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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: August 24, 2022

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

With moisture levels high and instability sufficient on Wednesday and Thursday, afternoon-to-early evening rains over the interior and the west will dominate, but the immediate east coast should be dry in the afternoons. A tropical wave will pass over the southern SFWMD on Friday. The moisture and instability accompanying the tropical wave will likely result in widespread coverage of rainfall across the SFWMD Friday and Saturday, with either or both days having the potential to be significant SFWMD rain events (half of an inch of total SFWMD rainfall or more). The very favorable environmental conditions at a minimum will also favor an increased risk of localized, significant rainfall totals. This pattern should continue through Monday next week, even if moisture and instability levels decrease to more typical values for late August. For the week ending next Tuesday morning, total SFWMD rainfall is forecast to be above the long-term average, with the greatest weekly rainfall over the interior and the west and the least amount along and near the east coast.

Kissimmee

Stage is rising gradually in East Lake Toho; flow at S-61 is being adjusted to hold stage in Lake Toho at the regulation schedule. Flow at S-65 remained at 0 cfs to allow KCH stage to rise slowly; S-65A discharge was increased to 300 cfs briefly to control a rainfall-driven stage rise in Pool A. With S-65A discharge remaining well-below bankfull, water depth on the Kissimmee River floodplain was steady over the week, with a mean depth of 0.12 feet on August 21, 2022. The concentration of dissolved oxygen in the Kissimmee River increased slowly over the week to 3.6 mg/L.

Lake Okeechobee

Lake Okeechobee stage was 12.67 feet NGVD on August 21, 2022, with water levels 0.37 feet lower than a month ago. Lake stage was in the Base Flow sub-band and in the ecological envelope, and less than one foot above the Water Shortage Management band. Average daily inflows (excluding rainfall) increased from the previous week, while outflows (excluding evapotranspiration) decreased. The most recent satellite image (August 21, 2022) from NOAA's Harmful Algal Bloom Monitoring System showed that

bloom potential was medium to high in the northern and southwestern areas of the Lake. The August 15-17 routine phytoplankton monitoring survey on the Lake revealed that all sites had total microcystin concentrations below detection limit.

Estuaries

Total inflow to the St. Lucie Estuary averaged 432 cfs over the past week with no flow coming from Lake Okeechobee. Mean salinities increased at all sites in the estuary 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 1,149 cfs over the past week with 24 cfs coming from the Lake. Mean surface salinities decreased at upper estuary sites and remained constant at lower estuary sites 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 Cape Coral and in the stressed range at Shell Point and Sanibel (>25).

Stormwater Treatment Areas

For the week ending Sunday, August 21, 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 12,400 ac-feet. The total amount of inflows to the STAs in WY2023 is approximately 420,000 ac-feet. Most STA cells are near or below target stage. STA-1E Western Flow-way is offline for post-construction vegetation grow in. Additionally, STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown, STA-2 Flow-way 2 is offline for construction activities, and STA-5/6 Flow-way 4 is offline for vegetation management activities. Operational restrictions are in 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 remain in the “poor” category across the Everglades Protection Area last week as another week of low rainfall meant a continued decline in stages. Dry conditions dominate the northern portions of all the WCAs, and WCA-3A has remained in the poor category over the last month. Recently reported wildfire in south-central WCA-3A North was determined to be 3,600 acres in size and a more recent fire is being estimated at 2,100 acres in the northeast of that sub-basin. Taylor slough stages were stable last week and remain just above average. Salinities remain above average across Florida Bay driven by conditions in the western region, and that region moved above the interquartile range. A continuation of dry conditions (La Nina) could result in undesirable future salinity conditions.

Biscayne Bay

Total inflow to Biscayne Bay averaged 350 cfs and the previous 30-day mean inflow averaged 269 cfs. The seven-day mean salinity was 33.7 at BBCW8 and 34.2 at BBCW10, both below the preferred maximum salinity of 35 for these sites. Salinity data provided as a courtesy by Biscayne National Park.

Supporting Information

Kissimmee Basin

Upper Kissimmee

On August 21, 2022, lake stages were 55.9 feet NGVD (0.6 feet below schedule) in East Lake Toho, 53.6 feet NGVD (0.1 feet above schedule) in Lake Toho, and 49.8 feet NGVD (1.2 feet below schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1, Figures KB-1-3**).

Lower Kissimmee

Discharges to the Kissimmee River were reduced to 0 cfs at S-65 and S-65A on Wednesday June 22, 2022 to slow the rate of stage decline in KCH. On August 21, 2022, discharge at S-65 was still 0 cfs; discharge at S-65A was declining after being increased briefly to 330 cfs to control the rise in S-65A headwater stage. Discharges from the Kissimmee River were 210 cfs at S-65D and 160 cfs at S-65E (**Table KB-2**). Headwater stages were 46.7 feet NGVD at S-65A and 26.3 feet NGVD at S-65D on August 21, 2022. Over the week ending August 21, 2022, S-65A discharge was increased to 330 cfs to discharge local basin runoff but remained well below bankfull; mean river channel stage in the Kissimmee River increased by 1.7 feet NGVD (**Figure KB-4**). With S-65A discharge well-below bankfull, water depth on the Kissimmee River floodplain remained steady over the week, with a mean depth of 0.13 feet on August 21, 2022 (**Figure KB-5**). The concentration of dissolved oxygen in the Kissimmee River increased slowly over the last week to 3.6 mg/L (**Table KB-2, Figure KB-6**).

Water Management Recommendations

Encourage stage in KCH to rise gradually by continuing 0 cfs discharge at S-65 and S-65A except when S-65A flow can be increased to manage stage in Pool A. 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)	
							8/21/22	8/14/22
Lakes Hart and Mary Jane	S-62	LKMJ	39	60.1	R	60.0	0.1	0.0
Lakes Myrtle, Preston and Joel	S-57	S-57	0	61.0	R	61.0	0.0	-0.2
Alligator Chain	S-60	ALLI	0	62.6	R	63.2	-0.6	-0.6
Lake Gentry	S-63	LKGT	0	60.2	R	61.0	-0.8	-0.9
East Lake Toho	S-59	TOHOE	3	55.9	R	56.5	-0.6	-0.8
Lake Toho	S-61	TOHOW S-61	190	53.6	R	53.5	0.1	-0.1
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	0	49.8	R	51.0	-1.2	-1.4

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.

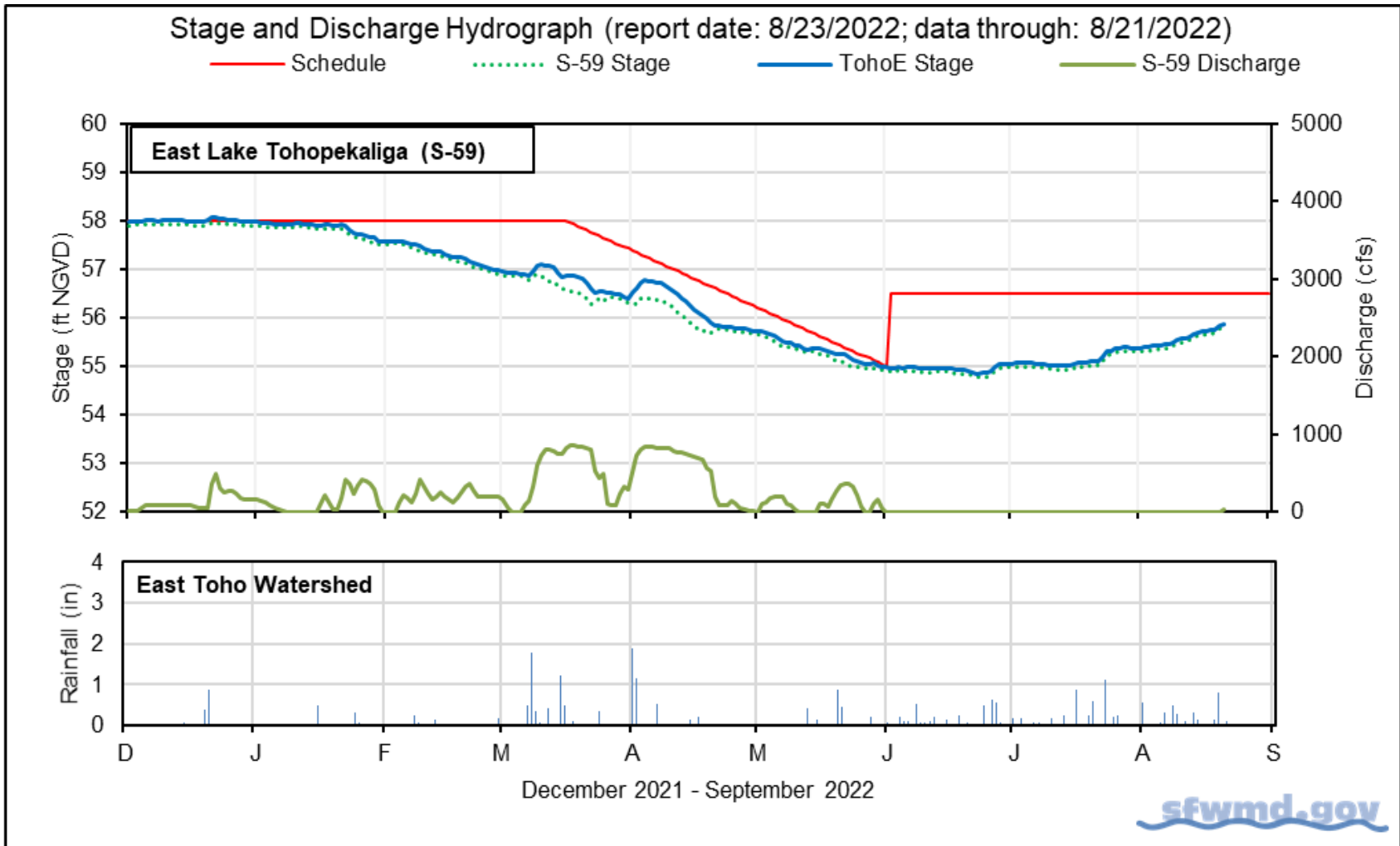


Figure KB-1. East Lake Toho regulation schedule, stage, discharge and rainfall.

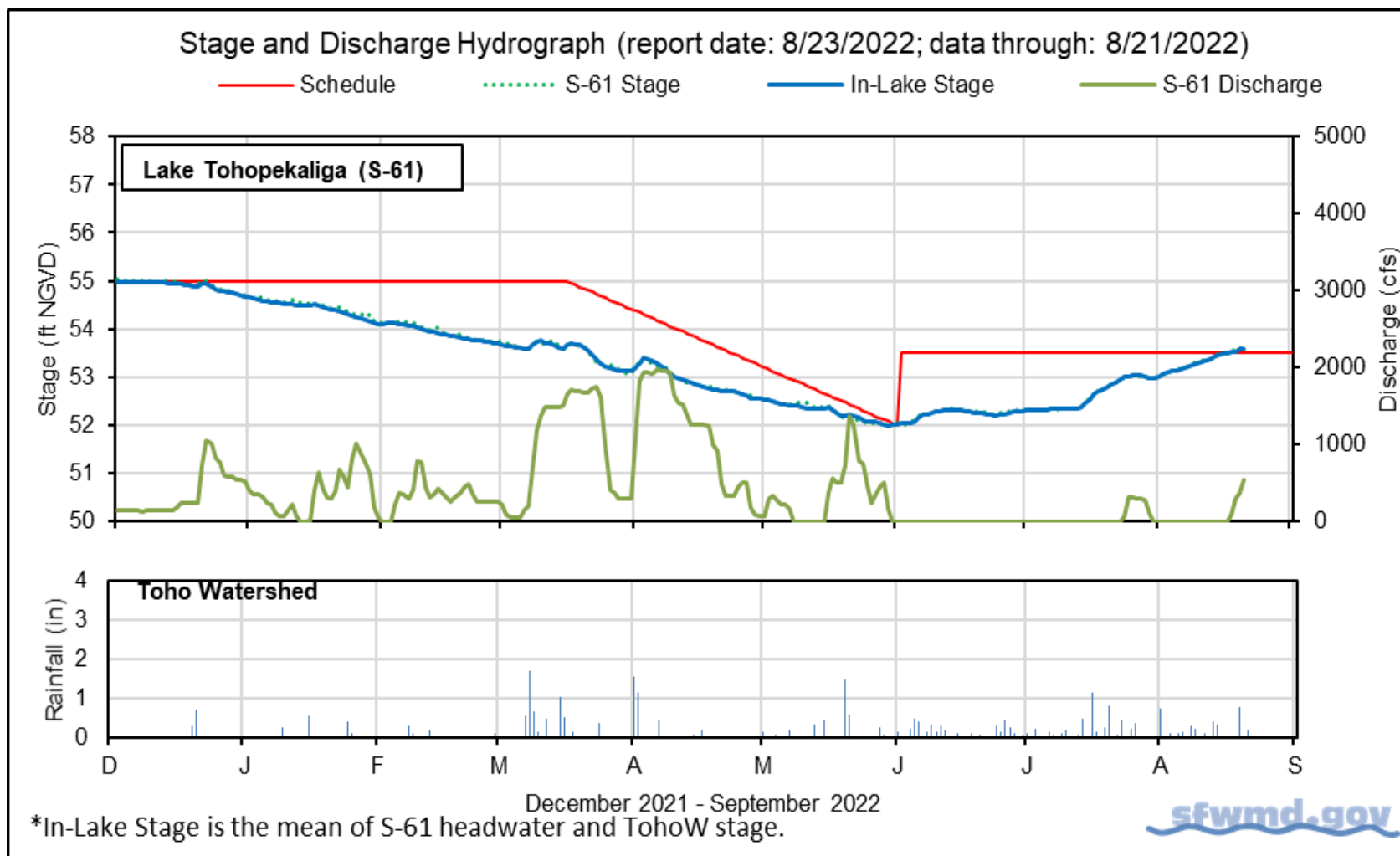


Figure KB-2. Lake Toho regulation schedule, stage, discharge and rainfall.

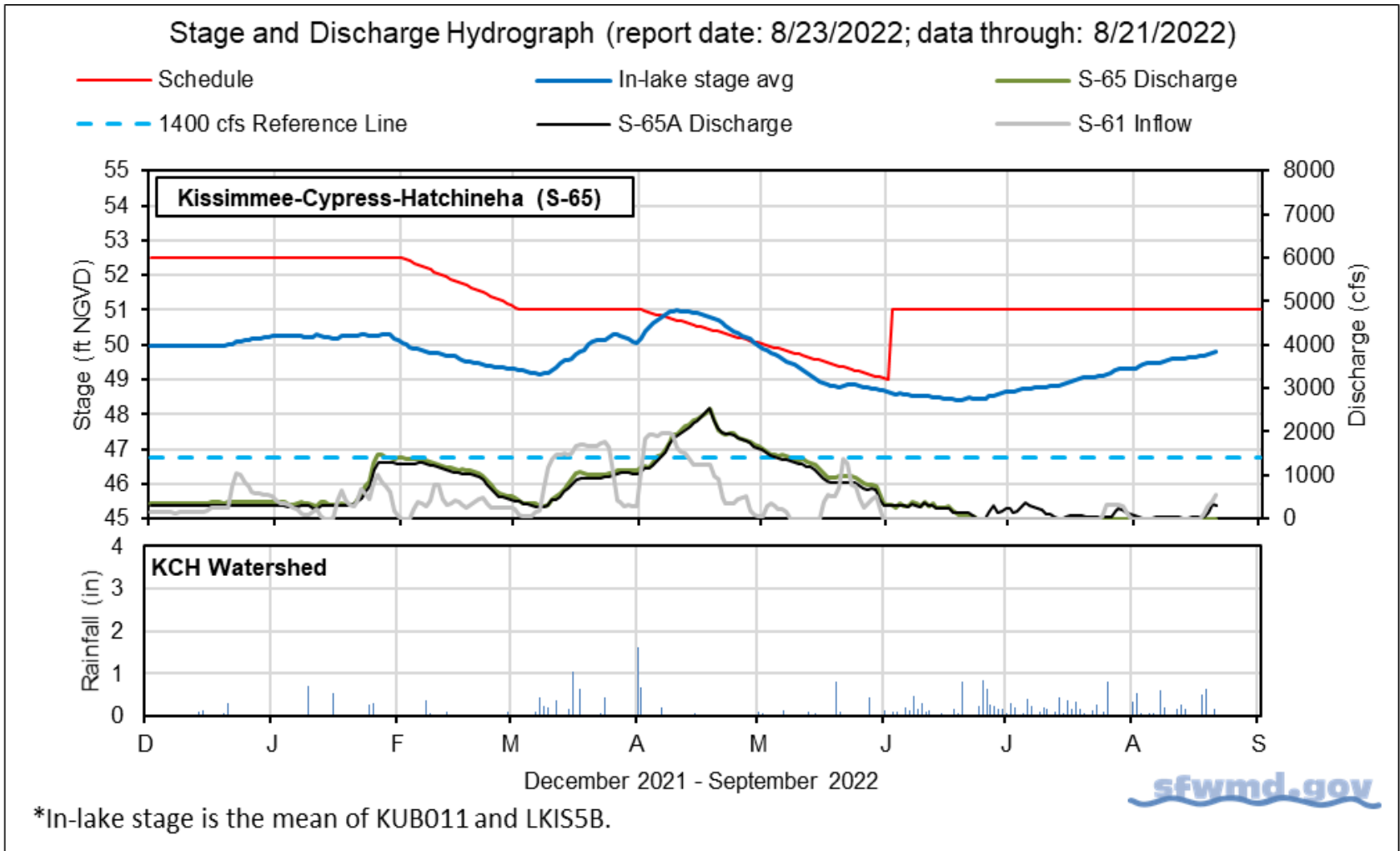


Figure KB-3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

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			
		8/21/22	8/21/22	8/14/22	8/7/22	7/31/22
Discharge	S-65	0	0	0	0	0
Discharge	S-65A ^a	310	130	29	32	130
Headwater Stage (feet NGVD)	S-65A	46.7	46.5	46.4	46.6	46.6
Discharge	S-65D ^b	210	80	80	160	220
Headwater Stage (feet NGVD)	S-65D ^c	26.3	26.2	26.2	26.2	26.2
Discharge (cfs)	S-65E ^d	160	86	86	150	180
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) ^e	Phase I, II/III river channel	3.8	3.6	3.5	3.4	3.3
Mean depth (feet) ^f	Phase I floodplain	0.13	0.12	0.11	0.13	0.18

a. Combined discharge from main and auxiliary structures.

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

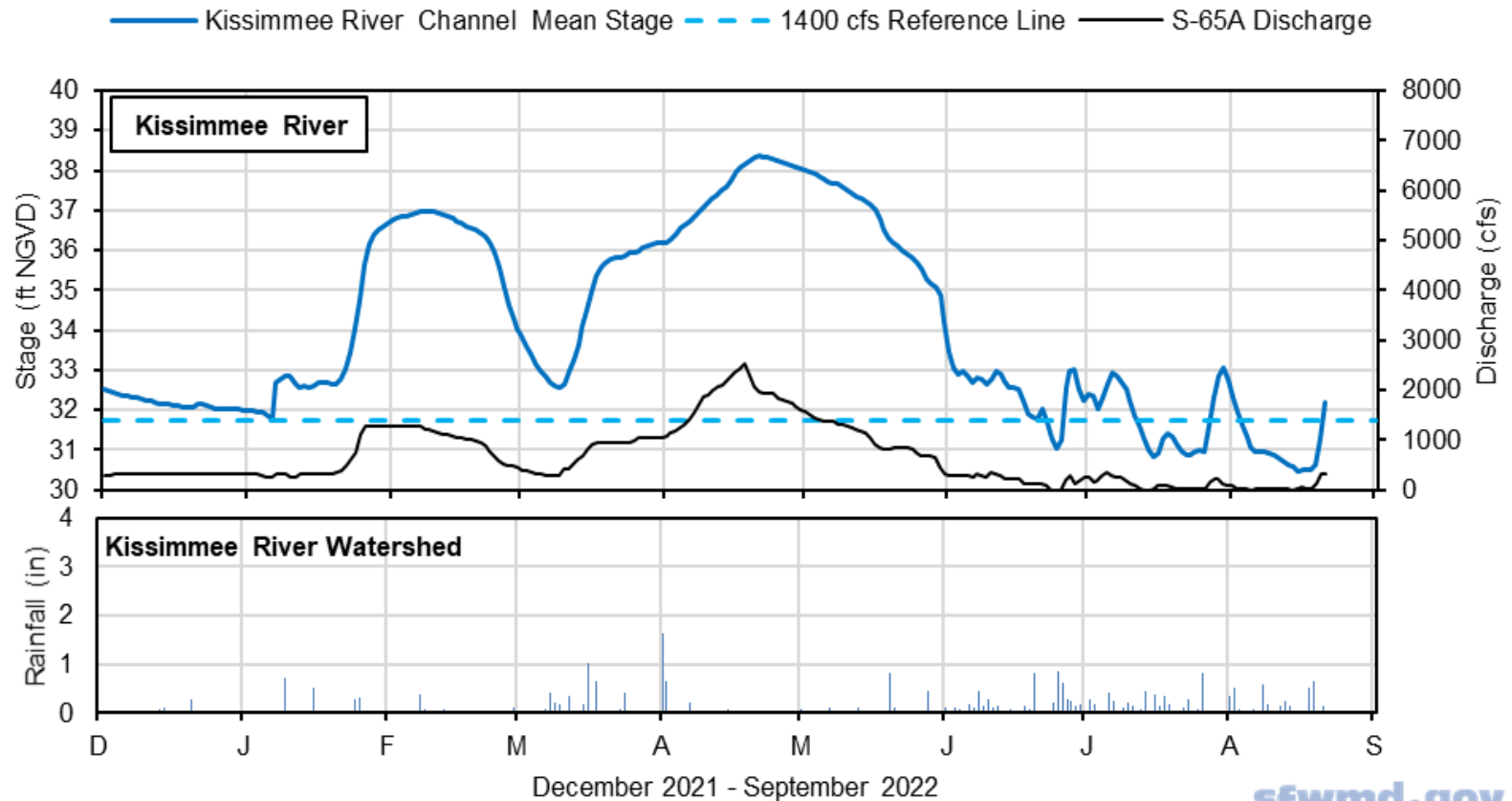
c. Average stage from S-65D and S-65DX1.

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).

Stage and Discharge Hydrograph (report date: 8/23/2022; data through: 8/21/2022)



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

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

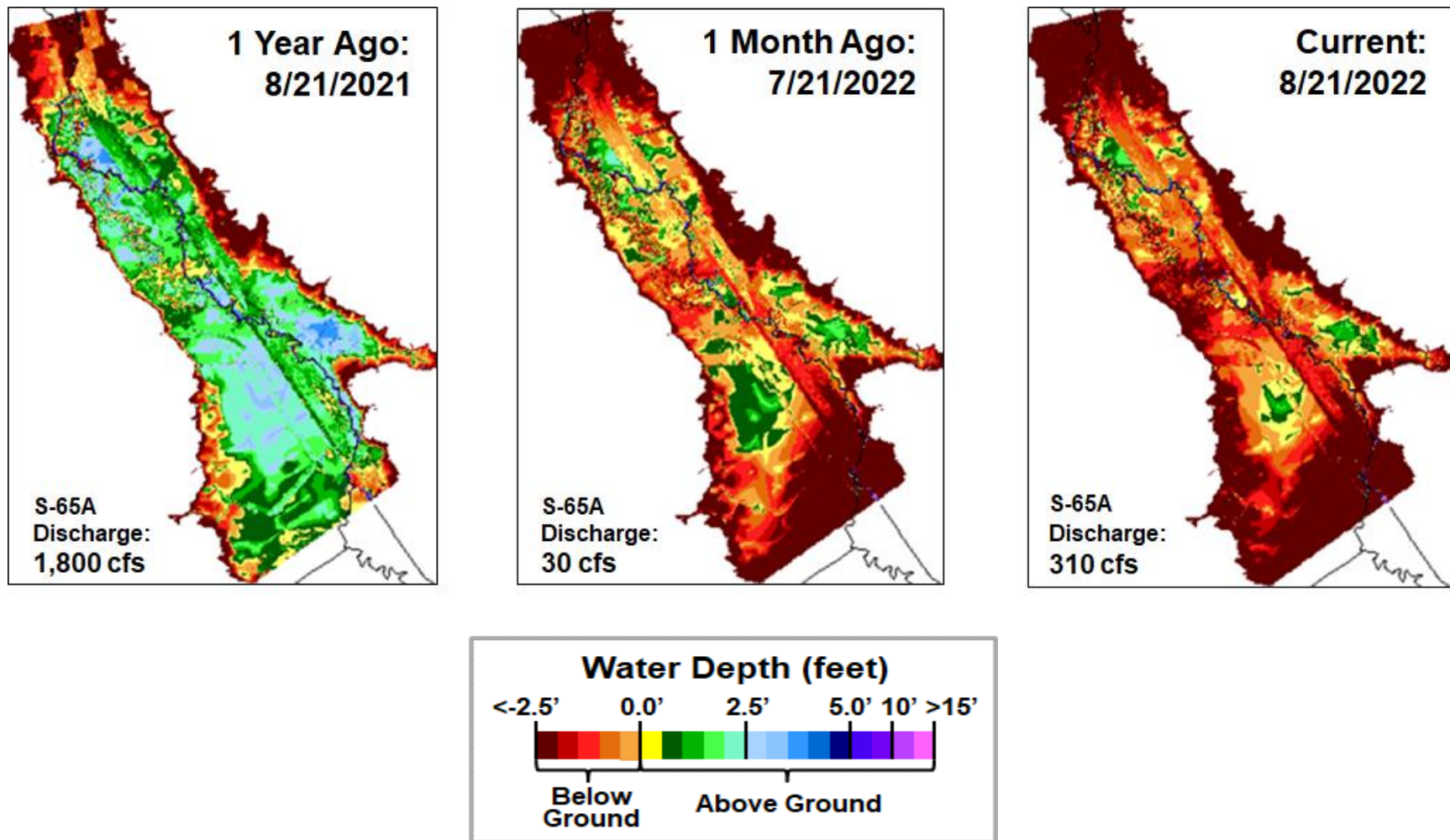
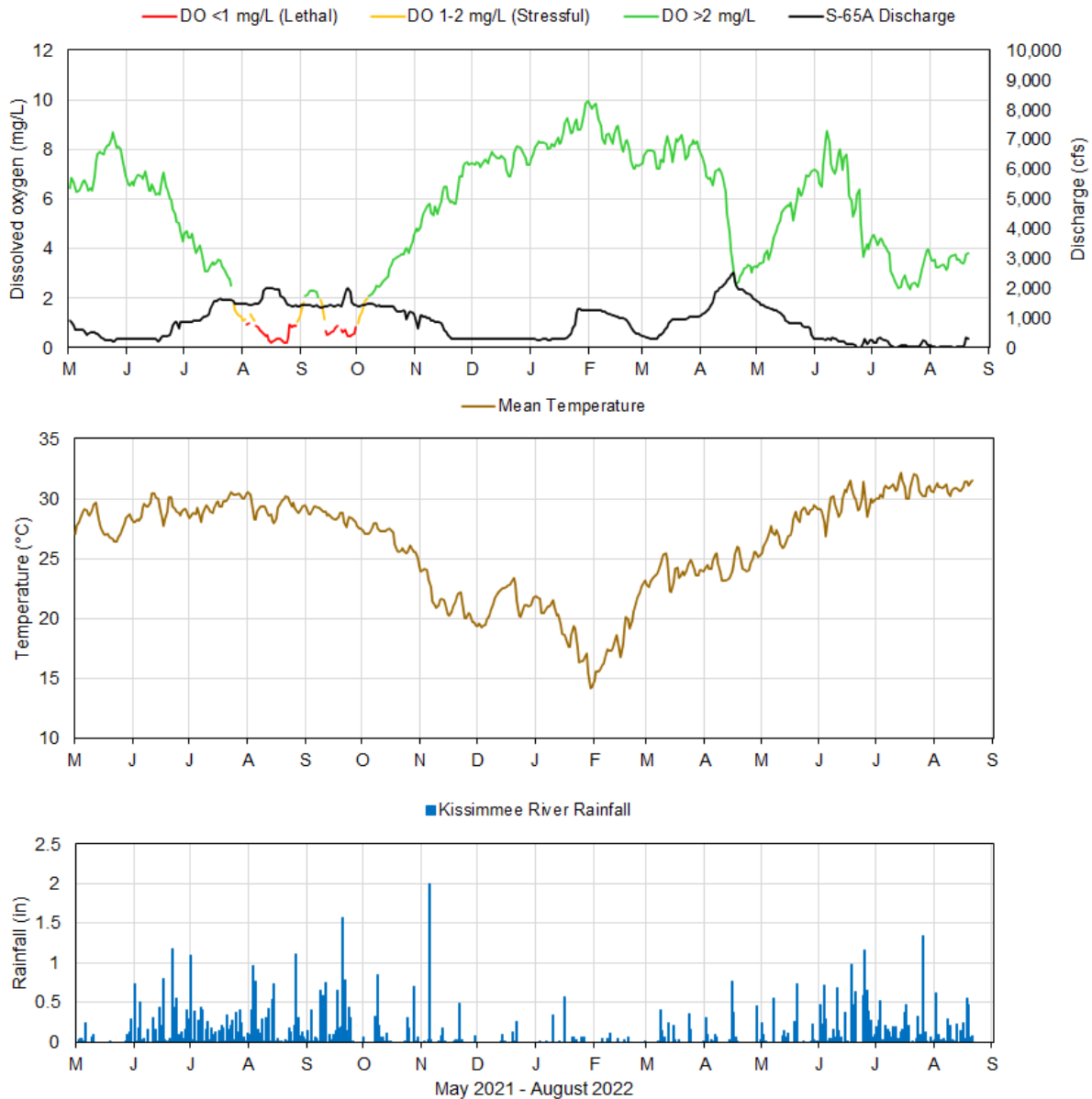


Figure KB-5. Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.



Report Date: 8/23/2022; data are through: 8/21/2022

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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 two stations reporting this week. Rainfall values are daily totals for Kissimmee River (Pool BCD) AHED watershed.

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.

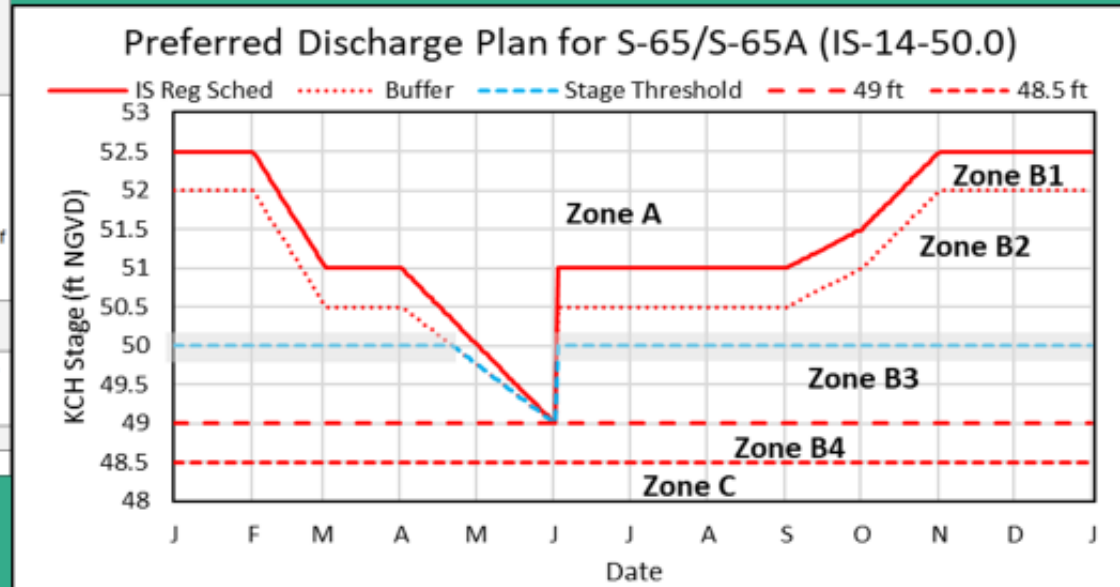
*Changes in discharge should not exceed limits in inset table below.

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

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 12.67 feet NGVD on August 21, 2022, with water levels 0.37 feet lower than a month ago (**Figure LO-1**). Lake stage was in the Base Flow sub-band (**Figure LO-2**) and less than one foot above the Water Shortage Management band. Lake stage remained within the ecological envelope where it has been for approximately 90% of 2022 (**Figure LO-3**). According to NEXRAD, 0.36 inches of rain fell directly on the Lake last week.

Average daily inflows (excluding rainfall) increased from the previous week from 170 cfs to 247 cfs. Average daily outflows (excluding evapotranspiration) decreased from 1,397 cfs to 932 cfs. The highest inflow came from the Kissimmee River/C-38 Canal via the S-65E and S-65EX1 structures (86 cfs). Outflows to the west via the S-77 into the C-43 Canal averaged 24 cfs, to the southeast via the S-271 into the L-8 Canal was 88 cfs, and to the south via S-350 structures was 820 cfs. There was no outflow to the east via the S-308 structure. **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 (August 21, 2022) from NOAA's Harmful Algal Bloom Monitoring System showed that bloom potential was medium to high in the northern region and western and southwestern nearshore areas of the Lake (**Figure LO-6**). The bloom potential was lower along the eastern nearshore areas of the Lake last week compared to the previous week. Prevailing winds were from the western, eastern, and southeastern directions. The August 15-17 routine phytoplankton monitoring survey on the Lake revealed that all sites had total microcystin concentrations below detection limit. Cylindrospermopsin toxin was detected at the EASTSHORE, NES135, NES191 and POLESOUT1 locations. The highest concentration of cylindrospermopsin was detected at NES135 (0.33 µg/L). All values were below the U.S.EPA standard for recreational waters (15 µg/L). Communities at 66% of the sites were mixed, at 22% of the sites were dominated by *Microcystis aeruginosa*, at 6% of sites by *Cylindrospermopsis raciborskii*, and at 3% of the sites they were co-dominated by *C. raciborskii* and *Dolichospermum circinale*.

Changes in Water Depth

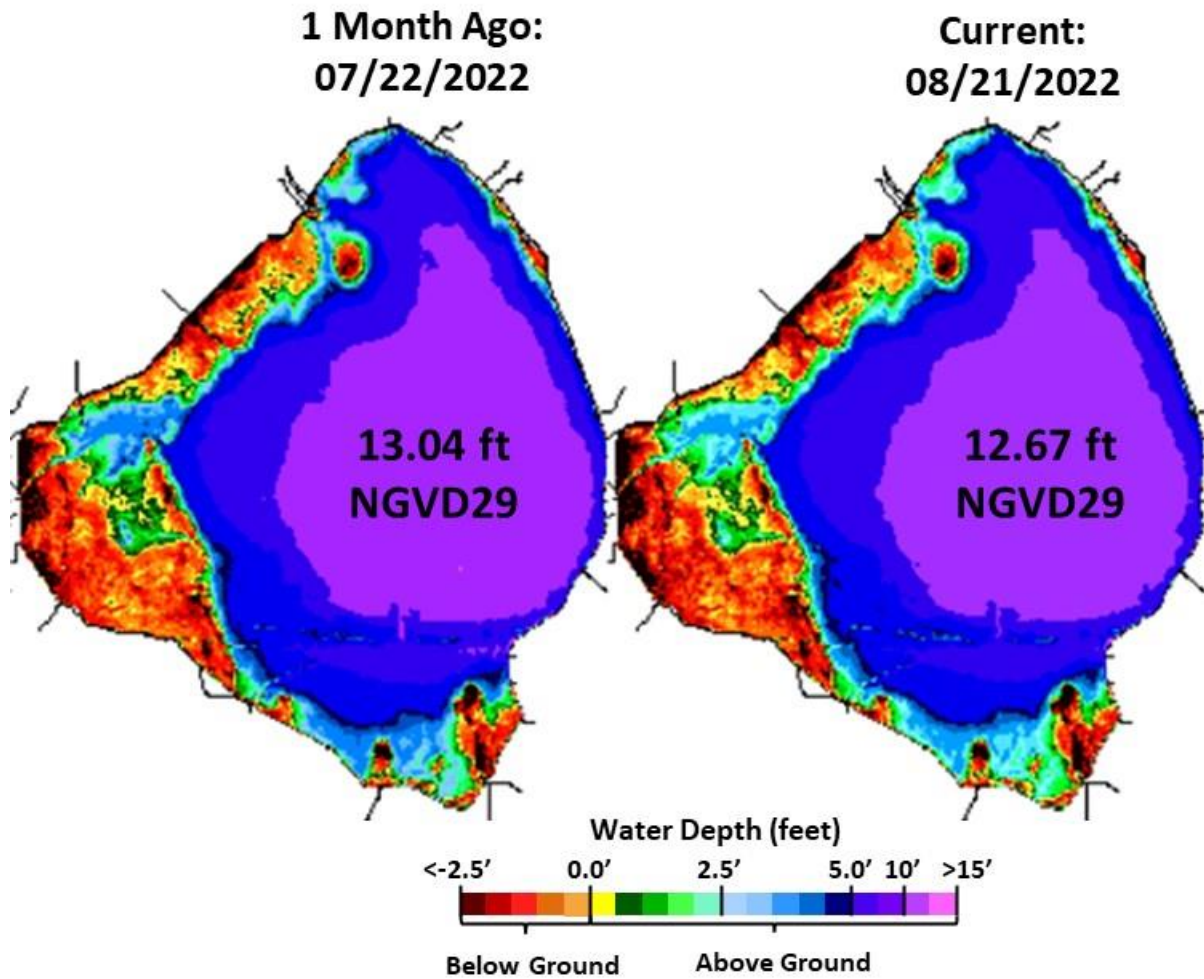


Figure LO-1. Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

Lake Okeechobee Water Level History and Projected Stages

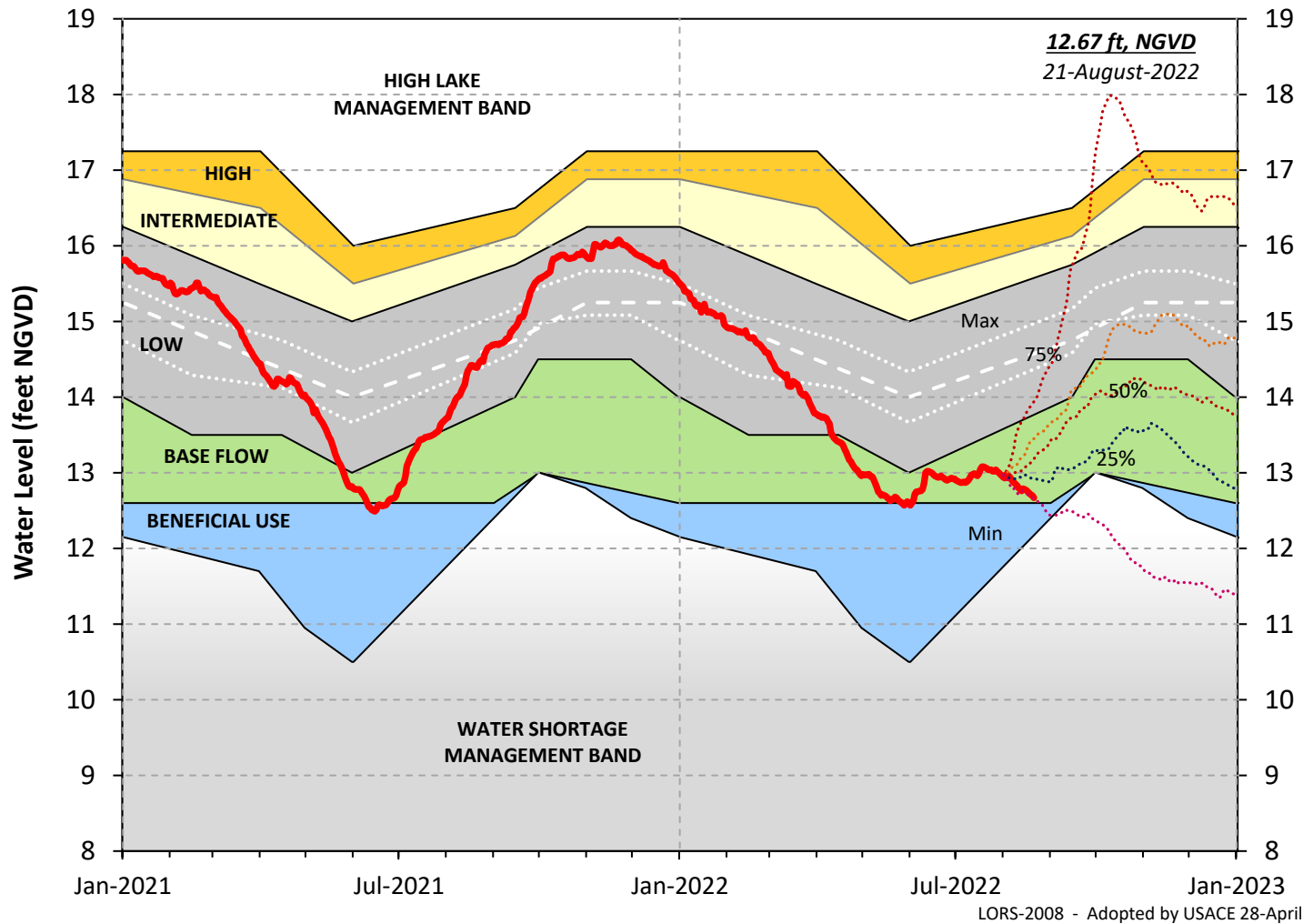


Figure LO-2. Recent Lake Okeechobee stages with projected stages based on a dynamic position analysis.

LORS-2008 - Adopted by USACE 28-April-

Lake Okeechobee Stage vs Ecological Envelope

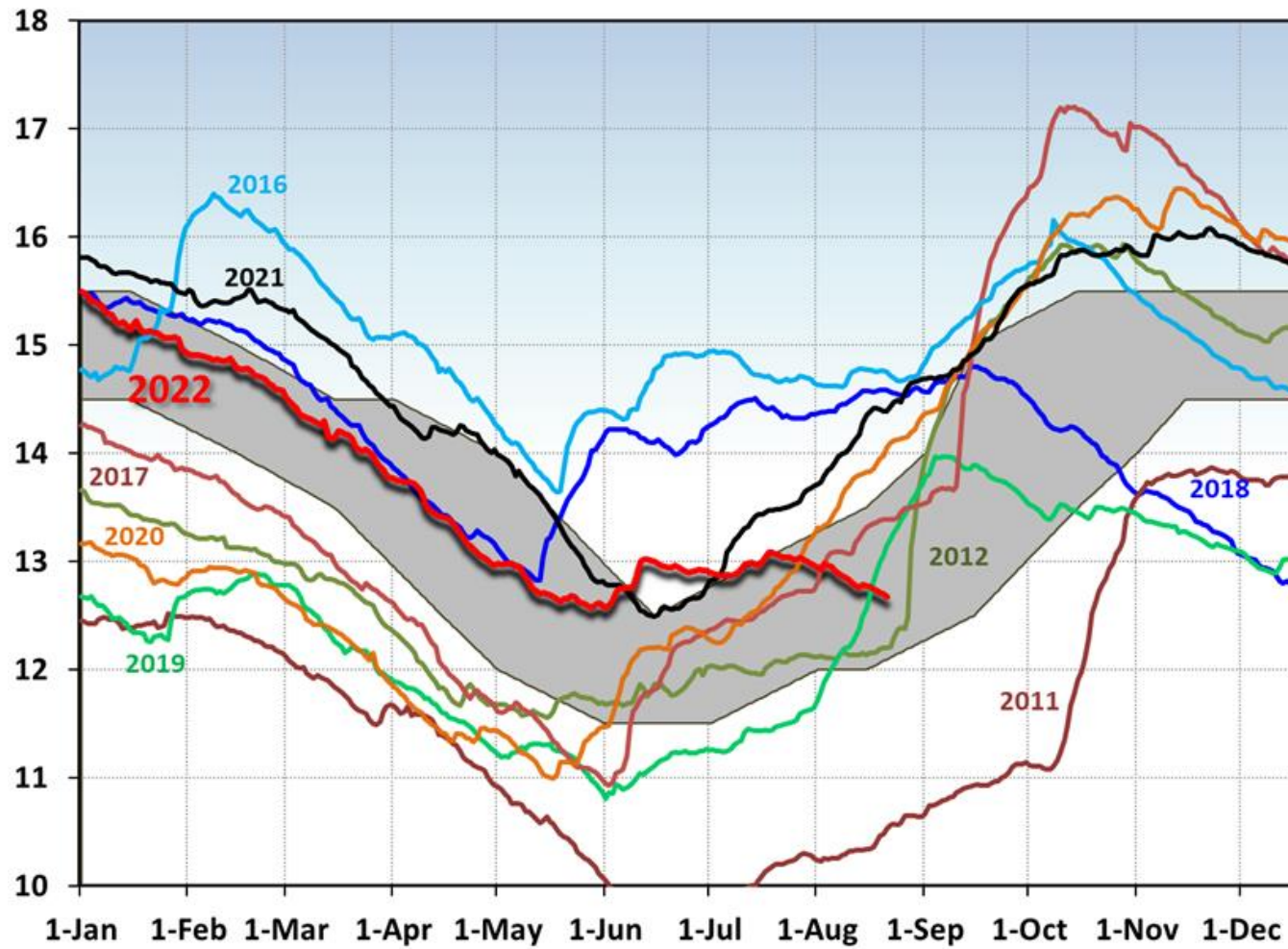


Figure LO-3. The prior six years of annual stage hydrographs for Lake Okeechobee in comparison to the ecological envelope.

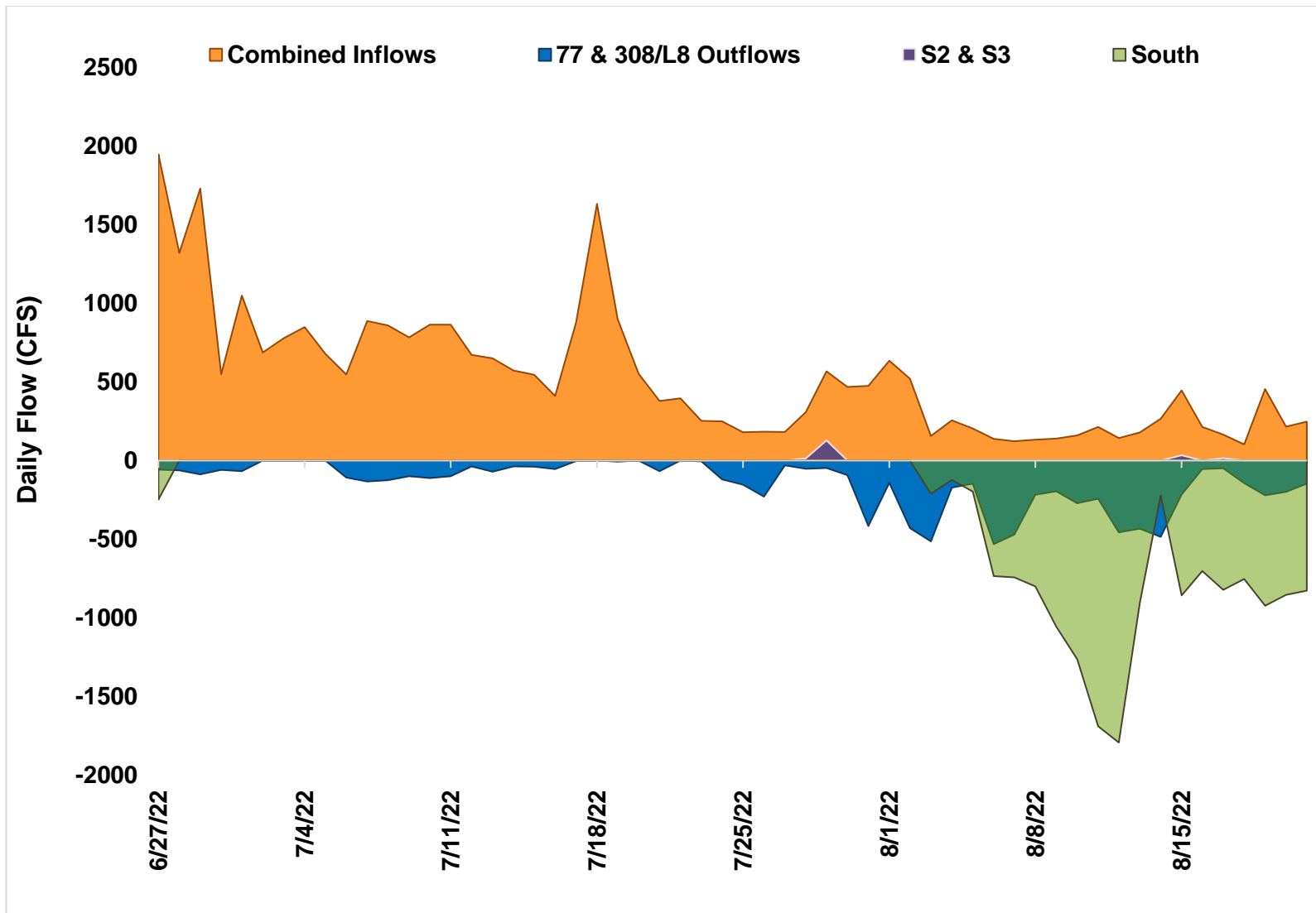


Figure LO-4. Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows from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

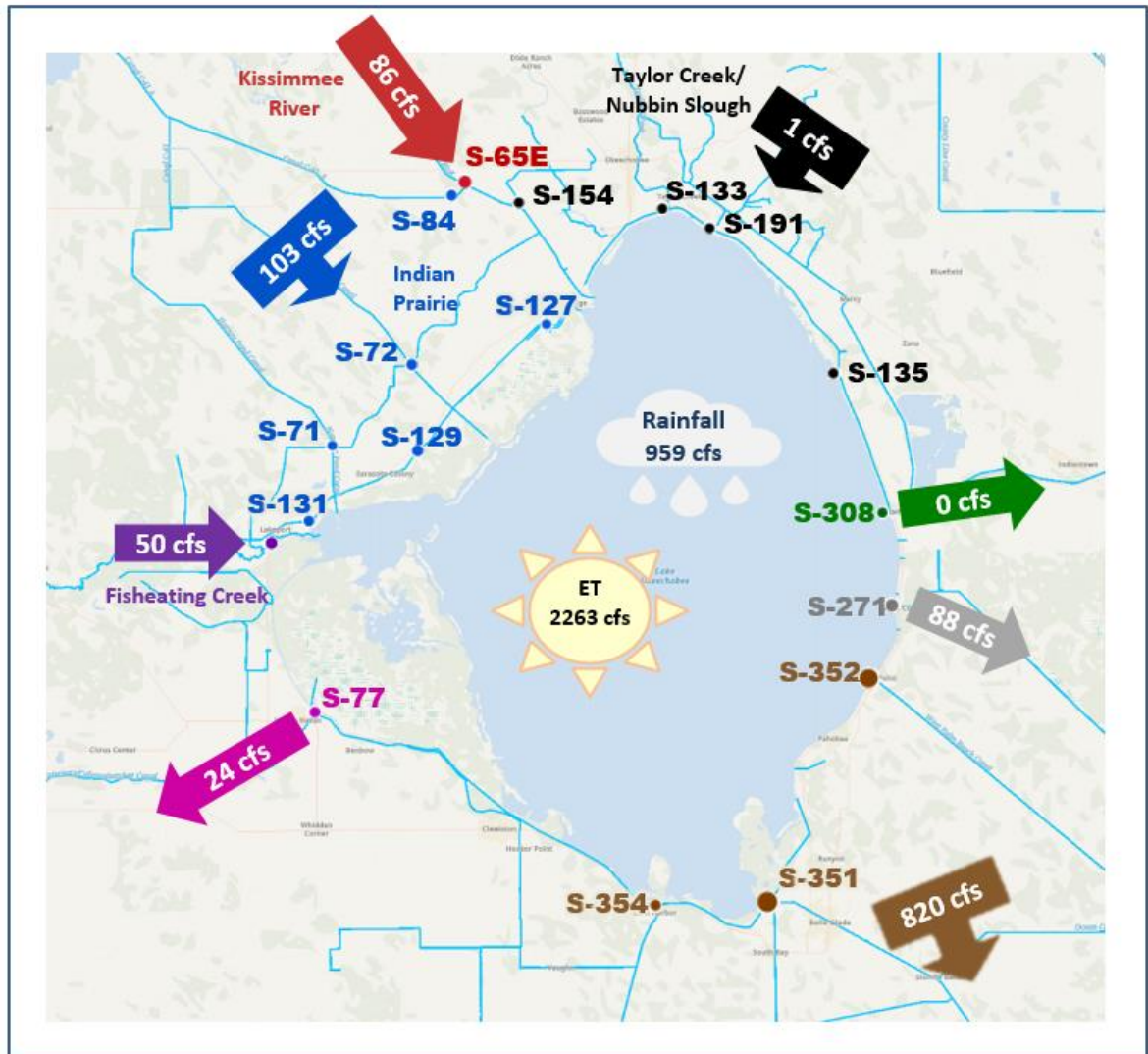


Figure LO-5. Inflows into Lake Okeechobee from Indian Prairie basins, Taylor Creek/Nubbin Slough, Kissimmee River and Fisheating Creek, and outflows to the west via S-77, to the east via S-308, to the south via S-351, S-352, S-354, and to southeast via S-271 (formerly Culvert 10A) for the week of August 15-21, 2022.

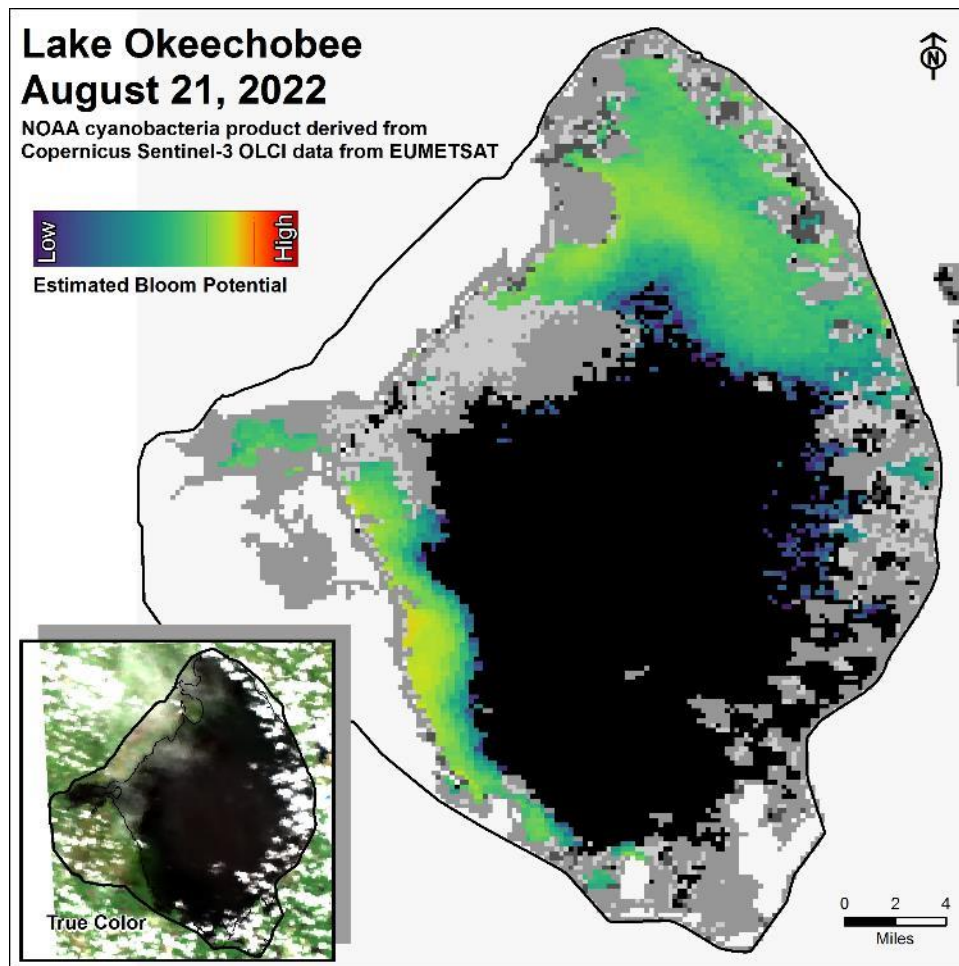


Figure LO-6. Cyanobacteria bloom potential on August 21, 2022 based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

Estuaries

St. Lucie Estuary

Over the past week, mean total inflow to the St. Lucie Estuary was 432 cfs (**Figures ES-1 and ES-2**) and the previous 30-day mean inflow was 266 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-2**.

Over the past week, salinities remained the same at the A1A Bridge site and increased at HR1 and US1 Bridge sites (**Table ES-1 and Figure ES-3**). The seven-day moving average of the surface and bottom salinities at the US1 Bridge was 22.2. 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 2.4 spat/shell in July (**Figure ES-5**).

Caloosahatchee River Estuary

Over the past week, mean total inflow to the Caloosahatchee River Estuary was 1,149 cfs (**Figures ES-6 and ES-7**), and the previous 30-day mean inflow was 1,202 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-7**.

Over the past week, salinities decreased at all 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 Cape Coral, and in the stressed range at Shell Point and Sanibel (**Figure ES-10**). The mean larval oyster recruitment rate reported by the Fish and Wildlife Research Institute was 4.5 spat/shell at Iona Cove and 17.9 spat/shell at Bird Island in July (**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 steady releases at 2,000 cfs with estimated tidal basin inflows of 560 cfs. Model results from all scenarios predict daily salinity to be 6.0 or lower and the 30-day moving average surface salinity to be 2.8 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.

Red Tide

The Florida Fish and Wildlife Research Institute reported on August 19, 2022, that *Karenia brevis*, the Florida red tide dinoflagellate, was not observed in any samples collected within the District region. On the east coast, red tide was not present in any samples from Palm Beach or Miami-Dade counties.

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.

Water Management Recommendations

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

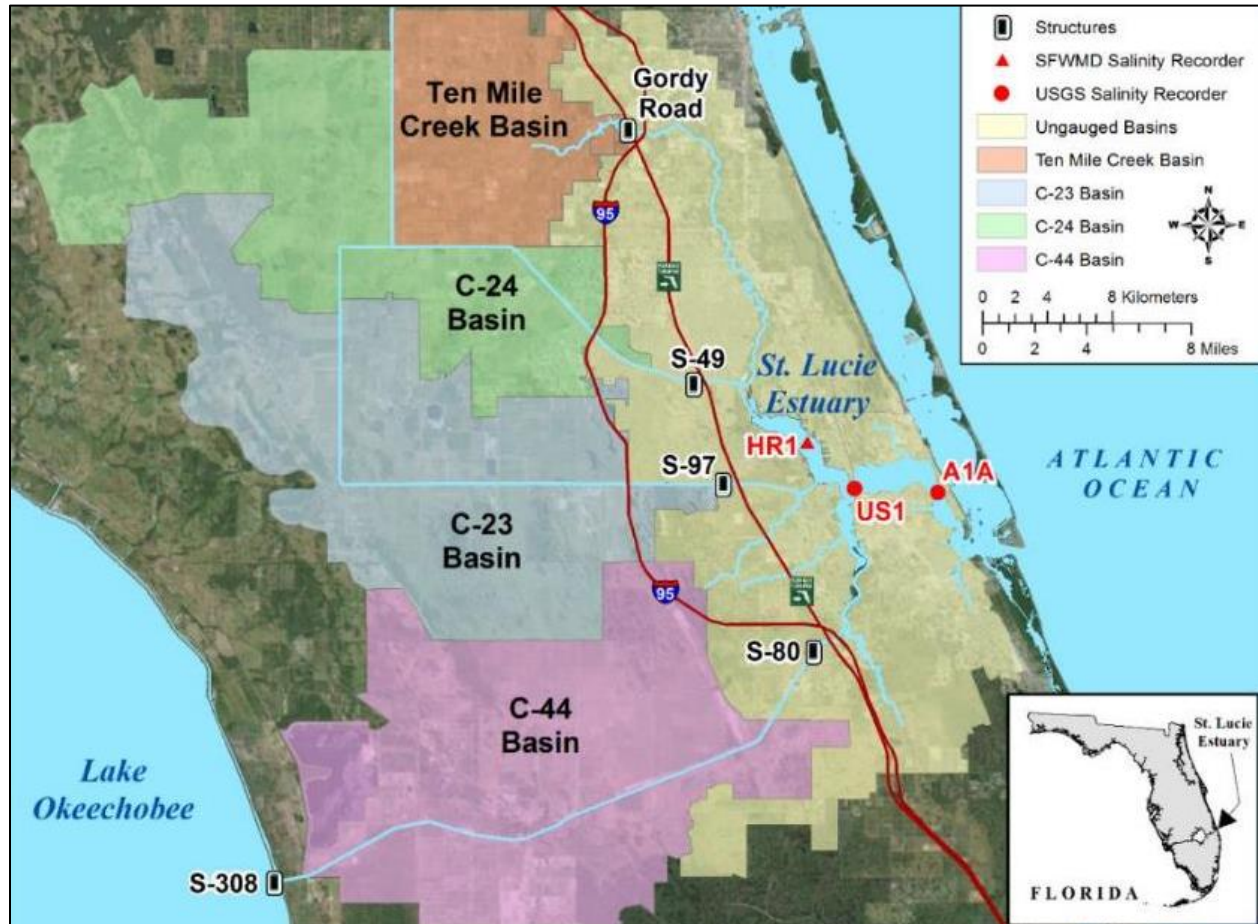


Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

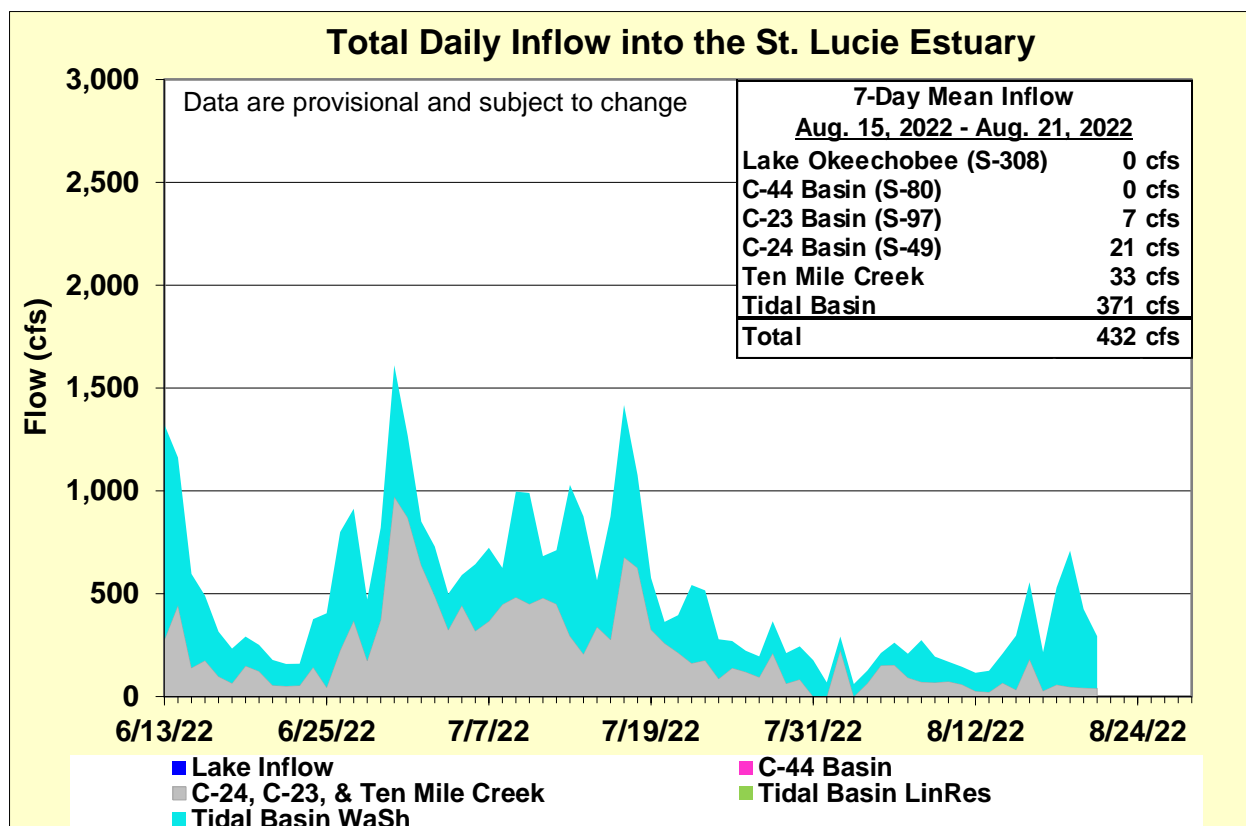


Figure ES-2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

Table ES-1. Seven-day mean salinity at oyster monitoring sites in the St. Lucie Estuary. Current means are in bold font; previous week's means are in parentheses. The envelope reflects the optimum salinity range for adult eastern oysters (*Crassostrea virginica*) in the estuary. Data are provisional.

Sampling Site	Surface	Bottom	Optimum Envelope
HR1 (North Fork)	16.3 (10.8)	19.2 (14.5)	10.0 – 25.0
US1 Bridge	21.7 (19.3)	22.7 (20.1)	10.0 – 25.0
A1A Bridge	28.6 (28.0)	30.0 (30.1)	10.0 – 25.0

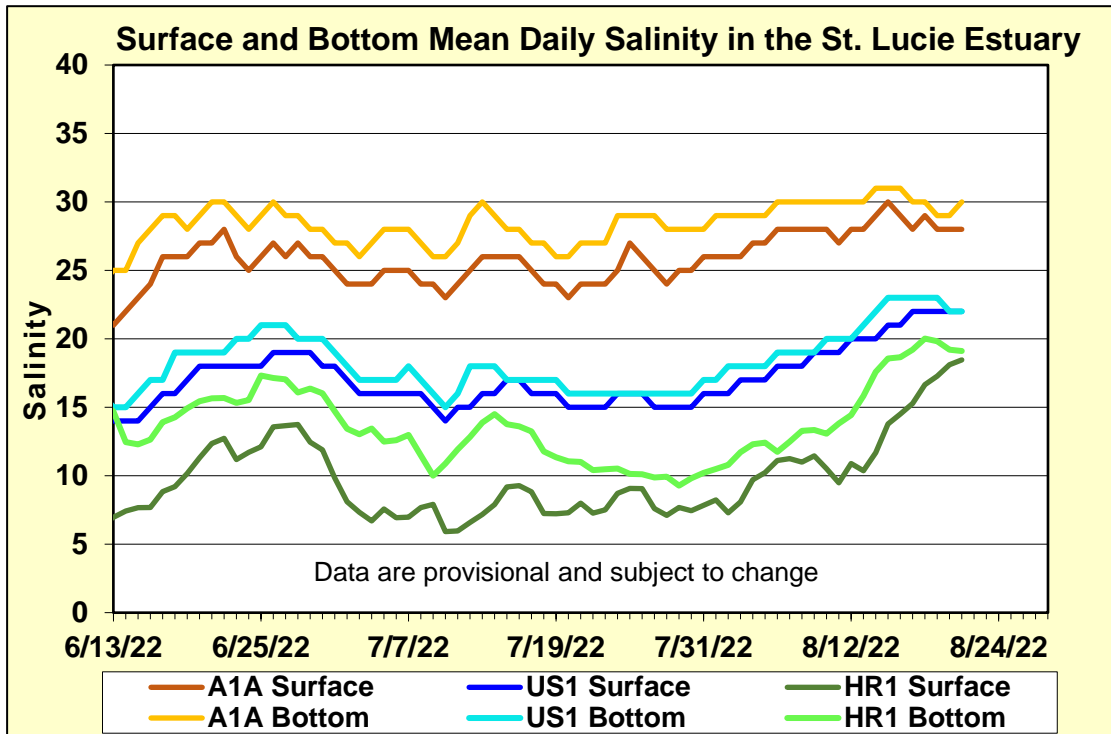


Figure ES-3. Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

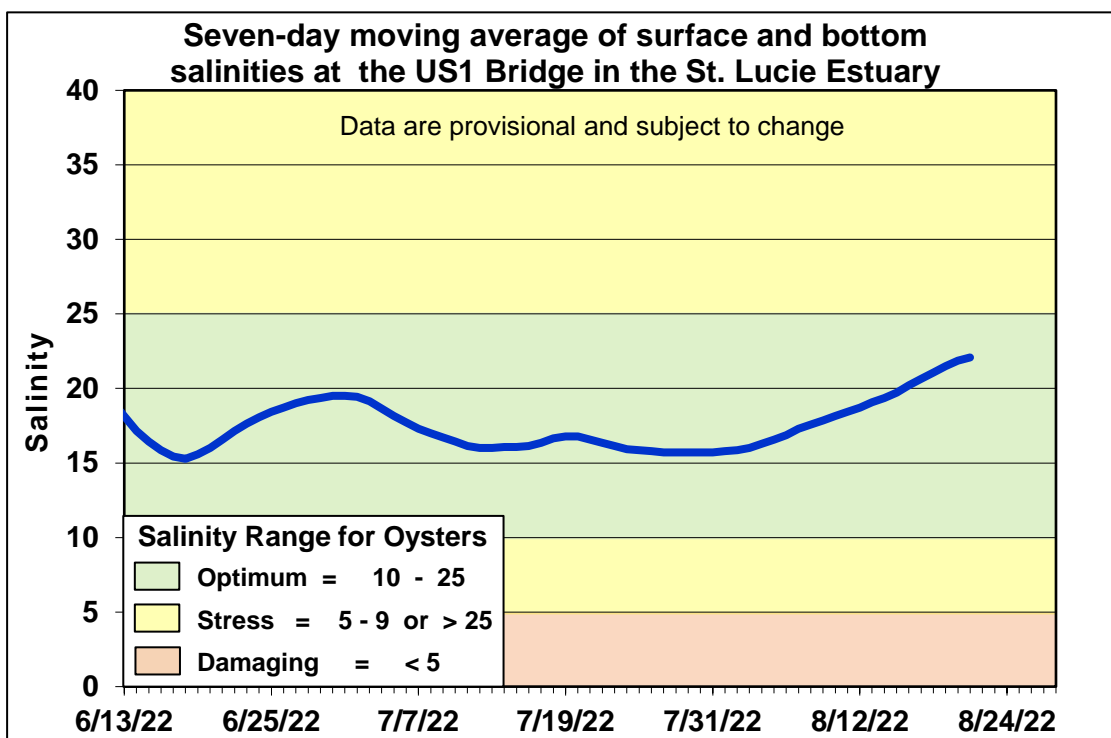


Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

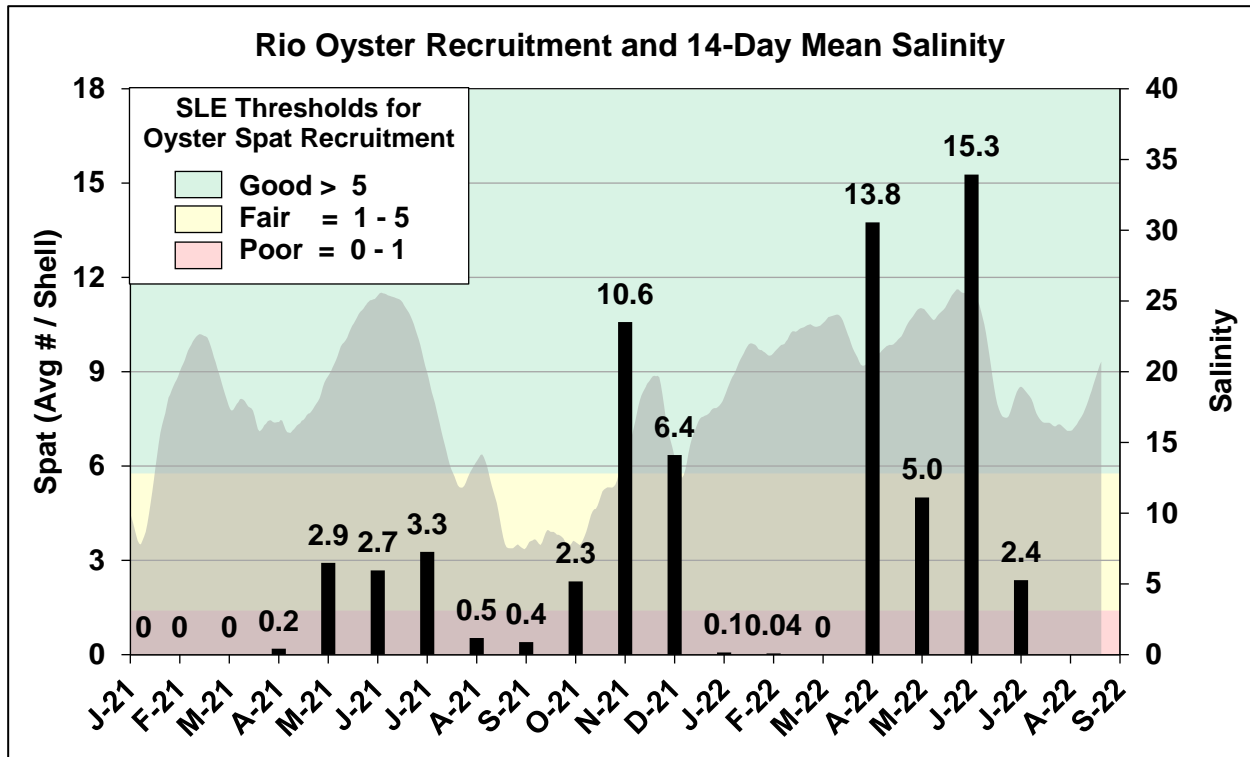


Figure ES-5. Mean oyster recruitment at the Rio oyster monitoring station and 14-day mean salinity at US1 Bridge.

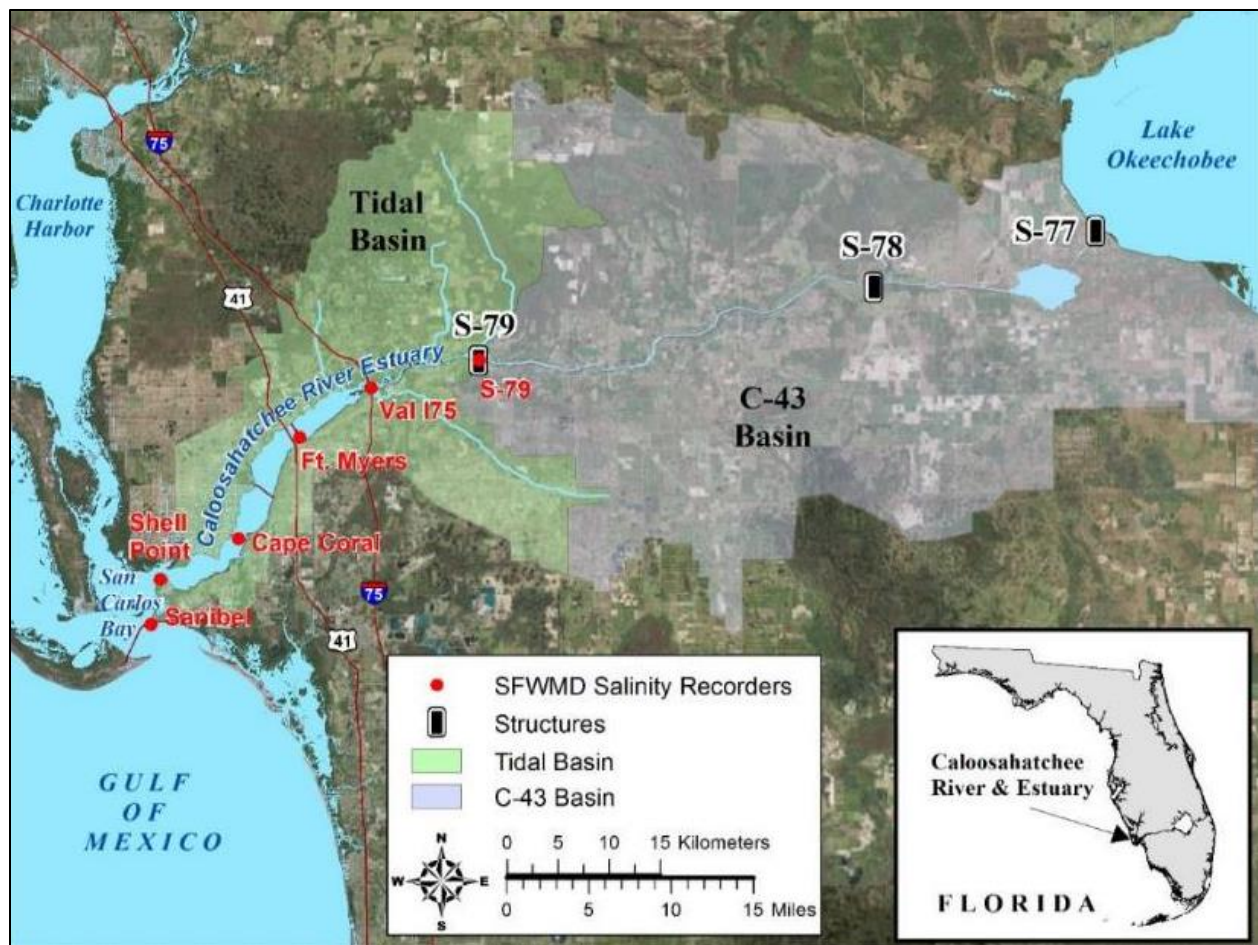


Figure ES-6. Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.

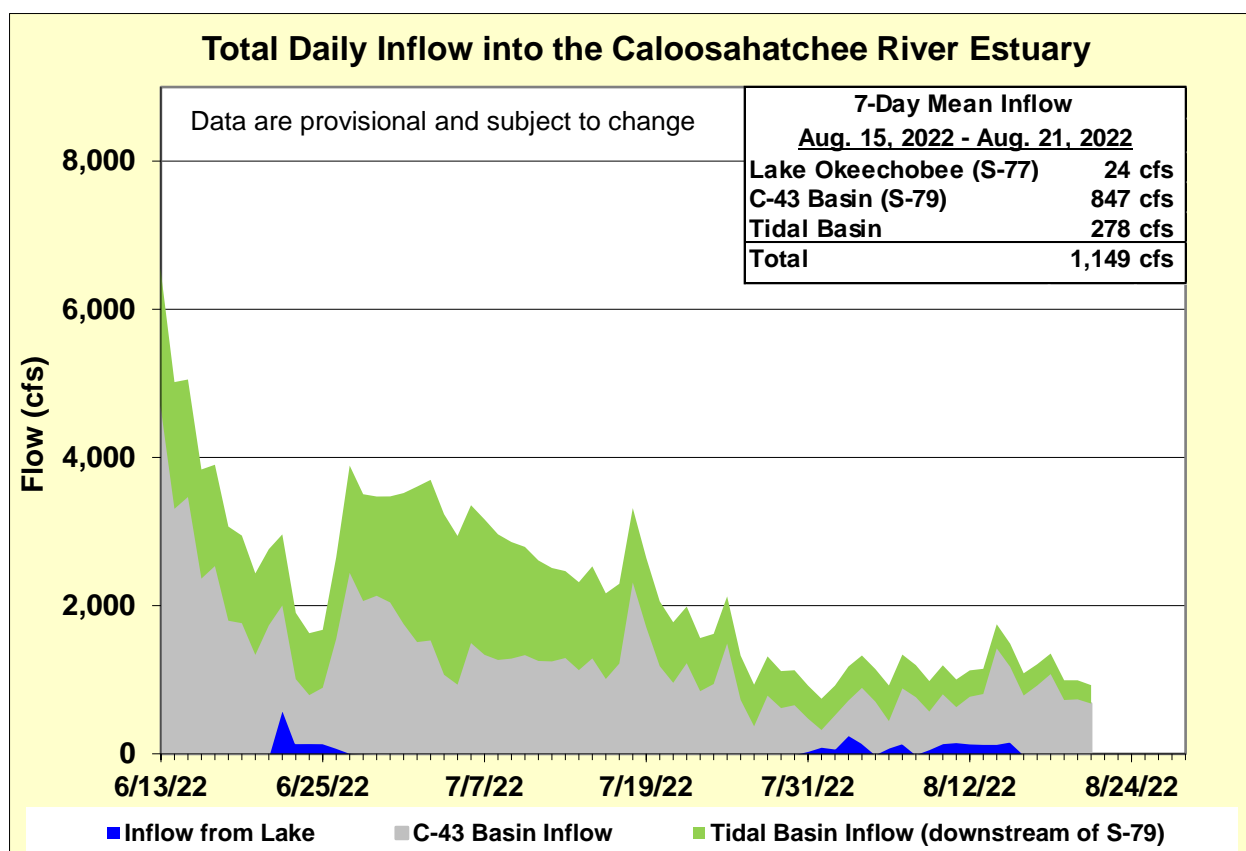


Figure ES-7. Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

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. Note that bottom sensors at Val I-75 are not reporting (NR) as of July 29, 2022.

Sampling Site	Surface	Bottom	Optimum Envelope
S-79 (Franklin Lock)	0.4 (1.2)	0.4 (1.2)	0.0 – 10.0
Val I-75	1.0 (1.3)	NR	0.0 – 10.0
Fort Myers Yacht Basin	5.1 (5.9)	6.7 (7.3)	0.0 – 10.0
Cape Coral	12.1 (12.3)	13.8 (14.1)	10.0 – 25.0
Shell Point	25.0 (26.1)	25.5 (27.0)	10.0 – 25.0
Sanibel	31.0 (31.2)	31.0 (32.0)	10.0 – 25.0

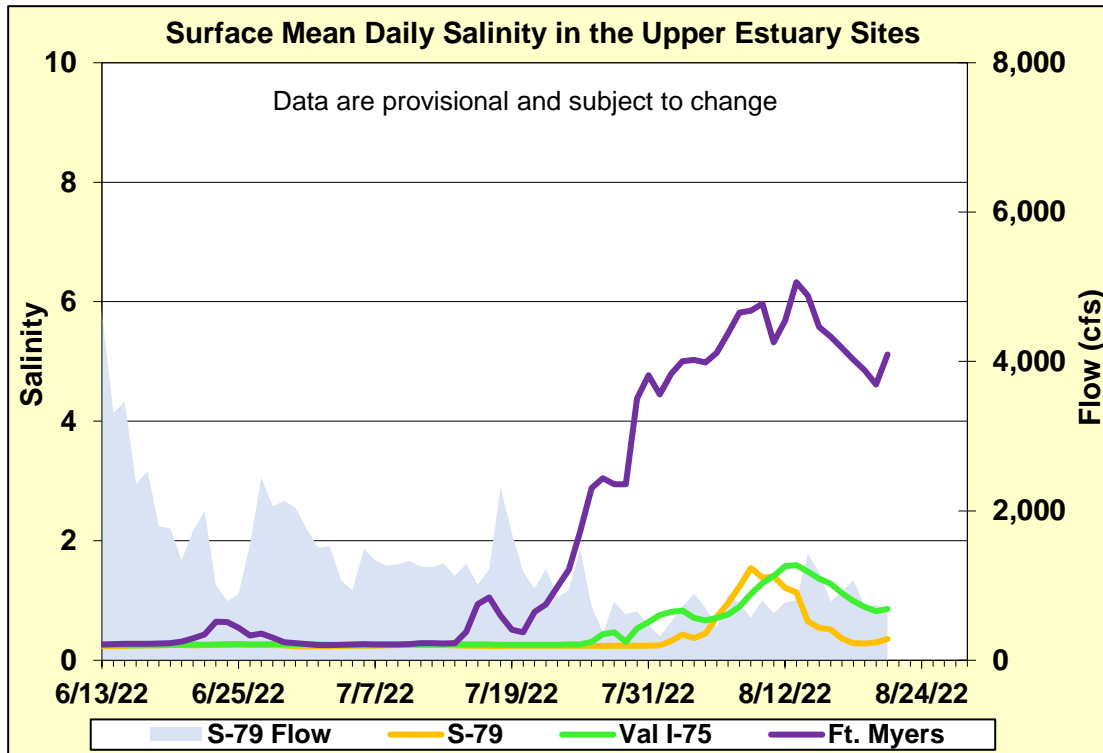


Figure ES-8. Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

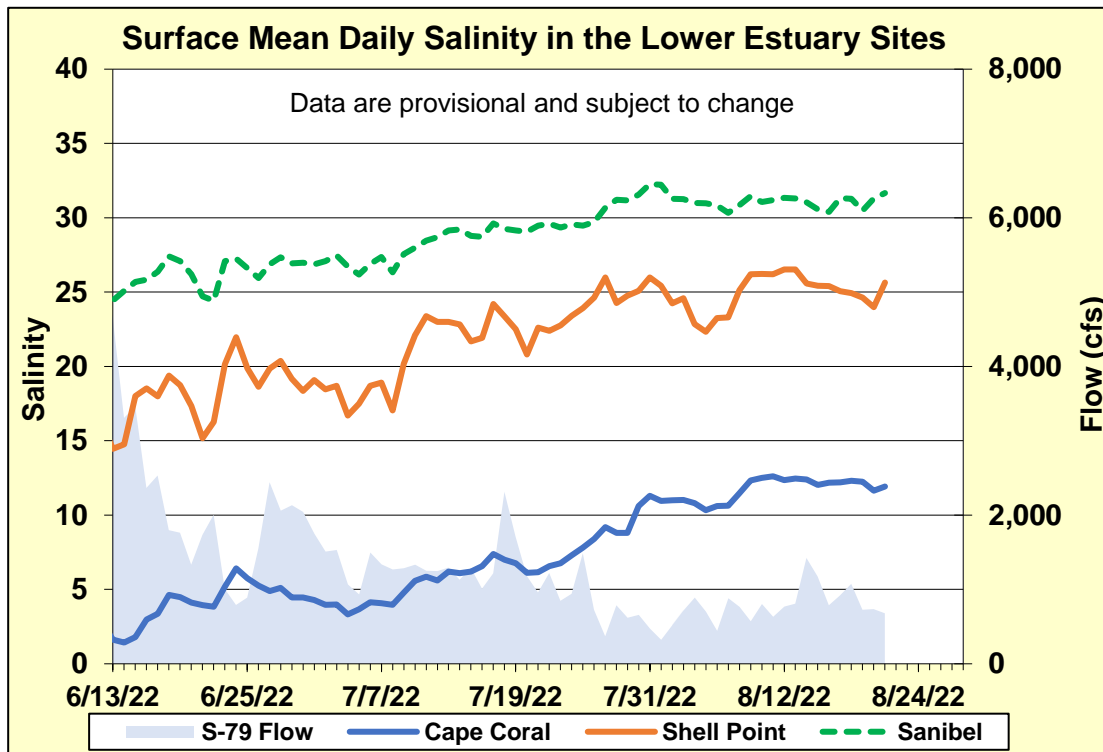


Figure ES-9. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

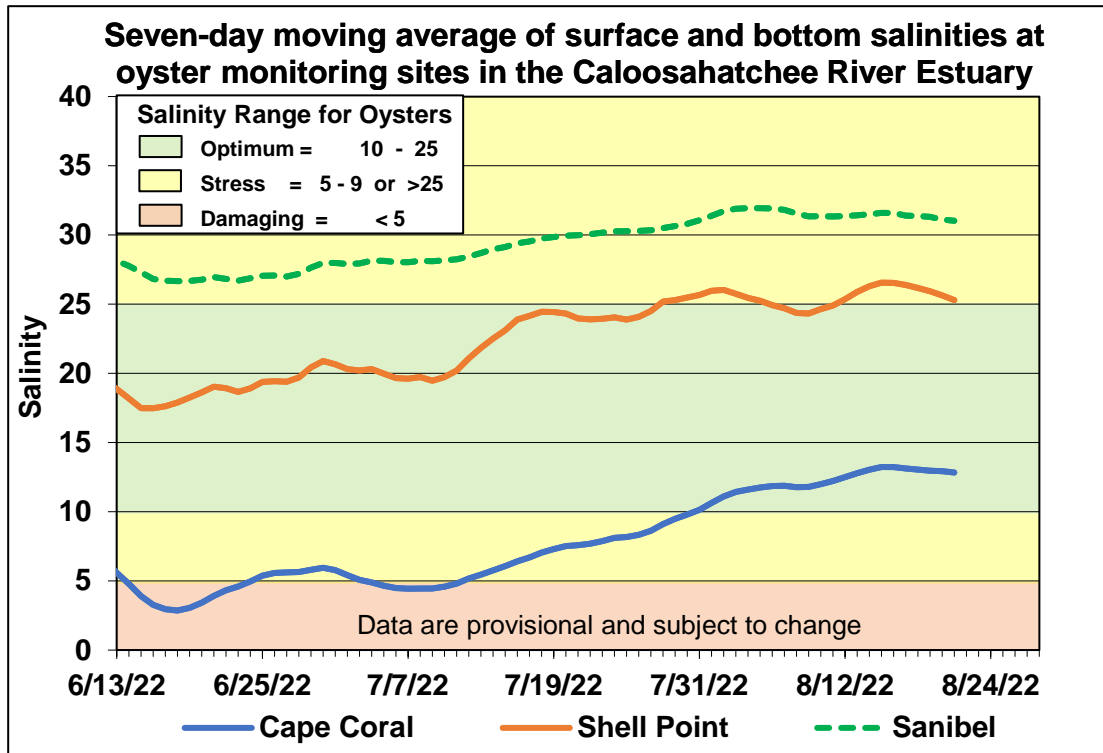


Figure ES-10. Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

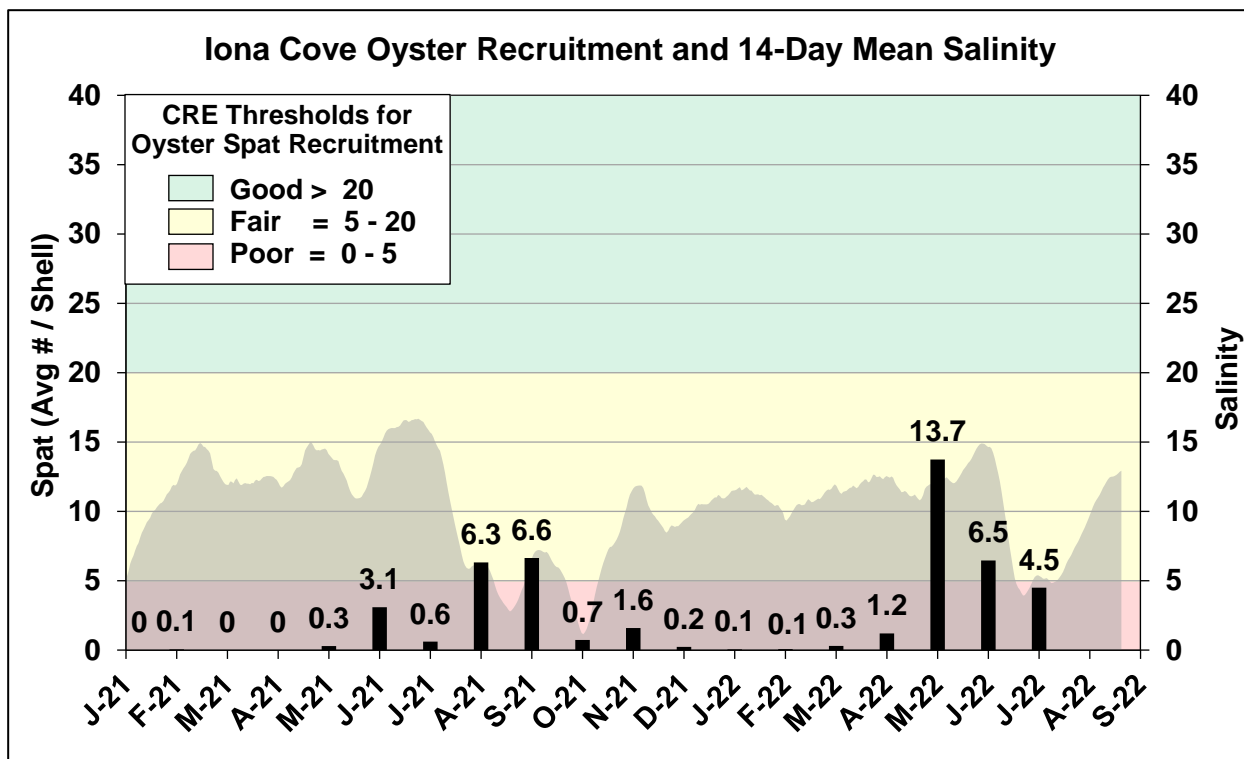


Figure ES-11. Mean oyster recruitment at the Iona Cove oyster monitoring station and 14-day mean salinity at Cape Coral.

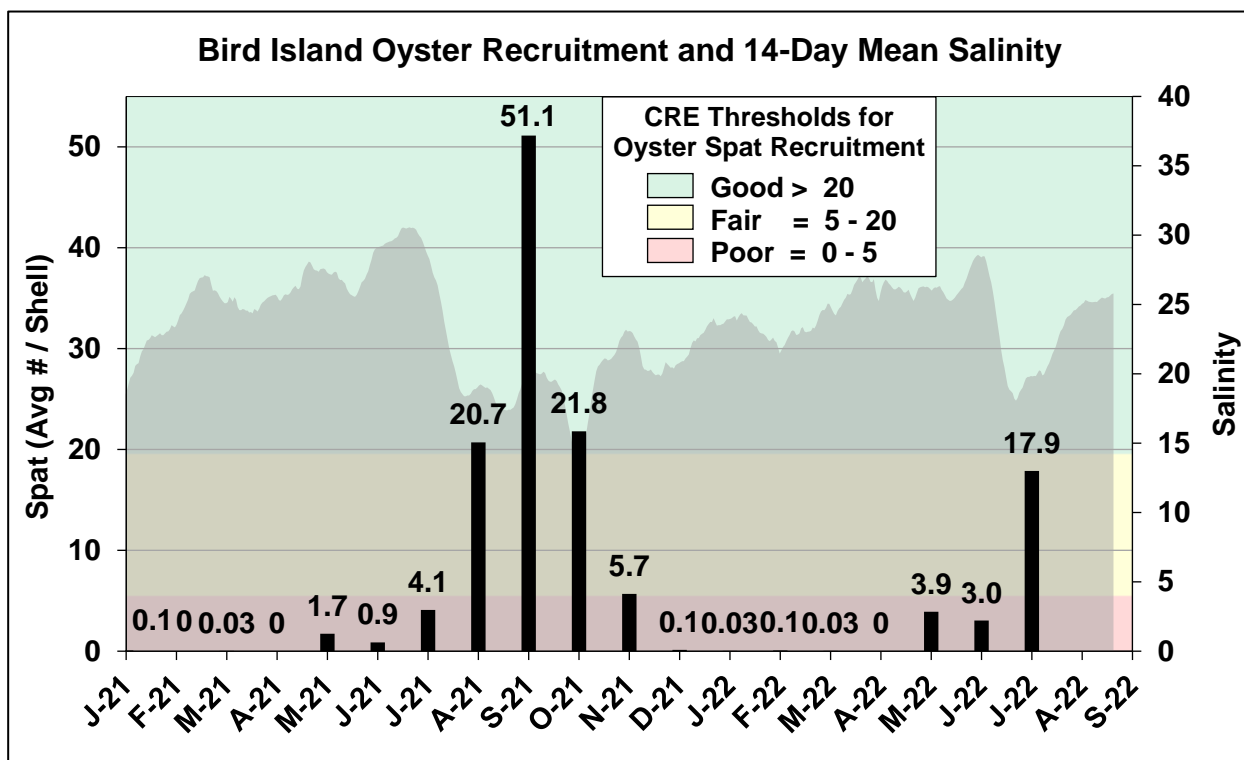


Figure ES-12. Mean oyster recruitment at the Bird Island oyster monitoring station and 14-day mean salinity at Shell Point.

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	561	6.0	2.8
B	450	561	4.4	2.4
C	800	561	3.4	2.1
D	1000	561	2.4	1.9
E	1500	561	1.4	1.6
F	2000	561	0.6	1.4

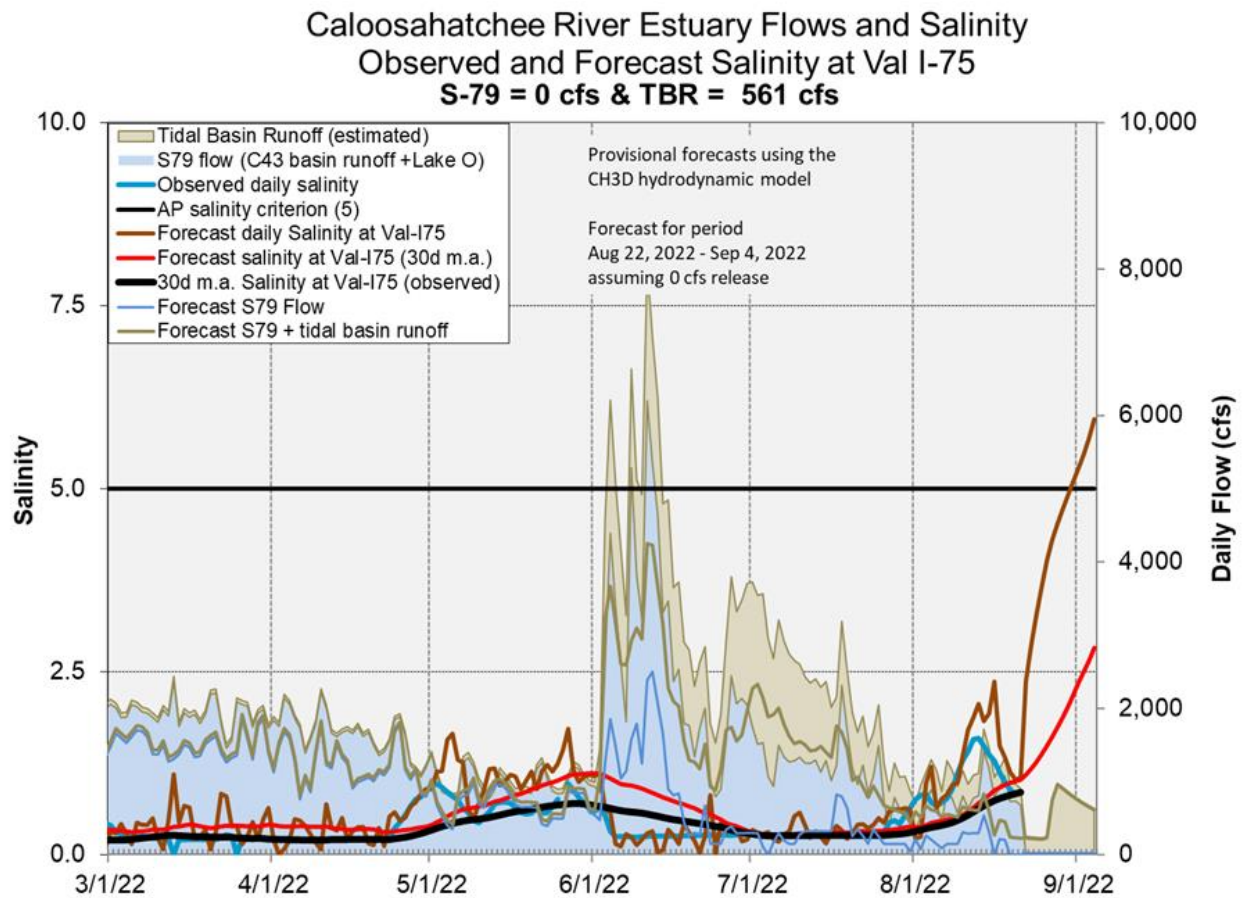


Figure ES-13. Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

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 near or below 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 $1.0 \text{ g/m}^2/\text{year}$ (**Figure S-2**).

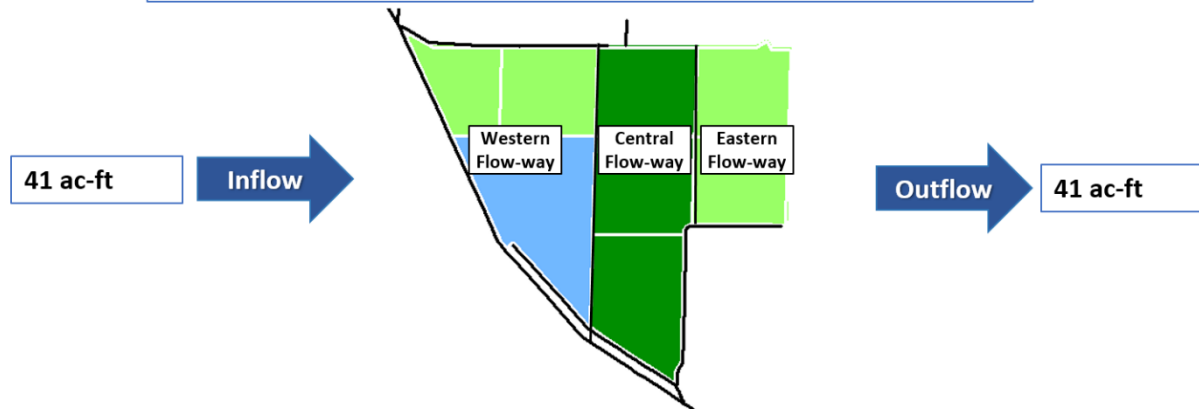
STA-2: STA-2 Flow-way 2 is offline for construction activities. Operational restrictions are in place in STA-2 Flow-ways 3 and 4 for vegetation management activities. Online treatment cells are near or below target stage. Vegetation in Flow-ways 1 and 3 is stressed, and in Flow-ways 2, 4, and 5 is highly stressed. The 365-day PLRs for Flow-ways 1, 4, and 5 are at or below $1.0 \text{ g/m}^2/\text{year}$. 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 at or near target stage. Vegetation in the Eastern and Central Flow-ways is highly stressed and in the Western Flow-way is stressed. The 365-day PLRs for the Central and Western Flow-ways are below $1.0 \text{ g/m}^2/\text{year}$ (**Figure S-4**).

STA-5/6: STA-5/6 Flow-way 4 is offline for vegetation management activities. 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 online flow-ways are below $1.0 \text{ g/m}^2/\text{year}$. (**Figure S-5** and **S-6**).

For definitions on STA operational language see glossary following figures.

STA-1E Weekly Status Report – 8/15/2022 through 8/21/2022




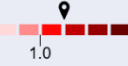





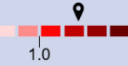





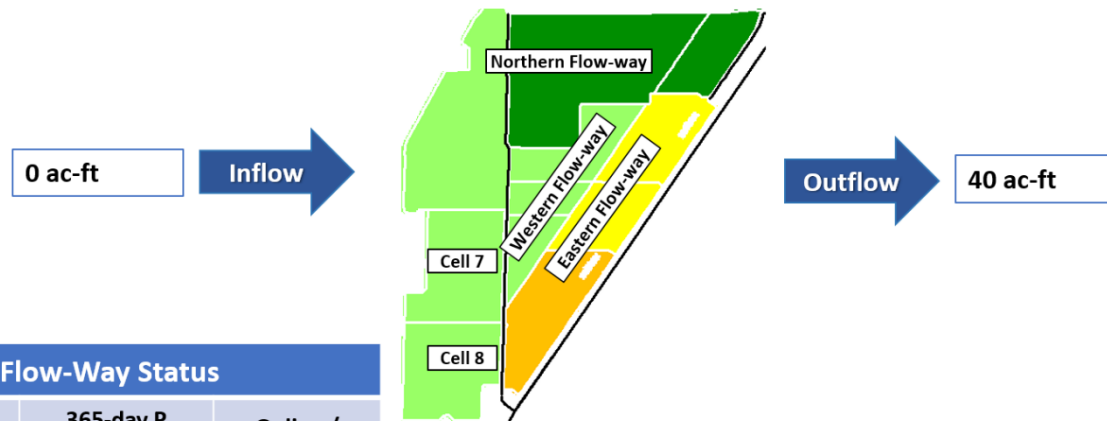
STA-1E Flow-Way Status				As of 8/21/2022				STA-1E Flow & Phosphorus Concentration			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)					7-day	28-day	365-day
Eastern	← → 		Vegetation management	 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	← → 		Vegetation rehabilitation	 Low Water Level (<0.2' below TS)	Depth / Area Based: Percent of Area Dry						
Western	Offline, post-construction grow in starting 3/28/2022			 0-25% Dry	 50-75% Dry	 25-50% Dry	 75-100% Dry	Total Inflow, ac-ft	41	1,250	177,783
								--Lake Inflow, ac-ft	0	N/A	2,600
								Total Outflow, ac-ft	41	1,649	148,199
								Inflow Conc., ppb	28	44	121
								Outflow Conc., ppb	16	20	24
								Includes Preliminary Data			

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

STA-1W Weekly Status Report – 8/15/2022 through 8/21/2022

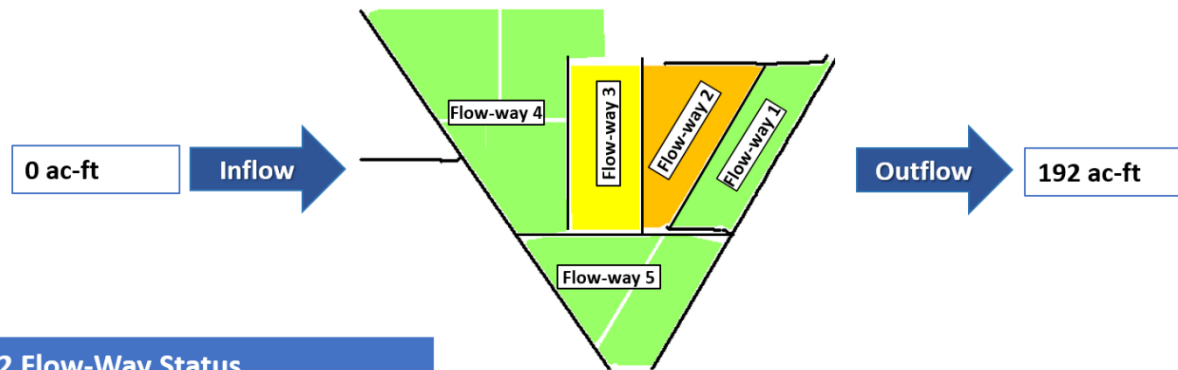


STA-1W Flow-Way Status			
Flow-Way	Vegetation Status Healthy --- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions
Northern			Vegetation management
Western			Vegetation management
Eastern			Vegetation management
Cell 7		N/A	Online
Cell 8		N/A	Construction

STA-1W Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	0	924	67,516
--Lake Inflow, ac-ft	0	N/A	2,000
Total Outflow, ac-ft	40	3,452	69,211
Inflow Conc., ppb	N/A	94	169
Outflow Conc., ppb	18	19	24
Includes Preliminary Data			

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

STA-2 Weekly Status Report – 8/15/2022 through 8/21/2022



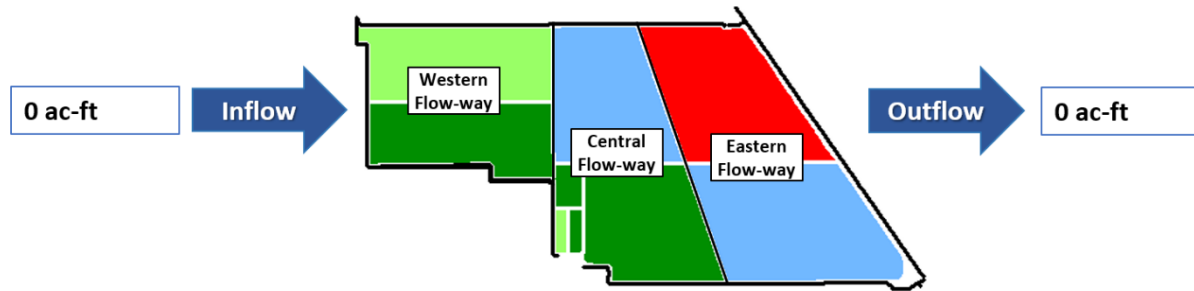
STA-2 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions
1			Online
2	Offline, construction activities as of 9/7/2021		
3			Vegetation Rehab
4			Vegetation Rehab
5			Online

As of 8/21/2022	
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	0	72	291,114
--Lake Inflow, ac-ft	0	N/A	27,600
Total Outflow, ac-ft	192	3,657	306,101
Inflow Conc., ppb	N/A	88	105
Outflow Conc., ppb	17	22	24
Includes Preliminary Data			

Figure S-3. STA-2 Weekly Status Report

STA-3/4 Weekly Status Report – 8/15/2022 through 8/21/2022





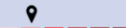









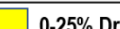

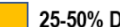
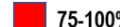
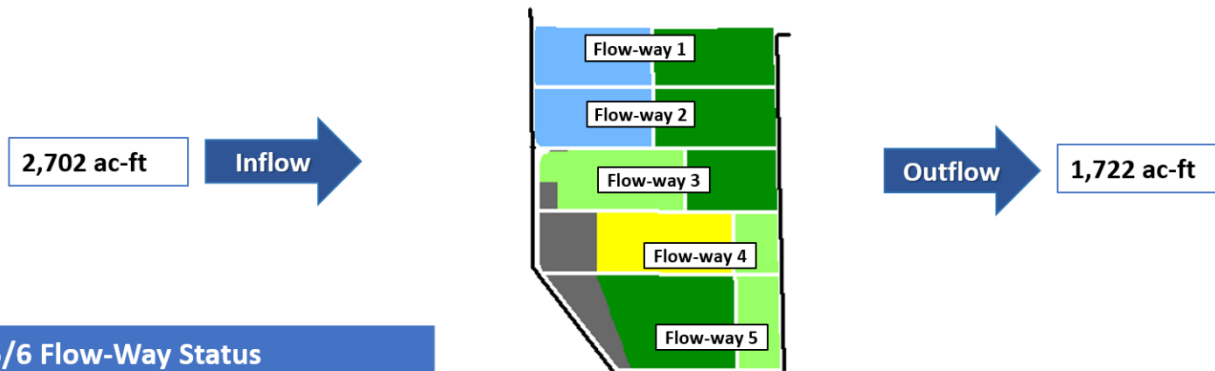
STA-3/4 Flow-Way Status				STA-3/4 Flow & Phosphorus Concentration			
Flow-Way	Vegetation Status <small>Healthy ----- Stressed</small> 	365-day P Loading Rate <small>(below 1.0 g P /m²/yr is optimal)</small>	Online / Offline / Restrictions	As of 8/21/2022			
				Stage Based: Relative to Target Stage (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		
				Includes Preliminary Data			
				Total Inflow, ac-ft			
--Lake Inflow, ac-ft							
Total Outflow, ac-ft							
Inflow Conc., ppb							
Outflow Conc., ppb							

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

STA-5/6 Weekly Status Report – 8/15/2022 through 8/21/2022



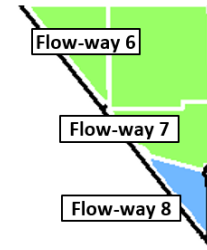
STA-5/6 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions
1	← →	1.0	Online
2	← →	1.0	Online
3	← →	1.0	Online
4	Offline, vegetation management starting 01/24/2022		
5	← →	1.0	Online

As of 8/21/2022	
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	2,702	10,315	155,063
--Lake Inflow, ac-ft	0	N/A	0
Total Outflow, ac-ft	1,722	8,187	145,593
Inflow Conc., ppb	204	223	227
Outflow Conc., ppb	16	45	49
Includes Preliminary Data			

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

STA-5/6 Weekly Status Report – 8/15/2022 through 8/21/2022



STA-5/6 Flow-Way Status				As of 8/21/2022
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			Online	Deep Water Level (> 2.8' above TS)
7			Online	High Water Level (1.5' – 2.8' above TS)
8			Online	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

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

Basic Concepts and Definitions for STA Weekly Status Report

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

Everglades

Water Conservation Area Regulation Schedules

WCA-1: Stage at the 1-8C gauge fell away from schedule over the week (but the 3 Gauge average remained stable). The average on Sunday was 0.24 feet below the rising Zone A1 regulation line. **WCA-2A:** Stage at the 2-17 gauge again declined slowly last week. The average on Sunday was 0.16 feet above the rising regulation line. **WCA-3A:** Last week the Three Gauge Average stages continued to fall below the Zone A reg line. The average stage was 0.52 feet below the rising regulation line on Sunday. **WCA-3A North:** At gauge 62 (Northwest corner) stage continues to decline, the average on Sunday was 0.91 feet below the rising Upper schedule line. (**Figures EV-1 through EV-4**).

Water Depths

The SFWDAT tool indicates that within the last month the dry conditions in the northern regions of all the major WCAs along with the southern end of Big Cypress National Preserve (BCNP) are drying down to soil surface. Along the northern reach of the L-67s depths have receded and the spatial extent of those deeper conditions are decreasing. North to South hydrologic connectivity is being maintained within all the sloughs of Everglades National Park (ENP; some decline in the western Lostman's Slough). The SFWDAT tool indicates that within the last month the dry conditions in the northern regions of all the major WCAs along with the southern end of BCNP are drying down to soil surface. Along the northern reach of the L-67s depths have receded and the spatial extent of those deeper conditions are decreasing. Comparing current WDAT water depths to one month ago most of the Everglades Protection Area (EPA) is lower with eastern WCA-3A significantly so. Looking back a year ago, northern WCA-2A and northwestern WCA-3A are shallower; conditions are deeper to the south, significantly so in portions of WCA-3B and central ENP (**Figure EV-5 and Figure EV-6**). Comparing current conditions to the 20-year median: Northern WCA-2A is now below the 10th percentile and all of WCA-3A and most of southern BCNP are below the 30th percentile; Northeast Shark River Slough remains in the upper percentiles (**Figure EV-7**).

Taylor Slough and Florida Bay

Taylor Slough and Florida Bay received an average of 0.31 inches of total rain this past week, twice that recorded the previous week. Stages in Taylor Slough changed very little with an average difference of +0.01 feet (Figure EV-8 and Figure EV-9). Taylor Slough is now 0.7 inches higher than its historical average for this time of year (pre-Florida Bay initiative which started in 2017). When possible, move water downstream through the Slough as the wet season continues to maintain stages.

Average Florida Bay salinity is 34.1, an increase of 1.4 for the week ending in 8/21. Individual station changes throughout the bay ranged from -0.7 in Little Madeira (LM) to +4.0 at Buoy Key (BK). Last week, salinity in Joe Bay (JB) and downstream at Trout Creek (TC; not shown) in the eastern nearshore region increased 9.9. This week, salinities at TC went back down by 12.3 (Figure EV-8), coinciding with an increase in flows by 1,100 cfs between 8/18-8/20. Upstream of Florida Bay at Taylor River (TR), salinities are 15.9, an increase of 13.1 from last week, but a decrease from the high of 21 on 8/17. In eastern and central Florida Bay, salinities remain within the 2001-2016 Interquartile Range but have now exceeded the 75th percentile in the western region (Figure EV-10). Florida Bay salinity is 4.7 above its historical average for this time of year, largely affected by salinities in the western region.

Water Management Recommendations

Maintaining a very moderate rate of stage change within the marsh of WCA-2A would have 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 as the wet season continues to maintain stages. 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	1.20	+0.05
WCA-2A	0.77	-0.06
WCA-2B	0.36	-0.16
WCA-3A	0.43	-0.12
WCA-3B	0.34	-0.06
ENP	0.50	-0.02

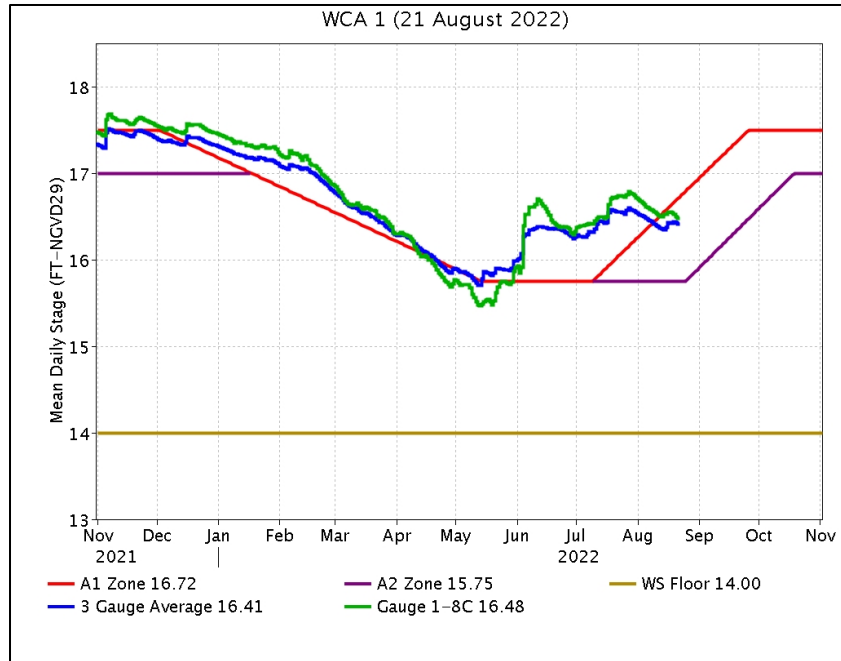


Figure EV-1. WCA-1 stage hydrographs and regulation schedule.

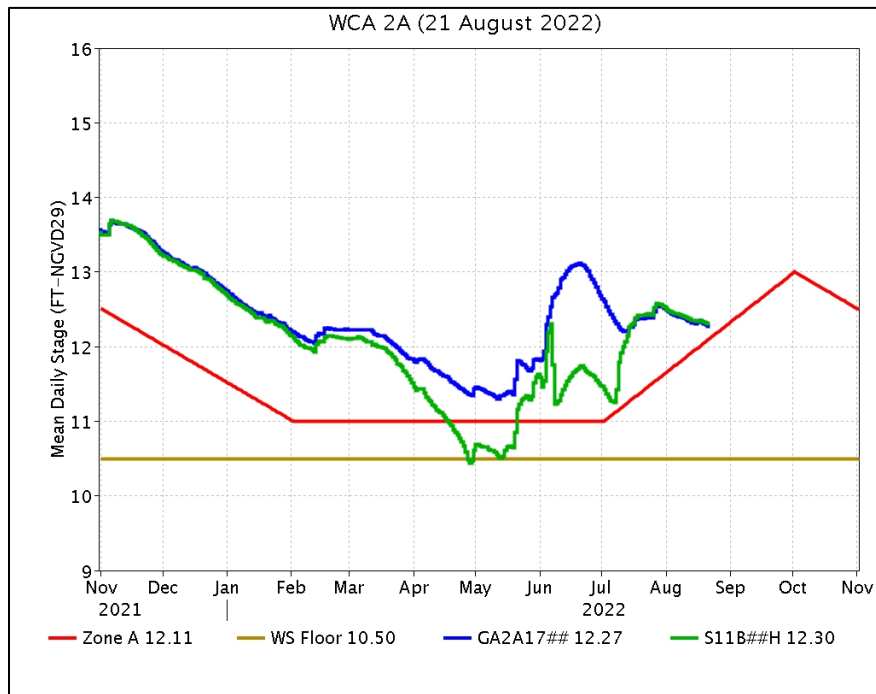


Figure EV-2. WCA-2A stage hydrographs and regulation schedule.

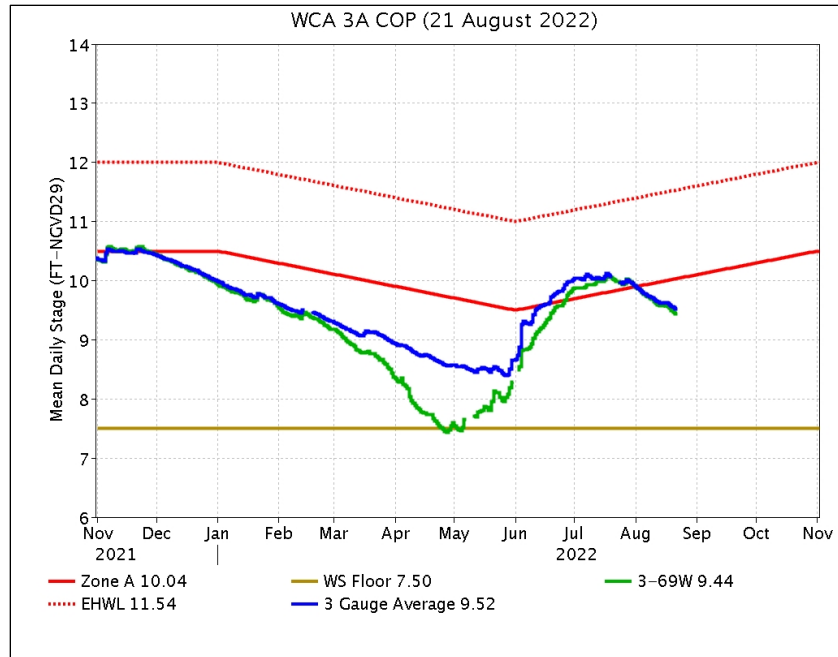


Figure EV-3. WCA-3A stage hydrographs (three-gauge average, S-333 headwater) and regulation schedule.

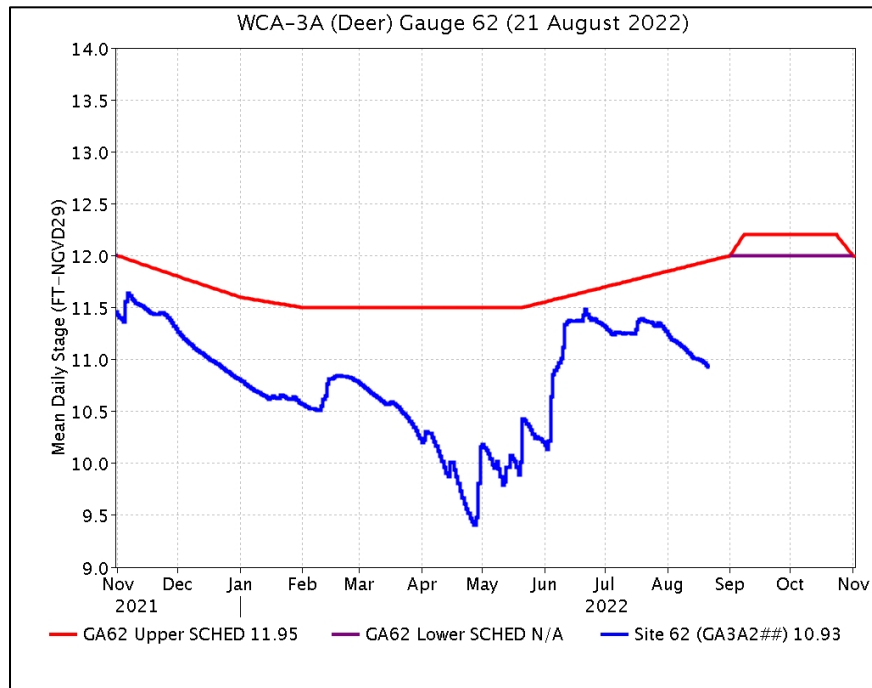


Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.

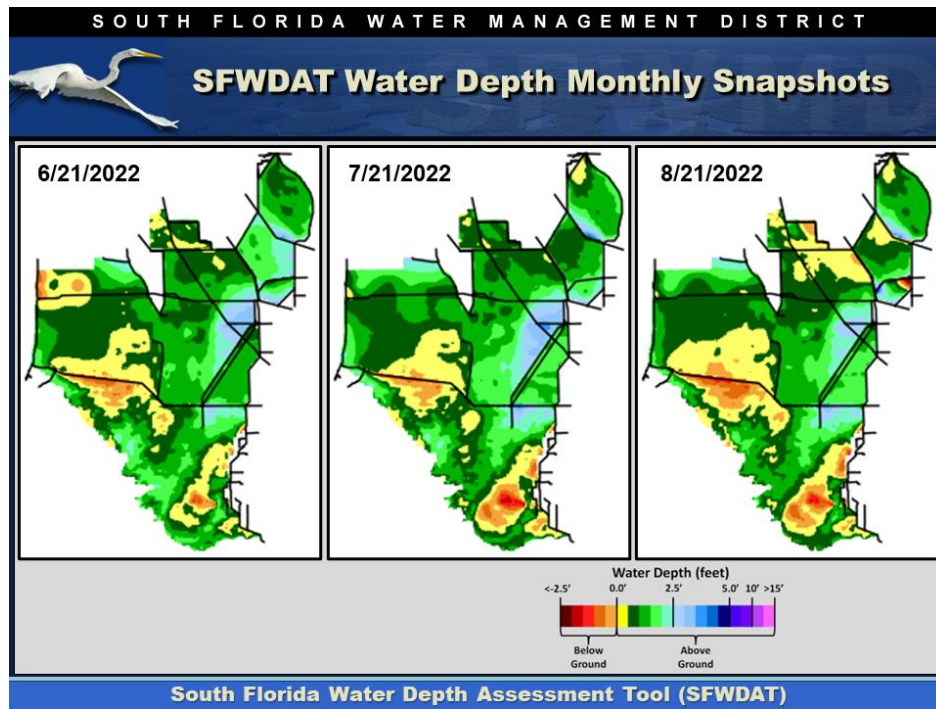


Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

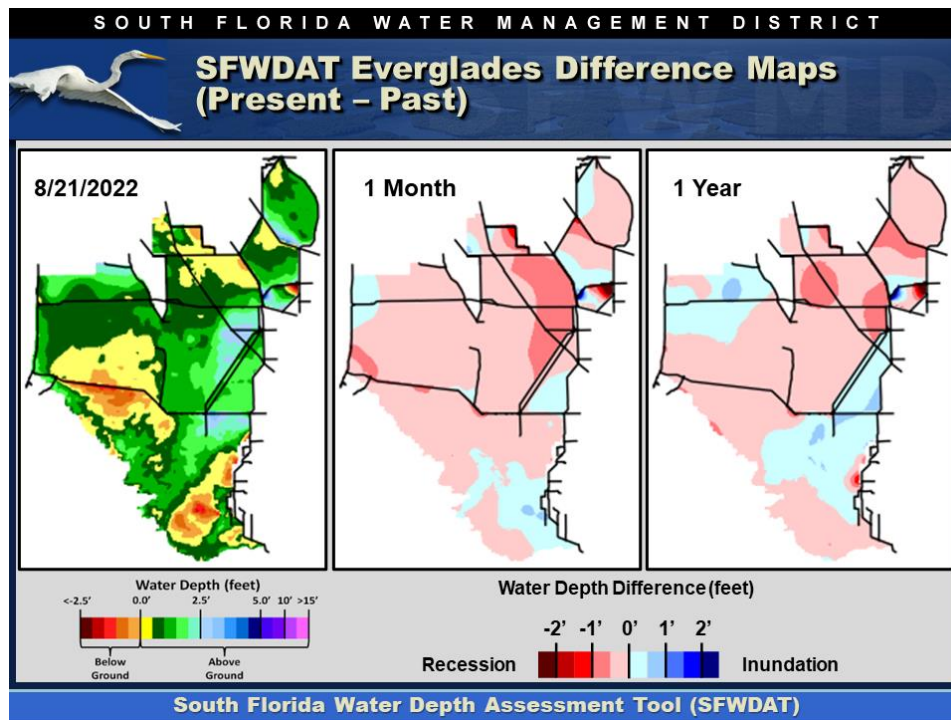


Figure EV-6. Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

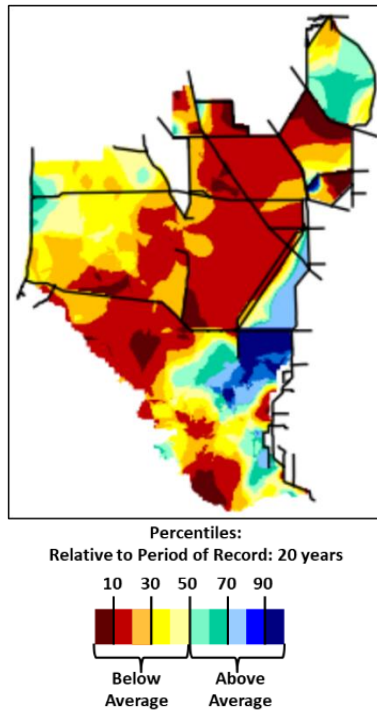


Figure EV-7. Present water depths (8/21/2022) compared to the day of year median over the previous 20 years.

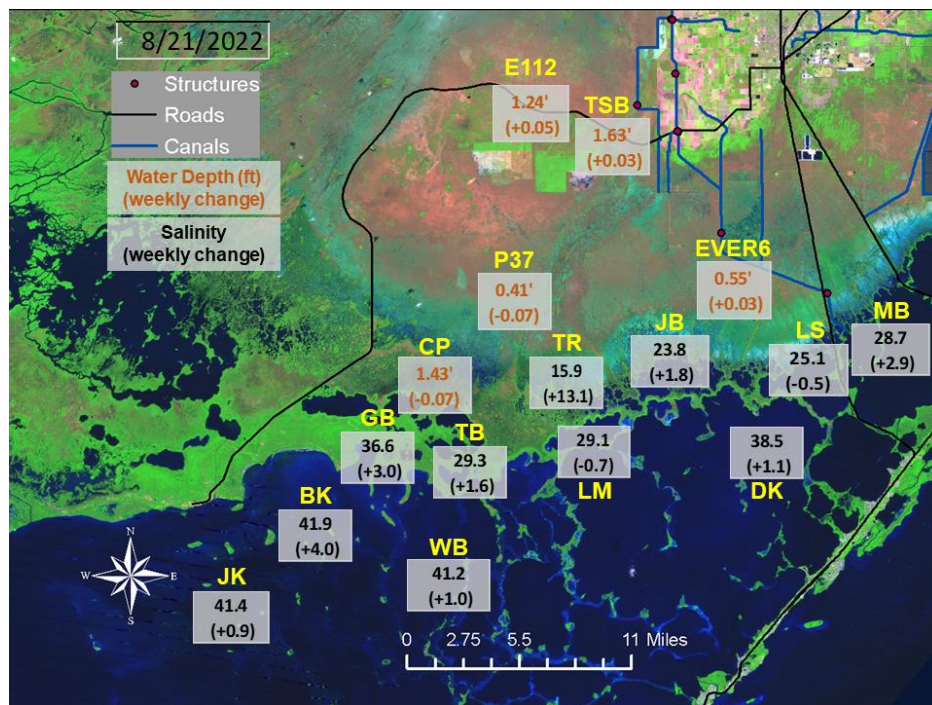


Figure EV-8. Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

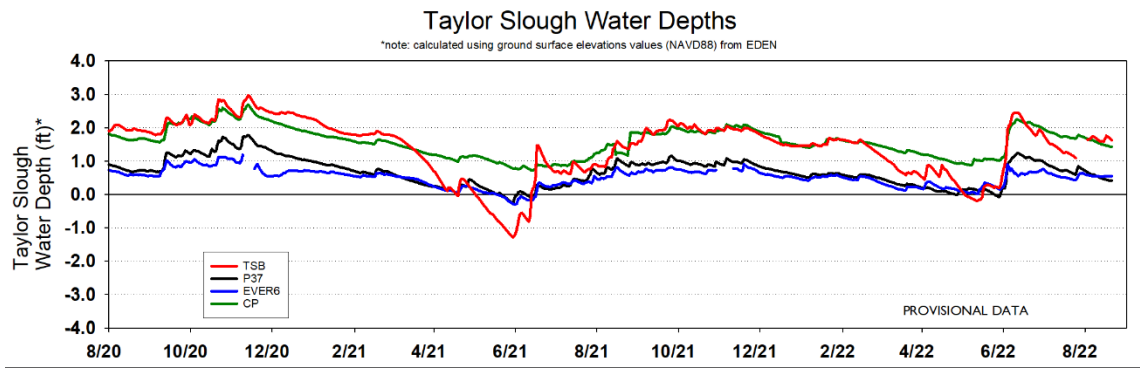


Figure EV-9. Taylor Slough water depth time series.

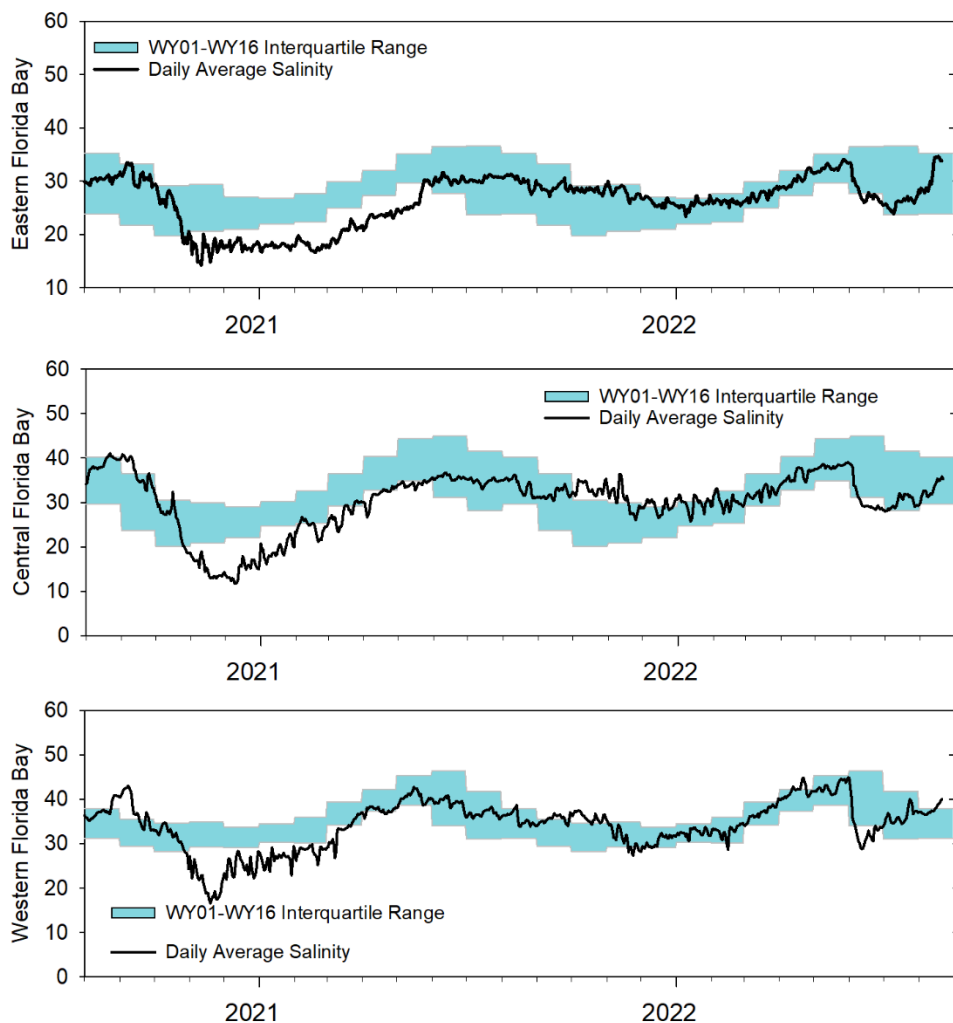


Figure EV-10. Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

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

SFWMD Everglades Ecological Recommendations, August 23rd, 2022 (red is new)			
Area	Weekly change	Recommendation	Reasons
WCA-1	Stage increased by 0.05'	Return to a moderate ascension rate of less than 0.25 feet per week.	Protect within basin and downstream habitat and wildlife.
WCA-2A	Stage decreased by 0.06'	Return to an ascension rate at about 0.0 feet per week until stage at 2-17 gauge.	Protect within basin and downstream habitat and wildlife.
WCA-2B	Stage decreased by 0.15'	Return to a moderate ascension rate of less than 0.25 feet per week.	Protect within basin and downstream habitat and wildlife.
WCA-3A NE	Stage decreased by 0.16'	Return to a moderate 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 decreased by 0.09'	Return to a moderate ascension rate of less than 0.25 feet per week.	
Central WCA-3A S	Stage decreased by 0.13'	Return to a moderate ascension rate of less than 0.25 feet per week.	Protect within basin and downstream habitat and wildlife.
Southern WCA-3A S	Stage decreased by 0.10'		
WCA-3B	Stage decreased by 0.06'	Return to a moderate ascension rate of less than 0.25 feet per week.	Protect within basin and downstream habitat and wildlife. Lower fire risk.
ENP-SRS	Stage decreased by 0.02'	Make discharges to ENP according to COP and TTFF protocol while adaptively considering upstream and downstream ecological conditions.	Protect within basin and upstream habitat and wildlife.
Taylor Slough	Stage changes ranged from -0.071' to +0.048'	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged -0.7 to +4.0	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 350 cfs and the previous 30-day mean inflow was 269 cfs. The seven-day mean salinity was 33.7 at BBCW8 and 34.2 at BBCW10, both below the preferred maximum salinity of 35 for these sites. Data provided by Biscayne National Park.

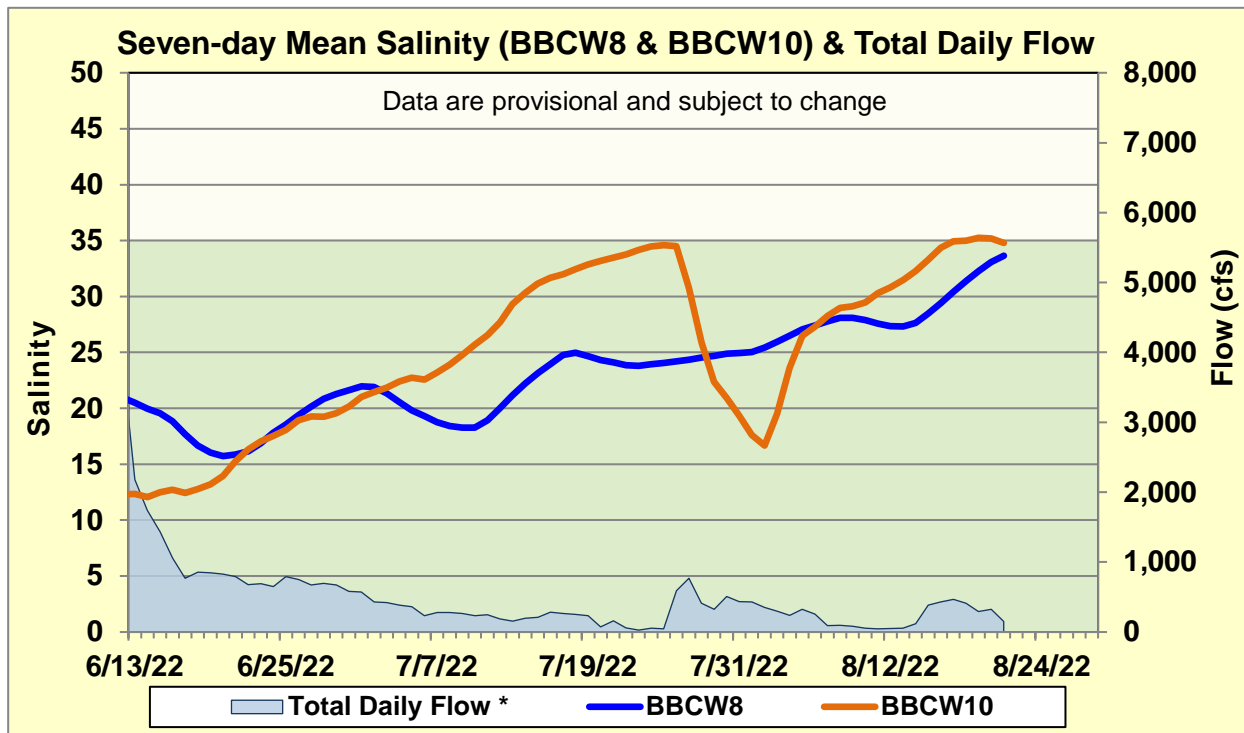


Figure BB-1. Seven-day mean salinity at BBCW8 and BBCW10 and total daily flow in Biscayne Bay. Total daily flow was calculated using flow from structures S20G, S20F, S21, S21A, S123, and S700P.