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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: June 21, 2023

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

Enhanced, mainly afternoon to evening rains, are likely over at least the northern half and possibly the northern two-thirds of the SFWMD with less over the southern third of the area. Late this week, copious moisture associated with a tropical wave will stream northeastward from the Central America and the eastern Pacific across most of Florida. Although atmospheric instability will not be as great as earlier in the week, the very deep moisture will create an environment conducive for widespread rains, some heavy, across the SFWMD. The conveyor belt of moisture could diminish some by Sunday, although now it is not altogether clear how much. Now, the model signal is greatest for heavier rains over the southern half of the SFWMD on Sunday afternoon to evening, especially over the southern interior on Sunday. For the week ending next Tuesday morning, total SFWMD rainfall is forecast to be above or much-above normal.

Kissimmee

Releases have not been made from East Lake Toho or Lake Toho since June 1 when both lakes reached their respective low pools. Weekly average discharges on June 18, 2023 at S-65 and S-65A were 260 cfs and 550 cfs, respectively. Mean weekly water depth on the Kissimmee River floodplain of 0.17 ft was essentially unchanged from the previous week. The weekly average concentration of dissolved oxygen in the Kissimmee River decreased from 5.2 mg/L last week to 3.7 mg/L for the week ending June 18, 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 14.16 feet NGVD on June 18, 2023, which is 0.12 feet higher than the previous week and 0.39 feet higher than a month ago. Average daily inflows (excluding rainfall) increased from the previous week, going from 1,774 cfs to 2,378 cfs. Average daily outflows (excluding evapotranspiration) decreased from the previous week, going from 114 cfs to 0 cfs. The most recent satellite image (June 19, 2023) from NOAA's Harmful Algal Bloom Monitoring System showed the highest bloom

potential in the southeastern nearshore areas of the Lake. Routine phytoplankton monitoring on June 6 - 8, revealed that chlorophyll a concentration was above the bloom threshold ($> 40 \mu\text{g/L}$) at seven sampling locations, with the highest concentration ($156 \mu\text{g/L}$) recorded at the PALMOUT3 location in the southwestern region of the Lake.

Estuaries

Total inflow to the St. Lucie Estuary averaged 672 cfs over the past week with no flow coming from Lake Okeechobee. Mean surface salinities decreased at the HR1 site and increased at the US1 and A1A Bridge sites 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 2,474 cfs over the past week with no flow coming from Lake Okeechobee. Mean surface salinities remained the same at S-79, increased at Sanibel, and decreased at the remaining sites in the estuary over the past week. Salinities were in the optimal range (0-10) for tape grass in the upper estuary. Salinities were in the optimal range for adult eastern oysters at Shell Point (10-25), in the lower stressed range at Cape Coral (5-10), and in the upper stressed range at Sanibel (>25).

Stormwater Treatment Areas

For the week ending Sunday, June 18, 2023, no Lake Okeechobee water was delivered to the FEBs/STAs. The total amount of Lake releases sent to the FEBs/STAs in WY2024 (since May 1, 2023) is approximately 2,000 ac-feet. The total amount of inflows to the STAs in WY2024 is approximately 167,000 ac-feet. Most STA cells are at or above target stage. STA-1E Western Flow-way is offline for post-construction vegetation grow in, STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown, and STA-2 Flow-way 2 is offline for post-construction vegetation grow in. Operational restrictions are in effect in STA-1E Central and Eastern Flow-way, STA-1W Eastern, Western, and Northern Flow-ways, and STA-2 Flow-ways 3 and 4 for vegetation management activities. STA-1E Central Flow-way, STA-1W Expansion Cells, and STA-2 Flow-way 3 contain nests of Migratory Bird Treaty Act protected species. This week, if 2008 LORS recommends Lake releases to the WCAs and conditions allow, releases will be sent to STA-2.

Everglades

Stage across the EPA rose last week at a “fair” or “good” rate in most regions with WCA-2A continuing to rise faster than is ecologically favorable. Total wading bird nesting effort was relatively low in the Everglades this year, with a preliminary estimate of 26,000 nesting, about 16,000 below the 10-year mean. Depths increased at most Taylor Slough sites last week and remains well above historical average. Average salinity fell again last week in Florida Bay and continues to trend towards a fresher than average condition for this time of year.

Biscayne Bay

Total inflow to Biscayne Bay averaged 1,267 cfs and the previous 30-day mean inflow averaged 1,220 cfs. The seven-day mean salinity was 24.5 at BBCW8 and 26.3 at BBCW10, both within the ideal salinity range for estuarine organisms in this region (salinity less than 35). Data provided by Biscayne National Park.

Supporting Information

Kissimmee Basin

Upper Kissimmee

On June 18, 2023, mean daily lake stages were 55.2 feet NGVD (1.3 feet below schedule) in East Lake Toho, 52.2 feet NGVD (1.3 feet below schedule) in Lake Toho, and 50.4 feet NGVD (0.6 feet below schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1, Figures KB-1-3**).

Lower Kissimmee

For the week ending June 18, 2023, mean weekly discharge was 260 cfs at S-65 and 550 cfs at S-65A. Mean weekly discharge from the Kissimmee River was 680 cfs at S-65D and 730 cfs at S-65E (**Table KB-2**). Mean weekly headwater stages were 46.4 feet NGVD at S-65A and 27.8 feet NGVD at S-65D on June 18, 2023. Mean weekly river channel stage of 34.6 ft NGVD on June 18, 2023 increased by 0.9 feet from the previous week (**Figure KB-4**). Mean weekly water depth on the Kissimmee River floodplain of 0.17 ft for the week ending June 18, 2023 was essentially unchanged from the previous week (**Table KB-2, Figure KB-5**). The weekly average concentration of dissolved oxygen in the Kissimmee River decreased from 5.2 mg/L the previous week to 3.7 mg/L for the week ending June 18, 2023 (**Table KB-2, Figure KB-6**).

Water Management Recommendations

Follow the IS-14-50 discharge plan for S-65/S-65A, including limiting lake stage ascension rates to 0.25 ft/week to the extent possible in East Lake Toho, Lake Toho and KCH. Due to the risk of a dissolved oxygen crash follow adaptive recommendations from the Kissimmee scientists.

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) ^a	Schedule Type ^b	Sunday Schedule Stage (feet NGVD)	Sunday Departure from Regulation (feet)	
							6/18/23	6/11/23
Lakes Hart and Mary Jane	S-62	LKMJ	0	59.8	R	60.0	-0.2	-0.3
Lakes Myrtle, Preston and Joel	S-57	S-57	0	59.9	R	61.0	-1.1	-1.0
Alligator Chain	S-60	ALLI	0	62.1	R	63.2	-1.1	-1.2
Lake Gentry	S-63	LKGT	0	59.7	R	61.0	-1.3	-1.3
East Lake Toho	S-59	TOHOE	0	55.2	R	56.5	-1.3	-1.5
Lake Toho	S-61	TOHOW S-61	0	52.2	R	53.5	-1.3	-1.3
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	260	50.4	R	51.0	-0.6	-0.6

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.

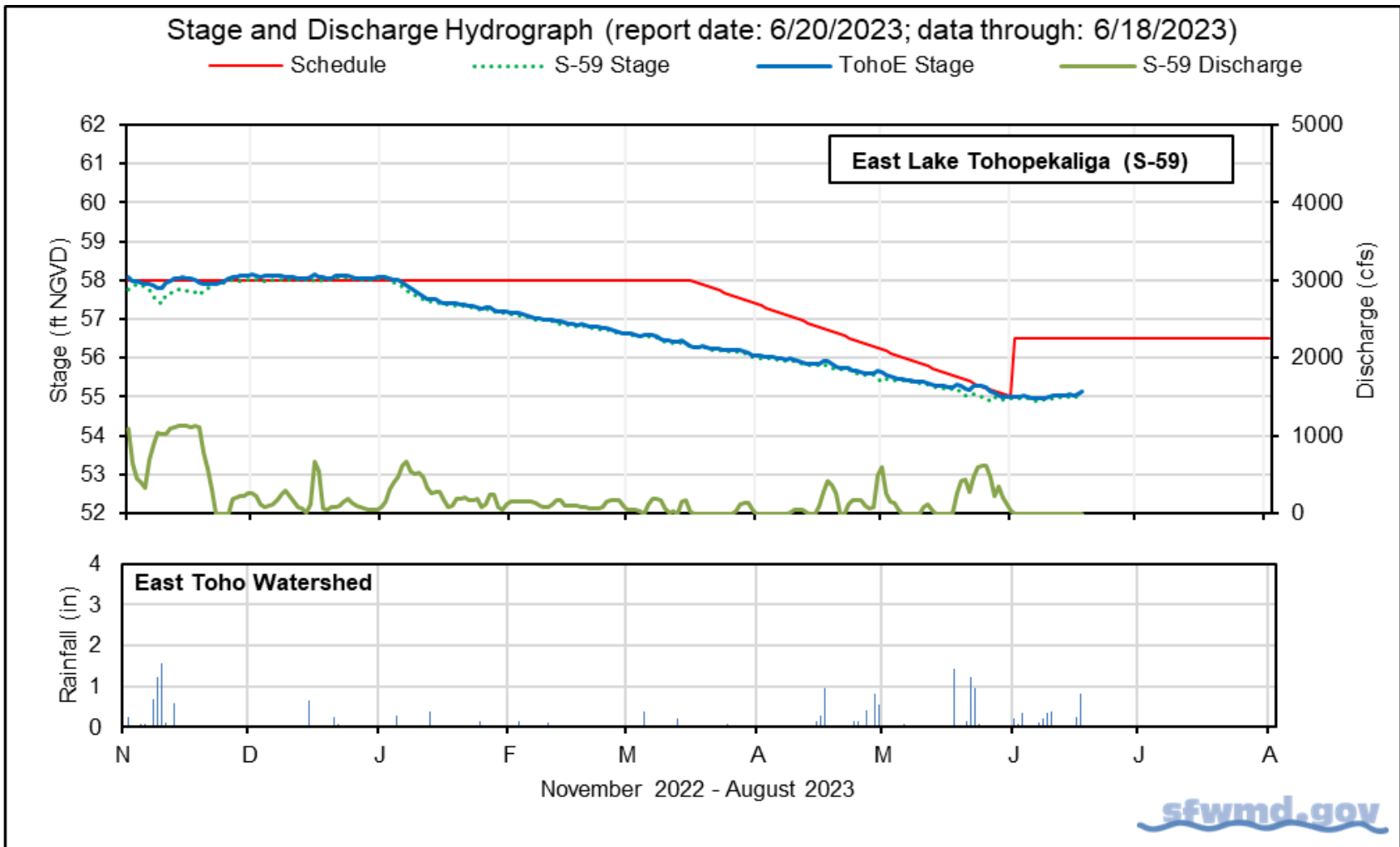


Figure KB-1. East Lake Toho regulation schedule, stage, discharge and rainfall.

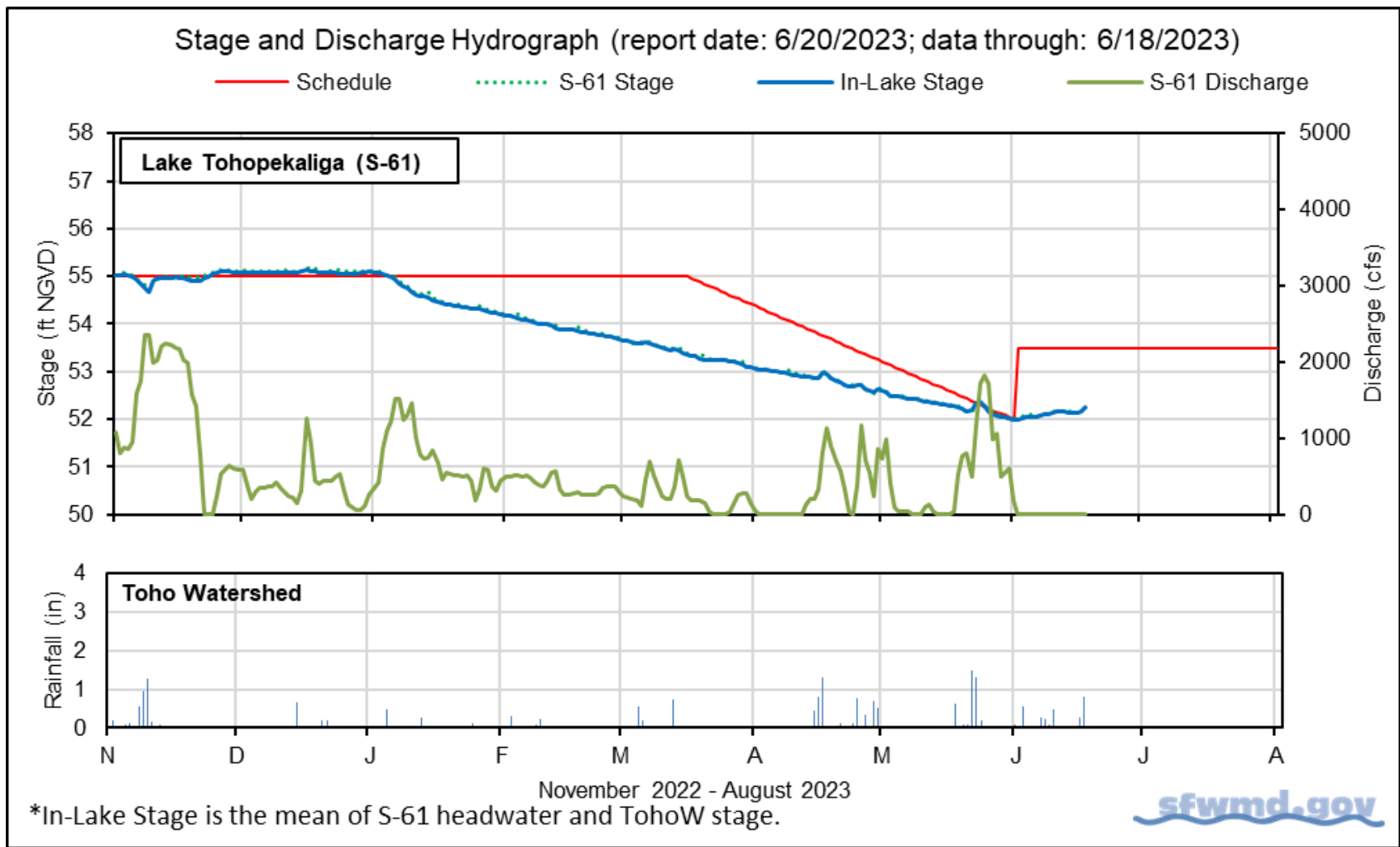


Figure KB-2. Lake Toho regulation schedule, stage, discharge and rainfall.

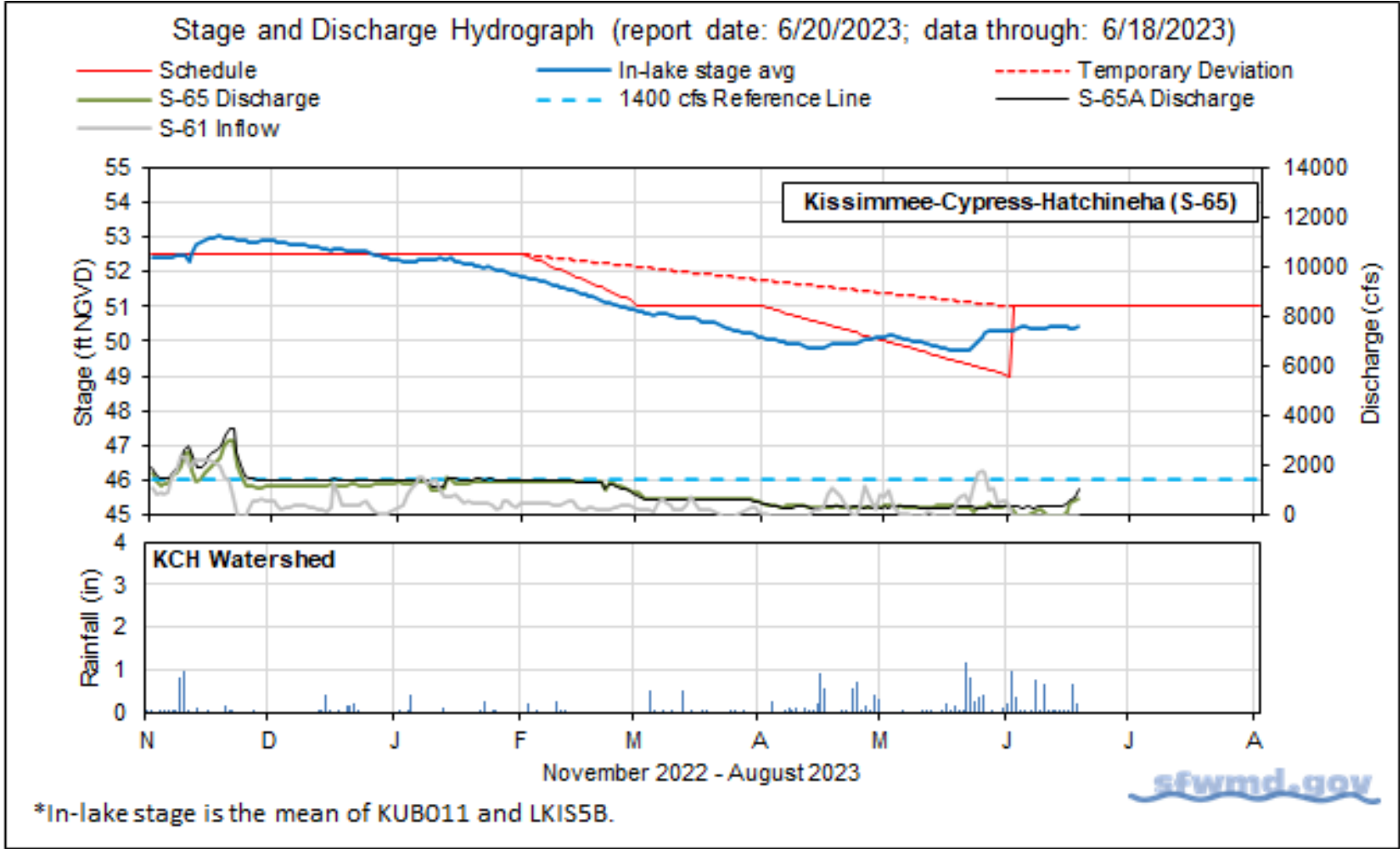


Figure KB-3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

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			
		6/18/23	6/18/23	6/11/23	6/4/23	5/28/23
Discharge	S-65	700	260	94	240	330
Discharge	S-65A ^a	1,000	550	330	310	310
Headwater Stage (feet NGVD)	S-65A	46.1	46.4	46.6	46.4	46.1
Discharge	S-65D ^b	1,000	680	520	360	430
Headwater Stage (feet NGVD)	S-65D ^c	27.8	27.8	27.8	28.1	28.2
Discharge (cfs)	S-65E ^d	1,100	730	510	380	430
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) ^e	Phase I, II/III river channel	3.0	3.7	5.2	7.3	7.1
River channel mean stage ^f	Phase I river channel	36.3	34.6	33.7	33.1	33.0
Mean depth (feet) ^g	Phase I floodplain	0.23	0.17	0.17	0.13	0.13

a. Combined discharge from main and auxiliary structures.

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

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

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

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

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

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

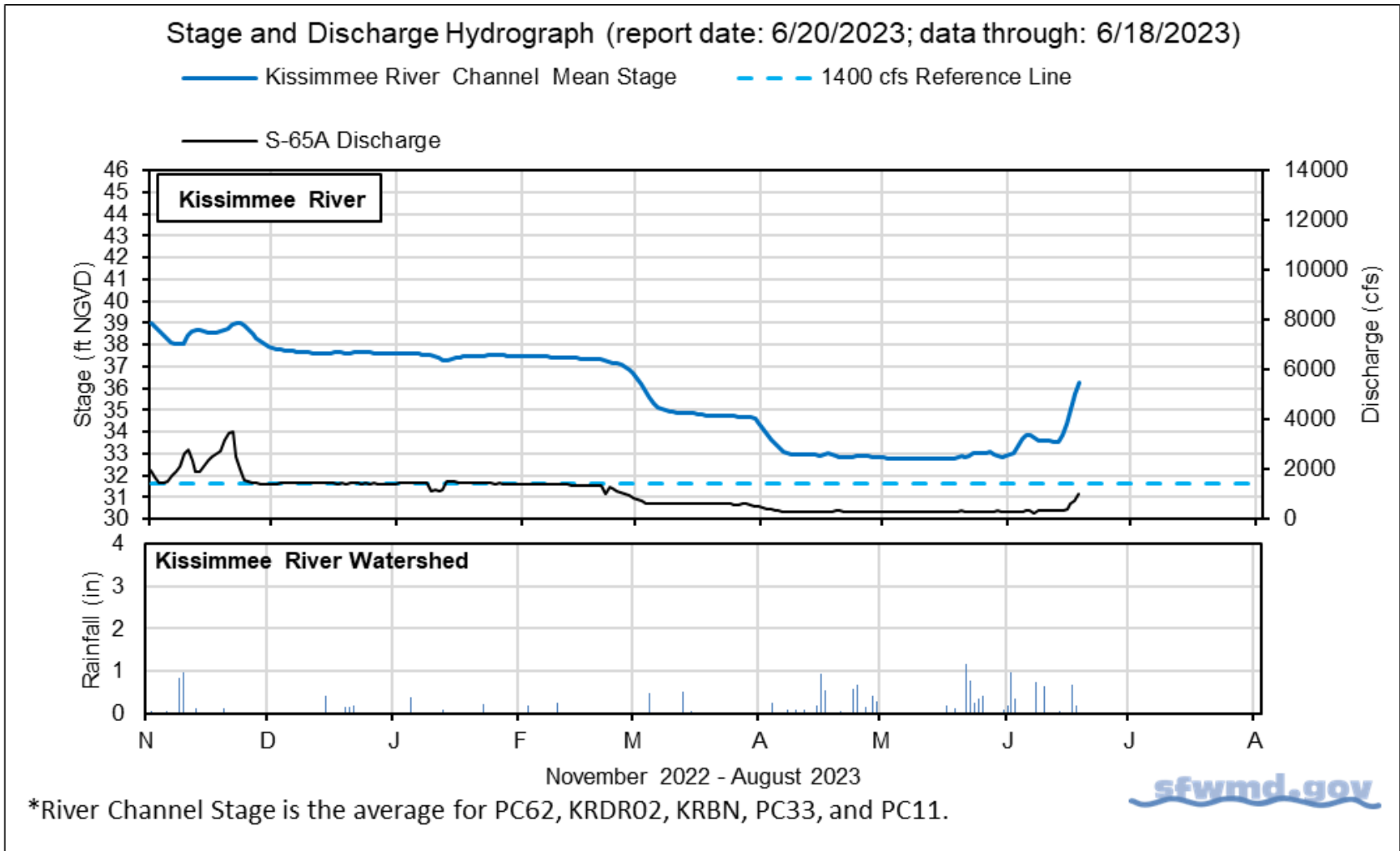


Figure KB-4. Kissimmee River stage, discharge and rainfall.

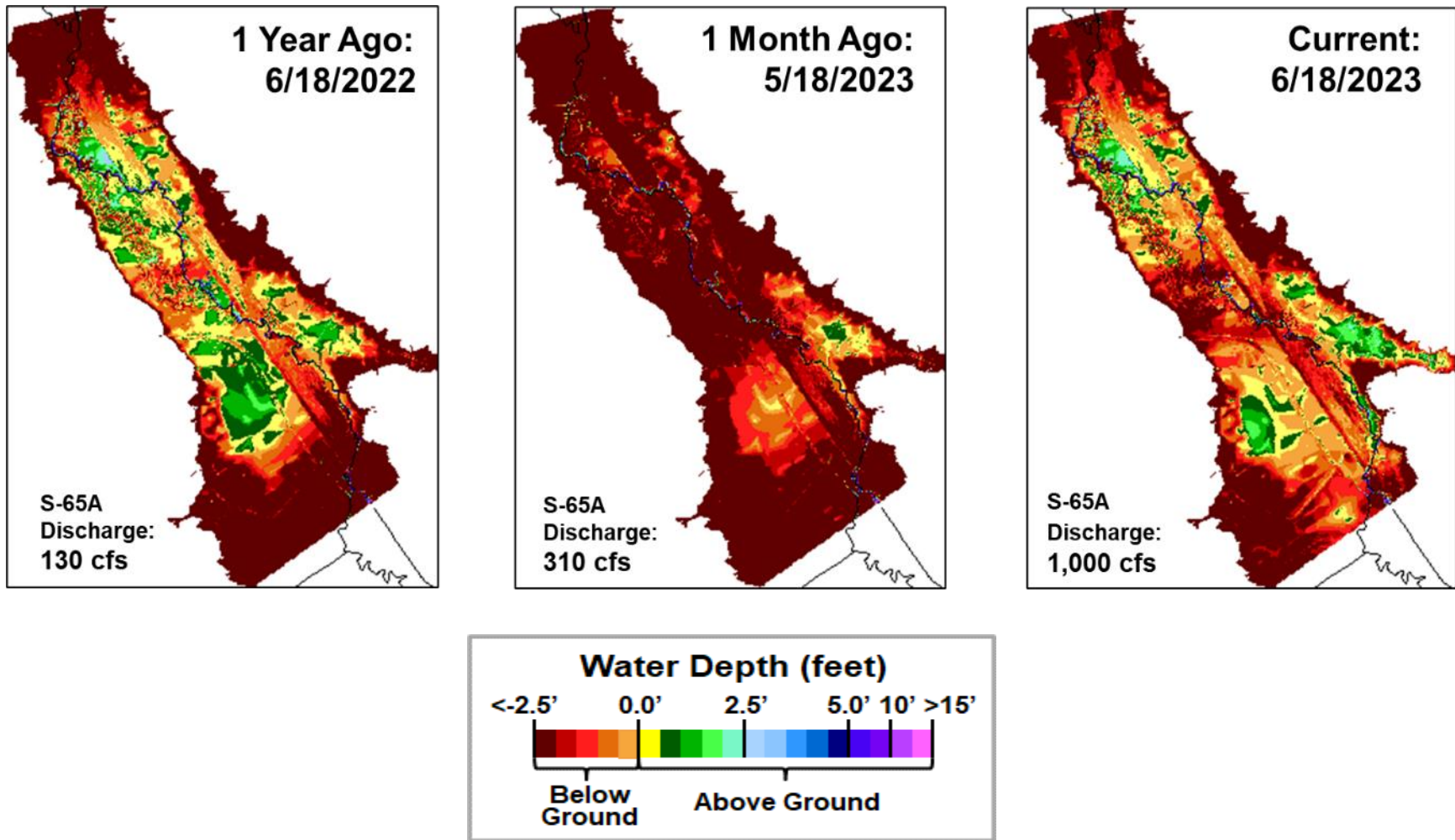
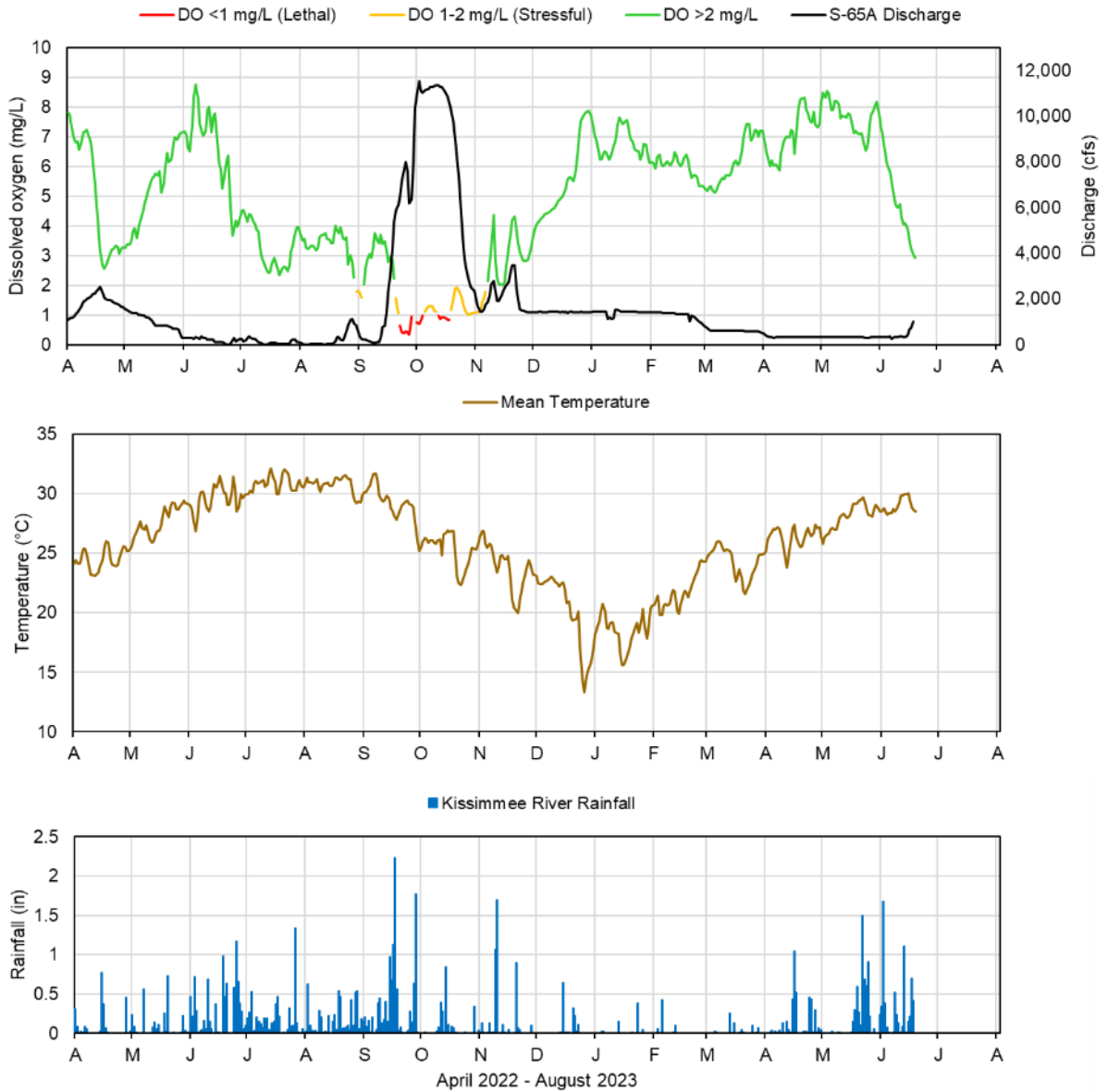


Figure KB-5. Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.



Report Date: 6/20/2023; data are through: 6/18/2023



Figure KB-6. Restored Kissimmee river channel mean daily dissolved oxygen concentration (mg/L), S-65A discharge (cfs), temperature (°C) and rainfall (inches). Dissolved oxygen (DO) and temperature are mean daily values averaged for PC62, KRDR02, KRBN, PC33, PC11, PD62R, and PD42R with an average of four stations reporting this week. Rainfall values are daily totals for Kissimmee River (Pool BCD) AHED watershed.

Stage and Discharge Guidance for 2021-2023.

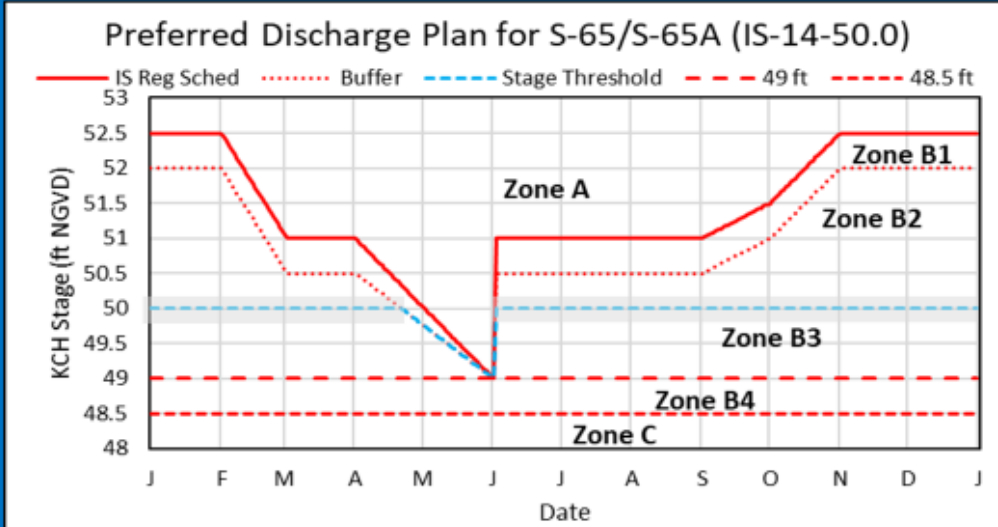
Zone	KCH Stage (ft NGVD)	S-65/S-65A Discharge*
A	Above regulation schedule line.	Flood control releases as needed with no limits on the rate of discharge change.
B1	In flood control buffer zone (0.5 ft below the schedule line).	Adjust S-65 discharge so that S-65A discharge is between 1400 cfs at the 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 ± 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

2021-2023 Discharge Plan for S-65/S-65A



- 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

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 14.16 feet NGVD on June 18, 2023, which is 0.12 feet higher than the previous week and 0.39 feet higher than a month ago (**Figure LO-1**). Lake stage remained in the Low sub-band (**Figure LO-2**) and was 1.61 feet above the upper limit of the ecological envelope (**Figure LO-3**). According to NEXRAD, 1.72 inches of rain fell directly on the Lake last week.

Average daily inflows (excluding rainfall) increased from the previous week, going from 1,774 cfs to 2,378 cfs. Average daily outflows (excluding evapotranspiration) decreased from the previous week, going from 114 cfs to 0 cfs. Most of the combined inflows came from the Indian Prairie Canals (734 cfs; highest inflow via S-71/S-72 (560 cfs)). The highest average single structure inflow came from the S-65E/EX1 structure (732 cfs). There were no outflows last week. Backflows via the S-271 were at an average rate of 96 cfs. **Figures LO-4 and LO-5** show the combined average daily inflows and outflows for the Lake over the past eight weeks, and average inflows and outflows last week, respectively. These data are provisional and are subject to change.

Cyanobacteria bloom potential increased in the central and eastern regions of the Lake early last week and was the highest in eastern nearshore areas of the Lake according to the most recent satellite image (June 19, 2023) from NOAA's Harmful Algal Bloom Monitoring System (**Figure LO-6**).

Routine phytoplankton monitoring on June 6 - 8, revealed that chlorophyll *a* concentration was above the bloom threshold ($> 40 \mu\text{g/L}$) at seven sampling locations, with the highest concentration ($156 \mu\text{g/L}$) recorded at the PALMOUT3 location in the southwestern region of the Lake. (**Figure LO-7**).

Changes in Water Depth

1 Month Ago:
05/19/2023

Current:
06/18/2023

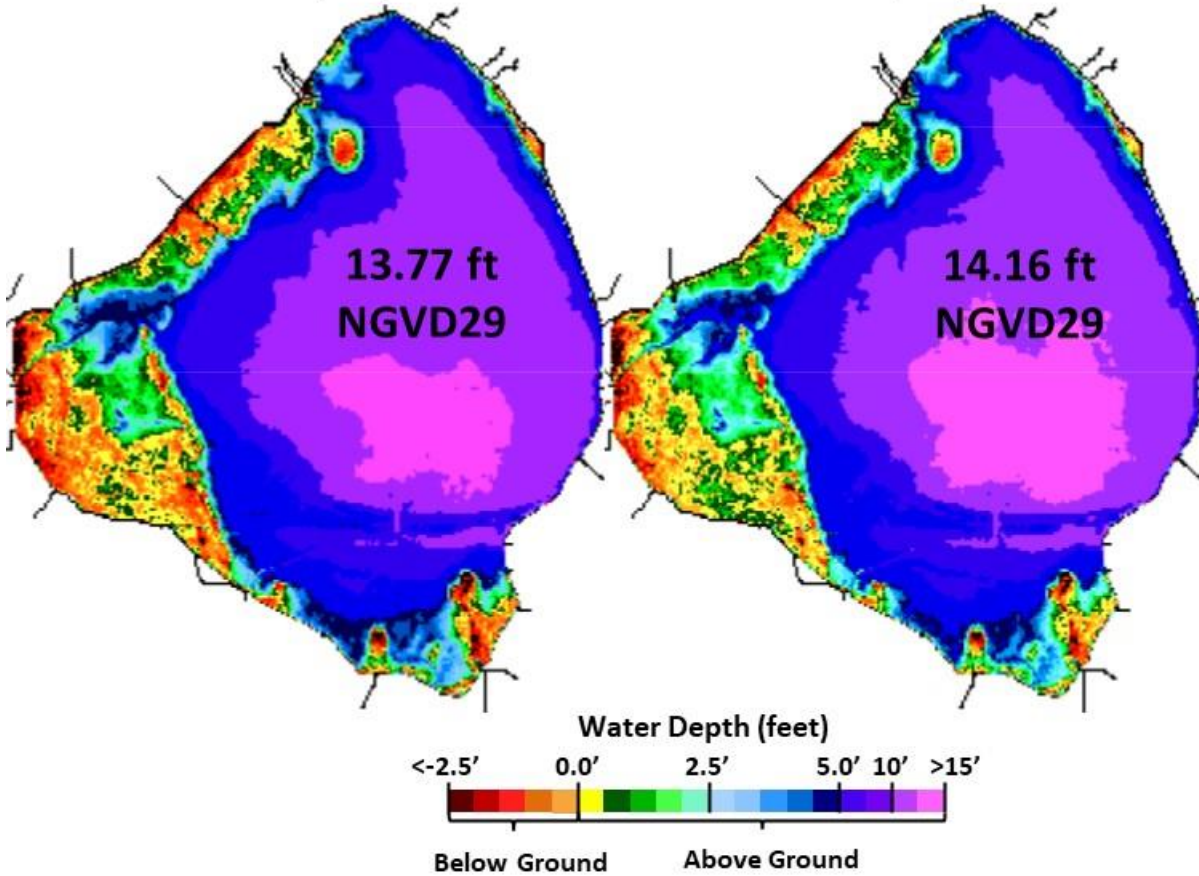


Figure LO-1. Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

Lake Okeechobee Water Level History and Projected Stages

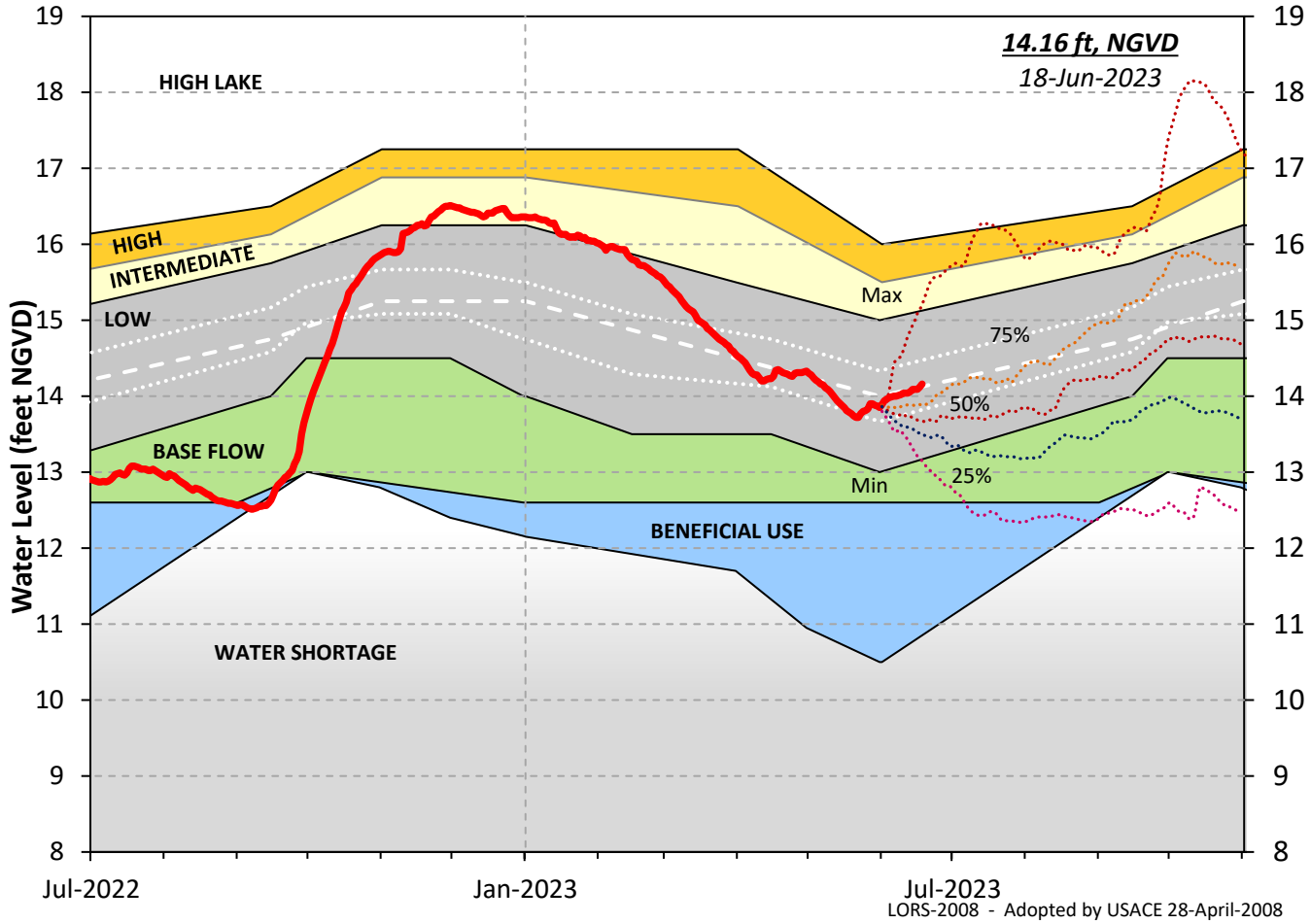


Figure LO-2. Recent Lake Okeechobee stages with projected stages based on a dynamic position analysis.

Lake Okeechobee Stage vs Ecological Envelope

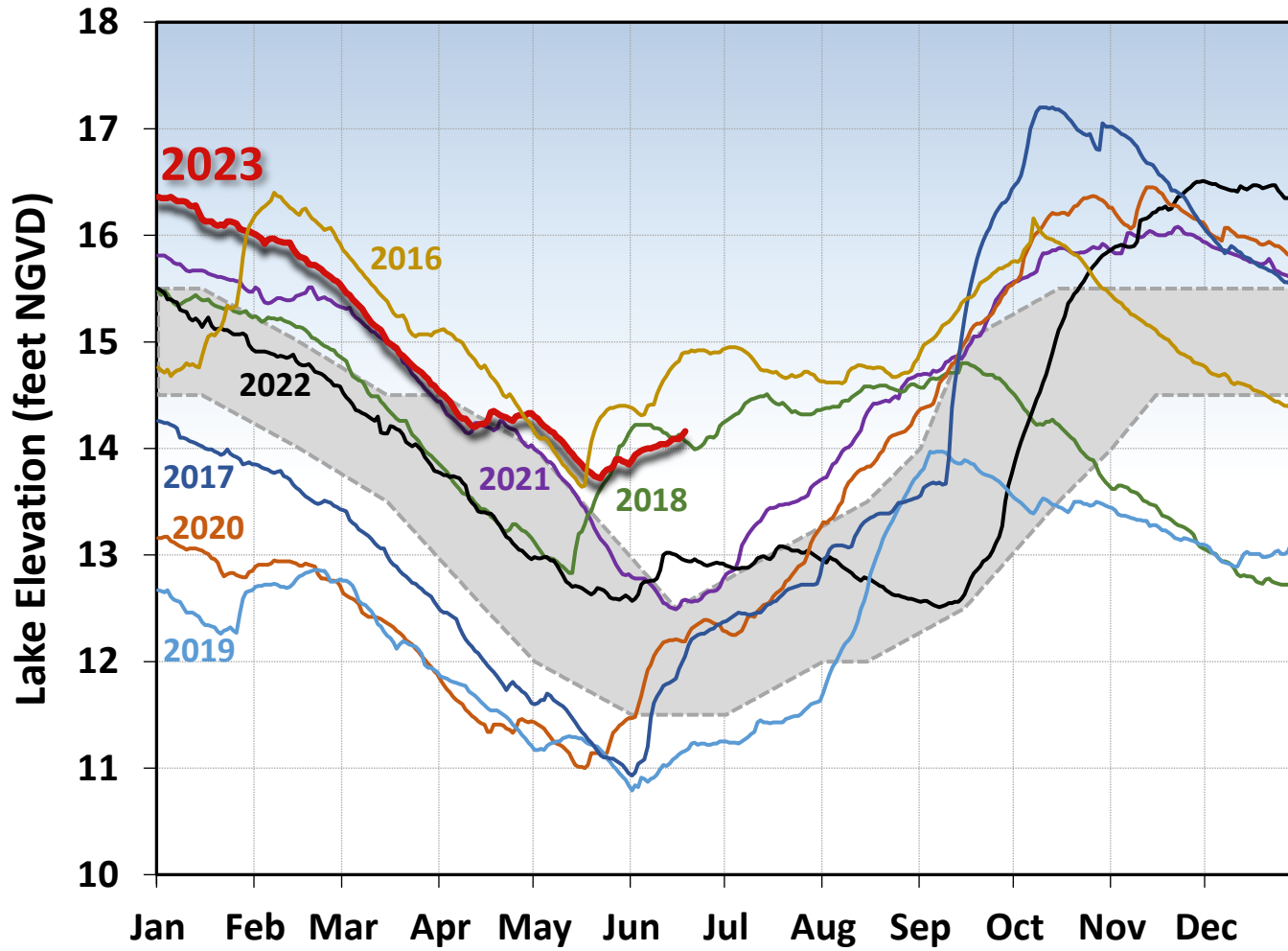


Figure LO-3. The prior seven years of annual stage hydrographs for Lake Okeechobee in comparison to the ecological envelope.

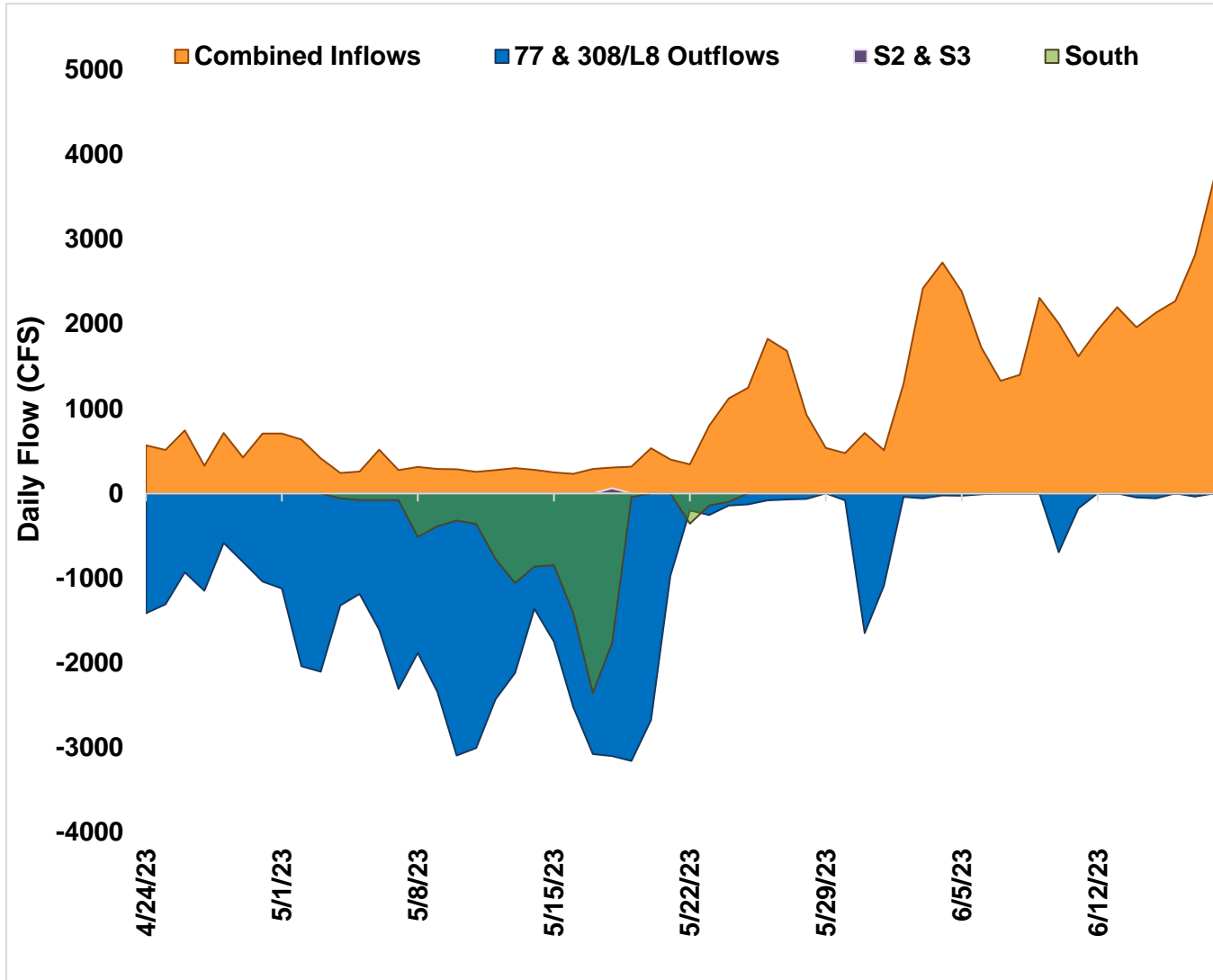


Figure LO-4. Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows from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

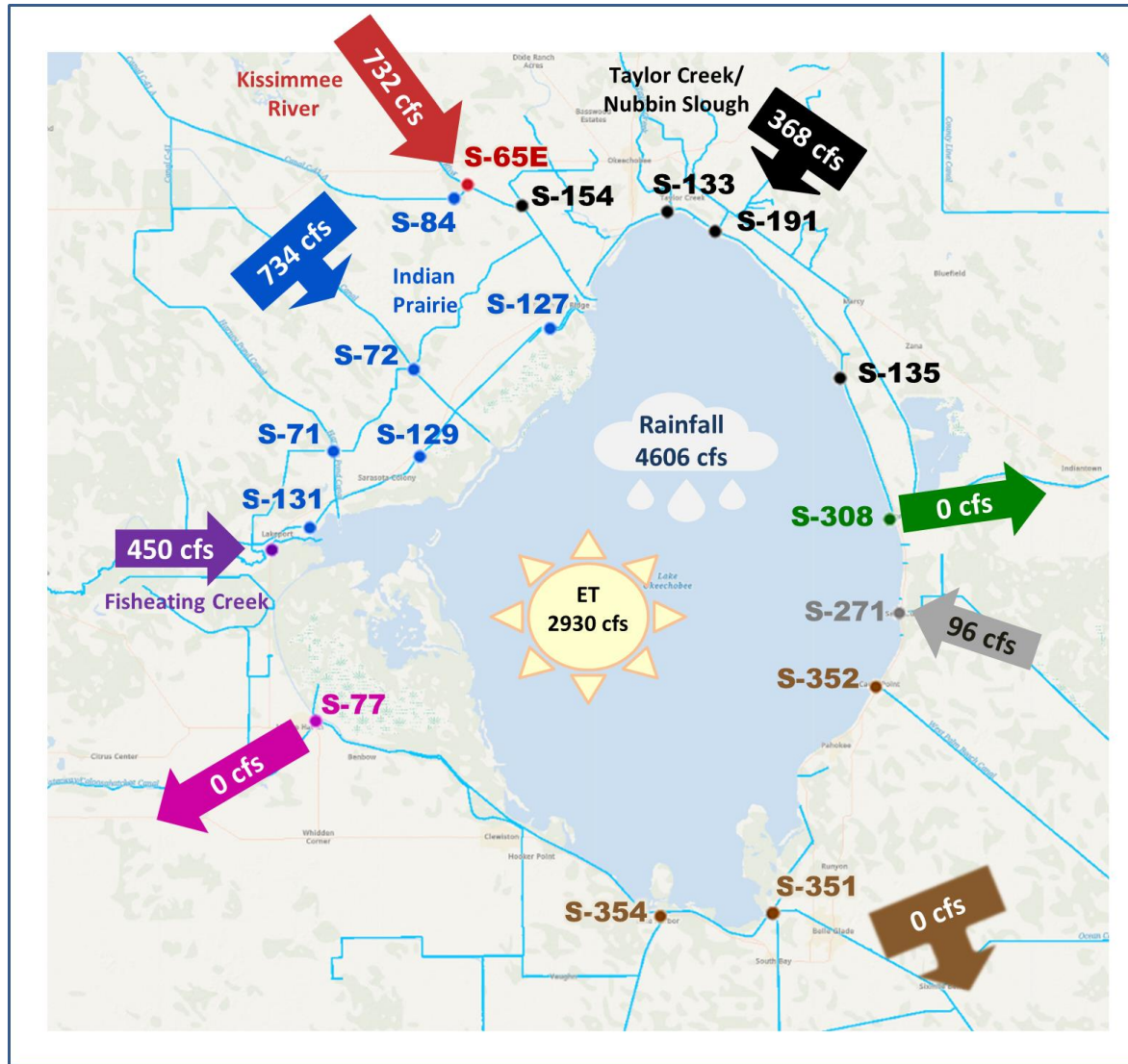


Figure LO-5. Inflows into Lake Okeechobee from Indian Prairie basins, Taylor Creek/Nubbin Slough, Kissimmee River and Fisheating Creek, and outflows to the west via S-77, to the east via S-308, to the south via S-351, S-352, S-354, and to southeast via S-271 (formerly Culvert 10A) for the week of June 12 - 18, 2023.

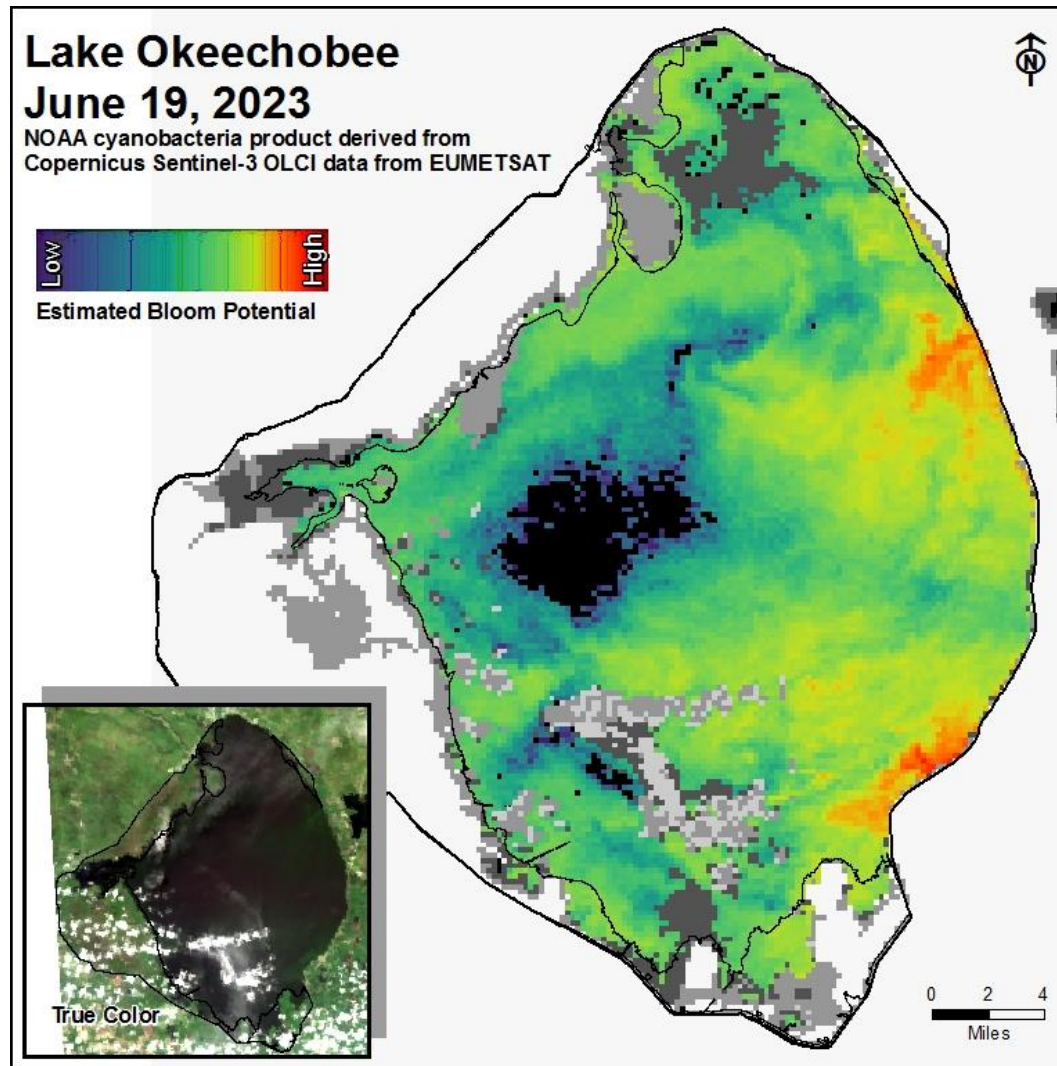


Figure LO-6. Cyanobacteria bloom potential on, June 19, 2023, based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

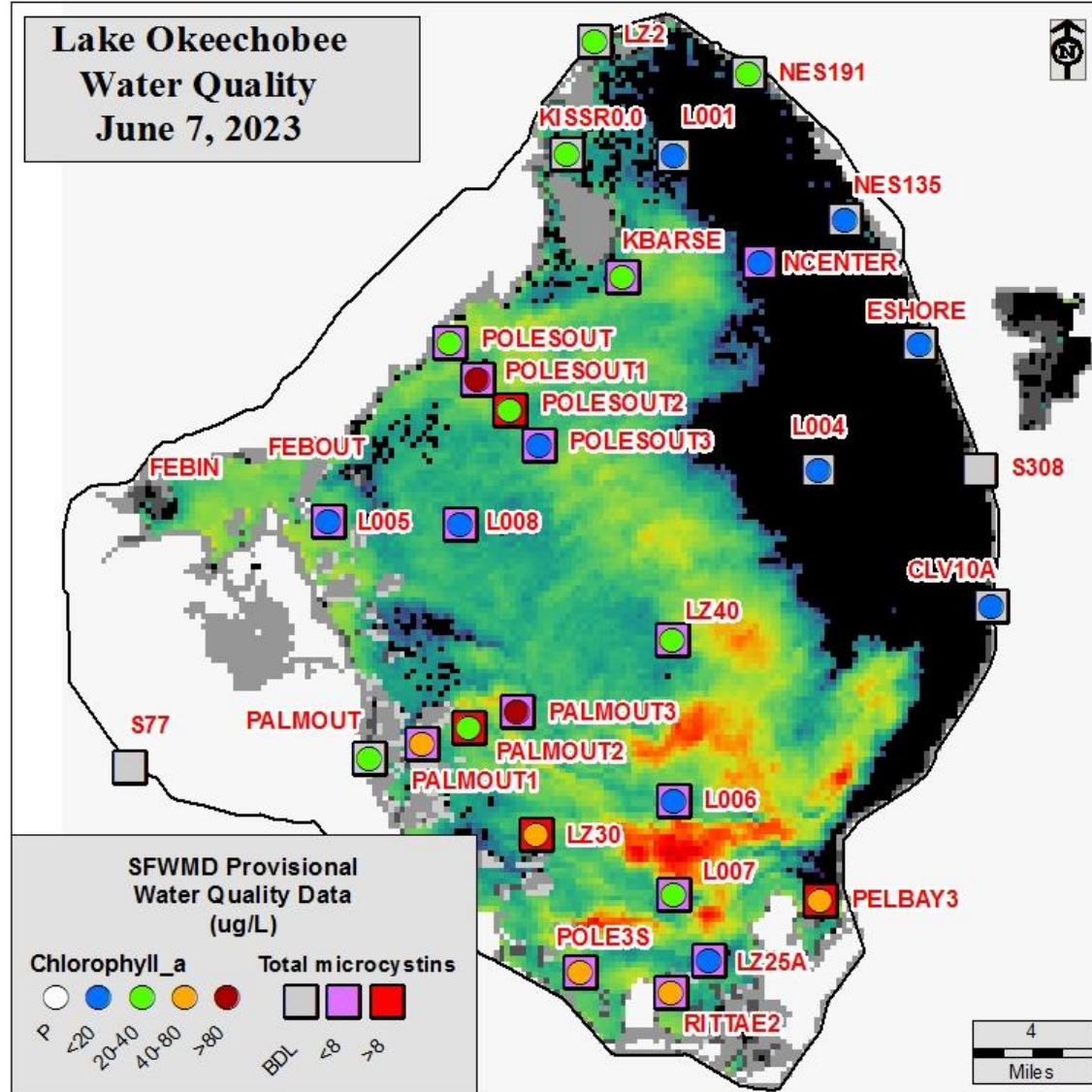


Figure LO-7. Total microcystins ($\mu\text{g/L}$) and chlorophyll *a* data from June 6 - 8, 2023. Sampling locations are overlaid on the June 7, 2023 image from NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

Estuaries

St. Lucie Estuary

Over the past week, mean total inflow to the St. Lucie Estuary was 672 cfs (**Figures ES-1 and ES-2**), and the previous 30-day mean inflow was 1,092 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-2**.

Over the past week, surface salinities decreased at the HR1 site and increased at the US1 and A1A Bridge sites (**Table ES-1 and Figure ES-3**). The seven-day moving average of the surface and bottom salinities at the US1 Bridge was 13.9. 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 0.08 spat/shell for May, which is a decrease from the recruitment rate recorded in April (**Figure ES-5**).

Caloosahatchee River Estuary

Over the past week, mean total inflow to the Caloosahatchee River Estuary was 2,474 cfs (**Figures ES-6 and ES-7**), and the previous 30-day mean inflow was 2,676 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, increased at Sanibel, and decreased at the remaining sites in the estuary (**Table ES-2 and Figures ES-8 and ES-9**). The seven-day mean salinities (**Table ES-2**) were in the optimal range (0-10) for tape grass in the upper estuary. The seven-day mean salinity values were within the optimal range for adult eastern oysters at Shell Point and in the stressed range at Cape Coral and Sanibel (**Figure ES-10**). The mean larval oyster recruitment rates reported by the Fish and Wildlife Research Institute were 3.9 spat/shell at Iona Cove and 4.0 spat/shell at Bird Island for May, both of which are an increase from April recruitment rates (**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, 2013¹) 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 a steady release at 2,000 cfs with estimated tidal basin inflows of 756 cfs. Model results from all scenarios predict daily salinity to be 0.8 or lower and the 30-day moving average surface salinity to be 0.3 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.

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

Red Tide

The Florida Fish and Wildlife Research Institute reported on June 16, 2023, that *Karenia brevis*, the Florida red tide dinoflagellate, was not observed in any samples collected within the District region. On the east coast, no red tide samples were collected from counties within the District region.

Water Management Recommendations

Lake stage is in the Low Sub-Band. Tributary conditions are wet. The LORS2008 release guidance suggests up to 3000 cfs release at S-79 to the Caloosahatchee River Estuary and up to 1170 cfs release at S-80 to the St. Lucie Estuary.

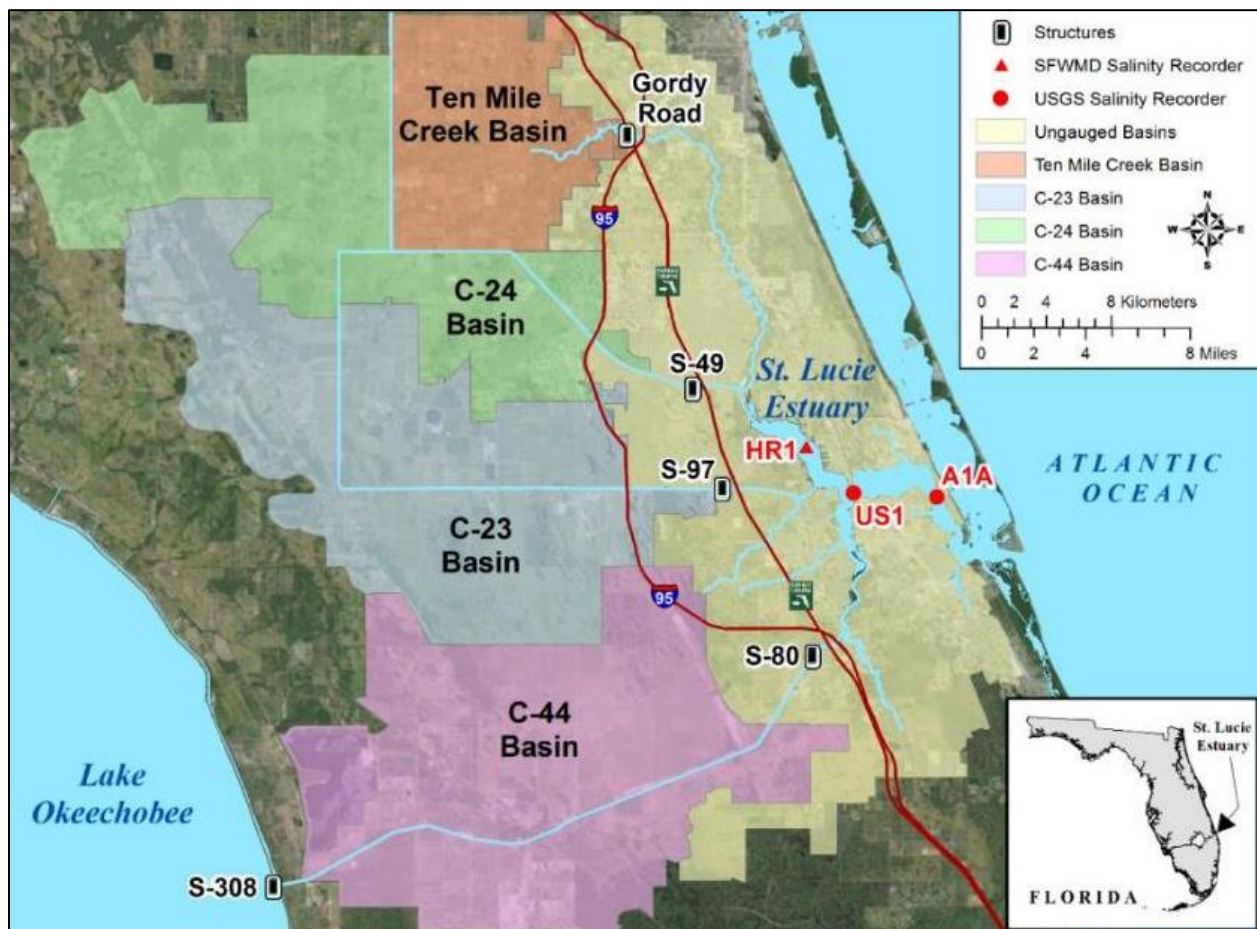


Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

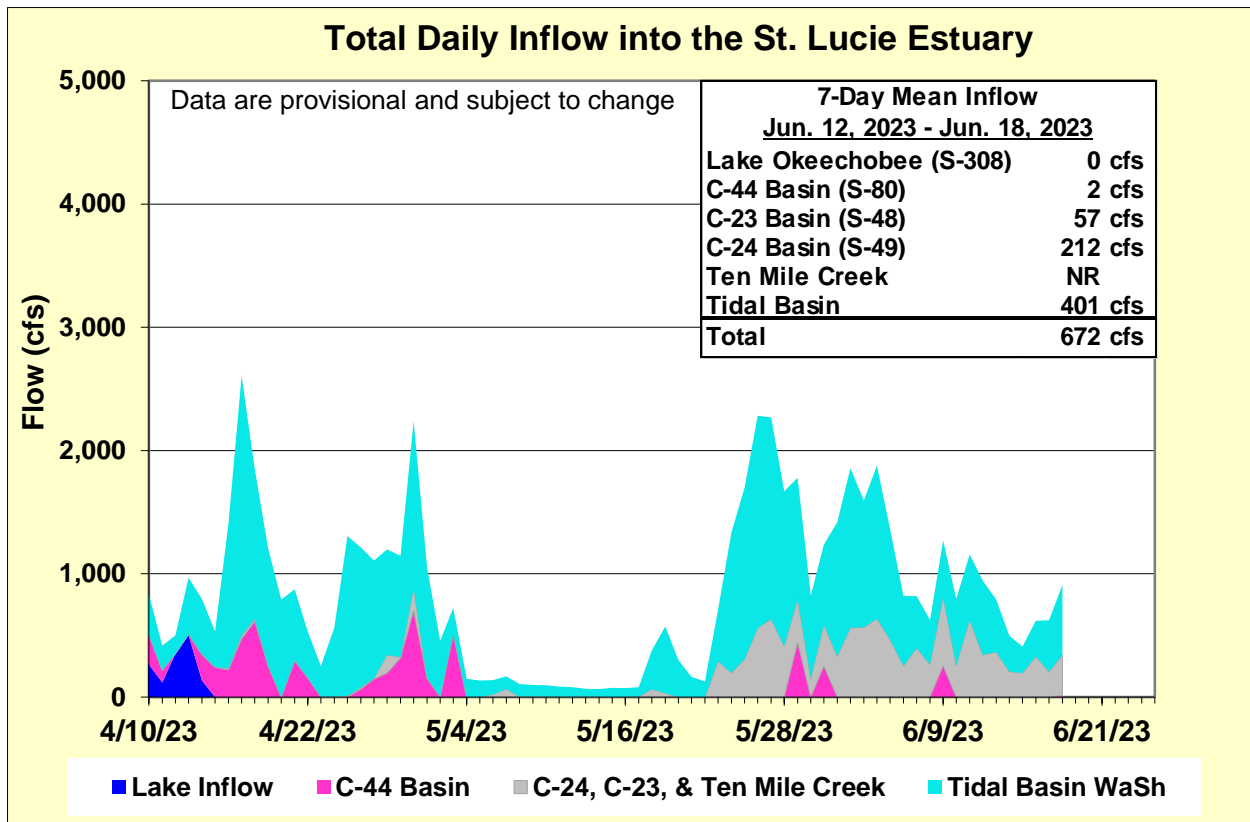


Figure ES-2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

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)	5.8 (6.4)	11.4 (11.0)	10.0 – 25.0
US1 Bridge	12.7 (12.1)	15.0 (14.7)	10.0 – 25.0
A1A Bridge	21.0 (20.4)	24.9 (25.9)	10.0 – 25.0

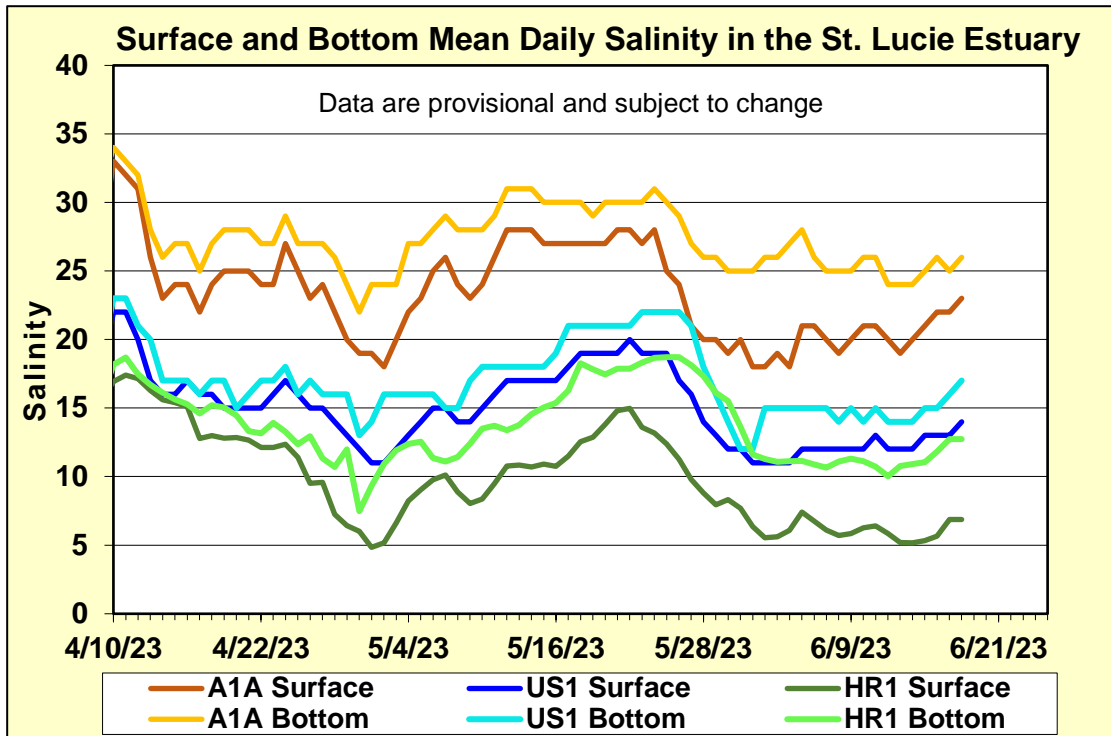


Figure ES-3. Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

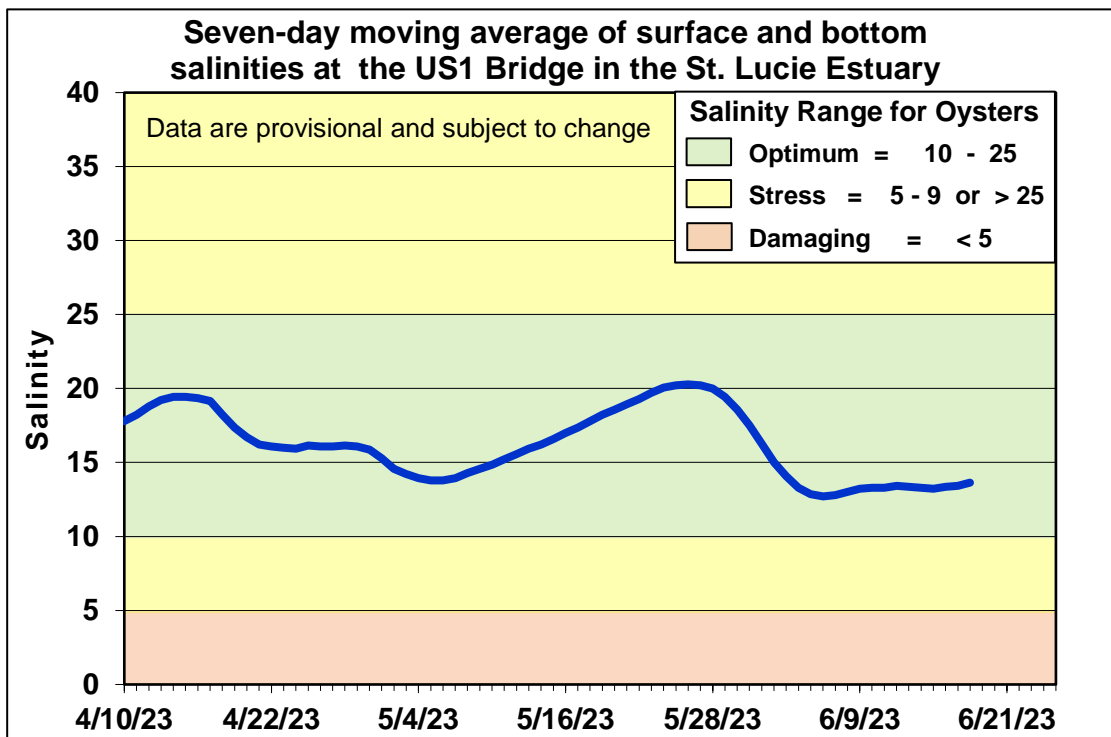


Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

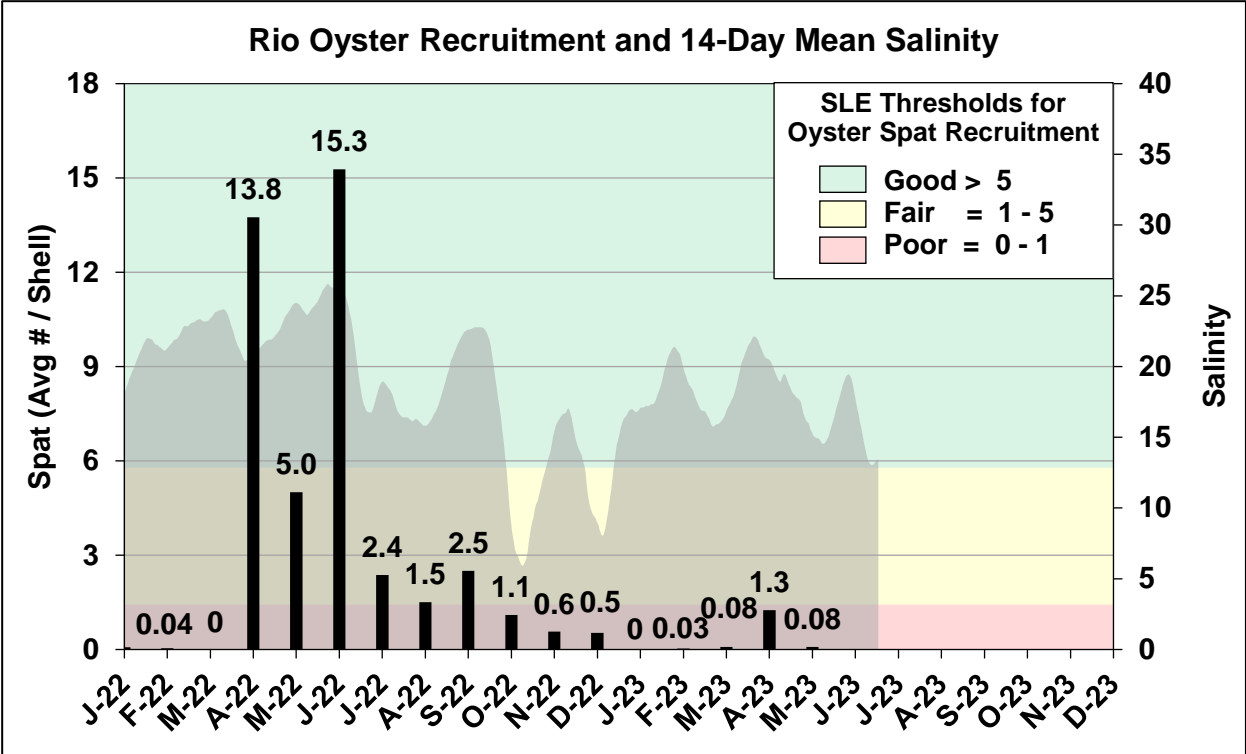


Figure ES-5. Mean oyster recruitment at the Rio oyster monitoring station and 14-day mean salinity at US1 Bridge.

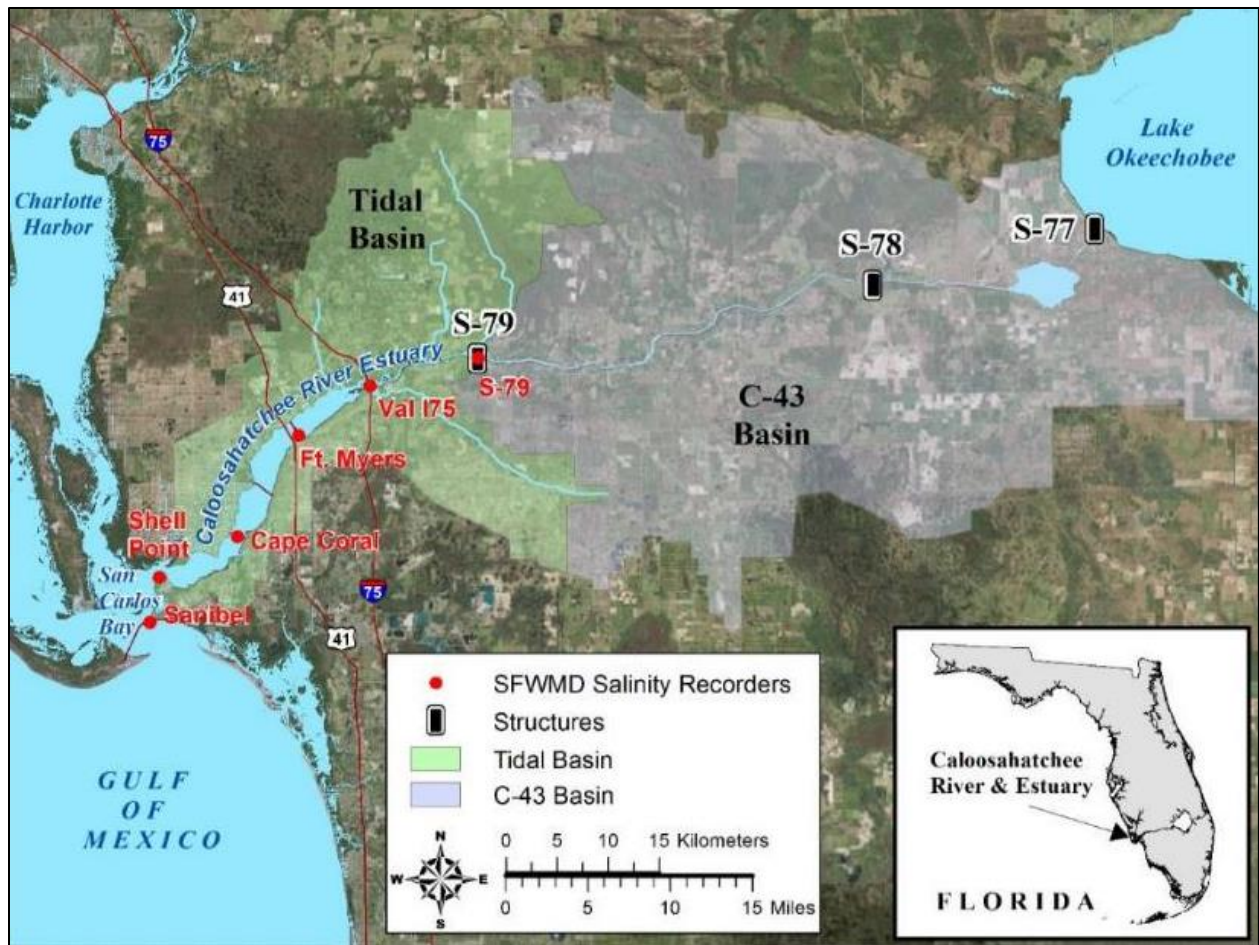


Figure ES-6. Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.

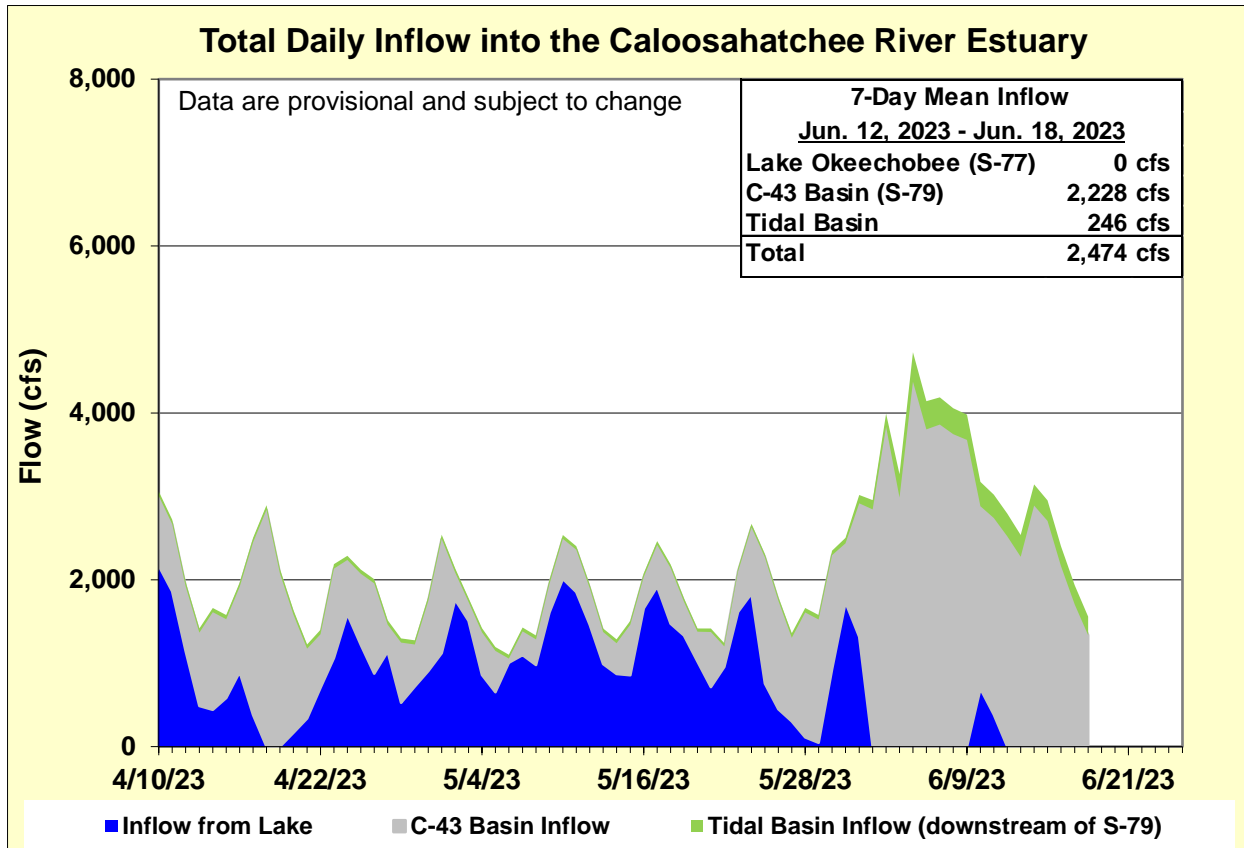


Figure ES-7. Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

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)	0.2 (0.2)	0.2 (0.2)	0.0 – 10.0
Val I-75	0.2 (0.3)	0.2 (0.2)	0.0 – 10.0
Fort Myers Yacht Basin	0.4 (2.0)	0.4 (2.8)	0.0 – 10.0
Cape Coral	7.1 (8.6)	8.1 (10.2)	10.0 – 25.0
Shell Point	23.8 (24.0)	25.1 (24.9)	10.0 – 25.0
Sanibel	30.4 (29.5)	31.6 (30.8)	10.0 – 25.0

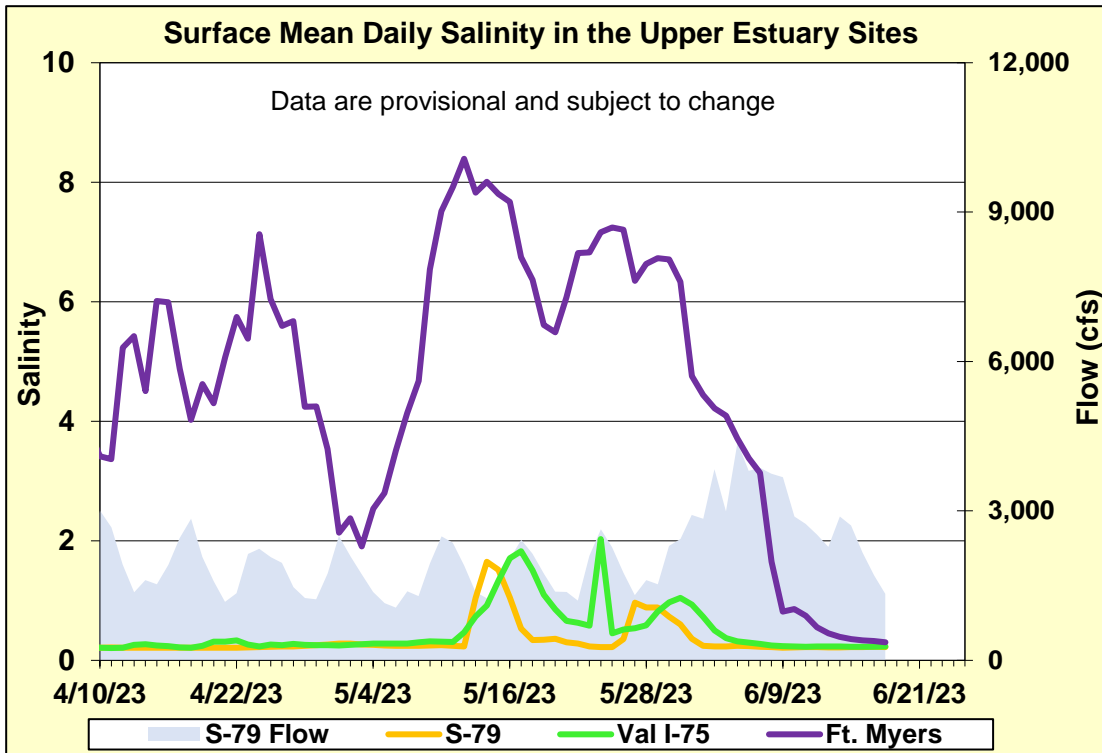


Figure ES-8. Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

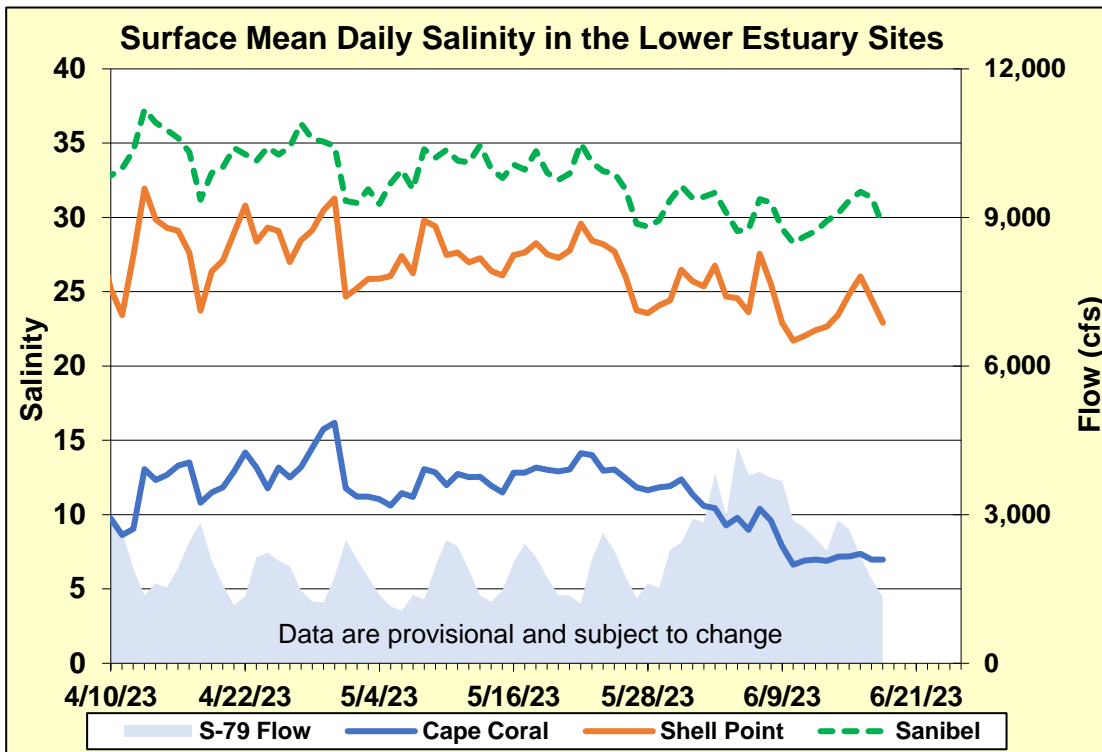


Figure ES-9. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

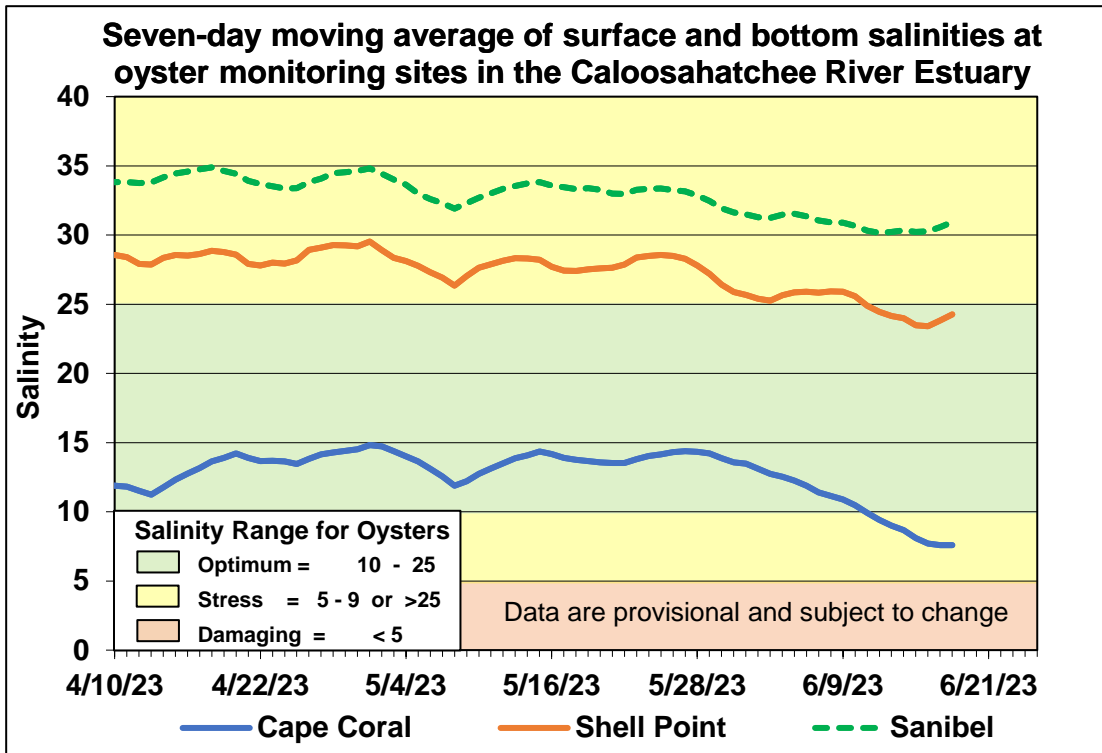


Figure ES-10. Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

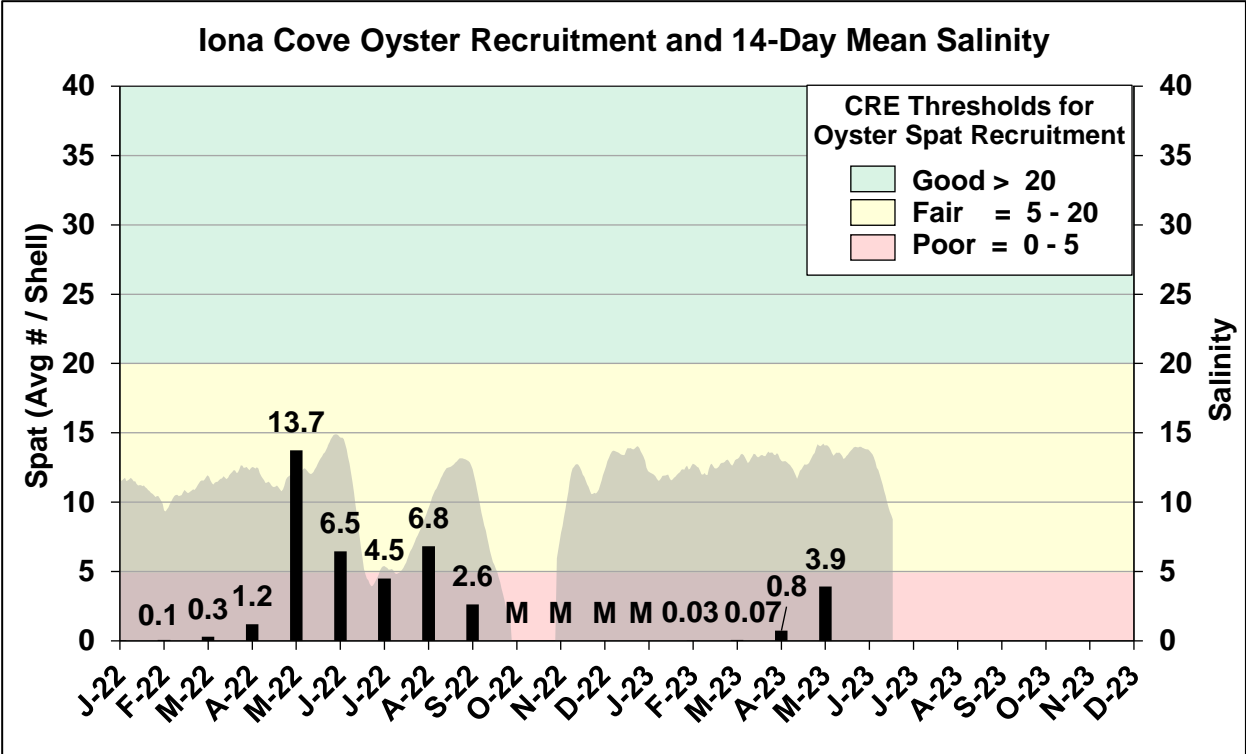


Figure ES-11. Mean oyster recruitment at the Iona Cove oyster monitoring station and 14-day mean salinity at Cape Coral.

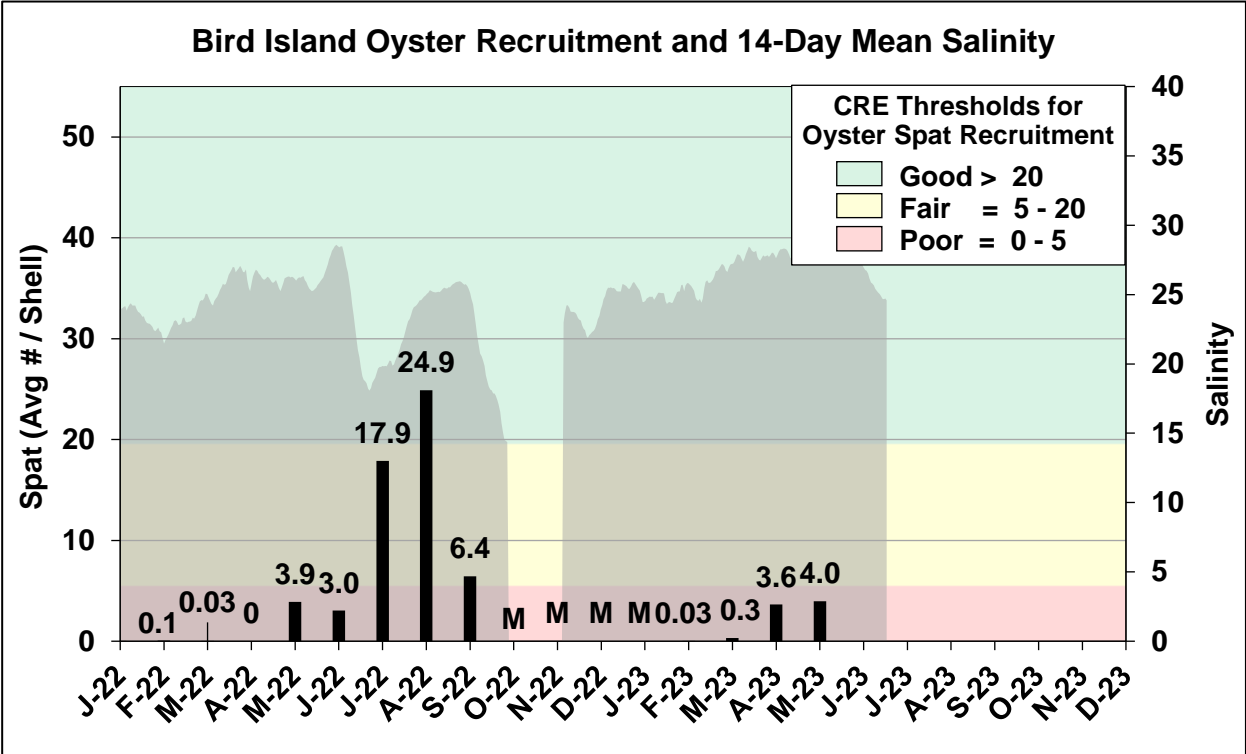


Figure ES-12. Mean oyster recruitment at the Bird Island oyster monitoring station and 14-day mean salinity at Shell Point.

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	756	0.8	0.3
B	450	756	0.4	0.3
C	750	756	0.3	0.3
D	1,000	756	0.3	0.3
E	1,500	756	0.3	0.3
F	2,000	756	0.3	0.3

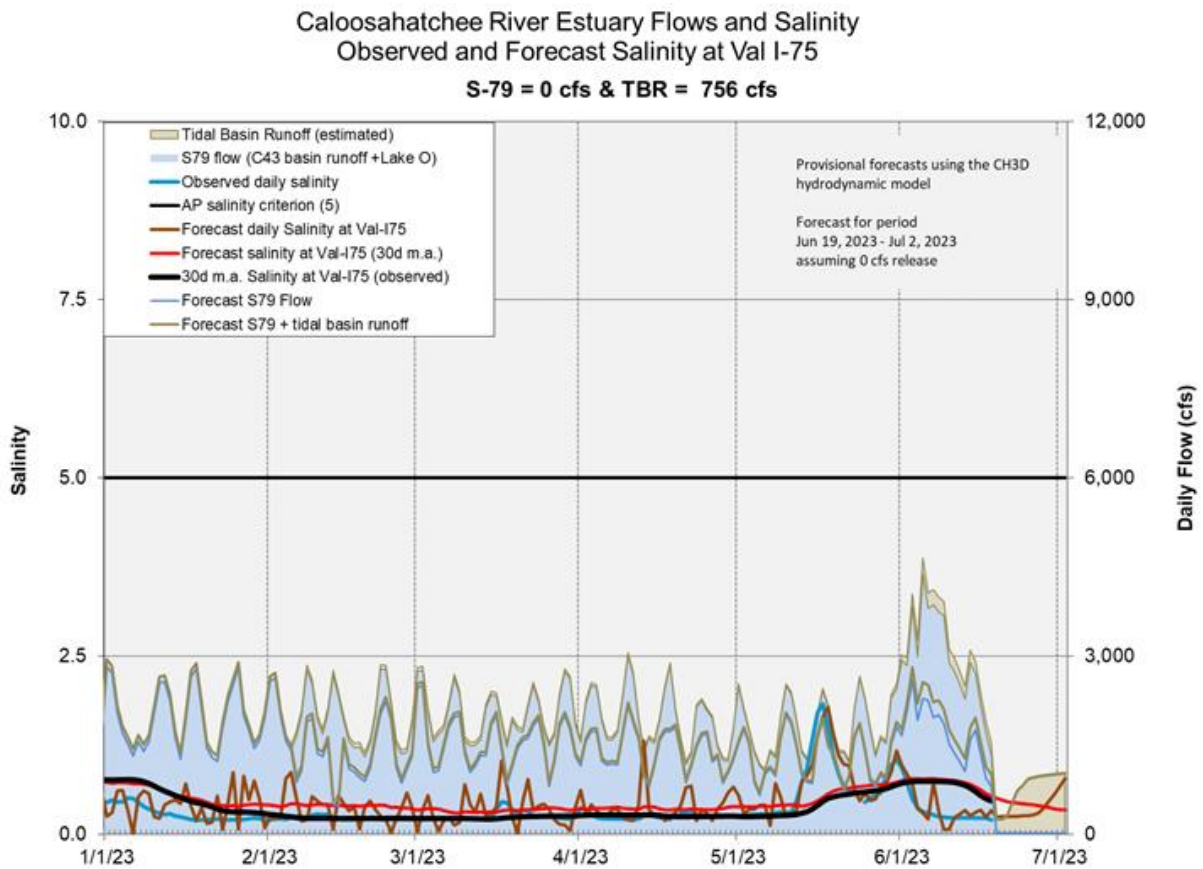


Figure ES-13. Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

Stormwater Treatment Areas

STA-1E: STA-1E Western Flow-way is offline for post-construction vegetation grow in. Operational restrictions are in place in STA-1E Central and Eastern Flow-ways for vegetation management activities. The Central Flow-way contains nests of Migratory Bird Treaty Act protected species. Most online treatment cells are above target stage. Vegetation in the flow-ways is stressed and highly stressed. The 365-day phosphorus loading rates (PLRs) for the Eastern and Central Flow-ways are below 1.0 g/m²/year (**Figure S-1**).

STA-1W: Operational restrictions are in place in STA-1W Western, Eastern, and Northern Flow-ways for vegetation management activities. Cell 7 and Cell 8 contain nests of Migratory Bird Treaty Act protected species. Most treatment cells are above 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/m²/year. The 365-day PLRs for the Northern and Western Flow-way are high (**Figure S-2**).

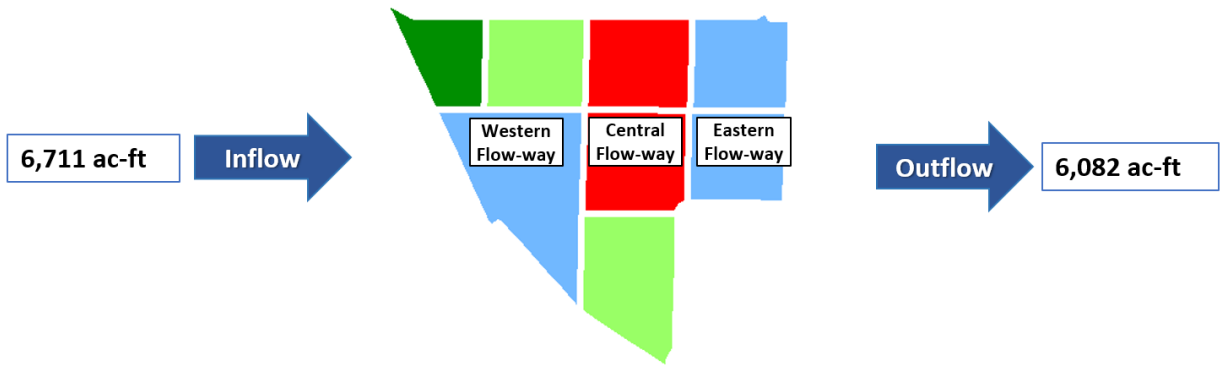
STA-2: STA-2 Flow-way 2 is offline for post-construction vegetation grow in. Operational restrictions are in place in STA-2 Flow-ways 3 and 4 for vegetation management activities. Flow-way 3 contains nests of Migratory Bird Treaty Act protected species. Most online treatment cells are above target stage. Vegetation in Flow-ways 1 and 3 is stressed, and in Flow-ways 2, 4 and 5 is highly stressed. The 365-day PLRs for Flow-ways 3, 4 and 5 are at or below 1.0 g/m²/year. The 365-day PLR for Flow-way 1 is high (**Figure S-3**).

STA-3/4: STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown. Online treatment cells are above target stage. Vegetation in the Eastern and Central Flow-ways is highly stressed and in the Western Flow-way is stressed. The 365-day PLRs for the Central and Western Flow-ways are below 1.0 g/m²/year (**Figure S-4**).

STA-5/6: All flow-ways in STA-5/6 are online. Most treatment cells are at or near 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/m²/year, except Flow-way 1 and 3 which are high (**Figure S-5** and **S-6**).

For definitions on STA operational language see glossary following figures.

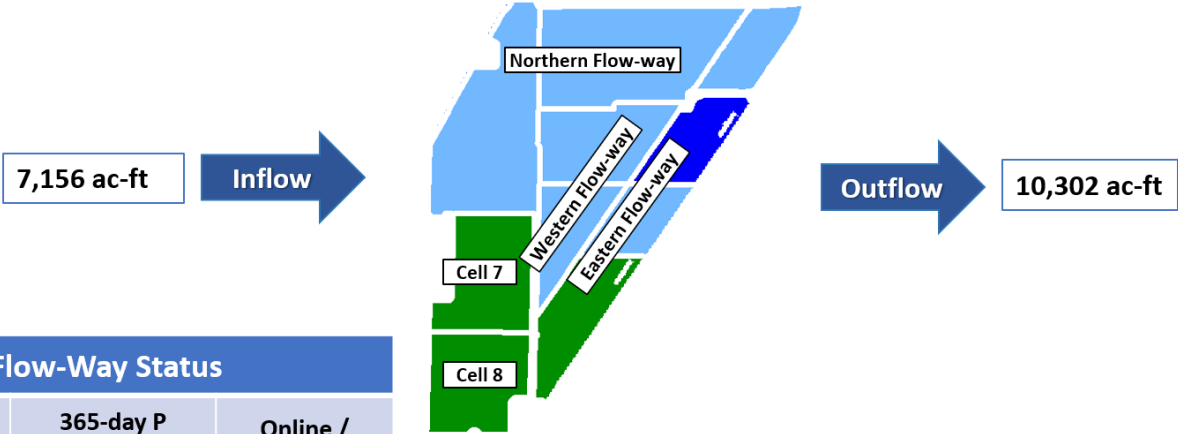
STA-1E Weekly Status Report – 6/12/2023 through 6/18/2023



STA-1E Flow-Way Status				As of 6/18/2023		STA-1E Flow & Phosphorus Concentration			
Flow-Way	Vegetation Status Healthy ----- Stressed ←-----→	365-day P Loading Rate (below 1.0 g P/m ² /yr is optimal)	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)			7-day	28-day	365-day
				<ul style="list-style-type: none"> ■ 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) 					
Eastern	← →		Vegetation management						
Central	← →		Vegetation rehab / Avian Nesting						
Western	Offline, post-construction grow in starting 3/28/2022								
Total Inflow, ac-ft							6,711	23,818	101,947
--Lake Inflow, ac-ft							0	N/A	1,500
Total Outflow, ac-ft							6,082	22,199	82,724
Inflow Conc., ppb							63	66	100
Outflow Conc., ppb							16	23	26
Includes Preliminary Data									

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

STA-1W Weekly Status Report – 6/12/2023 through 6/18/2023



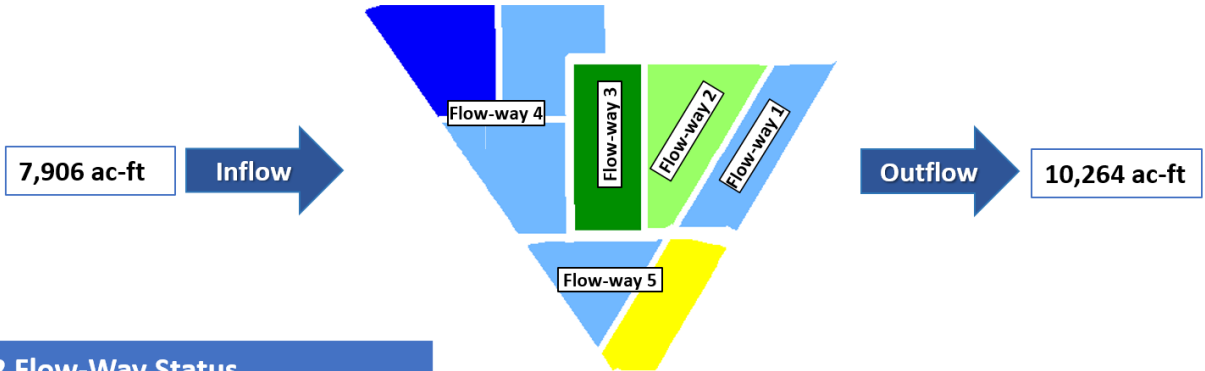
STA-1W Flow-Way Status			
Flow-Way	Vegetation Status Healthy --- Stressed	365-day P Loading Rate (below 1.0 g P / m ² /yr is optimal)	Online / Offline / Restrictions
Northern	← →	1.0	Vegetation management
Western	← →	1.0	Vegetation management
Eastern	← →	1.0	Vegetation management
Cell 7	← →	N/A	Online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

As of 6/18/2023	
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	7,156	25,229	158,064
--Lake Inflow, ac-ft	0	N/A	9,400
Total Outflow, ac-ft	10,302	27,741	168,017
Inflow Conc., ppb	79	114	181
Outflow Conc., ppb	19	19	19
Includes Preliminary Data			

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

STA-2 Weekly Status Report – 6/12/2023 through 6/18/2023



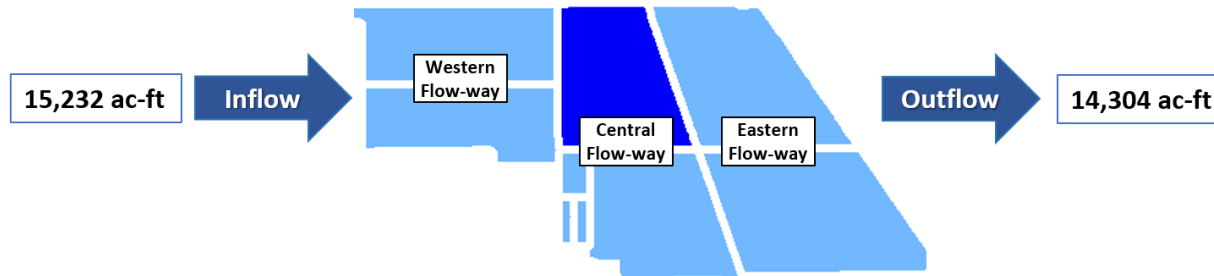
STA-2 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions
1	← →	1.0	Online
2	Offline, post-construction grow in starting 1/23/2023		
3	← →	1.0	Veg Rehab / Avian nesting
4	← →	1.0	Vegetation Rehab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

As of 6/18/2023	
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	7,906	37,524	271,668
--Lake Inflow, ac-ft	0	N/A	21,000
Total Outflow, ac-ft	10,264	31,189	281,329
Inflow Conc., ppb	131	85	98
Outflow Conc., ppb	13	13	26
Includes Preliminary Data			

Figure S-3. STA-2 Weekly Status Report

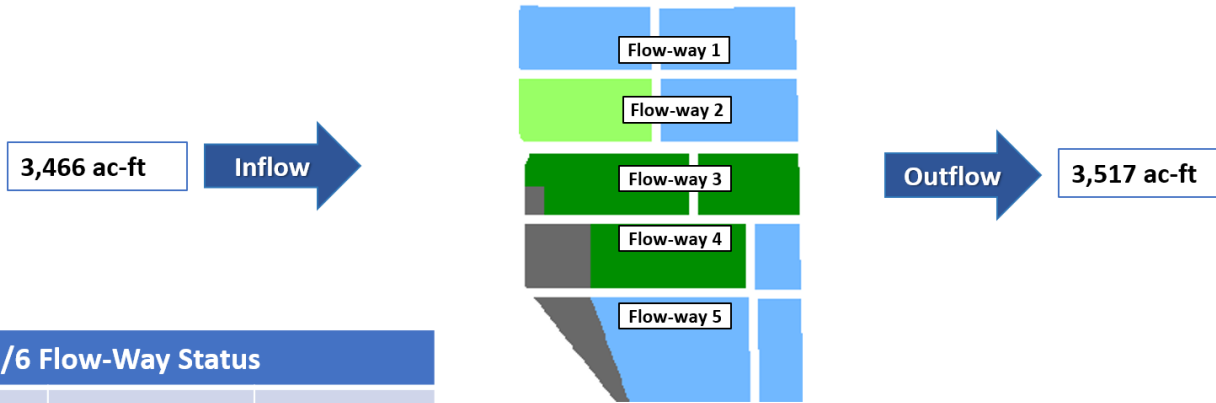
STA-3/4 Weekly Status Report – 6/12/2023 through 6/18/2023



STA-3/4 Flow-Way Status				As of 6/18/2023																																			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)																																			
Eastern	Offline, vegetation management drawdown as of 3/1/2021			<div style="display: flex; flex-direction: column; gap: 5px;"> <div style="background-color: #4b0082; width: 15px; height: 15px; border: 1px solid black;"></div> Deep Water Level (> 2.8' above TS) <div style="background-color: #0000ff; width: 15px; height: 15px; border: 1px solid black;"></div> High Water Level (1.5' – 2.8' above TS) <div style="background-color: #add8e6; width: 15px; height: 15px; border: 1px solid black;"></div> 0.2' – 1.5' above TS <div style="background-color: #008000; width: 15px; height: 15px; border: 1px solid black;"></div> Target Stage (TS +/- 0.2') <div style="background-color: #90ee90; width: 15px; height: 15px; border: 1px solid black;"></div> 0.2' – 0.5' below TS <div style="background-color: #ffff00; width: 15px; height: 15px; border: 1px solid black;"></div> 0.5' – 1.0' below TS <div style="background-color: #ffa500; width: 15px; height: 15px; border: 1px solid black;"></div> Low Water Level (1.0' – 1.2' below TS) <div style="background-color: #ff0000; width: 15px; height: 15px; border: 1px solid black;"></div> Extreme Low Water (> 1.2' below TS) </div>	<table border="1"> <thead> <tr> <th colspan="4">STA-3/4 Flow & Phosphorus Concentration</th> </tr> <tr> <th></th> <th>7-day</th> <th>28-day</th> <th>365-day</th> </tr> </thead> <tbody> <tr> <td>Total Inflow, ac-ft</td> <td>15,232</td> <td>35,367</td> <td>295,253</td> </tr> <tr> <td>--Lake Inflow, ac-ft</td> <td>0</td> <td>N/A</td> <td>1,400</td> </tr> <tr> <td>Total Outflow, ac-ft</td> <td>14,304</td> <td>26,538</td> <td>280,022</td> </tr> <tr> <td>Inflow Conc., ppb</td> <td>56</td> <td>66</td> <td>88</td> </tr> <tr> <td>Outflow Conc., ppb</td> <td>12</td> <td>14</td> <td>16</td> </tr> <tr> <td colspan="4">Includes Preliminary Data</td> </tr> </tbody> </table>			STA-3/4 Flow & Phosphorus Concentration					7-day	28-day	365-day	Total Inflow, ac-ft	15,232	35,367	295,253	--Lake Inflow, ac-ft	0	N/A	1,400	Total Outflow, ac-ft	14,304	26,538	280,022	Inflow Conc., ppb	56	66	88	Outflow Conc., ppb	12	14	16	Includes Preliminary Data			
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Includes Preliminary Data																																							
Central			Online																																				
Western			Online																																				

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

STA-5/6 Weekly Status Report – 6/12/2023 through 6/18/2023



STA-5/6 Flow-Way Status

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

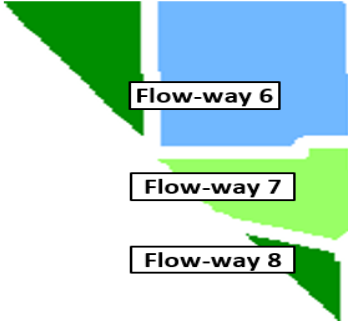
As of 6/18/2023	
Stage Based: Relative to Target Stage (TS)	
	Deep Water Level (> 2.8' above TS)
	High Water Level (1.5' – 2.8' above TS)
	0.2' – 1.5' above TS
	Target Stage (TS +/- 0.2')
	0.2' – 0.5' below TS
	0.5' – 1.0' below TS
	Low Water Level (1.0' – 1.2' below TS)
	Extreme Low Water (> 1.2' below TS)

STA-5/6 Flow & Phosphorus Concentration

	7-day	28-day	365-day
Total Inflow, ac-ft	3,466	14,164	163,458
--Lake Inflow, ac-ft	0	N/A	0
Total Outflow, ac-ft	3,517	11,169	158,013
Inflow Conc., ppb	232	243	287
Outflow Conc., ppb	116	92	44
Includes Preliminary Data			

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

STA-5/6 Weekly Status Report – 6/12/2023 through 6/18/2023



STA-5/6 Flow-Way Status				As of 6/18/2023	
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)	
6	←-----→	 1.0	Online		Deep Water Level (> 2.8' above TS)
7	←-----→	 1.0	Online		High Water Level (1.5' – 2.8' above TS)
8	←-----→	 1.0	Online		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)

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

Widespread rainfall across the Everglades Protection Area last week, heaviest over WCAs 2A and 2B. WCA-1: Last week stage at the 1-8C rose quickly at the end of the week. The average on Sunday was 0.22 feet above the flat Zone A1 regulation line. WCA-2A: Stage dropped quickly at the S11B–HW gauge last week. The average on Sunday was 0.94 feet above the flat regulation line. WCA-3A: The Three Gauge Average rose slowly over the week. The average stage was 0.23 feet below the rising regulation line on Sunday. WCA-3A North: Stage at gauge 62 (Northwest corner) rose to the Upper Schedule last week, the average on Sunday was 0.02 feet below that rising line (**Figures EV-1 through EV-4**).

Water Depths

The SFWDAT (South Florida Water Depth Assessment Tool) illustrates the current stage has risen to near ground surface across most of the Big Cypress National Preserve (BCNP) and in northwestern WCA-3A. Central WCA-3A depths are rising with only a small area with the potential for stage below ground. Pondered conditions remain in eastern WCA-2A and in the upper reaches of the L-67s in WCA-3A. Hydrologic connectivity continues to strengthen within Taylor and Shark River Sloughs within Everglades National Park (ENP). Comparing current SFWDAT water depths to one month ago conditions within the WCAs are slightly wetter but significantly higher stage in BCNP and most of ENP. Looking back a year ago, conditions are similar but drier in WCAs; significantly drier in southwestern BCNP and eastern ENP. (**Figure EV-5 and Figure EV-6**). Comparing current conditions to the 20-year average on June 18th: Depths are average to above average in WCAs 1 and 2A, and northern WCA-3A. Conditions remain well above average in central ENP, closer to average to the west and east of SRS. (**Figure EV-7**).

Taylor Slough and Florida Bay

Total weekly rainfall averaged 1.7 inches in Taylor Slough and Florida Bay over the past week (Monday-Sunday) based on the 18 gauges used for this report. Total weekly rainfall ranged from 0.1 inches at Johnson Key (JK) in the western region to 3.1 inches at Terrapin Bay (TB) in the central nearshore region. Stage changes were variable across Taylor Slough, with an average increase of +0.07 feet. Stage changes ranged from –0.07 feet at P37 in the western slough to +0.41 feet at Taylor Slough Bridge (TSB) in the northern slough (**Figure EV-8 and Figure EV-9**). Taylor Slough water levels are above the historical average for this time of year by +10.2 inches compared to before the Florida Bay initiative (starting in 2017), an increase of +0.2 inches from last week.

Average Florida Bay salinity was 29.8, 2.7 lower than the previous week. Salinity continued to decline at most sites and changes ranged from a decrease of 9.0 in Joe Bay (JB) in the eastern nearshore region to an increase of 1.2 in Johnson Key (JK) in the western region (**Figure EV-8**). Salinities remain within the IQR for the Eastern, Central and Western regions of the bay (**Figure EV-10**). Florida Bay salinity is 2.8 below its historical average for this time of year, down 1.6 from last week.

Water Management Recommendations

Balancing basin inflows and outflows, allowing for a natural rate of stage change has ecological benefit as the wet season progresses. Operations that elevate the ascension rates above 0.18 feet per week would have detrimental ecological impacts in sensitive regions of the EPA. The ecology of WCA-2A would benefit from a moderation of the current ascension rate or even a slow recession in the marsh. Ideal ecologically would be a recession rate of around 0.25' per two weeks until stages reach 0.5' above schedule. As conditions remain at the 90th percentile in NESRS, when water is available flow through Taylor Slough has ecological benefit downstream. Individual regional recommendations can be found in **Table EV-2**.

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

Everglades Region	Rainfall (inches)	Stage change (feet)
WCA-1	1.71	-0.03
WCA-2A	2.53	+0.23
WCA-2B	2.91	+0.18
WCA-3A	1.97	+0.13
WCA-3B	1.76	+0.00
ENP	1.31	-0.02

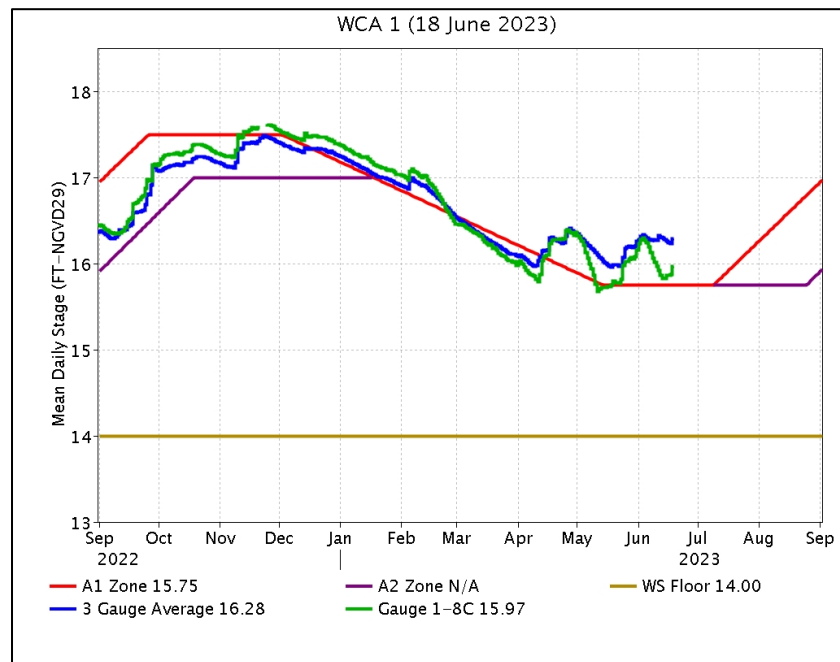


Figure EV-1. WCA-1 stage hydrographs and regulation schedule.

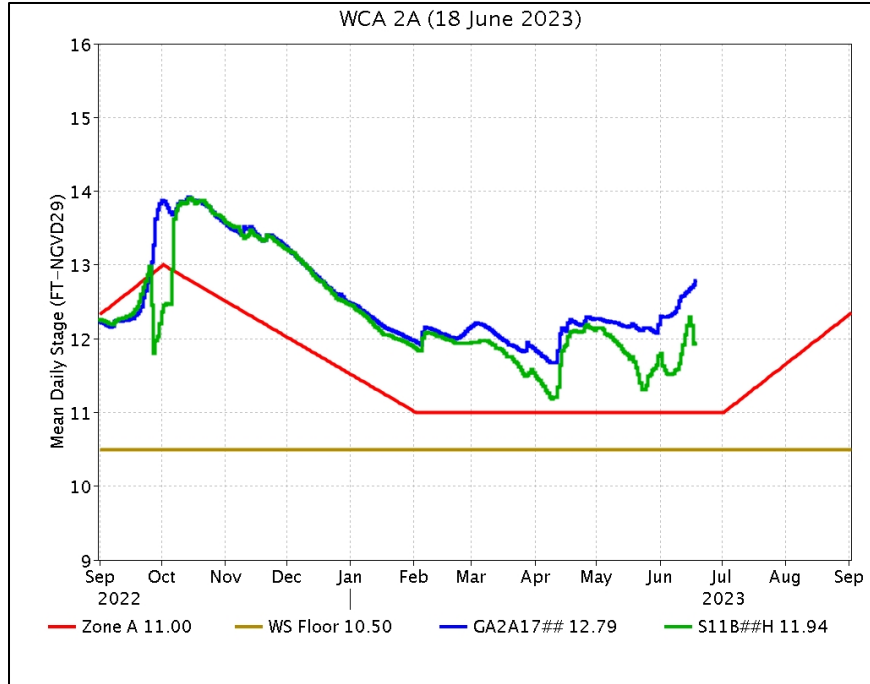


Figure EV-2. WCA-2A stage hydrographs and regulation schedule.

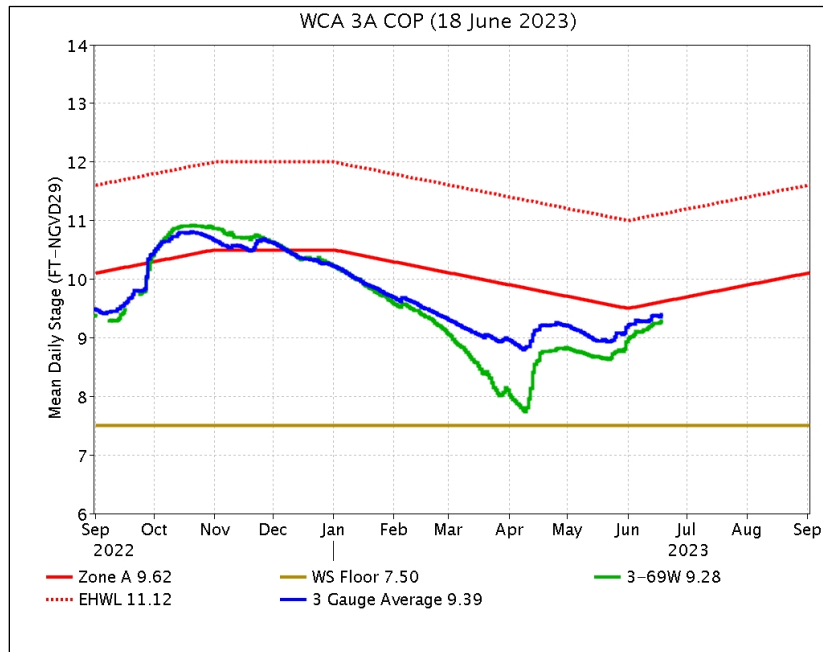


Figure EV-3. WCA-3A stage hydrographs (three-gauge average, 3-69W) and regulation schedule.

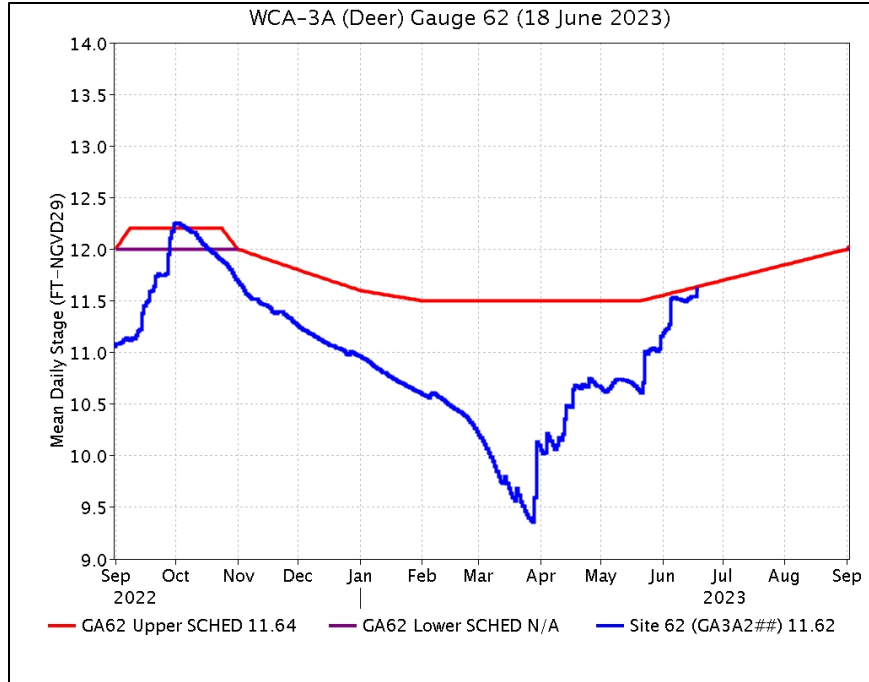


Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.

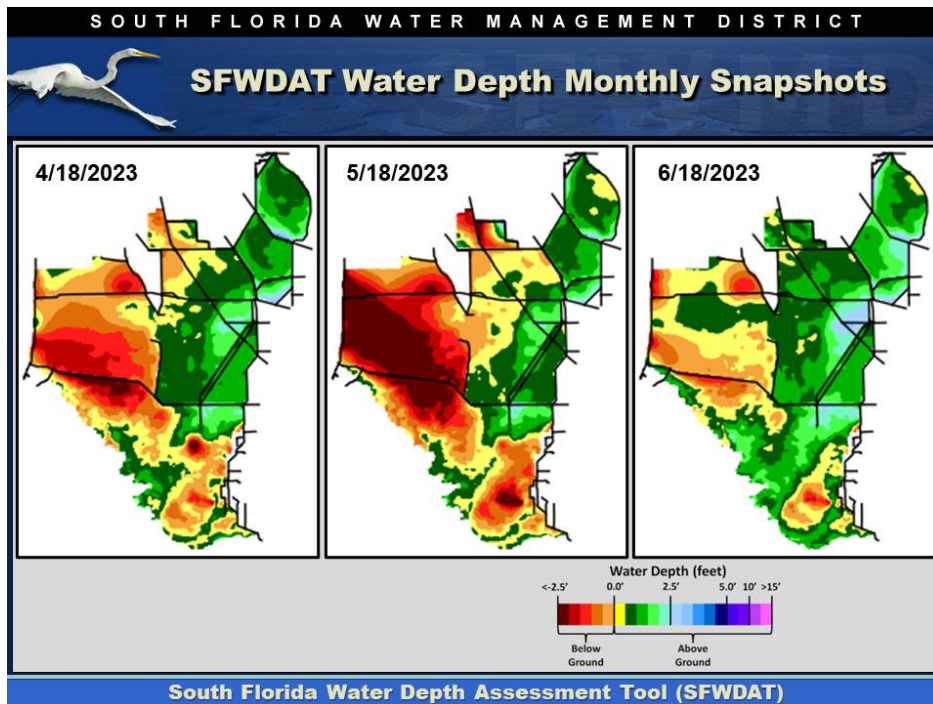


Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

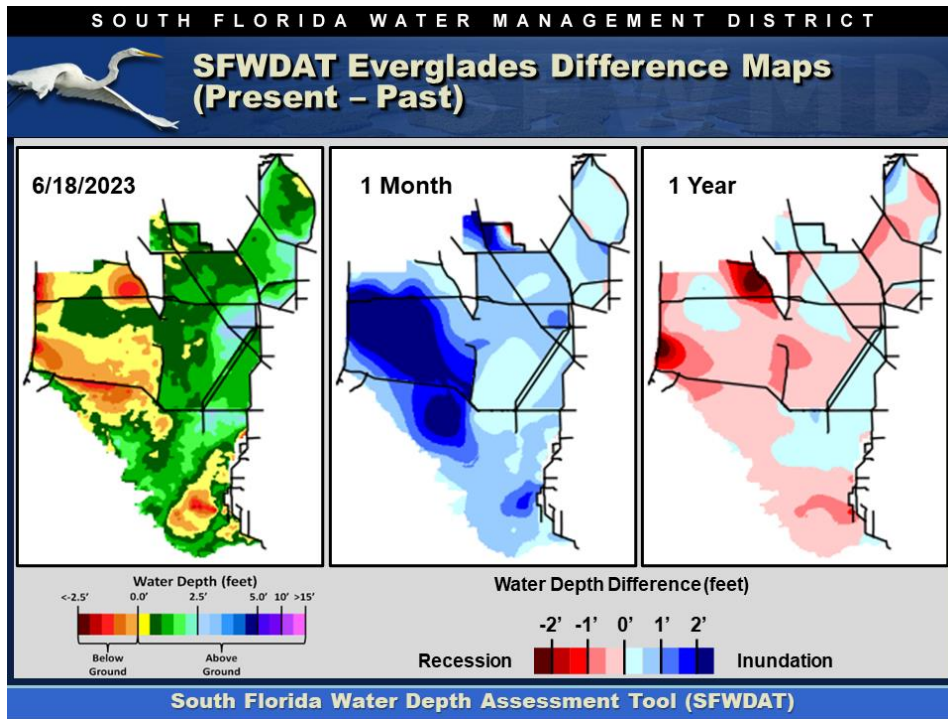


Figure EV-6. Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

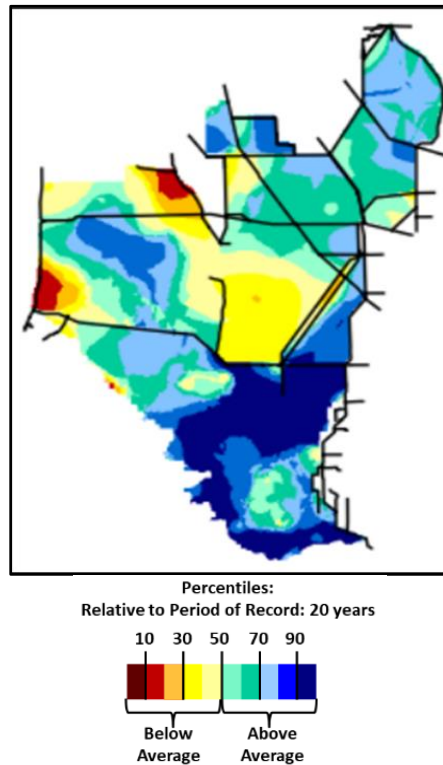


Figure EV-7. Present water depths (6/18/2023) compared to the day of year average over the previous 20 years.

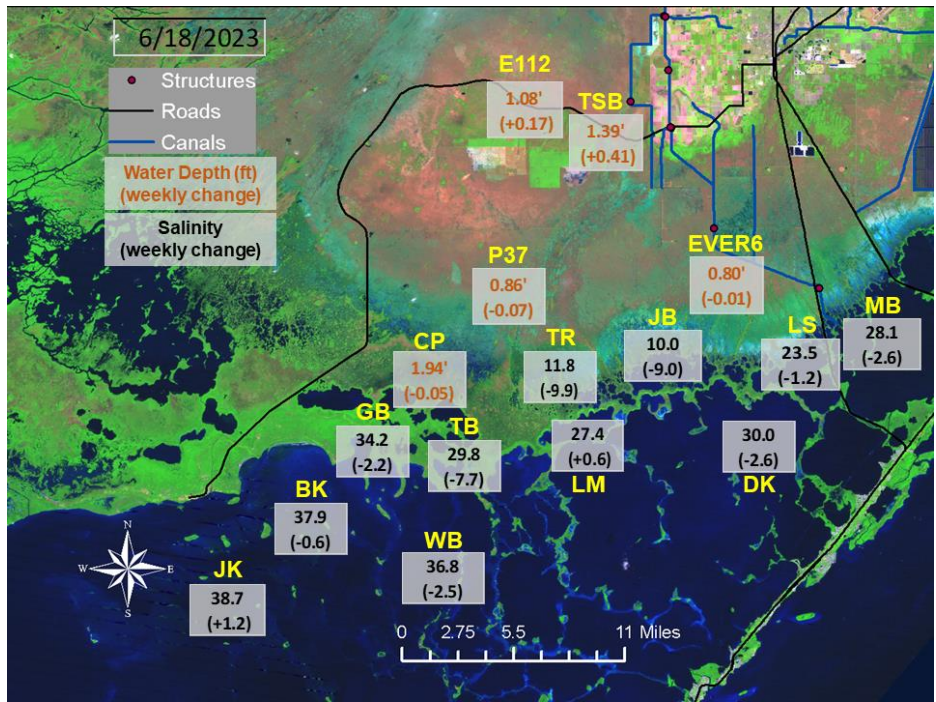


Figure EV-8. Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

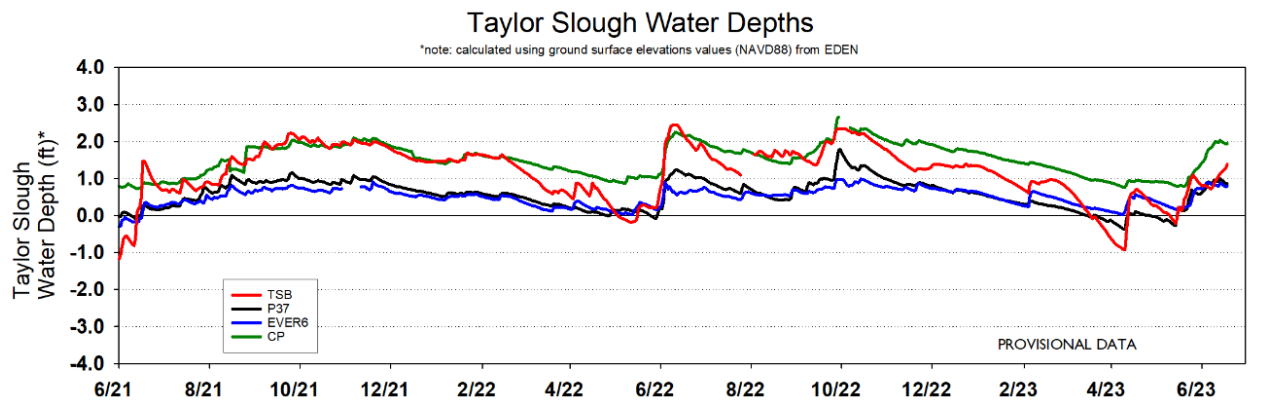


Figure EV-9. Taylor Slough water depth time series.

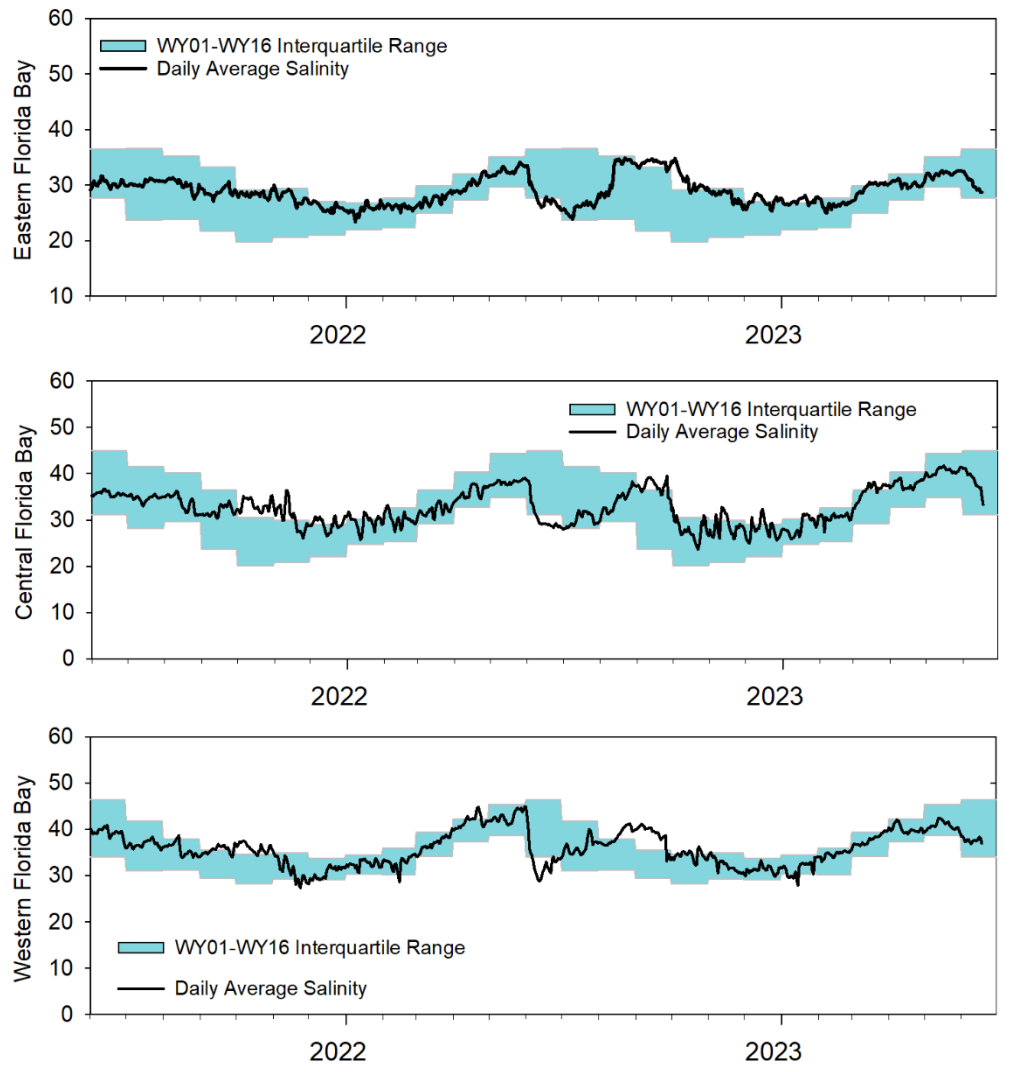


Figure EV-10. Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

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

SFWMD Everglades Ecological Recommendations, June 20, 2023 (red is new)			
	Weekly change	Recommendation	Reasons
WCA-1	Stage decreased by 0.03'	Conserve water in this basin as possible. Ascension rate of less than +0.18' per week.	Protect within basin and downstream habitat and wildlife.
WCA-2A	Stage increased by 0.23'	Allow water to flow south from this basin until stages reach 0.5' above regulation schedule at the 2-17 gauge. Recession rate of less than 0.125' per week, or 0.25' per two weeks.	Protect within basin and downstream habitat and wildlife.
WCA-2B	Stage increased by 0.18'	Conserve water in this basin as possible Ascension rate of less than +0.18' per week.	Protect within basin and downstream habitat and wildlife.
WCA-3A NE	Stage increased by 0.32'	Conserve water in this basin as possible. Ascension rate of less than +0.18' per week.	Protect within basin and downstream habitat and wildlife.
WCA-3A NW	Stage increased by 0.15'	Conserve water in this basin as possible. Ascension rate of less than +0.18' per week.	
Central WCA-3A S	Stage increased by 0.05'	Ascension rate of less than +0.18' per week.	Protect within basin and downstream habitat and wildlife.
Southern WCA-3A S	Stage increased by 0.02'		
WCA-3B	Stage was unchanged	Ascension rate of less than +0.18' per week.	Protect within basin and downstream habitat and wildlife.
ENP-SRS	Stage decreased by 0.02'	Make discharges to ENP according to COP and TTF protocol while adaptively considering upstream and downstream ecological conditions.	Protect within basin and upstream habitat and wildlife.
Taylor Slough	Stage changes ranged from -0.07' to +0.41'	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged from -9.0 to +1.2	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 1267 cfs, and the previous 30-day mean inflow was 1220 cfs. The seven-day mean salinity was 24.5 at BBCW8 and 26.3 at BBCW10, both within the ideal salinity range for estuarine organisms in this region (salinity less than 35). Data are provided by Biscayne National Park.

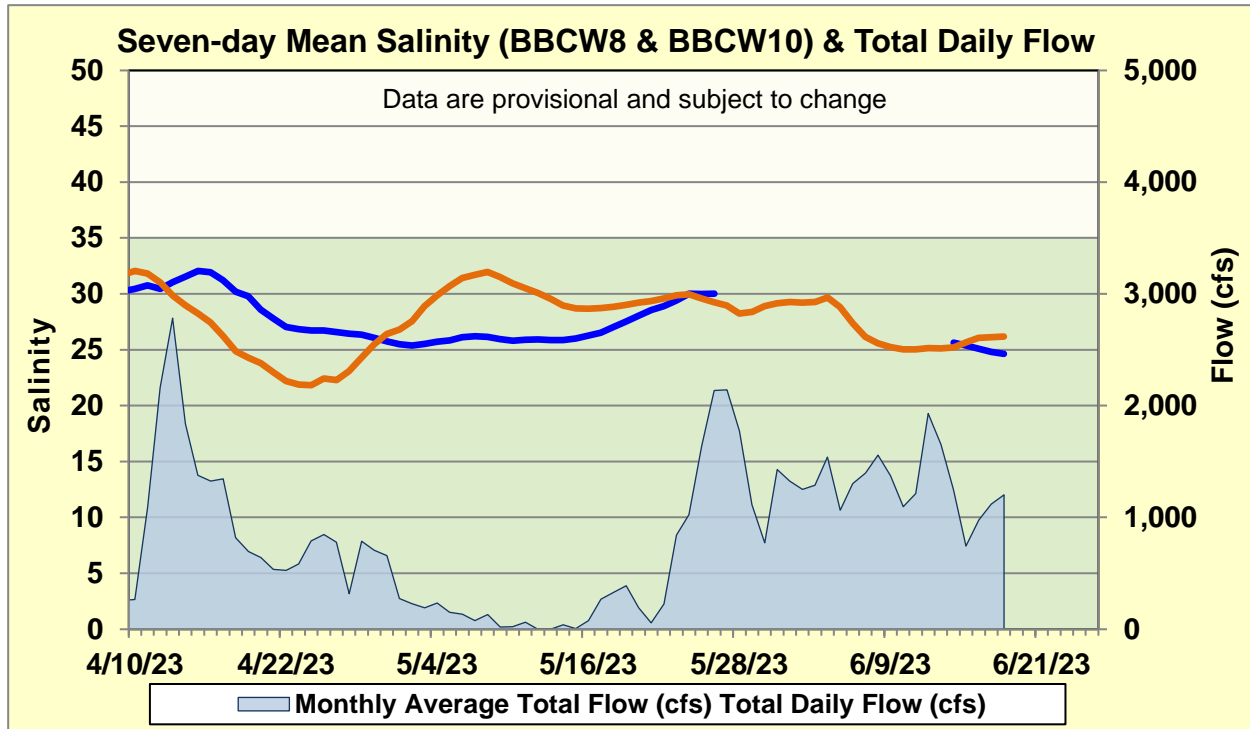


Figure BB-1. Seven-day mean salinity at BBCW8 and BBCW10 and total daily flow in Biscayne Bay. Total daily flow was calculated using flow from structures S20G, S20F, S21, S21A, S123, and S700P.