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M E M O R A N D U M

TO: John Mitnik, Assistant Executive Director, Executive Office Staff

FROM: SFWMD Staff Environmental Advisory Team

DATE: September 23, 2020

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

Strong surface high pressure covers the eastern United States providing for mostly dry conditions area wide. The dry conditions and much below normal total rainfall are forecast to continue through the day Thursday, but with a marginal increase of shower activity along or near the east coast, particularly the southeast coast on Wednesday. By Thursday, the cold front should begin to retreat northward. While the National Hurricane Center will be monitoring the disturbed weather associated with this feature, strong upper-level westerly winds are likely to prevent tropical cyclone formation. Regardless, very high levels of moisture surging northward should fuel a large increase of rains on Friday that could extend into Saturday as the surface trough lifts northward. While a widespread coverage of rains is predicted, large-scale instability could limit the overall intensity of the rain. A decrease of total rainfall is predicted on Sunday and Monday, with the rains on Monday standing a good chance of being at or below the daily climatological average. Early next week a cold front pushing through the eastern and southern United States will settle southward into the District around mid-week and is shown by much of the model guidance to stall. Best indications are that the southern half or two-thirds of the District would see increased and possibly enhanced rains near and south of the frontal boundary while a drying is possible over the north that could last several days.

Kissimmee

Tuesday morning stages were 57.3 feet NGVD (0.5 feet above schedule) in East Lake Toho, 53.9 feet NGVD (0.1 feet above schedule) in Toho, and 51.8 feet NGVD (0.5 feet above schedule) in Kissimmee-Cypress-Hatchineha; headwater stages were 46.7 feet NGVD at S-65A and 27.9 feet NGVD at S-65D. Tuesday morning discharges were 3,230 cfs at S-65, 4,040 cfs at S-65A, 4,870 cfs at S-65D and 5,040 cfs at S-65E. Dissolved oxygen concentration in the Kissimmee River averaged 1.3 mg/L for the week through Sunday. Kissimmee River mean floodplain depth on Sunday was 2.5 feet. Today's recommendation is to continue to use the IS-14-50 discharge plan through the 2020 wet season (the discharge rate of change limits for S-65 / S-65A may be adjusted for individual events after consultation with Kissimmee River Restoration Evaluation Program staff).

Lake Okeechobee

Lake Okeechobee stage was 15.19 feet NGVD on September 21, 2020, 0.24 feet higher than the previous week and 1.09 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. Stages have been above or near the top of the envelope since August 1, 2020 and are currently 0.1 feet above. Ascension rates have exceeded the recommended rate (<0.5 foot per 2 weeks) several times since the onset of the wet season but have remained close to one foot per month on average; potentially allowing submerged plant communities to keep up with rising stages. The cyanobacteria bloom risk potential increased in

the central/eastern portion of the Lake over the past week following heavy wind and rain. Water quality sampling on September 8-9, 2020 found 4 of 32 stations with microcystin toxins detected above the Environmental Protection Agency (EPA) recreational waters recommendation of 8 µg/L.

Estuaries

Total inflow to the St. Lucie Estuary averaged 2,032 cfs without including contribution from S-80 due to missing data for the structure over the past week. There was no flow coming from Lake Okeechobee. The seven-day average salinities decreased at HR1 and US1 but slightly increased at A1A over the past week. Salinity at the US1 Bridge is in the good range for adult eastern oysters.

Total inflow to the Caloosahatchee Estuary averaged 6,848 cfs over the past week with no flow coming from the Lake. Seven-day average salinity remained almost fresh at Val I75 and upstream and decreased in the lower 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 Shell Point (10-30) and Sanibel, and in the poor range at Cape Coral (0-5). Lake stage is in the Low sub-band of 2008 LORS. Tributary hydrological conditions are very wet. The LORS2008 Release Guidance suggests up to 3,000 cfs release at S-79 to the Caloosahatchee Estuary and up to 1,170 cfs release at S-80 to the St. Lucie Estuary.

Stormwater Treatment Areas

Over the past week, 3,400 ac-feet of 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 14,700 ac-feet. The total amount of inflows to the STAs in WY2021 is approximately 821,000 ac-feet. Most STA cells are 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

WCA-1 and WCA-3A remain above schedule but are generally trending along with regulation. WCA-2A stages have ascended quickly over the past two weeks and trend away from schedule. The two-gauge average in WCA-3A North remains below the Florida Fish and Wildlife Conservation Commission (FFWC) closure stage and the public closure was lifted. Depths in WCA-3A North that benefit the Alley North colony have the potential to be reached according to the latest Gauge 63 dynamic position analysis (DPA), with the probability increasing when compared to the last DPA. Heavy rains fell over Florida Bay and Taylor Slough and the stages increased. Salinities decreased slightly on average and weekly changes fluctuated widely due to wind driven flows. Salinity increased in the mangrove zone and flow from the five creeks was low, both impacted by the tropical system.

Supporting Information

KESSIMMEE BASIN Rainfall

The Upper Kissimmee Basin received 2.01 inches of rainfall in the past week and the Lower Basin received 1.80 inches (SFWMD Daily Rainfall Report 09/21/2020).

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: 9/22/2020

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)						
							9/20/20	9/13/20	9/6/20	8/30/20	8/23/20	8/16/20	8/9/20
Lakes Hart and Mary Jane	S-62	431	LKMJ	60.4	R	60.0	0.4	0.0	0.0	0.0	0.0	0.2	0.1
Lakes Myrtle, Preston, and Joel	S-57	96	S-57	61.1	R	61.0	0.1	0.0	0.0	0.0	0.0	0.0	-0.1
Alligator Chain	S-60	277	ALLI	63.2	R	63.2	0.0	0.2	0.1	0.0	0.1	0.1	0.0
Lake Gentry	S-63	404	LKGT	61.2	R	61.0	0.2	0.2	0.1	0.1	0.1	0.0	-0.1
East Lake Toho	S-59	952	TOHOE	57.3	R	56.8	0.5	0.3	-0.3	-0.7	-0.5	-0.4	-0.5
Lake Toho	S-61	1,566	TOHOW, S-61	53.9	R	53.8	0.1	0.1	0.1	-0.1	0.0	0.1	0.0
Lakes Kissimmee, Cypress, and Hatchineha	S-65	3,143	KUB011, LKIS5B	51.8	R	51.3	0.5	0.4	0.3	0.5	0.7	0.3	0.2

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: 9/22/2020

Metric	Location	1-Day Average		Average for the Preceding 7-Days ¹							
		9/20/2020	9/20/20	9/13/20	9/6/20	8/30/20	8/23/20	8/16/20	8/9/20	8/2/20	7/26/20
Discharge (cfs)	S-65	3,281	3,143	2,193	2,631	3,273	2,506	1,611	1,760	4,215	4,623
Discharge (cfs)	S-65A ²	3,953	3,855	2,700	3,176	4,247	3,173	1,990	2,554	4,851	5,111
Discharge (cfs)	S-65D ²	4,030	3,738	3,512	4,262	3,420	3,067	4,360	5,466	5,538	3,846
Headwater Stage (feet NGVD)	S-65D ²	27.86	27.77	27.63	27.74	27.75	27.59	27.57	27.70	27.75	26.99
Discharge (cfs)	S-65E ²	4,078	3,919	3,578	4,317	3,444	3,079	4,484	5,703	5,462	3,671
Discharge (cfs)	S-67	0	0	0	0	0	0	0	0	0	0
DO (mg/L) ³	Phases I & II/III river channel	1.2	1.3	0.9	0.7	1.1	1.0	0.4	0.5	0.4	0.2
Mean depth (feet) ⁴	Phase I floodplain	2.49	2.30	2.06	2.42	2.27	1.76	2.06	2.60	3.02	2.64

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.

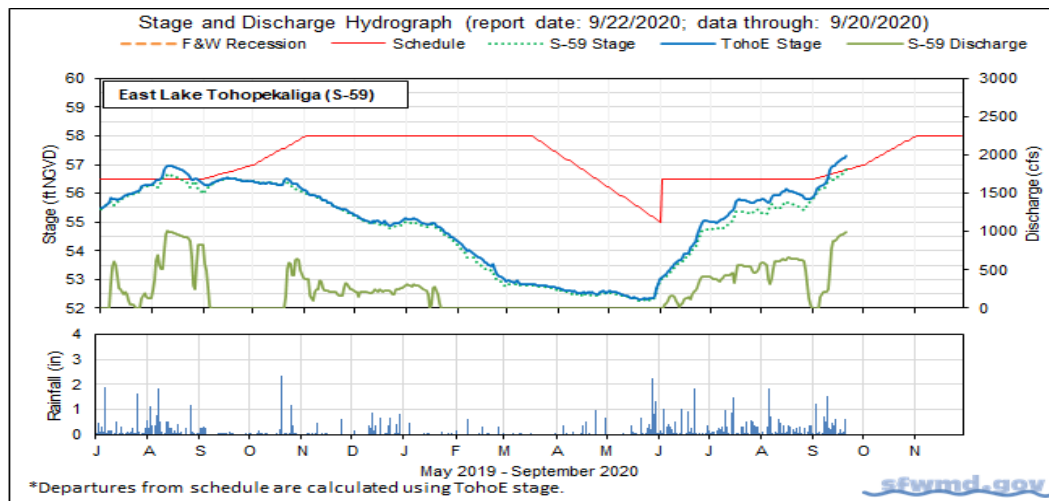


Figure 1. East Lake Toho regulation schedule, stage, discharge and rainfall.

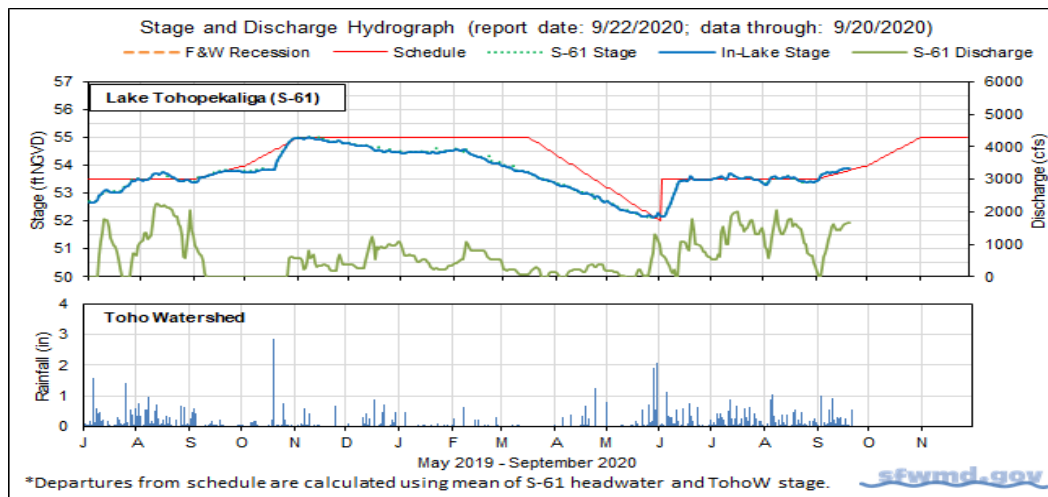


Figure 2. Lake Toho regulation schedule, stage, discharge and rainfall.

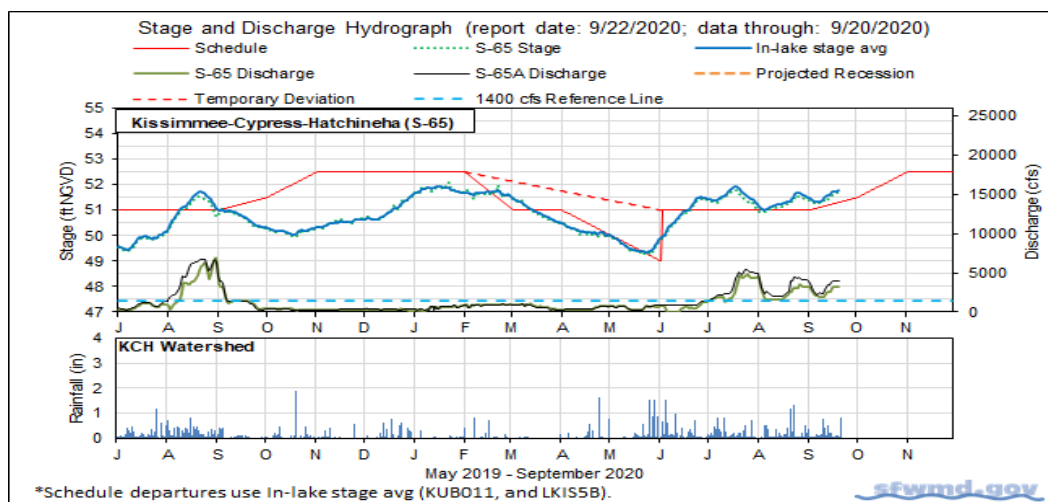


Figure 3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

Kissimmee River Phase I Restoration Area Water Depth Maps

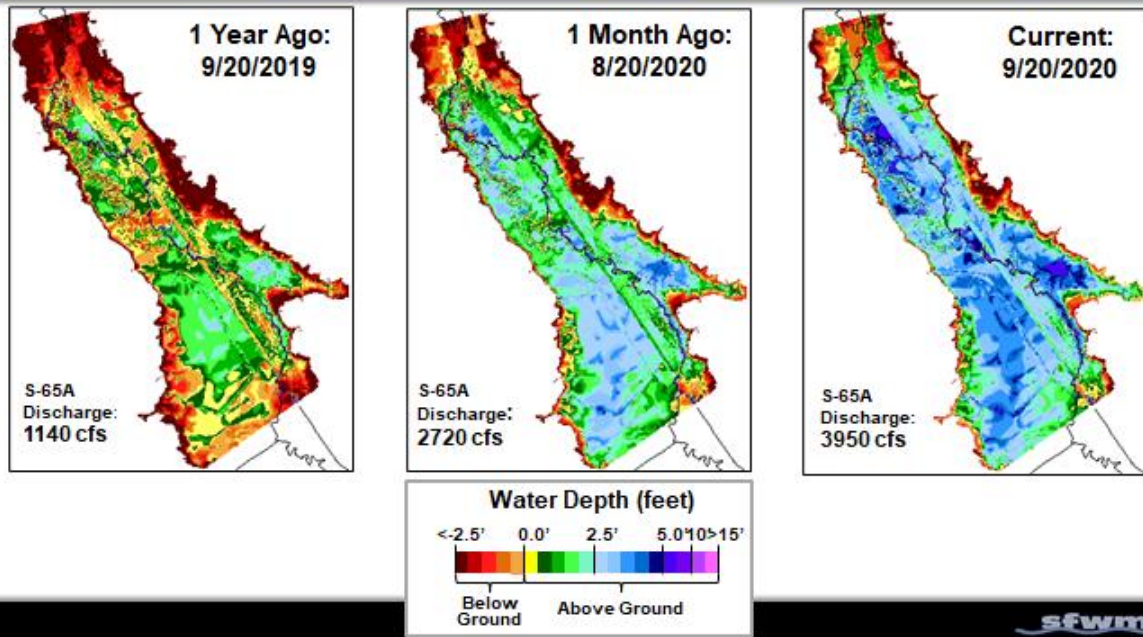


Figure 4. Phase I area floodplain water depths (from left to right) one year ago, one month ago and current. Color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to January 16, 2012.

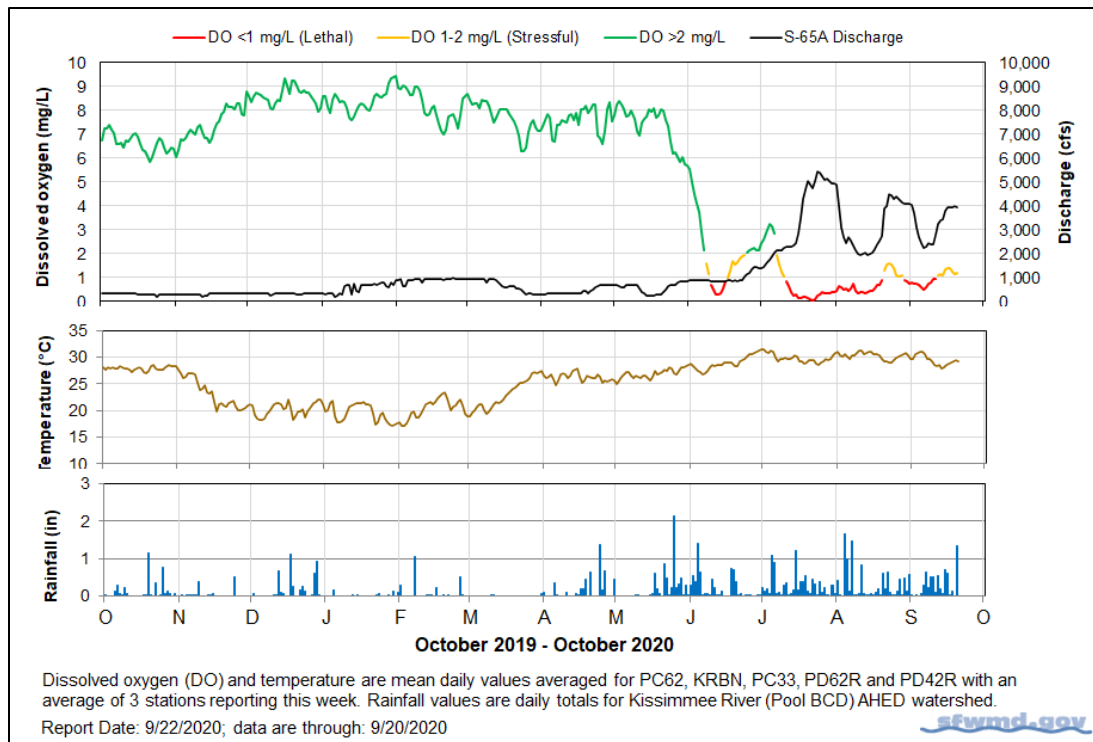


Figure 5. Restored Kissimmee river channel mean daily dissolved oxygen concentration (mg/L), S-65A discharge (cfs), temperature (°C) and rainfall (inches)

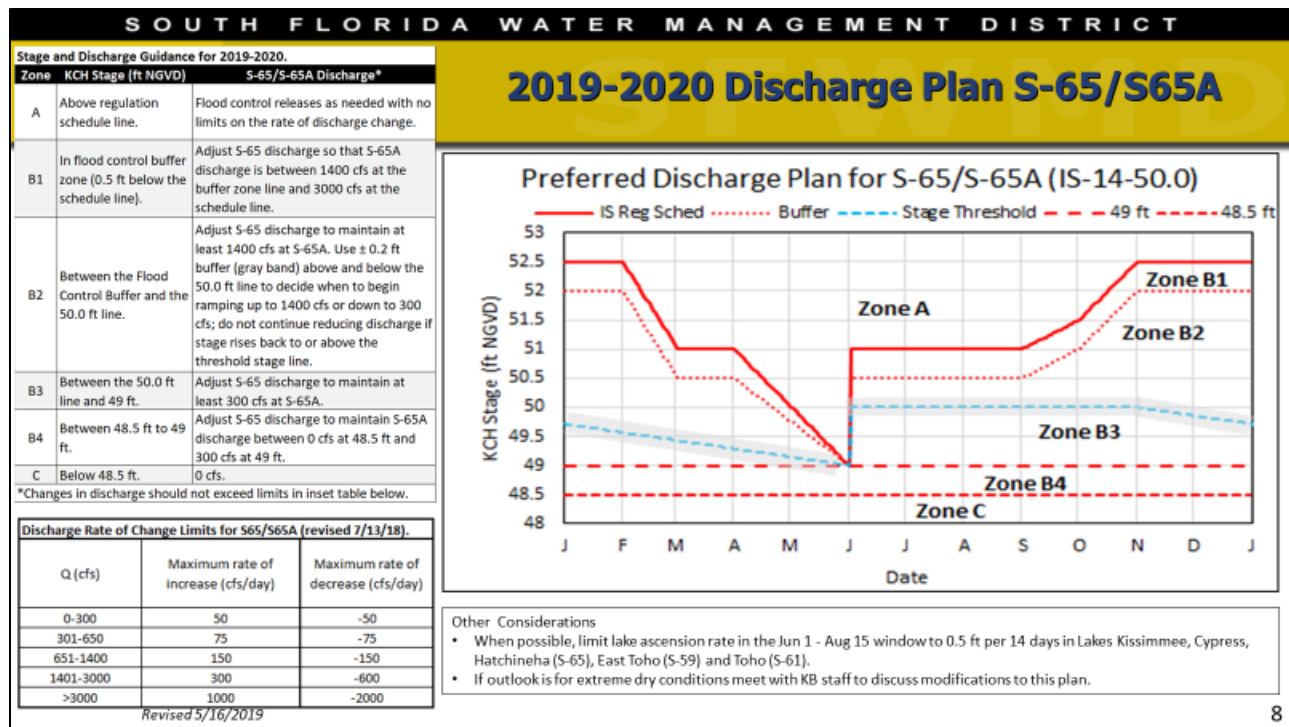


Figure 6. The 2019-2020 Discharge Plan for S-65/S-65A.

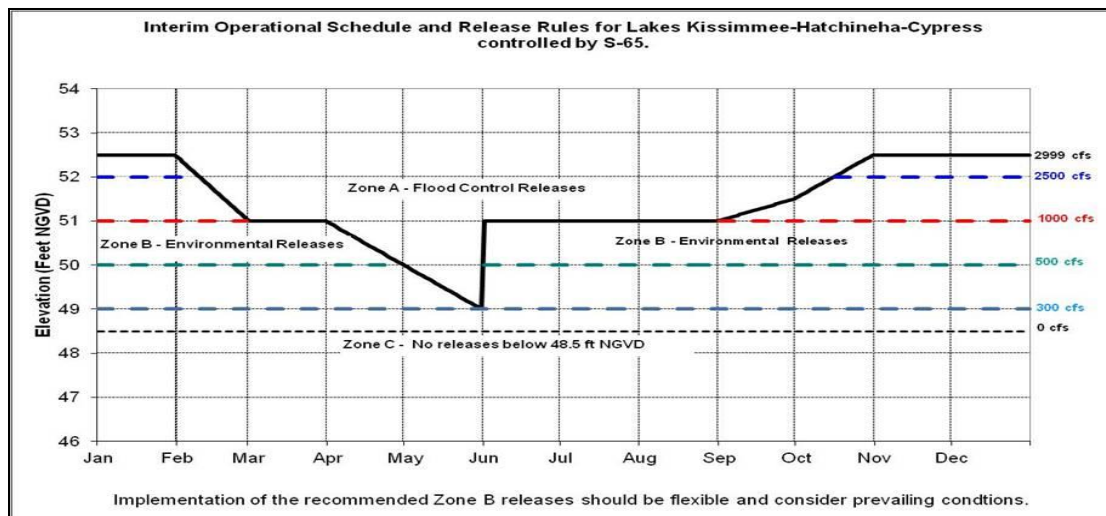


Figure 7. Interim operations schedule for S-65 (solid black line). The discharge schedule shown to the right has not been used in recent years.



Figure 8. The Kissimmee Basin.

LAKE OKEECHOBEE

Lake Okeechobee stage is 15.19 feet NGVD, 1.09 feet higher than a month ago and 1.43 feet higher than one year ago (Figure 1). Lake stages rose into the lower portion of the preferred ecological envelope on June 2, 2020 (Figure 2) but have been above the envelope since the end of July. Lake stage moved into the Beneficial Use sub-band on March 4, 2020, into the Base Flow sub-band in mid-July, and is currently in the Low sub-band (Figure 3). Lake stage reached a low of 10.99 feet NGVD on May 17 and has been rising at close to one foot per month since. According to RAINДАР, 1.41 inches of rain fell directly over the Lake through the past week, while much of the watershed received between 0.5 and 4.0 inches (Figure 4).

The average daily inflows (minus rainfall) increased slightly from the previous week, from 8,032 cfs, to 8,192 cfs, and the outflows (minus evapotranspiration) increased from 0 to 318 cfs. Approximately 50% of the inflows came from the Kissimmee River (4,077 cfs through S-65E & S-65EX1), but notable flows also came from the C-59 canal via the S-191 structure (1,062 cfs), from the C-41A canal (923 cfs through S-84 & S-84X), from Fisheating Creek (853 cfs), and 506 cfs came through S-71 and S-72. There were outflows of 318 cfs through the S-350 structures this past week. 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 September sampling occurred on the 8th and 9th (Figure 6). Chlorophyll-a results indicated that 4 sites in the western portion of the Lake had levels higher than 40 µg/L, although only 2 of these sites had detectable toxin levels (microcystin at 0.5 and 3.5 µg/L). Twelve other sites had chlorophyll-a values between 20-40 µg/L, and 4 of these sites had toxin levels higher than the EPA recreational waters recommendation of 8 µg/L, ranging from 10.0 – 62.0 µg/L. In total, 17 (of 32) sites had detectable levels of toxin (>0.25 µg/L).

The most recent clear satellite image (September 19, 2020) from NOAA's cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3 OLCI sensor data suggested an increased cyanobacteria bloom risk in the central/eastern region of the Lake (Figure 7).

Water Management Summary

Lake Okeechobee stage was 15.19 feet NGVD on September 21, 2020, 0.24 feet higher than the previous week and 1.09 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 – 15 feet NGVD +/- 0.5 feet) on June 2, 2020, after being up to 1.5 feet below since October 15, 2019. Stages have been above or near the top of the envelope since August 1, 2020 and are currently 0.1 feet above. Ascension rates have exceeded the recommended rate (<0.5 foot per 2 weeks) several times since the onset of the wet season but have remained close to one foot per month on average; potentially allowing submerged plant communities to keep up with rising stages. The cyanobacteria bloom risk potential increased in the central/eastern portion of the Lake over the past week following heavy wind and rain. Water quality sampling on September 8-9, 2020 found 4 of 32 stations with microcystin toxins detected above the EPA recreational waters recommendation of 8 µg/L.

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	3544	4077	1.6
S-71 & S-72	498	506	0.2
S-84 & S-84X	1596	923	0.4
Fisheating Creek	462	853	0.3
S-154	76	118	0.0
S-191	743	1062	0.4
S-133 P	142	117	0.0
S-127 P	52	44	0.0
S-129 P	47	38	0.0
S-131 P	41	18	0.0
S-135 P	363	265	0.1
S-2 P	0	0	0.0
S-3 P	0	0	0.0
S-4 P	0	0	0.0
L-8 Backflow	467	171	0.1
Rainfall	4079	3675	1.4
Total	12112	11867	4.6

OUTFLOWS	Previous week Avg Daily CFS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)
S-77	0	0	0.0
S-308	0	0	0.0
S-351	0	279	0.1
S-352	0	38	0.0
S-354	0	0	0.0
L-8 Outflow			
ET	1594	2192	0.8
Total	1594	2509	1.0

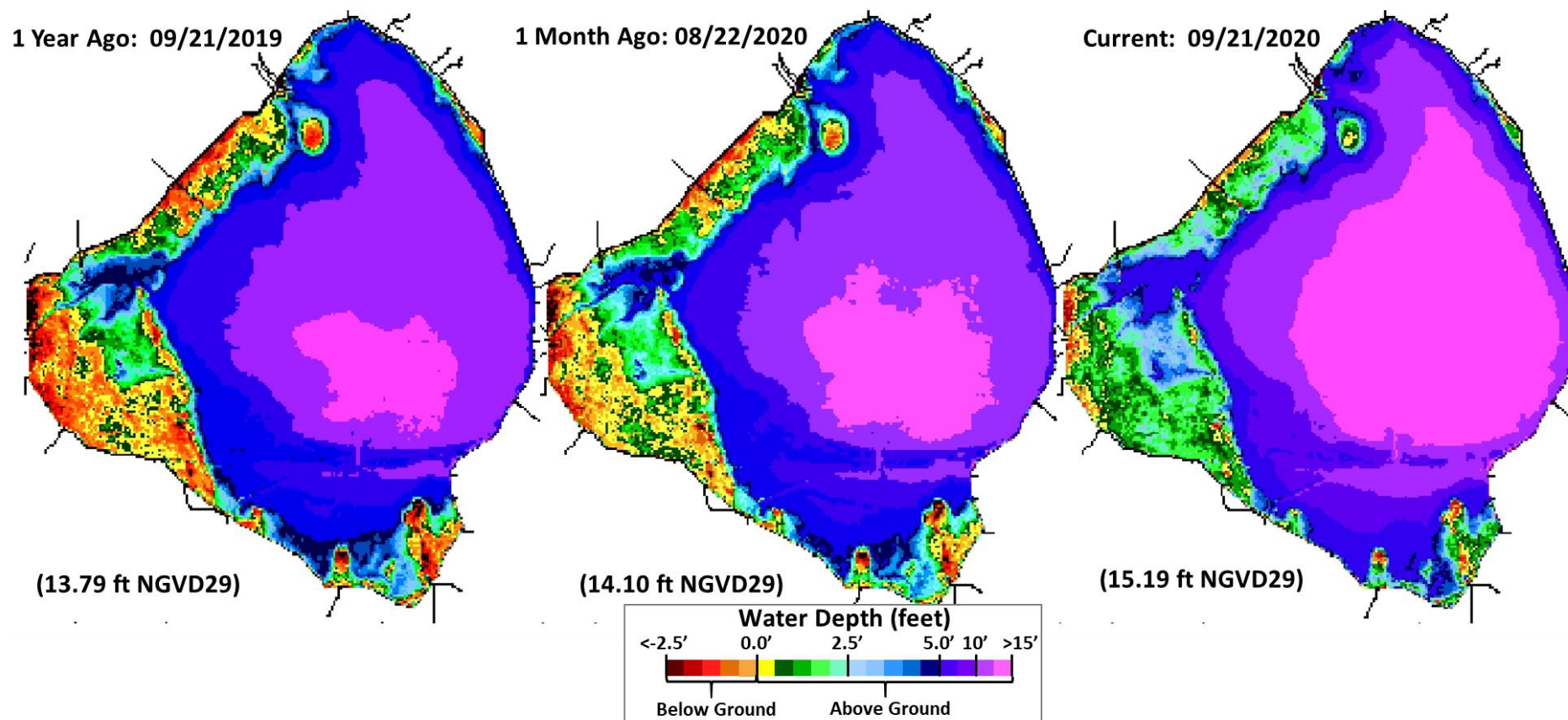


Figure 1. Water depth estimates on Lake Okeechobee based on the South Florida Water Depth Assessment Tool.

Lake Okeechobee Stage vs Updated Ecological Envelope

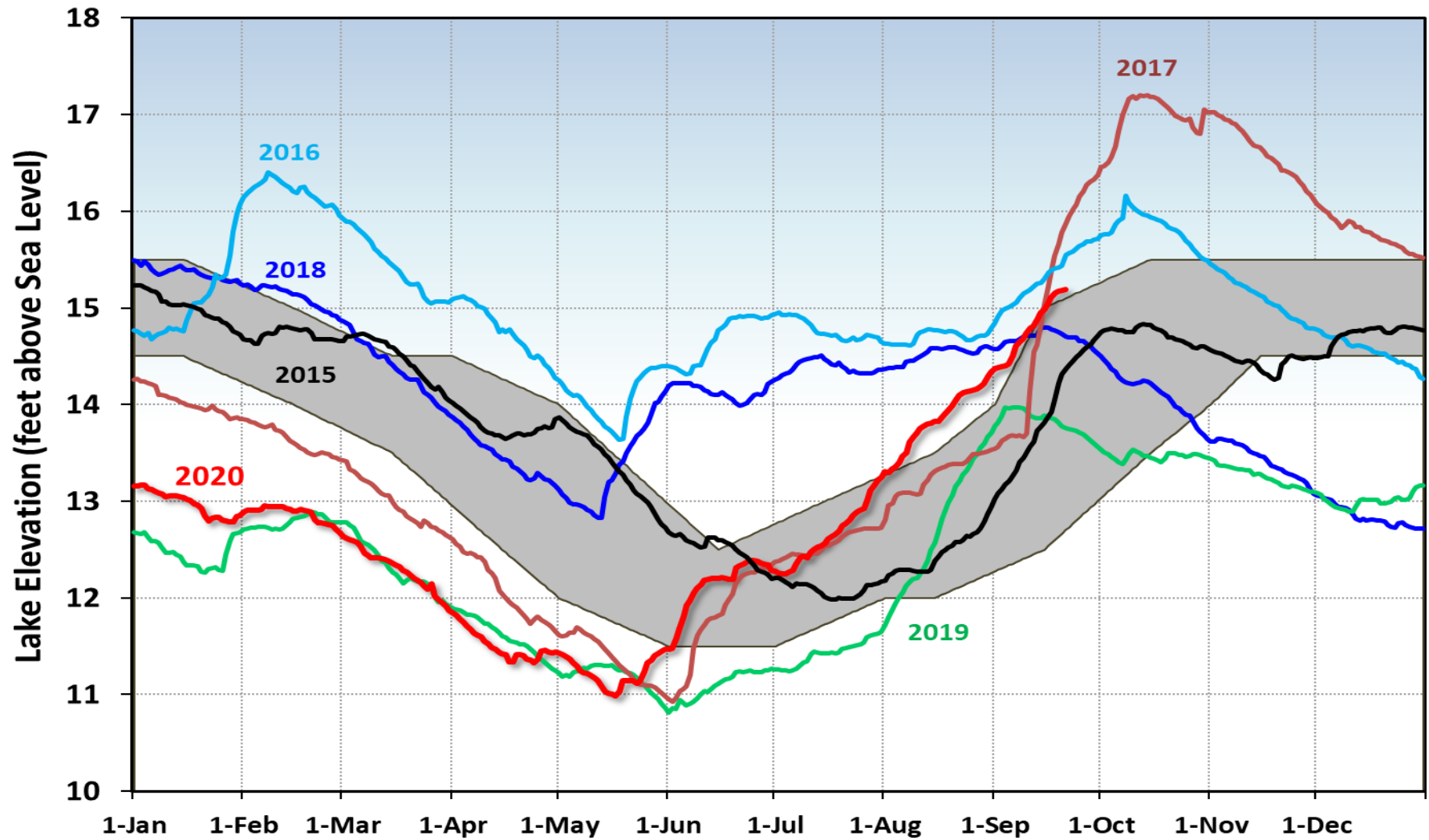


Figure 2. Select annual stage hydrographs for Lake Okeechobee in comparison to the updated Ecological Envelope.

Lake Okeechobee Water Level History and Projected Stages

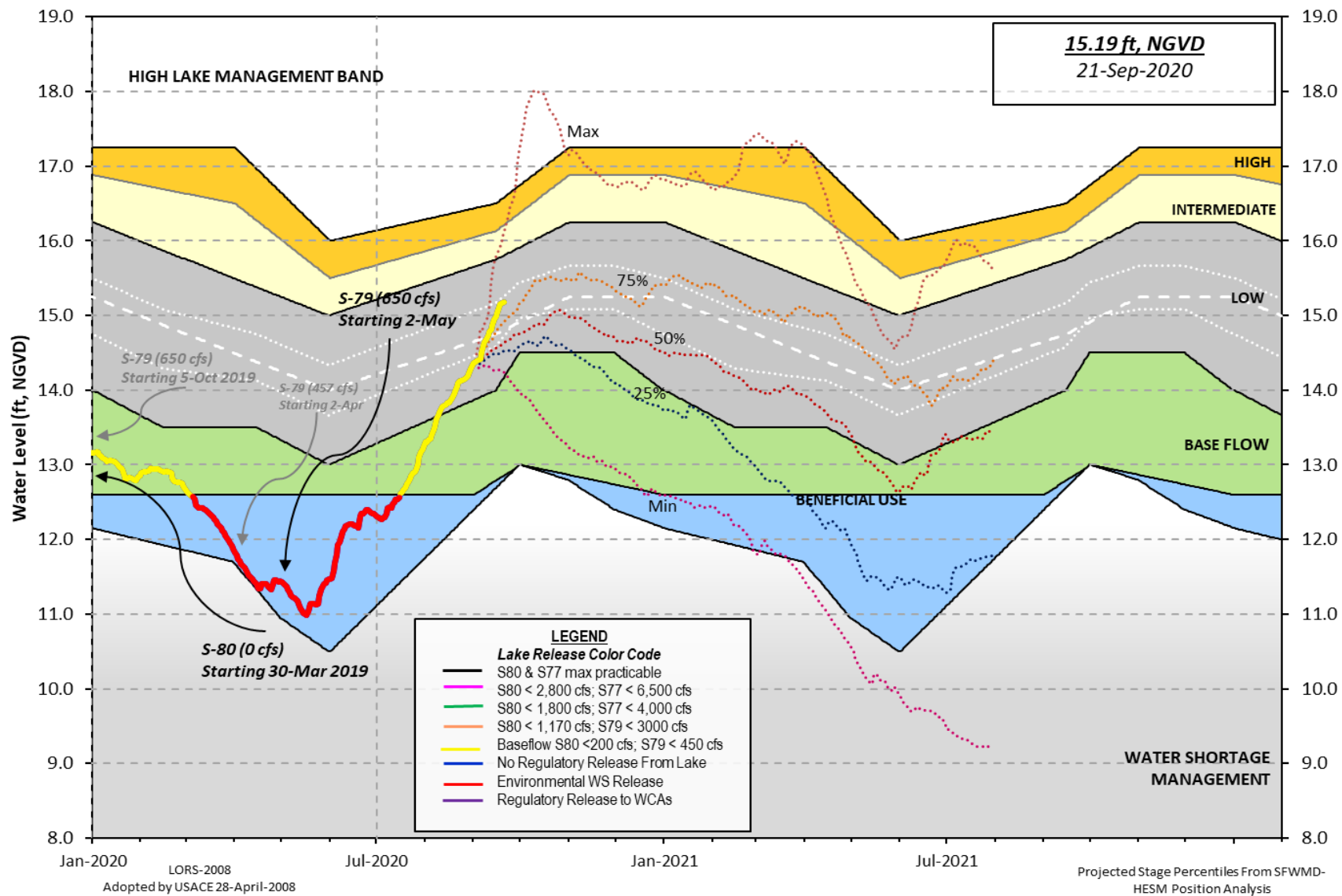


Figure 3. Recent Lake Okeechobee stage and releases, with projected stages based on a dynamic position analysis.

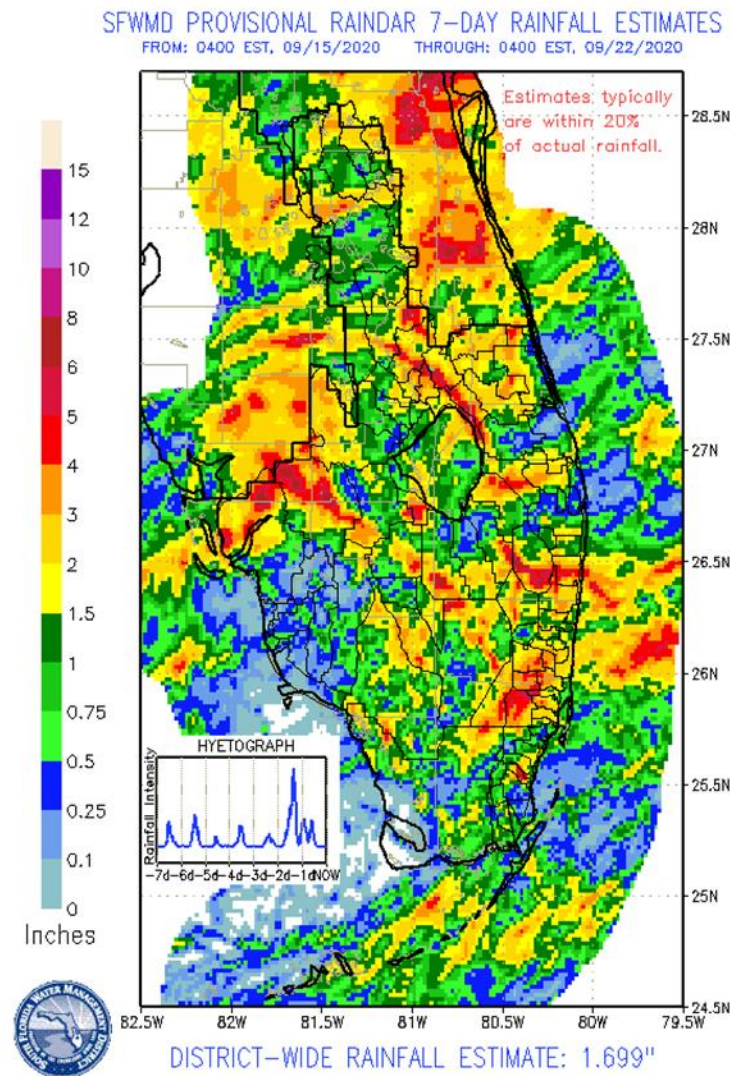


Figure 4. 7-Day rainfall estimates by RAINDAR.

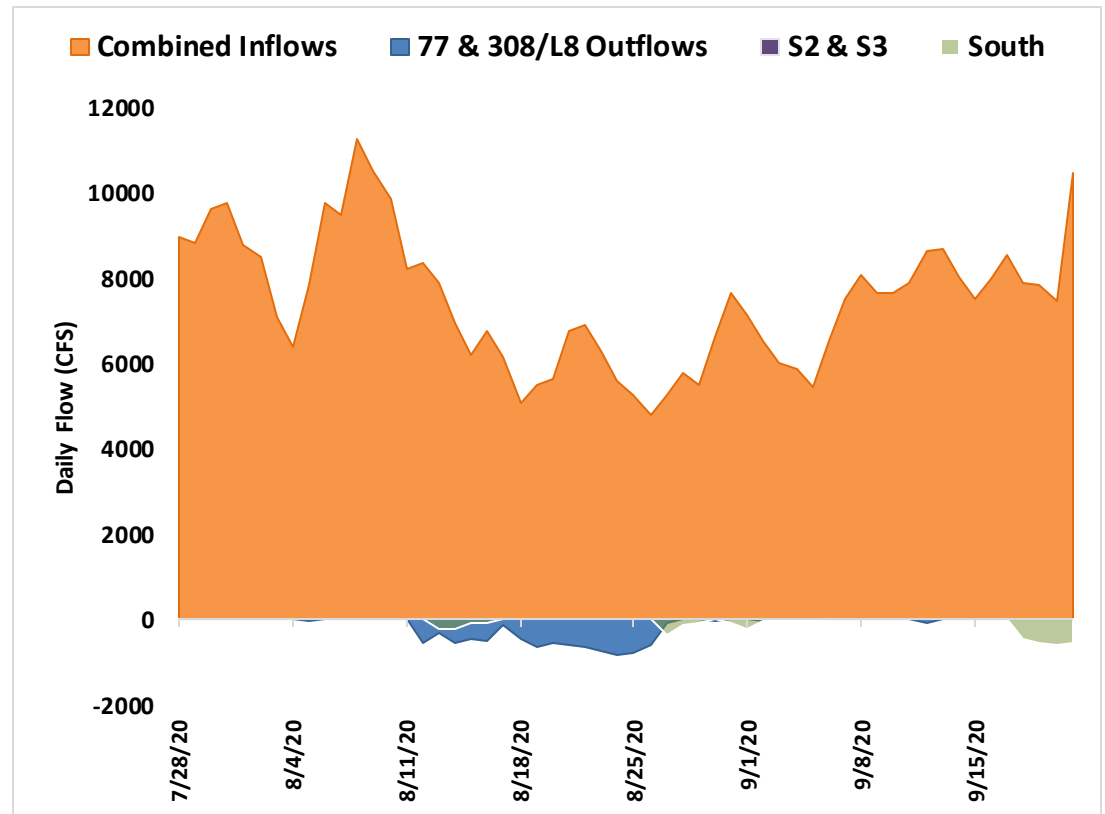


Figure 5. Major inflows (orange) and outflows (blue) of Lake Okeechobee, including the S-350 structures designated as South (green). The L-8 Canal flows through Culvert 10A are included as outflows when positive, and as inflows when backflowing into the Lake. All inflows and outflows are shown as positive 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: September 8-9, 2020

Station	CHLa (ug/L)	TOXIN (ug/L)	TAXA	Station	CHLa (ug/L)	TOXIN (ug/L)	TAXA
FEBIN	50.8	BDL	<i>Cylindro</i>	L001	28.8	0.4	mixed
FEBOUT	37.1	BDL	mixed	L004	38.5	10.0	<i>Micro/Cylin</i>
KISSR0.0	12.3	BDL	mixed	L006	5.4	2.4	<i>Microcys</i>
L005	19.5	BDL	mixed	L007	2.9	BDL	mixed
LZ2	24.6	BDL	mixed	L008	10.0	2.9	<i>Microcys</i>
KBARSE	38.4	62.0	<i>Microcys</i>	LZ30	7.4	0.5	<i>Microcys</i>
RITTAE2	15.0	BDL	mixed	LZ40	23.5	11.0	<i>Microcys</i>
PELBAY3	3.4	BDL	mixed	CLV10A	32.9	BDL	<i>Microcys</i>
POLE3S	12.2	0.3	mixed	NCCENTER	35.9	3.3	<i>Microcys</i>
LZ25A	3.5	BDL	mixed				
PALMOUT	14.0	0.3	mixed	S308C	14.0	BDL	mixed
PALMOUT1	22.1	4.0	<i>Microcys</i>	S77	6.6	BDL	mixed
PALMOUT2	16.7	2.0	<i>Microcys</i>				
PALMOUT3	17.4	1.6	<i>Microcys</i>				
POLESOUT	77.4	0.5	<i>Cylindro</i>				
POLESOUT1	64.6	BDL	<i>Cylindro</i>				
POLESOUT2	42.5	3.5	<i>Microcys</i>				
POLESOUT3	22.3	12.0	<i>Microcys</i>				
EASTSHORE	34.7	0.4	mixed				
NES135	30.1	BDL	mixed				
NES191	18.4	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*

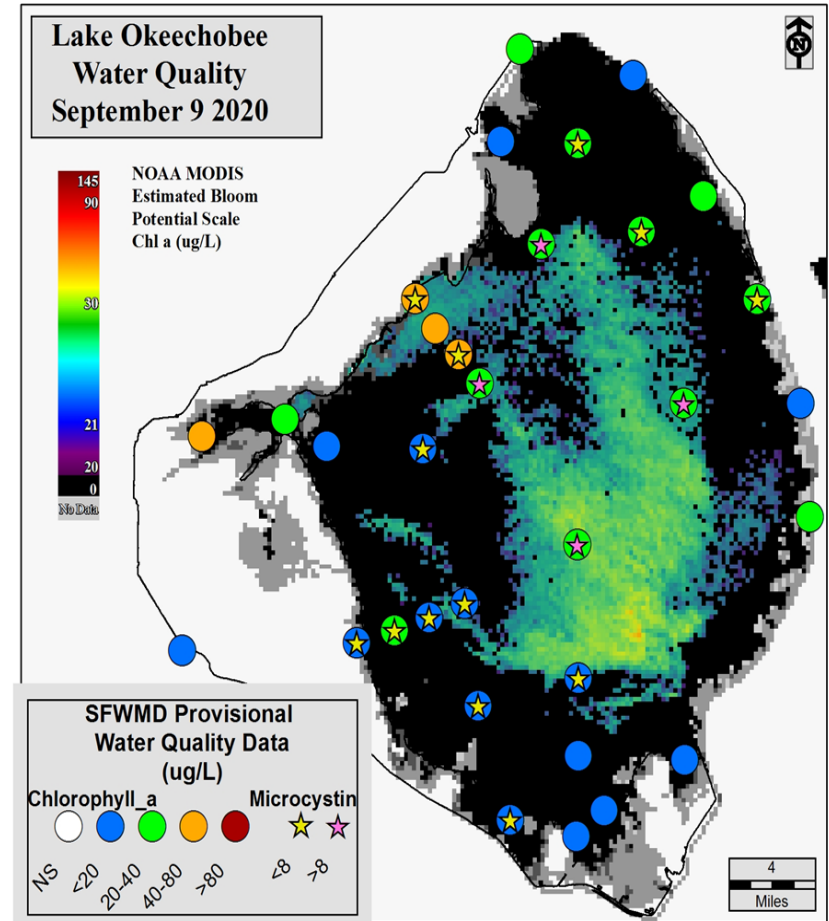


Figure 6. Provisional results from the expanded monitoring sampling trips on September 8-9, 2020

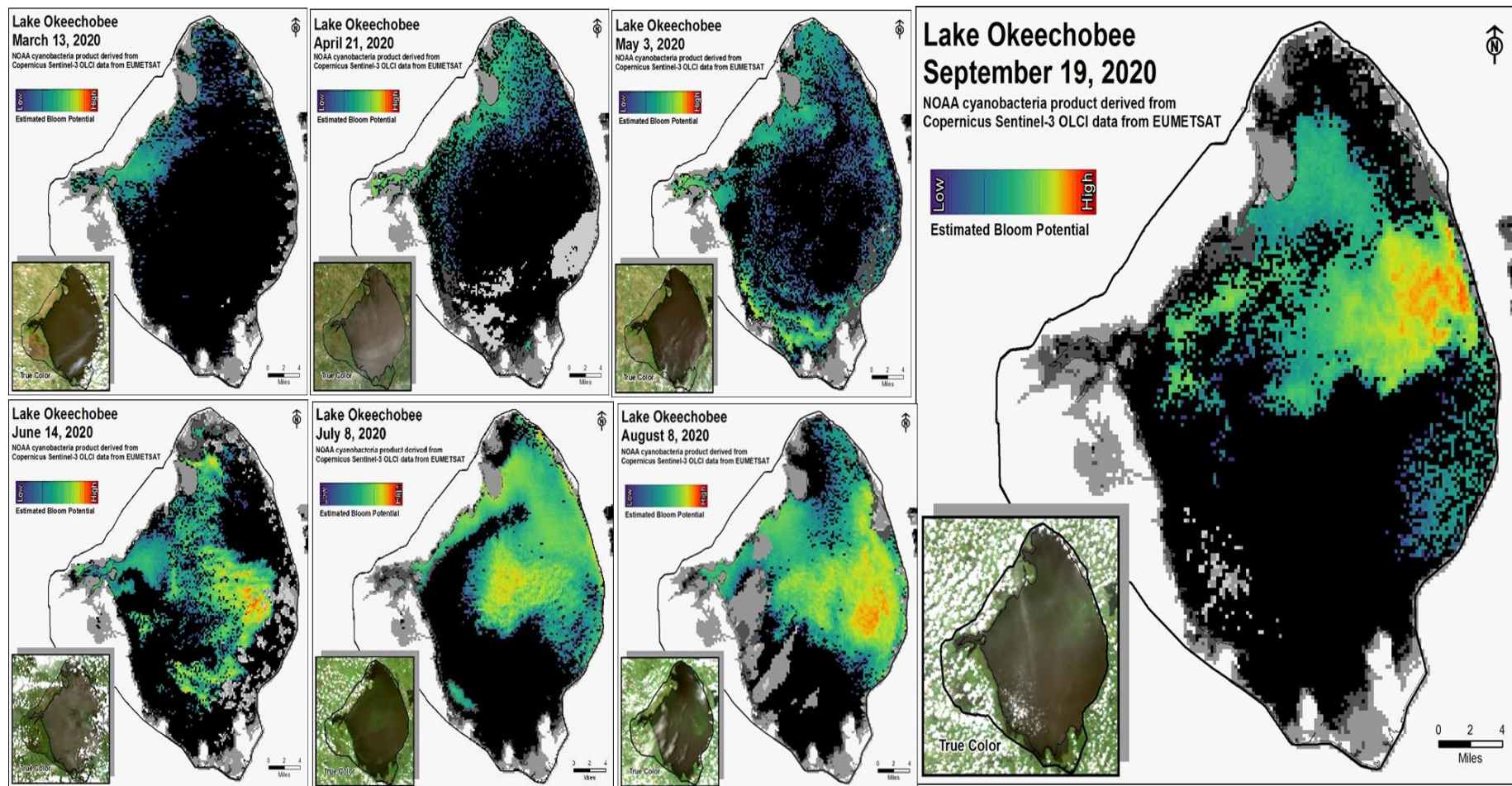


Figure 7. Potential for cyanobacterial blooms on Lake Okeechobee during 2020, based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

ESTUARIES

St. Lucie Estuary:

Due to missing data for flows at S-80, the numbers reported this week do not include the contribution from S-80. Last week total inflow to the St. Lucie Estuary averaged approximately 2,032 cfs (Figures 1 and 2) and last month inflow averaged about 1,600 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	891
S-80	Not Available
S-308	0
S-49 on C-24	484
S-97 on C-23	325
Gordy Rd. structure on Ten Mile Creek	332

Over the past week in the estuary, salinity decreased to A1A Bridge and remained the same 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. 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)	3.7 (5.4)	6.9 (8.9)	NA ¹
US1 Bridge	8.8 (9.9)	11.2 (12.9)	10.0-26.0
A1A Bridge	19.3 (19.0)	26.1 (25.1)	NA ¹

¹Envelope not applicable

Caloosahatchee Estuary:

Last week total inflow to the Caloosahatchee Estuary averaged approximately 6,848 cfs (Figures 5 and 6) and last month inflow averaged about 4,811 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	0
S-78	1,112
S-79	4,864
Tidal Basin Inflow	1,984

Over the past week in the estuary, salinity remained about the same to Val I-75 and decreased downstream (Table 4, Figures 7 & 8). The seven-day average salinity values are within the poor range

for adult eastern oysters at Cape Coral and in the good range at Shell Point and 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)	0.2 (0.2)	0.2 (0.2)	NA ¹
Val I-75	0.2 (0.2)	0.2 (0.2)	0.0-5.0 ²
Ft. Myers Yacht Basin	0.3 (0.8)	0.3 (1.9)	NA
Cape Coral	2.8 (5.1)	3.5 (8.5)	10.0-30.0
Shell Point	15.9 (18.5)	18.1 (21.5)	10.0-30.0
Sanibel	26.1 (28.0)	27.0 (29.2)	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 0.3 to 0.3 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 1,400 cfs. The 30-day moving average surface salinity at Val I-75 is forecast to be 0.3 and 0.3 (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	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 September 18, 2020, that *Karenia brevis*, the Florida red tide dinoflagellate, was not observed in samples collected from Lee or Palm Beach counties (no samples were analyzed this week from St. Lucie, Martin, Broward, or Miami-Dade counties).

Water Management Recommendations

Lake stage is in the Low sub-band. Tributary conditions are very wet. The LORS2008 release guidance suggests up to 3,000 cfs release at S-79 to the Caloosahatchee Estuary and up to 1,170 cfs release at S-80 to the St. Lucie Estuary.

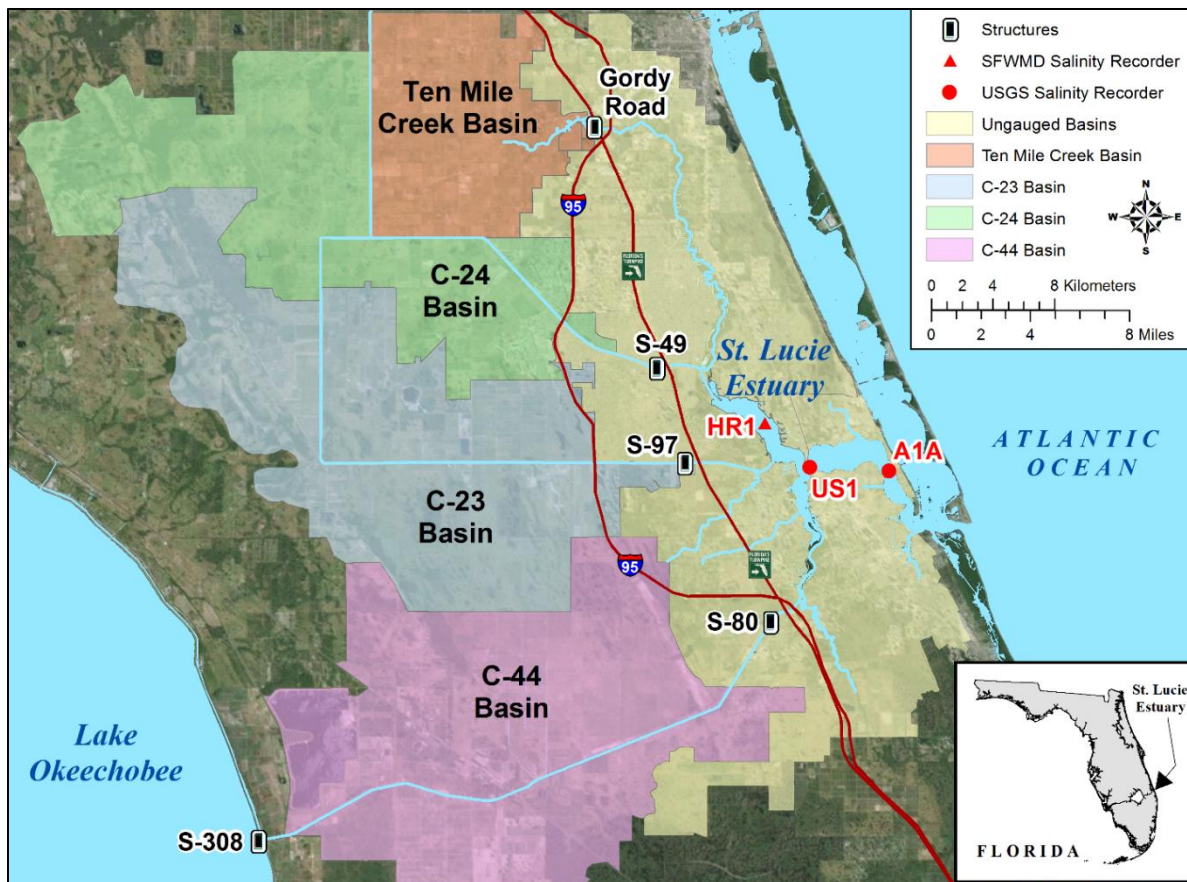


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

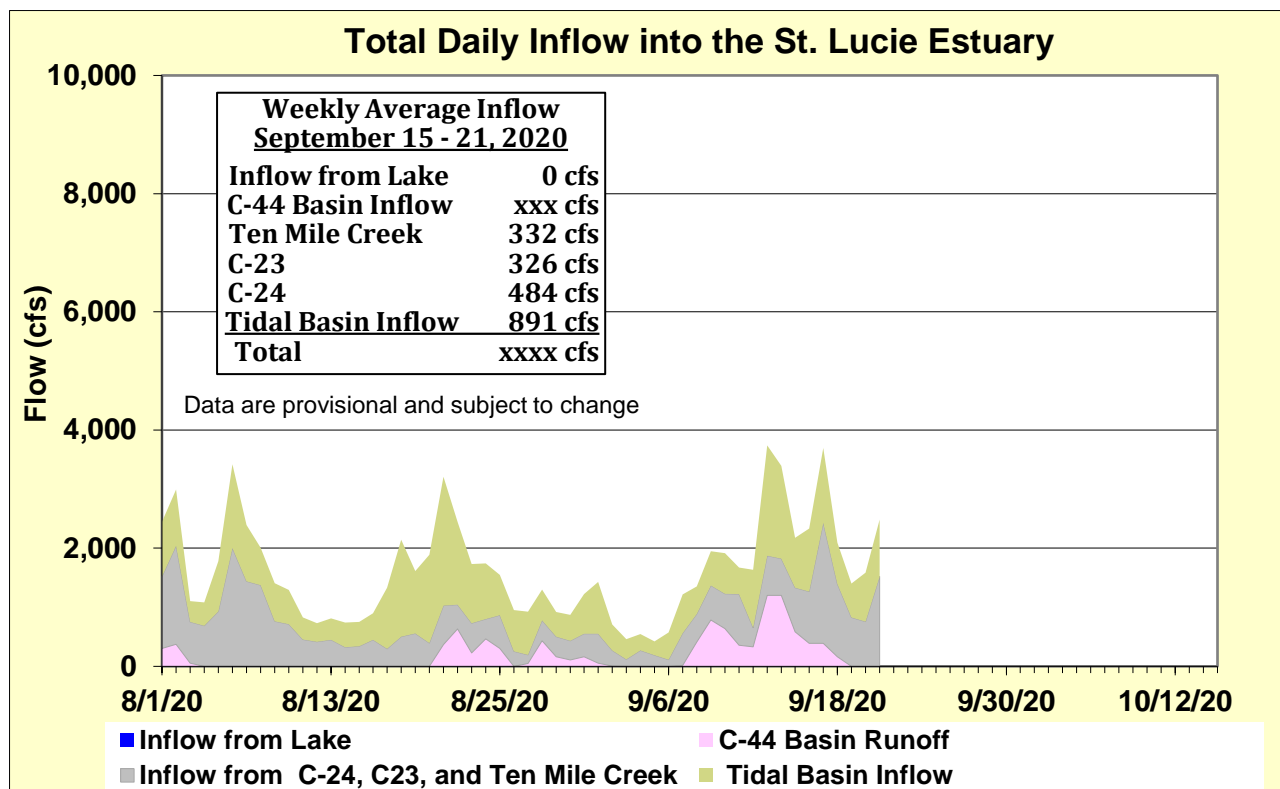


Figure 2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basin into the St. Lucie Estuary.

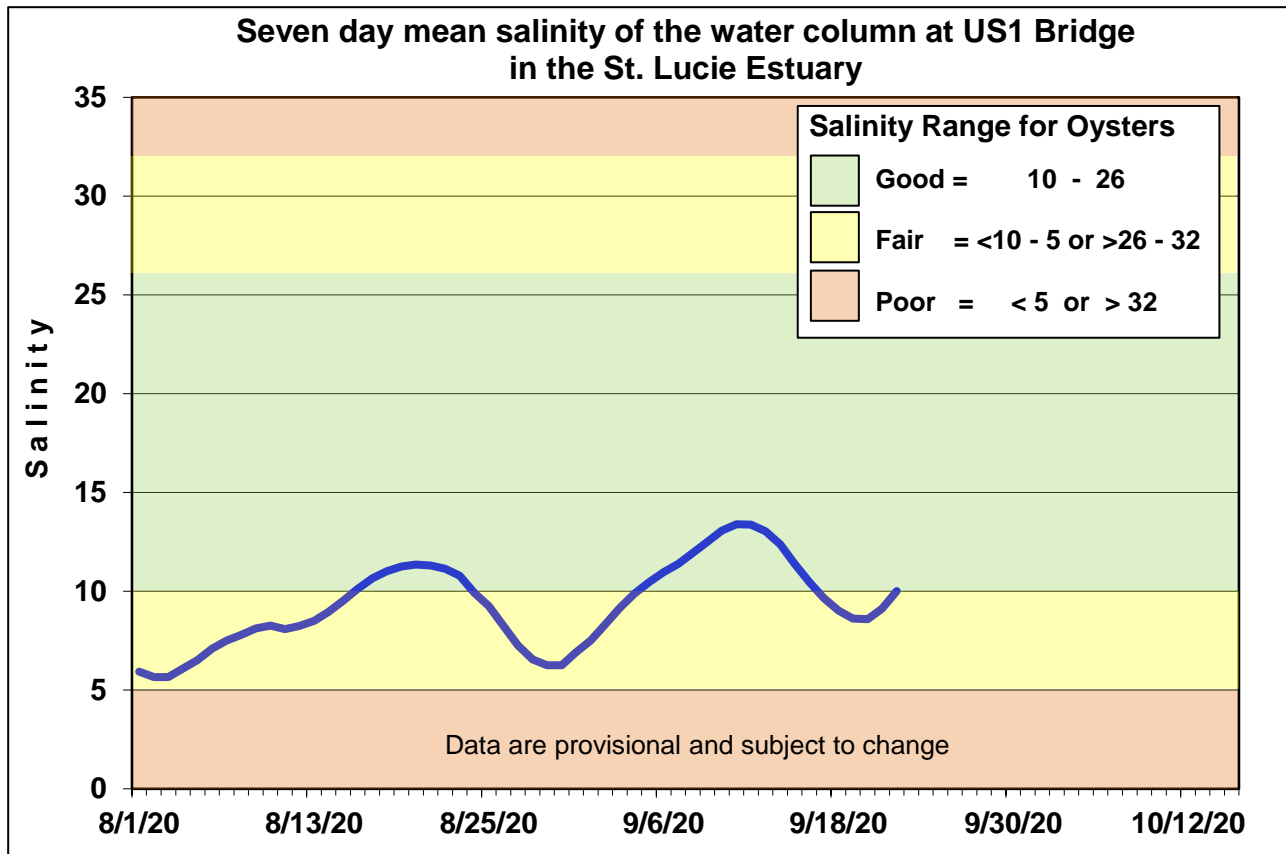


Figure 3. Seven-day mean salinity of the water column at the US1 Bridge.

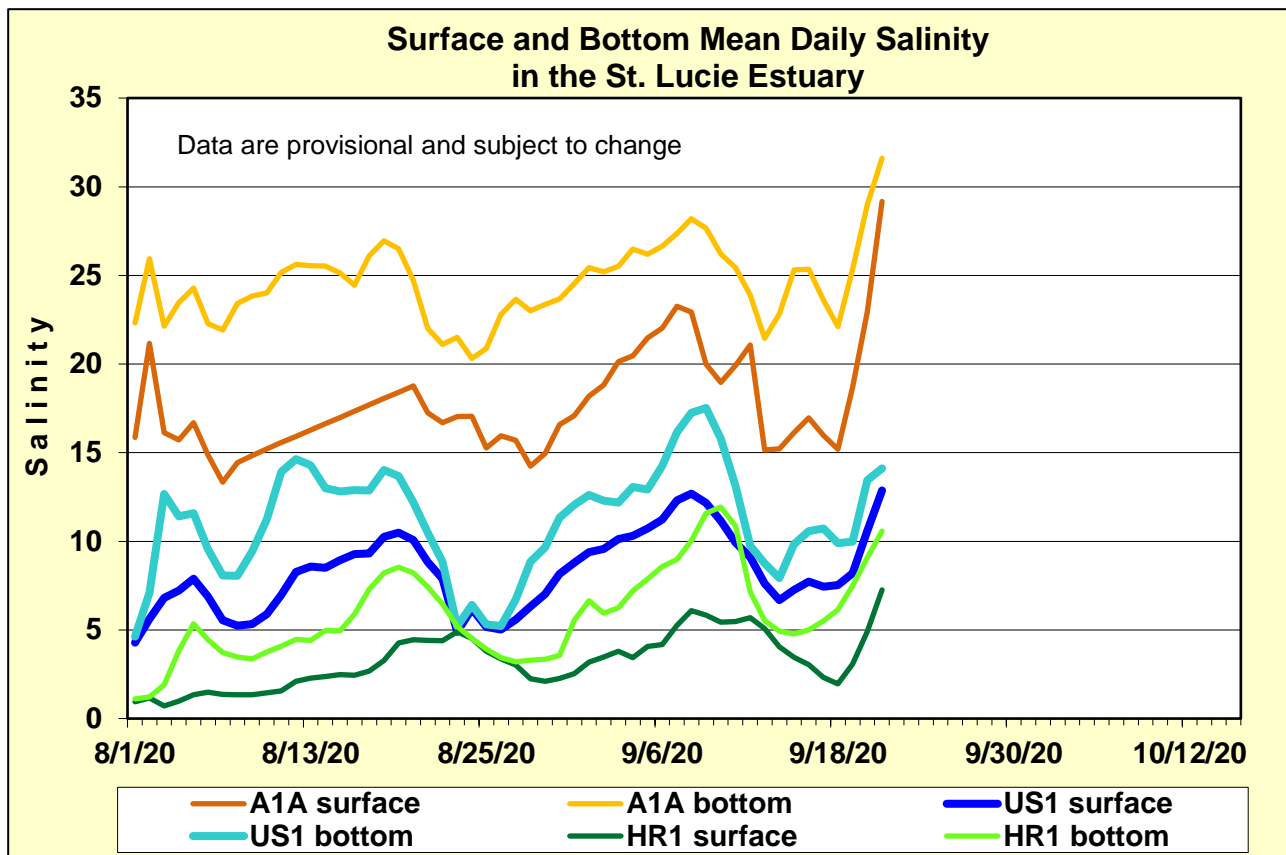


Figure 4. Daily mean salinity at the A1A, US1, and HR1 stations.

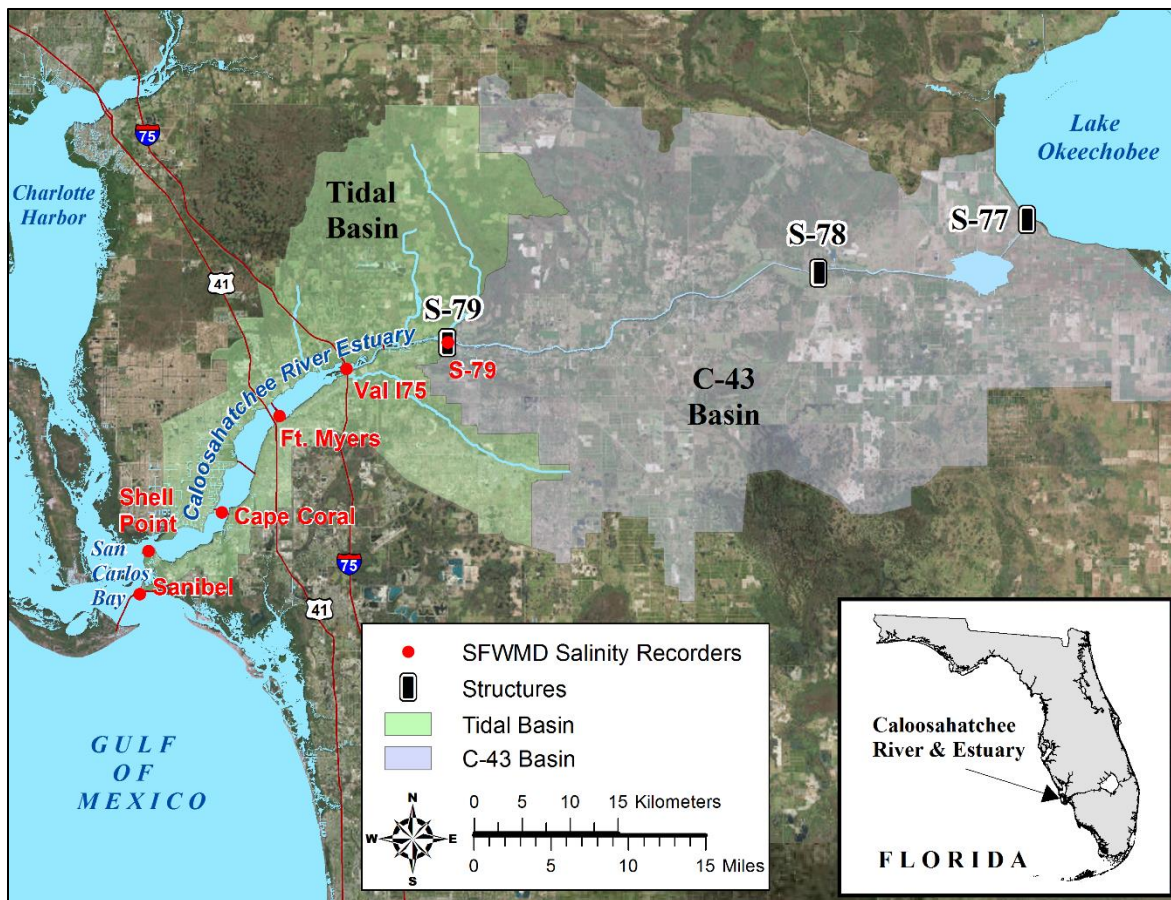


Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

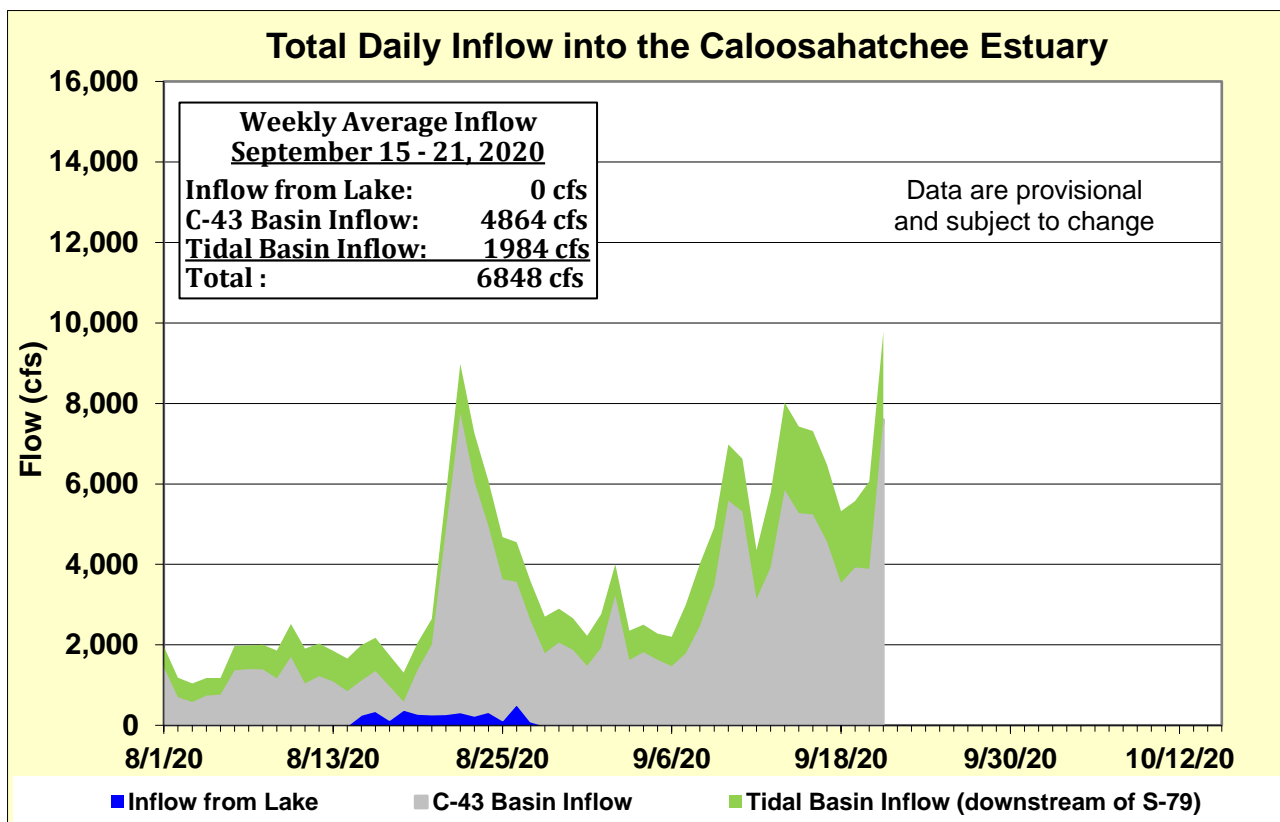


Figure 6. Total daily inflows from Lake Okeechobee, runoff from the C-43 basin

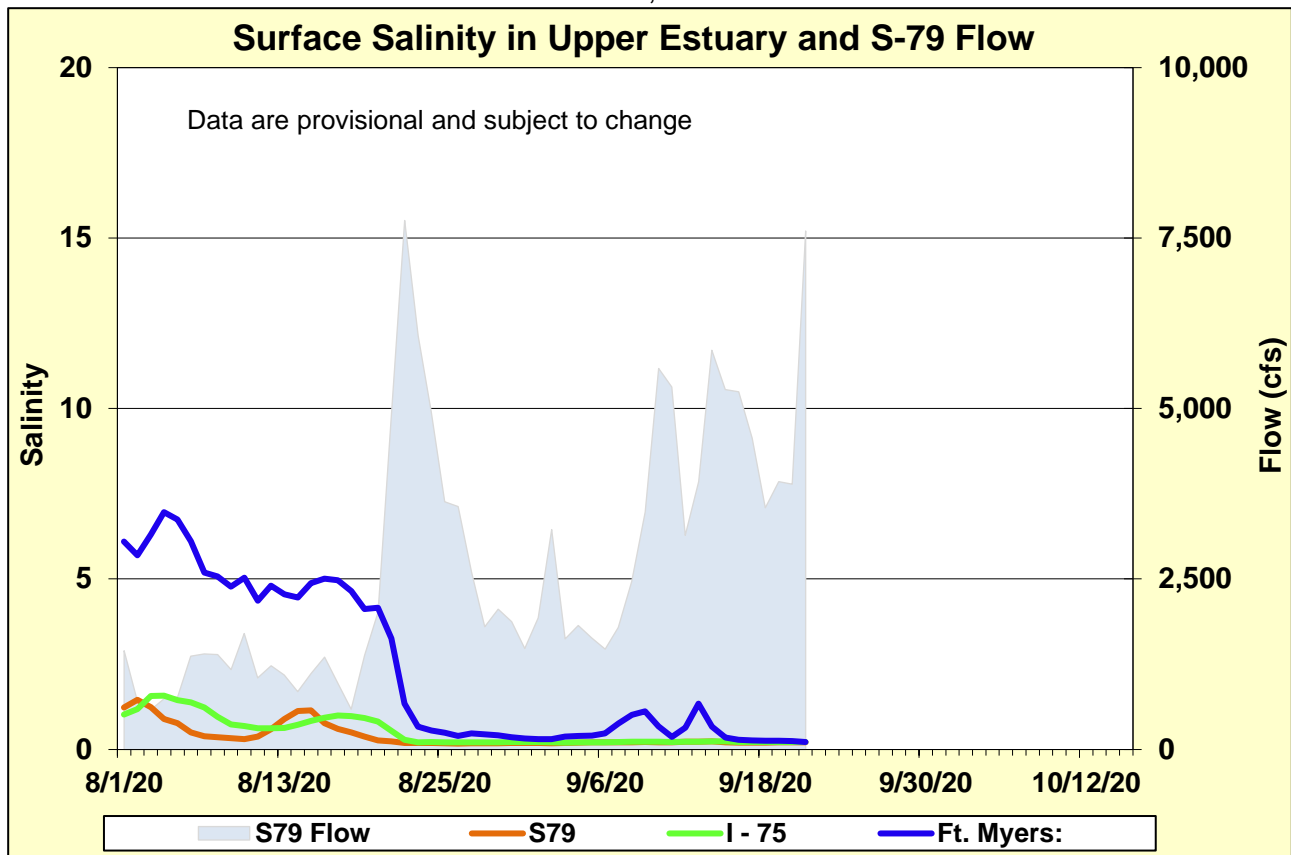


Figure 7. Daily mean flows at S-79 and salinity at upper estuary monitoring stations.

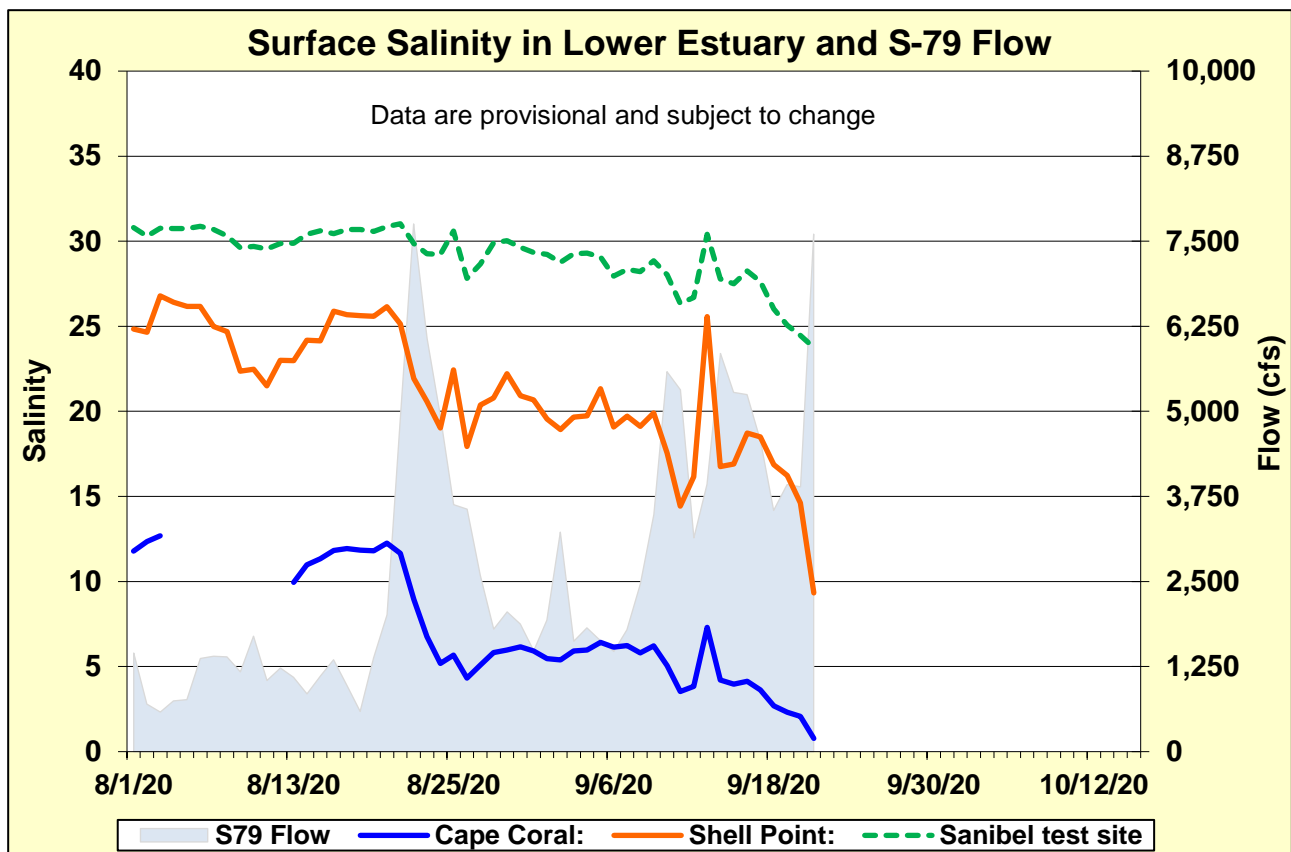


Figure 8. Daily mean flows at S-79 and salinity at lower estuary stations.

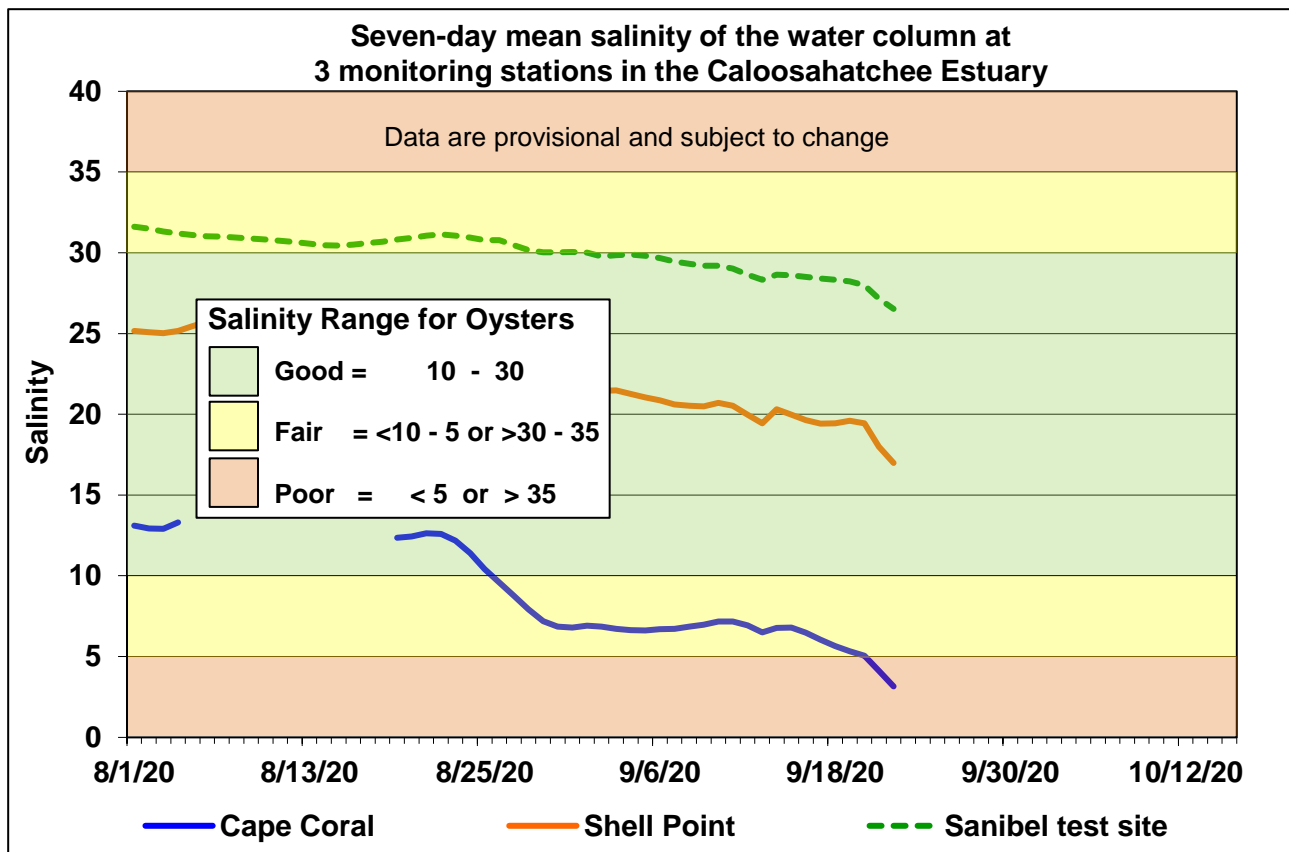


Figure 9. Seven-day mean salinity at Cape Coral, Shell Point, and Sanibel monitoring stations.

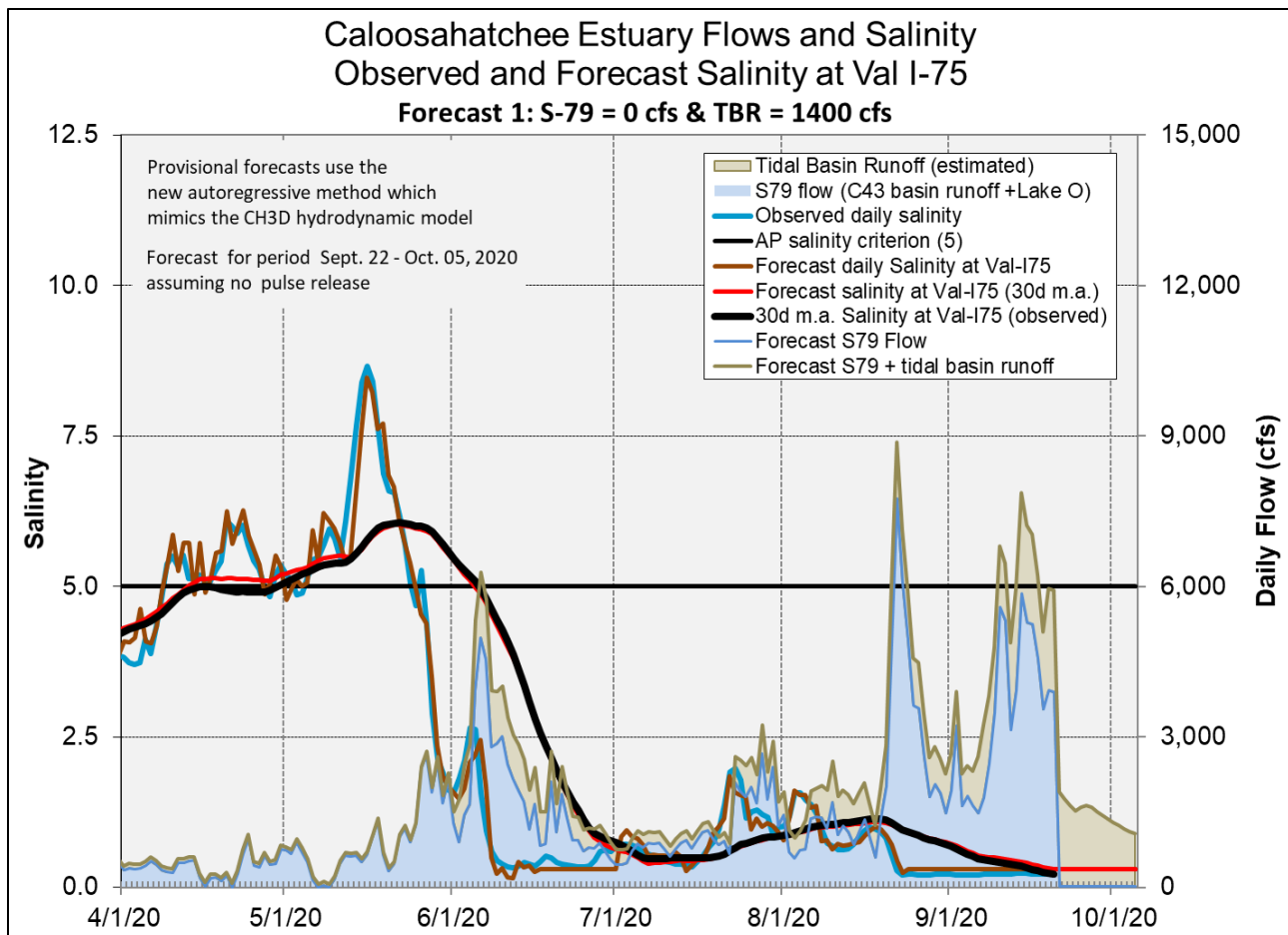
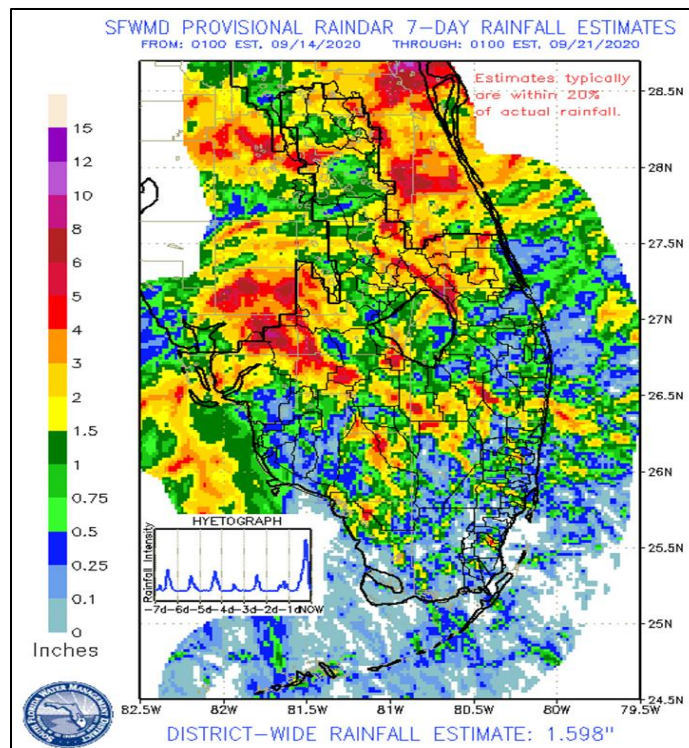


Figure 10. Forecasted Val I-75 surface salinity assuming no pulse release at S79.

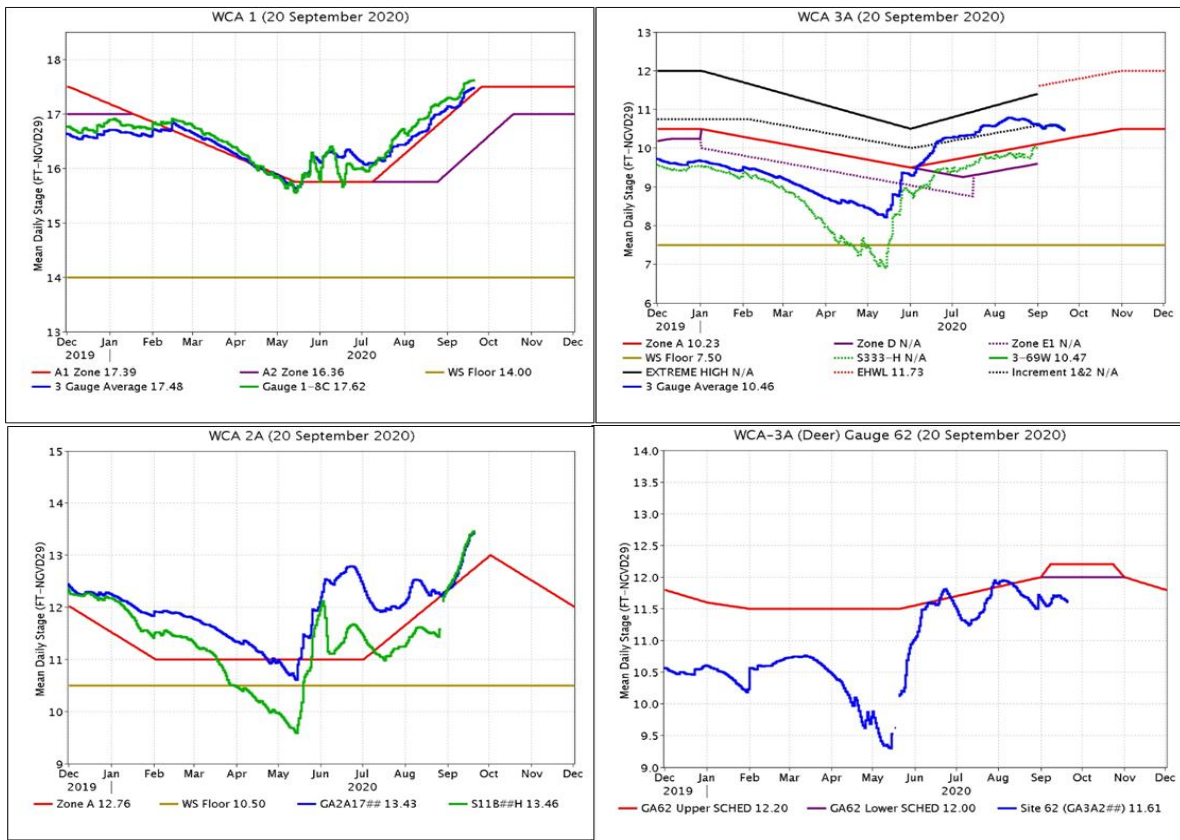
EVERGLADES

Scattered rainfall occurred across the Everglades last week, with the highest amount in northwestern WCA-3A and eastern WCA-1. At the gauges monitored for this report, stages increased 0.01 feet on average, and for the third week in a row central WCA-2A experienced the most extreme change with an increase of 0.30 feet. Evaporation was estimated at 0.88 inches last week.

Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	1.59	+0.15
WCA-2A	1.23	+0.30
WCA-2B	0.32	+0.03
WCA-3A	1.26	-0.14
WCA-3B	0.59	-0.05
ENP	0.54	+0.04



Regulation Schedules: WCA-1: Stage at the 1-8C Gauge trended along the rising Zone A1 regulation line last week, currently 0.23 feet above and 0.14 feet above the 3-Gauge average. WCA-2A: Stage at Gauge 2-17 stage continues to trend away from the rising regulation schedule, now 0.67 feet above. WCA-3A: The Three Gauge Average stage trended downward last week towards the rising Zone A regulation line, currently 0.23 feet above. WCA-3A: Stage at gauge 62 (Northwest corner) is currently 0.39 feet below the stable Lower Schedule and 0.59 feet below the Upper Schedule.

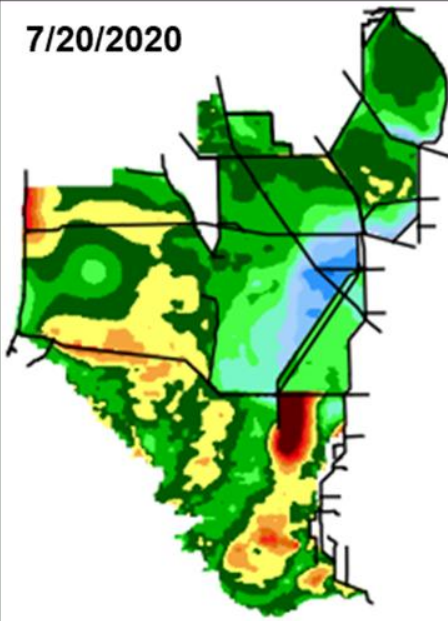


Water Depths: The WDAT tool for spatial interpolation of depth monthly snapshots over the last two months indicate ponding depths in WCA-3A South are diminishing around the upper reaches of the L-67 Canal. Ponding depths are being reached in both southern WCA-1 and southern WCA-2A. Hydrologic connectivity is well established within the major sloughs in Everglades National Park (ENP), and there is much less potential for water depths below ground along Tamiami Trail in southern Big Cypress National Preserve. Comparing WDAT water levels from present, over the last month stage changes were moderate across most the Everglades system. WCA-1 is deeper in the northwest and southeast, WCA-2A is deeper in the southeast and WCA-3A is significantly shallower downstream of the S-11s. Looking back one year, the stage difference patterns are similar to one month ago but more significant in WCA-1 and WCA-2A, both higher in stage by 1.0 foot.

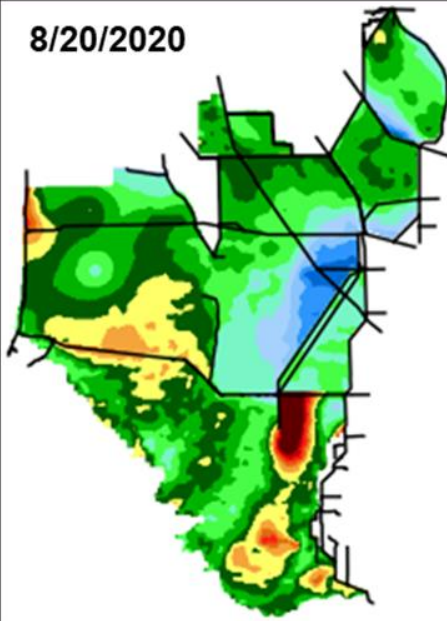


SFWDAT Water Depth Monthly Snapshots

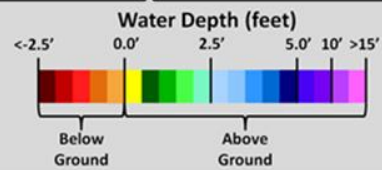
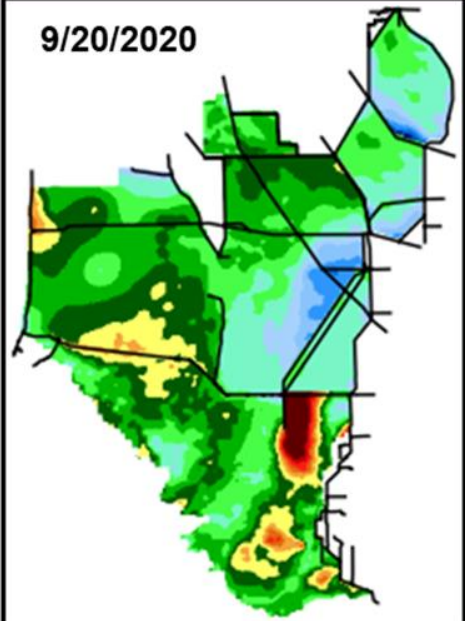
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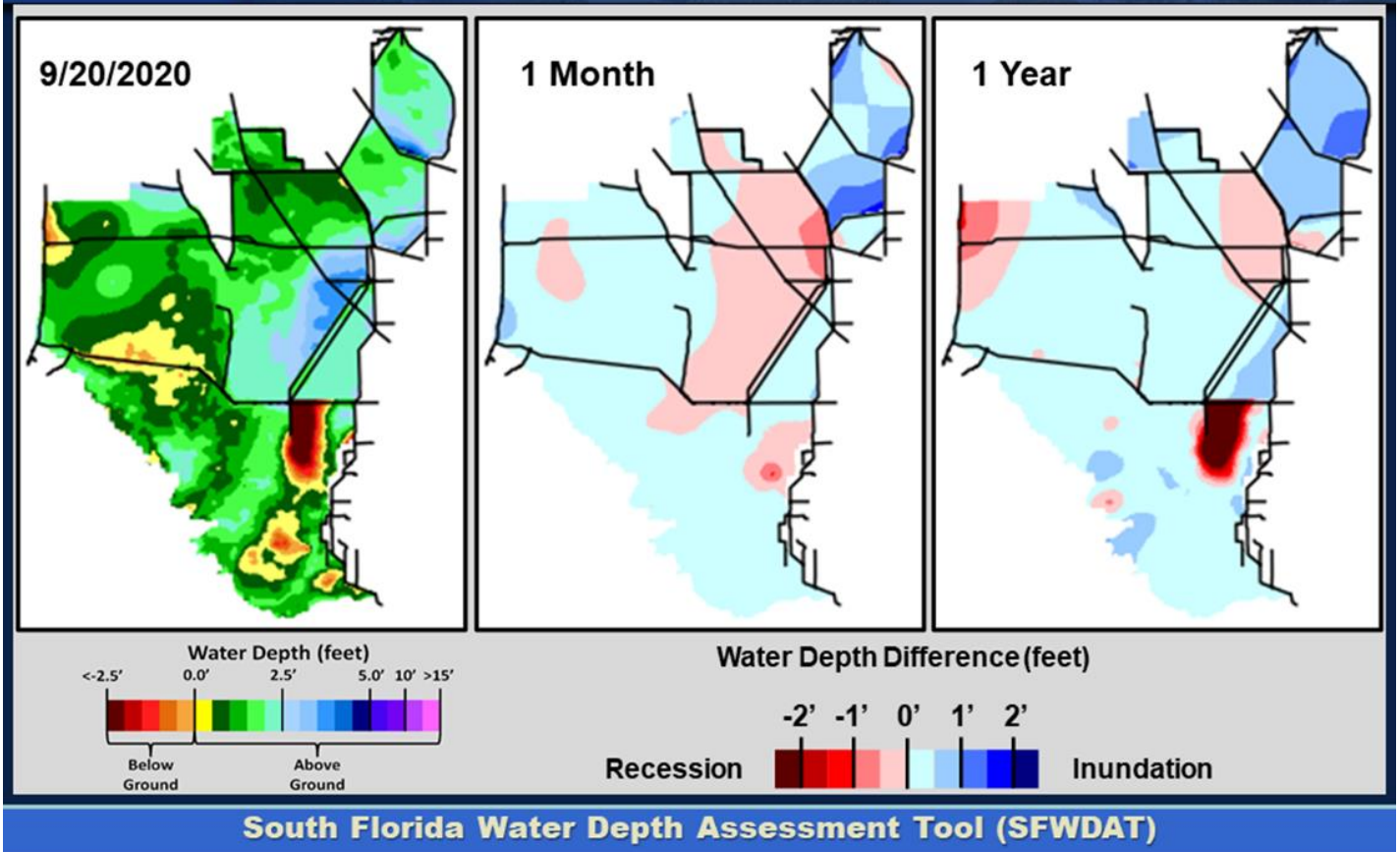
9/20/2020



South Florida Water Depth Assessment Tool (SFWDAT)

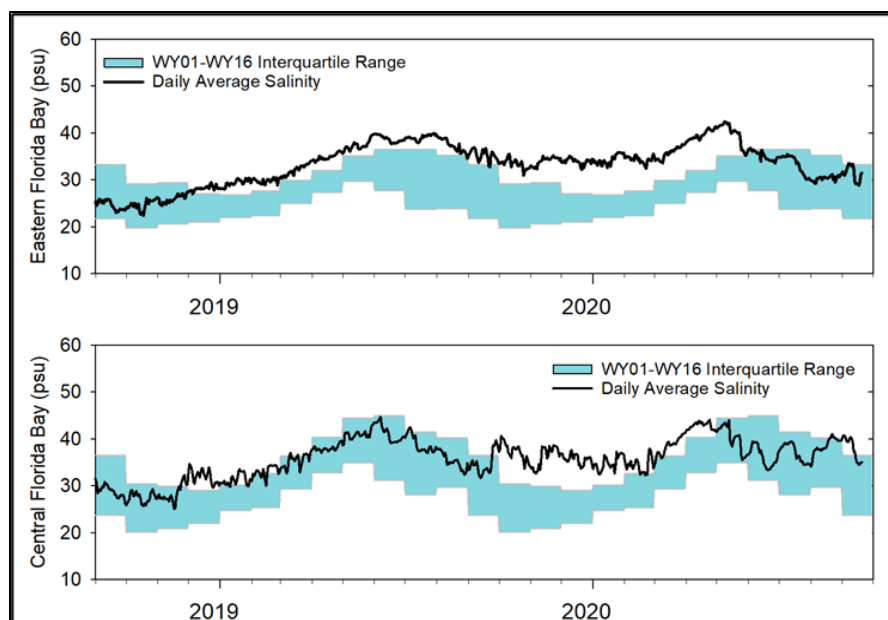
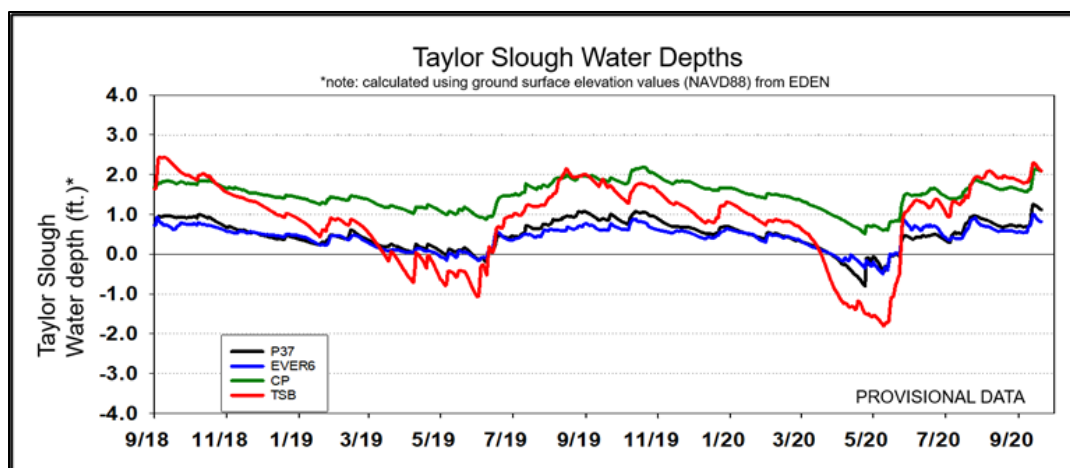
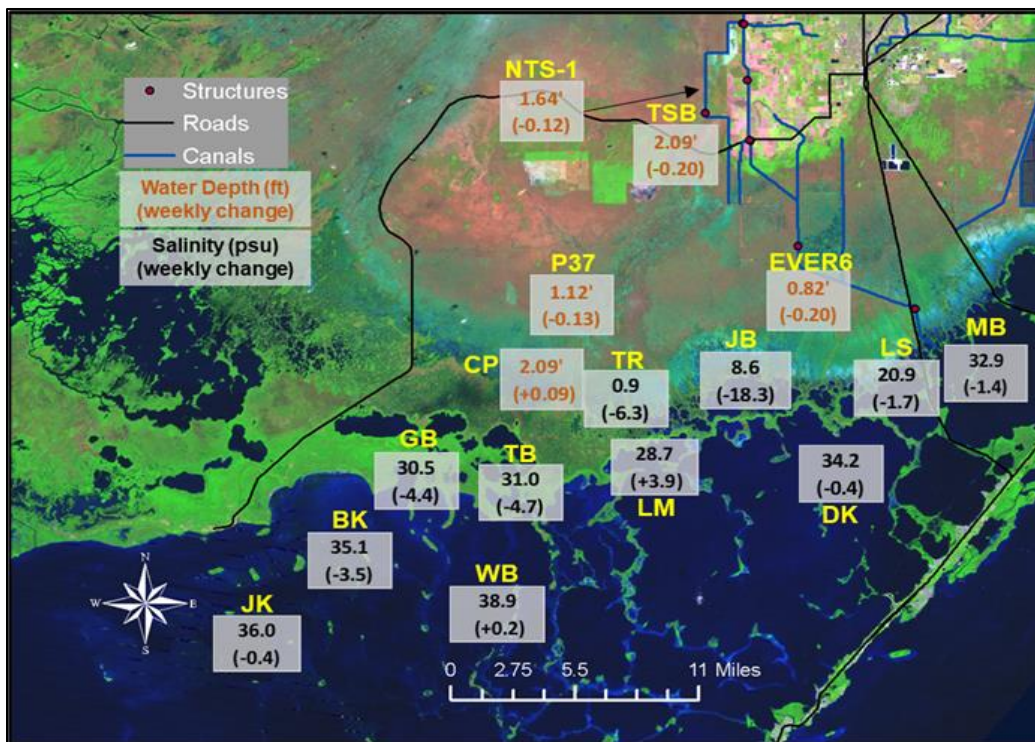


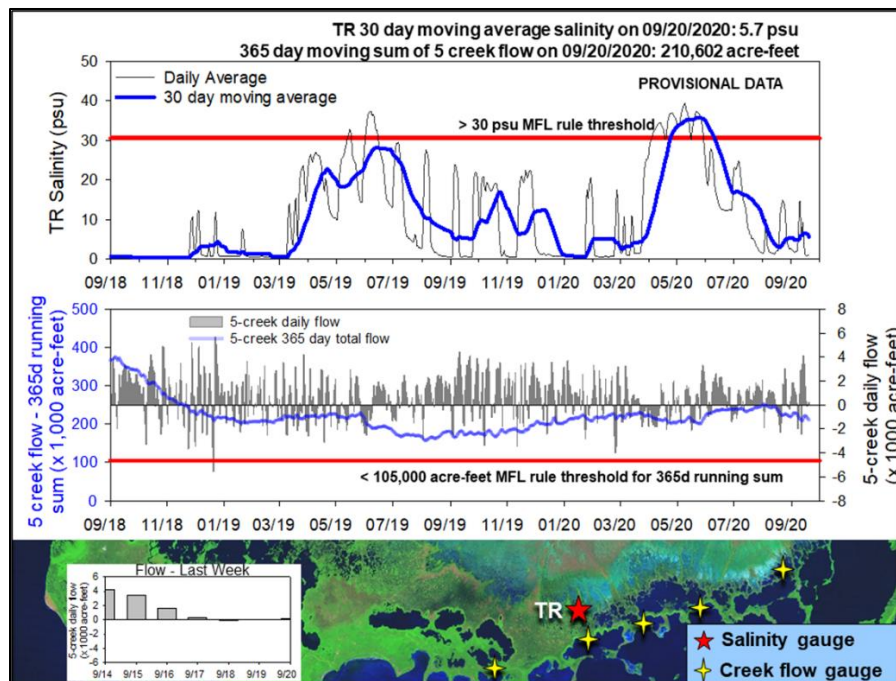
SFWDAT Everglades Difference Maps (Present – Past)



Tree island inundation in WCA-3A, WCA-3B and Everglades National Park: 371 Tree Islands of known elevation within WCA-3A, WCA-3B, and Everglades National Park's Shark Slough. Current rough estimates using WDAT (9/14/20): 43% or 161 of the tree islands are currently inundated, down from 48% the week prior. Initial islands were inundated beginning 5/24/20; the longest duration of continuous inundation is 112 days. Inundation for more than 90 days has the potential for ecological harm.

Taylor Slough Water Levels: An average of 0.21 inches of rain fell over Taylor Slough and Florida Bay this past week, and stages decreased 0.11 feet with almost all areas decreasing over the week. Northern Taylor Slough is 6 inches higher than the historical average (pre-Florida Bay Initiative). All areas are at least 2 inches higher than their historical averages.





Florida Bay Salinities: Salinities in Florida Bay decreased 3.3 psu on average with individual station changes ranging from -18.3 to $+3.9$ psu as the impacts of the previous week's rain were realized. Nearshore salinity is averaging 30 psu as we move into the part of the year expected to have the lowest salinities. The 75th percentile of October in each region has the largest month to month decrease for the year in every region of the Bay.

Florida Bay MFL: Salinity at the TR station in the mangrove zone (tracked for the Florida Bay MFL) has finally reached the < 1 psu condition for the first time this year as a result of last week's rain. The 30-day moving average decreased 0.5 psu to end at 5.7 psu. Weekly flow from the 5 creeks identified by yellow stars on the map totaled +9,700 acre-feet but all of that came at the beginning of the week. The 365-day moving sum of flow from the five creeks (tracked as part of the Florida Bay MFL criteria) decreased 1,000 acre-feet this week to end at 210,602 acre-feet which is between the historical median (249,091 acre-feet) and 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. Current climatic predictions for both tropical activity and for low rainfall amounts in the upcoming dry season makes this a particularly sensitive time of year for conserving water. Holding the water north in the system, during the historic peak creates conditions that could provide ecological benefit to the Everglades in the next season and beyond.

Moderating rapid increases in stage to within the preferred ecological rate of less than 0.25 feet per week or 0.50 feet per two weeks (as happened in central WCA-2A over the last three weeks with the 1-week and two-week maximum exceeded) has ecological benefit.

Peak stages in the fall in northern WCA-3A (11.5 feet NGVD 29 at gauge 3-63) provide improved conditions to support next season's wading bird nesting success at the Alley North colony by providing conditions for an increase in prey base as well as provide surface water that can protect it from terrestrial predators during the nesting season. The WDAT currently predicts the potential for exposed ground surface in the extreme northeast of WCA-3A North downstream of the S-150. Inflows or the

conservation of water within this area have ecological benefit for peat soil conservation and wading bird foraging.

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 90 days but not more than the 120-day upper bound for the potential to do ecological harm in regions containing sensitive islands. Moderating inflows/outflows within that region that decreases ponding in both spatial extent and the amount of time the region is inundated has benefit to the ecology of tree islands.

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 but require more freshwater to continue to decrease salinities in all areas of the 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, September 22nd, 2020 (red is new)			
Area	Weekly change	Recommendation	Reasons
WCA-1	Stage increased by 0.15'	Moderating the ascension rate to less than 0.25 feet per week or 0.50 feet per two weeks and conserving water in this basin has ecological benefit.	Protect upstream/downstream habitat and wildlife. Apple snail reproduction is hindered by rapidly increasing stage.
WCA-2A	Stage increased by 0.30'	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-2B	Stage increased by 0.03'	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 0.12'	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 0.15'	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 0.13'	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, and tree island ecology is diminished by flooding
Southern WCA-3A S	Stage decreased by 0.16'		
WCA-3B	Stage decreased by 0.05'	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 0.04'	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 -0.20' to +0.09'	Move water southward as possible	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged -18.3 to +3.9 psu.	Move water southward as possible	When available, provide freshwater to maintain low salinity buffer and promote water movement.