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, Interim Assistant Executive Director, Executive Office Staff

FROM: SFWMD Staff Environmental Advisory Team

DATE: August 28, 2019

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

A very moist and unstable air mass covers southern and central Florida this morning according to model and sounding data. With surface heating, a further destabilization of the atmosphere should occur by afternoon, and that should help to trigger scattered to numerous showers and thunderstorms area wide. The model guidance indicates that weak westerly steering winds would favor the greatest concentration of rains over the northeastern half or two-thirds of the area, with the short-range model runs particularly focused on the area from around Lake Okeechobee to the east-central or southeast coast of Florida. Today's Quantitative Precipitation Forecast (QPF) reflects the potential for concentrated rains over the southeast coast from this afternoon to early evening, where some significant local maxima are possible. The westerly wind regime would normally favor less overall areal average rainfall over the far west or southwest, and today's QPF shows that to be the case. However, the very favorable large-scale conditions for rain suggest that even areas over the western/southwestern interior should see at least a few areas of enhanced rains. Overall, the total District rainfall should be greater or even much greater than it was yesterday (0.19"), with areas north and west of Lake Okeechobee that have been dry the last couple of days likely seeing a substantial increase of rains today. Of note are the rains already ongoing over the southern third of the District, which could potentially influence the behavior of showers and thunderstorms later in the day in ways that are unknown at the moment. This activity will be closely monitored to determine whether an update to the forecast would be required at some point. The steering winds should become northwesterly or even northerly on Tuesday ahead of a mid-level disturbance passing through the southeastern United States. With still copious levels of moisture and sufficient instability across the area this would favor a greater concentration of rains from around Lake Okeechobee southeastward but especially south and east of Lake Okeechobee outside of the 'lake shadow' that would likely form. The mid-level disturbance over the southeastern United States is predicted to cut off over Florida on Wednesday, including a broad area of surface low pressure that should move slowly southwestward and then westward into the Gulf of Mexico by late in the week. Enhanced rains and a good or even widespread coverage of rains are likely to occur in conjunction with the low from Wednesday through Friday, with some areas of significant rainfall over this period. The rainfall forecast over the weekend is of extremely low confidence due to its dependence on the future track of Dorian, which at the moment is uncertain. If the track of Dorian is farther west and close to or over parts of the District, there could be considerable rainfall as well other effects related to the storm. On the other hand, if the track is more northward or northeastward and away from the coast of Florida, there could be a relative reduction of rainfall on Saturday and Sunday, compared to the enhanced rains from earlier in the week. For the week ending next Monday morning, the deterministic total QPF is a little under two and a quarter inches of rain or about 110% of normal, with the majority of probabilistic models showing at least normal and perhaps above-normal total District rainfall.

Kissimmee

Tuesday morning stages were 56.5 feet NGVD (at schedule) in East Lake Toho, 53.5 feet NGVD (at schedule) in Toho, and 51.5 feet NGVD (0.5 feet above schedule) in Kissimmee-Cypress-Hatchineha; headwater stages were 46.9 feet NGVD at S-65A and 27.3 feet NGVD at S-65D. Tuesday morning discharges were 3,951 cubic feet per second (cfs) at S-65, 4,939 cfs at S-65A, 7,632 cfs at S-65D and 7,494 cfs S-65E. Dissolved oxygen concentration in the Kissimmee River averaged 0.3 mg/L for the week through Sunday. Kissimmee River mean floodplain depth on Sunday was 3.16 feet. No new recommendations for this week.

Lake Okeechobee

Lake Okeechobee stage is 13.49 feet NGVD, increasing 0.43 feet from the previous week and 1.92 feet over the previous month. The lake stage is in the Base Flow sub-band. The Lake moved back into the ecological envelope (which varies seasonally from 12.5 – 15.5 feet NGVD +/- 0.5 feet) at the start of August, after spending about 215 days below, and is now at risk of moving above the ecological envelope. The lake stage ascension rates remain important to the continued recovery of Submerged and Emergent Aquatic Vegetation (SAV and EAV) in the nearshore zone. Continued high ascension rates will stress newly established plants and could reduce the beneficial effects that recent low lake stages have had on these communities. The latest estimate of cyanobacteria bloom potential on the Lake (August 22) shows reduced bloom potential across the western and northern areas, however the latest pictures exhibit high cloud cover.

Estuaries

Total inflow to the St. Lucie Estuary averaged 872 cfs over the past week with no flow coming from Lake Okeechobee. Over the past week, salinity (seven-day average) decreased slightly in the estuary. Salinity at the US1 Bridge is in the fair range for adult eastern oysters.

Total inflow to the Caloosahatchee Estuary averaged 5,416 cfs over the past week with no flow coming from the Lake. Salinity stays low in the upper estuary but increased slightly downstream of Cape Coral. The 30-day moving average surface salinity is 0.2 at Val I-75 and 0.3 at Ft. Myers. Salinity conditions between Val I-75 and Ft. Myers are good for tape grass. Salinities are in the good range for adult eastern at Shell Point and Sanibel but in the poor range at Cape Coral. Given the current estuarine conditions, there are no ecological benefits to the upper estuary associated with freshwater releases from Lake Okeechobee, but some benefits may accrue to the areas further downstream.

Stormwater Treatment Areas

Over the past week, no Lake Okeechobee water was delivered to the STAs. The total amount of Lake releases sent to the STAs/FEBs in WY2020 (since May 1, 2019) is approximately 7,700 acre-feet. The total amount of inflows to the STAs in WY2020 is approximately 608,000 acre-feet. All STA cells are at or above target depths. STA-1W Northern Flow-way is offline for STA-1W Expansion project construction activities and STA-5/6 Flow-ways 2 and 3 are offline for the Restoration Strategies project to grade non-effective treatment areas. Operational restrictions are in place in STA-5/6 Flow-way 1 to facilitate the Restoration Strategies grading project in Flow-ways 2 and 3, in STA-1E Western Flow-way following levee repairs in the West Distribution Cell, and in STA-1E Central Flow-way and STA-2 Flow-way 3 for vegetation management activities. This week, if 2008 LORS recommends Lake releases to the WCAs and the conditions allow, releases will be sent to STA-1E, STA-2 and A-1 FEB/STA-3/4.

Everglades

The stages within the Everglades Basins are all above the operationally desired regulation schedule except WCA-1, where despite receiving the most rain stages fell up to a tenth of a foot. WCA-3A stages while exceeding the desired operational band have not exceeded the threshold for flooding stress at gauge 65 in the southern end of that basin. WCA-2A is nearly one foot above schedule and increasing

in stage but trending towards regulation this week. Stages remained basically unchanged within the WCAs over the last week at the gauges monitored for this report except for WCA-3A North. It dropped nearly a quarter of a foot on the west side (gauge 62) and rose the same on the east side. FWC issued an emergency order to close portions of that basin due to high water. Ascension rates should remain below 0.25 feet per week or 0.5 feet per 2 weeks to protect Apple Snail reproduction within the WCAs. This rate was exceeded in WCA-2A and northeast WCA-3A over the last two weeks. Stages in Taylor Slough remain higher than the historical average for this time of year, and salinity conditions in the Florida Bay nearshore remain elevated but continue to decrease. The flow from the 5 main creeks feeding Florida Bay was 150% of historical average for this week but remains just below the 365-day moving sum 25th percentile, which was ecologically significant the last time these conditions persisted as it was associated with a seagrass die off.

Supporting Information

KISSIMMEE BASIN

Kissimmee Basin Rainfall

The Upper Kissimmee Basin received 0.62 inches of rainfall in the past week and the Lower Basin received 0.57 inches (SFWMD Daily Rainfall Report 8/26/2019).

Upper Kissimmee Basin

Stages and departures in the Kissimmee Chain of Lakes (KCOL) are shown in **Table 1**. KCOL stage hydrographs with respective regulation schedules and rainfall are shown in Figures 1-7.

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: 8/27/2019

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)						
							8/25/19	8/18/19	8/11/19	8/4/19	7/28/19	7/21/19	7/14/19
Lakes Hart and Mary Jane	S-62	276	LKMJ	59.9	R	60.0	**-0.1**	0.0	0.0	0.1	0.0	0.0	0.1
Lakes Myrtle, Preston, and Joel	S-57	36	S-57	60.9	R	61.0	**-0.1**	0.0	0.0	-0.3	-0.7	-0.8	-0.7
Alligator Chain	S-60	121	ALLI	63.2	R	63.2	**0.0**	0.0	0.1	-0.3	-0.6	-0.7	-0.7
Lake Gentry	S-63	132	LKGT	61.0	R	61.0	**0.0**	-0.2	-0.1	-0.9	-1.1	-1.4	-1.3
East Lake Toho	S-59	885	TOHOE	56.5	R	56.5	**0.0**	0.3	0.5	0.0	-0.2	-0.5	-0.7
Lake Toho	S-61	1,730	TOHOW, S-61	53.4	R	53.5	**-0.1**	0.1	0.2	0.0	-0.1	-0.3	-0.4
Lakes Kissimmee, Cypress, and Hatchineha	S-65	5,640	KUB011, LKIS5B	51.5	R	51.0	**0.5**	0.6	0.2	-0.3	-0.9	-1.1	-1.1

[1] Seven-day average of weighted daily means through midnight.
[2] Names of in-lake monitoring sites and structures used to determine lake stage; if more than one site is listed, an average is reported.
[3] A = projected ascension line, R = USACE regulation schedule, S = temporary recession target line, T = temporary schedule, N/A= not applicable or data not available.
DATA ARE PROVISIONAL

Lower Kissimmee Basin

Discharges at Lower Basin structures are shown in Table 2. SFWDAT depth maps for the Phase I restoration area are shown in Figure 8. Kissimmee River floodplain stages at selected stations are shown in Figure 9.

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: **8/27/2019**

Metric	Location	1-Day Average	Average for the Preceeding 7-Days[1]								
		8/25/2019	8/25/19	8/18/19	8/11/19	8/4/19	7/28/19	7/21/19	7/14/19	7/7/19	6/30/19
Discharge (cfs)	S-65	5,155	5,640	3,852	2,198	783	777	1,110	548	287	400
Discharge (cfs)	S-65A[2]	6,141	6,547	5,681	3,248	1,665	903	1,123	749	387	673
Discharge (cfs)	S-65D[2]	7,892	8,207	5,917	3,167	1,618	1,378	1,396	1,020	1,288	1,801
Headwater Stage (feet NGVD)	S-65D[2]	27.31	27.42	26.50	25.88	25.77	25.79	25.78	25.81	25.70	25.84
Discharge (cfs)	S-65E[2]	7,879	8,155	5,871	3,000	1,495	1,259	1,250	944	1,158	1,606
Discharge (cfs)	S-67	26	24	34	46	85	93	92	97	92	62
DO (mg/L)[3]	Phases I & II/III river channel	0.2	0.3	0.7	0.7	3.2	4.2	3.3	3.3	1.8	0.0
Mean depth (feet)[4]	Phase I floodplain	3.16	3.24	2.70	1.73	0.77	0.52	0.55	0.46	0.46	0.82

[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)

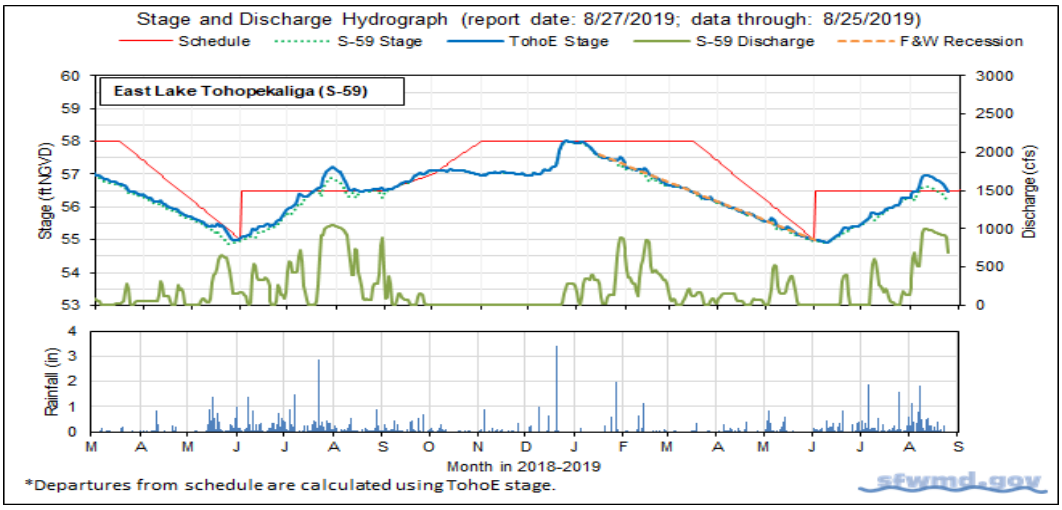


Figure 1.

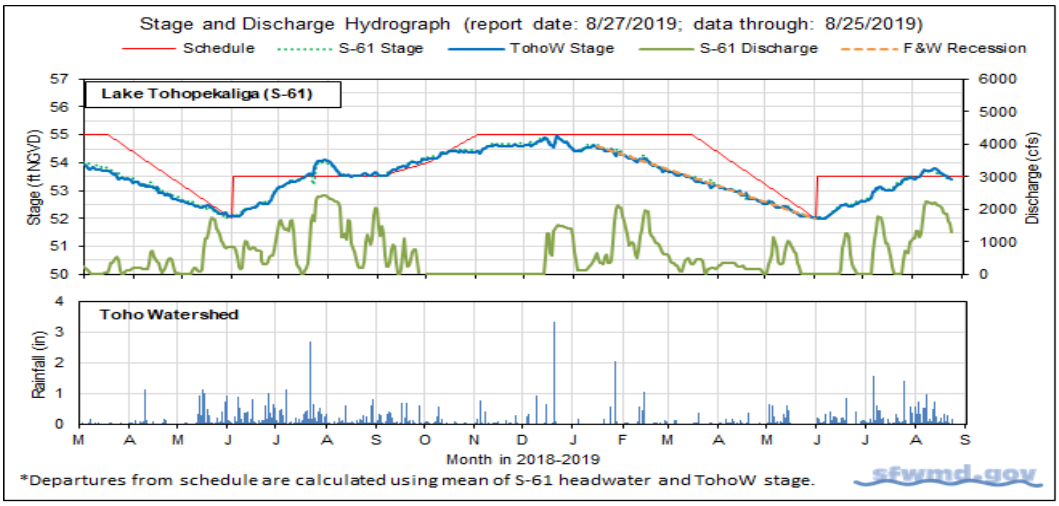


Figure 2.

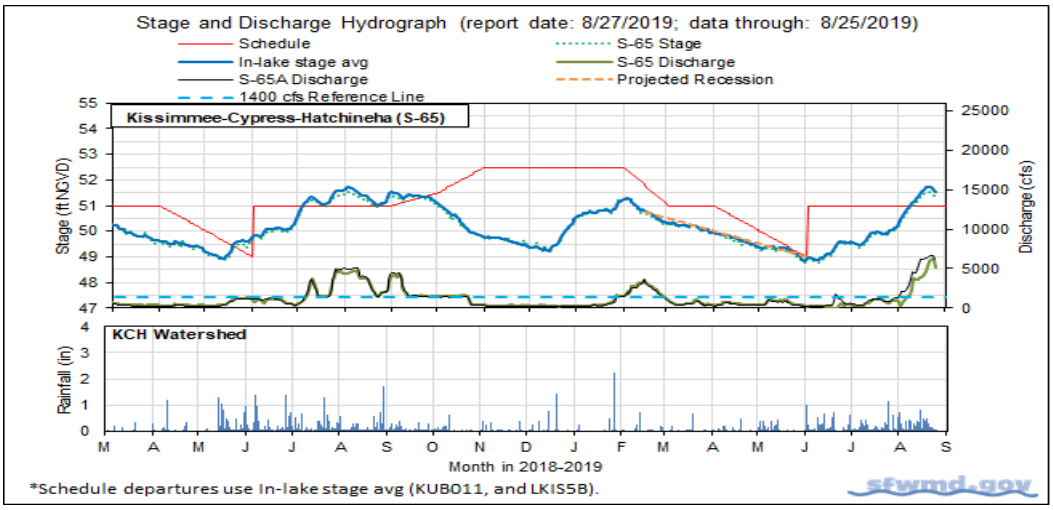


Figure 3.

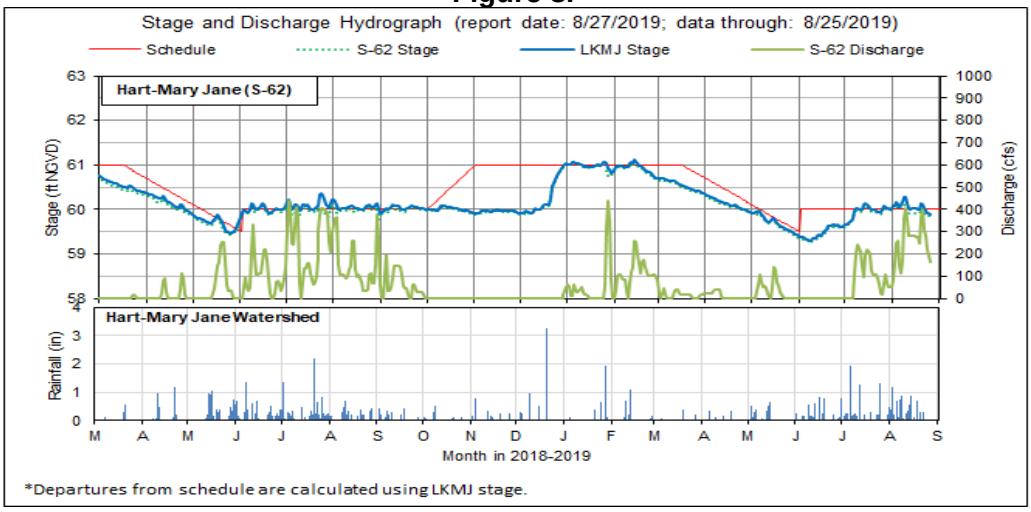


Figure 4.

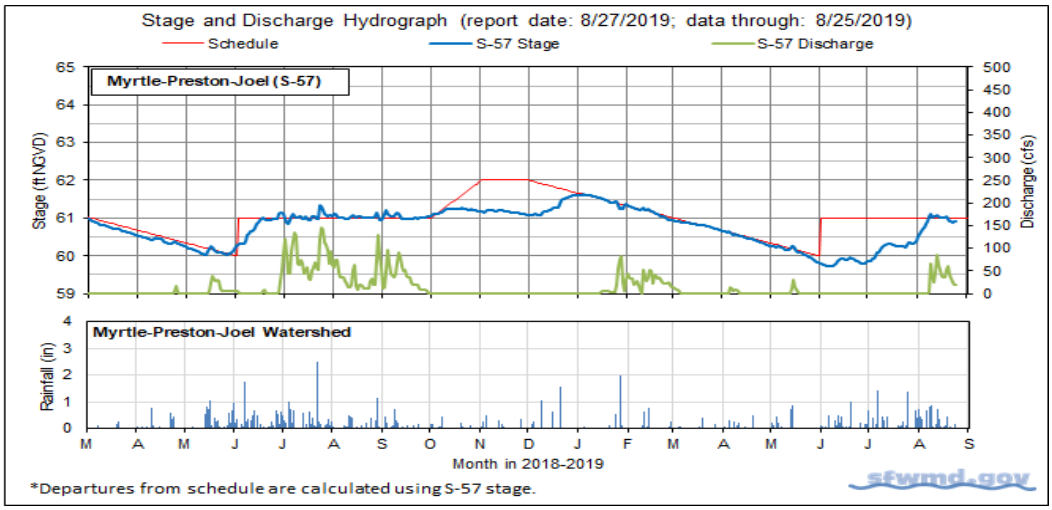


Figure 5.

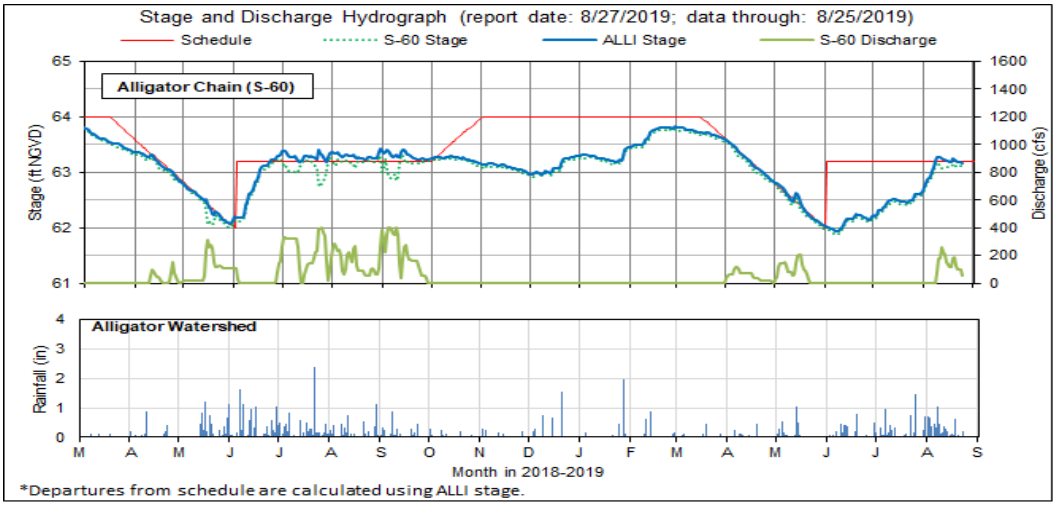


Figure 6.

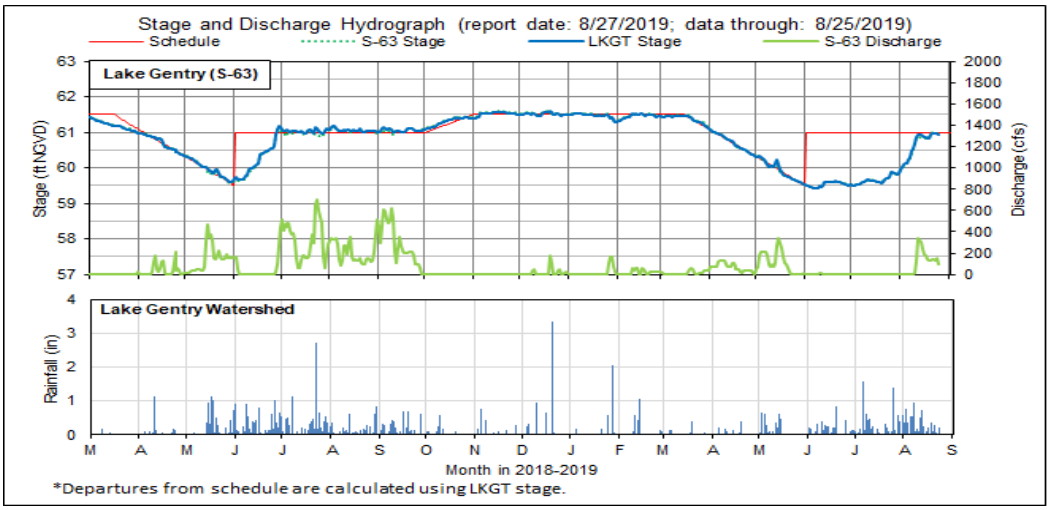


Figure 7.

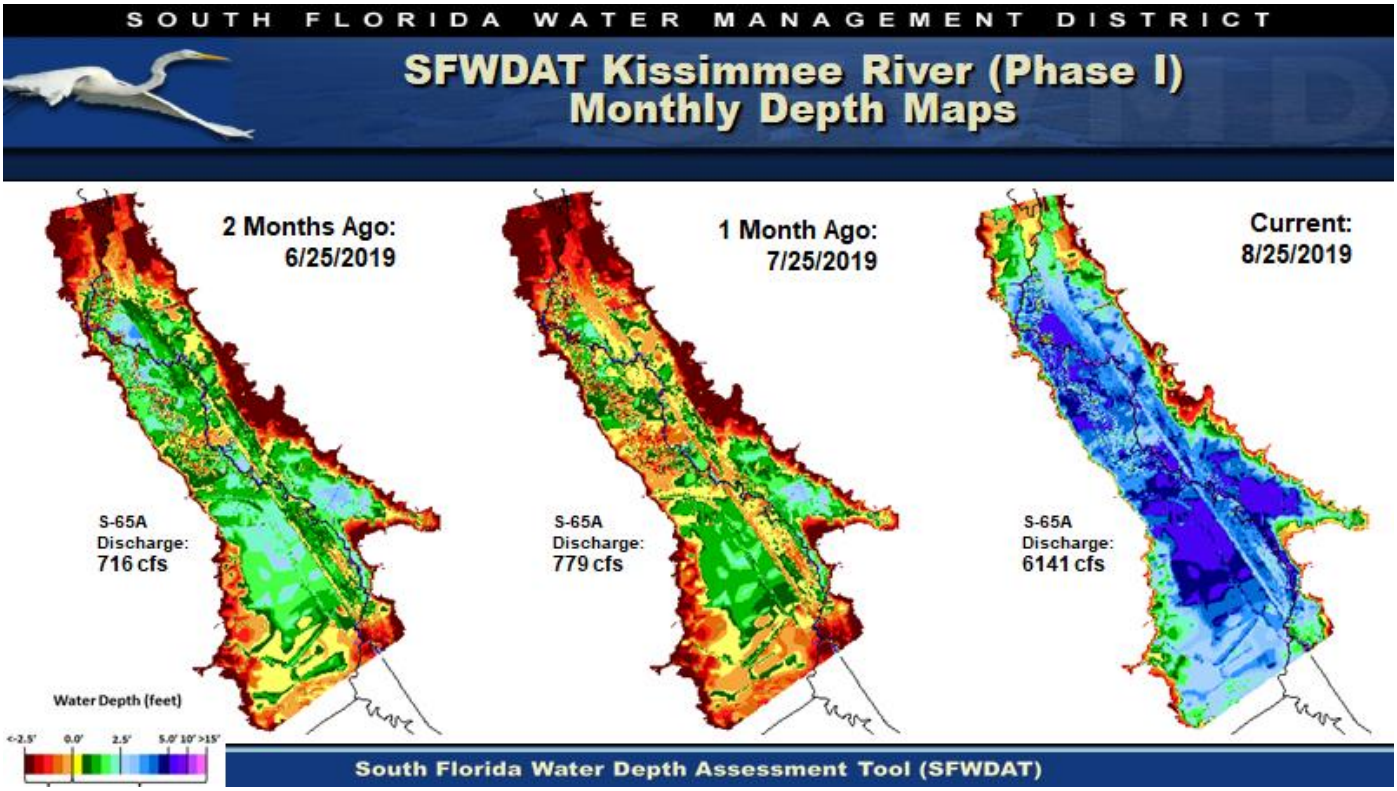


Figure 8. Phase I area floodplain water depths for this week, one month ago, and two months ago. Note that the WDAT color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to January 16, 2012.

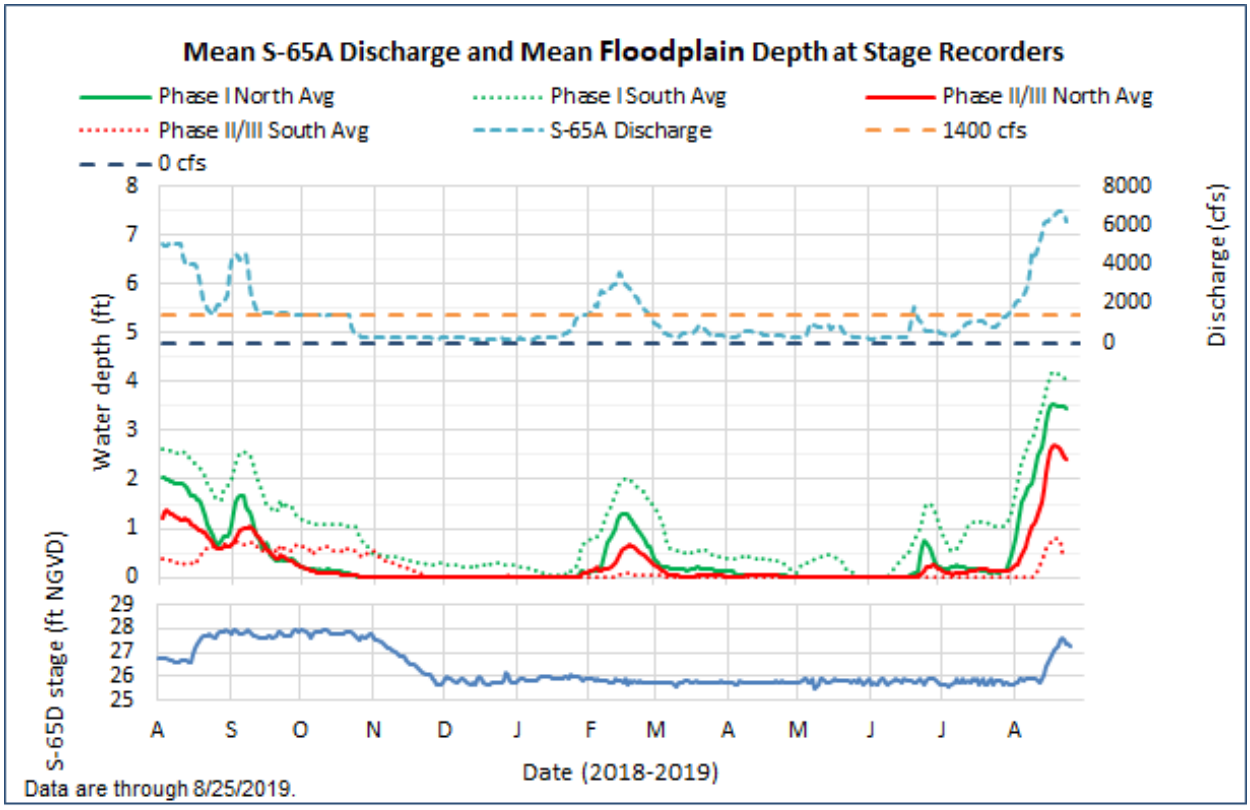


Figure 9. Mean water depth at stage recorders in the northern Phase I, southern Phase I, northern Phase II/III, and southern Phase II/III areas in relation to the S-65A discharge and S-65D headwater stage.

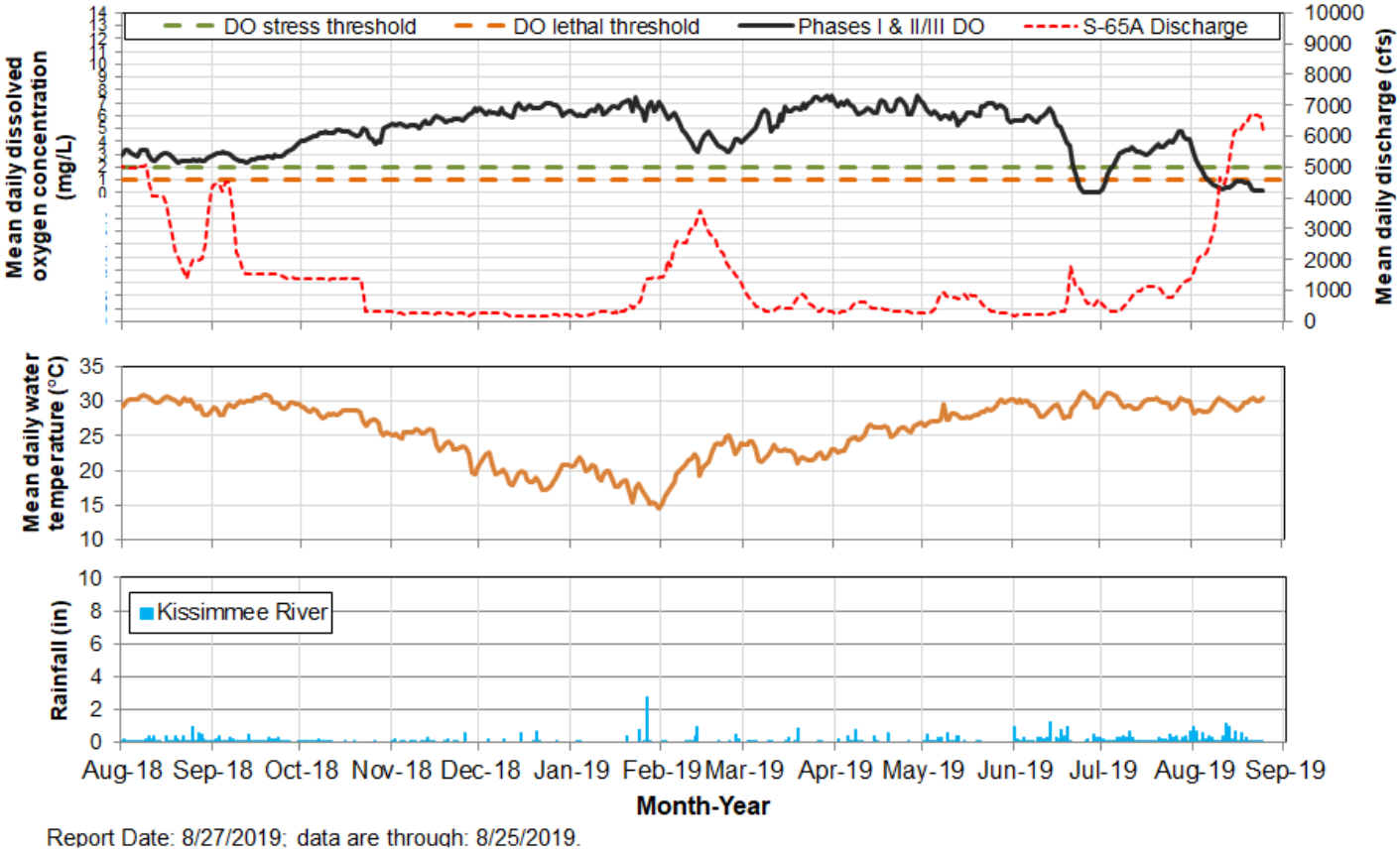


Figure 10. Mean daily dissolved oxygen, discharge, temperature and rainfall in the Phases I/II/III river channel.

Water Management Recommendations

Recommendation Date	Recommendation	Purpose	Outcome	Source	Report Date
8/26/2019	No new recommendations.		N/A		8/27/2019
8/19/2019	No new recommendations.		N/A		8/20/2019
8/7/2019	Manage discharge at S-65 and S-65A to control rising stage in KCH.	Switch to flood control operations as stage in KCH reaches the regulation line.	Implemented	KB Ops	8/13/2019
8/2/2019	a) Attempt to hold flow at S-65A steady during the rain forecast over the weekend. b) If it is necessary to increase discharge further, try to follow the discharge rate of change criteria to reduce effects on dissolved oxygen in the Kissimmee River c) Address stage rise in Pool A by reducing S-65 discharge. d) Stage in KCH will likely rise faster than the requested rate due to the need to control stage rise in Pool A. However, try to minimize the magnitude and duration of the exceedance after rainfall subsides.	Balance competing objectives while considering flood control in Pool A in light of the forecast for heavy cumulative rainfall.	Implemented	SFWMD Water Management/KB Ops	8/6/2019
7/24/2019	Maintain flow of at least 750-800 cfs or higher at S65A until the effects of forecast rainy period are known.	Manage stage in KCH while maintaining moderate discharge from S65A.	Implemented	KB Ops	7/30/2019
7/18/2019	a) Hold KCH stage steady until the risk of an exceedance of the 0.5 ft max rise per 14 days is past OR stage starts to decline. b) If KCH stage starts to decline, ramp down at 150 cfs/day over several days to 750 cfs. If this doesn't stop the decline we will regroup to discuss options.	Balance rate of rise in KCH against reduction of flow at S65A to avoid reducing flow to minimum until it is necessary.	Implemented	KB Ops/SFWMD Water Management	7/23/2019
7/14/2019	Do not increase S-65/S-S65A flow today	Control rate of stage rise in KCH while addressing DO sag concerns.	Implemented	SFWMD Water Management/KB Ops	7/16/2019
7/12/2019	Postpone second 150 cfs increase today (total 150 cfs).	Control rate of stage rise in KCH while addressing DO sag concerns.	Implemented	KB Ops	7/16/2019
7/11/2019	Increase S-65/S-S65A by 300 cfs tomorrow (double the rampup guidelines) in two increments of 150 cfs	Control rate of stage rise in KCH while addressing DO sag concerns.	Implemented	KB Ops	7/16/2019
7/11/2019	Increase S-65/S-S65A flow by 150 cfs today (double the rampup guidelines).	Control rate of stage rise in KCH while addressing DO sag concerns.	Implemented	KB Ops	7/16/2019
7/10/2019	Increase S-65/S-S65A flow by 150 cfs today (double the rampup guidelines).	Control rate of stage rise in KCH while addressing DO sag concerns.	Implemented	KB Ops	7/16/2019
7/8/2019	No new recommendations.		N/A		7/9/2019
6/27/2019	Continue discharge reductions at S-65A at up to double the normal rampdown rate, as possible.	Reduce river channel stage to allow DO recovery.	TBD	KB Ops	7/2/2019
6/27/2019	Manage S65 discharge to slow stage ascension to the extent possible.	Slow the rate of stage ascension in KCH.	TBD	KB Ops	7/2/2019

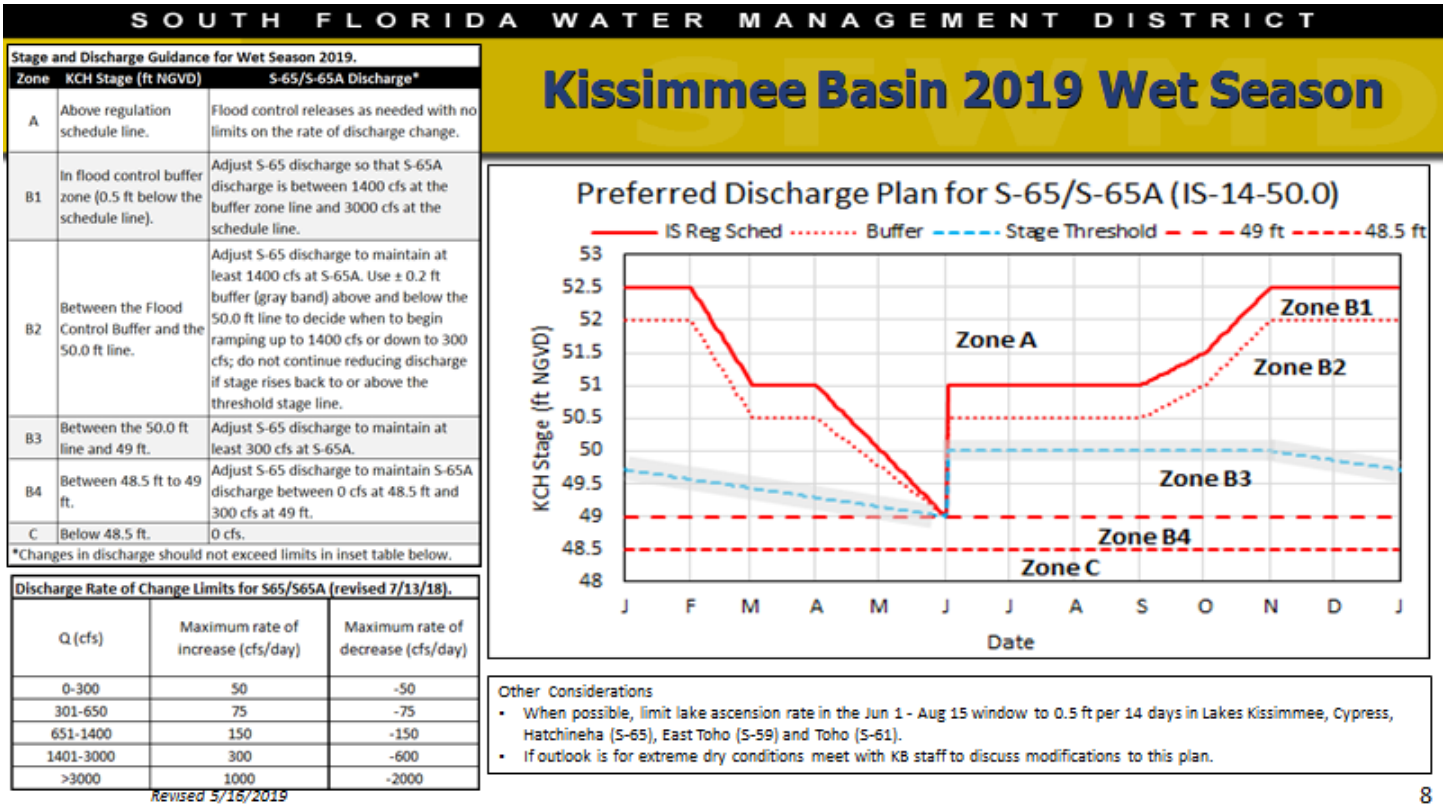


Figure 11. The 2019 Wet Season Discharge Plan for S-65/S-65A.

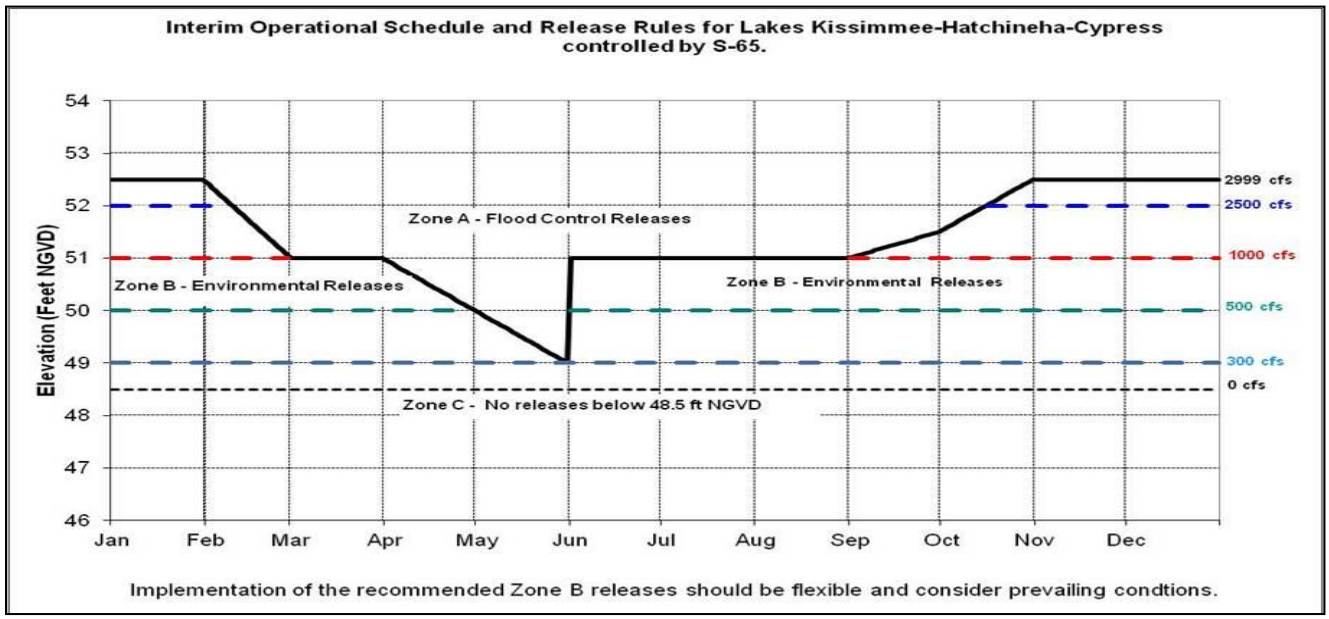


Figure 12. Interim operations schedule for S-65. The discharge schedule shown to the right has not been used in recent years.

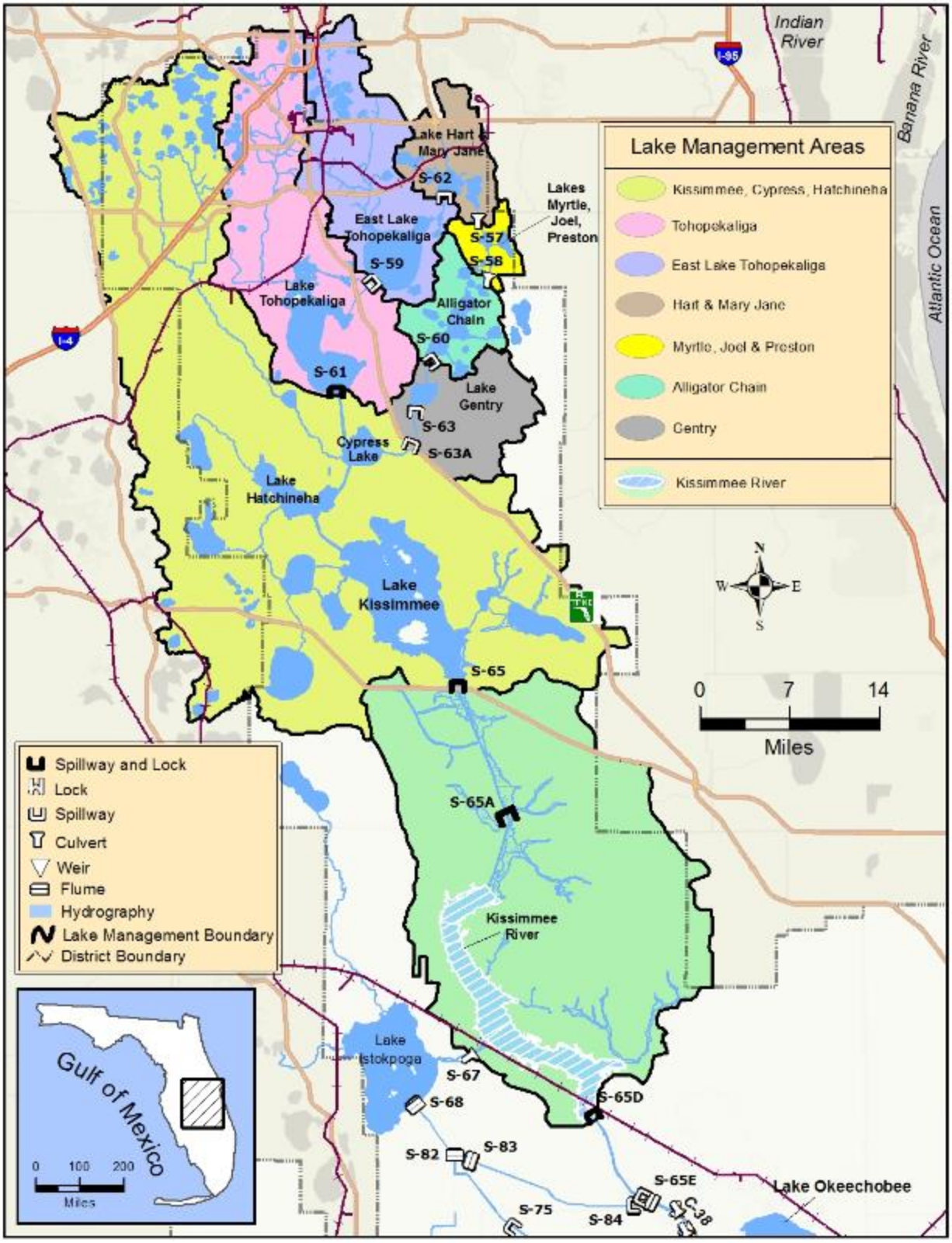


Figure 13. The Kissimmee Basin.

LAKE OKEECHOBEE

According to the USACE web site, Lake Okeechobee average daily lake stage is at 13.49 feet NGVD for August 27, 2019 increasing 0.43 feet from the previous week. This value is based on the use of four interior lake stations (L001, L005, L006 and LZ40) and three perimeter stations (S-308, S-4 and S-133), though the station L005 has been inactive for several weeks. The Lake is now 1.92 feet higher than a month ago and 1.04 feet lower than a year ago (Figure 1) when stages were about a foot above the top of the preferred ecological envelope (Figure 2). The Lake dropped into the Water Shortage sub-band on July 19, 2019 but moved back into the Beneficial Use sub-band in early August and is now in the Base-Flow sub-band (Figure 3). Lake stages are now higher for this time of year than they were in 2011, 2012, and 2015 (Figure 4). According to RAINDAR, during the week of August 20 to August 26, 2019, 0.32 inches of rain fell directly over the Lake, compared to 2.68 inches the previous week. The watershed received a wide range rainfall, some areas getting less than 0.5 inches and others receiving more than 4.5inches (Figure 5).

The average daily inflows (minus rainfall) to the Lake remain high but decreased slightly from the prior week, going from 12,697 cfs to 11,921 cfs. The inflows from the Kissimmee River (S-65E) increased, going from 6,466 cfs to 8,085 cfs, while those from Lake Istokpoga (via S-84 and S71) decreased from 4,304 cfs to 2,897 cfs. Passive backflow from the L-8 at Canal Point (via CLV10A) decreased slightly to 195 cfs, as did pumping from the various S-100 pumps, dropping from 503 cfs to 155 cfs (Table 1).

All Outflow gates were closed and consequently there were no releases from the Lake. The corrected average daily evapotranspiration value for the week based on the L006 and LZ40 weather platform solar radiation decreased from the previous week from 1.71 to 1.38 inches.

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 6 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.

The most recent viable satellite imagery (August 22, 2019) using NOAA's cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3(a&b) OLCI sensor data had a lot of cloud cover but appears to show reduced bloom potential in western and northern portions of the Lake (Figure 7).

Water Management Recommendations

Lake Okeechobee stage is 13.49 feet NGVD, increasing 0.43 feet from the previous week and 1.92 feet over the previous month. The stage is in the Base Flow sub-band. The lake moved back into the ecological envelope (which varies seasonally from 12.5 – 15.5 feet NGVD +/- 0.5 feet) at the start of August, after spending about 215 days below, and is now at risk of moving above the ecological envelope. Lake stage ascension rates remain important to the continued recovery of SAV and EAV in the nearshore zone. Continued high ascension rates will stress newly established plants and could reduce the beneficial effects that recent low lake stages have had on these communities. The latest estimate of cyanobacteria bloom potential on the lake (August 22) shows reduced bloom potential across the western and northern areas, however the latest pictures exhibit high cloud cover.

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	6466	8085	3.5
S-71 & S-72	1914	702	0.3
S-84 & S-84X	2390	2195	0.9
Fisheating Creek	328	284	0.1
S-154	200	160	0.1
S-191	611	146	0.1
S-133 P	190	47	0.0
S-127 P	165	72	0.0
S-129 P	55	17	0.0
S-131 P	49	19	0.0
S-135 P	44	0	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	286	195	0.1
Rainfall	5999	739	0.3
Total	**18696**	**12660**	**5.5**

OUTFLOWS	Previous week Avg Daily CFS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)
S-77	0	0	0.0
S-308	-725	0	0.0
S-351	0	0	0.0
S-352	0	0	0.0
S-354	0	0	0.0
L-8 Outflow			
ET	3830	3197	1.4
Total	**3105**	**3197**	**1.4**

Provisional Data

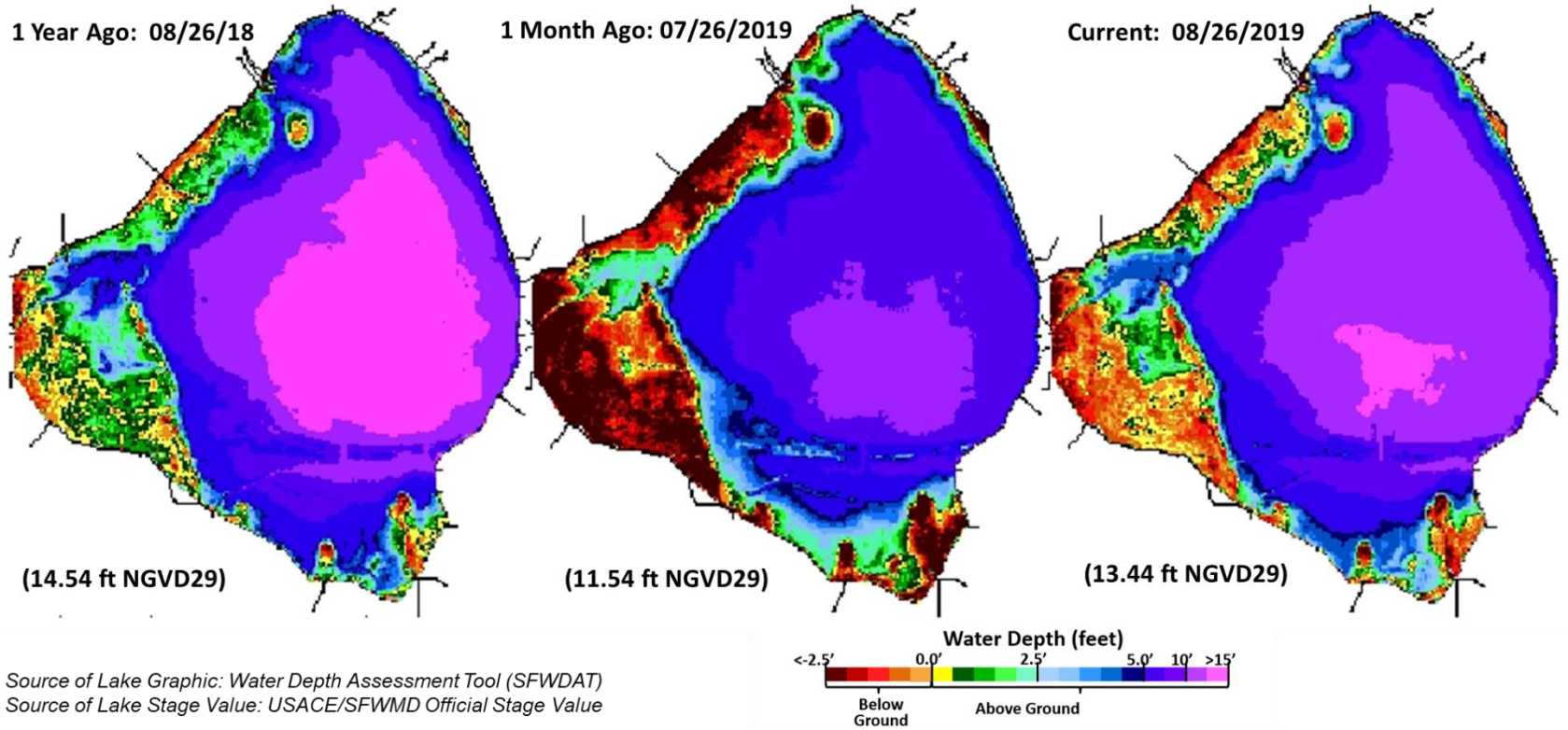


Figure 1. Water depth estimates on Lake Okeechobee based on the South Florida Water Depth Assessment Tool.

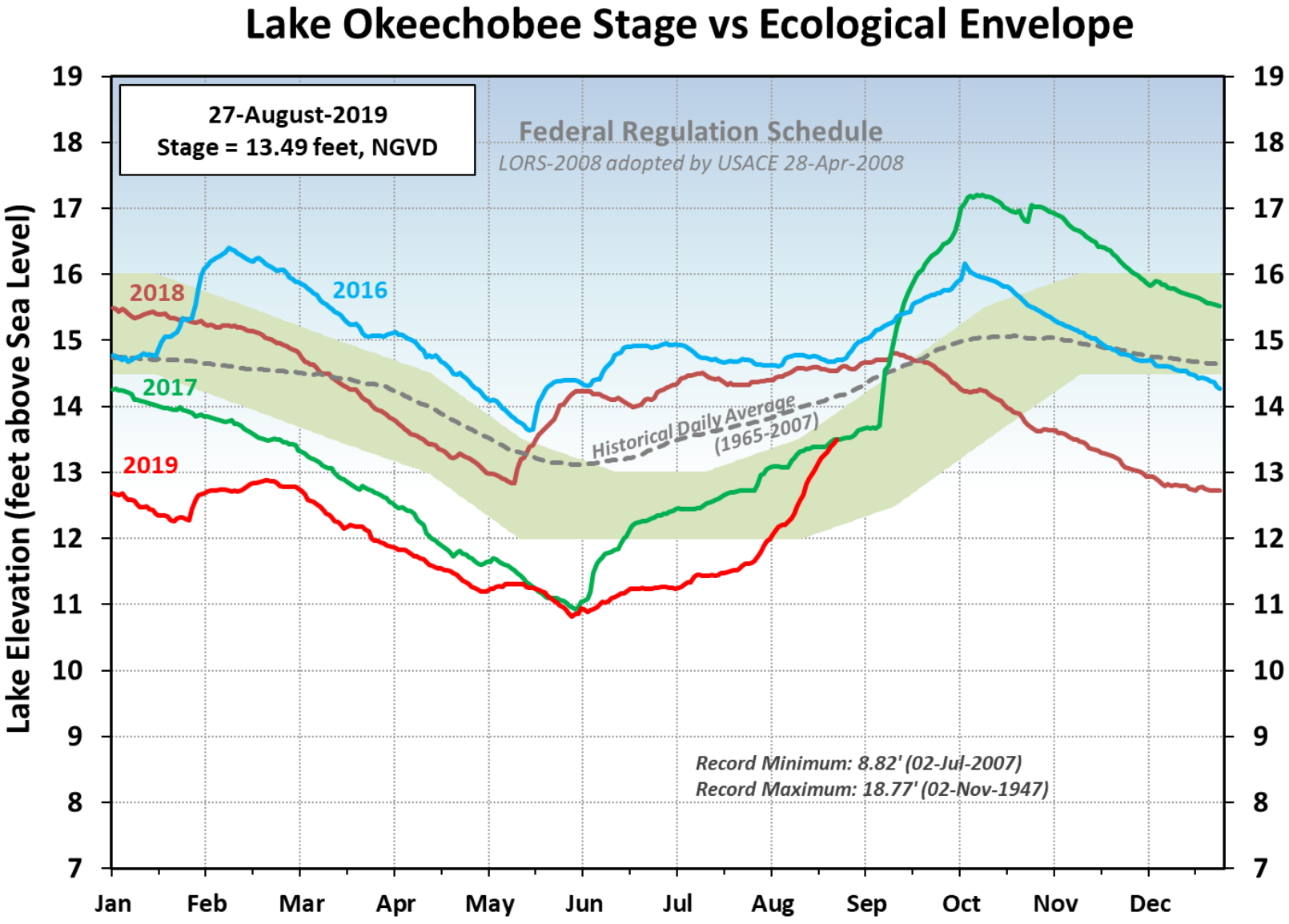


Figure 2. Select annual stage hydrographs for Lake Okeechobee in comparison to the Ecological Envelope.

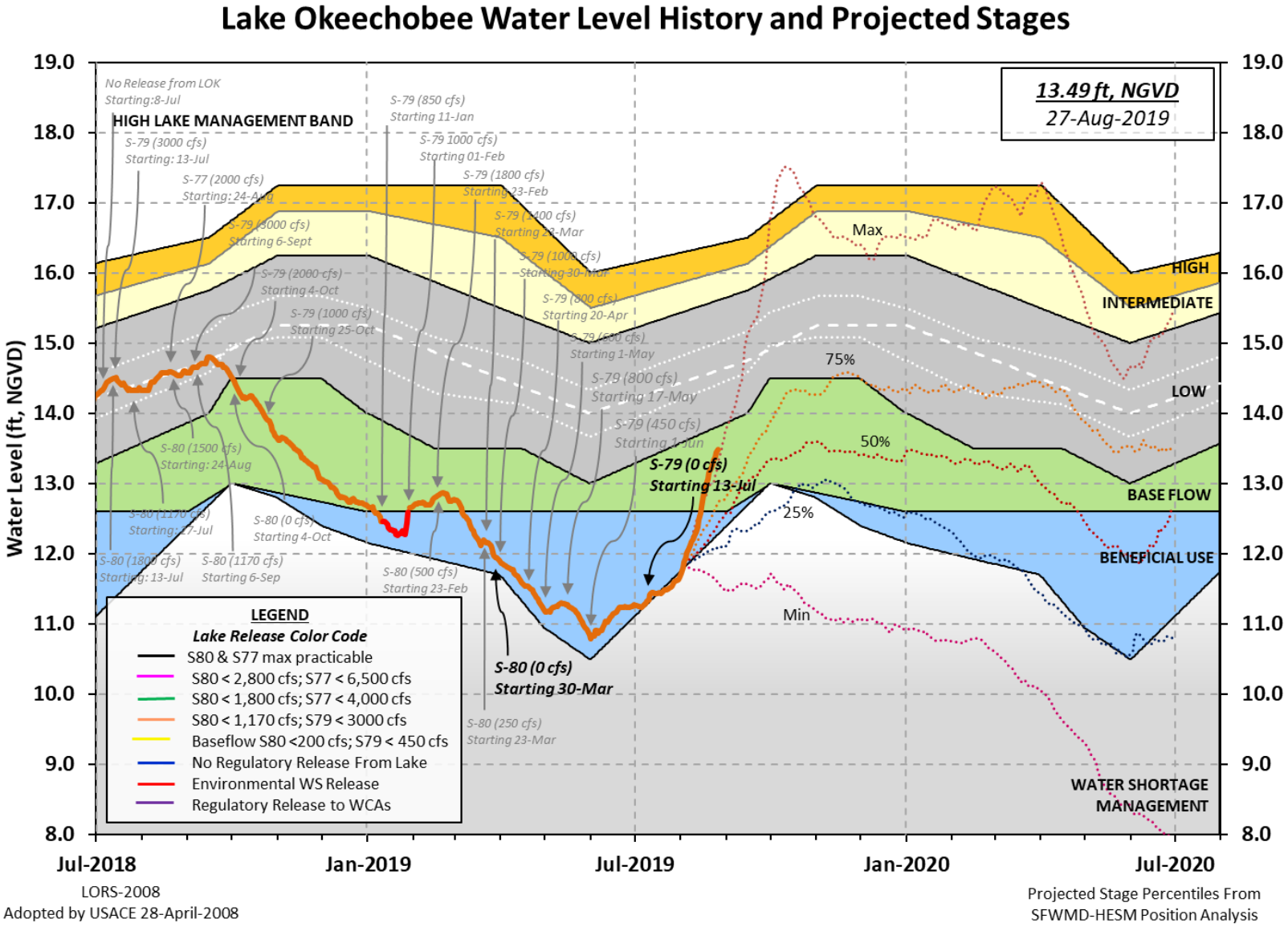


Figure 3. Recent Lake Okeechobee stage and releases, with projected stages based on a dynamic position analysis.

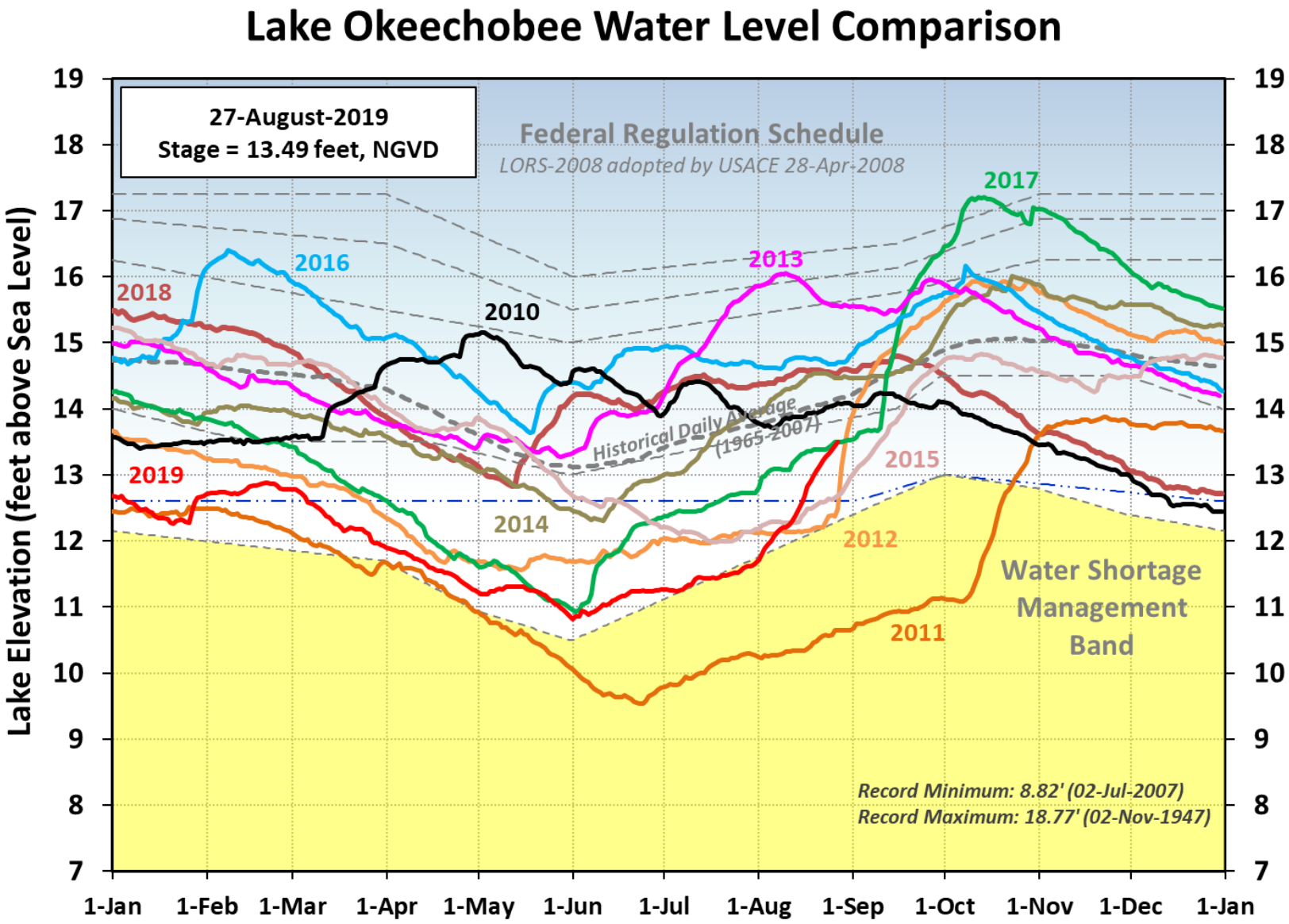


Figure 4. Select annual stage hydrographs for Lake Okeechobee from 2010 – 2019.

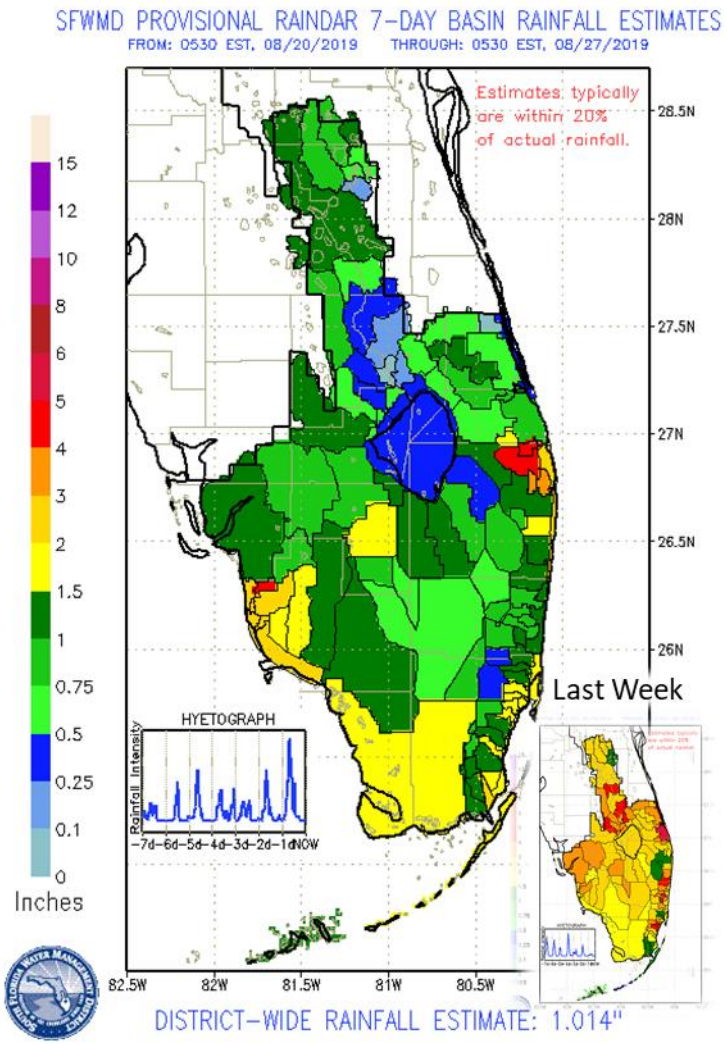


Figure 5. Rainfall estimates by basin.

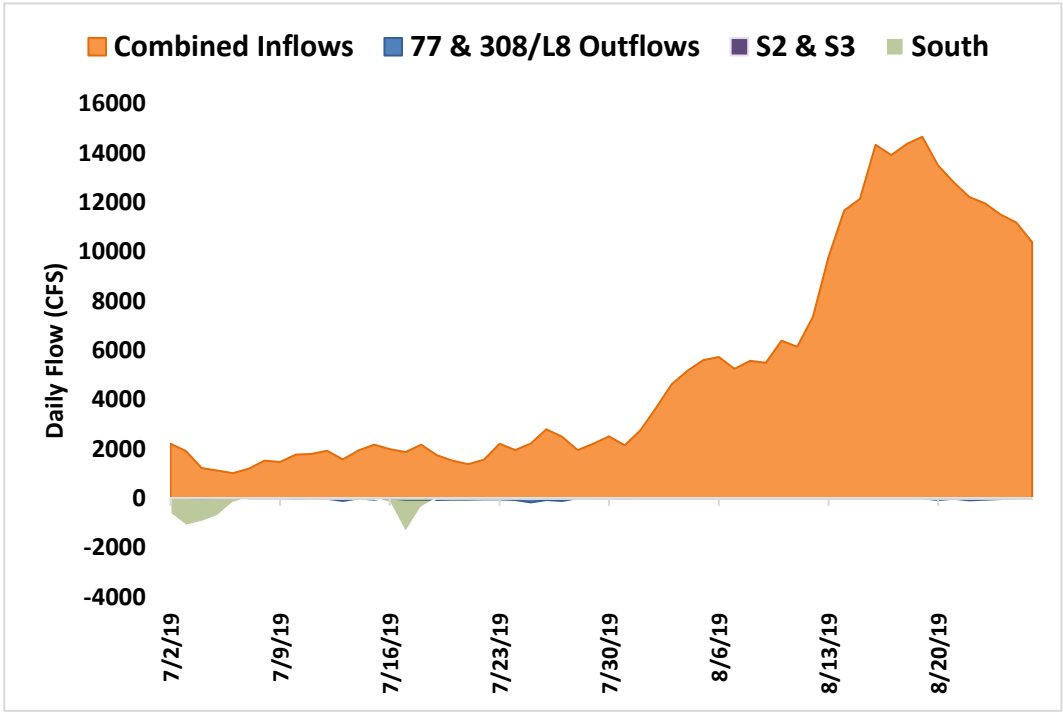


Figure 6. Major inflows (orange) and outflows (blue) of Lake Okeechobee, including the S-350 structures designated as South (green). The L-8 Canal flows through Culvert 10A are included as outflows when positive, and as inflows when backflowing into the lake. All inflows and outflows are shown as positive 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.

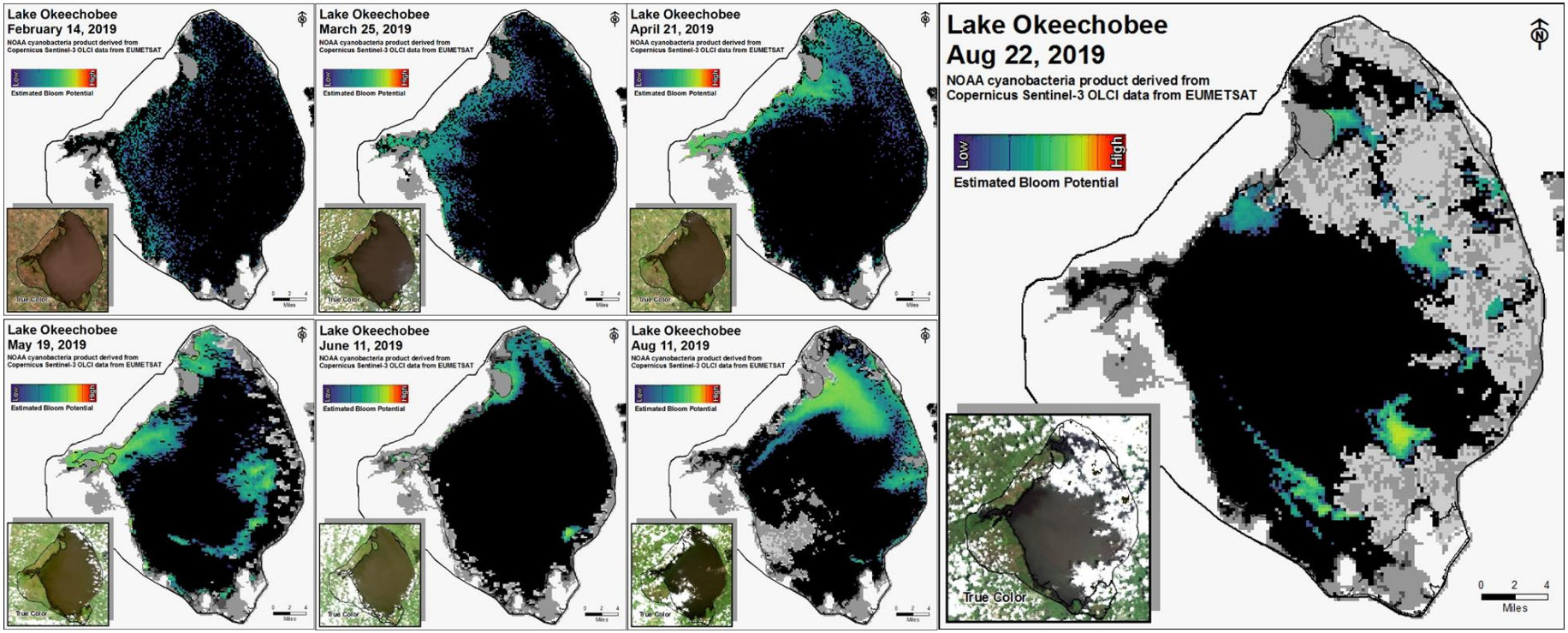


Figure 7. Potential for cyanobacterial blooms on Lake Okeechobee in 2019, based on NOAA's harmful algal bloom monitoring system derived from Copernicus Sentinel-3 OLCI data from EUMETSAT. Gray indicates cloud cover.

ESTUARIES

St. Lucie Estuary:

Last week total inflow to the St. Lucie Estuary averaged approximately 872 cfs (Figures 1 and 2) and last month inflow averaged about 1,700 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	396
S-80	0
S-308	0
S-49 on C-24	221
S-97 on C-23	68
Gordy Rd. structure on Ten Mile Creek	187

Over the past week, 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 estimated to be 6.6. Salinity conditions in the middle estuary are within the fair range for adult eastern oysters (Figure 3).

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

Sampling Site	Surface	Bottom	Envelope
HR1 (North Fork)	**1.6** (2.3)	**5.0** (9.5)	NA[1]
US1 Bridge	**5.4** (6.9)	**9.5** (8.9)	10.0-26.0
A1A Bridge	**16.1** (14.3)	**EM**[2] (~EM)	NA[1]

[1]Envelope not applicable and [2]Equipment Malfunction.

Caloosahatchee Estuary:

Last week total inflow to the Caloosahatchee Estuary averaged approximately 5,416 cfs (Figures 5 and 6) and last month inflow averaged about 6,405 cfs. Last week's provisional averaged inflows from the structures are shown in Table 3.

Table 3. Weekly average inflows (data is provisional).

Location	Flow (cfs)
S-77	0
S-78	964
S-79	3,898
Tidal Basin Inflow	1,518

Over the past week, salinity decreased throughout the estuary (Table 4, Figures 7 & 8). The seven-day average salinity values within the good range for adult eastern oysters at Shell Point and Sanibel and in the poor range at Cape Coral (Figure 9). The 30-day moving average surface salinity is 0.2 at Val I-75 and 0.3 at Ft. Myers. Salinity conditions between Val I-75 and Ft. Myers are good for tape grass.

Table 4. Seven-day average salinity at six monitoring stations in the Caloosahatchee Estuary. Current average is in bold face type, previous average in parentheses. The envelope reflects the preferred salinity range for tape grass (*Vallisneria americana*) at Val I-75 and for adult eastern oysters (*Crassostrea virginica*) elsewhere.

Sampling Site	Surface	Bottom	Envelope
S-79 (Franklin Lock)	**0.2** (0.2)	**0.2** (0.2)	NA[1]
Val I75	**0.2** (0.2)	**0.2** (0.2)	0.0-5.0[2]
Ft. Myers Yacht Basin	**0.2** (0.2)	**0.2** (0.2)	NA
Cape Coral	**0.6** (0.3)	**0.8** (0.3)	10.0-30.0
Shell Point	**EM**[3](EM)	**14.6** (11.7)	10.0-30.0
Sanibel	**NA** (20.7)	**NA** (23.8)	10.0-30.0

[1]Envelope not applicable, [2]Envelope is based on a 30-day average, and [3]Equipment Malfunction.

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 salinities of 0.3 at the end of the next two weeks for pulse releases at S-79 ranging from 0 to 800 cfs and Tidal Basin inflows of 815 cfs.

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	815	0.3	0.3
B	300	815	0.3	0.3
C	450	815	0.3	0.3
D	650	815	0.3	0.3
E	800	815	0.3	0.3

Red tide

The Florida Fish and Wildlife Research Institute reported on August 23, 2019, that *Karenia brevis, the Florida red tide dinoflagellate,* was not observed in samples collected from Lee, St. Lucie, Martin or Palm Beach counties (no samples from Broward, Miami counties).

Water Management Recommendations

Lake stage is in the Base Flow sub-band. Tributary conditions are very wet. Given the current estuarine conditions, there are no ecological benefits to the upper estuary associated with freshwater releases from Lake Okeechobee, but some benefits may accrue to areas further downstream.

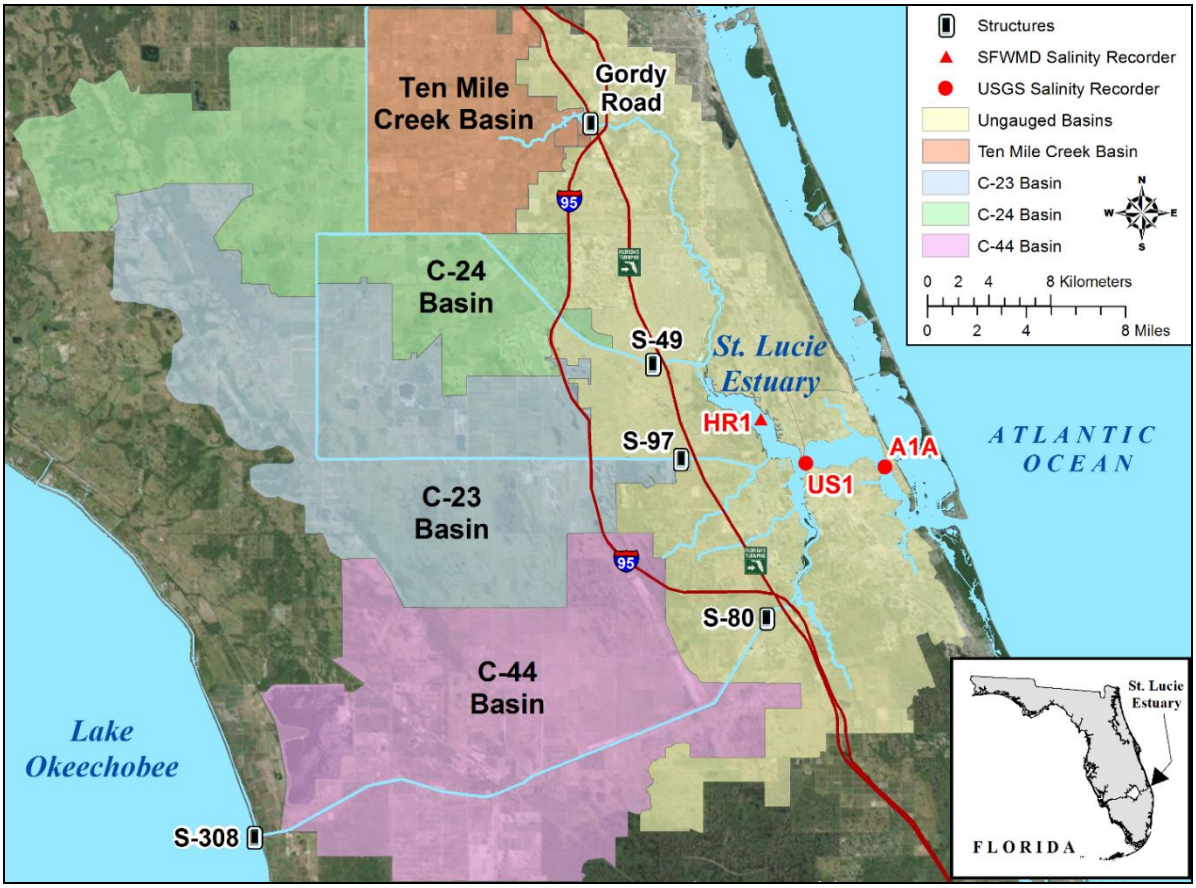


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

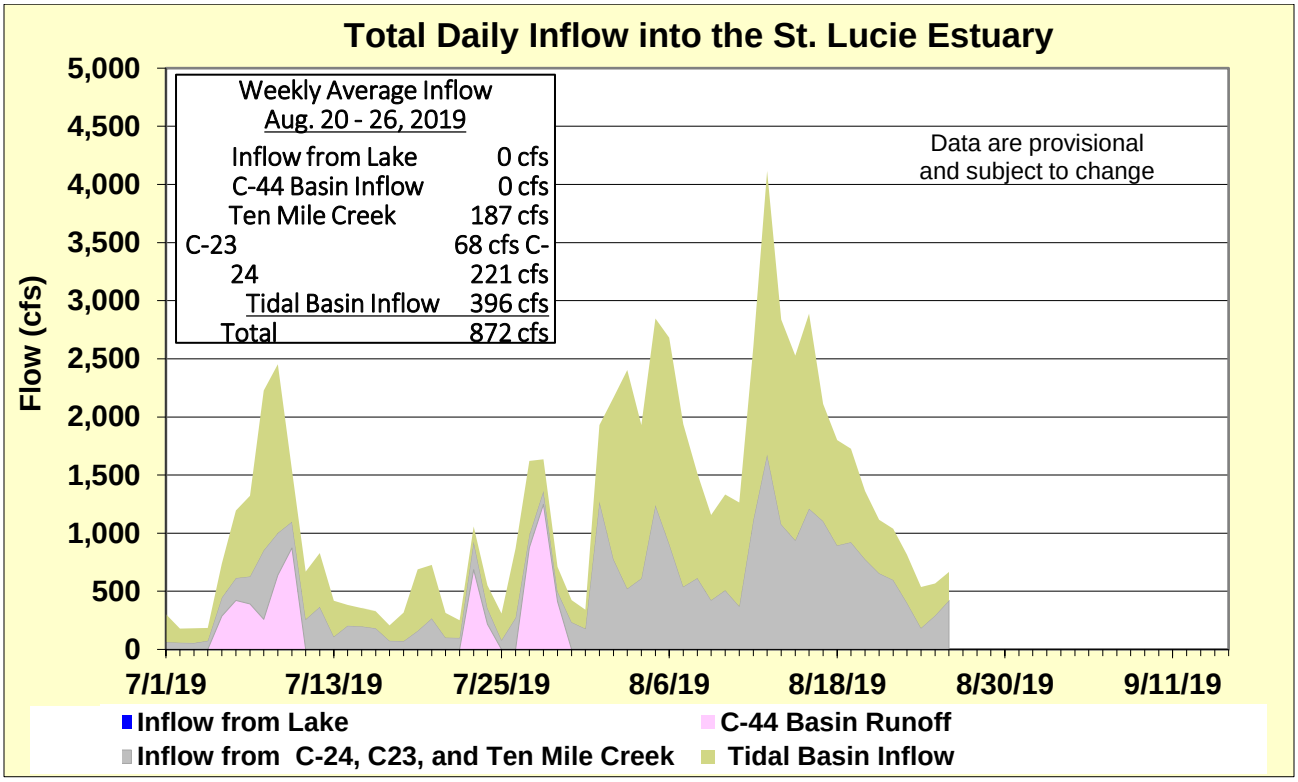


Figure 2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basins into the St. Lucie Estuary.

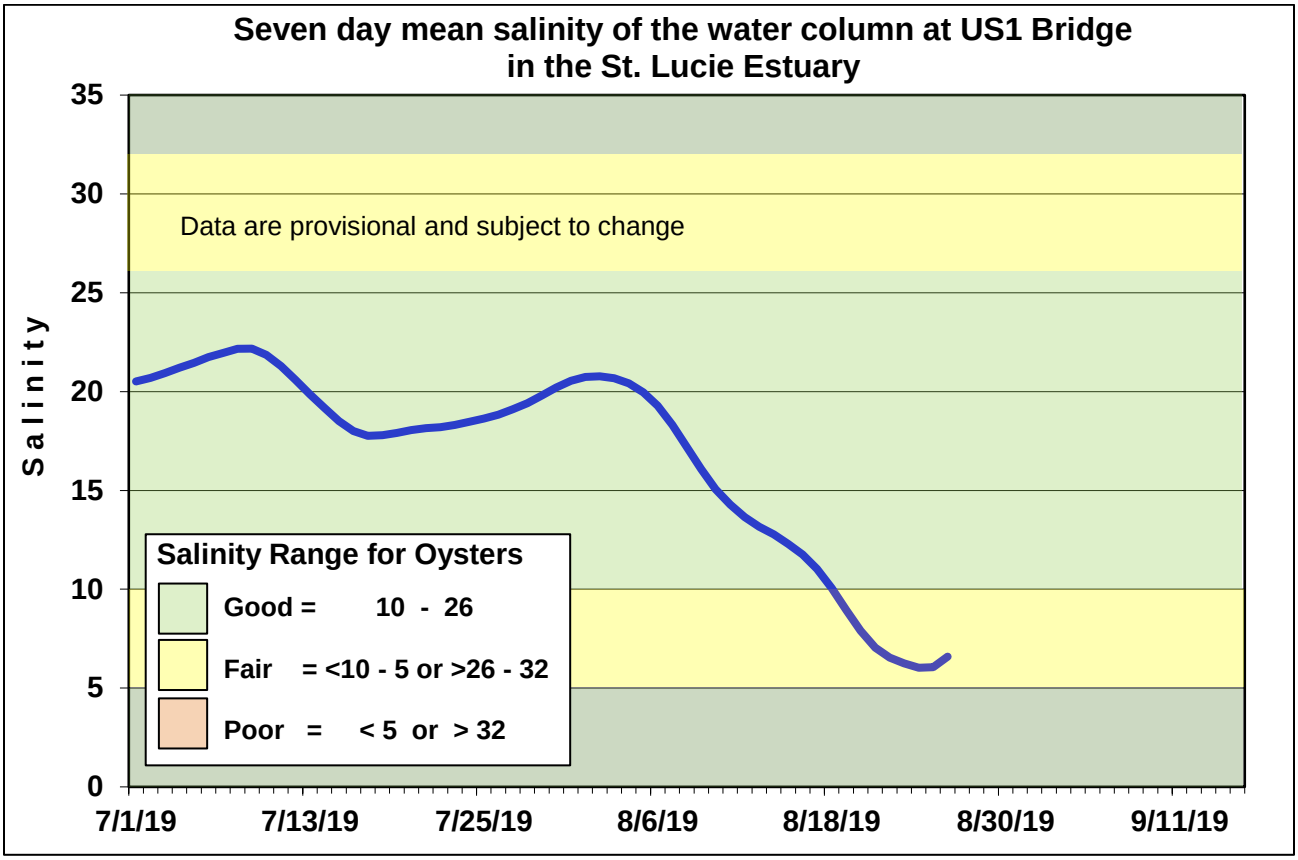


Figure 3. Seven-day mean salinity of the water column at the US1 Bridge.

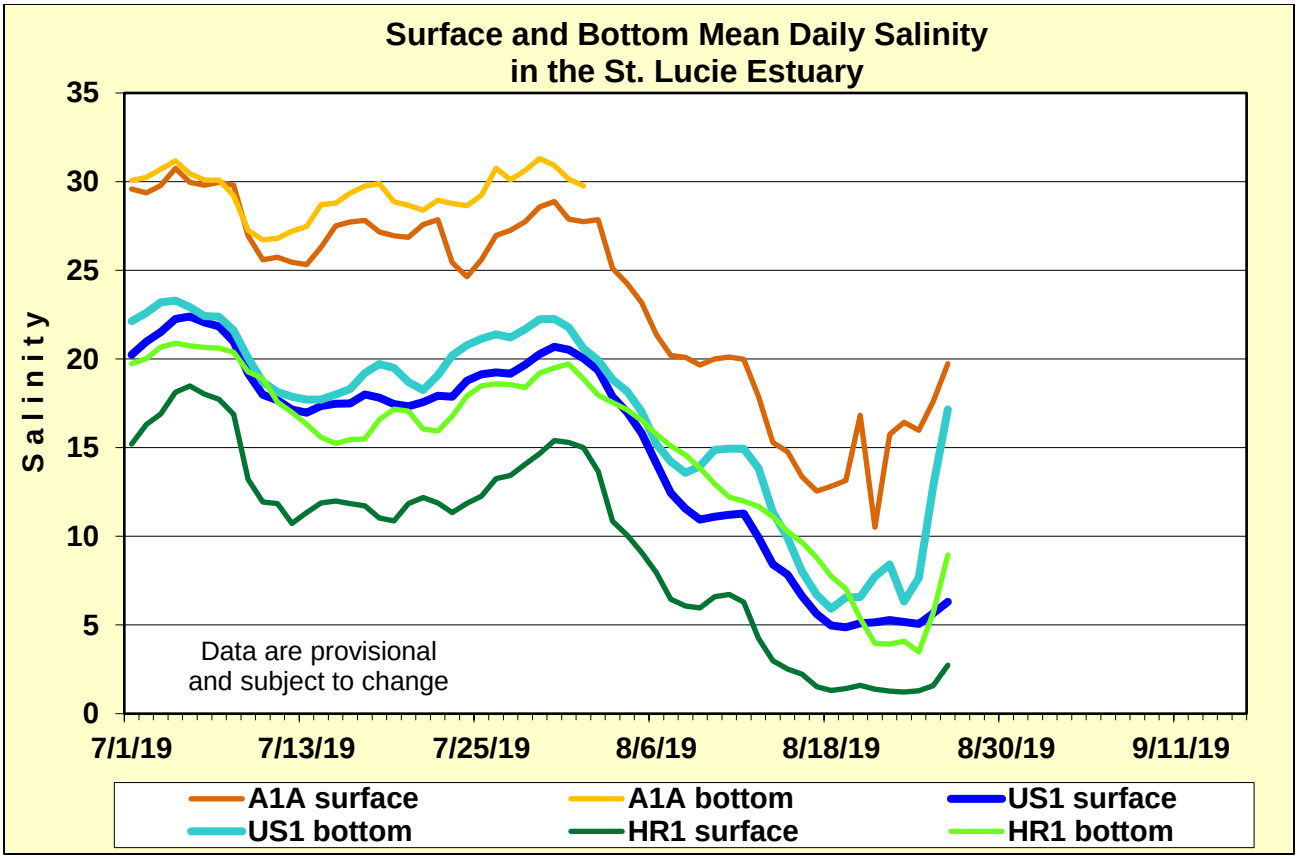


Figure 4. Daily mean salinity at the A1A, US1 and estimated HR1 stations.

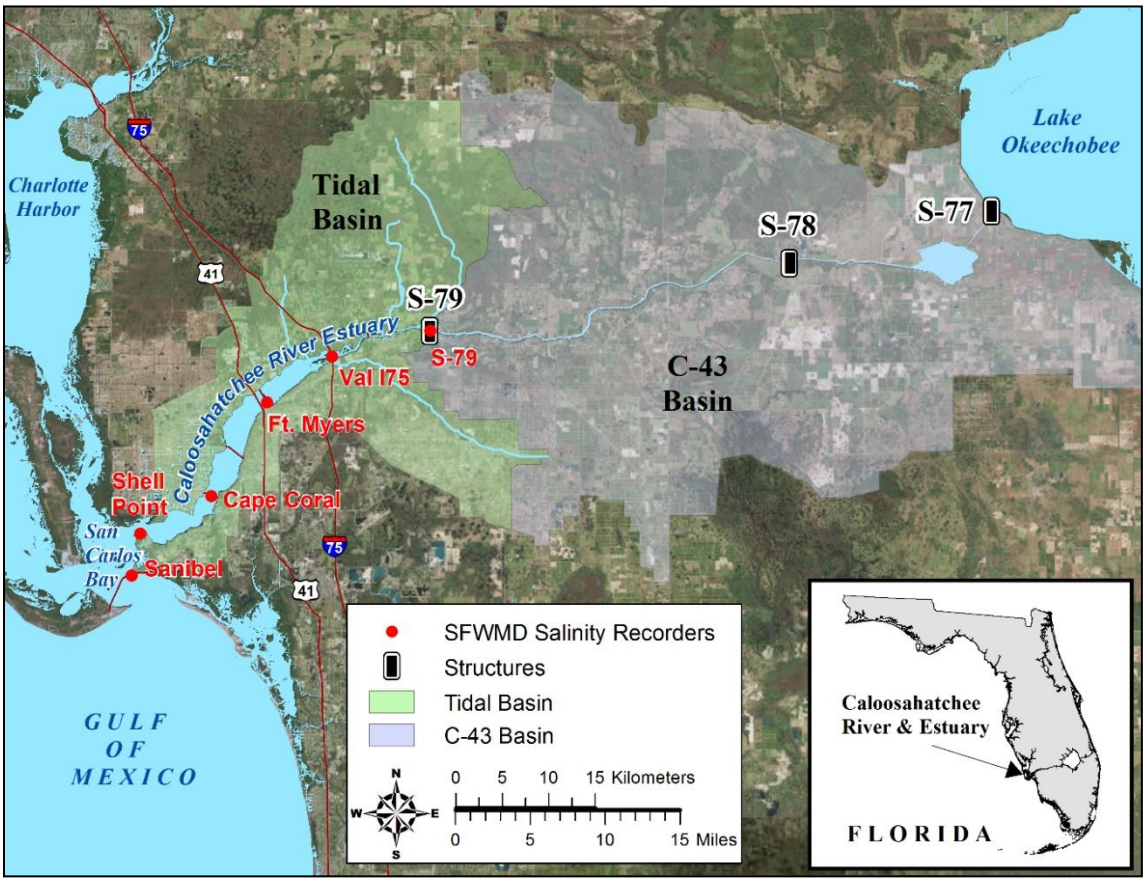


Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

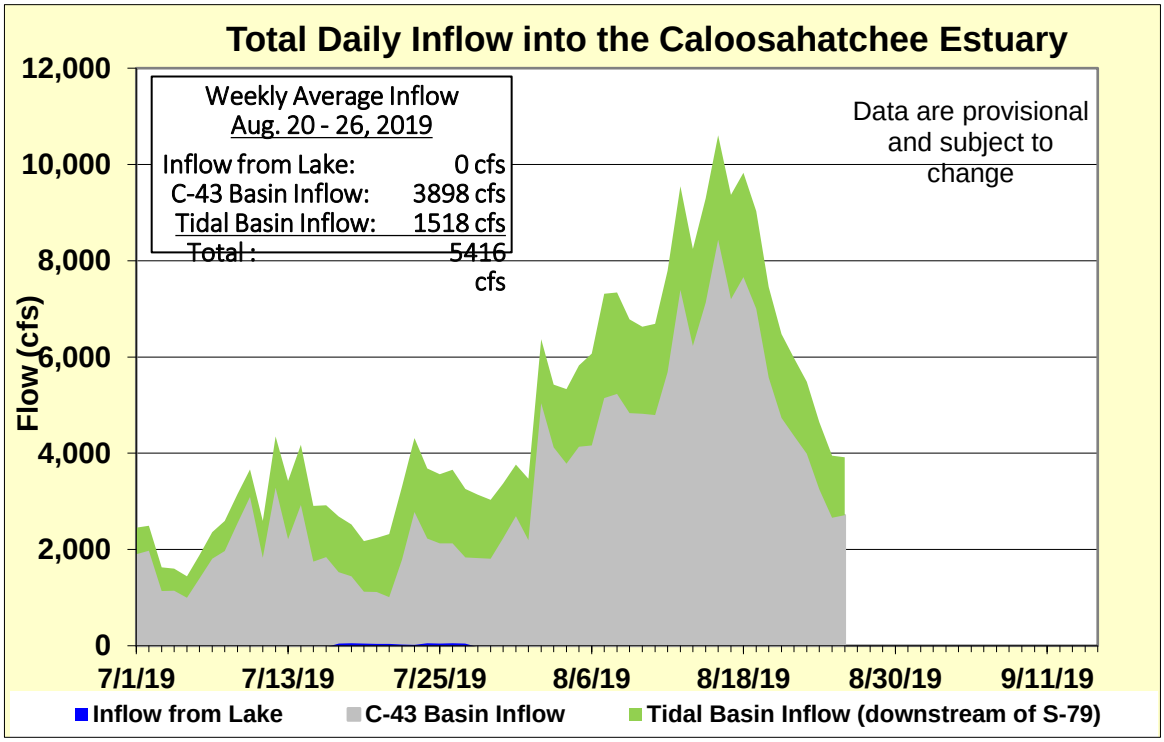


Figure 6. Total daily inflows from Lake Okeechobee, runoff from the C-43 basin, and tributaries in the tidal basin into the Caloosahatchee River Estuary.

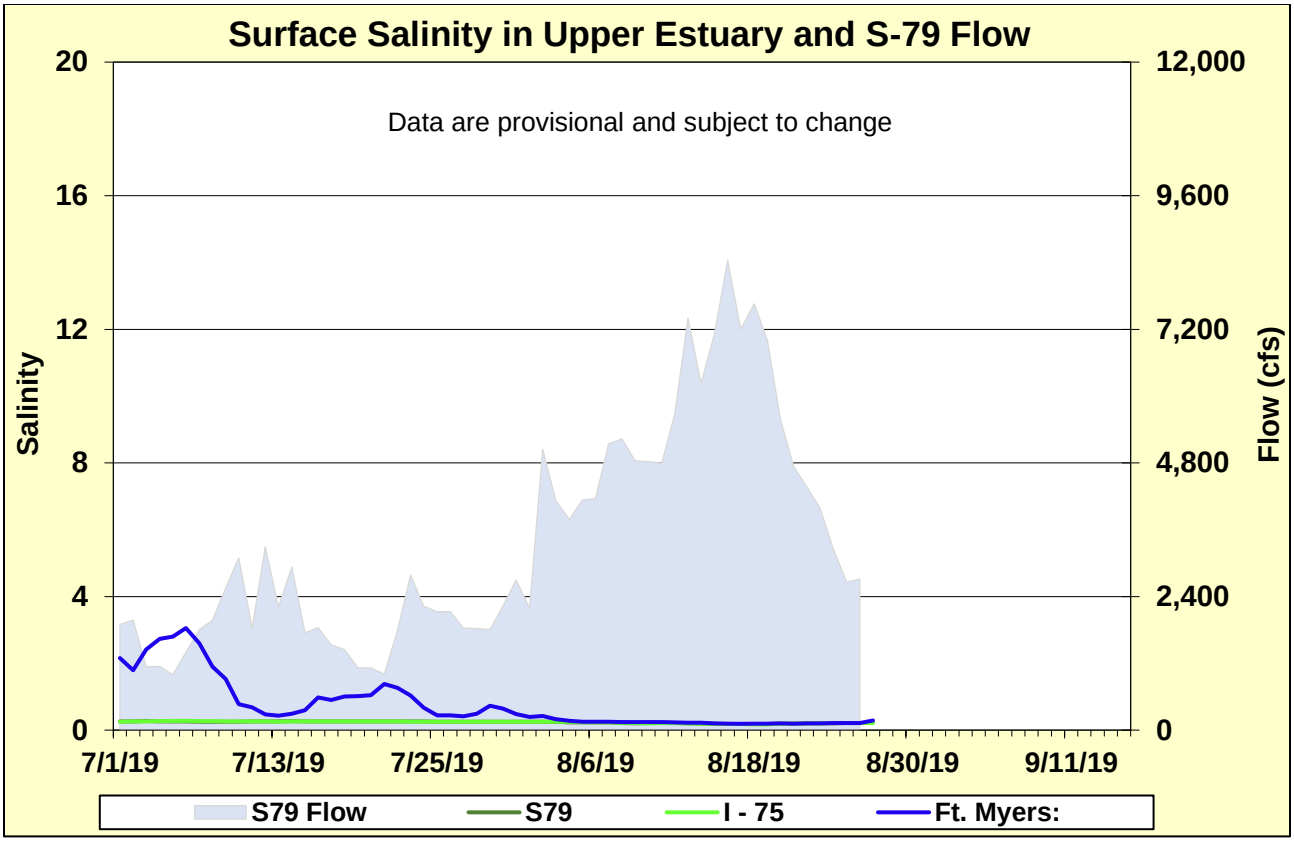


Figure 7. Daily mean flows at S-79 and salinity at upper estuary monitoring stations.

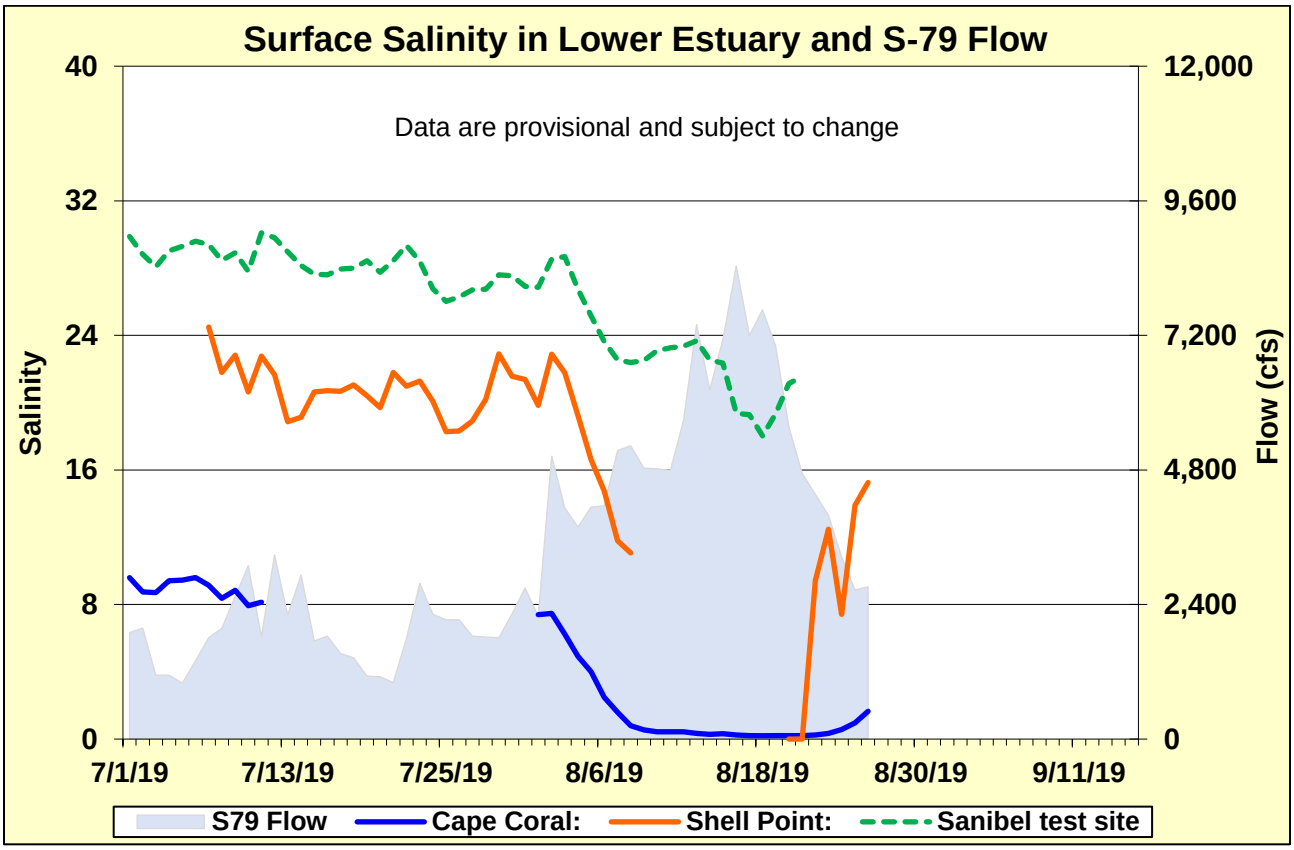


Figure 8. Daily mean flows at S-79 and salinity at lower estuary stations.

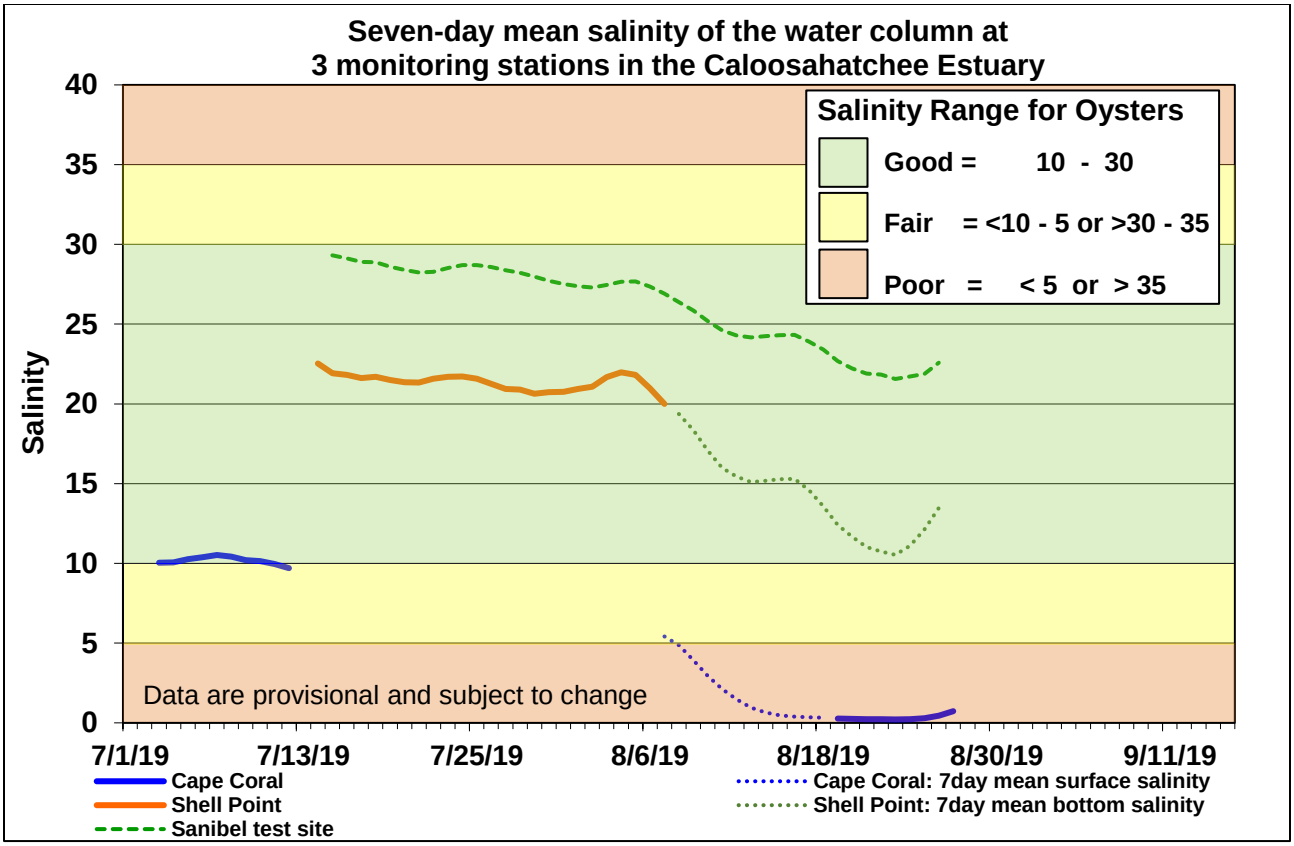


Figure 9. Seven-day mean salinity at Cape Coral, Shell Point, and Sanibel monitoring stations.

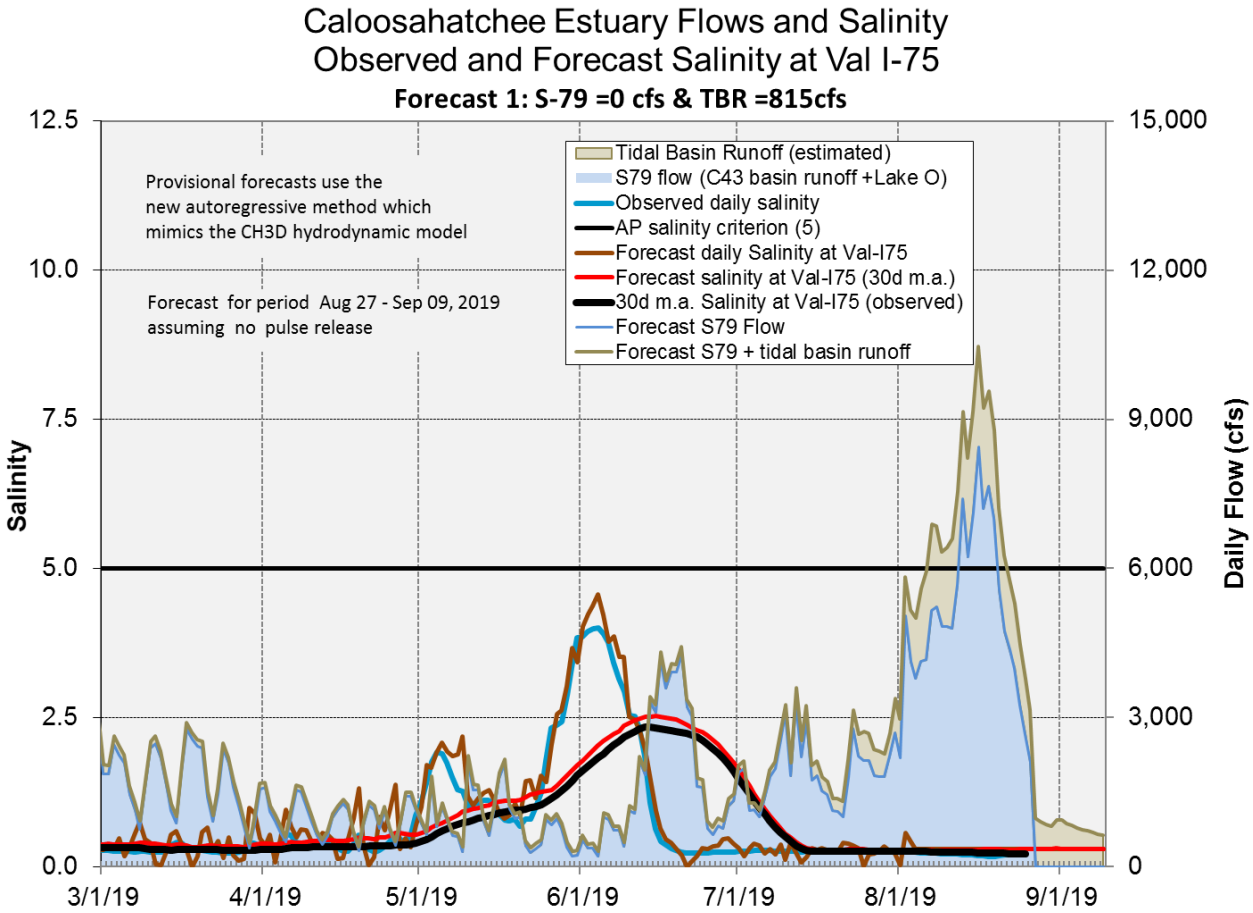
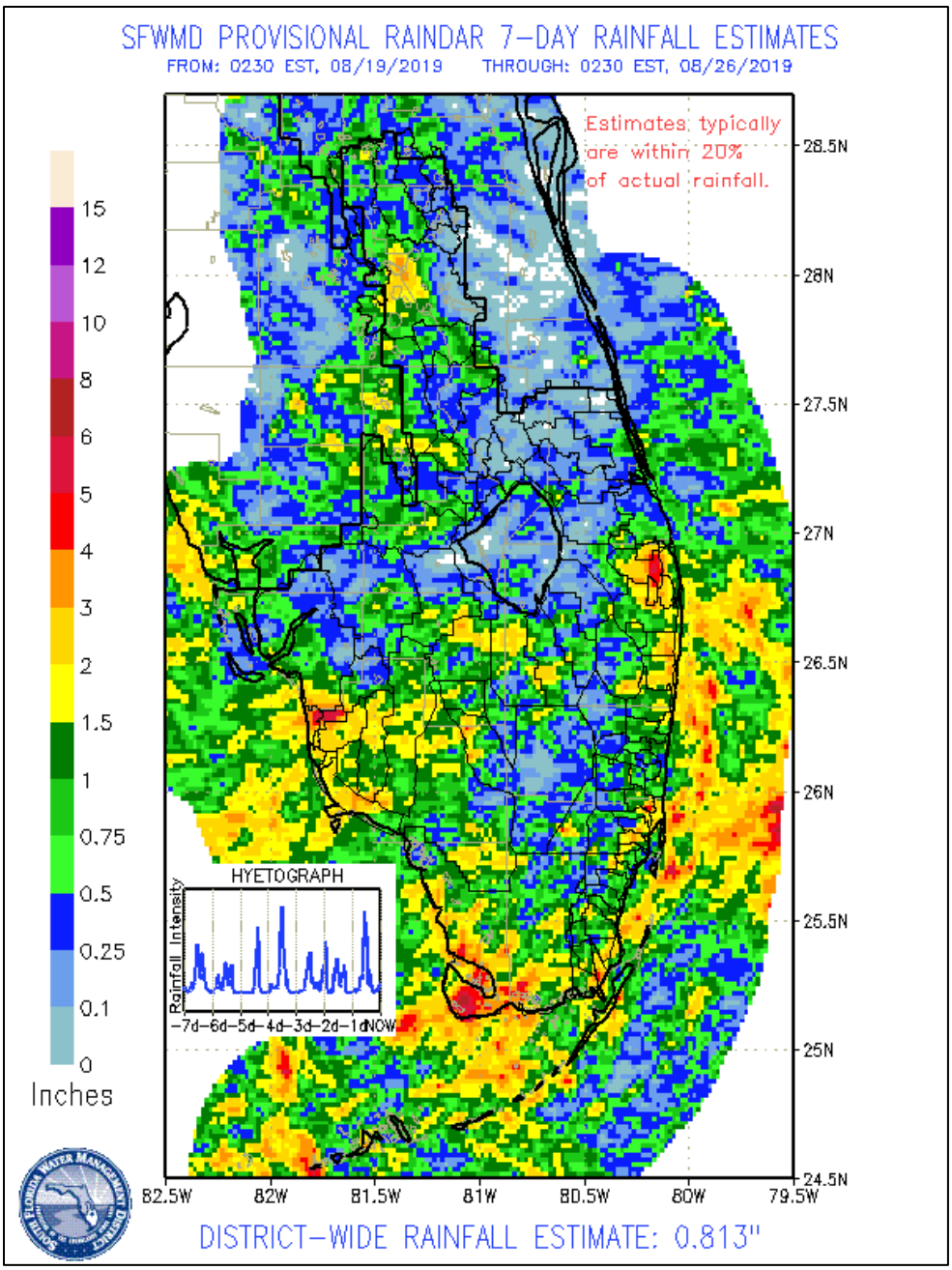


Figure 10. Forecasted Val I-75 surface salinity assuming no pulse release at S-79.

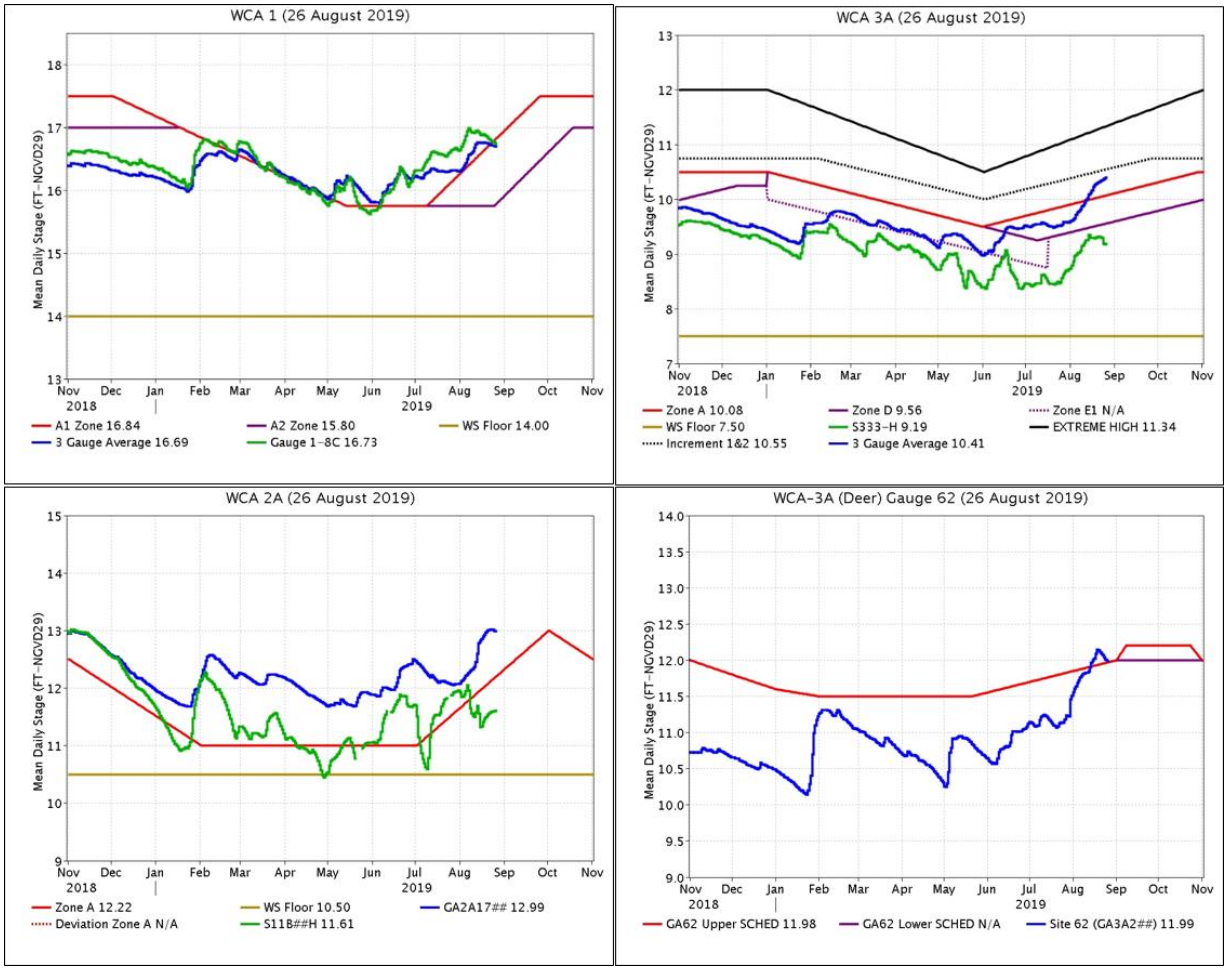
EVERGLADES

Below average rainfall was fairly consistent across the WCAs last week and stages remained basically unchanged as the gauges monitored for this report on average did not change. Pan evaporation was estimated at 1.71 inches and the Rainfall Plan continues to call for the maximum release.

Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	0.81	−0.06
WCA-2A	0.41	+0.03
WCA-2B	0.40	+0.02
WCA-3A	0.57	+0.04
WCA-3B	0.75	−0.04
ENP	1.73	+0.02



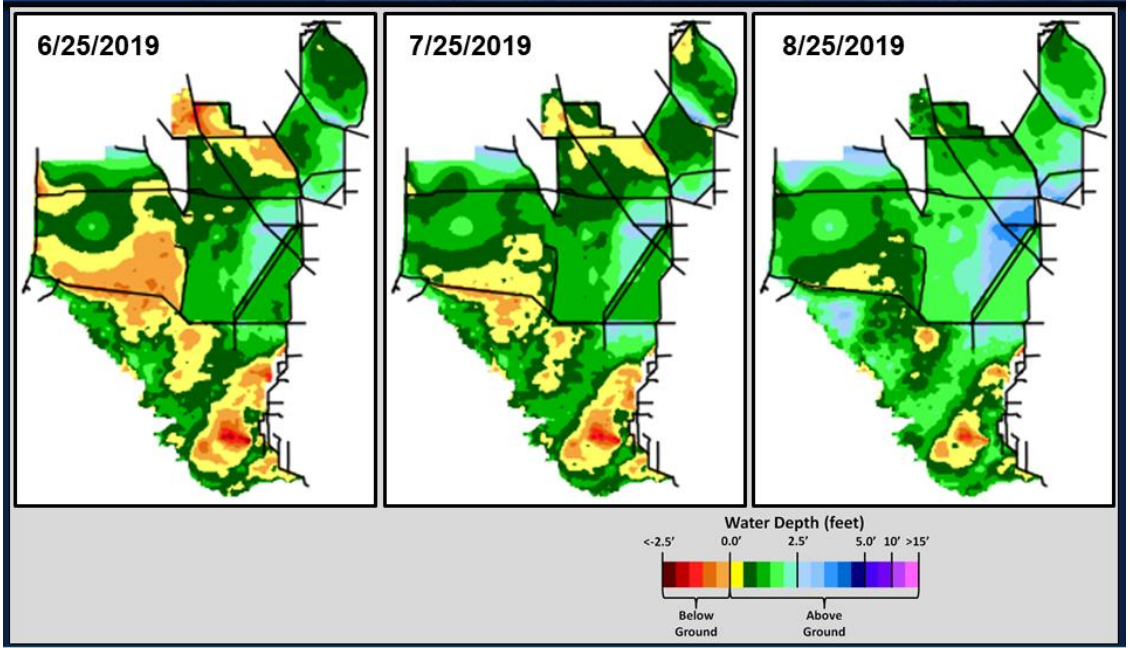
Regulation Schedules: WCA-1: The three-gauge average falls 0.15 feet below the Zone A1 line this week. WCA-2A: Gauge 2A-17 stage ascended rapidly away from the Zone A regulation line two weeks ago, now 0.77 feet above but moving towards the rising line. WCA-3A: The three-gauge average stage continues to ascend away from the Zone A regulation line at 0.33 feet above the desired operational band. WCA-3A at gauge 62 (northwest corner) is now at schedule at 0.01 feet above the upper schedule and descending.



Water Depths and Changes: The WDAT tool for spatial interpolation of depth monthly snapshots indicate stages in northeastern WCA-3A and northern WCA-1 have risen aboveground in the last month, protecting the peat soils there. The sloughs within Everglades National Park seem to be showing impacts of recent projects with increased water depths and connectivity within Lostmans, Shark River and Taylor Sloughs. Ponding has increased at the southern end of WCA-1, WCA-2B and along the L67 levees in WCA-3A South. WDAT difference maps indicate that the Greater Everglades has significantly increased in depth during the last month. In general, depths are higher within the WCAs over the last month. WCA-3A South and southern WCA-2A are mostly drier than last year at this time when the area was under a high-water emergency order for conditions in WCA-3A. WCA-1 was deeper, significantly so in the southern end and drier in the north end.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

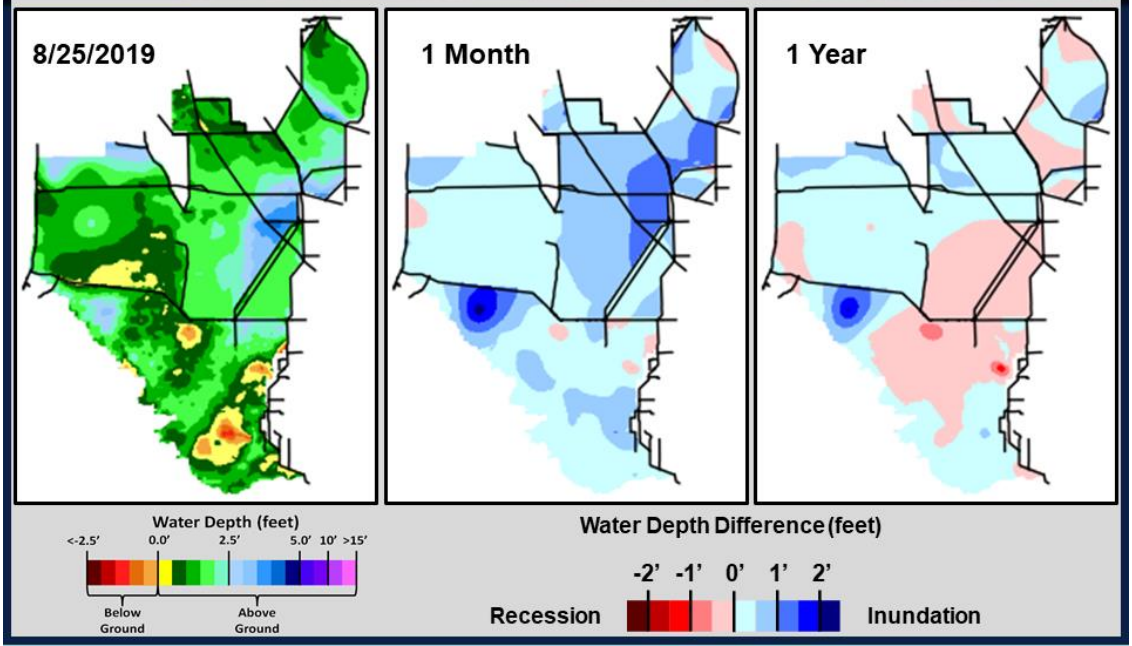
SFWDAT Water Depth Monthly Snapshots



South Florida Water Depth Assessment Tool (SFWDAT)

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

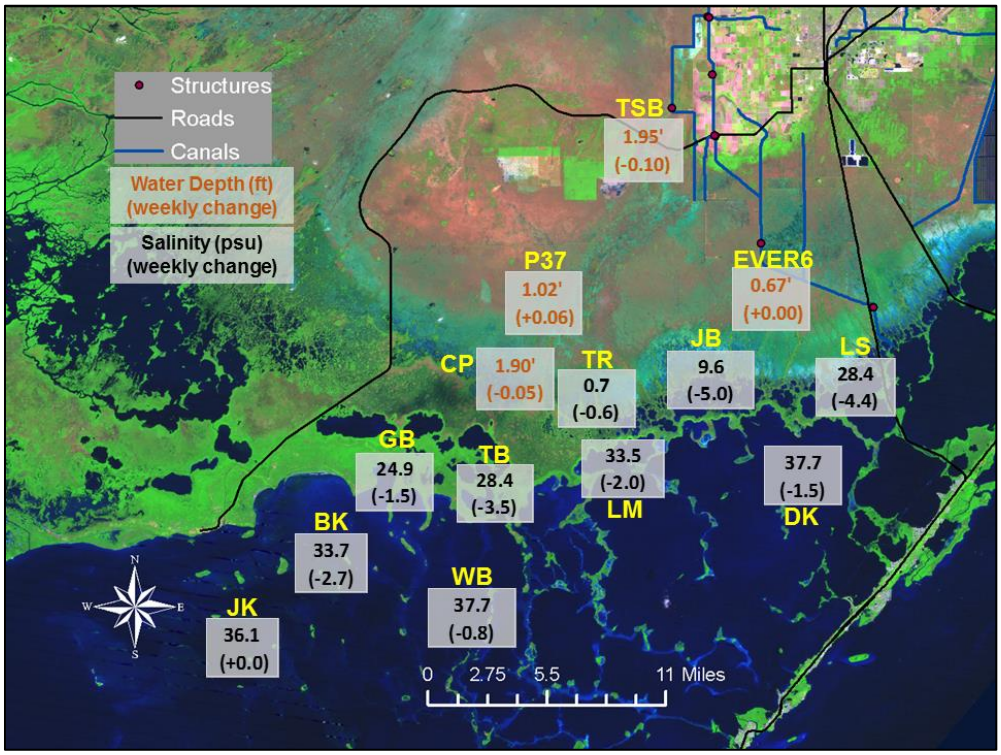
SFWDAT Everglades Difference Maps (Present – Past)

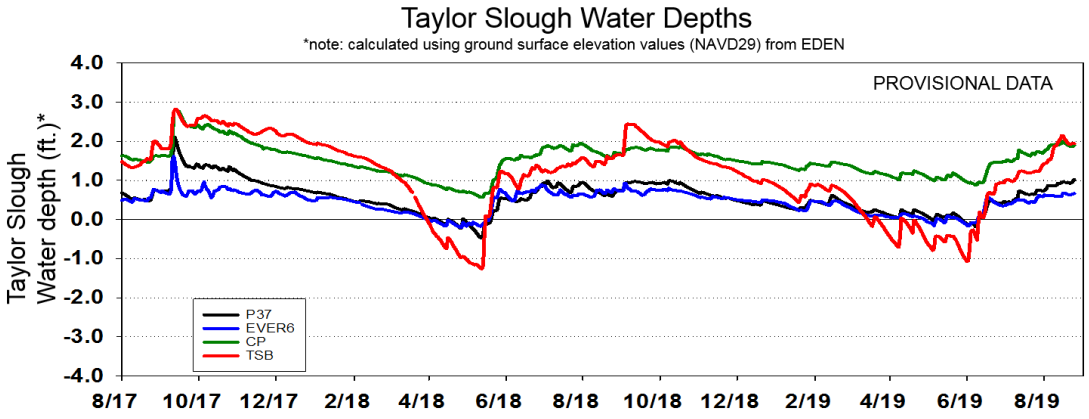


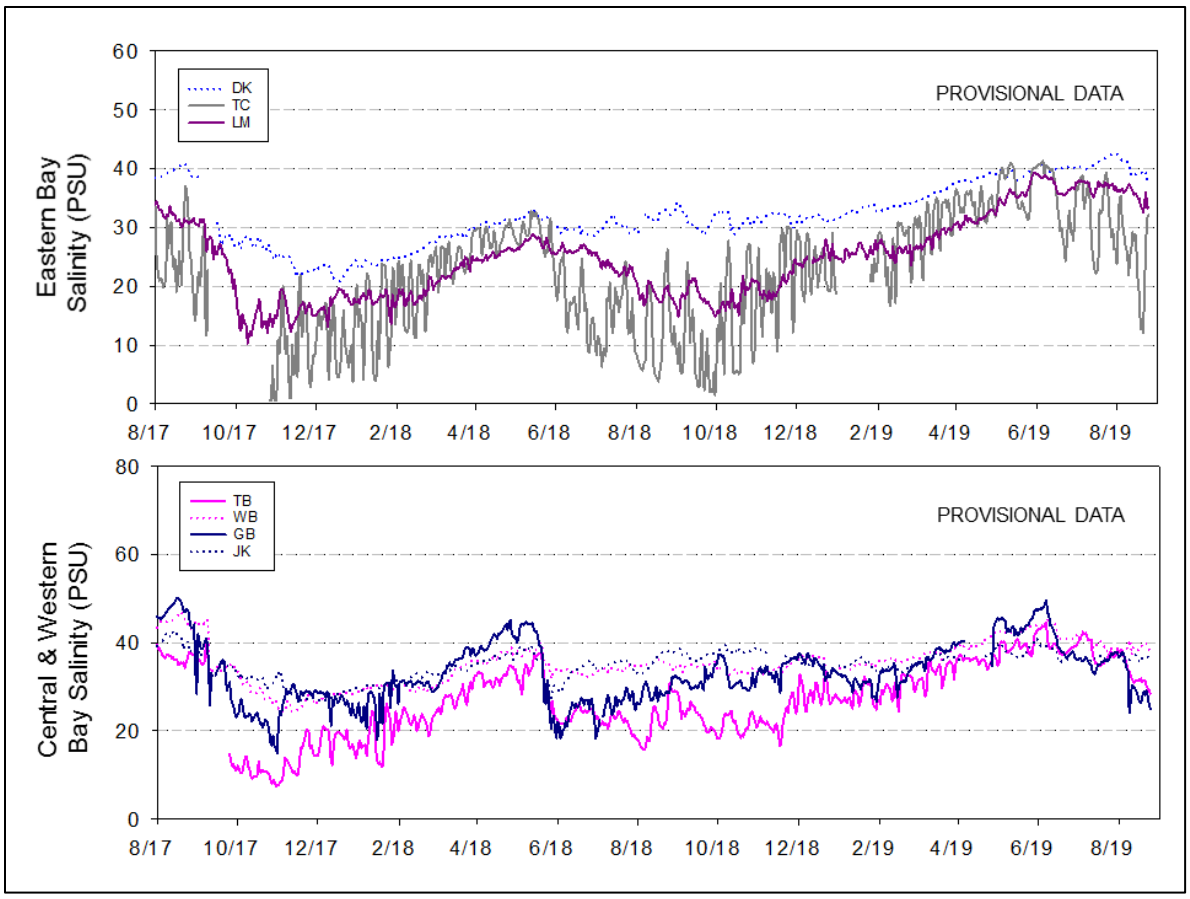
South Florida Water Depth Assessment Tool (SFWDAT)

Taylor Slough Water Levels: An average of 1.8 inches of rain fell over Taylor Slough and Florida Bay this past week, but the stage changes were moderate ranging from a decrease of −1.2 inches in the north to an increase of 0.77 inches in central Taylor Slough. Stages are still 4 inches higher than average for this time of year.

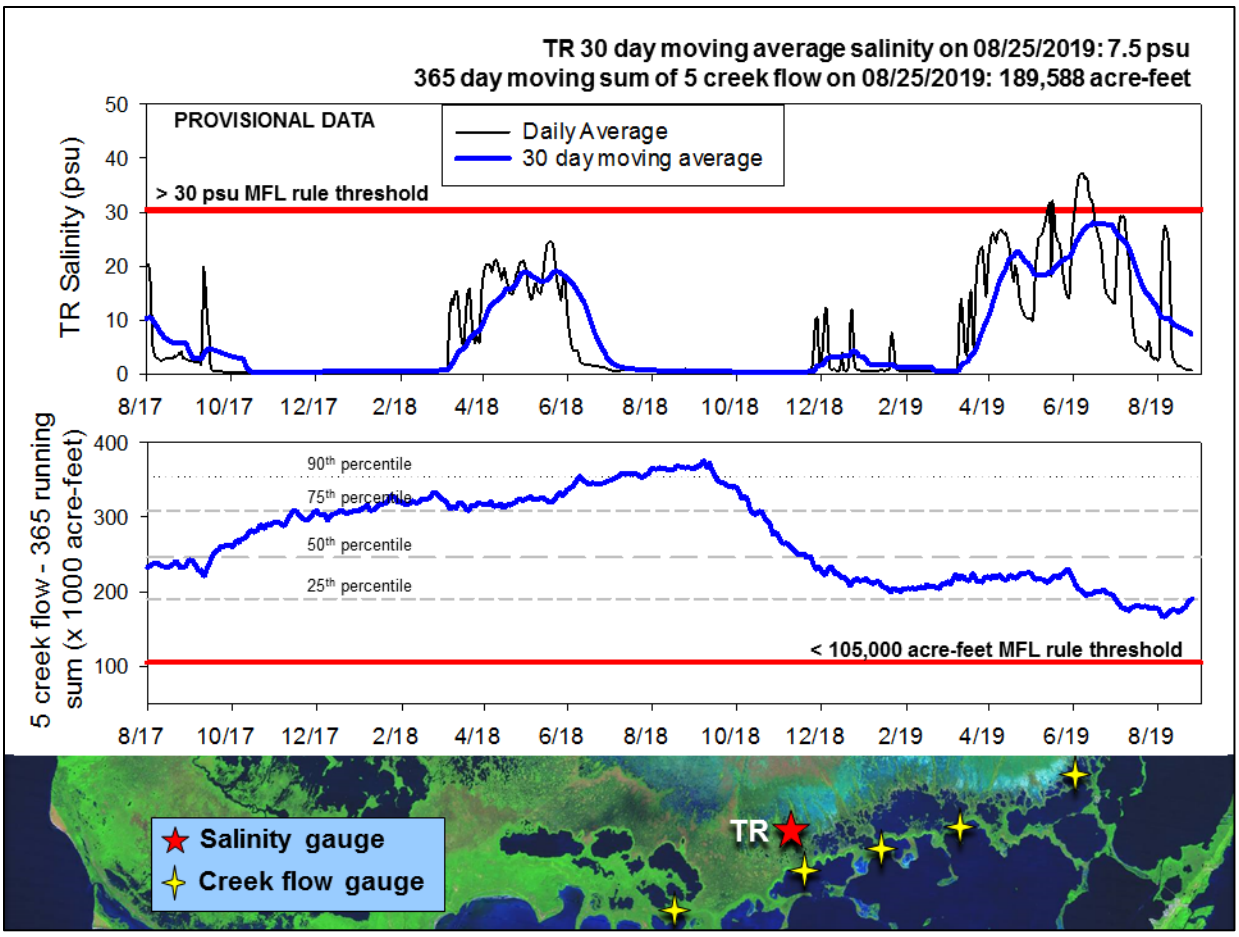
Florida Bay Salinities: Average salinity in Florida Bay was 30, down 2 from last week. The nearshore area continued to decrease over the last week and Garfield Bight (GB) still has the lowest salinity of the nearshore stations (provisional data) which is unusual for this time of year. The nearshore area salinity is still 6 above the average for this time of year, while the salinity for the Bay as a whole is 2 above average.







Florida Bay MFL: Salinity at the TR station in the mangrove zone (tracked for the Florida Bay MFL) continued decreasing to 0.7 this week. The 30-day moving average salinity decreased 1.0 to end at 7.5 on Sunday. The weekly flow from the 5 creeks feeding Florida Bay was approximately 11,000 acre-feet, which is 150% of the historical average for this time of year. The 365-day moving sum of flow from the five creeks (tracked as part of the Florida Bay MFL criteria) increased 15,000 acre-feet to end the week at 189,588 acre-feet which is still less than the 25th percentile (190,165 acre-feet). Creek flow is provisional data from the USGS and is highly variable. The last period below the 25th percentile was July 2014 through January 2016.



Water Management Recommendations

For the Water Conservation Areas, a rate of ascension less than 0.25 feet per week or less than 0.5 feet per 2 weeks is the general ecological recommendation. Over the last two weeks in WCA-1, WCA-2A and northeastern WCA-3A stage increases exceeded the recommended rate. WCA-1 depths have been relatively low over the past year, with stages below the seasonal historic averages since September. There is some consensus in the scientific community that allowing variability is good for the ecological health of the Everglades. Allowing current stages to run higher in WCA-1 may have ecological value. While perhaps less than desirable operationally the current slightly elevated stage in WCA-3A could prove beneficial ecologically. The entirety of the marsh within that basin is inundated (even the northeast corner), the 2.5-foot threshold at Gauge 65 which indicates flooding stress to tree islands has not been exceeded and steady discharges from WCA-3A are making it into the major sloughs of Everglades National Park. Moving water towards Taylor Slough and Florida Bay will freshen salinity conditions within the nearshore areas of Florida Bay and decrease the currently stressful conditions for seagrasses and fauna as nearshore salinities remain elevated. More specific recommendations appear in the summary table below. The red text represents new or modified information or recommendations.

SFWMD Everglades Ecological Recommendations, August 27th, 2019 (red is new)			
Area	Weekly change	Recommendation	Reasons
WCA-1	Stage decreased by 0.06'	Manage for a rate of ascencion less than +0.25' per week, or less than +0.5 per 2 weeks.	Protect tree islands, upstream/downstream habitat and wildlife. Protect conditions for apple snail reproduction.
WCA-2A	Stage increased by 0.03'	Manage for a rate of ascencion less than +0.25' per week, or less than +0.5 per 2 weeks.	Protect upstream/downstream habitat and wildlife. Protect conditions for apple snail reproduction.
WCA-2B	Stage increased by 0.03'	Manage for a rate of ascencion less than +0.25' per week, or less than +0.5 per 2 weeks.	Protect upstream/downstream habitat and wildlife. Protect conditions for apple snail reproduction.
WCA-3A NE	Stage increased by 0.19'	Manage for a rate of ascencion less than +0.25' per week, or less than +0.5 per 2 weeks.	Protect tree islands, upstream/downstream habitat and wildlife. Protect conditions for apple snail reproduction.
WCA-3A NW	Stage decreased by 0.17'	Manage for a rate of ascencion less than +0.25' per week, or less than +0.5 per 2 weeks.	
Central WCA-3A S	Stage increased by 0.12'	Maintain depths at regulation schedule. Manage for a rate of ascencion less than +0.25' per week, or less than +0.5 per 2 weeks.	Protect tree islands, upstream/downstream habitat and wildlife. Protect conditions for apple snail reproduction.
Southern WCA-3A S	Stage increased by 0.03'		
WCA-3B	Stage decreased by 0.04'	Manage for a rate of ascencion less than +0.25' per week, or less than +0.5 per 2 weeks.	Protect upstream/downstream habitat and wildlife. Protect conditions for apple snail reproduction.
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.
Taylor Slough	Stage changes ranged from −0.10' to +0.06'	Move water southward as possible	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged −5.0 to +0.0 psu	Move water southward as possible	When available, provide freshwater to maintain low salinity buffer and promote water movement.