

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:** October 05, 2022

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

### **Summary**

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

On Wednesday, a cold front will be positioned over Lake Okeechobee, with light frontal rains possible to the lower east coast. A farther southward progression of the front on Thursday will limit any form of rainfall to areas near and over the Florida Keys. On Saturday, a tropical wave traveling westward through the Caribbean will cause moisture levels to rebound somewhat, increasing the amount of rainfall over the lower east coast. With moisture levels gradually increasing throughout the day and a breezy NE wind present, light-to-moderate shower activity could be possible throughout most of the day, with the heaviest shower activity limited to the immediate coast. A continued increase in moisture levels on Sunday and Monday could support moderate-to-heavy storms, mainly along the immediate coast, with all day rains likely. Below average rainfall is expected for the 7-day period ending next Tuesday morning. Continued below average rainfall is possible for the week 2 period ending the morning of 18 October.

#### **Kissimmee**

Hurricane Ian passed over the Kissimmee Basin on September 28-29, 2022, bringing considerable rainfall that raised water levels in East Lake Toho (S-59), Lake Toho (S-61) and KCH (S-65) further above their respective regulation schedules; discharge at their outlet structures is being adjusted to bring stage in each lake back to its respective regulation schedule. S-65A discharge was increased to 10,000 cfs to control a rainfall-driven stage rise in Pool A. With S-65A discharge continuing to rise above bankfull, water depth on the Kissimmee River floodplain rose to a mean depth of 4.11 feet on October 2, 2022. The average concentration of dissolved oxygen in the Kissimmee River declined from 0.3 mg/L to 2.5 mg/L as Hurricane Ian passed over the basin and then decreased to 0.7 mg/L, well below the potentially lethal level for largemouth bass of 1.0 mg/L.

## Lake Okeechobee

Lake Okeechobee stage was 13.97 feet NGVD on October 2, 2022, with water levels 0.86 feet higher than previous week and 1.40 feet higher than a month ago. Lake stage was in the Base Flow band and in the ecological envelope. Average daily inflows (excluding rainfall) increased from the previous week. No outflows (excluding evapotranspiration) were reported last week. Pumping into the lake occurred at S-2, S-3 and S-4 pumping stations. The most recent satellite image (October 3, 2022) from NOAA's Harmful Algal Bloom Monitoring System showed that bloom potential was moderate in the western and northwestern parts of the lake. The bloom potential increased in those regions since the previous week. Microcystins were not detected in the water during the September 19-21 routine survey. Chlorophyll *a* exceeded 40 µg/L (Lake-wide bloom threshold) at 28% of the sites, with the highest value (77.1 µg/L) recorded at the KISSR0.0 location. Communities at 84% of the sites were mixed, 9% were dominated by *Microcystis aeruginosa*, 3% were dominated by *Planktolyngbya limnetica*, and the remaining 3% by a mix of *M. aeruginosa*/*M. wesenbergii*.

## **Estuaries**

Total inflow to the St. Lucie Estuary averaged 7,066 cfs over the past week with no flow coming from Lake Okeechobee. Mean salinities decreased then quickly increased again at all sites over the past week. Salinity in the middle estuary decreased into the damaging range (10-25) for adult eastern oysters.

Our instruments in the Caloosahatchee only worked for two days this week and stopped working as Hurricane Ian's storm surge began. The following statements are only based on the two days of data that were available. Total inflow to the Caloosahatchee Estuary averaged 10,950 cfs over the past week with no flow coming from Lake Okeechobee. Mean surface salinities remained the same at S-79, I-75 and Fort Myers, and increased at the remaining sites in 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 Shell Point and Sanibel, and in the damaging range at Cape Coral (<5).

## **Stormwater Treatment Areas**

For the week ending Sunday, September 25, 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 12,500 ac-feet. The total amount of inflows to the STAs in WY2023 is approximately 733,000 ac-feet. STA cells are above target stage. STA-1E Western Flow-way is offline for post-construction vegetation grow in, STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown, and STA-2 Flow-way 2 is offline for construction activities. Operational restrictions are in 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**

Rates of stage change were generally "fair" as rapidly rising water depths have some negative ecological impacts on the ecology of the Everglades. Depths recovered to near average stages for this time of year in WCA-3A North after a very rapid ascension over the last two weeks but given the below average conditions in that region pre-storm, that increased ascension rate provided depths that may have been a lifeline to WCA-3A North. Taylor slough stages rose last week and are above average depths for this time of the year. Salinities fell last week and only the eastern region of the Bay remains above the inter quartile range in all regions of Florida Bay and dropped from 8 to 7 above the bay-wide average for this time of year and have climbed from post storm lows in areas without significant rainfall or inflow.

## **Biscayne Bay**

Total inflow to Biscayne Bay averaged 3,374 cfs and the previous 30-day mean inflow averaged 1,368 cfs. The seven-day mean salinity was 26.2 at BBCW8 and 21.6 at BBCW10, both below the preferred maximum salinity of 35. Salinity data provided as a courtesy by Biscayne National Park.

## **Supporting Information**

### **Kissimmee Basin**

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

On October 2, 2022, lake stages were 60.7 feet NGVD (3.7 feet above schedule) in East Lake Toho, 56.6 feet NGVD (2.6 feet above schedule) in Lake Toho, and 54.2 feet NGVD (2.7 feet above schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1, Figures KB-1-3**).

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

On October 2, 2022, average daily discharge was 11,000 cfs at S-65 and to 10,000 cfs at S-65A to manage rainfall-driven rising water levels in KCH and Pool A, respectively. Average daily discharge from the Kissimmee River was 9,600 cfs at S-65D and 9,300 cfs at S-65E (**Table KB-2**). Headwater stages were 50.6 feet NGVD at S-65A and 28.7 feet NGVD at S-65D on October 2, 2022. As S-65A discharge and local runoff increased to the Kissimmee River, mean river channel stage increased by 1.13 feet (**Figure KB-4**) and water depth on the Kissimmee River floodplain rose to a mean depth of 4.11 feet on October 2, 2022 (**Figure KB-5**). The average concentration of dissolved oxygen in the Kissimmee River increased from 0.3 mg/L to 2.5 mg/L as Hurricane Ian passed over the basin and then decreased to 0.7 mg/L on October 2, 2022 (**Table KB-2, Figure KB-6**).

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

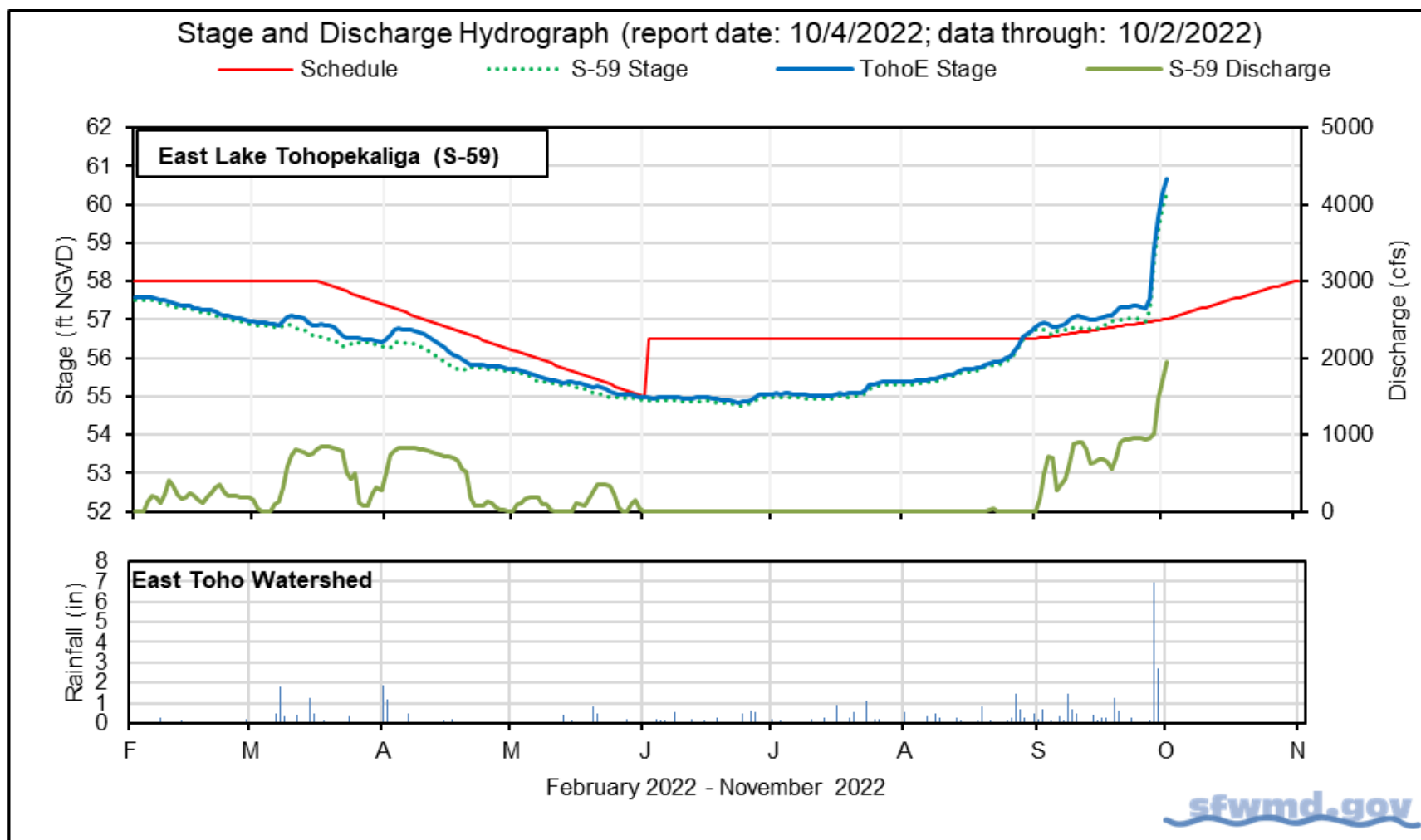
Per the IS-14-50.0 discharge plan, adjust S-65 discharge to maintain a minimum flow of at least 1,400 cfs at S-65A to the Kissimmee River. Note general guidance for discharge and maximum rates of change in discharge (**Figure KB-7**).

**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.

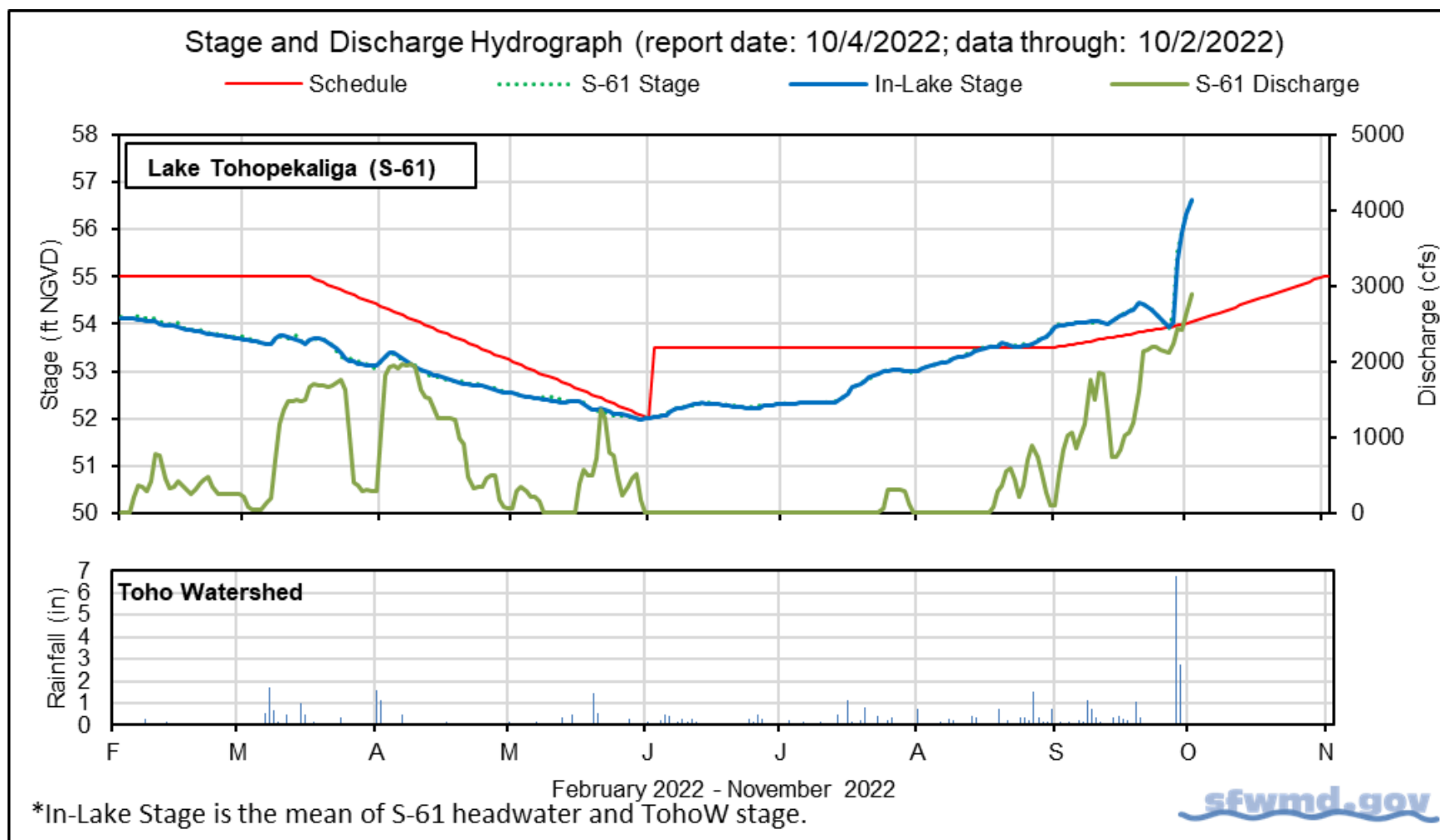
Water Body	Structure	Stage Monitoring Site	7-Day Average Discharge (cfs)	Lake Stage (feet NGVD) <sup>a</sup>	Schedule Type <sup>b</sup>	Schedule Stage (feet NGVD)	Departure from Regulation (feet)	
							10/2/22	9/25/22
Lakes Hart and Mary Jane	S-62	LKMJ	530	63.8	R	60.0	3.8	-0.2
Lakes Myrtle, Preston and Joel	S-57	S-57	110	65.4	R	61.0	4.4	-0.1
Alligator Chain	S-60	ALLI	540	64.9	R	63.2	1.7	-0.1
Lake Gentry	S-63	LKGT	700	62.1	R	61.0	1.1	-0.2
East Lake Toho	S-59	TOHOE	1300	60.7	R	57.0	3.7	0.4
Lake Toho	S-61	TOHOW S-61	2400	56.6	R	54.0	2.6	0.2
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	7000	54.2	R	51.5	2.7	0.7

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.

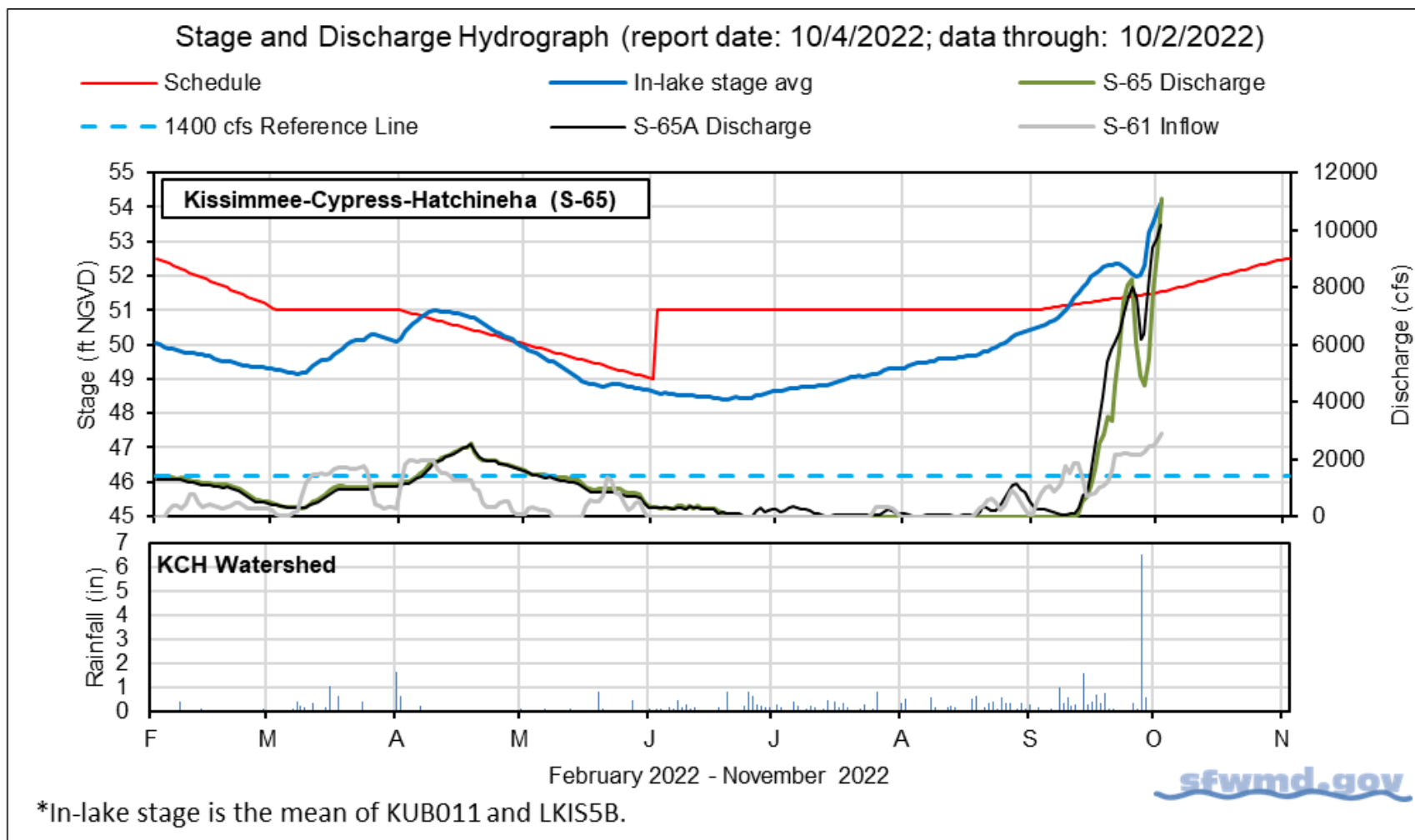
b. A: projected recession line; R: USACE regulation schedule; S: temporary recession target line; T: temporary schedule; NA: not applicable or not available.



**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			
		10/2/22	10/2/22	9/25/22	9/18/22	8/11/22
Discharge	S-65	11,000	7,000	5,900	1,300	0
Discharge	S-65A <sup>a</sup>	10,000	8,200	6,700	1,900	110
Headwater Stage (feet NGVD)	S-65A	50.6	49.2	47.9	46.8	46.3
Discharge	S-65D <sup>b</sup>	9,600	7,800	2,200	710	240
Headwater Stage (feet NGVD)	S-65D <sup>c</sup>	28.7	28.6	27.5	26.3	26.2
Discharge (cfs)	S-65E <sup>d</sup>	9,300	7,600	2,100	670	230
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) <sup>e</sup>	Phase I, II/III river channel	0.7	1.0	1.0	3.2	3.3
Mean depth (feet) <sup>f</sup>	Phase I floodplain	4.11	3.73	2.14	0.35	0.14

a. Combined discharge from main and auxiliary structures.

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

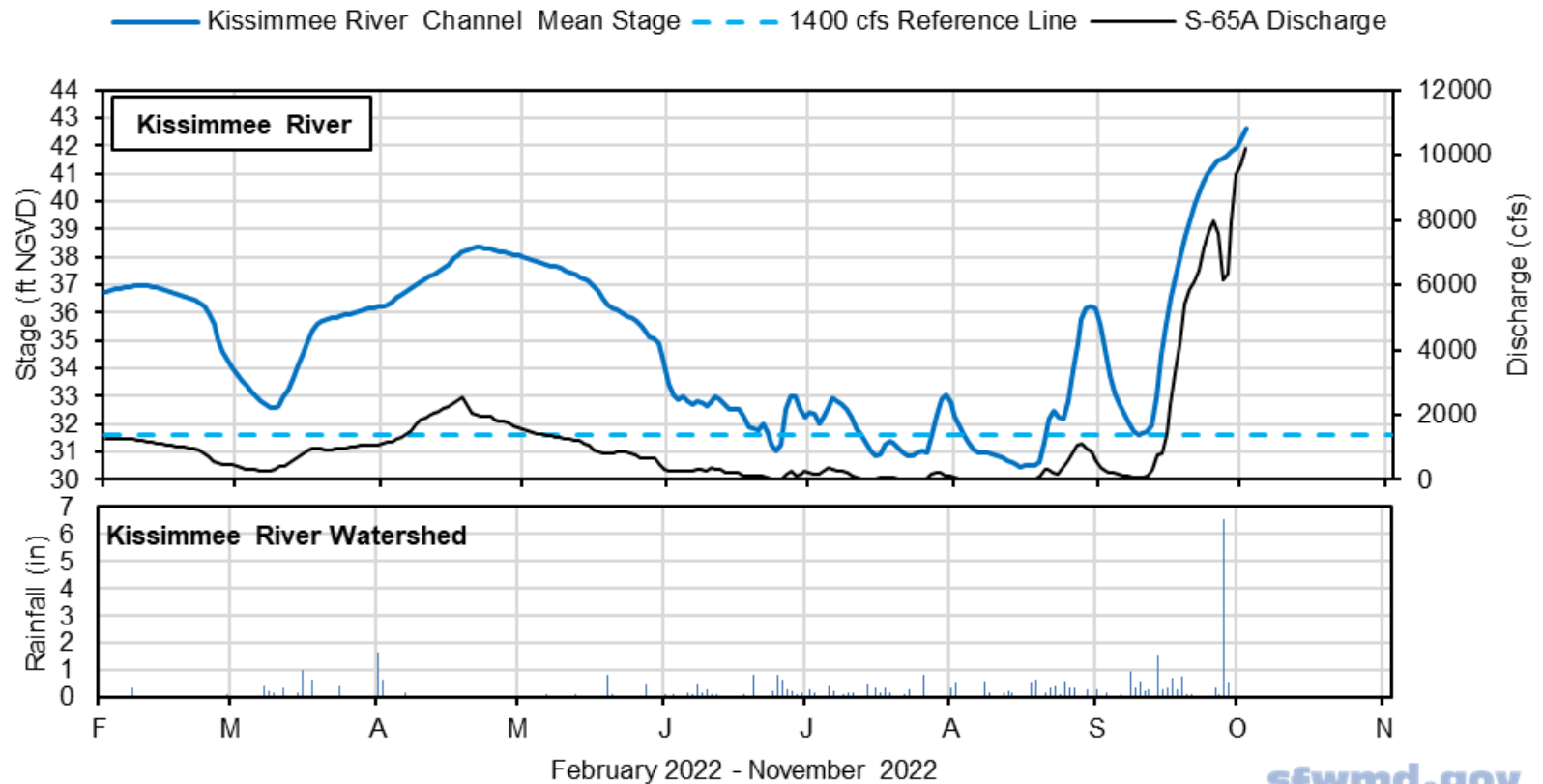
c. Average stage from S-65D and S-65DX1.

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).

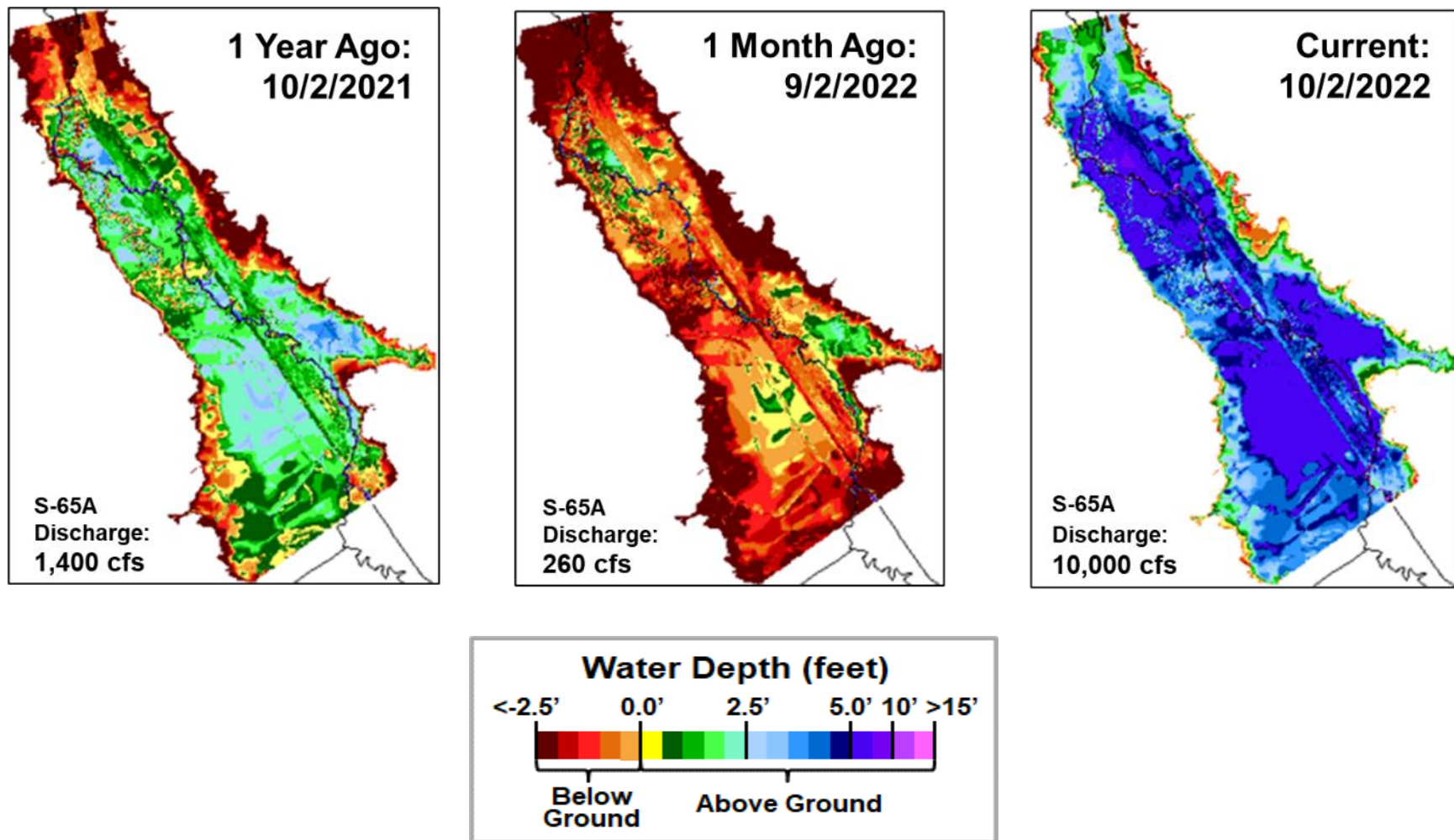
# Stage and Discharge Hydrograph (report date: 10/4/2022; data through: 10/2/2022)



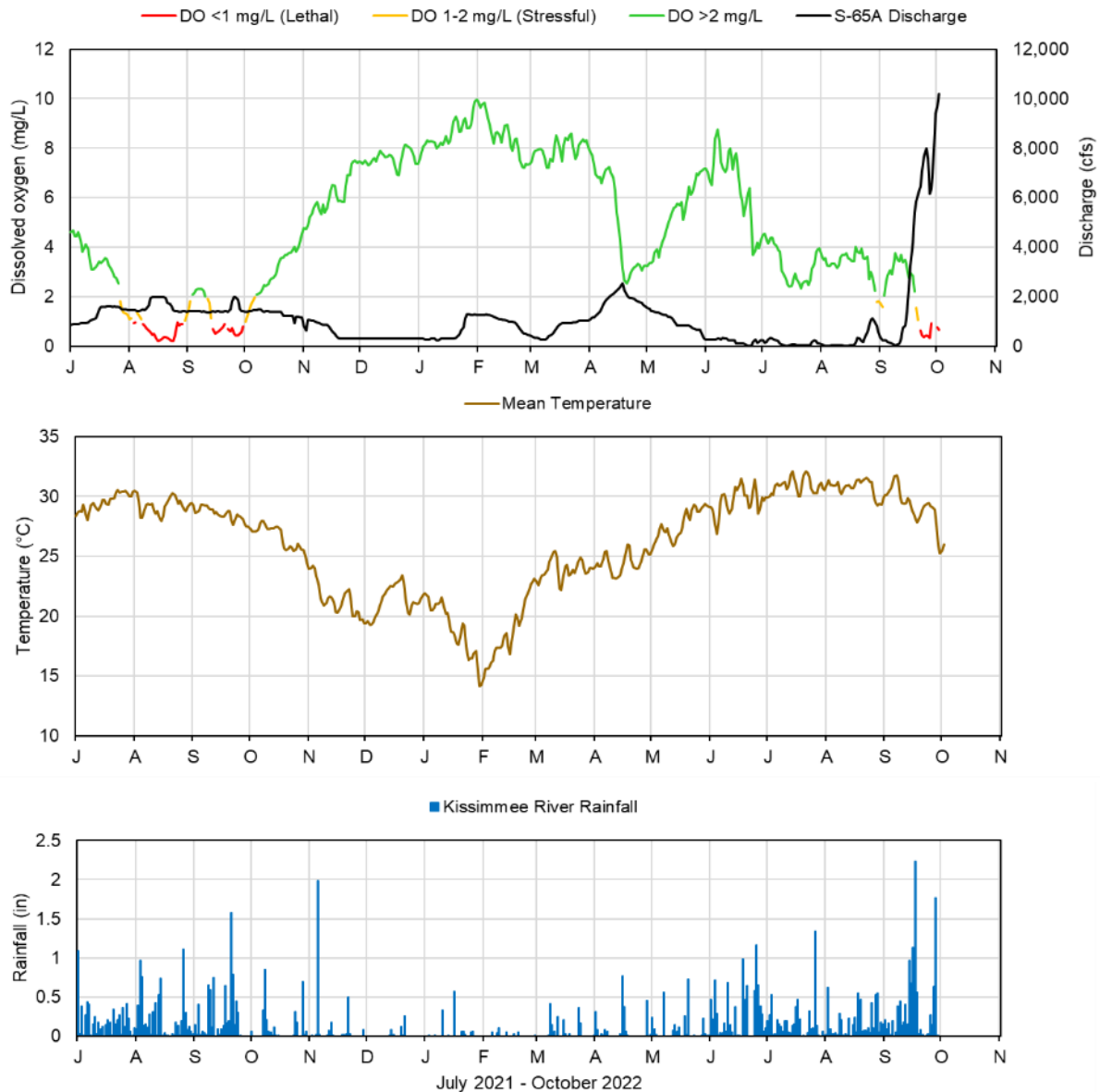
\*River Channel Stage is the average for PC62, KRDR02, KRBN, PC33, and PC11.

[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.



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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 five 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.

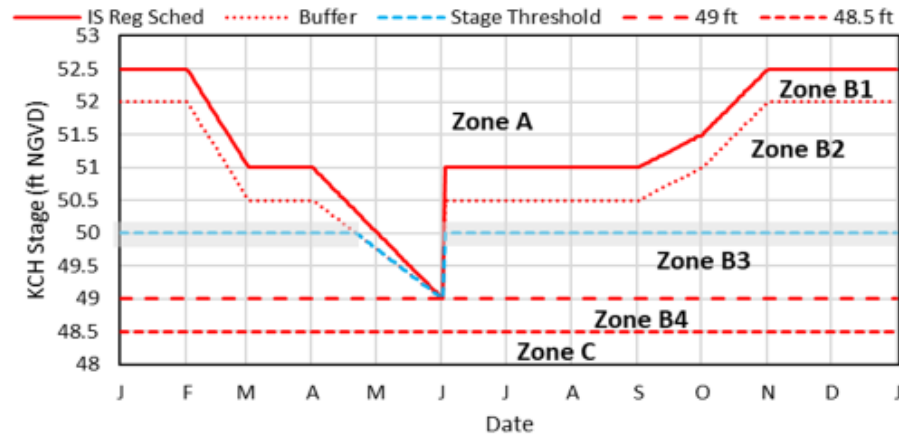
Table KB-3. Discharge Rate of Change Limits for S65/S65A (revised 1/14/19).

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

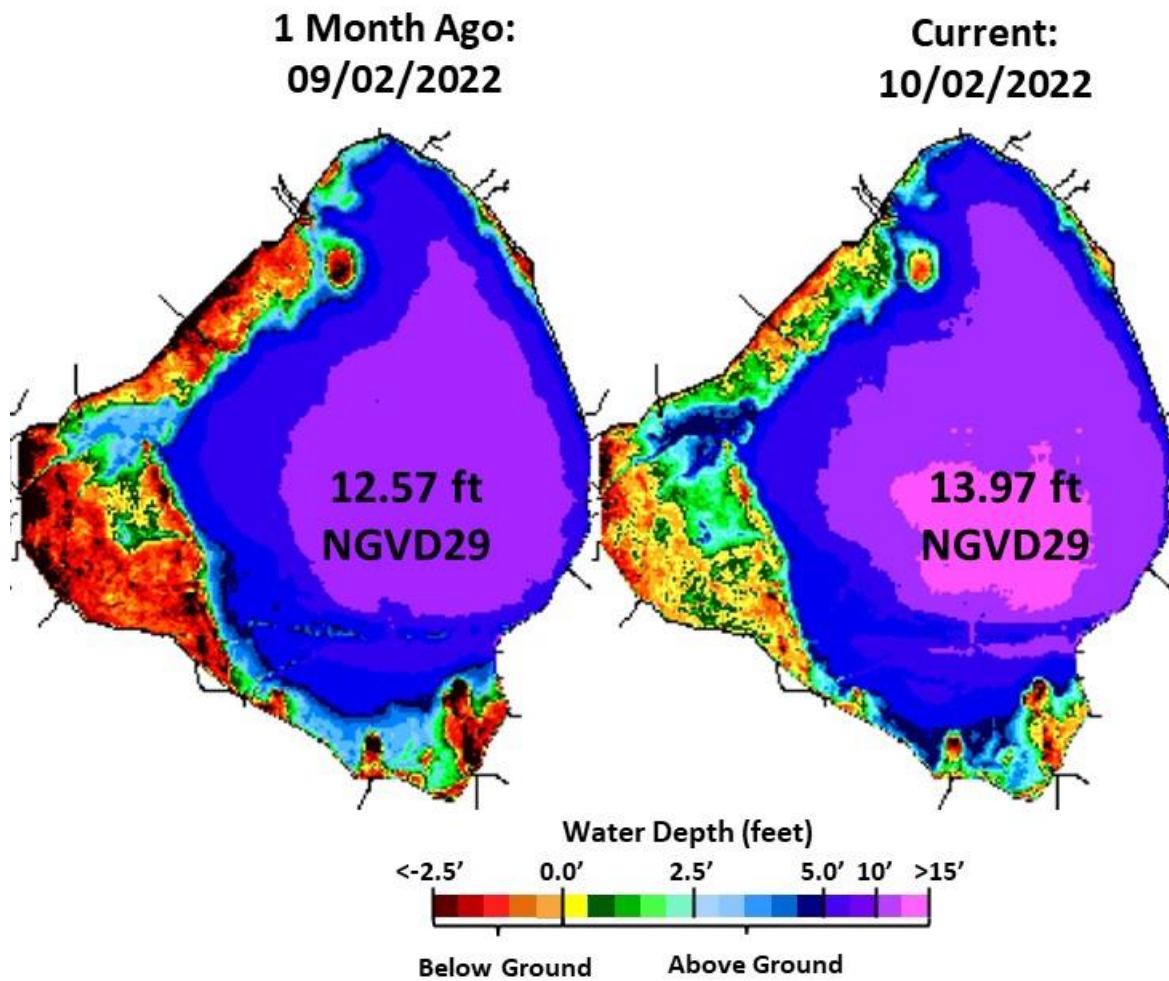
Lake Okeechobee stage was 13.97 feet NGVD on October 2, 2022, with water levels 0.86 feet higher than previous week and 1.40 feet higher than a month ago (**Figure LO-1**). Lake stage was in the Base Flow sub band (**Figure LO-2**) and within the ecological envelope where it has been for about 90% of 2022 (**Figure LO-3**). According to NEXRAD, 2.53 inches of rain fell directly on the Lake last week.

Average daily inflows (excluding rainfall) increased significantly from the previous week, going from 8,005 cfs to 18,443 cfs. Average daily outflows (excluding evapotranspiration) remained 0 cfs. The highest inflow came from the C-38 Canal (7,615 cfs). Back flow was recorded from the L-8 Canal via the S-271 structure at an average daily rate of 834 cfs and the S-308 structure at an average daily rate of 254 cfs. There was no outflow to the west via the S-77 structure or to the south via the S-350 structures. Water was pumped into the Lake at the S-2, S-3, and S-4 pumping stations at an average rate of 1,995 cfs (combined average inflow). **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 (October 3, 2022) from NOAA's Harmful Algal Bloom Monitoring System showed that bloom potential was moderate in the western and northwestern parts of the lake. Overall bloom potential increased in those regions since last week (**Figure LO-6**).

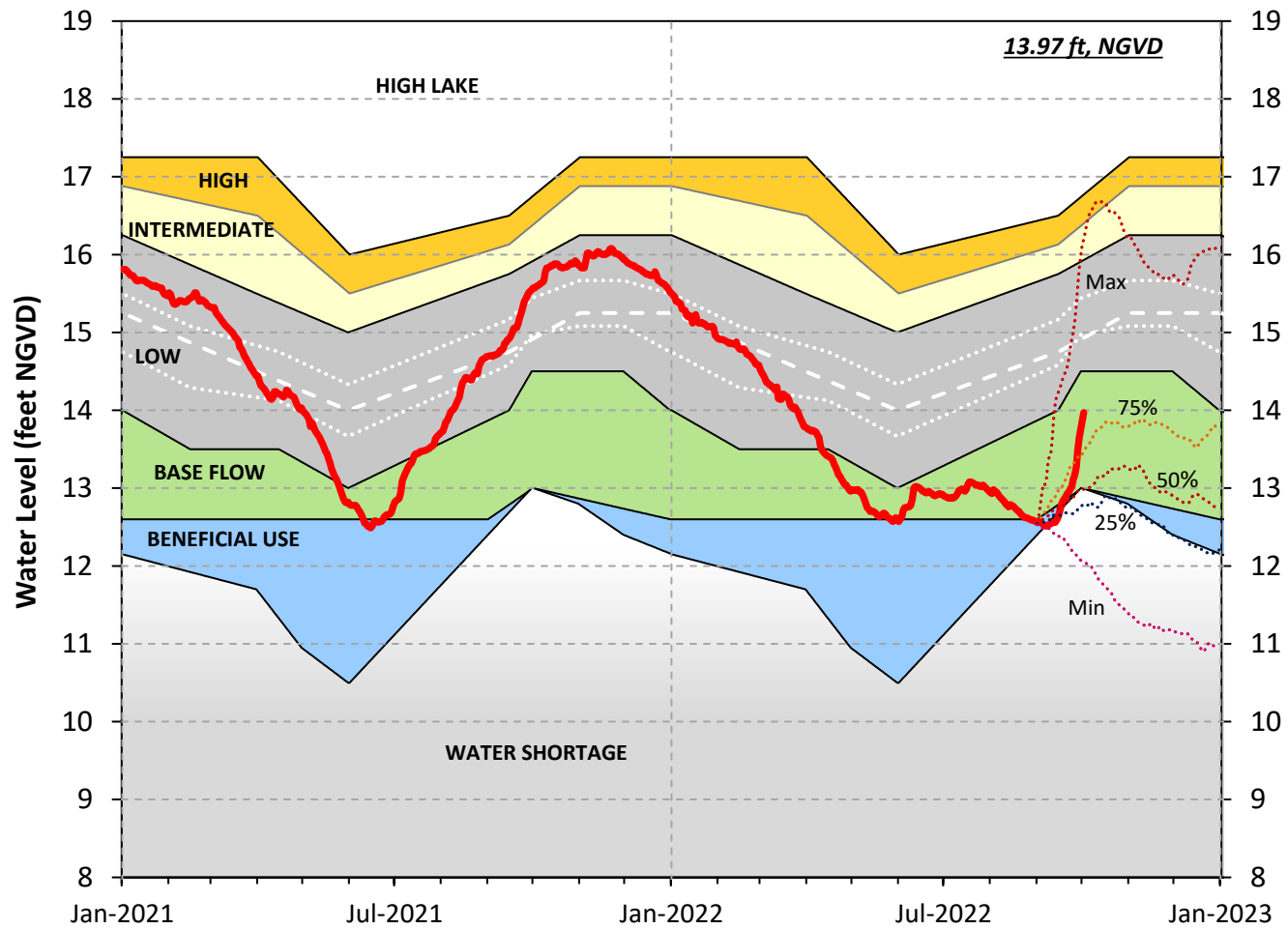
The September 19-21 survey on the Lake revealed that 28% of the sites had chlorophyll a concentration above 40 µg/L. The highest value (77.1 µg/L) was recorded at the KISSR0.0 location in the northern part of the Lake. Total microcystins concentrations were below detection limit at all sampling locations. Communities at 84% of the sites were mixed, 9% were dominated by *Microcystis aeruginosa*, 3% were dominated by *Planktolyngbya limnetica*, and the remaining 3% by a mix of *M. aeruginosa*/*M. wesenbergii* (**Figure LO-7**).

## Changes in Water Depth



**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

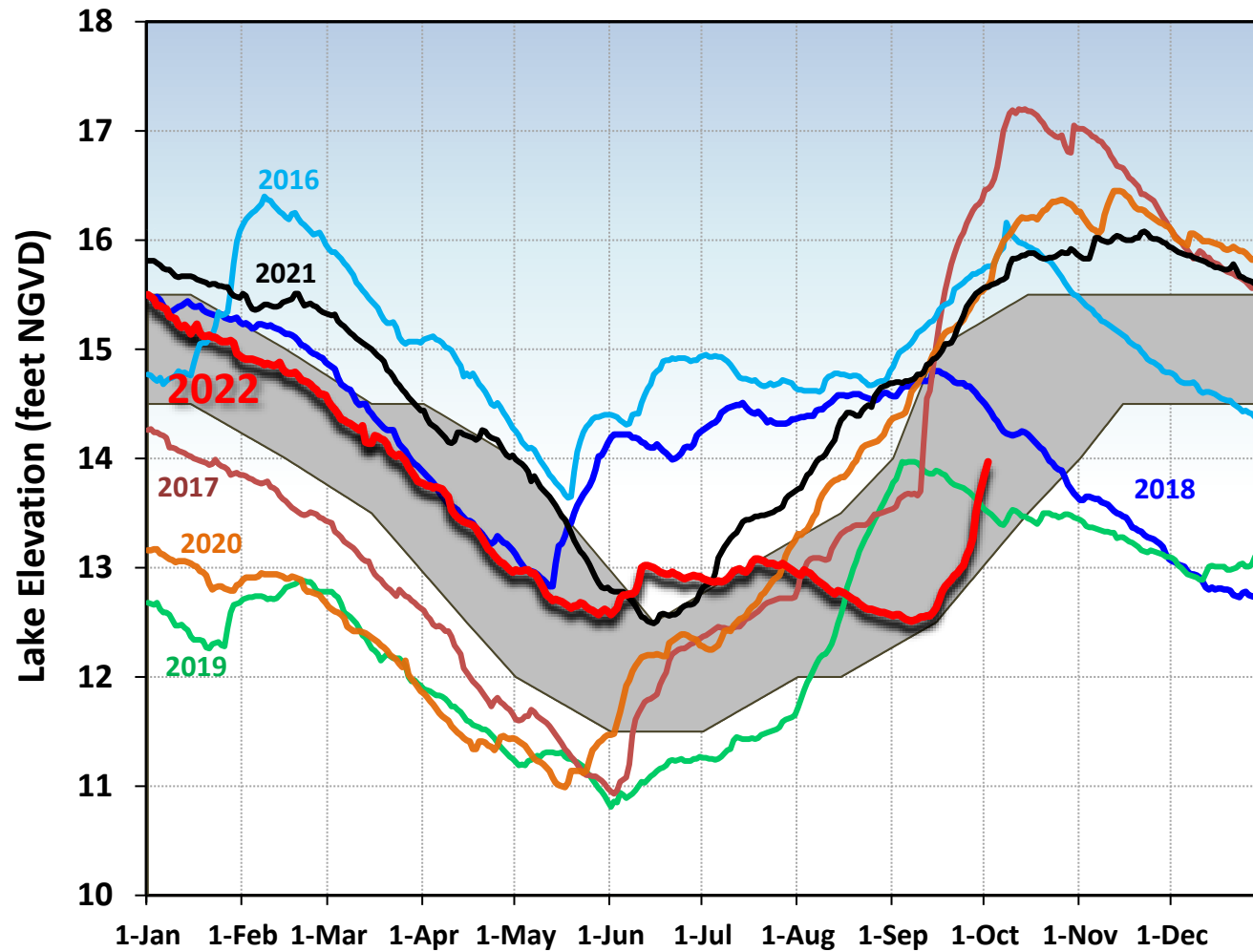


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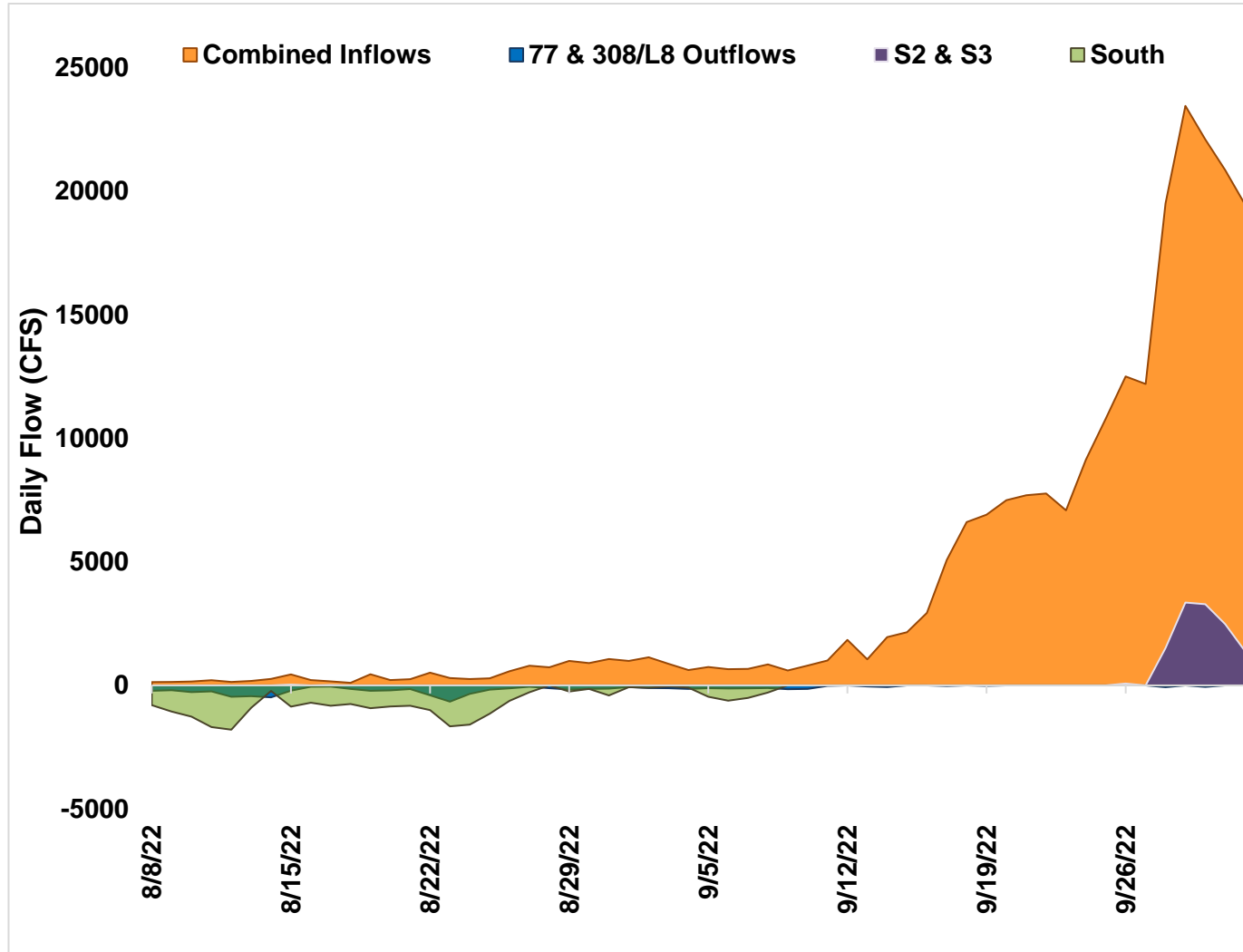
**Figure LO-2.** Recent Lake Okeechobee stages with projected stages based on a dynamic position analysis.



## Lake Okeechobee Stage vs Ecological Envelope

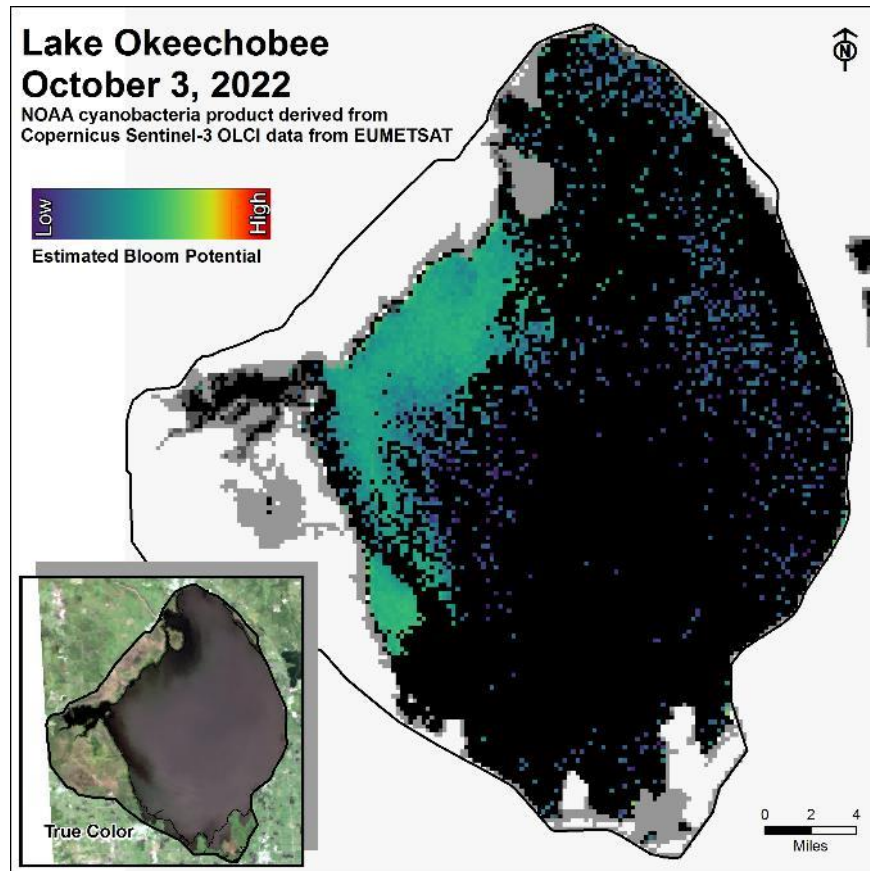


**Figure LO-3.** The prior six years of annual stage hydrographs for Lake Okeechobee in comparison to the ecological envelope.

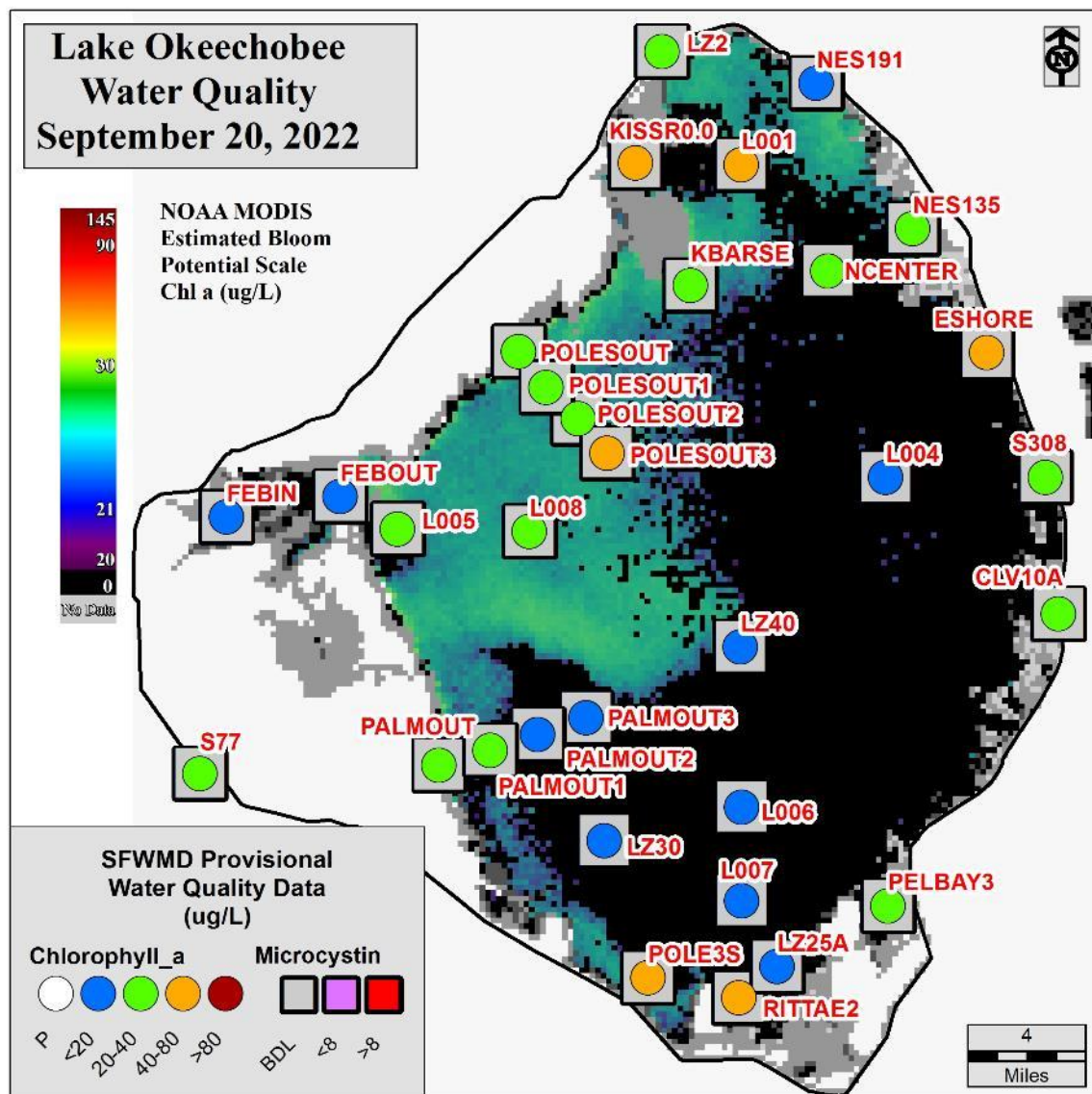


**Figure LO-4.** Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows 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-6.** Cyanobacteria bloom potential on October 3, 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 September 19-21, 2022.

## Estuaries

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

The estuary was impacted by Hurricane Ian over a 2-day period with most of the freshwater inflow coming from the basins (**Figure ES-2**). This inflow resulted in a rapid decrease in salinity throughout the estuary, but salinity began to recover quickly (**Figure ES-3**). Long-term impacts to oyster habitat are unlikely but will be monitored.

Over the past week, mean total inflow to the St. Lucie Estuary was 7,066 cfs (**Figures ES-1 and ES-2**) and the previous 30-day mean inflow was 3,289 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-2**.

Over the past week, salinities decreased at all sites in the estuary (**Table ES-1 and Figure ES-3**). The seven-day moving average of the surface and bottom salinities at the US1 Bridge was 3.6. Salinity conditions in the middle estuary were estimated to be within the damaging range for adult eastern oysters (**Figure ES-4**). The mean larval oyster recruitment rate for September reported by the Fish and Wildlife Research Institute was 2.5 spat/shell (**Figure ES-5**).

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

The Caloosahatchee River Estuary received system-wide impacts from damaging winds and large storm surge following the landfall of Hurricane Ian 20 miles WNW of Fort Myers, Florida at 3:05 PM Wednesday, September 28, 2022 as a category 4 storm. All South Florida Water Management District water quality sensors in the estuary were affected by the storm and ceased to function on September 28, 2022. Over the past week, mean total inflow to the Caloosahatchee River Estuary was 12,754 cfs (**Figures ES-6 and ES-7**) and the previous 30-day mean inflow was 7,990 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-7**.

Salinity is only reported for the period September 26-27, 2022, for the Caloosahatchee River Estuary. During that period, salinities remained the same at S-79, Val I-75 and Ft. Myers and increased at the remaining sites in the estuary (**Table ES-2 and Figures ES-8 and ES-9**). The mean salinities (**Table ES-2**) were in the optimal range (0-10) for tape grass in the upper estuary on September 27, 2022. The two-day mean salinity values were within the optimal range for adult eastern oysters at Sanibel and Shell Point, and in the damaging range at Cape Coral (**Figure ES-10**). The mean larval oyster recruitment rate reported by the Fish and Wildlife Research Institute in September was 2.6 spat/shell at Iona Cove and 6.4 spat/shell at Bird Island (**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

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



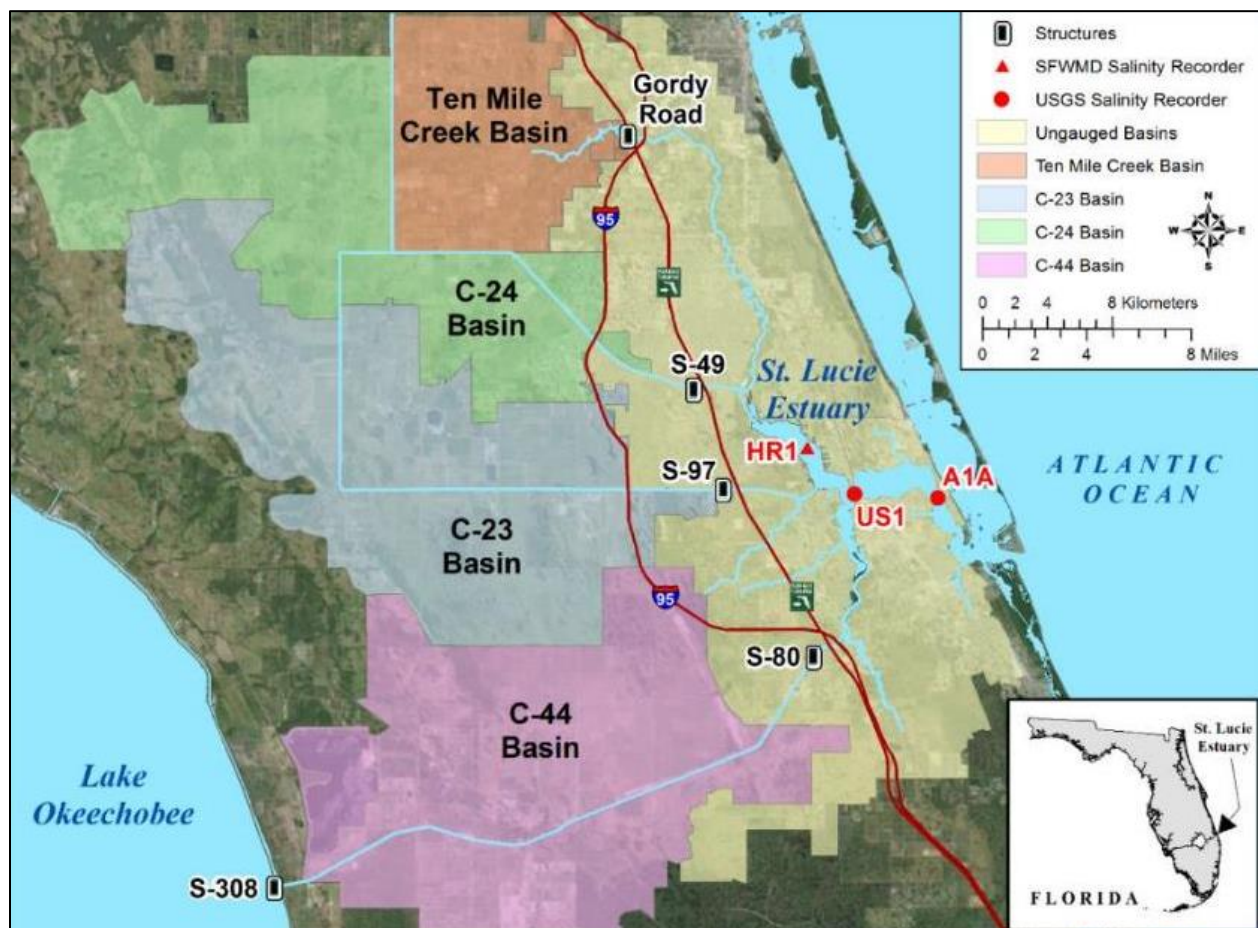
tidal basin. Model scenarios included pulse releases at S-79 ranging from 0 to 1500 cfs, and a steady release at 2,000 cfs with estimated tidal basin inflows of 1118 cfs. Model results from all scenarios predict daily salinity to be 0.3 or lower and the 30-day moving average surface salinity to be 0.2 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.

### **Red Tide**

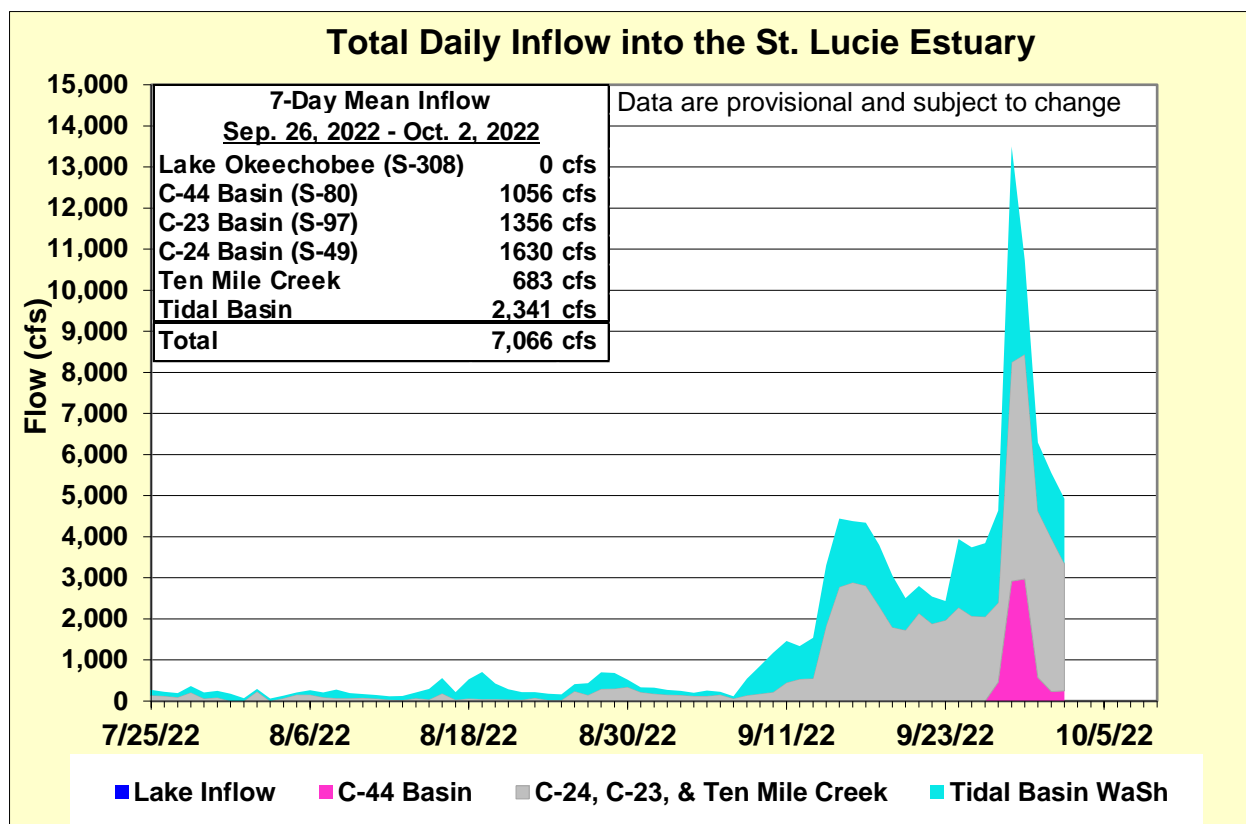
The Florida Fish and Wildlife Research Institute reported on September 23, 2022, that *Karenia brevis*, the Florida red tide dinoflagellate, was not observed in any samples collected within the District region. On the east coast, red tide was not observed in samples from St. Lucie, Martin or Miami-Dade counties.

### **Water Management Recommendations**

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



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

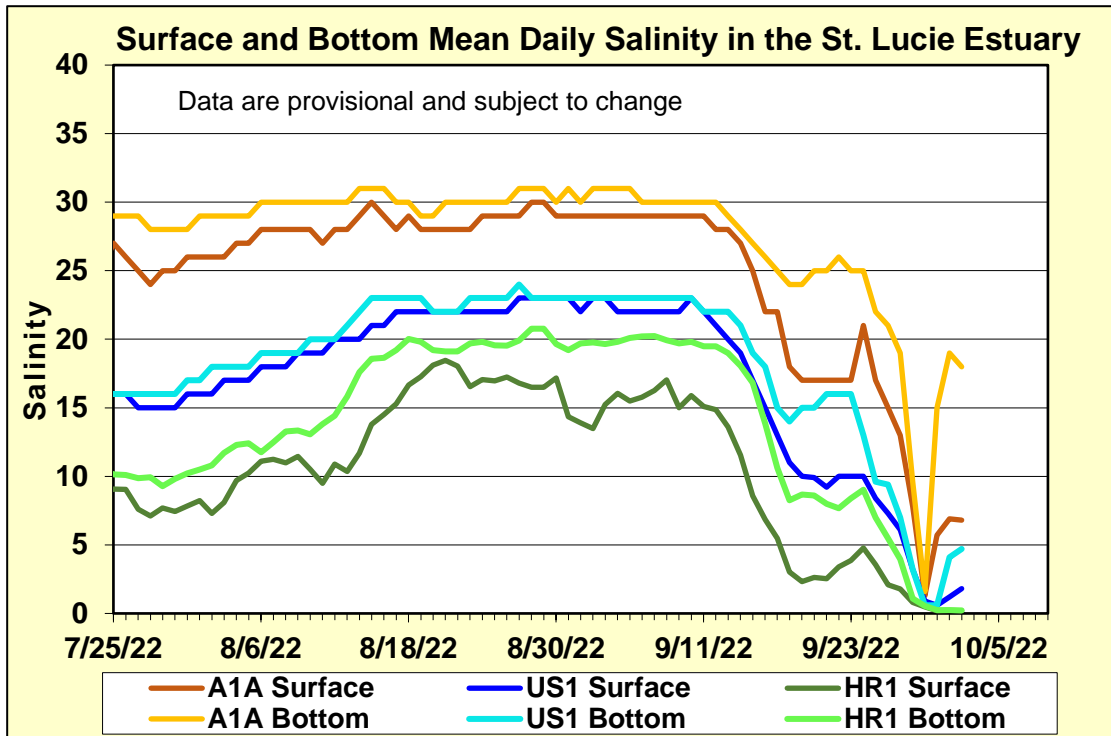


**Figure ES-2.** Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

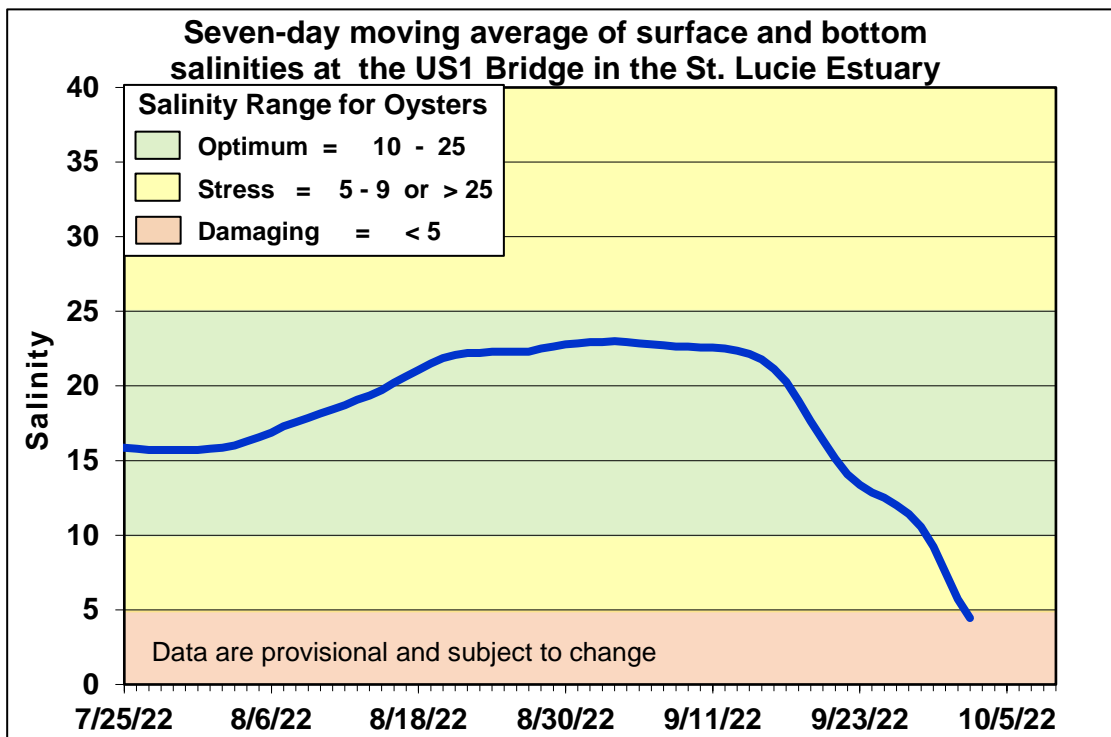
**Table ES-1.** Seven-day mean salinity at oyster monitoring sites in the St. Lucie Estuary. Current means are in bold font; previous week's means are in parentheses. The envelope reflects the optimum salinity range for adult eastern oysters (*Crassostrea virginica*) in the estuary. Data are provisional.

Sampling Site	Surface	Bottom	Optimum Envelope
HR1 (North Fork)	<b>0.8</b> (3.3)	<b>1.7</b> (8.2)	10.0 – 25.0
US1 Bridge	<b>3.0</b> (9.6)	<b>4.2</b> (14.4)	10.0 – 25.0
A1A Bridge	<b>8.1</b> (17.6)	<b>14.7</b> (24.6)	10.0 – 25.0

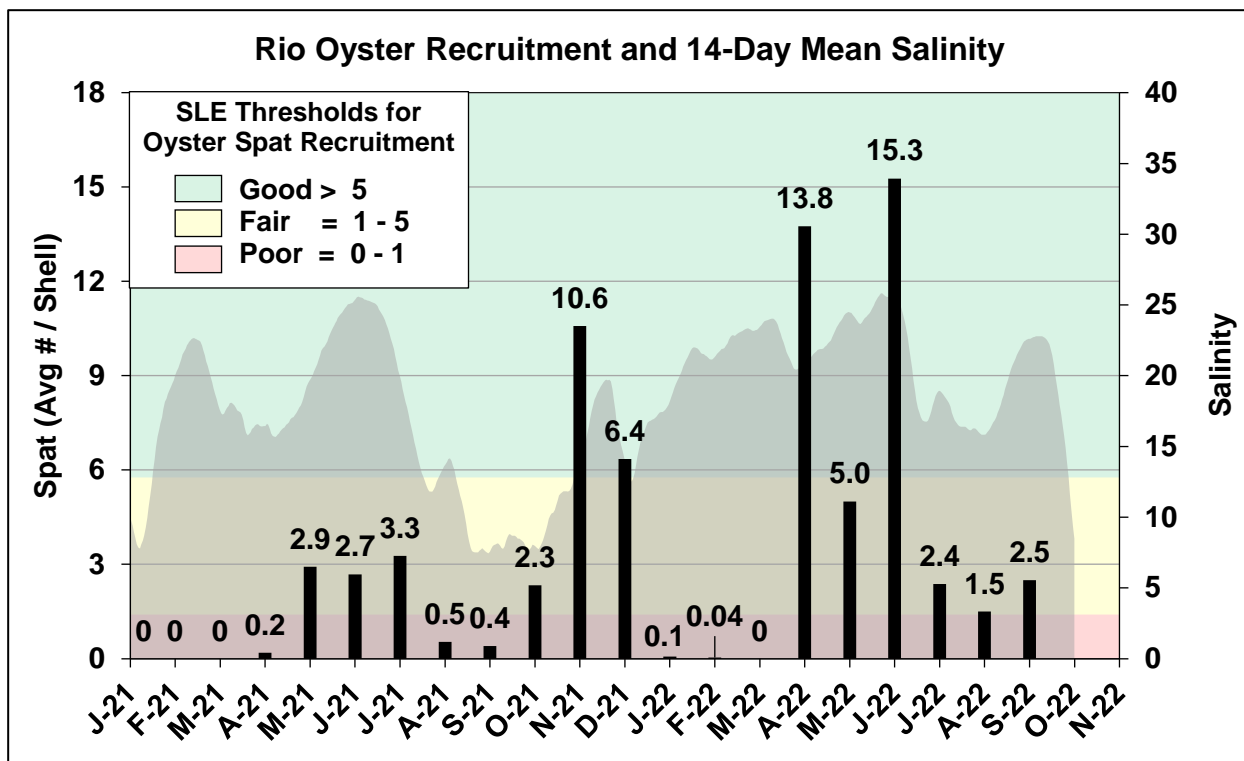




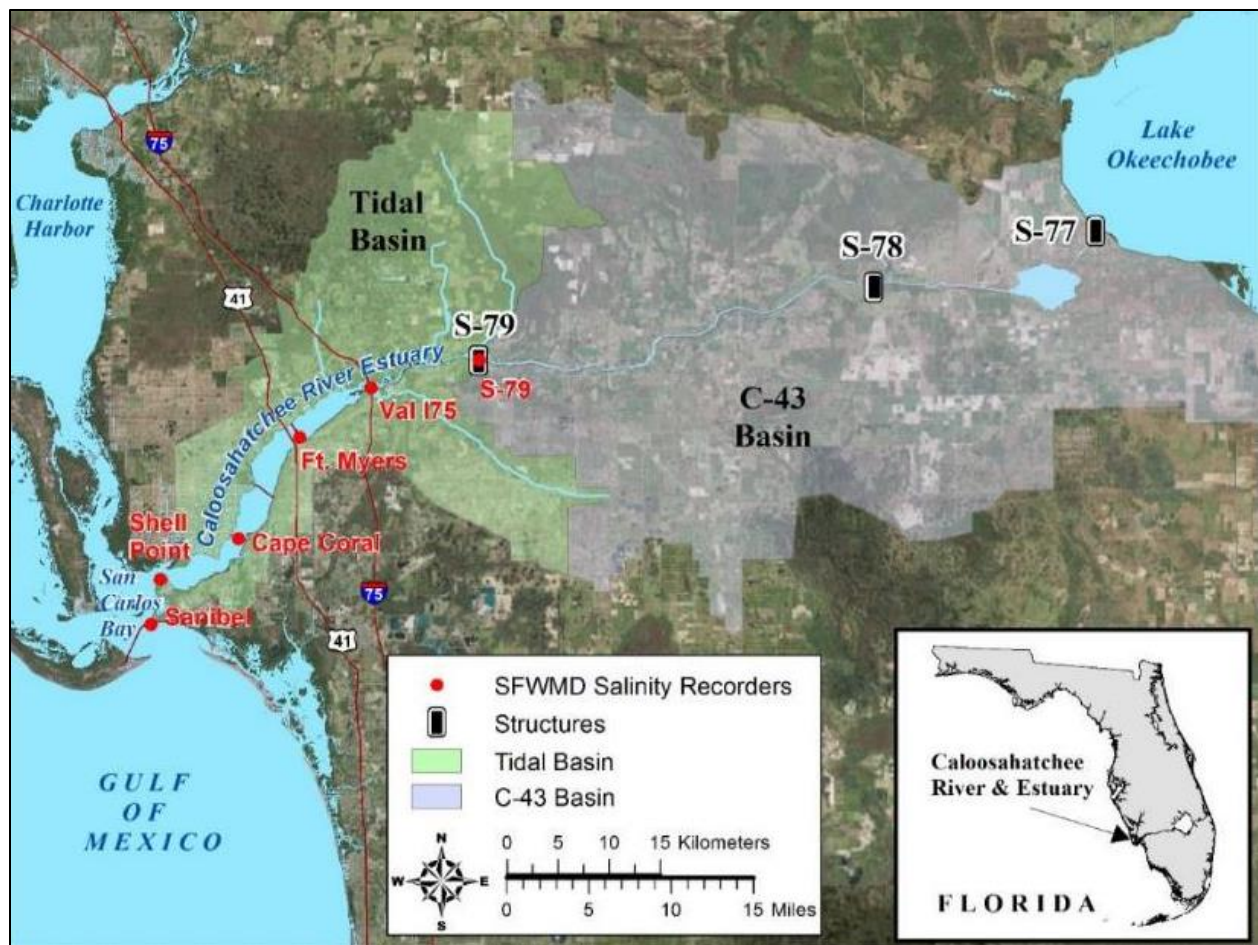
**Figure ES-3.** Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.



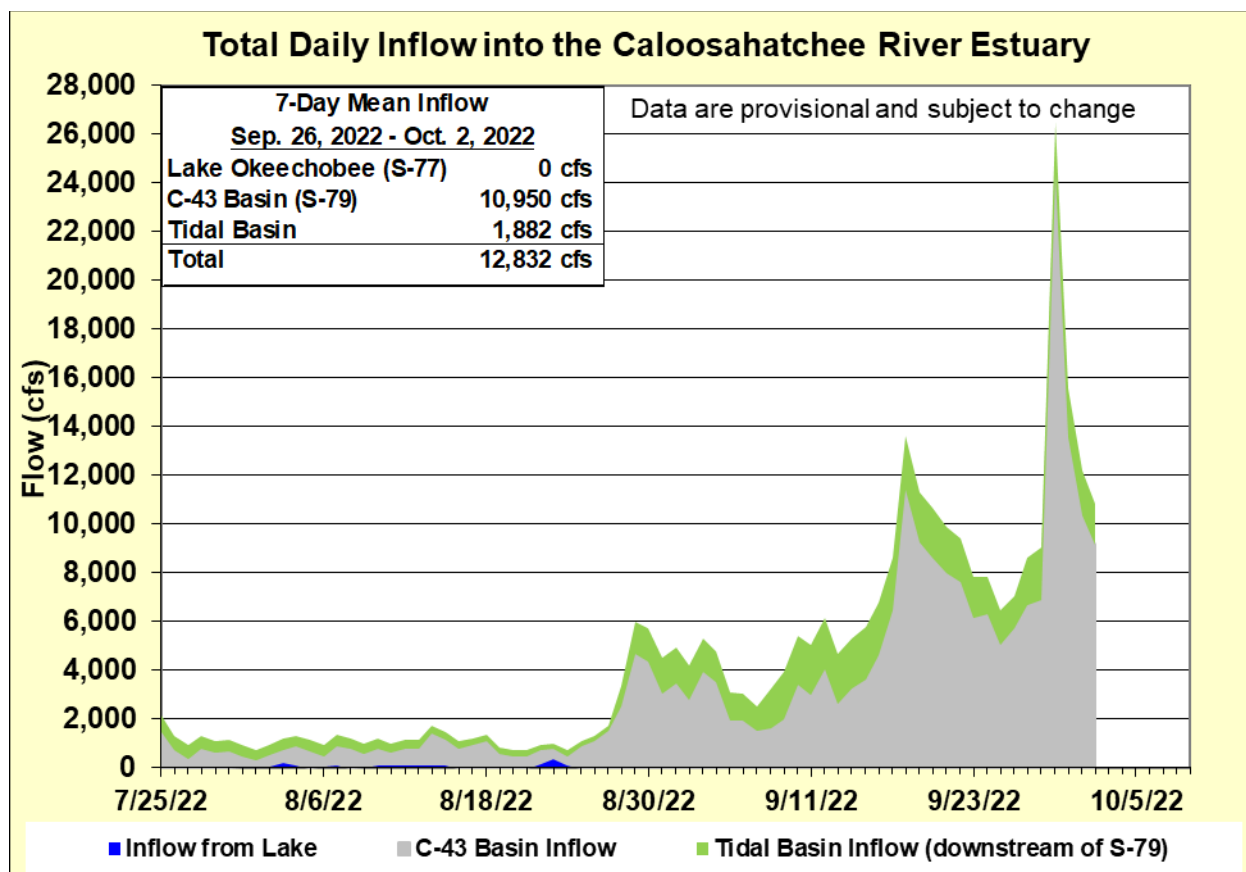
**Figure ES-4.** Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.



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



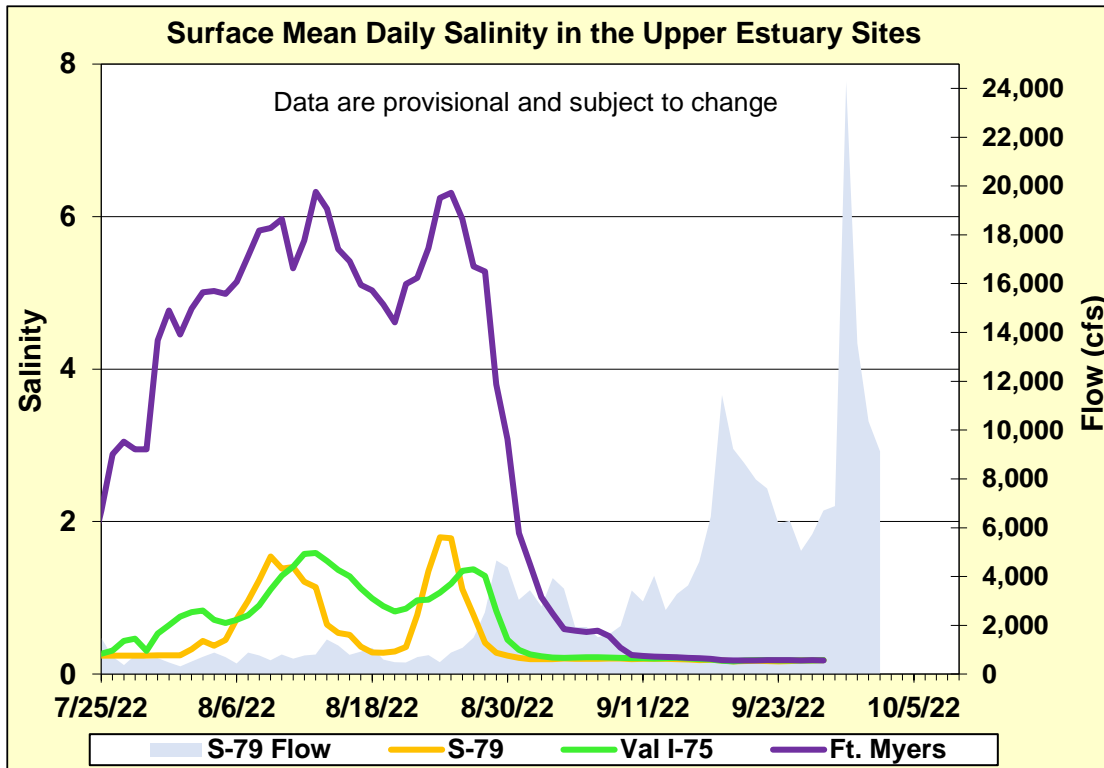
**Figure ES-6.** Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.



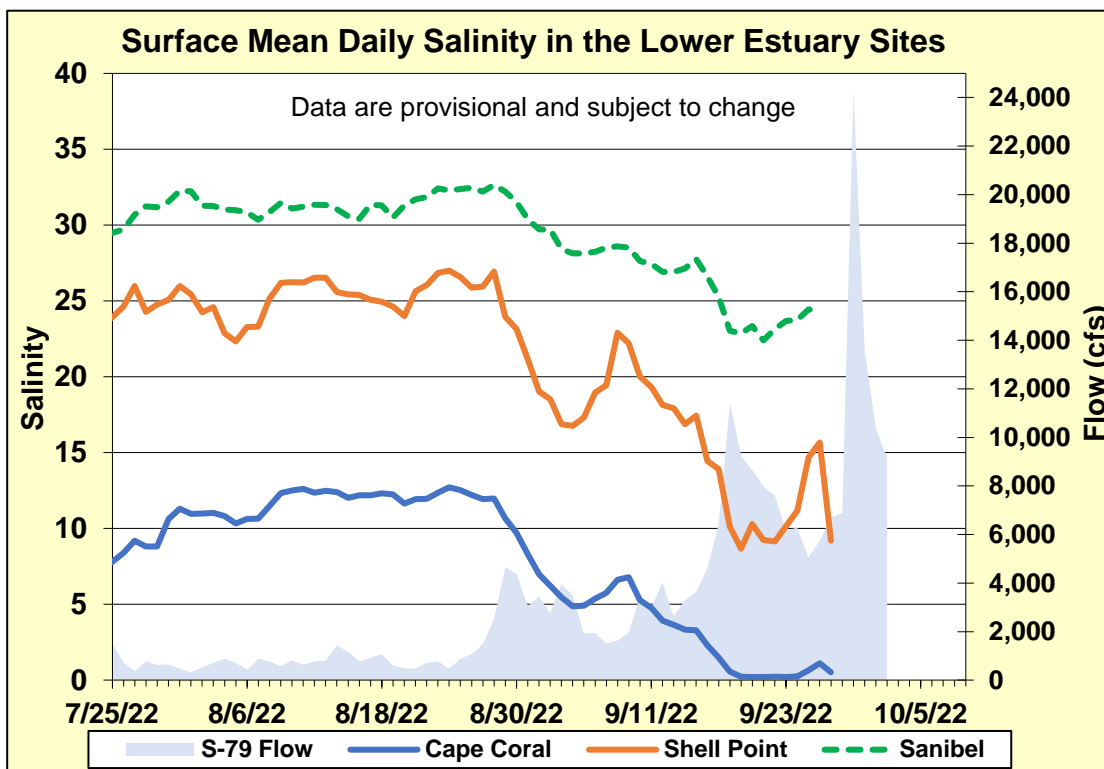
**Figure ES-7.** Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

**Table ES-2.** Mean salinity at six monitoring sites in the Caloosahatchee River Estuary. Current means are in bold font; previous week's means are in parentheses. Average salinity at six monitoring stations in the Caloosahatchee Estuary reflects period 9/26/2022–9/27/2022. No salinity data were available for these sites after 09/28/2022 when Hurricane Ian damaged area equipment. Current average is in bold face type, previous average 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.

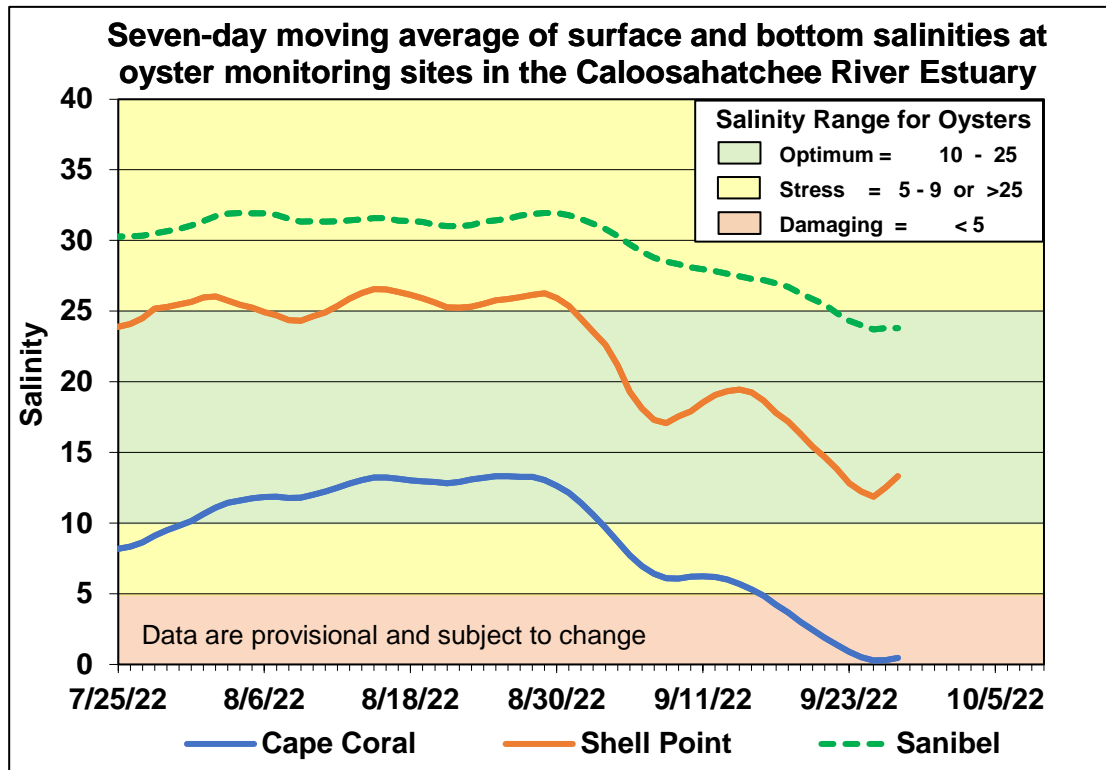
Sampling Site	Surface	Bottom	Optimum Envelope
S-79 (Franklin Lock)	<b>0.2</b> (0.2)	<b>0.2</b> (0.2)	0.0 – 10.0
Val I-75	<b>0.2</b> (0.2)	<b>0.2</b> (0.2)	0.0 – 10.0
Fort Myers Yacht Basin	<b>0.2</b> (0.2)	<b>0.2</b> (0.2)	0.0 – 10.0
Cape Coral	<b>0.8</b> (0.3)	<b>1.2</b> (0.3)	10.0 – 25.0
Shell Point	<b>12.4</b> (10.5)	<b>13.8</b> (14.6)	10.0 – 25.0
Sanibel	<b>24.3</b> (23.4)	<b>23.5</b> (24.2)	10.0 – 25.0



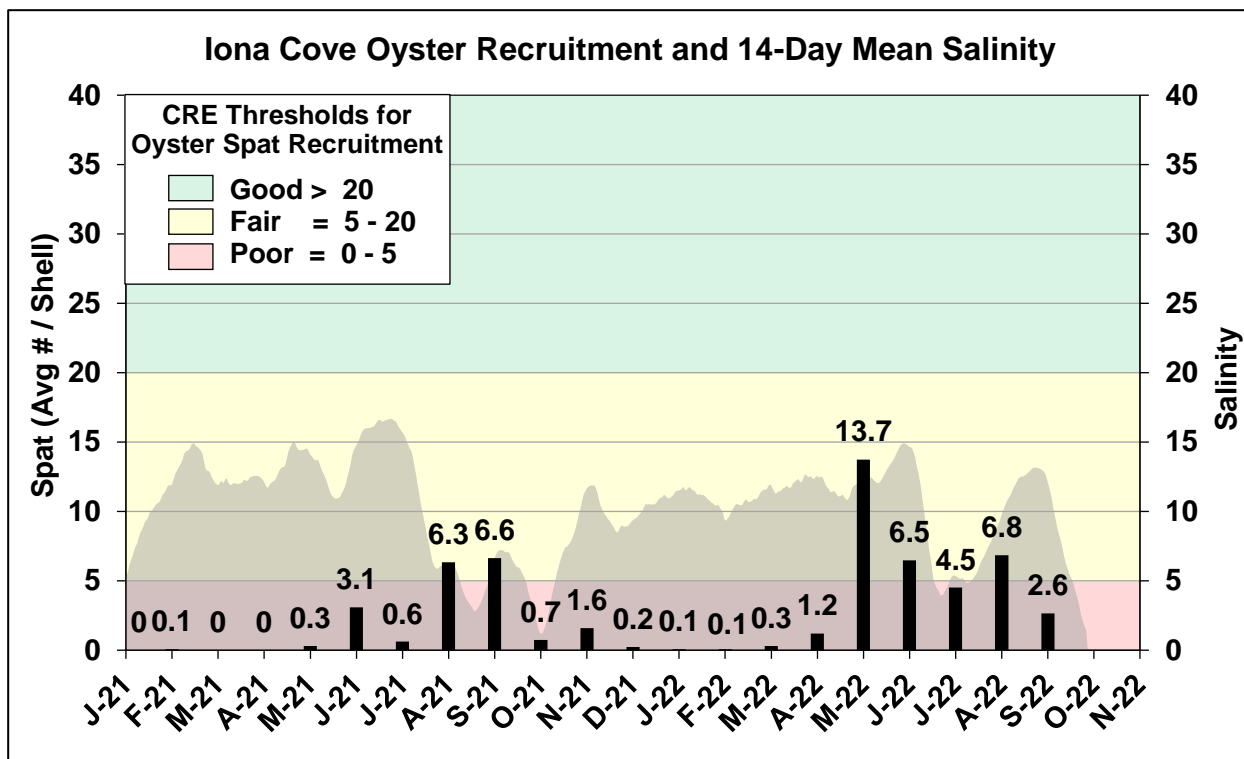
**Figure ES-8.** Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79. No salinity data were available for these sites after 09/28/2022 when Hurricane Ian damaged area equipment.



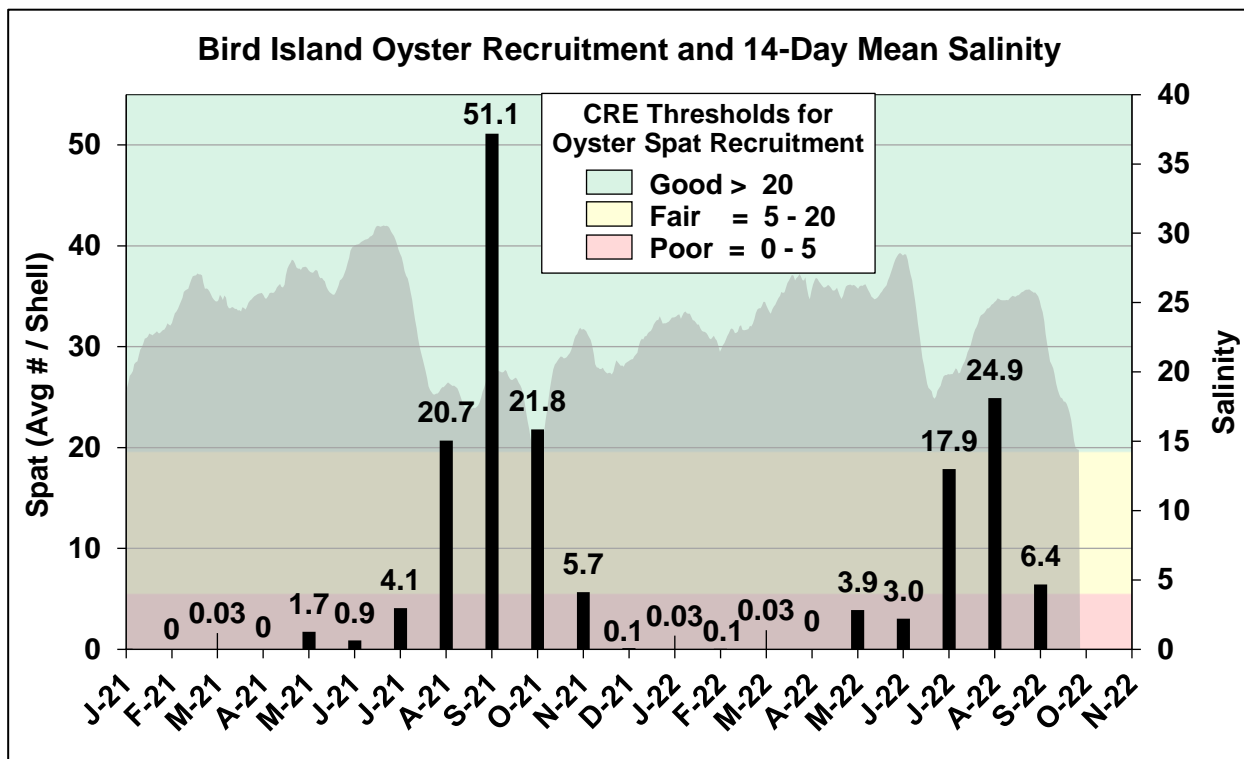
**Figure ES-9.** Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79. No salinity data were available for these sites after 09/28/2022 when Hurricane Ian damaged area equipment.



**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. No salinity data were available for these sites after 09/28/2022 when Hurricane Ian damaged area equipment.



**Figure ES-11.** Mean oyster recruitment at the Iona Cove oyster monitoring station and 14-day mean salinity at Cape Coral. No salinity data were available for these sites after 09/28/2022 when Hurricane Ian damaged area equipment.



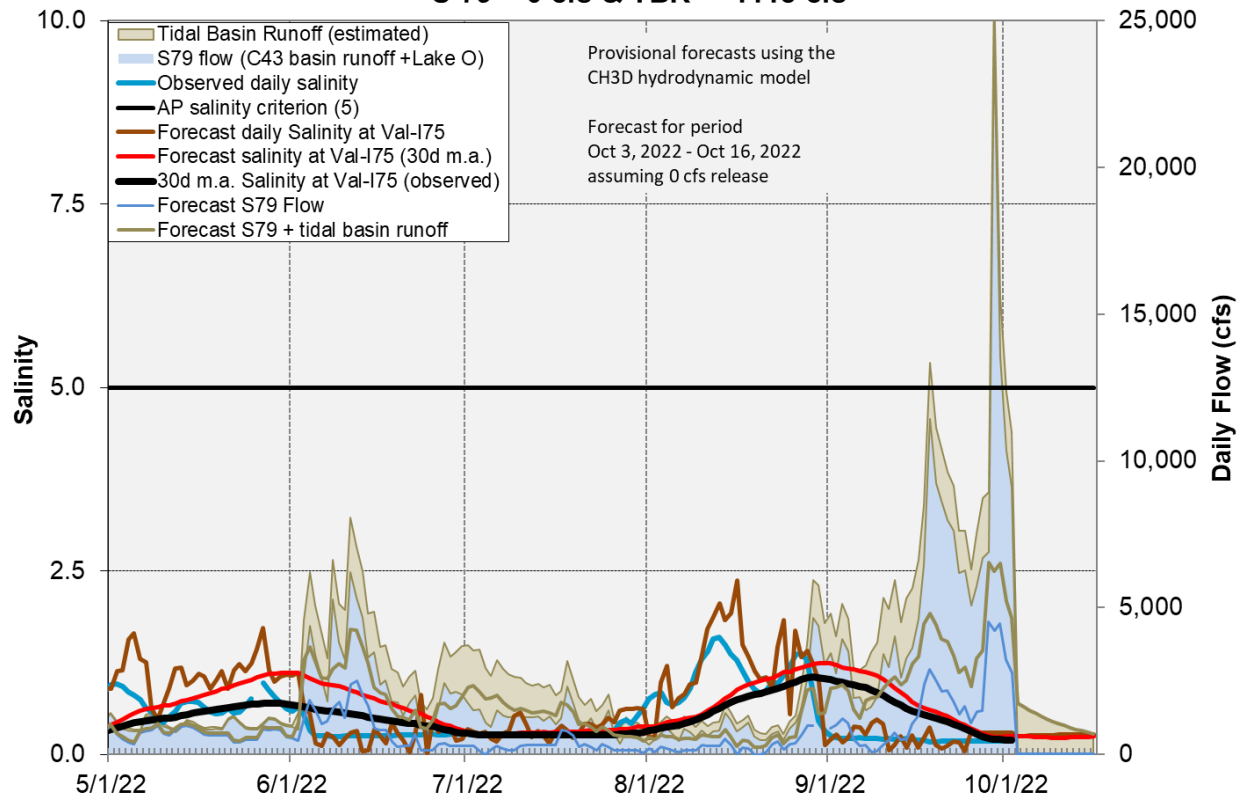
**Figure ES-12.** Mean oyster recruitment at the Bird Island oyster monitoring station and 14-day mean salinity at Shell Point. No salinity data were available for these sites after 09/28/2022 when Hurricane Ian damaged area equipment.

**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	1118	0.3	0.2
B	450	1118	0.3	0.2
C	750	1118	0.3	0.2
D	1000	1118	0.3	0.2
E	1500	1118	0.3	0.2
F	2000	1118	0.3	0.2



**Caloosahatchee River Estuary Flows and Salinity**  
**Observed and Forecast Salinity at Val I-75**  
**S-79 = 0 cfs & TBR = 1118 cfs**



**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 above 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 and 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. Treatment cells are above 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**).

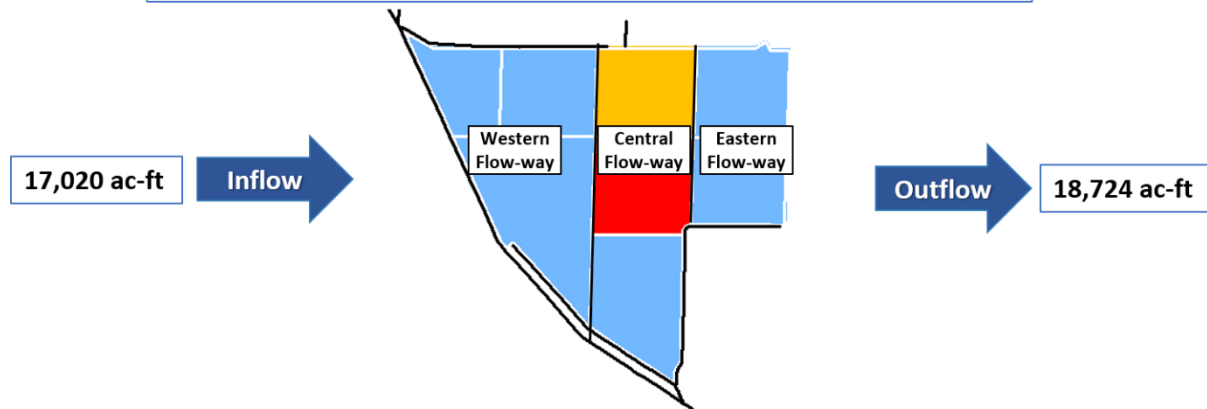
**STA-2:** STA-2 Flow-way 2 is offline for construction activities. Operational restrictions are in place in STA-2 Flow-ways 3 and 4 for vegetation management activities. Online treatment cells are above target stage. Vegetation in Flow-ways 1 and 3 is stressed, and in Flow-ways 2, 4 and 5 is highly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








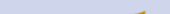





**STA-3/4:** STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown. Online treatment cells are above target stage. Vegetation in the Eastern and Central Flow-ways is highly stressed and in the Western Flow-way is stressed. The 365-day PLRs for the Central and Western Flow-ways are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

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

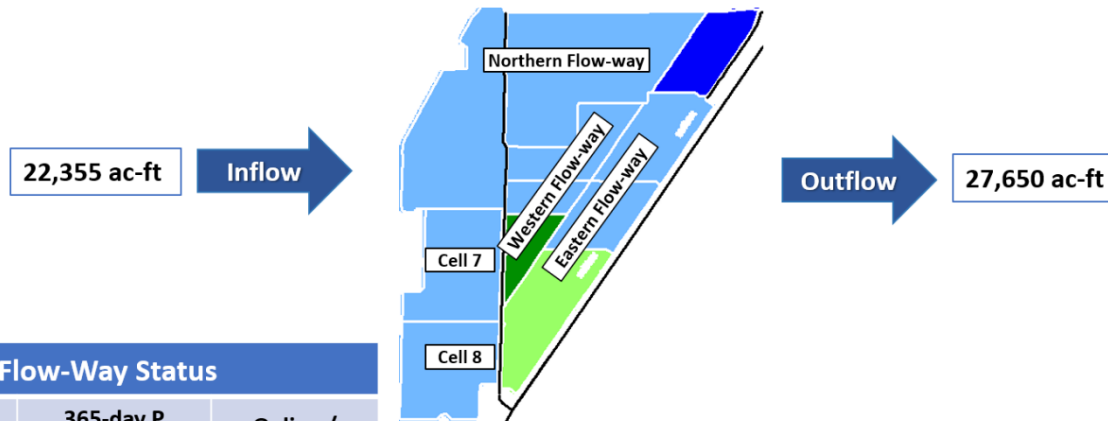
For definitions on STA operational language see glossary following figures.

# STA-1E Weekly Status Report – 9/26/2022 through 10/2/2022



STA-1E Flow-Way Status				As of 10/2/2022		STA-1E Flow & Phosphorus Concentration			
Flow-Way	Vegetation Status <small>Healthy ----- Stressed</small> 	365-day P Loading Rate <small>(below 1.0 g P /m²/yr is optimal)</small>	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)		Total Inflow, ac-ft	7-day	28-day	365-day
				 Deep Water Level (> 2.8' above TS)	 High Water Level (1.5' – 2.8' above TS)				
Eastern		 1.0	Vegetation management	 0.2' – 1.5' above TS	Total Outflow, ac-ft	18,724	26,935	123,274	
				 Target Stage (TS +/- 0.2')					
Central		 1.0	Vegetation rehabilitation	 Low Water Level (<0.2' below TS)	Inflow Conc., ppb	149	137	113	
				Depth / Area Based: Percent of Area Dry					
Western	Offline, post-construction grow in starting 3/28/2022			 0-25% Dry	Outflow Conc., ppb	32	32	26	
				 25-50% Dry					 50-75% Dry
						Includes Preliminary Data			

# STA-1W Weekly Status Report – 9/26/2022 through 10/2/2022



STA-1W Flow-Way Status			
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
Northern			Vegetation management
Western			Vegetation management
Eastern			Vegetation management
Cell 7		N/A	Online
Cell 8		N/A	Construction

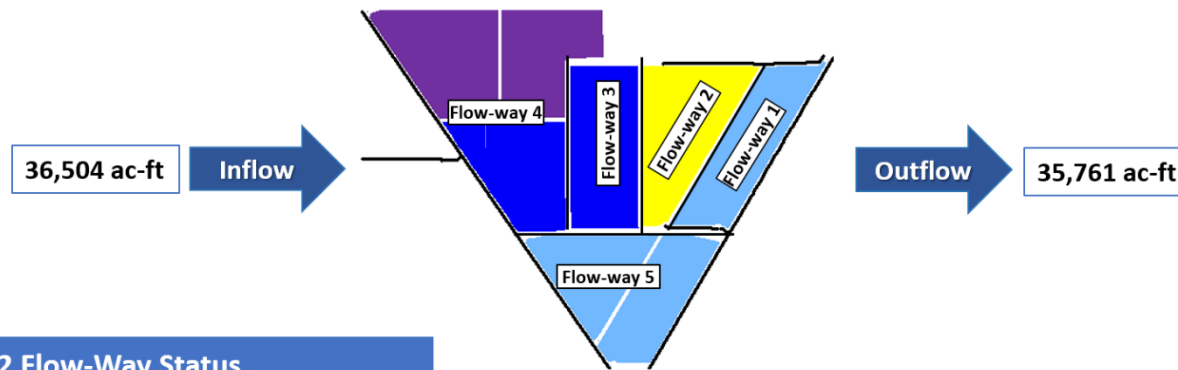
Cell 8

As of 10/2/2022			
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		50-75% Dry
	25-50% Dry		75-100% Dry

STA-1W Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	22,355	39,617	102,812
--Lake Inflow, ac-ft	0	N/A	2,000
Total Outflow, ac-ft	27,650	39,077	98,987
Inflow Conc., ppb	165	162	166
Outflow Conc., ppb	21	21	23
Includes Preliminary Data			

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

# STA-2 Weekly Status Report – 9/26/2022 through 10/2/2022



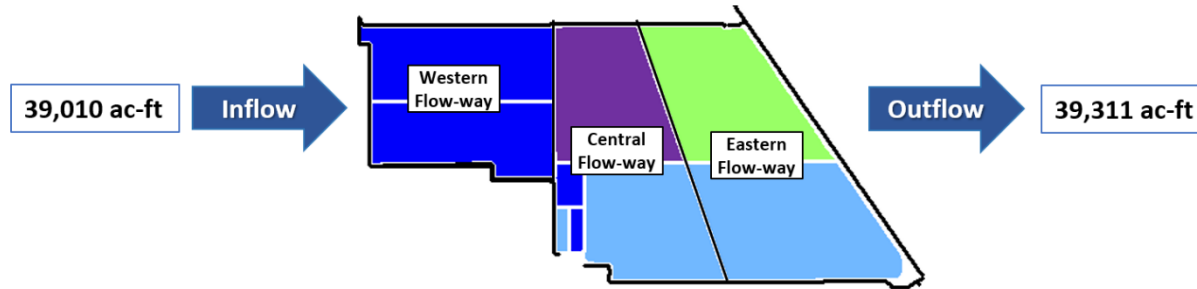
STA-2 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m <sup>2</sup> /yr is optimal)	Online / Offline / Restrictions
1			Online
2	Offline, construction activities as of 9/7/2021		
3			Vegetation Rehab
4			Vegetation Rehab
5			Online

















As of 10/2/2022	
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	36,504	97,107	309,213
--Lake Inflow, ac-ft	0	N/A	27,600
Total Outflow, ac-ft	35,761	78,966	304,208
Inflow Conc., ppb	148	138	116
Outflow Conc., ppb	23	24	26
Includes Preliminary Data			

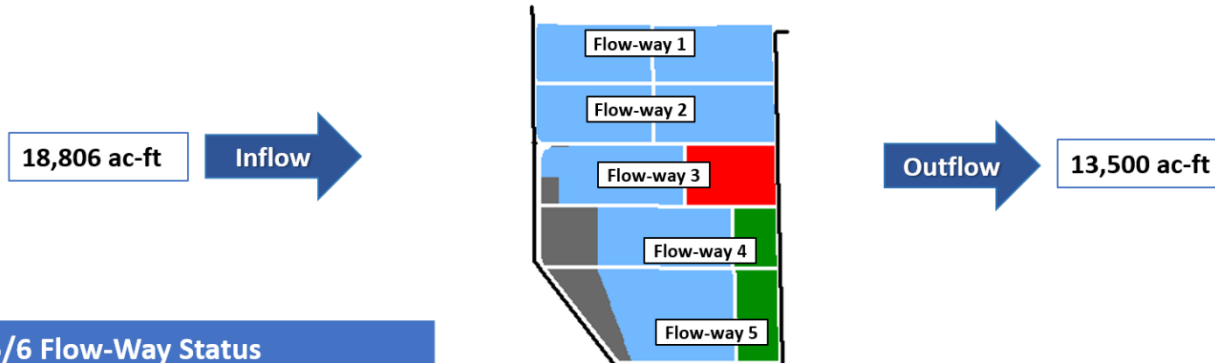
**Figure S-3.** STA-2 Weekly Status Report

STA-3/4 Weekly Status Report – 9/26/2022 through 10/2/2022



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 <small>(below 1.0 g P /m²/yr is optimal)</small>	Online / Offline / Restrictions	As of 10/2/2022			
				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	39,010	89,445	267,199
				--Lake Inflow, ac-ft	0	N/A	5,300
				Total Outflow, ac-ft	39,311	74,397	250,799
				Inflow Conc., ppb	66	102	88
				Outflow Conc., ppb	12	18	16
				Includes Preliminary Data			

STA-5/6 Weekly Status Report – 9/26/2022 through 10/2/2022



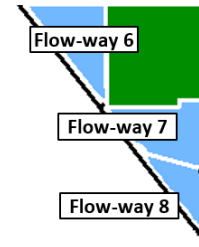
STA-5/6 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m <sup>2</sup> /yr is optimal)	Online / Offline / Restrictions
1			Online
2			Online
3			Online
4			Online
5			Online

As of 10/2/2022	
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	18,806	45,426	142,696
--Lake Inflow, ac-ft	0	N/A	0
Total Outflow, ac-ft	13,500	34,941	122,884
Inflow Conc., ppb	268	267	212
Outflow Conc., ppb	20	23	31
Includes Preliminary Data			

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

STA-5/6 Weekly Status Report – 9/26/2022 through 10/2/2022




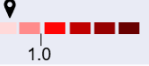




STA-5/6 Flow-Way Status				As of 10/2/2022
Flow-Way	Vegetation Status Healthy ----- Stressed ←-----→	365-day P Loading Rate (below 1.0 g P /m <sup>2</sup> /yr is optimal)	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)
6	←-----→ 	 1.0	Online	<div>Deep Water Level (&gt; 2.8' 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>
7	←-----→ 	 1.0	Online	Depth / Area Based: Percent of Area Dry
8	←-----→ 	 1.0	Online	<div>0-25% Dry</div> <div>25-50% Dry</div> <div>50-75% Dry</div> <div>75-100% Dry</div>

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 continues to rise rapidly in response to rainfall and inflow. The average on Sunday was 0.29 feet below the rising Zone A1 regulation line. WCA-2A: Stage at the 2-17 gauge also rose quickly but did recede at the end of the week. The average on Sunday was 0.88 feet above the rising regulation line. WCA-3A: Last week the Three Gauge Average stages continued a steady ascension last week going above schedule. The average stage was 0.22 feet above the rising regulation line on Sunday. WCA-3A North: At gauge 62 (Northwest corner) stage also rose quickly and above schedule, the average on Sunday was 0.20 feet above the now flat Upper schedule line. (**Figures EV-1 through EV-4**).

### ***Water Depths***

The SFWDAT tool indicates a big response to tropical rainfall comparing depths to September 2nd. WCA-2A depths have increased above 2.5 feet in the southern region. Along the northern reach of the L-67s depths have increased and the spatial extent of those deeper conditions has expanded greatly. Connectivity in the western sloughs of ENP continues to strengthen, while remaining strong in the east. Comparing current WDAT water depths to one month ago conditions within the EPA are much wetter, northern WCA-3A is significantly deeper and northern WCA-2A much deeper. Looking back a year ago, southern WCA-2A and southern WCA-1 are significantly shallower; conditions are significantly deeper east of the Miami Canal in WCA-3A. (**Figure EV-5 and Figure EV-6**). Comparing current conditions to the 20-year median: good recovery towards and even above average conditions in northwestern WCA-3A and northern WCA-2A moves into the upper percentiles. Northeastern WCA-3A North is now at or above average. ENP continues to experience drier than average conditions to the west. (**Figure EV-7**).

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

Taylor Slough and Florida Bay received an average of 5.50 inches of total rain this past week based on 17 gauges where data is available. Precipitation ranged from 3.01 to 11.28 inches. Most rain was recorded on Tuesday 9/27, where stations received between 2.39 and 8.52 inches. Taylor Slough stages increased at all sites where data is available, with an average increase of +0.556 feet (**Figure EV-8 and Figure EV-9**). Taylor Slough water levels are above the historical average for this time of year by +6.14 inches compared to before the Florida Bay initiative (starting in 2017).

Average Florida Bay salinity is 31.3, a decrease of -2.9 for the week from 9/26 to 10/2. Salinity changes ranged from a decrease of -13.1 in Terrapin Bay (TB) in the central/western nearshore region downstream of McCormick Creek to an increase of +2.8 in Joe Bay (JB) in the eastern nearshore on 10/2 (**Figure EV-8**). Salinities at all stations decreased concurrent with the rain on Tuesday 9/27 and maximum flows at the creeks were measured on Friday 9/30 for stations with available data. The largest salinity declines were in Western Florida Bay. With the decrease in Central and Western region salinities this week, only the Eastern Bay currently exceeds the 2001-2016 Interquartile

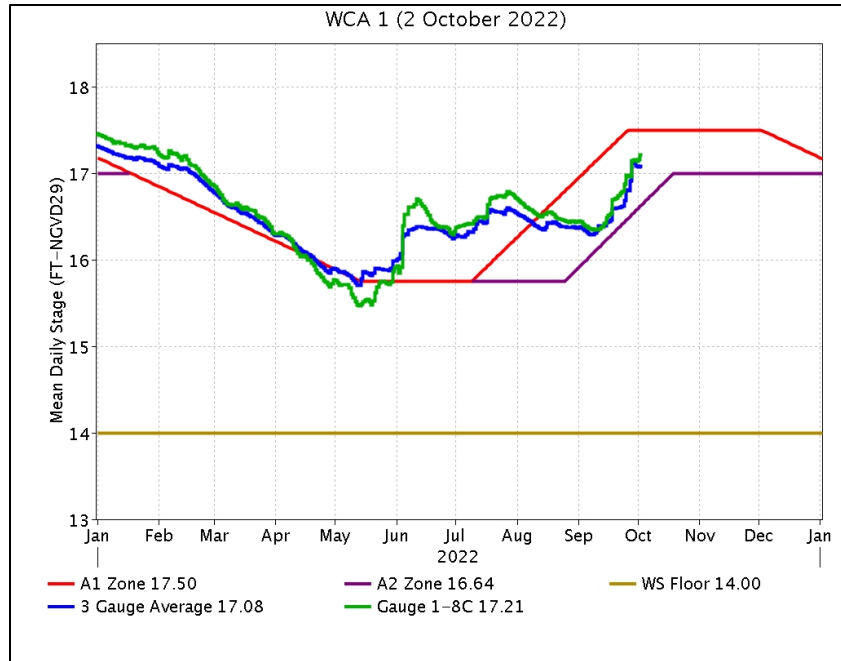
Range, (**Figure EV-10**). Florida Bay salinity is 6.88 above its historical average for this time of year, a decrease of –1.55 inches from last week.

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

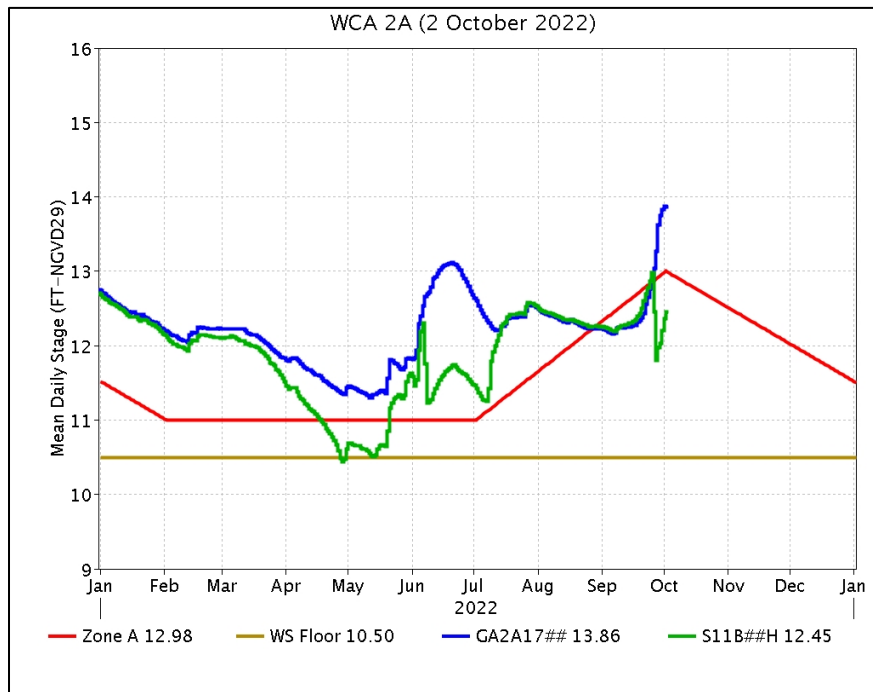
We continue to recommend high level discussions on strategies that could prevent further degradation of NE-WCA3A as even average conditions in this region are too low for ecological productivity. Conserving water in this region may prove critical for the upcoming wading bird nesting season. Maintaining a moderate rate of stage change within the marsh of WCA-2A and northern WCA-3A, avoiding large abrupt changes in water depth as flow through begins has an ecological benefit. Steady flows into northern WCA-3A would continue to benefit the ecology of that region by helping to provide enough water to protect recession rates needed to sustain surface water in the Alley North region in the dry season. When water is available discharge downstream through Taylor Slough. Individual regional recommendations can be found in **Table EV-2**.

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

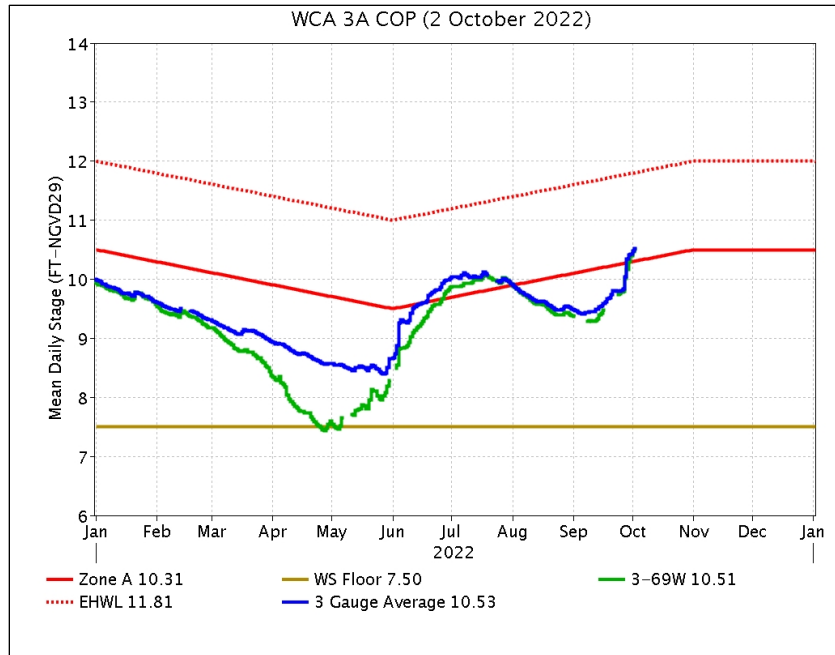
Everglades Region	Rainfall (inches)	Stage change (feet)
WCA-1	5.53	+0.29
WCA-2A	6.16	+0.89
WCA-2B	8.00	+0.85
WCA-3A	4.89	+0.67
WCA-3B	5.42	+0.45
ENP	5.35	+0.11



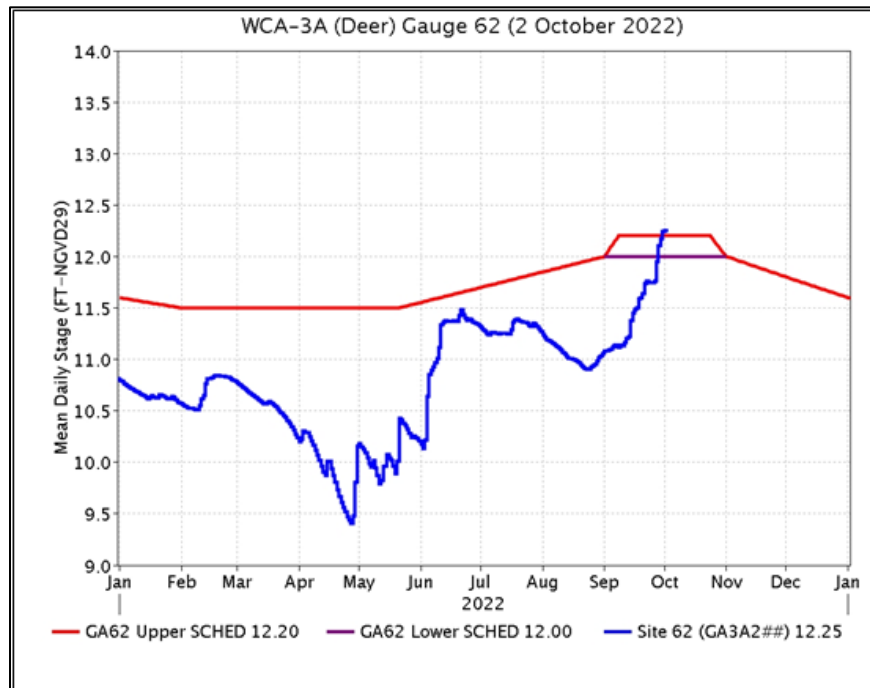
**Figure EV-1.** WCA-1 stage hydrographs and regulation schedule.



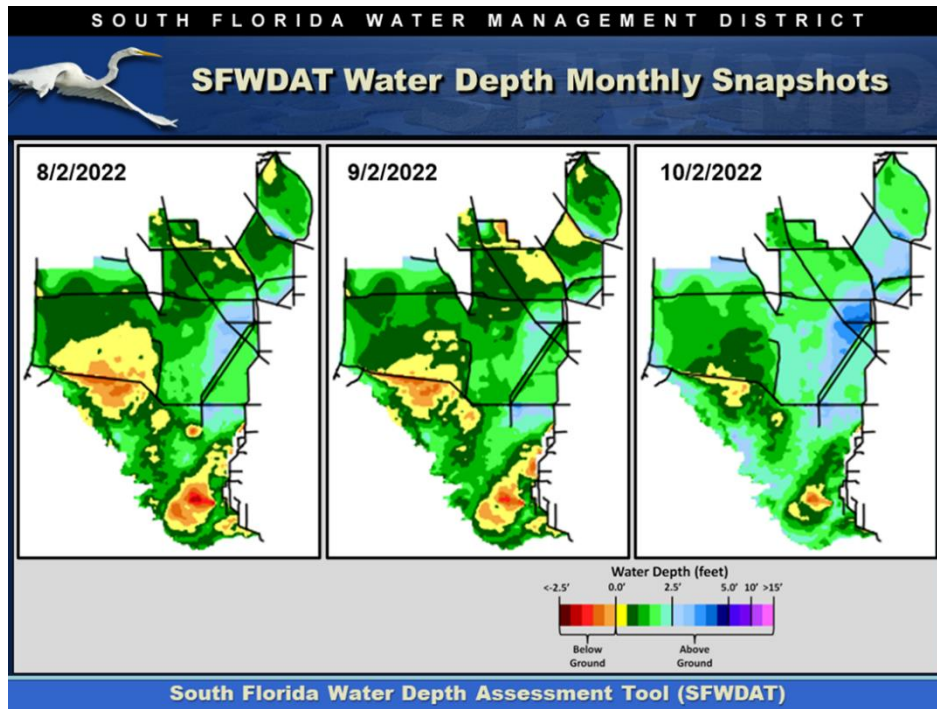
**Figure EV-2.** WCA-2A stage hydrographs and regulation schedule.



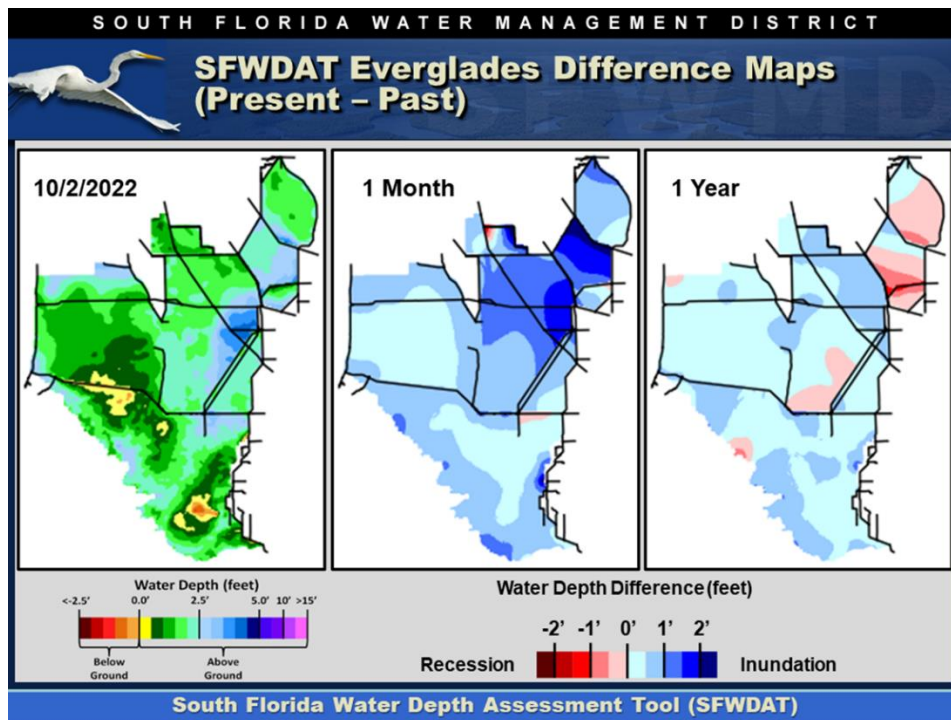
**Figure EV-3.** WCA-3A stage hydrographs (three-gauge average, S-333 headwater) and regulation schedule.



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

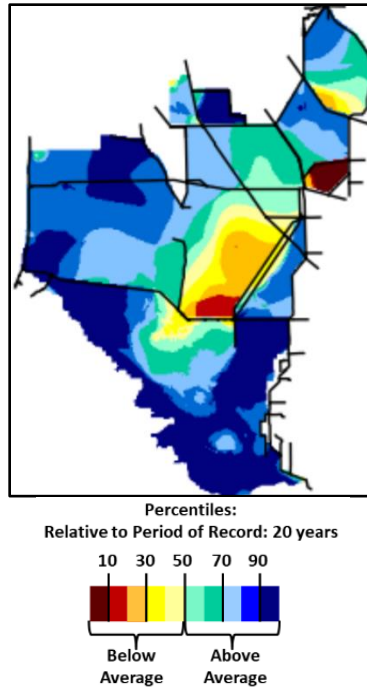


**Figure EV-5.** Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

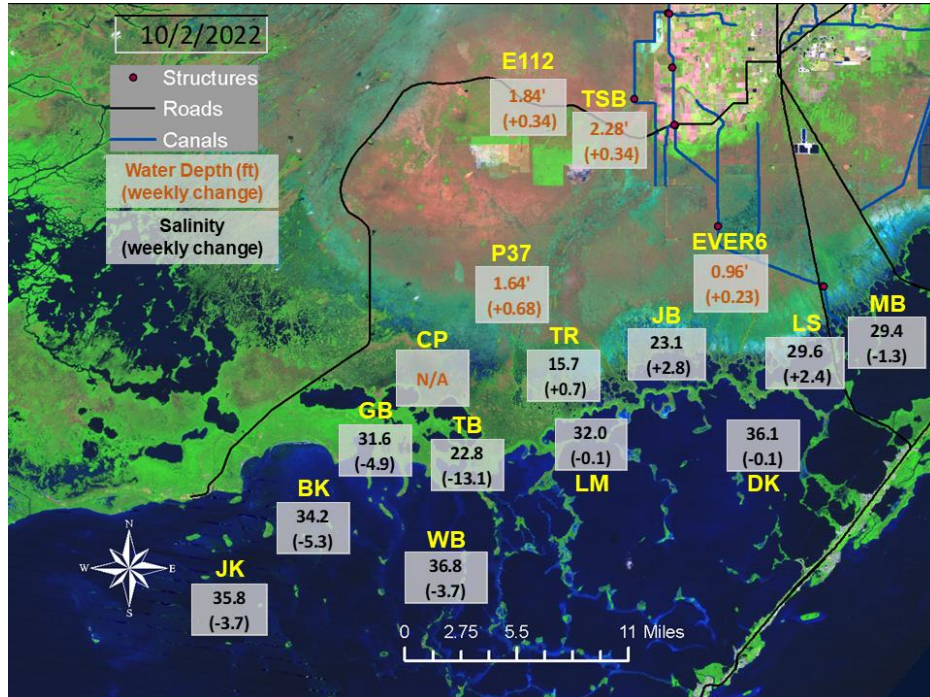


**Figure EV-6.** Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

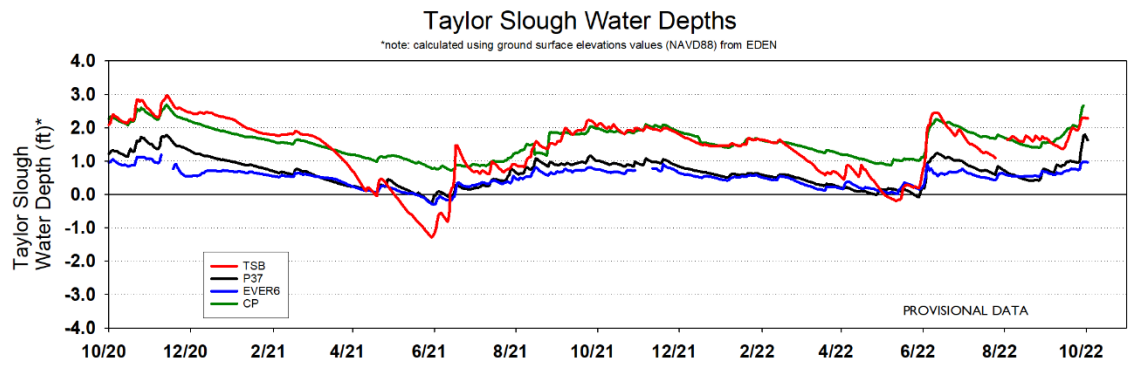




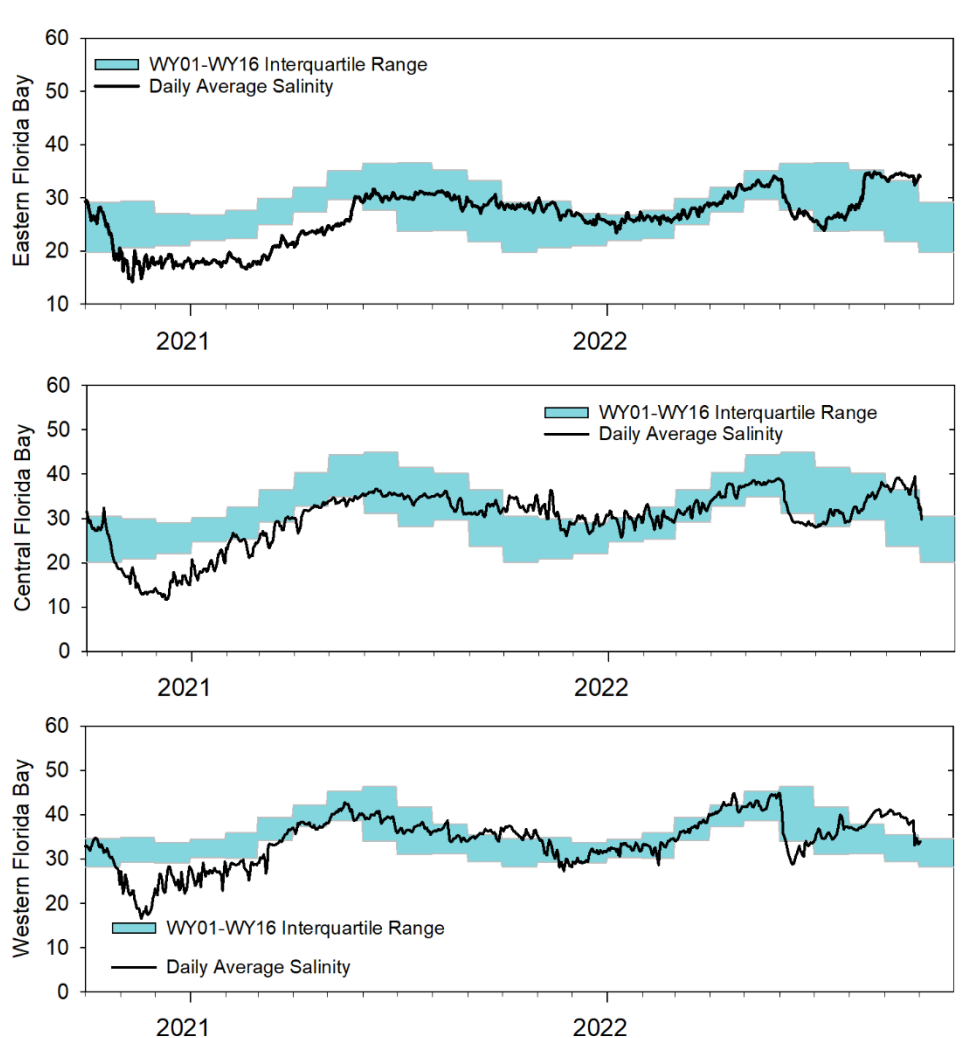
**Figure EV-7.** Present water depths (10/2/2022) compared to the day of year median over the previous 20 years.



**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.

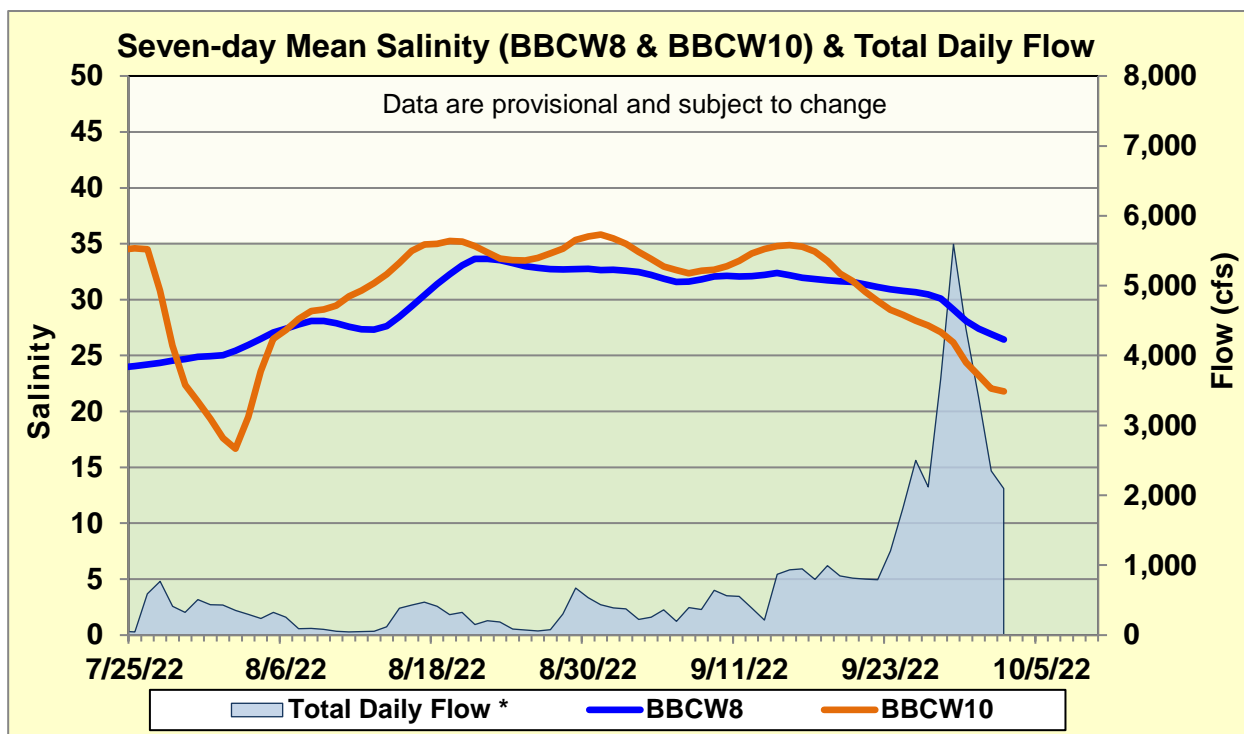


**Table EV-2.** Weekly water depth changes and water management recommendations

<b>SFWMD Everglades Ecological Recommendations, October 4th, 2022 (red is new)</b>			
<b>Area</b>	<b>Weekly change</b>	<b>Recommendation</b>	<b>Reasons</b>
<b>WCA-1</b>	Stage increased by 0.29'	Ascension rate of less than 0.50 feet per two weeks.	Protect within basin and downstream habitat and wildlife.
<b>WCA-2A</b>	Stage increased by 0.89'	Ascension rate of less than 0.25 feet per week.	Protect within basin and downstream habitat and wildlife.
<b>WCA-2B</b>	Stage increased by 0.85'	Ascension rate of less than 0.25 feet per week.	Protect within basin and downstream habitat and wildlife.
<b>WCA-3A NE</b>	Stage increased by 1.31'	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 increased by 0.50'	Ascension rate of less than 0.25 feet per week.	
<b>Central WCA-3A S</b>	Stage increased by 0.45'	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 increased by 0.43'		
<b>WCA-3B</b>	Stage increased by 0.45'	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 0.11'	Make discharges to ENP according to COP and TTFF protocol while adaptively considering upstream and downstream ecological conditions. Discussions on water management within the system should be continued.	Protect within basin and upstream habitat and wildlife.
<b>Taylor Slough</b>	Stage changes ranged from +0.227' to +1.189'	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
<b>FB- Salinity</b>	Salinity changes ranged -13.1 to +2.8	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 3,374 cfs and the previous 30-day mean inflow was 1,368 cfs. The seven-day mean salinity was 26.2 at BBCW8 and 21.6 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.