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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 16, 2020

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

Tropical Storm Sally is in the northeastern Gulf of Mexico, but associated moisture and outer thunderstorm bands will continue to enhance thunderstorm development over the District, particularly west. Some drier air is forecast to move in from the east Tuesday with daily thunderstorm coverage dropping to below average for Tuesday, Wednesday, and Thursday. Steering winds should focus activity over the interior and west Tuesday and Wednesday and then north and over the southern interior Thursday. As Sally exits eastward across Georgia and South Carolina on Friday, a trailing band of moisture will shift eastward over north Florida and central Florida with an uptick in shower coverage Friday mainly north and southeast. The exiting Sally will also push a frontal boundary southward through north Florida and into north-central Florida Saturday and Saturday night. A weak low is then forecast along this boundary near the east central Florida coast Saturday night and then southward to near Lake Okeechobee. The combination of this boundary and the developing low should bring an increase in shower activity Saturday and Sunday, particularly north and east. Total rainfall is forecast to be near the historical average for both the first 7-day period (Week 1) and the second 7-day period (Week 2).

Kissimmee

Tuesday morning stages were 57.1 feet NGVD (0.4 feet above schedule) in East Lake Toho, 53.8 feet NGVD (0.1 feet above schedule) in Toho, and 51.7 feet NGVD (0.5 feet above schedule) in Kissimmee-Cypress-Hatchineha; headwater stages were 46.6 feet NGVD at S-65A and 27.9 feet NGVD at S-65D. Tuesday morning discharges were 2650 cfs at S-65, 3410 cfs at S-65A, 3440 cfs at S-65D and 3890 cfs at S-65E. Dissolved oxygen concentration in the Kissimmee River averaged 1.1 mg/L for the week through Sunday. Kissimmee River mean floodplain depth on Sunday was 2.11 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 14.95 feet NGVD on September 14, 2020; 0.34 feet higher than the previous week and 1.12 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 now just 0.03 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 1 foot per month on average; potentially allowing submerged plant communities to keep up with rising stages. The cyanobacteria bloom risk potential declined over the past several days with wind and rain, though sampling on September 8-9 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 2,191 cfs over the past week with no flow coming from Lake Okeechobee. The seven-day average salinities decreased at US1 and downstream but increased at HR1 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 5,812 cfs over the past week with no flow coming from the Lake. There was little change in the seven-day average salinity in the estuary over the past week. Salinities are in the good range (0-10) for tape grass at Val I-75 and Ft. Myers. Salinities are in the good range for adult eastern oysters at Shell Point (10-30) and Sanibel and are in the fair range at Cape Coral (5-10).

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 (STAs)

Over the past week, no Lake Okeechobee water was delivered to the Flow Equalization Basins (FEBs)/STAs. The total amount of Lake releases sent to the FEBs/STAs in WY2021 (since May 1, 2020) is approximately 11,300 ac-feet. The total amount of inflows to the STAs in WY2021 is approximately 756,000 acre-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

Water Conservation Area (WCA)-1 and WCA-3A remain above schedule but are generally trending along the regulation line. 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 (FFWC) closure stage and the public closure was lifted. Depths in WCA-3A north that benefit the Alley North colony could potentially be reached based on 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. Salinities 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 2.65 inches of rainfall in the past week, and the Lower Basin received 2.35 inches of rain (SFWMD Daily Rainfall Report 09/13/2020).

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: 9/15/2020

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)						
							9/13/20	9/6/20	8/30/20	8/23/20	8/16/20	8/9/20	8/2/20
Lakes Hart and Mary Jane	S-62	244	LKMJ	60.0	R	60.0	0.0	0.0	0.0	0.0	0.2	0.1	-0.2
Lakes Myrtle, Preston, and Joel	S-57	43	S-57	61.0	R	61.0	0.0	0.0	0.0	0.0	0.0	-0.1	-0.2
Alligator Chain	S-60	278	ALLI	63.4	R	63.2	0.2	0.1	0.0	0.1	0.1	0.0	-0.1
Lake Gentry	S-63	447	LKGT	61.2	R	61.0	0.2	0.1	0.1	0.1	0.0	-0.1	-0.2
East Lake Toho	S-59	534	TOHOE	57.0	R	56.7	0.3	-0.3	-0.7	-0.5	-0.4	-0.5	-0.7
Lake Toho	S-61	1,355	TOHOW, S-61	53.8	R	53.7	0.1	0.1	-0.1	0.0	0.1	0.0	-0.2
Lakes Kissimmee, Cypress, and Hatchineha	S-65	2,193	KUB011, LKIS5B	51.6	R	51.2	0.4	0.3	0.5	0.7	0.3	0.2	0.1

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

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: 9/15/2020

Metric	Location	1-Day Average		Average for the Preceding 7-Days ¹							
		9/13/2020	9/13/20	9/6/20	8/30/20	8/23/20	8/16/20	8/9/20	8/2/20	7/26/20	7/19/20
Discharge (cfs)	S-65	2,612	2,193	2,631	3,273	2,506	1,611	1,760	4,215	4,623	2,396
Discharge (cfs)	S-65A ²	3,403	2,700	3,176	4,247	3,173	1,990	2,554	4,851	5,111	3,202
Discharge (cfs)	S-65D ²	3,429	3,512	4,262	3,420	3,067	4,360	5,466	5,538	3,846	2,383
Headwater Stage (feet NGVD)	S-65D ²	27.71	27.63	27.74	27.75	27.59	27.57	27.70	27.75	26.99	26.02
Discharge (cfs)	S-65E ²	3,508	3,578	4,317	3,444	3,079	4,484	5,703	5,462	3,671	2,229
Discharge (cfs)	S-67	0	0	0	0	0	0	0	0	0	0
DO (mg/L) ³	Phases I & II/III river channel	1.4	1.1	0.8	1.1	1.0	0.4	0.5	0.4	0.2	0.2
Mean depth (feet) ⁴	Phase I floodplain	2.11	2.06	2.42	2.27	1.76	2.06	2.60	3.02	2.64	1.63

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

²S-65A discharge combines S-65A with auxiliary structures; S-65D discharge combines discharge at S-65D, S-65DX1, and S-65DX2; S-65D stage averages stage at S-65D and S-65DX1; S-65E discharge combines S-65E and S-65EX1.

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

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

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

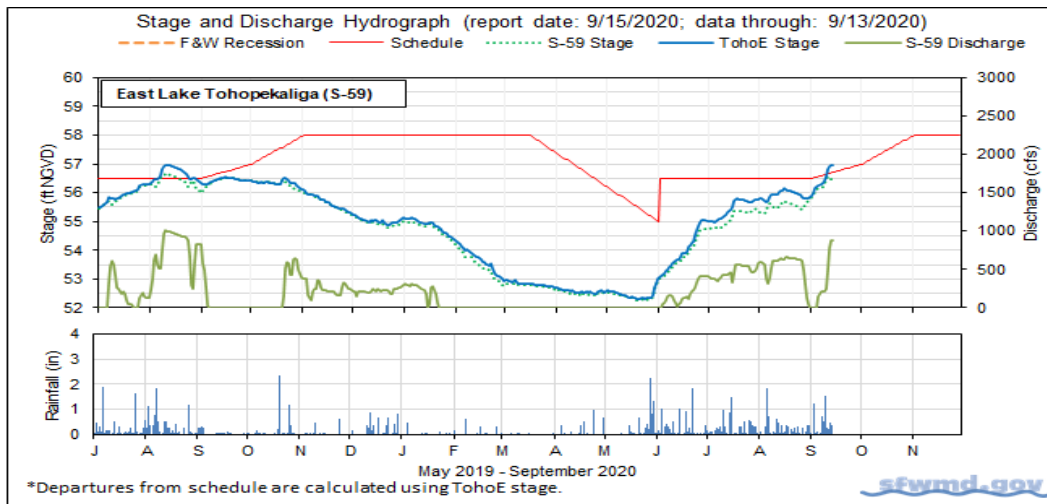


Figure 1. East Lake Toho regulation schedule, stage, discharge and rainfall.

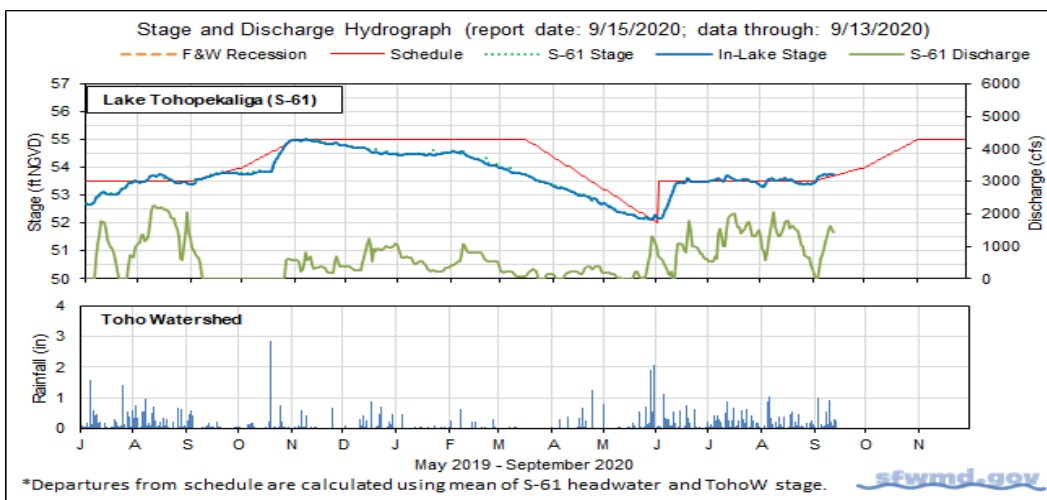


Figure 2. Lake Toho regulation schedule, stage, discharge and rainfall.

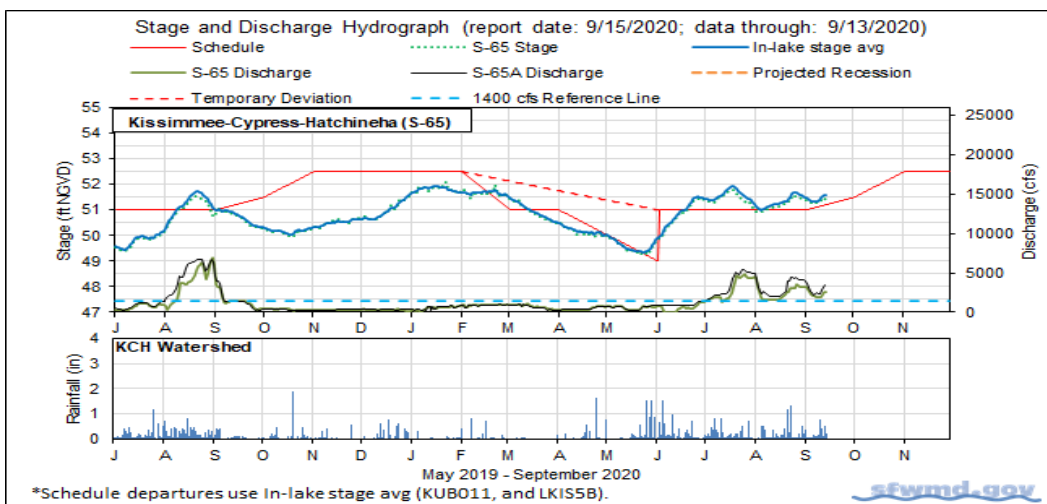


Figure 3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

Kissimmee River Phase I Restoration Area Water Depth Maps

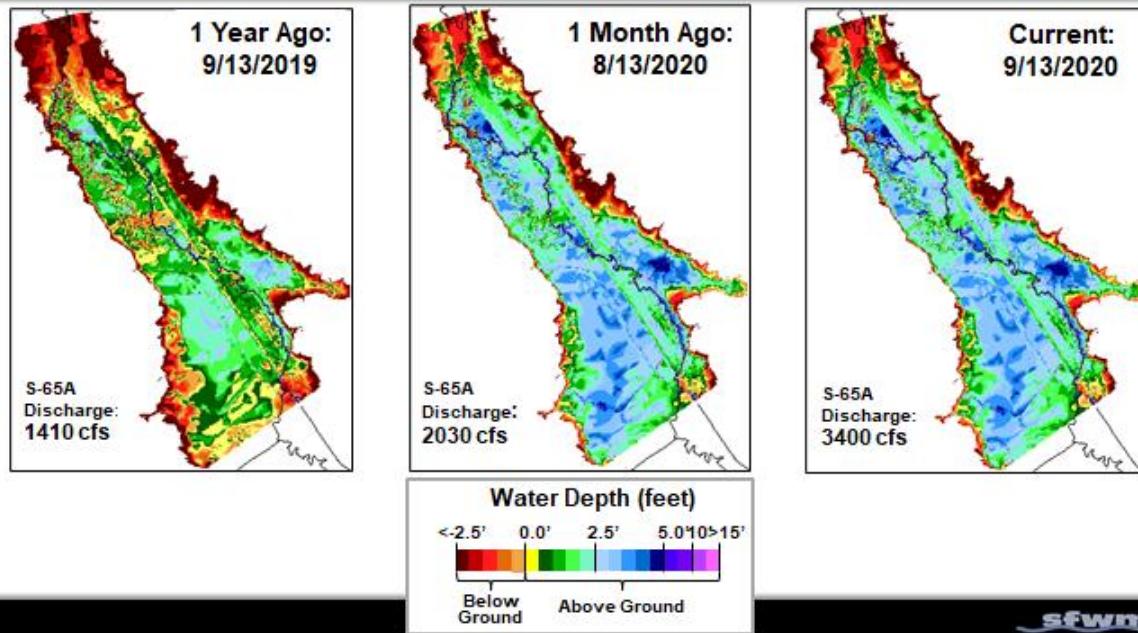
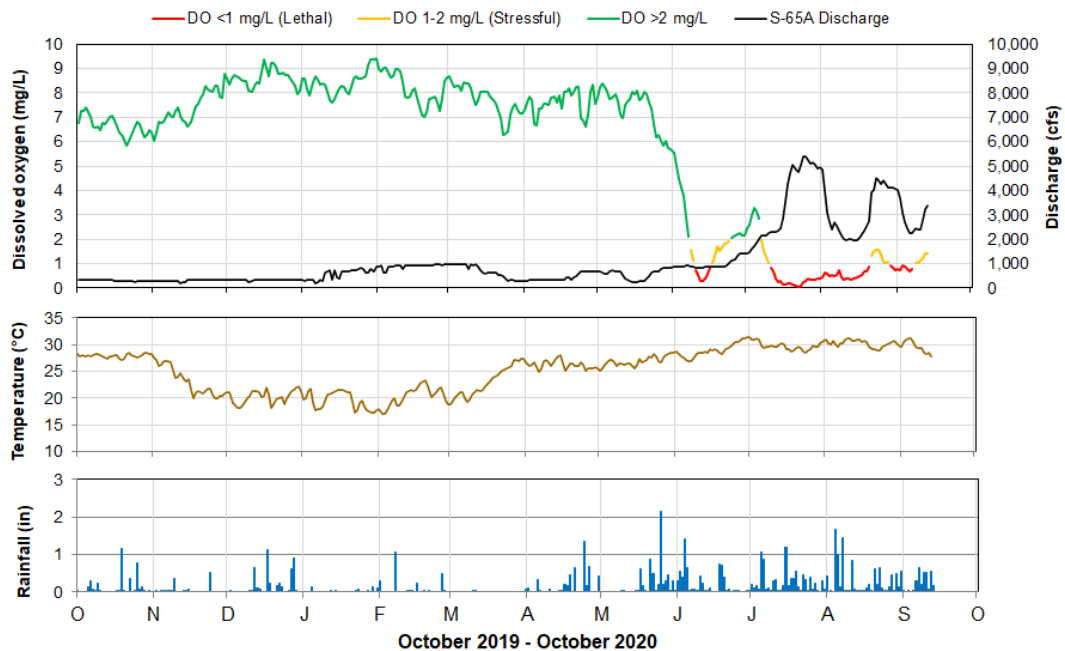


Figure 4. Phase I area floodplain water depths (from left to right) one year ago, one month ago and current. Color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to January 16, 2012.



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

Report Date: 9/15/2020; data are through: 9/13/2020

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

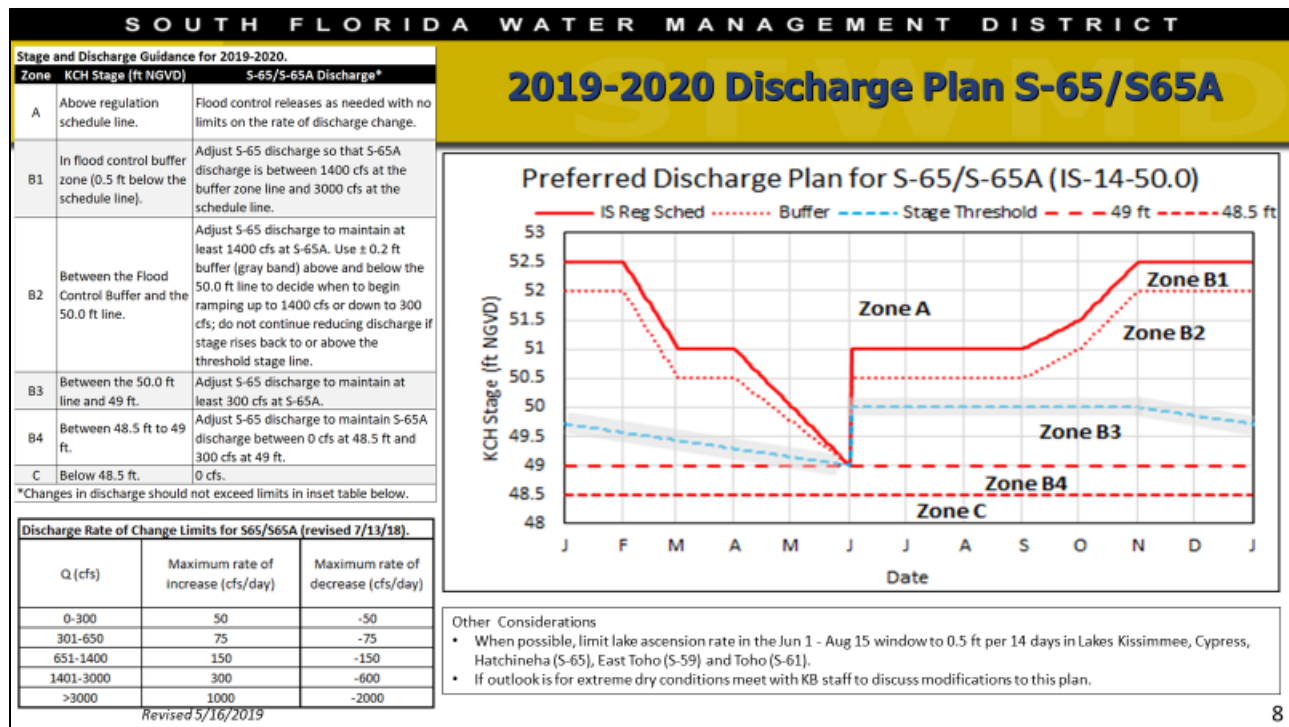


Figure 6. The 2019-2020 Discharge Plan for S-65/S-65A.

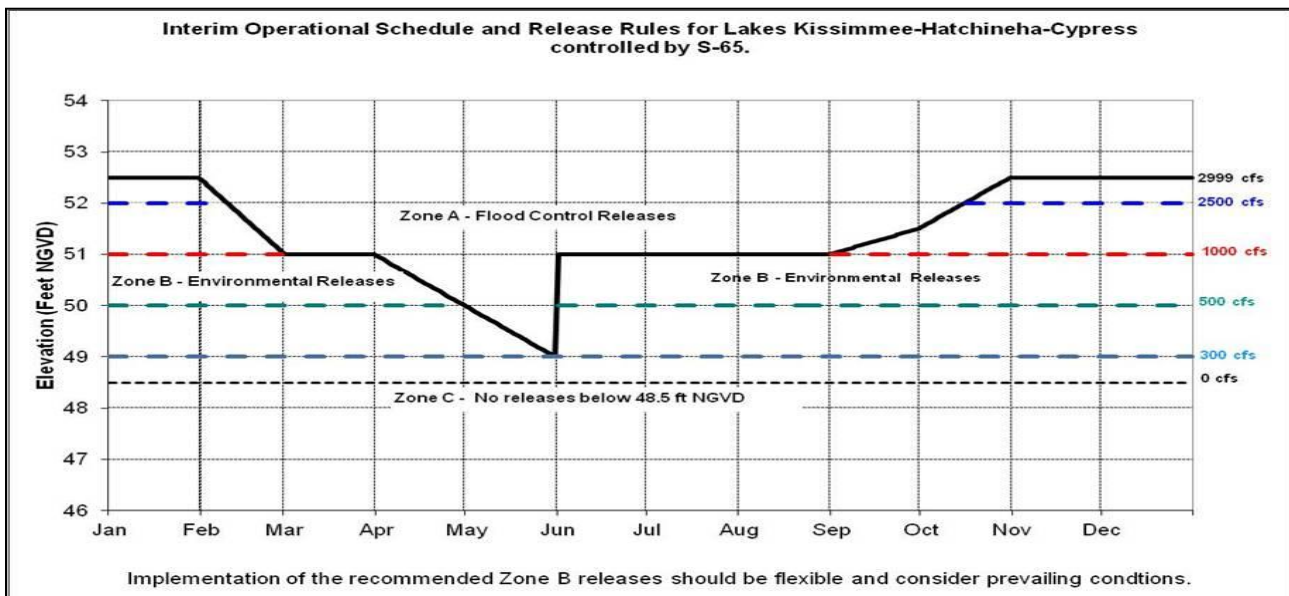


Figure 7. Interim operations schedule for S-65 (solid black line). The discharge schedule shown to the right has not been used in recent years.

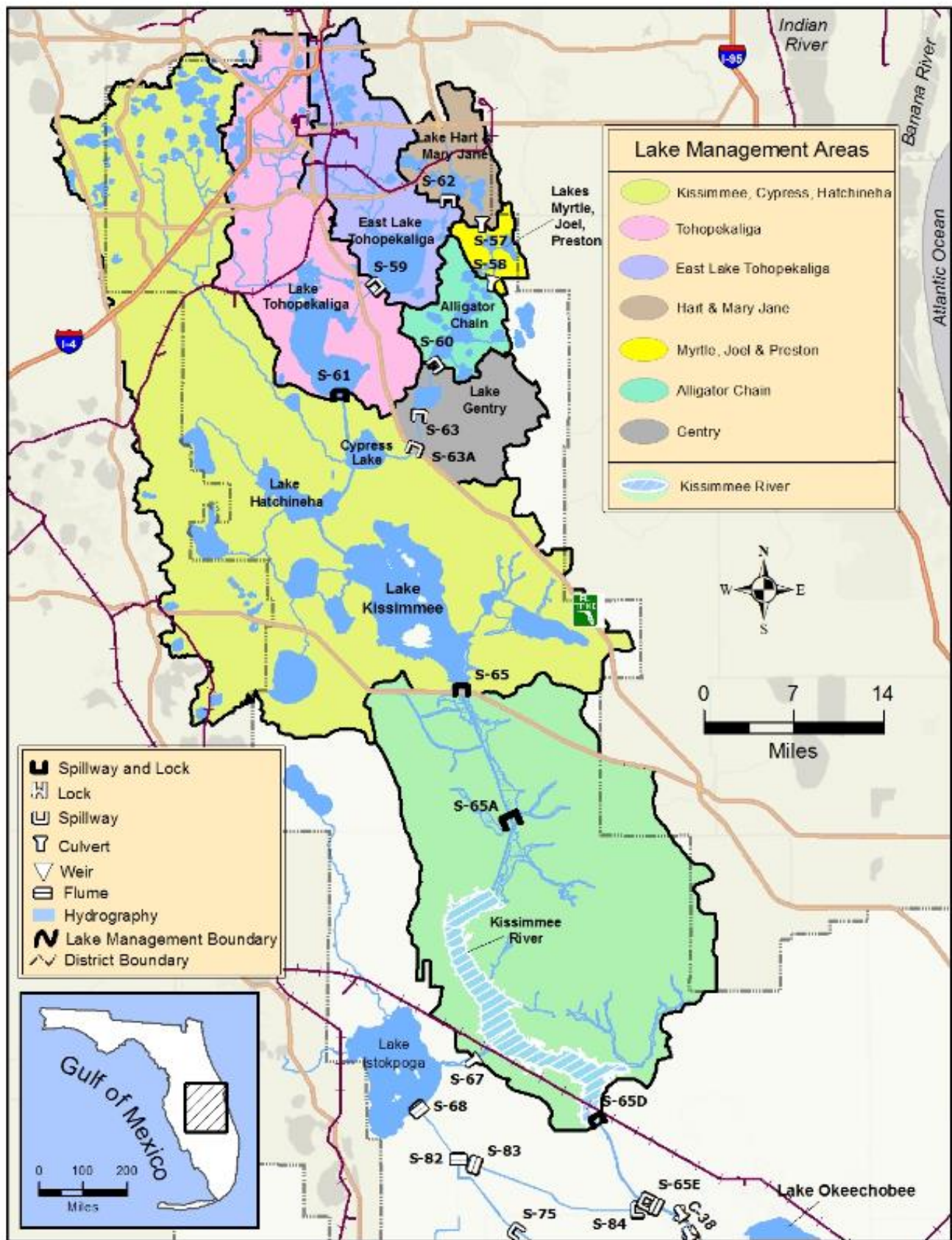


Figure 8. The Kissimmee Basin.

LAKE OKEECHOBEE

Lake Okeechobee stage is 14.95 feet NGVD; 1.12 feet higher than a month ago and 1.09 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 now in the Low sub-band (Figure 3). Lake stage reached a low of 10.99 feet on May 17 and has been rising at close to one foot per month since. According to RAINДАР, 1.58 inches of rain fell directly over the Lake through the past week, while much of the watershed received between 1.5 and 4.0 inches (Figure 4).

The average daily inflows (minus rainfall) increased from the previous week, from 6,396 cfs to 8,032 cfs, and the outflows (minus evapotranspiration) decreased from 63 cfs to 0. Most of the inflows came from the Kissimmee River (3,544 cfs through S-65E & S-65EX1), while 1,596 cfs came from the C-41a canal (through S-84 & S-84X), 744 cfs came from the C-59 canal via the S-191 structure, 498 cfs came from S-71 and S-72, and 462 cfs came from Fisheating Creek. An additional 467 cfs came from passive inflow from the east through the L-8 Canal via Culvert 10A. There were no outflows for the 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 are still pending. A possible blue-green algae bloom was reported at 13 sites. All of those sites and four others (17 total) had detectable levels of toxin ($>0.25 \mu\text{g/L}$), four of which had toxin levels higher than the EPA recreational waters recommendation of $8 \mu\text{g/L}$; ranging from $10.0 - 62.0 \mu\text{g/L}$.

The most recent clear satellite image (September 9, 2020) from NOAA's cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3 OLCI sensor data suggested a moderate cyanobacteria bloom risk persisting in the central/northern region of the Lake, around which some of the higher toxin values were located (Figure 7).

Lake Okeechobee stage was 14.95 feet NGVD on September 14, 2020; 0.34 feet higher than the previous week and 1.12 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 now just 0.03 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 1 foot per month on average; potentially allowing submerged plant communities to keep up with rising stages. The cyanobacteria bloom risk potential declined over the past several days with wind and rain, though sampling on September 8-9 found 4 of 32 stations with microcystin toxins detected above the EPA recreational waters recommendation of $8 \mu\text{g/L}$.

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	4206	3544	1.4
S-71 & S-72	220	498	0.2
S-84 & S-84X	892	1596	0.6
Fisheating Creek	250	462	0.2
S-154	59	76	0.0
S-191	122	744	0.3
S-133 P	125	142	0.1
S-127 P	45	52	0.0
S-129 P	37	47	0.0
S-131 P	25	41	0.0
S-135 P	175	364	0.1
S-2 P	0	0	0.0
S-3 P	0	0	0.0
S-4 P	70	0	0.0
L-8 Backflow	168	467	0.2
Rainfall	5845	4087	1.6
Total	12241	12119	4.7

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	0	0.0
S-352	62	0	0.0
S-354	0	0	0.0
L-8 Outflow			
ET	2314	1597	0.6
Total	2377	1597	0.6

Provisional Data

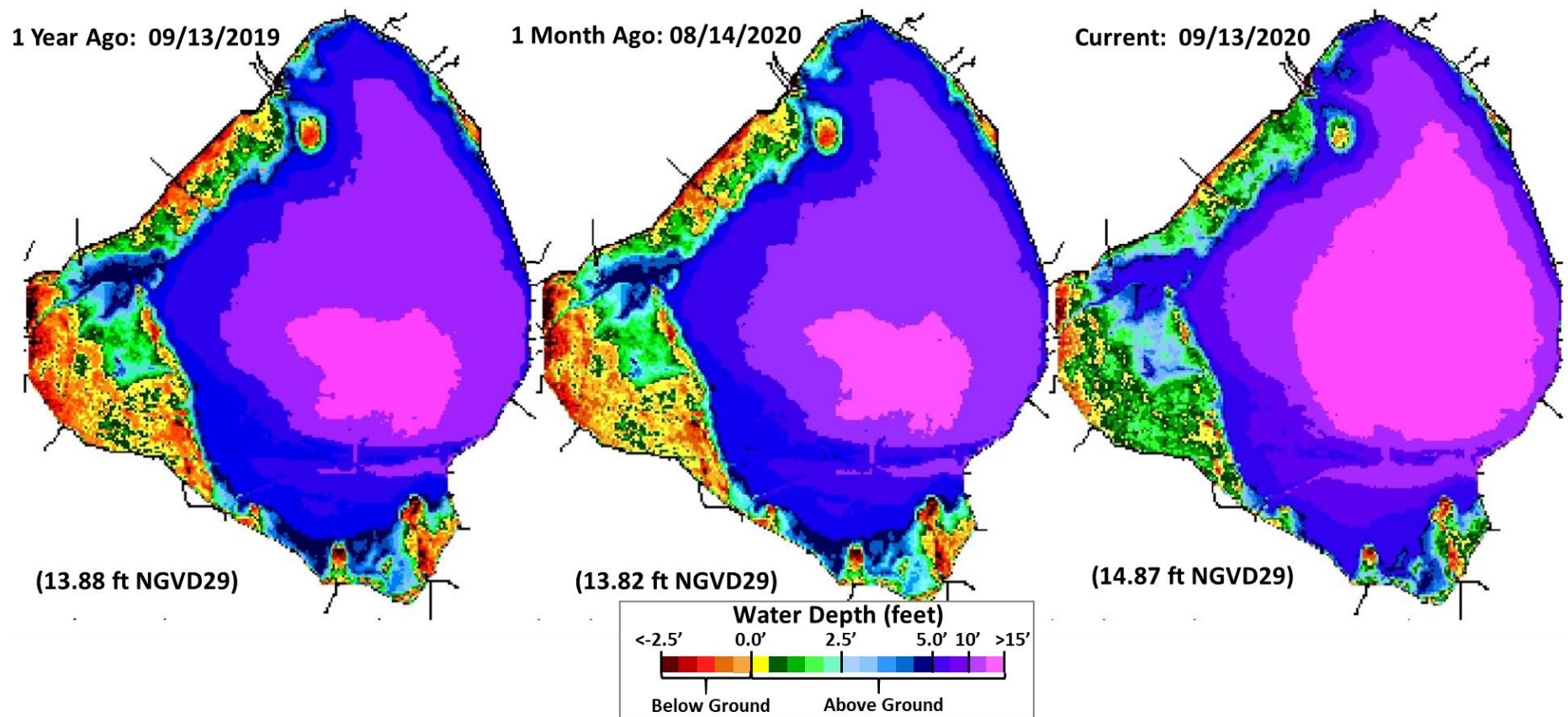


Figure 1. Water depth estimates on Lake Okeechobee based on the South Florida Water Depth Assessment Tool.

Lake Okeechobee Stage vs Updated Ecological Envelope

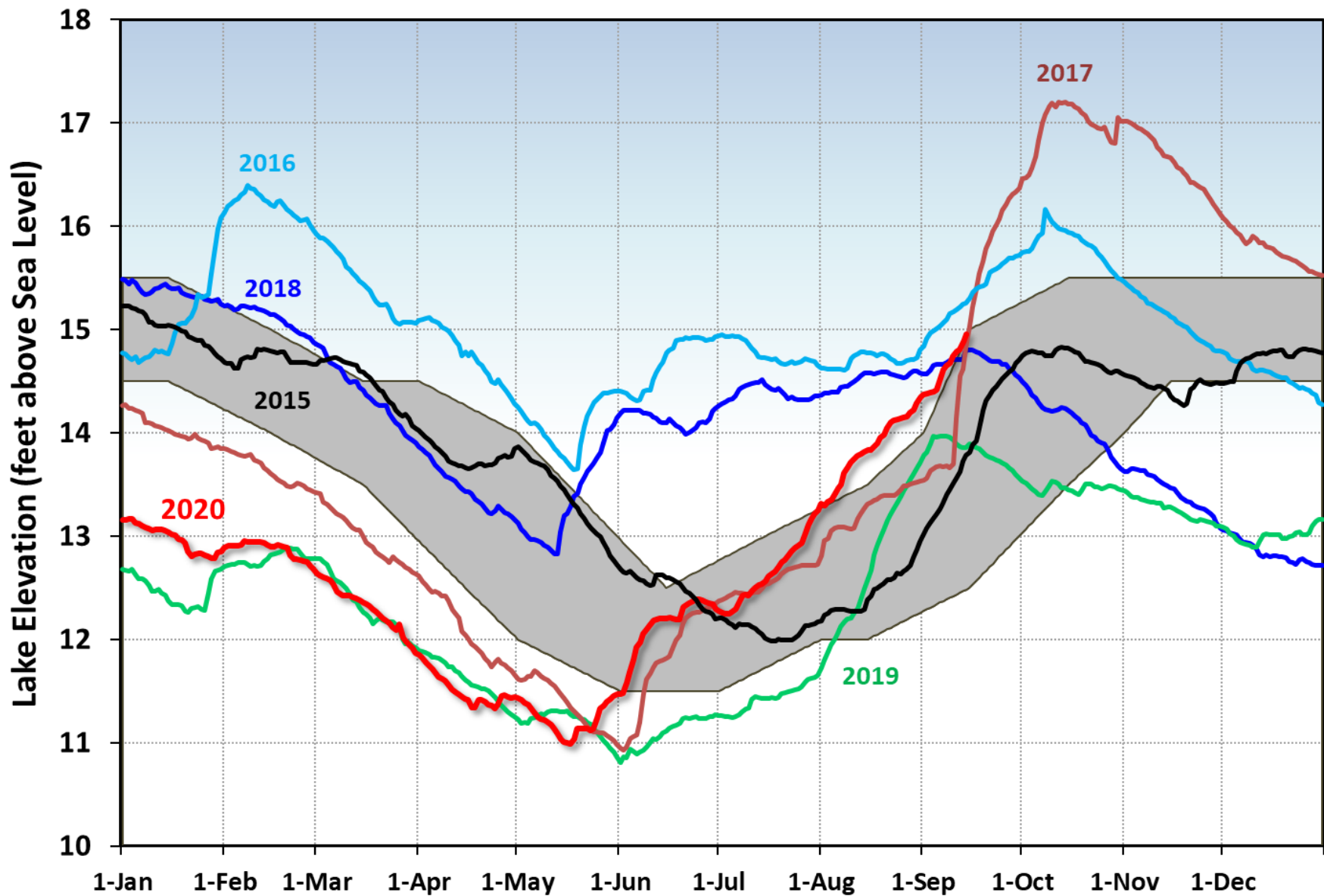


Figure 2. Select annual stage hydrographs for Lake Okeechobee in comparison to the updated Ecological Envelope.

Lake Okeechobee Water Level History and Projected Stages

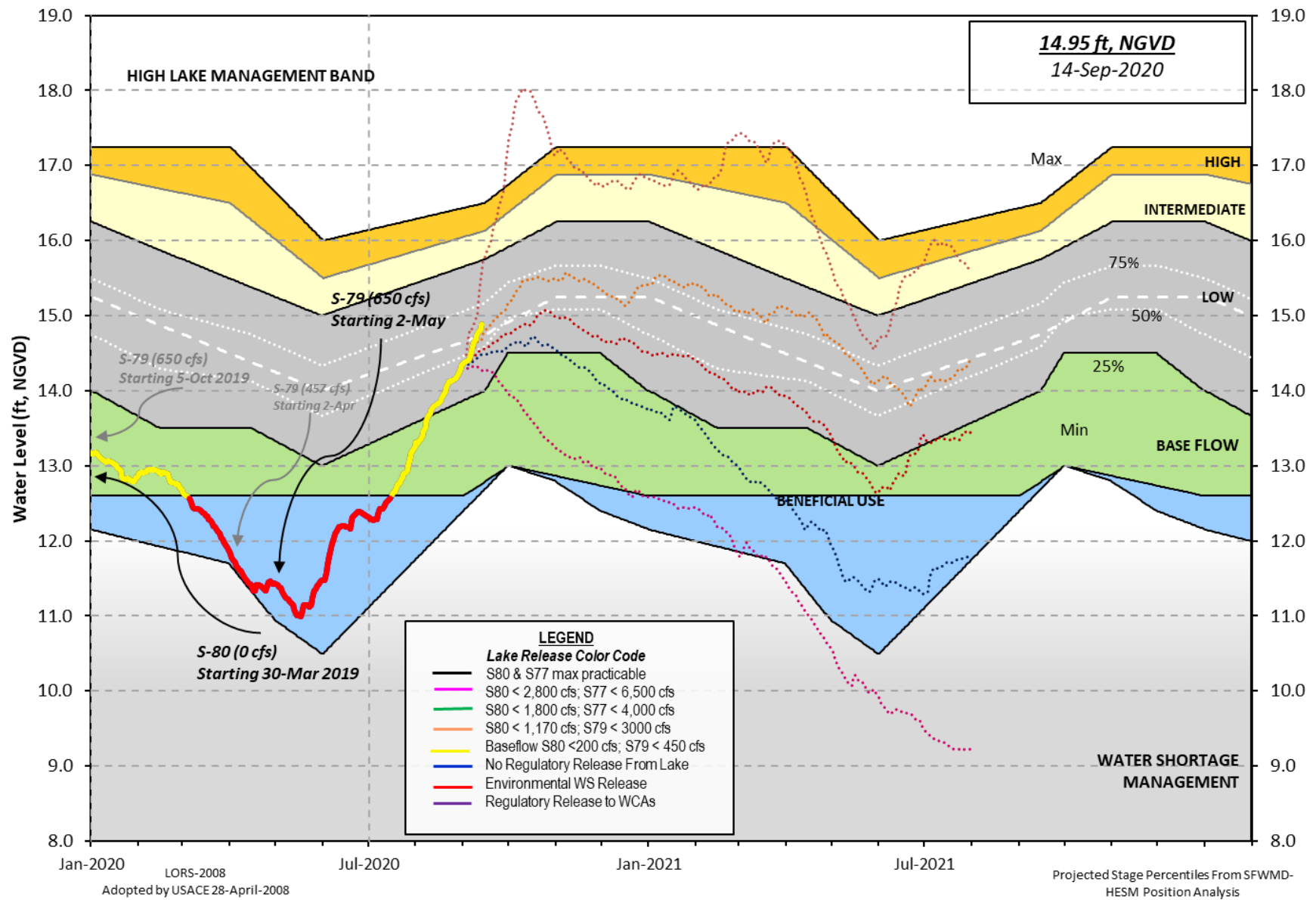


Figure 3. Recent Lake Okeechobee stage and releases, with projected stages based on a dynamic position analysis.

SFWMD PROVISIONAL RAINDAR 7-DAY RAINFALL ESTIMATES

FROM: 0400 EST, 09/08/2020 THROUGH: 0400 EST, 09/15/2020

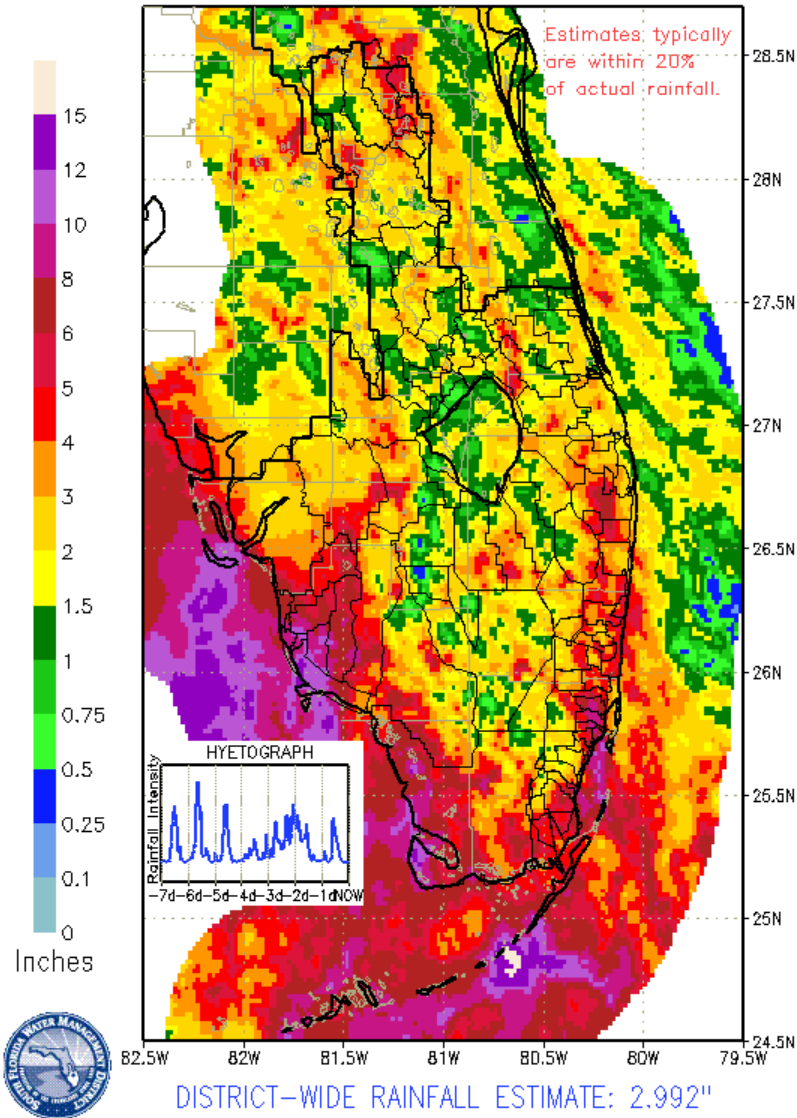


Figure 4. 7-Day rainfall estimates by RAINDAR.

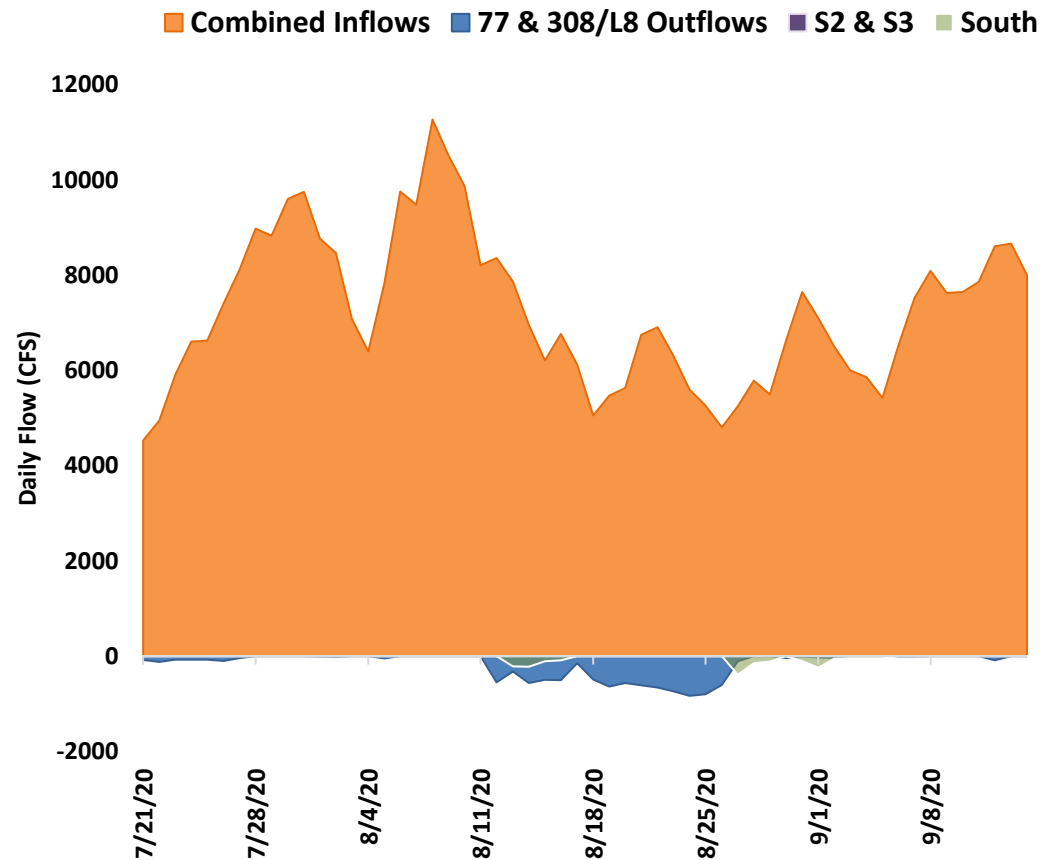


Figure 5. Major inflows (orange) and outflows (blue) of Lake Okeechobee, including the S-350 structures designated as South (green). The L-8 Canal flows through Culvert 10A are included as outflows when positive, and as inflows when backflowing into the Lake. All inflows and outflows are shown as positive and negative, respectively, for visual purposes. Outflows through the S-77 and S-308 structures are shown based on their downstream gauges to account for lock openings for navigation.

Collection Date: September 8-9, 2020

Station	CHLa (ug/L)	TOXIN (ug/L)	TAXA
FEBIN	P	BDL	<i>Cylindro</i>
FEBOUT	P	BDL	<i>mixed</i>
KISSR0.0	P	BDL	<i>mixed</i>
L005	P	BDL	<i>mixed</i>
LZ2	P	BDL	<i>mixed</i>
KBARSE	P	62.0	<i>Microcys</i>
RITTAE2	P	BDL	<i>mixed</i>
PELBAY3	P	BDL	<i>mixed</i>
POLE3S	P	0.3	<i>mixed</i>
LZ25A	P	BDL	<i>mixed</i>
PALMOUT	P	0.3	<i>mixed</i>
PALMOUT1	P	4.0	<i>Microcys</i>
PALMOUT2	P	2.0	<i>Microcys</i>
PALMOUT3	P	1.6	<i>Microcys</i>
POLESOUT	P	0.5	<i>Cylindro</i>
POLESOUT1	P	BDL	<i>Cylindro</i>
POLESOUT2	P	3.5	<i>Microcys</i>
POLESOUT3	P	12.0	<i>Microcys</i>
EASTSHORE	P	0.4	<i>mixed</i>
NES135	P	BDL	<i>mixed</i>
NES191	P	BDL	<i>mixed</i>

Station	CHLa (ug/L)	TOXIN (ug/L)	TAXA
L001	P	0.4	<i>mixed</i>
L004	P	10.0	<i>Micro/Cylin</i>
L006	P	2.4	<i>Microcys</i>
L007	P	BDL	<i>mixed</i>
L008	P	2.9	<i>Microcys</i>
LZ30	P	0.5	<i>Microcys</i>
LZ40	P	11.0	<i>Microcys</i>
CLV10A	P	BDL	<i>Microcys</i>
NCENTER	P	3.3	<i>Microcys</i>

Samples collected Sept 8

S308C	P	BDL	<i>mixed</i>
S77	P	BDL	<i>mixed</i>

- 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*

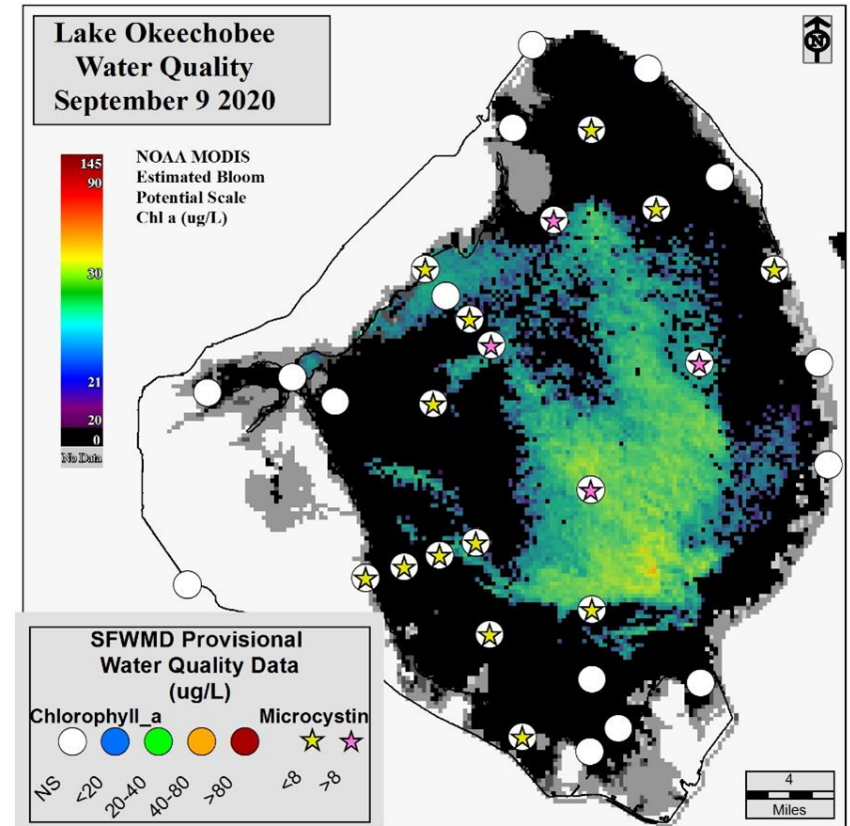


Figure 6. Provisional results from the expanded monitoring sampling trips on September 8-9, 2020

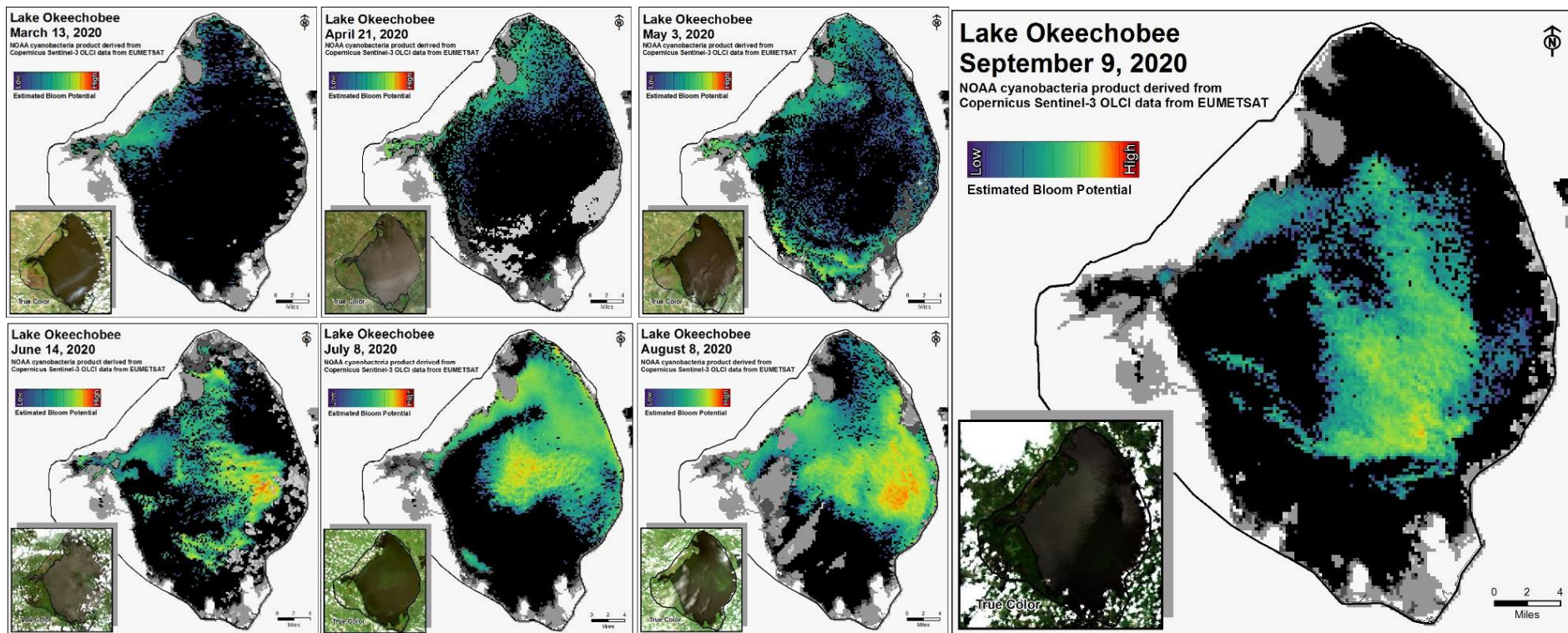


Figure 7. Potential for cyanobacterial blooms on Lake Okeechobee during 2020, based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

ESTUARIES

St. Lucie Estuary:

Last week total inflow to the St. Lucie Estuary averaged approximately 2,191 cfs (Figures 1 and 2) and last month inflow averaged about 1,514 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	896
S-80	704
S-308	0
S-49 on C-24	285
S-97 on C-23	217
Gordy Rd. structure on Ten Mile Creek	89

Over the past week salinity increased at HR1 and decreased at US1 Bridge and downstream (Table 2, Figures 3 and 4). The seven-day moving average of the water column (an average of the surface and bottom salinity) at the US1 Bridge is 12.2. 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)	5.4 (3.9)	8.9 (7.4)	NA ¹
US1 Bridge	9.9 (10.5)	12.9 (13.4)	10.0-26.0
A1A Bridge	19.0 (20.6)	25.1 (26.1)	NA ¹

¹Envelope not applicable

Caloosahatchee Estuary:

Last week total inflow to the Caloosahatchee Estuary averaged approximately 5,812 cfs (Figures 5 and 6) and last month inflow averaged about 4,035 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	1,262
S-79	4,252
Tidal Basin Inflow	1,560

Over the past week salinity remained about the same (Table 4, Figures 7 & 8). The seven-day average salinity values are within the fair 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 I75	0.2 (0.2)	0.2 (0.2)	0.0-5.0 ²
Ft. Myers Yacht Basin	0.8 (0.4)	1.9 (0.6)	NA
Cape Coral	5.1 (5.9)	8.5 (7.8)	10.0-30.0
Shell Point	18.5 (19.7)	21.5 (21.3)	10.0-30.0
Sanibel	28.0 (28.9)	29.2 (29.8)	10.0-30.0

¹Envelope not applicable and ²Envelope is based on a 2-week forecast 30-day average

The forecast for 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 a daily salinity of 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 1,300 cfs. The 30-day moving average surface salinity at Val I-75 is forecast to be 0.3 over the range of flows as well (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	1300	0.3	0.3
B	300	1300	0.3	0.3
C	450	1300	0.3	0.3
D	650	1300	0.3	0.3
E	800	1300	0.3	0.3

Red tide

The Florida Fish and Wildlife Research Institute reported on September 11, 2020, that *Karenia brevis*, the Florida red tide dinoflagellate, was not observed in samples collected from or offshore of Lee, Broward, Palm Beach, Martin, or St. Lucie counties (no samples were analyzed this week from Miami-Dade county).

Lake stage is in the Low sub-band. Tributary conditions are wet. The LORS2008 release guidance suggested up to 450 cfs release at S-79 to the Caloosahatchee Estuary and up to 200 cfs release at S-80 to the St. Lucie Estuary.

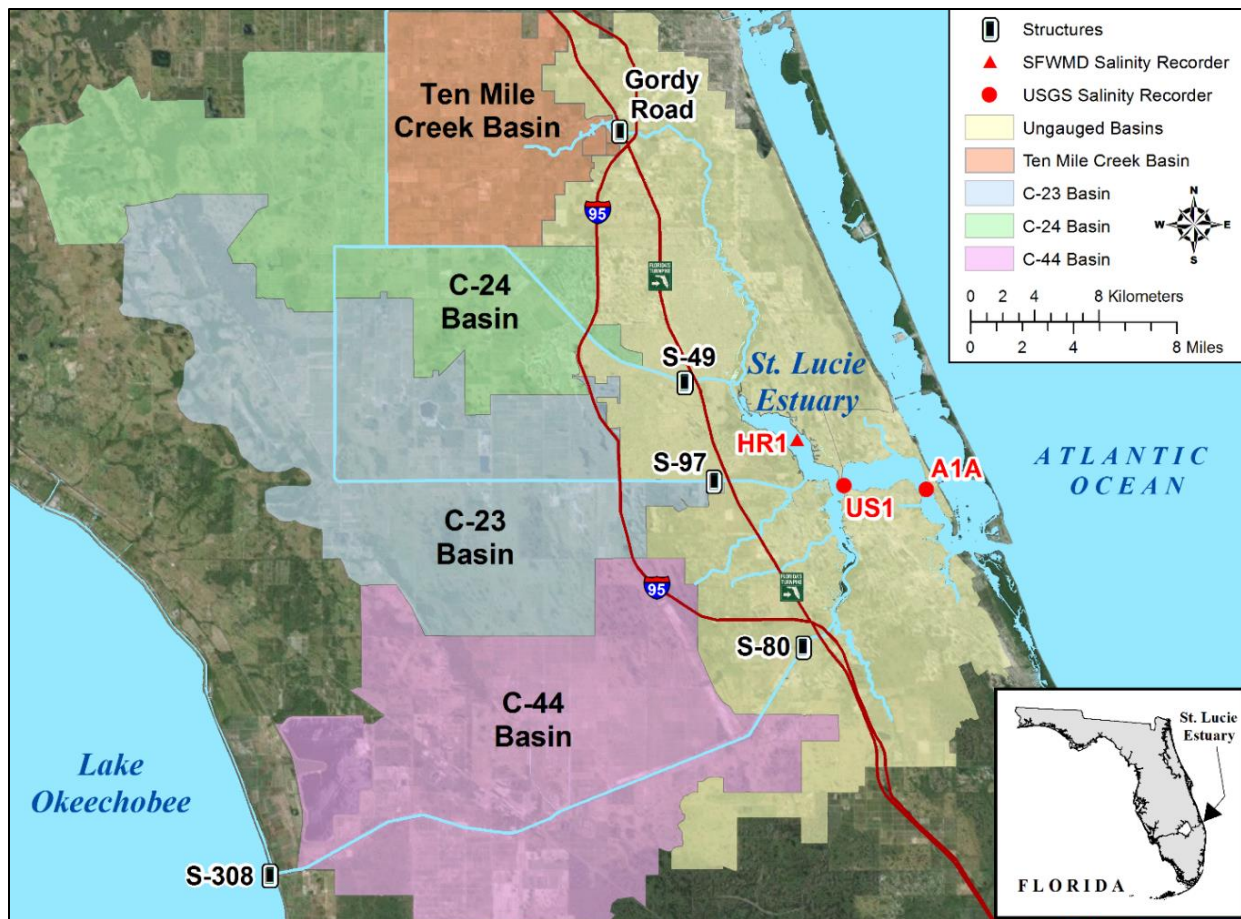


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

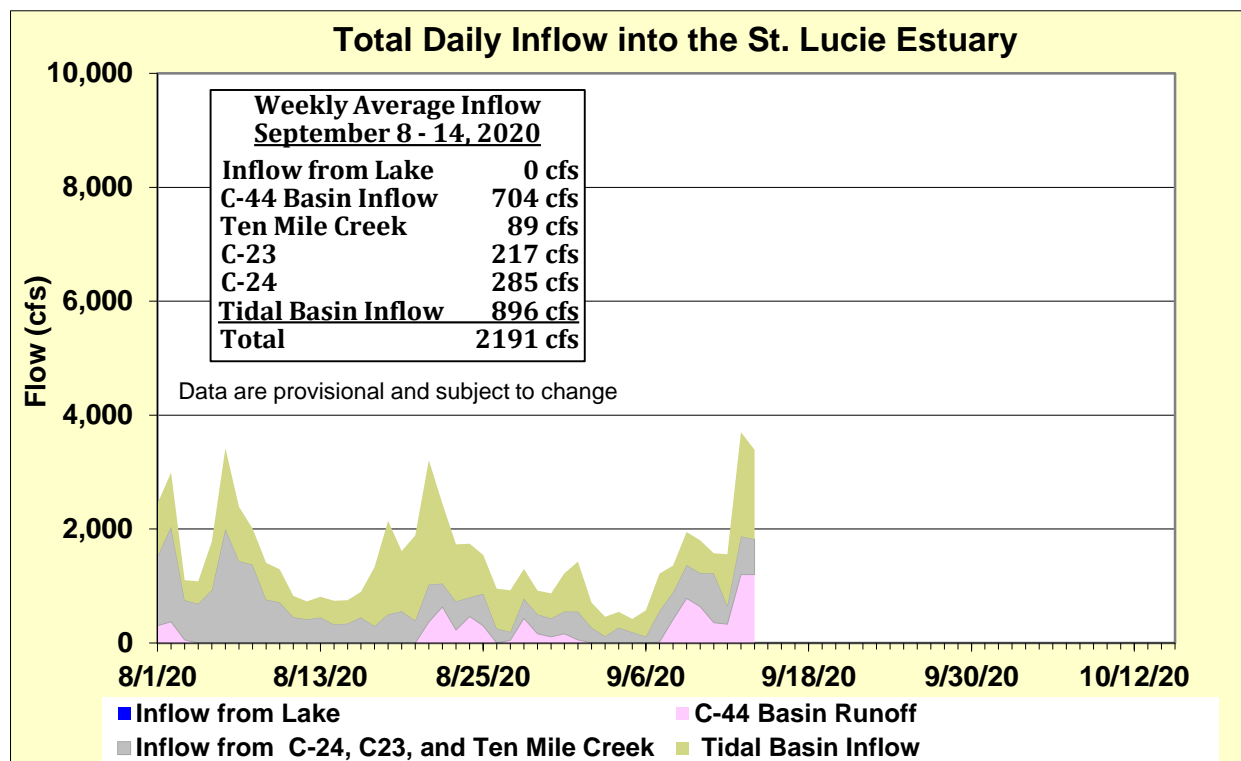


Figure 2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basin into the St. Lucie Estuary.

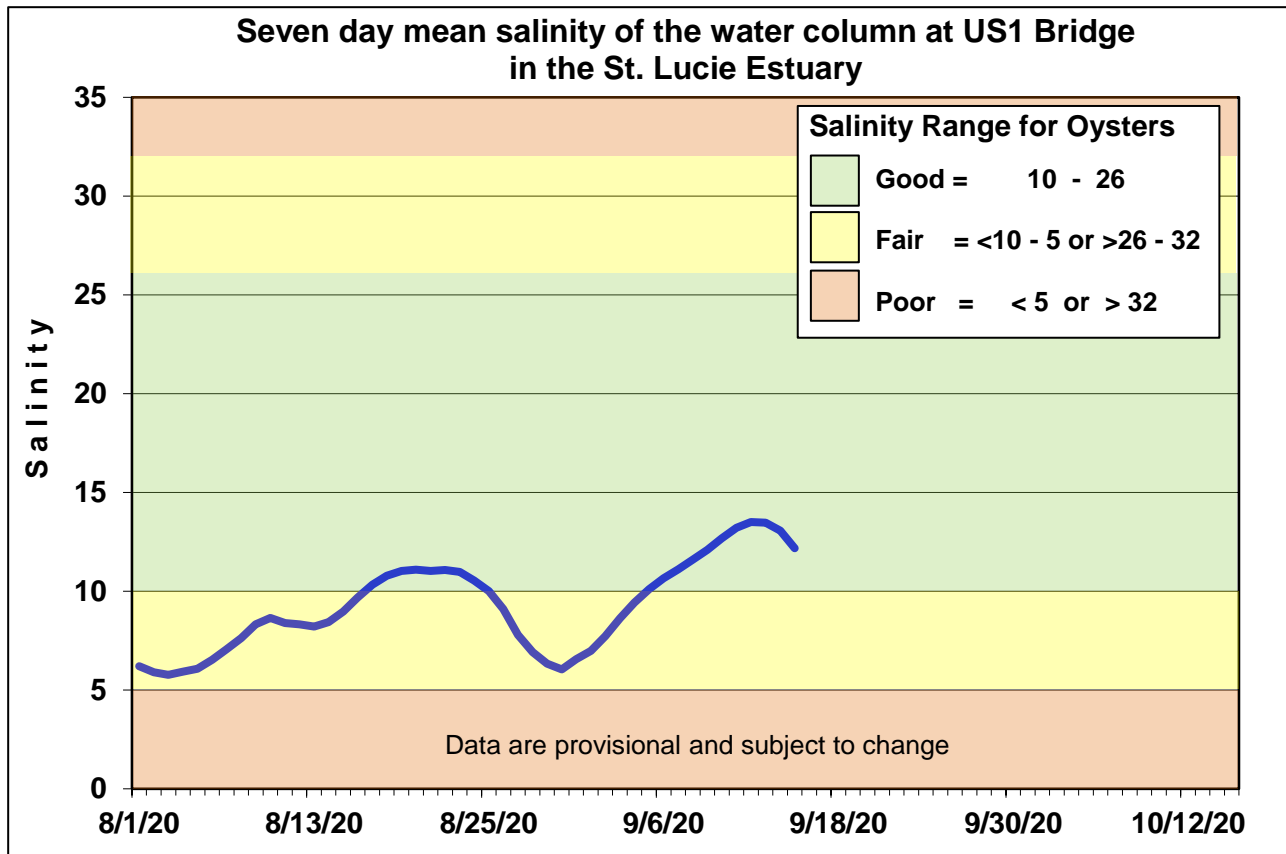


Figure 3. Seven-day mean salinity of the water column at the US1 Bridge.

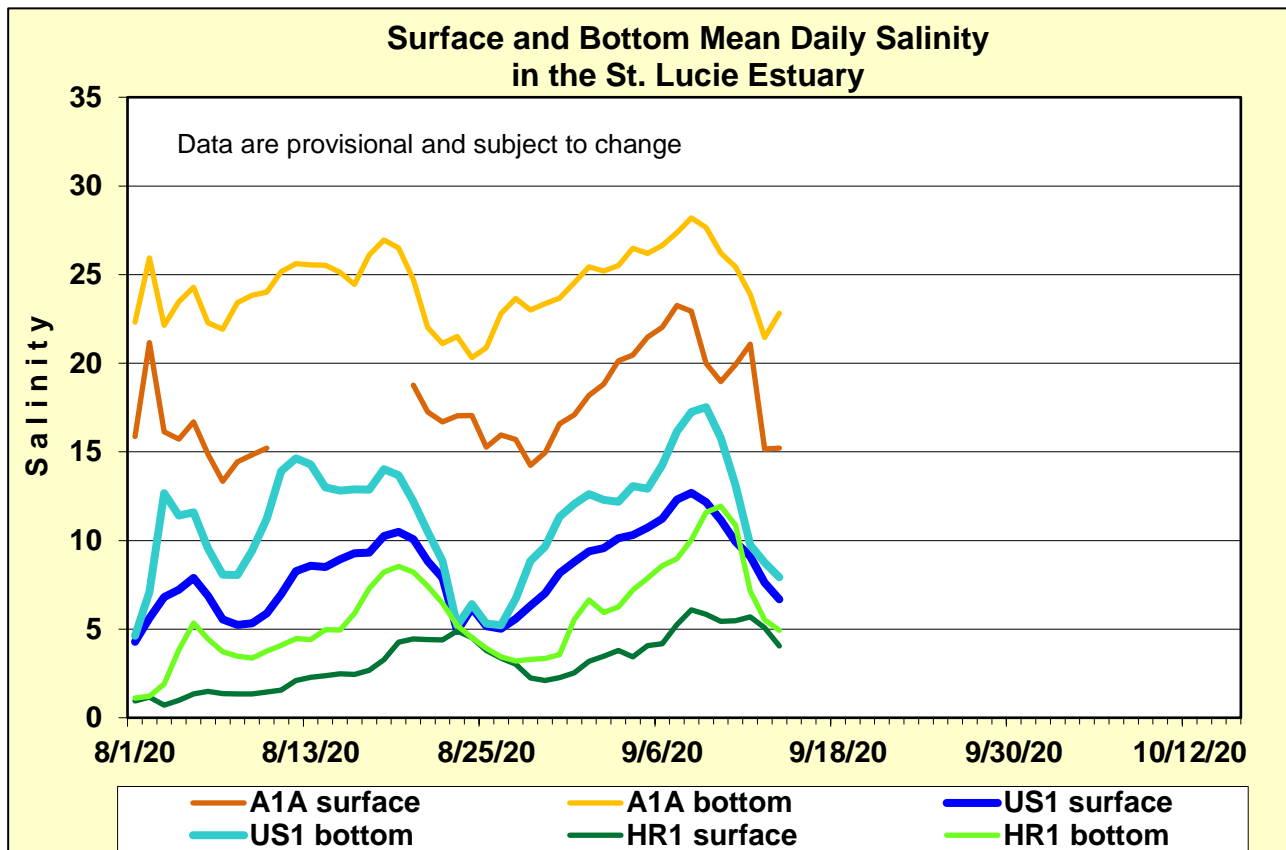


Figure 4. Daily mean salinity at the A1A, US1, and HR1 stations.

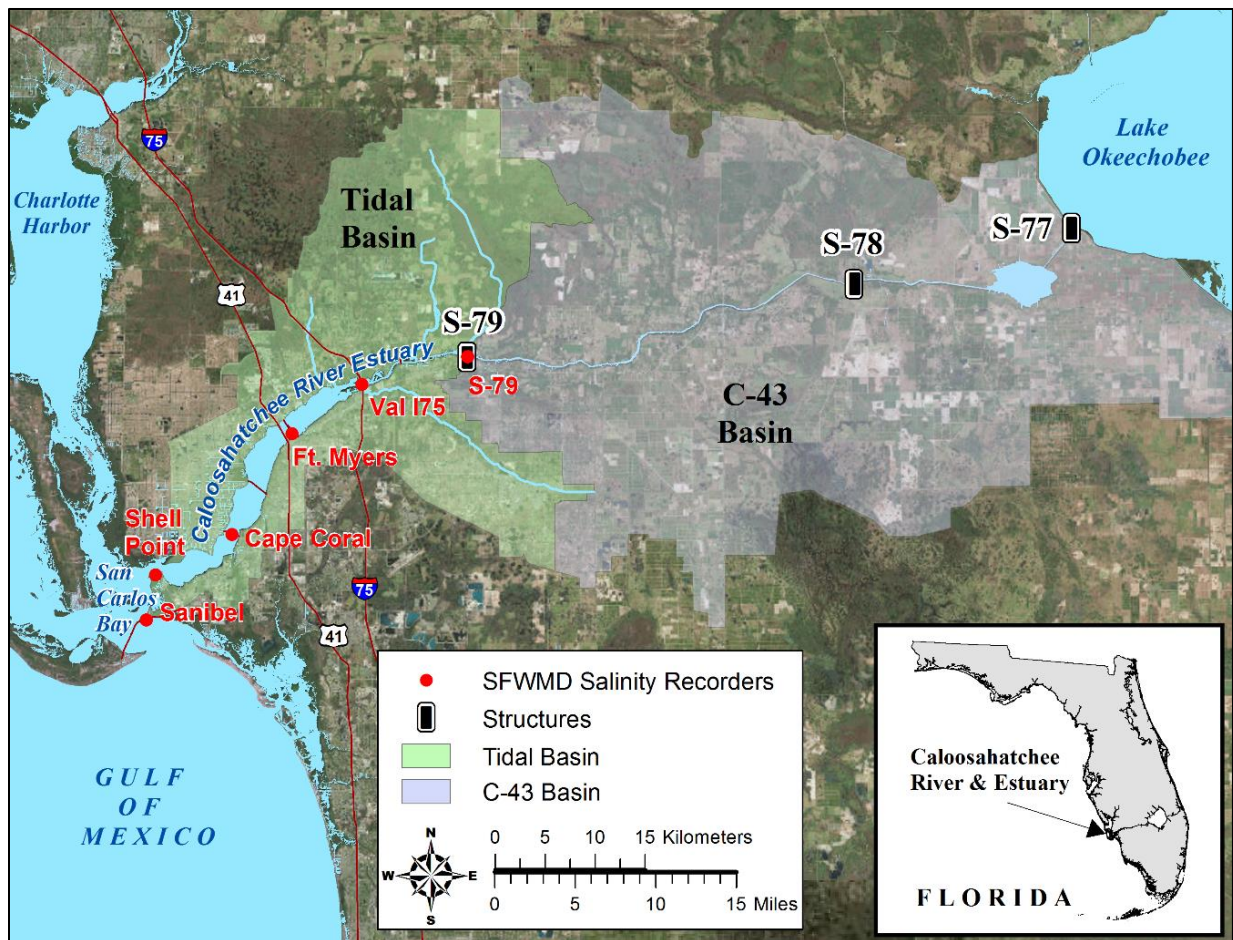


Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

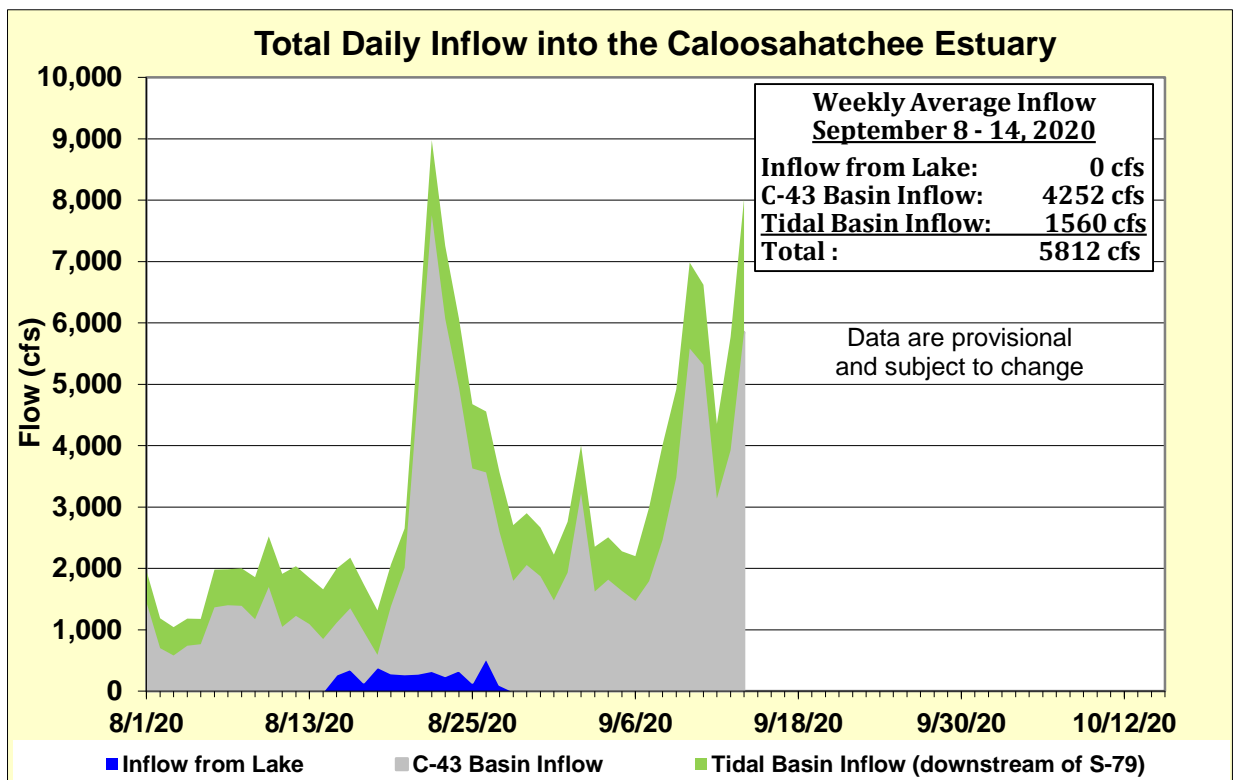


Figure 6. Total daily inflows from Lake Okeechobee, runoff from the C-43 basin

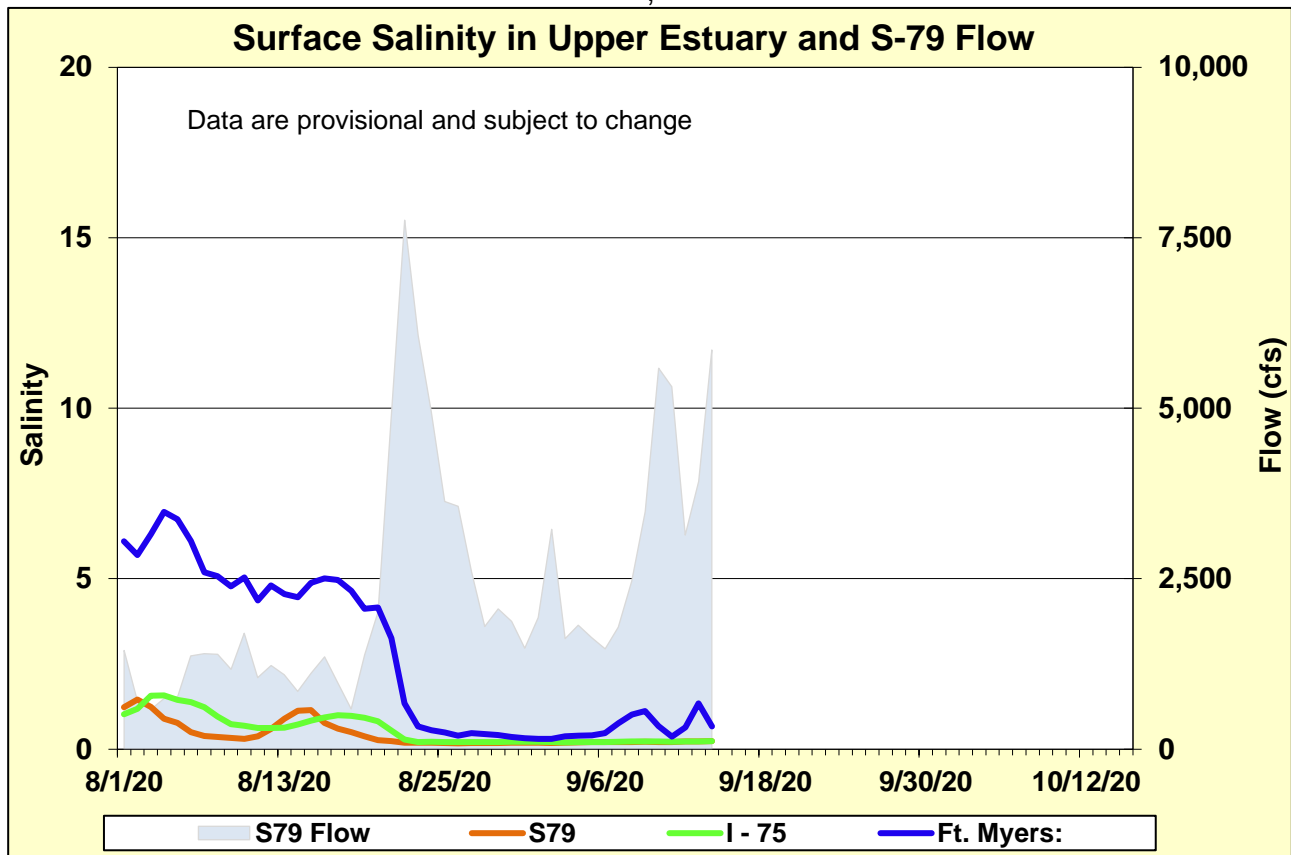


Figure 7. Daily mean flows at S-79 and salinity at upper estuary monitoring stations.

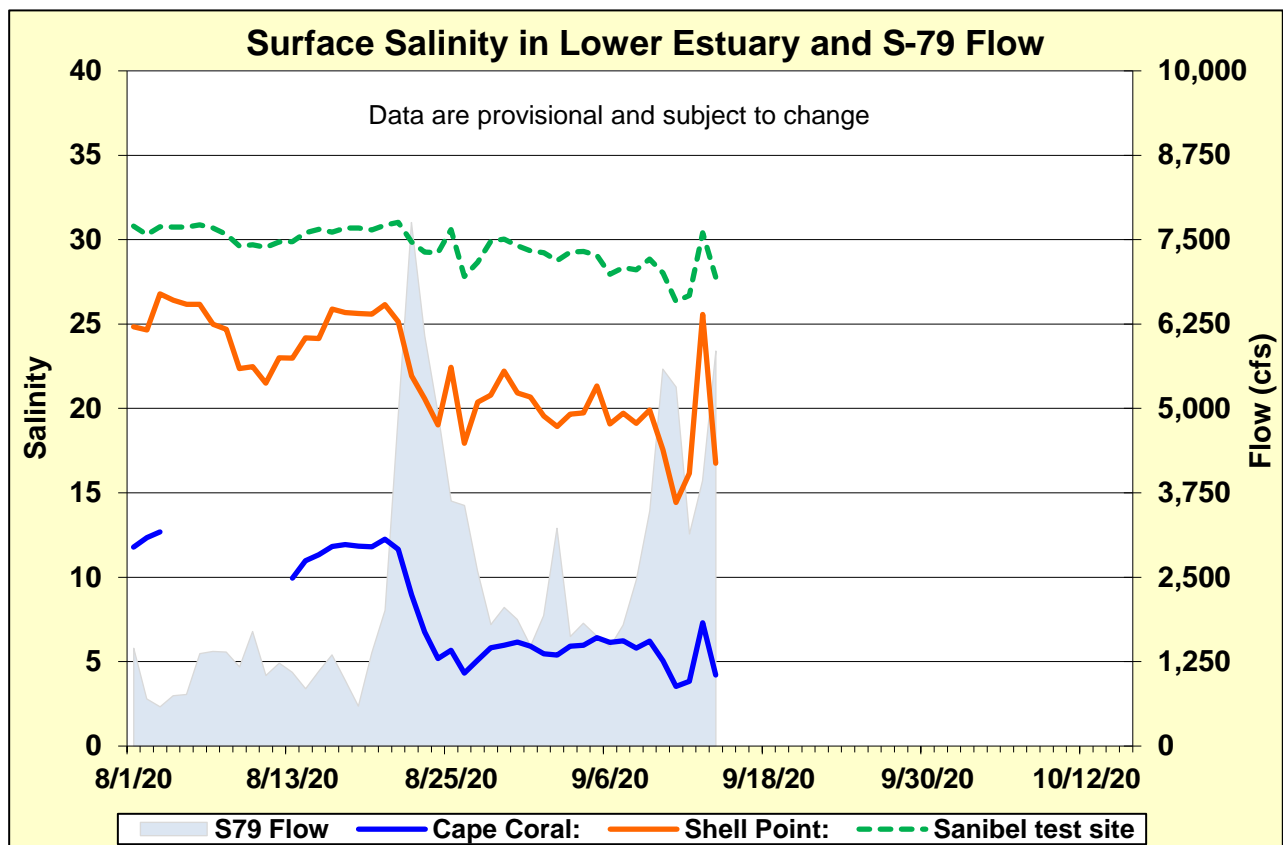


Figure 8. Daily mean flows at S-79 and salinity at lower estuary stations.

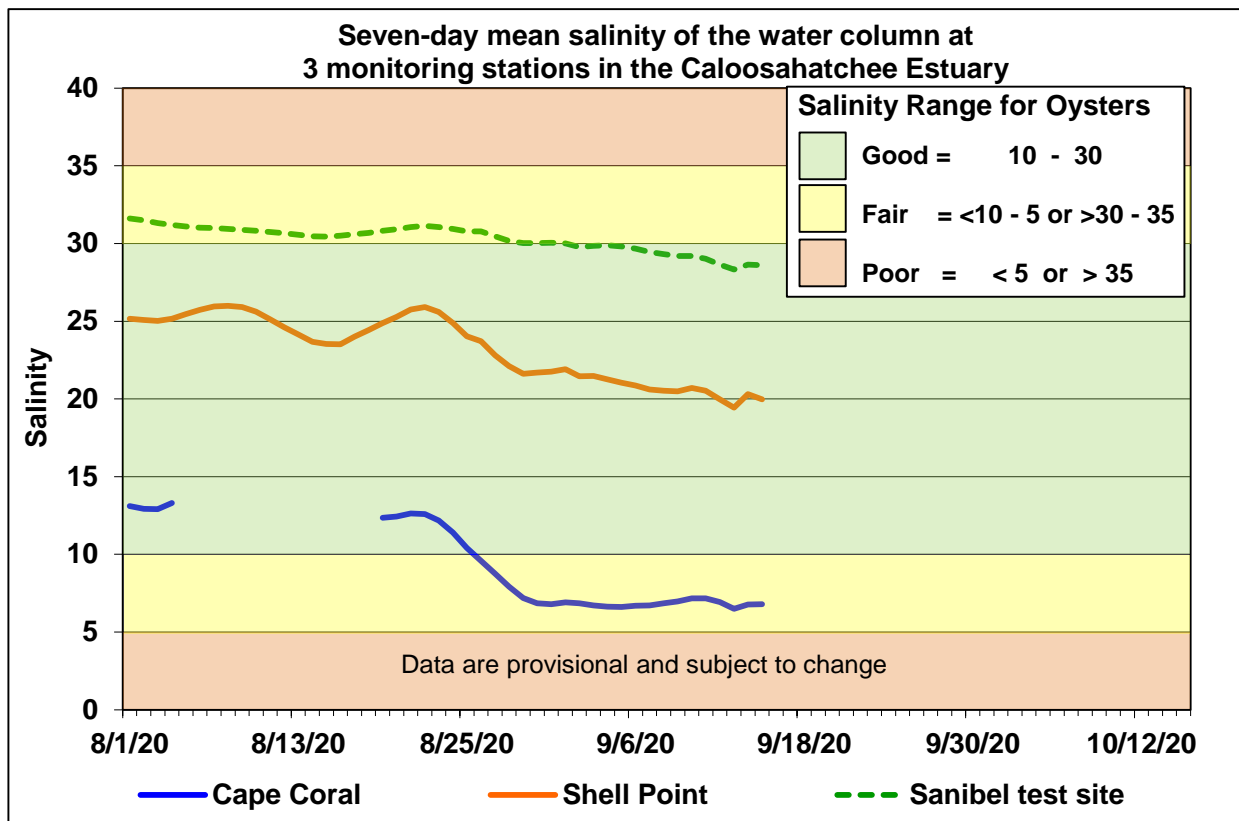


Figure 9. Seven-day mean salinity at Cape Coral, Shell Point, and Sanibel monitoring stations.

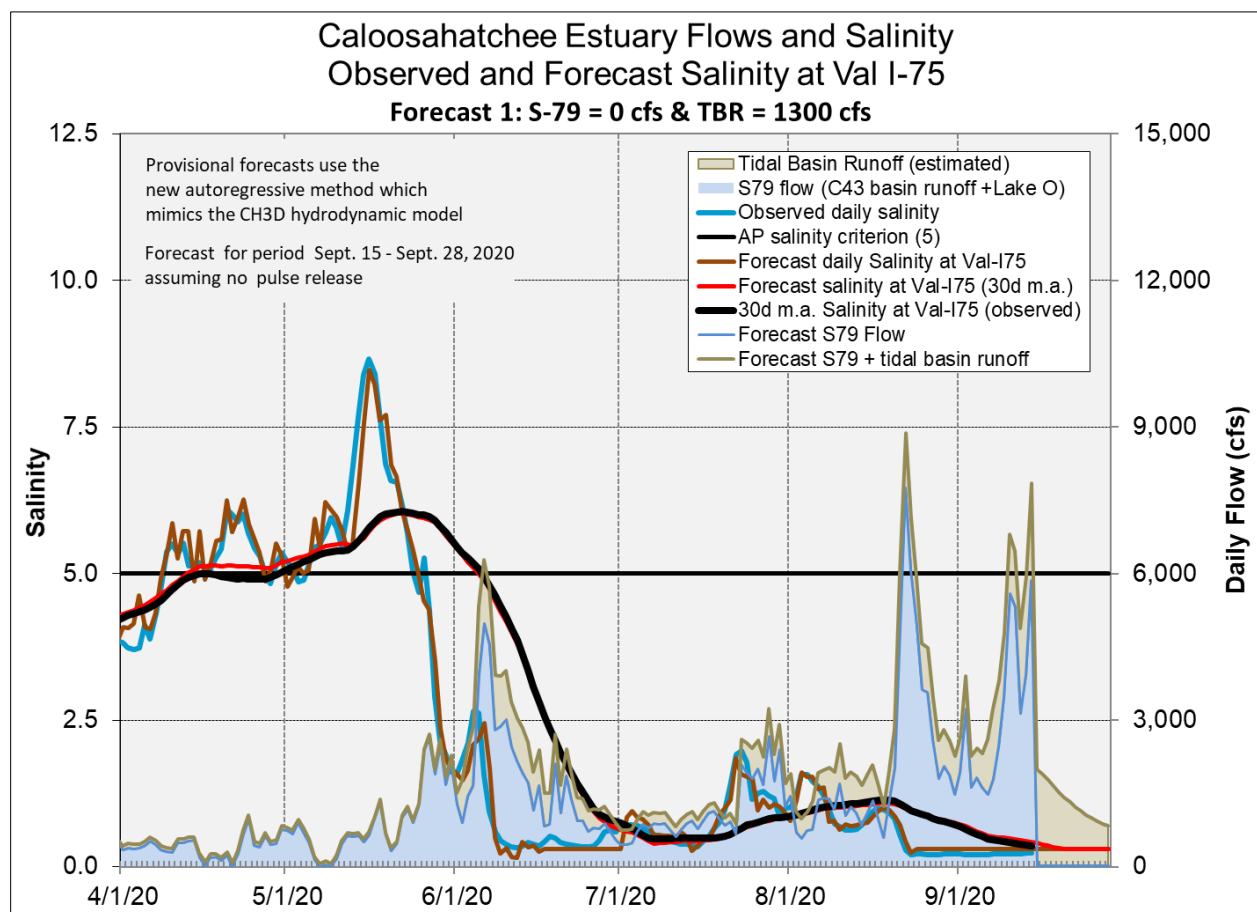
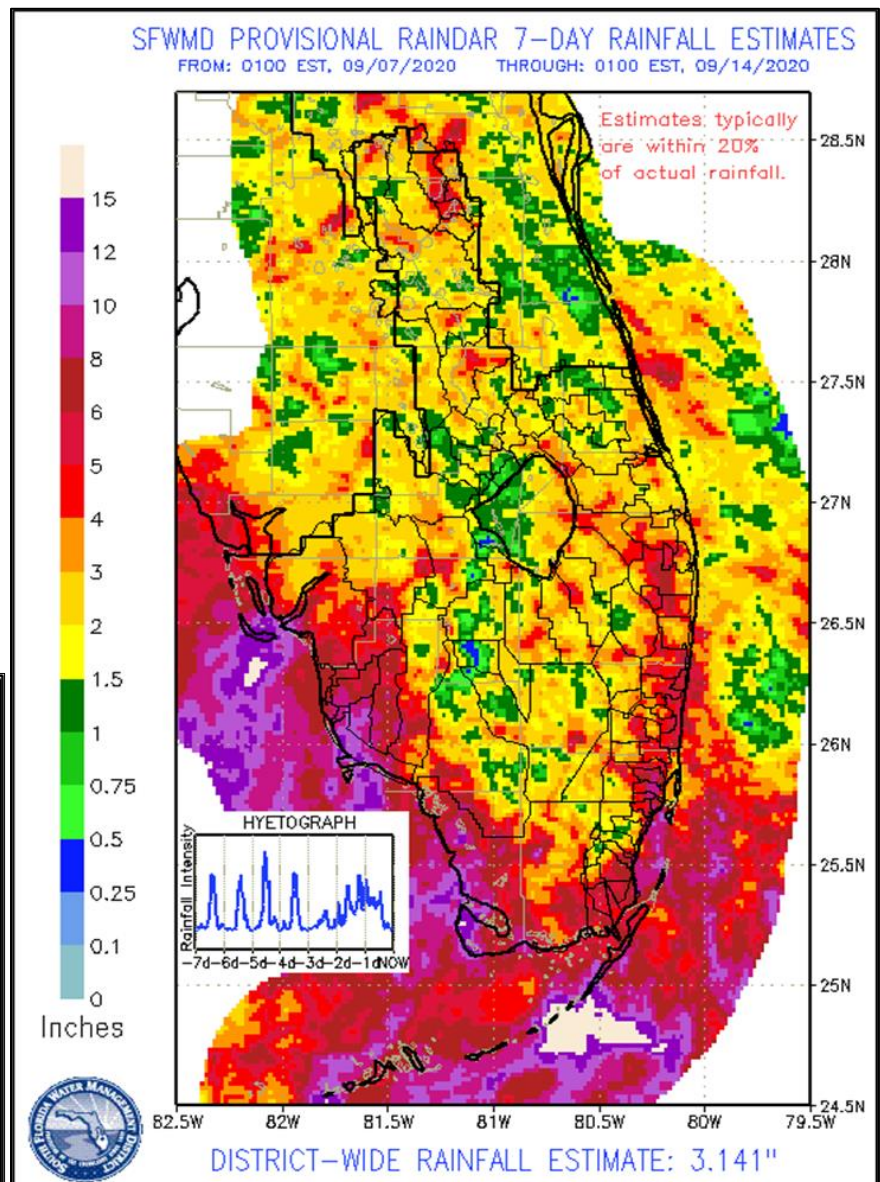


Figure 10. Forecasted Val I-75 surface salinity assuming no pulse release at S-79.

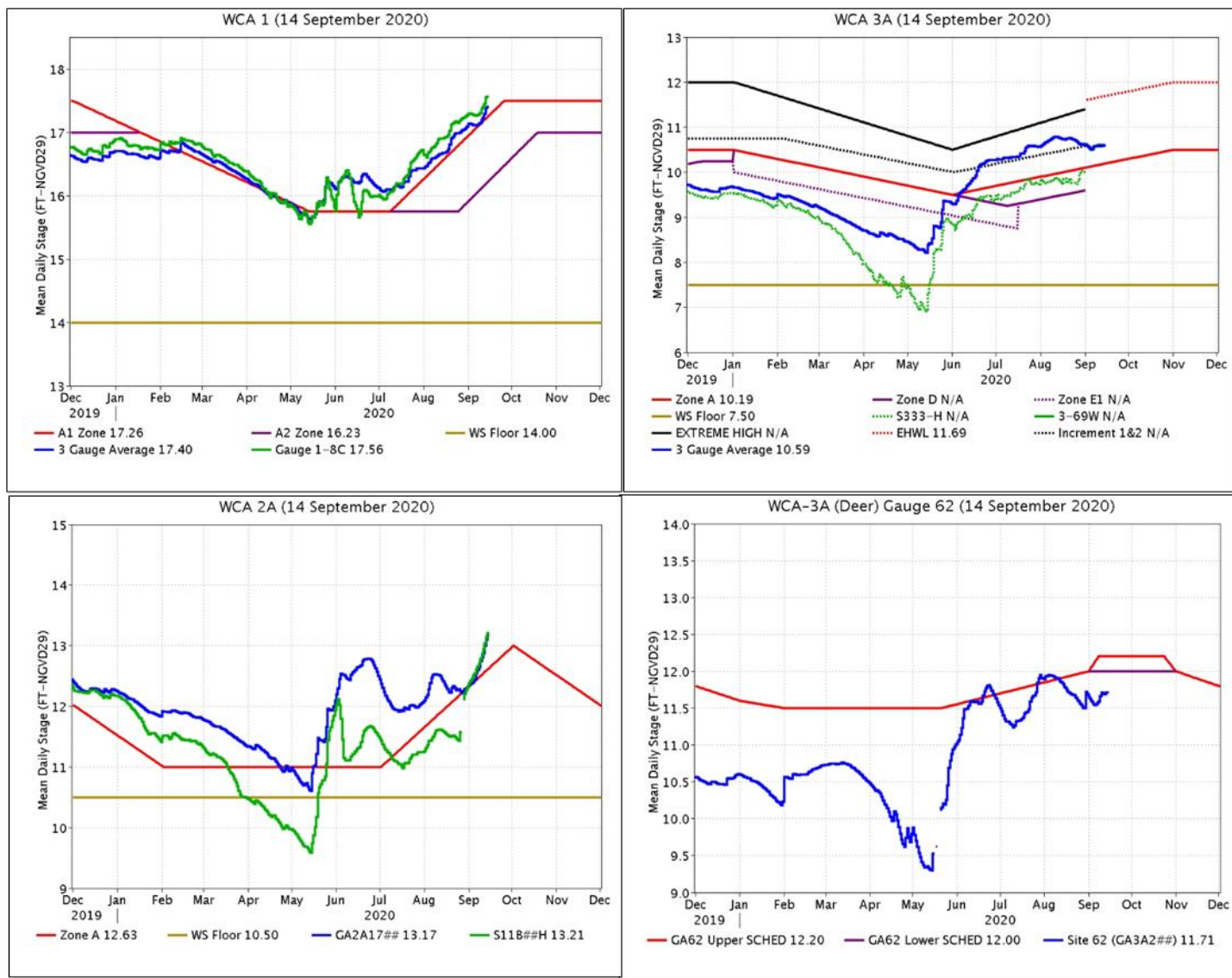
EVERGLADES

Above average rainfall was recorded across the Everglades last week; the highest amount in Everglades National Park. At the gauges monitored for this report, stages increased 0.20 feet on average, with central WCA-2A experiencing the most extreme change with an increase of 0.55 feet. Evaporation was estimated at 0.88 inches last week.

Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	2.78	+0.27
WCA-2A	2.87	+0.55
WCA-2B	2.93	+0.15
WCA-3A	2.23	+0.06
WCA-3B	2.75	+0.24
ENP	6.00	+0.20



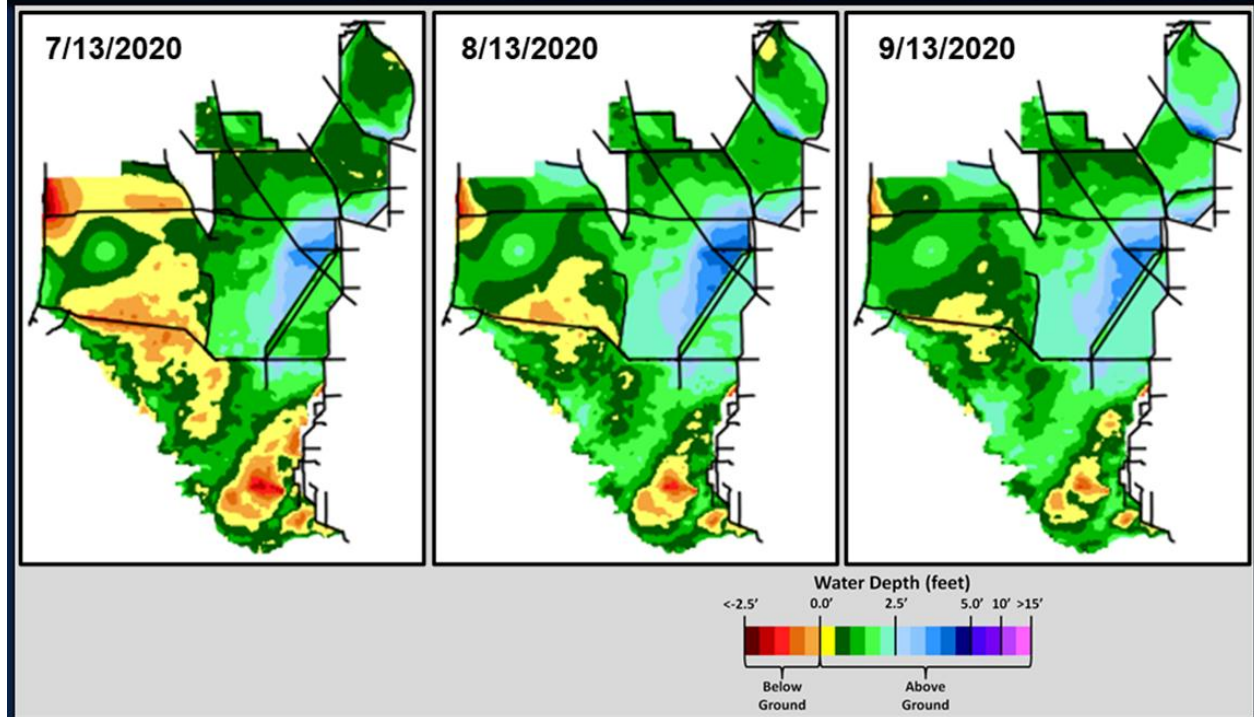
Regulation Schedules: WCA-1: Stage at the 1-8C Gauge trended above the rising Zone A1 regulation line last week, currently 0.30 feet above, and above the 3-Gauge average by 0.16 feet. WCA-2A: Stage at Gauge 2-17 trended sharply above the rising regulation schedule and is now 0.54 feet above. WCA-3A: The Three-Gauge Average parallels above the rising Zone A regulation line, currently 0.40 feet above. WCA-3A: Stage at gauge 62 (Northwest corner) is currently 0.29 feet below the stable Lower Schedule and 0.59 feet below the Upper Schedule.



Water Depths: The Water Depth Assessment Tool (WDAT) for spatial interpolation of monthly water depth 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 southern WCA-1, and there is no longer the potential for exposed ground surface in the north of that basin. Hydrologic connectivity is well established within the major sloughs in Everglades National Park (ENP). Over the last month stages stayed relatively stable across the Everglades. Only WCA-1 (deeper in the northwest and southeast) and WCA-2A (deeper in the southeast) experienced significant changes. Looking back one year, the stage difference patterns are similar yet more significant than one month ago. Compared to one year ago, there are shallower depths in northeastern WCA-3A and 3B, while conditions in WCA-1 are significantly deeper, especially in the southeast.



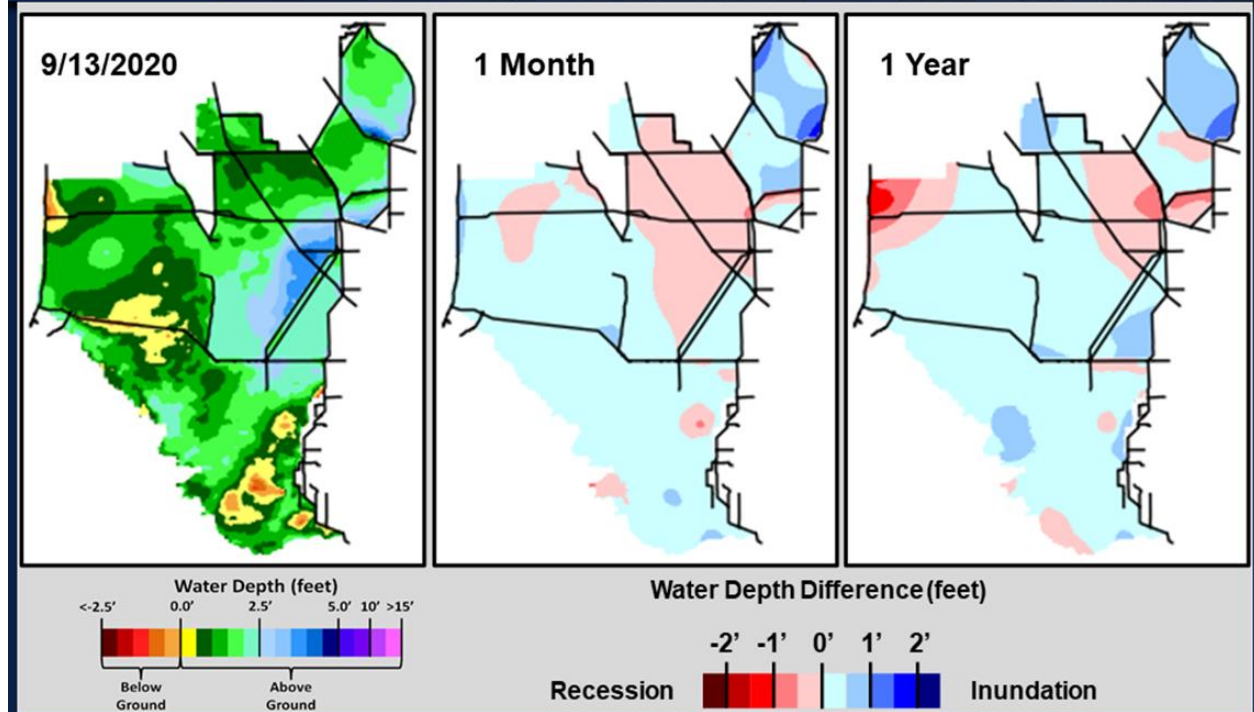
SFWDAT Water Depth Monthly Snapshots



South Florida Water Depth Assessment Tool (SFWDAT)



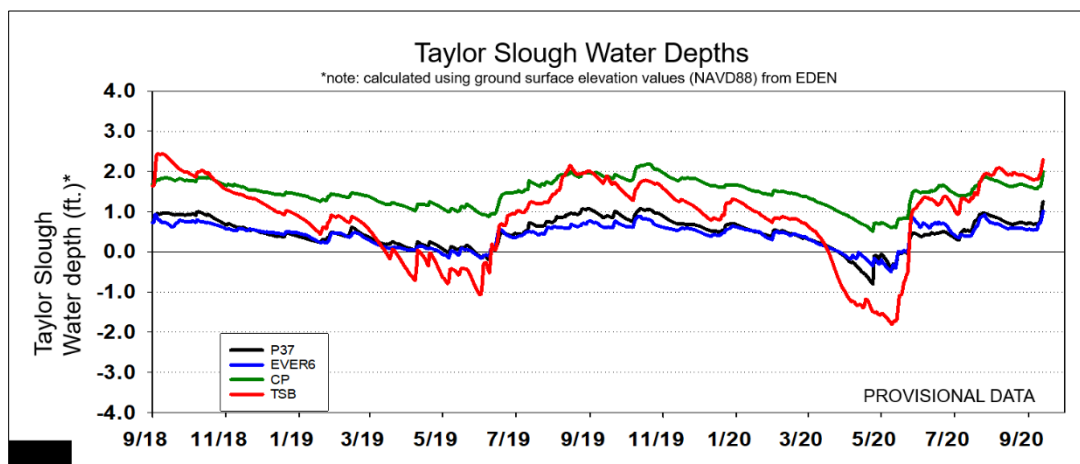
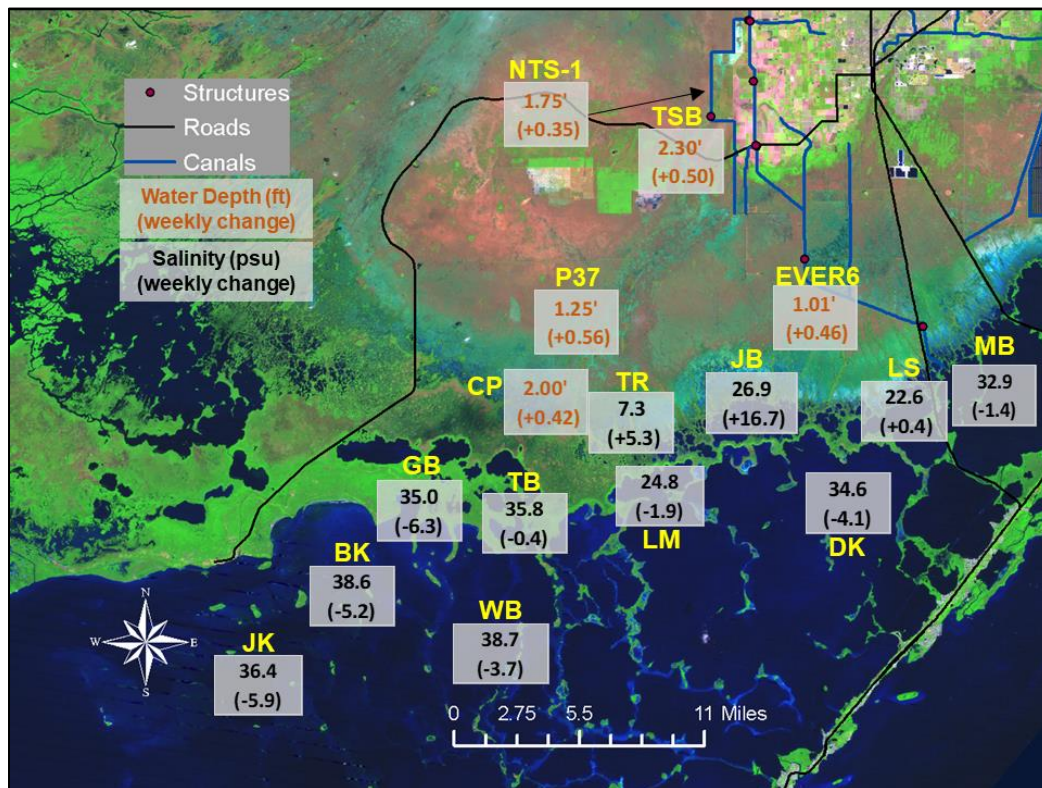
SFWDAT Everglades Difference Maps (Present – Past)



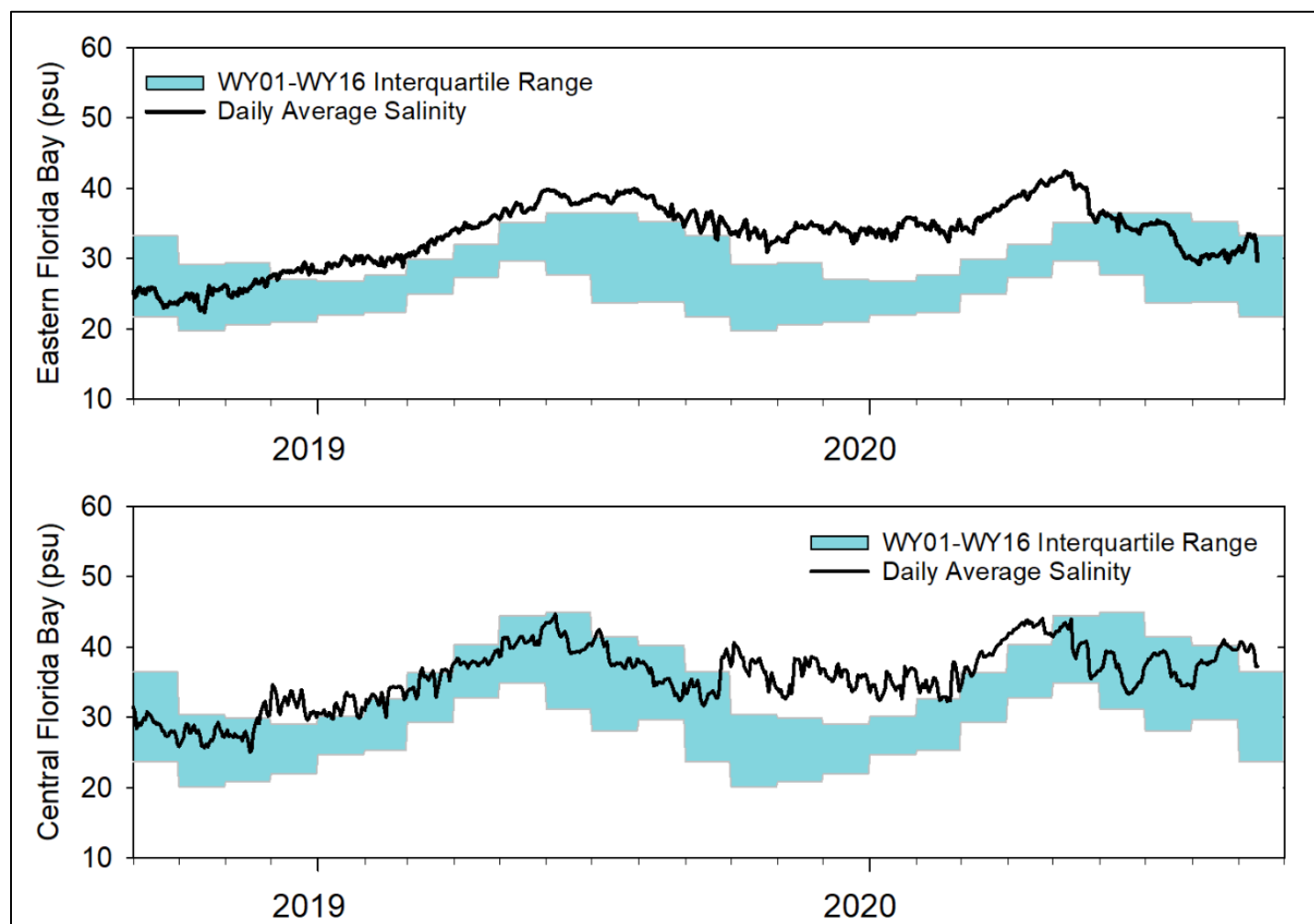
South Florida Water Depth Assessment Tool (SFWDAT)

Tree island inundation in WCA-3A, WCA-3B and ENP: There are 371 Tree Islands of known elevation within WCA-3A, -3B, and Everglades National Park's Shark Slough. Current rough estimates using WDAT (9/14/20) are that 48% or 180 of the tree islands are currently inundated, up from 41% the week prior. Inundation began 5/24/20, with the longest duration of continuous inundation being 106 days. Inundation for more than 90 days has the potential for ecological harm.

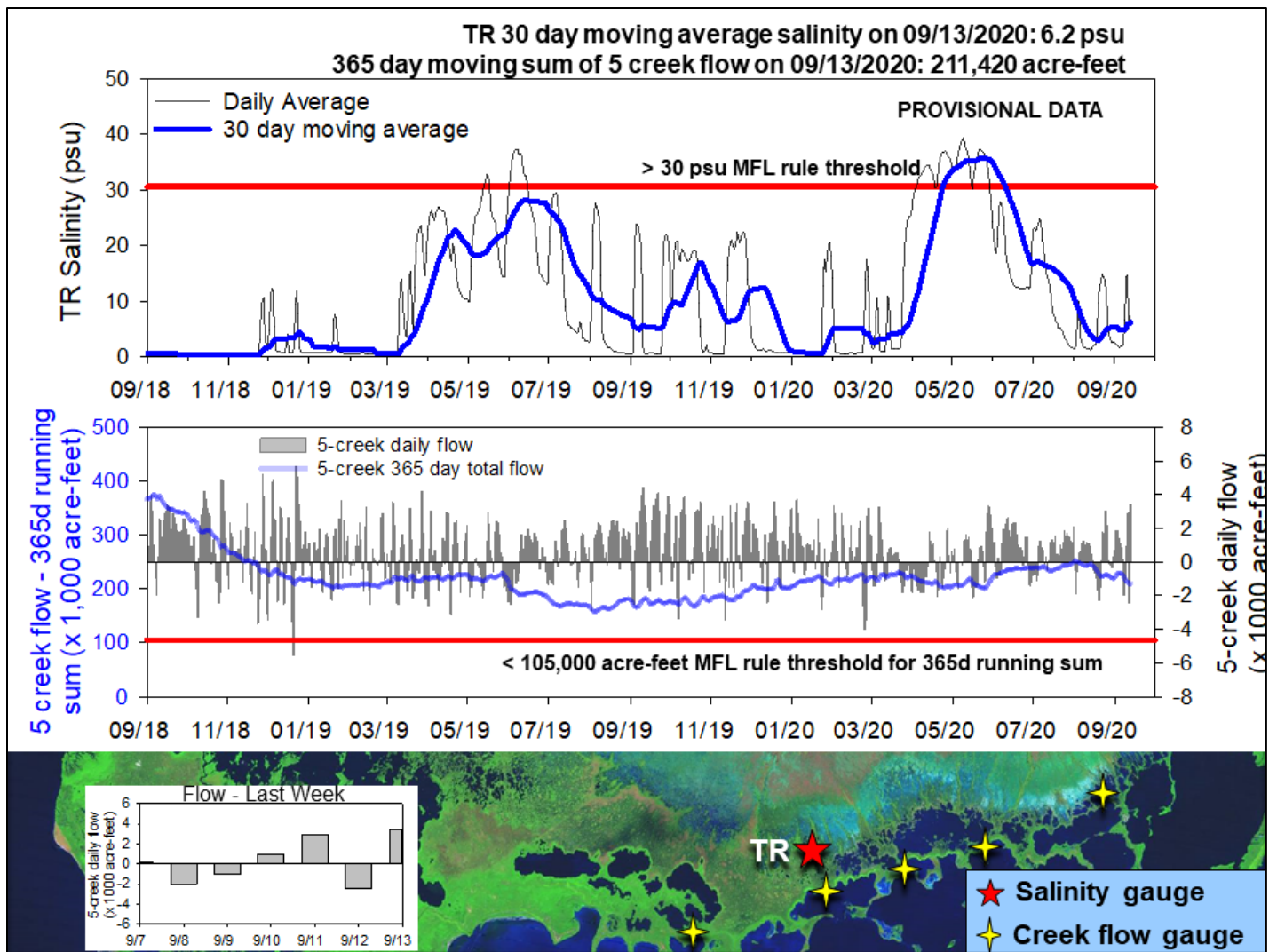
Taylor Slough Water Levels: An average of 6 inches of rain fell over Taylor Slough and Florida Bay this past week with most of it falling on Saturday. Stages increased almost half a foot (0.46 feet). The Taylor Slough area is almost a half foot (5.4 inches) higher than its historical average with the rain and recent water movements.



Florida Bay Salinities: Salinities in Florida Bay decreased 1.2 on average with individual station changes ranging from -6.3 to +16.7 due to wind driven water movements over the weekend. The rains brought the central and western salinities down below 40. Further decreases in salinity are expected as the wind impacts from this past weekend's tropical system end and the freshwater from upstream starts moving again.



Florida Bay MFL: Salinity at the TR station in the mangrove zone (tracked for the Florida Bay MFL) increased from 2 to 14 over the last week before decreasing to 7 by the end of the week. The 30-day moving average increased 1.4 to end at 6.2. Weekly flow from the 5 creeks identified by yellow stars on the map totaled just over +2,000 acre-feet and were heavily driven by wind impacts. The 365-day moving sum of flow from the five creeks (tracked as part of the Florida Bay MFL criteria) decreased 17,000 acre-feet this week to end at 211,420 acre-feet which is between the historical median (249,091 acre-feet) and the 25th percentile (192,885 acre-feet). Creek flows are provisional U.S. Geological Survey (USGS) data.



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 two weeks) has ecological benefit. Peak stages in the fall in northern WCA-3A provide improved conditions to support next season's wading bird nesting success at the Alley north colony by providing conditions for an increase in prey base as well as 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 northwest of WCA-3A North along the Miami Canal. Inflows or the conservation of water within this area has 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. More freshwater is required 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 15th, 2020 (red is new)

Area	Weekly change	Recommendation	Reasons
WCA-1	Stage increased by 0.27'	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 0.55'	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 0.15'	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 increased by 0.03'	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 increased 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 increased by 0.10'	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 0.05'		
WCA-3B	Stage increased by 0.24'	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 0.20'	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 +0.35' to +0.56'	Move water southward as possible	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged -6.3 to +16.7 psu	Move water southward as possible	When available, provide freshwater to maintain low salinity buffer and promote water movement.