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: July 29, 2020

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

A decreasing trend in rainfall is expected during the next few days as subsidence and greater stability is associated with the subtropical ridge of high pressure expanding westward over Florida from the Atlantic. The decreasing trend may be sharper on Thursday and Friday, as a modestly dense concentration of Saharan dust and an associated Saharan Air Layer arrive over Florida ahead of a tropical disturbance or potential tropical cyclone passing over or near the Greater Antilles. The stable air mass accompanying the Saharan Dust is expected to suppress rainfall both days. The leading edge of considerable moisture and enhanced instability associated with a potential tropical cyclone will be pushing through the Bahamas on Thursday and Friday and could reach the southern half of the District as early as Friday night. Increasing rain chances in the east are forecasted by early Saturday morning, possibly followed by a multi-day significant rainfall event from Saturday through at least Monday, as the potential tropical cyclone passes over or near the Florida peninsula. While there continues to be a wide variety of model forecasts regarding the probable track/intensity of this system, a majority of model solutions indicate the potential for greatly enhanced rains during this time and an elevated risk of excessive rainfall that could span a few days. Periods of scattered, heavy rainfall and thunderstorms are forecasted north and south of Lake Okeechobee during the day on Saturday. On Sunday, a significant District rain event with widespread coverage is expected (0.44 inches possible). Rains continue to be possible for Monday across the District with heavier rains in the afternoon (0.40 inches possible). The QPF from Saturday through Monday is critically dependent on the ultimate track/evolution of the potential tropical cyclone, both of which are of low confidence at this time until the track/intensity forecasts become more certain.

Kissimmee

Tuesday morning stages were 55.7 feet NGVD (0.8 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 47.2 feet NGVD at S-65A and 27.8 feet NGVD at S-65D. Tuesday morning discharges were 4,390 cfs at S-65, 5,170 cfs at S-65A, 5,560 cfs at S-65D and 5,420 cfs at S-65E. Dissolved oxygen concentration in the Kissimmee River averaged 0.2 mg/L for the previous week through Sunday, well below the critical threshold of 1 mg/L. Kissimmee River mean floodplain depth on Sunday was 3.1 feet. Today's recommendation is to continue to manage S-65/S-65A discharge to reduce stage in Lakes Kissimmee, Cypress and Hatchineha while considering effects on dissolved oxygen in the Kissimmee River. The wet season recommendations are to 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 feet per 30 days from June 1–August 15. To the extent possible, attempt to control the ascension rate in Lakes Toho, Kissimmee, Cypress and Hatchineha to be less than 0.5 feet per 14 days during the same June 1–August 15 timeframe.

Lake Okeechobee

Lake Okeechobee stage was 13.01 feet NGVD on July 27, 2020, 0.26 feet higher than the previous week and 0.65 feet higher than the previous month. The Lake is in the Base Flow sub-band. Lake stage moved back into the ecological envelope (which varies seasonally from 12.0–15.0 feet NGVD +/- 0.5 feet) on June 2, 2020, after being nearly 1.5 feet below since October 15, 2019. While ascension rates were high in early June, the rate of rise slowed and remained stable through the beginning of July, providing submerged plant communities an opportunity to catch up with rising stages. The cyanobacteria bloom risk potential over the past several weeks indicates a decreased bloom intensity in the central and eastern areas of the Lake, but increased bloom risk along western and southern shorelines.

Estuaries

Total inflow to the St. Lucie Estuary averaged 1,541 cfs over the past week with no flow coming from Lake Okeechobee. The seven-day average salinities decreased in the estuary over the past week. Salinity at the US1 Bridge is in the fair range for adult eastern oysters. Total inflow to the Caloosahatchee Estuary averaged 2,016 cfs over the past week with 71 cfs (estimated) coming from the Lake. The seven-day average salinity increased in the estuary 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 Base Flow sub-band of 2008 LORS. Tributary hydrological conditions are wet. The LORS2008 Release Guidance suggests up to 450 cfs release at S-79 to the Caloosahatchee Estuary and up to 200 cfs release at S-80 to the St. Lucie 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 11,100 ac-feet. The total amount of inflows to the STAs in WY2021 is approximately 440,000 ac-feet. Most STA cells are above target stage, while the EAV cells of STA-3/4 are considerably 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

All WCAs are above regulation. Depths are increasing at an ecologically favorable rate and following the rising trend of the schedules. Stages at the “Deer Gauge” in northwestern WCA-3A are at the Upper Schedule and the two-gauge average in WCA-3A North is 0.16 feet NGVD below the FFWC closure stage. Ascension rates impact apple snail reproduction and the current ecologically-preferred ascension rate in the Everglades is 0.05–0.15 feet per week, with a maximum of 0.25 feet per week or 0.50 feet per two weeks. Collectively, the Everglades fell below the maximum ascension rate of 0.50 feet over the past two weeks. Florida Bay and Taylor Slough received heavy rainfall and stages increased on average, with the largest increase in Upper Taylor Slough. In FB, both average and nearshore salinities decreased but remain above average. Daily average salinity in the mangrove zone continued to decrease last week and flows from the creeks remained positive for the entire week.

SUPPORTING INFORMATION

Kissimmee Basin

Rainfall

The Upper Kissimmee Basin received 1.66 inches of rainfall and the Lower Basin received 1.94 inches in the past week (SFWMD Daily Rainfall Report 07/27/2020).

Upper Kissimmee

Table 1 lists stage and discharge for several KCL water bodies using data from lake outfall structures. KCL stage hydrographs with respective regulation schedules and rainfall are shown in **Figures 1-3**.

Table 1. Average discharge (cfs) for the preceding seven days, stage (feet NGVD), and departures from KCL flood regulation (R) or temporary schedules (T, A, or S); provisional, real-time data are from SFWMD.

Report Date: 7/28/2020

Water Body	Structure	7-day Average Discharge (cfs)[1]	Stage Monitoring Site[2]	Lake Stage (feet)	Schedule Type[3]	Schedule Stage (feet)	Daily Departure (feet)						
							7/26/20	7/19/20	7/12/20	7/5/20	6/28/20	6/21/20	6/14/20
Lakes Hart and Mary Jane	S-62	148	LKMJ	60.0	R	60.0	0.0	0.0	0.2	0.2	0.0	0.2	0.1
Lakes Myrtle, Preston, and Joel	S-57	38	S-57	61.0	R	61.0	0.0	0.0	0.1	-0.2	-0.1	-0.2	-0.2
Alligator Chain	S-60	124	ALLI	63.2	R	63.2	0.0	0.0	-0.2	-0.6	-0.5	-0.4	-0.5
Lake Gentry	S-63	176	LKGT	61.1	R	61.0	0.1	0.1	0.1	-0.2	-0.2	-0.3	-0.6
East Lake Toho	S-59	542	TOHOE	55.7	R	56.5	-0.8	-0.7	-1.2	-1.5	-1.4	-2.2	-2.7
Lake Toho	S-61	1,565	TOHOW, S-61	53.5	R	53.5	0.0	0.0	0.2	0.1	0.0	0.0	-0.1
Lakes Kissimmee, Cypress, and Hatchineha	S-65	4,623	KUB011, LKIS5B	51.5	R	51.0	0.5	0.9	0.7	0.4	0.5	0.2	-0.1

[1] Seven-day average of weighted daily means through midnight.
[2] Names of in-lake monitoring sites and structures used to determine lake stage; if more than one site is listed, an average is reported.
[3] 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

Table 2 lists discharges at lower basin structures. **Figure 4** shows SFWDAT depth maps for the Phase I restoration area. **Figure 5** shows mean daily dissolved oxygen concentrations, discharge, temperature, and rainfall. **Figures 6-8** shows the 2019-2020 Discharge Plan for S-65/S-65A, interim regulation schedule for S-65, and map of the Kissimmee Basin, respectively.

Table 2. One- and seven-day average discharge at lower basin structures, dissolved oxygen concentration in phases I and II/III area river channel, and depth in the Phase I area floodplain using provisional, real-time data from SFWMD.

Report Date: 7/28/2020

Metric	Location	1-Day Average	Average for the Preceeding 7-Days[1]								
		7/26/2020	7/26/20	7/19/20	7/12/20	7/5/20	6/28/20	6/21/20	6/14/20	6/7/20	5/31/20
Discharge (cfs)	S-65	4,562	4,623	2,396	1,779	1,527	873	581	80	427	695
Discharge (cfs)	S-65A[2]	5,254	5,111	3,202	2,174	1,559	1,127	864	854	884	788
Discharge (cfs)	S-65D[2]	5,215	3,846	2,383	1,602	1,314	1,453	1,641	1,988	1,485	903
Headwater Stage (feet NGVD)	S-65D[2]	27.68	26.99	26.02	25.81	25.76	25.72	25.74	25.72	25.78	25.76
Discharge (cfs)	S-65E[2]	5,078	3,671	2,229	1,574	1,240	1,402	1,549	1,868	1,552	926
Discharge (cfs)	S-67	0	0	0	0	0	0	0	0	0	0
DO (mg/L)[3]	Phases I & II/III river channel	0.4	0.2	0.2	1.4	2.7	2.0	1.2	0.7	4.0	6.0
Mean depth (feet)[4]	Phase I floodplain	3.05	2.64	1.63	1.13	0.73	0.71	0.78	0.90	0.56	0.28

[1] Seven-day average of weighted daily means through Sunday midnight.
[2] S-65A discharge combines S-65A with auxillary strucutures; 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.
[3] DO is the average for sondes at KRBN, PC62, PC33, PD62R, and PD42R.
[4] 1-day spatial average from South Florida Water Depth Assessment Tool (SFWDAT).
DATA ARE PROVISIONAL; N/A indicates that data were not available.

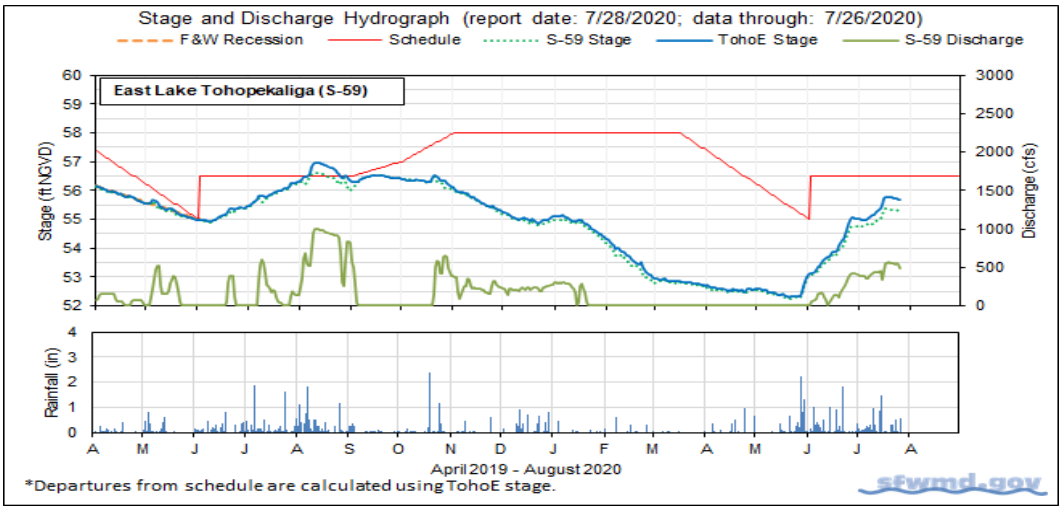


Figure 1. East Lake Toho regulation schedule, stage, discharge and rainfall.

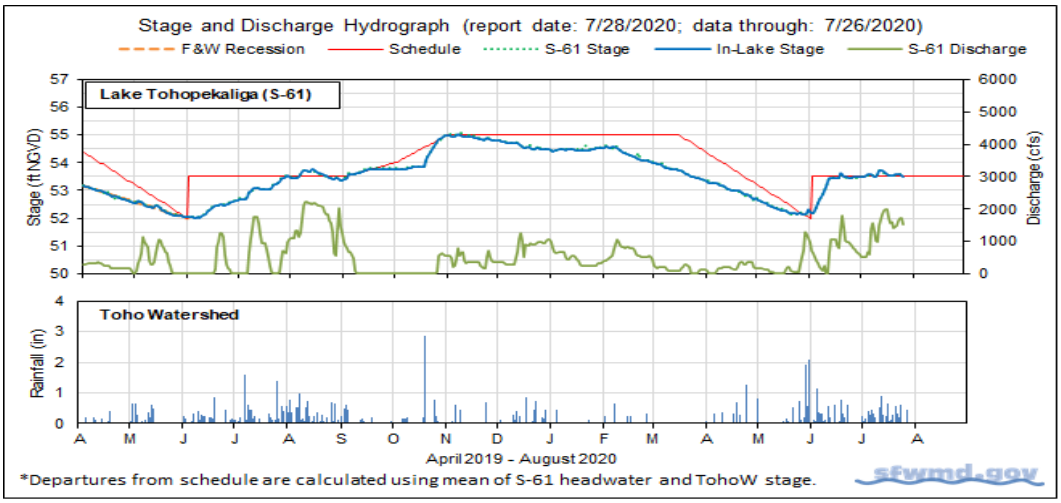


Figure 2. Lake Toho regulation schedule, stage, discharge and rainfall.

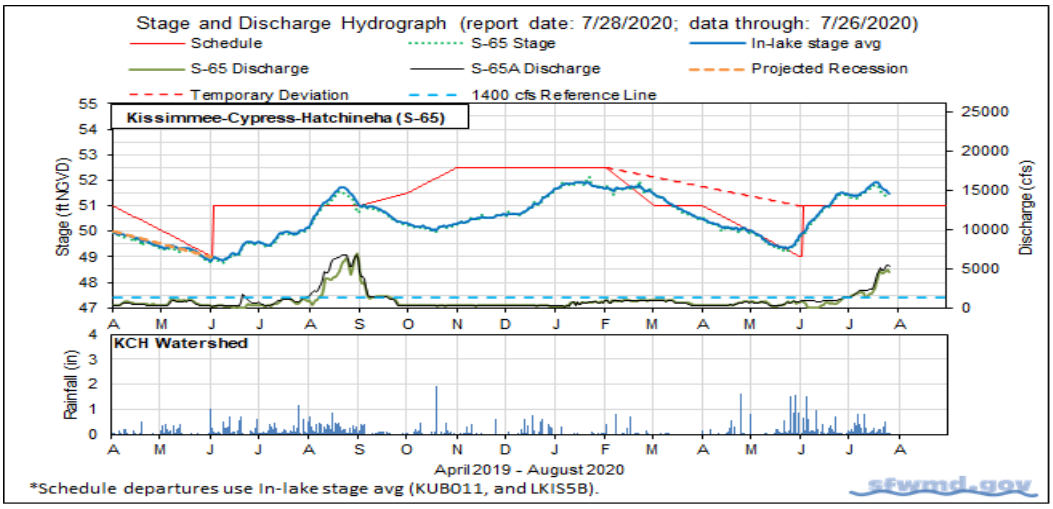


Figure 3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

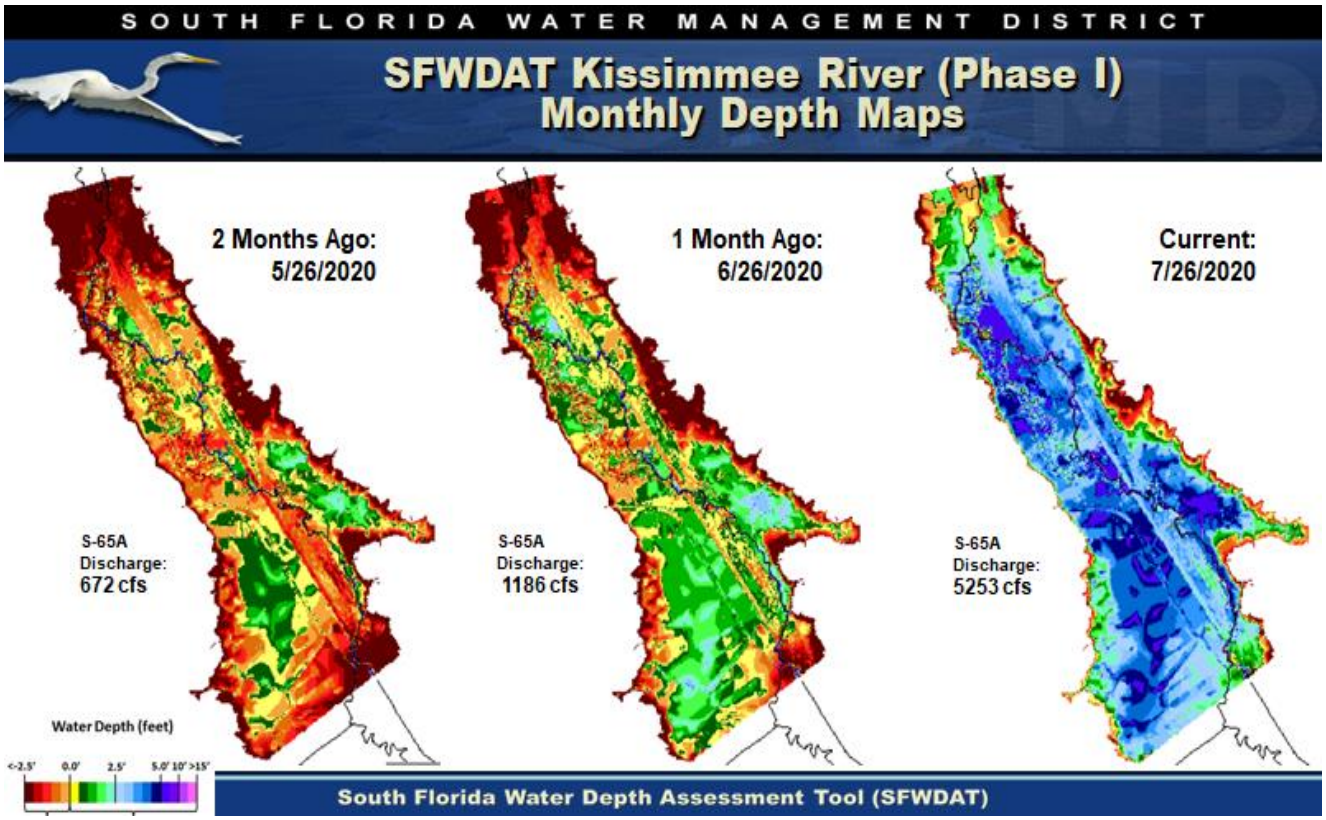


Figure 4. Comparison of Phase I area floodplain water depths (from left to right) two months ago, one month ago and current. Color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to January 16, 2012.

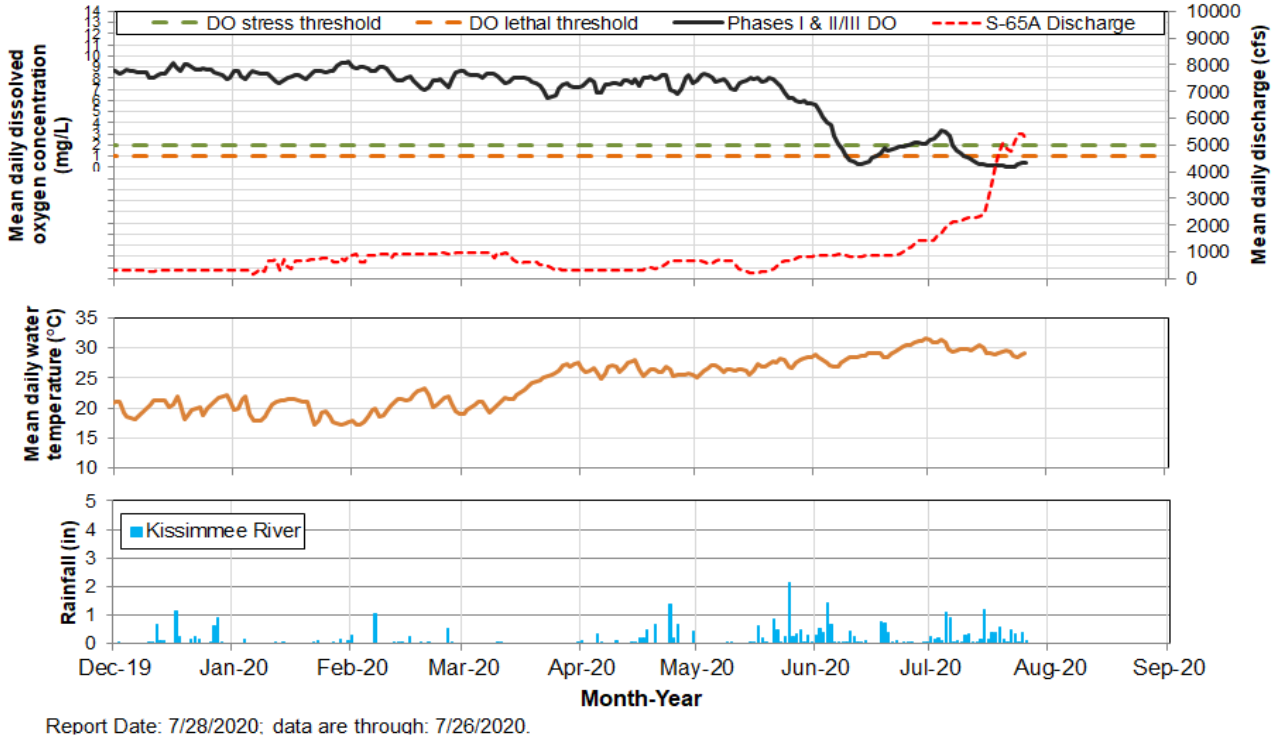


Figure 5. Restored Kissimmee River channel mean daily dissolved oxygen concentration (mg/L), S-65A discharge (cfs), temperature (°C) and rainfall (inches).

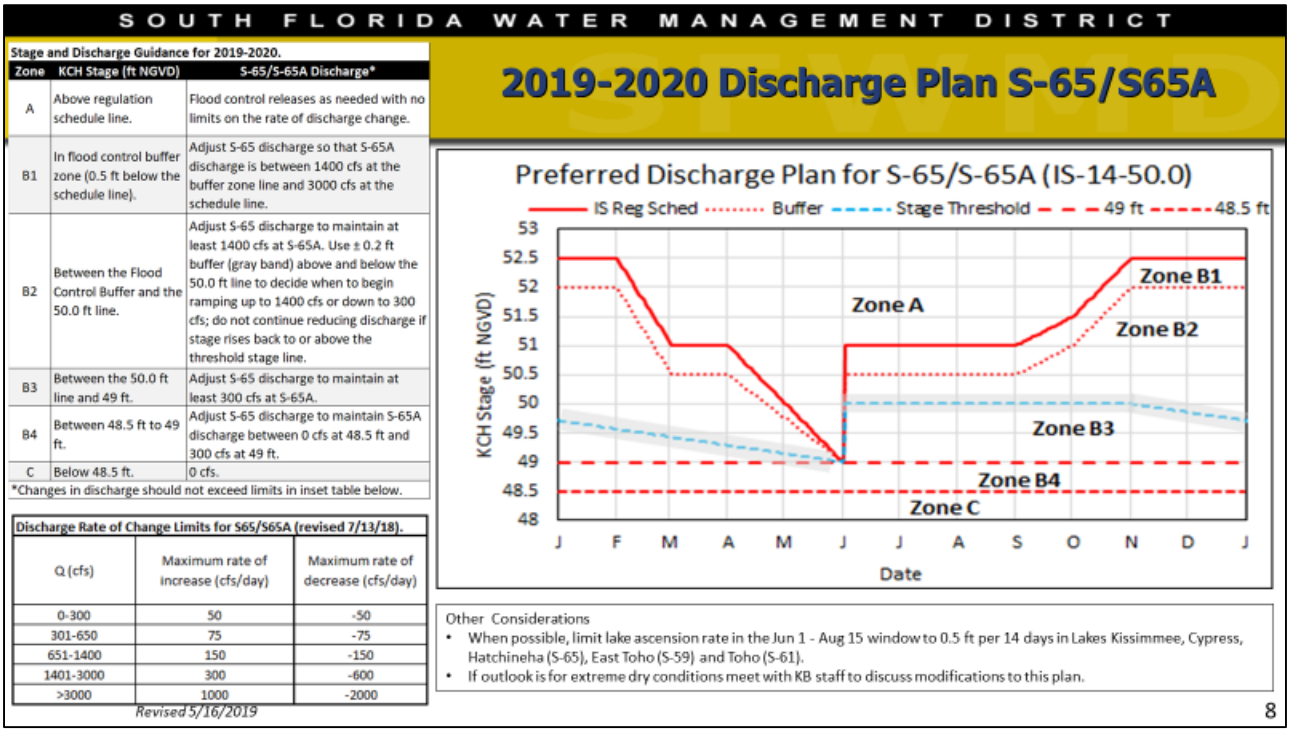


Figure 6. The 2019-2020 Discharge Plan for S-65/S-65A, called the "Preferred Discharge Plan IS-14-50.0". This is developed collaboratively each year between ecologists and SFWMD water managers based on prevailing ecological and hydrologic conditions.

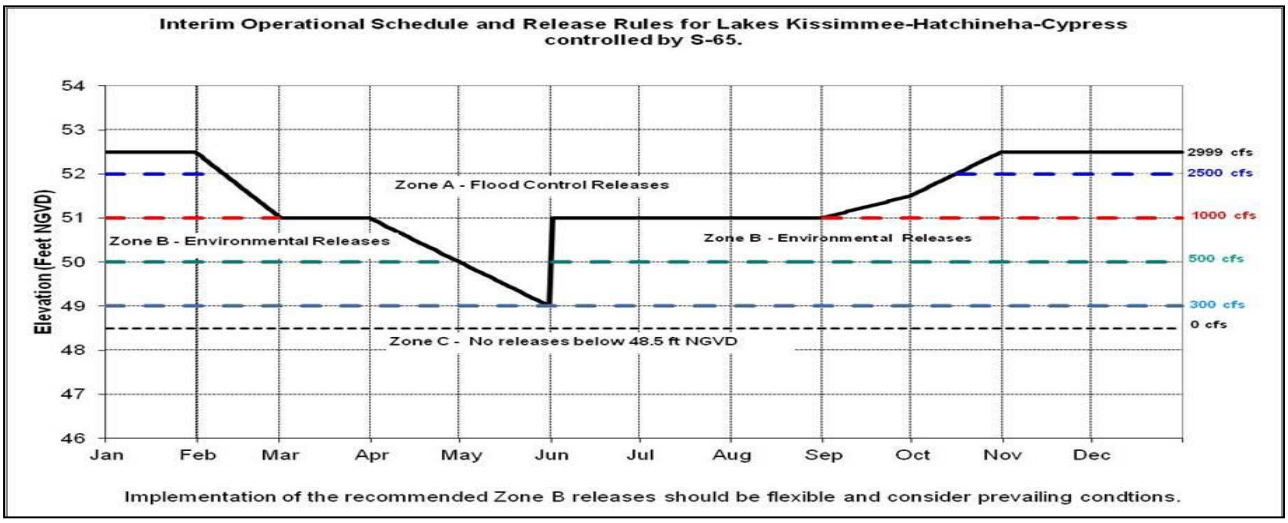


Figure 7. Interim operations schedule for S-65 (solid black line). This preferred discharge plan and the interim regulation schedule will be used until the Headwaters Lakes Revitalization regulation schedule is implemented.

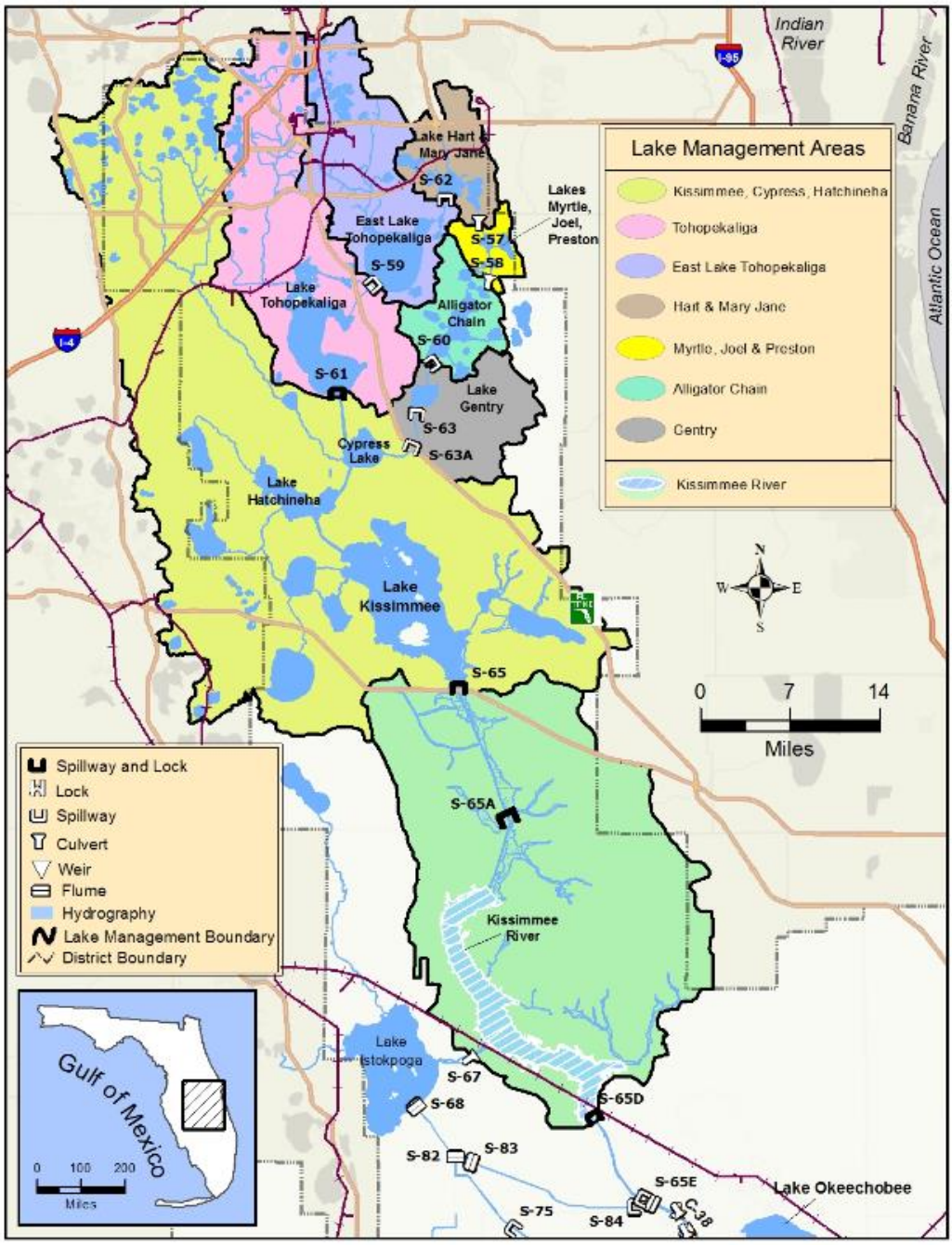


Figure 8. Kissimmee Basin map showing Central and Southern Florida (C&SF) flood control project structures and color-coded watersheds.

Lake Okeechobee

Lake Okeechobee stage is 13.01 feet NGVD, 0.65 feet higher than a month ago and 1.44 feet higher than one year ago (**Figure 1**). The Lake has been within the preferred ecological envelope since June 2, 2020 (**Figure 2**). Lake stage moved into the Beneficial Use sub-band on March 4, 2020 and is now in the Base Flow sub-band (**Figure 3**). Lake stage reached a low of 10.99 feet NGVD on May 17, 2020, rose rapidly for a month, levelled out for the remainder of June, and has been rising between 0.20 and 0.26 feet per week in July. According to RAINDAR, 2.21 inches of rain fell directly over the Lake during the past week (**Figure 4**), with majority of the watershed receiving between 1.5 and 4.0 inches. The district-wide average was approximately 2.5 inches.

The average daily inflows (minus rainfall) increased from 4,386 cfs to 6,293 cfs, while the outflows (minus evapotranspiration) decreased from 154 cfs to 71 cfs. Most of the inflows came from the Kissimmee River (4,047 cfs through S-65E and S-65EX1), while 1,160 cfs came from the C-41A canal (through S-84 and S-84X), 204 cfs from Fisheating Creek, and approximately 367 cfs from S-71 and S-72 (due to problems with DBHydro, flows through S-72 are potentially higher than reported here). Additionally, 226 cfs came from the C-44 canal through S-308, which is predominantly an outflow from the Lake unless stages are relatively low. The only outflow was 71 cfs to the Caloosahatchee (S-77). 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 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 first July sampling occurred on the 7th and 8th and ten sites had a chlorophyll *a* value greater than 40 μg/L, two of which were greater than 100 μg/L (**Figure 6**). Despite the very high chlorophyll *a* values, cyano-toxin values were relatively low. Three of 30 sites (10%) had microcystin levels above the EPA recreational waters recommendation of 8 μg/L; NES191 at 8.8 μg/L, CLV10A at 14.0 μg/L, and 17.0 μg/L at L004 in the east/center of the lake. Eight more sites had microcystin detected (detection limit of ≥ 0.25 μg/L), ranging from 0.3–7.5 μg/L. The most recent sampling occurred on July 21 and 22, 2020 but all of the chlorophyll *a* results are still pending. Cyano-toxin values were again above the EPA threshold at three sites, however, in contrast to the first July sampling event the elevated toxin values were at the central and southern sites of LZ40, L006, and L007. Nineteen additional sites also had toxin levels above detection (**Figure 7**).

Current satellite imagery (July 8, 15 and 26, 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, northern and eastern areas of the Lake but an increase in intensity along the western and southern shorelines (**Figure 8**).

Lake Okeechobee Summary

Lake Okeechobee stage was 13.01 feet NGVD on July 27, 2020, 0.26 feet higher than the previous week and 0.65 feet higher than the previous month. The Lake is in 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 high in early June, the rate of rise slowed and remained stable through the beginning of July, providing submerged plant communities an opportunity to catch up with rising stages. The cyanobacteria bloom risk potential over the past several weeks indicates a decreased bloom intensity in the central and eastern areas of the Lake, but increased bloom risk along western and southern shorelines.

Table 1. Average daily inflows, 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	2358	4047	1.8
S-71 & S-72	337	367	0.2
S-84 & S-84X	966	1160	0.5
Fisheating Creek	237	204	0.1
S-154	7	22	0.0
S-191	133	56	0.0
S-133 P	8	33	0.0
S-127 P	2	2	0.0
S-129 P	2	11	0.0
S-131 P	11	19	0.0
S-135 P	73	81	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	23	63	0.0
Rainfall	3716	4854	2.2
Total	**7873**	**10921**	**5.0**

OUTFLOWS	Previous week Avg Daily CFS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)
S-77	154	71	0.0
S-308	-229	-226	-0.1
S-351	0	0	0.0
S-352	0	0	0.0
S-354	0	0	0.0
L-8 Outflow			
ET	1942	1636	0.7
Total	**1867**	**1480**	**0.7**

Provisional Data

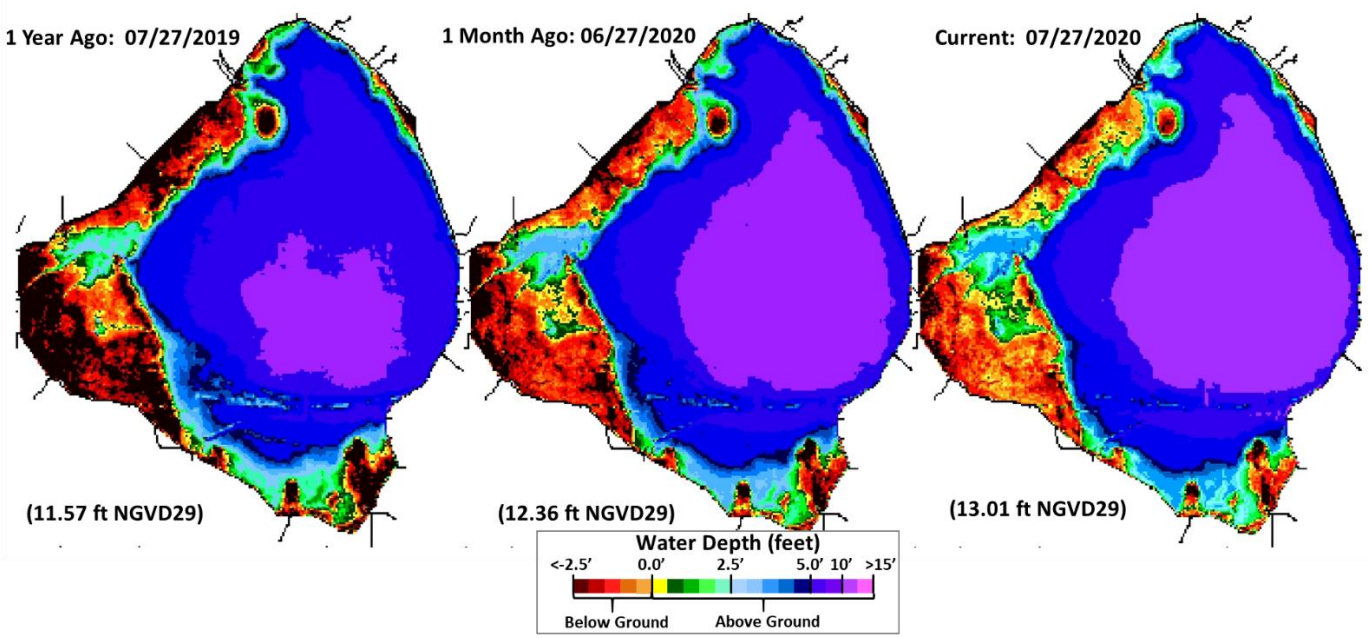


Figure 1. Water depth estimates on Lake Okeechobee based on the South Florida Water Depth Assessment Tool.

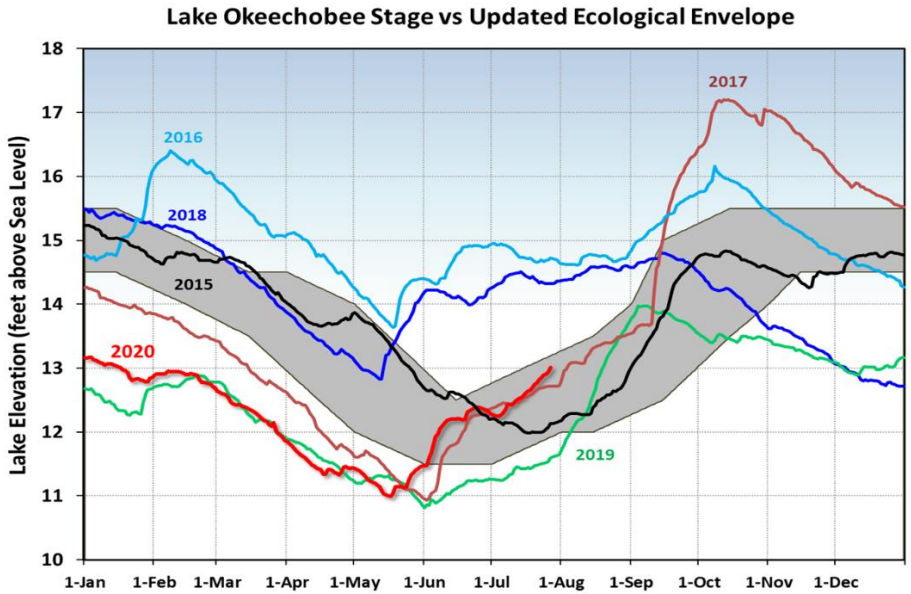


Figure 2. Select annual stage hydrographs for Lake Okeechobee in comparison to the updated Ecological Envelope.

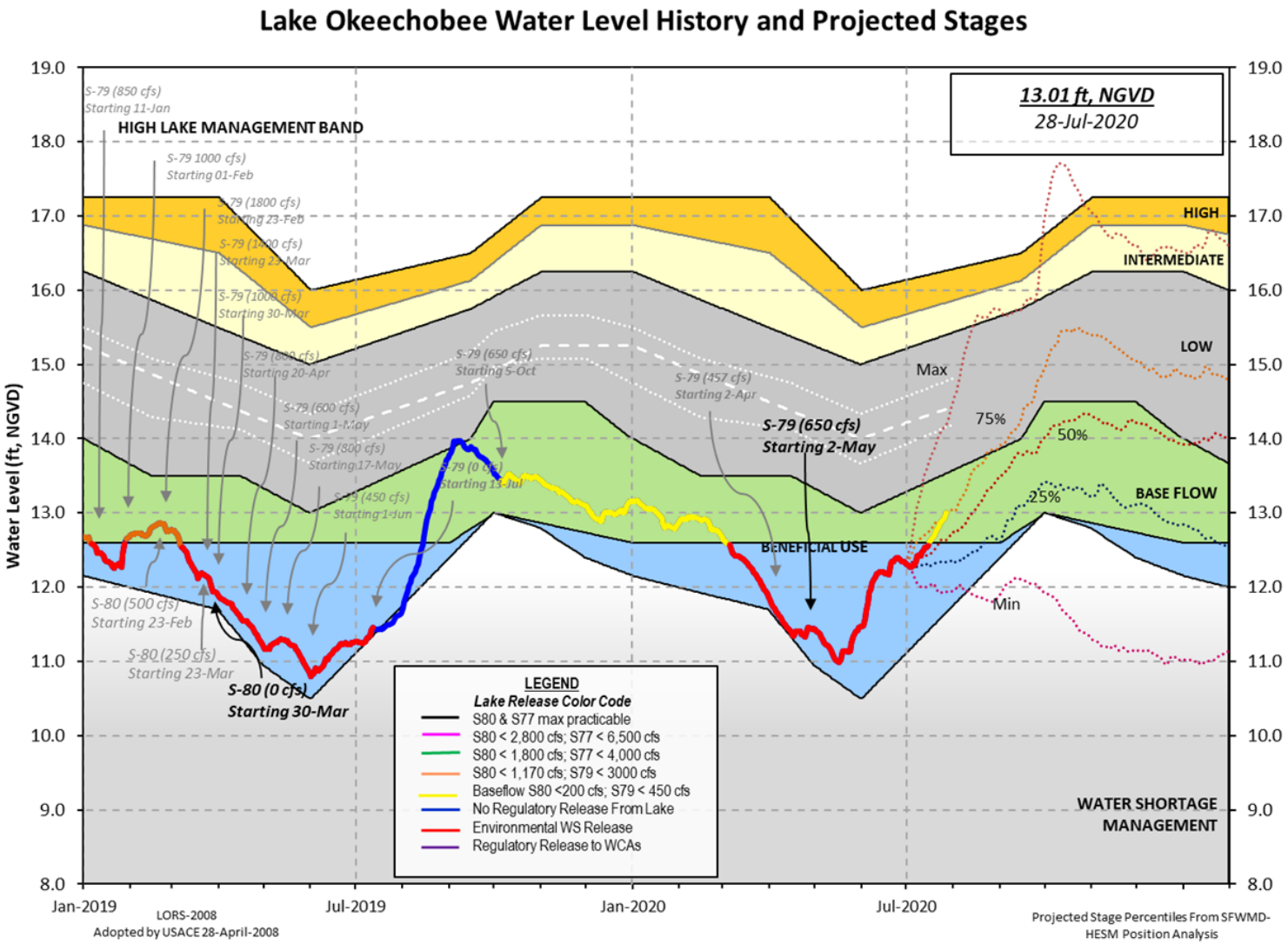


Figure 3. Recent Lake Okeechobee stage and releases, with projected stages based on a dynamic position analysis.

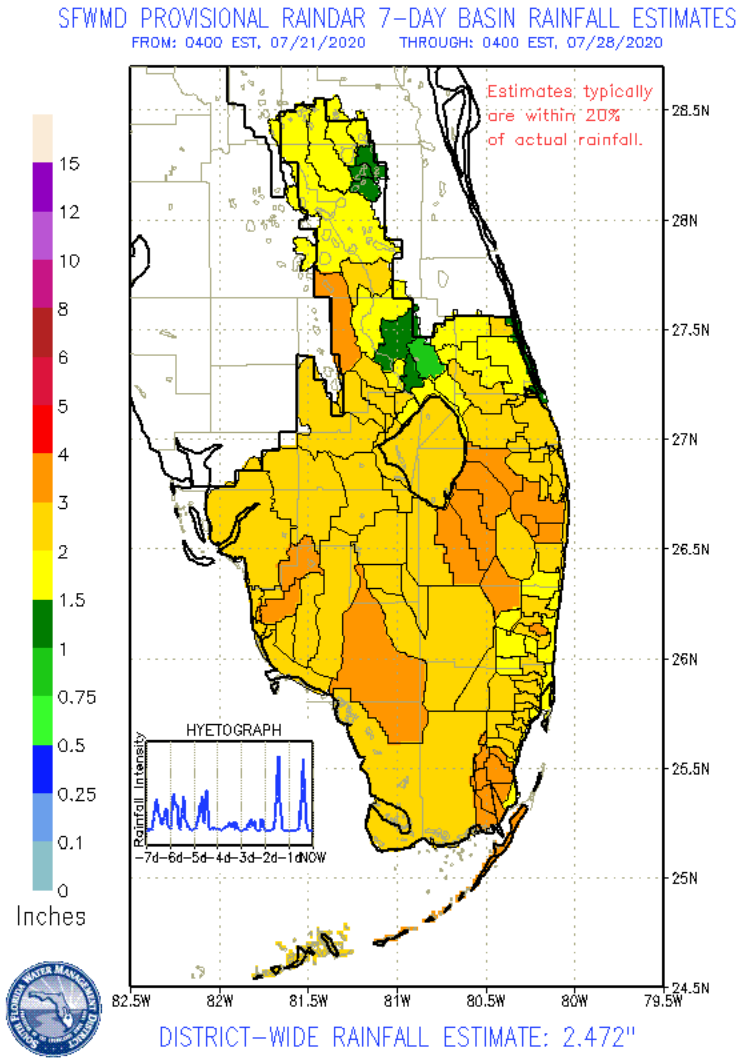


Figure 4. 7-Day rainfall estimates by RAINDAR.

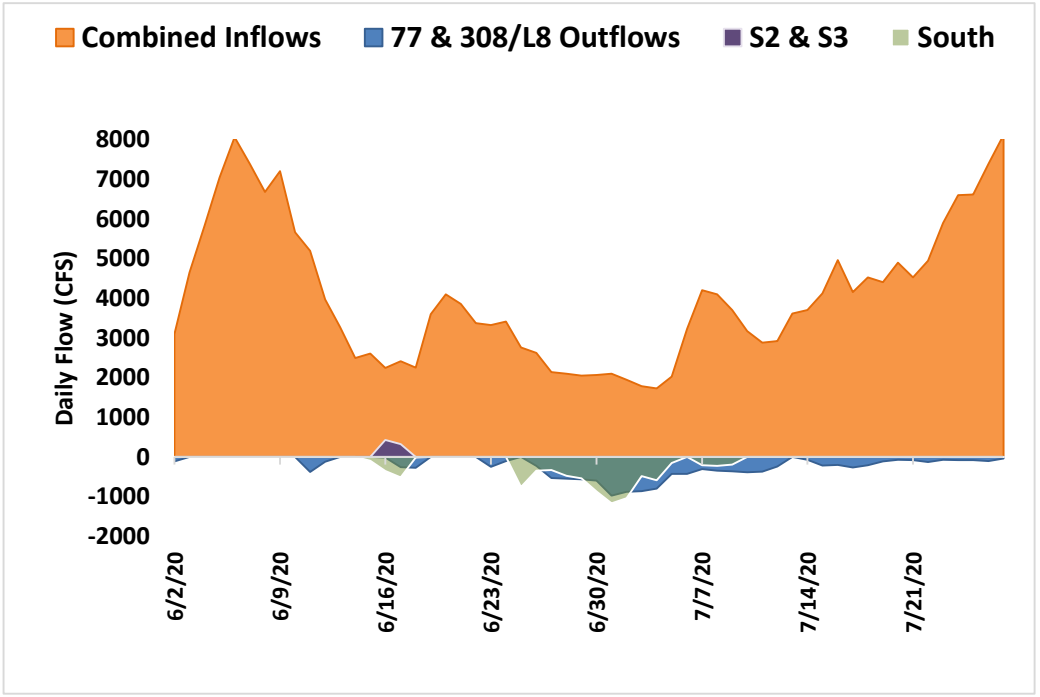


Figure 5. Major inflows (orange) and outflows (blue) of Lake Okeechobee, including the S-350 structures designated as South (green). The L-8 Canal flows through Culvert 10A are included as outflows when positive, and as inflows when backflowing into the Lake. All inflows and outflows are shown as positive 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.

Collection Date: July 7 - 8

Station	CHLa (ug/L)	TOXIN (ug/L)	TAXA
FEBIN	1.1	BDL	*mixed*
FEBOUT	78.7	BDL	*Cylindro*
KISSR0.0	10.2	BDL	*mixed*
L005	10.1	BDL	*mixed*
LZ2	35.4	**0.3**	*mixed*
KBARSE	79.8	BDL	*mixed*
RITTAE2	1.8	BDL	*mixed*
PELBAY3	9.3	BDL	*Microcys*
POLE3S	3.4	BDL	*mixed*
LZ25A	2.4	BDL	*mixed*
PALMOUT	2.5	BDL	*mixed*
PALMOUT1	3.7	BDL	*mixed*
PALMOUT2	3.4	BDL	*mixed*
PALMOUT3	6.4	BDL	*Microcys*
POLESOUT	93.2	BDL	*Cylin/Plank*
POLESOUT1	32.3	BDL	*mixed*
POLESOUT2	27.6	**3.8**	*Microcys*
POLESOUT3	15.0	**4.9**	*Microcys*
EASTSHORE	70.6	**7.5**	*Microcys*
NES135	51.3	**3.0**	*Microcys*
NES191	106.0	8.8	*Microcys*

Station	CHLa (ug/L)	TOXIN (ug/L)	TAXA
L001	142.0	BDL	*Cylindro*
L004	64.0	17	*Microcys*
L006	4.1	**1.0**	*Microcys*
L007	5.8	BDL	*mixed*
L008	18.8	**6.0**	*Microcys*
LZ30	7.3	BDL	*Microcys*
LZ40	12.2	**6**	*Microcys*
CLV10A	57.5	14.0	*Microcys*
NCENTER	88.7	BDL	*Cylindro*
Samples collected June 29			
S308C	16.0	BDL	*Microcys*
S77	13.0	BDL	*mixed*

- 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

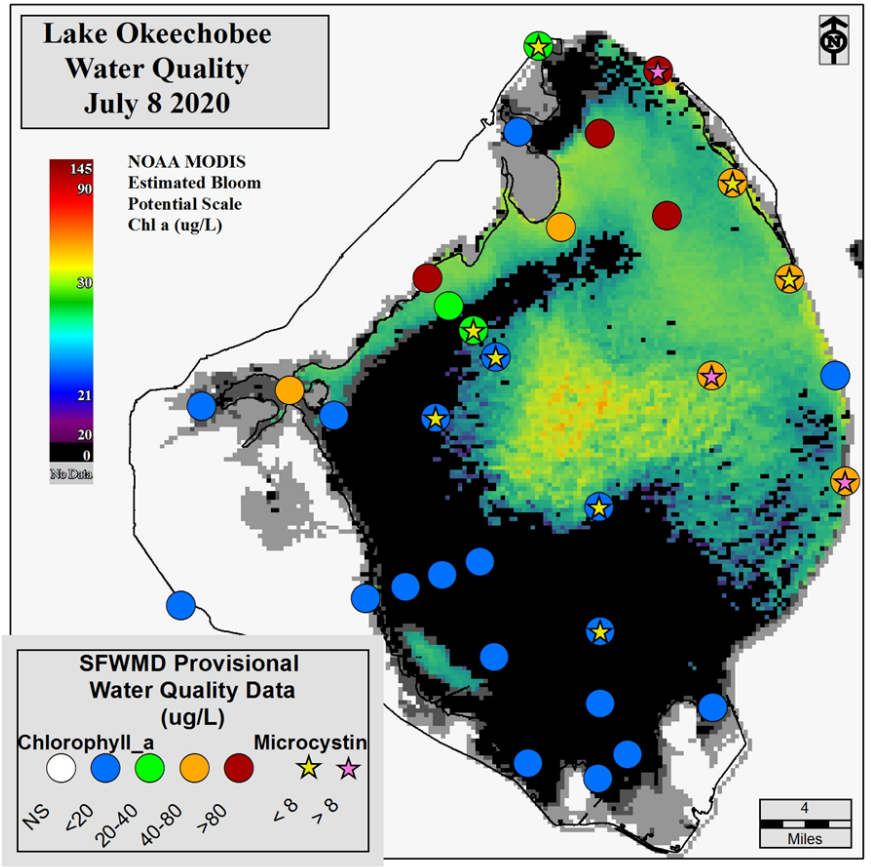


Figure 6. Provisional results from the expanded monitoring sampling trips on July 7-8, 2020.

Collection Date: July 21 - 22

Station	CHLa (ug/L)	TOXIN (ug/L)	TAXA
FEBIN	P	BDL	*NS*
FEBOUT	P	BDL	*NS*
KISSR0.0	P	BDL	*Microcys*
L005	P	BDL	*mixed*
LZ2	P	**0.3**	*mixed*
KBARSE	P	**0.3**	*Cylindro*
RITTAE2	P	BDL	*Planktol*
PELBAY3	P	**0.5**	*Microcys*
POLE3S	P	BDL	*mixed*
LZ25A	P	**1.0**	*Microcys*
PALMOUT	P	**1.1**	*mixed*
PALMOUT1	P	BDL	*mixed*
PALMOUT2	P	**0.5**	*Microcys*
PALMOUT3	P	**4.7**	*Microcys*
POLESOUT	P	**0.3**	*Cylindro*
POLESOUT1	P	**0.3**	*Cylindro*
POLESOUT2	P	**0.7**	*Microcys*
POLESOUT3	P	**4.6**	*Microcys*
EASTSHORE	P	**0.3**	*mixed*
NES135	P	**0.4**	*Microcys*
NES191	P	BDL	*mixed*

Station	CHLa (ug/L)	TOXIN (ug/L)	TAXA
L001	P	**0.4**	*Microcys*
L004	P	**1**	*Microcys*
L006	P	**29.0**	*Microcys*
L007	P	**12.0**	*Microcys*
L008	P	**0.5**	*Microcys*
LZ30	P	**7.3**	*Microcys*
LZ40	P	**18**	*Microcys*
CLV10A	P	**2.4**	*Microcys*
NCENTER	P	**0.28**	*Microcys*

Samples collected July 13

S308C	4.4	BDL	*mixed*
S77	3.9	BDL	*mixed*

- 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

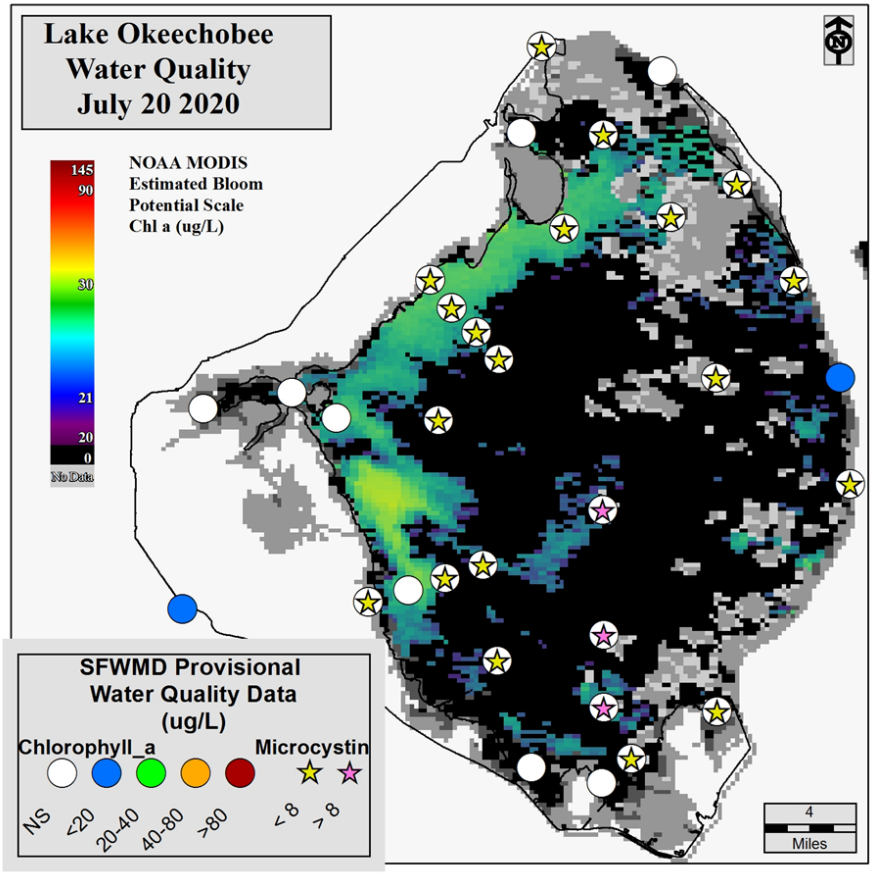


Figure 7. Provisional results from the expanded monitoring sampling trips on July 21-22, 2020.

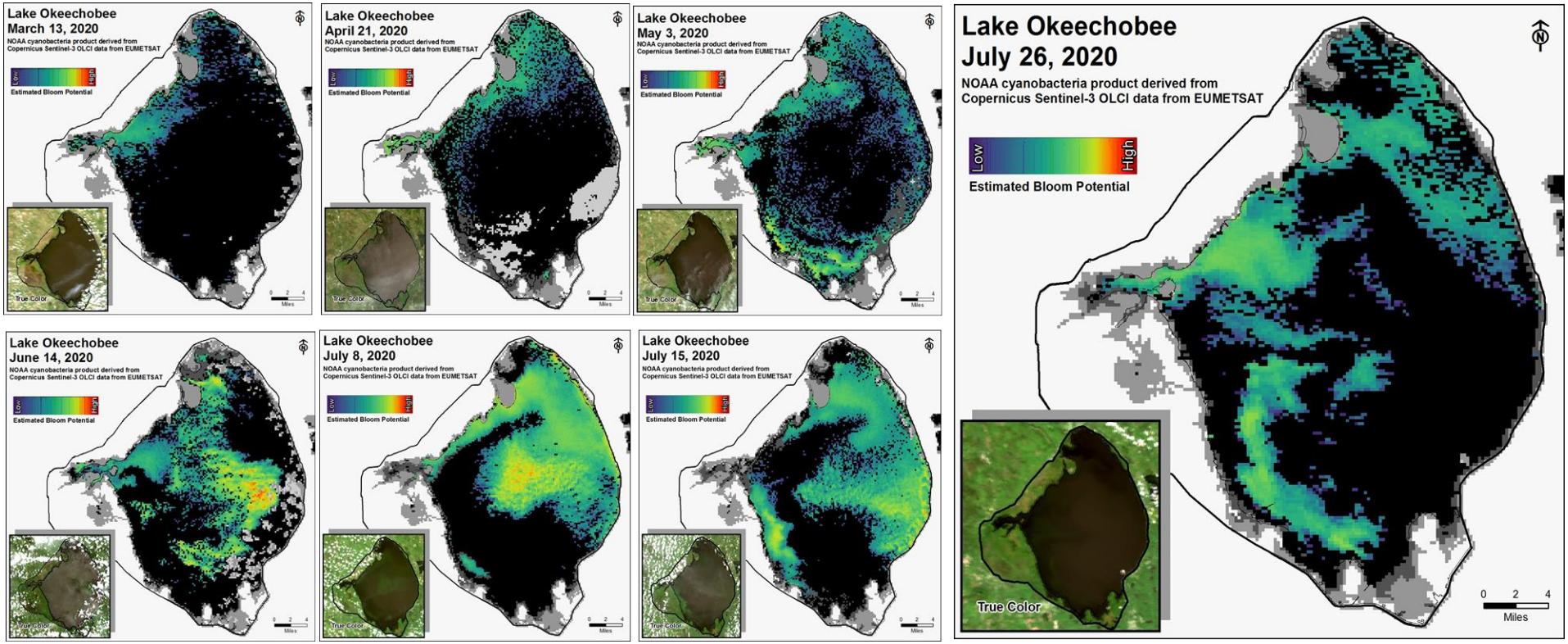


Figure 8. Potential for cyanobacterial blooms on Lake Okeechobee during 2020, based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

Estuaries

St. Lucie Estuary:

Last week, total inflow to the St. Lucie Estuary averaged approximately 1,541cfs (**Figures 1-2**) and last month, inflow averaged about 1,373 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).

Location	Flow (cfs)
Tidal Basin Inflow	884
S-80	0
S-308	-226
S-49 on C-24	235
S-97 on C-23	236
Gordy Rd. structure on Ten Mile Creek	186

Over the past week, salinity decreased throughout the estuary (**Table 2**, **Figures 3-4**). The seven-day moving average of the water column (an average of the surface and bottom salinity) at the US1 Bridge is 6.8. 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.

Sampling Site	Surface	Bottom	Envelope
HR1 (North Fork)	**1.9** (4.1)	**2.6** (7.6)	NA[1]
US1 Bridge	**6.3** (9.5)	**6.9** (11.6)	10.0-26.0
A1A Bridge	**16.8** (18.5)	**22.6** (24.2)	NA[1]

[1]Envelope not applicable

Caloosahatchee Estuary:

Last week, total inflow to the Caloosahatchee Estuary averaged approximately 2,016 cfs (**Figures 5-6**) and last month, inflow averaged about 1,282 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).

Location	Flow (cfs)
S-77	71
S-78	659
S-79	1580
Tidal Basin Inflow	436

Over the past week, salinities 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)	**1.3** (0.7)	**1.3** (0.7)	NA[1]
Val I75	**1.5** (0.6)	**2.4** (1.0)	0.0-5.0[2]
Ft. Myers Yacht Basin	**7.8** (5.3)	**9.8** (7.3)	NA
Cape Coral	**13.7** (12.8)	**15.8** (15.5)	10.0-30.0
Shell Point	**26.5** (25.0)	**27.4** (26.3)	10.0-30.0
Sanibel	**32.1** (30.6)	**32.5** (31.5)	10.0-30.0

[1]Envelope not applicable, [2]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 2.0 to 4.3 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 430 cfs. The 30-day moving average surface salinity at Val I-75 is forecasted to be between 1.1 and 1.8 (**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	430	4.3	1.8
B	300	430	3.5	1.5
C	450	430	2.9	1.4
D	650	430	2.4	1.2
E	800	430	2.0	1.1

Red tide

The Florida Fish and Wildlife Research Institute reported on July 24, 2020, that *Karenia brevis,* the Florida red tide dinoflagellate, was not observed in samples collected from Lee, St. Lucie, Martin, Palm Beach, or Miami-Dade counties (no samples were analyzed this week from Broward county).

Water Management Recommendations

Lake stage is in the Base Flow sub-band. Tributary conditions are wet. The LORS2008 release guidance suggests up to 450 cfs release at S-79 to the Caloosahatchee Estuary and up to 200 cfs releases at S-80 to the St. Lucie Estuary.

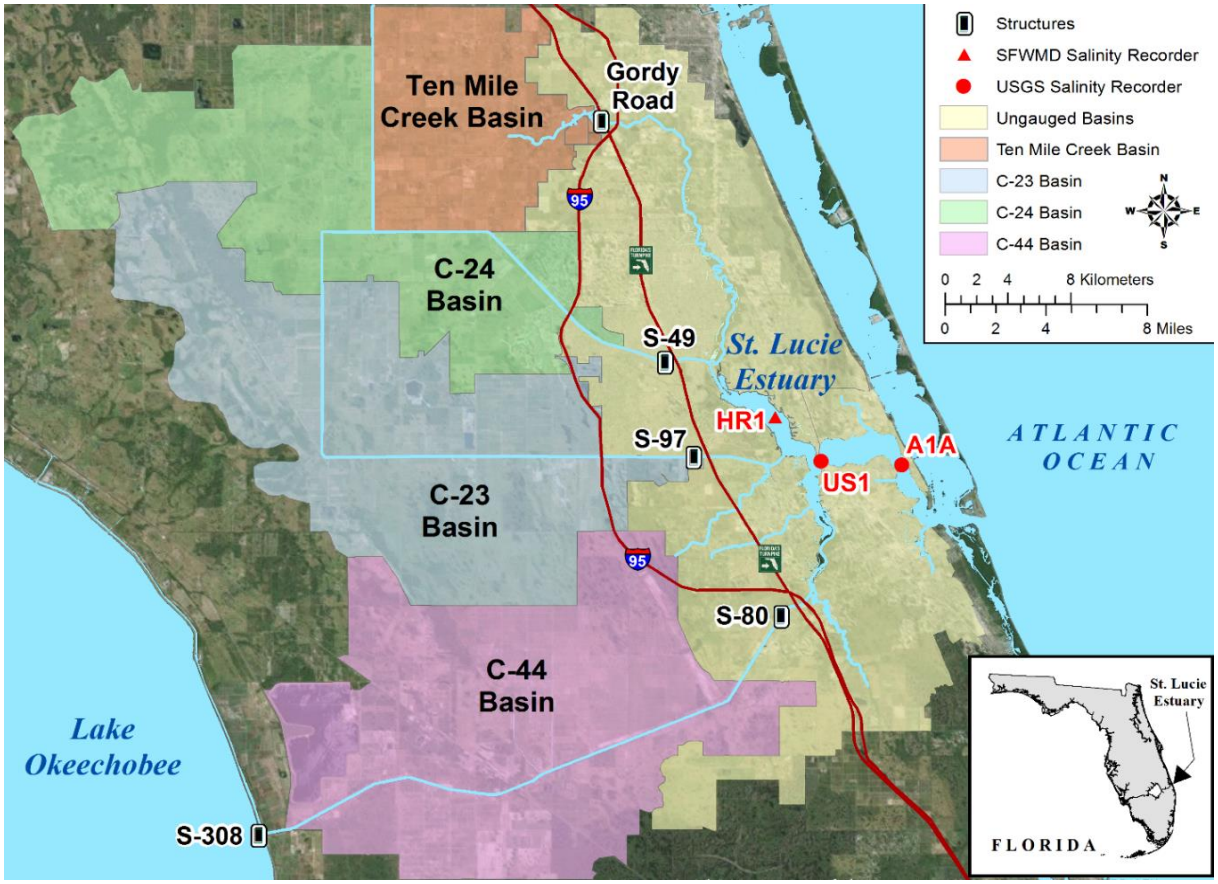


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

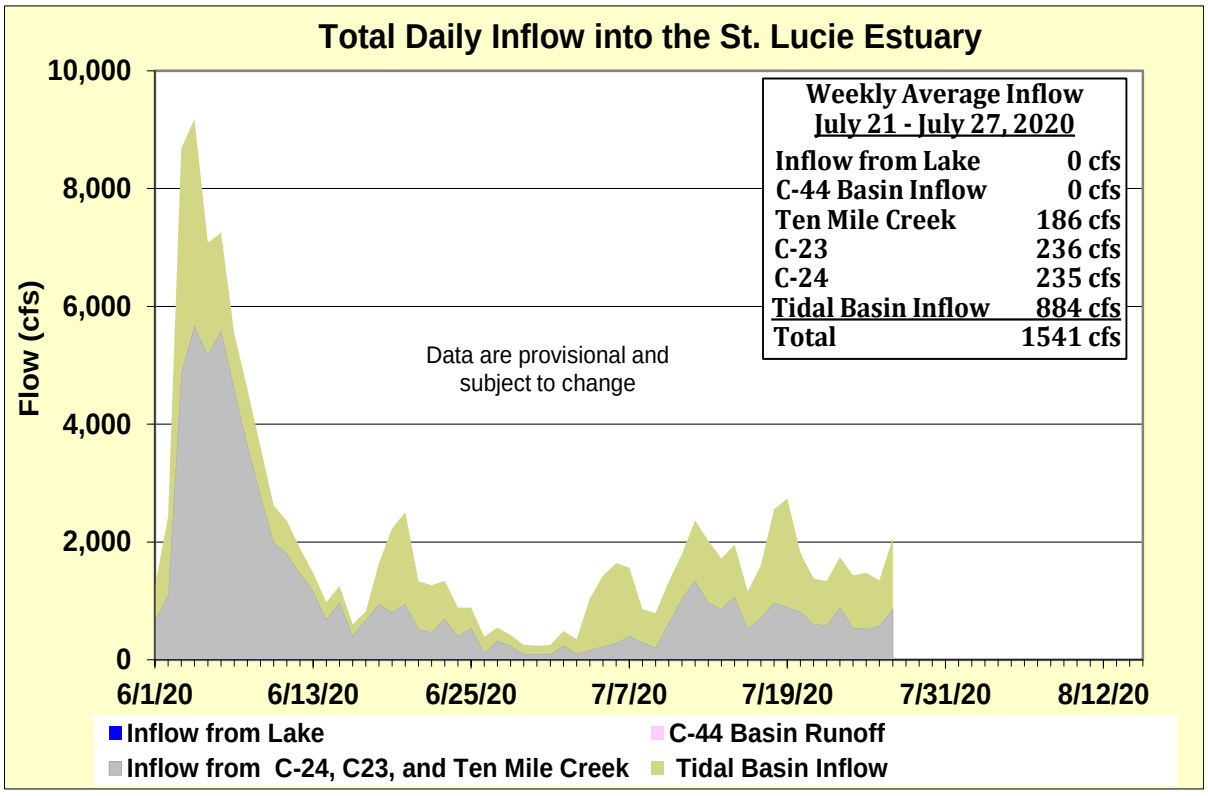


Figure 2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basin into the St. Lucie Estuary.

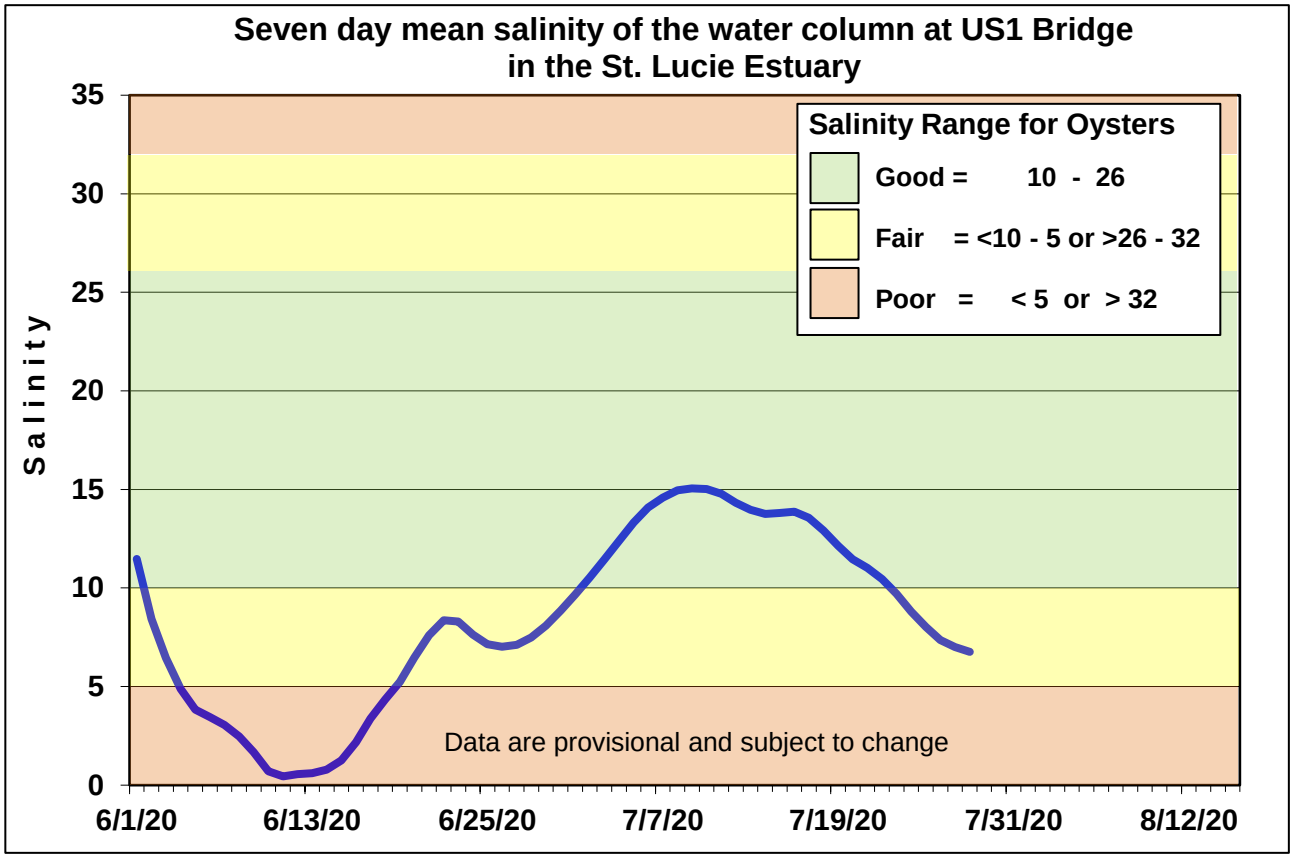


Figure 3. Seven-day mean salinity of the water column at the US1 Bridge.

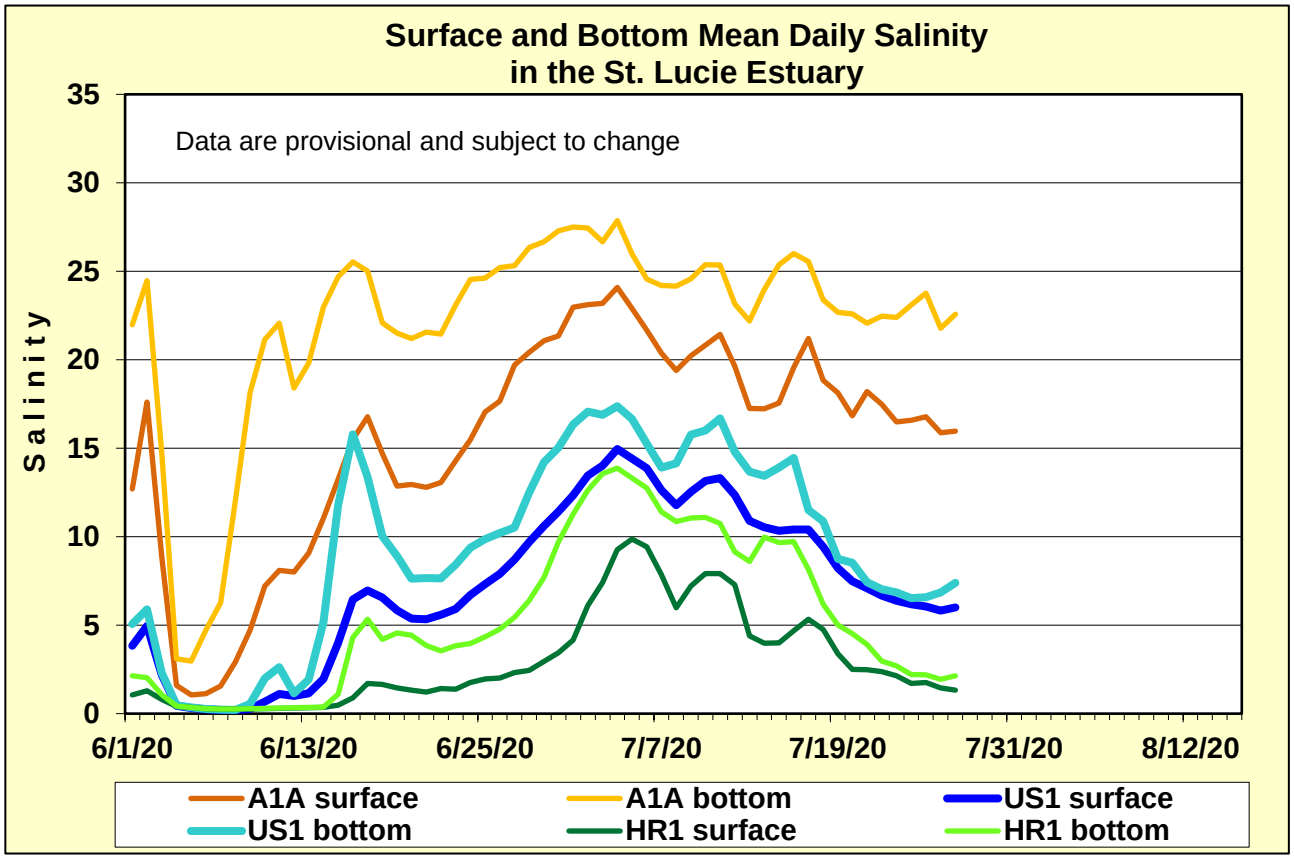


Figure 4. Daily mean salinity at the A1A, US1, and HR1 stations.

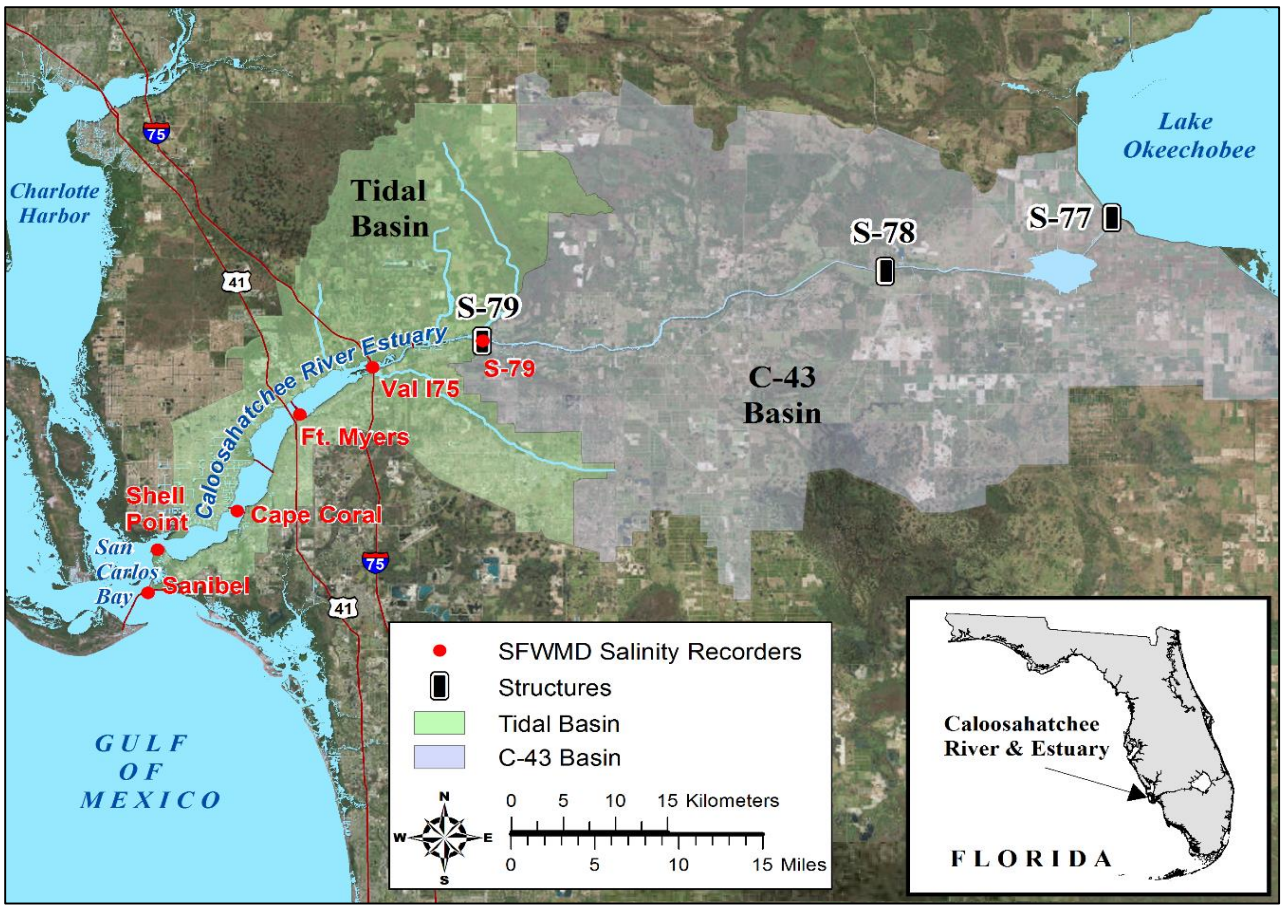


Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

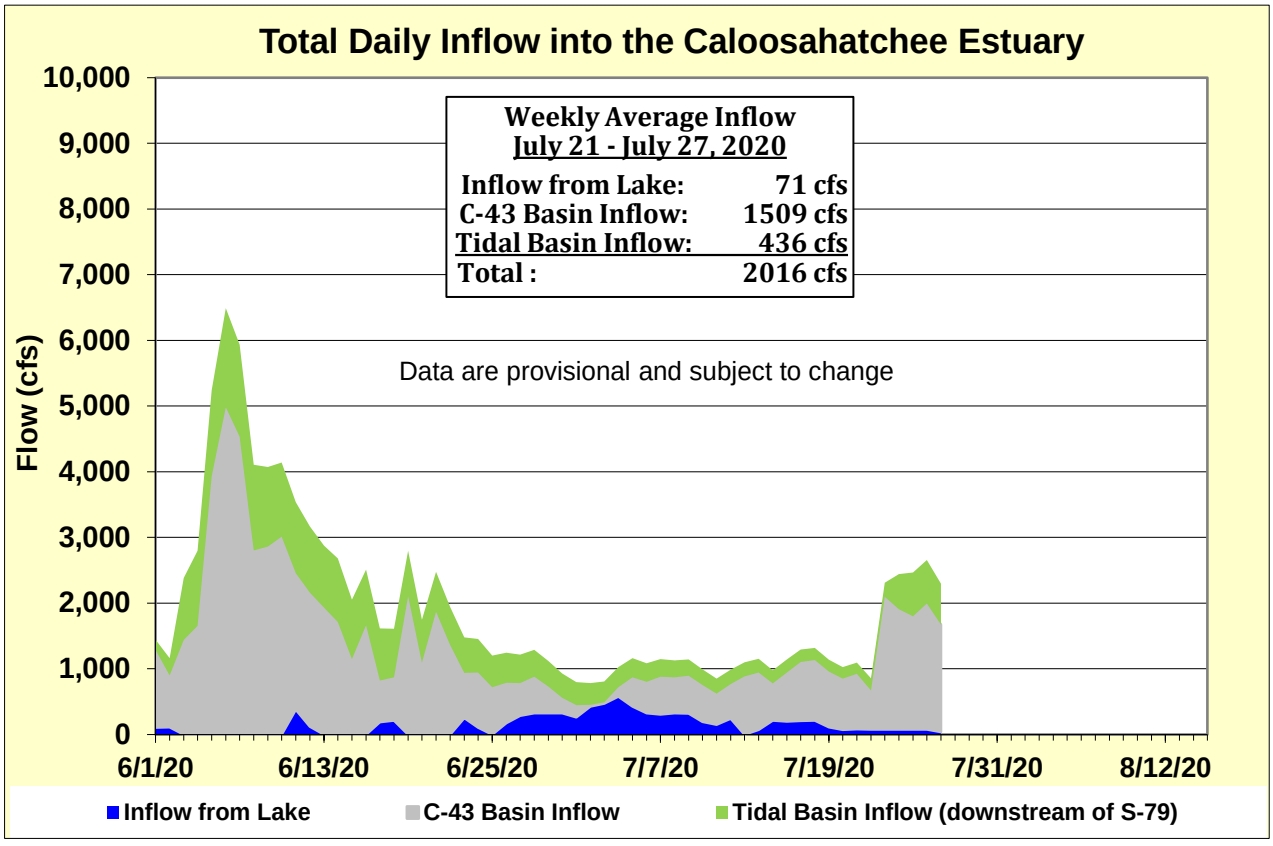


Figure 6. Total daily inflows from Lake Okeechobee, runoff from the C-43 basin

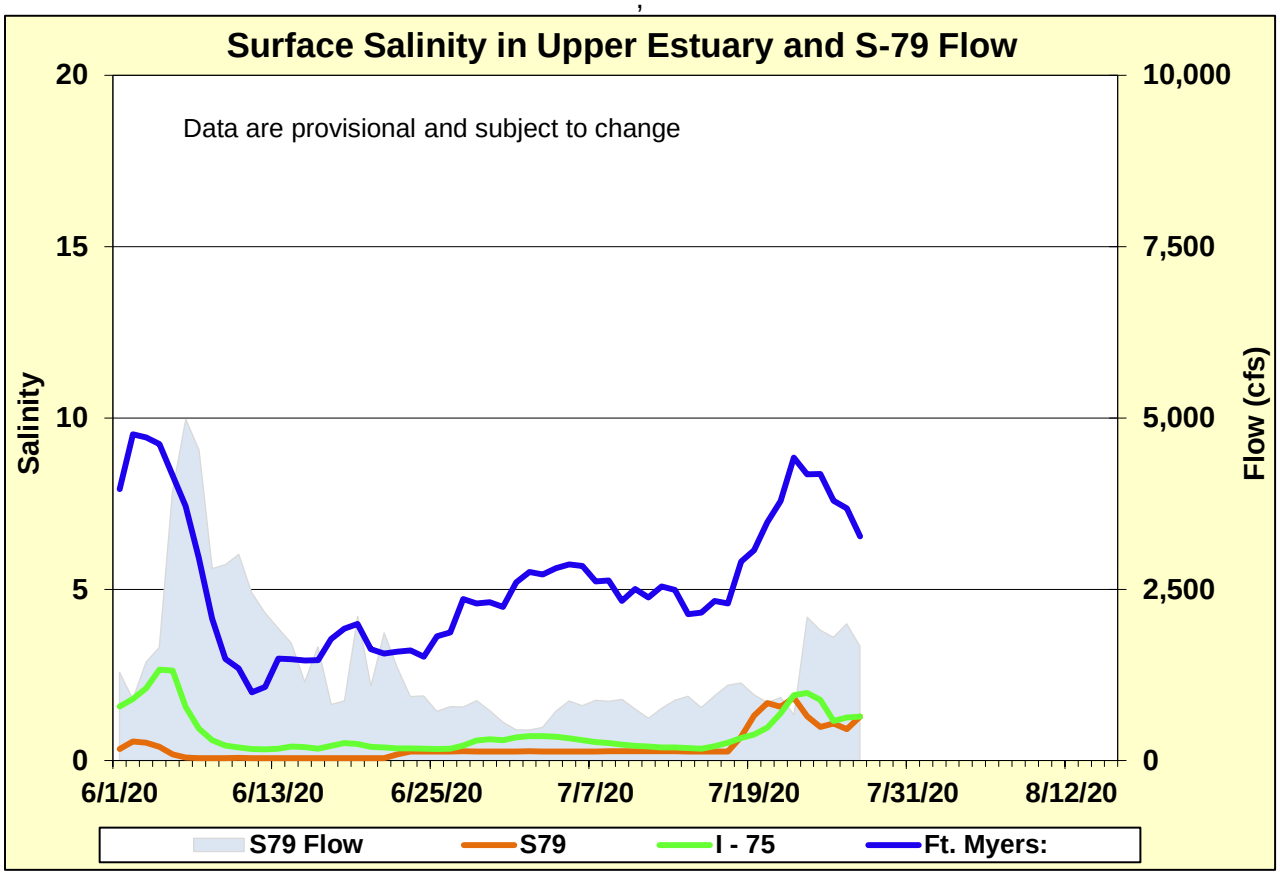


Figure 7. Daily mean flows at S-79 and salinity at upper estuary monitoring stations.

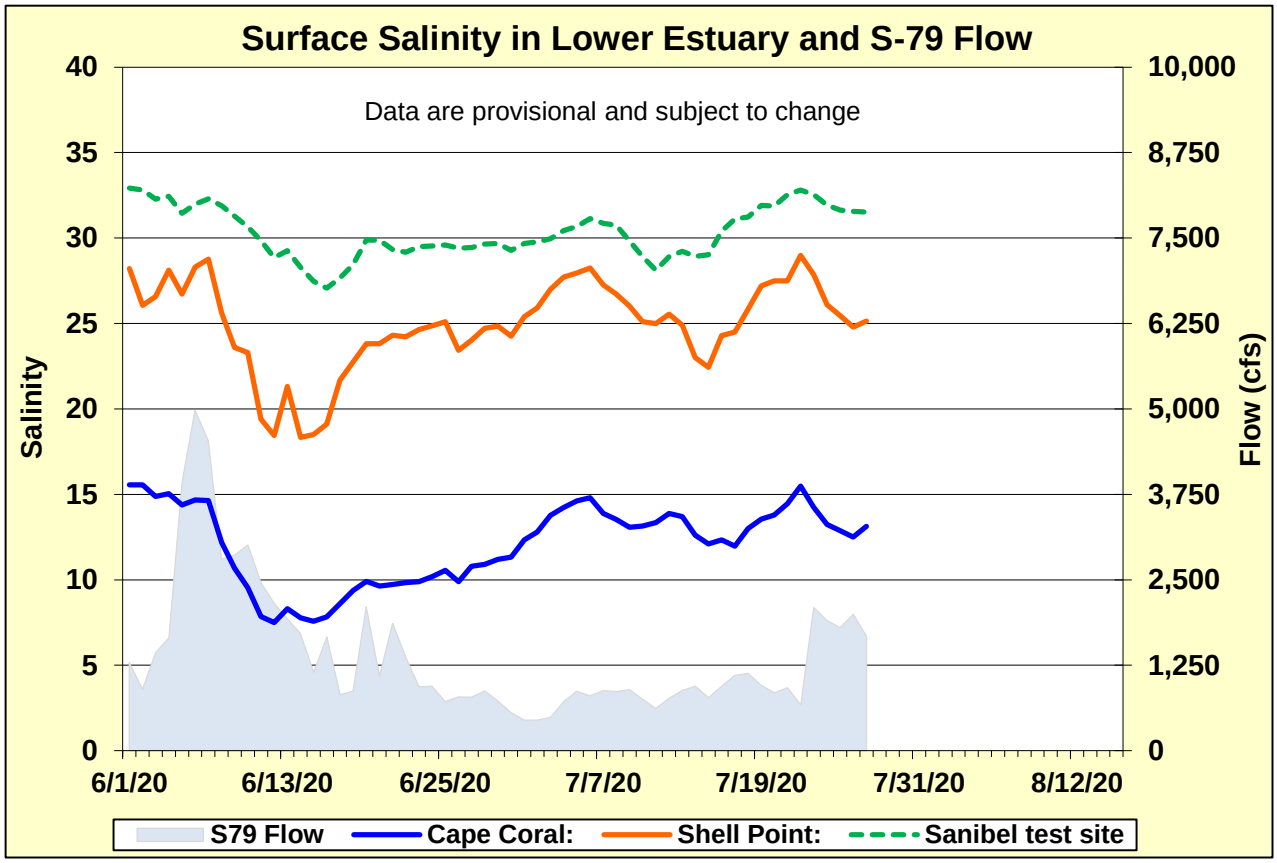


Figure 8. Daily mean flows at S-79 and salinity at lower estuary stations.

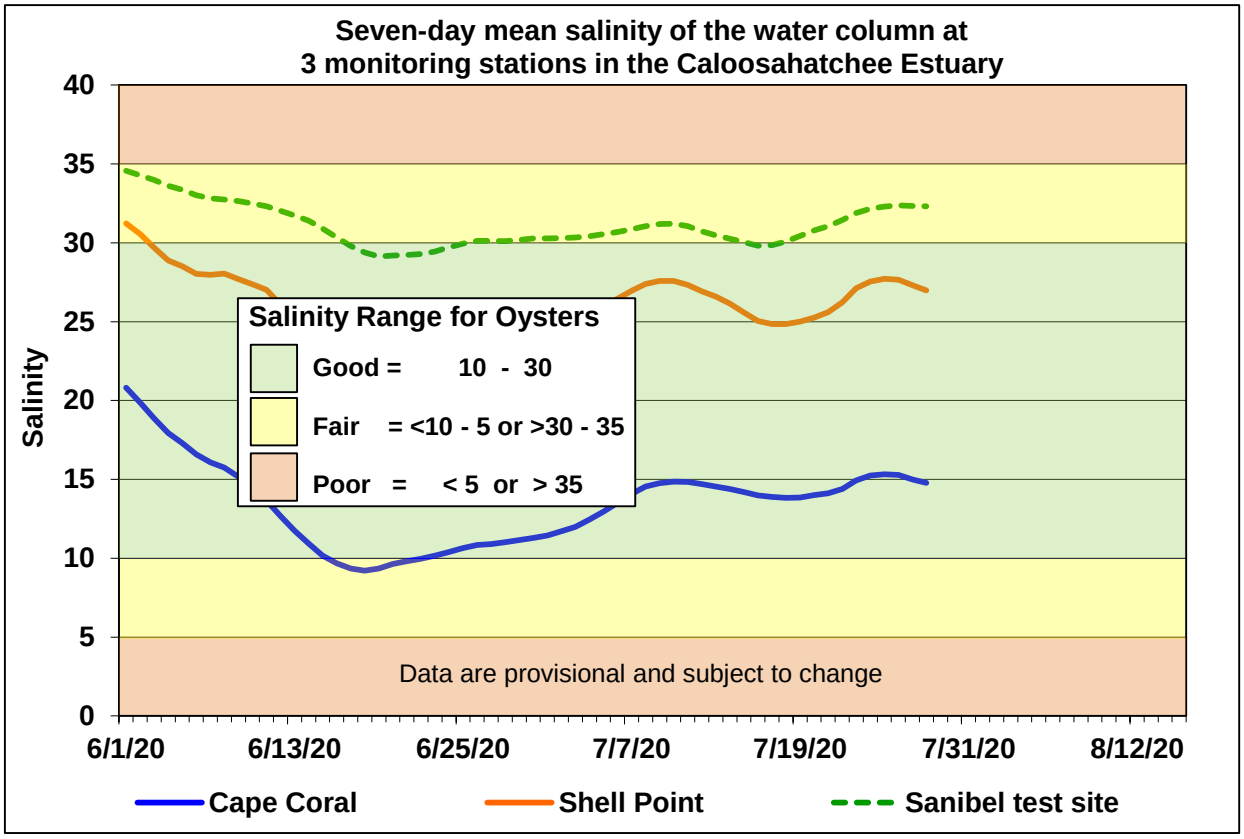


Figure 9. Seven-day mean salinity at Cape Coral, Shell Point, and Sanibel monitoring stations.

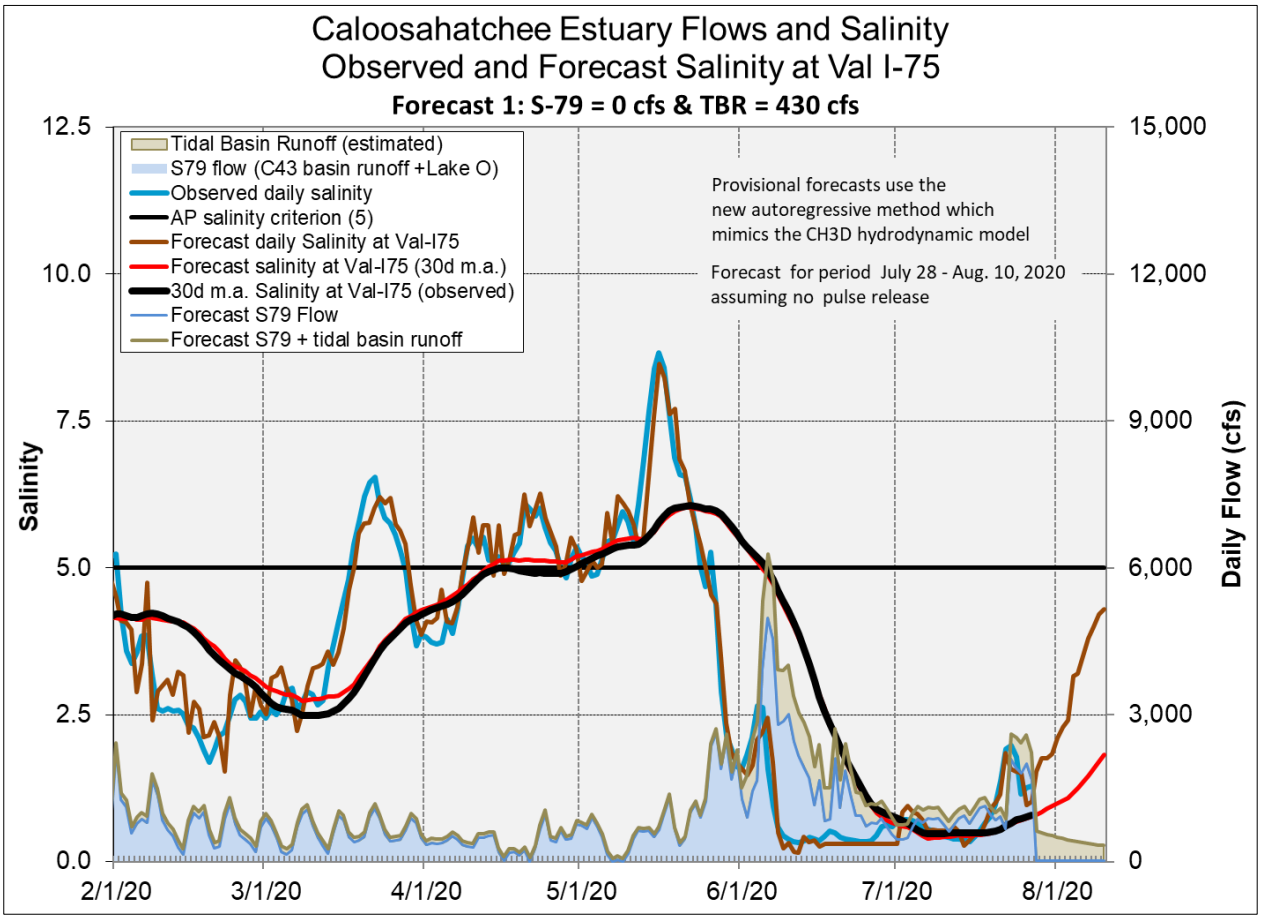
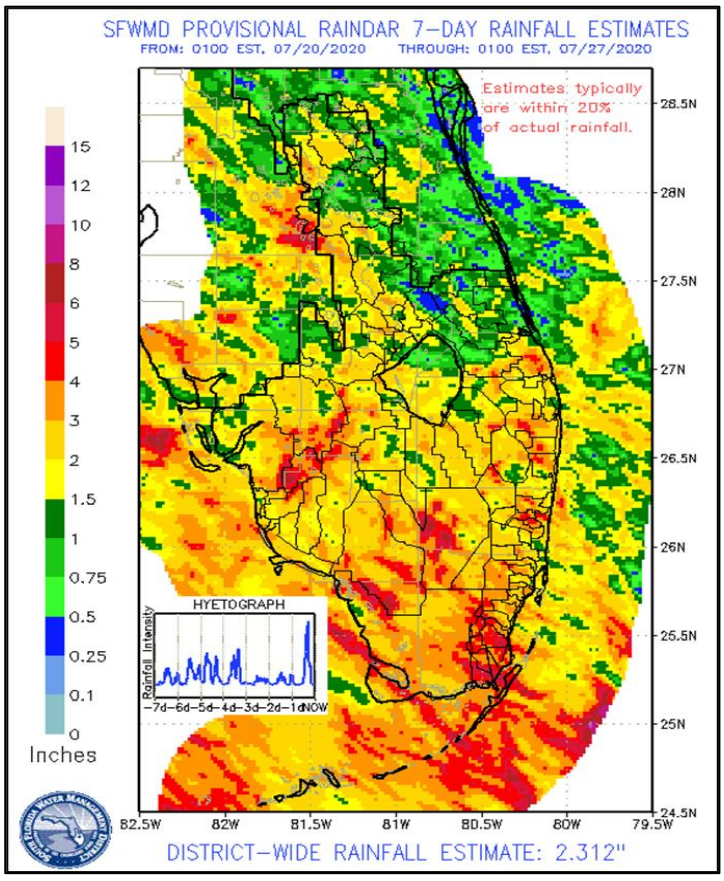


Figure 10. Forecasted Val I-75 surface salinity assuming no pulse release at S79.

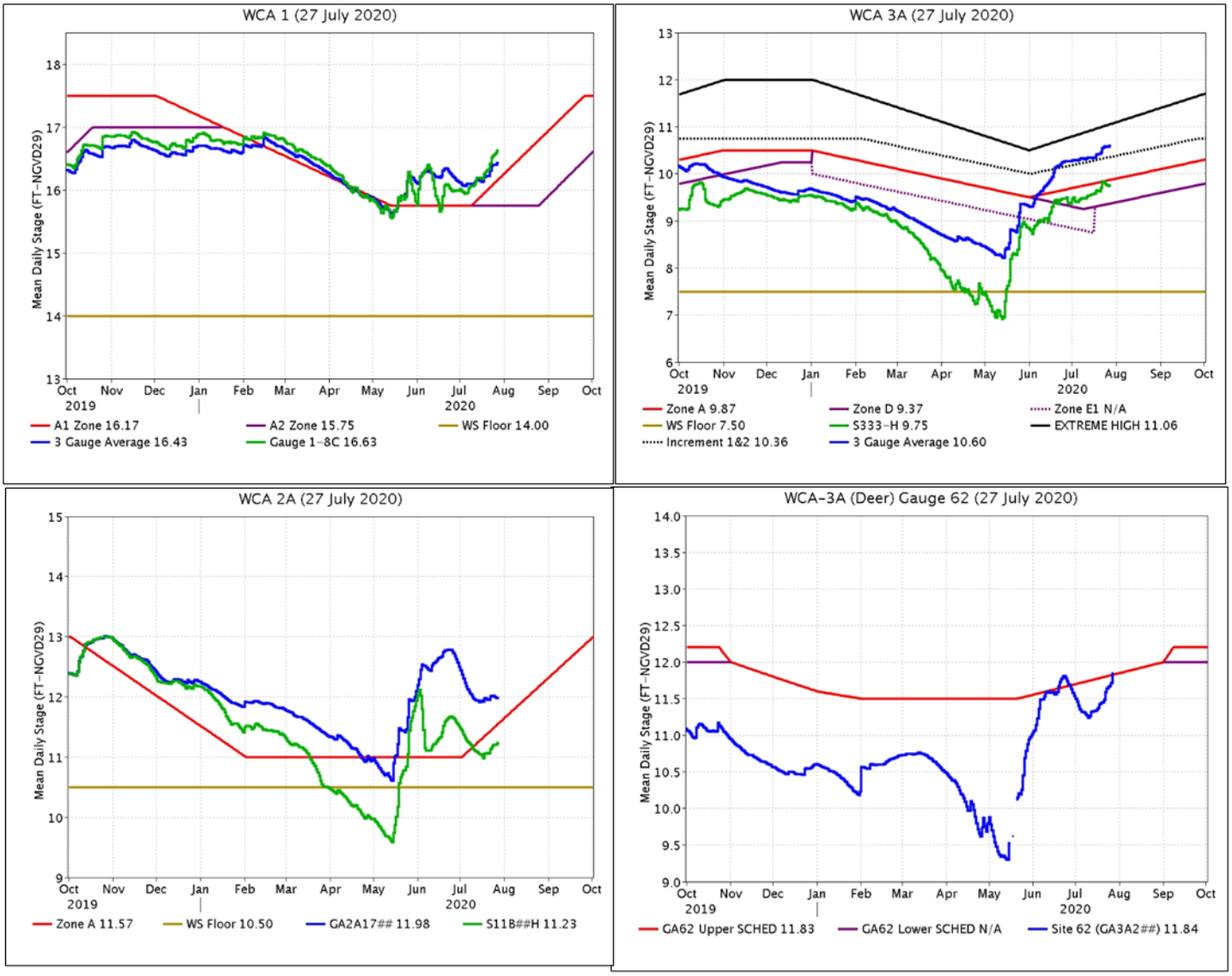
Everglades

Above average rainfall was consistently recorded across the WCAs last week; WCA-3A received the most at nearly double the weekly historical average. At the gauges monitored for this report, stages rose on average 0.18 feet last week with a maximum increase of +0.38 feet in NW WCA-3A. Evaporation was estimated at 1.49 inches last week slightly lower than the week prior.

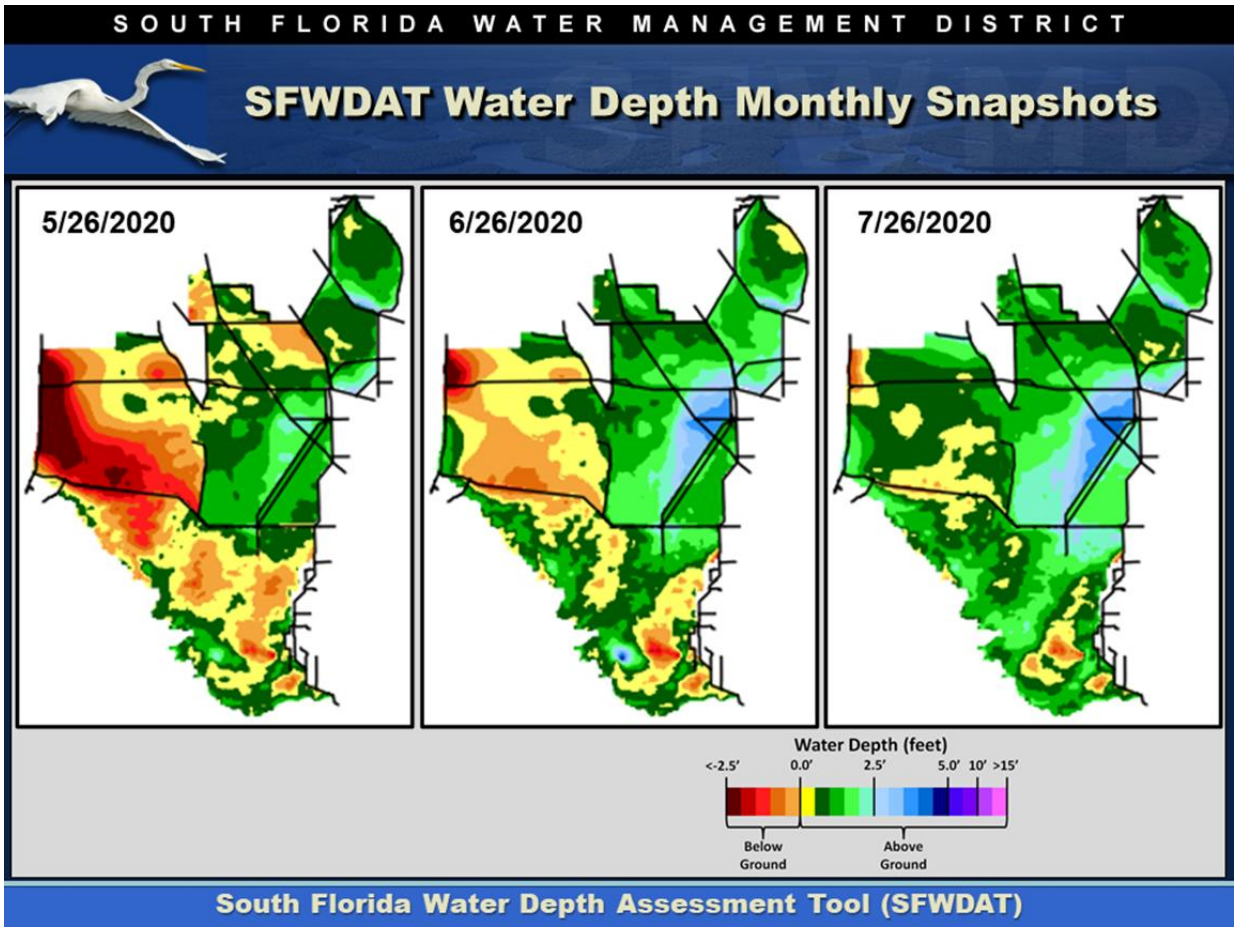
Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	2.31	+0.21
WCA-2A	2.65	+0.02
WCA-2B	2.39	+0.13
WCA-3A	3.30	+0.23
WCA-3B	2.81	+0.18
ENP	3.33	+0.16

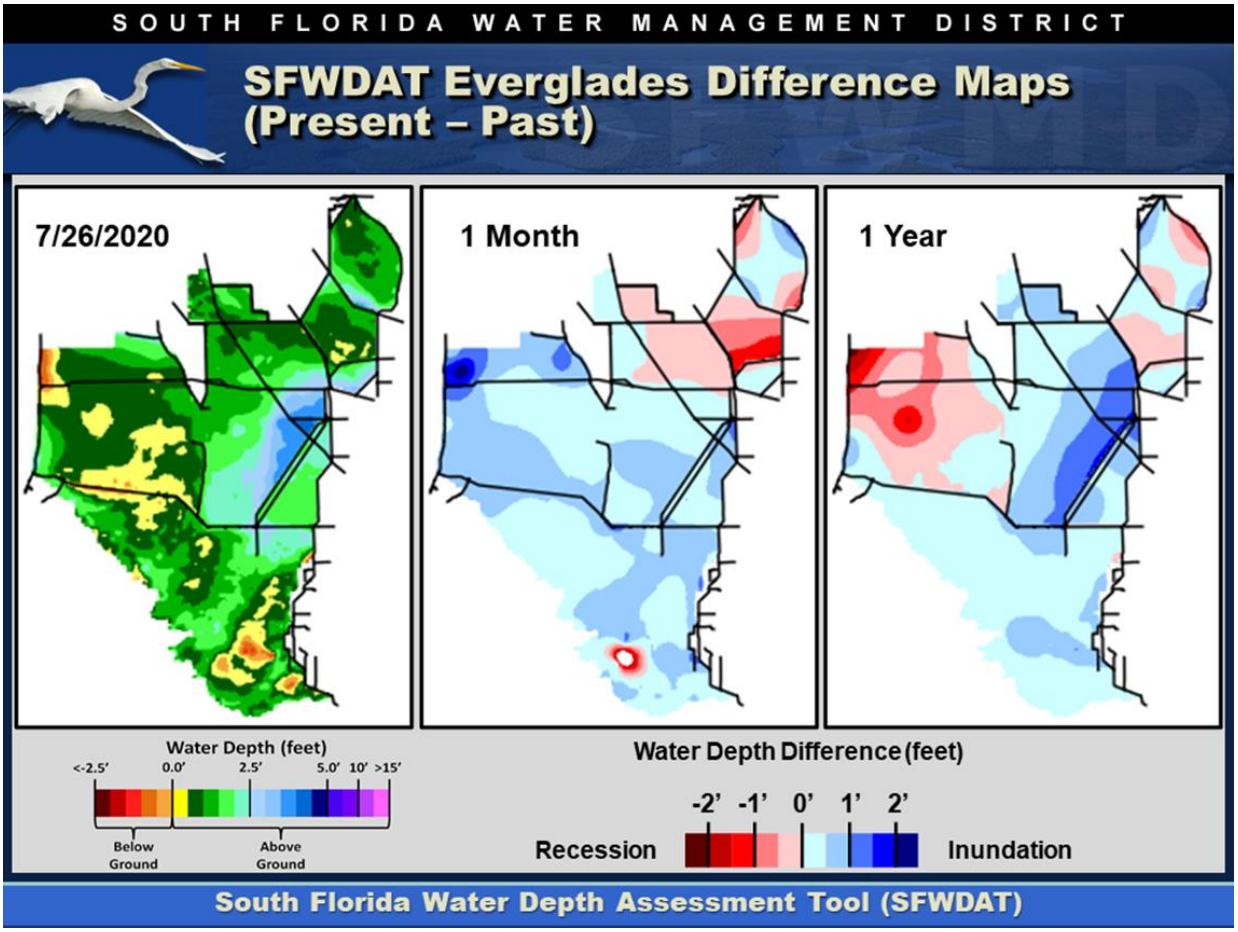


Regulation Schedules: WCA-1: Stage at the 1-8C Gauge remained trending along the rising Zone A1 regulation, line last week, currently 0.26 feet above nearly the same as the week prior. WCA-2A: Stage at Gauge 2-17 continued to trend towards the rising Zone A regulation line last week now 0.41 feet above. WCA-3A: The Three Gauge Average increased then stabilized remaining above the rising Increment 1.2-line, currently 0.24 feet above, and 0.73 feet above the Zone A regulation line. WCA-3A: Stage at gauge 62 (Northwest corner) increased again last week, meeting the rising Upper Schedule, currently 0.01 feet above.



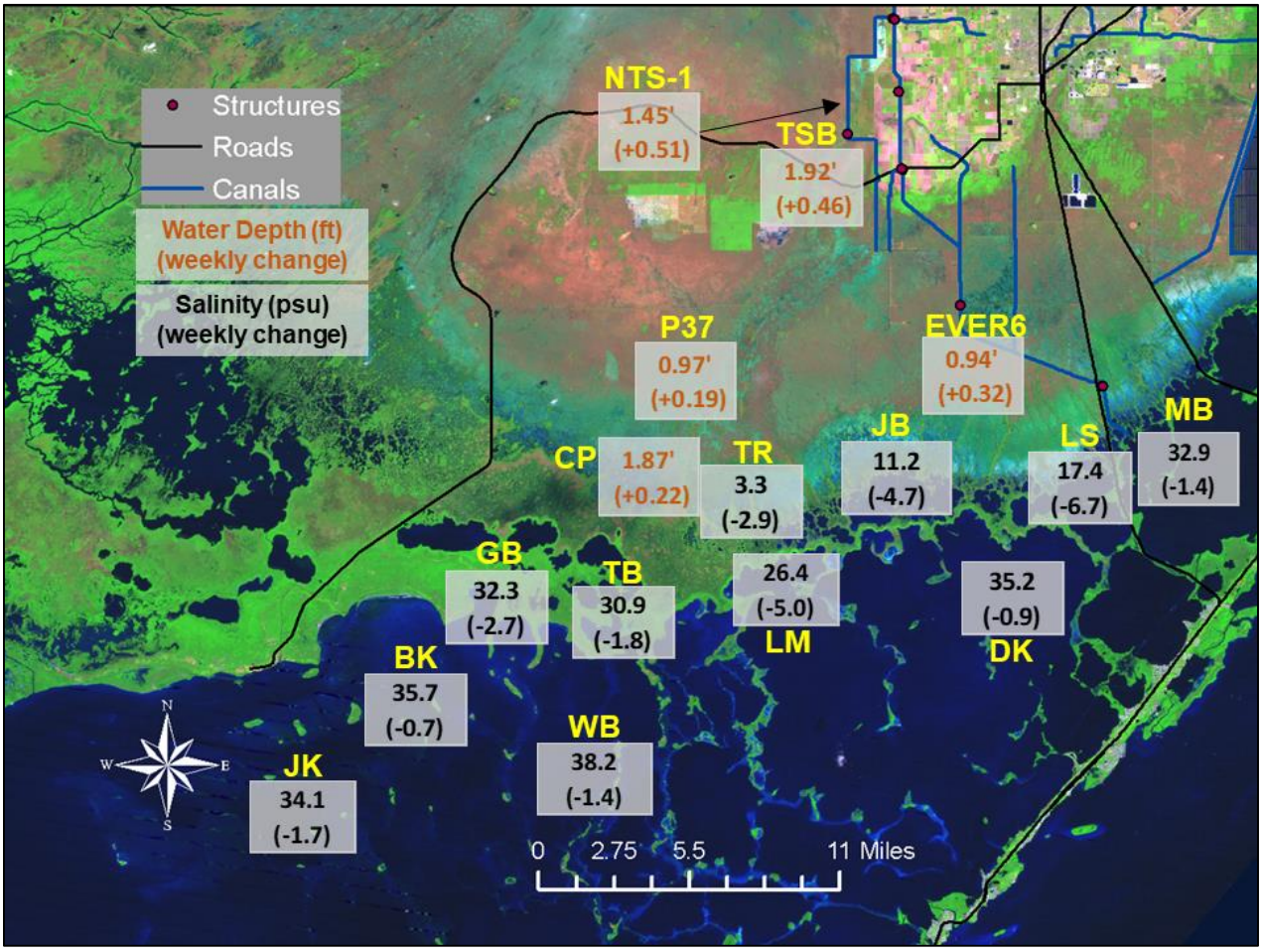
Water Depths: The WDAT tool for spatial interpolation of depth monthly snapshots indicate decreasing depths in WCA-3A North currently at 0.5 feet or higher across that sub-basin except in the extreme northeast downstream of S-150. Depths in WCA-3A South are rising, in excess of 3.5 feet along the upper reaches of the L-67 canal and the spatial extent expanding. WCA-2A stages are lowest in the south-central regions upstream of the S-11s and the S-14s. Stages in WCA-1 remain deepest along the southwestern perimeter. Hydrologic connectivity is strengthening within the major sloughs in Everglades National Park (ENP). Comparing WDAT water levels from present, over the last month stages rose across most of WCA-3A South. Northeastern WCA-3A is slightly lower in stage. WCA-2A is significantly drier, most dramatically in the south. Stage differences in WCA-1 are mixed. Looking back one year ago, the stage difference patterns are very different compared to the monthly output and more significant in WCA-3A. The WDAT model indicates mixed but mostly wetter conditions in the western basins compared to a month ago but not a year ago.

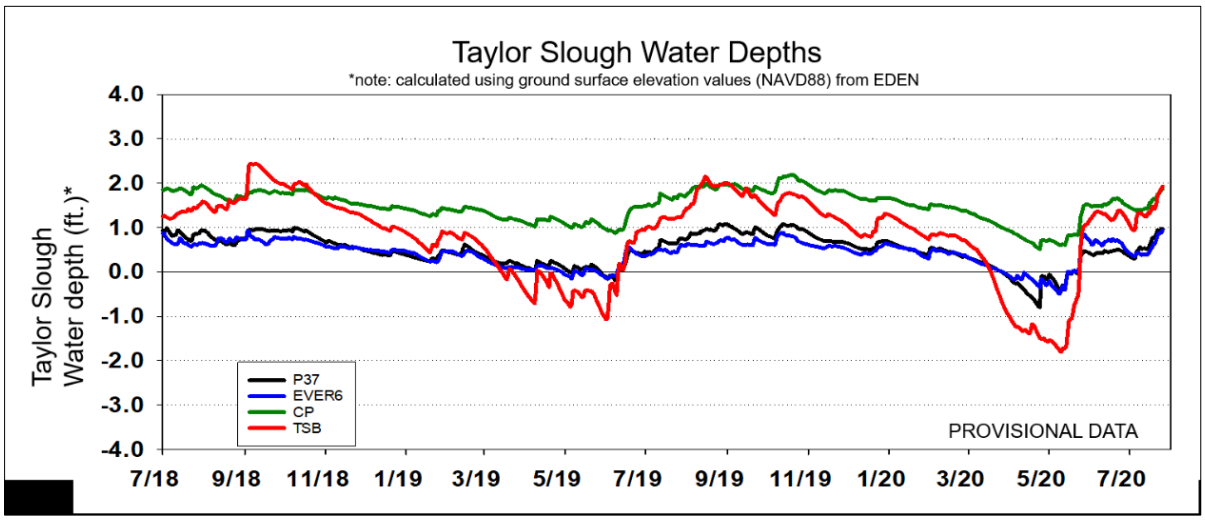

SOUTH FLORIDA WATER MANAGEMENT DISTRICT
SFWDAT Water Depth Monthly Snapshots
5/26/2020
6/26/2020
7/26/2020
Water Depth (feet)
<-2.5'
0.0'
2.5'
5.0'
10'
>15'
Below Ground
Above Ground
South Florida Water Depth Assessment Tool (SFWDAT)


SOUTH FLORIDA WATER MANAGEMENT DISTRICT
SFWDAT Everglades Difference Maps
(Present – Past)
7/26/2020
1 Month
1 Year
Water Depth (feet)
<-2.5'
0.0'
2.5'
5.0'
10'
>15'
Below Ground
Above Ground
Water Depth Difference (feet)
-2'
-1'
0'
1'
2'
Recession
Inundation
South Florida Water Depth Assessment Tool (SFWDAT)

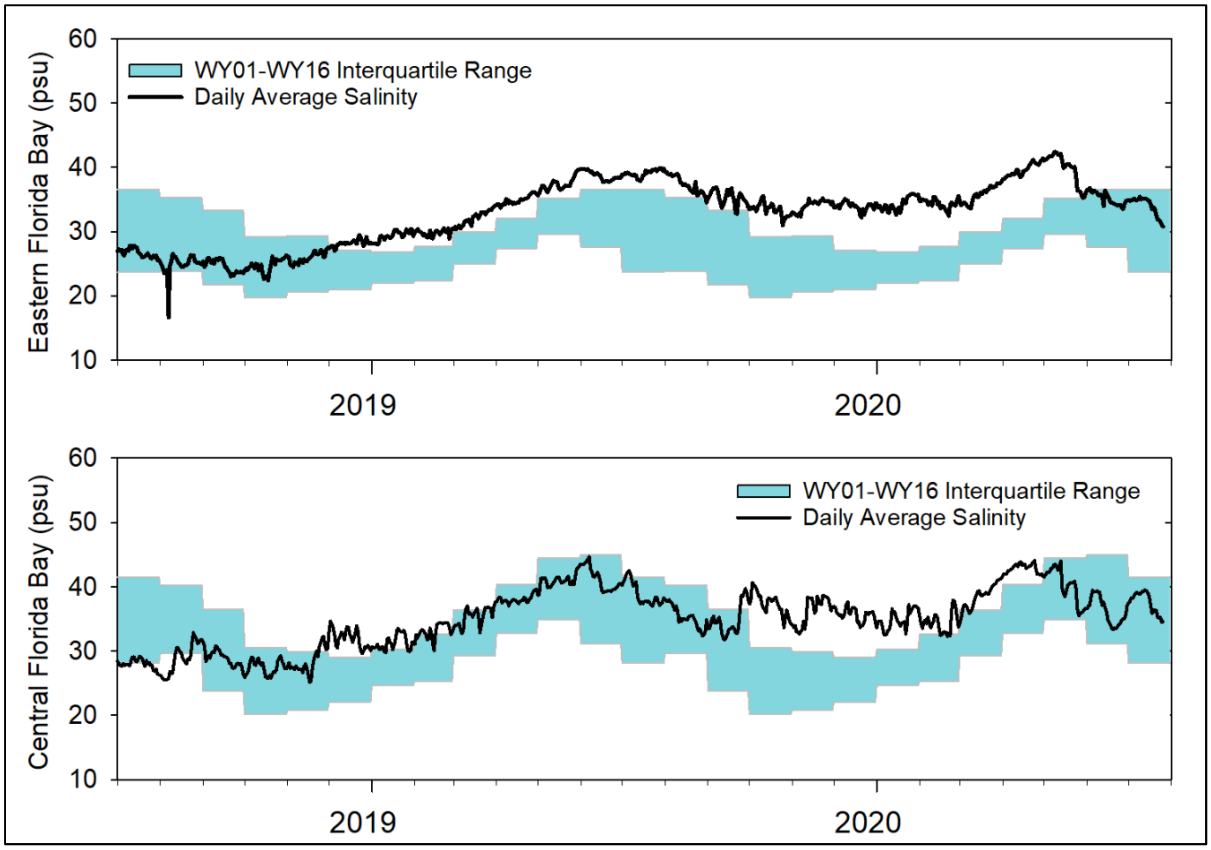
Tree island inundation: Current estimates using WDAT (7/26/20), 35% or 128 of the tree islands are currently inundated, up from 27% the week prior. Initial islands inundated beginning 5/24/20, longest duration of continuous inundation is 60 days. Maximum water depth relative to the tree island head is currently 1.59 feet.

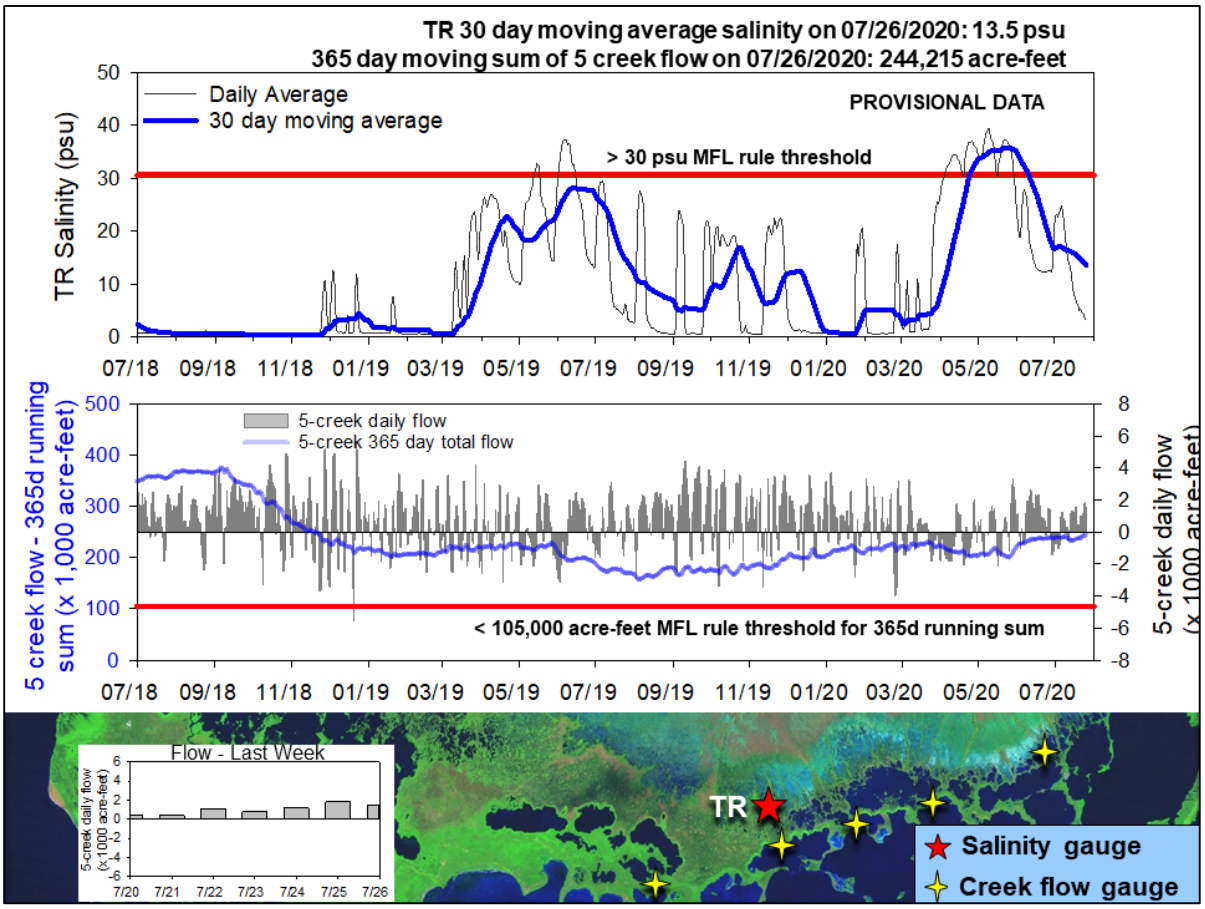
Taylor Slough Water Levels: Rainfall over Taylor Slough and Florida Bay this past week averaged 3.73 inches, and stages increased 0.34 feet on average. The largest weekly increase was 0.51 feet in Upper Taylor Slough, while the highest weekly rainfall total occurred over the Everglades National Park panhandle area (below the C-111). The increase in operations towards northern Taylor Slough should keep water levels rising.





Florida Bay Salinities: Average salinity in Florida Bay decreased 3 psu. Nearshore salinities averaged a weekly decrease of 5 psu with the eastern areas decreasing the most (as much as 6.7 psu) in correlation with the highest rainfall areas. Conditions are still 2 psu above the historical average.





Florida Bay MFL: Salinity at the TR station in the mangrove zone (tracked for the Florida Bay MFL) decreased from 6 psu to end the week at 3 psu while still decreasing. The 30-day moving average decreased 1.8 psu to end at 13.5 psu. Weekly flow from the 5 creeks identified by yellow stars on the map totaled just over 7,000 acre-feet with positive flows persisting all week again. The 365-day moving sum of flow from the five creeks (tracked as part of the Florida Bay MFL criteria) increased 6,000 acre-feet this week to end at 244,215 acre-feet which is approaching the median (249,091 acre-feet) and mean (250,857 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. If conditions allow, moderating ascension rates within WCA-3A North to within the preferred ecological range of 0.05–0.15 feet per week has ecological benefit. 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 providing surface water that can protect nests from terrestrial predators during the nesting season. Ponding along the L-67 canal/levee system has increased and inundation of the tree islands in that region has now persisted for 60 days. Moderating inflows into that region decreases ponding in both spatial extent and limits the amount of time the region is inundated, this has benefit to the ecology of tree islands in that region. 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 the nearshore/offshore gradient returns. More freshwater is needed to continue to decrease salinities in both the nearshore and across the bay towards more ecologically preferred 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 28th, 2020 (red is new)

Area	Weekly change	Recommendation	Reasons
WCA-1	Stage increased by 0.21'	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 increased by 0.02'	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 0.13'	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 0.14'	Moderating the ascension rate to less than 0.25 feet per week or 0.50 feet per two weeks. Conserving water in this region has ecological benefit.	Protect upstream/downstream habitat and wildlife. Apple snail reproduction is hindered by rapidly increasing stage.
WCA-3A NW	Stage increased by 0.38'	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 0.19'	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, and and tree island ecology is dimineshed by flooding
Southern WCA-3A S	Stage increased by 0.22'		
WCA-3B	Stage increased by 0.18'	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 0.16'	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 +0.19' to +0.51'	Move water southward as possible	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged −0.7 to −6.7 psu	Move water southward as possible	When available, provide freshwater to maintain low salinity buffer and promote water movement.