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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: July 26, 2023

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

A portion of the Saharan Air Layer (SAL) remains in place over south Florida causing a sharp reduction in the daily rainfall over the past couple of days, pushing the SFWMD totals well below the climatological average. In addition, southwesterly steering currents, driven by a large upper-level trough over the eastern US, have concentrated most of the daily rainfall along the east coast. By Wednesday night, a plume of deep tropical moisture, located over the western Atlantic, will move into south Florida. This moist air mass will restart the afternoon shower and thunderstorm activity across the region. Further, an upper-level low over the western Caribbean will lift northwards into the eastern Gulf of Mexico on Thursday supporting a widespread coverage of heavy rainfall on Thursday and Friday. When this feature moves out of the area on Saturday, the southeasterly flow will concentrate most of the daily rainfall along the southwest coast through early next week. Below to near average rainfall is expected for the 7-day period ending next Monday morning.

Kissimmee

Releases were made from East Lake Toho and Lake Toho as needed to slow the rate of stage rise. Weekly average discharges on July 23, 2023 at S-65 and S-65A were 670 cfs and 730 cfs, respectively. The mean weekly water depth on the Kissimmee River floodplain decreased by 0.13 feet to 0.29 feet over the week ending July 23, 2023. The weekly average concentration of dissolved oxygen in the Kissimmee River increased from 1.8 mg/L last week to 3.2 mg/L for the week ending July 23, 2023, which is above both the potentially lethal and physiologically stressful levels for largemouth bass and other sensitive species.

Lake Okeechobee

Lake Okeechobee stage was 14.99 feet NGVD on July 23, 2023, which was 0.10 feet higher than the previous week and 0.62 feet higher than a month ago. Average daily inflows (excluding rainfall) increased from the previous week, going from 4,014 cfs to 4,468 cfs. Average daily outflows (excluding rainfall) decreased from previous week,

going from 263 cfs to 55 cfs. The cyanobacteria index level decreased since the previous week but remained high in most areas of the Lake on July 23, 2023.

Estuaries

Total inflow to the St. Lucie Estuary averaged 1,581 cfs over the past week with no flow coming from Lake Okeechobee. Mean salinities decreased 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 3,153 cfs over the past week with 55 cfs coming from Lake Okeechobee. Mean salinities remained the same at S-79 and Val I-75, decreased slightly at Sanibel, and increased 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 23, 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 439,000 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 “poor” through “good” rate of stage change last week. Depths are above average for this time of year across most of the Everglades Protection Area. Most stages increased throughout Taylor Slough. Regional average stage change was close to zero, but stages remain well above the historical averages. Average salinity decreased last week in Florida Bay and continued to decline as a fresher than average condition for this time of year. Florida Bay water temperatures are being monitored, which have continued to be above 90°F in some areas.

Biscayne Bay

Total inflow to Biscayne Bay averaged 1,067 cfs and the previous 30-day mean inflow averaged 998 cfs. The seven-day mean salinity was 25.4 at BBCW8 and 24.3 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 July 23, 2023, mean daily lake stages were 55.9 feet NGVD (0.6 feet below schedule) in East Lake Toho, 53.0 feet NGVD (0.5 feet below schedule) in Lake Toho, and 50.0 feet NGVD (1.0 feet below schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1, Figures KB-1-3**).

Lower Kissimmee

For the week ending July 23, 2023, mean weekly discharge was 670 cfs at S-65 and 730 cfs at S-65A. Mean weekly discharge from the Kissimmee River was 1,600 cfs at S-65D and 1,900 cfs at S-65E (**Table KB-2**). Mean weekly headwater stages were 46.3 feet NGVD at S-65A and 27.9 feet NGVD at S-65D on July 23, 2023. Mean weekly river channel stage decreased by 0.6 feet to 36.6 ft NGVD over the week ending on July 23, 2023 (**Figure KB-4**). Mean weekly water depth on the Kissimmee River floodplain decreased by 0.13 feet to 0.29 feet over the week ending July 23, 2023 (**Table KB-2, Figure KB-5**). The weekly average concentration of dissolved oxygen in the Kissimmee River increased from 1.8 mg/L the previous week to 3.2 mg/L for the week ending July 23, 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 recent dissolved oxygen crash in the Kissimmee River, suspend maximum flow reduction criteria temporarily if recommended by KRREP staff to help improve DO conditions. With KCH stage declining toward the lower limit of the 50 ft buffer in IS-14-50, it may be recommended to begin S-65A flow reductions this week, depending on rainfall. In the meantime, it is recommended to maintain the current headwater stage at S-65D.

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)	
							7/23/23	7/16/23
Lakes Hart and Mary Jane	S-62	LKMJ	47	59.8	R	60.0	-0.2	-0.2
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	62.6	R	63.2	-0.6	-0.7
Lake Gentry	S-63	LKGT	0	60.1	R	61.0	-0.9	-1.0
East Lake Toho	S-59	TOHOE	9	55.9	R	56.5	-0.6	-0.9
Lake Toho	S-61	TOHOW S-61	220	53.0	R	53.5	-0.5	-0.6
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	670	50.0	R	51.0	-1.0	-0.9

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.

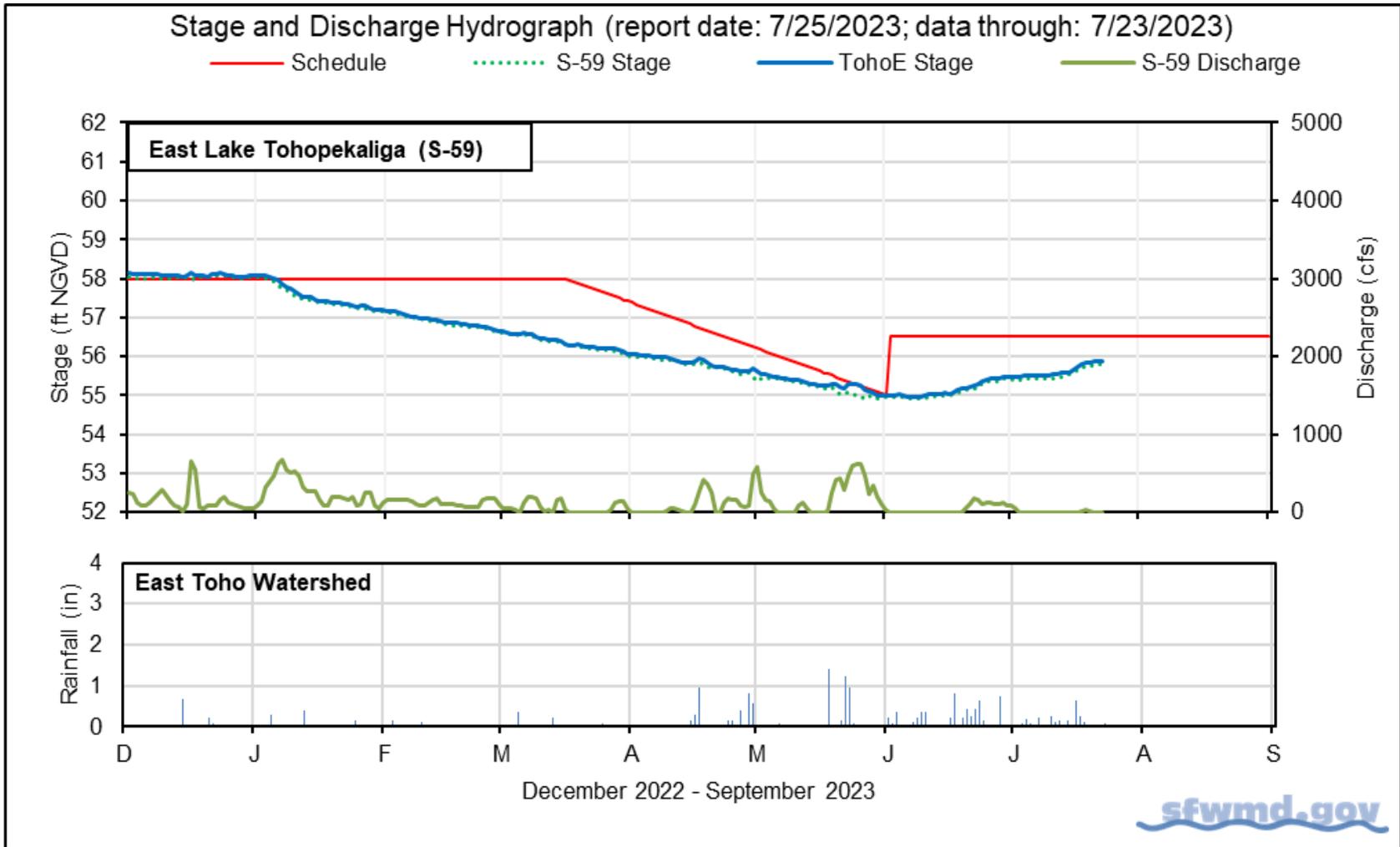


Figure KB-1. East Lake Toho regulation schedule, stage, discharge and rainfall.

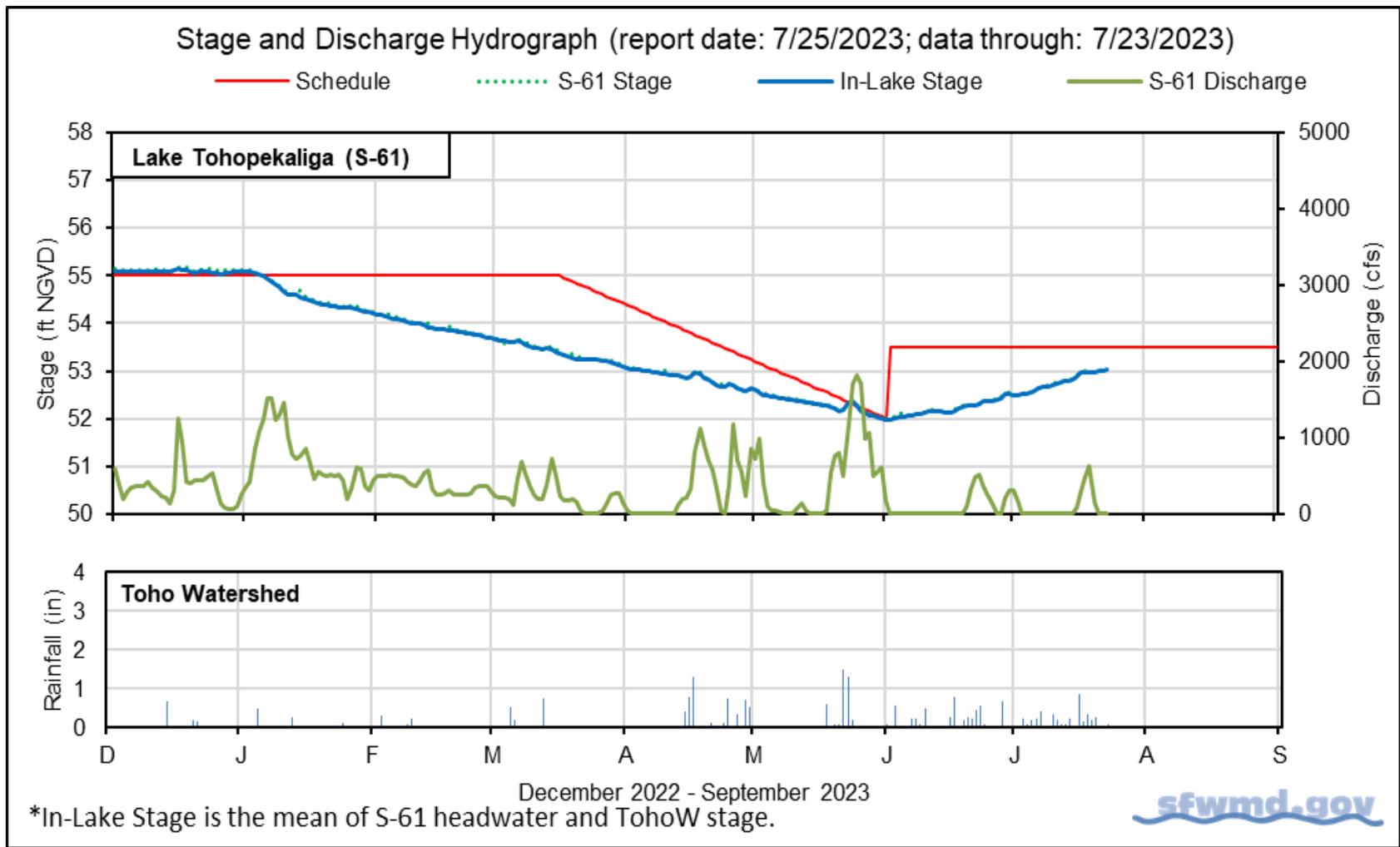


Figure KB-2. Lake Toho regulation schedule, stage, discharge and rainfall.

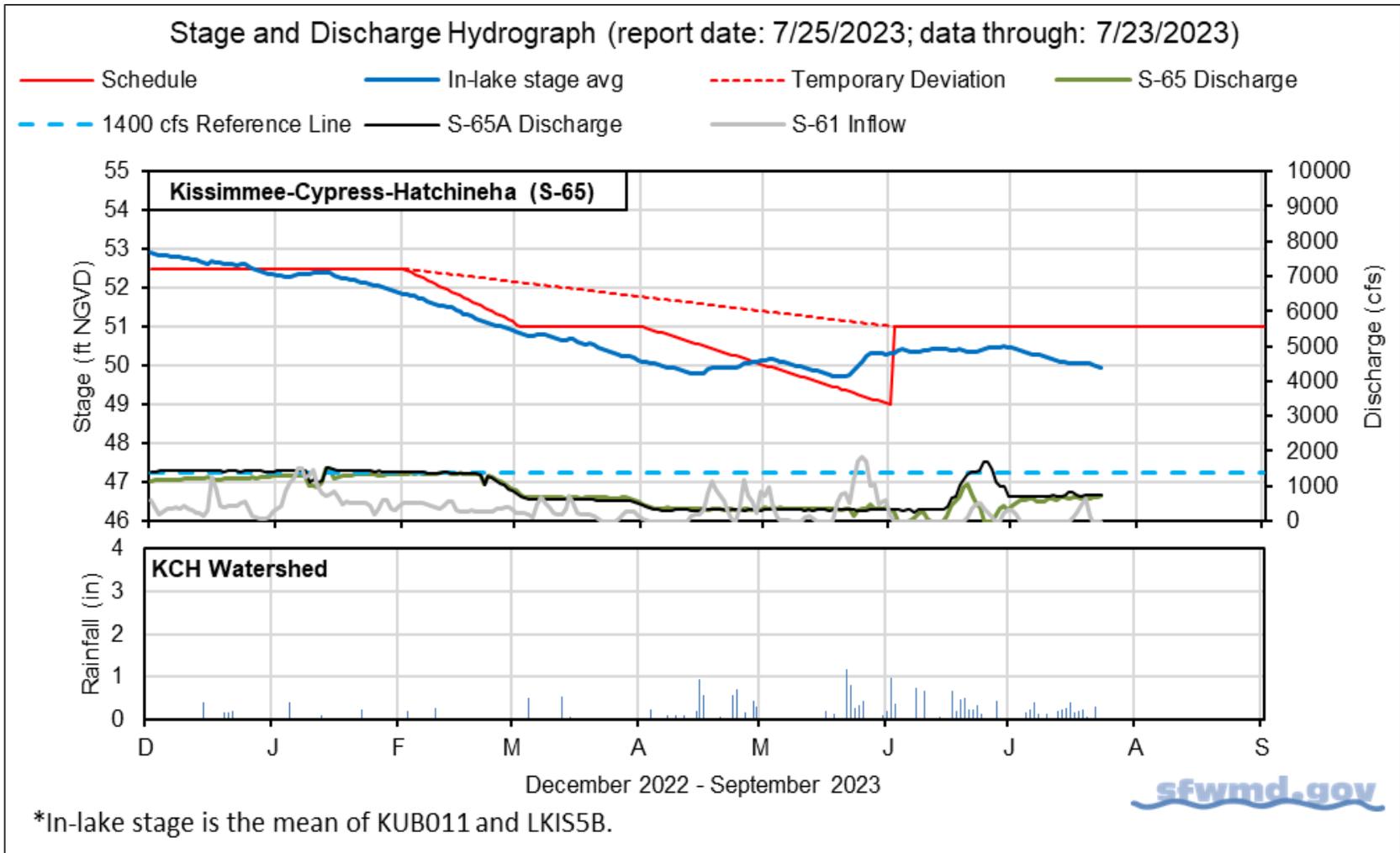


Figure KB-3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

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			
		7/23/23	7/23/23	7/16/23	7/9/23	7/2/23
Discharge	S-65	710	670	650	590	310
Discharge	S-65A ^a	730	730	760	700	960
Headwater Stage (feet NGVD)	S-65A	46.3	46.3	46.3	46.3	46.4
Discharge	S-65D ^b	1,500	1,600	1,900	2,700	2,800
Headwater Stage (feet NGVD)	S-65D ^c	27.9	27.9	27.8	27.9	27.9
Discharge (cfs)	S-65E ^d	1,600	1,900	2,000	2,700	2,900
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) ^e	Phase I, II/III river channel	3.8	3.1	1.8	0.6	0.0
River channel mean stage ^f	Phase I river channel	36.3	36.6	37.2	37.6	38.6
Mean depth (feet) ^g	Phase I floodplain	0.26	0.29	0.42	0.54	0.89

a. Combined discharge from main and auxiliary structures.

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

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

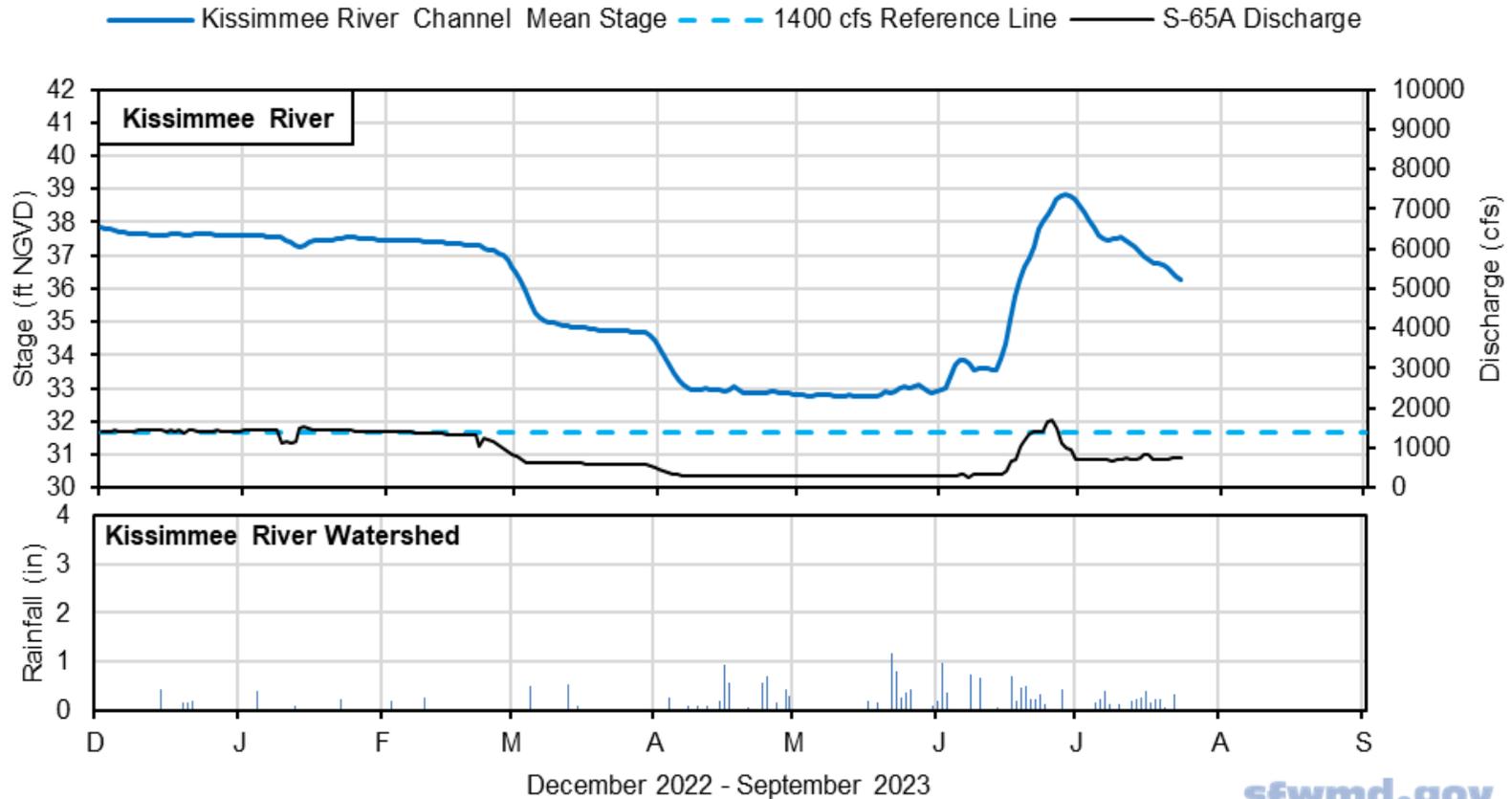
d. Combined discharge from S-65E and S-65EX1.

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

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

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

Stage and Discharge Hydrograph (report date: 7/25/2023; data through: 7/23/2023)



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



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

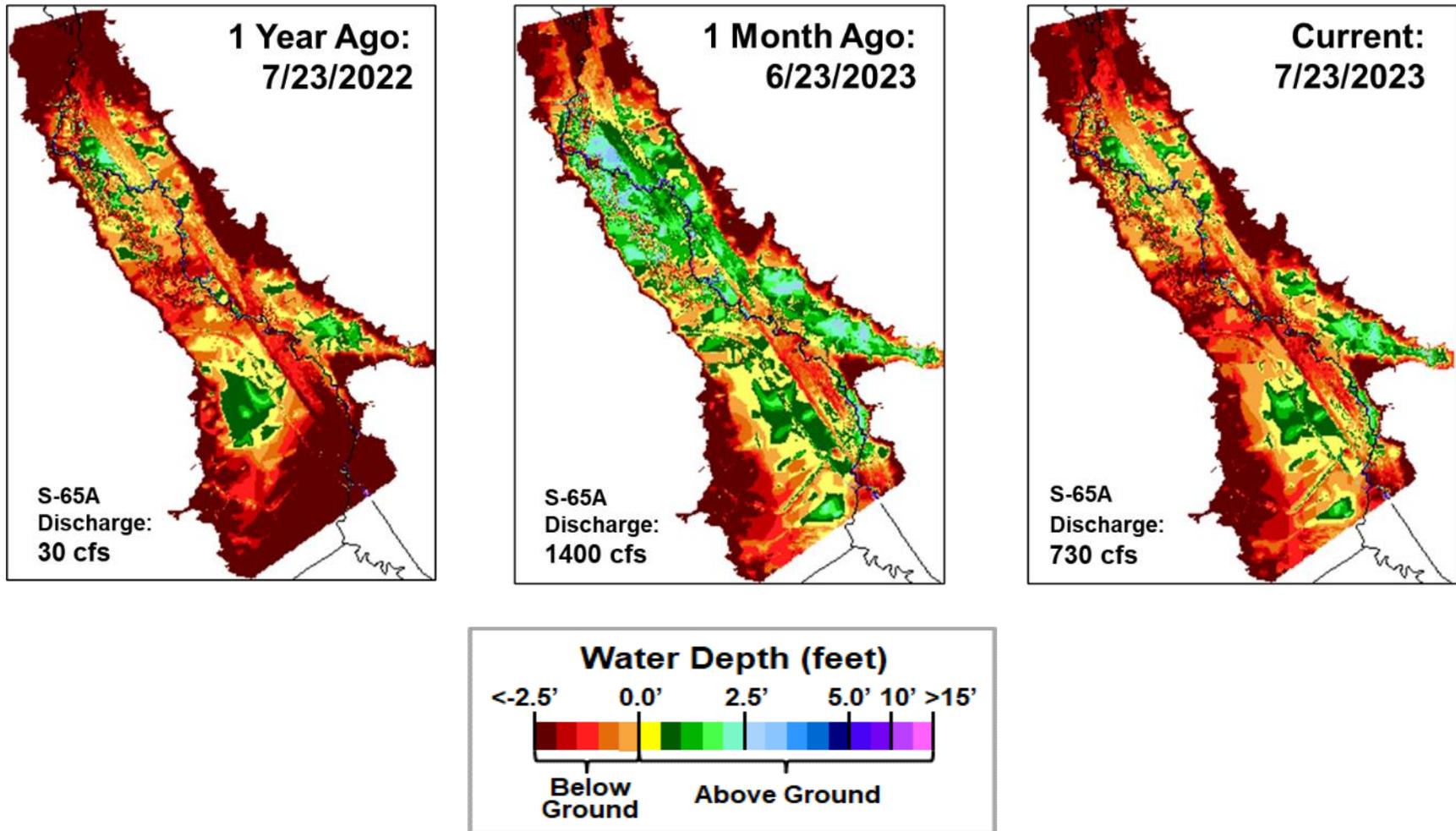
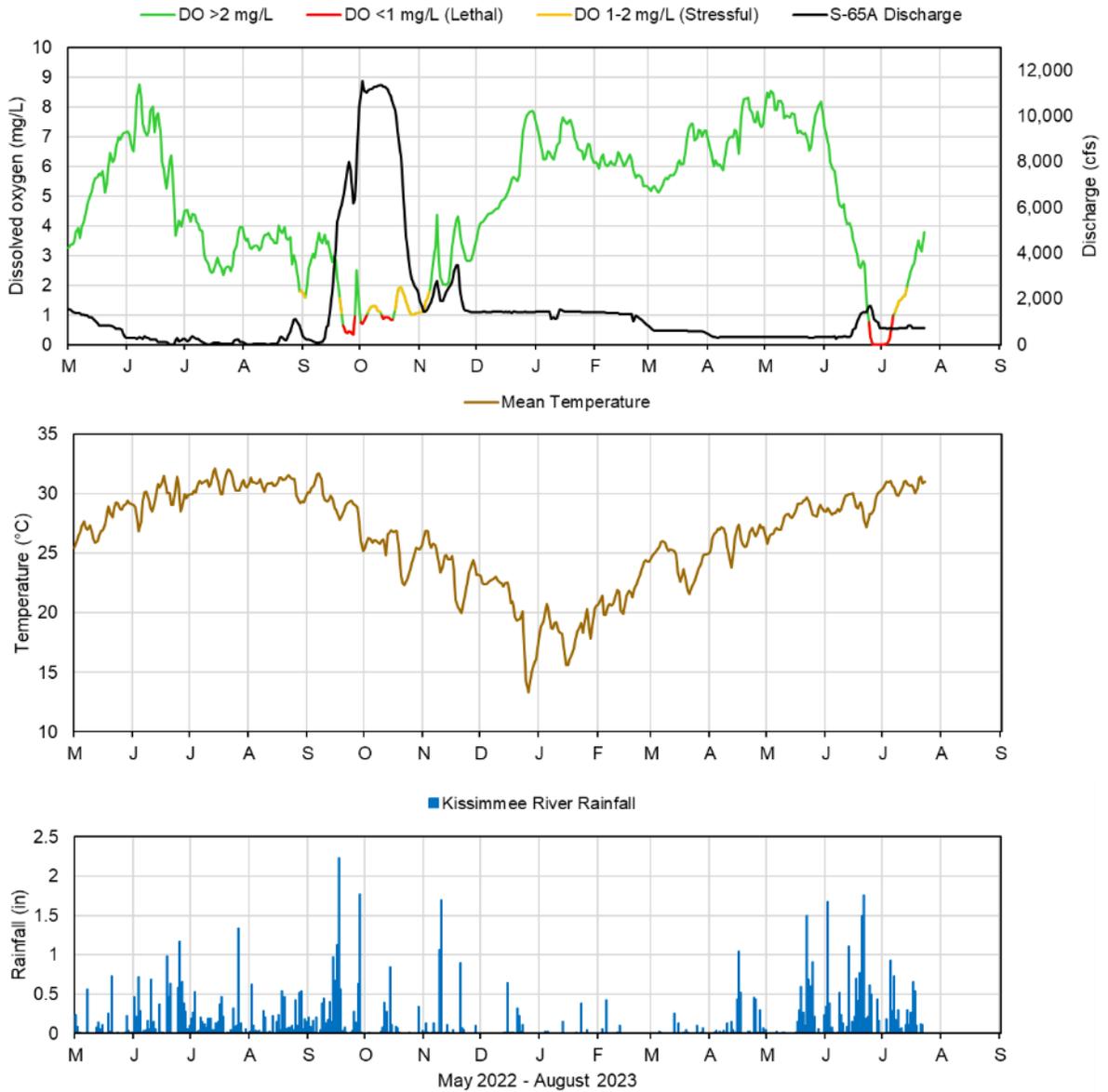


Figure KB-5. Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.



Report Date: 7/25/2023; data are through: 7/23/2023



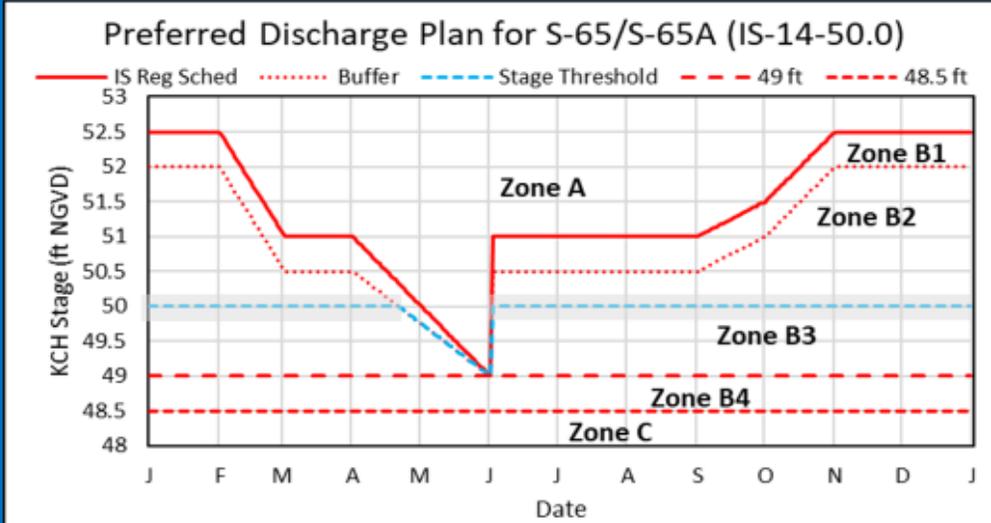
Figure KB-6. Restored Kissimmee river channel mean daily dissolved oxygen concentration (mg/L), S-65A discharge (cfs), temperature (°C) and rainfall (inches). Dissolved oxygen (DO) and temperature are mean daily values averaged for PC62, KRDR02, KRBN, PC33, PC11, PD62R, and PD42R with an average of four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

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 14.99 feet NGVD on July 23, 2023, which was 0.10 feet higher than the previous week and 0.62 feet higher than a month ago (**Figure LO-1**). Lake stage remained in the Low sub-band (**Figure LO-2**) and was 1.86 feet above the upper limit of the ecological envelope (**Figure LO-3**). According to NEXRAD, 0.55 inches of rain fell directly on the Lake last week.

Average daily inflows (excluding rainfall) increased from the previous week, going from 4,014 cfs to 4,468 cfs. The highest average single structure inflow came from the S-65E/EX1 structure (1,849 cfs). Backflows via the S-271 were at an average rate of 89 cfs. Average daily outflows (excluding rainfall) decreased from previous week, going from 263 cfs to 55 cfs. Outflows to the west via the S-77 structure averaged 55 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 level decreased since the previous week but remains high in most areas of the Lake according to the July 23, 2023, satellite image from NOAA's Harmful Algal Bloom Monitoring System (**Figure LO-6**).

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

Changes in Water Depth

1 Month Ago:
06/23/2023

Current:
07/23/2023

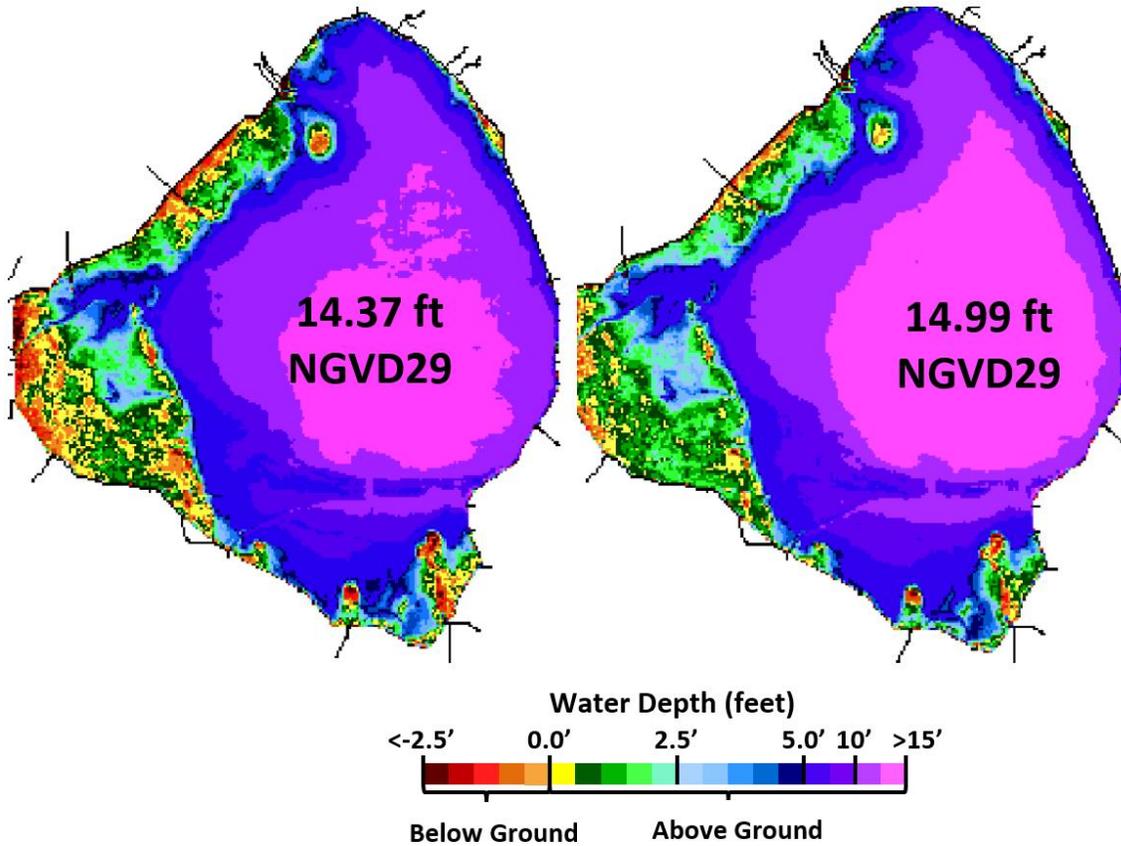


Figure LO-1. Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

Lake Okeechobee Water Level History and Projected Stages

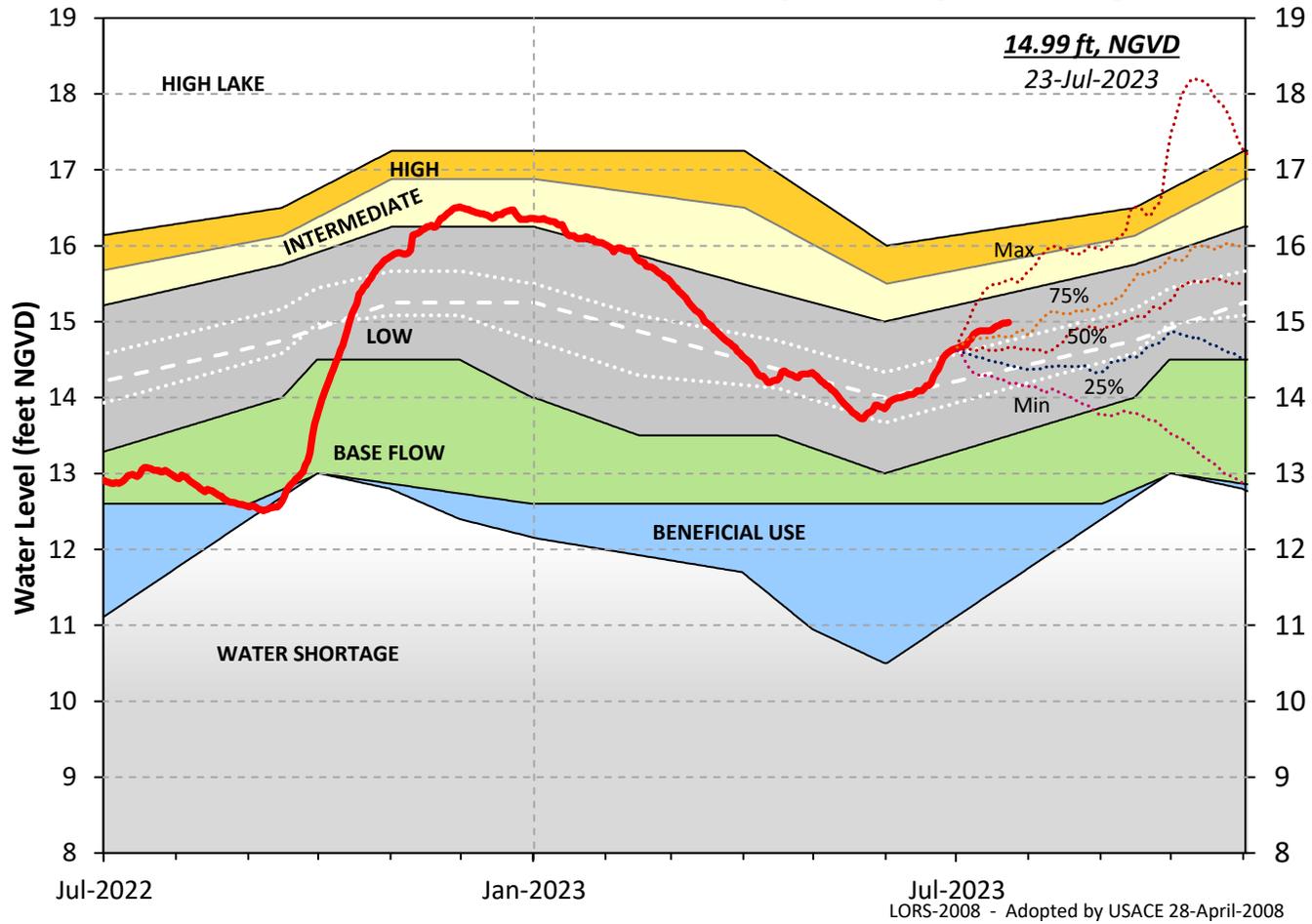


Figure LO-2. Recent Lake Okeechobee stages with projected stages based on a dynamic position analysis.

Lake Okeechobee Stage vs Ecological Envelope

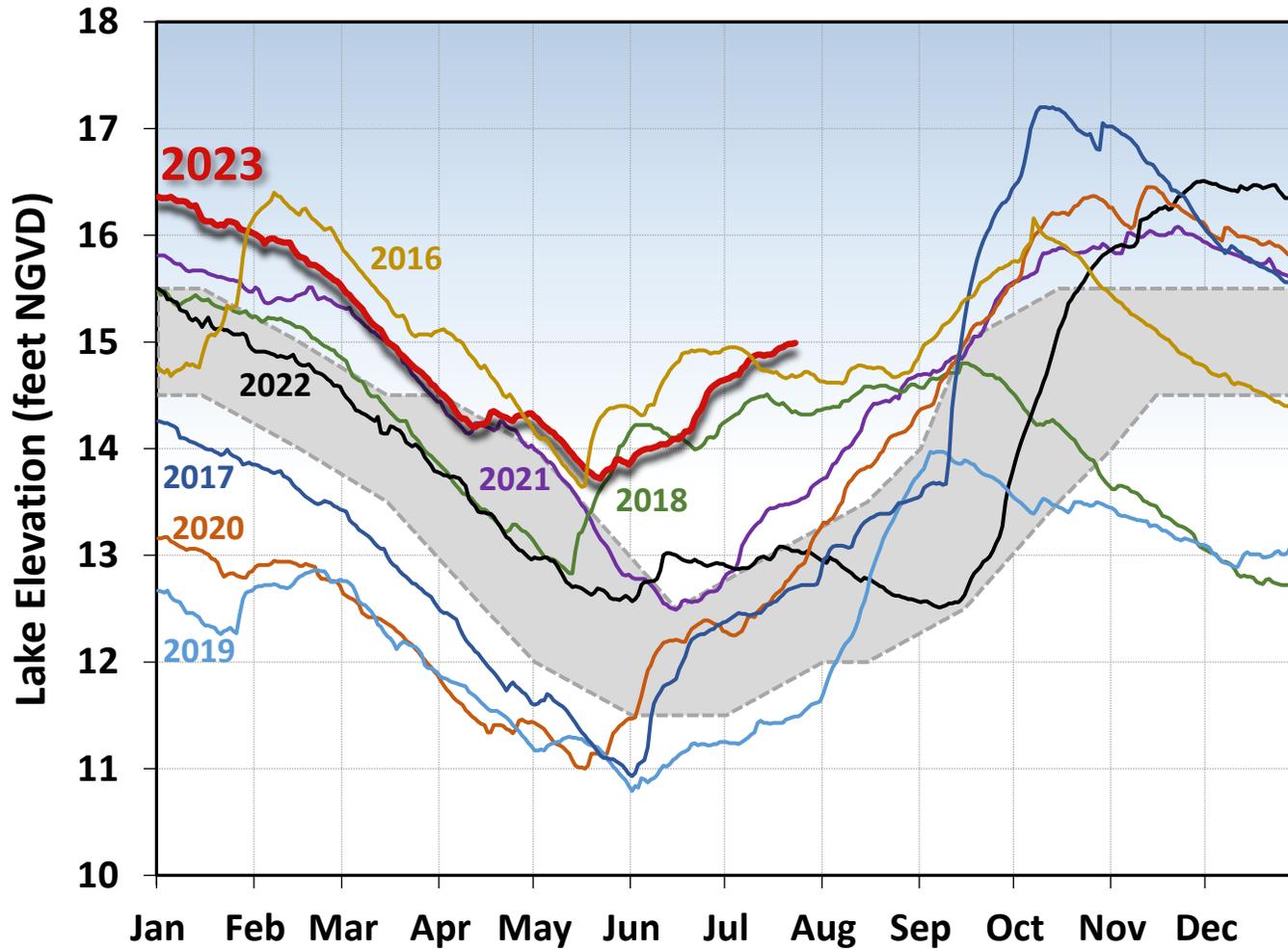


Figure LO-3. The prior seven years of annual stage hydrographs for Lake Okeechobee in comparison to the ecological envelope.

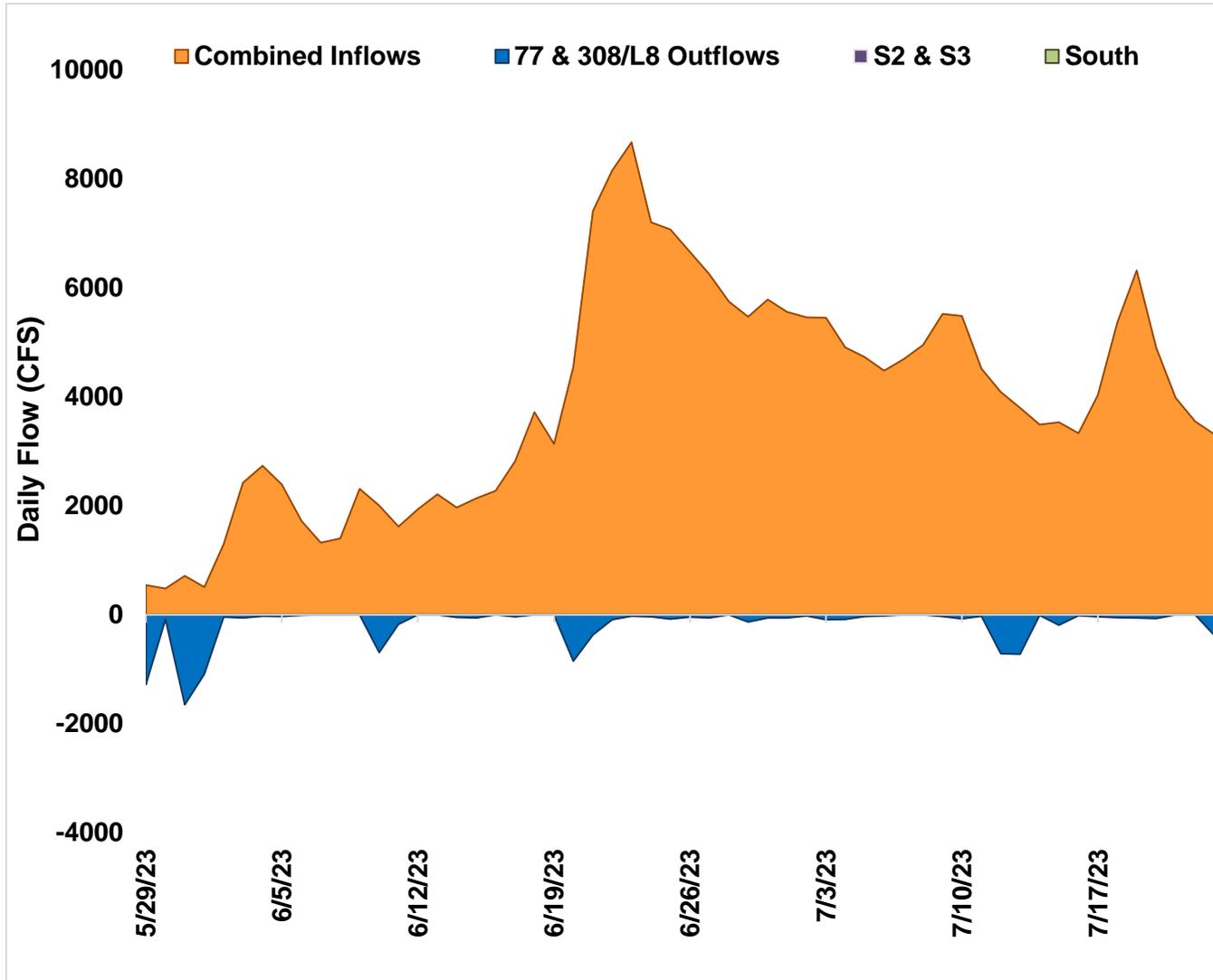


Figure LO-4. Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows from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

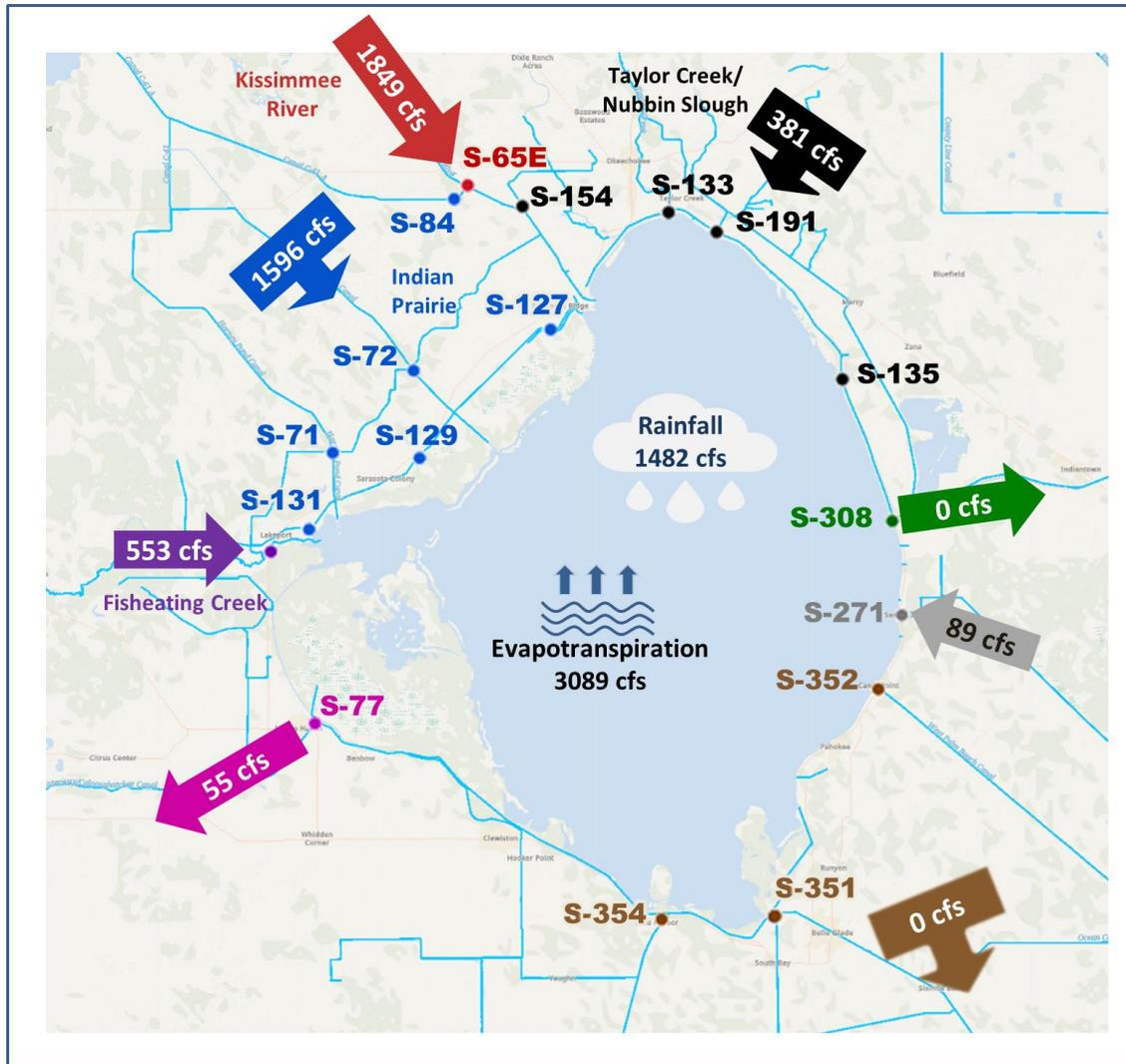


Figure LO-5. Inflows into Lake Okeechobee from Indian Prairie basins, Taylor Creek/Nubbin Slough, Kissimmee River and Fisheating Creek, and outflows to the west via S-77, to the east via S-308, to the south via S-351, S-352, S-354, and to southeast via S-271 (formerly Culvert 10A) for the week of July 17 - 23, 2023.

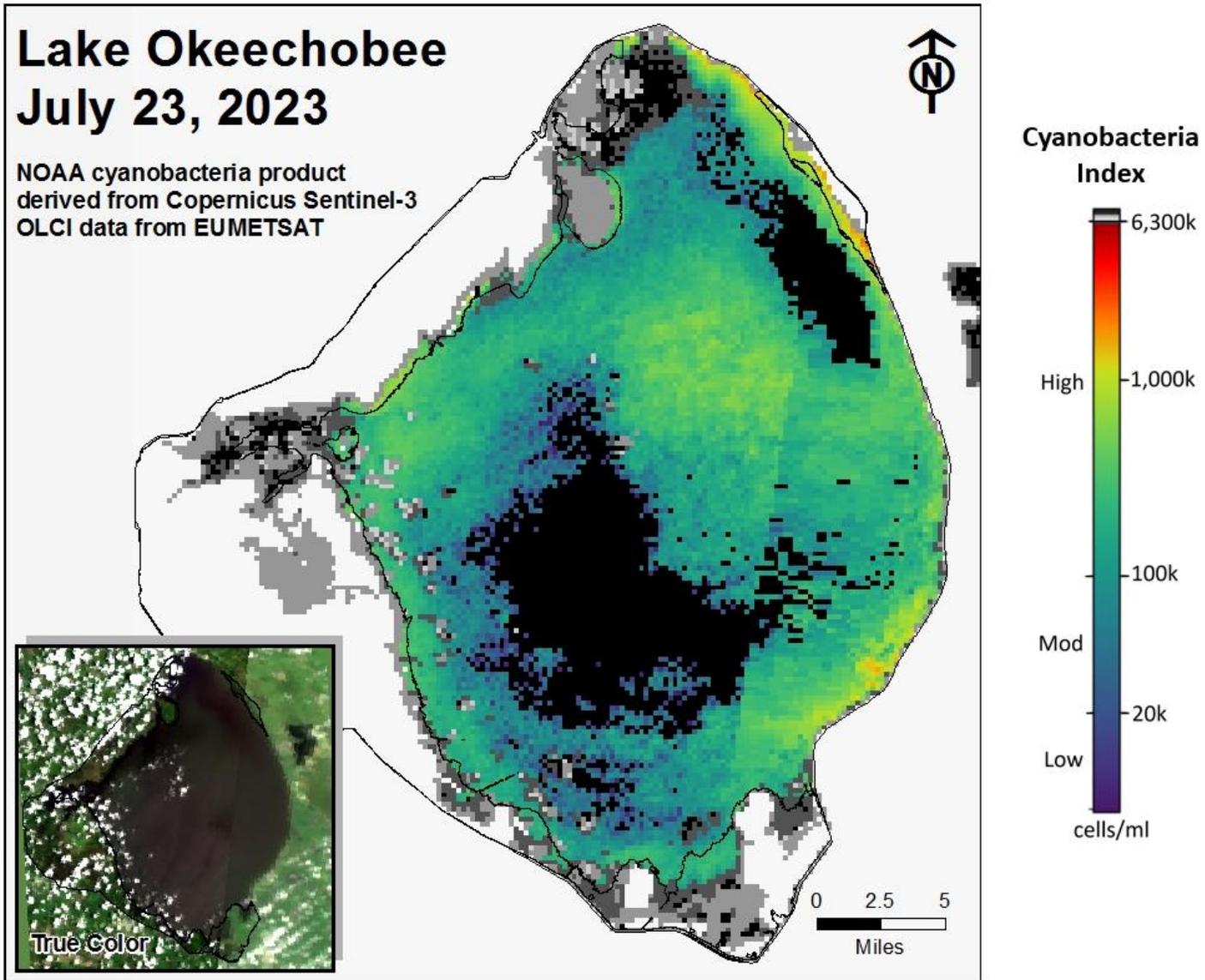


Figure LO-6. Cyanobacteria bloom index level on July 23, 2023, based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

Estuaries

St. Lucie Estuary

Over the past week, mean total inflow to the St. Lucie Estuary was 1,581 cfs (**Figures ES-1 and ES-2**), and the previous 30-day mean inflow was 1,363 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-2**.

Over the past week, salinities decreased at all sites within the estuary (**Table ES-1 and Figure ES-3**). The seven-day moving average of the surface and bottom salinities at the US1 Bridge was 14.1. 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**).

Caloosahatchee River Estuary

Over the past week, mean total inflow to the Caloosahatchee River Estuary was 3,153 cfs (**Figures ES-6 and ES-7**), and the previous 30-day mean inflow was 3,616 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, decreased slightly at Sanibel and increased 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 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**).

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

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.

Red Tide

The Florida Fish and Wildlife Research Institute reported on July 21, 2023, that *Karenia brevis*, the Florida red tide dinoflagellate, was not observed in any samples collected within the District region.

Water Management Recommendations

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

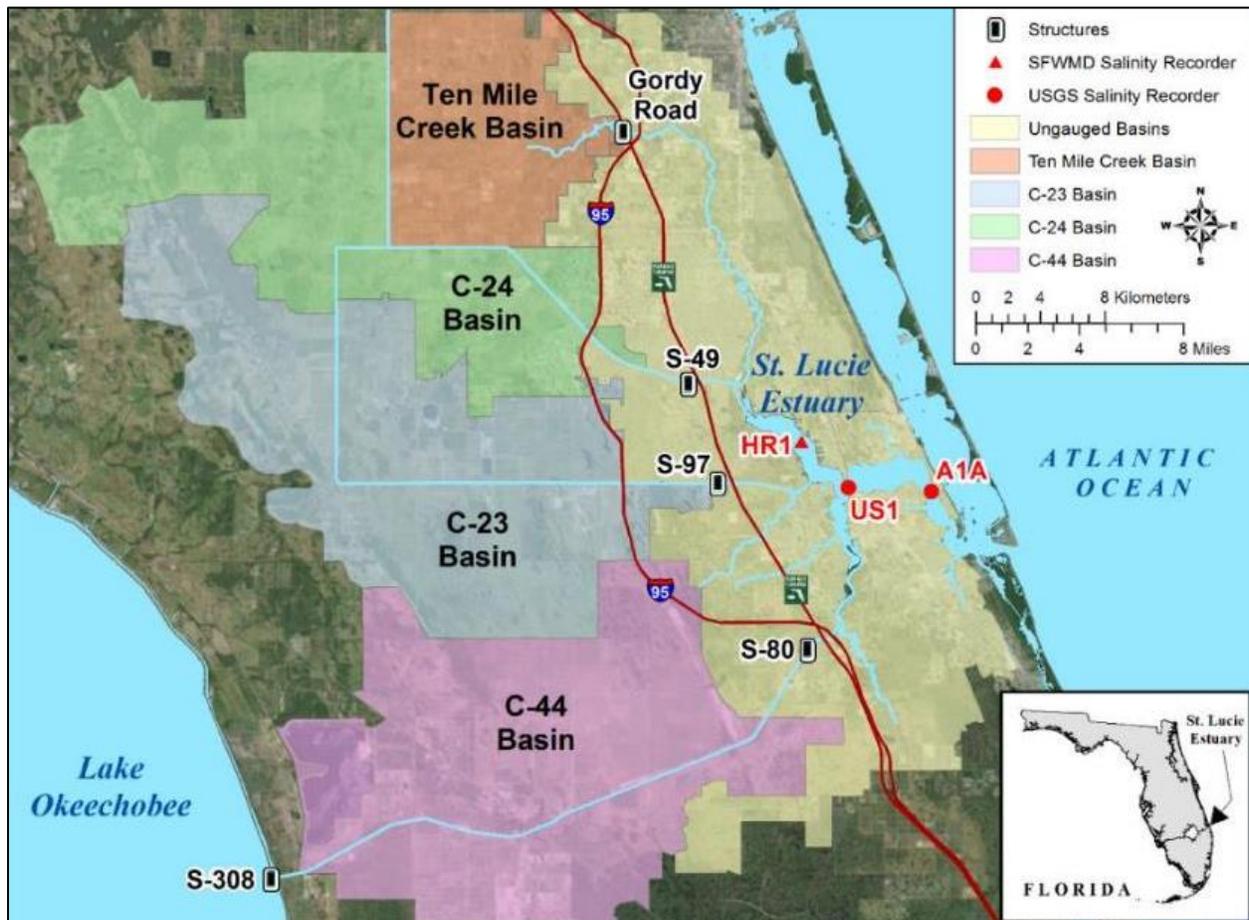


Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

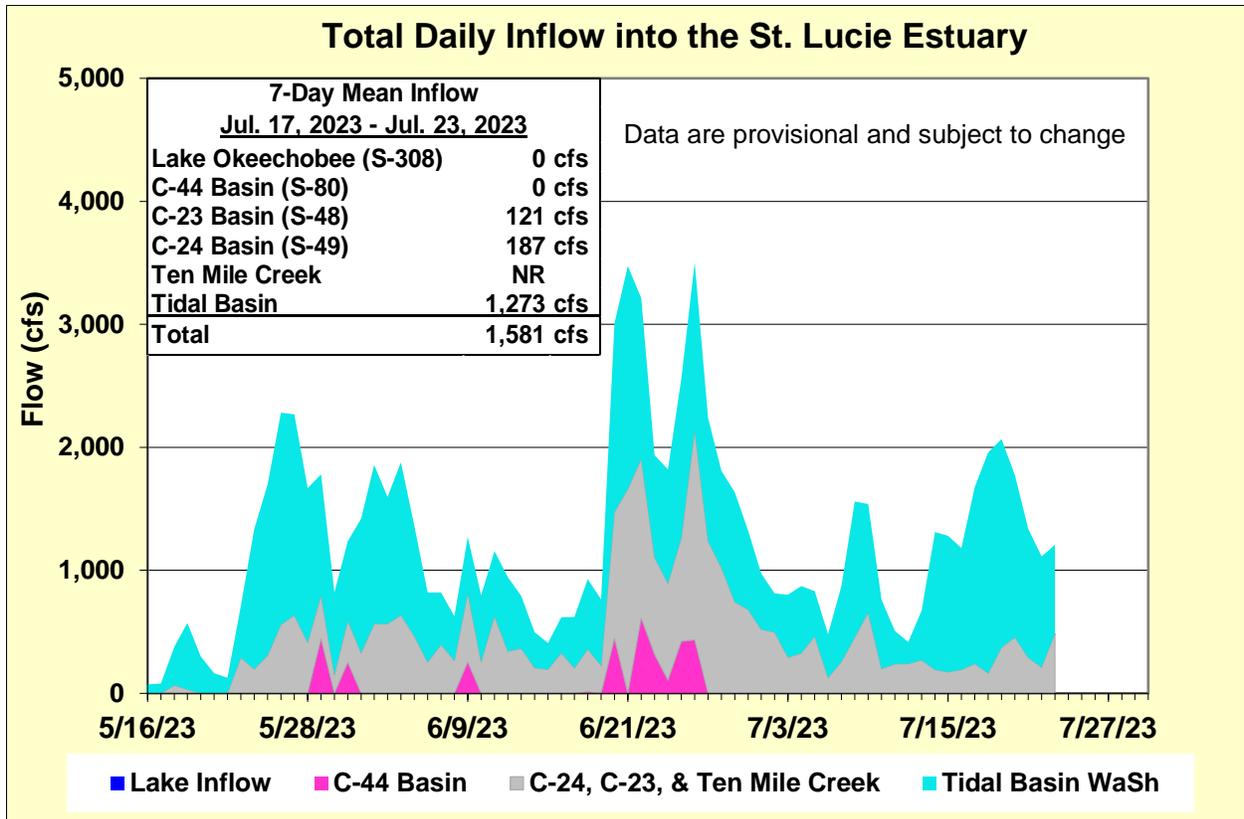


Figure ES-2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

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 (6.8)	12.0 (13.2)	10.0 – 25.0
US1 Bridge	12.6 (13.3)	15.6 (16.6)	10.0 – 25.0
A1A Bridge	20.4 (21.3)	25.9 (26.6)	10.0 – 25.0

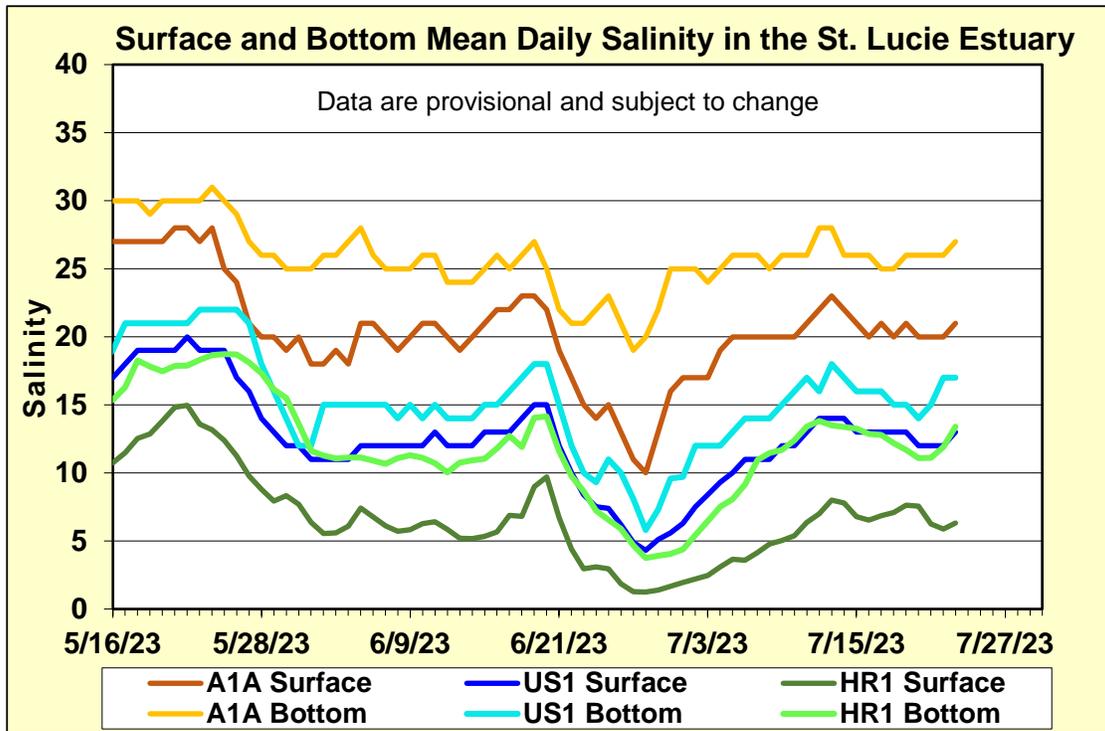


Figure ES-3. Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

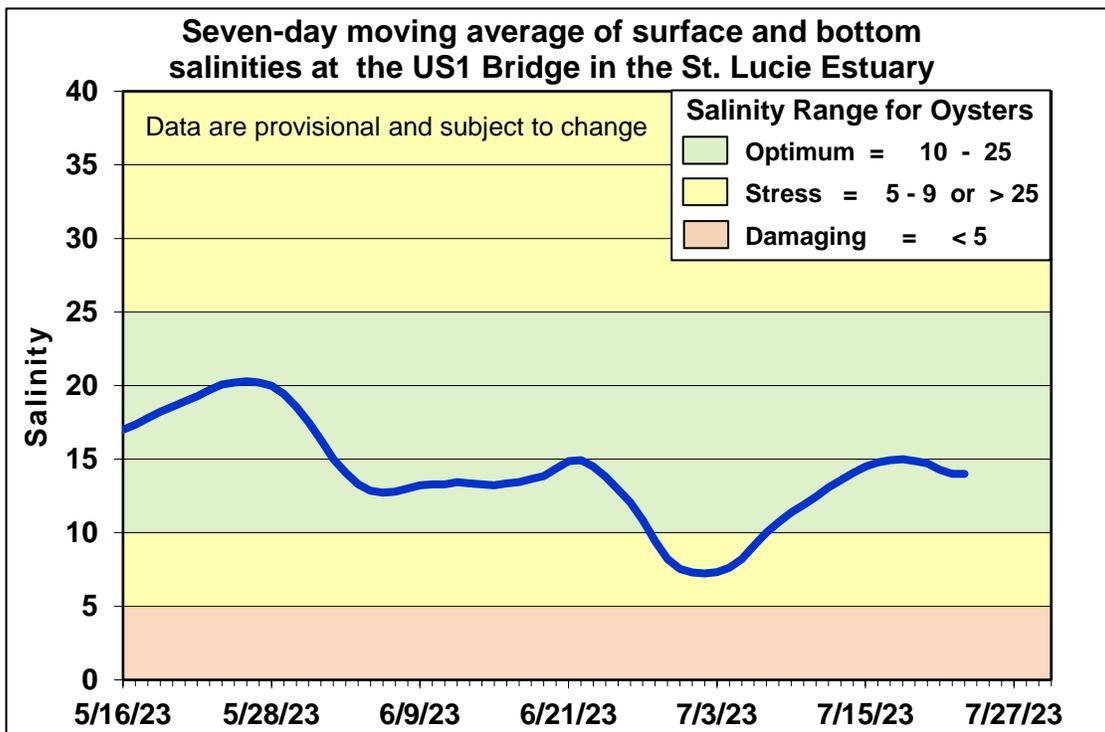


Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

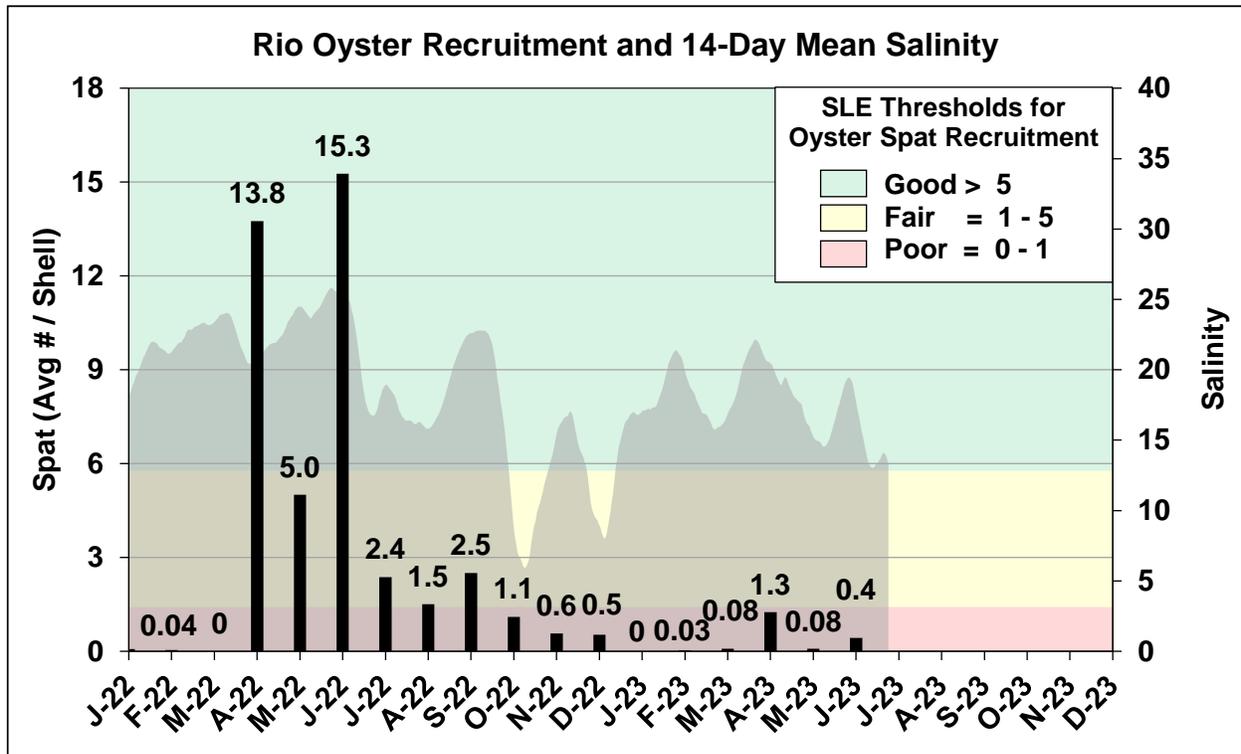


Figure ES-5. Mean oyster recruitment at the Rio oyster monitoring station and 14-day mean salinity at US1 Bridge.

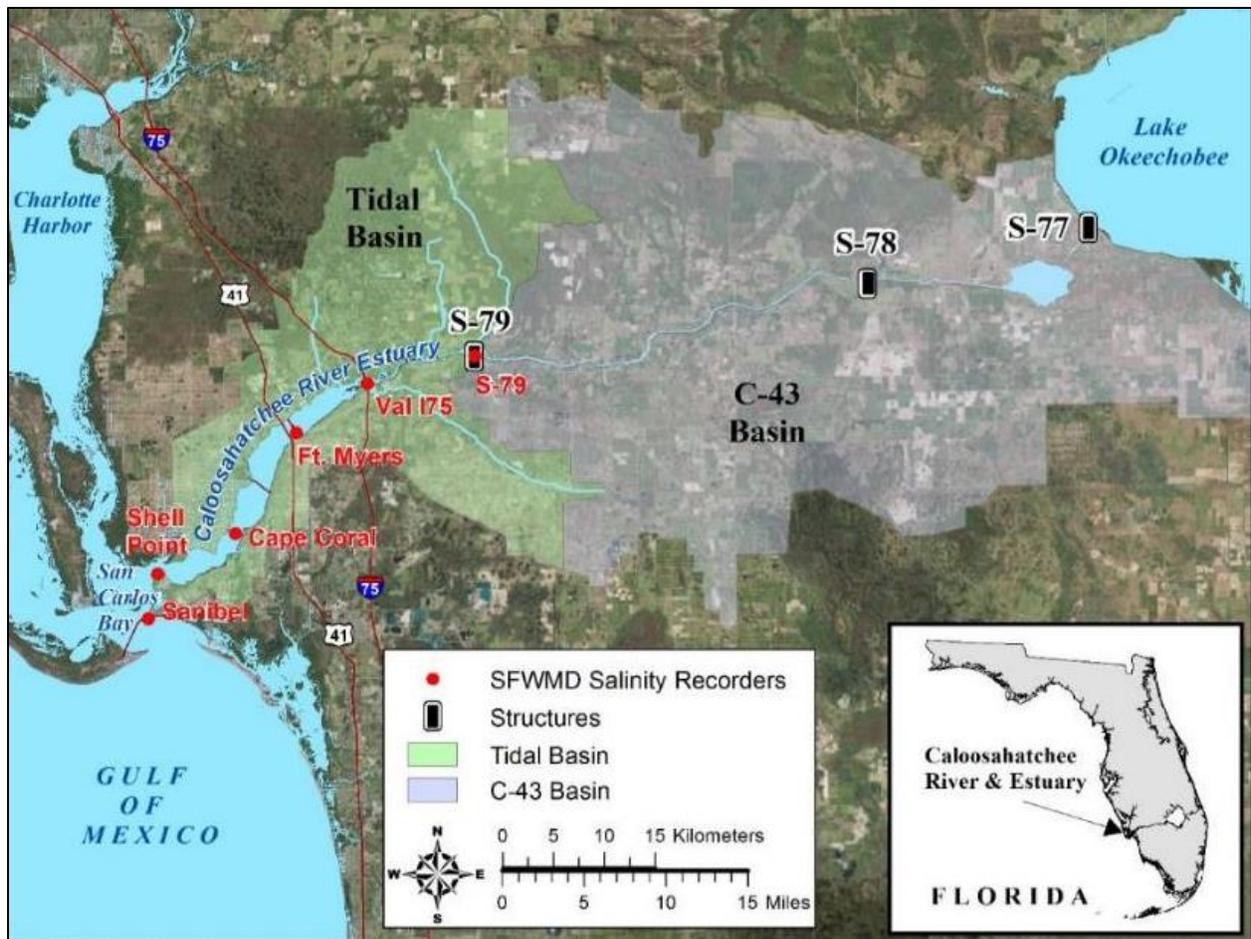


Figure ES-6. Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.

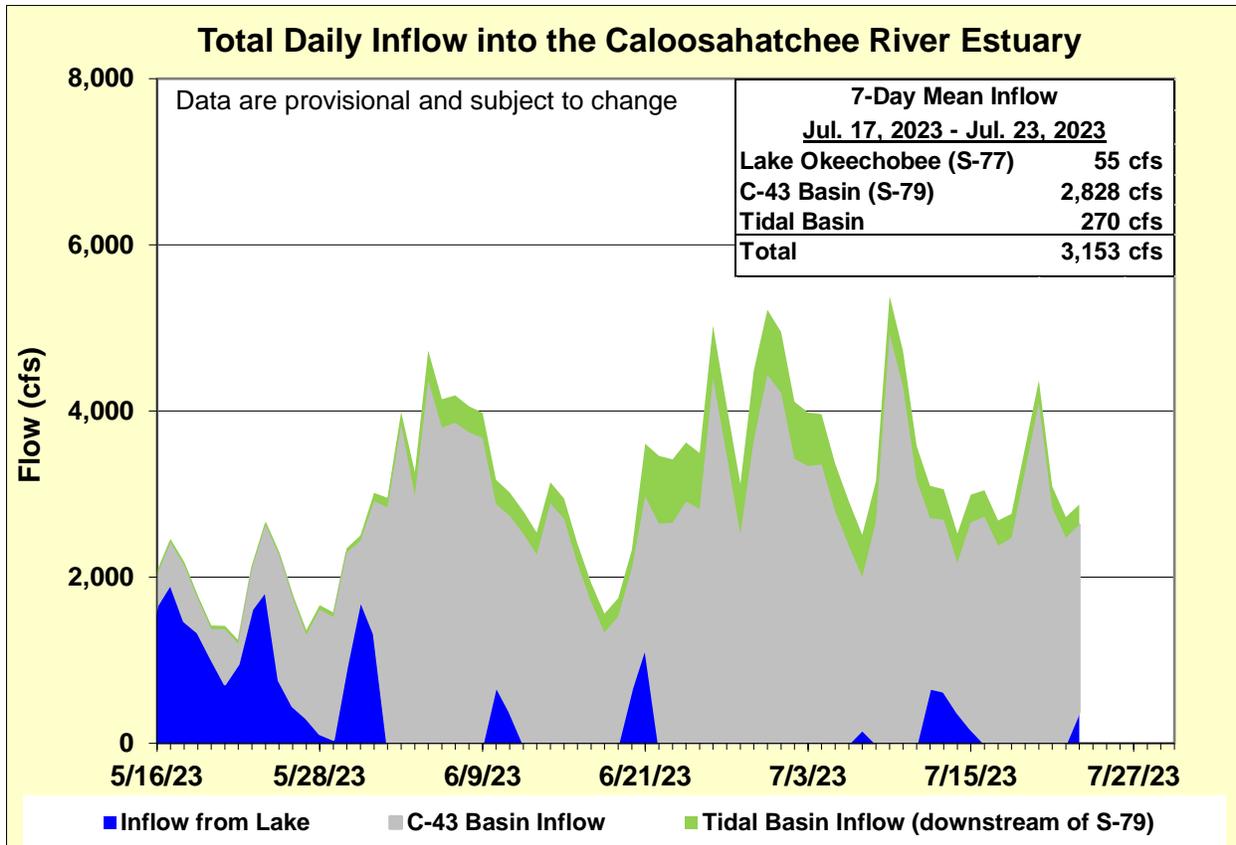


Figure ES-7. Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

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	0.3 (0.2)	0.3 (0.2)	0.0 – 10.0
Cape Coral	5.5 (4.4)	7.1 (6.1)	10.0 – 25.0
Shell Point	20.8 (20.0)	23.6 (23.2)	10.0 – 25.0
Sanibel	28.9 (29.2)	30.1 (30.7)	10.0 – 25.0

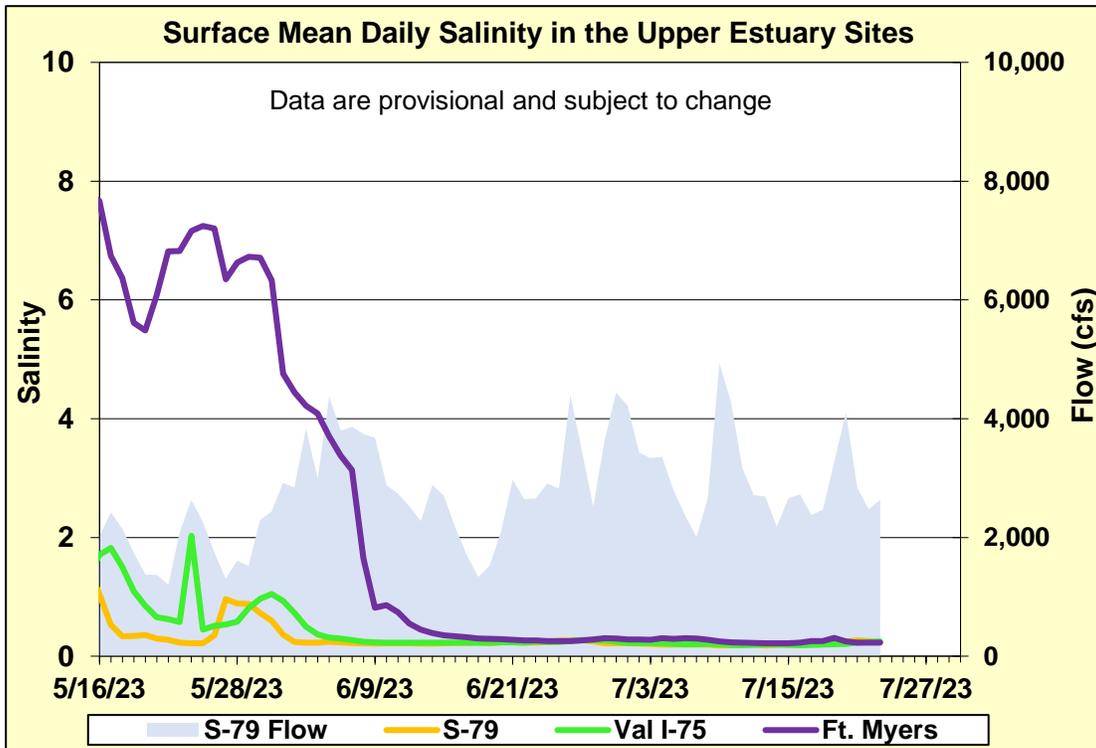


Figure ES-8. Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

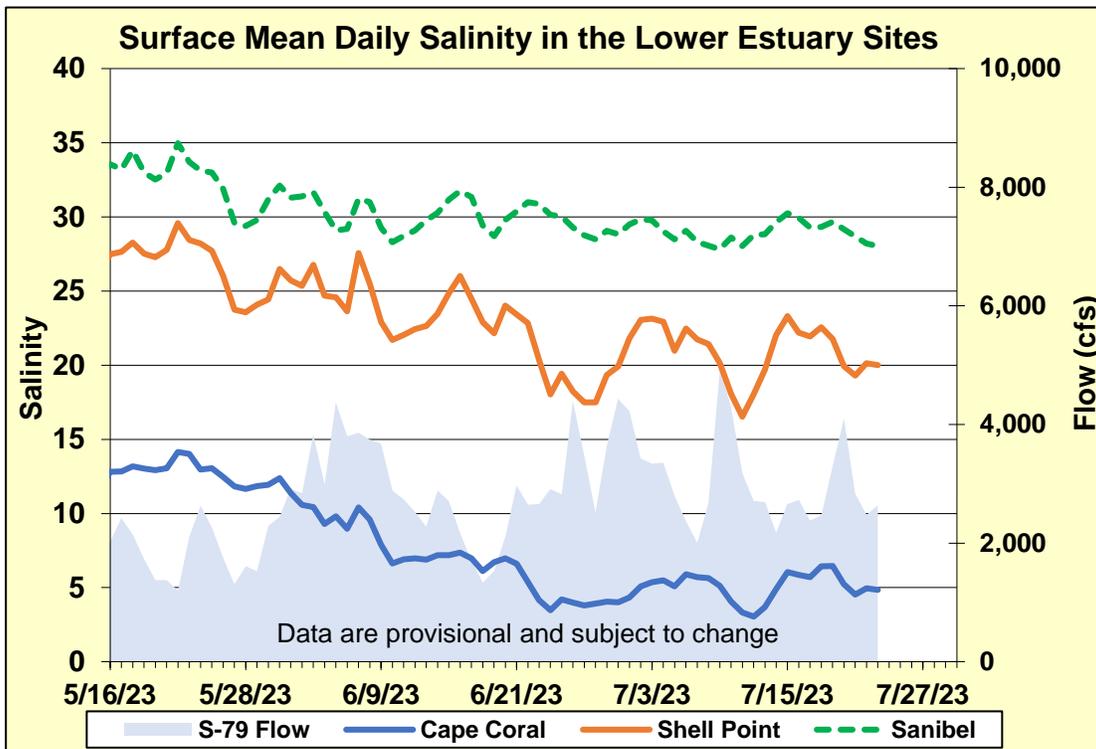


Figure ES-9. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

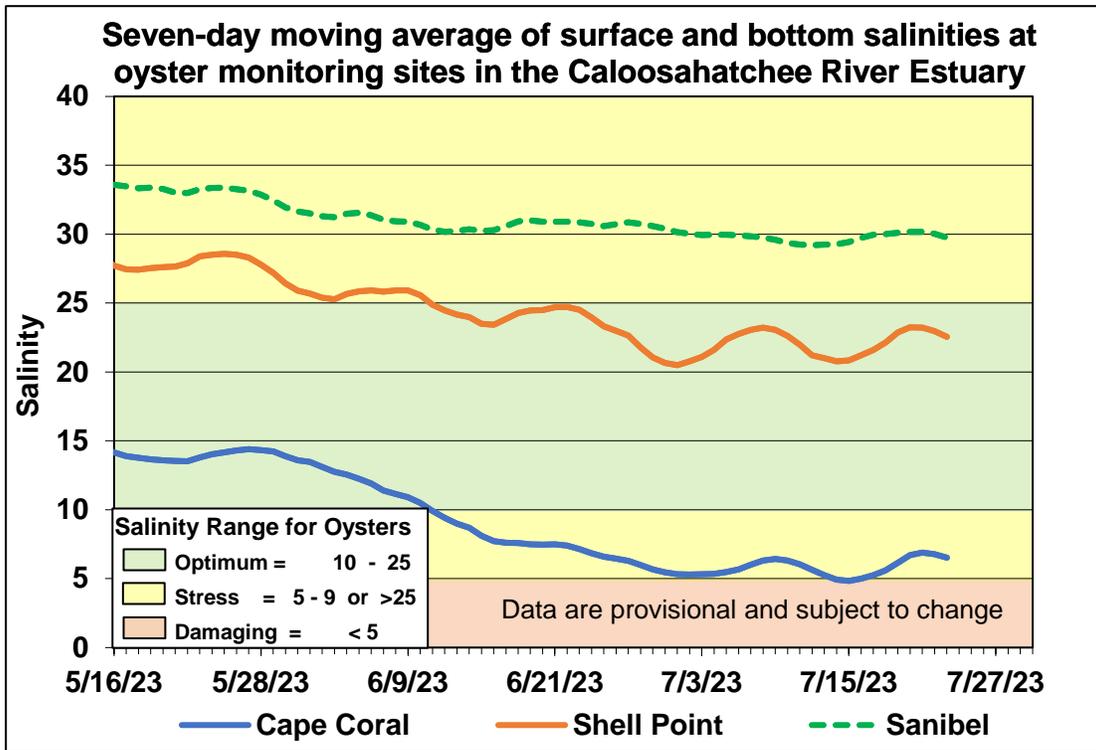


Figure ES-10. Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

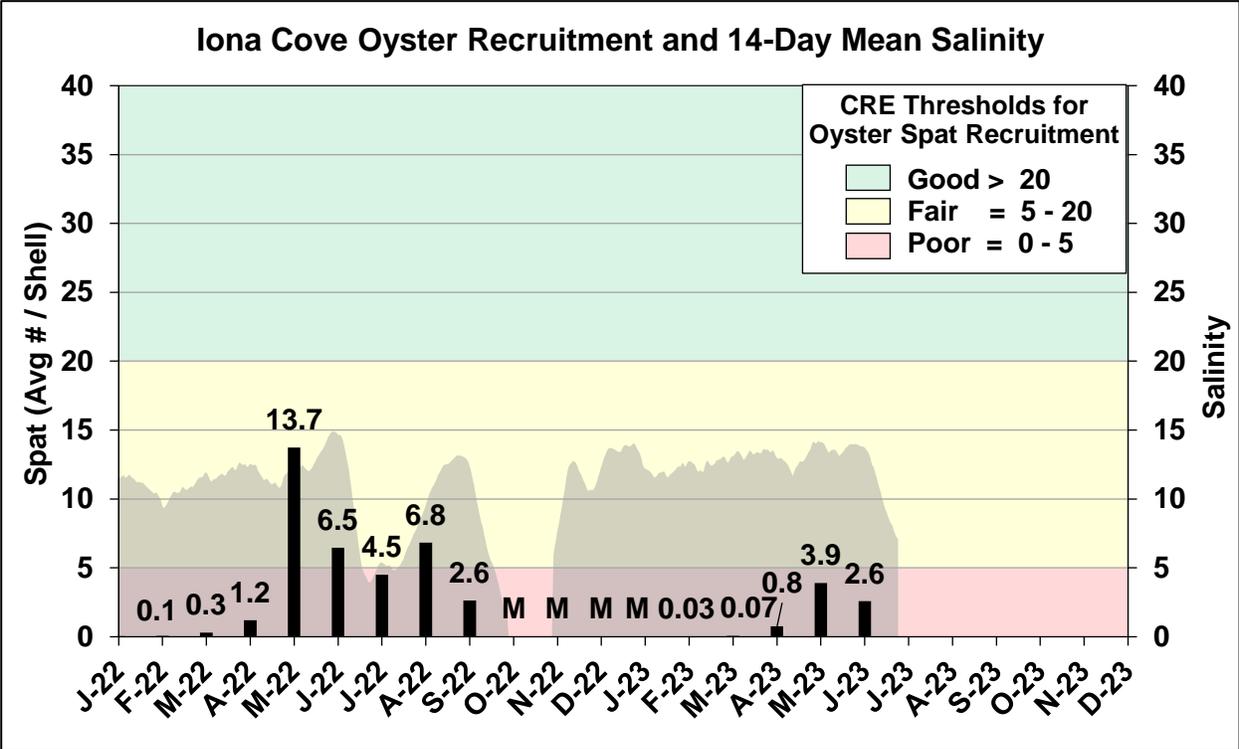


Figure ES-11. Mean oyster recruitment at the Iona Cove oyster monitoring station and 14-day mean salinity at Cape Coral.

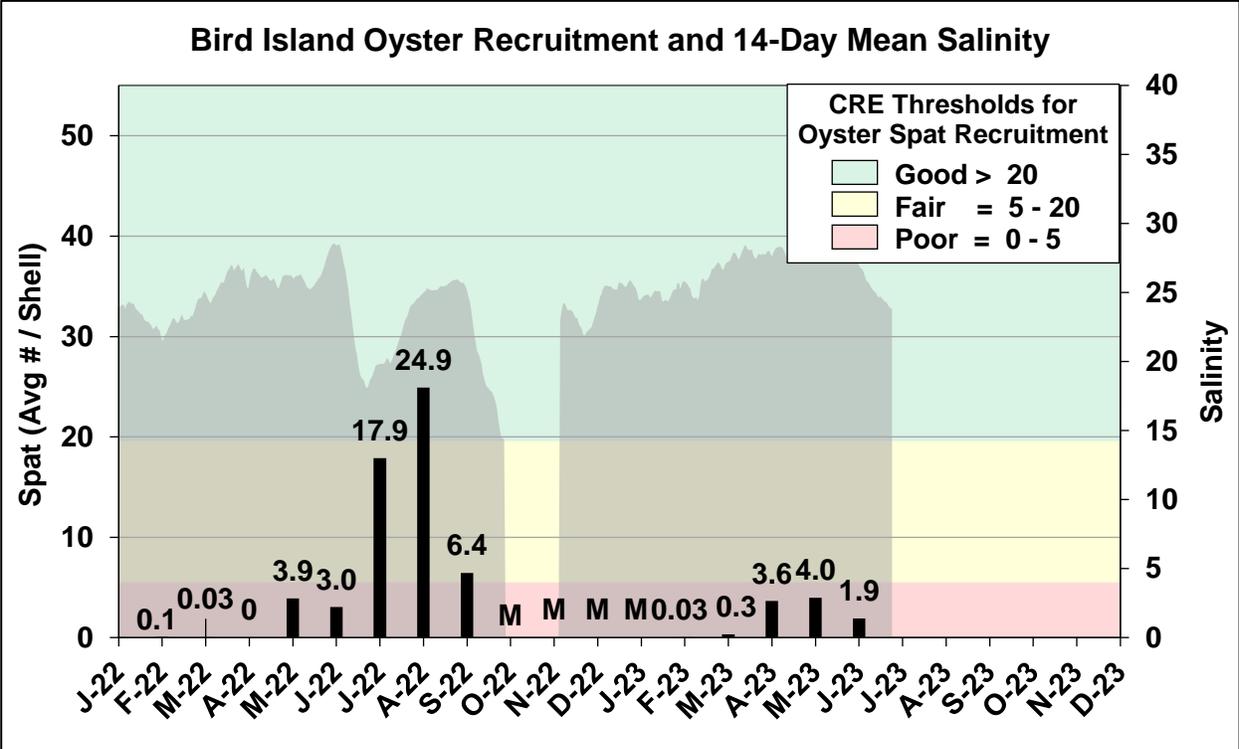


Figure ES-12. Mean oyster recruitment at the Bird Island oyster monitoring station and 14-day mean salinity at Shell Point.

Table ES-3. Predicted salinity at Val I-75 in the Caloosahatchee River Estuary at the end of the forecast period for various S-79 flow release scenarios.

Scenario	Simulated S-79 Flow (cfs)	Tidal Basin Runoff (cfs)	Daily Salinity	30-Day Mean Salinity
A	0	175	0.7	0.3
B	450	175	0.4	0.3
C	750	175	0.3	0.2
D	1,000	175	0.2	0.2
E	1,500	175	0.2	0.2
F	2,000	175	0.2	0.2

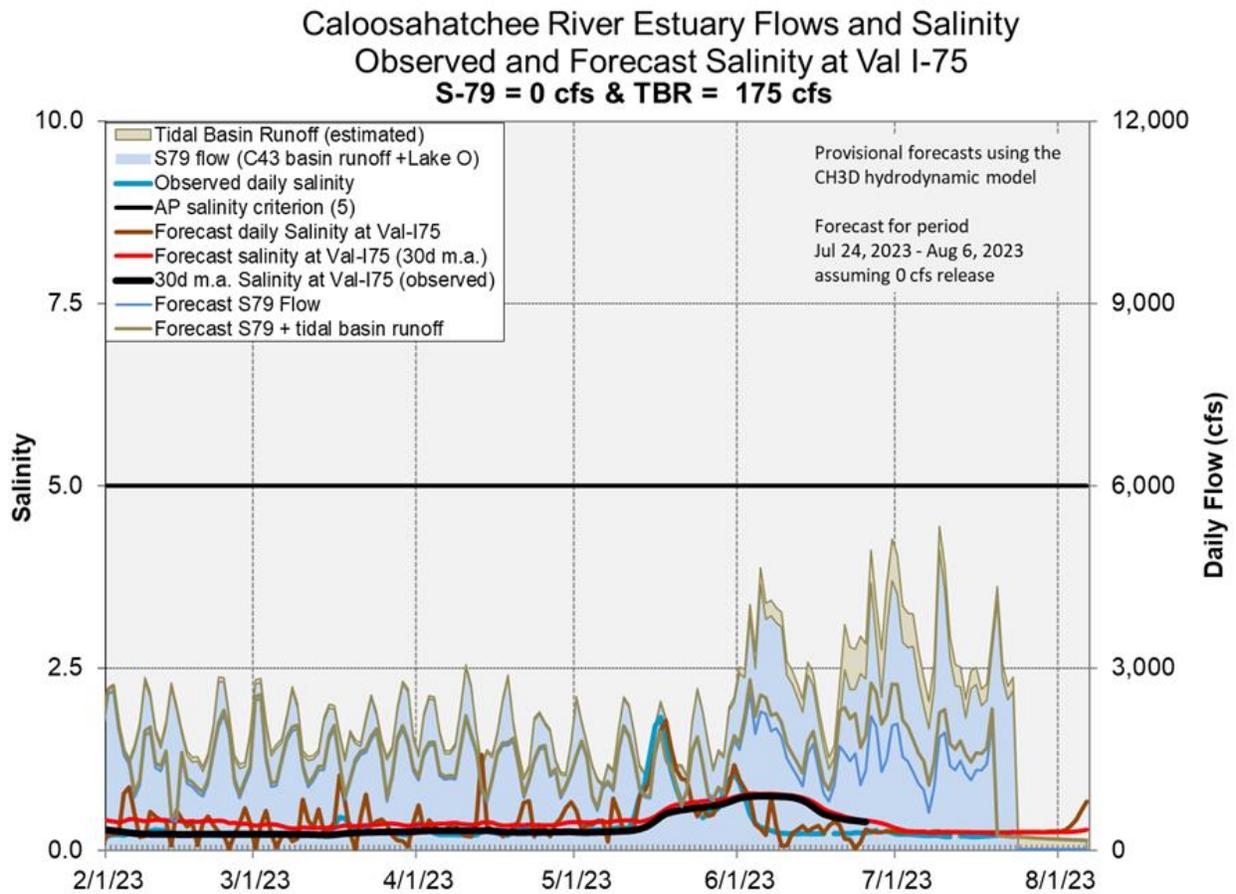


Figure ES-13. Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

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/m²/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**).

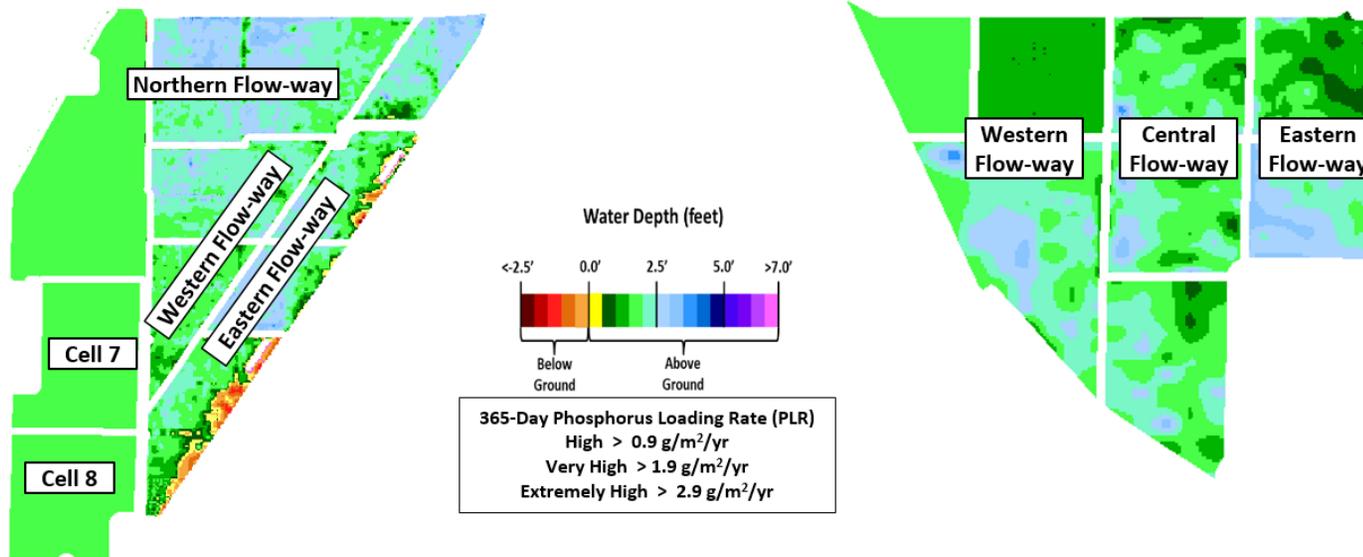
STA-2: STA-2 Flow-way 2 is offline for post-construction vegetation grow in. Operational restrictions are in place in STA-2 Flow-way 3 for canal plug refurbishments, and in Flow-way 4 for vegetation management activities. Most online treatment cells are above target stage. Vegetation in Flow-ways 1 and 3 is stressed, and in Flow-ways 4 and 5 is highly stressed. The 365-day PLRs for Flow-ways 3, 4, and 5 are below 1.0 g/m²/year. The 365-day PLR for Flow-way 1 is 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/m²/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/m²/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 – 7/17/2023 through 7/23/2023

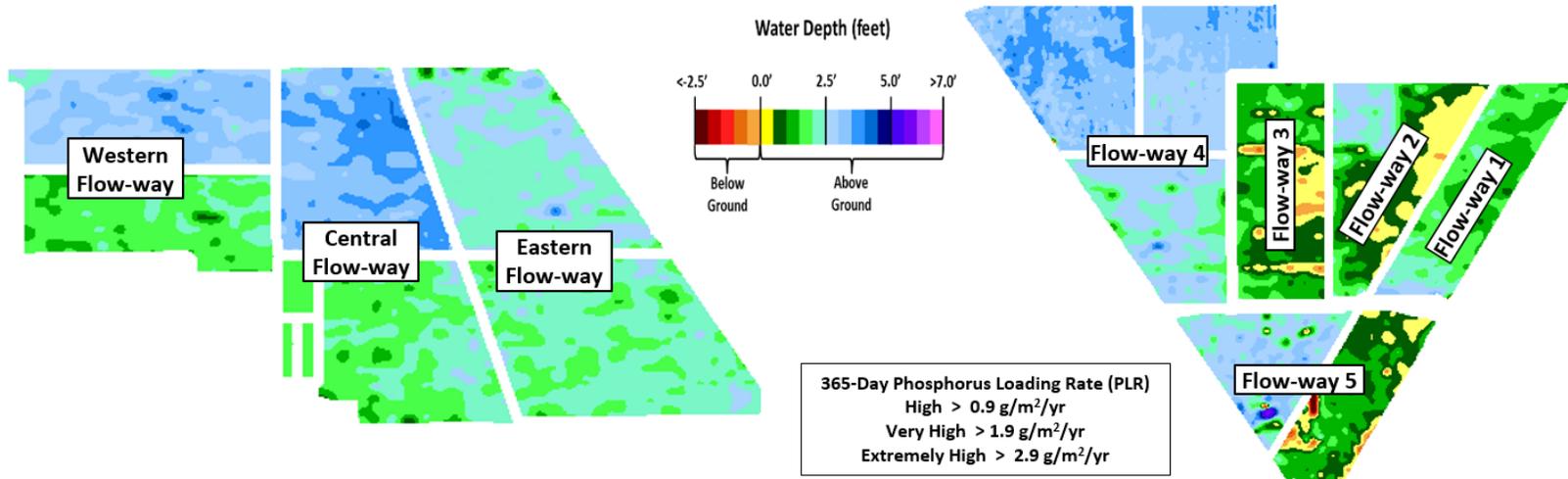


STA-1W	Flow-way Status
Western	<ul style="list-style-type: none"> • High 365-day PLR • Highly stressed vegetation conditions
Eastern	<ul style="list-style-type: none"> • High 365-day PLR • Highly stressed vegetation conditions
Northern	<ul style="list-style-type: none"> • High 365-day PLR • Highly stressed vegetation conditions • Planting emergent vegetation
Cell 7	<ul style="list-style-type: none"> • Stressed vegetation conditions
Cell 8	<ul style="list-style-type: none"> • Construction activities

STA-1E	Flow-way Status
Western	<ul style="list-style-type: none"> • Offline for post-construction vegetation grow-in
Central	<ul style="list-style-type: none"> • Highly stressed vegetation conditions
Eastern	<ul style="list-style-type: none"> • High 365-day PLR • Stressed vegetation conditions

Figure S-1. Eastern Flow Path Weekly Status Report

Central Flow Path Weekly Status Report – 7/17/2023 through 7/23/2023

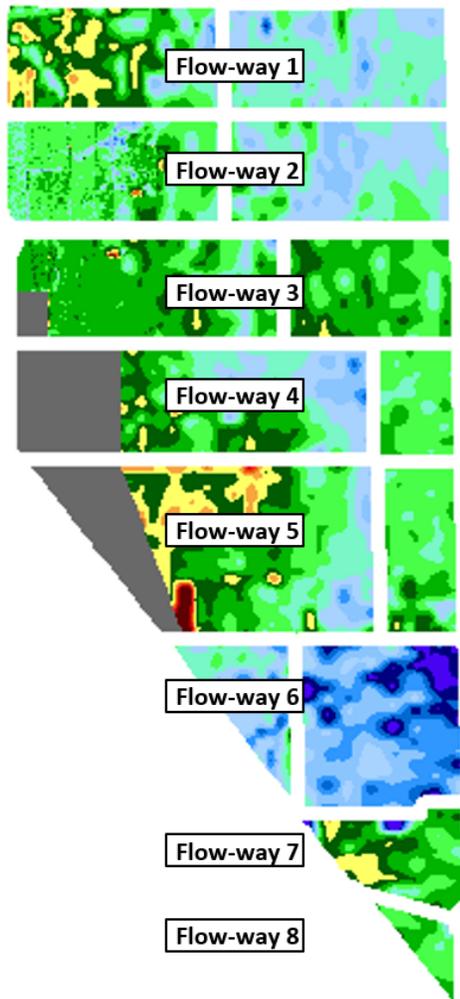


STA-3/4	Flow-way Status
Western	<ul style="list-style-type: none"> Stressed vegetation conditions Nuisance vegetation control within inflow canal
Central	<ul style="list-style-type: none"> Highly stressed vegetation conditions Removal of floating tussocks Nuisance vegetation control within inflow canal
Eastern	<ul style="list-style-type: none"> Offline for post-drawdown vegetation establishment Nuisance vegetation control within inflow canal

STA-2	Flow-way Status
Flow-way 1	<ul style="list-style-type: none"> High 365-day PLR Stressed vegetation conditions
Flow-way 2	<ul style="list-style-type: none"> Offline for post-construction vegetation grow-in
Flow-way 3	<ul style="list-style-type: none"> Refurbishments project - plug construction Stressed vegetation conditions
Flow-way 4	<ul style="list-style-type: none"> Planting emergent vegetation Nuisance vegetation control Highly stressed vegetation conditions
Flow-way 5	<ul style="list-style-type: none"> Highly stressed vegetation conditions

Figure S-2. Central Flow Path Weekly Status Report

Western Flow Path Weekly Status Report – 7/17/2023 through 7/23/2023



STA-5/6	Flow-way Status
Flow-way 1	<ul style="list-style-type: none"> Highly stressed vegetation conditions
Flow-way 2	<ul style="list-style-type: none"> Highly stressed vegetation conditions
Flow-way 3	<ul style="list-style-type: none"> Highly stressed vegetation conditions High 365-day PLR
Flow-way 4	<ul style="list-style-type: none"> Highly stressed vegetation conditions
Flow-way 5	<ul style="list-style-type: none"> Highly stressed vegetation conditions High 365-day PLR
Flow-way 6	<ul style="list-style-type: none"> Highly stressed vegetation conditions
Flow-way 7	
Flow-way 8	<ul style="list-style-type: none"> Stressed vegetation conditions

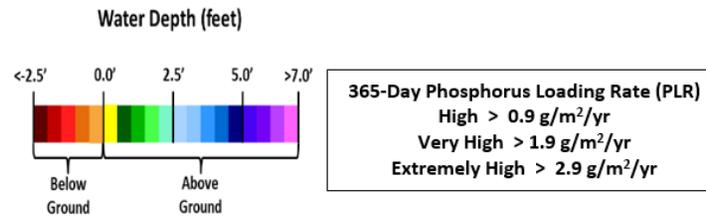


Figure S-3. Western Flow Path Weekly Status Report

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

Everglades

Water Conservation Area Regulation Schedules

WCA-1: Last week stage at the 1-8C was slowly decreasing. The average on Sunday was 0.36 feet above the now rising Zone A1 regulation line.

WCA-2A: 2-17 stage decreased slightly. The average on Sunday was 1.40 feet above the rising regulation line.

WCA-3A: The Three Gauge Average is questionable since site 64 was malfunctioning. The average stage predicted by the EDEN estimate is 10.59 so the three gauge average is potentially 0.69 feet above the rising regulation line.

WCA-3A North: Gauge 62 (Northwest corner) decreased slightly and remained below the rising line of the Upper Schedule last week by 0.16 feet.

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

Water Depths

The SFWDAT tool illustrates the current stage has been maintaining above ground surface across most BCNP and EPA basins. Central WCA-3A depths have risen significantly over the past two months and are maintaining depth magnitude. Pondered conditions are lessening in eastern WCA-2A yet the upper reaches of the L-67s in WCA-3A are deeper. Hydrologic connectivity has been prevalent in ENP and is potentially getting deeper.

Comparing current WDAT water depths to one month ago conditions within the central EPA and E ENP are deeper whereas North EPA and W reaches of ENP and central BCNP are drier. Looking back a year ago, conditions are slightly wetter in the central WCAs and E ENP. Western BCNP and ENP are drier as well as portions of LOX (**Figure EV-5 and Figure EV-6**).

Comparing current conditions to the 20-year average on July 23rd: Depths are above average in WCA-2A, south 3B and most of LOX. Conditions are mixed in northern WCA-3A and central BCNP. Depths are well above average across ENP except for a portion of the 10,000 islands area (**Figure EV-7**).

Taylor Slough and Florida Bay

Total weekly rainfall averaged 0.6 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 Whipray Basin (WB) in the central region to 1.9 inches at Taylor Slough Bridge (TSB) in the northern slough. Most stages increased across Taylor Slough, but changes across all stages averaged to approximately 0.0 feet. Stage changes ranged from -0.11 feet at Craighead Pond (CP) in the southwestern slough, to +0.04 feet at E112 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 +4.8 inches compared to before the Florida Bay initiative (starting in 2017), a decrease of -1.5 inches from last week.

Average Florida Bay salinity was 27.1, -0.7 lower than the previous week. Salinity changes were variable across sites and ranged from a decrease of -5.8 at Garfield Bight (GB) in the western nearshore region to an increase of +1.4 at Whipray Basin (WB) in the central region (**Figure EV-8**). Salinities remain within the IQR for the Eastern, Central and Western regions of the bay, with Eastern salinities falling to near the 25th percentile. Florida Bay salinity is below its historical average for this time of year by -1.3, a decrease of -0.5 relative to last week.

Water Management Recommendations

Keeping water within the system and flowing south has long term ecological benefits; however, operations that elevate the ascension rates above 0.18 feet per week have detrimental ecological impacts on sensitive regions of the EPA. Moderating 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 between 0.01 and 0.18 ft/week (early wet season ecologically beneficial) ascension rates. As conditions remain above the 90th percentile in NESRS, continuing strong positive TS creek flows to avoid salinity swings in the nearshore areas is ecologically beneficial. 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	1.51	-0.06
WCA-2A	1.46	-0.03
WCA-2B	1.15	+0.12
WCA-3A	0.71	+0.01
WCA-3B	0.99	+0.04
ENP	0.90	-0.04



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



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

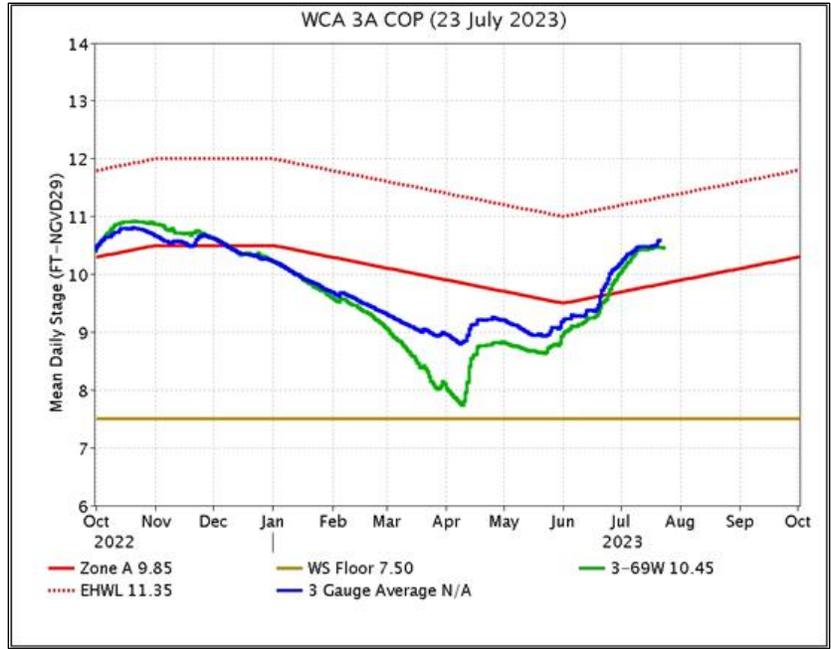


Figure EV-3. WCA-3A stage hydrographs (three-gauge average, 3-69W) and regulation schedule.

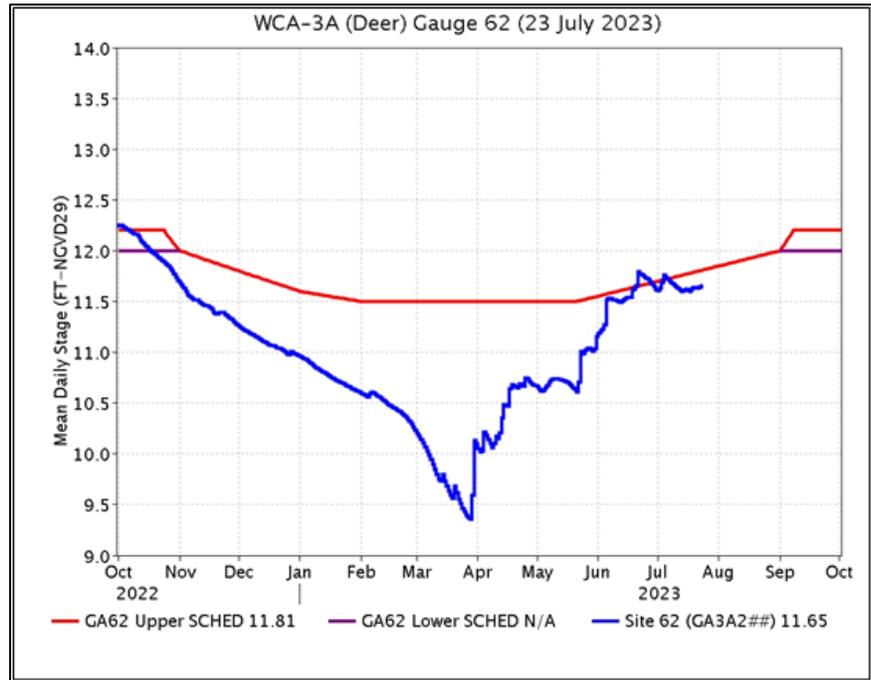


Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.

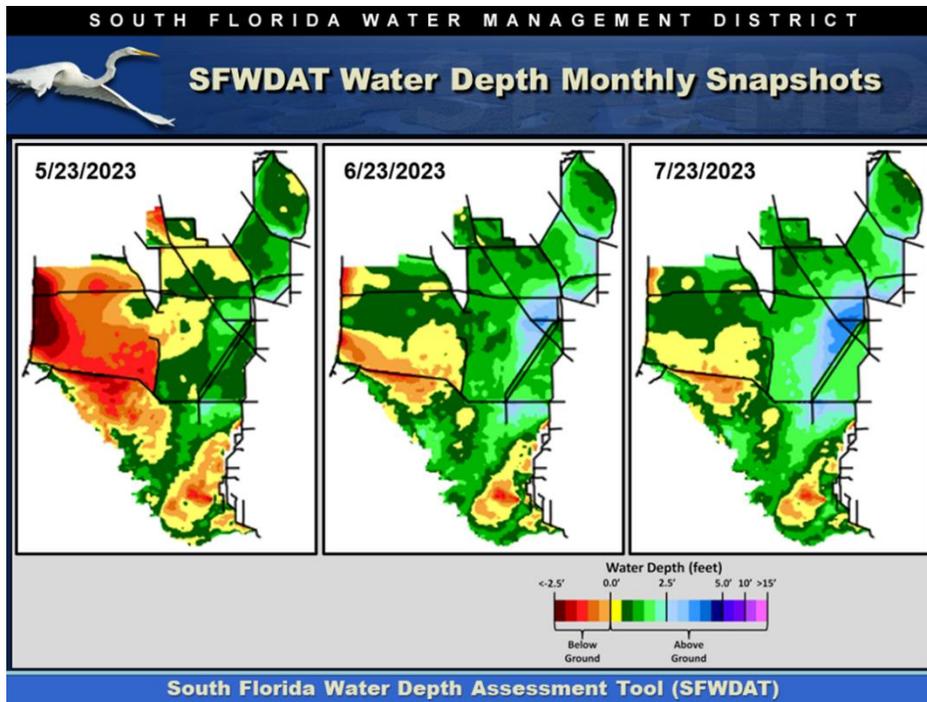


Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

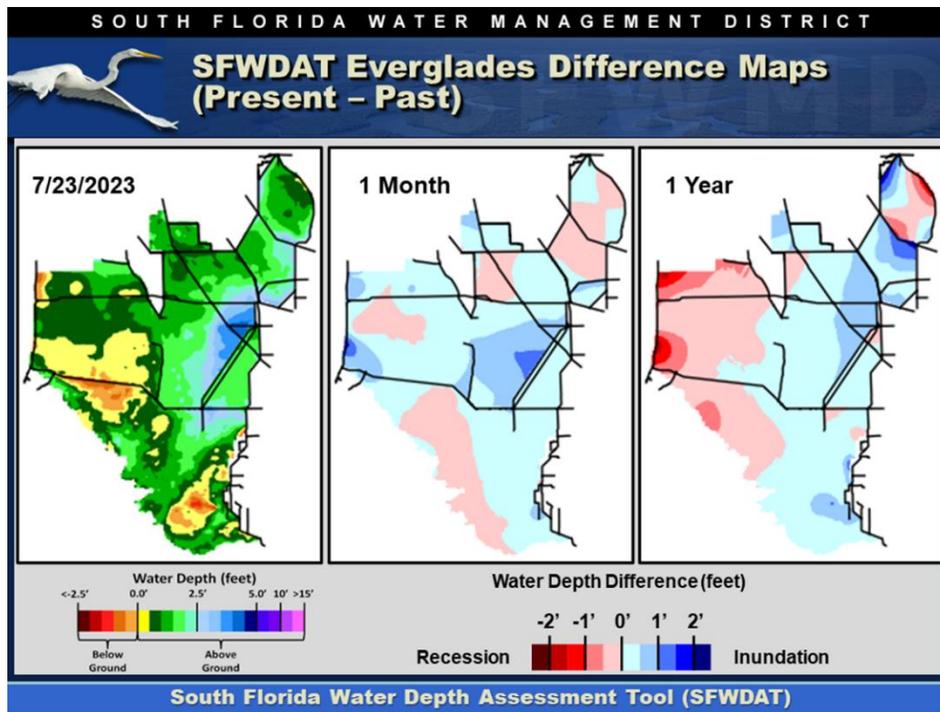


Figure EV-6. Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

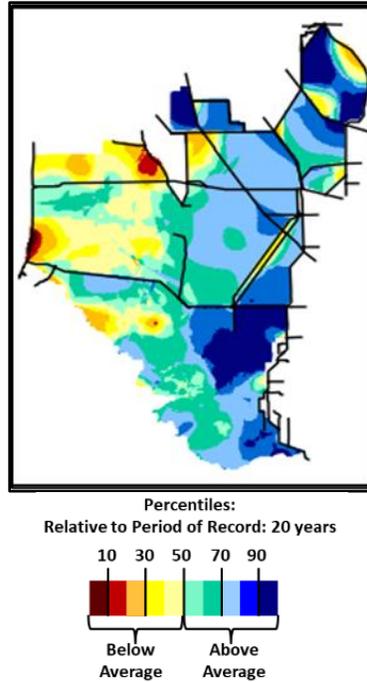


Figure EV-7. Present water depths (7/16/2023) compared to the day of year average over the previous 20 years.

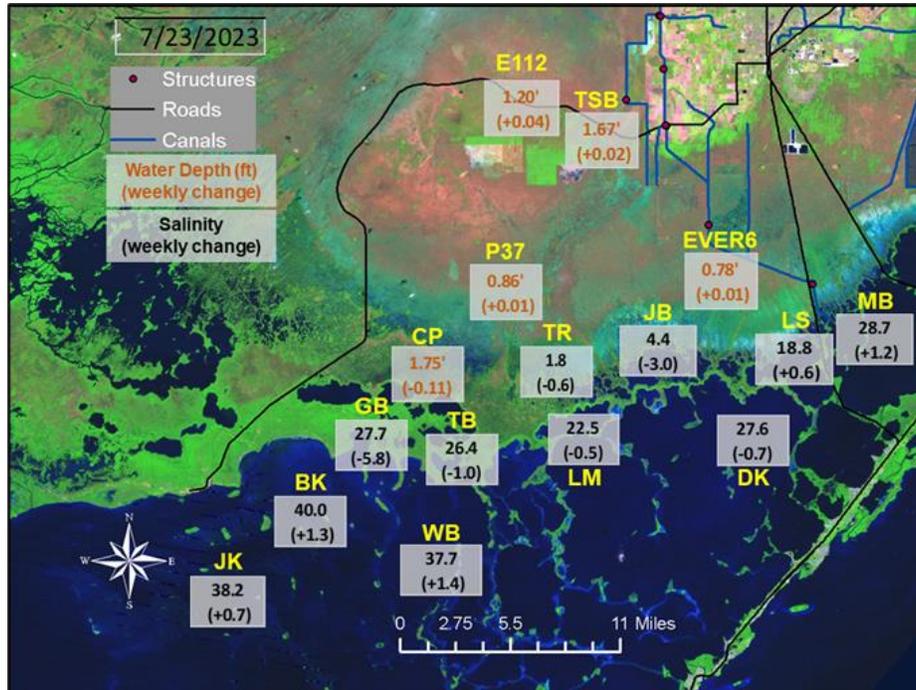


Figure EV-8. Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

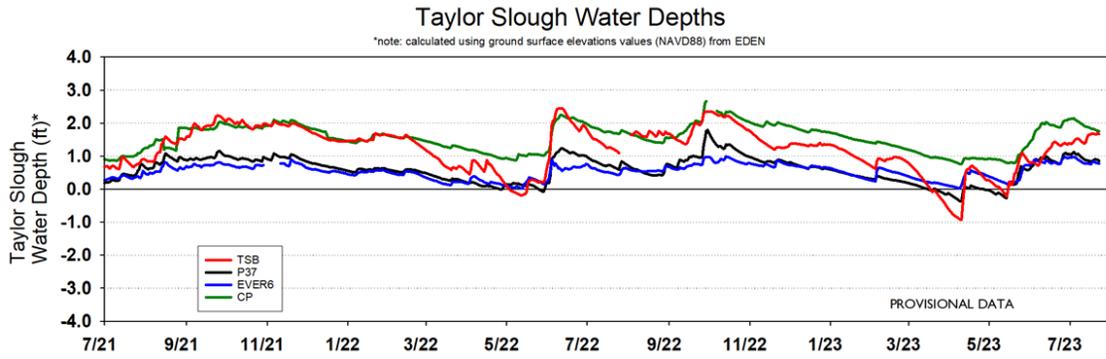


Figure EV-9. Taylor Slough water depth time series.

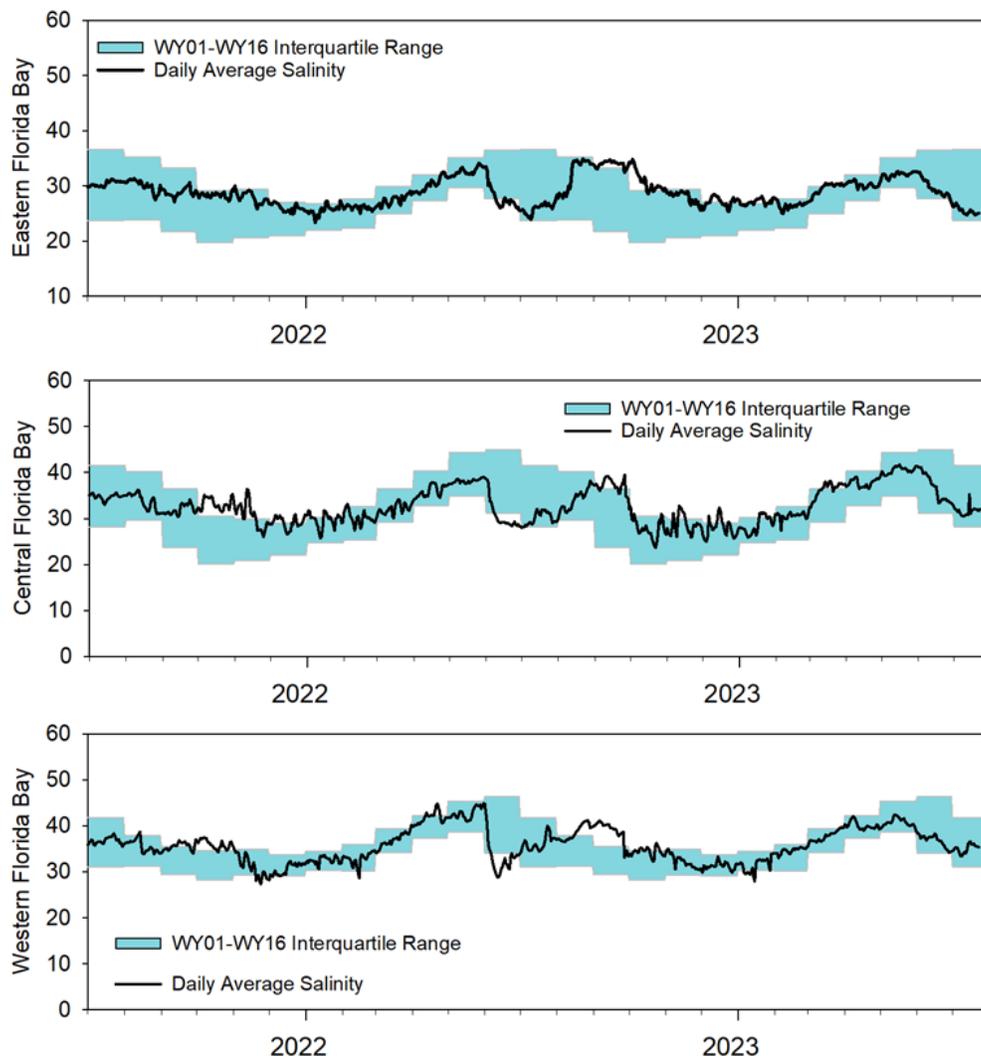


Figure EV-10. Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

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 decreased by 0.06'	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 0.03'	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 0.12'	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 0.04'	Ascension rate of less than +0.18' per week.	Protect within basin and downstream habitat and wildlife.
WCA-3A NW	Stage increased by 0.04'	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	No change		
WCA-3B	Stage increased by 0.04'	Ascension rate of less than +0.18' per week.	Protect within basin and downstream habitat and wildlife.
ENP-SRS	Stage decreased by 0.04'	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 -0.11' to +0.04'	Move water southward as possible.	When available, provide freshwater to promote water movement.
FB- Salinity	Salinity changes ranged from -5.8 to +1.4	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 1067 cfs, and the previous 30-day mean inflow was 998 cfs. The seven-day mean salinity was 25.4 at BBCW8 and 24.3 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.

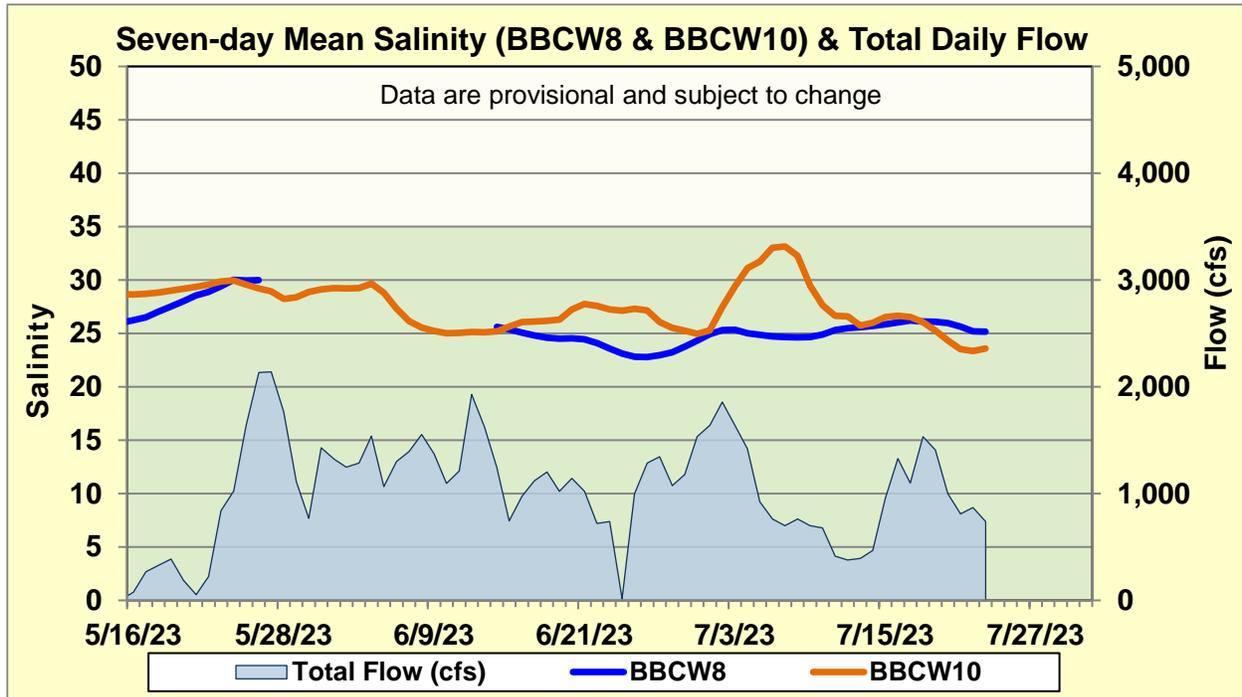


Figure BB-1. Seven-day mean salinity at BBCW8 and BBCW10 and total daily flow in Biscayne Bay. Total daily flow was calculated using flow from structures S20G, S20F, S21, S21A, S123, and S700P.