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: August 11, 2021

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

An upper level low located near Andros Island is expected to slowly migrate westward across the District Wednesday night and Thursday. Sinking air around the low is forecast to produce drier air over the area and below-average afternoon thunderstorm coverage Wednesday, and Thursday. Easterly steering winds are expected to focus afternoon thunderstorm activity over the interior and west each day. The combination of the easterly winds and unstable conditions under the upper level low will also help produce night and morning shower activity near the east coast each day. Potential Tropical Cyclone Six is over the northeastern Caribbean, and it is forecast to develop into a tropical storm bringing the potential for heavy rain of 4-6" and possible tropical storm conditions over the District Friday and Saturday. Outer shower bands associated with this system are forecast to keep fast-moving showers and thunderstorms over the District Sunday and Monday. Total rainfall is forecast to be above the historical average during the first 7-day period (Week 1) and then near the historical average again 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, but mean floodplain depth increased to 0.91 feet on August 8, 2021. Dissolved oxygen concentration in the Kissimmee River continued to decline to an average of 1.0 mg/L for the week and the last three days of the week being below the 1.0 mg/L threshold considered potentially lethal for sportfish.

Lake Okeechobee

Lake Okeechobee stage was 14 feet NGVD on August 8, 2021, 0.77 feet higher than a month ago, and 0.38 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 (**Figure LO-2**). Recent satellite imagery (August 8, 2021) shows a medium to high bloom potential in the southwestern, western and northeastern regions of the Lake.

Estuaries

Total inflow to the St. Lucie Estuary averaged approximately 2,432 cfs over the past week with no flow coming from Lake Okeechobee. Mean salinities decreased at all sites in the estuary over the past week. Salinity at the US1 Bridge was in the good range (10-26) for adult eastern oysters.

Total inflow to the Caloosahatchee Estuary averaged 4,930 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 but decreased 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 poor range at Cape Coral.

Stormwater Treatment Areas

For the week ending Sunday, August 8, 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 409,000 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

Rehydration rates were generally good across the Everglades Protection Area, WCA-1 and WCA-2 experienced elevated rates and fell into the fair range. Depth conditions are below average across most of WCA-3A. In Florida Bay salinities are generally stable and stages increased in Taylor Slough responding to increased rainfall. Overall conditions remain good in the Southern systems but now is the normal time of year where the lowest salinities are expected but have not been decreasing.

Supporting Information

Kissimmee Basin

Upper Kissimmee

On August 8, 2021, lake stages were 56.3 feet NGVD (0.2 feet below schedule) in East Lake Toho, 53.4 feet NGVD (0.1 feet below schedule) in Lake Toho, and 51.3 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 were 750 cfs at S-65 and 1,480 cfs at S-65A; discharges from the Kissimmee River were 1,600 cfs at S-65D and 1,760 cfs at S-65E (**Table KB-2**). Headwater stages were 46.6 feet NGVD at S-65A and 28.1 feet NGVD at S-65D on August 8, 2021. The concentration of dissolved oxygen in the Kissimmee River continued to decline, with the average for the week ending on August 8, 2021 decreasing to 1.0 mg/L; the last three days of the week were below the 1.0 mg/L threshold considered potentially lethal for sportfish (**Table KB-2**, **Figure KB-4**). Discharge at S-65/S-65A is being managed to attempt to limit further decline of dissolved oxygen in the Kissimmee River, but the outcome is dependent on rainfall. Flow at S-65A remains too low for complete inundation of the Kissimmee River floodplain, but mean floodplain depth increased to 0.91 feet on August 8, 2021 (**Figure KB-5**).

Water Management Recommendations

Due to the recent trend of dissolved oxygen decline in the Kissimmee River, we are continuing to make recommendations as necessary to adaptively manage flow at S-65 and S-65A. The current objective is to continue to maintain flow above bank-full (>1,400 cfs) without causing a persistent dissolved oxygen decline, while avoiding excessive stage rise in KCH. We are also balancing the rates of stage rise in Lakes KCH, Toho and East Toho by managing flow at S-61 and S-59.

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)	
							8/8/21	8/1/21
Lakes Hart and Mary Jane	S-62	LKMJ	220	60.0	R	60.0	0.0	0.1
Lakes Myrtle, Preston and Joel	S-57	S-57	60	61.0	R	61.0	0.0	0.1
Alligator Chain	S-60	ALLI	82	63.2	R	63.2	0.0	-0.1
Lake Gentry	S-63	LKGT	108	61.0	R	61.0	0.0	0.0
East Lake Toho	S-59	TOHOE	445	56.3	R	56.5	-0.2	-0.4
Lake Toho	S-61	TOHOW S-61	939	53.4	R	53.5	-0.1	-0.1
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	1,213	51.3	R	51.0	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.

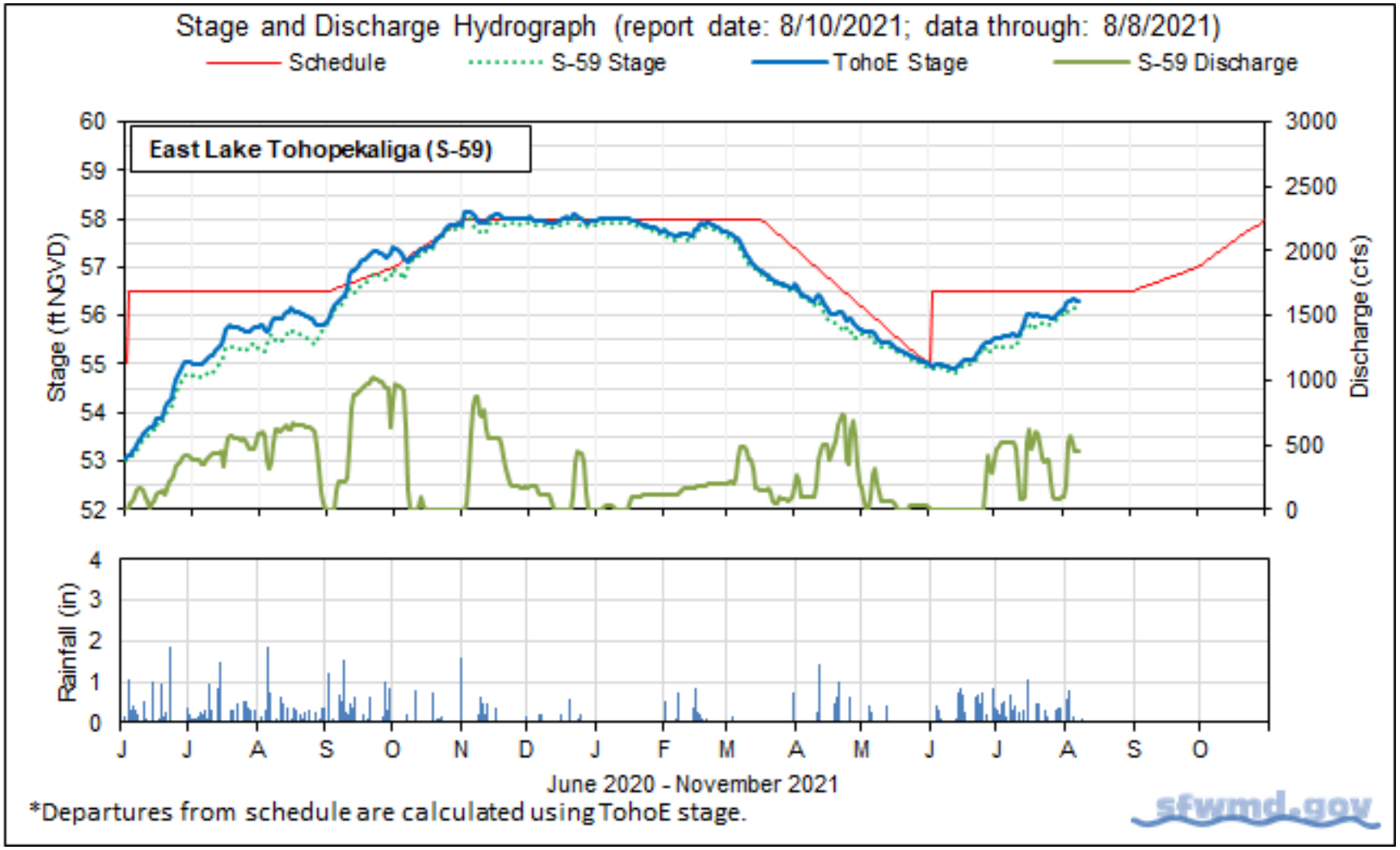


Figure KB-1. East Lake Toho regulation schedule, stage, discharge and rainfall.

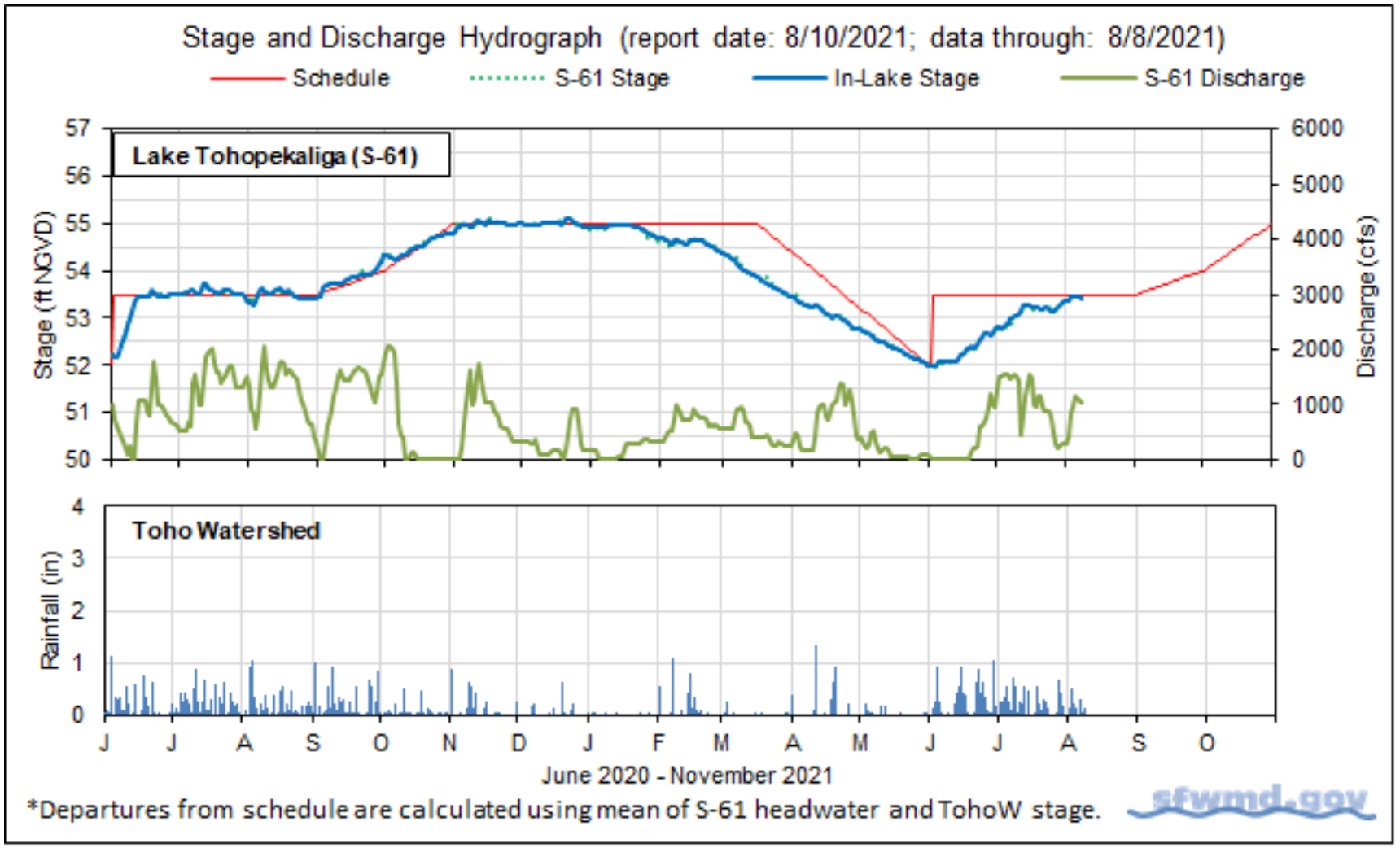


Figure KB-2. Lake Toho regulation schedule, stage, discharge and rainfall.

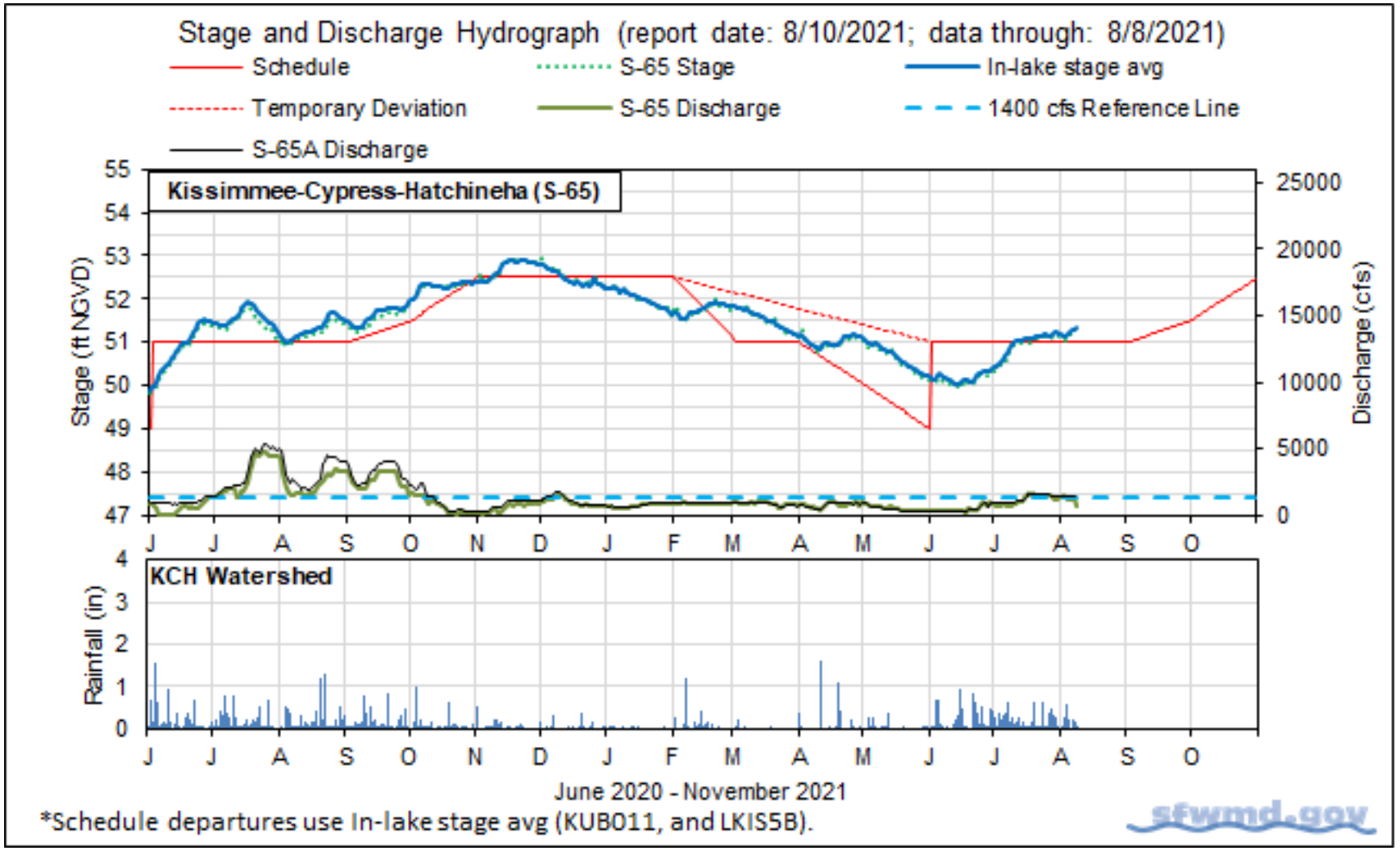


Figure KB-3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

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			
		8/8/21	8/8/21	8/1/21	7/25/21	7/18/21
Discharge	S-65	750	1,210	1,360	1,540	1,270
Discharge	S-65A[a]	1,480	1,460	1,500	1,610	1,320
Headwater Stage (feet NGVD)	S-65A	46.6	46.4	46.4	46.3	46.2
Discharge	S-65D[b]	1,600	1,600	1,380	1,240	1,120
Headwater Stage (feet NGVD)	S-65D[c]	28.1	27.7	27.6	27.5	27.5
Discharge (cfs)	S-65E[d]	1,760	1,790	1,590	1,360	1,200
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) [e]	Phase I, II/III river channel	0.8	1.0	1.7	3.2	3.4
Mean depth (feet) [f]	Phase I floodplain	0.91	0.86	0.68	0.36	0.19

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

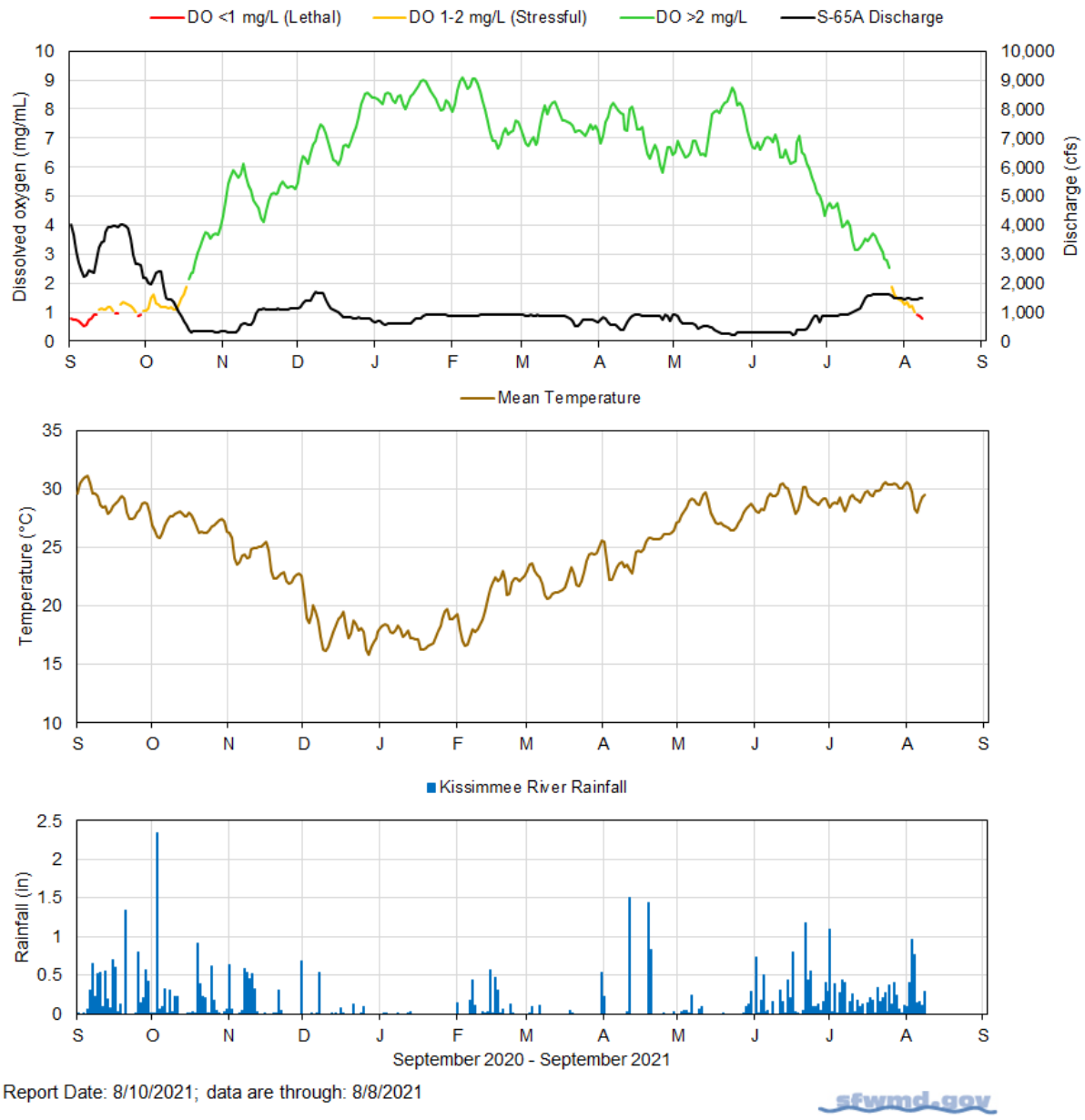


Figure KB-4. Restored Kissimmee river channel mean daily dissolved oxygen concentration (mg/L), S-65A discharge (cfs), temperature (°C) and rainfall (inches). Dissolved oxygen (DO) and temperature are mean daily values averaged for PC62, KRBN, PC33, PD62R, and PD42R with an average of four stations reporting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

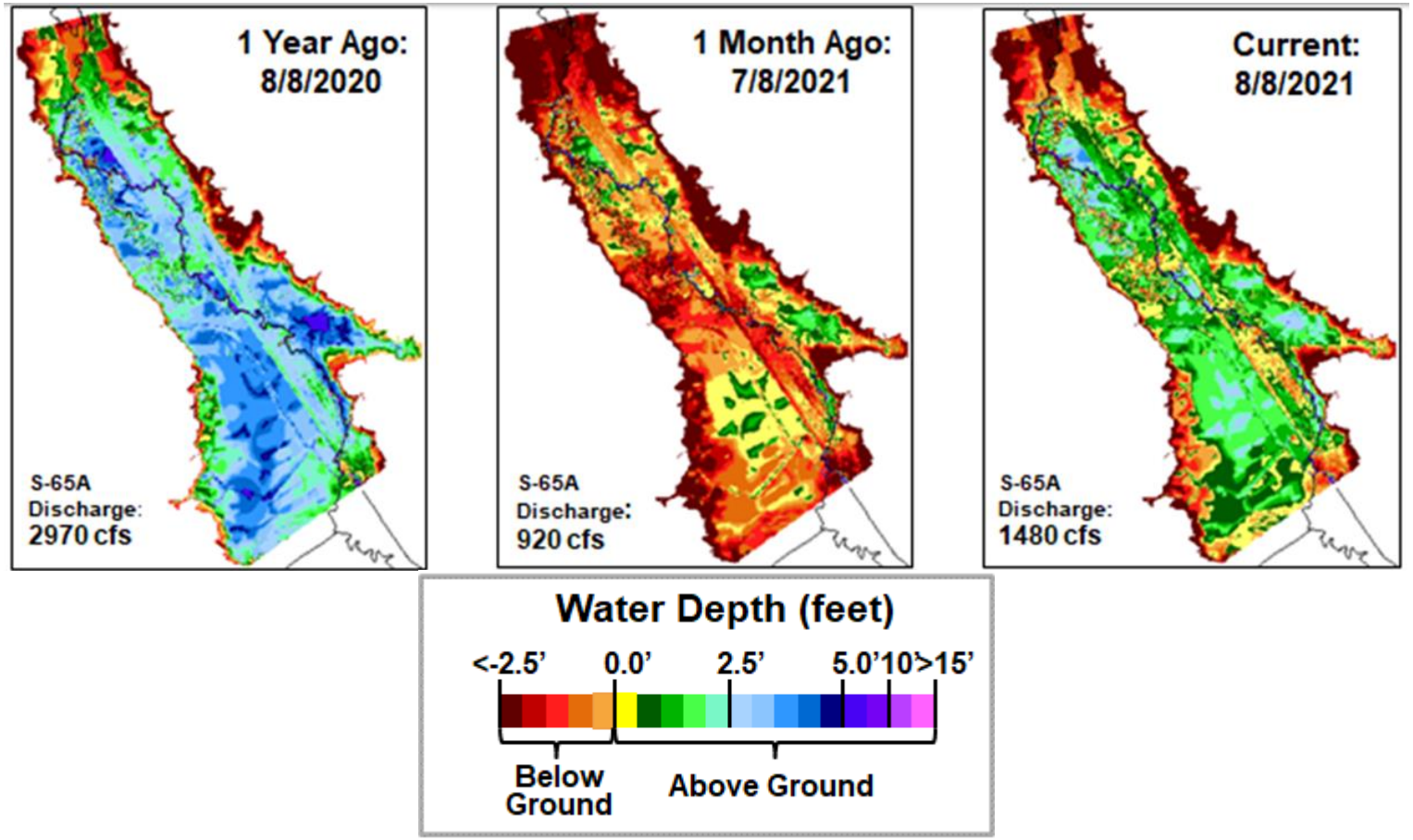


Figure KB-5. Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.

Lake Okeechobee

Lake Okeechobee stage was 14 feet NGVD on August 8, 2021, 0.77 feet higher than a month ago, and 0.38 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 (**Figure LO-2**). Lake stage remained in the Low flow sub-band last week (**Figure LO-3**). According to NEXRAD, 2.05 inches of rain fell directly on the Lake last week.

Average daily inflows (excluding rainfall) increased from the previous week, going from 4,591 cubic feet per second (cfs) to 6,036 cfs. Outflows (excluding evapotranspiration) decreased, going from 36 cfs to 0 cfs. Most of the inflows (~75% of the total) came from the Kissimmee River (1,787 cfs through S-65E & S-65EX1), C-41A canal (1,489 cfs through S-84 & S-84X) and C-40 & C-41 canals (1,242 cfs through S-72 & S-72). Water flowed back into the Lake from the C-44 canal (via S-308 structure) and L-8 Canal (via S-271 structure) at average rates of 297 cfs and 197 cfs, respectively over the past week. There were no releases to the west or south via S-77 or S-350 structures, respectively. 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 (August 8, 2021) from the NOAA cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3 OLCI sensor data showed medium to high bloom potential in the southwestern, western and northeastern nearshore areas of the Lake. Overall, bloom potential increased in the southwestern and western parts of the Lake from the previous week, and remained low in the central part of the Lake (**Figure LO-5**).

The latest water quality survey results from August 2-4, 2021 revealed that a total of 30 sites (or 94 %) had mixed communities or communities dominated by *Microcystis aeruginosa* (unicellular colonial, microcystin-producing cyanobacterium, not capable of fixing atmospheric nitrogen). At one (POLE3S) site (or 3%) communities were dominated by *Dolichospermum circinale* (filamentous, diazotrophic, saxitoxin-producing cyanobacterium). Percentage of sites dominated by *M. aeruginosa* (dominant bloom-forming species) was the same as in late July and lower by 3% compared to early July.
A total of 31 sites (or 97%) had microcystin toxin concentration below the EPA recommended human health recreational standard (8 µg/L). The highest toxin concentration (13 µg/L) was recorded at NES135 in the northeastern part of the Lake. Overall, toxin concentration above the EPA threshold decreased by 6% since early July and 3% since late July. All toxin, chlorophyll *a* concentrations, and dominant taxa are listed in **Table LO-2** and shown in **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	1591	1787	0.7
S-71 & S-72	696	1242	0.5
S-84 & S-84X	1357	1489	0.6
Fisheating Creek	340	577	0.2
S-154	32	50	0.0
S-191	0	64	0.0
S-133 P	28	63	0.0
S-127 P	44	58	0.0
S-129 P	35	48	0.0
S-131 P	30	52	0.0
S-135 P	70	129	0.1
S-2 P	11	0	0.0
S-3 P	9	0	0.0
S-4 P	9	0	0.0
*Backflow	341	476	0.2
Rainfall	3956	5516	2.3
Total	**8547**	**11552**	**4.8**

OUTFLOWS	Previous week Avg Daily (cfs)	Avg Daily Flow (cfs)	Equivalent Depth Week Total (in)
S-77	0	0	0.0
*S-308	*-85*	*-279*	*-0.1*
S-351	14	0	0.0
S-352	3	0	0.0
S-354	19	0	0.0
*L-8 (S-271)	*-256*	*-197*	*-0.1*
ET	3166	2193	0.9
Total	**3202**	**2193**	**0.9**

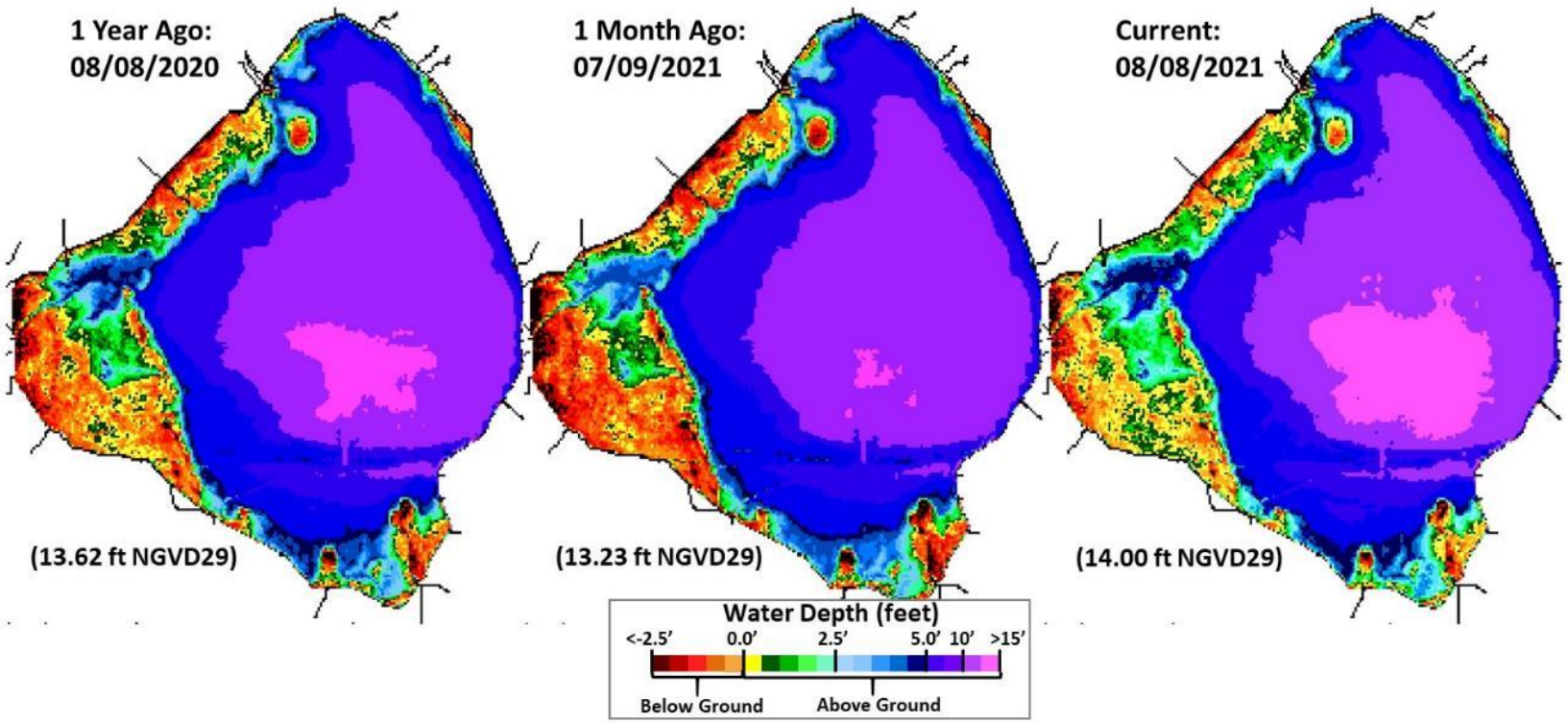


Figure LO-1. Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

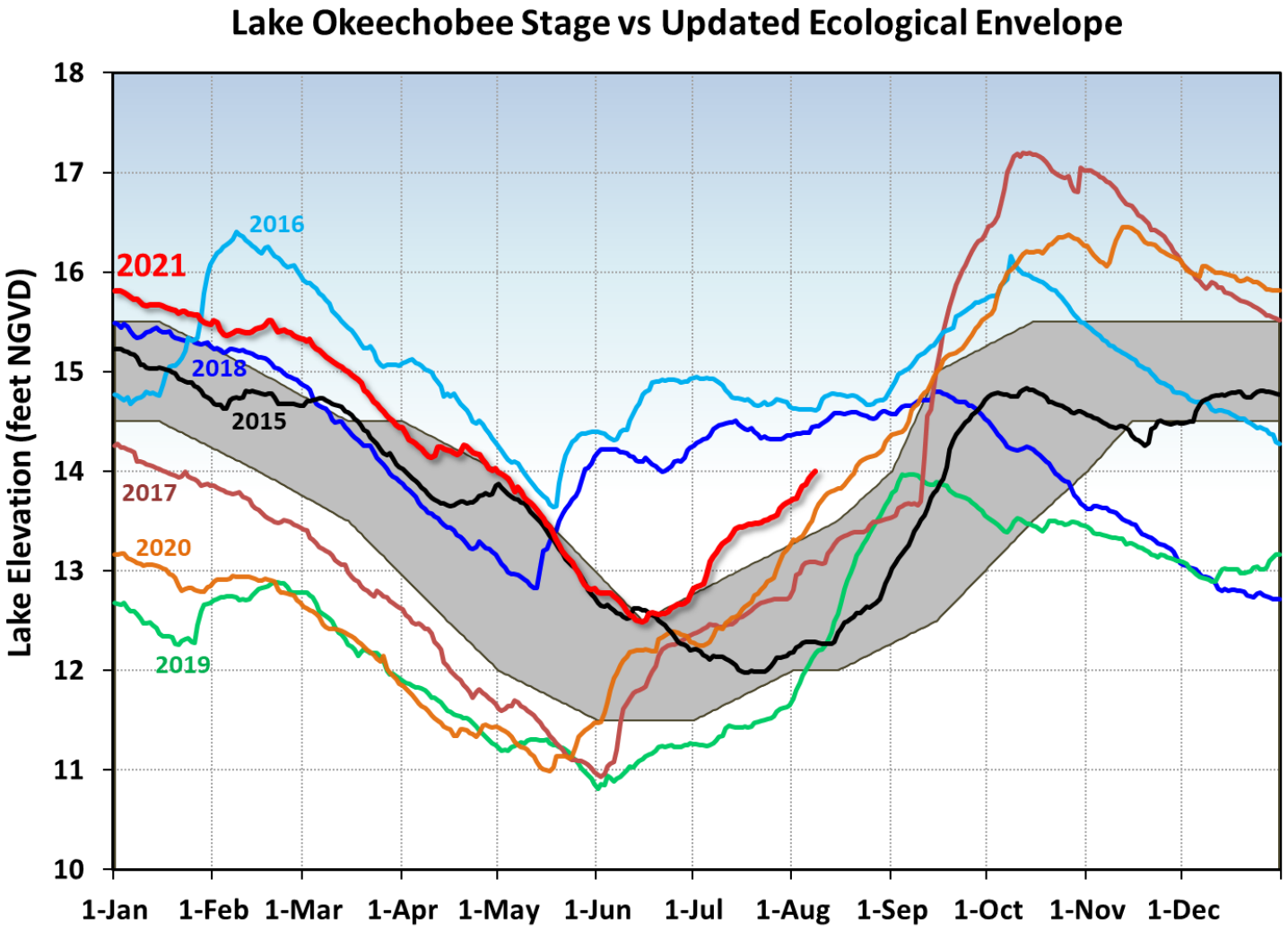


Figure LO-2. Select annual stage hydrographs for Lake Okeechobee in comparison to the updated ecological envelope.

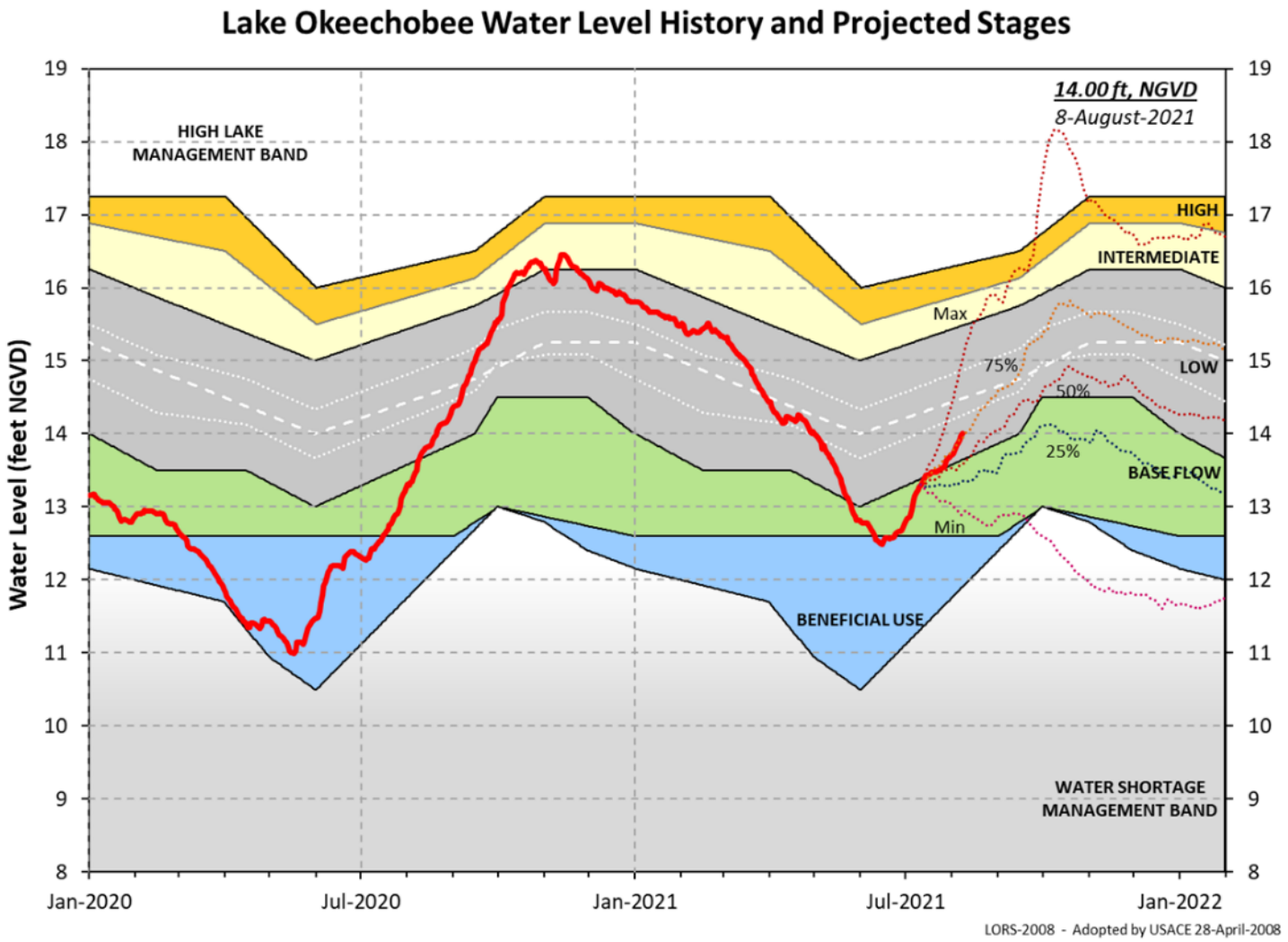


Figure LO-3. Recent Lake Okeechobee stages and releases, with projected stages based on a dynamic position analysis.

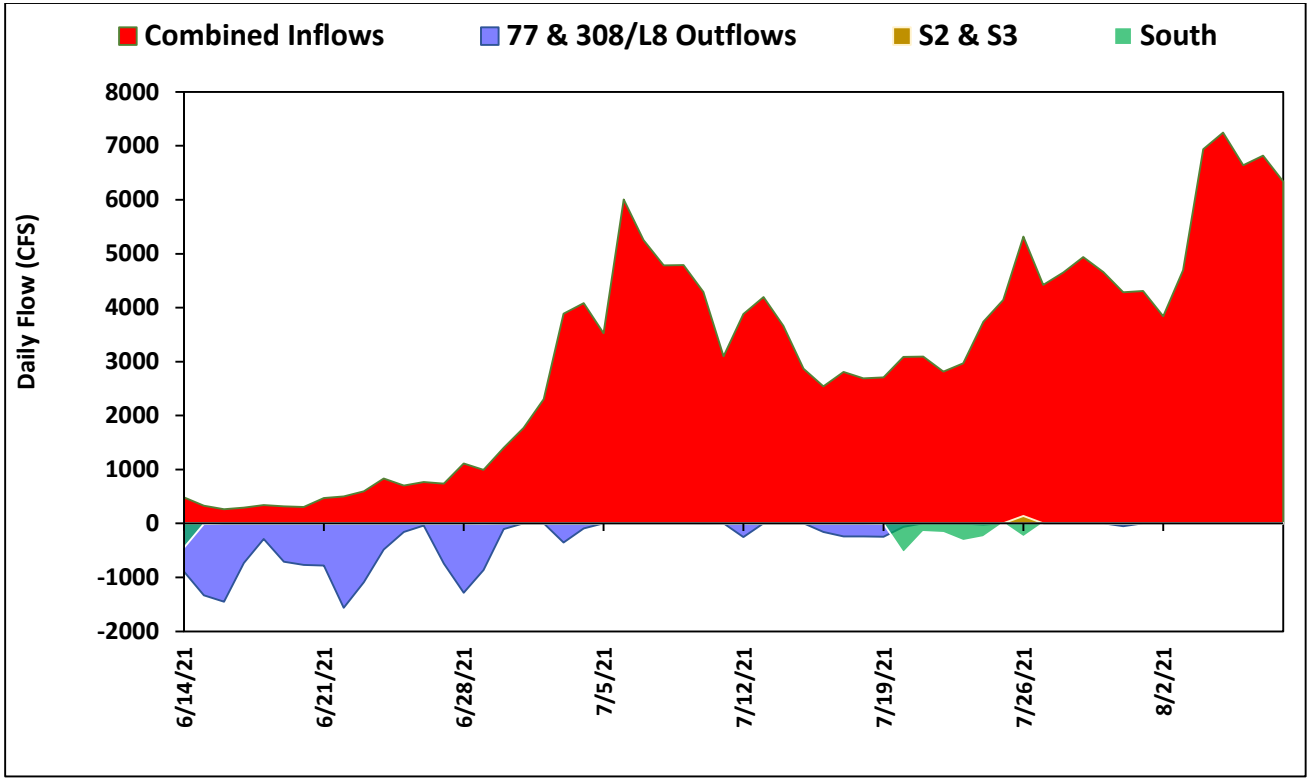


Figure LO-4. Major inflows (red) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) are included as inflows. Conversely, flows from Lake Okeechobee into the L-8 Canal are included 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 due to lock openings for navigation.

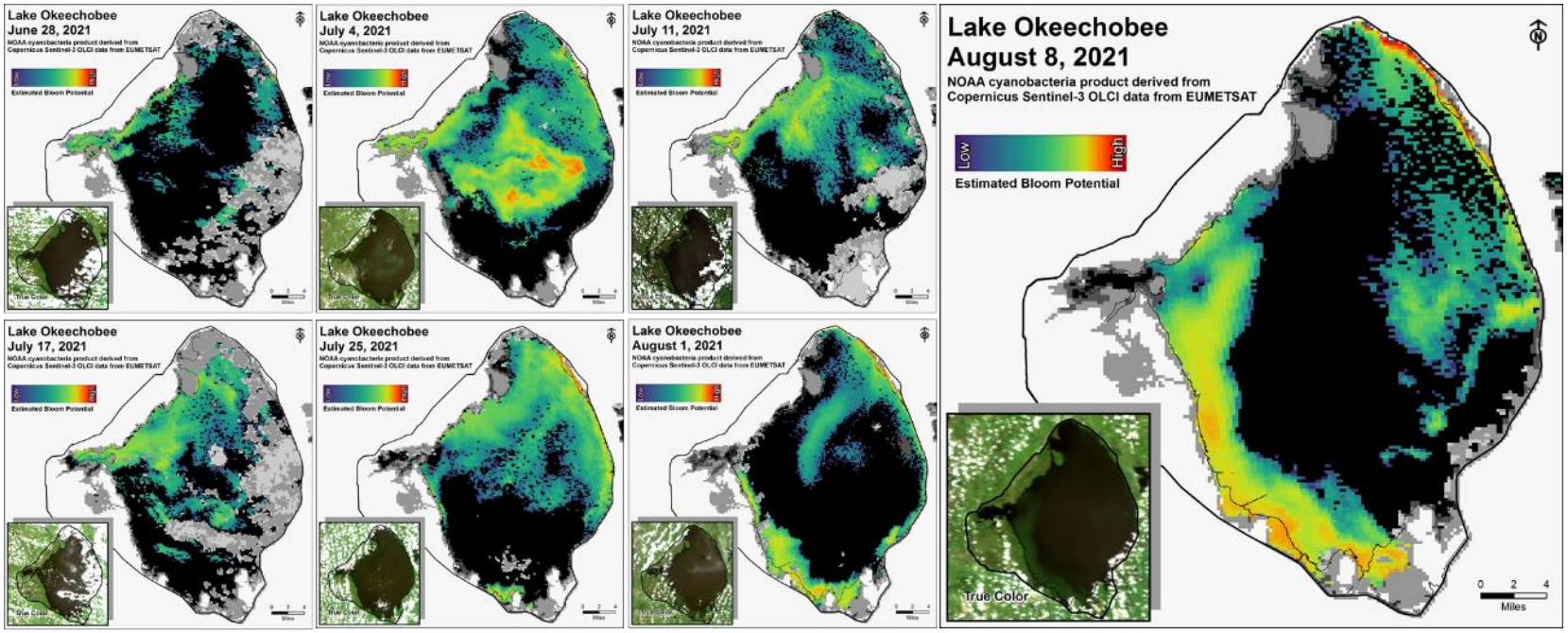


Figure LO-5. Cyanobacteria bloom potential based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover

Table LO-2. Provisional results of chlorophyll *a* concentrations and cyanobacteria taxa from sampling trips on August 2-4, 2021. Color coding generally follows the legend in **Figure LO-6**. Stations are in **bold** where sampling crews observed possible algal blooms and purple where toxin concentrations were above the EPA microcystin standard.

Collection Date: August 2-4, 2021

Station	CHLa (ug/L)	TOXIN (ug/L)	TAXA
FEBIN	P	BDL	*mixed*
FEBOUT	P	**0.3**	*Microcys*
KISSR0.0	P	BDL	*mixed*
L005	P	BDL	*mixed*
LZ2	P	BDL	*mixed*
KBARSE	P	BDL	*Microcys*
RITTAE2	P	BDL	*mixed*
PELBAY3	P	BDL	*Microcys*
POLE3S	P	BDL	*Dolichos*
LZ25A	P	BDL	*mixed*
PALMOUT	P	BDL	*mixed*
PALMOUT1	P	BDL	*Microcys*
PALMOUT2	P	BDL	*mixed*
PALMOUT3	P	BDL	*Microcys*
POLESOUT	P	BDL	*Microcys*
POLESOUT1	P	BDL	not analyzed
POLESOUT2	P	BDL	*mixed*
POLESOUT3	P	BDL	*Microcys*
EASTSHORE	P	**2.0**	*Microcys*
NES135	P	**13.0**	*Microcys*
NES191	P	**2.2**	*Microcys*

Station	CHLa (ug/L)	TOXIN (ug/L)	TAXA
L001	P	BDL	*mixed*
L004	P	**1.1**	*Microcys*
L006	P	BDL	*mixed*
L007	P	BDL	*mixed*
L008	P	BDL	*mixed*
LZ30	P	BDL	*mixed*
LZ40	P	BDL	*Microcys*
CLV10A	P	**0.4**	*Microcys*
NCENTER	P	BDL	*Microcys*
S308C	P	**0.6**	*Microcys*
S77	P	BDL	*mixed*

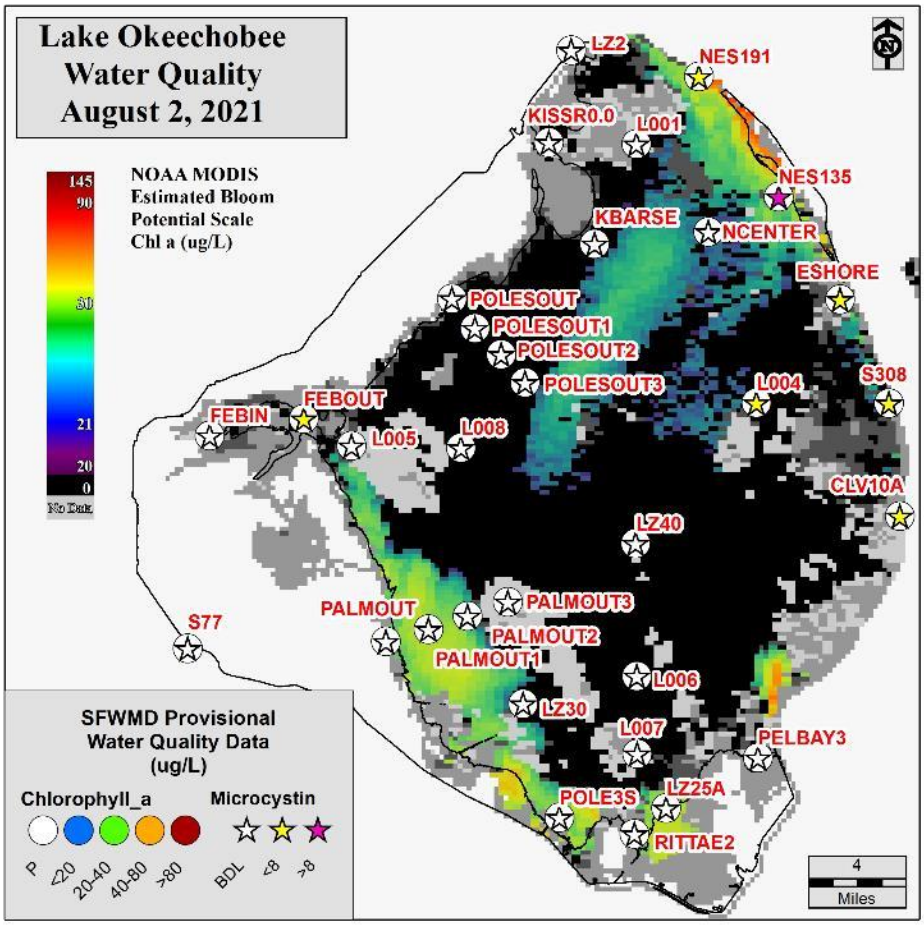


Figure LO-6. Expanded monitoring network and provisional results from samples collected August 2-4, 2021

Estuaries

St. Lucie Estuary

Over the past week, mean total inflow to the St. Lucie Estuary was approximately 2,432 cfs (**Figures ES-1** and **ES-2**) and the previous 30-day mean inflow was approximately 1,408 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-2**.

Over the past week, mean salinity decreased at all sites in 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 10.9. Salinity conditions in the middle estuary were estimated to be within the good 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 4,930 cfs (**Figures ES-5** and **ES-6**) and the previous 30-day mean inflow was approximately 4,490 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 Val I-75 and decreased 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 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 cfs with estimated tidal basin inflows of 1,010 cfs. Model results from all scenarios predict daily salinity to be 0.5 or lower 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 August 6, 2021, that *Karenia brevis*, the Florida red tide dinoflagellate, was observed at background to low concentrations in Charlotte County, and background to medium 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 Palm Beach or Broward counties.

Water Management Recommendations

Lake stage is in the Low Sub-Band. Tributary conditions are Very 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.

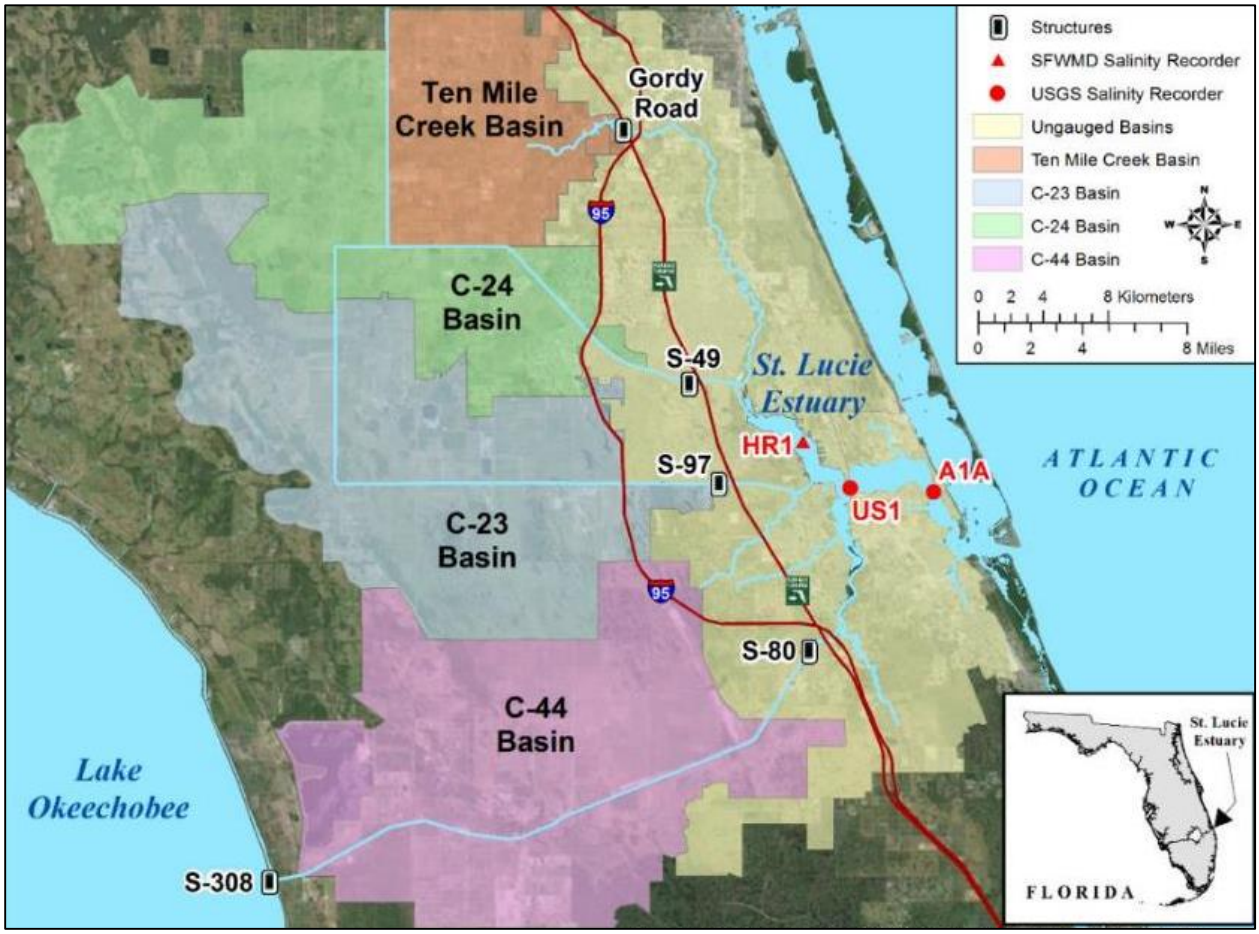


Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

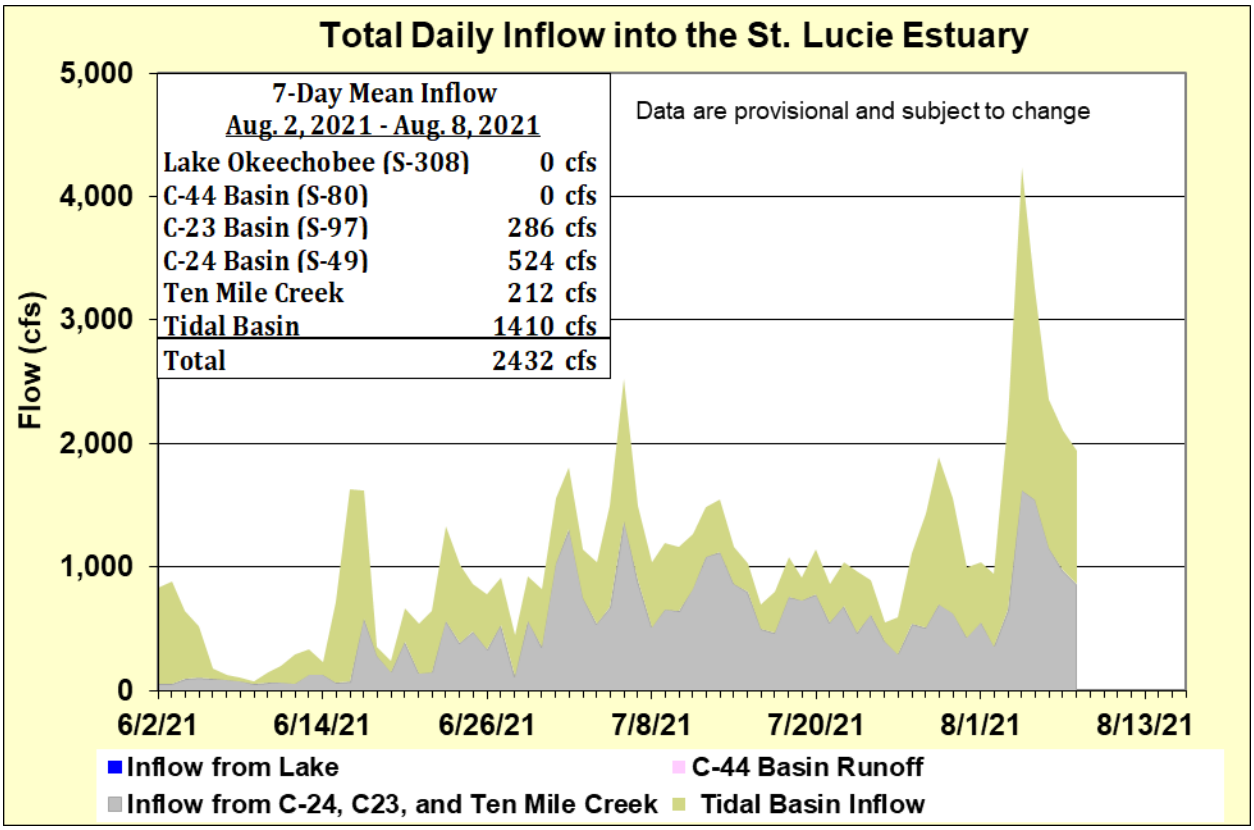


Figure ES-2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

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 (Nork Fork)	**3.1** (6.8)	**8.0** (12.6)	NA [a]
US1 Bridge	**9.5** (13.5)	**12.3** (16.1)	10.0 – 26.0
A1A Bridge	**17.2** (22.1)	**22.5** (25.4)	NA [a]

a. The envelope is not applicable.

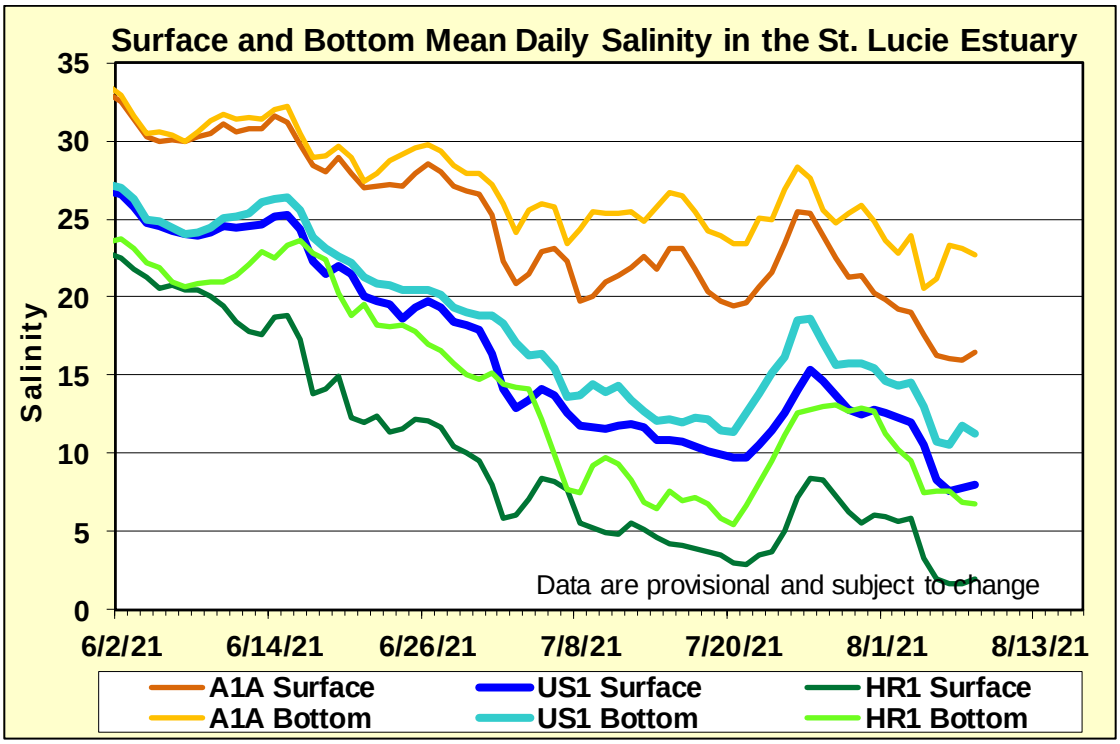


Figure ES-3. Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

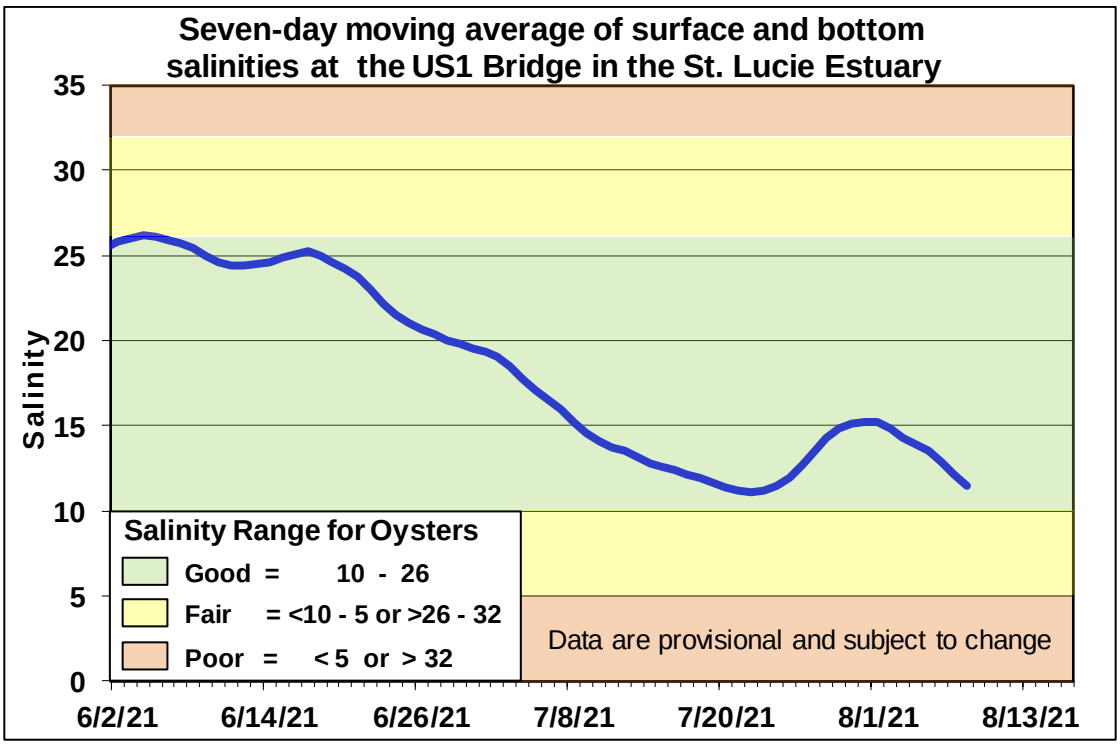


Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

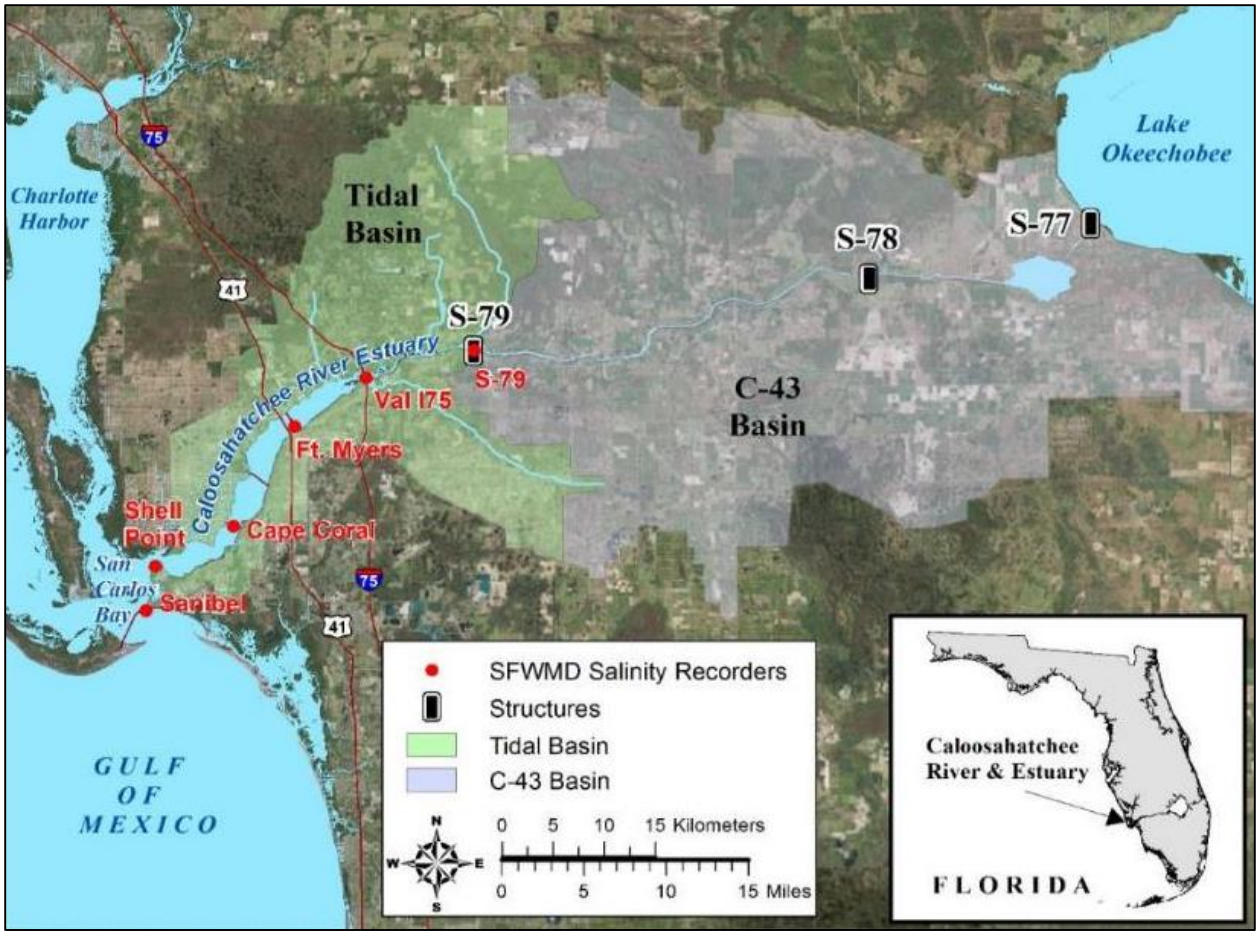


Figure ES-5. Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.

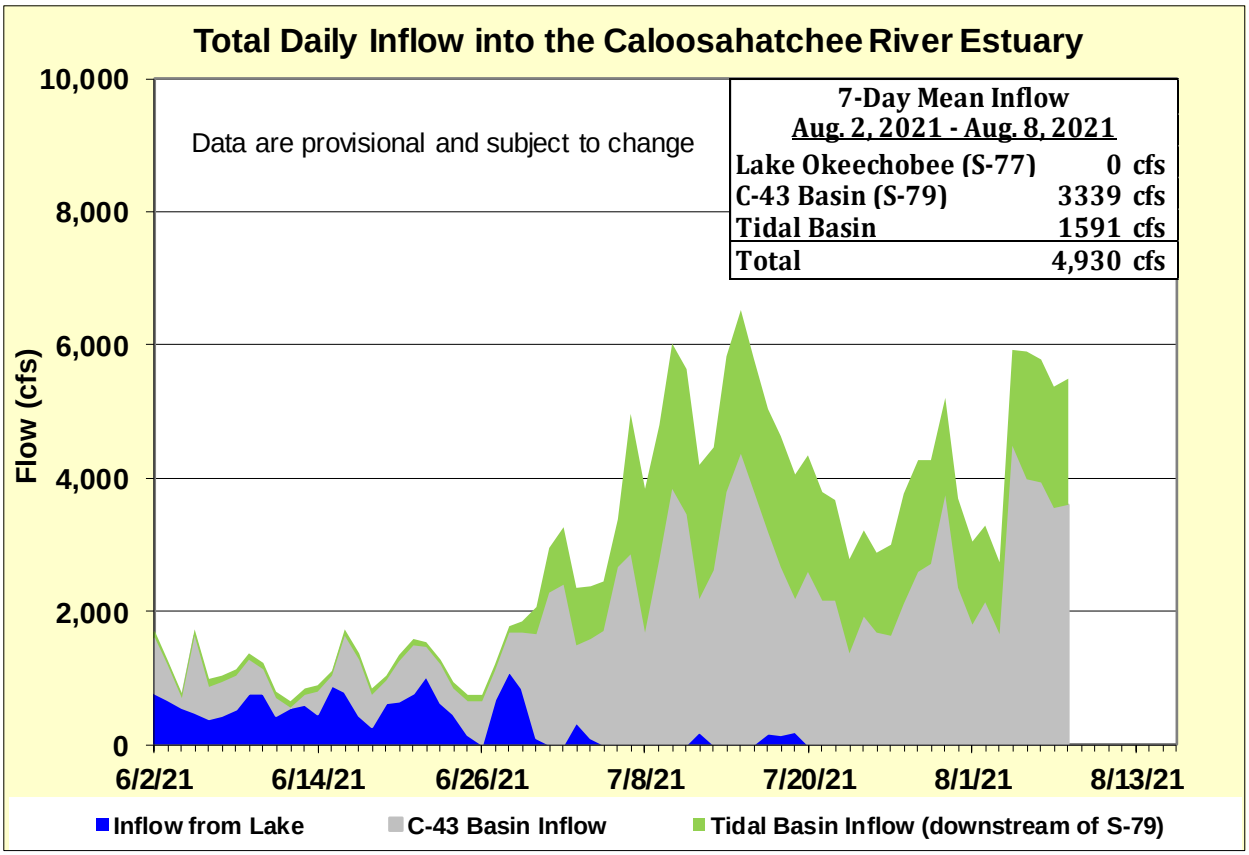


Figure ES-6. Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

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)	**0.2** (0.3)	NA [a]
Val I-75	**0.3** (0.3)	**0.3** (0.3)	0.0 – 5.0 [b]
Fort Myers Yacht Basin	**0.3** (0.5)	**0.4** (1.3)	NA [a]
Cape Coral	**3.4** (5.5)	**4.3** (7.2)	10.0 – 30.0
Shell Point	**17.7** (18.7)	**19.4** (19.6)	10.0 – 30.0
Sanibel	**25.4** (25.7)	**27.1** (28.8)	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.

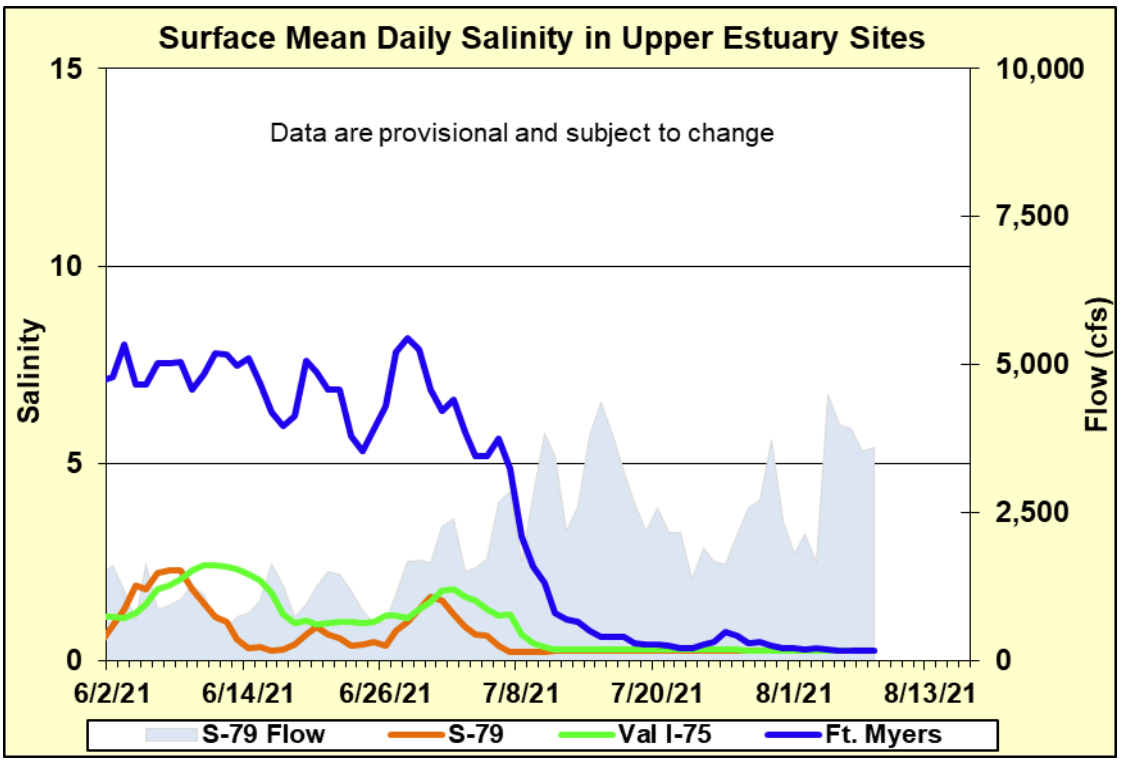


Figure ES-7. Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

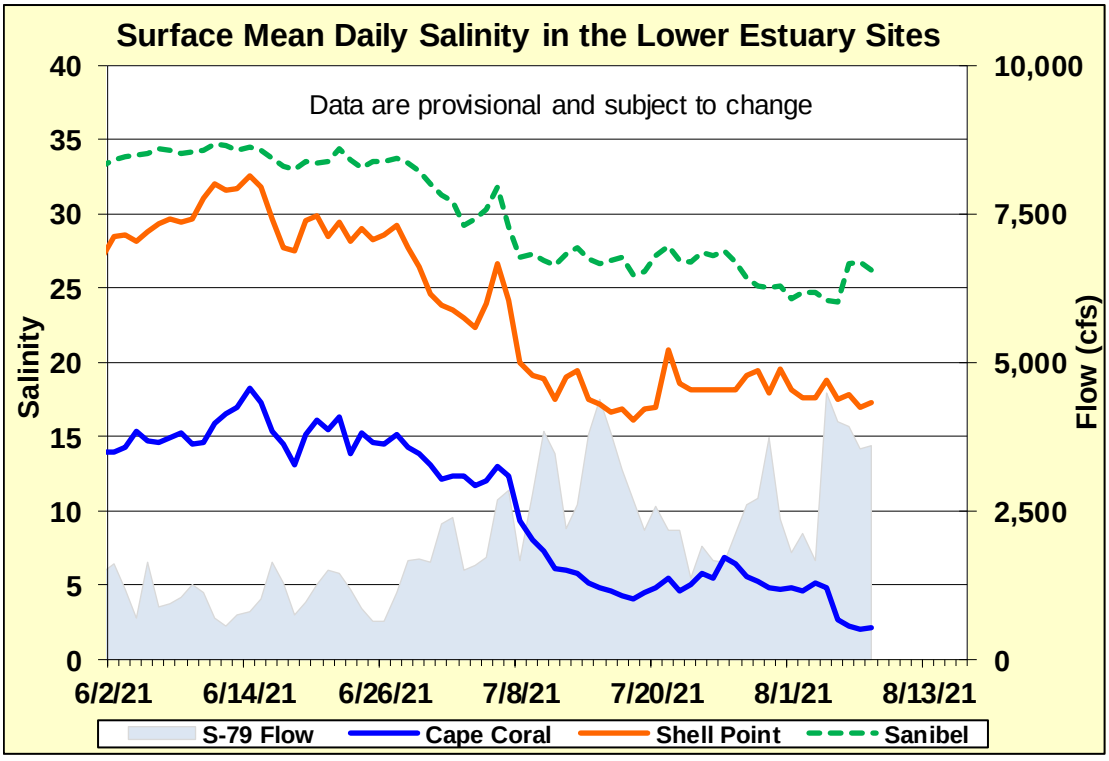


Figure ES-8. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

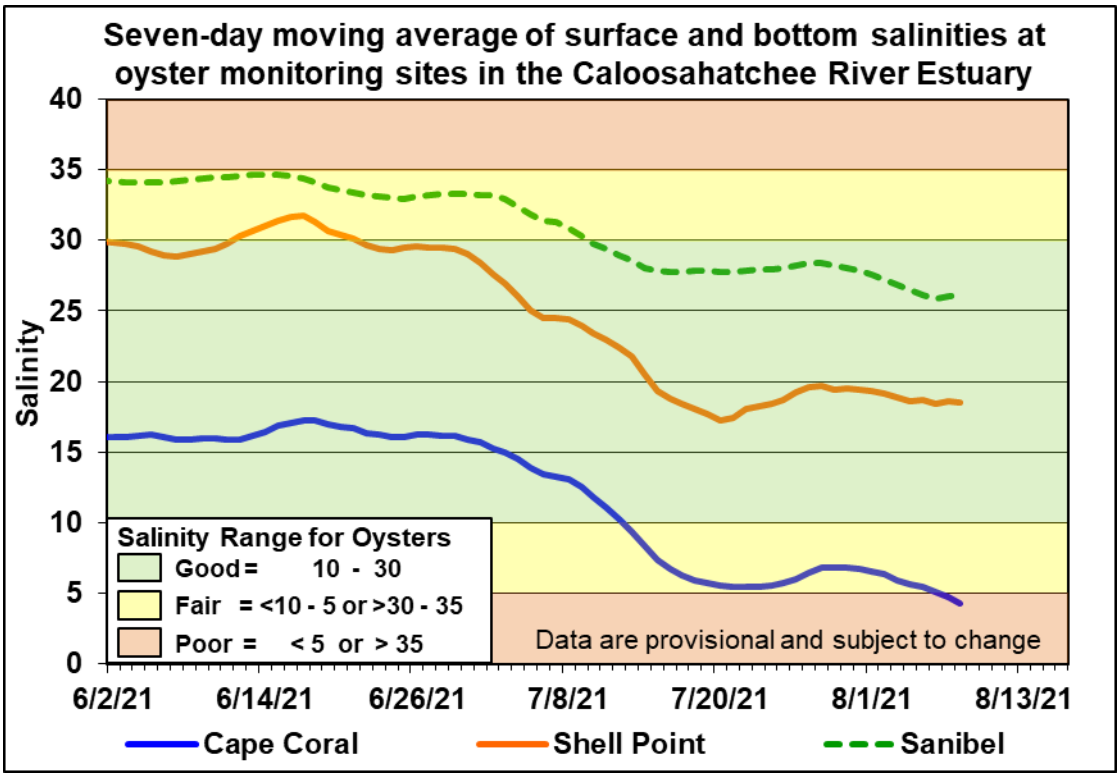


Figure ES-9. Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

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	1010	0.5	0.3
B	450	1010	0.3	0.3
C	800	1010	0.3	0.3
D	1000	1010	0.3	0.3
E	1500	1010	0.3	0.3
F	2000	1010	0.3	0.3

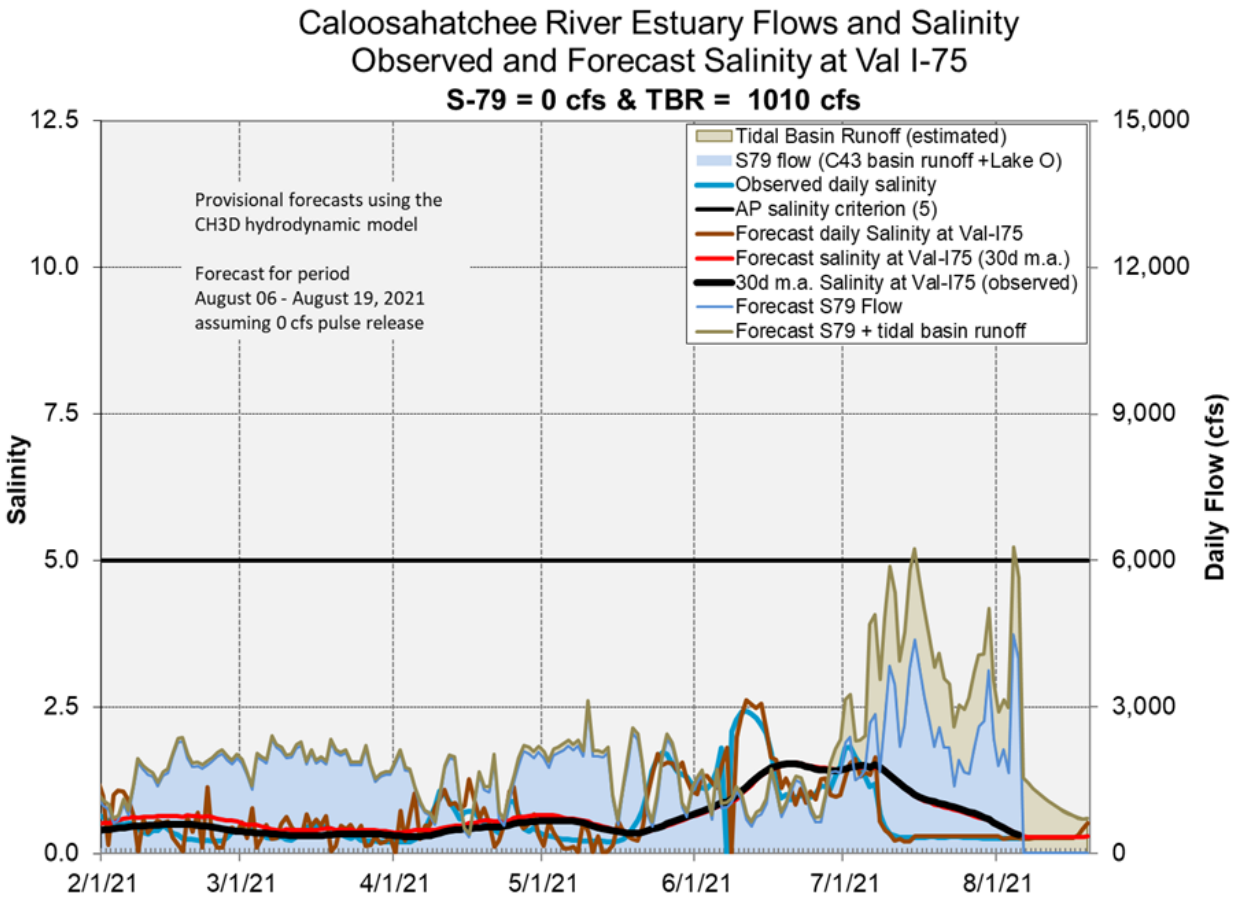


Figure ES-10. Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

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. Most treatment cells are 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 at or 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 PLR for Flow-ways 1 and 3 is high and for Flow-way 2 is very high (**Figure S-3).**

STA-3/4: STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown. 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 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. Most treatment cells are at or above target stage. The 365-day PLRs for most flow-ways are near 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.

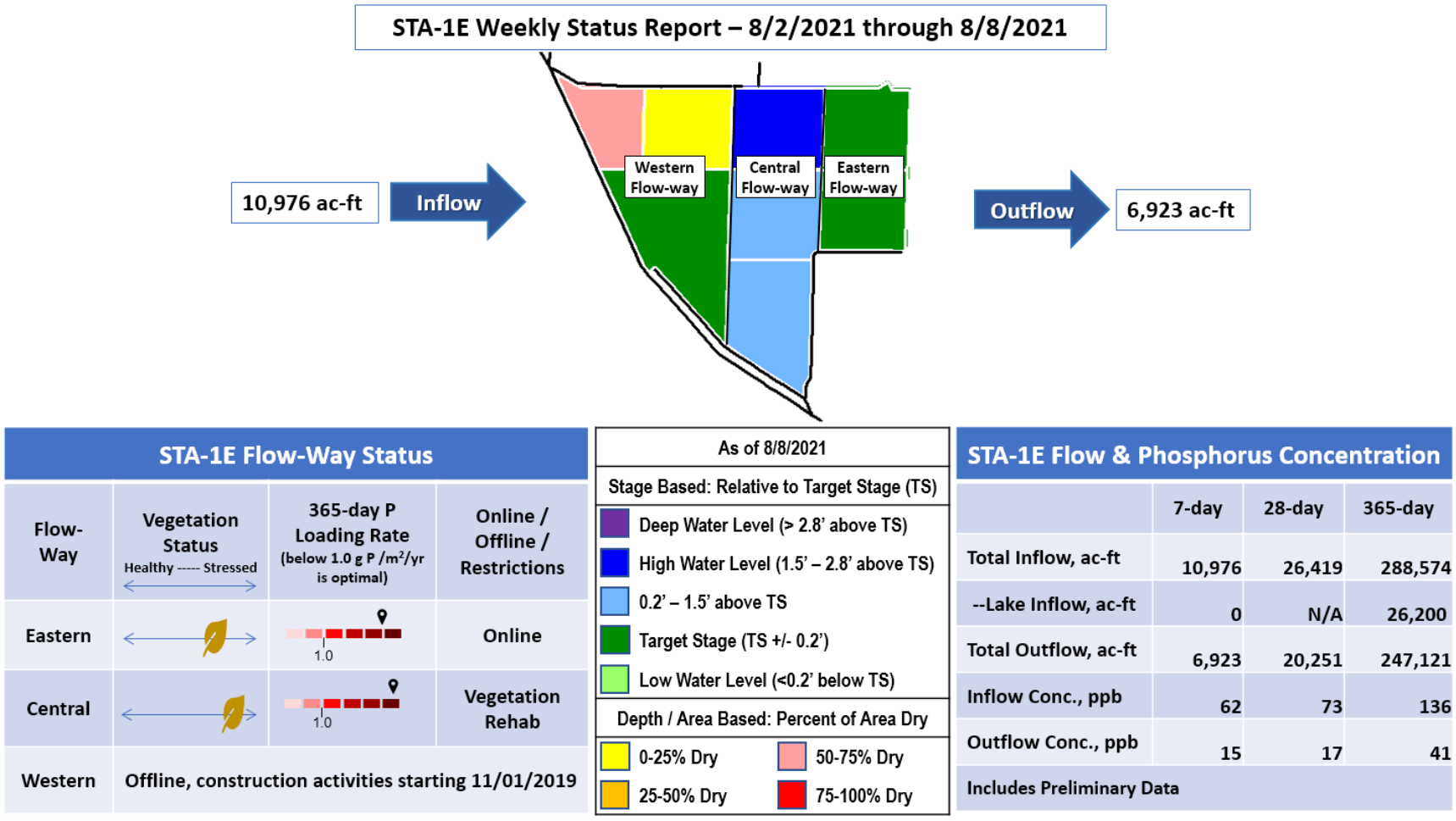


Figure S-1. STA-1E Weekly Status Report

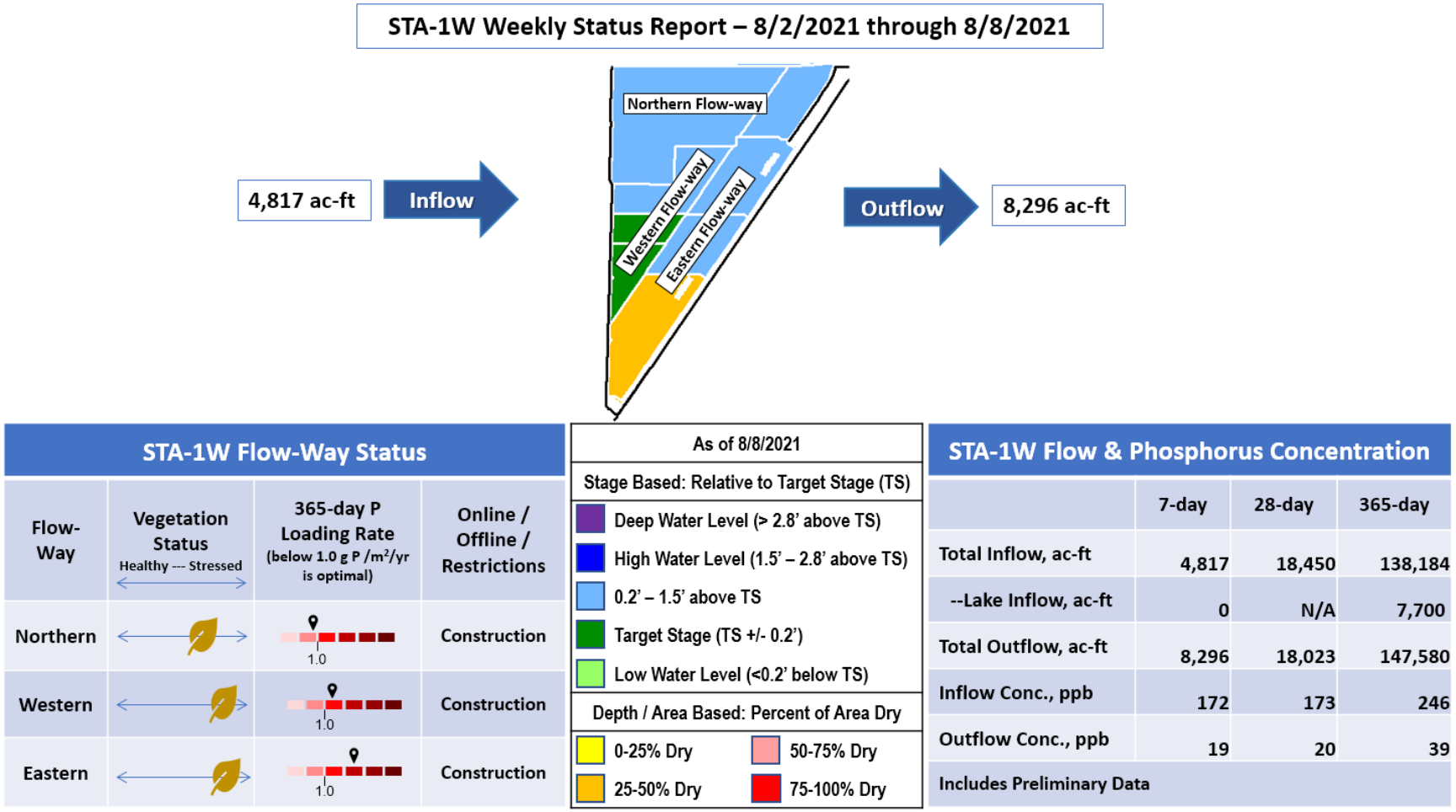
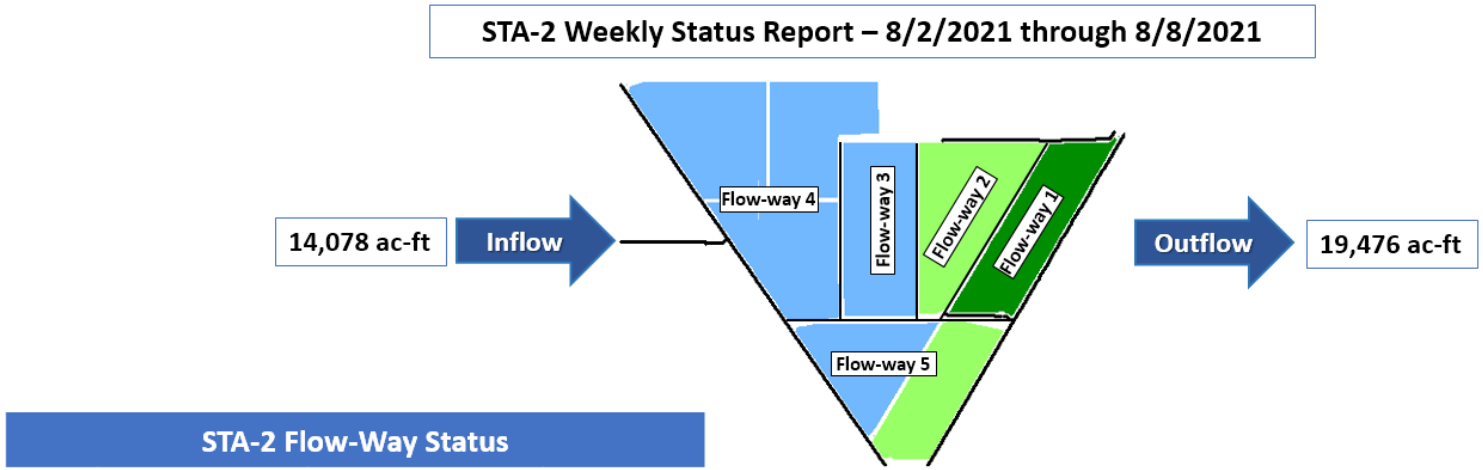


Figure S-2. STA-1W Weekly Status Report



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

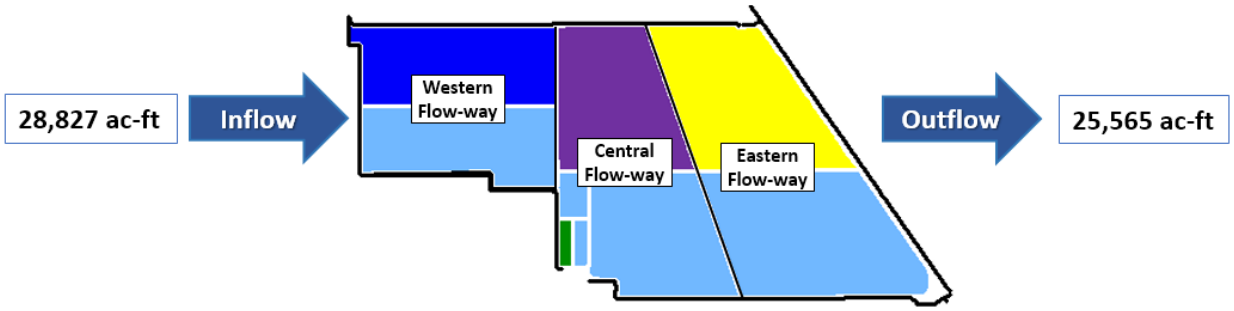
As of 8/8/2021	
Stage Based: Relative to Target Stage (TS)	
Deep Water Level (> 2.8' above TS)	
High Water Level (1.5' – 2.8' above TS)	
0.2' – 1.5' above TS	
Target Stage (TS +/- 0.2')	
Low Water Level (<0.2' below TS)	
Depth / Area Based: Percent of Area Dry	
0-25% Dry	50-75% Dry
25-50% Dry	75-100% Dry

STA-2 Flow & Phosphorus Concentration

	7-day	28-day	365-day
Total Inflow, ac-ft	14,078	37,312	424,009
--Lake Inflow, ac-ft	0	N/A	90,800
Total Outflow, ac-ft	19,476	48,486	467,909
Inflow Conc., ppb	132	102	93
Outflow Conc., ppb	15	15	20
Includes Preliminary Data			

Figure S-3. STA-2 Weekly Status Report

STA-3/4 Weekly Status Report – 8/2/2021 through 8/8/2021



STA-3/4 Flow-Way Status

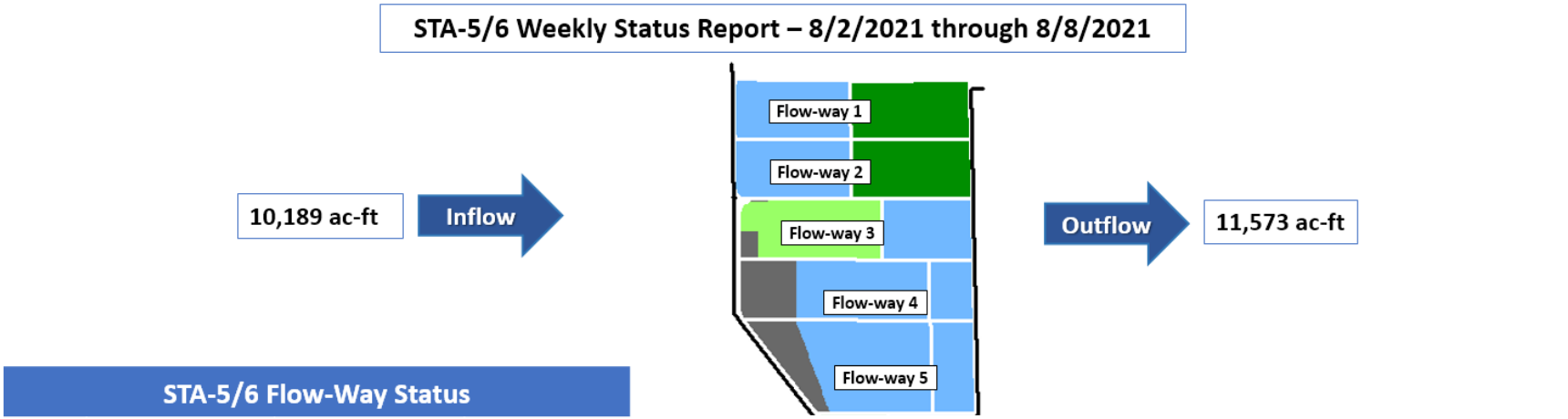
Flow-Way	Vegetation Status (Healthy ------ Stressed)	365-day P Loading Rate (below 1.0 g P /m²/yr is optimal)	Online / Offline / Restrictions
Eastern	Offline, vegetation management drawdown as of 3/1/2021		
Central		1.0	Online
Western		1.0	Online

As of 8/8/2021	
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	28,827	69,942	533,462
--Lake Inflow, ac-ft	0	N/A	61,600
Total Outflow, ac-ft	25,565	62,673	494,539
Inflow Conc., ppb	67	60	62
Outflow Conc., ppb	14	14	14
Includes Preliminary Data			

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



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

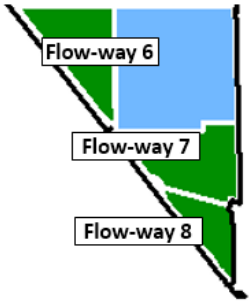
As of 8/8/2021	
Stage Based: Relative to Target Stage (TS)	
Deep Water Level (> 2.8' above TS)	
High Water Level (1.5' – 2.8' above TS)	
0.2' – 1.5' above TS	
Target Stage (TS +/- 0.2')	
Low Water Level (<0.2' below TS)	
Depth / Area Based: Percent of Area Dry	
0-25% Dry	50-75% Dry
25-50% Dry	75-100% Dry

STA-5/6 Flow & Phosphorus Concentration

	7-day	28-day	365-day
Total Inflow, ac-ft	10,189	27,236	129,637
--Lake Inflow, ac-ft	0	N/A	9,000
Total Outflow, ac-ft	11,573	18,531	146,012
Inflow Conc., ppb	246	231	280
Outflow Conc., ppb	37	36	72
Includes Preliminary Data			

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

STA-5/6 Weekly Status Report – 8/2/2021 through 8/8/2021



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		1.0	Online
7		1.0	Online
8		1.0	Online

As of 8/8/2021	
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 trended slightly faster than schedule last week and remains above the 3 Gauge average. Stage on Sunday was 0.41 feet above the Zone A1 regulation line. WCA-2A: Stage at 2A-17 stable the previous week, rose in parallel with the regulation line last week, averaging 0.66 feet higher on Sunday. WCA-3A: The Three Gauge Average continues to trend upwards faster than the slope of the Zone A regulation line last week. Stage ended the week at 0.33 feet below the Zone A line. WCA-3A: Stage change at gauge 62 (Northwest corner) rose sharply last week. The Sunday average was 0.20 feet below the rising Upper Schedule. (**Figures EV-1 through EV-4**).

Water Depths

The WDAT tool indicates that water levels rose significantly across the WCAs over the last two months. Northeastern WCA-3A is recovering with surface water present but still drier than the surrounding regions. While downstream in the upper reaches of the L-67 depths have exceeded 2.5 feet. North to South hydrologic connectivity weakened within Everglades National Park (ENP). Portions of eastern ENP and southern Big Cypress National Preserve (BCNP) remain dry or have water levels just at the ground surface. (**Figure EV-5**). Over the last month stages generally increased in most places but not significantly (more than 0.5 feet). The largest increases occurred downstream of the S-11s in WCA-3A and in northwestern BCNP. Compared to a year ago, WCA-3A is significantly drier than one year ago, especially in the east. Eastern ENP continues to be drier than a year ago. (**Figure EV-6**). Compared to the 20 year average water depths, much of the Everglades remains dryer than average with the exception of northeastern ENP, WCA-1, and western Big Cypress. Large areas of WCA-3A, ENP and eastern BCNP remain below average. (**Figure EV-7**).

Taylor Slough and Florida BayAn average of 1.23 inches of rain fell over Taylor Slough and Florida Bay over the week ending Sunday (8/8) with the largest volumes over the central Taylor Slough again (**Figure EV-7**). Stage increased by an average of 0.08 feet over the week (**Figure EV-8**) as a result of the rainfall and is at the regional historical average for this time of year. Sustained westward water movements into Taylor Slough have not occurred yet this wet season since water has not been consistently available. No phosphorus measurement was available for S-328 last week, but the phosphorus level should be less than 8 µg/L threshold before water movements towards Everglades National Park from that structure begin.

Salinities in Florida Bay averaged a decrease of less than 1 for the week ending 8/8, but individual stations had weekly changes ranging from −5.3 to +2.0 (**Figure EV-7**). The largest decreases are still in the northeast nearshore areas where positive trickle flows occurred over 4 of the 7 days last week. Salinities are 4 higher than the historical average bay-wide. Freshwater deliveries will still be needed to freshen the nearshore area. We are quickly reaching the time of year where the lowest salinities are expected, but salinities have not been decreasing (**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. An equal distribution of inflows across the northern perimeter of WCA-3A continue to have an ecological benefit. Rehydration of northern Taylor Slough has begun slowly and the most western structures (S-328 and G-737) continue to have phosphorus levels above 8 ppb. These structures should not be opened until the phosphorus levels return to below that criteria at these locations. 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	2.85	+0.33
WCA-2A	2.99	+0.36
WCA-2B	2.86	+0.19
WCA-3A	1.94	+0.26
WCA-3B	1.74	+0.09
ENP	2.01	+0.11

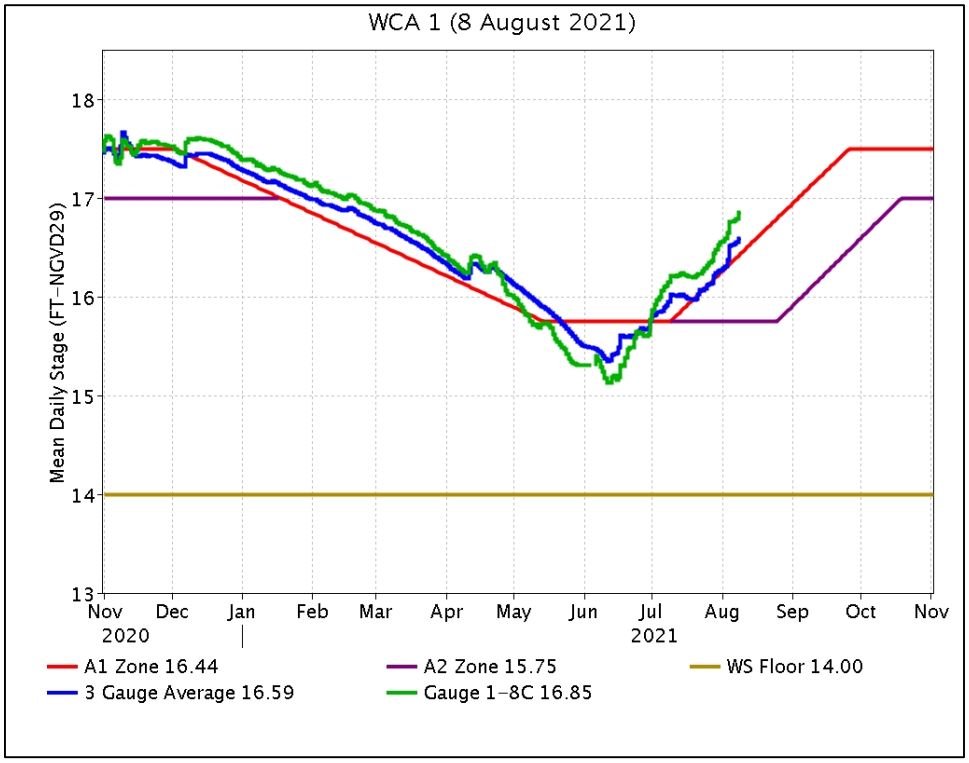


Figure EV-1. WCA-1 stage hydrographs and regulation schedule.

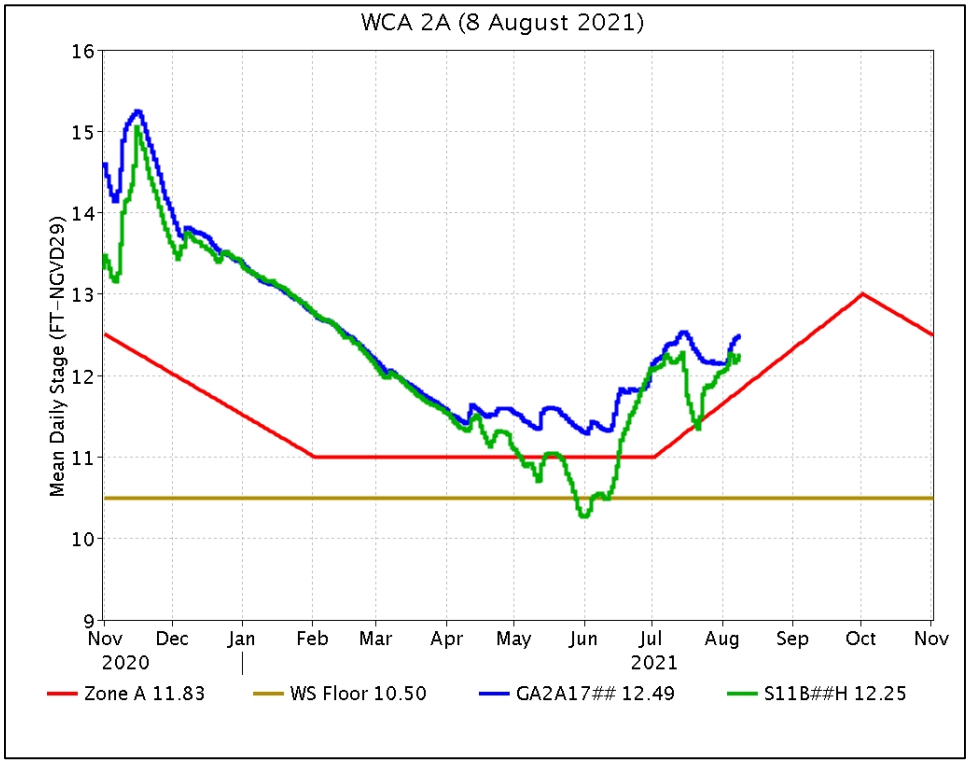


Figure EV-2. WCA-2A stage hydrographs and regulation schedule.

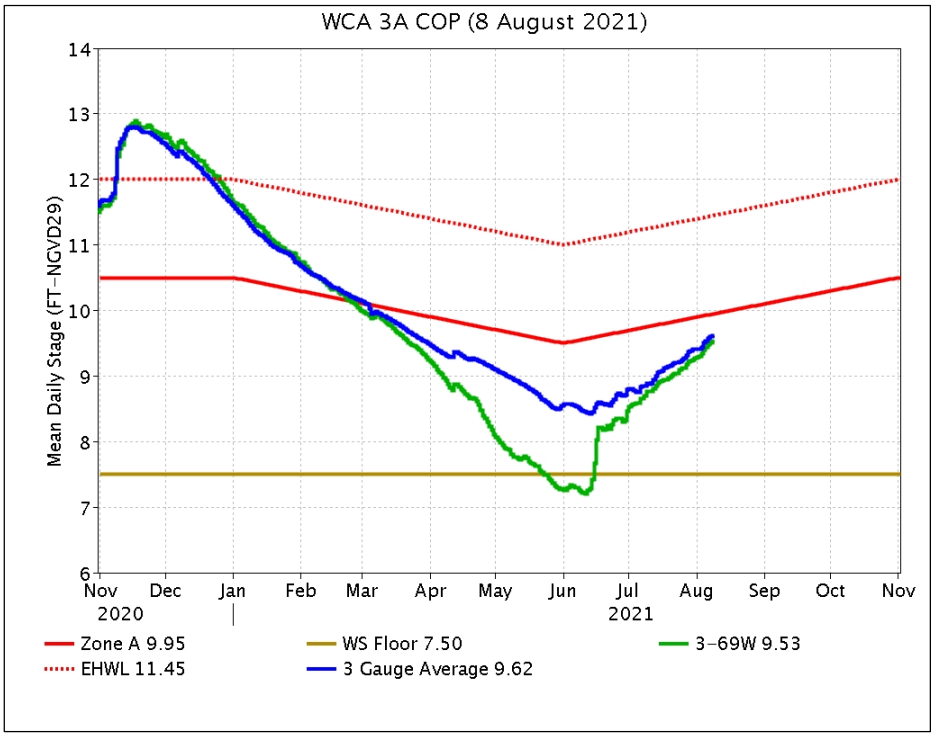


Figure EV-3. WCA-3A stage hydrographs (three-gauge average, S-333 headwater) and regulation schedule.

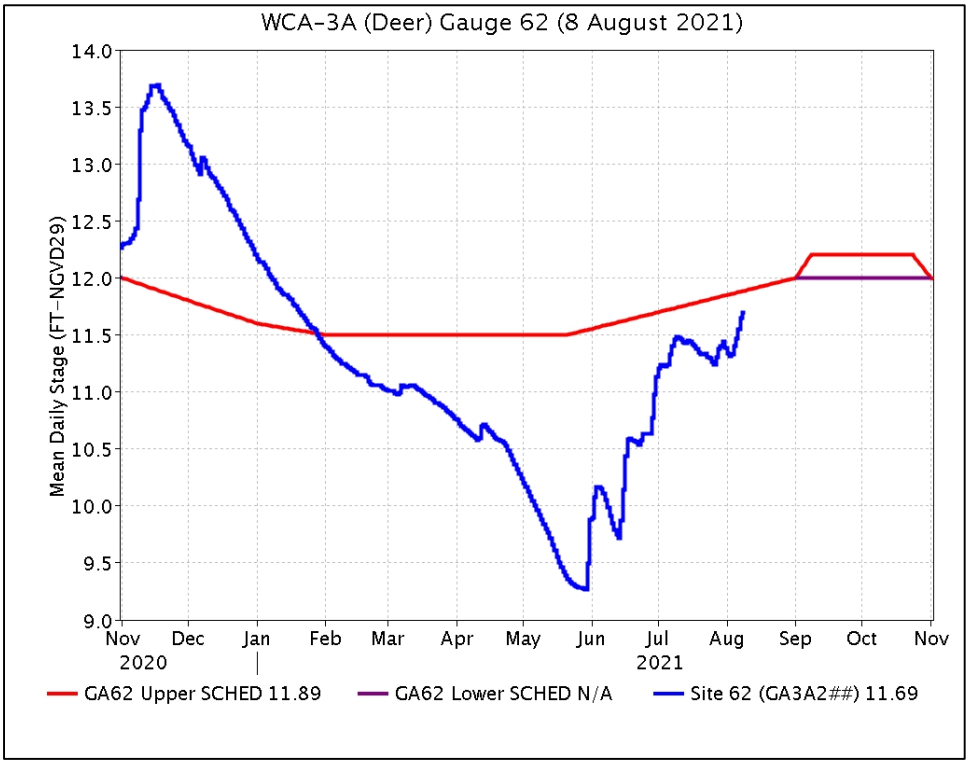


Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.

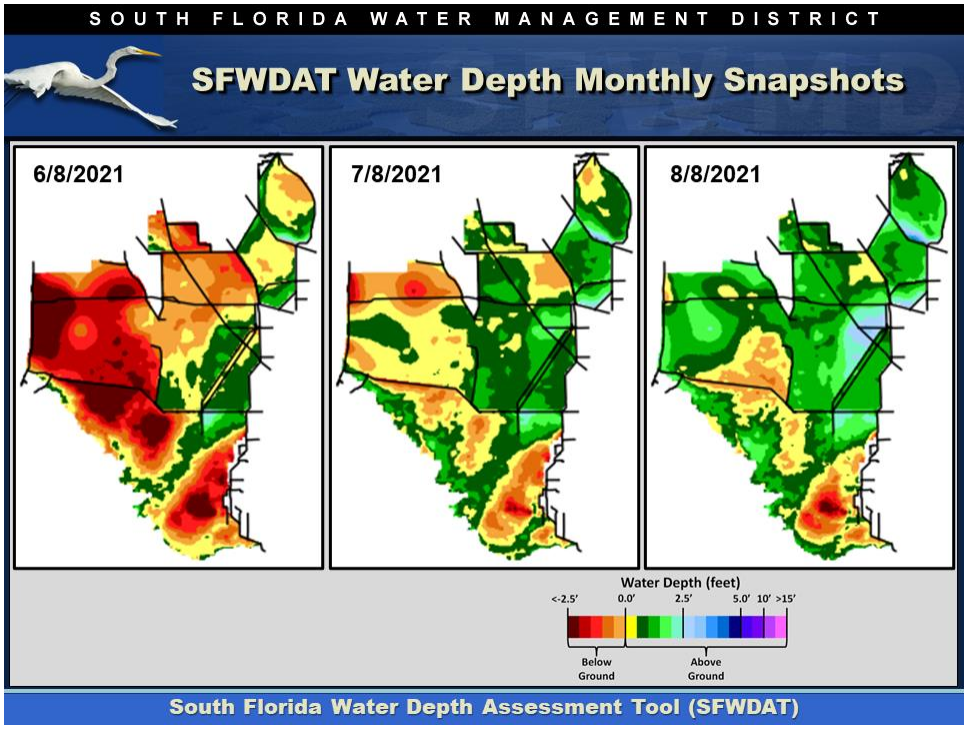


Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

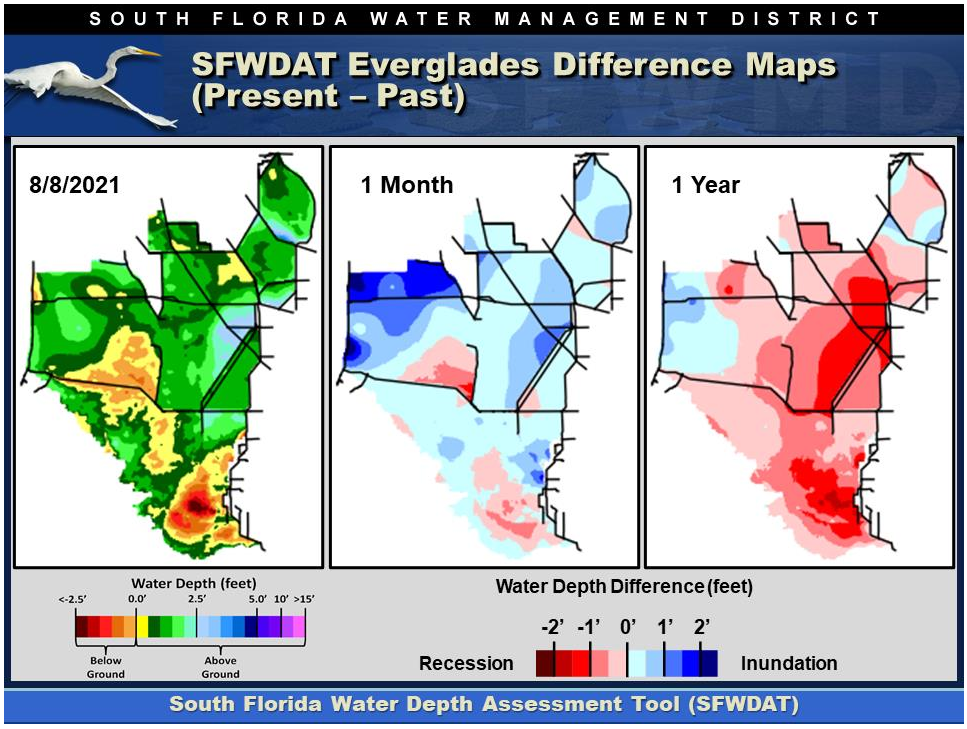


Figure EV-6. Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

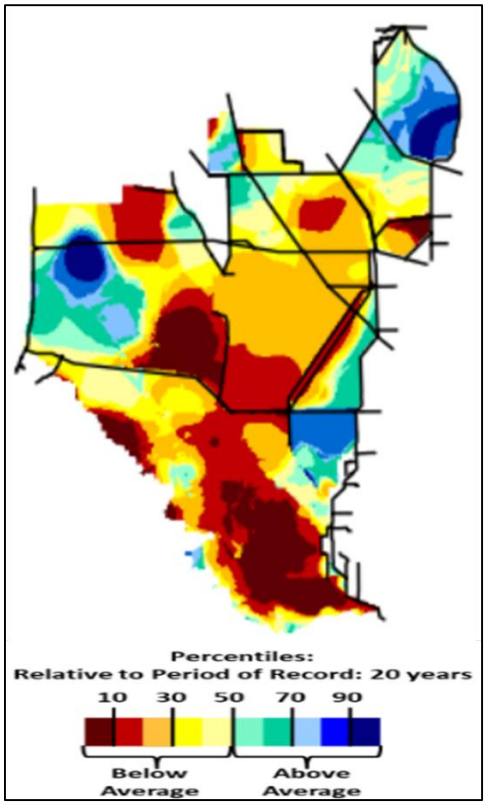


Figure EV-7. Present water depths compared to the day of year average over the previous 20 years.

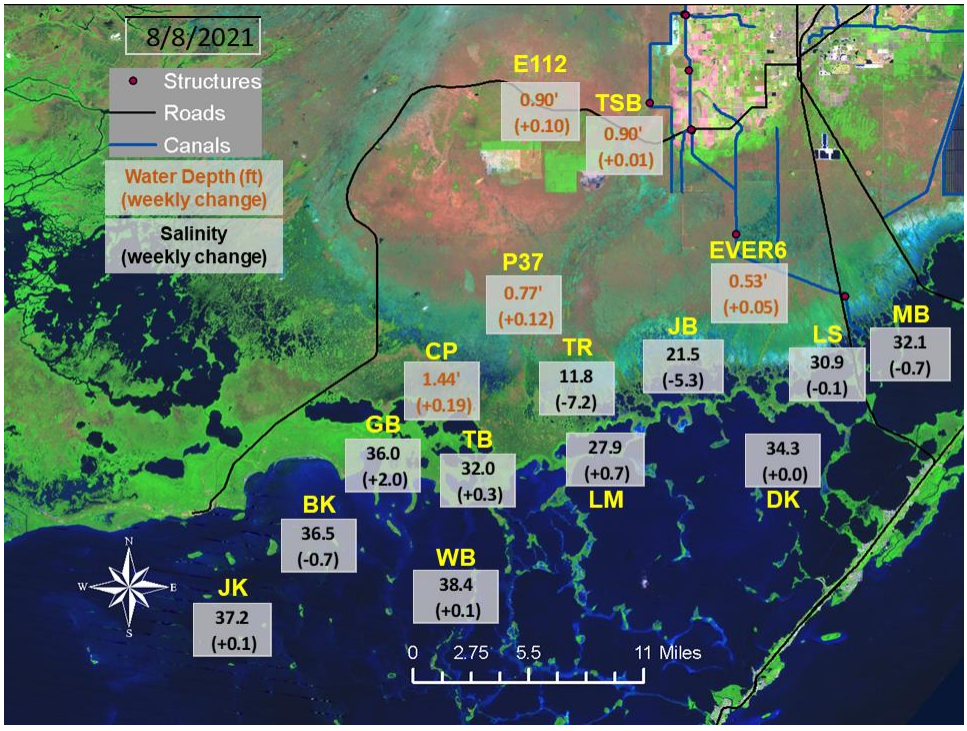


Figure EV-8. Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

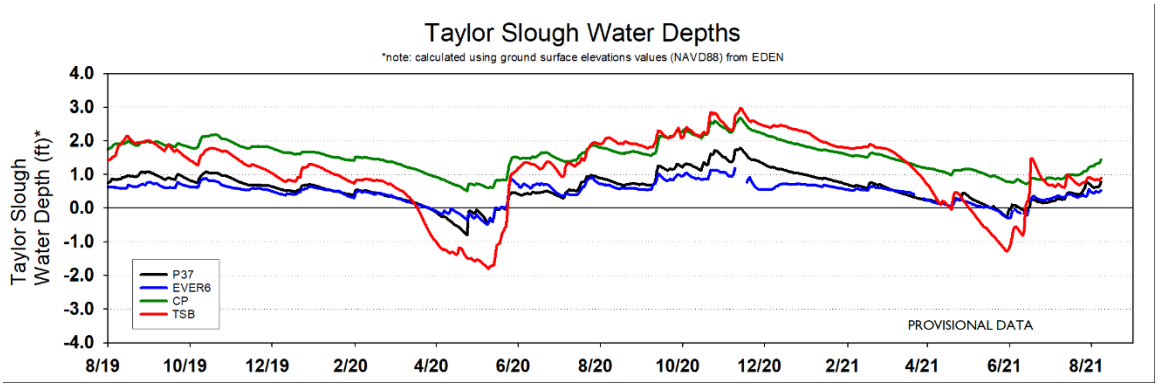


Figure EV-9. Taylor Slough water depth time series.

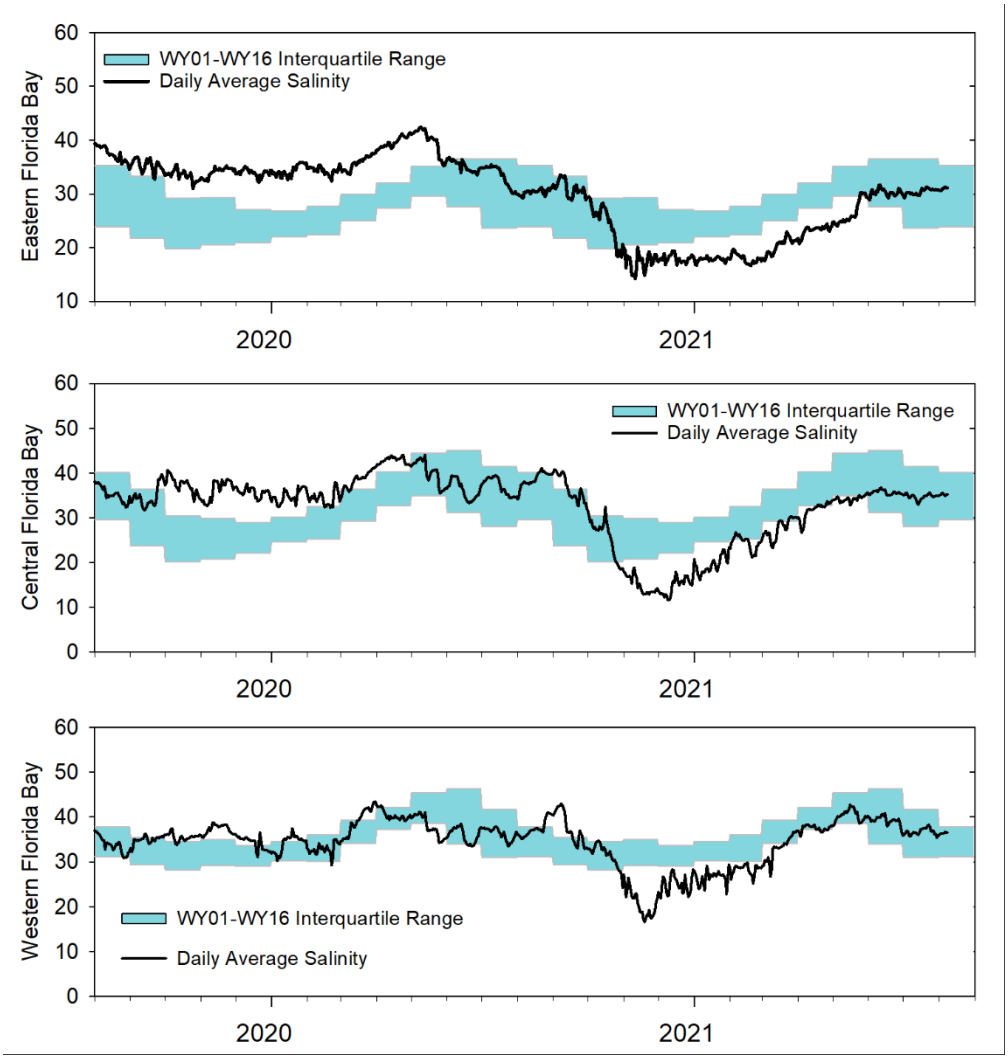


Figure EV-10. Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

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

SFWMD Everglades Ecological Recommendations, August 10th, 2021 (red is new)			
Area	Weekly change	Recommendation	Reasons
WCA-1	Stage increased by 0.33'	Moderate ascension rates to less than 0.50 feet per two weeks.	Protect within basin and downstream habitat and wildlife.
WCA-2A	Stage increased by 0.36'	Moderate ascension rates to less than 0.50 feet per two weeks.	Protect within basin and downstream habitat and wildlife.
WCA-2B	Stage increased by 0.19'	Maintain an ascension rate to between 0.01 and 0.25 feet per week.	Protect within basin and downstream habitat and wildlife.
WCA-3A NE	Stage increased by 0.16'	Maintain ascension rates between 0.01 and 0.25 feet per week.	Protect within basin and downstream habitat and wildlife.
WCA-3A NW	Stage decreased by 0.40	Moderate ascension rates to less than 0.50 feet per two weeks.	
Central WCA-3A S	Stage increased by 0.23'	Maintain ascension rates between 0.01 and 0.25 feet per week.	Protect within basin and downstream habitat and wildlife.
Southern WCA-3A S	Stage increased by 0.24'		
WCA-3B	Stage increased by 0.09'	Maintain ascension rates between 0.01 and 0.25 feet per week.	Protect within basin and downstream habitat and wildlife.
ENP-SRS	Stage increased by 0.11'	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 +0.19'	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged −5.3 to +2.0	Move water southward as possible.	When available, provide freshwater to maintain low salinity buffer and promote water movement.