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 29, 2021

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

A stationary cold front located over the Florida Straits Tuesday morning will begin to weaken and dissipate within the next couple of days. A drier and stable air mass behind the front will favor no rainfall across the District through the day Thursday. However, isolated or widely scattered showers over parts of the east are possible each day. Increased rains fueled by moisture from the east is forecast Thursday night, with the focus along the southeast coast and southeastern interior. A frontal system will push through late this week, which will usher in northeasterly winds Friday and Saturday diminishing by Monday. After the frontal passage, a modified continental air mass will continue overspreading the District. While the air mass will be stable, shallow moisture off of warm Gulf Stream waters will likely produce widely scattered, light showers primarily over the eastern half of the District beginning Monday, especially along the east coast. For the week ending next Tuesday morning, total District rainfall will be well below the long-term average, possibly marking the end of the wet season. However, there may be an interim with no fronts and a wetter period ahead during the week-2 period. Since there is some support for a resumption of wet-season-like rains next week, a definitive statement about the end of the wet season cannot be made at this time.

Kissimmee

Flow at S-65A continues to be too low for complete inundation of the Kissimmee River floodplain, but mean floodplain water depth increased to 1.59 feet by September 26, 2021. Following discharge reductions in late August, dissolved oxygen concentrations in the Kissimmee River rose above 2 mg/L, but declined again this week to below 1 mg/L.

Lake Okeechobee

Lake Okeechobee stage was 15.44 feet NGVD on September 26, 2021, 0.83 feet higher than a month ago, and 0.07 feet higher than a year ago. Lake stages have been above or at the very top of the ecological envelope for all of 2021, and currently 0.25 ft above. There have been essentially no outflows from the lake since late June 2021. Recent satellite imagery (September 26, 2021) showed medium algal bloom potential in the western part of the Lake but has decreased compared to the previous week.

Estuaries

Total inflow to the St. Lucie Estuary averaged approximately 2,791 cfs over the past week with no flow coming from Lake Okeechobee. Mean salinities increased slightly at the HR1 site and decreased at the US1 Bridge and A1A Bridge sites 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 10,574 cfs over the past week with no flow coming from the Lake. Mean salinities decreased at all 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 Sanibel and Shell Point and in the poor range at Cape Coral.

Stormwater Treatment Areas

For the week ending Sunday, September 26, 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 763,000 ac-feet. STA cells are above target stage, especially STA-3/4 EAV cells. STA-1E Western Flow-way is offline for the Restoration Strategies project to fill and grade Cells 5 and 7, STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown, and STA-2 Flow-way 2 is offline for construction activities. Operational restrictions are in place in STA-1W Western, Eastern, and Northern Flow-ways 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

Rehydration rates were above the recommended rate in WCA-2A and southern WCA-3A over the last few weeks. Depth conditions in WCA-3A North are increasing but remain below the historical median across that sub-basin. In Florida Bay salinities decreased and stages increased in Taylor Slough on average. Western Florida Bay fell back to within the 75th percentile of the historical average for this time, but more freshwater will be needed before the dry season begins to buffer salinity conditions.

SUPPORTING INFORMATION

Kissimmee Basin

Upper Kissimmee

On September 26, 2021, lake stages were 57.2 feet NGVD (0.3 feet above schedule) in East Lake Toho, 53.9 feet NGVD (at schedule) in Lake Toho, and 51.7 feet NGVD (0.3 feet above schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1**, **Figures KB-1-3**).

Lower Kissimmee

Discharges to the Kissimmee River on September 26, 2021 were 1,610 cfs at S-65 and 1,990 cfs at S-65A; discharges from the Kissimmee River were 3,320 cfs at S-65D and 3,530 cfs at S-65E (**Table KB-2**). Headwater stages were 46.3 feet NGVD at S-65A and 28.7 feet NGVD at S-65D on September 26, 2021. The concentration of dissolved oxygen in the Kissimmee River improved briefly, then declined again due to rainfall and associated runoff, with the average for the week ending on September 26, 2021 at 0.8 mg/L (**Table KB-2**, **Figure KB-4**). Flow at S-65A remains too low for complete inundation of the Kissimmee River floodplain, but mean floodplain depth increased to 1.59 feet by September 26, 2021 (**Figure KB-5**).

Water Management Recommendations

Maintain at least 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)	
							9/26/21	*9/19/21*
Lakes Hart and Mary Jane	S-62	LKMJ	452	60.4	R	60.0	0.4	0.5
Lakes Myrtle, Preston and Joel	S-57	S-57	153	61.6	R	61.0	0.6	0.1
Alligator Chain	S-60	ALLI	391	63.2	R	63.2	0.0	0.3
Lake Gentry	S-63	LKGT	679	61.0	R	61.0	0.0	0.2
East Lake Toho	S-59	TOHOE	969	57.2	R	56.9	0.3	0.4
Lake Toho	S-61	TOHOW S-61	1,692	53.9	R	53.9	0.0	0.1
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	1,174	51.7	R	51.4	0.3	-0.2

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.

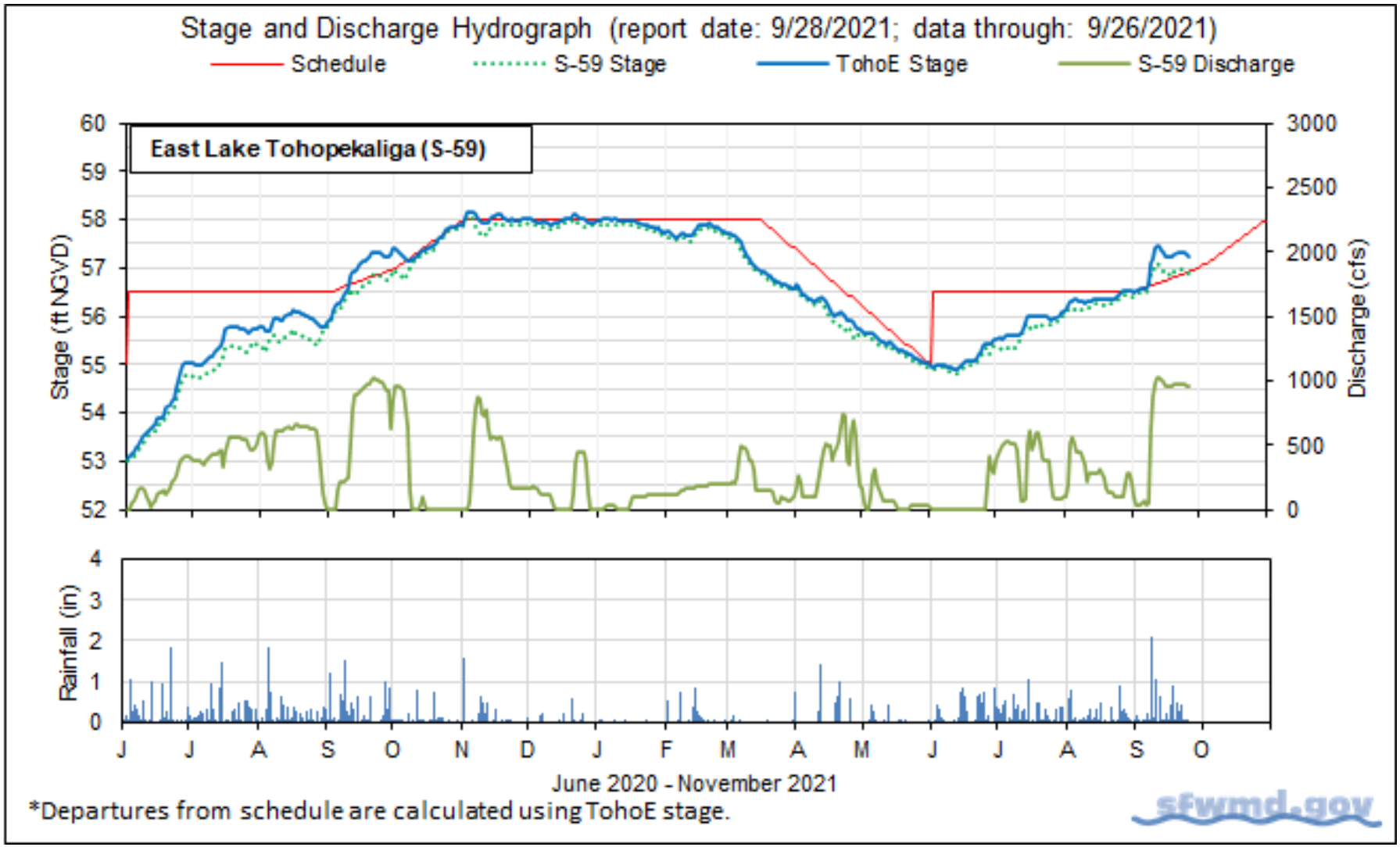


Figure KB-1. East Lake Toho regulation schedule, stage, discharge and rainfall.

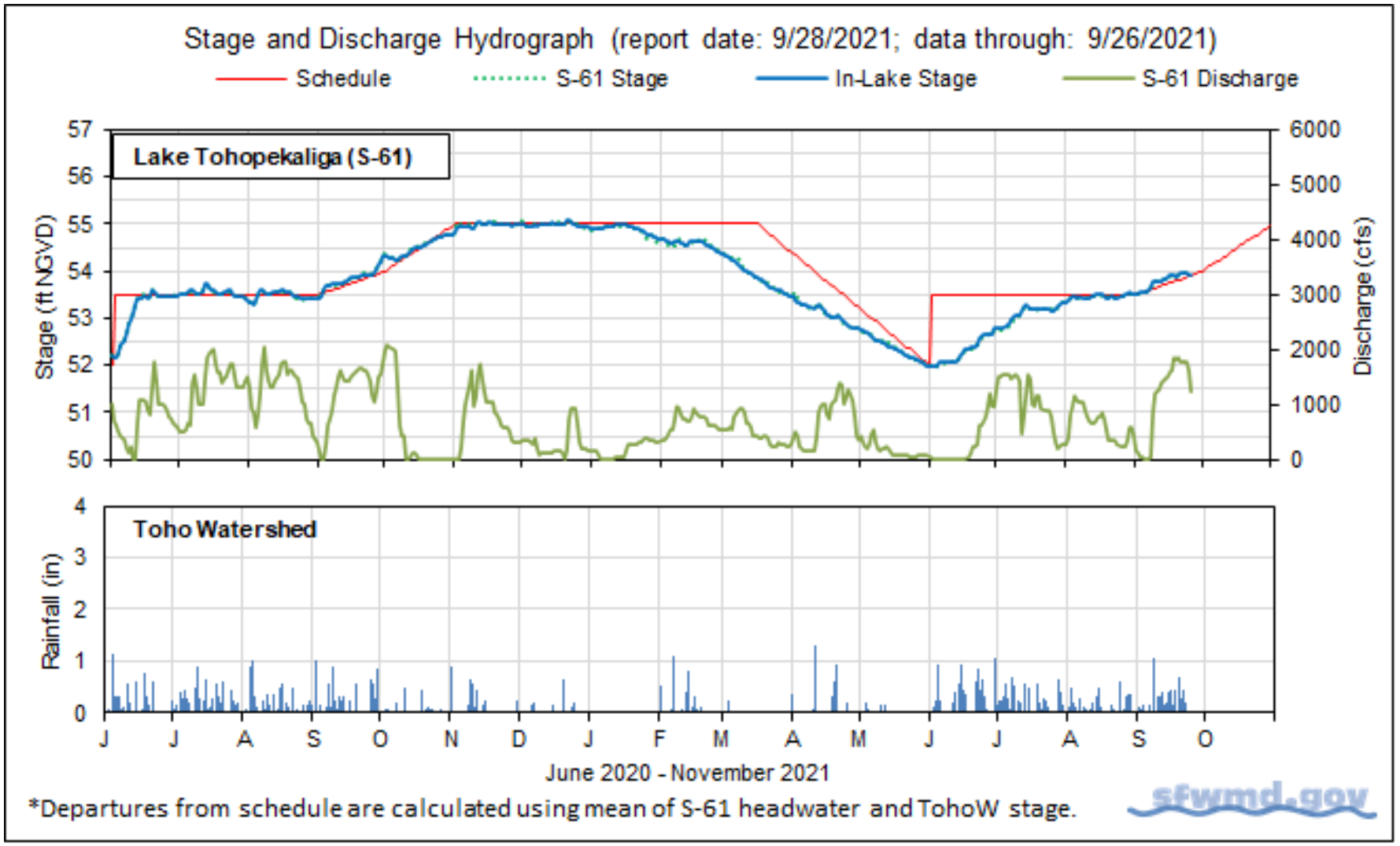


Figure KB-2. Lake Toho regulation schedule, stage, discharge and rainfall.

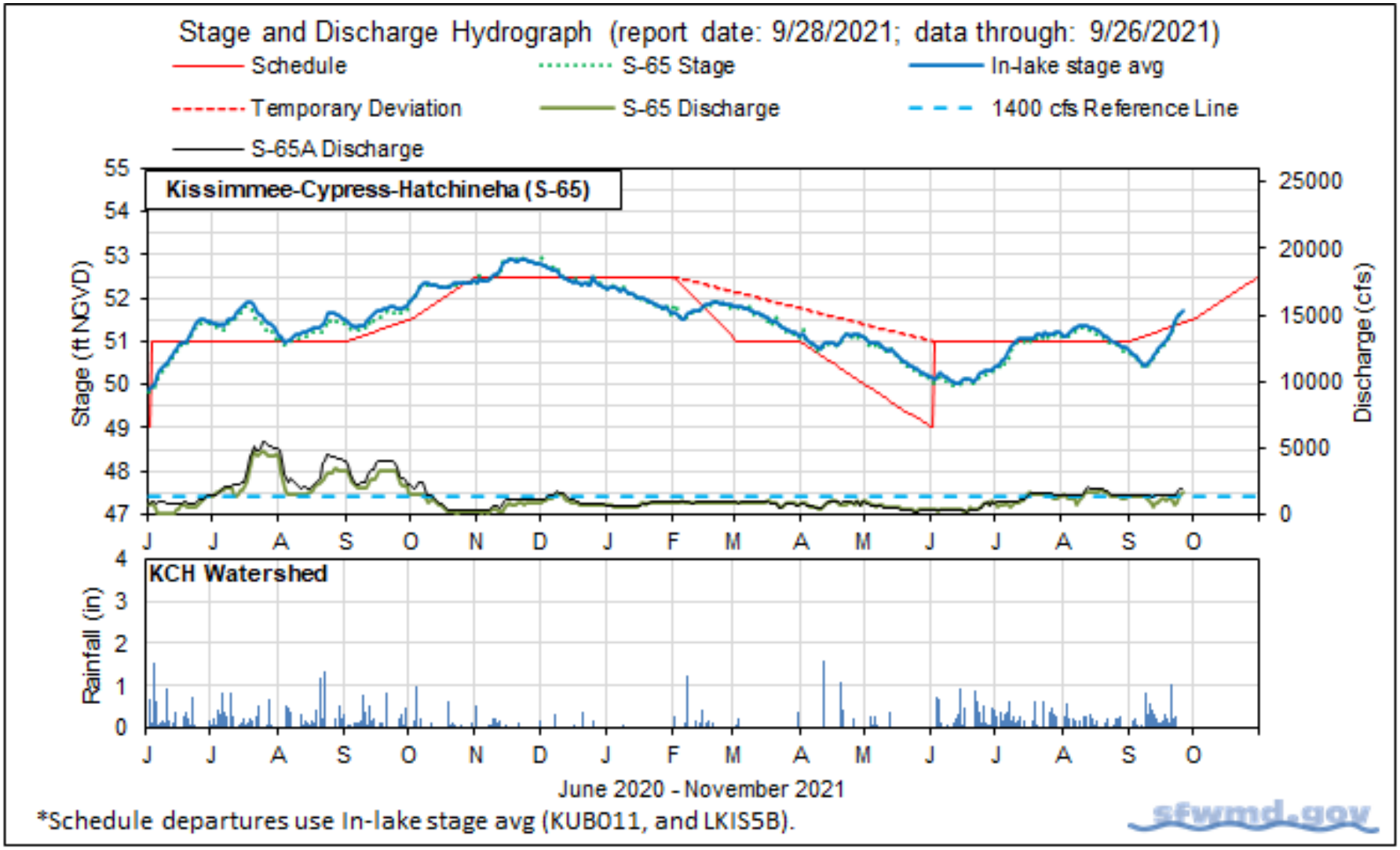


Figure KB-3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

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			
		9/26/21	9/26/21	9/19/21	9/12/21	9/5/21
Discharge	S-65	1,610	1,170	1,020	1,110	1,360
Discharge	S-65A[a]	1,990	1,650	1,420	1,400	1,410
Headwater Stage (feet NGVD)	S-65A	46.3	46.4	46.3	46.5	46.3
Discharge	S-65D[b]	3,320	2,650	1,680	1,570	1,770
Headwater Stage (feet NGVD)	S-65D[c]	28.7	28.7	28.5	28.4	28.4
Discharge (cfs)	S-65E[d]	3,530	2,870	1,730	1,640	1,840
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) [e]	Phase I, II/III river channel	0.6	0.8	0.8	2.2	1.8
Mean depth (feet) [f]	Phase I floodplain	1.59	1.52	1.21	0.94	0.98

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

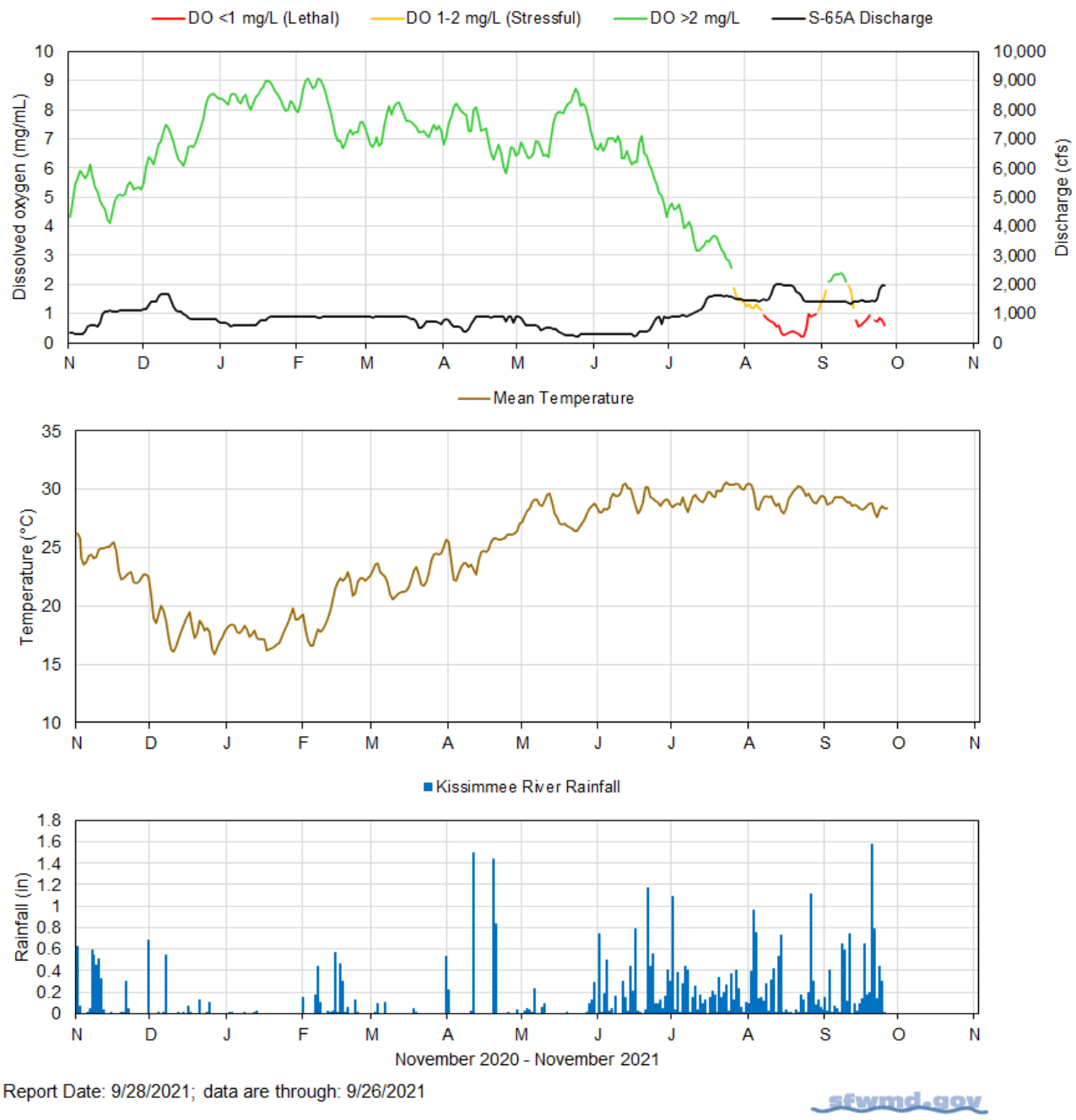


Figure KB-4. Restored Kissimmee river channel mean daily dissolved oxygen concentration (mg/L), S-65A discharge (cfs), temperature (°C) and rainfall (inches). Dissolved oxygen (DO) and temperature are mean daily values averaged for PC62, KRBN, PC33, PD62R, and PD42R with an average of four stations reporting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

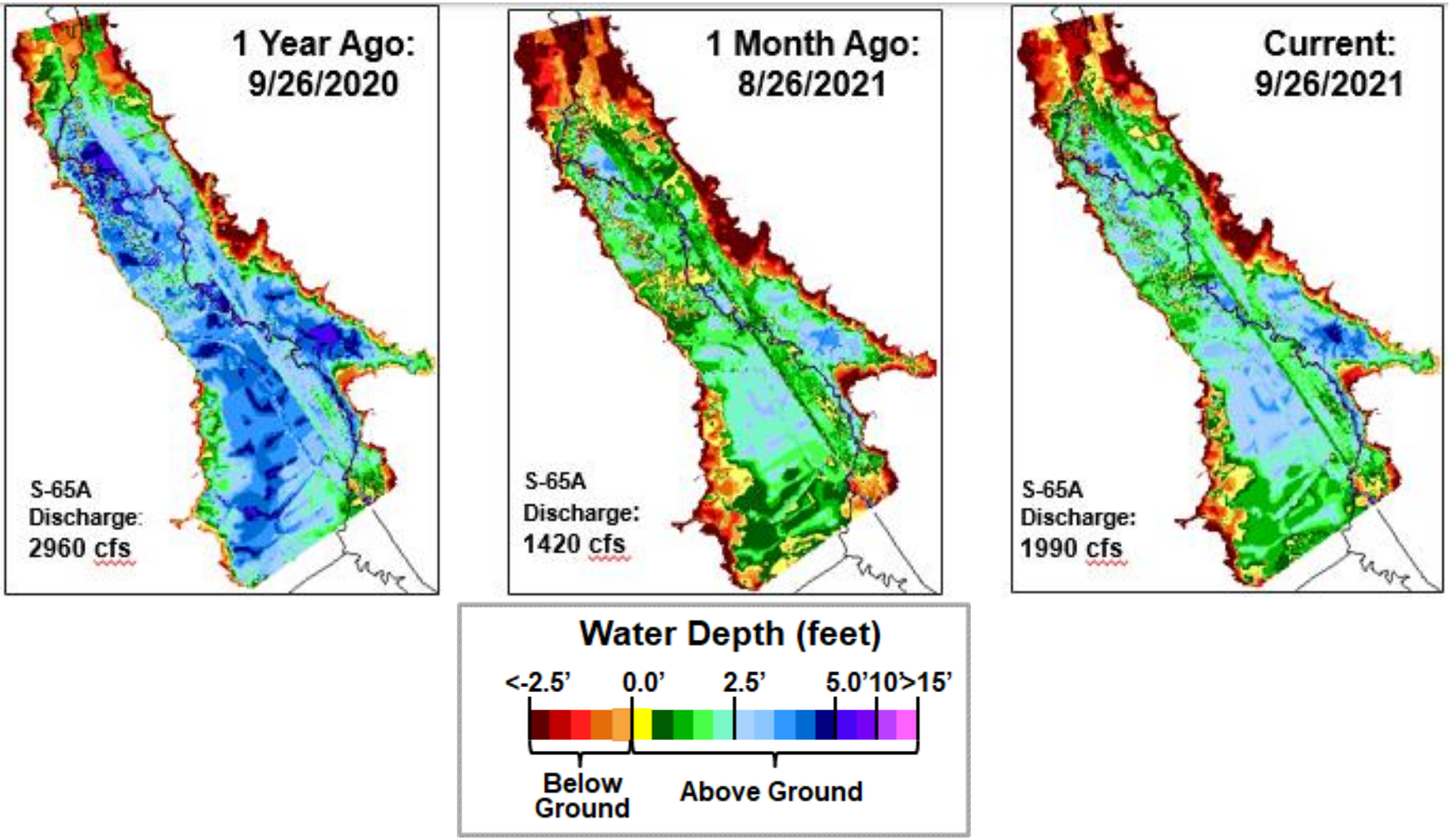


Figure KB-5. Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.

Lake Okeechobee

Lake Okeechobee stage was 15.44 feet NGVD on September 26, 2021, 0.83 feet higher than a month ago, and 0.07 feet higher than a year ago (**Figure LO-1**). Lake stage is currently 0.25 ft above the ecological envelope, having been either above or at the very top of the envelope for all of 2021 (**Figure LO-2**). Lake stage remained in the Low sub-band last week (**Figure LO-3**). According to NEXRAD, 1.67 inches of rain fell directly on the Lake last week.

Average daily inflows (excluding rainfall) increased substantially from the previous week, going from 3,916 cubic feet per second (cfs) to 10,193 cfs. Average daily outflows (excluding evapotranspiration) remained 0 cfs. There have been essentially no outflows from the Lake since late June 2021. Most of the inflows (~27% of the total or 2,795 cfs) came from the Kissimmee River through S-65E and S-65EX1 structures. The second highest inflow came from the C-41A canal via S-84 and S-84X structures (~23% of the total or 2,510 cfs) and the third highest inflow came from the C-40 and C-41 canals (~18% of the total or 1,790 cfs) through S-71 and S-72 structures. 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 backflow from L-8 canal via the S-271 structure at the average daily rate of 294 cfs. Average inflows and outflows through water control structures surrounding the Lake for the previous two weeks (cfs) 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 26, 2021) from the NOAA cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3 OLCI sensor data showed medium bloom potential in the western part of the Lake. The bloom potential decreased compared to the previous week. (**Figure LO-5**).

In late September, 56% of the sites had communities dominated by *Microcystis aeruginosa* and 16% had mixed communities. Approximately 9% and 13% of the sites had communities dominated by a mix of *Cylindrospermopsis raciborskii/Planktolyngbya limnetica* or *P limnetica*, respectively. The percentage of sites dominated by *M. aeruginosa* was 7% lower compared to early September. Approximately 88% of the sites had microcystin concentration below the EPA recommended human health recreational standard (8 µg/L). The highest toxin concentration (22 µg/L) was recorded at L006 in the central-south part of the Lake. Overall, the number of sites with toxin concentrations above the EPA threshold increased by 3% since early September. The September 20 - 21, 2021 survey results are shown in **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)	OUTFLOWS	Previous week Avg Daily (cfs)	Avg Daily Flow (cfs)	Equivalent Depth Week Total (in)
S-65E & S-65EX1	1732	2795	1.1	S-77	0	0	0.0
S-71 & S-72	345	1790	0.7	*S-308	0	0	0.0
S-84 & S-84X	895	2510	1.0	S-351	0	0	0.0
Fisheating Creek	249	1156	0.4	S-352	0	0	0.0
S-154	87	193	0.1	S-354	0	0	0.0
S-191	34	228	0.1	*L-8 (S-271)	*-142*	*-294*	*-0.1*
S-133 P	86	189	0.1	ET	2483	2589	1.0
S-127 P	14	104	0.0	**Total**	**2483**	**2589**	**1.0**
S-129 P	50	85	0.0				
S-131 P	53	142	0.1				
S-135 P	244	313	0.1				
S-2 P	0	0	0.0				
S-3 P	0	0	0.0				
S-4 P	0	394	0.2				
*Backflow	142	294	0.1				
Rainfall	4909	4976	1.9				
Total	**8838**	**15169**	**5.9**				

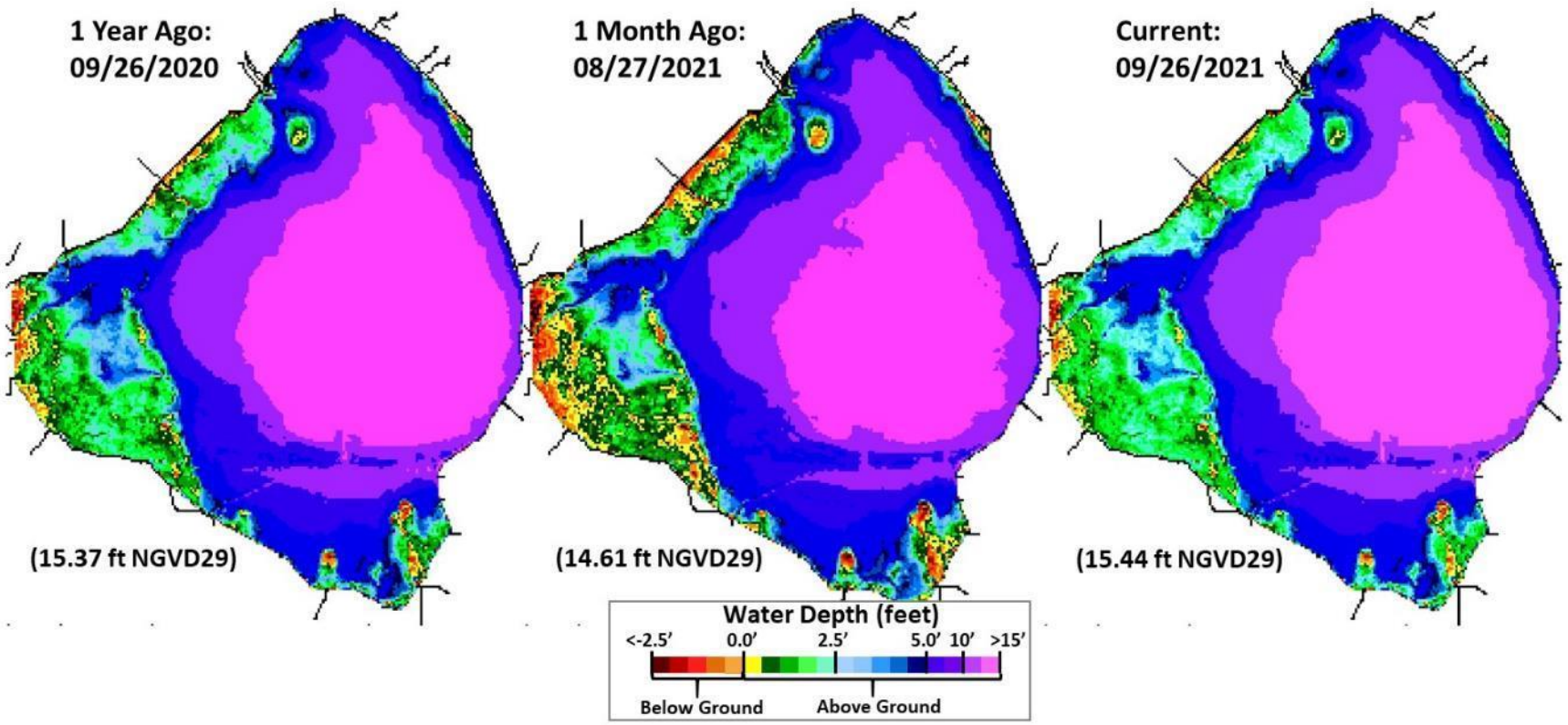


Figure LO-1. Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

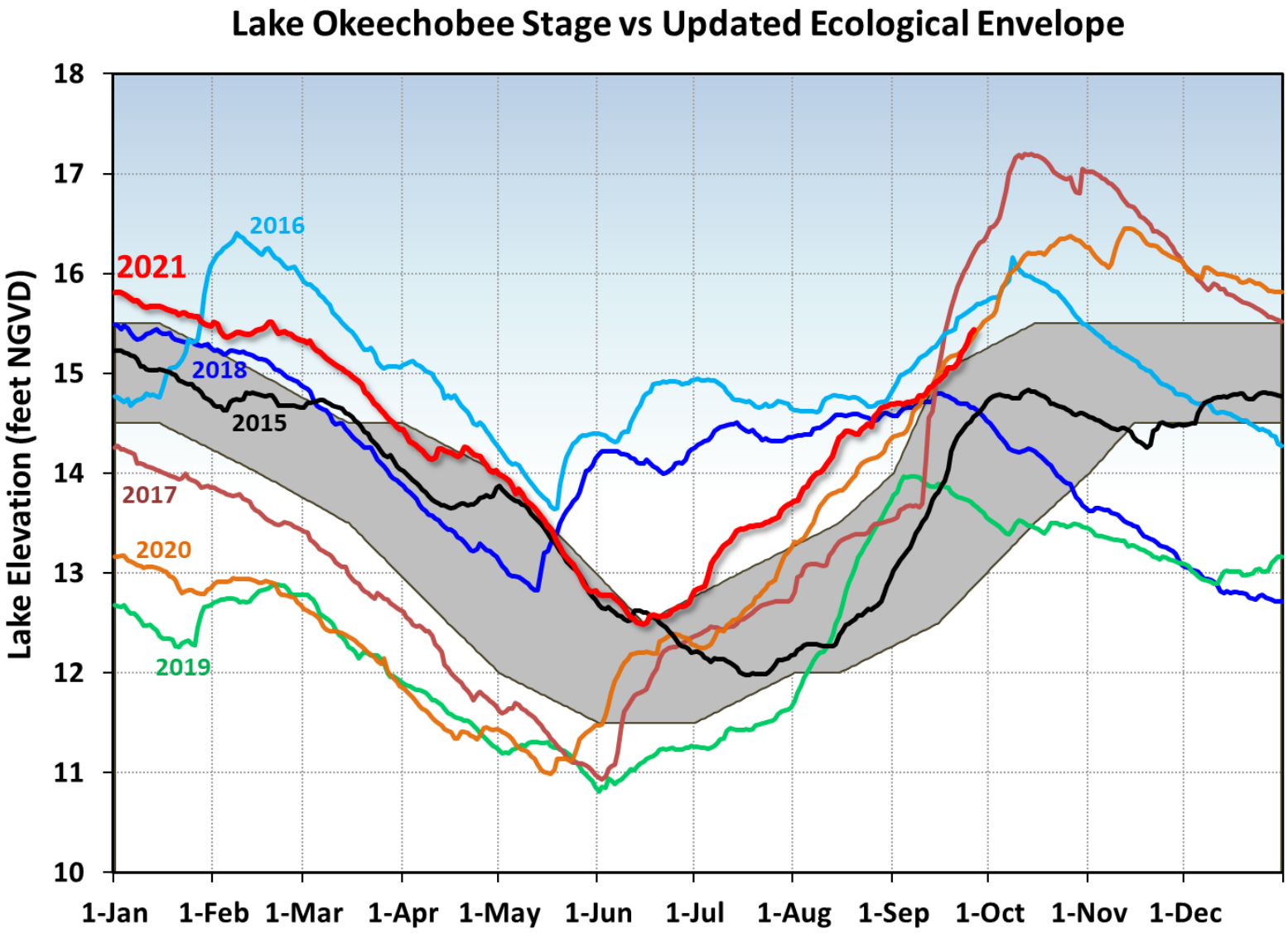


Figure LO-2. Select annual stage hydrographs for Lake Okeechobee in comparison to the updated ecological envelope.

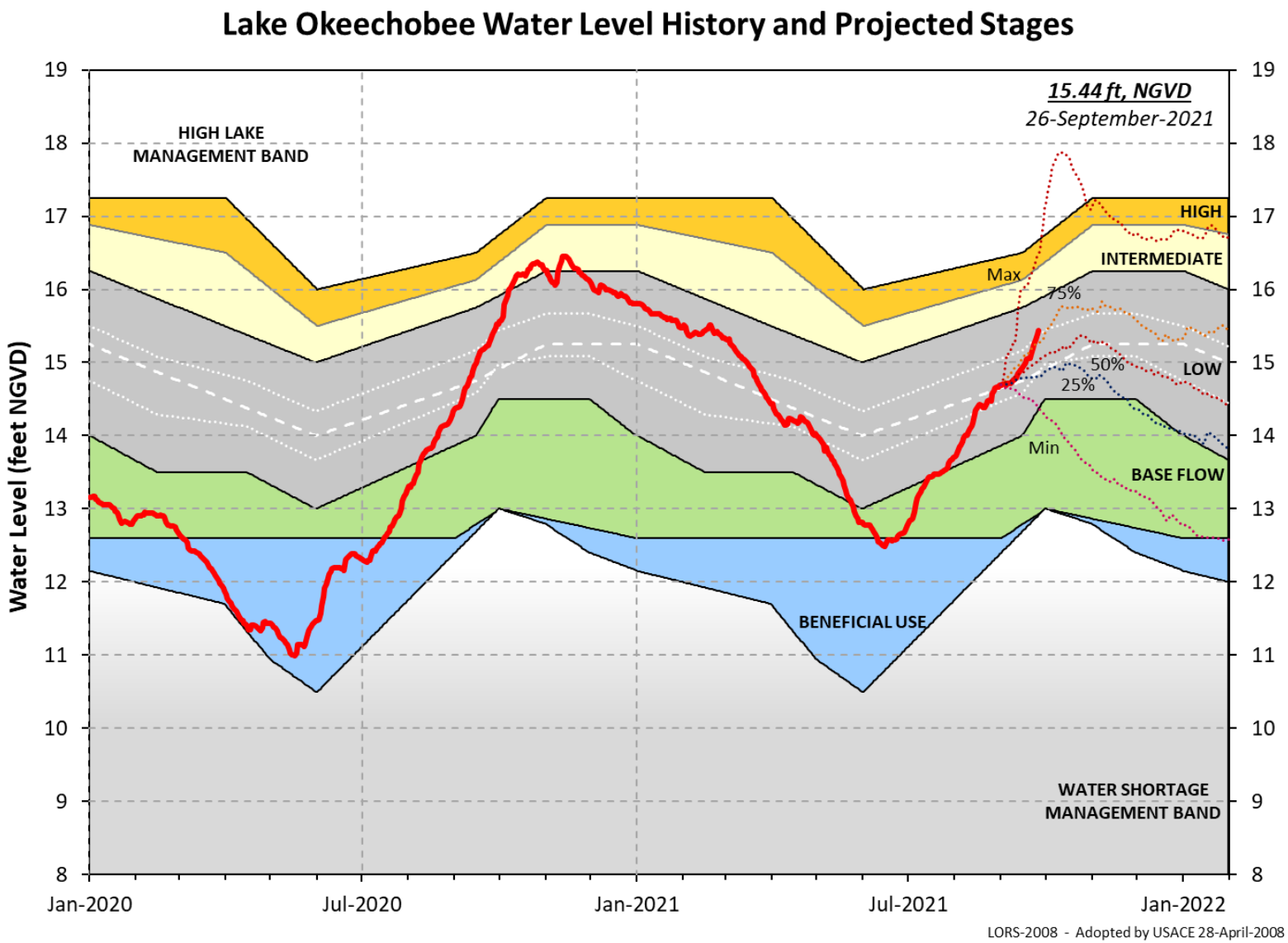


Figure LO-3. Recent Lake Okeechobee stages and releases, with projected stages based on a dynamic position analysis.

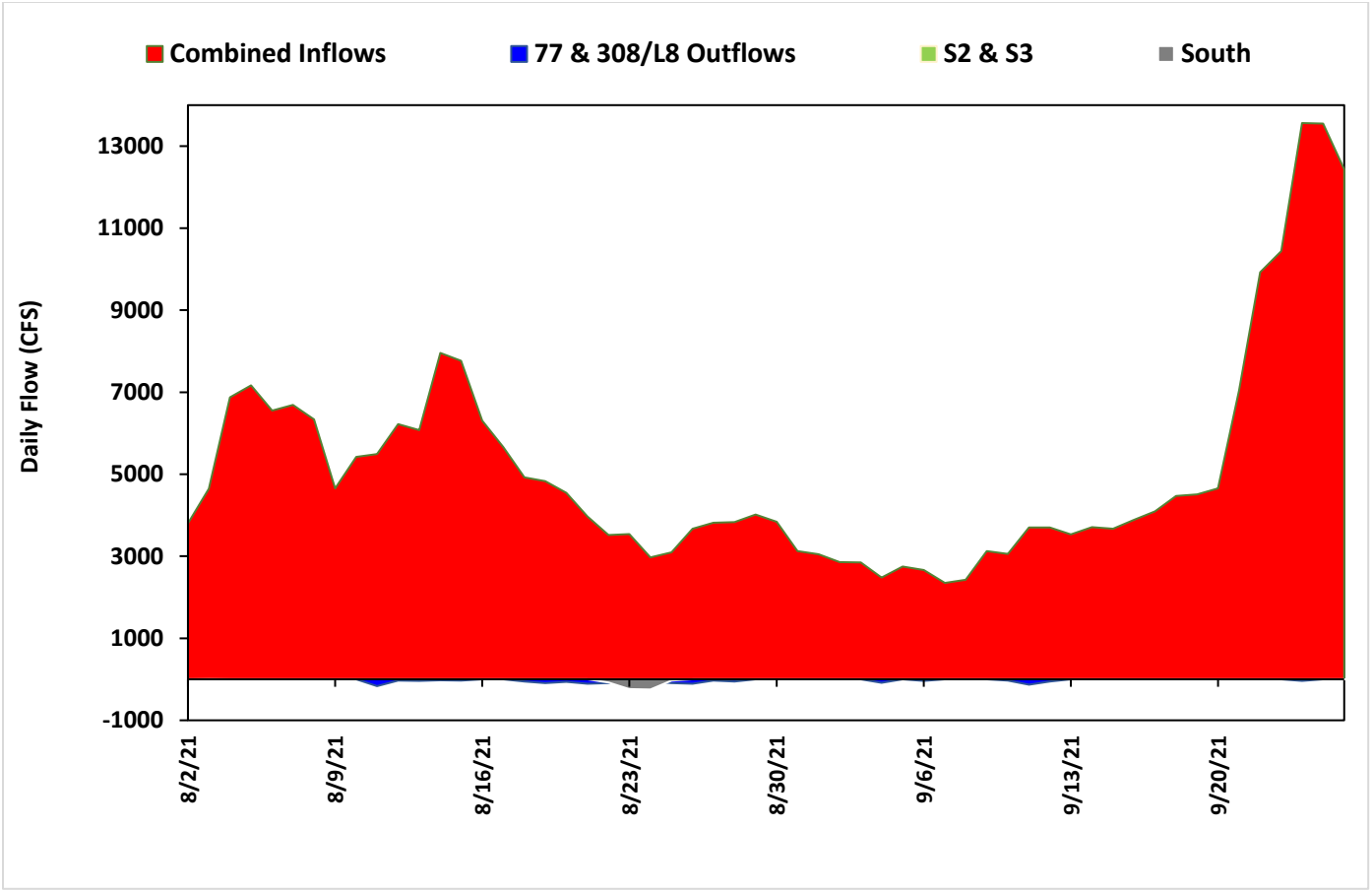


Figure LO-4. Major inflows (red) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in gray. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows from Lake 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.

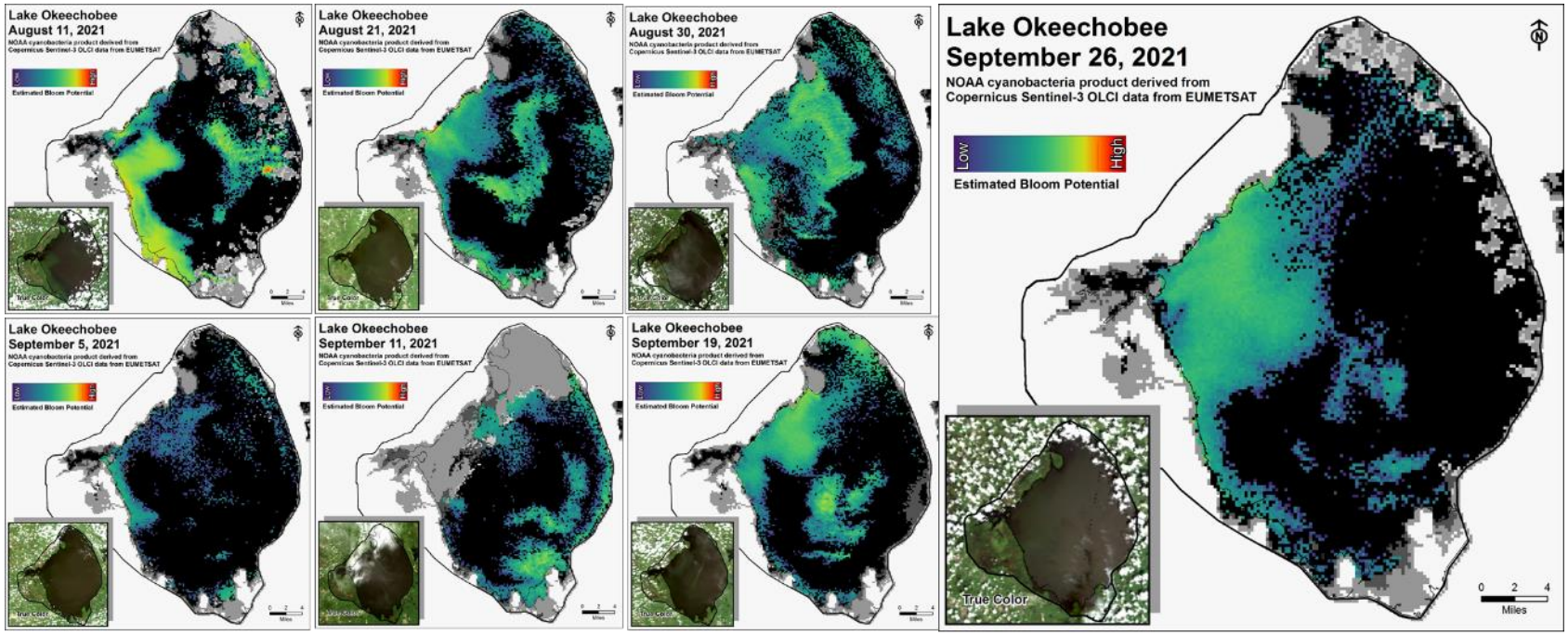


Figure LO-5. Cyanobacteria bloom potential based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

Table LO-2. Provisional results of chlorophyll *a* concentrations and cyanobacteria taxa from sampling trips on September 20 - 21, 2021. Color coding generally follows the legend in **Figure LO-6**.

Collection Date: September 20 - 21, 2021

Station	CHLa (ug/L)	TOXIN (ug/L)	TAXA
FEBIN	NS	NS	NS
FEBOUT	NS	NS	NS
KISSR0.0	P	**0.3**	*Microcys*
L005	P	**0.6**	*Cylin/Plank*
LZ2	P	**0.4**	*Microcys*
KBARSE	P	**0.4**	*Planktol*
RITTAE2	P	**0.5**	*mixed*
PELBAY3	P	**0.4**	*mixed*
POLE3S	P	**0.6**	*Microcys*
LZ25A	P	**0.8**	*Microcys*
PALMOUT	P	**0.4**	*mixed*
PALMOUT1	P	**0.7**	*Microcys*
PALMOUT2	P	**2.9**	*Microcys*
PALMOUT3	P	2.2	*Microcys*
POLESOUT	P	**0.7**	*Cylin/Plank*
POLESOUT1	P	**0.7**	Cylin/Plank
POLESOUT2	P	**0.5**	*Planktol*
POLESOUT3	P	**0.6**	*Planktol*
EASTSHORE	P	**0.5**	*mixed*
NES135	P	**0.6**	*Microcys*
NES191	P	**0.5**	*Microcys*

Station	CHLa (ug/L)	TOXIN (ug/L)	TAXA
L001	P	**0.3**	*Microcys*
L004	P	**1.4**	*Microcys*
L006	P	**22.0**	*Microcys*
L007	P	**0.8**	*Microcys*
L008	P	**0.8**	*Cylin/Plank*
LZ30	P	**3.4**	*Microcys*
LZ40	P	**13.0**	*Microcys*
CLV10A	P	BDL	*Microcys*
NCENTER	P	**0.4**	*Microcys*
S308C	P	BDL	*Microcys*
S77	0.7	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

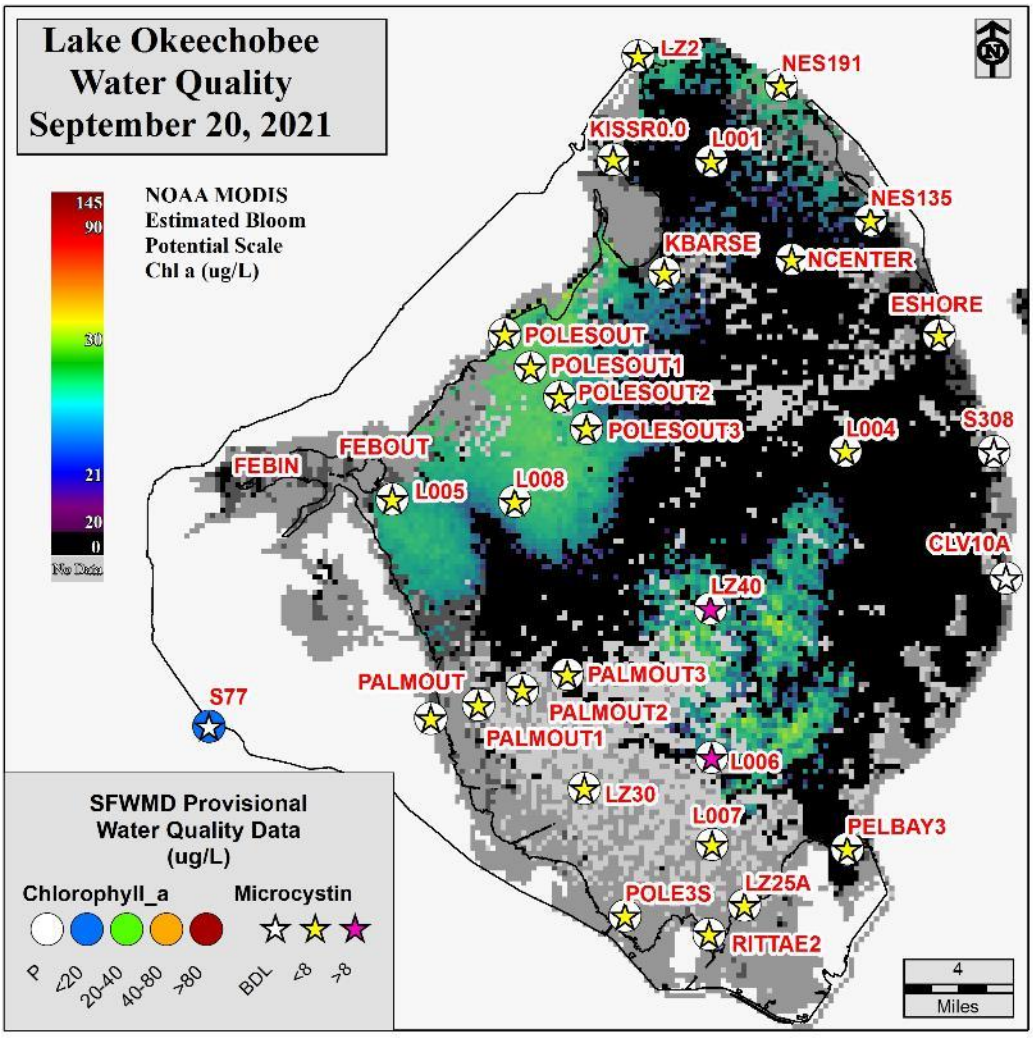


Figure LO-6. Expanded monitoring network and provisional results from samples collected September 20 - 21, 2021.

Estuaries

St. Lucie Estuary

Over the past week, mean total inflow to the St. Lucie Estuary was approximately 2,791 cfs (**Figures ES-1** and **ES-2**) and the previous 30-day mean inflow was approximately 2,364 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-2**.

Over the past week, salinities increased slightly at the HR1 site and decreased at the US1 Bridge and A1A Bridge sites (**Table ES-1** and **Figure ES-3**). The seven-day moving average of the surface and bottom salinities at the US1 Bridge was 7.3. 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 approximately 10,574 cfs (**Figures ES-5** and **ES-6**) and the previous 30-day mean inflow was approximately 5,467 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-6**.

Over the past week, salinities decreased at all sites within 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 poor 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 and 3,000 cfs with estimated tidal basin inflows of 1052 cfs. Model results from all scenarios predict daily salinity to be 0.3 and the 30-day moving average surface salinity to be 0.3 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 24, 2021, that *Karenia brevis*, the Florida red tide dinoflagellate, was observed at background to high concentrations in or offshore of Charlotte County, background concentrations in Lee

[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.

County. On the east coast, red tide was not observed in samples from St. Lucie, Martin, or Palm Beach 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 River Estuary and up to 1,170 cfs release at S-80 to the St. Lucie Estuary.

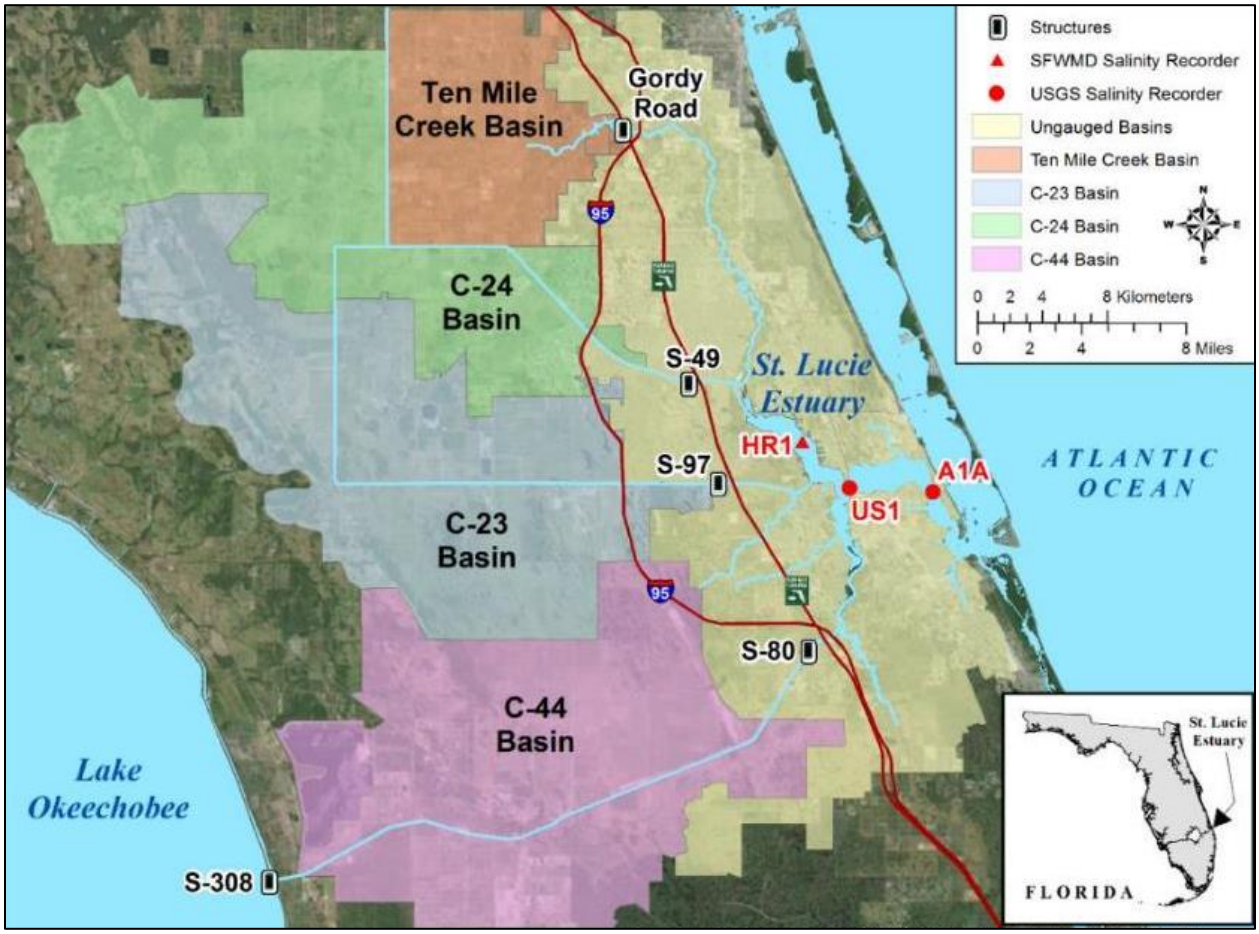


Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

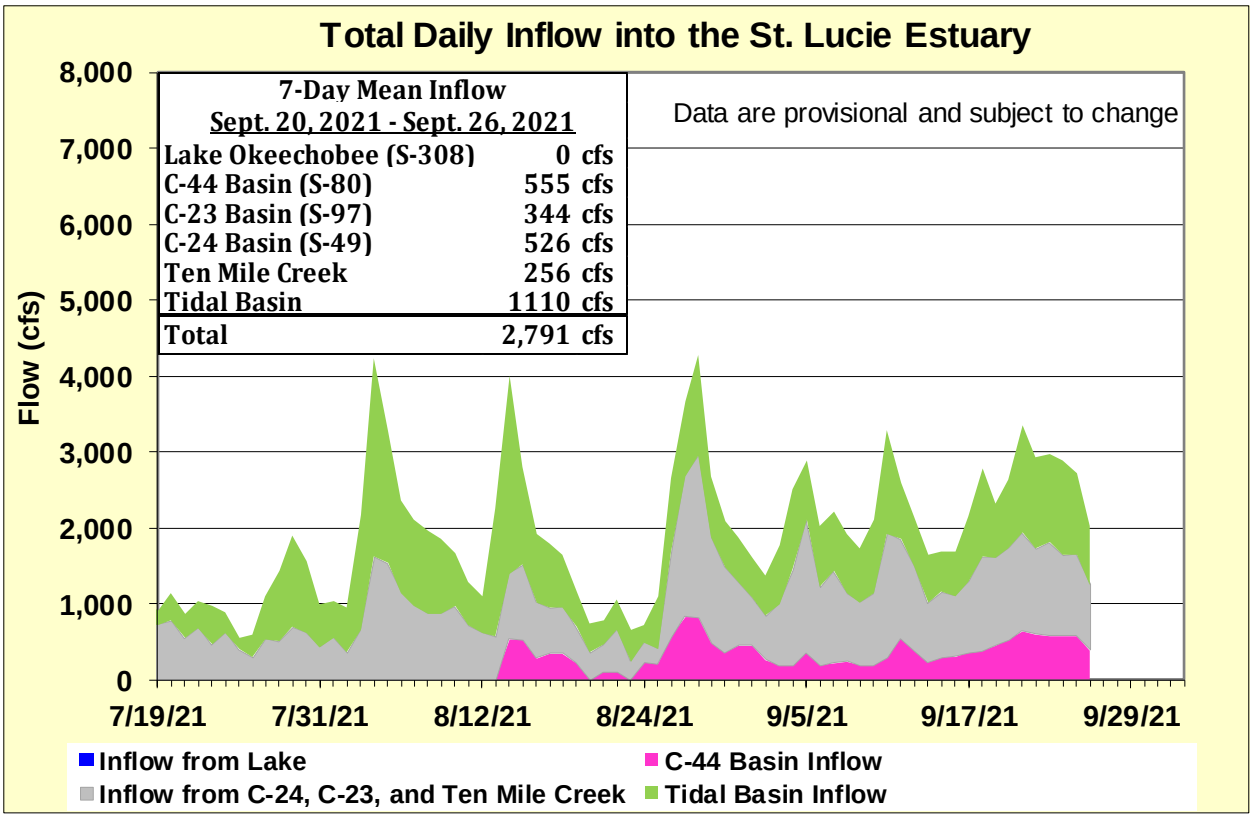


Figure ES-2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

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)	**2.0** (1.9)	**5.4** (5.3)	NA [a]
US1 Bridge	**6.1** (6.7)	**8.5** (9.3)	10.0 – 26.0
A1A Bridge	**14.4** (15.4)	**22.1** (22.9)	NA [a]

a. The envelope is not applicable.

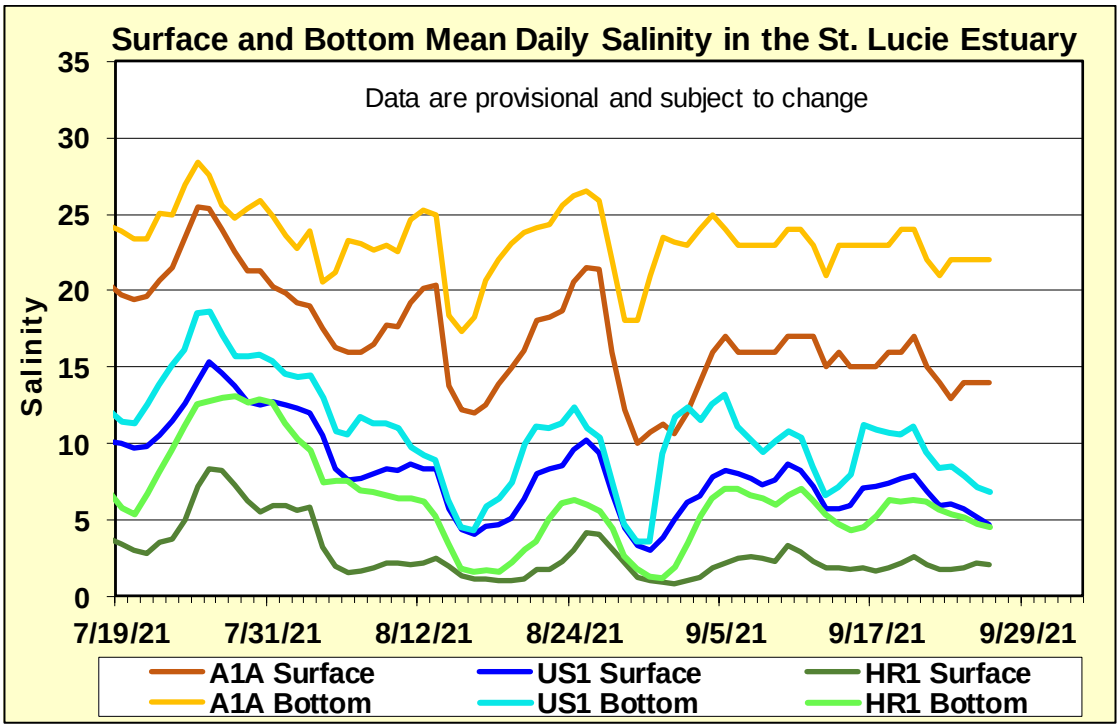


Figure ES-3. Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

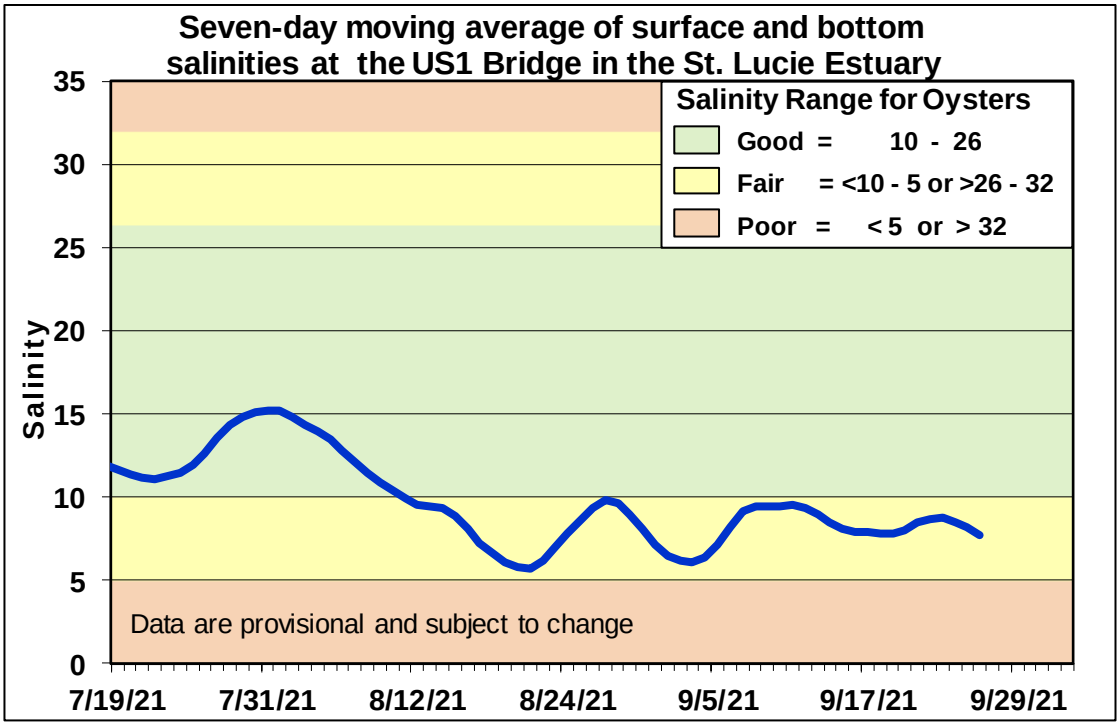


Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

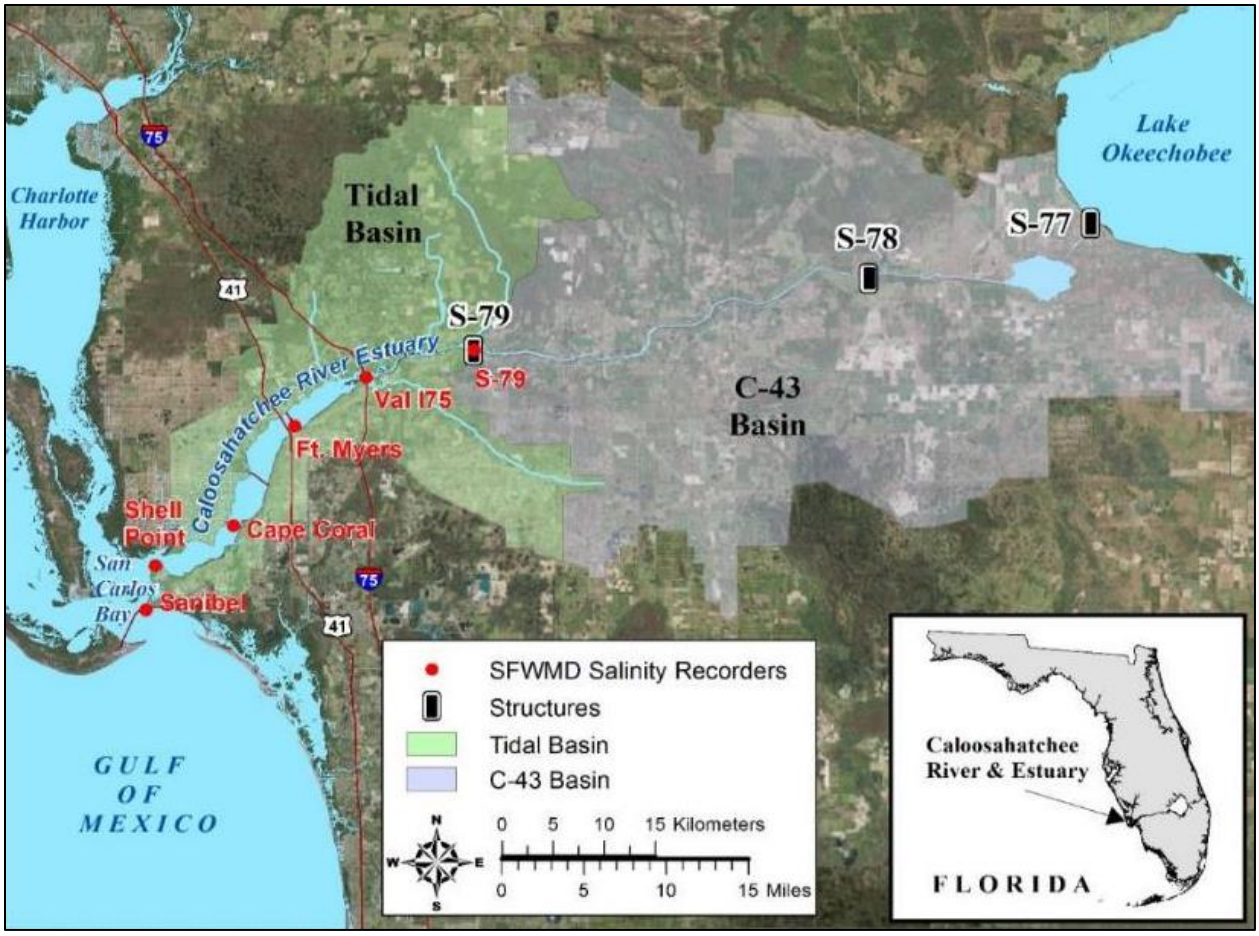


Figure ES-5. Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.

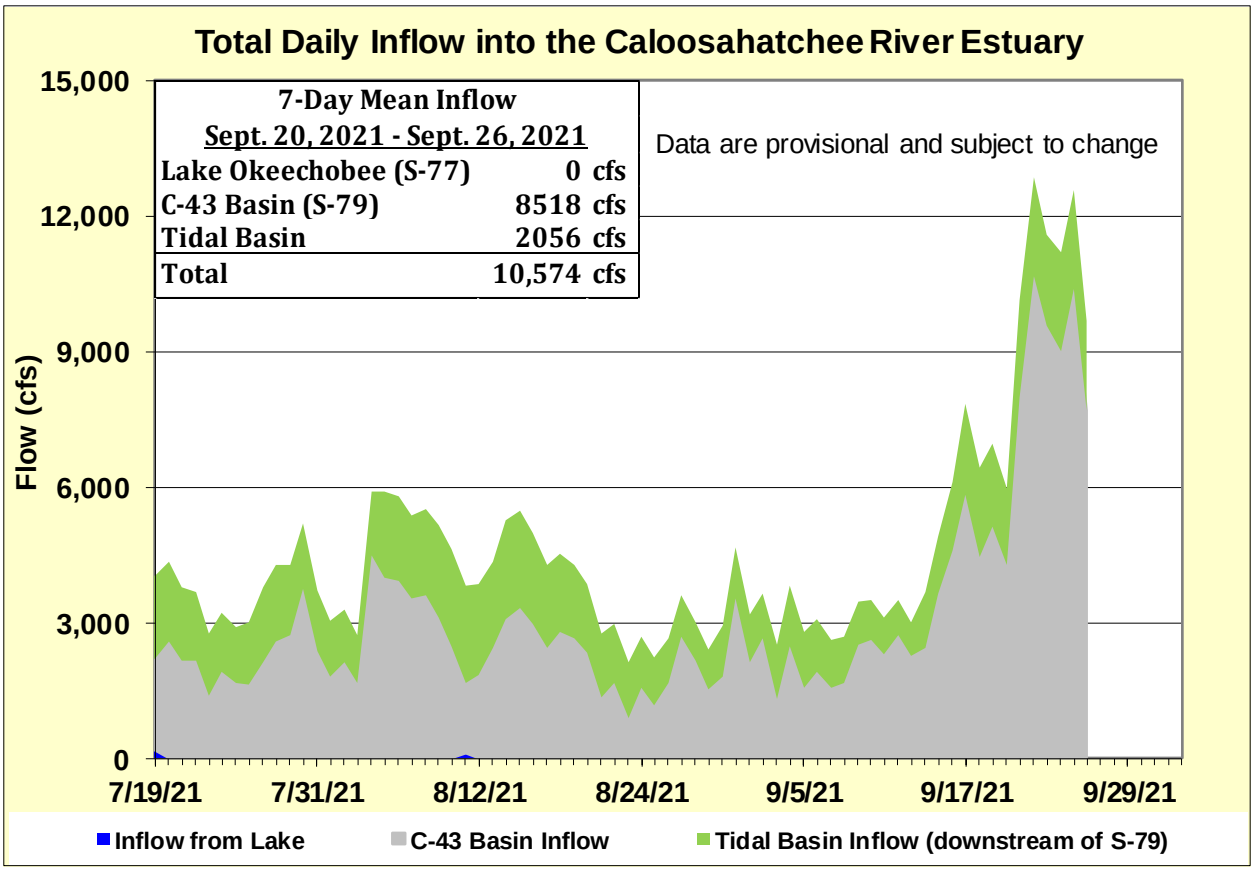


Figure ES-6. Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

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)	**0.2** (0.3)	**0.2** (0.3)	NA [a]
Val I-75	**0.2** (0.3)	**0.2** (0.3)	0.0 – 5.0 [b]
Fort Myers Yacht Basin	**0.2** (0.3)	**0.3** (0.6)	NA [a]
Cape Coral	**0.6** (4.1)	**0.7** (5.5)	10.0 – 30.0
Shell Point	**10.7** (17.1)	**13.7** (19.4)	10.0 – 30.0
Sanibel	**22.5** (25.2)	**24.3** (26.1)	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.

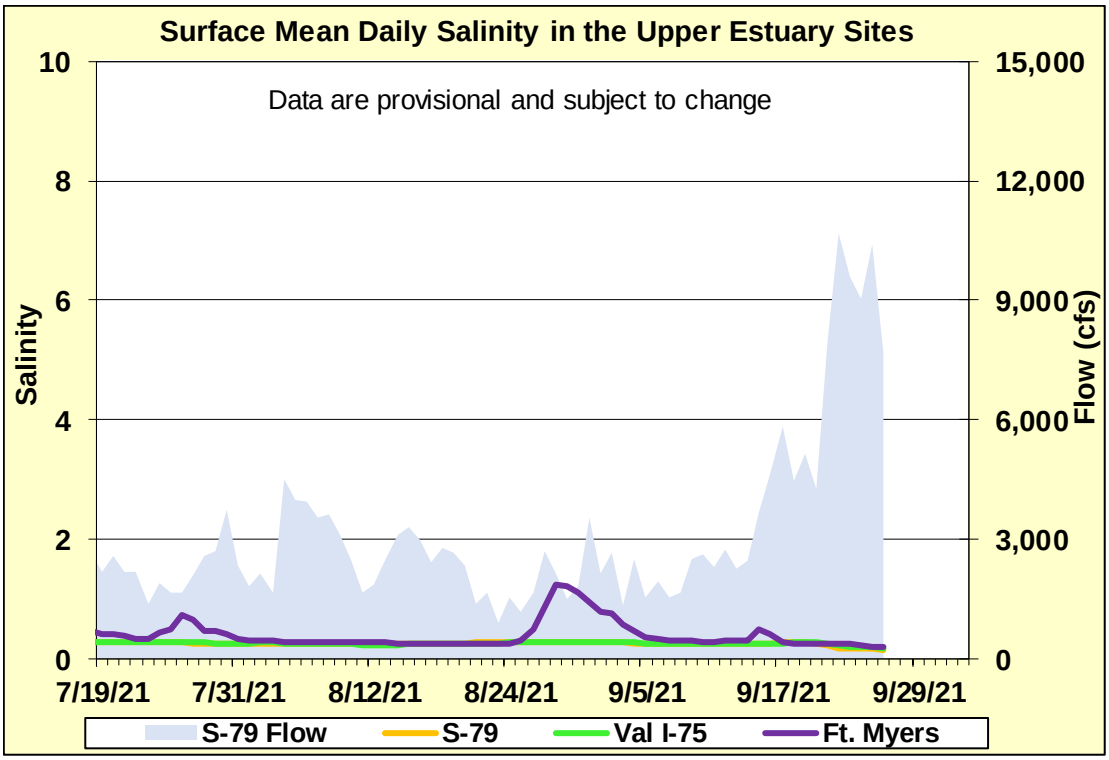


Figure ES-7. Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

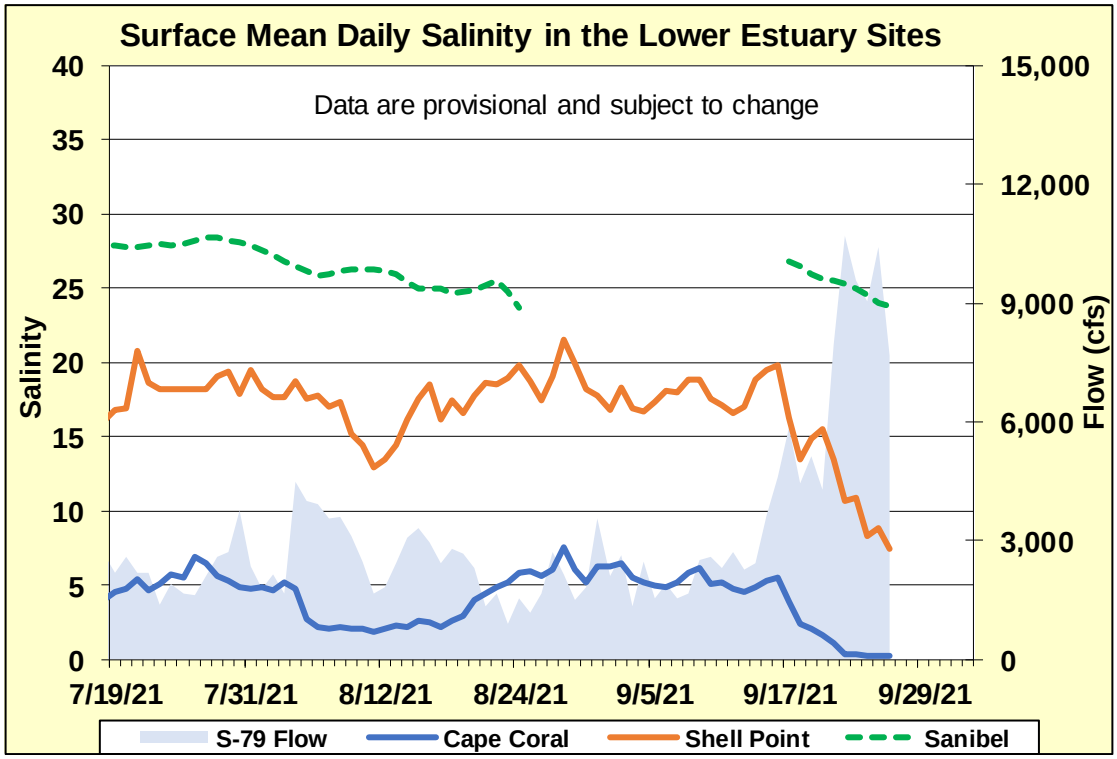


Figure ES-8. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

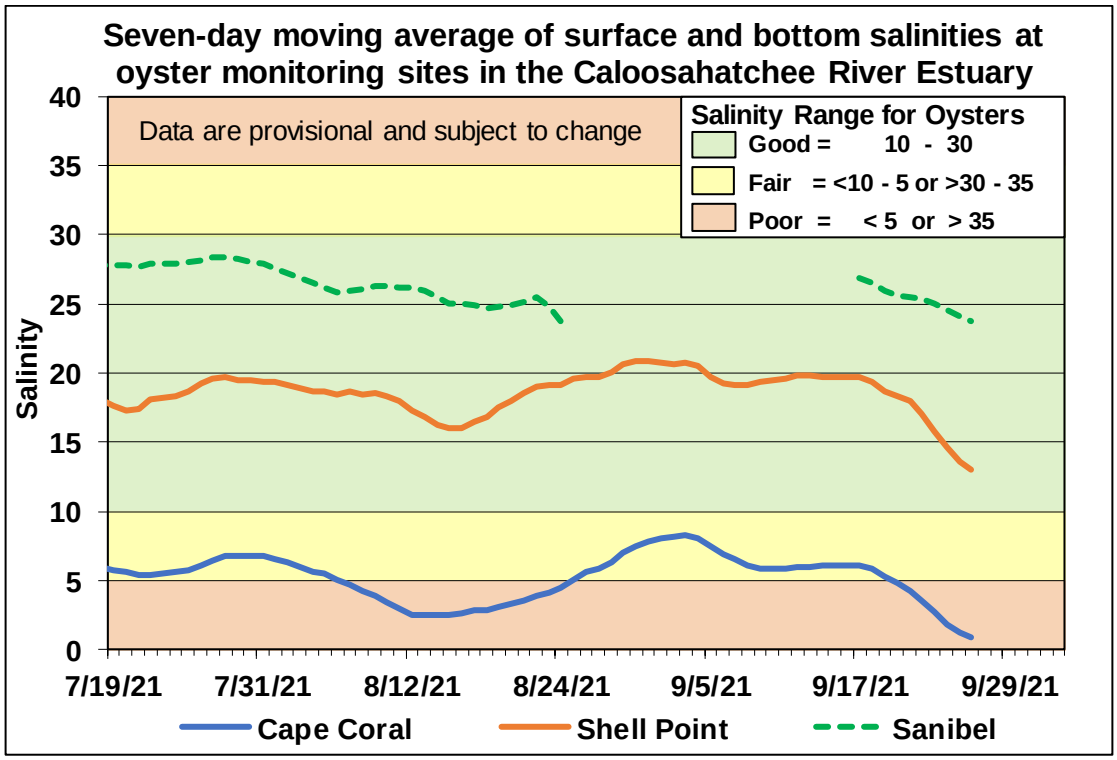


Figure ES-9. Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

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	1052	0.3	0.3
B	450	1052	0.3	0.3
C	1000	1052	0.3	0.3
D	1500	1052	0.3	0.3
E	2000	1052	0.3	0.3
F	3000	1052	0.3	0.3

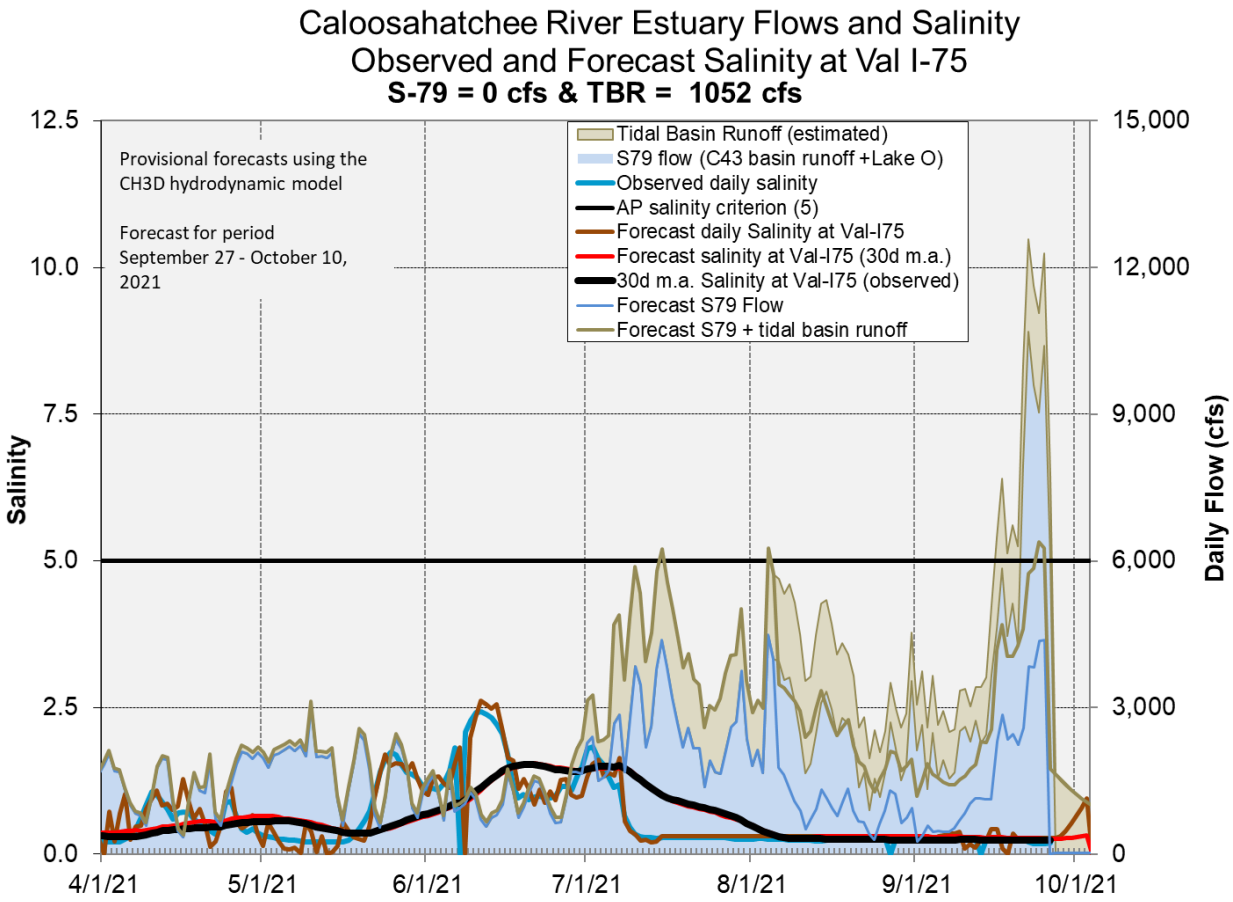


Figure ES-10. Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

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 above target stage and vegetation in these cells is stressed and highly stressed. The 365-day phosphorus loading rate (PLR) for the Eastern Flow-way is very high and for the Central Flow-way is extremely high (**Figure S-1**).

STA-1W: Operational restrictions are in place in STA-1W Western, Eastern, and Northern Flow-ways due to construction activities. All treatment cells are at or above target stage. Vegetation in the flow-ways is stressed and highly stressed. The 365-day PLRs for the Northern and Western Flow-ways are below 1.0 g/m^2/year. The 365-day PLR for the Eastern Flow-way is high (**Figure S-2**).

STA-2: STA-2 Flow-way 2 is offline for construction activities. Operational restrictions are in place in STA-2 Flow-ways 3 and 4 for vegetation management 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 1, 4 and 5 are below 1.0 g/m^2/year. The 365-day PLR for Flow-way 3 is high (**Figure S-3).**

STA-3/4: STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown. All online 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 PLR for the Western Flow-way is below 1.0 g/m^2/year. The 365-day PLR for the Central Flow-way is high (**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. All treatment cells are at or above target stage. All treatment cells have highly stressed vegetation conditions except Flow-ways 7 and 8 which are healthy. The 365-day PLRs for most flow-ways are high (**Figures S-5** and **S-6**).

For definitions on STA operational language see glossary following figures.

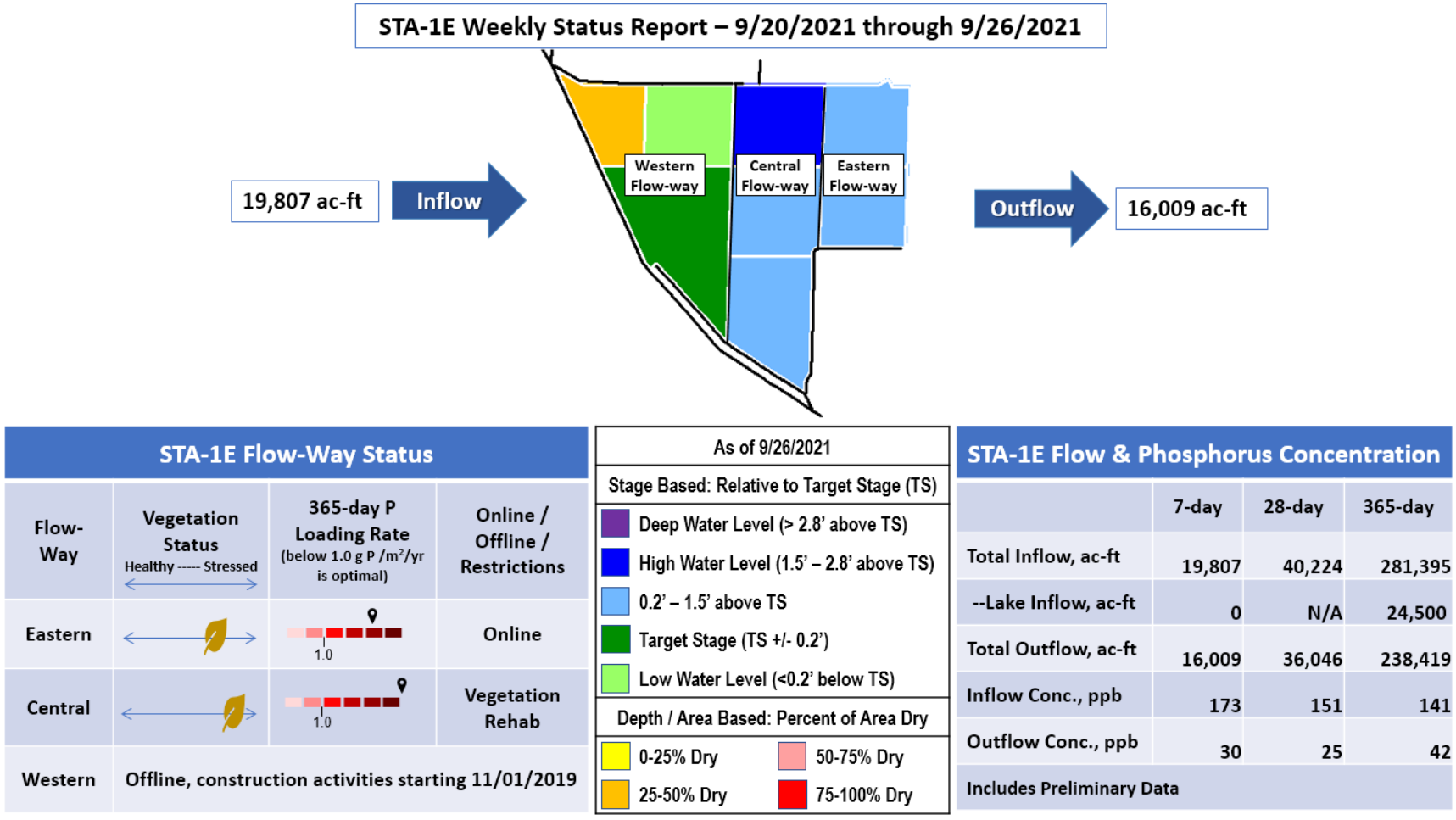


Figure S-1. STA-1E Weekly Status Report

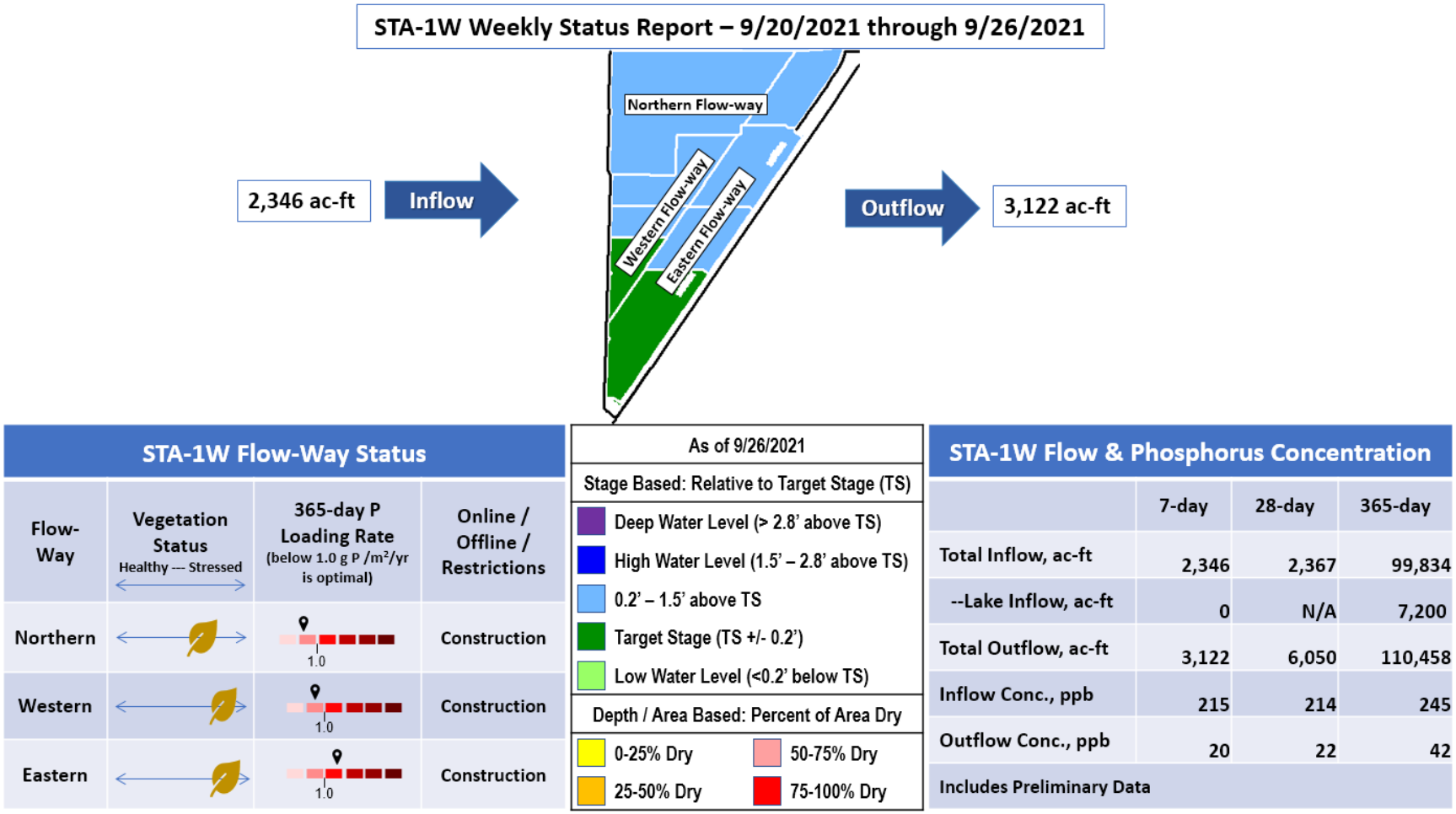
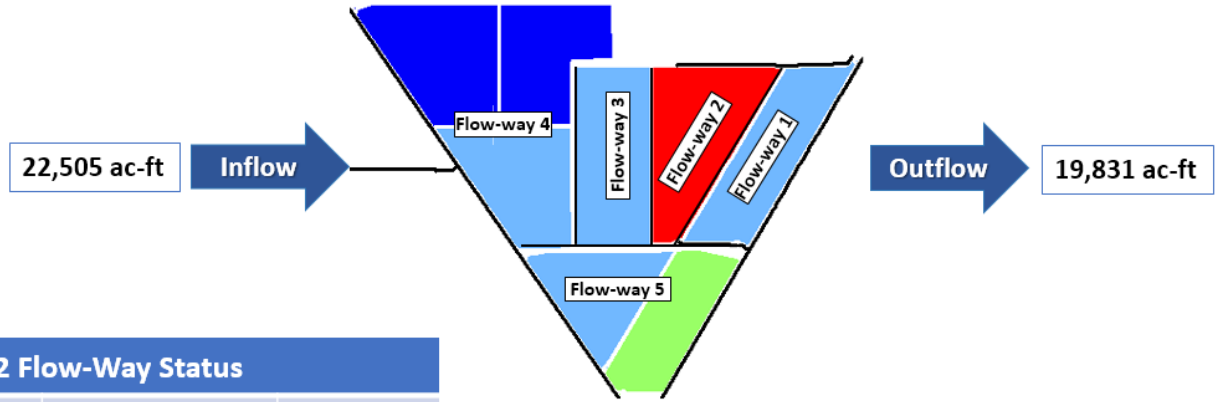


Figure S-2. STA-1W Weekly Status Report

STA-2 Weekly Status Report – 9/20/2021 through 9/26/2021



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	Offline, construction activities as of 9/7/2021		
3		1.0	Vegetation Rehab
4		1.0	Vegetation Rehab
5		1.0	Online

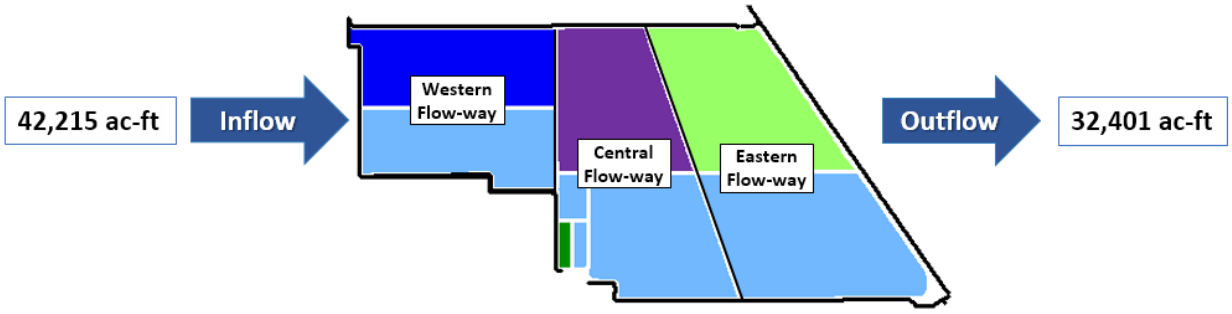
As of 9/26/2021	
Stage Based: Relative to Target Stage (TS)	
Deep Water Level (> 2.8' above TS)	
High Water Level (1.5' – 2.8' above TS)	
0.2' – 1.5' above TS	
Target Stage (TS +/- 0.2')	
Low Water Level (<0.2' below TS)	
Depth / Area Based: Percent of Area Dry	
0-25% Dry	50-75% Dry
25-50% Dry	75-100% Dry

STA-2 Flow & Phosphorus Concentration

	7-day	28-day	365-day
Total Inflow, ac-ft	22,505	58,778	423,951
--Lake Inflow, ac-ft	0	N/A	82,600
Total Outflow, ac-ft	19,831	56,051	454,244
Inflow Conc., ppb	145	117	93
Outflow Conc., ppb	14	15	19
Includes Preliminary Data			

Figure S-3. STA-2 Weekly Status Report

STA-3/4 Weekly Status Report – 9/20/2021 through 9/26/2021



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 9/26/2021
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	42,215	75,895	554,680
--Lake Inflow, ac-ft	0	N/A	59,700
Total Outflow, ac-ft	32,401	57,608	495,850
Inflow Conc., ppb	59	58	65
Outflow Conc., ppb	11	12	14
Includes Preliminary Data			

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

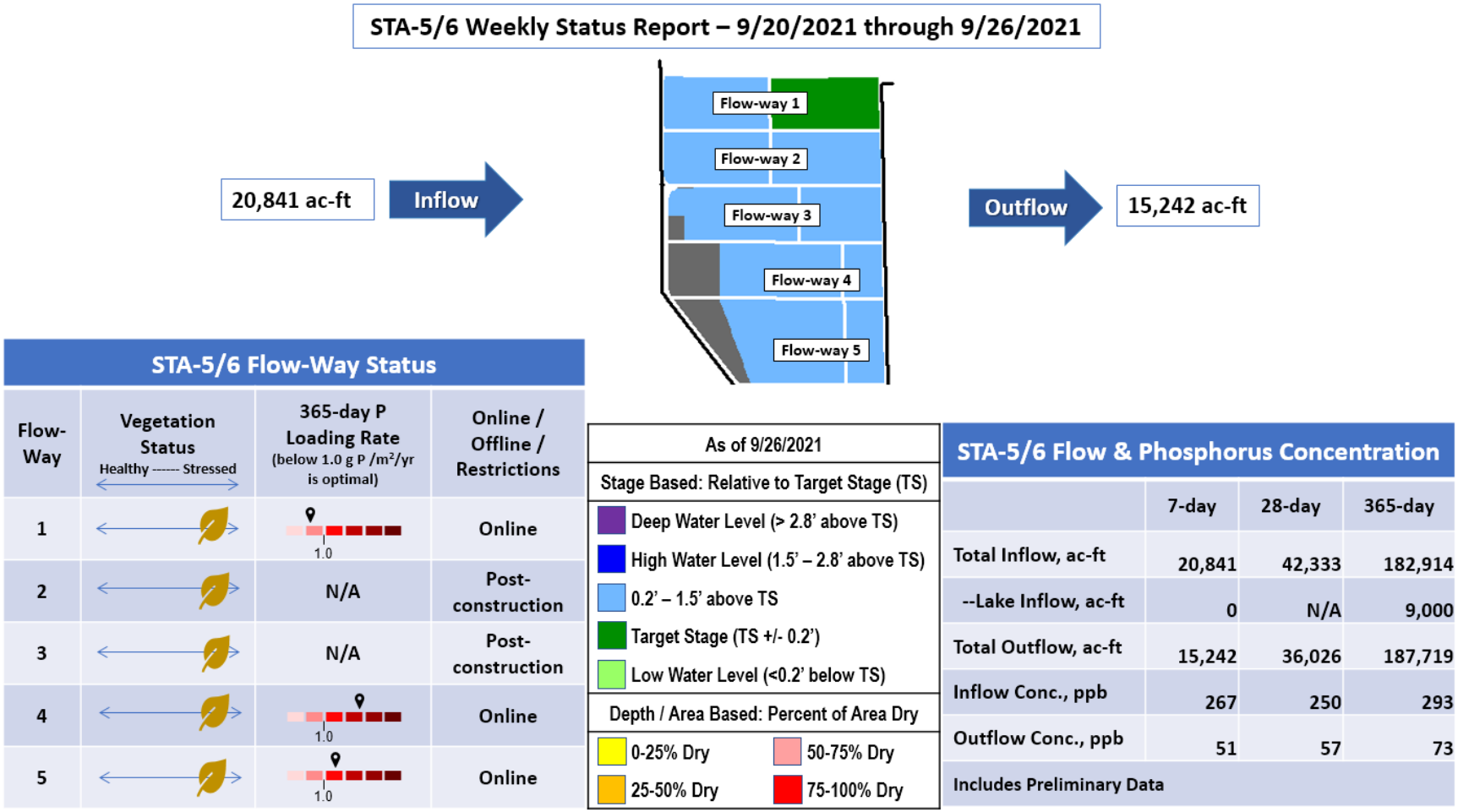
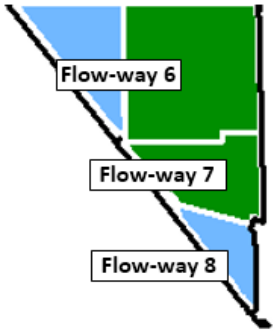
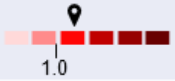
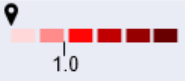


Figure S-5. STA-5/6 Weekly Status Report (Flow-ways 1 – 5)

STA-5/6 Weekly Status Report – 9/20/2021 through 9/26/2021



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 9/26/2021

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
- 25-50% Dry
- 50-75% 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: The Three-gauge average stages continue to follow just below the Zone A1 regulation line last week, the average on Sunday was 0.21 feet below that line.

WCA-2A: Stage at 2A-17 continue rise rapidly and faster than the slope of the schedule last week, average on Sunday was 1.14 feet higher than the Zone A regulation line.

WCA-3A: The Three Gauge Average stage continued to rise last week, moving into Zone A. Stage ended the week Sunday at 0.14 feet above the rising schedule line. WCA-3A Stage at gauge 62 (Northwest corner) rose and then stabilized last week. The Sunday average was 0.45 feet below the flat Upper Schedule (**Figures EV-1 through EV-4**).

Water Depths

The WDAT tool indicates that water depths in WCA-3A North have reached the surface across the entire sub-basin. The upper reaches of the L-67s depths exceeding 3.5 feet. Depths are in excess of 1.0 foot across WCA-2A, and vegetation conditions within the marsh were recently surveyed in the field and little stress was found. North to South hydrologic connectivity remains strong within Everglades National Park (ENP) sloughs (**Figure EV-5**). Comparing WDAT water levels from present over the last month, stages generally increased, most significantly in WCA-2A. Compared to a year ago, the WCA-2B and -3B basins are significantly drier, and WCA-2A is significantly wetter in the south (**Figure EV-6**). Compared to the 20-year median water depths, most of the central Everglades moved closer to the median last week. The region surrounding the upper reaches of the L-67s and the western sloughs in ENP are below average; while WCA-1, -2A and eastern ENP are significantly above average (**Figure EV-7**).

Taylor Slough and Florida Bay

An average of 1.75 inches of rain fell over Taylor Slough and Florida Bay over the week ending Sunday (9/26) and stage increased an average of 0.17 feet over the week with the largest increases in the northern part of the slough and all stations having increased over the week (**Figure EV-7**). The smallest weekly increases were in the area south of the degraded C-111 southern levee (EVER6; **Figure EV-8**). The individual stations in northern Taylor Slough are 2 to 7 inches above their historical averages while the Slough as a whole is 3.8 inches above the historical average for this time of year. The area that is farthest from average is the northern Taylor Slough area. It should be noted that Northern Taylor Slough historical averages are from before the alterations to the system to facilitate water movement and that this area is expected to be higher than the historical average.

Salinities in Florida Bay decreased 0.6 over the week ending 9/26, but individual stations had weekly changes ranging from −4.7 to +0.8 (**Figure EV-7**). The largest weekly decrease occurred in the western nearshore area (GB) but that station is still 4 salinity units saltier than its historical average. The western area decreased below the 75th

percentile with this past week's changes (**Figure EV-9**). More freshwater is still needed to push the estuarine front out into the Bay before the dry season begins. Most of the Bay is still marine (salinity 35) or higher and is still 4 salinity units higher than the historical average for this time of year.

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 northern WCA-3A that move downstream continue to have an ecological benefit. Continued freshwater into Florida Bay will push the estuarine front further into the Bay. 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	1.97	+0.20
WCA-2A	3.19	+0.66
WCA-2B	2.90	+0.25
WCA-3A	2.08	+0.22
WCA-3B	4.81	+0.36
ENP	2.65	+0.15

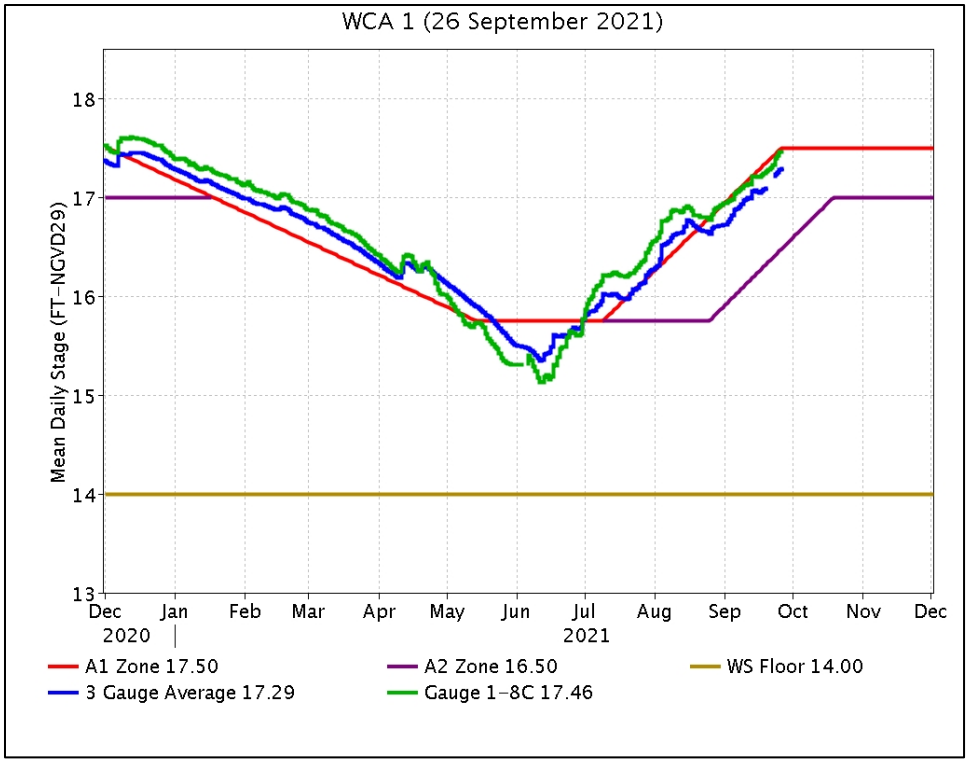


Figure EV-1. WCA-1 stage hydrographs and regulation schedule.

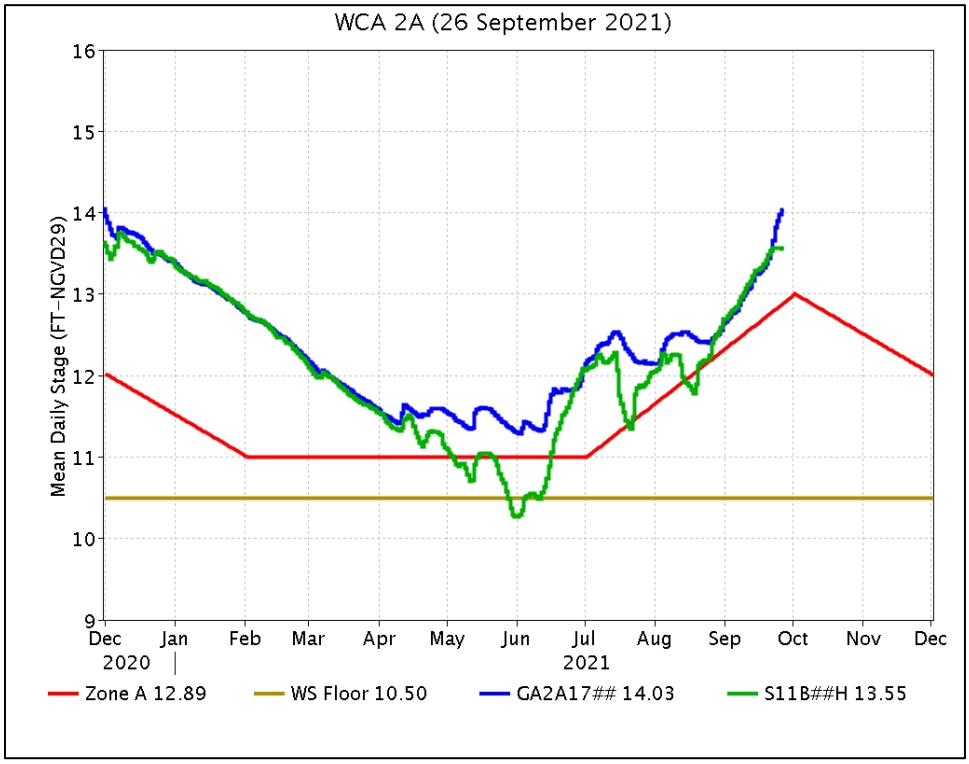


Figure EV-2. WCA-2A stage hydrographs and regulation schedule.

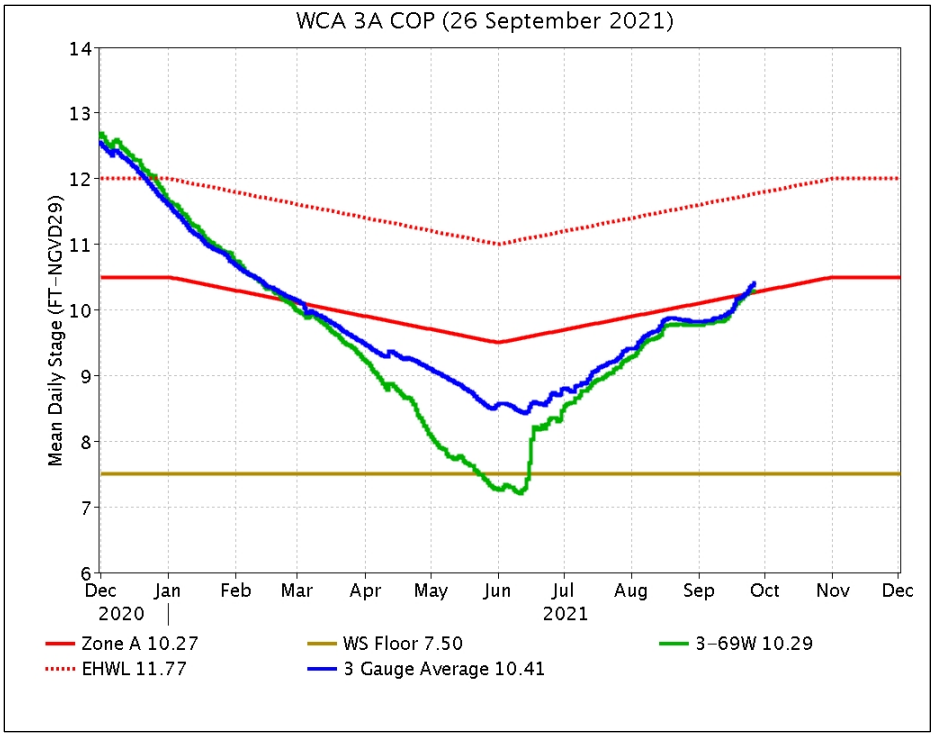


Figure EV-3. WCA-3A stage hydrographs (three-gauge average, S-333 headwater) and regulation schedule.

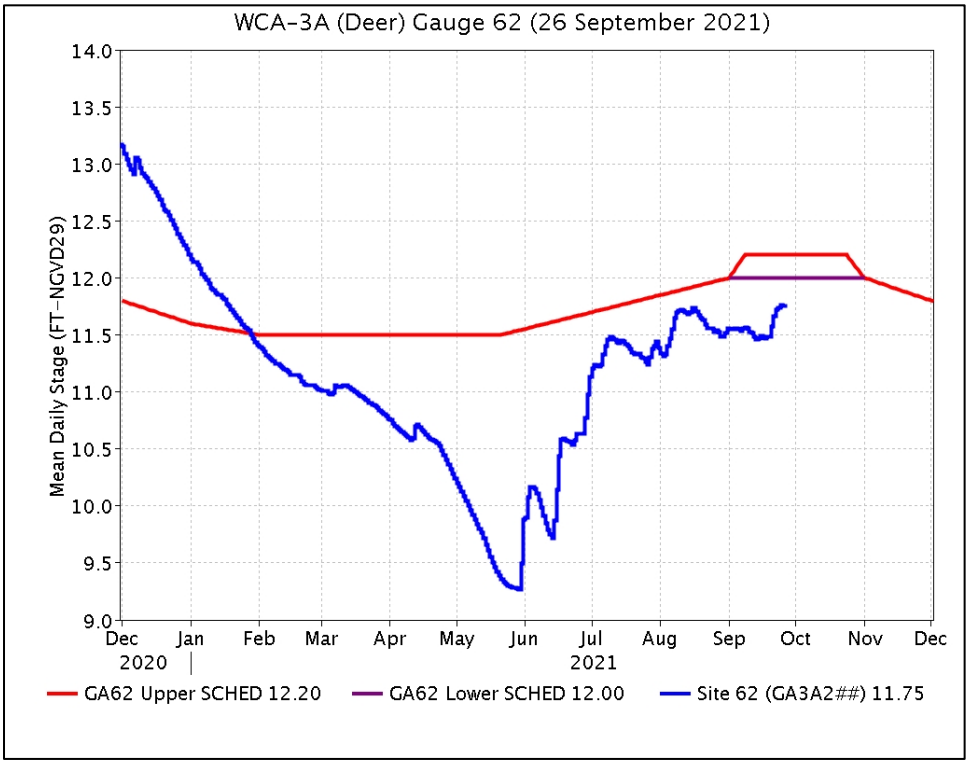


Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.

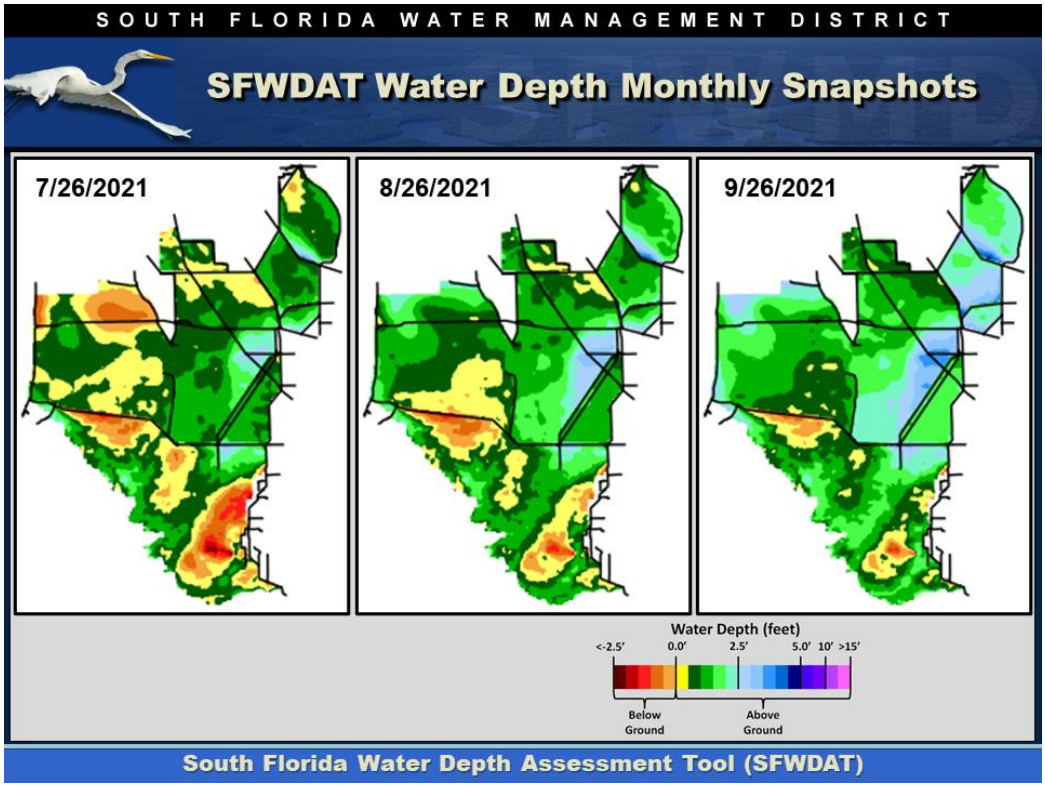


Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

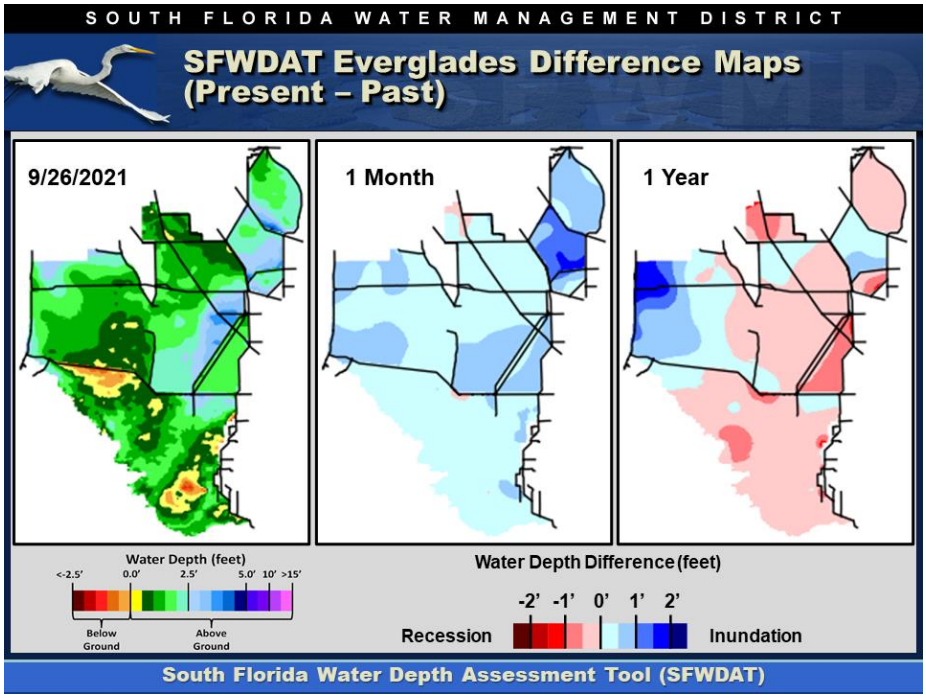


Figure EV-6. Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

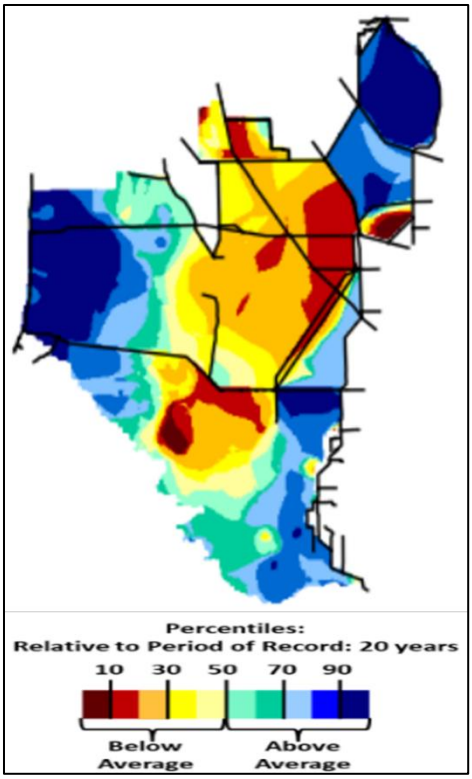


Figure EV-7. Present water depths compared to the day of year median over the previous 20 years.

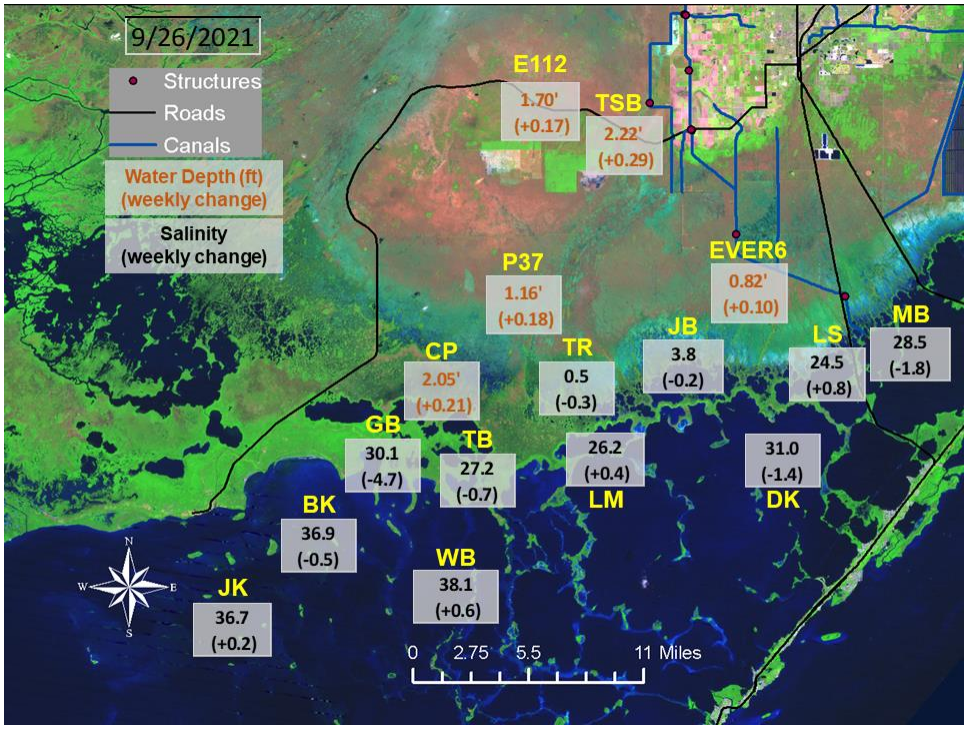


Figure EV-8. Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

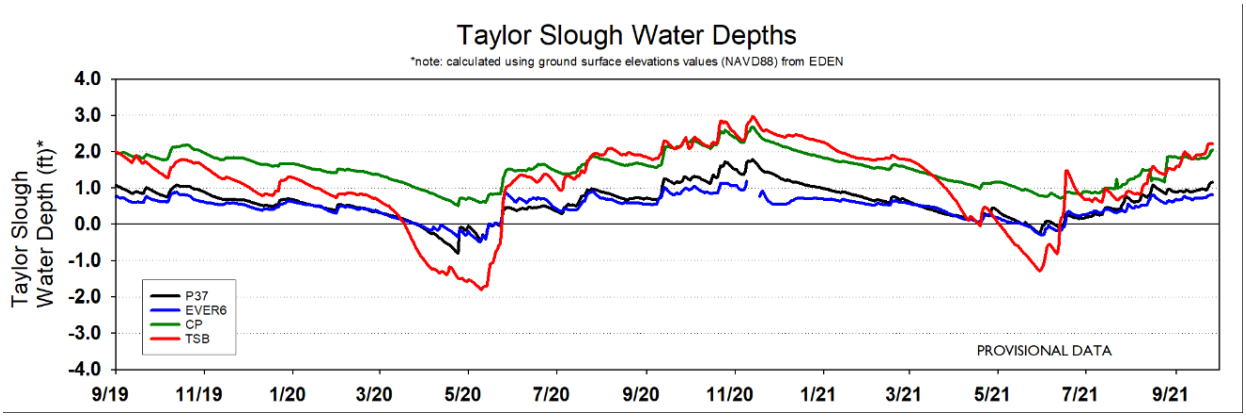


Figure EV-9. Taylor Slough water depth time series.

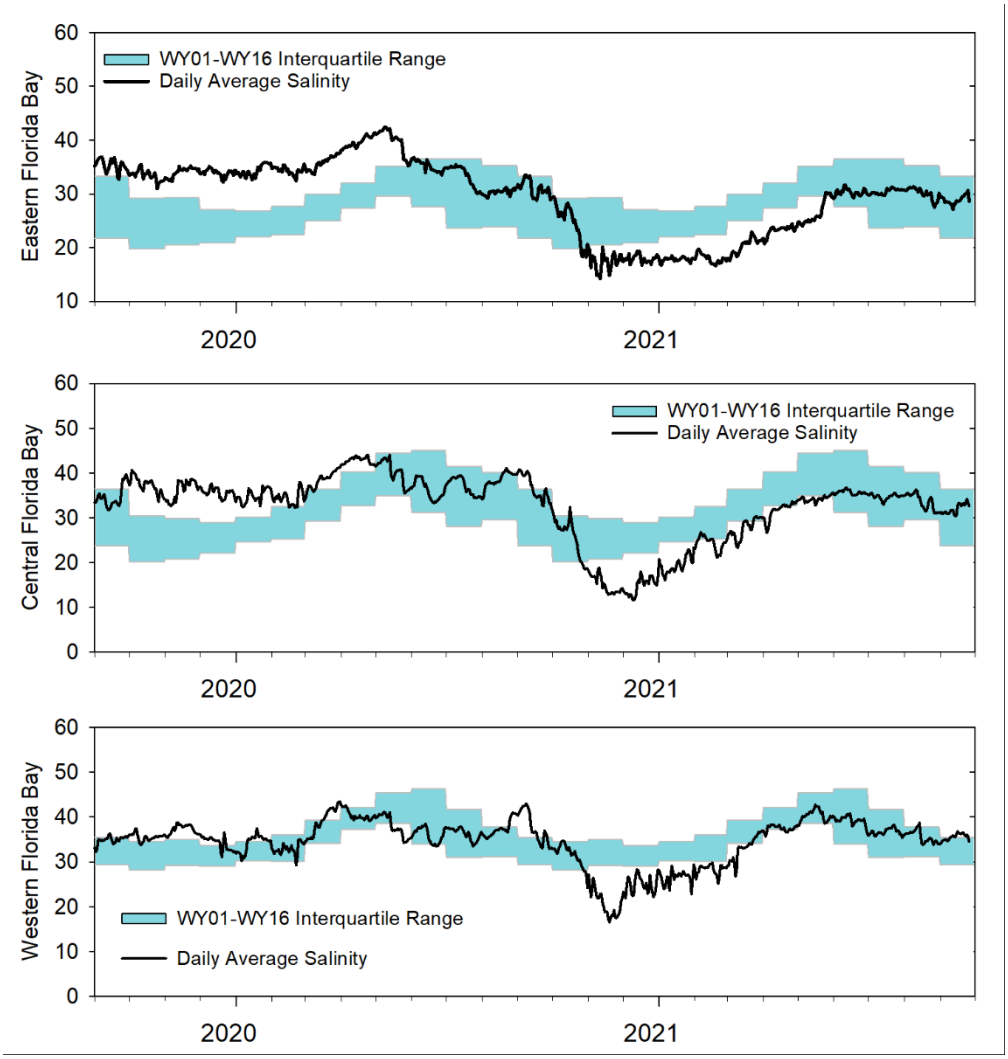


Figure EV-10. Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

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

SFWMD Everglades Ecological Recommendations, September 21, 2021 (red is new)			
Area	Weekly change	Recommendation	Reasons
WCA-1	Stage increased by 0.20'	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 0.66'	Moderate ascension rate to less than 0.50 feet per two weeks, while moving water through the system.	Protect within basin and downstream habitat and wildlife.
WCA-2B	Stage increased by 0.25'	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 increased by 0.16'	Maintain 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 0.22'	Maintain an ascension rates of less than 0.25 feet per week or 0.50 feet per two weeks.	
Central WCA-3A S	Stage increased by 0.23'	Moderate ascension rate to less than 0.50 feet per two weeks, while moving water through the system.	Protect within basin and downstream habitat and wildlife.
Southern WCA-3A S	Stage increased by 0.26'		
WCA-3B	Stage increased by 0.36'	Moderate the ascension rates to less than 0.50 feet per two weeks.	Protect within basin and downstream habitat and wildlife.
ENP-SRS	Stage increased by 0.15'	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 +0.06' to +0.29'	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged −4.7 to +0.8	Move water southward as possible.	When available, provide freshwater to maintain low salinity buffer and promote water movement.