

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, Assistant Executive Director, Executive Office Staff

**FROM:** SFWMD Staff Environmental Advisory Team

**DATE:** February 26, 2020

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

### **Summary**

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

A front system will bring moderate to locally heavy rains mainly north and east tonight and Wednesday. Dry air remains in place over the District but daytime heating should be able to generate some widely scattered showers this afternoon. A cold front will push into central Florida tonight and be near Lake Okeechobee by sunrise Wednesday. Scattered shower and thunderstorms will accompany the front as it moves into the area. The southward progress of the frontal boundary will slow Wednesday morning but a secondary cold front will then move through north Florida Wednesday morning and into central Florida Wednesday evening and then through south Florida Wednesday night. Expect the combination of these two boundaries to generate areas of moderate to locally heavy showers and thunderstorms over the District Wednesday. Activity should shift south of the District late Wednesday night with a few light showers lingering south east Thursday morning before very dry air spreads across the area during the day Thursday. The prospects for rains will then be fairly limited over the next week as a reinforcing front pushes through Saturday with just some widely scattered patches of light rain. Some moisture and spotty light showers will return along the east coast Monday night. In the extended forecast, below-average rains are forecast as the next frontal boundary stalls north of the District the latter part of next week.

#### **Kissimmee**

Tuesday morning stages were 53.1 feet NGVD (4.9 feet below schedule) in East Lake Toho, 54.1 feet NGVD (0.9 feet below schedule) in Toho, and 51.6 feet NGVD (0.3 feet above schedule) in Kissimmee-Cypress-Hatchineha; headwater stages were 46.3 feet NGVD at S-65A and 25.9 feet NGVD at S-65D. Tuesday morning discharges were 995 cfs at S-65, 964 cfs at S-65A, 880 cfs at S-65D and 514 cfs at S-65E. Dissolved oxygen concentration in the Kissimmee River averaged 7.8 mg/L for the week through Sunday. Kissimmee River mean floodplain depth on Sunday was 0.24 feet. Today's recommendations: Maintain S-65A discharge at 950 cfs or less to protect USACE construction work on the Kissimmee River floodplain. Continue the snail kite recession on Lake Tohopekaliga to reach low pool (52.0 feet NGVD) on June 1, 2020.

#### **Lake Okeechobee**

Lake Okeechobee stage was 12.77 feet NGVD on February 24, 2020, down 0.15 feet from the previous week, and down 0.06 feet from the previous month. The Lake remains in the Base Flow sub-band and is 0.17 feet above the Beneficial Use sub-band. Water levels moved below the ecological envelope (which varies seasonally from 12.5 – 15.5 feet NGVD +/- 0.5 feet) on October 15, 2019 and are currently 1.06 feet below the bottom of the envelope. Lake stages below the ecological envelope will continue to benefit recovering submerged and emergent marsh vegetation at low elevations but will reduce aquatic habitat for fish and wildlife. Wading bird and snail kite nesting efforts are likely to be lower for the second consecutive year on the Lake if stages continue below the ecological envelope throughout the breeding season.

## **Estuaries**

Total inflow to the St. Lucie Estuary averaged 355 cfs over the past week with no flow coming from Lake Okeechobee. Over the past week, salinities increased throughout the estuary. Salinity at the US1 Bridge is in the good range for adult eastern oysters. Total inflow to the Caloosahatchee Estuary averaged 834 cfs over the past week with 319 cfs coming from the Lake. Over the past week, salinity remained about the same from S-79 to Cape Coral but decreased further downstream. Salinities are in the good range for tape grass at Val I-75 and Ft. Myers. Salinities are in the good range for adult eastern oysters at Cape Coral and Shell Point and in the fair range at Sanibel. Lake stage is in the Base Flow sub-band of 2008 LORS. Tributary hydrological conditions are dry. The 2008 LORS release guidance suggests releases of up to 450 cfs at S-79 and up to 200 cfs at S-80.

## **Stormwater Treatment Areas**

Over the past week, 15,100 ac-ft of Lake Okeechobee water was delivered to the FEBs/STAs. The total amount of Lake releases sent to the FEBs/STAs in WY2020 (since May 1, 2019) is approximately 113,900 ac-feet. The total amount of inflows to the STAs in WY2020 is approximately 910,000 ac-feet. Most STA cells are above target, except STA-1E cells which are near or below target and STA-5/6 cells that continue to dry out. STA-1E Western Flow-way is offline for the Restoration Strategies project to fill and grade Cells 5 and 7. Operational restrictions are in place in STA-1W Northern Flow-way related to STA-1W Expansion #1 startup activities, in STA-3/4 Eastern Flow-way for energy dissipator installation, in STA-1E Eastern and Central Flow-way for East Distribution Cell levee repairs, in STA-1E Central Flow-way, STA-2 Flow-way 3, and STA-2 Flow-way 4 for vegetation management activities, and in STA-5/6 Flow-ways 2 and 3 following the Restoration Strategies project to grade non-effective treatment areas. This week, if 2008 LORS recommends Lake releases to the WCAs and the conditions allow, releases will be sent to STA-2 or A-1 FEB/STA-3/4.

## **Everglades**

Current stages in WCA-3A remain below average (Site 62 in the northwest is 0.16 feet below and Site 63 in the northeast is 0.85 feet below) for this time of year and salinities are above average in Florida Bay. Conserving fresh water in the Everglades, distributing it to where depths are low (WCA-3A North) and allowing it to flow south has important ecological benefit. As wading bird nesting begins in the Everglades, ecological recommendations move towards moderating recession rates where and when possible. Generally, this time of year, rates from -0.05 to -0.09 feet per week are desirable to optimize conditions for prey concentration and capture. However, given the below average stages in key foraging areas it currently remains ecologically desirable to conserve as much water as possible. This recommendation is expected to change as wading bird nesting increases in the Everglades. Little precipitation fell over Taylor Slough and Florida Bay last week and stages fell slightly but remain above average, especially in Upper Taylor Slough. Flows from the 5 creeks that discharge into Florida Bay increased last week. Questionable salinity data from the central and western nearshore heavily influenced the averages reported this week.

## Supporting Information

### KISSIMMEE BASIN

#### Kissimmee Basin Rainfall

The Upper Kissimmee Basin received 0.08 inches of rainfall in the past week and the Lower Basin received 0.06 inches (SFWMD Daily Rainfall Report 2/24/2020).

#### Upper Kissimmee Basin

Stages and departures in the Kissimmee Chain of Lakes (KCOL) are shown in **Table 1**. KCOL stage hydrographs with respective regulation schedules and rainfall are shown in Figures 1-3.

**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: 2/25/2020

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)						
							2/23/20	2/16/20	2/9/20	2/2/20	1/26/20	1/19/20	1/12/20
Lakes Hart and Mary Jane	S-62	12	LKMJ	60.9	R	61.0	-0.1	-0.2	0.0	0.0	0.0	-0.1	0.0
Lakes Myrtle, Preston, and Joel	S-57	8	S-57	61.1	R	61.1	0.0	-0.1	0.0	0.1	0.0	0.0	0.1
Alligator Chain	S-60	0	ALLI	63.5	R	64.0	-0.5	-0.5	-0.5	-0.5	-0.6	-0.5	-0.5
Lake Gentry	S-63	27	LKGT	61.4	R	61.5	-0.1	0.1	0.0	0.0	-0.1	-0.1	-0.1
East Lake Toho	S-59	0	TOHOE	53.2	R	58.0	-4.8	-4.4	-4.1	-3.7	-3.4	-3.2	-3.1
Lake Toho	S-61	653	TOHOW, S-61	54.1	R	55.0	-0.9	-0.7	-0.5	-0.4	-0.5	-0.5	-0.5
Lakes Kissimmee, Cypress, and Hatchineha	S-65	918	KUB011, LKIS5B	51.7	R	51.4	0.3	-0.1	-0.4	-0.8	-0.7	-0.6	-0.6

<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> A = projected ascension line, R = USACE regulation schedule, S = temporary recession target line, T = temporary schedule, 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: 2/25/2020

Metric	Location	1-Day Average			Average for the Preceding 7-Days <sup>1</sup>						
		2/23/2020	2/23/20	2/16/20	2/9/20	2/2/20	1/26/20	1/19/20	1/12/20	1/5/20	12/29/19
Discharge (cfs)	S-65	940	918	922	853	808	719	606	408	211	283
Discharge (cfs)	S-65A <sup>2</sup>	944	930	895	823	766	736	557	445	314	317
Discharge (cfs)	S-65D <sup>2</sup>	998	960	946	881	785	777	632	438	553	454
Headwater Stage (feet NGVD)	S-65D <sup>2</sup>	25.90	25.86	25.82	25.79	25.76	25.77	25.78	25.76	25.75	25.84
Discharge (cfs)	S-65E <sup>2</sup>	786	879	844	861	759	713	601	434	502	441
Discharge (cfs)	S-67	0	0	0	0	0	0	0	4	0	0
DO (mg/L) <sup>3</sup>	Phases I & II/III river channel	8.5	7.8	8.2	8.9	9.1	8.5	8.0	8.3	8.2	8.6
Mean depth (feet) <sup>4</sup>	Phase I floodplain	0.24	0.26	0.27	0.24	0.18	0.18	0.25	0.20	0.26	0.23

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

<sup>2</sup>S-65A discharge combines S-65A with auxiliary structures; S-65D discharge combines discharge at S-65D, S-65DX1, and S-65DX2; S-65D stage averages stage at S-65D and S-65DX1; S-65E discharge combines S-65E and S-65EX1.

<sup>3</sup>DO is the average for sondes at KRBN, PC62, PC33, PD62R, and PD42R.

<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)

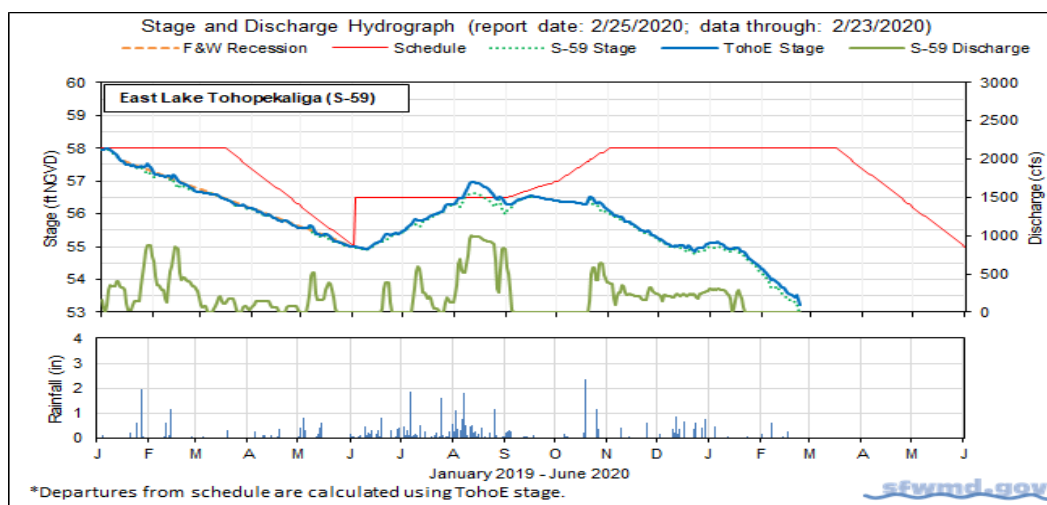


Figure 1.

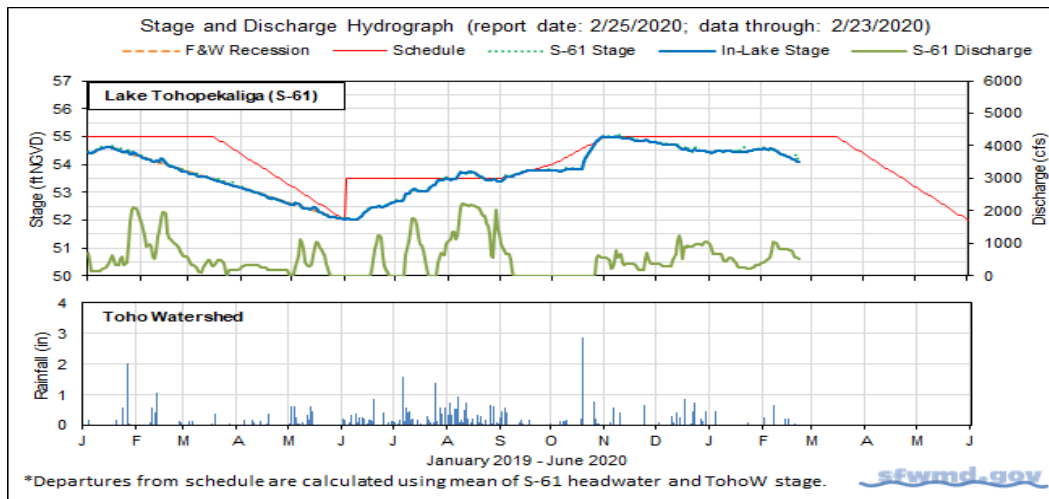


Figure 2.

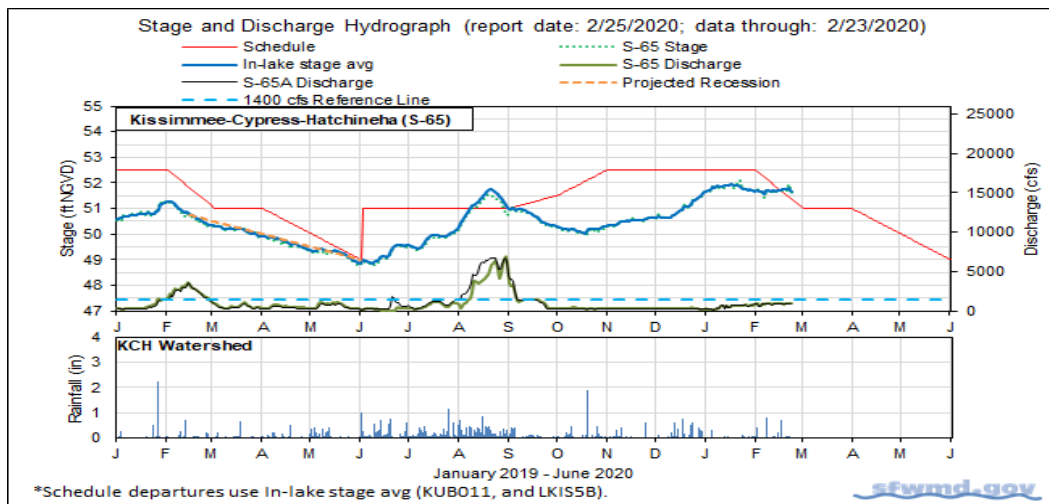
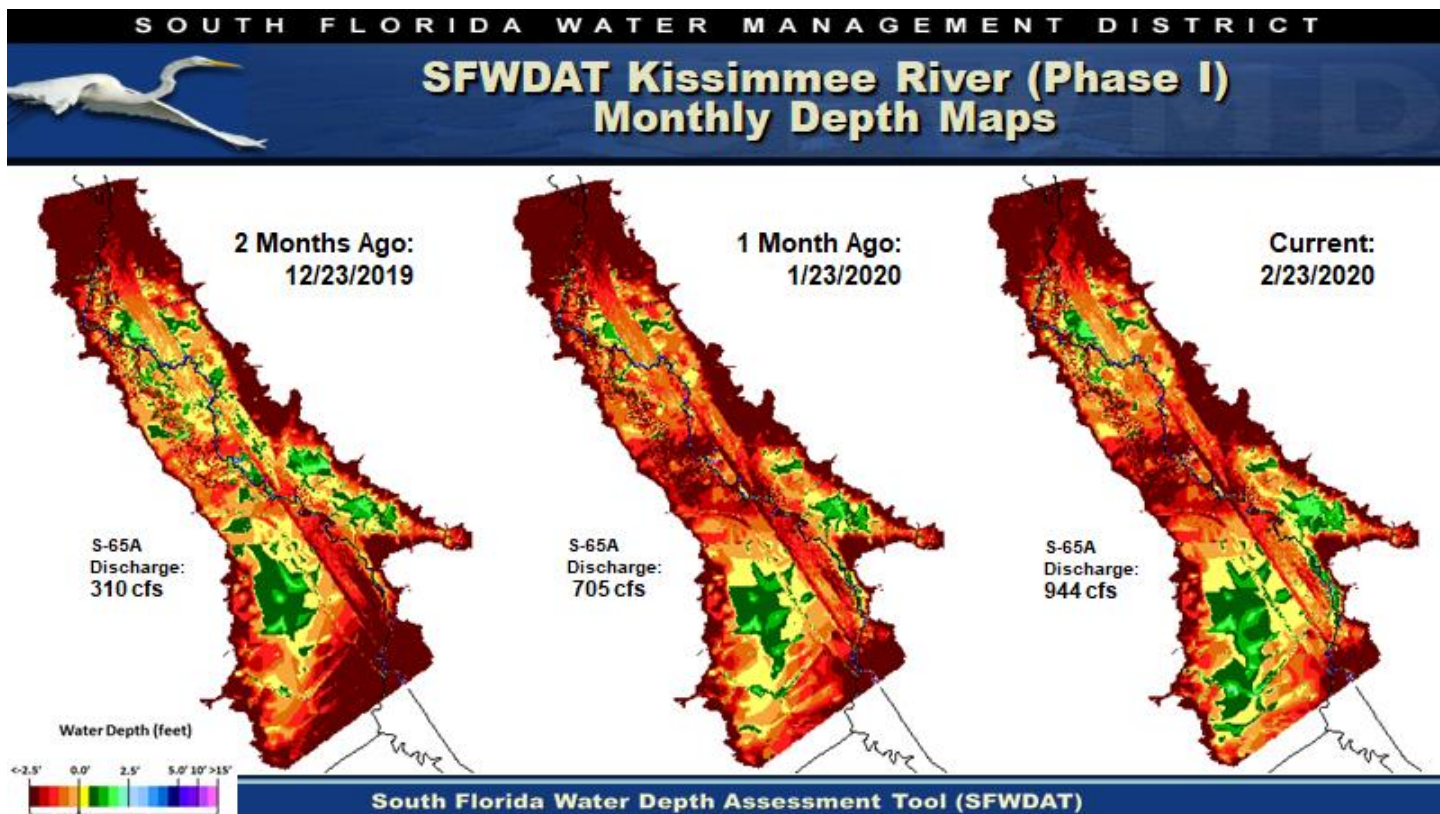
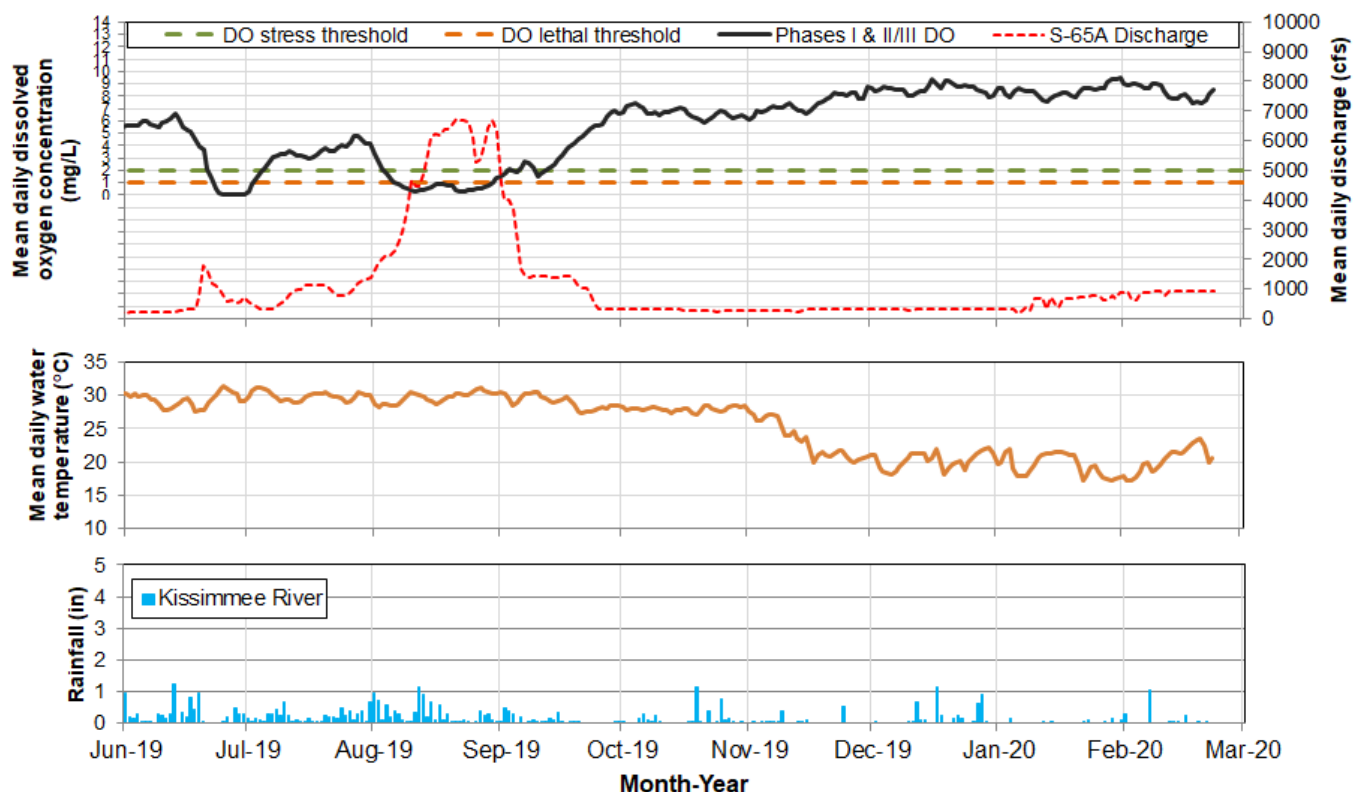


Figure 3.



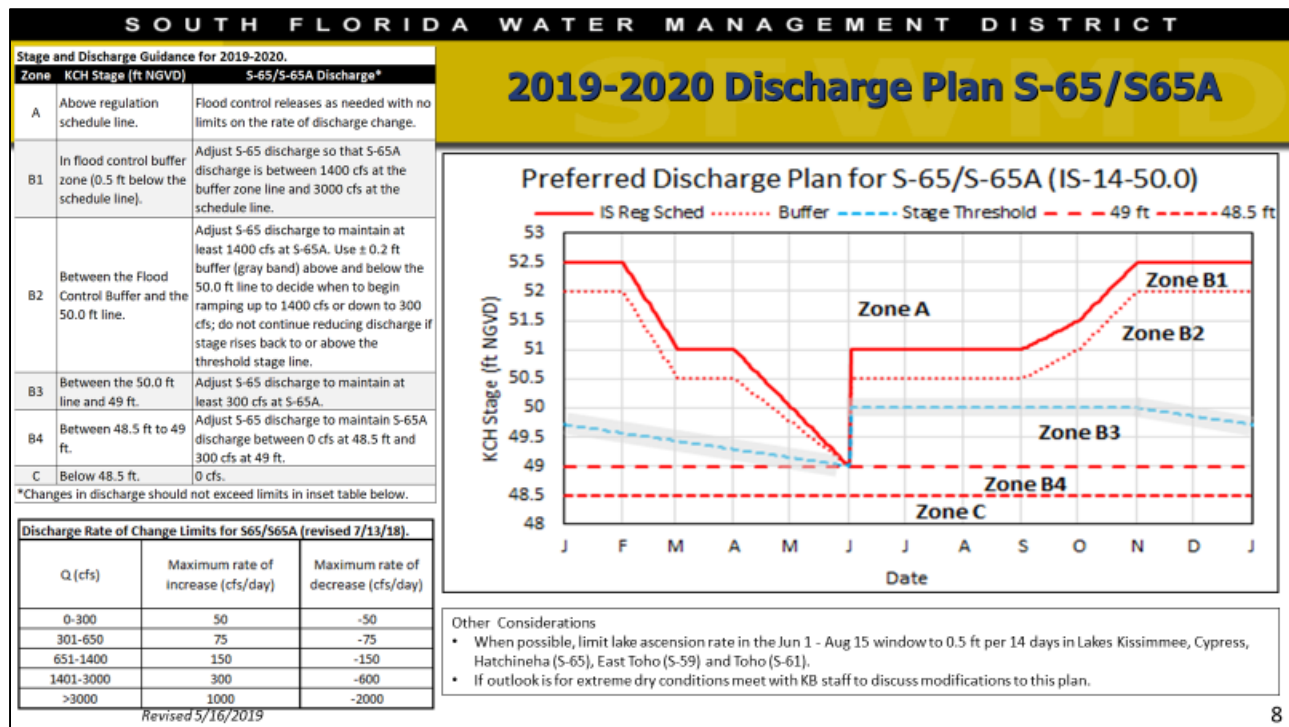
**Figure 4.** Phase I area floodplain water depths for this week, one month ago, and two months ago. Note that the WDAT color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to January 16, 2012.



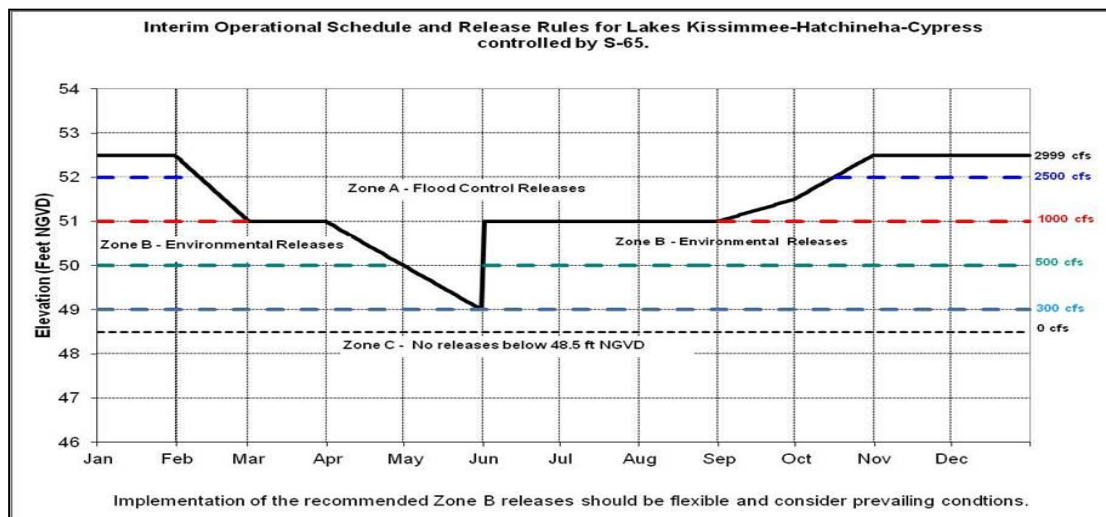
Report Date: 2/25/2020; data are through: 2/23/2020.

**Figure 5.** Mean daily dissolved oxygen, discharge, temperature and rainfall in the Phases I/II/III river channel.





**Figure 6.** The 2019-2020 Discharge Plan for S-65/S-65A.



**Figure 7.** Interim operations schedule for S-65. The discharge schedule shown to the right has not been used in recent years.



Figure 8. The Kissimmee Basin.



## **LAKE OKEECHOBEE**

Lake Okeechobee stage is 12.77 feet NGVD, 0.06 feet lower than a month ago and 0.04 feet lower than a year ago (Figure 1). The Lake is currently 1.06 feet below the preferred ecological envelope (Figure 2). Lake stages moved up into the Low sub-band on September 4, 2019 then moved back down into the Base Flow sub-band on September 11, 2019 where it has remained since (Figure 3). Lake stage has been gradually declining from around 14.0 feet NGVD since early September 2019 but hovered near 13.0 feet NGVD through December and January. According to RAINДАР, no rain fell directly over the Lake during the past week and watershed rainfall averaged less than 0.10 inches (Figure 4).

The average daily inflows (minus rainfall) decreased by roughly 100 cfs from the previous week, while outflows were very similar at 2,634 cfs. Most of the inflow came from the Kissimmee River (S-65E & S-65EX1), while most of the outflows (1,948 cfs) were released south through the S-350 structures. Releases west through S-77 (C-43/Caloosahatchee Canal) and east through the S-308 (C-44/St Lucie Canal) totaled less than 700 cfs. Total lake inflows and outflows for the past 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 5 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 second snail kite survey of the 2020 breeding season was completed on the Lake on February 10, 2020, which found zero nests and <50 snail kites lake wide. Surveys on the Kissimmee Chain of Lakes, for comparison, recorded over 400 snail kites, but no nests. This is the first year in over a decade that no kite nests were found in the state through the second breeding season survey.

Water quality samples collected on February 4 – 5, 2020 found elevated values of Chlorophyll a (Chla) along the western portion of the Lake at POLESOUT (25 µg/L), L005 (37 µg/L), Palmout (24 µg/L), POLE3S (22 µg/L), and the pelagic station L008 (28 µg/L). One eastern pelagic station (L004) was also elevated at 26 µg/L Chla (Figure 6). Microcystin was not found (detection limit of 0.20 µg/L) at any station.

Concurrent satellite imagery (February 3, 2020) using NOAA's cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3 OLCI sensor data suggested low-moderate potential for cyanobacterial blooms in the same general areas in early February (Figure 7). The latest satellite image (February 23, 2020) showed reduced bloom potential but still some elevated risk along the NW shore and near Fisheating Bay (Figure 7).

## **Water Management Summary**

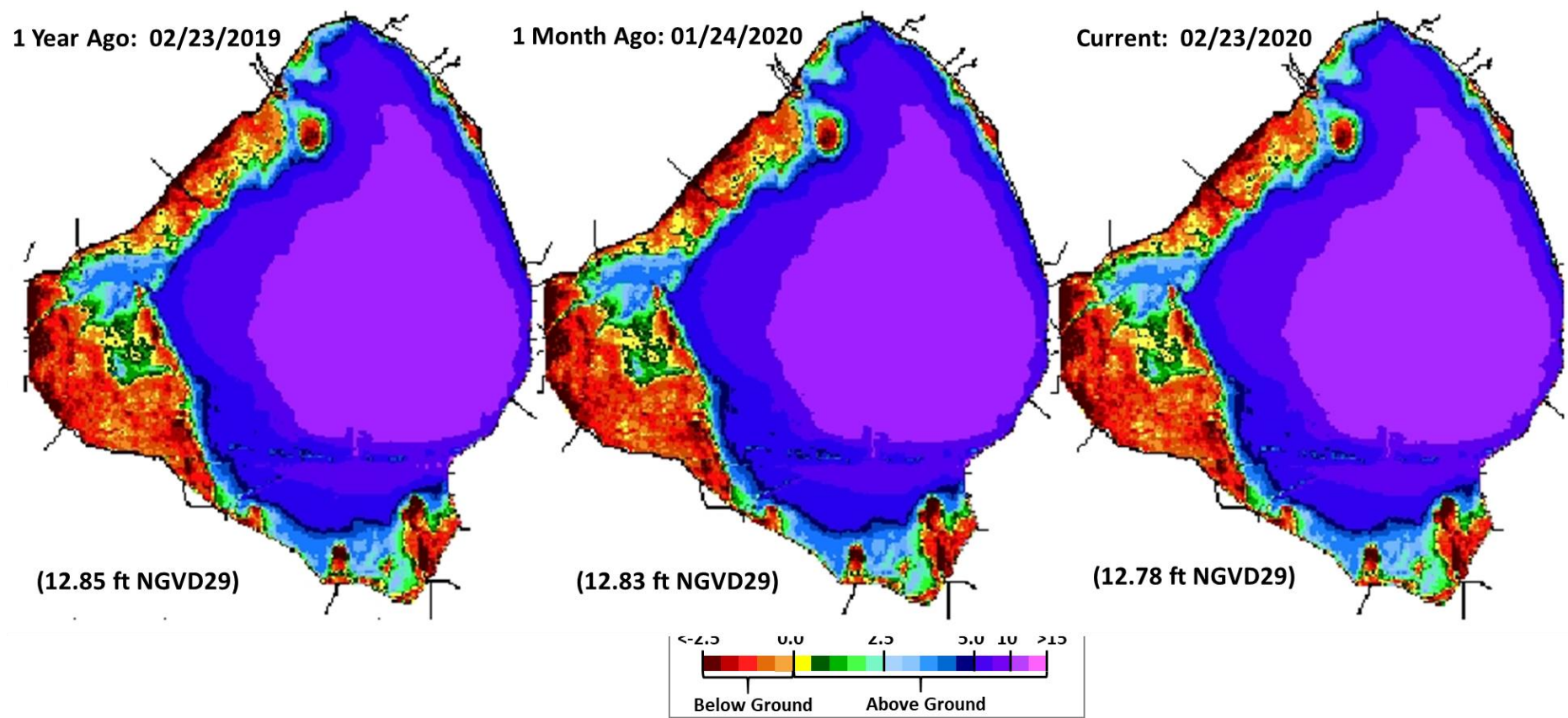
Lake Okeechobee stage was 12.77 feet NGVD on February 24, 2020, down 0.15 feet from the previous week, and down 0.06 feet from the previous month. The Lake remains in the Base Flow sub-band and is 0.17 feet above the Beneficial Use sub-band. Water levels moved below the ecological envelope (which varies seasonally from 12.5 – 15.5 feet NGVD +/- 0.5 feet) on October 15, 2019 and are currently 1.06 feet below the bottom of the envelope. Lake stages below the ecological envelope will continue to benefit recovering submerged and emergent marsh vegetation at low elevations but will reduce aquatic habitat for fish and wildlife. Wading bird and snail kite nesting efforts are likely to be lower for the second consecutive year on the Lake if stages continue below the ecological envelope throughout the breeding season.

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

INFLOWS	Previous week Avg Daily CFS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)
S-65E & S-65EX1	840	891	0.4
S-71 & S-72	5	15	0.0
S-84 & S-84X	129	6	0.0
Fisheating Creek	33	27	0.0
S-154	0	0	0.0
S-191	0	0	0.0
S-133 P	0	0	0.0
S-127 P	1	0	0.0
S-129 P	0	0	0.0
S-131 P	4	0	0.0
S-135 P	0	0	0.0
S-2 P	0	0	0.0
S-3 P	0	0	0.0
S-4 P	0	0	0.0
L-8 Backflow			
Rainfall	979	0	0.0
<b>Total</b>	<b>1990</b>	<b>939</b>	<b>0.4</b>

OUTFLOWS	Previous week Avg Daily CFS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)
S-77	592	386	0.2
S-308	419	301	0.1
S-351	686	1004	0.5
S-352	17	0	0.0
S-354	731	944	0.4
L-8 Outflow	131	NR	
ET	1531	1461	0.7
<b>Total</b>	<b>4107</b>	<b>4095</b>	<b>1.9</b>

Provisional Data



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

## Lake Okeechobee Stage vs (Draft) Ecological Envelope

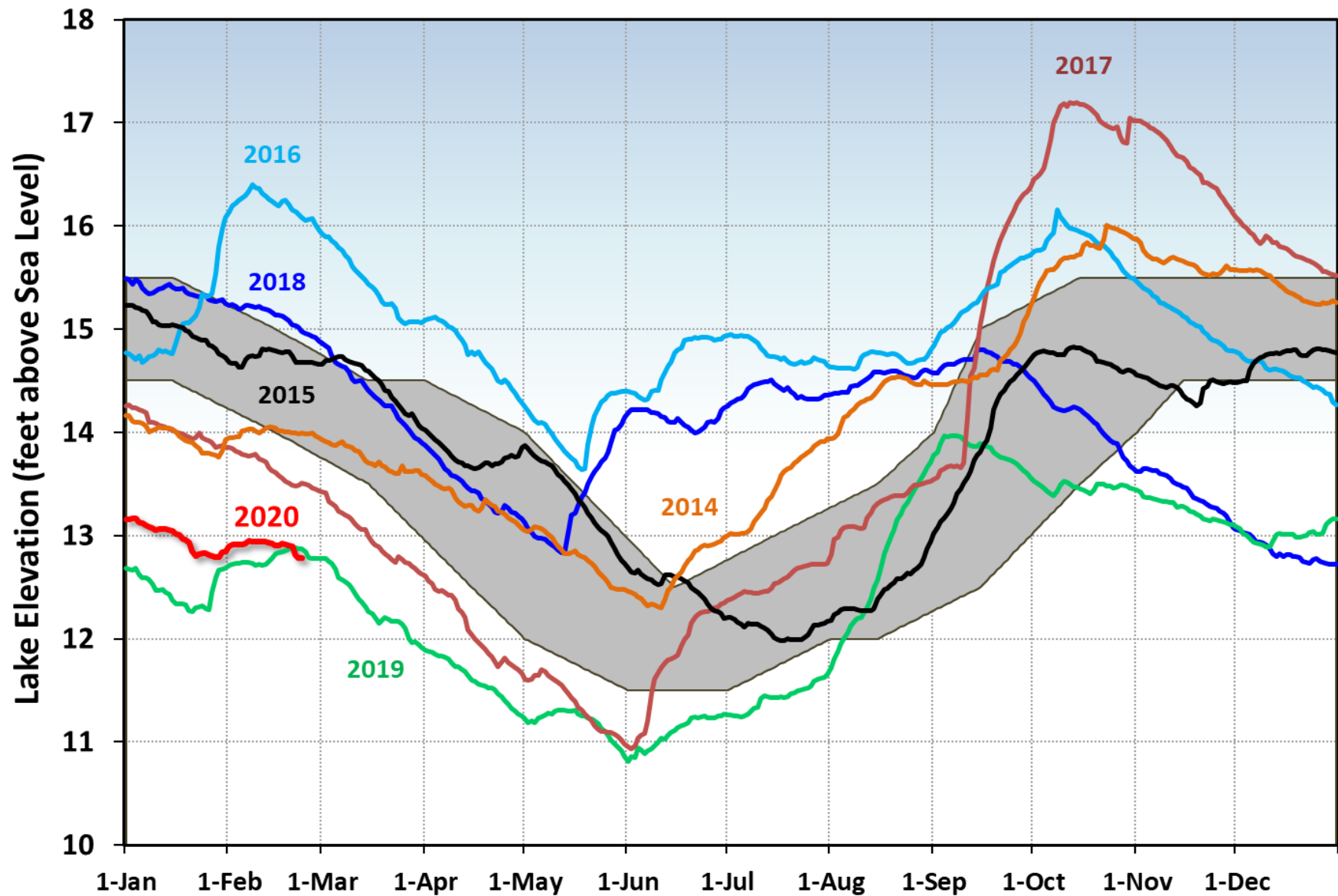
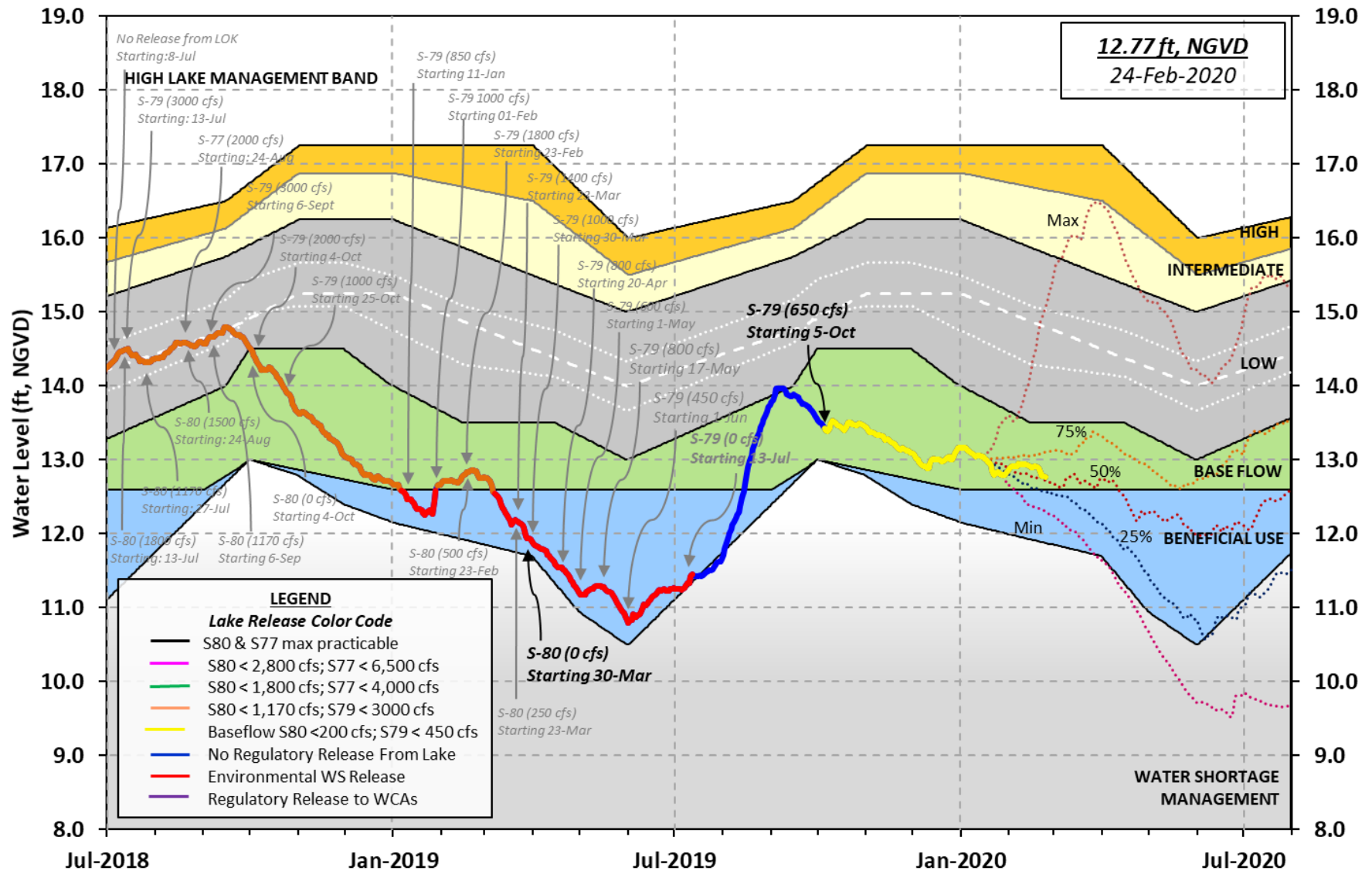


Figure 2. Select annual stage hydrographs for Lake Okeechobee in comparison to the (Draft) updated Ecological Envelope.

# Lake Okeechobee Water Level History and Projected Stages

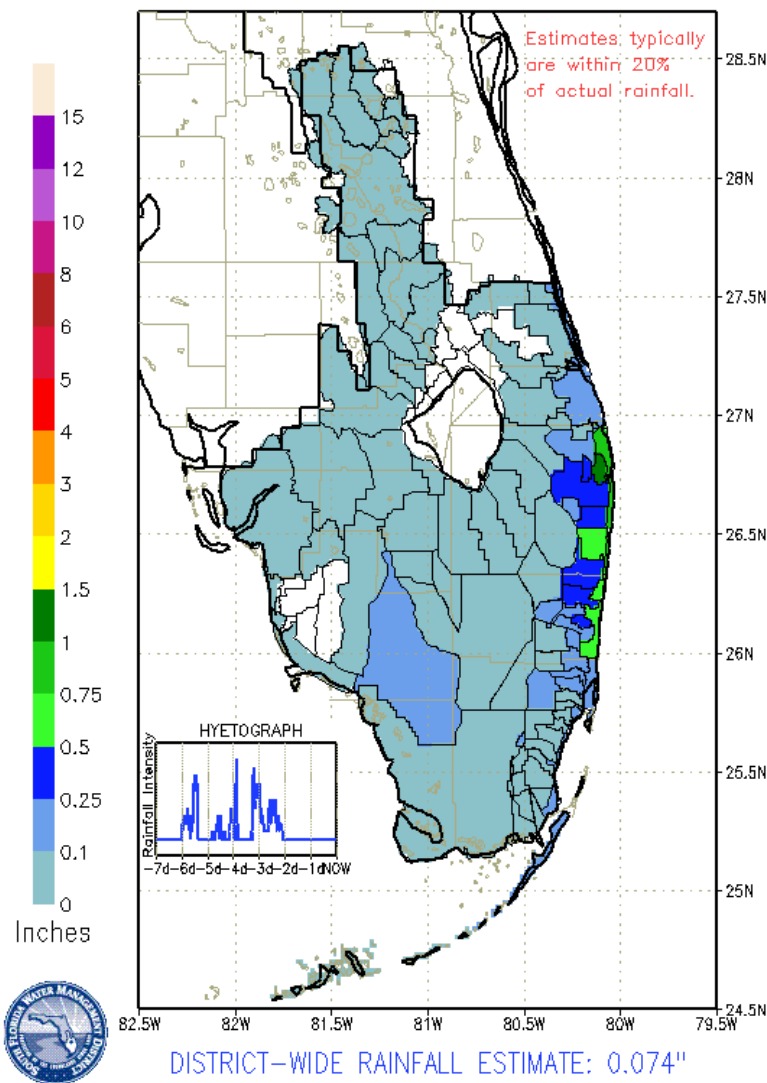


**Figure 3.** Recent Lake Okeechobee stage and releases, with projected stages based on a dynamic position analysis.

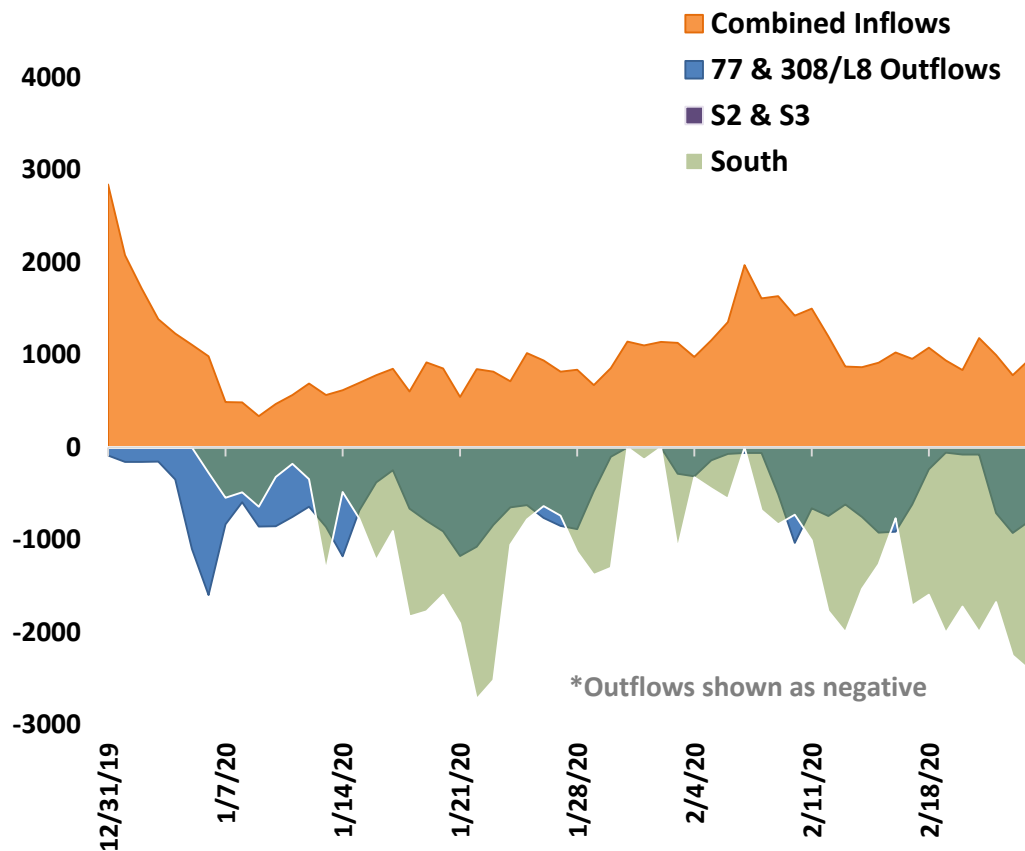


# SFWMD PROVISIONAL RAINDAR 7-DAY BASIN RAINFALL ESTIMATES

FROM: 0715 EST, 02/18/2020 THROUGH: 0715 EST, 02/25/2020



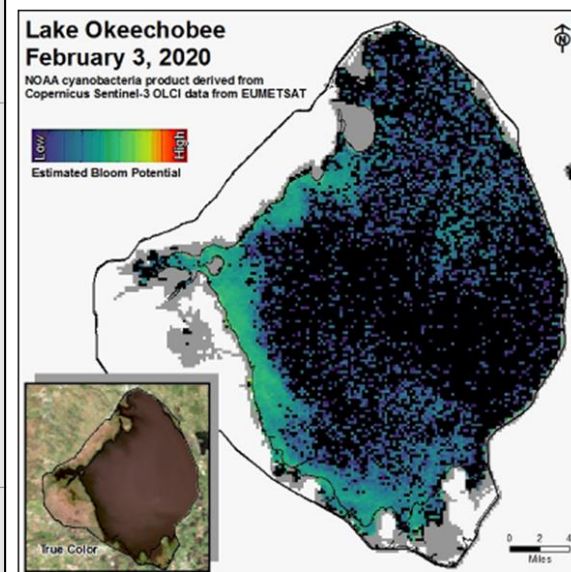
**Figure 4.** 7-Day rainfall estimates by RAINDAR.



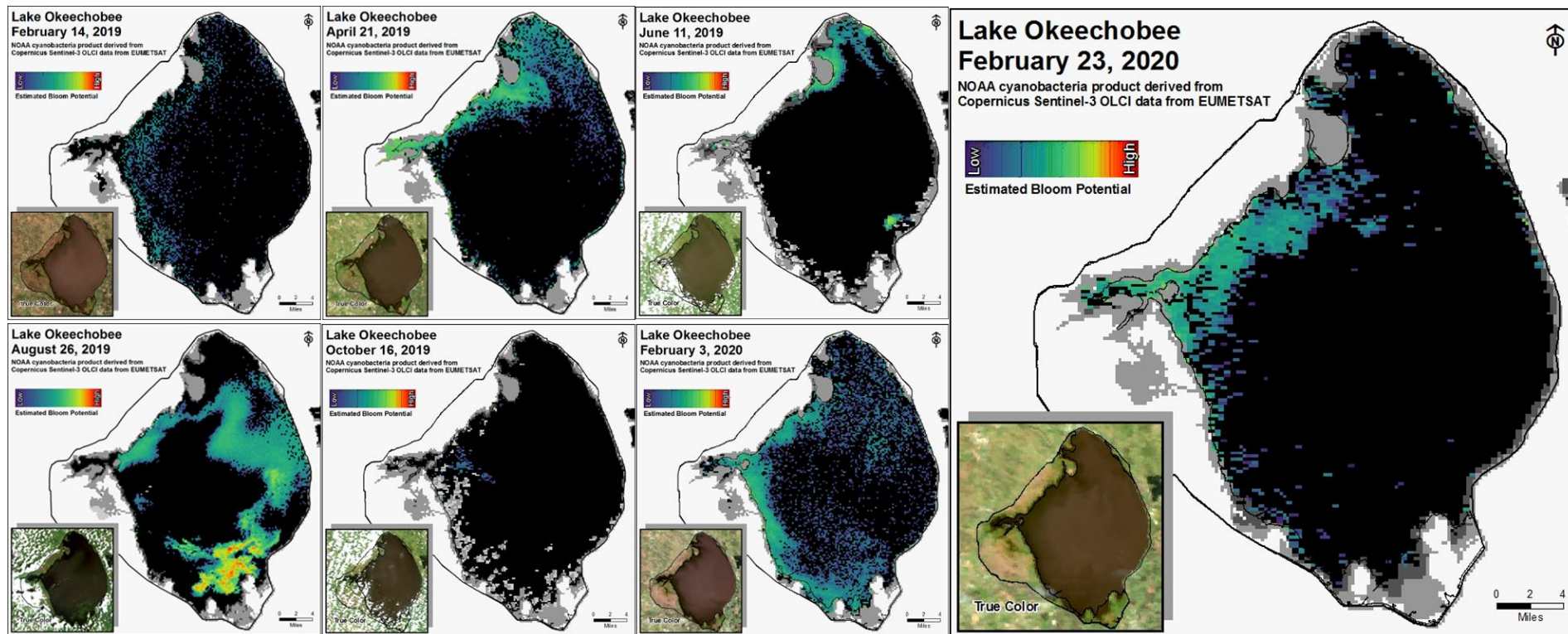
**Figure 5.** Major inflows (orange) and outflows (blue) of Lake Okeechobee, including the S-350 structures designated as South (green). The L-8 Canal flows through Culvert 10A are included as outflows when positive, and as inflows when backflowing into the Lake. All inflows and outflows are shown as positive and negative, respectively, for visual purposes. Outflows through the S-77 and S-308 structures are shown based on their downstream gauges to account for lock openings for navigation.



February 4 – 5, 2020		
Site	Chlorophyll <i>a</i> (µg/L)	Microcystin (µg/L)
<b>Nearshore Stations</b>		
KISSR0.0	13.1	BDL
L005	36.7	BDL
LZ2	15.3	BDL
LZ25A	4.1	
PALMOUT	23.7	
PELBAY3	2.4	
POLE3S	21.6	
POLESOUT	25.0	BDL
RITTAE2	7.8	
<b>Pelagic Stations</b>		
L001	16.4	
L004	25.7	
L006	7.7	
L007	8.1	
L008	27.8	
LZ30	8.7	BDL
LZ40	6.4	
CLV10A	7.9	BDL



**Figure 6.** Chlorophyll *a* (µg/L) and microcystin (µg/L) values for nearshore and pelagic stations for February 4 – 5, 2020. SFWMD classifies an algal bloom as having Chl *a* values >40 µg/L. Microcystin values <0.20 µg/L are below the detection limit (BDL).



**Figure 7.** Potential for cyanobacterial blooms on Lake Okeechobee in 2019 and 2020, based on NOAA's harmful algal bloom monitoring system derived from Copernicus Sentinel-3 OLCI data from EUMETSAT. Gray indicates cloud cover.

## **ESTUARIES**

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

Last week total inflow to the St. Lucie Estuary averaged approximately 355 cfs (Figures 1 and 2) and last month inflow averaged about 779 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 are provisional).

<b>Location</b>	<b>Flow (cfs)</b>
Tidal Basin Inflow	239
S-80	0
S-308	301
S-49 on C-24	23
S-97 on C-23	0
Gordy Rd. structure on Ten Mile Creek	93

Over the past week, salinity increased throughout the estuary (Table 2, Figures 3 and 4). The seven-day moving average of the water column (an average of the surface and bottom salinity) at the US1 Bridge is 19.6. Salinity conditions in the middle estuary are estimated to be within 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>14.0</b> (11.3)	<b>18.3</b> (14.6)	NA <sup>1</sup>
US1 Bridge	<b>19.1</b> (16.8)	<b>20.9</b> (18.0)	10.0-26.0
A1A Bridge	<b>28.3</b> (26.1)	<b>30.4</b> (28.5)	NA <sup>1</sup>

<sup>1</sup>Envelope not applicable

### **Caloosahatchee Estuary:**

Last week total inflow to the Caloosahatchee Estuary averaged approximately 834 cfs (Figures 5 and 6) and last month inflow averaged about 969 cfs. Last week's provisional averaged inflows from the structures and the tidal basin are shown in Table 3.

**Table 3.** Weekly average inflows (data is provisional).

<b>Location</b>	<b>Flow (cfs)</b>
S-77	386
S-78	368
S-79	710
Tidal Basin Inflow	124

Over the past week in the estuary, salinity remained about the same from S-79 to Cape Coral and decreased downstream (Table 4, Figures 7 & 8). The seven-day average salinity values are within the good range for adult eastern oysters at Cape Coral and at Shell Point and in the fair range at Sanibel (Figure 9). The seven-day average surface salinities (Table 4) are in the good range for tape grass at Val I-75 and at Ft. Myers.

**Table 4.** Seven-day average salinity at six monitoring stations in the Caloosahatchee Estuary. Current average is in bold, previous average in parentheses. The envelope reflects the preferred salinity range for associated sampling sites.

Sampling Site	Surface	Bottom	Envelope
S-79 (Franklin Lock)	<b>2.0</b> (1.7)	<b>2.0</b> (1.7)	NA <sup>1</sup>
Val I75	<b>2.2</b> (2.4)	<b>2.6</b> (3.1)	0.0-5.0 <sup>2</sup>
Ft. Myers Yacht Basin	<b>9.2</b> (9.6)	<b>11.4</b> (10.7)	NA
Cape Coral	<b>17.1</b> (17.7)	<b>19.4</b> (19.7)	10.0-30.0
Shell Point	<b>27.4</b> (28.5)	<b>27.6</b> (29.3)	10.0-30.0
Sanibel	<b>30.2</b> (32.1)	<b>31.6</b> (32.3)	10.0-30.0

<sup>1</sup>Envelope not applicable and <sup>2</sup>Envelope is based on a 2-week forecast 30-day average (see Table 5 below).

Forecast of surface salinity (Table 5 and Figure 10) at Val I-75 for the next two weeks using the autoregression model (Qiu and Wan, 2013) coupled with a linear reservoir model for the tidal basin predicts daily salinity ranging from 2.9 to 6.4 at the end of the two-week period for pulse release at S-79 ranging from 0 to 1,000 cfs and Tidal Basin inflows of 100 cfs. The 30-day moving average surface salinity at Val I-75 is forecast to be between 2.6 and 3.9 (Table 5). The current salinity conditions at Val I-75 are within the envelope of salinity 0.0-5.0 for this site (Table 4).

**Table 5.** Predicted salinity at Val I-75 at the end of forecast period

Scenario	Q79 (cfs)	TB runoff (cfs)	Daily salinity	30 day Mean
A	0	100	6.4	3.9
B	450	100	5.3	3.4
C	650	100	3.8	2.9
D	800	100	3.5	2.8
E	1000	100	2.9	2.6

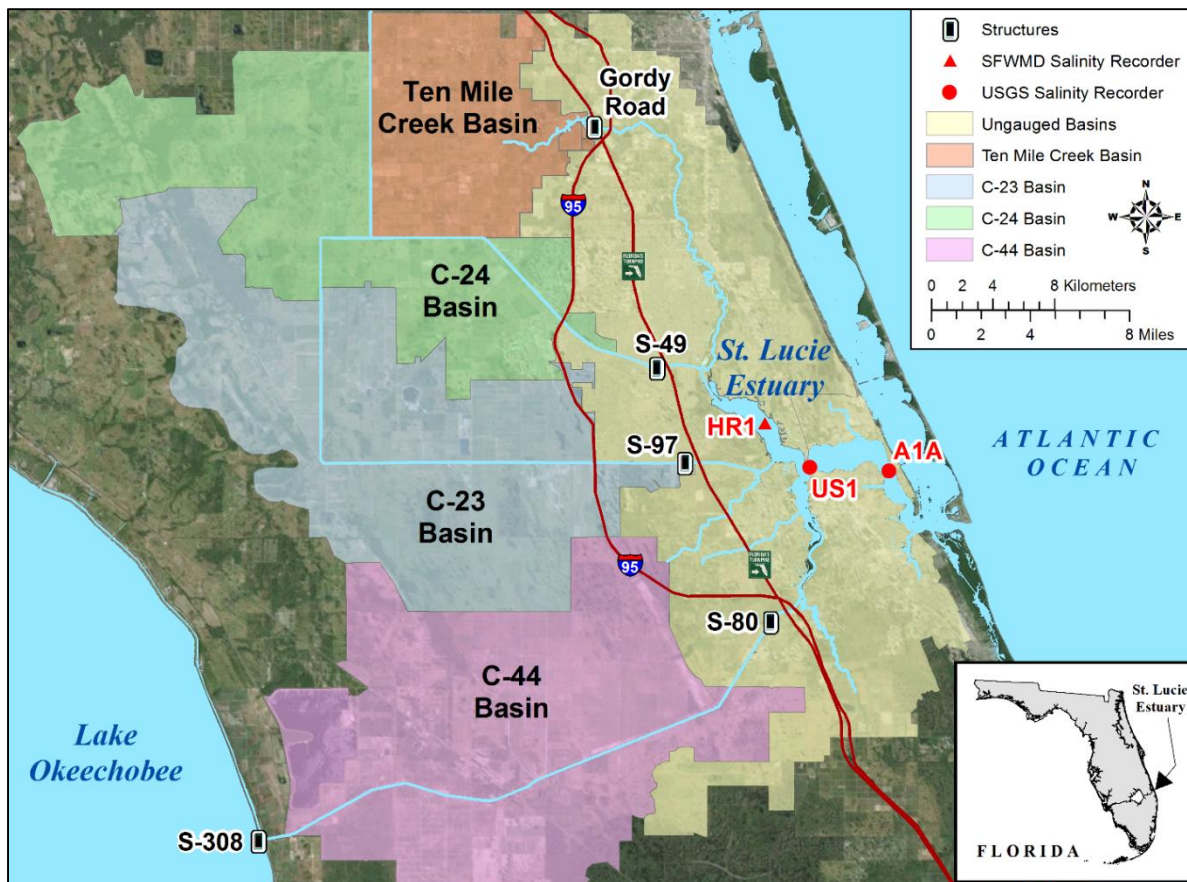
### Red tide

The Florida Fish and Wildlife Research Institute reported on February 20, 2020, that *Karenia brevis*, the Florida red tide dinoflagellate, was not observed in samples collected from Lee, St. Lucie, Martin, or Palm Beach counties (no samples were analyzed this week from Miami-Dade County).

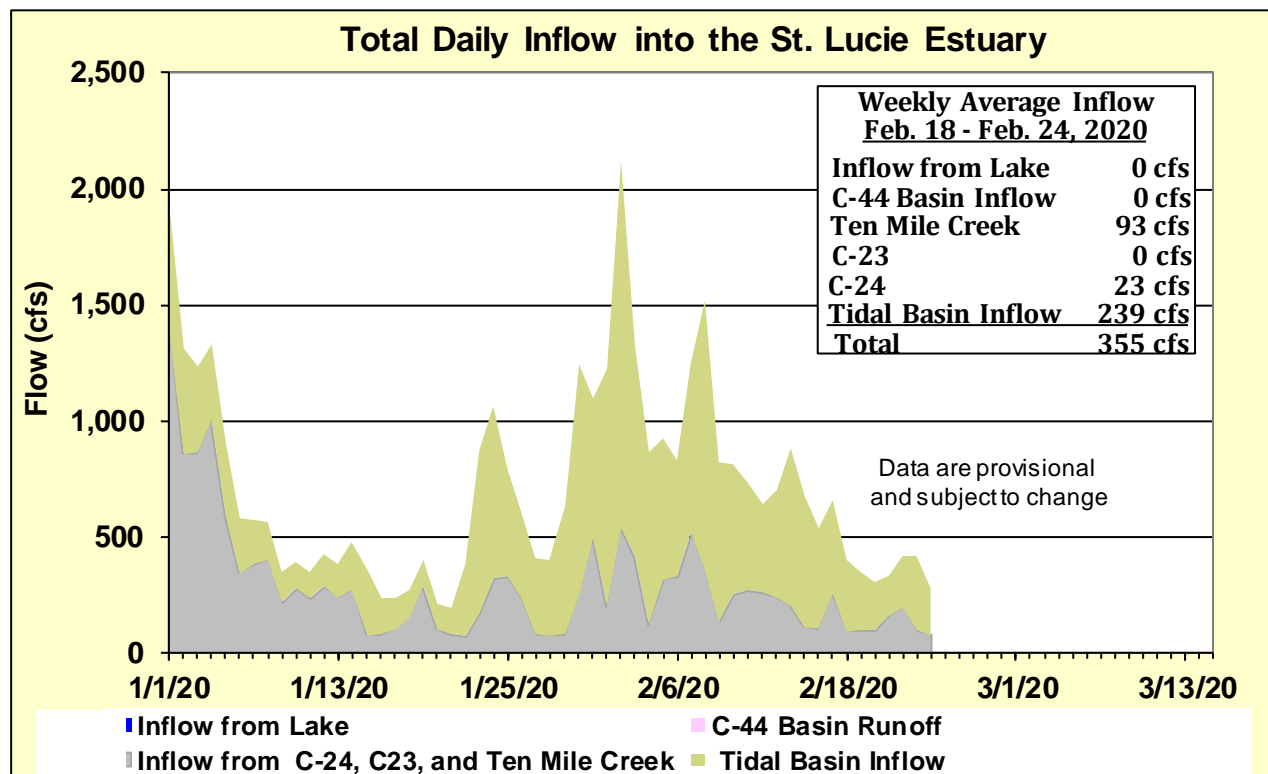
### Water Management Recommendations

Lake stage is in the Base Flow sub-band. Tributary conditions are dry. The 2008 LORS suggests releases of up to 450 cfs at S-79 and up to 200 cfs at S-80.

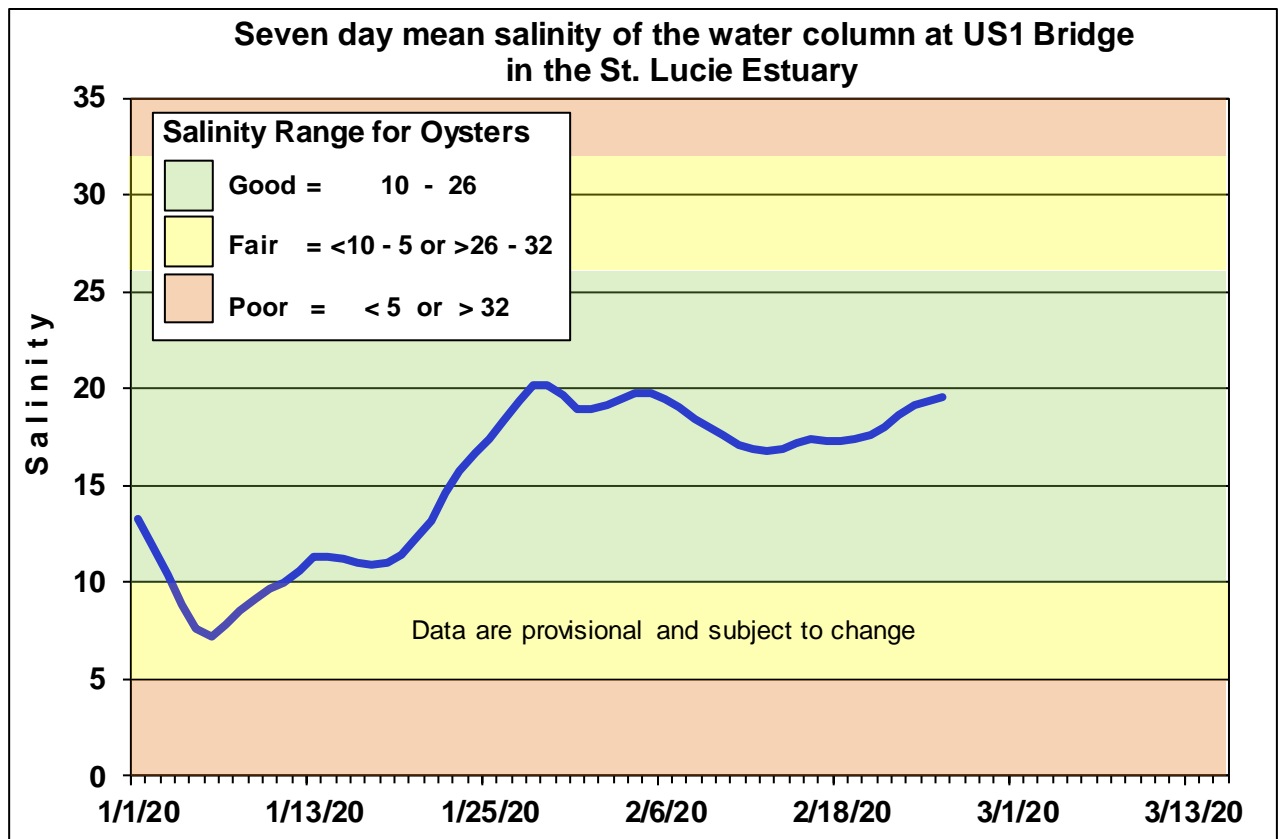




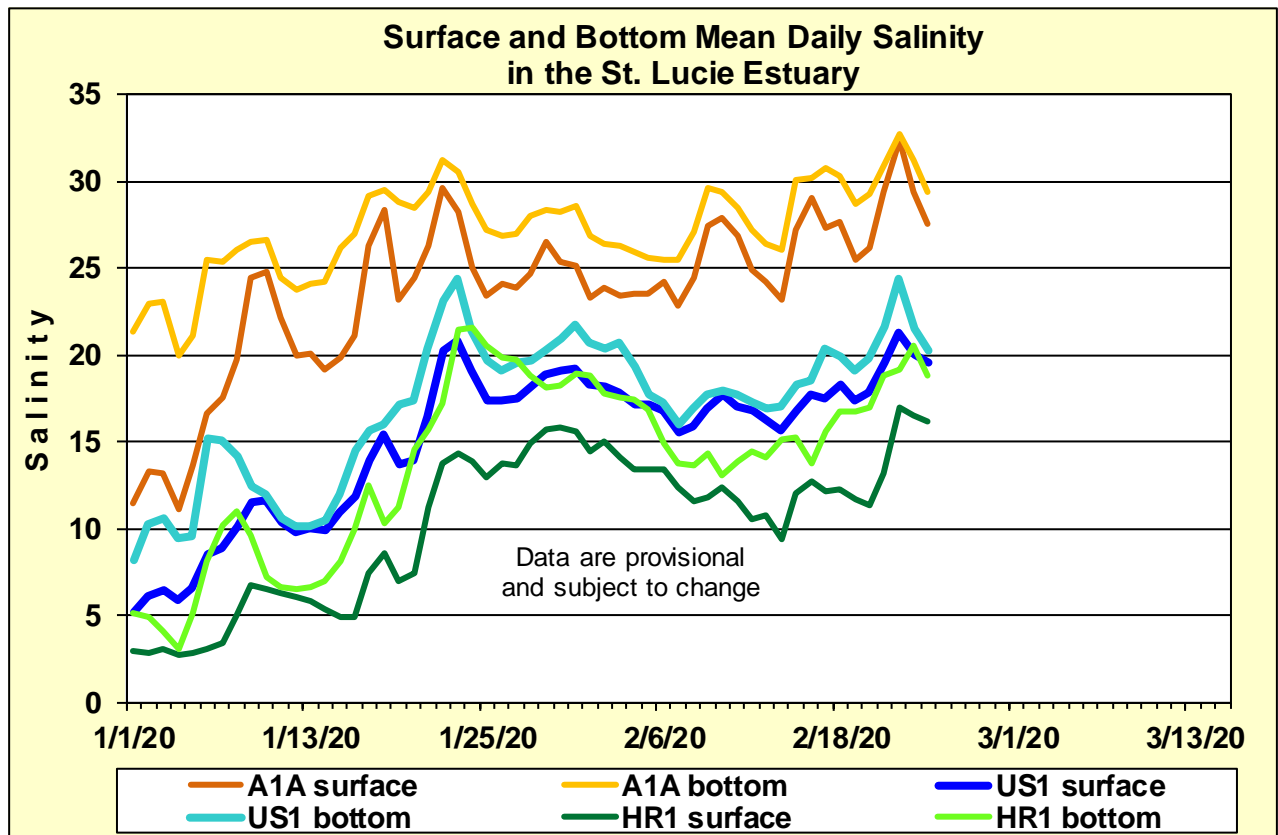
**Figure 1.** Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.



**Figure 2.** Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basin 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 HR1 stations.

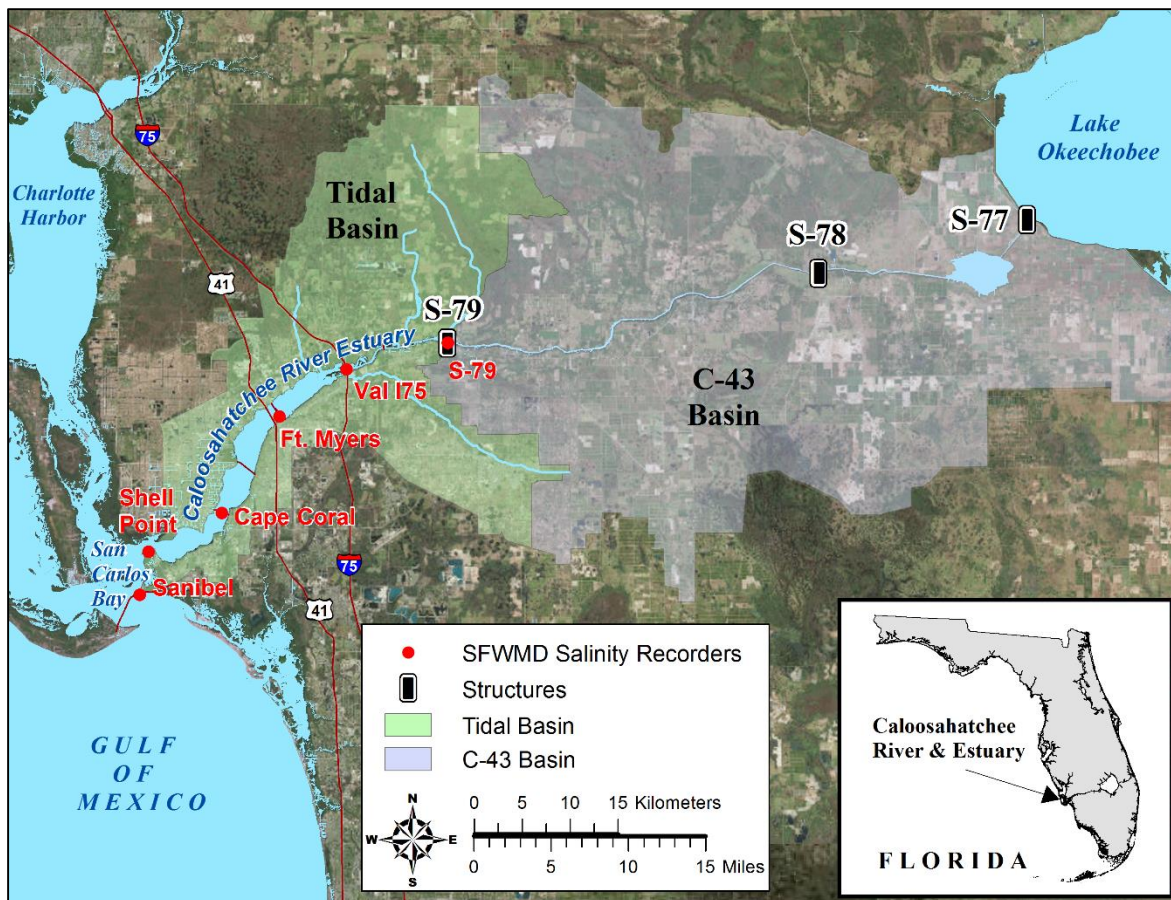


Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

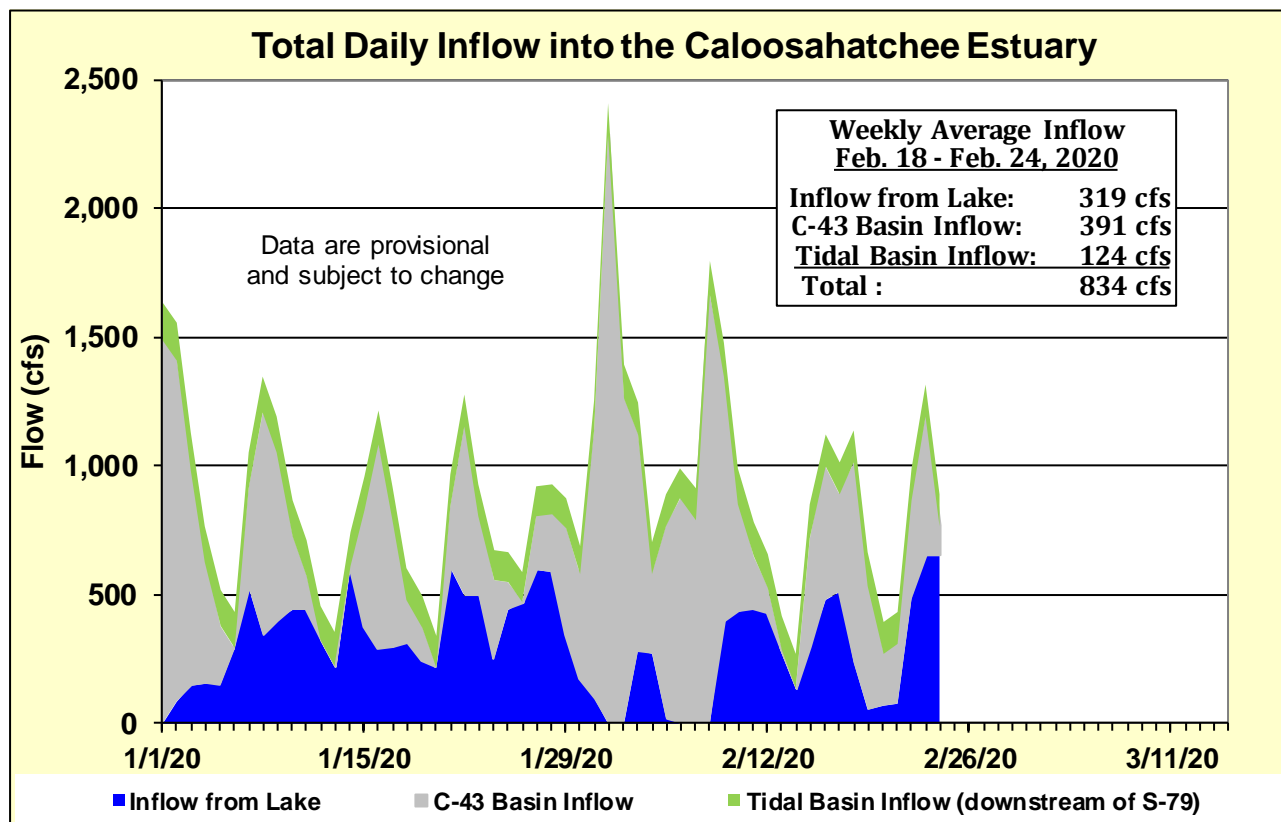
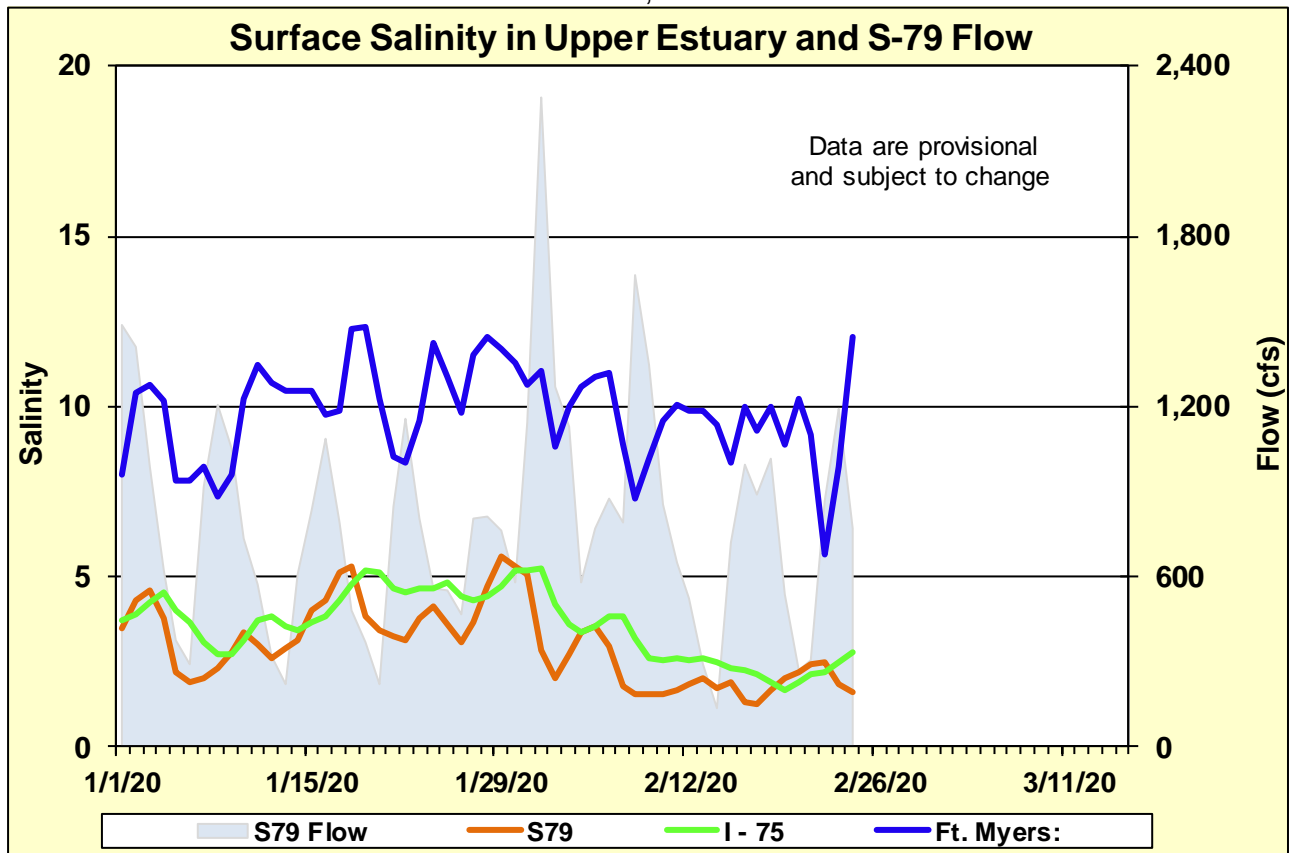
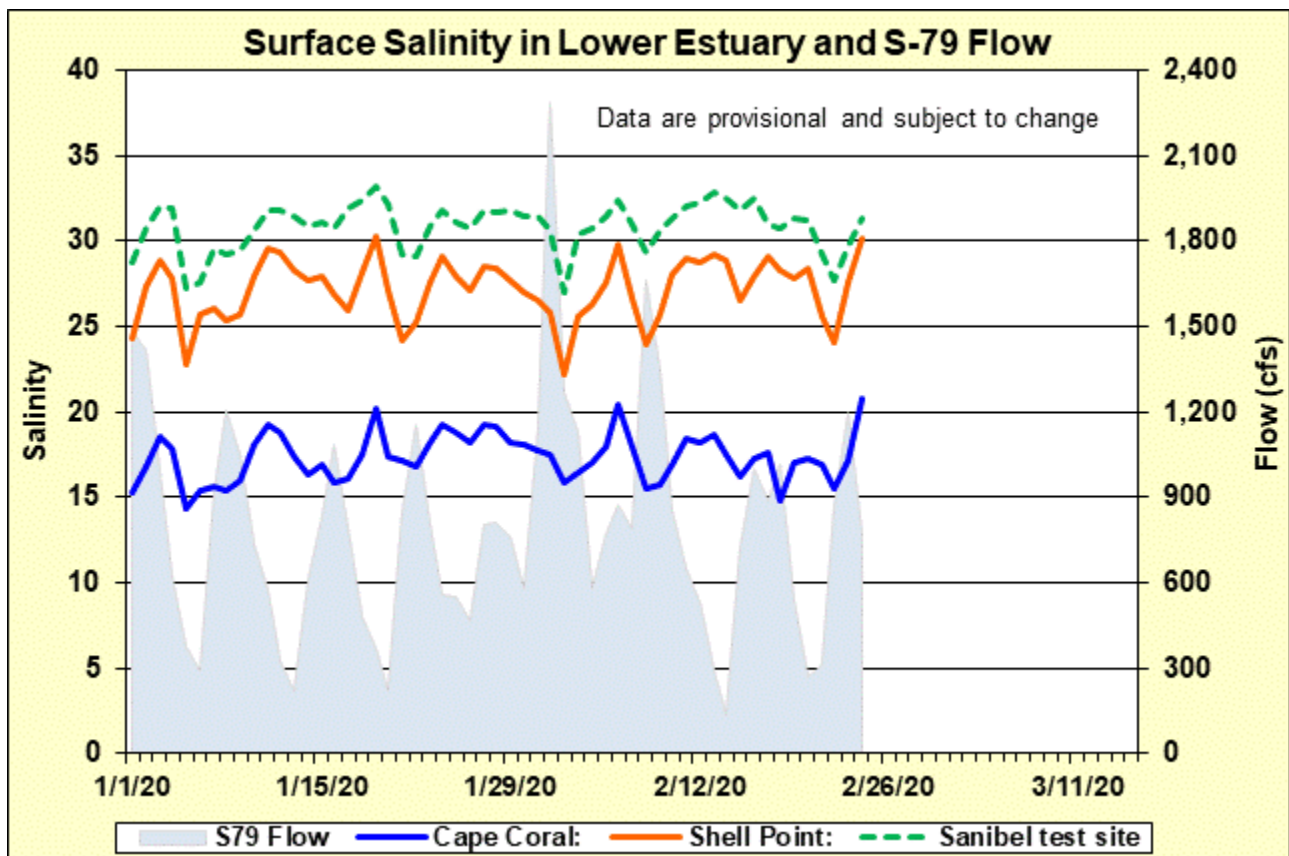


Figure 6. Total daily inflows from Lake Okeechobee, runoff from the C-43 basin

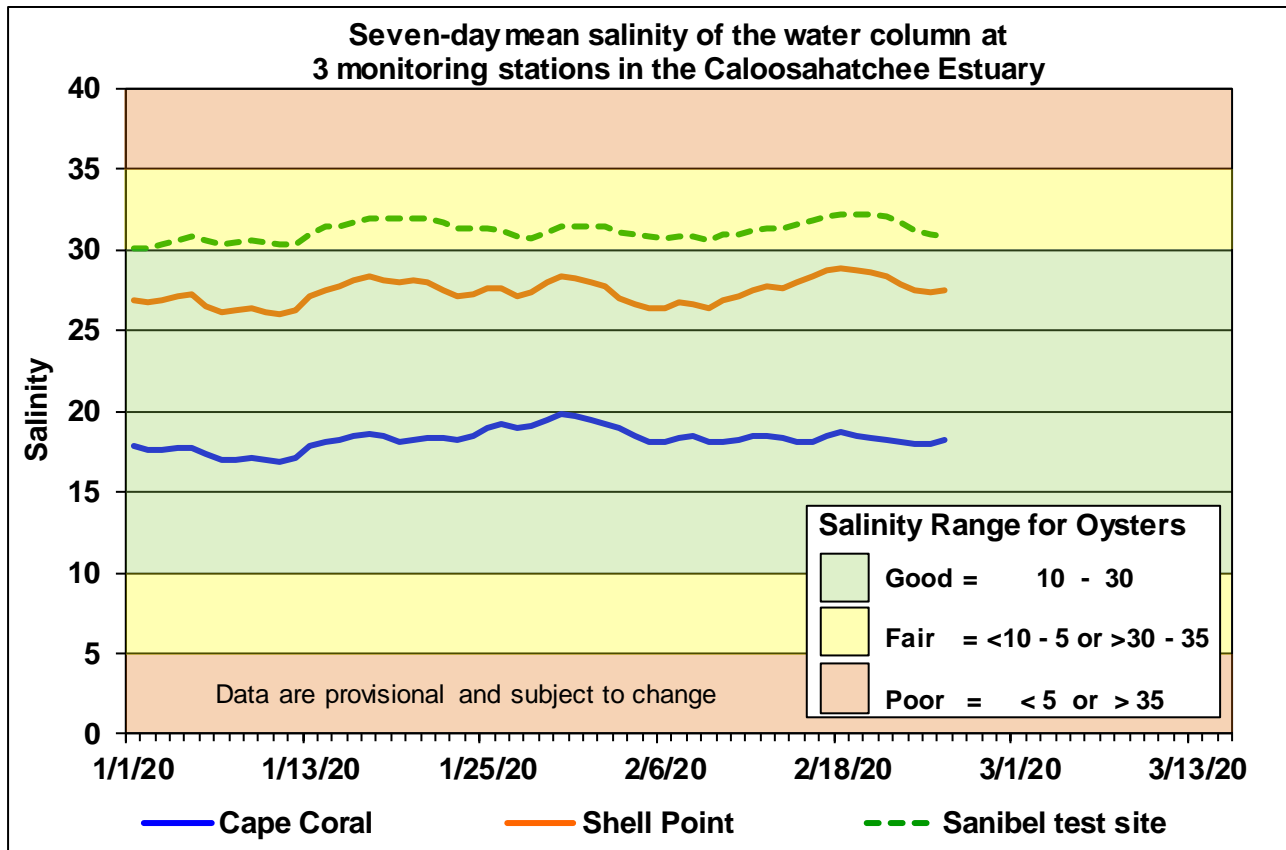


**Figure 7.** Daily mean flows at S-79 and salinity at upper estuary monitoring stations.

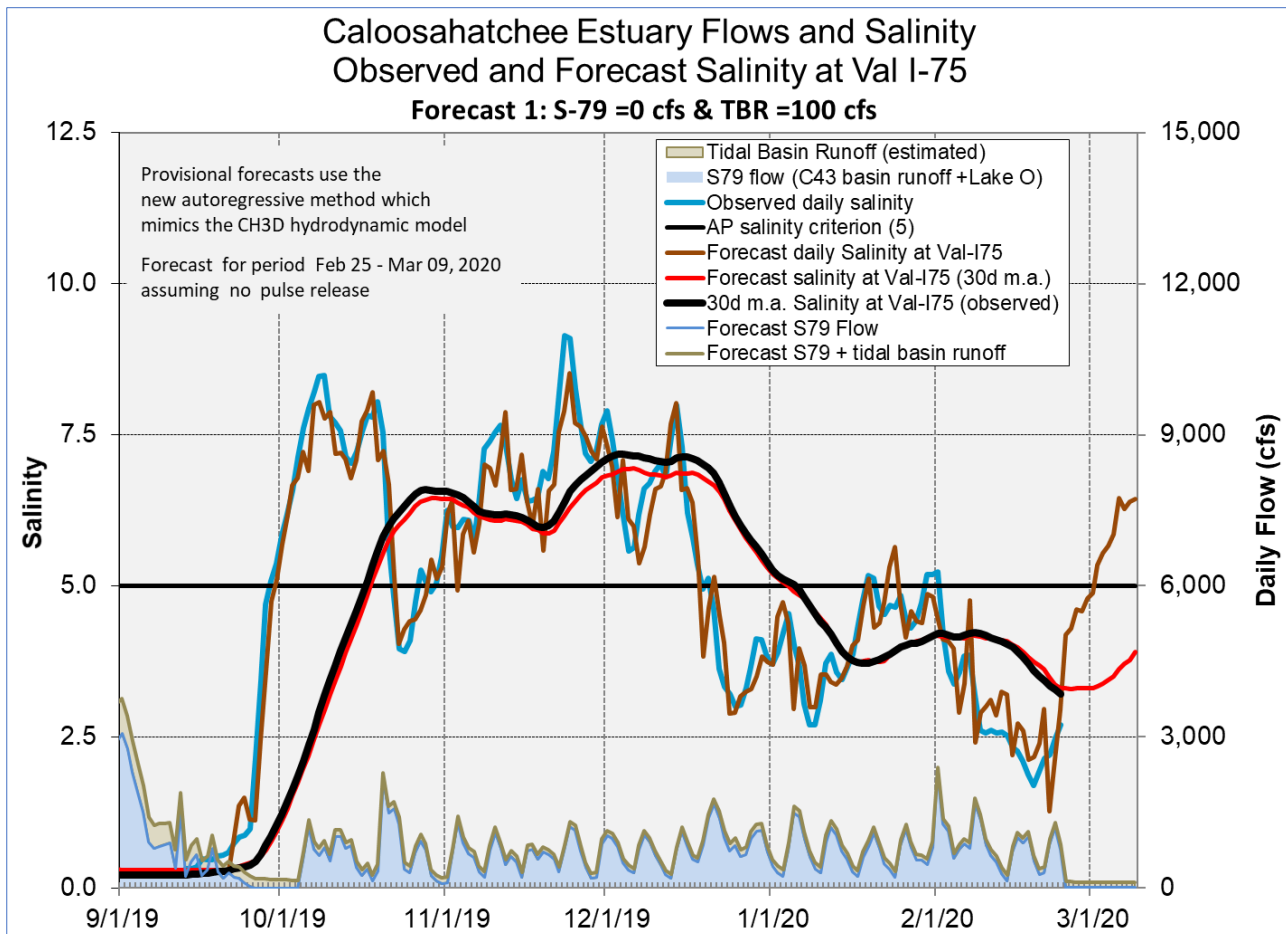


**Figure 8.** Daily mean flows at S-79 and salinity at lower estuary stations.





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



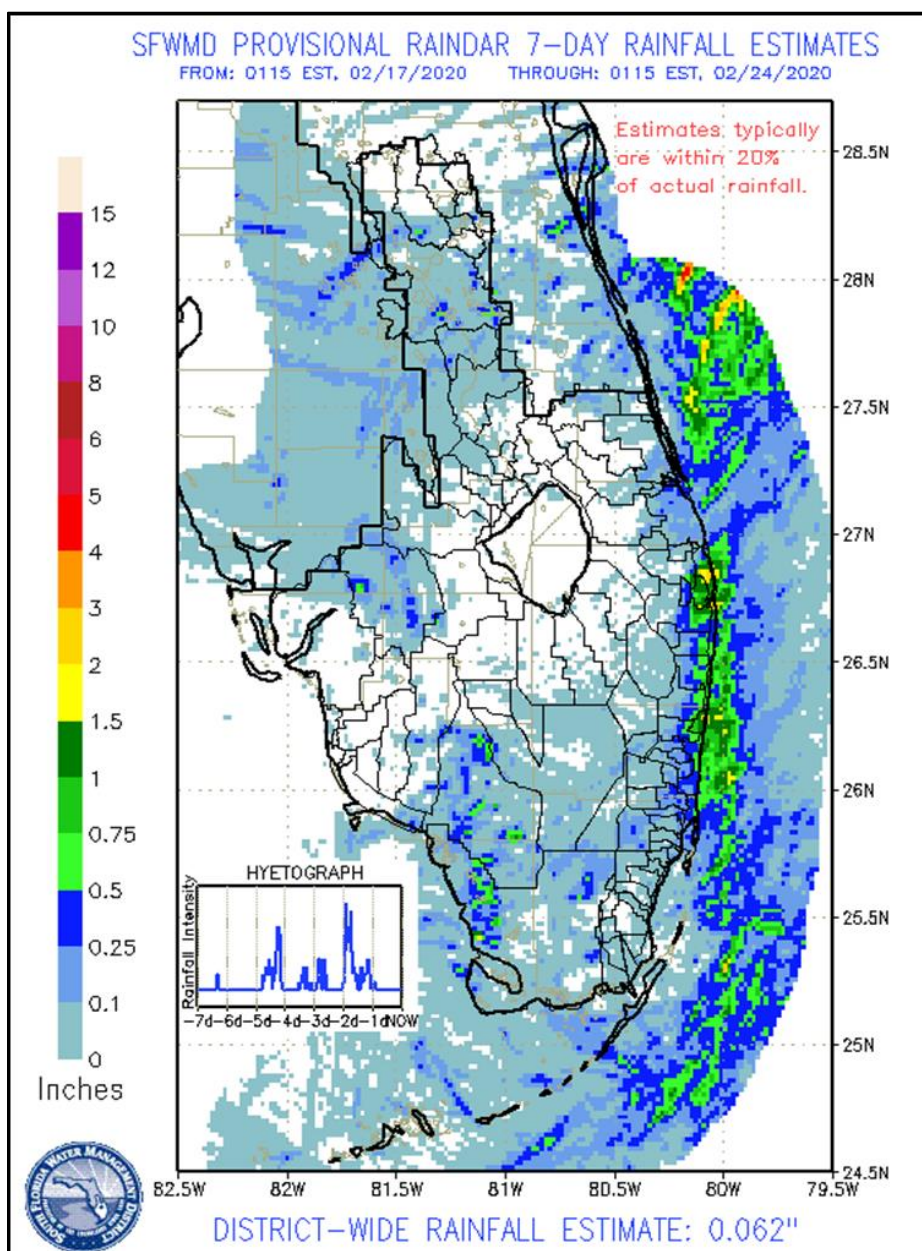
**Figure 10.** Forecasted Val I-75 surface



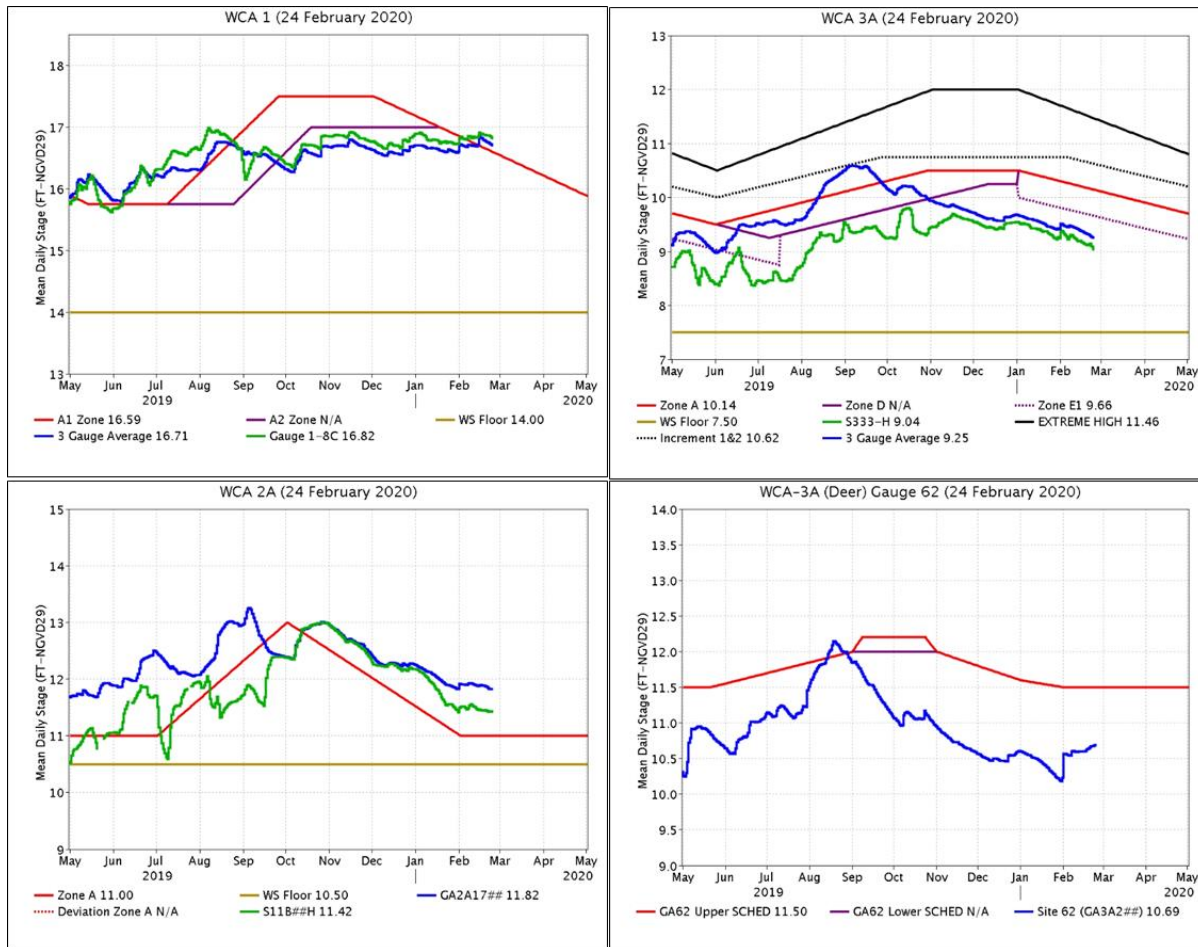
## EVERGLADES

Well below average amounts of precipitation fell evenly across the Everglades last week. At the gauges monitored for this report stages fell on average 0.08 feet last week, slightly faster than the week prior. Evaporation was estimated at 1.08 inches last week.

Everglades Region	Rainfall (Inches)	Stage Change (feet)	
WCA-1	0.03	-0.11	<div>Good</div> <div>Fair</div> <div>Poor</div>
WCA-2A	0.01	-0.08	
WCA-2B	0.07	-0.09	
WCA-3A	0.04	-0.06	
WCA-3B	0.04	-0.08	
ENP	0.11	-0.08	



Regulation Schedules: WCA-1: Stage at the 1-8C Gauge fell in parallel to the regulation line last week, currently 0.12 feet above the falling Zone A1 line. WCA-2A: Stage at Gauge S11-B remained roughly parallel to the Zone A regulation line last week now 0.42 feet above the stable regulation line. WCA-3A: The Three Gauge Average stage trends down and away from parallel to the falling Zone E1 regulation line last week, currently 0.41 feet below. WCA-3A at gauge 62 (Northwest corner): Stage trends up towards the stable Upper Schedule but remains well below, currently 0.81 feet below the regulation line.

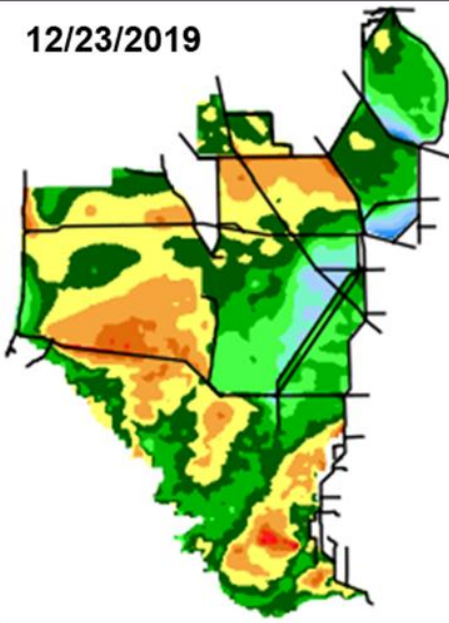


Water Depths: The WDAT tool for spatial interpolation of depth monthly snapshots indicates depths more than 1.0 foot below ground in extreme northeast WCA-3A North, while surface water is still present in the areas surrounding the Alley North colony in that basin. Depths remain stable and near 3.5 feet across WCA-2B. Hydrologic connectivity has gradually diminished over the last two months but remains in Shark River, Taylor and Lostman's Sloughs. Comparing WDAT water depths from present, depth changes over the last month are not highly significant with the exception being the northwestern corner of WCA-3A which is significantly deeper. Looking back one year the depth differences are mixed and more significant. The northeast corner of WCA-3A is significantly lower in depth, as is most of the eastern half of WCA-3 North and the rest of the basin slightly drier. Within WCA-2A, the region just north of the L-35B levee is significantly drier.

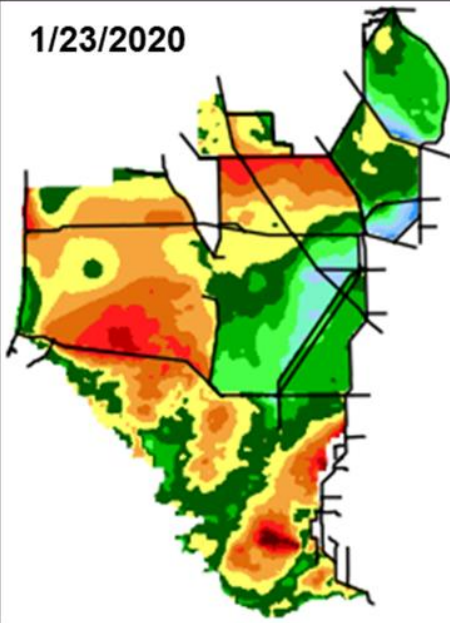


## SFWDAT Water Depth Monthly Snapshots

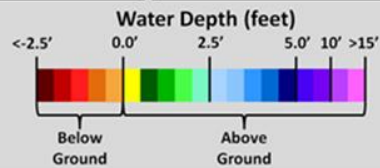
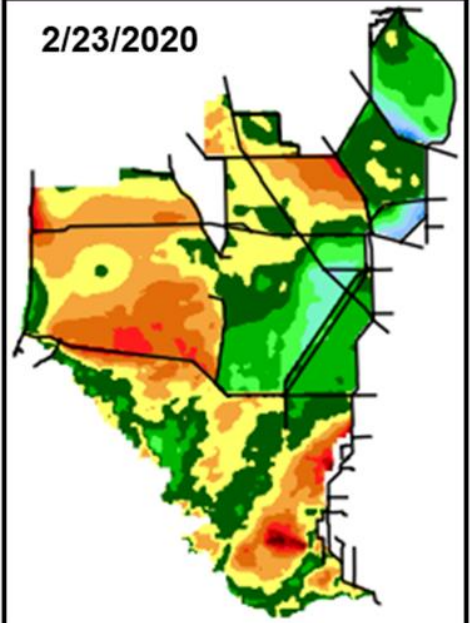
12/23/2019



1/23/2020



2/23/2020

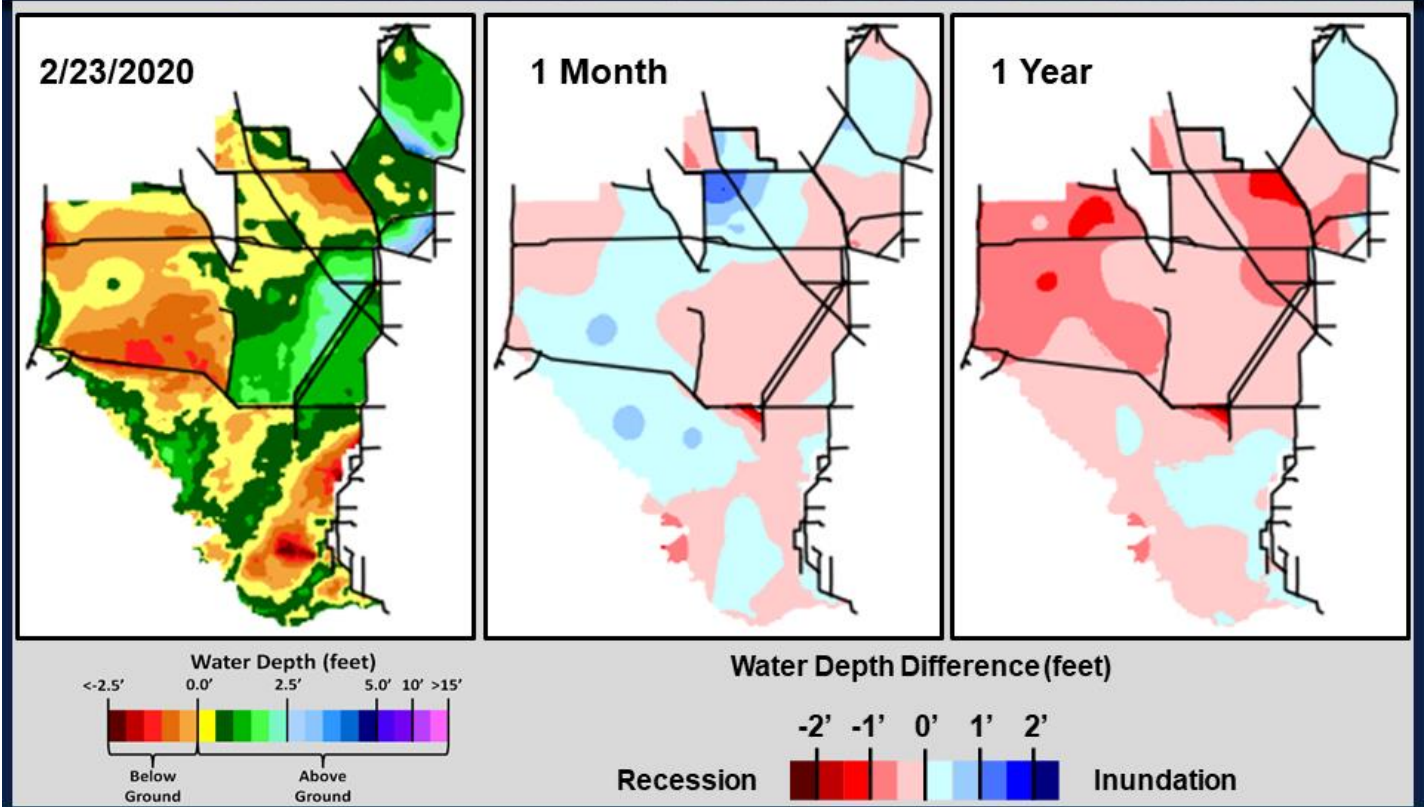


South Florida Water Depth Assessment Tool (SFWDAT)



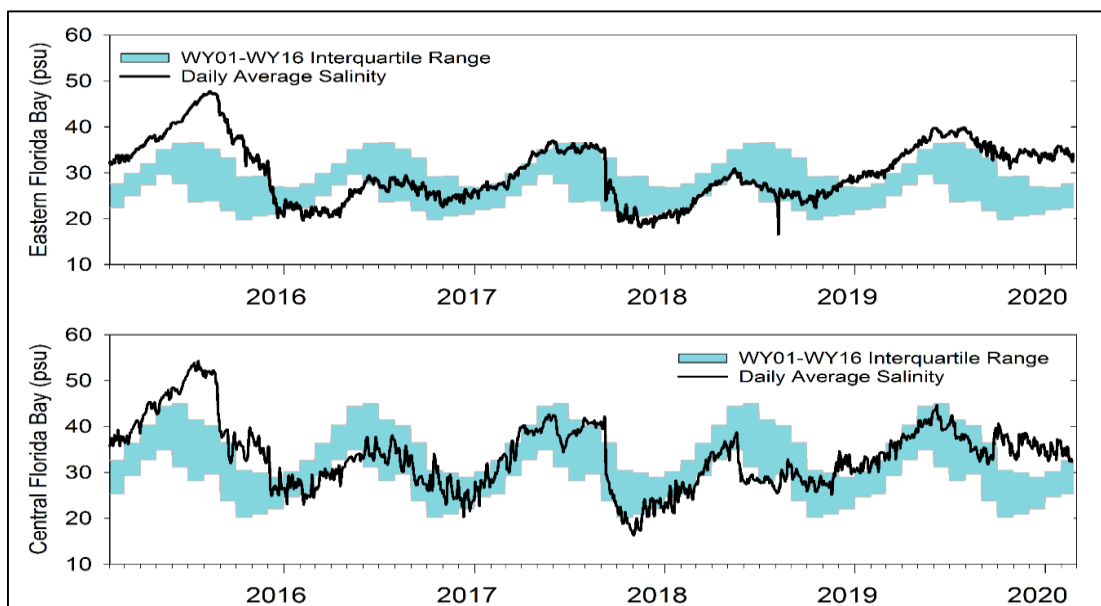
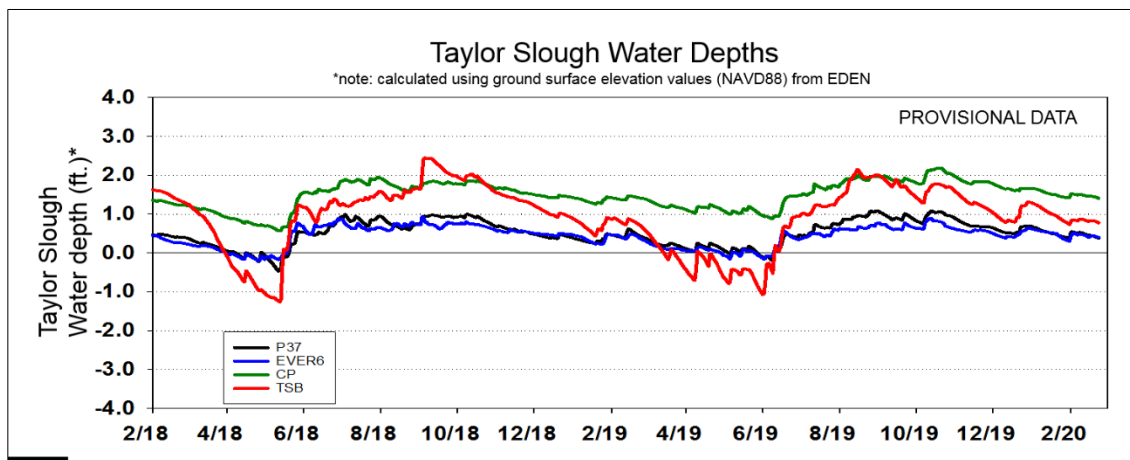
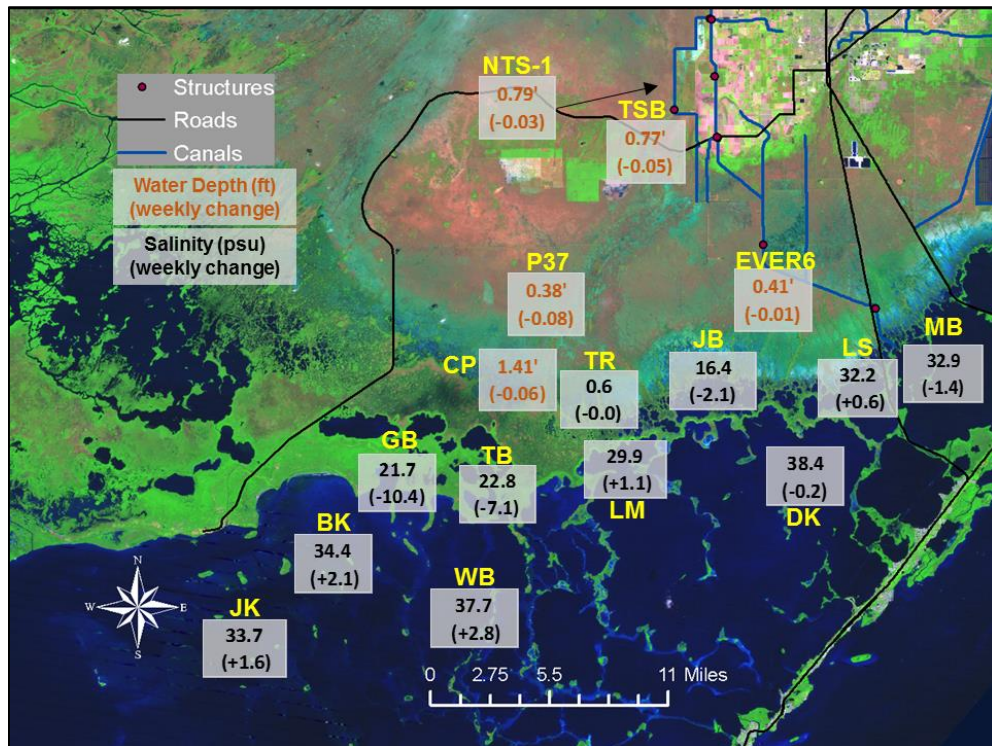


## SFWDAT Everglades Difference Maps (Present – Past)

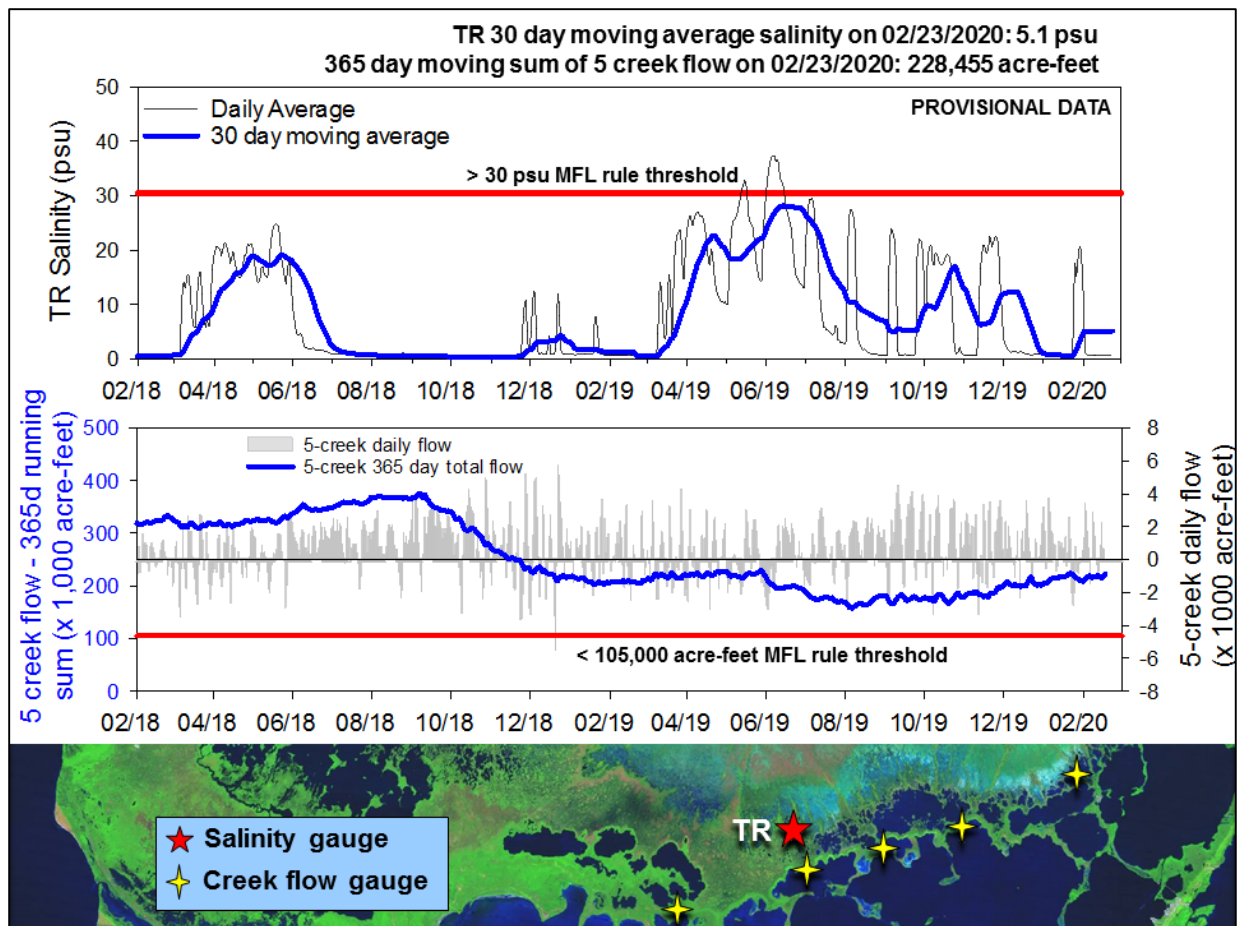


**South Florida Water Depth Assessment Tool (SFWDAT)**

Taylor Slough Water Levels: An average of 0.15 inches of rain fell over Taylor Slough and Florida Bay this last week and stages decreased an average of 0.04 feet. Upper Taylor Slough (west of S-332D impoundment) is 17 inches higher than its historical average (indicating success in keeping water within Everglades National Park along the eastern boundary) while the rest of Taylor Slough is 5 inches higher than the historical average.







Florida Bay Salinities: Average salinity in Florida Bay decreased 1.3 psu this week, but questionable low readings within the central and western nearshore on Saturday are having a heavy influence. The questionable data bring our averages down so that the nearshore is near average while the Bay as a whole is 2 psu above average. Florida Bay MFL: Salinity at the TR station in the mangrove zone (tracked for the Florida Bay MFL) remained near fresh this week. The 30-day moving average stayed at 5.1 psu. Weekly flow from the 5 creeks identified by yellow stars on the map totaled almost 6,000 acre-feet last week which is double last week's flows with consistent positive flow until Sunday. The 365-day moving sum of flow from the five creeks (tracked as part of the Florida Bay MFL criteria) increased 9,400 acre-feet this week to end at 228,455 acre-feet, between the 25th percentile (192,885 acre-feet) and the median (249,091 acre-feet). Creek flow are provisional USGS data.

### **Water Management Recommendations**

Current stages in WCA-3A are low for this time of year and salinities are high in Florida Bay. Conserving water within WCA-3A and moving low nutrient water south has many ecological benefits, these benefits are unrealized when flows are lost to tide. Discharges into northern WCA-3A have the potential to slow recessions near the important Alley North wading bird colony and the only foraging flocks of note currently in the WCAs. Maintaining saturated soils in over-drained portions of the Everglades, like WCA-3A Northeast, conserves peat and lowers the risk of muck fires, and depths there are well below average. Any available water sent through S-150 post plug construction into Northeastern WCA-3A would have greater ecological value than the same amount of water discharged in Northwestern 3A, however both areas are in need of hydration. Flows toward Taylor Slough and Florida Bay freshen salinity conditions within the nearshore areas of Florida Bay and decrease the currently stressful conditions for seagrasses and fauna as nearshore salinities remain elevated, decreasing the estuarine gradient within the bay which is problematic as the dry season progresses.

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

SFWMD Everglades Ecological Recommendations, February 25th, 2020 (red is new)			
Area	Weekly change	Recommendation	Reasons
WCA-1	Stage decreased by 0.11'	Conserving water in this basin has ecological benefit.	Protect downstream habitat and wildlife. Provide wading bird foraging opportunities later in the dry season.
WCA-2A	Stage decreased by 0.08'	Moderating the recession rate and conserving water in this basin has ecological benefit as downstream basins are below seasonal average.	Protect upstream/downstream habitat and wildlife. Provide wading bird foraging opportunities later in the dry season.
WCA-2B	Stage decreased by 0.09'	Conserving water in this basin has benefit.	Protect upstream/downstream habitat and wildlife.
WCA-3A NE	Stage decreased by 0.12'	Conserving water and slowing the recession in this basin has ecological benefit as current water depths are below seasonal averages. Inflows to this region have great ecological benefit.	Protect and conserve peat soils. Provide stage conditions that are conducive for succesful wading bird nesting at the Alley North wading bird colony.
WCA-3A NW	Stage increased by 0.07'	Conserving water and slowing the recession in this basin has ecological benefit as current water depths are below seasonal averages. Inflows to this region have ecological benefit.	
Central WCA-3A S	Stage decreased by 0.10'	Conserving water in this basin has ecological benefit as current water depths are below seasonal averages.	Protect upstream/downstream habitat and wildlife. Provide wading bird foraging oppurtunitys later in the dry season.
Southern WCA-3A S	Stage decreased by 0.11'		
WCA-3B	Stage decreased by 0.08'	Conserving water in this basin has benefit.	Protect tree islands, upstream/downstream habitat and wildlife.
ENP-SRS	Stage decreased by 0.03'	Make discharges to the Park according to the 2012 WCP rainfall plan.	Protect upstream/downstream habitat and wildlife.
Taylor Slough	Stage changes ranged from -0.01' to -0.08'	Move water southward as possible	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged -10.4 to +2.8 psu	Move water southward as possible	When available, provide freshwater to maintain low salinity buffer and promote water movement.