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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: September 21, 2022

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

A weak trough of low pressure and its associated zone of moisture over central Florida will slowly diffuse leaving the area on Thursday. The result will be diminishing rain chances each day. Hurricane Fiona will pull the remaining moisture from the trough, and a dry air mass over the Mid-Atlantic states will be transported southward, shutting down almost all rain chances across the SFWMD on Friday. As a cold front comes into central Florida this weekend, a narrow band of frontal rains are expected to develop over the central interior on Saturday and slide slightly southward on Sunday. Meanwhile, a large tropical cyclone is likely to take shape over the central Caribbean early next week. While it is too early to forecast the future path of this tropical cyclone, its large circulation and moisture envelope could begin overspreading south Florida on Monday. This would lead to increased precipitation chances early next week, and cause much above average rains during the week 2 period depending on the tropical cyclone's path. The progress of this tropical disturbance should be carefully monitored over the next few days. For now, below normal rainfall is expected for the 7-day period ending next Tuesday morning.

Kissimmee

Water levels in East Lake Toho (S-59), Lake Toho (S-61) and KCH (S-65) are above their respective regulation schedules because of rainfall; discharge at their outlet structures is being adjusted to bring stage in each lake back to its respective regulation schedule. S-65A discharge was increased to 4,200 cfs to control a rainfall-driven stage rise in Pool A. With S-65A discharge having increased above bankfull, water depth on the Kissimmee River floodplain rose to a mean depth of 0.50 feet on September 18, 2022. The concentration of dissolved oxygen in the Kissimmee River declined over the last week to 2.8 mg/L.

Lake Okeechobee

Lake Okeechobee stage was 12.83 feet NGVD on September 18, 2022, with water levels rising 0.28 feet over the past week, but still 0.12 feet lower than a month ago. Lake stage was in the Base Flow band and in the ecological envelope. Average daily inflows (excluding rainfall) increased, and outflows (excluding evapotranspiration) decreased from the previous week. The most recent satellite image (September 18, 2022) from NOAA's Harmful Algal Bloom Monitoring System showed that bloom potential was moderate to high in the western, northwestern, and southwestern parts of the lake. The bloom potential decreased in northwestern areas of the Lake since the previous week. Microcystins were not detected during the September 6-7 routine survey. Chlorophyll *a* exceeded 40 µg/L (Lake-wide bloom threshold) at 28% of the sites, with the highest value (58.3 µg/L) recorded at the PALMOUT location.

Estuaries

Total inflow to the St. Lucie Estuary averaged 3,362 cfs over the past week with no flow coming from Lake Okeechobee. Mean salinities decreased at all sites over the past week. Salinity in the middle estuary was within the optimal range (10-25) for adult eastern oysters.

Total inflow to the Caloosahatchee Estuary averaged 7,267 cfs over the past week with no flow coming from Lake Okeechobee. Mean surface salinities remained the same at S-79 and I-75 and decreased at the remaining sites in the estuary over the past week. Salinities were in the optimal range (0-10) for tape grass in the upper estuary. Salinities were in the optimal range (10-25) for adult eastern oysters at Shell Point, in the stressed range at Sanibel (>25) and in the damaging range at Cape Coral (<5).

Stormwater Treatment Areas

For the week ending Sunday, September 18, 2022, no Lake Okeechobee water was delivered to the FEBs/STAs. The total amount of Lake releases sent to the FEBs/STAs in WY2023 (since May 1, 2022) is approximately 12,500 ac-feet. The total amount of inflows to the STAs in WY2023 is approximately 480,000 ac-feet. Most STA cells are at or above target stage. STA-1E Western Flow-way is offline for post-construction vegetation grow in, STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown, and STA-2 Flow-way 2 is offline for construction activities. Operational restrictions are in effect in STA-1E Central and Eastern Flow-ways, STA-1W Eastern, Western, and Northern Flow-ways, and STA-2 Flow-ways 3 and 4 for vegetation management activities. This week, there is no capacity for Lake releases in the STAs.

Everglades

Rates of stage change moved into the “good” or “fair” category in all of the WCAs with increase precipitation. Dry conditions continue to dominate the northern portions of WCA-3A, but recent inflows and rainfall are recovering stages in that region. Northern WCA-2A is recovering depths responding to inflow and rainfall. Taylor slough stages rose last week and moved back above average depths for this time of the year. Salinities declined last week but remain above the inter quartile range in all regions of Florida Bay. Wide swings in salinity levels can be stressful to benthic vegetation. A persistent algal bloom is present in the western bay (versus the eastern bay).

Biscayne Bay

Total inflow to Biscayne Bay averaged 732 cfs and the previous 30-day mean inflow averaged 417 cfs. The seven-day mean salinity was 31.6 at BBCW8 and 32.3 at BBCW10, both below the preferred maximum salinity of 35. Salinity data provided as a courtesy by Biscayne National Park.

Supporting Information

Kissimmee Basin

Upper Kissimmee

On September 18, 2022, lake stages were 57.1 feet NGVD (0.3 feet above schedule) in East Lake Toho, 54.3 feet NGVD (0.5 feet above schedule) in Lake Toho, and 52.3 feet NGVD (1.0 feet above schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1, Figures KB-1-3**).

Lower Kissimmee

Discharge at S-65 resumed on September 12, 2022, after having been at 0 cfs for 81 days. On September 18, 2022, discharge was increased to 2,900 cfs at S-65 and to 4,200 cfs at S-65A to manage rainfall-driven rising water levels in KCH and Pool A, respectively. Discharges from the Kissimmee River were 1,100 cfs at S-65D and 1,100 cfs at S-65E (**Table KB-2**). Headwater stages were 47.4 feet NGVD at S-65A and 26.6 feet NGVD at S-65D on September 18, 2022. In the Kissimmee River, mean river channel stage increased by more than 6.0 ft in the last week as S-65A discharge and local runoff increased (**Figure KB-4**). With S-65A discharge having increased above bankfull, water depth on the Kissimmee River floodplain rose to a mean depth of 0.50 feet on September 18, 2022 (**Figure KB-5**). The concentration of dissolved oxygen in the Kissimmee River decreased to 2.8 mg/L over the last week (**Table KB-2, Figure KB-6**).

Water Management Recommendations

Adjust S-65 discharge to maintain a minimum flow of at least 300 cfs at S-65A to the Kissimmee River. Note general guidance for discharge and maximum rates of change in discharge (**Figure KB-7**).

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

Water Body	Structure	Stage Monitoring Site	7-Day Average Discharge (cfs)	Lake Stage (feet NGVD) ^a	Schedule Type ^b	Schedule Stage (feet NGVD)	Departure from Regulation (feet)	
							9/18/22	9/11/22
Lakes Hart and Mary Jane	S-62	LKMJ	280	60.0	R	60.0	0.0	0.1
Lakes Myrtle, Preston and Joel	S-57	S-57	83	61.1	R	61.0	0.1	0.0
Alligator Chain	S-60	ALLI	170	63.3	R	63.2	0.1	0.2
Lake Gentry	S-63	LKGT	280	61.0	R	61.0	0.0	0.1
East Lake Toho	S-59	TOHOE	710	57.1	R	56.8	0.3	0.4
Lake Toho	S-61	TOHOW S-61	1100	54.3	R	53.8	0.5	0.4
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	1300	52.3	R	51.3	1.0	0.2

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

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

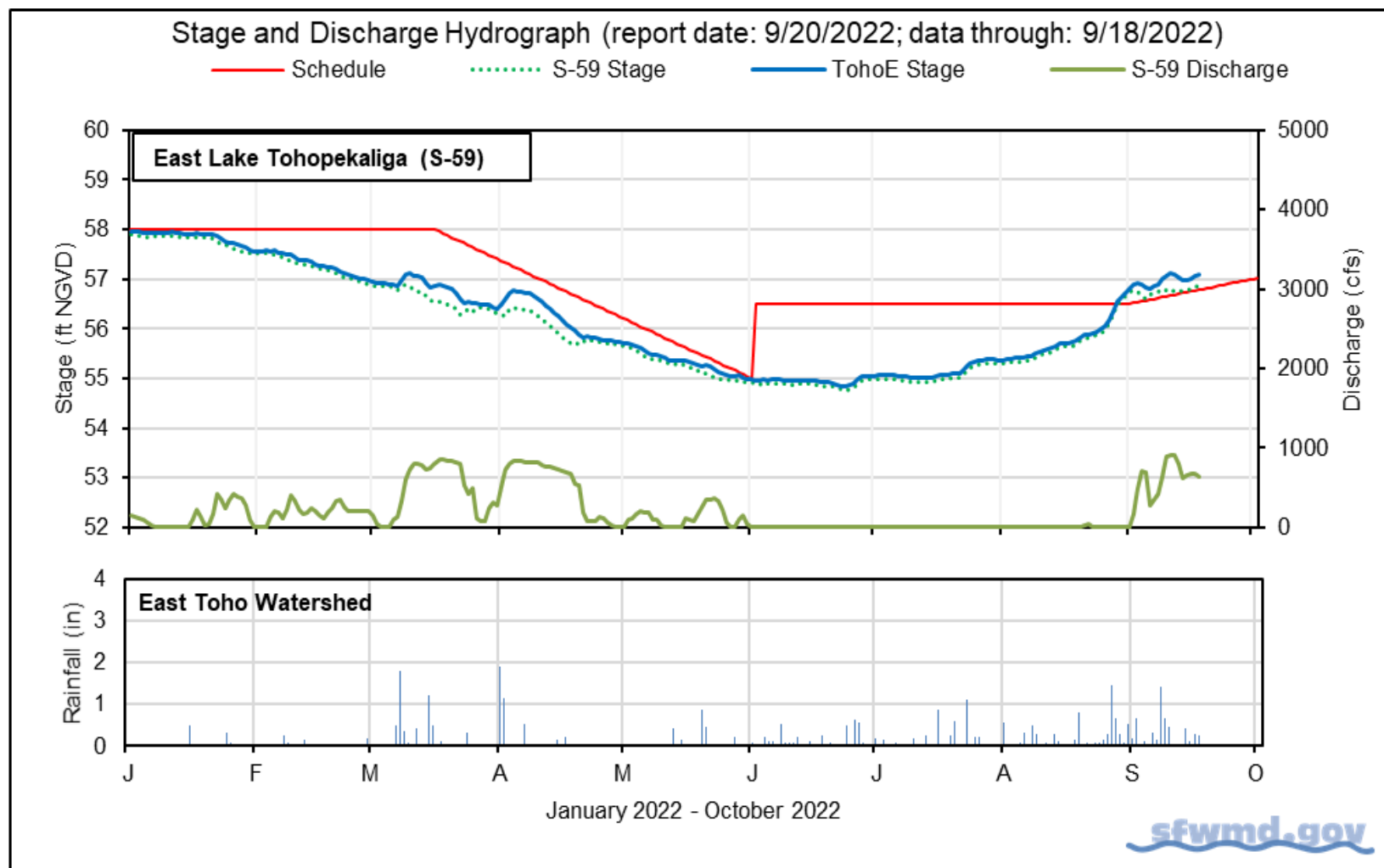


Figure KB-1. East Lake Toho regulation schedule, stage, discharge and rainfall.

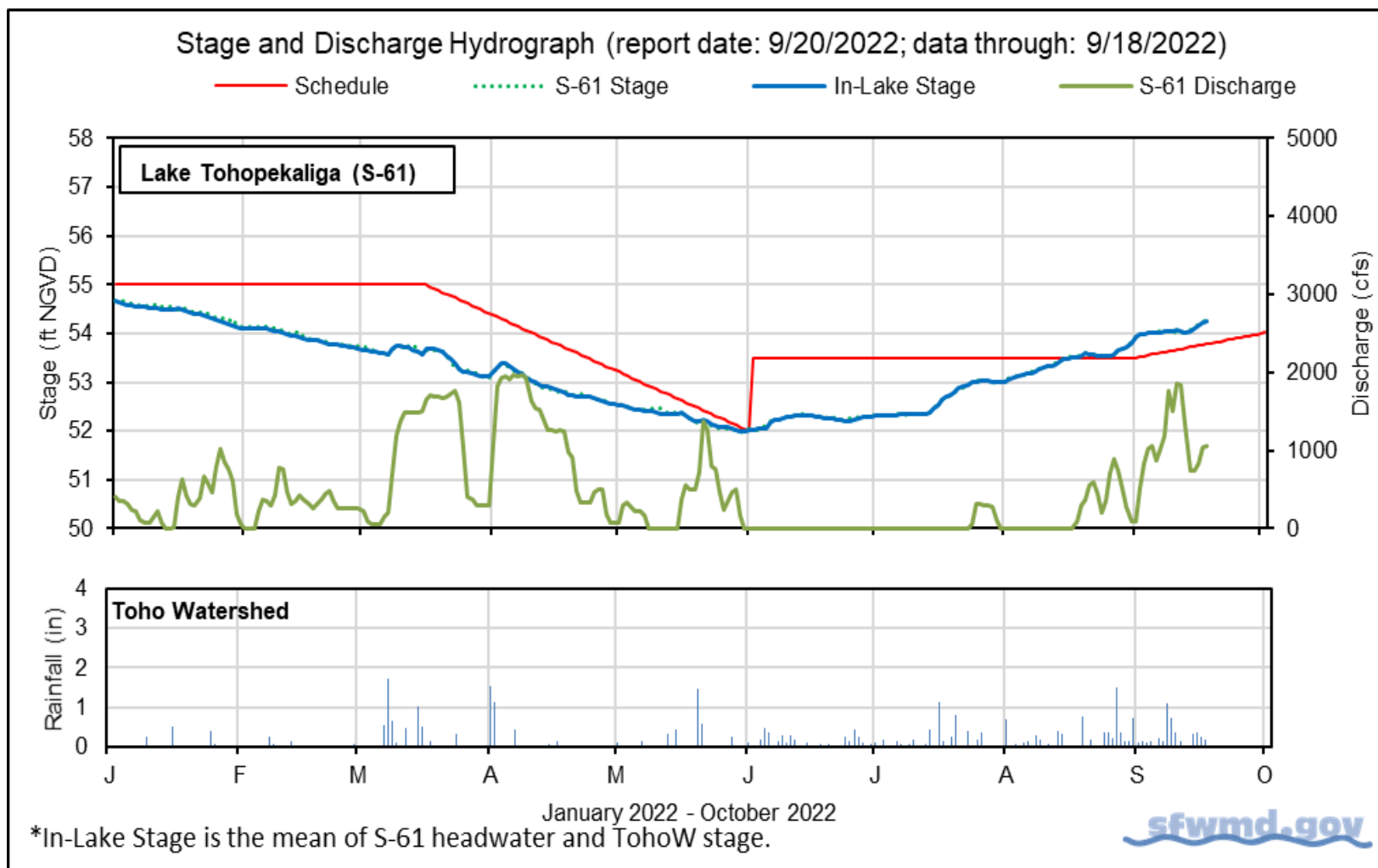


Figure KB-2. Lake Toho regulation schedule, stage, discharge and rainfall.

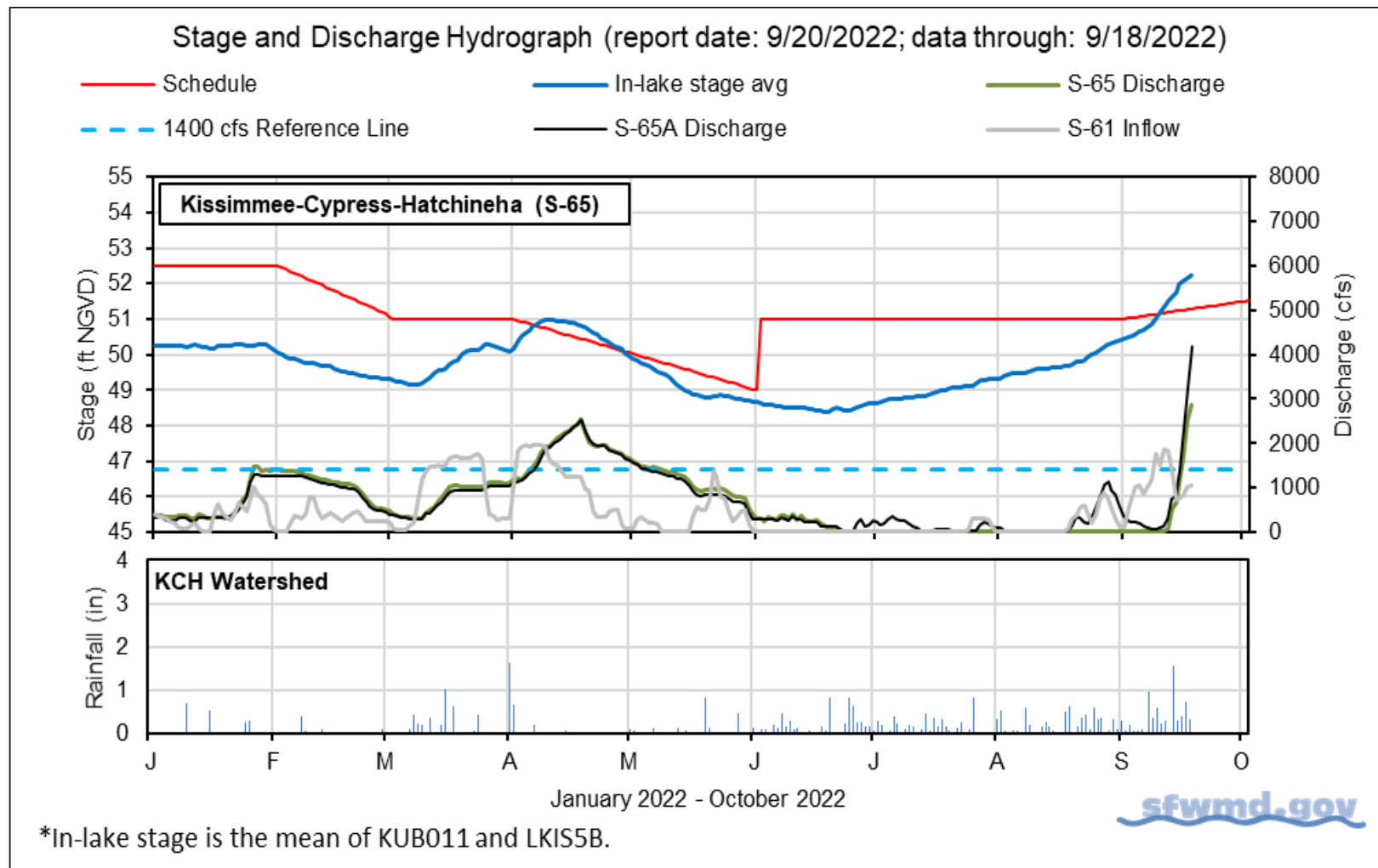


Figure KB-3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

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

Metric	Location	Daily Average	Average for Previous Seven Day Periods			
		9/18/22	9/18/22	9/11/22	9/4/22	8/28/22
Discharge	S-65	2,900	1,300	0	0	0
Discharge	S-65A ^a	4,200	1,900	110	490	630
Headwater Stage (feet NGVD)	S-65A	47.4	46.8	46.3	46.5	47.0
Discharge	S-65D ^b	1,100	710	240	800	400
Headwater Stage (feet NGVD)	S-65D ^c	26.6	26.3	26.2	26.3	26.2
Discharge (cfs)	S-65E ^d	1,100	670	230	740	380
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) ^e	Phase I, II/III river channel	2.8	3.2	3.3	2.0	3.3
Mean depth (feet) ^f	Phase I floodplain	0.50	0.31	0.14	0.15	0.09

a. Combined discharge from main and auxiliary structures.

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

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

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

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

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

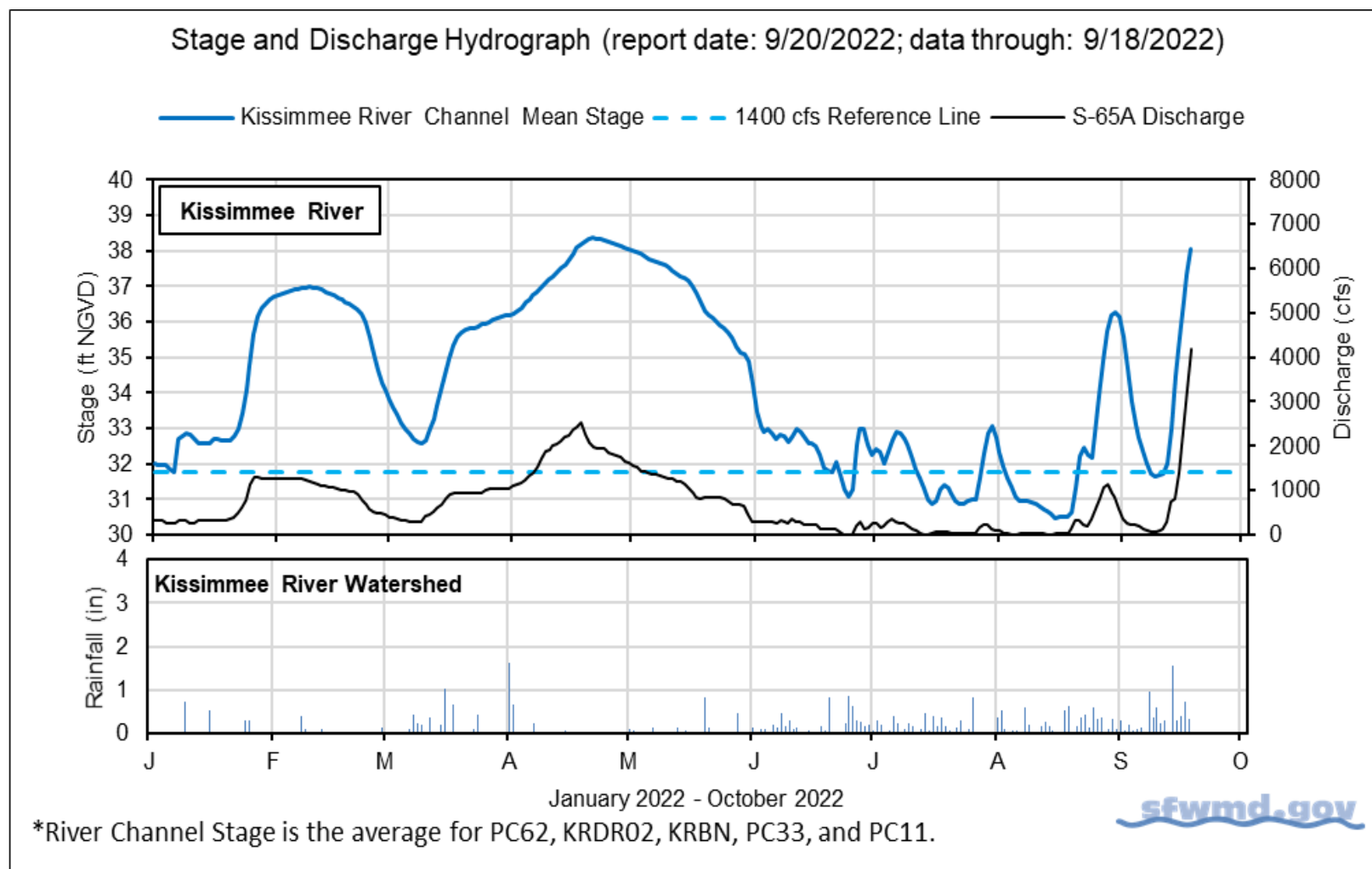


Figure KB-4. Kissimmee River stage, discharge and rainfall.

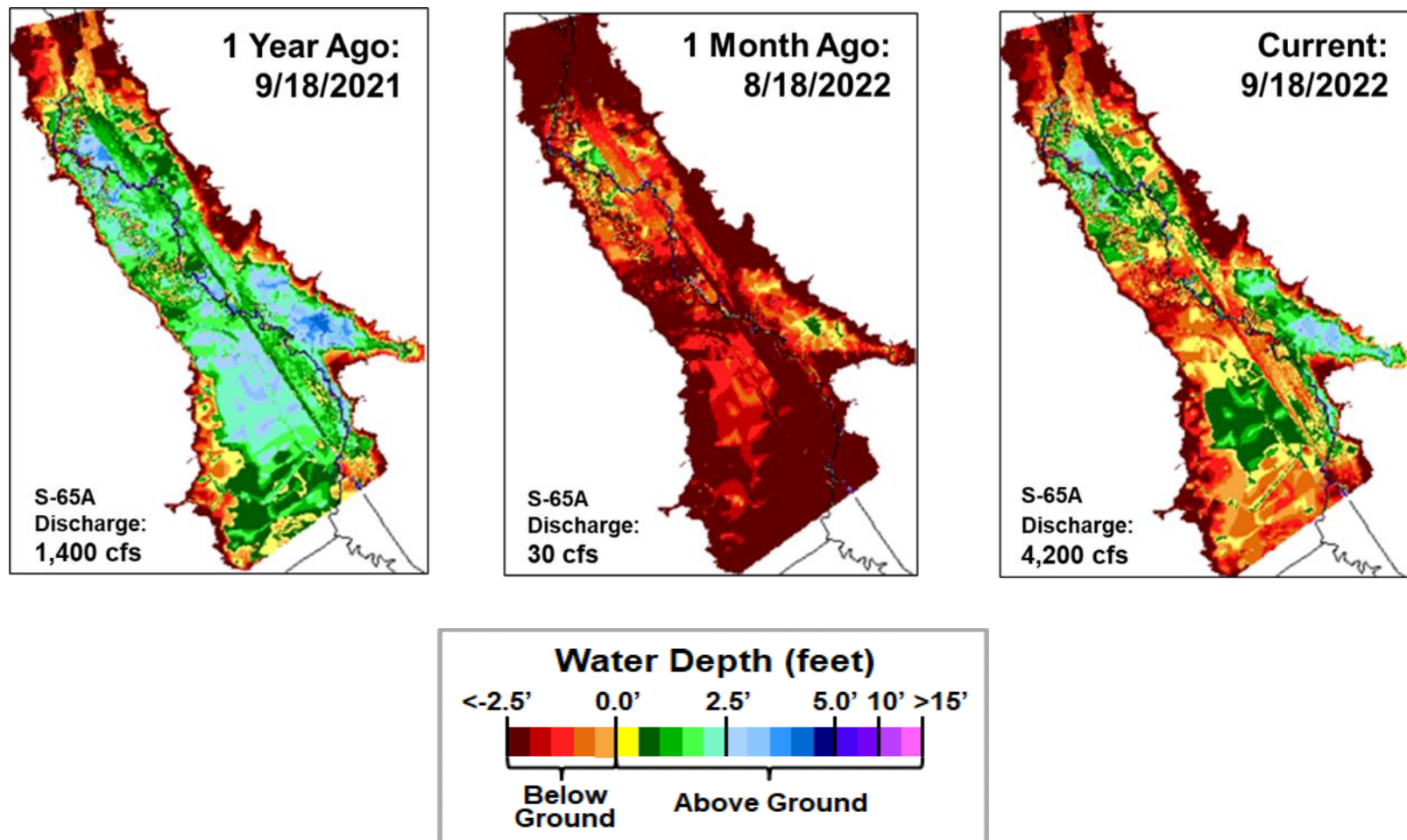
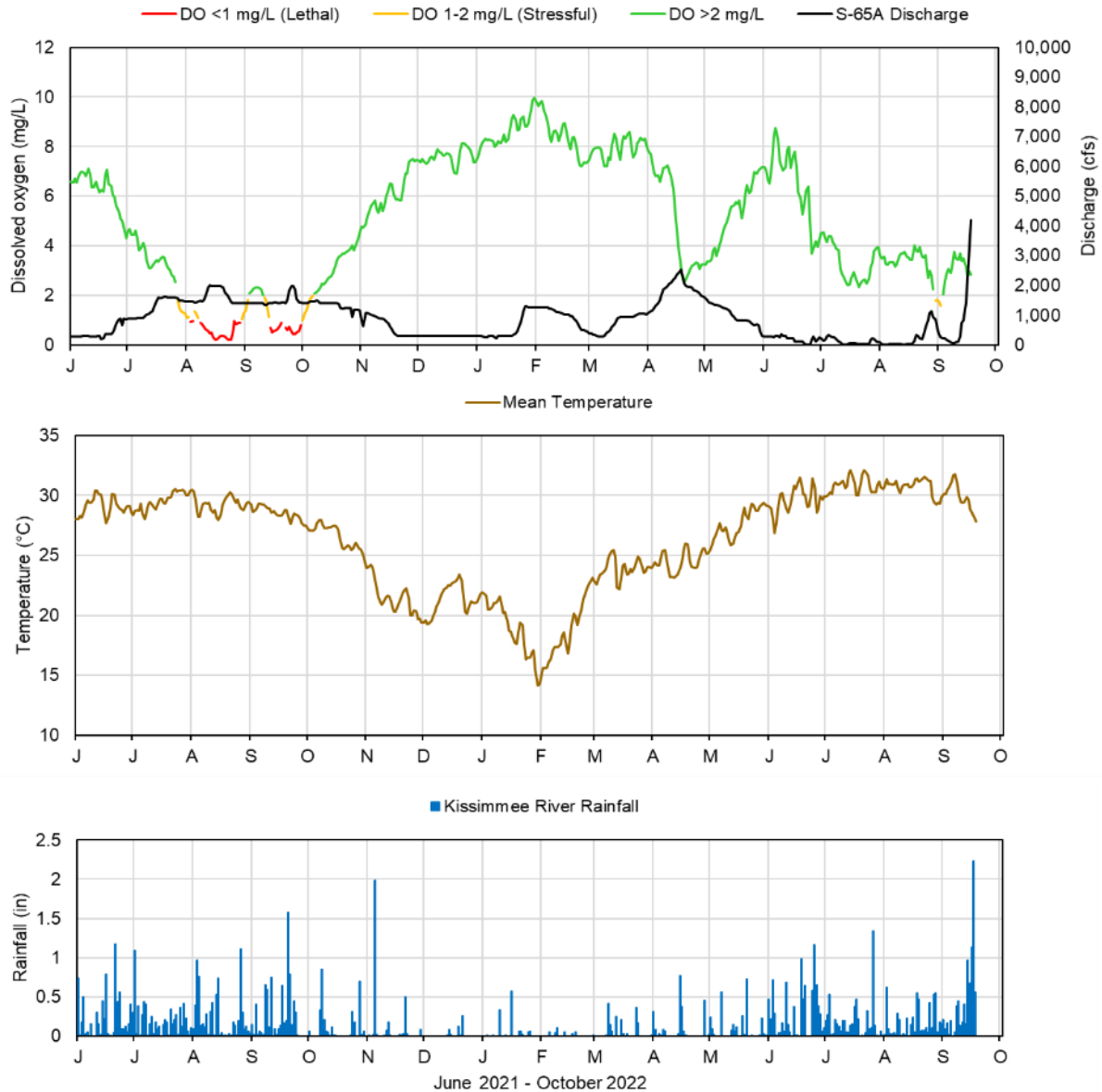


Figure KB-5. Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.



Report Date: 9/20/2022; data are through: 9/18/2022

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

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Stage and Discharge Guidance for 2021-2022.

Zone	KCH Stage (ft NGVD)	S-65/S-65A Discharge*
A	Above regulation schedule line.	Flood control releases as needed with no limits on the rate of discharge change.
B1	In flood control buffer zone (0.5 ft below the schedule line).	Adjust S-65 discharge so that S-65A discharge is between 1400 cfs at the buffer zone line and 3000 cfs at the schedule line.
B2	Between the Flood Control Buffer and the 50.0 ft line.	Adjust S-65 discharge to maintain at least 1400 cfs at S-65A. Use ± 0.2 ft buffer (gray band) above and below the 50.0 ft line to decide when to begin ramping up to 1400 cfs or down to 300 cfs; do not continue reducing discharge if stage rises back to or above the threshold stage line.
B3	Between the 50.0 ft line and 49 ft.	Adjust S-65 discharge to maintain at least 300 cfs at S-65A.
B4	Between 48.5 ft to 49 ft.	Adjust S-65 discharge to maintain S-65A discharge between 0 cfs at 48.5 ft and 300 cfs at 49 ft.
C	Below 48.5 ft.	0 cfs.

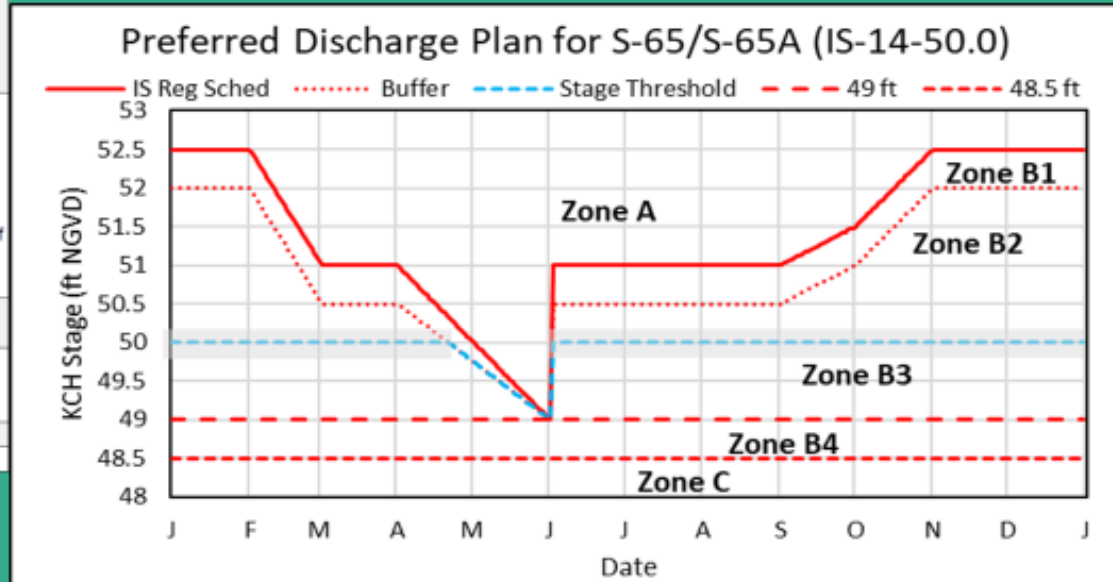
*Changes in discharge should not exceed limits in inset table below.

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

Q (cfs)	Maximum rate of INCREASE (cfs/day)	Maximum rate of DECREASE (cfs/day)
0-300	100	-50
301-650	150	-75
651-1400	300	-150
1401-3000	600	-600
>3000	1000	-2000

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2021-2022 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

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

Lake Okeechobee

Lake Okeechobee stage was 12.83 feet NGVD on September 18, 2022, with water levels rising 0.28 feet over the past week, but still 0.12 feet lower than a month ago (**Figure LO-1**). Lake stage was in the Base Flow band (**Figure LO-2**) and within the ecological envelope where it has been for about 90% of 2022 (**Figure LO-3**). According to NEXRAD, 2.95 inches of rain fell directly on the Lake last week.

Average daily inflows (excluding rainfall) increased significantly from the previous week, going from 701 cfs to 2,905 cfs, peaking at over 6,000 cfs by Sunday, September 18. Average daily outflows (excluding evapotranspiration) decreased, going from 365 cfs to 0 cfs. The highest inflow came from the Indian Prairie Canals (1,389 cfs combined average canal inflows). Back flow was recorded from the L-8 Canal via the S-271 structure at an average daily rate of 71 cfs. There was no outflow to the east via the S-308 structure, to the west via the S-77 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 most recent satellite image (September 18, 2022) from NOAA's Harmful Algal Bloom Monitoring System showed that bloom potential remains moderate to high in the western, northwestern, and southwestern nearshore areas of the lake. However, the overall bloom potential decreased in the northwestern region since last week (**Figure LO-6**).

The September 6-7 routine survey found no microcystins at any of the Lake stations. Chlorophyll *a* exceeded 40 µg/L (Lake-wide bloom threshold) at 28% of the sites, with the highest value (58.3 µg/L) recorded at the PALMOUT location (**Figure LO-7**).

Changes in Water Depth

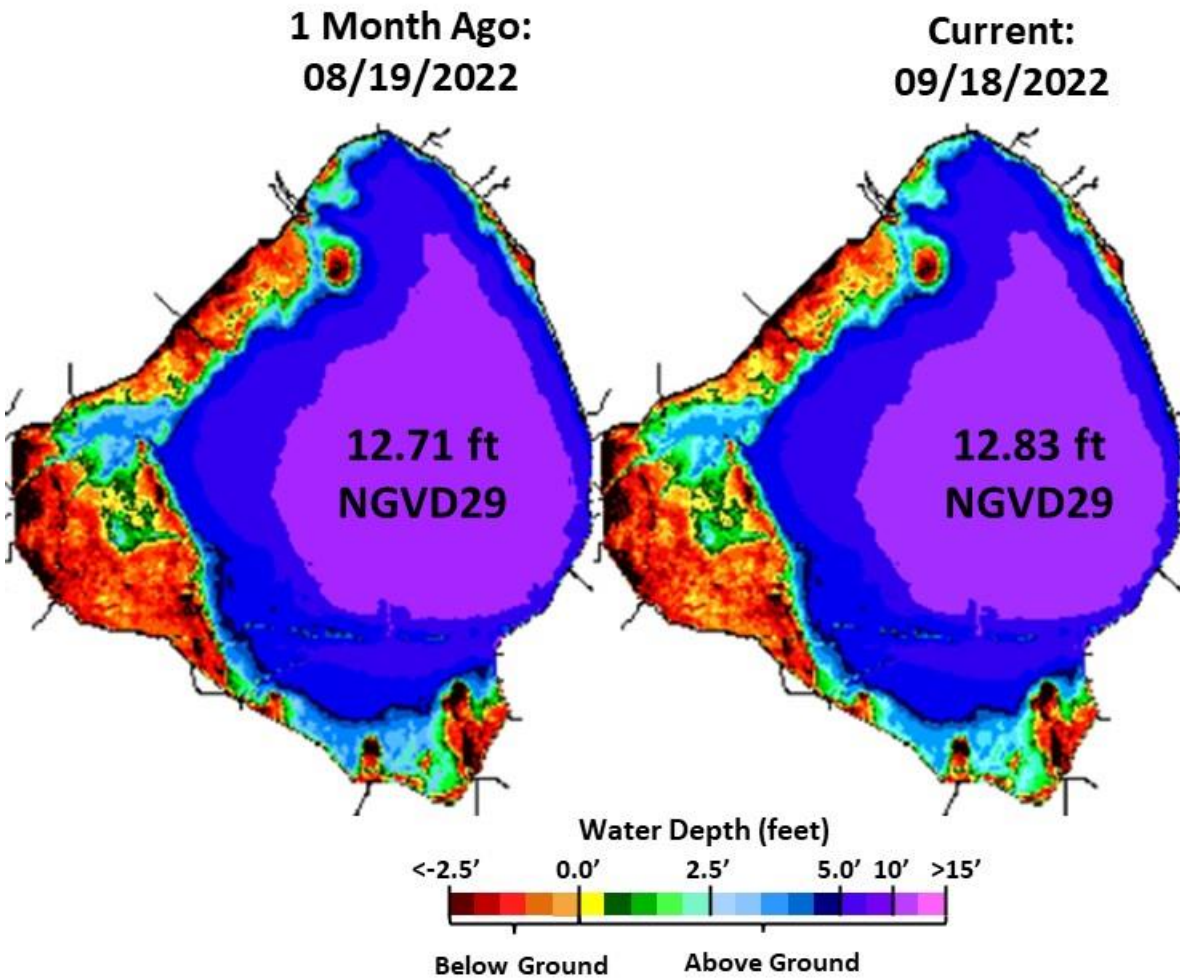
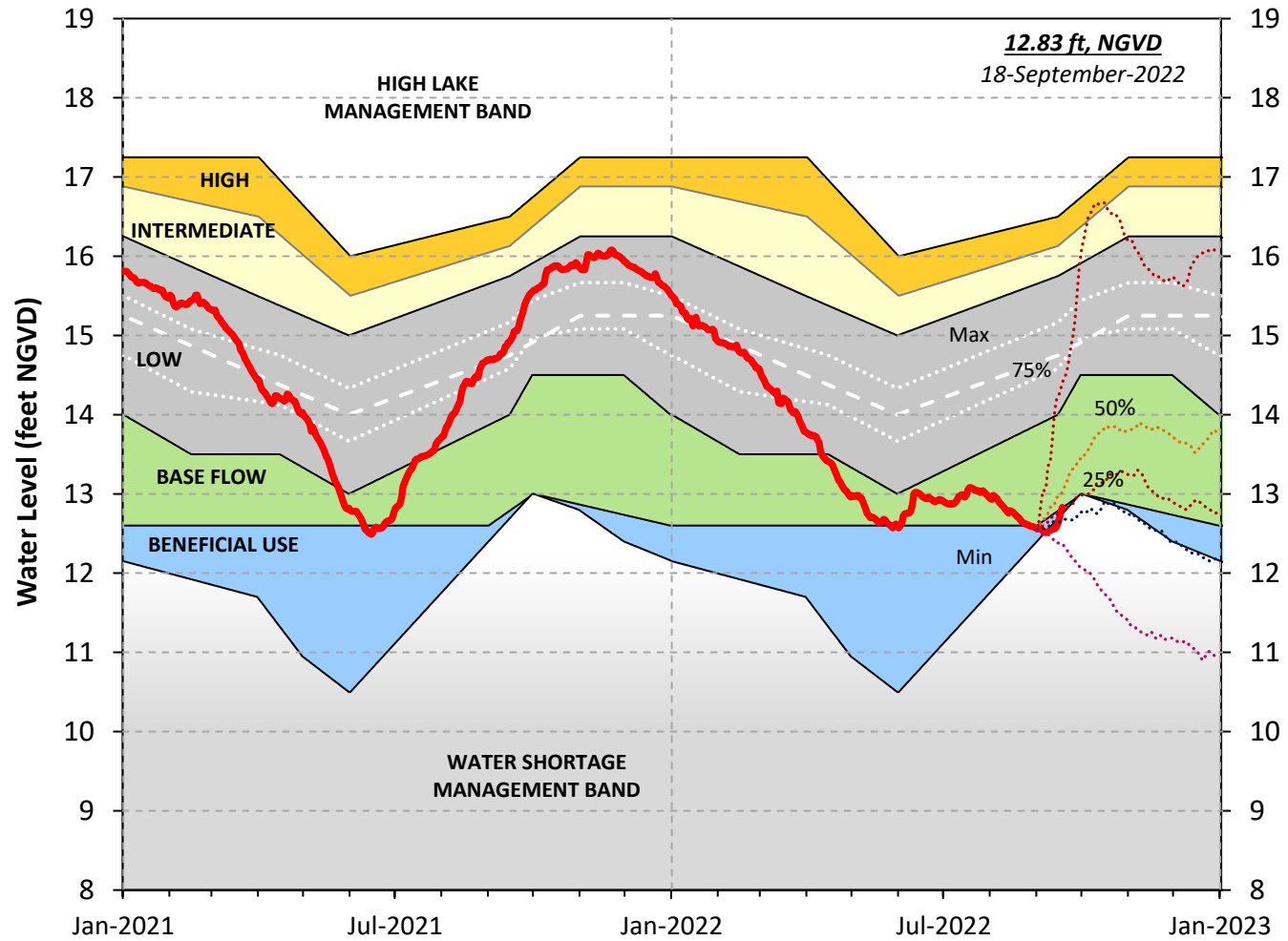


Figure LO-1. Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

Lake Okeechobee Water Level History and Projected Stages



LORS-2008 - Adopted by USACE 28-

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

Lake Okeechobee Stage vs Ecological Envelope

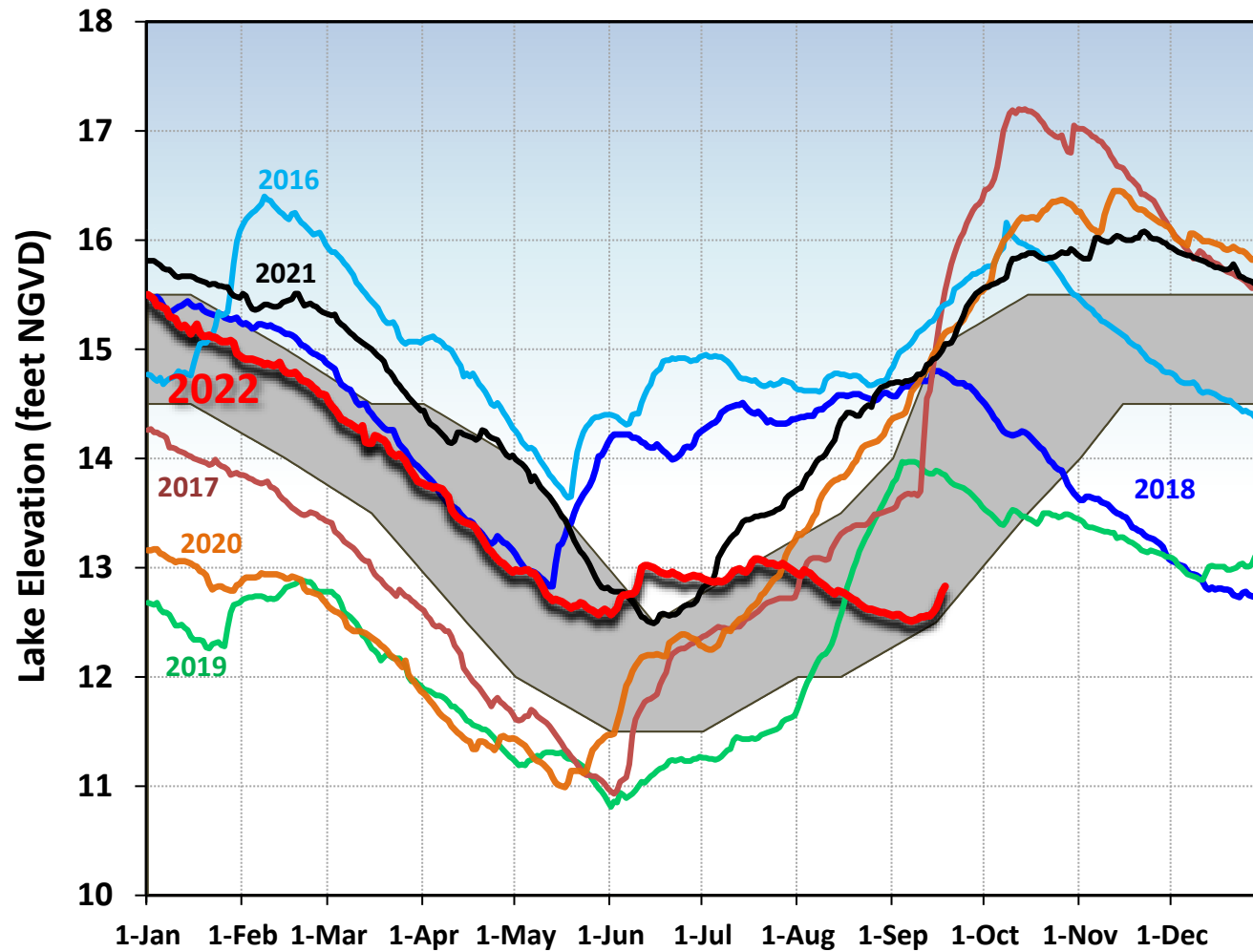


Figure LO-3. The prior six years of annual stage hydrographs for Lake Okeechobee in comparison to the ecological envelope.

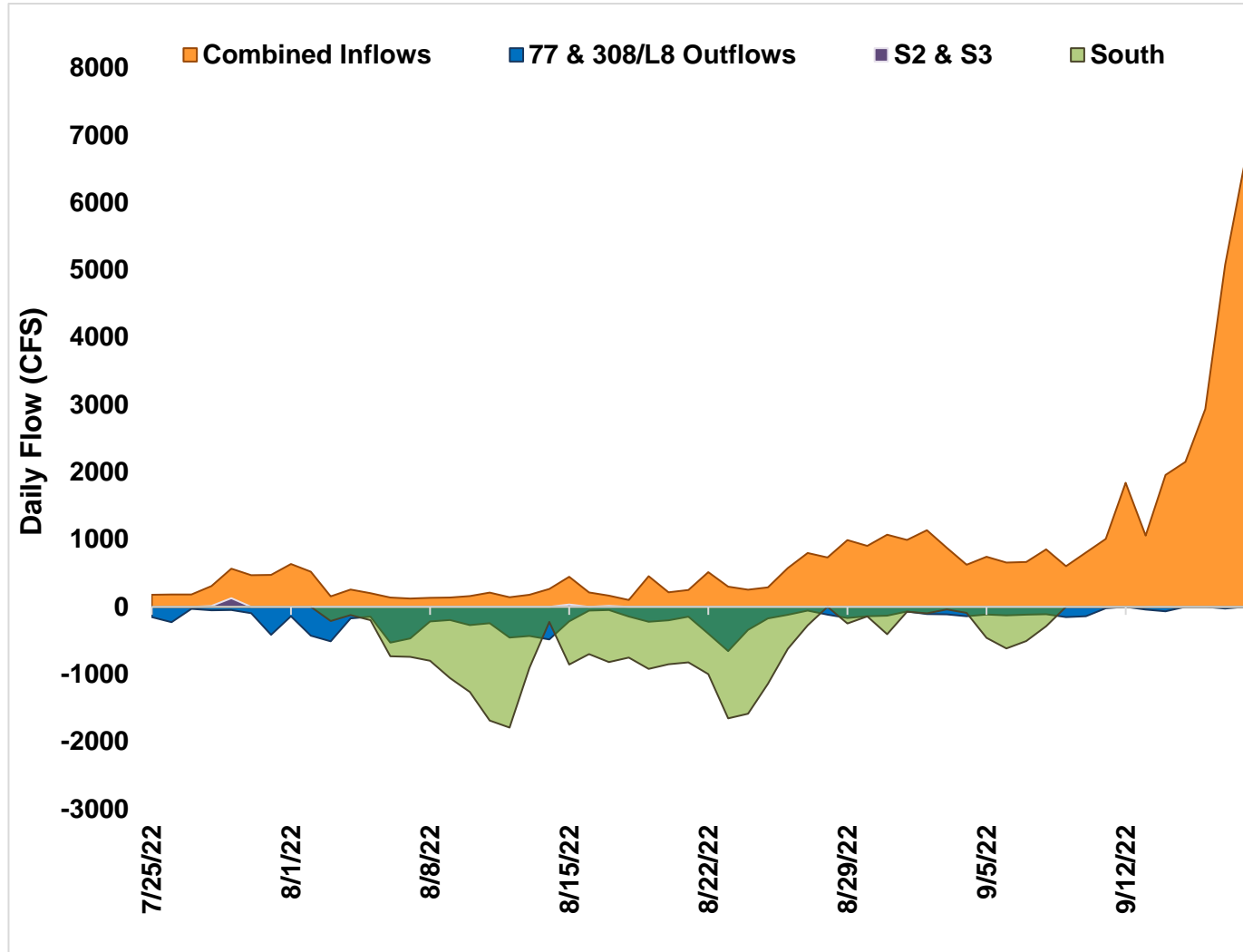


Figure LO-4. Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows from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



Figure LO-5. Inflows into Lake Okeechobee from Indian Prairie basins, Taylor Creek/Nubbin Slough, Kissimmee River and Fisheating Creek, and outflows to the west via S-77, to the east via S-308, to the south via S-351, S-352, S-354, and to southeast via S-271 (formerly Culvert 10A) for the week of September 12-18, 2022.

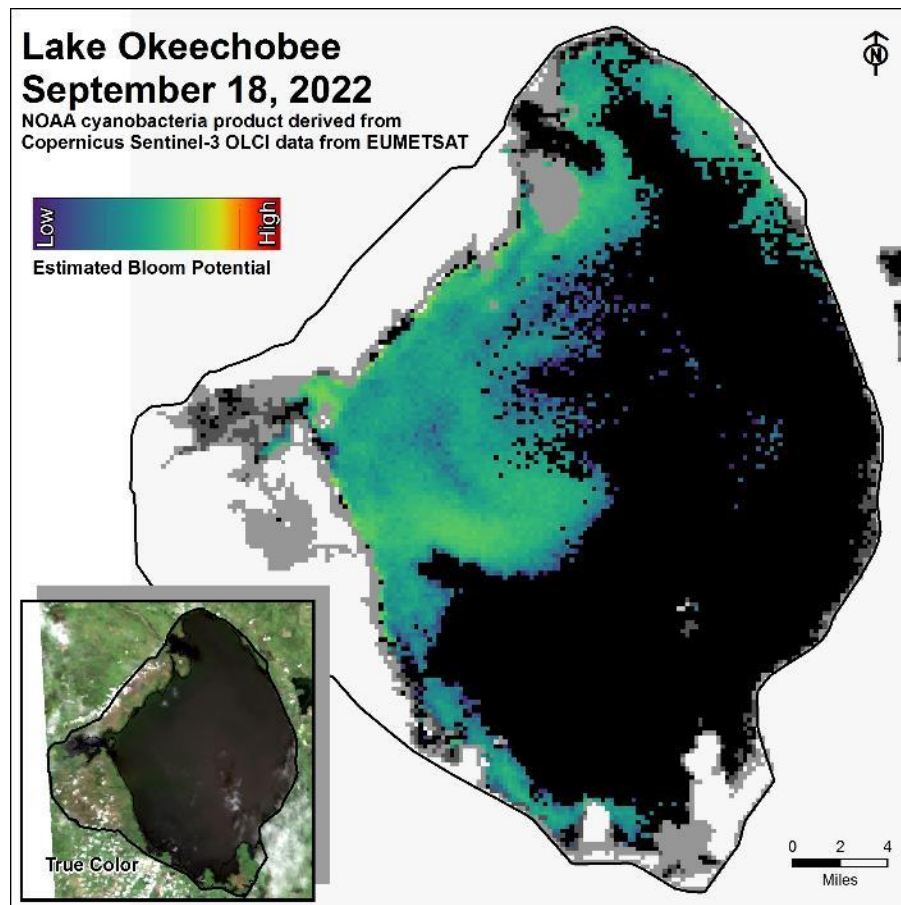


Figure LO-6. Cyanobacteria bloom potential on September 18, 2022 based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

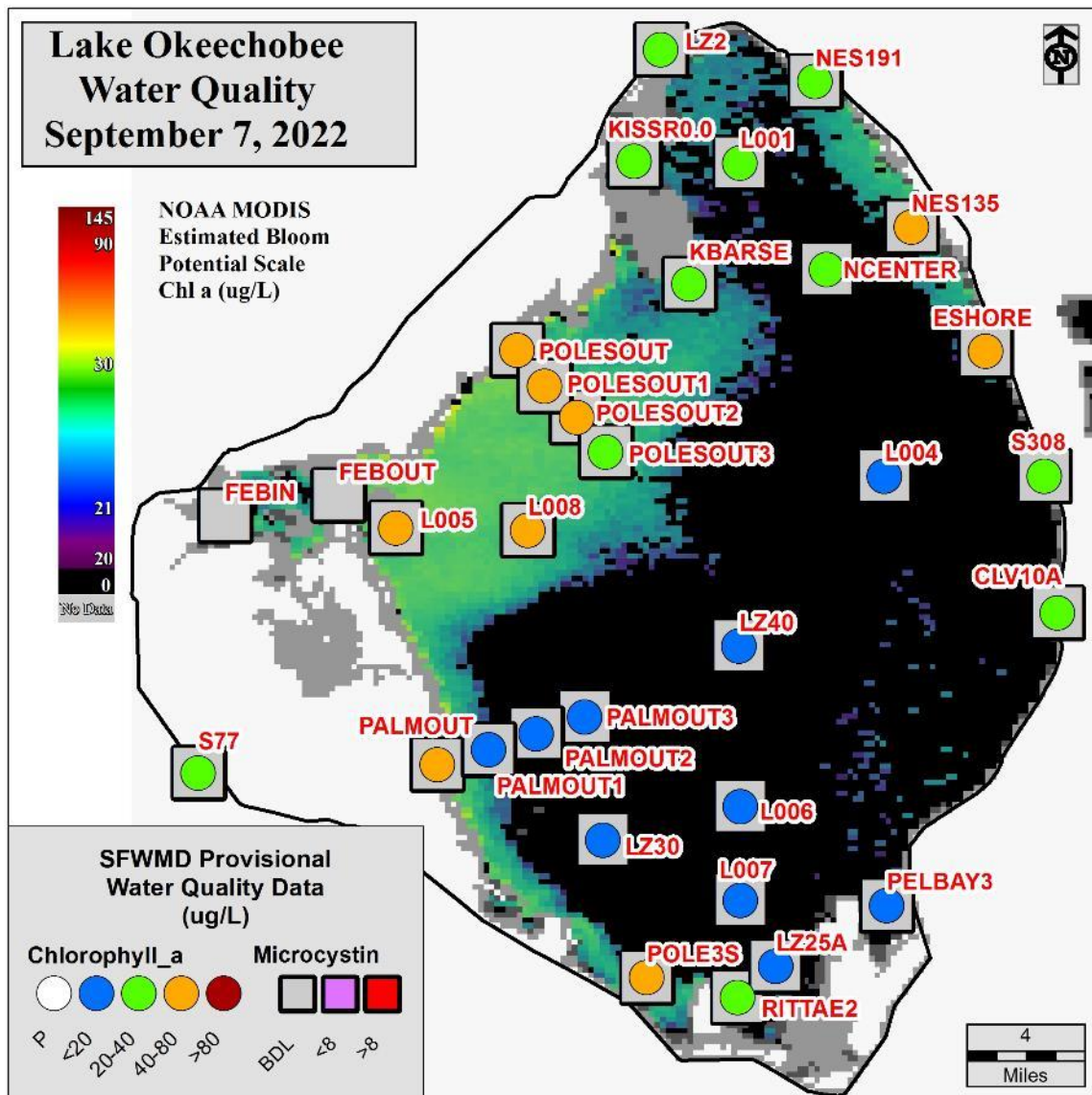


Figure LO-7. Expanded monitoring network and provisional chlorophyll *a* ($\mu\text{g/L}$) and total microcystins ($\mu\text{g/L}$) concentrations results from samples collected September 6-7, 2022.

Estuaries

St. Lucie Estuary

Over the past week, mean total inflow to the St. Lucie Estuary was 3,362 cfs (**Figures ES-1 and ES-2**) and the previous 30-day mean inflow was 1,125 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 in 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 17.6. 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 was 1.5 spat/shell in August (**Figure ES-5**).

Caloosahatchee River Estuary

Over the past week, mean total inflow to the Caloosahatchee River Estuary was 7,267 cfs (**Figures ES-6 and ES-7**) and the previous 30-day mean inflow was 4,140 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 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, in the stressed range at Sanibel, and in the damaging range at Cape Coral (**Figure ES-10**). The mean larval oyster recruitment rate reported by the Fish and Wildlife Research Institute was 6.8 spat/shell at Iona Cove and 24.9 spat/shell at Bird Island in August (**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 1131 cfs. Model results from all scenarios predict daily salinity to be 0.3 or lower and the 30-day moving average surface salinity to be 0.3 or lower at Val I-75 at the end of the two-week period (**Table ES-3 and Figure ES-13**). This keeps predicted salinities in the upper estuary within the optimal salinity range (0-10) for tape grass.

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

Red Tide

The Florida Fish and Wildlife Research Institute reported on September 16, 2022, that *Karenia brevis*, the Florida red tide dinoflagellate, was not observed at bloom concentrations in any samples collected within the District region. On the east coast, red tide was not observed in any samples from Palm Beach County.

Water Management Recommendations

Lake stage is in the Beneficial Sub-Band. Tributary conditions are wet. The LORS2008 release guidance suggests no lake releases to the Caloosahatchee River Estuary or the St. Lucie Estuary to manage Lake stages.

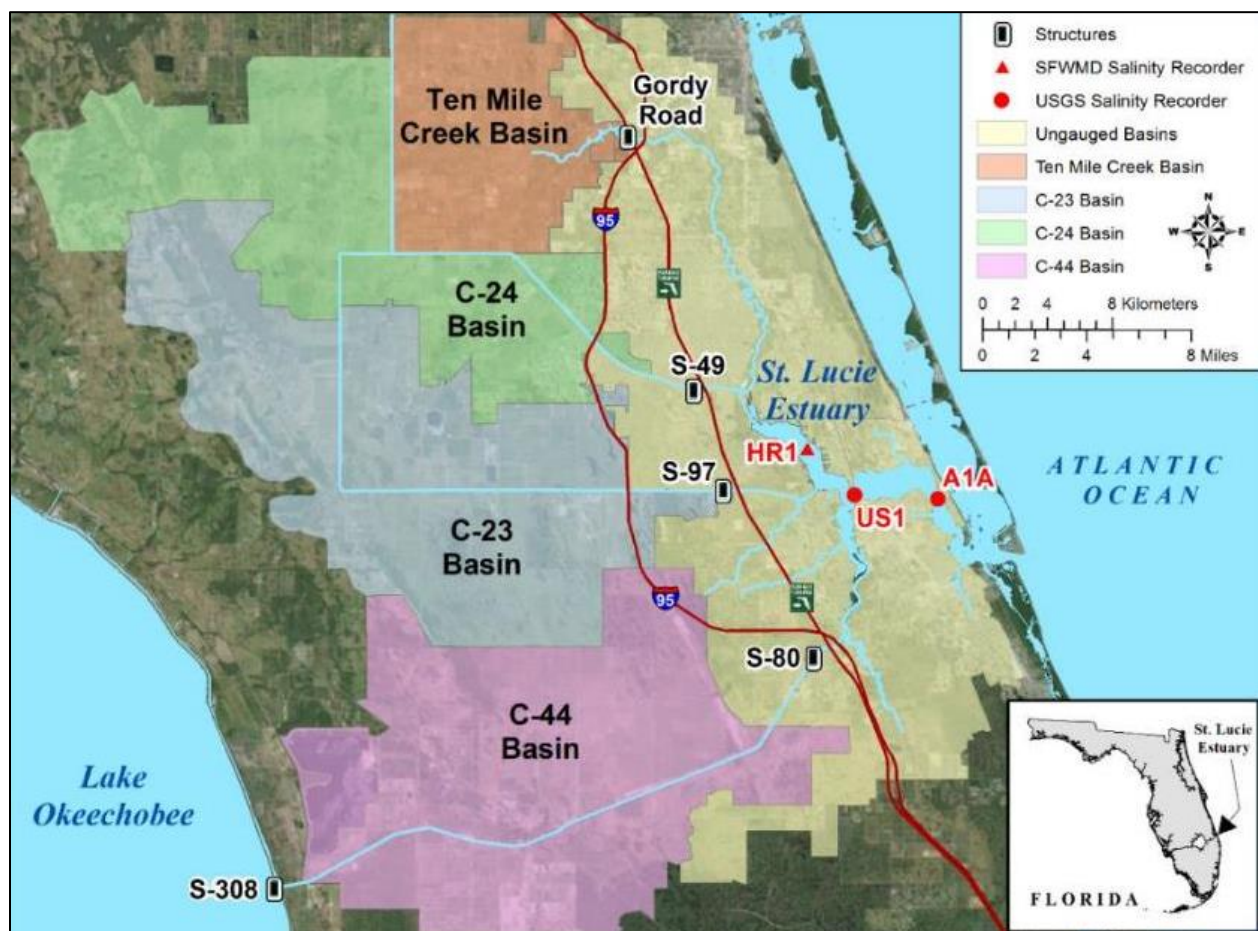


Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

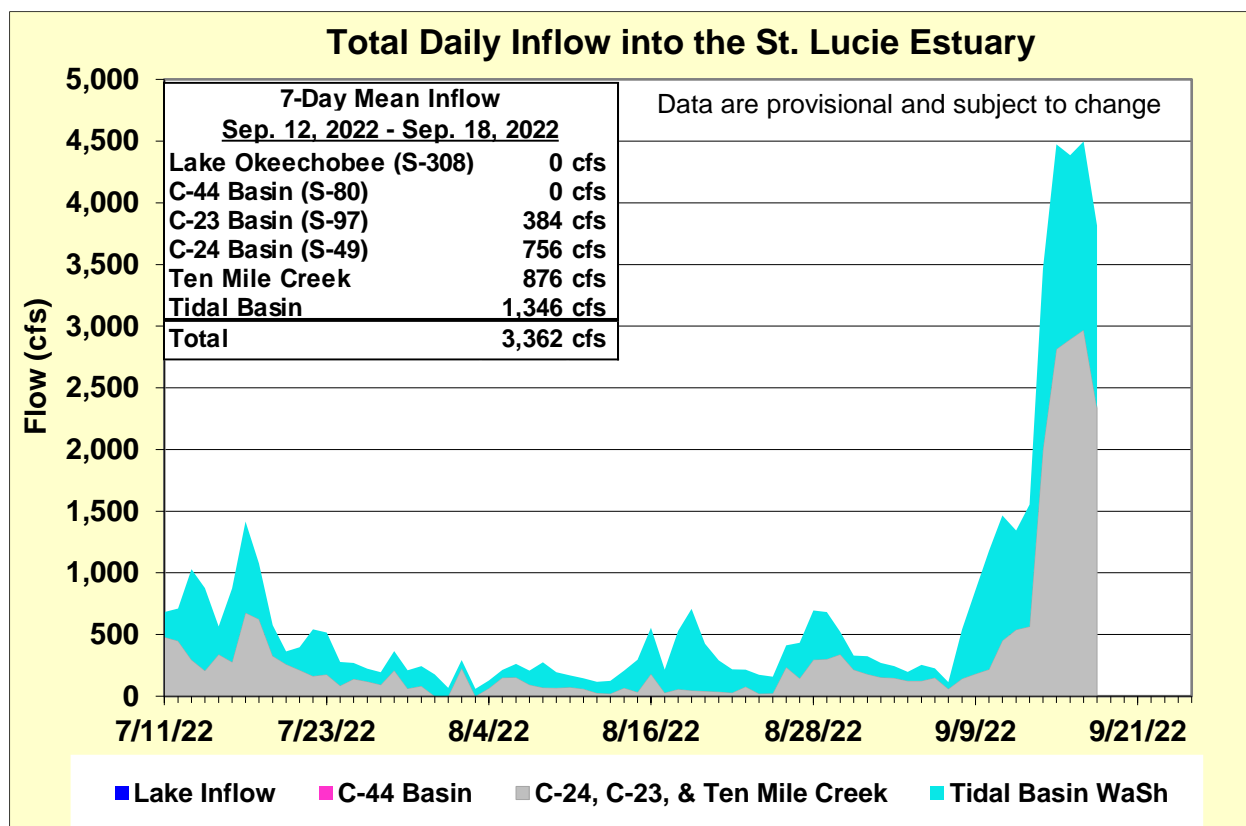


Figure ES-2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

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)	9.1 (15.8)	15.2 (19.9)	10.0 – 25.0
US1 Bridge	16.6 (22.1)	18.7 (22.9)	10.0 – 25.0
A1A Bridge	24.3 (29.0)	27.0 (30.1)	10.0 – 25.0

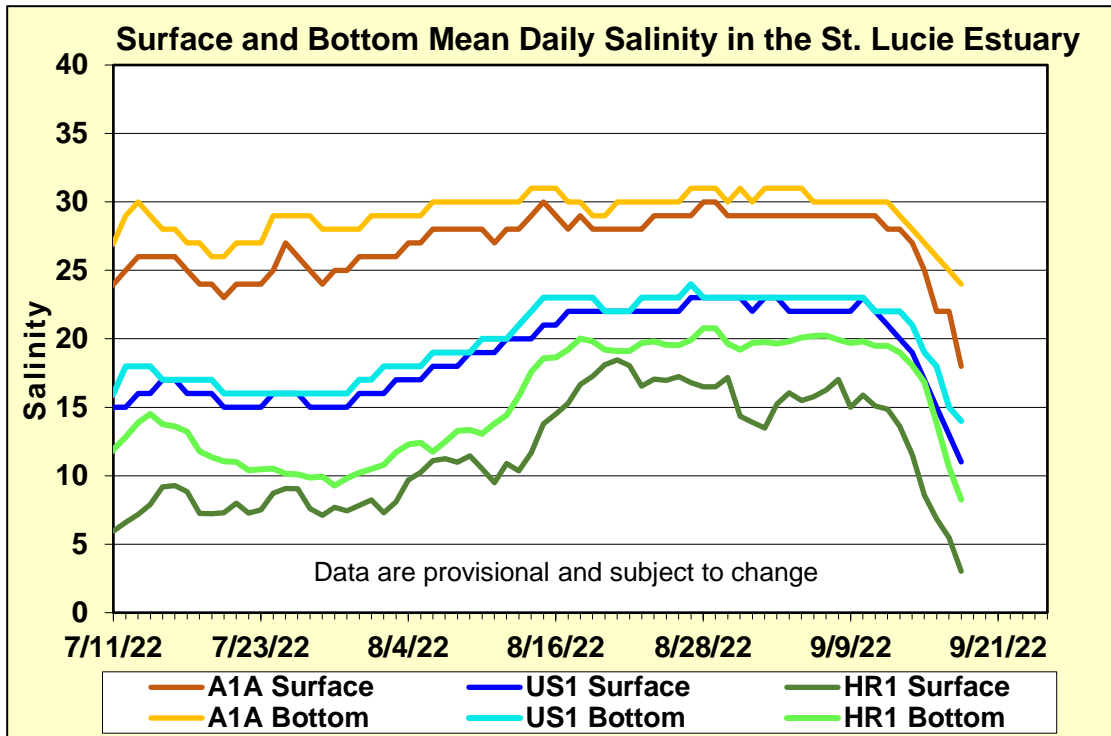


Figure ES-3. Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

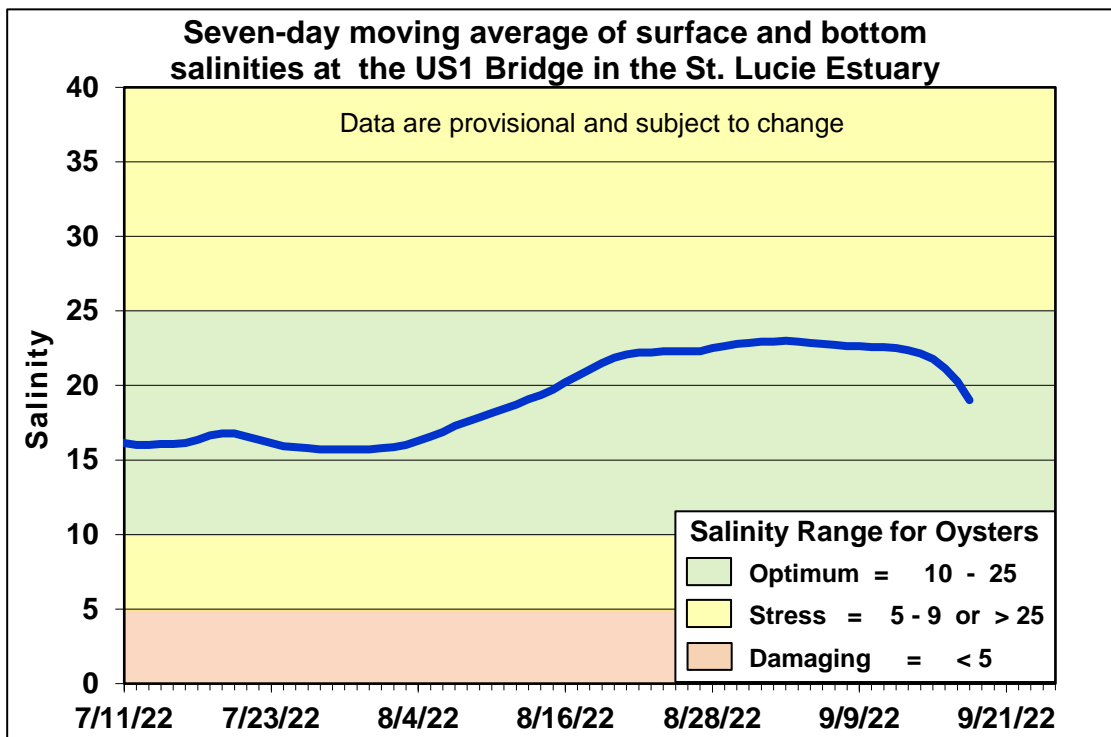


Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

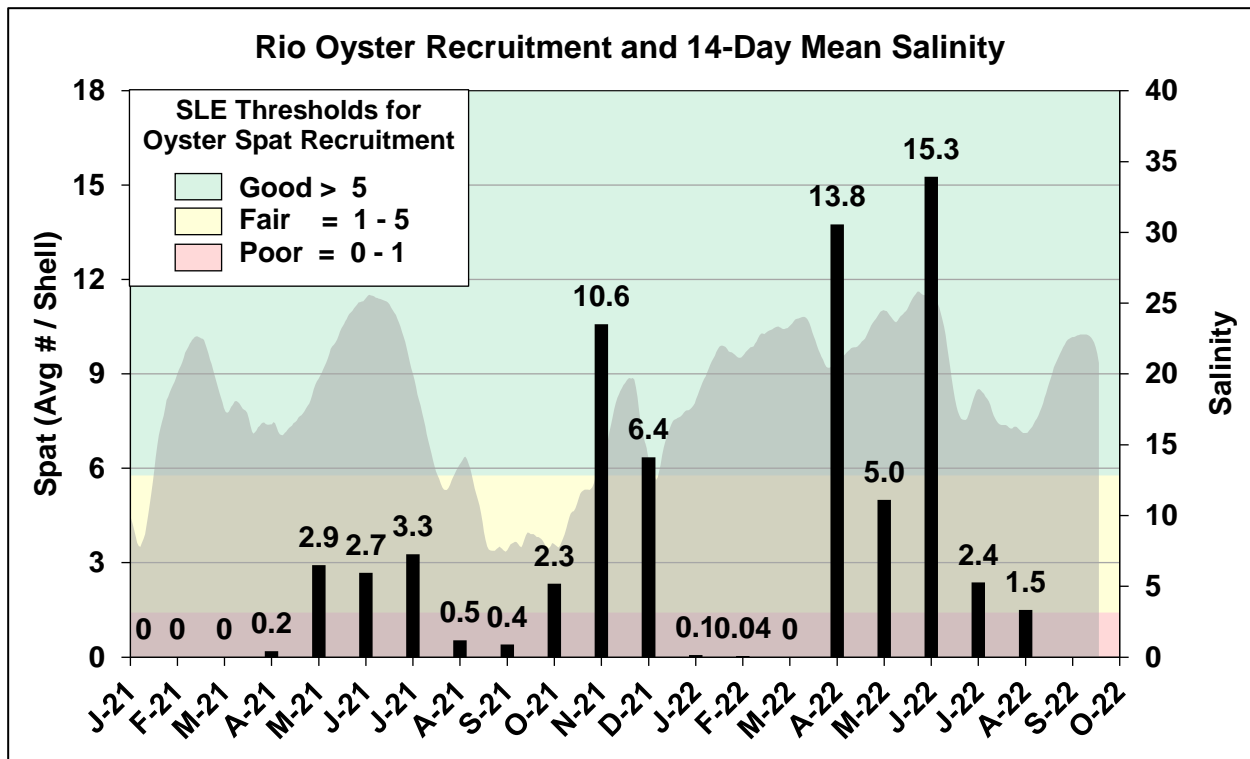


Figure ES-5. Mean oyster recruitment at the Rio oyster monitoring station and 14-day mean salinity at US1 Bridge.

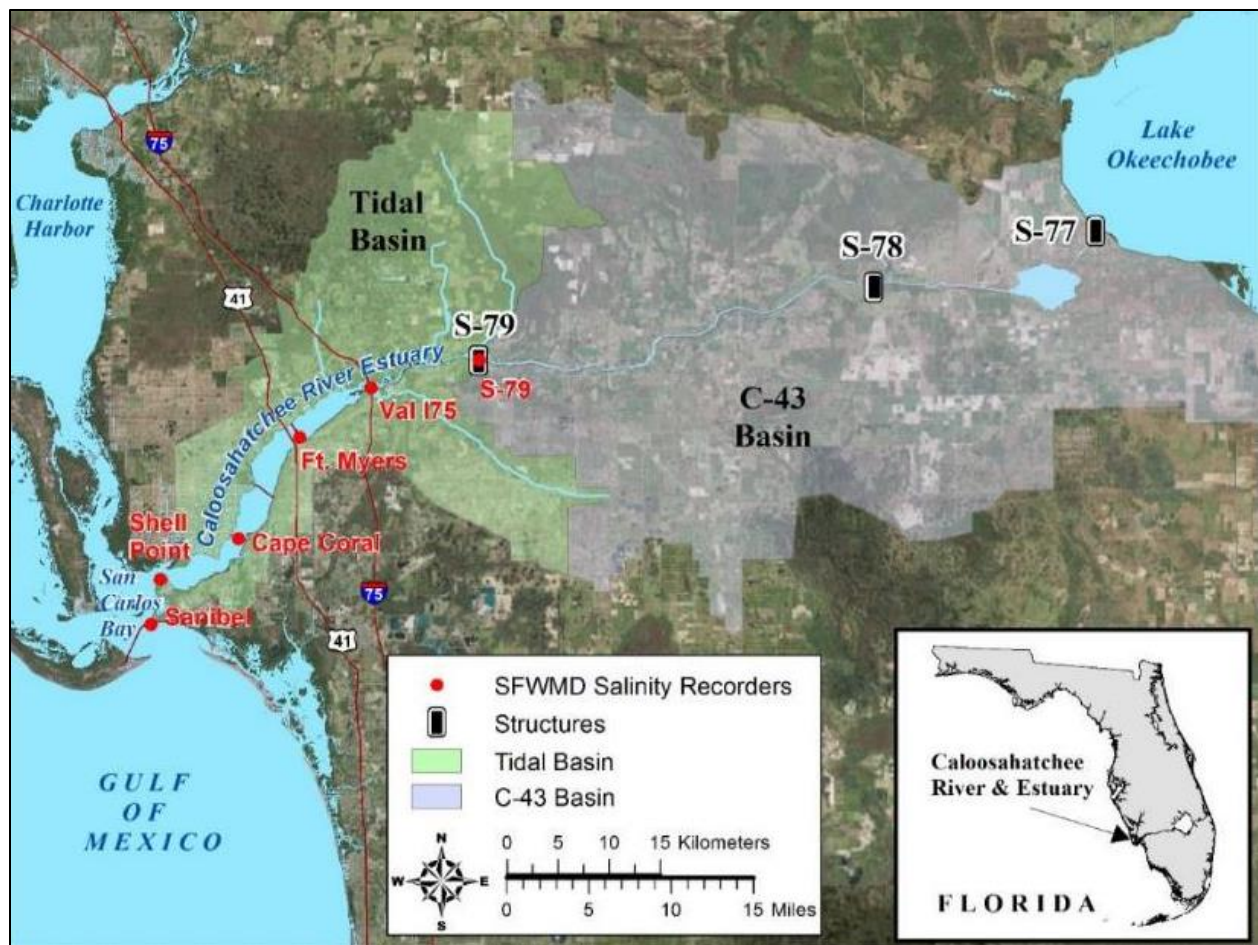


Figure ES-6. Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.

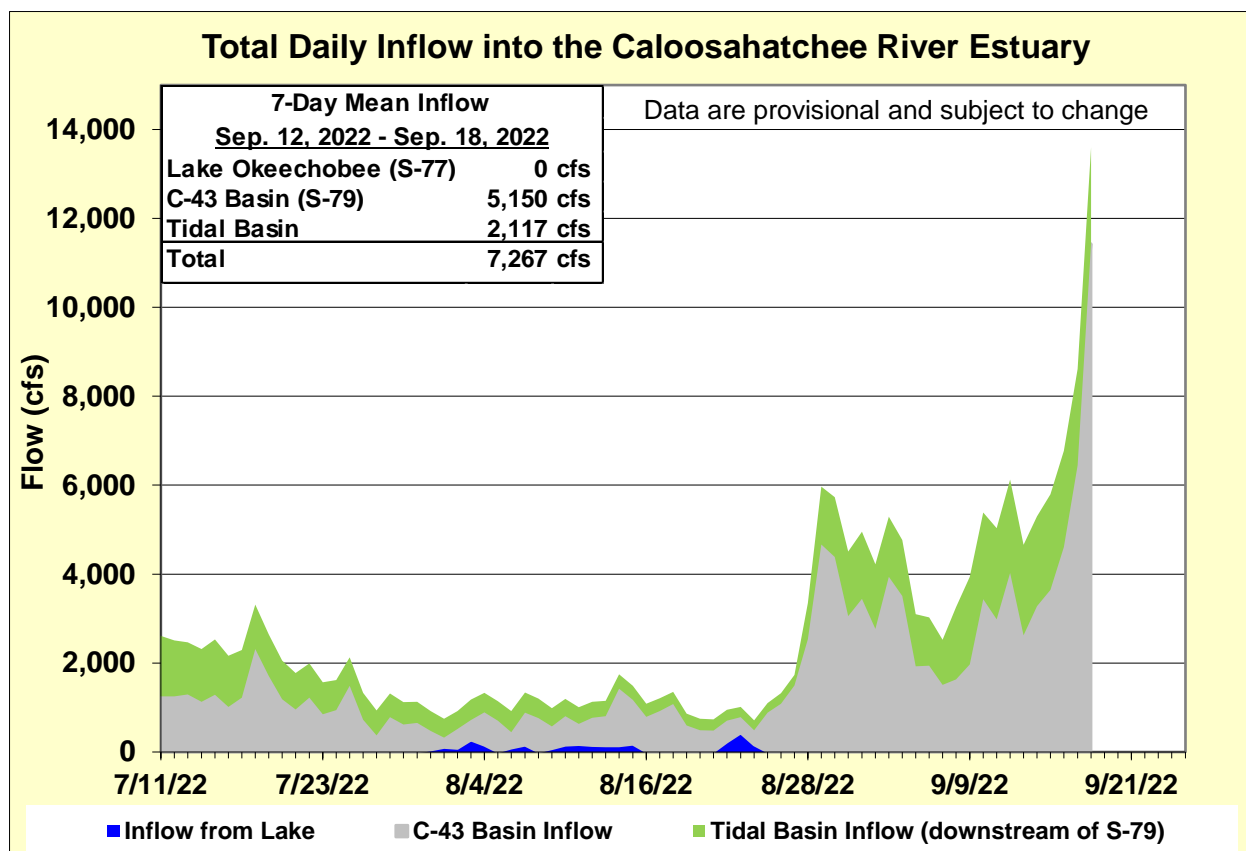


Figure ES-7. Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

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 (0.4)	0.2 (0.5)	0.0 – 10.0
Cape Coral	2.6 (5.6)	3.4 (6.7)	10.0 – 25.0
Shell Point	15.5 (20.0)	17.1 (18.1)	10.0 – 25.0
Sanibel	26.2 (28.1)	26.3 (27.5)	10.0 – 25.0

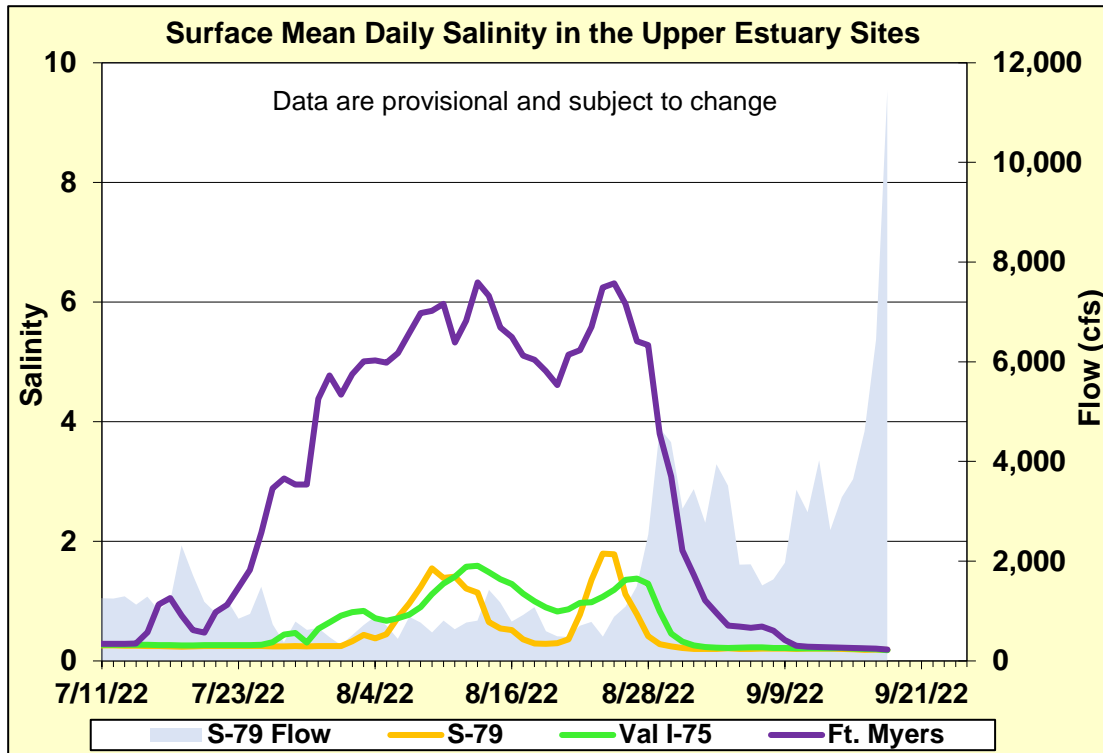


Figure ES-8. Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

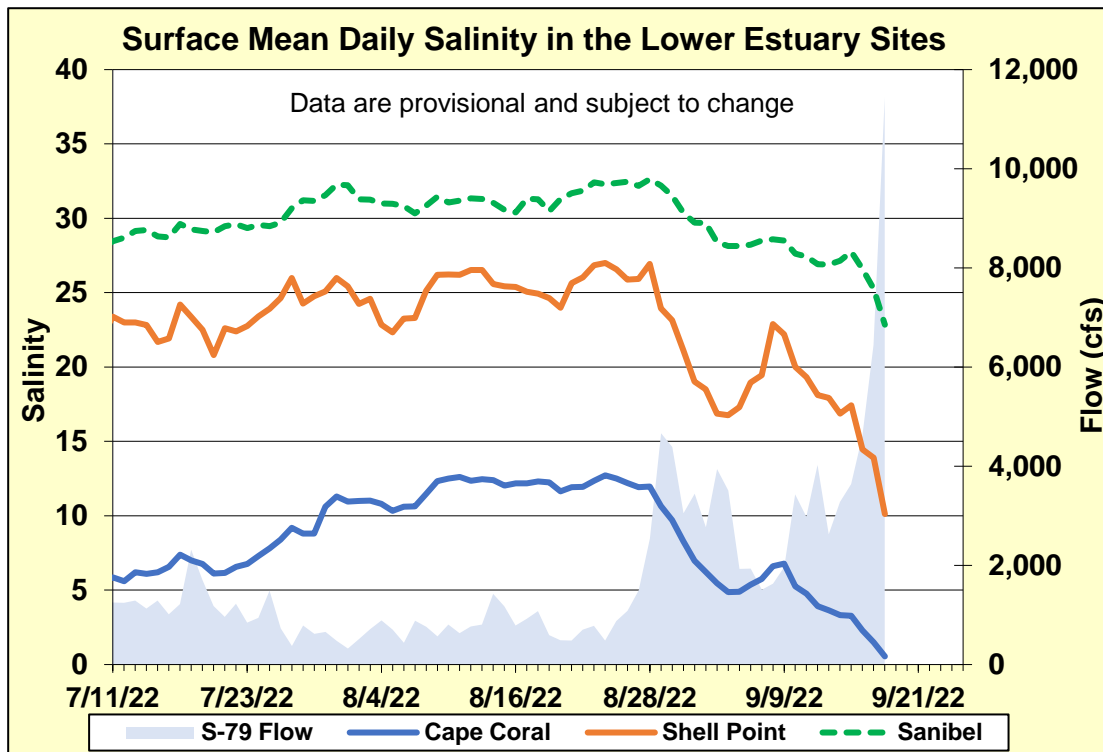


Figure ES-9. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

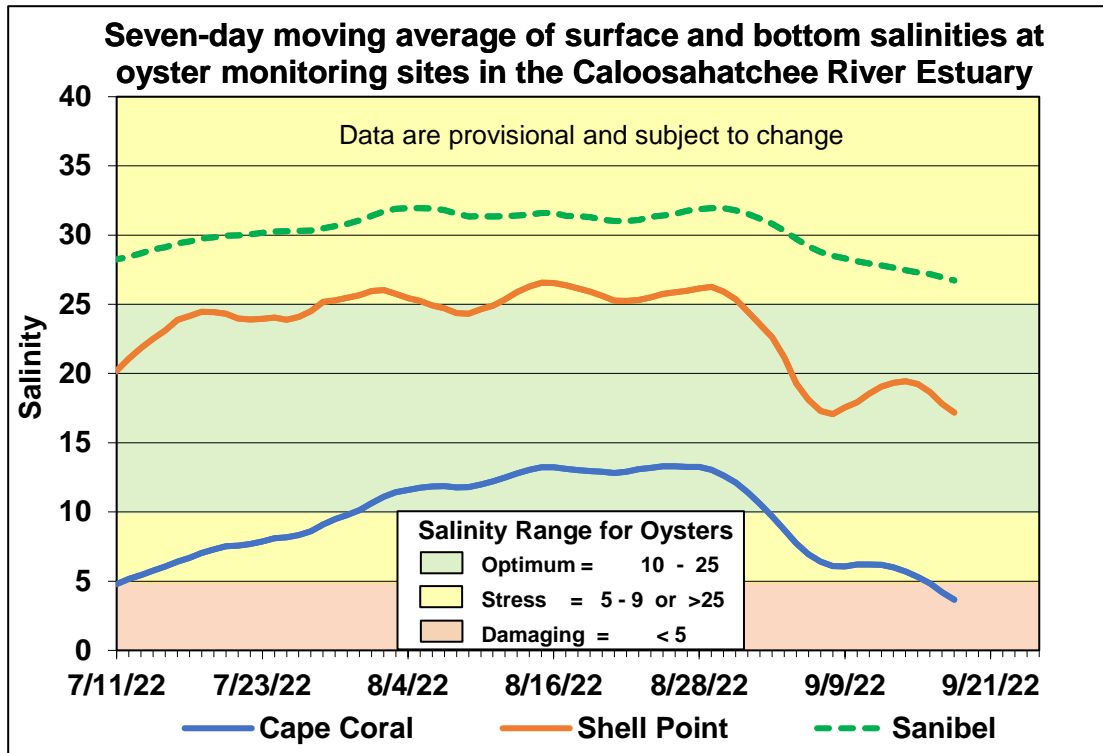


Figure ES-10. Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

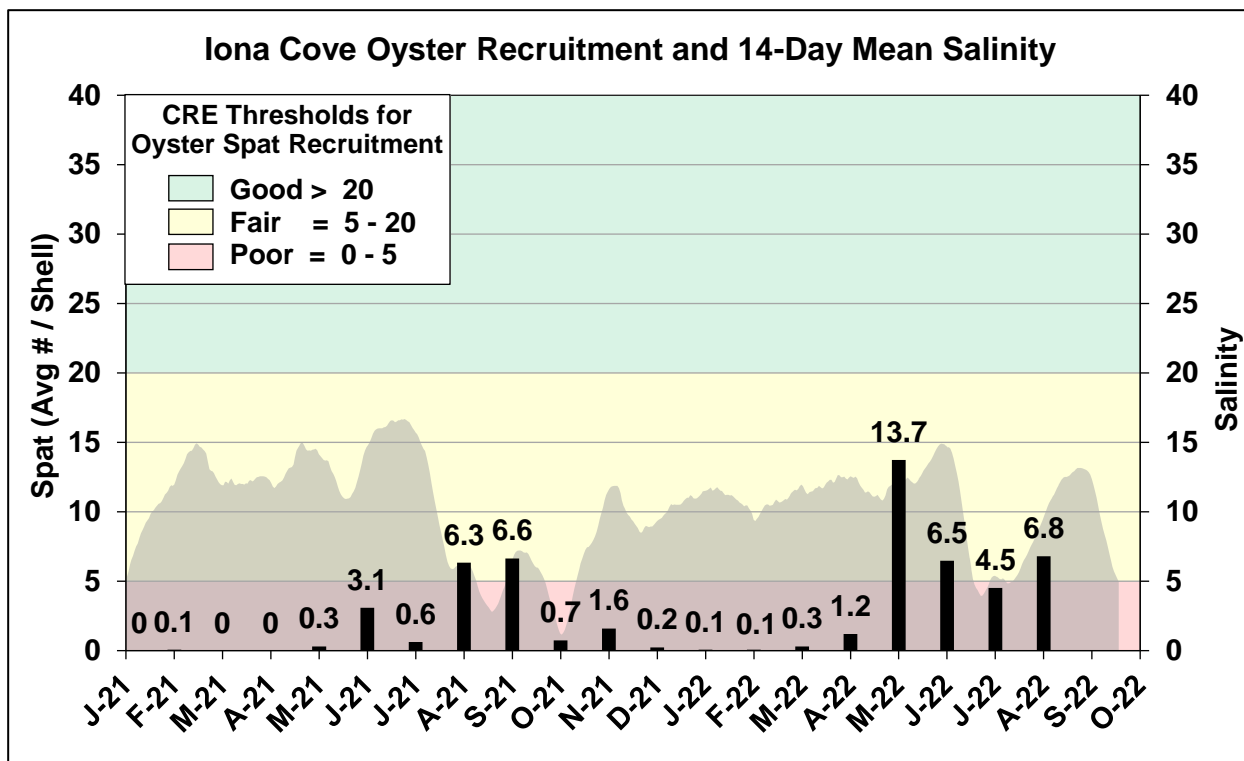


Figure ES-11. Mean oyster recruitment at the Iona Cove oyster monitoring station and 14-day mean salinity at Cape Coral.

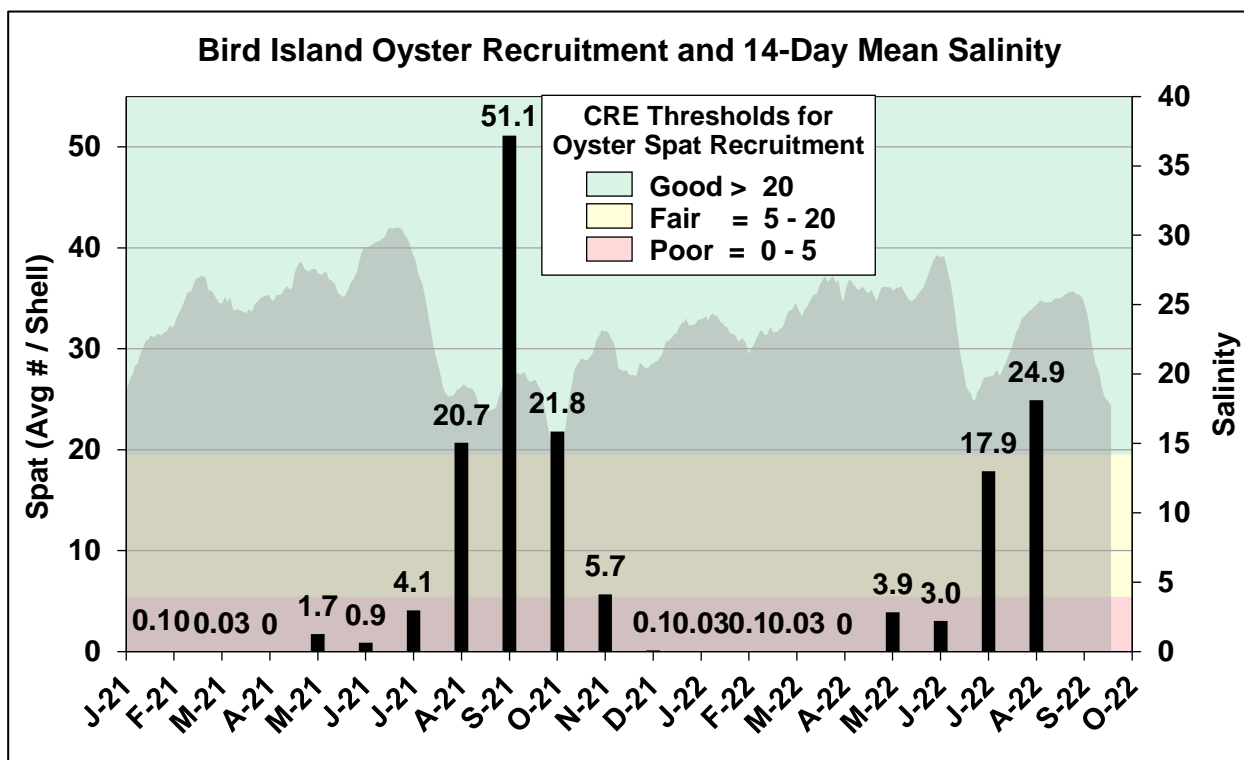


Figure ES-12. Mean oyster recruitment at the Bird Island oyster monitoring station and 14-day mean salinity at Shell Point.

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	1131	0.3	0.3
B	450	1131	0.3	0.3
C	750	1131	0.3	0.3
D	1000	1131	0.3	0.3
E	1500	1131	0.3	0.3
F	2000	1131	0.3	0.3

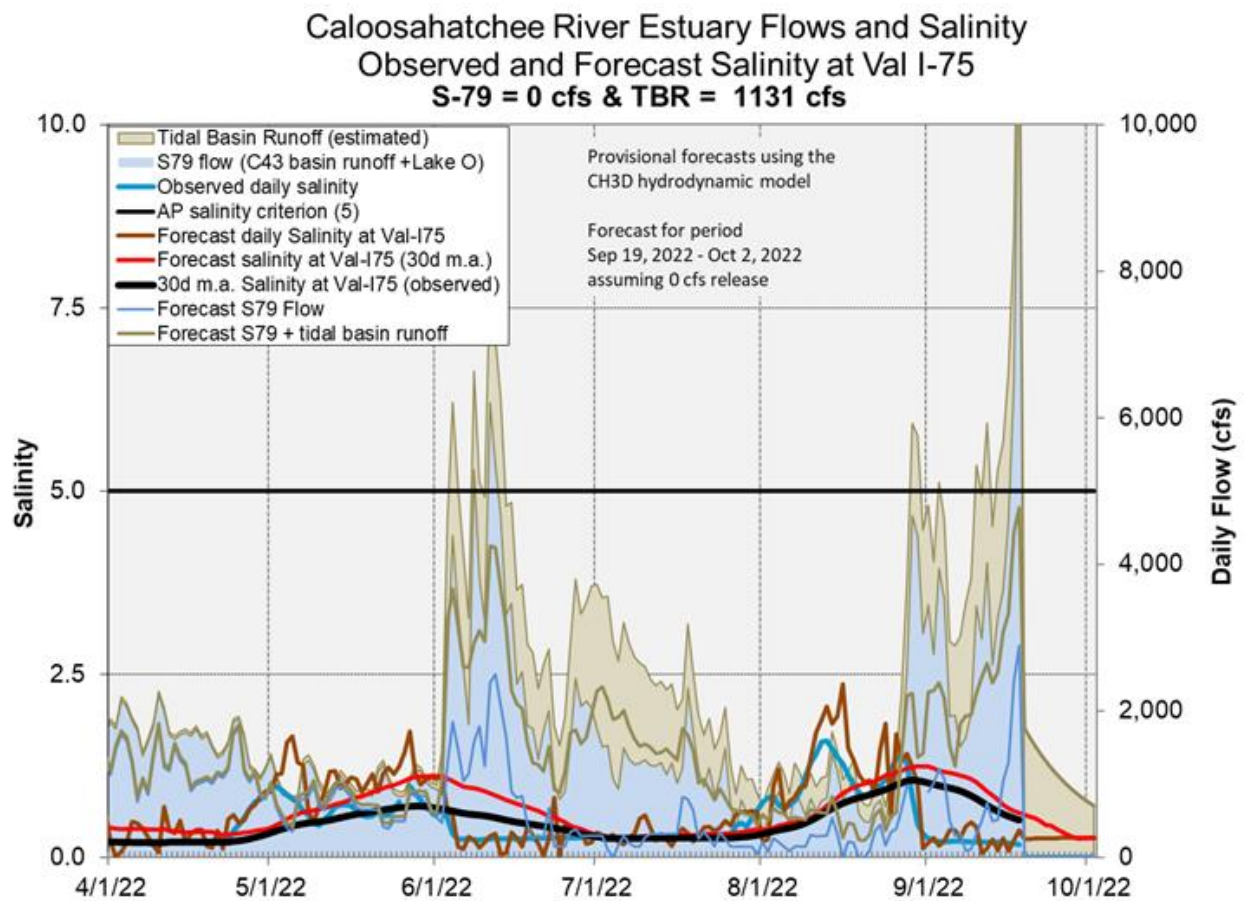


Figure ES-13. Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

Stormwater Treatment Areas

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

STA-1W: Operational restrictions are in place in STA-1W Western, Eastern, and Northern Flow-ways for vegetation management activities. Most treatment cells are at or near target stage. Vegetation in the flow-ways is stressed and highly stressed. The 365-day PLRs for the Northern, Western, and Eastern Flow-ways are below 1.0 g/m²/year (**Figure S-2**).

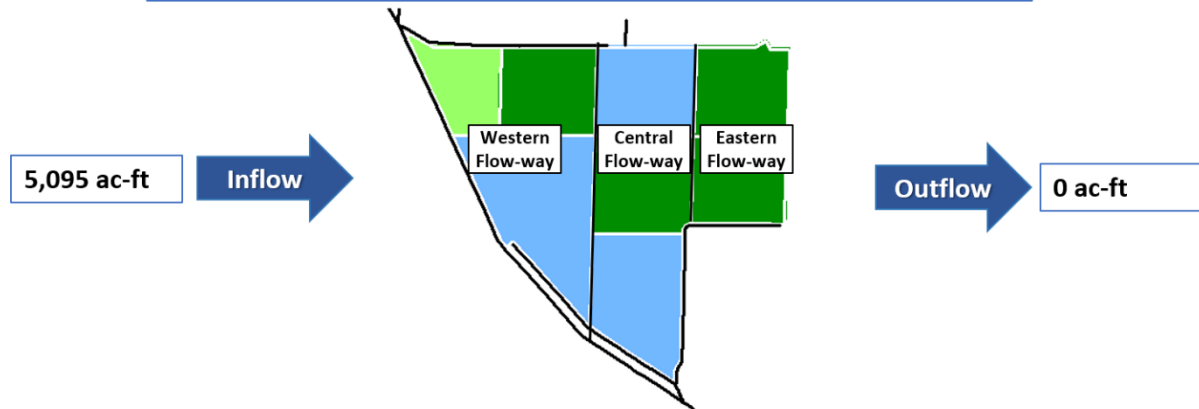
STA-2: STA-2 Flow-way 2 is offline for construction activities. Operational restrictions are in place in STA-2 Flow-ways 3 and 4 for vegetation management activities. Online treatment cells are above target stage. Vegetation in Flow-ways 1 and 3 is stressed, and in Flow-ways 2, 4 and 5 is highly stressed. The 365-day PLRs for Flow-ways 1, 4 and 5 are at or below 1.0 g/m²/year. The 365-day PLR for Flow-way 3 is high (**Figure S-3**).

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

STA-5/6: All flow-ways in STA-5/6 are online. Treatment cells are at or near target stage. All treatment cells have highly stressed vegetation conditions except Flow-ways 7 and 8 which are healthy. The 365-day PLRs for most flow-ways are below 1.0 g/m²/year, except Flow-way 4 which is high. (**Figure S-5** and **S-6**).

For definitions on STA operational language see glossary following figures.

STA-1E Weekly Status Report – 9/12/2022 through 9/18/2022












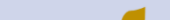





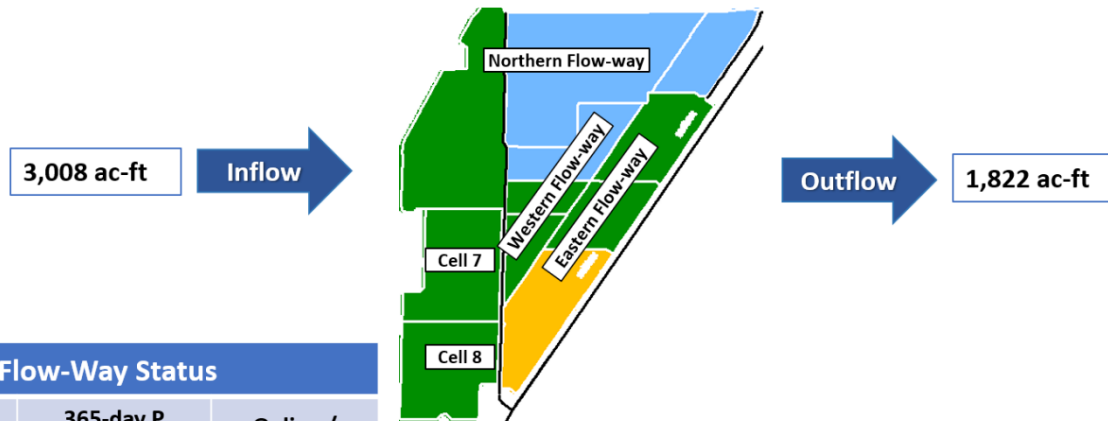
STA-1E Flow-Way Status				As of 9/18/2022		STA-1E Flow & Phosphorus Concentration			
Flow-Way	Vegetation Status <small>Healthy ----- Stressed</small> 	365-day P Loading Rate <small>(below 1.0 g P /m²/yr is optimal)</small> 	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)		Total Inflow, ac-ft	7-day	28-day	365-day
				 Deep Water Level (> 2.8' above TS)	 High Water Level (1.5' – 2.8' above TS)				
Eastern			Vegetation management	 0.2' – 1.5' above TS	 Target Stage (TS +/- 0.2')	Total Outflow, ac-ft	0	121	118,630
				 Low Water Level (<0.2' below TS)					
Central			Vegetation rehabilitation	Depth / Area Based: Percent of Area Dry		Inflow Conc., ppb	68	67	116
Western	Offline, post-construction grow in starting 3/28/2022			 0-25% Dry	 50-75% Dry	Outflow Conc., ppb	N/A	19	25
				 25-50% Dry	 75-100% Dry				
						Includes Preliminary Data			

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

STA-1W Weekly Status Report – 9/12/2022 through 9/18/2022



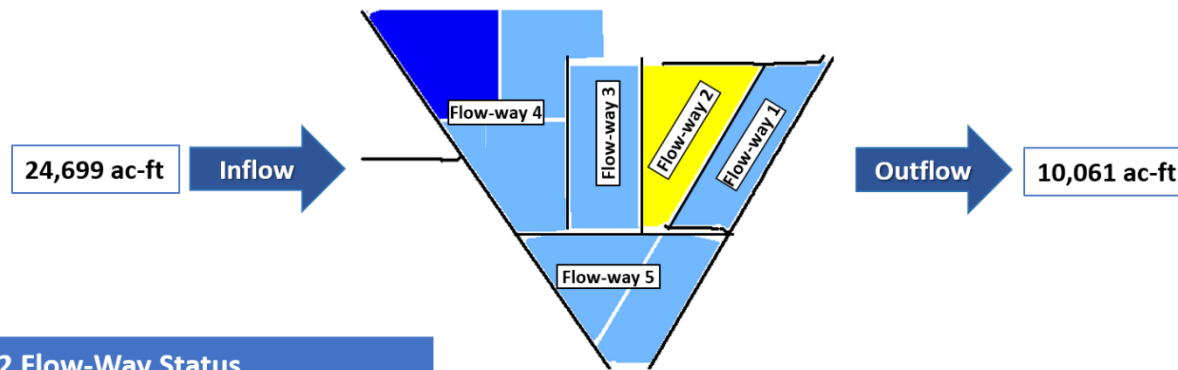
STA-1W Flow-Way Status			
Flow-Way	Vegetation Status Healthy --- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions
Northern	← →	1.0	Vegetation management
Western	← →	1.0	Vegetation management
Eastern	← →	1.0	Vegetation management
Cell 7	← →	N/A	Online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

As of 9/18/2022	
Stage Based: Relative to Target Stage (TS)	
Deep Water Level (> 2.8' above TS)	
High Water Level (1.5' – 2.8' above TS)	
0.2' – 1.5' above TS	
Target Stage (TS +/- 0.2')	
Low Water Level (<0.2' below TS)	
Depth / Area Based: Percent of Area Dry	
0-25% Dry	50-75% Dry
25-50% Dry	75-100% Dry

STA-1W Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	3,008	3,355	68,550
--Lake Inflow, ac-ft	0	N/A	2,000
Total Outflow, ac-ft	1,822	1,822	66,415
Inflow Conc., ppb	82	83	164
Outflow Conc., ppb	15	15	24
Includes Preliminary Data			

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

STA-2 Weekly Status Report – 9/12/2022 through 9/18/2022



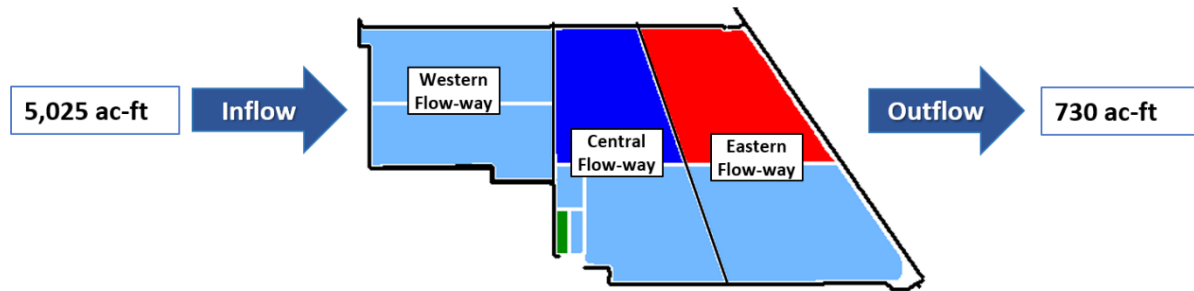
STA-2 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions
1			Online
2	Offline, construction activities as of 9/7/2021		
3			Vegetation Rehab
4			Vegetation Rehab
5			Online

As of 9/18/2022	
Stage Based: Relative to Target Stage (TS)	
	Deep Water Level (> 2.8' above TS)
	High Water Level (1.5' – 2.8' above TS)
	0.2' – 1.5' above TS
	Target Stage (TS +/- 0.2')
	Low Water Level (<0.2' below TS)
Depth / Area Based: Percent of Area Dry	
	0-25% Dry
	25-50% Dry
	50-75% Dry
	75-100% Dry

STA-2 Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	24,699	27,100	271,218
--Lake Inflow, ac-ft	0	N/A	27,600
Total Outflow, ac-ft	10,061	10,730	278,381
Inflow Conc., ppb	60	59	102
Outflow Conc., ppb	15	15	25
Includes Preliminary Data			

Figure S-3. STA-2 Weekly Status Report

STA-3/4 Weekly Status Report – 9/12/2022 through 9/18/2022



















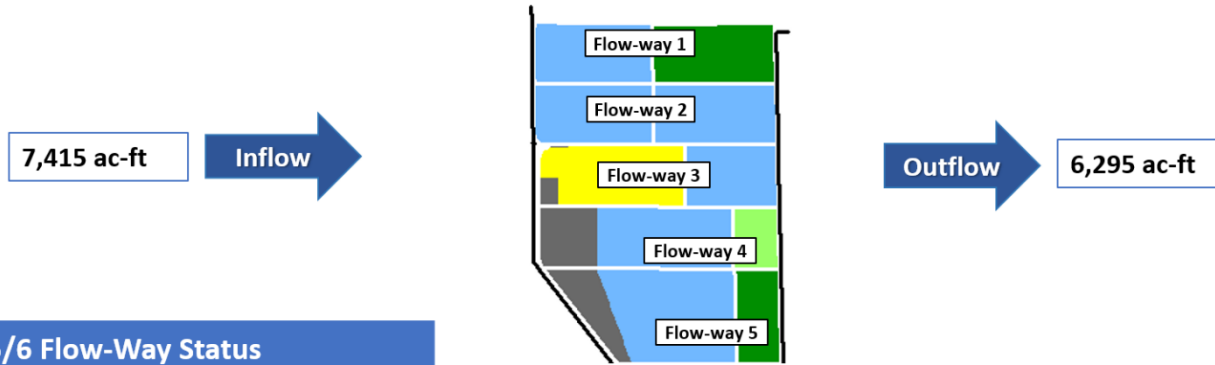
STA-3/4 Flow-Way Status				STA-3/4 Flow & Phosphorus Concentration			
Flow-Way	Vegetation Status <small>Healthy ----- Stressed</small> 	365-day P Loading Rate <small>(below 1.0 g P /m²/yr is optimal)</small>	Online / Offline / Restrictions	As of 9/18/2022			
				Stage Based: Relative to Target Stage (TS)			
Eastern			Offline, vegetation management drawdown as of 3/1/2021	 Deep Water Level (> 2.8' above TS)			
				 High Water Level (1.5' – 2.8' above TS)			
				 0.2' – 1.5' above TS			
				 Target Stage (TS +/- 0.2')			
Central			Online	 Low Water Level (<0.2' below TS)			
				Depth / Area Based: Percent of Area Dry			
Western			Online	 0-25% Dry	 50-75% Dry		
				 25-50% Dry	 75-100% Dry		
				7-day			
				28-day			
				365-day			
Total Inflow, ac-ft				5,025	5,199	239,343	
--Lake Inflow, ac-ft				0	N/A	5,300	
Total Outflow, ac-ft				730	816	229,975	
Inflow Conc., ppb				25	28	82	
Outflow Conc., ppb				13	13	15	
				Includes Preliminary Data			

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

STA-5/6 Weekly Status Report – 9/12/2022 through 9/18/2022



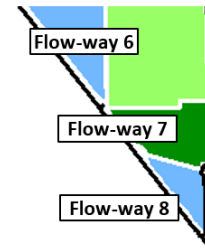
STA-5/6 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions
1			Online
2			Online
3			Online
4			Online
5			Online

As of 9/18/2022	
Stage Based: Relative to Target Stage (TS)	
	Deep Water Level (> 2.8' above TS)
	High Water Level (1.5' – 2.8' above TS)
	0.2' – 1.5' above TS
	Target Stage (TS +/- 0.2')
	Low Water Level (<0.2' below TS)
Depth / Area Based: Percent of Area Dry	
	0-25% Dry
	25-50% Dry
	50-75% Dry
	75-100% Dry

STA-5/6 Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	7,415	20,153	147,082
--Lake Inflow, ac-ft	0	N/A	0
Total Outflow, ac-ft	6,295	15,256	131,274
Inflow Conc., ppb	173	182	218
Outflow Conc., ppb	24	24	44
Includes Preliminary Data			

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

STA-5/6 Weekly Status Report – 9/12/2022 through 9/18/2022




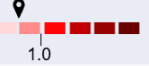











STA-5/6 Flow-Way Status				As of 9/18/2022	
Flow-Way	Vegetation Status Healthy ----- Stressed ←-----→	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)	
6	←-----→ 	 1.0	Online	 0.2' – 1.5' above TS	 Low Water Level (<0.2' below TS)
7	←-----→ 	 1.0	Online	 Target Stage (TS +/- 0.2')	
8	←-----→ 	 1.0	Online	Depth / Area Based: Percent of Area Dry	
				 0-25% Dry	 50-75% Dry
				 25-50% Dry	 75-100% Dry

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

Basic Concepts and Definitions for STA Weekly Status Report

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

Everglades

WCA-1: Stage at the 1-8C gauge rose rapidly in response to rainfall. The average on Sunday was 0.65 feet below the rising Zone A1 regulation line. WCA-2A: Stage at the 2-17 gauge rose over the week. The average on Sunday was 0.40 feet below the rising regulation line. WCA-3A: Last week the Three Gauge Average stages rose more quickly than the slope of the Zone A regulation line. The average stage was 0.54 feet below the rising regulation line on Sunday. WCA-3A North: At gauge 62 (Northwest corner) stage continued to ascend quickly, the average on Sunday was 0.61 feet below the now flat Upper schedule line. (**Figures EV-1 through EV-4**).

Water Depths

The SFWDAT tool indicates that within the last month northeastern WCA-3A continues to recover depths. Along the northern reach of the L-67s depths remained stable and the spatial extent of those deeper conditions is also stable. Depths have recovered in the southern portion of Big Cypress National Preserve (north of US41) over the last month. Connectivity in the western sloughs of Everglades National Park continues to strengthen, while remaining strong in the east. Comparing current WDAT water depths to one month ago northwestern WCA-3A is significantly deeper as is extreme northern WCA-2A. Looking back a year ago, southern WCA-2A is significantly lower; WCA-1 and east central WCA-3A are shallower; conditions are deeper to the south, significantly so within portions of WCA-3B (**Figure EV-5 and Figure EV-6**). Comparing current conditions to the 20-year median, there has been good recovery towards average conditions in northern WCA-3A and the extreme northern WCA-2A. WCA-3B and northeast Shark River Slough remains in the upper percentiles as they have this entire water year (**Figure EV-7**).

Taylor Slough and Florida Bay

Taylor Slough and Florida Bay received an average of 1.82 inches of total rain this past week, almost 1.0 inch more than the previous week based on 17 gauges used for this week's report. Taylor Slough stages increased at all sites, with an average increase of +0.19 feet (**Figure EV-8 and Figure EV-9**). Taylor Slough water levels are above the historical average for this time of year by +1.62 inches compared to before the Florida Bay initiative (starting in 2017).

Average Florida Bay salinity is 34.6, a decrease of -2.2 for the week from 9/12 to 9/18. Salinities decreased at nearly all stations. The greatest decreases were in nearshore areas, with a maximum of -11.4 in Joe Bay (JB). Salinity increased at Duck Key and Johnson Key by +0.1 and +0.7, respectively (**Figure EV-8**). Last week on 9/11, salinity downstream of JB at Trout Creek (TC; not shown) increased by +9.9 following negative flows and southern winds. This week, salinities decreased by -10.9 at TC, following precipitation and six days of positive flows. While all regions in the bay still exceed the 2001-2016 Interquartile Range, (**Figure EV-10**), the Central region decreased nearly to the 75th percentile. Florida Bay salinity is 8.0 above its historical average for this time of year, a slight decrease of -0.3 from last week.

Water Management Recommendations

Maintaining a very moderate rate of stage change within the marsh of WCA-2A has an ecological benefit. Flows into northern WCA-3A would benefit the ecology of that region by helping to provide enough water to protect the Alley North colony in the dry season. When water is available discharge downstream through Taylor Slough. Individual regional recommendations can be found in **Table EV-2**.

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

Everglades Region	Rainfall (inches)	Stage change (feet)
WCA-1	3.26	+0.22
WCA-2A	2.90	+0.09
WCA-2B	2.28	+0.07
WCA-3A	3.78	+0.24
WCA-3B	4.22	+0.28
ENP	2.84	+0.08

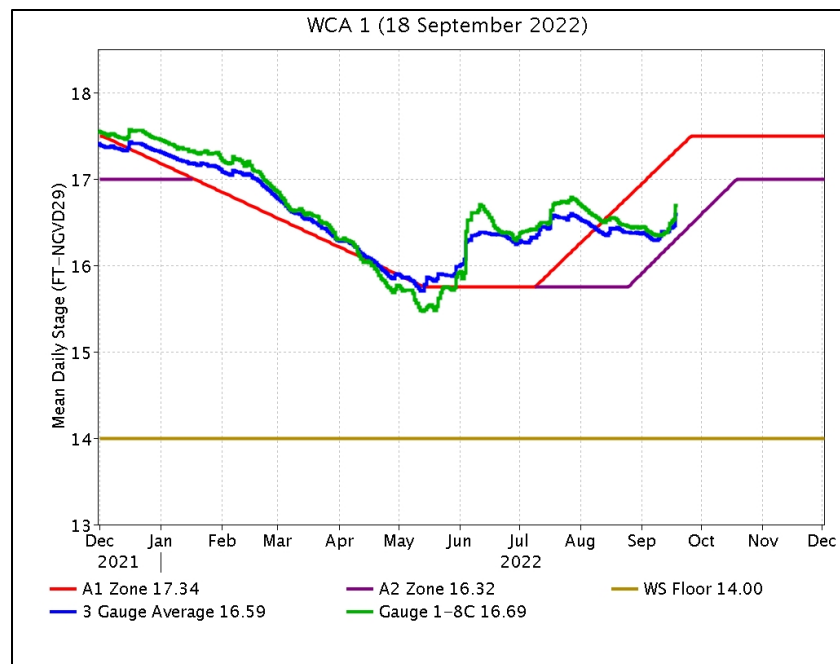


Figure EV-1. WCA-1 stage hydrographs and regulation schedule.

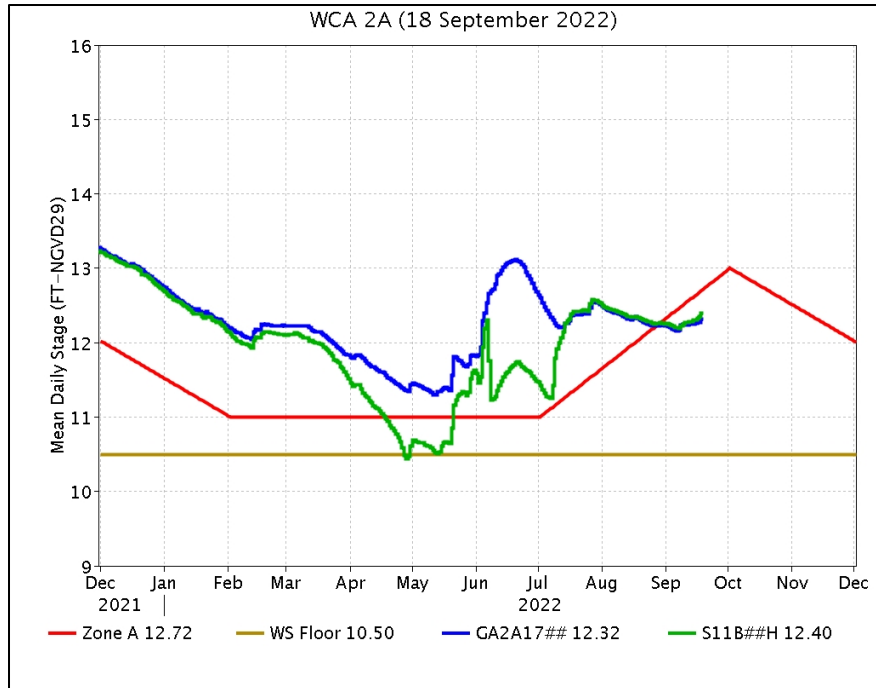


Figure EV-2. WCA-2A stage hydrographs and regulation schedule.

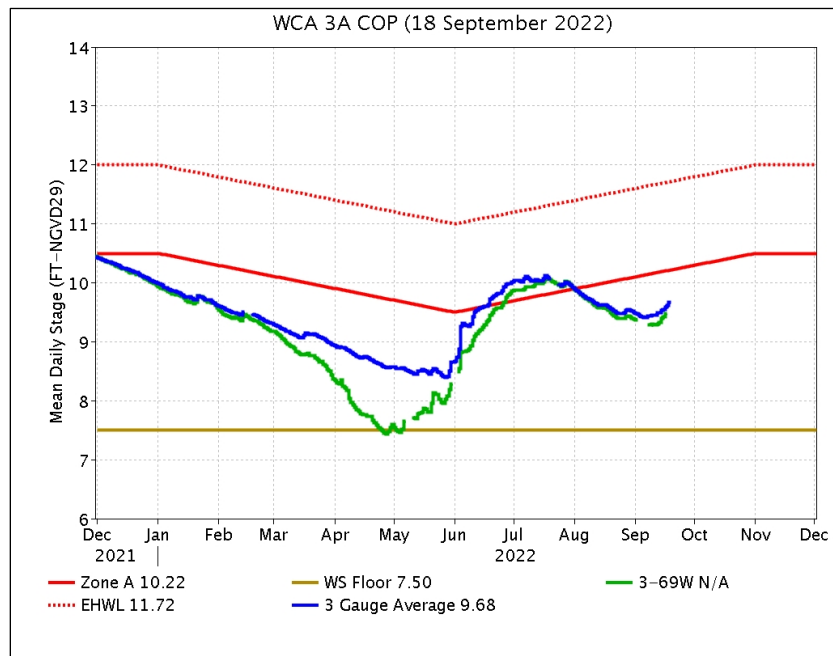


Figure EV-3. WCA-3A stage hydrographs (three-gauge average, S-333 headwater) and regulation schedule.

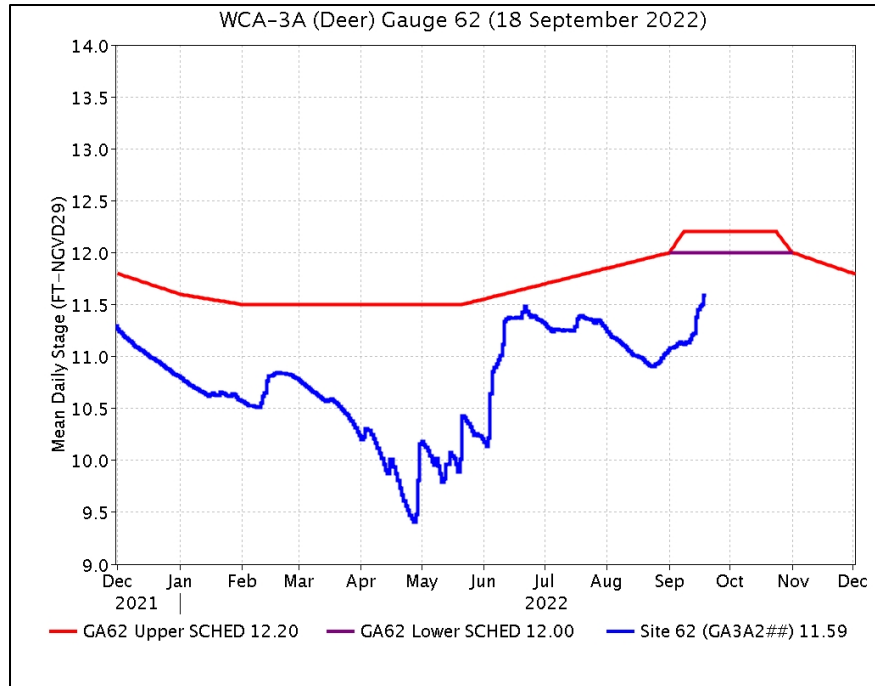


Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.

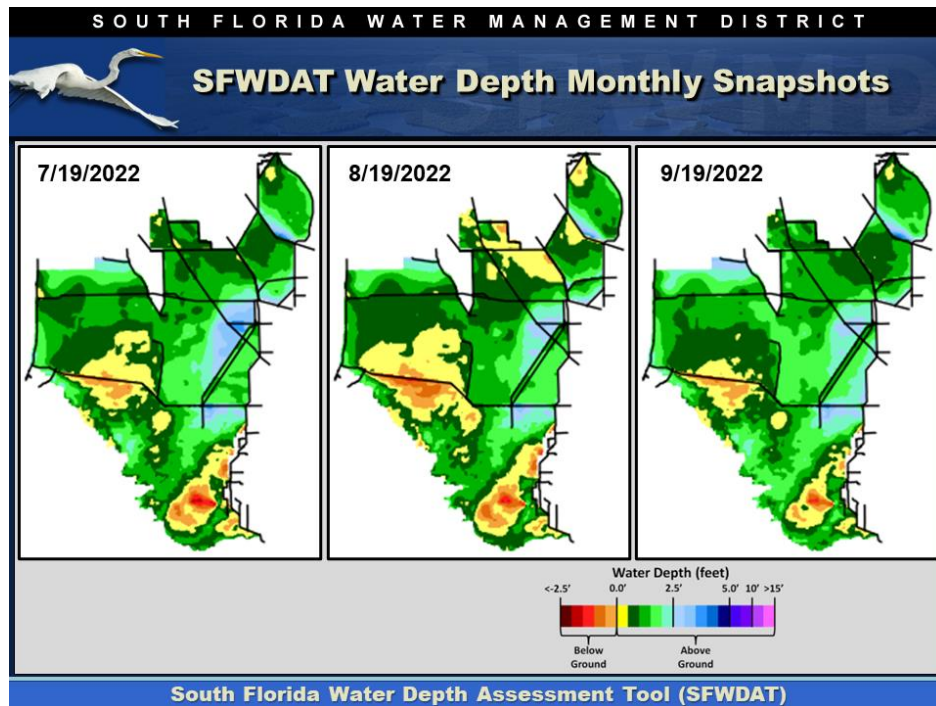


Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

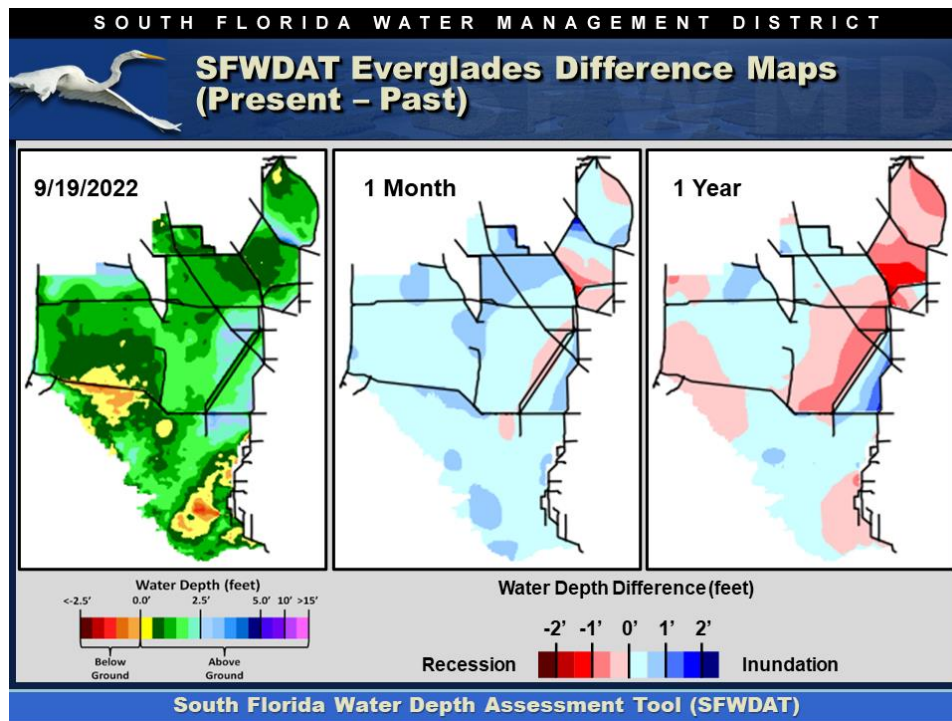


Figure EV-6. Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

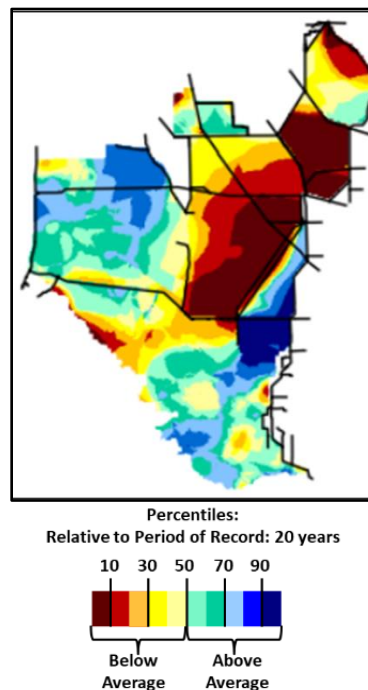


Figure EV-7. Present water depths (9/11/2022) compared to the day of year median over the previous 20 years.

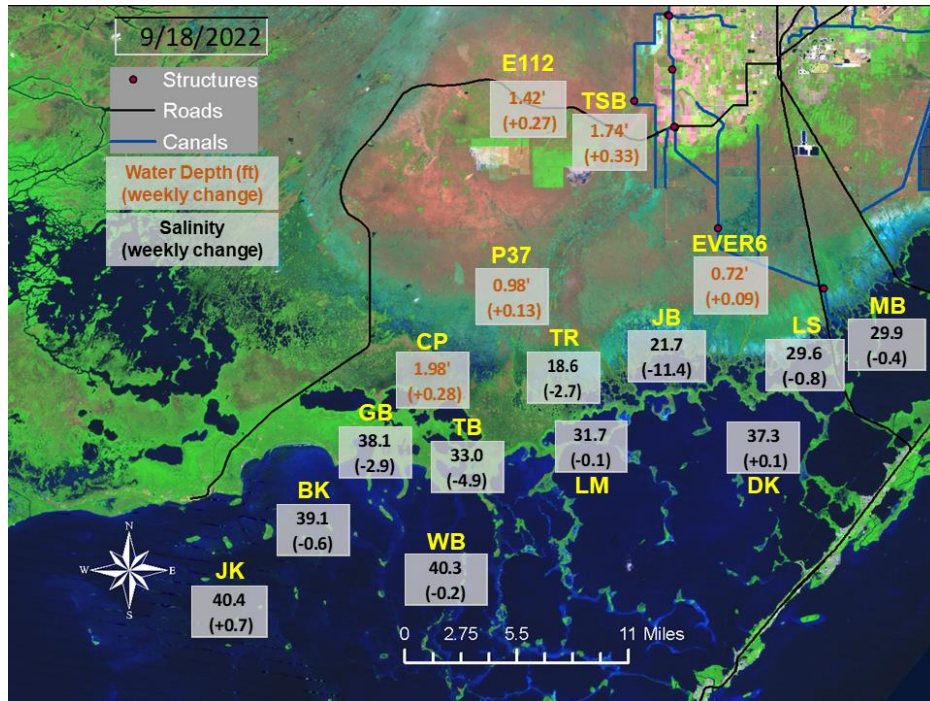


Figure EV-8. Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

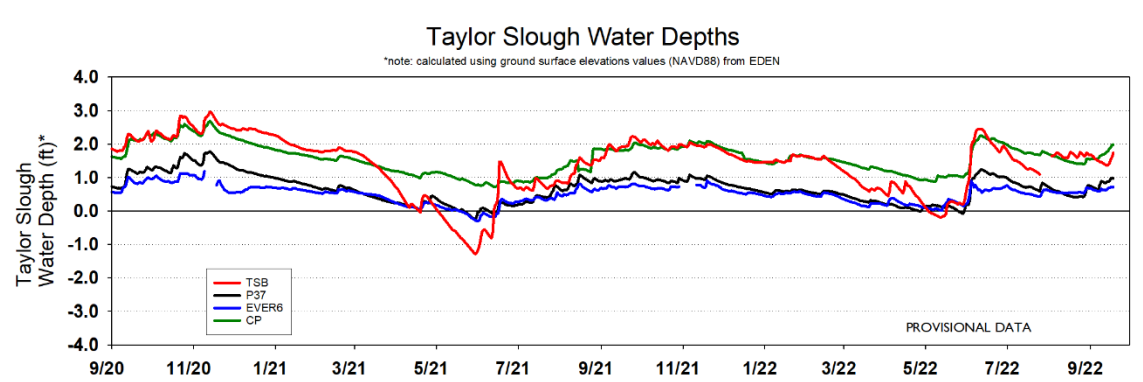


Figure EV-9. Taylor Slough water depth time series.

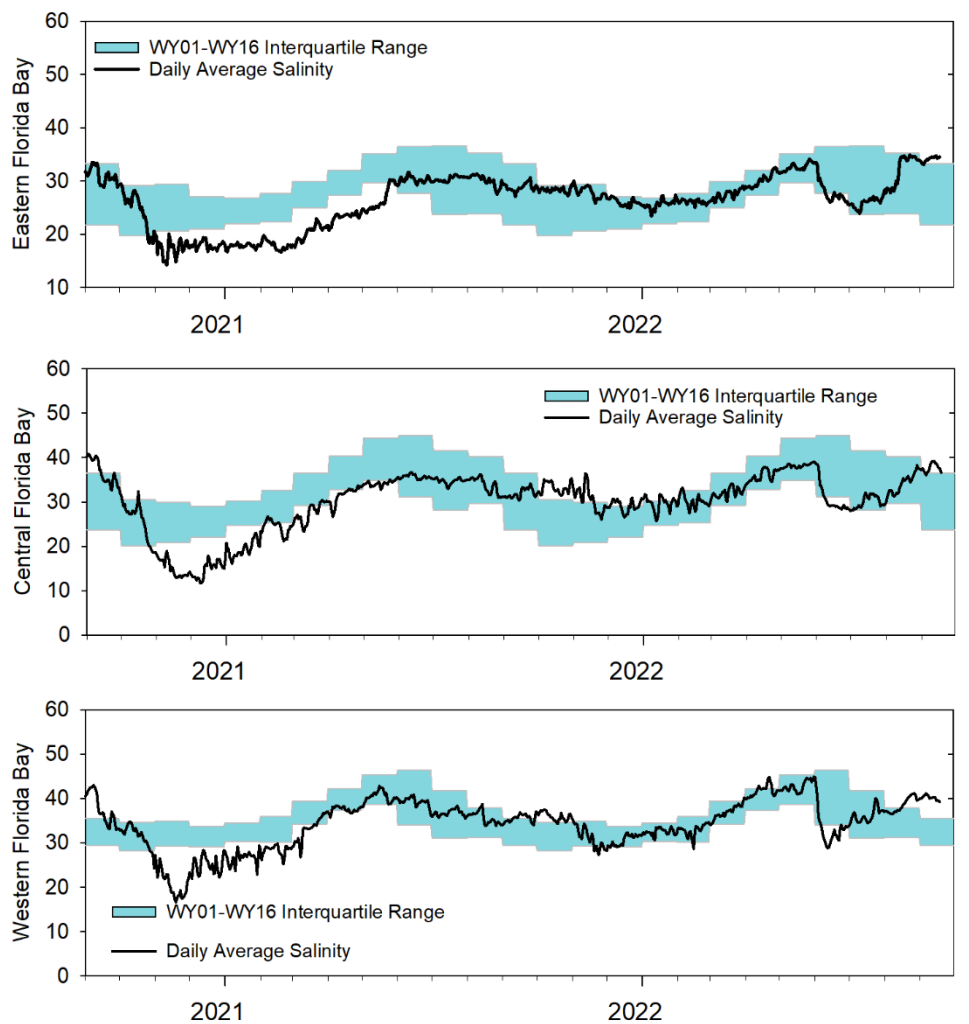


Figure EV-10. Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

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

SFWMD Everglades Ecological Recommendations, September 20th, 2022 (red is new)			
Area	Weekly change	Recommendation	Reasons
WCA-1	Stage increased by 0.22'	Ascension rate of less than 0.25 feet per week.	Protect within basin and downstream habitat and wildlife.
WCA-2A	Stage increased by 0.09'	Ascension rate of less than 0.25 feet per week.	Protect within basin and downstream habitat and wildlife.
WCA-2B	Stage increased by 0.07'	Ascension rate of less than 0.25 feet per week.	Protect within basin and downstream habitat and wildlife.
WCA-3A NE	Stage increased by 0.25'	Maintain ascension rate of less than 0.25 feet per week.	Protect within basin and downstream habitat and wildlife. Lower fire risk.
WCA-3A NW	Stage increased by 0.38'	Ascension rate of less than 0.50 feet per two weeks.	
Central WCA-3A S	Stage increased by 0.13'	Ascension rate of less than 0.25 feet per week.	Protect within basin and downstream habitat and wildlife.
Southern WCA-3A S	Stage increased by 0.19'		
WCA-3B	Stage increased by 0.28'	Ascension rate of less than 0.50 feet per two weeks.	Protect within basin and downstream habitat and wildlife. Lower fire risk.
ENP-SRS	Stage increased by 0.08'	Make discharges to ENP according to COP and TTFF protocol while adaptively considering upstream and downstream ecological conditions. Discussions on water management within the system should be continued.	Protect within basin and upstream habitat and wildlife.
Taylor Slough	Stage changes ranged from +0.045' to +0.330'	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged -11.4 to +0.7	Move water southward as possible	When available, provide freshwater to maintain low salinity buffer and promote water movement.

Biscayne Bay

As shown in **Figure BB-1**, mean total inflow to Biscayne Bay was 732 cfs and the previous 30-day mean inflow was 417 cfs. The seven-day mean salinity was 31.6 at BBCW8 and 32.3 at BBCW10, both below the preferred maximum salinity of 35 for these sites. Data provided by Biscayne National Park.

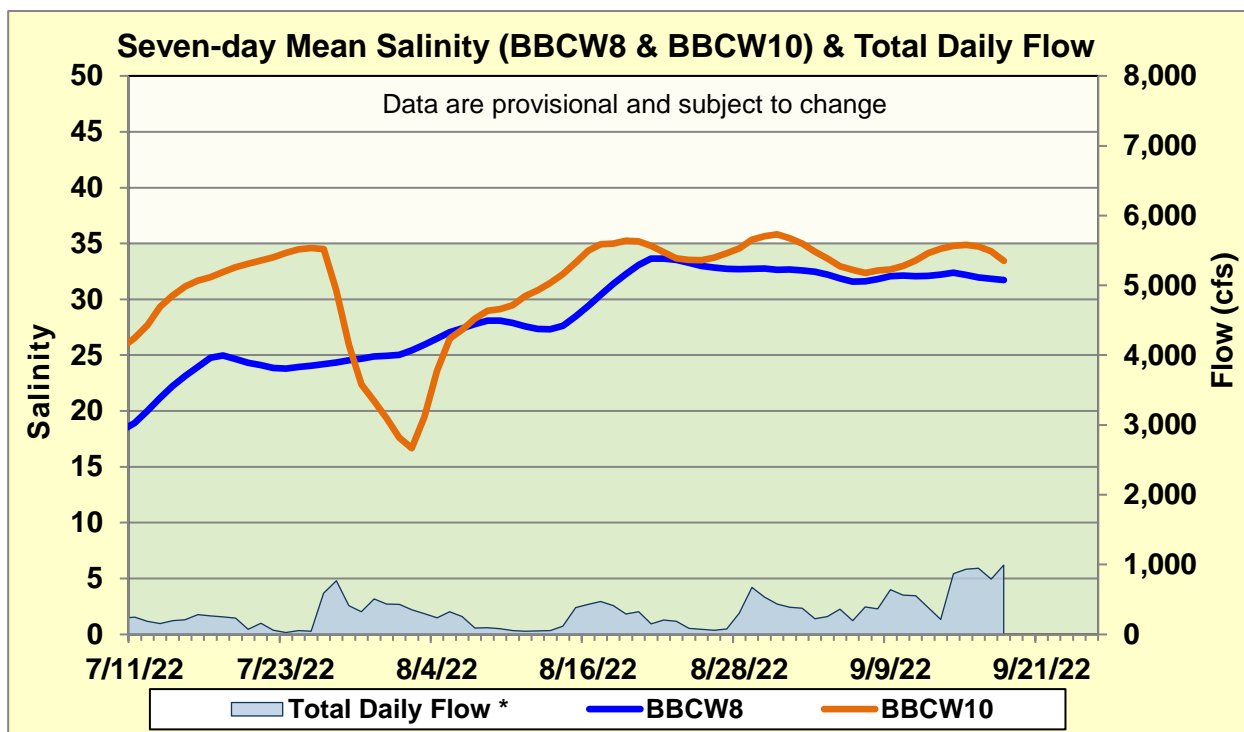


Figure BB-1. Seven-day mean salinity at BBCW8 and BBCW10 and total daily flow in Biscayne Bay. Total daily flow was calculated using flow from structures S20G, S20F, S21, S21A, S123, and S700P.