

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 3, 2022

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

### **Summary**

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

Calm winds will allow remnant moisture from a previous passing tropical wave to stick around until Thursday when a drier air mass over the Bahamas moves in. Afterwards, moisture over the central Atlantic is expected to move westward towards Florida. This return of deep tropical moisture and associated instability could cause potentially heavy rains Friday-Saturday. However, there is quite a bit of spread in the model guidance regarding the amount of moisture that could be present. For now, it looks like Saturday could feature the heaviest rainfall. The total average SFWMD rainfall ending next Tuesday morning will likely be slightly below normal for this time of the year but could be slightly above normal if the rainfall this weekend is at the upper end of the model solutions. There are equal chances that the total average rainfall during the week 2 period could be near normal or below average as well.

#### **Kissimmee**

Flow at S-59 and S-61 is being adjusted as needed to allow stage to rise gradually in East Toho and Toho, respectively. Flow at S-65/S-65A was reduced to 0 cfs to slow the stage decline in KCH, although some releases were made from S-65A to control a rainfall-driven stage rise in Pool A. Water depth on the Kissimmee River floodplain declined over the week, with a mean depth of 0.16 feet on July 31, 2022. The concentration of dissolved oxygen in the Kissimmee River increased slowly over the week to 4.0 mg/L.

#### **Lake Okeechobee**

Lake Okeechobee stage was 12.96 feet NGVD on July 31, 2022, with water levels 0.06 feet higher than a month ago (**Figure LO-1**). Lake stage on July 31, 2022 was in the Base Flow sub-band (**Figure LO-2**) and within the ecological envelope (**Figure LO-3**). Average daily inflows (excluding rainfall) decreased from the previous week, going from 589 cfs to 321 cfs. Average daily outflows (excluding evapotranspiration) were similar, going from 0 cfs to 73 cfs. The most recent satellite image (August 1, 2022) from NOAA's Harmful Algal

Bloom Monitoring System showed that bloom potential was moderate to high in the northern, western, and eastern nearshore areas of the Lake (**Figure LO-6**). The bloom potential increased compared to the previous week. The July 18 - 20 routine phytoplankton monitoring survey on the Lake revealed that 22% of the sites had chlorophyll *a* concentration above 40 µg/L. The highest chlorophyll *a* concentration (75.8 µg/L) was recorded at the NCENTER site in the northern part of the Lake (**Figure LO-7**). Concentrations of total microcystins at all sampling locations were below the 8 µg/L USEPA standard for recreational waters. The highest toxin concentration (2.8 µg/L) was also recorded at the NCENTER site (**Figure LO-7**).

## **Estuaries**

Total inflow to the St. Lucie Estuary averaged 308 cfs over the past week with no flow coming from Lake Okeechobee. Mean salinities increased at HR1 and A1A Bridge and remained the same at US1 Bridge over the past week. Salinity in the middle estuary was within the optimal range (10-25) for adult eastern oysters.

Total inflow to the Caloosahatchee Estuary averaged 1,265 cfs over the past week with 6 cfs coming from the Lake. Mean salinities remained the same at S-79 and increased at the remaining sites within the estuary over the past week. Salinities were in the optimal range (0-10) for tape grass in the upper estuary. Salinities were in the optimal range (10-25) for adult eastern oysters at Cape Coral and in the stressed range at Shell Point and Sanibel (>25).

## **Stormwater Treatment Areas**

For the week ending Sunday, July 31, 2022, no Lake Okeechobee water was delivered to the FEBs/STAs. The total amount of Lake releases sent to the FEBs/STAs in WY2023 (since May 1, 2022) is approximately 12,400 ac-feet. The total amount of inflows to the STAs in WY2023 is approximately 411,000 ac-feet. Most STA cells are near or above target stage. STA-1E Western Flow-way is offline for post-construction vegetation grow in. Additionally, STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown, STA-2 Flow-way 2 is offline for construction activities, and STA-5/6 Flow-way 4 is offline for vegetation management activities. Operational restrictions are in effect in STA-1E Central and Eastern Flow-ways, STA-1W Eastern, Western, and Northern Flow-ways, and STA-2 Flow-ways 3 and 4 for vegetation management activities. This week, there is no capacity for Lake releases in the STAs.

## **Everglades**

Ascension rates remained in the “poor” category in WCA-3A last week as scattered rainfall across the EPA meant declining water stages in some regions, generally not considered ecologically beneficial in the wet season. Northeastern WCA-3A stage change was less dramatic than the previous week. Taylor Slough stages increased slightly last week and remain above average. Salinities decreased across Florida Bay last week on

average including the western and nearshore stations which have been experiencing higher salinities.

## **Biscayne Bay**

Total inflow to Biscayne Bay averaged 510 cfs and the previous 30-day mean inflow averaged 294 cfs. The seven-day mean salinity was 25.0 at BBCW8 and 17.6 at BBCW10, both below the preferred maximum salinity of 35 for these sites. Salinity data provided as a courtesy by Biscayne National Park.

## **Supporting Information**

### **Kissimmee Basin**

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

On July 31, 2022, lake stages were 55.4 feet NGVD (1.1 feet below schedule) in East Lake Toho, 53.0 feet NGVD (0.5 feet below schedule) in Lake Toho, and 49.3 feet NGVD (1.7 feet below schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1, Figures KB-1-3**).

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

Discharges to the Kissimmee River were reduced to 0 cfs at S-65 and S-65A on Wednesday June 22, 2022 to slow the rate of stage decline in KCH. Discharges on July 31, 2022 were 0 cfs at S-65 and 100 cfs at S-65A; the discharge at S-65A was to control the rise in S-65A headwater stage. Discharges from the Kissimmee River were 370 cfs at S-65D and 330 cfs at S-65E (**Table KB-2**). Headwater stages were 46.5 feet NGVD at S-65A and 26.2 feet NGVD at S-65D on July 31, 2022. Over the week ending July 31, 2022, mean river channel stage increased by 2.1 ft NGVD as S-65A discharge increased to 230 cfs (**Figure KB-4**); however, with discharge still below bankfull, water depth on the Kissimmee River floodplain declined over the week, with a mean depth of 0.16 feet on July 31, 2022 (**Figure KB-5**). The concentration of dissolved oxygen in the Kissimmee River increased slowly over the last week to 4.0 mg/L (**Table KB-2, Figure KB-6**).

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

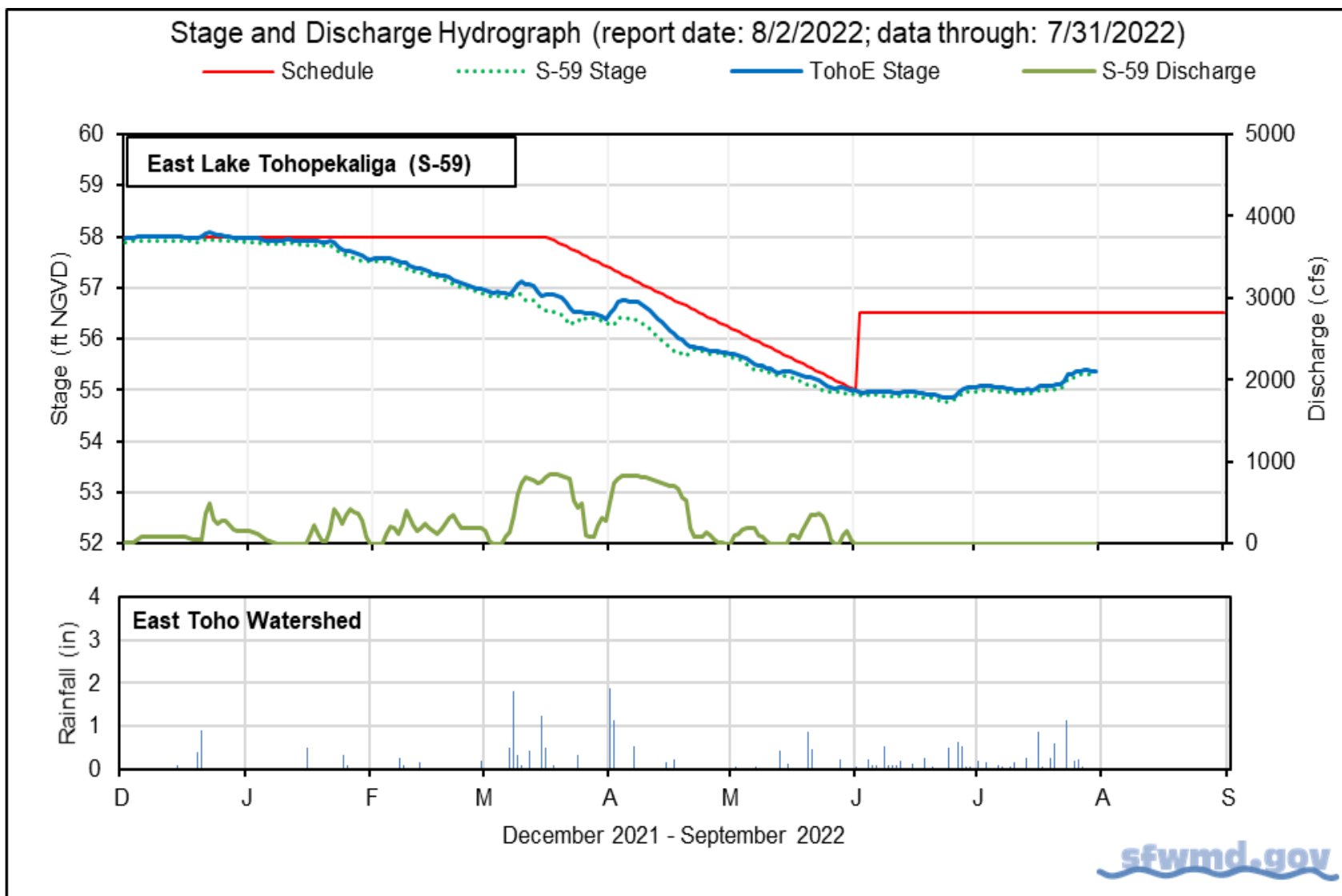
When possible, limit stage ascension rates in Lakes East Toho, Toho and KCH to a preferred maximum of 0.5 ft/14 days. Encourage stage in KCH to rise gradually by continuing 0 cfs discharge at S-65 and S-65A except when S-65A flow can be increased to manage stage in Pool A. Note general guidance for discharge and maximum rates of change in discharge (**Figure KB-7**).

**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.

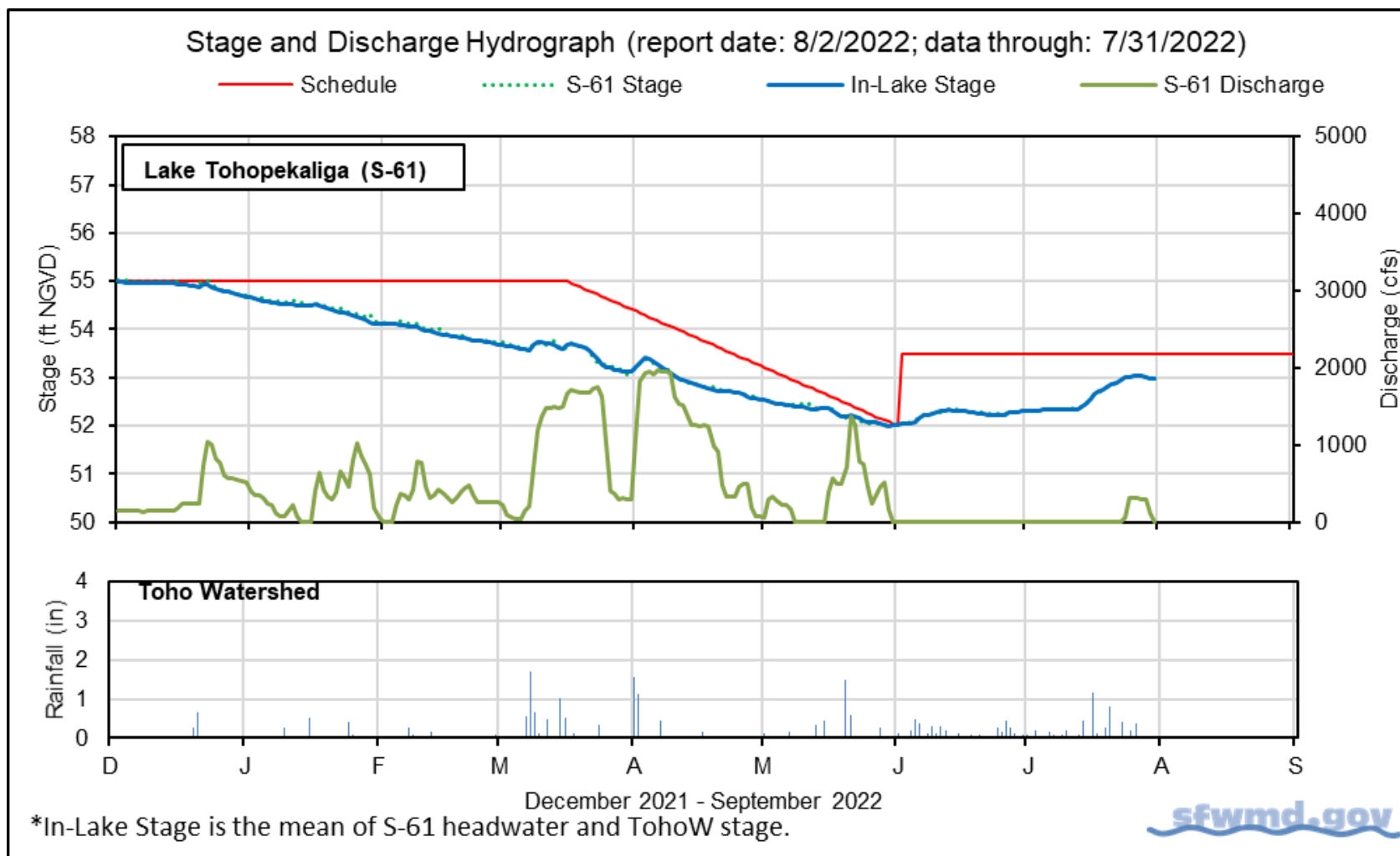
Water Body	Structure	Stage Monitoring Site	7-Day Average Discharge (cfs)	Lake Stage (feet NGVD) <sup>a</sup>	Schedule Type <sup>b</sup>	Schedule Stage (feet NGVD)	Departure from Regulation (feet)	
							7/31/22	7/24/22
Lakes Hart and Mary Jane	S-62	LKMJ	0	60.0	R	60.0	0.0	-0.2
Lakes Myrtle, Preston and Joel	S-57	S-57	0	60.6	R	61.0	-0.4	-0.5
Alligator Chain	S-60	ALLI	0	62.4	R	63.2	-0.8	-0.8
Lake Gentry	S-63	LKGT	0	60.0	R	61.0	-1.0	-1.0
East Lake Toho	S-59	TOHOE	0	55.4	R	56.5	-1.1	-1.2
Lake Toho	S-61	TOHOW S-61	232	53.0	R	53.5	-0.5	-0.5
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	0	49.3	R	51.0	-1.7	-1.9

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.

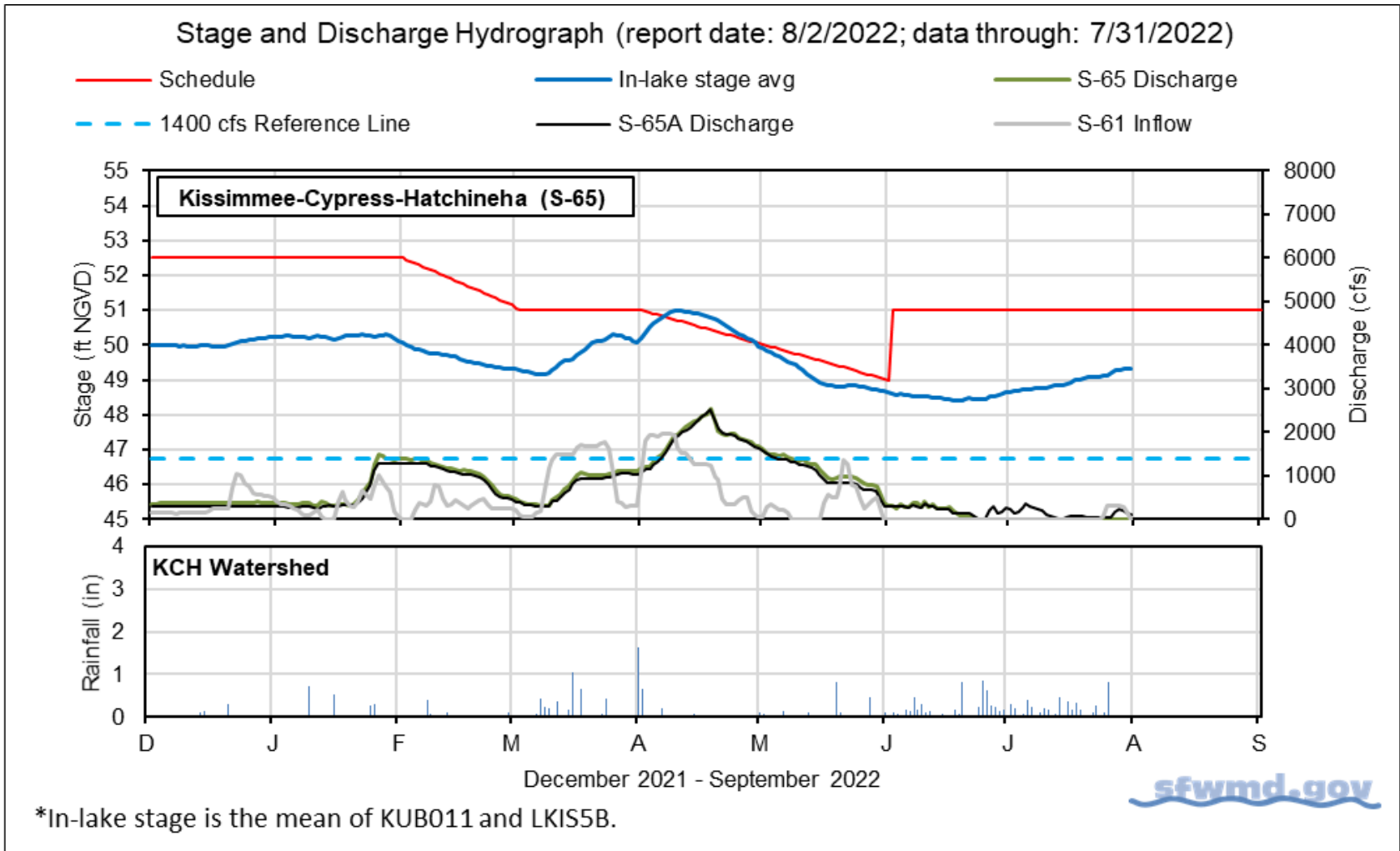
b. A: projected recession line; R: USACE regulation schedule; S: temporary recession target line; T: temporary schedule; NA: not applicable or not available.



**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			
		7/31/22	7/31/22	7/24/22	7/17/22	7/10/22
Discharge	S-65	0	0	0	0	0
Discharge	S-65A <sup>a</sup>	100	130	40	50	250
Headwater Stage (feet NGVD)	S-65A	46.5	46.6	46.5	46.3	46.5
Discharge	S-65D <sup>b</sup>	370	220	120	150	340
Headwater Stage (feet NGVD)	S-65D <sup>c</sup>	26.2	26.2	26.2	26.2	26.2
Discharge (cfs)	S-65E <sup>d</sup>	330	180	90	140	270
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) <sup>e</sup>	Phase I, II/III river channel	4.0	3.5	3.1	3.0	4.2
Mean depth (feet) <sup>f</sup>	Phase I floodplain	0.16	0.18	0.23	0.25	0.32

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.

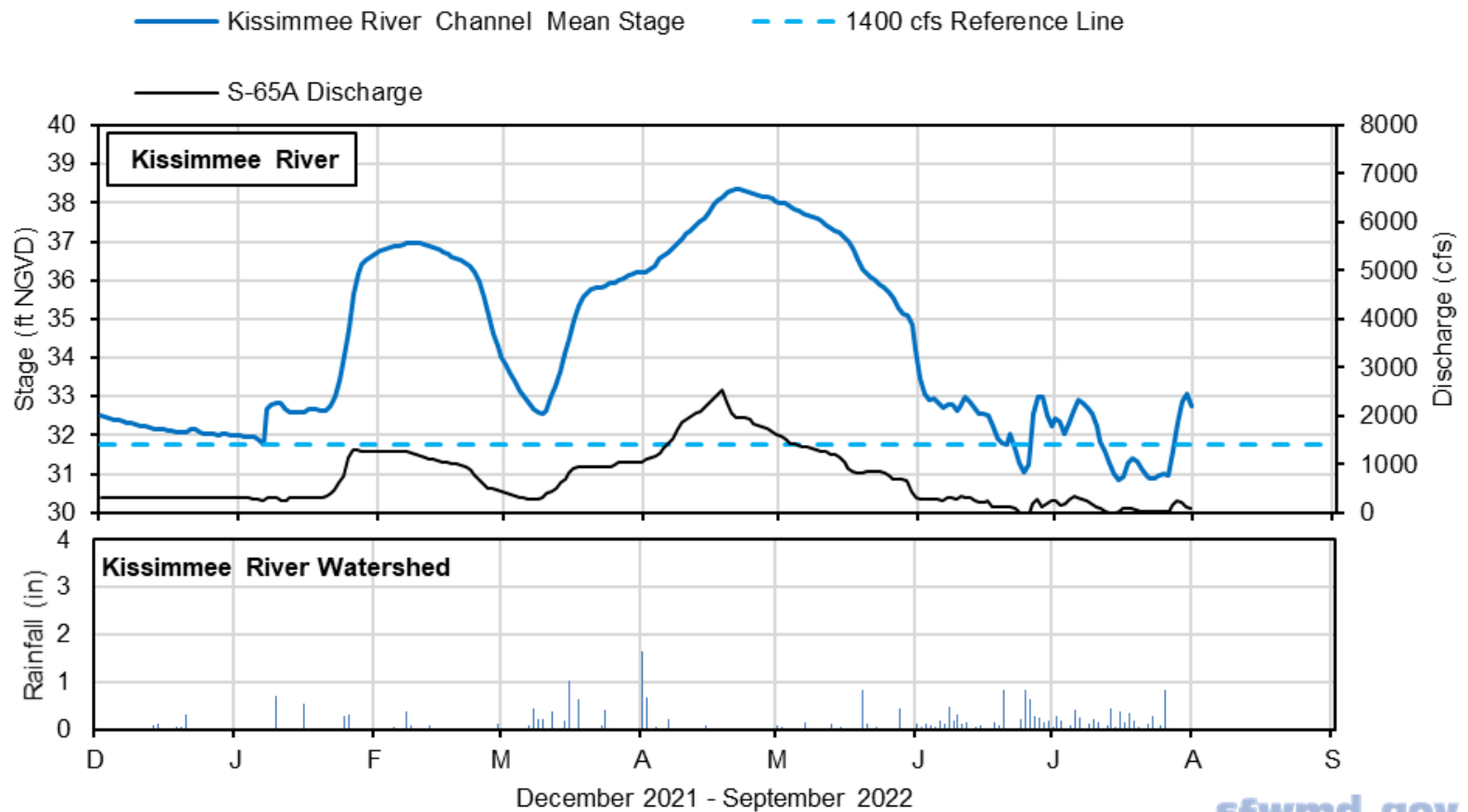
d. Combined discharge from S-65E and S-65EX1.

e. Dissolved oxygen is the average of values from sondes KRBN, PC62, PC33, PD62R and PD42R.

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



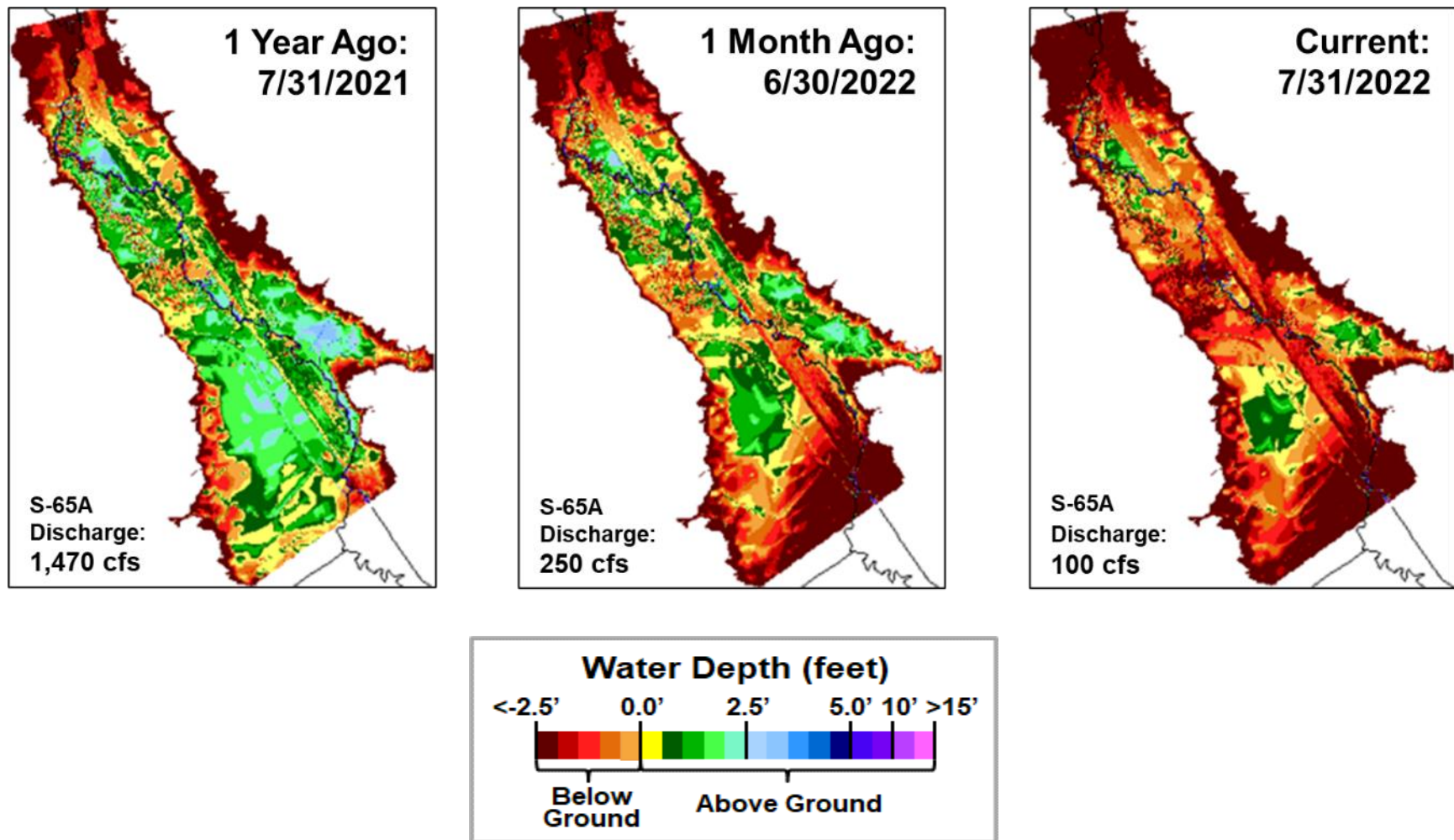
Stage and Discharge Hydrograph (report date: 8/2/2022; data through: 7/31/2022)



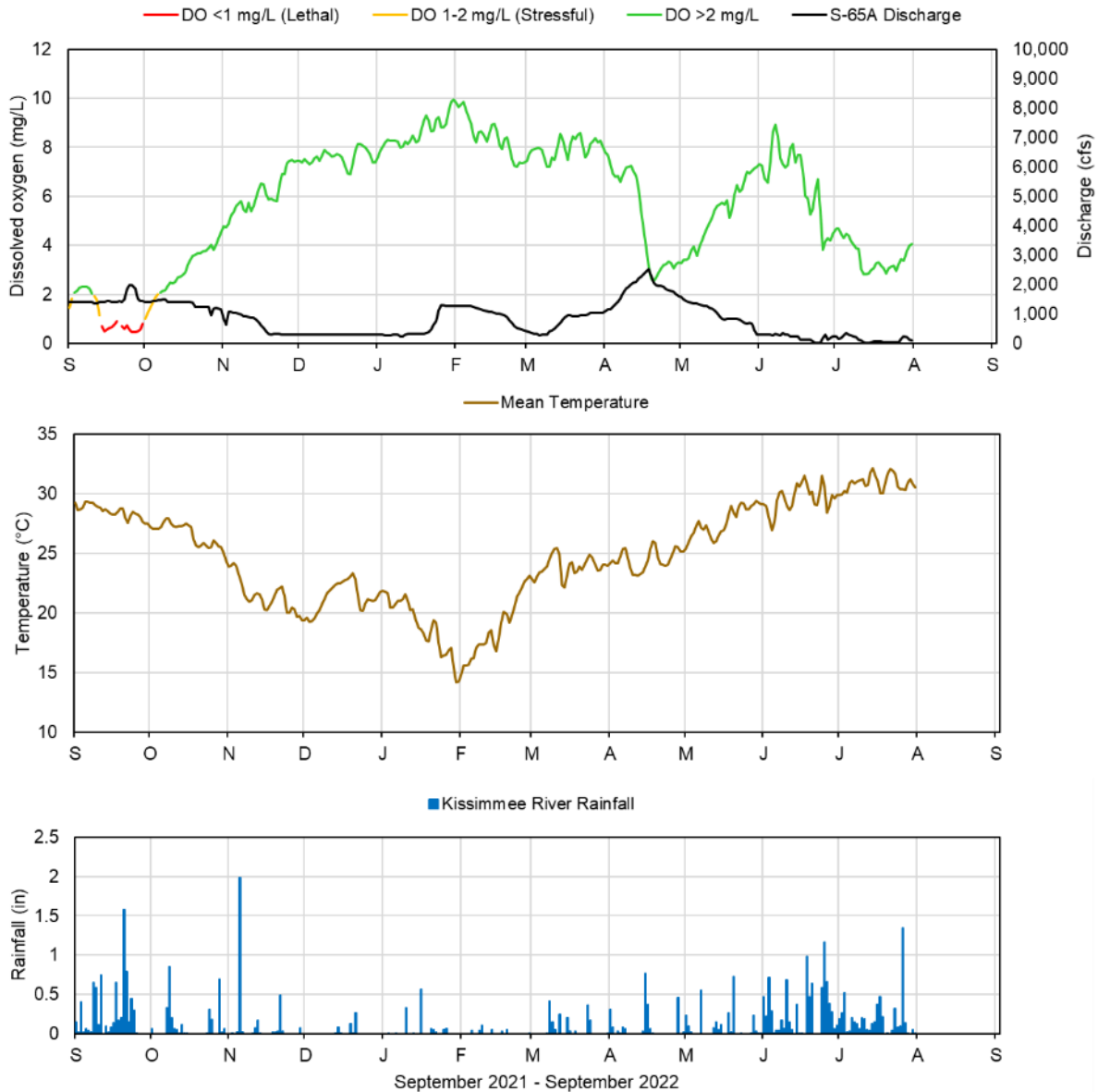
\*River Channel Stage is the average for PC62, KRDR02, KRBN, PC33, and PC11.

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

**Figure KB-4.** Kissimmee River stage, discharge and rainfall.



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



Report Date: 8/2/2022; data are through: 7/31/2022

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**Figure KB-6.** 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, KRDR02, KRBN, PC33, PC11, PD62R, and PD42R with an average of three stations reporting this week. Rainfall values are daily totals for Kissimmee River (Pool BCD) AHED watershed.

# SOUTH FLORIDA WATER MANAGEMENT DISTRICT

## Stage and Discharge Guidance for 2021-2022.

Zone	KCH Stage (ft NGVD)	S-65/S-65A Discharge*
A	Above regulation schedule line.	Flood control releases as needed with no limits on the rate of discharge change.
B1	In flood control buffer zone (0.5 ft below the schedule line).	Adjust S-65 discharge so that S-65A discharge is between 1400 cfs at the buffer zone line and 3000 cfs at the schedule line.
B2	Between the Flood Control Buffer and the 50.0 ft line.	Adjust S-65 discharge to maintain at least 1400 cfs at S-65A. Use $\pm 0.2$ ft buffer (gray band) above and below the 50.0 ft line to decide when to begin ramping up to 1400 cfs or down to 300 cfs; do not continue reducing discharge if stage rises back to or above the threshold stage line.
B3	Between the 50.0 ft line and 49 ft.	Adjust S-65 discharge to maintain at least 300 cfs at S-65A.
B4	Between 48.5 ft to 49 ft.	Adjust S-65 discharge to maintain S-65A discharge between 0 cfs at 48.5 ft and 300 cfs at 49 ft.
C	Below 48.5 ft.	0 cfs.

\*Changes in discharge should not exceed limits in inset table below.

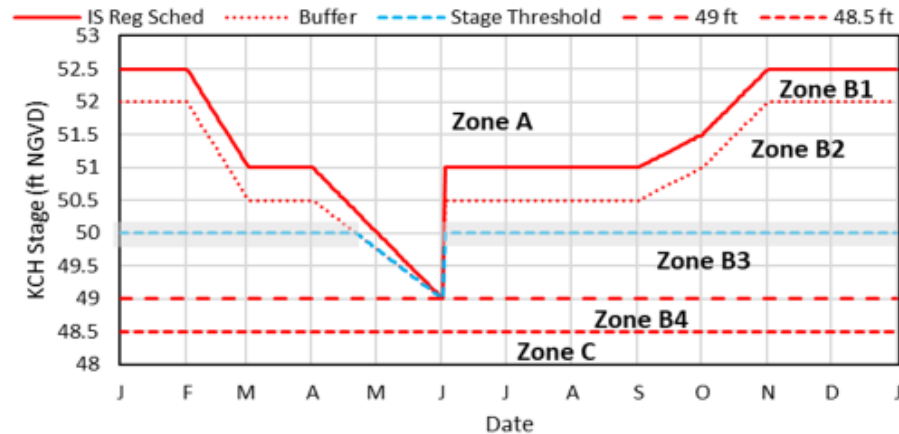
Table KB-3. Discharge Rate of Change Limits for S65/S65A (revised 1/14/19).

Q (cfs)	Maximum rate of INCREASE (cfs/day)	Maximum rate of DECREASE (cfs/day)
0-300	100	-50
301-650	150	-75
651-1400	300	-150
1401-3000	600	-600
>3000	1000	-2000

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

## 2021-2022 Discharge Plan for S-65/S-65A

### Preferred Discharge Plan for S-65/S-65A (IS-14-50.0)



#### Other Considerations

- When possible, limit lake ascension rate in the Jun 1 - Aug 15 window to 0.25 ft per 7 days in Lakes Kissimmee, Cypress, Hatchineha (S-65), East Toho (S-59) and Toho (S-61).
- If outlook is for extreme dry conditions meet with KB staff to discuss modifications to this plan.

Slide Revised 1/3/2022

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**Figure KB-7.** IS-14-50 Discharge Plan for S65/S65A with discharge rate of change limits (revised 1/14/19).

## Lake Okeechobee

Lake Okeechobee stage was 12.96 feet NGVD on July 31, 2022, with water levels 0.06 feet higher than a month ago (**Figure LO-1**). Lake stage was in the Base Flow sub-band (**Figure LO-2**) and in the ecological envelope. Lake stage remained within ecological envelope and has been within it for more than 80% of 2022 (**Figure LO-3**). According to NEXRAD, 0.58 inches of rain fell directly on the Lake last week.

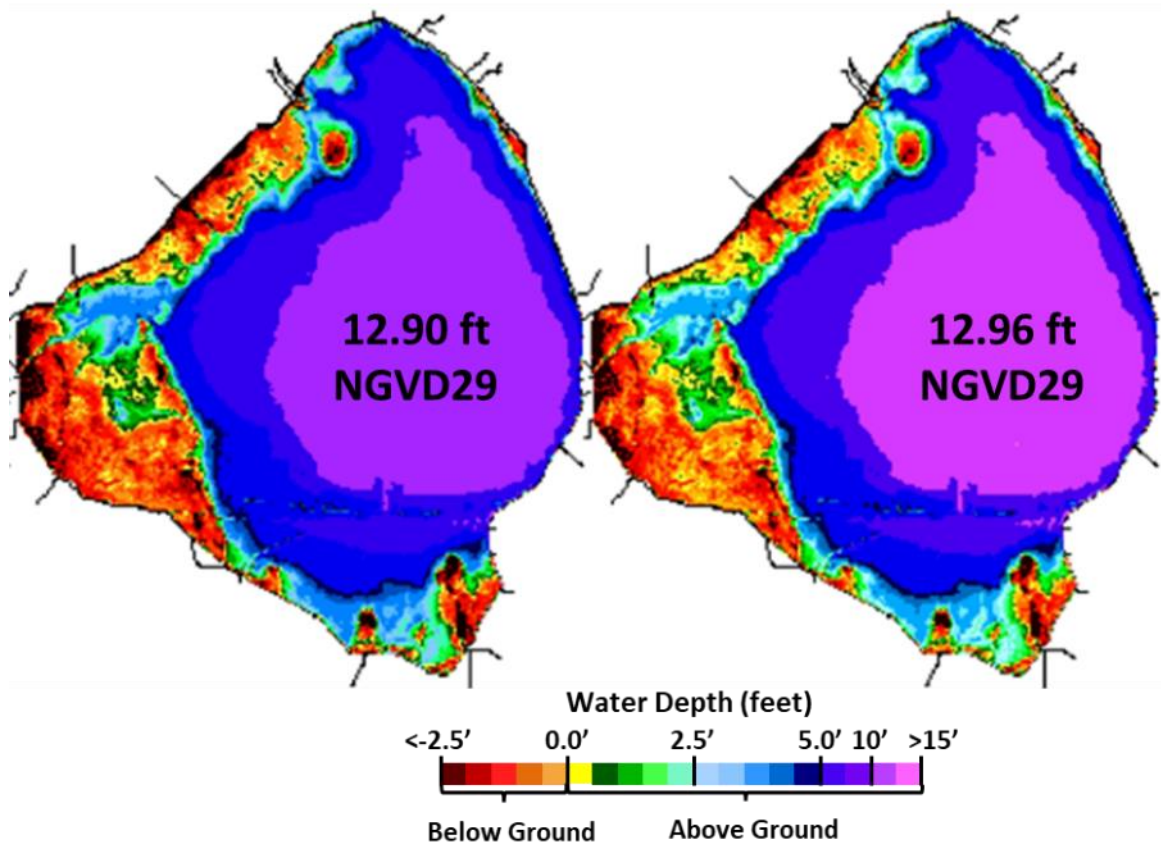
Average daily inflows (excluding rainfall) decreased from the previous week, going from 589 cfs to 321 cfs. Average daily outflows (excluding evapotranspiration) increased, going from 0 cfs to 73 cfs. The highest inflow came from the Kissimmee River via the S-65E and S-65EX1 structures (179 cfs). Backflow into the Lake from the C-44 Canal via the S-308 structure averaged 20 cfs. **Figures LO-4 and LO-5** show the combined average daily inflows and outflows for the Lake over the past eight weeks, and average inflows and outflows last week, respectively. These data are provisional and are subject to change.

The most recent satellite image (August 1, 2022) from NOAA's Harmful Algal Bloom Monitoring System showed that bloom potential was moderate to high in the northern, western, and eastern nearshore areas of the Lake (**Figure LO-6**). The bloom potential increased compared to the previous week. The July 18 - 20 routine phytoplankton monitoring survey on the Lake revealed that 22% of the sites had chlorophyll *a* concentration above 40 µg/L (Lake-wide bloom threshold). The highest chlorophyll *a* concentration (75.8 µg/L) was recorded at the NCENTER site in the northern part of the Lake (**Figure LO-7**). Concentrations of total microcystins at all sampling locations were below the 8 µg/L USEPA standard for recreational waters. The highest toxin concentration (2.8 µg/L) was also recorded at the NCENTER site (**Figure LO-7**).

## Changes in Water Depth

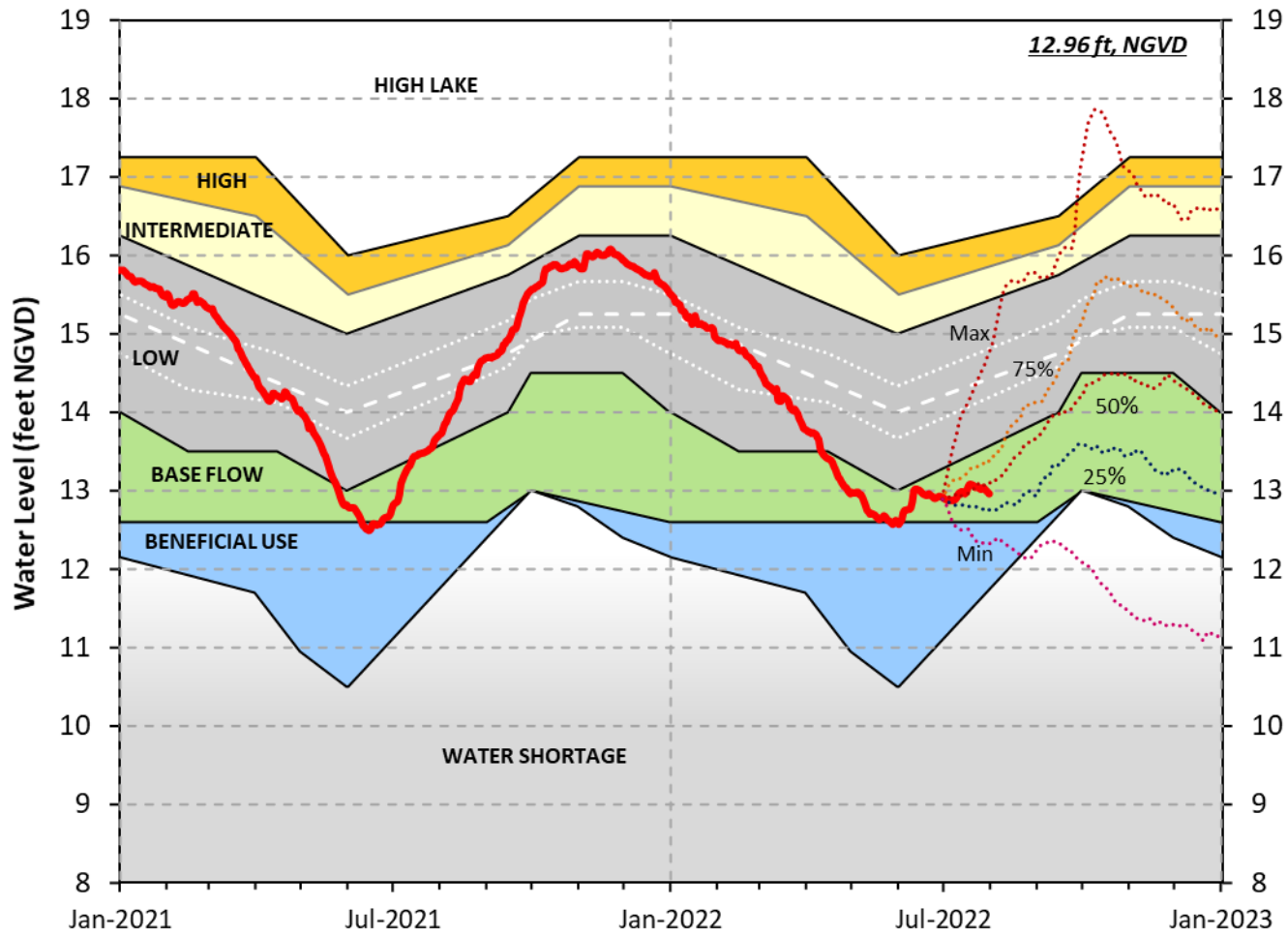
1 Month Ago:  
07/01/2022

Current:  
07/31/2022



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

## Lake Okeechobee Water Level History and Projected Stages

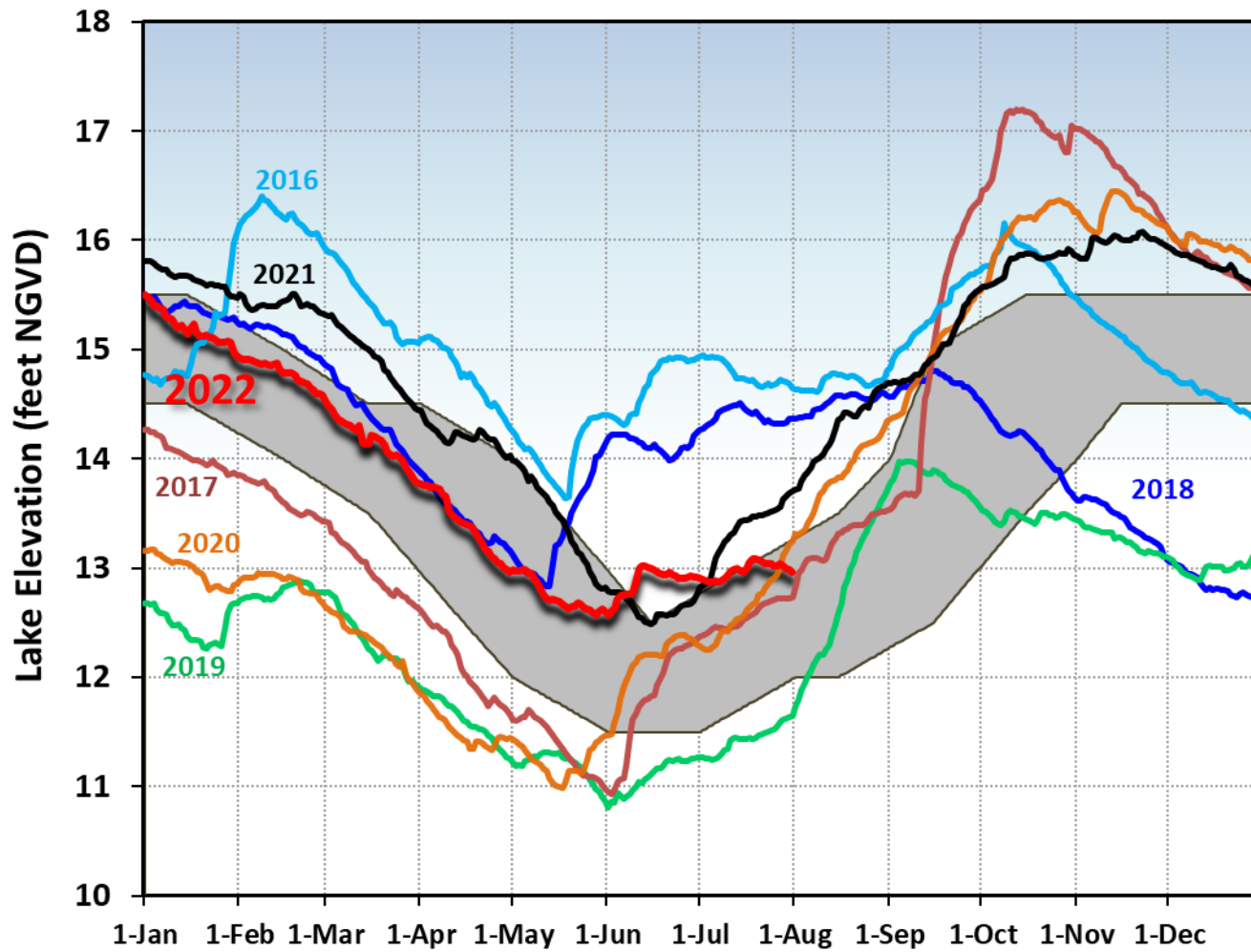


LORS-2008 - Adopted by USACE 28-

**Figure LO-2.** Recent Lake Okeechobee stages with projected stages based on a dynamic position analysis.

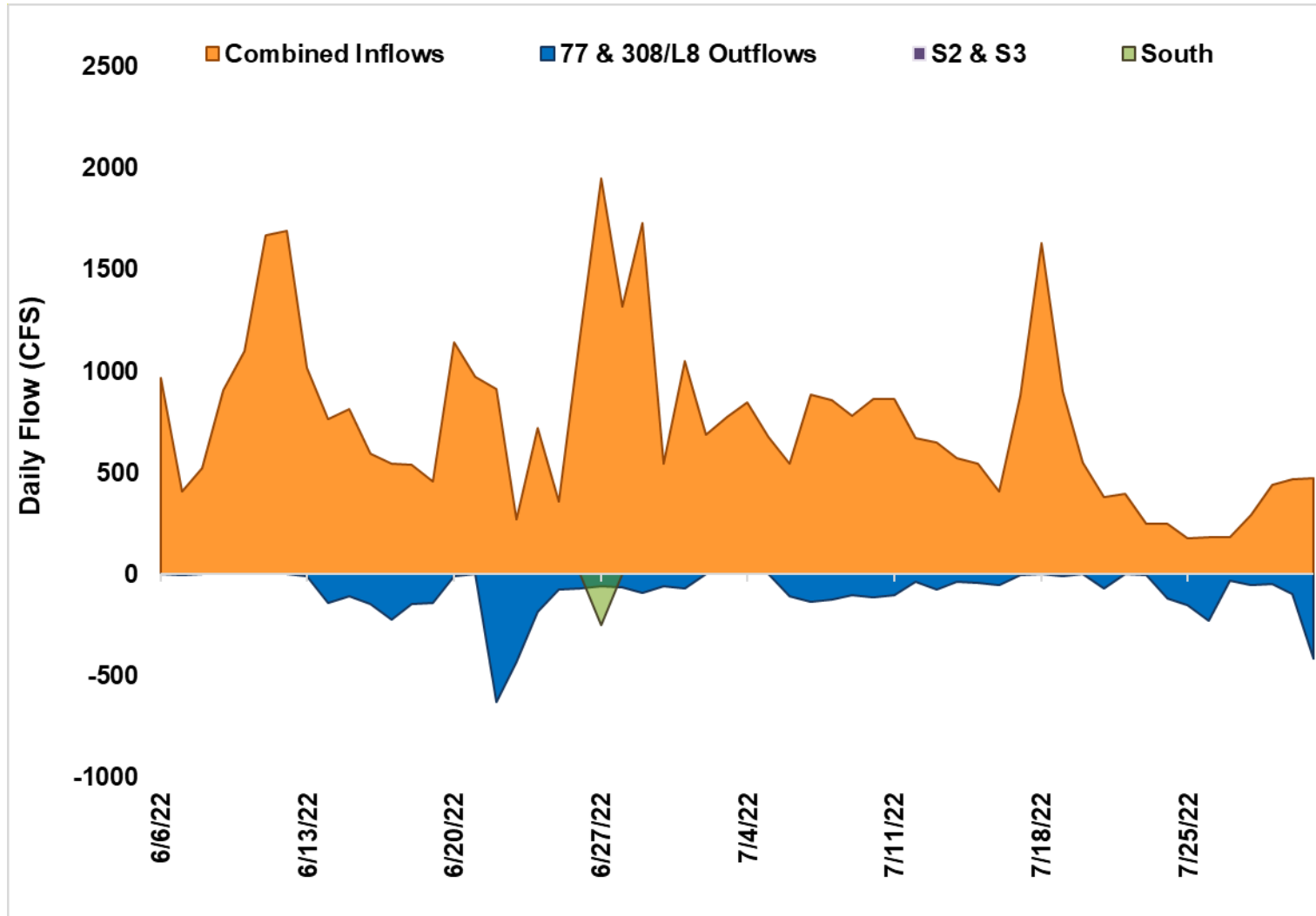


## Lake Okeechobee Stage vs Ecological Envelope

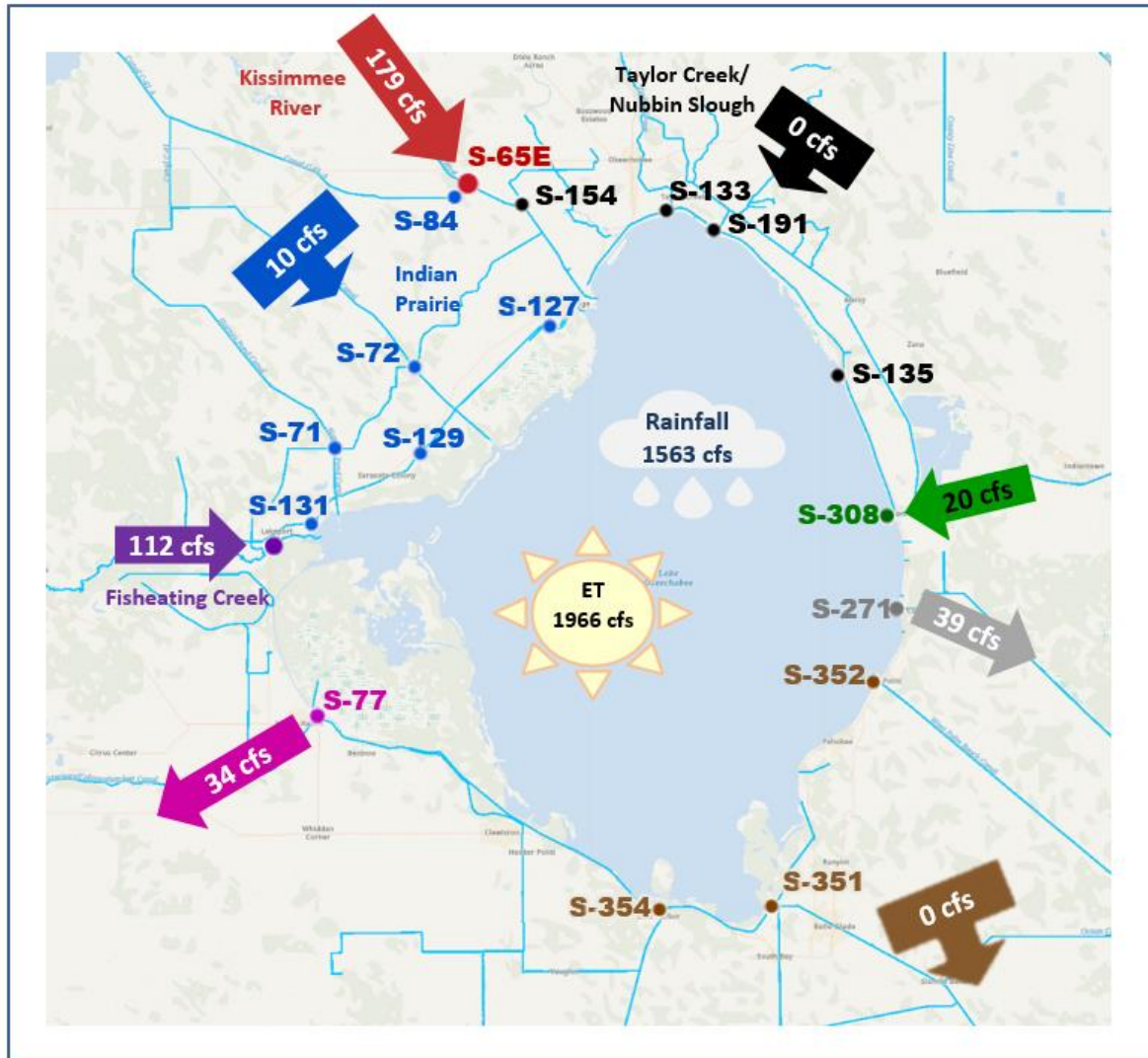


**Figure LO-3.** The prior six years of annual stage hydrographs for Lake Okeechobee in comparison to the ecological envelope.

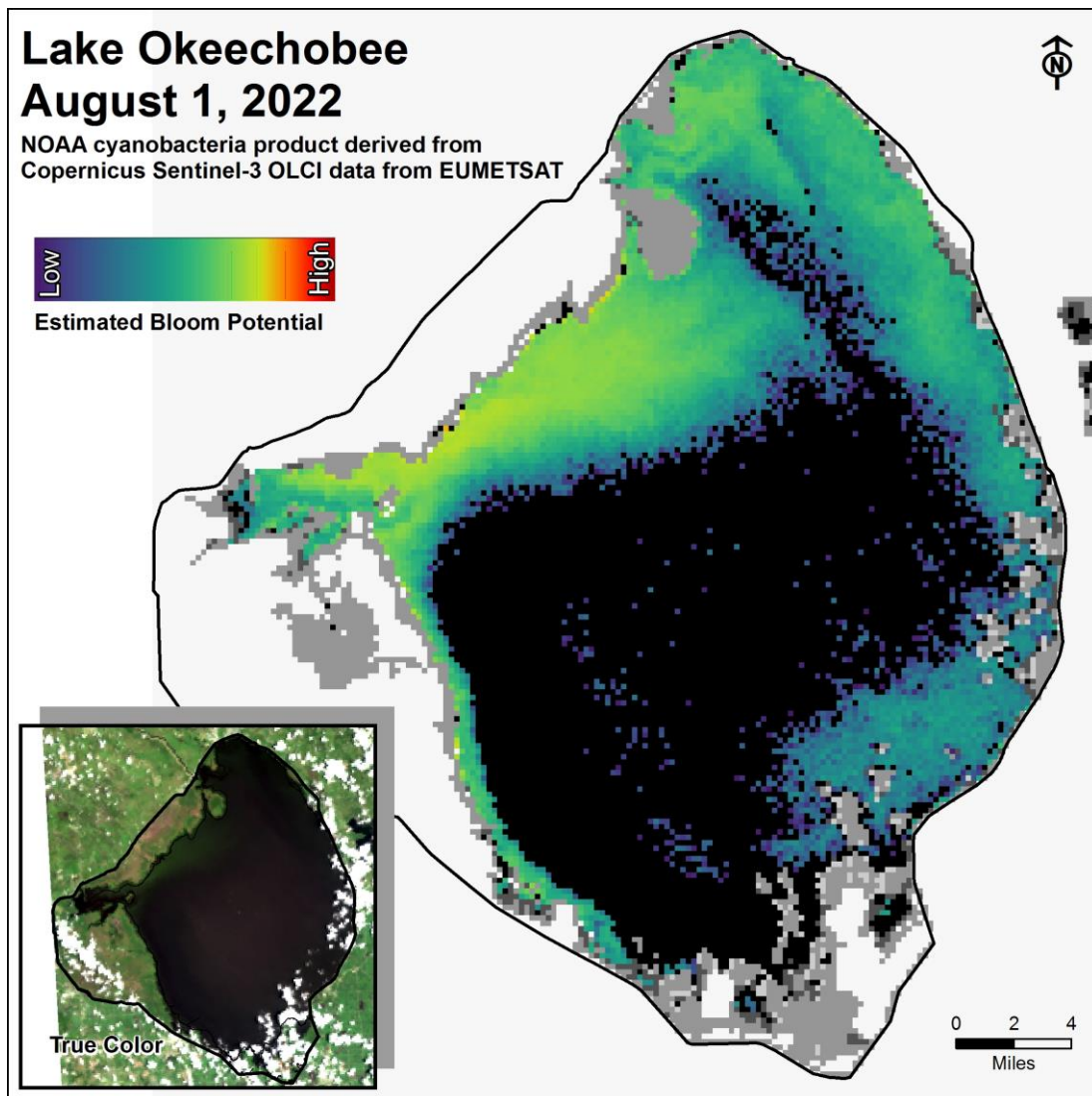




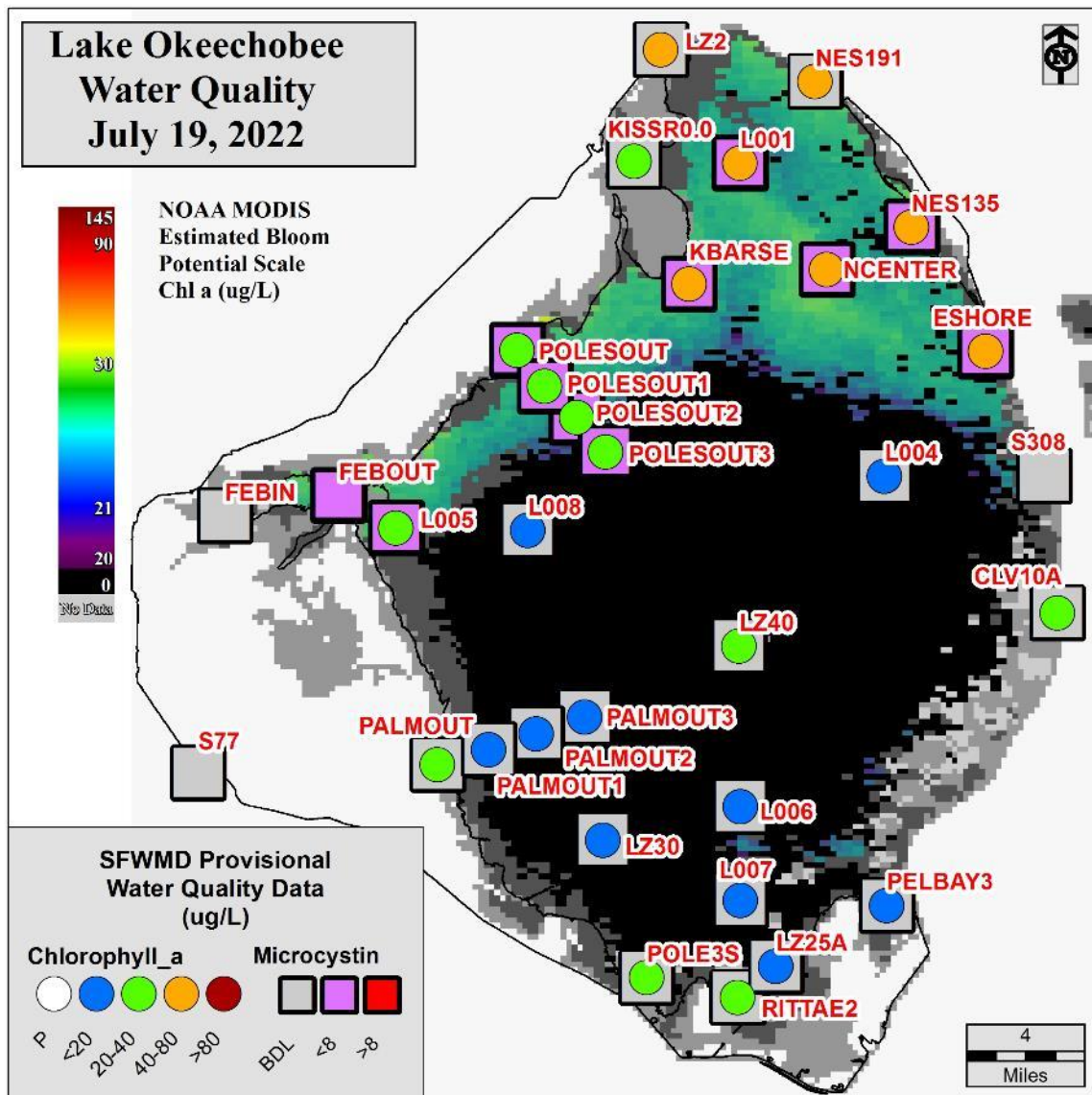
**Figure LO-4.** Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows 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.** Inflows into Lake Okeechobee from Indian Prairie basins, Taylor Creek/Nubbin Slough, Kissimmee River and Fisheating Creek, and outflows to the west via S-77, to the east via S-308, to the south via S-351, S-352, S-354, and to southeast via S-271 (formerly Culvert 10A) for the week of July 25-31, 2022.



**Figure LO-6.** Cyanobacteria bloom potential on August 1, 2022 based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.



**Figure LO-7.** Expanded monitoring network and provisional chlorophyll *a* ( $\mu\text{g/L}$ ) and total microcystins ( $\mu\text{g/L}$ ) concentrations results from samples collected July 18-20, 2022.

## Estuaries

### *St. Lucie Estuary*

Over the past week, mean total inflow to the St. Lucie Estuary was 308 cfs (**Figures ES-1 and ES-2**) and the previous 30-day mean inflow was 624 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-2**.

Over the past week, surface salinities increased at HR1 and the A1A Bridge site and remained the same at the US1 Bridge site (**Table ES-1 and Figure ES-3**). The seven-day moving average of the surface and bottom salinities at the US1 Bridge was 15.8. Salinity conditions in the middle estuary were estimated to be within the optimal range for adult eastern oysters (**Figure ES-4**). The mean larval oyster recruitment rate reported by the Fish and Wildlife Research Institute was 2.4 spat/shell in July (**Figure ES-5**).

### *Caloosahatchee River Estuary*

Over the past week, mean total inflow to the Caloosahatchee River Estuary was 1,265 cfs (**Figures ES-6 and ES-7**) and the previous 30-day mean inflow was 2,311 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-7**.

Over the past week, salinities remained the same at S-79 and increased at the remaining sites in the estuary (**Table ES-2 and Figures ES-8 and ES-9**). The seven-day mean salinities (**Table ES-2**) were in the optimal range (0-10) for tape grass in the upper estuary. The seven-day mean salinity values were within the optimal range for adult eastern oysters at Cape Coral, and in the stressed range at Shell Point and Sanibel (**Figure ES-10**). The mean larval oyster recruitment rate reported by the Fish and Wildlife Research Institute was 4.5 spat/shell at Iona Cove and 17.9 spat/shell at Bird Island in July (**Figures ES-11 and ES-12**).

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 1,500 cfs, and steady releases at 2,000 cfs with estimated tidal basin inflows of 282 cfs. Model results from all scenarios predict daily salinity to be 4.1 or lower and the 30-day moving average surface salinity to be 1.2 or lower at Val I-75 at the end of the two-week period (**Table ES-3 and Figure ES-13**). This keeps predicted salinities in the upper estuary within the optimal salinity range (0-10) for tape grass.

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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.

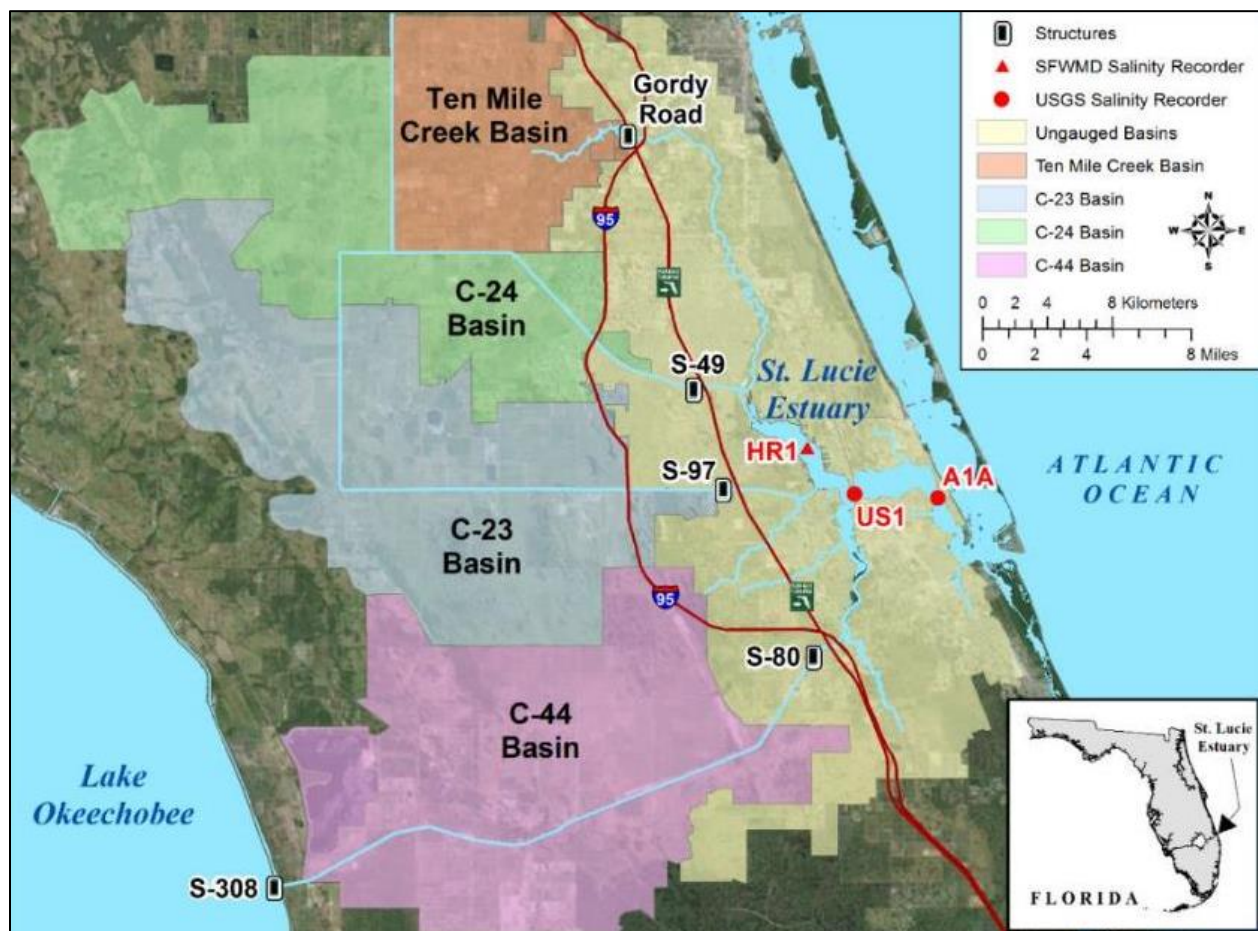


## Red Tide

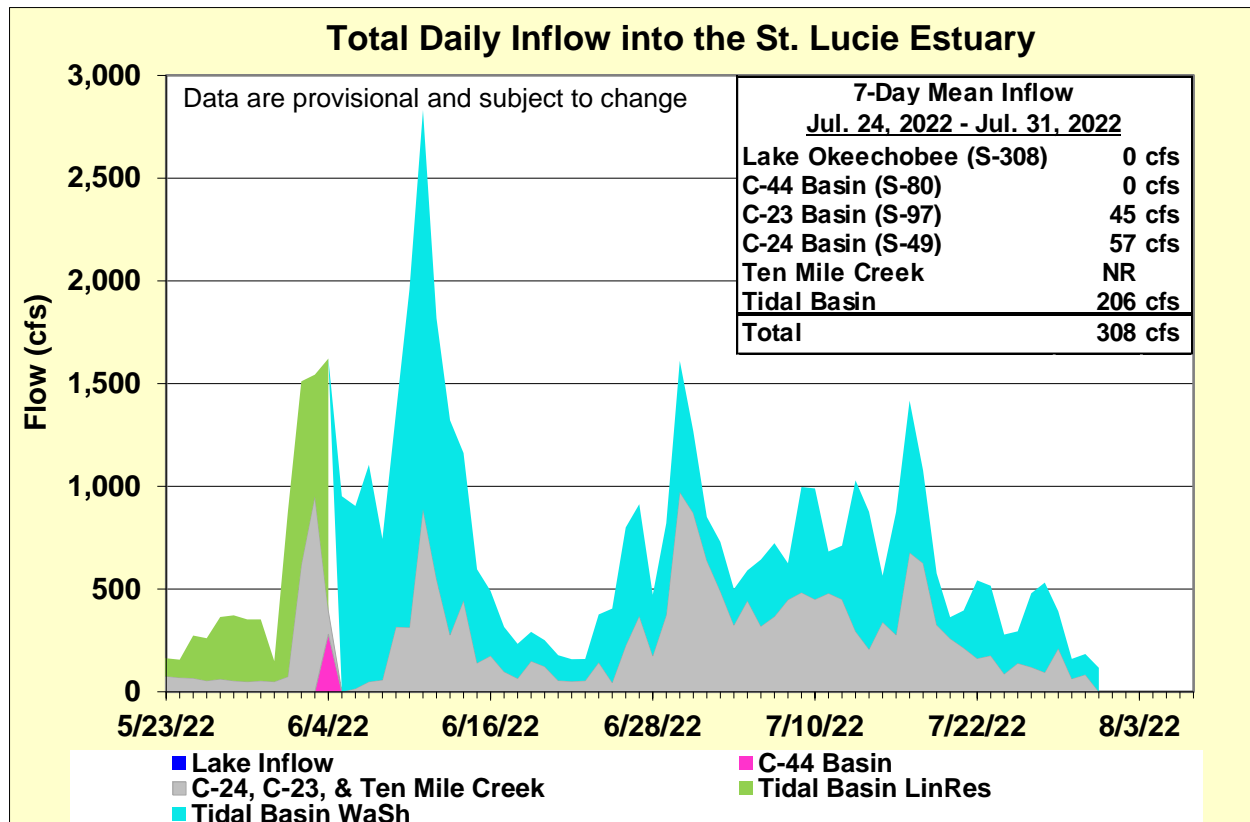
The Florida Fish and Wildlife Research Institute reported on July 29, 2022, that *Karenia brevis*, the Florida red tide dinoflagellate, was not observed in any samples collected within the District region. On the east coast, red tide was not observed in any samples from Broward county.

## Water Management Recommendations

Lake stage is in the Base Flow Sub-Band. Tributary conditions are dry. 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.



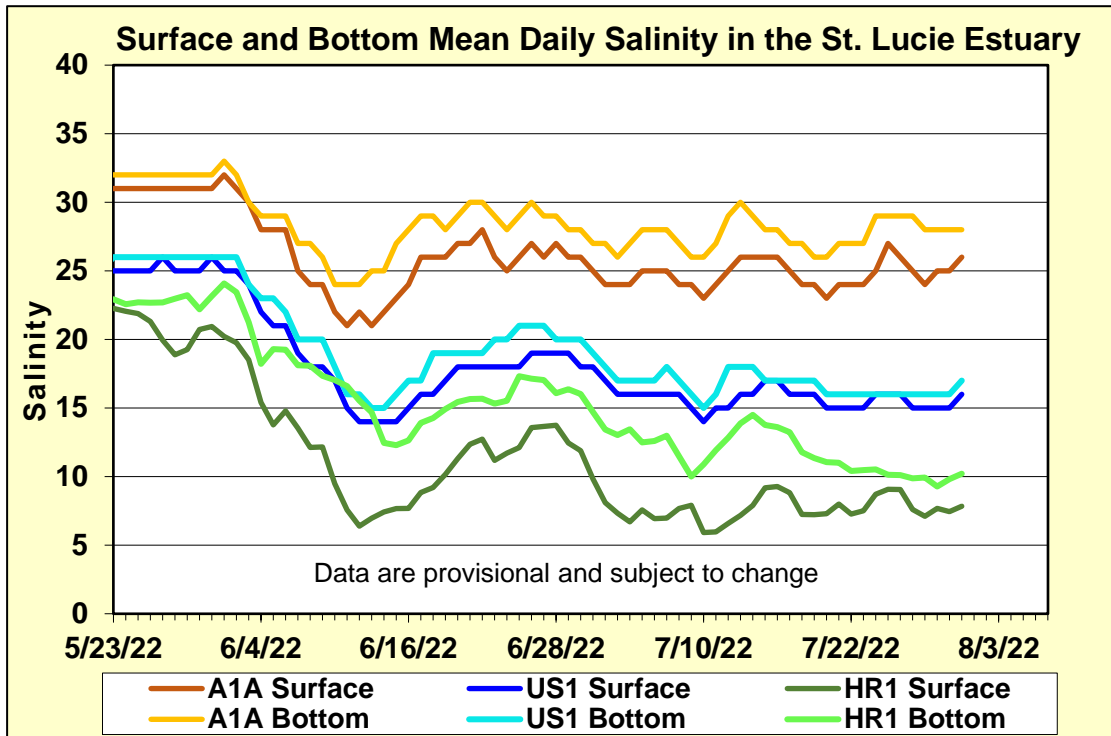
**Figure ES-1.** Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.



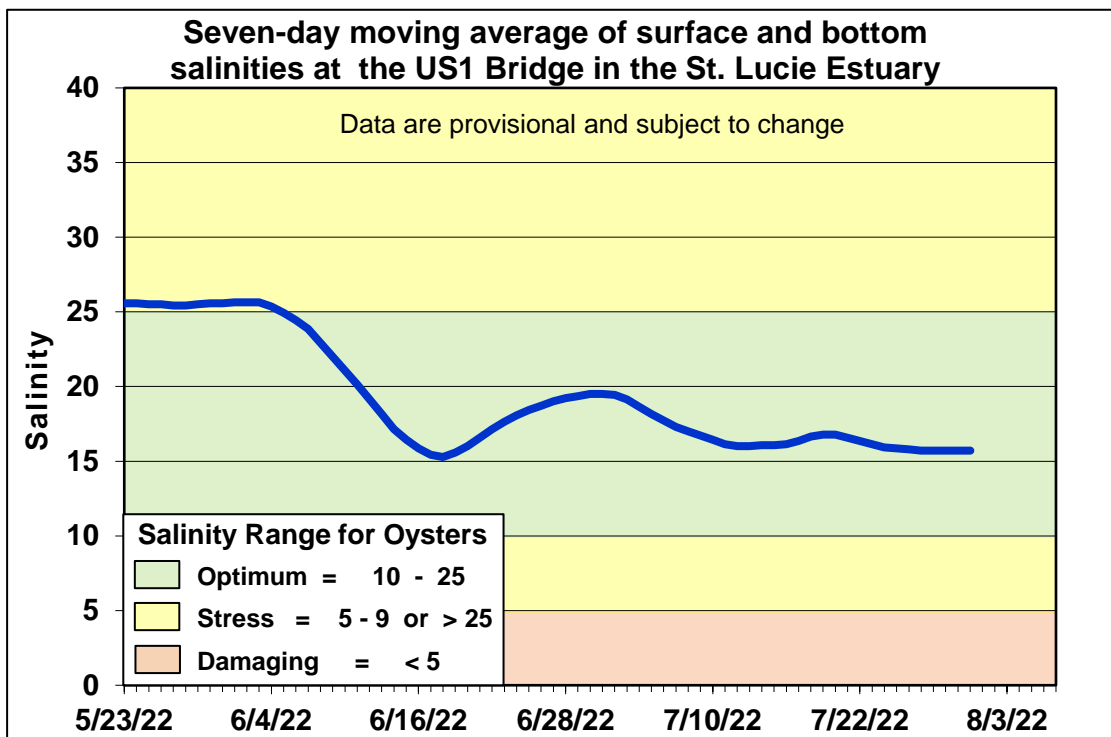
**Figure ES-2.** Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, and Tidal Basins into the St. Lucie Estuary. Ten Mile Creek flows are not reported after of July 23, 2022.

**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 optimum salinity range for adult eastern oysters (*Crassostrea virginica*) in the estuary. Data are provisional.

Sampling Site	Surface	Bottom	Optimum Envelope
HR1 (North Fork)	<b>8.0</b> (7.6)	<b>9.9</b> (10.9)	10.0 – 25.0
US1 Bridge	<b>15.4</b> (15.4)	<b>16.1</b> (16.3)	10.0 – 25.0
A1A Bridge	<b>25.4</b> (24.0)	<b>28.4</b> (27.0)	10.0 – 25.0

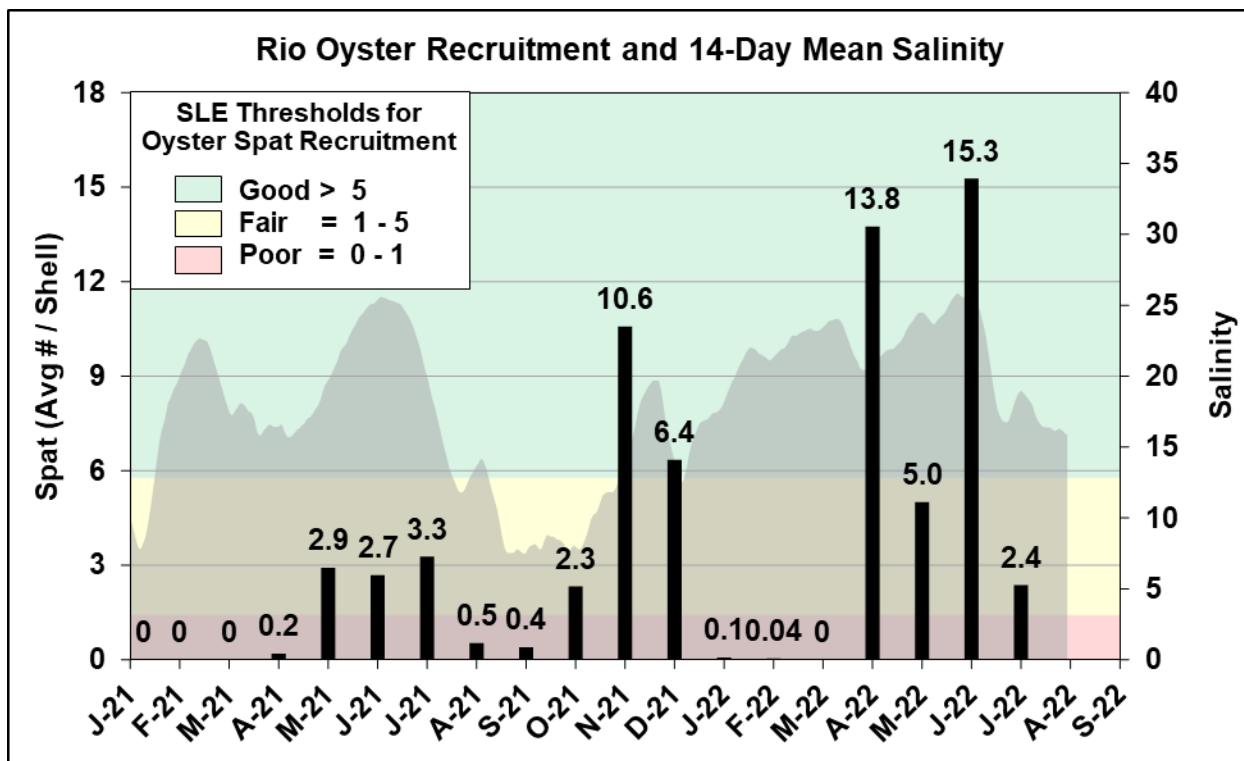


**Figure ES-3.** Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

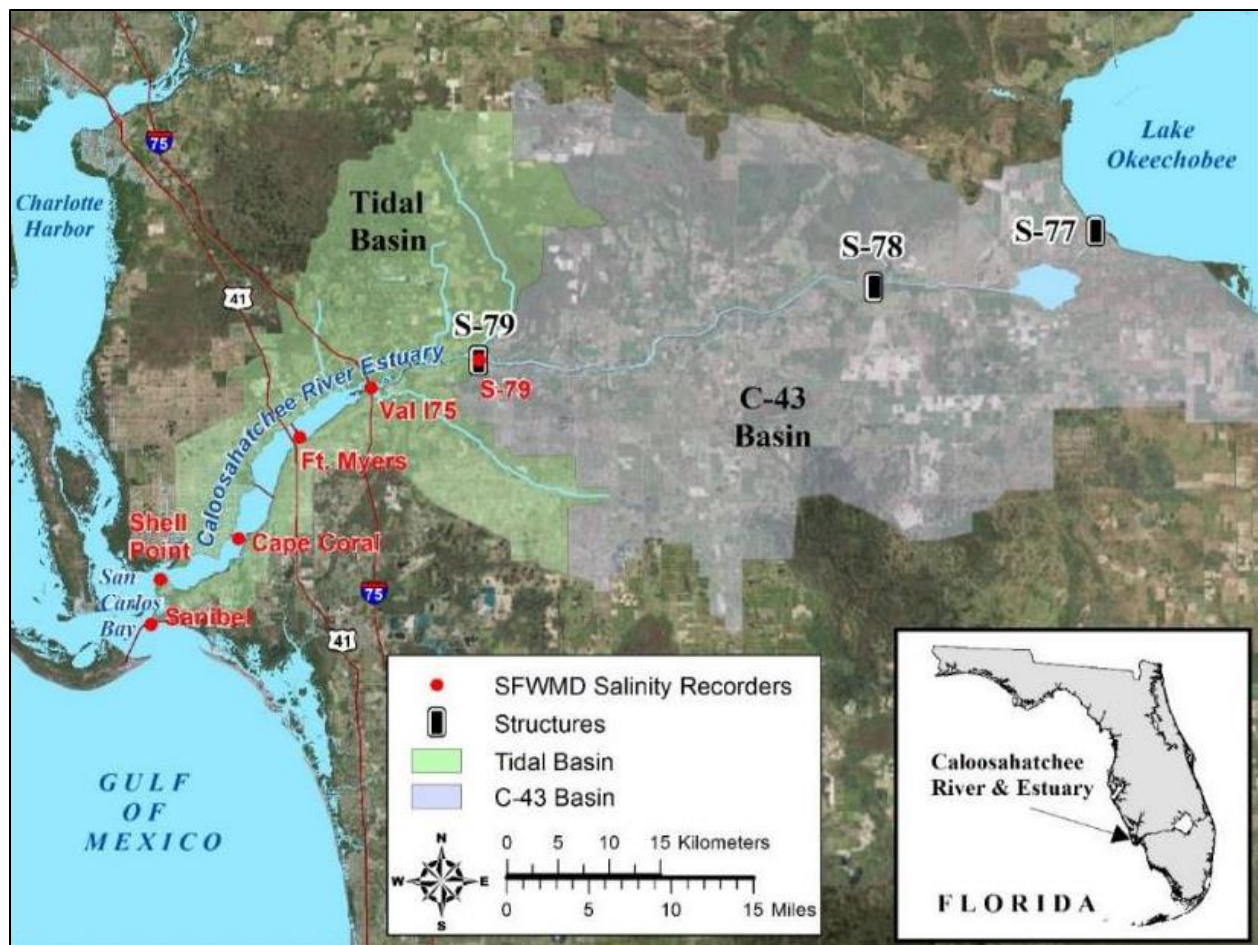


**Figure ES-4.** Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

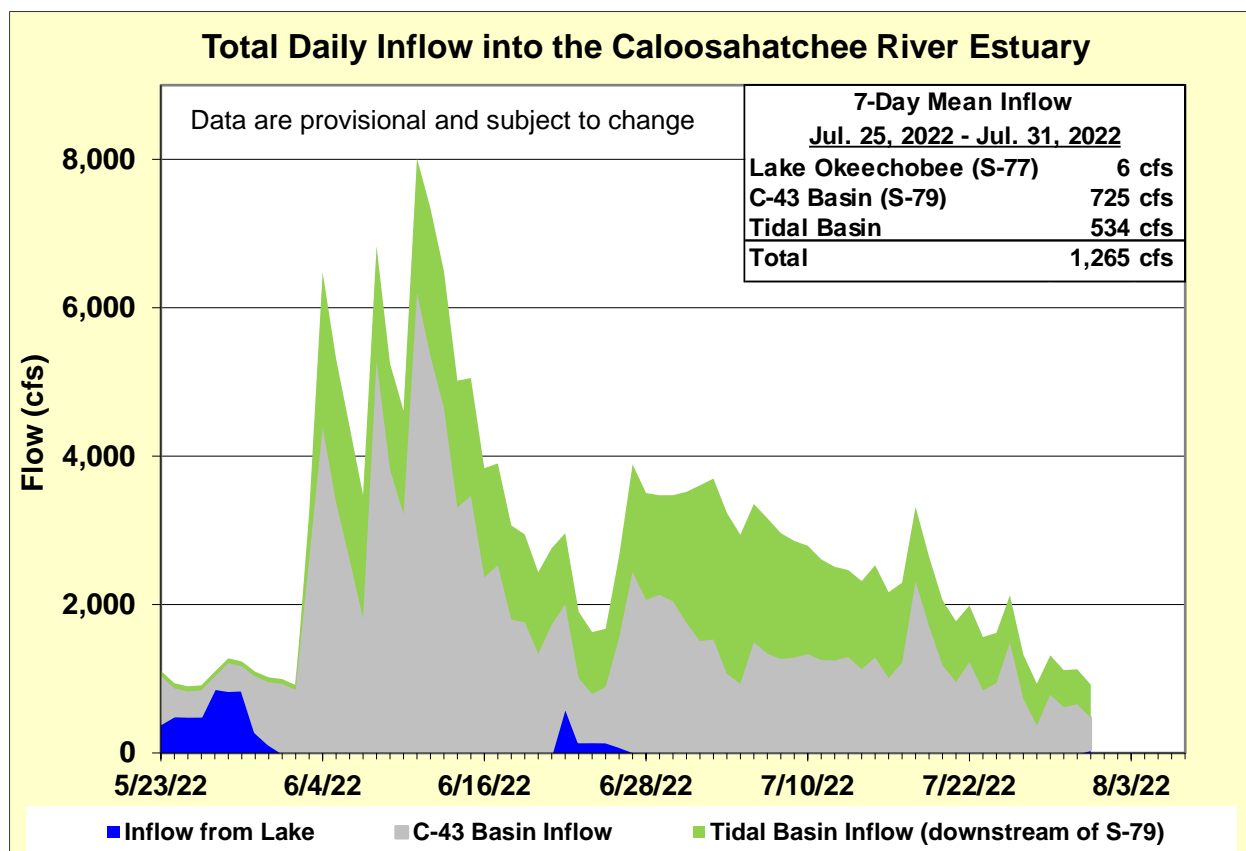




**Figure ES-5.** Mean oyster recruitment at the Rio oyster monitoring station and 14-day mean salinity at US1 Bridge.



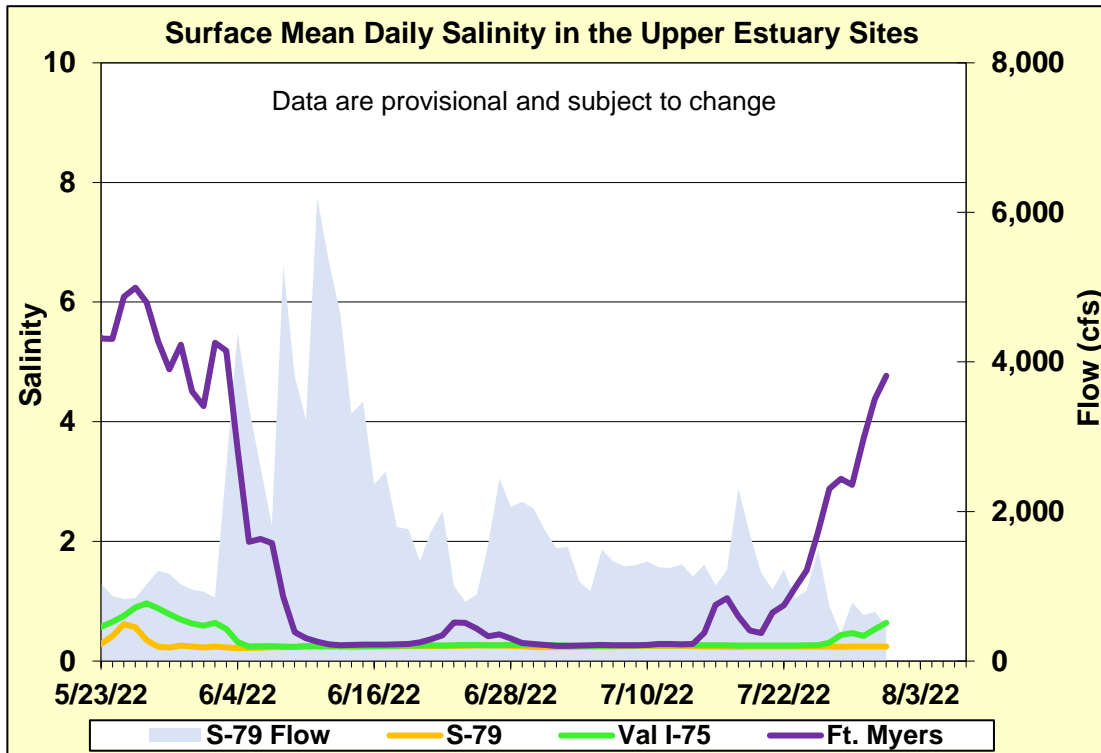
**Figure ES-6.** Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.



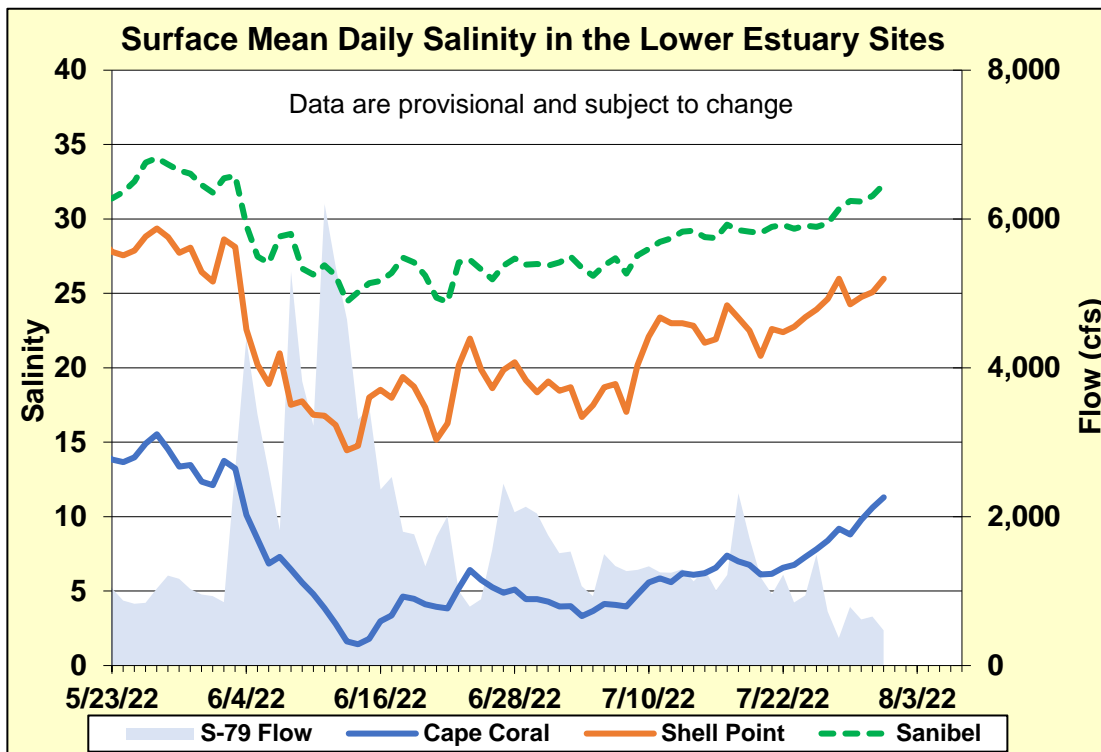
**Figure ES-7.** Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

**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 in the upper estuary sites is for the protection of tape grass and the envelope in the lower estuary is the optimum salinity range for adult eastern oysters (*Crassostrea virginica*). Data are provisional.

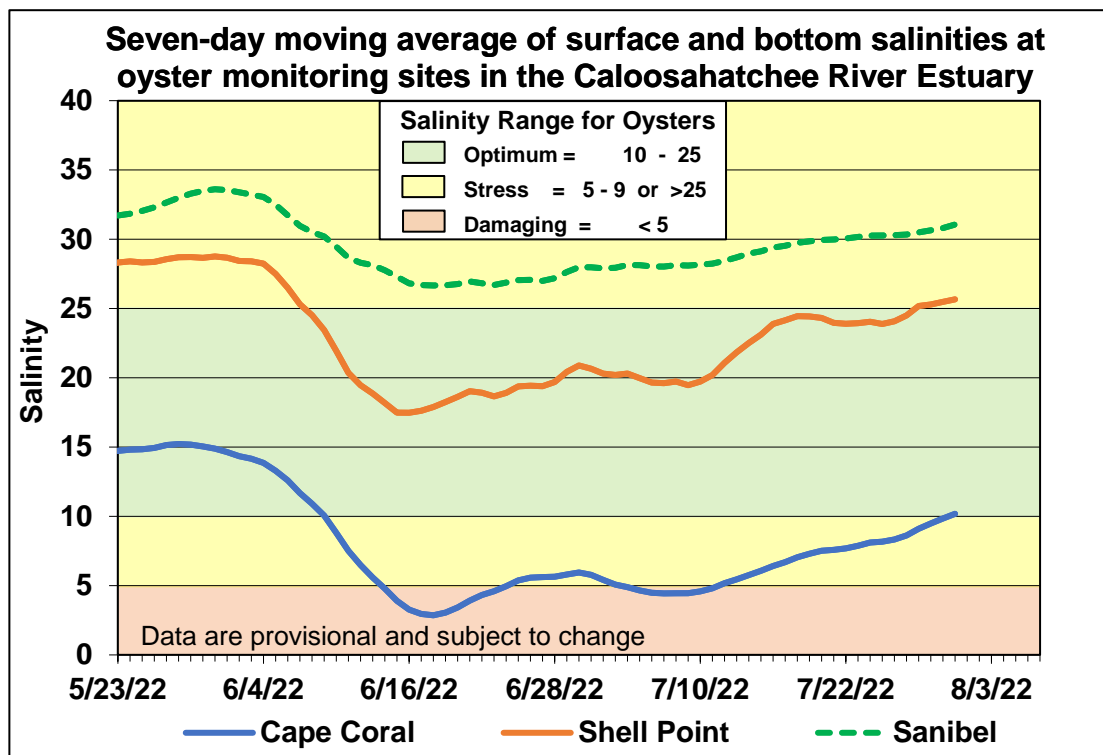
Sampling Site	Surface	Bottom	Optimum Envelope
S-79 (Franklin Lock)	<b>0.2</b> (0.2)	<b>0.3</b> (0.3)	0.0 – 10.0
Val I-75	<b>0.4</b> (0.3)	<b>0.6</b> (0.3)	0.0 – 10.0
Fort Myers Yacht Basin	<b>3.4</b> (0.9)	<b>5.0</b> (1.8)	0.0 – 10.0
Cape Coral	<b>9.4</b> (6.7)	<b>11.9</b> (9.7)	10.0 – 25.0
Shell Point	<b>24.9</b> (22.5)	<b>27.0</b> (25.2)	10.0 – 25.0
Sanibel	<b>30.9</b> (29.3)	<b>31.9</b> (31.2)	10.0 – 25.0



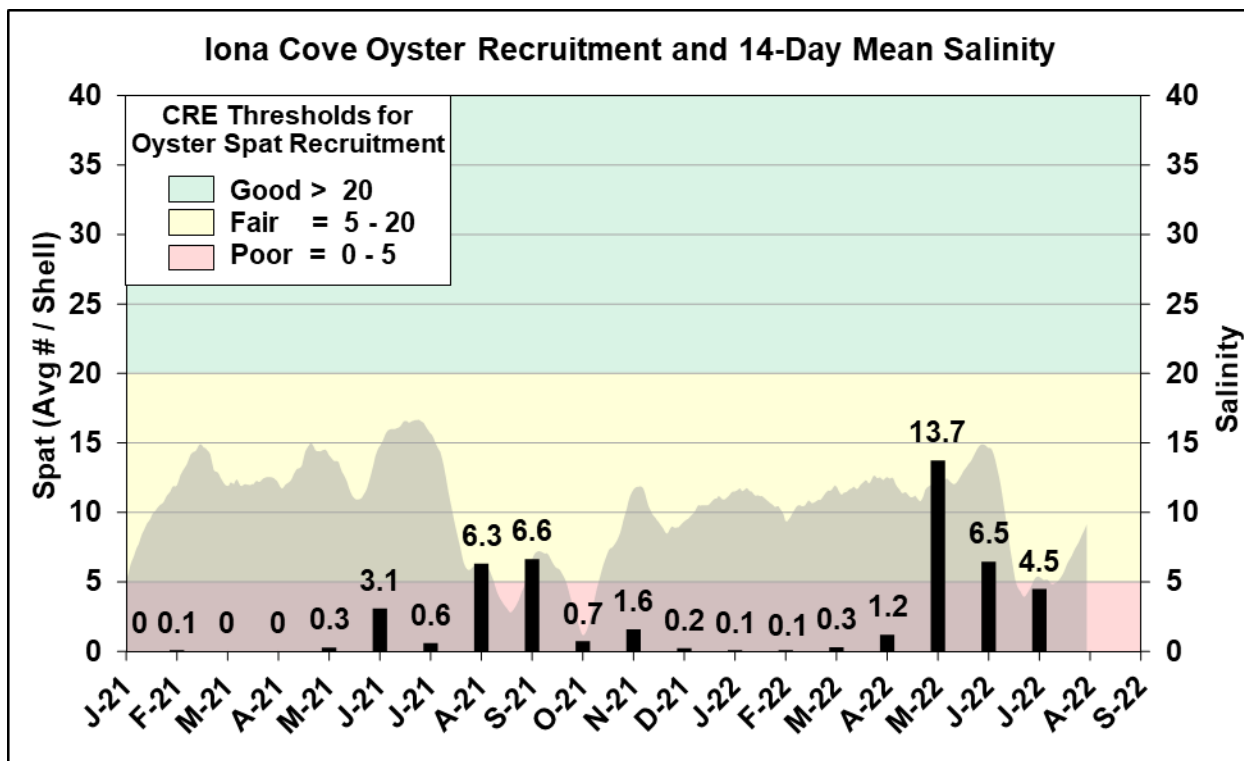
**Figure ES-8.** Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.



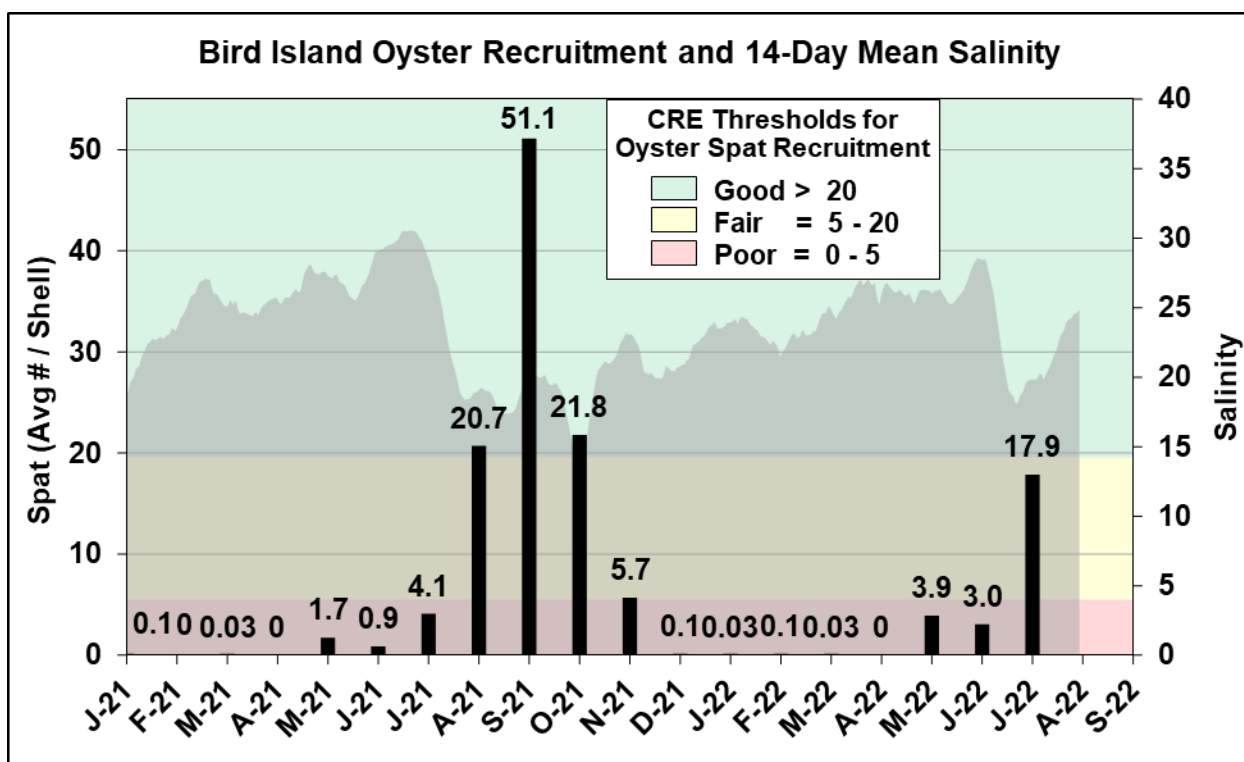
**Figure ES-9.** Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.



**Figure ES-10.** Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.



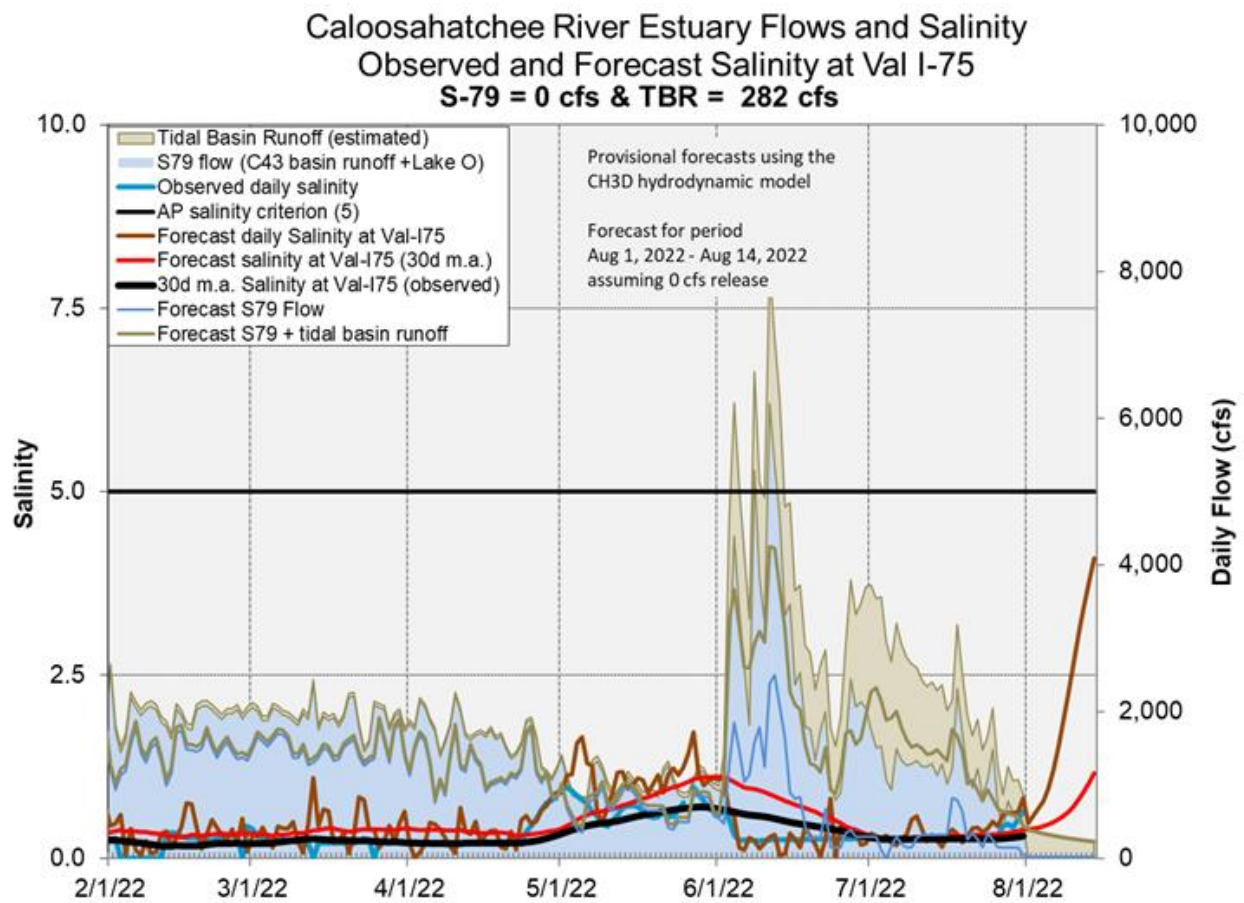
**Figure ES-11.** Mean oyster recruitment at the Iona Cove oyster monitoring station and 14-day mean salinity at Cape Coral.



**Figure ES-12.** Mean oyster recruitment at the Bird Island oyster monitoring station and 14-day mean salinity at Shell Point.

**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	282	4.1	1.2
B	450	282	2.8	0.9
C	750	282	2.0	0.7
D	1000	282	1.3	0.6
E	1500	282	0.6	0.5
F	2000	282	0.3	0.4



**Figure ES-13.** 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 post-construction vegetation grow in. Operational restrictions are in place in STA-1E Central and Eastern Flow-ways for vegetation management activities. Online treatment cells are at or near target stage and vegetation in the flow-ways is stressed and highly stressed. The 365-day phosphorus loading rates (PLRs) are high for the Eastern Flow-way and very high for the Central Flow-way (**Figure S-1**).

**STA-1W:** Operational restrictions are in place in STA-1W Western, Eastern, and Northern Flow-ways for vegetation management activities. Most treatment cells are near target stage. Vegetation in the flow-ways is stressed and highly stressed. The 365-day PLRs for the Northern, Western, and Eastern Flow-ways are below 1.0 g/m<sup>2</sup>/year (**Figure S-2**).

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

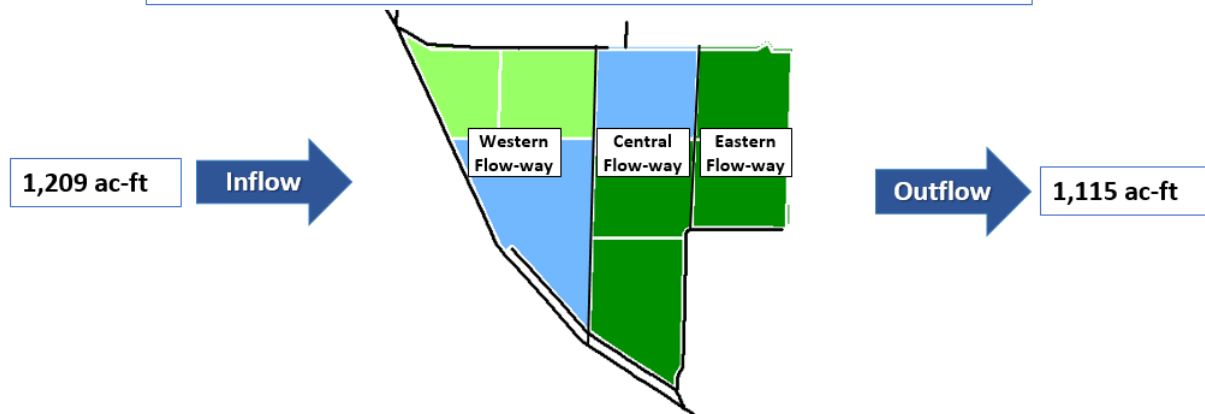
**STA-3/4:** STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown. Online treatment cells are near or above target stage. Vegetation in the Eastern and Central Flow-ways is highly stressed and in the Western Flow-way is stressed. The 365-day PLRs for the Central and Western Flow-ways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

**STA-5/6:** STA-5/6 Flow-way 4 is offline for vegetation management activities. Treatment cells are near or below target stage. All treatment cells have highly stressed vegetation conditions except Flow-ways 7 and 8 which are healthy. The 365-day PLRs for online flow-ways are below 1.0 g/m<sup>2</sup>/year. (**Figure S-5 and S-6**).

For definitions on STA operational language see glossary following figures.



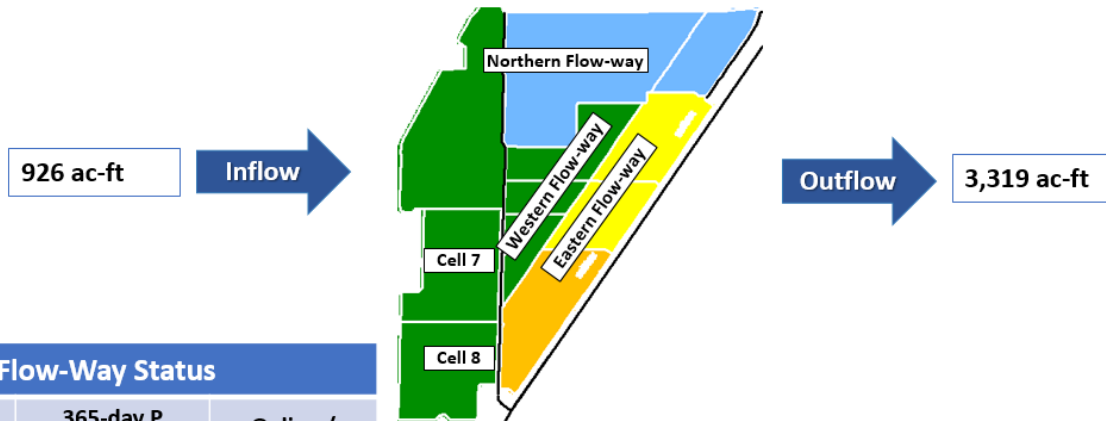
# STA-1E Weekly Status Report – 7/25/2022 through 7/31/2022



STA-1E Flow-Way Status				As of 7/31/2022		STA-1E 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	
Eastern			Vegetation management	Deep Water Level (> 2.8' above TS)		Total Inflow, ac-ft	1,209	8,425	204,815	
				High Water Level (1.5' – 2.8' above TS)						
				0.2' – 1.5' above TS						
				Target Stage (TS +/- 0.2')						
Central			Vegetation rehabilitation	Low Water Level (<0.2' below TS)		Total Outflow, ac-ft	1,115	7,944	172,063	
				Depth / Area Based: Percent of Area Dry						
				0-25% Dry						50-75% Dry
				25-50% Dry						75-100% Dry
Western	Offline, post-construction grow in starting 3/28/2022					Inflow Conc., ppb	43	54	118	
						Outflow Conc., ppb	20	21	23	
Includes Preliminary Data										

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

# STA-1W Weekly Status Report – 7/25/2022 through 7/31/2022



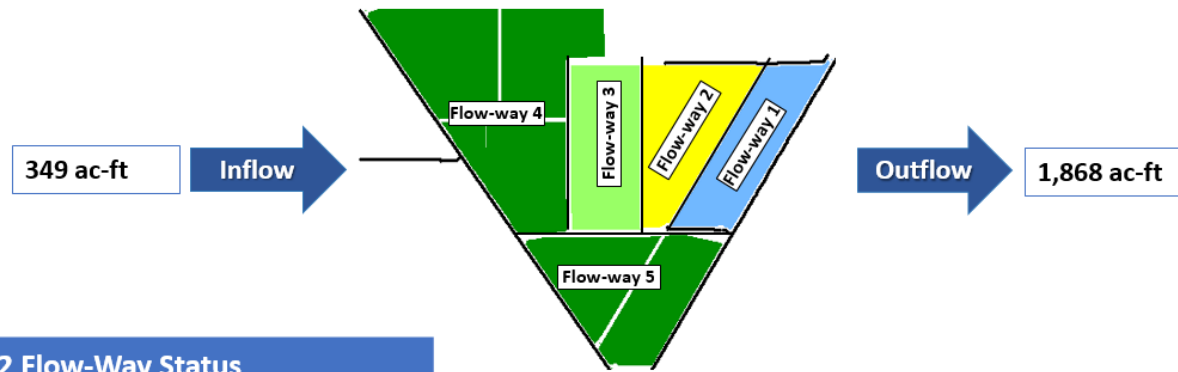
STA-1W Flow-Way Status			
Flow-Way	Vegetation Status Healthy — Stressed	365-day P Loading Rate (below 1.0 g P /m <sup>2</sup> /yr is optimal)	Online / Offline / Restrictions
Northern			Vegetation management
Western			Vegetation management
Eastern			Vegetation management
Cell 7		N/A	Online
Cell 8		N/A	Construction

As of 7/31/2022	
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-1W Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	926	11,876	74,914
--Lake Inflow, ac-ft	0	N/A	2,000
Total Outflow, ac-ft	3,319	14,298	83,285
Inflow Conc., ppb	94	123	168
Outflow Conc., ppb	19	22	24
Includes Preliminary Data			

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

# STA-2 Weekly Status Report – 7/25/2022 through 7/31/2022



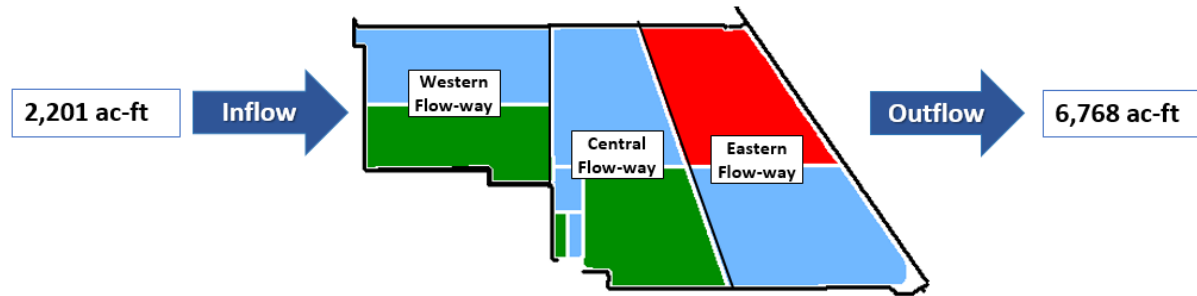
STA-2 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m <sup>2</sup> /yr is optimal)	Online / Offline / Restrictions
1			Online
2	Offline, construction activities as of 9/7/2021		
3			Vegetation Rehab
4			Vegetation Rehab
5			Online

As of 7/31/2022	
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-2 Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	349	9,648	314,483
--Lake Inflow, ac-ft	0	N/A	27,600
Total Outflow, ac-ft	1,868	11,718	343,590
Inflow Conc., ppb	46	47	104
Outflow Conc., ppb	24	35	23
Includes Preliminary Data			

**Figure S-3.** STA-2 Weekly Status Report

STA-3/4 Weekly Status Report – 7/25/2022 through 7/31/2022





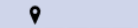





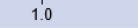







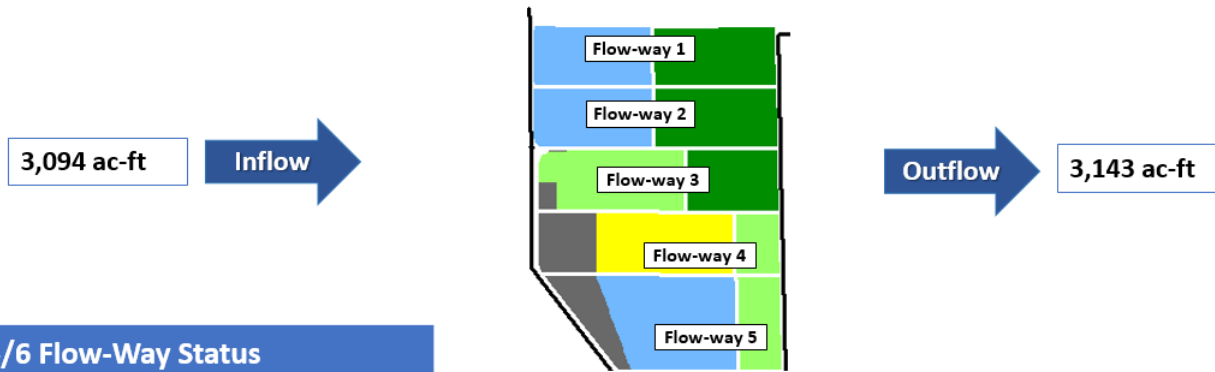
STA-3/4 Flow-Way Status				STA-3/4 Flow & Phosphorus Concentration			
Flow-Way	Vegetation Status <small>Healthy ----- Stressed</small> 	365-day P Loading Rate (below 1.0 g P / m²/yr is optimal)	Online / Offline / Restrictions	As of 7/31/2022			
				Stage Based: Relative to Target Stage (TS)			
Eastern			Offline, vegetation management drawdown as of 3/1/2021	 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')			
Central			Online	 Low Water Level (<0.2' below TS)			
				Depth / Area Based: Percent of Area Dry			
Western			Online	 0-25% Dry		 50-75% Dry	
				 25-50% Dry		 75-100% Dry	
Total Inflow, ac-ft				7-day	28-day	365-day	
--Lake Inflow, ac-ft				0	N/A	5,200	
Total Outflow, ac-ft				6,768	43,828	319,094	
Inflow Conc., ppb				29	50	87	
Outflow Conc., ppb				11	13	14	
Includes Preliminary Data							

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

# STA-5/6 Weekly Status Report – 7/25/2022 through 7/31/2022



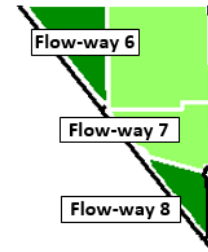
STA-5/6 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m <sup>2</sup> /yr is optimal)	Online / Offline / Restrictions
1			Online
2			Online
3			Online
4	Offline, vegetation management starting 01/24/2022		
5			Online

As of 7/31/2022	
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	3,094	12,415	177,349
--Lake Inflow, ac-ft	0	N/A	0
Total Outflow, ac-ft	3,143	7,228	172,130
Inflow Conc., ppb	222	222	242
Outflow Conc., ppb	93	68	51
Includes Preliminary Data			

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

STA-5/6 Weekly Status Report – 7/25/2022 through 7/31/2022



STA-5/6 Flow-Way Status				As of 7/31/2022	
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)	
				<div>Deep Water Level (&gt; 2.8' above TS)</div> <div>High Water Level (1.5' – 2.8' above TS)</div> <div>0.2' – 1.5' above TS</div> <div>Target Stage (TS +/- 0.2')</div> <div>Low Water Level (&lt;0.2' below TS)</div>	<div>Depth / Area Based: Percent of Area Dry</div> <div> <div>0-25% Dry</div> <div>25-50% Dry</div> <div>50-75% Dry</div> <div>75-100% Dry</div> </div>
6			Online	Target Stage (TS +/- 0.2')	0-25% Dry
7			Online	Target Stage (TS +/- 0.2')	0-25% Dry
8			Online	Target Stage (TS +/- 0.2')	0-25% 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,  $\mu\text{g/L}$  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 change at the 1-8C gauge was flat over the week. The average on Sunday was 0.45 feet above the rising Zone A1 regulation line. WCA-2A: Stage at the 2-17 gauge rose then fell, last week. The average on Sunday was 0.86 feet above the rising regulation line. WCA-3A: Last week the Three Gauge Average stages fell faster than the slope of the Zone A regulation line. The average stage was only 0.02 feet above the rising regulation line on Sunday. WCA-3A North: At gauge 62 (Northwest corner) stage continued to fall slowly, the average on Sunday was 0.58 feet below the rising Upper schedule line. (**Figures EV-1 through EV-4**).

### ***Water Depths***

The SFWDAT tool indicates that within the last month the dry conditions in northeast WCA-3A North are expanding, and depths are falling in northern WCA-1. Along the northern reach of the L-67s depths have receded but the spatial extent of water depths in the 1.5' to 2.0' range is expanding south and west. North to South hydrologic connectivity is being maintained within all the sloughs of Everglades National Park. Comparing current WDAT water depths to one month ago, stage changes were mixed in WCA-3A slightly higher in the south, significantly lower in the north; and significantly lower in northern WCA-2A as that region recovers from a wildfire then high water. Looking back a year ago, northern WCA-2A is shallower; with the rest of the EPA deeper significantly so in southern WCA-2A, along the upper reaches of the L-67s, northern BCNP and eastern ENP. (**Figure EV-5 and Figure EV-6**). Comparing current conditions to the 20-year median: The headwaters of ENP's western sloughs are below average, northeastern WCA-3A North is near the median, and NESRS and southern WCA-1 remain in the upper percentiles. (**Figure EV-7**)

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

Taylor Slough and Florida Bay received an average of 1.96 inches of total rain in the past week, approximately 1.8 inches more than the previous week. This was largely driven by rainfall on 7/26 in which all stations received over 1.00 inch of rain. Stages in Taylor Slough slightly increased, with an average change of +0.18 feet (**Figure EV-8 and Figure EV-9**). Individual stage gauge changes ranged from +0.03 feet at Taylor Slough Bridge to +0.33 feet at E112 in the northern slough area. Taylor Slough is now 1.67 inches higher than its historical average for this time of year (pre-Florida Bay initiative which started in 2017). Conditions remain favorable for moving water downstream through the Slough this year as the wet season continues.



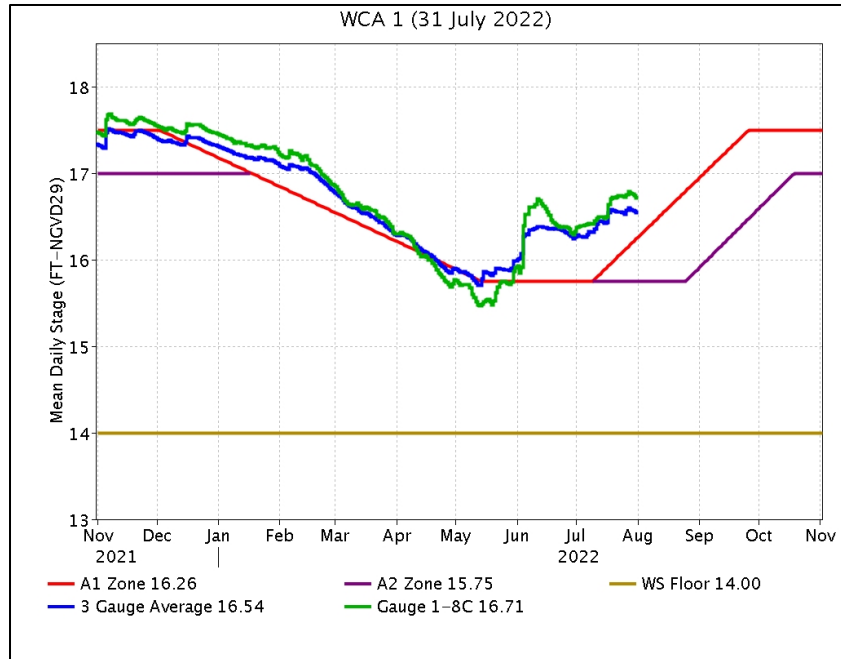
Across stations used to report average Florida Bay salinity, the Florida Bay average is 28.5, a change of –1.6 over the week ending in 7/31. Unlike the previous week, salinities decreased at several sites in the western and nearshore regions of the bay. Individual station changes throughout the bay ranged from –4.5 at both Buoy Key (BK) and Terrapin Bay (TB) to +0.9 at Duck Key (DK) in the eastern area (**Figure EV-8**). In all regions, salinities are within the 2001-2016 Interquartile Range, although in the eastern and central regions, salinities remain below the 50th percentile (**Figure EV-10**). Florida Bay salinity is 0.41 below its historical average for this time of year.

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

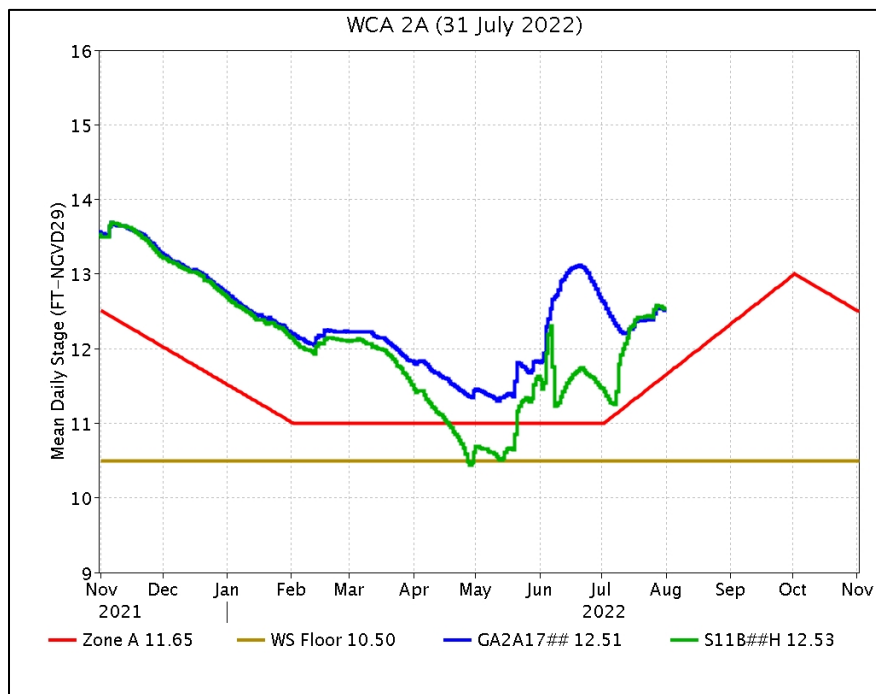
Maintaining a very moderate rate of stage change within the marsh of WCA-2A would have an ecological benefit, allowing stressed vegetation to recover. Flows into northeastern WCA-3A would be ecologically beneficial. Taylor Slough stages remain in a good place to expedite freshwater deliveries to the south as the wet season progresses. Individual regional recommendations can be found in **Table EV-2**.

**Table EV-2.** Previous week’s rainfall and water depth changes in Everglades basins.

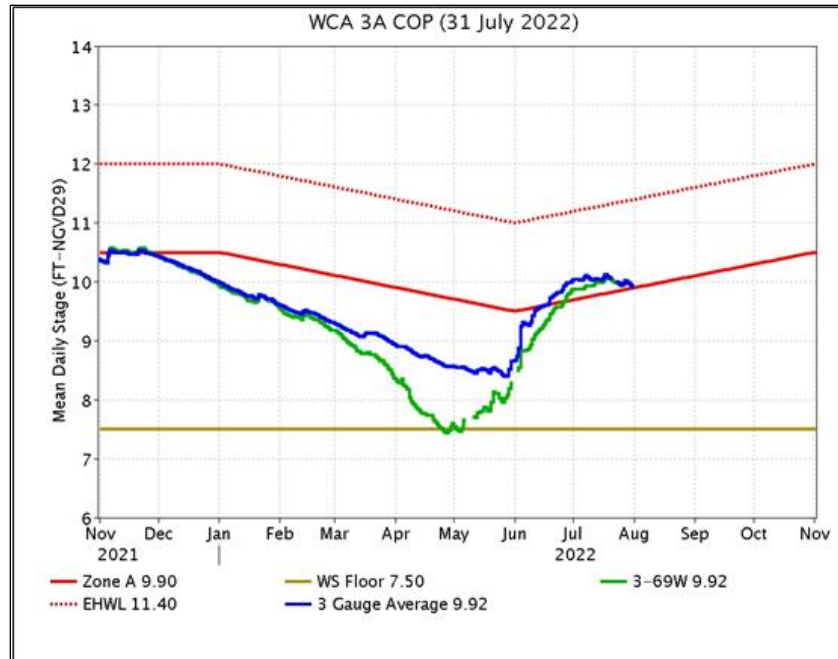
Everglades Region	Rainfall (inches)	Stage change (feet)
WCA-1	1.14	+0.00
WCA-2A	1.62	+0.12
WCA-2B	2.56	+0.30
WCA-3A	1.12	–0.06
WCA-3B	1.79	+0.10
ENP	1.10	+0.04



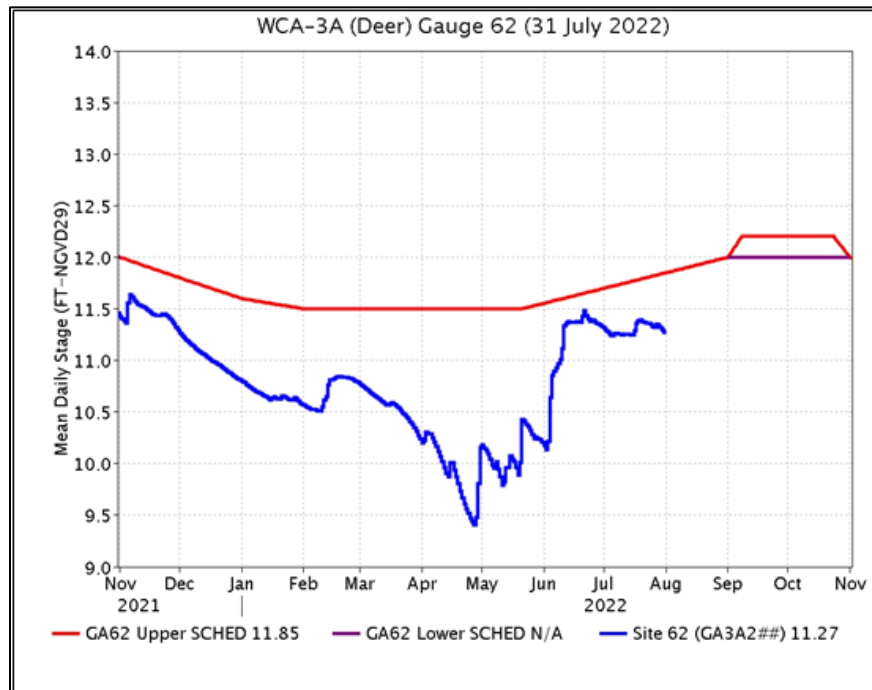
**Figure EV-1.** WCA-1 stage hydrographs and regulation schedule.



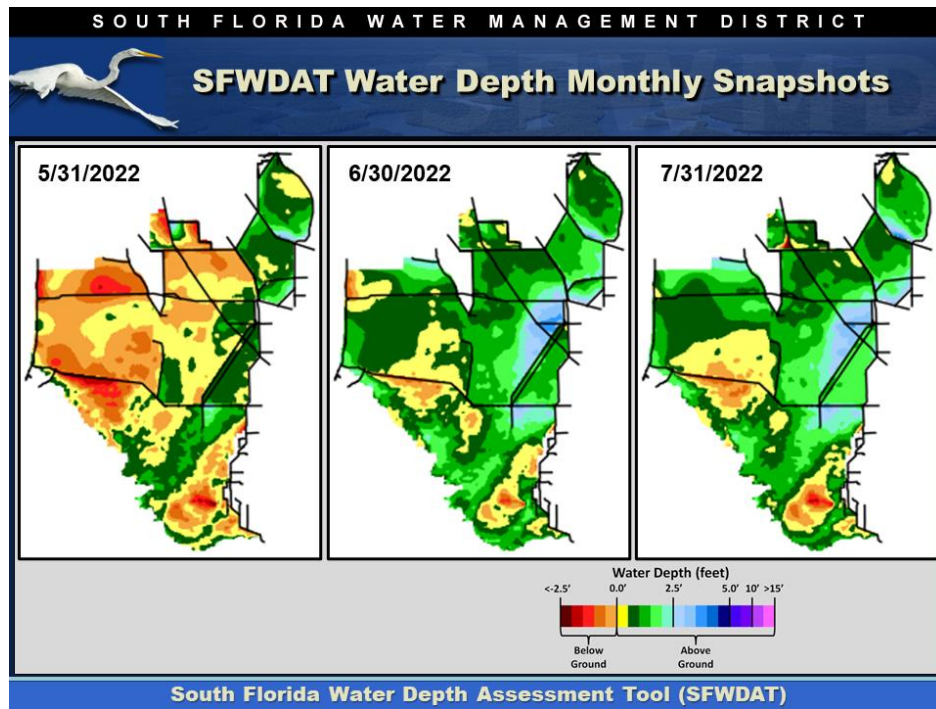
**Figure EV-2.** WCA-2A stage hydrographs and regulation schedule.



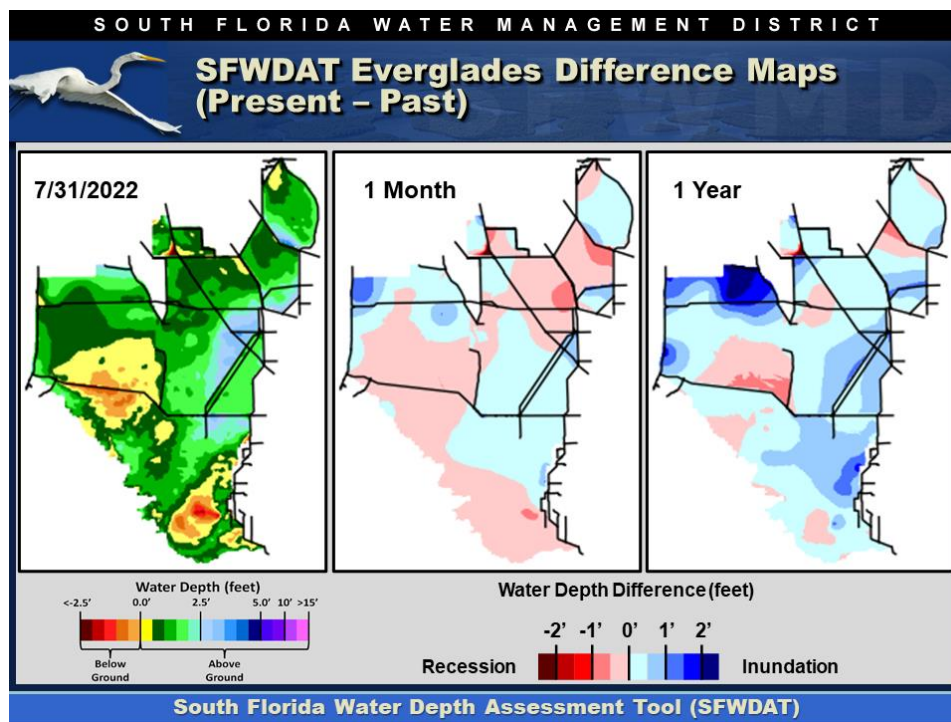
**Figure EV-3.** WCA-3A stage hydrographs (three-gauge average, S-333 headwater) and regulation schedule.



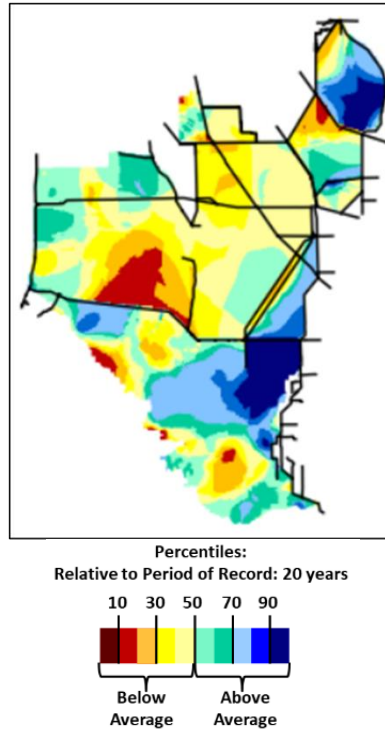
**Figure EV-4.** WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.



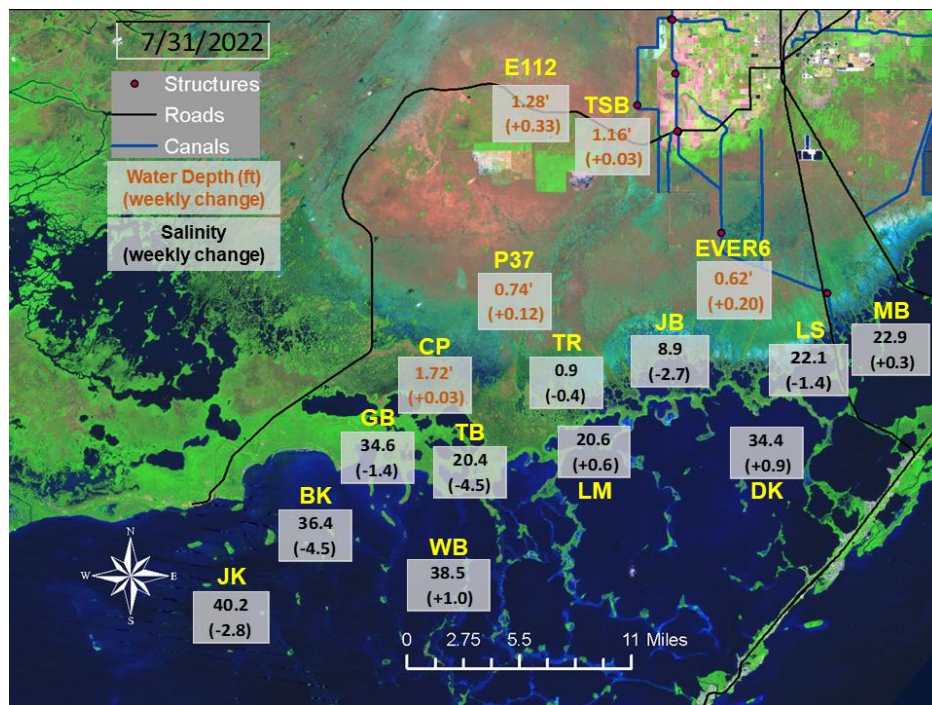
**Figure EV-5.** Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.



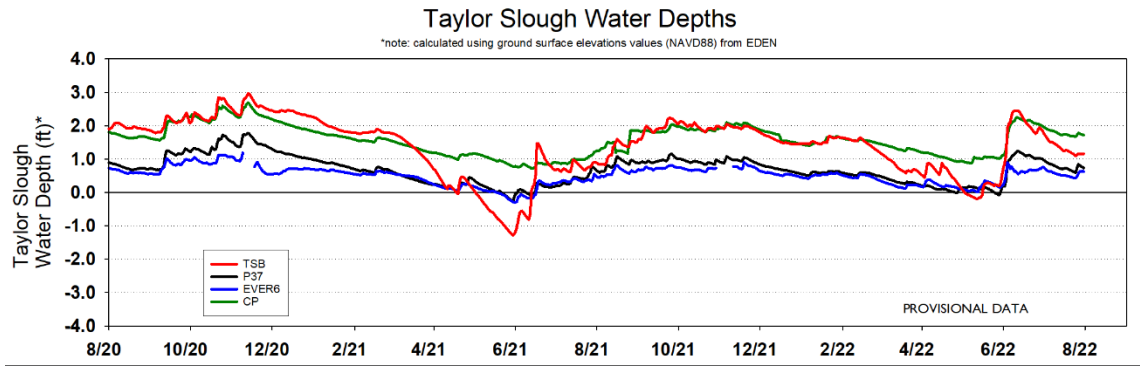
**Figure EV-6.** Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.



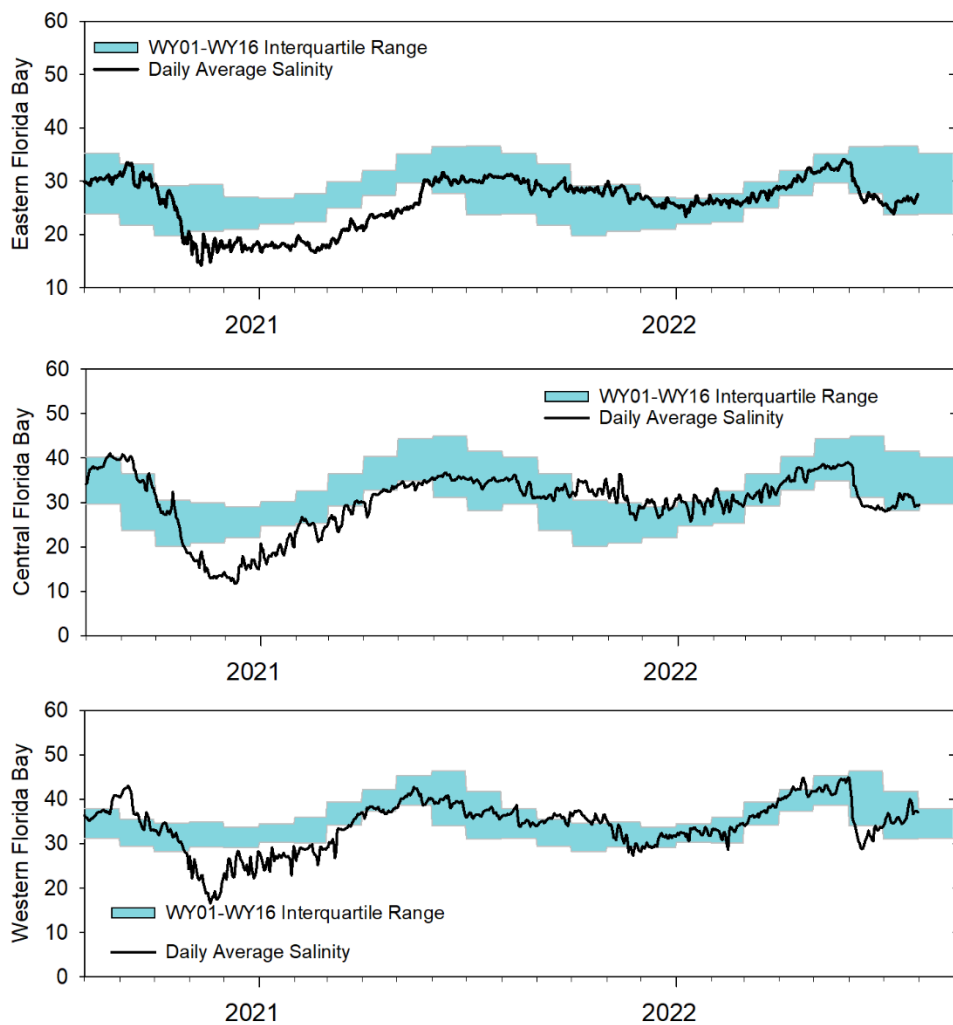
**Figure EV-7.** Present water depths (8/1/2022) compared to the day of year median over the previous 20 years.



**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.

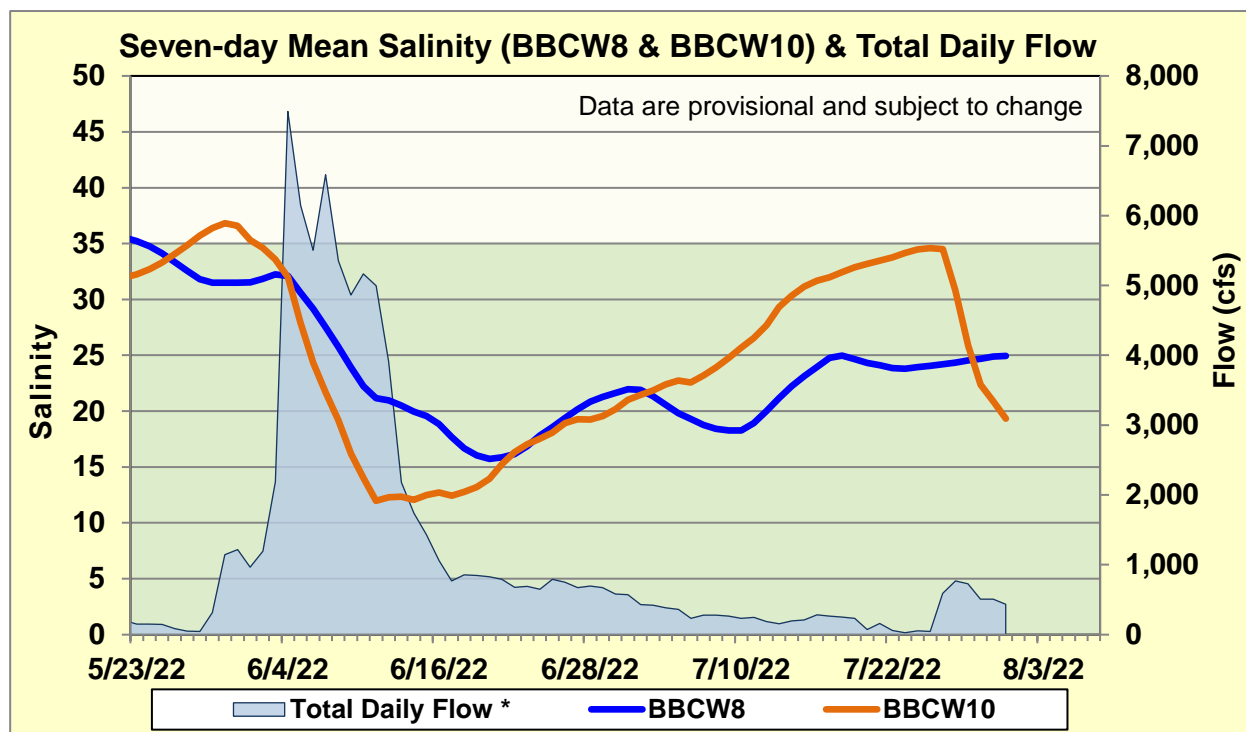


**Table EV-2.** Weekly water depth changes and water management recommendations

<b>SFWMD Everglades Ecological Recommendations, July 26th, 2022 (red is new)</b>			
<b>Area</b>	<b>Weekly change</b>	<b>Recommendation</b>	<b>Reasons</b>
<b>WCA-1</b>	Stage remained unchanged	Return to a moderate ascension rate of less than 0.18 feet per week.	Protect within basin and downstream habitat and wildlife.
<b>WCA-2A</b>	Stage increased by 0.12'	Maintain ascension rate at about 0.0 feet per week until stage at 2-17 gauge is within 0.75 feet of schedule.	Protect within basin and downstream habitat and wildlife.
<b>WCA-2B</b>	Stage increased by 0.30'	Return to a moderate ascension rate of less than 0.25 feet per week.	Protect within basin and downstream habitat and wildlife.
<b>WCA-3A NE</b>	Stage decreased by 0.08'	Return to a moderate ascension rate of less than 0.25 feet per week.	Protect within basin and downstream habitat and wildlife. Lower fire risk.
<b>WCA-3A NW</b>	Stage decreased by 0.09'	Return to a moderate ascension rate of less than 0.25 feet per week.	
<b>Central WCA-3A S</b>	Stage decreased by 0.06'	Return to a moderate ascension rate of less than 0.25 feet per week.	Protect within basin and downstream habitat and wildlife.
<b>Southern WCA-3A S</b>	Stage decreased by 0.01'		
<b>WCA-3B</b>	Stage increased by 0.10'	Maintain a moderate ascension rate of less than 0.25 feet per week.	Protect within basin and downstream habitat and wildlife. Lower fire risk.
<b>ENP-SRS</b>	Stage increased by 0.06'	Make discharges to ENP according to COP and TTFF protocol while adaptively considering upstream and downstream ecological conditions.	Protect within basin and upstream habitat and wildlife.
<b>Taylor Slough</b>	Stage changes ranged from +0.03' to +0.33'	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
<b>FB- Salinity</b>	Salinity changes ranged -4.5 to +0.9	Move water southward as possible	When available, provide freshwater to maintain low salinity buffer and promote water movement.

## Biscayne Bay

As shown in **Figure BB-1**, mean total inflow to Biscayne Bay was 510 cfs and the previous 30-day mean inflow was 294 cfs. The seven-day mean salinity was 25.0 at BBCW8 and 17.6 at BBCW10, both below the preferred maximum salinity of 35 for these sites. Data provided by Biscayne National Park.



**Figure BB-1.** Seven-day mean salinity at BBCW8 and BBCW10 and total daily flow in Biscayne Bay. Total daily flow was calculated using flow from structures S20G, S20F, S21, S21A, S123, and S700P.