

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, Interim Assistant Executive Director, Executive Office Staff

**FROM:** SFWMD Staff Environmental Advisory Team

**DATE:** July 01, 2020

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

### Summary

#### Weather Conditions and Forecast

Below-average rainfall this week. Mid-level high pressure centered near Grand Bahama Island will shift to over south Florida and continue to bring mostly dry conditions to the District over the next few days. Widely scattered showers and a few thunderstorms will focus over the interior today and then the interior and east Tuesday and Wednesday as westerly steering flow covers most of the District. As a mid-level trough moves into the northeastern Gulf of Mexico Thursday and Friday, the ridge should weaken and shift east of the District allowing afternoon shower activity to persist each day. A trough is then forecast to push into north Florida Saturday and central Florida Sunday as a low pressure system develops east of Jacksonville. This trough is currently forecast to bring a solid increase in moisture over the District and increase daily thunderstorm activity mainly north and east. Total rainfall should remain below average over the first 7-day period (Week 1) but daily thunderstorm coverage is forecast to return to closer to the historical average during the second 7-day period (Week 2).

#### Kissimmee

Tuesday morning stages were 55.0 feet NGVD (1.5 feet below schedule) in East Lake Toho, 53.5 feet NGVD (at schedule) in Toho, and 51.5 feet NGVD (0.5 feet above schedule) in Kissimmee-Cypress-Hatchineha; headwater stages were 46.2 feet NGVD at S-65A and 25.6 feet NGVD at S-65D. Tuesday morning discharges were 1349 cfs at S-65, 1416 cfs at S-65A, 1319 cfs at S-65D and 1267 cfs at S-65E. Dissolved oxygen concentration in the Kissimmee River averaged 2.3 mg/L for the week through Sunday. Kissimmee River mean floodplain depth on Sunday was 0.69 feet. **Recommendations Made in the Past Week:** (6/24) Increase flow at S65A by 150 cfs/day and hold at approximately 1400 cfs.

**Today's Recommendations:** (6/30) Continue to hold S65A flow at about 1400 cfs until further notice while DO response is evaluated. **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 12.34 feet NGVD on June 29, 2020, 0.01 feet lower than the previous week, but 0.89 feet higher than the previous month. The Lake entered the Beneficial Use sub-band on March 4, 2020 and is now 0.26 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 remains across the central, western, and northern portions of the lake, all showing elevated Chlorophyll-a concentrations based on satellite imagery.

## **Estuaries**

Total inflow to the St. Lucie Estuary averaged 664 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 fair range (5-10) for adult eastern oysters.

Total inflow to the Caloosahatchee Estuary averaged 1,284 cfs over the past week with 208 cfs (estimated) coming from the Lake. The seven-day average salinity remains low at S-79 and Val I-75 but increased at Ft. Myers, Cape Coral and Shell Point 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.

## **Water Management Recommendations**

Lake stage is in the Beneficial Use sub-band of 2008 LORS. Tributary hydrological conditions are normal. 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, 400 ac-feet of Lake Okeechobee water was delivered to the FEBs/STAs, which was incidental and related to EAA water supply operations. 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 300,000 ac-feet. Most STA cells are near or above 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**

Wading bird nesting has largely ended due to the onset of the rainy season, with some activity remaining in coastal ENP. Small wildfires have become prevalent but are generally declared out within days. 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. Due to the general drop in stages the maximum rate was not exceeded across most of the Everglades. Last week WCA-1 stage changes moderated last week and trend towards schedule, WCA-2A continued to ascend away from schedule last week and WCA-3A is above the Increment 1.2 action line and trending parallel to that line. Very little rain fell over TS and FB last week and stages decreased, with the largest drop occurring near the C-111 canal. Florida Bay average salinities remained unchanged. The 30-day moving average at the TR mangrove zone decreased last week.

## Supporting Information

### KESSIMMEE BASIN

#### Kissimmee Basin Rainfall

The Upper Kissimmee Basin received 1.29 inches of rainfall in the past week and the Lower Basin received 0.41 inches (SFWMD Daily Rainfall Report 6/29/2020).

#### 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: 6/30/2020

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)						
							6/28/20	6/21/20	6/14/20	6/7/20	5/31/20	5/24/20	5/17/20
Lakes Hart and Mary Jane	S-62	290	LKMJ	60.0	R	60.0	0.0	0.2	0.1	-0.2	0.1	-0.1	-0.2
Lakes Myrtle, Preston, and Joel	S-57	0	S-57	60.9	R	61.0	-0.1	-0.2	-0.2	-0.4	0.0	-0.1	-0.1
Alligator Chain	S-60	0	ALLI	62.7	R	63.2	-0.5	-0.4	-0.5	-0.9	0.1	0.0	0.0
Lake Gentry	S-63	0	LKGT	60.8	R	61.0	-0.2	-0.3	-0.6	-1.0	0.2	-0.1	0.1
East Lake Toho	S-59	350	TOHOE	55.1	R	56.5	-1.4	-2.2	-2.7	-3.1	-2.0	-3.0	-3.2
Lake Toho	S-61	869	TOHOW, S-61	53.5	R	53.5	0.0	0.0	-0.1	-0.8	0.3	-0.1	-0.3
Lakes Kissimmee, Cypress, and Hatchineha	S-65	873	KUB011, LKIS5B	51.5	R	51.0	0.5	0.2	-0.1	-0.6	0.8	0.0	-0.1

<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: 6/30/2020

Metric	Location	1-Day Average		Average for the Preceding 7-Days <sup>1</sup>							
		6/28/2020	6/28/20	6/21/20	6/14/20	6/7/20	5/31/20	5/24/20	5/17/20	5/10/20	5/3/20
Discharge (cfs)	S-65	1,344	873	581	80	427	695	496	353	738	760
Discharge (cfs)	S-65A <sup>2</sup>	1,426	1,127	864	854	884	788	438	313	656	679
Discharge (cfs)	S-65D <sup>2</sup>	1,327	1,453	1,641	1,988	1,485	903	325	441	667	722
Headwater Stage (feet NGVD)	S-65D <sup>2</sup>	25.75	25.72	25.74	25.72	25.78	25.76	25.84	25.61	25.81	25.84
Discharge (cfs)	S-65E <sup>2</sup>	1,167	1,402	1,549	1,868	1,552	926	312	411	617	677
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	2.6	2.3	1.4	0.7	4.0	6.0	7.6	7.7	7.8	7.9
Mean depth (feet) <sup>4</sup>	Phase I floodplain	0.69	0.71	0.78	0.90	0.56	0.28	0.08	0.07	0.09	0.14

<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)

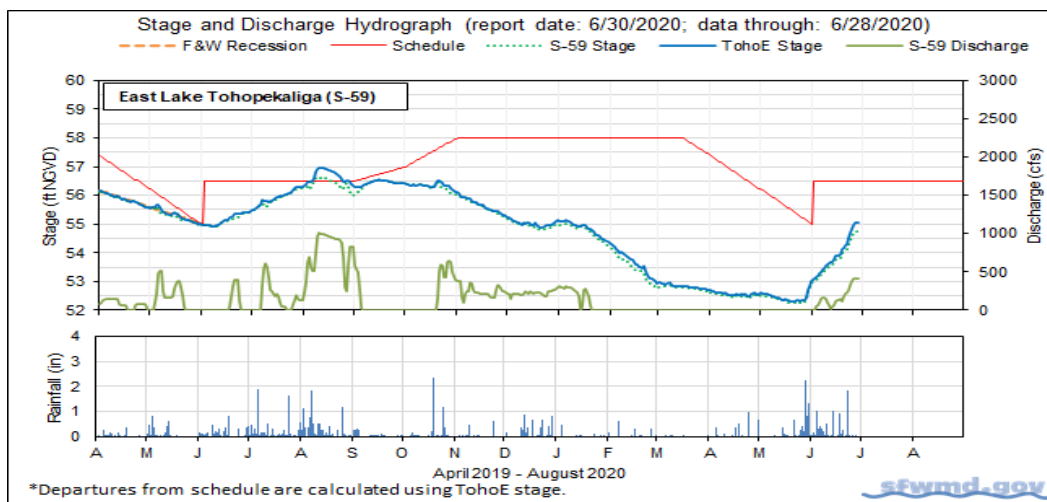


Figure 1.

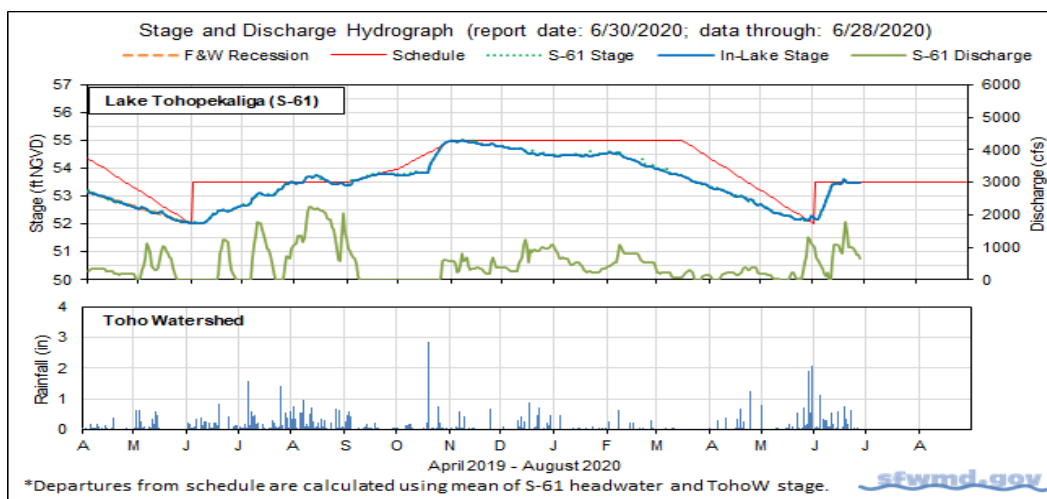


Figure 2.

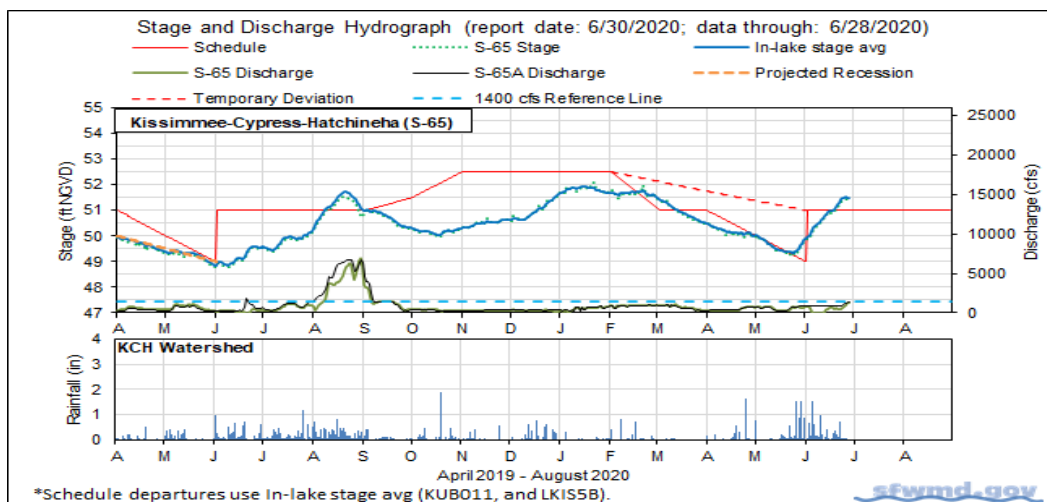
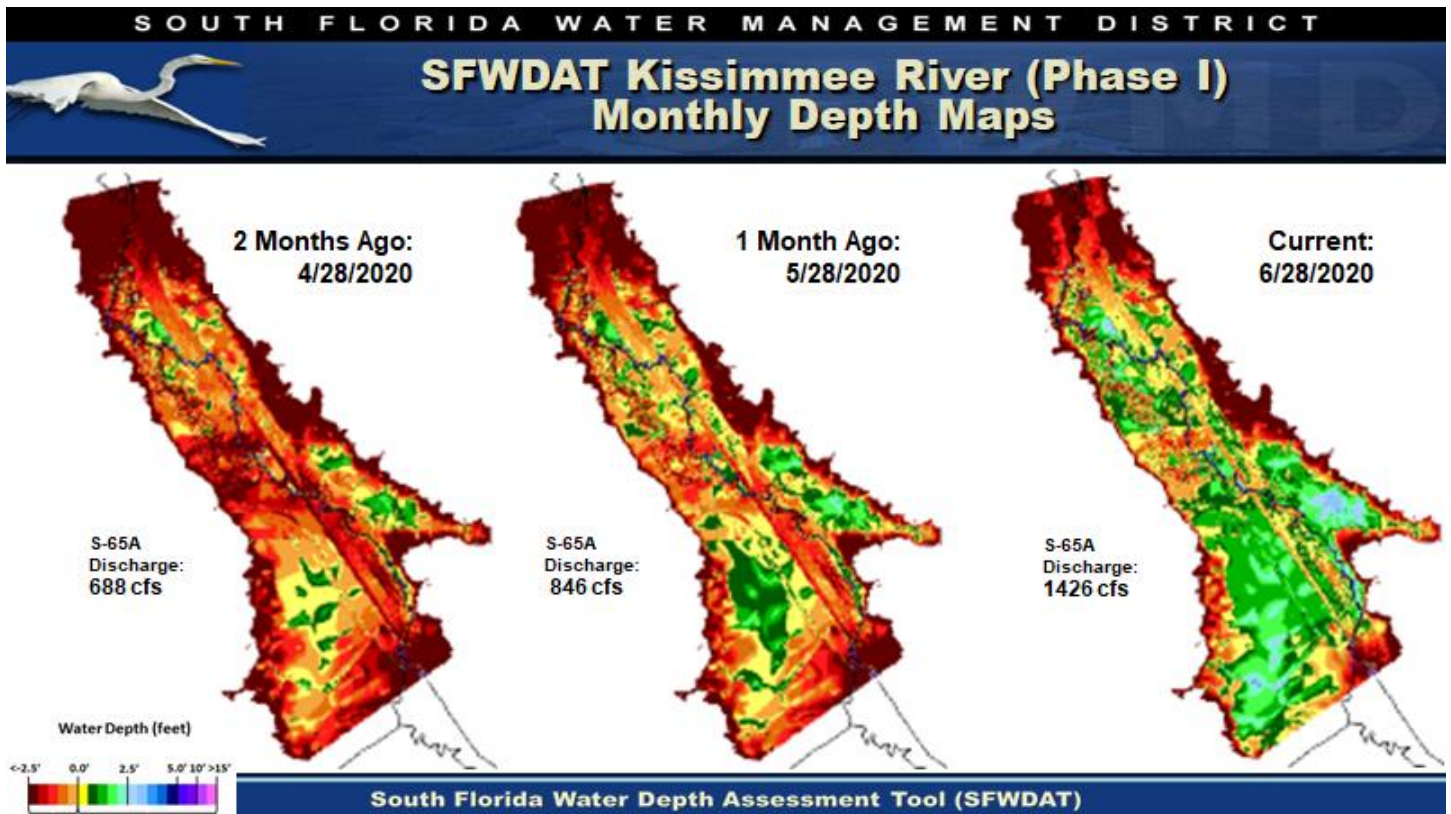
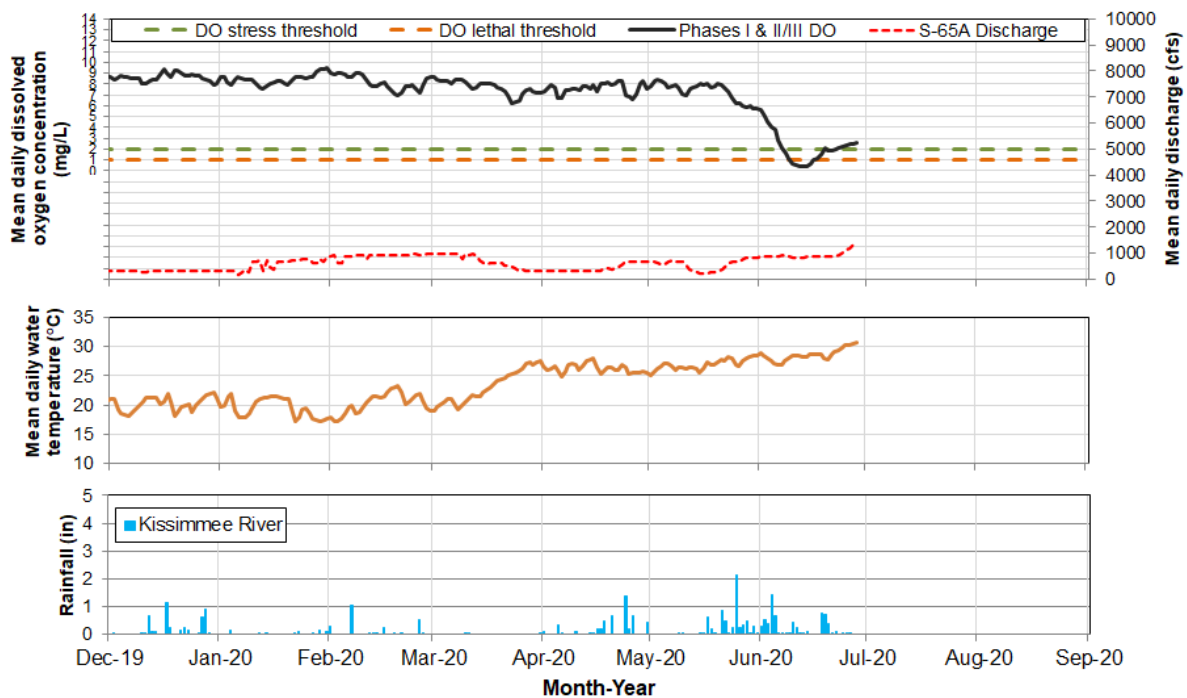


Figure 3.

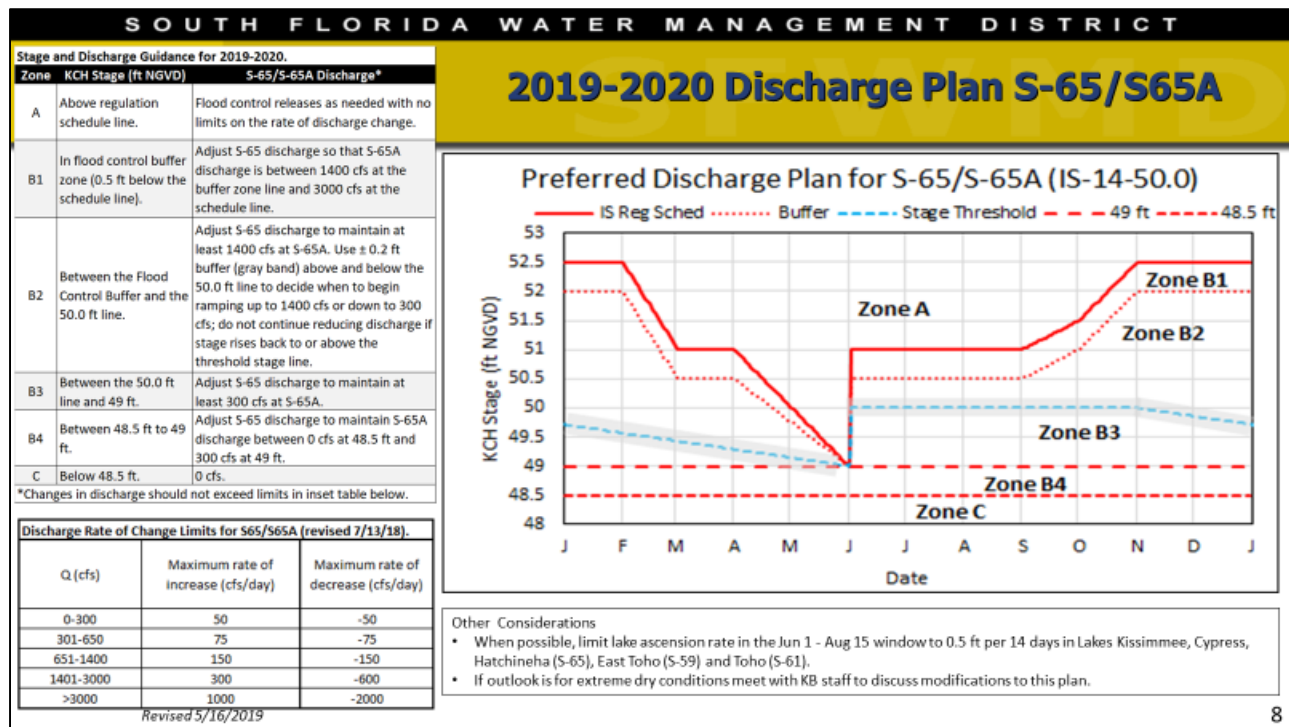


**Figure 4.** Phase I area floodplain water depths for this week, one month ago, and two months ago. Note that the WDAT color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to January 16, 2012.

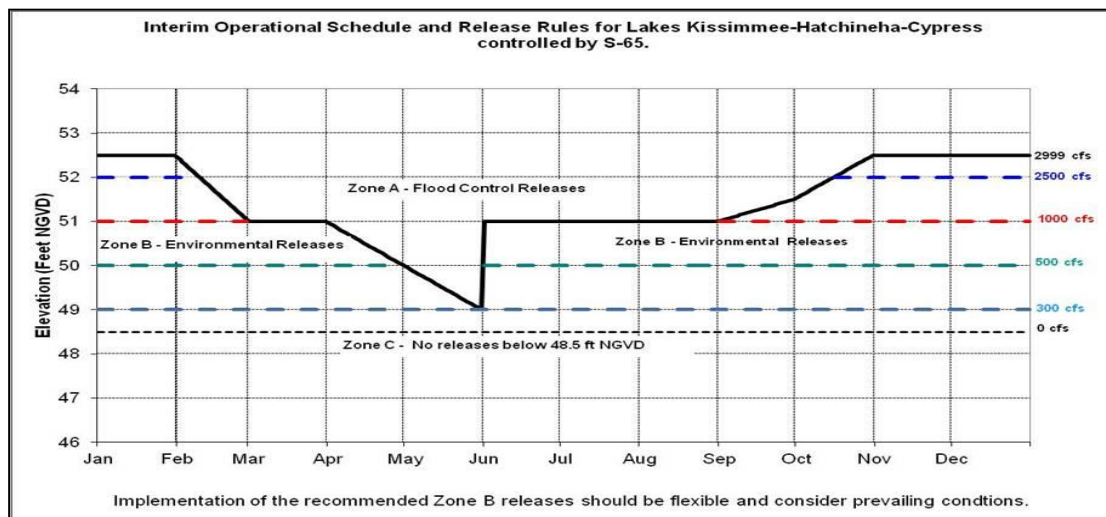


Report Date: 6/30/2020; data are through: 6/28/2020.

**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.

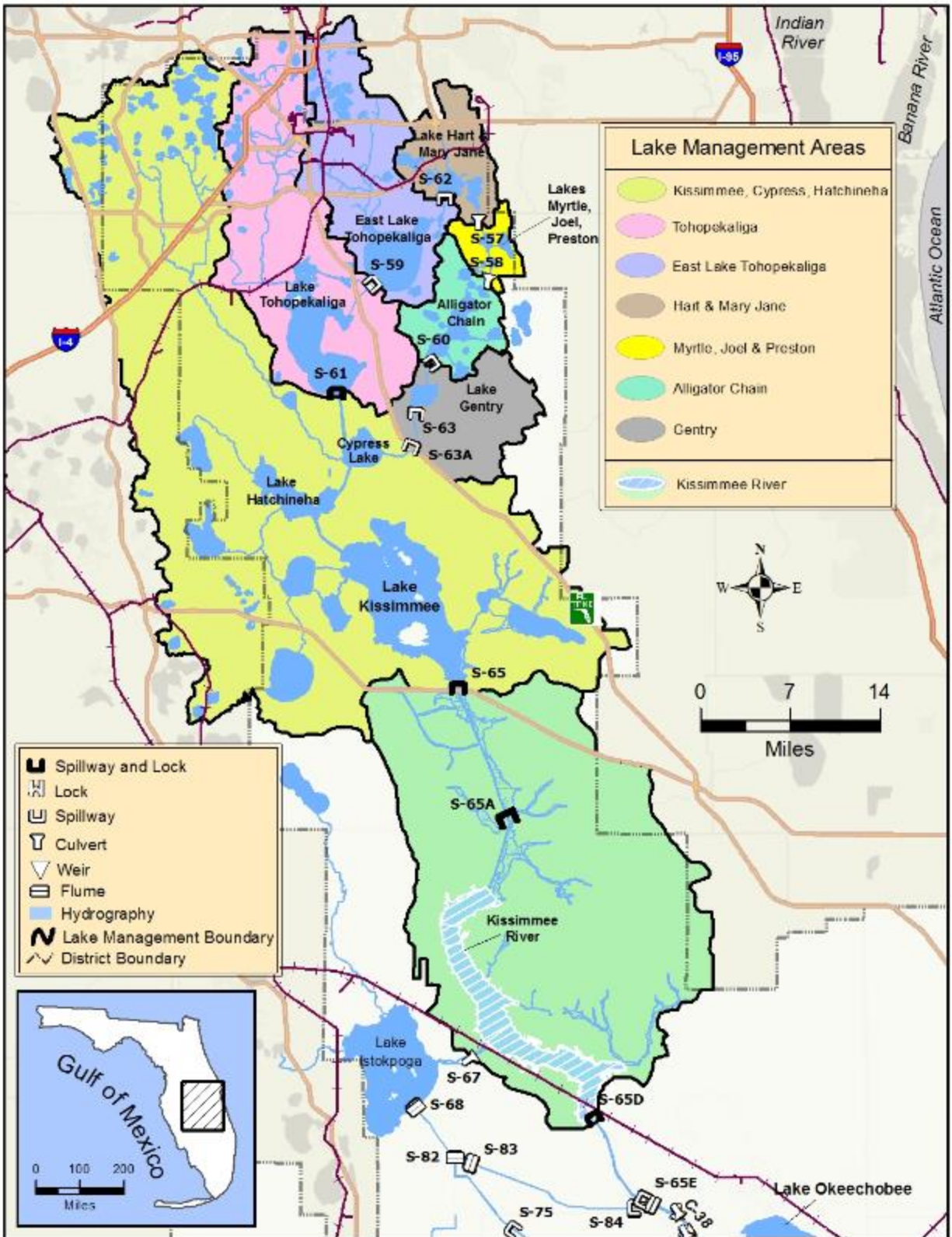


Figure 8. The Kissimmee Basin.

## **LAKE OKEECHOBEE**

Lake Okeechobee stage is 12.34 feet NGVD, 0.89 feet higher than a month ago and 1.09 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 RAINDAR, 0.2 inches of rain fell directly over the Lake during the past week (Figure 4), with most of the watersheds receiving minimal rainfall. The district-wide average was 0.24 inches.

The average daily inflows (minus rainfall) decreased from 3,091 cfs to 2,578 cfs, while the outflows (minus evapotranspiration) increased from 190 cfs to 648 cfs. Most of the inflows came from the Kissimmee River (1,356 through S-65E & S-65EX1), while 461 cfs came through Fisheating Creek and 224 cfs came from the C-41a canal (through S-84 & S-84X). 217 cfs also came from the C-44 canal through S-308, which is predominantly an outflow from the Lake. After a few weeks with almost zero outflows from the Lake (due to heavy rainfall in surrounding watersheds), 282 cfs were released to the Caloosahatchee (S-77) and around 350 cfs were released south through the S-350 structures. 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 still pending; however, toxin levels were above the EPA recreational waters recommendation of 8 µg/L at 4 sites. Two of these sites exhibit highly elevated toxin levels of 290 µg/L (LZ40) and 800 µg/L (L004). Follow-up visits to these 2 sites are scheduled for June 30.

Current satellite imagery (June 28, 2020) using NOAA's cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3 OLCI sensor data suggested a continued moderate cyanobacteria bloom risk potential for the central and northern areas of the Lake, with a moderate/high risk along the northwestern shoreline and Fisheating Bay. Slightly higher risks than this time last year (Figure 7).

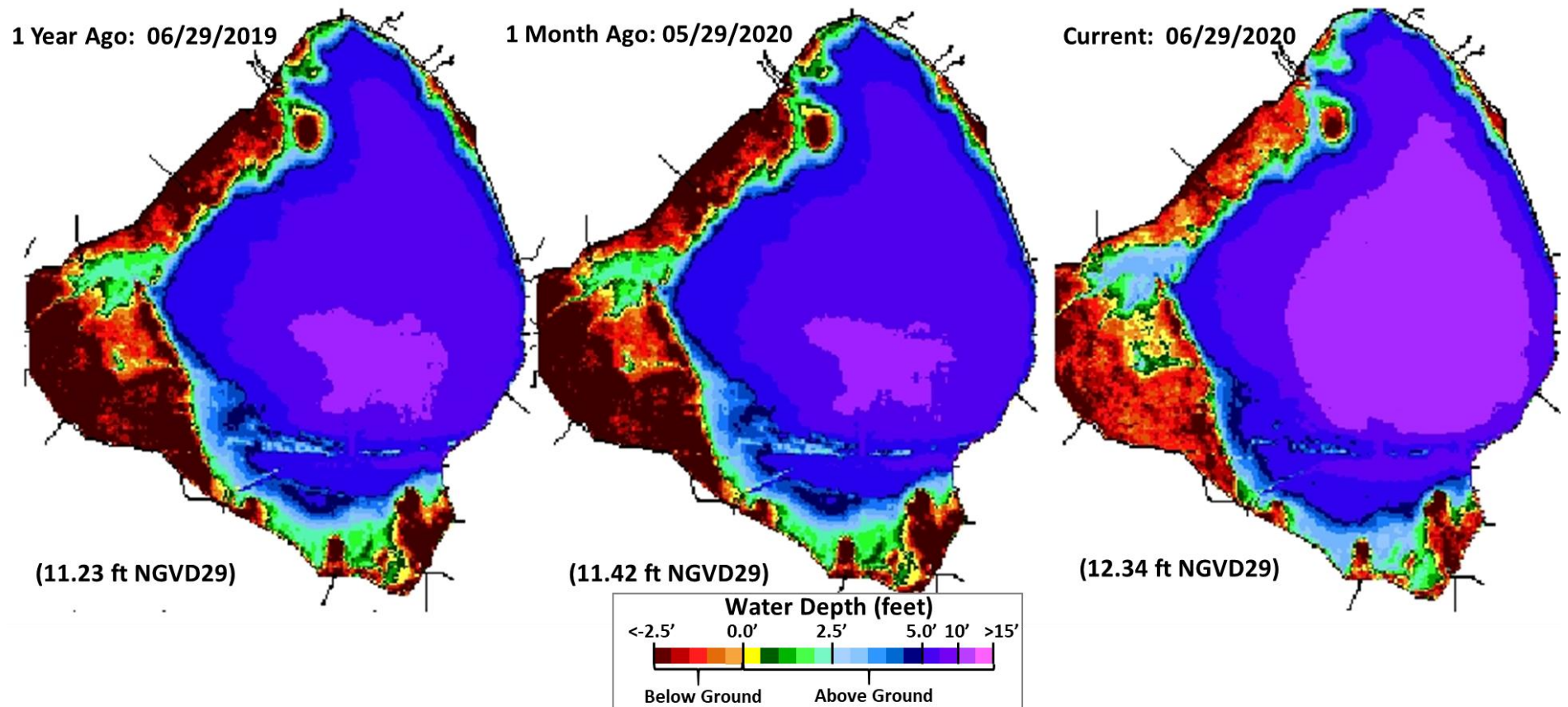
## **Water Management Summary**

Lake Okeechobee stage was 12.34 feet NGVD on June 29, 2020, 0.01 feet lower than the previous week, but 0.89 feet higher than the previous month. The Lake entered the Beneficial Use sub-band on March 4, 2020 and is now 0.26 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 remains across the central, western, and northern portions of the lake, all showing elevated Chlorophyll-a concentrations based on satellite imagery.

**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	1559	1356	0.6
S-71 & S-72	316	181	0.1
S-84 & S-84X	125	224	0.1
Fisheating Creek	279	461	0.2
S-154	0	0	0.0
S-191	162	18	0.0
S-133 P	8	1	0.0
S-127 P	15	1	0.0
S-129 P	11	6	0.0
S-131 P	22	33	0.0
S-135 P	94	80	0.0
S-2 P	62	0	0.0
S-3 P	46	0	0.0
S-4 P	45	0	0.0
L-8 Backflow	27		
Rainfall	3450	433	0.2
<b>Total</b>	<b>6222</b>	<b>2794</b>	<b>1.3</b>

OUTFLOWS	Previous week Avg Daily CFS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)
S-77	63	282	0.1
S-308	-320	-217	-0.1
S-351	51	30	0.0
S-352	0	147	0.1
S-354	76	174	0.1
L-8 Outflow		15	0.0
ET	2734	3127	1.4
<b>Total</b>	<b>2604</b>	<b>3558</b>	<b>1.6</b>



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

## Lake Okeechobee Stage vs Updated Ecological Envelope

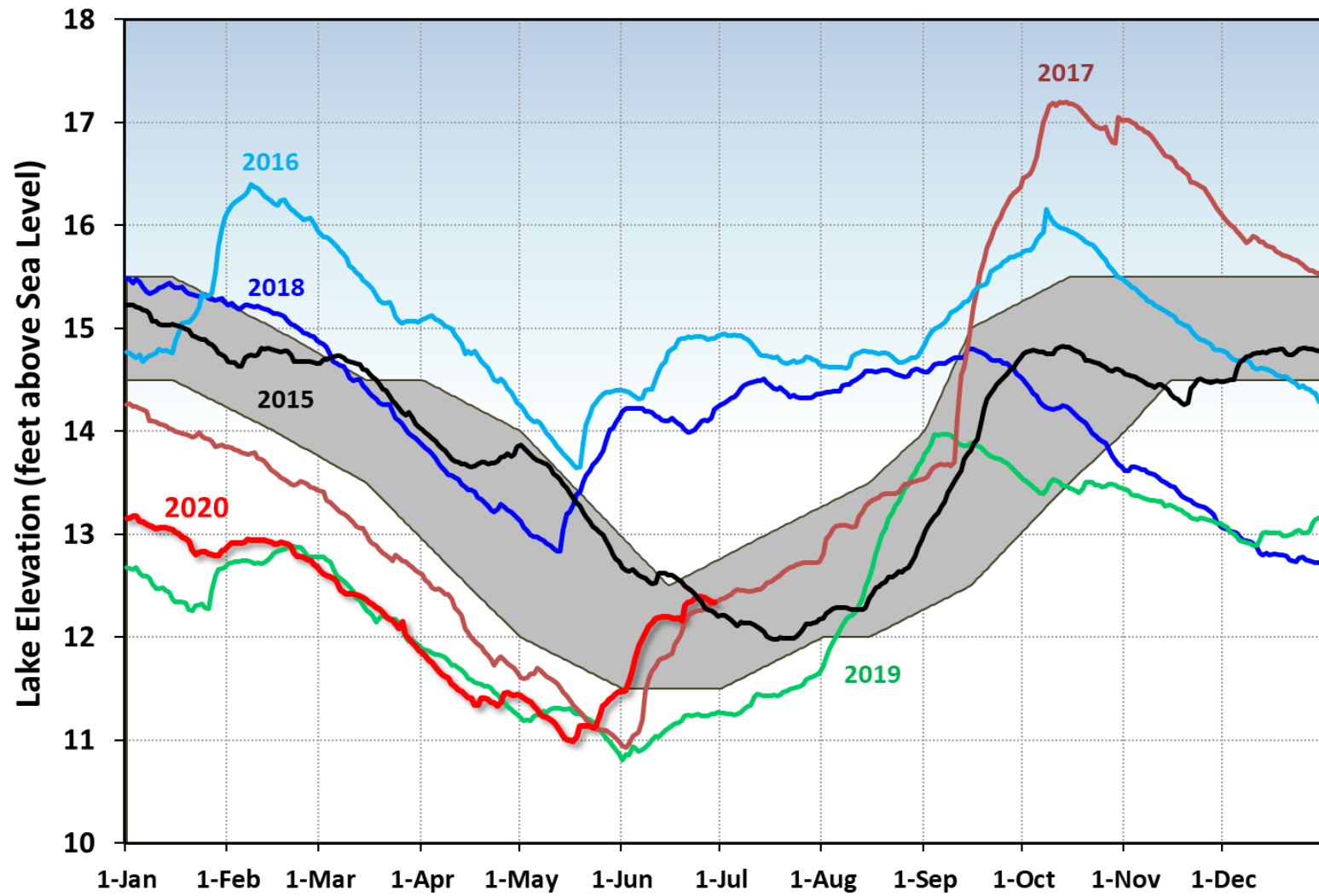
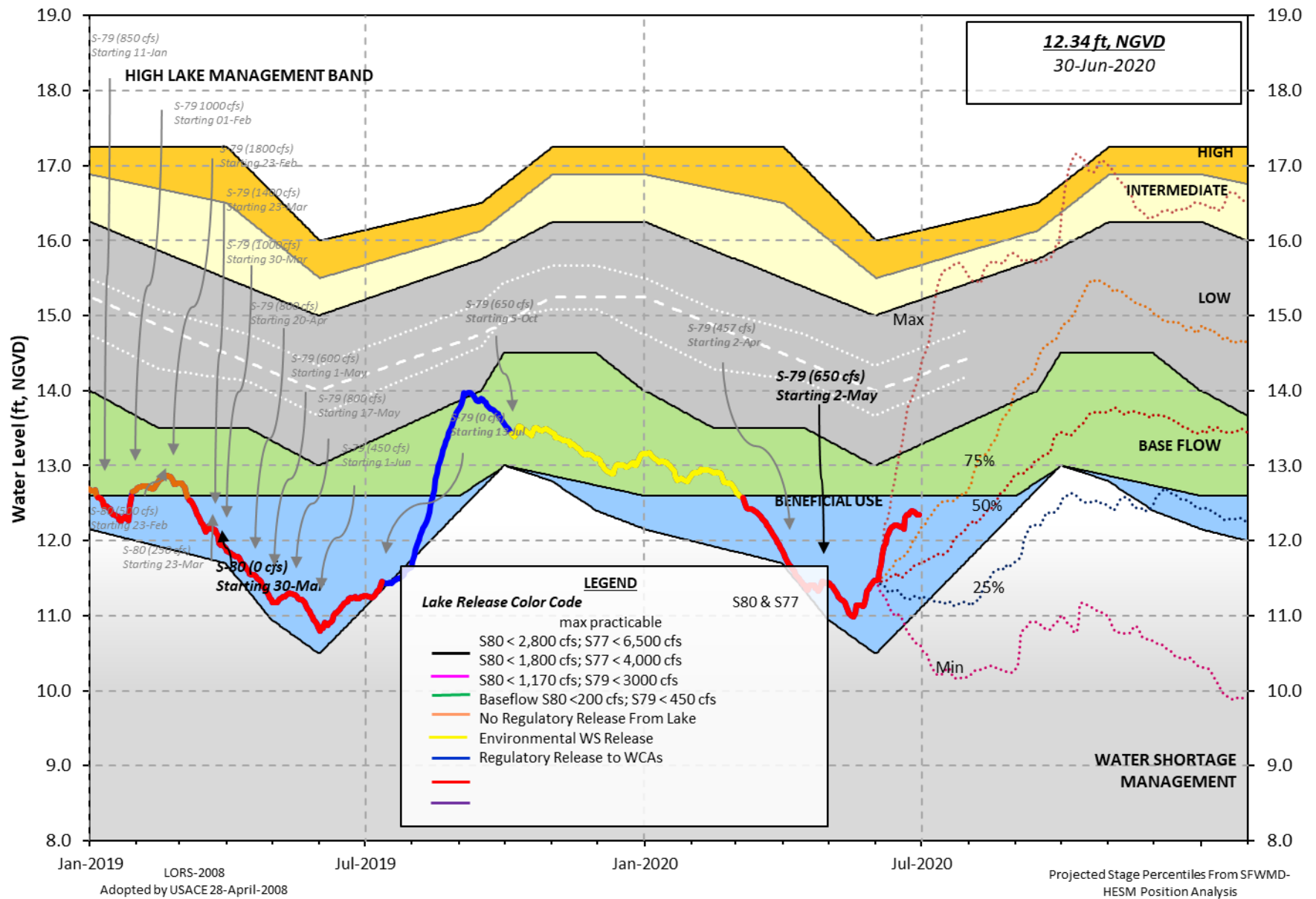


Figure 2. Select annual stage hydrographs for Lake Okeechobee in comparison to the updated Ecological Envelope.

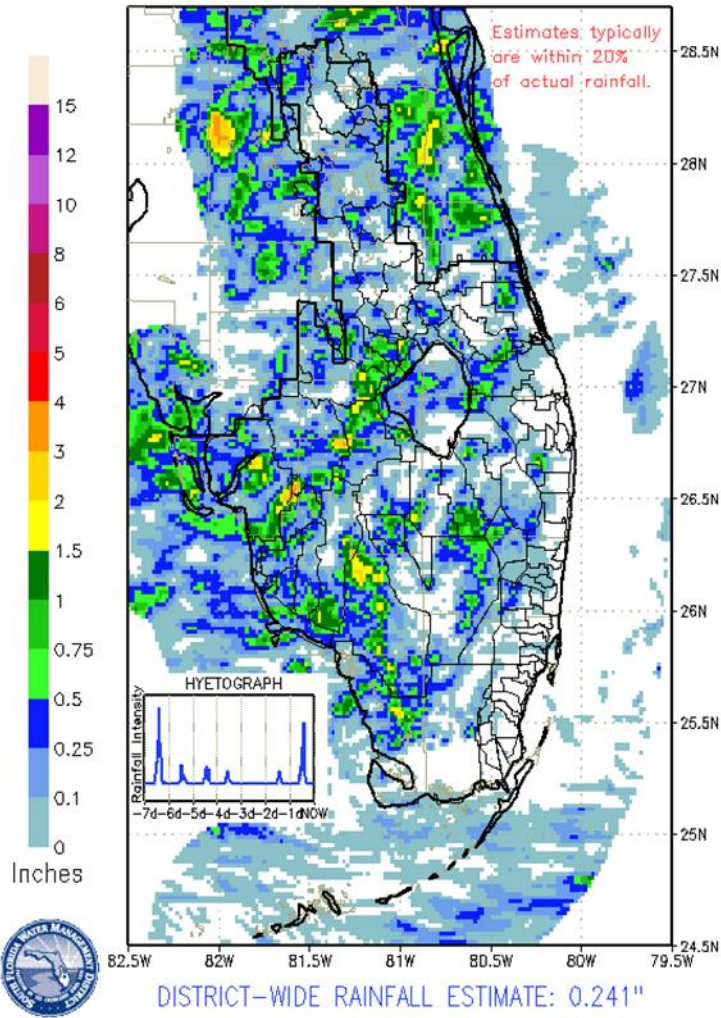
# Lake Okeechobee Water Level History and Projected Stages



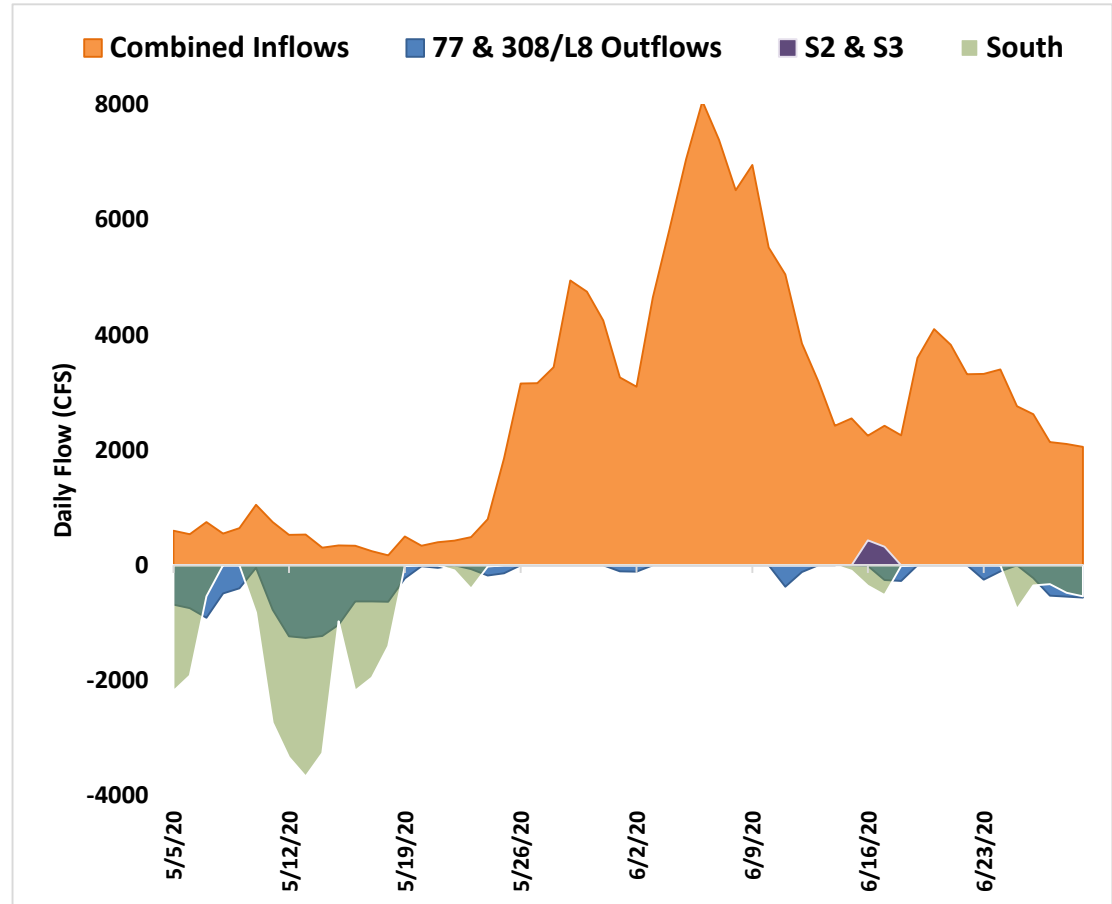
**Figure 3.** Recent Lake Okeechobee stage and releases, with projected stages based on a dynamic position analysis.

# SFWMD PROVISIONAL RAINDAR 7-DAY RAINFALL ESTIMATES

FROM: 0400 EST, 06/23/2020 THROUGH: 0400 EST, 06/30/2020



**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.

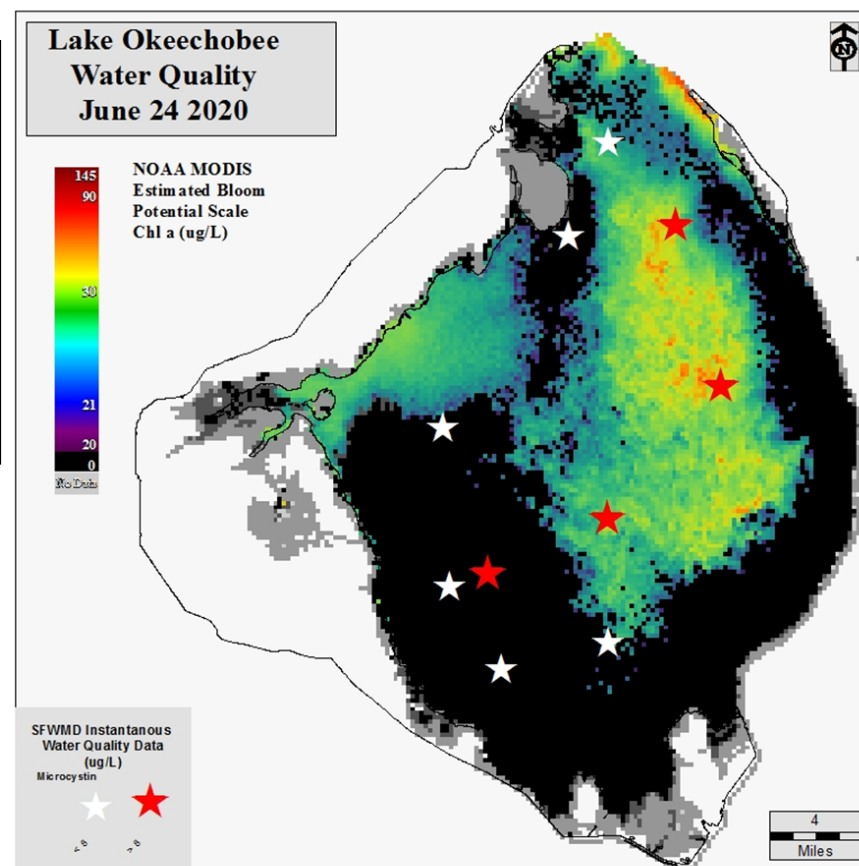
### Samples collected on June 23- 24, 2020

Station	CHLa (ug/L)	TOXIN (ug/L)	TAXA
FEBIN	P	0.20	NS
FEBOUT	P	0.20	Cylindro
KISSR0.0	P	0.20	Mixed
<b>L005</b>	P	0.20	Cylindro
<b>LZ2</b>	P	0.20	Mixed
KBARSE	P	0.32	Microcystis
RITTAE2	P	0.00	NS
PELBAY3	P	0.20	Mixed
POLE3S	P	0.20	Mixed
LZ25A	P	0.20	Mixed
PALMOUT	P	0.20	Mixed
PALMOUT1	P	0.20	Microcystis
<b>PALMOUT2</b>	P	0.85	Micro/Dolic
<b>PALMOUT3</b>	P	<b>8.30</b>	Microcystis
POLESOUT	P	0.20	Micro/Cylin
POLESOUT1	P	0.20	Cylindro
POLESOUT2	P	0.20	Micro/Cylin
POLESOUT3	P	0.20	Micro/Cylin
EASTSHORE	P	0.20	Microcystis
NES135	P	0.20	Mixed
NES191	P	0.20	Mixed

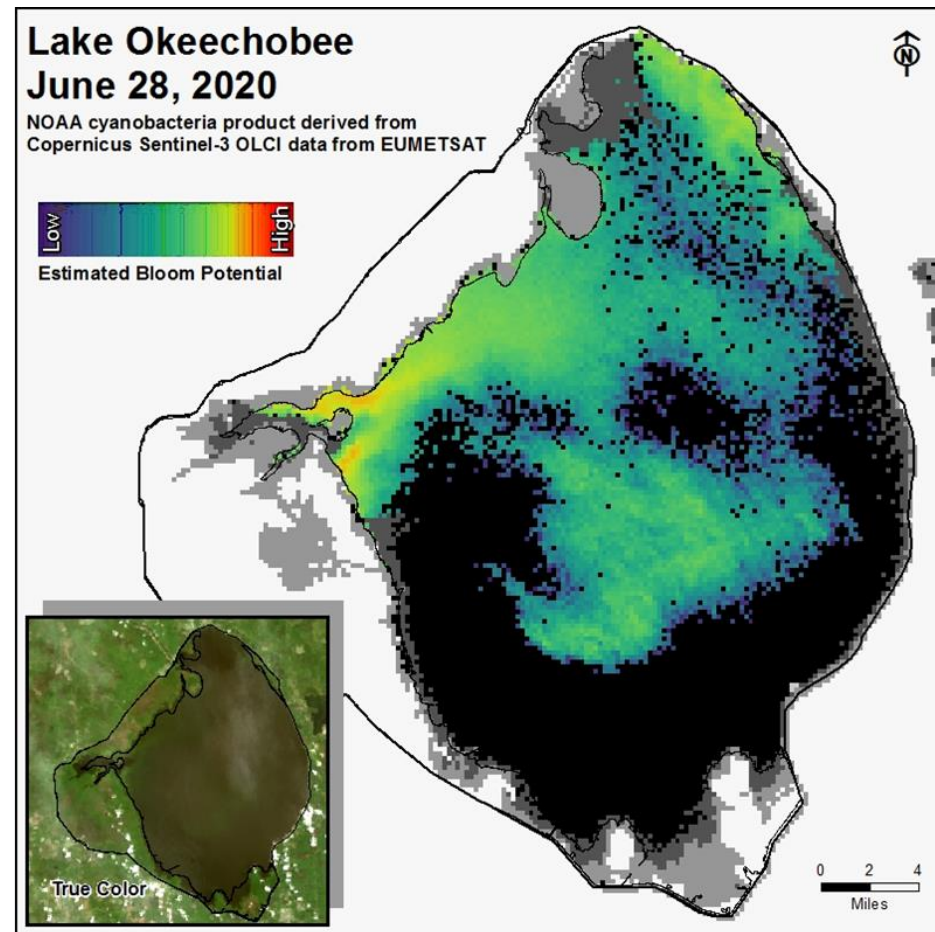
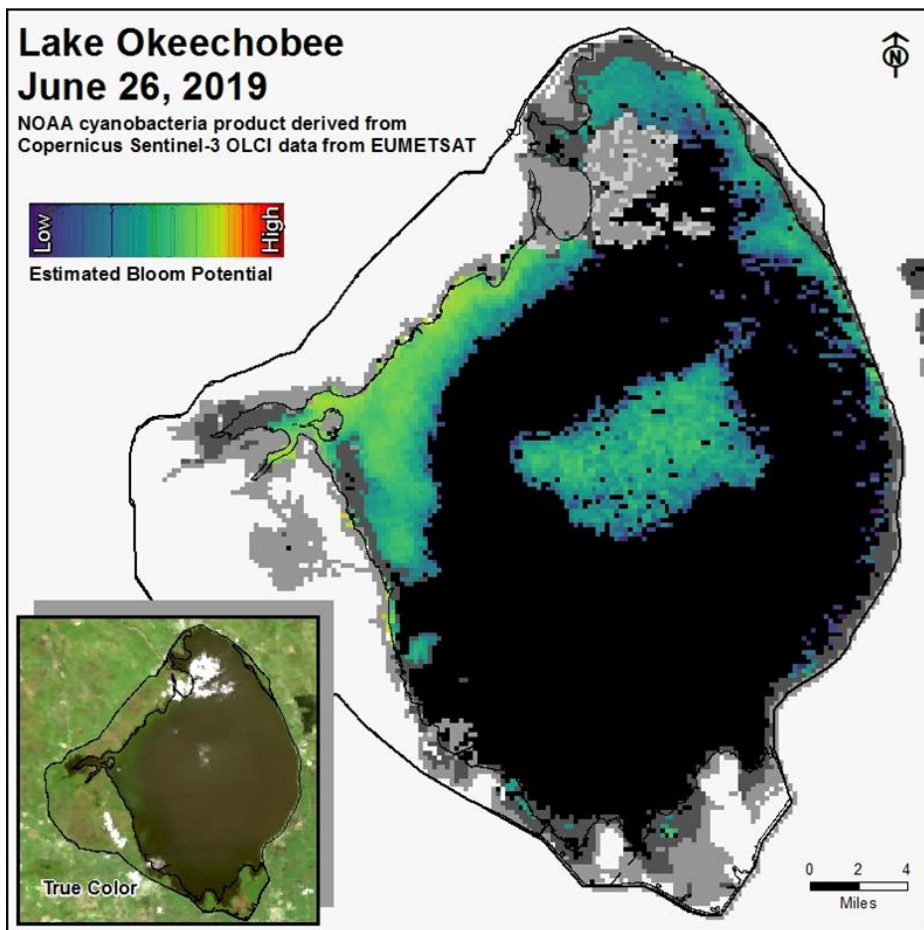
Station	CHLa (ug/L)	TOXIN (ug/L)	TAXA
<b>L001</b>	P	3.70	Microcystis
<b>L004</b>	P	<b>800</b>	Microcystis
<b>L006</b>	P	4.30	Microcystis
L007	P	0.20	Mixed
L008	P	1.10	Microcystis
<b>LZ30</b>	P	0.33	Microcystis
<b>LZ40</b>	P	<b>290</b>	Microcystis
CLV10A	P	0.20	Microcystis
<b>NCENTER</b>	P	<b>10.00</b>	Microcystis

- SFWMD considers >40 µg/L Chlorophyll *a* (Chl*a*) an algal bloom
- BDL – Below Detectable Limit of 0.25 µg/L
- ND – No Dominant taxa
- P – Pending
- NS – Not Sampled
- Bold – crew observed possible BGA
- 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 mid to late-June 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 664 cfs (Figures 1 and 2) and last month inflow averaged about 2,562 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	319
S-80	0
S-308	-248
S-49 on C-24	111
S-97 on C-23	111
Gordy Rd. structure on Ten Mile Creek	123

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 8.8. Salinity conditions in the middle estuary are estimated to be within the fair range for adult eastern oysters (Figure 3).

**Table 2.** Seven-day average salinity at three monitoring sites in the St. Lucie Estuary. Current average is in bold face type, previous average in parentheses. The envelope reflects the preferred salinity range for adult eastern oysters (*Crassostrea virginica*) in the middle estuary.

<b>Sampling Site</b>	<b>Surface</b>	<b>Bottom</b>	<b>Envelope</b>
HR1 (North Fork)	<b>2.1</b> (1.4)	<b>5.2</b> (4.3)	NA <sup>1</sup>
US1 Bridge	<b>8.1</b> (6.0)	<b>10.7</b> (10.1)	10.0-26.0
A1A Bridge	<b>18.0</b> (14.1)	<b>25.1</b> (22.6)	NA <sup>1</sup>

<sup>1</sup>Envelope not applicable

### **Caloosahatchee Estuary:**

Last week total inflow to the Caloosahatchee Estuary averaged approximately 1,284 cfs (Figures 5 and 6) and last month inflow averaged about 2,601 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	282
S-78	261
S-79	824
Tidal Basin Inflow	460

Over the past week, salinity increased throughout the estuary (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> (0.1)	<b>0.3</b> (0.1)	NA <sup>1</sup>
Val I75	<b>0.5</b> (0.4)	<b>0.6</b> (0.5)	0.0-5.0 <sup>2</sup>
Ft. Myers Yacht Basin	<b>3.9</b> (3.4)	<b>5.1</b> (4.3)	NA
Cape Coral	<b>10.5</b> (9.3)	<b>12.1</b> (11.1)	10.0-30.0
Shell Point	<b>24.5</b> (22.8)	<b>25.5</b> (23.8)	10.0-30.0
Sanibel	<b>29.5</b> (28.8)	<b>31.0</b> (30.1)	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 1.0 to 3.3 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 250 cfs. The 30-day moving average surface salinity at Val I-75 is forecast to be between 0.4 and 0.9 (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

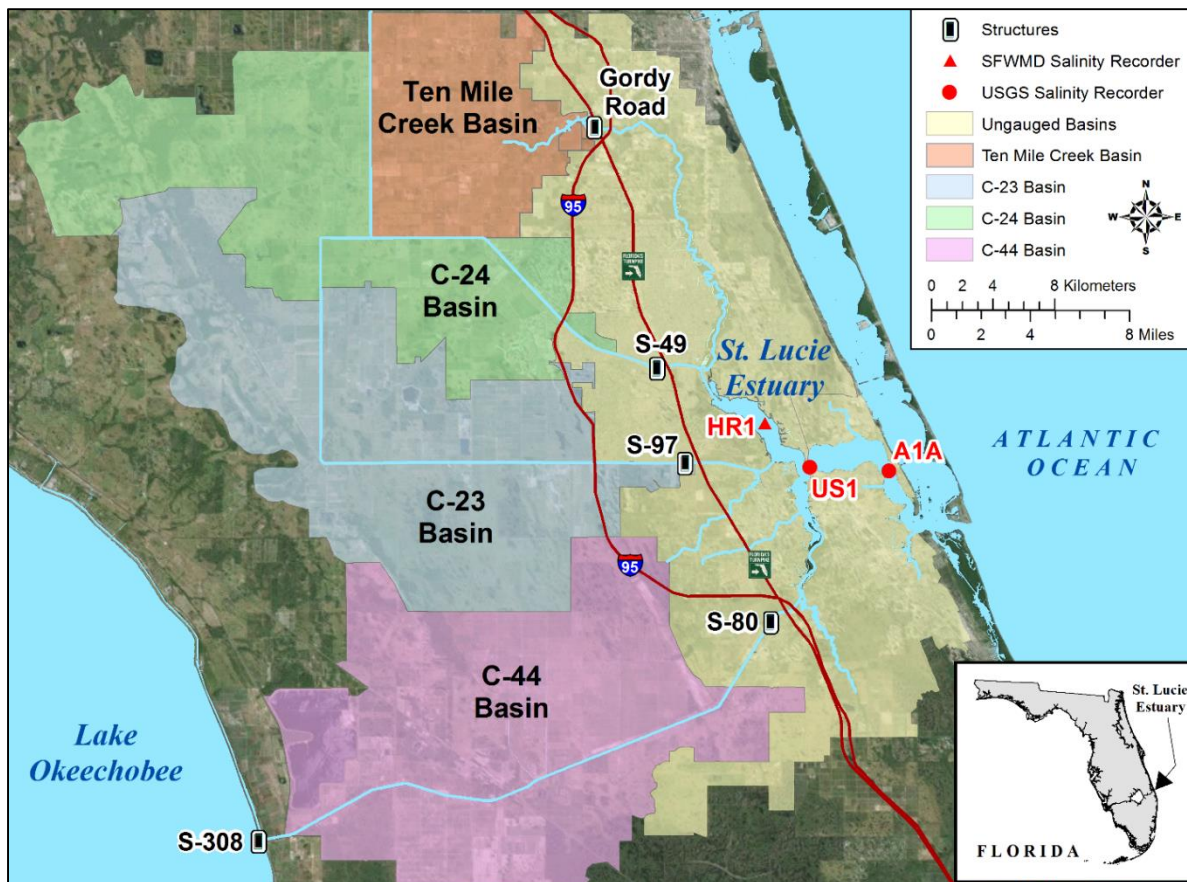
Scenario	Q79 (cfs)	TB runoff (cfs)	Daily salinity	30 day Mean
A	0	250	3.3	0.9
B	300	250	2.2	0.7
C	450	250	1.8	0.6
D	650	250	1.3	0.5
E	800	250	1.0	0.4

### Red tide

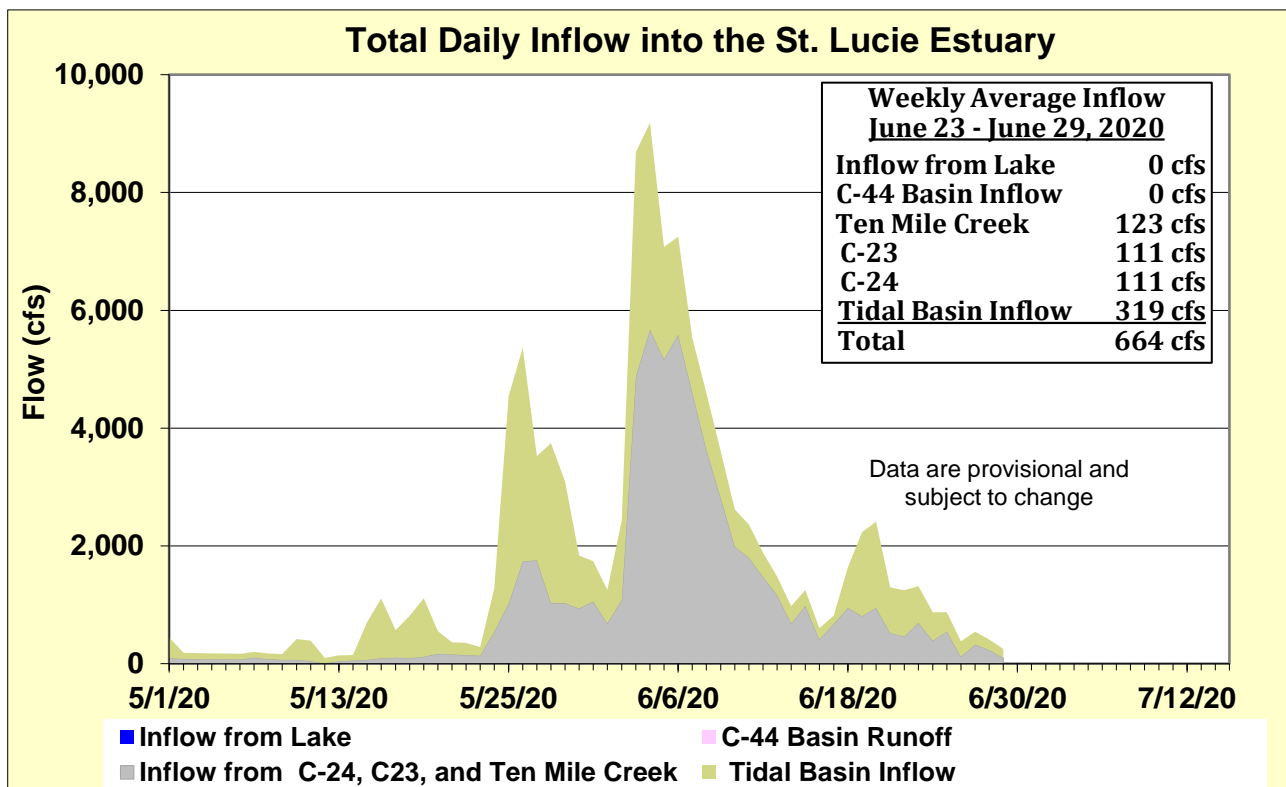
The Florida Fish and Wildlife Research Institute reported on June 26, 2020, that *Karenia brevis*, the Florida red tide dinoflagellate, was not observed in samples collected from Lee or Palm Beach counties (no samples were analyzed this week from St. Lucie, Martin, Broward, or Miami-Dade counties).

### Water Management Recommendations

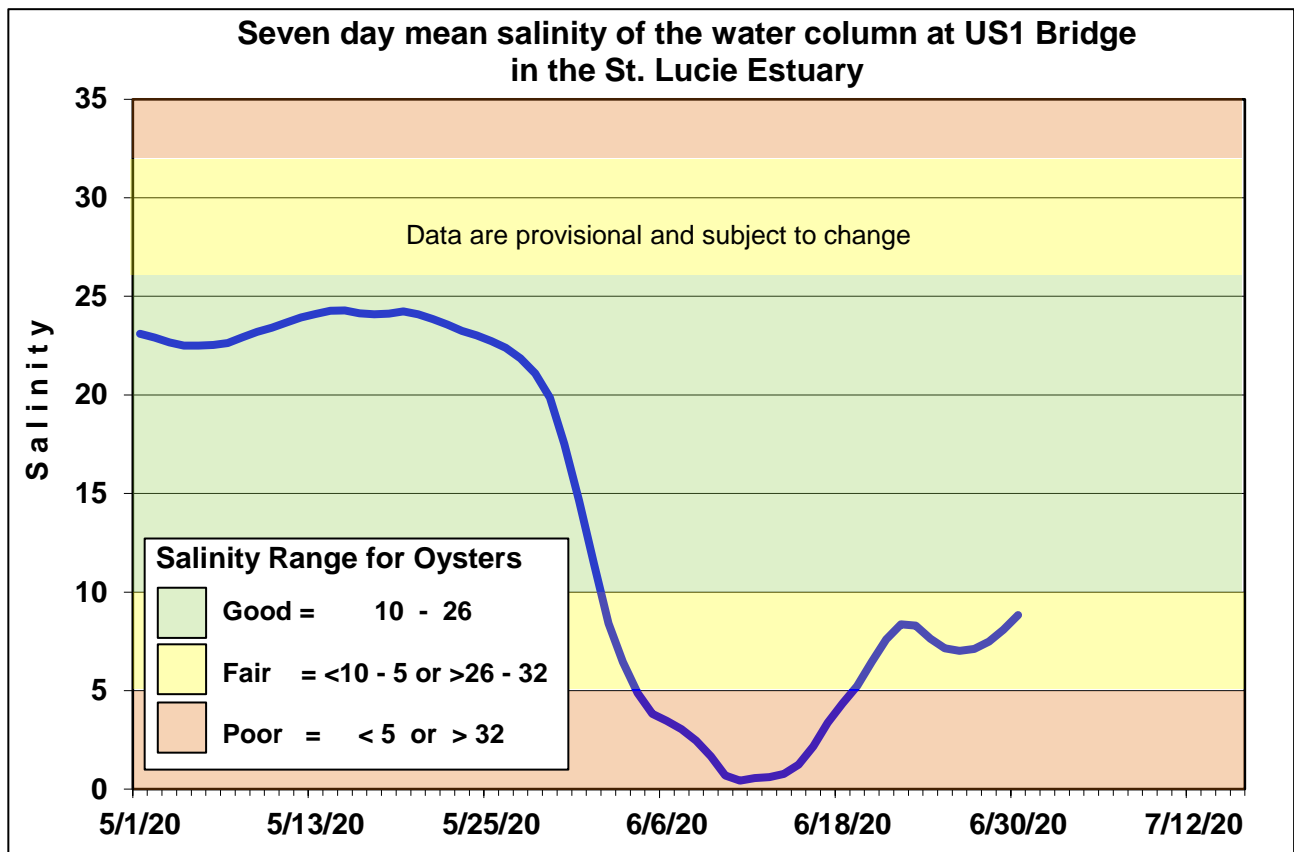
Lake stage is in the Beneficial Use Flow sub-band. Tributary conditions are normal. The South Florida Water Management District's Lake Okeechobee Adaptive Protocol's Release Guidance suggests noS-77to the Caloosahatchee Estuary.



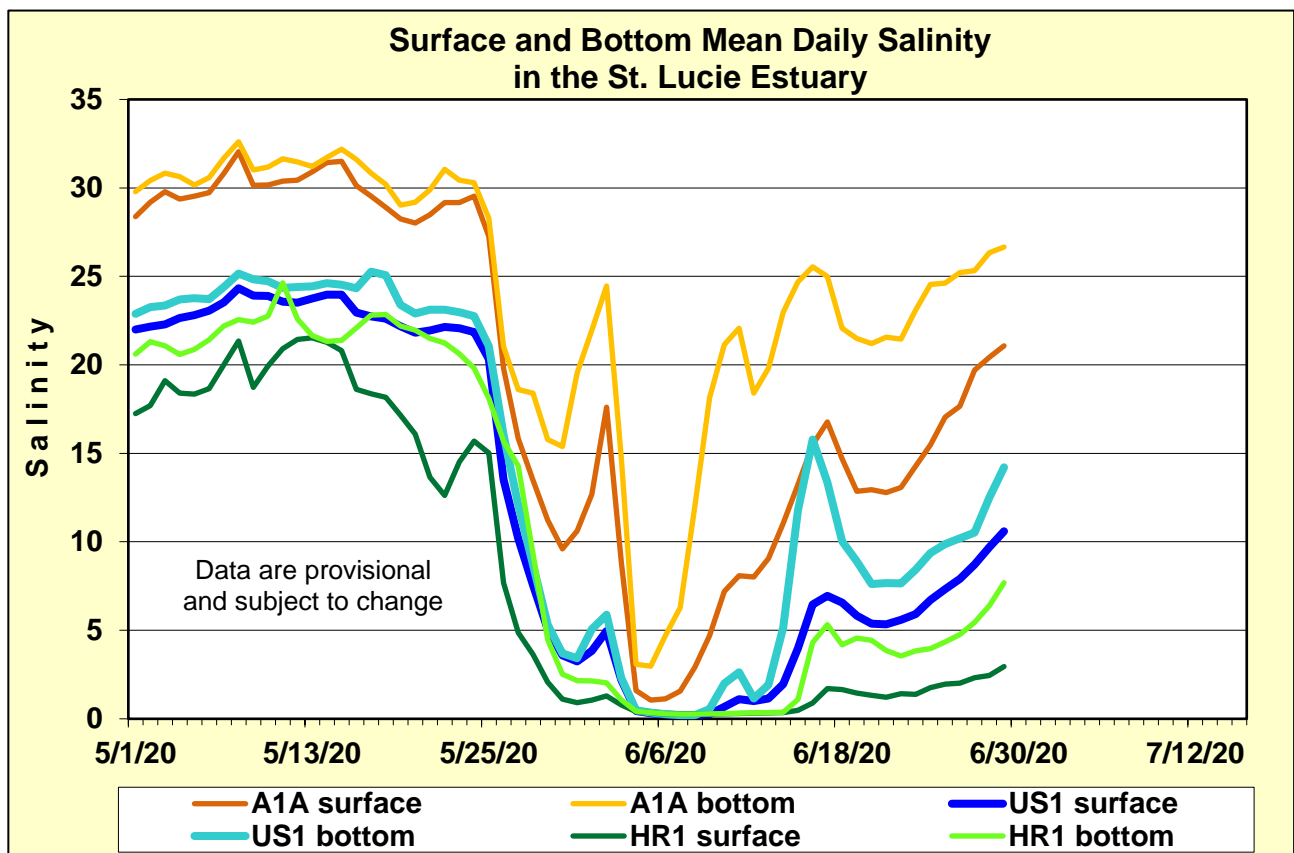
**Figure 1.** Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.



**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.

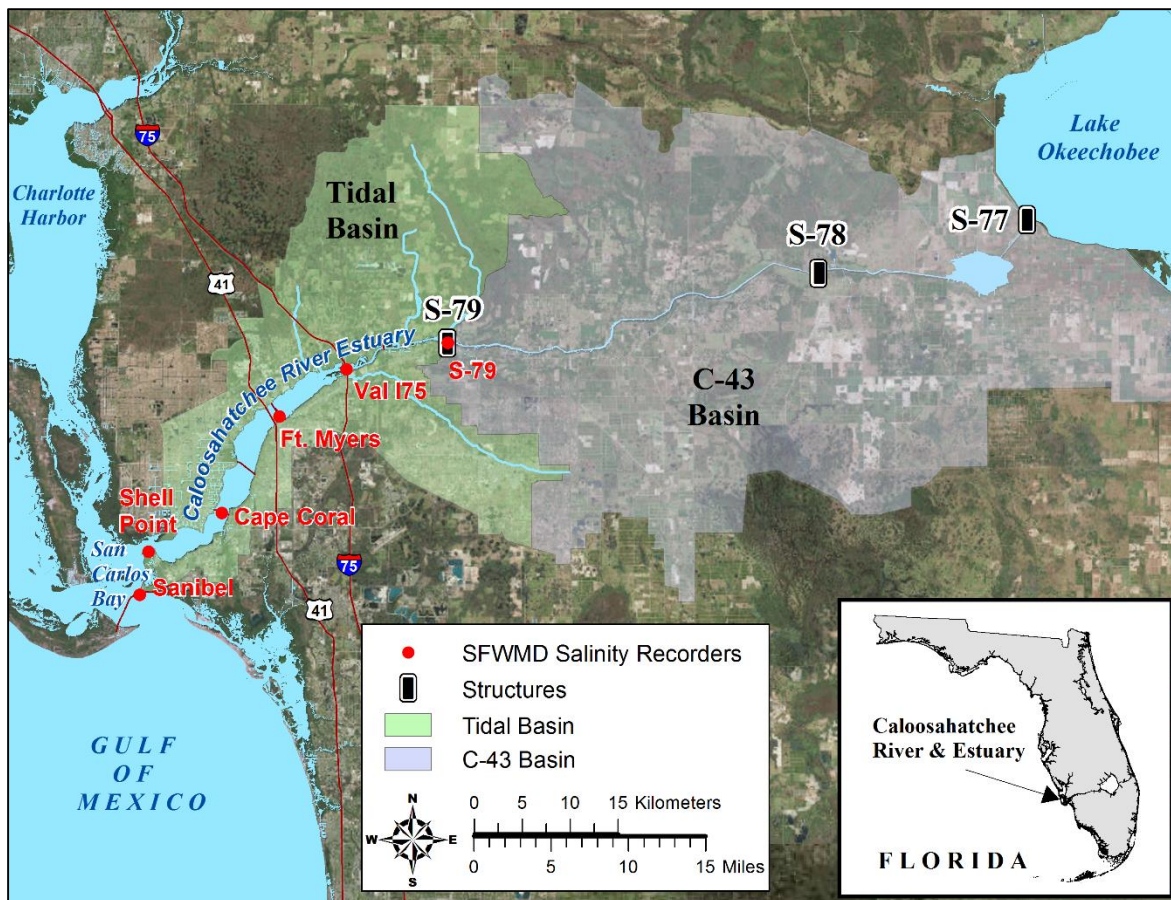


Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

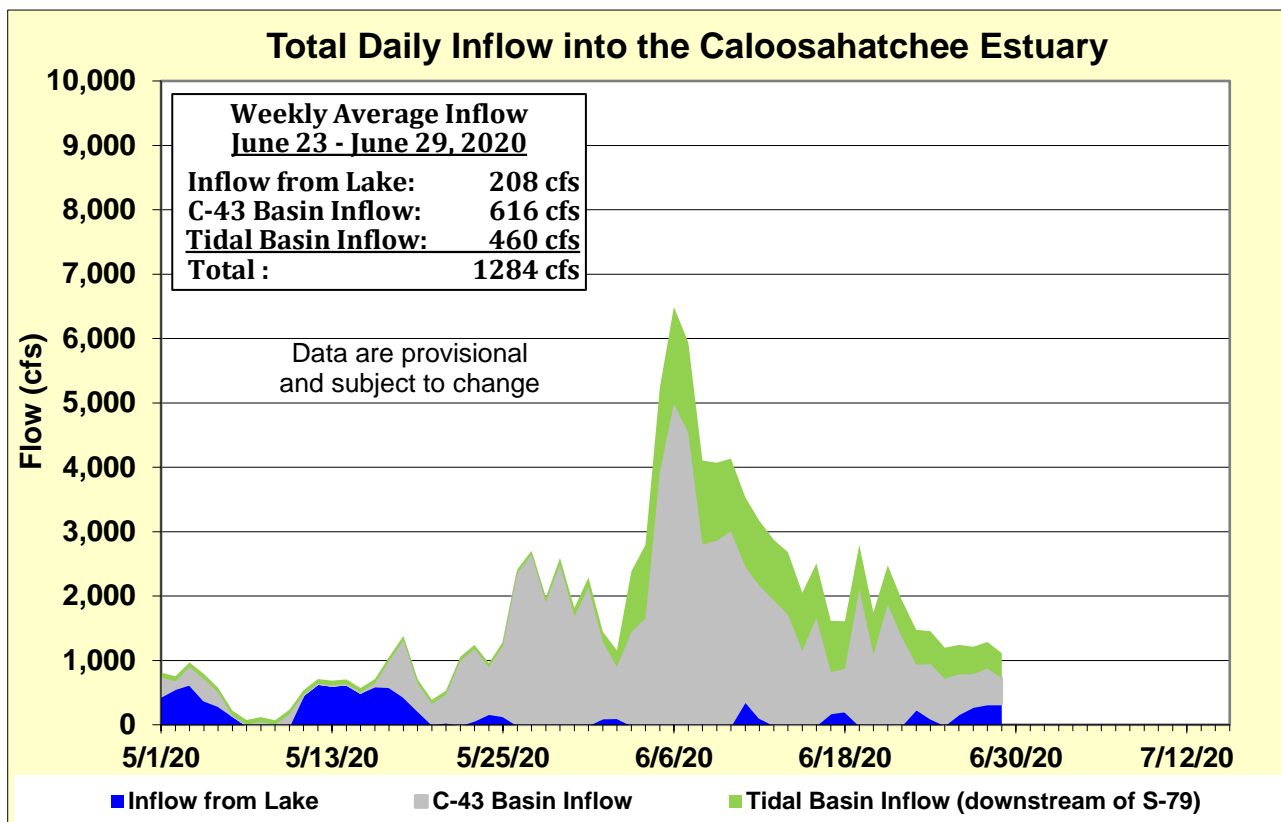
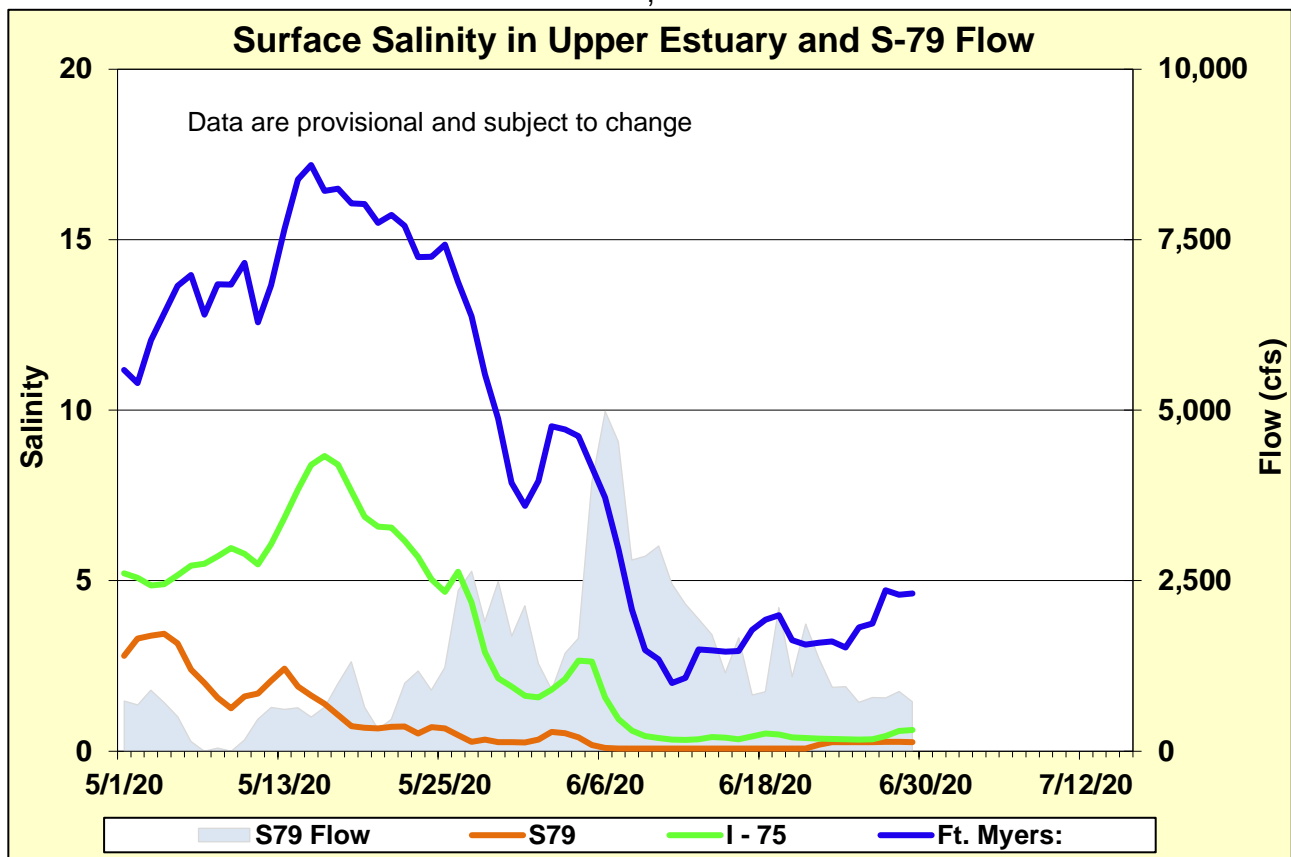
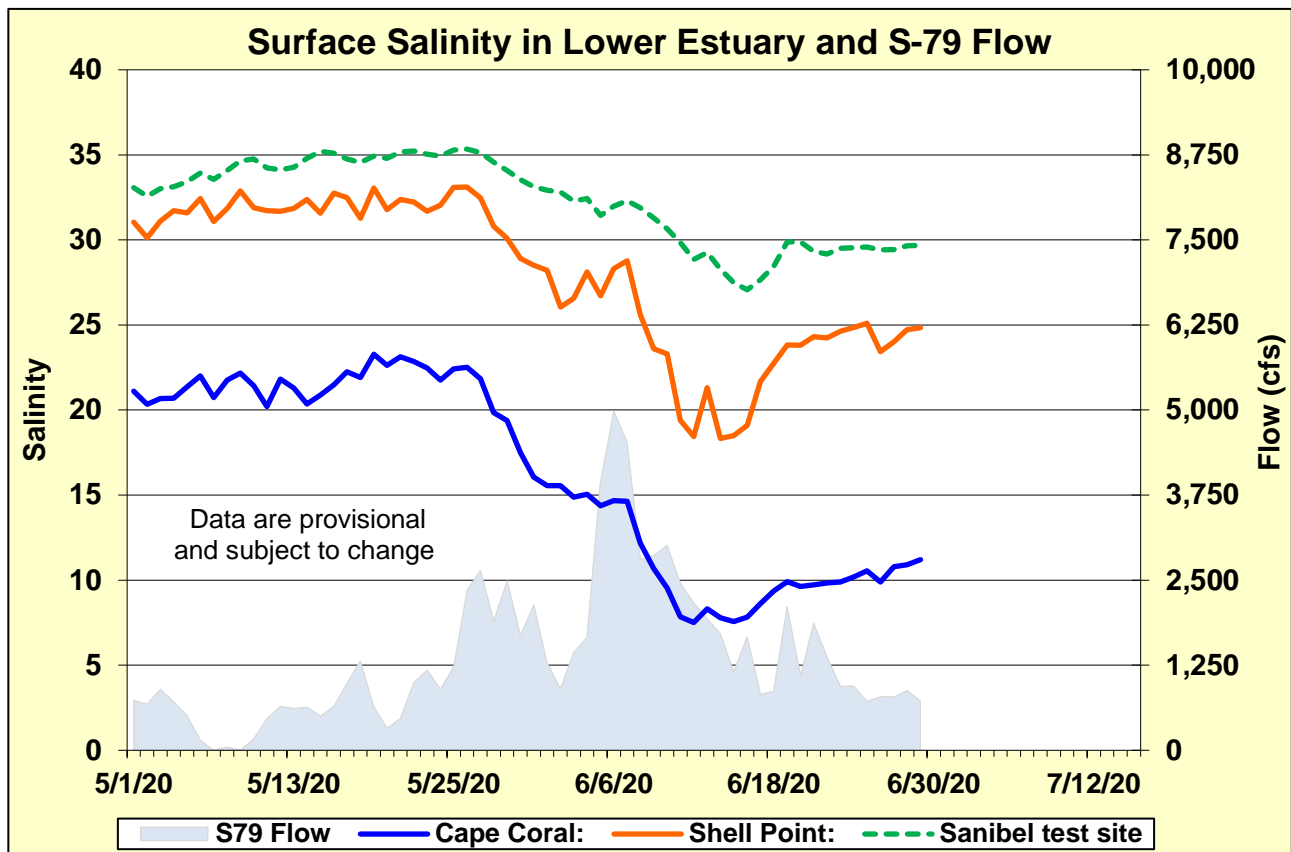


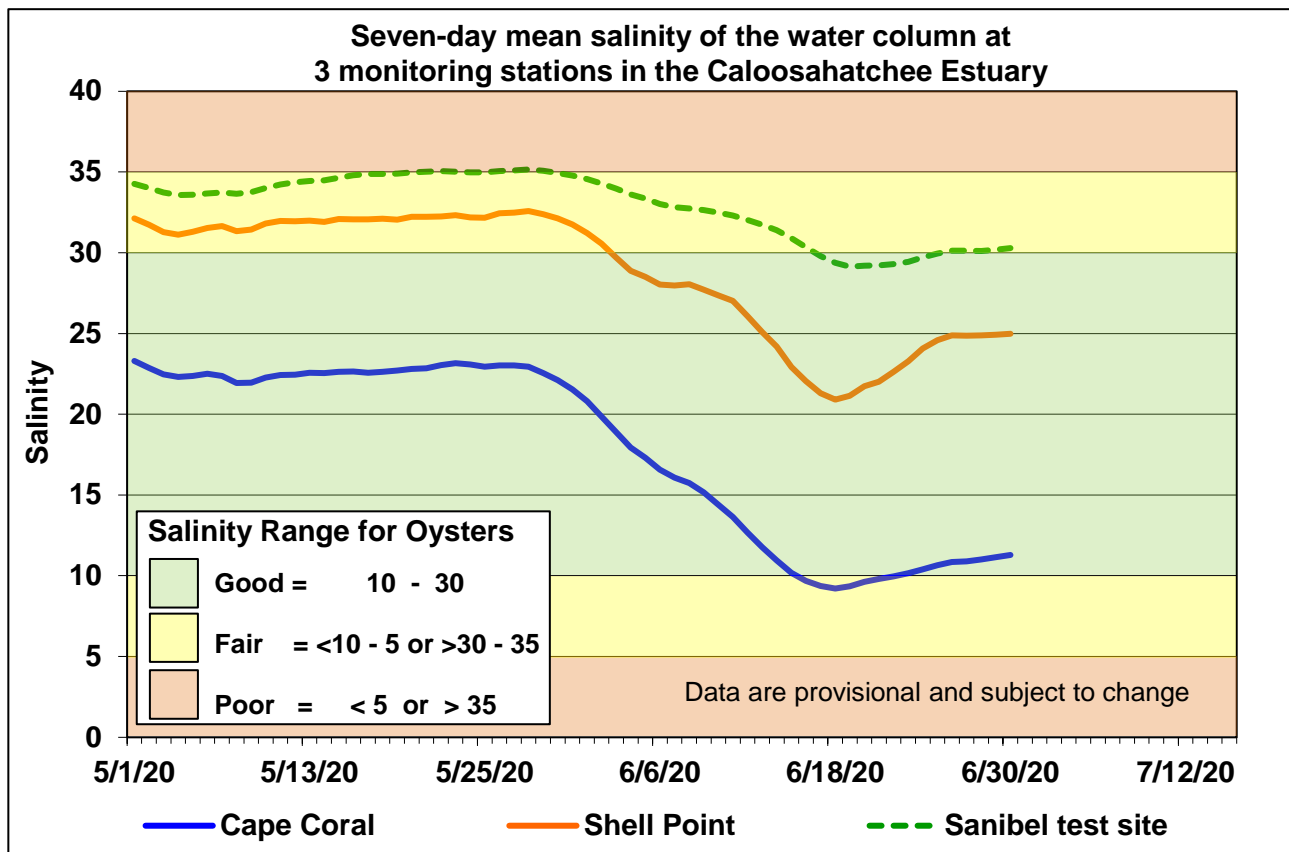
Figure 6. Total daily inflows from Lake Okeechobee, runoff from the C-43 basin



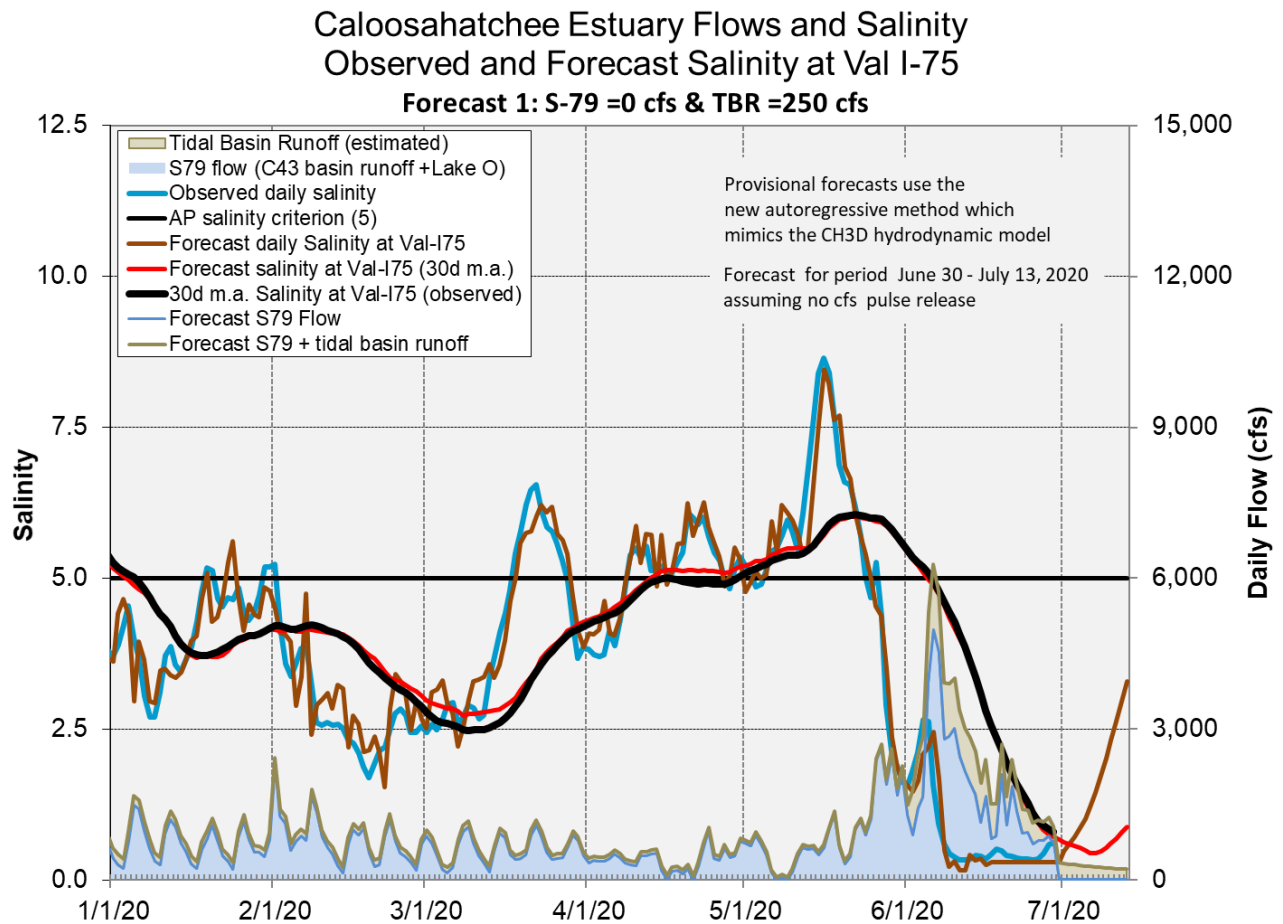
**Figure 7.** Daily mean flows at S-79 and salinity at upper estuary monitoring stations.



**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.

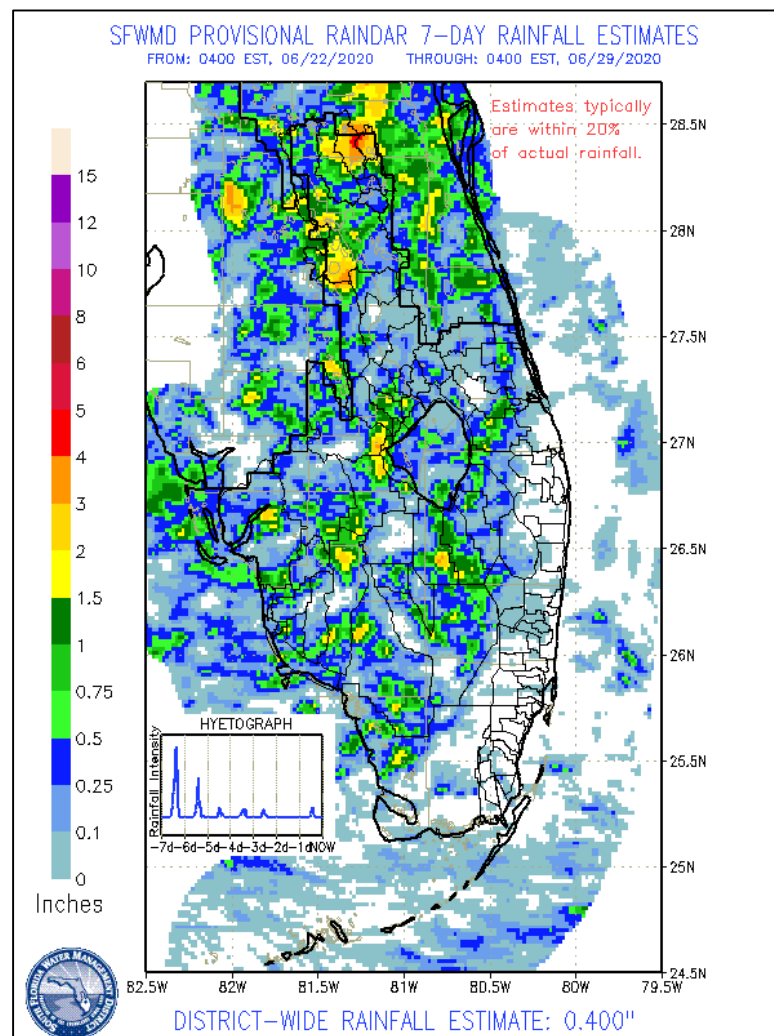


**Figure 10.** Forecasted Val I-75 surface salinity assuming no pulse release at S79.

## **EVERGLADES**

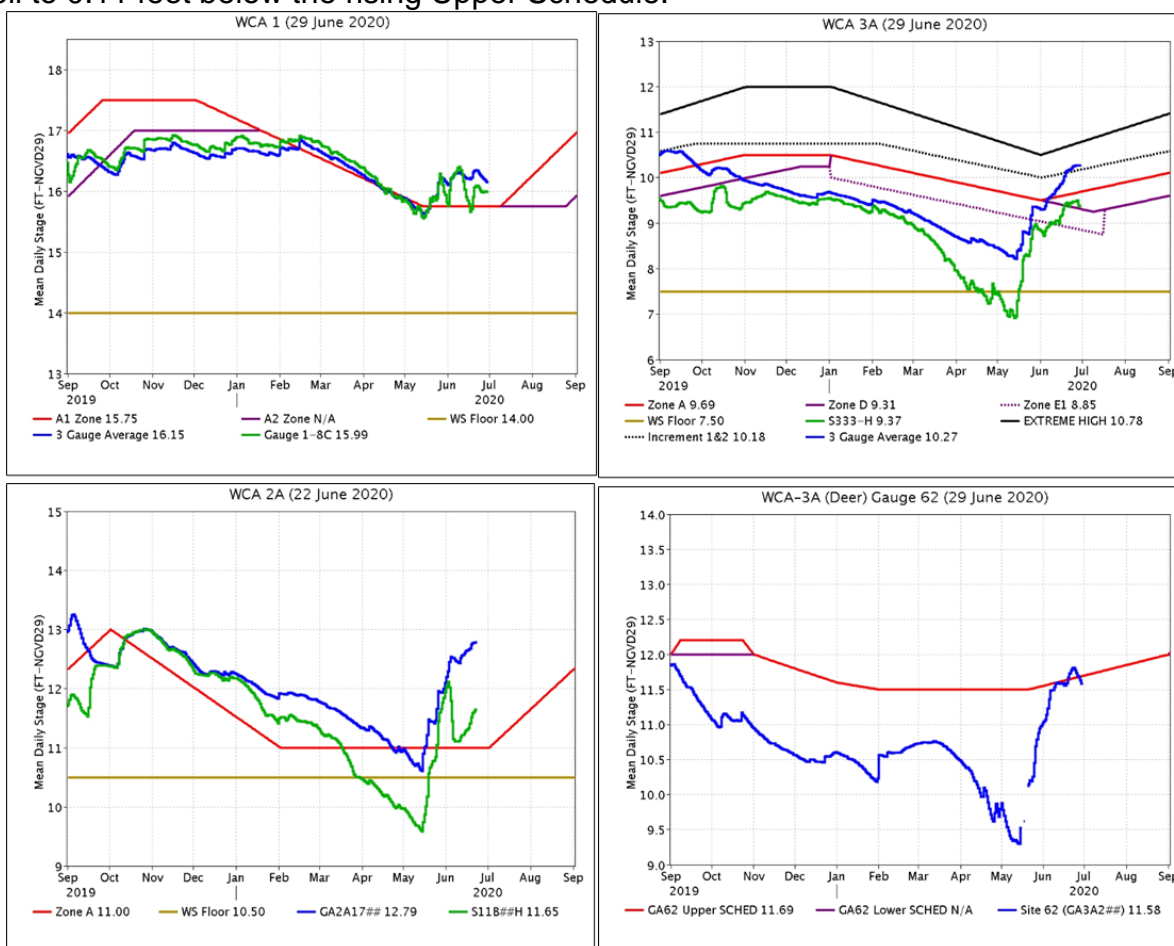
Well below average rainfall was recorded across the Everglades last week, with northern WCA-3A receiving the most. At the gauges monitored for this report stages fell on average 0.08 feet last week with a maximum increase of +0.16 feet in central WCA-3A. Evaporation was estimated at 1.86 inches last week an increase from the week prior.

Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	0.09	-0.20
WCA-2A	0.26	-0.19
WCA-2B	0.03	-0.11
WCA-3A	0.36	+0.03
WCA-3B	0.04	-0.06
ENP	0.16	-0.09



Regulation Schedules: WCA-1: Stage changes at the 1-8C Gauge moderated last week, trending towards the stable Zone A1 reg. line, currently 0.24 feet above. WCA-2A: Stage at Gauge S11-B trended upward the week prior, fell last week towards the flat Zone A reg line again last week now 0.55 feet above. WCA-3A: The Three Gauge Average paralleled the Increment 1.2-line last week, currently

0.09 feet above that rising action line. WCA-3A at gauge 62 (Northwest corner): Over the last week stages fell to 0.11 feet below the rising Upper Schedule.

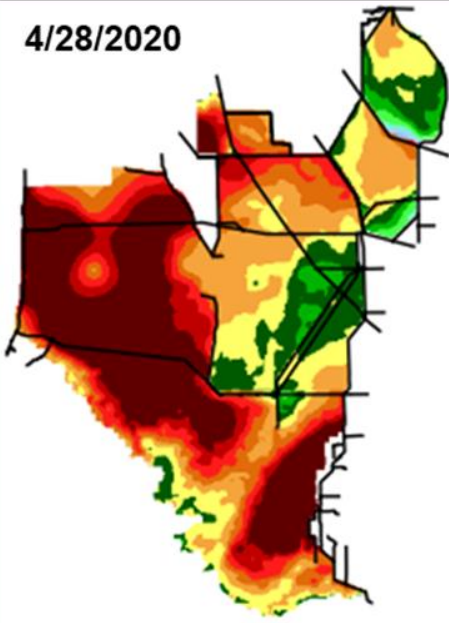


Water Depths: The WDAT tool for spatial interpolation of depth monthly snapshots indicate depths in WCA-3A North are at 1.0 feet or higher across that entire sub-basin. Depths in WCA-3A South are building, in excess of 3.5 feet along the upper reaches of the L-67 canal. WCA-2A stages are fairly constant 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, Taylor River and less so in Lostman's Slough within ENP. Comparing WDAT water levels from present, over the last month stages rose across all WCA-3A, most significantly along the upper reach of the L-67 canal downstream of the S-11s. WCA-2A is wetter in the south and drier in the north. Stage differences in WCA-1 are mixed. Looking back one year the stage difference patterns are very similar but less significant. The WDAT model indicates wetter conditions in the western basins and western ENP compared to a month ago but not a year ago.

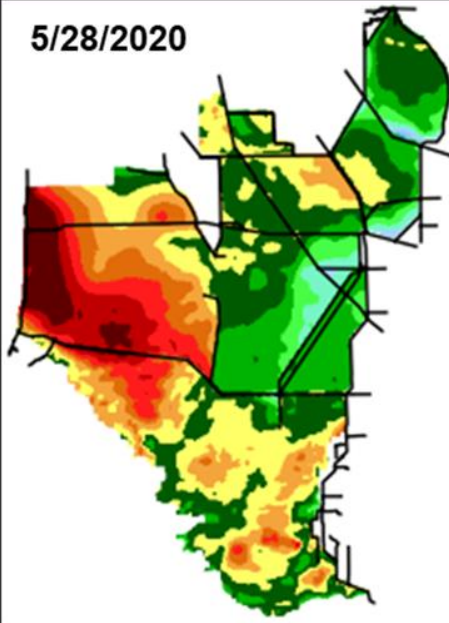


## SFWDAT Water Depth Monthly Snapshots

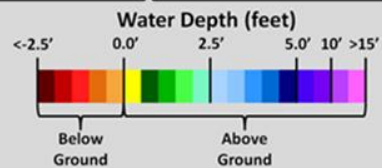
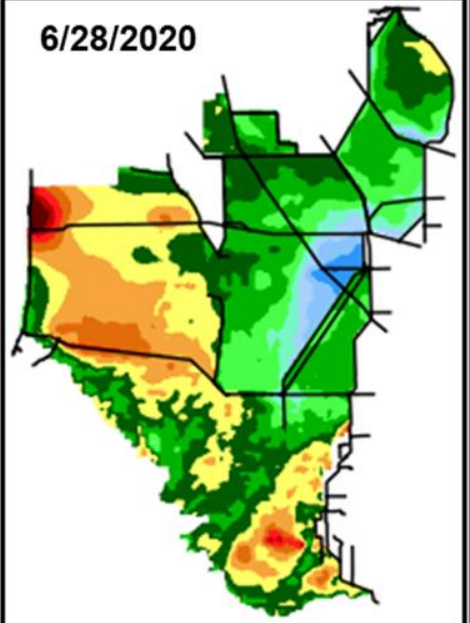
4/28/2020



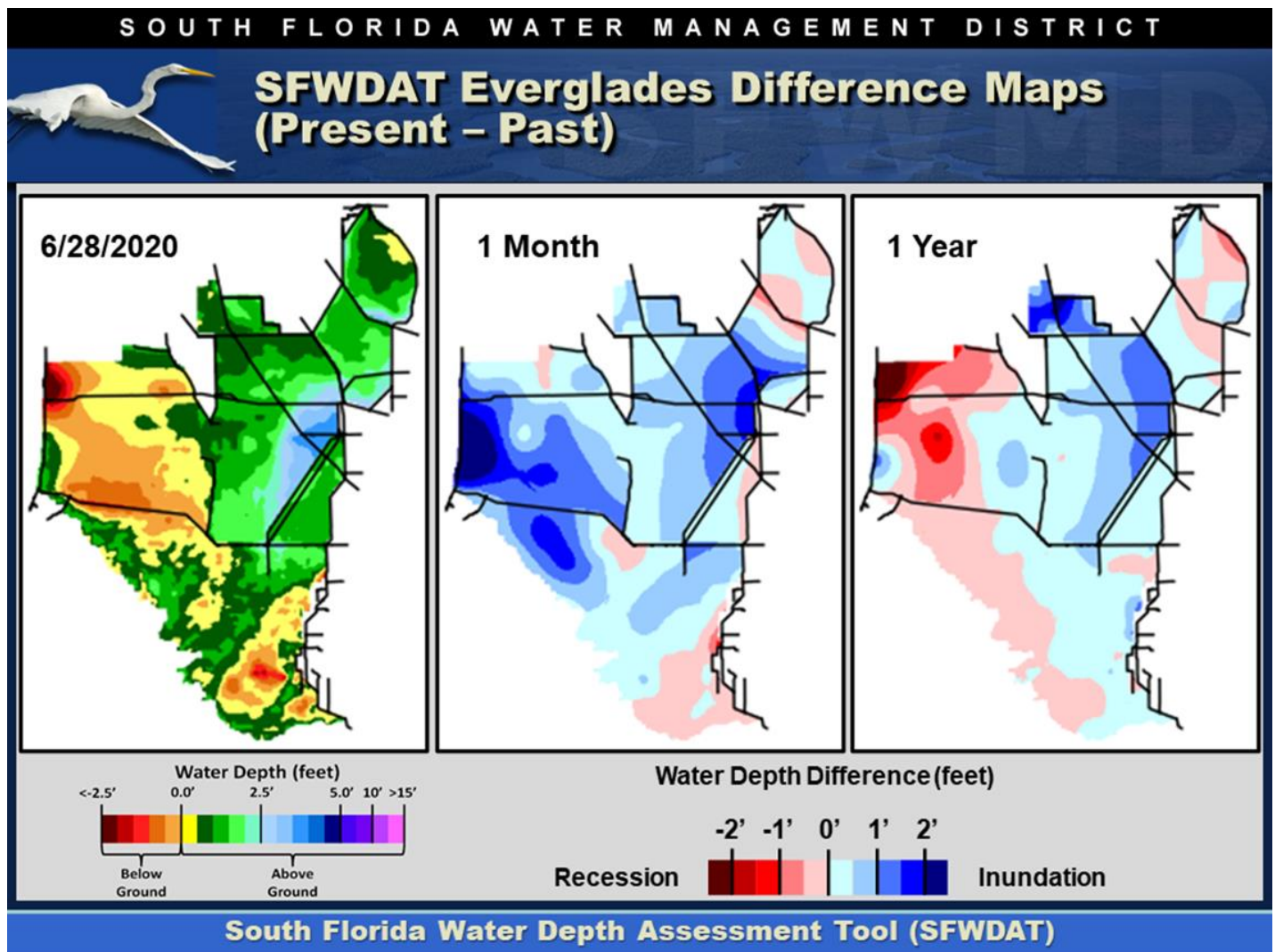
5/28/2020



6/28/2020



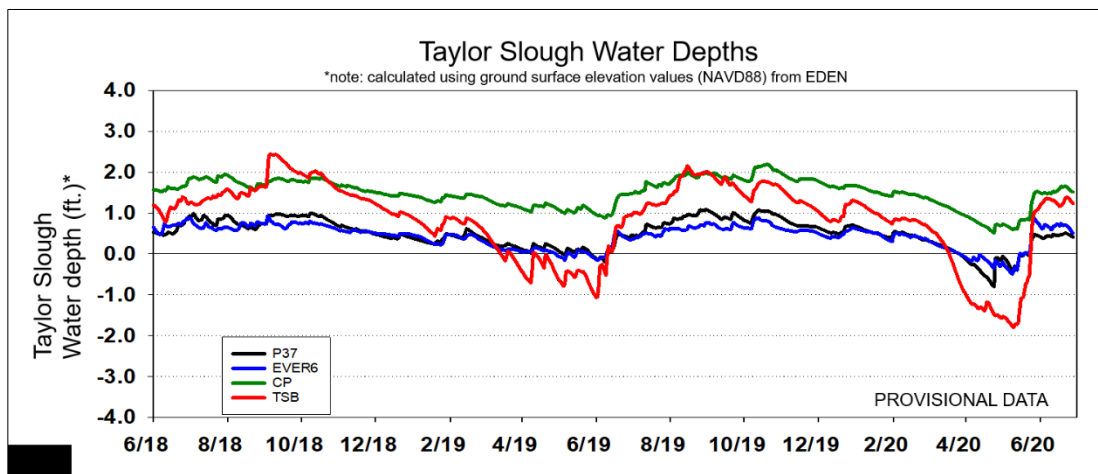
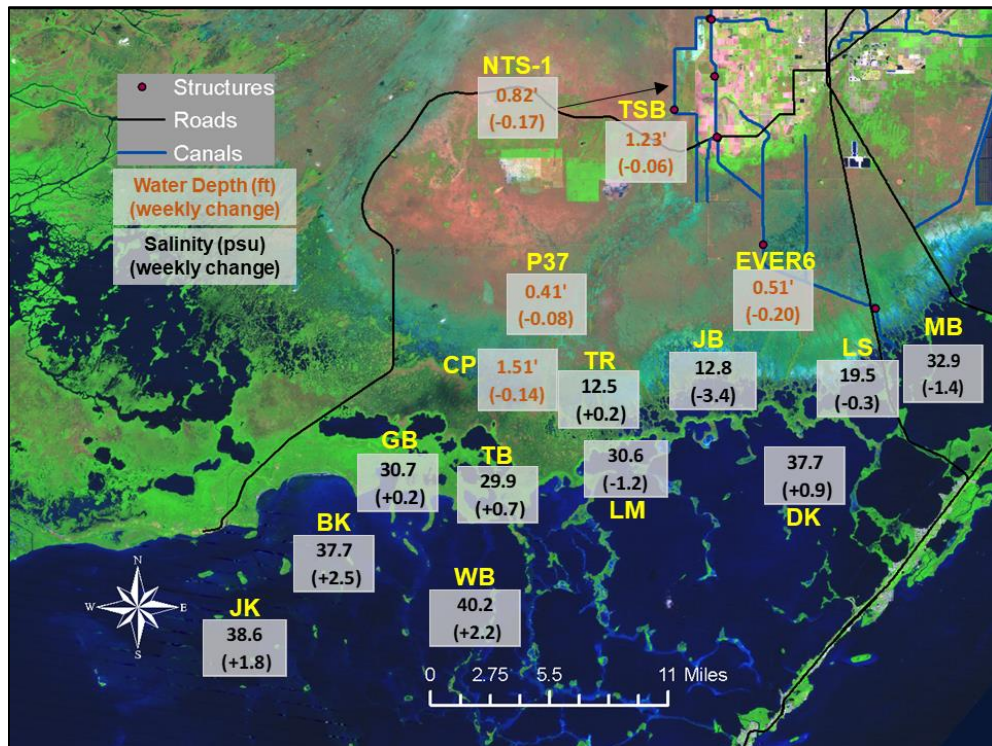
South Florida Water Depth Assessment Tool (SFWDAT)

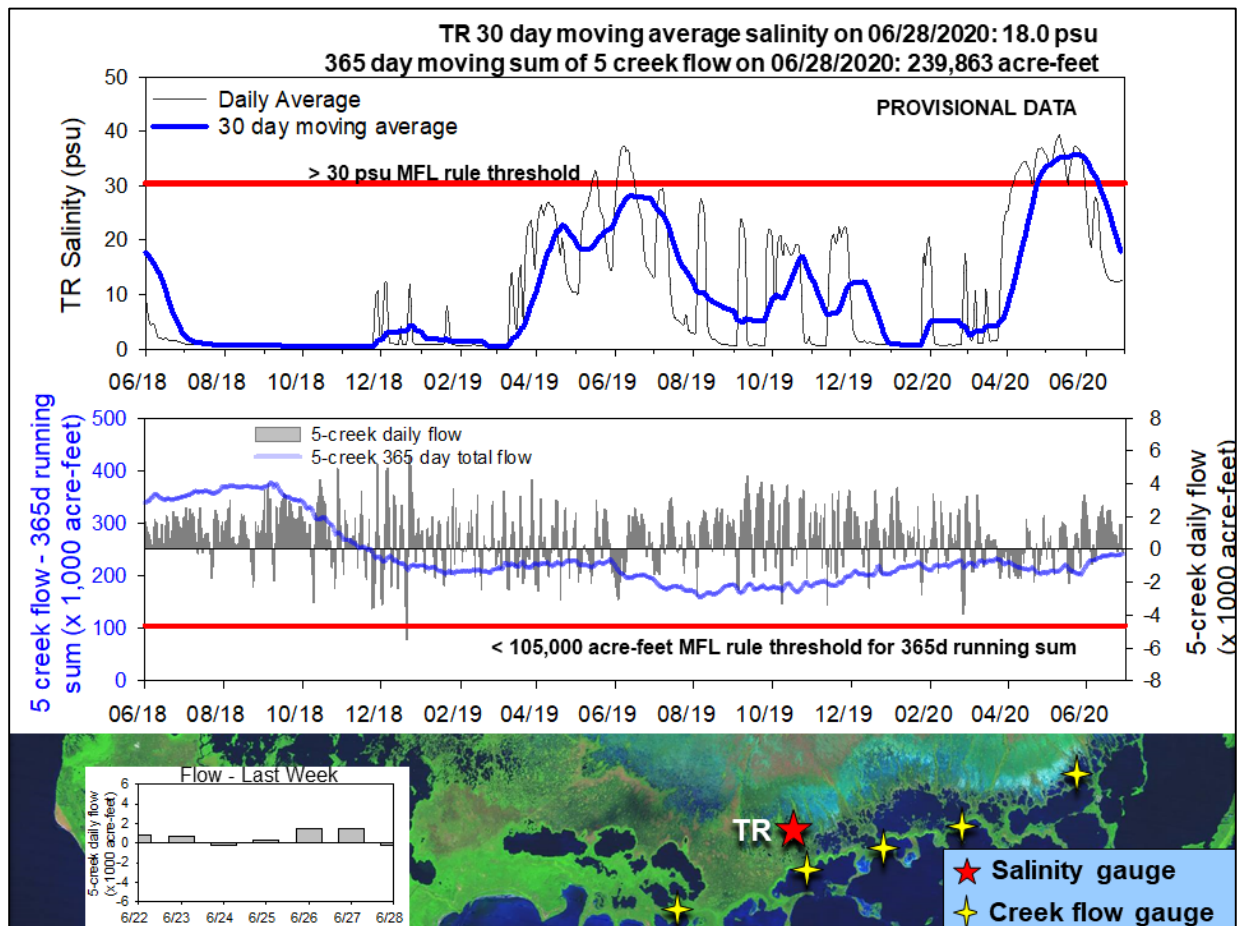
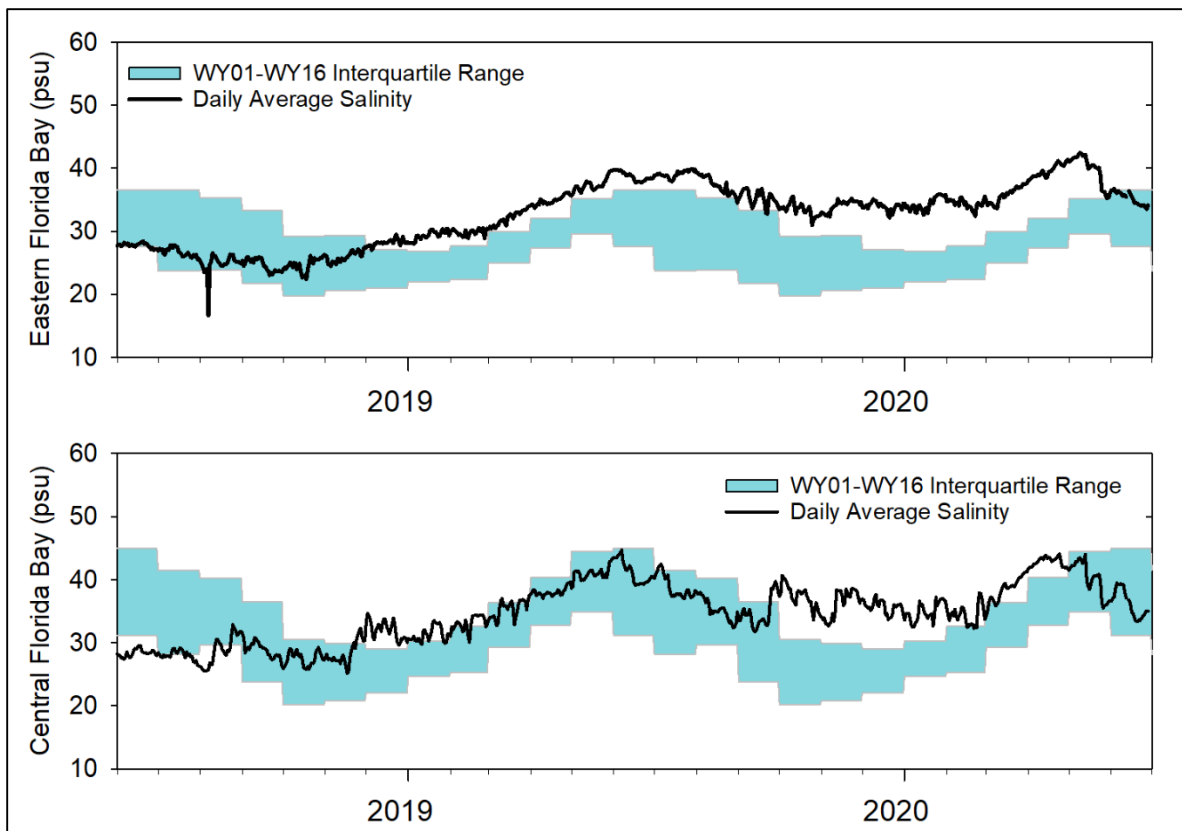


Wildlife bullets: Wading bird update helicopter survey June 26<sup>th</sup> and ESA species of concern:

- No foraging or nesting wading bird were seen throughout the Everglades except for coastal ENP
- \*\* snail kite numbers and nesting remains very low in South Florida, however an increase in activity was noted in the last WCA-3A survey
- \*\*\* CSSS continue to nest in sub-pop D, 13 active nests

Taylor Slough Water Levels: Very little rain fell over Taylor Slough and Florida Bay this past week and stages decreased an average of 0.13 feet. The largest decrease was 0.20 feet in the ENP panhandle near the C-111 canal. Stages are still 2.6 inches higher than the historical average due to the rapid rise at the start of the wet season.





Florida Bay Salinities: Average salinity in Florida Bay stayed the same this week with individual station changes ranging from -3.4 psu to +2.5 psu. The freshwater pulse had not yet reached the Bay before conditions started drying out 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 moving average decreased 5.3 psu to end at 18.0 psu. Weekly flow from the 5 creeks identified by yellow stars on the map totaled 4,500 acre-feet last week with positive flows on all but 2 days. Only the easternmost creek had positive flows the entire week. The 365-day moving sum of flow from the five creeks (tracked as part of the Florida Bay MFL criteria) increased 1,800 acre-feet this week to end at 239,863 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. As continued inflows into WCA 3A are expected and stages at the northern gauges in that basin are around 1.0 feet higher than the historical average for this time of year, in the short term it is recommend to moderate ascension rates to the extent possible in order to benefit wildlife and avoid 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.

In the longer term, and running somewhat opposed to the previous recommendation, peak stages later in the wet season 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 surround that colony island and protect it from terrestrial predators during the latter part of next dry season/wading bird 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, June 30th, 2020 (red is new)**

Area	Weekly change	Recommendation	Reasons
WCA-1	Stage decreased by 0.20'	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 0.19'	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-2B	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 NE	Stage increased by 0.10'	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 0.17'	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 0.16'	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 0.12'		
WCA-3B	Stage decreased by 0.06'	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 decreased by 0.09'	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 -0.06' to -0.20'	Move water southward as possible	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged -3.4 to +2.5 psu	Move water southward as possible	When available, provide freshwater to maintain low salinity buffer and promote water movement.