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: July 19, 2023

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

On Wednesday, the considerable moisture associated with a well-defined tropical wave extending northward from the Caribbean Sea will engulf the SFWMD. Although atmospheric instability will be about average, numerous showers and thunderstorms, some locally heavy, are expected around and south of Lake Okeechobee, where the moisture is greatest. Easterly to southeasterly steering winds around subtropical high pressure will generally favor an east-to-west progression of the heaviest rains, meaning that rains should peak overnight/early in the day over the eastern part of the SFWMD and from the southern interior of the SFWMD to the west coast from the afternoon through the early evening. Some significant rainfall is possible, especially over the far west/west coast. In the wake of the tropical wave on Thursday, moisture values should decrease some, which should also result in a decrease of total SFWMD rainfall. The spatial pattern of rains, however, should resemble Wednesday's depicted QPF, to some extent, with heavier interior and western rains and less over the eastern part of the SFWMD. Friday's rainfall forecast is uncertain since it is unclear at the moment whether steering winds will be easterly to southeasterly or begin to veer more southerly, the latter which would occur if a new upper-air trough over the Great Lakes/northeastern U.S. erodes subtropical high pressure. Finally, beginning as soon as this weekend through early next week, a large Saharan Air Layer (SAL) with a light concentration of Saharan Dust will overspread the SFWMD, especially over the southern part of the area. The significant decrease in moisture accompanying the SAL and large-scale stabilization of the lower atmosphere is expected to cause a notable decrease of total SFWMD rainfall through the period. With an upper-air trough likely to be in place over the eastern U.S. through the eastern/central Gulf of Mexico, the steering winds will also likely be southwesterly to westerly from Saturday through Sunday, meaning that any afternoon rains that do occur will most likely be over the northeastern half of the area and away from the southwestern part of the SFWMD, which has had persistently below normal rainfall this July. For the week ending next Tuesday morning, total SFWMD rainfall is likely to be below normal.

Kissimmee

No releases were made from East Lake Toho; small releases were made from Lake Toho to slow the rate of stage rise. Weekly average discharges on July 16, 2023, at S-65 and S-65A were 650 cfs and 760 cfs, respectively. Mean weekly water depth on the Kissimmee River floodplain decreased by 0.14 feet to 0.34 feet over the week ending July 16, 2023. The weekly average concentration of dissolved oxygen in the Kissimmee River increased from 0.6 mg/L last week to 1.8 mg/L for the week ending July 16, 2023, which is above the potentially lethal level but still in the range that is physiologically stressful for largemouth bass and other sensitive species. As of July 17, daily average DO in the Phase I area has recovered to 3.2 mg/L and to 2.0 mg/L in the Phase II/III area.

Lake Okeechobee

Lake Okeechobee stage was 14.89 feet NGVD on July 16, 2023, which is 0.04 feet higher than the previous week and 0.80 feet higher than a month ago. Average daily inflows (excluding rainfall) decreased from the previous week, going from 4,998 cfs to 4,014 cfs. Average daily outflows (excluding rainfall) increased from the previous week, going from 0 cfs to 263 cfs. The cyanobacteria index level increased from the previous week and was highest in the northeastern and eastern nearshore areas of the Lake on July 15, 2023. Routine phytoplankton monitoring on July 10 - 12, detected microcystins toxins at 28 locations, with the maximum concentration recorded at S-308 (170 µg/L). Nine locations had toxin concentrations above the 8 µg/L EPA recreational standard. Communities were dominated by *Microcystis aeruginosa* at 26 sites.

Estuaries

Total inflow to the St. Lucie Estuary averaged 861 cfs over the past week with no flow coming from Lake Okeechobee. Mean salinities increased at all three sites within the estuary over the past week. Salinity in the middle estuary was in the optimal range (10-25) for adult eastern oysters.

Total inflow to the Caloosahatchee Estuary averaged 3,290 cfs over the past week with 263 cfs coming from Lake Okeechobee. Mean salinities remained the same at S-79 and Val I-75, increased at Sanibel, and decreased at the remaining sites within 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 upper stressed range at Sanibel (>25) and in the lower stressed range at Cape Coral (5-10).

Stormwater Treatment Areas

For the week ending Sunday, July 16, 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 382,000 ac-feet. Most STA cells are above target stage. STA-1E Western Flow-way is offline for post-construction vegetation grow in, STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown, and STA-2 Flow-way 2 is offline for post-construction vegetation grow in. Operational restrictions are in effect in STA-1W Northern Flow-way and STA-2 Flow-way 4 for vegetation management activities, and in STA-2 Flow-way 3 for canal plug refurbishments. This week, if 2008

LORS recommends Lake releases to the WCAs and conditions allow, releases will be sent to STA-2.

Everglades

Most regions of the WCAs experienced a “fair” or “good” rate of stage change last week with WCA-2A as the exception. Depths are above average for this time of year across most of the Everglades Protection Area. Depths decreased on average in Taylor slough last week but remain well above the historical average. Average salinity increased in the nearshore of Florida Bay yet continues to be lower than average for this time of year.

Biscayne Bay

Total inflow to Biscayne Bay averaged 667 cfs and the previous 30-day mean inflow averaged 983 cfs. The seven-day mean salinity was 26.2 at BBCW8 and 26.5 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 July 16, 2023, mean daily lake stages were 55.7 feet NGVD (0.8 feet below schedule) in East Lake Toho, 52.9 feet NGVD (0.6 feet below schedule) in Lake Toho, and 50.1 feet NGVD (0.9 feet below schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1**, **Figures KB-1-3**).

Lower Kissimmee

For the week ending July 16, 2023, mean weekly discharge was 650 cfs at S-65 and 760 cfs at S-65A. Mean weekly discharge from the Kissimmee River was 1,900 cfs at S-65D and 2,000 cfs at S-65E (**Table KB-2**). Mean weekly headwater stages were 46.3 feet NGVD at S-65A and 27.8 feet NGVD at S-65D on July 16, 2023. Mean weekly river channel stage decreased by 0.4 feet to 37.2 ft NGVD over the week ending on July 16, 2023 (**Figure KB-4**). Mean weekly water depth on the Kissimmee River floodplain decreased by 0.14 feet to 0.34 feet over the week ending July 16, 2023 (**Table KB-2**, **Figure KB-5**). The weekly average concentration of dissolved oxygen in the Kissimmee River increased from 0.6 mg/L the previous week to 1.8 mg/L for the week ending July 16, 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 a dissolved oxygen crash in the Kissimmee River, suspend maximum flow reduction criteria temporarily if recommended by KRREP staff to help improve DO conditions.

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)	
							7/16/23	*7/9/23*
Lakes Hart and Mary Jane	S-62	LKMJ	41	59.8	R	60.0	-0.2	0.0
Lakes Myrtle, Preston and Joel	S-57	S-57	0	60.2	R	61.0	-0.8	-0.8
Alligator Chain	S-60	ALLI	0	62.5	R	63.2	-0.7	-0.8
Lake Gentry	S-63	LKGT	0	60.0	R	61.0	-1.0	-1.0
East Lake Toho	S-59	TOHOE	0	55.7	R	56.5	-0.8	-1.0
Lake Toho	S-61	TOHOW S-61	13	52.9	R	53.5	-0.6	-0.8
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	650	50.1	R	51.0	-0.9	-0.8

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.

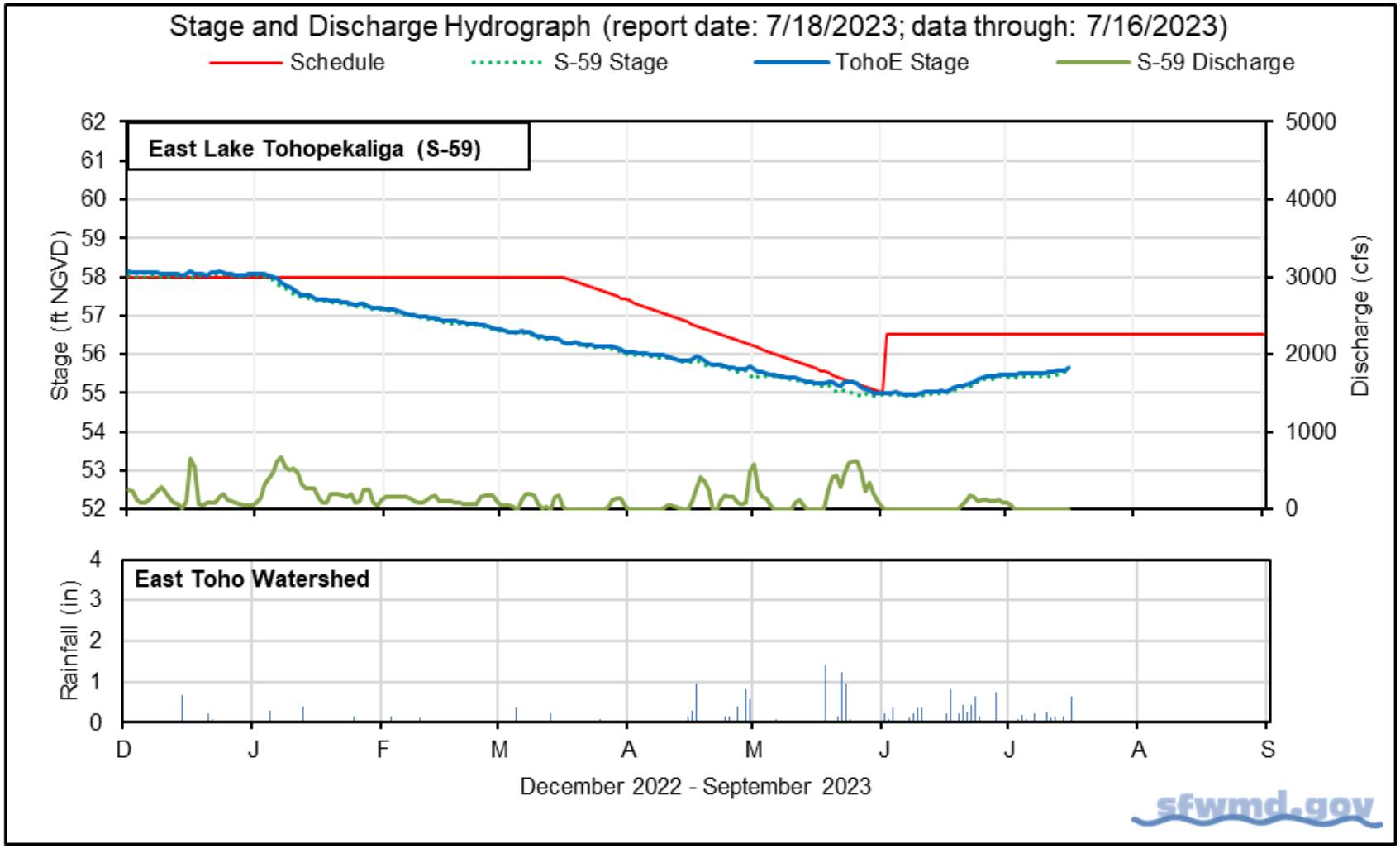


Figure KB-1. East Lake Toho regulation schedule, stage, discharge and rainfall.

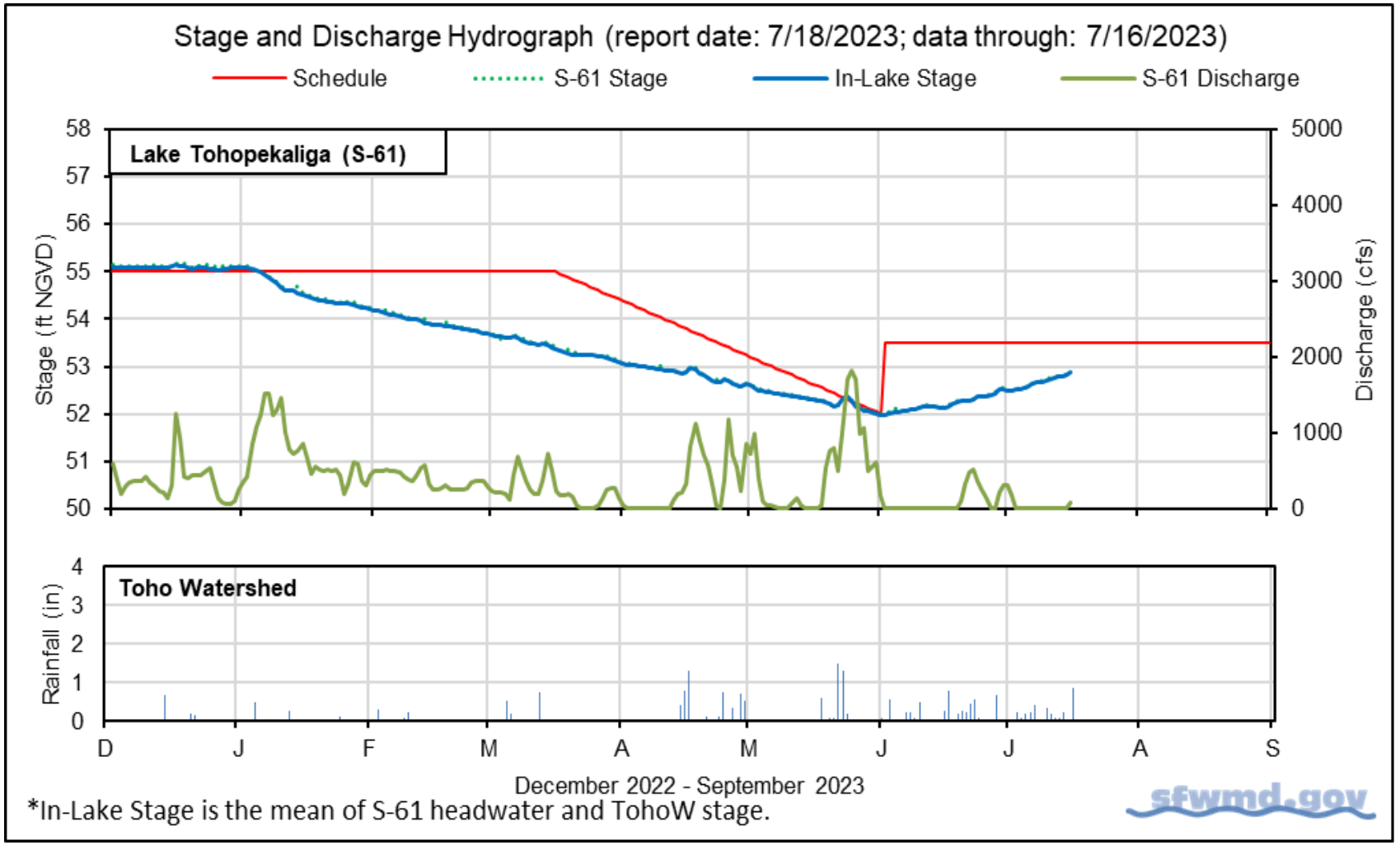


Figure KB-2. Lake Toho regulation schedule, stage, discharge and rainfall.

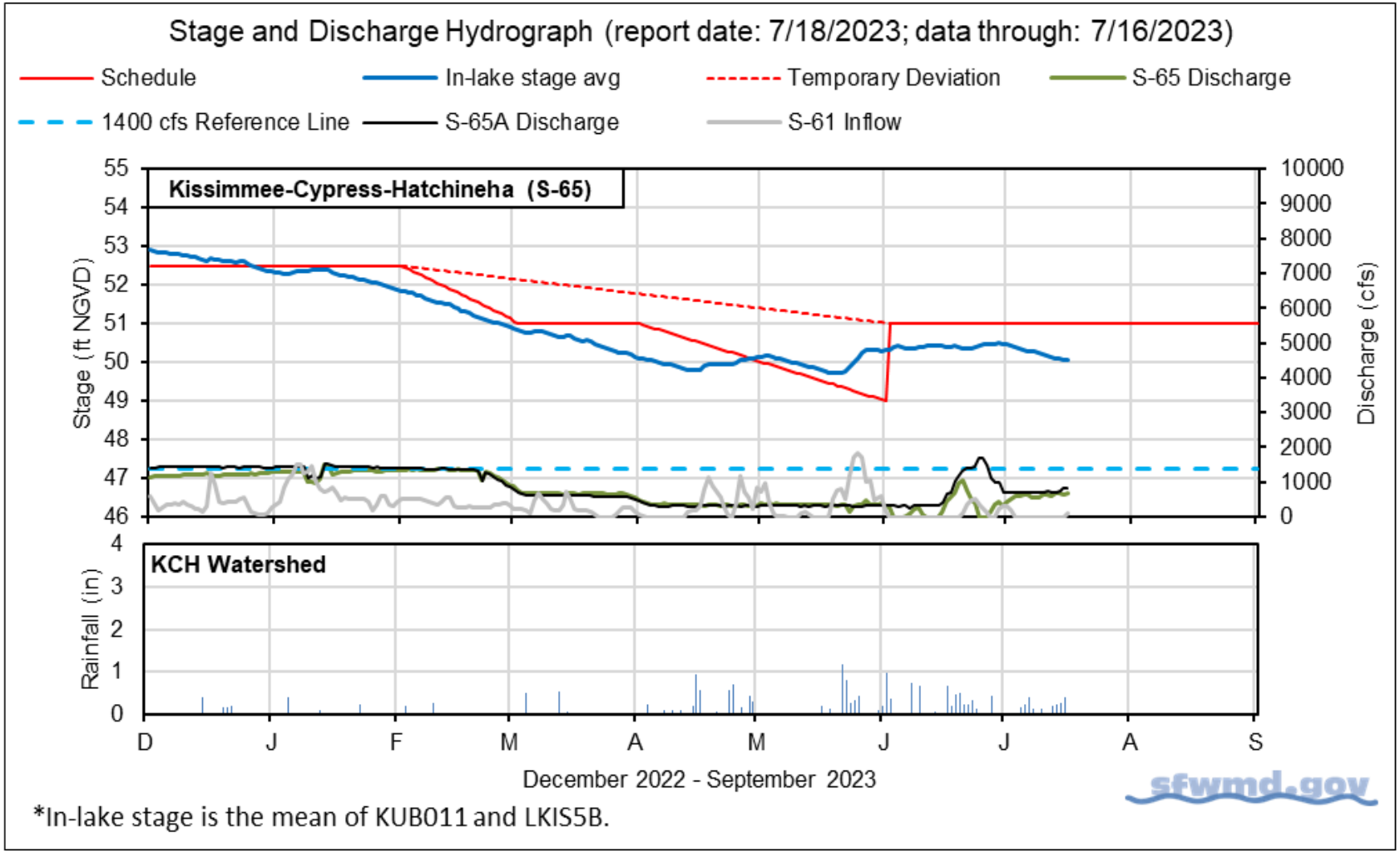


Figure KB-3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge, and rainfall.

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			
		7/16/23	7/16/23	7/9/23	7/2/23	6/25/23
Discharge	S-65	670	650	590	310	530
Discharge	S-65A[a]	820	760	700	960	1,400
Headwater Stage (feet NGVD)	S-65A	46.3	46.3	46.3	46.4	46.6
Discharge	S-65D[b]	1,800	1,900	2,700	2,800	1,800
Headwater Stage (feet NGVD)	S-65D[c]	27.8	27.8	27.9	27.9	27.8
Discharge (cfs)	S-65E[d]	2,000	2,000	2,700	2,900	1,900
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) [e]	Phase I, II/III river channel	2.5	1.8	0.6	0.0	1.9
River channel mean stage[f]	Phase I river channel	36.8	37.2	37.6	38.6	37.6
Mean depth (feet) [g]	Phase I floodplain	0.30	0.34	0.48	0.89	0.43

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).

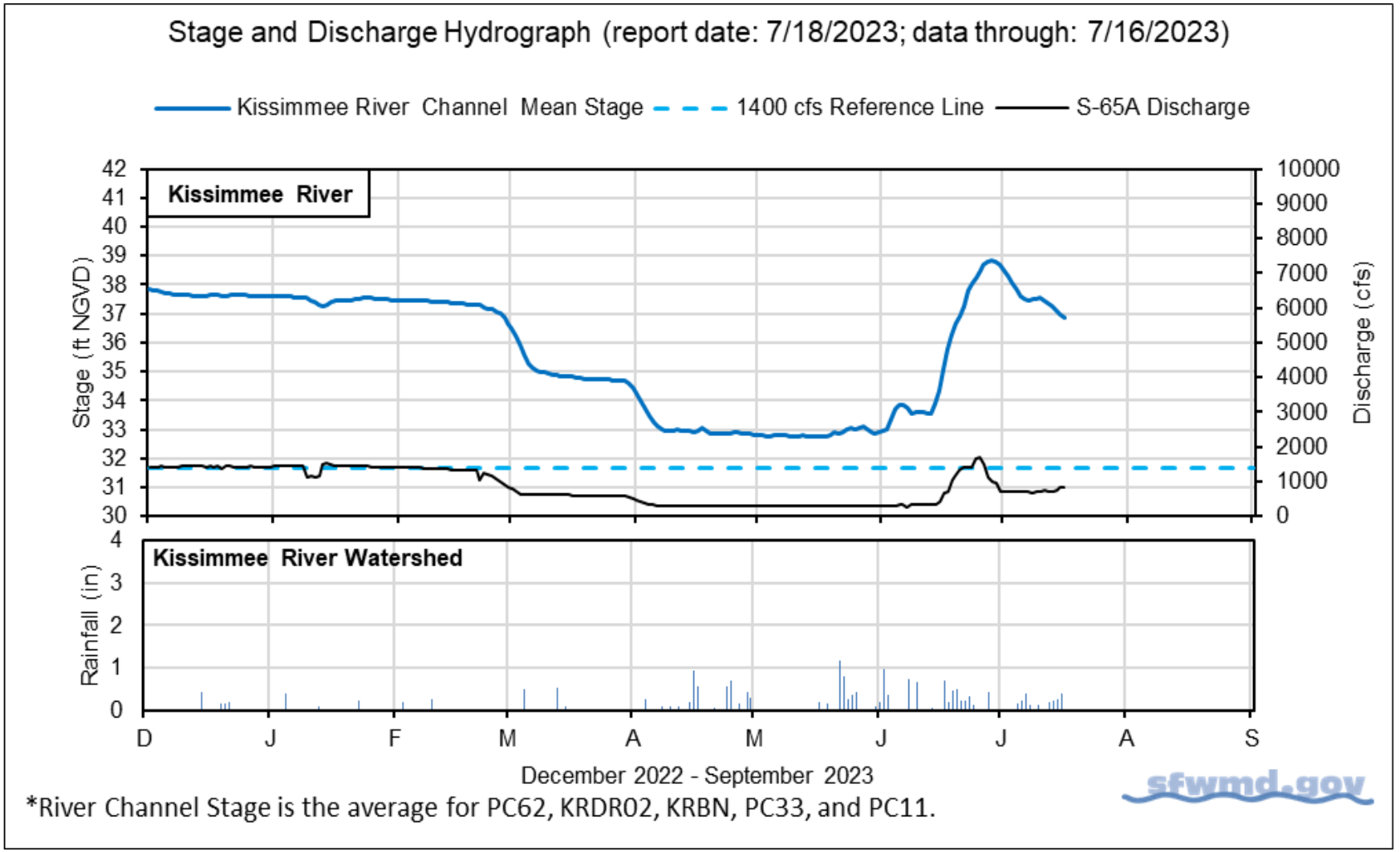


Figure KB-4. Kissimmee River stage, discharge, and rainfall.

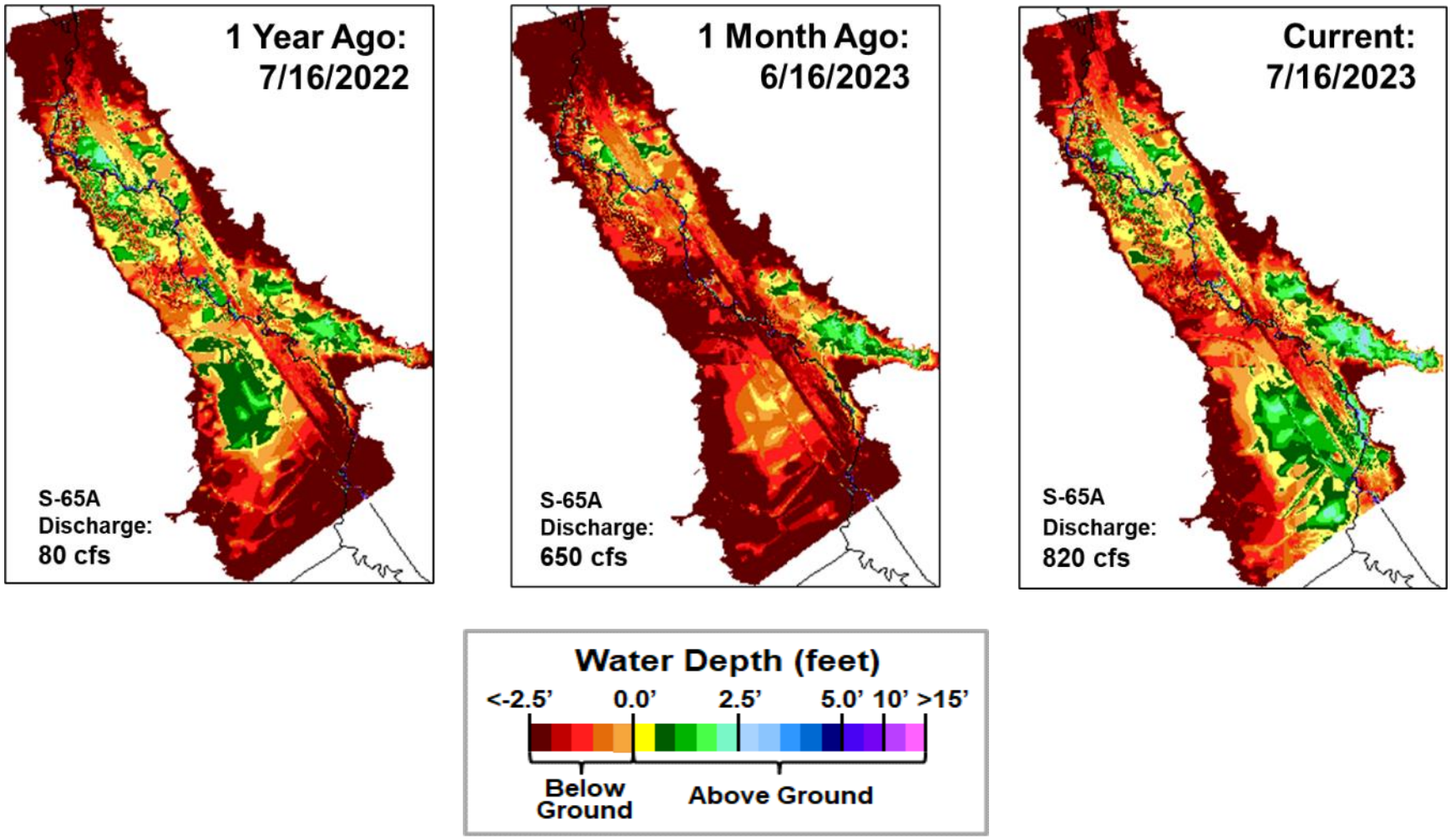


Figure KB-5. Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago, and current.

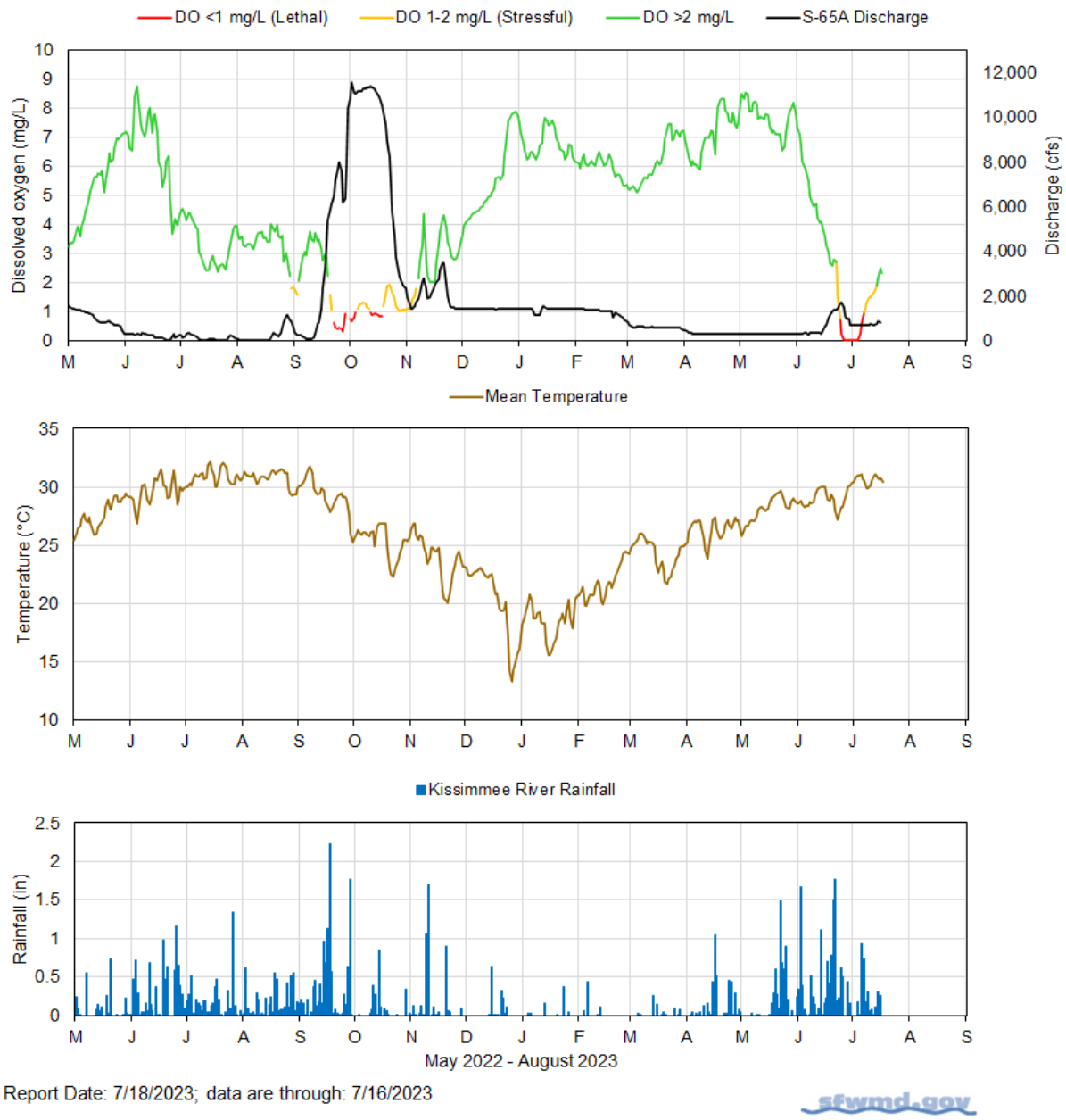


Figure KB-6. Restored Kissimmee River channel mean daily dissolved oxygen concentration (mg/L), S-65A discharge (cfs), temperature (°C) and rainfall (inches). Dissolved oxygen (DO) and temperature are mean daily values averaged for PC62, KRDR02, KRBN, PC33, PC11, PD62R, and PD42R with an average of four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

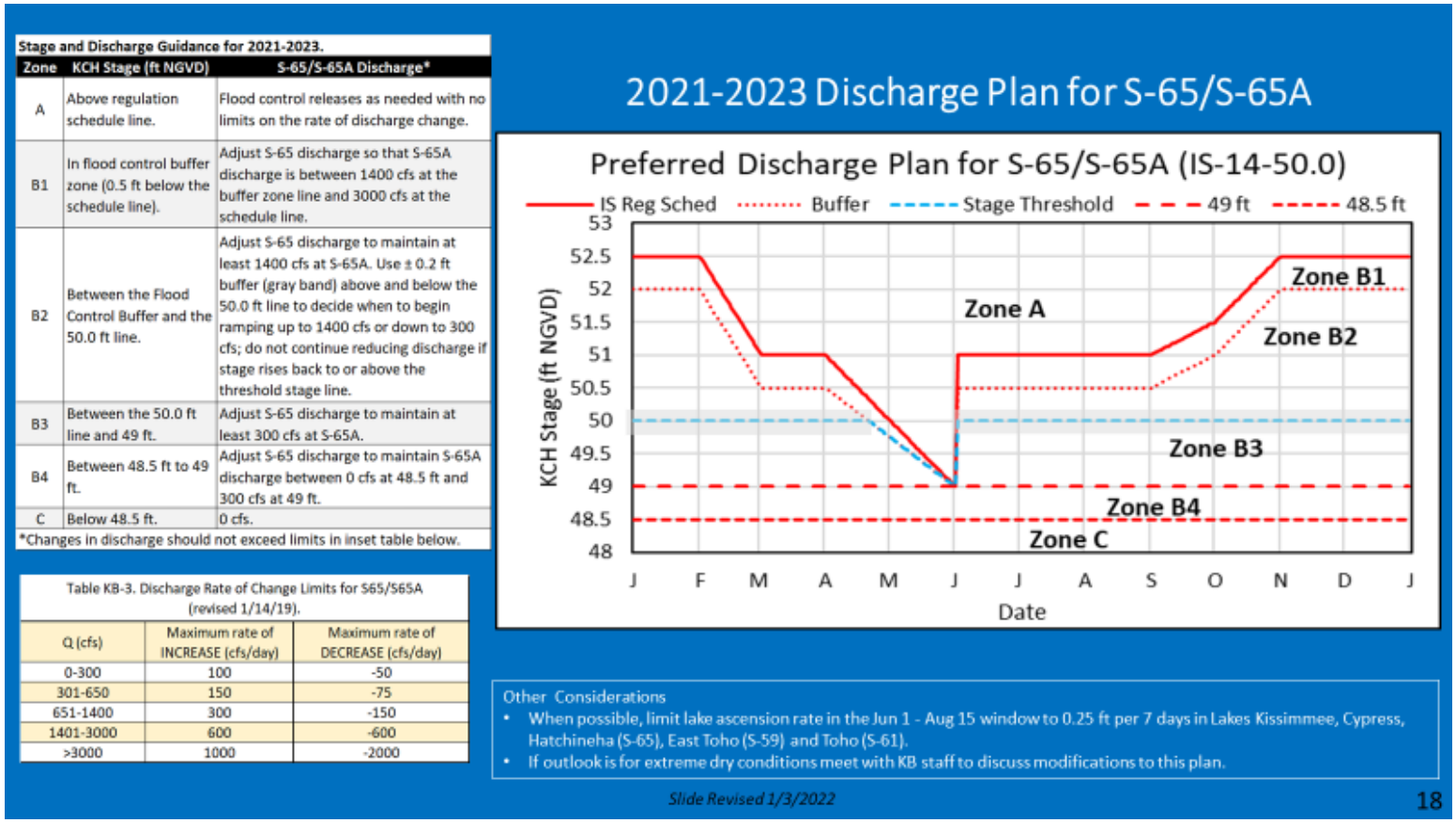


Figure KB-7. IS-14-50 Discharge Plan for S65/S65A with discharge rate of change limits (revised 1/14/19).

Lake Okeechobee

Lake Okeechobee stage was 14.89 feet NGVD on July 16, 2023, which was 0.04 feet higher than the previous week and 0.80 feet higher than a month ago (**Figure LO-1**). Lake stage remained in the Low sub-band (**Figure LO-2**) and was 1.88 feet above the upper limit of the ecological envelope (**Figure LO-3**). According to NEXRAD, 0.72 inches of rain fell directly on the Lake last week.

Average daily inflows (excluding rainfall) decreased from the previous week, going from 4,998 cfs to 4,014 cfs. The highest average single structure inflow came from the S-65E/EX1 structure (1,973 cfs). Backflows via the S-271 were at an average rate of 93 cfs. Average daily outflows (excluding rainfall) increased from the previous week, going from 0 cfs to 263 cfs. Outflows to the west via the S-77 structure averaged 263 cfs for the week. There were no outflows to the east via the S-308 structure or to the south via the S-350 structures. **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 cyanobacteria index increased from the previous week and was highest in the northeastern and eastern nearshore areas of the Lake according to the July 15, 2023, satellite image from NOAA's Harmful Algal Bloom Monitoring System (**Figure LO-6**).

Routine phytoplankton monitoring on July 10 - 12, revealed that microcystins toxins were detected at 28 locations, with the maximum concentration recorded at S-308 (170 µg/L). Toxin concentrations exceeded the EPA recreational standard (8 µg/L) at 9 locations (**Figure LO-7**). Twenty-six sites had communities dominated by *Microcystis aeruginosa,* and two sites had communities co-dominated by *M. aeruginosa* and *Dolichospermum circinale* (EASTSHORE) and *Cylindrospermopsis raciborski* and *Planktolyngbya limnetica* (POLESOUT). Sites KISSR0.0 and S-77 had mixed communities.

All data presented in this report are provisional and are subject to change.

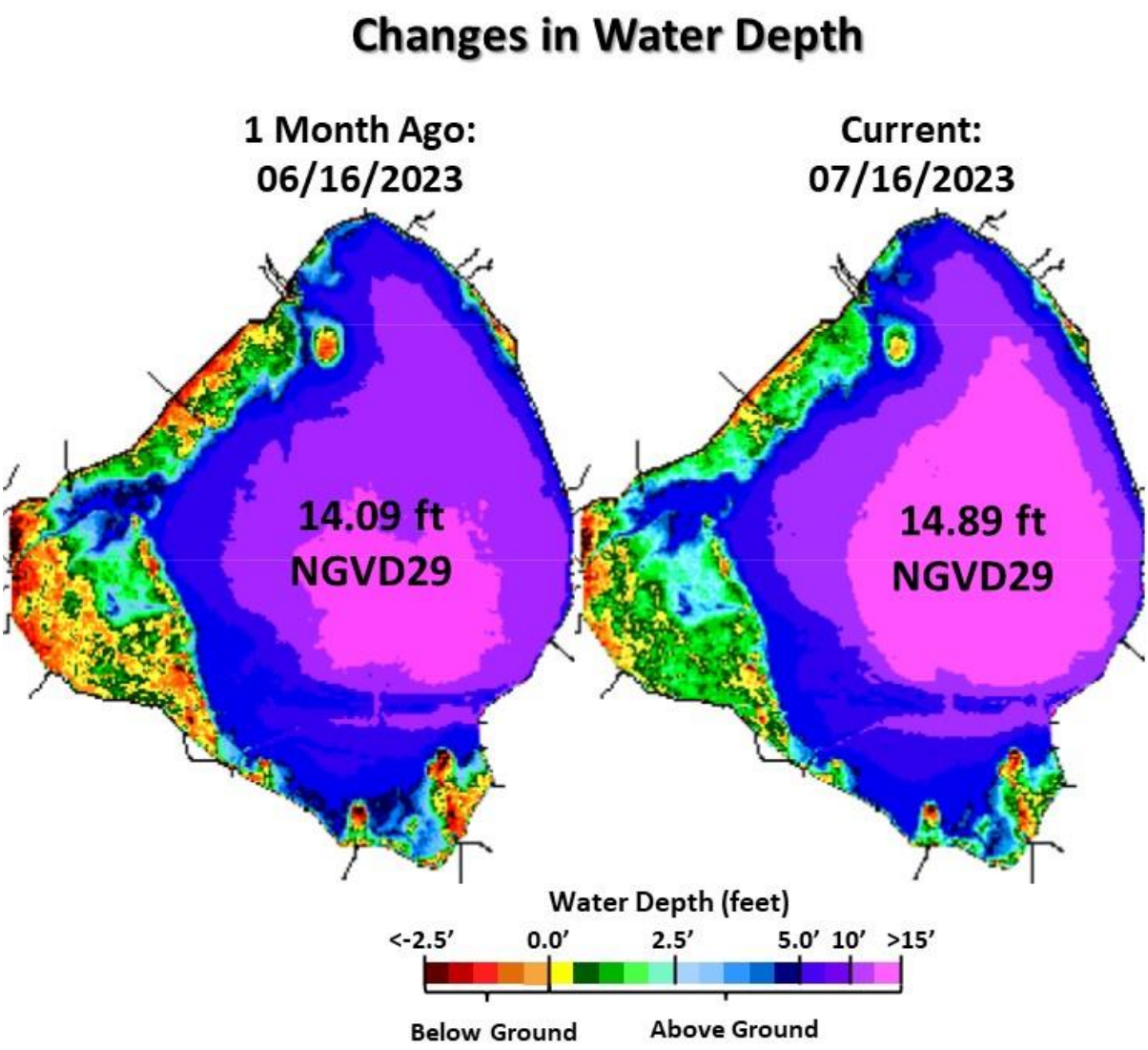


Figure LO-1. Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

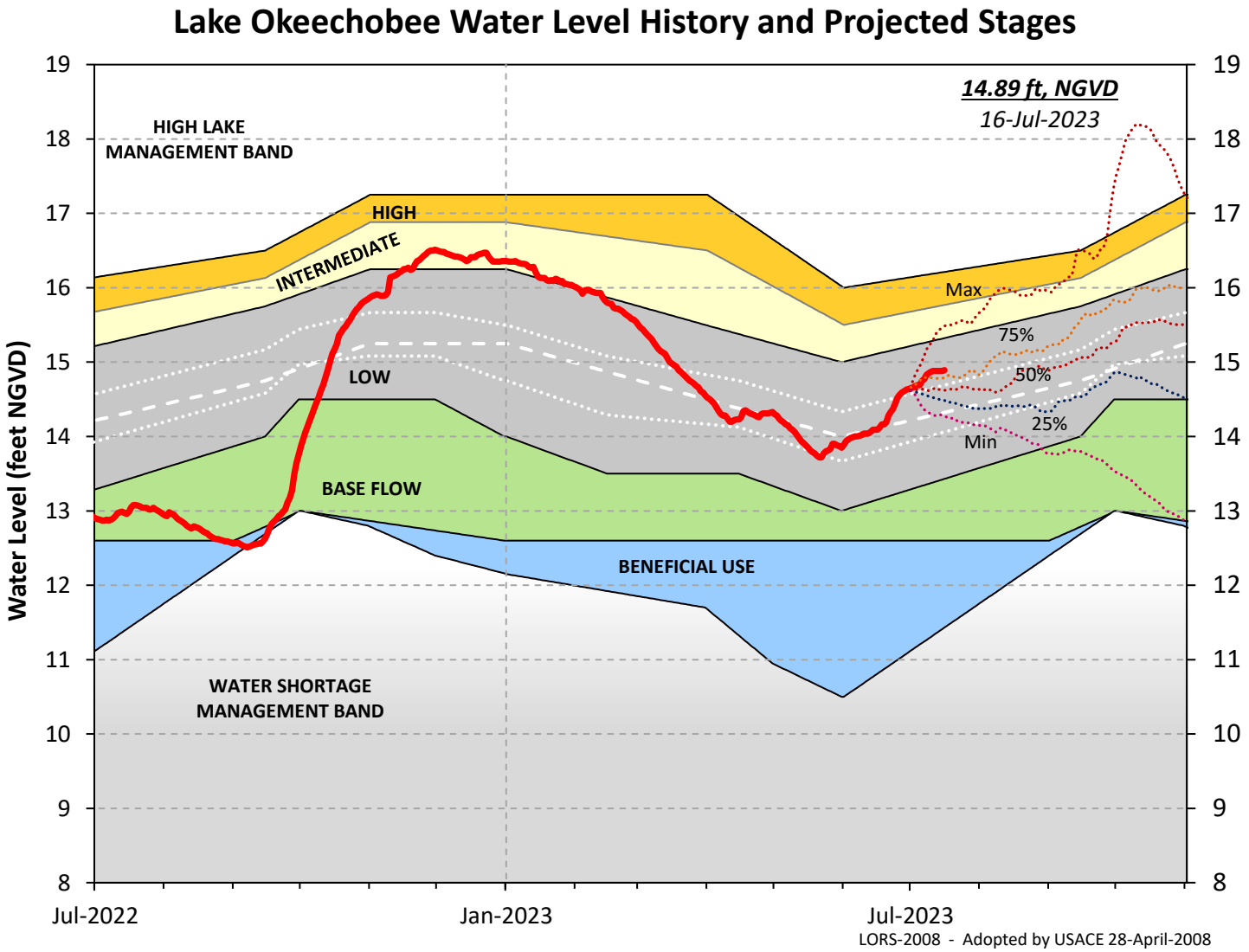


Figure LO-2. Recent Lake Okeechobee stages with projected stages based on a dynamic position analysis.

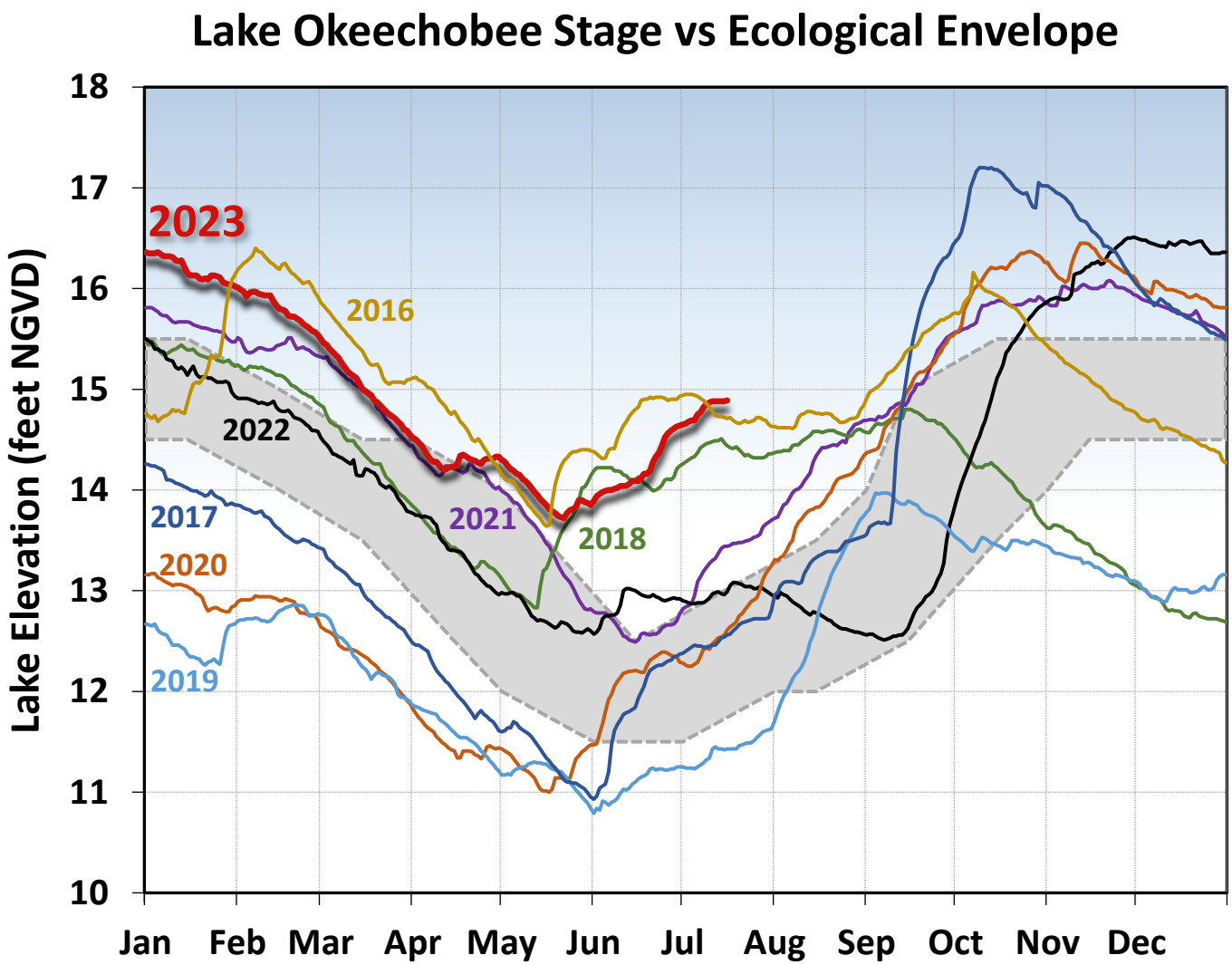


Figure LO-3. The prior seven years of annual stage hydrographs for Lake Okeechobee in comparison to the ecological envelope.

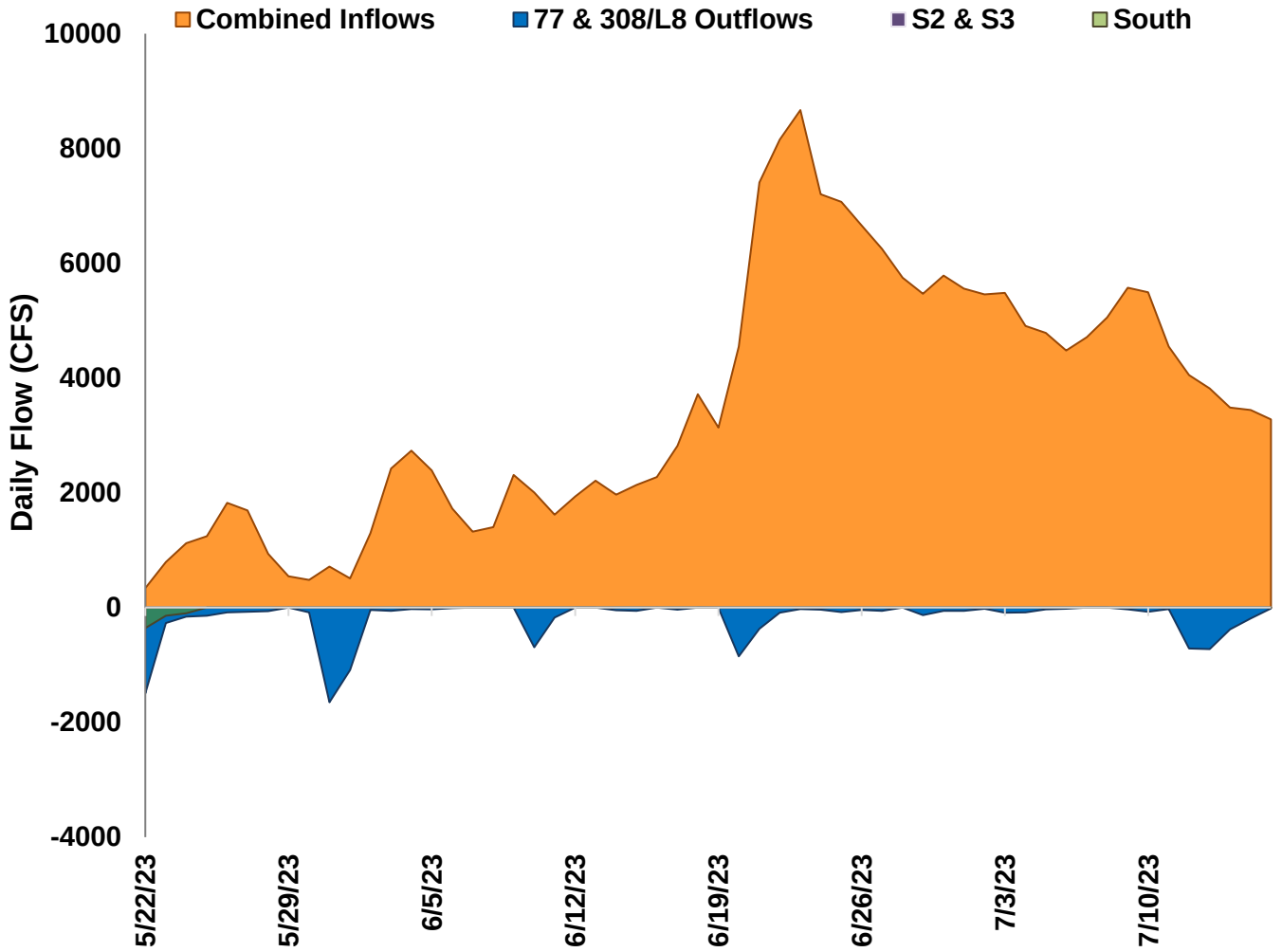


Figure LO-4. Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows from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

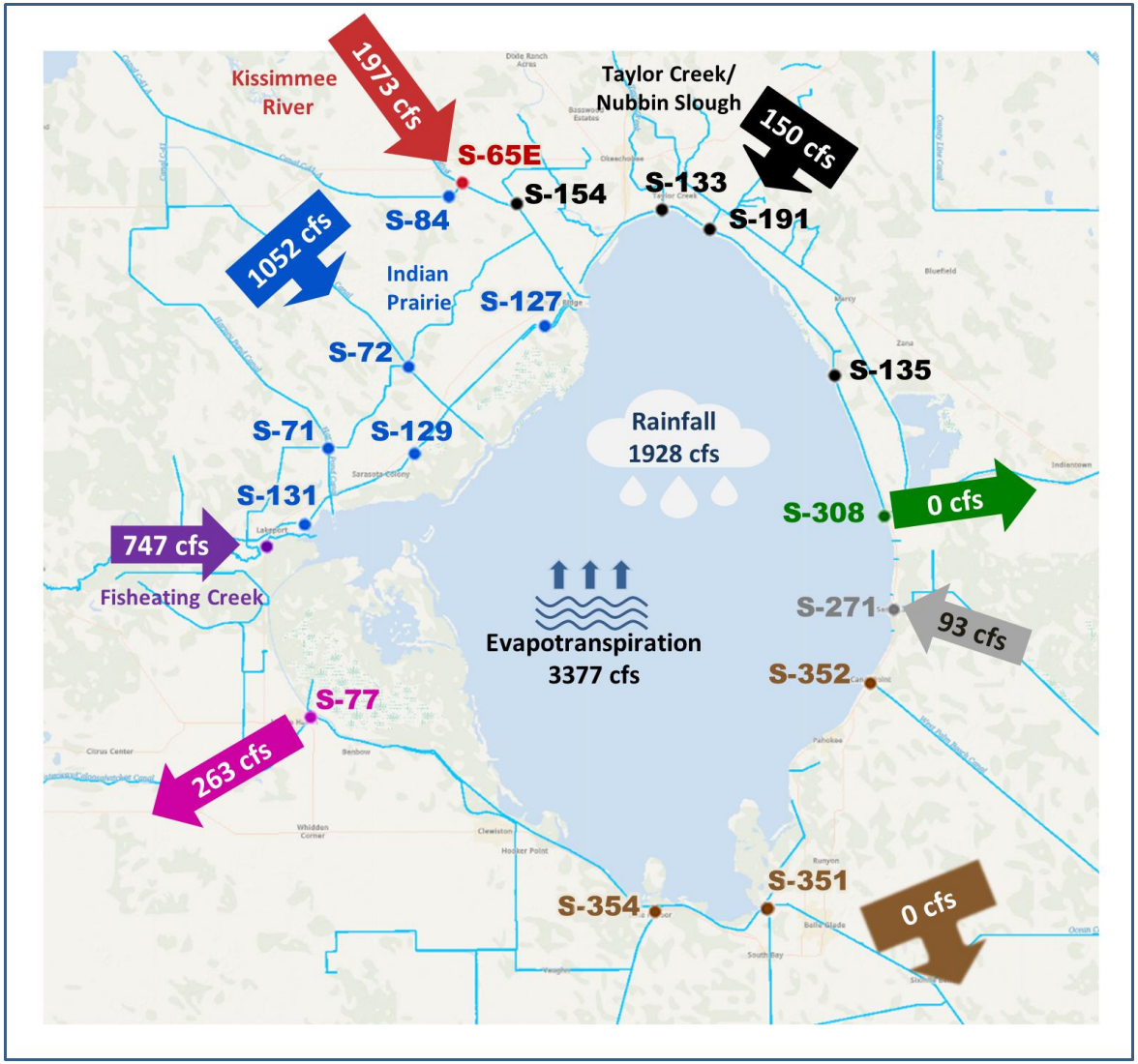


Figure LO-5. Inflows into Lake Okeechobee from Indian Prairie basins, Taylor Creek/Nubbin Slough, Kissimmee River and Fisheating Creek, and outflows to the west via S-77, to the east via S-308, to the south via S-351, S-352, S-354, and to southeast via S-271 (formerly Culvert 10A) for the week of July 10 - 16, 2023.

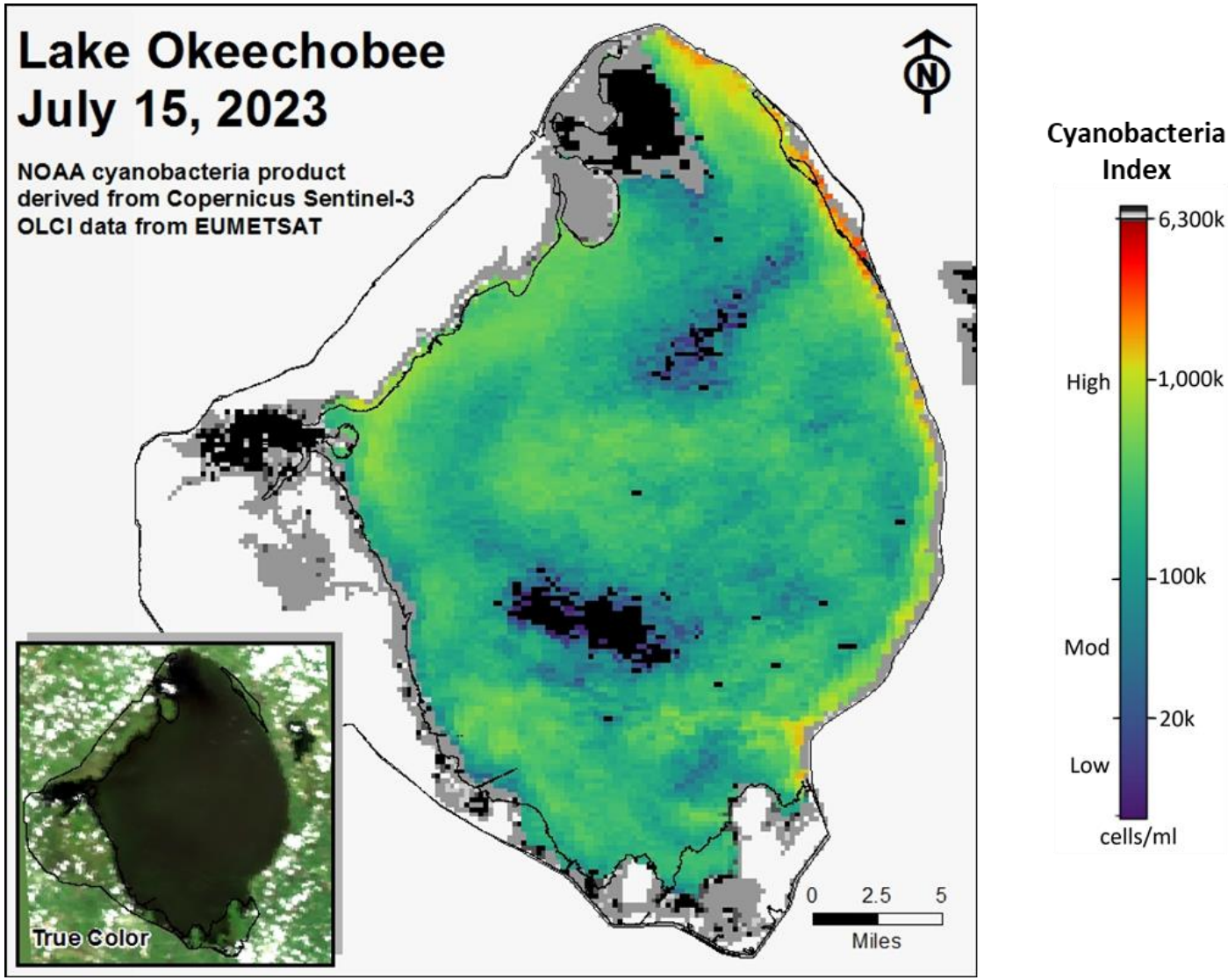


Figure LO-6. Cyanobacteria bloom index level on July 15, 2023, based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

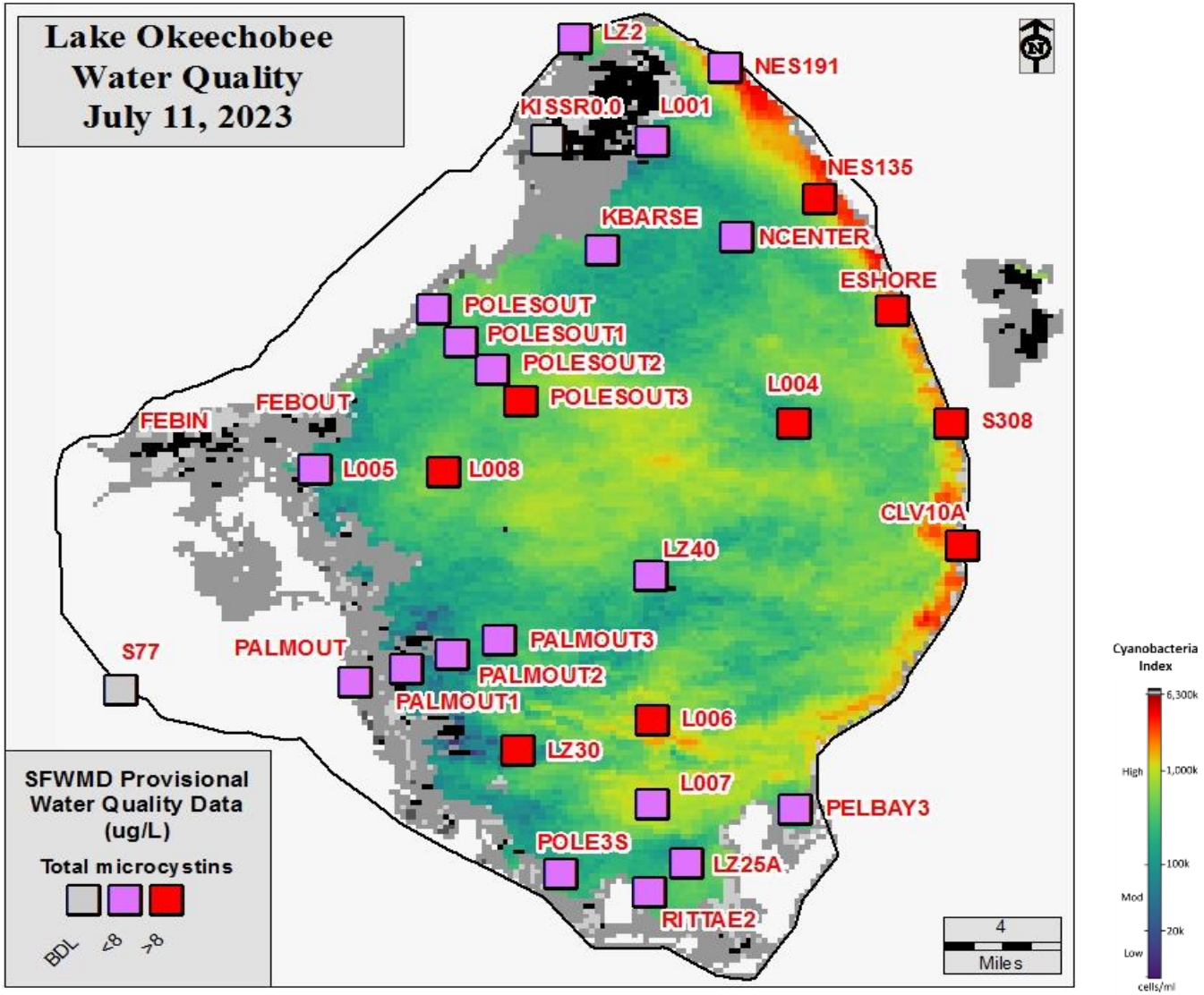


Figure LO-7. Total microcystins (µg/L) and chlorophyll *a* data from July 10 - 12, 2023. Sampling locations are overlaid on the July 11, 2023, image from NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

Estuaries

St. Lucie Estuary

Over the past week, mean total inflow to the St. Lucie Estuary was 861 cfs (**Figures ES-1** and **ES-2**), and the previous 30-day mean inflow was 1,456 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-2**.

Over the past week, salinities increased at all sites within the estuary (**Table ES-1** and **Figure ES-3**). The seven-day moving average of the surface and bottom salinities at the US1 Bridge was 14.9. 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 0.4 spat/shell for June, which is an increase from the recruitment rate recorded in May (**Figure ES-5**). Mean oyster density decreased slightly to 532 live oysters/m^2 in June but remains within the good range for oyster density.

Caloosahatchee River Estuary

Over the past week, mean total inflow to the Caloosahatchee River Estuary was 3,290 cfs (**Figures ES-6** and **ES-7**), and the previous 30-day mean inflow was 3,482 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-7**.

Over the past week, salinities remained the same at S-79 and Val I-75, 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 Sanibel and Cape Coral (**Figure ES-10**). The mean larval oyster recruitment rate reported by the Fish and Wildlife Research Institute was 2.6 spat/shell at Iona Cove and 1.9 spat/shell at Bird Island for June, which was a slight decrease from the recruitment rates recorded in May (**Figures ES-11 and ES-12**). Mean oyster density was 133 live oysters/m^2 at Iona Cove and 233 live oysters/m^2 at Bird Island in June, which is lower than densities previously recorded in March. These decreased densities can most likely be attributed to mortality of newly settled spring spat associated with changes in salinity and increased predation rates.

Surface salinity at Val I-75 was forecasted for the next two weeks using an autoregression model (Qiu and Wan, 2013[1]) 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 359 cfs. Model results from all scenarios predict daily salinity to be 0.7 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

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

Figure ES-13). This keeps predicted salinities in the upper estuary within the optimal salinity range (0-10) for tape grass.

Red Tide

The Florida Fish and Wildlife Research Institute reported on July 14, 2023, that *Karenia brevis*, the Florida red tide dinoflagellate, was not observed at bloom concentrations in any samples collected within the District region over the past week. On the east coast, red tide was not observed in samples from St. Lucie, Martin, or Palm Beach counties.

Water Management Recommendations

Lake stage is in the Low Sub-Band. Tributary conditions are wet. The LORS2008 release guidance suggests up to 3,000 cfs release at S-79 to the Caloosahatchee River Estuary and up to 1,170 cfs release at S-80 to the St. Lucie Estuary.

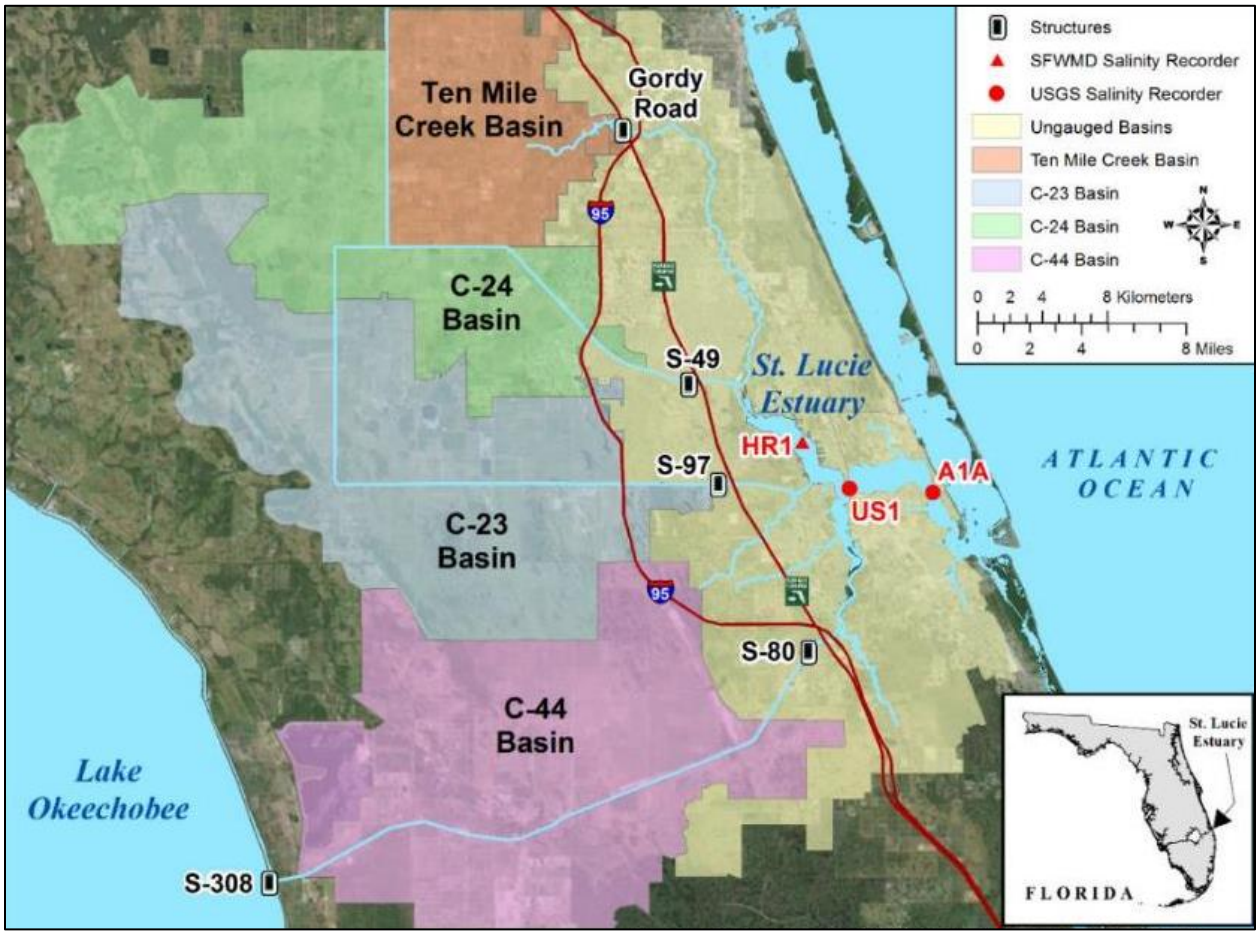


Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

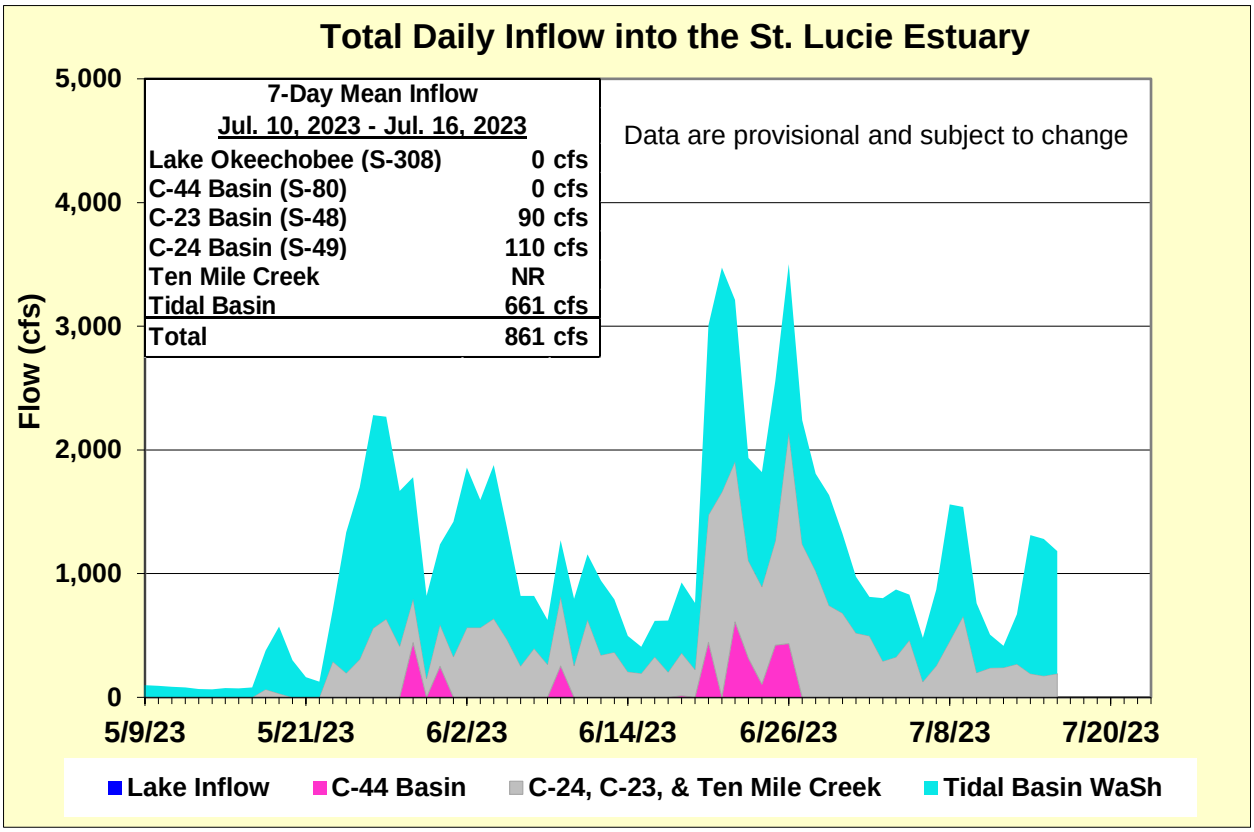


Figure ES-2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

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)	**6.8** (3.8)	**13.2** (9.3)	10.0 – 25.0
US1 Bridge	**13.3** (10.4)	**16.6** (13.4)	10.0 – 25.0
A1A Bridge	**21.3** (19.4)	**26.6** (25.4)	10.0 – 25.0

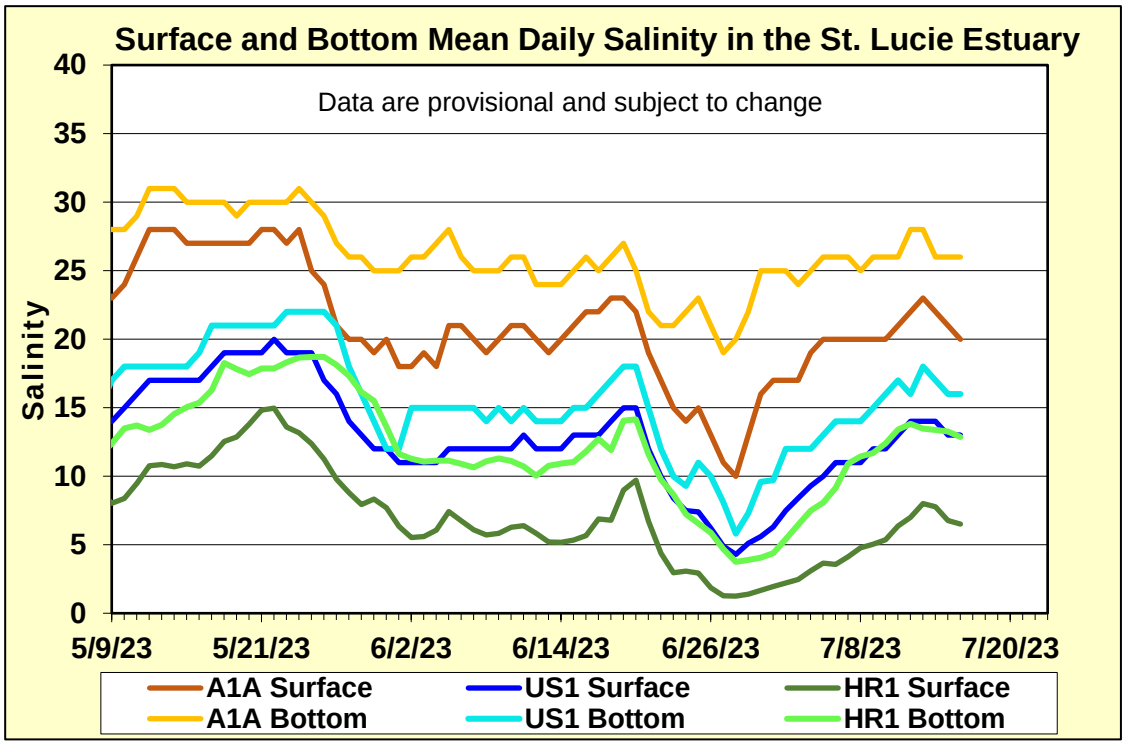


Figure ES-3. Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

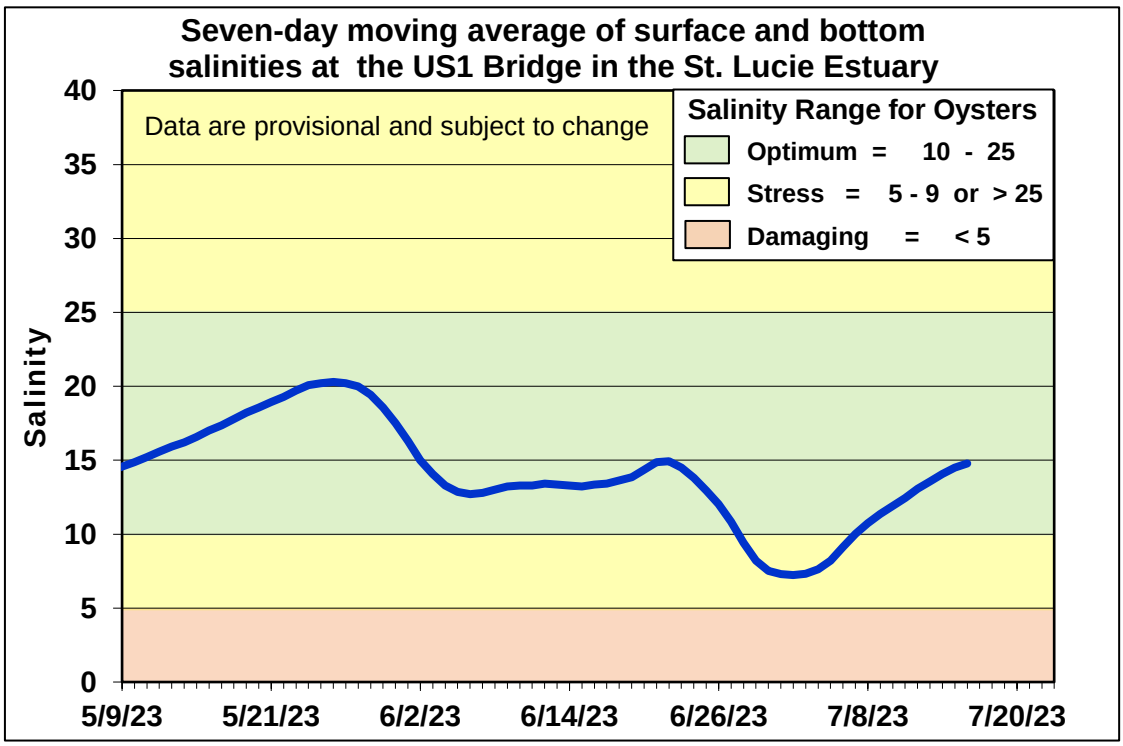


Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

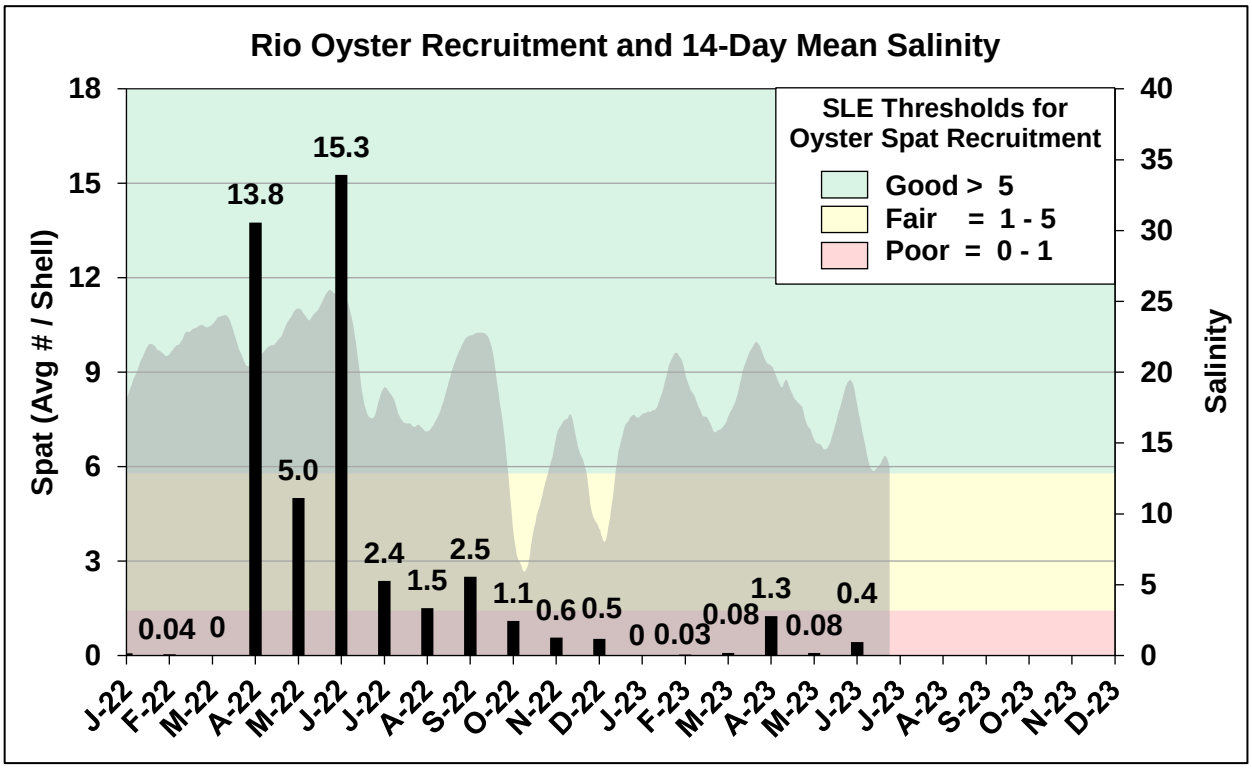


Figure ES-5. Mean oyster recruitment at the Rio oyster monitoring station and 14-day mean salinity at US1 Bridge.

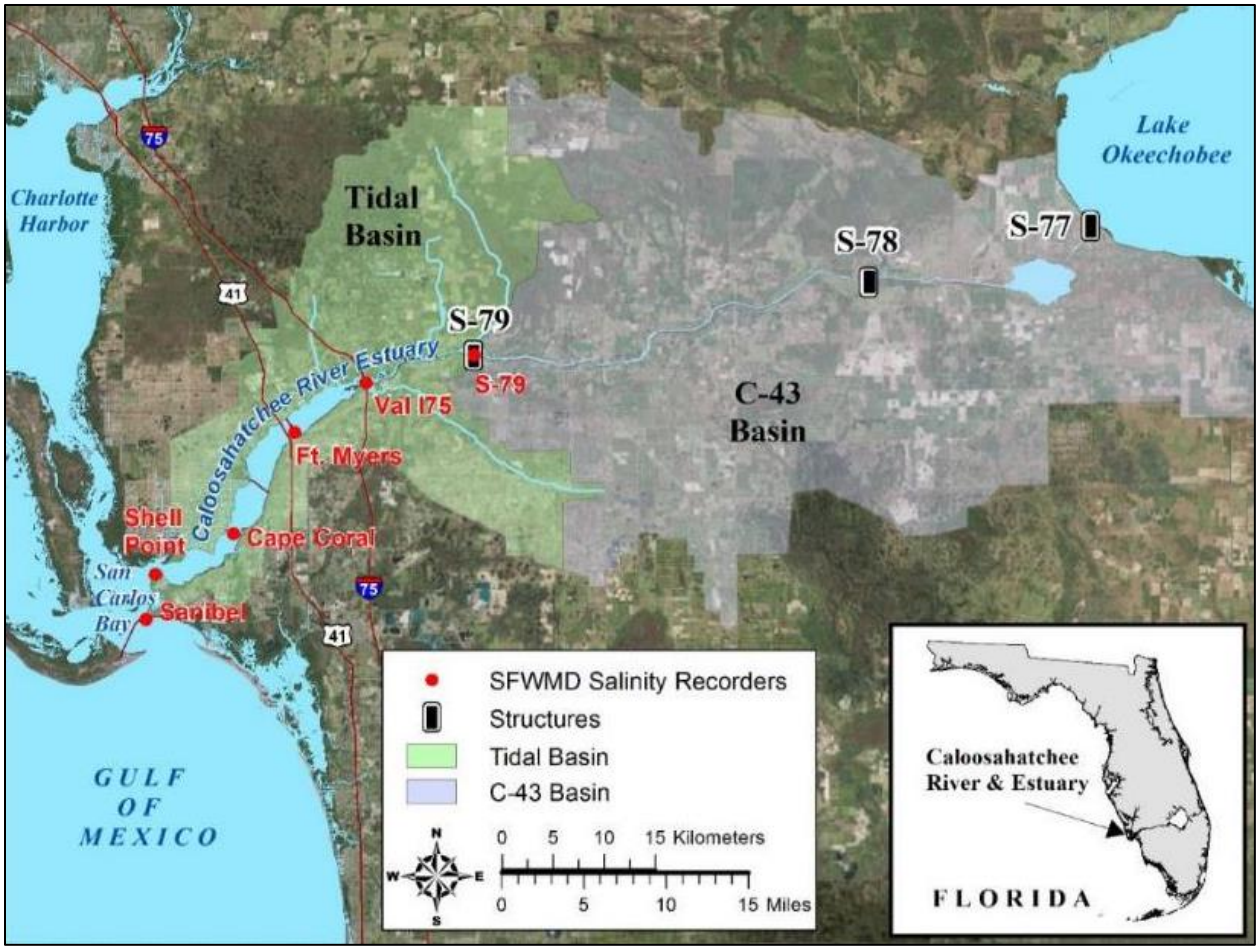


Figure ES-6. Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.

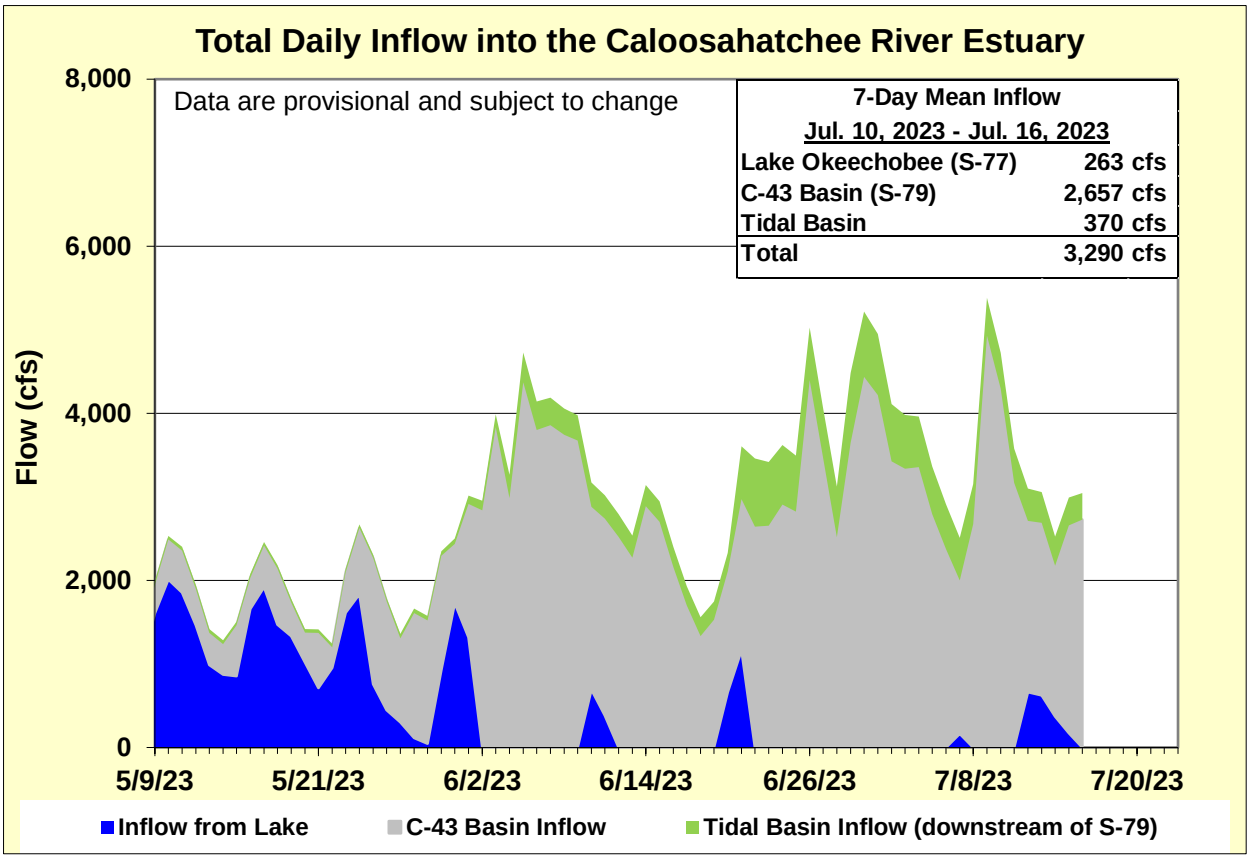


Figure ES-7. Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

Table ES-2. Seven-day mean salinity at six monitoring sites in the Caloosahatchee River Estuary. Current means are in bold font; previous week's means are in parentheses. The envelope in the upper estuary sites is for the protection of tape grass and the envelope in the lower estuary is the optimum salinity range for adult eastern oysters (*Crassostrea virginica*). Data are provisional.

Sampling Site	Surface	Bottom	Optimum Envelope
S-79 (Franklin Lock)	**0.2** (0.2)	**0.2** (0.2)	0.0 – 10.0
Val I-75	**0.2** (0.2)	**0.2** (0.2)	0.0 – 10.0
Fort Myers Yacht Basin	**0.2** (0.3)	**0.2** (0.3)	0.0 – 10.0
Cape Coral	**4.4** (5.5)	**6.1** (7.2)	10.0 – 25.0
Shell Point	**20.0** (21.8)	**23.2** (23.4)	10.0 – 25.0
Sanibel	**29.2** (28.6)	**30.7** (30.1)	10.0 – 25.0

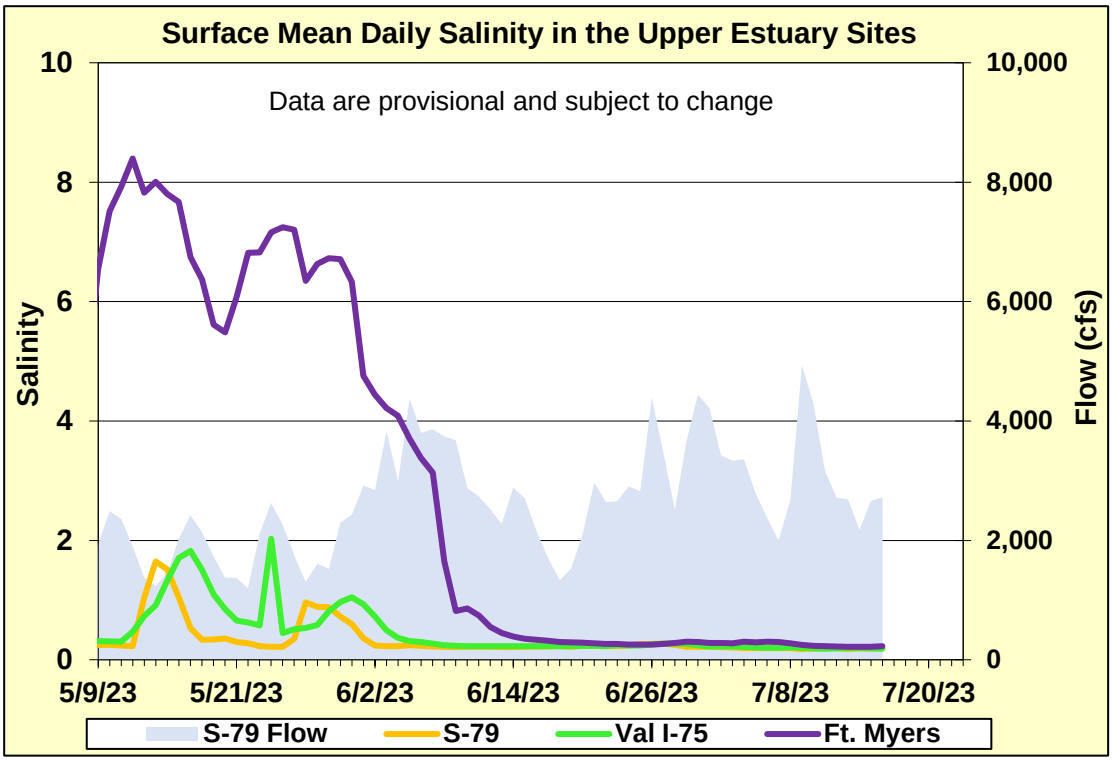


Figure ES-8. Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

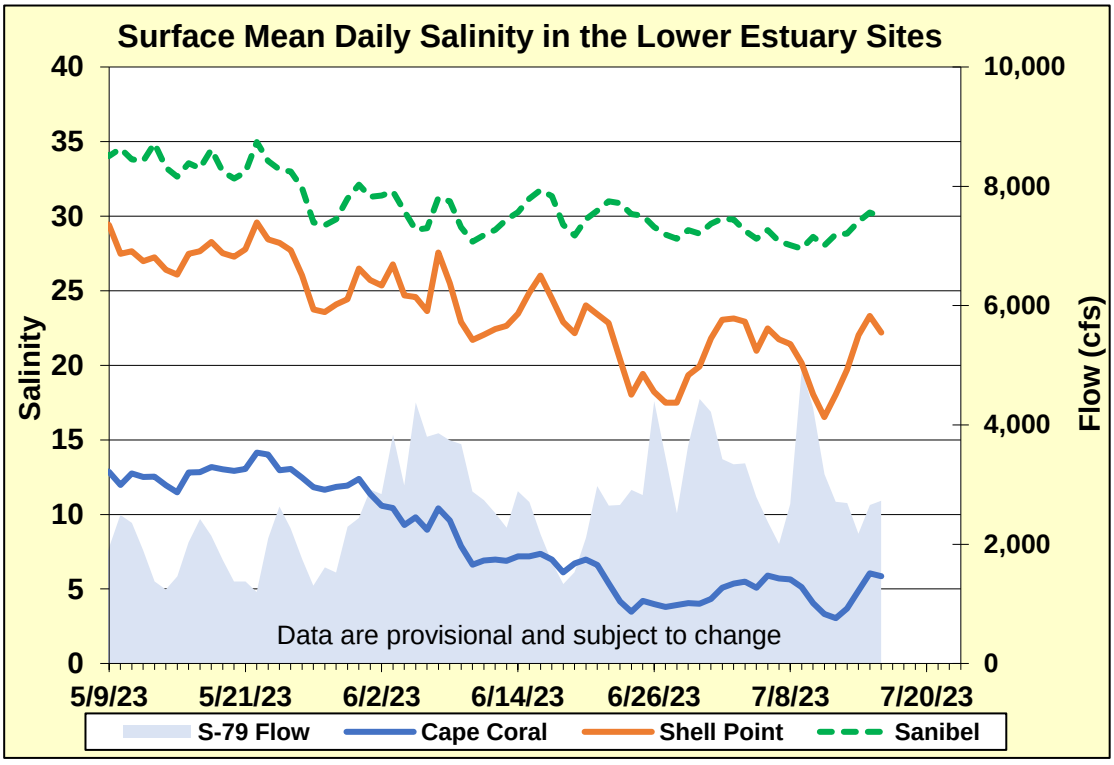


Figure ES-9. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

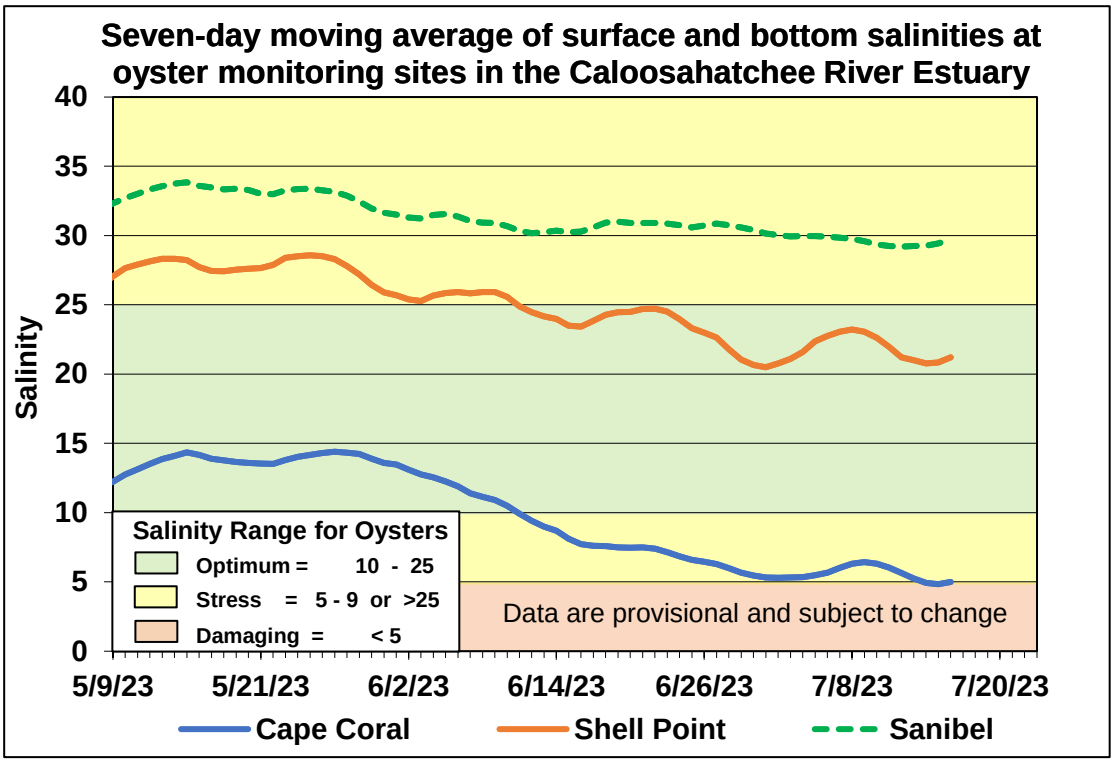


Figure ES-10. Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

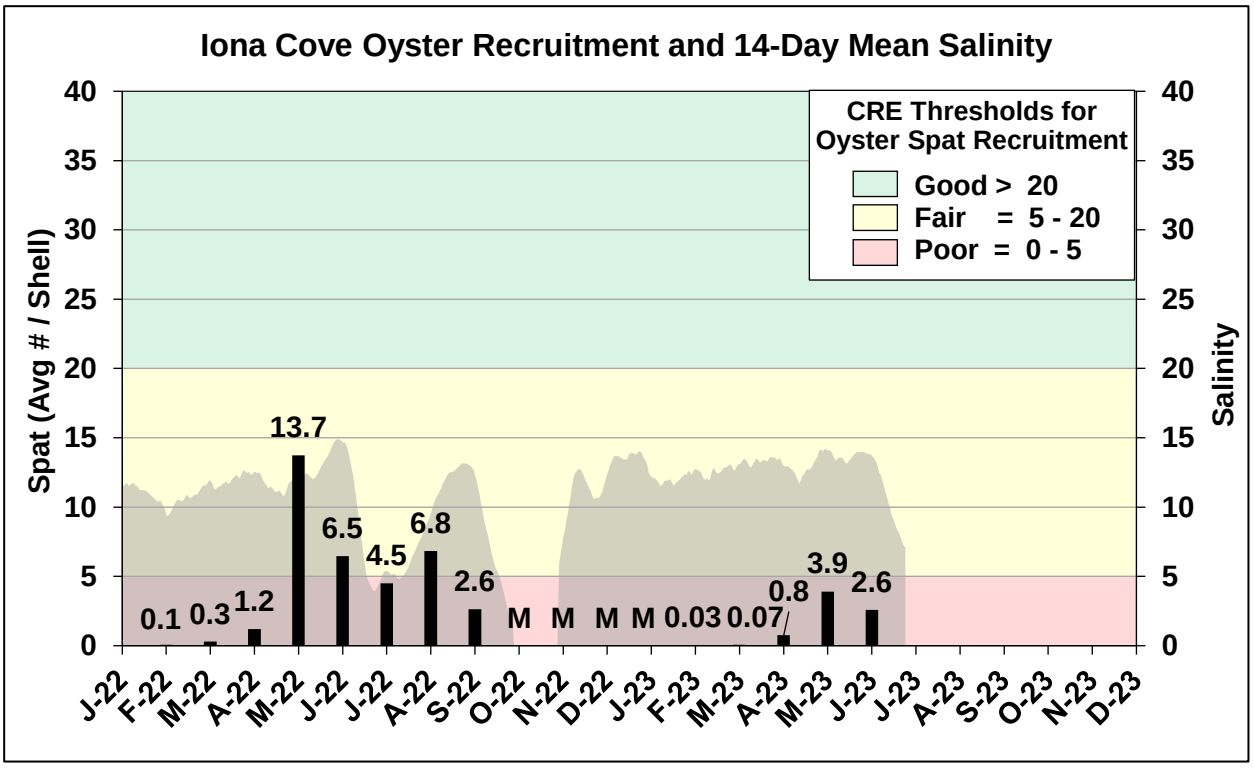


Figure ES-11. Mean oyster recruitment at the Iona Cove oyster monitoring station and 14-day mean salinity at Cape Coral.

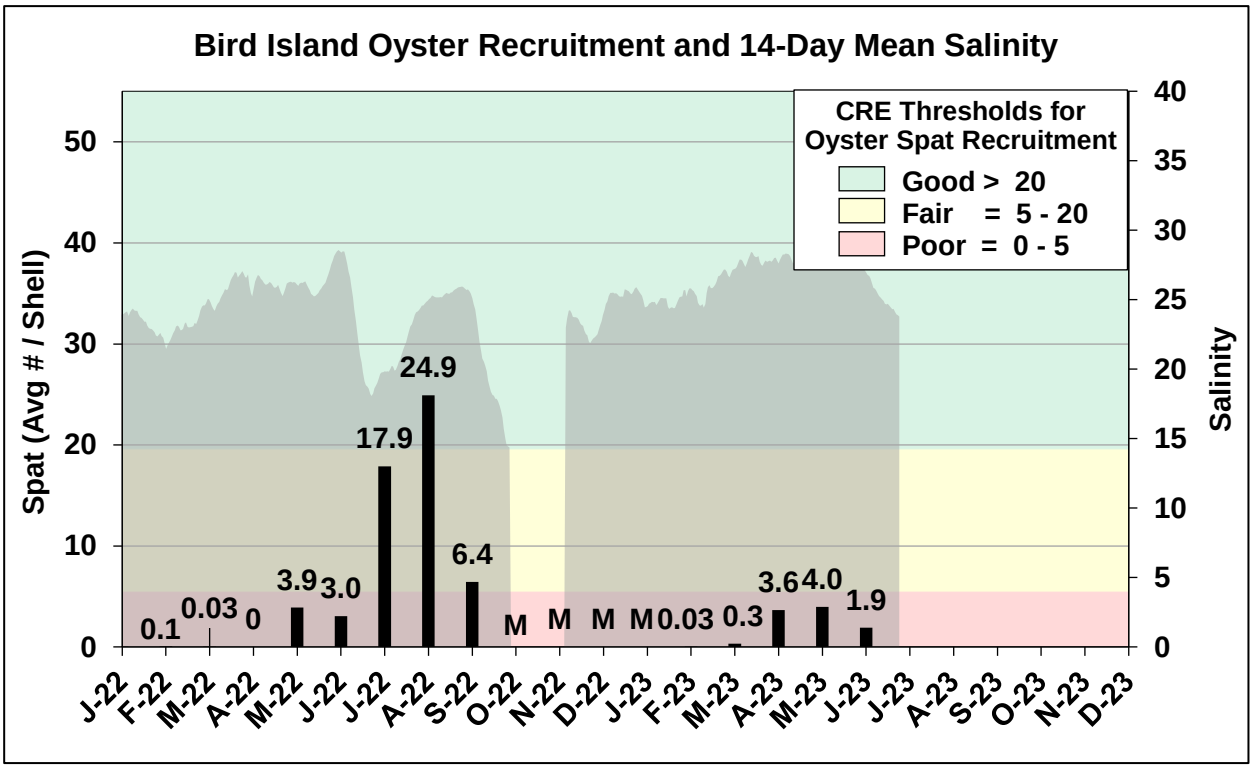


Figure ES-12. Mean oyster recruitment at the Bird Island oyster monitoring station and 14-day mean salinity at Shell Point.

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	359	0.7	0.3
B	450	359	0.4	0.3
C	750	359	0.3	0.3
D	1,000	359	0.3	0.2
E	1,500	359	0.3	0.2
F	2,000	359	0.3	0.2

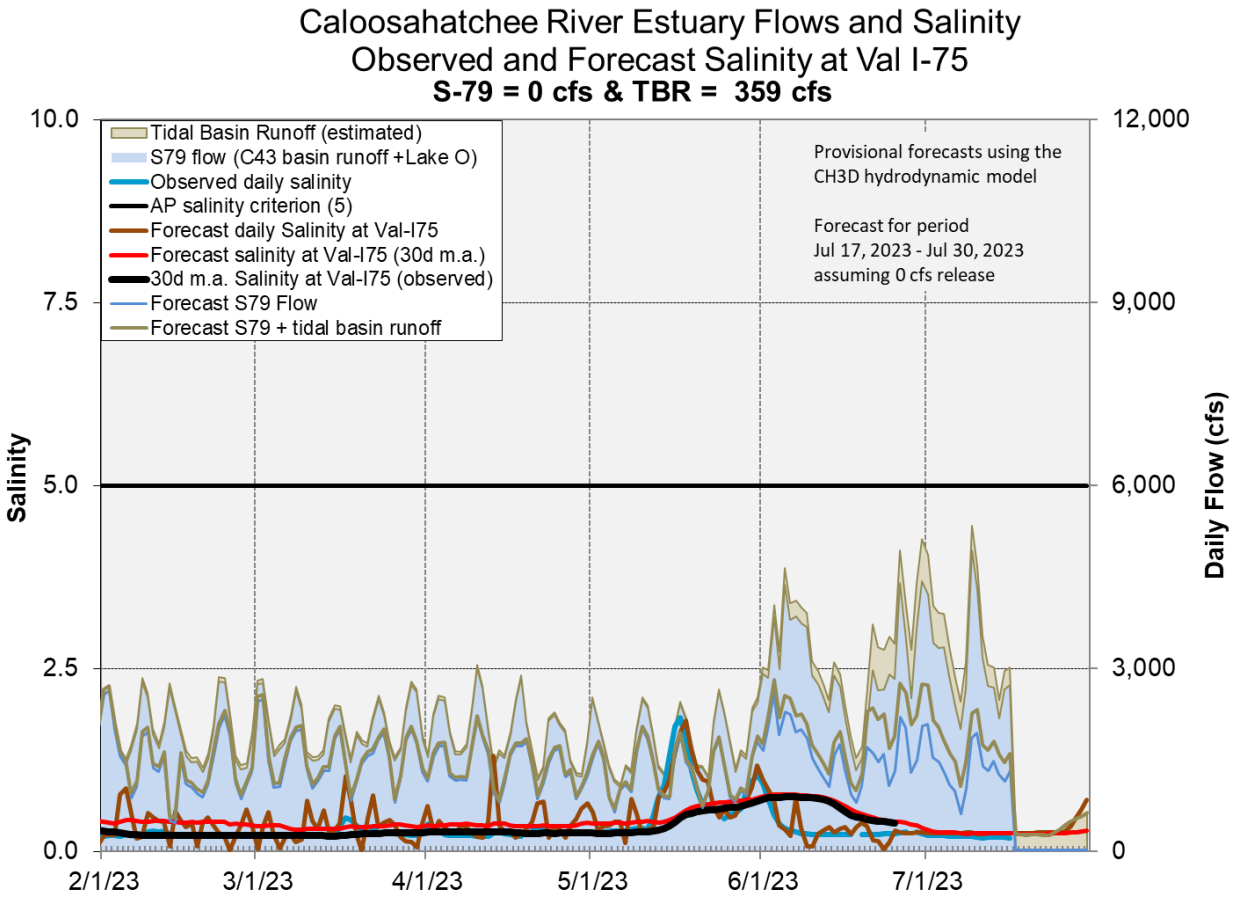


Figure ES-13. Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

Stormwater Treatment Areas

STA-1E: STA-1E Western Flow-way is offline for post-construction vegetation grow in. Online treatment cells are at or above target stage. Vegetation in the flow-ways is stressed and highly stressed. The 365-day phosphorus loading rate (PLRs) for the Central Flow-ways is below 1.0 g/m^2/year. The 365-day PLR for the Eastern Flow-way is high (**Figure S-1**).

STA-1W: An operational restriction is in place in STA-1W Northern Flow-way for vegetation management activities. Treatment cells are above target stage. Vegetation in the flow-ways is stressed and highly stressed. The 365-day PLRs for the Eastern, Western, and Northern Flow-ways are high (**Figure S-1**).

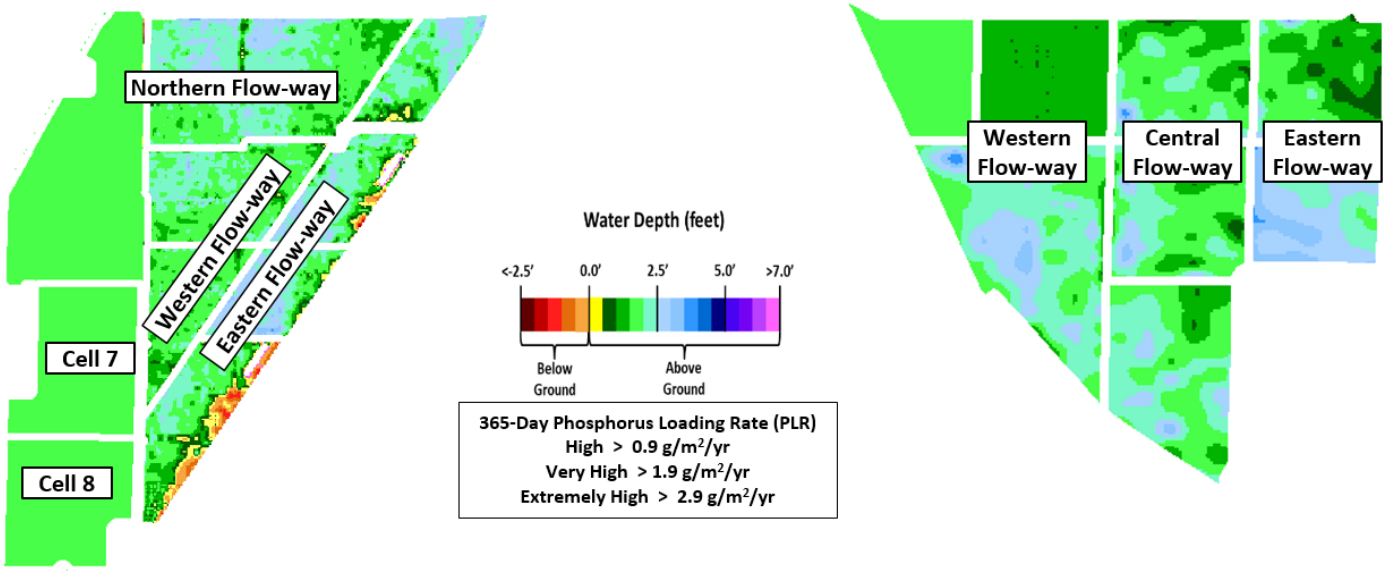
STA-2: STA-2 Flow-way 2 is offline for post-construction vegetation grow in. Operational restrictions are in place in STA-2 Flow-way 3 for canal plug refurbishments, and in Flow-way 4 for vegetation management activities. Most online treatment cells are above target stage. Vegetation in Flow-ways 1 and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

STA-3/4: STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation. Online treatment cells are above target stage. Vegetation in the Central Flow-way 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^2/year (**Figure S-2**).

STA-5/6: All flow-ways in STA-5/6 are online. Most treatment cells are at or above target stage. All treatment cells have highly stressed or stressed vegetation conditions except Flow-ways 7 which is healthy. The 365-day PLRs for most flow-ways are at or below 1.0 g/m^2/year, except Flow-way 3 and 5 which are high (**Figure S-3**).

For definitions on STA operational language see glossary following figures.

Eastern Flow Path Weekly Status Report – 7/10/2023 through 7/16/2023

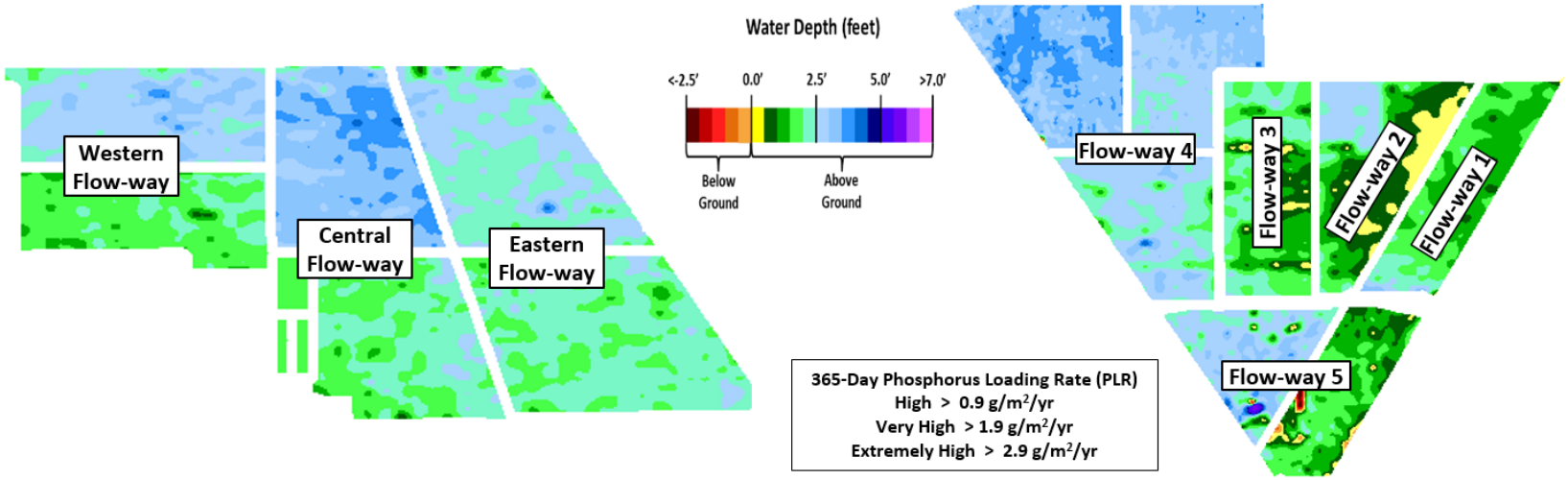


STA-1W	Flow-way Status
Western	• High 365-day PLR • Highly stressed vegetation conditions
Eastern	• High 365-day PLR • Highly stressed vegetation conditions
Northern	• High 365-day PLR • Highly stressed vegetation conditions • Planting emergent vegetation
Cell 7	• Stressed vegetation conditions
Cell 8	• Construction activities

STA-1E	Flow-way Status
Western	• Offline for post-construction vegetation grow-in
Central	• Highly stressed vegetation conditions
Eastern	• High 365-day PLR • Stressed vegetation conditions

Figure S-1. Eastern Flow Path Weekly Status Report

Central Flow Path Weekly Status Report – 7/10/2023 through 7/16/2023

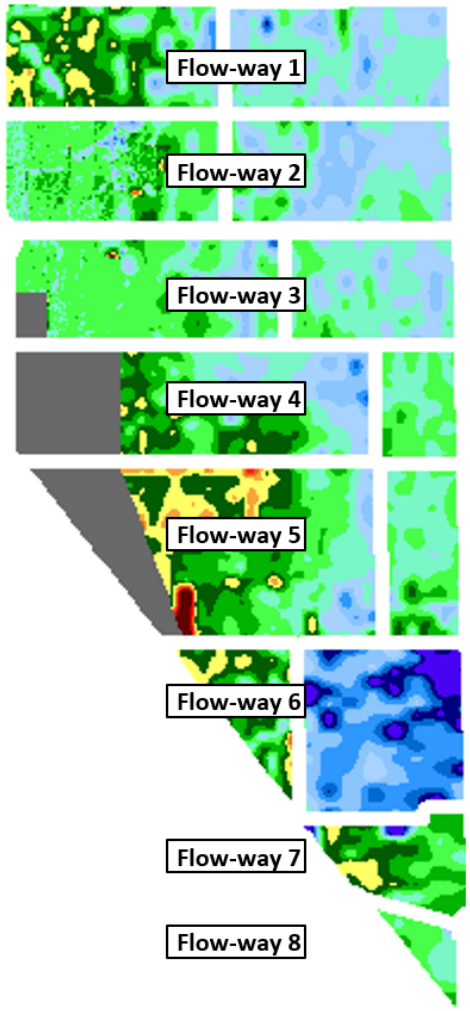


STA-3/4	Flow-way Status
Western	• Stressed vegetation conditions • Nuisance vegetation control within inflow canal
Central	• Highly stressed vegetation conditions • Removal of floating tussocks • Nuisance vegetation control within inflow canal
Eastern	• Offline for post-drawdown vegetation establishment • Nuisance vegetation control within inflow canal

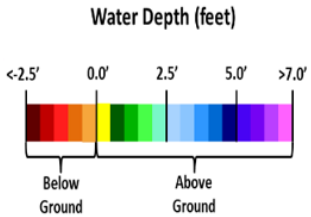
STA-2	Flow-way Status
Flow-way 1	• High 365-day PLR • Stressed vegetation conditions
Flow-way 2	• Offline for post-construction vegetation grow-in
Flow-way 3	• High 365-day PLR • Refurbishments project - plug construction • Stressed vegetation conditions
Flow-way 4	• Planting emergent vegetation • FAV eradication • Highly stressed vegetation conditions
Flow-way 5	• Highly stressed vegetation conditions

Figure S-2. Central Flow Path Weekly Status Report

Western Flow Path Weekly Status Report – 7/10/2023 through 7/16/2023



STA-5/6	Flow-way Status
Flow-way 1	• Highly stressed vegetation conditions
Flow-way 2	• Highly stressed vegetation conditions
Flow-way 3	• Highly stressed vegetation conditions • High 365-day PLR
Flow-way 4	• Highly stressed vegetation conditions
Flow-way 5	• Highly stressed vegetation conditions • High 365-day PLR
Flow-way 6	• Highly stressed vegetation conditions
Flow-way 7	
Flow-way 8	• Stressed vegetation conditions



365-Day Phosphorus Loading Rate (PLR)
High > 0.9 g/m^2/yr
Very High > 1.9 g/m^2/yr
Extremely High > 2.9 g/m^2/yr

Figure S-3. Western Flow Path Weekly Status Report

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, µg/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

WCA1: Last week stage at the 1-8C was slowly decreasing. The average on Sunday was 0.53 feet above the now rising Zone A1 regulation line.

WCA-2A: Stage decreased at 2-17 last week. The average on Sunday was 1.57 feet above the now rising regulation line.

WCA-3A: The Three Gauge Average held fairly level. The average stage was 0.68 feet above the rising regulation line on Sunday.

WCA-3A North: Stage at gauge 62 (Northwest corner) fell and remained below the Upper Schedule last week, the average on Sunday was 0.17 feet below that rising line.

See figures **EV-1** through **EV-4**.

Water Depths

The SFWDAT illustrates the current stage has risen above ground surface across most BCNP and completely across WCA-3A North. Central WCA-3A depths have risen significantly over the past two months. Ponded conditions are remaining in eastern WCA-2A and in the upper reaches of the L-67s in WCA-3A. Hydrologic connectivity has been prevalent in ENP.

Comparing current WDAT water depths to one month ago conditions within the EPA are wetter as a whole and significantly higher stage in eastern WCA-3A downstream of the S-11s. Looking back a year ago, conditions are similar; slightly wetter in WCAs only significantly drier in northwestern BCNP and portions of LOX. (**Figure EV-5 and Figure EV-6)**.

Comparing current conditions to the 20-year average on July 17th: Depths are above average in WCA-2A, south 3A and most of LOX. Conditions remain above average in northern WCA-3A and central BCNP; and well above average across ENP. (**Figure EV-7**).

Taylor Slough and Florida Bay

Total weekly rainfall averaged 0.7 inches in Taylor Slough and Florida Bay over the past week (Monday-Sunday) based on the 17 gauges used for this report. Total weekly rainfall ranged from 0.0 inches at Joe Bay (JB) in the eastern nearshore region to 3.4 inches at Taylor Slough Bridge (TSB) in the northern slough. Most stages decreased across Taylor Slough, with an average decrease of -0.03 feet. Stage changes ranged from −0.14 feet at P37 and Craighead Pond (CP) in the south and southwestern slough, respectively, to +0.18 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 +6.3 inches compared to before the Florida Bay initiative (starting in 2017), a decrease of −0.6 inches from last week.

Average Florida Bay salinity was 27.8, +2.0 higher than the previous week. In contrast to previous weeks, salinity increased at most sites. Changes ranged from a decrease of −1.1 at Little Madeira (LM) in the eastern nearshore region to an increase of +7.6 at Garfield Bight (GB) in the western nearshore region (**Figure EV-8**). Salinities in most nearshore sites increased following low or negative creek flows but remain within the IQR for the Eastern, Central and Western regions of the bay, with Central and Western salinities increasing to near the 50th percentile. Florida Bay salinity is still below its historical average for this time of year by −1.8, an increase of +1.9 relative to last week.

Water Management Recommendations

Keeping water within the system and flowing south has long term ecological benefits but operations that increase ascension rates above 0.18 feet per week have detrimental ecological impacts on sensitive regions of the EPA. Short term operations (i.e., water to tide) that alleviate high rates of stage change or abnormal depths can be protective of the ecology of the WCAs. The ecology of central WCA-3A would benefit from a slower ascension rate. The ecology of southern and eastern WCA-2A would benefit if depths could be maintained until stage reaches within 0.75 feet of the rising regulation schedule. As conditions remain at the 90th percentile in NESRS, continue strong positive creek flows to TS avoid salinity swings in the nearshore areas while facilitating water mixing and oxygen dissolution. 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	2.29	+0.01
WCA-2A	1.89	-0.21
WCA-2B	1.58	+0.04
WCA-3A	0.86	+0.00
WCA-3B	1.53	+0.15
ENP	0.92	+0.04

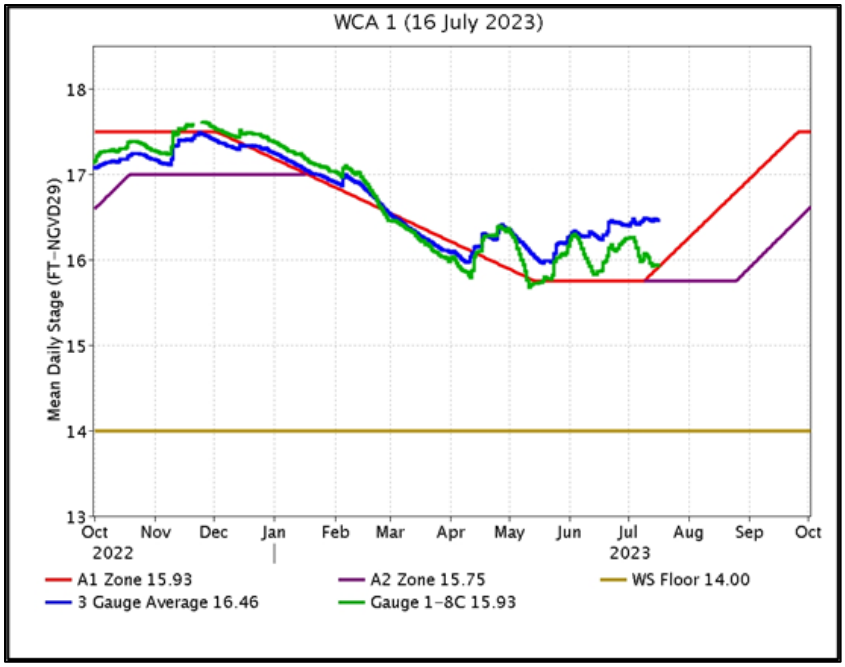


Figure EV-1. WCA-1 stage hydrographs and regulation schedule.

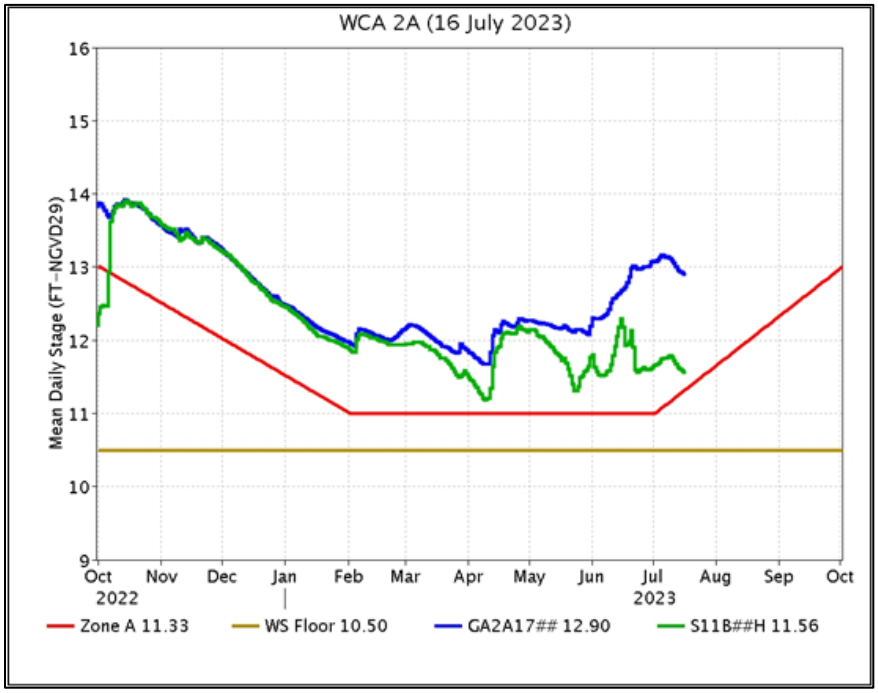


Figure EV-2. WCA-2A stage hydrographs and regulation schedule.

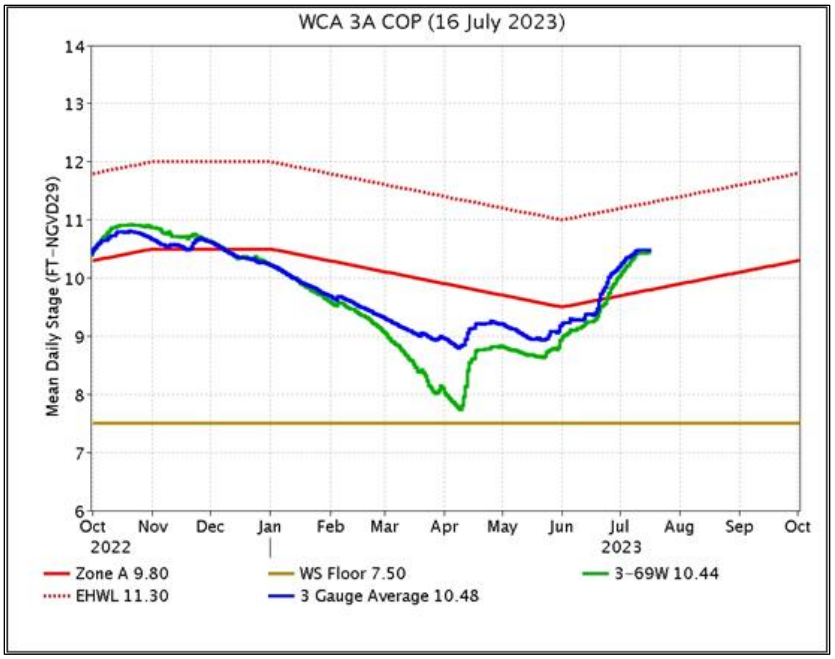


Figure EV-3. WCA-3A stage hydrographs (three-gauge average, 3-69W) and regulation schedule.

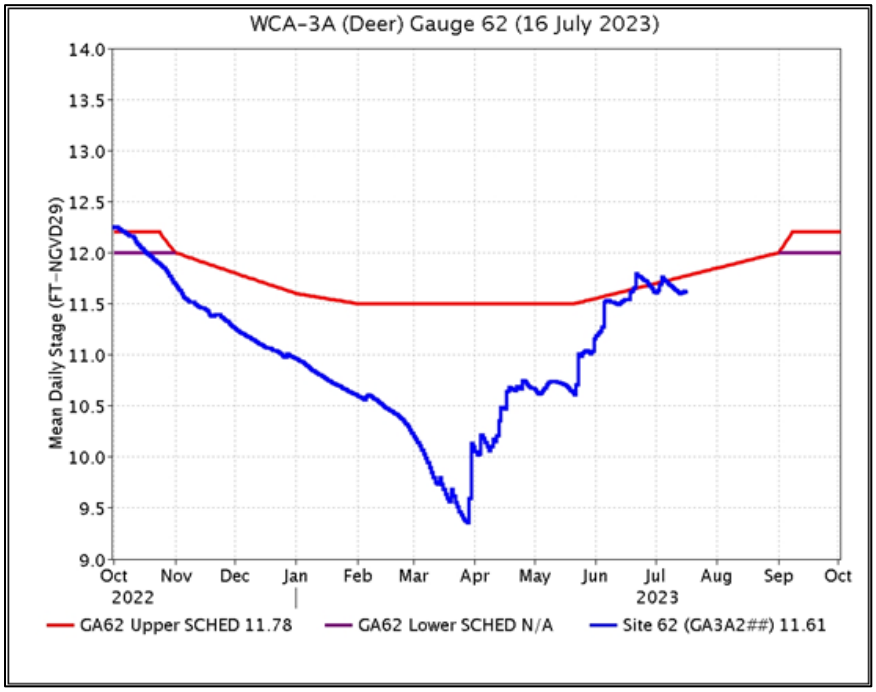


Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.

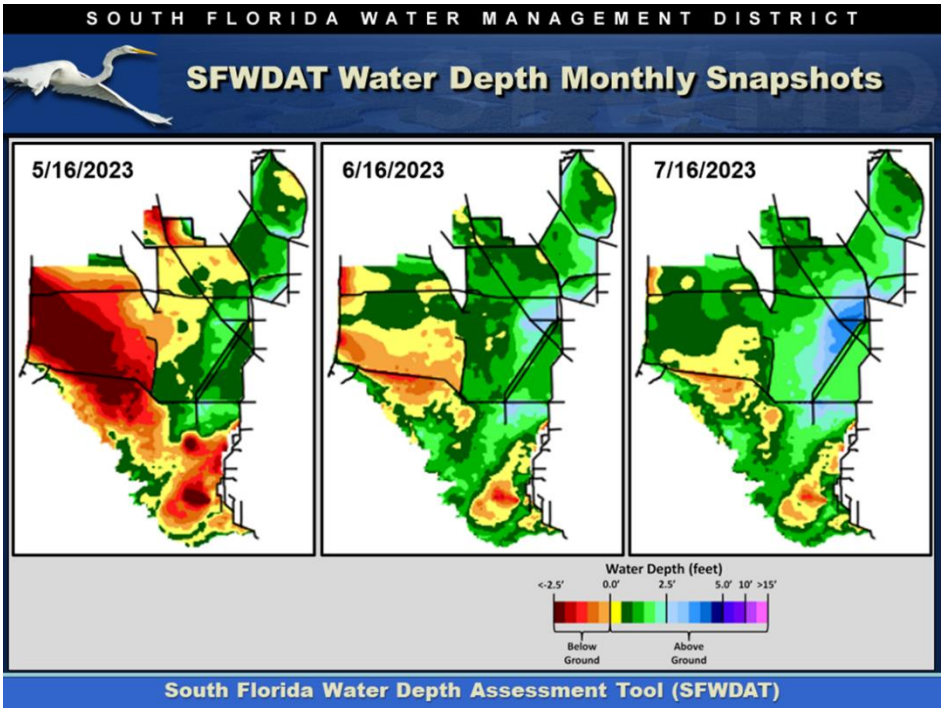


Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

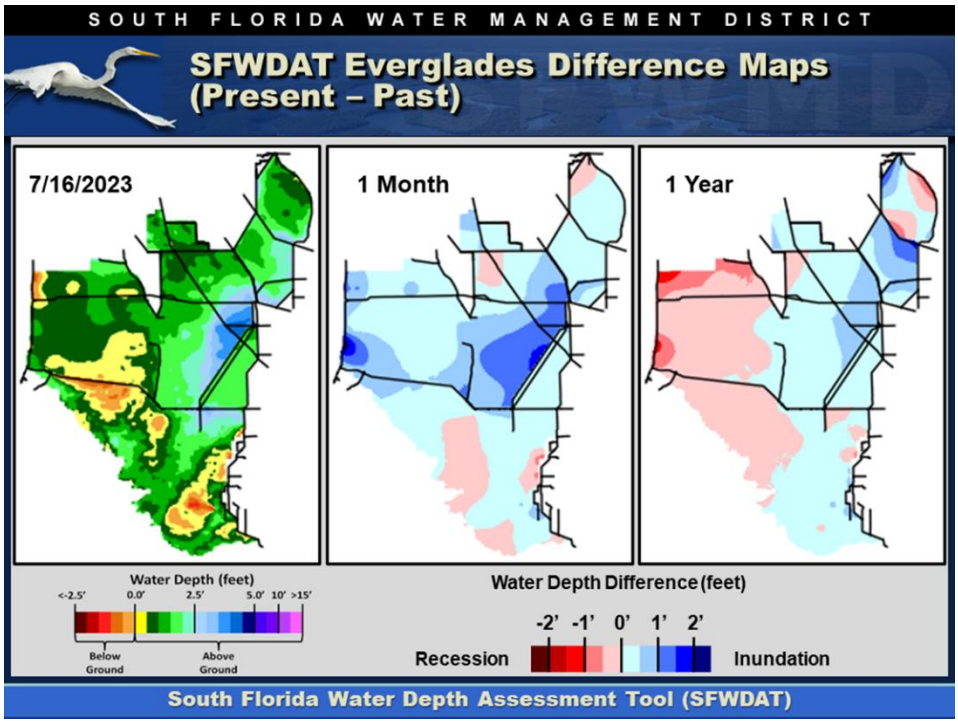


Figure EV-6. Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

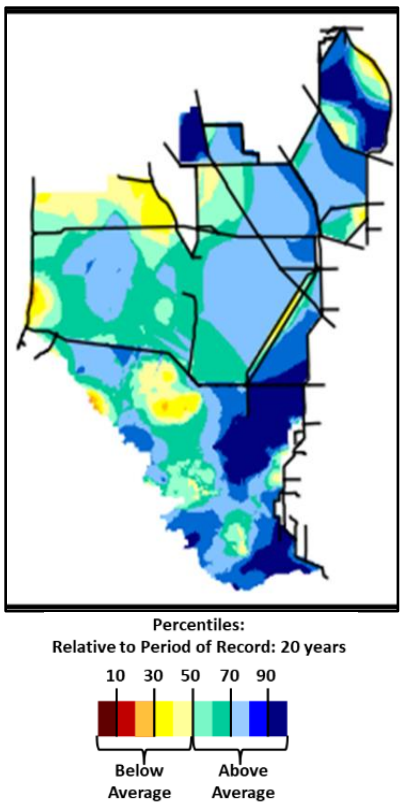


Figure EV-7. Present water depths (7/16/2023) compared to the day of year average over the previous 20 years.

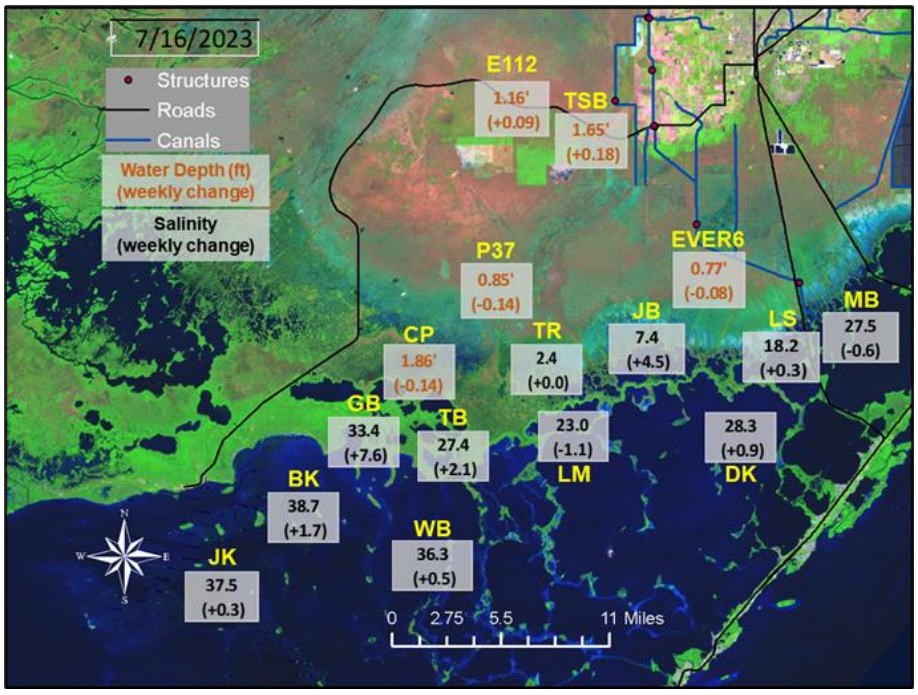


Figure EV-8. Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

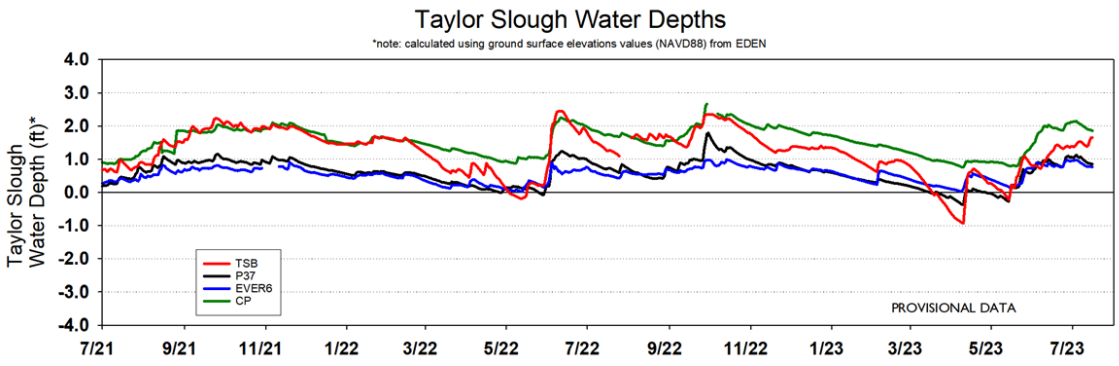


Figure EV-9. Taylor Slough water depth time series.

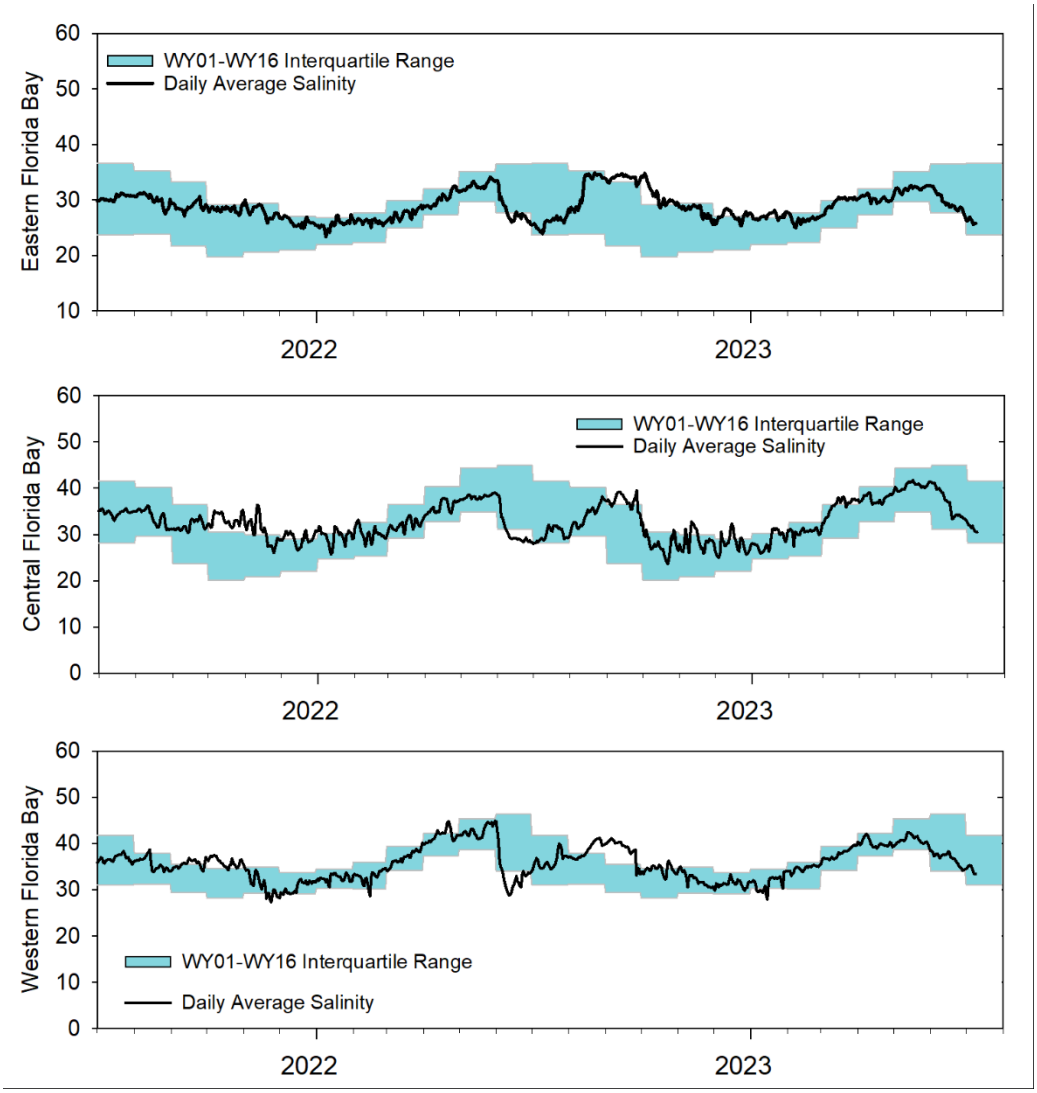


Figure EV-10. Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

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

SFWMD Everglades Ecological Recommendations, July 18, 2023 (red is new)			
	Weekly change	Recommendation	Reasons
WCA-1	Stage increased by 0.01'	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 decreased by 0.21'	Minimal ascension rate. Move water from this basin to tide as necessary.	Protect within basin and downstream habitat and wildlife.
WCA-2B	Stage increased by 0.04'	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 decreased by 0.05'	Ascension rate of less than +0.18' per week.	Protect within basin and downstream habitat and wildlife.
WCA-3A NW	Stage decreased by 0.05'	Ascension rate of less than +0.18' per week.	
Central WCA-3A S	Stage increased by 0.01'	Ascension rate of less than +0.18' per week.	Protect within basin and downstream habitat and wildlife.
Southern WCA-3A S	Stage increased by 0.09'		
WCA-3B	Stage increased by 0.15'	Ascension rate of less than +0.18' per week.	Protect within basin and downstream habitat and wildlife.
ENP-SRS	Stage increased by 0.04'	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.
Taylor Slough	Stage changes ranged from −0.14' to +0.18'	Move water southward as possible.	When available, provide freshwater to promote water movement.
FB- Salinity	Salinity changes ranged from −1.1 to +7.6	Move water southward as possible.	When available, provide freshwater to promote water movement.

Biscayne Bay

As shown in **Figure BB-1**, mean total inflow to Biscayne Bay was 667 cfs, and the previous 30-day mean inflow was 983 cfs. The seven-day mean salinity was 26.2 at BBCW8 and 26.5 at BBCW10, both within the ideal salinity range for estuarine organisms in this region (salinity less than 35). Data were provided by Biscayne National Park.

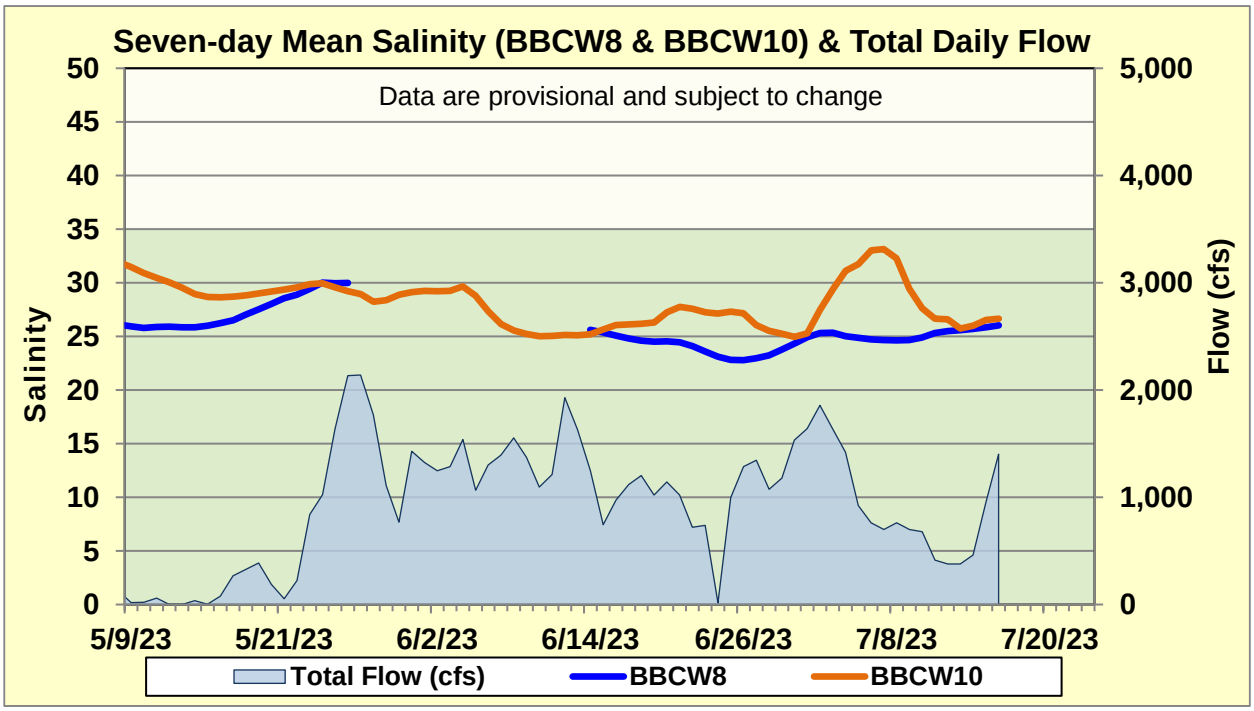


Figure BB-1. Seven-day mean salinity at BBCW8 and BBCW10 and total daily flow in Biscayne Bay. Total daily flow was calculated using flow from structures S20G, S20F, S21, S21A, S123, and S700P.