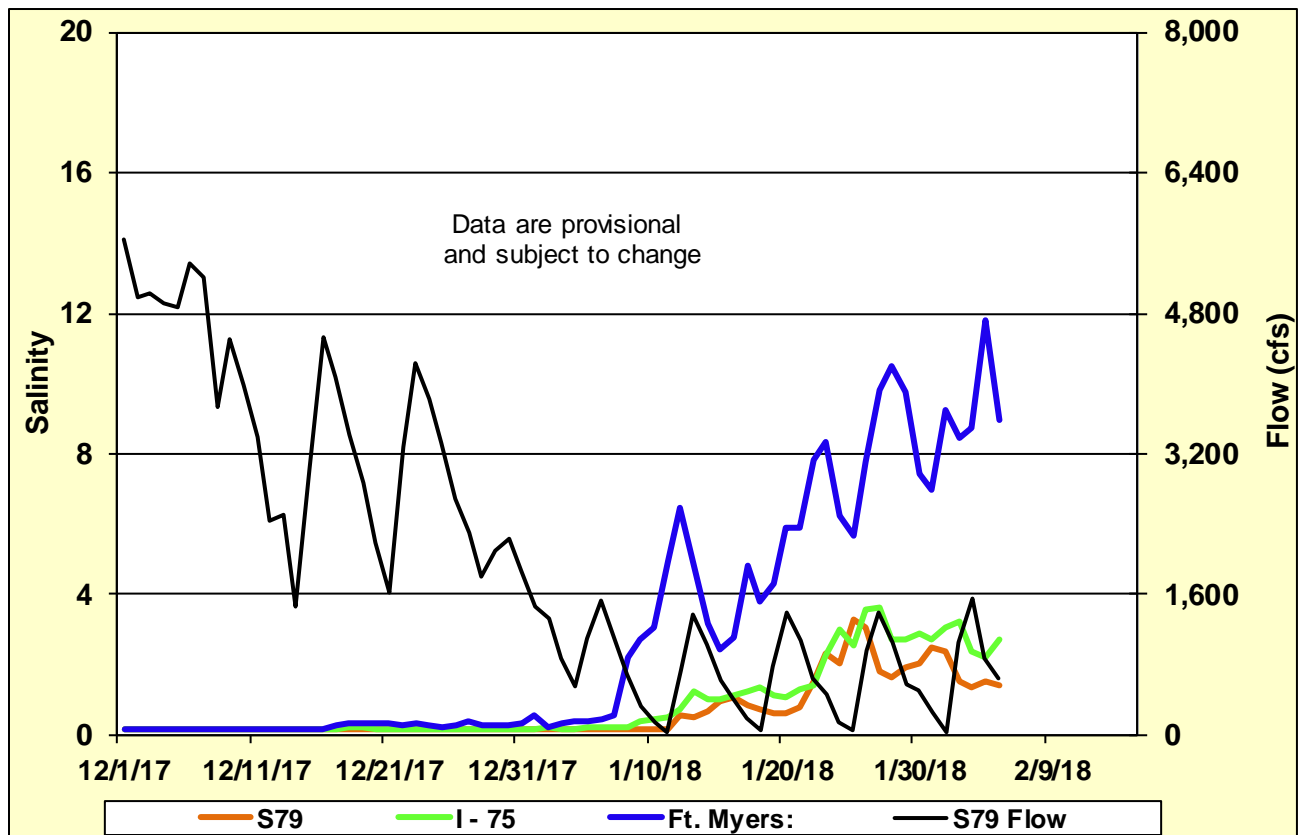




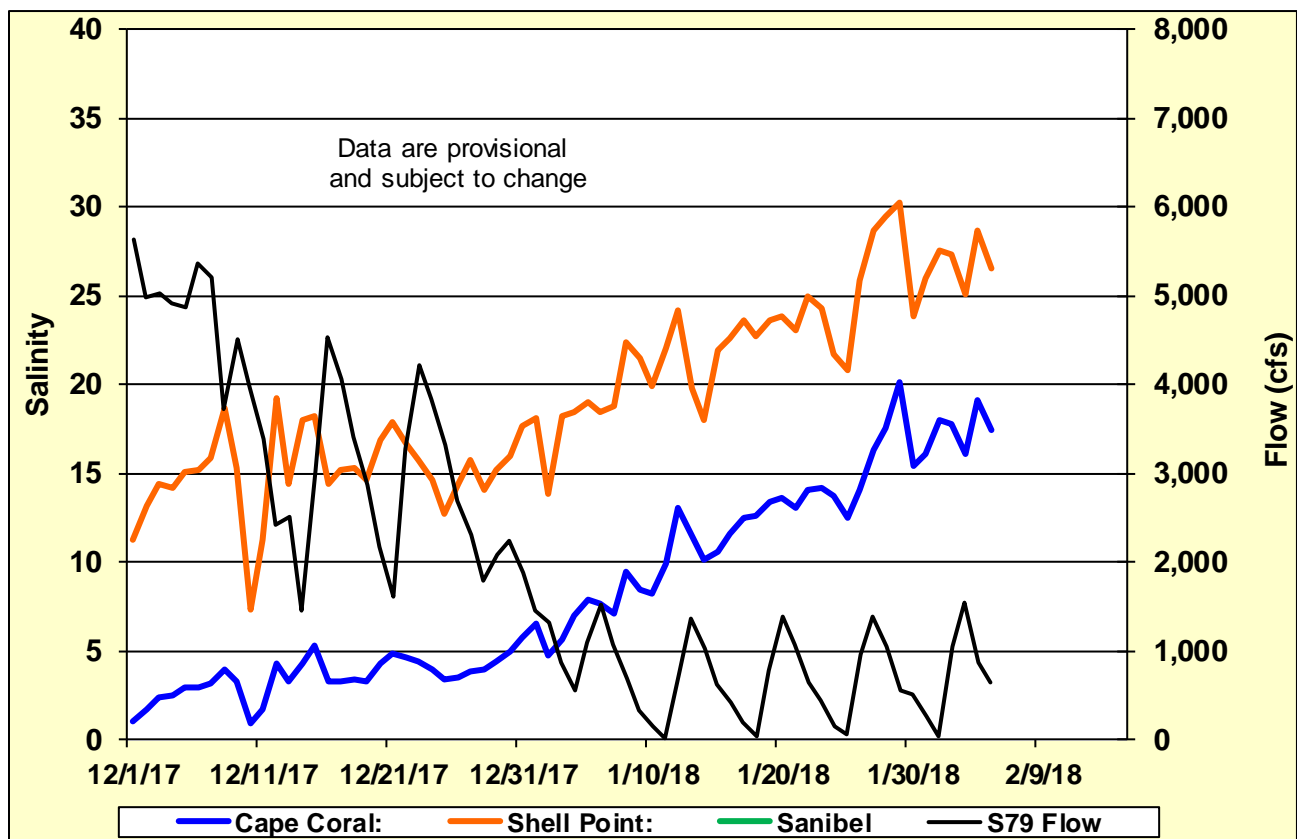
**Figure 6.** Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.



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

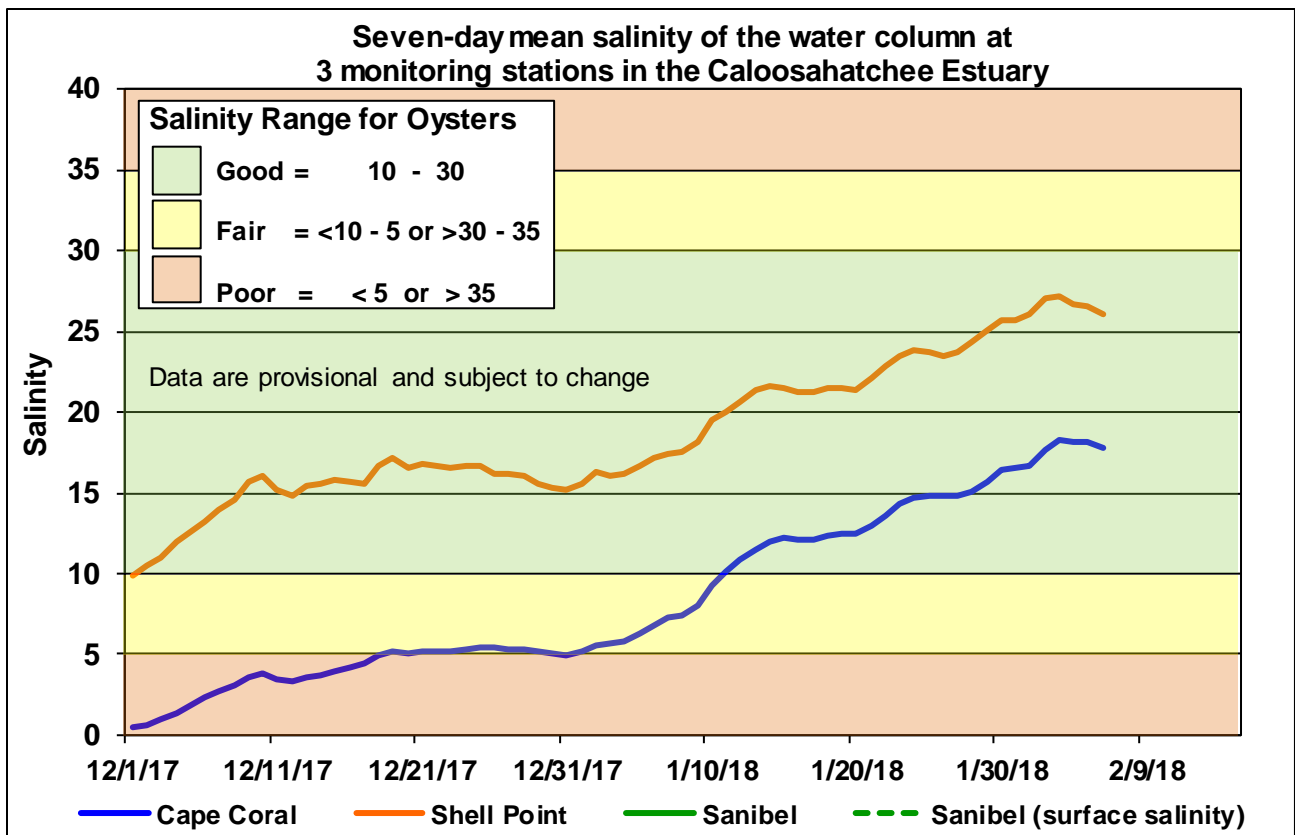


**Figure 8.** Daily mean flows at S-79 and salinity at upper estuary monitoring stations.

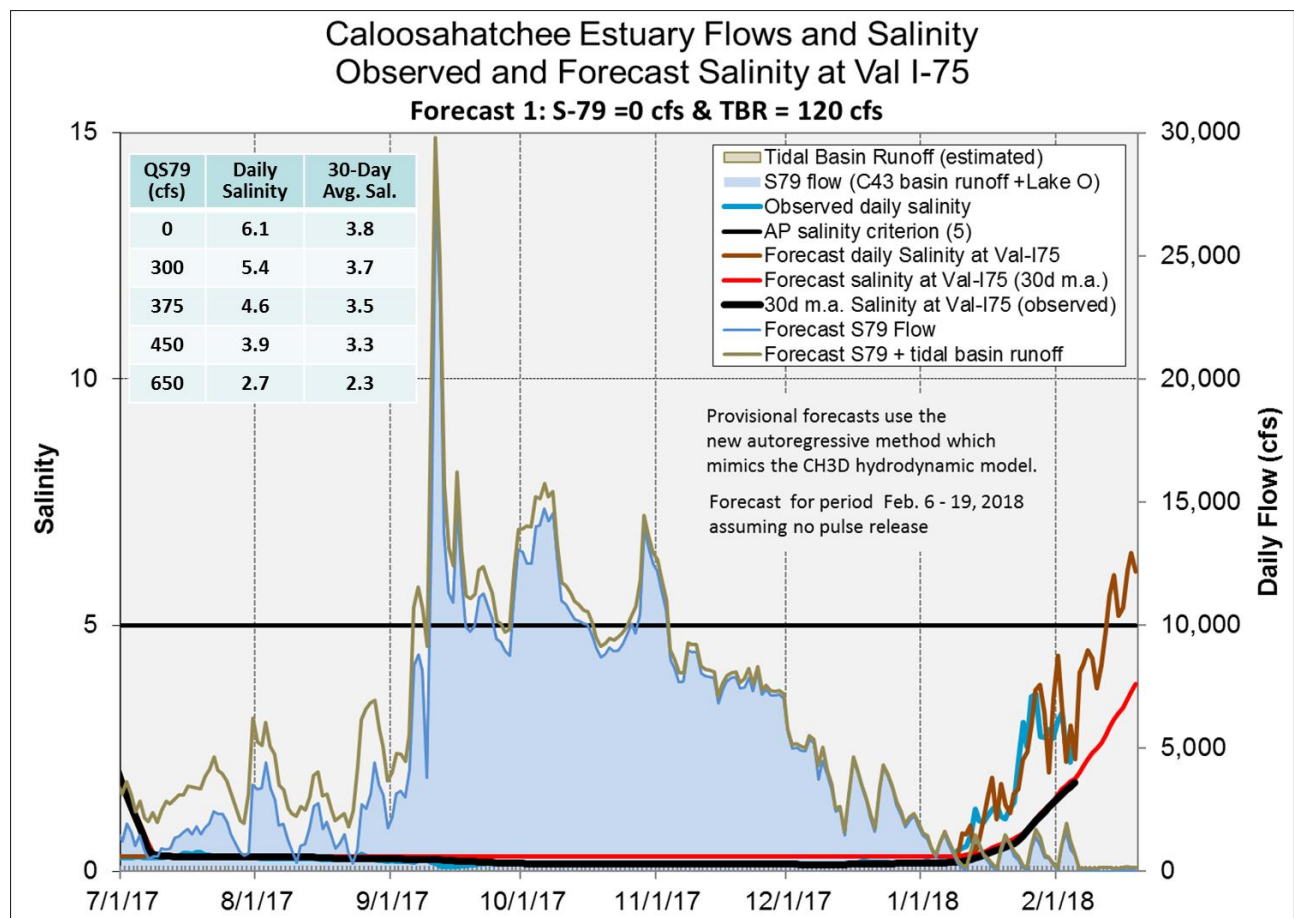


**Figure 9.** Daily mean flows at S-79 and salinity at lower estuary stations.





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

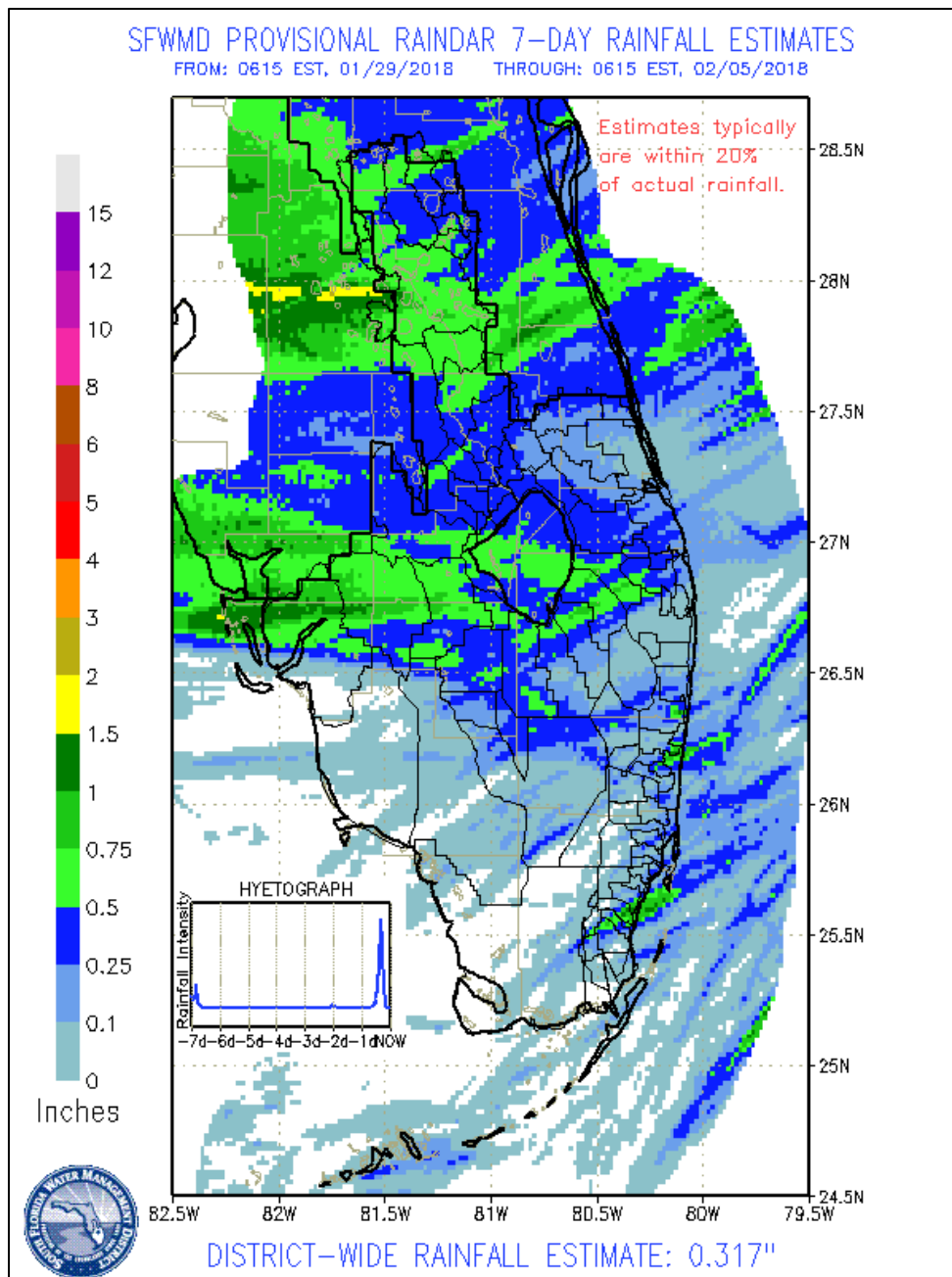


**Figure 11.** 14-day salinity forecast at Val I-75 assuming no releases at S-79.

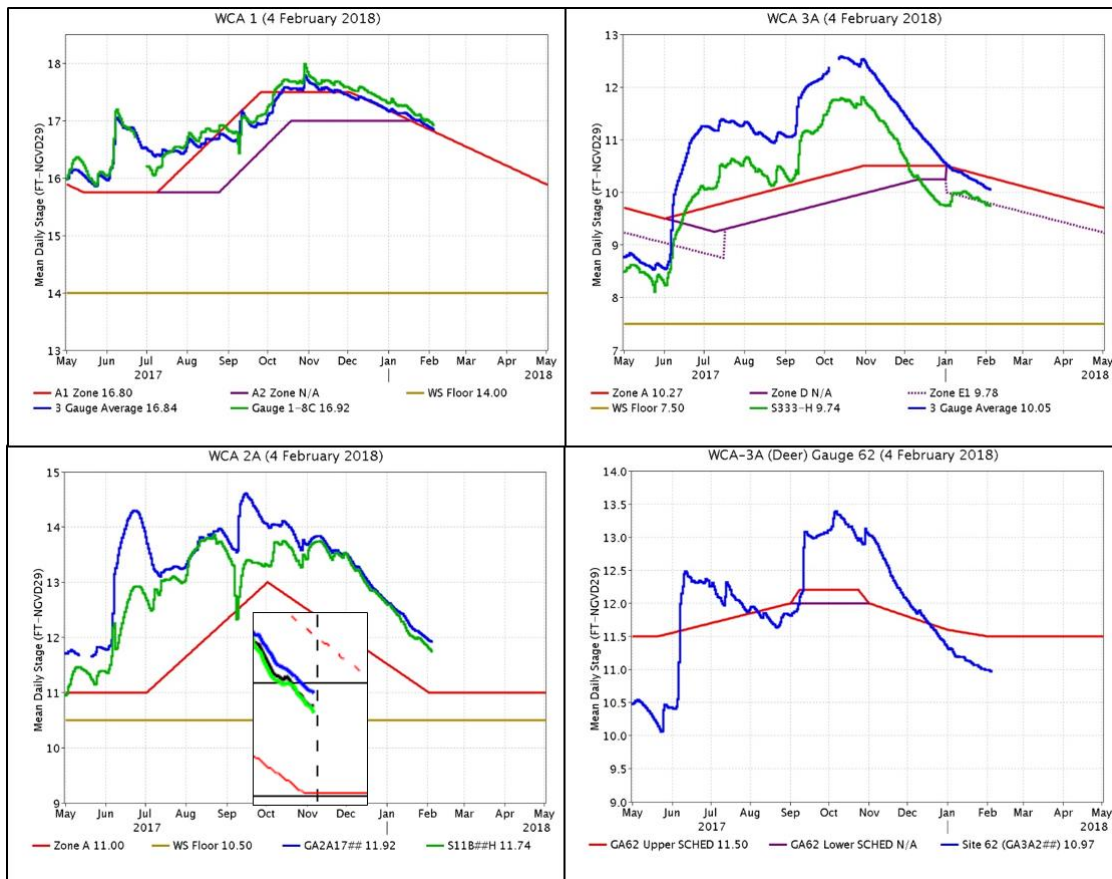
## **EVERGLADES**

At the gauges monitored for this report, the water depth across the Everglades averaged a decrease of 0.09 feet last week. Individual gauge changes in the WCAs ranged from 0.00 feet (Everglades National Park) to -0.15 feet (central WCA-3A). Pan evaporation was estimated at 1.37 inches last week.

Everglades Region	Rainfall (Inches)	Stage Change (feet)	
WCA-1	0.13	-0.09	Good
WCA-2A	0.22	-0.12	Fair
WCA-2B	0.10	-0.13	Poor
WCA-3A	0.15	-0.08	Good
WCA-3B	0.03	-0.08	Good
ENP	0.02	+0.00	Fair



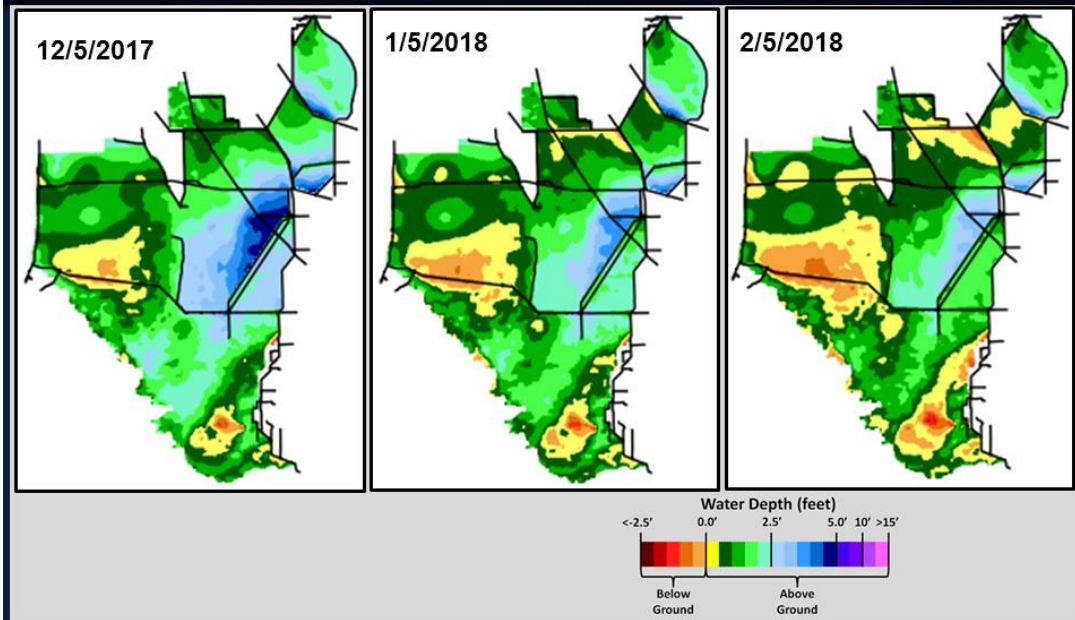
Regulation Schedules: WCA-1 three-gauge average continues trending along the top of the Zone A1 schedule, at 0.04 feet above. WCA-2A (subject to a temporary deviation – see inset) marsh stage at gauge GA2A17 remains 0.92 feet above Zone A1, but below the temporary schedule. WCA-3A three-gauge average stage is 0.22 feet below Zone A. WCA-3A at gauge 62 (northwest corner) continues to fall below the upper schedule at 0.53 feet below.



Water Depths and Changes: The WDAT tool for spatial interpolation of depth indicates a range from a low of  $-1.0$  to  $-0.5$  feet in the northeastern corner of WCA-3A, to a high of  $3.5$  to  $4.0$  feet in the extreme southern regions of WCA-1 and WCA-2B. Comparing WDAT water levels from present, water depths over the last week fell across most of the Everglades. The northwestern corner shows an extreme exception, with an increase of  $1.0$  to  $1.5$  feet.



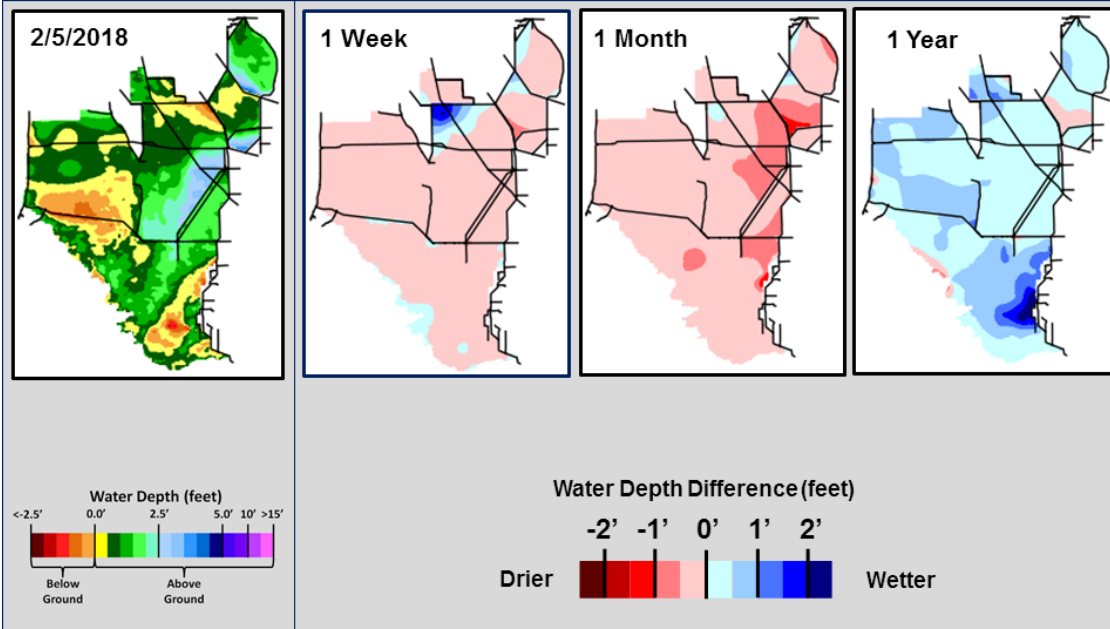
## SFWDAT Water Depth Monthly Snapshots



South Florida Water Depth Assessment Tool (SFWDAT)



## SFWDAT Everglades Difference Maps (Present – Past)



South Florida Water Depth Assessment Tool (SFWDAT)

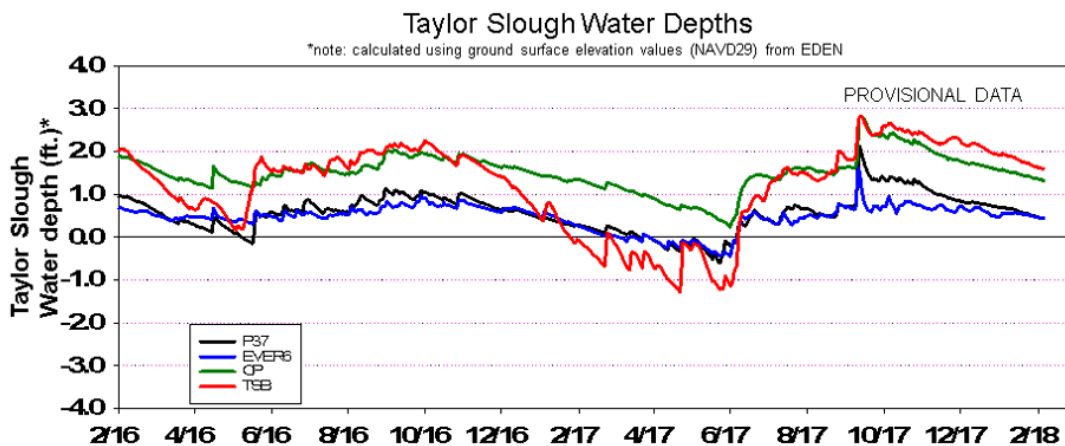
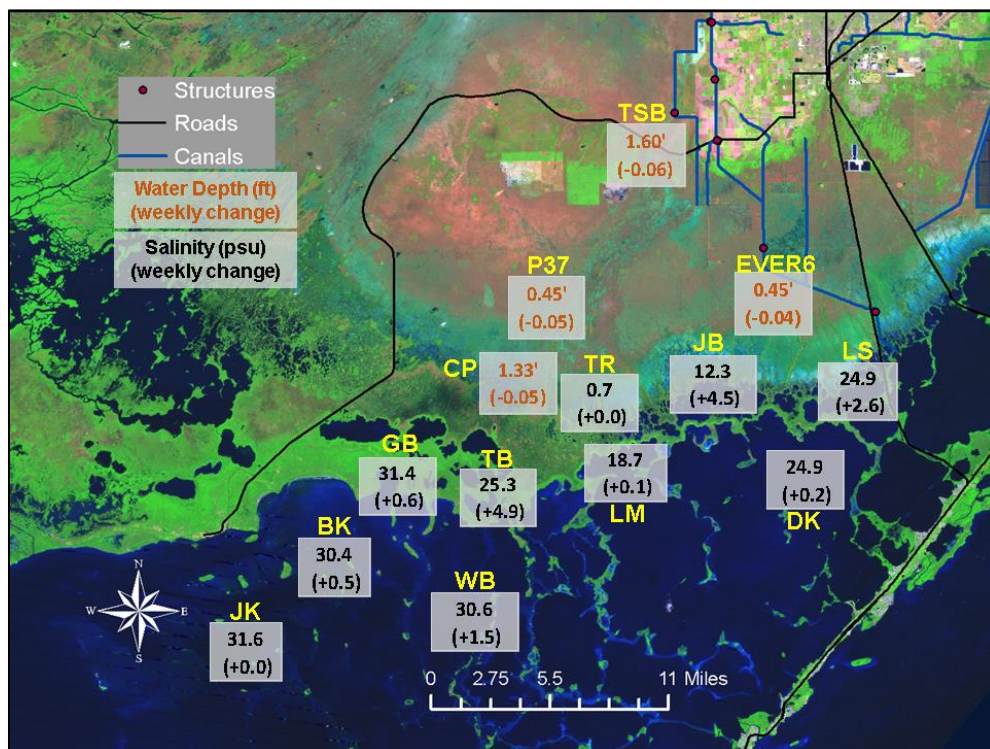


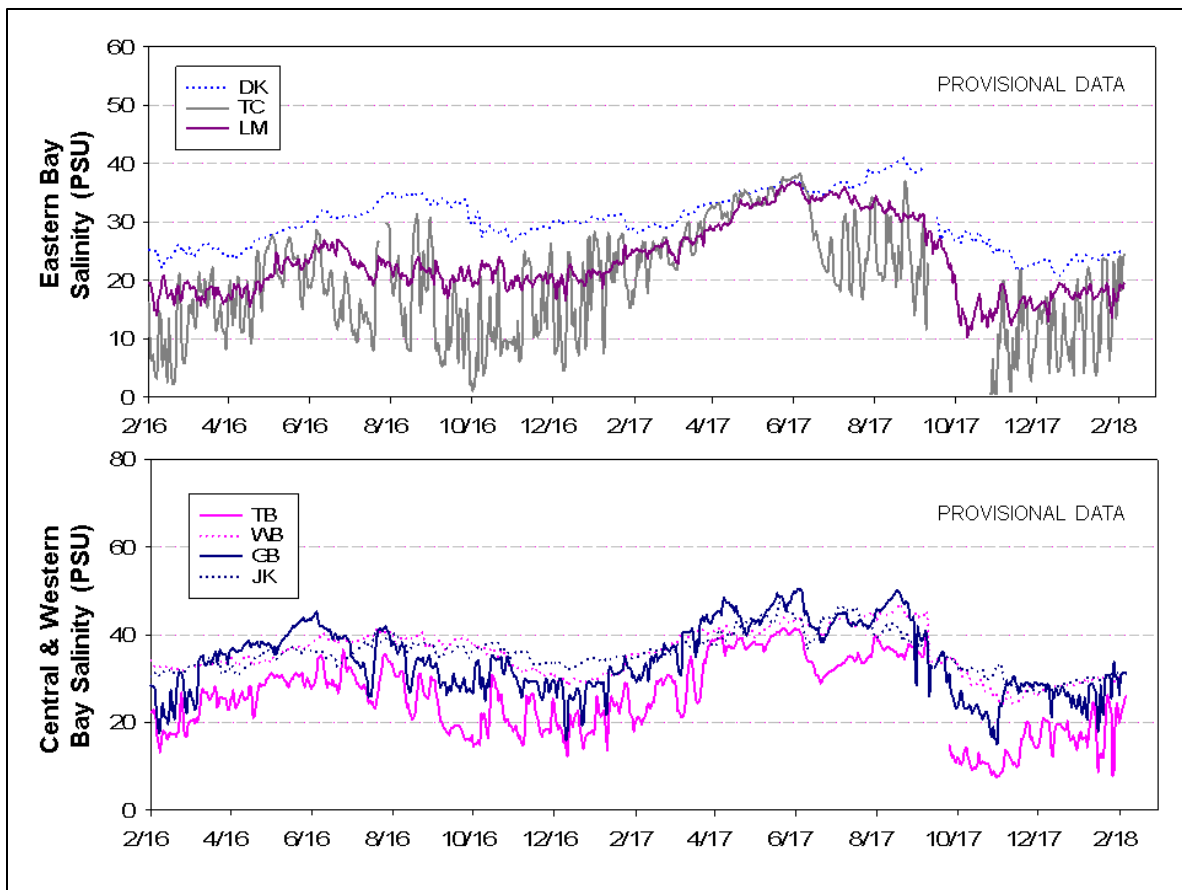
Wading bird flight conducted on February 5, 2018:

- Most foraging is occurring in northern WCA-3A
- Few birds foraging elsewhere in the system
- Great Egrets and Roseate Spoonbills nesting at Alley colony North; 6th Ave. colony nesting initiated

Taylor Slough stages: Water levels are decreasing in Taylor Slough with changes this past week ranging from -0.04 to -0.06 feet. Water levels are still 2 to 16 inches above the historical average for this time of year with the largest divergence occurring in northern Taylor Slough.

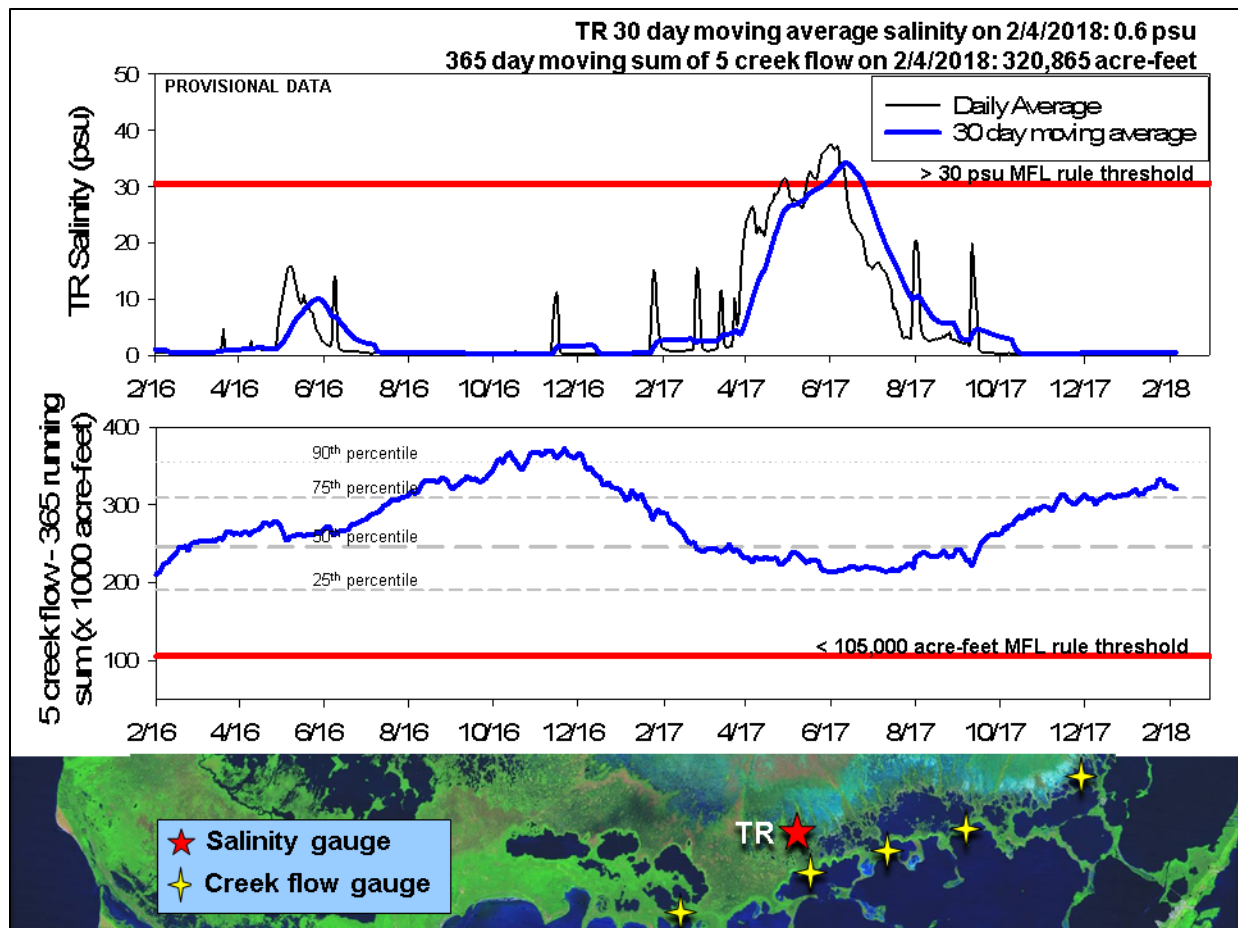
Florida Bay Salinities: Salinity changes over the last week ranged from 0 psu in the western bay to 4.9 psu in the central nearshore region. Current salinities range from 12 psu in the northeastern embayments to 32 psu in the western bay. Compared to historical averages, salinities range from 3 psu below to 2 psu above average.





Florida Bay MFL: Mangrove zone daily average salinity remains near fresh at 0.7 psu. The 30-day moving average is 0.6 psu. The weekly cumulative flow from the five creeks denoted by yellow stars on the map decreased by 5,000 acre-feet over the last week to end at 200 acre-feet. This matches the historical average for this time of year as flows are expected to decrease through the dry season. The 365-day moving sum of flow from the five creeks decreased about 6,500 acre-feet over the last week to end at 320,865 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

There continues to be concern regarding the higher than average water depths in the southern part of WCA-3A, however in the northern regions of that basin, depths have reached levels of ecological importance and the northeastern region of that basin would benefit from a slower recession rate. In contrast, the northwestern region of the basin has been experiencing a moderate recession rate over the last month and conditions there are stable. WCA-2A is currently experiencing a recession rate that falls within the fair range for wading bird foraging, as depth conditions there appear to be improving. Slowing the recession rate to between 0.05 and 0.09 feet per week would help improve and maintain conditions for wading bird foraging. Keeping water within the Everglades system and routing to areas in need of water better serves the ecology of the Everglades. More specific recommendations appear in the summary table below. The red text represents new or modified information or recommendations.

## Everglades Ecological Recommendations, February 6th, 2018 (red is new)

Area	Current Condition	Cause(s)	Recommendation	Reasons
<b>WCA-1</b>	Stages decreased -0.09'	Rainfall, ET, management	Maintain 0.07 to 0.10 ft/week recession rates.	Protect habitat and facilitate invasive plant treatments.
<b>WCA-2A</b>	Stages decreased -0.12'	Rainfall, ET, management	Maintain depths at temporary regulation schedule or slightly above. Slow recession rates.	Foster conditions for wildlife and optimal wading bird foraging. Protect nesting habitat.
<b>WCA-2B</b>	Stages decreased -0.13'	Rainfall, ET, management	Maintain depths at regulation schedule or slightly above.	Protect upstream/downstream habitat and wildlife. Foster conditions for wildlife and wading bird foraging
<b>WCA-3A NE</b>	Stages decreased -0.13'	Rainfall, ET, management	Slower recession rates with additional inflows would be beneficial.	Protect habitat and wildlife, foster conditions for wading bird foraging and protect nesting habitat.
<b>WCA-3A NW</b>	Stages decreased -0.03'	Rainfall, ET, management	Maintain recession rates and continue current flows.	
<b>Central WCA-3A S</b>	Stages decreased -0.15'	Rainfall, ET, management	Maintain moderate recession rates as depths are approaching 2.5 feet at Site 65.	Water depths above 2.5 feet at gauge 65 are indicative that tree islands are flooded and under stress. Depths exceeded that mark on 18 June, meaning the tree islands have been flooded for <b>234</b> days. Reach optimal depths and recession rates for wildlife.
<b>Southern WCA-3A S</b>	Stages decreased -0.02'	Rainfall, ET, management		
<b>WCA-3B</b>	Stages decreased -0.08'	Rainfall, ET, management	Maintain depths at regulation schedule.	Protect habitat and wildlife from high water stress.
<b>ENP-SRS</b>	Stages decreased -0.00'	ET, rainfall, topography, management	Make discharges to the Park according to the 2012 WCP rainfall plan.	Keep peat wet to promote native habitat and maintain wetland plant and animal communities. Protect habitat and wildlife, including apple snail reproduction.
<b>Taylor Slough</b>	Stage changes ranged from -0.04' to -0.06'	Rain, ET, inflows	Move water southward as possible	When available, provide freshwater buffer for downstream conditions.
<b>FB- Salinity</b>	Salinity changes ranged 0.0 to +4.9 psu.	Rain, ET, inflows, wind	Move water southward as possible	When available, provide freshwater to main low salinity buffer and promote water movement.