Disclaimer: Information contained in the report addresses environmental conditions only and is not the official South Florida Water Management District operations recommendation or decision.

M E M O R A N D U M

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

FROM: SFWMD Staff Environmental Advisory Team

DATE: September 8, 2021

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

Outer moisture associated with a disturbance over the central and northeastern Gulf of Mexico is forecast to lift over the area and help increase daily thunderstorm coverage Wednesday with the steering winds focusing the heaviest activity over the interior. As the disturbance exits to the northeast, it will bring a low level trough into north-central Florida Thursday. This trough will bring southwesterly steering winds to the District Thursday and Friday which will continue to focus daily thunderstorm activity over the interior and east. A weakening cold front is forecast to push into central Florida Saturday and then become diffuse over the area. This boundary should increase shower activity over the northern portions of the District Saturday and then northern and western areas Sunday. Total rainfall is forecast to be on the drier side of average during the first 7-day period (Week 1) and then near the historical average during the second 7-day period (Week 2).

Kissimmee

Flow at S-65A continues to be too low for complete inundation of the Kissimmee River floodplain, and the mean floodplain depth decreased to 0.94 feet by September 5, 2021. Following the discharge reduction in late August, dissolved oxygen concentrations in the Kissimmee River have risen above the lethal zone threshold (1.0 mg/L) considered potentially lethal for sportfish and is almost out of the stressful zone (1.0-2.0 mg/L).

Lake Okeechobee

Lake Okeechobee stage was 14.71 feet NGVD on September 05, 2021, 0.79 feet higher than a month ago, and 0.29 feet higher than one year ago (**Figure LO-1**). Lake stages were above the ecological envelope from August 1, 2020 to March 30, 2021, and near or within the upper threshold of the envelope until late-June 2021. Lake stages have increased recently due to increased precipitation and inflows over the last several weeks and have been above the ecological envelope since early-July, now approximately 0.5 feet above (**Figure LO-2**). Lake stage remained in the Low flow sub-band last week (**Figure LO-3**). According to NEXRAD, 0.64 inches of rain fell directly on the Lake last week.

Estuaries

Total inflow to the St. Lucie Estuary averaged 2,514 cfs over the past week with no flow coming from Lake Okeechobee. Mean surface salinities decreased at all sites in the estuary over the past week. Salinity at the US1 Bridge was in the fair range (10-26) for adult eastern oysters. Total inflow to the Caloosahatchee Estuary averaged 3,359 cfs over the past week with no flow coming from the Lake. Mean surface salinities remained the same at S-79 and Val I-75, decreased at Sanibel, and increased at the remaining sites in the estuary over the past week. Salinities were in the good range (0-10) for tape grass at Val I-75 and Ft. Myers. Salinities were also in the good range (10-30) for adult eastern oysters at Shell Point and Sanibel and in the fair range at Cape Coral.

Stormwater Treatment Areas

For the week ending Sunday, September 5, 2021, no Lake Okeechobee water was delivered to the FEBs/STAs. The total amount of Lake releases sent to the FEBs/STAs in WY2022 (since May 1, 2021) is approximately 61,000 ac-feet. The total amount of inflows to the STAs in WY2022 is approximately 550,000 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, and STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown. Operational restrictions are in place in STA-1W Western, Eastern, and Northern Flow-ways, and STA-2 Flow-way 2 for construction activities. Operational restrictions are in effect in STA-1E Central Flow-way and STA-2 Flow-ways 3 and 4 for vegetation management activities. Operational restrictions are also in effect in STA-5/6 Flow-ways 2 and 3 following the Restoration Strategies project to grade non-effective treatment areas. This week, if 2008 LORS recommends Lake releases to the WCAs and conditions allow, releases will be sent to STA-2.

Everglades

Rainfall amounts increased this week and were consistent across the basins. At the gauges monitored for this report, stages rose 0.11 feet on average last week. Rehydration rates were good to fair across most of the Everglades Protection Area, the exceptions were northeastern and central WCA-3A. Depth conditions in WCA-3A North remain below the historical median across that sub-basin. In Florida Bay, salinities remained unchanged, and stages increased in Taylor Slough on average. The mangrove zone continues to freshen, but more fresh water is needed as the Bay remains in a marine condition (above 35).

Supporting Information

Kissimmee Basin

Upper Kissimmee

On September 5, 2021, lake stages were 56.6 feet NGVD (at schedule) in East Lake Toho, 53.6 feet NGVD (at schedule) in Lake Toho, and 50.6 feet NGVD (0.5 feet below schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1**, **Figures KB-1-3**).

Lower Kissimmee

Discharges to the Kissimmee River on September 5, 2021, were 1,370 cubic feet per second (cfs) at S-65 and 1,420 cfs at S-65A; discharges from the Kissimmee River were 1,660 cfs at S-65D and 1,700 cfs at S-65E (**Table KB-2**). Headwater stages were 46.4 feet NGVD at S-65A and 28.5 feet NGVD at S-65D on September 5, 2021. The concentration of dissolved oxygen in the Kissimmee River increased, with the average for the week ending on September 5, 2021, at 1.6 mg/L after a few weeks below the 1.0 mg/L threshold considered potentially lethal for sunfish (**Table KB-2**, **Figure KB-4**). Discharge at S-65/S-65A was reduced in late August; the resulting reduction in water depth was a factor in the improvements in dissolved oxygen. Flow at S-65A remains too low for complete inundation of the Kissimmee River floodplain, and mean floodplain depth decreased to 0.94 feet by September 5, 2021 (**Figure KB-5**), also due to the reductions in discharge.

Water Management Recommendations

Maintain 1,400 cfs at S65/S65A after September 1 per the IS-14-50 discharge plan.

Table KB-1. Average discharge for the preceding seven days and Sunday's average daily stage and departures from KCL flood regulation or temporary schedules. All data are provisional.

Water Body	Structure	Stage Monitoring Site	7-Day Average Discharge (cfs)	Lake Stage (feet NGVD)[a]	Schedule Type[b]	Schedule Stage (feet NGVD)	Departure from Regulation (feet)	
							9/5/21	*8/29/21*
Lakes Hart and Mary Jane	S-62	LKMJ	53	60.1	R	60.0	0.1	0.0
Lakes Myrtle, Preston and Joel	S-57	S-57	3	61.1	R	61.0	0.1	0.0
Alligator Chain	S-60	ALLI	0	63.2	R	63.2	0.0	0.0
Lake Gentry	S-63	LKGT	18	61.0	R	61.0	0.0	0.1
East Lake Toho	S-59	TOHOE	108	56.6	R	56.6	0.0	0.0
Lake Toho	S-61	TOHOW S-61	199	53.6	R	53.6	0.0	0.0
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	1,359	50.6	R	51.1	-0.5	-0.1

a. Names of in-lake monitoring sites and structures used to determine lake stage. If more than one site is listed, an average is reported.

b. A: projected recession line; R: USACE regulation schedule; S: temporary recession target line; T: temporary schedule; NA: not applicable or not available.

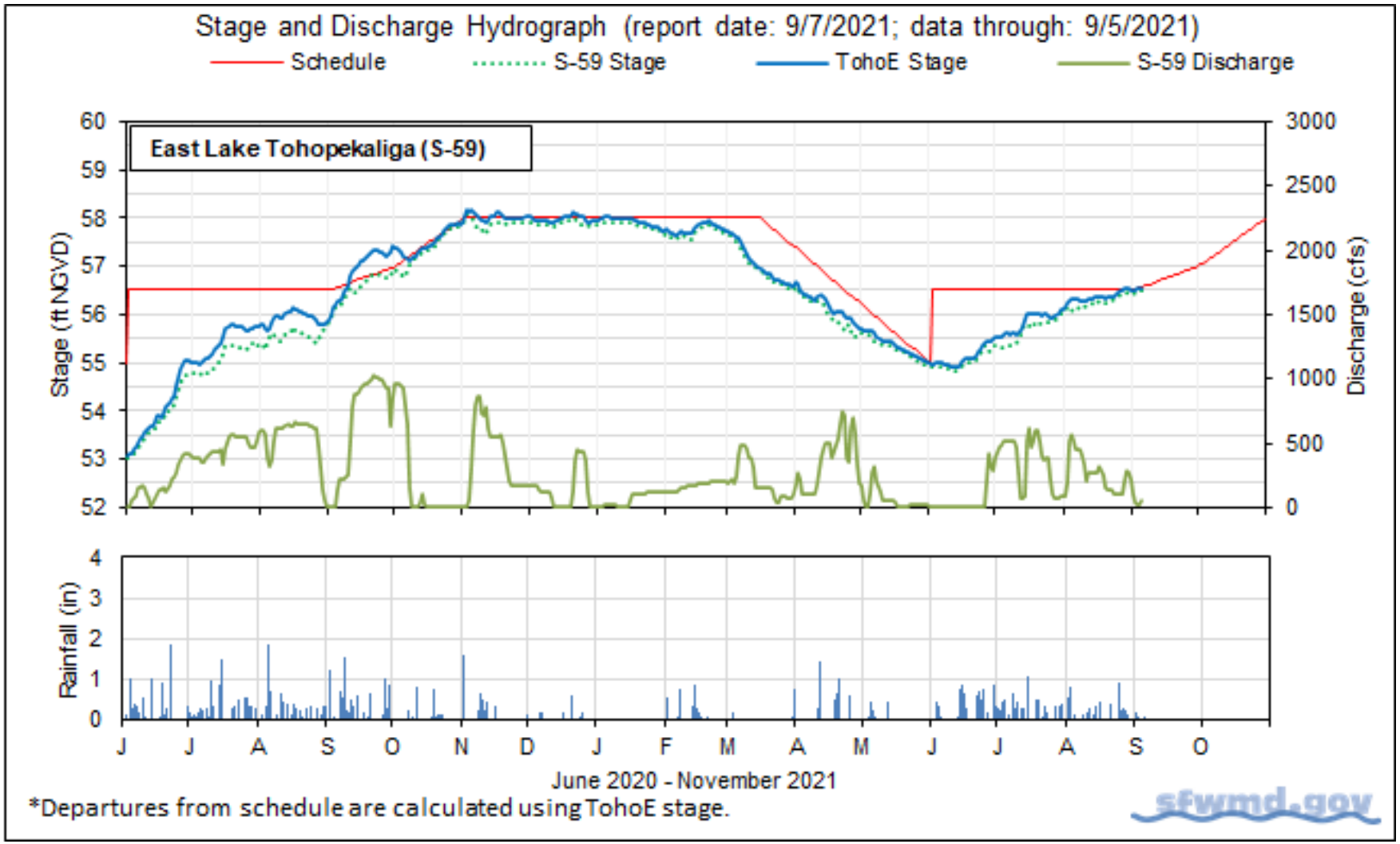


Figure KB-1. East Lake Toho regulation schedule, stage, discharge and rainfall.

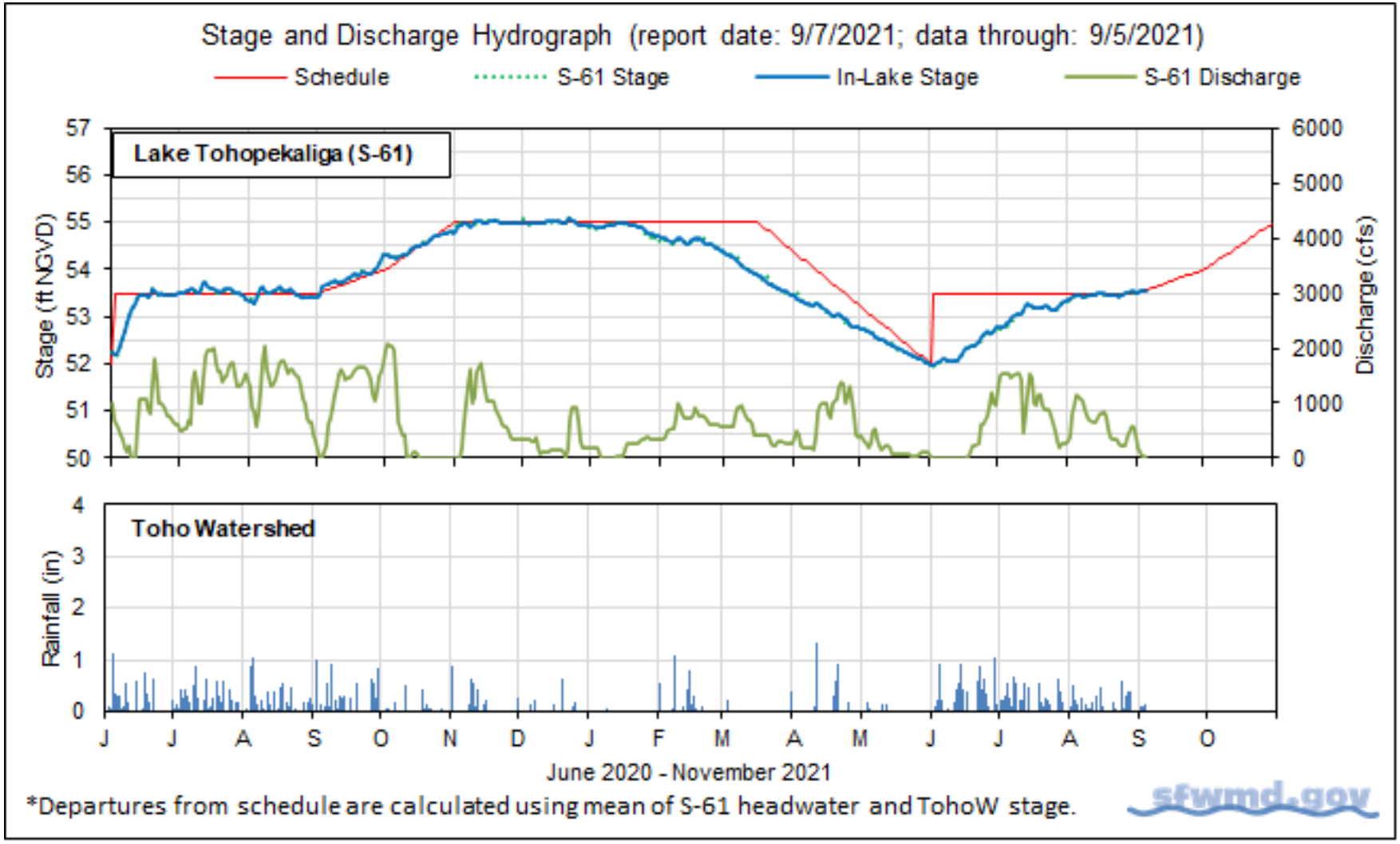


Figure KB-2. Lake Toho regulation schedule, stage, discharge and rainfall.

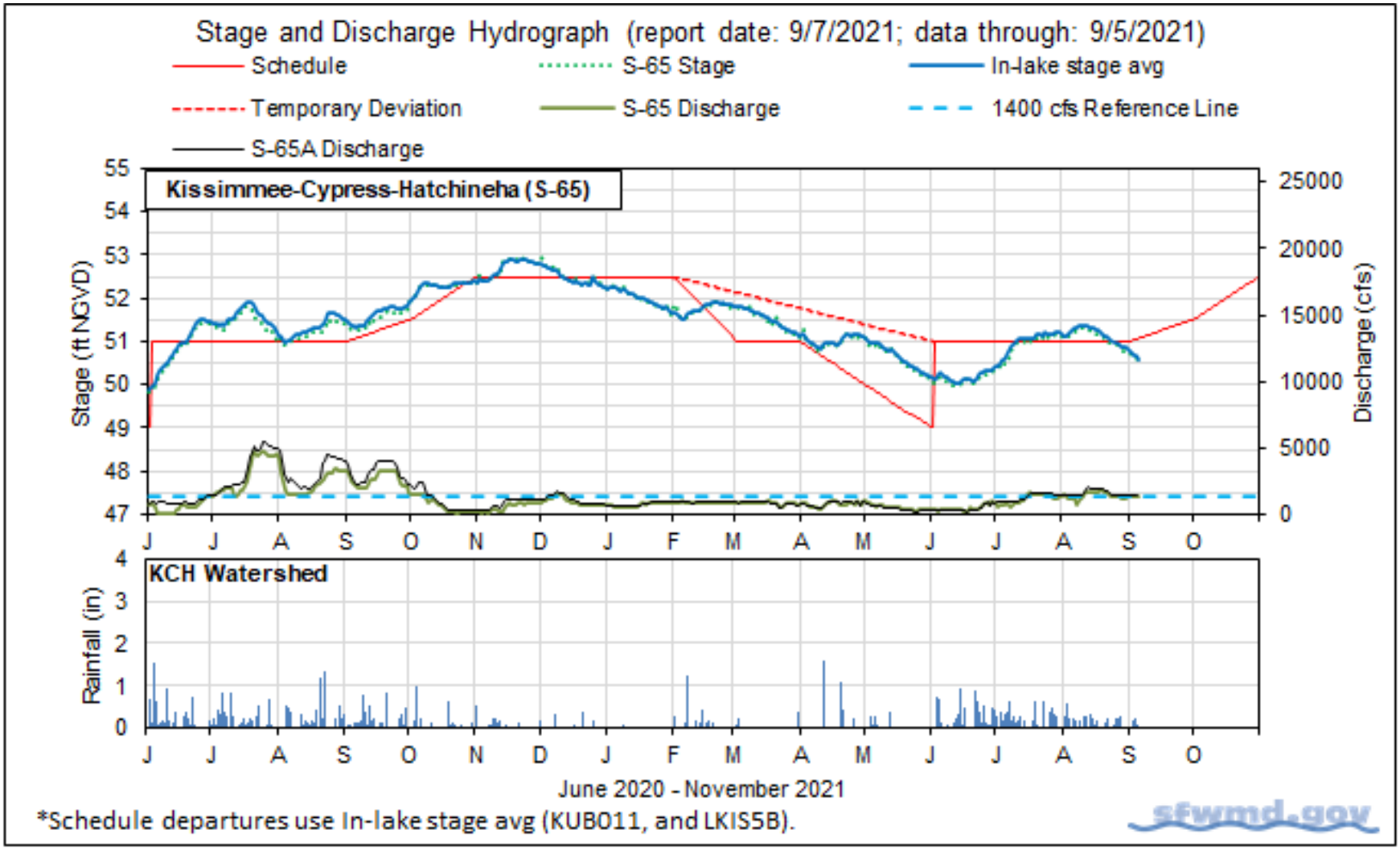


Figure KB-3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

Table KB-2. One- and seven-day average discharge and stage at Lower Kissimmee basin structures, river channel dissolved oxygen concentrations and water depths in the Phase I area floodplain. All data are provisional.

Metric	Location	Daily Average	Average for Previous Seven Day Periods			
		9/5/21	9/5/21	8/29/21	8/22/21	8/15/21
Discharge	S-65	1,370	1,360	1,360	1,700	1,470
Discharge	S-65A[a]	1,420	1,410	1,450	1,900	1,790
Headwater Stage (feet NGVD)	S-65A	46.4	46.3	46.3	46.3	46.5
Discharge	S-65D[b]	1,660	1,770	2,030	2,040	1,890
Headwater Stage (feet NGVD)	S-65D[c]	28.5	28.4	28.5	28.5	28.5
Discharge (cfs)	S-65E[d]	1,700	1,840	2,100	2,260	2,200
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) [e]	Phase I, II/III river channel	2.1	1.6	0.6	0.3	0.7
Mean depth (feet) [f]	Phase I floodplain	0.94	0.99	1.08	1.11	0.93

a. Combined discharge from main and auxiliary structures.

b. Combined discharge from S-65D, S-65DX1 and S-65DX2.

c. Average stage from S-65D and S-65DX1.

d. Combined discharge from S-65E and S-65EX1.

e. Dissolved oxygen is the average of values from sondes KRBN, PC62, PC63, PD62R and PD42R.

f. One-day spatial average obtained from the South Florida Water Depth Assessment Tool (SFWDAT).

Table KB-3. Discharge rate of change limits for S65/S-65A (revised 1/14/19).

Discharge (cfs)	Maximum Rate of Increase (cfs/day)	Maximum Rate of Decrease (cfs/day)
0-300	100	-50
301-650	150	-75
651-1,400	300	-150
1,401-3,000	600	-600
>3,000	1,000	-2,000

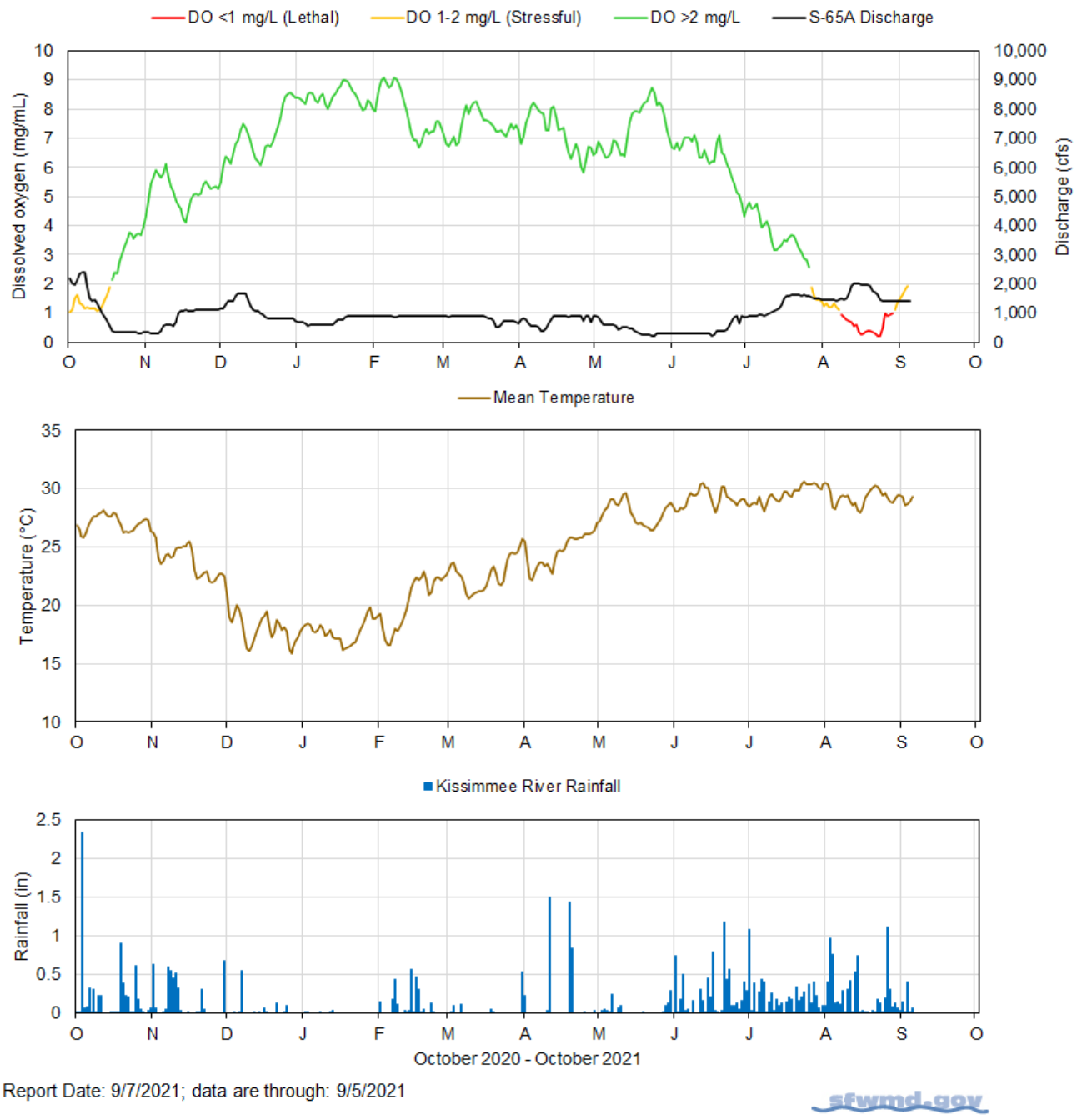


Figure KB-4. Restored Kissimmee river channel mean daily dissolved oxygen concentration (mg/L), S-65A discharge (cfs), temperature (°C) and rainfall (inches). Dissolved oxygen (DO) and temperature are mean daily values averaged for PC62, KRBN, PC33, PD62R, and PD42R with an average of four stations reporting this week. Rainfall values are daily totals for Kissimmee River (Pool BCD) AHED watershed.

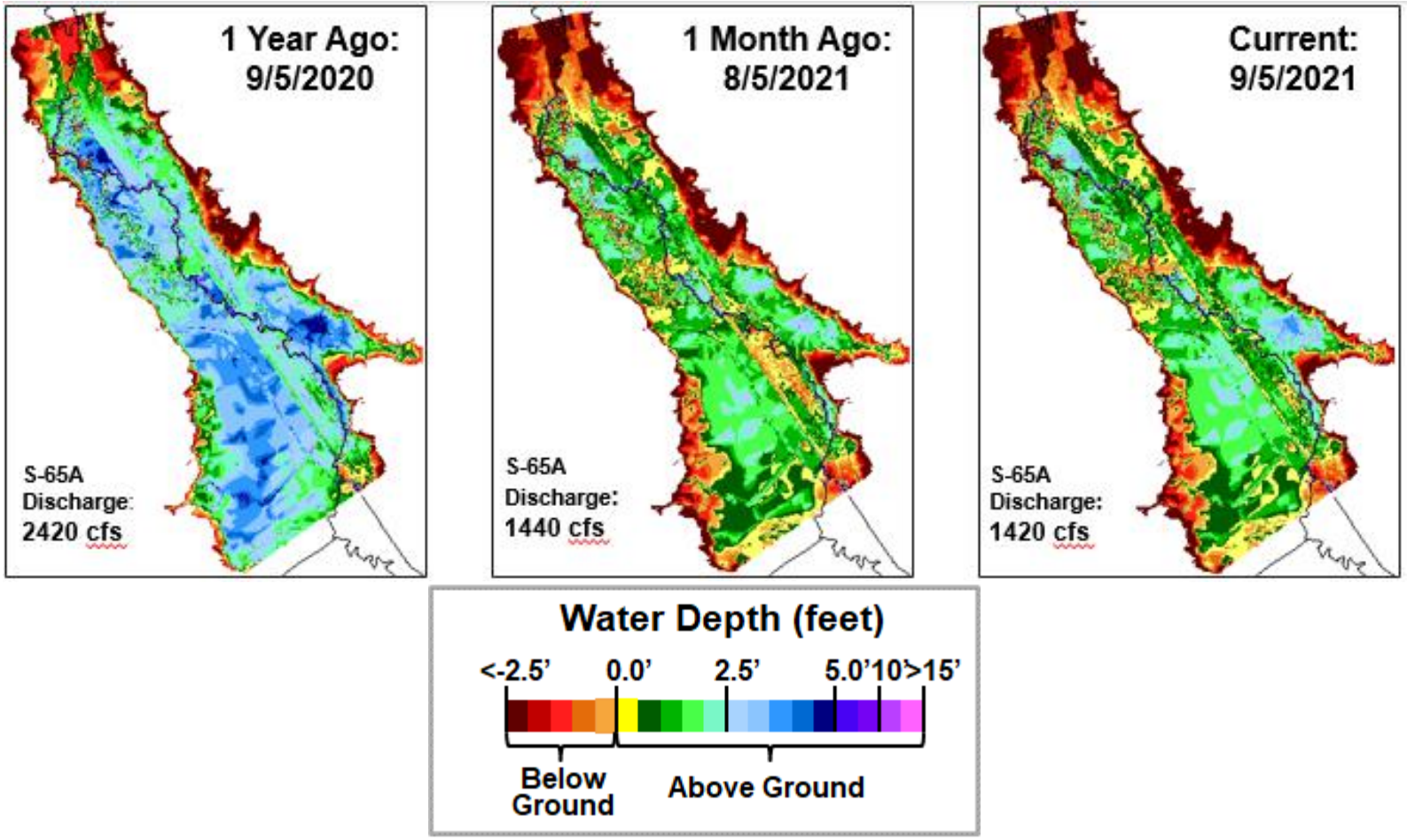


Figure KB-5. Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.

Lake Okeechobee

Lake Okeechobee stage was 14.71 feet NGVD on September 5, 2021, 0.79 feet higher than a month ago, and 0.29 feet higher than one year ago (**Figure LO-1**). Lake stages were above the ecological envelope from August 1, 2020 to March 30, 2021, and near or within the upper threshold of the envelope until mid-June. Lake stages have been above the ecological envelope since early-July and are approximately 0.5 feet above (**Figure LO-2**). Recent satellite imagery (September 5, 2021) shows medium bloom potential in western, north-eastern and southern parts of the Lake, and low to medium bloom potential in west-central region (**Figure LO-5**).

Average daily inflows (excluding rainfall) decreased from the previous week, going from 3,677 cfs to 2,940 cfs. Average daily outflows (excluding evapotranspiration) decreased compared to the previous week, going from 75 cfs to 0 cfs. Most of the inflows (~63% of the total or 1,839 cfs) came from the Kissimmee River through S-65E & S-65EX1 structures, C-40 & C-41 canals (~9% of the total or 264 cfs) through S-71 & S-72 structures, and Fisheating Creek (~8% of the total or 232 cfs). There was no outflow to the west via S-77, to the east via S-308, or to the south via S-351, S-352, and S-354 structures. There was a backflow from L-8 canal via the S-271 structure at the average rate of 99 cfs. Average inflows and outflows through water control structures surrounding the Lake for the previous two weeks are shown in Table LO-1, as is the resultant Lake elevation change in inches (in) due to each structure's flow for the past week. **Figure LO-4** 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 satellite image (September 5, 2021) from the NOAA cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3 OLCI sensor data showed medium bloom potential in western, north-eastern, and southern parts of the Lake, and low to medium bloom potential in west-central region (**Figure LO-5**).

A total of 16 sites (or 50%) had communities dominated by *Microcystis aeruginosa,* and 41% had mixed communities. At one site (RITTAE2), communities were dominated by *Cylindrospermopsis raciborskii*. Percentage of sites dominated by *M. aeruginosa* was similar to late July and early August. A total of 30 sites (or 94%) had microcystin concentration below EPA recommended human health recreational standard (8 µg/L). The highest toxin concentration (4.3 µg/L) was recorded at L005 in the western part of the Lake. Overall, toxin concentration above the EPA threshold decreased by 6% since late July and 3% since early August (**Table LO-2** and **Figure LO-6**).

Table LO-1. Weekly Lake Okeechobee inflows and outflows (cfs) and as change in elevation (in). Provisional data.

INFLOWS	Previous week Avg Daily (cfs)	Avg Daily Flow (cfs)	Equivalent Depth Week Total (in)
S-65E & S-65EX1	2097	1839	0.7
S-71 & S-72	327	264	0.1
S-84 & S-84X	235	105	0.0
Fisheating Creek	530	232	0.1
S-154	72	55	0.0
S-191	14	0	0.0
S-133 P	30	56	0.0
S-127 P	35	11	0.0
S-129 P	26	28	0.0
S-131 P	12	26	0.0
S-135 P	167	225	0.1
S-2 P	0	0	0.0
S-3 P	0	0	0.0
S-4 P	0	0	0.0
*Backflow	132	99	0.0
Rainfall	6459	1627	0.6
Total	**10136**	**4567**	**1.8**

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	34	0	0.0
S-352	40	0	0.0
S-354	0	0	0.0
*L-8 (S-271)	*-132*	*-99*	*0.0*
ET	1964	2365	0.9
Total	**2038**	**2365**	**0.9**

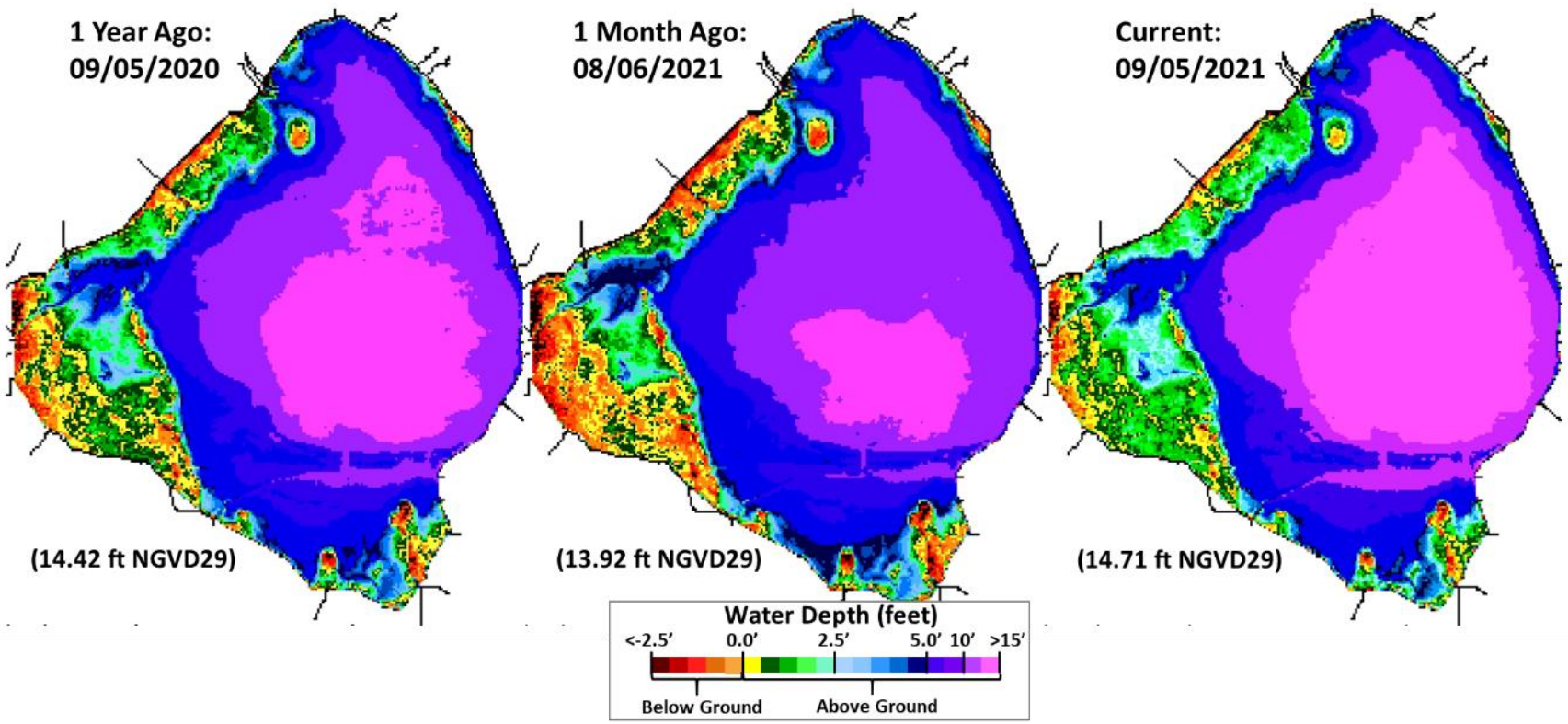


Figure LO-1. Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

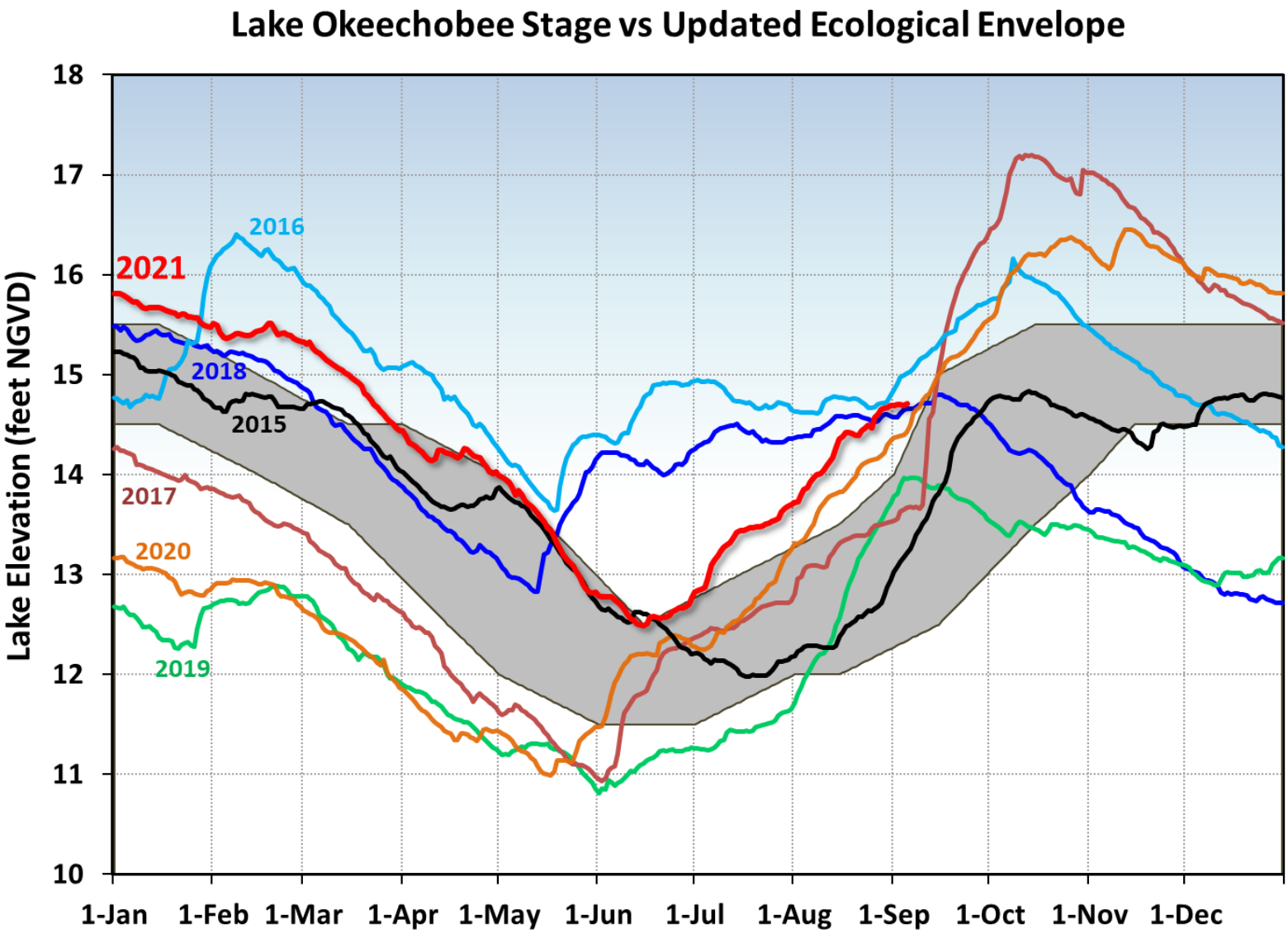


Figure LO-2. Select annual stage hydrographs for Lake Okeechobee in comparison to the updated ecological envelope.

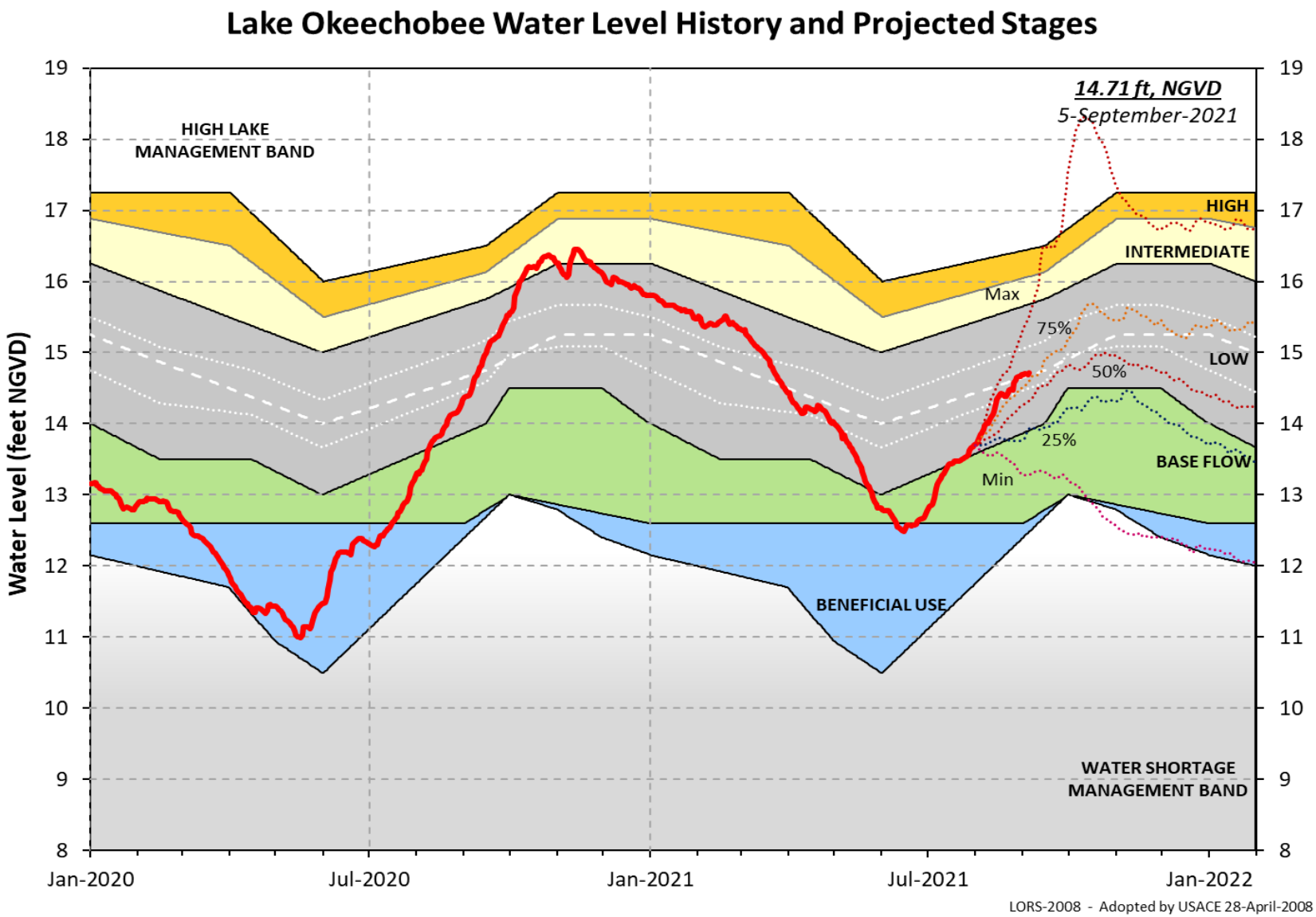


Figure LO-3. Recent Lake Okeechobee stages and releases, with projected stages based on a dynamic position analysis.

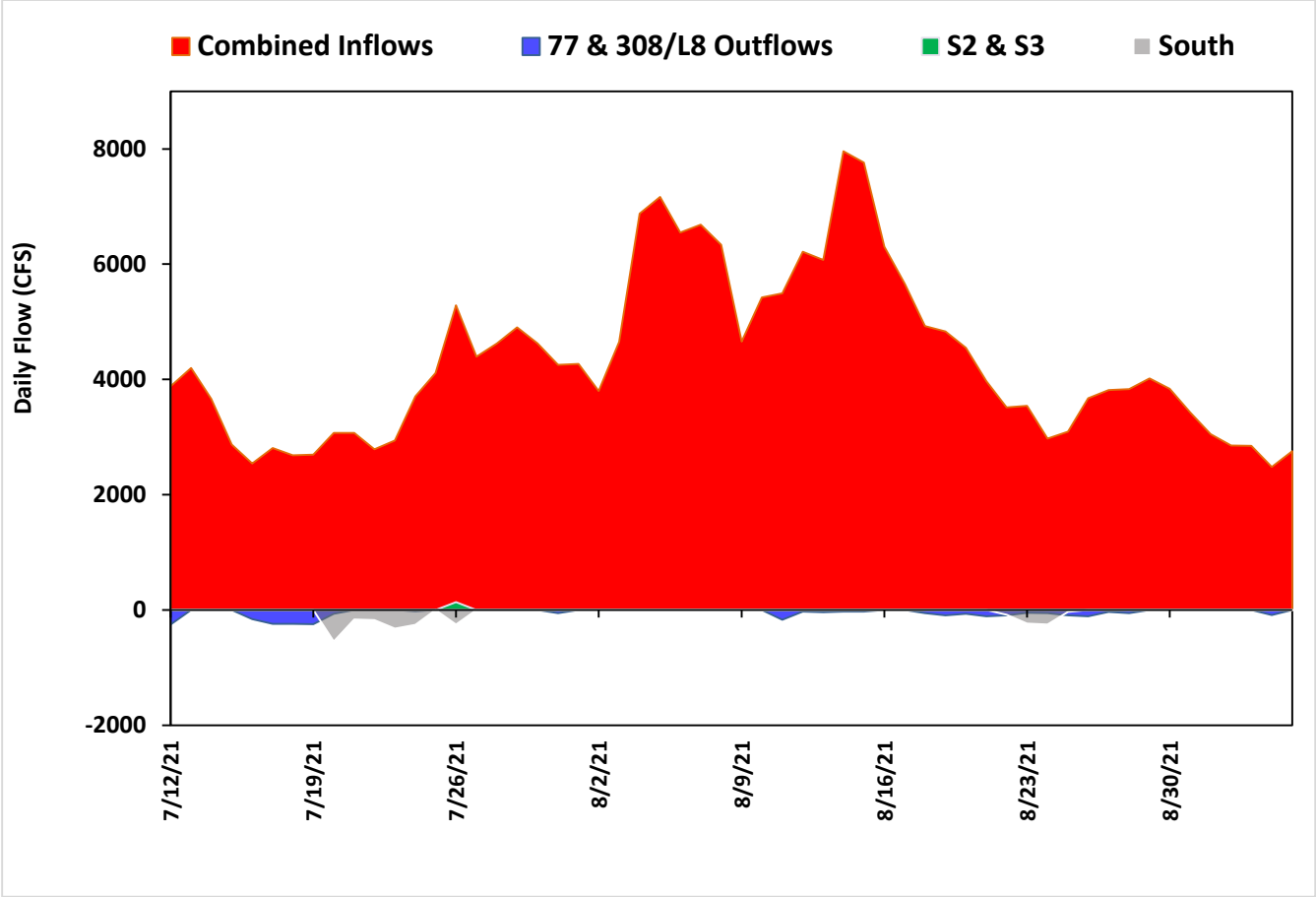


Figure LO-4. Major inflows (red) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in gray. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows from Lake Okeechobee into the L-8 or C-44 canals are included with outflows. Inflows are shown as positive values; outflows are negative. Outflows through the S-77 (Caloosahatchee) and S-308 (C-44 Canal) structures are based on downstream gauges to include flows to lock openings for navigation.

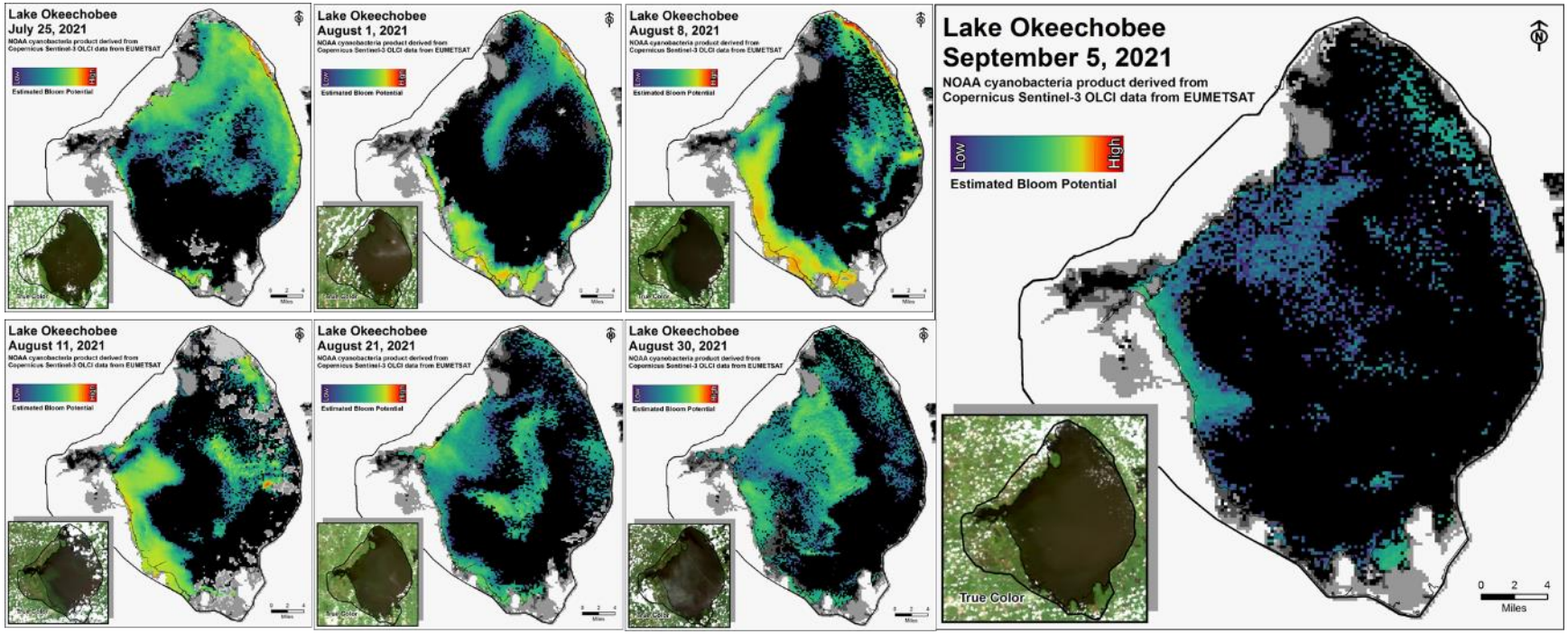


Figure LO-5. Cyanobacteria bloom potential based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

Table LO-2. Provisional results of chlorophyll *a* concentrations and cyanobacteria taxa from sampling trips on August 23-25, 2021. Color coding generally follows the legend in **Figure LO-6**.

Collection Date: August 23-25, 2021

Station	CHLa (ug/L)	TOXIN (ug/L)	TAXA
FEBIN			
FEBOUT			
KISSR0.0	P	BDL	*mixed*
L005	P	**4.3**	*Microcys*
LZ2	P	BDL	*mixed*
KBARSE	P	BDL	*Microcys*
RITTAE2	P	BDL	*Cylindro*
PELBAY3	P	BDL	*mixed*
POLE3S	P	BDL	*mixed*
LZ25A	P	BDL	*mixed*
PALMOUT	P	**0.4**	*Microcys*
PALMOUT1	P	BDL	*Microcys*
PALMOUT2	P	BDL	*mixed*
PALMOUT3	P	0.3	*Microcys*
POLESOUT	P	BDL	*Microcys*
POLESOUT1	P	**0.5**	mixed
POLESOUT2	P	BDL	*mixed*
POLESOUT3	P	**1.2**	*Microcys*
EASTSHORE	P	**0.4**	*Microcys*
NES135	P	**0.6**	*Microcys*
NES191	P	**0.3**	*Microcys*

Station	CHLa (ug/L)	TOXIN (ug/L)	TAXA
L001	P	BDL	*Microcys*
L004	P	**0.3**	*Microcys*
L006	P	BDL	*mixed*
L007	P	BDL	*mixed*
L008	P	**0.3**	*mixed*
LZ30	P	BDL	*mixed*
LZ40	P	**1.0**	*Microcys*
CLV10A	P	**0.3**	*Microcys*
NCENTER	P	**0.6**	*Microcys*
S308C	P	**1.1**	*Microcys*
S77	P	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
- Station bold font – crew observed possible BGA
- Chlorophyll *a* analyzed by SFWMD
- Toxin and Taxa analyzed by FDEP:
  Microcys = Microcystis; Cylindro = Cylindrospermopsis; Planktol = Planktolyngbya; Dolicho = Dolichospermum

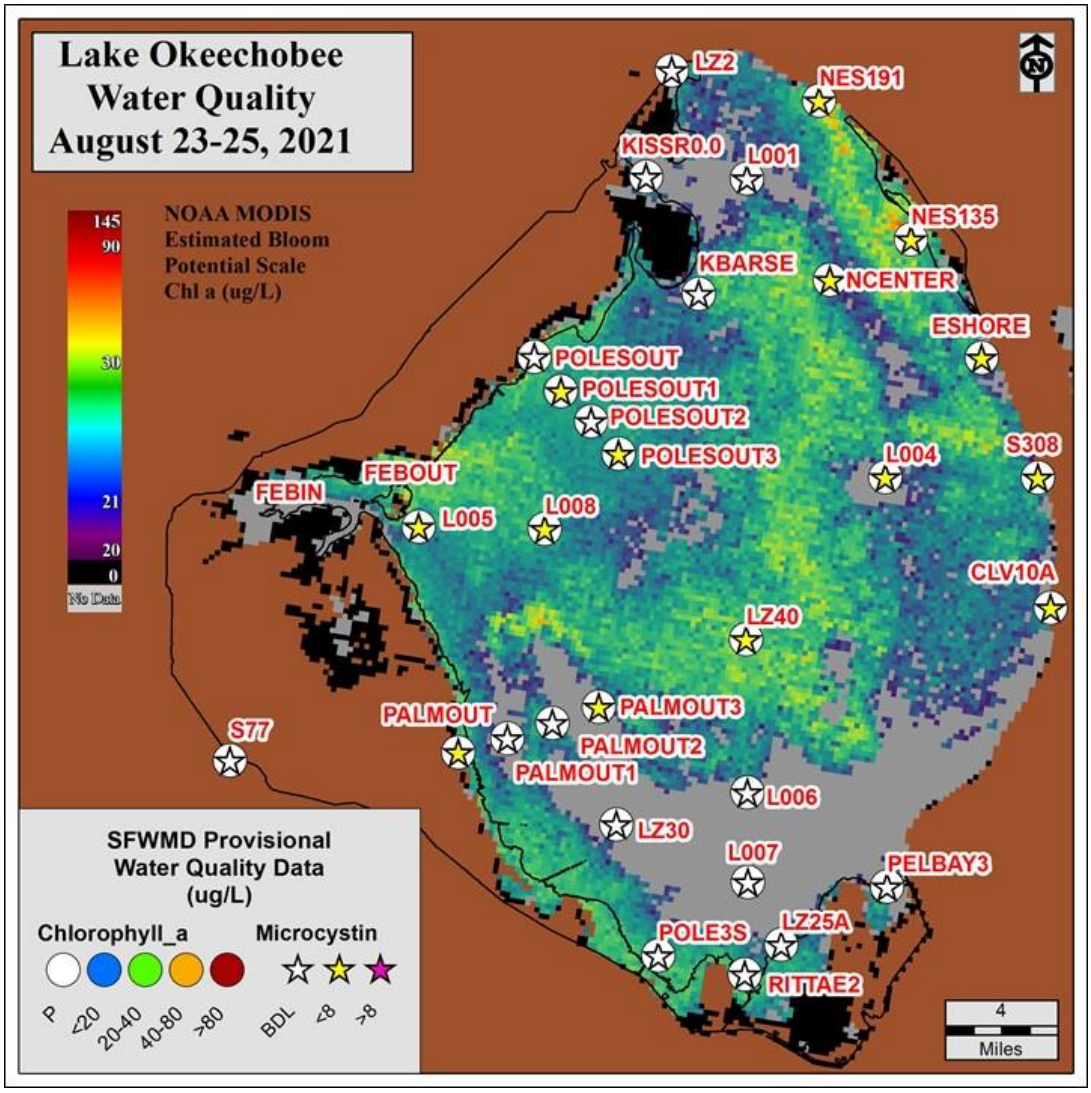


Figure LO-6. Expanded monitoring network and provisional results from samples collected August 23-25, 2021.

Estuaries

St. Lucie Estuary

Over the past week, mean total inflow to the St. Lucie Estuary was 2,514 cfs (**Figures ES-1** and **ES-2**), and the previous 30-day mean inflow was 2,024 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-2**.

Over the past week, salinities decreased at all sites within the estuary (**Table ES-1** and **Figure ES-3**). The seven-day moving average of the surface and bottom salinities at the US1 Bridge was 6.1. Salinity conditions in the middle estuary were estimated to be within the fair range for adult eastern oysters (**Figure ES-4**).

Caloosahatchee River Estuary

Over the past week, mean total inflow to the Caloosahatchee River Estuary was 3,359 cfs (**Figures ES-5** and **ES-6**), and the previous 30-day mean inflow was approximately 4,065 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-6**.

Over the past week, salinities remained the same at S-79 and Val I-75, decreased at Sanibel, and increased at the remaining sites in the estuary (**Table ES-2** and **Figures ES-7** and **ES-8**). The seven-day mean surface salinities (**Table ES-2**) were in the good range (0-10) for tape grass at Val I-75 and at Ft. Myers. The seven-day mean surface salinity values were within the good range for adult eastern oysters at Shell Point and Sanibel, and in the fair range at Cape Coral (**Figure ES-9**).

Surface salinity at Val I-75 was forecasted for the next two weeks using an autoregression model (Qiu and Wan, 2013[1]) coupled with a linear reservoir model for the tidal basin. Model scenarios included pulse releases at S-79 ranging from 0 to 1500 cfs and steady releases at 2,000 cfs with estimated tidal basin inflows of 554 cfs. Model results from all scenarios predict daily salinity to be 0.8 or lower and the 30-day moving average surface salinity to be 0.3 or lower at Val I-75 at the end of the two-week period (**Table ES-3** and **Figure ES-10**). This keeps predicted salinities at Val I-75 within the LORS 2008 salinity range (0.0-5.0).

Red Tide

The Florida Fish and Wildlife Research Institute reported on September 3, 2021, that *Karenia brevis*, the Florida red tide dinoflagellate, was observed at background to high concentrations in Charlotte County and background to low concentrations in Lee County. On the east coast, red tide was not observed in samples collected from St. Lucie, Palm Beach, or Broward counties.

[1] Qui, C., and Y. Wan. 2013. Time series modeling and prediction of salinity in the Caloosahatchee River Estuary. *Water Resources Research* 49:5804-5816.

Water Management Recommendations

Lake stage is in the Low Sub-Band. Tributary conditions are Wet. The LORS2008 release guidance suggests up to 450 cfs release at S-79 to the Caloosahatchee River Estuary and up to 200 cfs release at S-80 to the St. Lucie Estuary.

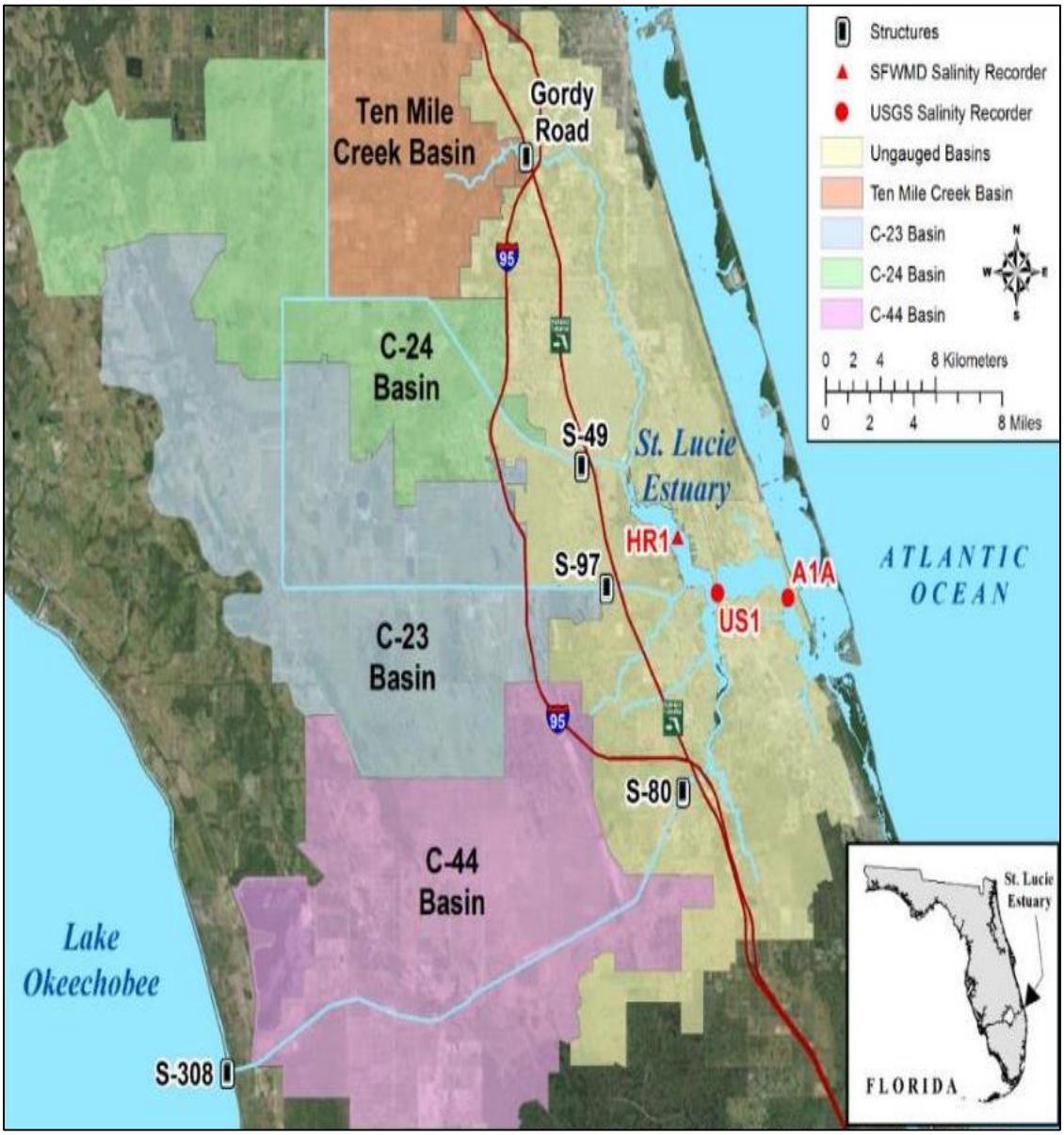


Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

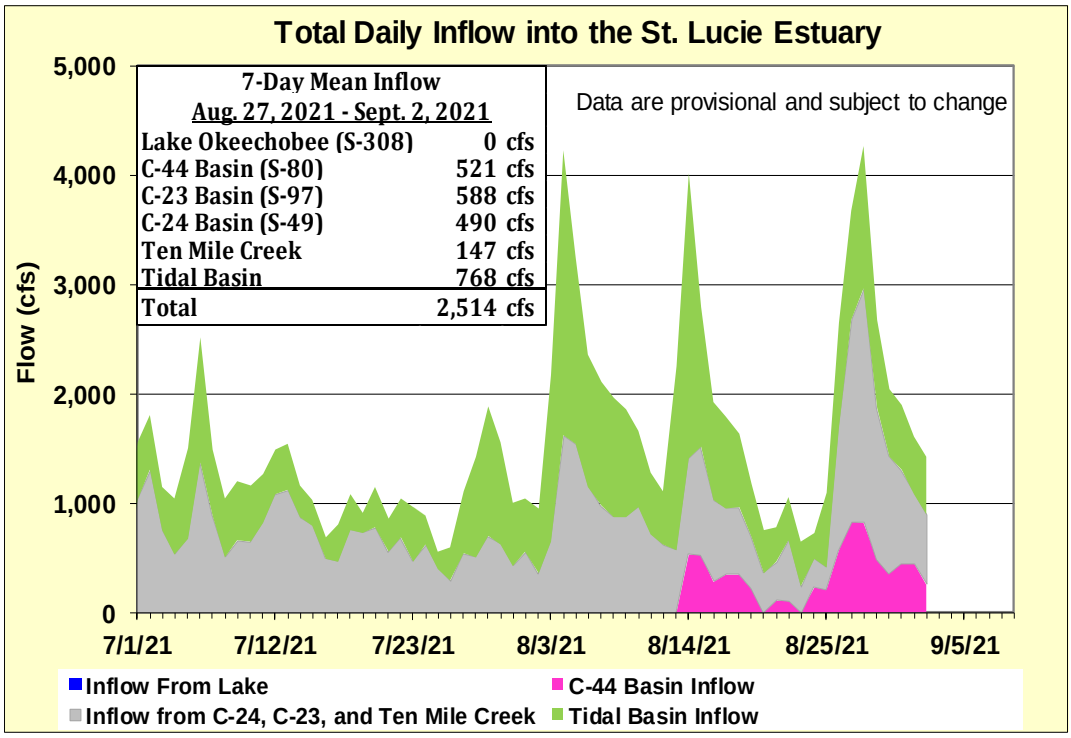


Figure ES-2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

Table ES-1. Seven-day mean salinity at oyster monitoring sites in the St. Lucie Estuary. Current means are in bold font; previous week's means are in parentheses. The envelope reflects the preferred salinity range for adult eastern oysters (*Crassostrea virginica*) in the middle estuary. Data are provisional.

Sampling Site	Surface	Bottom	Envelope
HR1 (North Fork)	**1.5** (2.6)	**2.4** (5.1)	NA [a]
US1 Bridge	**4.7** (8.6)	**7.5** (11.0)	10.0 – 26.0
A1A Bridge	**11.8** (19.2)	**21.3** (25.2)	NA [a]

a. The envelope is not applicable.

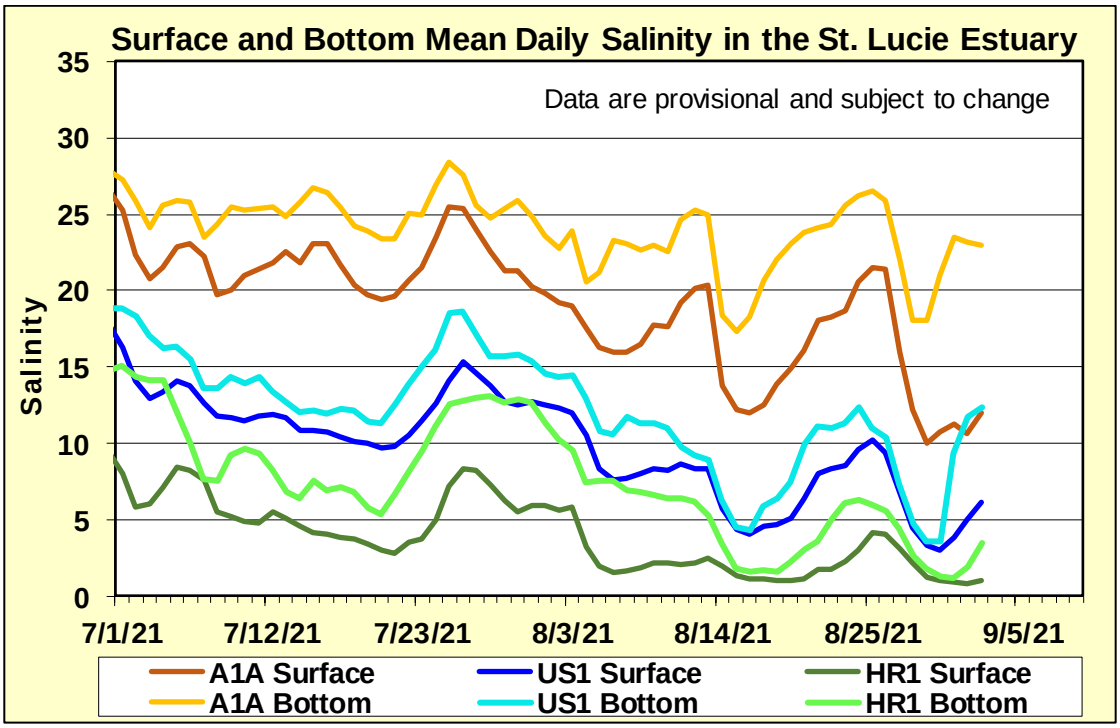


Figure ES-3. Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

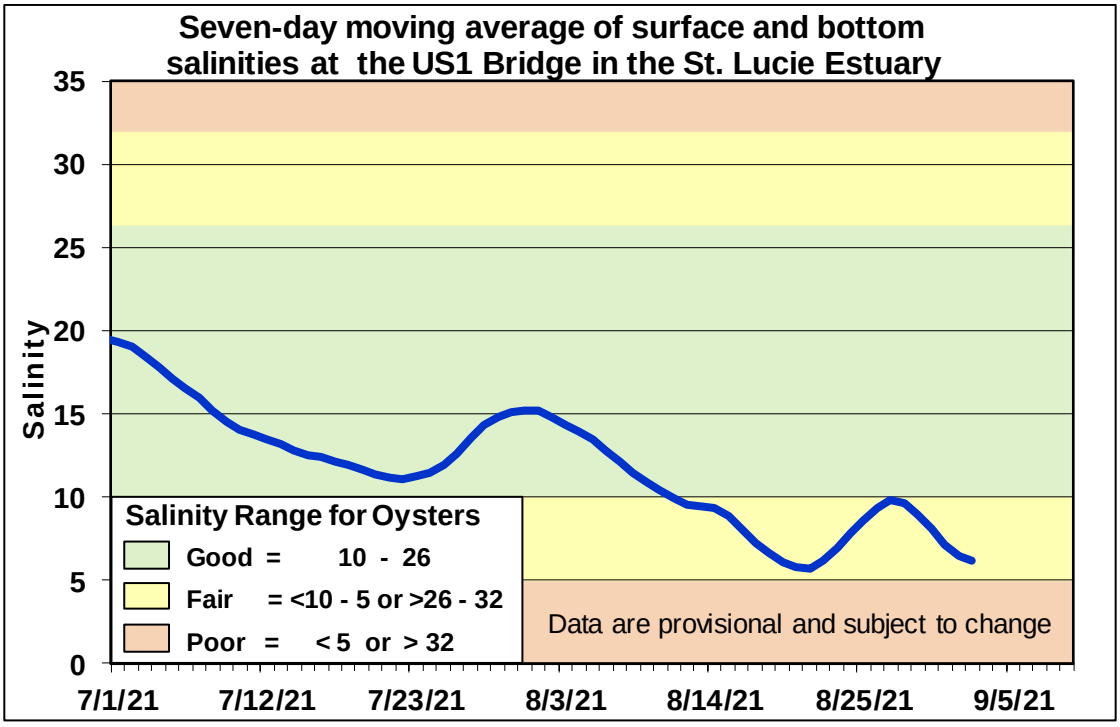


Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

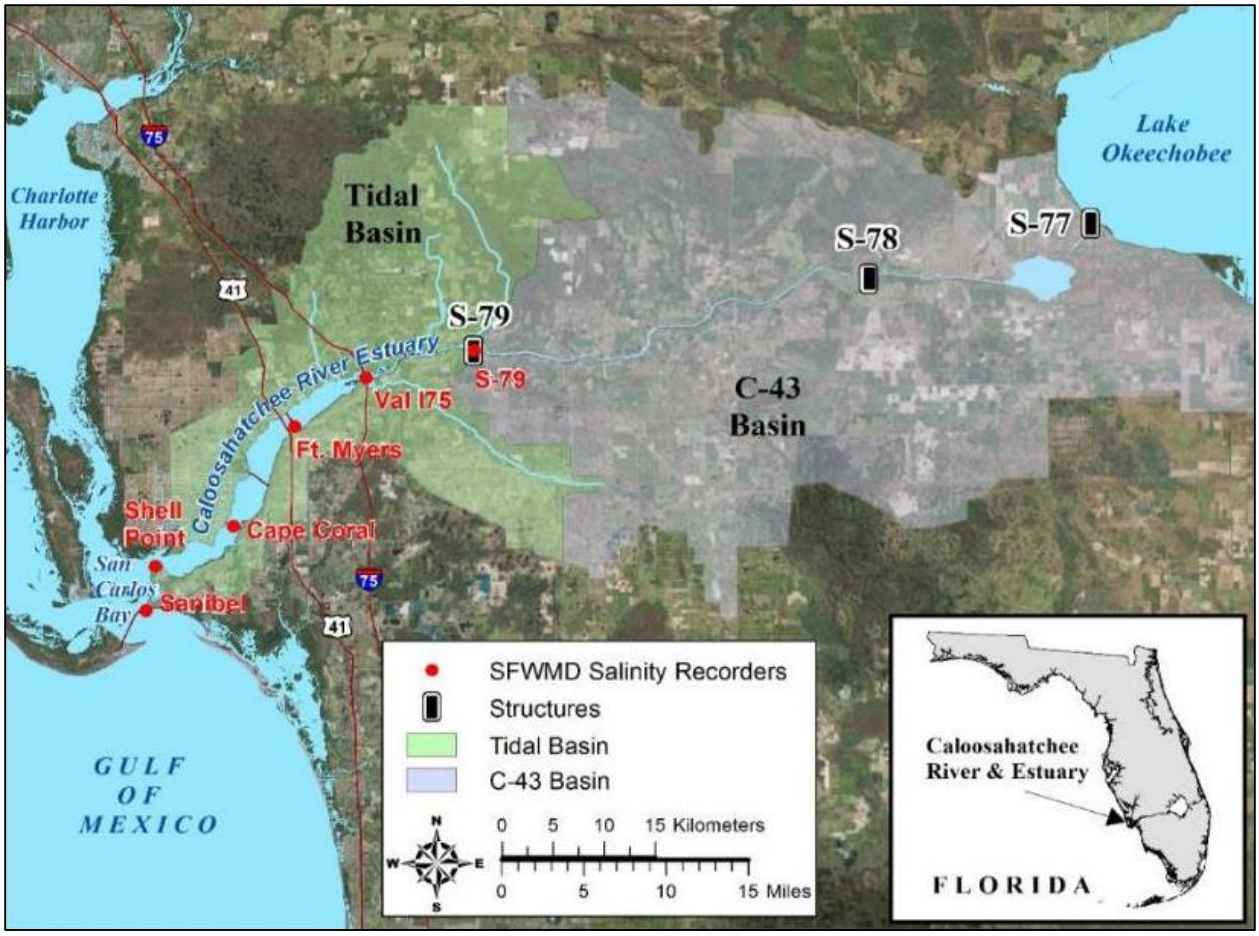


Figure ES-5. Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.

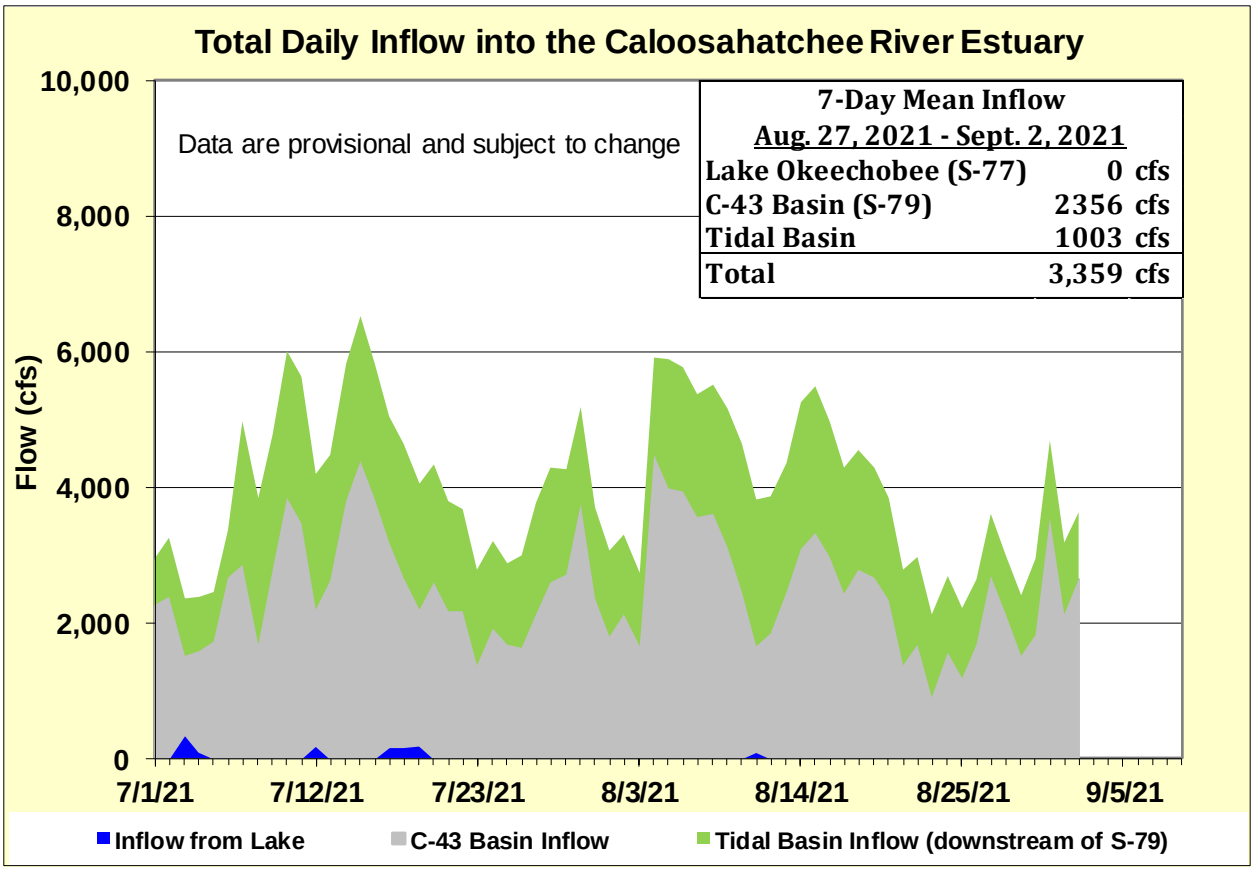


Figure ES-6. Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

Table ES-2. Seven-day mean salinity at six monitoring sites in the Caloosahatchee River Estuary. Current means are in bold font; previous week's means are in parentheses. The envelope at I-75 is for the protection of tape grass in the upper estuary and the envelope in the lower estuary is the preferred salinity range for adult eastern oysters (*Crassostrea virginica*). Data are provisional.

Sampling Site	Surface	Bottom	Envelope
S-79 (Franklin Lock)	**0.3** (0.3)	**0.3** (0.3)	NA [a]
Val I-75	**0.3** (0.3)	**0.3** (0.3)	0.0 – 5.0 [b]
Fort Myers Yacht Basin	**1.0** (0.3)	**3.6** (0.4)	NA [a]
Cape Coral	**6.3** (5.2)	**10.3** (6.6)	10.0 – 30.0
Shell Point	**18.8** (18.6)	**22.8** (21.0)	10.0 – 30.0
Sanibel	**12.3** (17.1)	**10.7** (16.4)	10.0 – 30.0

a. The envelope is not applicable.
b. The envelope is based on the predicted 30-day mean for the next two weeks.

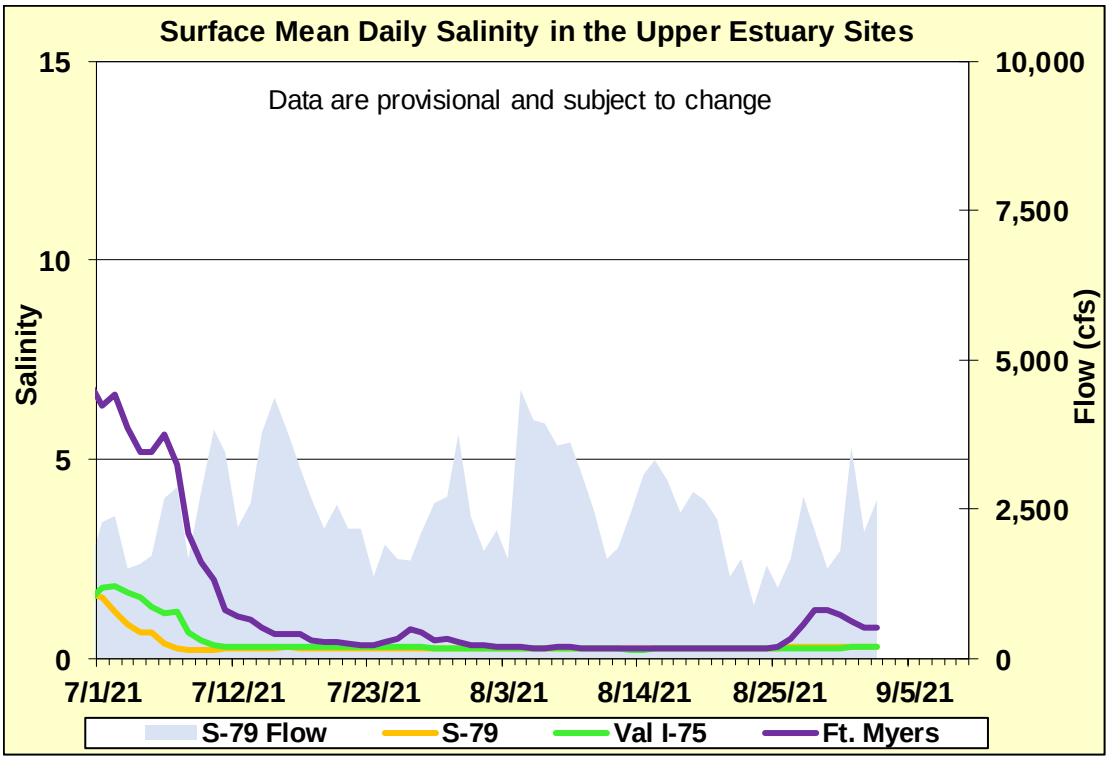


Figure ES-7. Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

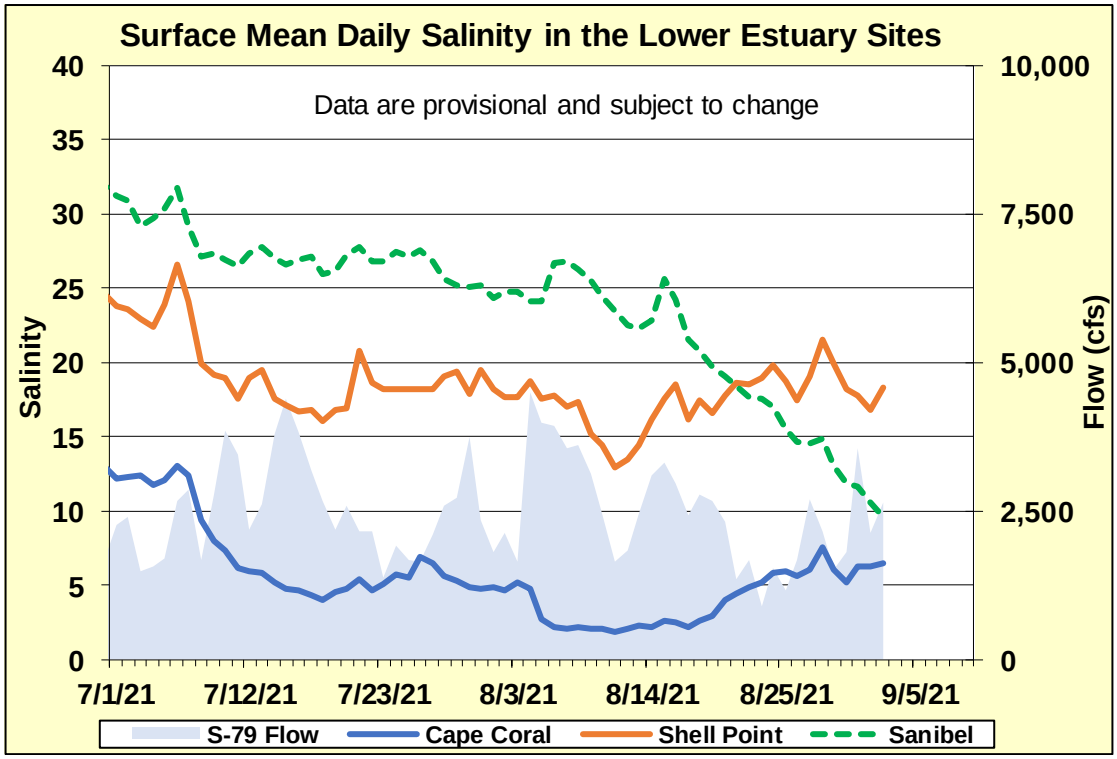


Figure ES-8. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

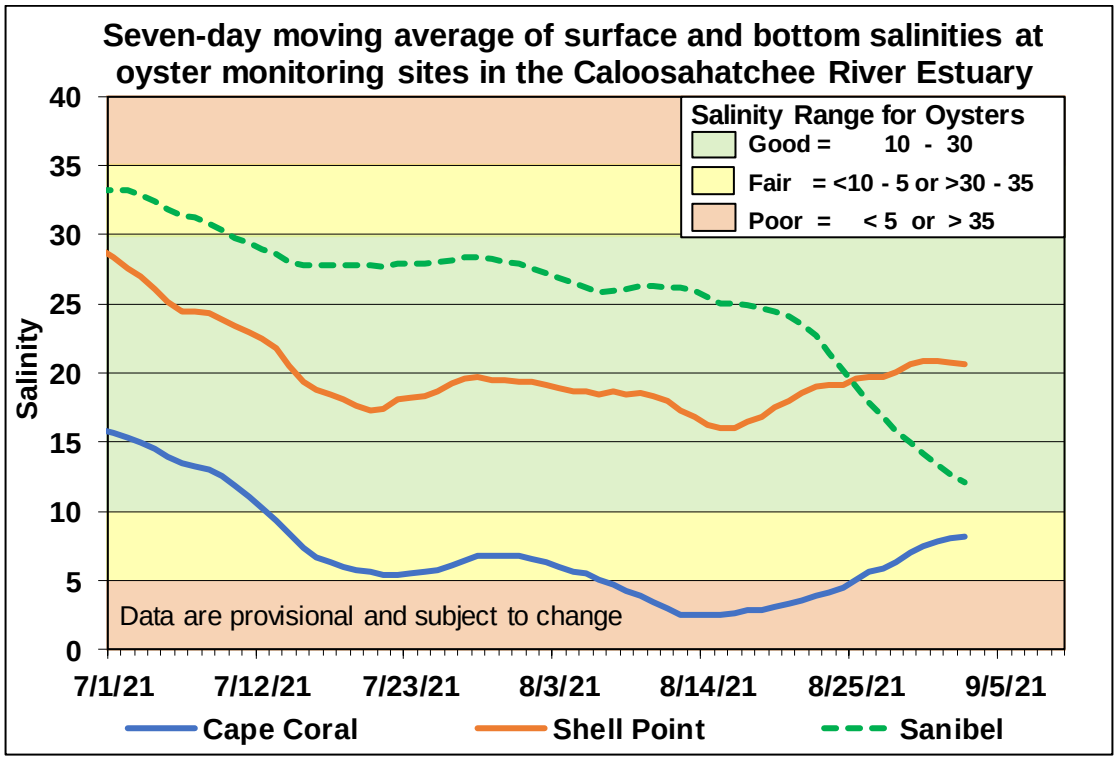


Figure ES-9. Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

Table ES-3. Predicted salinity at Val I-75 in the Caloosahatchee River Estuary at the end of the forecast period for various S-79 flow release scenarios.

Scenario	Simulated S-79 Flow (cfs)	Tidal Basin Runoff (cfs)	Daily Salinity	30-Day Mean Salinity
A	0	554	0.8	0.3
B	450	554	0.4	0.3
C	800	554	0.3	0.3
D	1000	554	0.3	0.3
E	1500	554	0.3	0.3
F	2000	554	0.3	0.3

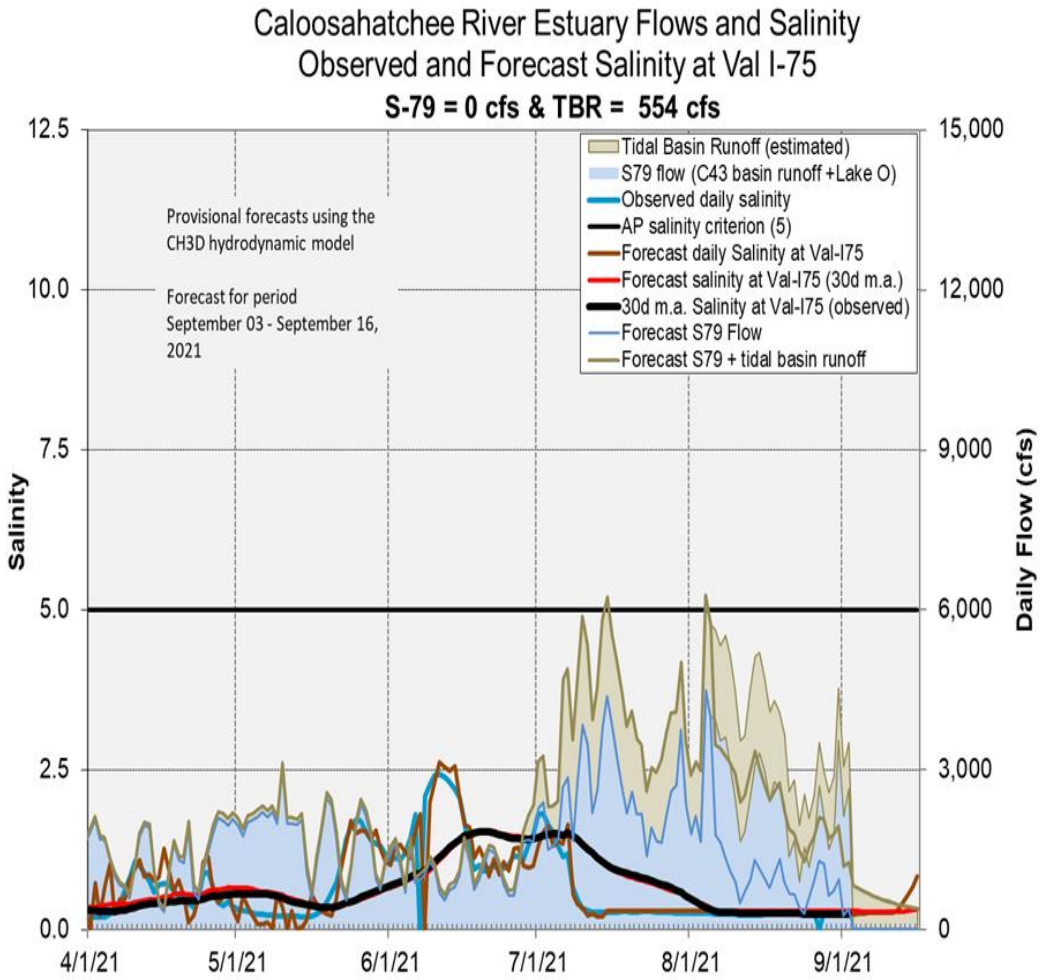


Figure ES-10. Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

Stormwater Treatment Areas

STA-1E: 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-1E Central Flow-way for vegetation management activities. Online treatment cells are at or above target stage, vegetation in these cells is stressed and highly stressed, and the 365-day phosphorus loading rates (PLR) for these flow-ways are very high (**Figure S-1**).

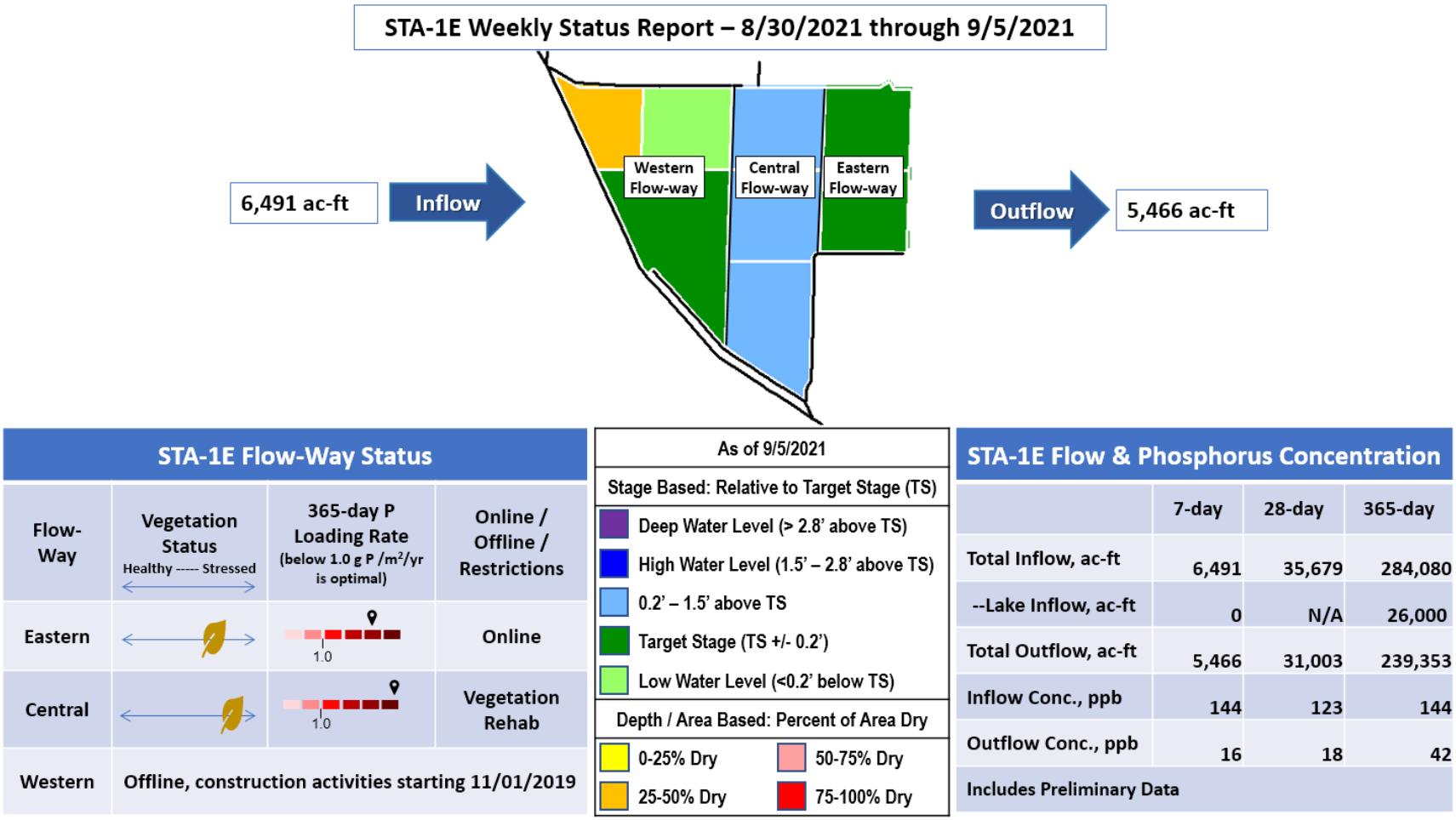
STA-1W: Operational restrictions are in place in STA-1W Western, Eastern, and Northern Flow-ways due to construction activities. Treatment cells are at or above target stage. Vegetation in the flow-ways is stressed and highly stressed. The 365-day PLRs for most flow-ways are high (**Figure S-2**).

STA-2: Operational restrictions are in place in STA-2 Flow-ways 3 and 4 for vegetation management activities and in Flow-way 2 for construction activities. Most treatment cells are above target stage. Vegetation in Flow-ways 1 and 3 is stressed, and in Flow-ways 2, 4 and 5 is highly stressed. The 365-day PLRs for Flow-ways 4 and 5 are below 1.0 g/m^2/year. The 365-day PLRs for Flow-ways 1, 2 and 3 are high (**Figure S-3).**

STA-3/4: STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown. Most treatment cells are above target stage. Vegetation in the Eastern and Central Flow-ways is highly stressed and in the Western Flow-way is stressed. The 365-day PLRs for all flow-ways are below 1.0 g/m^2/year (**Figure S-4**).

STA-5/6: Operational restrictions are in place in STA-5/6 Flow-ways 2 and 3 following the Restoration Strategies project to grade non-effective treatment areas. Treatment cells are at or above target stage. The 365-day PLRs for most flow-ways are above 1.0 g/m^2/year. All treatment cells have highly stressed vegetation conditions except Flow-ways 7 and 8, which are healthy (**Figure S-5** and **S-6**).

For definitions on STA operational language see glossary following figures.



STA-1E Flow-Way Status			
Flow-Way	Vegetation Status (Healthy ----- Stressed)	365-day P Loading Rate (below 1.0 g P /m²/yr is optimal)	Online / Offline / Restrictions
Eastern		1.0	Online
Central		1.0	Vegetation Rehab
Western	Offline, construction activities starting 11/01/2019		

As of 9/5/2021	
Stage Based: Relative to Target Stage (TS)	
Deep Water Level (> 2.8' above TS)	
High Water Level (1.5' – 2.8' above TS)	
0.2' – 1.5' above TS	
Target Stage (TS +/- 0.2')	
Low Water Level (<0.2' below TS)	
Depth / Area Based: Percent of Area Dry	
0-25% Dry	50-75% Dry
25-50% Dry	75-100% Dry

STA-1E Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	6,491	35,679	284,080
--Lake Inflow, ac-ft	0	N/A	26,000
Total Outflow, ac-ft	5,466	31,003	239,353
Inflow Conc., ppb	144	123	144
Outflow Conc., ppb	16	18	42
Includes Preliminary Data			

Figure S-1. STA-1E Weekly Status Report

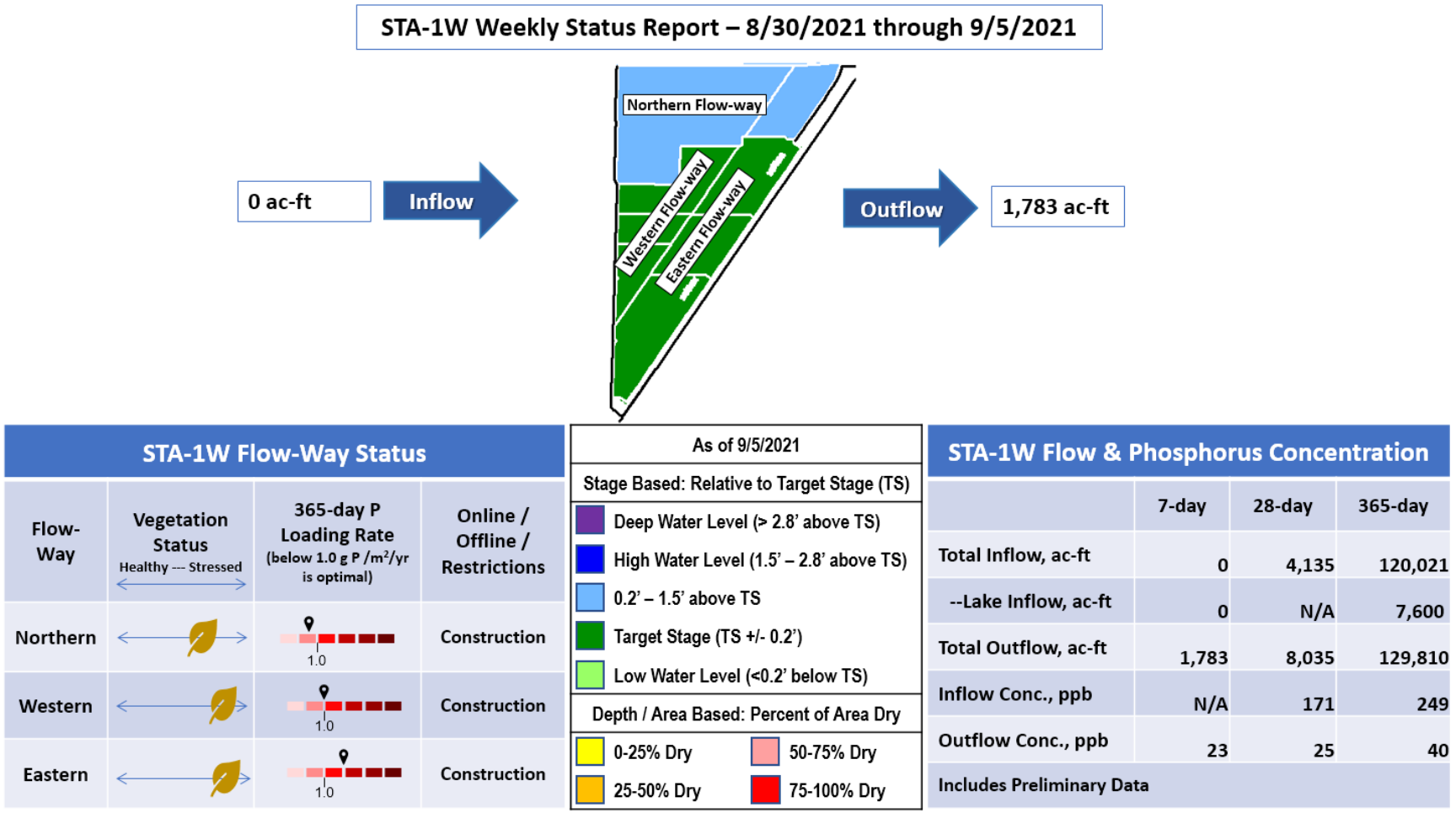
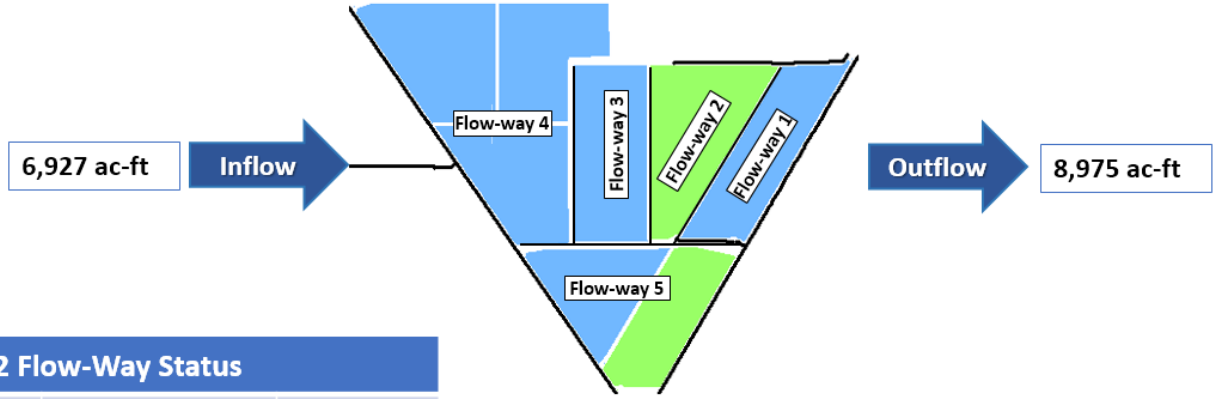


Figure S-2. STA-1W Weekly Status Report

STA-2 Weekly Status Report – 8/30/2021 through 9/5/2021



STA-2 Flow-Way Status

Flow-Way	Vegetation Status (Healthy ------ Stressed)	365-day P Loading Rate (below 1.0 g P /m²/yr is optimal)	Online / Offline / Restrictions
1		1.0	Online
2		1.0	Construction
3		1.0	Vegetation Rehab
4		1.0	Vegetation Rehab
5		1.0	Online

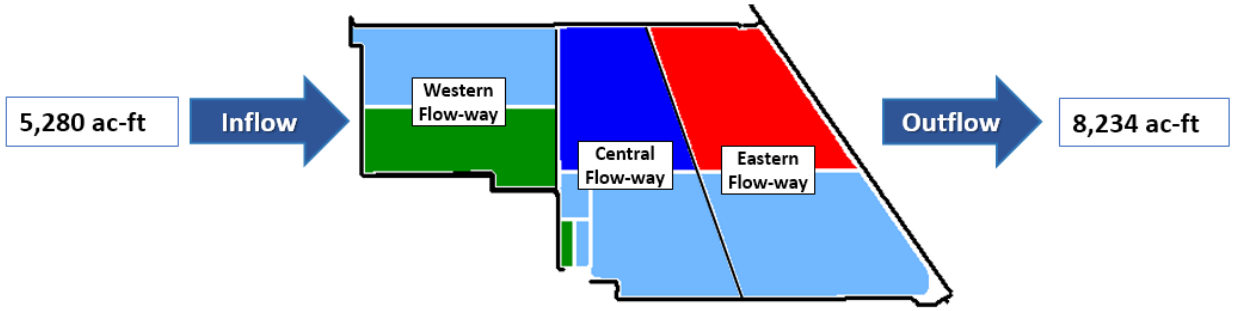
As of 9/5/2021	
Stage Based: Relative to Target Stage (TS)	
Deep Water Level (> 2.8' above TS)	
High Water Level (1.5' – 2.8' above TS)	
0.2' – 1.5' above TS	
Target Stage (TS +/- 0.2')	
Low Water Level (<0.2' below TS)	
Depth / Area Based: Percent of Area Dry	
0-25% Dry	50-75% Dry
25-50% Dry	75-100% Dry

STA-2 Flow & Phosphorus Concentration

	7-day	28-day	365-day
Total Inflow, ac-ft	6,927	28,407	428,867
--Lake Inflow, ac-ft	0	N/A	90,800
Total Outflow, ac-ft	8,975	31,976	467,253
Inflow Conc., ppb	68	87	92
Outflow Conc., ppb	15	16	20
Includes Preliminary Data			

Figure S-3. STA-2 Weekly Status Report

STA-3/4 Weekly Status Report – 8/30/2021 through 9/5/2021



STA-3/4 Flow-Way Status

Flow-Way	Vegetation Status (Healthy ------ Stressed)	365-day P Loading Rate (below 1.0 g P /m²/yr is optimal)	Online / Offline / Restrictions
Eastern	Offline, vegetation management drawdown as of 3/1/2021		
Central		1.0	Online
Western		1.0	Online

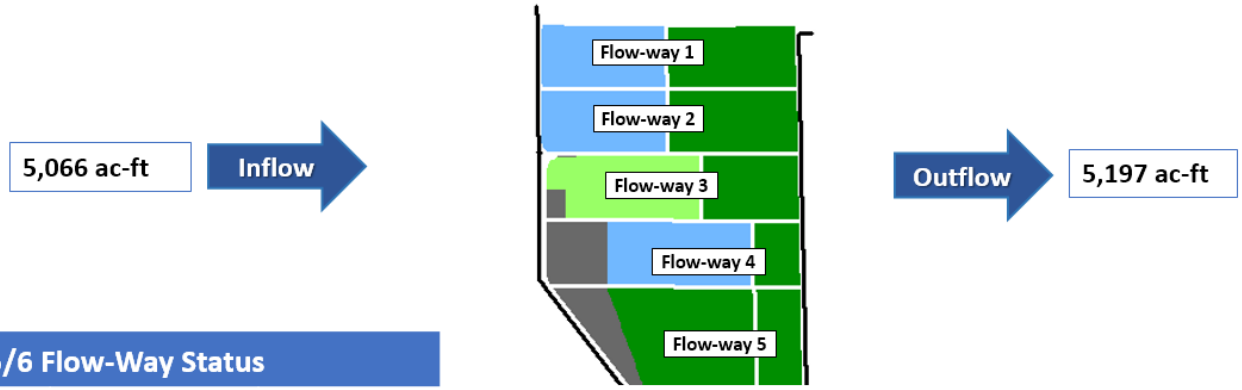
As of 9/5/2021	
Stage Based: Relative to Target Stage (TS)	
Deep Water Level (> 2.8' above TS)	
High Water Level (1.5' – 2.8' above TS)	
0.2' – 1.5' above TS	
Target Stage (TS +/- 0.2')	
Low Water Level (<0.2' below TS)	
Depth / Area Based: Percent of Area Dry	
0-25% Dry	50-75% Dry
25-50% Dry	75-100% Dry

STA-3/4 Flow & Phosphorus Concentration

	7-day	28-day	365-day
Total Inflow, ac-ft	5,280	45,038	536,082
--Lake Inflow, ac-ft	0	N/A	61,000
Total Outflow, ac-ft	8,234	47,767	493,098
Inflow Conc., ppb	43	60	64
Outflow Conc., ppb	20	21	15
Includes Preliminary Data			

Figure S-4. STA-3/4 Weekly Status Report

STA-5/6 Weekly Status Report – 8/30/2021 through 9/5/2021



STA-5/6 Flow-Way Status

Flow-Way	Vegetation Status (Healthy ------ Stressed)	365-day P Loading Rate (below 1.0 g P /m²/yr is optimal)	Online / Offline / Restrictions
1		1.0	Online
2		N/A	Post-construction
3		N/A	Post-construction
4		1.0	Online
5		1.0	Online

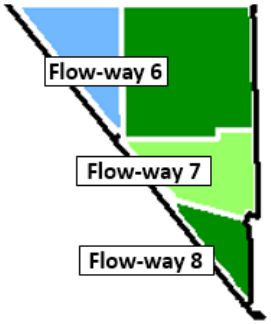
As of 9/5/2021	
Stage Based: Relative to Target Stage (TS)	
Deep Water Level (> 2.8' above TS)	
High Water Level (1.5' – 2.8' above TS)	
0.2' – 1.5' above TS	
Target Stage (TS +/- 0.2')	
Low Water Level (<0.2' below TS)	
Depth / Area Based: Percent of Area Dry	
0-25% Dry	50-75% Dry
25-50% Dry	75-100% Dry

STA-5/6 Flow & Phosphorus Concentration

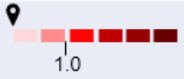
	7-day	28-day	365-day
Total Inflow, ac-ft	5,066	31,244	153,646
--Lake Inflow, ac-ft	0	N/A	9,000
Total Outflow, ac-ft	5,197	33,169	169,939
Inflow Conc., ppb	245	304	296
Outflow Conc., ppb	53	58	72
Includes Preliminary Data			

Figure S-5. STA-5/6 Weekly Status Report (Flow-ways 1 – 5)

STA-5/6 Weekly Status Report – 8/30/2021 through 9/5/2021



STA-5/6 Flow-Way Status

Flow-Way	Vegetation Status Healthy ------ Stressed	365-day P Loading Rate (below 1.0 g P /m²/yr is optimal)	Online / Offline / Restrictions
6			Online
7			Online
8			Online

As of 9/5/2021	
Stage Based: Relative to Target Stage (TS)	
Deep Water Level (> 2.8' above TS)	
High Water Level (1.5' – 2.8' above TS)	
0.2' – 1.5' above TS	
Target Stage (TS +/- 0.2')	
Low Water Level (<0.2' below TS)	
Depth / Area Based: Percent of Area Dry	
0-25% Dry	50-75% Dry
25-50% Dry	75-100% Dry

Figure S-6. STA-5/6 Weekly Status Report (Flow-ways 6 – 8)

Basic Concepts and Definitions for STA Weekly Status Report

- **Inflow**: Sum of flow volume at all inflow structures to an STA.
- **Lake Inflow**: Portion of the STA total inflow volume that originates from Lake Okeechobee.
- **Outflow**: Sum of flow volume at outflow structures from an STA.
- **Total Phosphorus** (TP): Total mass of phosphorus in all its forms; including particulate, dissolved, etc.
- **Inflow Concentration**: TP concentration is the mass of TP in micrograms per liter of water, µg/L or ppb. Inflow concentration refers to the flow-weighted mean TP from all inflow structures over a period of time.
- **Outflow Concentration**: The flow-weighted mean TP from all outflow structures over a period of time. The outflow concentration represents the reduction of inflow TP achieved by STA treatment of the inflow water.
- **WQBEL**: The STA outflow concentration that is required upon completion of the Restoration Strategies projects by December 2025. The outflow concentration shall not exceed 13 ppb as an annual flow weighted mean in more than 3 out of 5 water years on a rolling basis and shall not exceed 19 ppb as an annual flow weighted in any water year.
- **Flow-Way** (FW): One or more treatment cells connected in series. Cells typically have emergent aquatic vegetation (EAV) in the front portion of the flow-way followed by a mix of EAV and submerged aquatic vegetation (SAV)
- **Vegetation Status**: Healthy means the vegetation condition is good and will allow the STA to perform as designed. Stressed means the vegetation is showing signs of poor health, such as browning or areas of vegetation die-off, or the cell contains undesirable vegetation such as floating exotic vegetation requiring treatment. The TP reduction capability of the STA is affected when the vegetation condition is poor.
- **Phosphorus Loading Rate** (PLR): Mass of inflow TP in grams, divided by total treatment area of STA in square meters, per year. In general, a 365-day value of less than 1.0 is needed for an STA to perform optimally. A PLR of 2.0 is considered very high and a PLR of 3.0 is considered extremely high. The TP reduction capability of the STA is affected when the PLR is high, very high and extremely high.
- **Online**: Online status means the FW can receive and treat inflow.
- **Online with Restriction**: The FW can receive and treat inflow, but the amount of flow or water level may be limited temporarily. For example, a vegetation rehabilitation effort may require reduced flows through an area while the new plants are establishing, or nesting by protected species may require a certain water level not to be exceeded.
- **Offline**: The FW is unable to receive and treat inflow due to repairs, construction, or other prohibitive reasons.
- **Depth**: Difference between the average surface water level in a cell and the average ground elevation in that cell. Target depths, or depths between flow events, are between 1.25 ft to 1.5 ft. As depth approaches or drops below zero, an increasing percentage of the cell is considered dry and STA conditions deteriorate. An increase in depth above target depth is expected with increasing flow. However, as depth increases much above the target depth and is sustained over a period of time, it can be detrimental to vegetation health and overall STA treatment performance.
- **Note**: The data provided in this summary report were developed using a combination of provisional and quality-assured flow and water quality data. In some cases, best professional judgment was used to estimate missing data and revise questionable data. Values provided are not considered final but are appropriate for use in STA operational decision-making.

Everglades

Water Conservation Area Regulation Schedules

WCA-1: Stage at the 1-8C gauge remained following the Zone A1 regulation line last week. Stage on Monday was 0.03 feet below the line. **WCA-2A**: Stage at 2A-17 continued to rise according to schedule last week, average on Sunday was 0.32 feet higher than the Zone A regulation line. **WCA-3A**: The Three Gauge Average stage remained flat last week. Stage ended the week at 0.30 feet below the rising Zone A line. Stage at gauge 62 (Northwest corner) held steady last week. The Monday average was 0.64 feet below the Upper Schedule. (**Figures EV-1 through EV-4**).

Water Depths

The WDAT tool indicates that water levels rose across the Everglades Protection Area (EPA) over the last two months. Depths in northeastern WCA-3A are unchanged over the last month and remain drier than the surrounding regions. In the upper reaches of the L-67s, depths have exceeded 2.5 feet. Some North to South hydrologic connectivity was regained within Everglades National Park (ENP) over the last month. Portions of eastern ENP remain dry or have water levels just at the ground surface. (**Figure EV-5**). Over the last month, stages generally increased, except in northern WCA-3A and 2A. Compared to a year ago, WCA-3A is significantly drier, especially in the east. Most of ENP remains drier than a year ago, significantly so along the eastern boundary. (**Figure EV-6**). Compared to the 20-year median water depths, much of the central and western Everglades is in the lower 10% of the historical median; significant exceptions are found in northeastern ENP and WCA-1. (**Figure EV-7**).

Taylor Slough and Florida Bay

An average of 1.60 inches of rain fell over Taylor Slough and Florida Bay over the week ending Sunday (9/5), and the westward most structures near northern Taylor Slough opened on 8/31. Stage increased an average of 0.10 feet over the week with the largest increases occurring in the northern reaches (**Figure EV-7**). Taylor Slough Bridge (TSB) had the largest weekly increase with 0.30 feet (**Figure EV-8**). The individual stations range from 1 inch to 6 inches above the historical averages for this time of year, with Taylor Slough averaging 2.2 inches higher than the historical average. Northern Taylor Slough stations are 3 to 6 inches above their historical averages.

Salinities in Florida Bay on average had no change for the week ending 9/5, but individual stations had weekly changes ranging from −4.0 to +4.2 (**Figure EV-7**). The coastal mangrove zone continued to decrease towards the near-fresh condition expected in the wet season, and the near-shore embayment salinities are all under 30. More freshwater will still be needed to push the estuarine front out into the Bay. Most of the Bay is still marine (salinities of 35 or higher). The western Bay is starting September near its 75th percentile of historical data (**Figure EV-9**).

Water Management Recommendations

Ascension rates that do not exceed 0.25 feet per week or 0.50 feet per two weeks are considered ecologically healthy. Flows into Florida Bay and northeastern WCA-3A continue to have an ecological benefit. Individual regional recommendations can be found in **Table EV-2**.

Table EV-2. Previous week's rainfall and water depth changes in Everglades regions.

Everglades Region	Rainfall (inches)	Stage change (feet)
WCA-1	1.71	+0.17
WCA-2A	1.67	+0.26
WCA-2B	1.81	+0.05
WCA-3A	1.27	+0.02
WCA-3B	1.15	+0.03
ENP	1.14	+0.12

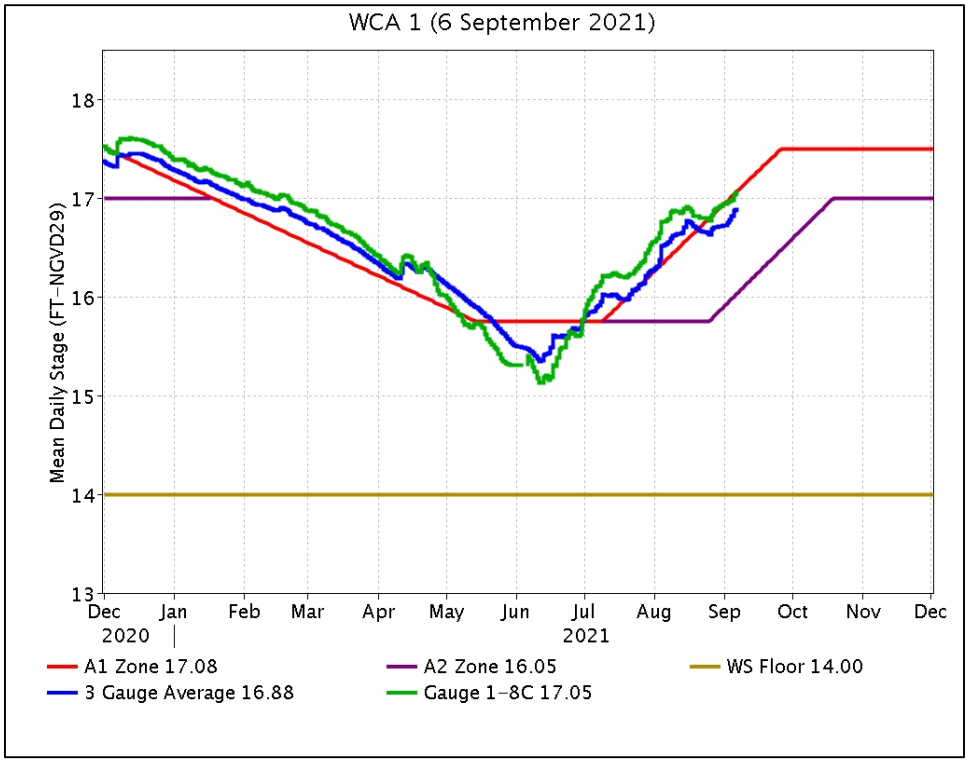


Figure EV-1. WCA-1 stage hydrographs and regulation schedule.

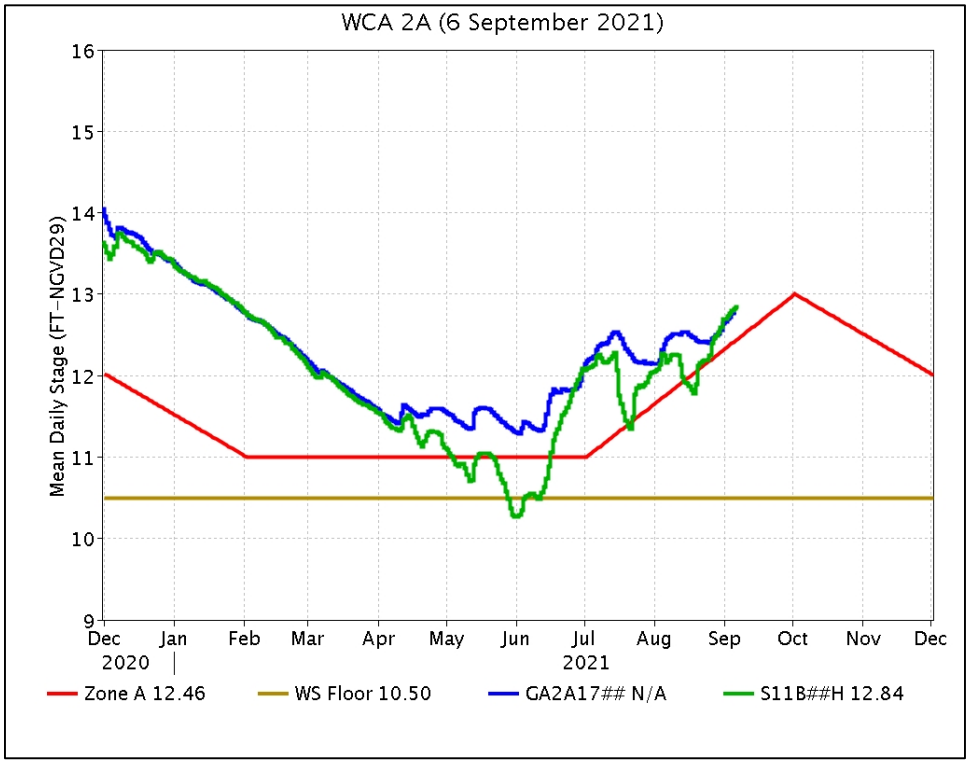


Figure EV-2. WCA-2A stage hydrographs and regulation schedule.

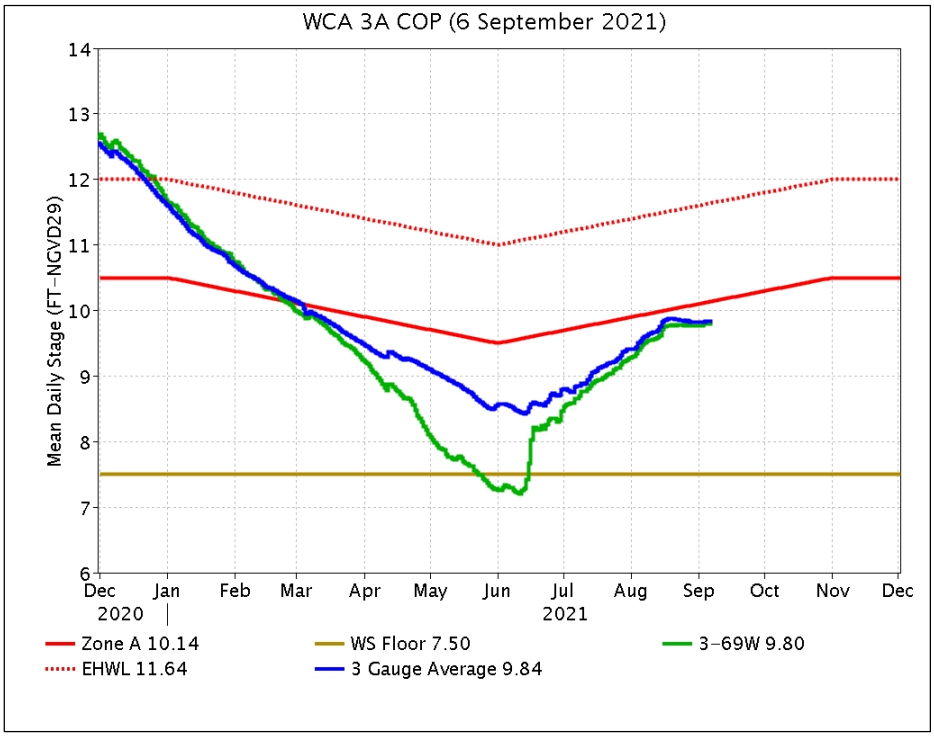


Figure EV-3. WCA-3A stage hydrographs (three-gauge average, S-333 headwater) and regulation schedule.

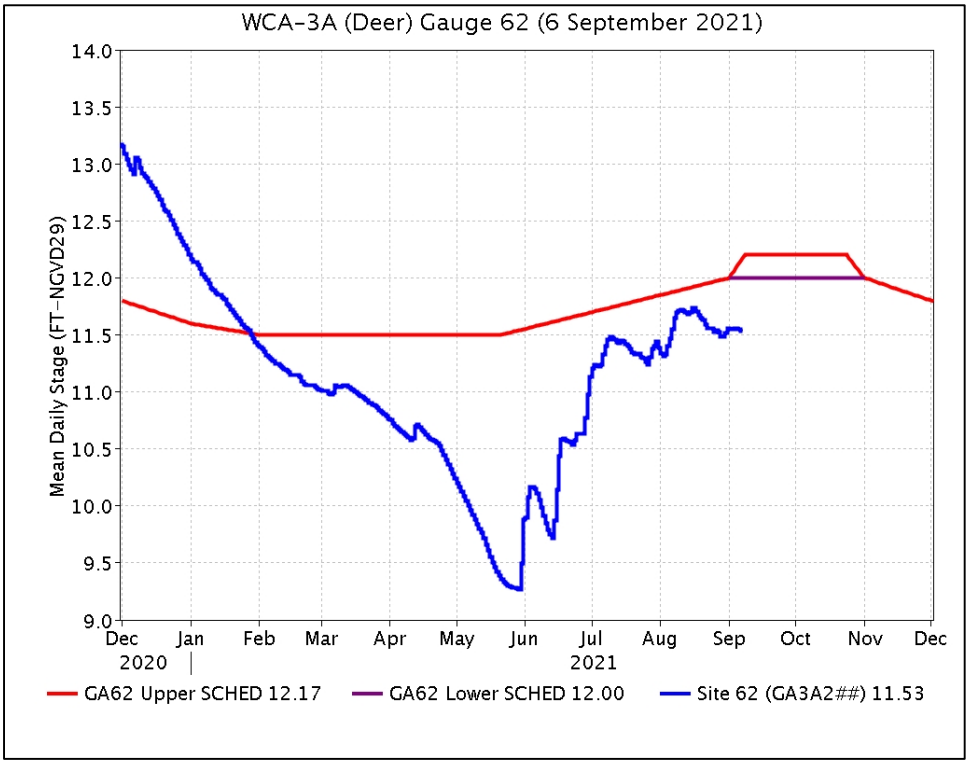


Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.

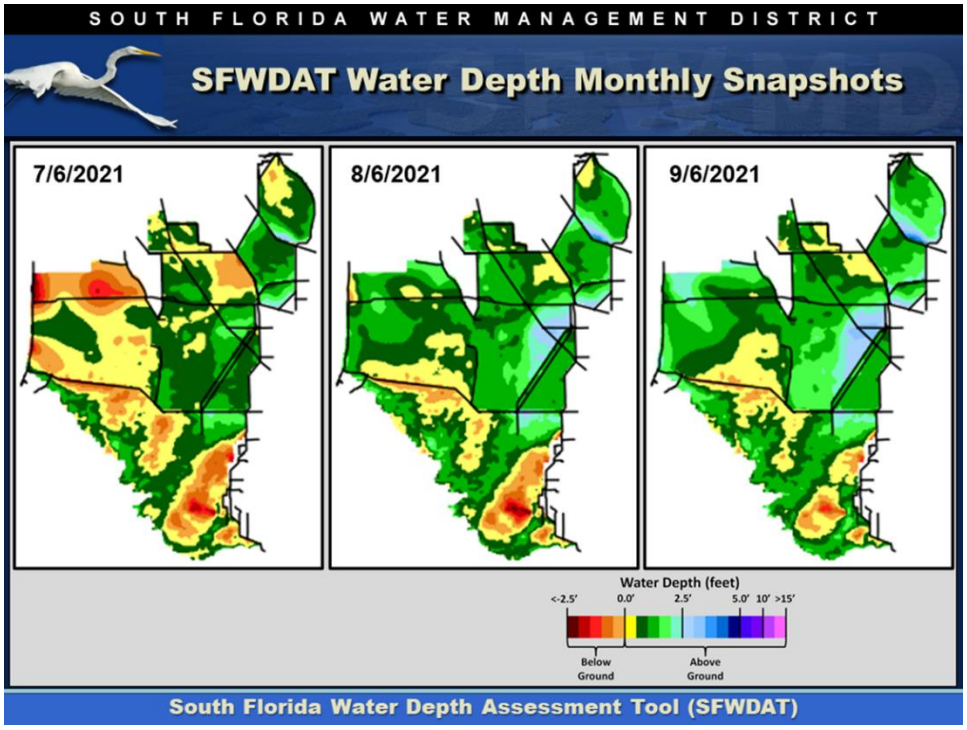


Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

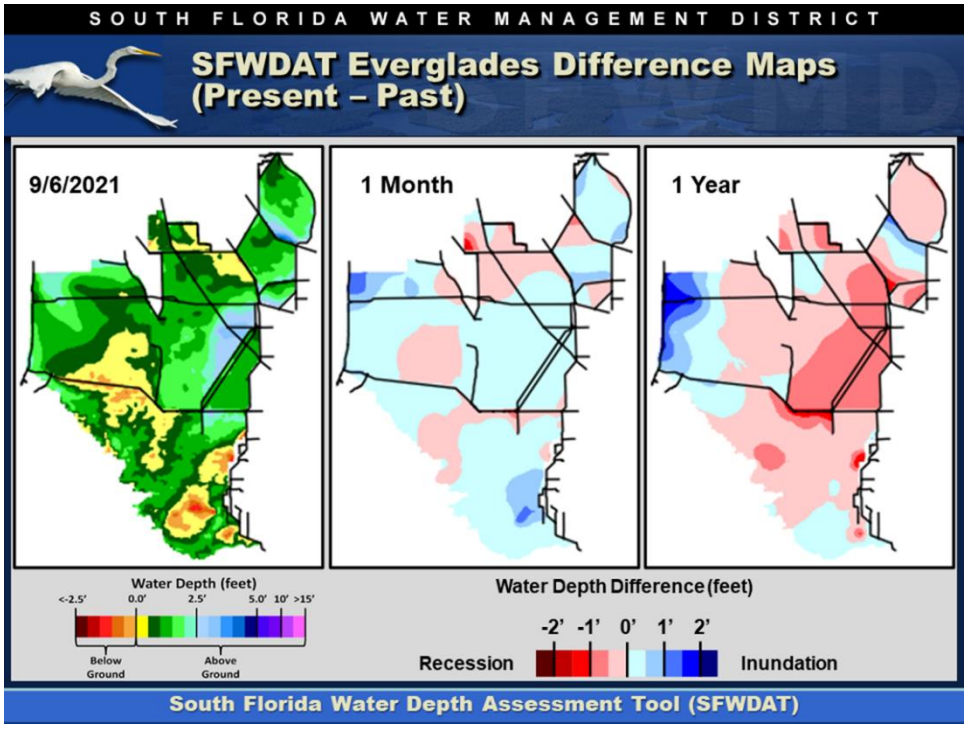


Figure EV-6. Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

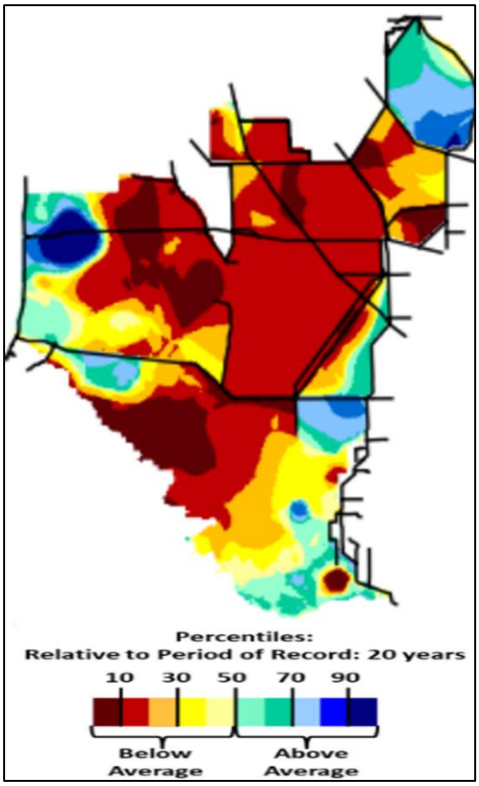


Figure EV-7. Present water depths compared to the day of year median over the previous 20 years.

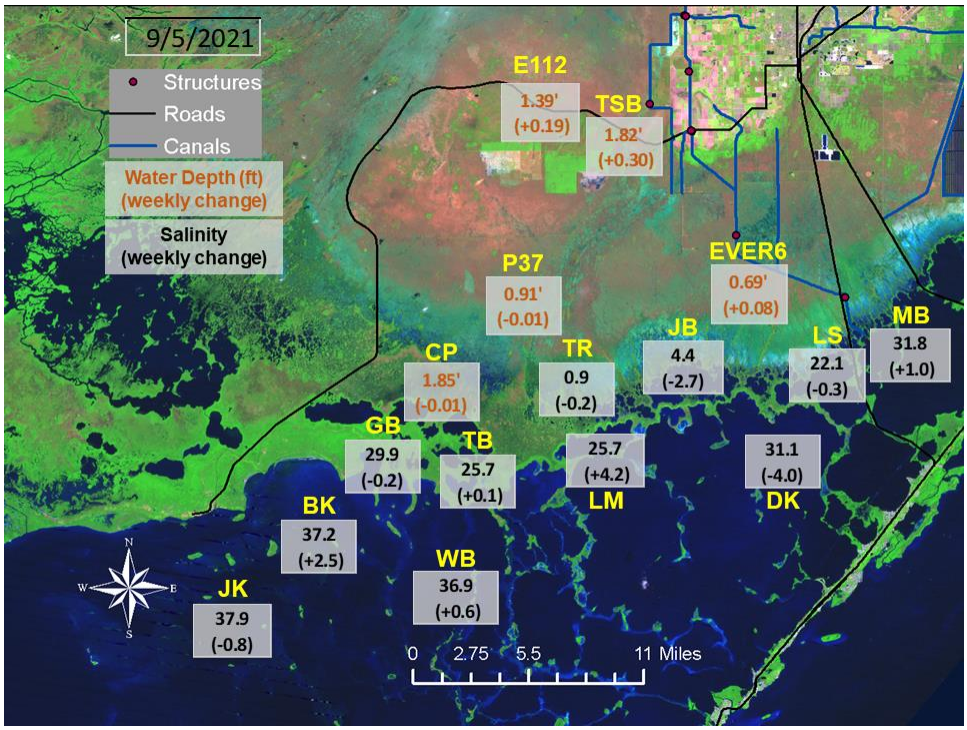


Figure EV-8. Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

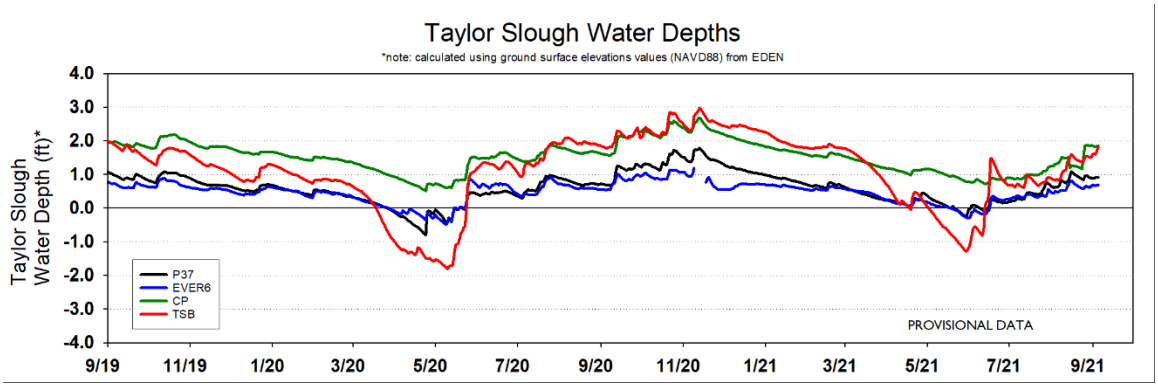


Figure EV-9. Taylor Slough water depth time series.

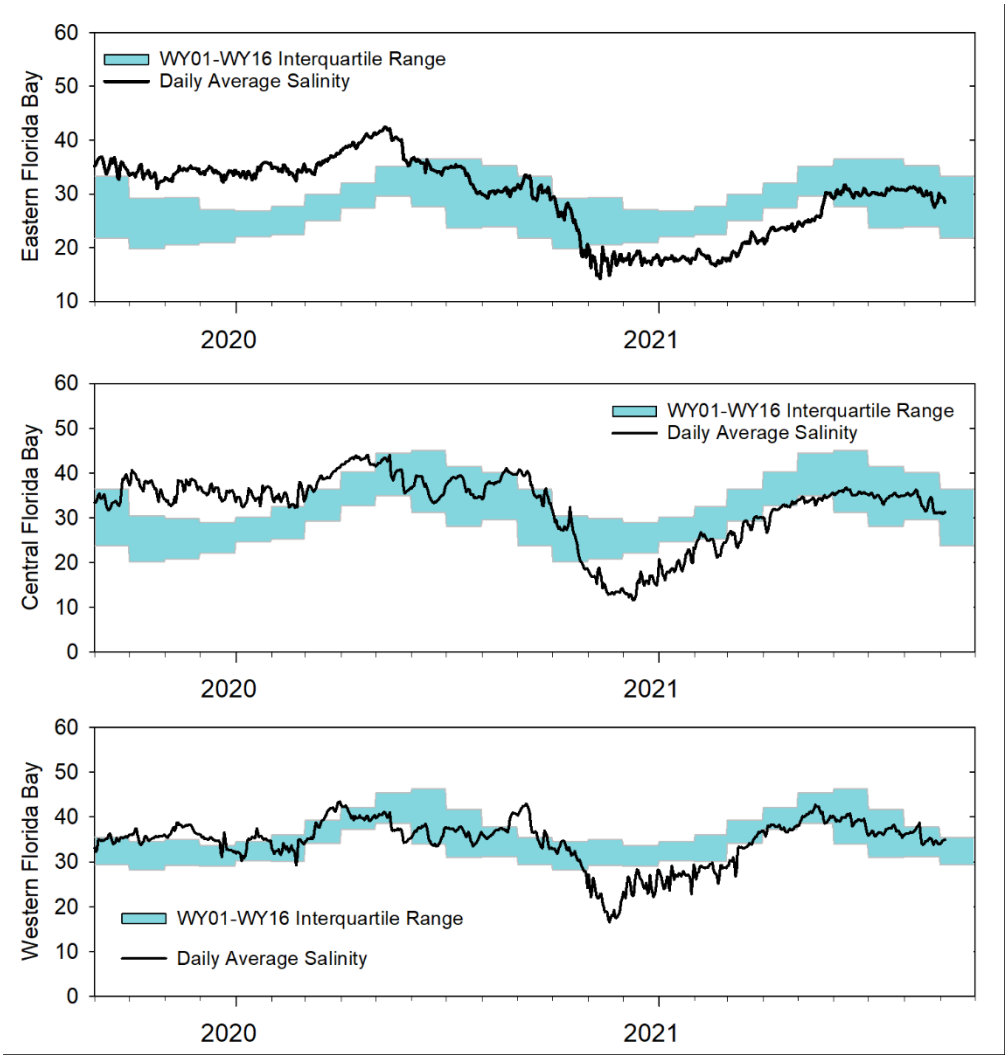


Figure EV-10. Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

Table EV-2. Weekly water depth changes and water management recommendations

SFWMD Everglades Ecological Recommendations, September,7th 2021 (red is new)			
Area	Weekly change	Recommendation	Reasons
WCA-1	Stage increased by 0.17'	Maintain ascension rates of less than 0.25 feet per week or 0.50 feet per two weeks.	Protect within basin and downstream habitat and wildlife.
WCA-2A	Stage increased by 0.26'	Moderate ascension rate to less than 0.50 feet per two weeks.	Protect within basin and downstream habitat and wildlife.
WCA-2B	Stage increased by 0.05'	Maintain ascension rates of less than 0.25 feet per week or 0.50 feet per two weeks	Protect within basin and downstream habitat and wildlife.
WCA-3A NE	Stage decreased by 0.02'	Initiate an ascension rates of less than 0.50 feet per two weeks.	Protect within basin peat soils and downstream habitat and wildlife.
WCA-3A NW	Stage increased by 0.04'	Maintain an ascension rates of less than 0.25 feet per week or 0.50 feet per two weeks.	
Central WCA-3A S	Stage remained unchanged	Initiate an ascension rates of less than 0.25 feet per week or 0.50 feet per two weeks.	Protect within basin and downstream habitat and wildlife.
Southern WCA-3A S	Stage increased by 0.07'		
WCA-3B	Stage increased by 0.03'	Maintain ascension rates of less than 0.25 feet per week or 0.50 feet per two weeks.	Protect within basin and downstream habitat and wildlife.
ENP-SRS	Stage increased by 0.12'	Make discharges to the Park according to COP and TTFF protocol while considering upstream and downstream ecological conditions.	Protect within basin and upstream habitat and wildlife.
Taylor Slough	Stage changes ranged from −0.01' to +0.30'	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged −4.0 to +4.2	Move water southward as possible.	When available, provide freshwater to maintain low salinity buffer and promote water movement.