

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: August 26, 2020

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

Despite the storm's proximity, the southern path that Hurricane Laura has taken reduced the chance of significant rainfall across the District, as the strongest winds and heaviest rains will pass well to the south of the area. Rainfall totals should be no more than about an inch. Below normal total rainfall is expected through Wednesday following the passage of Laura, although there could be a marginal increase of rain chances south of Lake Okeechobee on Wednesday in association with a weak mid-level disturbance passing through the Florida Straits. A low- to mid-level ridge of high pressure should begin to retreat from Florida on Thursday, while moisture associated with a tropical wave passes through the northwestern Caribbean Sea, Yucatan and southwestern Gulf of Mexico northeastward toward Florida. The moisture from the wave should cause total District rainfall and the coverage of rain to increase relative to earlier in the week, with southeasterly to southerly steering winds over the District favoring afternoon rains over the interior and the west. After Hurricane Laura makes landfall in Texas later this week, its remnants should move across the Mississippi Valley, Midwest and eastern United States, the high-pressure area extending across Florida to shift southward causing a large-scale weather pattern shift with steering winds over Florida veering to the southwest and ultimately the west by later in the weekend. Good moisture, instability, and steering wind change should favor interior and eastern rains Saturday and Sunday. The greatest rains will be around and east of Lake Okeechobee on Saturday and over the eastern interior to the eastern metropolitan areas on Sunday. For the week ending next Monday morning, total District rainfall is likely to be below the long-term mean for the last week of August, with a much lower chance that it would approach normal if the rains later in the week are greater than forecast. Total weekly rainfall is expected to be about 60% of normal.

Kissimmee

Tuesday morning stages were 55.6 feet NGVD (0.9 feet below schedule) in East Lake Toho, 53.4 feet NGVD (0.1 feet below schedule) in Toho, and 51.7 feet NGVD (0.7 feet above schedule) in Kissimmee-Cypress-Hatchineha; headwater stages were 46.5 feet NGVD at S-65A and 27.8 feet NGVD at S-65D. Tuesday morning discharges were 3,090 cfs at S-65, 4,290 cfs at S-65A, 2,740 cfs at S-65D and 2,850 cfs at S-65E. Dissolved oxygen concentration in the Kissimmee River averaged 1.0 mg/L for the week through Sunday, [critical threshold is 1 mg/L]. Kissimmee River mean floodplain depth on Sunday was 1.8 feet. Today's recommendation is to continue managing S65/S65A discharge per the recommendation for the 2020 Wet Season (continue using the IS-14-50 discharge plan through the 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. Additional recommendations are: to the extent possible from June 1- August 15, attempt to control the ascension rate in East Lake Toho to less than 1 foot per 30 days and less than 0.5 feet per 14 days in lakes Toho, Kissimmee, Cypress and Hatchineha.

Lake Okeechobee

Lake Okeechobee stage was 14.13 feet NGVD on August 24, 2020, 0.27 feet higher than the previous week and 1.22 feet higher than the previous month. The Lake is 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 0.37 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, eastern and southern areas but remains in the moderate range along the northwest shoreline.

Estuaries

Total inflow to the St. Lucie Estuary averaged 2,070 cfs over the past week with no flow coming from Lake Okeechobee. The seven-day average salinities increased at HR1 but decreased at US1 and downstream 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 4,866 cfs over the past week with estimated 119 cfs coming from the Lake. The seven-day average salinity decreased 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 644,000 ac-feet. Most STA cells are near or above target stage, especially the EAV cells of STA-1W and STA-3/4 which are well 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

Heavy rains in the north meant WCA-1 rose rapidly last week, while WCA-2A and WCA-3A stages changed very little and all remain above schedule. Stages at the “Deer Gauge” in northwestern WCA-3A remains below the Upper Schedule and the two-gauge average in WCA-3A North also remains below the Florida Fish and Wildlife Conservation (FWWC) closure stage (EO 20-26 EWMA HL RWMA Closure) but public closure remains in effect. Depths in WCA-3A north that benefit the Alley North colony have the potential to be reached according to the Gauge 63 dynamic position analysis. Daily rainfall but in moderate amounts over Florida Bay and Taylor Slough meant little stage change. Wind driven mass water movement in Florida Bay resulted in an increase in salinity and is above average for this time of year. Daily average salinity in the mangrove zone increased last week and flows from the creeks were mostly negative. The current ecologically preferred ascension 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. Conditions have been less than ideal in central and southern WCA-3A over the last few weeks.

Supporting Information

KISSIMMEE BASIN

The Upper Kissimmee Basin received 2.39 inches of rainfall in the past week and the Lower Basin received 1.86 inches (SFWMD Daily Rainfall Report 08/24/2020).

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: 8/25/2020

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)						
							8/23/20	8/16/20	8/9/20	8/2/20	7/26/20	7/19/20	7/12/20
Lakes Hart and Mary Jane	S-62	257	LKMJ	60.0	R	60.0	0.0	0.2	0.1	-0.2	0.0	0.0	0.2
Lakes Myrtle, Preston, and Joel	S-57	61	S-57	61.0	R	61.0	0.0	0.0	-0.1	-0.2	0.0	0.0	0.1
Alligator Chain	S-60	81	ALLI	63.3	R	63.2	0.1	0.1	0.0	-0.1	0.0	0.0	-0.2
Lake Gentry	S-63	127	LKGT	61.1	R	61.0	0.1	0.0	-0.1	-0.2	0.1	0.1	0.1
East Lake Toho	S-59	646	TOHOE	56.0	R	56.5	-0.5	-0.4	-0.5	-0.7	-0.8	-0.7	-1.2
Lake Toho	S-61	1,583	TOHOW, S-61	53.5	R	53.5	0.0	0.1	0.0	-0.2	0.0	0.0	0.2
Lakes Kissimmee, Cypress, and Hatchineha	S-65	2,506	KUB011, LKIS5B	51.7	R	51.0	0.7	0.3	0.2	0.1	0.5	0.9	0.7

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: 8/25/2020

Metric	Location	1-Day Average		Average for the Preceding 7-Days ¹							
		8/23/2020	8/23/20	8/16/20	8/9/20	8/2/20	7/26/20	7/19/20	7/12/20	7/5/20	6/28/20
Discharge (cfs)	S-65	3,068	2,506	1,611	1,760	4,215	4,623	2,396	1,779	1,527	873
Discharge (cfs)	S-65A ²	4,498	3,173	1,990	2,554	4,851	5,111	3,202	2,174	1,559	1,127
Discharge (cfs)	S-65D ²	2,823	3,067	4,360	5,466	5,538	3,846	2,383	1,602	1,314	1,453
Headwater Stage (feet NGVD)	S-65D ²	27.53	27.59	27.57	27.70	27.75	26.99	26.02	25.81	25.76	25.72
Discharge (cfs)	S-65E ²	2,832	3,079	4,484	5,703	5,462	3,671	2,229	1,574	1,240	1,402
Discharge (cfs)	S-67	0	0	0	0	0	0	0	0	0	0
DO (mg/L) ³	Phases I & II/III river channel	1.7	1.0	0.4	0.5	0.4	0.2	0.2	1.4	2.7	2.0
Mean depth (feet) ⁴	Phase I floodplain	1.84	1.75	2.06	2.60	3.02	2.64	1.63	1.13	0.73	0.71

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.

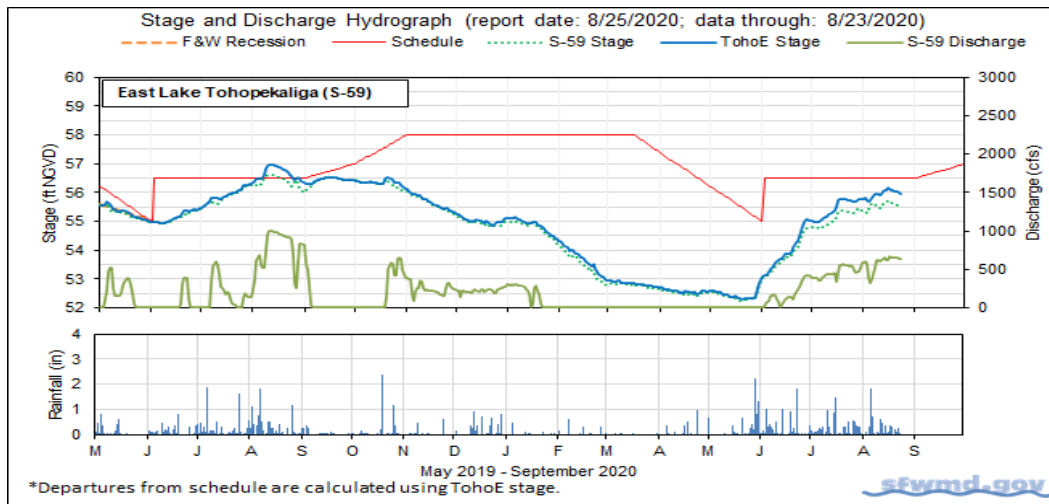


Figure 1. East Lake Toho regulation schedule, stage, discharge and rainfall.

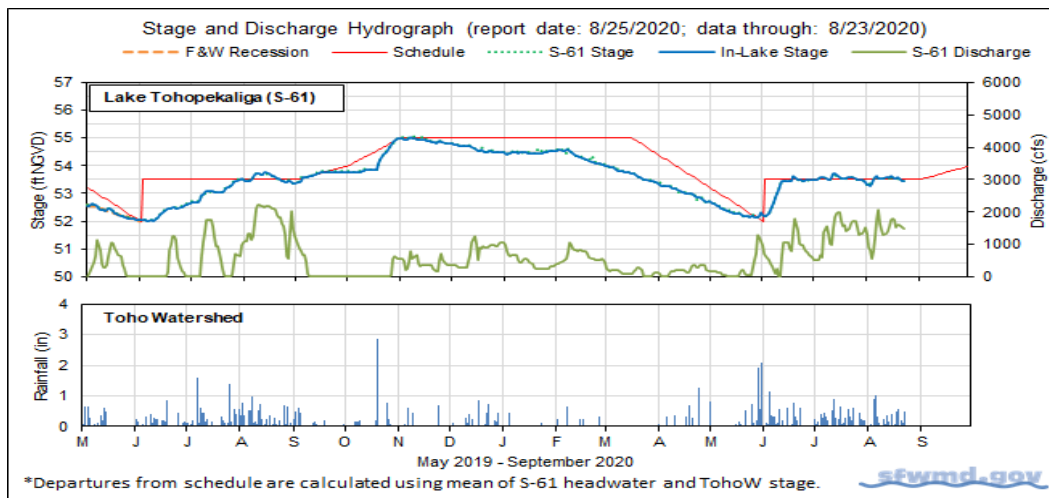


Figure 2. Lake Toho regulation schedule, stage, discharge and rainfall.

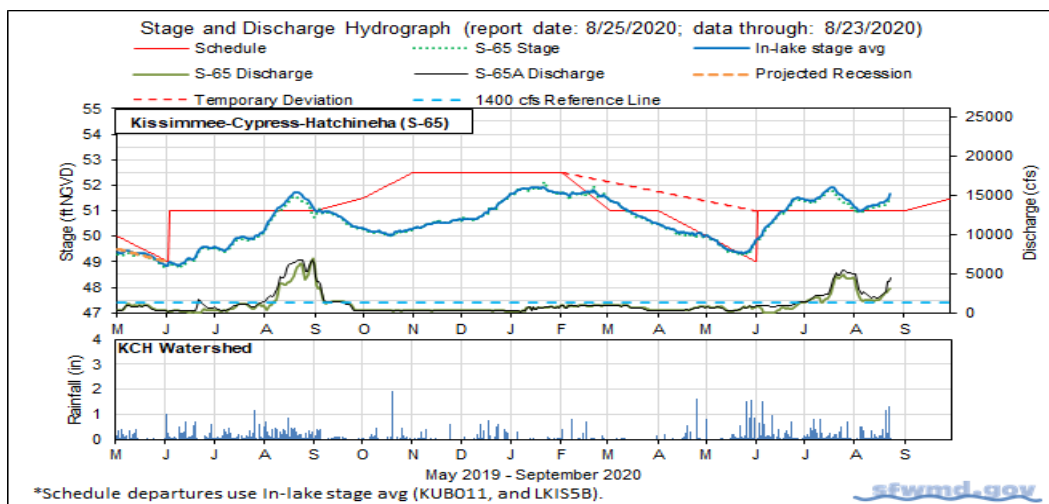


Figure 3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

Kissimmee River Phase I Restoration Area Water Depth Maps

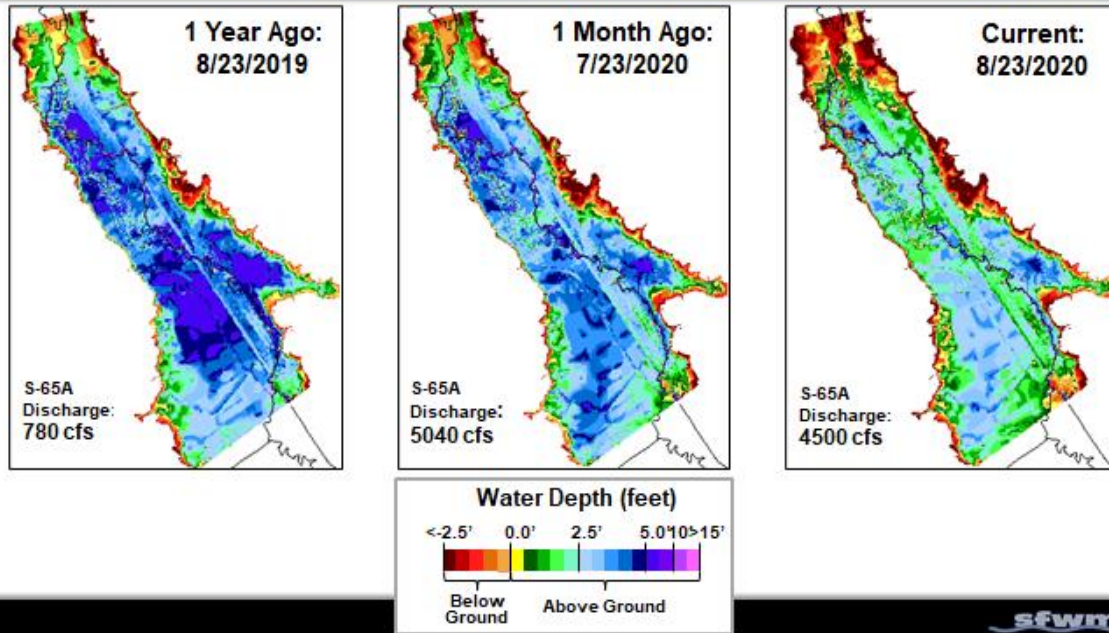
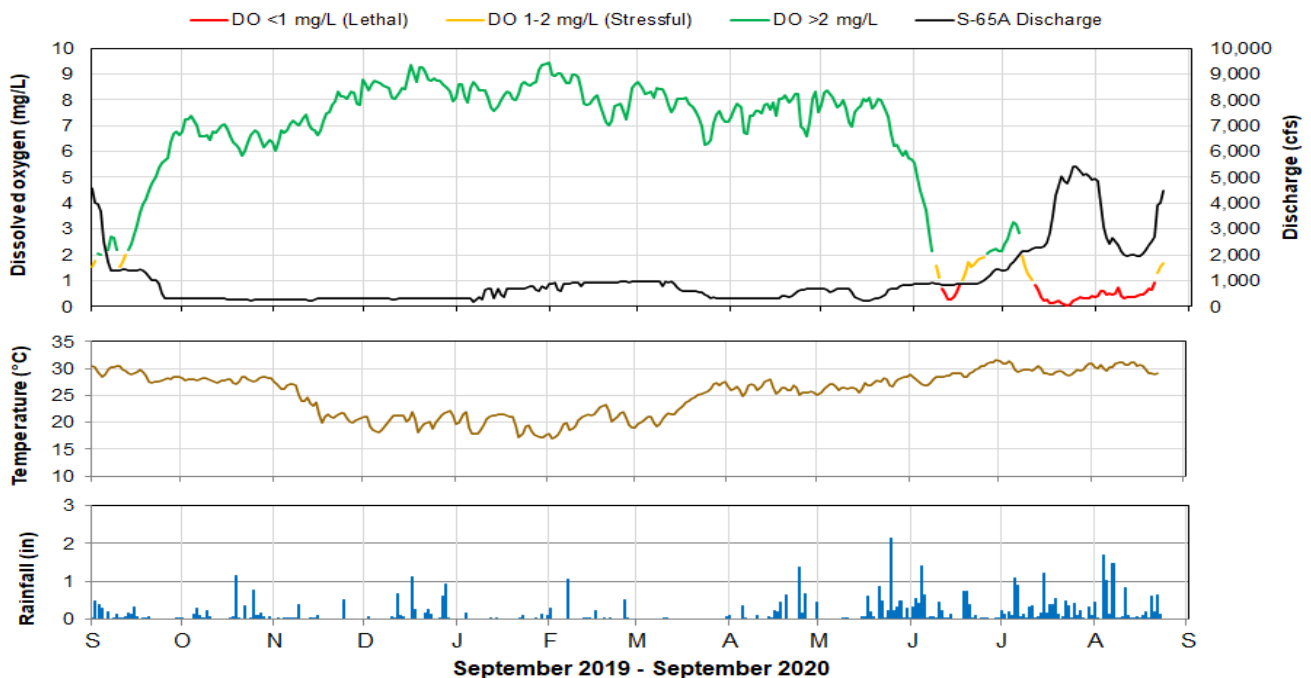


Figure 4. Phase I area floodplain water depths (from left to right) one year ago, one month ago and current. Color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to January 16, 2012.



Dissolved oxygen (DO) and temperature are mean daily values averaged for PC62, KRBN, PC33, PD62R and PD42R with an average of 4 stations reporting this week. Rainfall values are daily totals for Kissimmee River (Pool BCD) AHED watershed.

Report Date: 8/25/2020; data are through: 8/23/2020

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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)

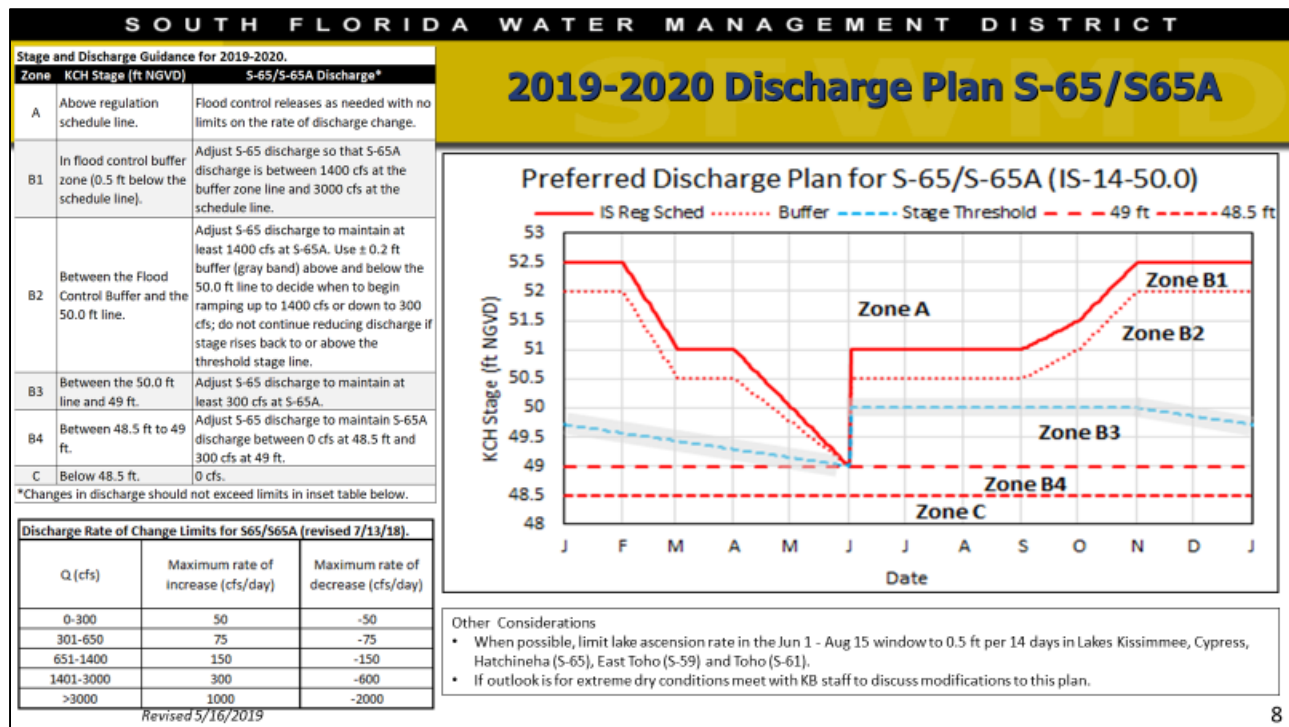


Figure 6. The 2019-2020 Discharge Plan for S-65/S-65A.

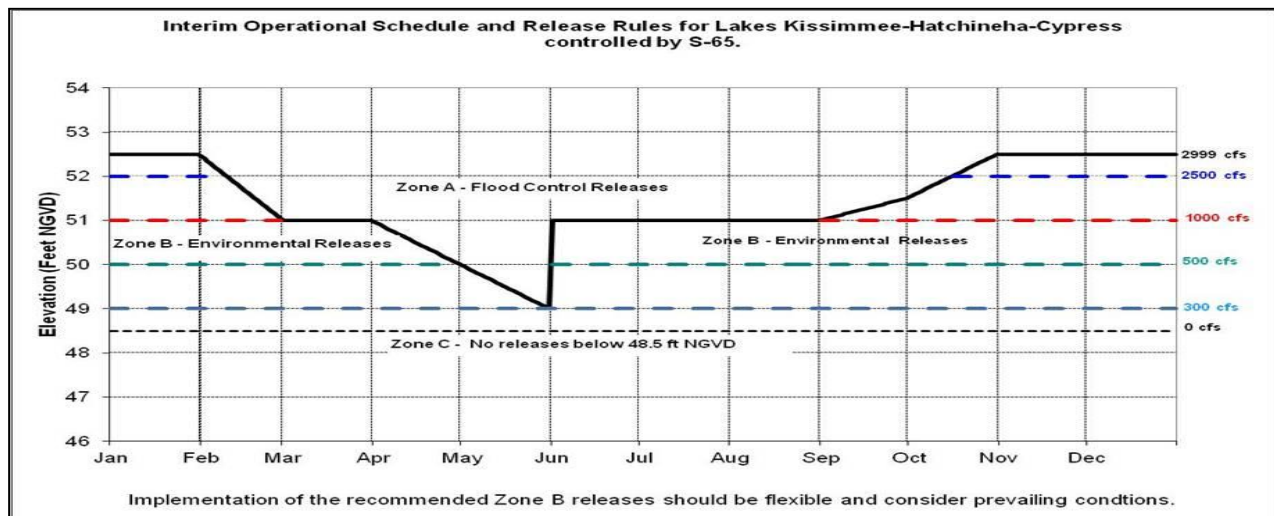


Figure 7. Interim operations schedule for S-65 (solid black line). The discharge schedule shown to the right has not been used in recent years.



Figure 8. The Kissimmee Basin.

LAKE OKEECHOBEE

Lake Okeechobee stage is 14.13 feet NGVD, 1.22 feet higher than a month ago and 0.75 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 0.37 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 ft per week since early July. According to RAINДАР, 2.19 inches of rain fell directly over the Lake (Figure 4). The district-wide average was approximately 1.74 inch, although rainfall was highly variable throughout the watershed.

The average daily inflows (minus rainfall) decreased from 7,200 cfs to 5,952 cfs, and the outflows (minus evapotranspiration) decreased from 451 cfs to 183 cfs over the past week. Most of the inflows came from the Kissimmee River (2,961 cfs through S-65E & S-65EX1), while 1,191 cfs came from the C-41A canal (through S-84 & S-84X), 312 cfs from Fisheating Creek, around 325 cfs came from S-71 and S-72, 340 cfs from the north structures (S-154 and S-191), and 253 cfs from the northern pumps to manage basin runoff from the recent rains. An additional 90 cfs and 480 cfs also came from passive inflow from the east through S-308 and the L-8 Canal via Culvert 10A, respectively. Outflows totaled 183 cfs all going west through 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 first August sampling occurred on the 4th and 5th (Figure 6). Bloom conditions ($>40 \mu\text{g/L}$) were detected at 8 sites 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 23, 2020) from NOAA's cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3 OLCI sensor data was partially obscured by cloud cover but suggested a decrease in cyanobacteria bloom risk potential in the central, southern and eastern regions with moderate bloom risk persisting along the northwestern shoreline from Fisheating Bay to the Kissimmee River (Figure 7).

Water Management Summary

Lake Okeechobee stage was 14.13 feet NGVD on August 24, 2020, 0.27 feet higher than the previous week and 1.22 feet higher than the previous month. The Lake is 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 0.37 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, eastern and southern areas but remains in the moderate range along the northwest shoreline.

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

INFLOWS	Previous week Avg Daily CFS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)	OUTFLOWS	Previous week Avg Daily CFS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)
S-65E & S-65EX1	4154	2961	1.2	S-77	360	183	0.1
S-71 & S-72	476	325	0.1	S-308	-84	-90	0.0
S-84 & S-84X	1508	1191	0.5	S-351	0	0	0.0
Fisheating Creek	170	312	0.1	S-352	0	0	0.0
S-154	75	60	0.0	S-354	91	0	0.0
S-191	196	280	0.1	L-8 Outflow			
S-133 P	83	70	0.0	ET	1859	2330	1.0
S-127 P	7	13	0.0	Total	2226	2423	1.0
S-129 P	3	44	0.0				
S-131 P	2	75	0.0				
S-135 P	113	51	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	329	480	0.2				
Rainfall	1746	5244	2.2				
Total	8862	11106	4.6				

Provisional Data

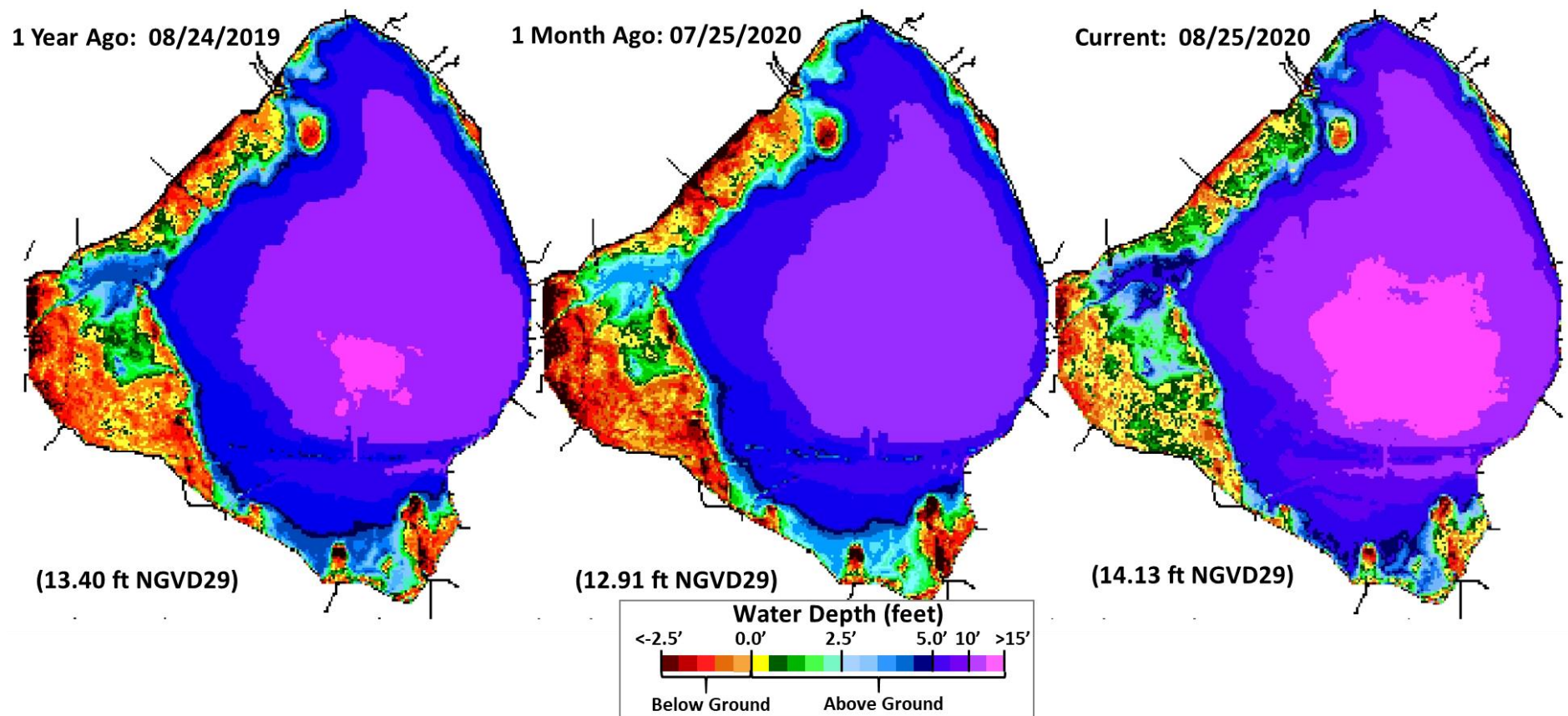


Figure 1. Water depth estimates on Lake Okeechobee based on the South Florida Water Depth Assessment Tool.

Lake Okeechobee Stage vs Updated Ecological Envelope

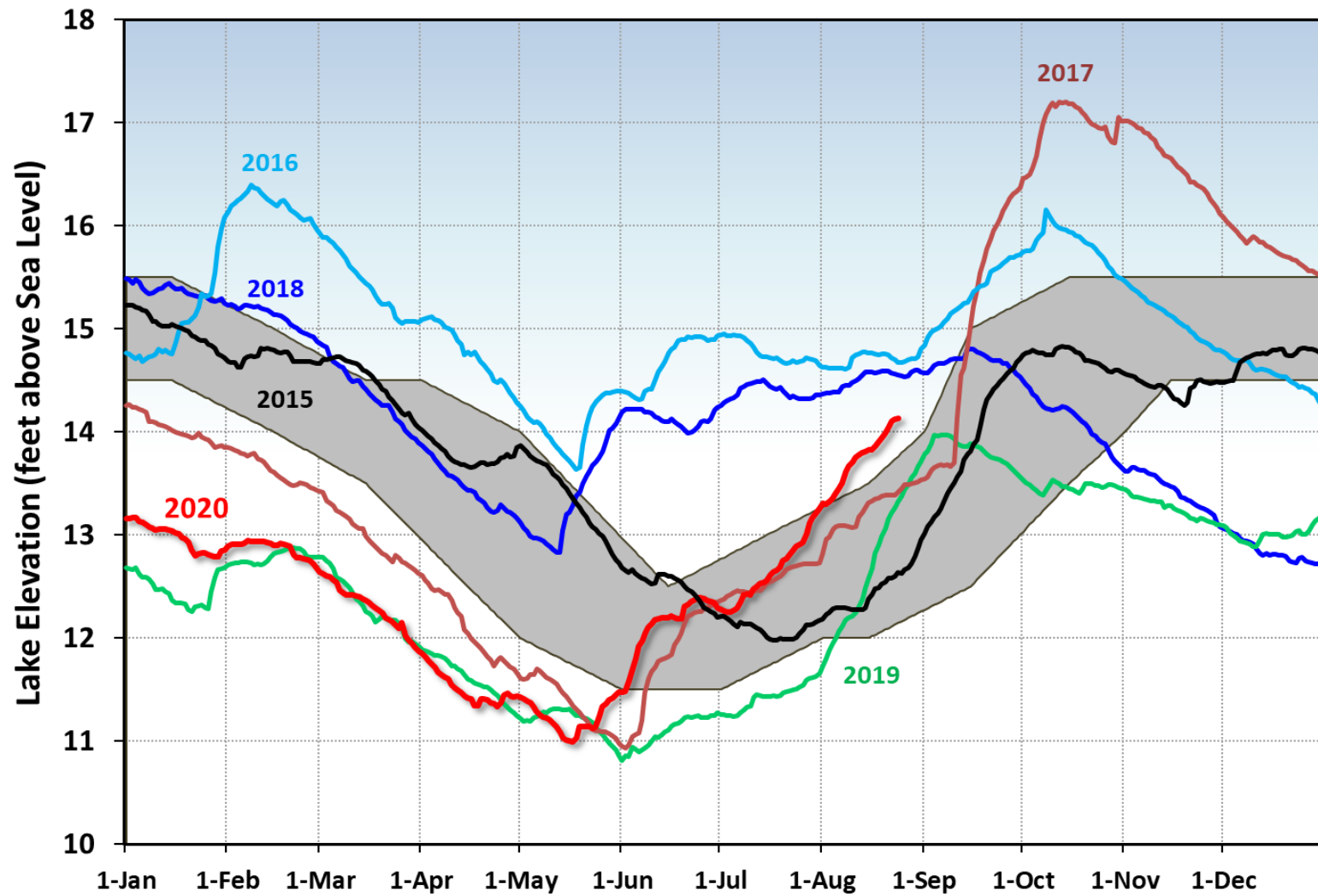


Figure 2. Select annual stage hydrographs for Lake Okeechobee in comparison to the updated Ecological Envelope.

Lake Okeechobee Water Level History and Projected Stages

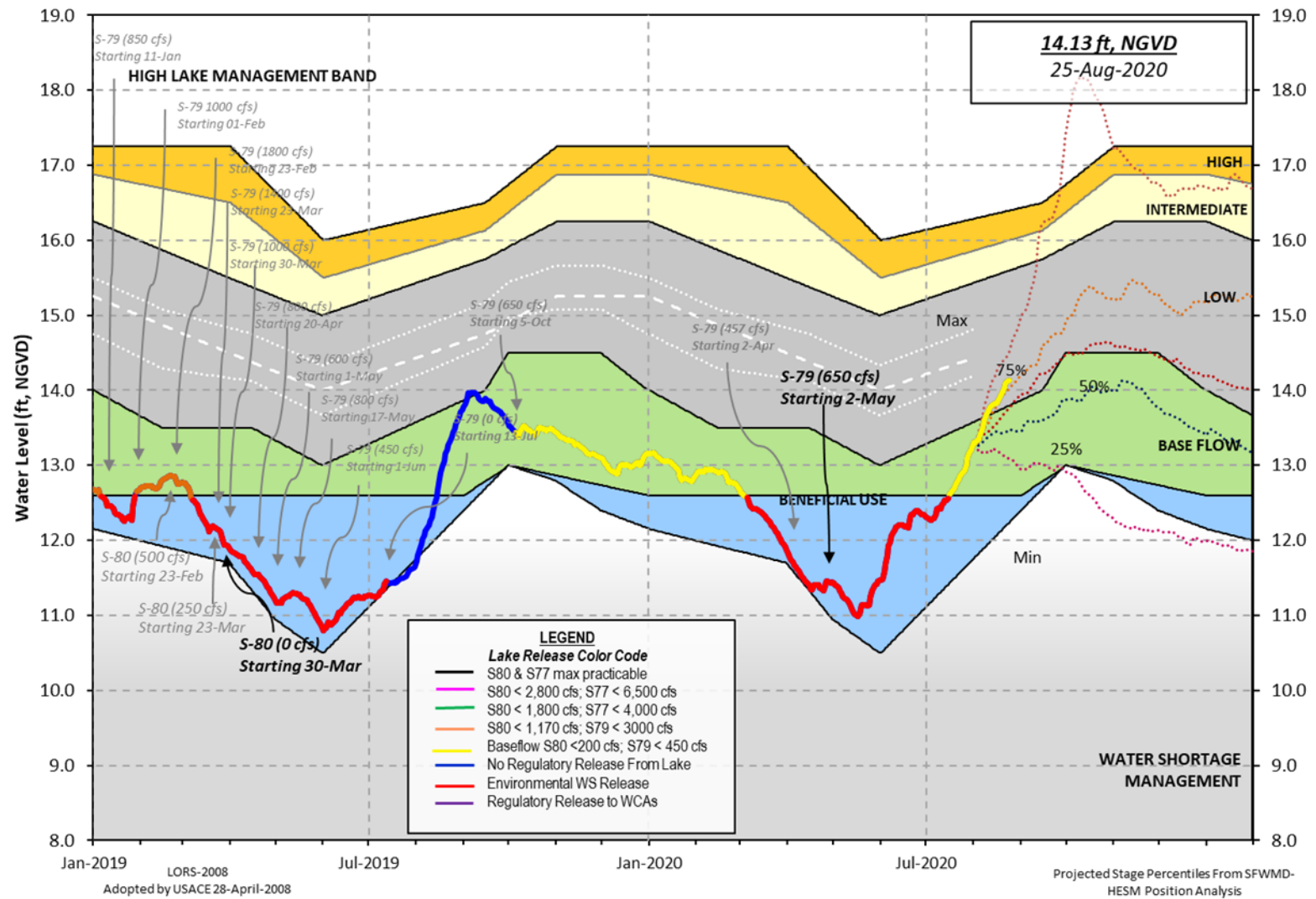


Figure 3. Recent Lake Okeechobee stage and releases, with projected stages based on a dynamic position analysis.

SFWMD PROVISIONAL RAINDAR 7-DAY BASIN RAINFALL ESTIMATES

FROM: 0700 EST, 08/18/2020 THROUGH: 0700 EST, 08/25/2020

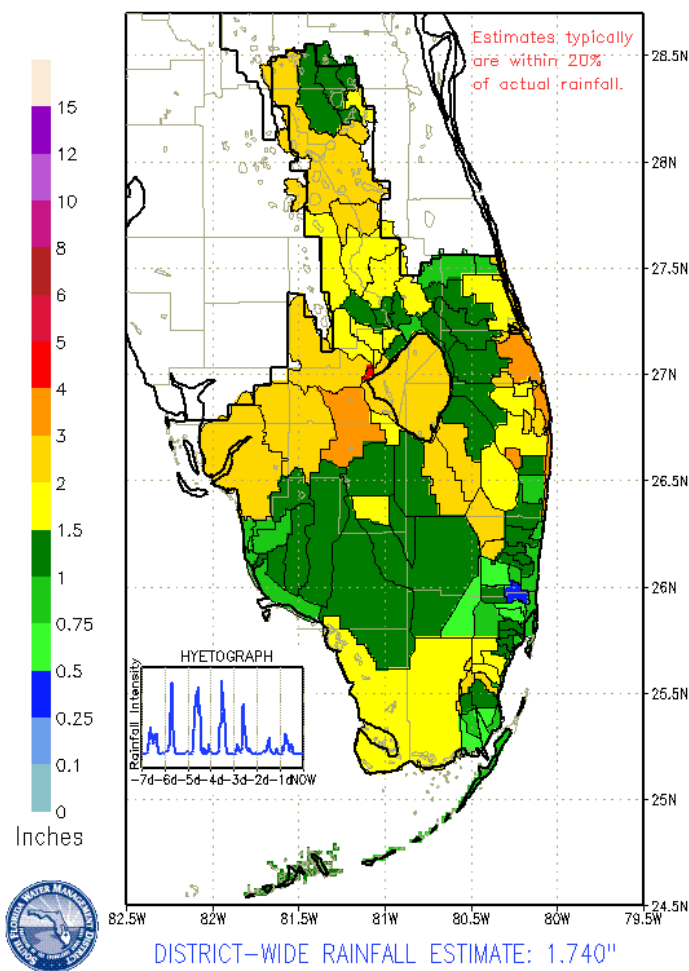


Figure 4. 7-Day rainfall estimates by RAINDAR.

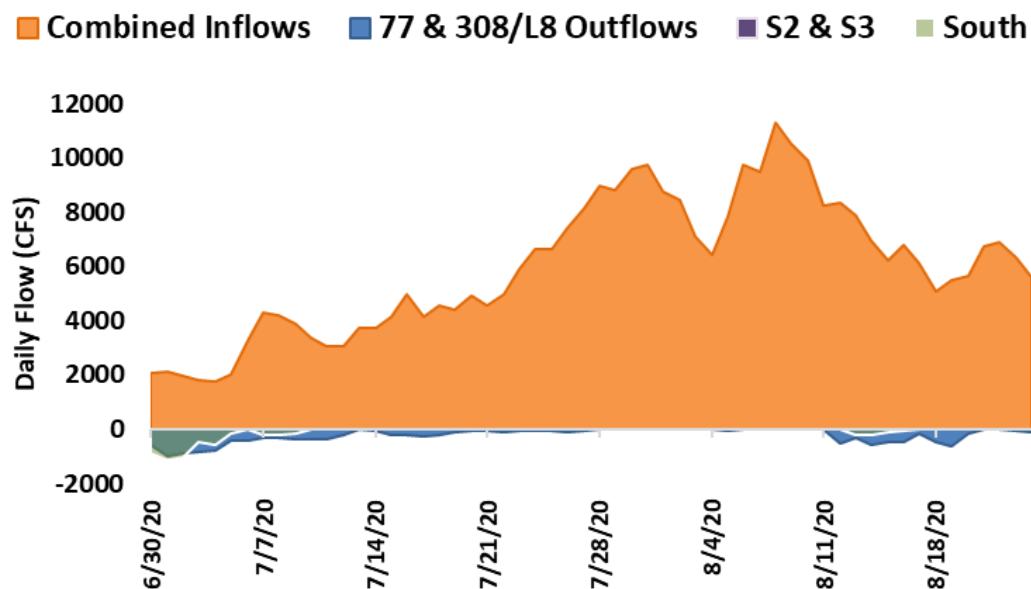


Figure 5. Major inflows (orange) and outflows (blue) of Lake Okeechobee, including the S-350 structures designated as South (green). The L-8 Canal flows through Culvert 10A are included as outflows when positive, and as inflows when backflowing into the Lake. All inflows and outflows are shown as positive 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 (8/17)	P	BDL	<i>Cylindro</i>
* FEBOUT (8/17)	P	0.2	<i>Planktol</i>
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>
* RITTAE2	17.0	0.4	<i>Microcys</i>
PELBAY3	7.6	0.3	mixed
POLE3S	9.0	BDL	mixed
LZ25A	5.8	BDL	mixed
PALMOUT	6.1	BDL	mixed
PALMOUT1	21.9	3.2	<i>Microcys</i>
PALMOUT2	15.4	2.2	<i>Microcys</i>
PALMOUT3	7.7	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	6.5	BDL	mixed
L007	6.3	BDL	mixed
L008	32.5	0.7	<i>Microcys</i>
LZ30	8.3	BDL	<i>Microcys</i>
LZ40	31.9	25.0	<i>Microcys</i>
CLV10A	69.7	0.3	<i>Microcys</i>
NCENTER	38.4	1.8	<i>Microcys</i>

Samples collected Aug 10

S308C	4.1	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*

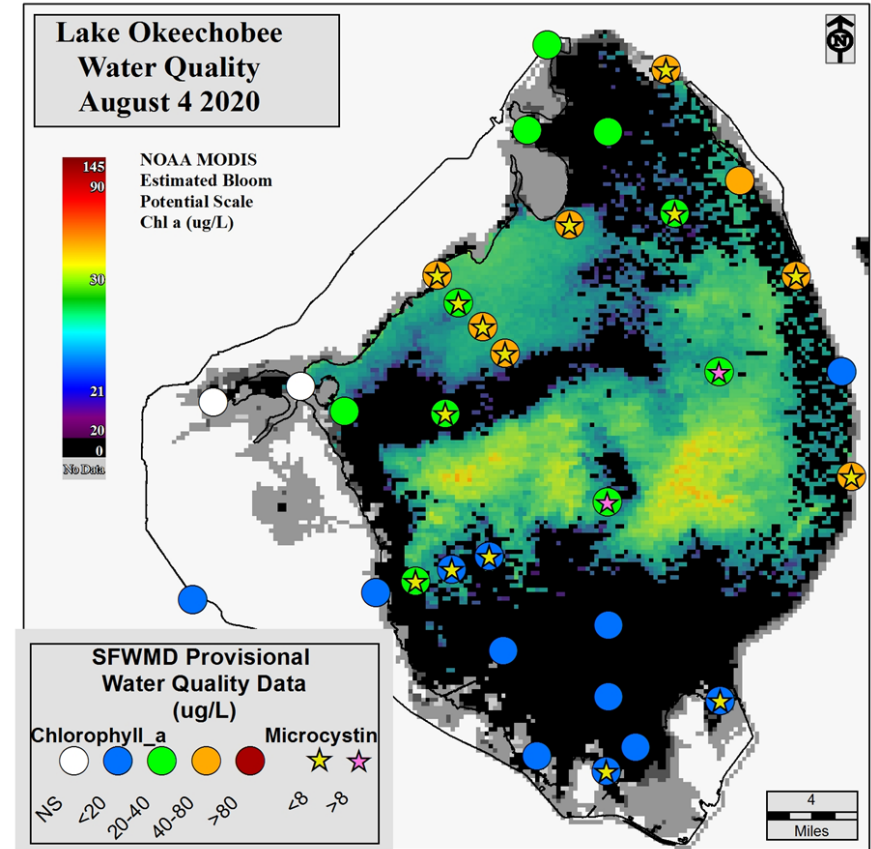


Figure 6. Provisional results from the expanded monitoring sampling trips on August 4-5, 2020.

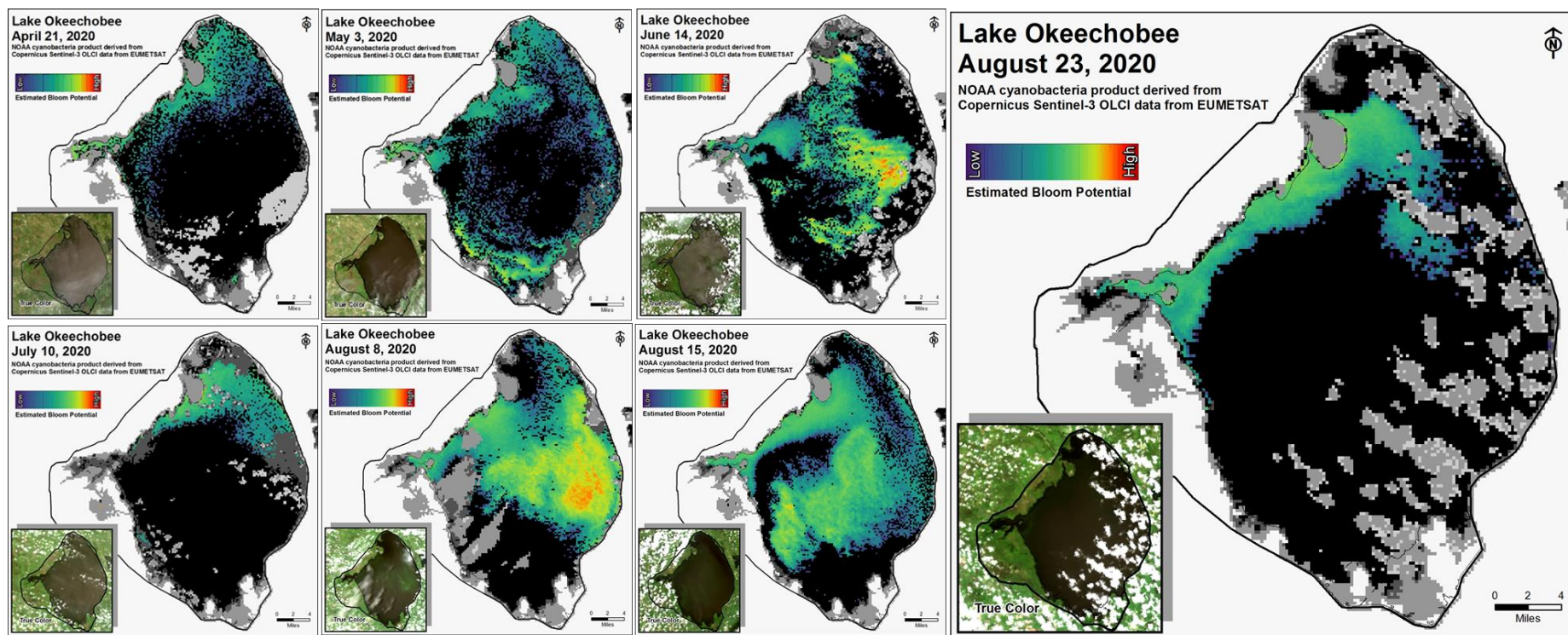


Figure 7. Potential for cyanobacterial blooms on Lake Okeechobee during 2020, based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

ESTUARIES

St. Lucie Estuary:

Last week total inflow to the St. Lucie Estuary averaged approximately 2,070 cfs (Figures 1 and 2) and last month inflow averaged about 1,760 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	1,346
S-80	243
S-308	-91
S-49 on C-24	239
S-97 on C-23	101
Gordy Rd. structure on Ten Mile Creek	141

Over the past week in the estuary, salinity increased in the North Fork and decreased at US1 Bridge and downstream (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 10.0. Salinity conditions in the middle estuary are estimated to be just 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)	4.3 (2.3)	6.9 (5.2)	NA ¹
US1 Bridge	8.4 (8.6)	10.1 (13.5)	10.0-26.0
A1A Bridge	17.4 (NR ²)	23.3 (25.4)	NA ¹

¹Envelope not applicable and ²Not Reporting

Caloosahatchee Estuary:

Last week total inflow to the Caloosahatchee Estuary averaged approximately 4,866 cfs (Figures 5 and 6) and last month inflow averaged about 2,655 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	183
S-78	973
S-79	3946
Tidal Basin Inflow	920

Over the past week, salinity decreased throughout the estuary except at Sanibel where it remained the same (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)	0.3 (0.8)	0.3 (0.8)	NA ¹
Val I75	0.6 (0.8)	0.6 (1.6)	0.0-5.0 ²
Ft. Myers Yacht Basin	2.7 (4.7)	3.0 (6.9)	NA
Cape Coral	9.8 (11.2)	11.0 (13.5)	10.0-30.0
Shell Point	23.4 (23.9)	24.6 (24.9)	10.0-30.0
Sanibel	30.2 (30.2)	31.3 (31.2)	10.0-30.0

¹Envelope not applicable and ²Envelope 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 1.1 to 2.5 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 750 cfs. The 30-day moving average surface salinity at Val I-75 is forecast to be between 0.6 and 1.0 (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	750	2.5	1.0
B	300	750	1.9	0.8
C	450	750	1.7	0.7
D	650	750	1.5	0.7
E	800	750	1.1	0.6

Red tide

The Florida Fish and Wildlife Research Institute reported on August 21, 2020, that *Karenia brevis*, the Florida red tide dinoflagellate, was not observed in samples collected from Lee, St. Lucie, Martin, or Miami-Dade counties (no samples were analyzed this week from Palm Beach 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.

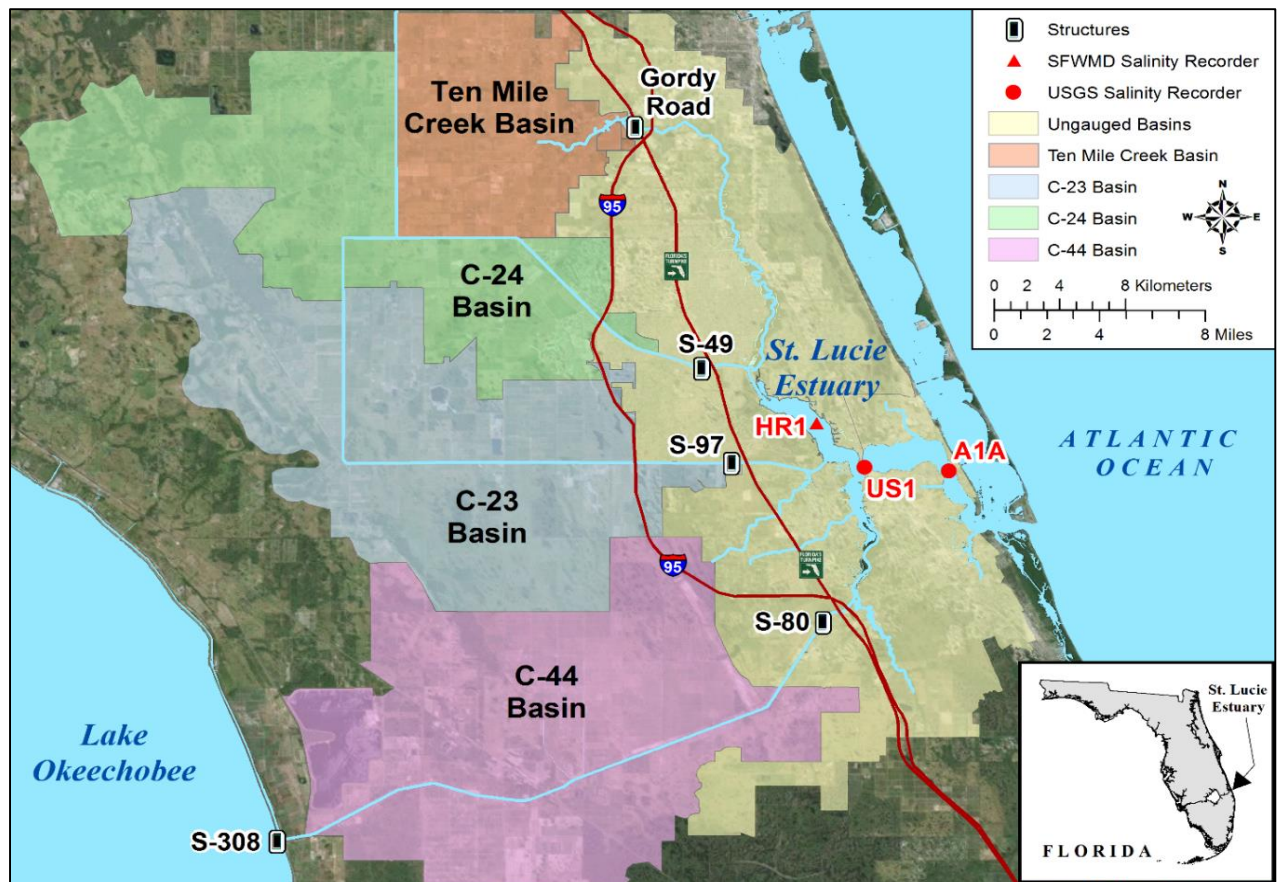


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

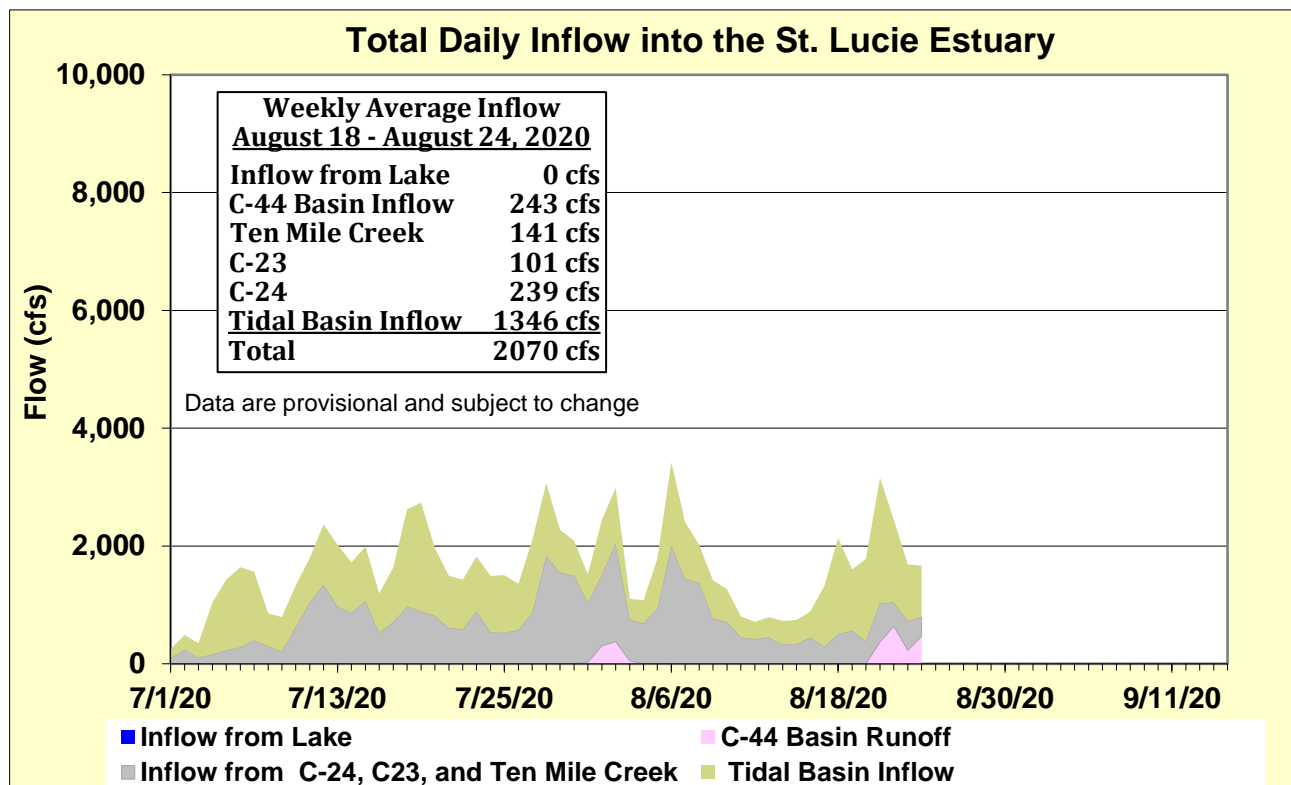


Figure 2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basin into the St. Lucie Estuary.

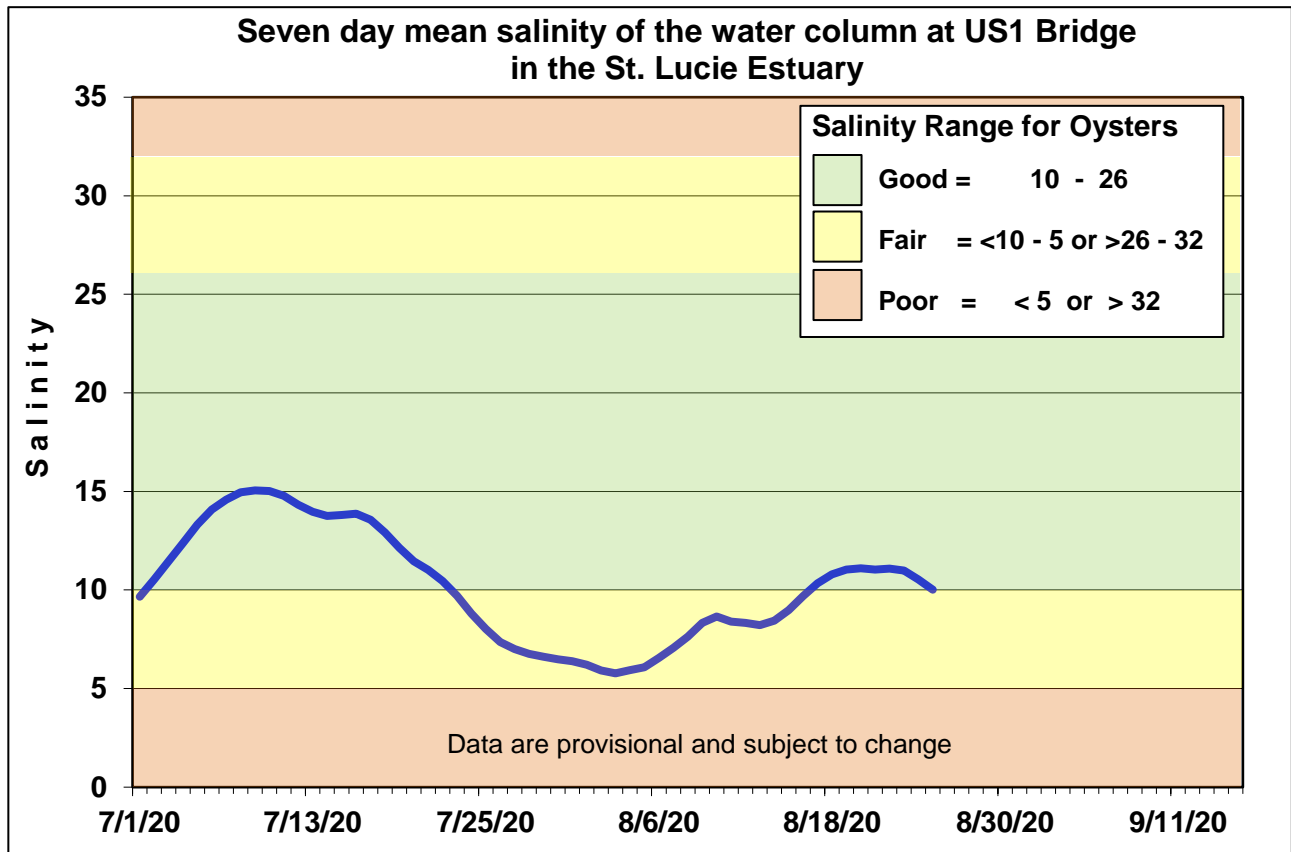


Figure 3. Seven-day mean salinity of the water column at the US1 Bridge.

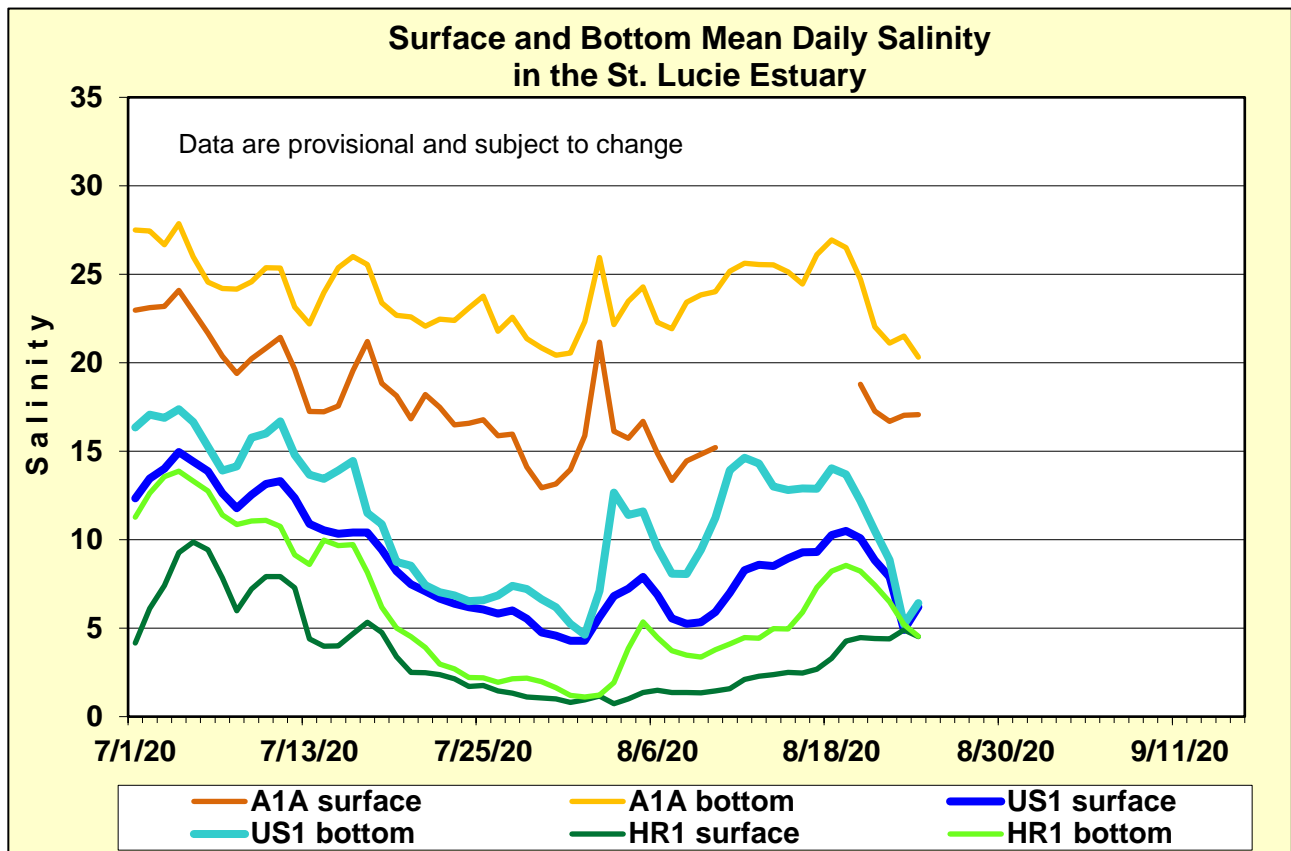


Figure 4. Daily mean salinity at the A1A, US1, and HR1 stations.

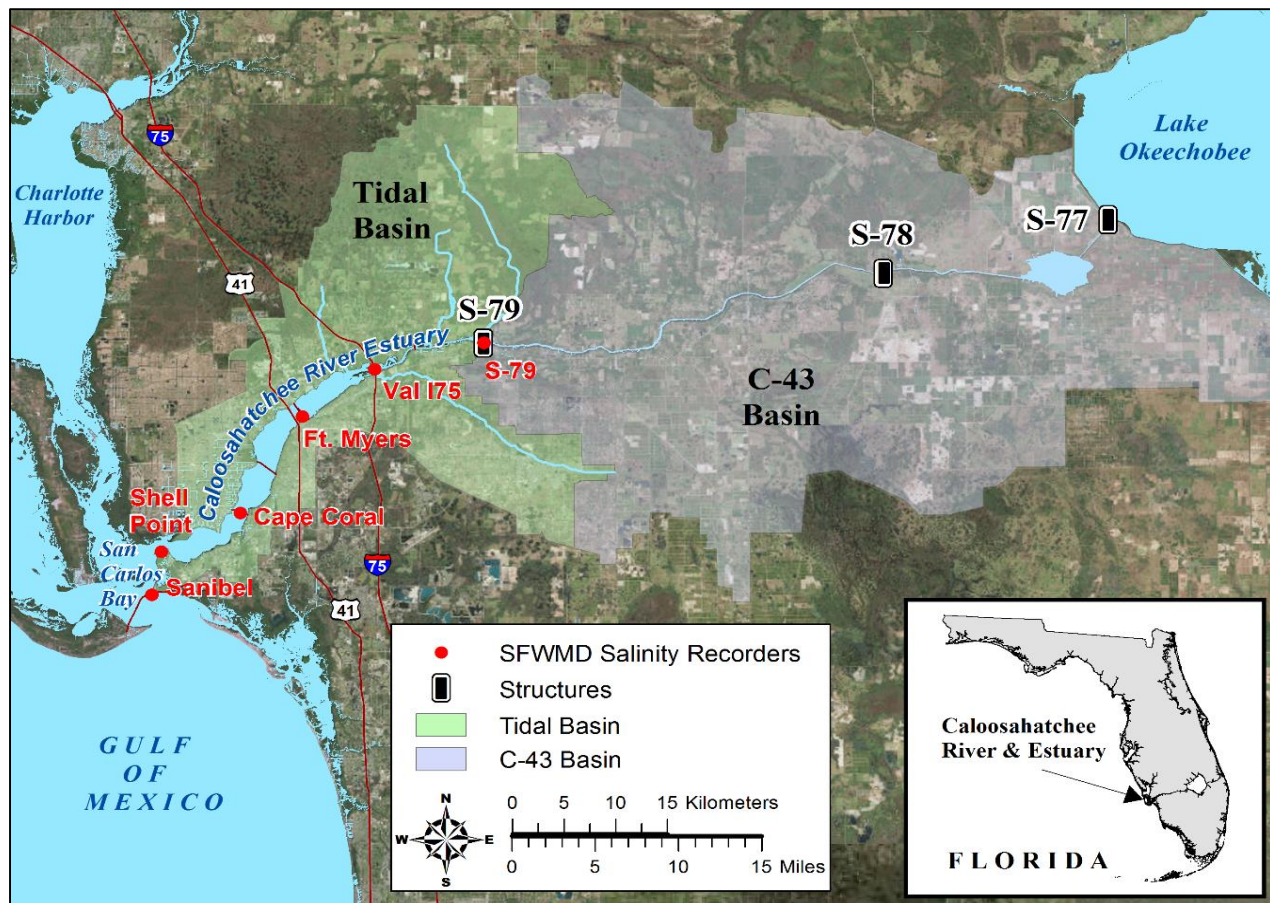


Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

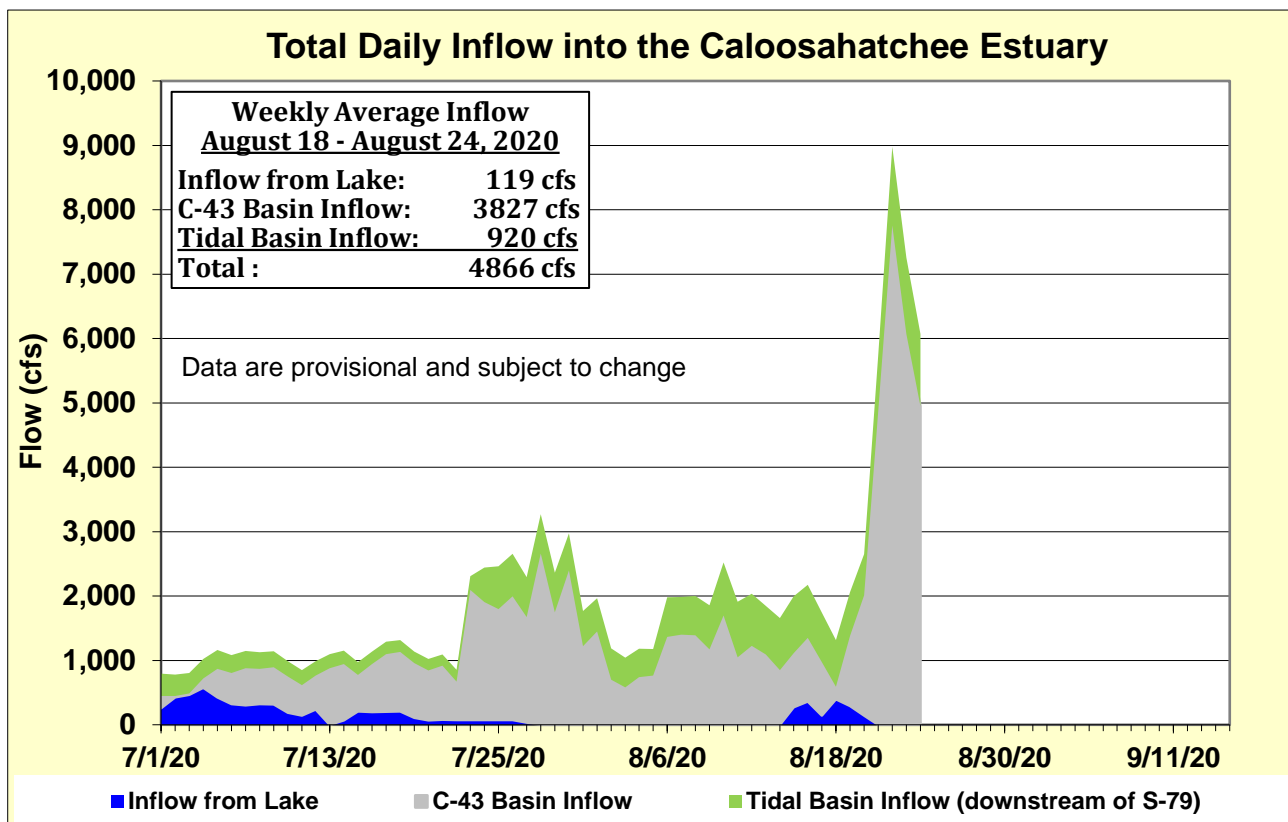


Figure 6. Total daily inflows from Lake Okeechobee, runoff from the C-43 basin

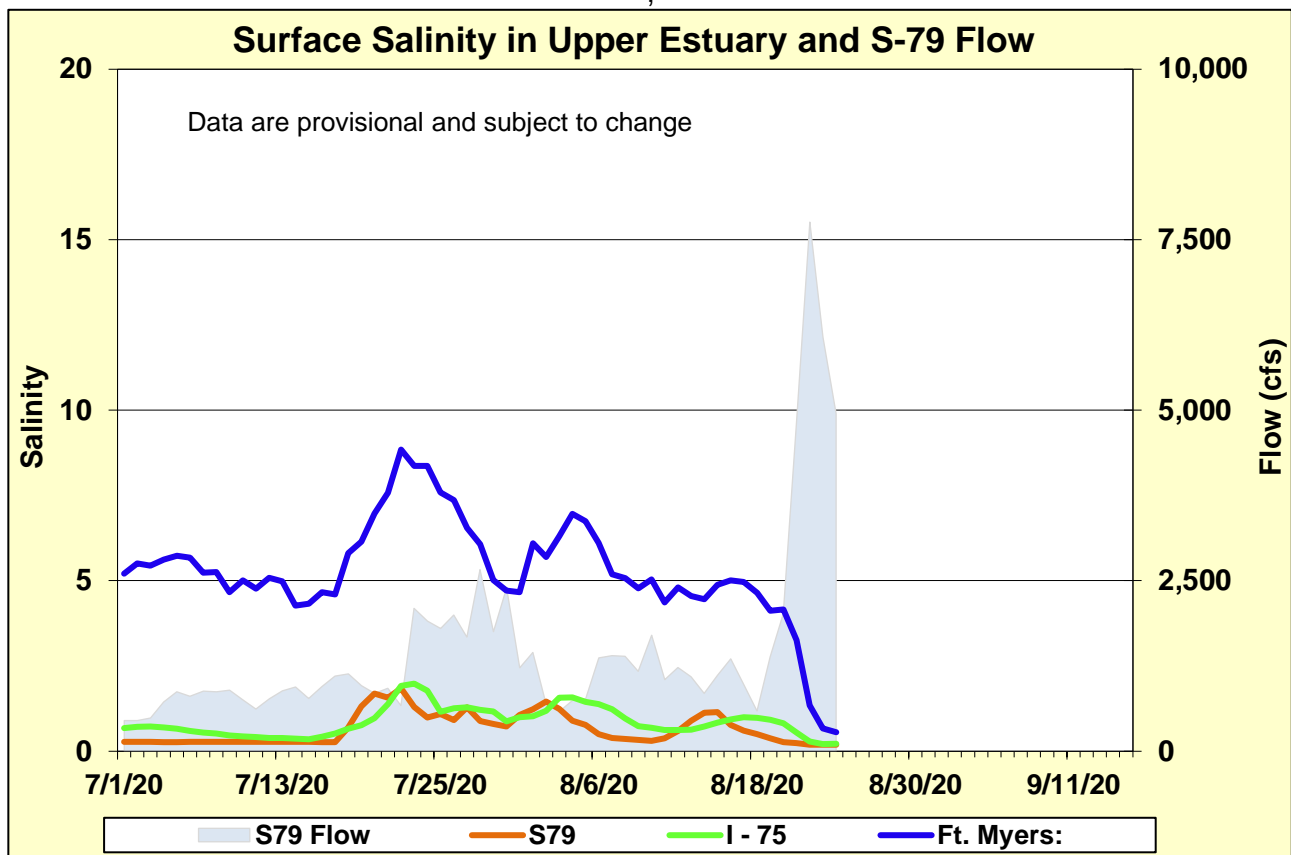


Figure 7. Daily mean flows at S-79 and salinity at upper estuary monitoring stations.

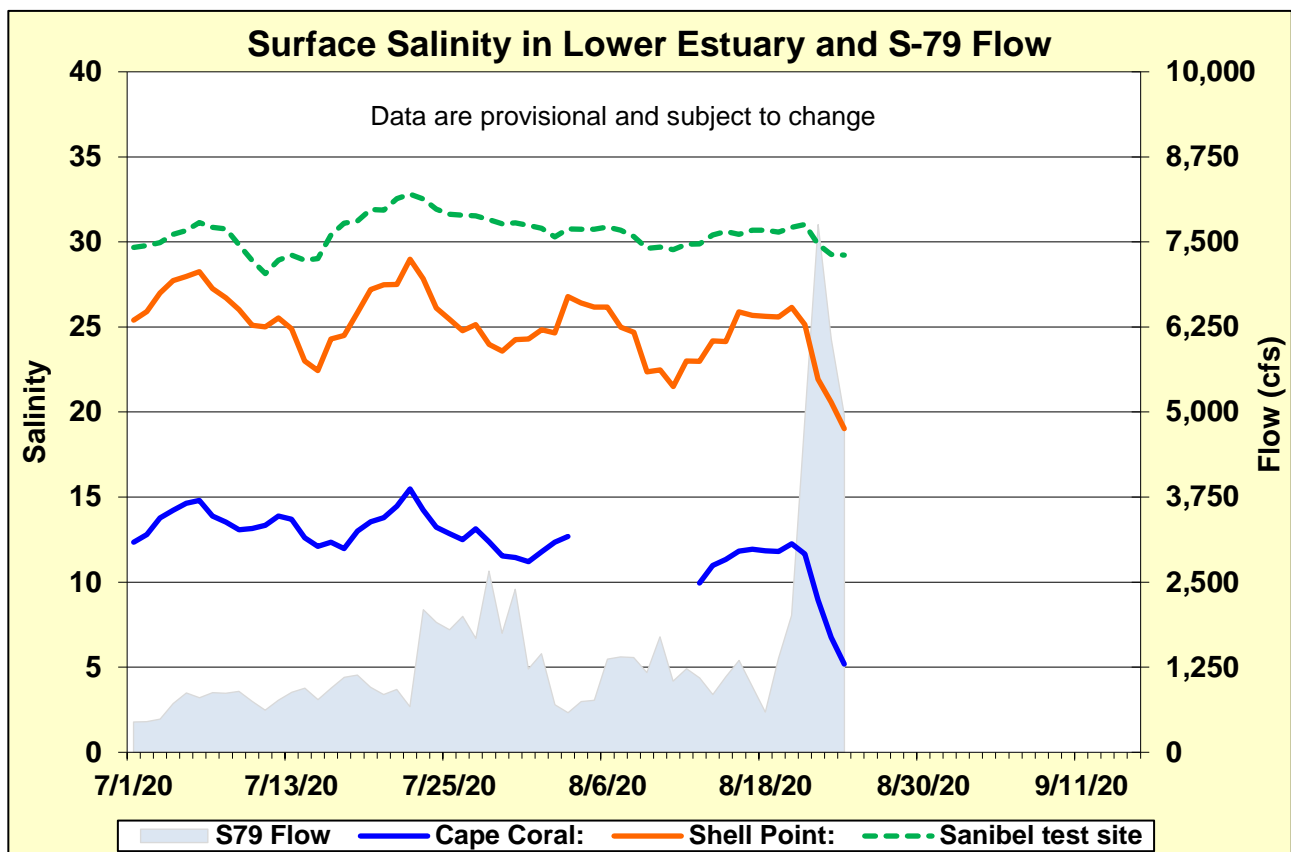


Figure 8. Daily mean flows at S-79 and salinity at lower estuary stations.

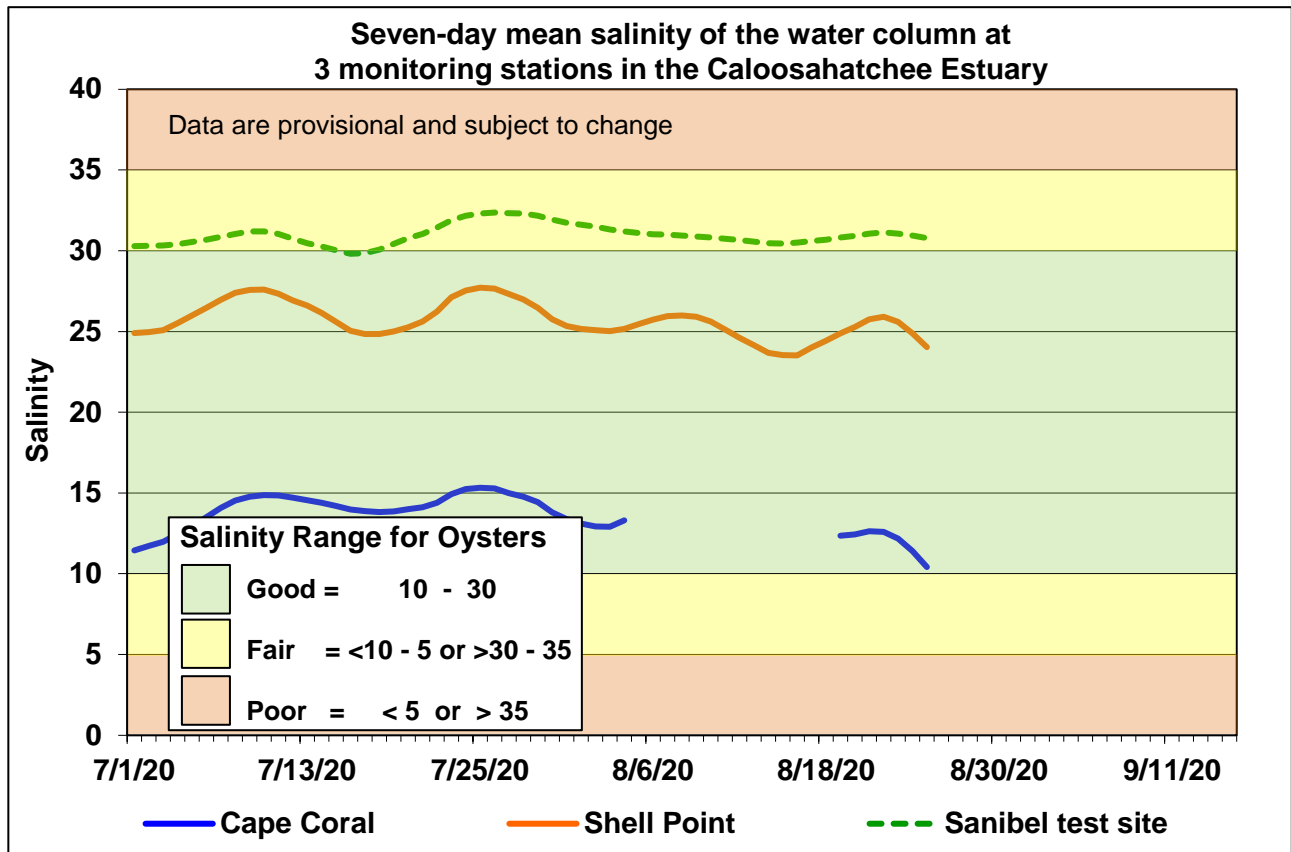


Figure 9. Seven-day mean salinity at Cape Coral, Shell Point, and Sanibel monitoring stations.

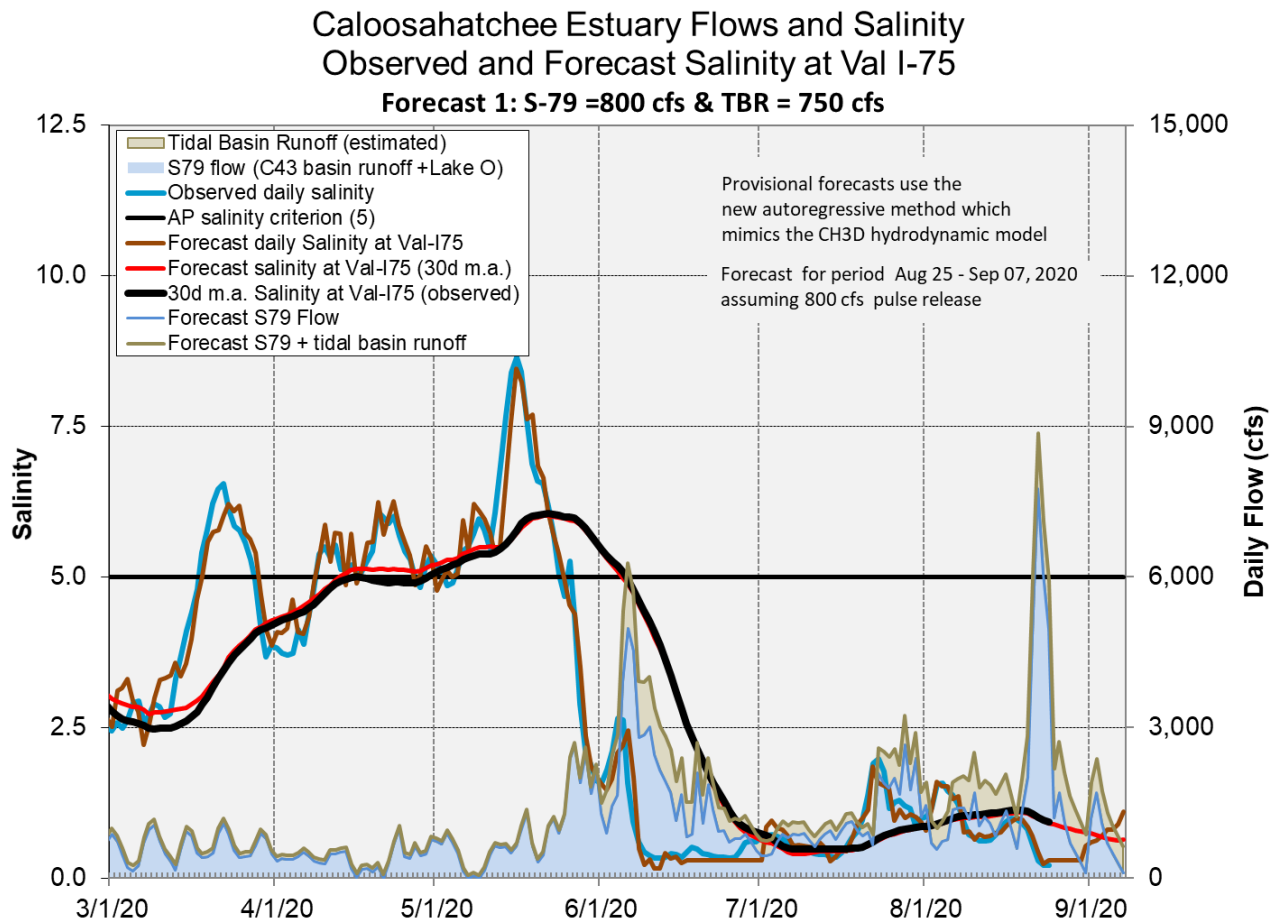
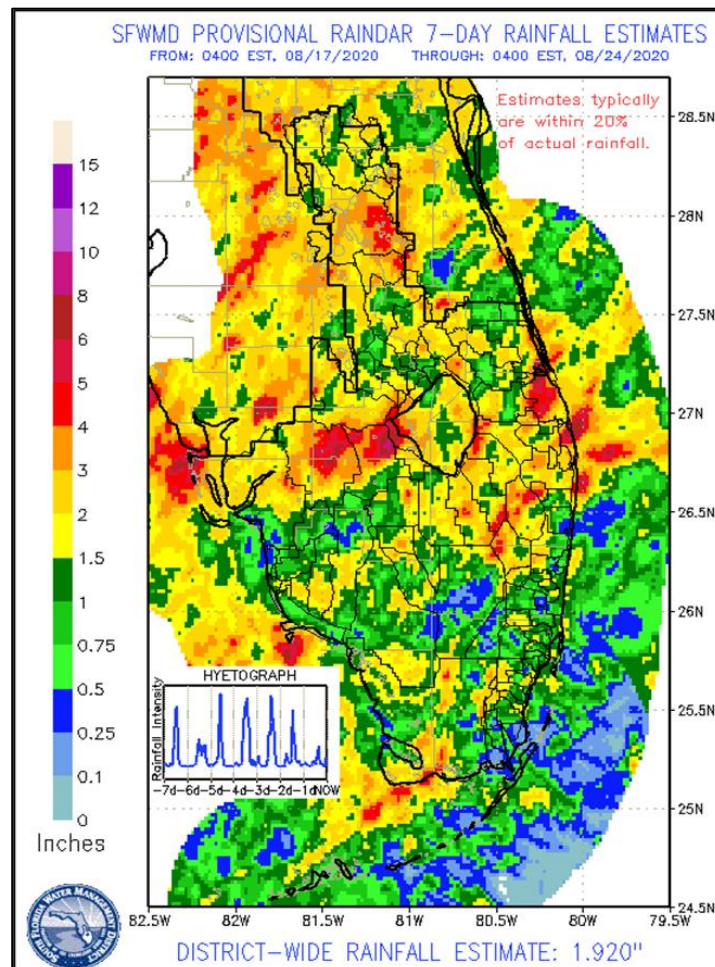


Figure 10. Forecasted Val I-75 surface salinity assuming no pulse release at S79.

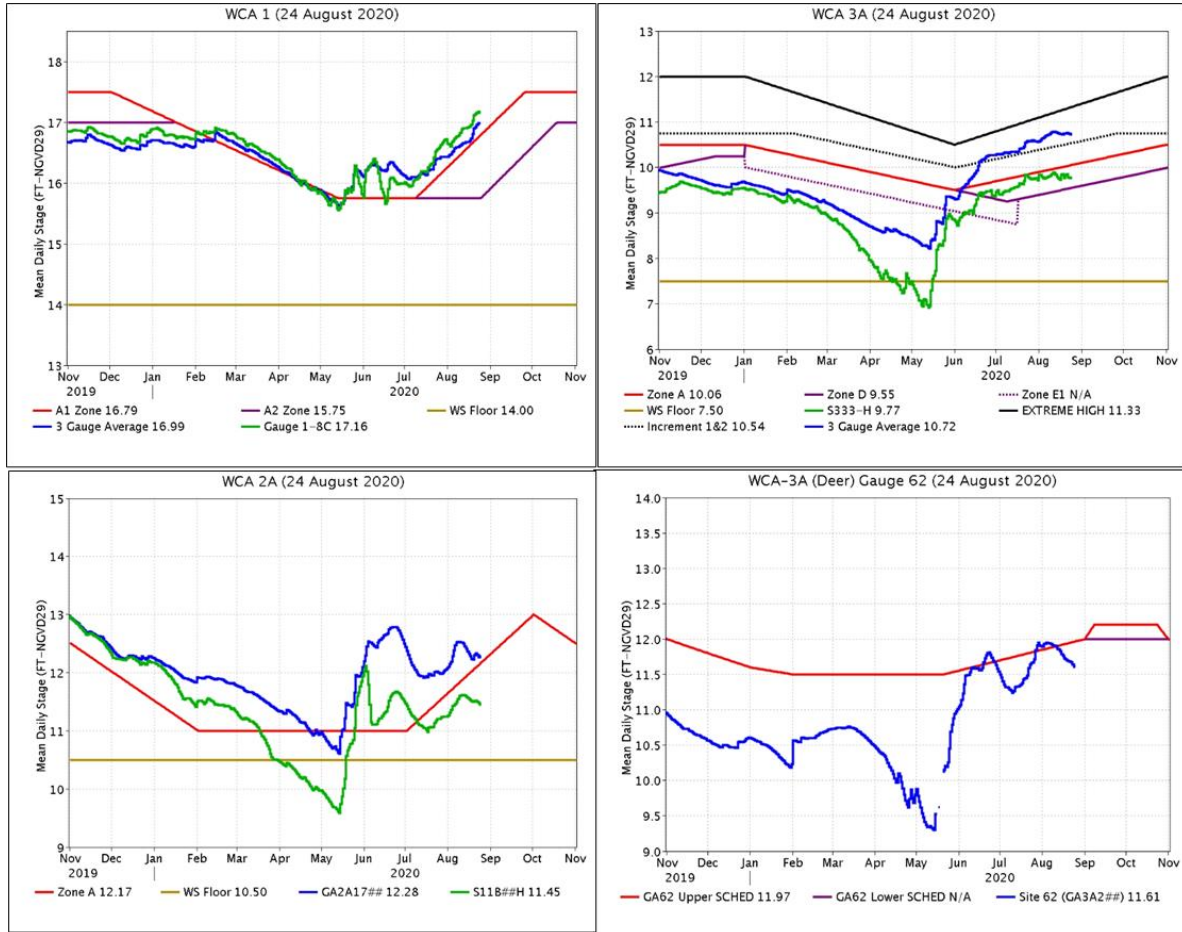
EVERGLADES

Scattered rainfall was recorded across the Everglades last week, above average in the north. At the gauges monitored for this report stages increased 0.07 feet on average. WCA-1 had the maximum depth change over the week with an increase of 0.34 feet. Evaporation was estimated at 1.87 inches last week, higher than the week prior.

Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	2.72	+0.31
WCA-2A	2.61	-0.04
WCA-2B	1.80	+0.13
WCA-3A	1.12	-0.05
WCA-3B	0.73	+0.00
ENP	1.52	+0.02



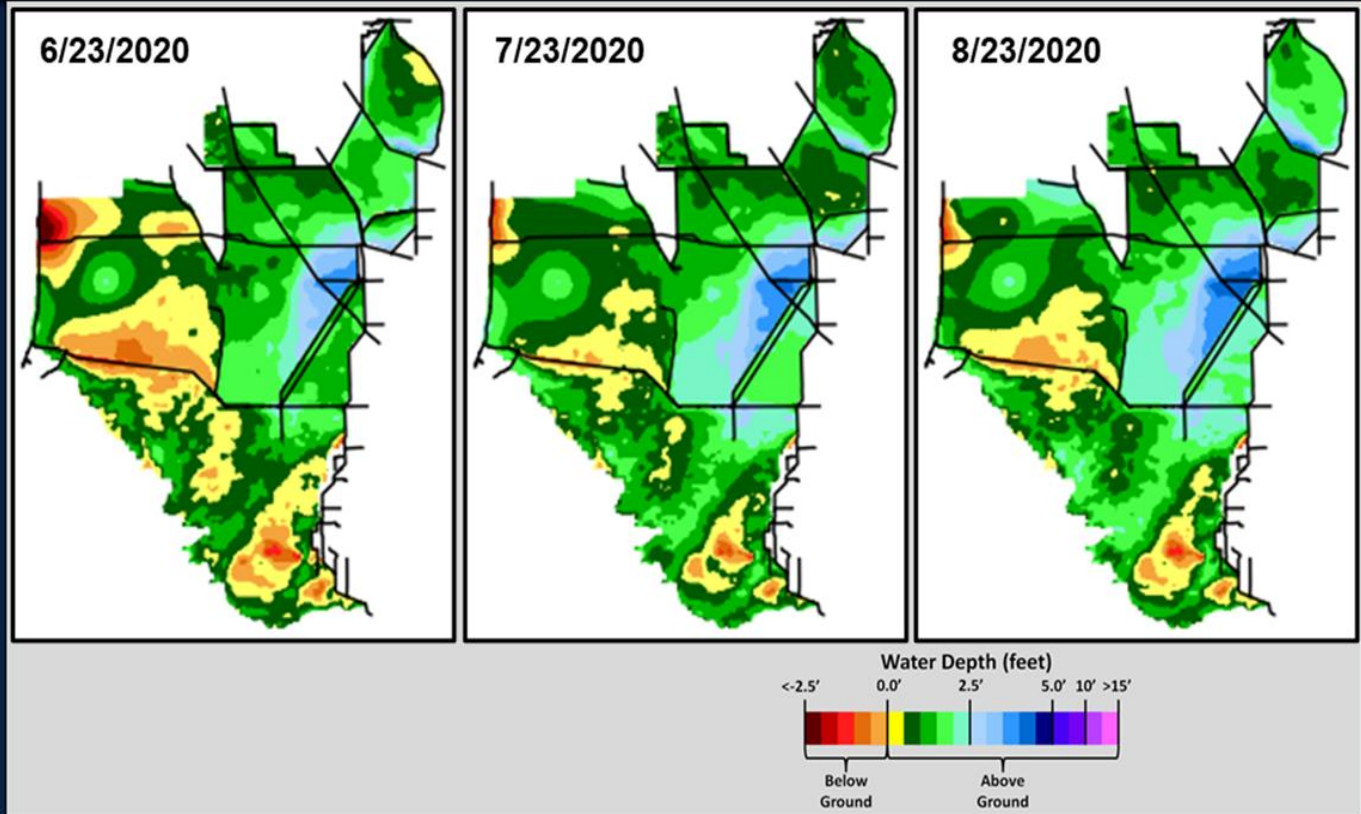
Regulation Schedules: WCA-1: Stage at the 1-8C Gauge followed along the rising Zone A1 regulation line last week, currently 0.37 feet above and the 3-Gauge average moved to 0.20 feet above. WCA-2A: Stage at Gauge 2-17 after falling quickly towards the rising Zone A regulation line the previous week, now trends closer to the regulation line now 0.11 feet above. WCA-3A: The Three Gauge Average trends slightly downward and towards the rising Increment 1.2-line again this week, currently 0.18 feet above, and 0.66 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 0.36 feet below.



Water Depths: The WDAT tool for spatial interpolation of depth monthly snapshots over the last two months 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. Stages in WCA-1 are increasing and there is no longer the potential for exposed ground surface in the north of that basin. Hydrologic connectivity is well established within the major sloughs in Everglades National Park (ENP). Comparing WDAT water levels from present, over the last month stages stayed relatively stable across the Everglades. Only WCA-1 (deeper in the south) and The Big Cypress basin (shallower in the far west) experienced significant changes. Looking back one year the stage difference patterns are more significant than one month ago. Compared to one year ago there are shallower depths in Southern WCA-2A; deeper in WCA-3A along the lower L-67 and significantly lower in the extreme northwest of that basin.



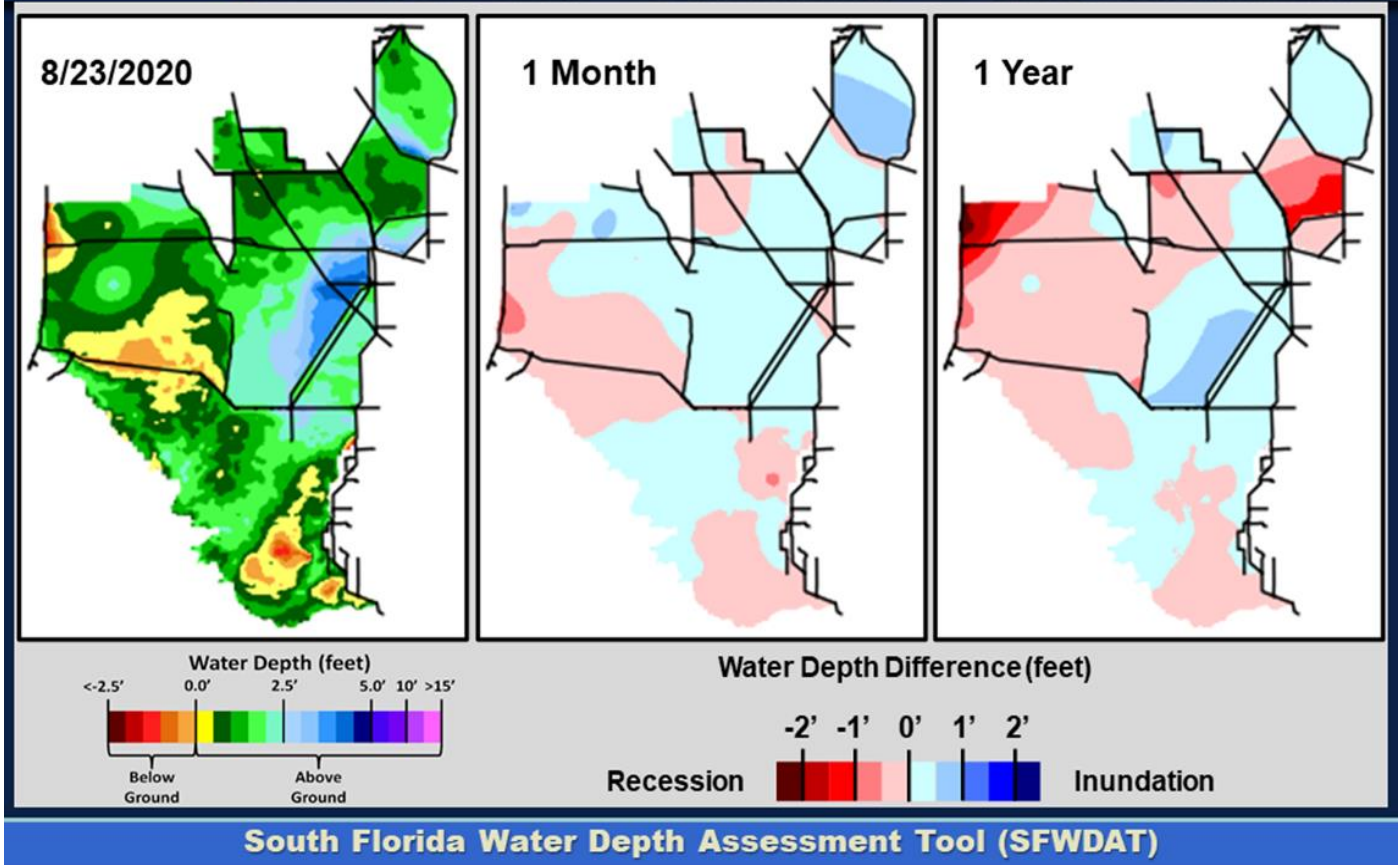
SFWDAT Water Depth Monthly Snapshots



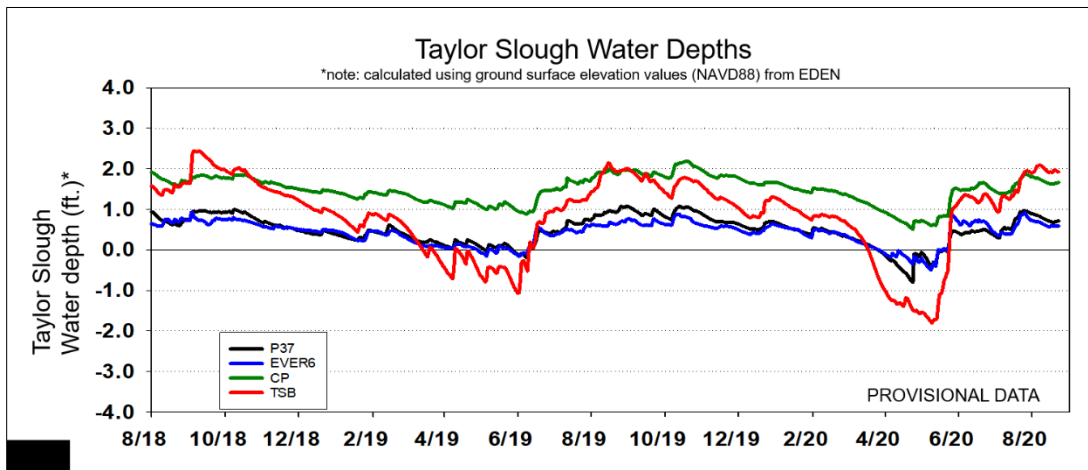
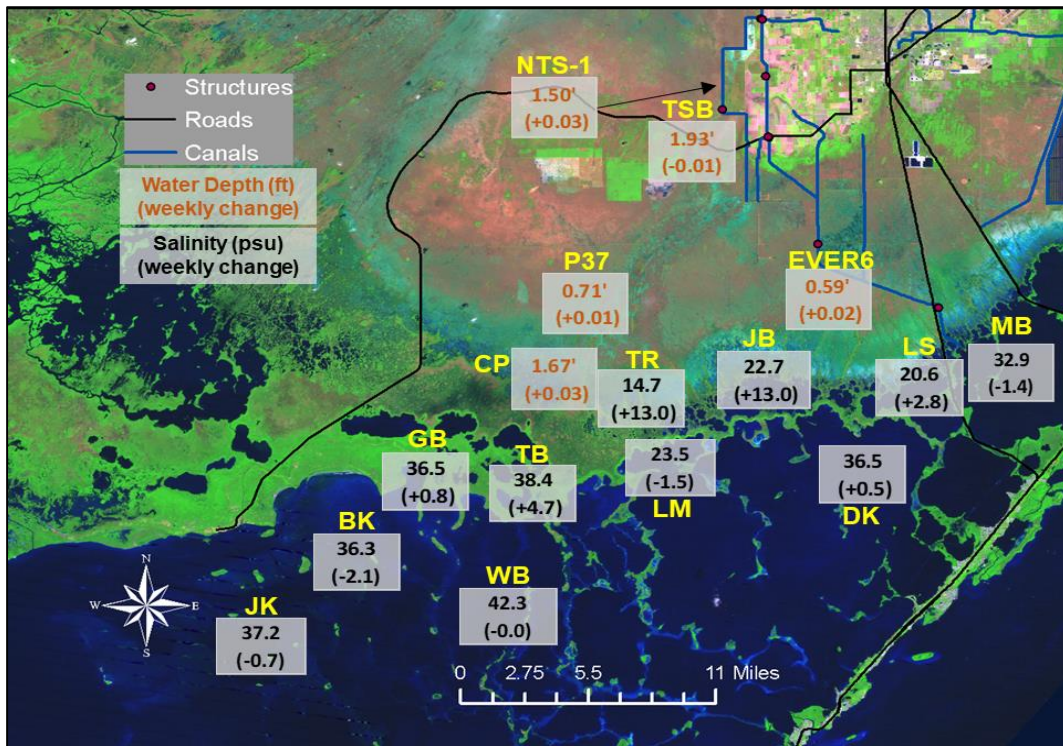
South Florida Water Depth Assessment Tool (SFWDAT)

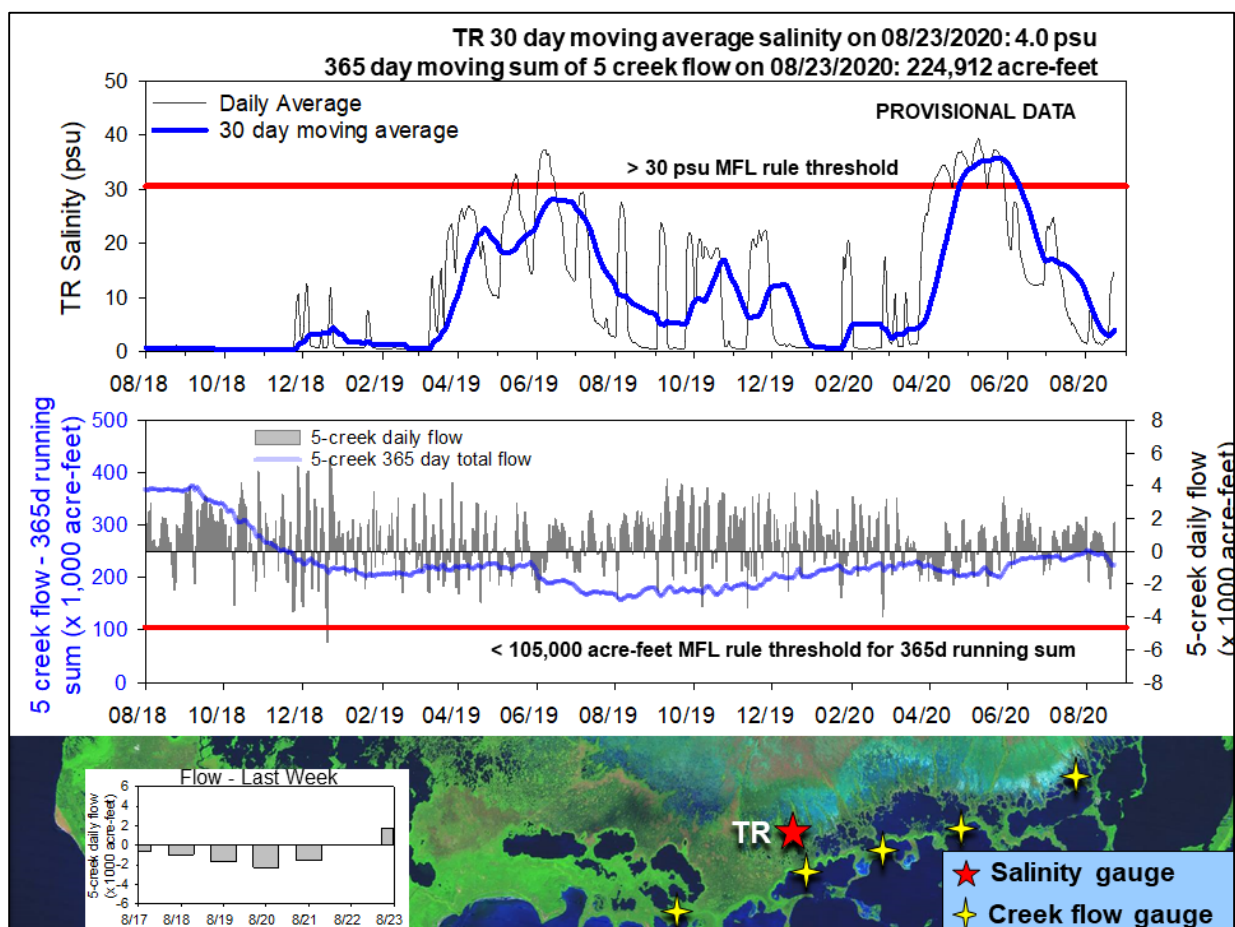
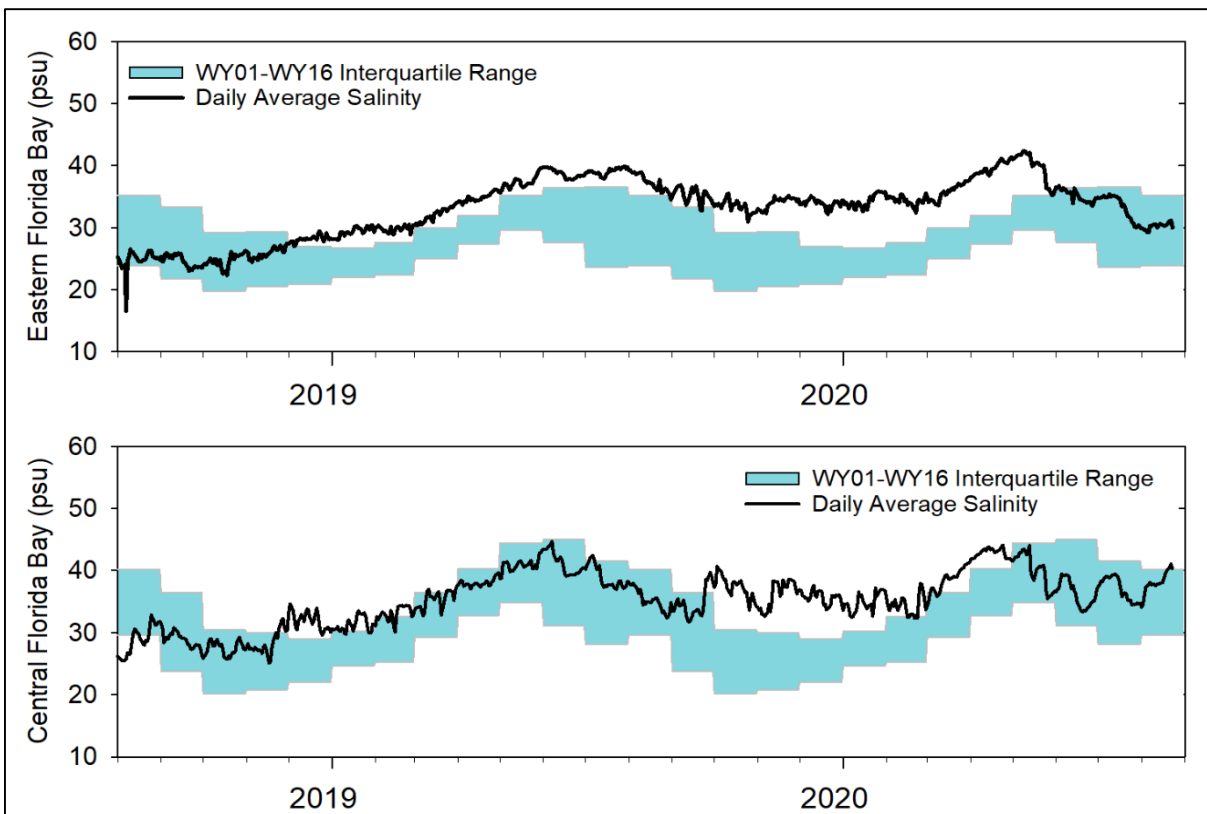


SFWDAT Everglades Difference Maps (Present – Past)



Taylor Slough Water Levels: Daily rains fell over Taylor Slough and Florida Bay this past week averaging almost an inch (0.94 inches), and stages increased 0.02 feet on average. TSB in northern Taylor Slough was the only station that decreased over the week (0.01 feet). The other stations increased between 0.01 and 0.03 feet for the week. Northern Taylor Slough is 6.4 inches deeper than the historical average (pre-Florida Bay Initiative).





Florida Bay Salinities: Mass movement of water from the west to northeast was responsible for the salinity changes this week with average salinity in Florida Bay increasing an average of 1.9 psu and individual stations changing -2.1 psu to +13.0 psu. The increased average Central Florida Bay salinity is due to the increase at the central nearshore station.

Florida Bay MFL: Salinity at the TR station in the mangrove zone (tracked for the Florida Bay MFL) rapidly increased from 2 psu to 15 psu starting on Thursday (8/20). The 30-day moving average increased 0.6 psu to end at 4.0 psu. Weekly flow from the 5 creeks identified by yellow stars on the map totaled just over -5,000 acre-feet. After negative flows for most of the week, positive flows returned on Sunday. The 365-day moving sum of flow from the five creeks (tracked as part of the Florida Bay MFL criteria) decreased 18,000 acre-feet this week to end at 224,912 acre-feet which is decreasing away from the historical median (249,091 acre-feet) but still above the 25th percentile (192,885 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 86 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 25th, 2020 (red is new)

Area	Weekly change	Recommendation	Reasons
WCA-1	Stage increased by 0.31'	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 0.04'	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 decreased by 0.07'	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 0.13'	Moderating the ascension rate to less than 0.25 feet per week or 0.50 feet per two weeks.	
Central WCA-3A S	Stage decreased by 0.01'	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 diminished by flooding
Southern WCA-3A S	Stage increased by 0.02'		
WCA-3B	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.
ENP-SRS	Stage increased 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 -0.01' to +0.03'	Move water southward as possible	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged -2.1 to +13.0 psu	Move water southward as possible	When available, provide freshwater to maintain low salinity buffer and promote water movement.