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M E M O R A N D U M

TO: John Mitnik, Assistant Executive Director, Executive Office Staff

FROM: SFWMD Staff Environmental Advisory Team

DATE: July 27, 2022

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

After a tropical wave moves past the SFWMD into the southeastern Gulf of Mexico on Wednesday, some moisture and instability are likely across the western half of the SFWMD during the afternoon and should cause showers and thunderstorms to focus from the western interior of the SFWMD through the western Kissimmee Valley. However, an enormous Saharan Air Layer (SAL) will begin arriving over the eastern part of the SFWMD by Wednesday morning. The much drier air and dust will cause a sharp reduction of rainfall in the east. When the SAL overspreads the remainder of the SFWMD on Thursday, its strong suppressing effect is forecast to result in virtually no rainfall area wide. A second tropical wave passing the Florida Straits on Friday will cause some rains to develop over the far southern and western parts of the SFWMD while rainfall remains notably absent north of Lake Okeechobee. The continued effects of the SAL and subsidence associated with a strengthening subtropical ridge of high pressure over the western Atlantic Ocean this weekend will keep total SFWMD rainfall below normal through early next week. Some increase of rain across the area is possible by Monday next week as yet another tropical wave passes near the area. Despite the tropical wave's influence, total daily SFWMD rainfall is still below the daily climatological average. For the week ending next Tuesday morning, total SFWMD rainfall is likely to be much below normal with conditions continuing during the week-2 period (*2 -8 August*).

Kissimmee

Flow at S-59 and S-61 is being adjusted to allow stage to rise gradually in East Toho and Toho, respectively. Flow at S-65/S-65A was reduced to 0 cfs to slow the stage decline in KCH, although some releases were made from S-65A to control a rainfall-driven stage rise in Pool A. Water depth on the Kissimmee River floodplain declined over the week, with a mean depth of 0.19 feet on July 24, 2022. The concentration of dissolved oxygen in the Kissimmee River was steady over the week, with an average of 3.1 mg/L for the week ending on July 24, 2022.

Lake Okeechobee

Lake Okeechobee stage was 13.04 feet NGVD on July 24, 2022, with water levels 0.13 feet higher than a month ago (**Figure LO-1**). Lake stage on July 24, 2022 was in the Base Flow sub-band (**Figure LO-2**) and within the ecological envelope (**Figure LO-3**). Average daily inflows (excluding rainfall) decreased from the previous week, going from 639 cfs to 577 cfs. Average daily outflows (excluding evapotranspiration) decreased, going from 49 cfs to 0 cfs. The most recent satellite image (July 23, 2022) from NOAA's Harmful Algal Bloom Monitoring System showed that bloom potential was moderate to high in the northern, northwestern, and northeastern nearshore areas of the Lake (**Figure LO-6**). The bloom potential decreased compared to the previous week. The July 18 - 20 routine phytoplankton monitoring survey on the Lake revealed that 34% of the sites had total microcystins concentration above detection limit, but all were below EPA recreational standard of 8 µg/L. The highest toxin concentration (2.8 µg/L) was recorded at the NCENTER site in the northern part of the Lake. Communities at 63% of the sites were dominated by *Microcystis aeruginosa* and 3% of the sites were co-dominated by *Planktolyngbya limnetica* and *M. aeruginosa*. Approximately 31% of the sites had mixed communities.

Estuaries

Total inflow to the St. Lucie Estuary averaged 549 cfs over the past week with no flow coming from Lake Okeechobee. Mean salinities decreased at all sites within 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 2,137 cfs over the past week with no flow coming from the Lake. Mean salinities remained the same at S-79 and Val I-75, decreased at Shell Point, and increased at the remaining sites within the estuary over the past week. Salinities were in the optimal range (0-10) for tape grass in the upper estuary. Salinities were in the optimal range (10-25) for adult eastern oysters at Shell Point and in the stressed range at Cape Coral (5-9) and Sanibel (>25).

Total inflow to Biscayne Bay averaged 121 cfs and the previous 30-day mean inflow averaged 333 cfs. The seven-day mean salinity was 24.1 at BBCW8 and 34.6 at BBCW10, both below the preferred maximum salinity of 35 for these sites. Salinity data provided as a courtesy by Biscayne National Park.

Stormwater Treatment Areas

For the week ending Sunday, July 24, 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 403,000 ac-feet. Most STA cells are near or above 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

Ascension rates fell in the “poor” category across most of the Everglades last week as low rainfall meant declining water stages, generally not considered ecologically beneficial in the wet season. Northeastern WCA-3A experienced a rapid recession last week. Taylor Slough stages continued to decline last week but remain above average. Salinities increased again in Florida Bay last week on average driven by increases at the western stations but remain near the bottom of the inner quartile range in the central and eastern bay.

Supporting Information

Kissimmee Basin

Upper Kissimmee

On July 24, 2022, lake stages were 55.3 feet NGVD (1.2 feet below schedule) in East Lake Toho, 53.0 feet NGVD (0.5 feet below schedule) in Lake Toho, and 49.1 feet NGVD (1.9 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. Discharges on July 24, 2022 were 0 cfs at S-65 and 30 cfs at S-65A; the discharge at S-65A was to control the rise in S-65A headwater stage. Discharges from the Kissimmee River were 110 cfs at S-65D and 70 cfs at S-65E (**Table KB-2**). Headwater stages were 46.5 feet NGVD at S-65A and 26.2 feet NGVD at S-65D on July 24, 2022. Over the week ending July 24, 2022, Kissimmee River mean river channel stage decreased by 0.4 ft NGVD as S-65A discharge decreased (**Figure KB-4**); water depth on the Kissimmee River floodplain declined over the week, with a mean depth of 0.19 feet on July 24, 2022 (**Figure KB-5**). The concentration of dissolved oxygen in the Kissimmee River was fairly steady over the last week, with an average of 3.1 mg/L for the week ending on July 24, 2022 (**Table KB-2, Figure KB-6**).

Water Management Recommendations

When possible, limit stage ascension rates in Lakes East Toho, Toho and KCH to a preferred maximum of 0.5 ft/14 days. 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)	
							7/24/22	7/17/22
Lakes Hart and Mary Jane	S-62	LKMJ	0	59.8	R	60.0	-0.2	-0.4
Lakes Myrtle, Preston and Joel	S-57	S-57	0	60.5	R	61.0	-0.5	-0.5
Alligator Chain	S-60	ALLI	0	62.4	R	63.2	-0.8	-0.9
Lake Gentry	S-63	LKGT	0	60.0	R	61.0	-1.0	-1.1
East Lake Toho	S-59	TOHOE	0	55.3	R	56.5	-1.2	-1.4
Lake Toho	S-61	TOHOW S-61	9	53.0	R	53.5	-0.5	-0.8
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	0	49.1	R	51.0	-1.9	-2.0

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.

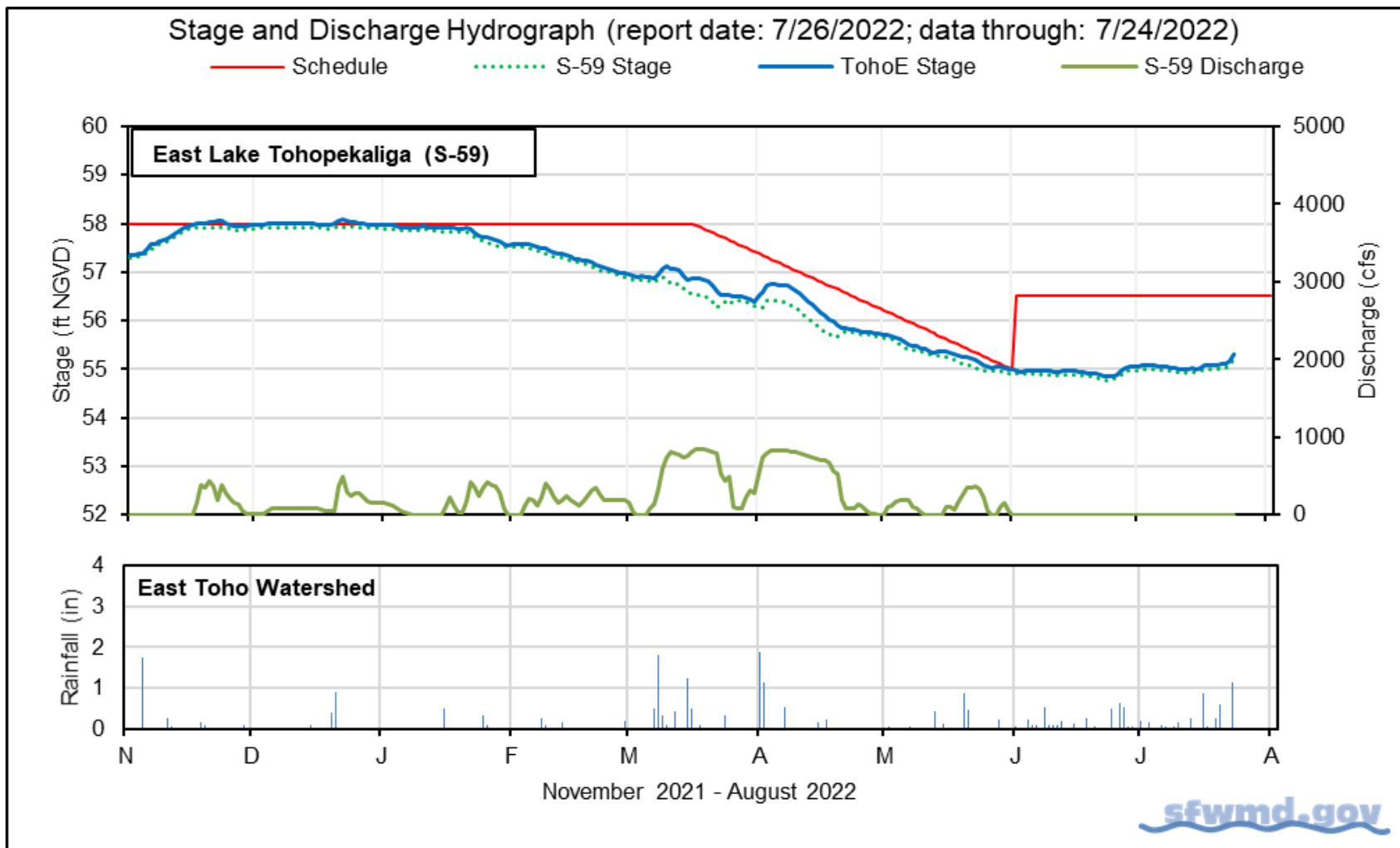


Figure KB-1. East Lake Toho regulation schedule, stage, discharge and rainfall.

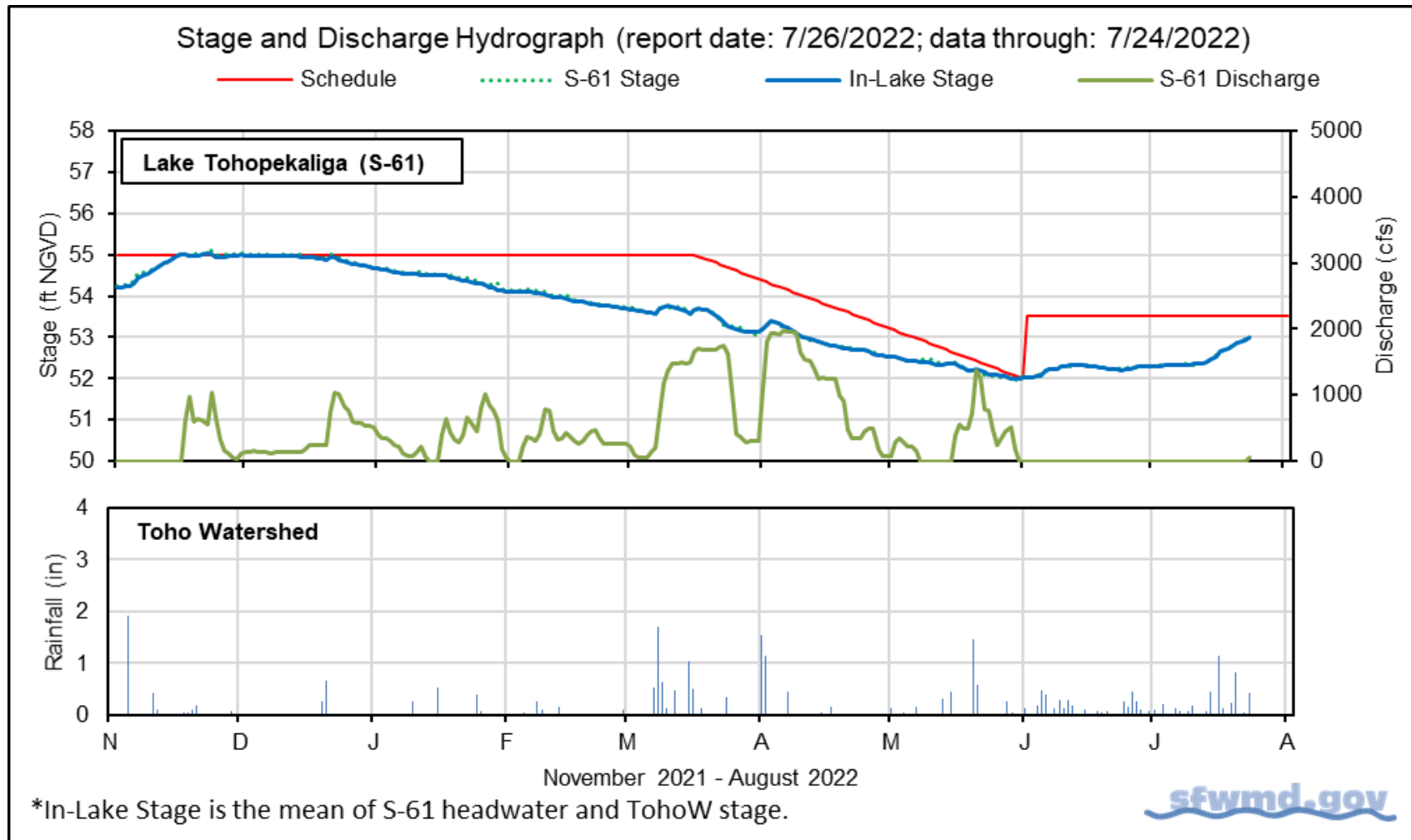


Figure KB-2. Lake Toho regulation schedule, stage, discharge and rainfall.

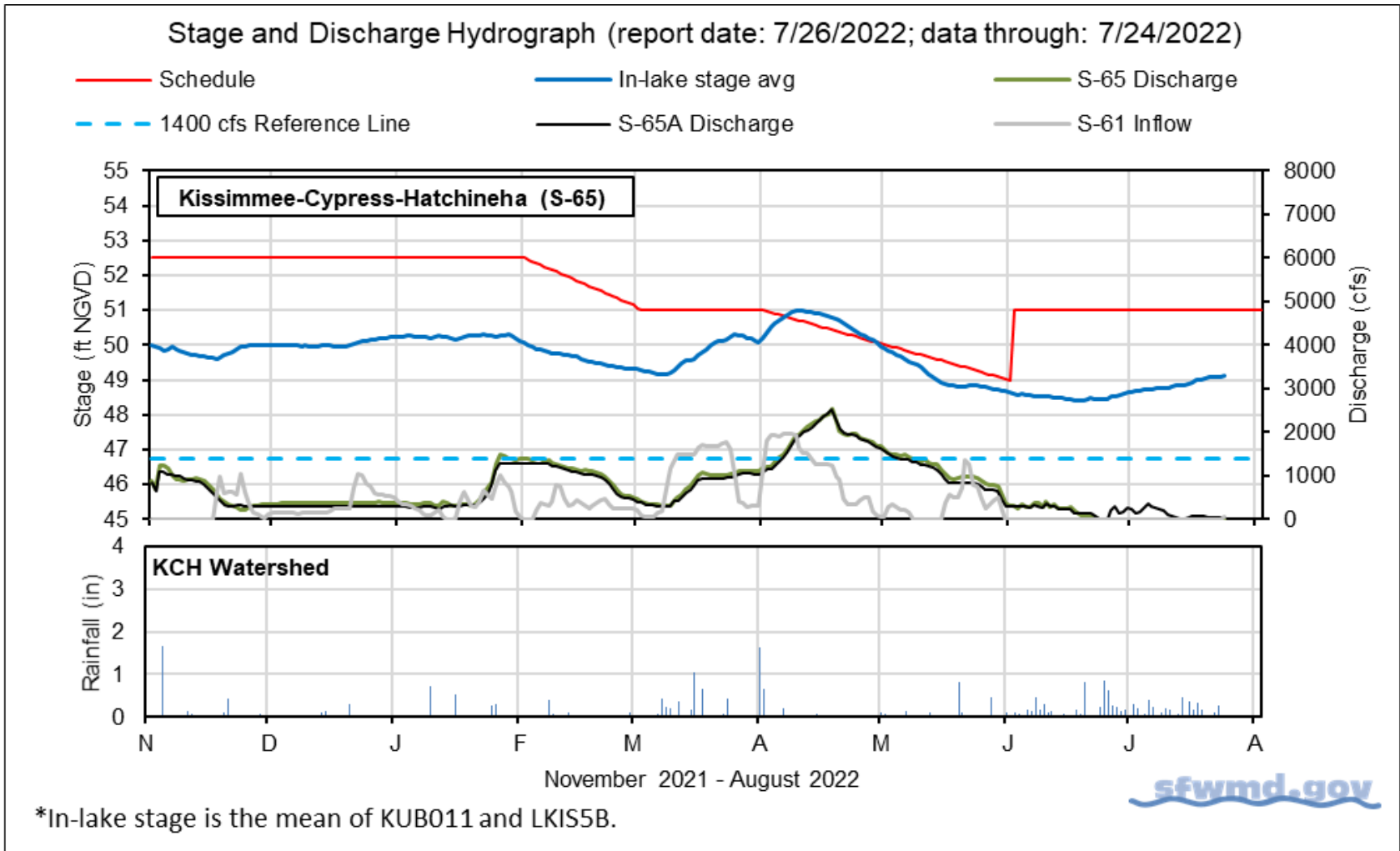


Figure KB-3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

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			
		7/24/22	7/24/22	7/17/22	7/10/22	7/3/22
Discharge	S-65	0	0	0	0	0
Discharge	S-65A ^a	30	40	50	250	200
Headwater Stage (feet NGVD)	S-65A	46.5	46.5	46.3	46.5	46.5
Discharge	S-65D ^b	110	120	150	340	470
Headwater Stage (feet NGVD)	S-65D ^c	26.2	26.2	26.2	26.2	26.2
Discharge (cfs)	S-65E ^d	70	90	140	270	380
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) ^e	Phase I, II/III river channel	3.2	3.1	3.0	4.2	4.4
Mean depth (feet) ^f	Phase I floodplain	0.19	0.23	0.25	0.32	0.40

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).

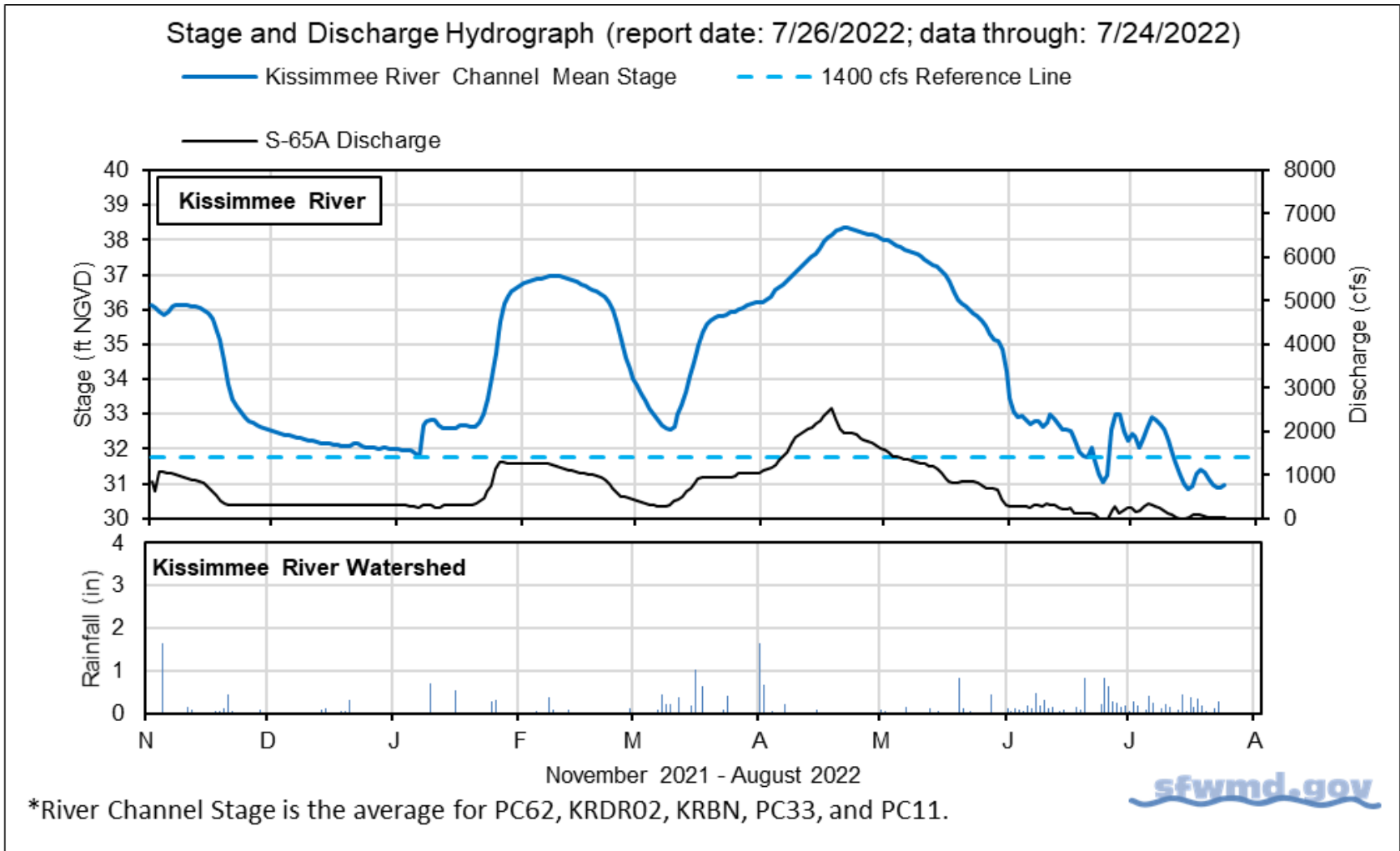


Figure KB-4. Kissimmee River stage, discharge and rainfall.

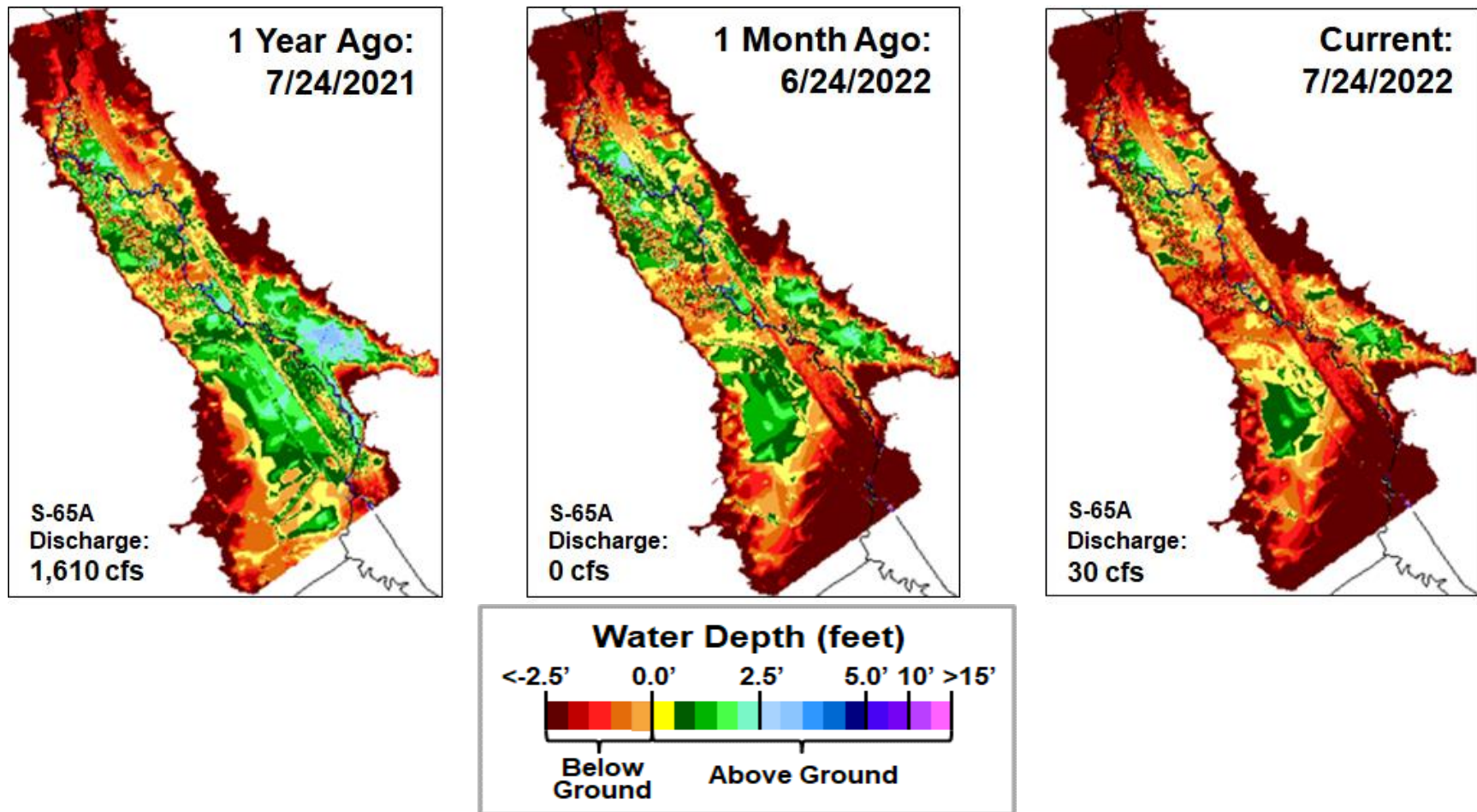
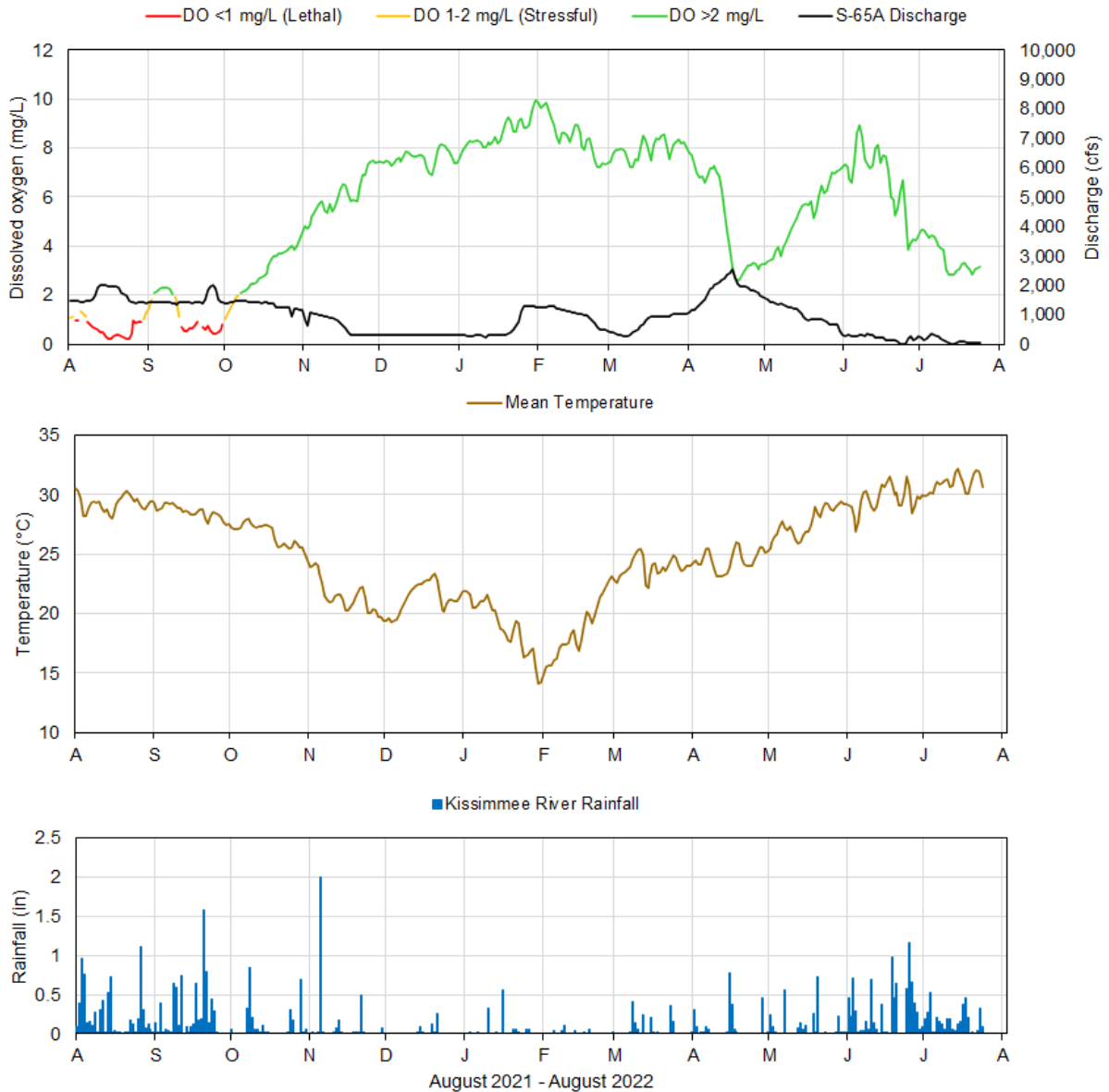


Figure KB-5. Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.



Report Date: 7/26/2022; data are through: 7/24/2022

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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 three 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.

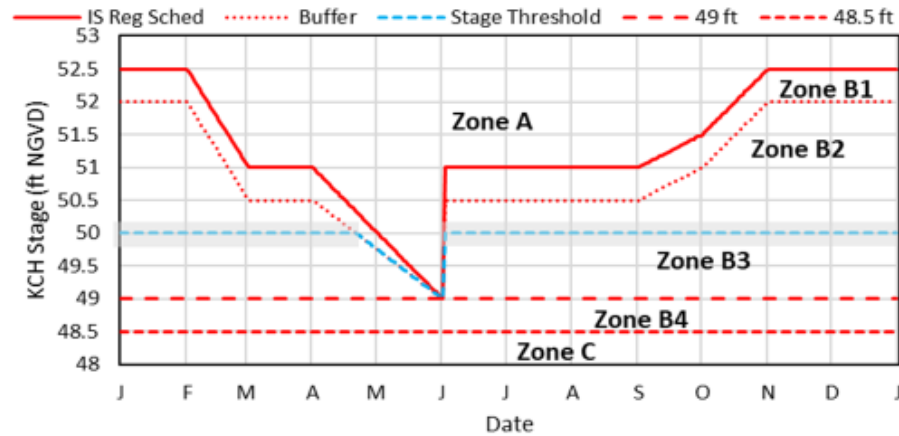
Table KB-3. Discharge Rate of Change Limits for S65/S65A (revised 1/14/19).

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

Preferred Discharge Plan for S-65/S-65A (IS-14-50.0)



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 13.04 feet NGVD on July 24, 2022, with water levels 0.13 feet higher than a month ago (**Figure LO-1**). Lake stage was in the Base Flow sub-band (**Figure LO-2**) and re-entered the ecological envelope on July 20, 2022, after spending the prior 3 days above it (**Figure LO-3**). According to NEXRAD, 0.65 inches of rain fell directly on the Lake last week.

Average daily inflows (excluding rainfall) decreased from the previous week, going from 639 cfs to 577 cfs. Average daily outflows (excluding evapotranspiration) decreased, going from 49 cfs to 0 cfs. The highest inflow came from the C-41 and C-40 Canals via the S-71 and S-72 structures (283 cfs). Backflow into the Lake from the C-44 Canal via the S-308 structure averaged 58 cfs and from the L-8 Canal via the S-271 structure averaged 19 cfs. **Figures LO-4 and LO-5** show the combined average daily inflows and outflows for the Lake over the past eight weeks, and average inflows and outflows last week, respectively. These data are provisional and are subject to change.

The most recent satellite image (July 23, 2022) from NOAA's Harmful Algal Bloom Monitoring System showed that bloom potential was moderate to high in the northern, northwestern, and northeastern nearshore areas of the Lake (**Figure LO-6**). The bloom potential decreased compared to the previous week. The July 18 - 20 routine phytoplankton monitoring survey on the Lake revealed that 34% of the sites had total microcystins concentration above detection limit, but all were below EPA recreational standard of 8 µg/L. The highest toxin concentration (2.8 µg/L) was recorded at the NCENTER site in the northern part of the Lake. Communities at 63% of the sites were dominated by *Microcystis aeruginosa* and 3% of the sites were co-dominated by *Planktolyngbya limnetica* and *M. aeruginosa*. Approximately 31% of the sites had mixed communities.

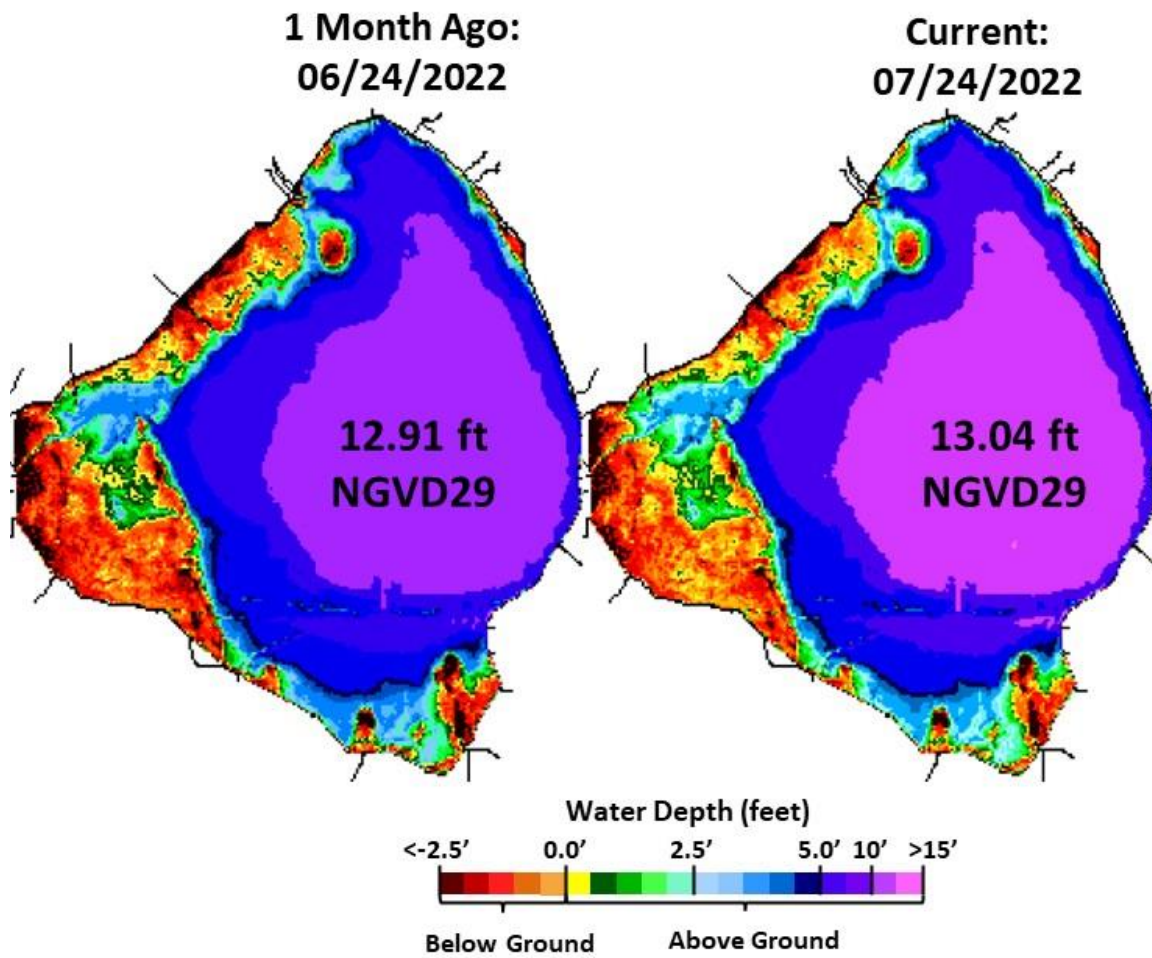


Figure LO-1. Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

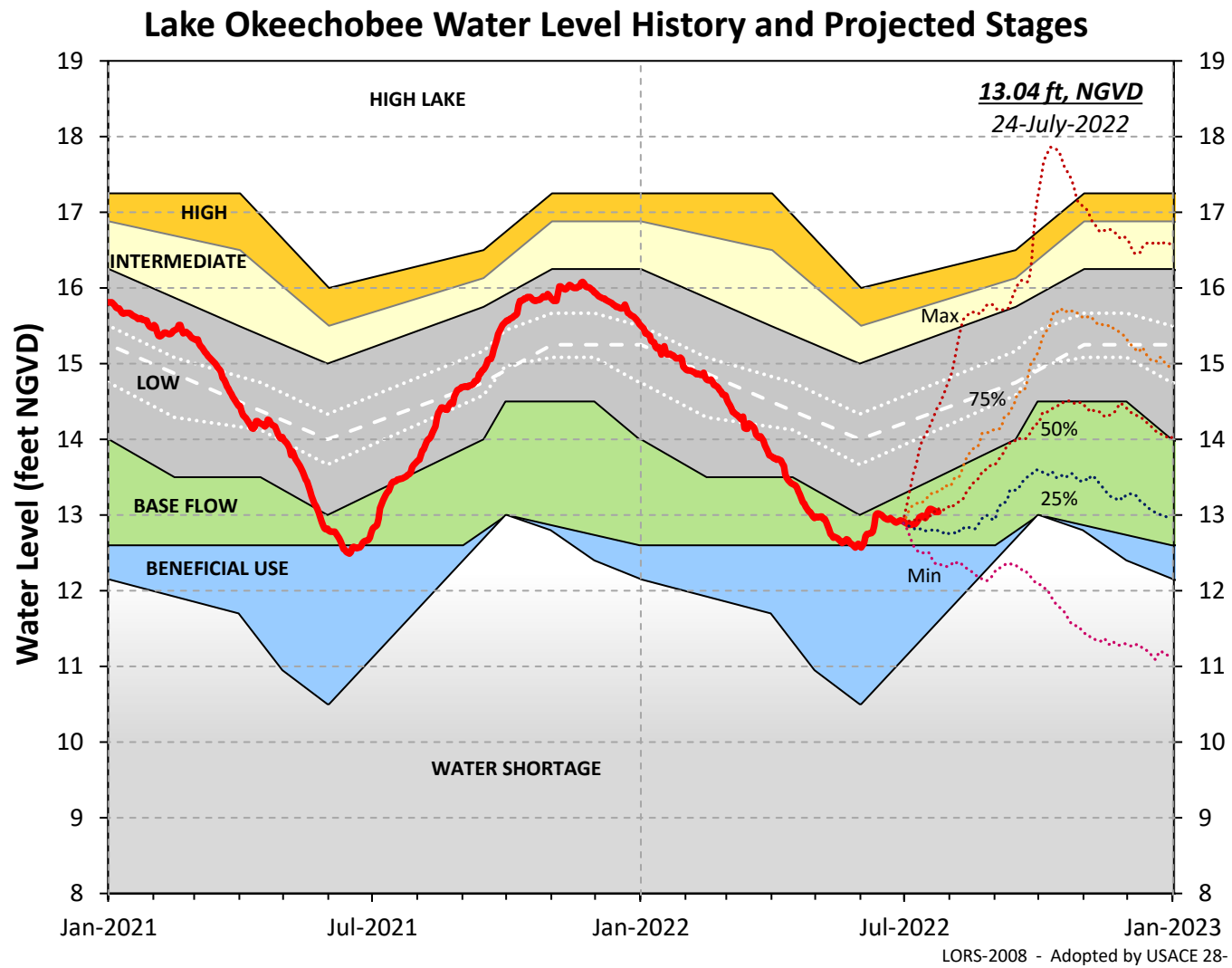


Figure LO-2. Recent Lake Okeechobee stages with projected stages based on a dynamic position analysis.

Lake Okeechobee Stage vs Ecological Envelope

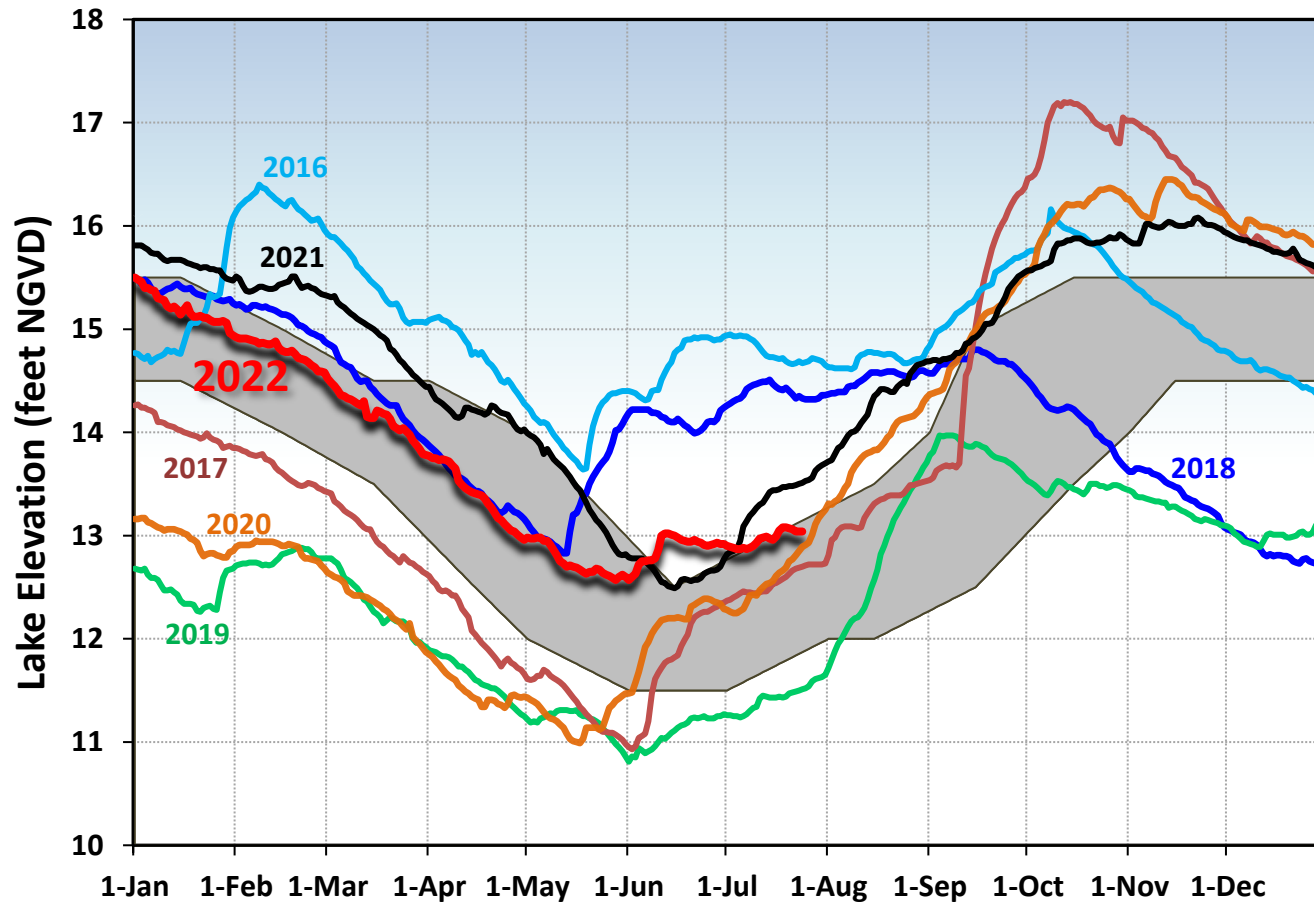


Figure LO-3. The prior six years of annual stage hydrographs for Lake Okeechobee in comparison to the ecological envelope.

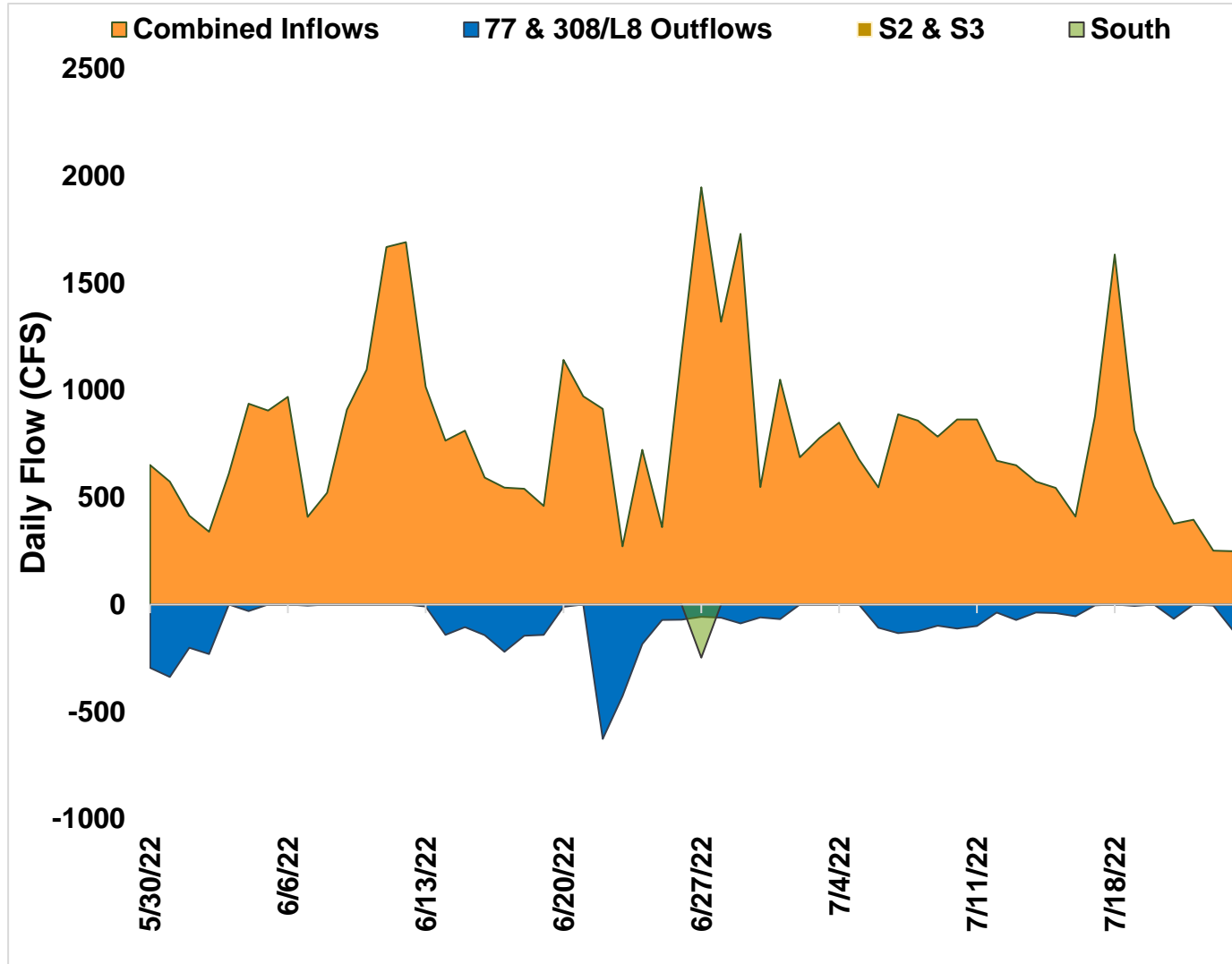


Figure LO-4. Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows from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

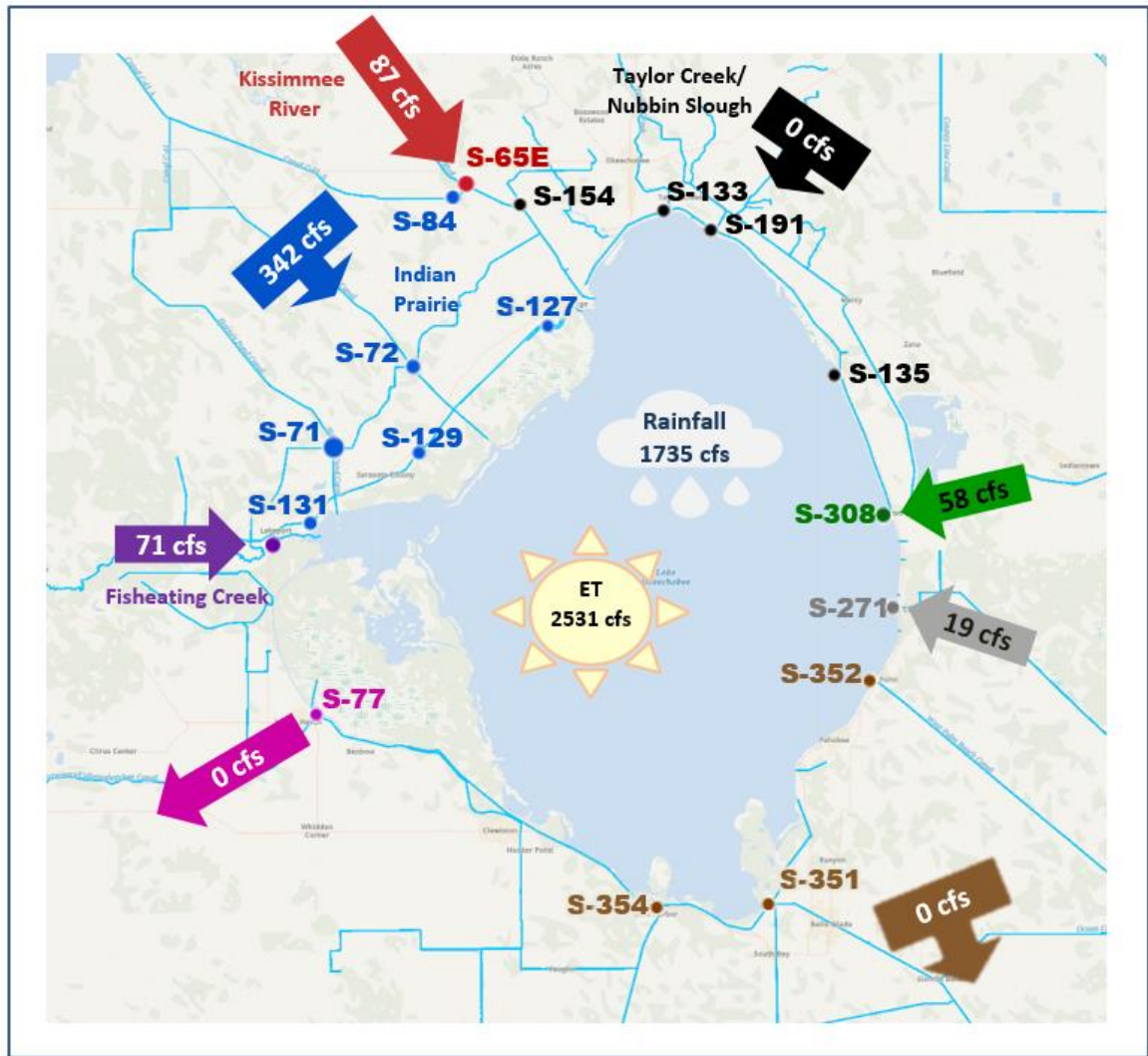


Figure LO-5. Inflows into Lake Okeechobee from Indian Prairie basins, Taylor Creek/Nubbin Slough, Kissimmee River and Fisheating Creek, and outflows to the west via S-77, to the east via S-308, to the south via S-351, S-352, S-354, and to southeast via S-271 (formerly Culvert 10A) for the week of July 18 - 24, 2022.

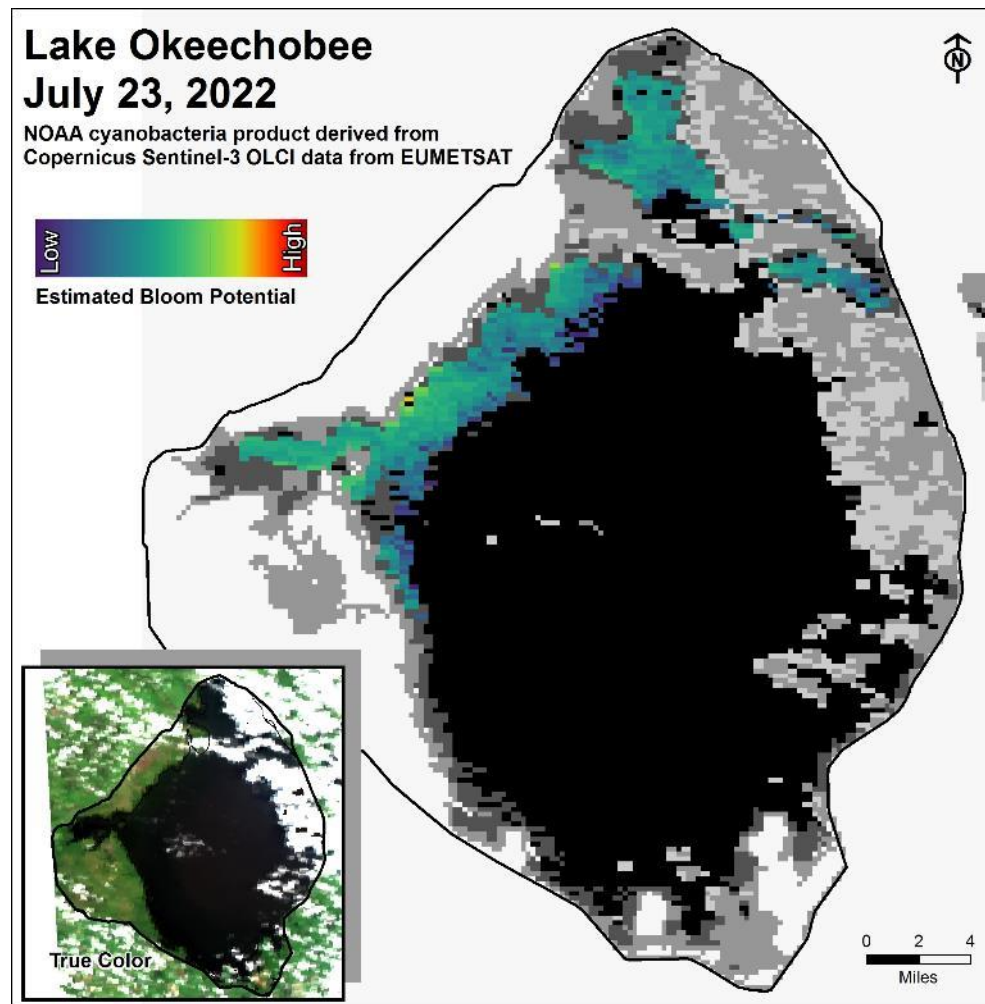


Figure LO-6. Cyanobacteria bloom potential on July 23, 2022 based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

Estuaries

Northern Estuaries

St. Lucie Estuary

Over the past week, mean total inflow to the St. Lucie Estuary was 549 cfs (**Figures ES-1 and ES-2**) and the previous 30-day mean inflow was 764 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 15.9. Salinity conditions in the middle estuary were estimated to be within the optimal range for adult eastern oysters (**Figure ES-4**). The mean larval oyster recruitment rate reported by the Fish and Wildlife Research Institute was 15.3 spat/shell for June and was higher than any recruitment rate reported in the past two years (**Figure ES-5**).

Caloosahatchee River Estuary

Over the past week, mean total inflow to the Caloosahatchee River Estuary was 2,137 cfs (**Figures ES-6 and ES-7**) and the previous 30-day mean inflow was 2,755 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-7**.

Over the past week, salinities remained the same at S-79 and Val I-75, decreased at Shell Point and increased at the remaining sites in the estuary (**Table ES-2 and Figures ES-8 and ES-9**). The seven-day mean salinities (**Table ES-2**) were in the optimal range (0-10) for tape grass in the upper estuary. The seven-day mean salinity values were within the optimal range for adult eastern oysters at Shell Point, and in the stressed range at Cape Coral (5-9) and Sanibel (>25) (**Figure ES-10**). The mean larval oyster recruitment rate reported by the Fish and Wildlife Research Institute was 1.2 spat/shell at Iona Cove in April. Recruitment rates remained low at Bird Island (**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 1500 cfs, and steady releases at 2,000 cfs with estimated tidal basin inflows of 569 cfs. Model results from all scenarios predict daily salinity to be 2.5 or lower and the 30-day moving average surface salinity to be 0.7 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 July 22, 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 samples from St Lucie, Martin, Palm Beach or Miami-Dade counties.

Water Management Recommendations

Lake stage is in the Base Flow Sub-Band. Tributary conditions are near normal. 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.

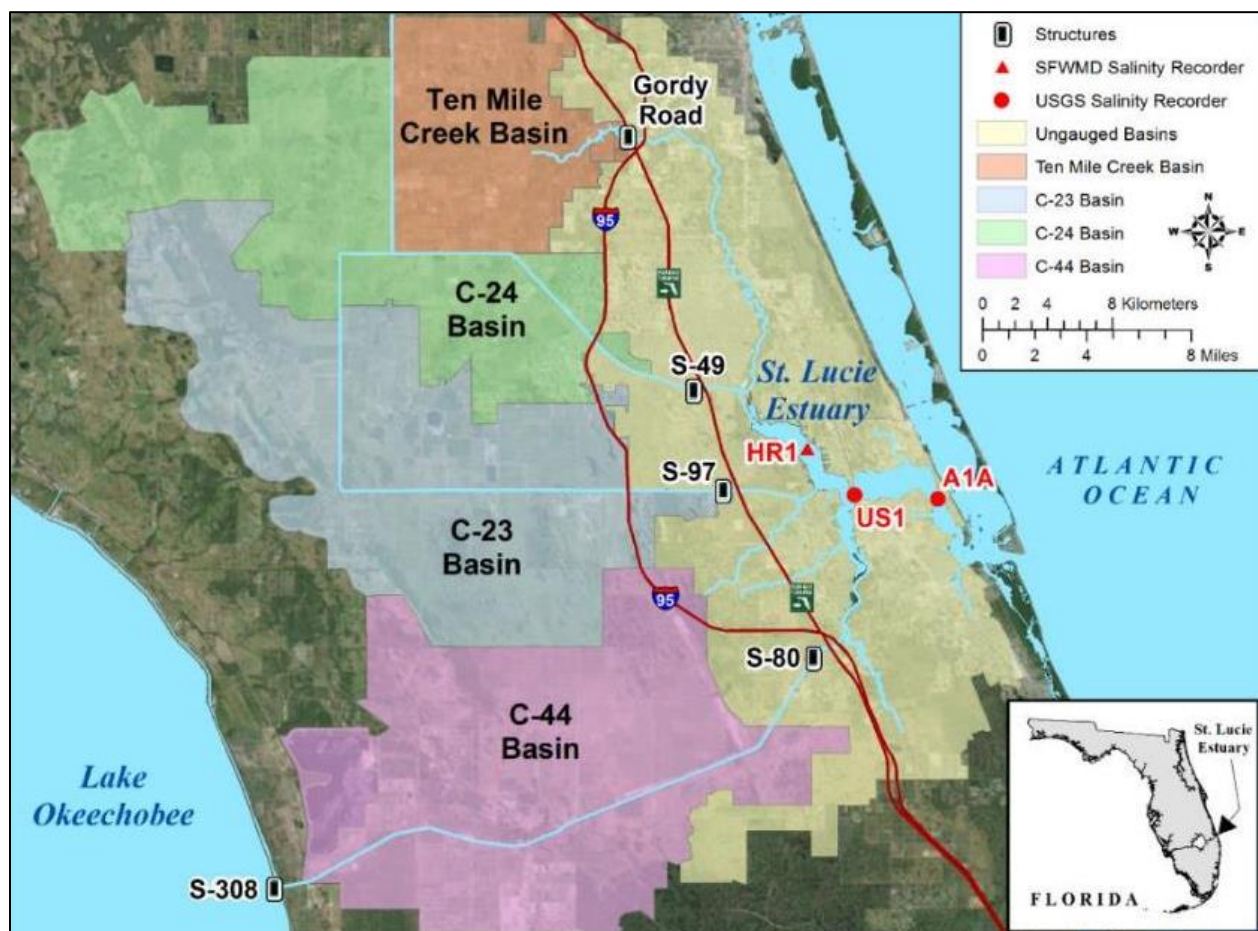


Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

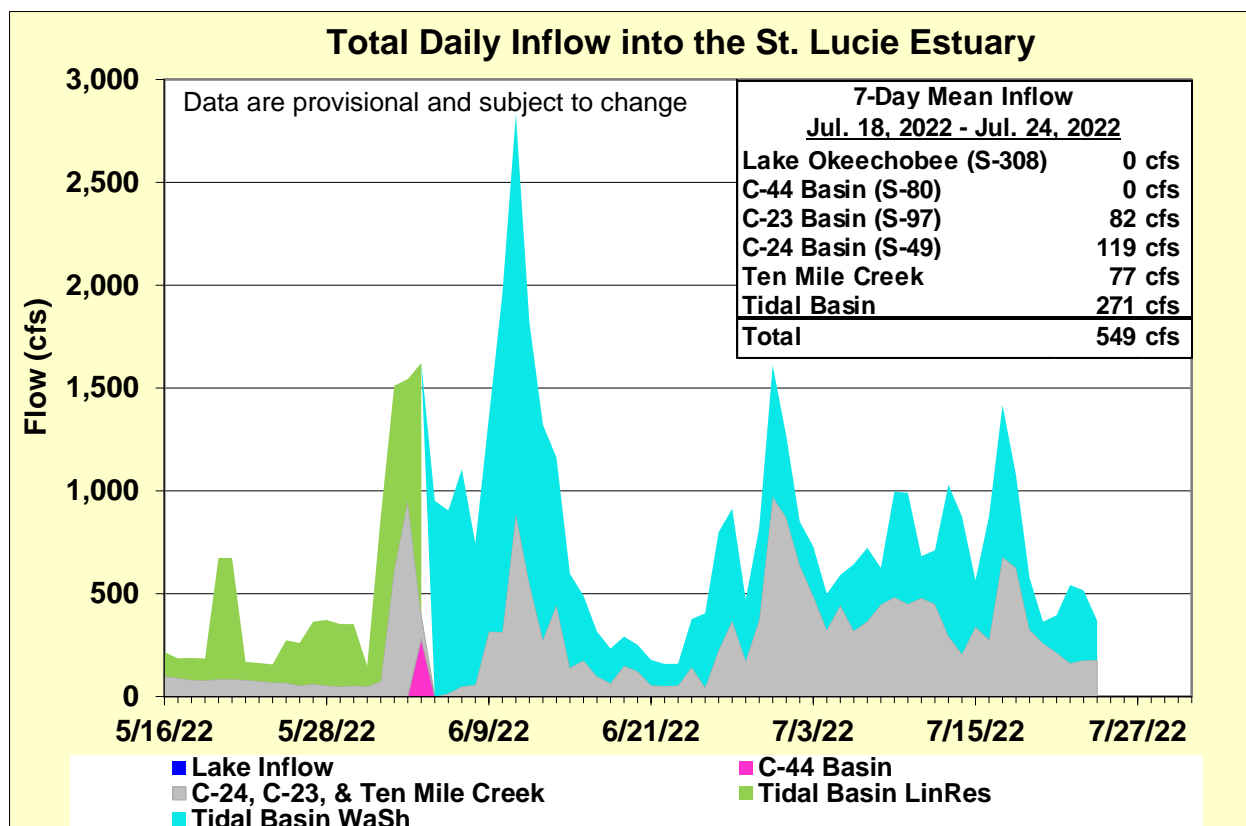


Figure ES-2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

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)	7.6 (7.8)	10.9 (13.4)	10.0 – 25.0
US1 Bridge	15.4 (16.0)	16.3 (17.3)	10.0 – 25.0
A1A Bridge	24.0 (25.4)	27.0 (28.3)	10.0 – 25.0

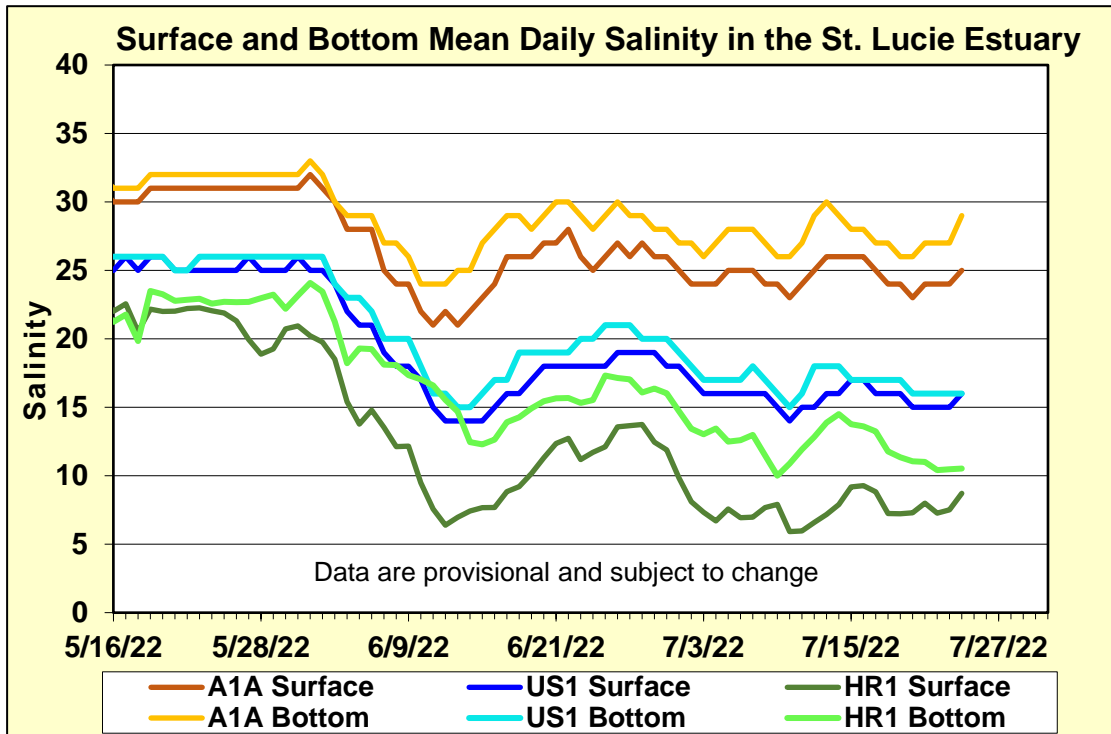


Figure ES-3. Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

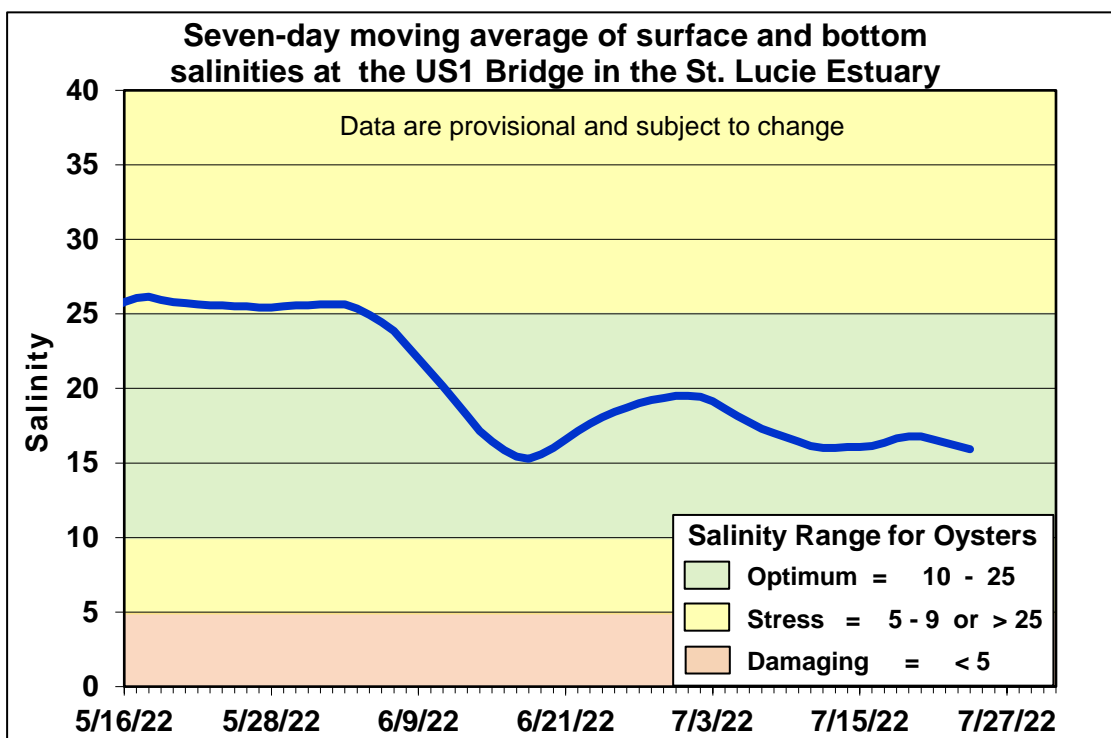


Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

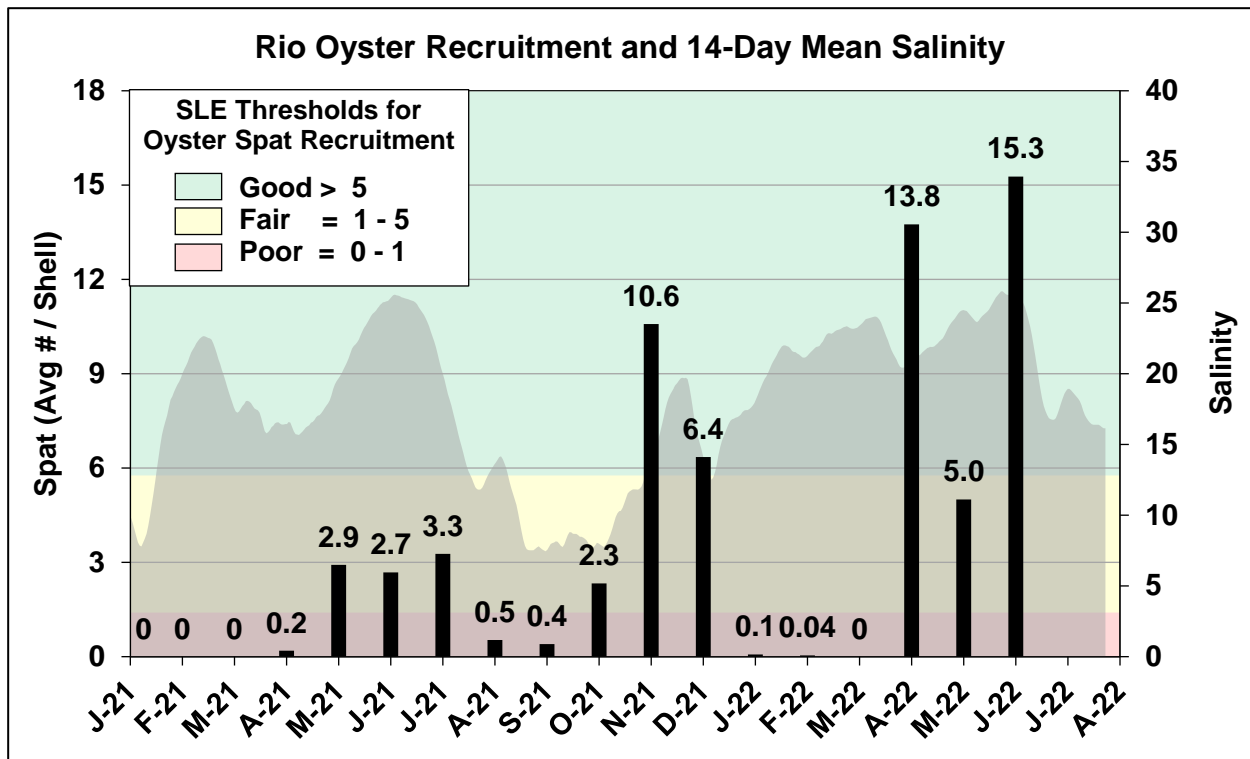


Figure ES-5. Mean oyster recruitment at the Rio oyster monitoring station and 14-day mean salinity at US1 Bridge.

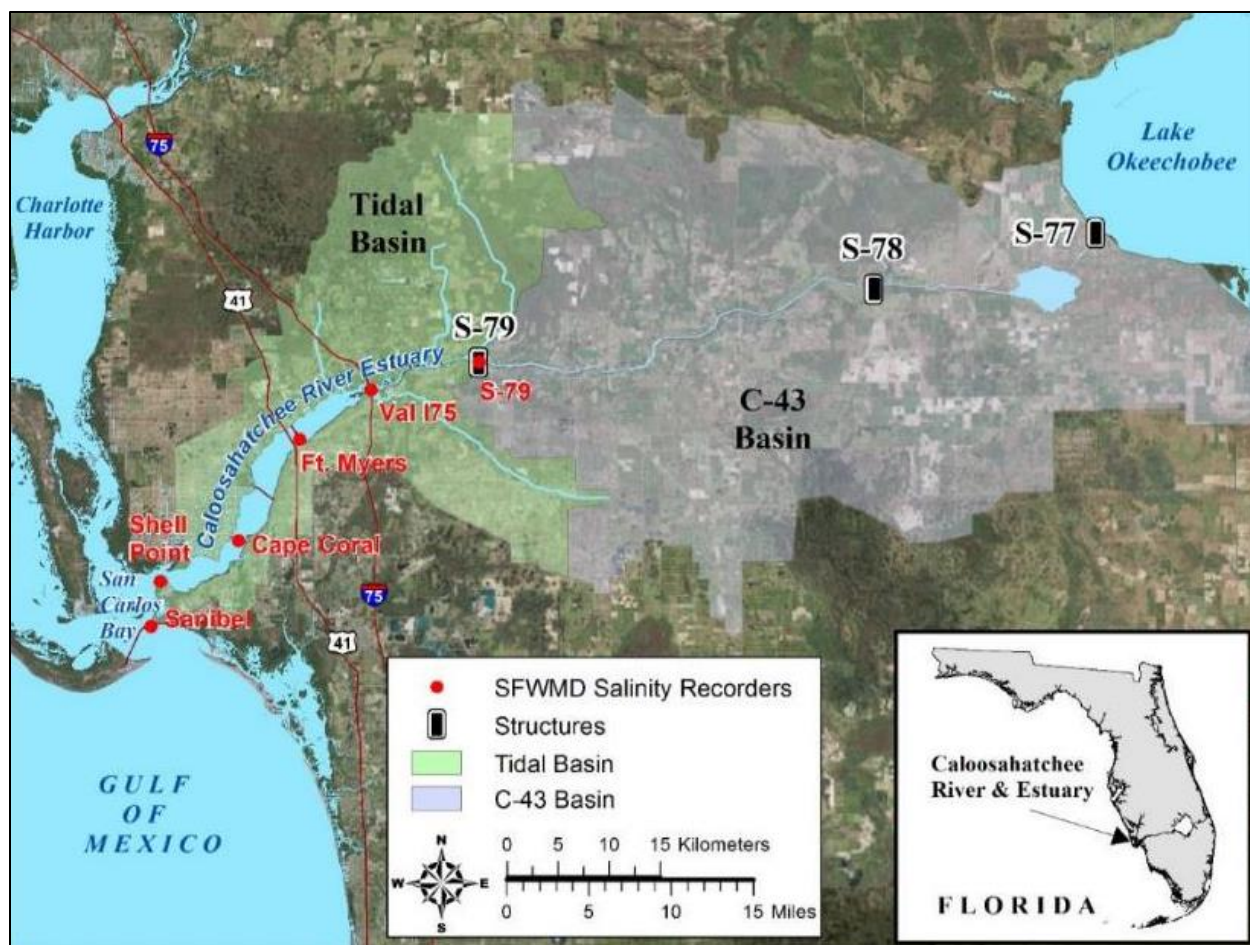


Figure ES-6. Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.

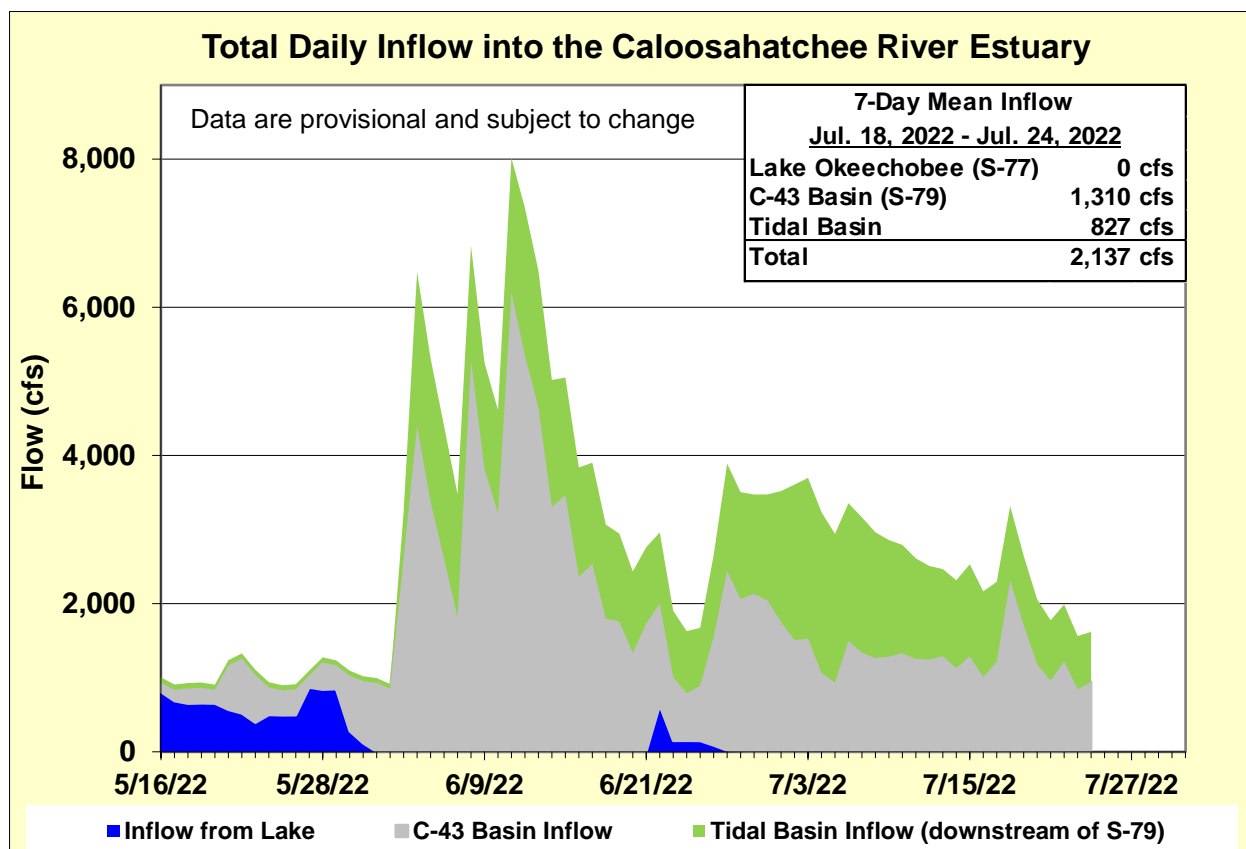


Figure ES-7. Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

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)	0.3 (0.3)	0.0 – 10.0
Val I-75	0.3 (0.3)	0.3 (0.3)	0.0 – 10.0
Fort Myers Yacht Basin	0.9 (0.5)	1.8 (0.6)	0.0 – 10.0
Cape Coral	6.7 (6.3)	9.7 (7.8)	10.0 – 25.0
Shell Point	22.5 (22.9)	25.2 (26.0)	10.0 – 25.0
Sanibel	29.3 (28.9)	31.2 (30.5)	10.0 – 25.0

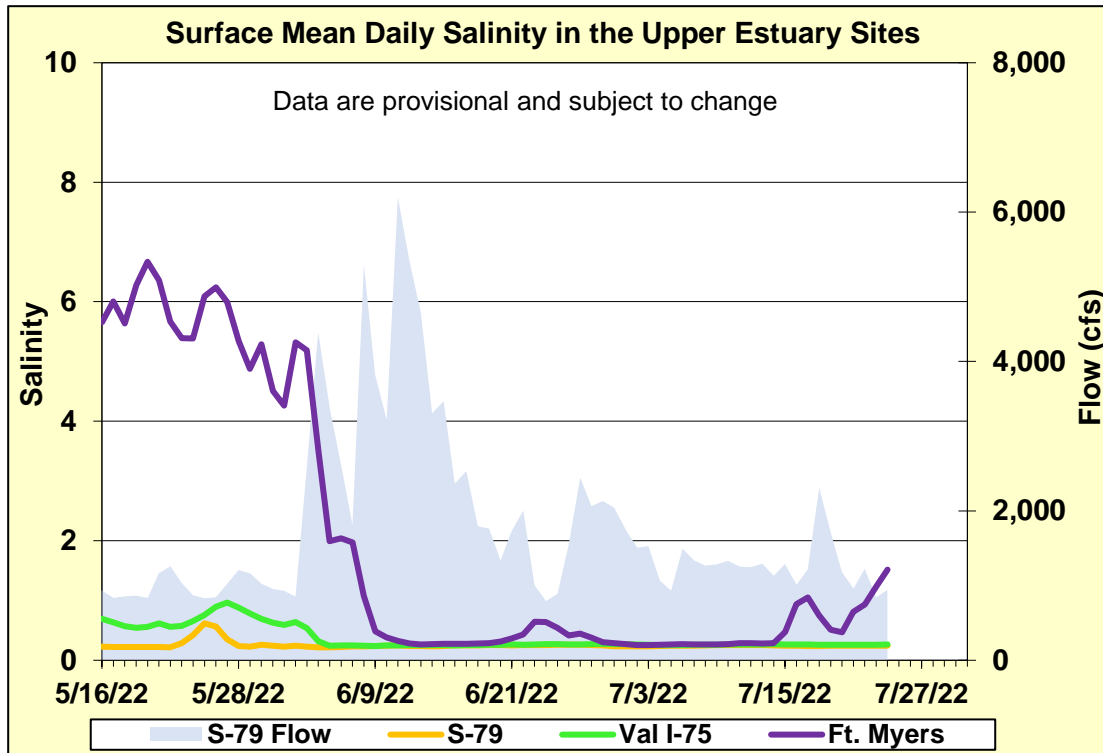


Figure ES-8. Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

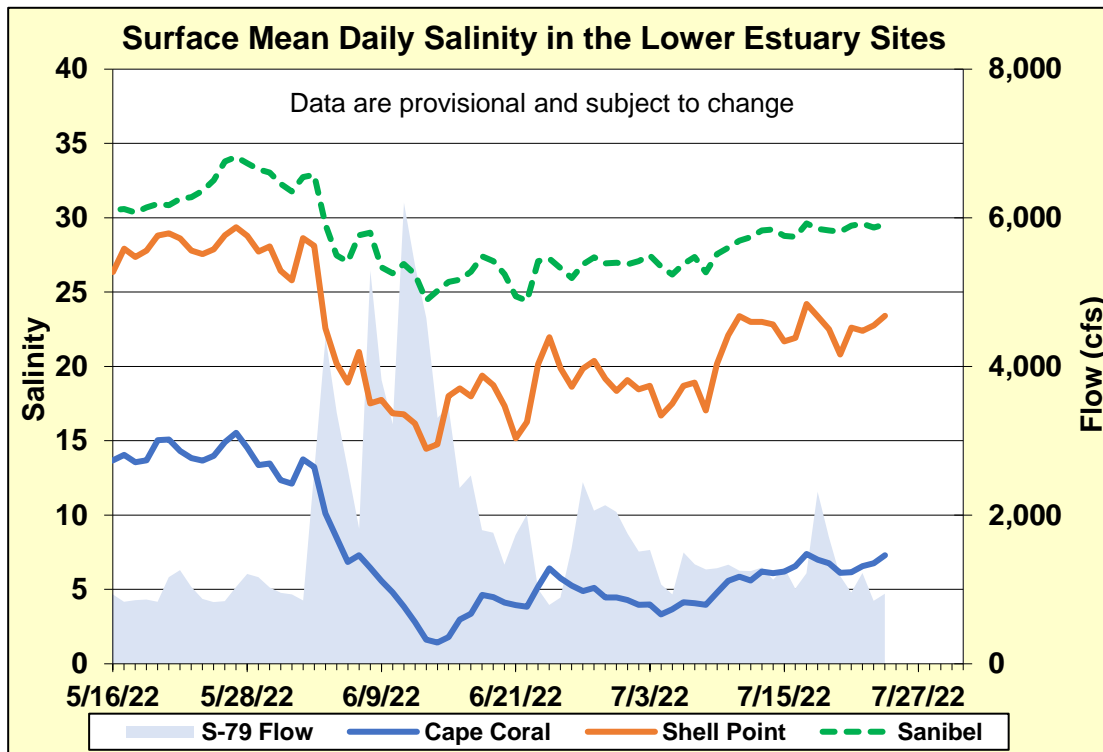


Figure ES-9. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

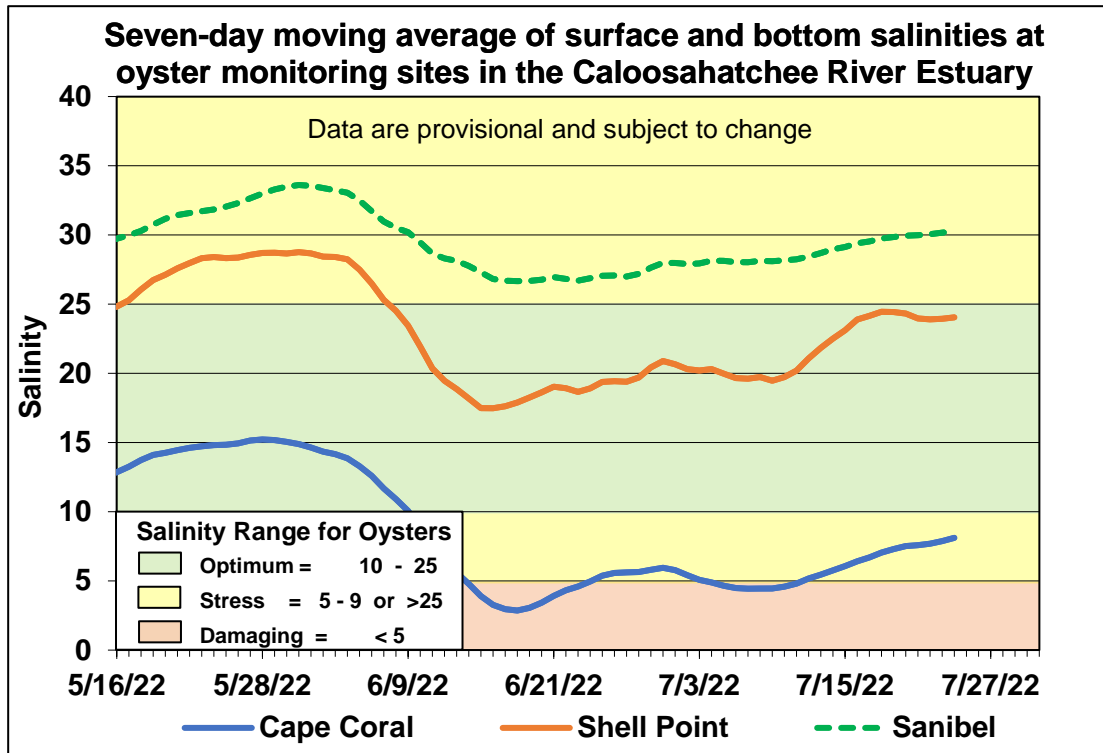


Figure ES-10. Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

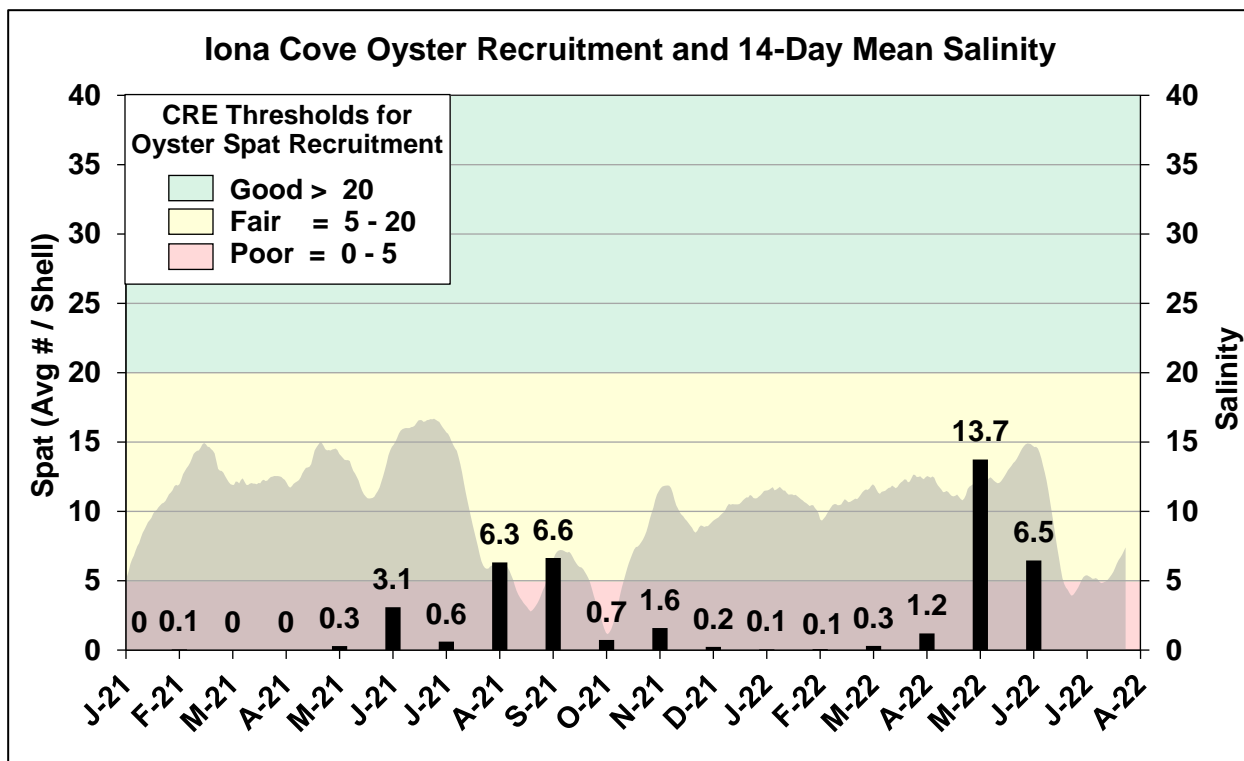


Figure ES-11. Mean oyster recruitment at the Iona Cove oyster monitoring station and 14-day mean salinity at Cape Coral.

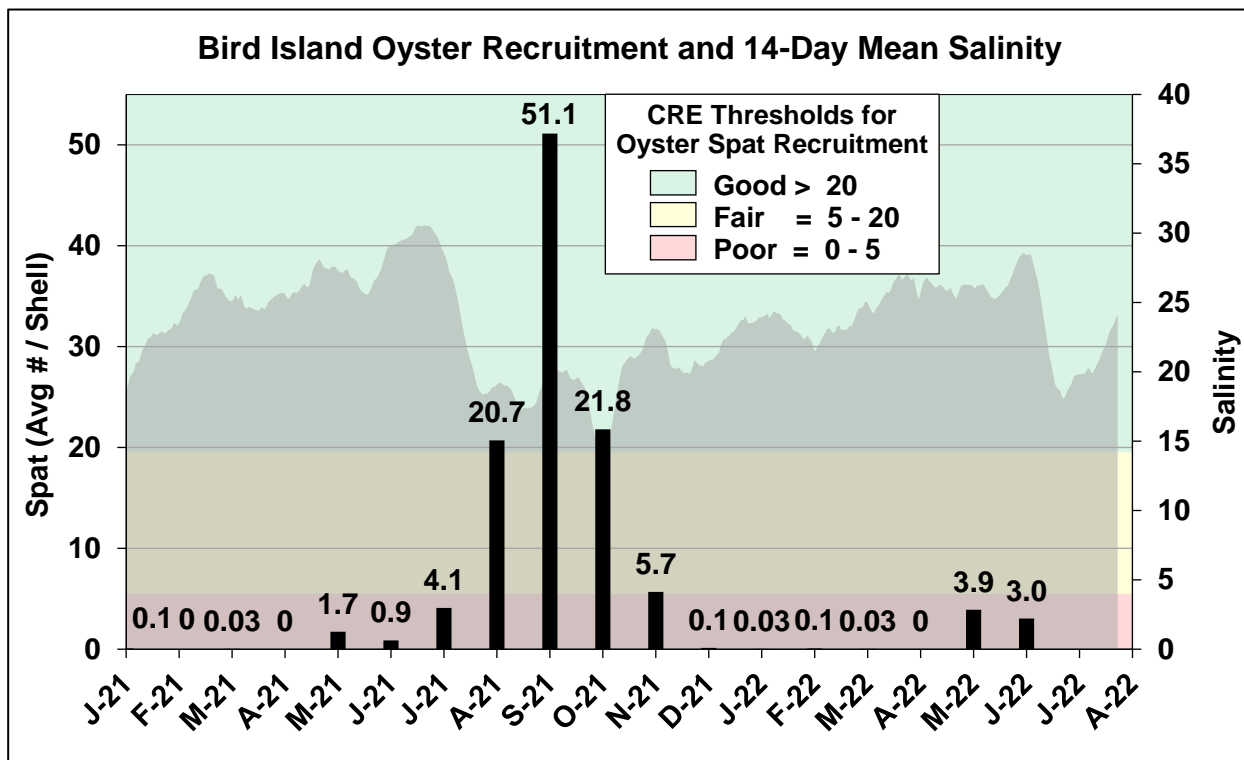


Figure ES-12. Mean oyster recruitment at the Bird Island oyster monitoring station and 14-day mean salinity at Shell Point.

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	569	2.5	0.7
B	450	569	1.5	0.5
C	800	569	0.9	0.4
D	1000	569	0.5	0.3
E	1500	569	0.3	0.3
F	2000	569	0.3	0.3

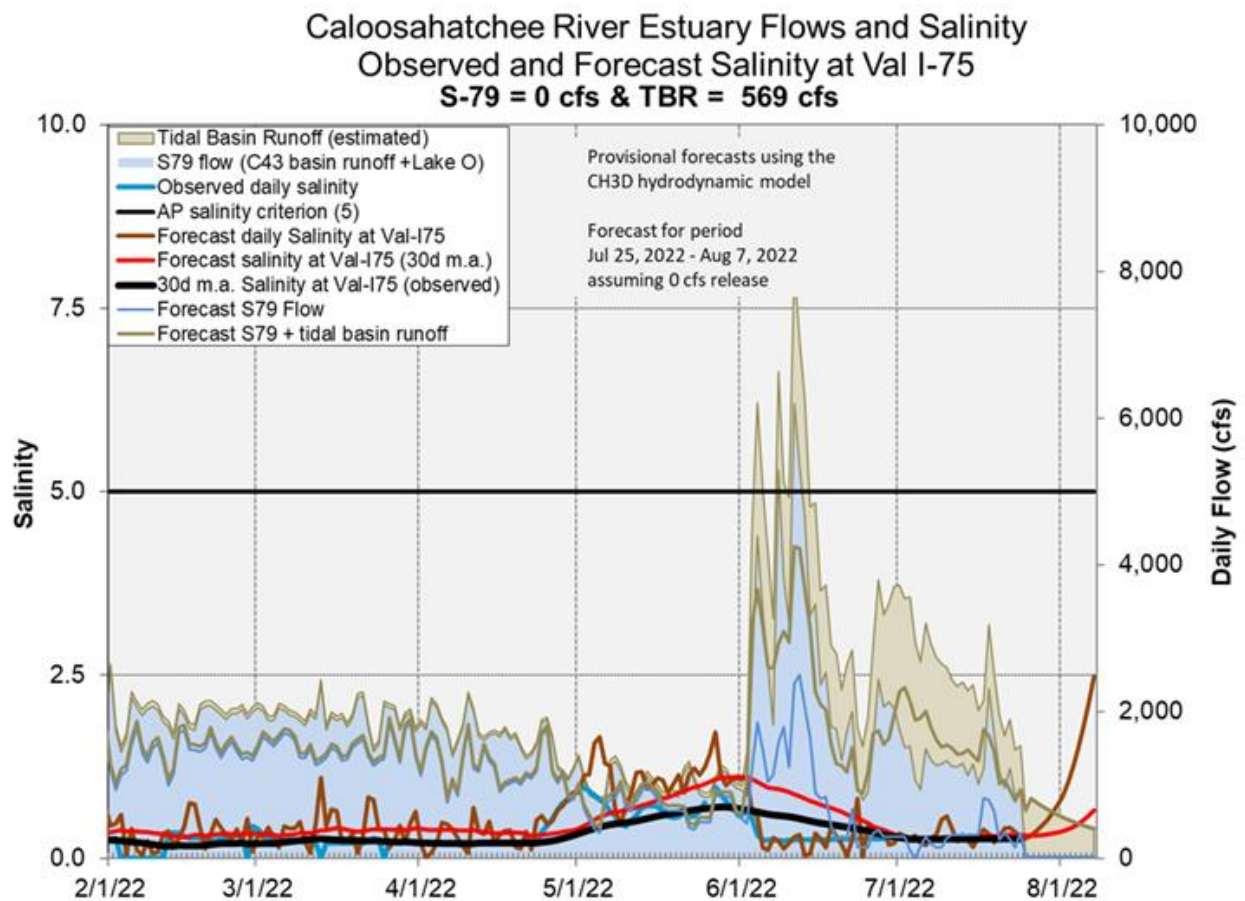


Figure ES-13. Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

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 near or above 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 Flow-way and very high for the 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 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**).

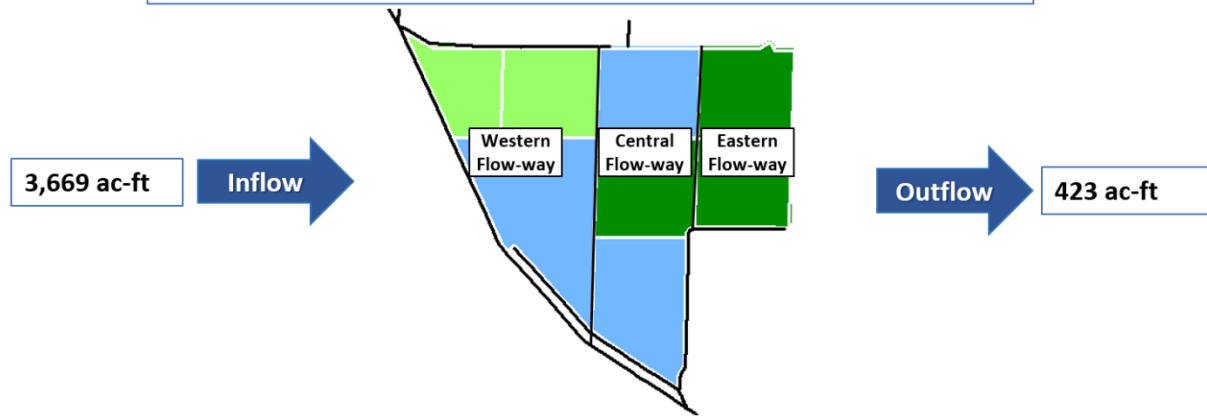
STA-2: STA-2 Flow-way 2 is offline for construction activities. Operational restrictions are in place in STA-2 Flow-ways 3 and 4 for vegetation management activities. Online treatment cells are near or above target stage. Vegetation in Flow-ways 1 and 3 is stressed, and in Flow-ways 2, 4 and 5 is highly 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: STA-5/6 Flow-way 4 is offline for vegetation management activities. Treatment cells are near or below 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 g/m²/year. (**Figure S-5 and S-6**).

For definitions on STA operational language see glossary following figures.

STA-1E Weekly Status Report – 7/18/2022 through 7/24/2022


















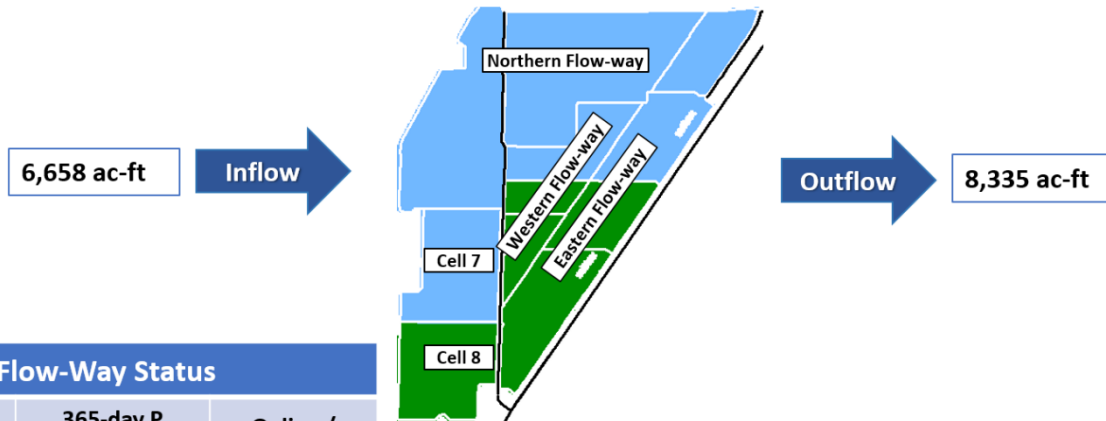
STA-1E Flow-Way Status				As of 7/24/2022		STA-1E Flow & Phosphorus Concentration			
Flow-Way	Vegetation Status <small>Healthy ----- Stressed</small> 	365-day P Loading Rate <small>(below 1.0 g P /m²/yr is optimal)</small>  1.0	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)			7-day	28-day	365-day
				 Deep Water Level (> 2.8' above TS)	 High Water Level (1.5' – 2.8' above TS)				
Eastern		 1.0	Vegetation management	 0.2' – 1.5' above TS	 Target Stage (TS +/- 0.2')		3,669	12,242	213,153
				 Low Water Level (<0.2' below TS)					
Central		 1.0	Vegetation rehabilitation	Depth / Area Based: Percent of Area Dry			423	8,736	177,904
Western	Offline, post-construction grow in starting 3/28/2022			 0-25% Dry	 50-75% Dry		117	60	12
				 25-50% Dry	 75-100% Dry				
							Includes Preliminary Data		

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

STA-1W Weekly Status Report – 7/18/2022 through 7/24/2022



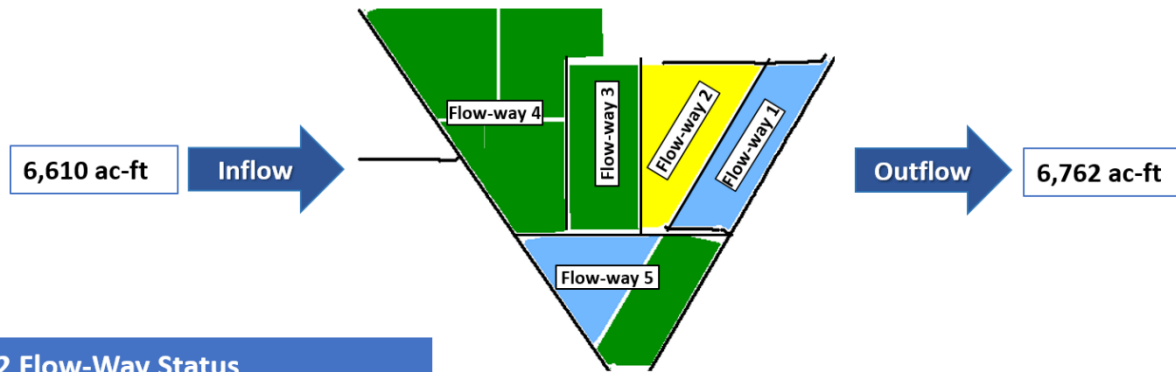
STA-1W Flow-Way Status			
Flow-Way	Vegetation Status Healthy --- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions
Northern			Vegetation management
Western			Vegetation management
Eastern			Vegetation management
Cell 7		N/A	Online
Cell 8		N/A	Construction

As of 7/24/2022	
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-1W Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	6,658	12,596	81,566
--Lake Inflow, ac-ft	0	N/A	3,000
Total Outflow, ac-ft	8,335	13,350	84,126
Inflow Conc., ppb	129	129	169
Outflow Conc., ppb	23	23	24
Includes Preliminary Data			

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

STA-2 Weekly Status Report – 7/18/2022 through 7/24/2022



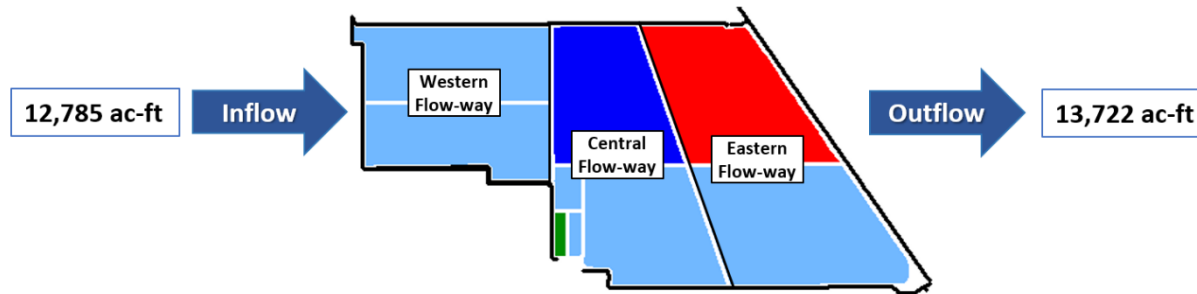
STA-2 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions
1			Online
2	Offline, construction activities as of 9/7/2021		
3			Vegetation Rehab
4			Vegetation Rehab
5			Online

As of 7/24/2022	
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	6,610	10,200	325,579
--Lake Inflow, ac-ft	0	N/A	28,100
Total Outflow, ac-ft	6,762	14,078	350,262
Inflow Conc., ppb	51	50	104
Outflow Conc., ppb	46	38	23
Includes Preliminary Data			

Figure S-3. STA-2 Weekly Status Report

STA-3/4 Weekly Status Report – 7/18/2022 through 7/24/2022










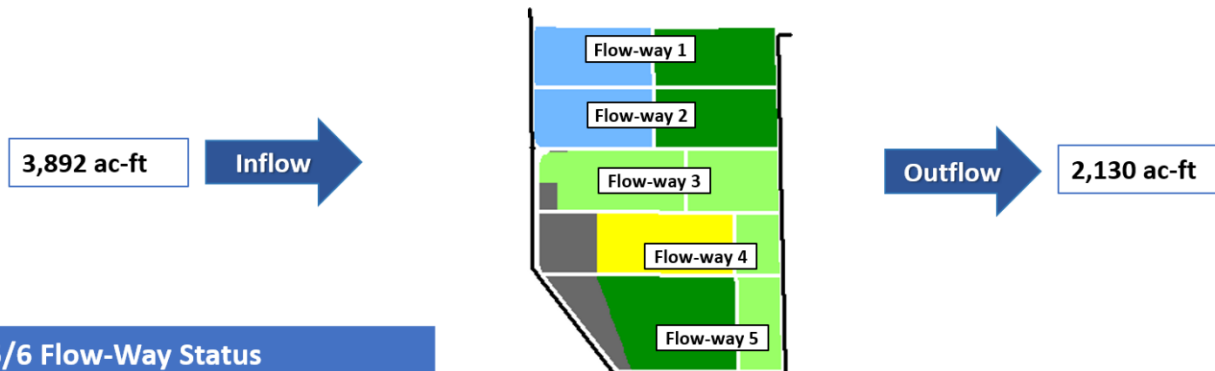
STA-3/4 Flow-Way Status				STA-3/4 Flow & Phosphorus Concentration																											
Flow-Way	Vegetation Status <small>Healthy ----- Stressed</small> 	365-day P Loading Rate <small>(below 1.0 g P /m²/yr is optimal)</small>	Online / Offline / Restrictions	As of 7/24/2022																											
				Stage Based: Relative to Target Stage (TS)																											
Eastern				<div><div></div> Deep Water Level (> 2.8' above TS)</div> <div><div></div> High Water Level (1.5' – 2.8' above TS)</div> <div><div></div> 0.2' – 1.5' above TS</div> <div><div></div> Target Stage (TS +/- 0.2')</div> <div><div></div> Low Water Level (<0.2' below TS)</div>																											
				Depth / Area Based: Percent of Area Dry																											
Central			Online	<div><div></div> 0-25% Dry</div> <div><div></div> 25-50% Dry</div> <div><div></div> 50-75% Dry</div> <div><div></div> 75-100% Dry</div>																											
Western			Online																												
				Includes Preliminary Data																											
				<table><tr><td></td><td>7-day</td><td>28-day</td><td>365-day</td></tr><tr><td>Total Inflow, ac-ft</td><td>12,785</td><td>53,584</td><td>347,819</td></tr><tr><td>--Lake Inflow, ac-ft</td><td>0</td><td>N/A</td><td>5,400</td></tr><tr><td>Total Outflow, ac-ft</td><td>13,722</td><td>49,998</td><td>320,433</td></tr><tr><td>Inflow Conc., ppb</td><td>41</td><td>45</td><td>87</td></tr><tr><td>Outflow Conc., ppb</td><td>11</td><td>12</td><td>14</td></tr></table>					7-day	28-day	365-day	Total Inflow, ac-ft	12,785	53,584	347,819	--Lake Inflow, ac-ft	0	N/A	5,400	Total Outflow, ac-ft	13,722	49,998	320,433	Inflow Conc., ppb	41	45	87	Outflow Conc., ppb	11	12	14
	7-day	28-day	365-day																												
Total Inflow, ac-ft	12,785	53,584	347,819																												
--Lake Inflow, ac-ft	0	N/A	5,400																												
Total Outflow, ac-ft	13,722	49,998	320,433																												
Inflow Conc., ppb	41	45	87																												
Outflow Conc., ppb	11	12	14																												

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

STA-5/6 Weekly Status Report – 7/18/2022 through 7/24/2022



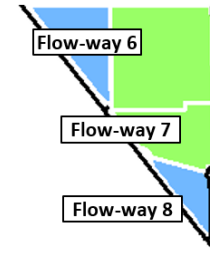
STA-5/6 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions
1			Online
2			Online
3			Online
4	Offline, vegetation management starting 01/24/2022		
5			Online

As of 7/24/2022	
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	3,892	10,366	180,542
--Lake Inflow, ac-ft	0	N/A	0
Total Outflow, ac-ft	2,130	4,666	173,334
Inflow Conc., ppb	229	205	242
Outflow Conc., ppb	52	34	49
Includes Preliminary Data			

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

STA-5/6 Weekly Status Report – 7/18/2022 through 7/24/2022














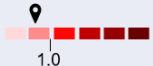



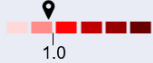
STA-5/6 Flow-Way Status				As of 7/24/2022	
Flow-Way	Vegetation Status Healthy ----- Stressed 	365-day P Loading Rate (below 1.0 g P /m²/yr is optimal)	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)	
				 Deep Water Level (> 2.8' above TS)	 High Water Level (1.5' – 2.8' above 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
6			Online		
7			Online		
8			Online		

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 rose slowly last week. The average on Sunday was 0.63 feet above the rising Zone A1 regulation line. WCA-2A: Stage at the 2-17 gauge tracked slower than the slope of the regulation line last week. The average on Sunday was 0.88 feet above the rising regulation line. WCA-3A: Last week the Three Gauge Average stages fell faster than the slope of the Zone A regulation line. The average stage was only 0.12 feet above the rising regulation line on Sunday. WCA-3A North: At gauge 62 (Northwest corner) stage fell during the week, the average on Sunday was 0.47 feet below the rising Upper schedule line. (**Figures EV-1 through EV-4**).

Water Depths

The SFWDAT tool indicates drying conditions in northwest WCA-3A North, and depths have receded in WCA-2A. Along the northern reach of the L-67s depths are similar but the spatial extent of the deeper water is expanding south and west. North to South hydrologic connectivity is being maintained within all the sloughs of Everglades National Park. Comparing current WDAT water depths to one month ago, stages are deeper in WCA-3A; and significantly lower in northern WCA-2A as that region recovers from a wildfire. Looking back a year ago, only WCA-2A is shallower; with the rest of the EPA deeper particularly downstream of the S-11s along the upper reaches of the L-67s and in northern BCNP. (**Figure EV-5 and Figure EV-6**). Comparing current conditions to the 20-year median: Northern WCA-2A is below average, northeastern WCA-3A North is near the median highlighting the need for restoration, and NESRS and WCA-1 remain in the upper percentiles. (**Figure EV-7**)

Taylor Slough and Florida Bay

Taylor Slough and Florida Bay received an average of 0.16 inches of total rain in the past week, over half an inch less than the previous week. Stages in Taylor Slough have continued to decrease, with an average change of -0.10 feet (**Figure EV-8 and Figure EV-9**). Individual stage gauge changes ranged from -0.149 feet at E112 to -0.045 feet at P33, both in the northern slough area. Taylor Slough is now 1.37 inches higher than its historical average for this time of year (pre-Florida Bay initiative which started in 2017). Conditions continue to be favorable for moving water downstream through the Slough this year as the wet season continues.

Across stations used to report average Florida Bay salinity, the Florida Bay average is 30.1, which changed by +2.7 over the week ending in 7/24. Similar to the previous week, salinities increased at nearly all sites and regions of the bay. Individual station changes throughout the bay ranged from -0.3 just south of Taylor River in Little Madeira Bay (LM) and Manatee Bay (MB) to +9.0 in Garfield Bight (GB) in the western nearshore area (**Figure EV-8**). In all regions, salinities are within the 2001-2016 Interquartile Range, although in the eastern and central regions, salinities remain below the 50th percentile (**Figure EV-10**). Florida Bay salinity is 1.26 higher than its historical average for this time of year, largely driven by increases at Garfield Bight, Buoy Key (BK), and Johnson Key (JK) in the western bay.

Water Management Recommendations

Maintaining a very moderate rate of stage change within the marsh of WCA-2A would have an ecological benefit, allowing stressed vegetation to recover. Flows into northeastern WCA-3A would be ecologically beneficial. Taylor Slough stages remain in a good place to expedite freshwater deliveries to the south as the wet season progresses. 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	0.66	-0.06
WCA-2A	0.52	+0.02
WCA-2B	0.40	-0.02
WCA-3A	0.46	-0.13
WCA-3B	0.20	-0.02
ENP	0.68	-0.06

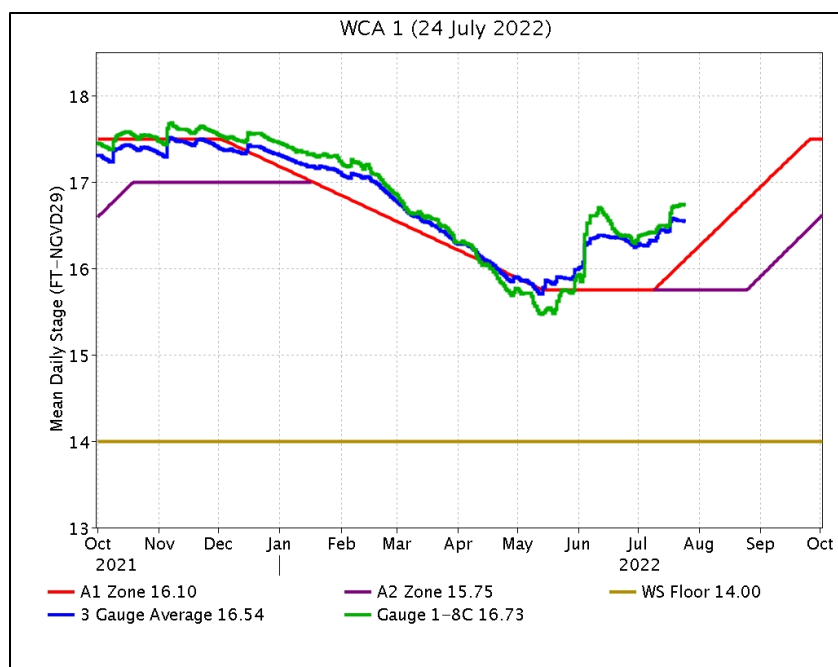


Figure EV-1. WCA-1 stage hydrographs and regulation schedule.

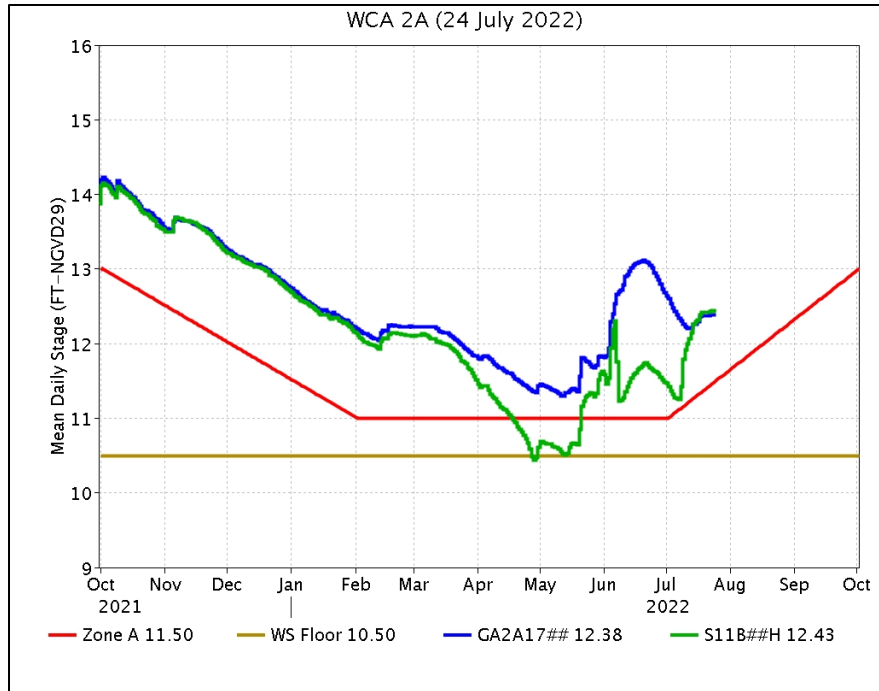


Figure EV-2. WCA-2A stage hydrographs and regulation schedule.

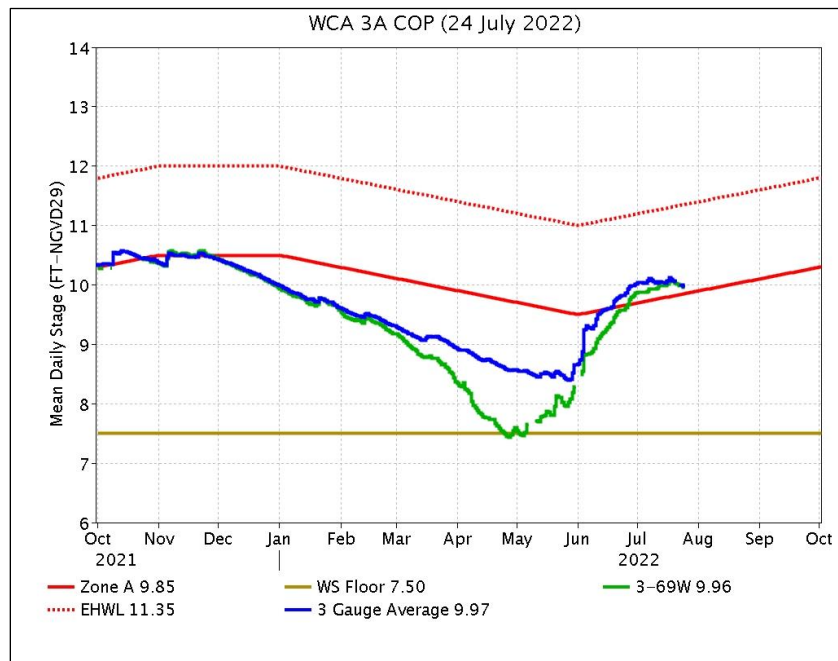


Figure EV-3. WCA-3A stage hydrographs (three-gauge average, S-333 headwater) and regulation schedule.

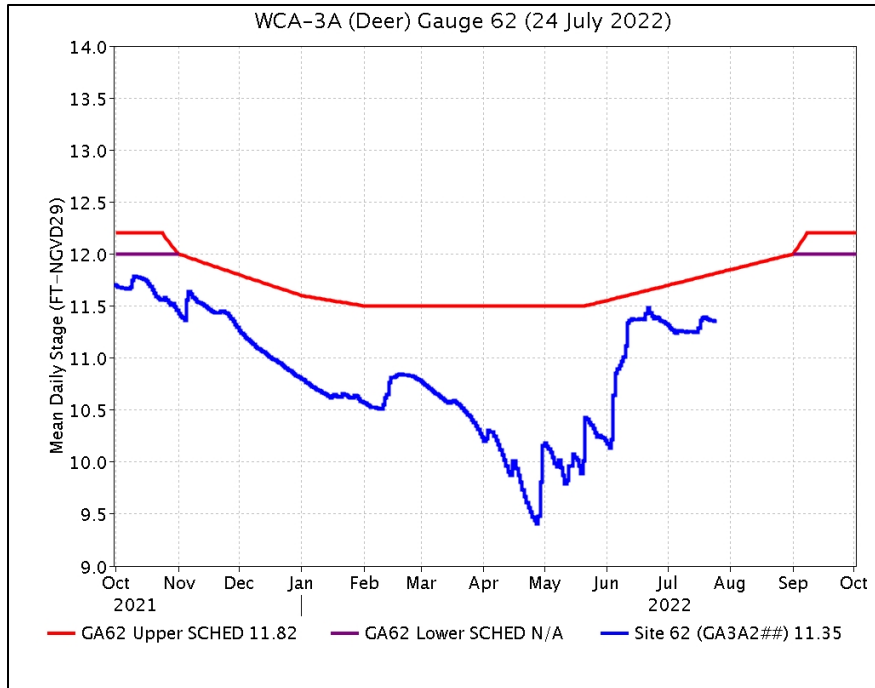


Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.

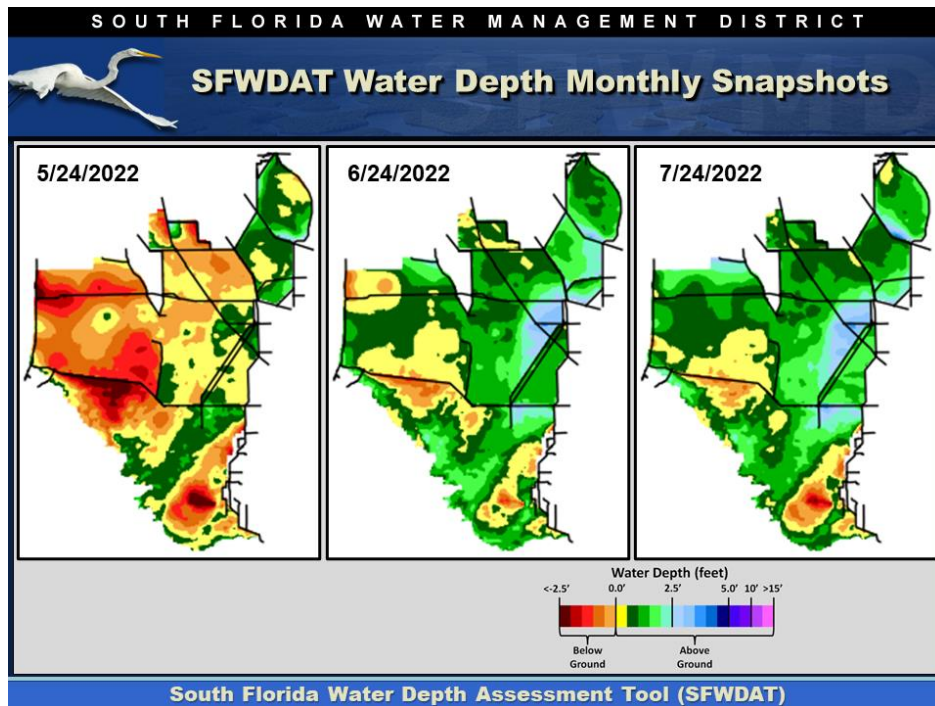


Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

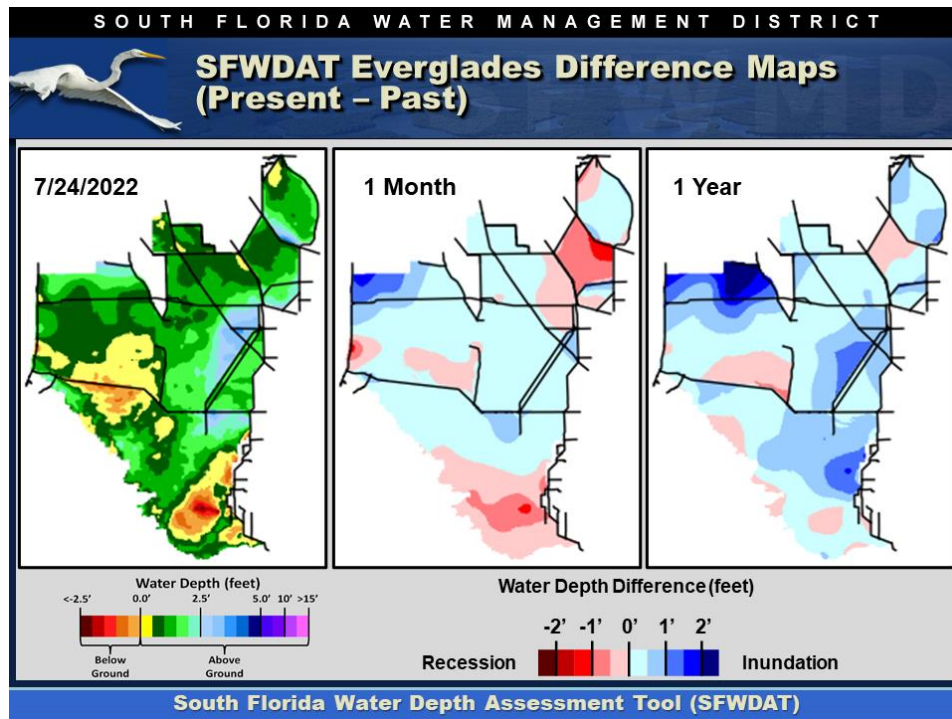


Figure EV-6. Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

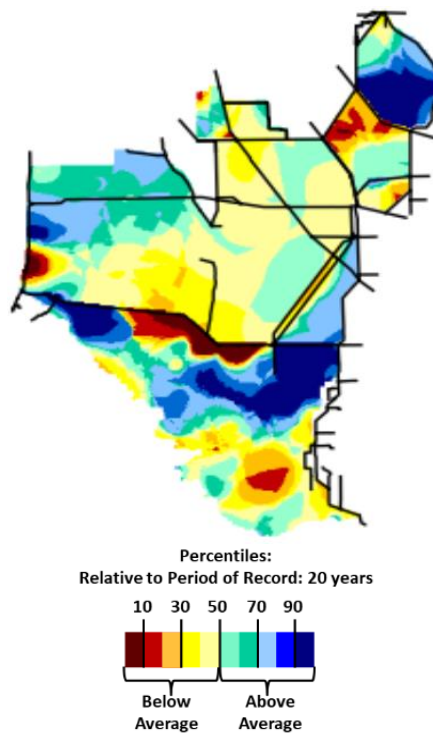


Figure EV-7. Present water depths (7/10/2022) compared to the day of year median over the previous 20 years.

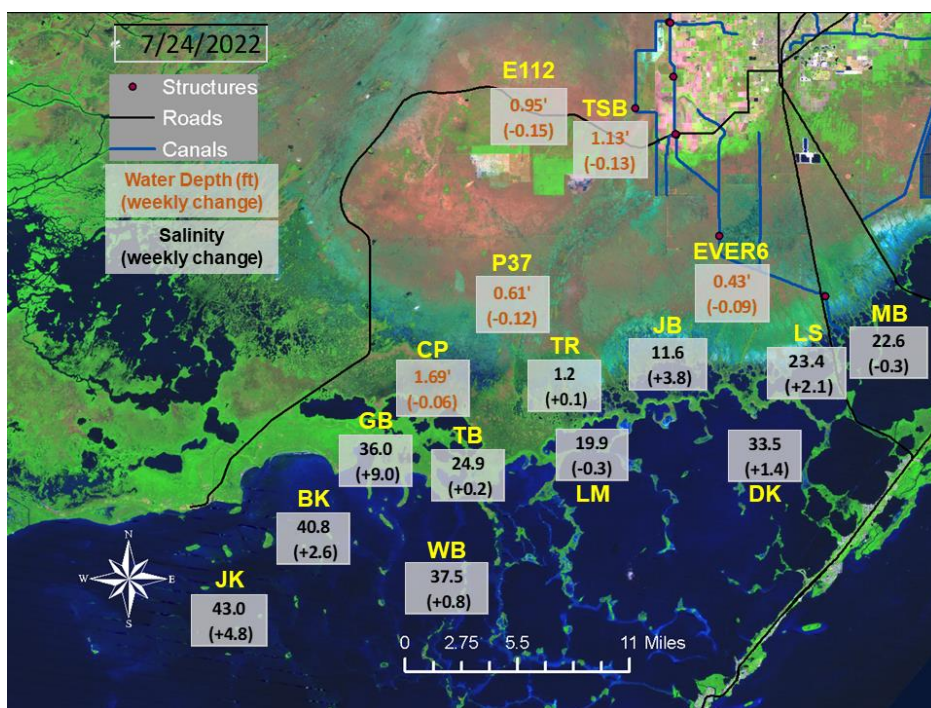


Figure EV-8. Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

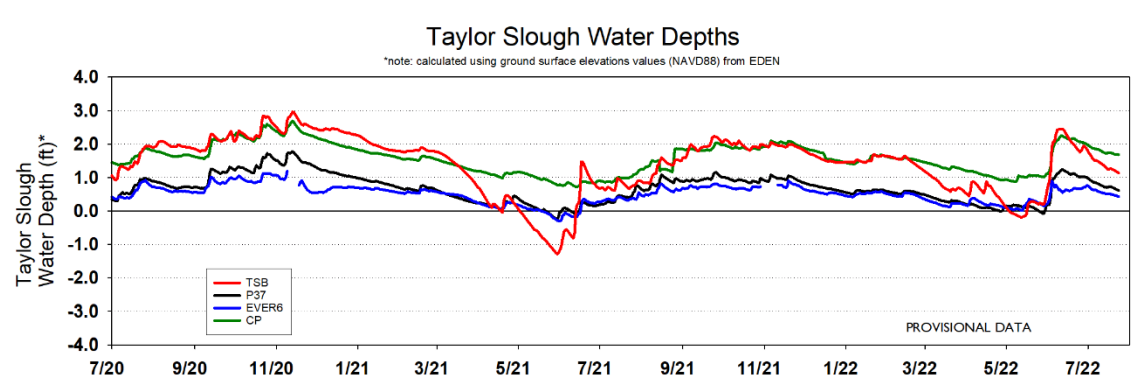


Figure EV-9. Taylor Slough water depth time series.

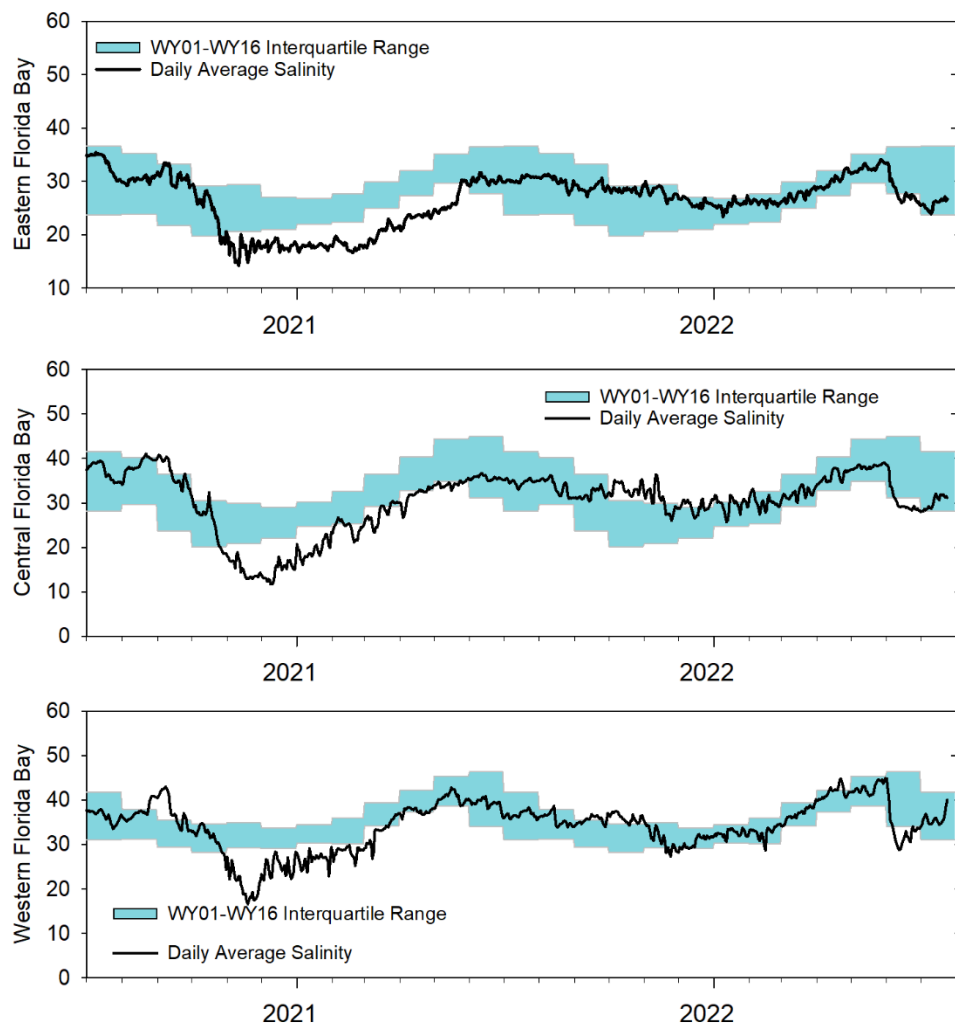


Figure EV-10. Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

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

SFWMD Everglades Ecological Recommendations, July 26th, 2022 (red is new)			
Area	Weekly change	Recommendation	Reasons
WCA-1	Stage decreased by 0.06'	Return to a moderate ascension rate of less than 0.18 feet per week.	Protect within basin and downstream habitat and wildlife.
WCA-2A	Stage increased by 0.02'	Maintain ascension rate to about 0.0 feet per week until stage at 2-17 gauge is within 0.75 feet of schedule.	Protect within basin and downstream habitat and wildlife.
WCA-2B	Stage decreased by 0.02'	Return to a moderate ascension rate of less than 0.18 feet per week.	Protect within basin and downstream habitat and wildlife.
WCA-3A NE	Stage decreased by 0.31'	Return to a moderate ascension rate of less than 0.18 feet per week.	Protect within basin and downstream habitat and wildlife. Lower fire risk.
WCA-3A NW	Stage decreased by 0.05'	Return to a moderate ascension rate of less than 0.18 feet per week.	
Central WCA-3A S	Stage decreased by 0.05'	Return to a moderate ascension rate of less than 0.18 feet per week.	Protect within basin and downstream habitat and wildlife.
Southern WCA-3A S	Stage decreased by 0.07'		
WCA-3B	Stage decreased by 0.02'	Return to a moderate ascension rate of less than 0.18 feet per week.	Protect within basin and downstream habitat and wildlife. Lower fire risk.
ENP-SRS	Stage decreased by 0.06'	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 -0.149' to -0.045'	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged -0.3 to +9.0	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 121 cfs and the previous 30-day mean inflow was 333 cfs. The seven-day mean salinity was 24.1 at BBCW8 and 34.6 at BBCW10, both below the preferred maximum salinity of 35 for these sites. Data provided by Biscayne National Park.

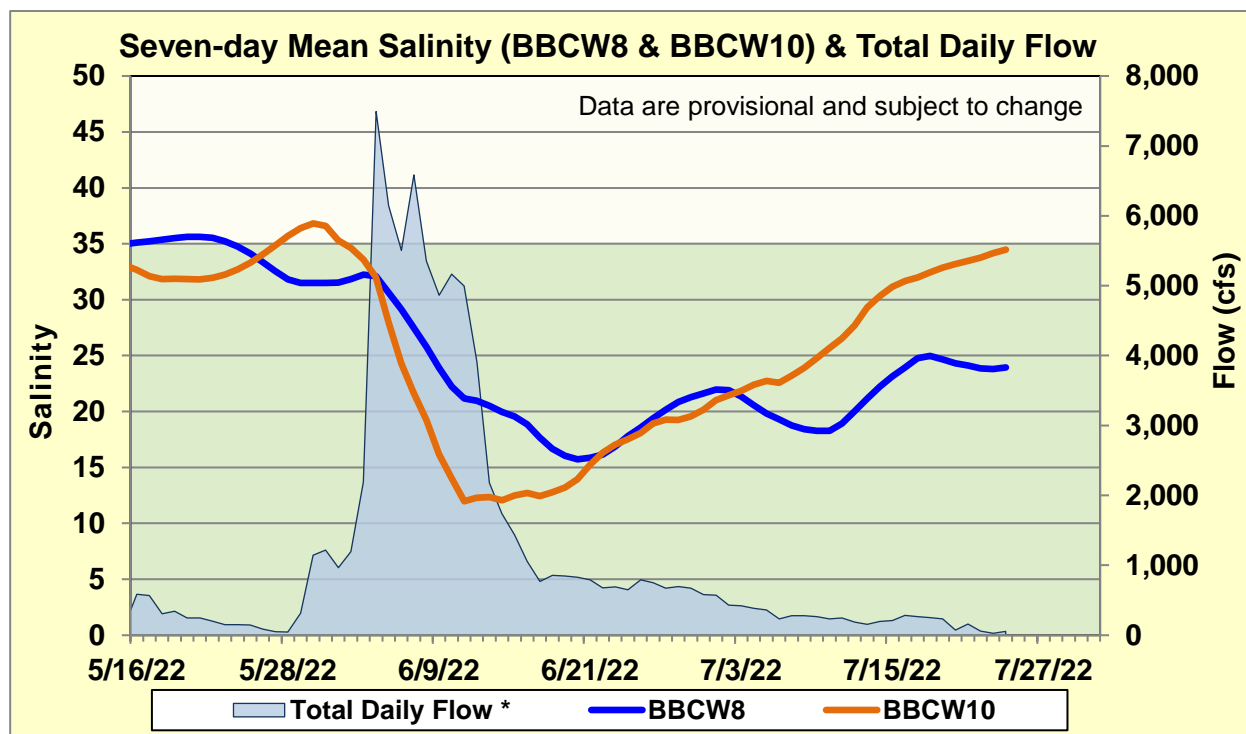


Figure BB-1. Seven-day mean salinity at BBCW8 and BBCW10 and total daily flow in Biscayne Bay. Total daily flow was calculated using flow from structures S20G, S20F, S21, S21A, S123, and S700P.