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 21, 2019

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

The forecast is for afternoon thunderstorms focused west today. The northern end of a tropical wave is passing through the area today, but moisture is less plentiful than predicted and outflow from shower activity to our southeast this morning has brought more stable conditions to the area. Therefore, the main opportunity for regeneration of showers near the east coast will be this evening and tonight but daytime heating should help to develop some showers and thunderstorms over the interior and western areas this afternoon. Drier air is forecast to spread over the area Tuesday and southeasterly steering winds should focus scattered afternoon showers and thunderstorms over the interior and west Wednesday and Thursday. The northern end of a second tropical wave is forecast to move across the area on Friday. Therefore, expect scattered shower activity to affect the southeastern coast Thursday night with above average thunderstorm activity developing across the District Friday. Daytime heating should continue to generate afternoon thunderstorm activity focused primarily over the interior and northeast Saturday, Sunday, and Monday.

Kissimmee

Tuesday morning stages were 56.8 feet NGVD (0.3 feet above schedule) in East Lake Toho, 53.6 feet NGVD (0.1 feet above schedule) in Toho, and 51.7 feet NGVD (0.7 feet above schedule) in Kissimmee-Cypress-Hatchineha; headwater stages were 48.0 feet NGVD at S-65A and 27.5 feet NGVD at S-65D. Tuesday morning discharges were 4,917 cfs at S-65, 6,417 cfs at S-65A, 8,191 cfs at S-65D and 8,125 cfs S-65E. Dissolved oxygen concentration in the Kissimmee River averaged 0.5 mg/L for the week through Sunday. Kissimmee River mean floodplain depth on Sunday was 3.23 feet. No new recommendations for this week.

Lake Okeechobee

Lake Okeechobee stage is 12.99 feet NGVD, increasing 0.69 feet from the previous week and 1.07 feet over the previous two weeks. The Lake stage dropped into the Water Shortage Band on July 19, 2019, moved back into the Beneficial Use sub-band last week, and crossed into the Base Flow sub-band this week. The Lake stage has also moved back into the ecological envelope, which varies seasonally from 12.5 – 15.5 feet NGVD (+/- 0.5 feet), after spending about 215 days below. Lake stage ascension rates remain important to the continued recovery of SAV and EAV (Submerged and Emergent Aquatic Vegetation) 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 18, 2019) shows decreased potential along the northwest shoreline but elevated potential in the northeast region. Cloud cover obscured the eastern shoreline for most of the past week.

Estuaries

Total inflow to the St. Lucie Estuary averaged 2,552 cfs over the past week with no flow coming from Lake Okeechobee. Over the past week, salinity decreased significantly throughout the estuary. Salinity at the US1 Bridge is now in the fair range for adult eastern oysters. Total inflow to the Caloosahatchee Estuary averaged 9,418 cfs over the past week with no flow coming from the Lake. Salinity decreased in the estuary. The 30-day moving average surface salinity is 0.2 at Val I-75 and 0.4 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 7,400 acre-feet. The total amount of inflows to the STAs in WY2020 is approximately 551,000 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 schedules. WCA-1 stage remains slightly above schedule and moved towards the regulation line over the past week. 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. Stages rose unevenly within the WCAs over the last week at the gauges monitored for this report and levels dropped again this week in Northeast Shark River Slough. 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-1, WCA-2A and northeast and central 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 did show a decrease. The flow from the 5 main creeks feeding Florida Bay was consistent with historical average this week but remains below the 25th percentile which was ecologically significant the last time these conditions persisted.

Supporting Information

KISSIMMEE BASIN

Kissimmee Basin Rainfall

The Upper Kissimmee Basin received 2.49 inches of rainfall in the past week and the Lower Basin received 4.16 inches (SFWMD Daily Rainfall Report 8/19/2019).

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: 8/20/2019

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)						
							8/18/19	8/11/19	8/4/19	7/28/19	7/21/19	7/14/19	7/7/19
Lakes Hart and Mary Jane	S-62	274	LKMJ	60.0	R	60.0	**0.0**	0.0	0.1	0.0	0.0	0.1	0.0
Lakes Myrtle, Preston, and Joel	S-57	51	S-57	61.0	R	61.0	**0.0**	0.0	-0.3	-0.7	-0.8	-0.7	-0.9
Alligator Chain	S-60	174	ALLI	63.2	R	63.2	**0.0**	0.1	-0.3	-0.6	-0.7	-0.7	-0.8
Lake Gentry	S-63	246	LKGT	60.8	R	61.0	**-0.2**	-0.1	-0.9	-1.1	-1.4	-1.3	-1.4
East Lake Toho	S-59	973	TOHOE	56.8	R	56.5	**0.3**	0.5	0.0	-0.2	-0.5	-0.7	-0.7
Lake Toho	S-61	2,151	TOHOW, S-61	53.6	R	53.5	**0.1**	0.2	0.0	-0.1	-0.3	-0.4	-0.5
Lakes Kissimmee, Cypress, and Hatchineha	S-65	3,852	KUB011, LKIS5B	51.6	R	51.0	**0.6**	0.2	-0.3	-0.9	-1.1	-1.1	-1.6

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

Lower Kissimmee Basin

Discharges at Lower Basin structures are shown in Table 2. SFWDAT depth maps for the Phase I restoration area are shown in Figure 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: **8/20/2019**

Metric	Location	1-Day Average	Average for the Preceeding 7-Days[1]									
		8/18/2019	8/18/19	8/11/19	8/4/19	7/28/19	7/21/19	7/14/19	7/7/19	6/30/19	6/23/19	6/16/19
Discharge (cfs)	S-65	4,359	**3,852**	2,198	783	777	1,110	548	287	400	106	165
Discharge (cfs)	S-65A[2]	6,389	**5,681**	3,248	1,665	903	1,123	749	387	673	1,014	255
Discharge (cfs)	S-65D[2]	7,732	**5,917**	3,167	1,618	1,378	1,396	1,020	1,288	1,801	975	290
Headwater Stage (feet NGVD)	S-65D[2]	27.07	**26.50**	25.88	25.77	25.79	25.78	25.81	25.70	25.84	25.80	25.84
Discharge (cfs)	S-65E[2]	7,794	**5,871**	3,000	1,495	1,259	1,250	944	1,158	1,606	903	331
Discharge (cfs)	S-67	27	**34**	46	85	93	92	97	92	62	96	22
DO (mg/L)[3]	Phases I & II/III river channel	0.9	**0.5**	0.7	3.2	4.2	3.3	3.3	1.8	0.0	3.0	5.9
Mean depth (feet)[4]	Phase I floodplain	3.23	**2.70**	1.73	0.77	0.52	0.55	0.46	0.46	0.82	0.39	0.13

[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)

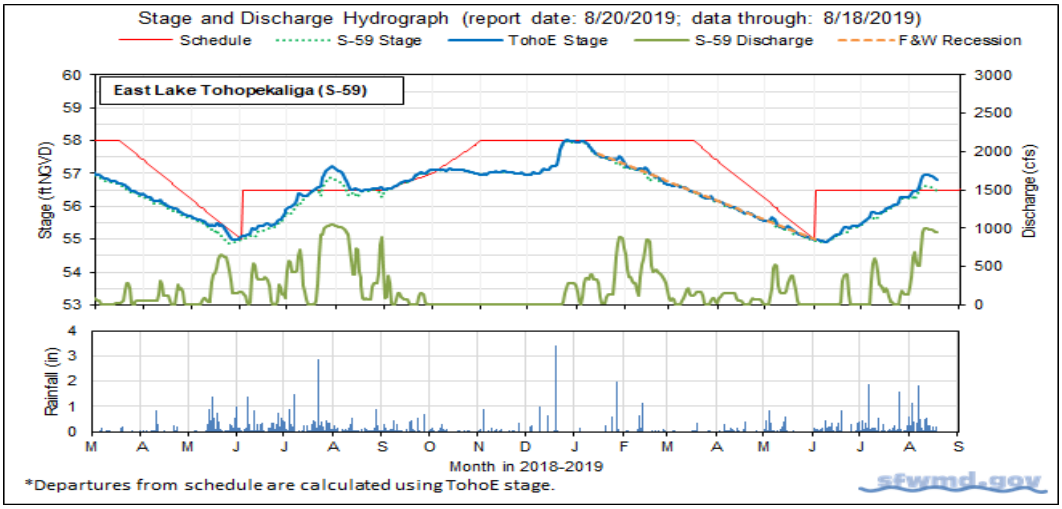


Figure 1.

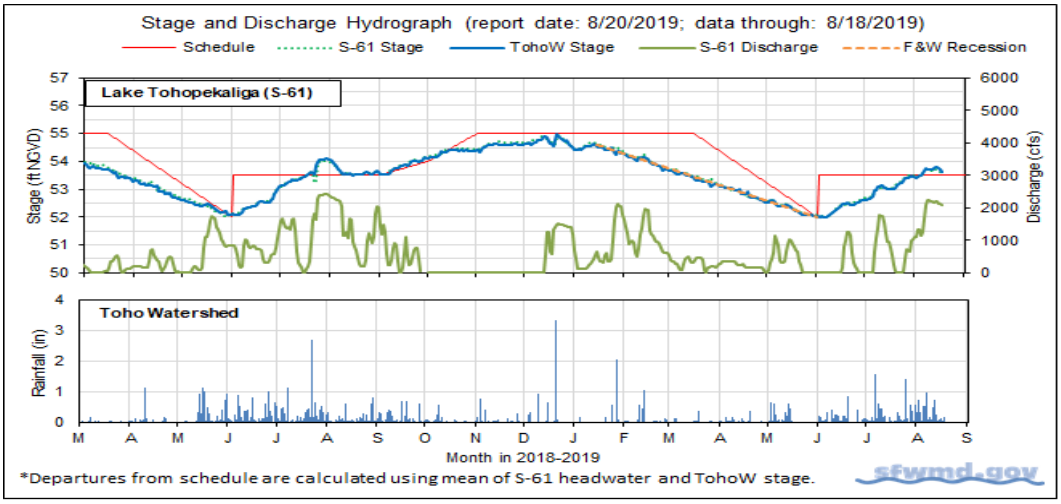


Figure 2.

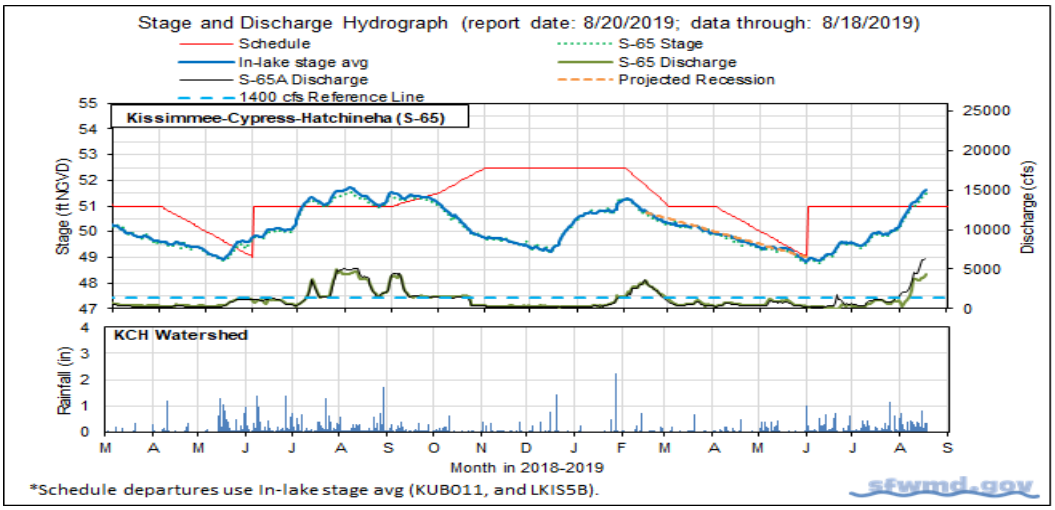


Figure 3.

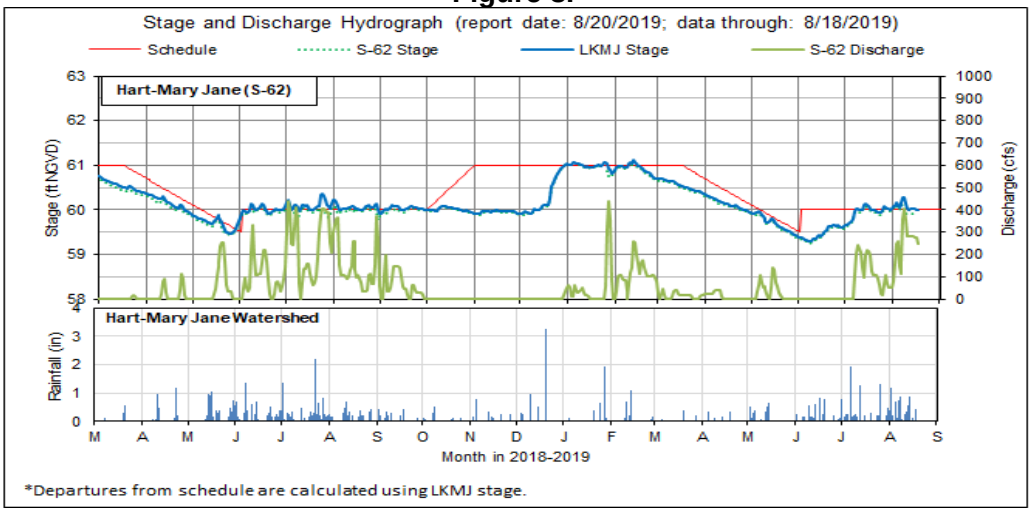


Figure 4.

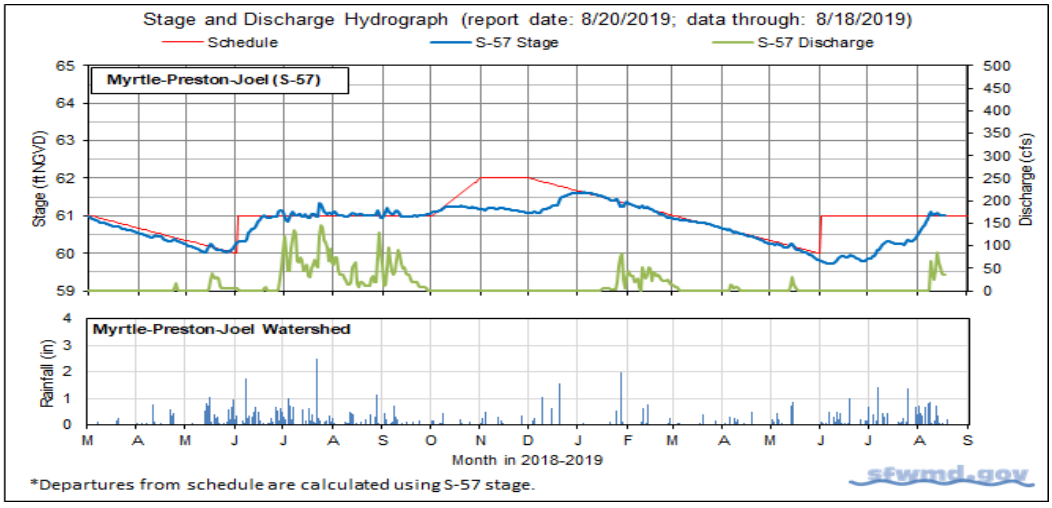


Figure 5.

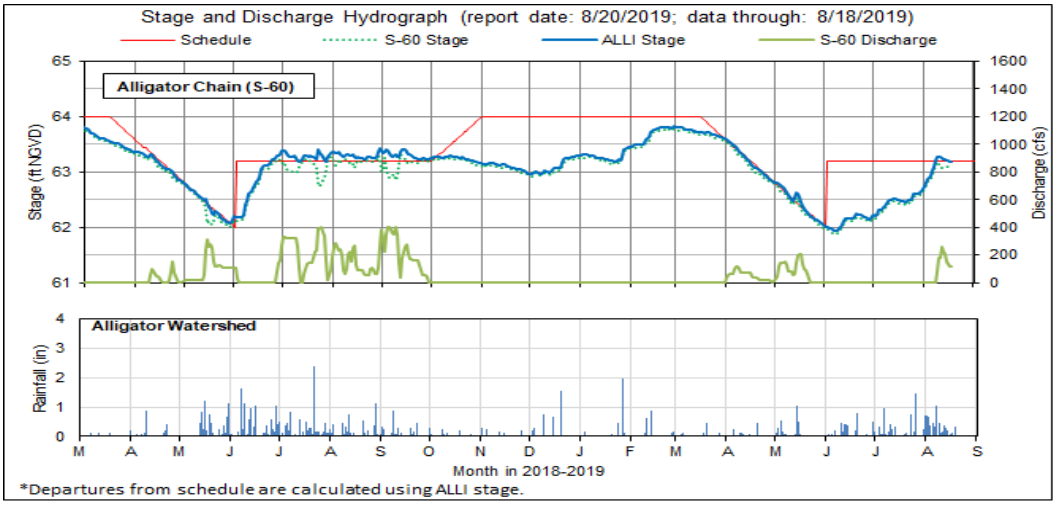


Figure 6.

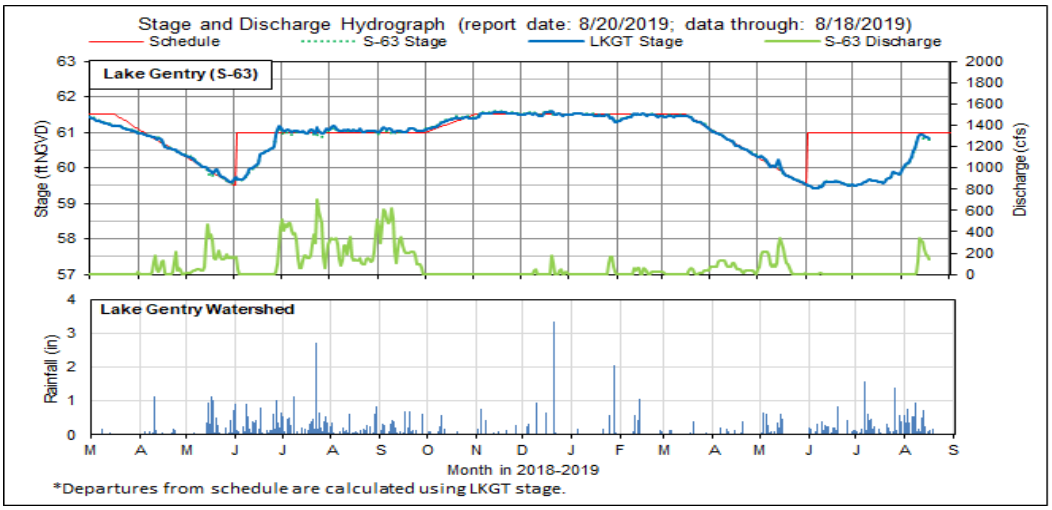


Figure 7.

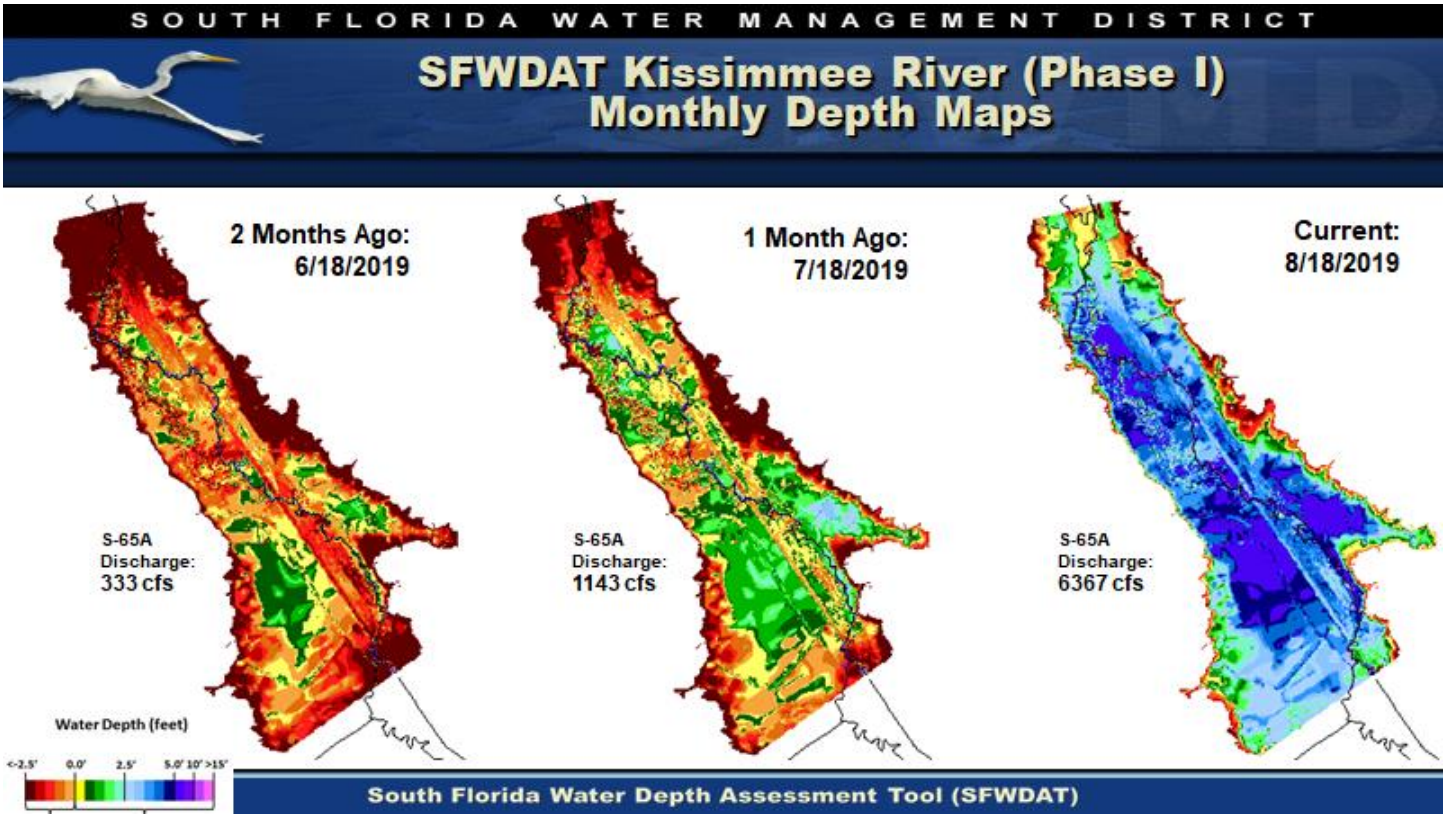


Figure 8. Phase I area floodplain water depths for this week, one month ago, and two months ago. Note that the WDAT color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to January 16, 2012.

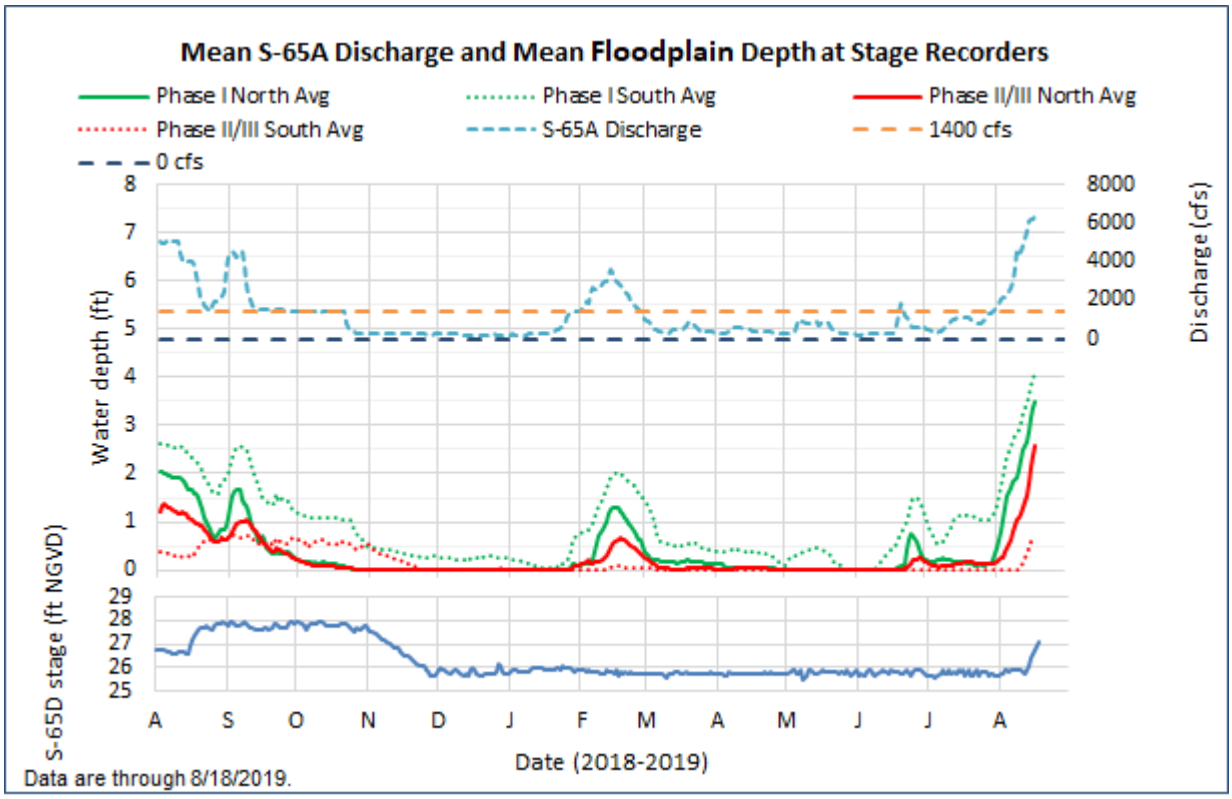


Figure 9. Mean water depth at stage recorders in the northern Phase I, southern Phase I, northern Phase II/III, and southern Phase II/III areas in relation to the S-65A discharge and S-65D headwater stage.

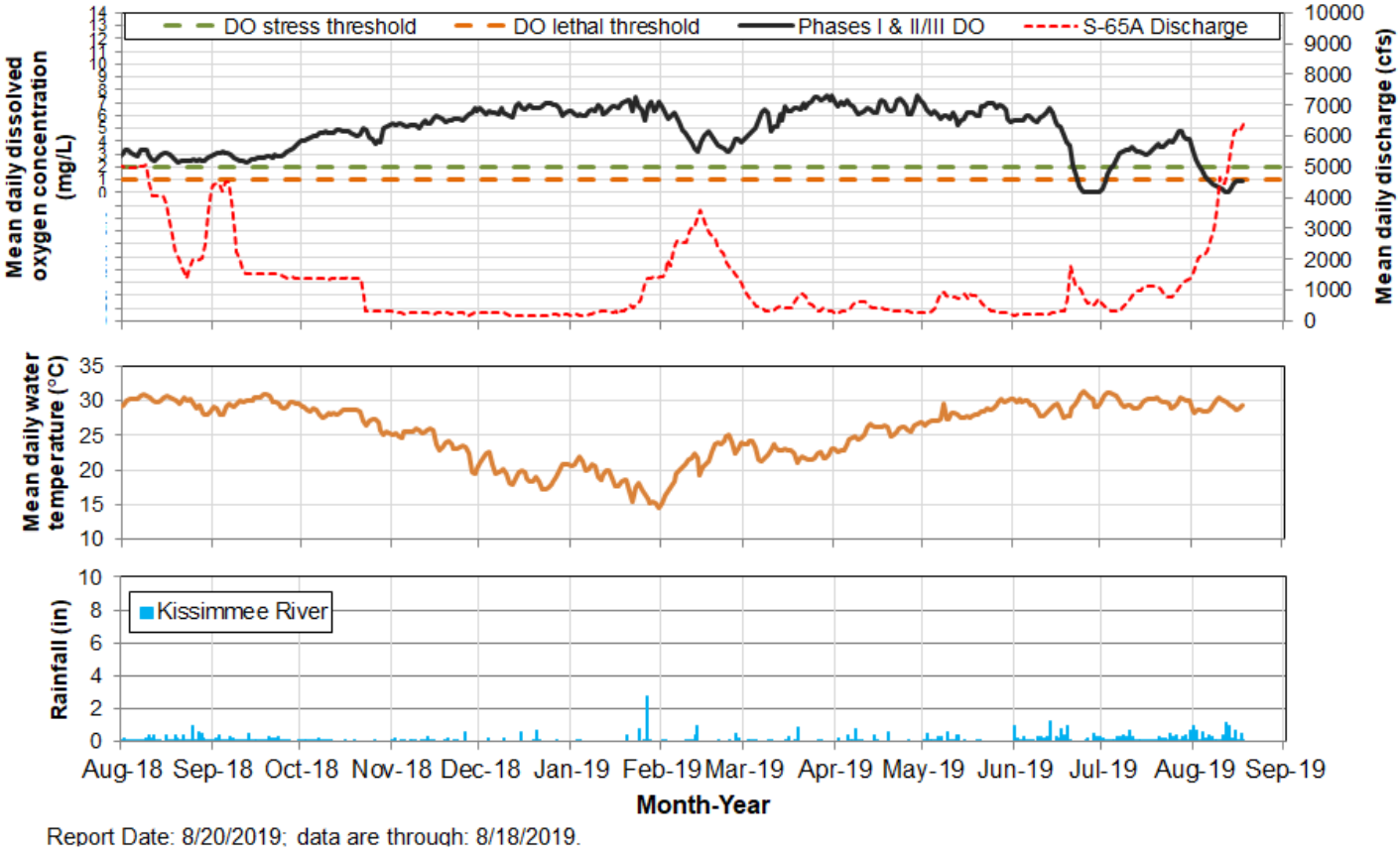


Figure 10. Mean daily dissolved oxygen, discharge, temperature and rainfall in the Phases I/II/III river channel.

Water Management Recommendations

Recommendation Date	Recommendation	Purpose	Outcome	Source	Report Date
8/19/2019	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
6/24/2019	Continue discharge reductions at S-65A at up to double the normal rampdown rate, as possible.	Reduce river channel stage to allow DO recovery.	Implemented	KB Ops	6/25/2019
6/21/2019	Reduce discharge at S-65A to below 1400 cfs as soon as possible.	Reduce chance of DO crash given the need for continued high discharge.	Implemented	KB Ops	6/25/2019
6/19/2019	Start flood control measures as headwater stage at S-65A reaches 47 ft	Avoid flooding in Pool A.	Implemented (flow increased to 2000 cfs)	SFWMD Water Management/KB Ops	6/25/2019
6/17/2019	If needed, double rates of discharge increase for S-65/S-65A up to 150 cfs/day.	Slow rate of rise in KCH if necessary.	TBD	KB Ops	6/18/2019
6/17/2019	Increase flow at S-61.	Slow Lake Toho ascension rate	Implemented	KB Ops	6/18/2019
6/13/2019	Increase discharge at S-65A. Double the rate of discharge increase if necessary to maintain headwater at S-65A.	Purpose: Control stage in Pool A due to heavy rain overnight in Pool A basin.	Implemented	Water Management/KB Ops	6/18/2019
6/1/2019	Begin implementation of the 2019 Wet Season Discharge Plan for S-65/S-65A (see figure).	Provide variable flow from S-65/S-65A to balance Kissimmee River and Headwaters Lakes objectives, including Kissimmee River floodplain inundation, moderate rates of change in discharge, and controlled rate of stage rise in the lakes.	Planned	KB Ops	6/11/2019

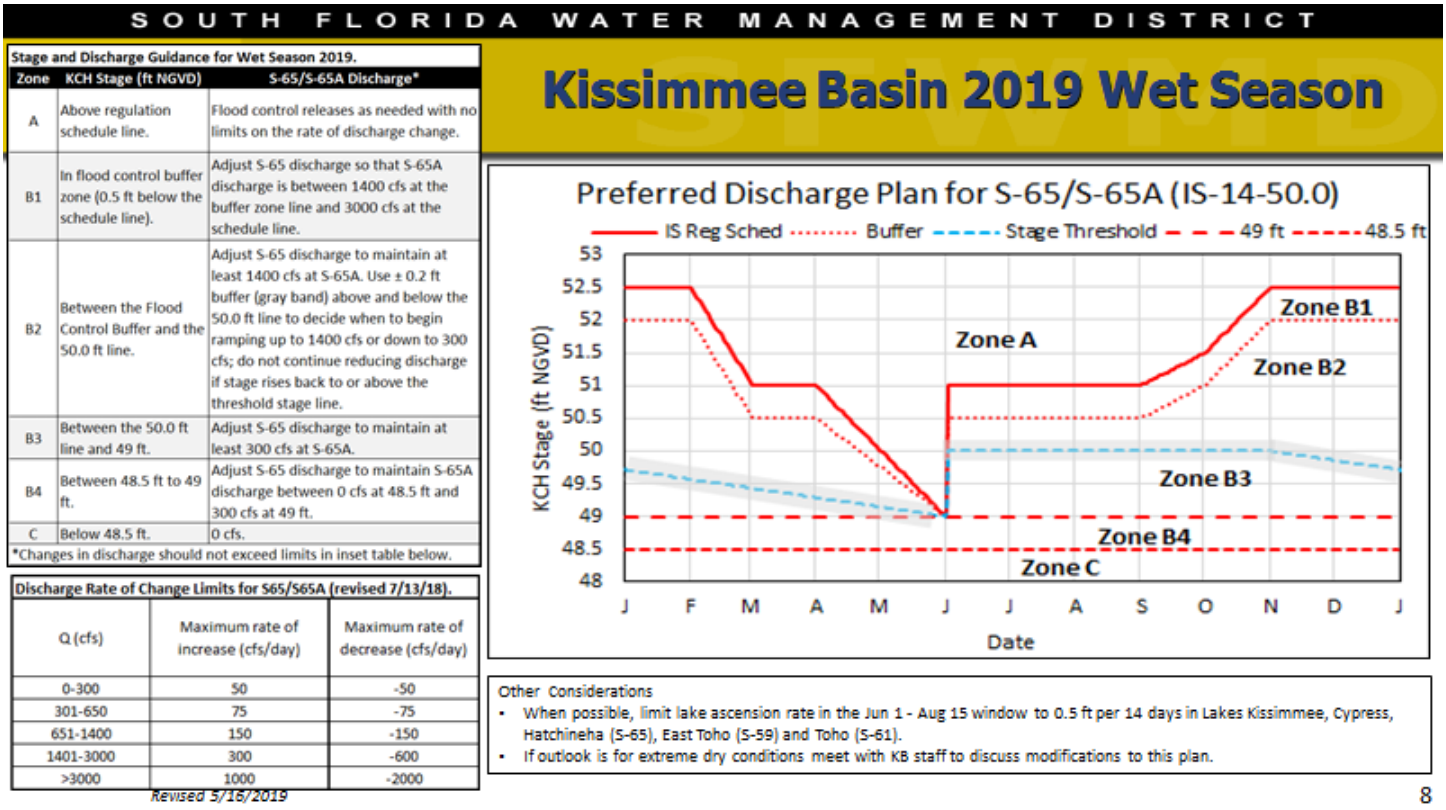


Figure 11. The 2019 Wet Season Discharge Plan for S-65/S-65A.

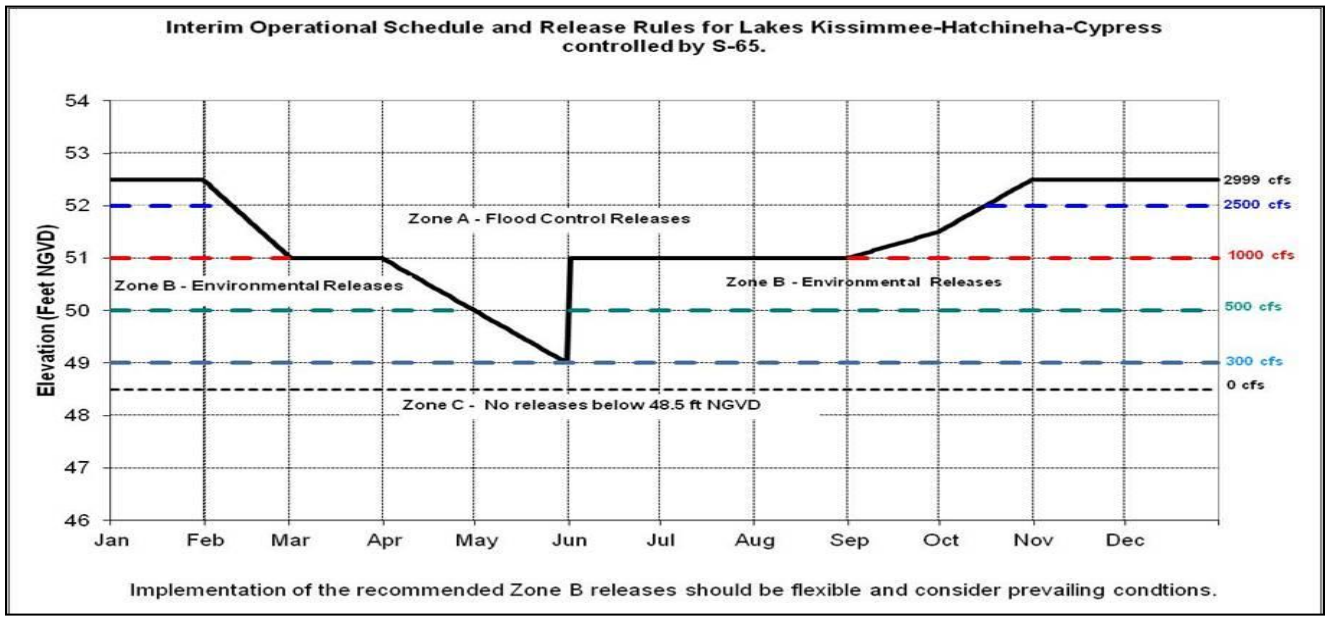


Figure 12. Interim operations schedule for S-65. The discharge schedule shown to the right has not been used in recent years.

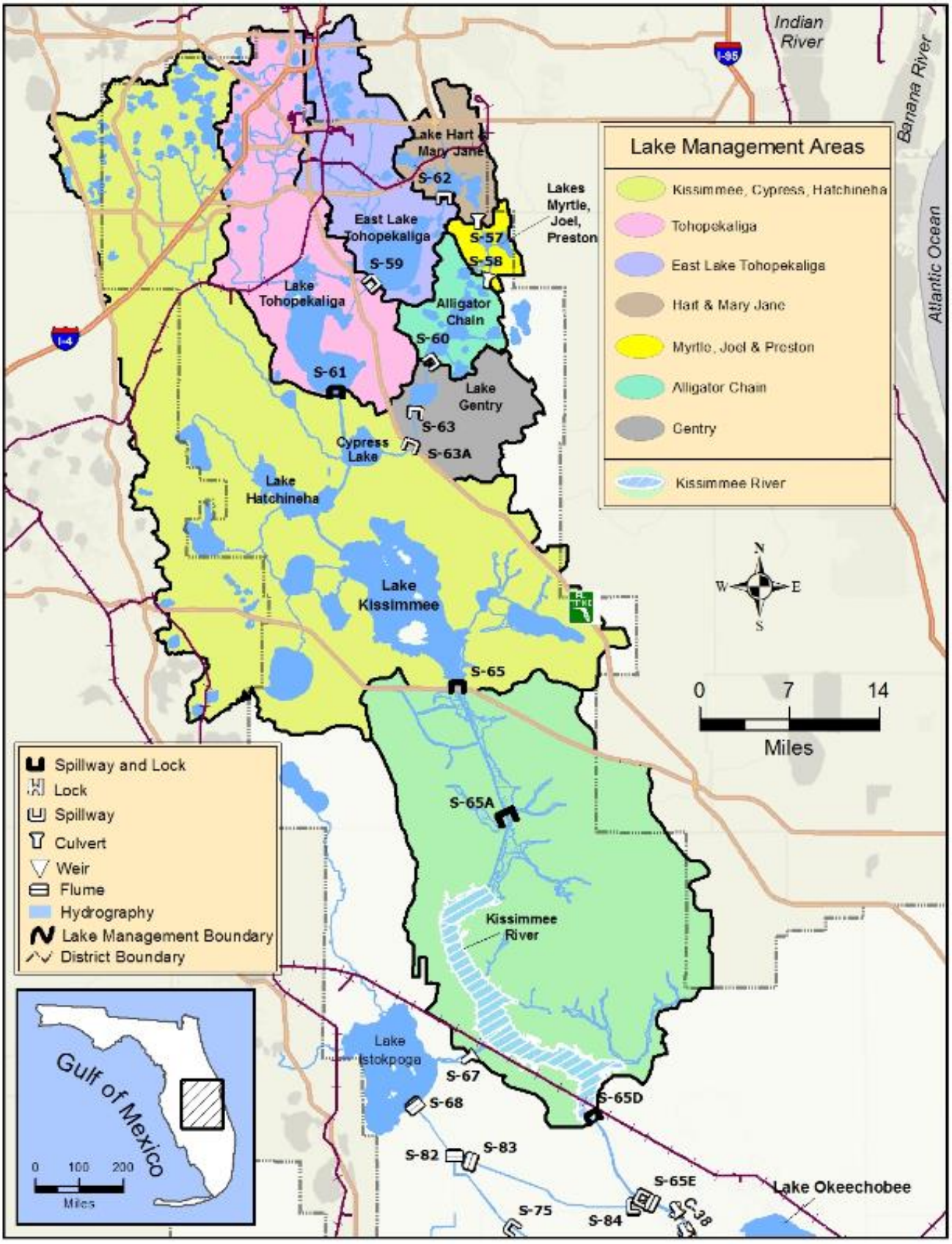


Figure 13. The Kissimmee Basin.

LAKE OKEECHOBEE

According to the USACE web site, Lake Okeechobee average daily lake stage is at 12.99 feet NGVD for August 18, 2019 increasing 0.69 feet from the previous week. This value is based on the use of three interior lake stations (L001, L006 and LZ40) and three perimeter stations (S-308, S-4 and S-133). Stations L005 and S-352 have been inactive for several weeks. The Lake is now 1.56 feet higher than a month ago and 1.59 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, moved back into the Beneficial Use sub-band in the previous week, but is now back 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 12 to August 18, 2019, 2.68 inches of rain fell directly over the Lake, compared to 2.13 inches the previous week. Most of the watershed received similar amounts of rainfall, between 1.5 – 5.0 inches (Figure 5).

The average daily inflows (minus rainfall) to the Lake more than doubled from the prior week, going from 5,568 cfs to 12,478 cfs. The inflows from the Kissimmee River (S-65E) almost doubled, going from 3,258 cfs to 6,203 cfs, while those from Lake Istokpoga (via S-84 and S71) increased from 1,484 cfs to 4,306 cfs. C-44 canal stages were regulated through the S-308 structure, resulting in an average daily backflow of 419 cfs into the lake, down from 490 cfs the previous week. Passive backflow from the L-8 at Canal Point (via CLV10A) increased from 124 cfs the past week to 285 cfs this week, while pumping from the various S-100 pumps doubled from 595 cfs to 1,356 cfs (Table 1).

Outflows from the Lake were negative, as noted above through the S-308 structure. 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 increased from the previous week to 0.12 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 18, 2019) using NOAA's cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3(a&b) OLCI sensor data showed bloom potential may be decreasing along the northwest shoreline but remains elevated in northern portions of the lake (Figure 7). Cloud cover obscured most of the eastern side of the lake most of the week.

Water Management Recommendations

Lake Okeechobee stage is 12.99 feet NGVD, increasing 0.69 feet from the previous week and 1.07 feet over the previous two weeks. The Lake dropped into the Water Shortage Band on July 19, 2019, moved back into the Beneficial Use sub-band last week, and crossed into the Base Flow sub-band this week. The Lake has also moved back into the ecological envelope, which varies seasonally from 12.5 – 15.5 feet NGVD (+/- 0.5 feet), after spending about 215 days below. Lake stage ascension rates remain important to the continued recovery of SAV and EAV (Submerged and Emergent Aquatic Vegetation) 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 18, 2019) shows decreased potential along the northwest shoreline but elevated potential in the northeast region. Cloud cover obscured the eastern shoreline for most of the past week.

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	3258	6203	2.8
S-71 & S-72	642	1981	0.9
S-84 & S-84X	841	2325	1.0
Fisheating Creek	197	327	0.1
S-154	99	194	0.1
S-191	218	624	0.3
S-133 P	156	212	0.1
S-127 P	77	169	0.1
S-129 P	21	57	0.0
S-131 P	19	48	0.0
S-135 P	5	52	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	124	285	0.1
Rainfall	4599	5991	2.7
Total	**10256**	**18469**	**8.3**

OUTFLOWS	Previous week Avg Daily CFS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)
S-77	0	0	0.0
S-308	-490	-419	-0.2
S-351	0	0	0.0
S-352	0	0	0.0
S-354	0	0	0.0
L-8 Outflow			
ET	3331	1912	0.9
Total	**2841**	**1493**	**0.7**

Provisional Data

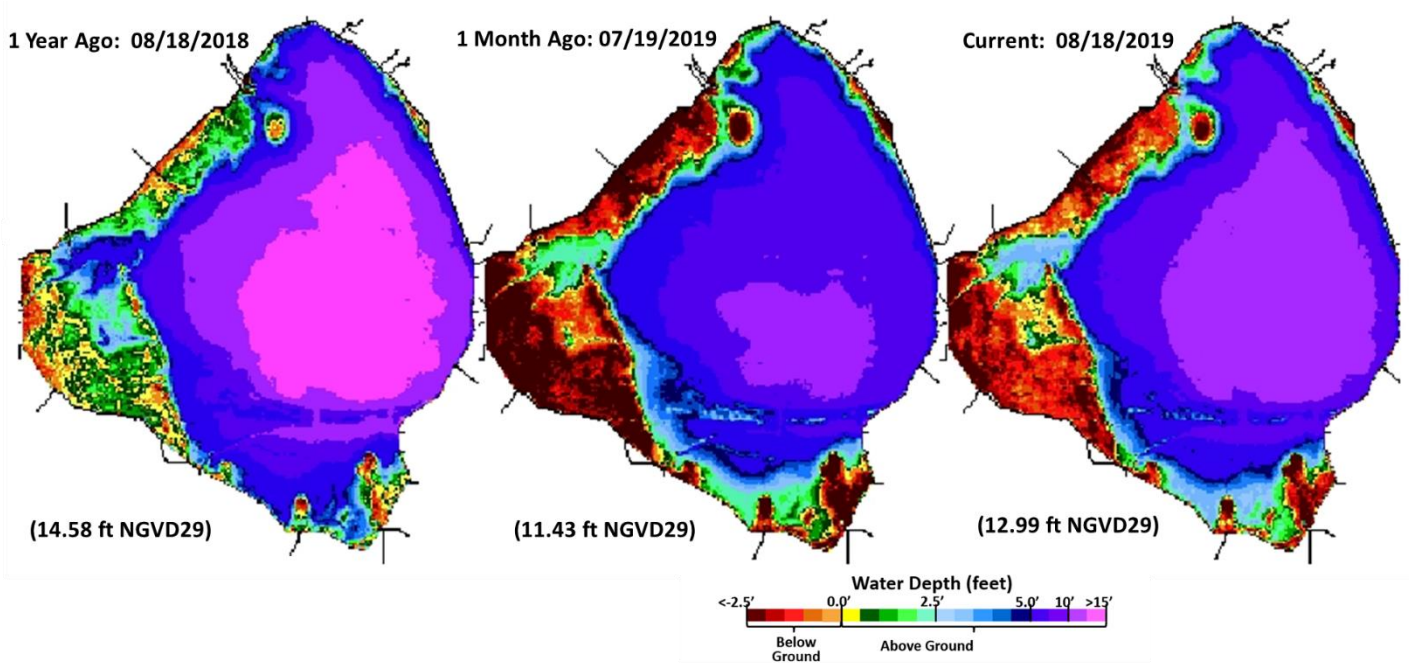


Figure 1. Water depth estimates on Lake Okeechobee based on the South Florida Water Depth Assessment Tool.

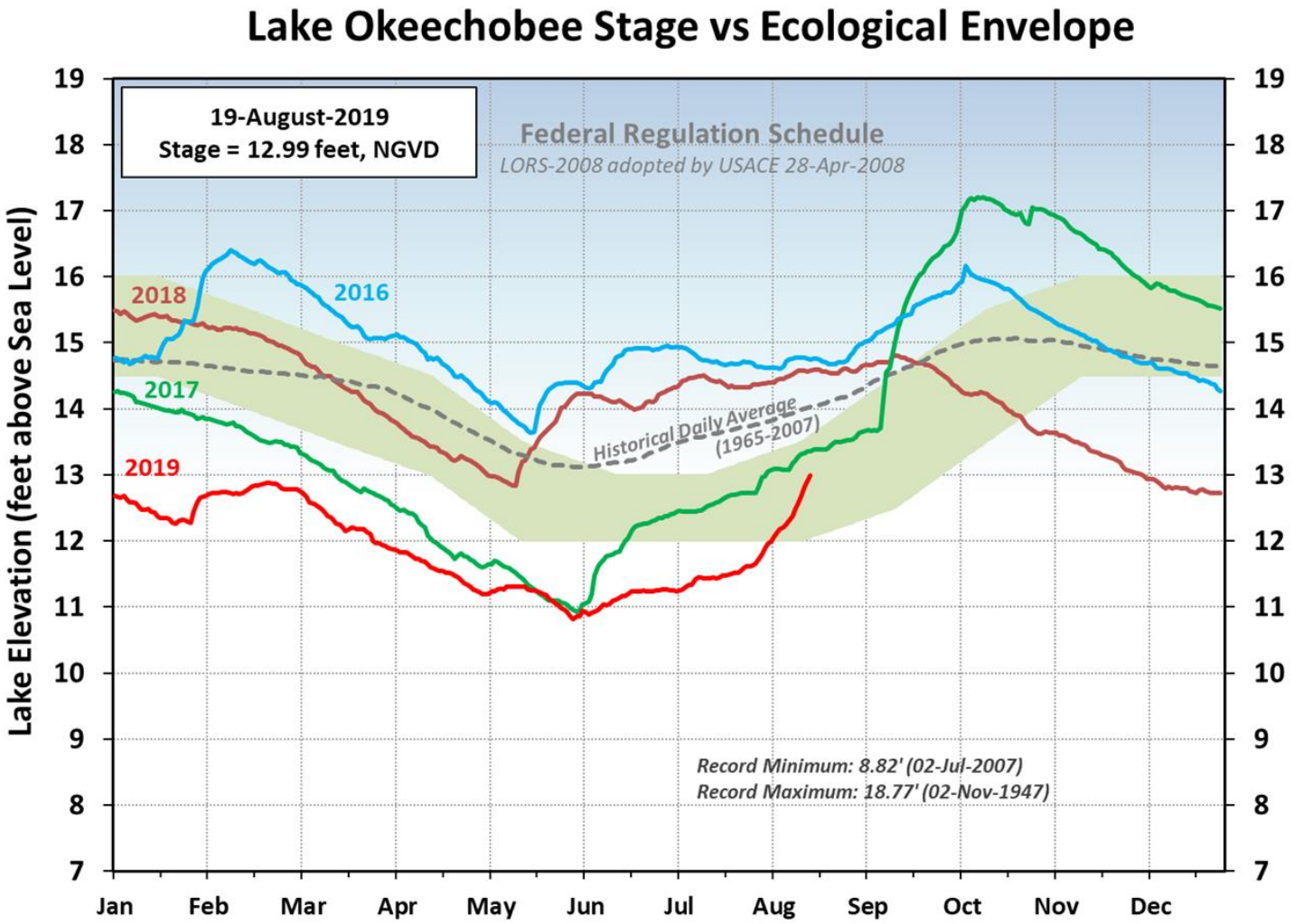


Figure 2. Select annual stage hydrographs for Lake Okeechobee in comparison to the Ecological Envelope.

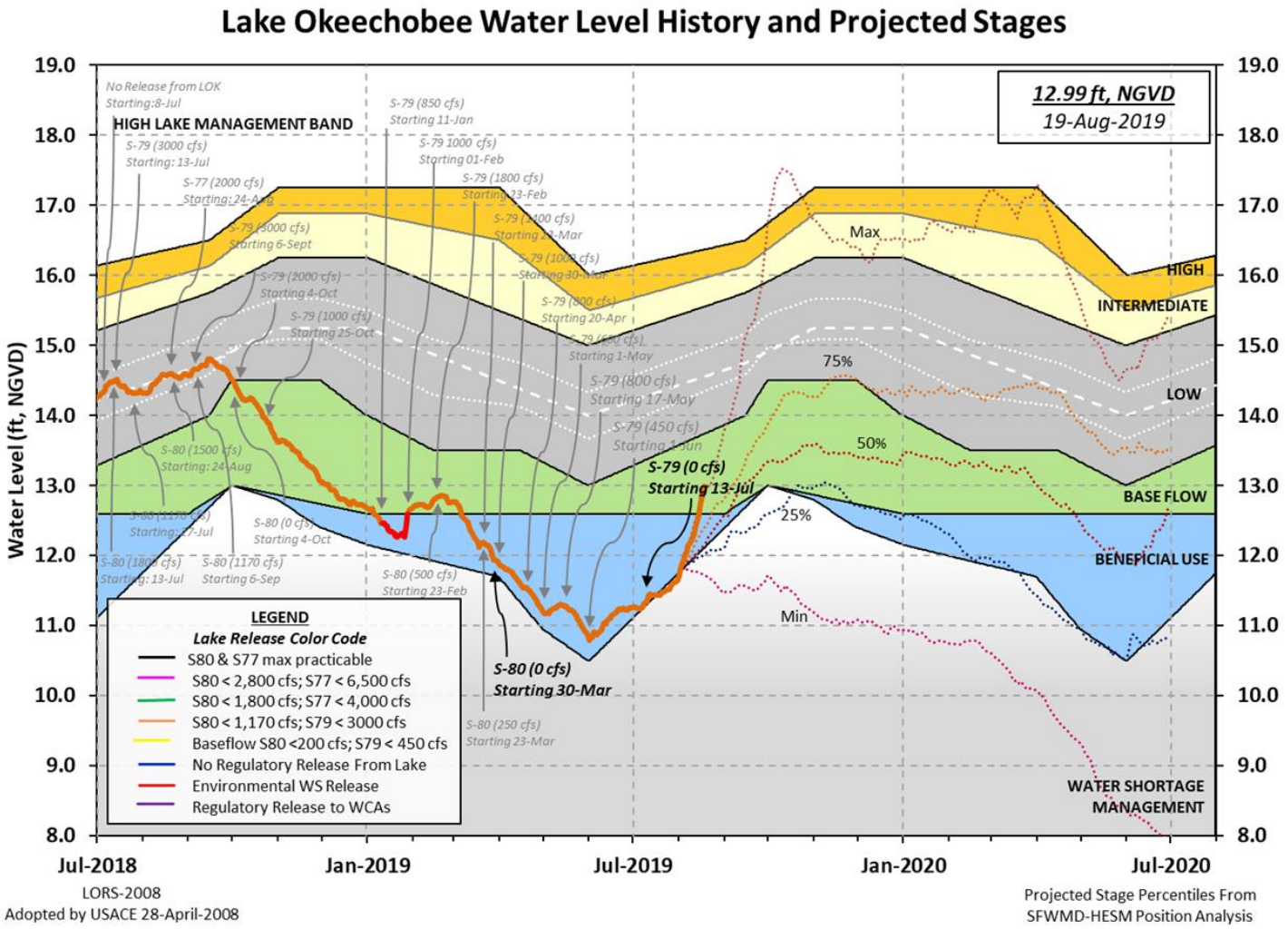


Figure 3. Recent Lake Okeechobee stage and releases, with projected stages based on a dynamic position analysis.

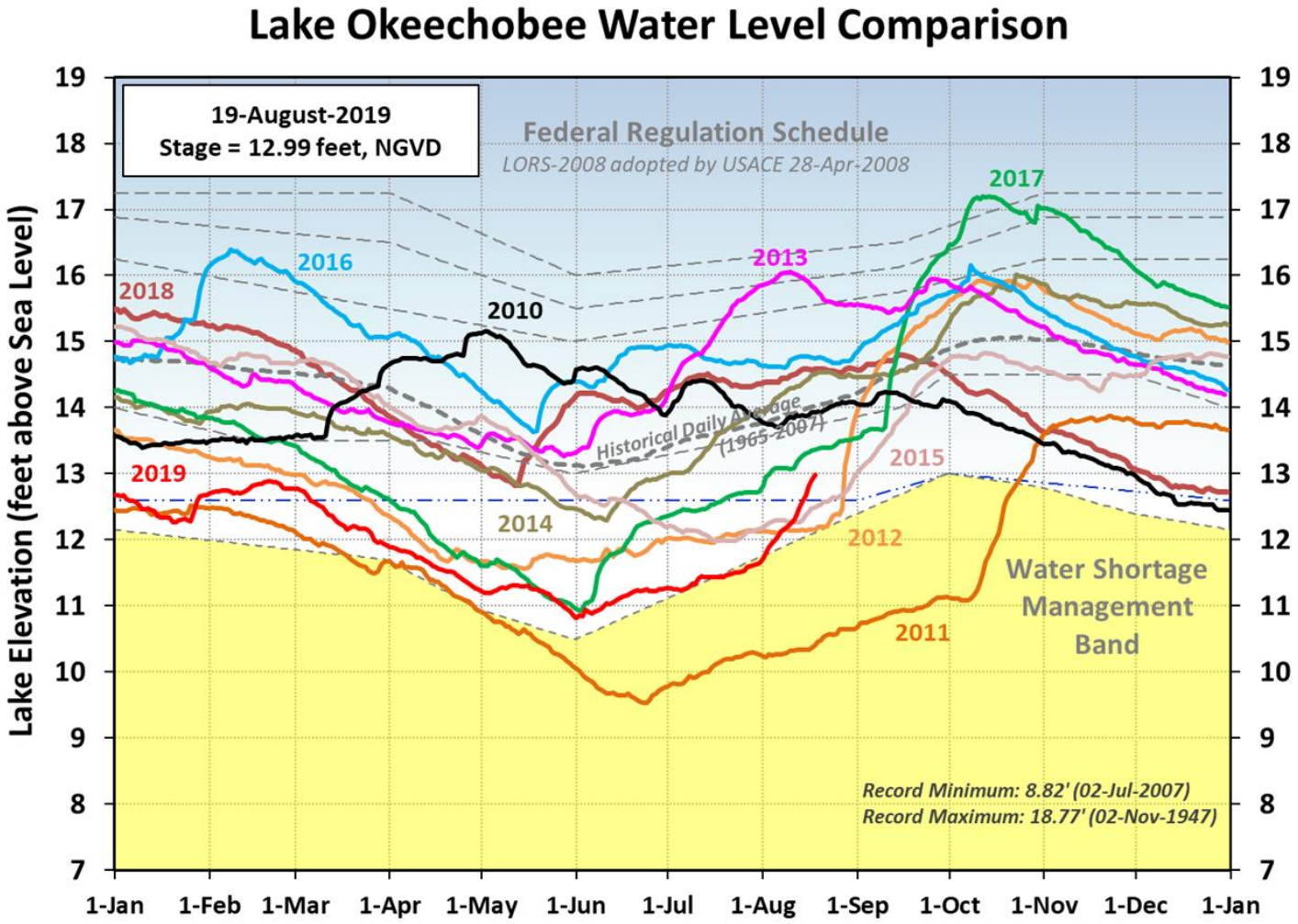


Figure 4. Select annual stage hydrographs for Lake Okeechobee from 2010 – 2019.

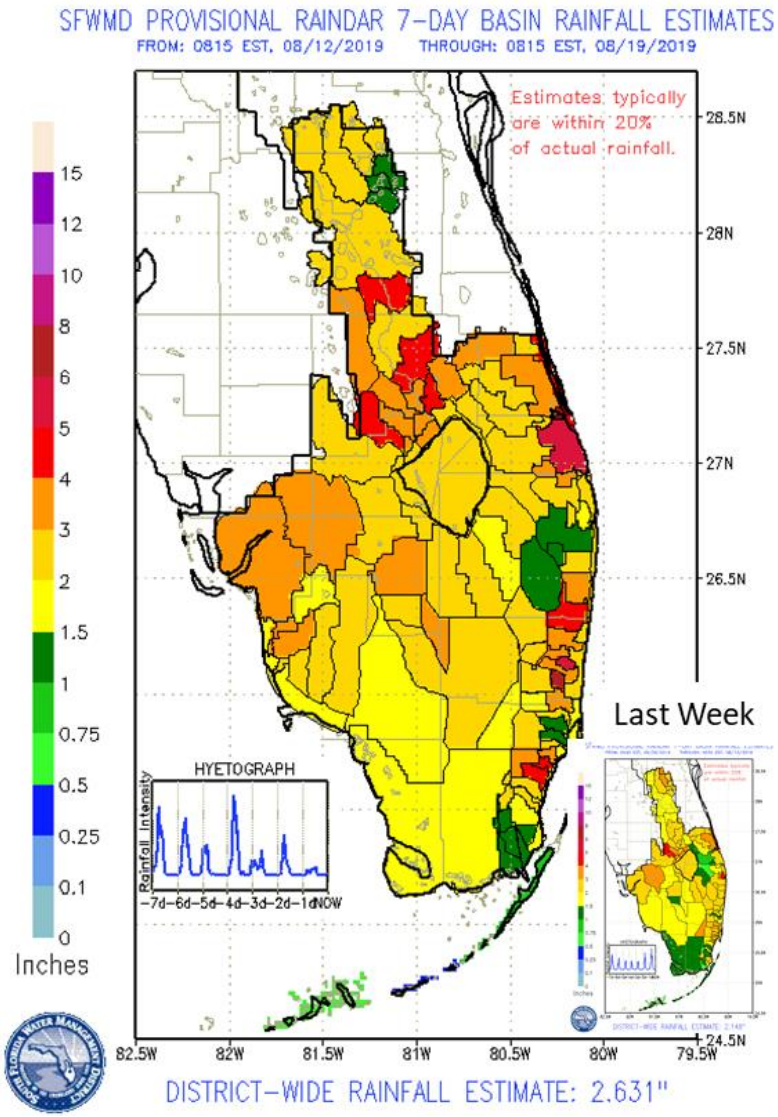


Figure 5. Rainfall estimates by basin.

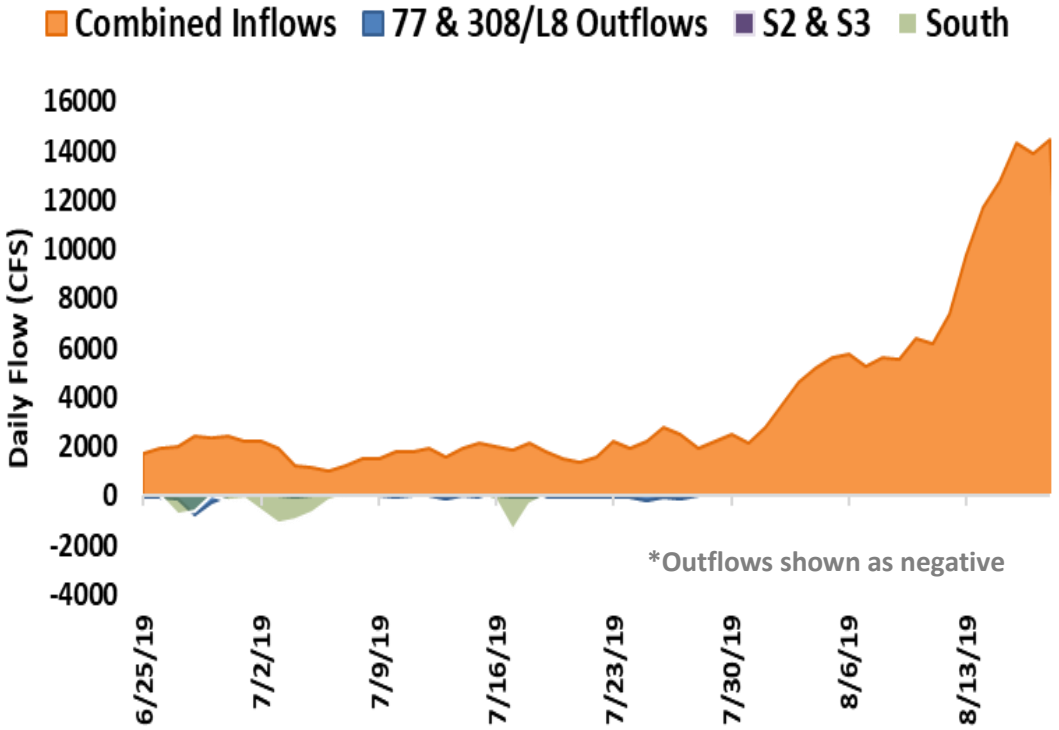


Figure 6. Major inflows (orange) and outflows (blue) of Lake Okeechobee, including the S-350 structures designated as South (green). The L-8 Canal flows through Culvert 10A are included as outflows when positive, and as inflows when backflowing into the lake. All inflows and outflows are shown as positive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

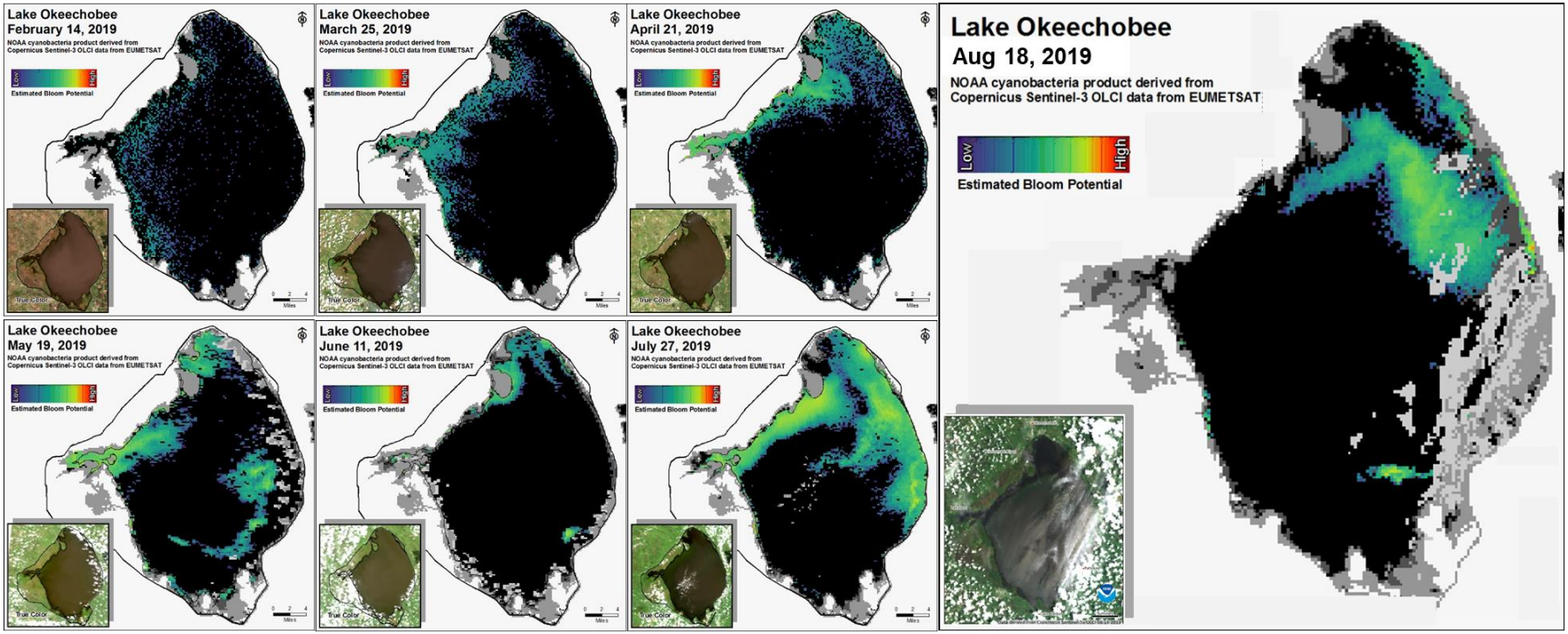


Figure 7. Potential for cyanobacterial blooms on Lake Okeechobee in 2019, based on NOAA's harmful algal bloom monitoring system derived from Copernicus Sentinel-3 OLCI data from EUMETSAT. Gray indicates cloud cover.

ESTUARIES

St. Lucie Estuary:

Last week total inflow to the St. Lucie Estuary averaged approximately 2,552 cfs (Figures 1 and 2) and last month inflow averaged about 1,657 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	1454
S-80	0
S-308	-396
S-49 on C-24	590
S-97 on C-23	291
Gordy Rd. structure on Ten Mile Creek	217

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 13.6. Salinity conditions in the middle estuary are 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** (6.6)	**9.5** (13.8)	NA[1]
US1 Bridge	**6.9** (11.8)	**8.9** (14.5)	10.0-26.0
A1A Bridge	**14.3** (20.2)	**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 9,418 cfs (Figures 5 and 6) and last month inflow averaged about 5,945 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	1,987
S-79	7,293
Tidal Basin Inflow	2,125

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 0.4 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)	**0.3** (0.3)	NA
Cape Coral	**0.3** (~6.5)	**0.3** (EM)	10.0-30.0
Shell Point	**EM**[3](EM)	**11.7** (15.1)	10.0-30.0
Sanibel	**20.7** (23.3)	**23.8** (25.7)	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 salinity ranging from 0.3 to 0.3 at the end of the next two weeks for pulse release at S-79 ranging from 0 to 800 cfs and Tidal Basin inflows of 1,400 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	1,400	0.3	0.3
B	300	1,400	0.3	0.3
C	450	1,400	0.3	0.3
D	650	1,400	0.3	0.3
E	800	1,400	0.3	0.3

Red tide

The Florida Fish and Wildlife Research Institute reported on August 16, 2019, that *Karenia brevis, the Florida red tide dinoflagellate,* was not observed in samples collected from Lee, Palm Beach, or Miami Dade counties (no samples from St. Lucie, Martin or Broward counties).

Water Management Recommendations

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.

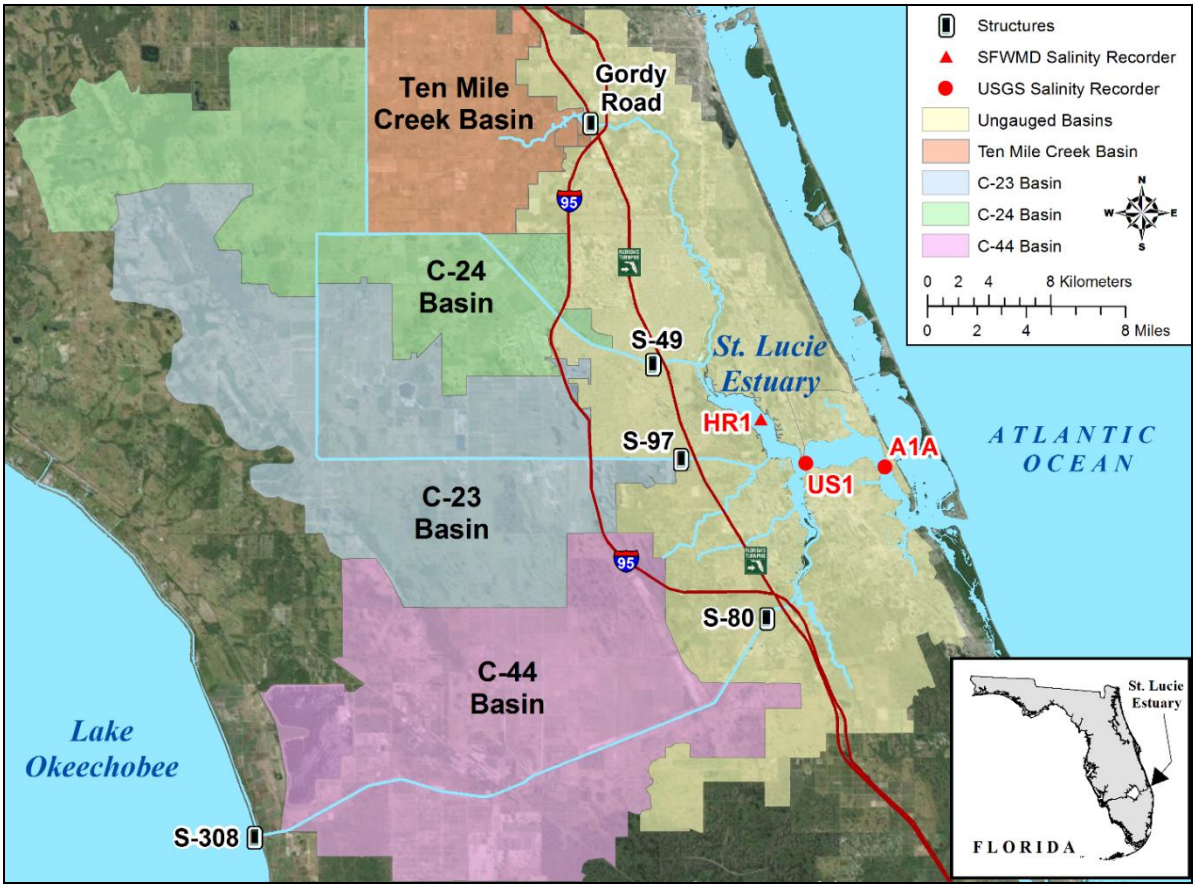


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

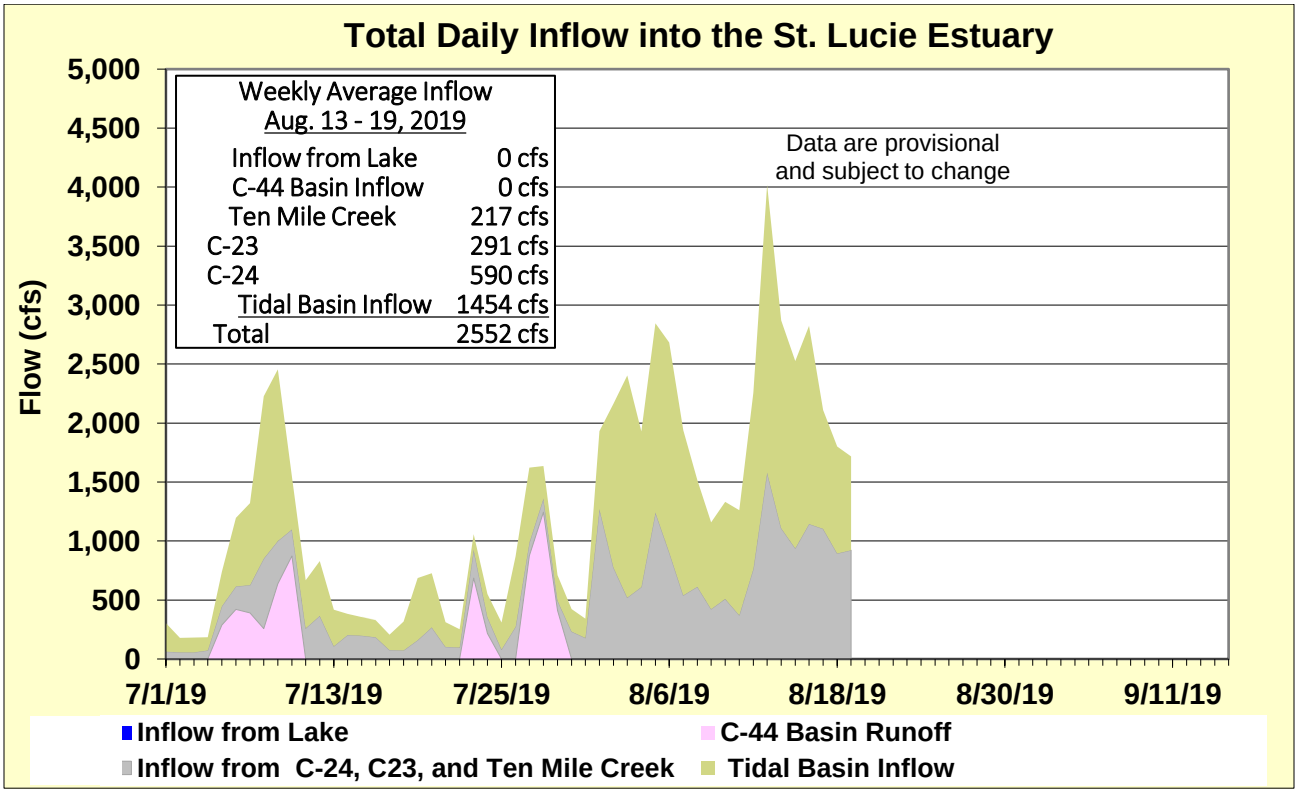


Figure 2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basins into the St. Lucie Estuary.

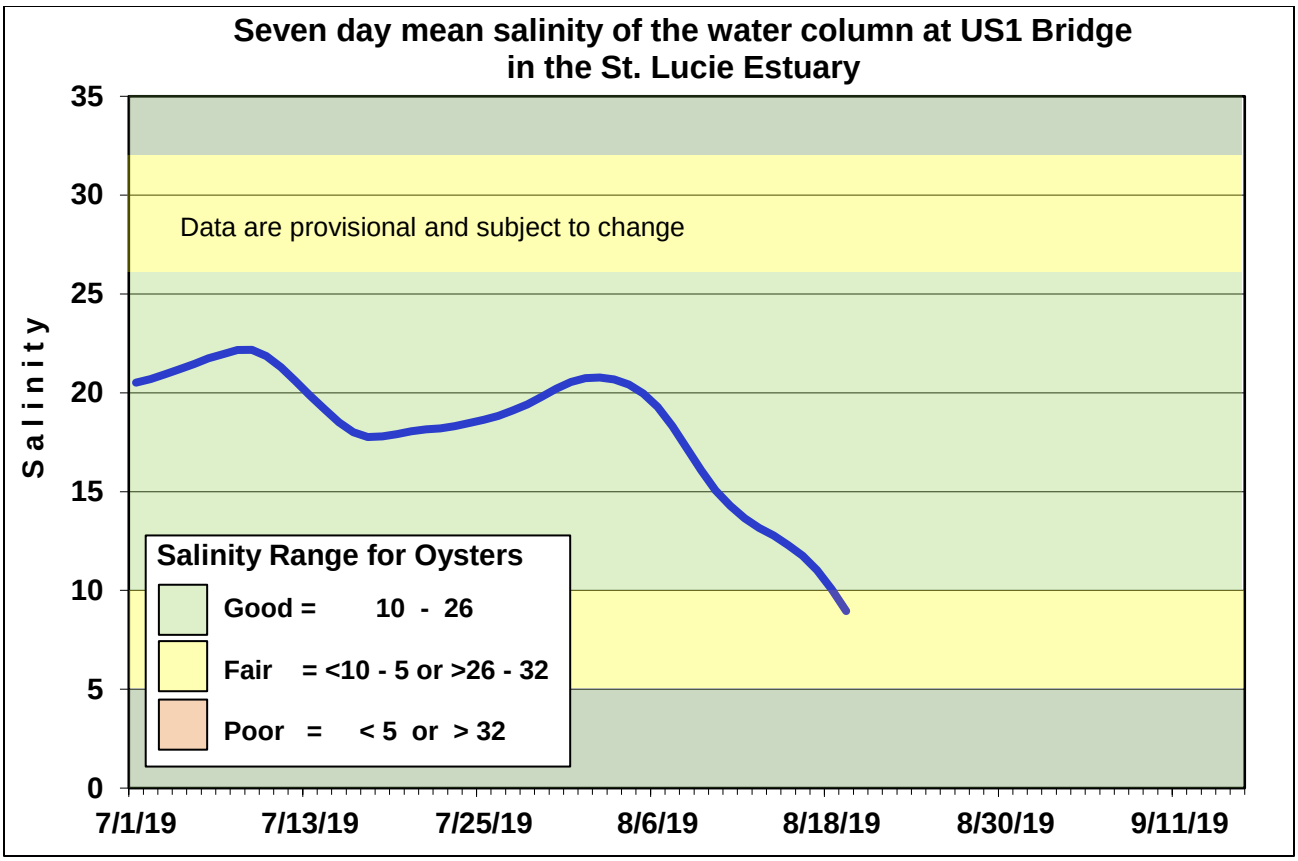


Figure 3. Seven-day mean salinity of the water column at the US1 Bridge.

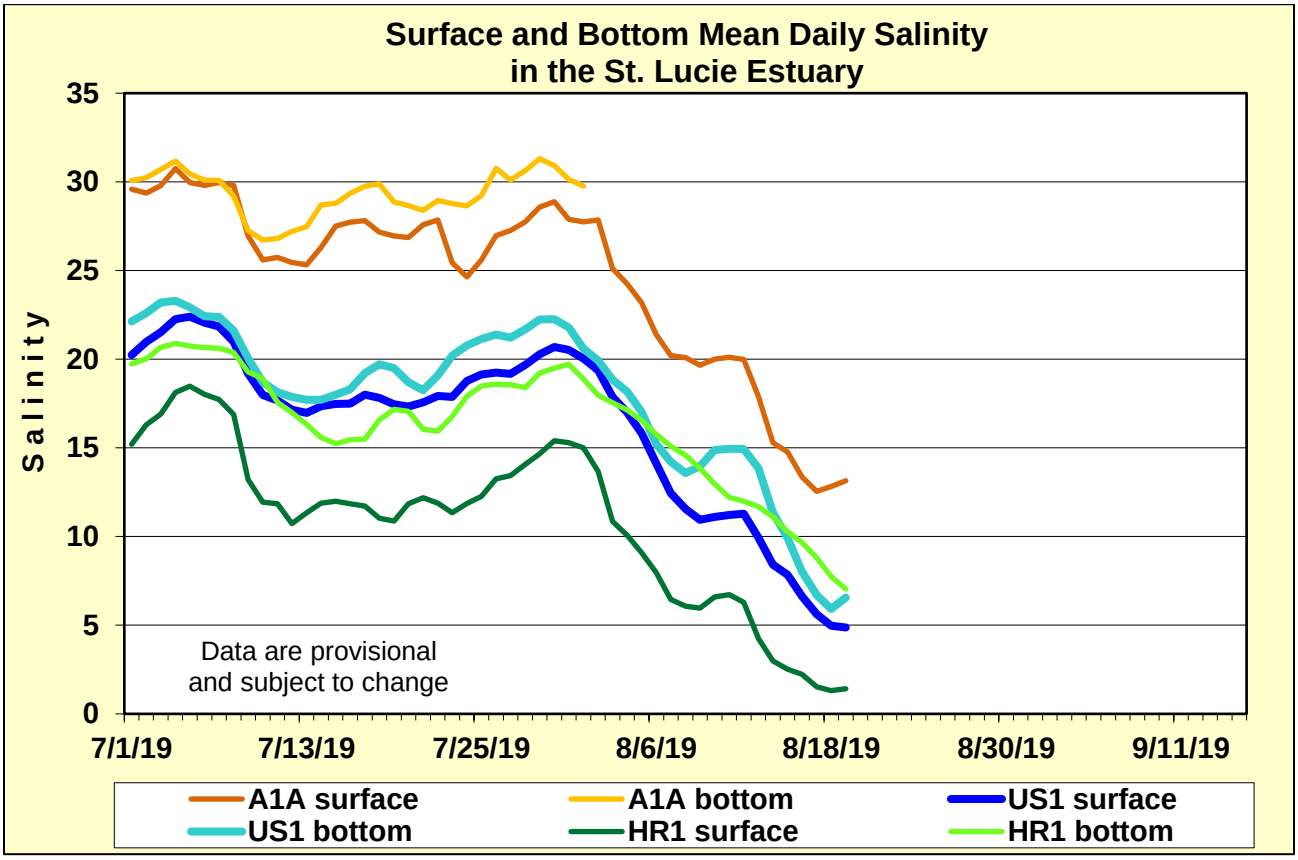


Figure 4. Daily mean salinity at the A1A, US1 and estimated HR1 stations.

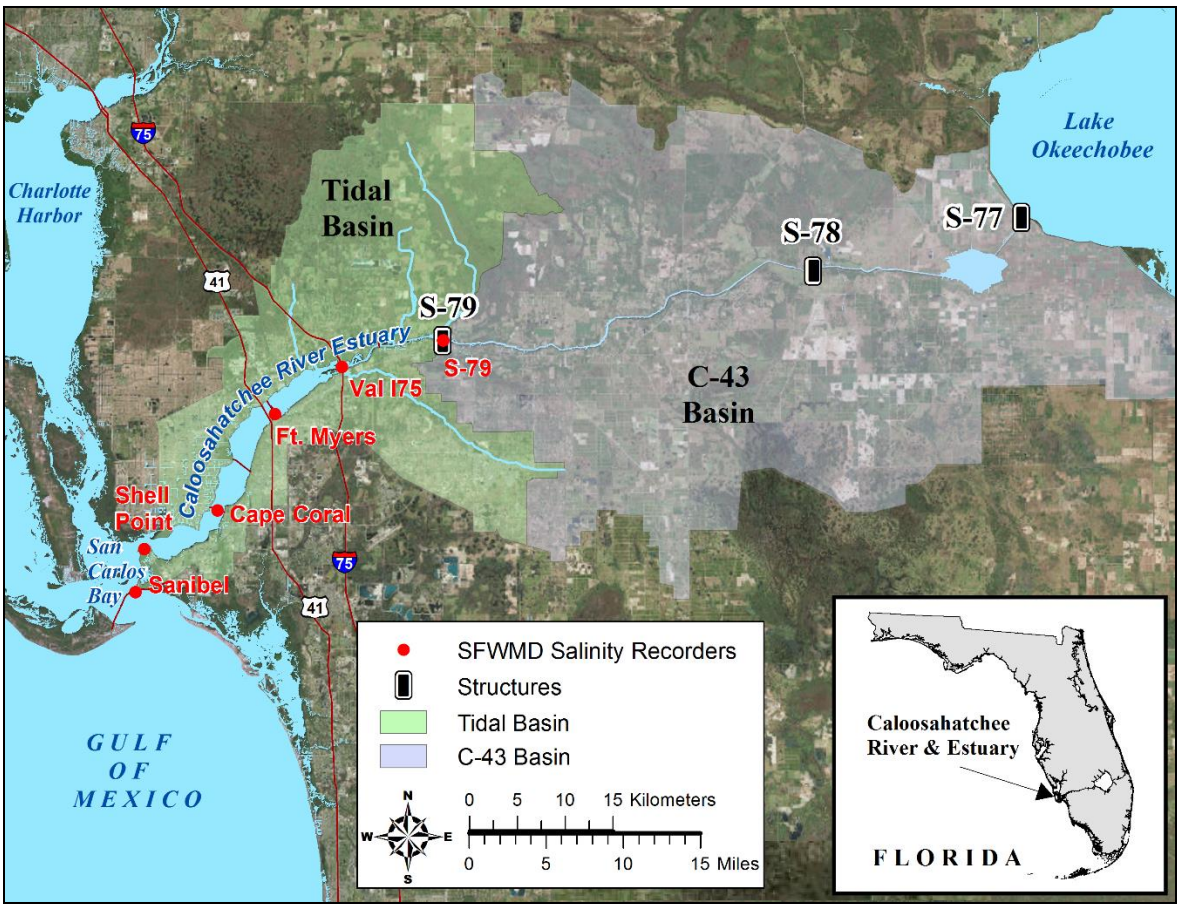


Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

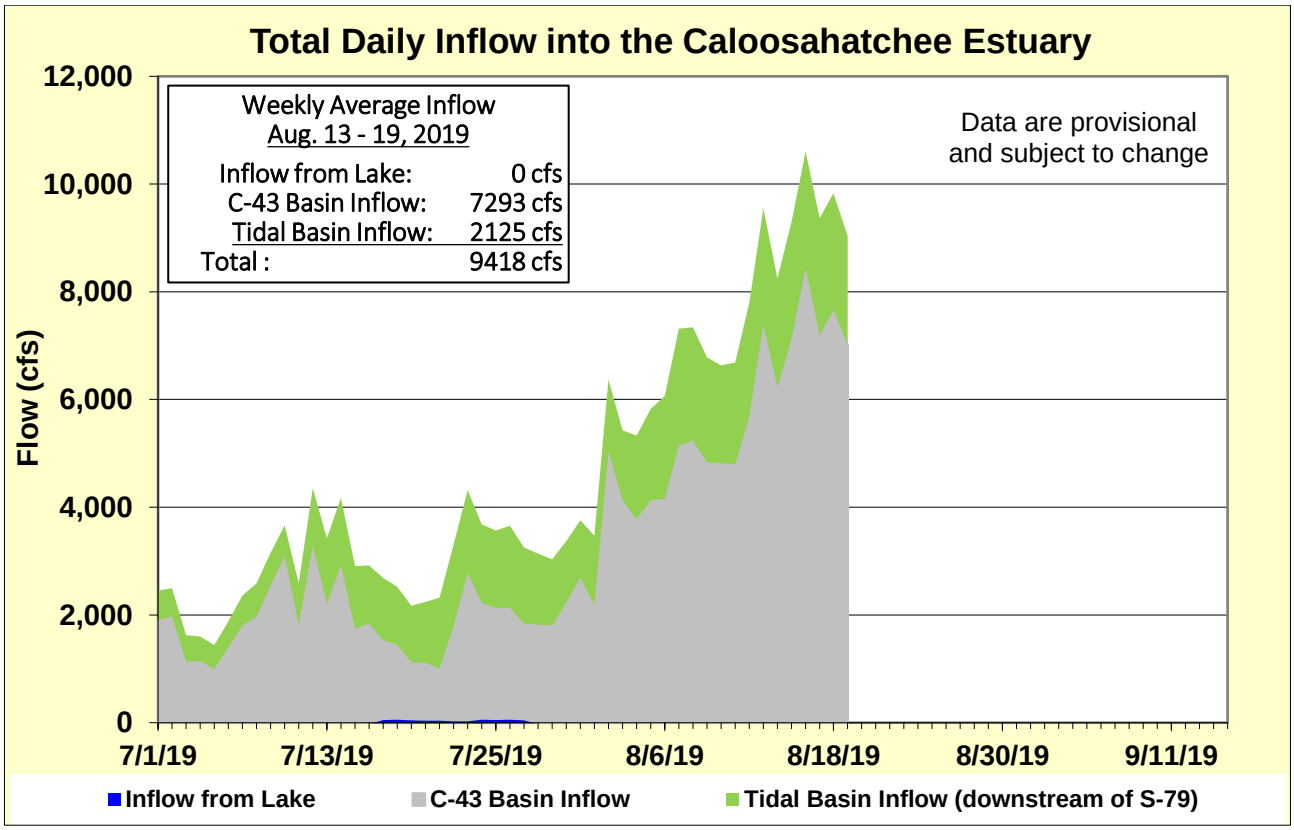


Figure 6. Total daily inflows from Lake Okeechobee, runoff from the C-43 basin, and tributaries in the tidal basin into the Caloosahatchee River Estuary.

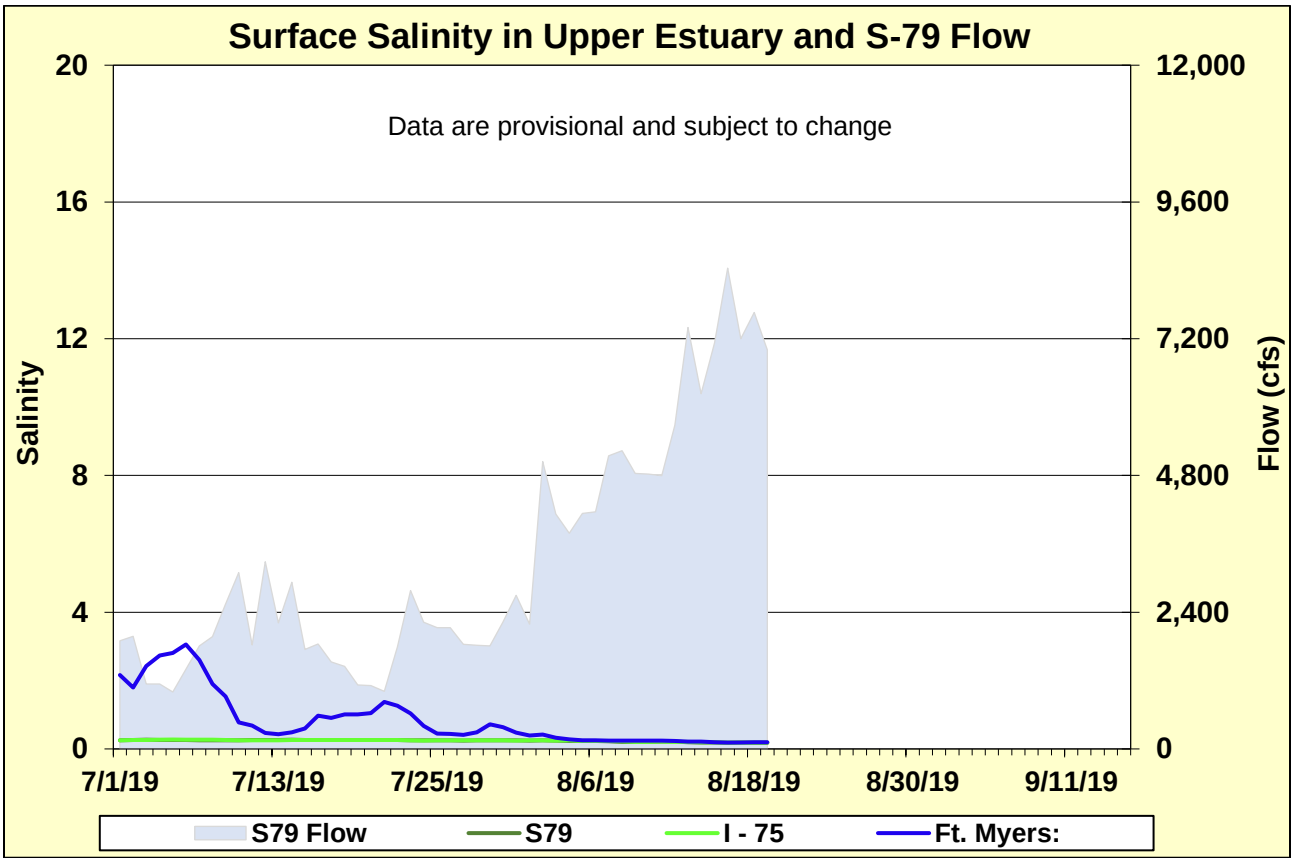


Figure 7. Daily mean flows at S-79 and salinity at upper estuary monitoring stations.

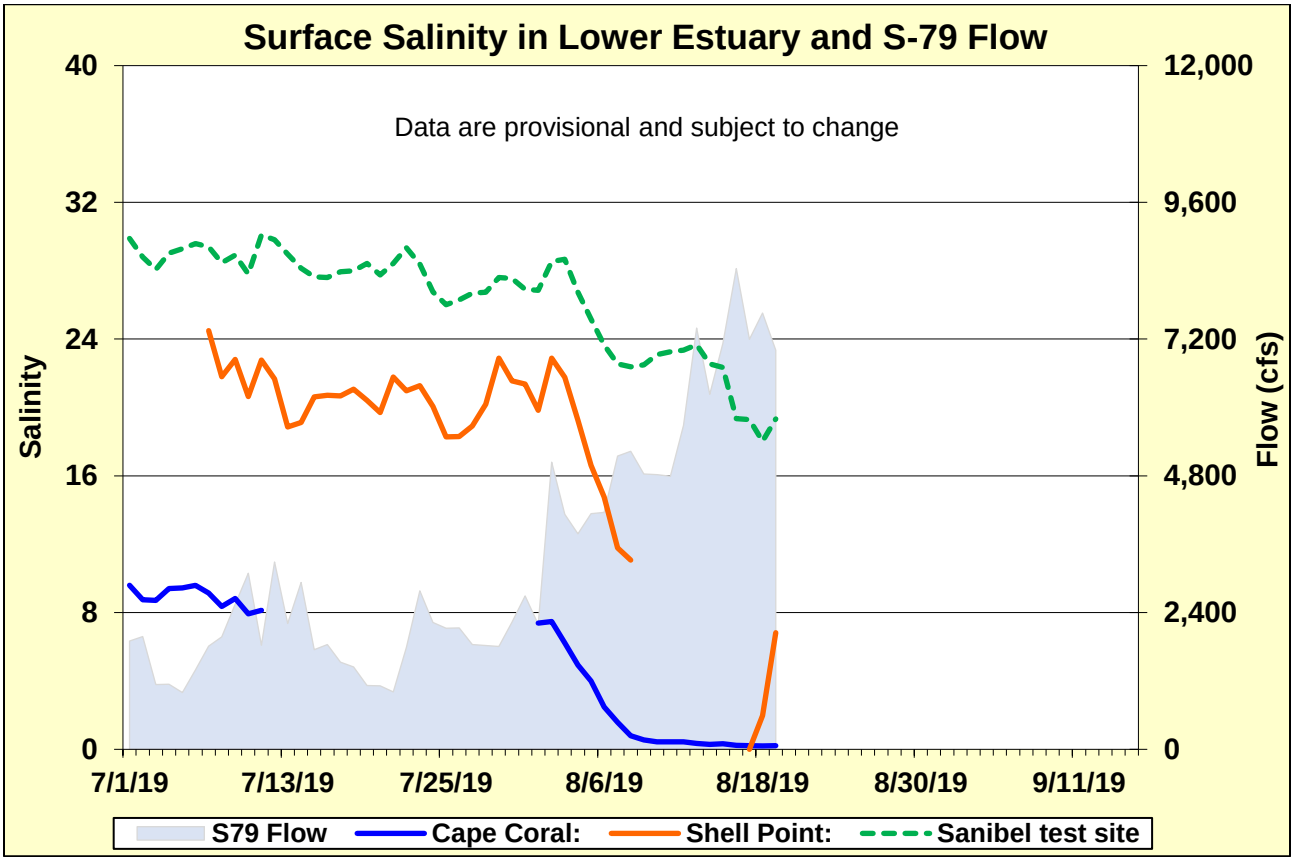


Figure 8. Daily mean flows at S-79 and salinity at lower estuary stations.

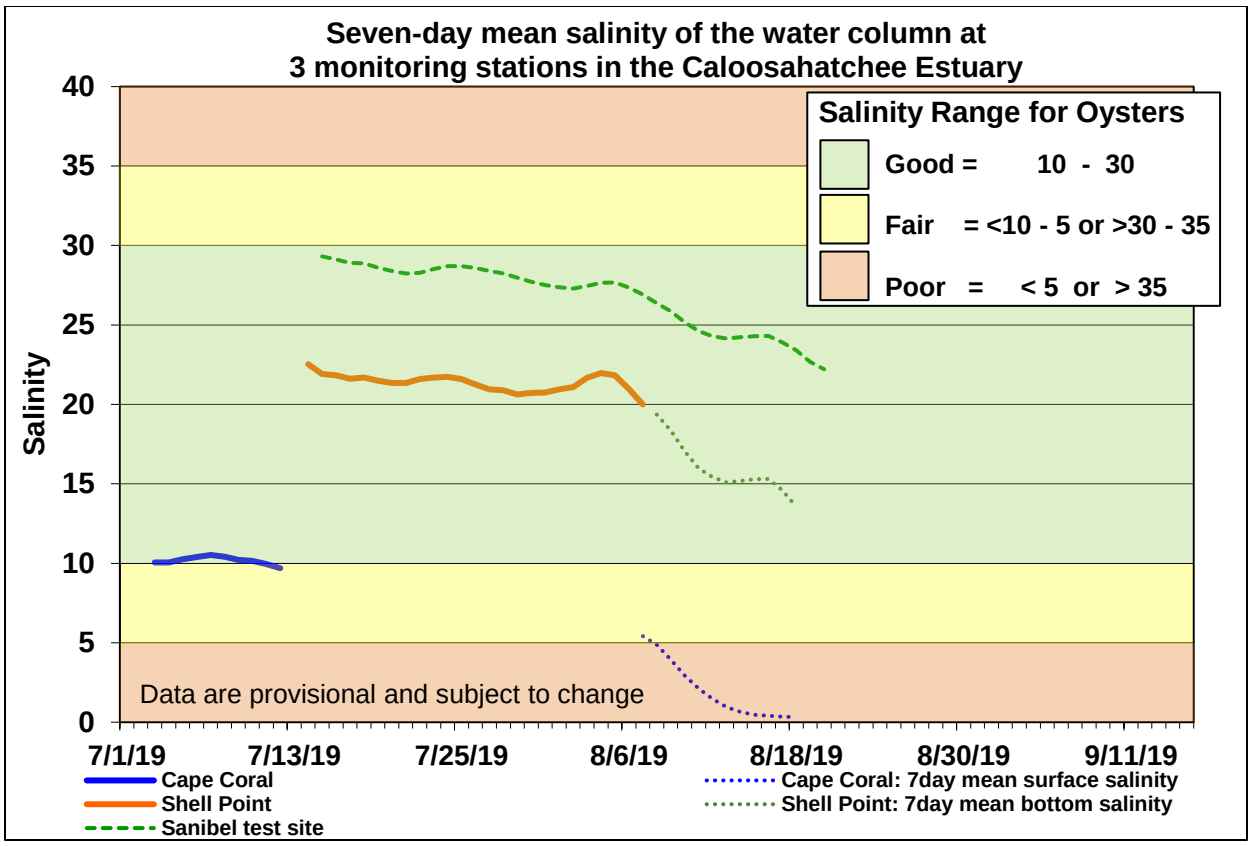


Figure 9. Seven-day mean salinity at Cape Coral, Shell Point, and Sanibel monitoring stations.

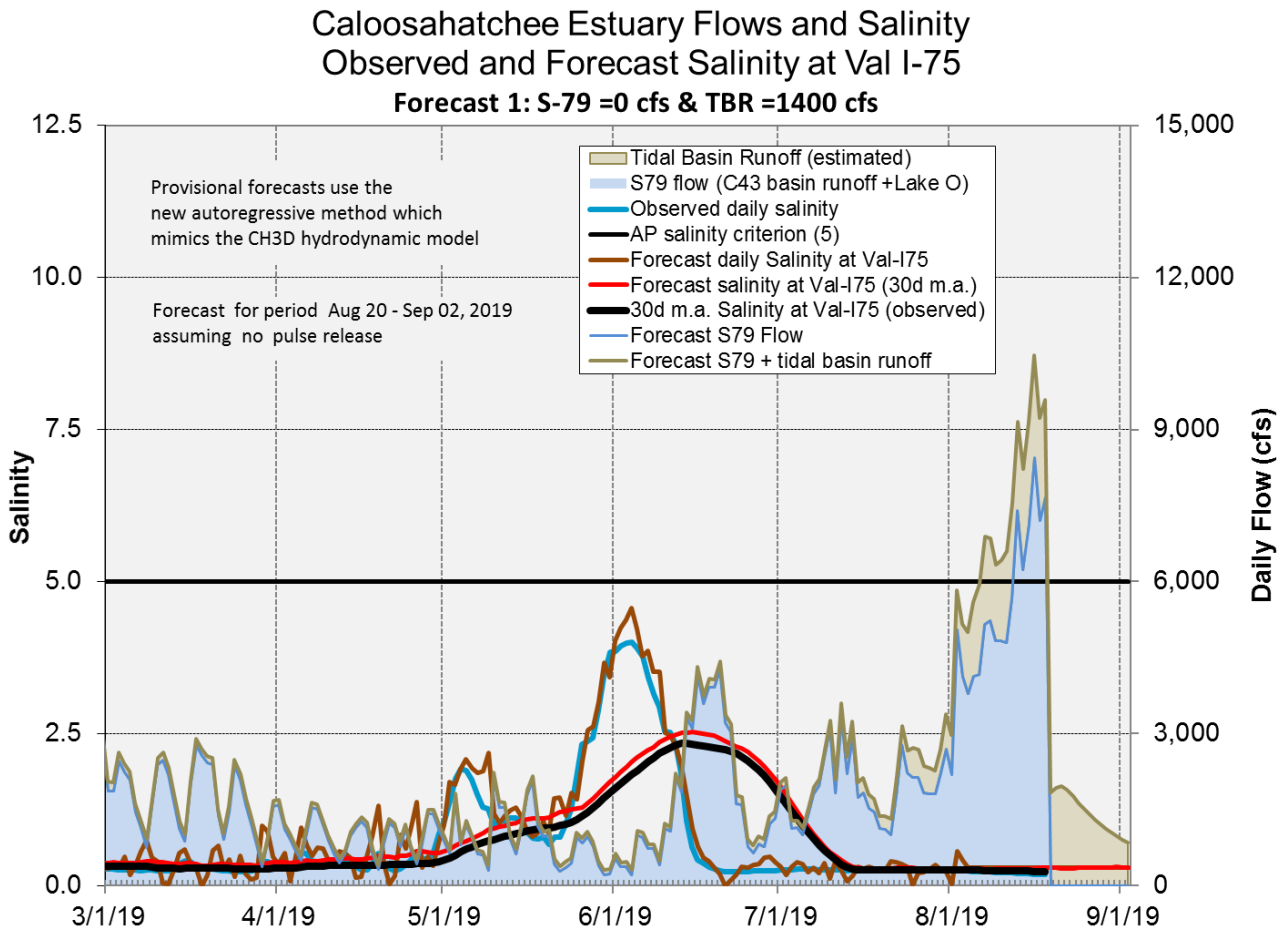
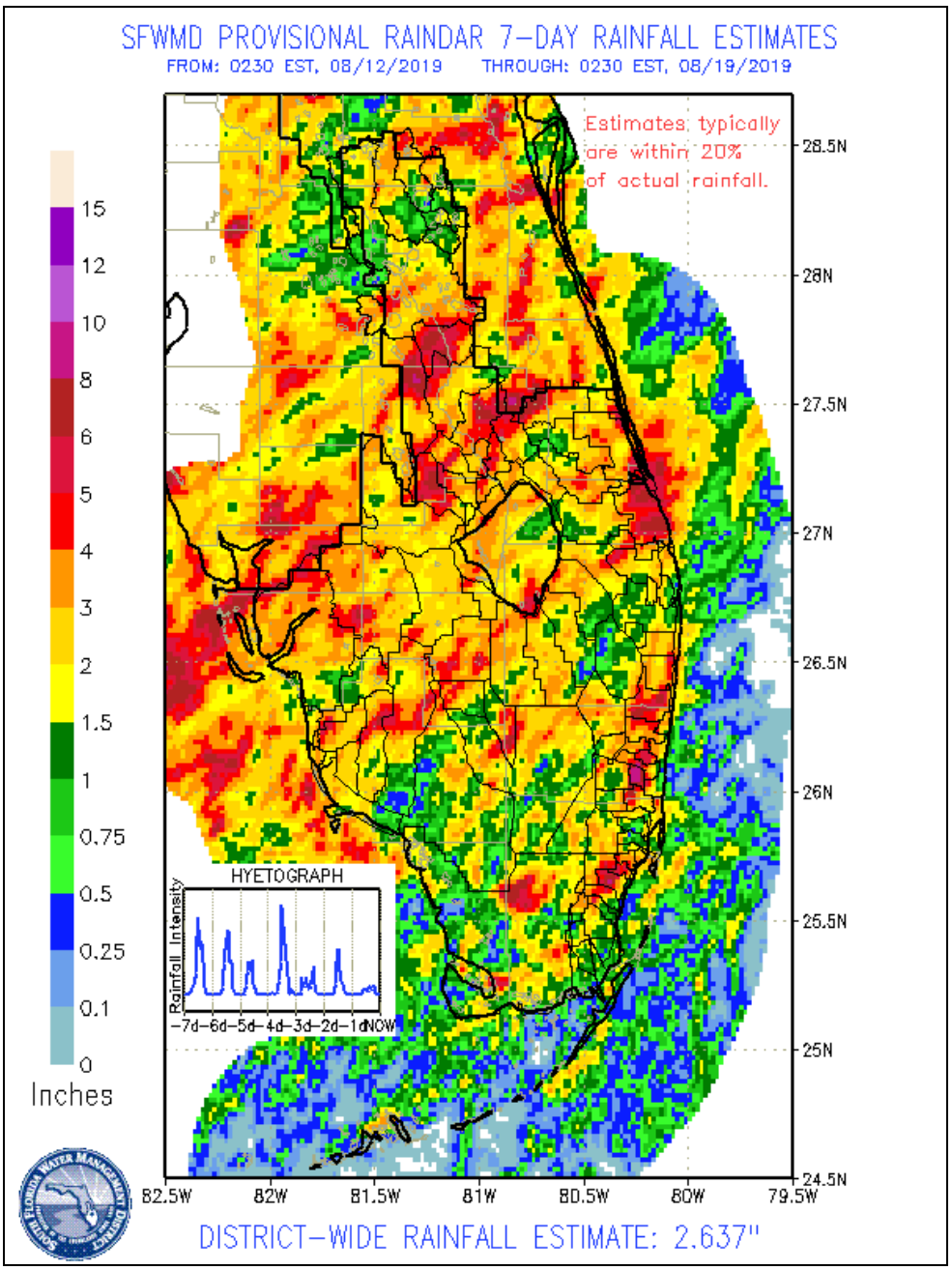


Figure 10. Forecasted Val I-75 surface salinity assuming no pulse release at S-79.

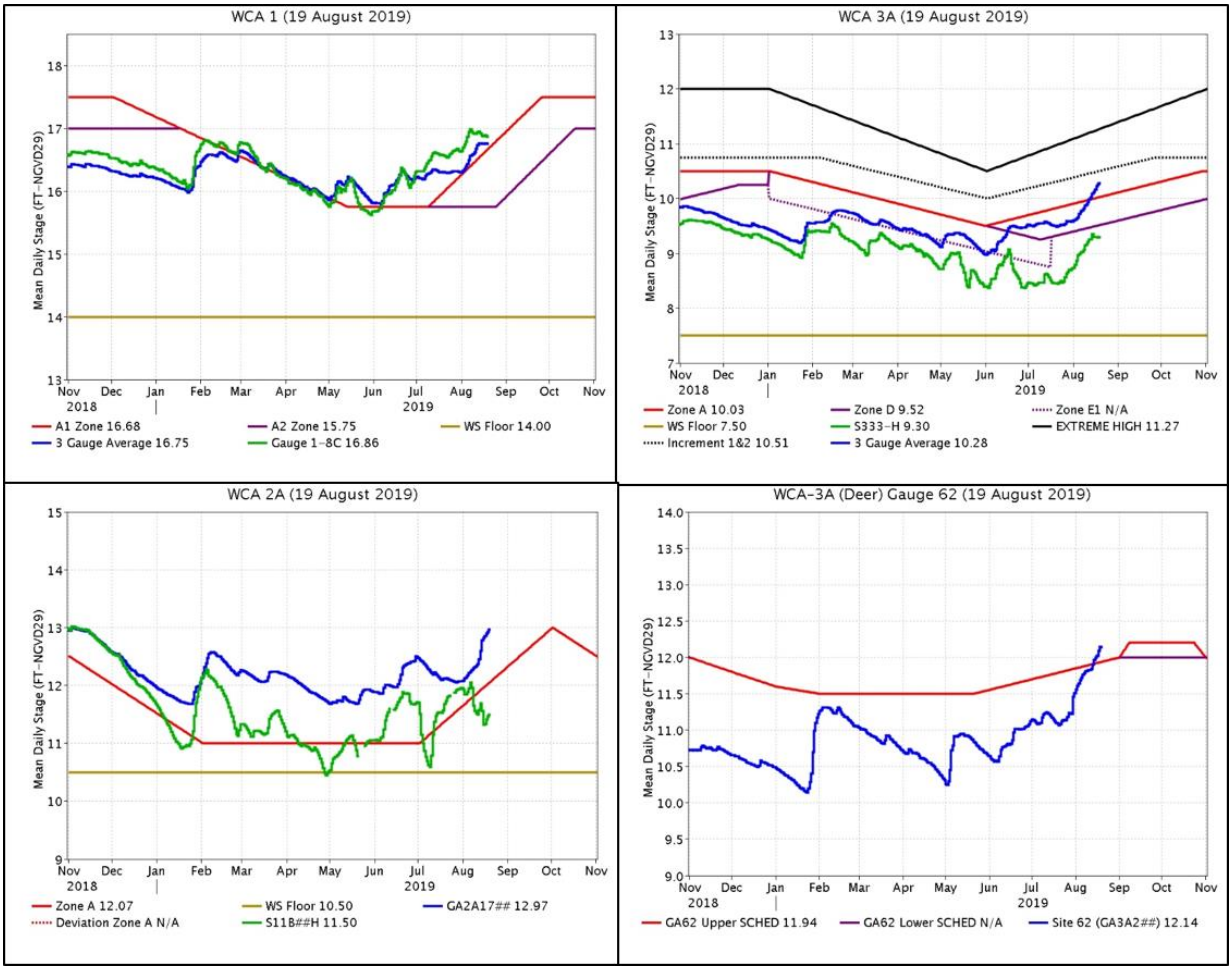
EVERGLADES

Above average rainfall was patchy across the WCAs and stages rose unevenly with WCA-2A stage increasing 0.51 feet more than WCA-1 over the last week. On average at the gauges monitored for this report the stage in the Everglades rose 0.19 feet. Pan evaporation was estimated at 1.75 inches and the Rainfall Plan continues to call for the maximum release.

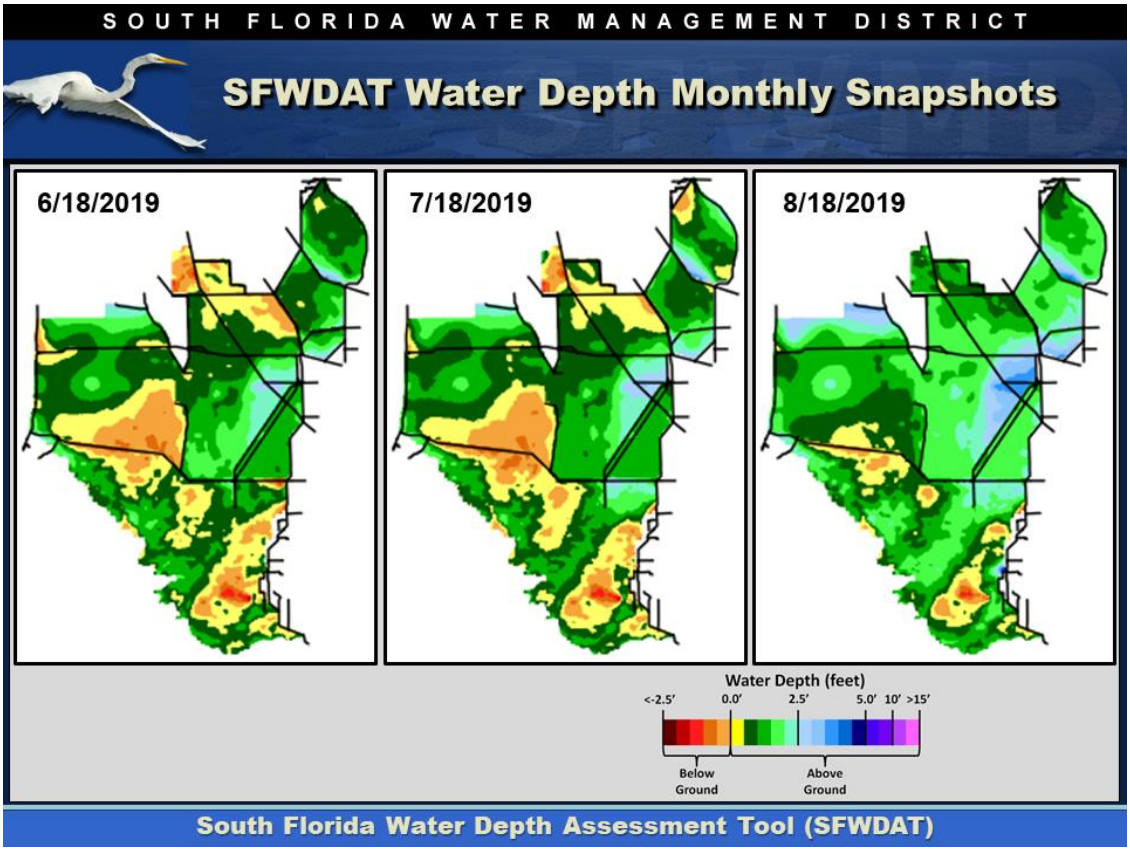
Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	1.37	+0.05
WCA-2A	2.62	+0.56
WCA-2B	2.44	+0.21
WCA-3A	2.04	+0.30
WCA-3B	1.98	+0.11
ENP	1.76	−0.02

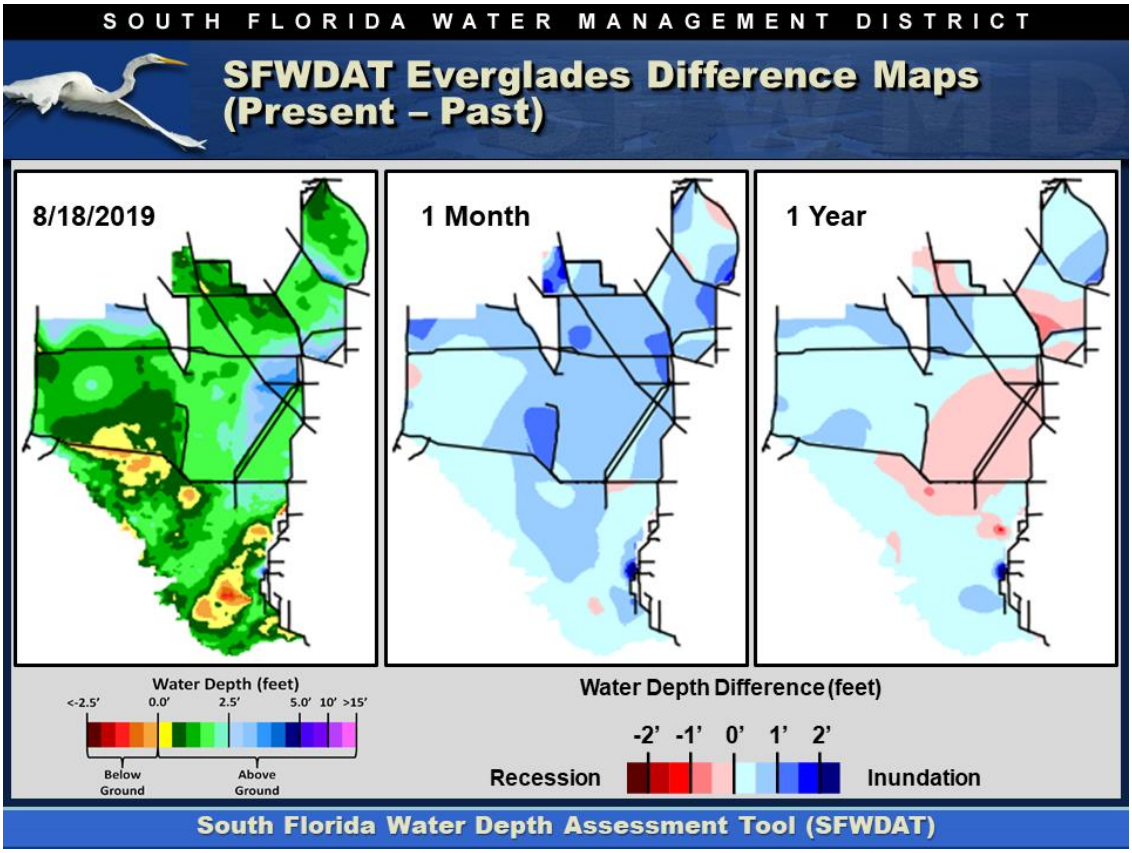


Regulation Schedules: WCA-1: The three-gauge average stage moved closer to the Zone A1 line this week, currently 0.07 feet above. WCA-2A: Gauge 2A-17 stage ascended rapidly away from the Zone A regulation line this week, now 0.90 feet above. WCA-3A: The three-gauge average stage continues to ascend and trend away from the Zone A regulation line at 0.25 feet above the desired operational band. WCA-3A at gauge 62 (northwest corner) is now 0.20 feet above the upper schedule and ascending.



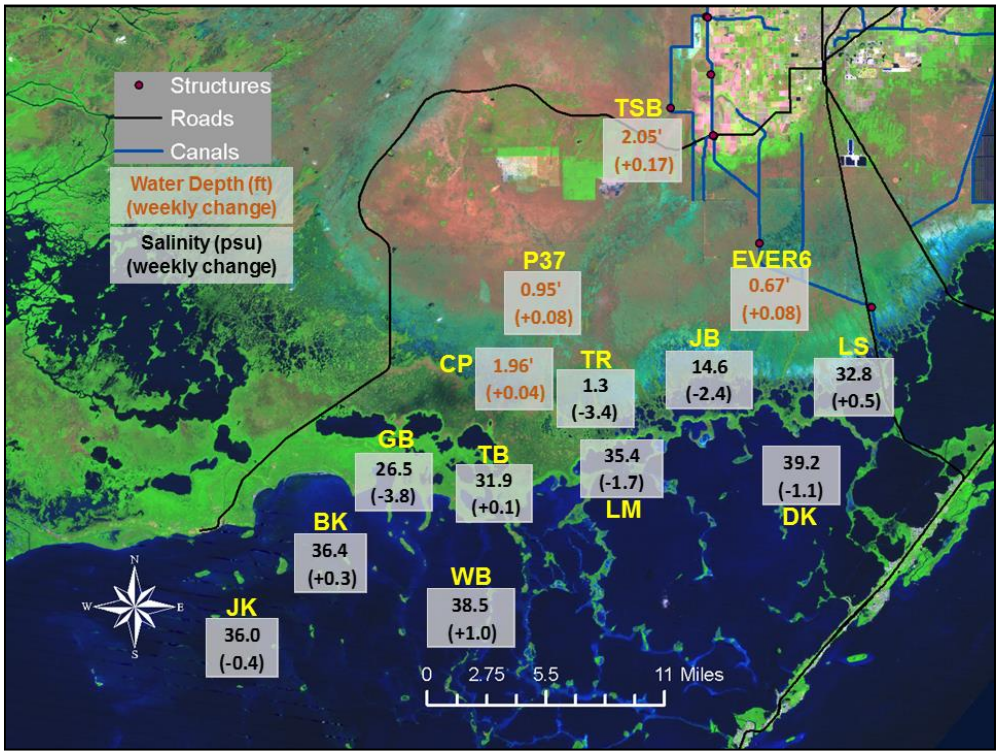
Water Depths and Changes: The WDAT tool for spatial interpolation of depth monthly snapshots indicate stages in northeastern WCA-3A have risen above ground in the last month, protecting the peat soils there. The sloughs within Everglades National Park seem to be showing impacts of recent projects with 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, only WCA-1 indicates a slightly more moderate increase in depths. 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.

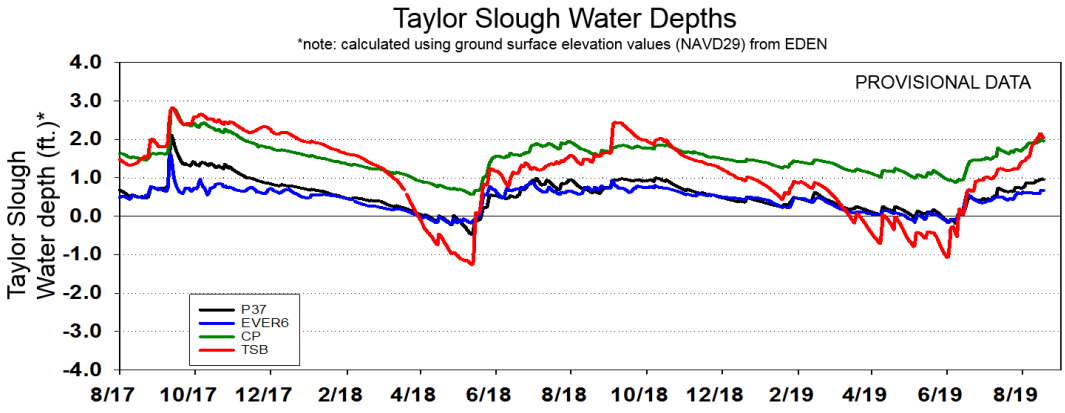

SOUTH FLORIDA WATER MANAGEMENT DISTRICT
SFWDAT Water Depth Monthly Snapshots
6/18/2019
7/18/2019
8/18/2019
Water Depth (feet)
<-2.5'
0.0'
2.5'
5.0'
10'
>15'
Below Ground
Above Ground
South Florida Water Depth Assessment Tool (SFWDAT)

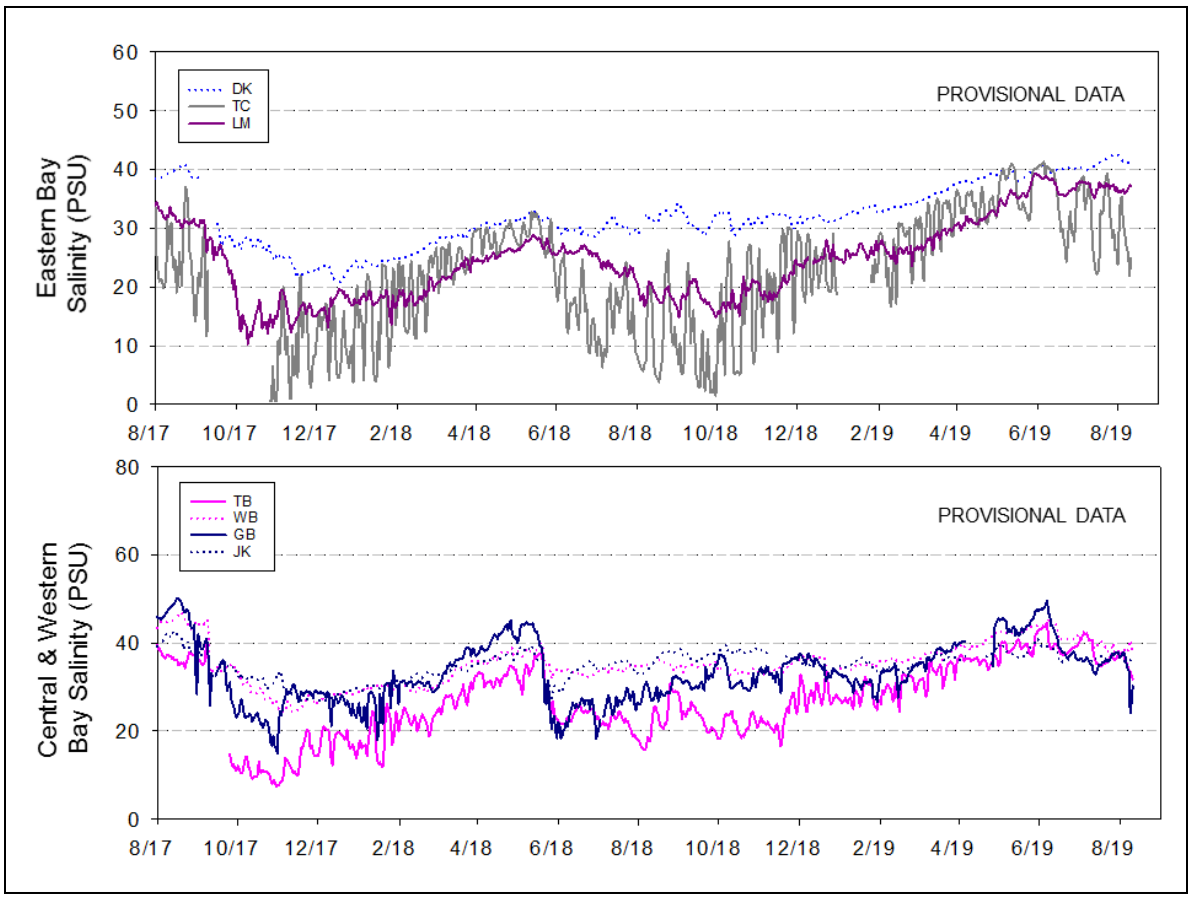

SOUTH FLORIDA WATER MANAGEMENT DISTRICT
SFWDAT Everglades Difference Maps
(Present – Past)
8/18/2019
1 Month
1 Year
Water Depth (feet)
<-2.5'
0.0'
2.5'
5.0'
10'
>15'
Below Ground
Above Ground
Water Depth Difference (feet)
-2'
-1'
0'
1'
2'
Recession
Inundation
South Florida Water Depth Assessment Tool (SFWDAT)

Taylor Slough Water Levels: An average of 1.3 inches of rain fell over Taylor Slough and Florida Bay this past week, and stages in the marsh and mangrove zone increased 1.1 inches as a result. All stations increased with the largest increase of 2.0 inches in northern Taylor Slough. Stages are still 5 inches higher than average for this time of year.

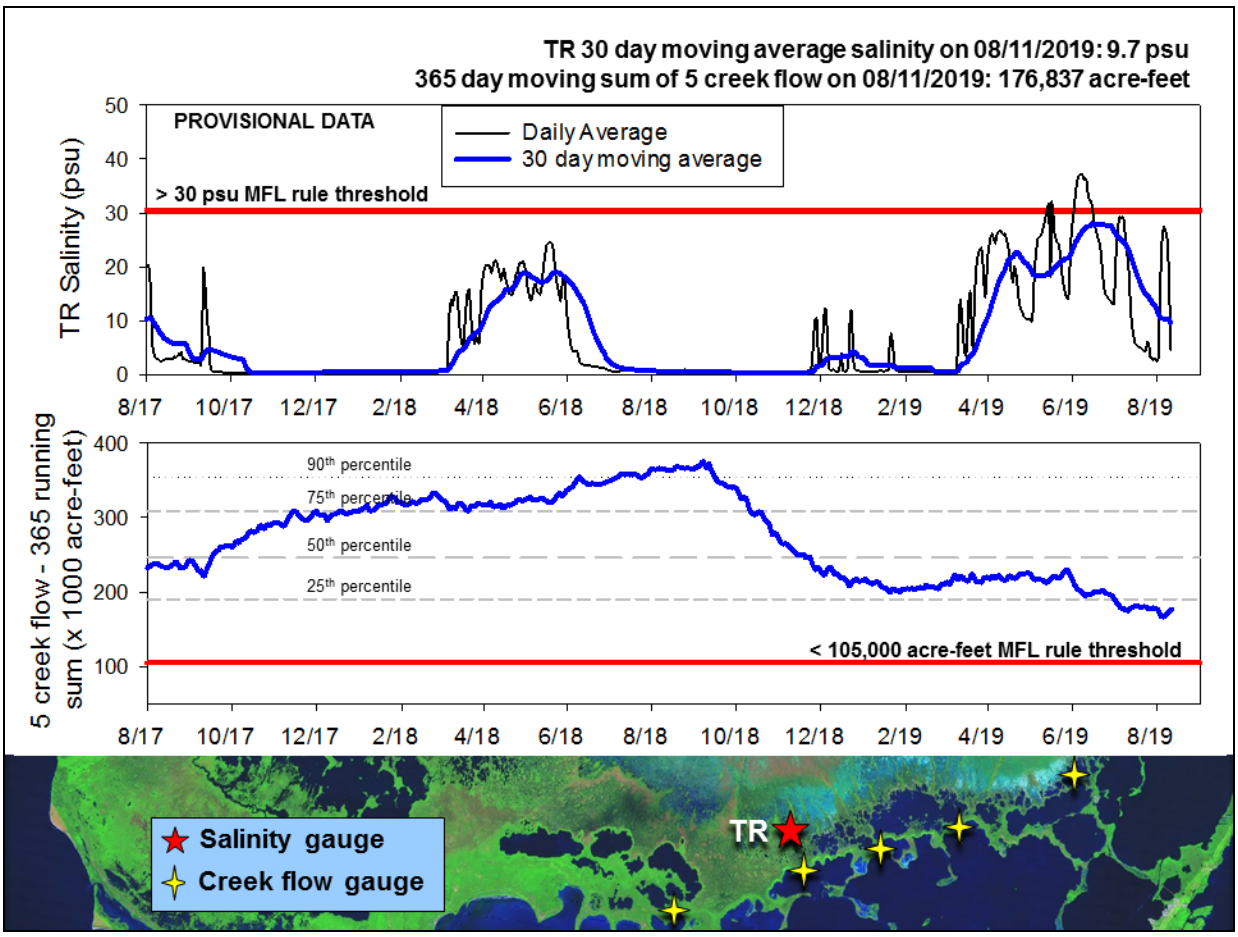
Florida Bay Salinities: Average salinity in Florida Bay was 32 psu, down 1 psu from last week. The nearshore area is still elevated but did show a decrease over the last week. Garfield Bight (GB), furthest from freshwater deliveries, is 4 psu below its historical average (provisional data) for this time of year while the other nearshore stations are 4 to 13 psu higher than their averages. This is under investigation. Garfield Bight is a very shallow embayment (1 to 2 feet deep) so it can freshen very quickly, but it is unusual for this to be the first shoreline station to decrease below 30 psu.







Florida Bay MFL: Salinity at the TR station in the mangrove zone (tracked for the Florida Bay MFL) continued decreasing to 1.4 psu this week. The 30-day moving average decreased 1.2 psu to end at 8.5 psu on Sunday. The weekly flow from the 5 creeks feeding Florida Bay was approximately 8,000 acre-feet, consistent with the historical average for this time of year. The 365-day moving sum of flow from the 5 creeks (tracked as part of the Florida Bay MFL criteria) decreased 2,000 acre-feet to end the week at 174,752 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. This was the period of drought leading up to the seagrass die-off event in 2015 and the subsequent relief of it with the dry season rains of WY2016.



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 and central WCA-3A, stage increases exceeded the recommended rate. 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 20th, 2019 (red is new)			
Area	Weekly change	Recommendation	Reasons
WCA-1	Stage increased by 0.05'	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 0.56'	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 upstream/downstream habitat and wildlife. Protect conditions for apple snail reproduction.
WCA-2B	Stage increased by 0.21'	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 0.63'	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 increased by 0.32'	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 0.23'	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 increased by 0.11'	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 decreased 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 +0.04' to +0.17'	Move water southward as possible	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged −3.8 to +1.0 psu	Move water southward as possible	When available, provide freshwater to maintain low salinity buffer and promote water movement.