

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

## MEMORANDUM

**TO:** John Mitnik, Assistant Executive Director, Executive Office Staff

**FROM:** SFWMD Staff Environmental Advisory Team

**DATE:** July 8, 2020

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

### Summary

#### Weather Conditions and Forecast

The influence of an upper-air disturbance located over the north-central Gulf of Mexico and Florida Panhandle has contributed to enhanced rains across the District the last couple of days. With that system now well inland and moving farther away, its influence on the District's weather has diminished. However, moisture levels across the area remain above-average but with less instability compared to the previous two days. The result of which should be a decrease of total District rainfall to around the daily climatological average (0.23") with good geographic coverage. Since Monday, a low- to mid-level ridge of high pressure expanding south and west of the Florida peninsula has provided for an onshore flow of winds over the southern part of the District. Winds aloft are resulting in a very light net steering flow, which along with good moisture levels, will favor rains breaking out along the east coast sea breeze as it tries to slowly move inland. By the afternoon, the enhanced moisture levels should develop into scattered to locally numerous showers and thunderstorms over the interior of the District, especially around and to the southwest of Lake Okeechobee. The weak steering winds will favor localized, significant rainfall in some areas. Upper level warming over the next couple of days will decrease instability over Florida resulting in below normal total rainfall Wednesday and Thursday, with a tendency for afternoon rains to be formed over the interior and eastern part of the District and away from the immediate west coast thanks to westerly steering winds. The disturbance in the southeastern United States is forecast to move northeastward while hugging the North Carolina and Mid-Atlantic coasts Wednesday through Friday this week and should help to carve out a trough of low pressure inland of the East coast of the United States. An upper-air impulse over the Midwest and Great Lakes digging southward behind it late this week should then reinforce this pattern going into the weekend. Total rainfall around or just above the long-term average for the second week of July is favored under this weather regime. Locally, there is some possible enhancement of rains late this week north and west of Lake Okeechobee in association with a long tongue of moisture rotating around the large circulation of the low near the Mid-Atlantic coast.

#### Kissimmee

Tuesday morning stages were 55.1 feet NGVD (1.4 feet below schedule) in East Lake Toho, 53.6 feet NGVD (0.1 feet above schedule) in Toho, and 51.4 feet NGVD (0.4 feet above schedule) in Kissimmee-Cypress-Hatchineha; headwater stages were 46.2 feet NGVD at S-65A and 25.8 feet NGVD at S-65D. Tuesday morning discharges were 2010 cfs at S-65, 2121 cfs at S-65A, 1591 cfs at S-65D, and 1316 cfs at S-65E. Dissolved oxygen concentration in the Kissimmee River averaged 2.9 mg/L for the week through Sunday. Kissimmee River mean floodplain depth on Sunday was 0.78 feet.

**Recommendations Made in the Past Week:** (7/3) Increase flow at S65A by up to 150 cfs per day to lower stage in Lakes Kissimmee-Cypress-Hatchineha. **Today's Recommendations:** (7/7) Hold current S65A discharge (~2,100 cfs) until further discussion due to declining DO. **2020 Wet Season Recommendations for Kissimmee Basin:** Continue to use the IS-14-50 discharge plan through the 2020 Wet Season. The discharge rate of change limits for S-65/S-65A may be adjusted for individual

events after consultation with Kissimmee River Restoration Evaluation Program staff. To the extent possible, attempt to control the ascension rate in East Lake Toho to be less than 1 ft/30d during the June 1- August 15 window. To the extent possible, attempt to control the ascension rate in Lakes Toho and Kissimmee-Cypress-Hatchineha to be less than 0.5 ft/14d during the June 1-August 15 window.

### **Lake Okeechobee**

Lake Okeechobee stage was 12.32 feet NGVD on July 6, 2020, 0.02 feet lower than the previous week, but 0.40 feet higher than the previous month. The Lake entered the Beneficial Use sub-band on March 4, 2020 and is now 0.28 feet below the Base Flow sub-band. Lake stage moved back into the ecological envelope (which varies seasonally from 12 – 15 feet NGVD +/- 0.5 feet) on June 2, 2020, after being up to 1.5 feet below since October 15, 2019. While ascension rates were recently quite high (over 1 foot in 3 weeks), the rate of rise slowed over the past weeks, providing submerged plant communities an opportunity to catch up with rising stages. The increased cyanobacteria bloom risk potential associated with previous large inflows lessened across the central portion of the lake but intensified along the northwestern shoreline.

### **Estuaries**

Total inflow to the St. Lucie Estuary averaged 739 cfs over the past week with no flow coming from Lake Okeechobee. The seven-day average salinities increased in the estuary over the past week. Salinity at the US1 Bridge is in the good range for adult eastern oysters.

Total inflow to the Caloosahatchee Estuary averaged 940 cfs over the past week with 400 cfs (estimated) coming from the Lake. The seven-day average salinity remains low at S-79 and Val I-75 but increased downstream over the past week. Salinities are in the good range (0-10) for tape grass at Val I-75 and Ft. Myers. Salinities are in the good range (10-30) for adult eastern oysters at Cape Coral and Shell Point and in the fair range at Sanibel.

Lake stage is in the Beneficial Use sub-band of 2008 LORS. Tributary hydrological conditions are dry. The SFWMD's Lake Okeechobee Adaptive Protocol's Release Guidance suggests no S-77 release to the Caloosahatchee Estuary.

### **Stormwater Treatment Areas**

Over the past week, no Lake Okeechobee water was delivered to the FEBs/STAs. The total amount of Lake releases sent to the FEBs/STAs in WY2021 (since May 1, 2020) is approximately 10,000 ac-feet. The total amount of inflows to the STAs in WY2021 is approximately 309,000 ac-feet. Most STA cells are at or near target stage. 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-1E Central Flow-way, STA-2 Flow-way 3, STA-2 Flow-way 4, STA-3/4 Eastern, Central, and Western Flow-ways 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, there is no capacity for Lake releases in the STAs.

### **Everglades**

All the WCAs are above regulation but have generally stabilized over the past week. Ascension rates impact apple snail reproduction and the current ecologically preferred rate in the Everglades is 0.05–0.15 feet per week, with a maximum of 0.25 per week or 0.5 per two weeks. The lower than average rainfall and general drop in stages over the last week meant that most of the Everglades fell outside of the recommended ascension rates except in a few important regions in the WCAs. Florida Bay and Taylor Slough received more rain than the week prior, but stages decreased, with the largest drop occurring in northern Taylor Slough. Florida Bay average salinities increased, especially in the nearshore north. Salinity in the mangrove zone increased again reversing the decreases of the last month.

## Supporting Information

### KISSIMMEE BASIN

#### Kissimmee Basin Rainfall

The Upper Kissimmee Basin received 1.06 inches of rainfall in the past week and the Lower Basin received 0.50 inches (SFWMD Daily Rainfall Report 7/5/2020).

#### 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: 7/7/2020

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)						
							7/5/20	6/28/20	6/21/20	6/14/20	6/7/20	5/31/20	5/24/20
Lakes Hart and Mary Jane	S-62	108	LKMJ	60.2	R	60.0	0.2	0.0	0.2	0.1	-0.2	0.1	-0.1
Lakes Myrtle, Preston, and Joel	S-57	0	S-57	60.8	R	61.0	-0.2	-0.1	-0.2	-0.2	-0.4	0.0	-0.1
Alligator Chain	S-60	0	ALLI	62.6	R	63.2	-0.6	-0.5	-0.4	-0.5	-0.9	0.1	0.0
Lake Gentry	S-63	0	LKGT	60.8	R	61.0	-0.2	-0.2	-0.3	-0.6	-1.0	0.2	-0.1
East Lake Toho	S-59	388	TOHOE	55.0	R	56.5	-1.5	-1.4	-2.2	-2.7	-3.1	-2.0	-3.0
Lake Toho	S-61	569	TOHOW, S-61	53.6	R	53.5	0.1	0.0	0.0	-0.1	-0.8	0.3	-0.1
Lakes Kissimmee, Cypress, and Hatchineha	S-65	1,527	KUB011, LKIS5B	51.4	R	51.0	0.4	0.5	0.2	-0.1	-0.6	0.8	0.0

<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 4. Mean daily dissolved oxygen concentrations, discharge, temperature, and rainfall are shown in Figure 5. The 2019-2020 Discharge Plan for S-65/S-65A, the interim regulation schedule for S-65, and a map of the Kissimmee Basin are shown respectively in Figures 6-8.

**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: 7/7/2020

Metric	Location	1-Day Average		Average for the Preceding 7-Days <sup>1</sup>							
		7/5/2020	7/5/20	6/28/20	6/21/20	6/14/20	6/7/20	5/31/20	5/24/20	5/17/20	5/10/20
Discharge (cfs)	S-65	1,819	1,527	873	581	80	427	695	496	353	738
Discharge (cfs)	S-65A <sup>2</sup>	1,865	1,559	1,127	864	854	884	788	438	313	656
Discharge (cfs)	S-65D <sup>2</sup>	1,318	1,314	1,453	1,641	1,988	1,485	903	325	441	667
Headwater Stage (feet NGVD)	S-65D <sup>2</sup>	25.68	25.76	25.72	25.74	25.72	25.78	25.76	25.84	25.61	25.81
Discharge (cfs)	S-65E <sup>2</sup>	1,226	1,240	1,402	1,549	1,868	1,552	926	312	411	617
Discharge (cfs)	S-67	0	0	0	0	0	0	0	0	0	0
DO (mg/L) <sup>3</sup>	Phases I & II/III river channel	3.3	2.9	2.0	1.2	0.7	4.0	6.0	7.6	7.7	7.8
Mean depth (feet) <sup>4</sup>	Phase I floodplain	0.78	0.73	0.71	0.78	0.90	0.56	0.28	0.08	0.07	0.09

<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)

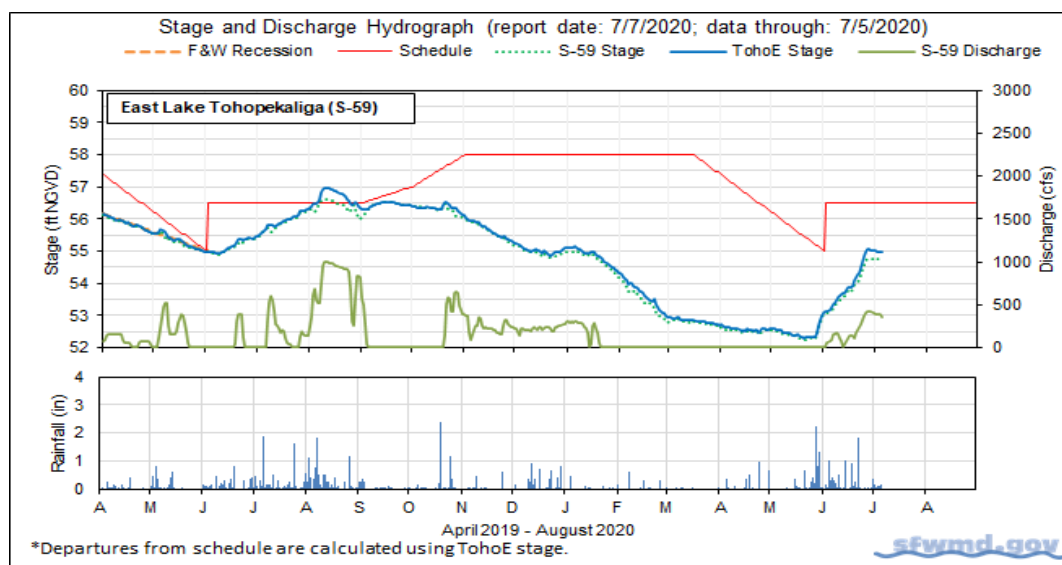


Figure 1.

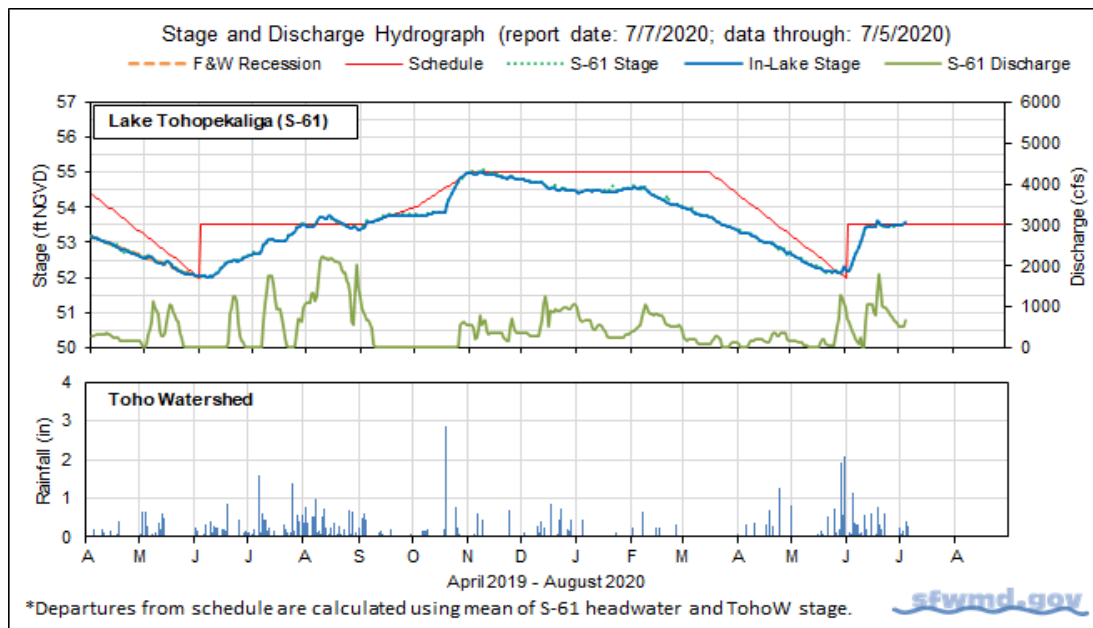


Figure 2.

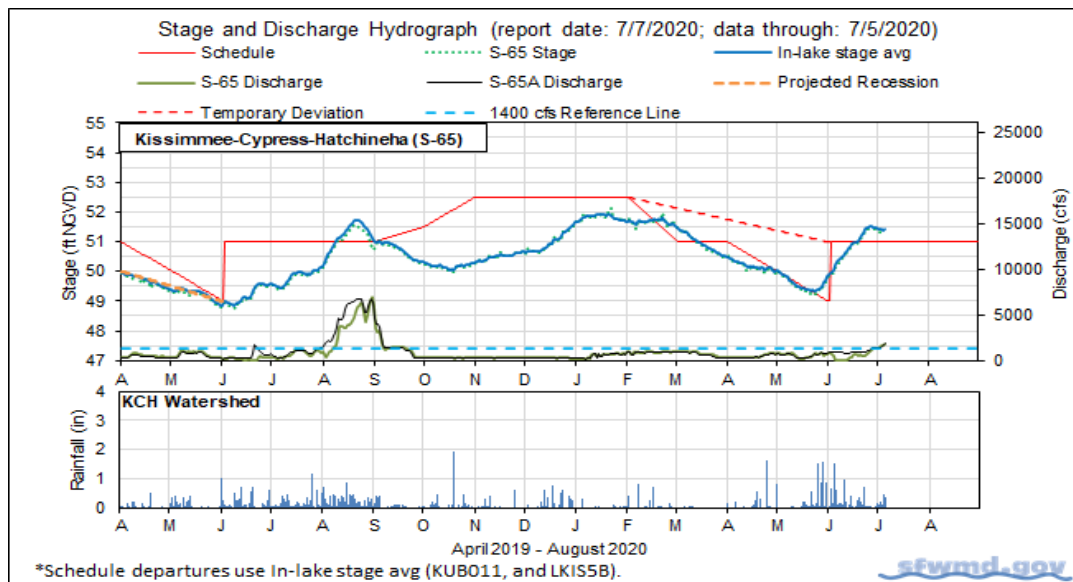
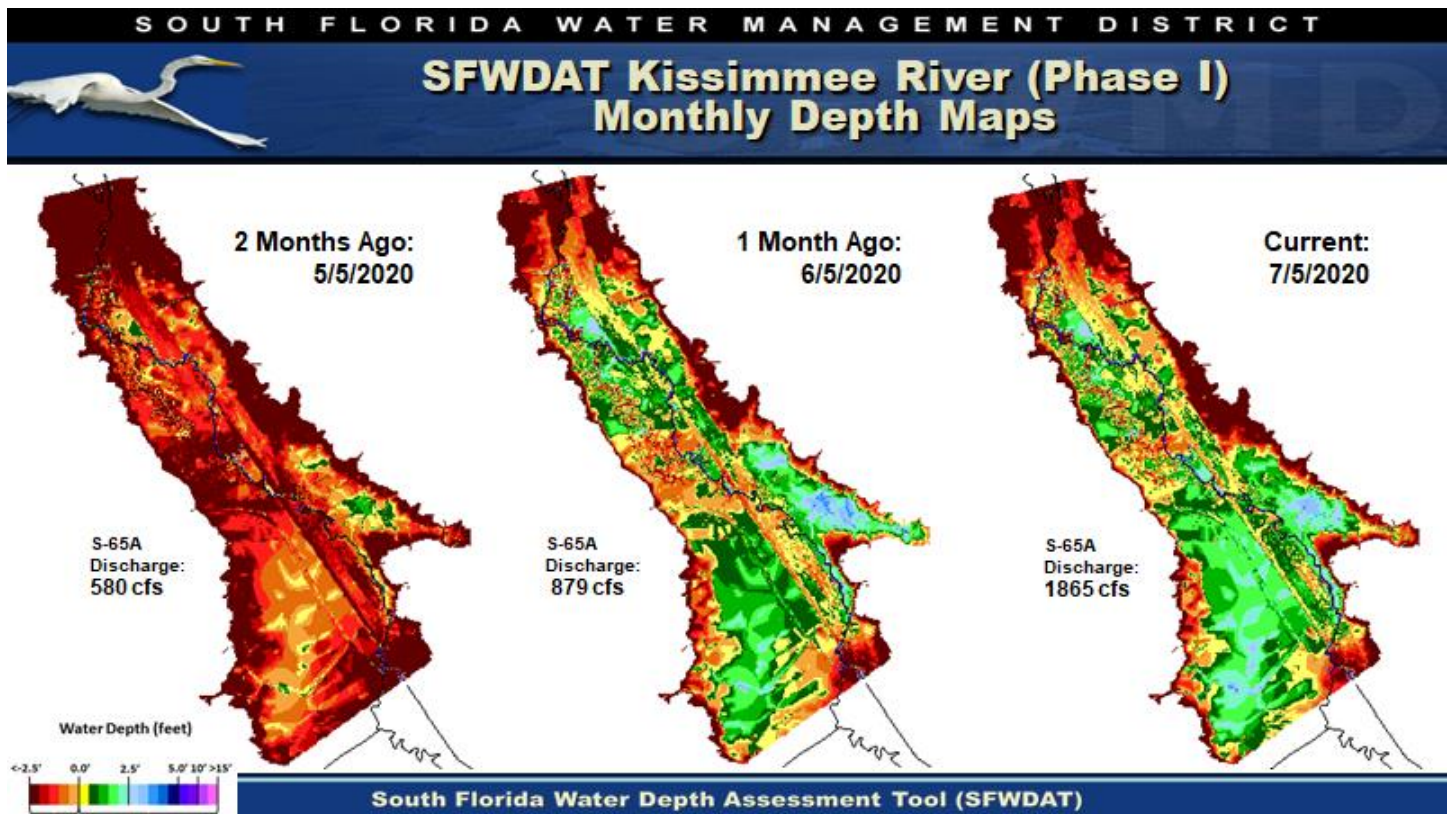
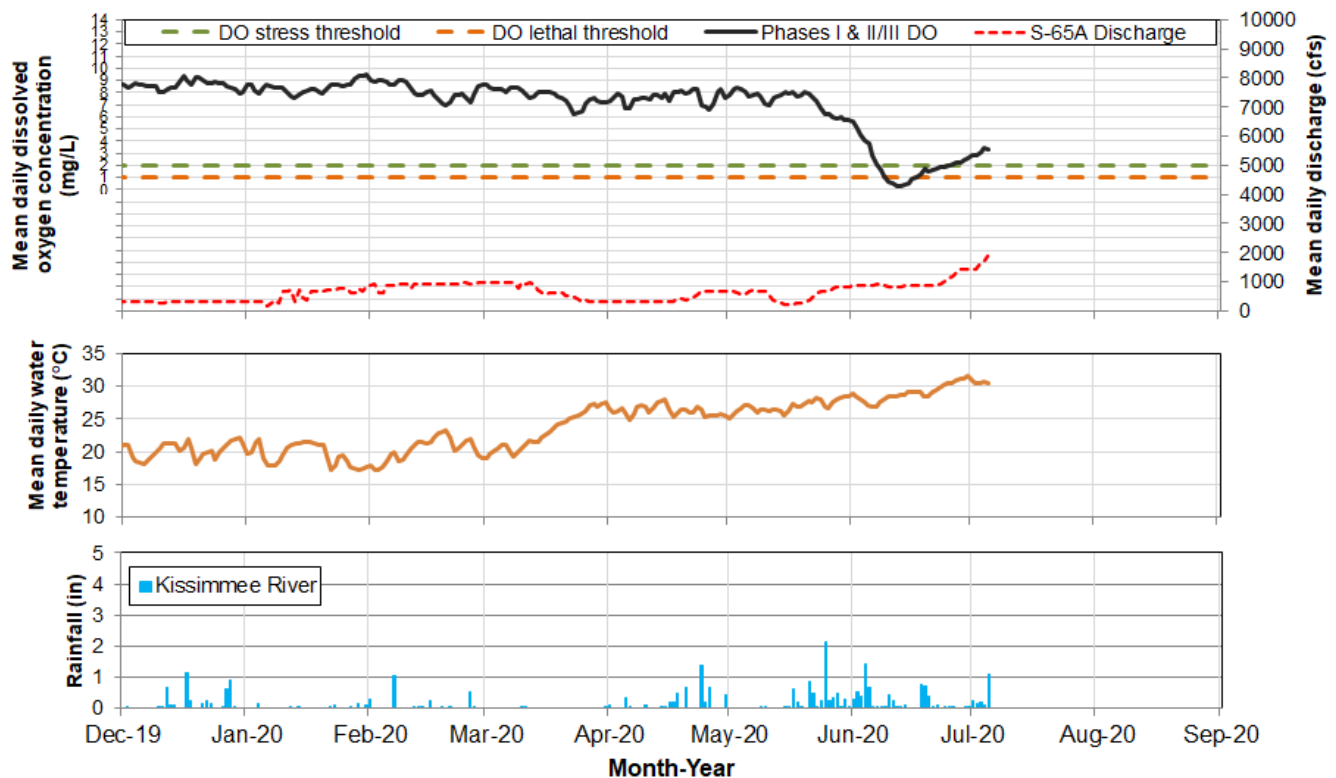


Figure 3.



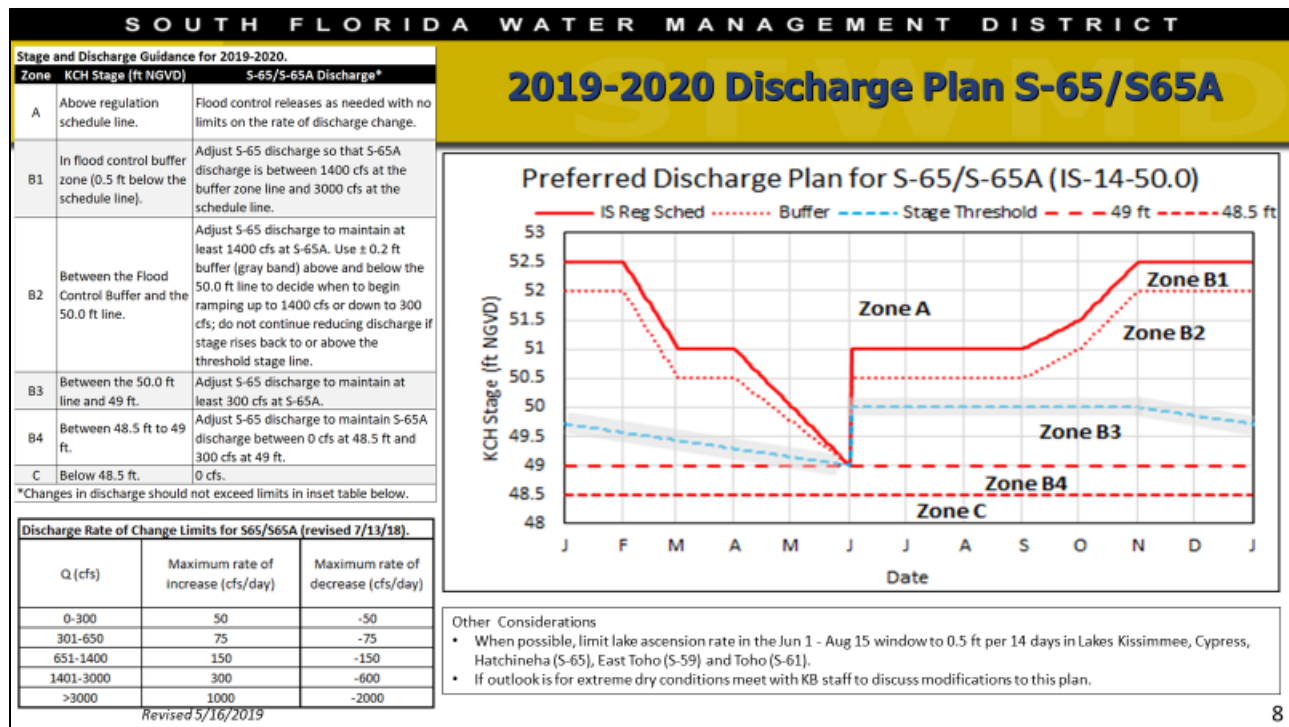
**Figure 4.** Phase I area floodplain water depths for this week, one month ago, and two months ago. Note that the WDAT color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to January 16, 2012.



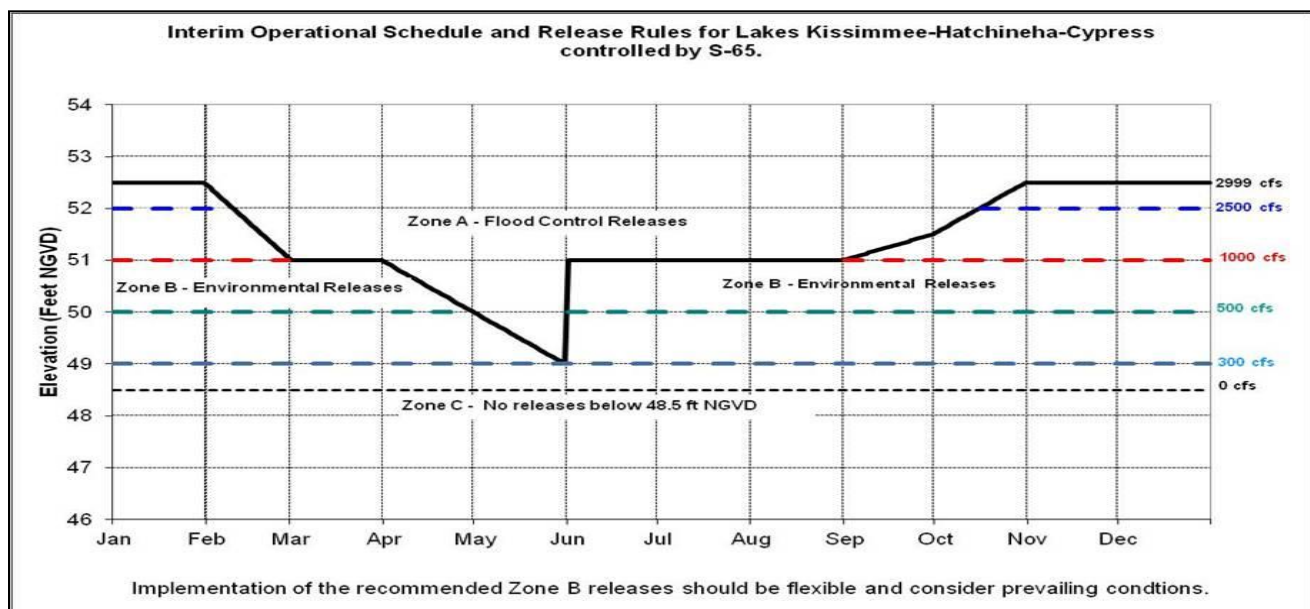
Report Date: 7/7/2020; data are through: 7/5/2020.

**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.

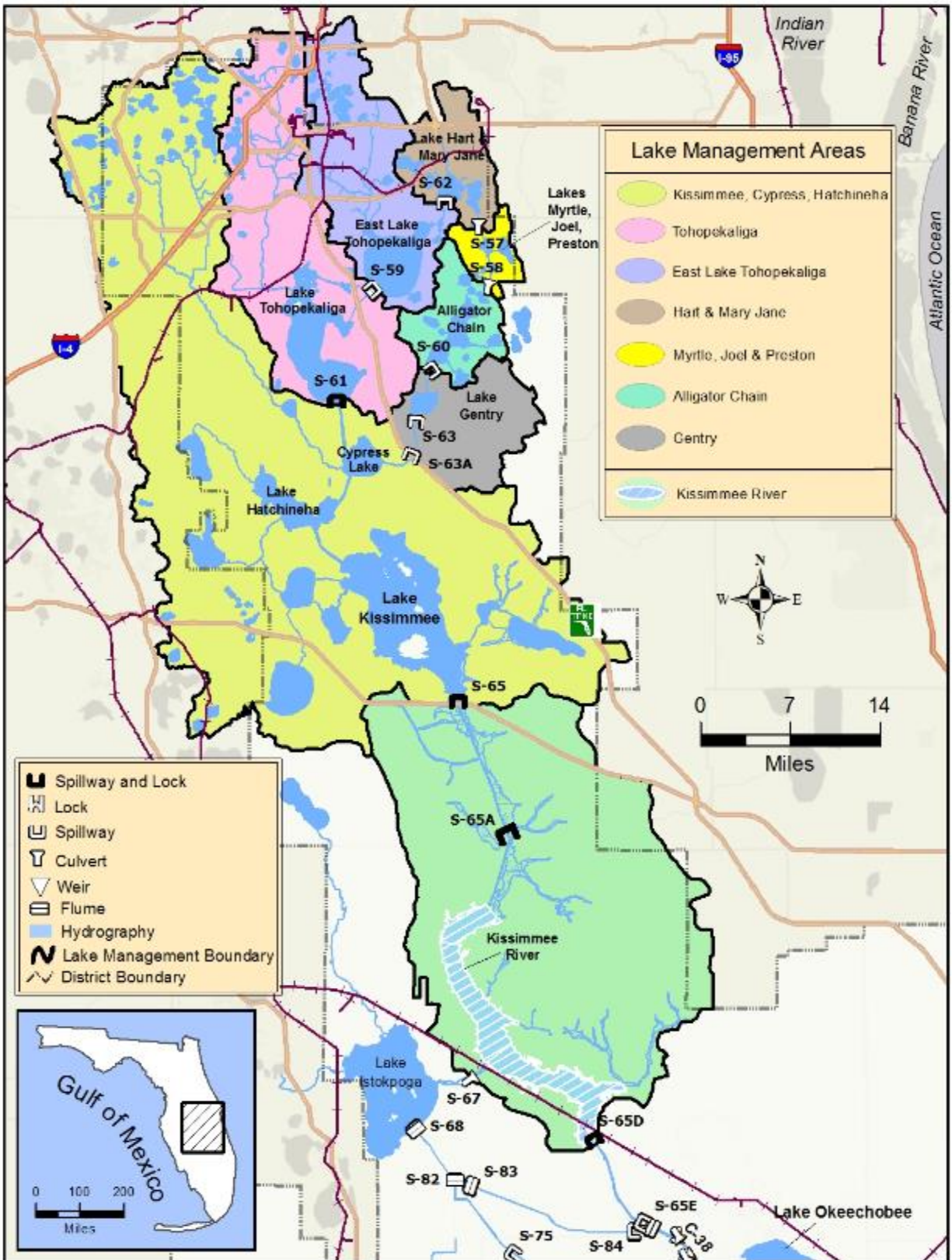


Figure 8. The Kissimmee Basin.



## **LAKE OKEECHOBEE**

Lake Okeechobee stage is 12.32 feet NGVD, 0.40 feet higher than a month ago and 1.07 feet higher than one year ago (Figure 1). The Lake has been back within the preferred ecological envelope since June 2, 2020 (Figure 2). Lake stage moved into the Base Flow sub-band on September 11, 2019 and entered the Beneficial Use sub-band on March 4, 2020 (Figure 3). Lake stage reached a low of 10.99 on May 17, rose rapidly for a month, and then leveled off again recently. According to RAINДАР, 1.38 inches of rain fell directly over the Lake during the past week (Figure 4). Most of the heavy rain fell north of the Lake with spotty heavy rain to the south and less rain in the western portions of the watershed.

The average daily inflows (minus rainfall) decreased from 2,579 cfs to 2,025 cfs, and the outflows (minus evapotranspiration) increased from 647 cfs to 1,313 cfs. Most of the inflows came from the Kissimmee River (1,261 through S-65E & S-65EX1), while 384 cfs came through Fisheating Creek and 223 cfs came from Lake Istokpoga (through S-71, S-72, S-84 & S-84X). An additional 53 cfs also came from the C-44 canal through S-308, which is predominantly an outflow from the Lake, and 103 cfs came from minor pumping activities. After a few weeks with almost zero outflows from the Lake (due to heavy rainfall in surrounding watersheds), 665 cfs were released to the Caloosahatchee (S-77), around 615 cfs were released south through the S-350 structures and 33 cfs were released through the L-8 (Culvert 10A). 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.

Water quality sampling occurs twice-monthly at approximately 30 stations from May – October as part of expanded monitoring efforts to track and study Harmful Algal Blooms on the Lake. The most recent sampling occurred on June 23 and 24 (Figure 6). Chlorophyll results are now available and indicate that 8 sites had CHL<sub>a</sub> levels above 40 µg/L, 6 of which had values above 80 µg/L. Despite the elevated bloom levels, 5 of the 8 sites had toxin levels below detection. Additionally, the site that had the second highest toxin value (LZ40) had a CHL<sub>a</sub> value of less than 40 µg/L. The two sites that had highly elevated toxin levels of 290 µg/L (LZ40) and 800 µg/L (L004) were resampled on June 30, 2020. This subsequent sampling indicated toxin levels at LZ40 decreased from 290 µg/L to 99 µg/L, still well above the EPA recreational waters recommendation of 8 µg/L, while toxin levels at L004 decreased to below detectable levels.

Current satellite imagery (July 4, 2020) using NOAA's cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3 OLCI sensor data suggested a decrease in cyanobacteria bloom risk potential for the central areas of the Lake but an increase in intensity along the northwestern shoreline. Current bloom risk is similar to this time last year but covers more area (Figure 7).

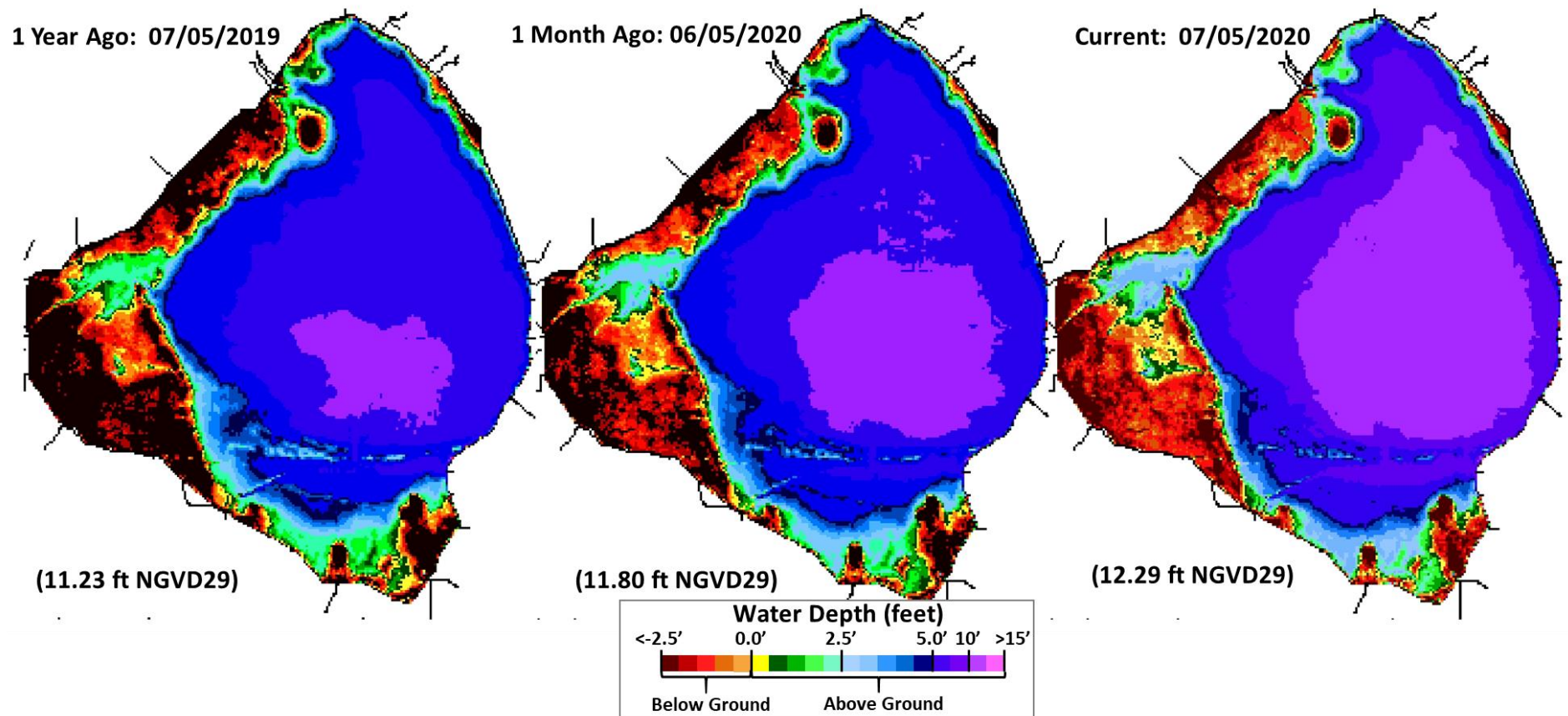
## **Water Management Summary**

Lake Okeechobee stage was 12.32 feet NGVD on July 6, 2020, 0.02 feet lower than the previous week, but 0.40 feet higher than the previous month. The Lake entered the Beneficial Use sub-band on March 4, 2020 and is now 0.28 feet below the Base Flow sub-band. Lake stage moved back into the ecological envelope (which varies seasonally from 12 – 15 feet NGVD +/- 0.5 feet) on June 2, 2020, after being up to 1.5 feet below since October 15, 2019. While ascension rates were recently quite high (over 1 foot in 3 weeks), the rate of rise slowed over the past weeks, providing submerged plant communities an opportunity to catch up with rising stages. The increased cyanobacteria bloom risk potential associated with previous large inflows lessened across the central portion of the lake but intensified along the northwestern shoreline.

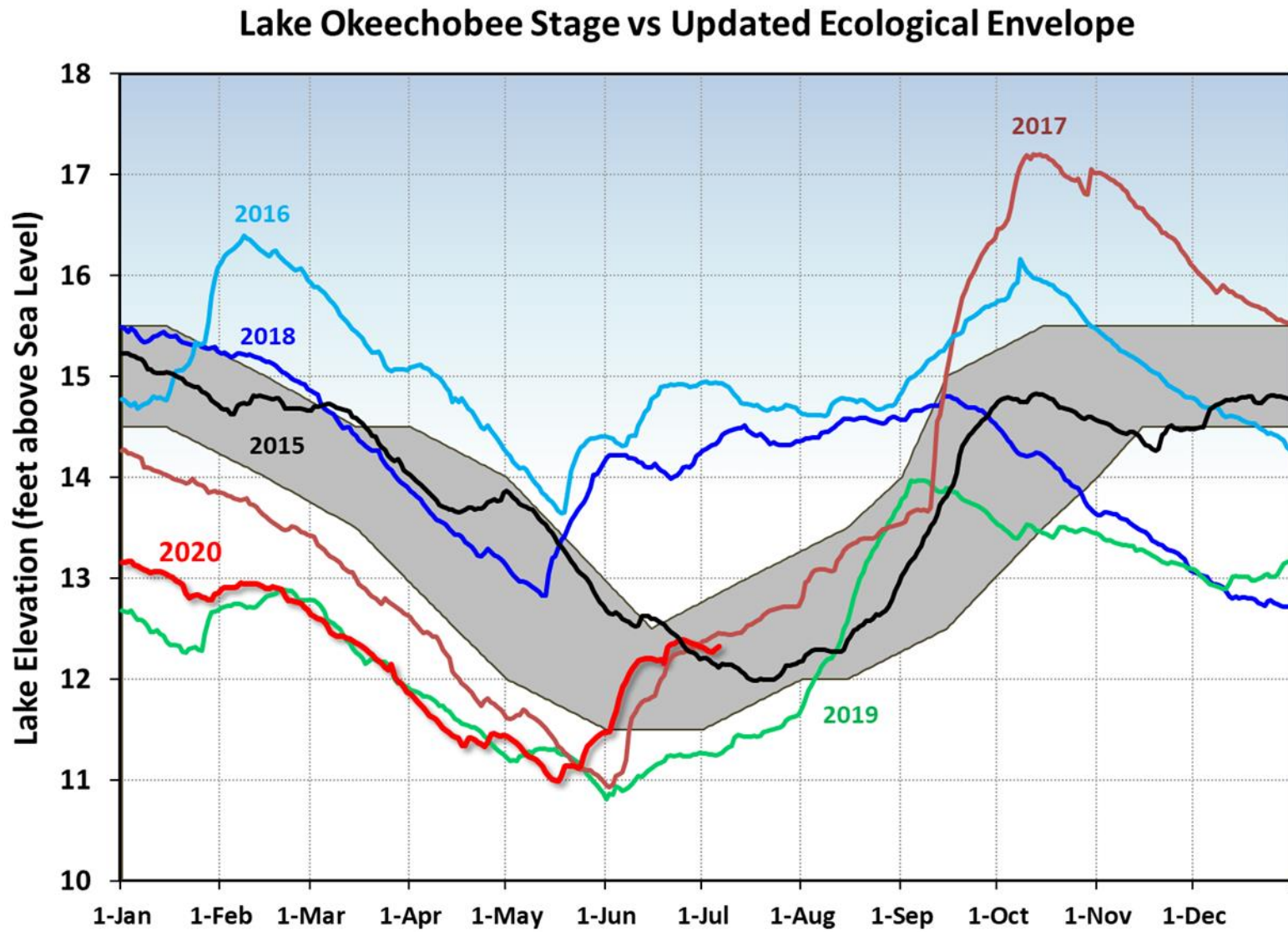
**Table 1.** Average daily inflows and outflows and the approximate depth equivalents on Lake Okeechobee for various structures.

INFLOWS	Previous week Avg Daily CFS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)	OUTFLOWS	Previous week Avg Daily CFS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)
S-65E & S-65EX1	1356	1261	0.6	S-77	282	665	0.3
S-71 & S-72	183	87	0.0	S-308	-217	-53	0.0
S-84 & S-84X	224	136	0.1	S-351	30	130	0.1
Fisheating Creek	461	384	0.2	S-352	146	252	0.1
S-154	0	6	0.0	S-354	174	233	0.1
S-191	18	0	0.0	L-8 Outflow	15	33	0.0
S-133 P	1	0	0.0	ET	3121	2216	1.0
S-127 P	1	0	0.0	<b>Total</b>	<b>3551</b>	<b>3476</b>	<b>1.6</b>
S-129 P	6	0	0.0				
S-131 P	34	20	0.0				
S-135 P	80	0	0.0				
S-2 P	0	0	0.0				
S-3 P	0	0	0.0				
S-4 P	0	77	0.0				
L-8 Backflow							
Rainfall	432	2982	1.4				
<b>Total</b>	<b>2794</b>	<b>4954</b>	<b>2.3</b>				

Provisional Data



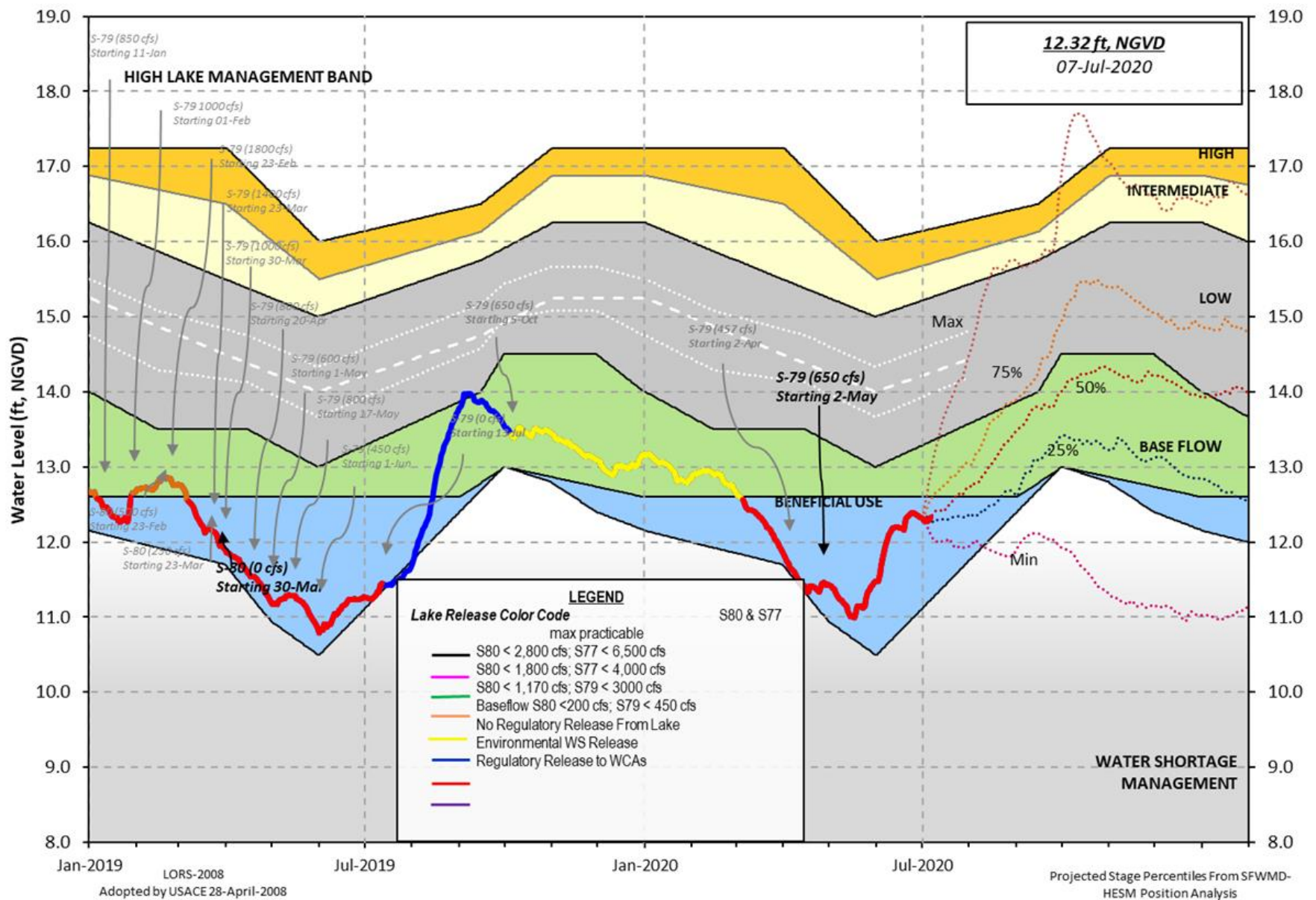
**Figure 1.** Water depth estimates on Lake Okeechobee based on the South Florida Water Depth Assessment Tool.



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

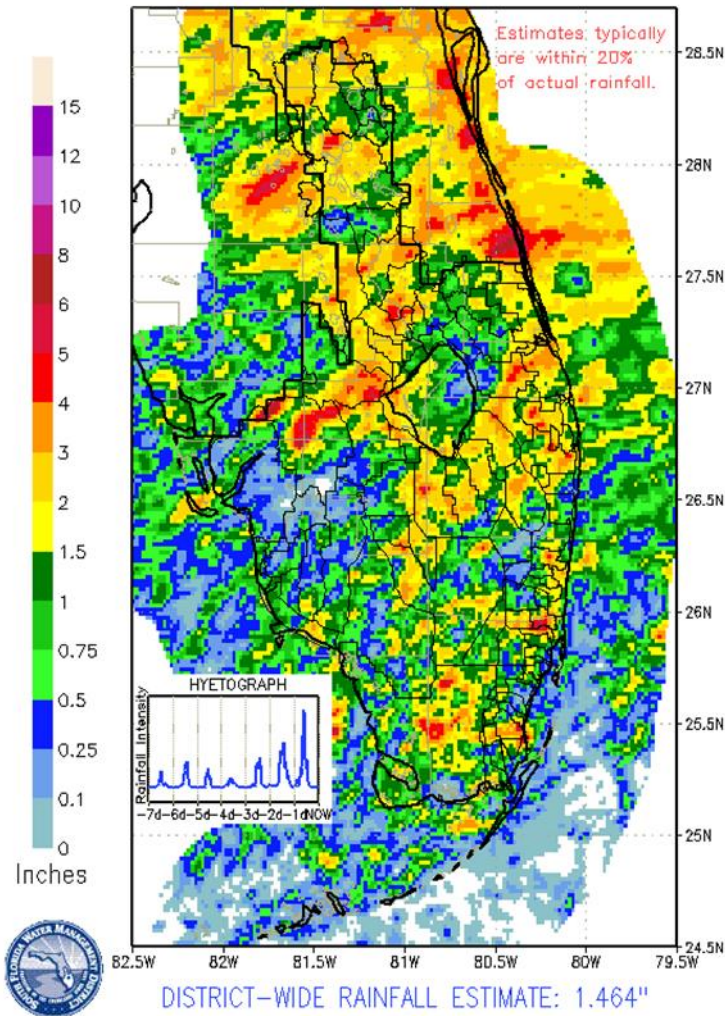


## Lake Okeechobee Water Level History and Projected Stages

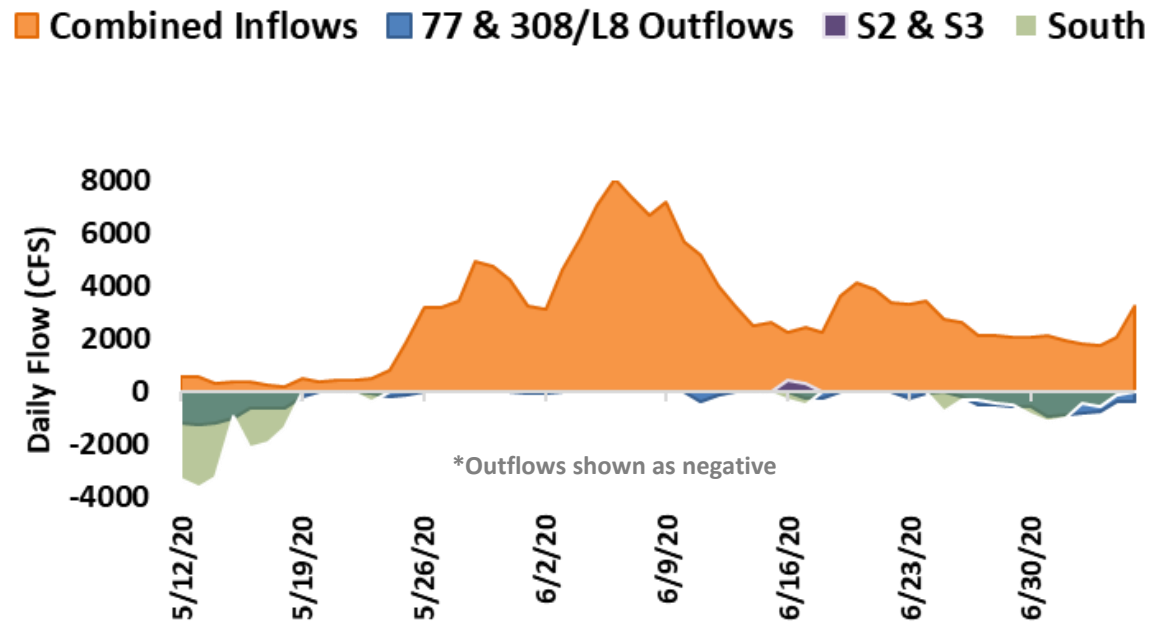


**Figure 3.** Recent Lake Okeechobee stage and releases, with projected stages based on a dynamic position analysis.

SFWMD PROVISIONAL RAINDAR 7-DAY RAINFALL ESTIMATES  
FROM: 0400 EST, 06/30/2020 THROUGH: 0400 EST, 07/07/2020



**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.

### Samples collected on June 23- 24, 2020

Station	CHLa (ug/L)	TOXIN (ug/L)	TAXA
FEBIN			NS
FEBOUT			NS
KISSR0.0	13.2	BDL	mixed
L005	32.5	BDL	Cylindro
LZ2	85.1	BDL	mixed
KBARSE	26.2	0.3	Microcys
RITTAE2			NS
PELBAY3	6.5	BDL	mixed
POLE3S	3.4	BDL	mixed
LZ25A	6.8	BDL	mixed
PALMOUT	6.6	BDL	mixed
PALMOUT1	9.1	BDL	Microcys
PALMOUT2	15.5	0.9	Micro/Dolic
PALMOUT3	40.2	8.3	Microcys
POLESOUT	88.8	BDL	Micro/Cylin
POLESOUT1	89.5	BDL	Cylindro
POLESOUT2	125.0	BDL	Micro/Cylin
POLESOUT3	80.4	BDL	Micro/Cylin
EASTSHORE	23.2	BDL	Microcys
NES135	24.9	BDL	mixed
NES191	39.9	BDL	mixed

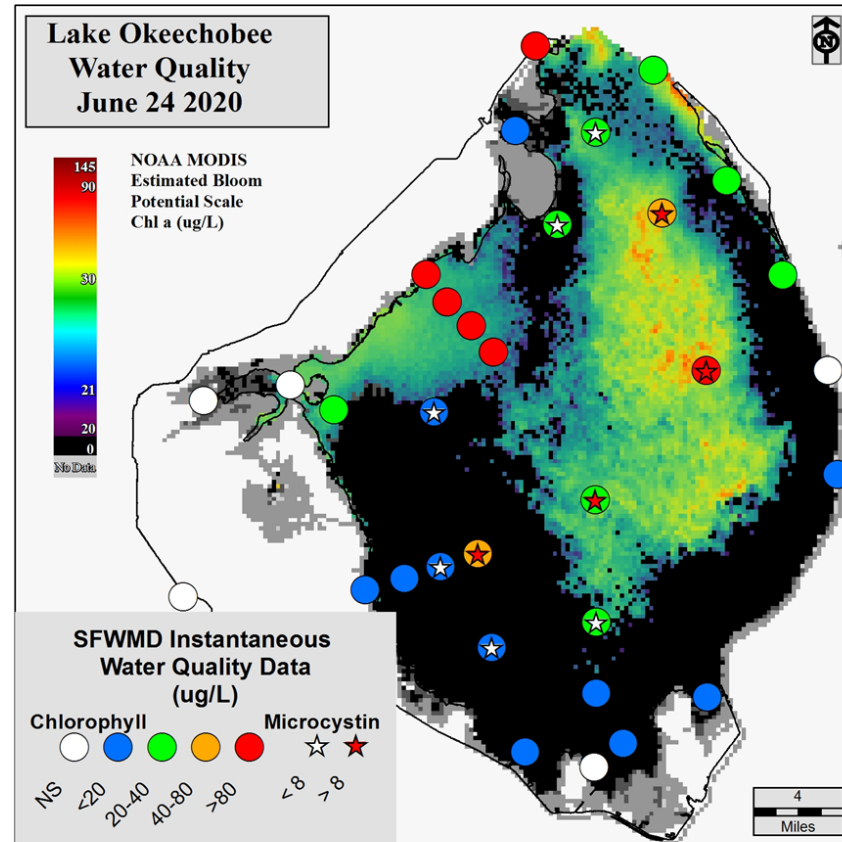
Station	CHLa (ug/L)	TOXIN (ug/L)	TAXA
L001	37.8	3.7	Microcys
L004	85.7	800	Microcys
L006	32.9	4.3	Microcys
L007	7.8	BDL	mixed
L008	18.4	1.1	Microcys
LZ30	12.8	0.3	Microcys
LZ40	32.3	290	Microcys
CLV10A	15.9	BDL	Microcys
NCENTER	61.2	10	Microcys

Samples collected June 29

S308C	P	BDL	Microcys
S77	P	BDL	mixed

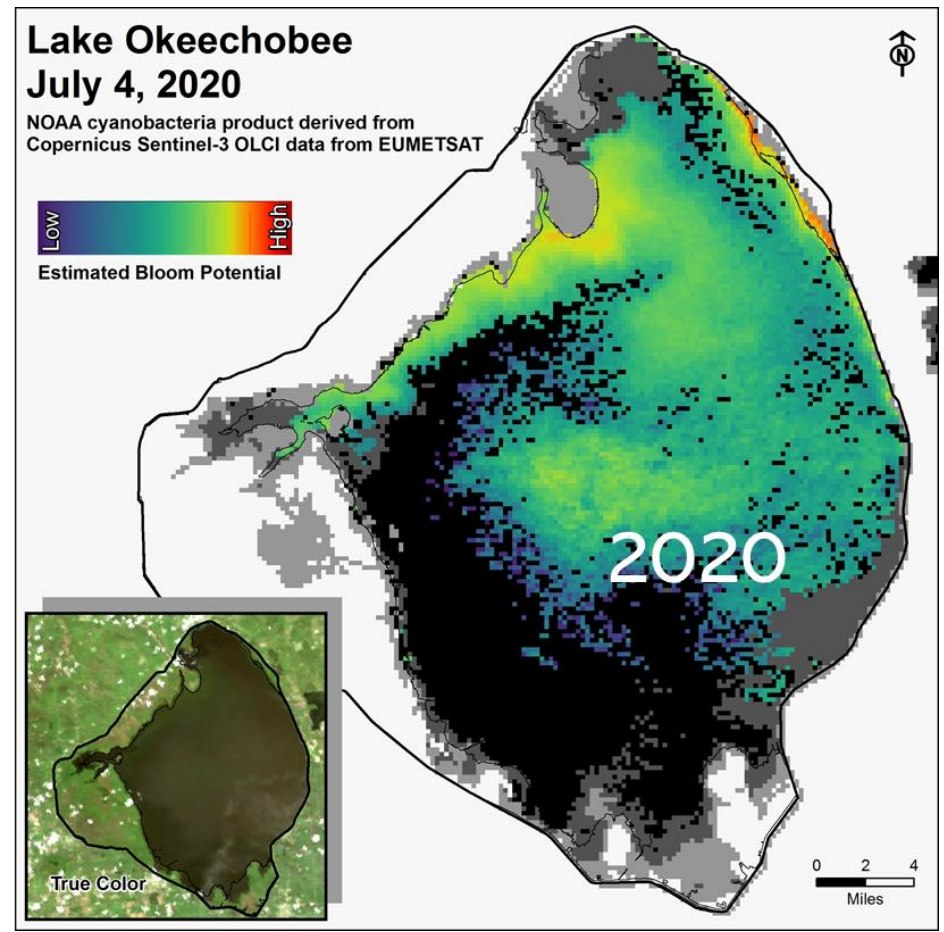
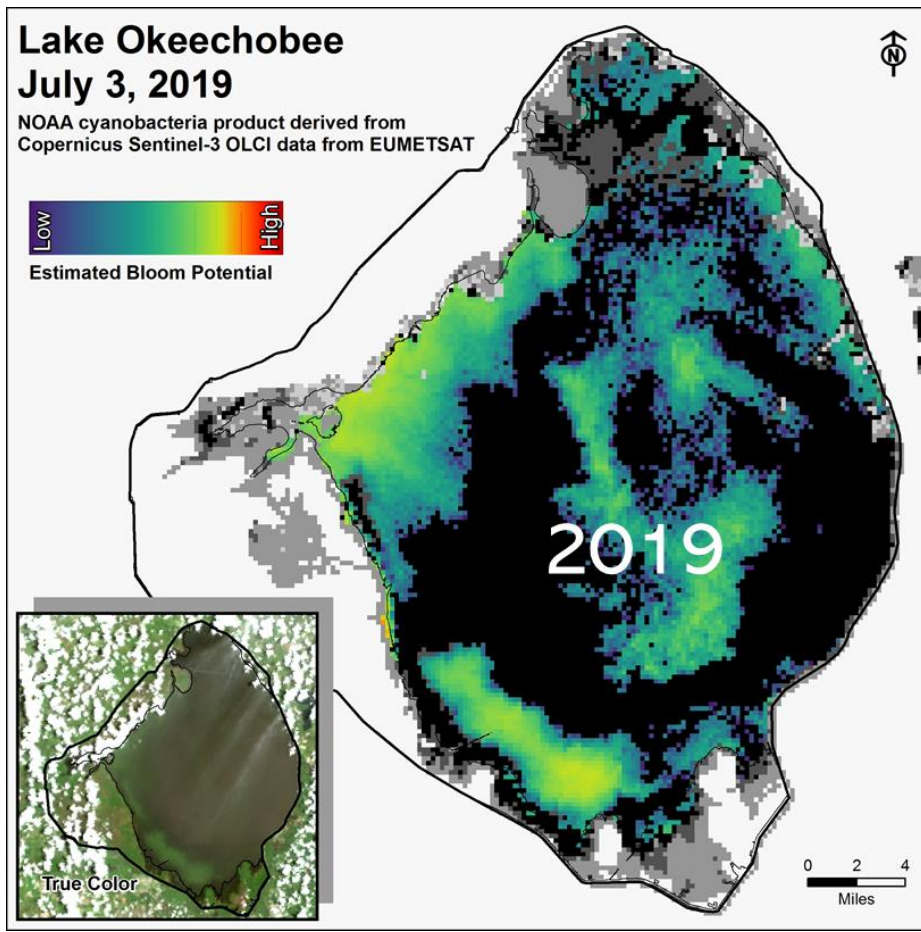
- SFWMD: >40 µg/L Chlorophyll *a* (Chla) an algal bloom
- BDL – Below Detectable Limit of 0.25 µg/L
- Mixed – No Dominant taxa
- P – Pending
- NS – Not Sampled
- Chlorophyll *a* analyzed by SFWMD
- Toxin and Taxa analyzed by FDEP

*Cylindro* = *Cylindrospermopsis*  
*Planktol* = *Planktolyngbya*  
*Dolicho* = *Dolichospermum*



**Figure 6.** Expanded monitoring provisional results for the sampling trips on June 23-24, 2020.





**Figure 7.** Potential for cyanobacterial blooms on Lake Okeechobee in early July 2019 and 2020, based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.



## **ESTUARIES**

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

Last week total inflow to the St. Lucie Estuary averaged approximately 739 cfs (Figures 1 and 2) and last month inflow averaged about 1,488 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	575
S-80	0
S-308	-53
S-49 on C-24	40
S-97 on C-23	23
Gordy Rd. structure on Ten Mile Creek	101

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 14.6. 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>7.1</b> (2.1)	<b>12.4</b> (5.2)	NA <sup>1</sup>
US1 Bridge	<b>13.5</b> (8.1)	<b>16.4</b> (10.7)	10.0-26.0
A1A Bridge	<b>22.8</b> (18.0)	<b>26.8</b> (25.1)	NA <sup>1</sup>

<sup>1</sup>Envelope not applicable

### **Caloosahatchee Estuary:**

Last week total inflow to the Caloosahatchee Estuary averaged approximately 940 cfs (Figures 5 and 6) and last month inflow averaged about 2,094 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	665
S-78	407
S-79	619
Tidal Basin Inflow	321

Over the past week in the estuary, salinity increased downstream of S-79 (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 (0-10) 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 at Val I-75 is for the protection of tape grass in the upper estuary and the envelope in the lower estuary reflects the preferred salinity range for adult eastern oysters (*Crassostrea virginica*).

Sampling Site	Surface	Bottom	Envelope
S-79 (Franklin Lock)	<b>0.3</b> (0.3)	<b>0.3</b> (0.3)	NA <sup>1</sup>
Val I75	<b>0.7</b> (0.5)	<b>0.8</b> (0.6)	0.0-5.0 <sup>2</sup>
Ft. Myers Yacht Basin	<b>5.4</b> (3.9)	<b>6.2</b> (5.1)	NA
Cape Coral	<b>13.4</b> (10.5)	<b>14.8</b> (12.1)	10.0-30.0
Shell Point	<b>26.6</b> (24.5)	<b>27.3</b> (25.5)	10.0-30.0
Sanibel	<b>30.1</b> (29.5)	<b>31.6</b> (31.0)	10.0-30.0

<sup>1</sup>Envelope not applicable, <sup>2</sup>Envelope is based on a 2-week forecast 30-day average.

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 1.8 to 4.9 at the end of the two week period for pulse release at S-79 ranging from 0 to 800 cfs and estimated Tidal Basin inflows of 200 cfs. The 30-day moving average surface salinity at Val I-75 is forecast to be between 0.8 and 1.5 (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

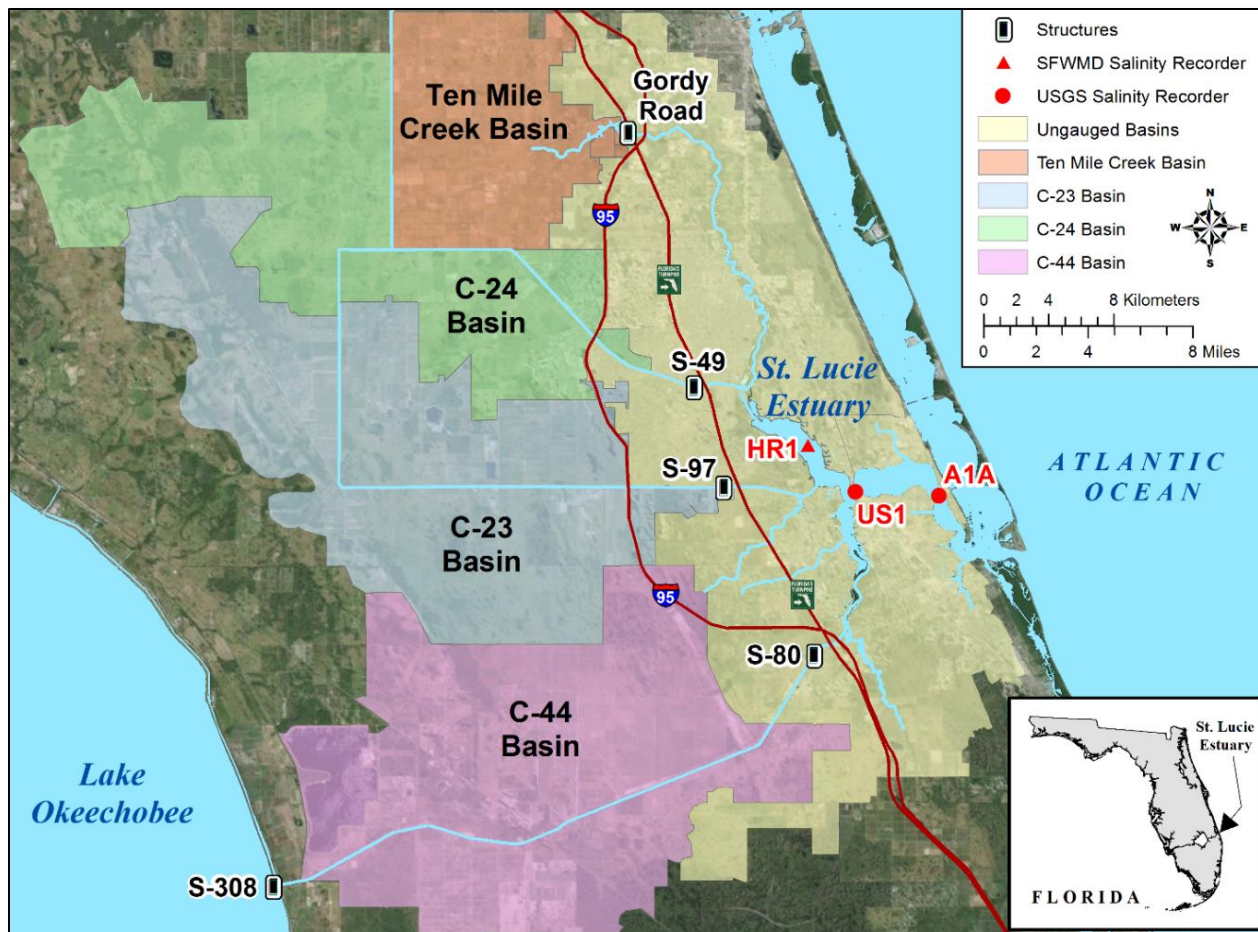
Scenario	Q79 (cfs)	TB runoff (cfs)	Daily salinity	30 day Mean
A	0	200	4.9	1.5
B	300	200	3.5	1.2
C	450	200	3.0	1.0
D	650	200	2.2	0.9
E	800	200	1.8	0.8

## Red tide

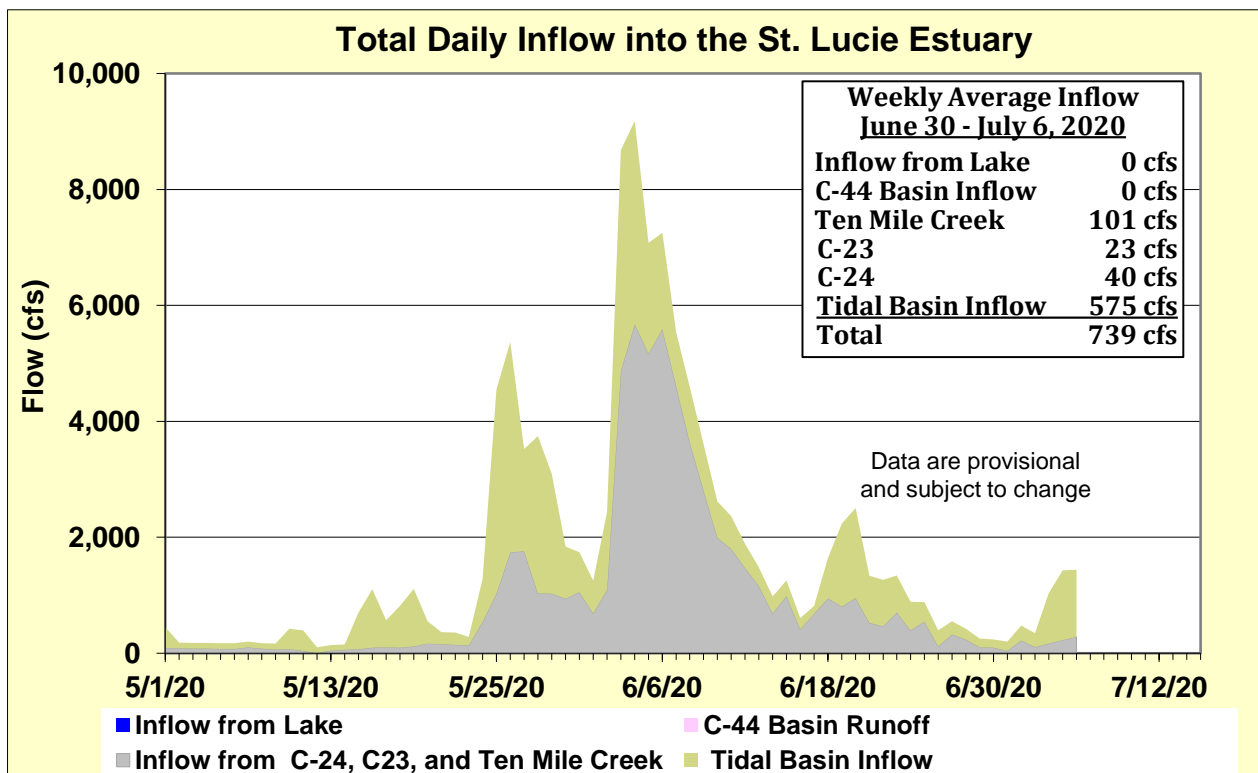
The Florida Fish and Wildlife Research Institute reported on July 2, 2020, that *Karenia brevis*, the Florida red tide dinoflagellate, was not observed in samples collected from Lee, Palm Beach, Broward, or Miami-Dade counties (no samples were analyzed this week from St. Lucie or Martin counties).

## Water Management Recommendations

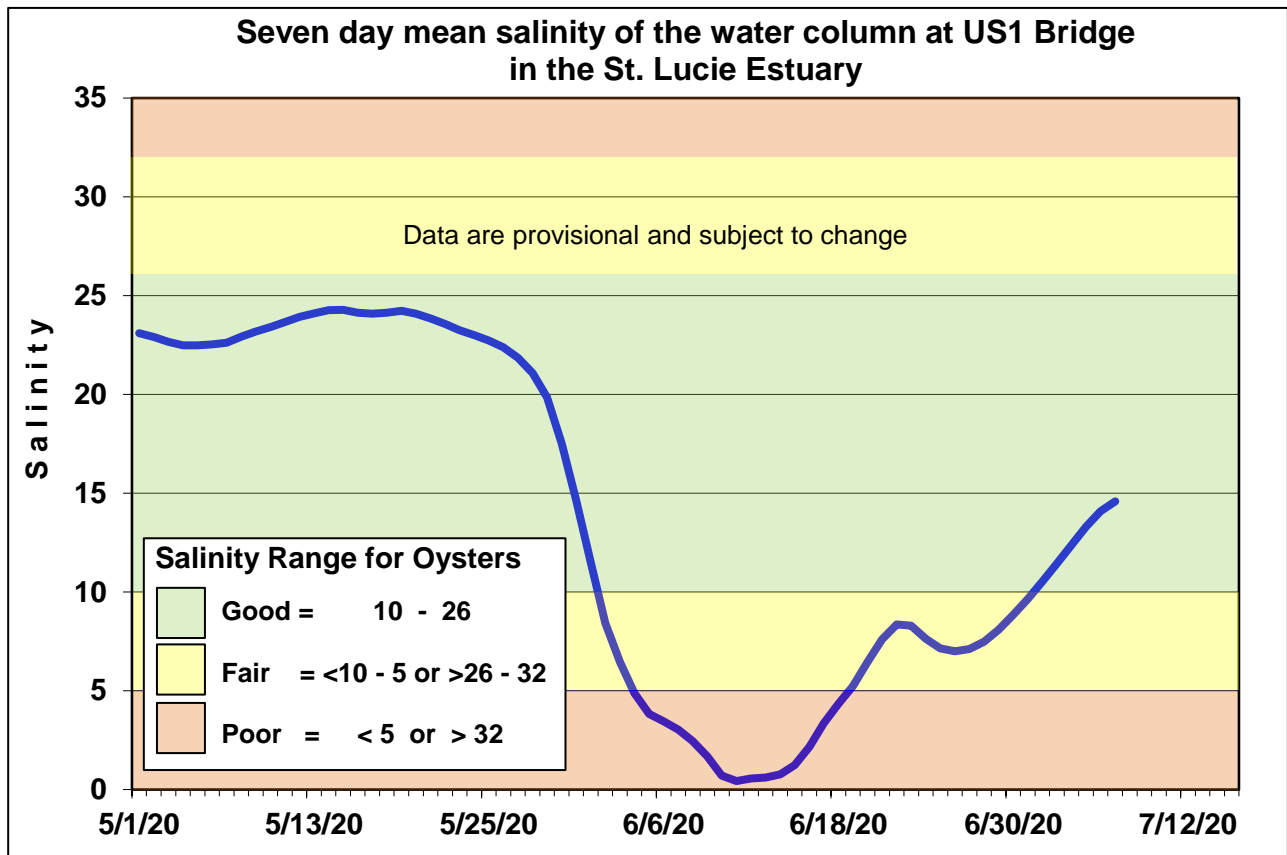
Lake stage is in the Beneficial Use Flow sub-band. Tributary conditions are dry. The South Florida Water Management District's Lake Okeechobee Adaptive Protocol's Release Guidance suggests no S-77 to the Caloosahatchee Estuary.



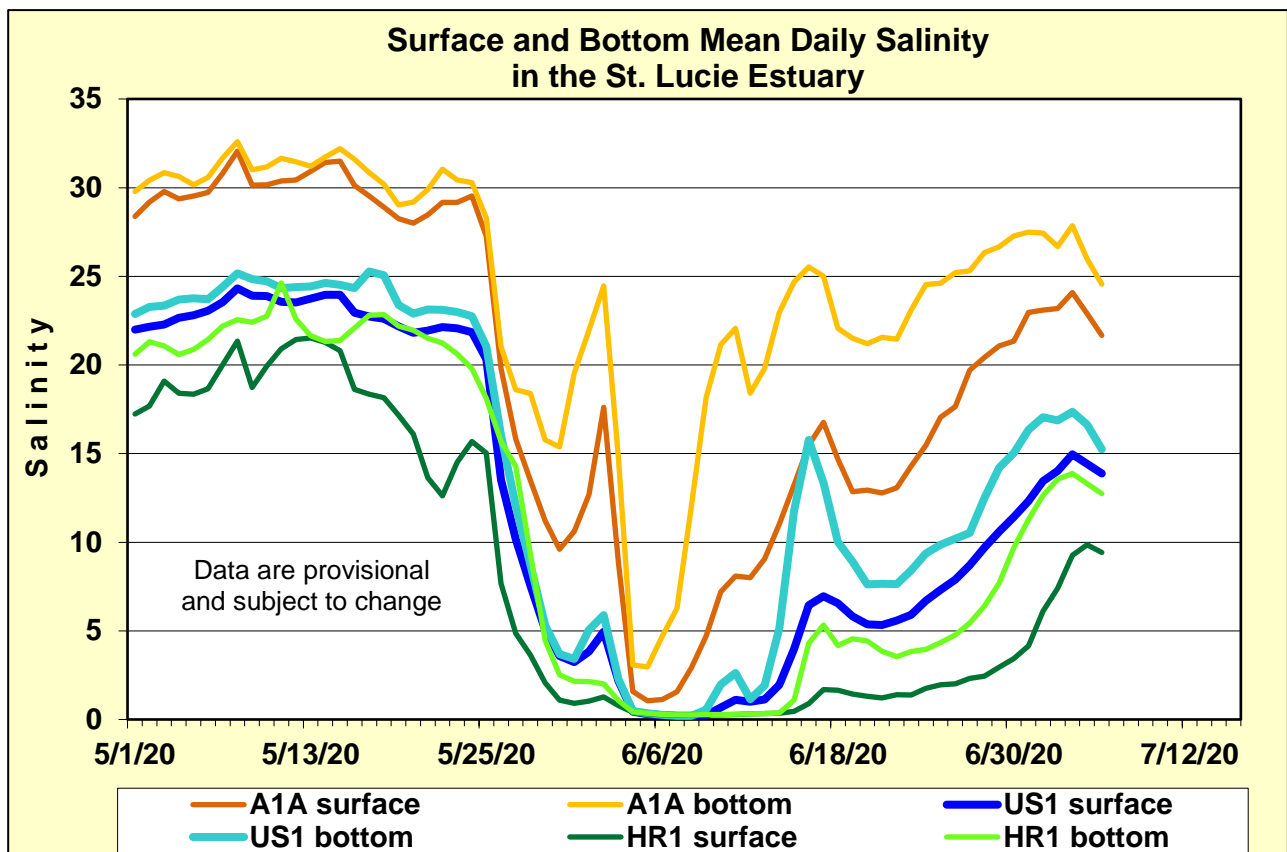
**Figure 1.** Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.



**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.

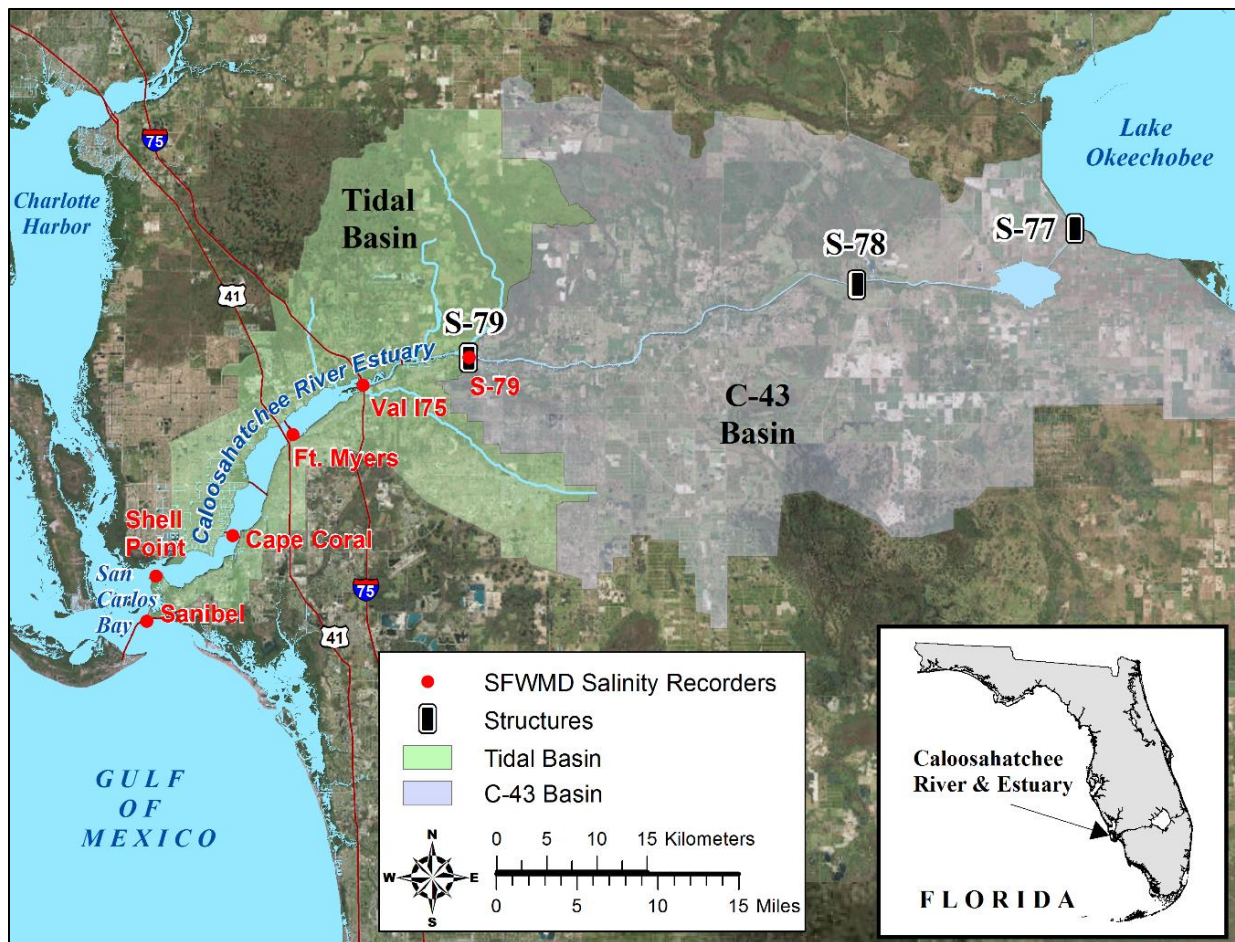


**Figure 3.** Seven-day mean salinity of the water column at the US1 Bridge.

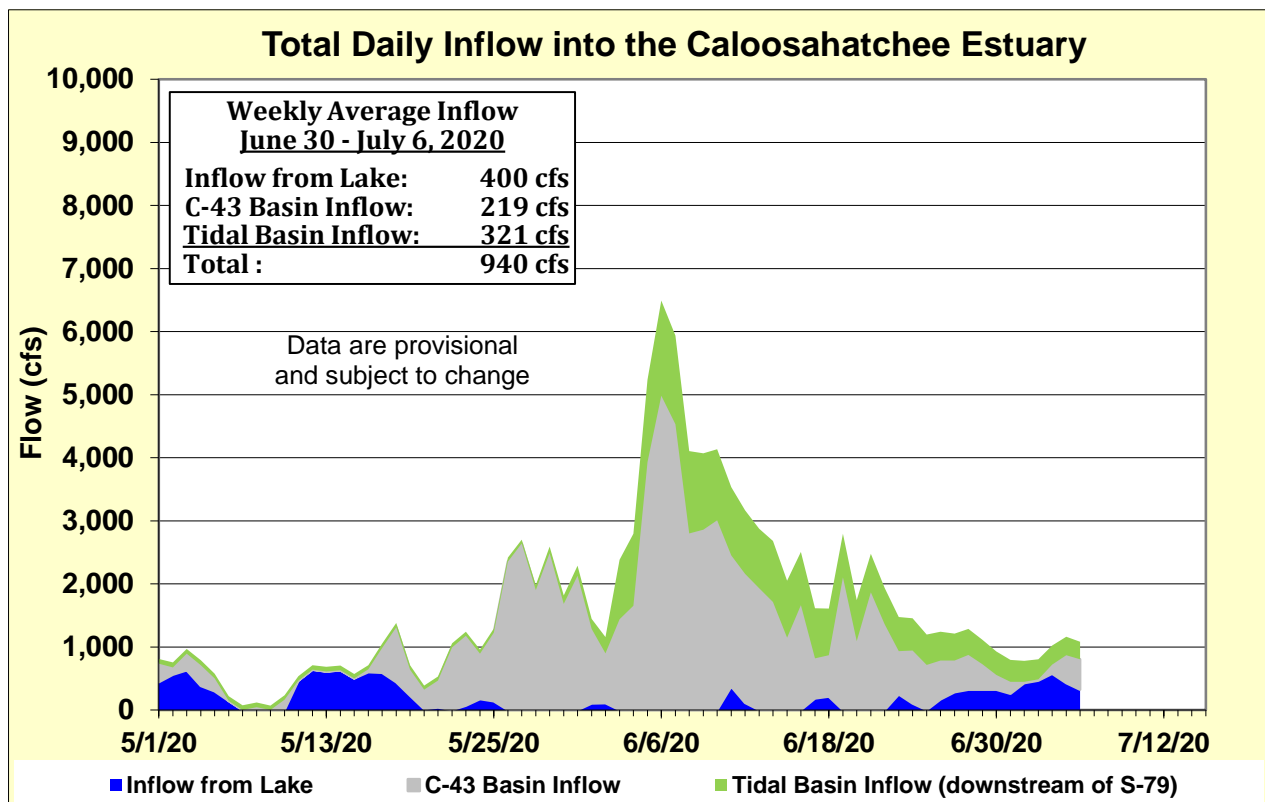


**Figure 4.** Daily mean salinity at the A1A, US1, and HR1 stations.

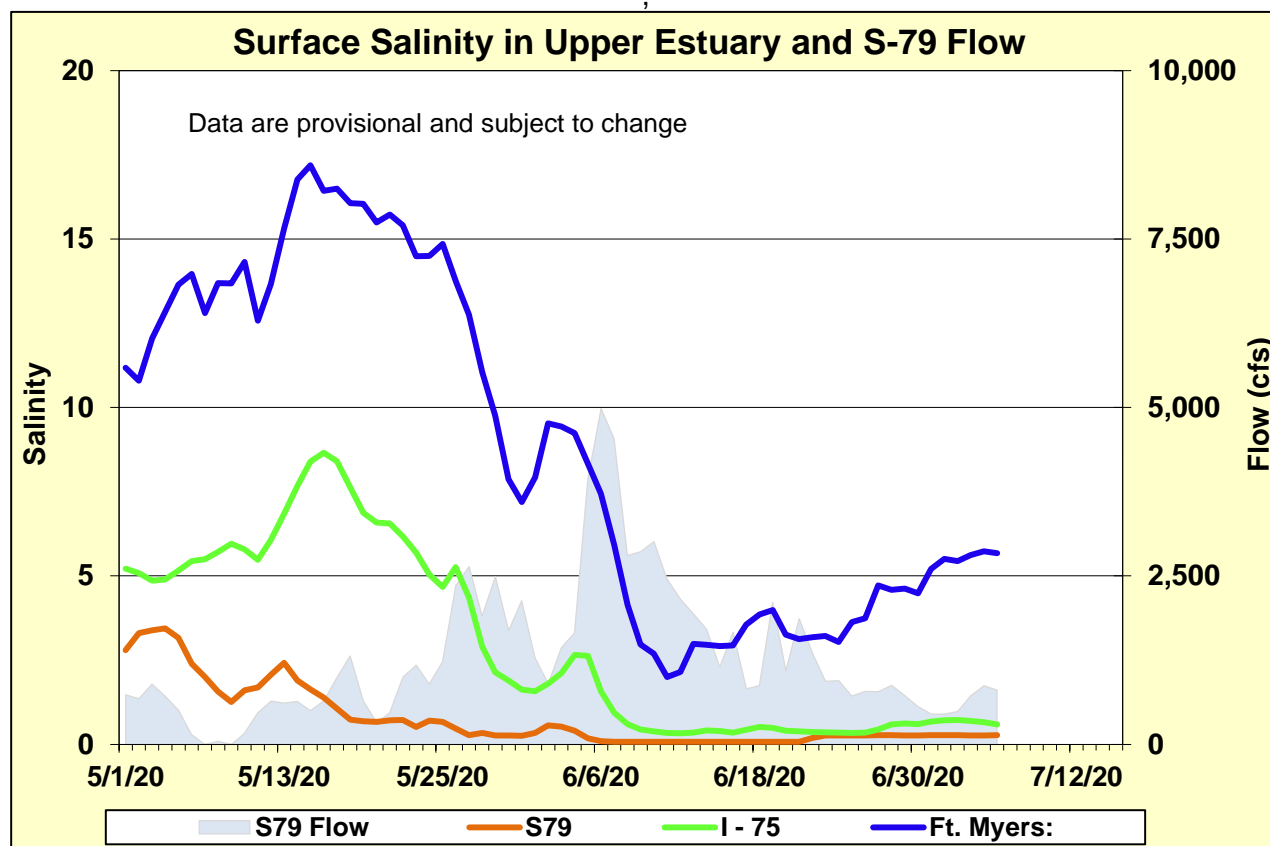




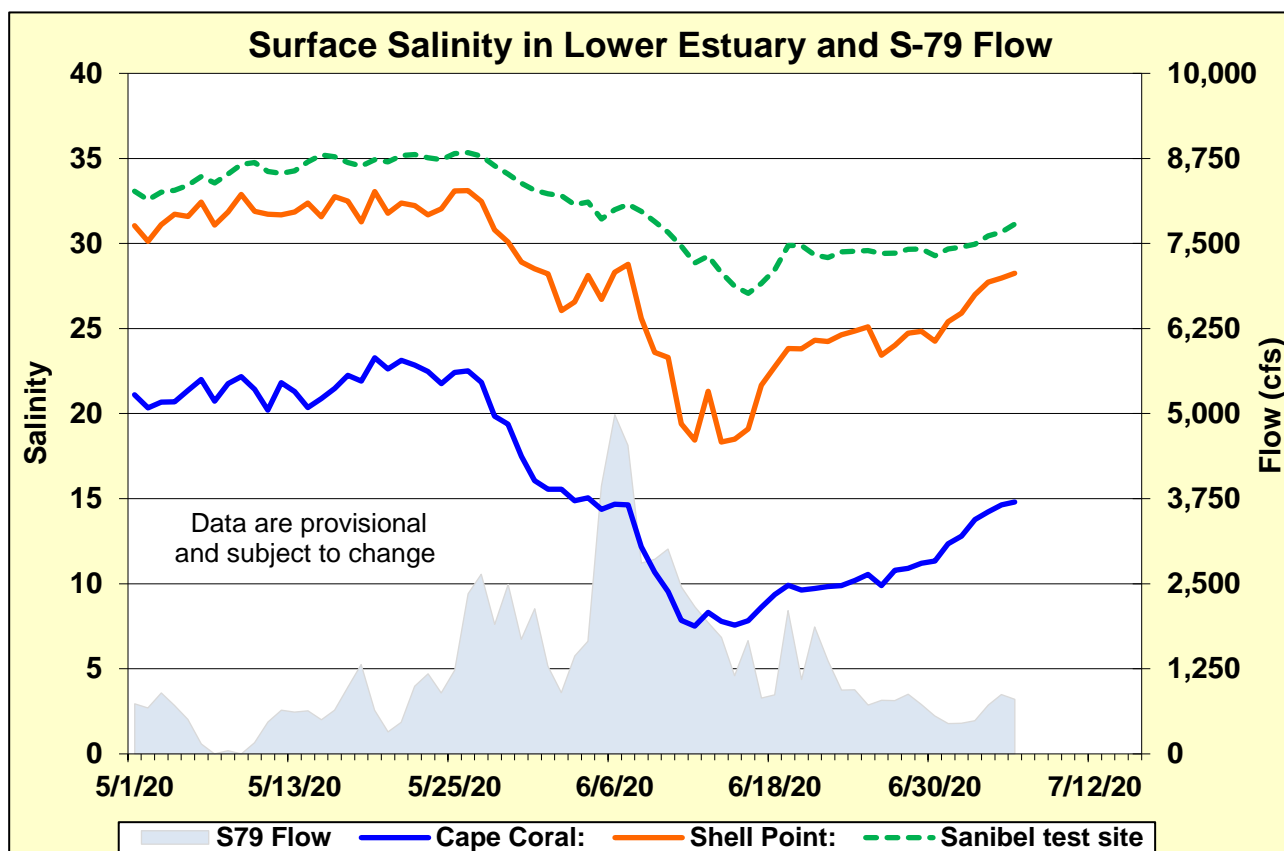
**Figure 5.** Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.



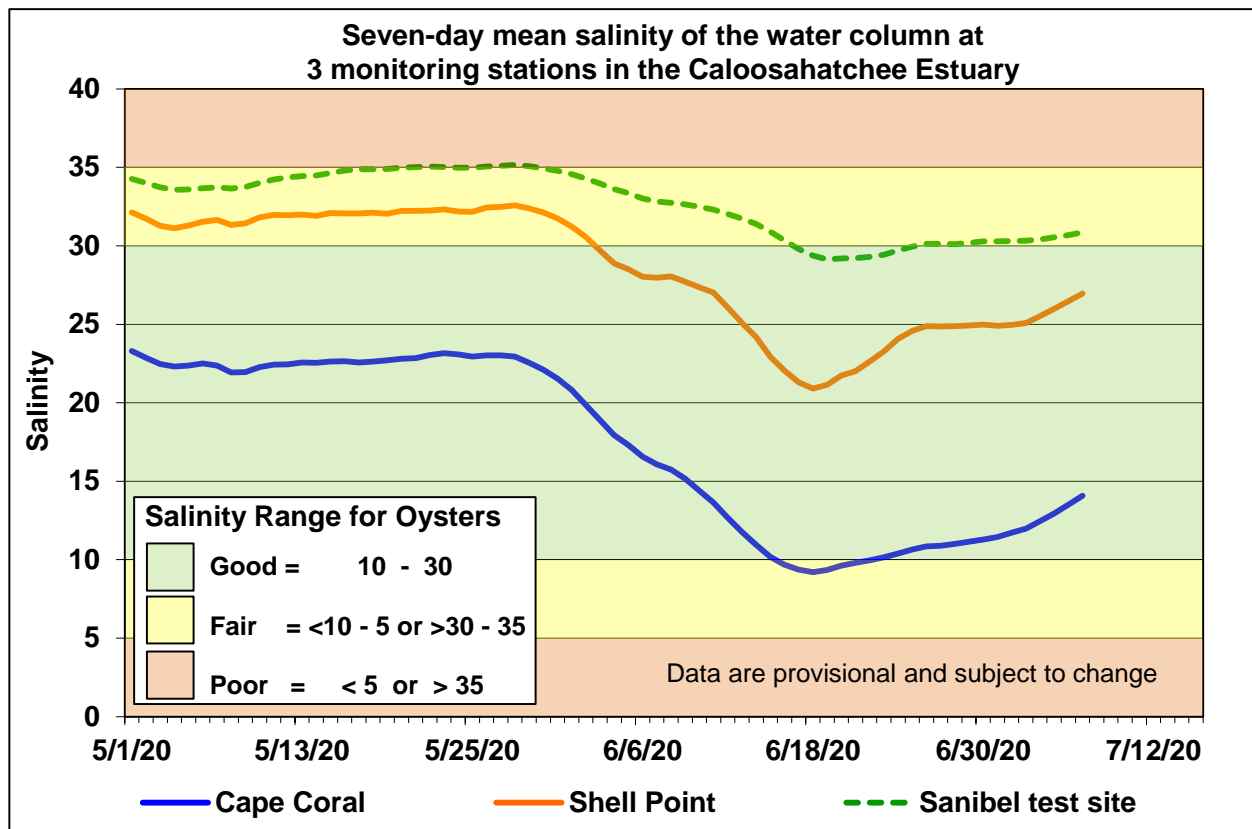
**Figure 6.** Total daily inflows from Lake Okeechobee, runoff from the C-43 basin



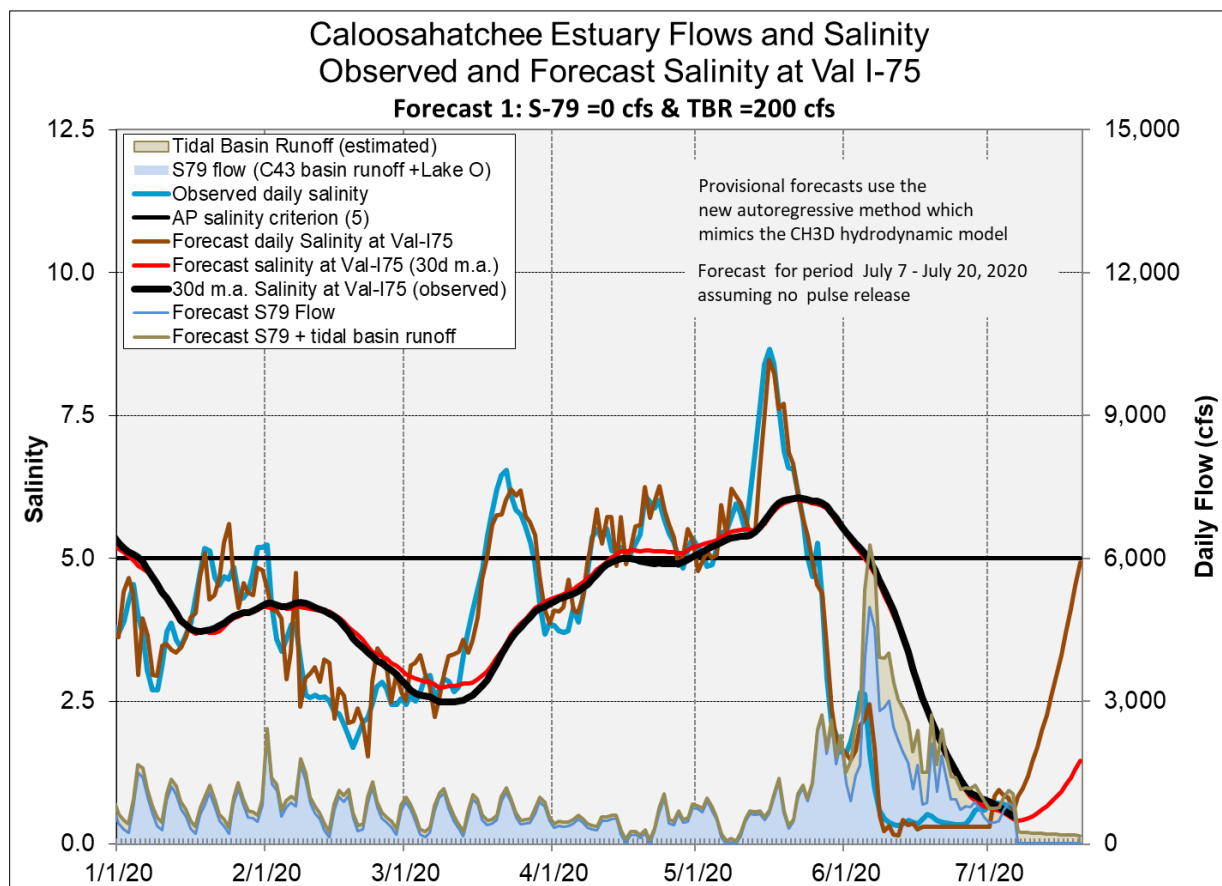
**Figure 7.** Daily mean flows at S-79 and salinity at upper estuary monitoring stations.



**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.



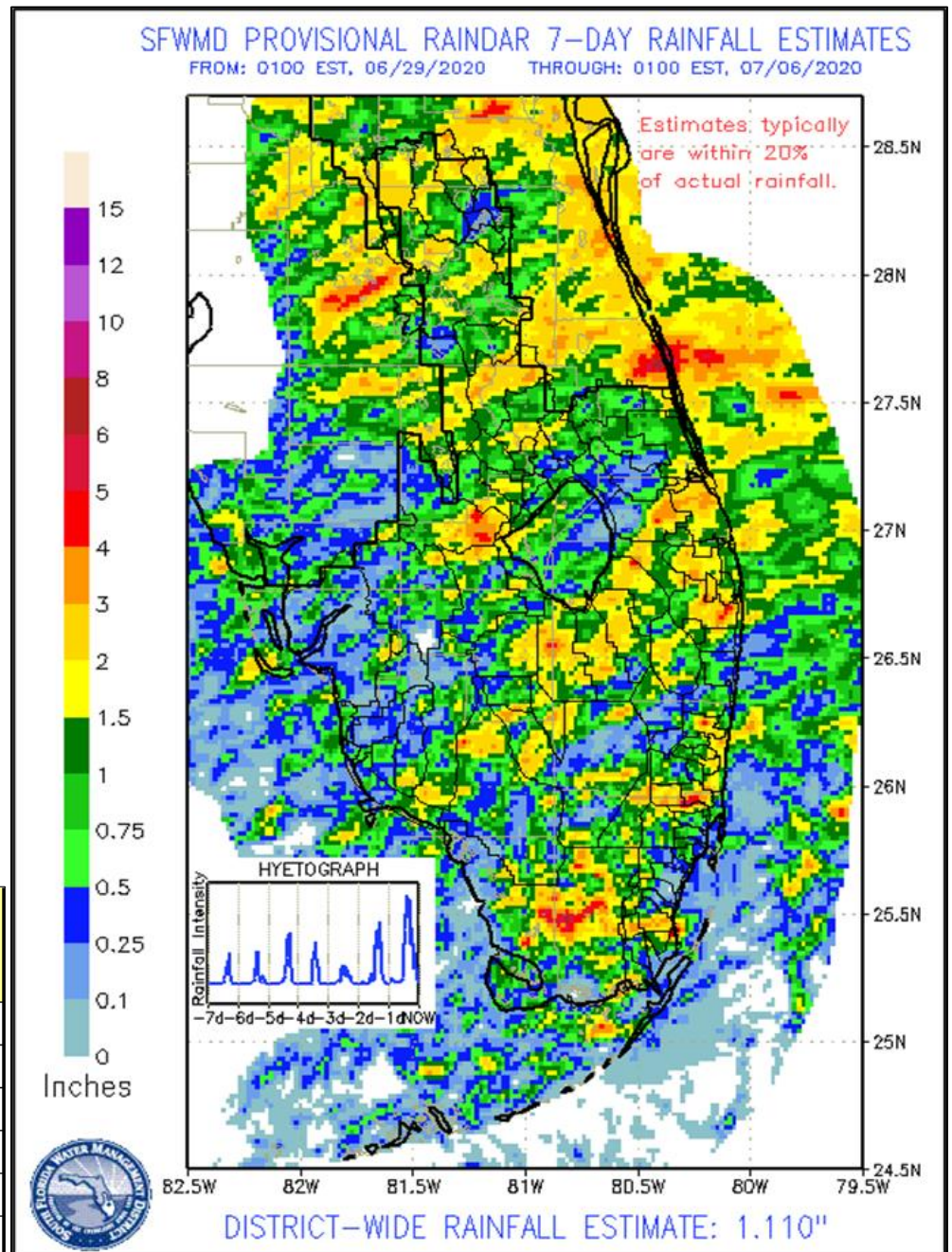
**Figure 10.** Forecasted Val I-75 surface salinity assuming no pulse release at S-79.



## EVERGLADES

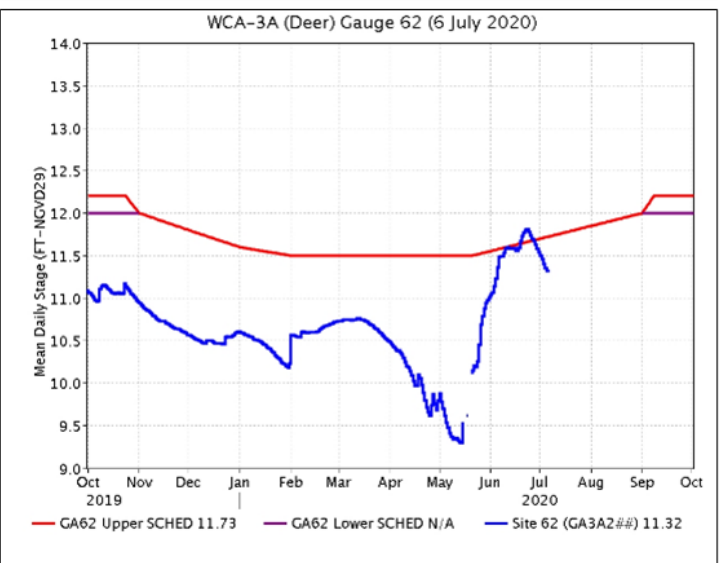
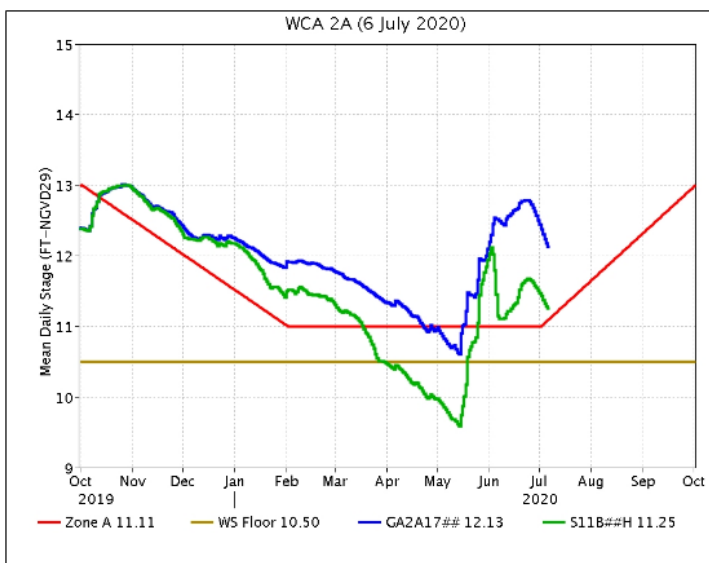
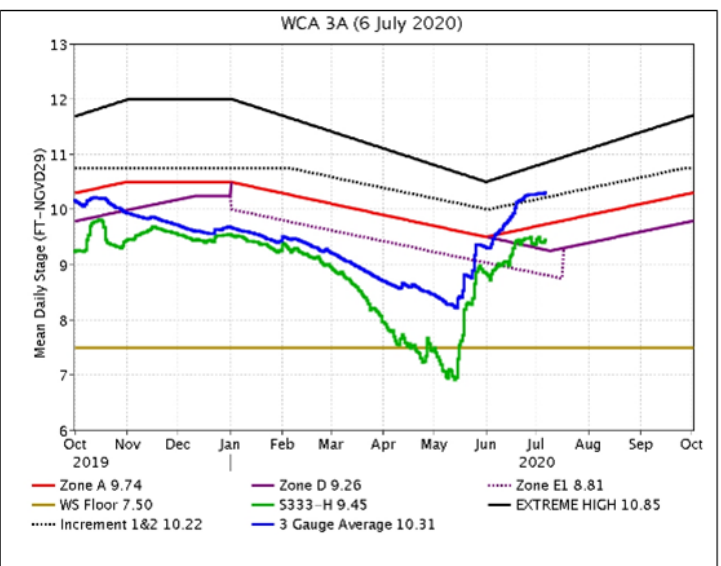
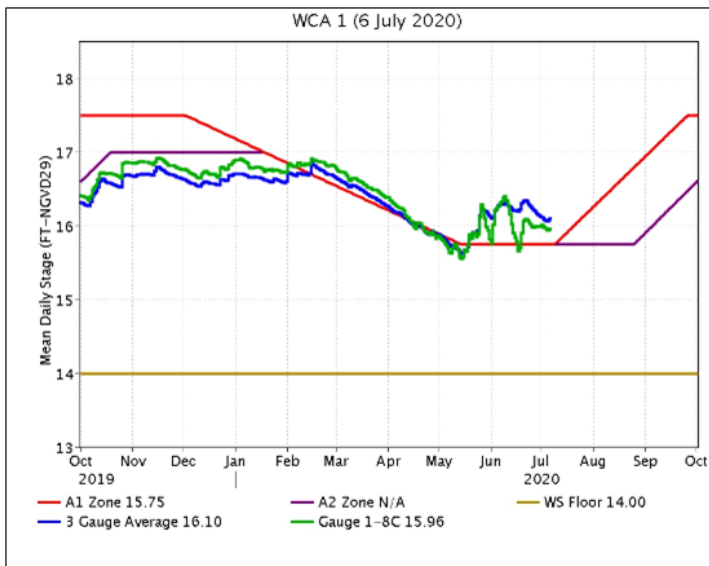
Below average to average rainfall was recorded across the Everglades last week, with WCA-3B receiving the most. At the gauges monitored for this report, stages fell on average 0.03 feet last week with a maximum increase of +0.21 feet in WCA-3B. Evaporation was estimated at 1.86 inches last week, the same as the week prior.

Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	1.23	-0.06
WCA-2A	0.70	-0.45
WCA-2B	0.29	+0.02
WCA-3A	0.99	-0.05
WCA-3B	1.38	+0.08
ENP	1.32	+0.15

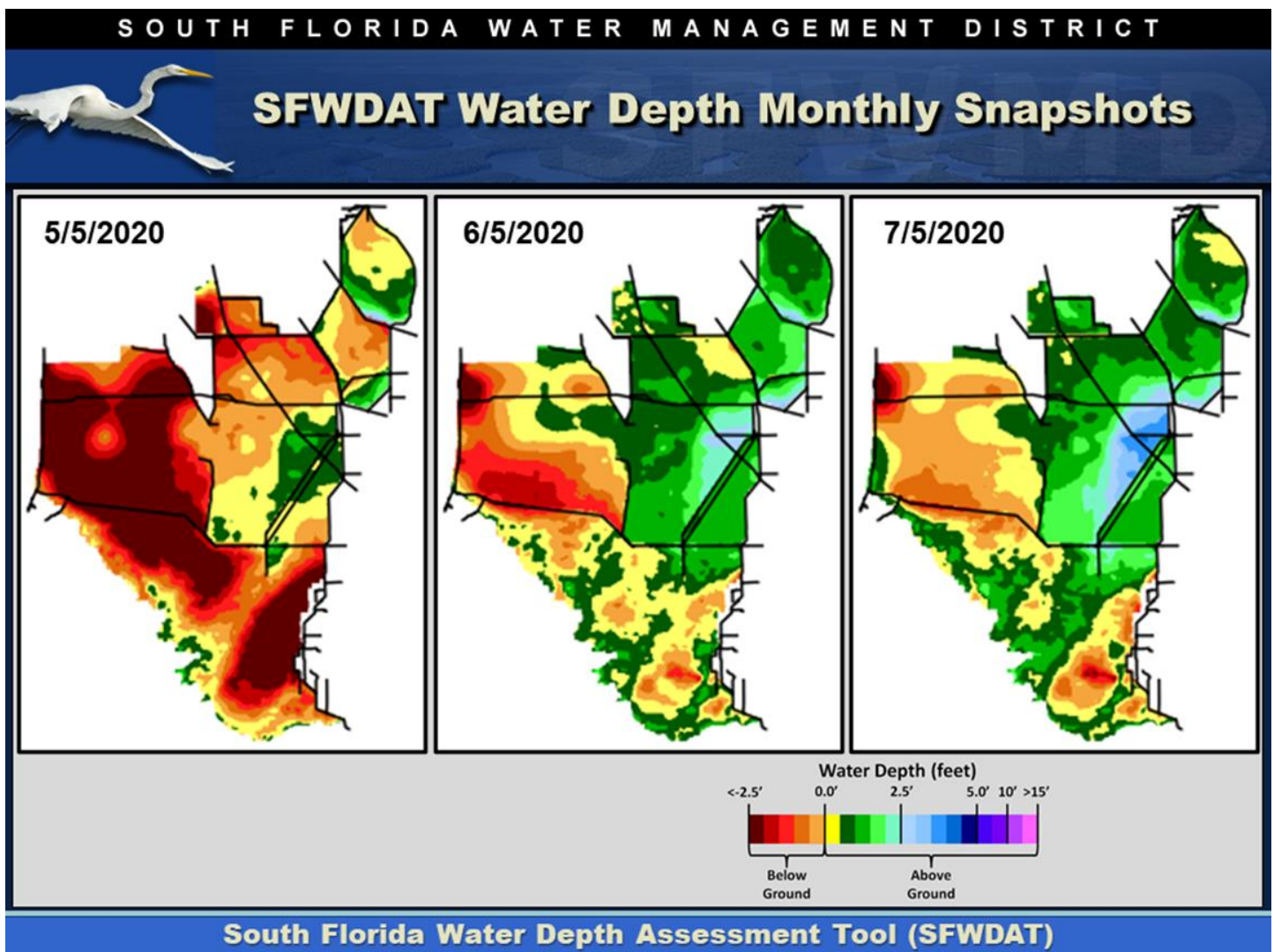




Regulation Schedules: WCA-1: Stage at the 1-8C Gauge continued moving towards the now rising Zone A1 reg. line, currently 0.21 feet above the line. WCA-2A: Stage at Gauge 2-17 continued its fall towards the rising Zone A reg. line, now 1.02 feet above the line. WCA-3A: The Three Gauge Average continues to parallel the Increment 1.2-line, currently 0.09 feet above that rising action line. WCA-3A: Stage at Gauge 62 (Northwest corner) continued to fall sharply, now 0.41 feet below the rising Upper Schedule.

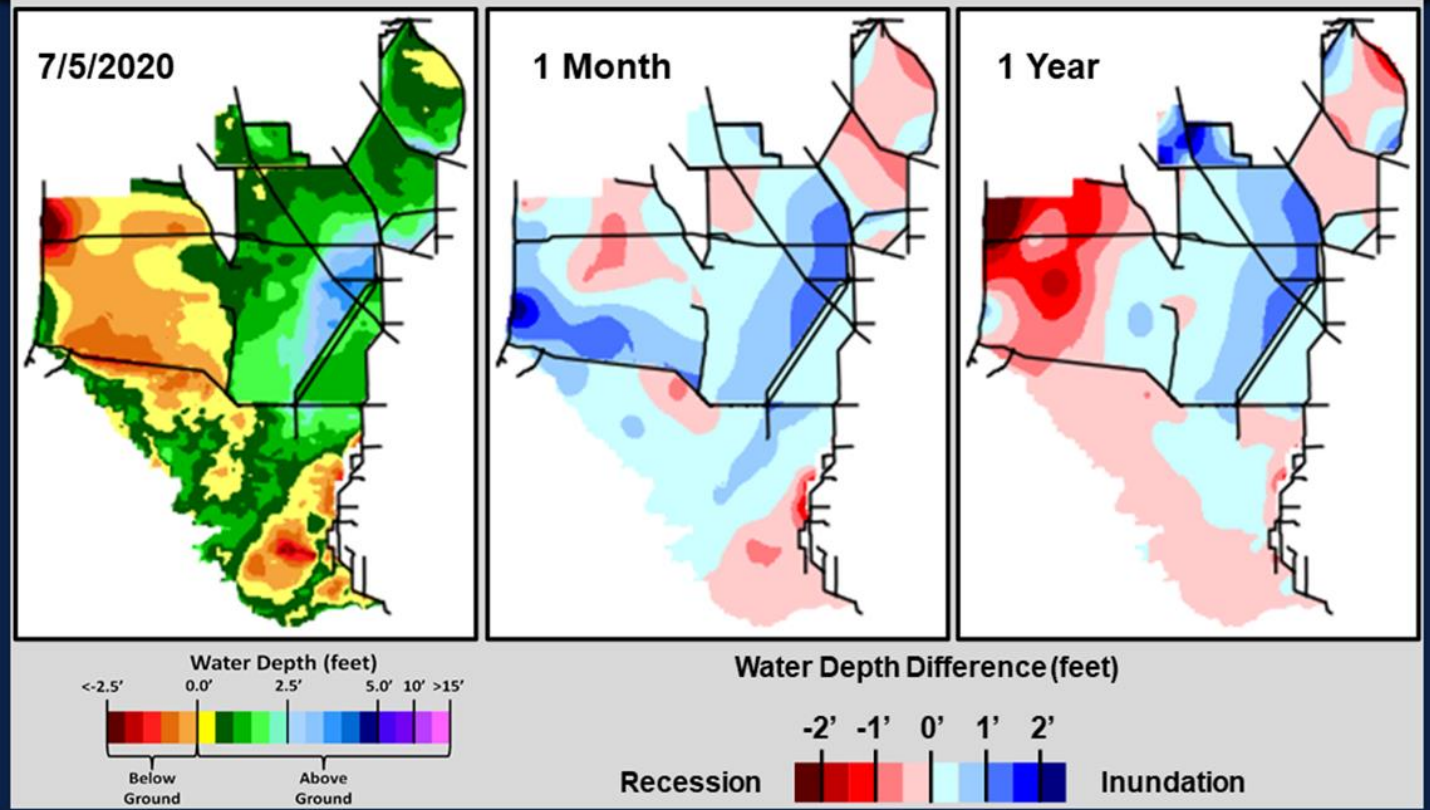


Water Depths: The WDAT tool for spatial interpolation of monthly depth snapshots indicate depths in WCA-3A North are at 1.0 feet or higher across that sub-basin except along the upper reaches of the Miami Canal. Depths in WCA-3A South are increasing, more than 3.5 feet along the upper reaches of the L-67 canal. WCA-2A stages are constant across that basin. Stages in WCA-1 are lowest in the northeast and deeper along the southern perimeter. Hydrologic connectivity has returned to Shark River Slough but looks to be diminishing in Taylor Slough and Lostman's Slough within Everglades National Park (ENP). Comparing WDAT water levels from present, over the last month stages rose across most of WCA-3A, most significantly along the upper reach of the L-67 canal downstream of the S-11s. Northwestern WCA-3A is slightly lower in stage. WCA-2A is wetter in the south and drier in the north. Stage differences in WCA-1 are mixed with wetter conditions in the southeast and northwest. Looking back one year, the stage difference patterns are very similar and more significant in WCA-3A and WCA-1. The WDAT model indicates wetter conditions in the western basins and western ENP compared to a month ago but not a year ago.





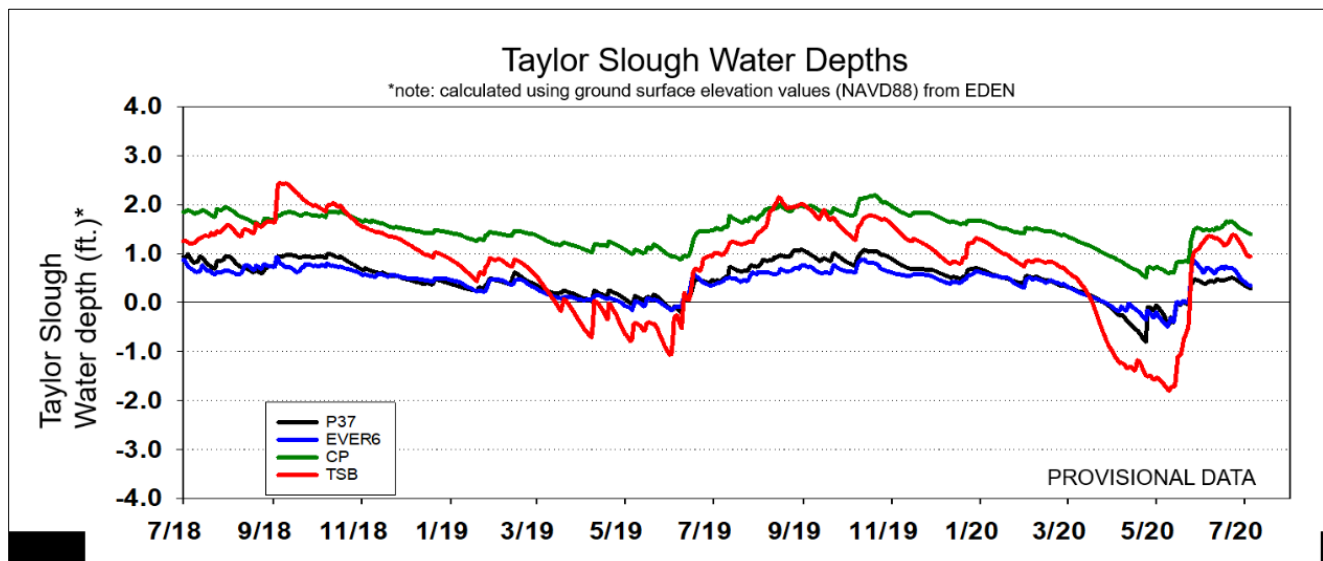
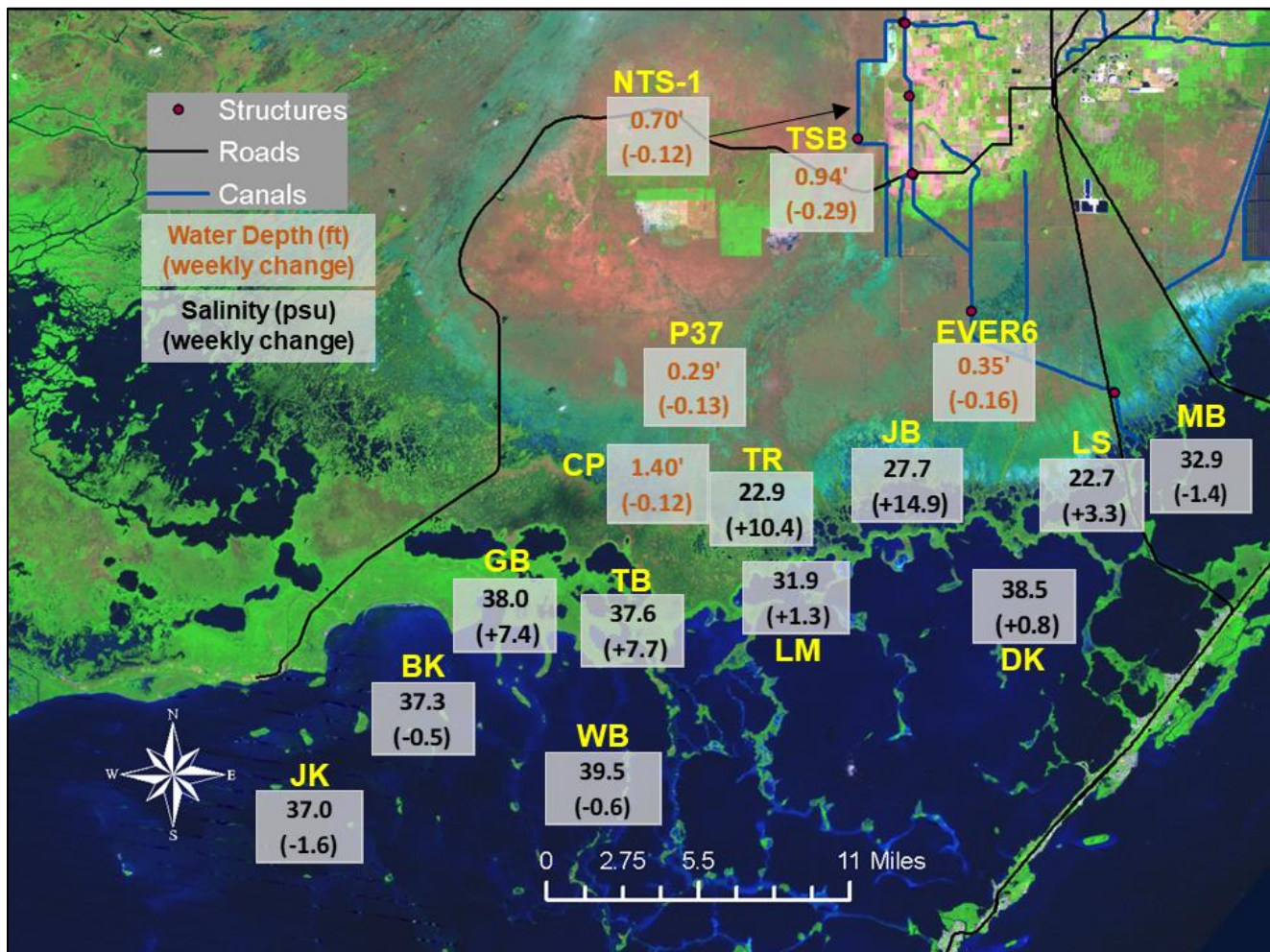
## SFWDAT Everglades Difference Maps (Present – Past)



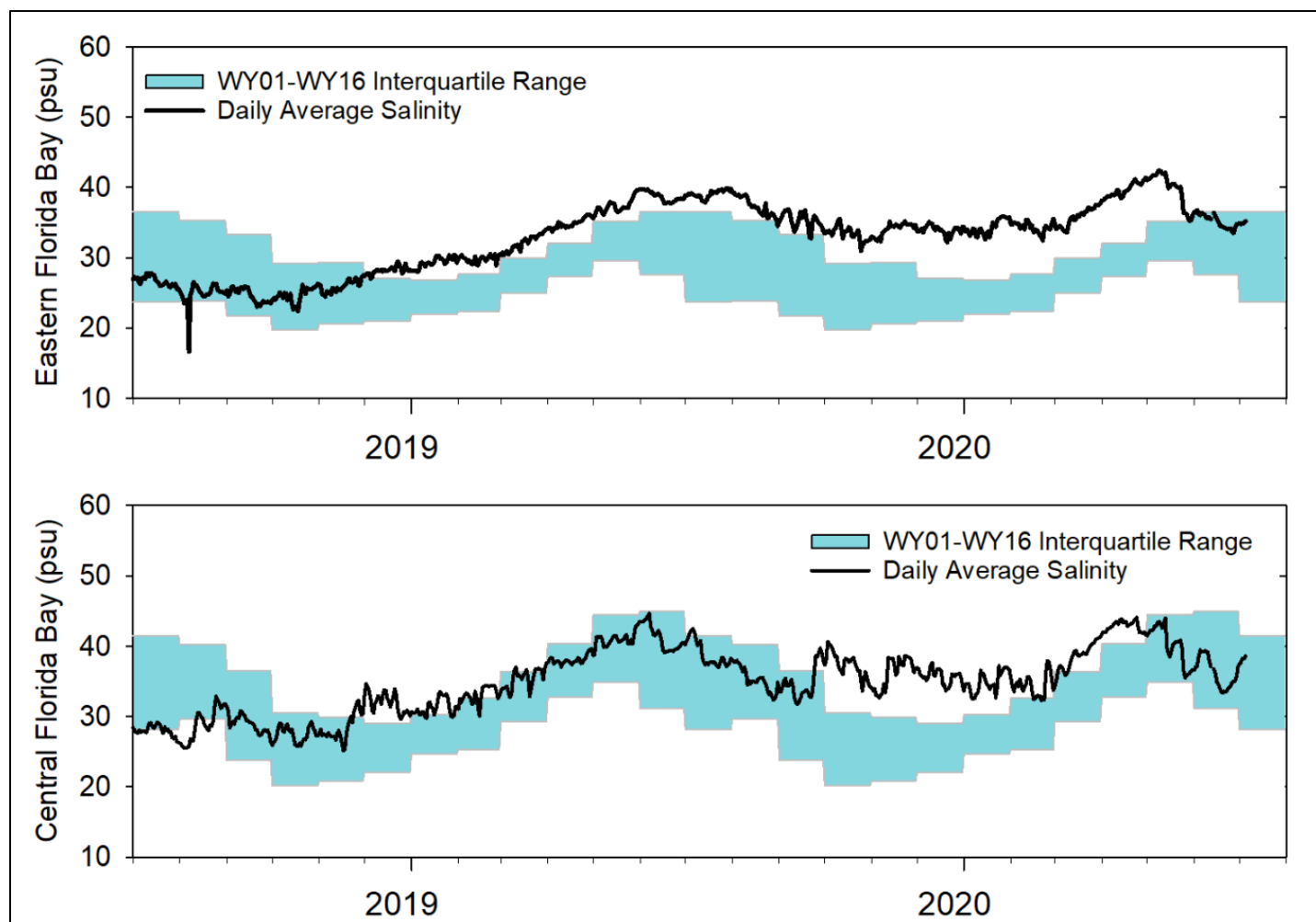
**South Florida Water Depth Assessment Tool (SFWDAT)**



Taylor Slough Water Levels: Taylor Slough Water Levels: A quarter inch of rain fell over Taylor Slough and Florida Bay this past week, and stages decreased an average of 0.16 feet. The largest decrease was 0.29 feet in northern Taylor Slough. Stages are within 0.2 inches of average currently. Stages are still above ground but will reach ground surface in 2 weeks in the central areas if current rates continue. This would sever the north-south connection in the slough.

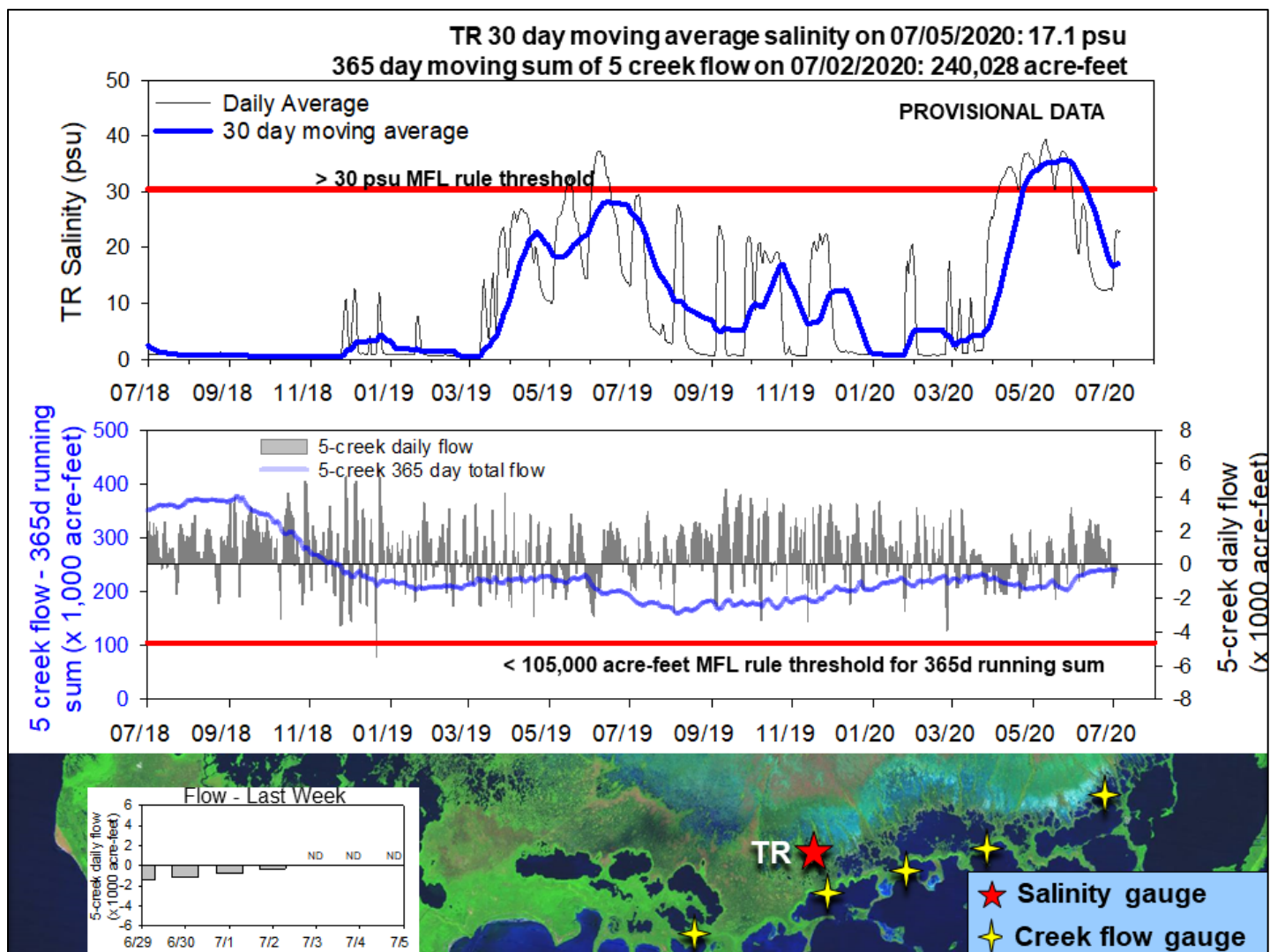


Florida Bay Salinities: Average salinity in Florida Bay increased 3.6 psu with the northern nearshore area showing the largest increases. Saline water is moving upstream again. More rain and water deliveries are needed to fuel freshwater flows towards Florida Bay to continue the decrease of those salinities.



Florida Bay MFL: Salinity at the TR station in the mangrove zone (tracked for the Florida Bay MFL) stayed at 12 for the last week halting the steady decrease of the previous 2 weeks. The 30-day salinity moving average decreased 5.3 to end at 18.0. Weekly flow from the 5 creeks identified by yellow stars on the map totaled -3,600 acre-feet last week through Thursday (7/2) with negative flows at all 5 creeks. No data were available for Taylor River after Thursday, but the other 4 creeks continued negative flows through the weekend. The 365-day moving sum of flow from the five creeks (tracked as part of the Florida Bay MFL criteria) increased 200 acre-feet this week to end at 240,028 acre-feet and is approaching the median (249,091 acre-feet). Creek flows are provisional USGS data.





### Water Management Recommendations

When water is discharged to tide its potential to benefit the ecology of the Everglades is lost. Conserving water in the WCAs and sending it southward has ecological benefit. This week stages at the northern gauges in WCA-3A are closer to the historical average for this time of year, moderating ascension rates benefits wildlife and avoids other possible high-water impacts. Recommended ascension rates are the lower than the preferred max rate of 0.25 feet per week or 0.50 per two weeks. Peak stages in northern WCA-3A provide improved conditions to support next season's wading bird nesting success at the Alley north colony by providing conditions for an increase in prey base as well as provide surface water that can protect it from terrestrial predators during the nesting season. Flows towards 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 the nearshore/off shore gradient returns but require more freshwater to continue to decrease salinities across the bay towards more ecologically preferred average conditions. More specific recommendations appear in the summary table below. The red text represents new or modified information or recommendations.

## SFWMD Everglades Ecological Recommendations, July 7th, 2020 (red is new)

Area	Weekly change	Recommendation	Reasons
WCA-1	Stage decreased by 0.06'	Moderating the ascension rate to less than 0.25 feet per week or 0.50 feet per two weeks and conserving water in this basin has ecological benefit.	Protect upstream/downstream habitat and wildlife. Apple snail reproduction is hindered by rapidly increasing stage.
WCA-2A	Stage decreased by 0.45'	Moderating the ascension rate to less than 0.25 feet per week or 0.50 feet per two weeks and conserving water in this basin has ecological benefit.	Protect upstream/downstream habitat and wildlife. Apple snail reproduction is hindered by rapidly increasing stage.
WCA-2B	Stage increased by 0.02'	Moderating the ascension rate to less than 0.25 feet per week or 0.50 feet per two weeks.	Protect upstream/downstream habitat and wildlife. Apple snail reproduction is hindered by rapidly increasing stage.
WCA-3A NE	Stage decreased by 0.11'	Moderating the ascension rate to less than 0.25 feet per week or 0.50 feet per two weeks.	Protect upstream/downstream habitat and wildlife. Apple snail reproduction is hindered by rapidly increasing stage.
WCA-3A NW	Stage decreased by 0.27'	Moderating the ascension rate to less than 0.25 feet per week or 0.50 feet per two weeks.	
Central WCA-3A S	Stage increased by 0.12'	Moderating the ascension rate to less than 0.25 feet per week or 0.50 feet per two weeks.	Protect upstream/downstream habitat and wildlife. Apple snail reproduction is hindered by rapidly increasing stage.
Southern WCA-3A S	Stage increased by 0.06'		
WCA-3B	Stage increased by 0.08'	Moderating the ascension rate to less than 0.25 feet per week or 0.50 feet per two weeks.	Protect upstream/downstream habitat and wildlife. Apple snail reproduction is hindered by rapidly increasing stage.
ENP-SRS	Stage increased by 0.15'	Make discharges to the Park according to the 2012 WCP rainfall plan	Protect upstream/downstream habitat and wildlife. Apple snail reproduction is hindered by rapidly increasing stage.
Taylor Slough	Stage changes ranged from -0.12' to -0.29'	Move water southward as possible	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged -1.6 to +14.9 psu	Move water southward as possible	When available, provide freshwater to maintain low salinity buffer and promote water movement.