

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 1, 2021

**SUBJECT:** Weekly Environmental Conditions for Systems Operations

### **Summary**

#### **Weather Conditions and Forecast**

On Wednesday, a mid- to upper-level trough is forecast to develop over the eastern U.S. in association with Hurricane Ida, with Ida's long tail of moisture likely to swing into north/central Florida early in the day. The enhancing effect of the trough and the high levels of moisture in Ida's outer band are expected to enhance rains north and west of Lake Okeechobee, while the southeastern part of the District remains essentially dry. The fast movement of the rains north of the Lake should generally limit local maxima. An upper-air trough forming in the eastern U.S. will sink southward across Florida by late Friday or Saturday. Large-scale ascent ahead of the trough and high levels of available moisture should provide for a good or widespread coverage of rain across the District Thursday and Friday. However, instability levels are a bit uncertain. Any increase of instability could make both days even wetter than currently forecast and cause total rainfall to result above the daily climatological average. Over the weekend, as the trough axis sinks southward, a drying is likely to commence north of Lake Okeechobee, while areas south and east of Lake Okeechobee continue to see some rainfall. Another upper-air trough pushing through the Great Lakes could induce a weak trough of low pressure near and west of Florida early next week. While this could result in some increase of rains, there is a large uncertainty regarding exactly how this weather pattern would unfold. As a result, the quantitative precipitation forecast (QPF) is rated with lower confidence than normal for the extended-range part of the forecast. For the week ending next Tuesday morning, total District rainfall most likely will result below the long-term average for the first week of September. There's a strong signal for the week 2 period (*7-13 September*) to feature below or much below normal rainfall.

#### **Kissimmee**

Flow at S-65A continues to be too low for complete inundation of the Kissimmee River floodplain, but mean floodplain depth increased to 1.10 feet by August 29, 2021. Dissolved oxygen concentration in the Kissimmee River slightly increased to an average of 0.6 mg/L for the week; but still below the 1.0 mg/L threshold considered potentially lethal for sportfish.

## **Lake Okeechobee**

Lake Okeechobee stage was 14.66 feet NGVD on August 29, 2021, 0.98 feet higher than a month ago, and 0.44 feet higher than one year ago. Lake stages were above the ecological envelope from August 1, 2020 to March 30, 2021, and near or within the upper threshold of the envelope until mid-June. Lake stages have been above the ecological envelope since early-July and are 0.75 foot above. Recent satellite imagery (August 30, 2021) shows a medium to high bloom potential in the western and central-west parts of the Lake, and low bloom potential in the south-eastern region.

## **Estuaries**

Total inflow to the St. Lucie Estuary averaged approximately 2,179 cfs over the past week with no flow coming from Lake Okeechobee. Mean surface salinities increased at all sites in the estuary over the past week. Salinity at the US1 Bridge was in the fair range (10-26) for adult eastern oysters. Total inflow to the Caloosahatchee Estuary averaged 2,675 cfs over the past week with no flow coming from the Lake. Mean surface salinities remained the same at S-79, decreased at Sanibel, and increased at the remaining sites in the estuary over the past week. Salinities were in the good range (0-10) for tape grass at Val I-75 and Ft. Myers. Salinities were also in the good range (10-30) for adult eastern oysters at Shell Point and Sanibel, and in the fair range at Cape Coral.

## **Stormwater Treatment Areas**

For the week ending Sunday, August 29, 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 539,000 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, in general, were fair across the Everglades Protection Area as WCAs 1, 2 and 3A South rose in stage on average 0.06 feet. Depth conditions are generally low for this time of year. WCA-3A North, WCA-2A, central Big Cypress National Preserve and western Everglades National Park (ENP) are well below the historical median; below 10% of historical data in some regions. In Florida Bay, salinities decreased last week and stages increased in Taylor Slough on average. The mangrove zone continues to freshen but more fresh water is needed to extend the estuarine front farther out into the Bay. Last week, phosphorus concentration at S-328 was 10 µg/L, which suggests that phosphorus concentrations for the S-328 and G-737 are likely sufficiently low (below 8 µg/L) enough to open and move water towards ENP.

## **Supporting Information**

### **Kissimmee Basin**

#### ***Upper Kissimmee***

On August 29, 2021, lake stages were 56.5 feet NGVD (at schedule) in East Lake Toho, 53.5 feet NGVD (at schedule) in Lake Toho, and 50.9 feet NGVD (0.1 feet below schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1, Figures KB-1-3**).

#### ***Lower Kissimmee***

Discharges to the Kissimmee River on August 29, 2021 were 1,270 cfs at S-65 and 1,420 cfs at S-65A; discharges from the Kissimmee River were 2,010 cfs at S-65D and 2,080 cfs at S-65E (**Table KB-2**). Headwater stages were 46.4 feet NGVD at S-65A and 28.4 feet NGVD at S-65D on August 29, 2021. The concentration of dissolved oxygen in the Kissimmee River continued a downward trend but the average for the week ending on August 29, 2021 increased slightly to 0.6 mg/L; however, is still below the 1.0 mg/L threshold considered potentially lethal for sportfish (**Table KB-2, Figure KB-4**). Discharge at S-65/S-65A was reduced, which resulted in small but promising increases in dissolved oxygen. Flow at S-65A remains too low for complete inundation of the Kissimmee River floodplain, but mean floodplain depth increased to 1.10 feet by August 29, 2021 (**Figure KB-5**).

#### ***Water Management Recommendations***

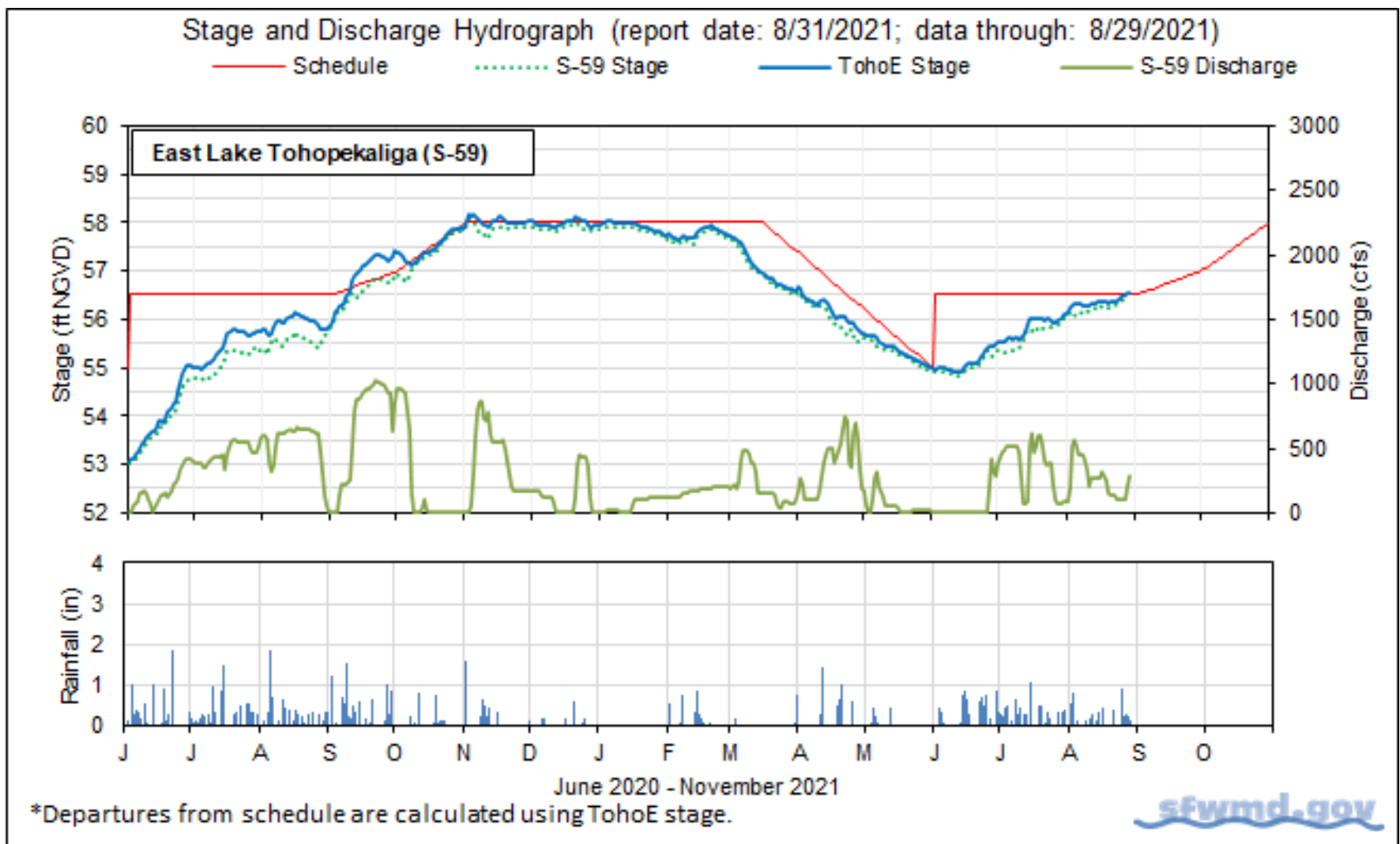
Maintain 1,400 cfs at S65/S65A after September 1 per the IS-14-50 discharge plan.

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

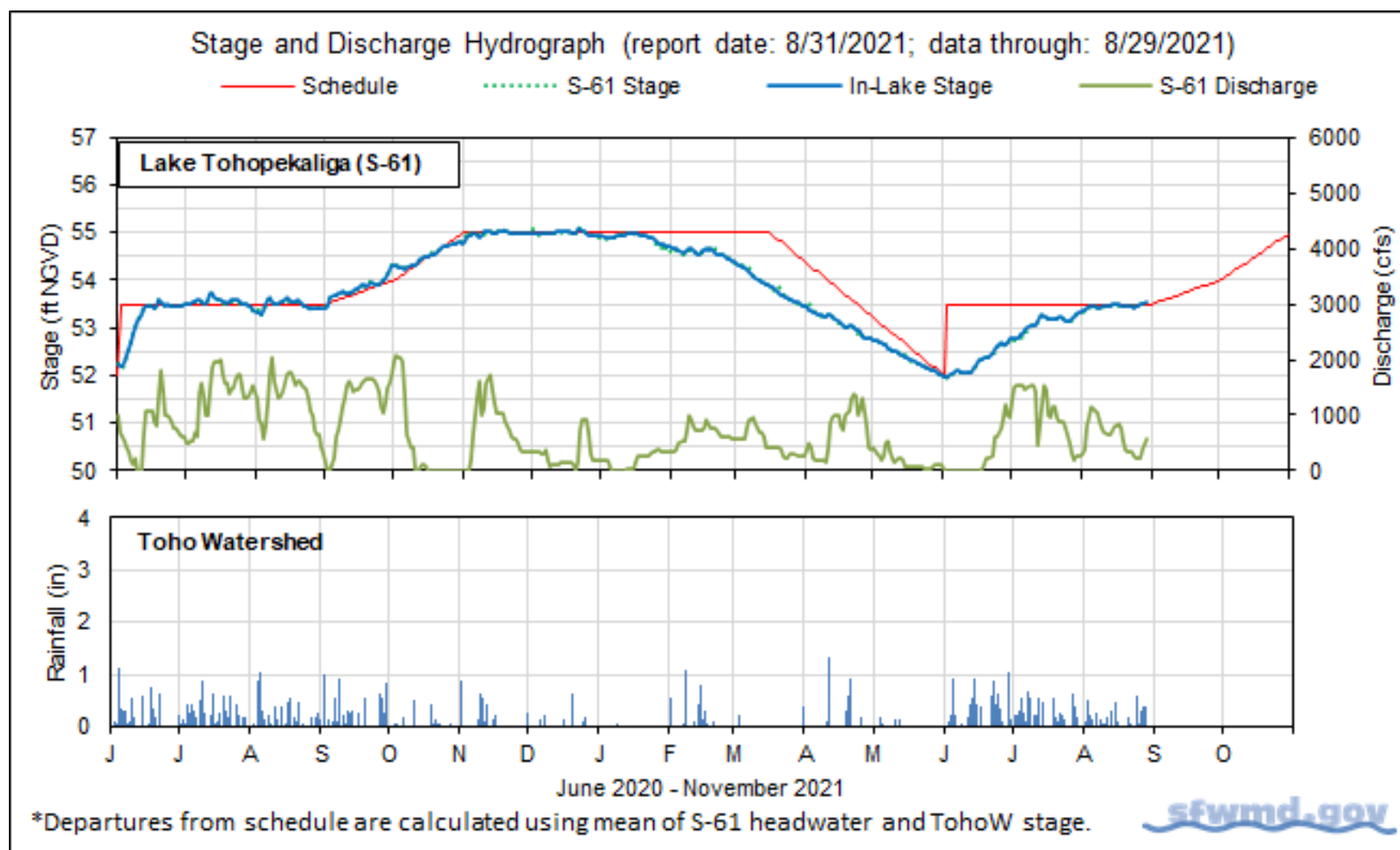
Water Body	Structure	Stage Monitoring Site	7-Day Average Discharge (cfs)	Lake Stage (feet NGVD) <sup>a</sup>	Schedule Type <sup>b</sup>	Schedule Stage (feet NGVD)	Departure from Regulation (feet)	
							8/29/21	8/22/21
Lakes Hart and Mary Jane	S-62	LKMJ	63	60.0	R	60.0	0.0	-0.1
Lakes Myrtle, Preston and Joel	S-57	S-57	7	61.0	R	61.0	0.0	0.0
Alligator Chain	S-60	ALLI	0	63.2	R	63.2	0.0	0.0
Lake Gentry	S-63	LKGT	4	61.1	R	61.0	0.1	0.0
East Lake Toho	S-59	TOHOE	145	56.5	R	56.5	0.0	-0.1
Lake Toho	S-61	TOHOW S-61	321	53.5	R	53.5	0.0	0.0
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	1,358	50.9	R	51.0	-0.1	0.1

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

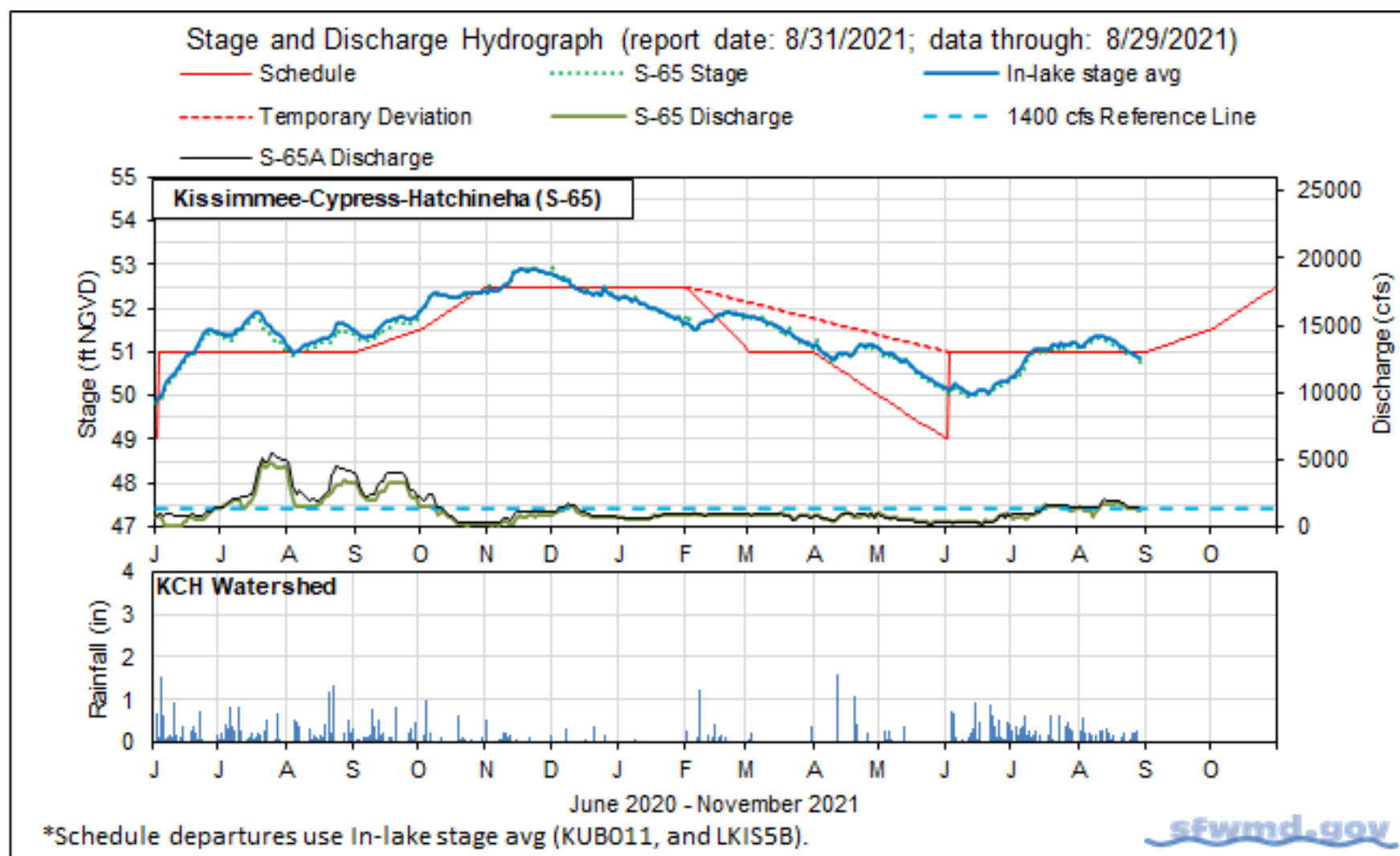
b. A: projected recession line; R: USACE regulation schedule; S: temporary recession target line; T: temporary schedule; NA: not applicable or not available.



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



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



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

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

Metric	Location	Daily Average 8/29/21	Average for Previous Seven Day Periods			
			8/29/21	8/22/21	8/15/21	8/8/21
Discharge	S-65	1,270	1,360	1,700	1,470	1,210
Discharge	S-65A <sup>a</sup>	1,420	1,450	1,900	1,790	1,460
Headwater Stage (feet NGVD)	S-65A	46.4	46.3	46.3	46.5	46.4
Discharge	S-65D <sup>b</sup>	2,010	2,030	2,040	1,890	1,600
Headwater Stage (feet NGVD)	S-65D <sup>c</sup>	28.4	28.5	28.5	28.5	27.7
Discharge (cfs)	S-65E <sup>d</sup>	2,080	2,100	2,260	2,200	1,790
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) <sup>e</sup>	Phase I, II/III river channel	1.0	0.6	0.3	0.7	1.2
Mean depth (feet) <sup>f</sup>	Phase I floodplain	1.10	1.09	1.13	0.93	0.84

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.

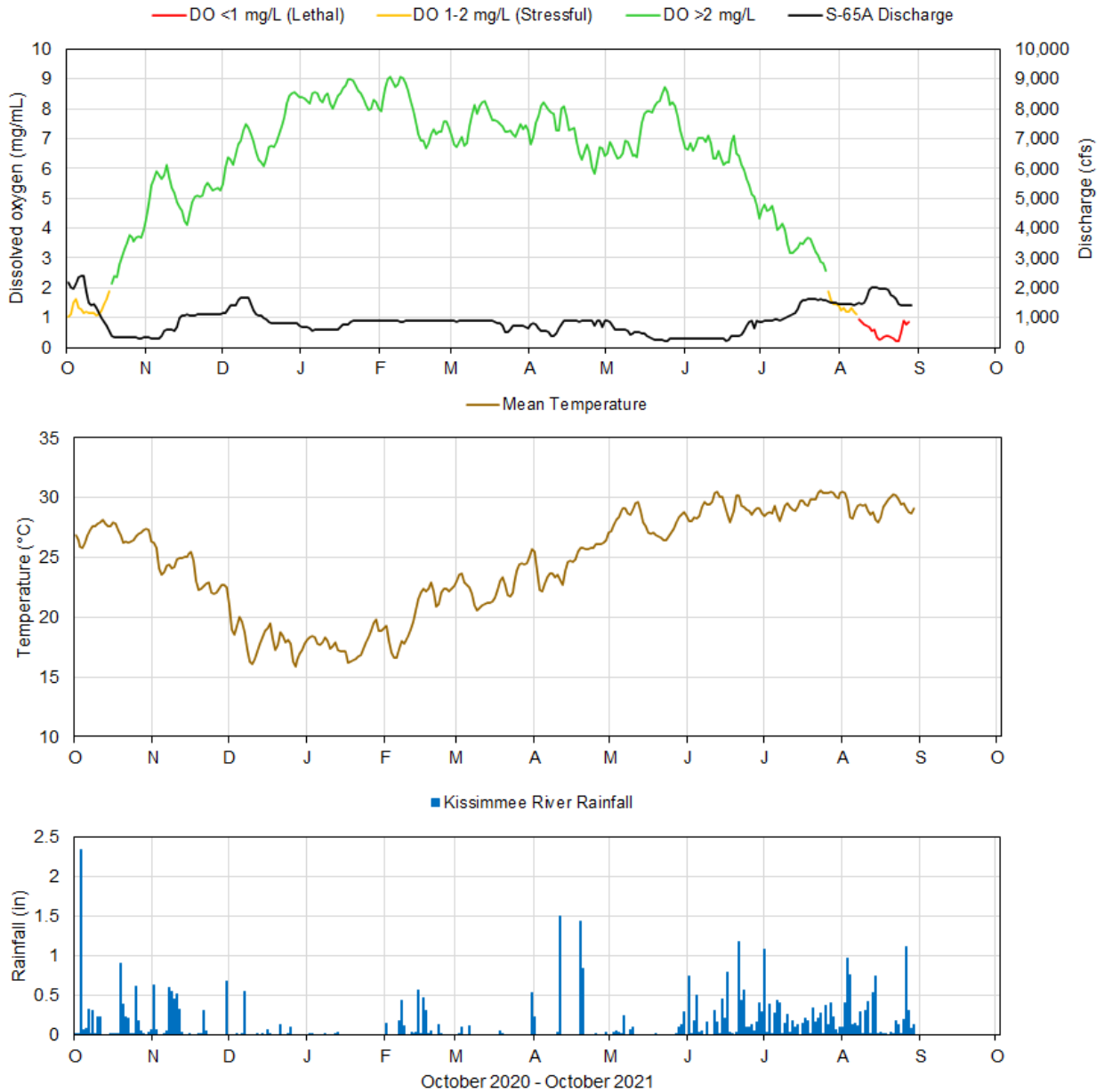
e. Dissolved oxygen is the average of values from sondes KRBN, PC62, PC63, PD62R and PD42R.

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).

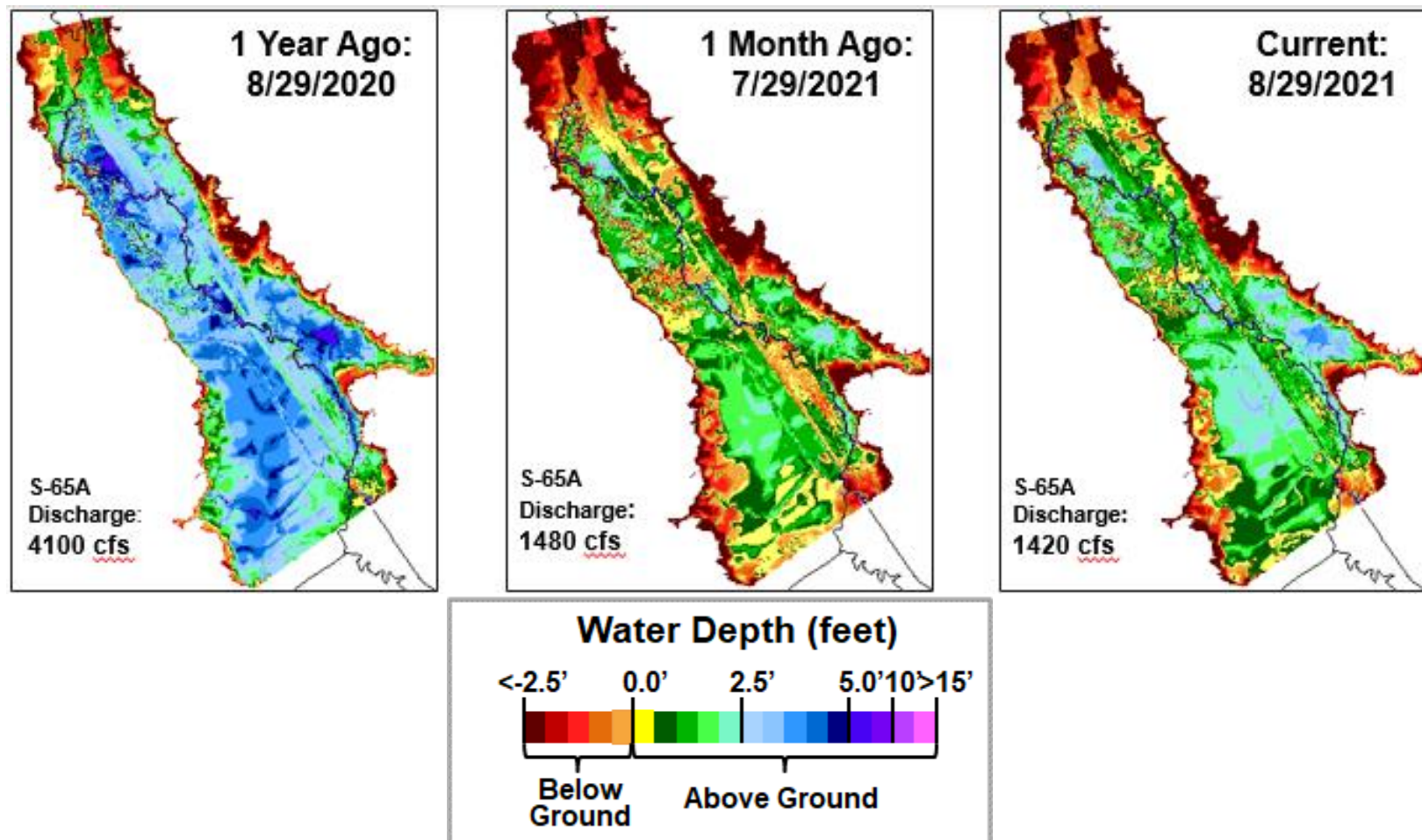
Discharge (cfs)	Maximum Rate of Increase (cfs/day)	Maximum Rate of Decrease (cfs/day)
0-300	100	-50
301-650	150	-75
651-1,400	300	-150
1,401-3,000	600	-600
>3,000	1,000	-2,000



Report Date: 8/31/2021; data are through: 8/29/2021

[sfwmd.gov](http://sfwmd.gov)

**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 14.66 feet NGVD on August 29, 2021, 0.98 feet higher than a month ago, and 0.44 feet higher than one year ago (**Figure LO-1**). Lake stages were above the ecological envelope from August 1, 2020 to March 30, 2021, and near or within the upper threshold of the envelope until late June 2021. Lake stages have increased recently due to increased precipitation and inflows over the last several weeks and have been above the ecological envelope since early-July, now 0.75 foot above (**Figure LO-2**). Lake stage remained in the Low flow sub-band last week (**Figure LO-3**). According to NEXRAD, 2.18 inches of rain fell directly on the Lake last week.

Average daily inflows (excluding rainfall) decreased from the previous week, going from 4,833 cubic feet per second (cfs) to 3,680 cfs. Average daily outflows (excluding evapotranspiration) were similar to the previous week, going from 53 cfs to 75 cfs. Most of the inflows (~86% of the total) came from the Kissimmee River (2097 cfs through S-65E and S-65EX1), Fisheating Creek (530 cfs), C-40 and C-41 canals (327 cfs through S-71 and S-72), and Lake Istokpoga Basin C-41A canal (235 cfs through S-84 and S-84X). There was no outflow to the west via S-77 or east via S-308 structures. There was a backflow from L-8 canal via the S-271 structure at the average rate of 132 cfs. Outflow to the south via the S-351 and S-352 structures increased from 11 cfs to 75 cfs. There was no outflow south via S-354 structure. 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.

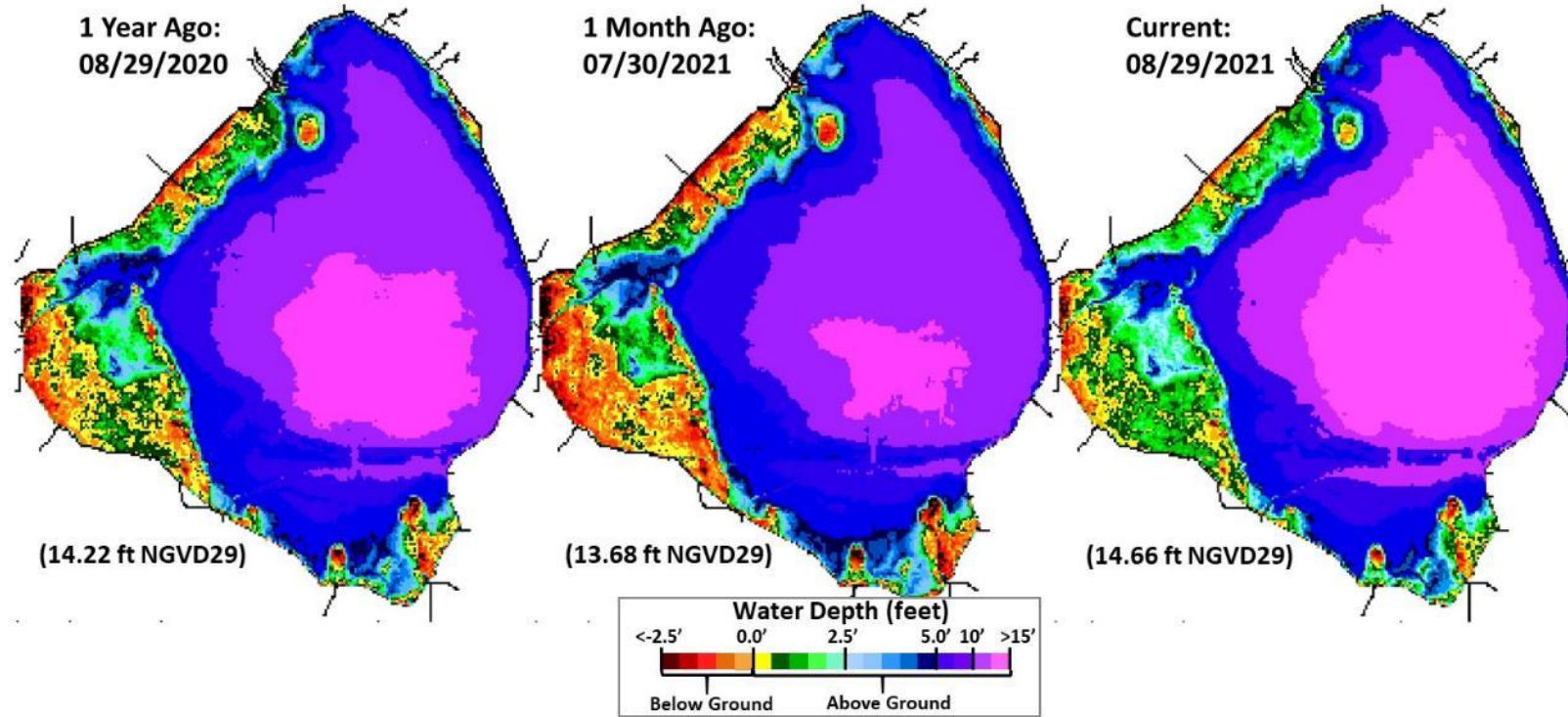
The most recent satellite image (August 30, 2021) from the NOAA cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3 OLCI sensor data showed medium to high bloom potential in western and central-west parts of the Lake and low bloom potential in south-eastern region (**Figure LO-5**).

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

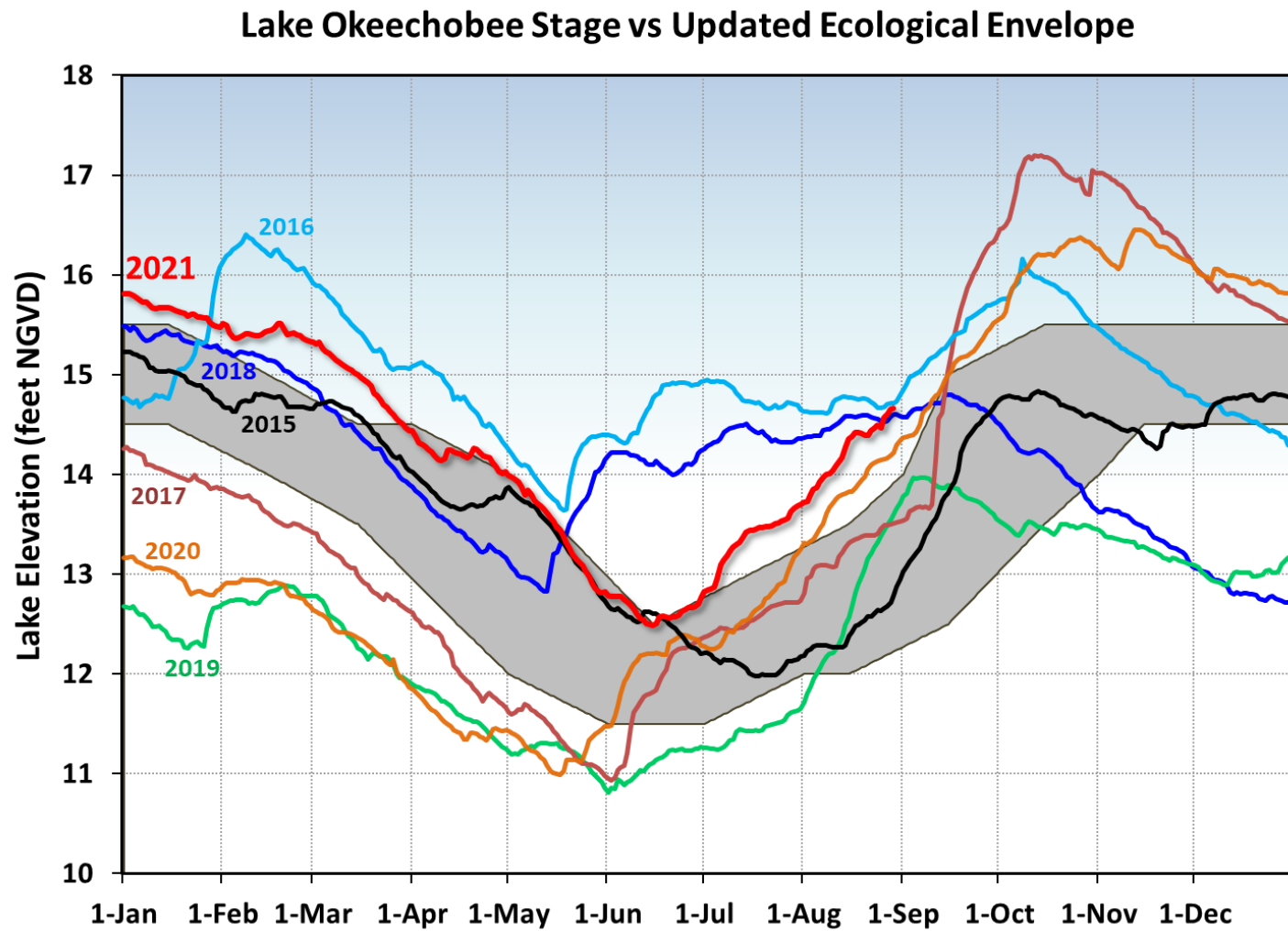
**Table LO-1.** Weekly Lake Okeechobee inflows and outflows (cfs) and as change in elevation (in).

Provisional data.

INFLOWS	Previous week Avg Daily (cfs)	Avg Daily Flow (cfs)	Equivalent Depth Week Total (in)	OUTFLOWS	Previous week Avg Daily (cfs)	Avg Daily Flow (cfs)	Equivalent Depth Week Total (in)
S-65E & S-65EX1	2256	2097	0.9	S-77	0	0	0.0
S-71 & S-72	625	327	0.3	*S-308	0	0	0.0
S-84 & S-84X	534	235	0.2	S-351	0	34	0.0
Fisheating Creek	865	530	0.4	S-352	11	41	0.0
S-154	132	72	0.1	S-354	0	0	0.0
S-191	18	14	0.0	*L-8 (S-271)	42	-132	0.0
S-133 P	34	30	0.0	ET	2577	2413	1.0
S-127 P	97	35	0.0	<b>Total</b>	<b>2631</b>	<b>2487</b>	<b>1.1</b>
S-129 P	31	26	0.0				
S-131 P	11	12	0.0				
S-135 P	230	169	0.1				
S-2 P	0	0	0.0				
S-3 P	0	0	0.0				
S-4 P	0	0	0.0				
*Backflow	0	132	0.0				
Rainfall	755	6459	0.3				
<b>Total</b>	<b>5588</b>	<b>10139</b>	<b>2.3</b>				

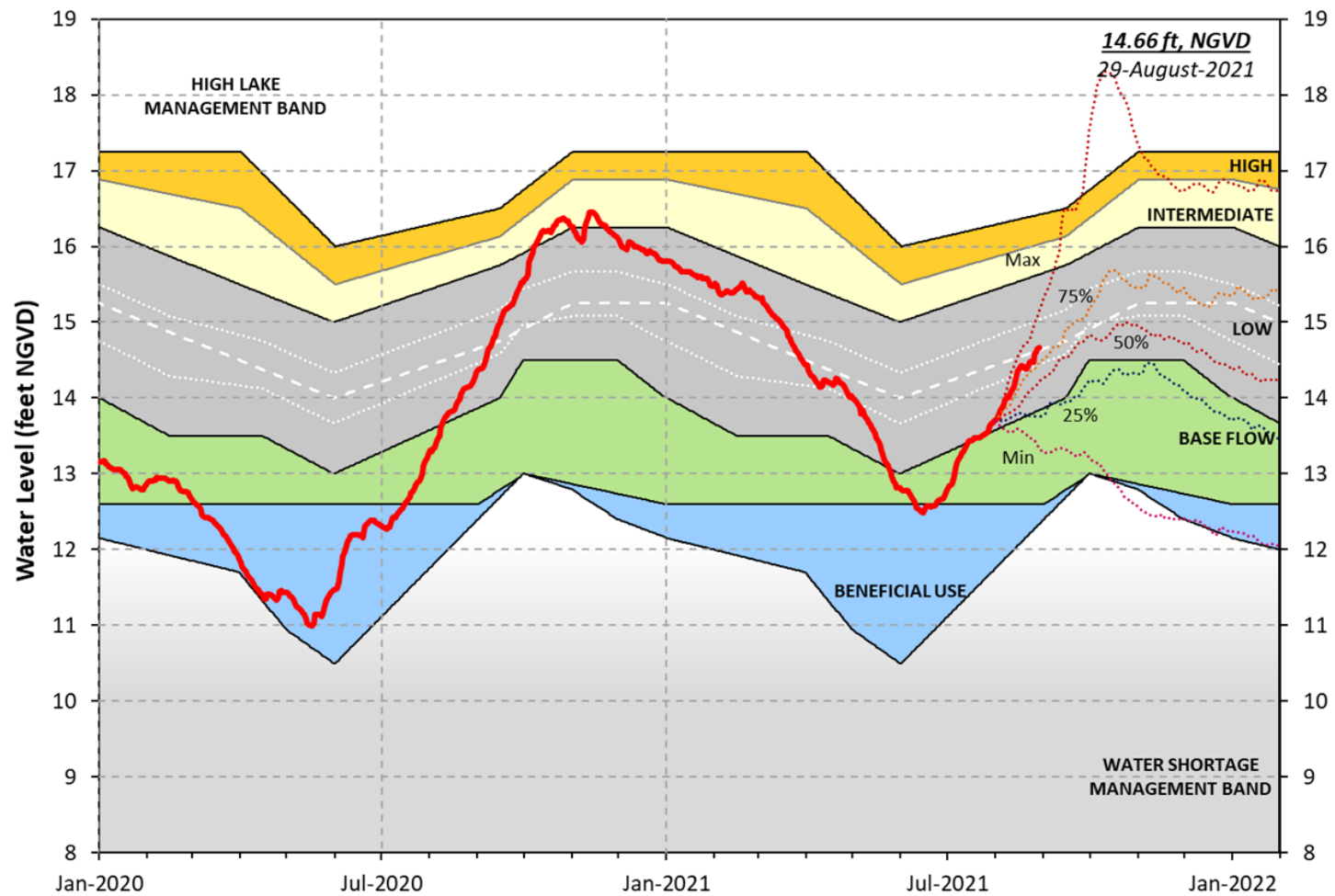


**Figure LO-1.** Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).



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

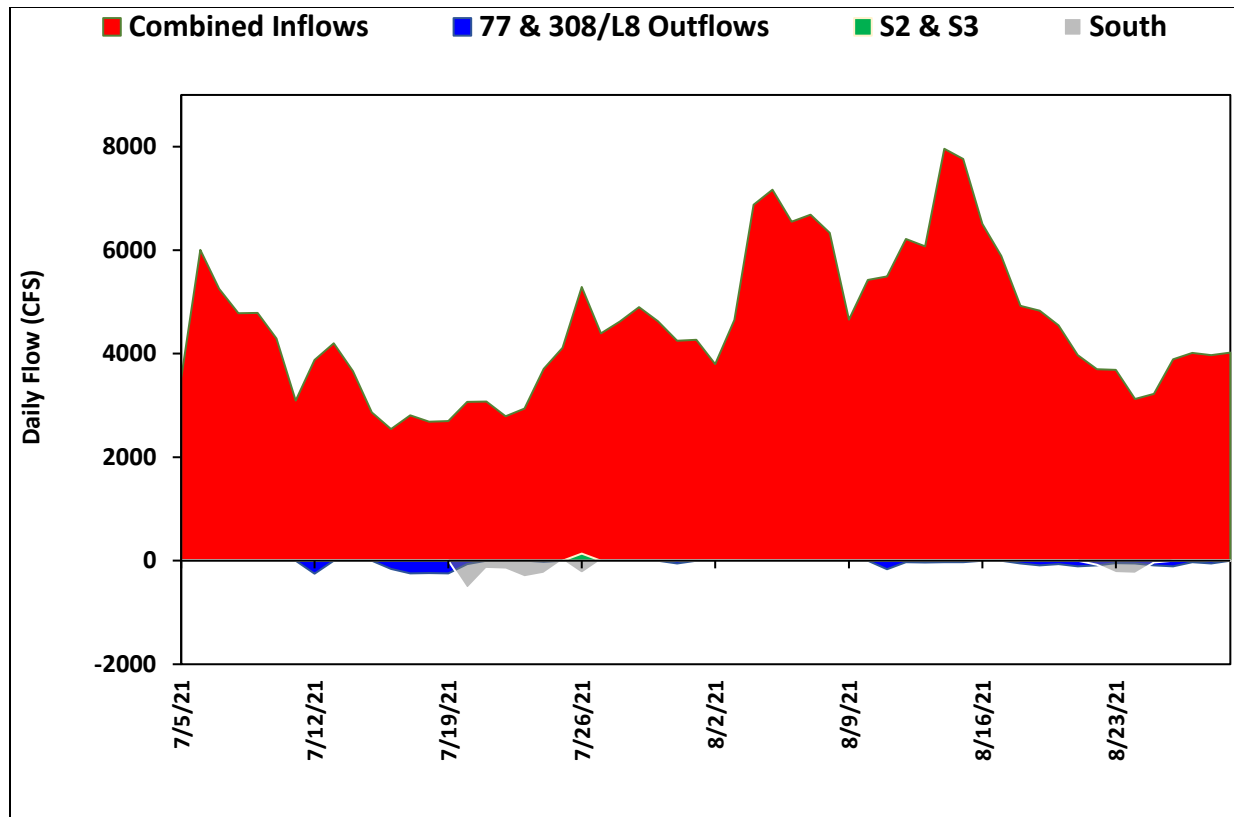
## Lake Okeechobee Water Level History and Projected Stages



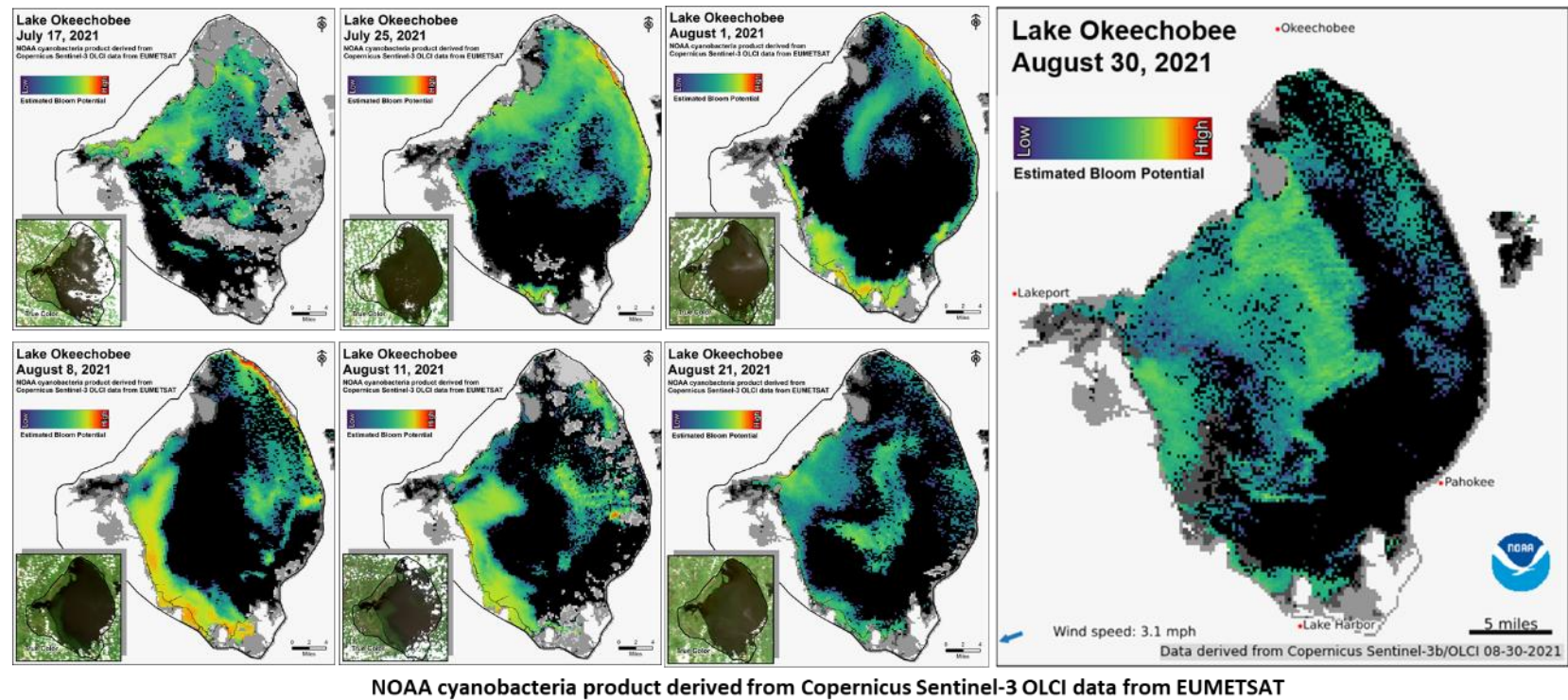
LORS-2008 - Adopted by USACE 28-April-2008

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





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



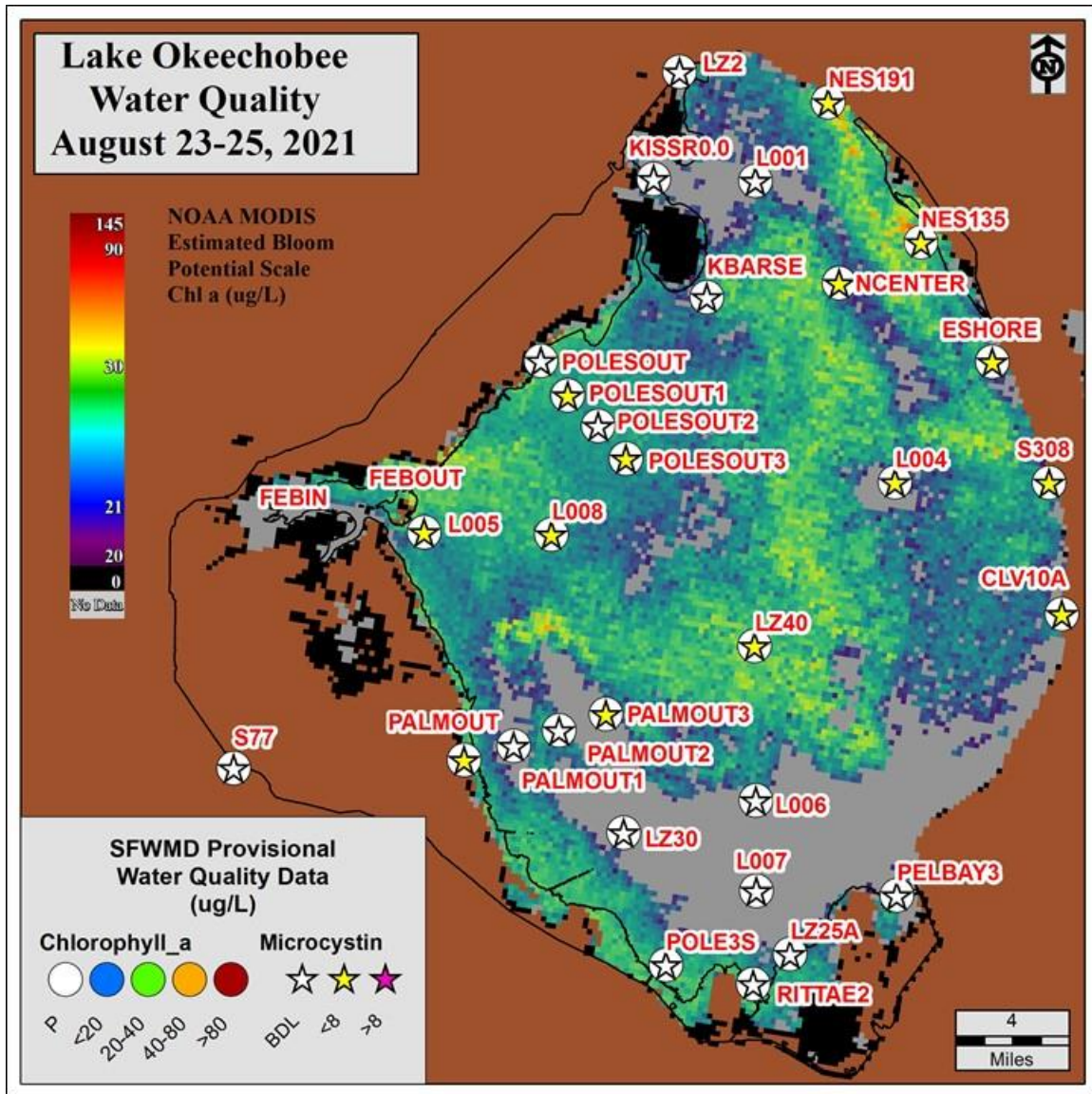
**Figure LO-5.** Cyanobacteria bloom potential based on NOAA’s harmful algal bloom monitoring system. Gray color indicates cloud cover.

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

**Collection Date: August 23-25, 2021**

Station	CHLa (ug/L)	TOXIN (ug/L)	TAXA	Station	CHLa (ug/L)	TOXIN (ug/L)	TAXA
FEBIN				L001	P	BDL	<i>Microcys</i>
FEBOUT				L004	P	<b>0.3</b>	<i>Microcys</i>
KISSR0.0	P	BDL	<i>mixed</i>	L006	P	BDL	<i>mixed</i>
<b>L005</b>	P	<b>4.3</b>	<i>Microcys</i>	L007	P	BDL	<i>mixed</i>
LZ2	P	BDL	<i>mixed</i>	L008	P	<b>0.3</b>	<i>mixed</i>
KBARSE	P	BDL	<i>Microcys</i>	LZ30	P	BDL	<i>mixed</i>
RITTAE2	P	BDL	<i>Cylindro</i>	<b>LZ40</b>	P	<b>1.0</b>	<i>Microcys</i>
PELBAY3	P	BDL	<i>mixed</i>	CLV10A	P	<b>0.3</b>	<i>Microcys</i>
POLE3S	P	BDL	<i>mixed</i>	<b>NCENTER</b>	P	<b>0.6</b>	<i>Microcys</i>
LZ25A	P	BDL	<i>mixed</i>				
PALMOUT	P	<b>0.4</b>	<i>Microcys</i>	<b>S308C</b>	P	<b>1.1</b>	<i>Microcys</i>
PALMOUT1	P	BDL	<i>Microcys</i>	S77	P	BDL	<i>mixed</i>
PALMOUT2	P	BDL	<i>mixed</i>				
PALMOUT3	P	0.3	<i>Microcys</i>				
POLESOUT	P	BDL	<i>Microcys</i>				
POLESOUT1	P	<b>0.5</b>	<i>mixed</i>				
POLESOUT2	P	BDL	<i>mixed</i>				
<b>POLESOUT3</b>	P	<b>1.2</b>	<i>Microcys</i>				
EASTSHORE	P	<b>0.4</b>	<i>Microcys</i>				
NES135	P	<b>0.6</b>	<i>Microcys</i>				
NES191	P	<b>0.3</b>	<i>Microcys</i>				

- SFWMD considers >40 µg/L Chlorophyll *a* (Chla) an algal bloom
- BDL – Below Detectable Limit of **0.25** µg/L
- ND – No Dominant taxa
- P – Pending
- NS – Not Sampled
- Station bold font – crew observed possible BGA
- Chlorophyll *a* analyzed by SFWMD
- Toxin and Taxa analyzed by FDEP:  
*Microcys* = *Microcystis*; *Cylindro* = *Cylindrospermopsis*; *Planktol* = *Planktolyngbya*;  
*Dolicho* = *Dolichospermum*



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

## Estuaries

### ***St. Lucie Estuary***

Over the past week, mean total inflow to the St. Lucie Estuary was approximately 2,179 cfs (**Figures ES-1 and ES-2**) with no flow coming from Lake Okeechobee. The previous 30-day mean inflow was approximately 1,947 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-2**.

Over the past week, salinities increased at all sites within the estuary (**Table ES-1 and Figure ES-3**). The seven-day moving average of the surface and bottom salinities at the US1 Bridge was 8.1. Salinity conditions in the middle estuary were estimated to be within the fair range for adult eastern oysters (**Figure ES-4**).

### ***Caloosahatchee River Estuary***

Over the past week, mean total inflow to the Caloosahatchee River Estuary was approximately 2,675 cfs (**Figures ES-5 and ES-6**) with no flow coming from Lake Okeechobee. The previous 30-day mean inflow was approximately 4,009 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-6**.

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

Surface salinity at Val I-75 was forecasted for the next two weeks, using an autoregression model (Qiu and Wan, 2013<sup>1</sup>) 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 a steady release at 2,000 cfs with estimated tidal basin inflows of 627 cfs. Model results from all scenarios predict daily salinity to be 0.8 or lower and the 30-day moving average surface salinity to be 0.3 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 27, 2021, that *Karenia brevis*, the Florida red tide dinoflagellate, was observed at background to high concentrations in Charlotte County, and background to medium concentrations in and

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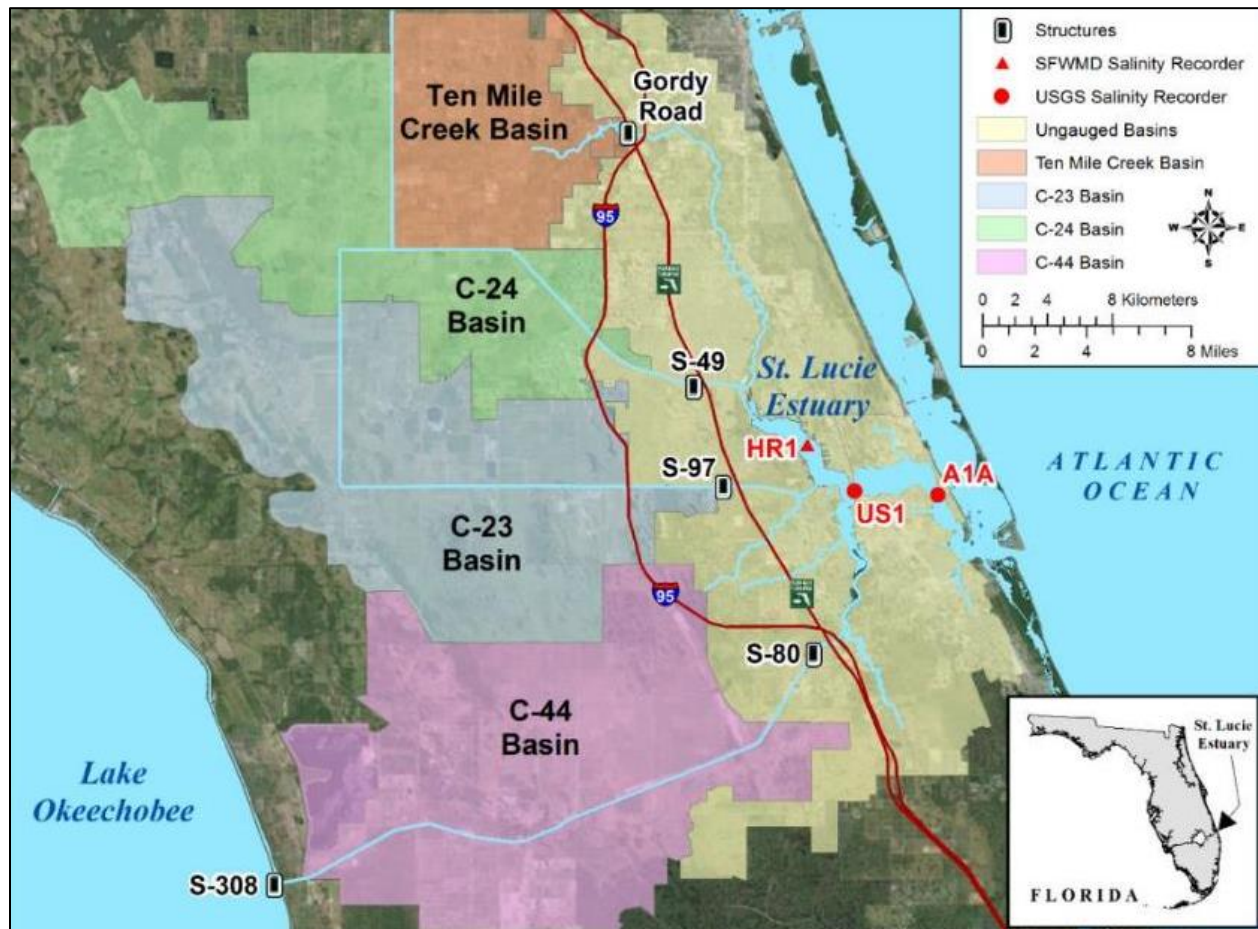
<sup>1</sup> Qiu, C., and Y. Wan. 2013. Time series modeling and prediction of salinity in the Caloosahatchee River Estuary. *Water Resources Research* 49:5804-5816.



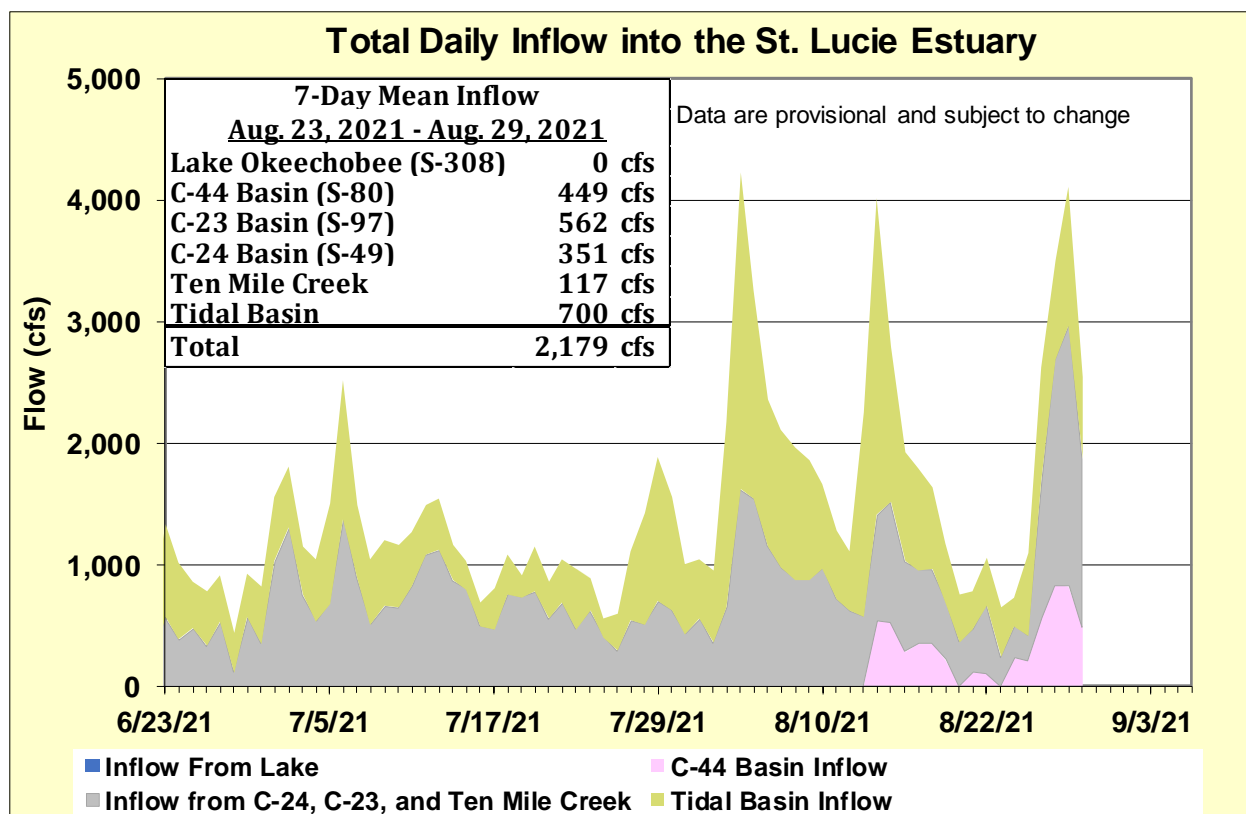
offshore of Lee County. On the east coast, red tide was not observed in samples taken from St. Lucie, Martin, or Palm Beach counties.

### ***Water Management Recommendations***

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



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

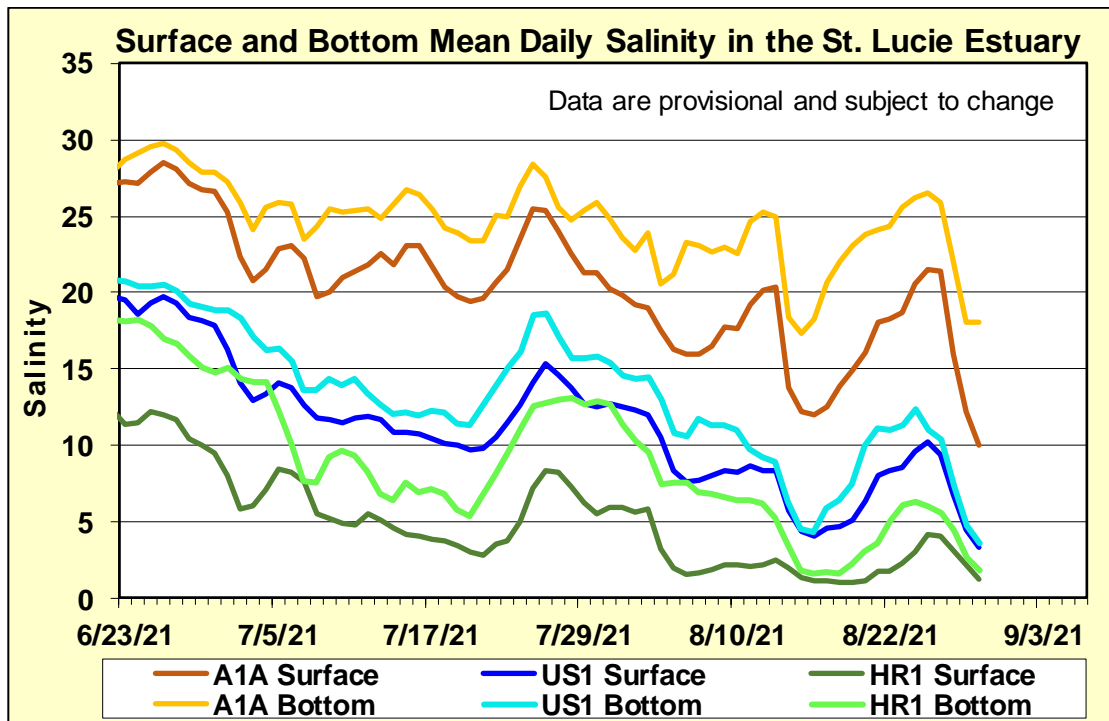


**Figure ES-2.** Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

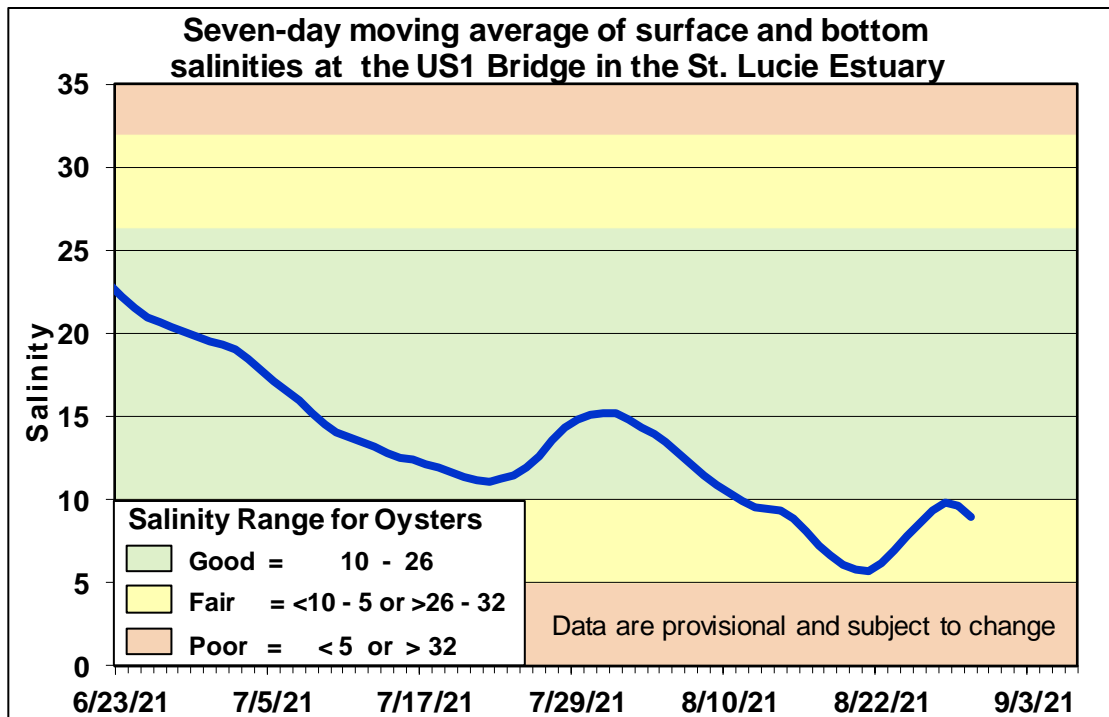
**Table ES-1.** Seven-day mean salinity at oyster monitoring sites in the St. Lucie Estuary. Current means are in bold font; previous week's means are in parentheses. The envelope reflects the preferred salinity range for adult eastern oysters (*Crassostrea virginica*) in the middle estuary. Data are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

Sampling Site	Surface	Bottom	Envelope
HR1 (North Fork)	<b>2.9</b> (1.3)	<b>4.7</b> (2.7)	NA <sup>a</sup>
US1 Bridge	<b>7.5</b> (5.9)	<b>8.7</b> (8.0)	10.0 – 26.0
A1A Bridge	<b>17.2</b> (15.1)	<b>23.2</b> (22.3)	NA <sup>a</sup>

a. The envelope is not applicable.

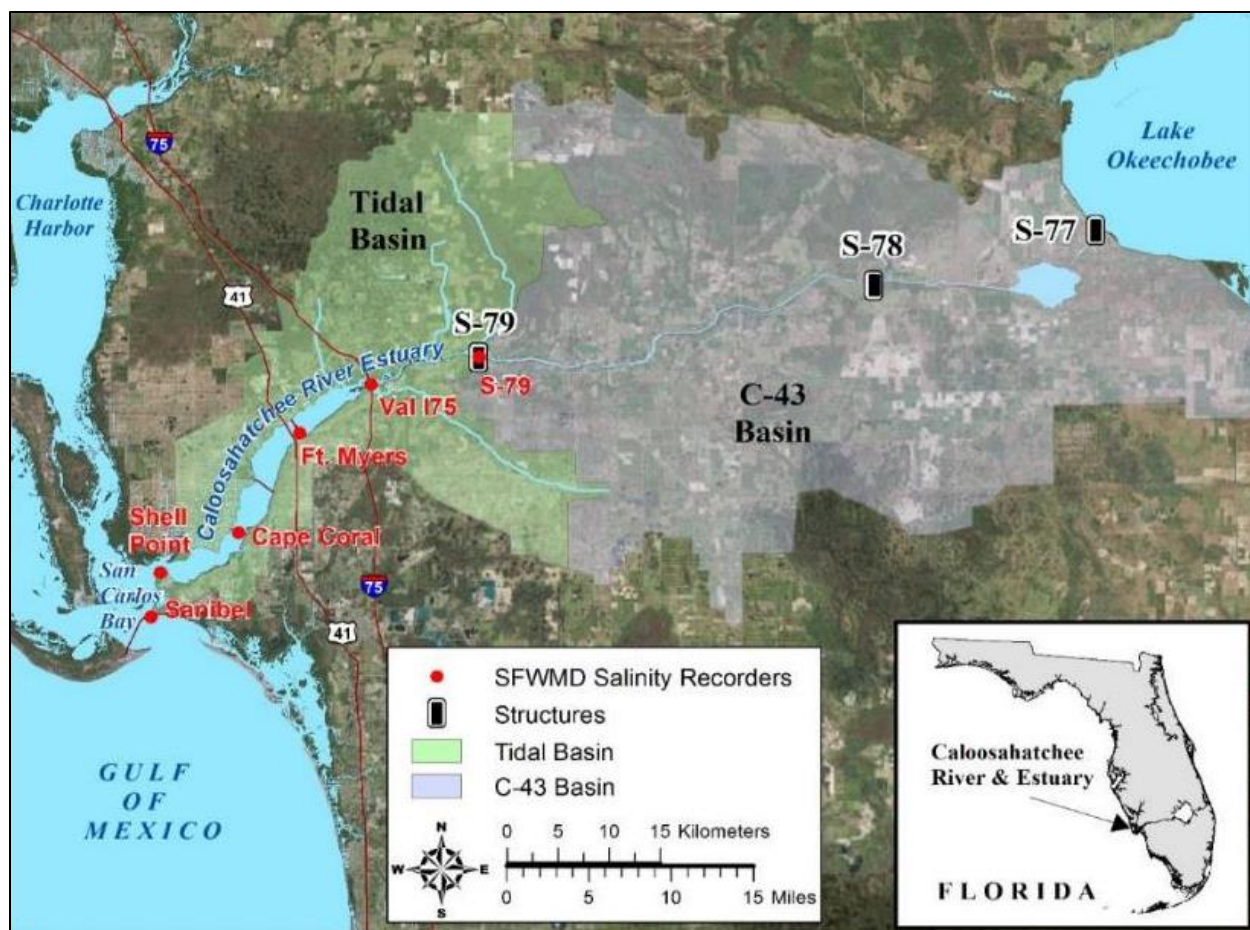


**Figure ES-3.** Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

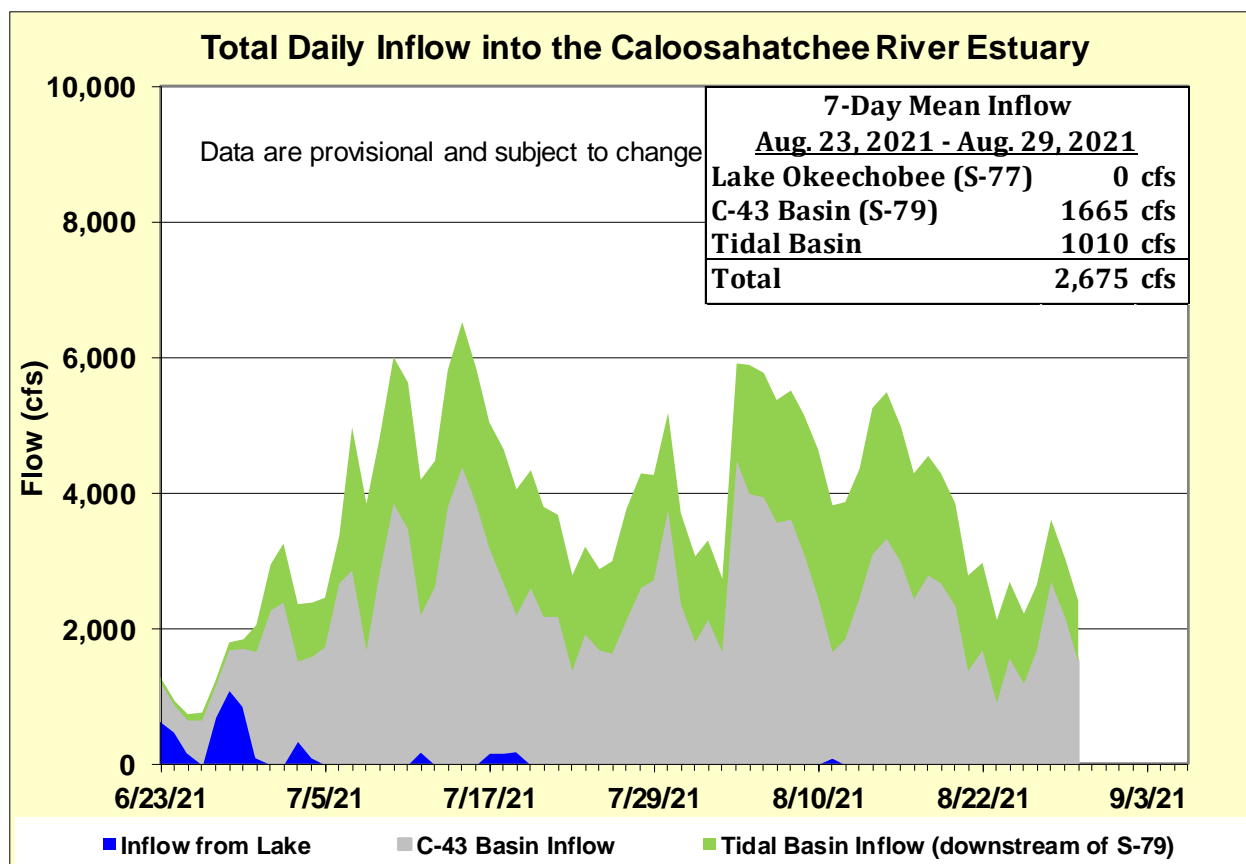


**Figure ES-4.** Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.





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



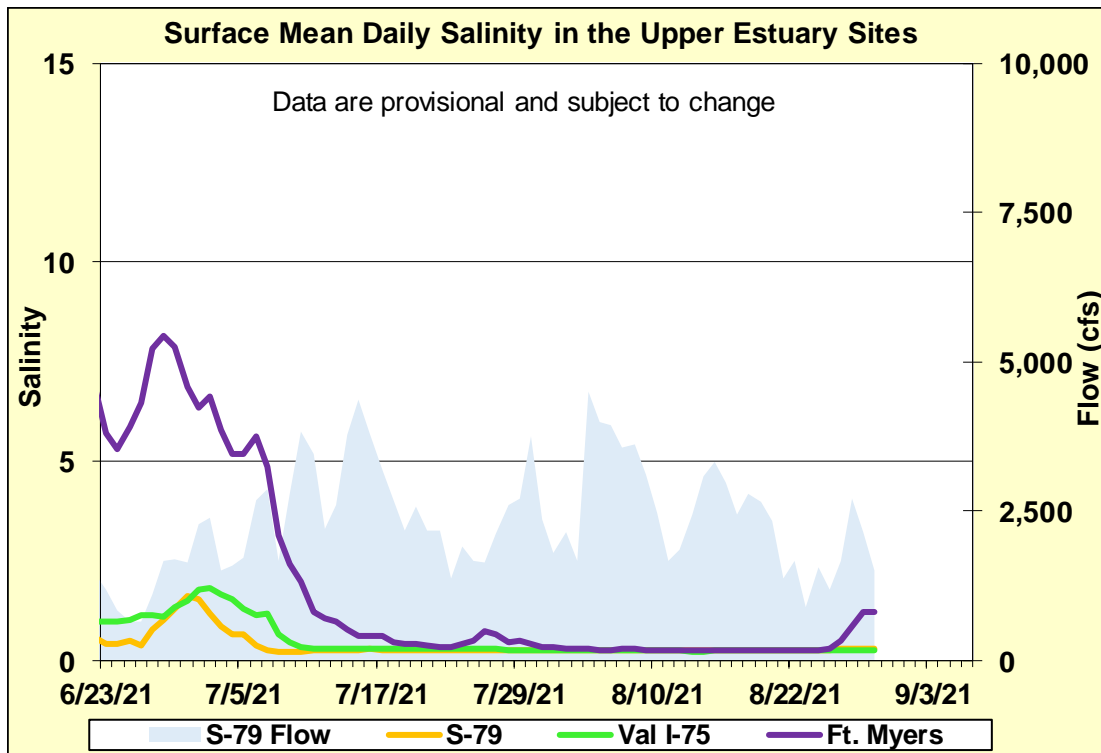
**Figure ES-6.** Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

**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.

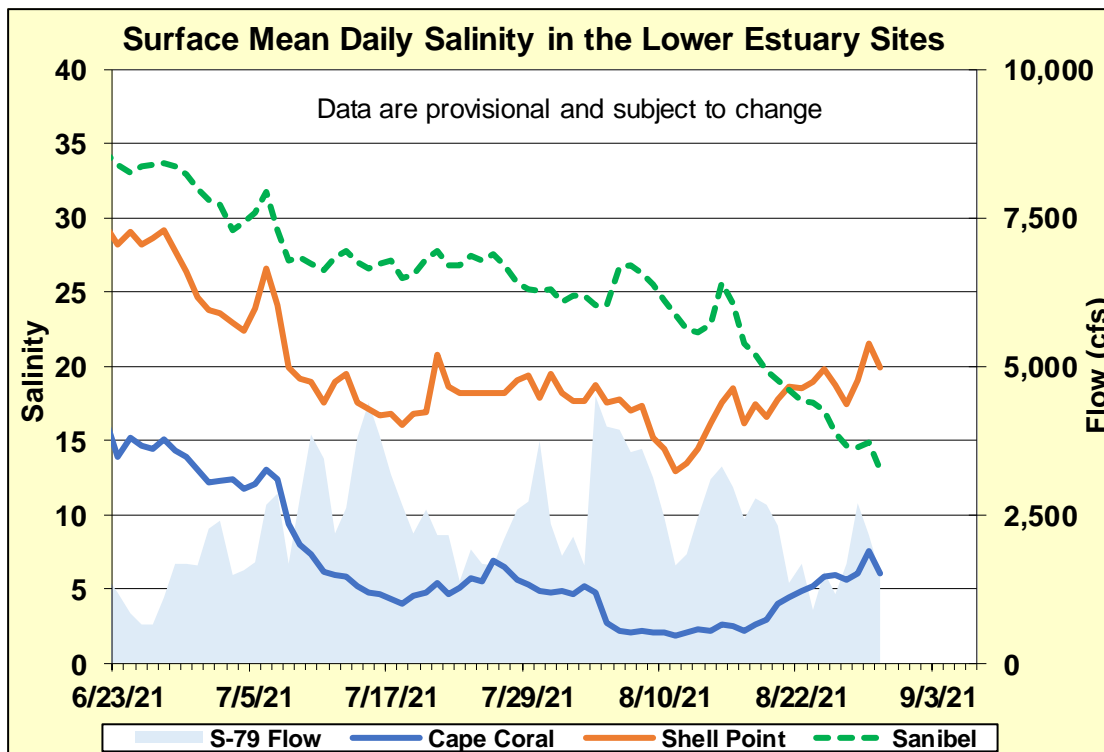
Sampling Site	Surface	Bottom	Envelope
S-79 (Franklin Lock)	<b>0.3</b> (0.3)	<b>0.3</b> (0.3)	NA <sup>a</sup>
Val I-75	<b>0.3</b> (0.2)	<b>0.3</b> (0.2)	0.0 – 5.0 <sup>b</sup>
Fort Myers Yacht Basin	<b>0.7</b> (0.2)	<b>1.3</b> (0.3)	NA <sup>a</sup>
Cape Coral	<b>6.0</b> (3.4)	<b>8.9</b> (4.9)	10.0 – 30.0
Shell Point	<b>19.3</b> (17.7)	<b>22.4</b> (20.6)	10.0 – 30.0
Sanibel	<b>15.3</b> (20.2)	<b>13.0</b> (22.7)	10.0 – 30.0

a. The envelope is not applicable.

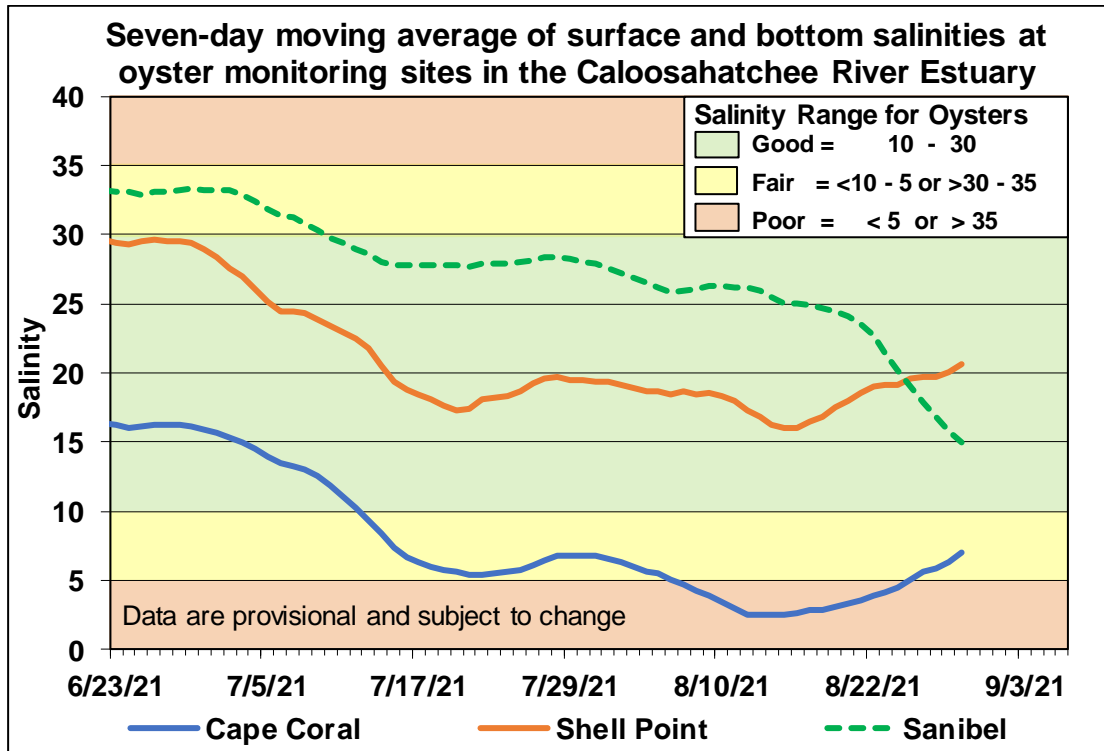
b. The envelope is based on the predicted 30-day mean for the next two weeks.



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



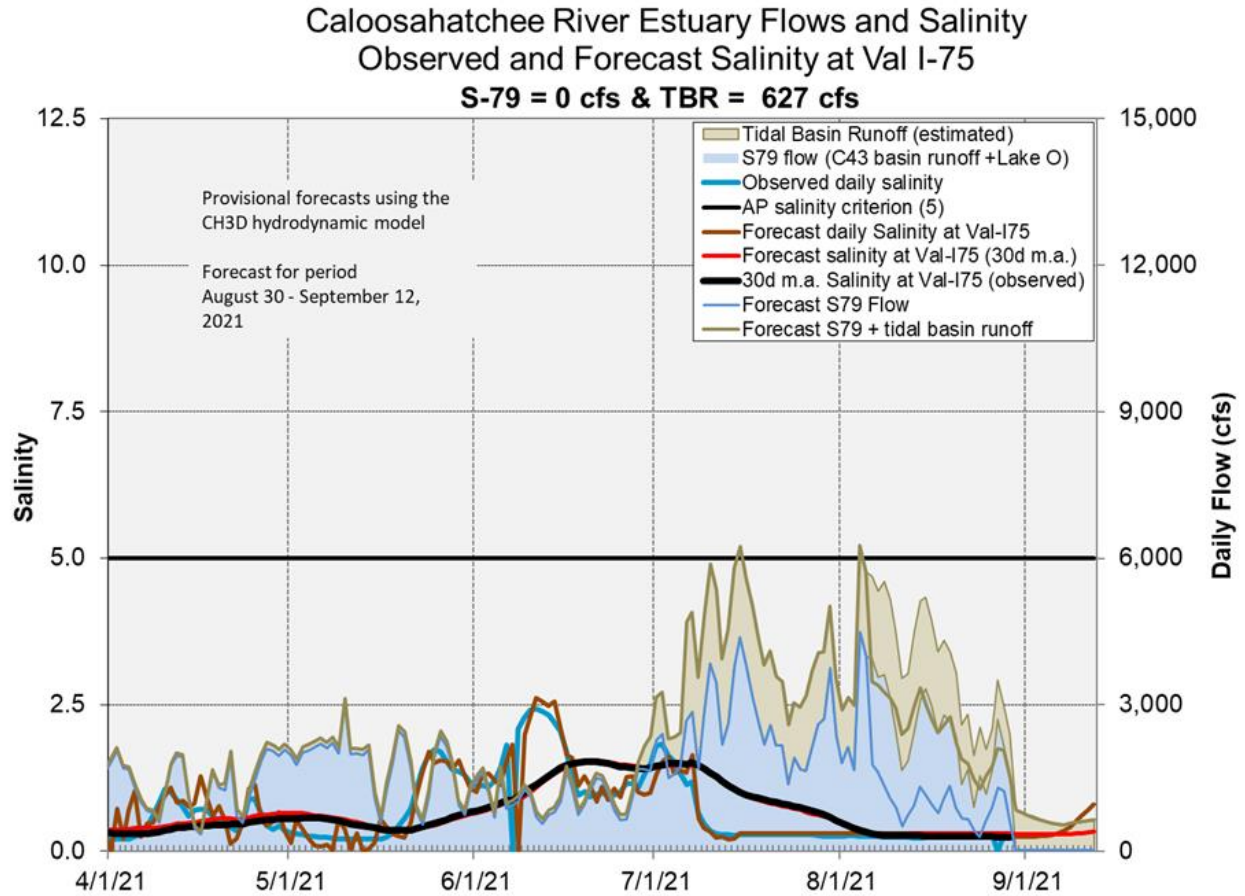
**Figure ES-8.** Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.



**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	627	0.8	0.3
B	450	627	0.4	0.3
C	800	627	0.3	0.3
D	1000	627	0.3	0.3
E	1500	627	0.3	0.3
F	2000	627	0.3	0.3



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

## **Stormwater Treatment Areas**

**STA-1E:** STA-1E Western Flow-way is offline for the Restoration Strategies project to fill and grade Cells 5 and 7. Operational restrictions are in place in STA-1E Central Flow-way for vegetation management activities. Online treatment cells are at or above target stage, vegetation in these cells are stressed or highly stressed, and the 365-day phosphorus loading rates (PLR) for these flow-ways are very high (**Figure S-1**).

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

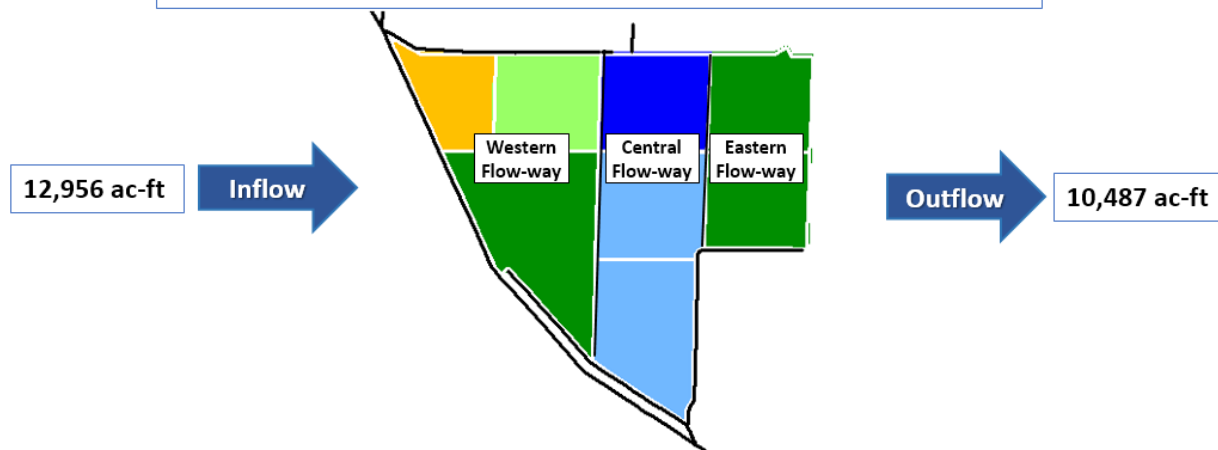
**STA-2:** Operational restrictions are in place in STA-2 Flow-ways 3 and 4 for vegetation management activities and in Flow-way 2 for construction activities. Treatment cells are at or above target stage. Vegetation in Flow-ways 1 and 3 are stressed, and in Flow-ways 2, 4 and 5 are highly stressed.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


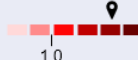


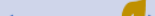
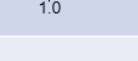
**STA-3/4:** STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown. Online treatment cells are at or above target stage. Vegetation in the Eastern and Central Flow-ways are highly stressed and in the Western Flow-way is stressed. The 365-day PLRs for all flow-ways are below 1.0 g/m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

For definitions on STA operational language see glossary following figures.

# STA-1E Weekly Status Report – 8/23/2021 through 8/29/2021



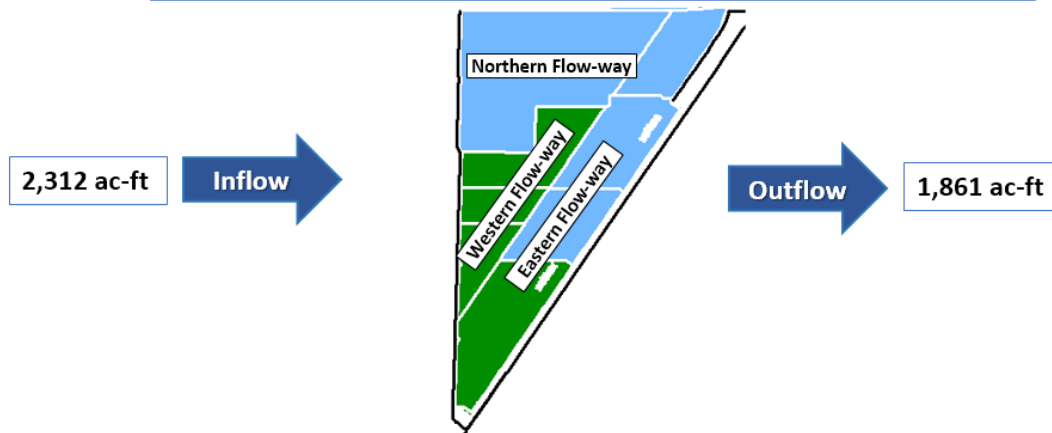
STA-1E Flow-Way Status			
Flow-Way	Vegetation Status <small>Healthy ----- Stressed</small> 	365-day P Loading Rate <small>(below 1.0 g P /m²/yr is optimal)</small> 	Online / Offline / Restrictions
Eastern			Online
Central			Vegetation Rehab
Western	Offline, construction activities starting 11/01/2019		

As of 8/29/2021			
Stage Based: Relative to Target Stage (TS)			
 Deep Water Level (> 2.8' above TS)			
 High Water Level (1.5' – 2.8' above TS)			
 0.2' – 1.5' above TS			
 Target Stage (TS +/- 0.2')			
 Low Water Level (<0.2' below TS)			
Depth / Area Based: Percent of Area Dry			
 0-25% Dry		 50-75% Dry	
 25-50% Dry		 75-100% Dry	

STA-1E Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	12,956	40,140	285,592
--Lake Inflow, ac-ft	0	N/A	26,200
Total Outflow, ac-ft	10,487	34,480	242,291
Inflow Conc., ppb	46	80	138
Outflow Conc., ppb	15	17	41
Includes Preliminary Data			

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

# STA-1W Weekly Status Report – 8/23/2021 through 8/29/2021












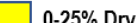
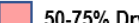




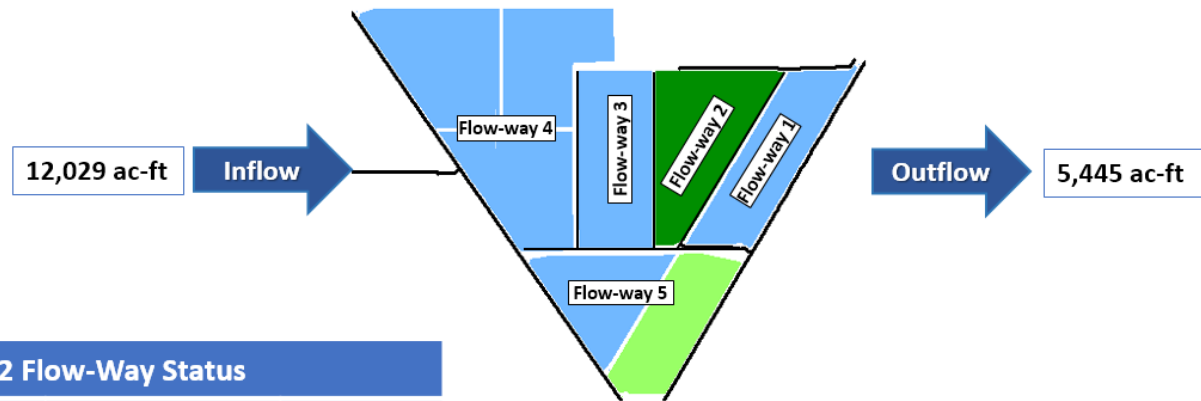
STA-1W Flow-Way Status				As of 8/29/2021				STA-1W Flow & Phosphorus Concentration							
Flow-Way	Vegetation Status <small>Healthy --- Stressed</small>	365-day P Loading Rate <small>(below 1.0 g P / m<sup>2</sup>/yr is optimal)</small>	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)					7-day	28-day	365-day				
Northern			Construction	 Deep Water Level (> 2.8' above TS)				Total Inflow, ac-ft	2,312	8,966	120,820				
				 High Water Level (1.5' – 2.8' above TS)											
				 0.2' – 1.5' above TS											
				 Target Stage (TS +/- 0.2')											
Western			Construction	 Low Water Level (<0.2' below TS)				Total Outflow, ac-ft	1,861	14,545	129,884				
				Depth / Area Based: Percent of Area Dry											
				 0-25% Dry	 50-75% Dry							Inflow Conc., ppb	77	136	247
				 25-50% Dry	 75-100% Dry										
Eastern			Construction					Outflow Conc., ppb	16	21	40				
Includes Preliminary Data															

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



### STA-2 Weekly Status Report – 8/23/2021 through 8/29/2021



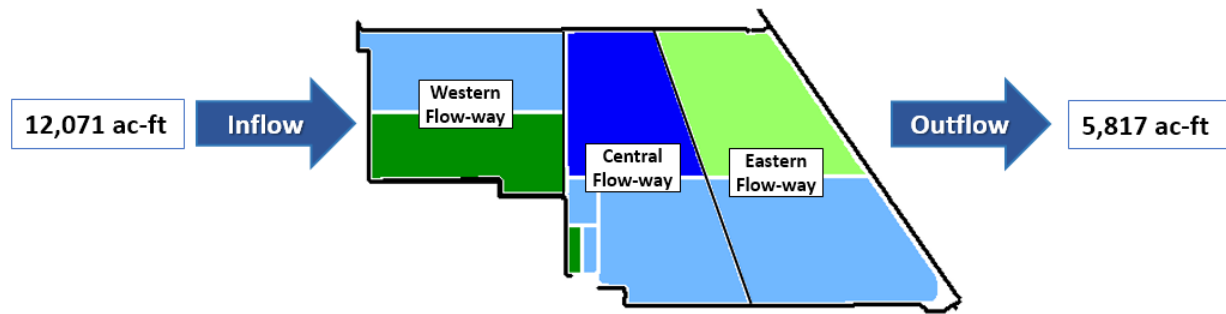
STA-2 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m <sup>2</sup> /yr is optimal)	Online / Offline / Restrictions
1	←  →	1.0	Online
2	←  →	1.0	Construction
3	←  →	1.0	Vegetation Rehab
4	←  →	1.0	Vegetation Rehab
5	←  →	1.0	Online

As of 8/29/2021	
Stage Based: Relative to Target Stage (TS)	
Deep Water Level (> 2.8' above TS)	0.2' – 1.5' above TS
High Water Level (1.5' – 2.8' above TS)	Target Stage (TS +/- 0.2')
0.2' – 1.5' above TS	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	12,029	32,249	420,709
--Lake Inflow, ac-ft	0	N/A	90,800
Total Outflow, ac-ft	5,445	42,316	461,479
Inflow Conc., ppb	48	82	92
Outflow Conc., ppb	15	16	20
Includes Preliminary Data			

Figure S-3. STA-2 Weekly Status Report

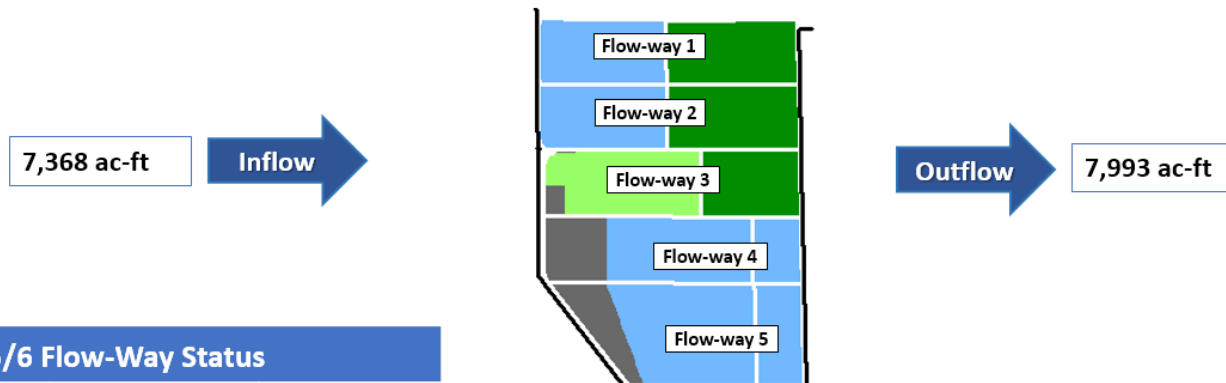
STA-3/4 Weekly Status Report – 8/23/2021 through 8/29/2021



STA-3/4 Flow-Way Status				As of 8/29/2021				STA-3/4 Flow & Phosphorus Concentration			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m <sup>2</sup> /yr is optimal)	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)					7-day	28-day	365-day
Eastern	Offline, vegetation management drawdown as of 3/1/2021			Deep Water Level (> 2.8' above TS)				Total Inflow, ac-ft	12,071	68,622	541,311
Central			Online	High Water Level (1.5' – 2.8' above TS)				--Lake Inflow, ac-ft	0	N/A	61,000
Western			Online	0.2' – 1.5' above TS				Total Outflow, ac-ft	5,817	65,083	495,963
				Target Stage (TS +/- 0.2')				Inflow Conc., ppb	67	67	64
				Low Water Level (<0.2' below TS)				Outflow Conc., ppb	13	16	14
				Depth / Area Based: Percent of Area Dry				Includes Preliminary Data			
				0-25% Dry		50-75% Dry					
				25-50% Dry		75-100% Dry					

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

STA-5/6 Weekly Status Report – 8/23/2021 through 8/29/2021



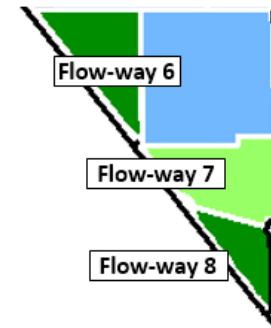
STA-5/6 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P / m <sup>2</sup> /yr is optimal)	Online / Offline / Restrictions
1			Online
2		N/A	Post-construction
3		N/A	Post-construction
4			Online
5			Online

As of 8/29/2021	
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

STA-5/6 Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	7,368	36,535	150,890
--Lake Inflow, ac-ft	0	N/A	9,000
Total Outflow, ac-ft	7,993	39,624	167,540
Inflow Conc., ppb	253	308	294
Outflow Conc., ppb	60	56	72
Includes Preliminary Data			

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

## STA-5/6 Weekly Status Report – 8/23/2021 through 8/29/2021



STA-5/6 Flow-Way Status				As of 8/29/2021	
Flow-Way	Vegetation Status Healthy ----- Stressed ←-----→	365-day P Loading Rate (below 1.0 g P / m <sup>2</sup> /yr is optimal)	Online / Offline / Restrictions	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
6	←-----→	1.0	Online		
7	←-----→	1.0	Online		
8	←-----→	1.0	Online		

**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,  $\mu\text{g/L}$  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 followed the Zone A1 regulation line last week. Stage on Sunday was on the line (**Figure EV-1**).

**WCA-2A:** Stage at 2A-17 returned to rising along with schedule last week, average on Sunday was 0.23 feet higher than the Zone A regulation line (**Figure EV-2**).

**WCA-3A:** The Three Gauge Average trended away from the Zone A regulation line last week. Stage ended the week at 0.27 feet below the Zone A line the same as the week prior. The WCA-3A stage at gauge 62 (Northwest corner) decreased last week. The Sunday average was 0.51 feet below the Upper Schedule (**Figures EV-3-4**).

### ***Water Depths***

The WDAT tool indicates that water levels rose across the EPA over the last two months. Depths in northeastern WCA-3A are building slowly but still drier than the surrounding regions and drier than last week. While in the upper reaches of the L-67s depths have exceeded 2.5 feet.

Some North to South hydrologic connectivity was lost within Everglades National Park (ENP) over the last month. Portions of eastern ENP remain dry or have water levels just at the ground surface (**Figure EV-5**). Over the last month, stages generally increased, most significantly in northern Big Cypress National Preserve (BCNP). Compared to a year ago, WCA-3A is significantly drier, especially in the east along the L-67 canals. Most of ENP remains drier than a year ago, some regions significantly so (**Figure EV-6**). Compared to the 20-year median water depths, much of the central and western Everglades remains in the lower 10% to 40% with significant exceptions in northeastern ENP and WCA-1 (**Figure EV-7**).

### ***Taylor Slough and Florida Bay***

An average of 2.23 inches of rain fell over Taylor Slough and Florida Bay over the week ending Sunday (8/29) with the largest daily amount falling on Thursday. Stage increased an average of 0.14 feet over the week (**Figure EV-7**) with a peak at all stations corresponding with the Thursday rainfall before decreasing towards the end of the week (**Figure EV-8**). The individual stations range from average to 3 inches above the historical averages for this time of year with Taylor Slough averaging 1.4 inches higher than the historical average. The latest phosphorus measurement at S-328 on August 24, 2021 was 10 µg/L, suggesting that the phosphorus levels are likely sufficiently low enough (below 8 µg/L) now for S-328 and G-737 to open and move water towards Everglades National Park.

Salinities in Florida Bay averaged a 1.8 decrease for the week ending August 29, 2021, but individual stations had weekly changes ranging from -4.7 to +2.6 (**Figure EV-7**). The coastal mangrove zone continued to decrease towards the near-fresh condition expected in the wet season. More freshwater will be needed to push the estuarine front out into the

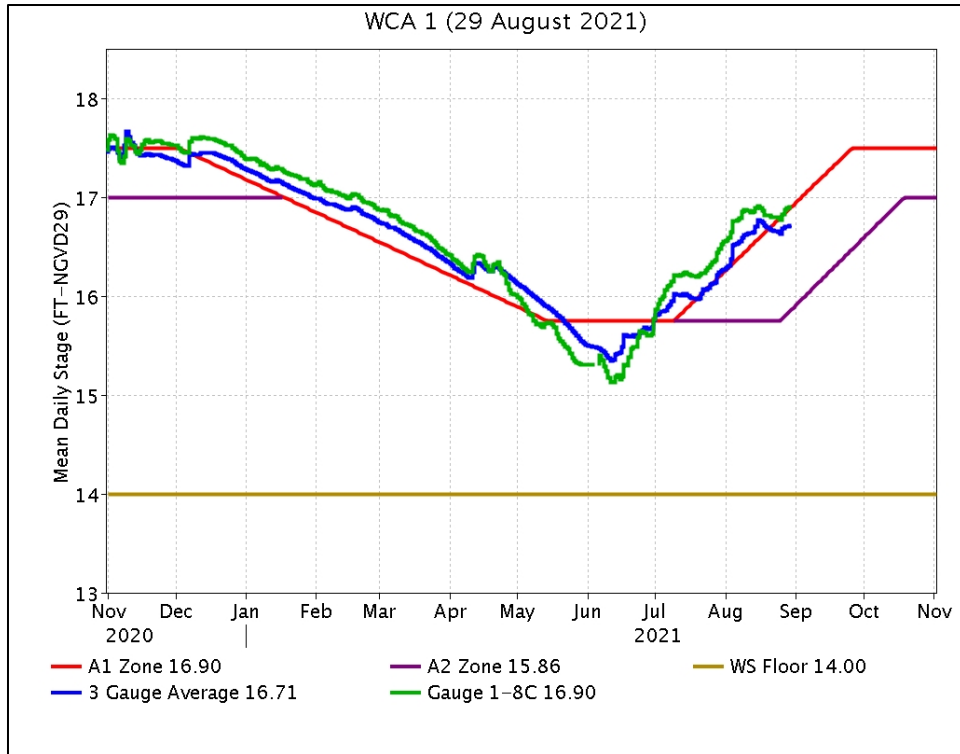
Bay. Most of the Bay is still 35 or higher. The central Florida Bay average is trending towards the 25th percentile of its historical average for August (**Figure EV-9**), but the historical range drops for September so conditions are not as low as one may think based on August data.

### ***Water Management Recommendations***

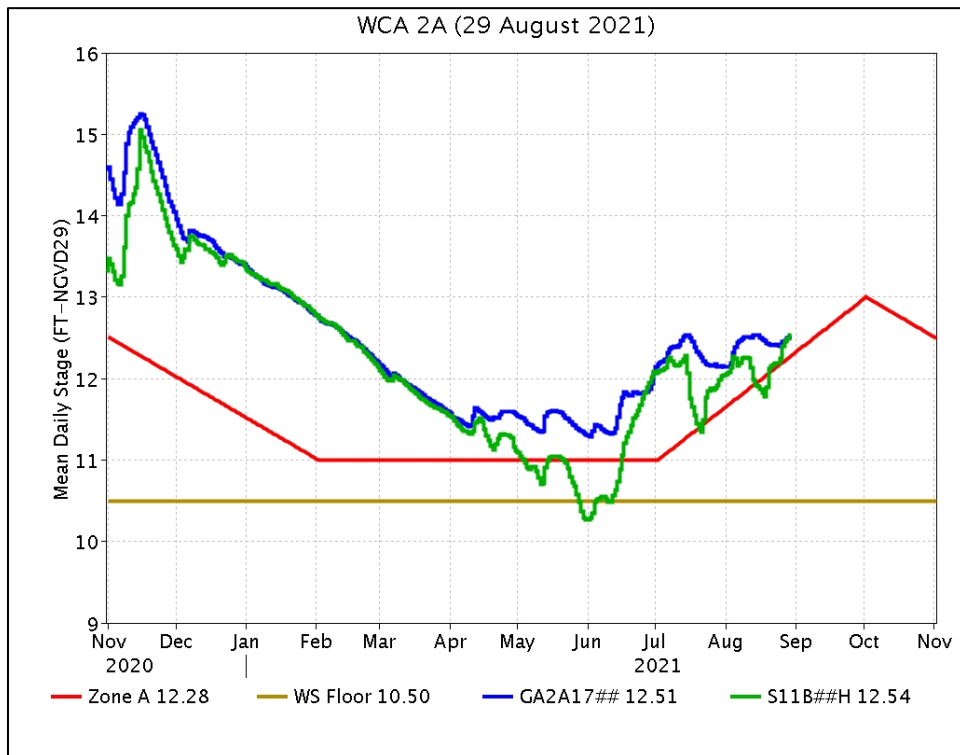
Ascension rates that do not exceed 0.25 feet per week or 0.50 feet per two weeks are considered ecologically healthy. Flows into northeastern WCA-3A continue to have an ecological benefit. In TS, areas near the S-328 continue to have elevated levels of phosphorus but are expected to decrease to below 8 ppb soon. These structures should not be opened until the phosphorus levels return to below that threshold at that structure. 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	1.72	+0.06
WCA-2A	1.03	+0.10
WCA-2B	0.56	-0.12
WCA-3A	1.02	-0.04
WCA-3B	0.46	-0.02
ENP	1.04	-0.08

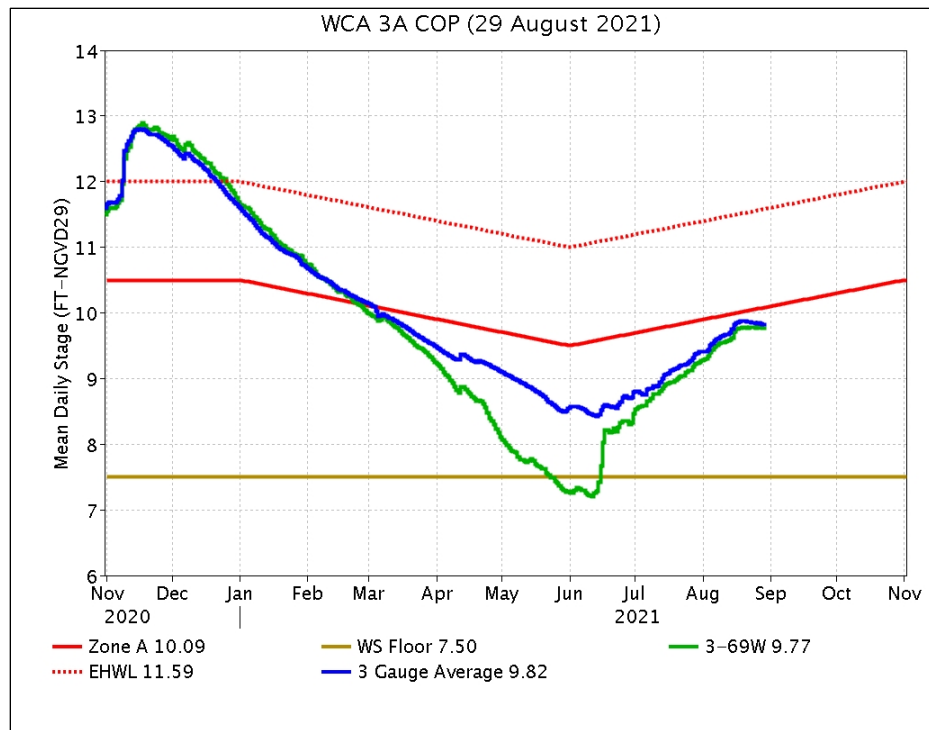


**Figure EV-1.** WCA-1 stage hydrographs and regulation schedule.

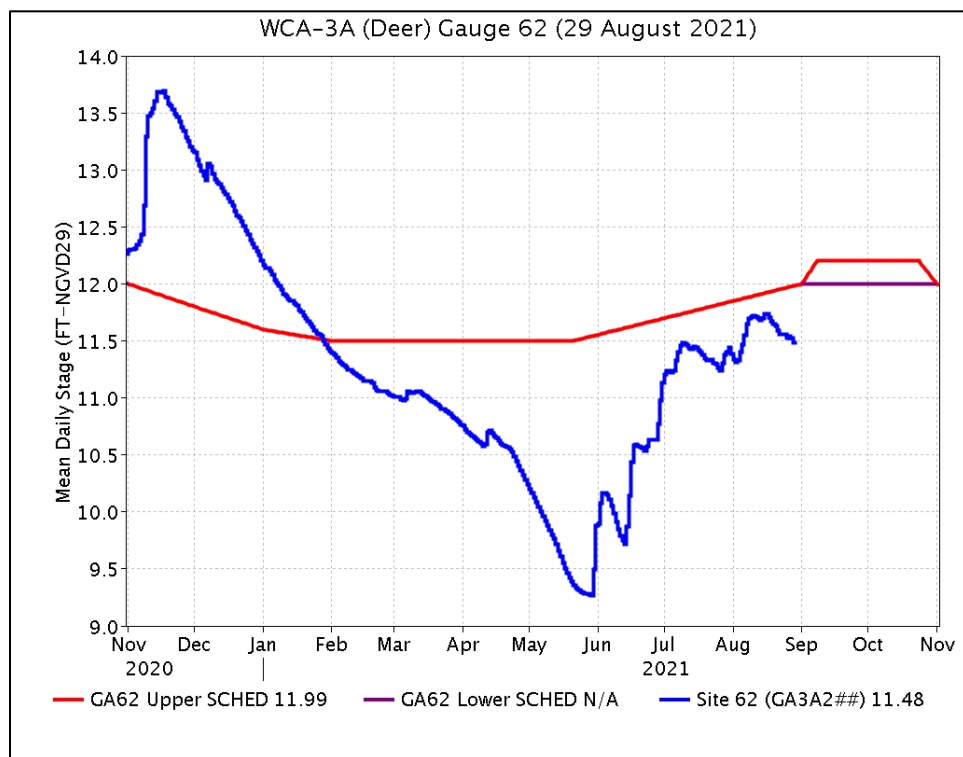


**Figure EV-2.** WCA-2A stage hydrographs and regulation schedule.

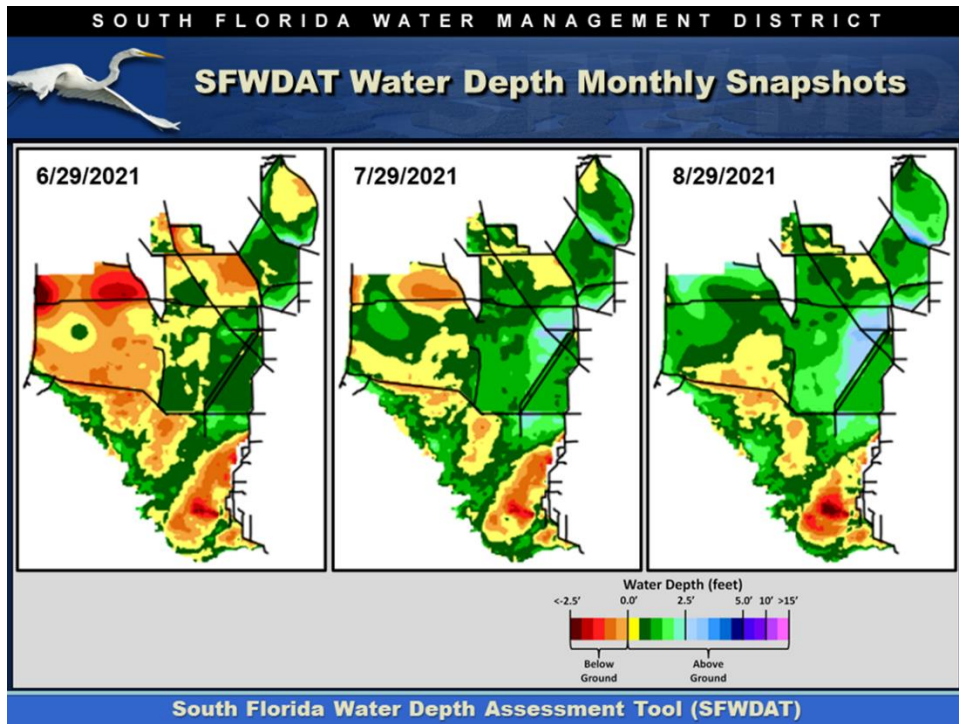




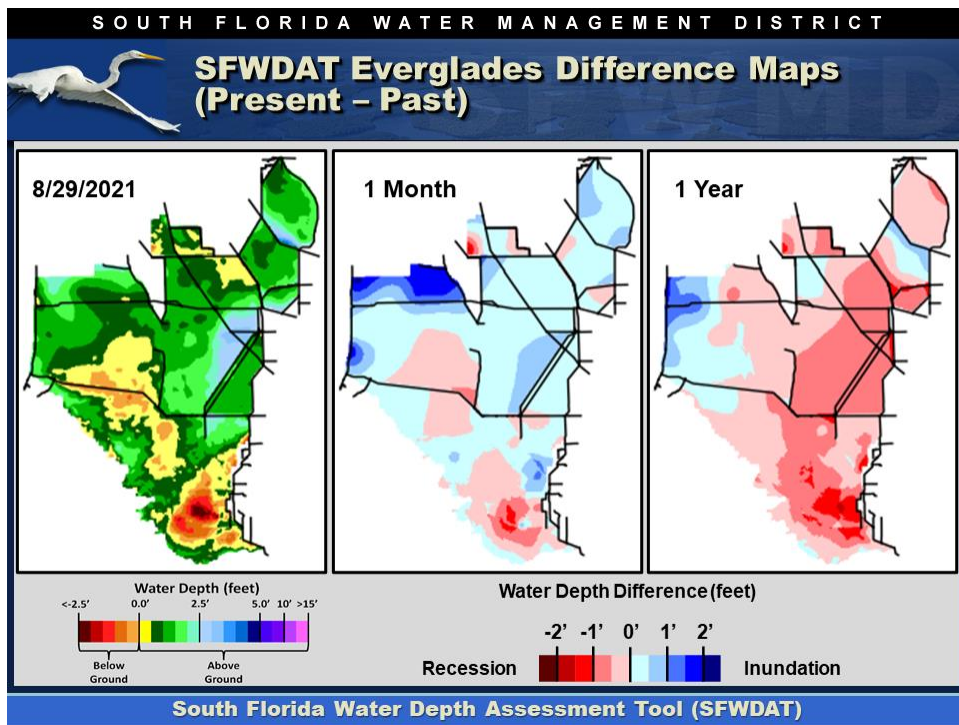
**Figure EV-3.** WCA-3A stage hydrographs (three-gauge average, S-333 headwater) and regulation schedule.



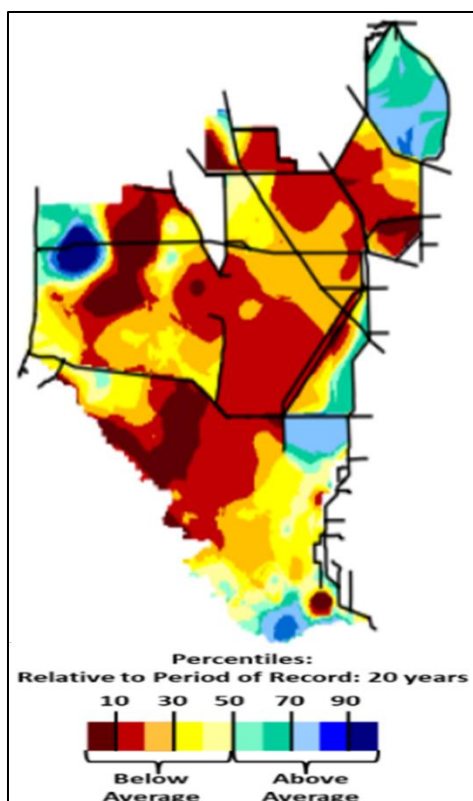
**Figure EV-4.** WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.



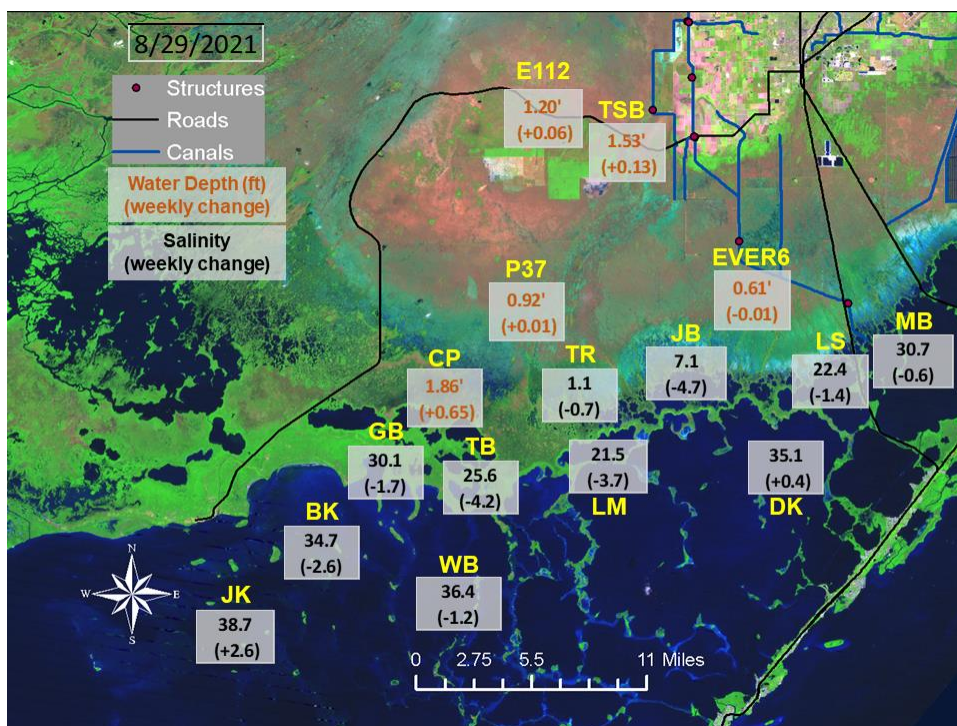
**Figure EV-5.** Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.



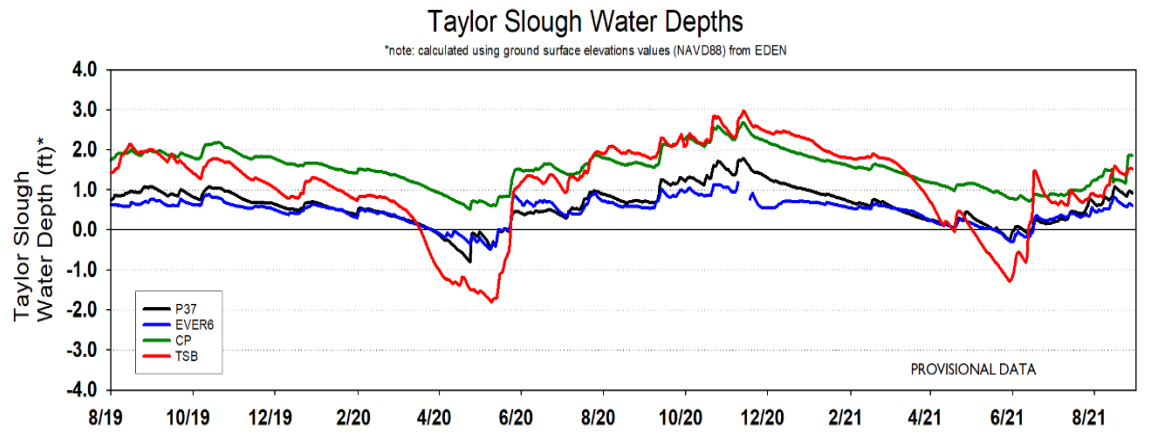
**Figure EV-6.** Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.



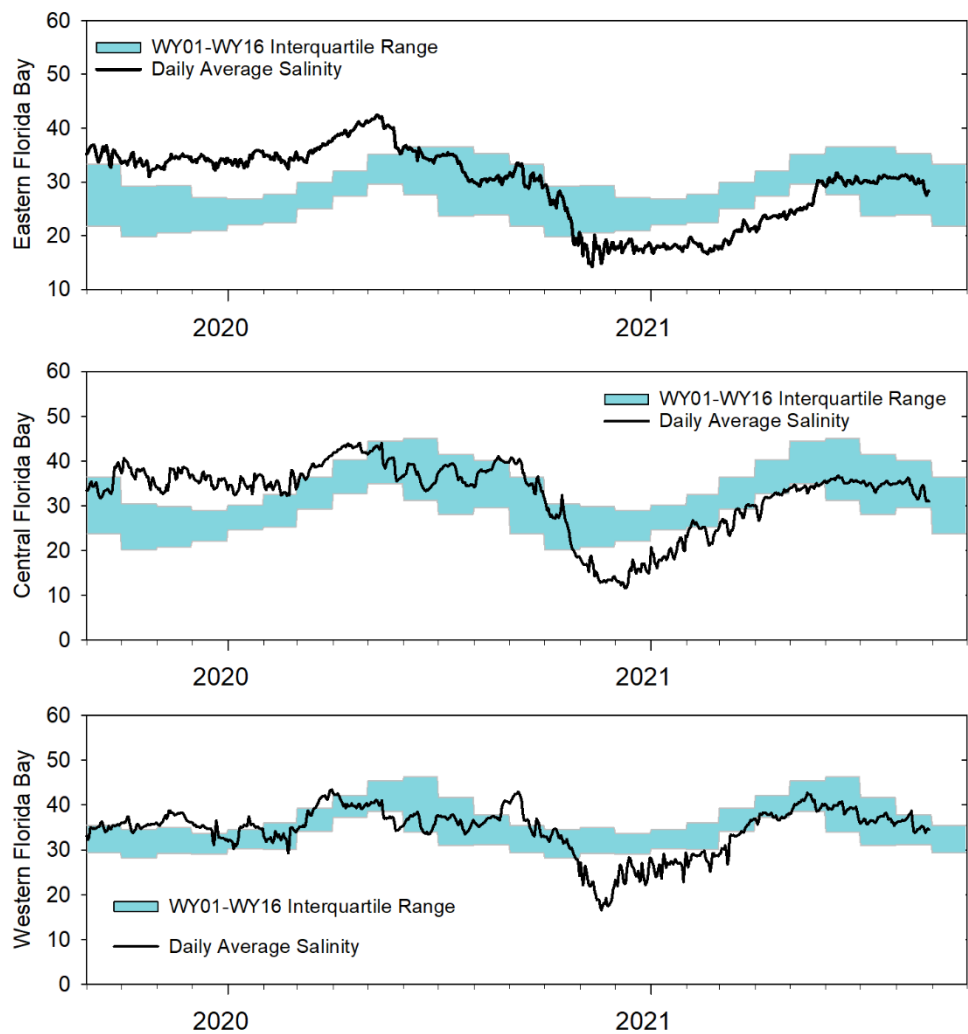
**Figure EV-7.** Present water depths compared to the day of year median over the previous 20 years.



**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

<b>SFWMD Everglades Ecological Recommendations, August 31st, 2021 (red is new)</b>			
<b>Area</b>	<b>Weekly change</b>	<b>Recommendation</b>	<b>Reasons</b>
<b>WCA-1</b>	Stage increased by 0.06'	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.
<b>WCA-2A</b>	Stage increased by 0.10'	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.
<b>WCA-2B</b>	Stage decreased by 0.12'	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.
<b>WCA-3A NE</b>	Stage decreased by 0.18'	Initiate an ascension rates to less than 0.50 feet per two weeks.	Protect within basin peat soils and downstream habitat and wildlife.
<b>WCA-3A NW</b>	Stage decreased by 0.06'	Initiate an ascension rates of less than 0.25 feet per week or 0.50 feet per two weeks.	
<b>Central WCA-3A S</b>	Stage increased by 0.07'	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.
<b>Southern WCA-3A S</b>	Stage increased by 0.02'		
<b>WCA-3B</b>	Stage decreased by 0.02'	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.
<b>ENP-SRS</b>	Stage decreased by 0.08'	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.
<b>Taylor Slough</b>	Stage changes ranged from -0.17' to +0.01'	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
<b>FB- Salinity</b>	Salinity changes ranged -5.7 to +2.0	Move water southward as possible.	When available, provide freshwater to maintain low salinity buffer and promote water movement.