

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:** May 11, 2022

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

### **Summary**

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

A non-tropical area of low pressure off the coast of the Outer Banks will drift southwestward throughout the week as an upper-level ridge builds in over the northeast US. The weather pattern over the coming days will coincide with the evolution of this area of low pressure and how close it comes to the District. Currently, the District is located on the western side of this low, which is allowing dry, stable mid-Atlantic air to be transported all the way down into south Florida. Mostly sunny skies and low relative humidity will contribute to high rates of evapotranspiration inland Wednesday. Light scattered rains will be possible along the east coast Wednesday. The area of low pressure is expected to remain broad and disorganized throughout the week. Moisture will gradually return to the District as the area of low pressure draws closer to the coastline. On Thursday, afternoon thunderstorms could occur, while higher rainfall amounts on Friday and Saturday are possible along the east coast if the low pressure tracks further south. The 7-day total District rainfall ending next Tuesday will likely be well below the historical average for this time of the year.

#### **Kissimmee**

Flow at S-59 and S-61 is being adjusted to keep East Toho and Toho on their respective recession lines. With stage in KCH declining, flow at S-65/S-65A is being reduced. Water depth on the Kissimmee River floodplain has decreased, with a mean depth of 0.78 feet as of May 8, 2022. With the S-65/S-65A discharge reductions, the concentration of dissolved oxygen in the Kissimmee River has continued to rise, with an average of 3.6 mg/L for the week ending on May 8, 2022.

#### **Lake Okeechobee**

Lake Okeechobee stage was 12.91 feet NGVD on May 8, 2022, with water levels 0.77 feet lower than a month ago (**Figure LO-1**). Lake stage remains in the Baseflow sub-band and has been within the ecological envelope for 18 weeks (**Figure LO-3**). Average daily inflows (excluding rainfall) decreased from the previous week, from 1,641 cfs to 1,579 cfs. Average daily outflows (excluding evapotranspiration) decreased from 3,481

cfs to 2,622 cfs. The most recent SAV survey revealed further decline in SAV abundance at deeper water sites from the 2020 peak as a result of higher stages, and relatively dense SAV communities at shallow water sites along transects in the SW and NW regions of the Lake. The May 2 - 4, 2022 routine water quality monitoring survey revealed that 66% of the sites had mixed cyanobacterial and algal communities, and 25% had communities dominated by *Microcystis aeruginosa*. Toxins were below detection level at 94% of the sites. Recent satellite imagery (May 8, 2022) showed moderate to high bloom potential in Fisheating Bay, the NW and NE nearshore regions (**Figure LO-6**).

## **Estuaries**

Total inflow to the St. Lucie Estuary averaged 238 cfs over the past week with no flow coming from Lake Okeechobee. Mean salinities decreased at all sites in the estuary over the past week. Salinity at the US1 Bridge was in the optimal range (10-25) for adult eastern oysters. Total inflow to the Caloosahatchee Estuary averaged 1,052 cfs over the past week with 604 cfs coming from the Lake. Mean surface salinities were about the same as last week throughout the estuary, except for Ft. Myers which decreased slightly. Salinities were in the optimal range (0-10) for tape grass in the upper estuary. Salinities were in the optimal range (10-25) for adult eastern oysters at Cape Coral and in the stressed range at Shell Point and Sanibel.

## **Stormwater Treatment Areas**

For the week ending Sunday, May 8, 2022, approximately 4,500 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 4,700 ac-feet. The total amount of inflows to the STAs in WY2023 is approximately 8,800 ac-feet. Most STA cells are at or near target stage, except STA-5/6 cells that are drying out. STA-1E Western Flow-way is offline for post-construction vegetation grow in, and STA-1E Eastern Flow-way is offline for vegetation management activities related to Tropical Storm Eta. Additionally, STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown, STA-2 Flow-way 2 is offline for construction activities, and STA-5/6 Flow-way 4 is offline for vegetation management activities. Operational restrictions are in place in STA-1W Eastern and Northern Flow-ways, STA-2 Flow-way 3, and STA-3/4 Central Flow-way for nesting by Migratory Bird Treaty Act protected species. Operational restrictions are in place in STA-1W Western, Eastern, and Northern Flow-ways for construction activities. Operational restrictions are in effect in STA-1E Central Flow-way and STA-2 Flow-ways 3 and 4 for vegetation management activities, and in STA-2 Flow-way 1 following dryout conditions. This week, if 2008 LORS recommends Lake releases to the WCAs and conditions allow, releases will be sent to STA-2 and STA-3/4.

## **Everglades**

Dry conditions continue to dominate WCA-3A North where recessions were good in the east but elevated into the poor range in the west, and that sub-basin remains closed to some public activity. In the regions critical to current wading bird foraging stage changes remained in the “fair” or “good” rate of change category. Wading bird foraging increased

from the previous week, but expectations for nesting success remain low, especially for the Wood Stork due to a very late initiation of nesting. All the Cape Sable Seaside Sparrow subpopulations have reached the target of 40% dry, including sub population Echo, where recessions were slow to reach the % dry target. Stages receded across Taylor slough last week but remain above average, while now mostly without surface water the extension of the hydroperiod via timely rainfall and water deliveries had an ecological benefit. Salinities increased on average in Florida Bay and all regions are near the middle of their interquartile range but are rising.

## **Biscayne Bay**

Total inflow to Biscayne Bay averaged 268 cfs, and the previous 30-day mean inflow averaged 194 cfs. The seven-day mean salinity was 33.8 at BBCW8 and 33.8 at BBCW10, both below the preferred maximum salinity of 35 for these sites. Salinity data provided as a courtesy by Biscayne National Park.

## **Supporting Information**

### **Kissimmee Basin**

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

On May 8, 2022, lake stages were 55.5 feet NGVD (0.4 feet below schedule) in East Lake Toho, 52.4 feet NGVD (0.5 feet below schedule) in Lake Toho, and 49.5 feet NGVD (0.3 feet below schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1, Figures KB-1-3**).

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

Discharges to the Kissimmee River on May 8, 2022 were 1,390 cfs at S-65 and 1,320 cfs at S-65A; discharges from the Kissimmee River were 1,670 cfs at S-65D and 1,500 cfs at S-65E (**Table KB-2**). Headwater stages were 46.3 feet NGVD at S-65A and 27.1 feet NGVD at S-65D on May 8, 2022. With the S-65/S-65A discharge reductions, the concentration of dissolved oxygen in the Kissimmee River has continued to rise, with an average of 3.6 mg/L for the week ending on May 8, 2022 (**Table KB-2, Figure KB-4**). Water depth on the Kissimmee River floodplain has decreased with a mean depth of 0.78 feet as of May 8, 2022 (**Figure KB-5**).

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

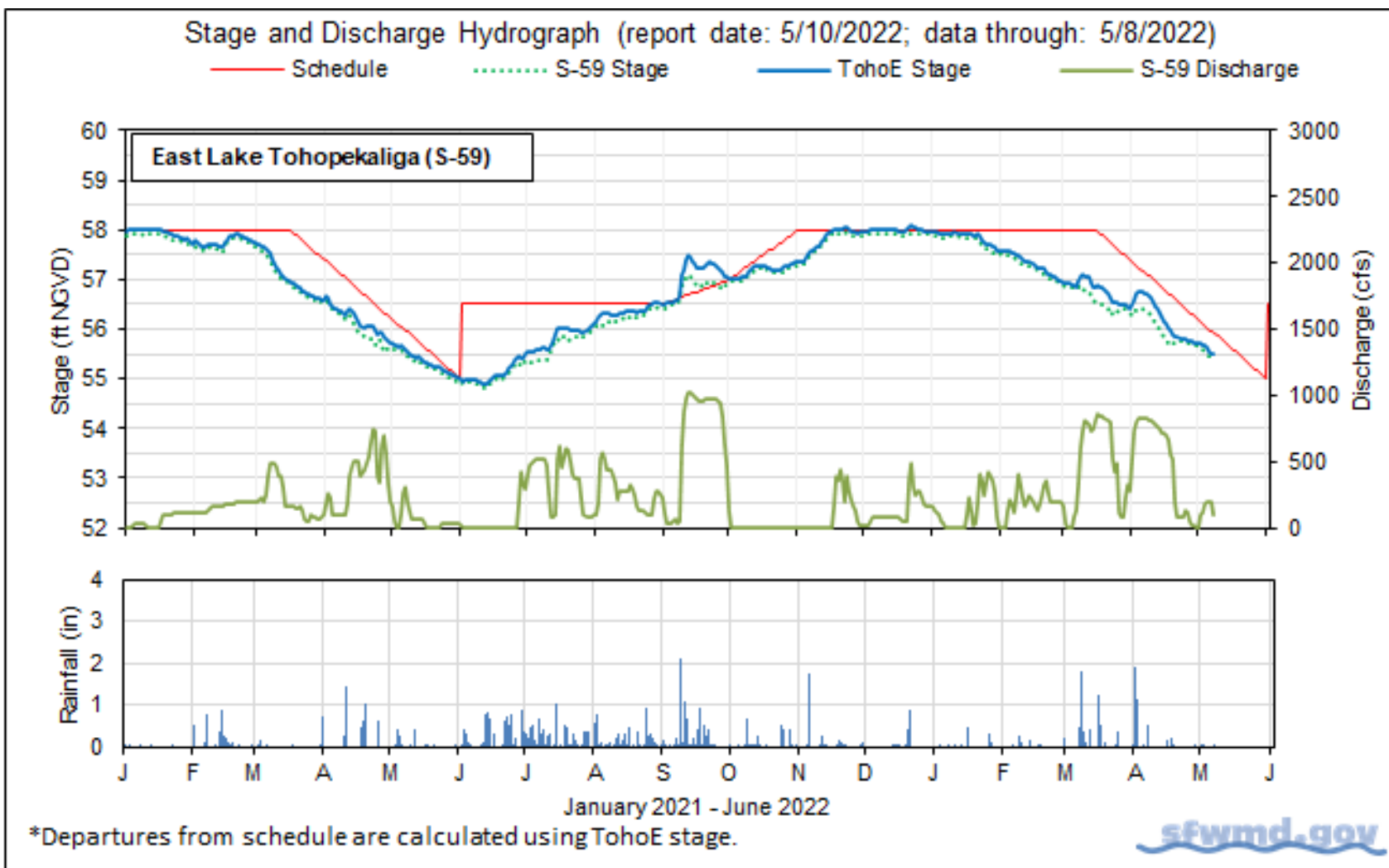
Continue following the stage recession lines in Lakes East Toho and Toho. In KCH, continue the slow rampdown in flow at S-65/S-65A.

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

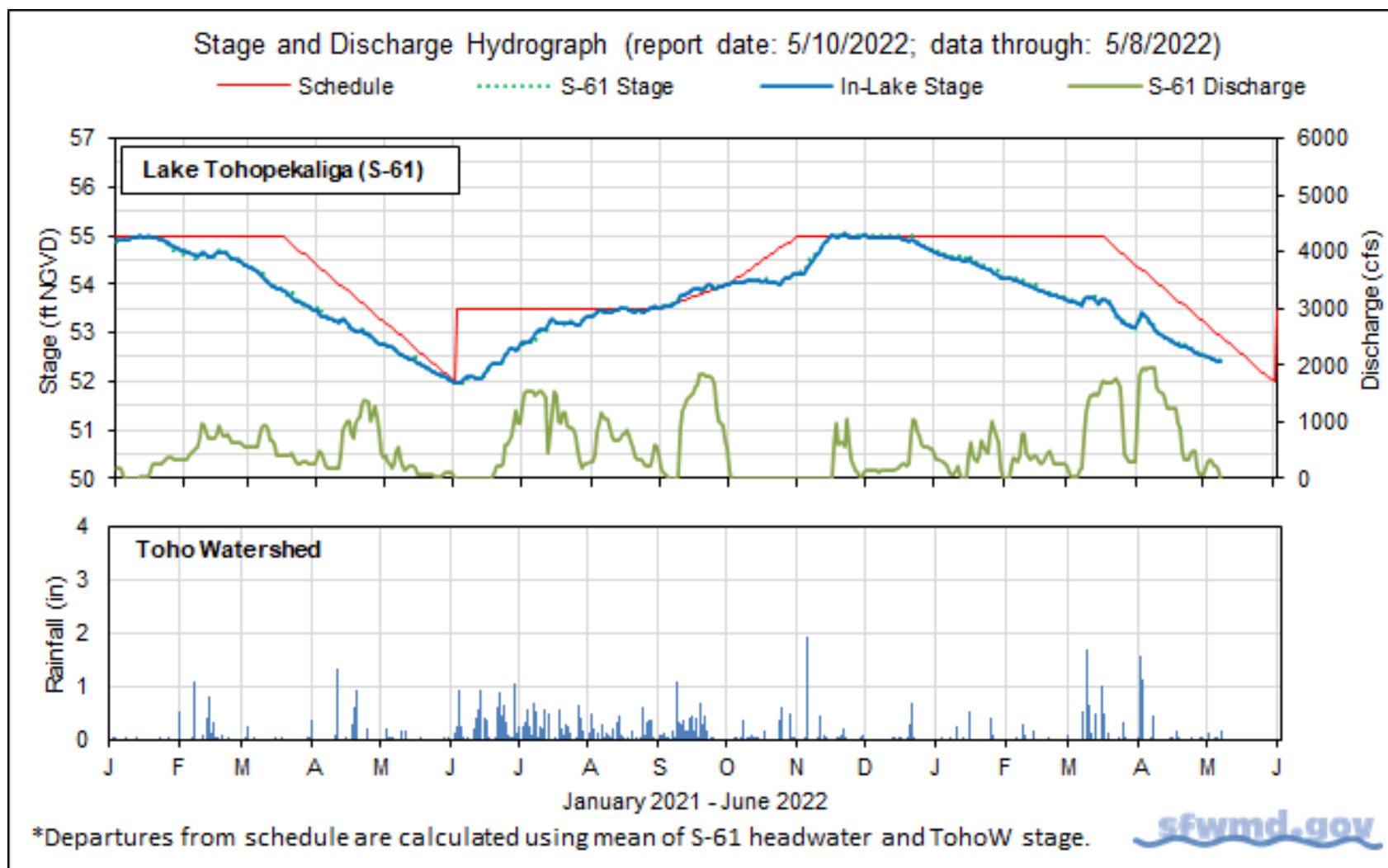
Water Body	Structure	Stage Monitoring Site	7-Day Average Discharge (cfs)	Lake Stage (feet NGVD) <sup>a</sup>	Schedule Type <sup>b</sup>	Schedule Stage (feet NGVD)	Departure from Regulation (feet)	
							5/8/22	5/1/22
Lakes Hart and Mary Jane	S-62	LKMJ	16	59.8	R	60.0	-0.2	-0.2
Lakes Myrtle, Preston and Joel	S-57	S-57	5	60.2	R	60.3	-0.1	0.0
Alligator Chain	S-60	ALLI	92	62.6	R	62.6	0.0	0.0
Lake Gentry	S-63	LKGT	131	60.1	R	60.1	0.0	0.0
East Lake Toho	S-59	TOHOE	152	55.5	R	55.9	-0.4	-0.5
Lake Toho	S-61	TOHOW S-61	216	52.4	R	52.9	-0.5	-0.7
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	1,462	49.5	R	49.8	-0.3	-0.1

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

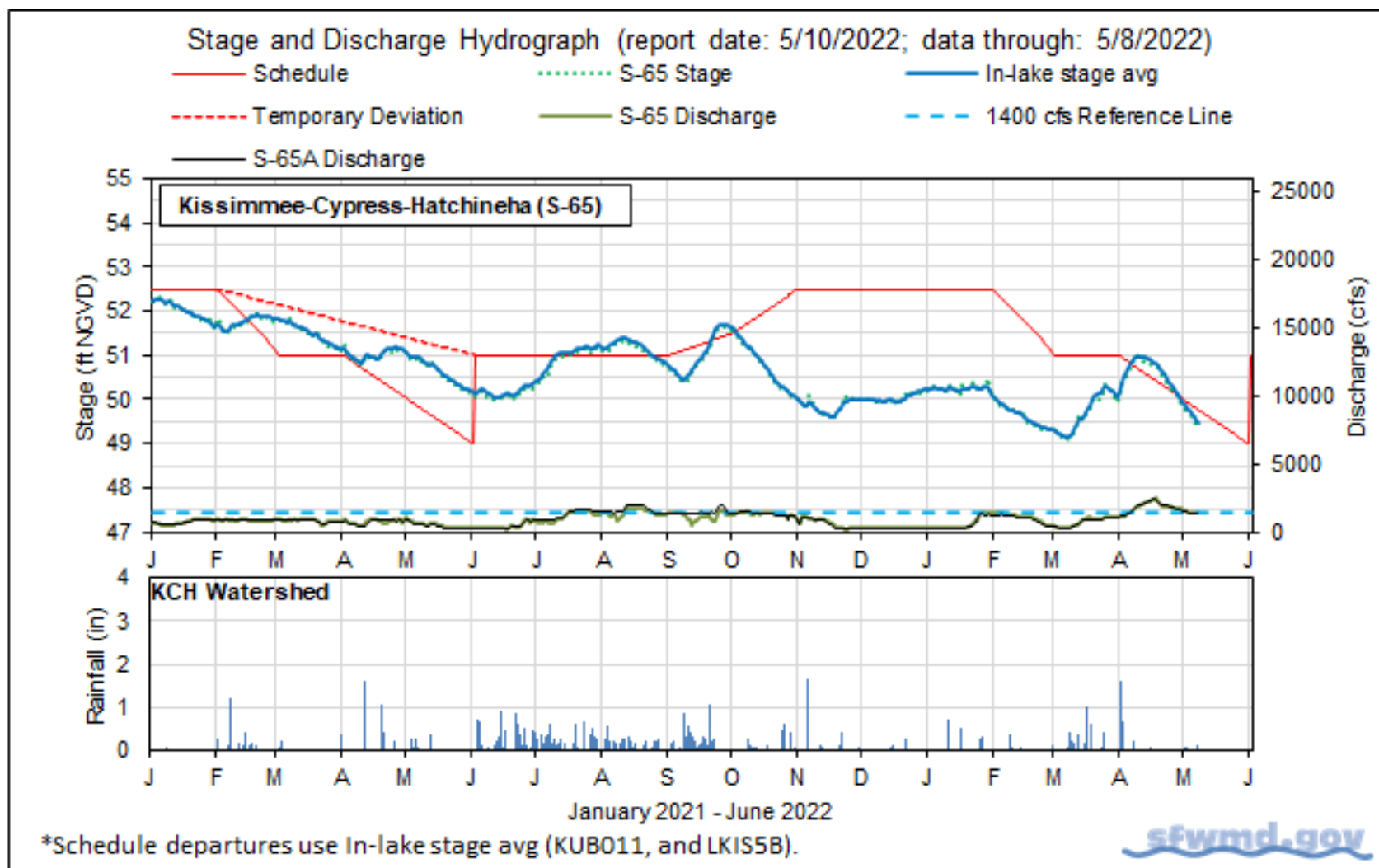
b. A: projected recession line; R: USACE regulation schedule; S: temporary recession target line; T: temporary schedule; NA: not applicable or not available.



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



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



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

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

Metric	Location	Daily Average	Average for Previous Seven Day Periods			
		5/8/22	5/8/22	5/1/22	4/24/22	4/17/22
Discharge	S-65	1,390	1,460	1,750	2,090	2,240
Discharge	S-65A <sup>a</sup>	1,320	1,400	1,720	2,100	2,200
Headwater Stage (feet NGVD)	S-65A	46.3	46.2	46.2	46.4	46.5
Discharge	S-65D <sup>b</sup>	1,670	1,770	1,820	1,500	1,220
Headwater Stage (feet NGVD)	S-65D <sup>c</sup>	27.1	27.1	27.1	27.0	26.8
Discharge (cfs)	S-65E <sup>d</sup>	1,500	1,570	1,630	1,310	1,090
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) <sup>e</sup>	Phase I, II/III river channel	3.9	3.6	3.2	3.0	6.0
Mean depth (feet) <sup>f</sup>	Phase I floodplain	0.78	0.83	0.97	0.98	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.

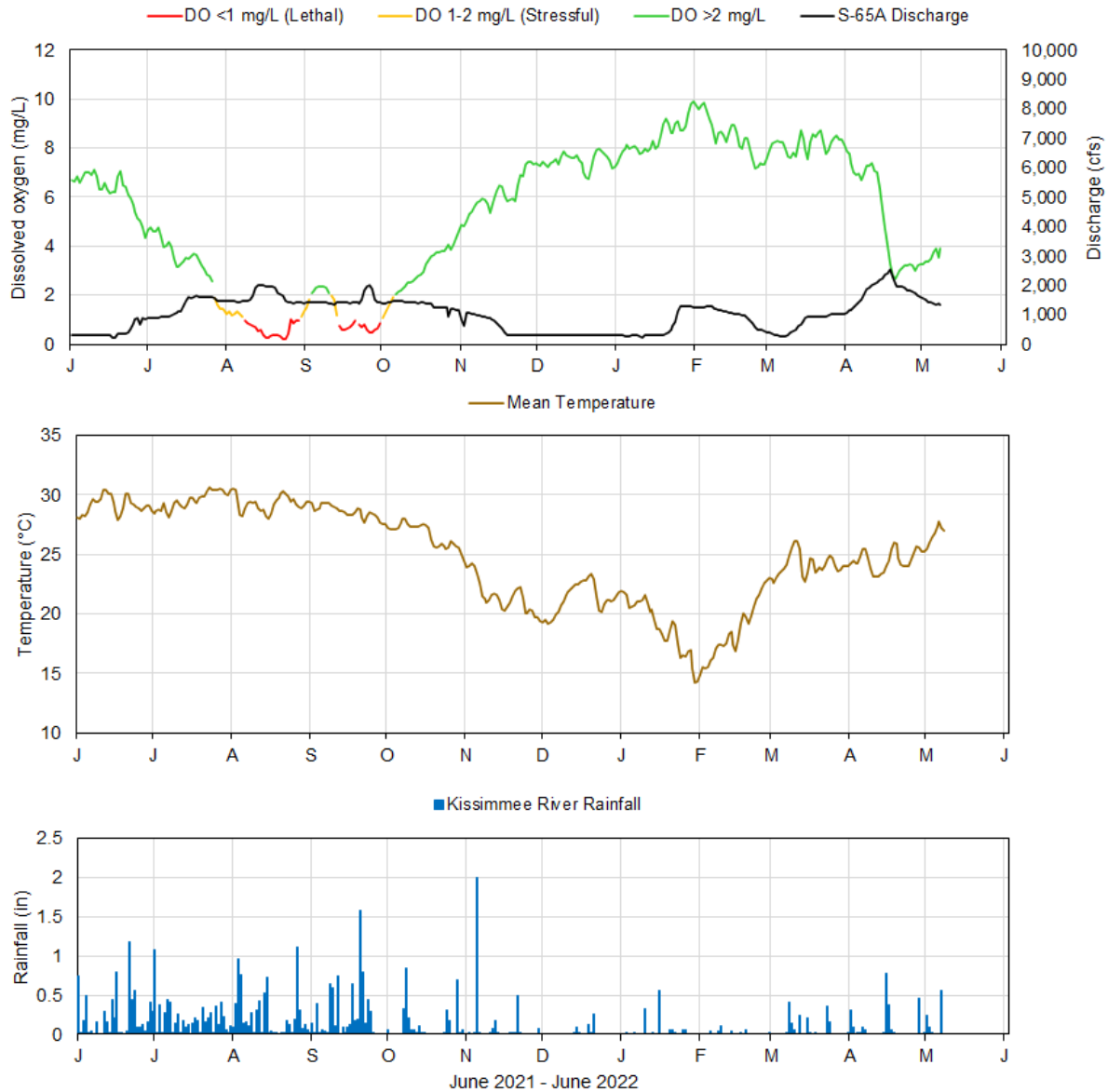
e. Dissolved oxygen is the average of values from sondes KRBN, PC62, PC33, PD62R and PD42R.

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



**Table KB-3.** Discharge rate of change limits for S65/S-65A (revised 1/14/19).

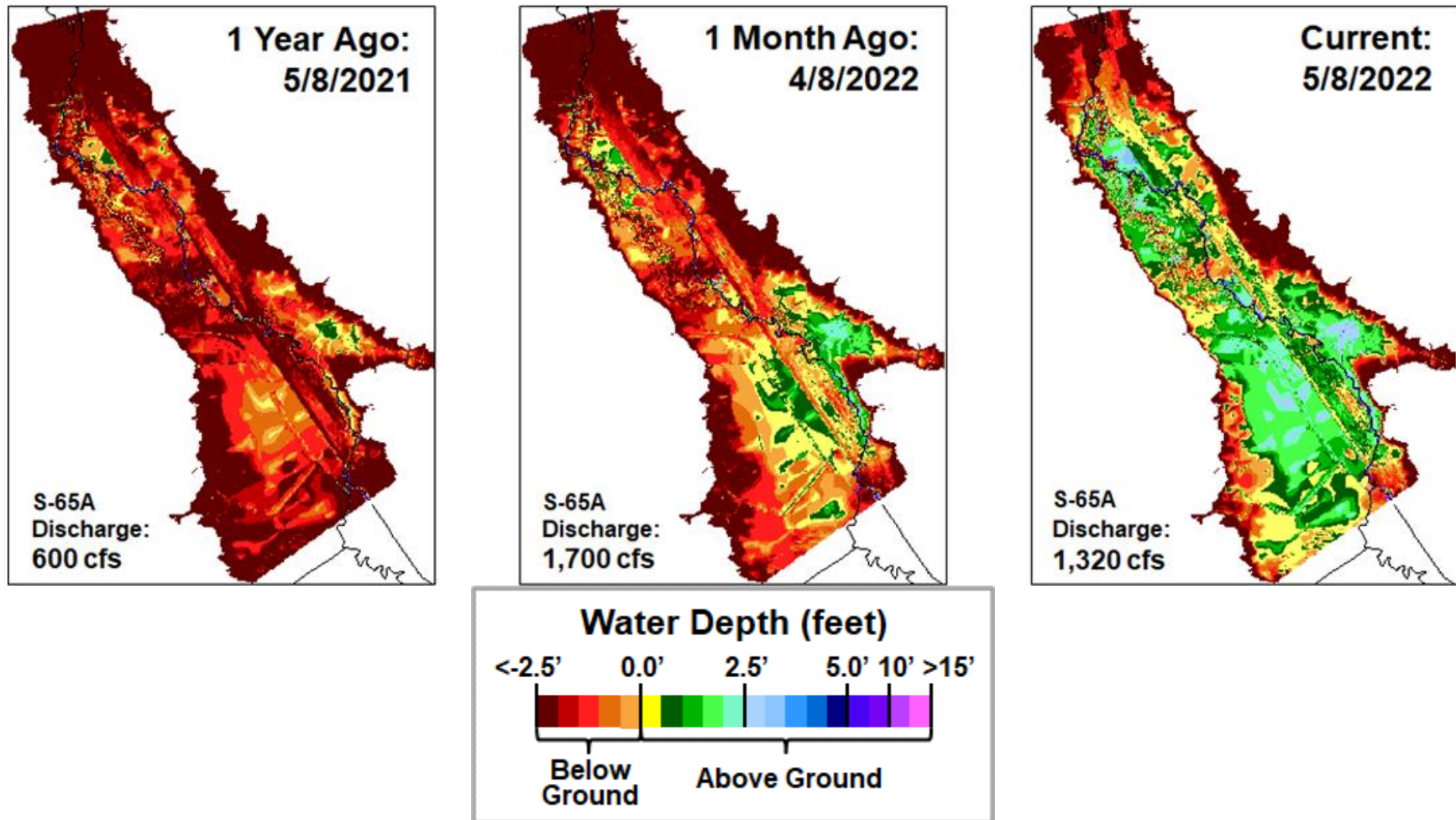
Discharge (cfs)	Maximum Rate of Increase (cfs/day)	Maximum Rate of Decrease (cfs/day)
0-300	100	-50
301-650	150	-75
651-1,400	300	-150
1,401-3,000	600	-600
>3,000	1,000	-2,000



Report Date: 5/10/2022; data are through: 5/8/2022

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

**Figure KB-4.** Restored Kissimmee river channel mean daily dissolved oxygen concentration (mg/L), S-65A discharge (cfs), temperature (°C) and rainfall (inches). Dissolved oxygen (DO) and temperature are mean daily values averaged for PC62, KRBN, PC33, PD62R, and PD42R with an average of four stations reporting this week. Rainfall values are daily totals for Kissimmee River (Pool BCD) AHED watershed.



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

# 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.

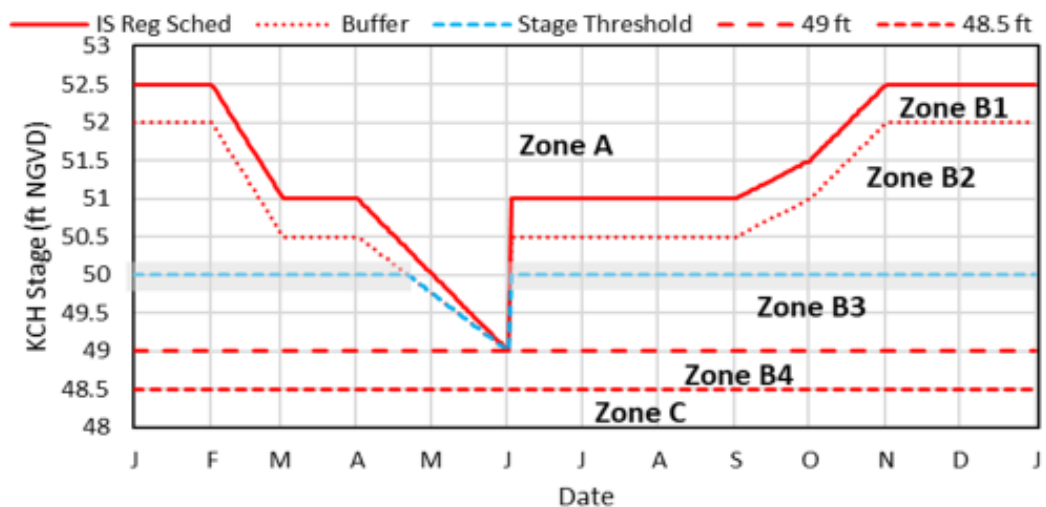
Table KB-3. Discharge Rate of Change Limits for S65/S65A (revised 1/14/19).

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-6.** IS-14-50 Discharge Plan for S65/S65A with discharge rate of change limits (revised 1/14/19).

## Lake Okeechobee

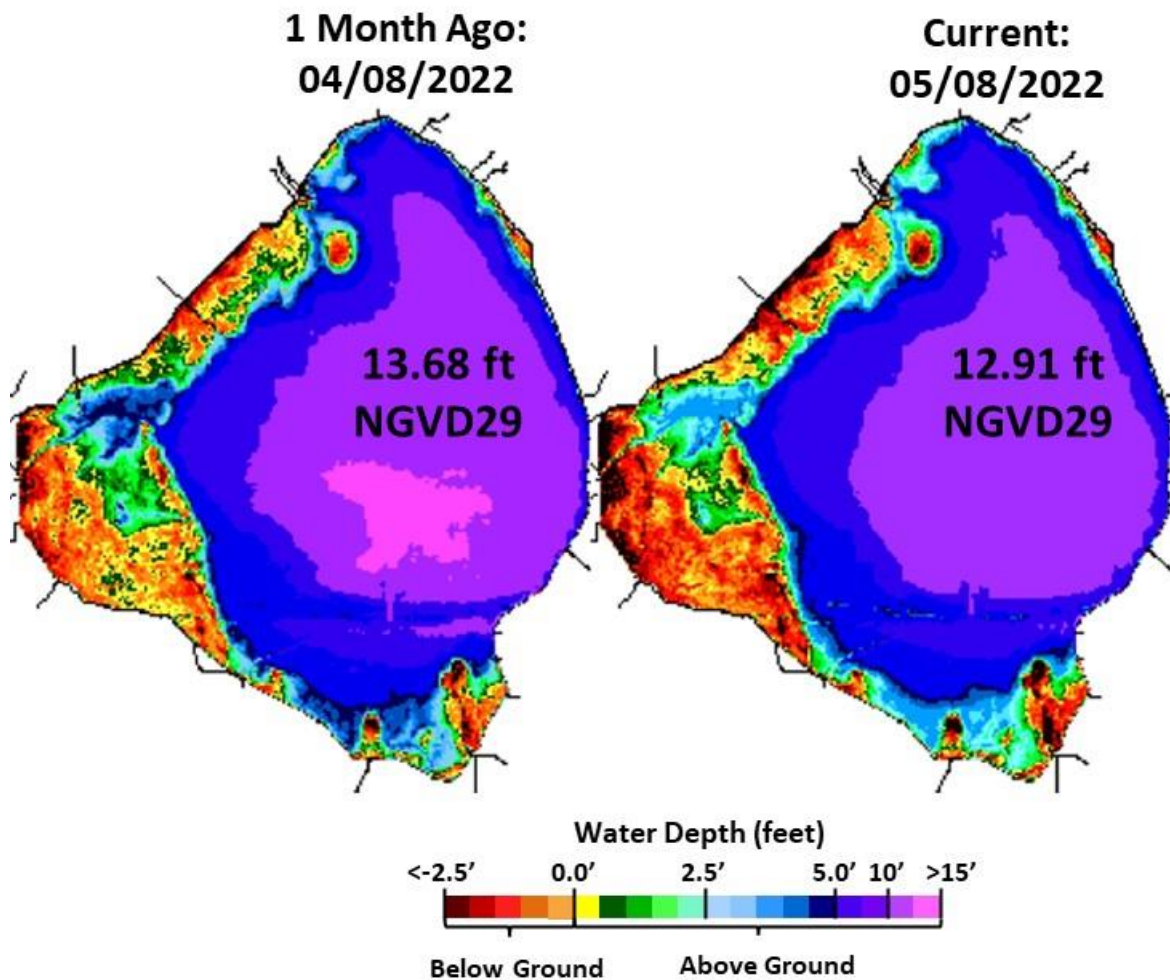
Lake Okeechobee stage was 12.91 feet NGVD on May 8, 2022, with water levels 0.77 feet lower than a month ago (**Figure LO-1**). Lake stage remains in the Baseflow sub-band (**Figure LO-2**) and has been within the ecological envelope for 18 weeks (**Figure LO-3**). According to NEXRAD, 0.75 inches of rain fell directly on the Lake last week.

Average daily inflows (excluding rainfall) decreased from the previous week, going from 1,641 cfs to 1,579 cfs. Average daily outflows (excluding evapotranspiration) decreased, going from 3,481 cfs to 2,622 cfs. Highest inflows came from the Kissimmee River through the S-65E structure (1,570 cfs). The outflow to the west via the S-77 structure into the C-43 Canal was 869 cfs and outflows south via the S-350 structures totaled 1,014 cfs. Flows east were 707 cfs via the S-308 structure into the C-44 Canal and 33 cfs via the S-271 structure into the L-8 canal (formerly Culvert 10A), respectively. **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.

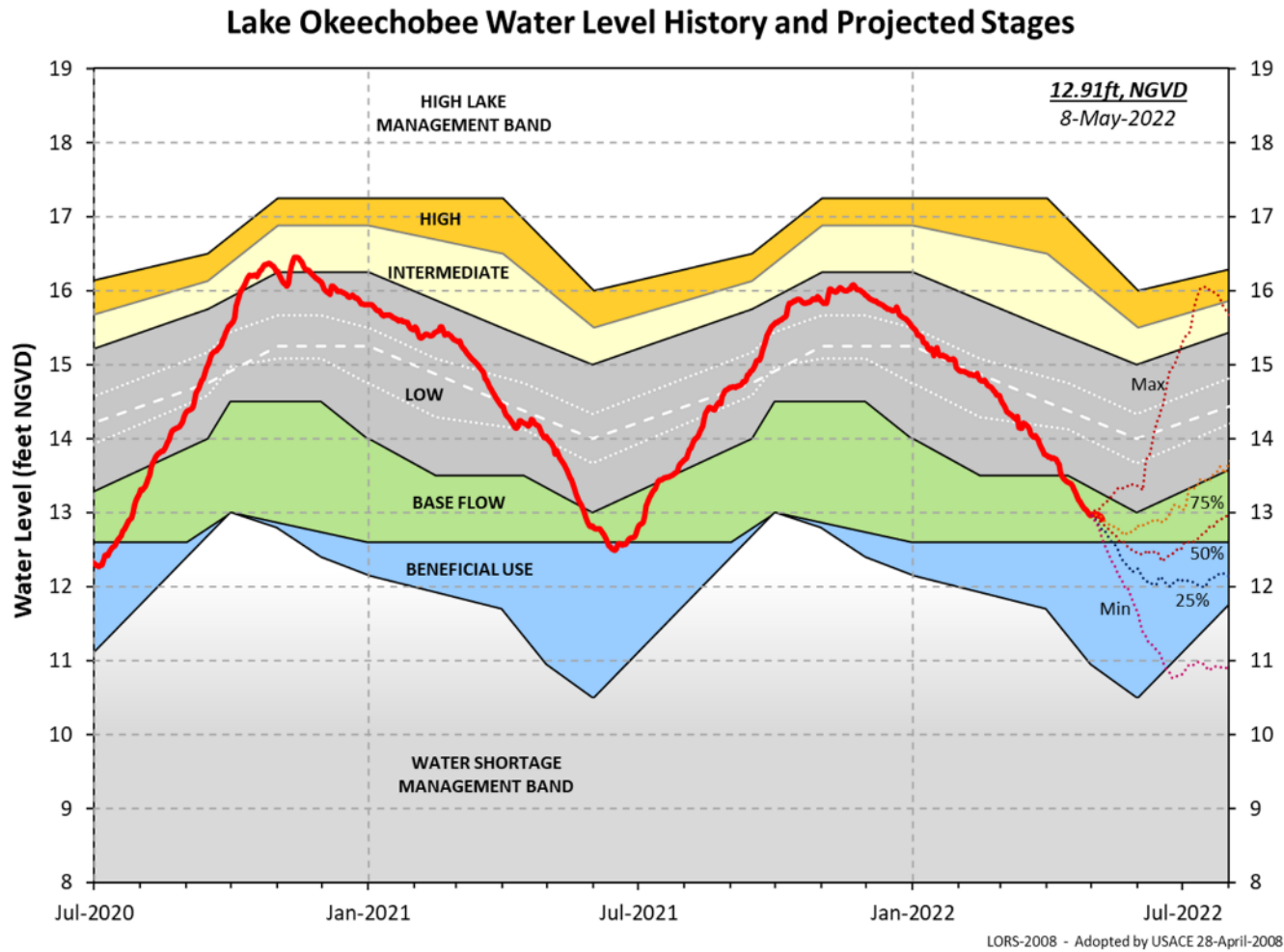
The most recent submersed aquatic vegetation (SAV) survey revealed further decline in SAV abundance at deeper water sites from the 2020 peak as a result of higher stages, and relatively dense SAV communities at shallow water sites along transects in the SW and NW regions of the Lake.

The most recent satellite image (May 8, 2022) from the NOAA cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3 OLCI sensor showed moderate to high bloom potential in Fisheating Bay and the NW and NE nearshore regions (**Figure LO-6**). Continuous monitoring stations (six) on the Lake show optimal surface water temperatures ( $> 25^{\circ}\text{C}$ ) for cyanobacterial and algal growth. The May 2 - 4, 2022 routine water quality monitoring survey on the Lake revealed that 66% of the sites had mixed cyanobacterial and algal communities, and 25% had communities dominated by *Microcystis aeruginosa*. Toxins were below detection level at 94% of the sites. Only 2 sites (PALMOUT2 and RITTAE2) in the SW and S regions of the Lake had total microcystin concentrations slightly above detection level ( $0.25\text{ }\mu\text{g/L}$ ), but below the EPA  $8\text{ }\mu\text{g/L}$  recreational standard ( $0.9\text{ }\mu\text{g/L}$  and  $0.3\text{ }\mu\text{g/L}$  at PALMOUT2 and RITTAE2, respectively).

## Changes in Water Depth

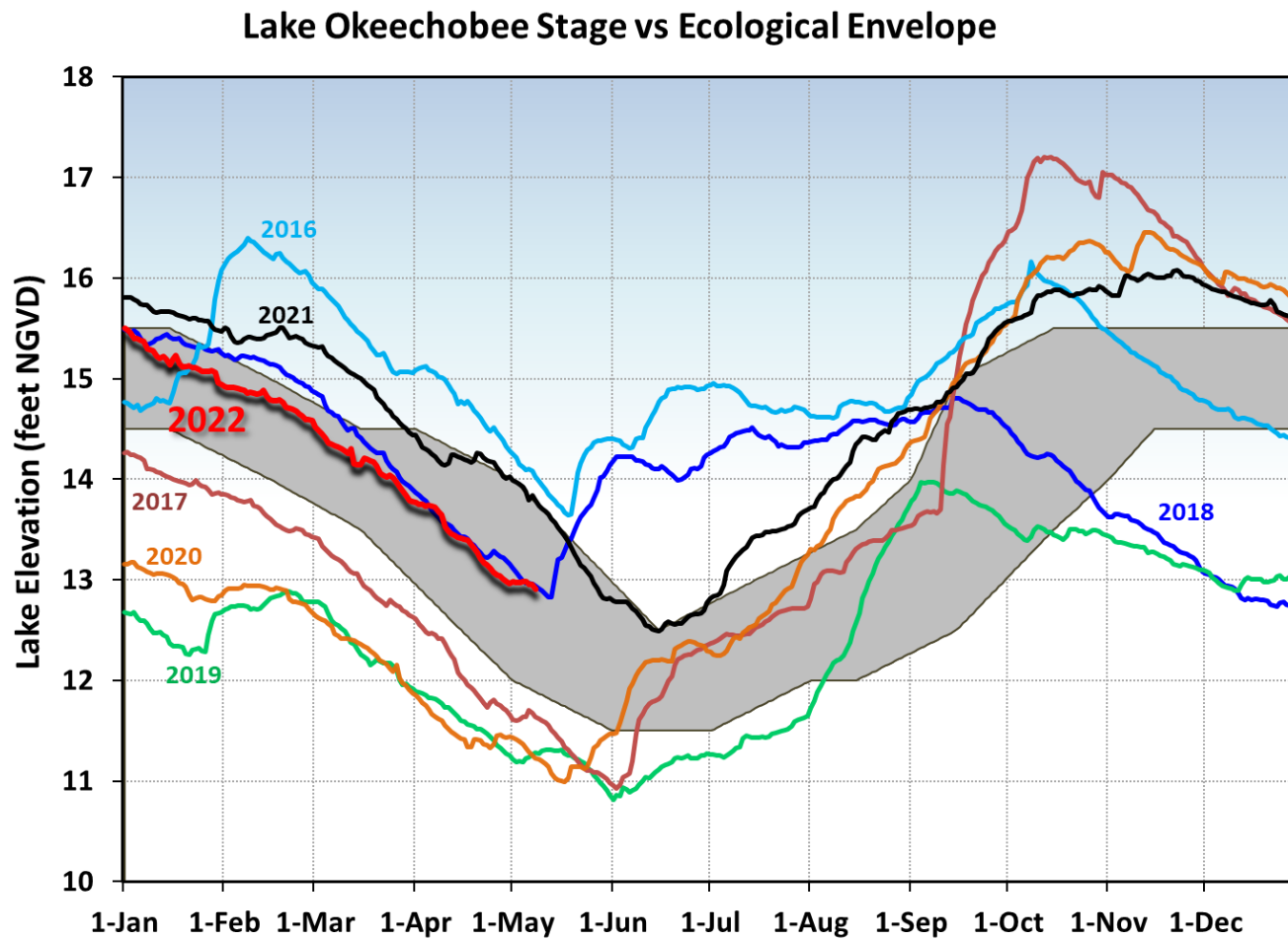


**Figure LO-1.** Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).



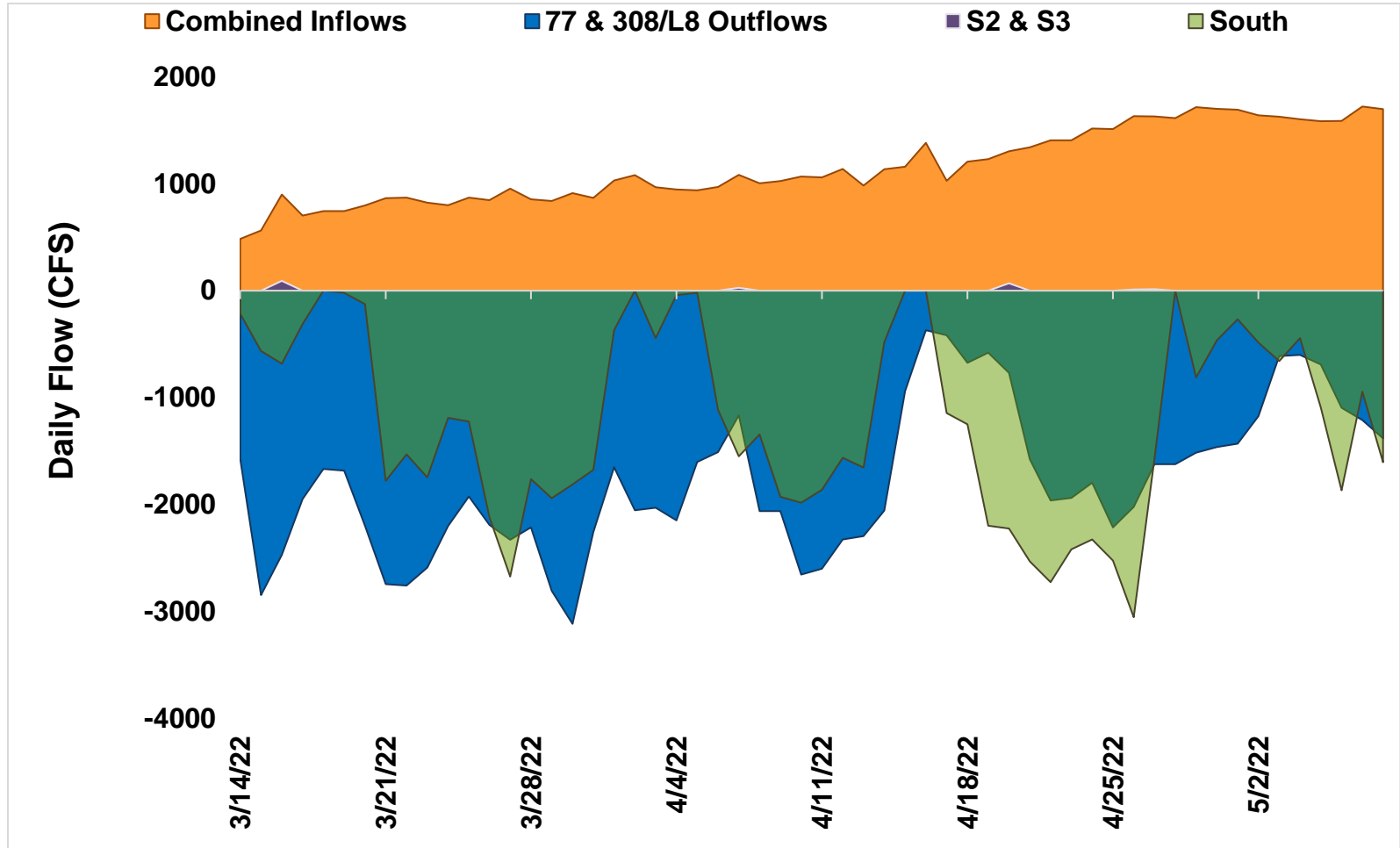
**Figure LO-2.** Recent Lake Okeechobee stages with projected stages based on a dynamic position analysis.



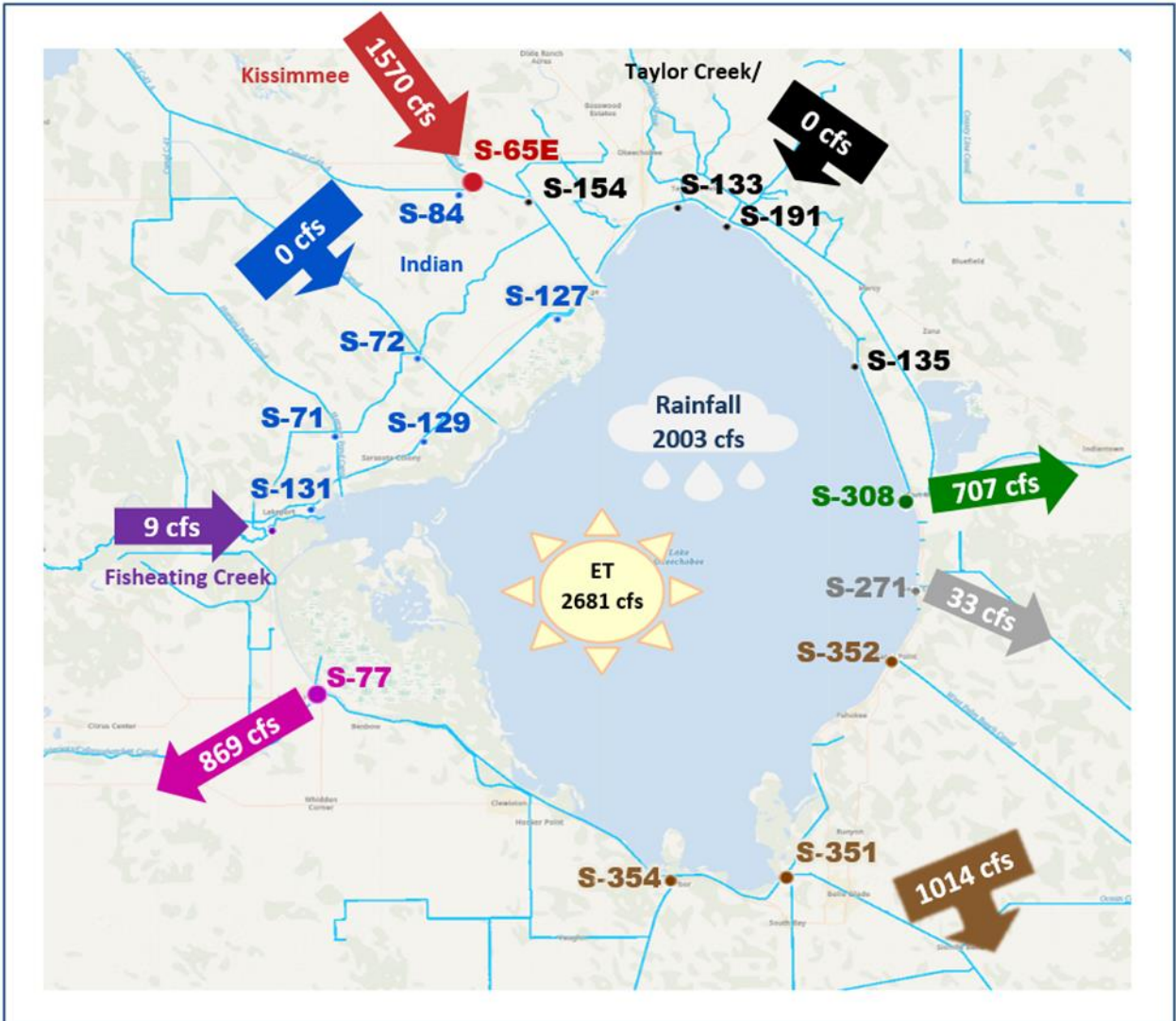


**Figure LO-3.** The prior six years of annual stage hydrographs for Lake Okeechobee in comparison to the ecological envelope.

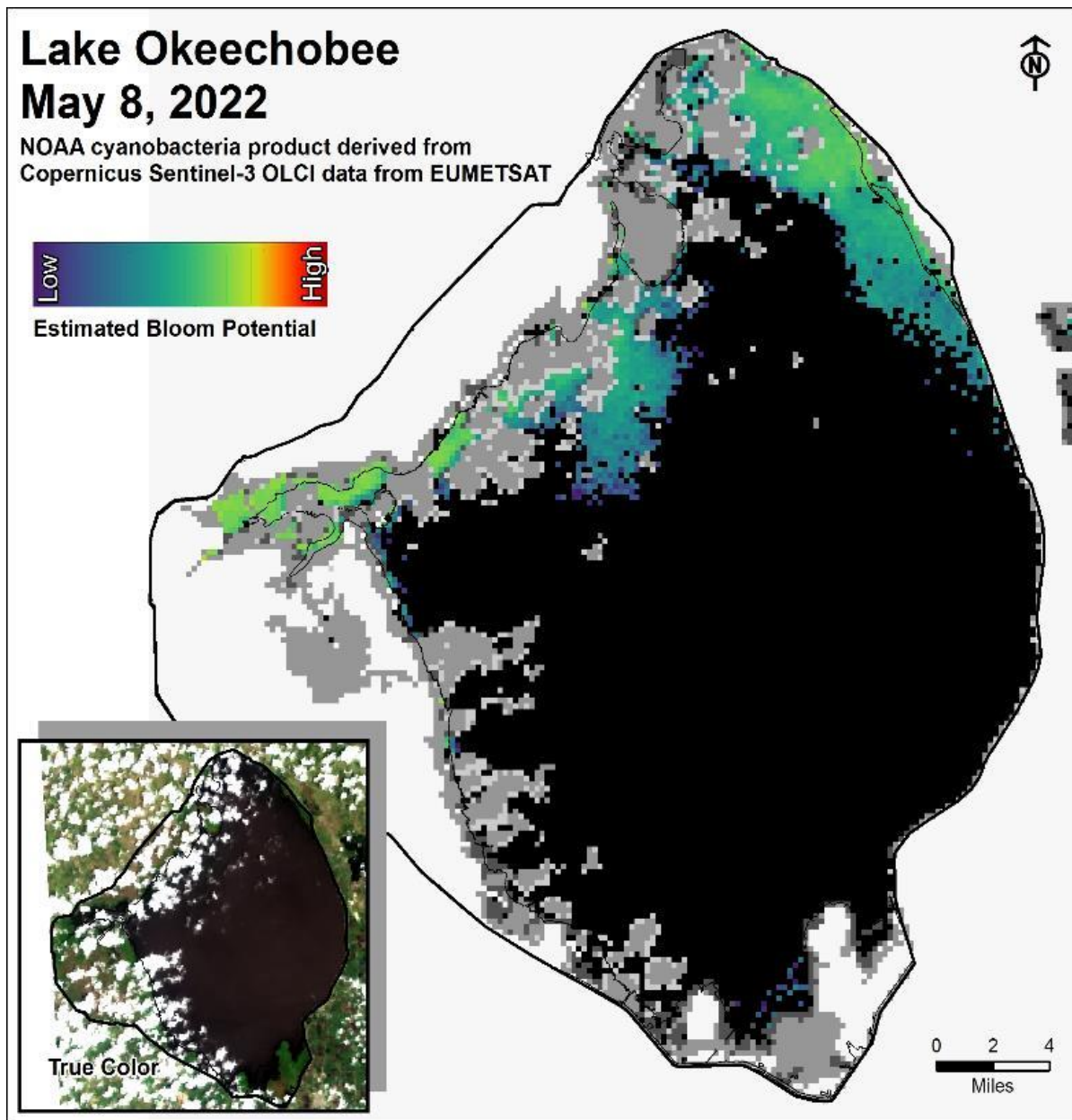




**Figure LO-4.** Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows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



**Figure LO-5.** Inflows into Lake Okeechobee from Indian Prairie basins, Taylor Creek/Nubbin Slough, Kissimmee River and Fisheating Creek, and outflows to the west via S-77, to the east via S-308, to the south via S-351, S-352, S-354, and to southeast via S-271 (formerly Culvert 10A) for the week of May 2 - 8, 2022.



**Figure LO-6.** Cyanobacteria bloom potential on May 8, 2022 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 238 cfs (**Figures ES-1 and ES-2**), and the previous 30-day mean inflow was 307 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-2**.

Over the past week, salinities decreased at all sites 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 23.0. Salinity conditions in the middle estuary were estimated to be within the optimal range for adult eastern oysters (**Figure ES-4**). Larval oyster recruitment rates reported by the Fish and Wildlife Research Institute were reported at 13.8 for April and was higher than any recruitment rate reported for 2021 (**Figure ES-5**).

### *Caloosahatchee River Estuary*

Over the past week, mean total inflow to the Caloosahatchee River Estuary was 1,052 cfs (**Figures ES-6 and ES-7**), and the previous 30-day mean inflow was 1,499 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 about the same throughout the estuary (**Table ES-2 and Figures ES-8 and ES-9**). The seven-day mean salinities (**Table ES-2**) were in the optimal range (0-10) for tape grass in the upper estuary. The seven-day mean salinity values were within the optimal range for adult eastern oysters at Cape Coral, and in the stressed range at Shell Point and Sanibel (**Figure ES-10**). Larval oyster recruitment rates reported by the Fish and Wildlife Research Institute were 1.2 for April at Iona Cove and was higher than recruitment rates observed last year in April. Recruitment rates at Bird Island for April was still low, similar to the previous year (**Figures ES-11 and ES-12**).

Surface salinity at Val I-75 was forecasted for the next two weeks, using an autoregression model (Qiu and Wan, 2013<sup>1</sup>) coupled with a linear reservoir model for the tidal basin. Model scenarios included pulse releases at S-79 ranging from 0 to 1,500 cfs and steady releases at 2,000 cfs with estimated tidal basin inflows of 36 cfs. Model results from all scenarios predict daily salinity to be 3.9 or lower and the 30-day moving average surface salinity to be 1.4 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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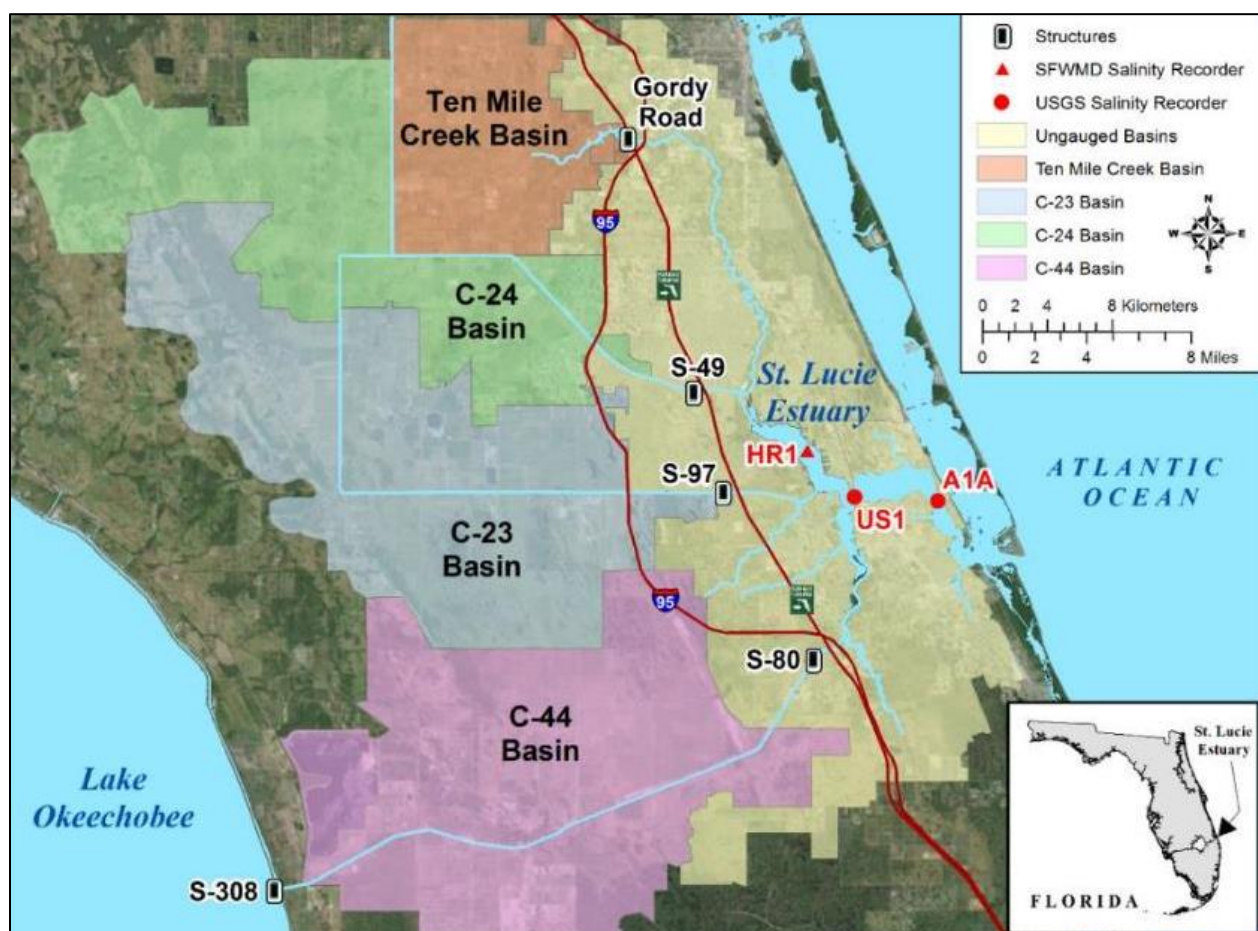
<sup>1</sup> Qui, C., and Y. Wan. 2013. Time series modeling and prediction of salinity in the Caloosahatchee River Estuary. *Water Resources Research* 49:5804-5816.

## Red Tide

The Florida Fish and Wildlife Research Institute reported on May 6, 2022, that *Karenia brevis*, the Florida red tide dinoflagellate, was not observed in any samples collected within the District region. On the east coast, red tide was not observed in samples from Palm Beach County.

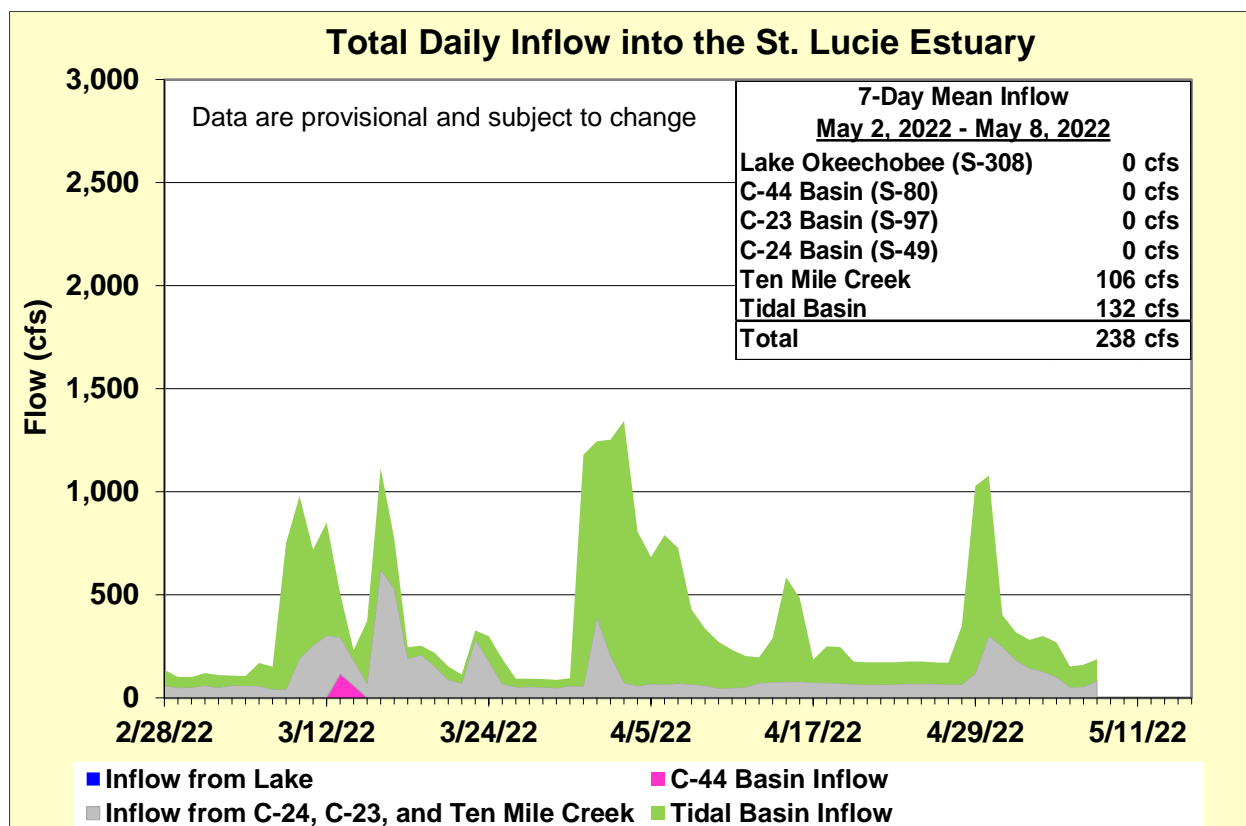
## Water Management Recommendations

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



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

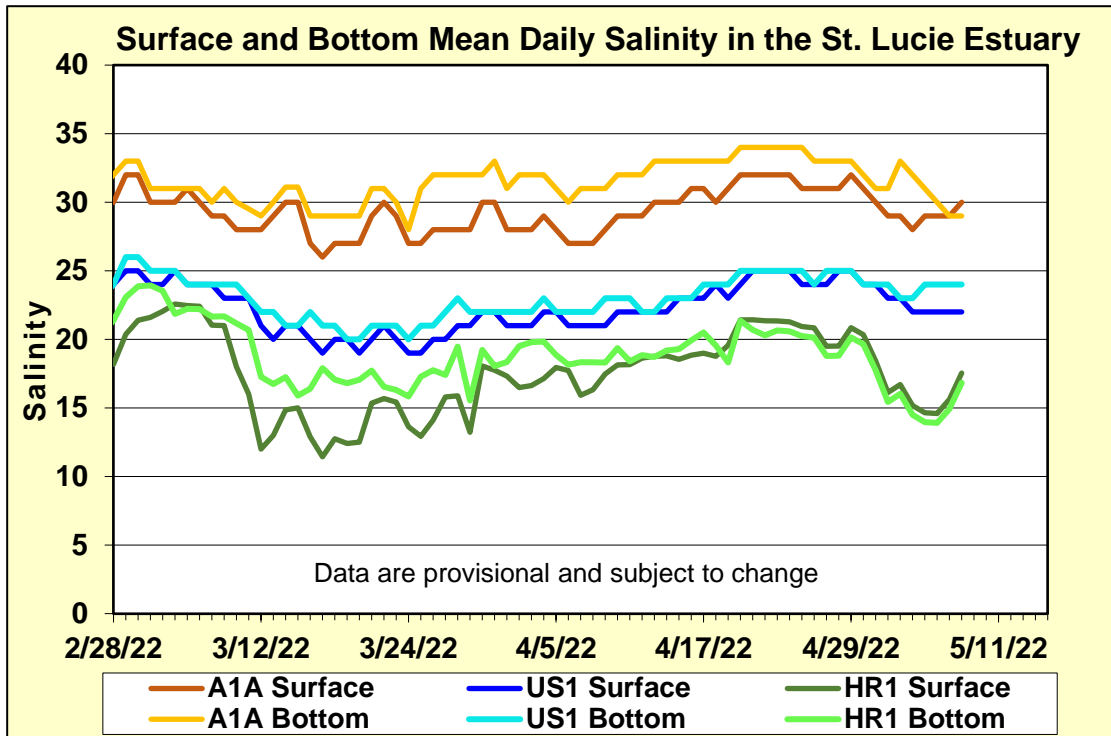




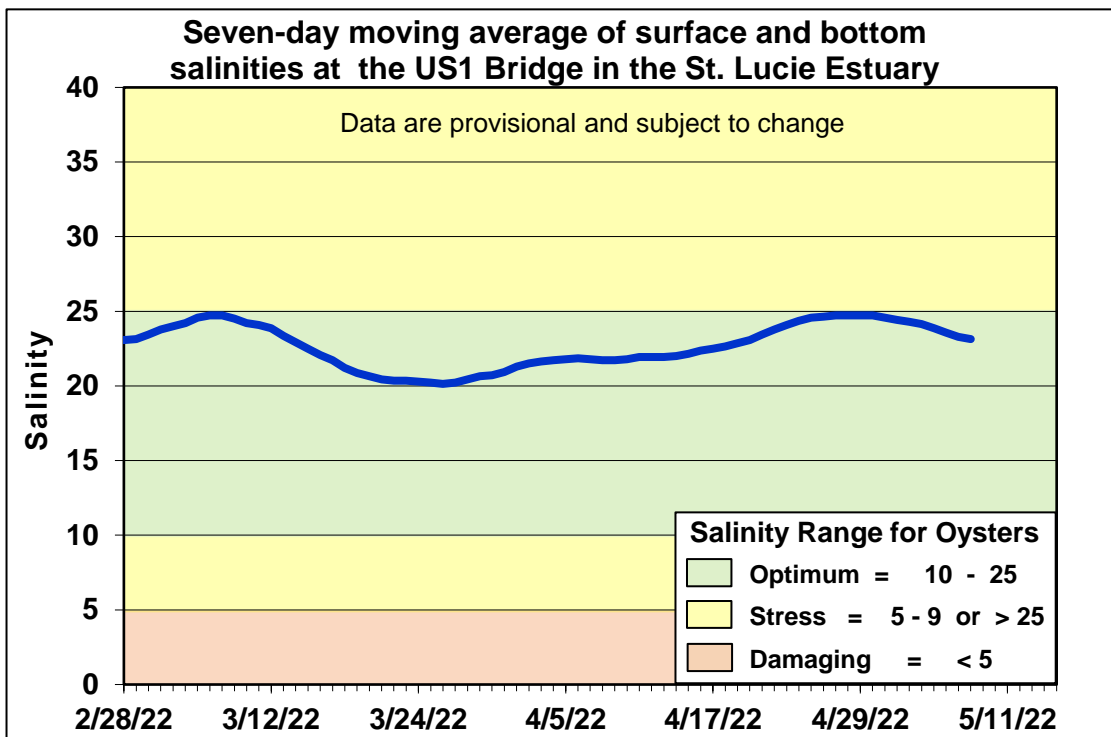
**Figure ES-2.** Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

**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.

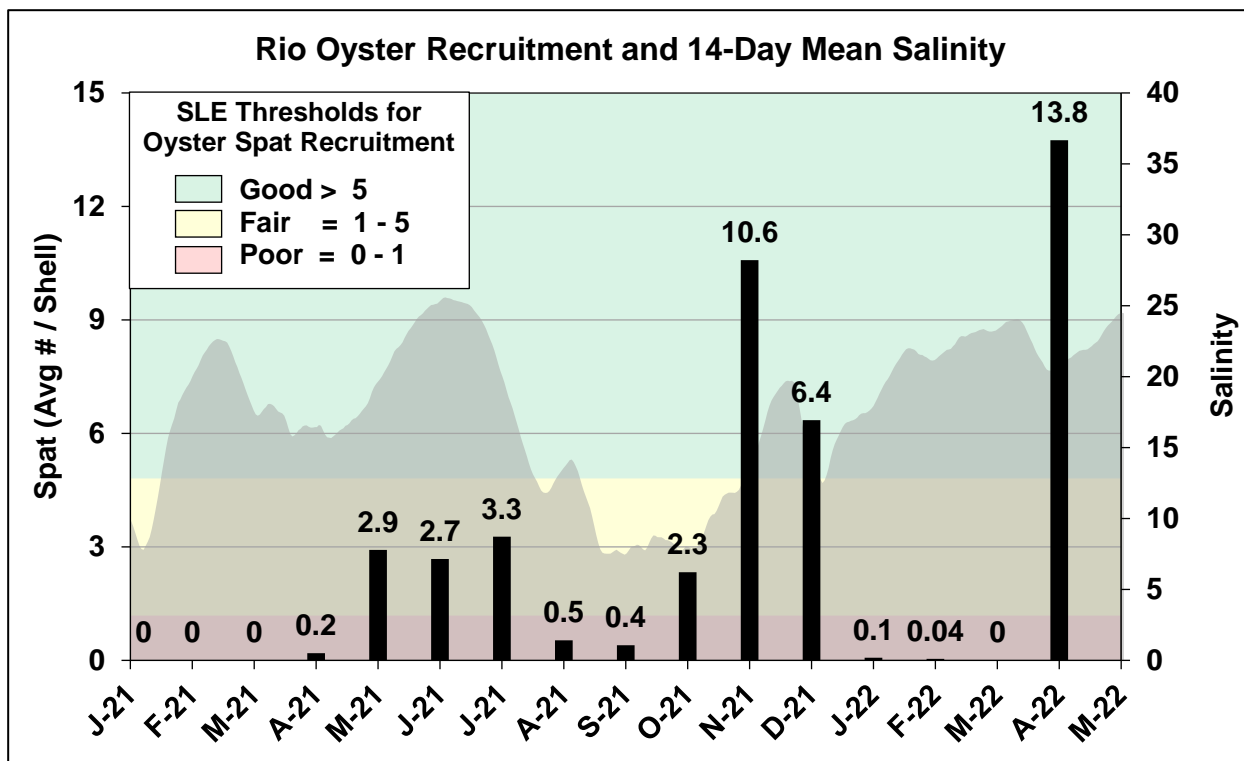
Sampling Site	Surface	Bottom	Optimum Envelope
HR1 (North Fork)	<b>15.8</b> (20.1)	<b>15.1</b> (19.4)	10.0 – 25.0
US1 Bridge	<b>22.3</b> (24.3)	<b>23.7</b> (24.6)	10.0 – 25.0
A1A Bridge	<b>29.0</b> (31.0)	<b>28.0</b> (32.7)	10.0 – 25.0



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

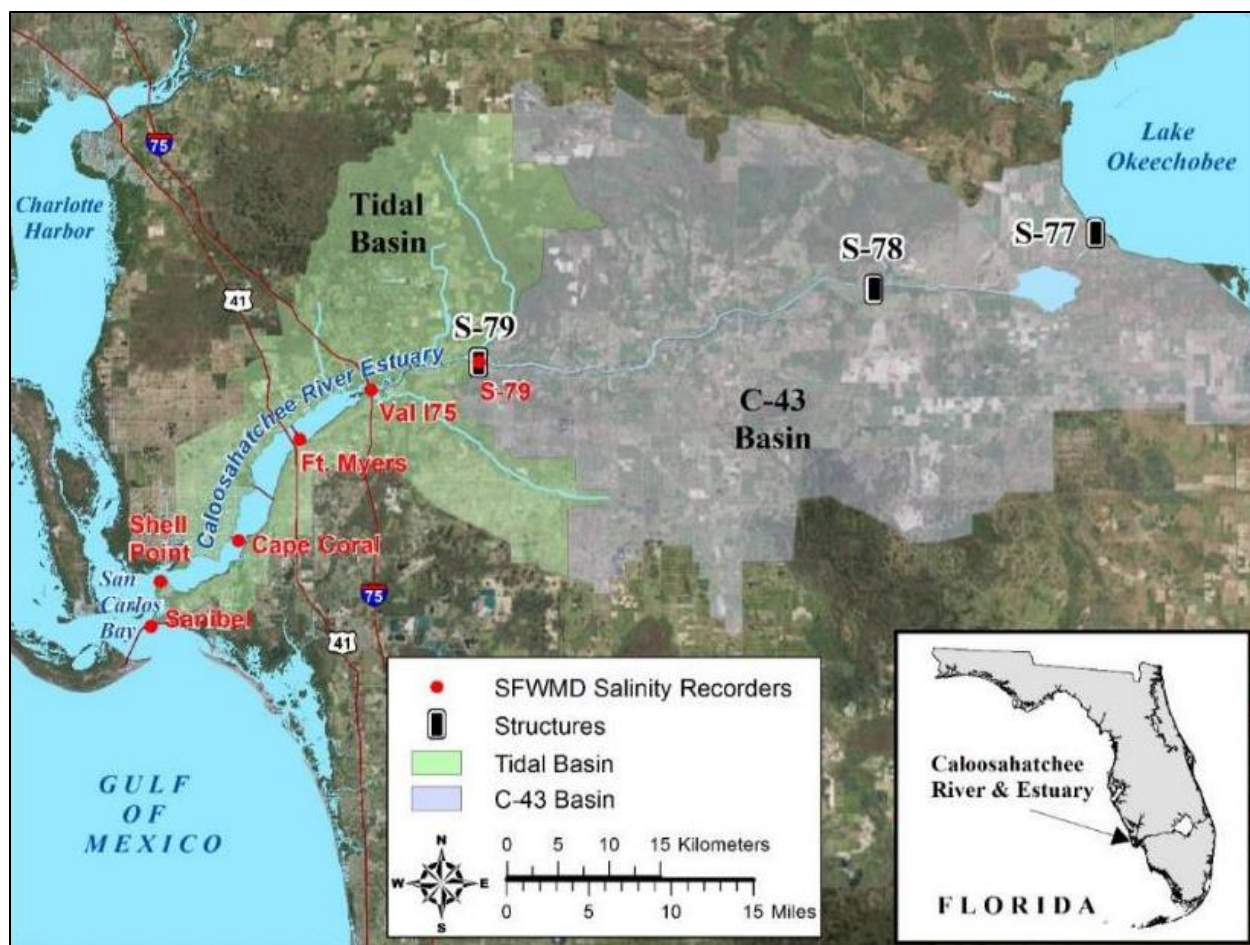


**Figure ES-4.** Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

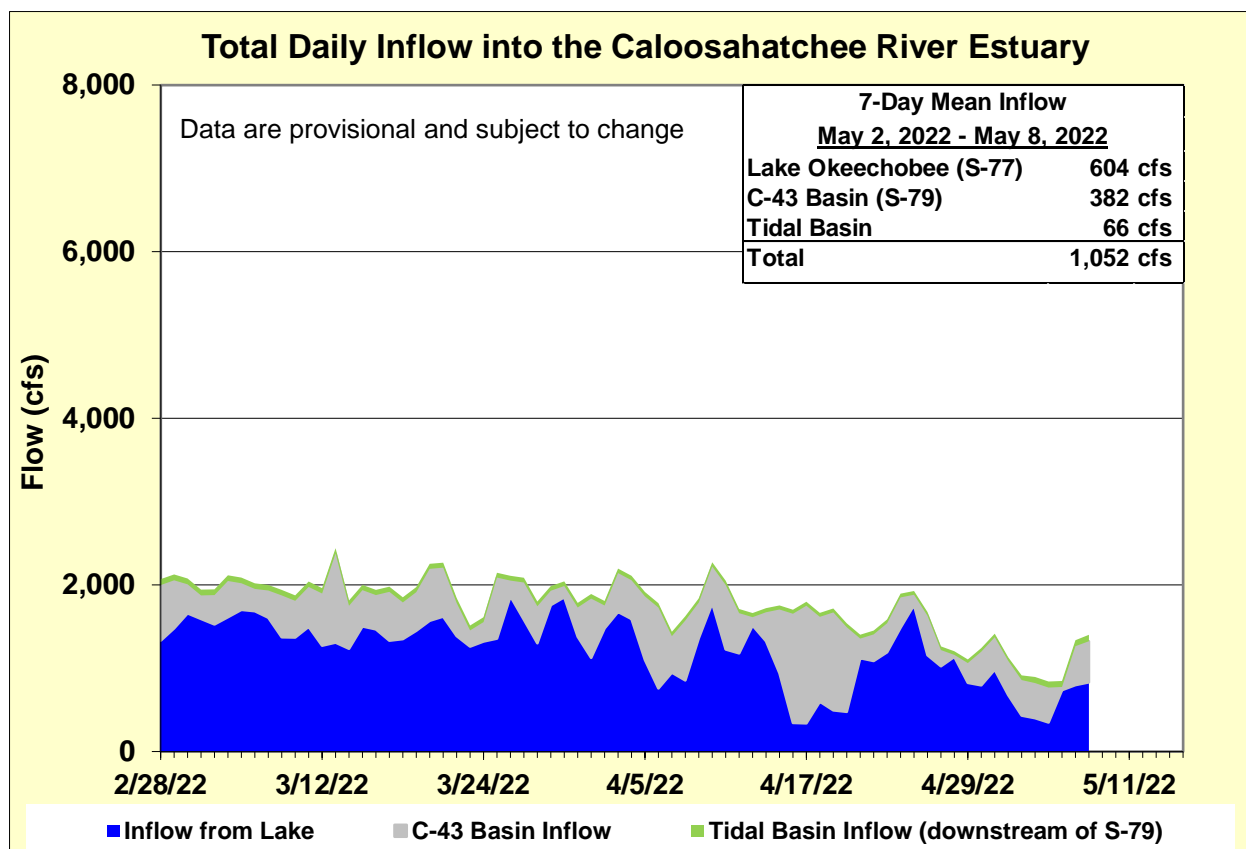


**Figure ES-5.** Mean oyster recruitment at the Rio oyster monitoring station and 14-day mean salinity at US1 Bridge.





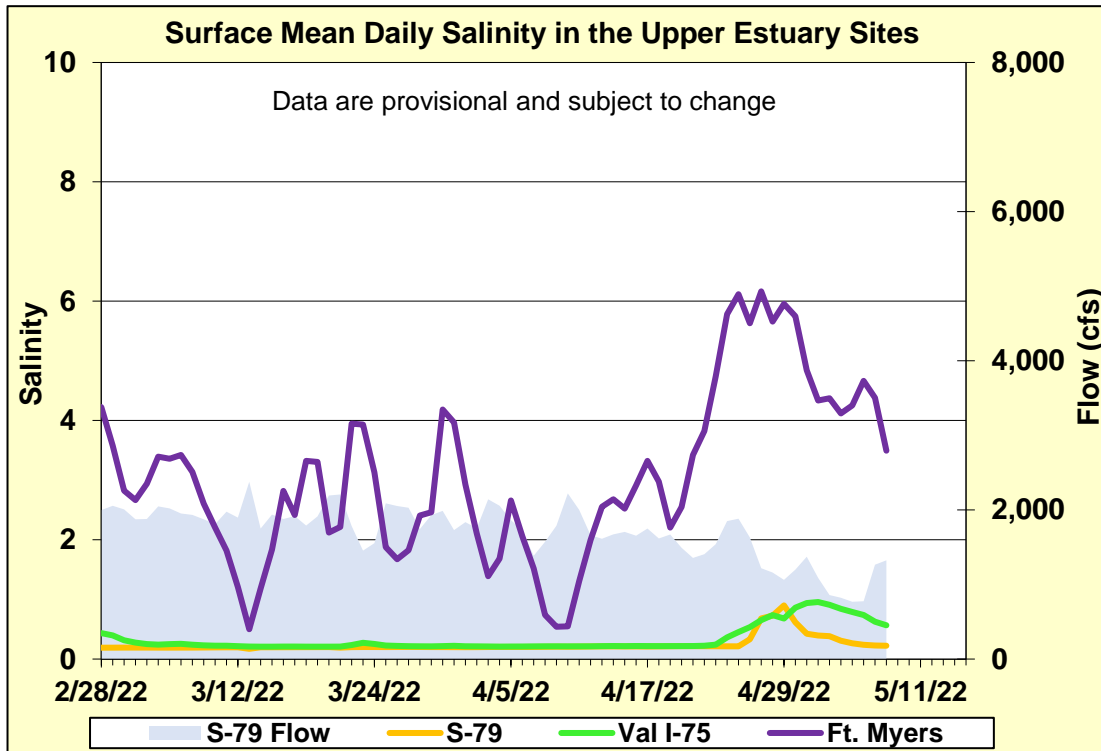
**Figure ES-6.** Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.



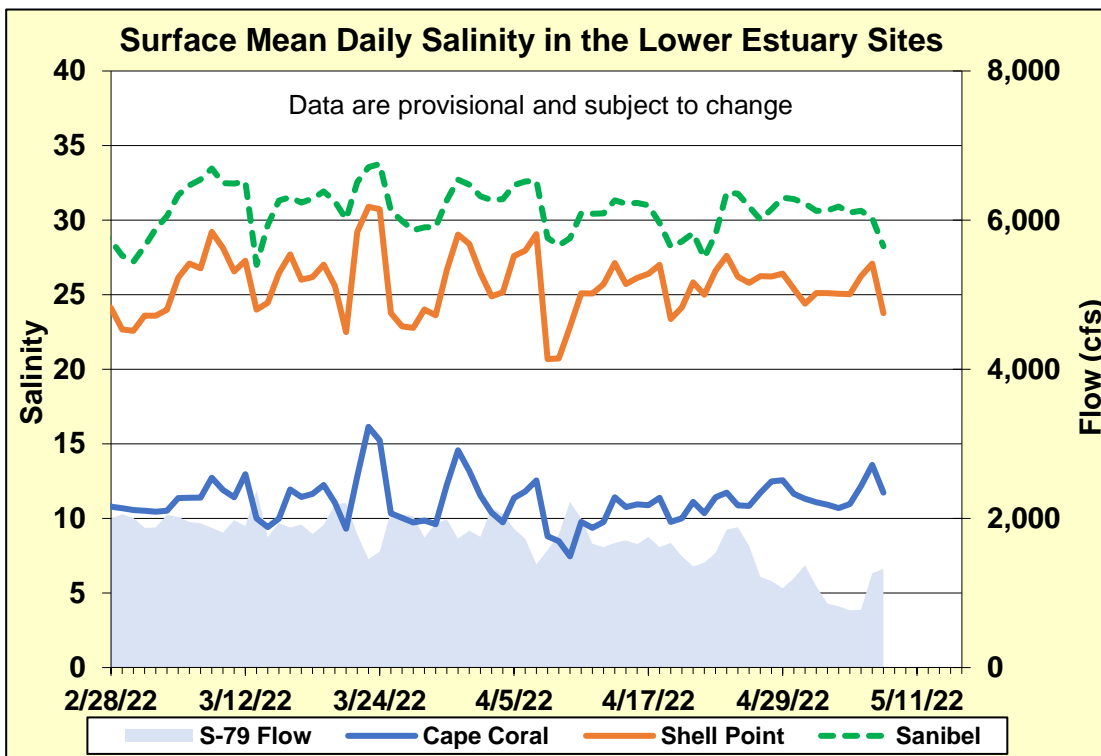
**Figure ES-7.** Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

**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.

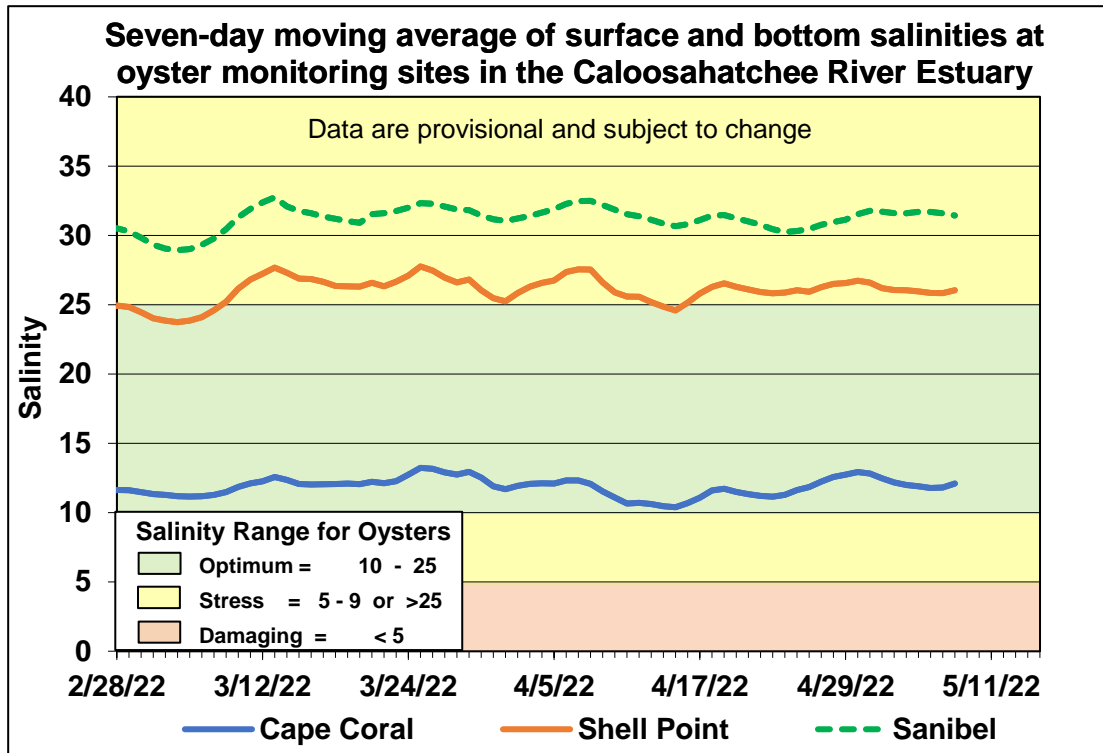
Sampling Site	Surface	Bottom	Optimum Envelope
S-79 (Franklin Lock)	<b>0.3</b> (0.6)	<b>0.3</b> (0.6)	0.0 – 10.0
Val I-75	<b>0.8</b> (0.7)	<b>0.9</b> (1.2)	0.0 – 10.0
Fort Myers Yacht Basin	<b>4.2</b> (5.7)	<b>4.9</b> (7.8)	0.0 – 10.0
Cape Coral	<b>11.6</b> (11.6)	<b>12.8</b> (13.3)	10.0 – 25.0
Shell Point	<b>25.3</b> (25.8)	<b>26.5</b> (26.6)	10.0 – 25.0
Sanibel	<b>30.2</b> (31.1)	<b>32.0</b> (32.4)	10.0 – 25.0



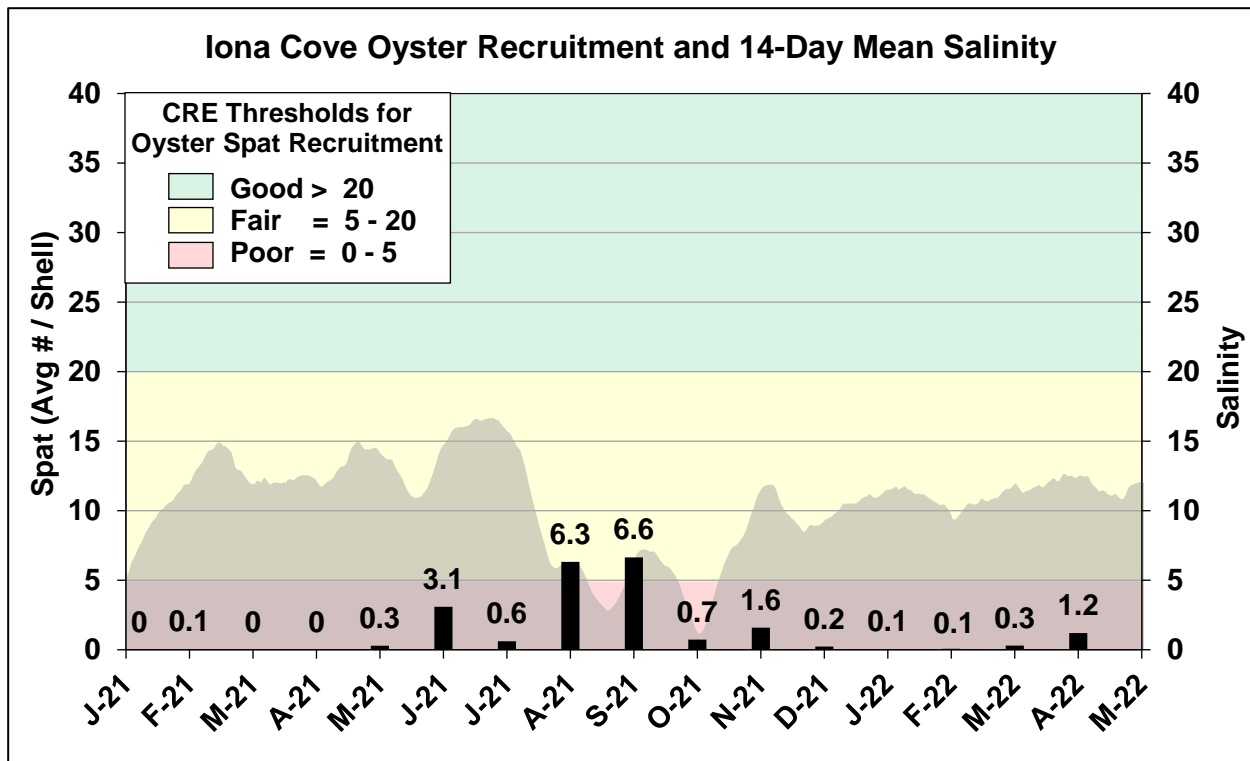
**Figure ES-8.** Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.



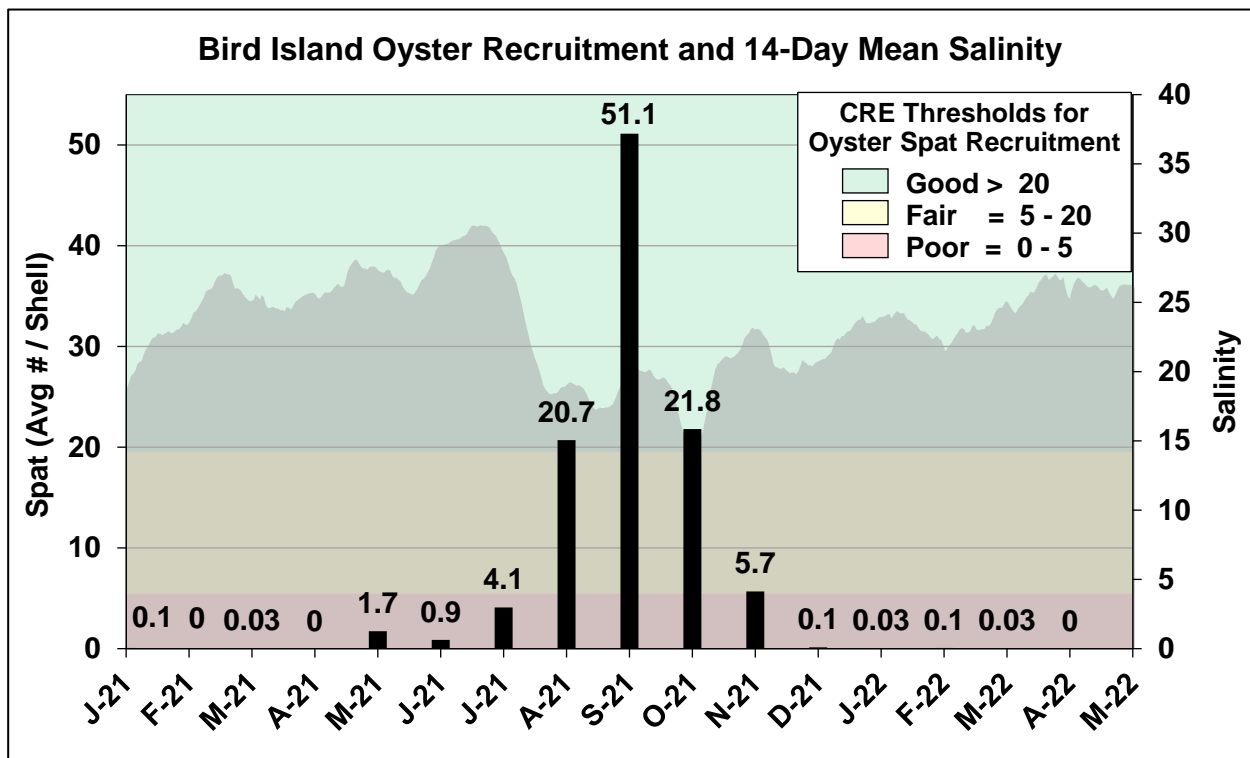
**Figure ES-9.** Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.



**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.



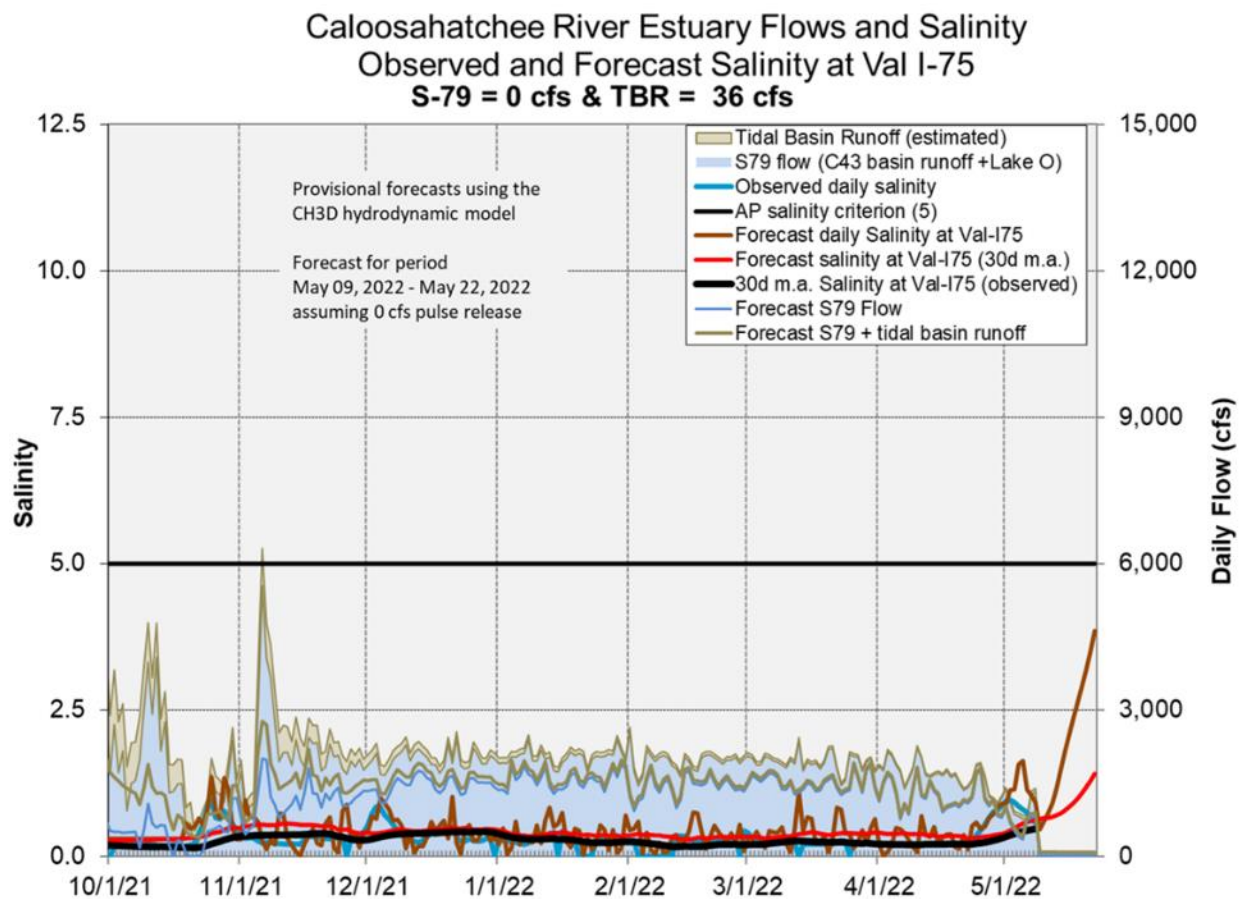
**Figure ES-11.** Mean oyster recruitment at the Iona Cove oyster monitoring station and 14-day mean salinity at Cape Coral.



**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	36	3.9	1.4
B	450	36	2.6	1.1
C	800	36	1.7	1.0
D	1000	36	1.1	0.9
E	1500	36	0.5	0.7
F	2000	36	0.3	0.6



**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, and the Eastern Flow-way is offline for vegetation management activities related to Tropical Storm Eta. Operational restrictions are in place in STA-1E Central Flow-way 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) is high for the Central Flow-way (**Figure S-1**).

**STA-1W:** Operational restrictions are in place in STA-1W Western, Eastern, and Northern Flow-ways due to construction activities. The Eastern and Northern Flow-ways contain nests of Migratory Bird Treaty Act protected species. Most treatment cells are at or near target stage. Vegetation in the flow-ways is stressed and highly stressed. The 365-day PLRs for the Northern and Western, and Eastern Flow-ways are below 1.0 g/m<sup>2</sup>/year (**Figure S-2**).

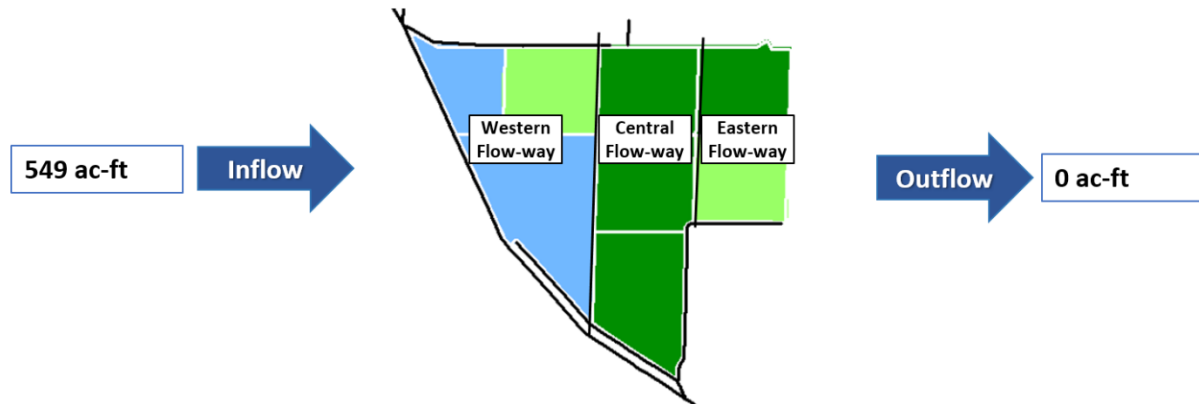
**STA-2:** STA-2 Flow-way 2 is offline for construction activities. Flow-way 3 contains nests of Migratory Bird Treaty Act protected species. Operational restrictions are in place in STA-2 Flow-ways 3 and 4 for vegetation management activities, and in Flow-way 1 following dryout conditions. Online treatment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

**STA-3/4:** STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown. The Central Flow-way contains nests of Migratory Bird Treaty Act protected species. Most 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:** STA-5/6 Flow-way 4 is offline for vegetation management activities. All 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 flow-ways 1, 6, 7, and 8 are below 1.0 g/m<sup>2</sup>/year. The 365-day PLRs for flow-ways 4 and 5 are high. (**Figure S-5** and **S-6**).

For definitions on STA operational language see glossary following figures.

# STA-1E Weekly Status Report – 5/2/2022 through 5/8/2022

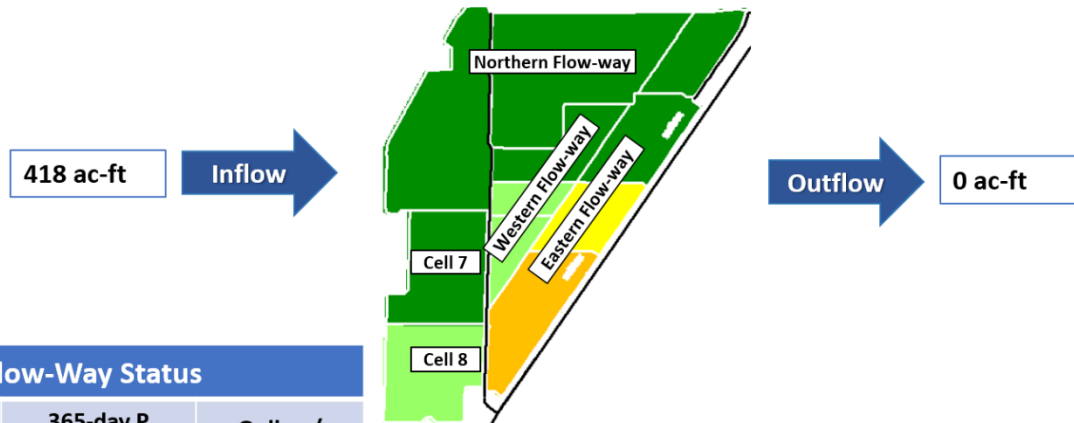


STA-1E Flow-Way Status				STA-1E Flow & Phosphorus Concentration			
Flow-Way	Vegetation Status Healthy ----- Stressed ←-----→	365-day P Loading Rate (below 1.0 g P /m <sup>2</sup> /yr is optimal)	Online / Offline / Restrictions	As of 5/8/2022			
Eastern	Offline, Tropical Storm Eta repairs starting 01/24/2022	1.0	Vegetation Rehab	Stage Based: Relative to Target Stage (TS)			
				Deep Water Level (> 2.8' above TS) High Water Level (1.5' – 2.8' above TS) 0.2' – 1.5' above TS Target Stage (TS +/- 0.2') Low Water Level (<0.2' below TS)			
				Depth / Area Based: Percent of Area Dry			
Central	←-----→	1.0	Vegetation Rehab	0-25% Dry	50-75% Dry	75-100% Dry	
Western	Offline, post-construction grow in starting 3/28/2022			25-50% Dry			
				7-day      28-day      365-day Total Inflow, ac-ft      549      2,973      173,581 --Lake Inflow, ac-ft      0      N/A      3,800 Total Outflow, ac-ft      0      2      142,677 Inflow Conc., ppb      100      98      118 Outflow Conc., ppb      N/A      N/A      22 Includes Preliminary Data			

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



# STA-1W Weekly Status Report – 5/2/2022 through 5/8/2022



## STA-1W Flow-Way Status

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

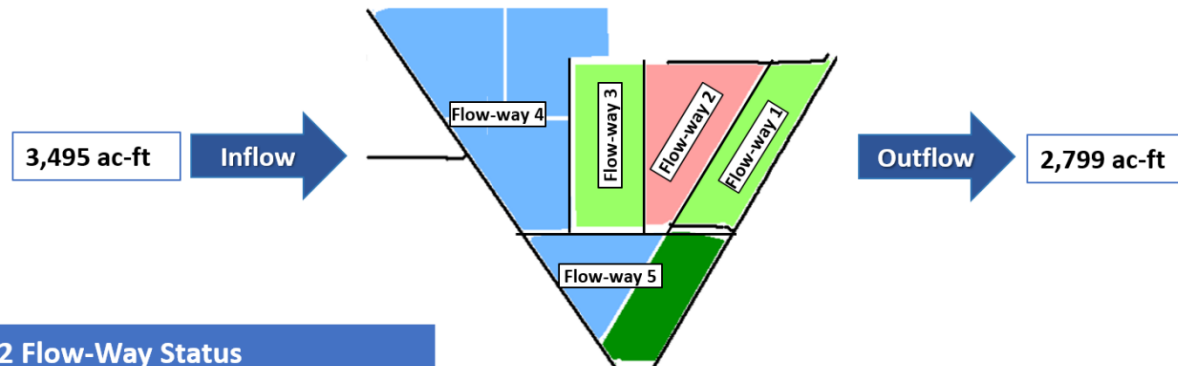
As of 5/8/2022	
Stage Based: Relative to Target Stage (TS)	
Deep Water Level (> 2.8' above TS)	
High Water Level (1.5' – 2.8' above TS)	
0.2' – 1.5' above TS	
Target Stage (TS +/- 0.2')	
Low Water Level (<0.2' below TS)	
Depth / Area Based: Percent of Area Dry	
0-25% Dry	50-75% Dry
25-50% Dry	75-100% Dry








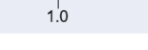
## STA-1W Flow & Phosphorus Concentration










	7-day	28-day	365-day
Total Inflow, ac-ft	418	743	57,246
--Lake Inflow, ac-ft	0	N/A	3,300
Total Outflow, ac-ft	0	0	52,971
Inflow Conc., ppb	127	121	158
Outflow Conc., ppb	N/A	N/A	24
Includes Preliminary Data			

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

# STA-2 Weekly Status Report – 5/2/2022 through 5/8/2022



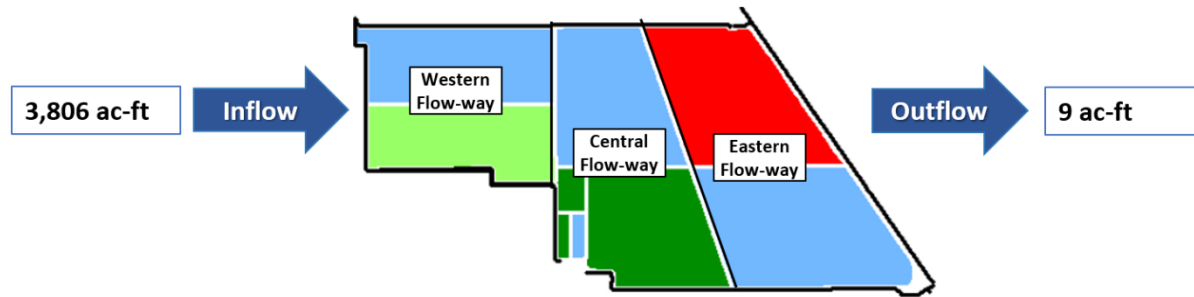
STA-2 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m <sup>2</sup> /yr is optimal)	Online / Offline / Restrictions
1			Post Dryout
2	Offline, construction activities as of 9/7/2021		
3			Veg Rehab / Nesting
4			Vegetation Rehab
5			Online

As of 5/8/2022	
Stage Based: Relative to Target Stage (TS)	
	Deep Water Level (> 2.8' above TS)
	High Water Level (1.5' – 2.8' above TS)
	0.2' – 1.5' above TS
	Target Stage (TS +/- 0.2')
	Low Water Level (<0.2' below TS)
Depth / Area Based: Percent of Area Dry	
	0-25% Dry
	25-50% Dry
	50-75% Dry
	75-100% Dry

STA-2 Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	3,495	9,050	288,473
--Lake Inflow, ac-ft	3,000	N/A	37,800
Total Outflow, ac-ft	2,799	6,099	300,027
Inflow Conc., ppb	98	54	90
Outflow Conc., ppb	17	16	15
Includes Preliminary Data			

Figure S-3. STA-2 Weekly Status Report

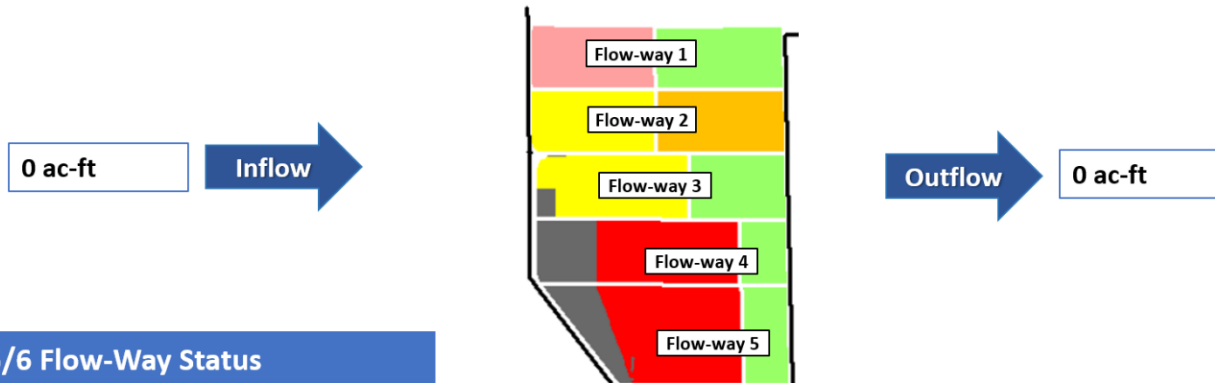
STA-3/4 Weekly Status Report – 5/2/2022 through 5/8/2022



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 5/8/2022			
				Stage Based: Relative to Target Stage (TS)			
Eastern	Offline, vegetation management drawdown as of 3/1/2021			<div>Deep Water Level (&gt; 2.8' above TS)</div> <div>High Water Level (1.5' – 2.8' above TS)</div> <div>0.2' – 1.5' above TS</div> <div>Target Stage (TS +/- 0.2')</div> <div>Low Water Level (&lt;0.2' below TS)</div>			
				Depth / Area Based: Percent of Area Dry			
Central			Avian Nesting	<div>0-25% Dry</div> <div>25-50% Dry</div> <div>50-75% Dry</div> <div>75-100% Dry</div>			
Western			Online				
					7-day	28-day	365-day
Total Inflow, ac-ft					3,806	3,806	341,375
--Lake Inflow, ac-ft					1,500	N/A	27,300
Total Outflow, ac-ft					9	330	305,152
Inflow Conc., ppb					42	41	92
Outflow Conc., ppb					45	26	15
Includes Preliminary Data							

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

# STA-5/6 Weekly Status Report – 5/2/2022 through 5/8/2022



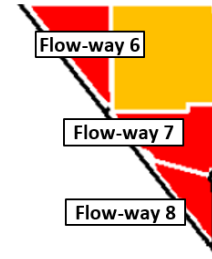
STA-5/6 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m <sup>2</sup> /yr is optimal)	Online / Offline / Restrictions
1			Online
2		N/A	Online
3		N/A	Online
4	Offline, vegetation management starting 01/24/2022		
5			Online

As of 5/8/2022	
Stage Based: Relative to Target Stage (TS)	
	Deep Water Level (> 2.8' above TS)
	High Water Level (1.5' – 2.8' above TS)
	0.2' – 1.5' above TS
	Target Stage (TS +/- 0.2')
	Low Water Level (<0.2' below TS)
Depth / Area Based: Percent of Area Dry	
	0-25% Dry
	25-50% Dry
	50-75% Dry
	75-100% Dry

STA-5/6 Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	0	0	177,784
--Lake Inflow, ac-ft	0	N/A	5,300
Total Outflow, ac-ft	0	7	169,175
Inflow Conc., ppb	N/A	N/A	243
Outflow Conc., ppb	N/A	46	50
Includes Preliminary Data			

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

STA-5/6 Weekly Status Report – 5/2/2022 through 5/8/2022



STA-5/6 Flow-Way Status				As of 5/8/2022	
Flow-Way	Vegetation Status Healthy ----- Stressed ←-----→	365-day P Loading Rate (below 1.0 g P /m <sup>2</sup> /yr is optimal)	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)	
				Deep Water Level (> 2.8' above TS)	
6	←-----→	1.0	Online	High Water Level (1.5' – 2.8' above TS)	
				0.2' – 1.5' above TS	
7	←-----→	1.0	Online	Target Stage (TS +/- 0.2')	
				Low Water Level (<0.2' below TS)	
8	←-----→	1.0	Online	Depth / Area Based: Percent of Area Dry	
				0-25% Dry	50-75% Dry
				25-50% Dry	75-100% Dry

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

## Basic Concepts and Definitions for STA Weekly Status Report

- **Inflow:** Sum of flow volume at all inflow structures to an STA.
- **Lake Inflow:** Portion of the STA total inflow volume that originates from Lake Okeechobee.
- **Outflow:** Sum of flow volume at outflow structures from an STA.
- **Total Phosphorus (TP):** Total mass of phosphorus in all its forms; including particulate, dissolved, etc.
- **Inflow Concentration:** TP concentration is the mass of TP in micrograms per liter of water,  $\mu\text{g/L}$  or ppb. Inflow concentration refers to the flow-weighted mean TP from all inflow structures over a period of time.
- **Outflow Concentration:** The flow-weighted mean TP from all outflow structures over a period of time. The outflow concentration represents the reduction of inflow TP achieved by STA treatment of the inflow water.
- **WQBEL:** The STA outflow concentration that is required upon completion of the Restoration Strategies projects by December 2025. The outflow concentration shall not exceed 13 ppb as an annual flow weighted mean in more than 3 out of 5 water years on a rolling basis and shall not exceed 19 ppb as an annual flow weighted in any water year.
- **Flow-Way (FW):** One or more treatment cells connected in series. Cells typically have emergent aquatic vegetation (EAV) in the front portion of the flow-way followed by a mix of EAV and submerged aquatic vegetation (SAV)
- **Vegetation Status:** Healthy means the vegetation condition is good and will allow the STA to perform as designed. Stressed means the vegetation is showing signs of poor health, such as browning or areas of vegetation die-off, or the cell contains undesirable vegetation such as floating exotic vegetation requiring treatment. The TP reduction capability of the STA is affected when the vegetation condition is poor.
- **Phosphorus Loading Rate (PLR):** Mass of inflow TP in grams, divided by total treatment area of STA in square meters, per year. In general, a 365-day value of less than 1.0 is needed for an STA to perform optimally. A PLR of 2.0 is considered very high and a PLR of 3.0 is considered extremely high. The TP reduction capability of the STA is affected when the PLR is high, very high and extremely high.
- **Online:** Online status means the FW can receive and treat inflow.
- **Online with Restriction:** The FW can receive and treat inflow, but the amount of flow or water level may be limited temporarily. For example, a vegetation rehabilitation effort may require reduced flows through an area while the new plants are establishing, or nesting by protected species may require a certain water level not to be exceeded.
- **Offline:** The FW is unable to receive and treat inflow due to repairs, construction, or other prohibitive reasons.
- **Depth:** Difference between the average surface water level in a cell and the average ground elevation in that cell. Target depths, or depths between flow events, are between 1.25 ft to 1.5 ft. As depth approaches or drops below zero, an increasing percentage of the cell is considered dry and STA conditions deteriorate. An increase in depth above target depth is expected with increasing flow. However, as depth increases much above the target depth and is sustained over a period of time, it can be detrimental to vegetation health and overall STA treatment performance.
- **Note:** The data provided in this summary report were developed using a combination of provisional and quality-assured flow and water quality data. In some cases, best professional judgment was used to estimate missing data and revise questionable data. Values provided are not considered final but are appropriate for use in STA operational decision-making.

## **Everglades**

### ***Water Conservation Area Regulation Schedules***

WCA-1: Stage at the 1-8C fell along the slope of the regulation line last week. The average on Sunday was 0.13 feet below the falling Zone A1 regulation line. WCA-2A: Stage receded gradually at the S11B headwater last week. The average at that gauge on Sunday was 0.39 feet below the flat regulation line, and 0.11 feet above the water supply floor. WCA-3A: Last week the Three Gauge Average stages declined gradually; average stage remained 1.14 feet below the falling regulation line on Sunday (3-69W is estimated to be +0.20'). WCA-3A: Stage fell quickly at gauge 62 (Northwest corner) last week, the average on Sunday was 1.48 feet below the flat Upper schedule line. (**Figures EV-1 through EV-4**).

### ***Water Depths***

The SFWDAT tool indicates that stages are falling significantly belowground east of the Miami Canal in WCA-3A North. WCA-1 and WCA-2A are drying down. Southern WCA-3A along the L-67s potentially drying down to soil surface is a rare event. North to South hydrologic connectivity remains within Everglades National Park's Shark River Slough and has greatly diminished (and potentially lost) in Taylor slough (**Figure EV-5**). Comparing current WDAT water depths to the depth one month ago, stages decreased across the eastern Everglades Protection Area, while deeper in western Big Cypress National Park (BCNP). Looking back one-year, south-eastern WCA-3A is significantly lower in depth compared to one year ago, while BCNP is much wetter. (**Figure EV-6**). Comparing current depths to the past 20 years, the eastern half WCA-3A North remains in the 10th percentile. BCNP is above the 50th percentile but below the soil surface as is typical for this time of year but not favorable. Eastern WCA-3A South is within the 10 to 20th percentile, a good thing for that historically ponded region. Everglades National Park remains above the 70th percentile. (**Figure EV-7**).

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

Stages in Taylor Slough decreased an average of 0.05 feet over this past week while receiving 0.3 inches of weekly rain and a pulse of water through multiple structures towards the end of the week. Individual stage gauge changes ranged from -0.21 to +0.07 feet (**Figure EV-8**). The Slough is now 5.9 inches higher than average driven in large part by the northern areas which are 6 inches higher than the historical average for this time of year (pre-Florida Bay initiative which started in 2017). Only the Craighead Pond station (CP) still has appreciable standing water, but this station is below sea level and expected (**Figure EV-9**). Northern Taylor Slough is now dry. This is almost 3 months later than was typical in previous years due in large part to water movements through the dry season.

Salinities in Florida Bay averaged an increase of 0.8 over the week ending 5/8, with individual station changes ranging from -1.7 to +3.1 (**Figure EV-8**). The largest increases occurred in the nearshore areas where creek flows were negative (moving upstream) for 5 of the last 7 days. Each region is still in the middle of its respective interquartile range, but salinities are rising (**Figure EV-10**). This is the time of year that salinities rise rapidly

due to increased evaporation and the lack of precipitation/flow. The start of the wet season can start a rapid freshening.

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

Conserving water in the northern basins, then allowing that water to move downstream as we transition further into the dry season maximizes the ecological benefit of freshwater on the landscape. Flows as long as possible into the northern WCA-3A that assist recession rates in that sub-basin have an ecological benefit by protecting particularly fragile peat soils from oxidation and lowering the risk of muck fires as we move into the driest part of the year. Continued rain and freshwater flows to the Taylor Slough area have prolonged the hydroperiod there. If stage can be maintained, it will help expedite deliveries to the south when the wet season begins. 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	0.88	-0.02
WCA-2A	1.46	+0.03
WCA-2B	2.55	+0.02
WCA-3A	1.14	+0.14
WCA-3B	0.94	-0.03
ENP	1.08	-0.05



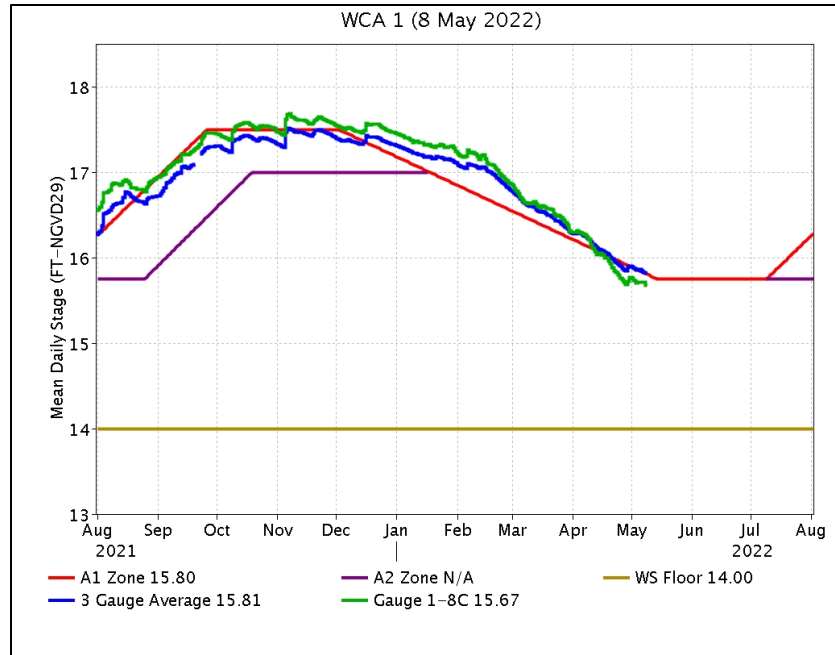


Figure EV-1. WCA-1 stage hydrographs and regulation schedule.

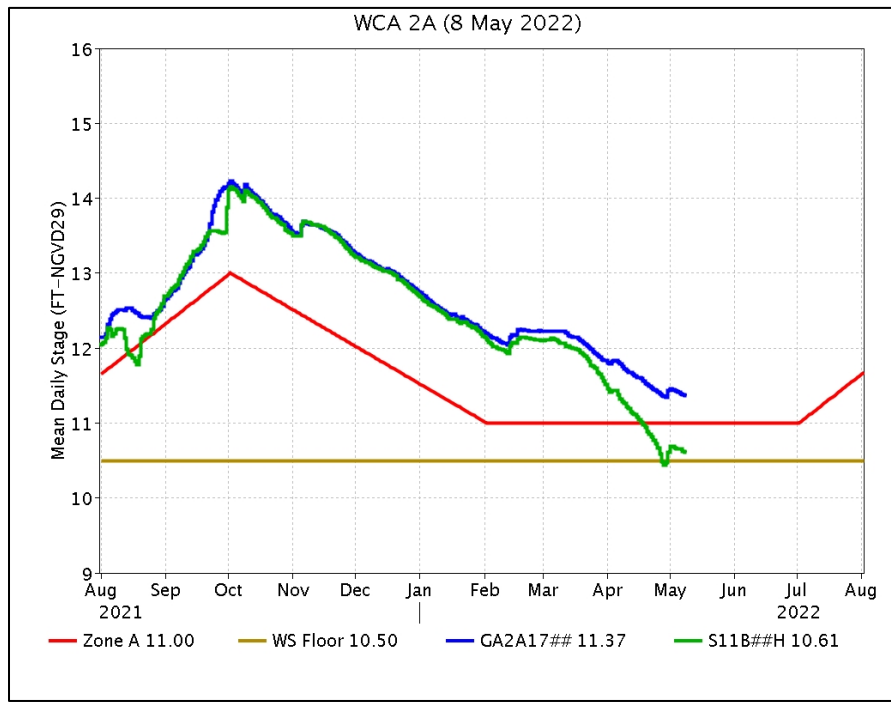
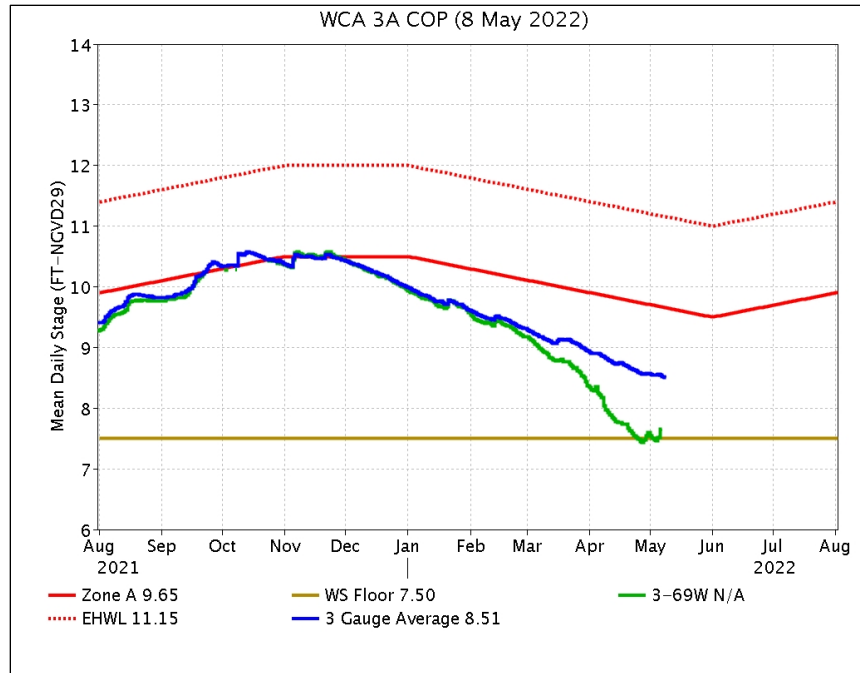
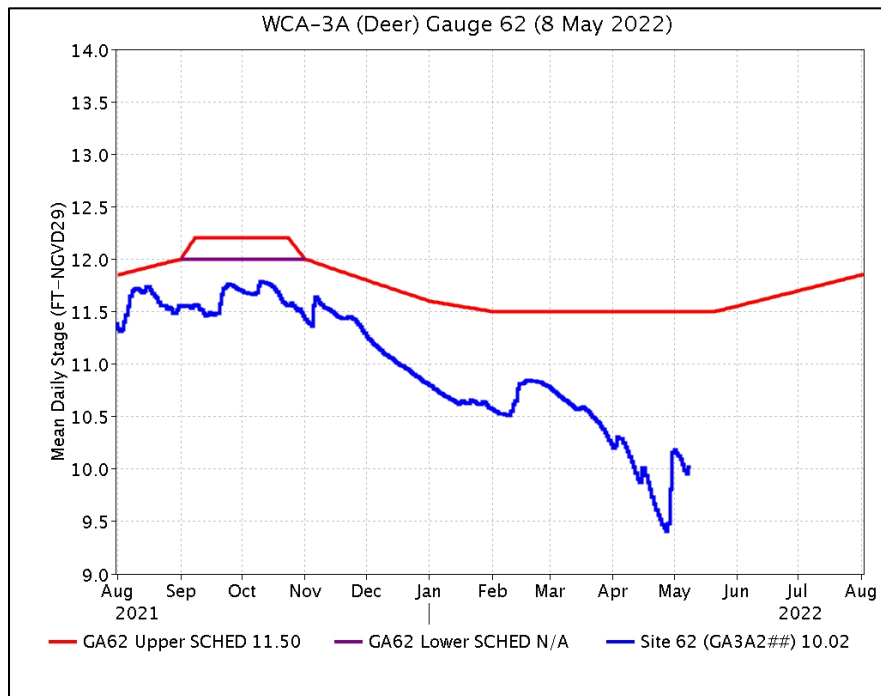


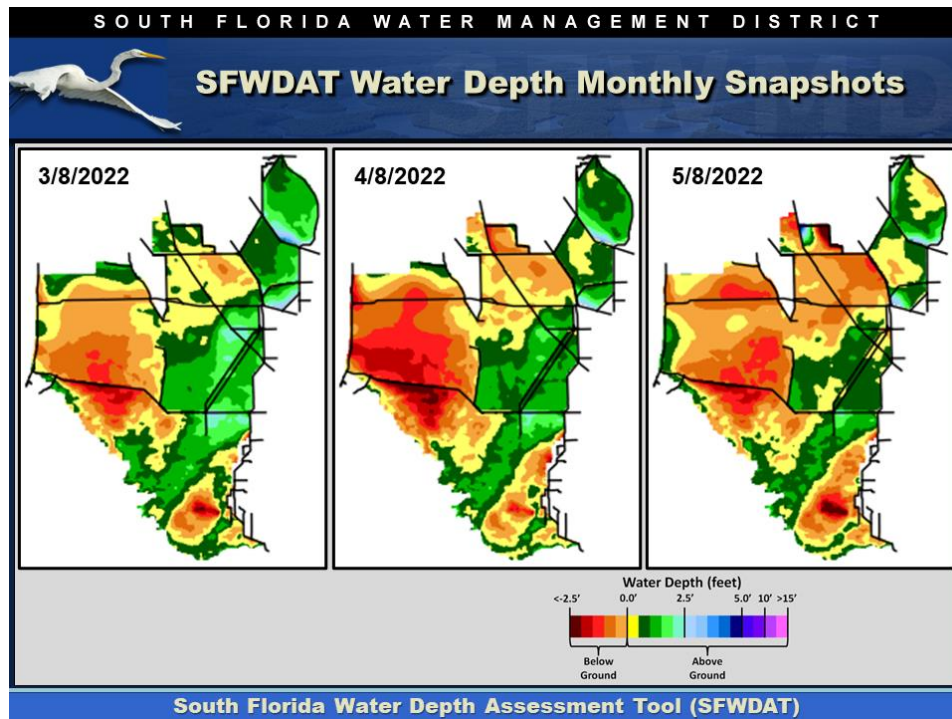
Figure EV-2. WCA-2A stage hydrographs and regulation schedule.



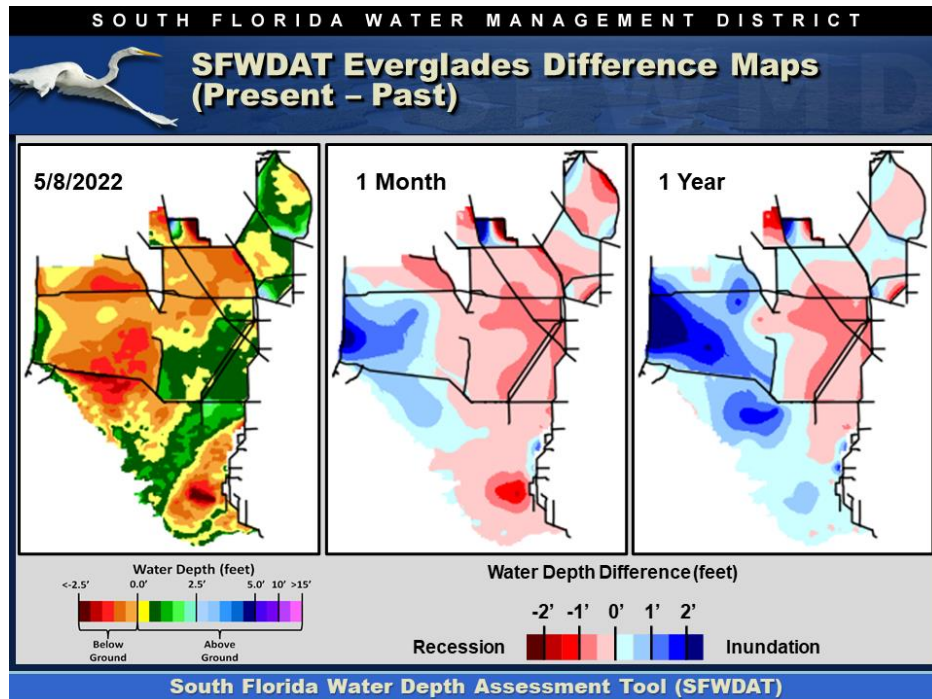
**Figure EV-3.** WCA-3A stage hydrographs (three-gauge average, S-333 headwater) and regulation schedule.



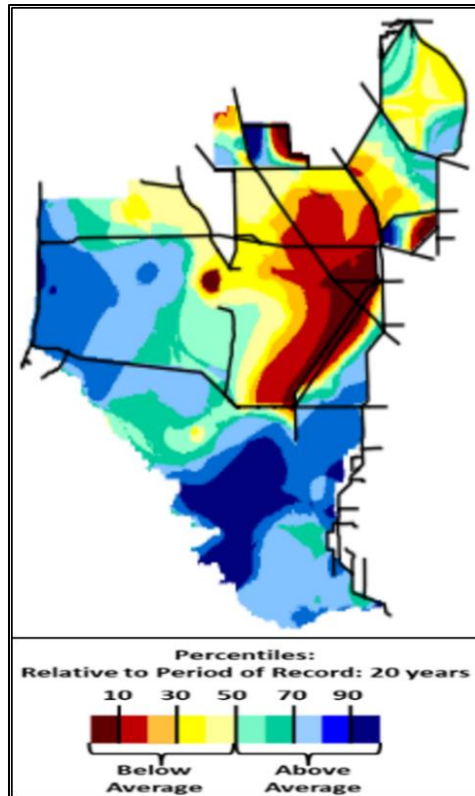
**Figure EV-4.** WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.



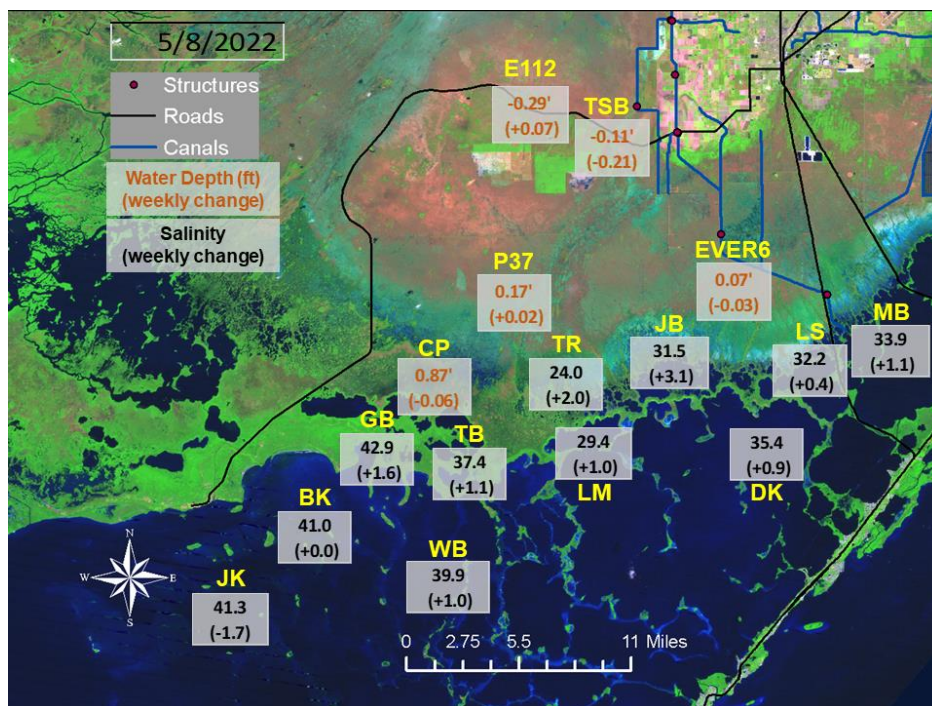
**Figure EV-5.** Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.



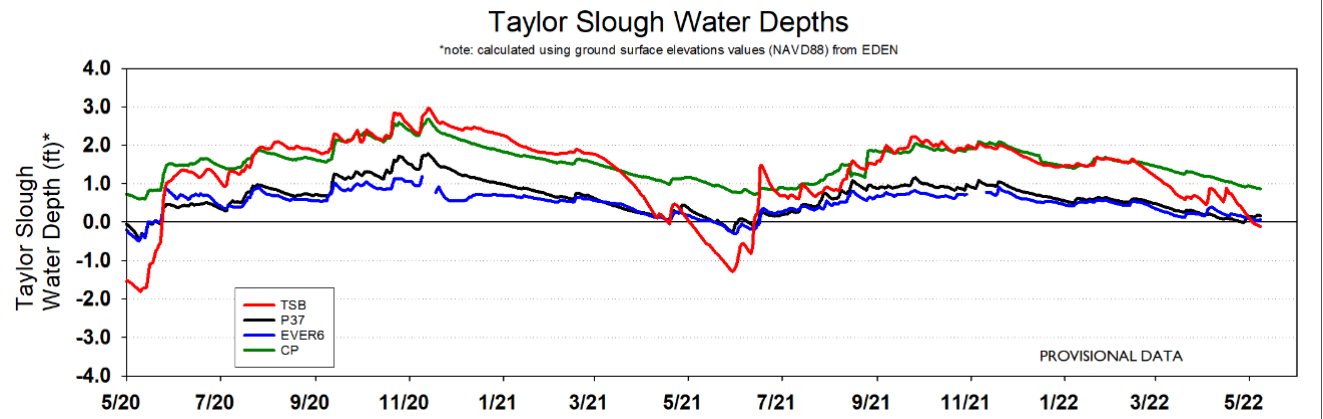
**Figure EV-6.** Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.



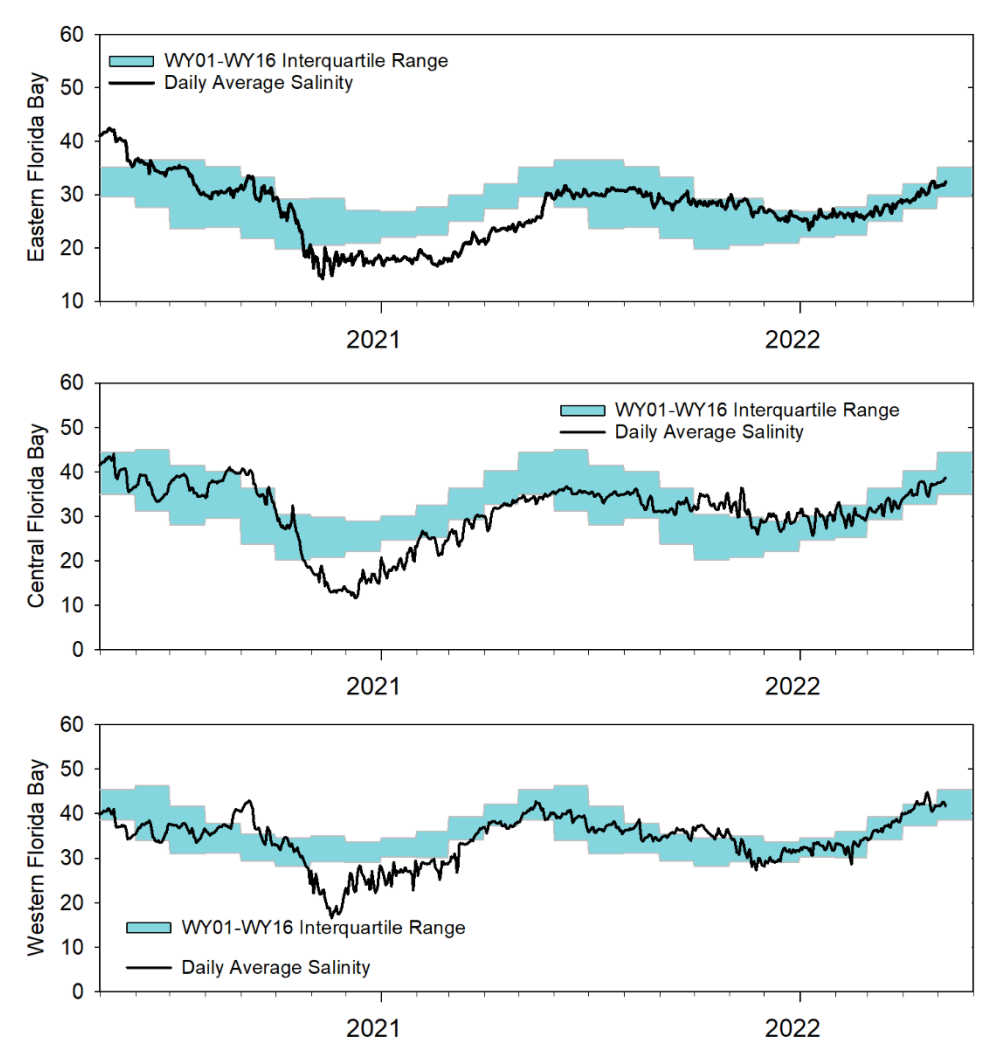
**Figure EV-7.** Present water depths (5/8/2022) compared to the day of year median over the previous 20 years.



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



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



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

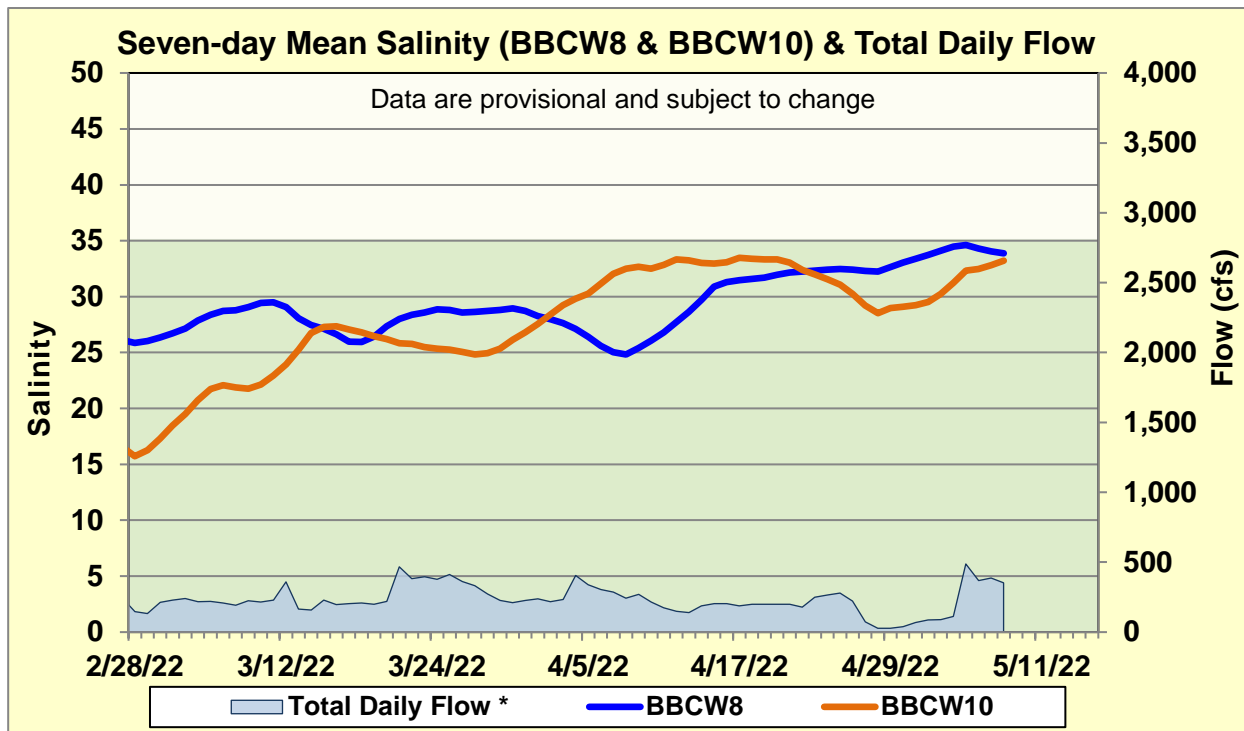


**Table EV-2.** Weekly water depth changes and water management recommendations

<b>SFWMD Everglades Ecological Recommendations, May 3, 2022 (red is new)</b>			
<b>Area</b>	<b>Weekly change</b>	<b>Recommendation</b>	<b>Reasons</b>
<b>WCA-1</b>	Stage decreased by 0.08'	Maintain the recession rate at less than 0.10 feet per week.	Protect within basin and downstream habitat and wildlife. Stages are above the 90 <sup>th</sup> percentile.
<b>WCA-2A</b>	Stage decreased by 0.09'	Conserve water in this basin letting the water move south when conditions allow. <b>Moderate</b> the recession rate to less than 0.10 feet per week.	Protect within basin and downstream habitat and wildlife. Protect peat soil and future wading bird forage as the dry season progresses.
<b>WCA-2B</b>	Stage decreased by 0.20'	Conserve water in this basin, maintain a minimum input to maintain stage while moving water south when conditions allow.	Protect within basin and downstream habitat and wildlife.
<b>WCA-3A NE</b>	Stage decreased by 0.02'	Conserve water in this basin, while letting the water move south when conditions allow. Maintaining a recession rate less than 0.10 feet per week has an ecological benefit.	Protect within basin peat soils, and downstream habitat and wildlife. Lower fire risk.
<b>WCA-3A NW</b>	Stage decreased by 0.19'	Conserve water in this basin letting the water move south when conditions allow. <b>Moderate</b> the recession rate to less than 0.10 feet per week has an ecological benefit.	
<b>Central WCA-3A S</b>	Stage decreased by 0.01'	<b>Maintaining</b> a recession rate less than 0.10 feet per week has an ecological benefit.	Protect within basin and downstream habitat and wildlife. Lower fire risk.
<b>Southern WCA-3A S</b>	Stage decreased by 0.15'		
<b>WCA-3B</b>	Stage decreased by 0.11'	<b>Moderate</b> the recession rate to less than 0.10 feet per week in this basin, letting the water move south when conditions allow.	Protect within basin and downstream habitat and wildlife. Lower fire risk.
<b>ENP-SRS</b>	Stage decreased by 0.11'	Make discharges to ENP according to COP and TTFF protocol while adaptively considering upstream and downstream ecological conditions.	Protect within basin and upstream habitat and wildlife.
<b>Taylor Slough</b>	Stage changes ranged from -0.21' to +0.07'	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
<b>FB- Salinity</b>	Salinity changes ranged -1.7 to +3.1	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 268 cfs, and the previous 30-day mean inflow was 194 cfs. The seven-day mean salinity was 33.8 at BBCW8 and 33.8 at BBCW10, both below the preferred maximum salinity of 35 for these sites. Data provided by Biscayne National Park.



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