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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: August 19, 2020

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

Enhanced daily thunderstorm coverage is possible today through Friday. An upper level trough over the Gulf of Mexico is expected to pull moisture northward over the District, as well as move energy across the area, which should result in above average thunderstorm coverage Wednesday, Thursday, and Friday. While the focus of heaviest rains will shift each day, all portions of the District should receive some meaningful rains at some point during the next four days. High pressure should then build in across the southern end of the District bringing some drier air from the southeast Saturday and Sunday. Moisture associated with a developing tropical system is forecast to increase the rainfall potential over the southern portion of the District Monday. The exact details of this potential system will remain uncertain for the next few days. Rainfall is forecast to be above the historical average for the first 7-day period (Week 1) and near the historical average for the second 7-day period (Week 2), but there is a high level of uncertainty for Week 2.

Kissimmee

Tuesday morning stages were 55.6 feet NGVD (0.9 feet below schedule) in East Lake Toho, 53.5 feet NGVD (at schedule) in Toho, and 51.3 feet NGVD (0.3 feet above schedule) in Kissimmee-Cypress-Hatchineha; headwater stages were 46.1 feet NGVD at S-65A and 27.6 feet NGVD at S-65D. Tuesday morning discharges were 2,080 cfs at S-65, 2,370 cfs at S-65A, 3,140 cfs at S-65D and 2,720 cfs at S-65E. Dissolved oxygen concentration in the Kissimmee River averaged 0.5 mg/L for the week through Sunday, [well below the critical threshold of 1 mg/L]. Kissimmee River mean floodplain depth on Sunday was 1.9 feet. Today's recommendation is to continue to manage S-65/S-65A discharge per the seasonal recommendations for 2020 Wet Season. 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 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 13.86 feet NGVD on August 17, 2020, 0.15 feet higher than the previous week and 1.20 feet higher than the previous month. The Lake is now in the Low sub-band. Lake stage moved into the ecological envelope (which varies seasonally from 12.0 – 15.0 feet NGVD +/- 0.5 feet) on June 2, 2020, after being up to 1.5 feet below since October 15, 2019, but it is now 0.30 feet above the top of envelope. Ascension rates were high in early June, but briefly slowed and stabilized through the beginning of July, potentially providing submerged plant communities an opportunity to catch up with rising stages. However, lake stage has been rising higher than the recommended rate (<0.5 feet per 2 weeks) over the past few weeks. The cyanobacteria bloom risk

potential decreased from last week in the central and eastern areas but increased in the southwestern area of the Lake.

Estuaries

Total inflow to the St. Lucie Estuary averaged 868 cfs over the past week with no flow coming from Lake Okeechobee. The seven-day average salinities increased in the estuary over the past week. Salinity at the US1 Bridge is in the good range for adult eastern oysters. Total inflow to the Caloosahatchee Estuary averaged 1,911 cfs over the past week with approximately 112 cfs coming from the Lake. The seven-day average salinity decreased slightly 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 for adult eastern oysters at Cape Coral and Shell Point and in the fair range at Sanibel. Lake stage is in the Low sub-band of 2008 LORS. Tributary hydrological conditions are very 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 594,000 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

Below average rainfall across the WCAs meant depths decreased across most of the Everglades. Stages at the “Deer Gauge” in northwestern WCA-3A fell below the Upper Schedule and the two-gauge average stage in WCA-3A North also fell below the Florida Fish and Wildlife Conservation (FFWC) closure stage (EO 20-26 EWMA HL RWMA Closure). Florida Bay and Taylor Slough received even less rainfall this week than the week prior, and stages fell on average in the slough. In Florida Bay, average salinity increased at all sites and is above average for this time of year. Daily average salinity in the mangrove zone remained low last week and flows from the creeks were almost double the volume from the week prior. 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 0.5 feet per two weeks. Over the last month, ascension rates have been generally favorable in regions important to apples snails like central and southern WCA-3A and closer to optimal in WCA-1.

Supporting Information

KISSIMMEE BASIN

Rainfall

The Upper Kissimmee Basin received 1.22 inches of rainfall in the past week and the Lower Basin received 1.19 inches (SFWMD Daily Rainfall Report 08/17/2020).

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: 8/18/2020

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)						
							8/16/20	8/9/20	8/2/20	7/26/20	7/19/20	7/12/20	7/5/20
Lakes Hart and Mary Jane	S-62	133	LKMJ	60.2	R	60.0	0.2	0.1	-0.2	0.0	0.0	0.2	0.2
Lakes Myrtle, Preston, and Joel	S-57	16	S-57	61.0	R	61.0	0.0	-0.1	-0.2	0.0	0.0	0.1	-0.2
Alligator Chain	S-60	18	ALLI	63.3	R	63.2	0.1	0.0	-0.1	0.0	0.0	-0.2	-0.6
Lake Gentry	S-63	28	LKGT	61.0	R	61.0	0.0	-0.1	-0.2	0.1	0.1	0.1	-0.2
East Lake Toho	S-59	632	TOHOE	56.1	R	56.5	-0.4	-0.5	-0.7	-0.8	-0.7	-1.2	-1.5
Lake Toho	S-61	1,512	TOHOW, S-61	53.6	R	53.5	0.1	0.0	-0.2	0.0	0.0	0.2	0.1
Lakes Kissimmee, Cypress, and Hatchineha	S-65	1,611	KUB011, LKISSB	51.3	R	51.0	0.3	0.2	0.1	0.5	0.9	0.7	0.4

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

Discharges at lower basin structures are shown in **Table 2**. **Figure 4** compares floodplain inundation depths from one year and one month ago with current inundation depths in the Phase I restored area of the Kissimmee River. **Figure 5** shows dissolved oxygen concentration along with S-65A discharge, water temperature and rainfall. **Figures 6-8** are included for reference. **Figure 6** is the current guide for operation of S-65 and 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. A preferred discharge plan and the interim regulation schedule (**Figure 7**) will be used until the Headwaters Lakes Revitalization regulation schedule is implemented. **Figure 8** is a map of the Kissimmee Basin showing Central and Southern Florida (C&SF) flood control project structures and color-coded watersheds.

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: 8/18/2020

Metric	Location	1-Day Average		Average for the Preceding 7-Days ¹							
		8/16/2020	8/16/20	8/9/20	8/2/20	7/26/20	7/19/20	7/12/20	7/5/20	6/28/20	6/21/20
Discharge (cfs)	S-65	1,709	1,611	1,760	4,215	4,623	2,396	1,779	1,527	873	581
Discharge (cfs)	S-65A ²	2,040	1,990	2,554	4,851	5,111	3,202	2,174	1,559	1,127	864
Discharge (cfs)	S-65D ²	3,744	4,360	5,466	5,538	3,846	2,383	1,602	1,314	1,453	1,641
Headwater Stage (feet NGVD)	S-65D ²	27.60	27.57	27.70	27.75	26.99	26.02	25.81	25.76	25.72	25.74
Discharge (cfs)	S-65E ²	3,792	4,484	5,703	5,462	3,671	2,229	1,574	1,240	1,402	1,549
Discharge (cfs)	S-67	0	0	0	0	0	0	0	0	0	0
DO (mg/L) ³	Phases I & II/III river channel	0.5	0.5	0.7	0.4	0.2	0.2	1.4	2.7	2.0	1.2
Mean depth (feet) ⁴	Phase I floodplain	1.88	2.07	2.60	3.02	2.64	1.63	1.13	0.73	0.71	0.78

¹Seven-day average of weighted daily means through Sunday midnight.

²S-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.

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

⁴1-day spatial average from South Florida Water Depth Assessment Tool (SFWDAT).

DATA ARE PROVISIONAL; N/A indicates that data were not available.

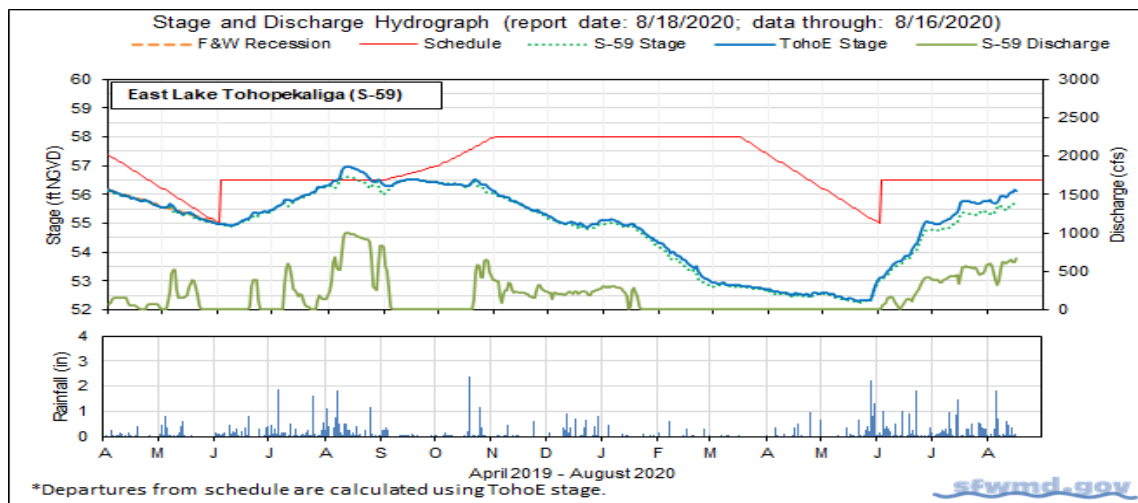


Figure 1. East Lake Toho regulation schedule, stage, discharge and rainfall.

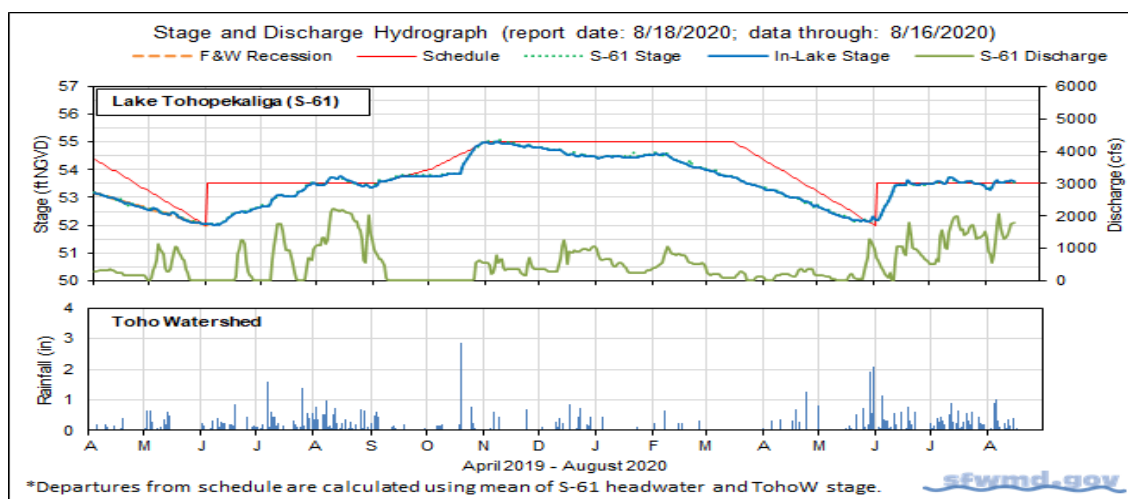


Figure 2. Lake Toho regulation schedule, stage, discharge and rainfall.

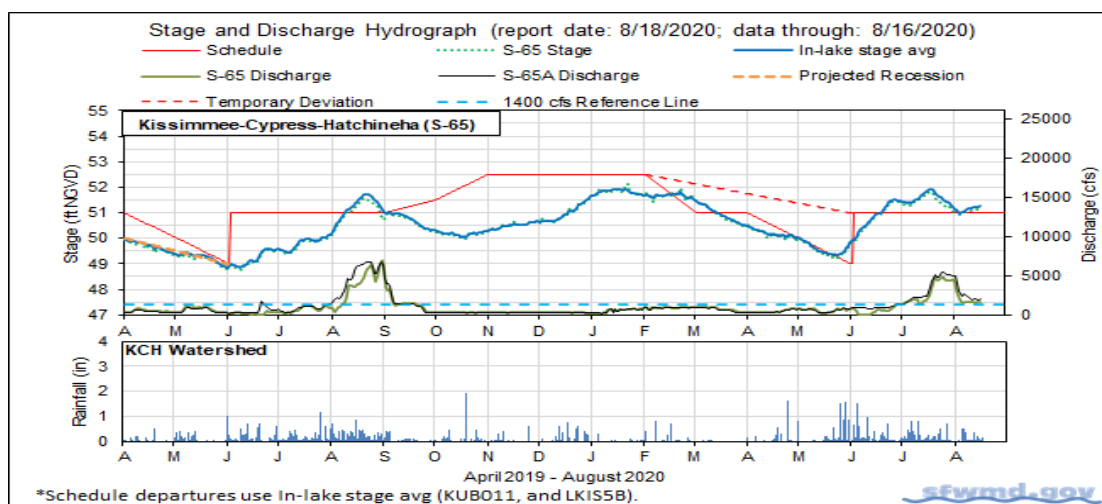


Figure 3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

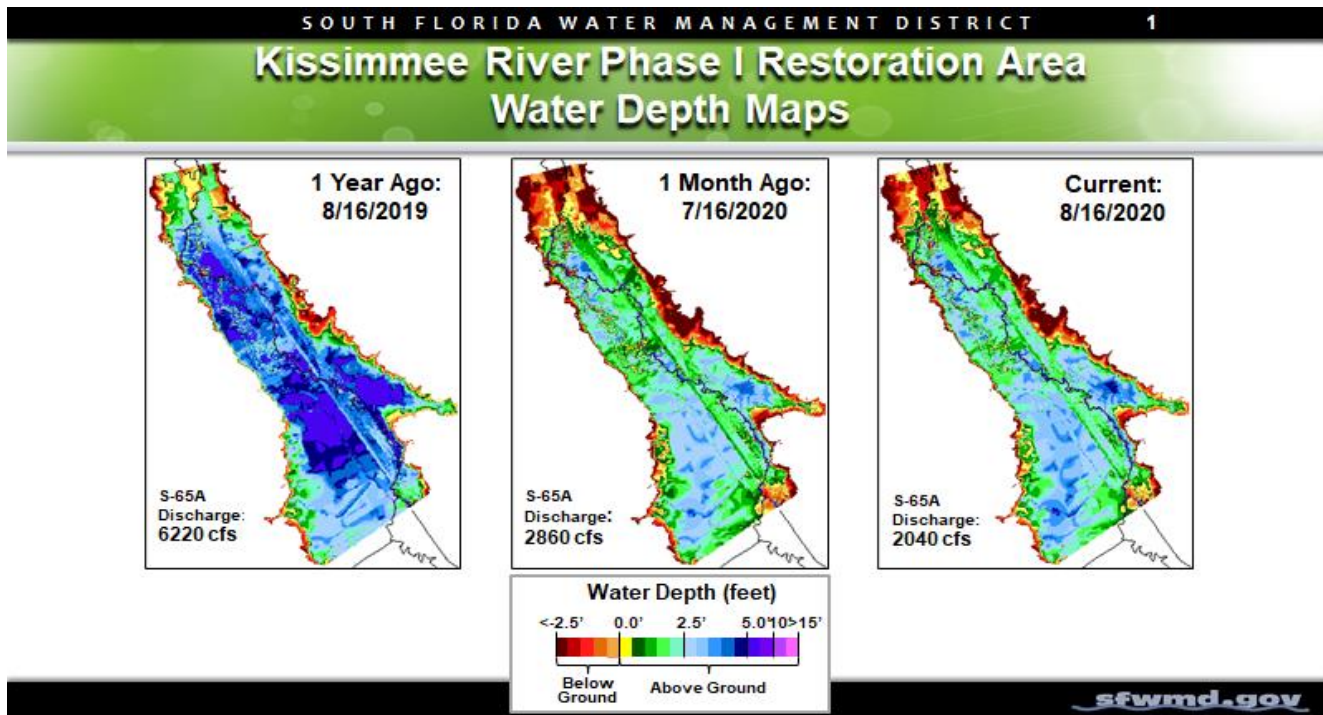
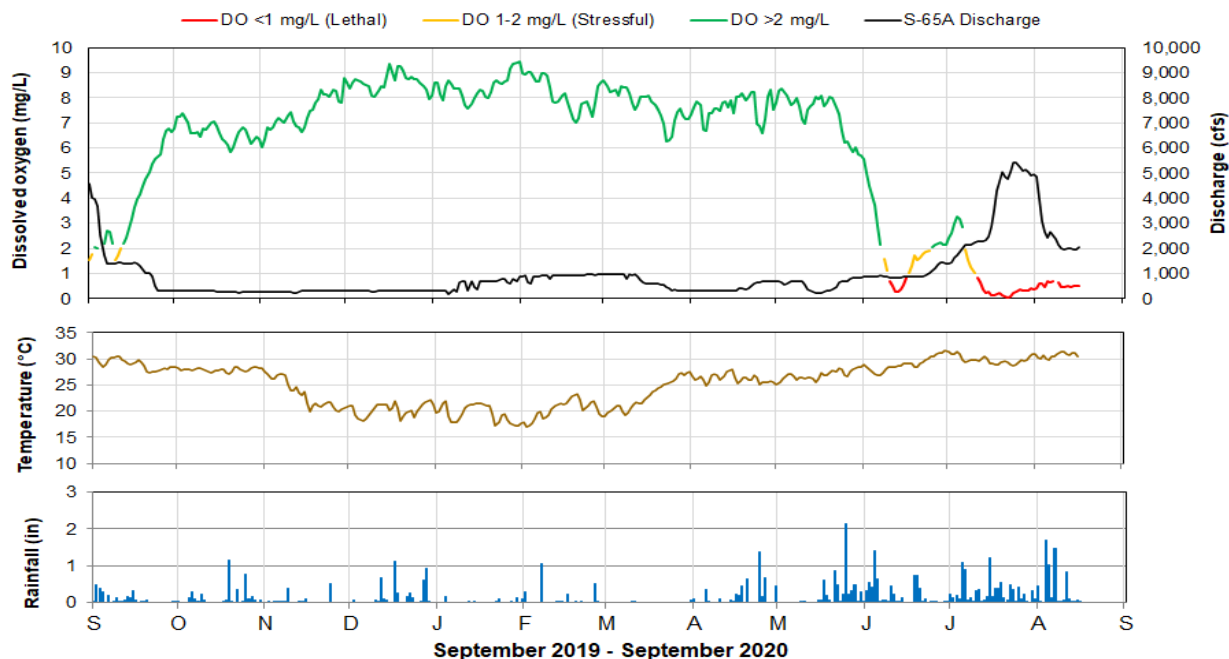


Figure 4. Phase I area floodplain water depths (from left to right) one year ago, one month ago and current. Color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to January 16, 2012.



Dissolved oxygen (DO) and temperature are mean daily values averaged for PC62, KRBN, PC33, PD62R and PD42R with an average of 3 stations reporting this week. Rainfall values are daily totals for Kissimmee River (Pool BCD) AHED watershed.

Report Date: 8/18/2020; data are through: 8/16/2020

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

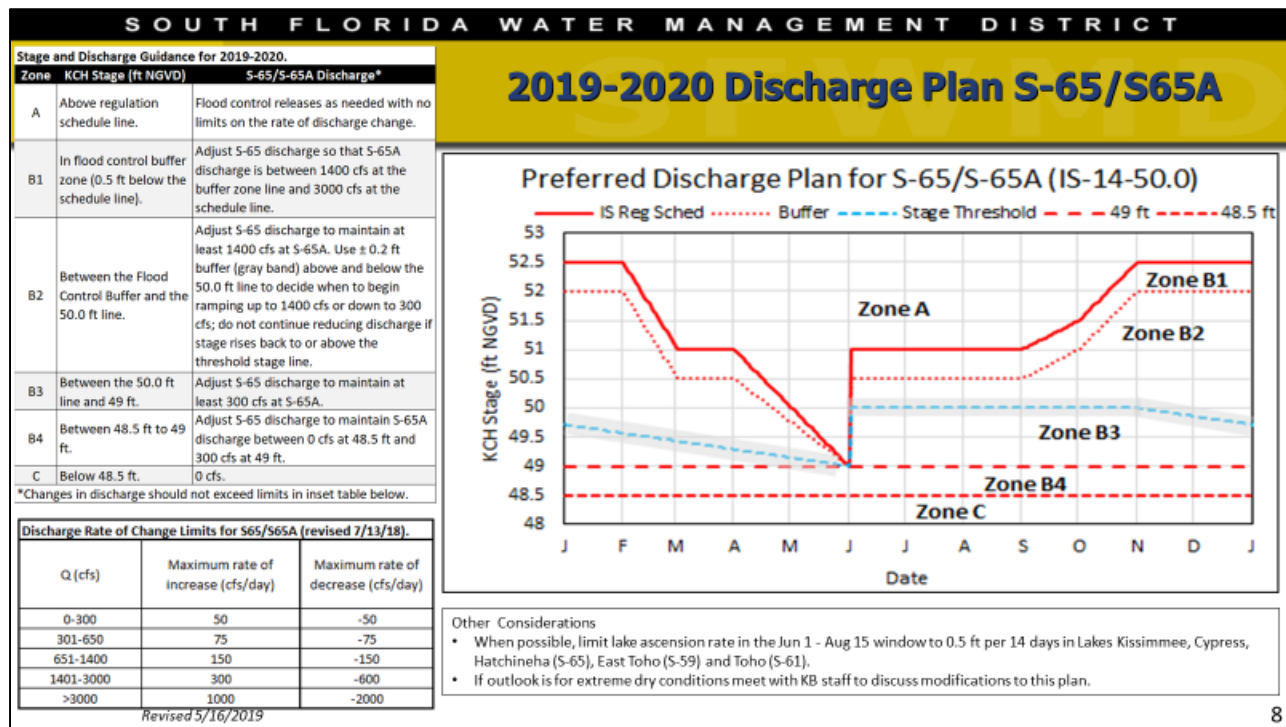


Figure 6. The 2019-2020 Discharge Plan for S-65/S-65A.

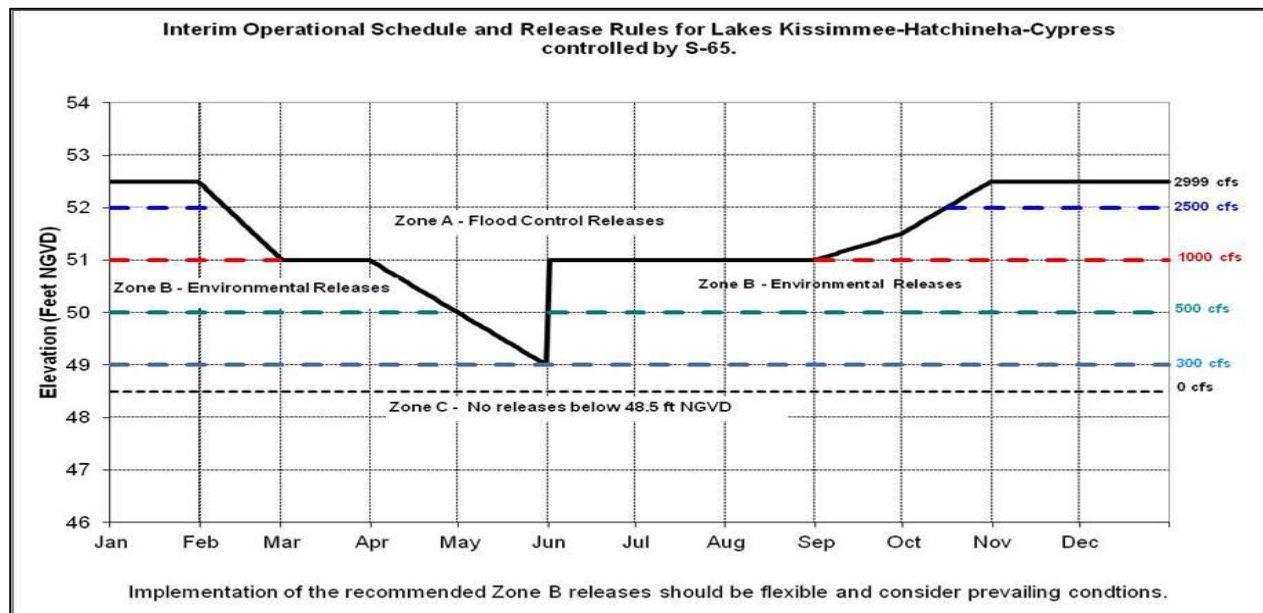


Figure 7. Interim operations schedule for S-65 (solid black line). The discharge schedule shown to the right has not been used in recent years.



Figure 8. The Kissimmee Basin.

LAKE OKEECHOBEE

Lake Okeechobee stage is 13.86 feet NGVD, 1.20 feet higher than a month ago and 0.96 feet higher than one year ago (Figure 1). The Lake had been back within the preferred ecological envelope since June 2, 2020 (Figure 2) but rose to 0.30 feet above the top of the envelope this week. Lake stage moved into the Beneficial Use sub-band on March 4, 2020, into the Base Flow sub-band in mid-July, and is now in the Low sub-band (Figure 3). Lake stage reached a low of 10.99 feet NGVD on May 17, rose rapidly for a month, levelled out for the remainder of June, but has been rising at a rate greater than the recommended 0.25 feet per week since early July. According to RAINДАР, 0.74 inches of rain fell directly over the Lake and in the south-central region during the past week (Figure 4). The district-wide average was approximately 1 inch, although most of the remaining watershed received between 1 and 4 inches of rain.

The average daily inflows (minus rainfall) decreased from 9,288 cfs to 7,195 cfs, while the outflows (minus evapotranspiration) increased from 0 cfs to 451 cfs over the past week. Most of the inflows came from the Kissimmee River (4,152 cfs through S-65E & S-65EX1), while 1,506 cfs came from the C-41A canal (through S-84 & S-84X), 170 cfs from Fisheating Creek, and around 476 cfs came from S-71 and S-72. An additional 84 cfs and 329 cfs also came from passive inflow from the east through S-308 and the L-8 Canal via Culvert 10A, respectively. Outflows totaled 451 cfs with 360 cfs going west through S-77 and 91 cfs going south through S-354. 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 first August sampling occurred on the 4th and 5th and about half of the chlorophyll *a* values are still pending (Figure 6). Of the 15 sites that have reported values, 7 exhibited bloom conditions ($>40 \mu\text{g/L}$) and all were in the northern region. Cyano-toxin values were relatively low at most of the sites, with 17 sites exhibiting detectable levels of toxin, however 10 of these sites were less than $1 \mu\text{g/L}$, and all but 2 sites had microcystin levels below the EPA recreational waters recommendation of $8 \mu\text{g/L}$. L004 and LZ40 had toxin levels of $28 \mu\text{g/L}$ and $25 \mu\text{g/L}$, respectively.

The most recent satellite image (August 15, 2020) from NOAA's cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3 OLCI sensor data suggested a slight decrease in cyanobacteria bloom risk potential in the central and eastern regions but an increase in the southwestern region of the Lake (Figure 7).

Water Management Summary

Lake Okeechobee stage was 13.86 feet NGVD on August 17, 2020, 0.15 feet higher than the previous week and 1.20 feet higher than the previous month. The Lake is now in the Low sub-band. Lake stage moved into the ecological envelope (which varies seasonally from 12.0 – 15.0 feet NGVD ± 0.5 feet) on June 2, 2020, after being up to 1.5 feet below since October 15, 2019, but it is now 0.30 feet above the top of envelope. Ascension rates were high in early June, but briefly slowed and stabilized through the beginning of July, potentially providing submerged plant communities an opportunity to catch up with rising stages. However, lake stage has been rising higher than the recommended rate (<0.5 feet

per 2 weeks) over the past few weeks. The cyanobacteria bloom risk potential decreased from last week in the central and eastern areas but increased in the southwestern area of the lake.

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

INFLOWS	Previous week Avg Daily CFS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)	OUTFLOWS	Previous week Avg Daily CFS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)
S-65E & S-65EX1	5785	4152	1.7	S-77	0	360	0.2
S-71 & S-72	393	476	0.2	S-308	-331	-84	0.0
S-84 & S-84X	1458	1506	0.6	S-351	0	0	0.0
Fisheating Creek	253	170	0.1	S-352	0	0	0.0
S-154	23	75	0.0	S-354	0	91	0.0
S-191	376	195	0.1	L-8 Outflow			
S-133 P	91	84	0.0	ET	2099	1967	0.8
S-127 P	17	7	0.0	Total	1767	2334	1.0
S-129 P	7	2	0.0				
S-131 P	22	2	0.0				
S-135 P	129	113	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	404	329	0.1				
Rainfall	3940	1772	0.7				
Total	12898	8882	3.7				

Provisional Data

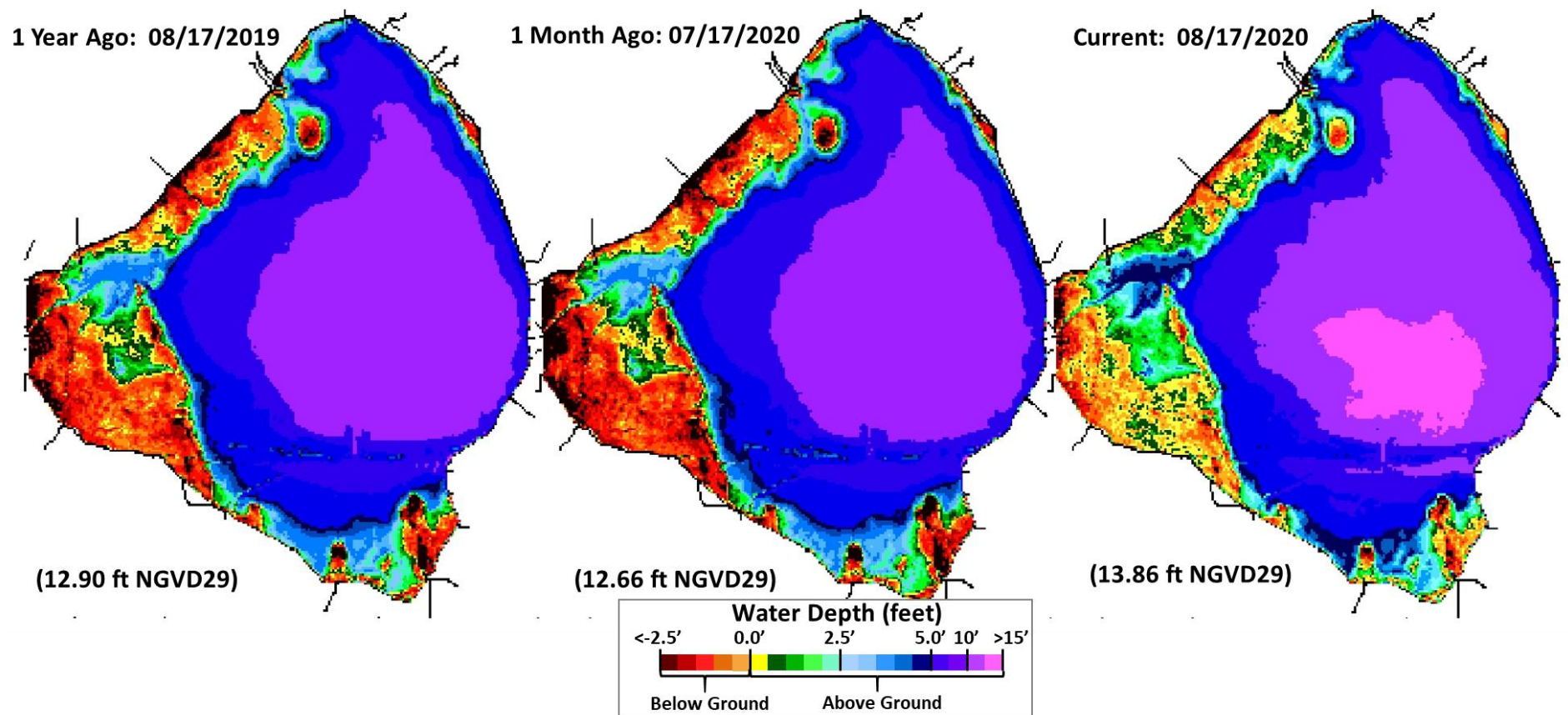


Figure 1. Water depth estimates on Lake Okeechobee based on the South Florida Water Depth Assessment Tool.

Lake Okeechobee Stage vs Updated Ecological Envelope

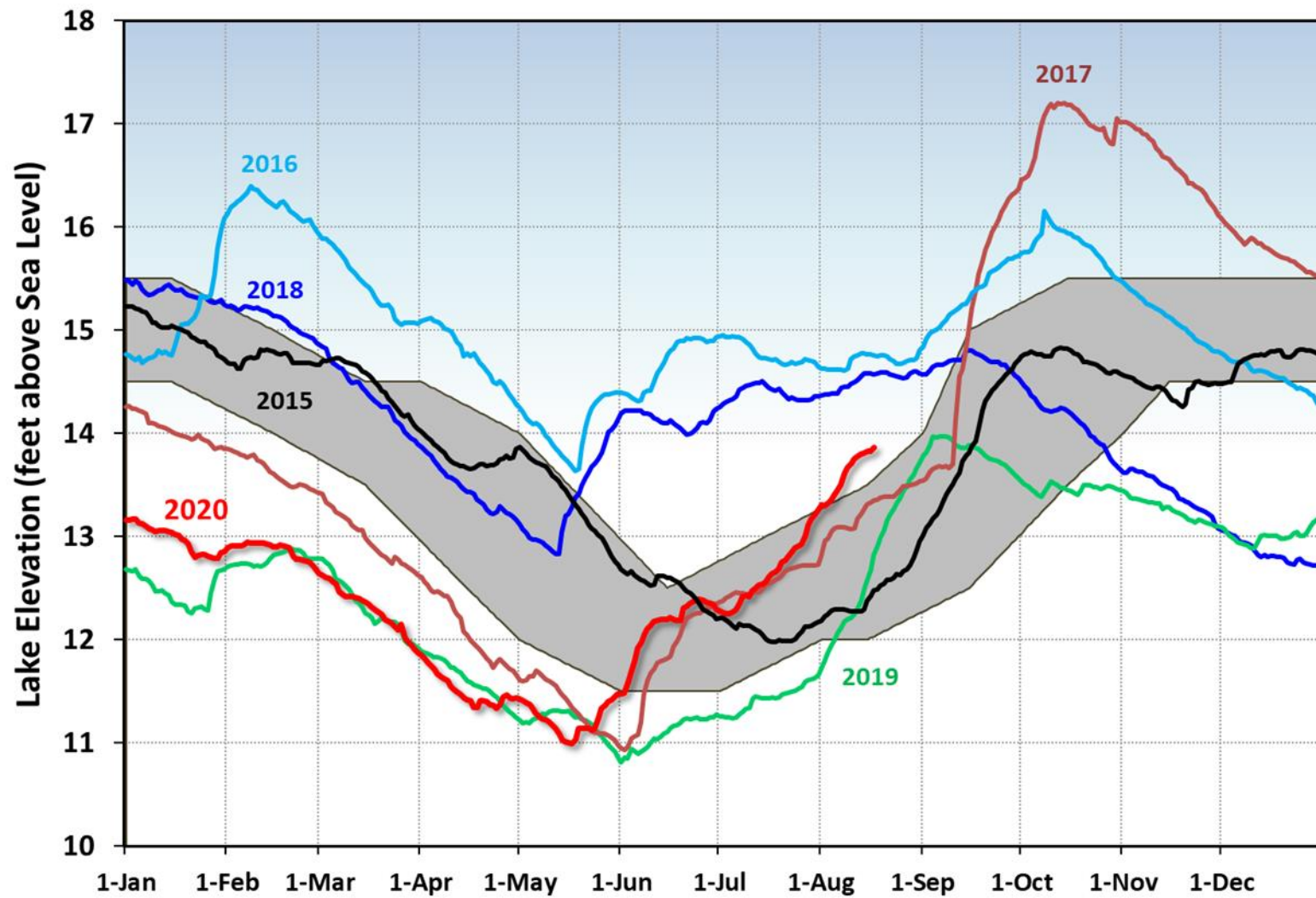


Figure 2. Select annual stage hydrographs for Lake Okeechobee in comparison to the updated Ecological Envelope.

Lake Okeechobee Water Level History and Projected Stages

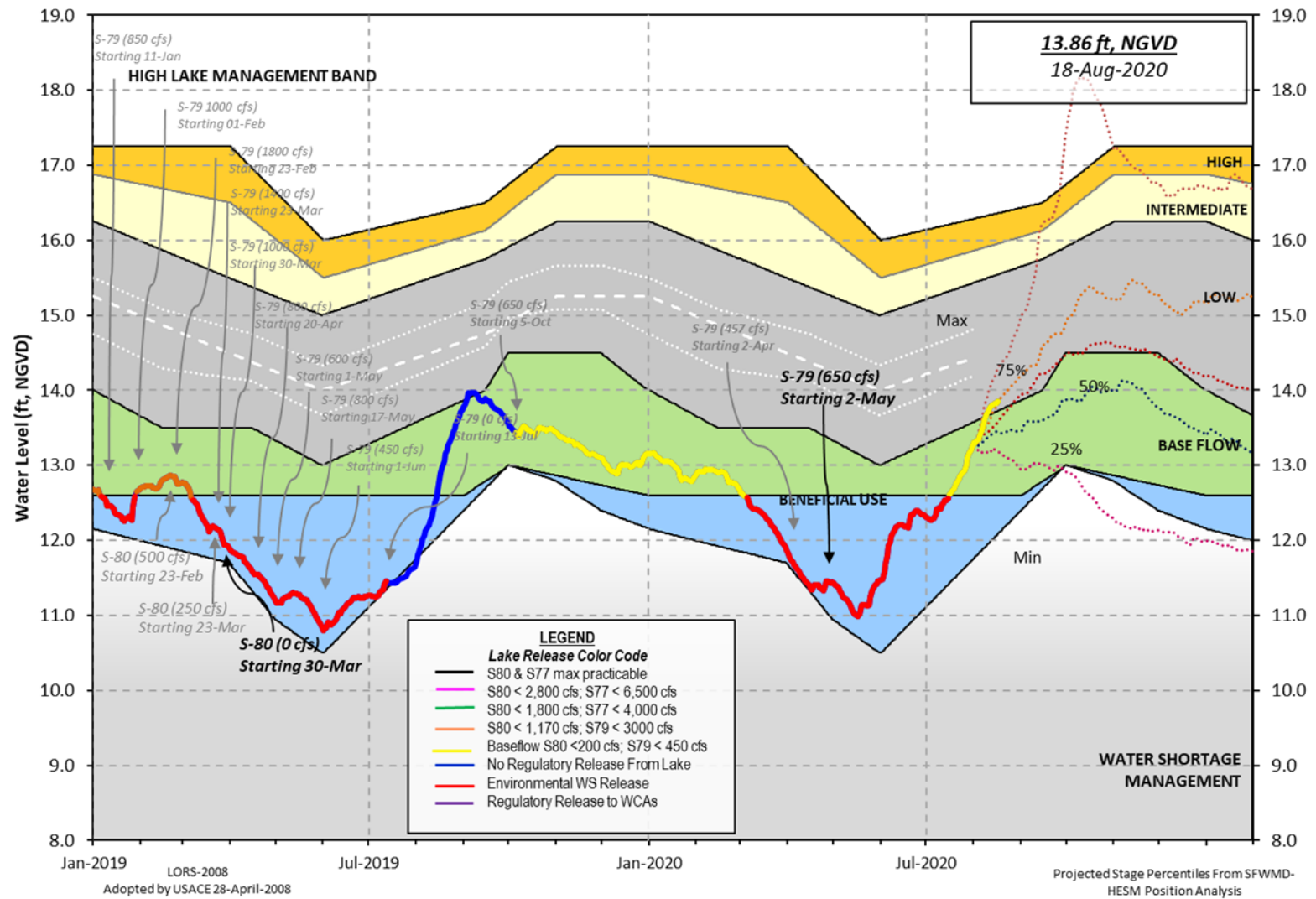


Figure 3. Recent Lake Okeechobee stage and releases, with projected stages based on a dynamic position analysis.

SFWMD PROVISIONAL RAINDAR 7-DAY BASIN RAINFALL ESTIMATES
FROM: 0400 EST, 08/11/2020 THROUGH: 0400 EST, 08/18/2020

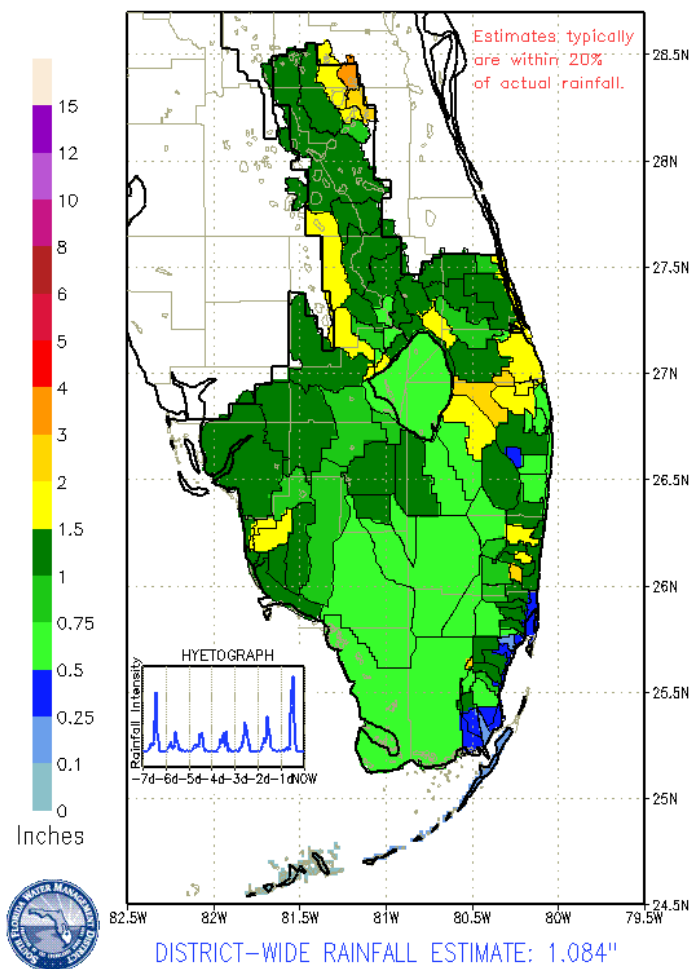


Figure 4. 7-Day rainfall estimates by RAINDAR.

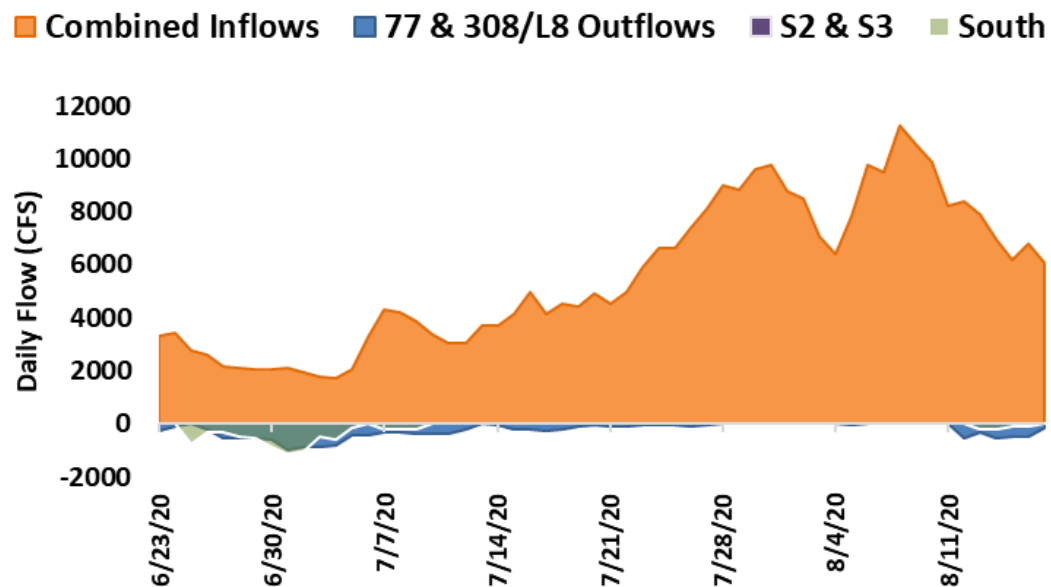


Figure 5. Major inflows (orange) and outflows (blue) of Lake Okeechobee, including the S-350 structures designated as South (green). The L-8 Canal flows through Culvert 10A are included as outflows when positive, and as inflows when backflowing into the Lake. All inflows and outflows are shown as positive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

Collection Date: August 4-5, 2020

Station	CHL _a (ug/L)	TOXIN (ug/L)	TAXA
FEBIN			NS
FEBOUT			NS
KISSR0.0	20.0	BDL	mixed
L005	21.0	BDL	<i>Cylindro</i>
LZ2	32.3	BDL	mixed
KBARSE	51.9	1.0	<i>Micro/Cylin</i>
RITAE2	P	0.4	<i>Microcys</i>
PELBAY3	P	0.3	mixed
POLE3S	P	BDL	mixed
LZ25A	P	BDL	mixed
PALMOUT	P	BDL	mixed
PALMOUT1	P	3.2	<i>Microcys</i>
PALMOUT2	P	2.2	<i>Microcys</i>
PALMOUT3	P	2.0	<i>Microcys</i>
POLESOUT	66.8	0.3	<i>Cylindro</i>
POLESOUT1	39.5	0.3	<i>Cylindro</i>
POLESOUT2	66.0	0.3	<i>Micro/Cylin</i>
POLESOUT3	45.2	0.5	<i>Micro/Cylin</i>
EASTSHORE	67.5	0.5	<i>Microcys</i>
NES135	74.5	BDL	NS
NES191	47.2	0.3	mixed

Station	CHL _a (ug/L)	TOXIN (ug/L)	TAXA
L001	34.1	BDL	mixed
L004	21.5	28.0	<i>Microcys</i>
L006	P	BDL	mixed
L007	P	BDL	mixed
L008	32.5	0.7	<i>Microcys</i>
LZ30	P	BDL	<i>Microcys</i>
LZ40	P	25.0	<i>Microcys</i>
CLV10A	P	0.3	<i>Microcys</i>
NCENTER	38.4	1.8	<i>Microcys</i>

Samples collected Aug 10

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*

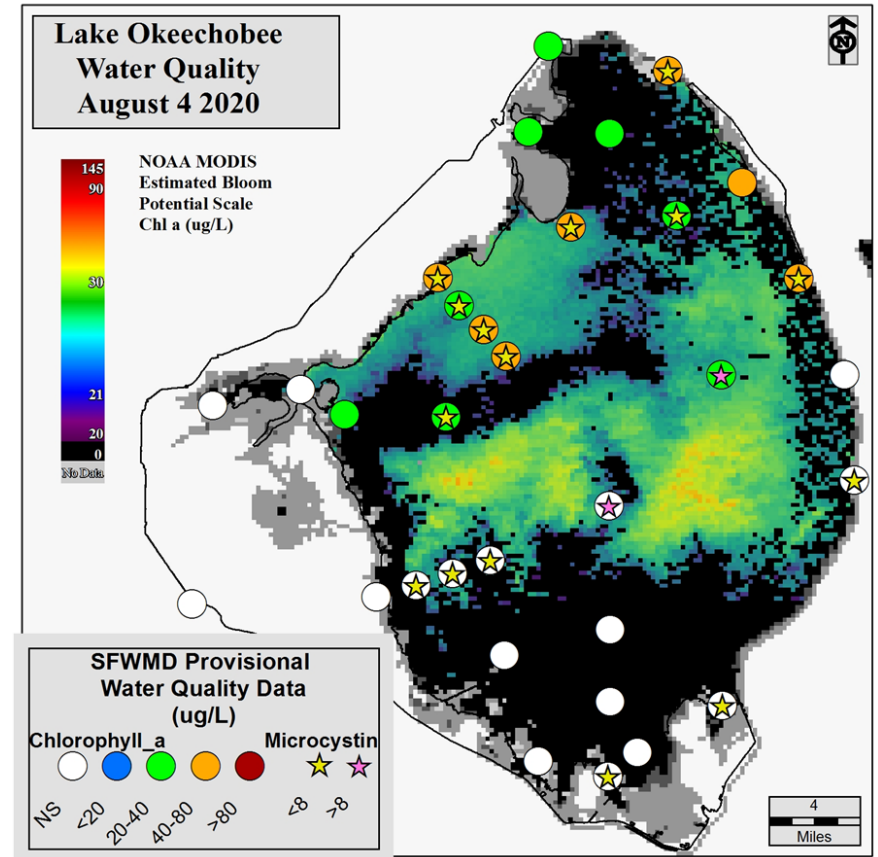


Figure 6. Provisional results from the expanded monitoring sampling trips on August 4-5, 2020.

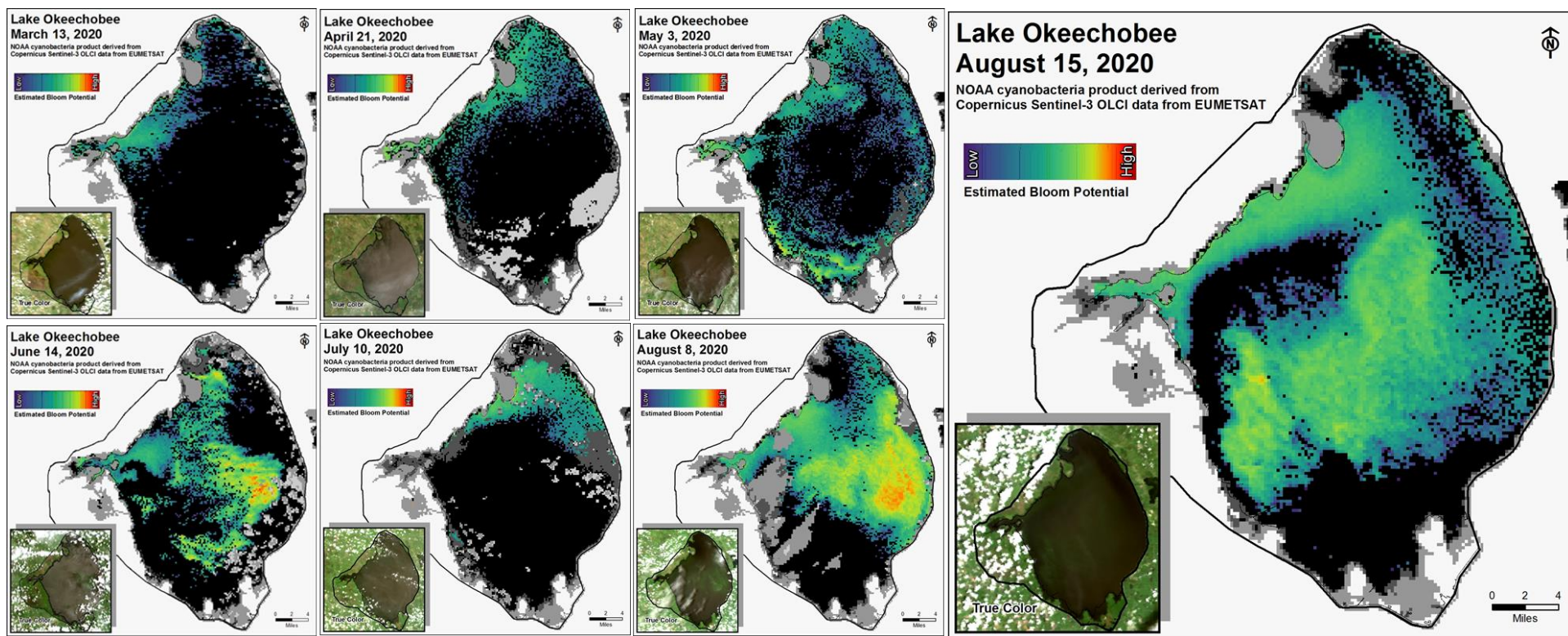


Figure 7. Potential for cyanobacterial blooms on Lake Okeechobee during 2020, based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

ESTUARIES

St. Lucie Estuary:

Last week total inflow to the St. Lucie Estuary averaged approximately 868 cfs (Figures 1 and 2) and last month inflow averaged about 1,692 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	474
S-80	0
S-308	-101
S-49 on C-24	162
S-97 on C-23	123
Gordy Rd. structure on Ten Mile Creek	109

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 10.8. 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)	2.3 (1.3)	5.2 (4.0)	NA ¹
US1 Bridge	8.6 (6.3)	13.5 (9.9)	10.0-26.0
A1A Bridge	NR² (15.0)	25.4 (23.3)	NA ¹

¹Envelope not applicable and ²Not Reporting

Caloosahatchee Estuary:

Last week total inflow to the Caloosahatchee Estuary averaged approximately 1,911 cfs (Figures 5 and 6) and last month inflow averaged about 1,897 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	360
S-78	154
S-79	1093
Tidal Basin Inflow	818

Over the past week in the estuary, surface salinity increased at S-79 and decreased downstream (Table 4, Figures 7 & 8). The seven-day average salinity values are within the good range for adult eastern oysters at Shell Point and most likely at Cape Coral 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)	0.8 (0.5)	0.8 (0.5)	NA ¹
Val I75	0.8 (1.1)	1.6 (1.5)	0.0-5.0 ²
Ft. Myers Yacht Basin	4.7 (5.7)	6.9 (7.0)	NA
Cape Coral	11.2 (NR ³)	13.5 (NR)	10.0-30.0
Shell Point	23.9 (24.8)	24.9 (25.5)	10.0-30.0
Sanibel	30.2 (30.4)	31.2 (31.1)	10.0-30.0

¹Envelope not applicable, ²Envelope is based on a 2-week forecast 30-day average, ³Not Reporting

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 1.5 to 3.6 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 500 cfs. The 30-day moving average surface salinity at Val I-75 is forecast to be between 1.0 and 1.7 (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	500	3.6	1.7
B	300	500	2.6	1.4
C	450	500	2.2	1.3
D	650	500	1.9	1.1
E	800	500	1.5	1.0

Red tide

The Florida Fish and Wildlife Research Institute reported on August 14, 2020, that *Karenia brevis*, the Florida red tide dinoflagellate, was not observed in samples collected from Lee, Palm Beach, or Miami-Dade counties (no samples were analyzed this week from St. Lucie, Martin, or Broward counties).

Water Management Recommendations

Lake stage is in the Low sub-band. Tributary conditions are very wet. The LORS2008 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.

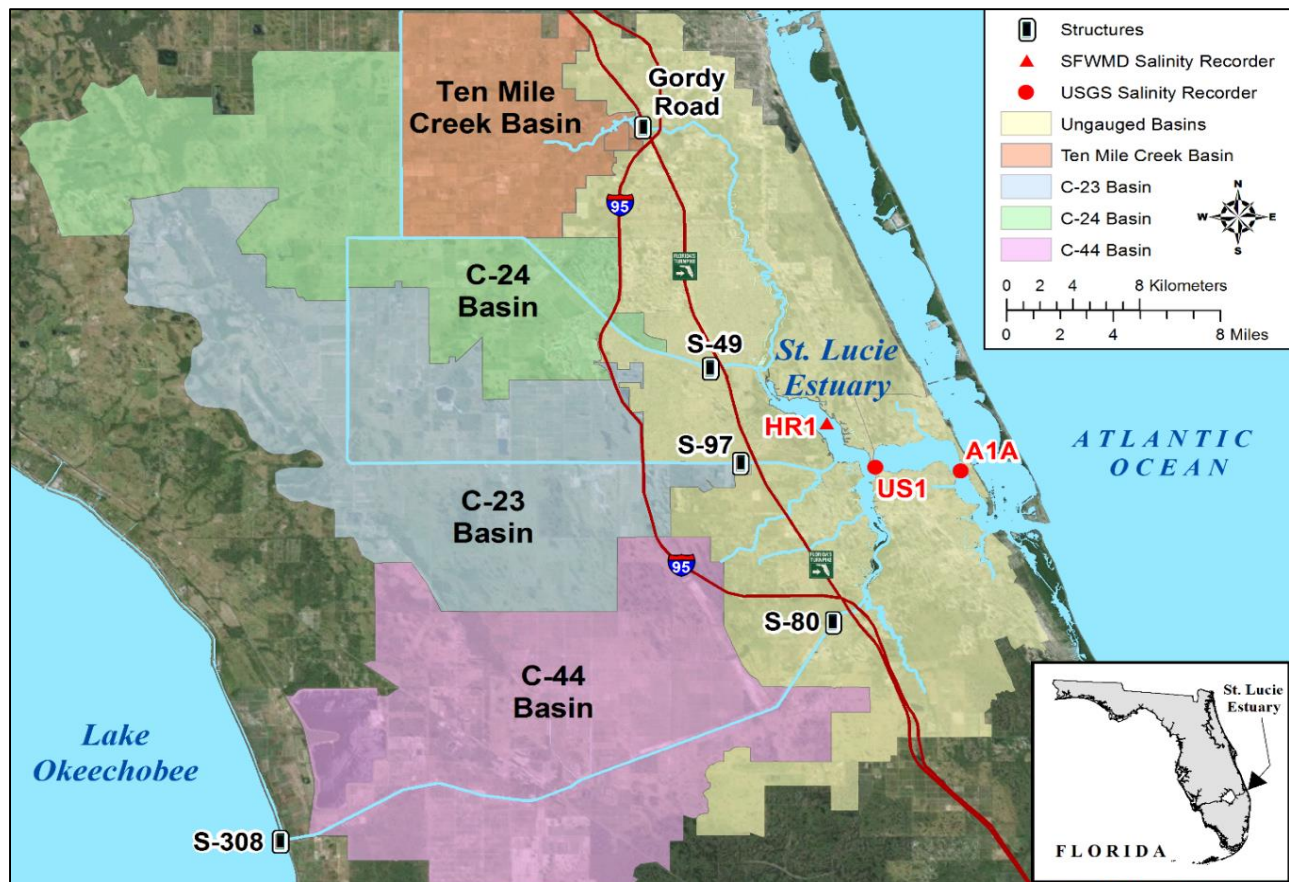


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

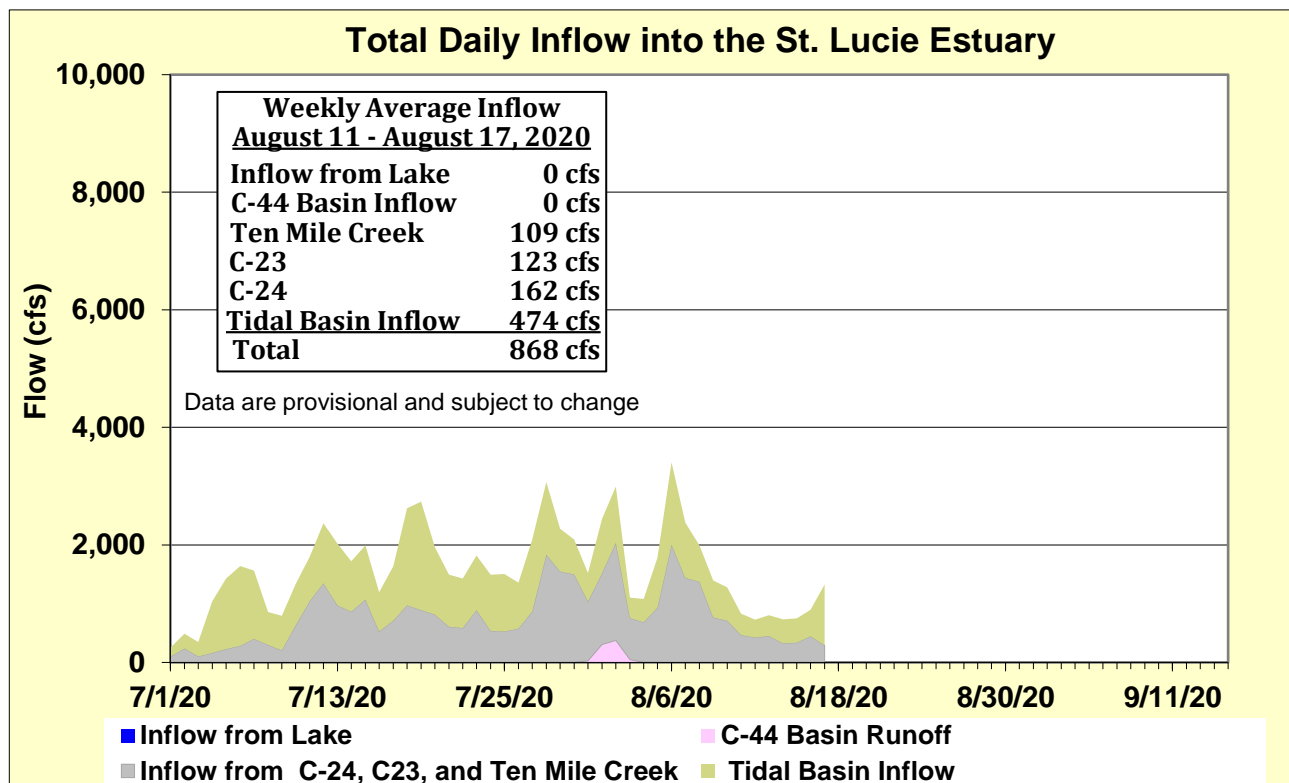


Figure 2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basin into the St. Lucie Estuary.

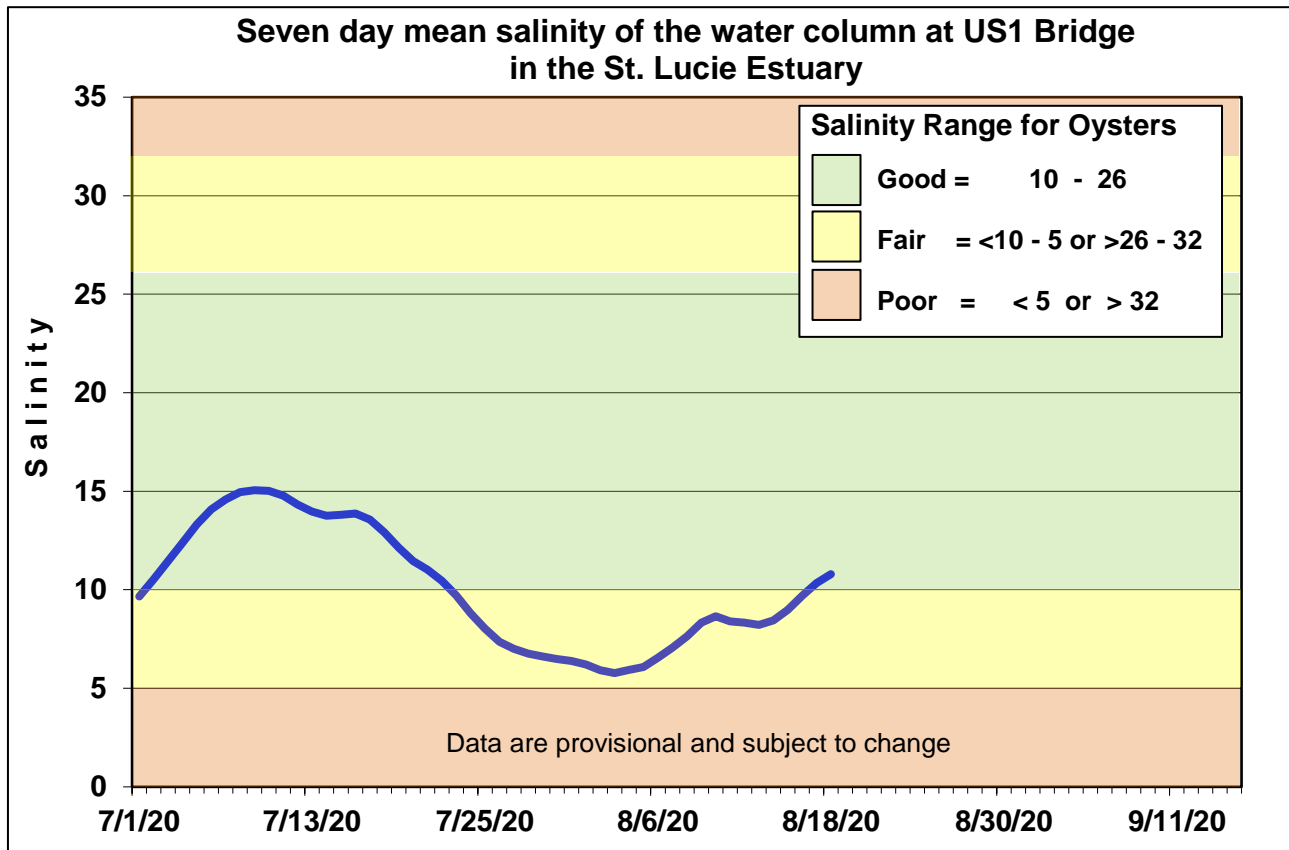


Figure 3. Seven-day mean salinity of the water column at the US1 Bridge.

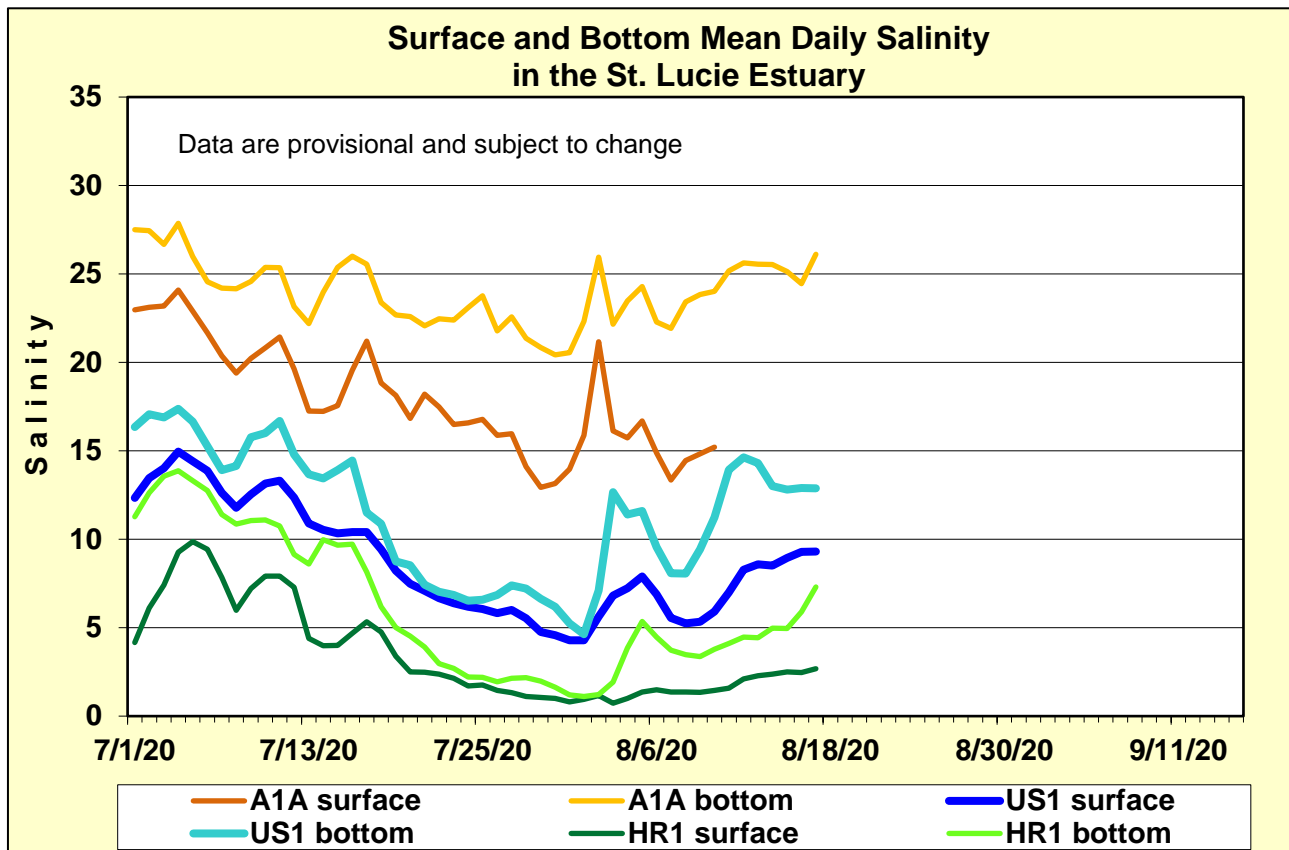


Figure 4. Daily mean salinity at the A1A, US1, and HR1 stations.

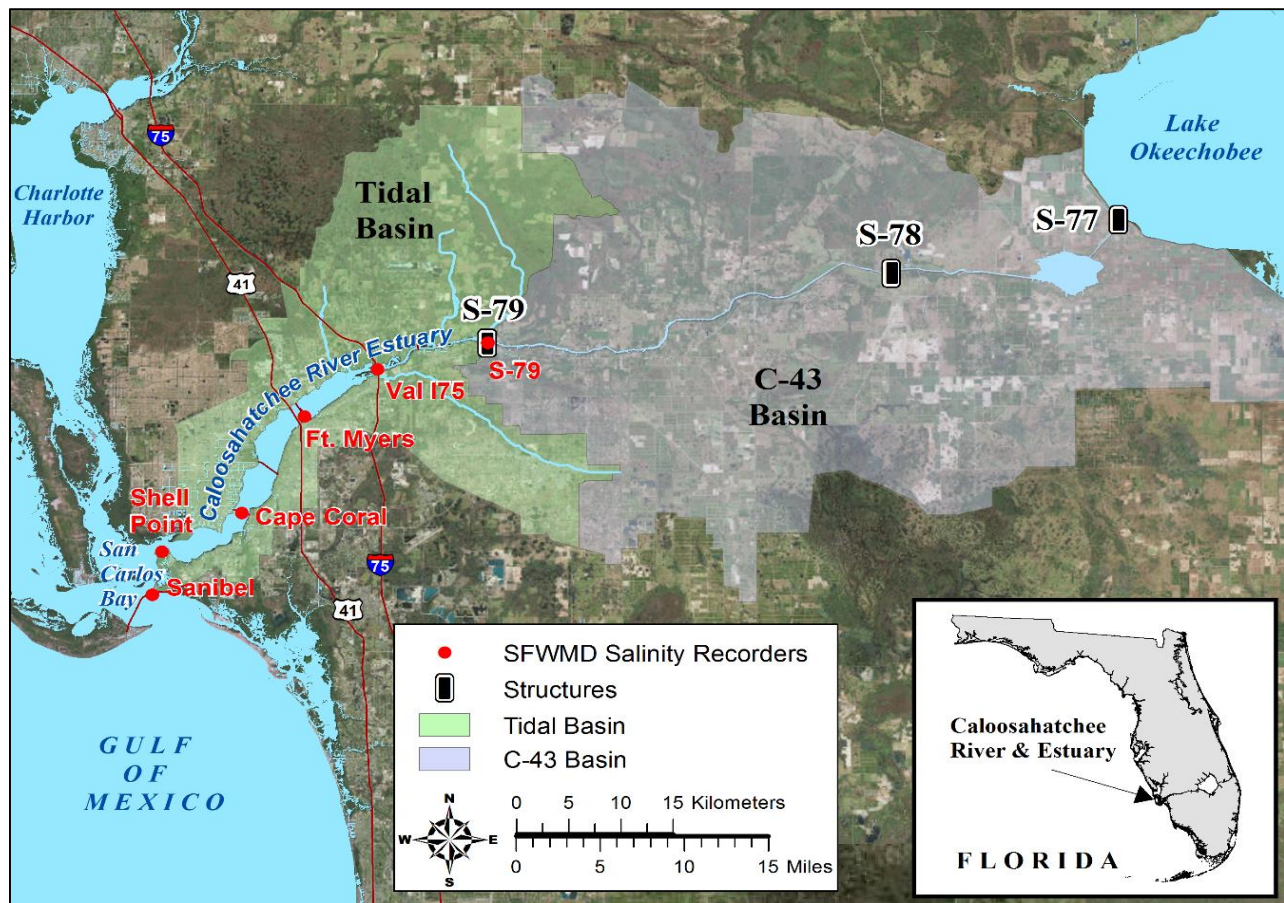


Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

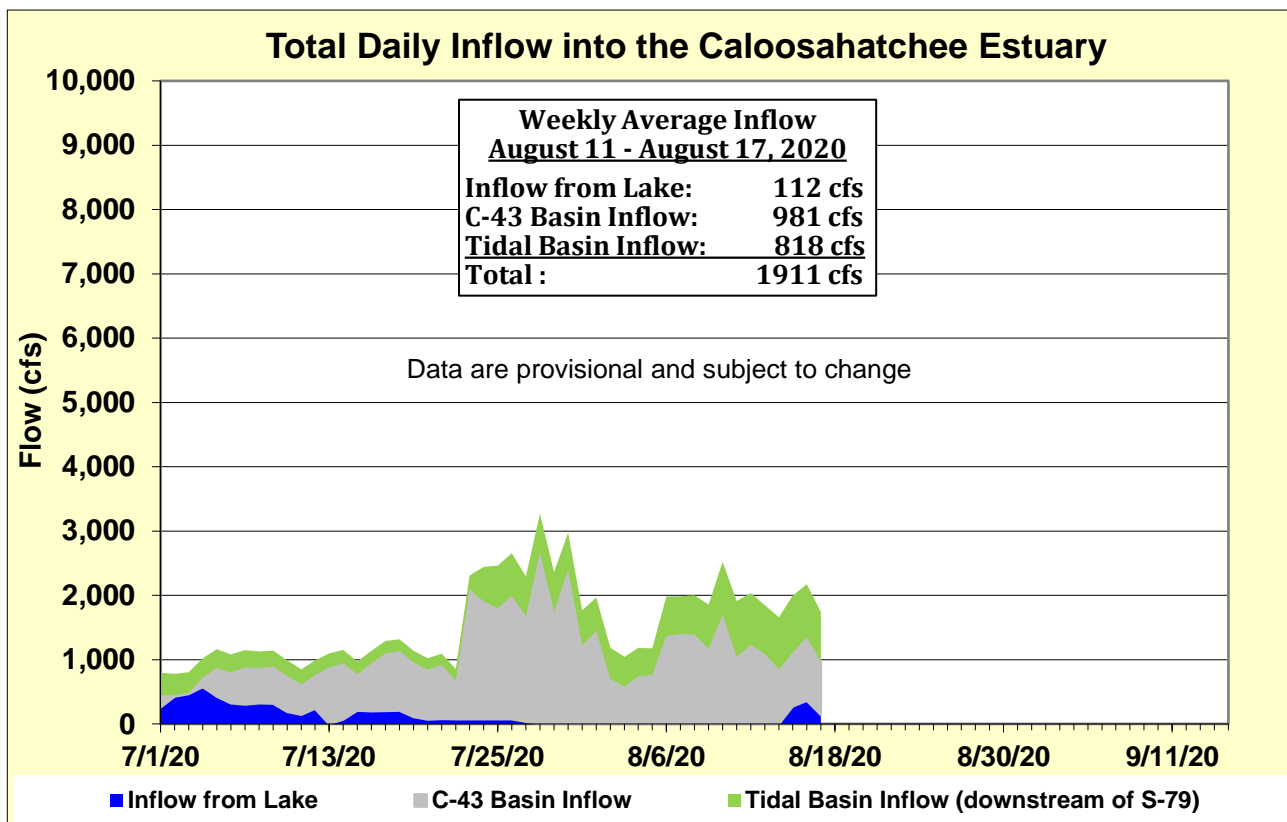


Figure 6. Total daily inflows from Lake Okeechobee, runoff from the C-43 basin

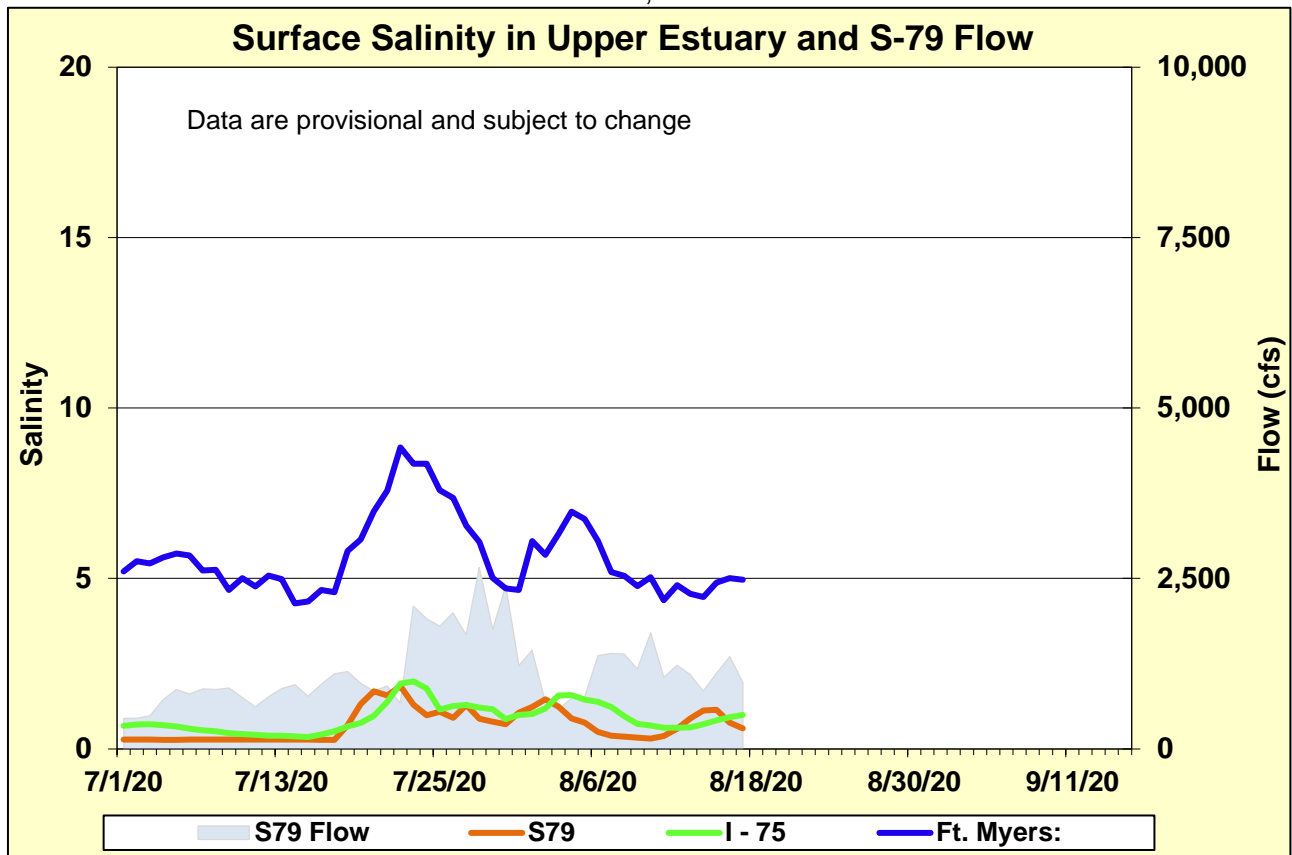


Figure 7. Daily mean flows at S-79 and salinity at upper estuary monitoring stations.

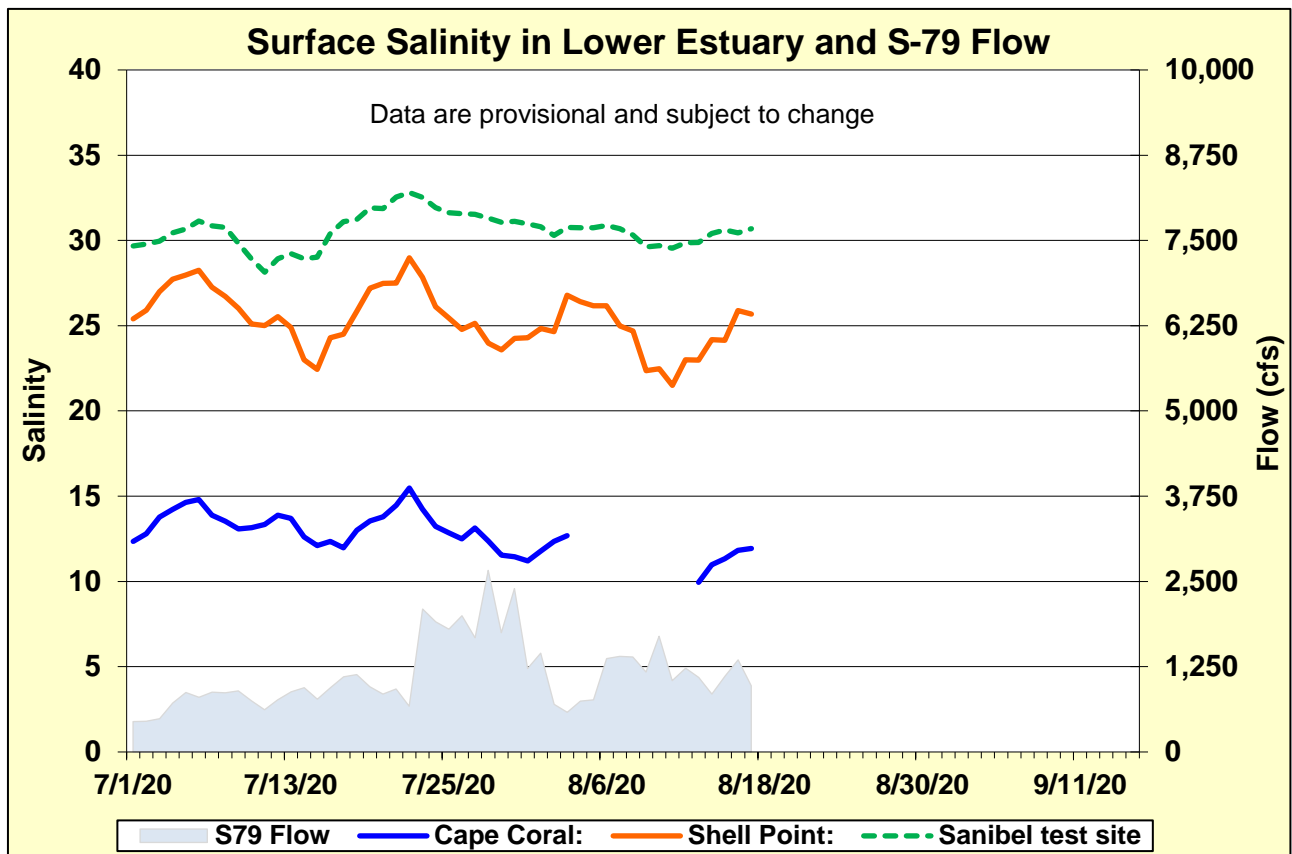


Figure 8. Daily mean flows at S-79 and salinity at lower estuary stations.

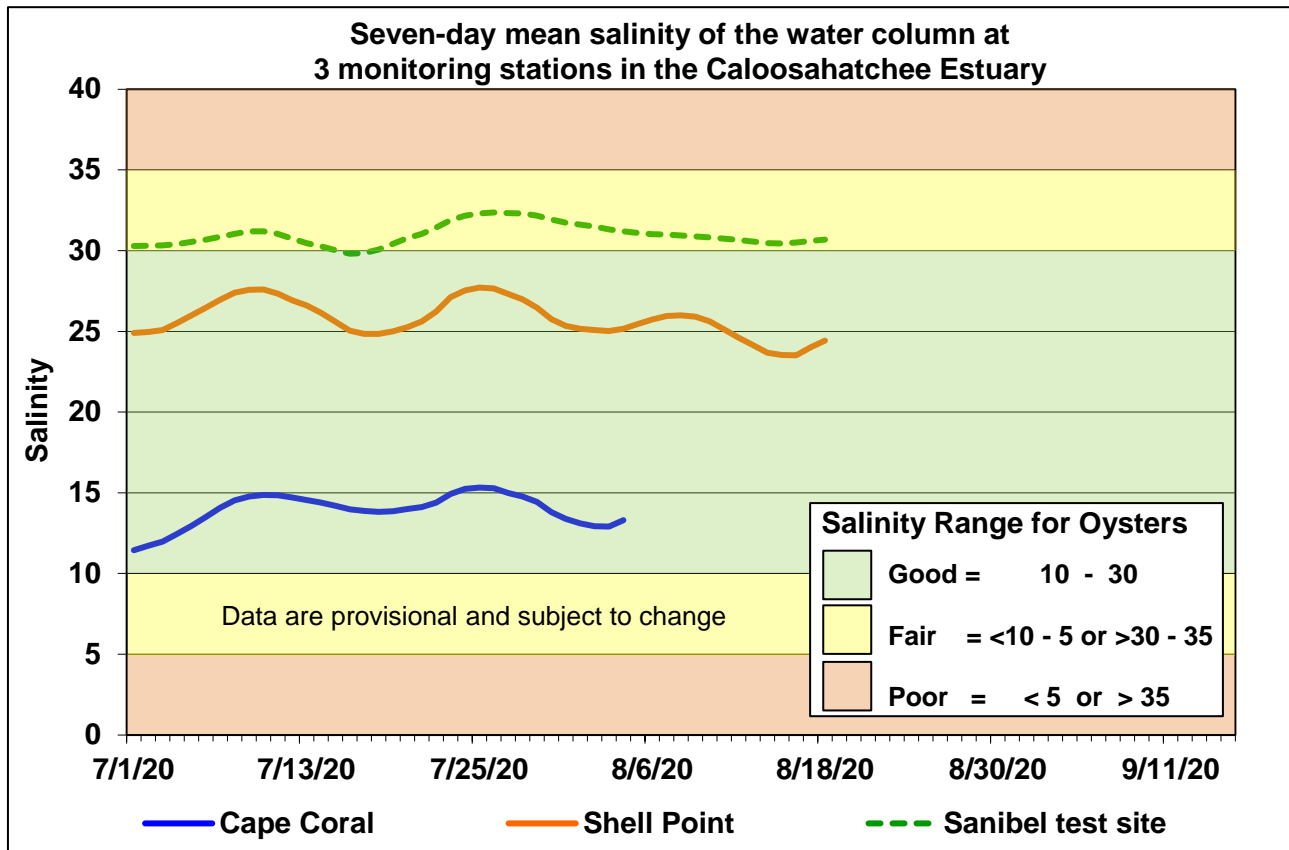


Figure 9. Seven-day mean salinity at Cape Coral, Shell Point, and Sanibel monitoring stations.

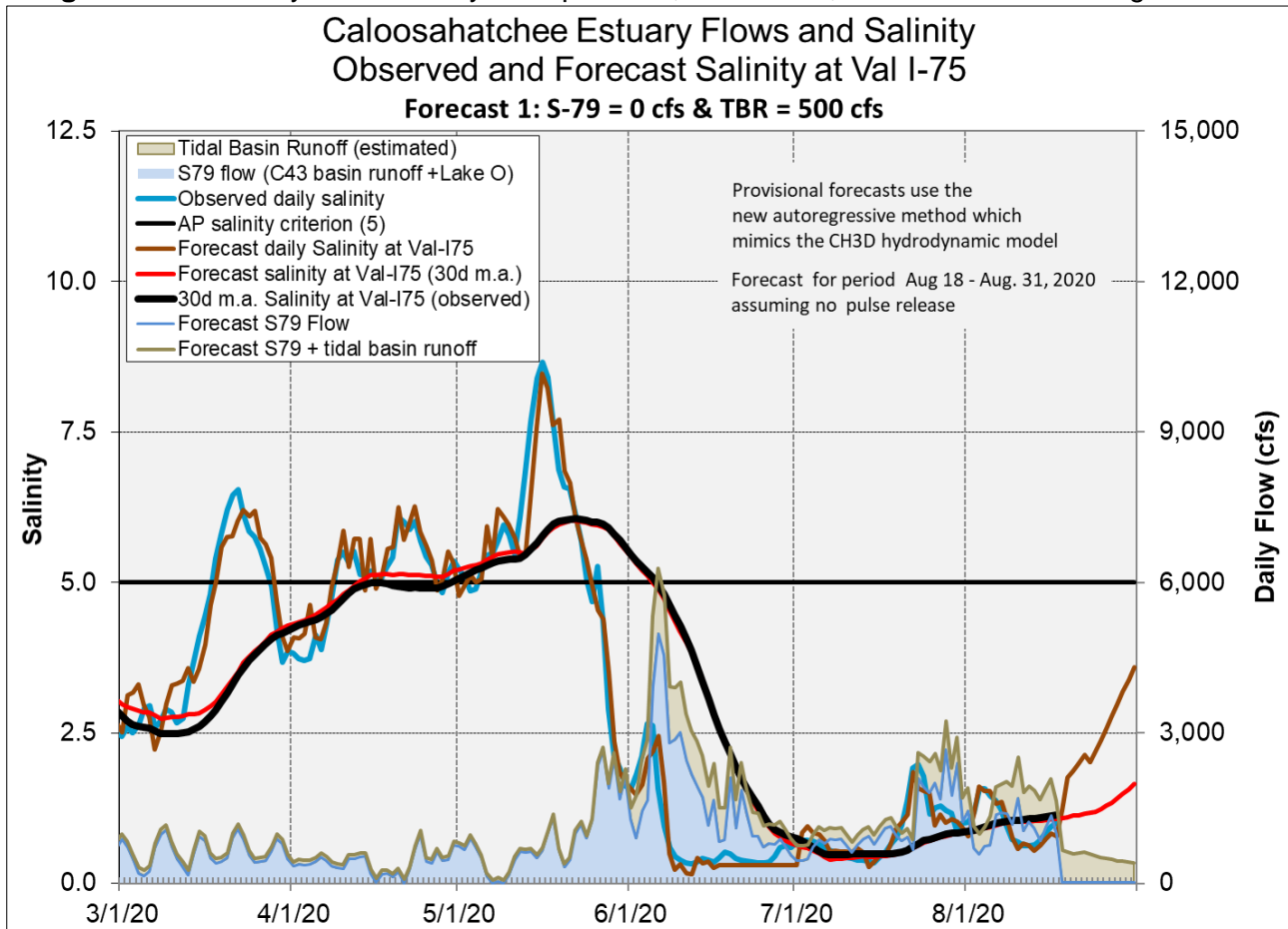
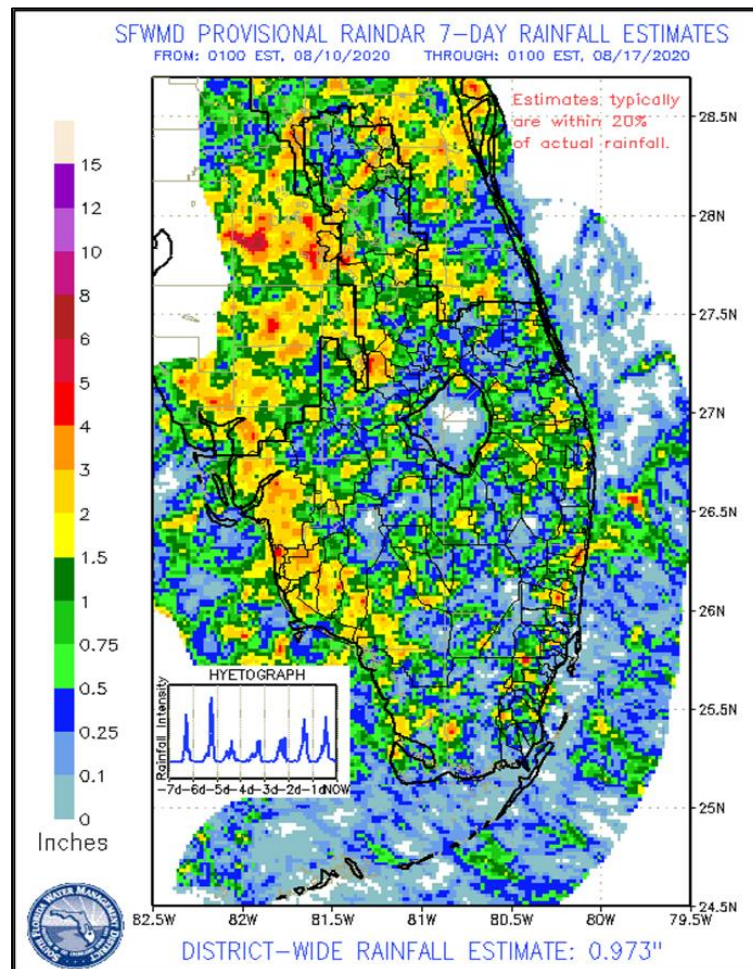


Figure 10. Forecasted Val I-75 surface salinity assuming no pulse release at S79.

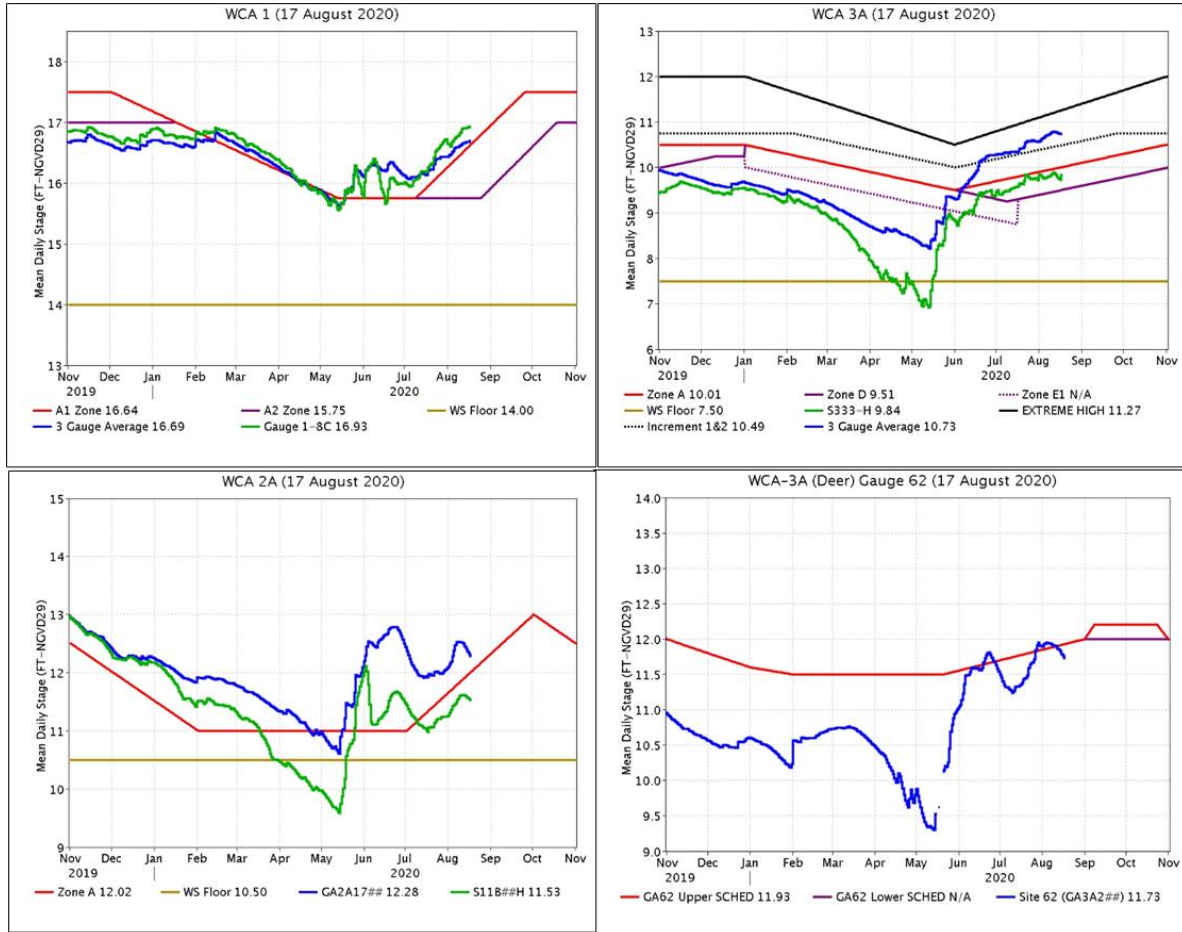
EVERGLADES

Scattered below average rainfall was recorded across the Everglades last week. At the gauges monitored for this report, stages fell 0.02 feet on average and for the third week in a row central WCA-2A had the maximum depth change over the week with a drop of 0.24 feet. Evaporation was estimated at 1.44 inches last week, lower than the week prior.

Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	0.55	+0.07
WCA-2A	0.32	-0.24
WCA-2B	0.51	+0.04
WCA-3A	0.67	-0.06
WCA-3B	0.42	-0.04
ENP	0.69	-0.02



Regulation Schedules: WCA-1: Stage at the 1-8C Gauge followed along the rising Zone A1 regulation line last week, currently 0.29 feet above and the 3-Gauge average remained 0.05 feet above. WCA-2A: Stage at Gauge 2-17 reversed recent trends and fell quickly towards the rising Zone A regulation line last week now 0.26 feet above. WCA-3A: The Three Gauge Average stage fell slightly downward and towards the rising Increment 1.2-line, currently 0.24 feet above, and 0.72 feet above the Zone A regulation line. WCA-3A: Stage at gauge 62 (Northwest corner) fell away from the rising Upper Schedule last week, now 0.20 feet below.

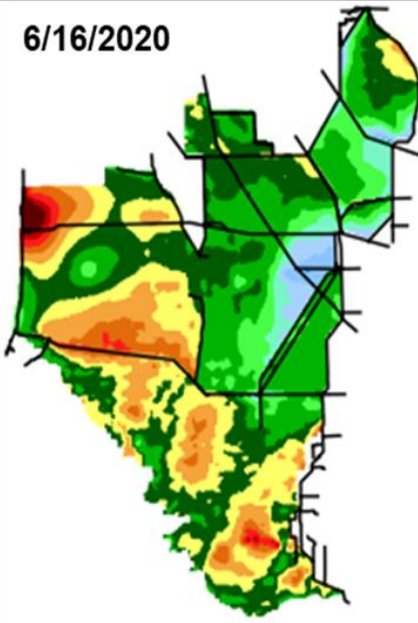


Water Depths: The WDAT tool for spatial interpolation of depth monthly snapshots indicate ponding depths in WCA-3B and WCA-3A South are building, in excess of 4.0 feet along the upper reaches of the L-67 canal and the spatial extent is expanding west along the southern boundary to the L-28S. WCA-2A depths are consistent across the basin. Depths in WCA-1 remain highest along the southwestern perimeter with the potential for shallow depths in the far north . Hydrologic connectivity is established within the major sloughs in Everglades National Park (ENP). Comparing WDAT water levels from present, over the last month depths rose across most of the Everglades. Differences in WCA-1 are mixed. Looking back one year, the depth difference patterns are different than one month ago. Compared to one year ago, there are shallower depths in Northern WCA-2A; greater depths in WCA-3A along the L-67 and significantly lower in the extreme northwest of that basin. The WDAT model indicates wetter conditions in the western basins and ENP compared to a month ago but not compared to a 12 year ago.

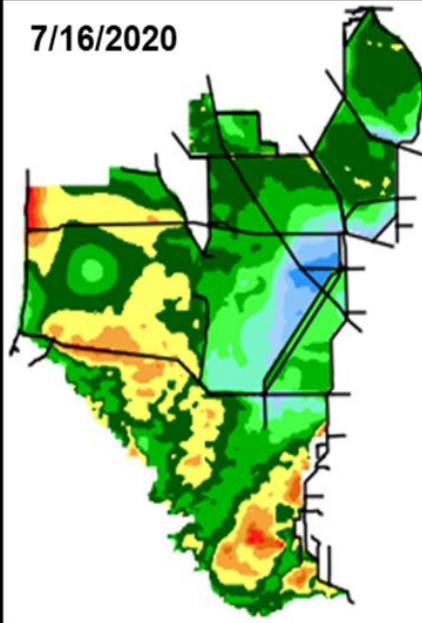


SFWDAT Water Depth Monthly Snapshots

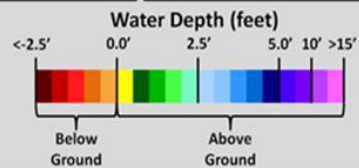
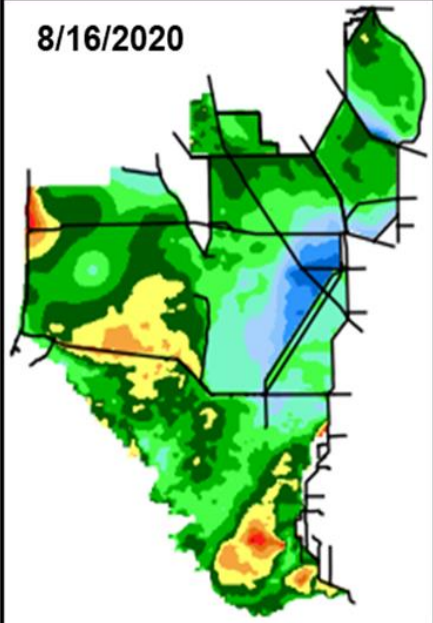
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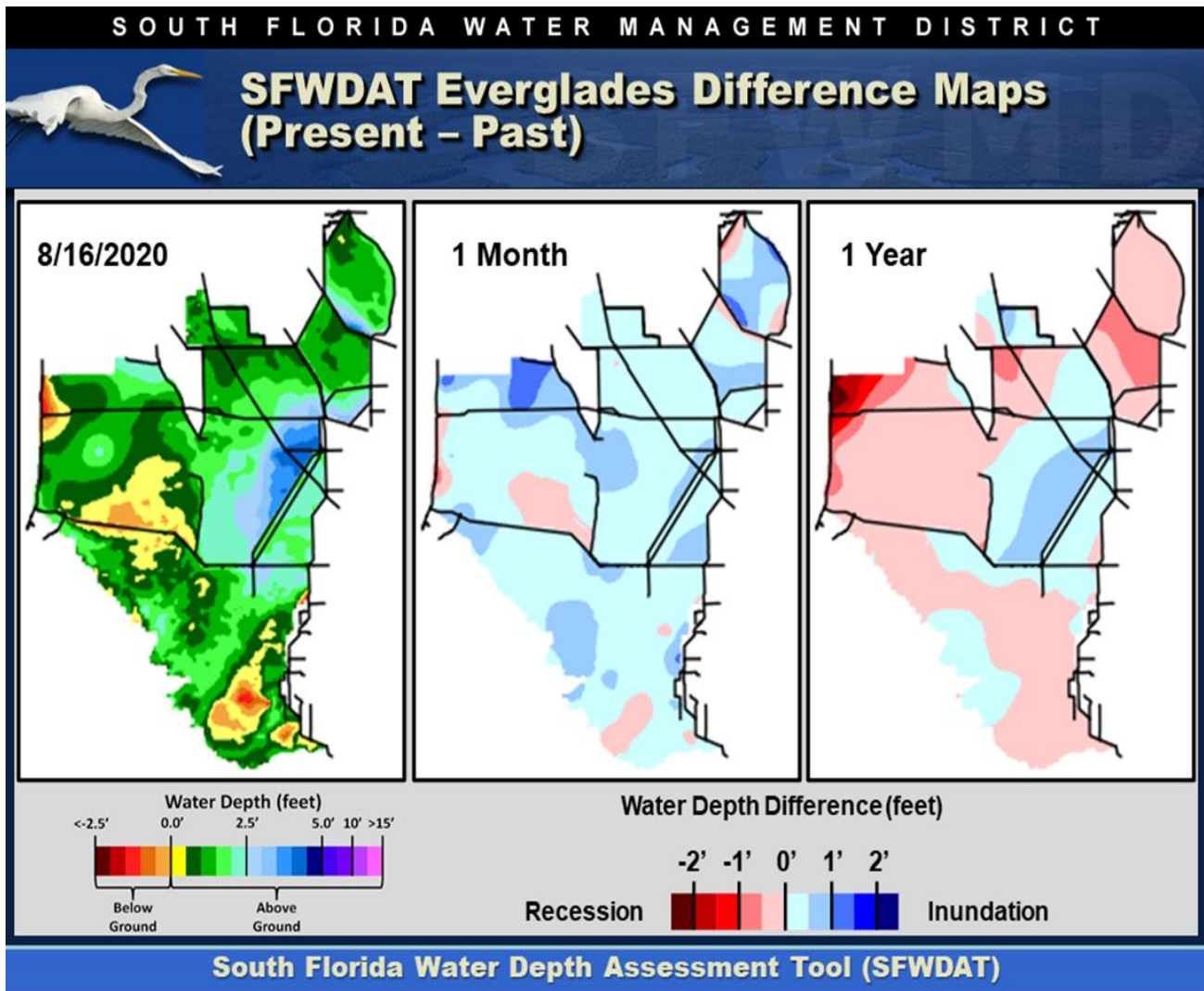
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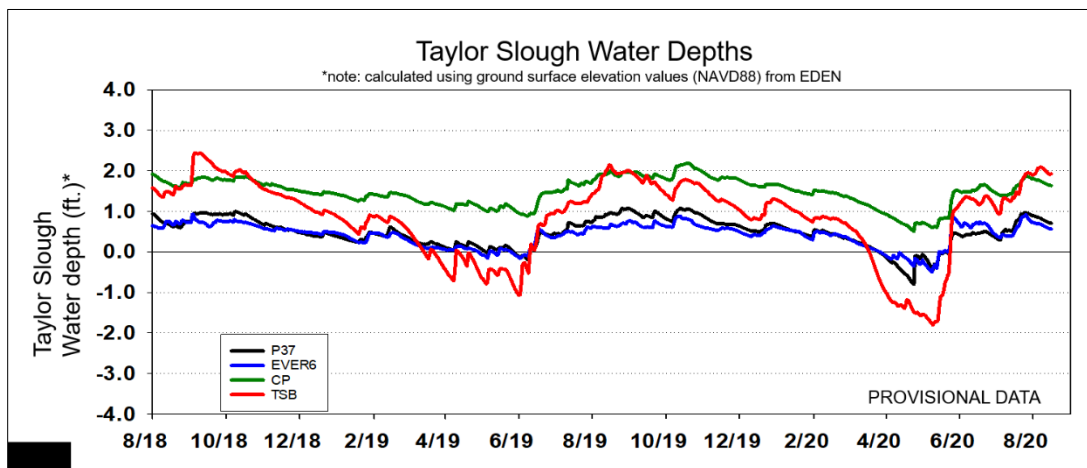
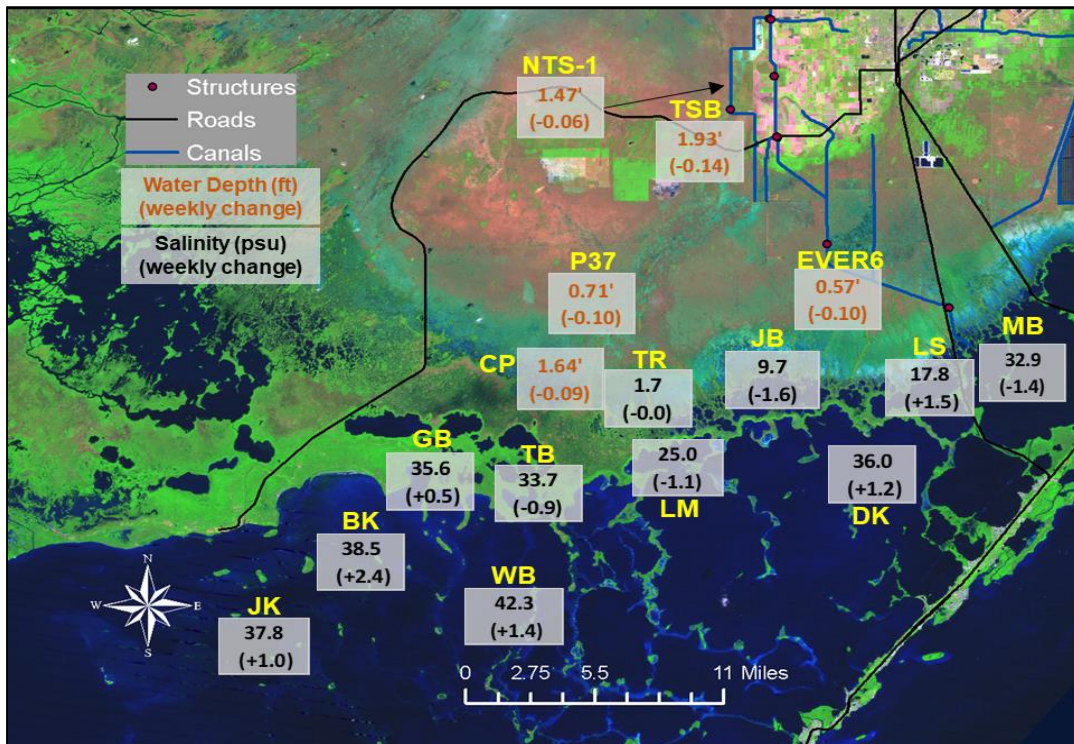
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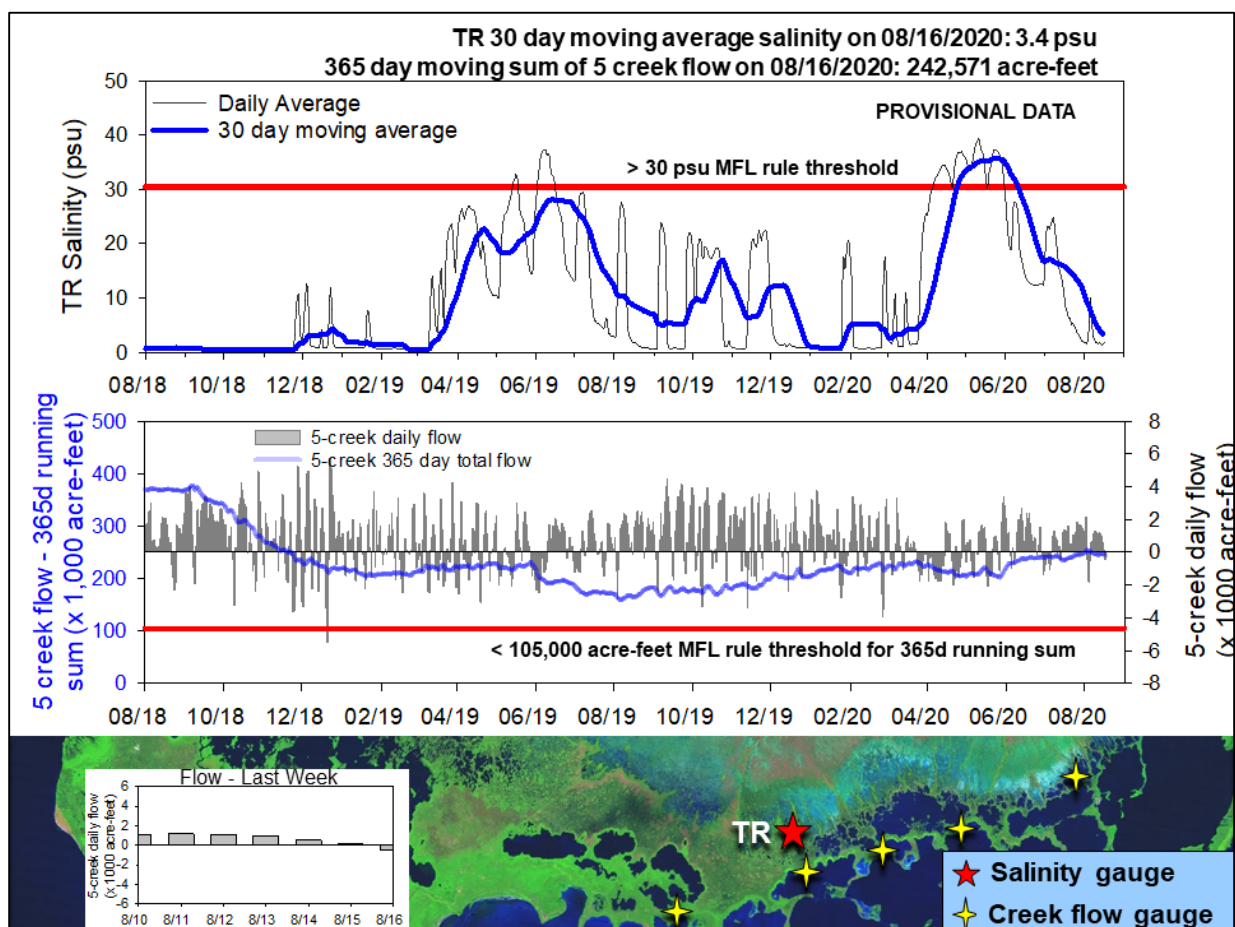
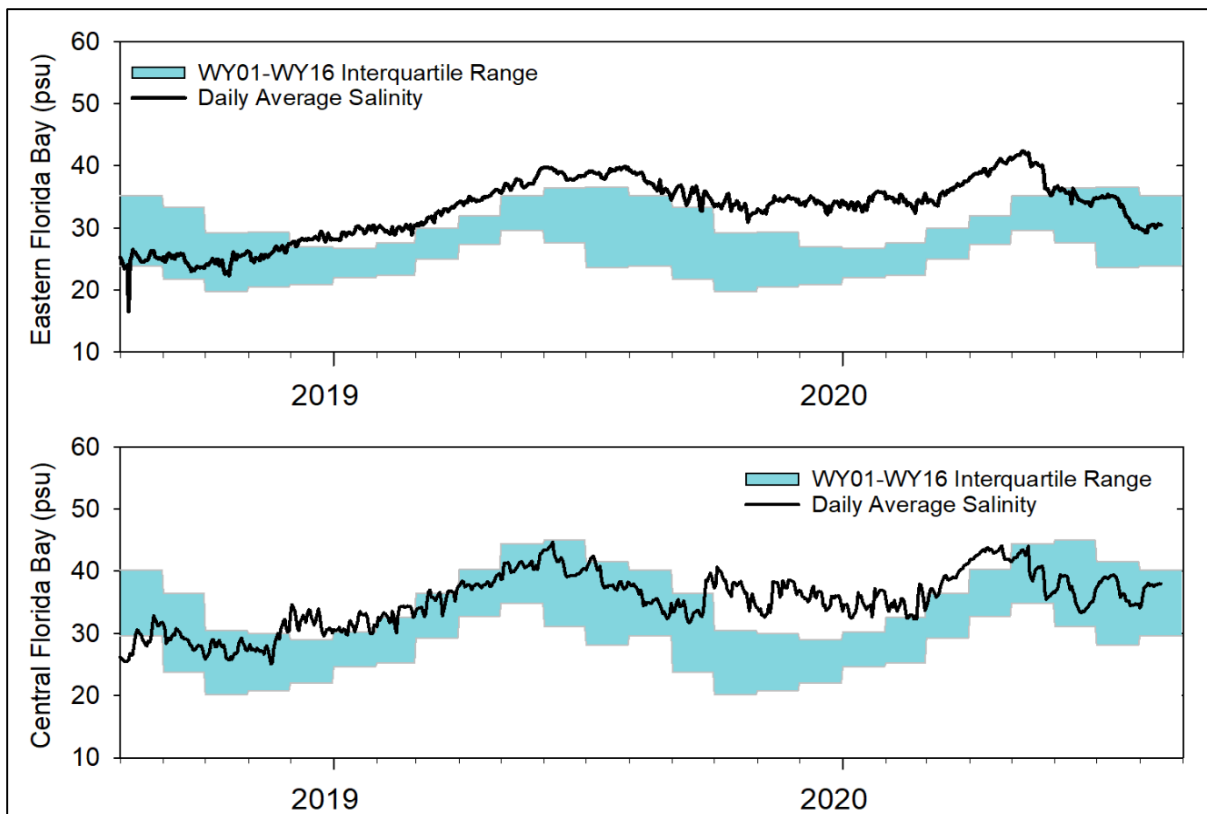


South Florida Water Depth Assessment Tool (SFWDAT)



Taylor Slough Water Levels: Rainfall over Taylor Slough and Florida Bay this past week averaged less than last week at 0.13 inches, and stages decreased 0.1 feet on average. All areas decreased similarly with individual station weekly changes ranging from -0.06 to -0.14 feet. Northern Taylor Slough is 7.1 inches deeper than the historical average (pre-Florida Bay Initiative).





Florida Bay Salinities: Average salinity in Florida Bay increased an average of 0.5 psu this past week with individual stations changing -1.6 psu to +2.4 psu. Nearshore salinities averaged a weekly decrease of 0.5 psu while bay sites averaged an increase of 1.5 psu. All stations are average to 6 psu above the historical average for this time of year.

Florida Bay MFL: Salinity at the TR station in the mangrove zone (tracked for the Florida Bay MFL) stayed in the 1.2 to 1.7 psu range the entire week. The 30-day moving average decreased 2.5 psu to end at 3.4 psu. Weekly flow from the 5 creeks identified by yellow stars on the map totaled just over 4,300 acre-feet which is double last week's flows. Daily volumes decreased over the week. The 365-day moving sum of flow from the five creeks (tracked as part of the Florida Bay MFL criteria) decreased 2,000 acre-feet this week to end at 242,571 acre-feet which is staying near the historical 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.

Peak stages in the fall 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 more than 80 days. Moderating inflows/outflows within that region decreases ponding in both spatial extent and the amount of time the region is inundated; this has benefit to the ecology of tree islands in that region.

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 more freshwater is needed to continue to decrease salinities in both the nearshore and the eastern bay towards a more ecologically preferred condition.

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

SFWMD Everglades Ecological Recommendations, August 18th, 2020 (red is new)

Area	Weekly change	Recommendation	Reasons
WCA-1	Stage increased by 0.07'	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 0.24'	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 0.04'	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 remained unchanged	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 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 remained unchanged	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 tree island ecology is diminished by flooding
Southern WCA-3A S	Stage decreased by 0.08'		
WCA-3B	Stage decreased by 0.04'	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 0.02'	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 -0.14'	Move water southward as possible	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged -1.6 to +2.4 psu	Move water southward as possible	When available, provide freshwater to maintain low salinity buffer and promote water movement.