

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:** January 11, 2023

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

### **Summary**

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

Cool and dry conditions following a weak cold front Monday will preclude any rainfall chances Tuesday. The wind direction will then veer north/northwest in association with a secondary cold front from a weak area of surface low pressure traveling northeastward over the northwestern Atlantic. These northerly winds will transport cool and dry mid-latitude air southward into the SFWMD Wednesday, leading to clear skies with no rainfall. A deep cold front will approach the northern portions of the SFWMD on Thursday night. Rain chances will increase over the northern interior just after midnight on Thursday and a strong cold front will cross the SFWMD on Friday. Widespread, fast-moving light showers will overspread much of the SFWMD ahead of the cold front. The computer models indicate that the greatest concentration of showers could occur early in the day north and west of Lake Okeechobee. The shower activity will end quickly following the frontal passage. The coldest conditions the SFWMD has experienced since Christmas Day will be felt on Saturday and Sunday, however, frost or freezes are unlikely with this frontal passage. The cool, dry, and stable conditions following the frontal passage will prevent any rainfall on Saturday through Monday. Much below average total SFWMD rainfall is expected for the 7-day period ending next Tuesday morning.

#### **Kissimmee**

Releases have begun from East Lake Toho and Lake Toho to lower lake stages to 0.5 ft below their respective regulation schedules by January 15 and begin their recessions to their respective low pools on June 1. Weekly average discharges on January 8, 2023 at S-65 and S-65A were 1,300 cfs and 1,400 cfs, respectively, both of which had not changed from the previous week. Mean weekly water depth on the Kissimmee River floodplain decreased slightly from the previous week, from 0.54 feet to 0.52 feet. The weekly average concentration of dissolved oxygen in the Kissimmee River decreased from 7.7 mg/L the previous week to 6.6 mg/L for the week ending January 8, 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 16.32 feet NGVD on January 8, 2023, which is 0.04 feet lower than the previous week and 0.10 feet lower than a month ago. Lake stage remained in the Intermediate sub-band and was 0.82 feet above the upper limit of the ecological envelope. In 2022, lake stage was within the ecological envelope for 70% of the year, and above it for 30% of the year. This is the third year in a row Lake stages have exceeded 16 feet NGVD at the beginning of the dry season and is the highest lake stage at this time of year for more than two decades. According to NEXRAD, 0.01 inches of rain fell directly on the Lake last week. Average daily inflows (excluding rainfall) increased slightly from the previous week, going from 1,970 cfs to 1,984 cfs. Average daily outflows (excluding evapotranspiration) also increased from the previous week going from 1,445 cfs to 1,696 cfs. The most recent satellite image (January 8, 2023) from NOAA's Harmful Algal Bloom Monitoring System showed low-moderate bloom potential along much of the nearshore region of the Lake.

## **Estuaries**

Total inflow to the St. Lucie Estuary averaged 182 cfs over the past week with no flow coming from Lake Okeechobee. Mean salinities remained the same at US1 Bridge, decreased at HR1, and increased at the A1A Bridge 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 1,875 cfs over the past week with 1,026 cfs coming from Lake Okeechobee. Mean salinities remained the same at S-79 and Cape Coral, increased at Val I-75 and Shell Point, and decreased at Ft. Myers and Sanibel 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 Sanibel and Shell Point (>25).

## **Stormwater Treatment Areas**

For the week ending Sunday, January 8, 2023, 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 12,600 ac-feet. The total amount of inflows to the STAs in WY2023 is approximately 980,000 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 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, if 2008 LORS recommends Lake releases to the WCAs and conditions allow, releases will be sent to STA-2.

## **Everglades**

Last week rates of stage change in WCA-3A moved into the “fair” or “poor” category and WCA-2A remained in that condition. Depths are above average in WCA-3A northeast (but remain one of the shallowest regions in the WCAs), maintaining that condition could be important for wading bird nesting in that region. Wading birds are foraging in more flocks but smaller numbers of birds per flock (4-5K total) in WCA-3A North and conditions are similar to last year, which was a poor to moderate wading bird nesting season. Taylor slough stages remains well above the pre-Florida Bay initiative average. Average salinity decreased again last week in Florida Bay and moved much closer to average for this time of the year. Salinities in the eastern bay moved back within the IQR and are now below the 25th percentile in the western bay. Salinities have decreased in the nearshore region since positive flows conditions corresponded with east/northeast winds.

## **Biscayne Bay**

Total inflow to Biscayne Bay averaged 519 cfs and the previous 30-day mean inflow averaged 657 cfs. The seven-day mean salinity was 25.2 at BBCW8 and 20.9 at BBCW10, both within the ideal salinity range for estuarine organisms in this region (salinity less than 35). Data were provided by Biscayne National Park.

## Supporting Information

### Kissimmee Basin

#### *Upper Kissimmee*

On January 8, 2023, mean daily lake stages were 57.8 feet NGVD (0.2 feet below schedule) in East Lake Toho, 54.8 feet NGVD (0.2 feet below schedule) in Lake Toho, and 52.4 feet NGVD (0.1 below schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1, Figures KB-1-3**).

#### *Lower Kissimmee*

For the week ending January 8, 2023, mean weekly discharge was 1,300 cfs at S-65 and 1,400 cfs at S-65A. Mean weekly discharge from the Kissimmee River was 1,400 cfs at S-65D and 1,500 cfs at S-65E (**Table KB-2**). Mean weekly headwater stages were 46.4 feet NGVD at S-65A and 28.4 feet NGVD at S-65D on January 8, 2023. Mean weekly river channel stage stayed approximately the same as the previous week's mean of 37.6 feet (**Figure KB-4**). Mean weekly water depth on the Kissimmee River floodplain for the week ending January 8, 2023 decreased slightly from the previous week, from 0.54 feet to 0.52 feet (**Table KB-2, Figure KB-5**). The weekly average concentration of dissolved oxygen in the Kissimmee River decreased from 7.7 mg/L the previous week to 6.6 mg/L for the week ending January 8, 2023 (**Table KB-2, Figure KB-6**).

#### *Water Management Recommendations*

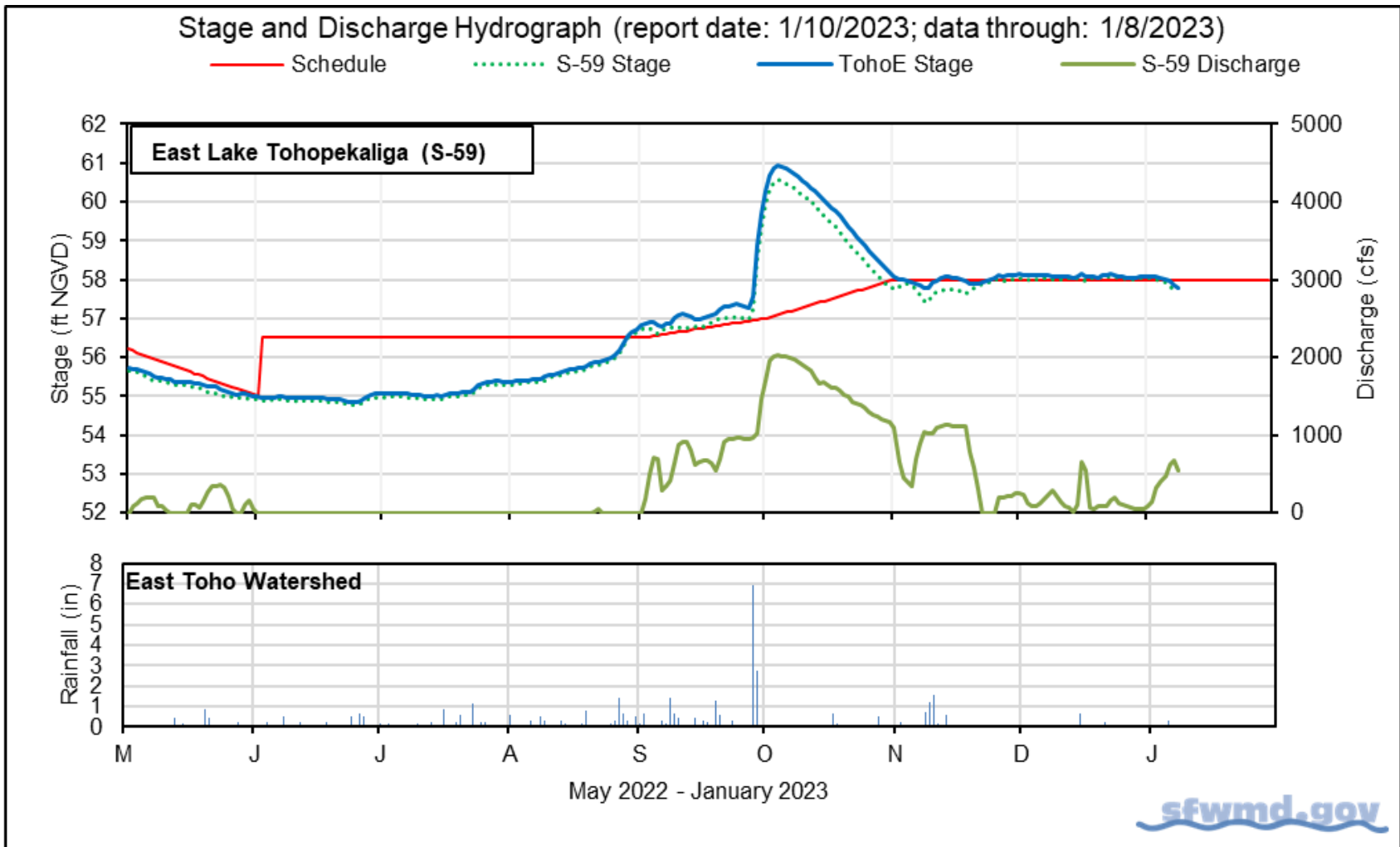
Lower stages in Lake Toho and East Lake Toho to 0.5 ft below their respective regulation schedules by January 15, then begin stage recessions to their June 1 low pools. Per the IS-14-50.0 discharge plan, adjust S-65 discharge to maintain a minimum flow of at least 1,400 cfs at S-65A to the Kissimmee River while stage in KCH is at or above 50 ft. (**Figure KB-7**).

**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.

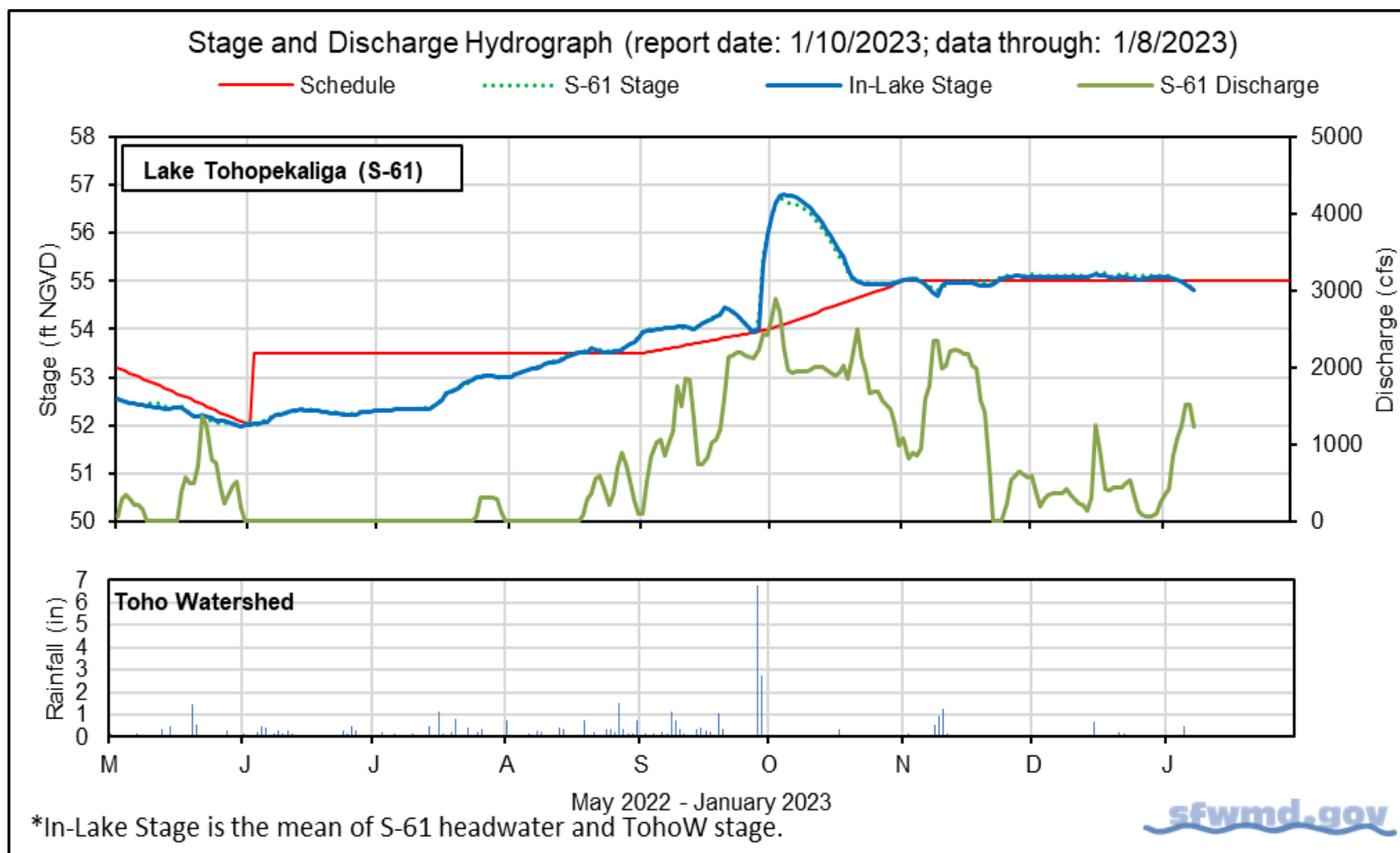
Water Body	Structure	Stage Monitoring Site	Weekly (7-Day) Average Discharge (cfs)	Sunday Lake Stage (feet NGVD) <sup>a</sup>	Schedule Type <sup>b</sup>	Sunday Schedule Stage (feet NGVD)	Sunday Departure from Regulation (feet)	
							1/8/23	1/1/23
Lakes Hart and Mary Jane	S-62	LKMJ	62	61.1	R	61.0	0.1	0.1
Lakes Myrtle, Preston and Joel	S-57	S-57	28	61.7	R	61.6	0.1	0.1
Alligator Chain	S-60	ALLI	44	64.1	R	64.0	0.1	0.1
Lake Gentry	S-63	LKGT	62	61.6	R	61.5	0.1	0.1
East Lake Toho	S-59	TOHOE	450	57.8	R	58.0	-0.2	0.1
Lake Toho	S-61	TOHOW S-61	1100	54.8	R	55.0	-0.2	0.1
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	1300	52.4	R	52.5	-0.1	-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.

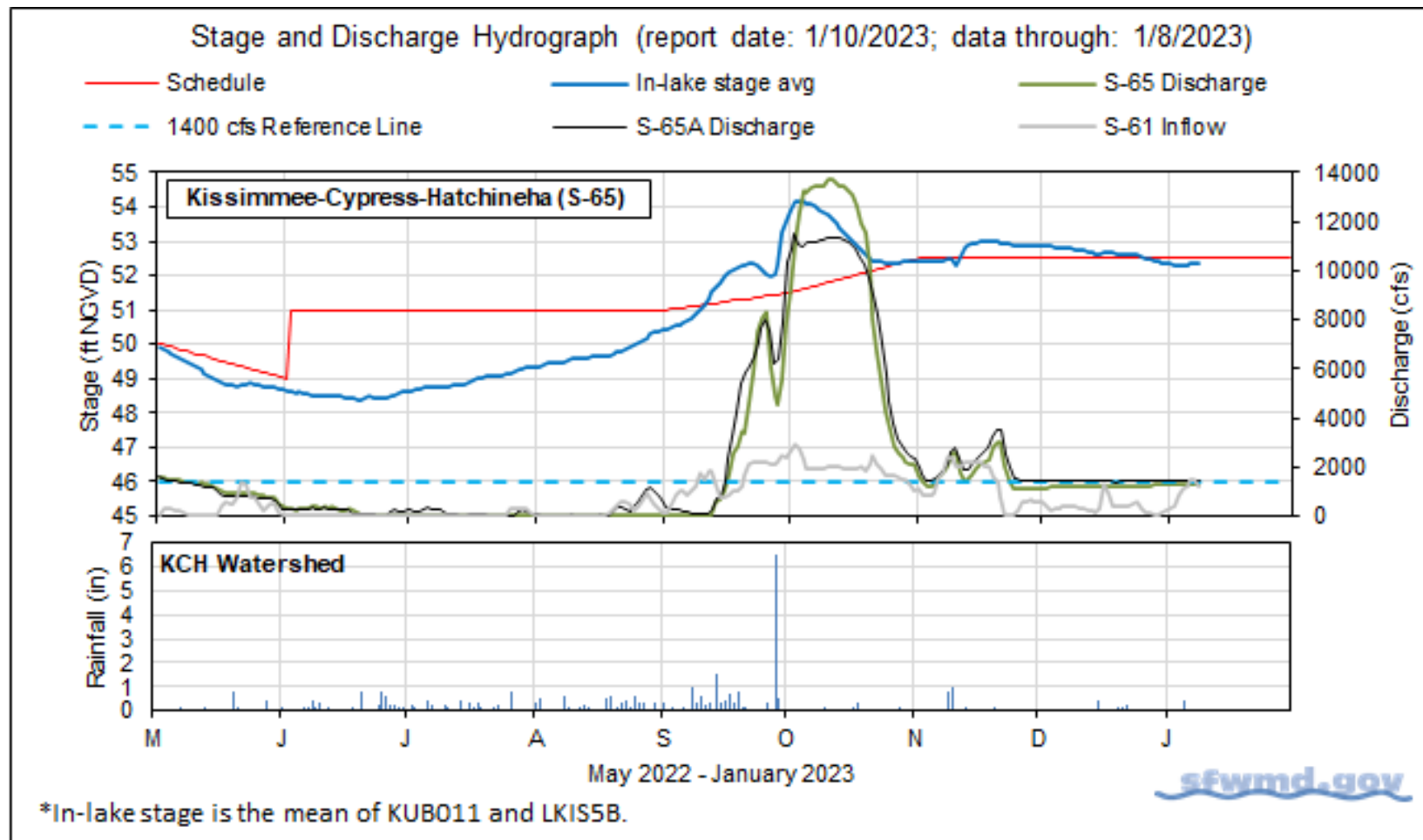
b. A: projected recession line; R: USACE regulation schedule; S: temporary recession target line; T: temporary schedule; NA: not applicable or not available.



**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			
		1/8/23	1/8/23	1/1/23	12/25/22	12/18/22
Discharge	S-65	1,300	1,300	1,300	1,200	1,200
Discharge	S-65A <sup>a</sup>	1,400	1,400	1,400	1,400	1,400
Headwater Stage (feet NGVD)	S-65A	46.4	46.4	46.3	46.4	46.3
Discharge	S-65D <sup>b</sup>	1,400	1,400	1,500	1,600	1,600
Headwater Stage (feet NGVD)	S-65D <sup>c</sup>	28.5	28.4	28.3	28.3	28.4
Discharge (cfs)	S-65E <sup>d</sup>	1,400	1,500	1,500	1,600	1,600
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) <sup>e</sup>	Phase I, II/III river channel	6.6	6.6	7.7	5.9	4.9
River channel mean stage <sup>f</sup>	Phase I river channel	37.6	37.6	37.6	37.6	37.6
Mean depth (feet) <sup>g</sup>	Phase I floodplain	0.51	0.52	0.54	0.57	0.58

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.

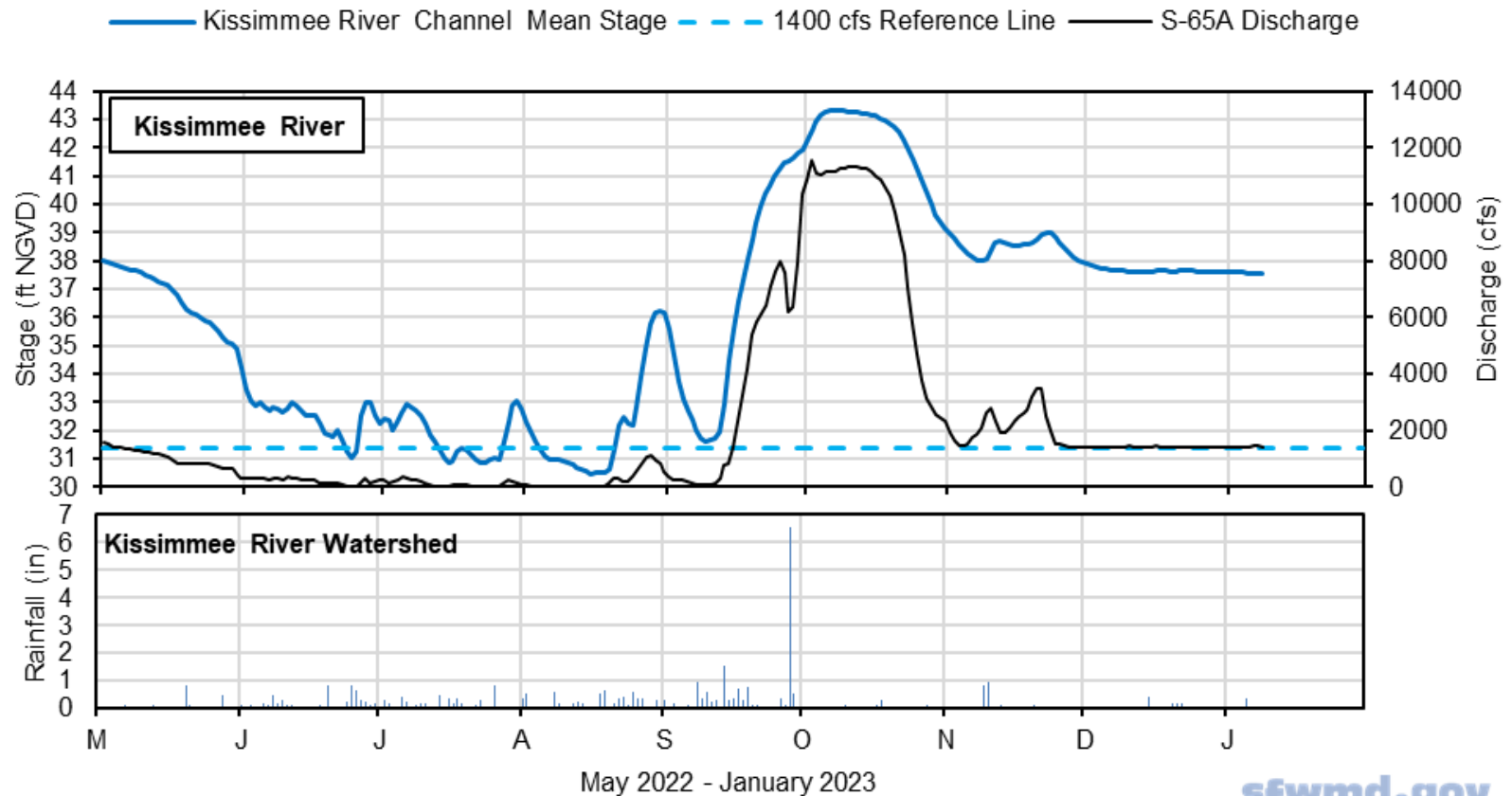
d. Combined discharge from S-65E and S-65EX1.

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).

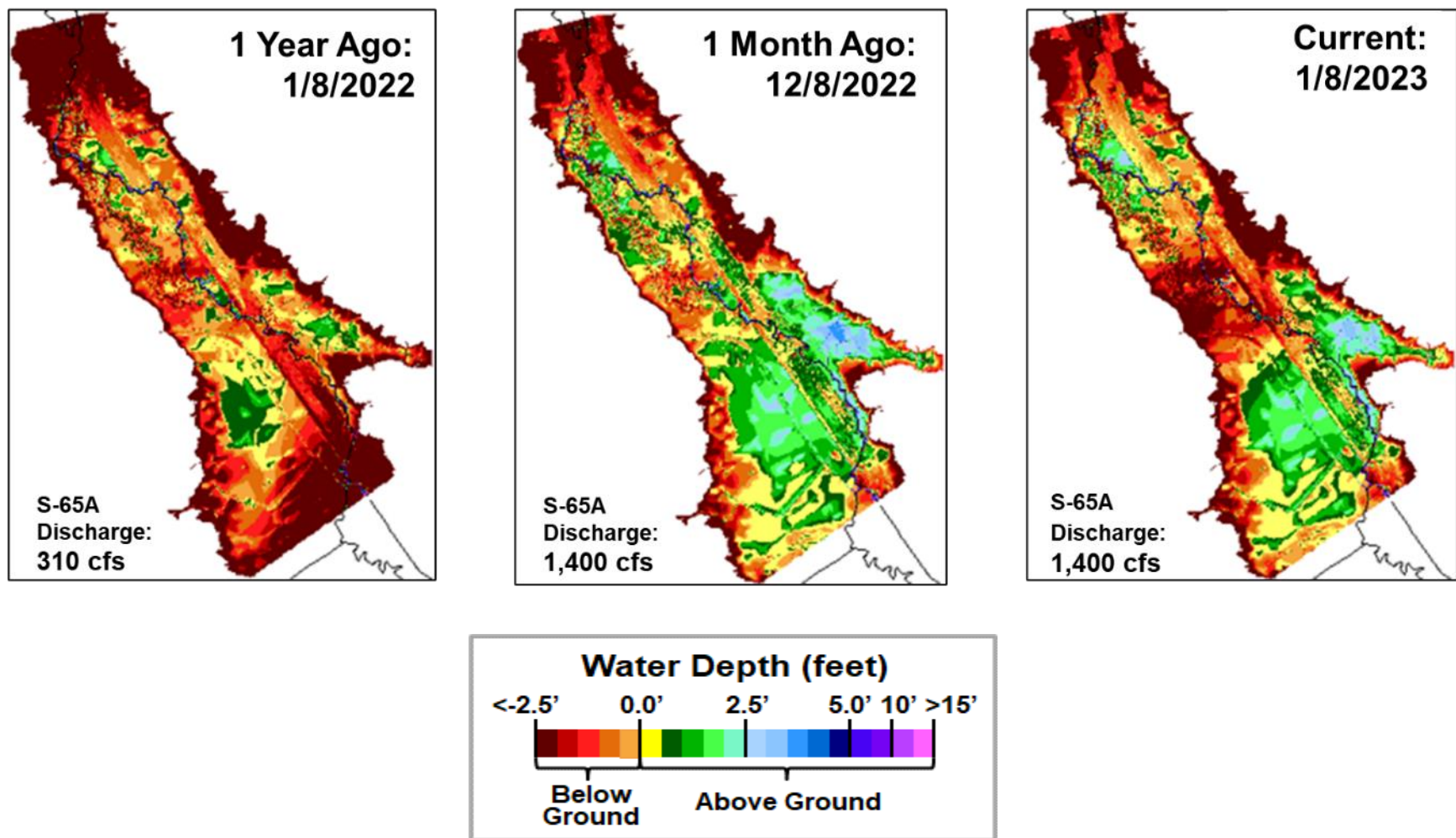
Stage and Discharge Hydrograph (report date: 1/10/2023; data through: 1/8/2023)



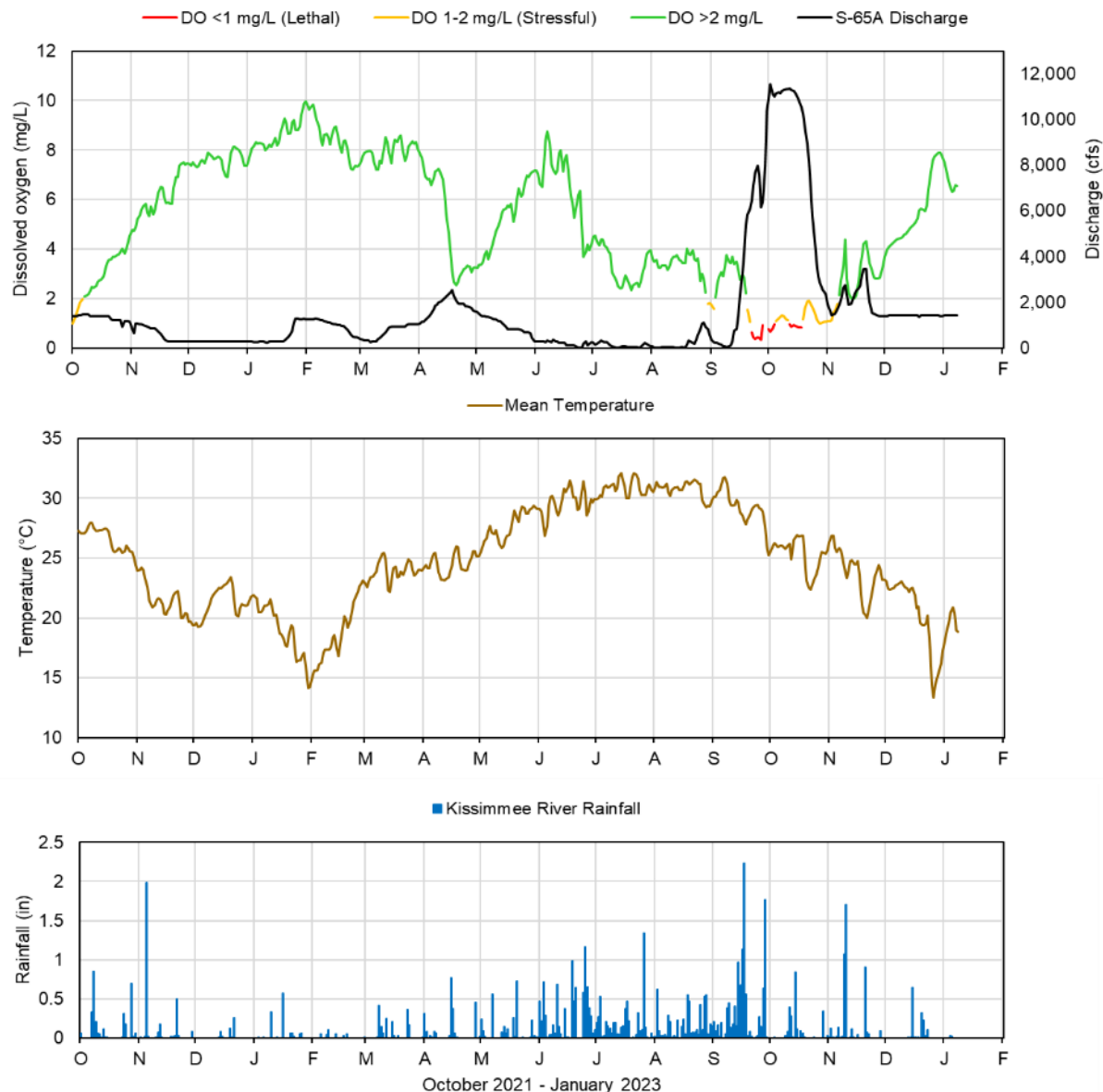
\*River Channel Stage is the average for PC62, KRDR02, KRBN, PC33, and PC11.

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

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



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



Report Date: 1/10/2023; data are through: 1/8/2023

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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.

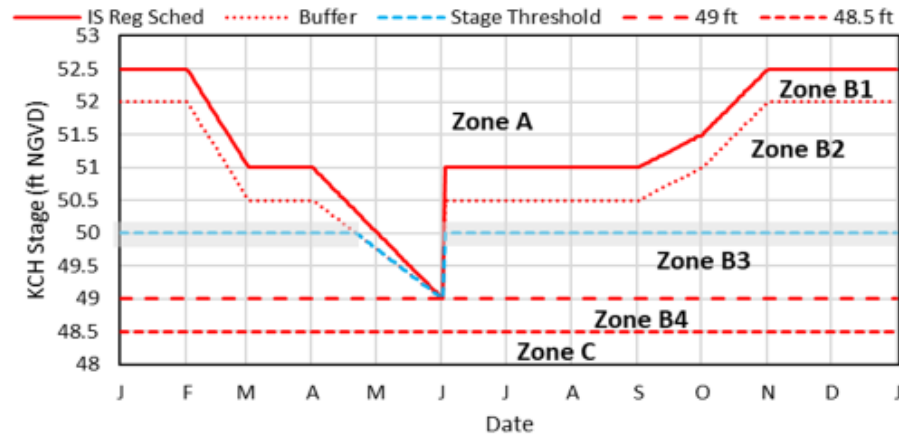
Table KB-3. Discharge Rate of Change Limits for S65/S65A (revised 1/14/19).

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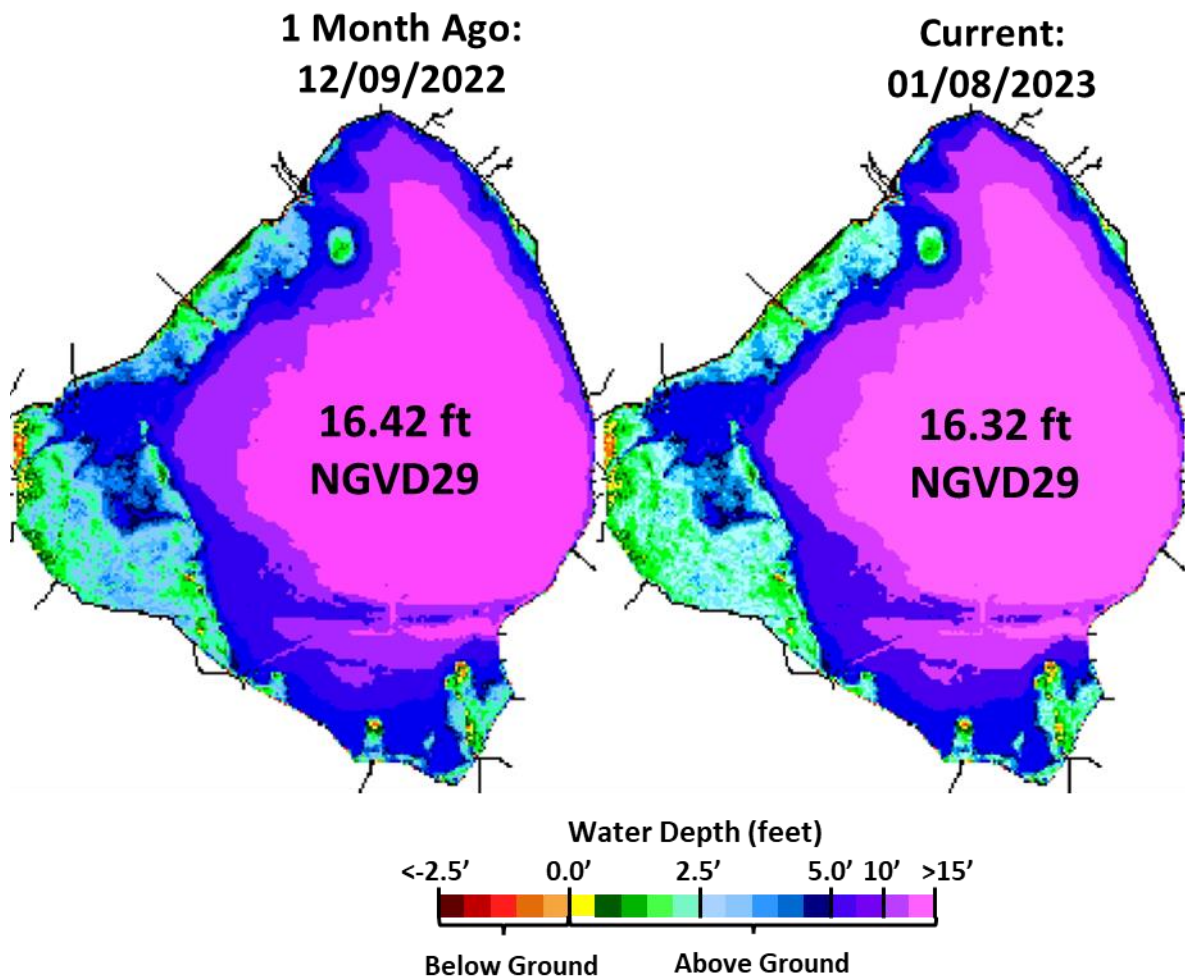
**Figure KB-7.** IS-14-50 Discharge Plan for S65/S65A with discharge rate of change limits (revised 1/14/19).

## Lake Okeechobee

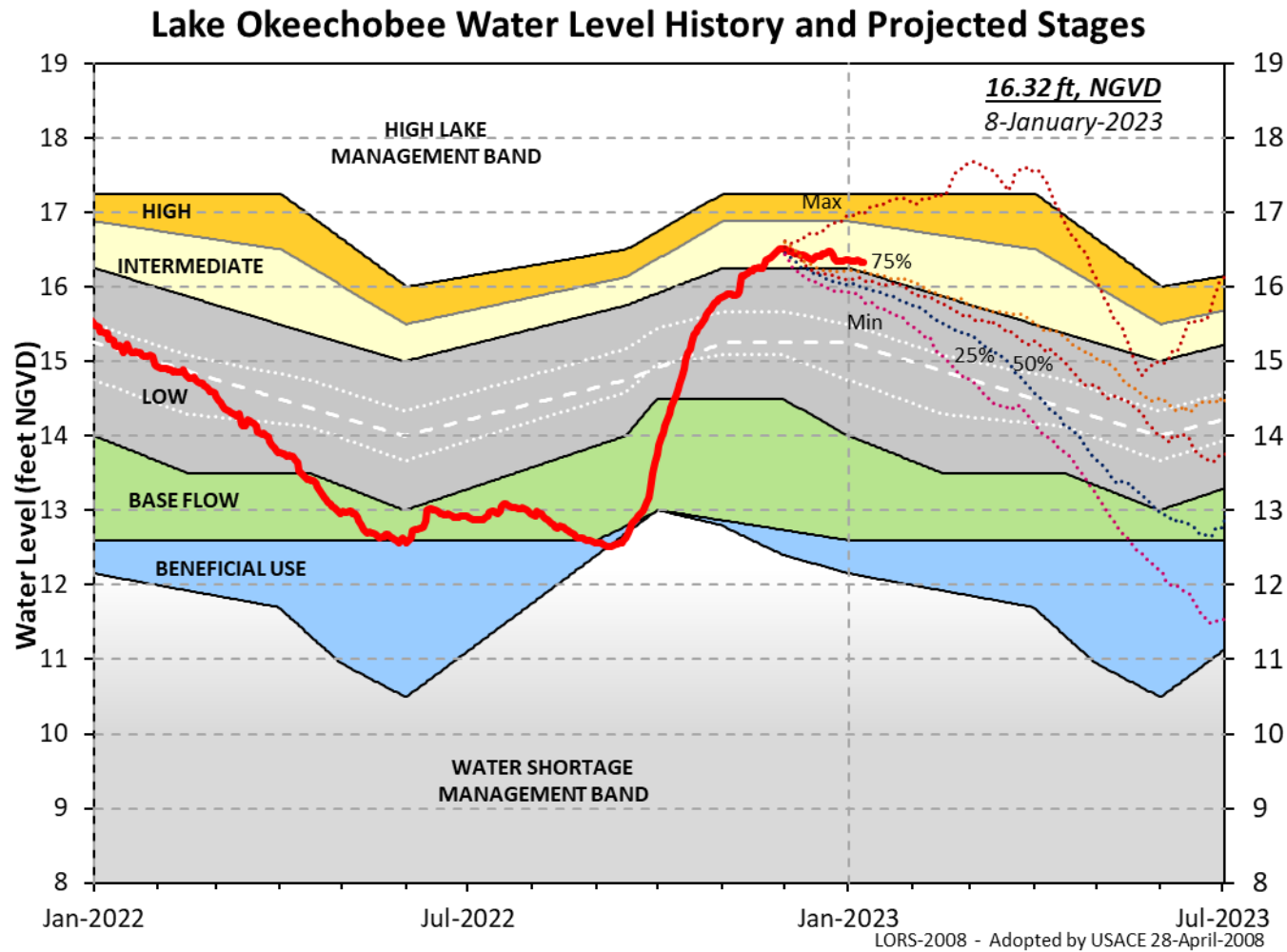
Lake Okeechobee stage was 16.32 feet NGVD on January 8, 2023, which 0.04 feet lower than the previous week and 0.10 feet lower than a month ago (**Figure LO-1**). Lake stage remained in the Intermediate sub-band (**Figure LO-2**) and was 0.82 feet above the upper limit of the ecological envelope (**Figure LO-3**). According to NEXRAD, 0.01 inches of rain fell directly on the Lake last week.

Average daily inflows (excluding rainfall) increased slightly from the previous week, going from 1,970 cfs to 1,984 cfs. Average daily outflows (excluding evapotranspiration) also increased from the previous week going from 1,445 cfs to 1,696 cfs. The highest inflow came from the Kissimmee River (C-38 Canal; 1,460 cfs), followed by the S-84(X) structures (294 cfs from Indian Prairie). Outflows to the west via the S-77 structure averaged 1,118 cfs for the week. Outflows to the south via the S-350 structures averaged 578 cfs, and an average of 2 cfs flowed into the Lake from the L-8 canal through the S-271 structure. There was no flow to the east via the S-308 structure. **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 (January 8, 2023) from NOAA's Harmful Algal Bloom Monitoring System showed low-moderate bloom potential along much of the nearshore region of the Lake, which is an increase in bloom risk from the previous week (**Figure LO-6**).



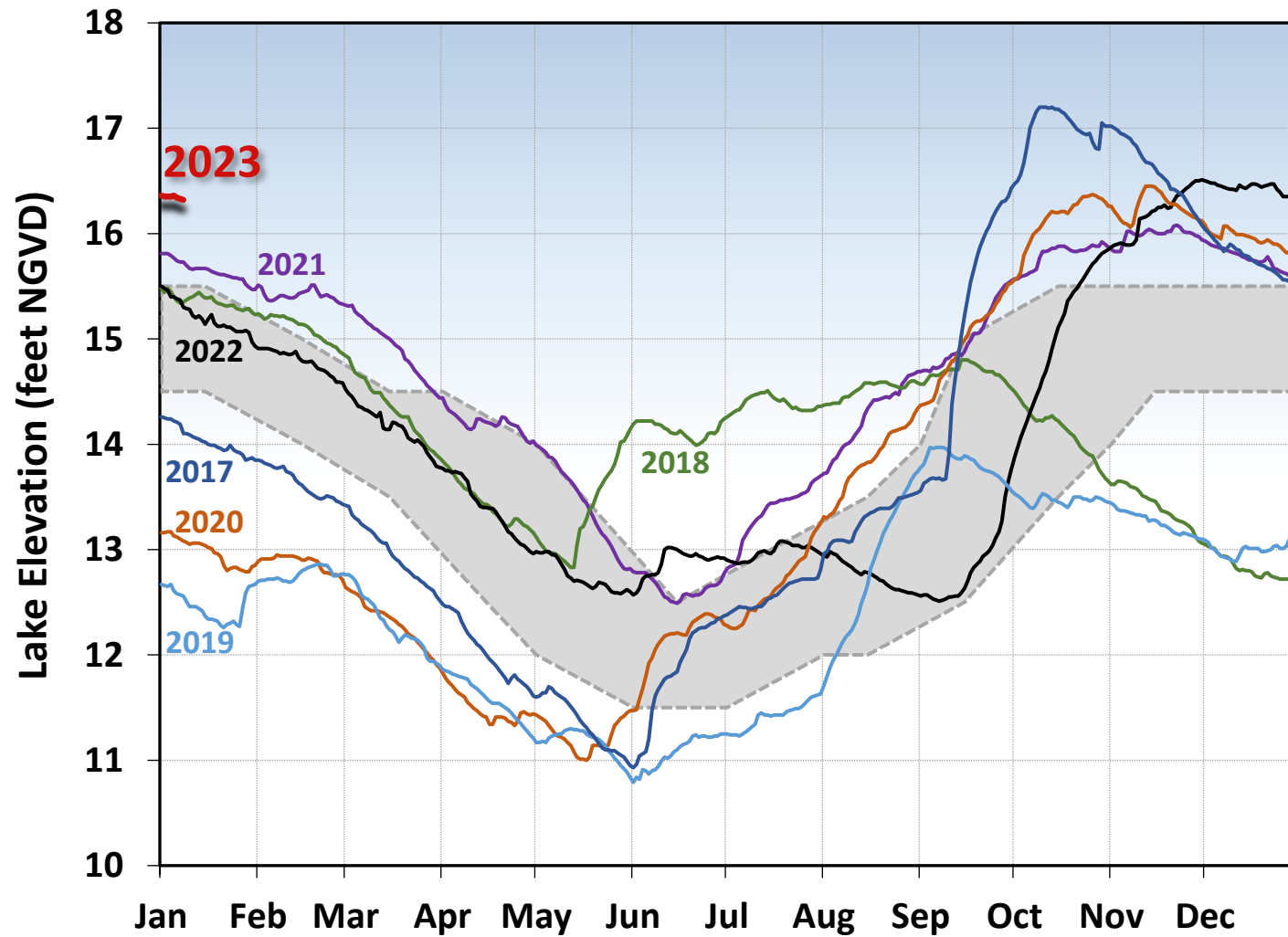
**Figure LO-1.** Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).



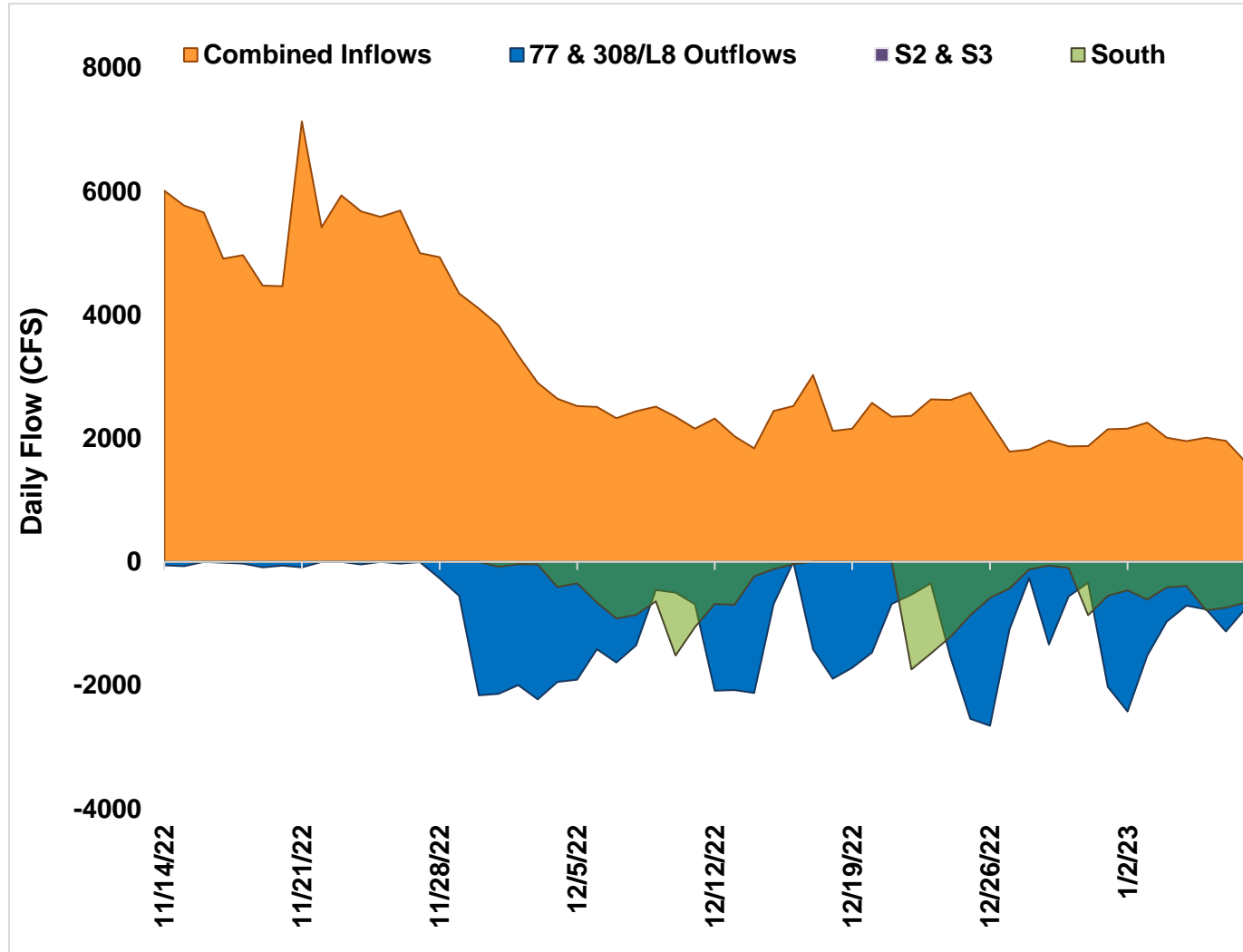
**Figure LO-2.** Recent Lake Okeechobee stages with projected stages based on a dynamic position analysis.



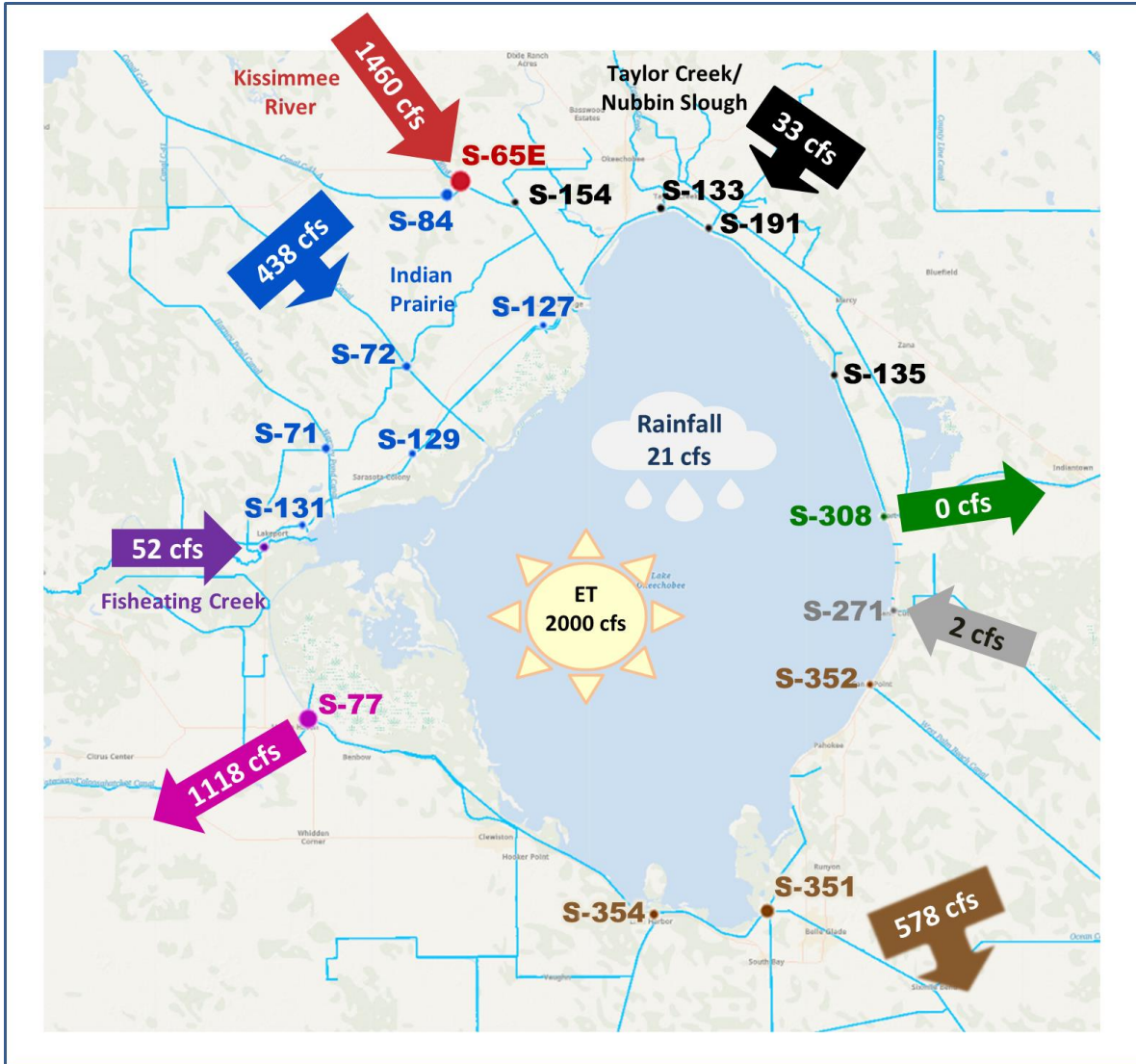
## Lake Okeechobee Stage vs Ecological Envelope



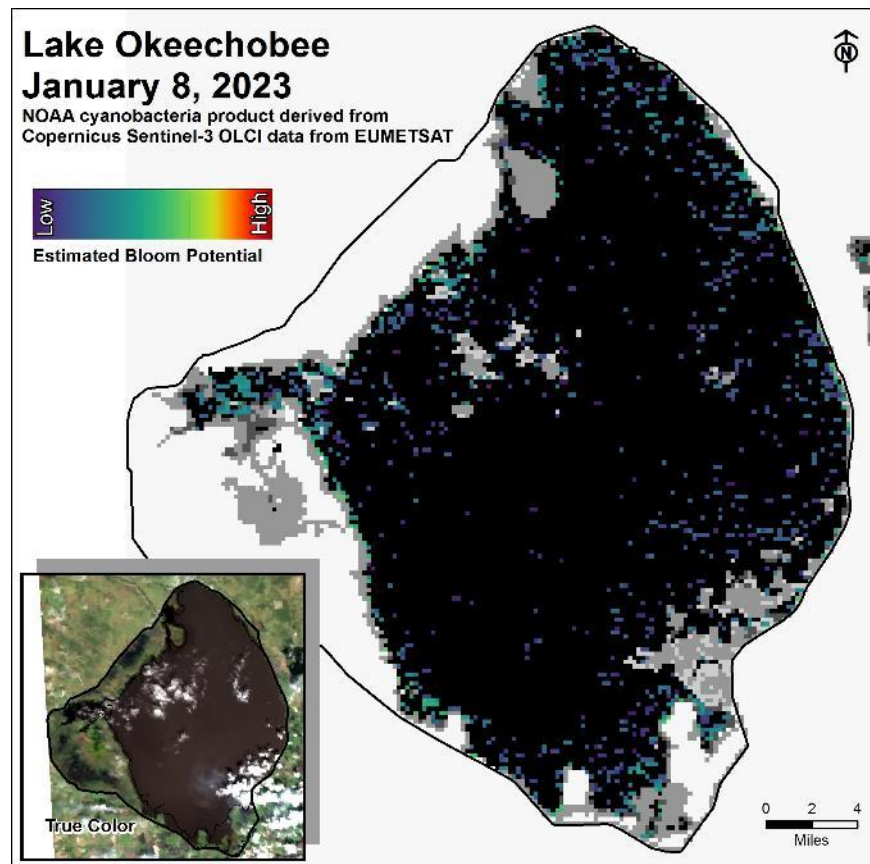
**Figure LO-3.** The prior seven years of annual stage hydrographs for Lake Okeechobee in comparison to the ecological envelope.



**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 January 02 - 08, 2023.



**Figure LO-6.** Cyanobacteria bloom potential on January 8, 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 182 cfs (**Figures ES-1 and ES-2**) and the previous 30-day mean inflow was 372 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-2**.

Over the past week, salinities remained the same at the US1 Bridge site, decreased at HR1, and increased at the A1A Bridge site (**Table ES-1 and Figure ES-3**). The seven-day moving average of the surface and bottom salinities at the US1 Bridge was 17.3. 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 0.5 spat/shell for December (**Figure ES-5**).

### *Caloosahatchee River Estuary*

Over the past week, mean total inflow to the Caloosahatchee River Estuary was 1,875 cfs (**Figures ES-6 and ES-7**) and the previous 30-day mean inflow was 2,048 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-7**.

Over the past week, surface salinities remained the same at S-79 and Cape Coral, increased at Val I-75 and Shell Point, and decreased at Ft. Myers and Sanibel (**Table ES-2 and Figures ES-8 and ES-9**). The seven-day mean salinities (**Table ES-2**) were in the optimal range (0-10) for tape grass in the upper estuary. The seven-day mean salinity values were within the optimal range for adult eastern oysters at Cape Coral, and in the stressed range at Shell Point and Sanibel (**Figure ES-10**). Oyster recruitment data in the CRE are not available at this time; FWRI will redeploy recruitment collectors once water quality conditions improve.

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 103 cfs. Model results from all scenarios predict daily salinity to be 1.4 or lower and the 30-day moving average surface salinity to be 0.5 or lower at Val I-75 at the end of the two-week period (**Table ES-3 and Figure ES-11**). This keeps predicted salinities in the upper estuary within the optimal salinity range (0-10) for tape grass.

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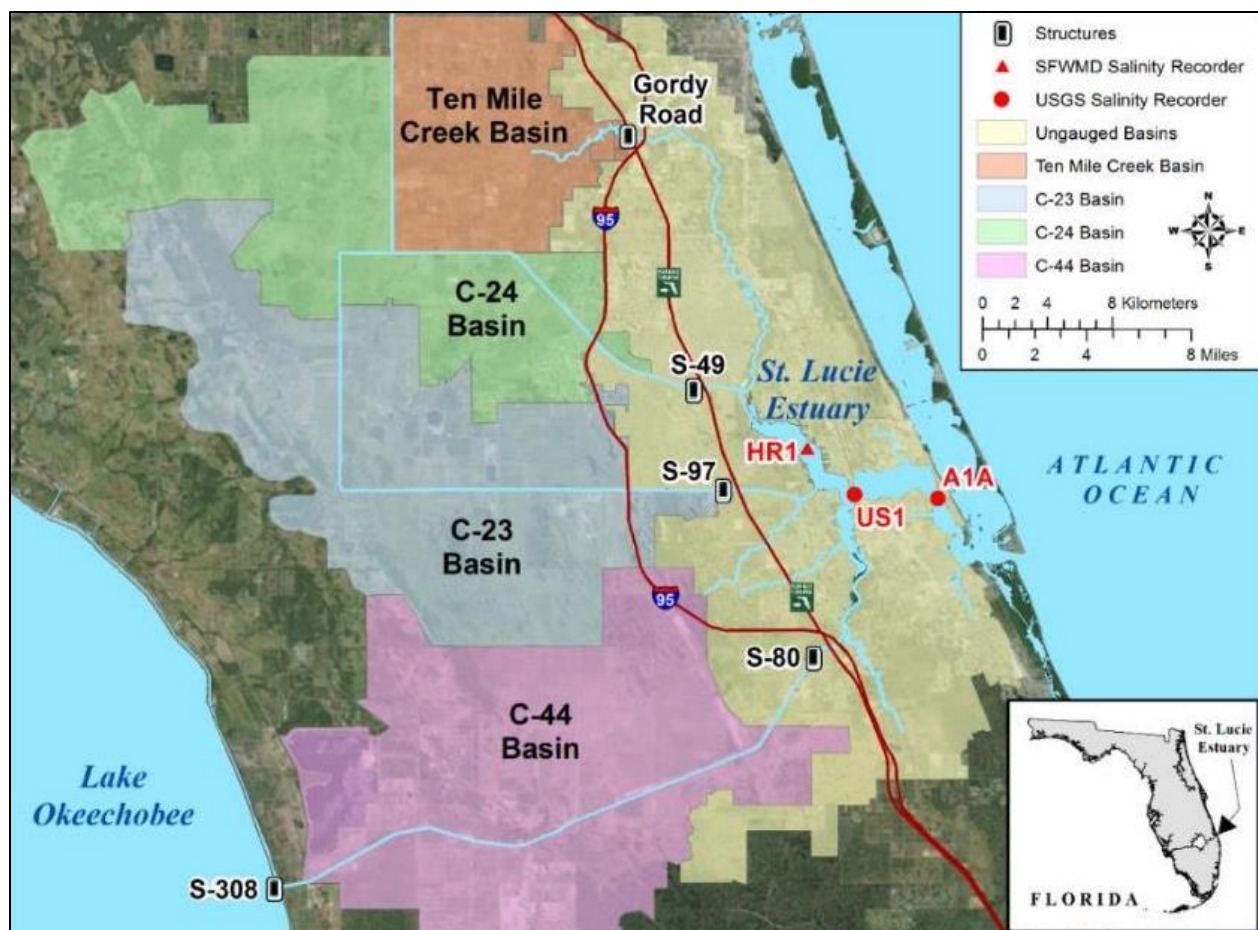
<sup>1</sup> Qui, C., and Y. Wan. 2013. Time series modeling and prediction of salinity in the Caloosahatchee River Estuary. *Water Resources Research* 49:5804-5816.

## Red Tide

The Florida Fish and Wildlife Research Institute reported on January 6, 2023, that *Karenia brevis*, the Florida red tide dinoflagellate, was observed at bloom concentrations in one sample collected from Charlotte County over the past week. On the east coast, red tide was not observed in samples from Palm Beach County.

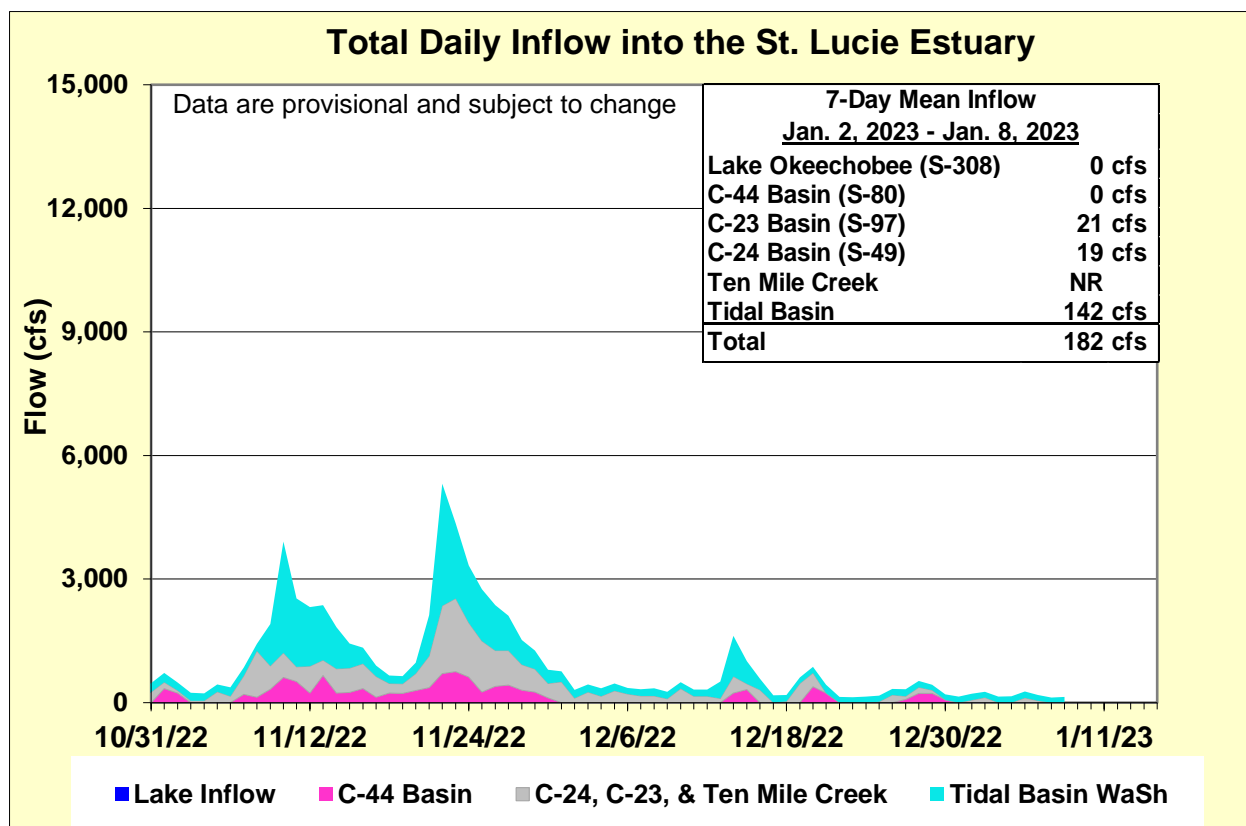
## Water Management Recommendations

Lake stage is in the Intermediate Sub-Band. Tributary conditions are normal. The LORS2008 release guidance suggests up to 4,000 cfs release at S-77 to the Caloosahatchee River Estuary and up to 1,800 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.

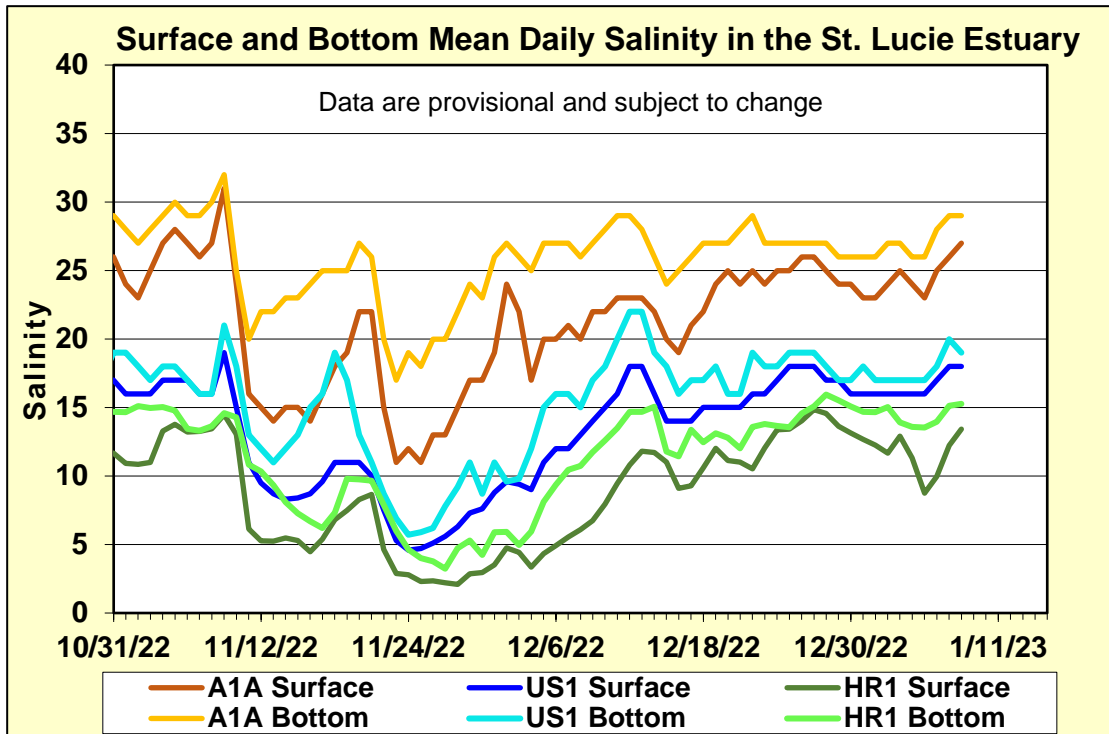




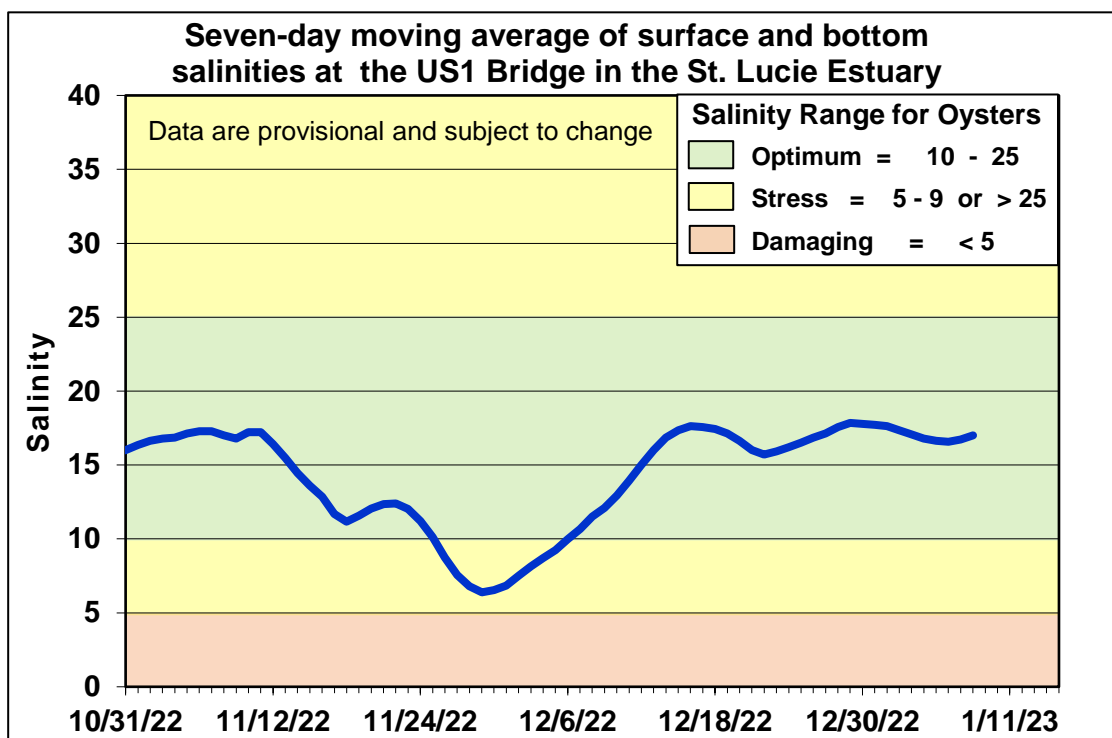
**Figure ES-2.** Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

**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>11.5</b> (13.6)	<b>14.4</b> (15.1)	10.0 – 25.0
US1 Bridge	<b>16.7</b> (16.9)	<b>17.9</b> (17.9)	10.0 – 25.0
A1A Bridge	<b>24.9</b> (24.4)	<b>27.4</b> (26.4)	10.0 – 25.0

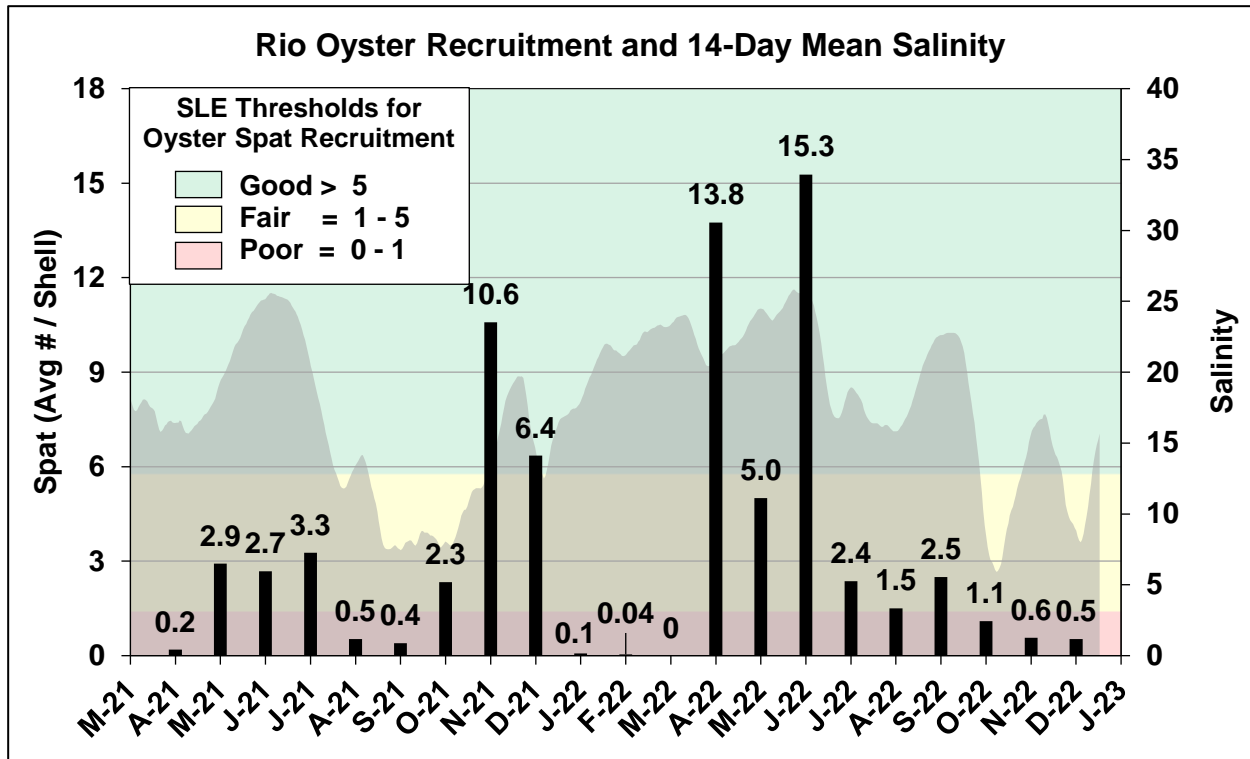


**Figure ES-3.** Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

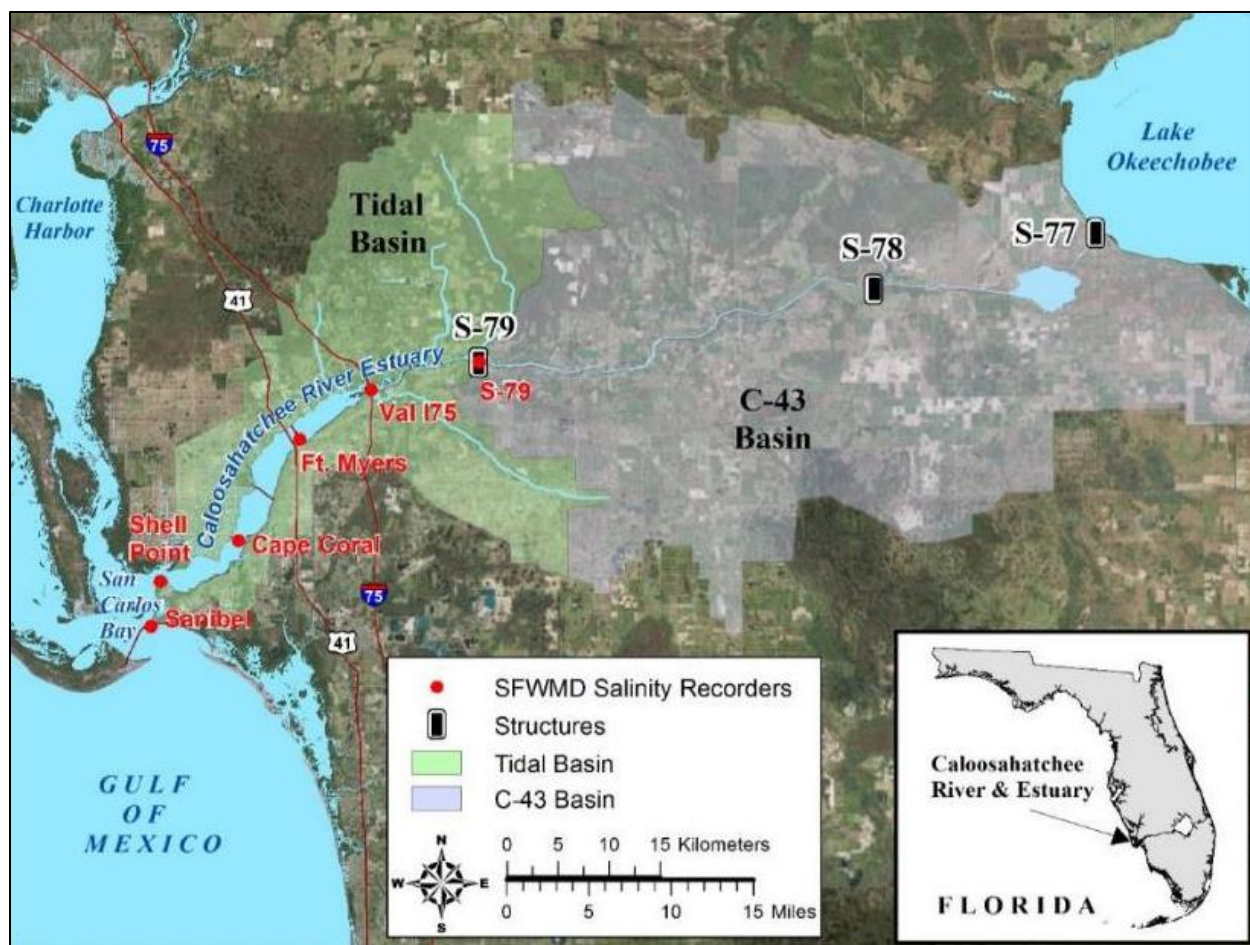


**Figure ES-4.** Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

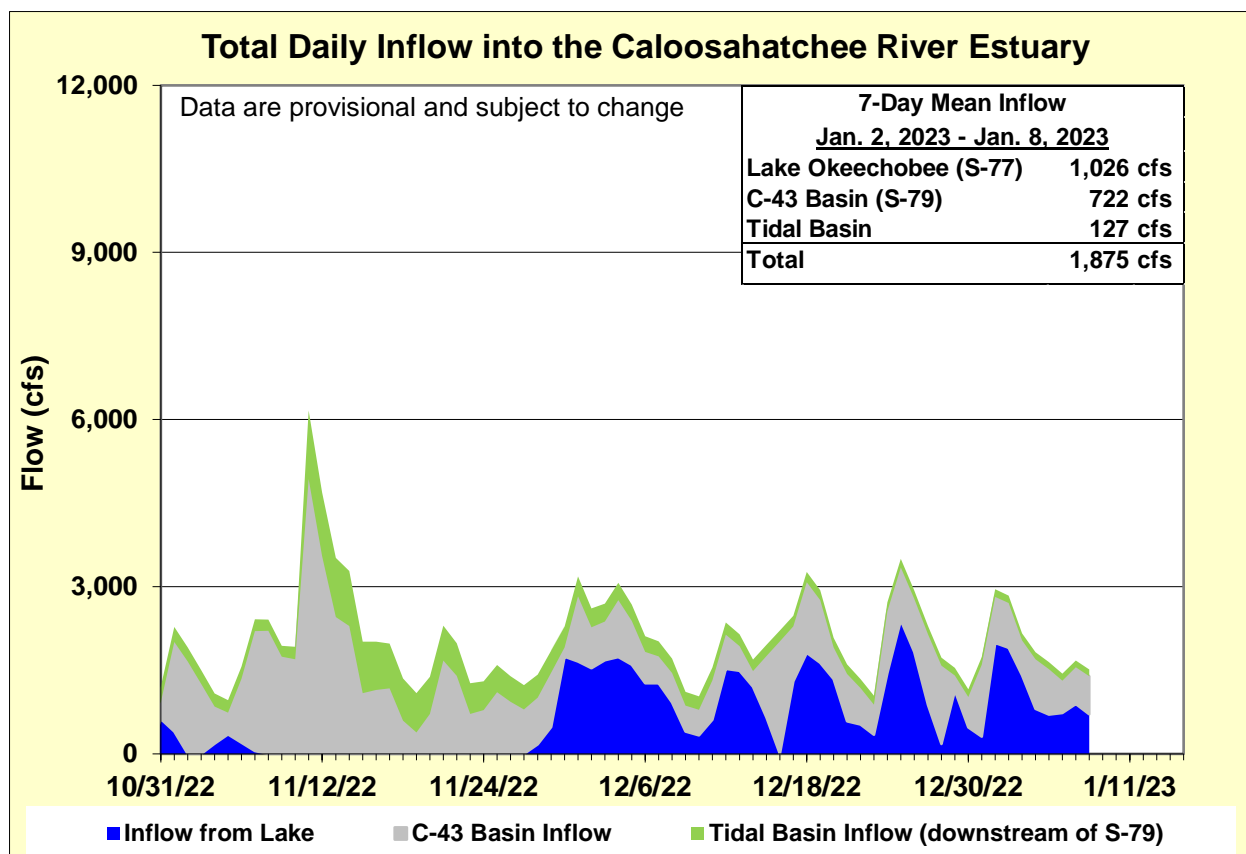




**Figure ES-5.** Mean oyster recruitment at the Rio oyster monitoring station and 14-day mean salinity at US1 Bridge.



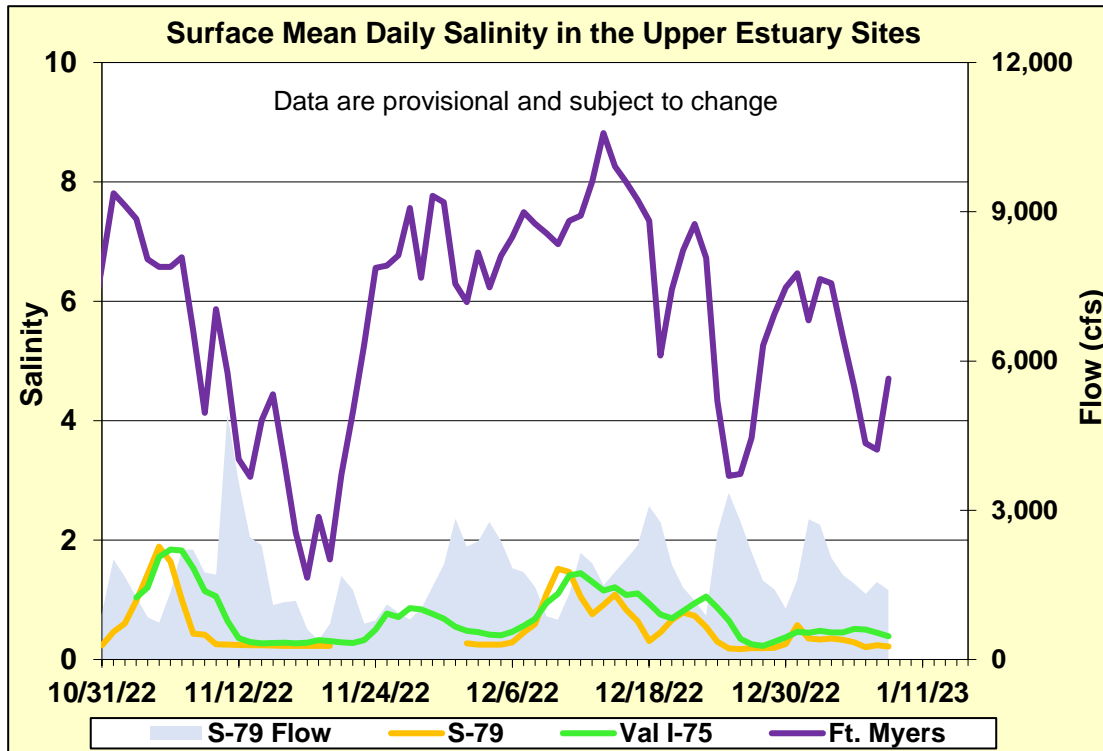
**Figure ES-6.** Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.



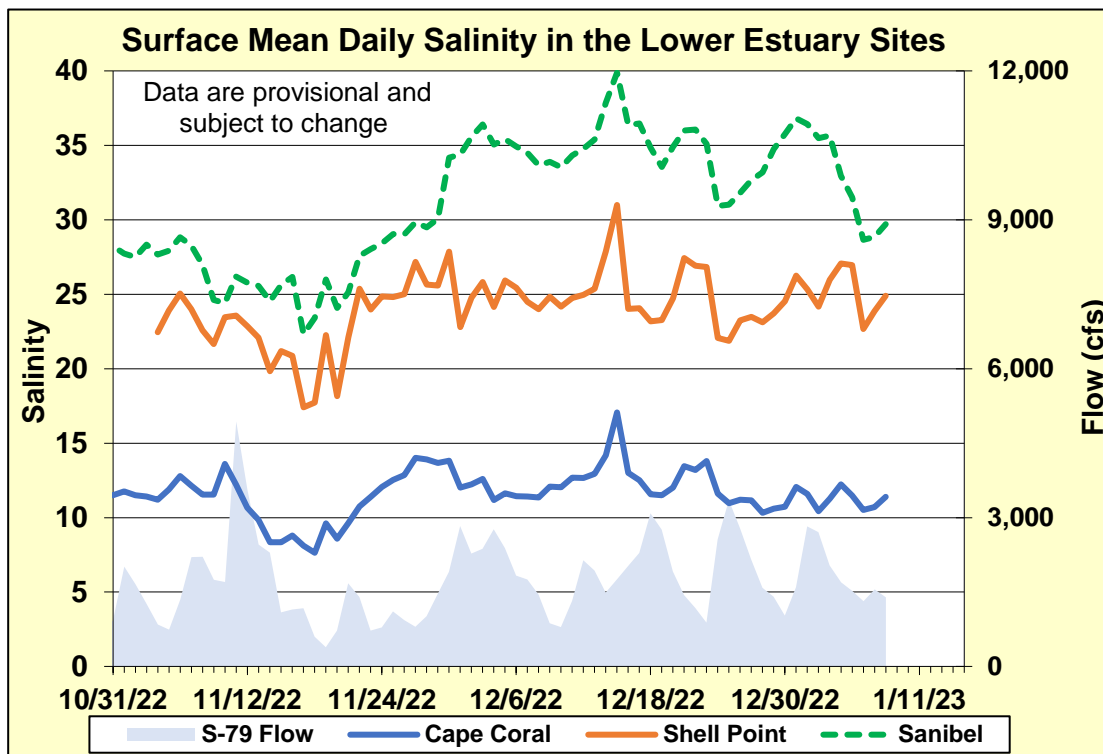
**Figure ES-7.** Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

**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.

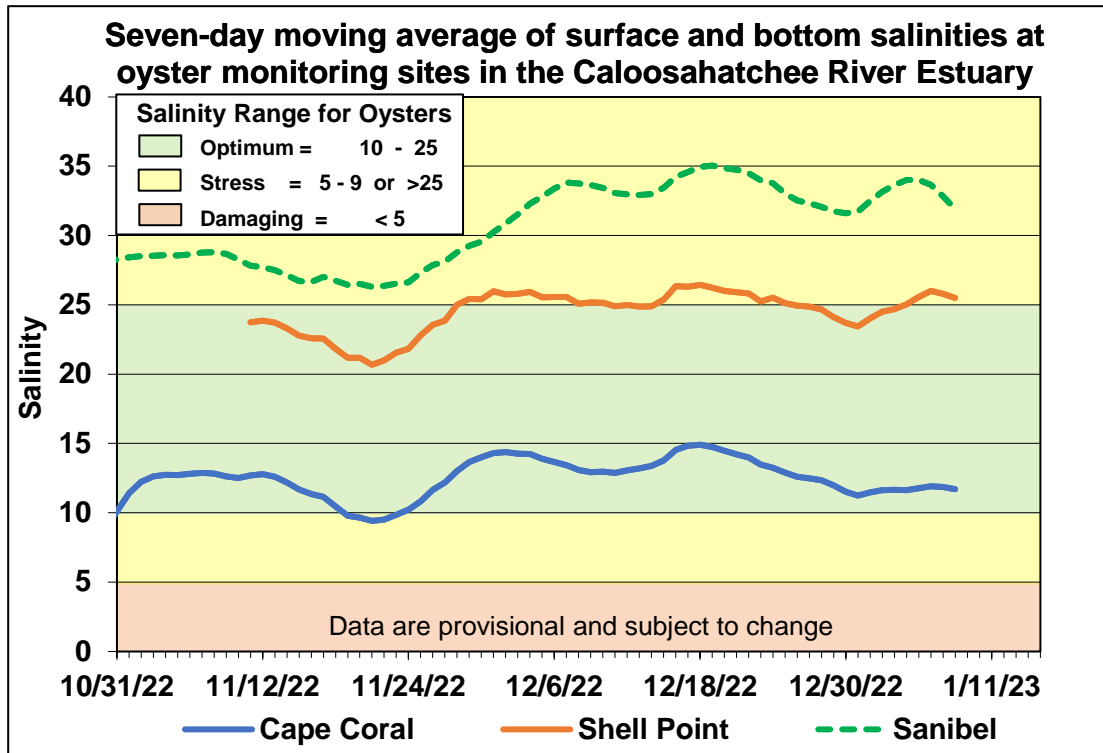
Sampling Site	Surface	Bottom	Optimum Envelope
S-79 (Franklin Lock)	<b>0.3</b> (0.3)	<b>0.3</b> (0.3)	0.0 – 10.0
Val I-75	<b>0.5</b> (0.3)	<b>0.6</b> (0.8)	0.0 – 10.0
Fort Myers Yacht Basin	<b>4.9</b> (5.2)	<b>5.7</b> (5.8)	0.0 – 10.0
Cape Coral	<b>11.1</b> (11.1)	<b>12.5</b> (12.2)	10.0 – 25.0
Shell Point	<b>25.1</b> (24.2)	<b>25.8</b> (24.7)	10.0 – 25.0
Sanibel	<b>31.8</b> (34.5)	<b>30.4</b> (31.8)	10.0 – 25.0



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



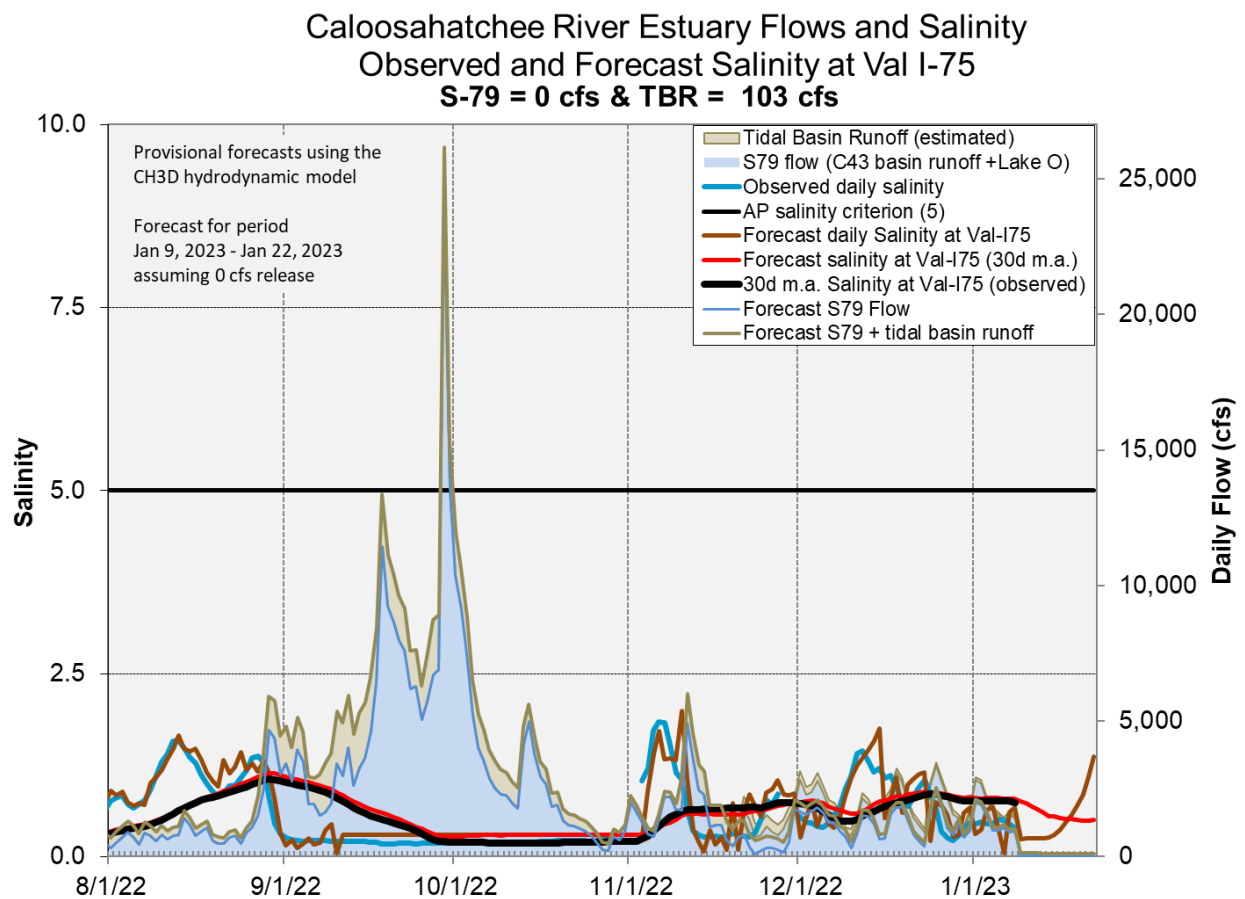
**Figure ES-9.** Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.



**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.

**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	103	1.4	0.5
B	450	103	0.7	0.4
C	750	103	0.4	0.4
D	1000	103	0.3	0.4
E	1500	103	0.3	0.4
F	2000	103	0.3	0.4



**Figure ES-11.** Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

## Stormwater Treatment Areas

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

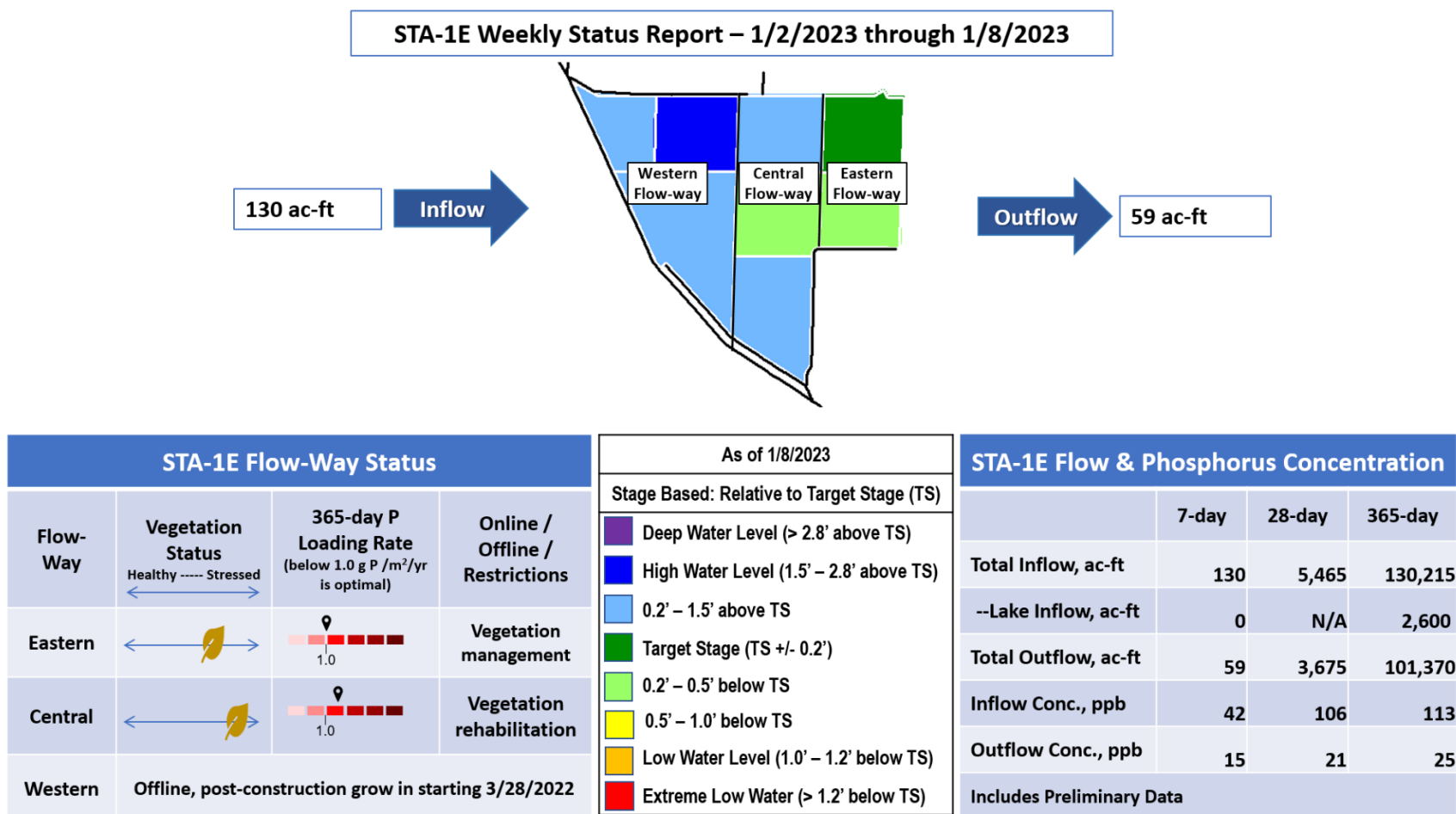
**STA-1W:** Operational restrictions are in place in STA-1W Western, Eastern, and Northern Flow-ways for vegetation management activities. Treatment cells are at target stage. Vegetation in the flow-ways is stressed and highly stressed. The 365-day PLR for the Eastern Flow-way is below 1.0 g/m<sup>2</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 construction activities. Operational restrictions are in place in STA-2 Flow-ways 3 and 4 for vegetation management activities. Online treatment cells are at or near target stage. Vegetation in Flow-ways 1 and 3 is stressed, and in Flow-ways 2, 4 and 5 is highly stressed. The 365-day PLRs for Flow-ways 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 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. 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**).

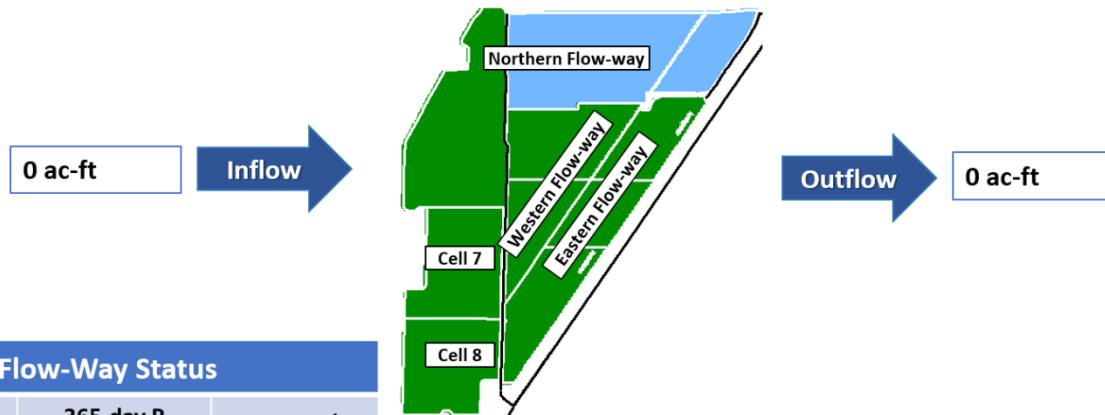
For definitions on STA operational language see glossary following figures.



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



# STA-1W Weekly Status Report – 1/2/2023 through 1/8/2023



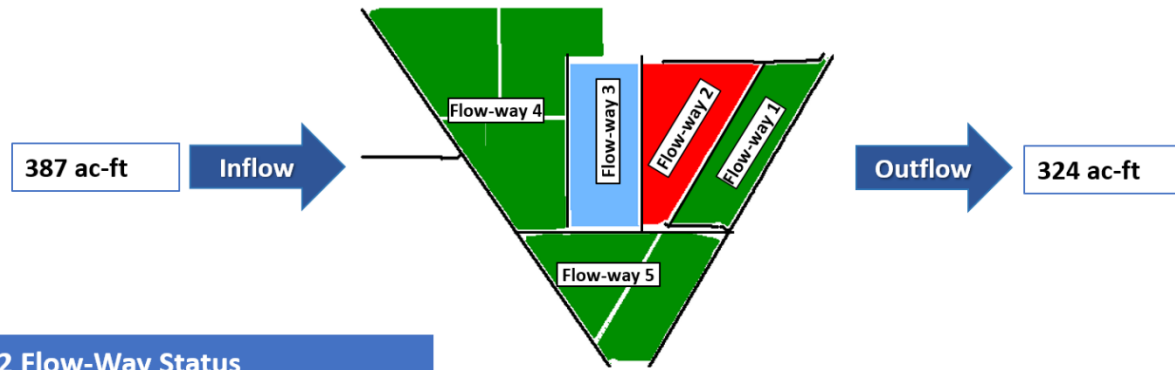
STA-1W Flow-Way Status			
Flow-Way	Vegetation Status Healthy --- Stressed	365-day P Loading Rate (below 1.0 g P /m <sup>2</sup> /yr is optimal)	Online / Offline / Restrictions
Northern			Vegetation management
Western			Vegetation management
Eastern			Vegetation management
Cell 7		N/A	Online
Cell 8		N/A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




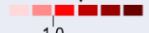




As of 1/8/2023	
Stage Based: Relative to Target Stage (TS)	
	Deep Water Level (> 2.8' above TS)
	High Water Level (1.5' – 2.8' above TS)
	0.2' – 1.5' above TS
	Target Stage (TS +/- 0.2')
	0.2' – 0.5' below TS
	0.5' – 1.0' below TS
	Low Water Level (1.0' – 1.2' below TS)
	Extreme Low Water (> 1.2' below TS)









STA-1W Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	0	4,331	144,103
--Lake Inflow, ac-ft	0	N/A	1,700
Total Outflow, ac-ft	0	4,984	146,727
Inflow Conc., ppb	N/A	117	197
Outflow Conc., ppb	N/A	20	20
Includes Preliminary Data			

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

# STA-2 Weekly Status Report – 1/2/2023 through 1/8/2023



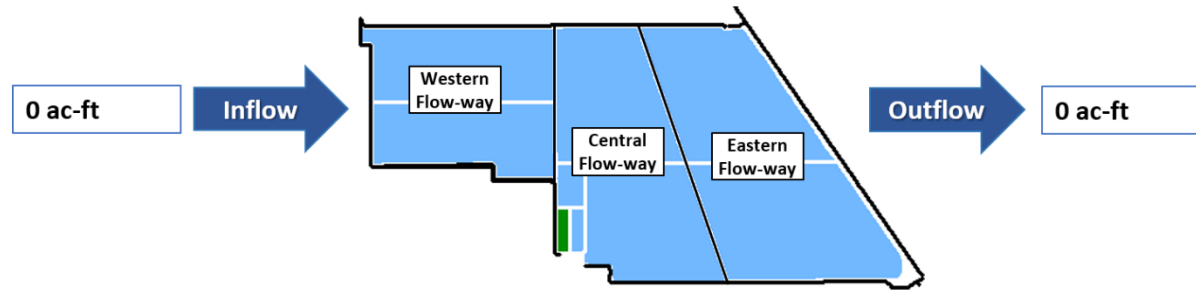
STA-2 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m <sup>2</sup> /yr is optimal)	Online / Offline / Restrictions
1			Online
2	Offline, construction activities as of 9/7/2021		
3			Vegetation Rehab
4			Vegetation Rehab
5			Online

As of 1/8/2023	
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	387	3,705	312,606
--Lake Inflow, ac-ft	0	N/A	24,800
Total Outflow, ac-ft	324	2,128	332,479
Inflow Conc., ppb	19	21	114
Outflow Conc., ppb	18	20	30
Includes Preliminary Data			

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

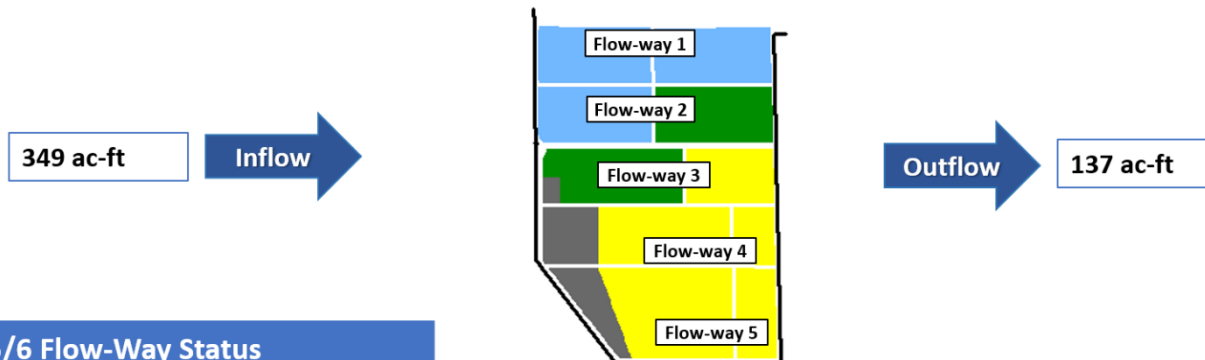
STA-3/4 Weekly Status Report – 1/2/2023 through 1/8/2023



STA-3/4 Flow-Way Status				STA-3/4 Flow & Phosphorus Concentration			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m <sup>2</sup> /yr is optimal)	Online / Offline / Restrictions	As of 1/8/2023			
				Stage Based: Relative to Target Stage (TS)			
				Deep Water Level (> 2.8' above TS)	7-day		
				High Water Level (1.5' – 2.8' above TS)	28-day		
				0.2' – 1.5' above TS	365-day		
				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)			
Eastern	Offline, vegetation management drawdown as of 3/1/2021			Total Inflow, ac-ft	0	0	299,765
Central		1.0	Online	--Lake Inflow, ac-ft	0	N/A	5,300
Western		1.0	Online	Total Outflow, ac-ft	0	0	294,007
				Inflow Conc., ppb	N/A	N/A	93
				Outflow Conc., ppb	N/A	N/A	16
				Includes Preliminary Data			

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

STA-5/6 Weekly Status Report – 1/2/2023 through 1/8/2023



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	← →	1.0	Online
2	← →	1.0	Online
3	← →	1.0	Online
4	← →	1.0	Online
5	← →	1.0	Online

As of 1/8/2023	
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	349	3,393	155,599
--Lake Inflow, ac-ft	0	N/A	0
Total Outflow, ac-ft	137	2,863	149,050
Inflow Conc., ppb	116	223	284
Outflow Conc., ppb	17	16	40
Includes Preliminary Data			

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

STA-5/6 Weekly Status Report – 1/2/2023 through 1/8/2023

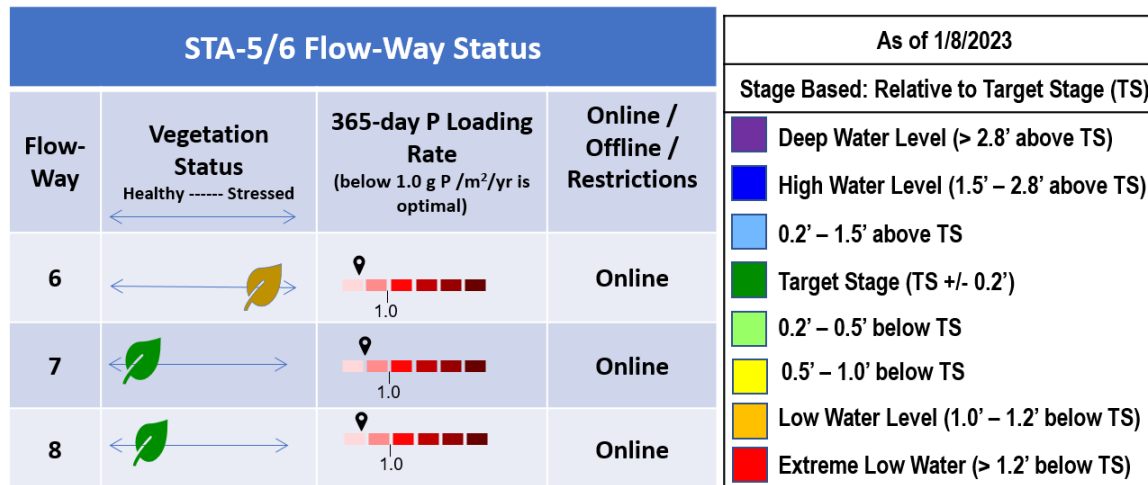
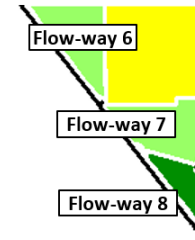


Figure S-6. STA-5/6 Weekly Status Report (Flow-ways 6 – 8)

## 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 receded over the week in parallel with schedule. The average on Sunday was 0.19 feet above the falling Zone A1 regulation line. WCA-2A: Stage recession at the 2-17 gauge increased and remains faster than the slope of the regulation line. The average on Sunday was 0.96 feet above the falling regulation line. WCA-3A: Over the last week the Three Gauge Average stage receded faster than the slope of the regulation line. The average stage was 0.37 feet below the falling regulation line on Sunday. WCA-3A North: At gauge 62 (Northwest corner) stage continued a recession that is falling faster than the slope of the Upper schedule line, the average on Sunday was 0.64 feet below (**Figures EV-1 through EV-4**).

### ***Water Depths***

The SFWDAT tool illustrates current stages in the EPA are falling in most of the major basins, with NESRS and WCA-1 retaining stage. WCA-3A continues to dry down from the northwest to the southeast. There is an increasing potential for stages to have moved to ground surface in the headwaters of the Miami Canal and in northern WCA-2A. Comparing current WDAT water depths to one month ago conditions within the EPA are generally shallower with southern WCA-2A and downstream of the S-11s in WCA-3A significantly so. Looking back a year ago, most of WCA-3A is deeper; significantly so in extreme northeast, and northwestern ENP. (**Figure EV-5 and Figure EV-6**). Comparing current conditions to the 20-year average on January 8: Conditions are above average in northeastern WCA-3A; significantly above average in WCA-3B, northeastern SRS and portions of WCA-1 (**Figure EV-7**).

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

Taylor Slough and Florida Bay received an average of 0.01 inches of total rain over the 11 days from the previous reporting end date (**12/29/22 to 1/8/23**) based on 17 gauges available for this report. Most stations received no rain with a maximum of 0.04 at Taylor Slough Bridge (TSB) in northern Taylor Slough. Between **12/29/22 and 1/8/23**, Taylor Slough stage changes ranged from decreases of -0.14 feet to -0.06 feet (**Figure EV-8 and Figure EV-9**). Taylor Slough water levels remain above the historical average for this time of year by +6.0 inches compared to before the Florida Bay initiative (starting in 2017), an increase of +0.2 inches from **12/29**.

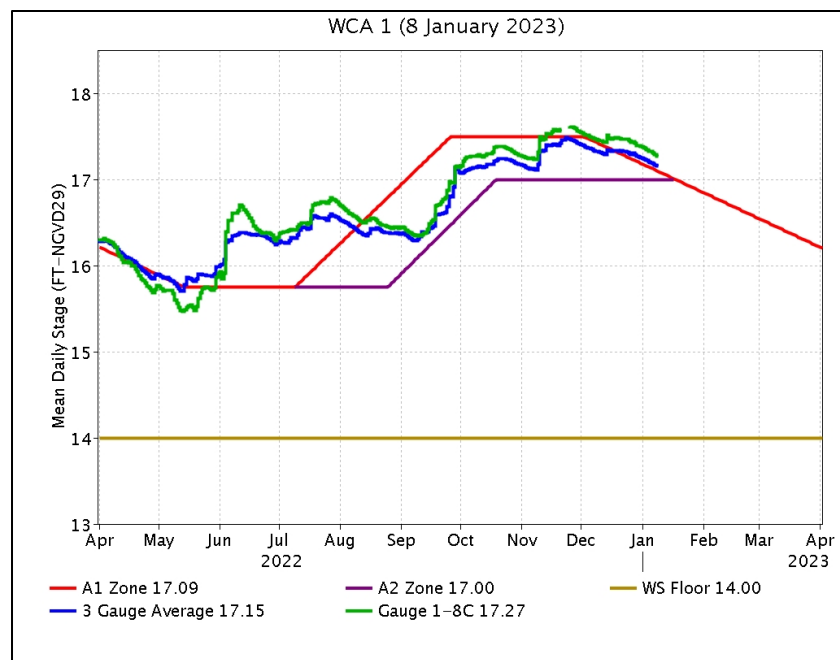
Average Florida Bay salinity on **1/8** was 25.8, a decrease of -0.8 from **12/29**. Salinity changes ranged from a decrease of -2.6 in Little Madeira Bay (LM) to an increase of +0.3 in Whipray Basin (WB) in the western region (**Figure EV-8**). This corresponded with mostly calm east to northeasterly winds and positive flows. As of **1/8**, salinities in Eastern and Central Florida Bay are within the historical IQR and below the 25<sup>th</sup> percentile in the Western region (**Figure EV-10**). Florida Bay salinity on **1/8** was +0.2 above its historical average for this time of year, down -1.4 from **12/29**.

## Water Management Recommendations

We recommend continuing discussion and utilize strategies that could prevent further degradation of WCA3A North. Conserving water in this region will most likely prove critical for the upcoming wading bird nesting season. Optimizing the volume of water moving into the northern perimeter of WCA-3A will benefit the ecology of that region as conditions transition to a dry season predicted to be drier than average. Maintaining a moderate rate of stage change within the marshes of WCAs, avoiding abrupt changes in water depth and conserving water north in the system has an ecological benefit. Moderating the recession rate in WCA-2A could help serve this purpose. When water is available discharge downstream through Taylor Slough. Individual regional recommendations can be found in **Table EV-2**.

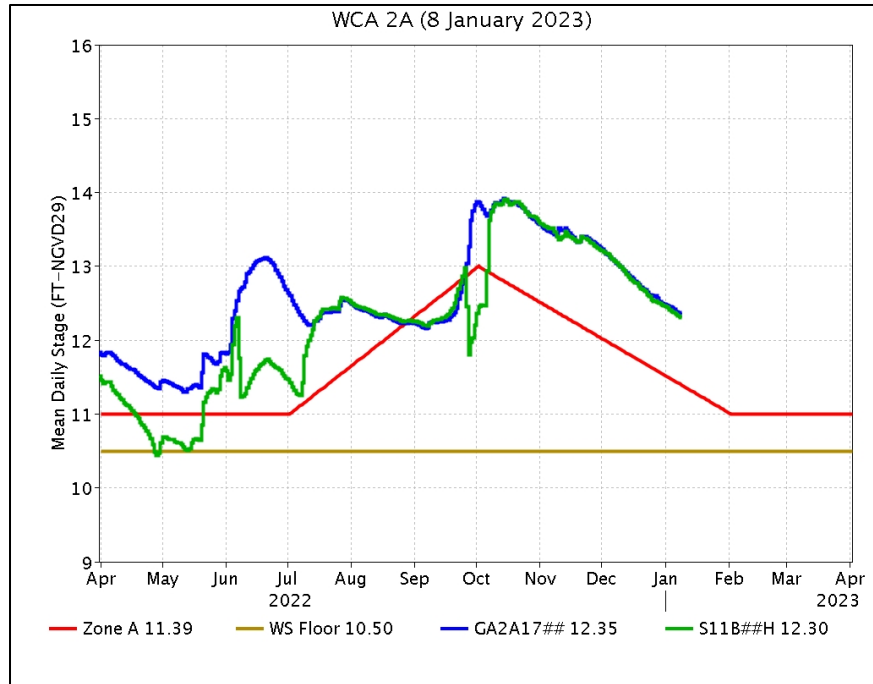
**Table EV-2.** Previous week's rainfall and water depth changes in Everglades basins.

Everglades Region	Rainfall (inches)	Stage change (feet)
WCA-1	0.00	-0.10
WCA-2A	<0.01	-0.14
WCA-2B	0.00	+0.05
WCA-3A	0.07	-0.13
WCA-3B	0.00	-0.09
ENP	0.00	-0.03

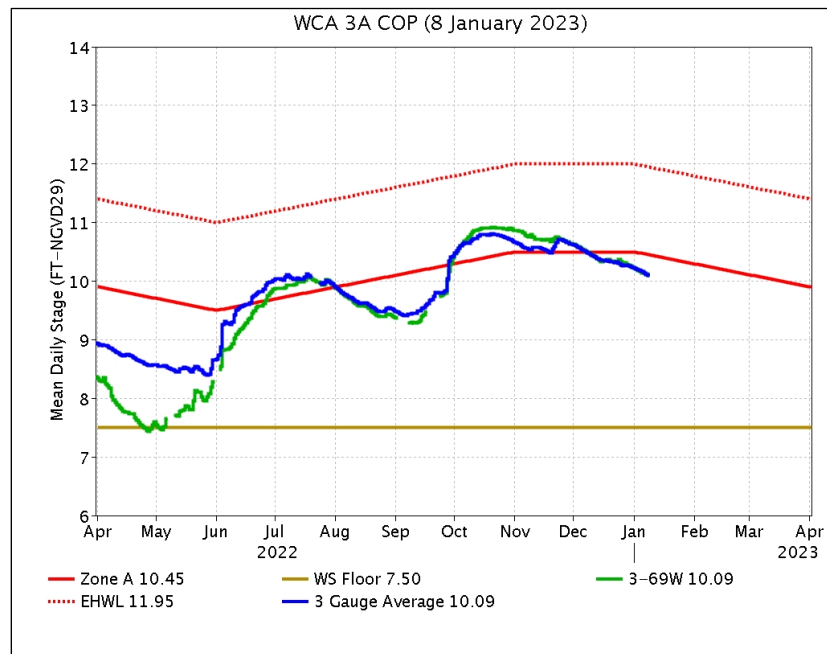


**Figure EV-1.** WCA-1 stage hydrographs and regulation schedule.

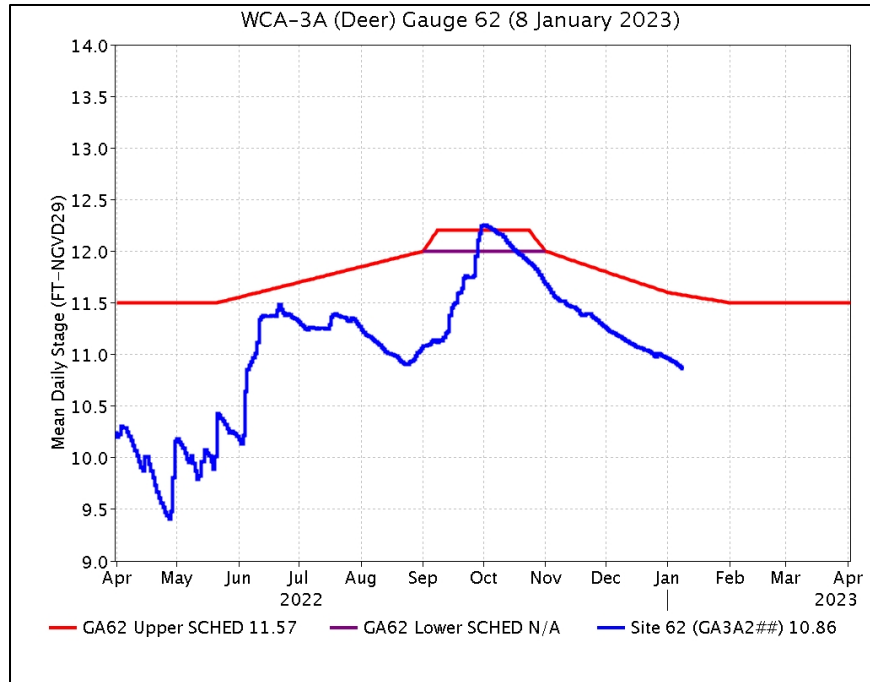




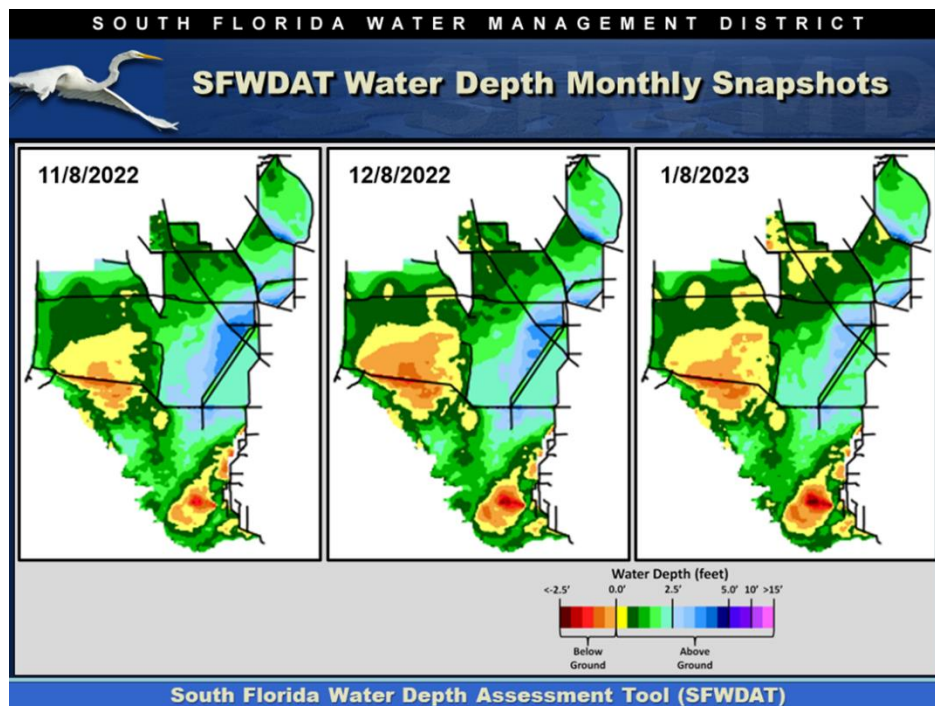
**Figure EV-2.** WCA-2A stage hydrographs and regulation schedule.



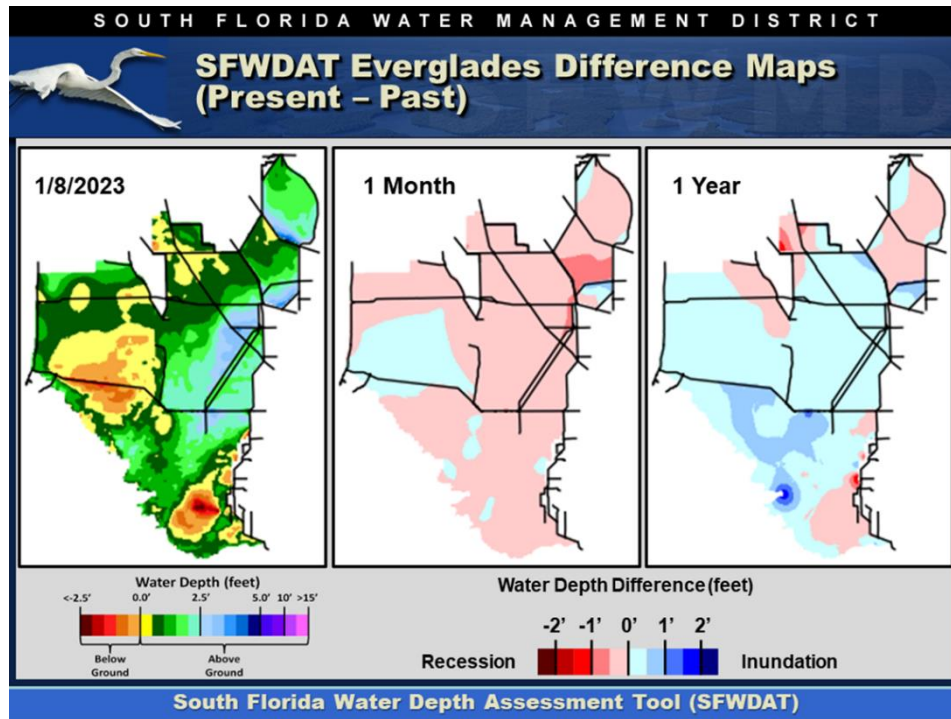
**Figure EV-3.** WCA-3A stage hydrographs (three-gauge average, S-333 headwater) and regulation schedule.



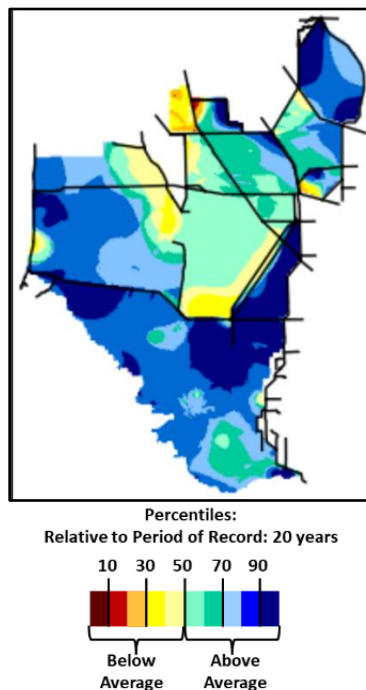
**Figure EV-4.** WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.



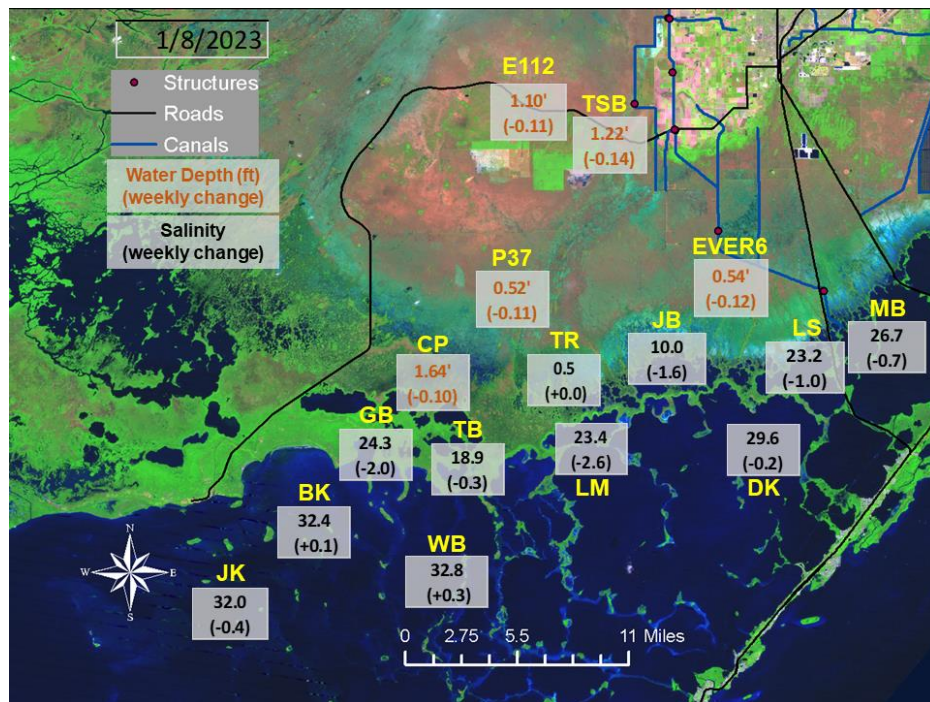
**Figure EV-5.** Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.



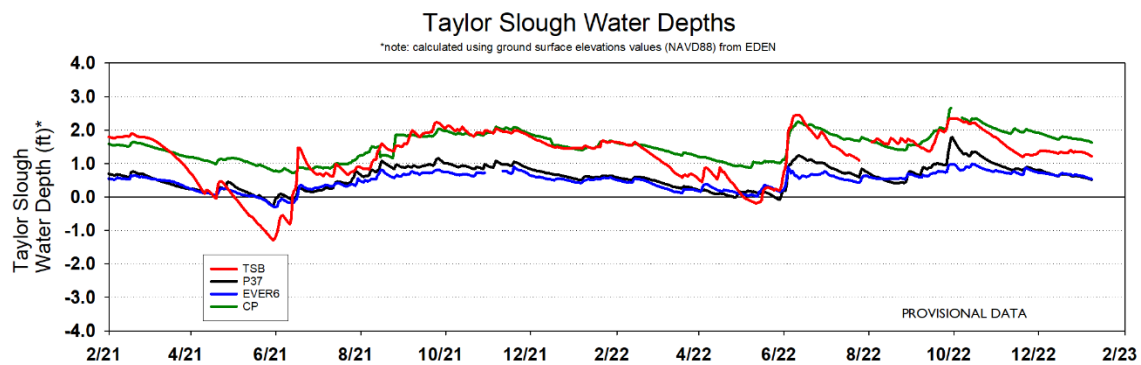
**Figure EV-6.** Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.



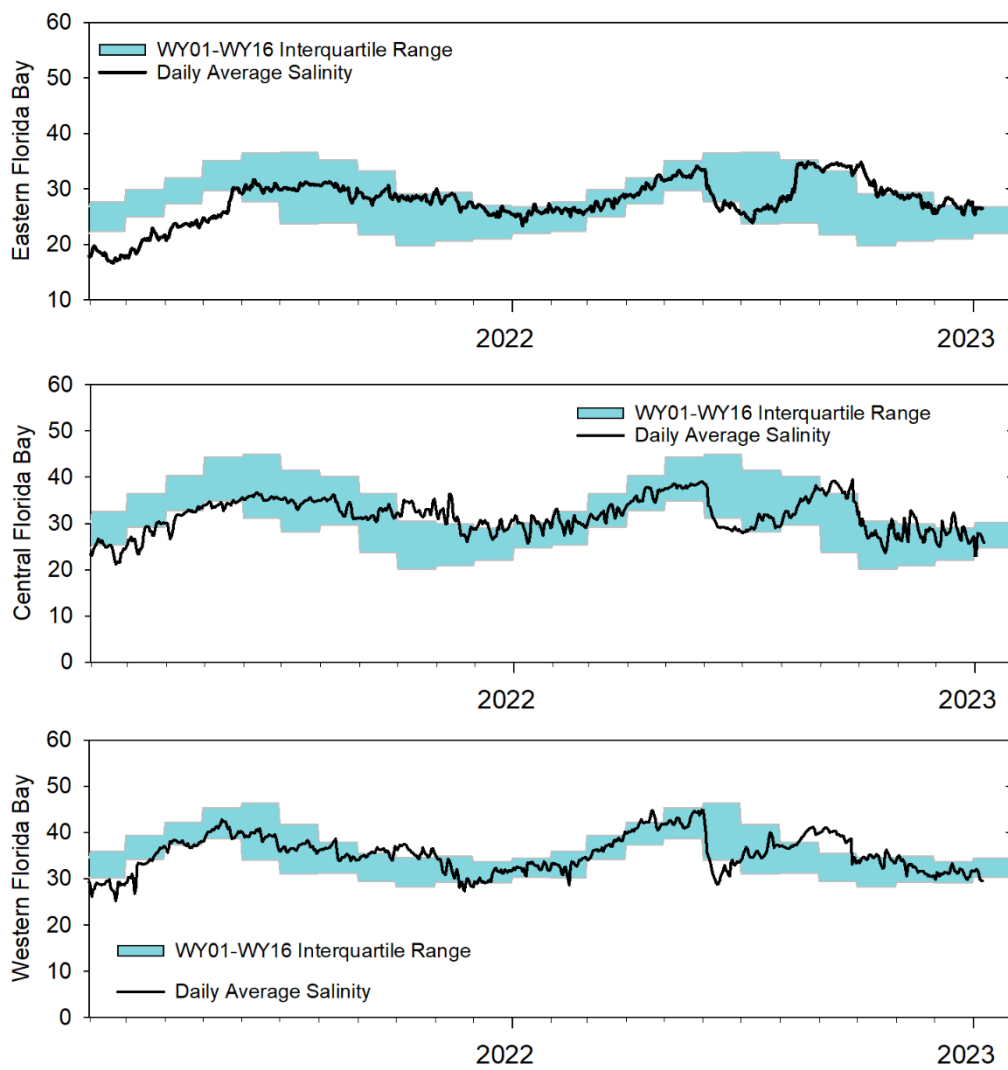
**Figure EV-7.** Present water depths (1/1/2023) compared to the day of year average over the previous 20 years.



**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.



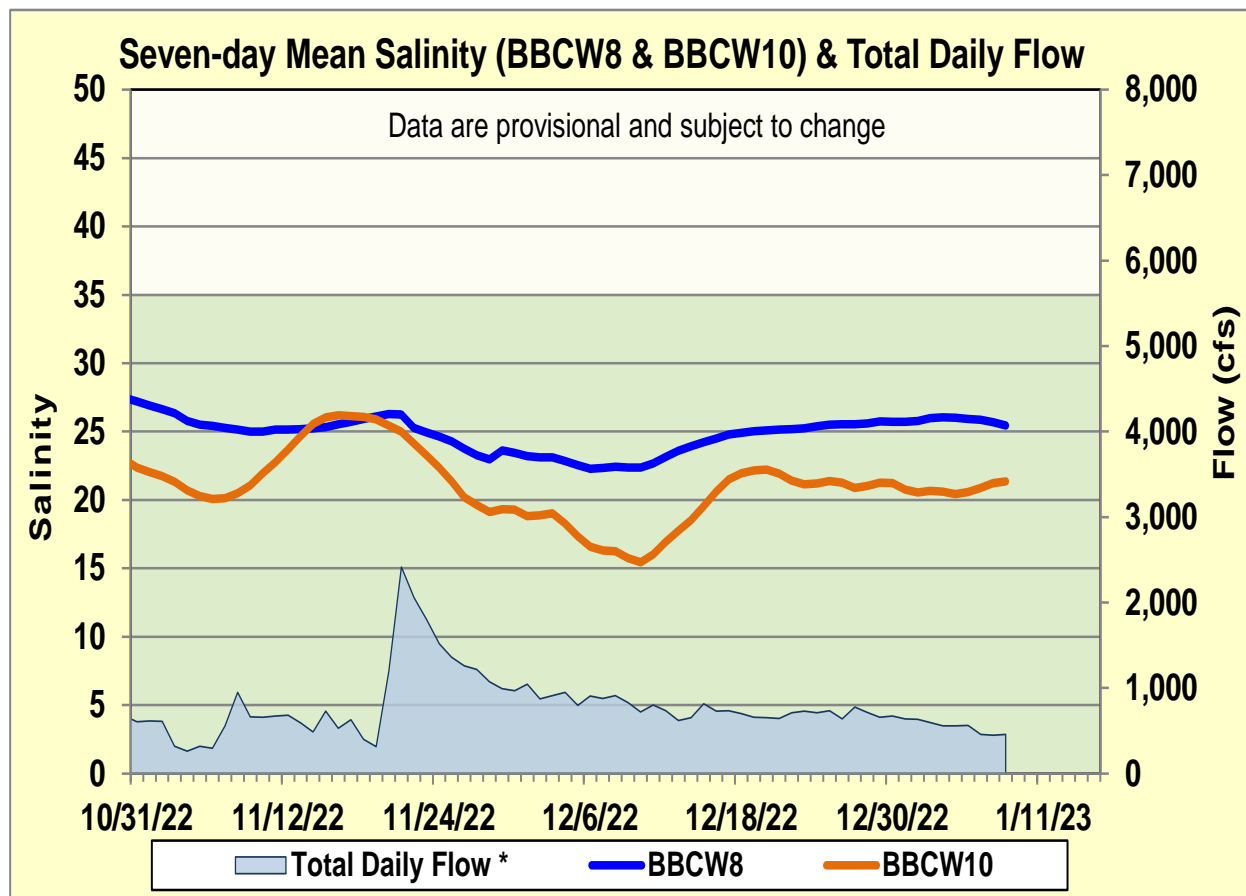
**Figure EV-10.** Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

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

SFWMD Everglades Ecological Recommendations, January 10 <sup>th</sup> 2023 (red is new)			
Area	Weekly change	Recommendation	Reasons
WCA-1	Stage decreased by 0.10'	Conserve water in this basin as possible. Recession rate of less than 0.05' per week.	Protect within basin and downstream habitat and wildlife.
WCA-2A	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.
WCA-2B	Stage increased by 0.06'	Conserve water in this basin as possible. Recession rate of less than 0.05' per week.	Protect within basin and downstream habitat and wildlife.
WCA-3A NE	Stage decreased by 0.15'	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.
WCA-3A NW	Stage decreased by 0.10'	Conserve water in this basin as possible. Recession rate of less than 0.05' per week	
Central WCA-3A S	Stage decreased by 0.13'	Conserve water in this basin as possible. Recession rate of less than 0.10' per week	Protect within basin and downstream habitat and wildlife.
Southern WCA-3A S	Stage decreased by 0.14'		
WCA-3B	Stage decreased by 0.09'	Recession rate of less than 0.10' per week.	Protect within basin and downstream habitat and wildlife.
ENP-SRS	Stage decreased by 0.03'	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.
Taylor Slough	Stage changes ranged from -0.14' to -0.06'	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged from -2.6 to +0.3	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 519 cfs and the previous 30-day mean inflow was 657 cfs. The seven-day mean salinity was 25.2 at BBCW8 and 20.9 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.