

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:** March 15, 2023

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

### **Summary**

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

An upper-air disturbance will pass through Florida Wednesday morning, along with a cold front. Ahead of it, there could be a trace of shower activity across the SFWMD, followed by even cooler temperatures (below normal for mid-March) Wednesday and Thursday, while dry condition persists, except for some east-coast shower activity possible on Wednesday. Atmospheric stability should inhibit any rainfall through at least Friday evening. Then, a cold front will result in widespread coverage of rainfall, some of it heavy, on Saturday into Sunday morning in the northern part of the SFWMD and around Lake Okeechobee. Sunday, periods of heavy rains over the southeastern half of the SFWMD are possible, with the heaviest rains occurring during the afternoon over the eastern metropolitan areas after daytime heating reaches a maximum. Beyond Sunday, it is unclear where the front boundary will move or how quickly. For the week next Tuesday morning, total SFWMD rainfall is likely to be above or even much above normal, with the greatest positive rainfall anomalies across the Florida Straits and Florida Keys, where much of the region has seen little rainfall year-to-date. Additionally, there is an increasing chance that this weekend's rain event will produce the most substantial rainfall on a SFWMD-scale since mid-December, providing some relief to drought-stricken areas.

#### **Kissimmee**

Releases were made from East Lake Toho and Lake Toho to continue their recessions to their respective low pools on June 1. Weekly average discharges on March 12, 2023 at S-65 and S-65A were 680 cfs and 620 cfs, respectively. Mean weekly water depth on the Kissimmee River floodplain of 0.14 ft was approximately 0.14 foot lower than last week. The weekly average concentration of dissolved oxygen in the Kissimmee River increased from 5.3 mg/L last week to 5.4 mg/L for the week ending March 12, 2023, above both the potentially lethal level and the physiologically stressful range for largemouth bass and other sensitive species.

## **Lake Okeechobee**

Lake Okeechobee stage was 15.13 feet NGVD on March 12, 2023, dropping 0.24 feet over the previous week and 0.80 feet lower than a month ago. Lake stage dropped into the Low sub-band and was 0.58 feet above the upper limit of the ecological envelope. Lake stage has been above the ecological envelope since early November 2022. According to NEXRAD, 0.03 inches of rain fell directly on the Lake last week. Average daily inflows (excluding rainfall) decreased from the previous week, going from 1,052 cfs to 690 cfs. Average daily outflows (excluding evapotranspiration) also decreased from the previous week, going from 4,499 cfs to 4,288 cfs. The most recent satellite image (March 12, 2023) from NOAA's Harmful Algal Bloom Monitoring System showed moderate bloom potential in some nearshore regions of the Lake, especially in Fisheating Bay and the southern bays, but low potential in the pelagic region.

## **Estuaries**

Total inflow to the St. Lucie Estuary averaged 149 cfs over the past week with all of it coming from Lake Okeechobee. Mean surface salinities increased at all sites in the estuary over the past week. Salinity in the middle estuary was in the optimal range (10-25) for adult eastern oysters.

Total inflow to the Caloosahatchee Estuary averaged 1,993 cfs over the past week with 1,466 cfs coming from Lake Okeechobee. Mean salinities remained the same at S-79, Val I-75 and Sanibel, 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 for adult eastern oysters at Cape Coral (10-25) and in the upper stressed range at Shell Point and Sanibel (>25).

## **Stormwater Treatment Areas**

For the week ending Sunday, March 12, 2023, 4,400 ac-ft of 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 36,600 ac-feet. The total amount of inflows to the STAs in WY2023 is approximately 1,015,000 ac-feet. Most STA cells are at or near target stage, except STA-5/6 where most cells are below target. 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 post-construction vegetation grow in. 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, if 2008 LORS recommends Lake releases to the WCAs and conditions allow, releases will be sent to STA-2.

## **Everglades**

Rates of stage change within the EPA remained elevated, with all regions in the "fair" or "poor" range over the last five weeks. Depths remain above average in WCA-3A northeast (but also remain one of the shallowest regions in the WCAs), maintaining above average conditions could be important for wading bird nesting in that region. Depths are below ground in WCA-3A northwest. A successful prescribed fire was conducted in northern

WCA-1 last week. Wading birds continue nesting in ENP. Nesting and foraging have begun in WCA-1. White ibis continue foraging in northern WCA-2A and aggregating at Alley North in large numbers (10-15K). More WOST were noted at the Jetport colony last week, up from 10 a week ago to now 250 to 350 individuals nesting. Last week once again Taylor Slough stages fell last week at all gauges and depths remains above average, however that metric moved much closer last week. Average salinity increased again last week in Florida Bay and the central region moved above the IQR.

### **Biscayne Bay**

Total inflow to Biscayne Bay averaged 221 cfs and the previous 30-day mean inflow averaged 351 cfs. The seven-day mean salinity was 30.4 at BBCW8 and 29.9 at BBCW10, both within the ideal salinity range for estuarine organisms in this region (salinity less than 35). Data provided by Biscayne National Park.

## **Supporting Information**

### **Kissimmee Basin**

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

On March 12, 2023, mean daily lake stages were 56.4 feet NGVD (1.6 feet below schedule) in East Lake Toho, 53.5 feet NGVD (1.5 feet below schedule) in Lake Toho, and 50.7 feet NGVD (1.3 feet below the approved temporary deviation schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1, Figures KB-1-3**).

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

For the week ending March 12, 2023, mean weekly discharge was 680 cfs at S-65 and 620 cfs at S-65A. Mean weekly discharge from the Kissimmee River was 630 cfs at S-65D and 670 cfs at S-65E (**Table KB-2**). Mean weekly headwater stages were 46.3 feet NGVD at S-65A and 28.4 feet NGVD at S-65D on March 12, 2023. Mean weekly river channel stage of 35.0 ft NGVD on March 12, 2023 was 1.1 foot lower than the previous week's mean (**Figure KB-4**). Mean weekly water depth on the Kissimmee River floodplain of 0.14 ft for the week ending March 12, 2023 was approximately 0.14 foot lower than the previous week's mean (**Table KB-2, Figure KB-5**). The weekly average concentration of dissolved oxygen in the Kissimmee River increased from 5.3 mg/L the previous week to 5.4 mg/L for the week ending March 12, 2023 (**Table KB-2, Figure KB-6**).

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

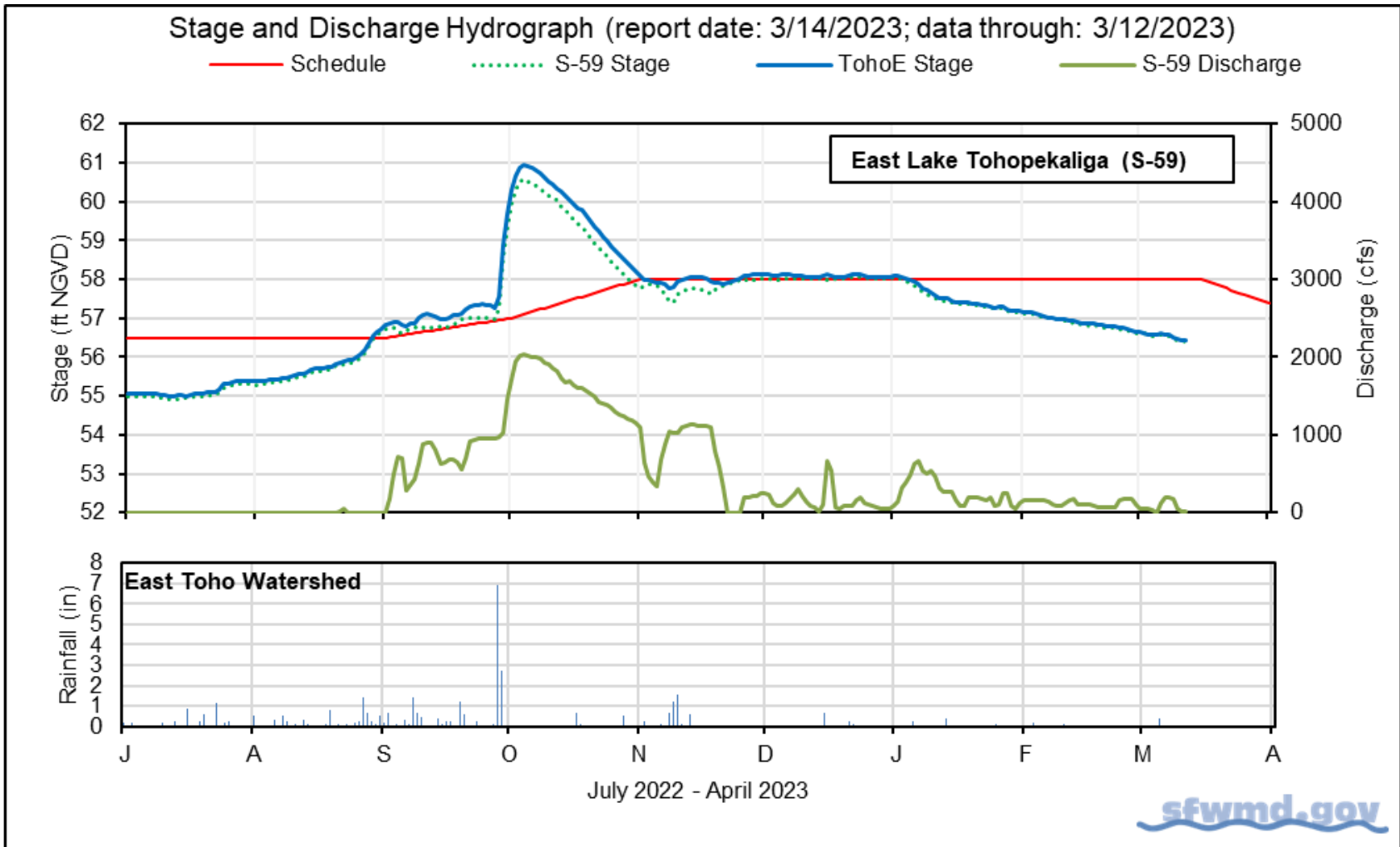
Continue stage recessions in Lake Toho and East Lake Toho to their June 1 low pools. Beginning Wednesday 02/22/2023, reduce discharge at S-65/S-65A by 75 cfs/day until discharge is decreased to 650 cfs, then as needed reduce at 38 cfs/day until discharge is decreased to 300 cfs.

**Table KB-1.** Average discharge for the preceding seven days, Sunday’s average daily stage and Sunday’s average daily departure from KCOL flood regulation lines or temporary schedules. All data are provisional.

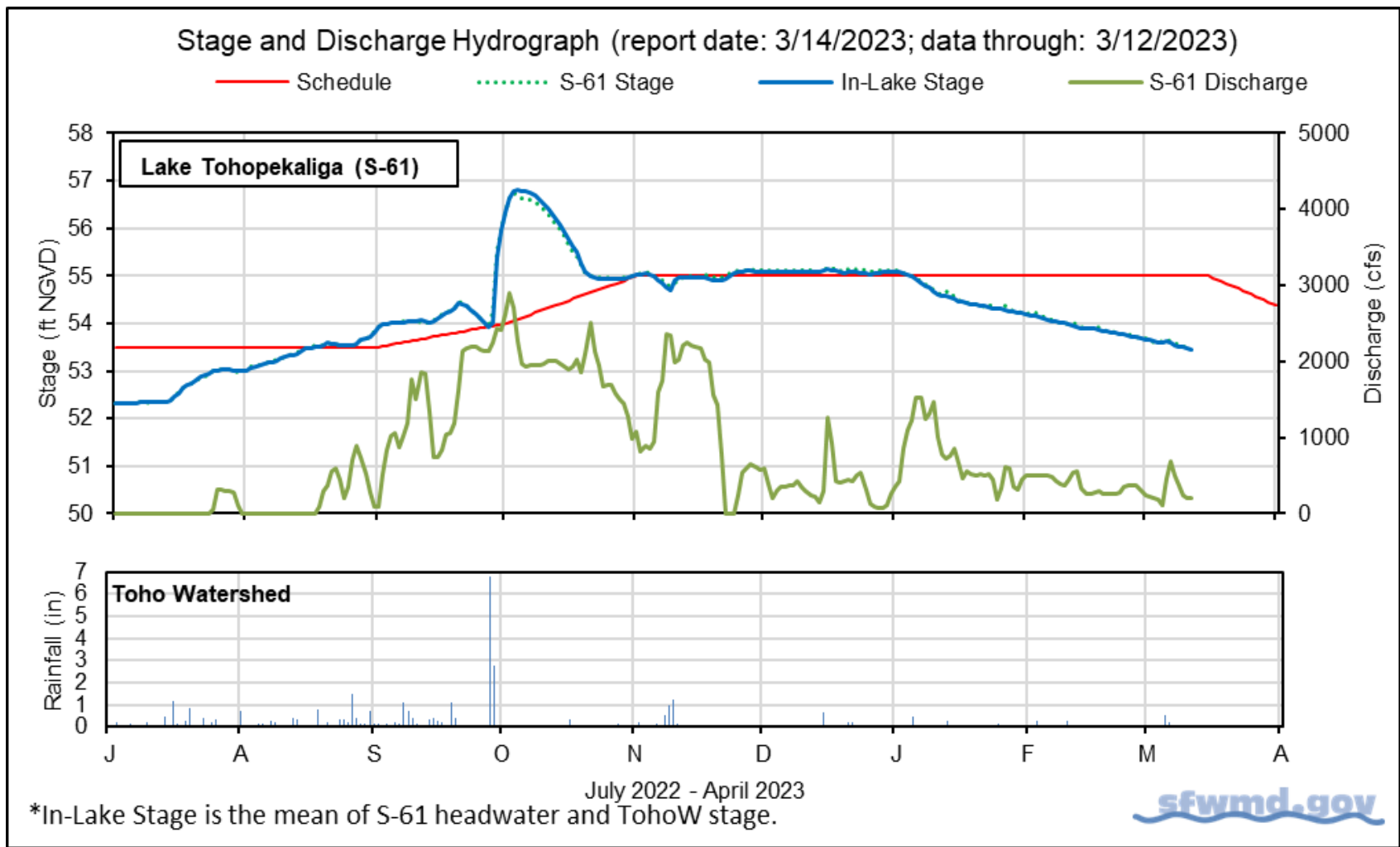
Water Body	Structure	Stage Monitoring Site	Weekly (7-Day) Average Discharge (cfs)	Sunday Lake Stage (feet NGVD) <sup>a</sup>	Schedule Type <sup>b</sup>	Sunday Schedule Stage (feet NGVD)	Sunday Departure from Regulation (feet)	
							3/12/23	3/5/23
Lakes Hart and Mary Jane	S-62	LKMJ	11	60.6	R	61.0	-0.4	-0.4
Lakes Myrtle, Preston and Joel	S-57	S-57	0	60.6	R	60.9	-0.3	-0.2
Alligator Chain	S-60	ALLI	0	63.7	R	64.0	-0.3	-0.2
Lake Gentry	S-63	LKGT	0	61.4	R	61.5	-0.1	-0.1
East Lake Toho	S-59	TOHOE	110	56.4	R	58.0	-1.6	-1.4
Lake Toho	S-61	TOHOW S-61	380	53.5	R	55.0	-1.5	-1.4
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	680	50.7	T	52.0	-1.3	-0.2

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

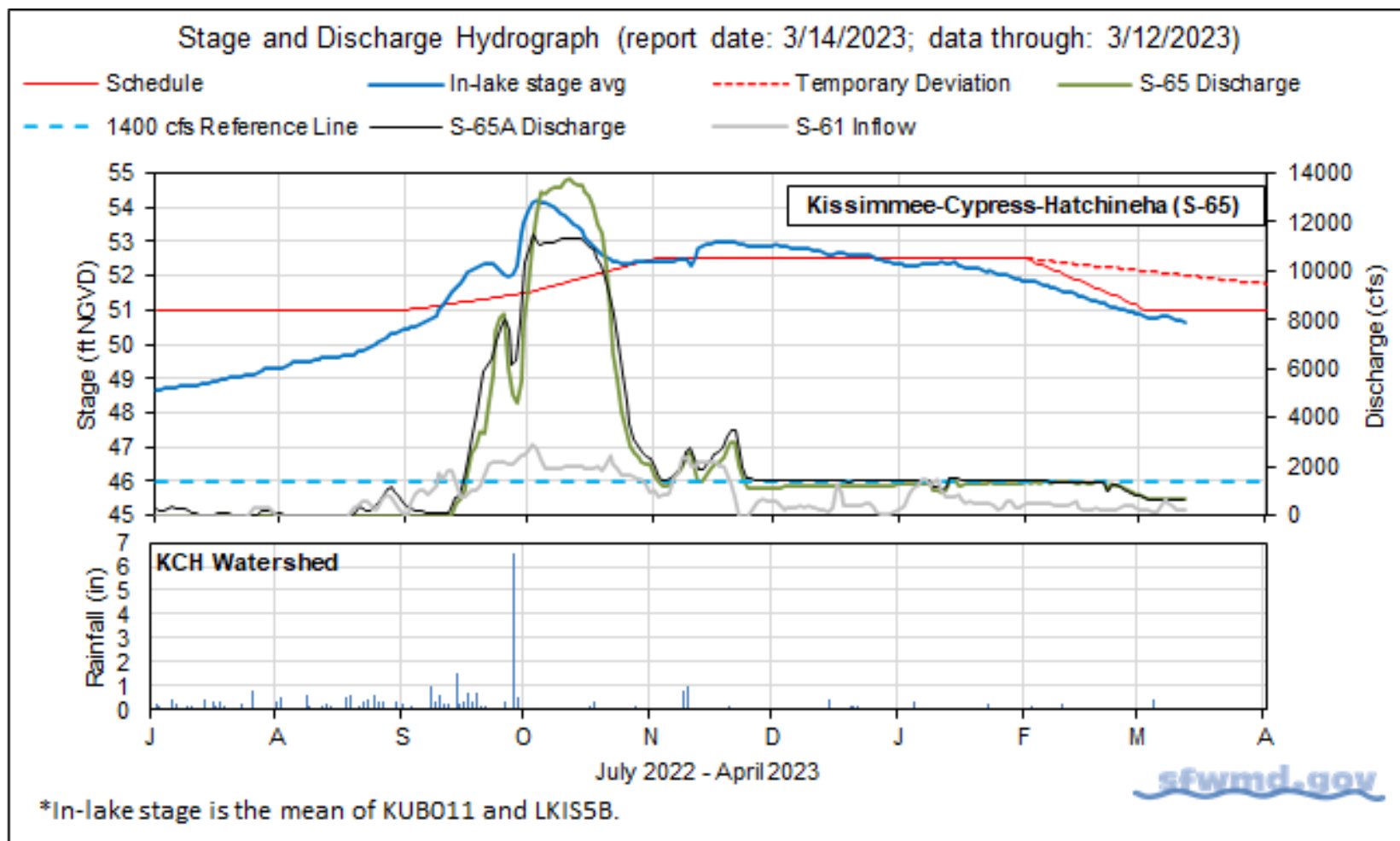
b. A: projected recession line; R: USACE regulation schedule; S: temporary recession target line; T: temporary schedule; NA: not applicable or not available.



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



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



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

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

Metric	Location	Sunday Daily Average	Weekly Average for Previous Seven Day Periods			
		3/12/23	3/12/23	3/5/23	2/26/23	2/19/23
Discharge	S-65	670	680	790	1,200	1,400
Discharge	S-65A <sup>a</sup>	610	620	740	1,200	1,300
Headwater Stage (feet NGVD)	S-65A	46.3	46.3	46.3	46.3	46.3
Discharge	S-65D <sup>b</sup>	610	630	1,000	1,200	1,300
Headwater Stage (feet NGVD)	S-65D <sup>c</sup>	28.3	28.4	28.4	28.4	28.4
Discharge (cfs)	S-65E <sup>d</sup>	670	670	1,000	1,300	1,300
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) <sup>e</sup>	Phase I, II/III river channel	5.7	5.4	5.3	5.7	6.3
River channel mean stage <sup>f</sup>	Phase I river channel	34.9	35.0	36.1	37.2	37.3
Mean depth (feet) <sup>g</sup>	Phase I floodplain	0.13	0.14	0.28	0.42	0.47

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.

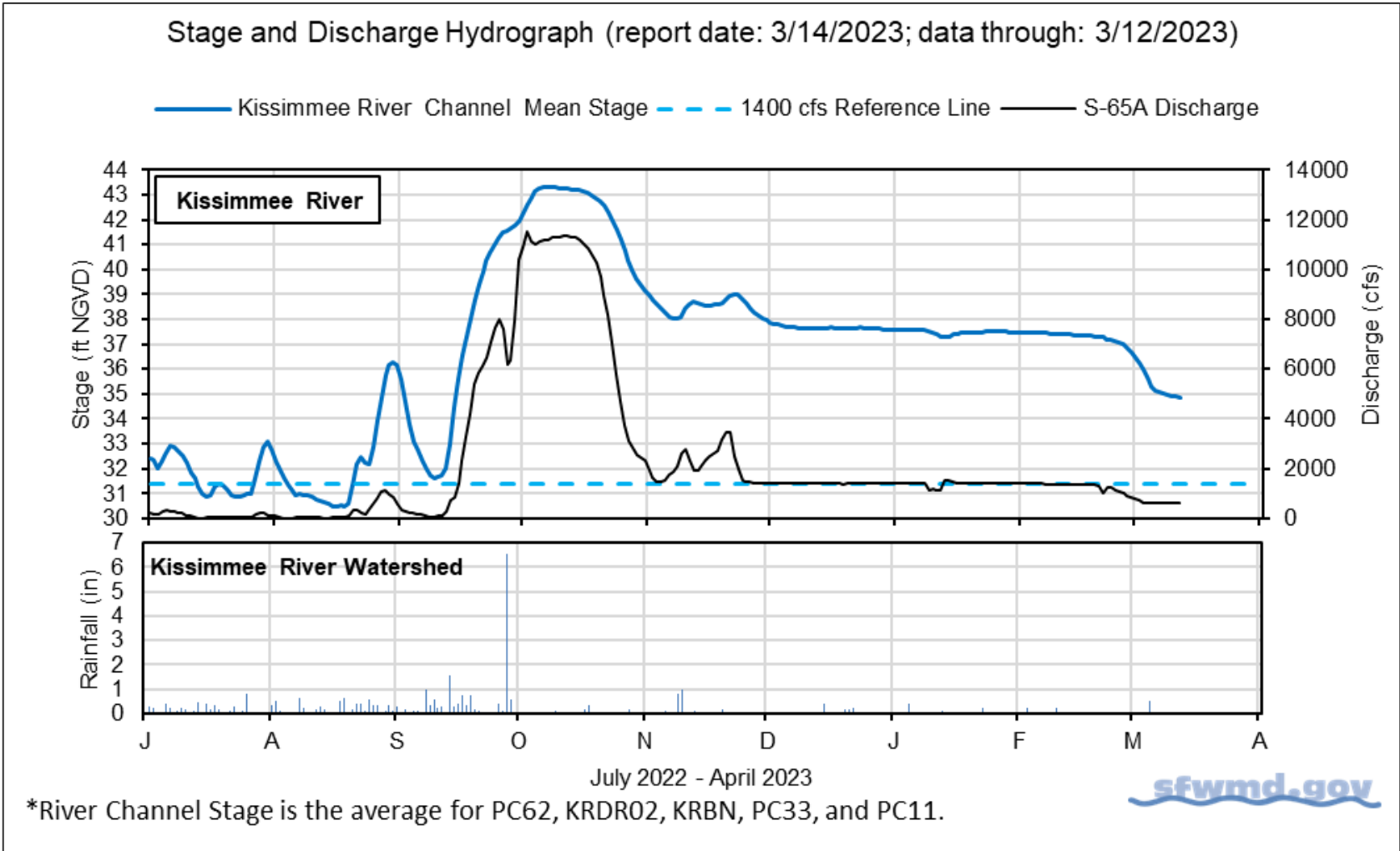
d. Combined discharge from S-65E and S-65EX1.

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

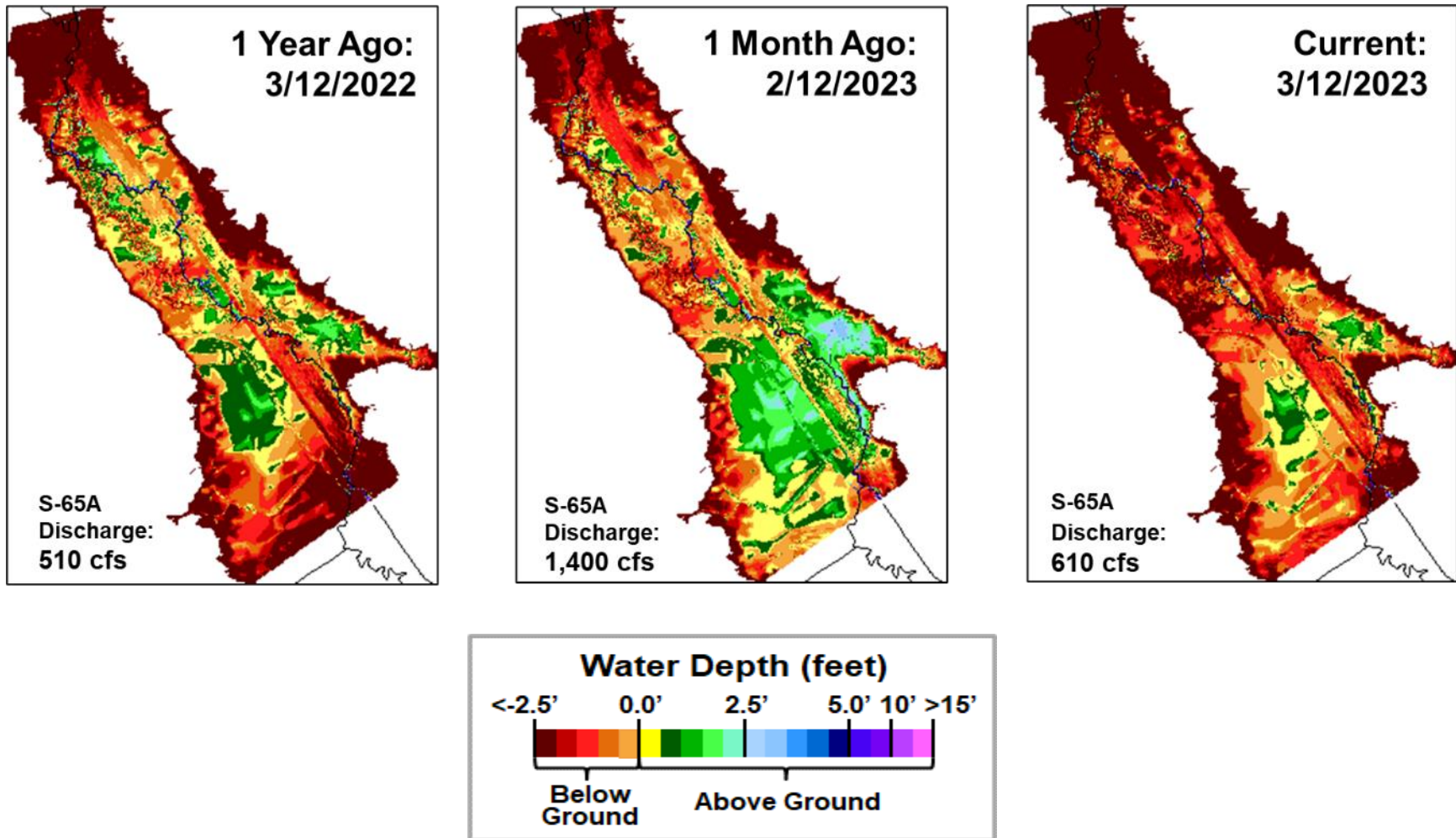
f. Mean of five river channel stations (PC62, KRDR02, KRBN, PC33, PC11) in the Phase I area.

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

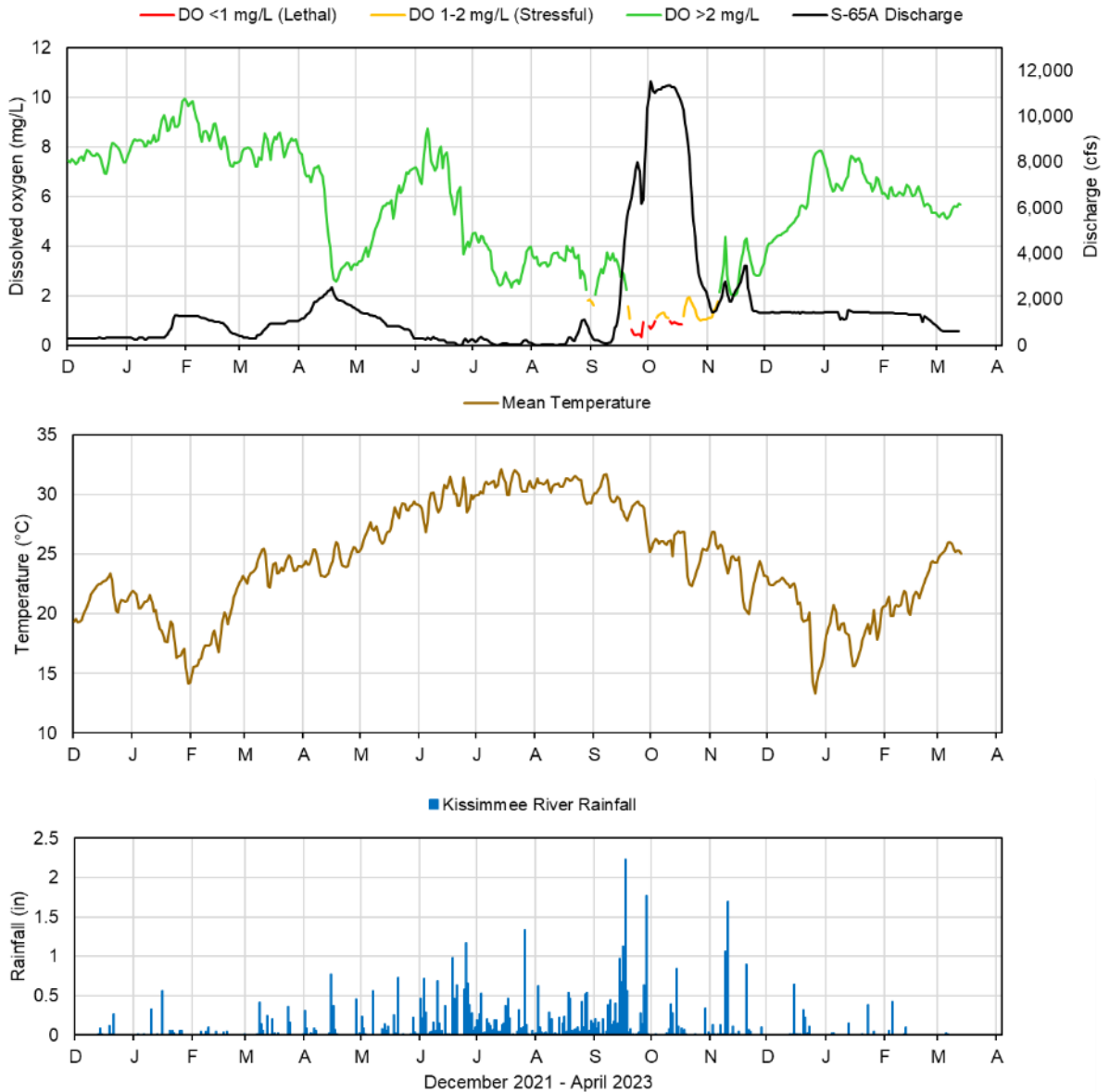




**Figure KB-4.** Kissimmee River stage, discharge and rainfall.



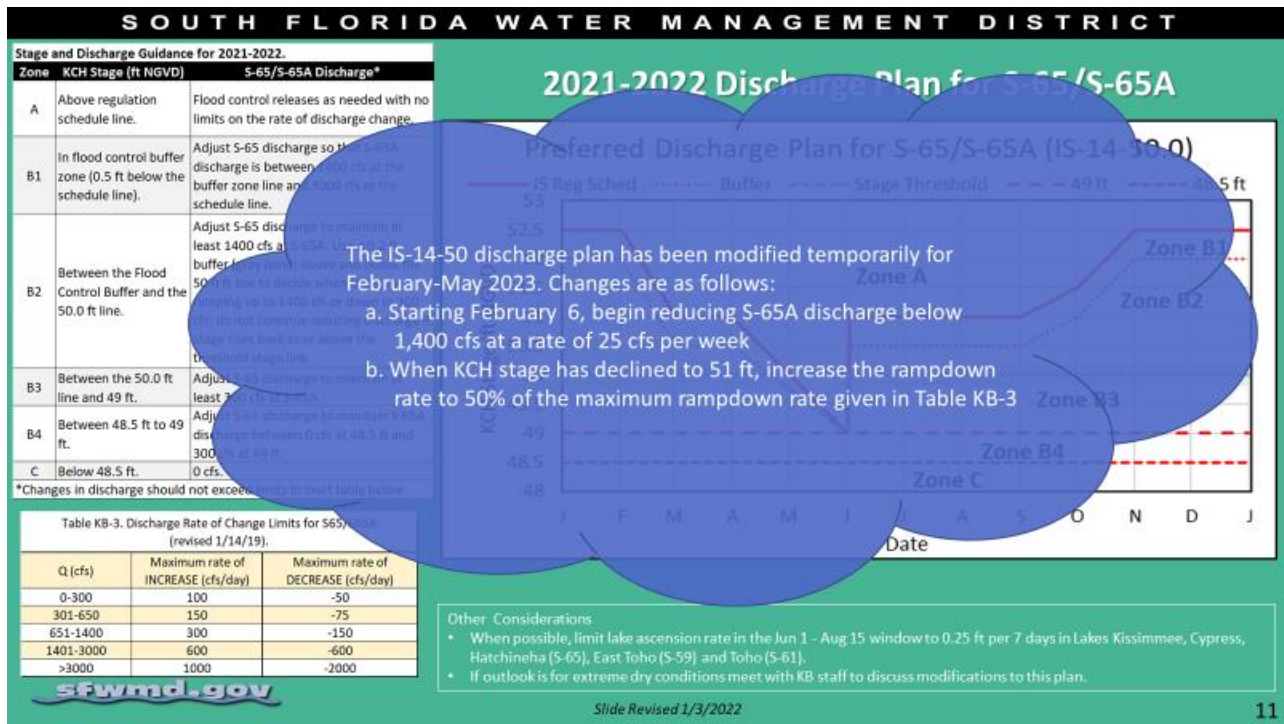
**Figure KB-5.** Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.



Report Date: 3/14/2023; data are through: 3/12/2023



**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 six stations reporting this week. Rainfall values are daily totals for Kissimmee River (Pool BCD) AHED watershed.



**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 15.13 feet NGVD on March 12, 2023, which is 0.24 feet lower than the previous week and 0.80 feet lower than a month ago (**Figure LO-1**). Lake stage remained in the Low sub-band (**Figure LO-2**) and was 0.58 feet above the upper limit of the ecological envelope (**Figure LO-3**). According to NEXRAD, 0.03 inches of rain fell directly on the Lake last week.

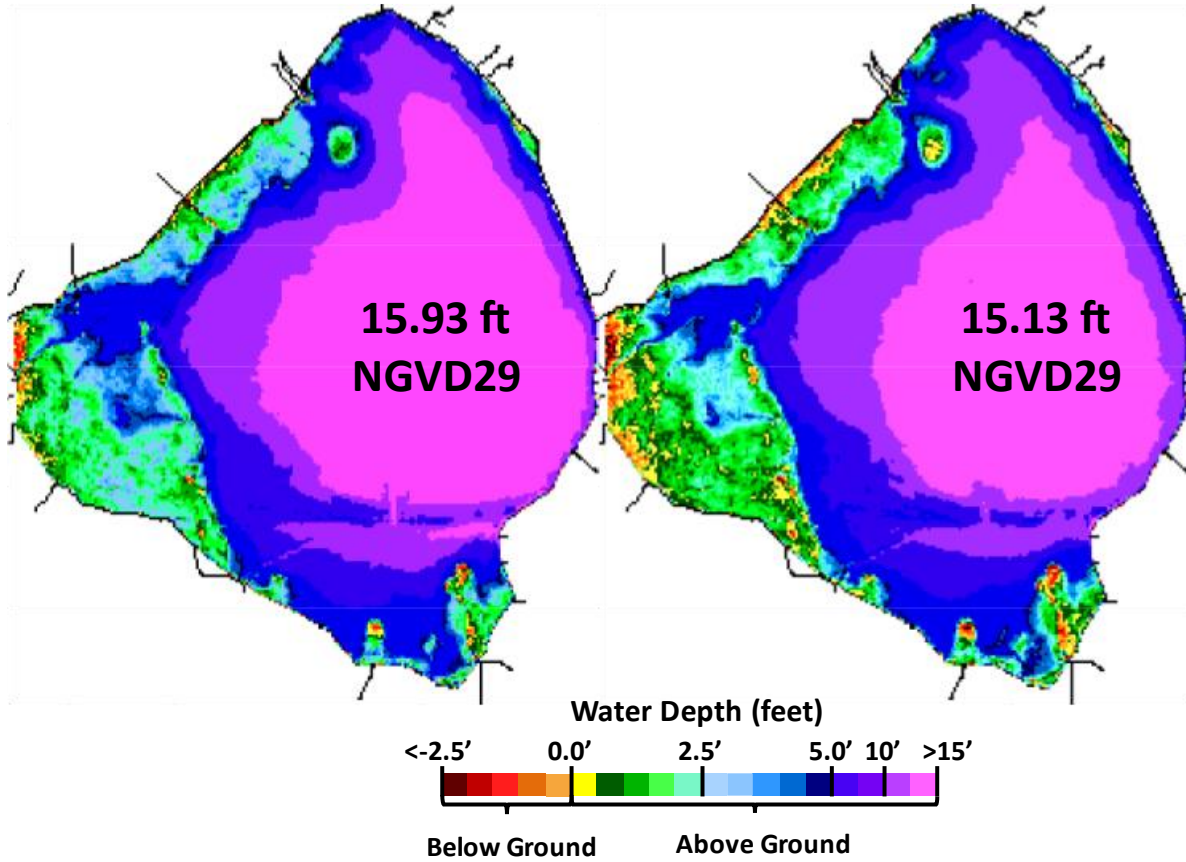
Average daily inflows (excluding rainfall) decreased from the previous week, going from 1,052 cfs to 690 cfs. Average daily outflows (excluding evapotranspiration) also decreased from the previous week, going from 4,499 cfs to 4,288 cfs. The majority of the inflow (97%) came from the Kissimmee River (C-38 Canal; 669 cfs). Outflows to the west via the S-77 structure averaged 1,742 cfs for the week. Outflows to the east via the S-308 structure averaged 240 cfs and outflows south via the S-350 structures averaged 1,900 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 (March 12, 2023) from NOAA's Harmful Algal Bloom Monitoring System showed moderate bloom potential in some nearshore regions of the Lake, especially in Fisheating Bay and the southern bays, but low potential in the pelagic region (**Figure LO-6**).

As of March 13, 2023, 85 snail kite nests have been counted in the western region of Lake Okeechobee, which is more for this time of year than has been recorded in at least the last 30 years of monitoring. However, continued rapid recession rates may affect the survival of those nests if water levels become too shallow to protect nests from mammalian predators.

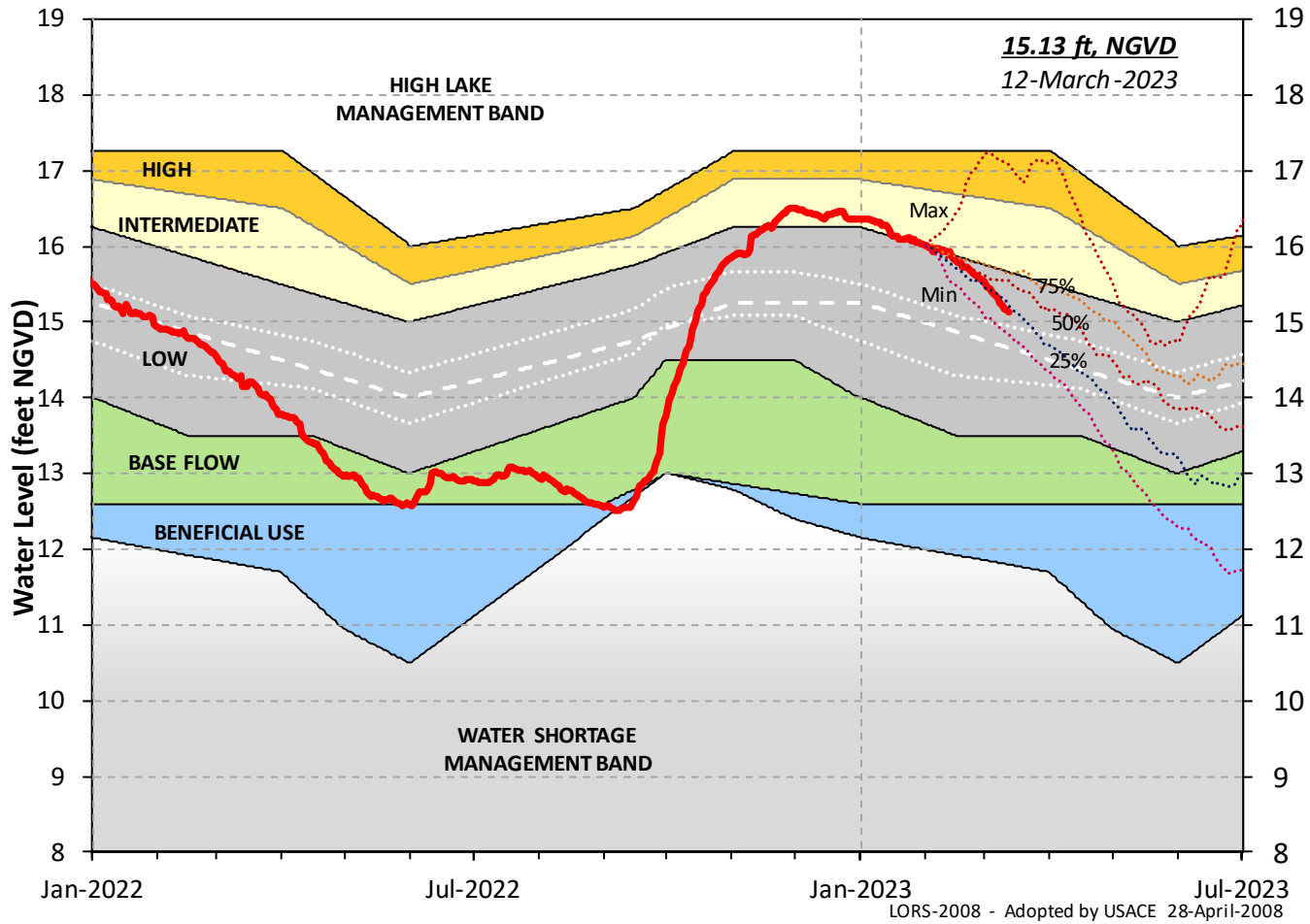
**1 Month Ago:  
02/10/2023**

**Current:  
03/12/2023**



**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



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



## Lake Okeechobee Stage vs Ecological Envelope

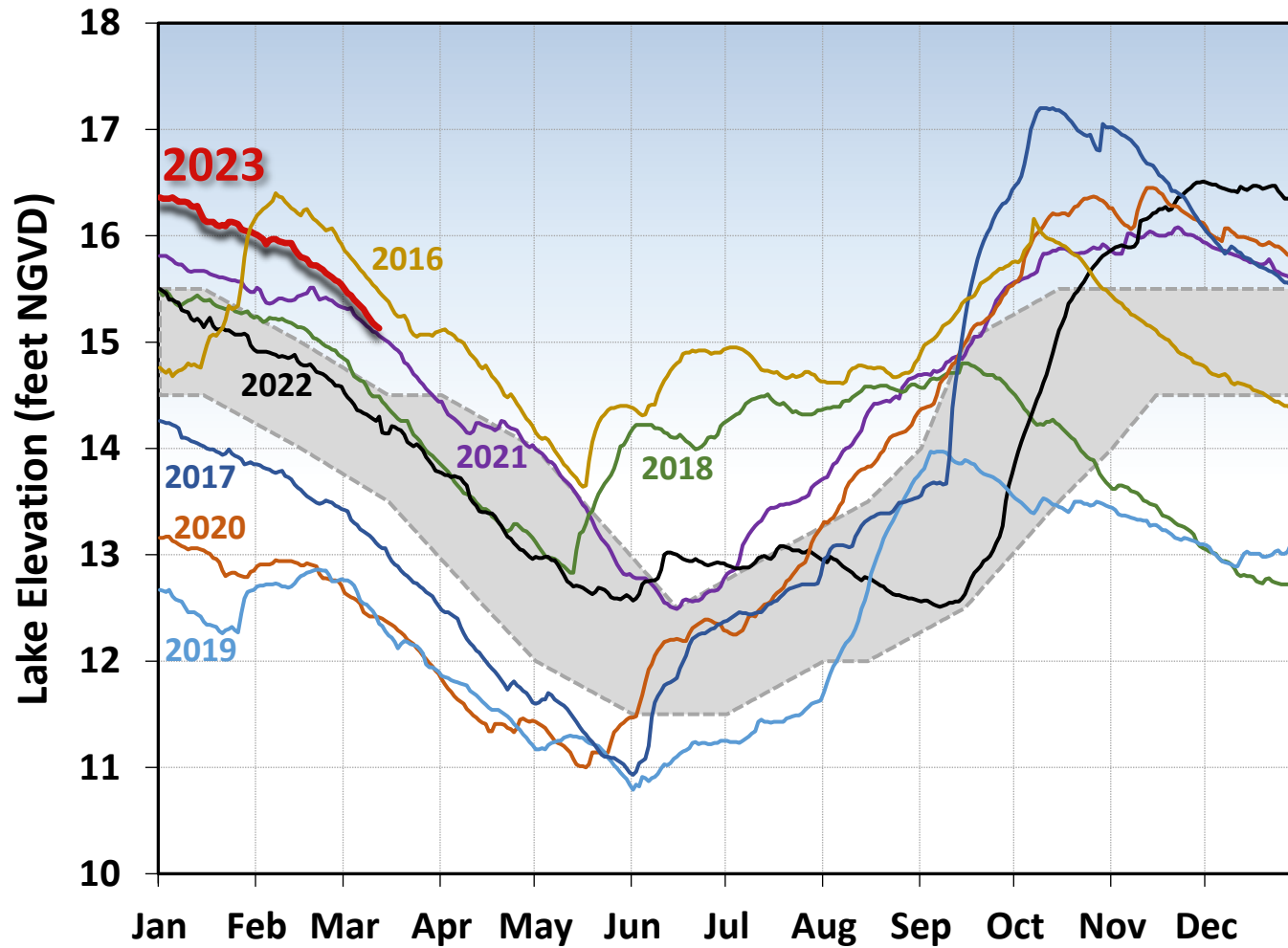
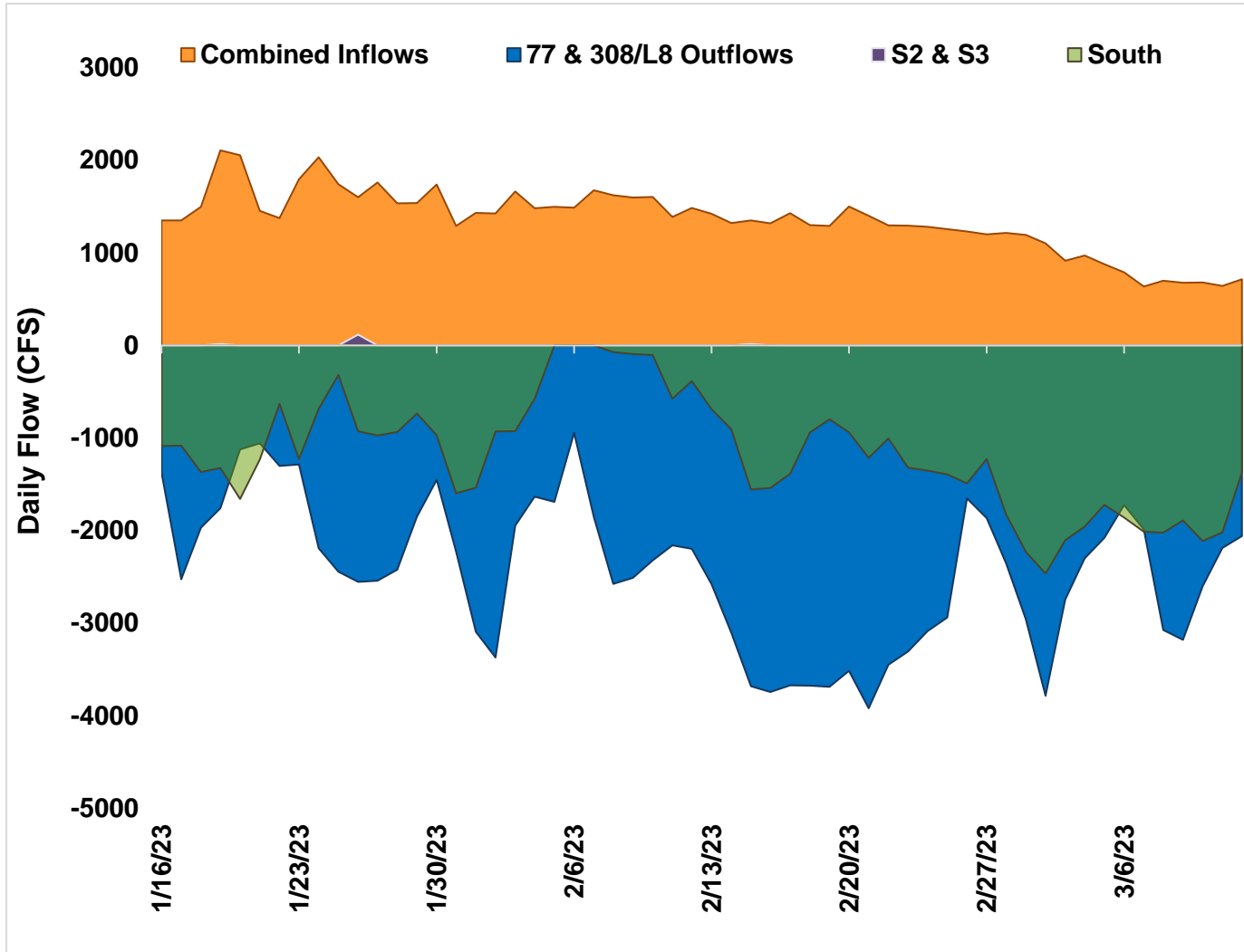
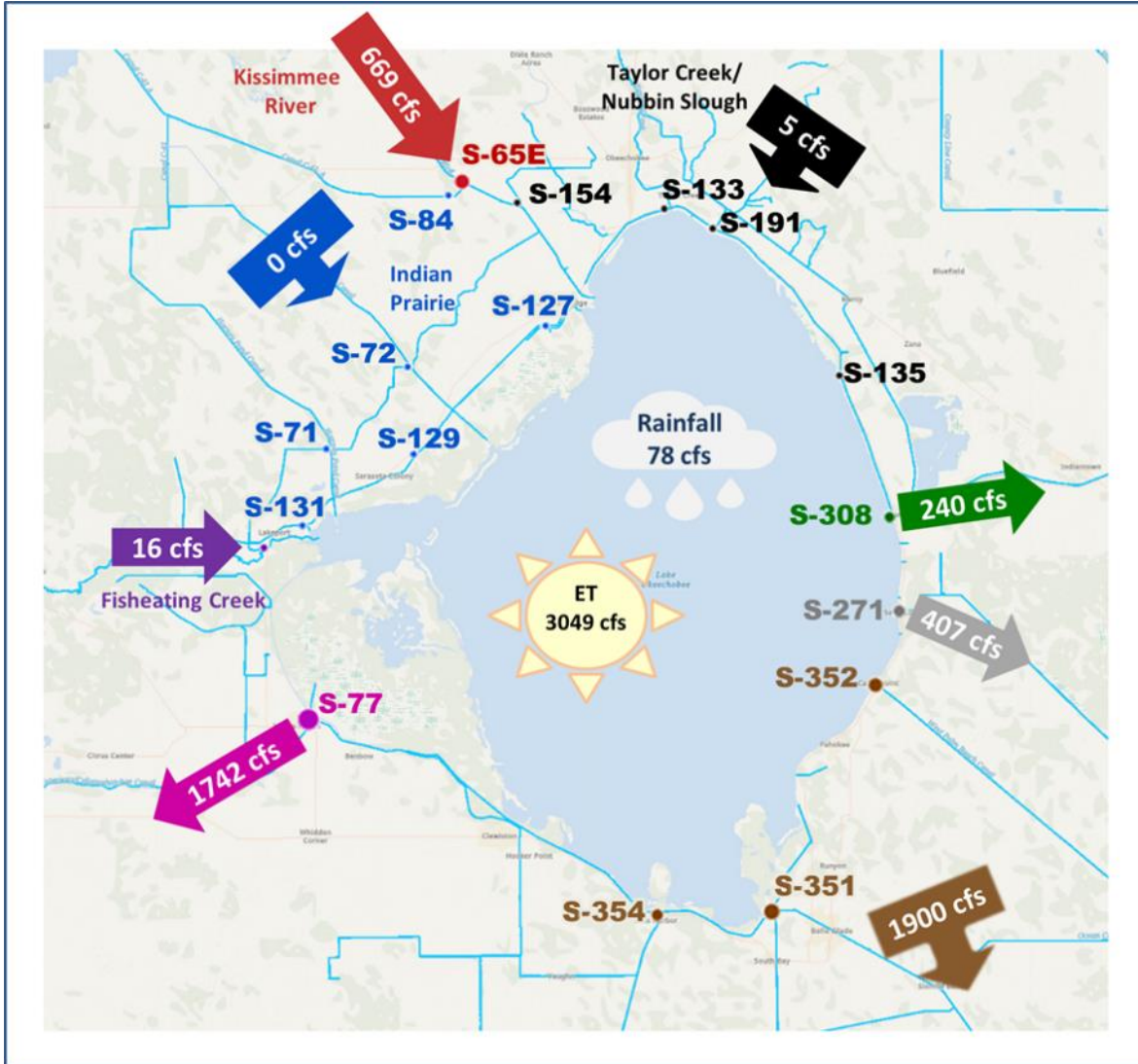


Figure LO-3. The prior seven years of annual stage hydrographs for Lake Okeechobee in comparison to the ecological envelope.

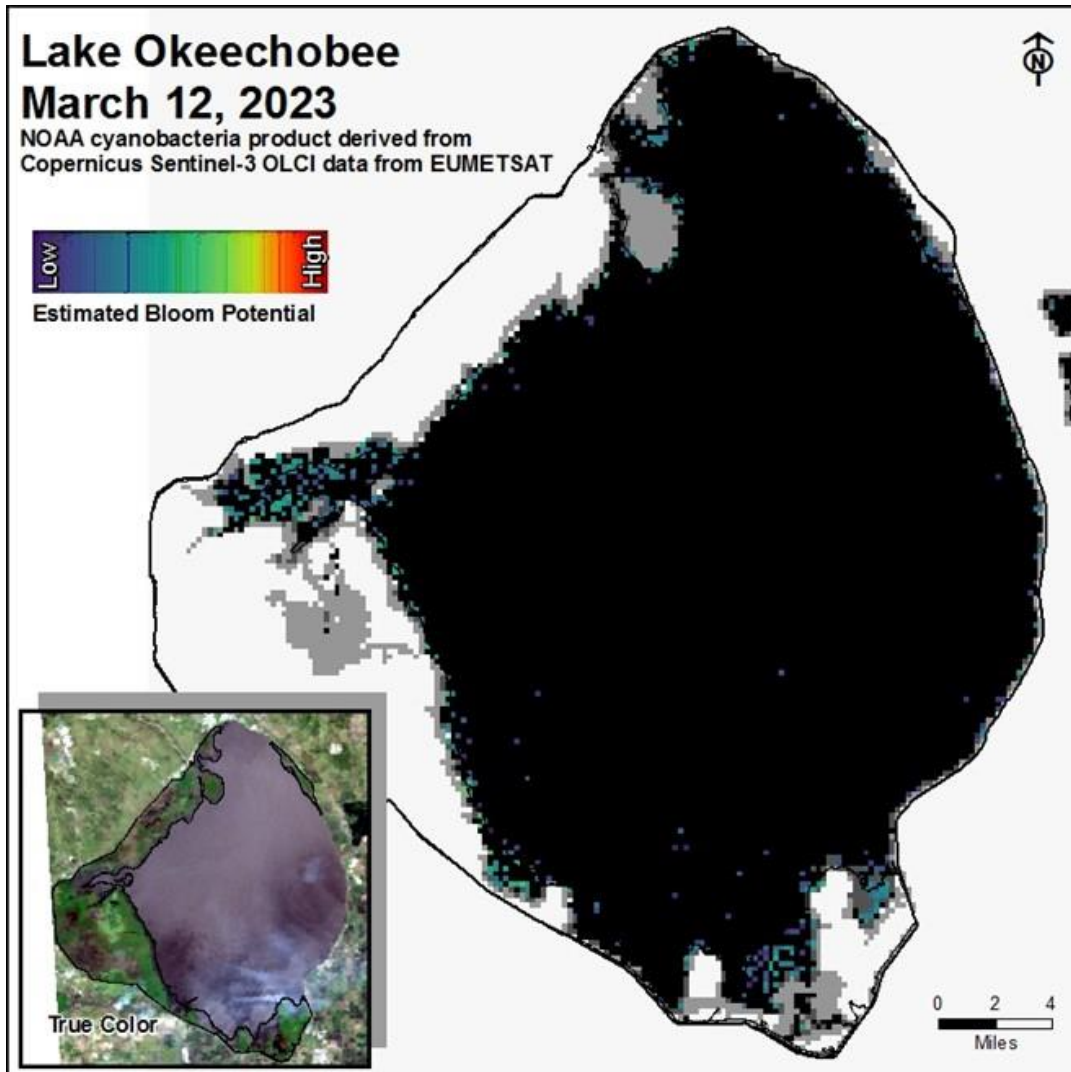




**Figure LO-4.** Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows 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 March 06 – March 12, 2023.



**Figure LO-6.** Cyanobacteria bloom potential on March 12, 2023, based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

## Estuaries

### *St. Lucie Estuary*

Over the past week, mean total inflow to the St. Lucie Estuary was 149 cfs (**Figures ES-1 and ES-2**) and the previous 30-day mean inflow was 129 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-2**.

Over the past week, salinities increased at all sites within the estuary (**Table ES-1 and Figure ES-3**). The seven-day moving average of the surface and bottom salinities at the US1 Bridge was 21.6. 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 (FWRI) was 0.01 spat/shell for February (**Figure ES-5**).

### *Caloosahatchee River Estuary*

Over the past week, mean total inflow to the Caloosahatchee River Estuary was 1,993 cfs (**Figures ES-6 and ES-7**) and the previous 30-day mean inflow was 2,010 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, Val I-75, and Sanibel, increased at Ft. Myers and decreased at Cape Coral and Shell Point (**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 upper stressed range at Shell Point and Sanibel (**Figure ES-10**). The mean larval oyster recruitment rate reported by FWRI was 0.03 spat/shell at Iona Cove and 0 spat/shell at Bird Island for February (**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 1500 cfs, and a steady release at 2,000 cfs with estimated tidal basin inflows of 58 cfs. Model results from all scenarios predict daily salinity to be 1.2 or lower and the 30-day moving average surface salinity to be 0.4 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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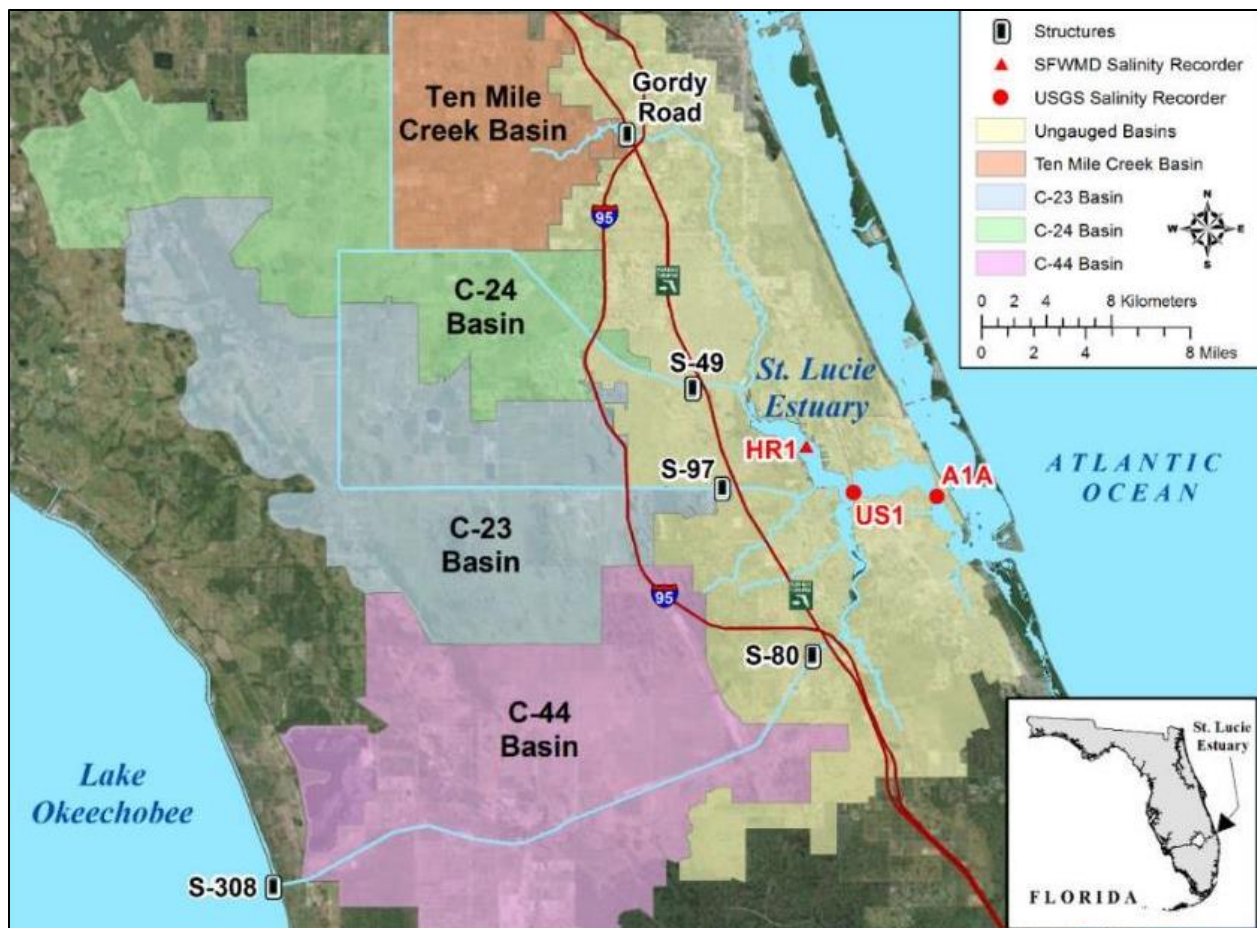
<sup>1</sup> Qiu, C., and Y. Wan. 2013. Time series modeling and prediction of salinity in the Caloosahatchee River Estuary. *Water Resources Research* 49:5804-5816.

## Red Tide

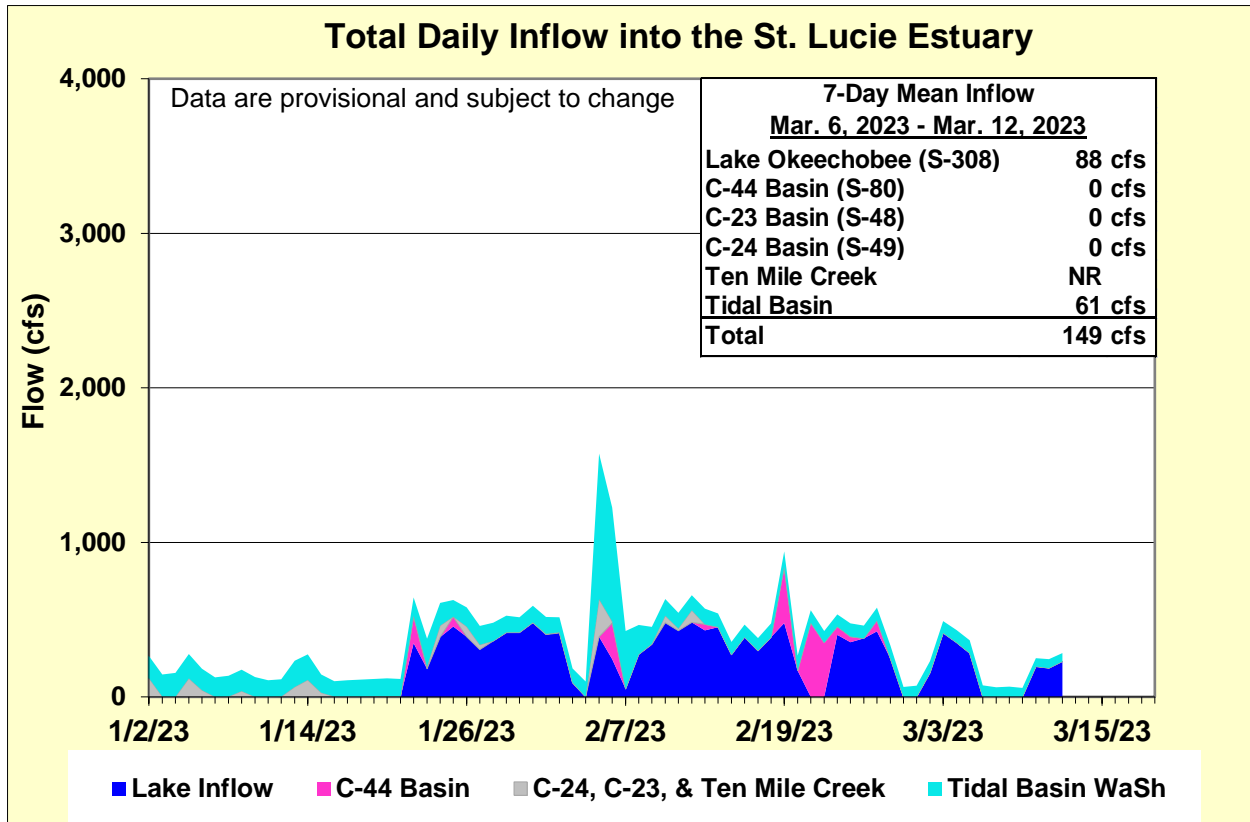
The Florida Fish and Wildlife Research Institute reported on March 10, 2023, that *Karenia brevis*, the Florida red tide dinoflagellate, was observed at bloom concentrations in six samples collected from Charlotte County, nine from Lee County, and eight from Collier County over the past week. On the east coast, red tide was not observed in samples from St. Lucie, Martin, or Palm Beach counties.

## Water Management Recommendations

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

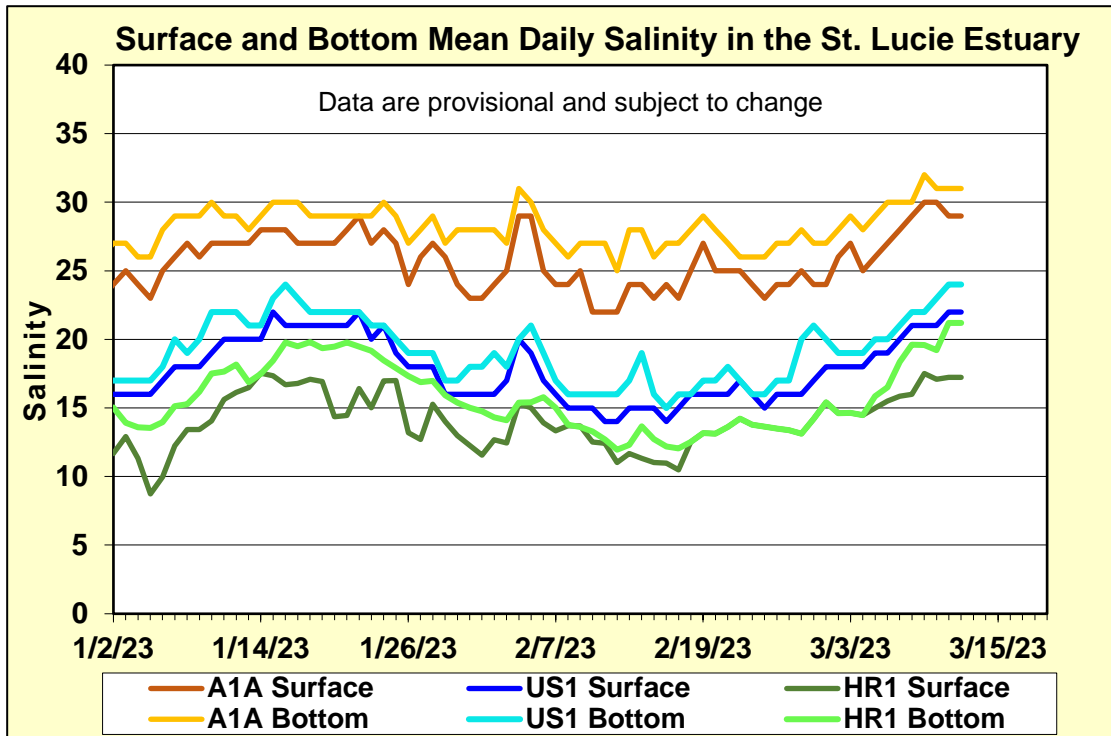


**Figure ES-2.** Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

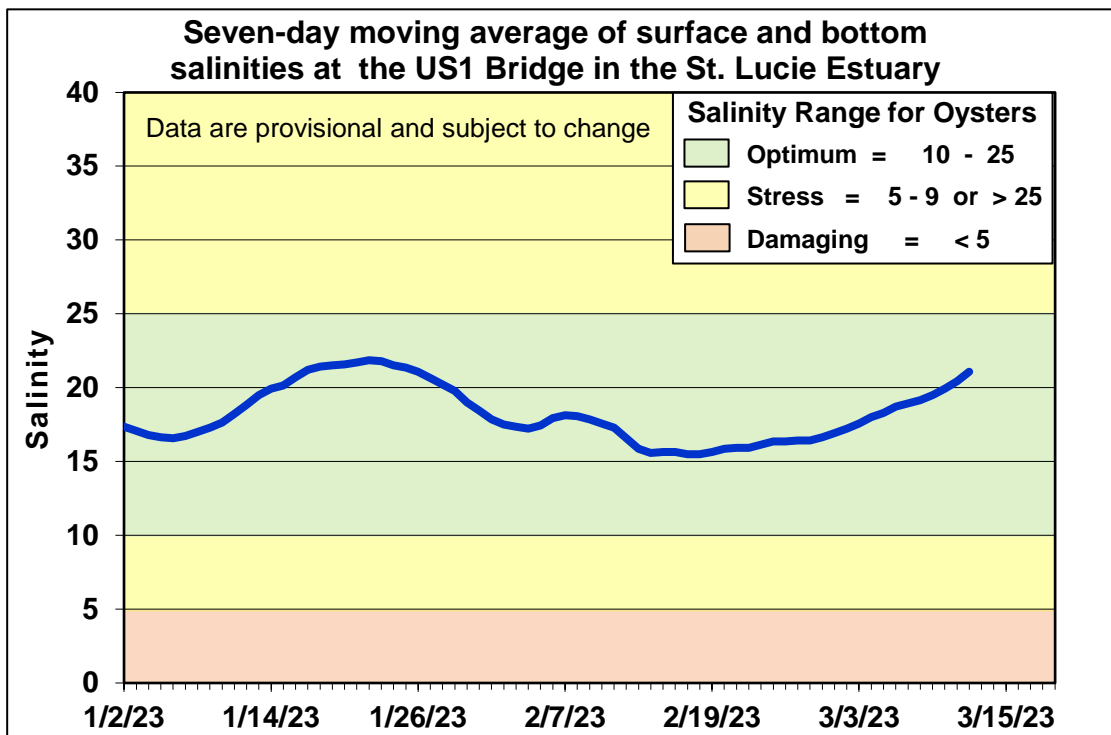
**Table ES-1.** Seven-day mean salinity at oyster monitoring sites in the St. Lucie Estuary. Current means are in bold font; previous week's means are in parentheses. The envelope reflects the optimum salinity range for adult eastern oysters (*Crassostrea virginica*) in the estuary. Data are provisional.

Sampling Site	Surface	Bottom	Optimum Envelope
HR1 (North Fork)	<b>16.6</b> (14.5)	<b>19.4</b> (14.6)	10.0 – 25.0
US1 Bridge	<b>20.9</b> (17.7)	<b>22.3</b> (19.7)	10.0 – 25.0
A1A Bridge	<b>28.9</b> (25.3)	<b>30.7</b> (28.0)	10.0 – 25.0

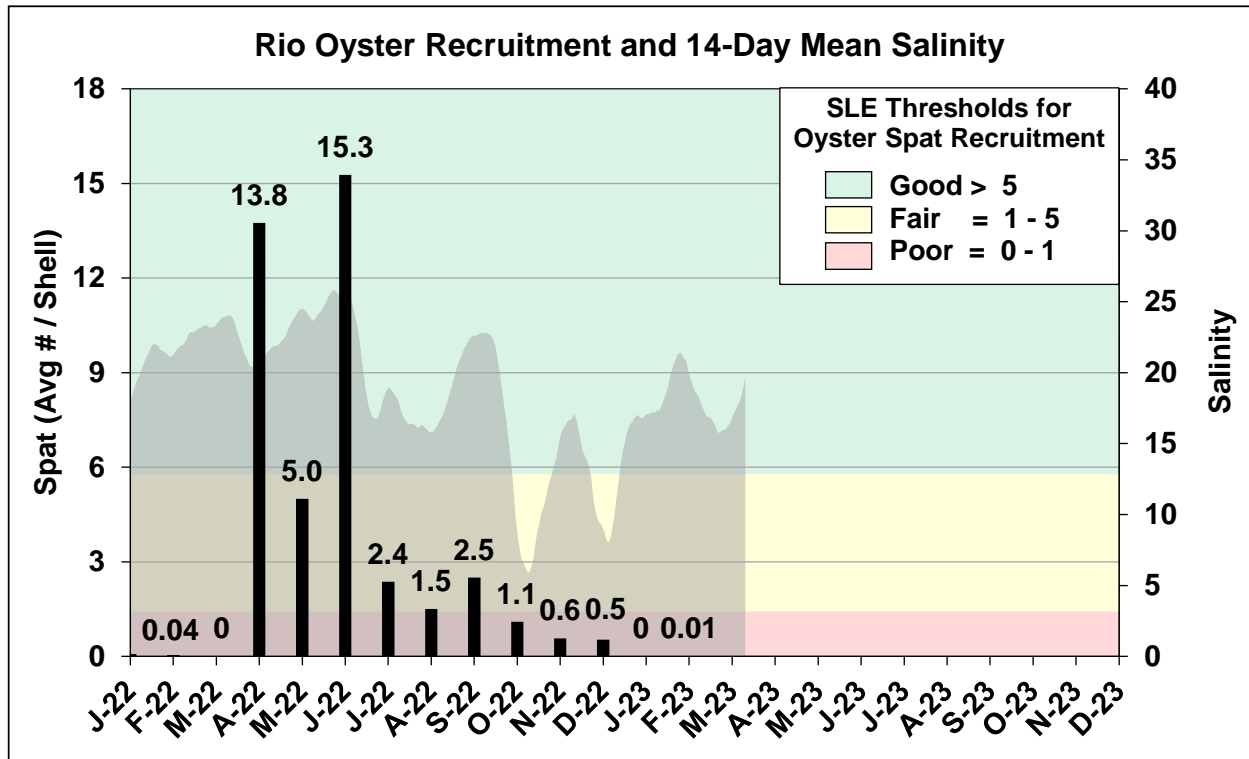




**Figure ES-3.** Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

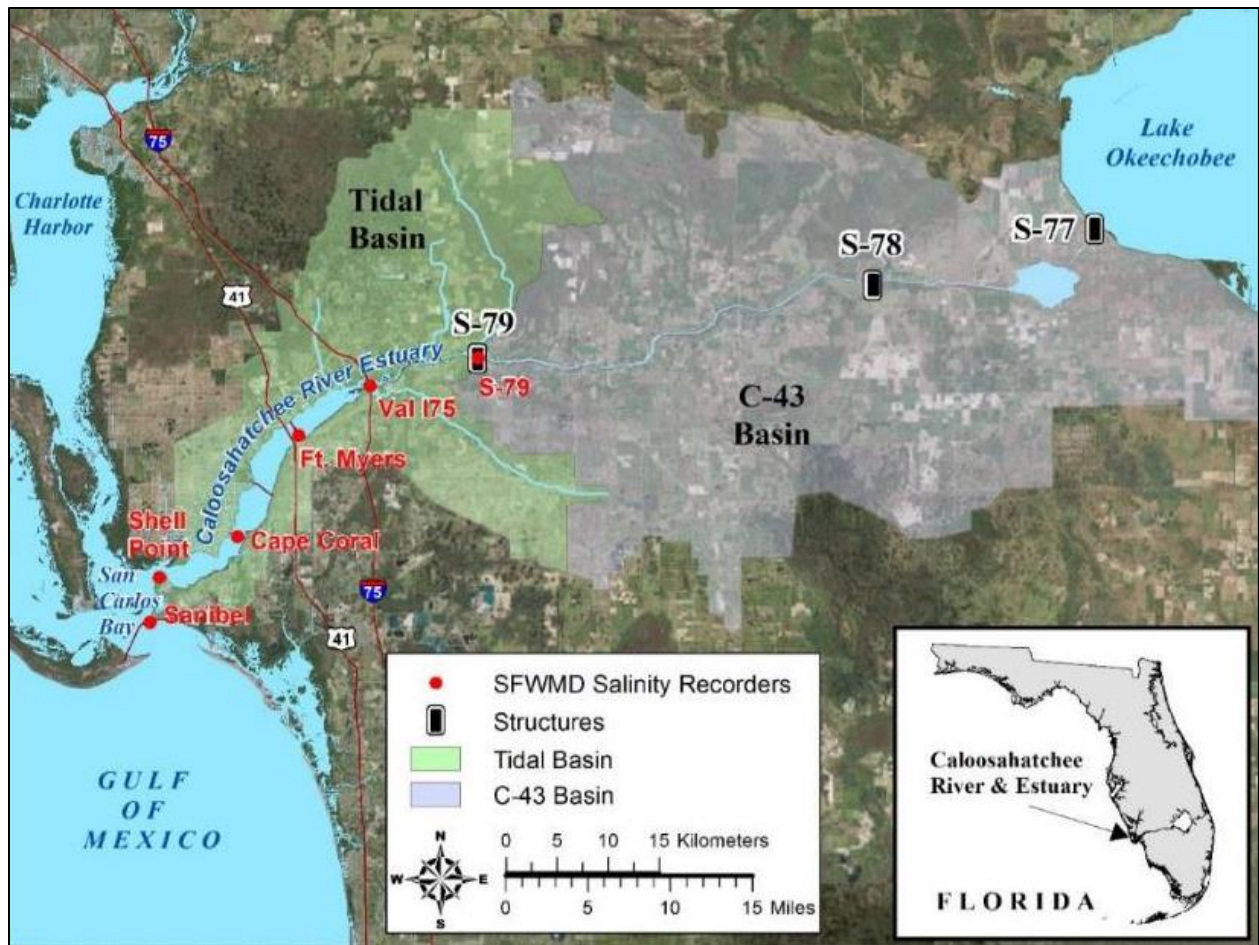


**Figure ES-4.** Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

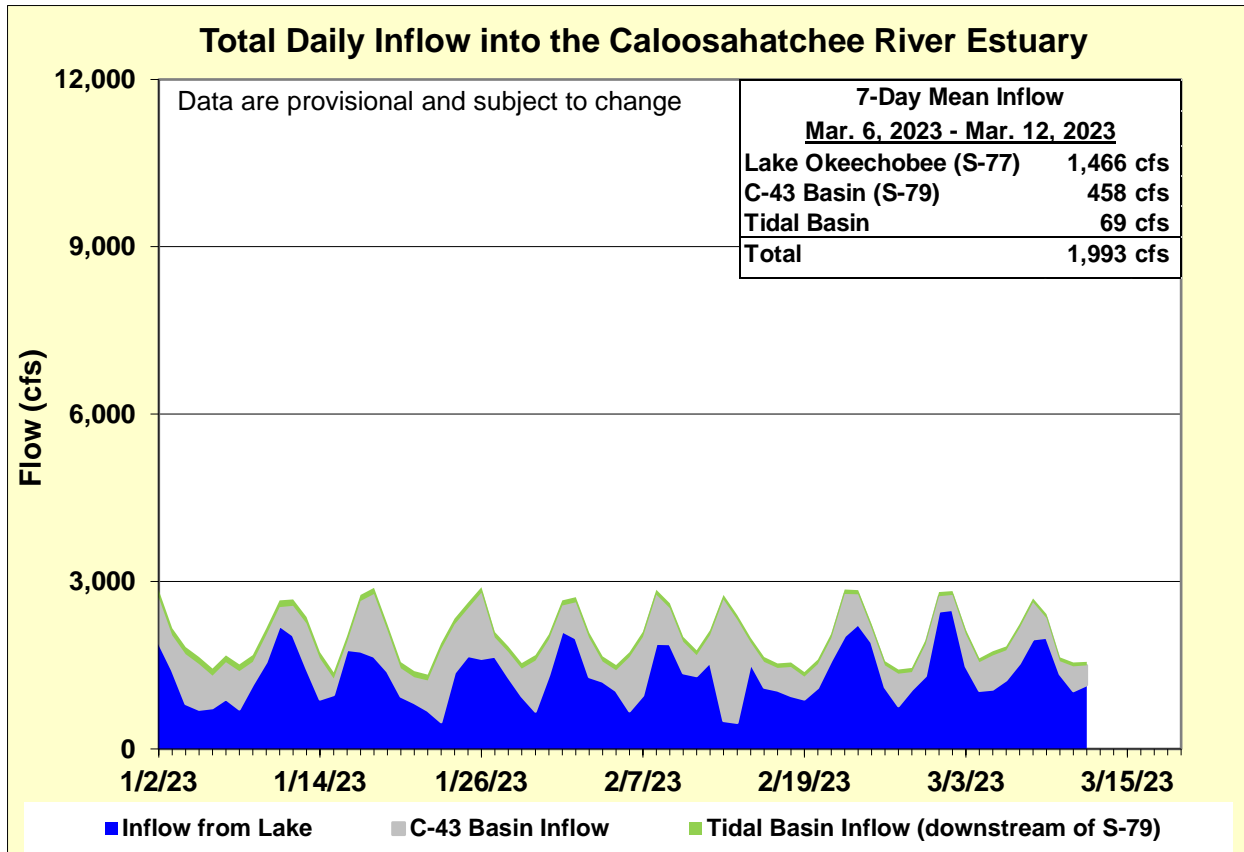


**Figure ES-5.** Mean oyster recruitment at the Rio oyster monitoring station and 14-day mean salinity at US1 Bridge.





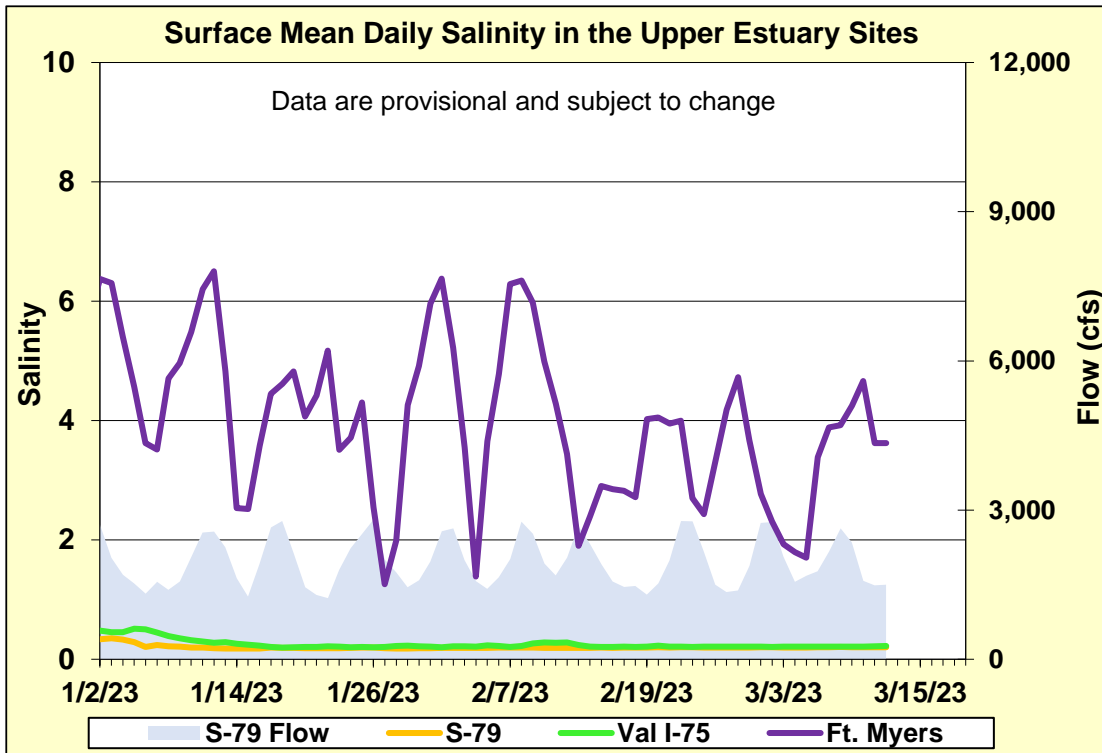
**Figure ES-6.** Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.



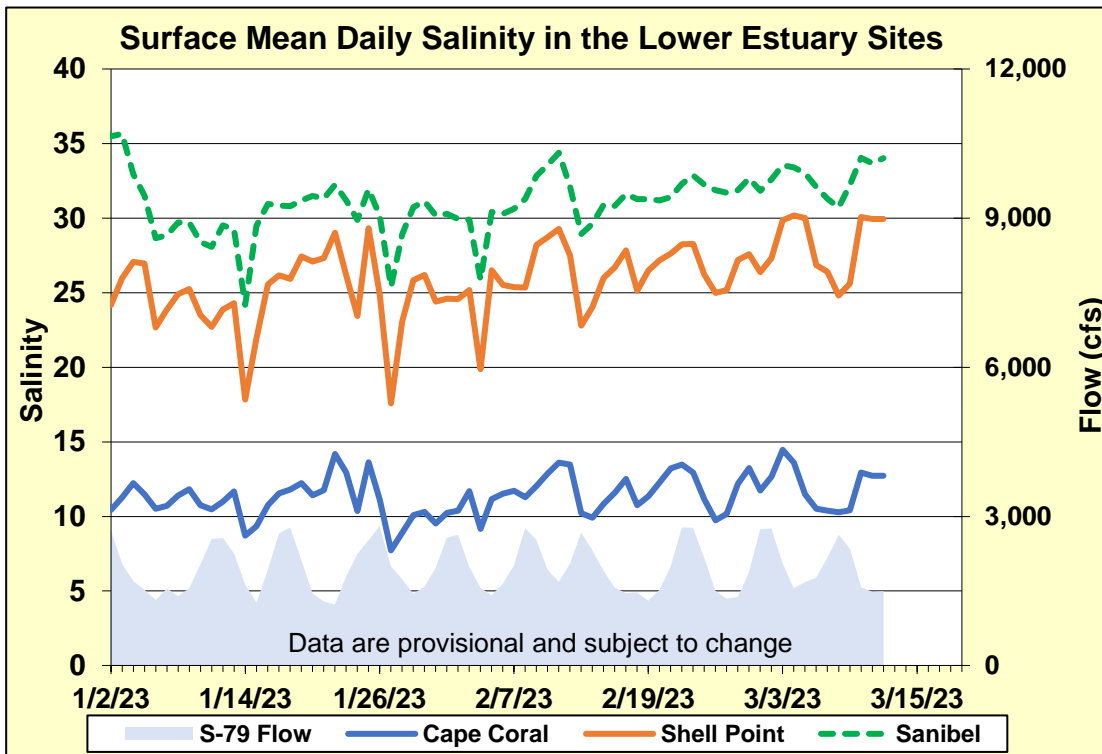
**Figure ES-7.** Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

**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.

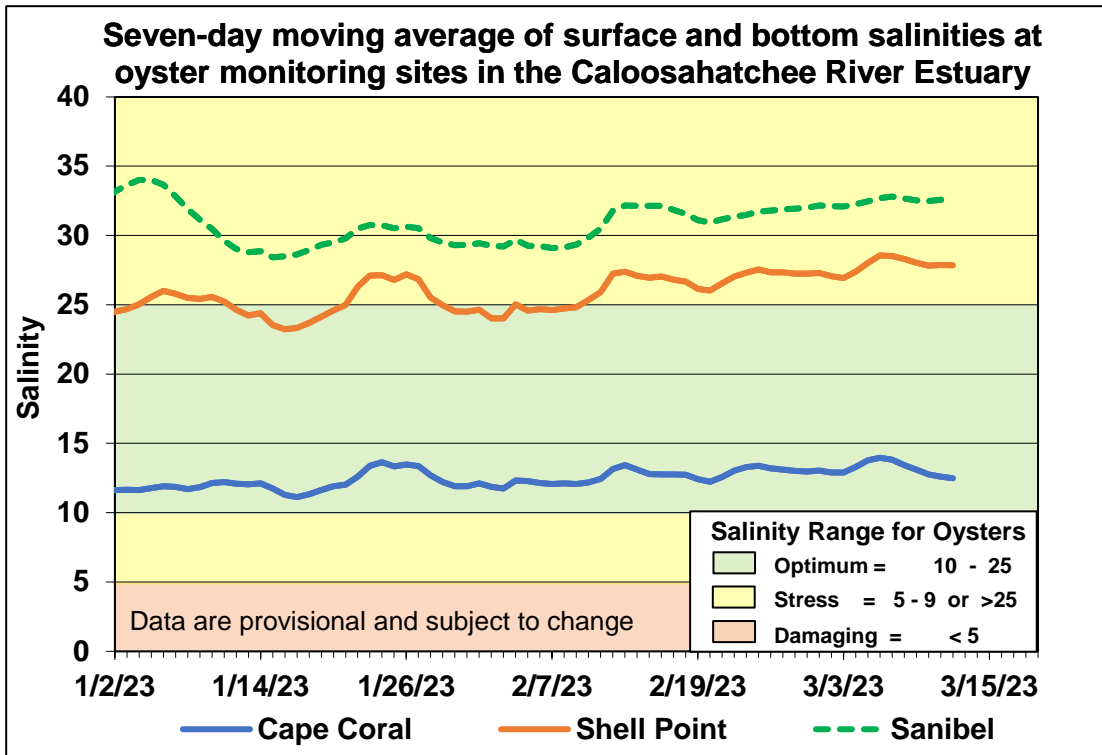
Sampling Site	Surface	Bottom	Optimum Envelope
S-79 (Franklin Lock)	<b>0.2</b> (0.2)	<b>0.2</b> (0.2)	0.0 – 10.0
Val I-75	<b>0.2</b> (0.2)	<b>0.2</b> (0.2)	0.0 – 10.0
Fort Myers Yacht Basin	<b>3.9</b> (2.7)	<b>5.5</b> (3.9)	0.0 – 10.0
Cape Coral	<b>11.4</b> (12.8)	<b>13.7</b> (15.1)	10.0 – 25.0
Shell Point	<b>27.7</b> (28.4)	<b>28.0</b> (28.8)	10.0 – 25.0
Sanibel	<b>32.6</b> (32.7)	<b>32.9</b> (32.7)	10.0 – 25.0



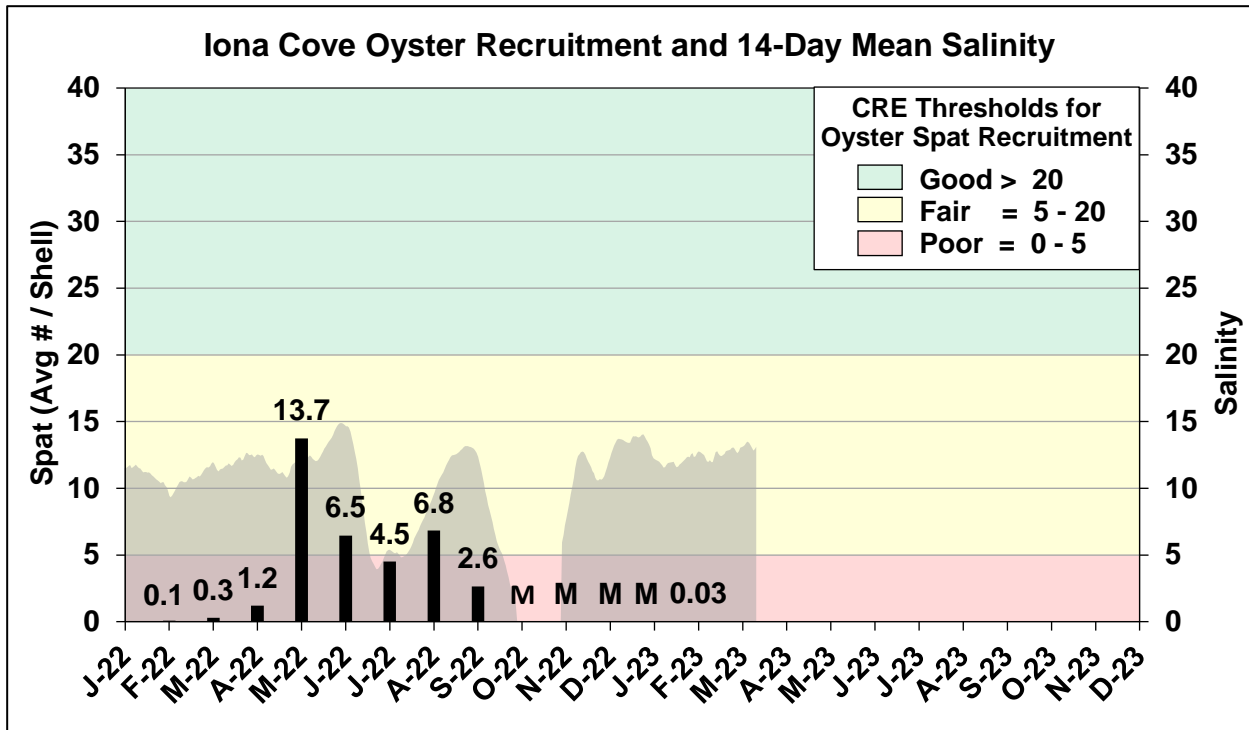
**Figure ES-8.** Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.



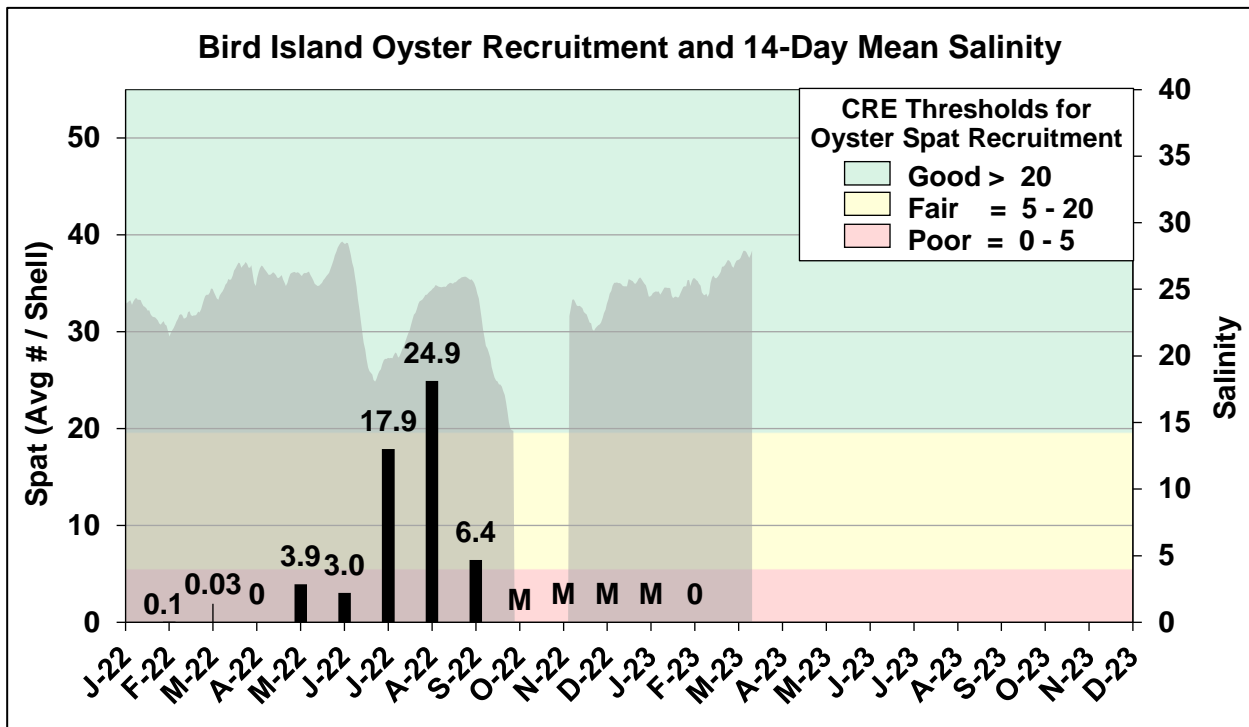
**Figure ES-9.** Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.



**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.



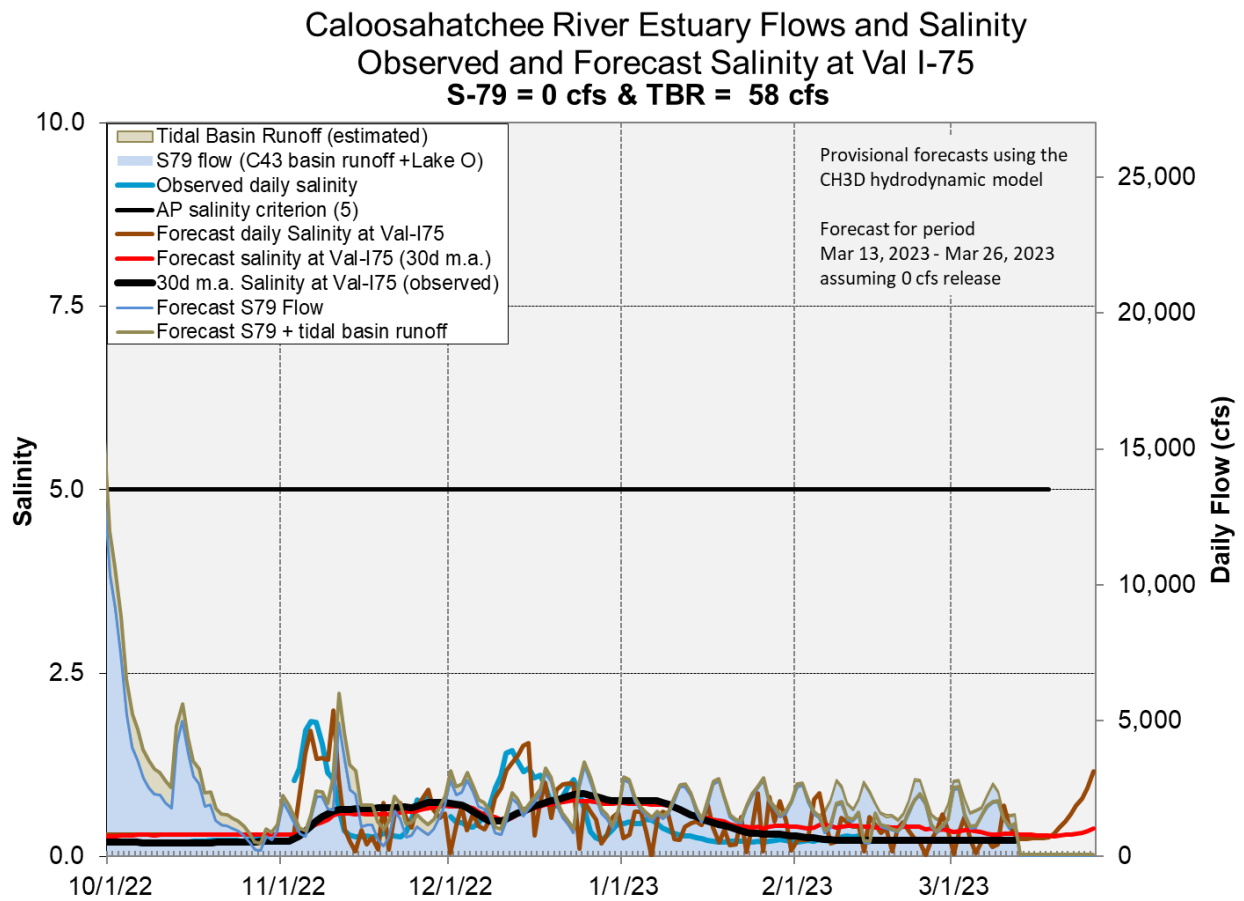
**Figure ES-11.** Mean oyster recruitment at the Iona Cove oyster monitoring station and 14-day mean salinity at Cape Coral.



**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	58	1.2	0.4
B	450	58	0.6	0.3
C	750	58	0.4	0.3
D	1000	58	0.3	0.3
E	1500	58	0.3	0.3
F	2000	58	0.3	0.3



**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 rate (PLR) for the Eastern Flow-way is below 1.0 g/m<sup>2</sup>/year. The 365-day PLR for the Central Flow-way is high (**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 at target stage. Vegetation in the flow-ways is stressed and highly stressed. The 365-day PLR for the Eastern Flow-way is below 1.0 g/m<sup>2</sup>/year. The 365-day PLRs for the Northern and Western Flow-way are high (**Figure S-2**).

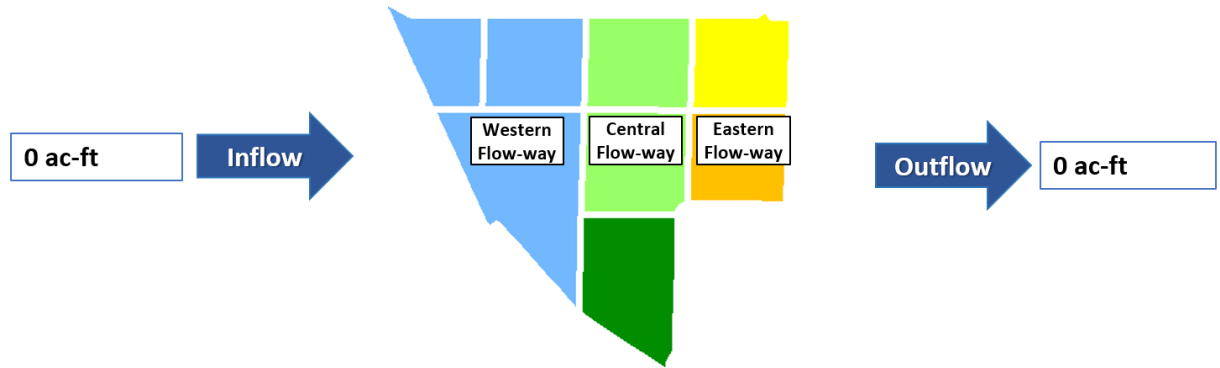
**STA-2:** STA-2 Flow-way 2 is offline for post-construction vegetation grow in. Operational restrictions are in place in STA-2 Flow-ways 3 and 4 for vegetation management activities. Online treatment cells are at or near target stage. Vegetation in Flow-ways 1 and 3 is stressed, and in Flow-ways 2, 4 and 5 is highly stressed. The 365-day PLRs for Flow-ways 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 at or near 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. Most treatment cells are 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 most flow-ways are at or below 1.0 g/m<sup>2</sup>/year, except Flow-ways 3 and 4 which are high (**Figure S-5** and **S-6**).

For definitions on STA operational language see glossary following figures.

**STA-1E Weekly Status Report – 3/6/2023 through 3/12/2023**

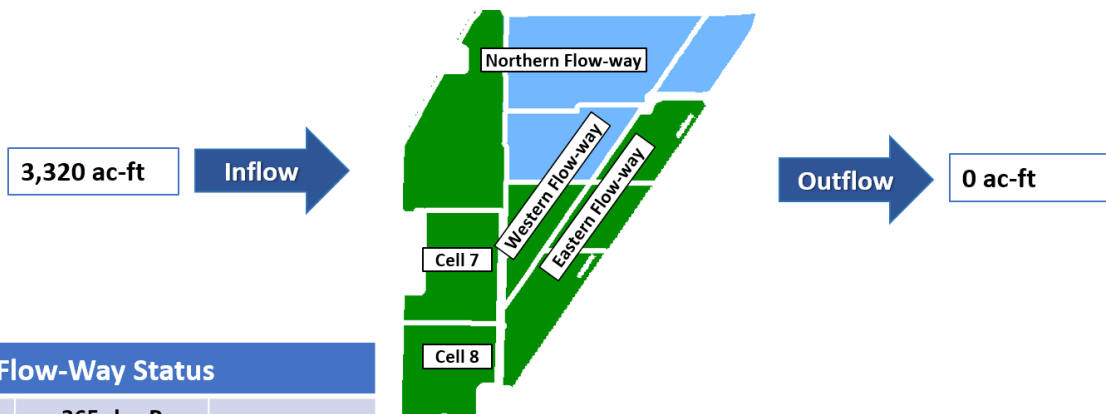


STA-1E Flow-Way Status				As of 3/12/2023		STA-1E Flow & Phosphorus Concentration				
Flow-Way	Vegetation Status Healthy ----- Stressed ←-----→	365-day P Loading Rate (below 1.0 g P /m <sup>2</sup> /yr is optimal)	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)		7-day	28-day	365-day		
				<ul style="list-style-type: none"> <li><span style="color: purple;">■</span> Deep Water Level (&gt; 2.8' above TS)</li> <li><span style="color: blue;">■</span> High Water Level (1.5' – 2.8' above TS)</li> <li><span style="color: lightblue;">■</span> 0.2' – 1.5' above TS</li> <li><span style="color: green;">■</span> Target Stage (TS +/- 0.2')</li> <li><span style="color: lightgreen;">■</span> 0.2' – 0.5' below TS</li> <li><span style="color: yellow;">■</span> 0.5' – 1.0' below TS</li> <li><span style="color: orange;">■</span> Low Water Level (1.0' – 1.2' below TS)</li> <li><span style="color: red;">■</span> Extreme Low Water (&gt; 1.2' below TS)</li> </ul>						
Eastern	←  →	 1.0	Vegetation management							
Central	←  →	 1.0	Vegetation rehabilitation							
Western	Offline, post-construction grow in starting 3/28/2022									
Total Inflow, ac-ft						0	106	126,218		
--Lake Inflow, ac-ft						0	N/A	3,200		
Total Outflow, ac-ft						0	170	100,409		
Inflow Conc., ppb						N/A	30	115		
Outflow Conc., ppb						N/A	18	25		
Includes Preliminary Data										

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



STA-1W Weekly Status Report – 3/6/2023 through 3/12/2023



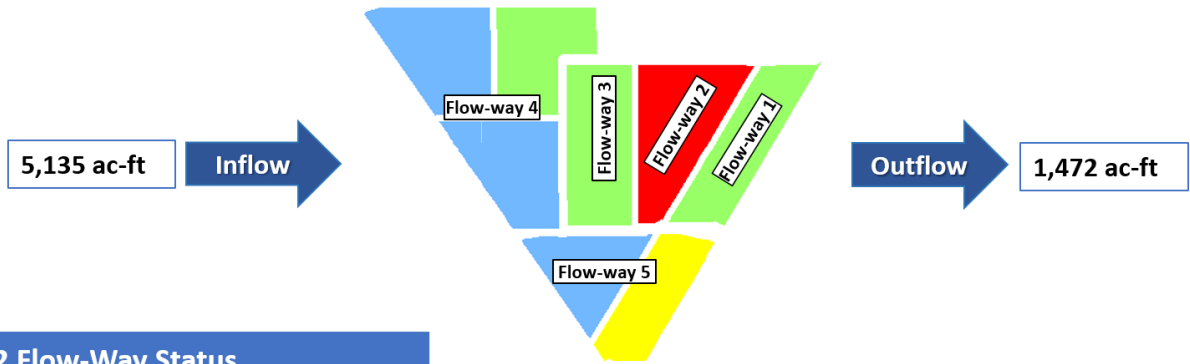
STA-1W Flow-Way Status			
Flow-Way	Vegetation Status Healthy --- Stressed	365-day P Loading Rate (below 1.0 g P /m <sup>2</sup> /yr is optimal)	Online / Offline / Restrictions
Northern	← →		Vegetation management
Western	← →		Vegetation management
Eastern	← →		Vegetation management
Cell 7	← →	N/A	Online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

As of 3/12/2023	
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')
	0.2' – 0.5' below TS
	0.5' – 1.0' below TS
	Low Water Level (1.0' – 1.2' below TS)
	Extreme Low Water (> 1.2' below TS)

STA-1W Flow & Phosphorus Concentration				
	7-day	28-day	365-day	
Total Inflow, ac-ft	3,320	5,038	147,047	
--Lake Inflow, ac-ft	3,100	N/A	7,700	
Total Outflow, ac-ft	0	310	147,436	
Inflow Conc., ppb	160	157	198	
Outflow Conc., ppb	N/A	18	20	
Includes Preliminary Data				

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

**STA-2 Weekly Status Report – 3/6/2023 through 3/12/2023**



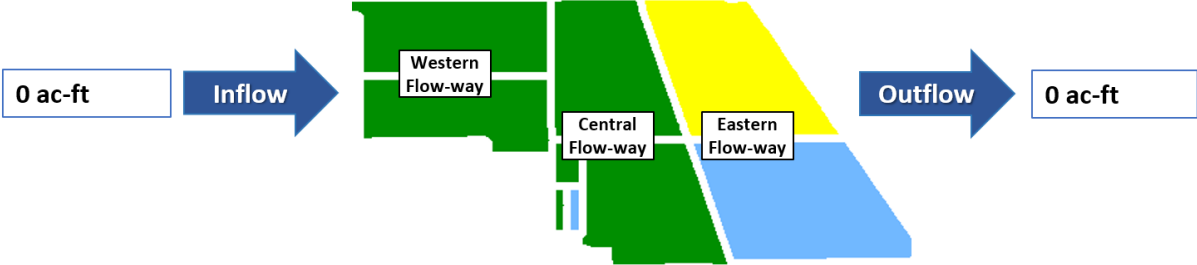
STA-2 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m <sup>2</sup> /yr is optimal)	Online / Offline / Restrictions
1			Online
2	Offline, post-construction grow in starting 1/23/2023		
3			Vegetation Rehab
4			Vegetation Rehab
5			Online

As of 3/12/2023	
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')
	0.2' – 0.5' below TS
	0.5' – 1.0' below TS
	Low Water Level (1.0' – 1.2' below TS)
	Extreme Low Water (> 1.2' below TS)

STA-2 Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	5,135	10,126	320,388
--Lake Inflow, ac-ft	1,300	N/A	32,100
Total Outflow, ac-ft	1,472	7,216	334,521
Inflow Conc., ppb	78	80	114
Outflow Conc., ppb	17	17	30
Includes Preliminary Data			

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

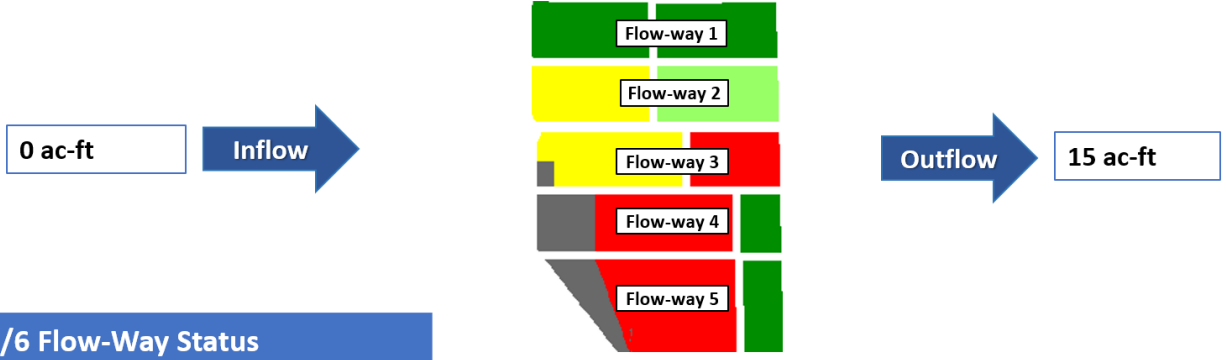
**STA-3/4 Weekly Status Report – 3/6/2023 through 3/12/2023**



STA-3/4 Flow-Way Status				As of 3/12/2023		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 /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	Offline, vegetation management drawdown as of 3/1/2021			<div style="background-color: purple; width: 10px; height: 10px; display: inline-block;"></div> Deep Water Level (> 2.8' above TS) <div style="background-color: blue; width: 10px; height: 10px; display: inline-block;"></div> High Water Level (1.5' – 2.8' above TS) <div style="background-color: lightblue; width: 10px; height: 10px; display: inline-block;"></div> 0.2' – 1.5' above TS <div style="background-color: green; width: 10px; height: 10px; display: inline-block;"></div> Target Stage (TS +/- 0.2') <div style="background-color: lightgreen; width: 10px; height: 10px; display: inline-block;"></div> 0.2' – 0.5' below TS <div style="background-color: yellow; width: 10px; height: 10px; display: inline-block;"></div> 0.5' – 1.0' below TS <div style="background-color: orange; width: 10px; height: 10px; display: inline-block;"></div> Low Water Level (1.0' – 1.2' below TS) <div style="background-color: red; width: 10px; height: 10px; display: inline-block;"></div> Extreme Low Water (> 1.2' below TS)					
Central	← →		Online			Total Inflow, ac-ft	0	22	299,711
Western	← →		Online			--Lake Inflow, ac-ft	0	N/A	3,100
						Total Outflow, ac-ft	0	569	291,803
						Inflow Conc., ppb	N/A	N/A	94
						Outflow Conc., ppb	N/A	26	16
Includes Preliminary Data									

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

**STA-5/6 Weekly Status Report – 3/6/2023 through 3/12/2023**



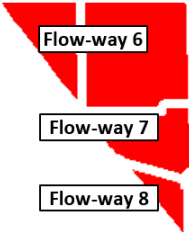
STA-5/6 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m <sup>2</sup> /yr is optimal)	Online / Offline / Restrictions
1	← →		Online
2	← →		Online
3	← →		Online
4	← →		Online
5	← →		Online

As of 3/12/2023
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')
0.2' – 0.5' below TS
0.5' – 1.0' below TS
Low Water Level (1.0' – 1.2' below TS)
Extreme Low Water (> 1.2' below TS)

STA-5/6 Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	0	0	152,471
--Lake Inflow, ac-ft	0	N/A	0
Total Outflow, ac-ft	15	15	148,145
Inflow Conc., ppb	N/A	N/A	289
Outflow Conc., ppb	46	46	40
Includes Preliminary Data			

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

STA-5/6 Weekly Status Report – 3/6/2023 through 3/12/2023



STA-5/6 Flow-Way Status				As of 3/12/2023	
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)	
				Color	Range
6	←-----→	1.0	Online		Extreme Low Water (> 1.2' below TS)
7	←-----→	1.0	Online		High Water Level (1.5' – 2.8' above TS)
8	←-----→	1.0	Online		Low Water Level (1.0' – 1.2' below TS)

**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***

From Monday to Sunday of last week the EPA received more rainfall than the previous two weeks but still a low amount. WCA-1: Last week stage at the 1-8C continued to follow just below schedule. The average on Monday was 0.08 feet below the falling Zone A1 regulation line. WCA-2A: Stage recession returned at the 2-17, gauge last week. The average on Monday was 1.05 feet above the flat regulation line. WCA-3A: The Three Gauge Average stage continues to recede faster than the slope of the schedule line. The average stage was 0.92 feet below the falling regulation line on Monday. WCA-3A North: At gauge 62 (Northwest corner) stage continues a precipitous recession, the average on Monday was 1.77 feet below the flat Upper schedule line (**Figures EV-1 through EV-4**).

### ***Water Depths***

The SFWDAT tool illustrates current stages in the EPA are falling within the major basins; with below ground conditions in northwestern WCA-3A and well below in southern BCNP.

WCA-3A continues to dry down from the northwest to the southeast with only a small pocket in the southeast corner (which contains the Alley North colony) that has apparent surface water present.

Comparing current WDAT water depths to one month ago conditions within the EPA are shallower significantly in the west.

Looking back a year ago, conditions are much dryer in the west, and dryer but less so to the east (**Figure EV-5 and Figure EV-6**). Comparing current conditions to the 20-year average on March 12: Conditions are above average in southern WCA-2A, northeastern WCA-3A and now well below in central and southern WCA-3A; above the 80th percentile in portions of northeastern SRS and WCA-3B, with northwestern WCA-1 approaching average (**Figure EV-7**).

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

Total weekly rainfall averaged only 0.2 inches in Taylor Slough and Florida Bay over the past week (Monday-Sunday) based on 17 gauges available for this report. Rainfall ranged from 0.0 inches at 7 sites to 0.7 inches at Highway Creek in the eastern nearshore area. Stages at all sites in Taylor Slough decreased over the past week. Taylor Slough stage changes averaged a decrease of -0.21 feet and ranged from a decrease of -0.08 feet at EVER6 in the southern C-111 area to -0.43 feet at E112 in northern Taylor Slough (**Figure EV-8 and Figure EV-9**). Taylor Slough water levels remain above the historical average for this time of year by +2.7 inches compared to before the Florida Bay initiative (starting in 2017), but decreased -3.6 inches from last week, driven by decreases at all sites, and especially in the northern Slough.

Average Florida Bay salinity was 32.6, +1.3 higher than last week. Salinity changes ranged from a decrease of -0.7 at Johnson Key (JK) in the western bay to +4.4 in Terrapin Bay (TB) in the central nearshore region, following predominantly south-southwest winds and negative flows. (**Figure EV-8**). As of 3/12, salinity remains at the 50<sup>th</sup> percentile and

the 75<sup>th</sup> percentile in the Western and Eastern regions, respectively. Central Bay salinity just exceeded the IQR on 3/12 (**Figure EV-10**). Florida Bay salinity is +2.7 above its historical average for this time of year, up +0.2 from last week.

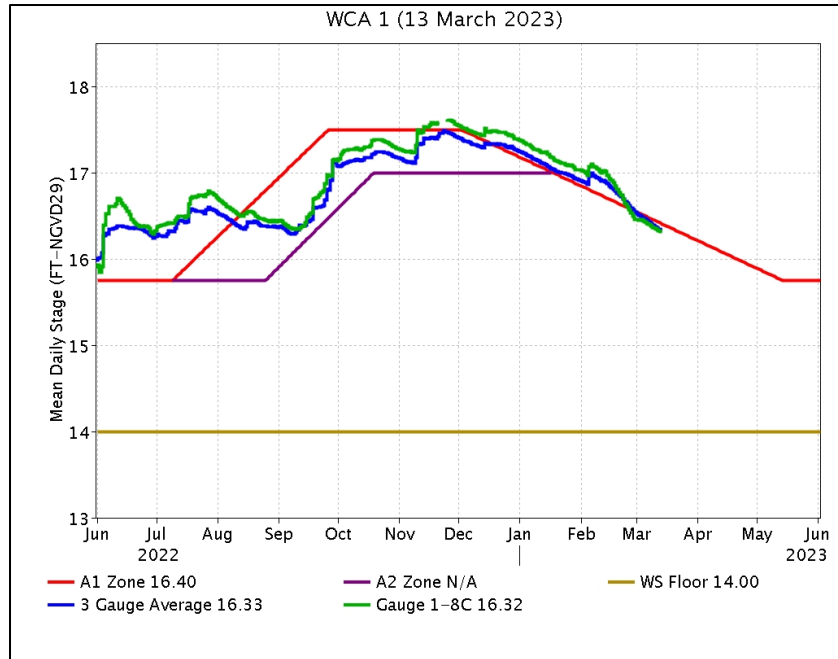
**Water Management Recommendations**

We recommend continuing discussion and the utilization of strategies that prevent further degradation of WCA3A North. Conserving water in this region will most likely prove critical for the upcoming wading bird nesting season. Once an assessment of the recent wildfire in WCA-3A Northeast can be conducted the focus for available inflows should shift to the Northwest. As water levels go below ground in that region of the sub-basin inflows that slow the recession in that area are especially ecologically beneficial given the very high recession rates. Maintaining a moderate rate of stage change within the marshes of WCAs despite reversals, avoiding abrupt changes in water depth and conserving water north in the system has an ecological benefit. When water is available discharge downstream through Taylor Slough. Individual regional recommendations can be found in **Table EV-2**.

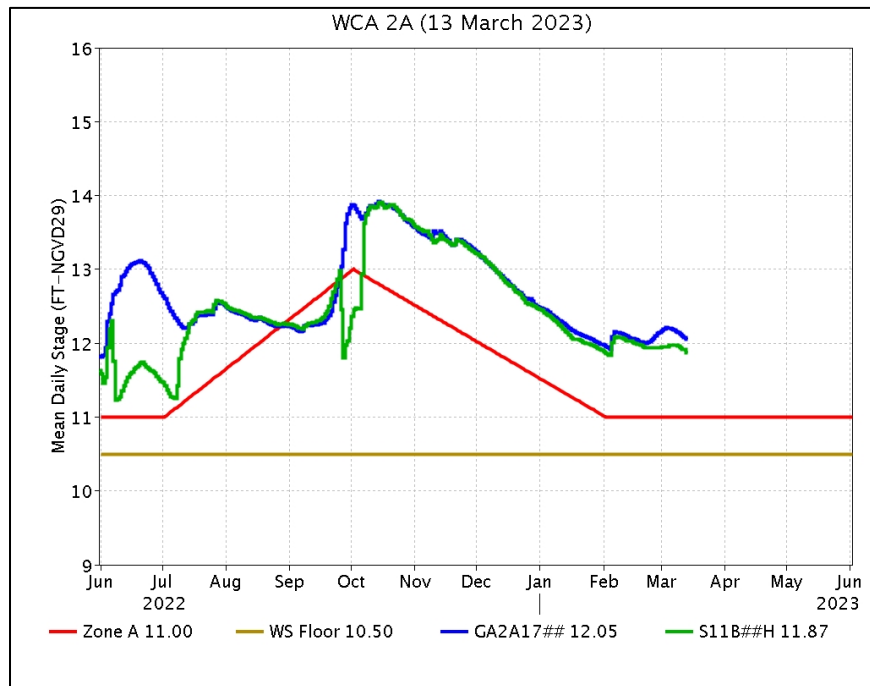
**Table EV-2.** Previous week’s rainfall and water depth changes in Everglades basins.

Everglades Region	Rainfall (inches)	Stage change (feet)
WCA-1	<0.01	-0.11
WCA-2A	0.03	-0.14
WCA-2B	0.10	-0.18
WCA-3A	0.05	-0.17
WCA-3B	0.10	-0.10
ENP	0.13	-0.08

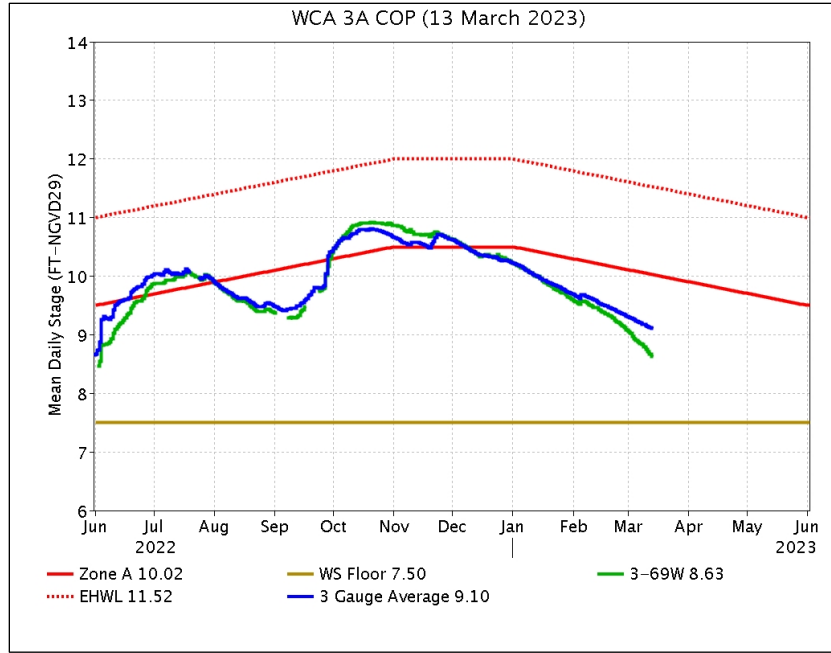




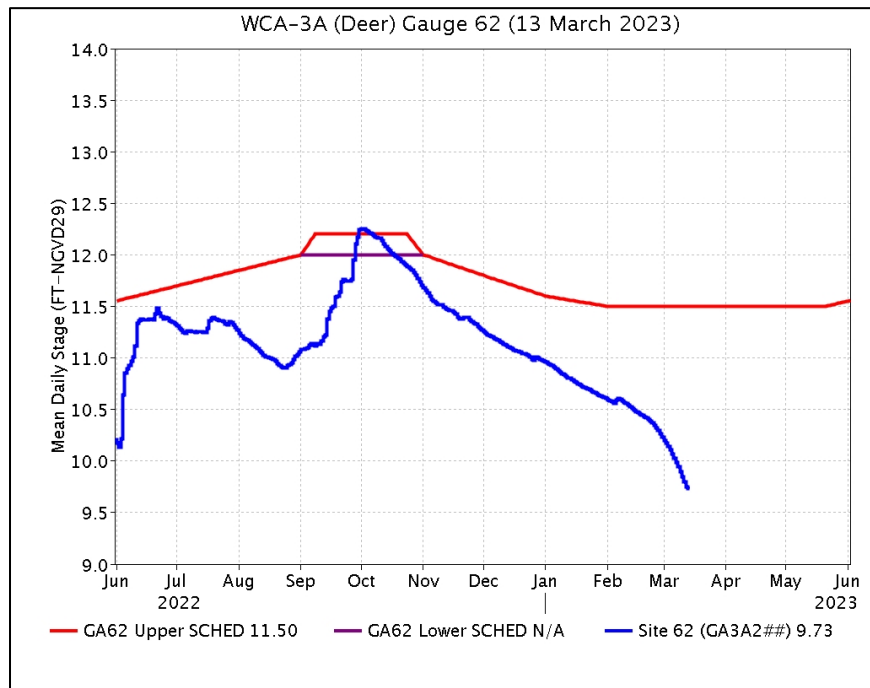
**Figure EV-1.** WCA-1 stage hydrographs and regulation schedule.



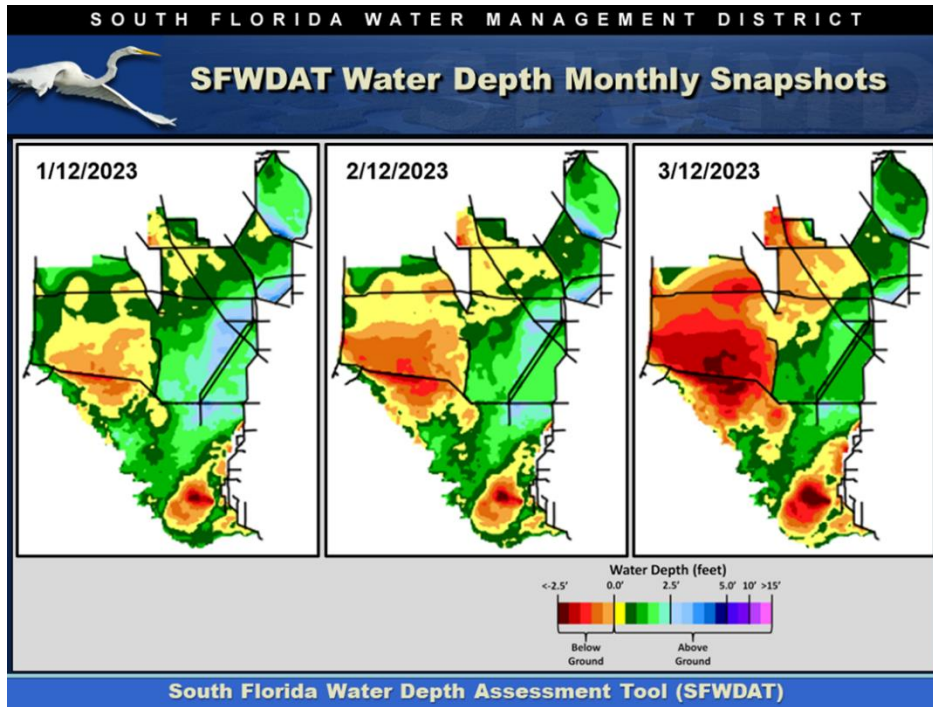
**Figure EV-2.** WCA-2A stage hydrographs and regulation schedule.



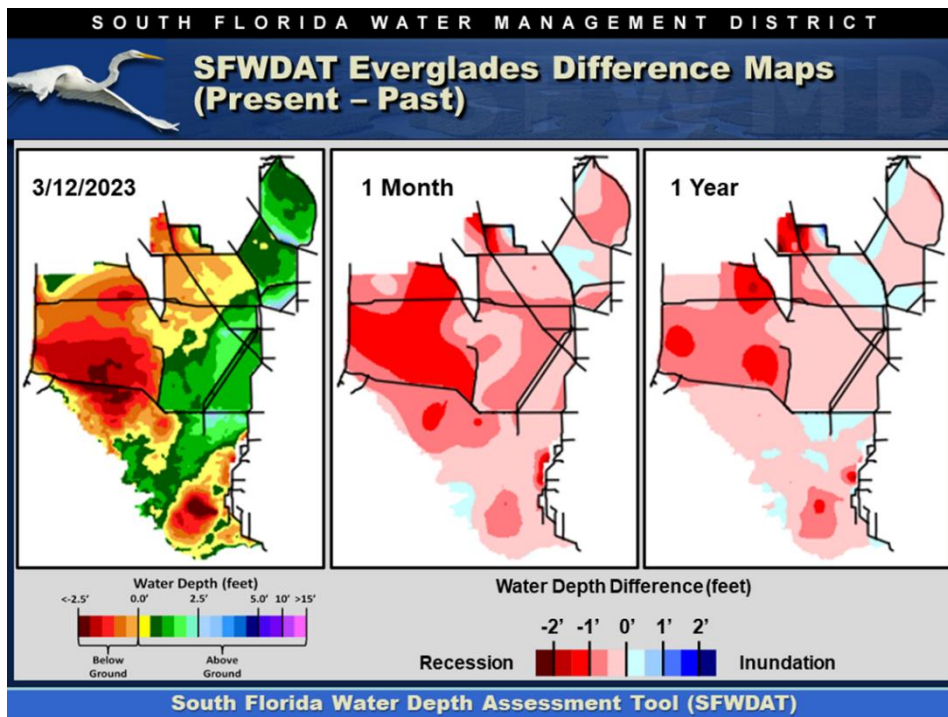
**Figure EV-3.** WCA-3A stage hydrographs (three-gauge average, 3-69W) and regulation schedule.



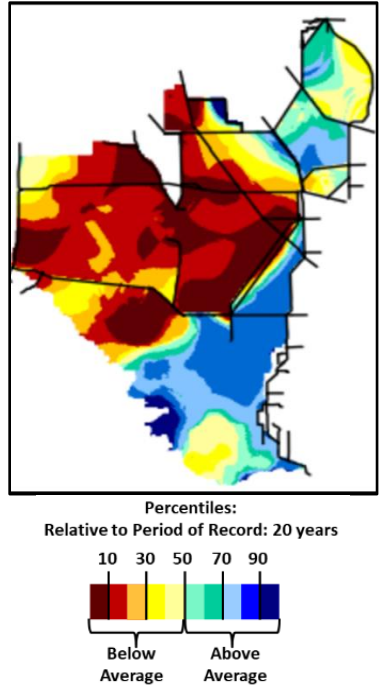
**Figure EV-4.** WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.



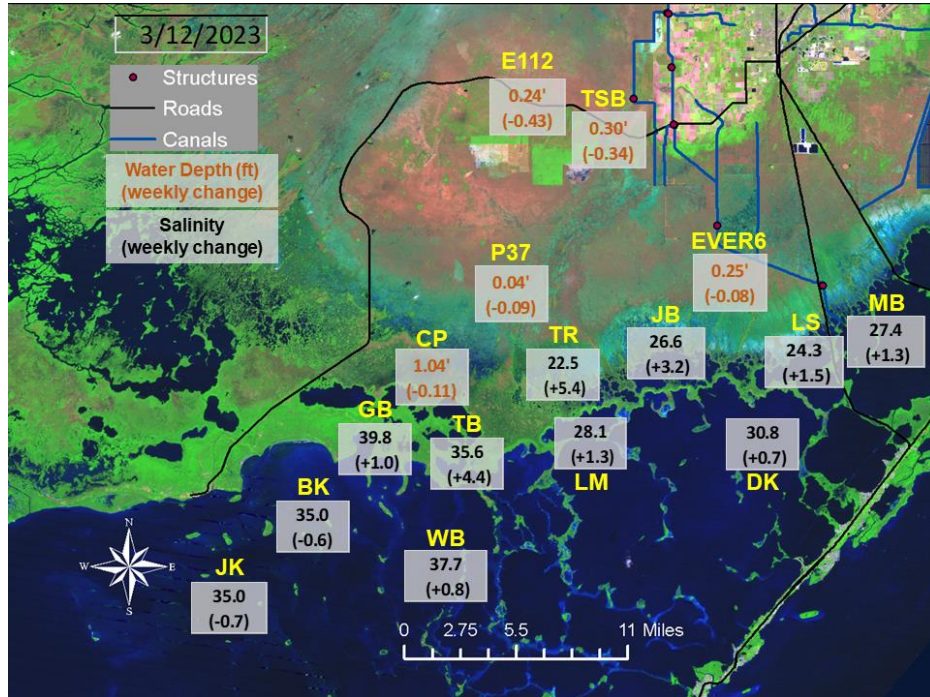
**Figure EV-5.** Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.



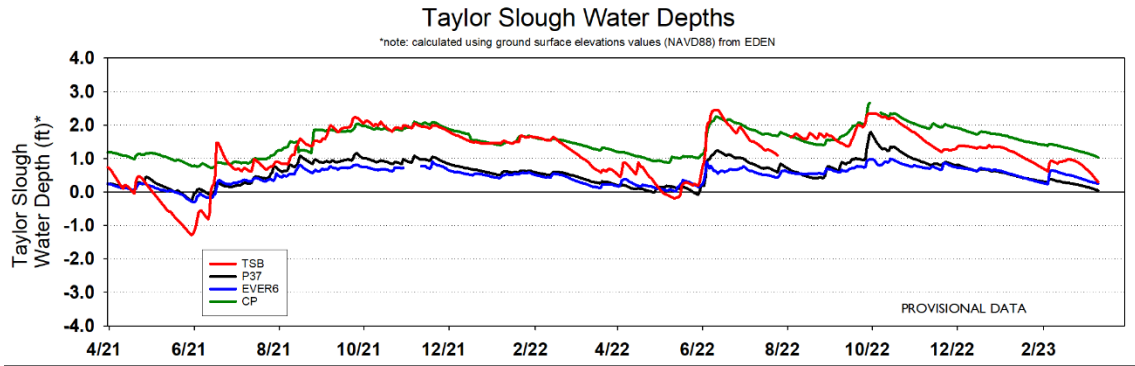
**Figure EV-6.** Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.



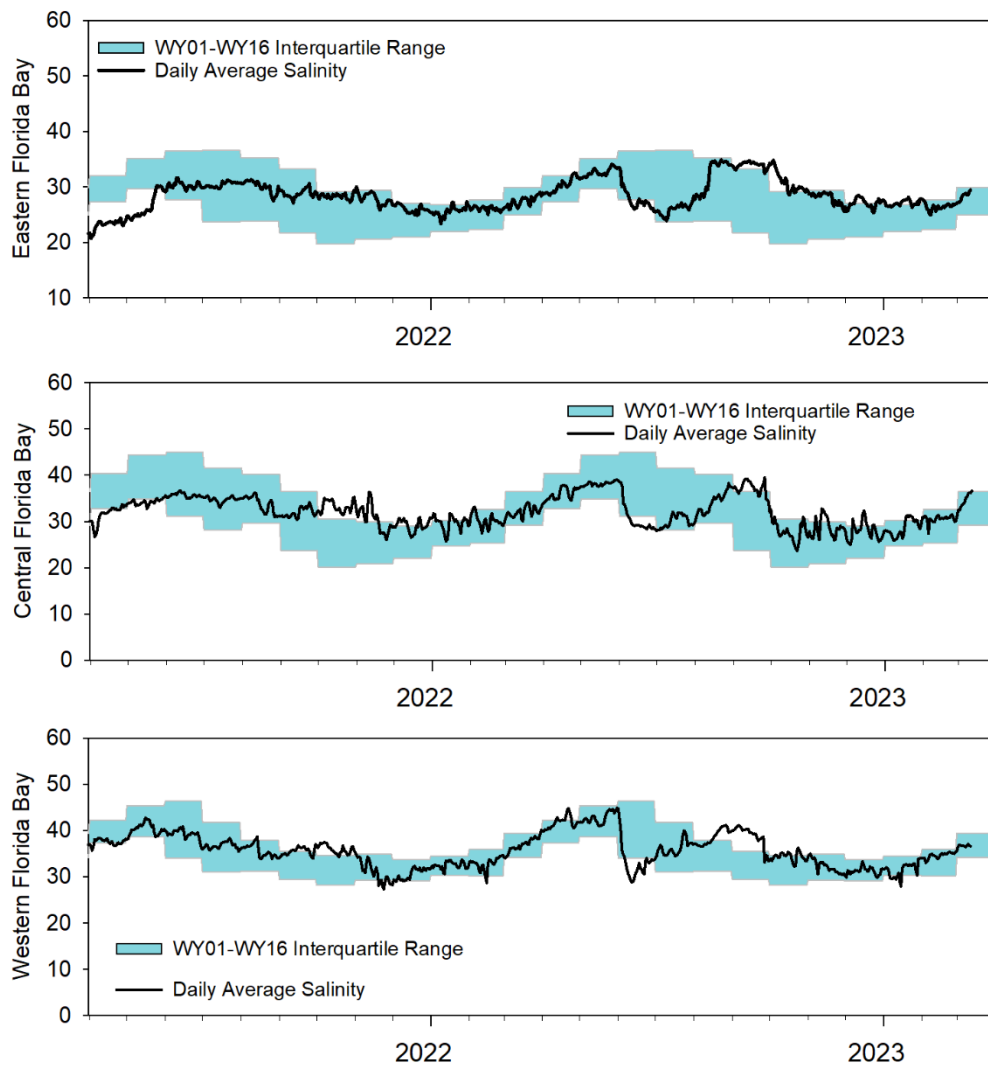
**Figure EV-7.** Present water depths (3/12/2023) compared to the day of year average over the previous 20 years.



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



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



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

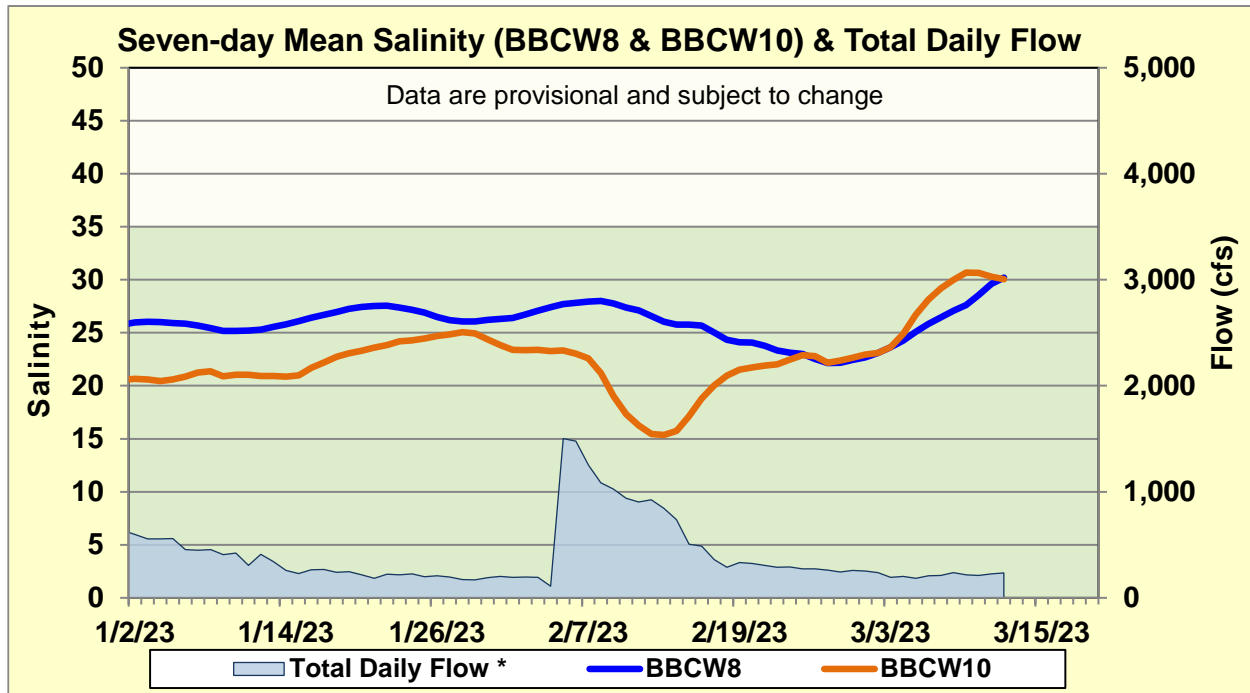
**Table EV-2.** Weekly water depth changes and water management recommendations

<b>SFWMD Everglades Ecological Recommendations, March 14, 2023 (red is new)</b>			
	Weekly change	Recommendation	Reasons
<b>WCA-1</b>	Stage decreased by 0.11'	Conserve water in this basin as possible. Recession rate of less than 0.05' per week.	Protect within basin and downstream habitat and wildlife.
<b>WCA-2A</b>	Stage decreased by 0.14'	Conserve water in this basin as possible. Recession rate of less than 0.05' per week.	Protect within basin and downstream habitat and wildlife. Protect conditions conducive to wading bird foraging later in the season.
<b>WCA-2B</b>	Stage decreased by 0.18'	Conserve water in this basin as possible. Recession rate of less than 0.05' per week.	Protect within basin and downstream habitat and wildlife.
<b>WCA-3A NE</b>	Stage decreased by 0.12'	Conserve water in this basin as possible. Recession rate of less than 0.05' per week	Protect within basin and downstream habitat and wildlife. Protect conditions conducive to wading bird foraging later in the season. Lower fire risk and protect peat soils.
<b>WCA-3A NW</b>	Stage decreased by 0.33'	<b>Conserve water in this basin as possible.</b> Recession rate of less than 0.05' per week	
<b>Central WCA-3A S</b>	Stage decreased by 0.11'	Conserve water in this basin as possible. Recession rate of less than 0.10' per week	Protect within basin and downstream habitat and wildlife.
<b>Southern WCA-3A S</b>	Stage decreased by 0.12'		
<b>WCA-3B</b>	Stage decreased by 0.10'	Recession rate of less than 0.10' per week.	Protect within basin and downstream habitat and wildlife.
<b>ENP-SRS</b>	Stage decreased by 0.08'	Make discharges to ENP according to COP and TTFP 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 -0.43' to -0.08'	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
<b>FB- Salinity</b>	Salinity changes ranged from -0.7 to +4.4	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 221 cfs and the previous 30-day mean inflow was 351 cfs. The seven-day mean salinity was 30.4 at BBCW8 and 29.9 at BBCW10, both within the ideal salinity range for estuarine organisms in this region (salinity less than 35). 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.