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 22, 2020

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

Enhanced thunderstorm activity tonight and early Tuesday; potential for a drier pattern beginning Sunday / Monday. Today through Saturday, deep easterly flow will favor scattered shower activity near the east coast during the nights and mornings while afternoon thunderstorm activity will be focused over the interior and west. An upper level low moving westward across western Cuba will pull some moisture and low-level energy associated with a passing tropical wave northward over the southern half of the District tonight. This moisture and energy will create the opportunity for enhanced thunderstorm development this evening and Tuesday. Low level energy and moisture associated with a second tropical wave is forecast enhance thunderstorm development again Thursday. Mid-level high pressure and drier air is forecast to move over the District Sunday and then more so on Monday so expect a decrease in shower activity east on Sunday with afternoon thunderstorm activity focused over the interior and west. Overall rainfall is forecast to be near the historical average over the first 7-day period (Week 1) with above-average rainfall over the southern half of the District. With a drier pattern beginning early next week, there is the potential for well-below average thunderstorm activity for the second 7-day period (Week 2).

Kissimmee

Tuesday morning stages were 55.8 feet NGVD (0.7 feet below schedule) in East Lake Toho, 53.6 feet NGVD (0.1 feet above schedule) in Toho, and 51.8 feet NGVD (0.8 feet above schedule) in Kissimmee-Cypress-Hatchineha; headwater stages were 46.9 feet NGVD at S-65A and 26.4 feet NGVD at S-65D. Tuesday morning discharges were 4,790 cfs at S-65, 5,040 cfs at S-65A, 3,060 cfs at S-65D and 2,630 cfs at S-65E. Dissolved oxygen concentration in the Kissimmee River averaged 0.2 mg/L for the week through Sunday, well below the critical threshold of 1 mg/L. Kissimmee River mean floodplain depth on Sunday was 1.84 feet. Today's recommendation is to continue to manage S-65 / S-65A discharge to slow the stage rise in lakes Kissimmee, Cypress and Hatchineha while considering effects on dissolved oxygen in the Kissimmee River. The wet season recommendation is 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 foot 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 less than 0.5 feet per 14 days during the same June 1 – August 15 timeframe.

Lake Okeechobee

Lake Okeechobee stage was 12.75 feet NGVD on July 20, 2020, 0.22 feet higher than the previous week and 0.44 feet higher than the previous month. The Lake is now 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 has been slower over the past few weeks, providing submerged plant communities an opportunity to catch up with rising stages. The cyanobacteria bloom risk potential over the past week indicates a slightly decreased bloom density in the center of the Lake, but increased bloom risk along western shorelines.

Estuaries

Total inflow to the St. Lucie Estuary averaged 1,938 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 good range for adult eastern oysters.

Total inflow to the Caloosahatchee Estuary averaged 1,142 cfs over the past week with 154 cfs (estimated) coming from the Lake. The seven-day average salinity increased slightly in the upper 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 Beneficial Use sub-band of 2008 LORS. Tributary hydrological conditions are wet. The LORS 2008 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 (STAs)

Over the past week, no Lake Okeechobee water was delivered to the flow equalization basins (FEBs) or STAs. The total amount of Lake releases sent to the FEBs/STAs in water year (WY) 2021 (since May 1, 2020) is approximately 11,100 acre-feet. The total amount of inflows to the STAs in WY2021 is approximately 374,000 ac-feet. Most STA cells are near or above target stage, while the emergent aquatic vegetation (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 in the STAs to accept releases from Lake Okeechobee.

Everglades

All the water conservation areas (WCAs) are above regulation but depths have generally stabilized and followed the rising trend of the schedules over the past week. The WCA-2A recession has reversed as that basin trends towards the regulation schedule. 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. Most of the Everglades fell within the recommended ascension rates over the past week. Florida Bay and Taylor Slough received above average rainfall and stages increased nearly 0.20 feet on average. Salinity fell throughout Florida Bay and conditions suggest that the freshwater front is moving towards the shoreline. Daily average salinity in the mangrove zone decreased rapidly last week and flows from the creeks were mostly positive.

Supporting Information

KISSIMMEE BASIN

Kissimmee Basin Rainfall

The Upper Kissimmee Basin received 1.36 inches of rainfall in the past week and the Lower Basin received 1.70 inches (SFWMD Daily Rainfall Report 7/19/2020).

Upper Kissimmee Basin

Stages and regulation / temporary schedule 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: 7/21/2020

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)						
							7/19/20	7/12/20	7/5/20	6/28/20	6/21/20	6/14/20	6/7/20
Lakes Hart and Mary Jane	S-62	260	LKMJ	60.0	R	60.0	**0.0**	0.2	0.2	0.0	0.2	0.1	-0.2
Lakes Myrtle, Preston, and Joel	S-57	62	S-57	61.0	R	61.0	**0.0**	0.1	-0.2	-0.1	-0.2	-0.2	-0.4
Alligator Chain	S-60	117	ALLI	63.2	R	63.2	**0.0**	-0.2	-0.6	-0.5	-0.4	-0.5	-0.9
Lake Gentry	S-63	172	LKGT	61.1	R	61.0	**0.1**	0.1	-0.2	-0.2	-0.3	-0.6	-1.0
East Lake Toho	S-59	481	TOHOE	55.8	R	56.5	**-0.7**	-1.2	-1.5	-1.4	-2.2	-2.7	-3.1
Lake Toho	S-61	1,812	TOHOW, S-61	53.5	R	53.5	**0.0**	0.2	0.1	0.0	0.0	-0.1	-0.8
Lakes Kissimmee, Cypress, and Hatchineha	S-65	2,396	KUB011, LKIS5B	51.9	R	51.0	**0.9**	0.7	0.4	0.5	0.2	-0.1	-0.6

[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 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: **7/21/2020**

Metric	Location	1-Day Average	Average for the Preceeding 7-Days[1]								
		7/19/2020	7/19/20	7/12/20	7/5/20	6/28/20	6/21/20	6/14/20	6/7/20	5/31/20	5/24/20
Discharge (cfs)	S-65	3,859	**2,396**	1,779	1,527	873	581	80	427	695	496
Discharge (cfs)	S-65A[2]	4,685	**3,202**	2,174	1,559	1,127	864	854	884	788	438
Discharge (cfs)	S-65D[2]	2,738	**2,383**	1,602	1,314	1,453	1,641	1,988	1,485	903	325
Headwater Stage (feet NGVD)	S-65D[2]	26.26	**26.02**	25.81	25.76	25.72	25.74	25.72	25.78	25.76	25.84
Discharge (cfs)	S-65E[2]	2,658	**2,229**	1,574	1,240	1,402	1,549	1,868	1,552	926	312
Discharge (cfs)	S-67	0	**0**	0	0	0	0	0	0	0	0
DO (mg/L)[3]	Phases I & II/III river channel	0.2	**0.2**	1.4	2.7	2.0	1.2	0.7	4.0	6.0	7.6
Mean depth (feet)[4]	Phase I floodplain	1.84	**1.63**	1.13	0.73	0.71	0.78	0.90	0.56	0.28	0.08

[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.

KCOL Hydrographs (through Sunday midnight)

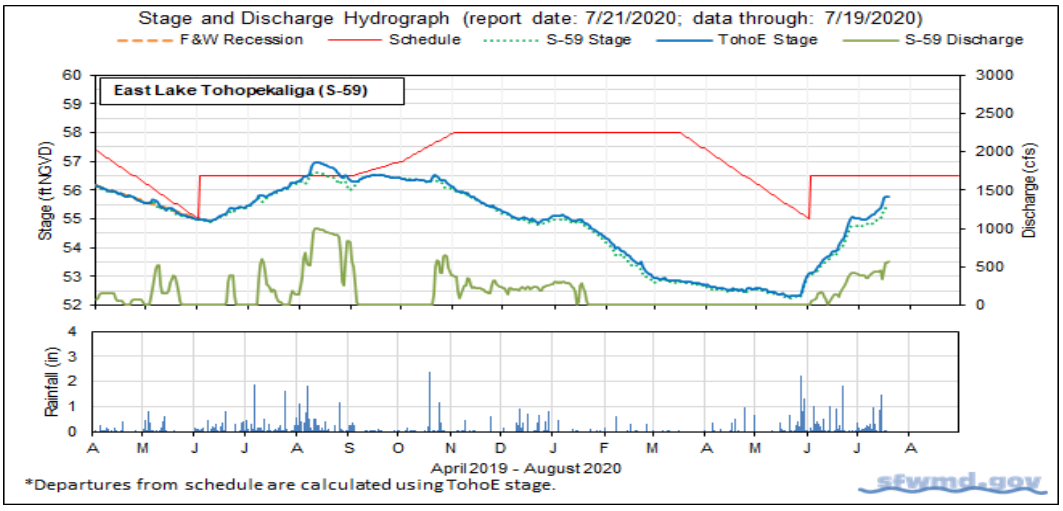


Figure 1.

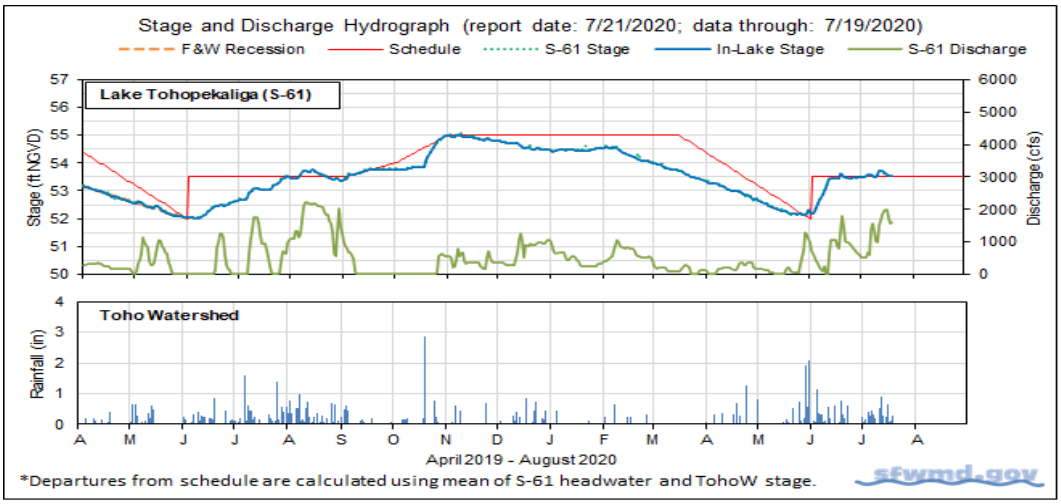


Figure 2.

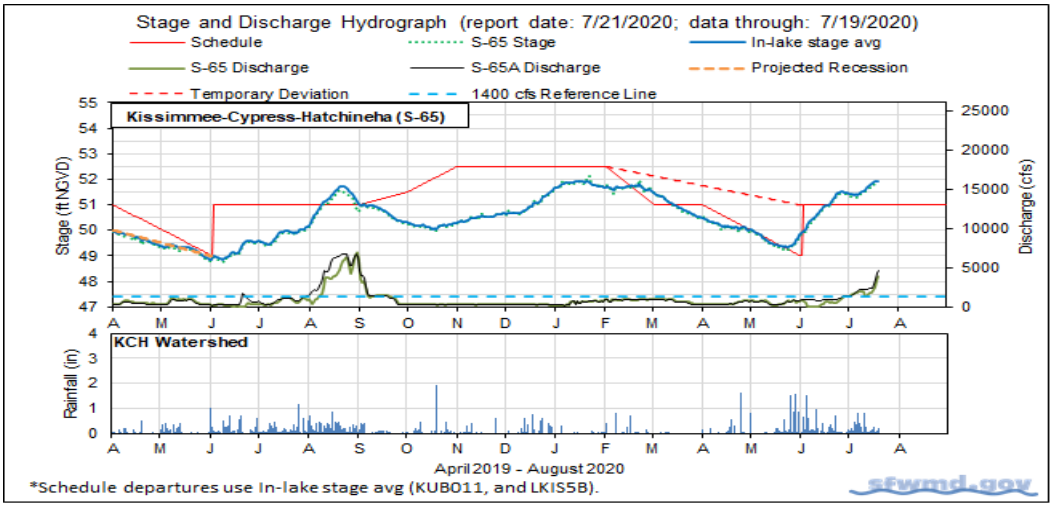


Figure 3.

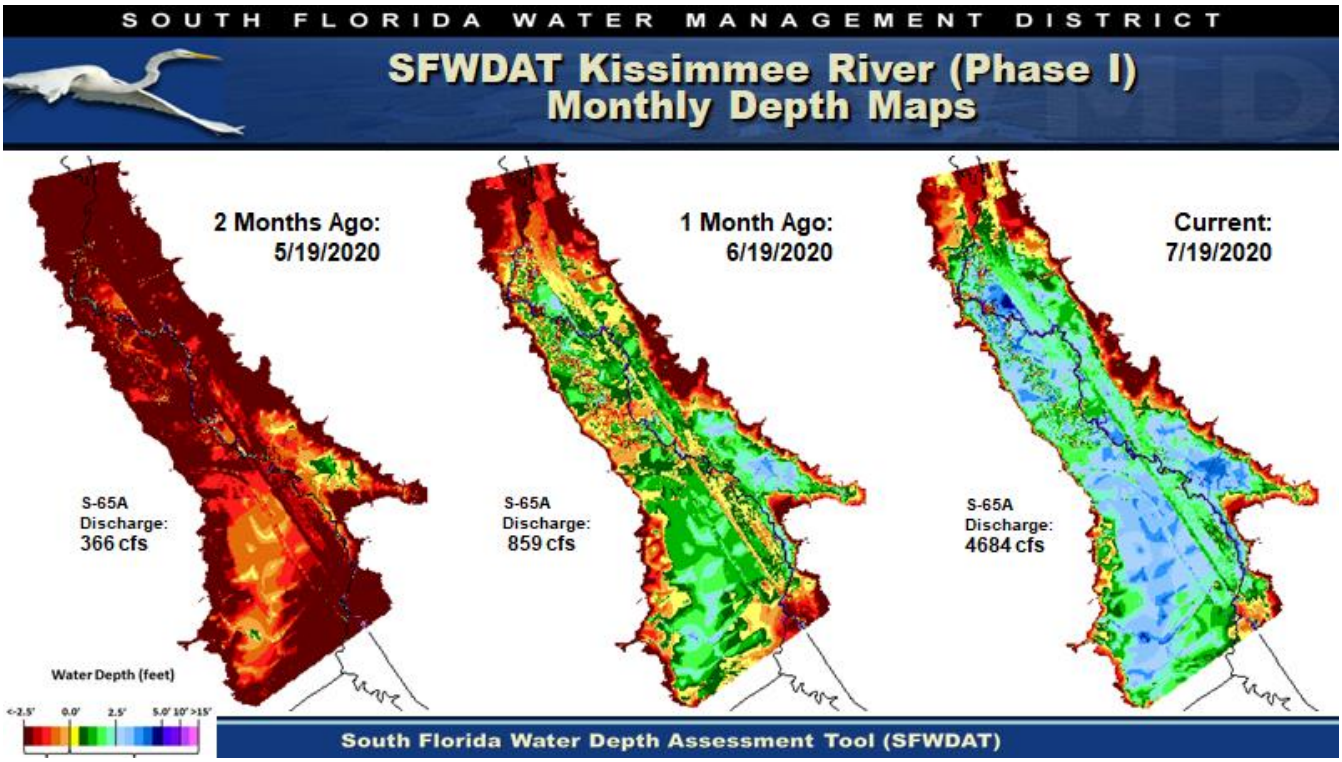


Figure 4. Phase I area floodplain water depths for this week, one month ago, and two months ago. Note that the WDAT color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to January 16, 2012.

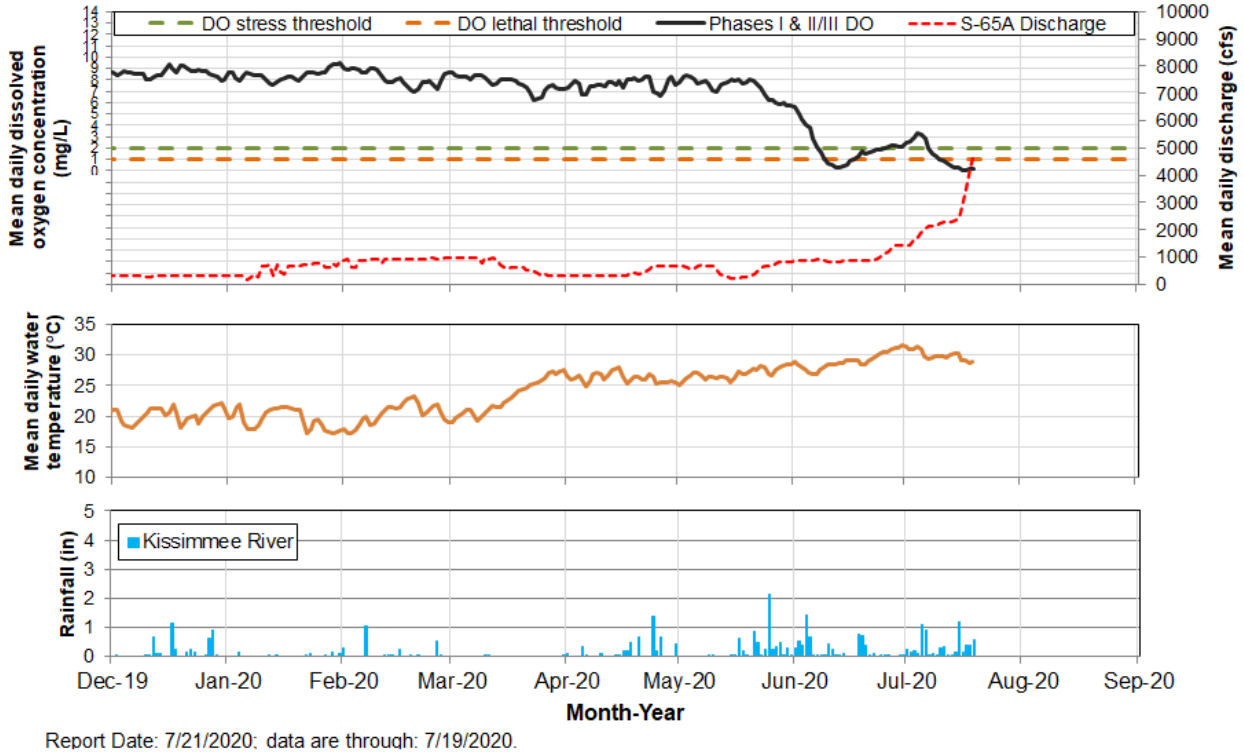


Figure 5. Mean daily dissolved oxygen, discharge, temperature and rainfall in the Phases I/II/III river channel.

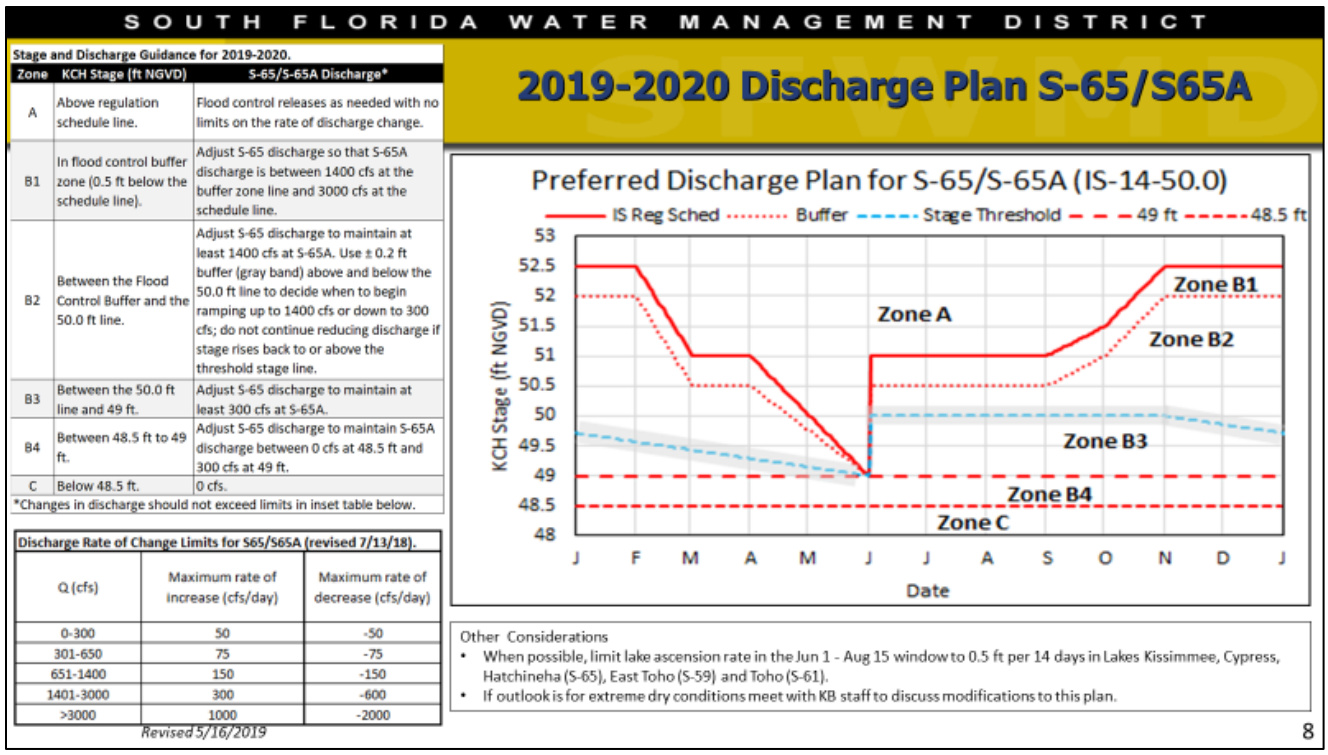


Figure 6. The 2019-2020 Discharge Plan for S-65/S-65A.

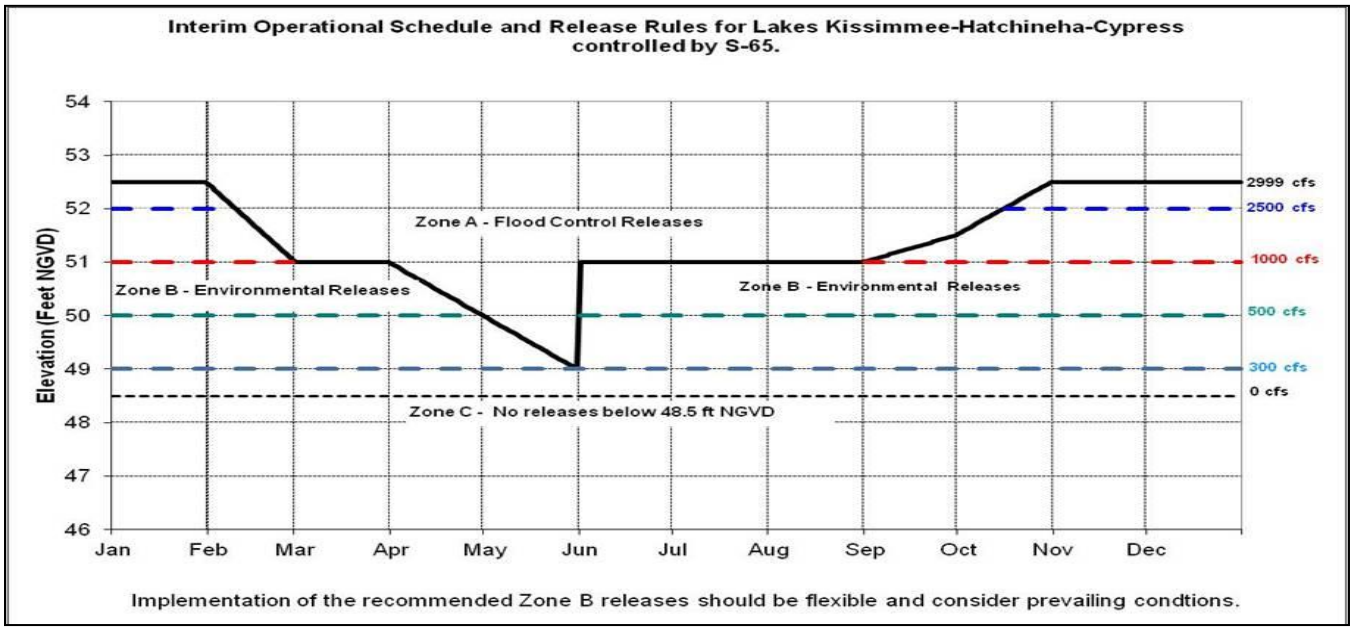


Figure 7. Interim operations schedule for S-65. The discharge schedule shown to the right has not been used in recent years.

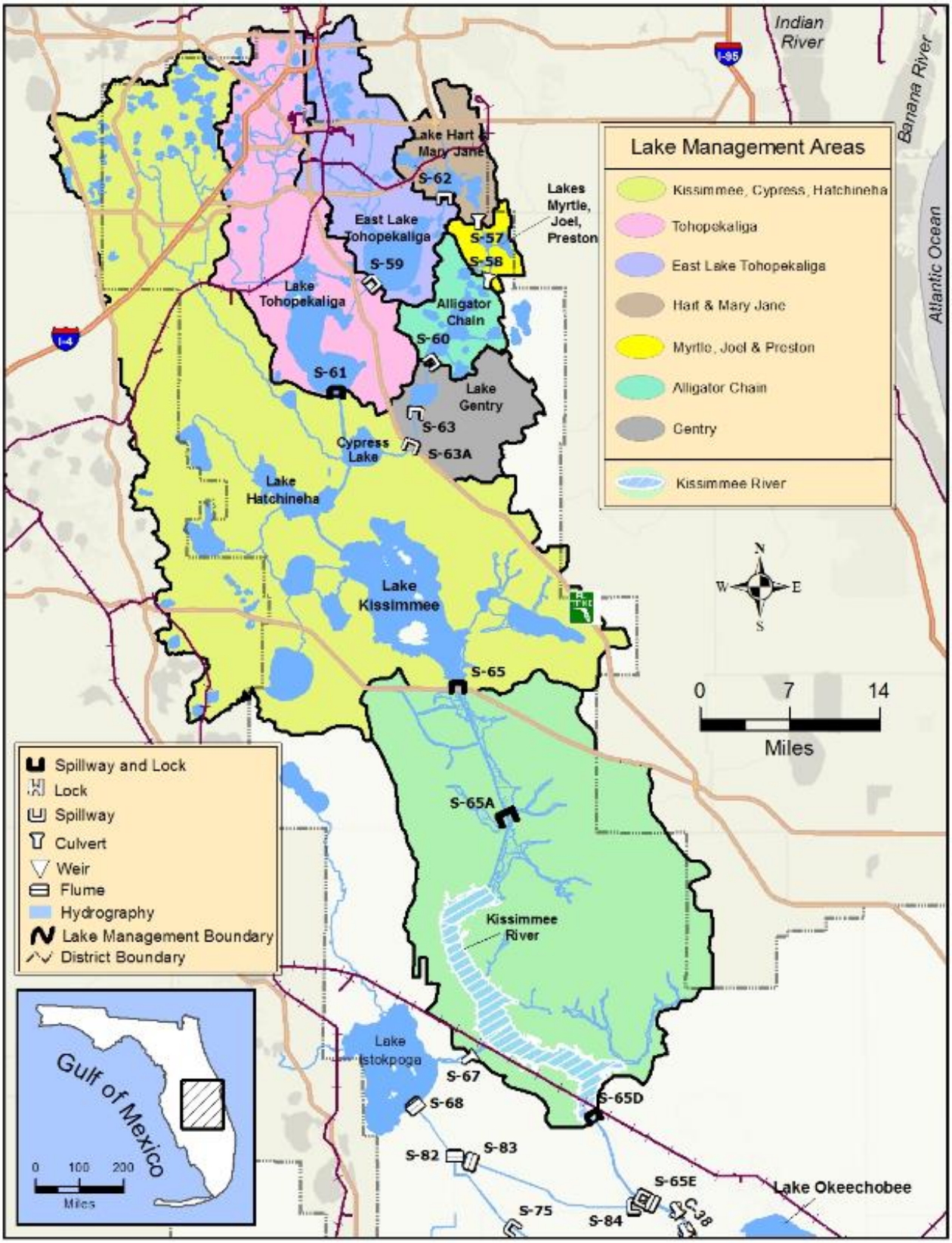


Figure 8. The Kissimmee Basin.

LAKE OKEECHOBEE

Lake Okeechobee stage is 12.75 feet NGVD, 0.44 feet higher than a month ago and 1.29 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 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 on May 17, rose rapidly for a month, leveled out for the remainder of June, and has been rising approximately 0.25 feet per week in July. According to RAINDAR, 1.7 inches of rain fell directly over the Lake during the past week (Figure 4), with highly variable rainfall across the watershed. The district-wide average was approximately 2 inches.

The average daily inflows (minus rainfall) increased from 3,543 cfs to 4,373 cfs, while the outflows (minus evapotranspiration) decreased from 374 cfs to 154 cfs. Most of the inflows came from the Kissimmee River (2,358 cfs through S-65E & S-65EX1), while 966 cfs came from the C-41a canal (through S-84 & S-84X), 237 cfs from Fisheating Creek, and around 300 cfs from S-71 and S-72 (due to problems with DBHYDRO, flows through S72 are potentially higher than reported here). 233 cfs also 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 154 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 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 July 7 and 8 (Figure 6). The majority of the chlorophyll *a* results are still pending, but of those completed thus far, all had values greater than 40 μg/L. Despite the very high chl-a values, cyano-toxin values were relatively low. Three of thirty 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 a high of 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 or greater), ranging from 0.3 – 7.5 μg/L.

NOAA's cyanobacteria monitoring product, which is derived from EUMETSAT's Sentinel 3 OLCI sensor data, provides near-daily estimates of cyanobacteria bloom potential on the Lake. Weekly composites are also available, which represent an approximate maximum weekly coverage based on combining several daily images, giving a better estimate of conditions due to variable cloud cover and weather patterns. The most recent composite (July 12 - 18, 2020) suggests similar cyanobacteria bloom risk potential compared to the prior week (July 5 - 11, 2020), with some increases along the western shoreline but slight decreases in the center of the Lake (Figure 7).

Water Management Summary

Lake Okeechobee stage was 12.75 feet NGVD on July 20, 2020, 0.22 feet higher than the previous week and 0.44 feet higher than the previous month. The Lake is now 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 has been slower over the past few weeks, providing submerged plant communities an opportunity to catch up with rising stages. The cyanobacteria bloom risk potential over the past week indicates a slightly decreased bloom density in the center of the Lake, but increased bloom risk along western shorelines.

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	1640	2358	1.1
S-71 & S-72	157	319	0.1
S-84 & S-84X	930	966	0.4
Fisheating Creek	353	237	0.1
S-154	0	7	0.0
S-191	0	133	0.1
S-133 P	0	8	0.0
S-127 P	9	2	0.0
S-129 P	9	2	0.0
S-131 P	33	11	0.0
S-135 P	12	73	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	69	23	0.0
Rainfall	4641	3662	1.7
Total	**7853**	**7802**	**3.5**

OUTFLOWS	Previous week Avg Daily CFS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)
S-77	285	154	0.1
S-308	-331	-233	-0.1
S-351	0	0	0.0
S-352	88	0	0.0
S-354	0	0	0.0
L-8 Outflow			
ET	2197	2151	1.0
Total	**2240**	**2072**	**0.9**

Provisional Data

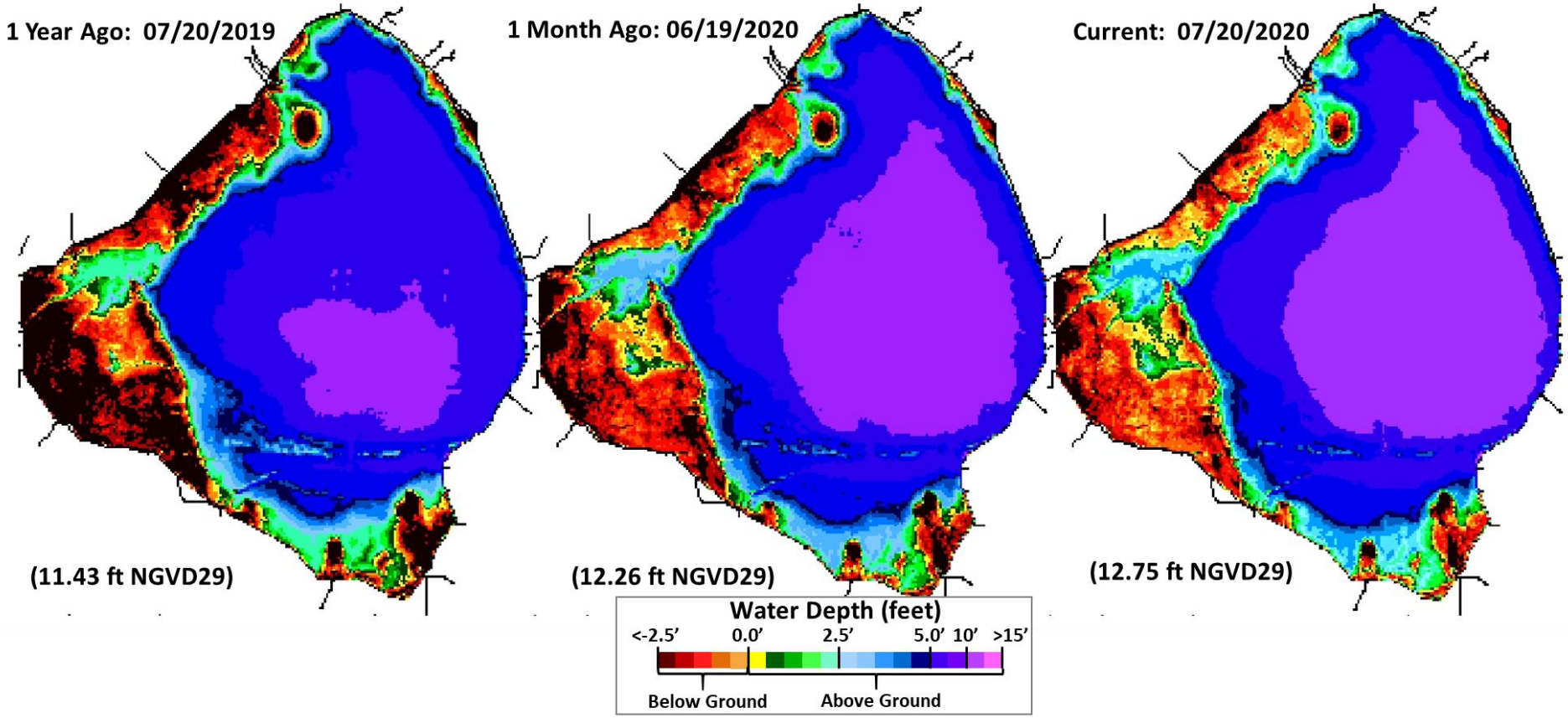


Figure 1. Water depth estimates on Lake Okeechobee based on the South Florida Water Depth Assessment Tool.

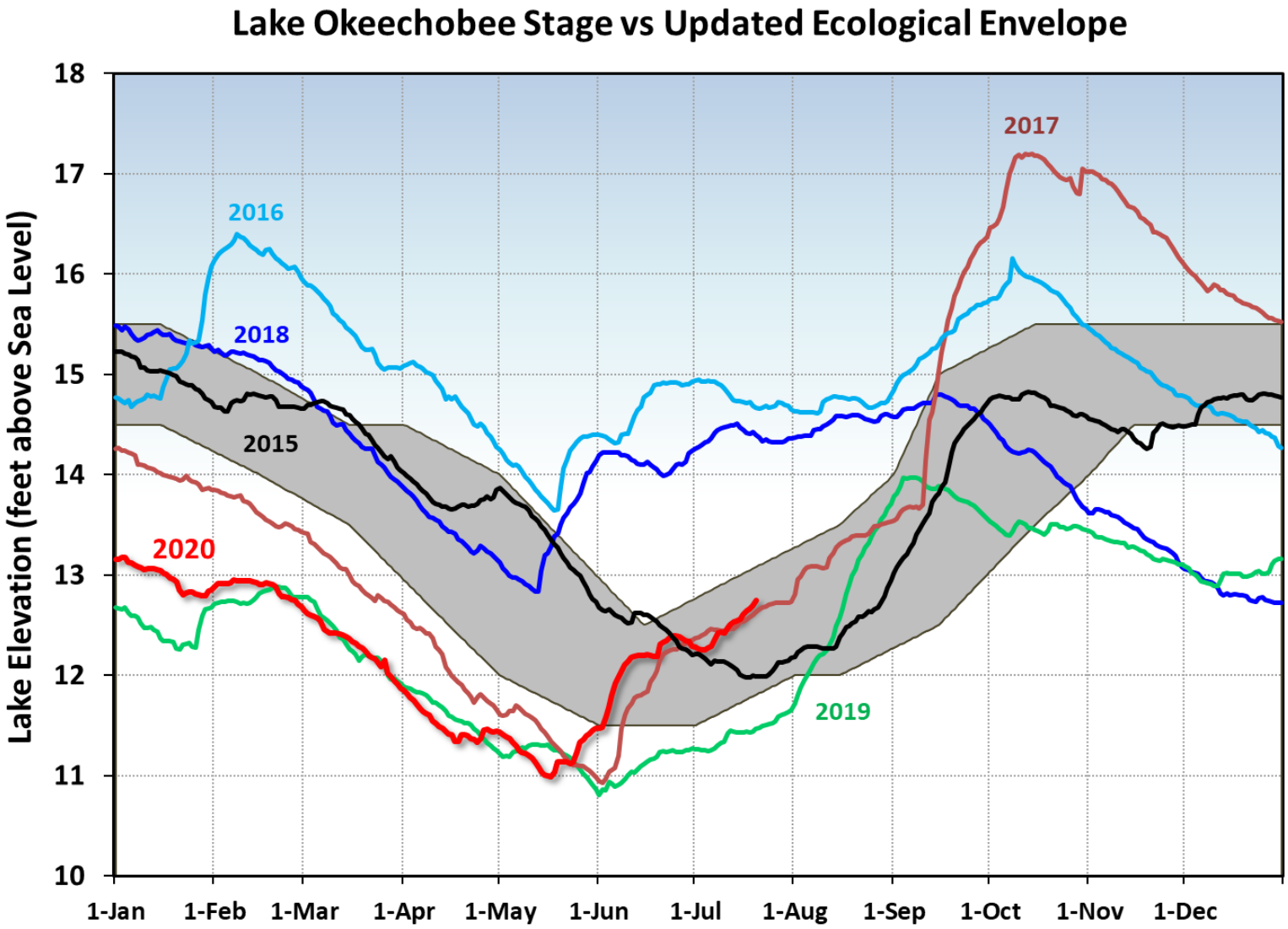


Figure 2. Select annual stage hydrographs for Lake Okeechobee in comparison to the updated Ecological Envelope.

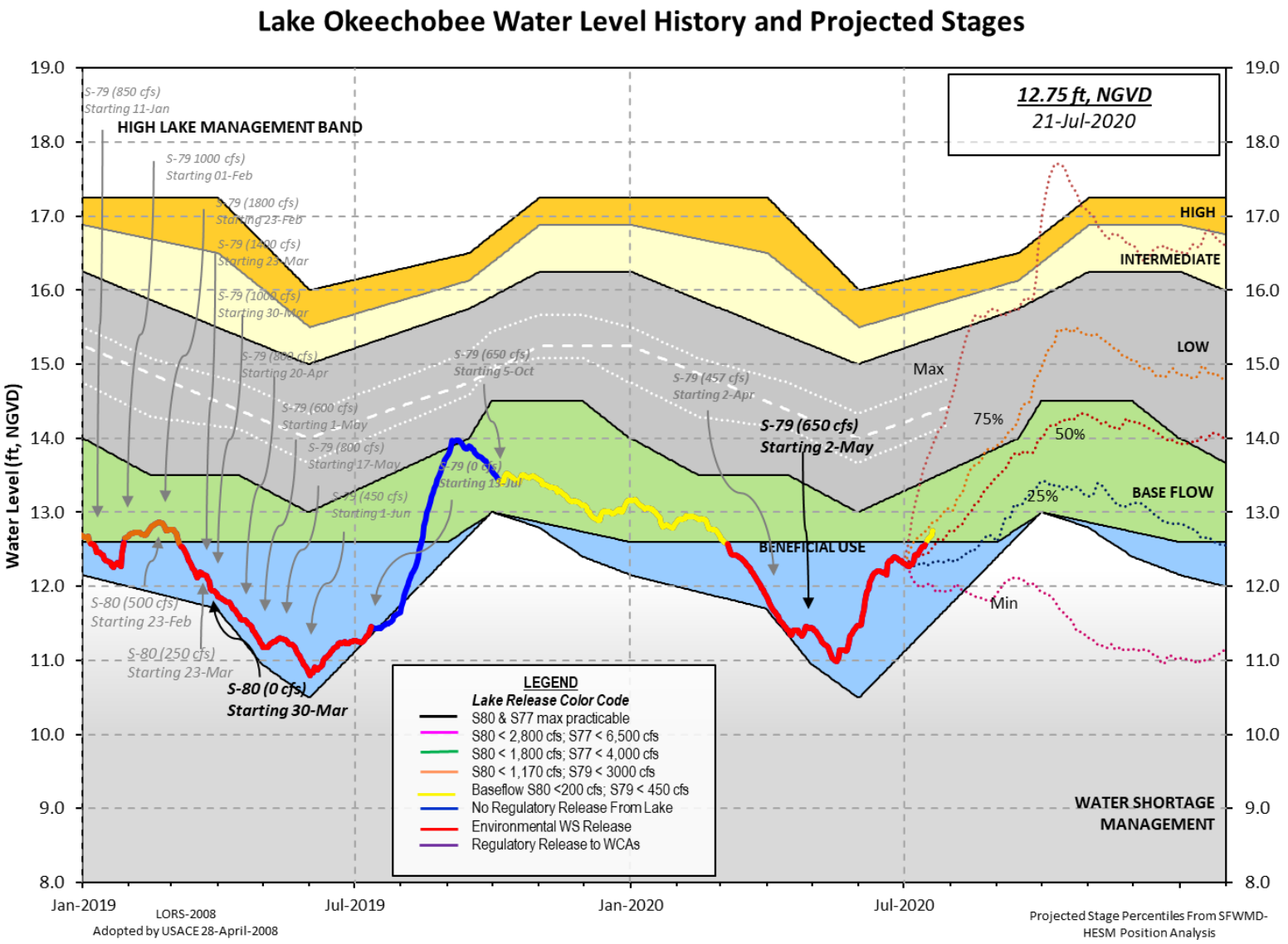


Figure 3. Recent Lake Okeechobee stage and releases, with projected stages based on a dynamic position analysis.

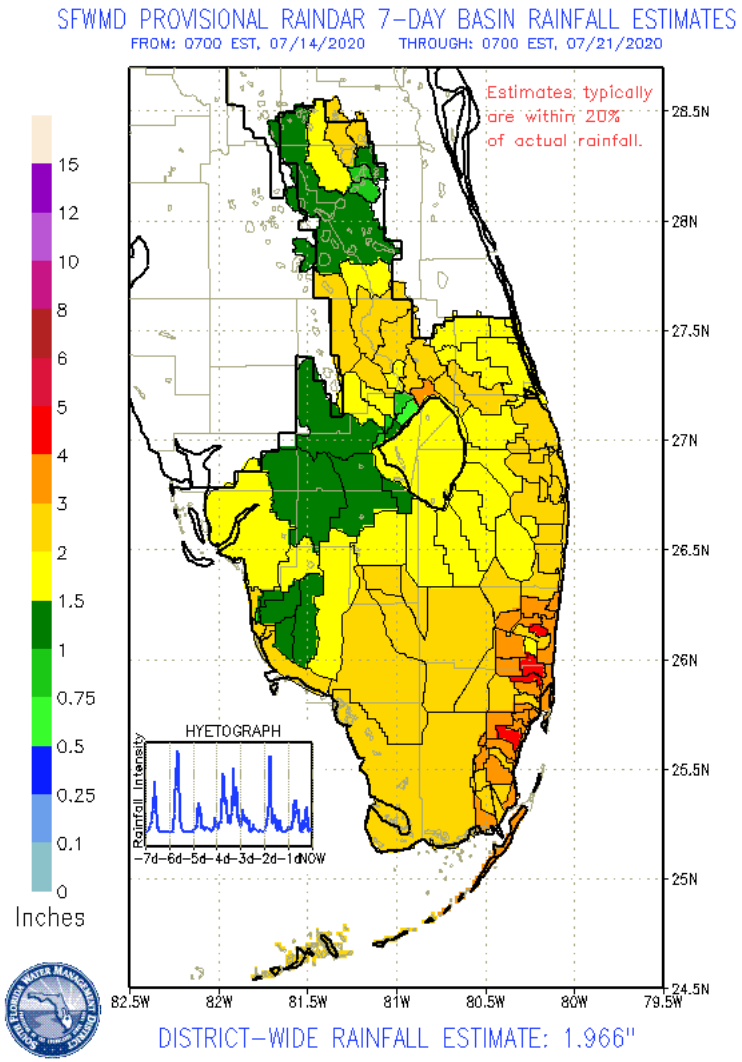


Figure 4. 7-Day rainfall estimates by RAINDAR.

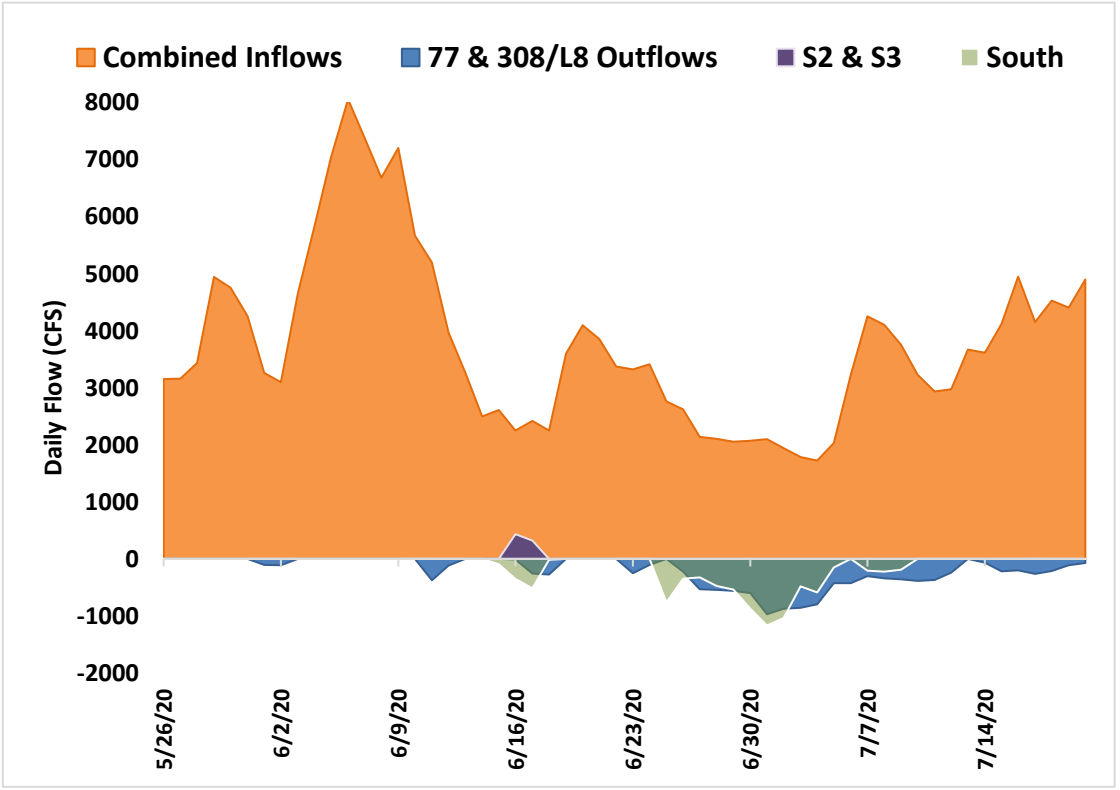


Figure 5. Major inflows (orange) and outflows (blue) of Lake Okeechobee, including the S-350 structures designated as South (green). The L-8 Canal flows through Culvert 10A are included as outflows when positive, and as inflows when backflowing into the Lake. All inflows and outflows are shown as positive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

Samples collected on July 7- 8, 2020

Station	CHL*a* (ug/L)	TOXIN (ug/L)	TAXA
FEBIN	P	BDL	mixed
FEBOUT	P	BDL	*Cylindro*
KISSR0.0	P	BDL	mixed
L005	P	BDL	mixed
LZ2	P	**0.3**	mixed
KBARSE	P	BDL	mixed
RITTAE2	P	BDL	mixed
PELBAY3	P	BDL	*Microcys*
POLE3S	P	BDL	mixed
LZ25A	P	BDL	mixed
PALMOUT	P	BDL	mixed
PALMOUT1	P	BDL	mixed
PALMOUT2	P	BDL	mixed
PALMOUT3	P	BDL	*Microcys*
POLESOUT	**93.2**	BDL	*Cylin/Plank*
POLESOUT1	P	BDL	mixed
POLESOUT2	P	**3.8**	*Microcys*
POLESOUT3	P	**4.9**	*Microcys*
EASTSHORE	**70.6**	**7.5**	*Microcys*
NES135	P	**3.0**	*Microcys*
NES191	**106.0**	**8.8**	*Microcys*

Station	CHL*a* (ug/L)	TOXIN (ug/L)	TAXA
L001	**142.0**	BDL	*Cylindro*
L004	P	**17**	*Microcys*
L006	P	**1.0**	*Microcys*
L007	P	BDL	mixed
L008	P	**6.0**	*Microcys*
LZ30	P	BDL	*Microcys*
LZ40	P	**6**	*Microcys*
CLV10A	P	**14.0**	*Microcys*
NCENTER	**88.7**	BDL	*Cylindro*
Samples collected July 13			
S308C	P	BDL	mixed
S77	P	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

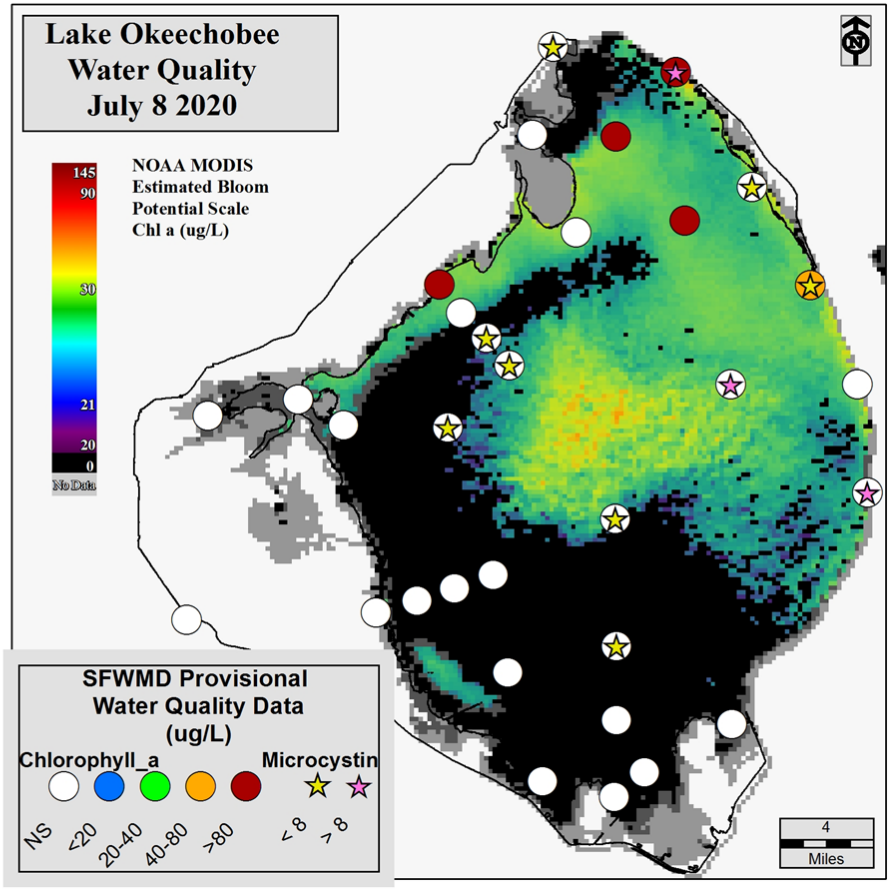


Figure 6. Provisional results from the expanded monitoring sampling trips on July 7-8, 2020.

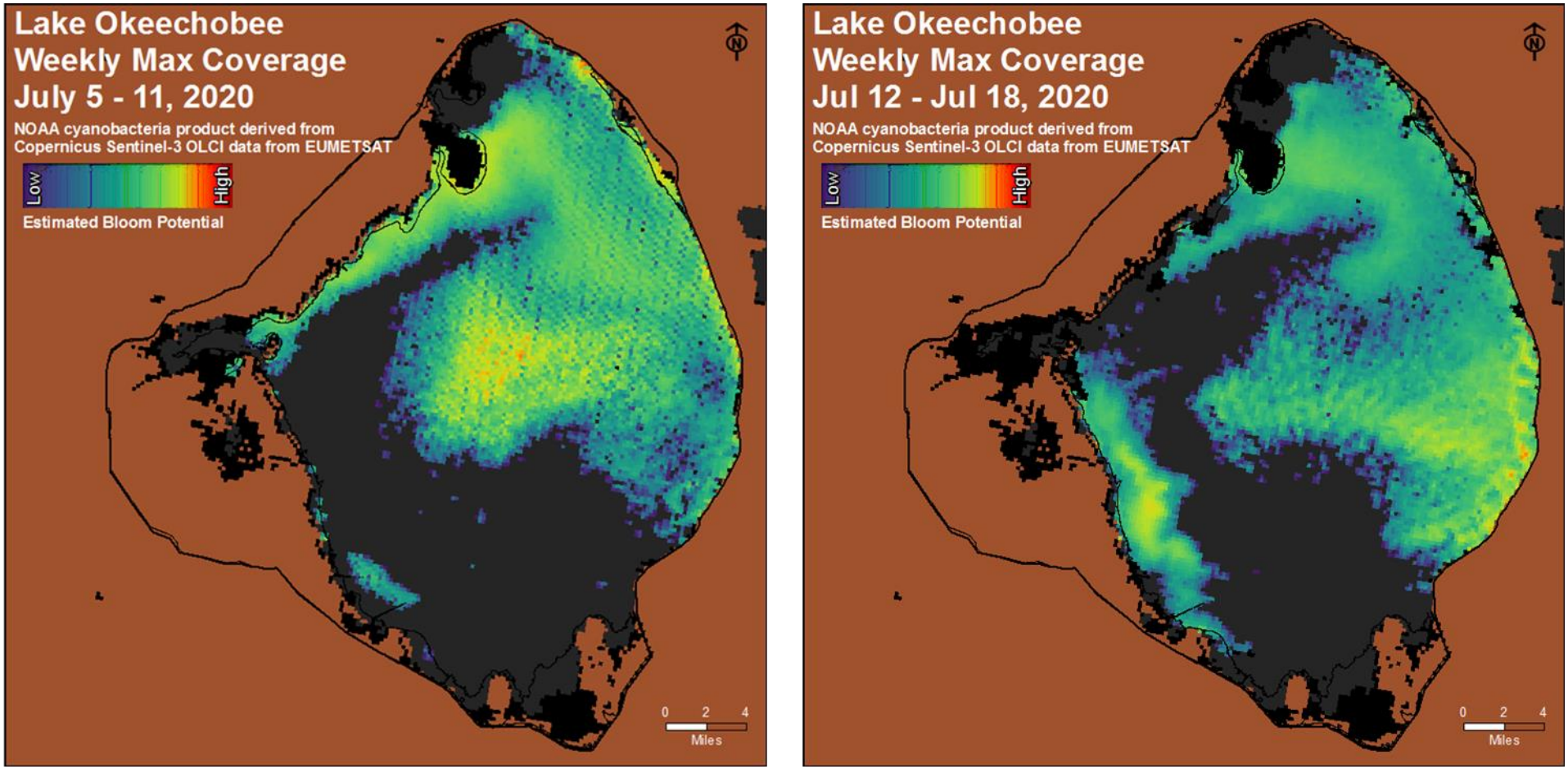


Figure 7. Potential for cyanobacterial blooms on Lake Okeechobee in early and mid-July 2020, based on NOAA's harmful algal bloom monitoring system. Images represent an approximate maximum coverage based on a composite of available weekly images. Gray color indicates cloud cover.

ESTUARIES

St. Lucie Estuary:
Last week total inflow to the St. Lucie Estuary averaged approximately 1,938 cfs (Figures 1 and 2) and last month inflow averaged about 1,236 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	1102
S-80	0
S-308	-233
S-49 on C-24	370
S-97 on C-23	275
Gordy Rd. structure on Ten Mile Creek	191

Over the past week, surface salinity decreased 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 11.0. 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.

Sampling Site	Surface	Bottom	Envelope
HR1 (North Fork)	**4.1** (6.9)	**7.6** (10.4)	NA[1]
US1 Bridge	**9.5** (12.4)	**11.6** (15.0)	10.0-26.0
A1A Bridge	**18.5** (19.9)	**24.2** (24.1)	NA[1]

[1]Envelope not applicable

Caloosahatchee Estuary:
Last week total inflow to the Caloosahatchee Estuary averaged approximately 1,142 cfs (Figures 5 and 6) and last month inflow averaged about 1,177 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	154
S-78	465
S-79	951
Tidal Basin Inflow	191

Over the past week in the estuary, surface salinities increased slightly in the upper 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)	**0.7** (0.3)	**0.7** (0.3)	NA[1]
Val I75	**0.6** (0.5)	**1.0** (0.5)	0.0-5.0[2]
Ft. Myers Yacht Basin	**5.3** (5.0)	**7.3** (6.3)	NA
Cape Coral	**12.8** (13.5)	**15.5** (15.3)	10.0-30.0
Shell Point	**25.0** (25.8)	**26.3** (26.5)	10.0-30.0
Sanibel	**30.6** (29.5)	**31.5** (31.0)	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 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 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	200	4.9	1.8
B	300	200	3.4	1.5
C	450	200	2.8	1.4
D	650	200	2.2	1.2
E	800	200	1.8	1.1

Red tide

The Florida Fish and Wildlife Research Institute reported on July 17, 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 wet. The LORS 2008 release guidance suggest 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.

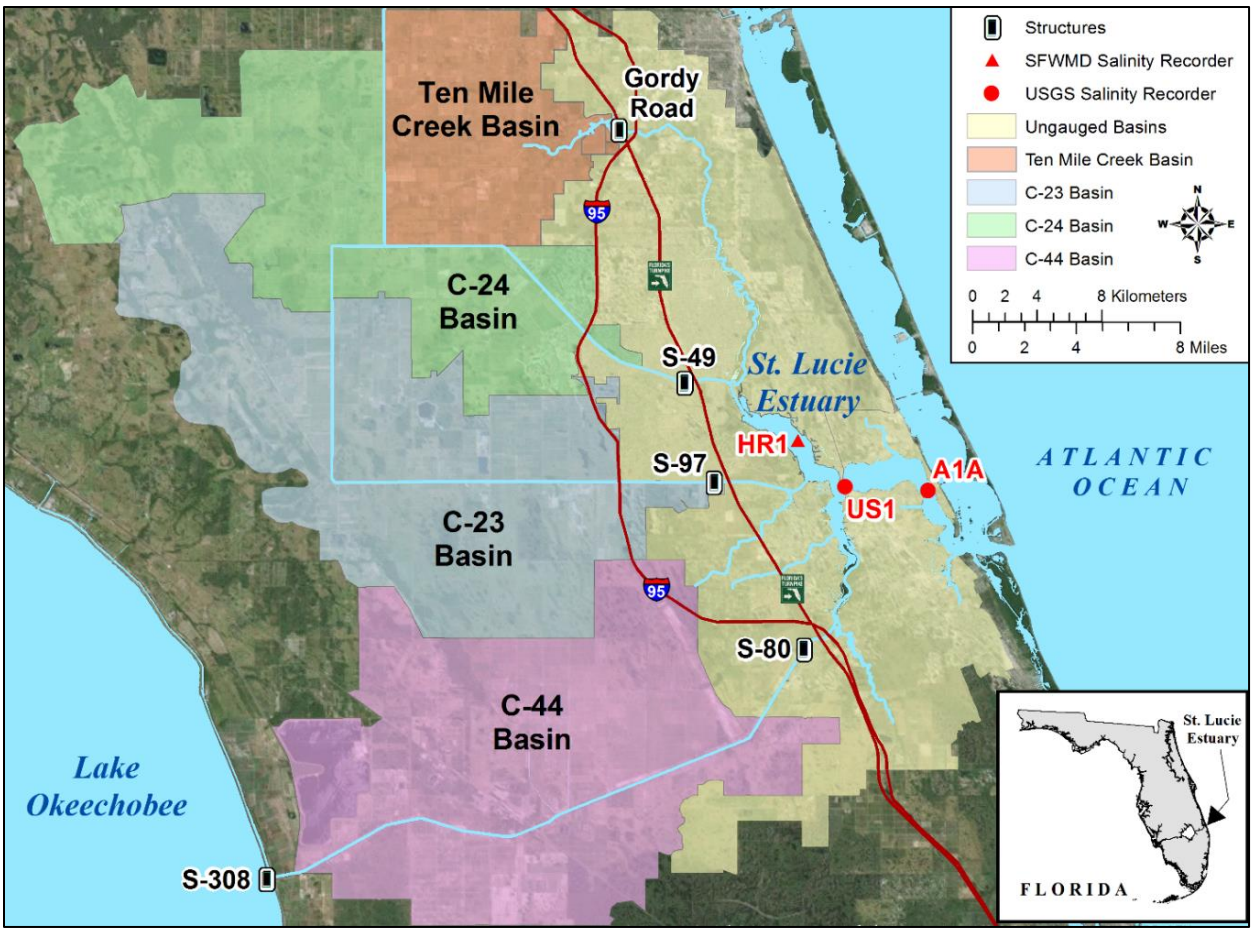


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

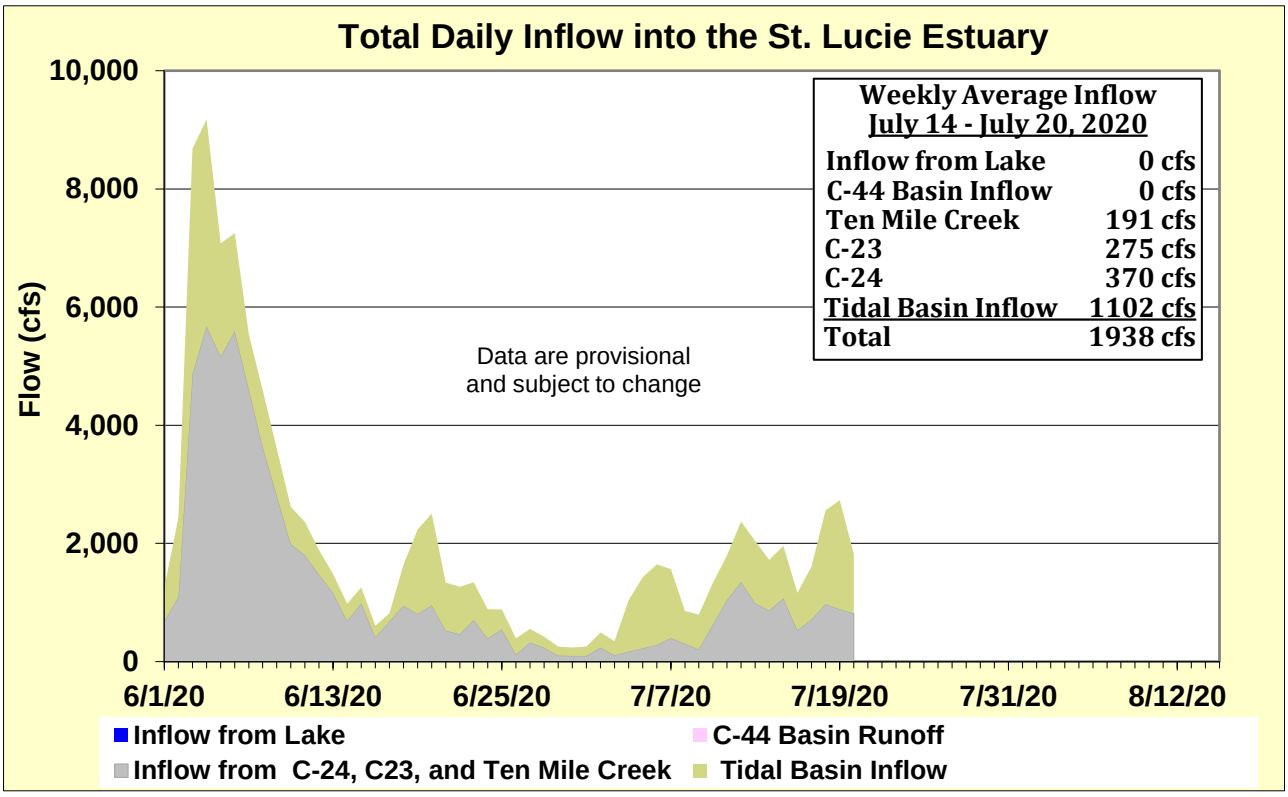


Figure 2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basin into the St. Lucie Estuary.

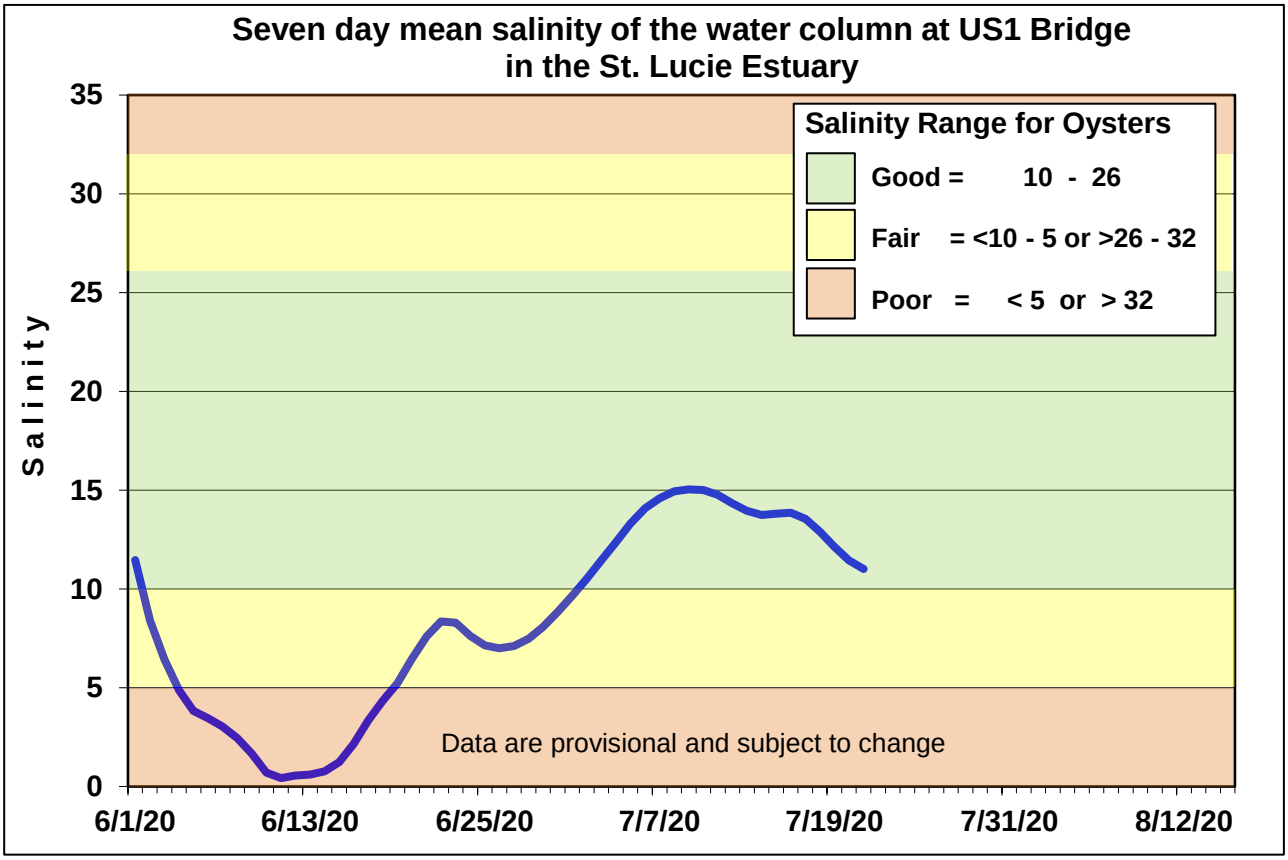


Figure 3. Seven-day mean salinity of the water column at the US1 Bridge.

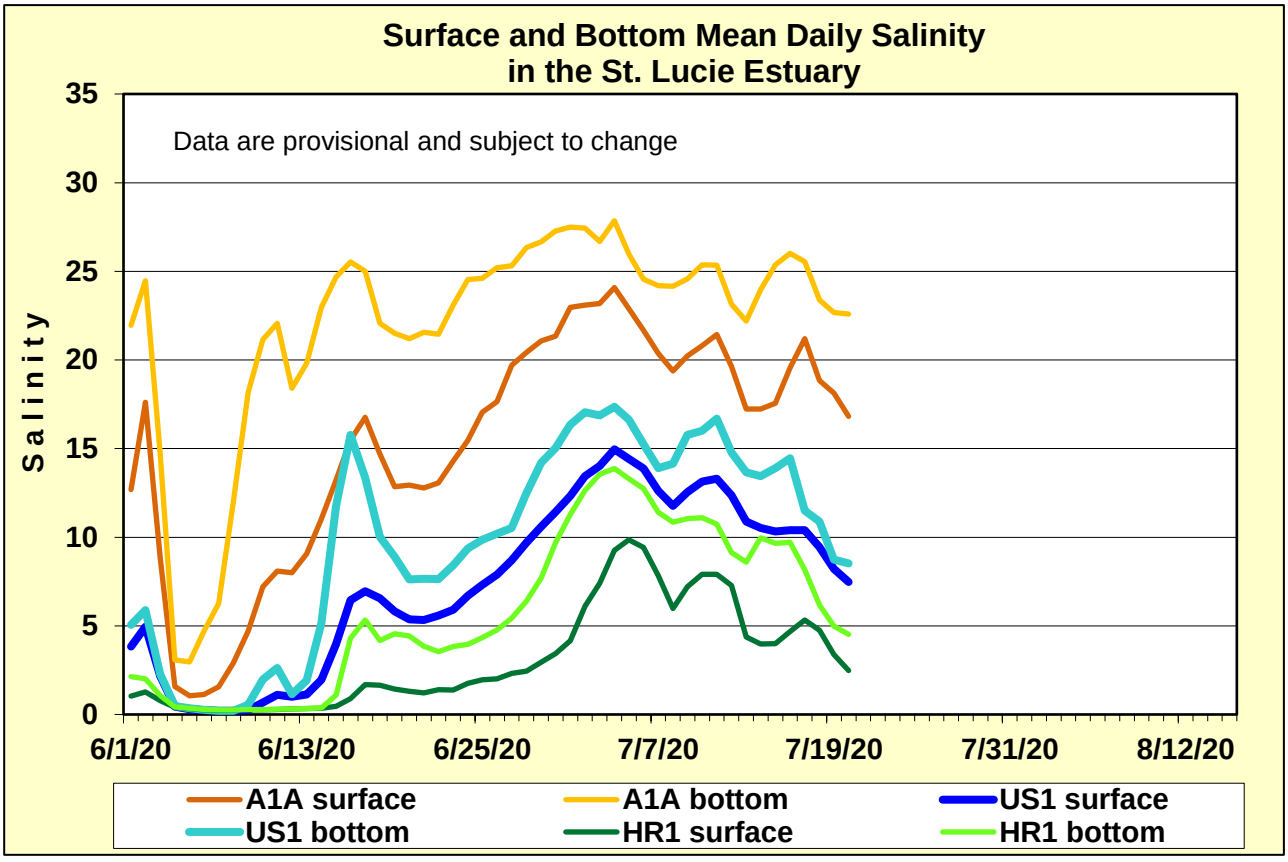


Figure 4. Daily mean salinity at the A1A, US1, and HR1 stations.

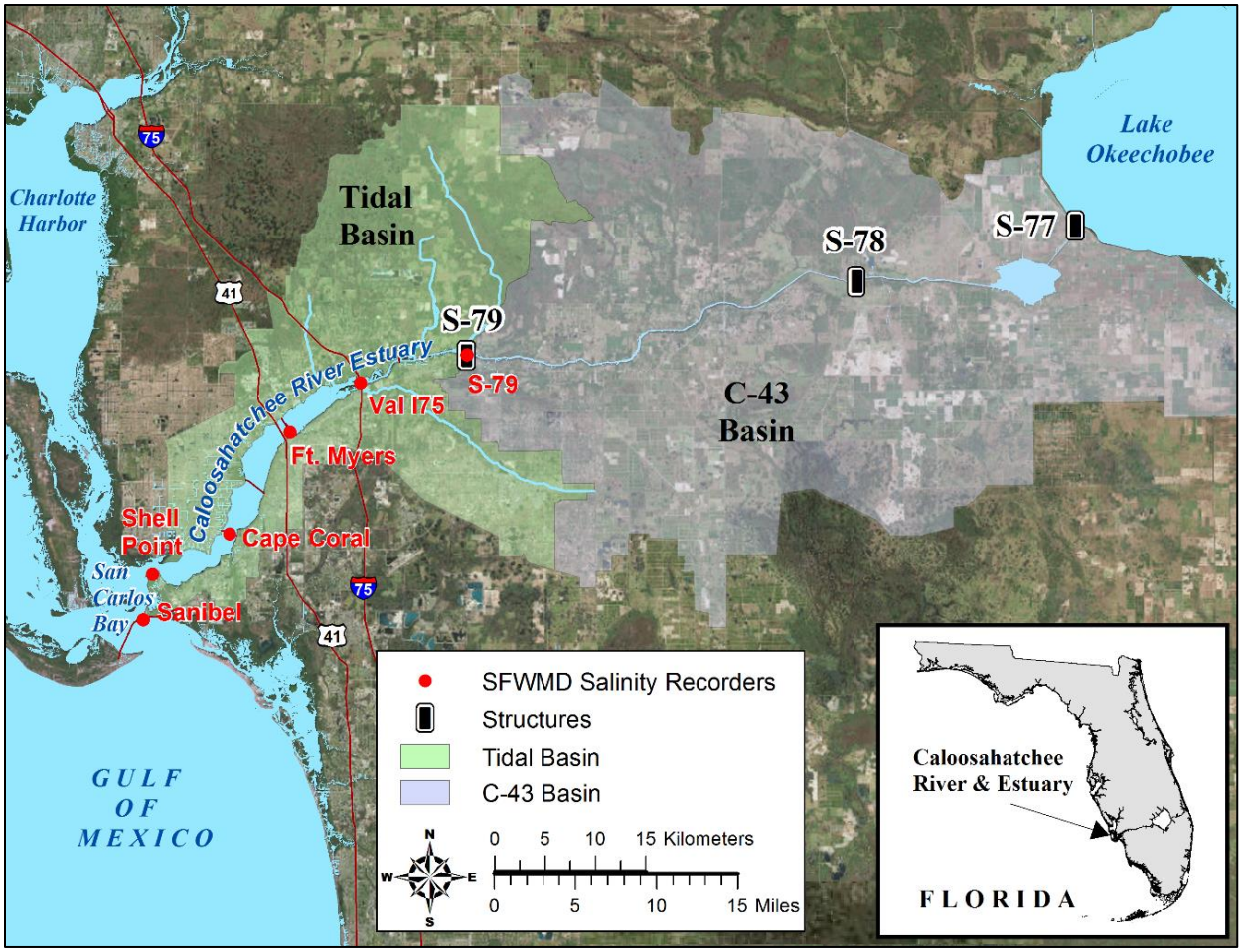


Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

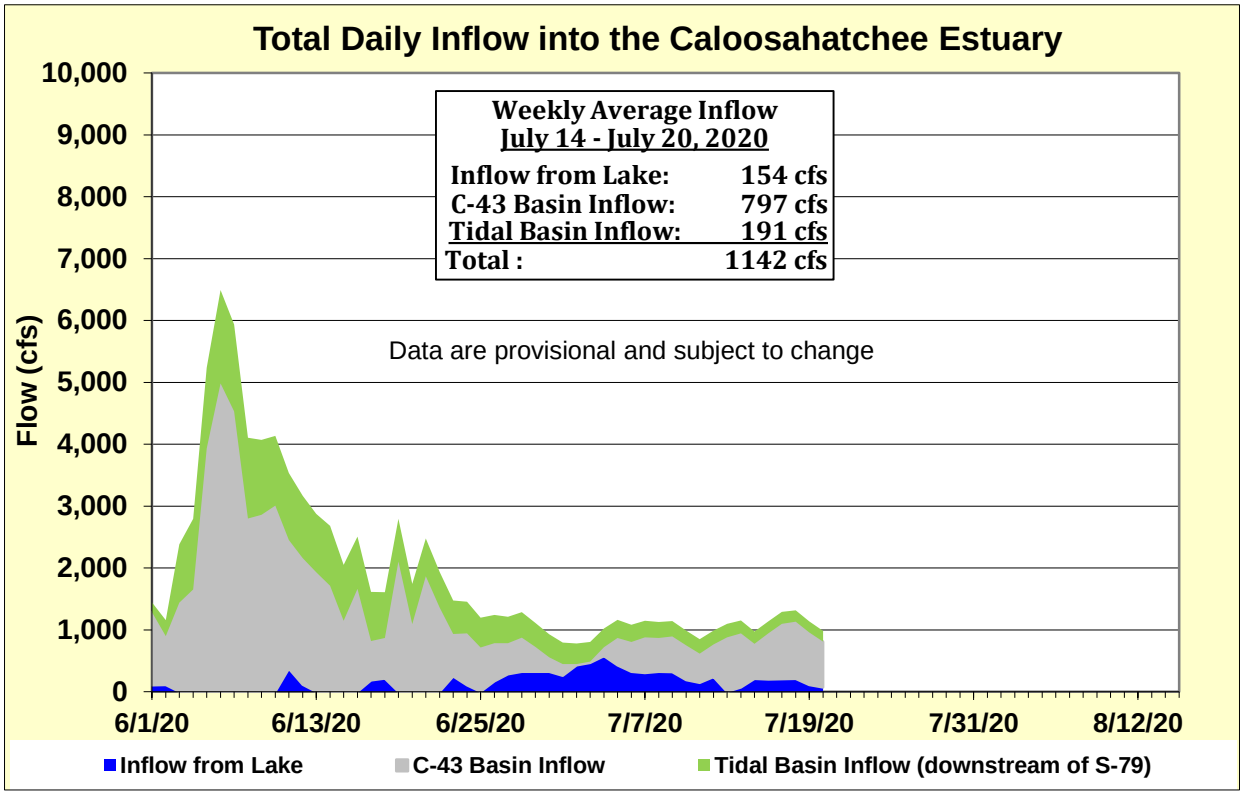


Figure 6. Total daily inflows from Lake Okeechobee, runoff from the C-43 basin.

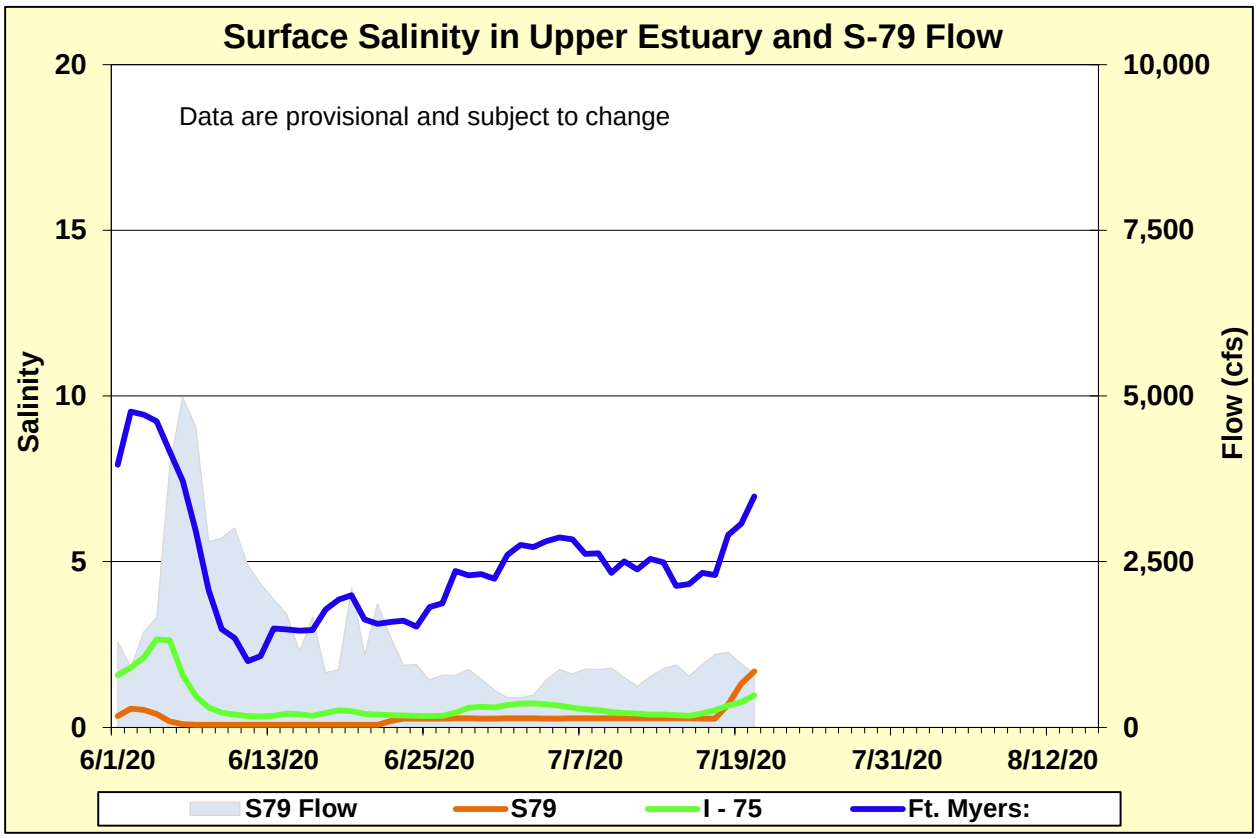


Figure 7. Daily mean flows at S-79 and salinity at upper estuary monitoring stations.

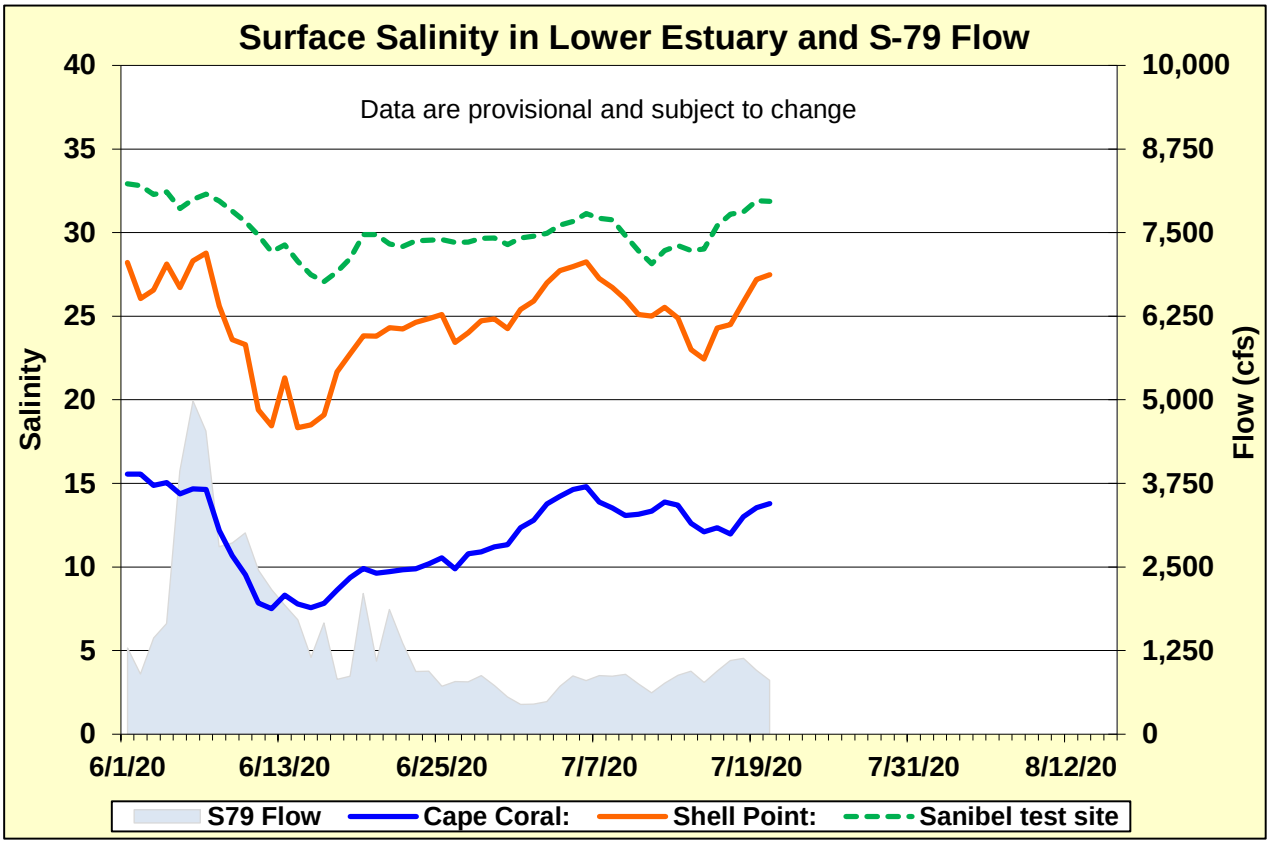


Figure 8. Daily mean flows at S-79 and salinity at lower estuary stations.

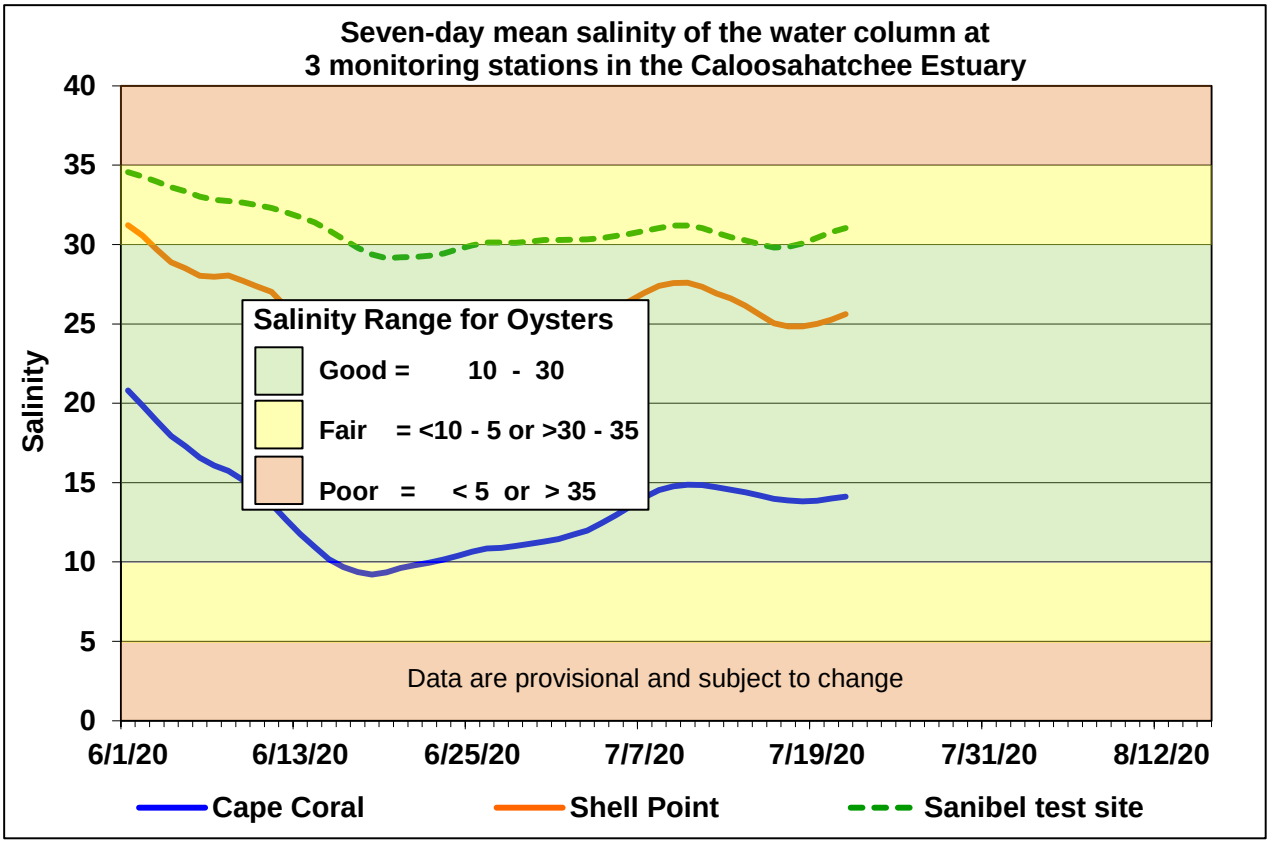


Figure 9. Seven-day mean salinity at Cape Coral, Shell Point, and Sanibel monitoring stations.

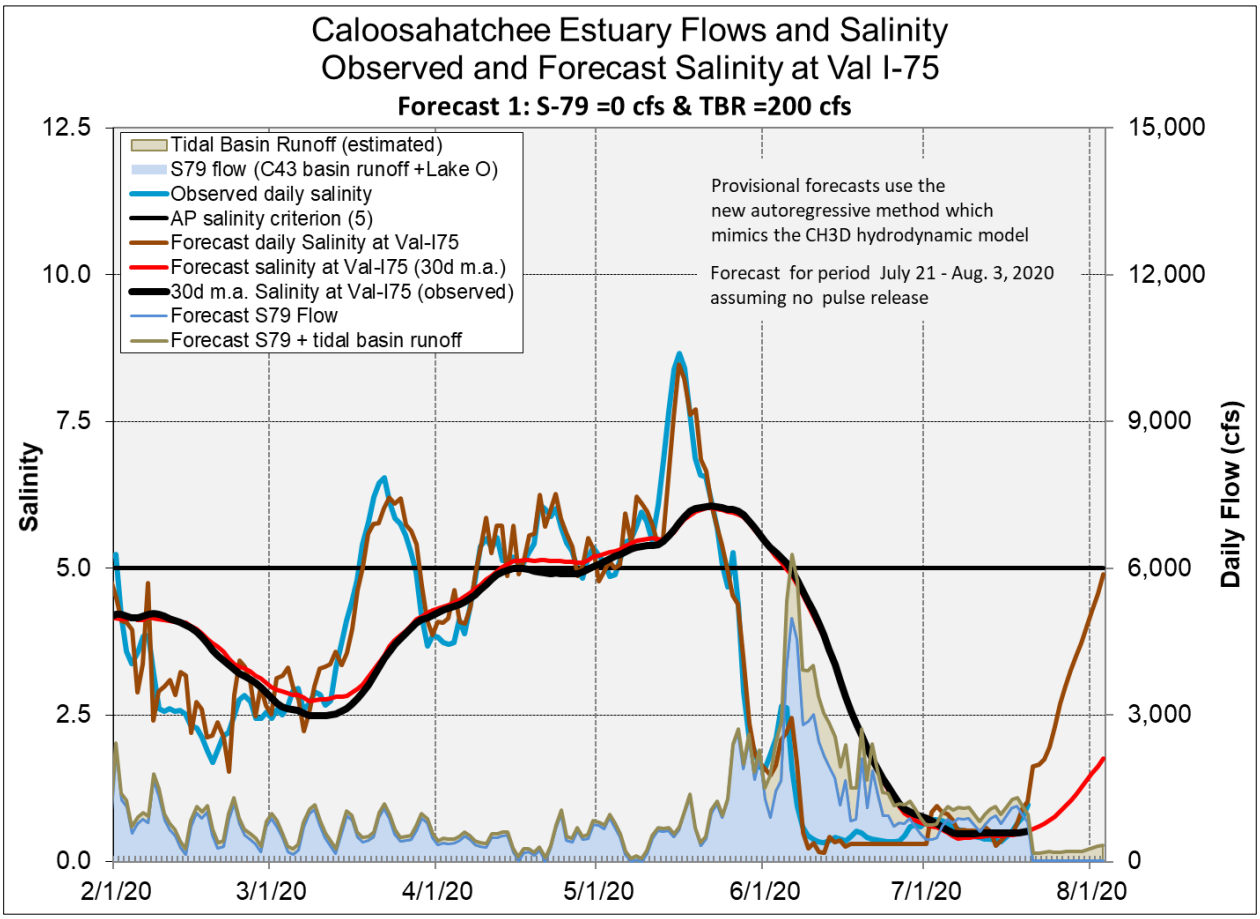
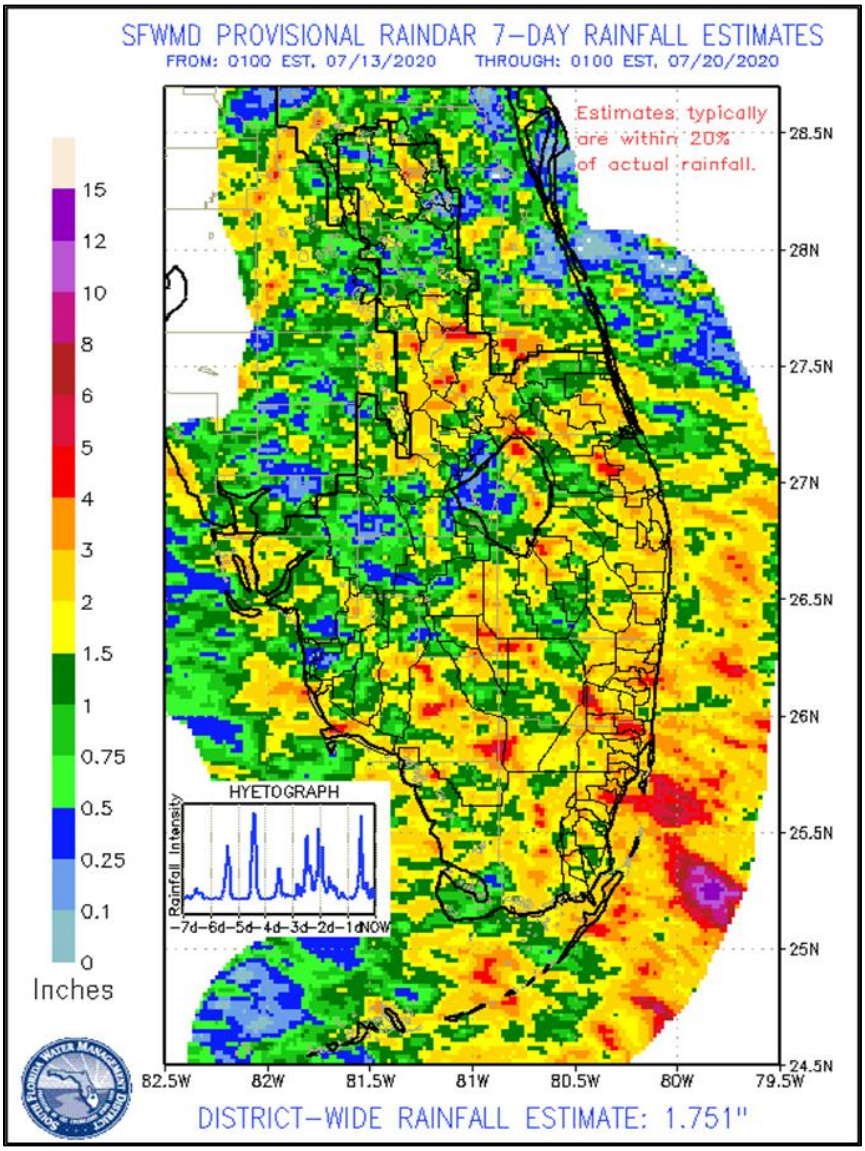


Figure 10. Forecasted Val I-75 surface salinity assuming no pulse release at S-79.

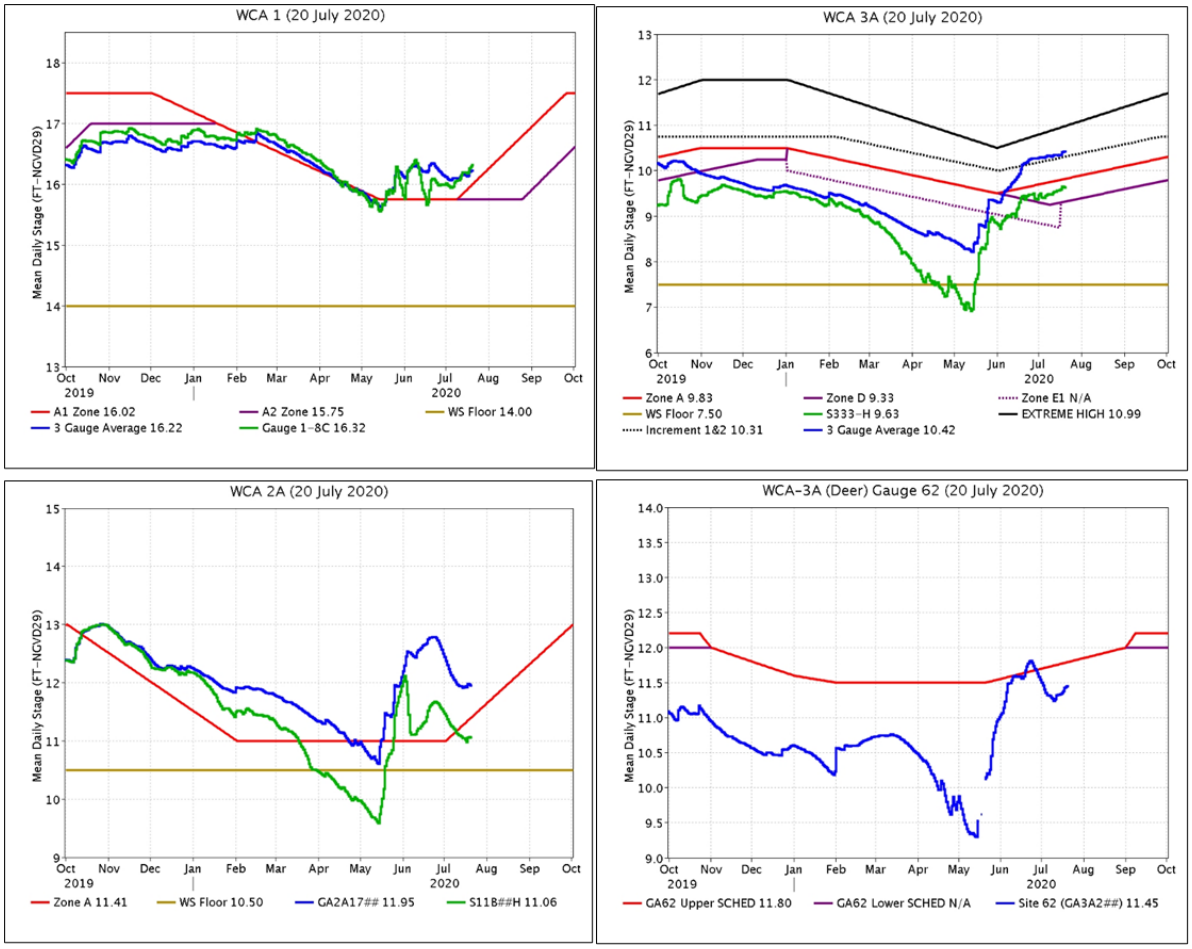
EVERGLADES

Above-average rainfall was consistently recorded across the Everglades last week. At gauges monitored for this report, stages rose on average of 0.10 feet last week with a maximum increase of 0.23 feet in WCA-3B. Evaporation was estimated at 1.60 inches last week, slightly lower than the week prior.

Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	1.79	+0.03
WCA-2A	1.94	+0.02
WCA-2B	2.53	+0.11
WCA-3A	1.88	+0.09
WCA-3B	2.34	+0.23
ENP	1.78	+0.07



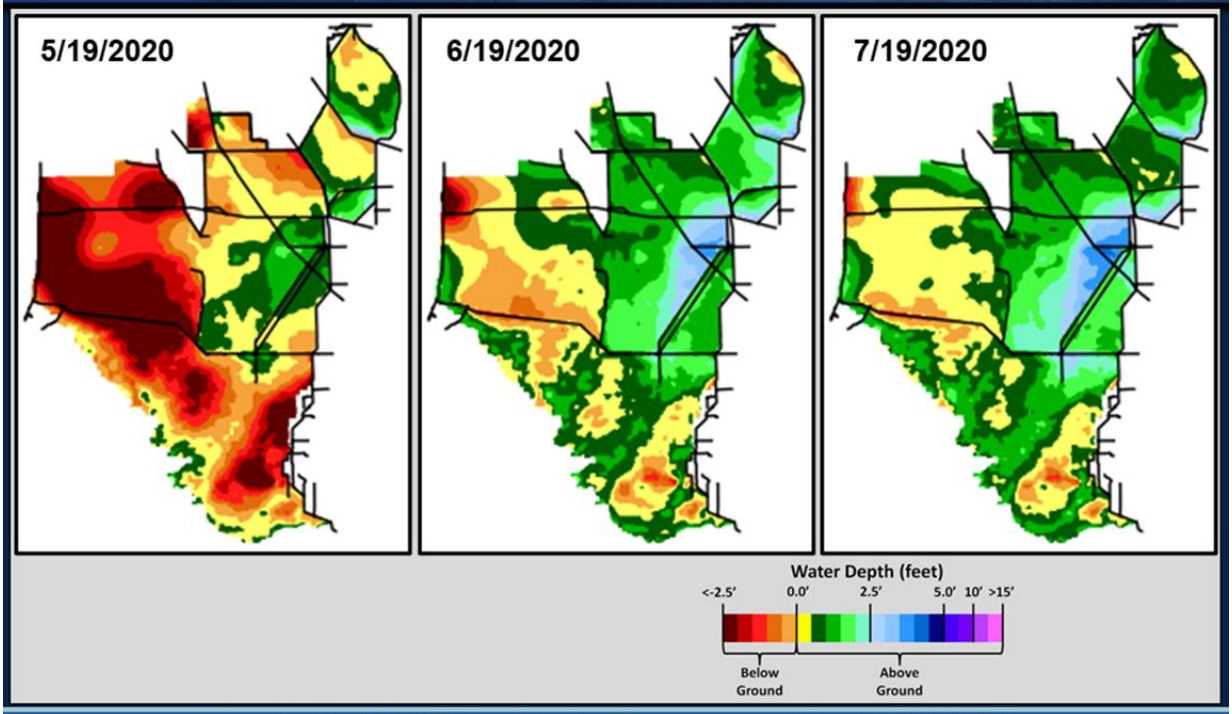
Regulation Schedules: WCA-1: Stage at the 1-8C Gauge remained trending along the rising Zone A1 regulation line last week, currently 0.30 feet above nearly the same as the week prior. WCA-2A: Stage at Gauge 2-17 continued to stabilize last week, now 0.54 feet above the rising Zone A regulation line. WCA-3A: The Three Gauge Average continues to parallel the Increment 1.2-line, currently 0.11 feet above that rising action line. WCA-3A: Stage at gauge 62 (Northwest corner) increased last week, trending towards the rising Upper Schedule, currently 0.35 feet below.



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 building, in excess of 3.5 feet along the upper reaches of the L-67 canal. WCA-2A depths have fallen especially in the south western regions upstream of the S-11s. Stages in WCA-1 remain lowest in the northeast and deeper along the southern perimeter. Hydrologic connectivity is returning to 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, most significantly along the upper L-67 canal. Northwestern WCA-3A is slightly lower in stage. WCA-2A is significantly drier, most dramatically in the east. Stage differences in WCA-1 are mixed with significantly drier conditions in the northwest. Looking back one year the stage difference patterns are very different compared to the monthly output and more significant in WCA-3A and WCA-1. The WDAT model indicates mixed but mostly wetter conditions in the western basins and western ENP compared to a month ago but not a year ago particularly in western BCNP.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

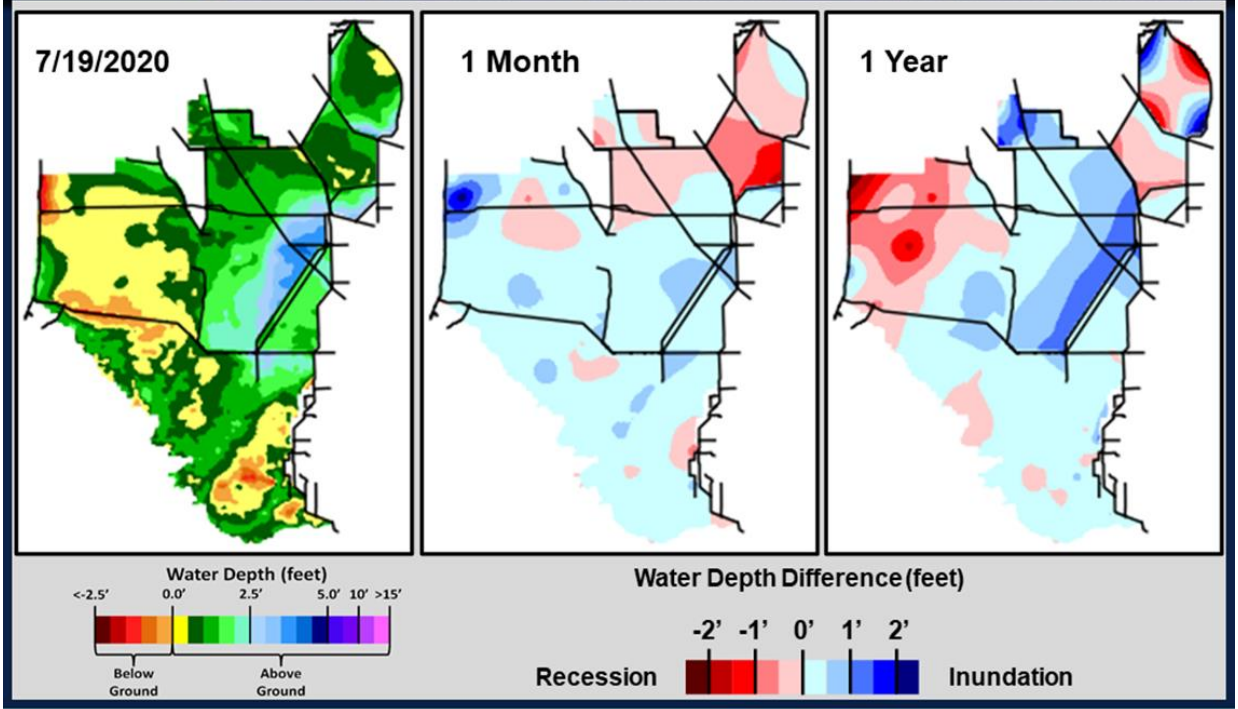
SFWDAT Water Depth Monthly Snapshots



South Florida Water Depth Assessment Tool (SFWDAT)

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

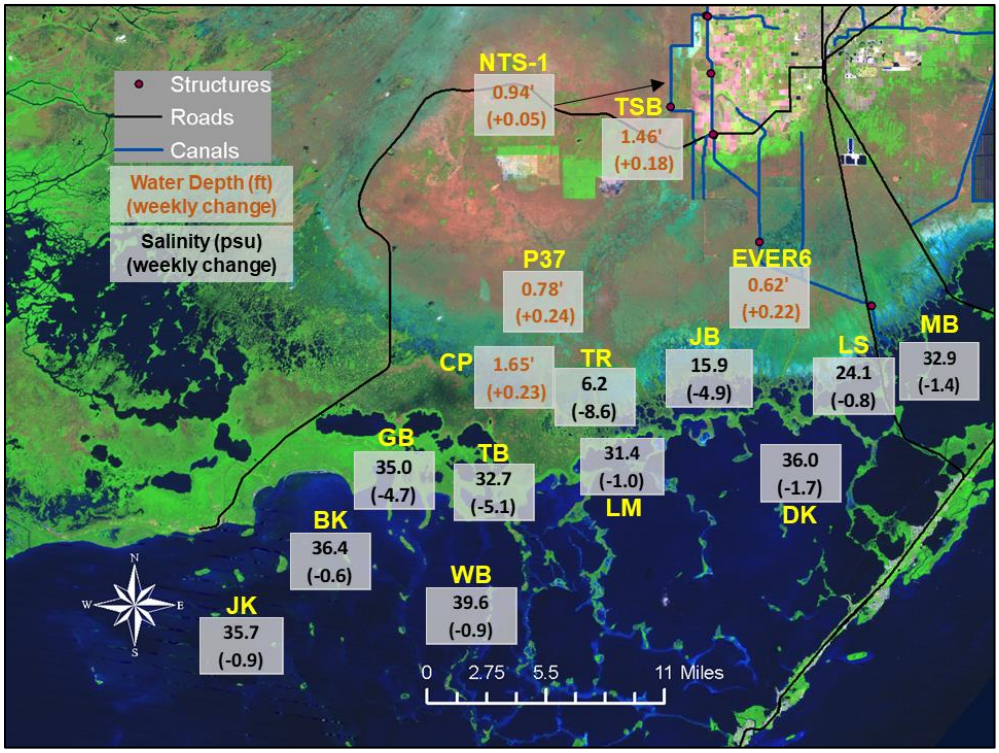
SFWDAT Everglades Difference Maps (Present – Past)

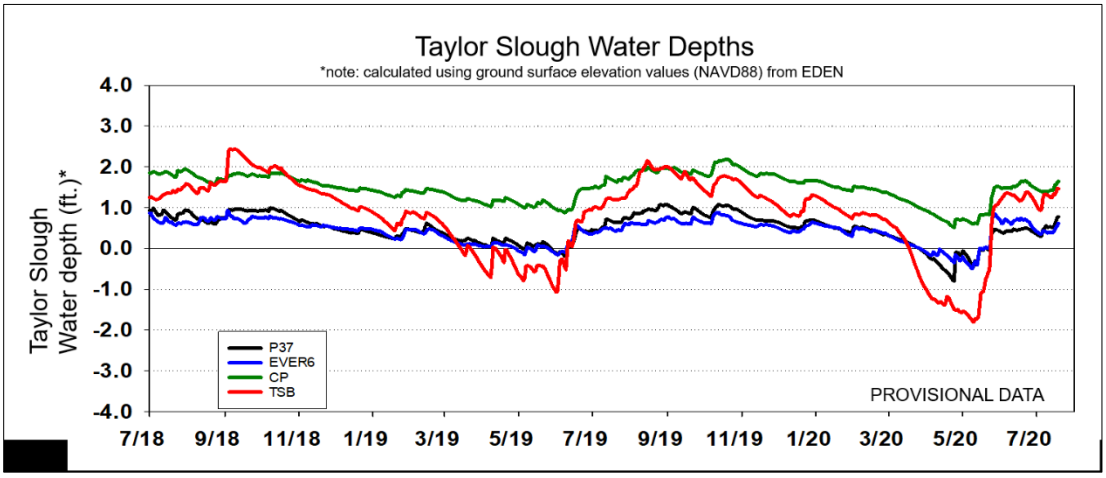


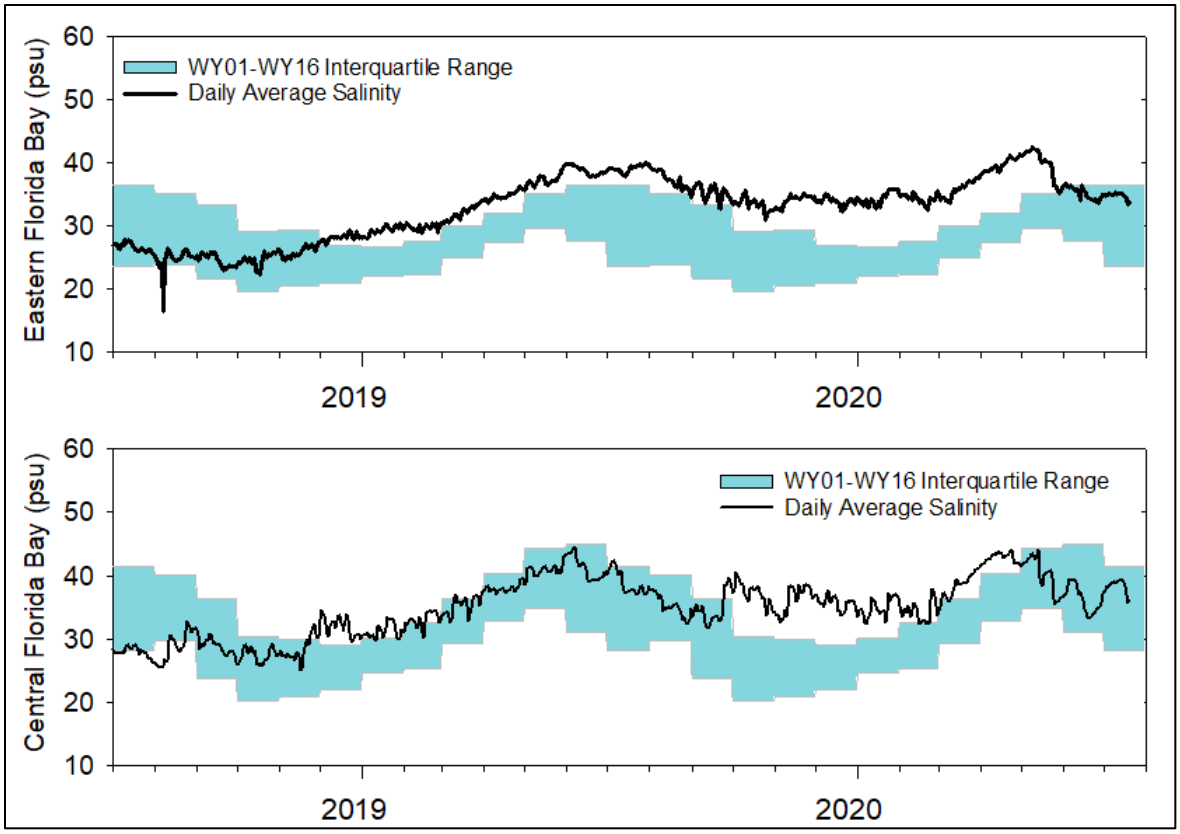
South Florida Water Depth Assessment Tool (SFWDAT)

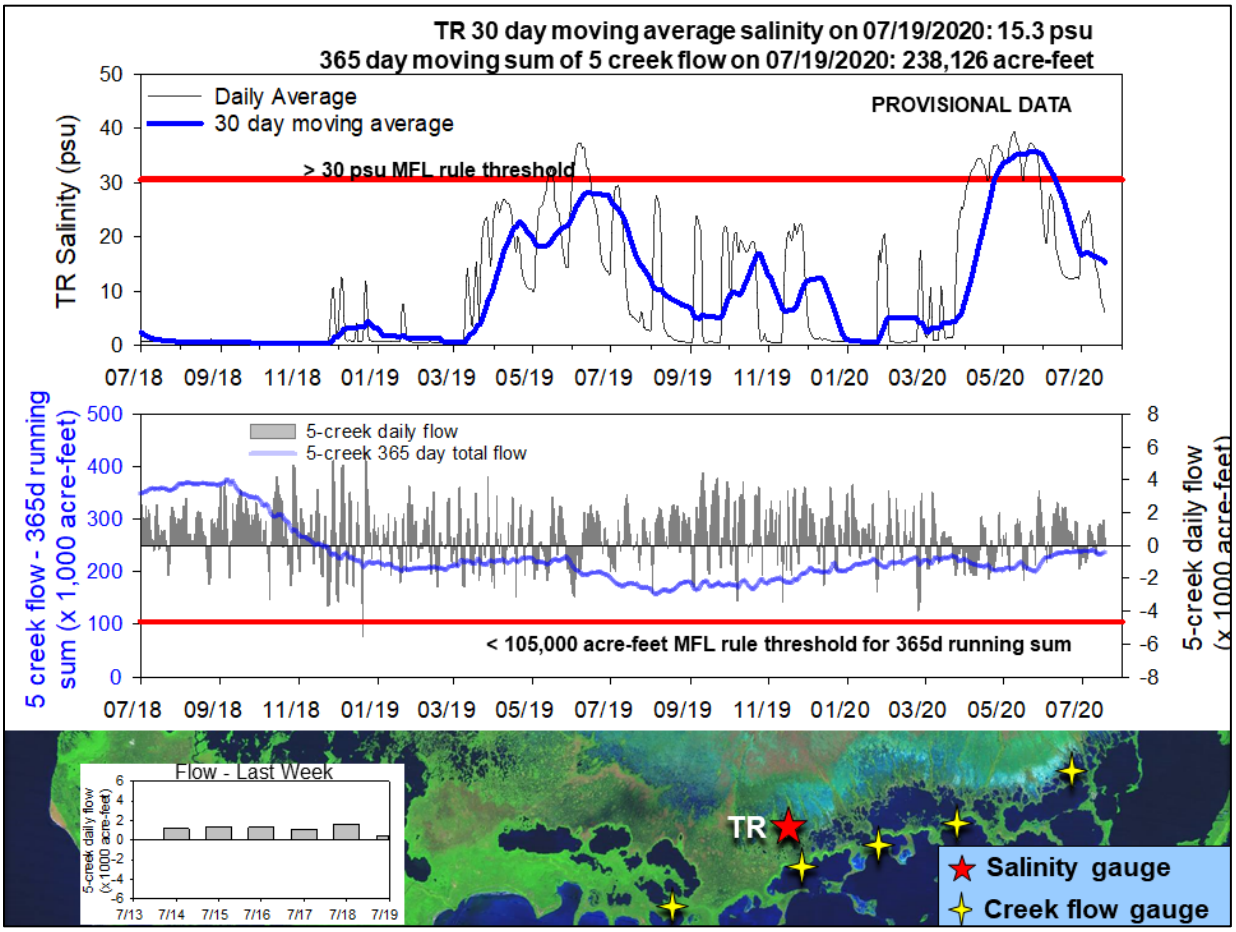
Tree island inundation: Current rough estimates using WDAT (7/20/20), 26% or 100 of the tree islands are currently inundated, up from 22% the week prior. Initial islands inundated beginning 5/24/20, longest duration of continuous inundation is 54 days. Maximum water depth relative to the tree island head is currently 1.48 feet.

Taylor Slough Water Levels: Rainfall over Taylor Slough and Florida Bay this past week averaged 2.46 inches, and stages increased 0.18 feet on average. The largest weekly increase was 0.24 feet in central Taylor Slough where the largest measured rainfall (4.23 inches) occurred as well. The increase in operations towards northern Taylor Slough should keep water levels rising in the near future.






Eastern Florida Bay (psu)
WY01-WY16 Interquartile Range
Daily Average Salinity
60
50
40
30
20
10
2019
2020
Central Florida Bay (psu)
WY01-WY16 Interquartile Range
Daily Average Salinity
60
50
40
30
20
10
2019
2020


TR 30 day moving average salinity on 07/19/2020: 15.3 psu
365 day moving sum of 5 creek flow on 07/19/2020: 238,126 acre-feet
TR Salinity (psu)
Daily Average
30 day moving average
PROVISIONAL DATA
> 30 psu MFL rule threshold
50
40
30
20
10
0
07/18
09/18
11/18
01/19
03/19
05/19
07/19
09/19
11/19
01/20
03/20
05/20
07/20
5 creek flow - 365d running sum (x 1,000 acre-feet)
5-creek daily flow
5-creek 365 day total flow
< 105,000 acre-feet MFL rule threshold for 365d running sum
500
400
300
200
100
0
8
6
4
2
0
-2
-4
-6
-8
5-creek daily flow (x 1000 acre-feet)
07/18
09/18
11/18
01/19
03/19
05/19
07/19
09/19
11/19
01/20
03/20
05/20
07/20
Flow - Last Week
5-creek daily flow (x1000 acre-feet)
6
4
2
0
-2
-4
-6
7/13
7/14
7/15
7/16
7/17
7/18
7/19
TR
Salinity gauge
Creek flow gauge

Florida Bay Salinities: Average salinity in Florida Bay decreased 2 practical salinity units (psu) with decreases occurring throughout the bay. Shoreline salinities averaged a weekly decrease of 4 psu and mangrove pond salinity at TR decreased to below 10 psu suggesting that the freshwater front is moving towards the shoreline finally.

Florida Bay MFL: Salinity at the TR station in the mangrove zone (tracked for the Florida Bay MFL) decreased from 15 psu to end the week at 6 psu while still decreasing. The 30-day moving average decreased 1.0 psu to end at 15.3 psu. Weekly flow from the 5 creeks identified by yellow stars on the map totaled about 7,000 acre-feet with positive flows persisting all week. The 365-day moving sum of flow from the five creeks (tracked as part of the Florida Bay MFL criteria) increased 1,000 acre-feet this week to end at 238,126 acre-feet which 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. Now that depths have stabilized in WCA-2A, if conditions allow, moderating ascension rates to within the preferred ecological range of 0.05–0.15 feet per week as stage follows the regulation schedule or slightly above 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 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 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 21st, 2020 (red is new)			
Area	Weekly change	Recommendation	Reasons
WCA-1	Stage increased by 0.03'	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 0.11'	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 decreased by 0.01'	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 0.12'	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 0.11'	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, and and tree island ecology is dimineshed by flooding
Southern WCA-3A S	Stage increased by 0.14'		
WCA-3B	Stage increased by 0.23'	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 0.07'	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 +0.05' to +0.24'	Move water southward as possible	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged −0.6 to −5.1 psu	Move water southward as possible	When available, provide freshwater to maintain low salinity buffer and promote water movement.