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M E M O R A N D U M

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

FROM: SFWMD Staff Environmental Advisory Team

DATE: September 14, 2022

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

True wet season rains are forecast for this week. Deep moisture pooling south of a stationary frontal boundary over the Southeastern United States (SEUS) is forecast to fuel repeat heavy rains each day this week. Very heavy rains are likely on Wednesday, Thursday, and Friday. The greatest concentration of rains is likely over the west, and much above average weekly rainfall is expected to result. An upper disturbance centered over the Great Lakes region will soon lift out into Atlantic Canada on Wednesday. A cold front extends from western New York all the way to southern Louisiana. South of the frontal boundary, deep tropical moisture stretches from the southern Gulf of Mexico and western Caribbean Sea up to coastal New England. The frontal boundary will be left behind over the SEUS, allowing moisture to pool for a few days. The abundant deep tropical moisture, sufficient daytime instability, and lift provided by the frontal boundary will support very heavy rainfall this week, with above average total SFWMD rainfall today, and possibly two 0.5-inch days in a row on Wednesday and Thursday. An additional heavy rainfall day is also possible on Friday. For today, scattered storms will first initiate during the early afternoon along the coastal sea breeze boundaries and spread inland throughout the day, particularly along the west coast where there is a weak southwest flow present. Heavy storms are likely over the central interior where the east and west coast sea breeze boundaries are likely to collide. The greatest rainfall amounts could possibly occur south of Lake Okeechobee where steering currents are lighter, and local maximums in excess of 4 inches are a certain possibility. A further increase in moisture on Wednesday will favor widespread heavy rainfall across the SFWMD, with over 0.5-inch a certain possibility. Light steering currents could allow for some areas to receive excessive amounts of rainfall at a local or even a more-broad scale, however it is not entirely clear which parts of the SFWMD will receive the most rainfall. While there is a strong model signal for heavy rainfall in almost all computer models, the Weather Prediction Center (WPC) highlights a marginal risk of excessive rainfall on Tuesday, Wednesday, and Thursday. With little change to the position of the frontal boundary, heavy rains are likely up until Saturday. Afterwards, there is considerable divergence within the model solutions regarding the atmospheric conditions

over southern Florida on Sunday and Monday. Much above average rainfall is expected for the 7-day period ending next Tuesday morning.

Kissimmee

Stages in East Lake Toho and Lake Toho have risen to their respective regulation schedules; flow at S-59 and S-61 is being adjusted to hold stages at their regulation schedules. Flow at S-65 remained at 0 cfs, which allowed KCH stage to rise to the regulation schedule. S-65A discharge was decreased to 62 cfs as runoff decreased and then increased to 120 cfs to control a rainfall-driven stage rise in Pool A. With S-65A discharge remaining below bankfull, water depth on the Kissimmee River floodplain was steady over the week, with a mean depth of 0.17 feet on September 11, 2022. The concentration of dissolved oxygen in the Kissimmee River averaged 3.3 mg/L in the last week.

Lake Okeechobee

Lake Okeechobee stage was 12.55 feet NGVD on September 11, 2022, with water levels 0.23 feet lower than a month ago. Lake stage was in the Water Shortage Management band and in the ecological envelope, and just 0.11 feet above the lower envelope limit. Average daily inflows (excluding rainfall) decreased and outflows (excluding evapotranspiration) increased from the previous week. The most recent satellite image (September 11, 2022) from NOAA's Harmful Algal Bloom Monitoring System showed that bloom potential was moderate to high in the western, northwestern, and southwestern parts of the lake. The bloom potential decreased along the northern and northeastern areas of the Lake since the previous week. Microcystins were not detected in the water during the September 6-7 routine survey. Chlorophyll *a* exceeded 40 µg/L (Lake-wide bloom threshold) at 28% of the sites, with the highest value (58.3 µg/L) recorded at the PALMOUT location. The survey also revealed that communities at 19% of the sites were dominated by *Microcystis aeruginosa*, 59% of the sites had mixed communities, 12% of sites were dominated by either *Planktolyngbya limnetica* or *Cylindrospermopsis raciborskii* or were co-dominated by these two species. The S-308 site had communities dominated by *Carteria cordiformis* green algae.

Estuaries

Total inflow to the St. Lucie Estuary averaged 669 cfs over the past week with no flow coming from Lake Okeechobee. Mean surface salinities remained similar to the previous week at all sites over the past week. Salinity in the middle estuary was within the optimal range (10-25) for adult eastern oysters.

Total inflow to the Caloosahatchee Estuary averaged 3,752 cfs over the past week with no flow coming from Lake Okeechobee. Mean surface salinities remained the same at S-79 and Shell Point and decreased at the remaining sites in the estuary over the past week. Salinities were in the optimal range (0-10) for tape grass in the upper estuary. Salinities were in the optimal range (10-25) for adult eastern oysters at Shell Point and in the stressed range at Cape Coral (<10) and Sanibel (>25).

Stormwater Treatment Areas

For the week ending Sunday, September 11, 2022, no Lake Okeechobee water was delivered to the FEBs/STAs. The total amount of Lake releases sent to the FEBs/STAs in WY2023 (since May 1, 2022) is approximately 12,500 ac-feet. The total amount of inflows to the STAs in WY2023 is approximately 435,000 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

Less rain meant rates of stage change fell into the “poor” category in most regions of the EPA. Dry conditions continue to dominate the northern portions of all the WCAs, and WCA-3A NE has remained in the poor category the last 6 weeks. Another recently reported wildfire in northern WCA-3A (west of the Miami canal), details are emerging, but the fire seems more significant in size than the others. Taylor slough stages rose last week and remain just above average. Salinities remain above average across Florida Bay but decreased over the week. Wide swings in salinity levels can be stressful to benthic vegetation. Low rainfall and creek flow in the western bay (versus the eastern bay) have meant a persistent algal bloom there.

Biscayne Bay

Total inflow to Biscayne Bay averaged 438 cfs and the previous 30-day mean inflow averaged 318 cfs. The seven-day mean salinity was 32.1 at BBCW8 and 34.1 at BBCW10, both below the preferred maximum salinity of 35. Salinity data provided as a courtesy by Biscayne National Park.

Supporting Information

Kissimmee Basin

Upper Kissimmee

On September 11, 2022, lake stages were 57.1 feet NGVD (0.4 feet above schedule) in East Lake Toho, 54.1 feet NGVD (0.4 feet above schedule) in Lake Toho, and 51.3 feet NGVD (0.1 feet above 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 September 11, 2022, discharge at S-65 was still 0 cfs; discharge at S-65A was increased to 120 cfs to control the rise in S-65A headwater stage due to rainfall after having been decreased to 62 cfs earlier in the week as runoff decreased. Discharges from the Kissimmee River were 200 cfs at S-65D and 160 cfs at S-65E (**Table KB-2**). Headwater stages were 46.5 feet NGVD at S-65A and 26.1 feet NGVD at S-65D on September 11, 2022. In the Kissimmee River, mean river channel stage decreased by more than 1 ft early in the last week but began to rise as S-65A discharge and local runoff increased (**Figure KB-4**). With S-65A discharge remaining below bankfull, water depth on the Kissimmee River floodplain remained steady over the week, with a mean depth of 0.17 feet on September 11, 2022 (**Figure KB-5**). The concentration of dissolved oxygen in the Kissimmee River averaged 3.3 mg/L in the last week (**Table KB-2, Figure KB-6**).

Water Management Summary

Stages in East Lake Toho and Lake Toho have risen to their respective regulation schedules; flow at S-59 and S-61 is being adjusted to hold stages at their regulation schedules. Flow at S-65 remained at 0 cfs, which allowed KCH stage to rise to the regulation schedule. S-65A discharge was decreased to 62 cfs as runoff decreased and then increased to 120 cfs to control a rainfall-driven stage rise in Pool A. With S-65A discharge remaining below bankfull, water depth on the Kissimmee River floodplain was steady over the week, with a mean depth of 0.17 feet on September 11, 2022. The concentration of dissolved oxygen in the Kissimmee River averaged 3.3 mg/L in the last week.

Water Management Recommendations

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

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

Water Body	Structure	Stage Monitoring Site	7-Day Average Discharge (cfs)	Lake Stage (feet NGVD) ^a	Schedule Type ^b	Schedule Stage (feet NGVD)	Departure from Regulation (feet)	
							9/11/22	9/4/22
Lakes Hart and Mary Jane	S-62	LKMJ	190	60.1	R	60.0	0.1	0.0
Lakes Myrtle, Preston and Joel	S-57	S-57	60	61.0	R	61.0	0.0	0.1
Alligator Chain	S-60	ALLI	52	63.4	R	63.2	0.2	-0.1
Lake Gentry	S-63	LKGT	47	61.1	R	61.0	0.1	-0.4
East Lake Toho	S-59	TOHOE	600	57.1	R	56.7	0.4	0.3
Lake Toho	S-61	TOHOW S-61	1300	54.1	R	53.7	0.4	0.5
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	0	51.3	R	51.2	0.1	-0.5

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

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

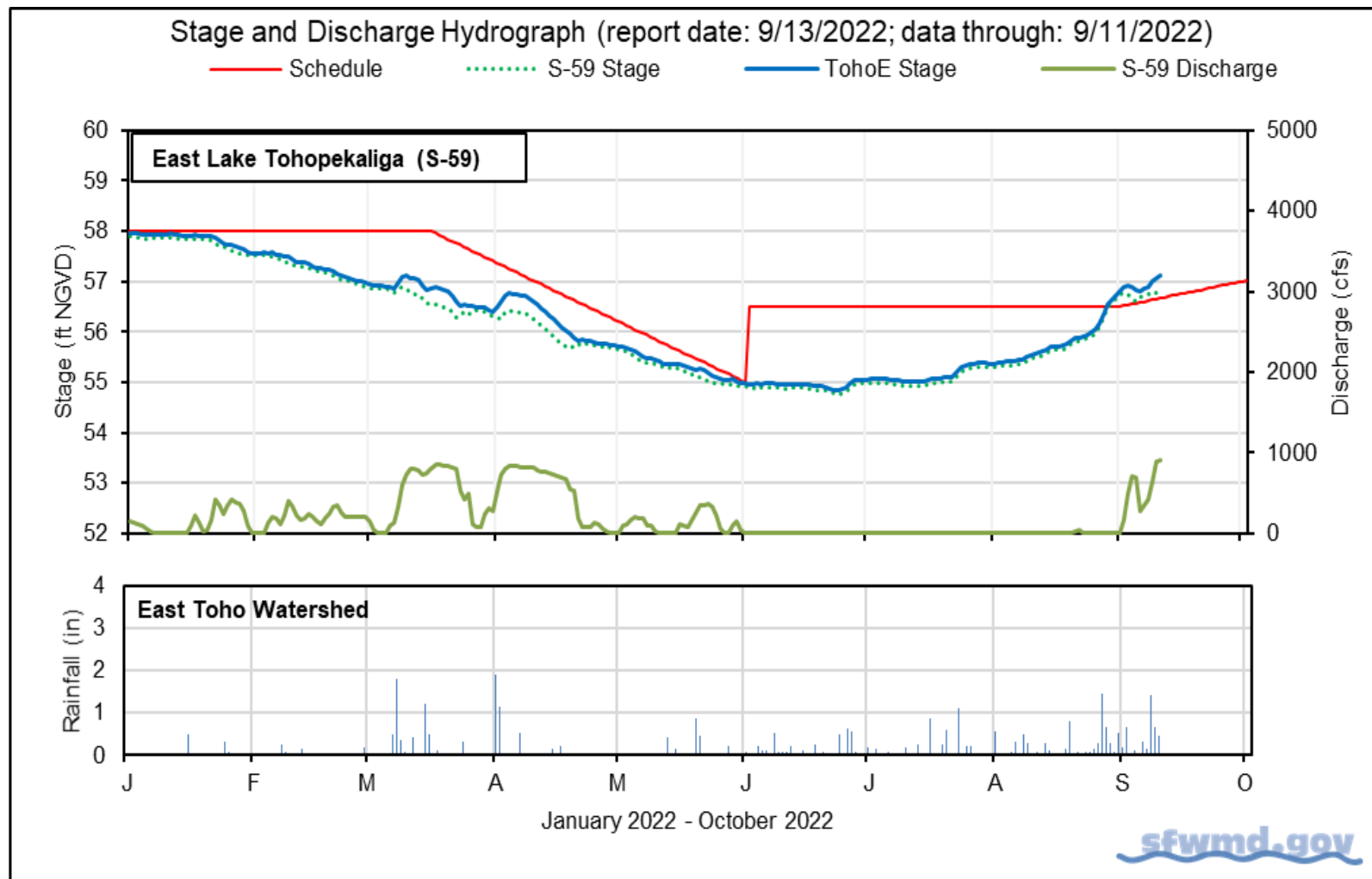


Figure KB-1. East Lake Toho regulation schedule, stage, discharge and rainfall.

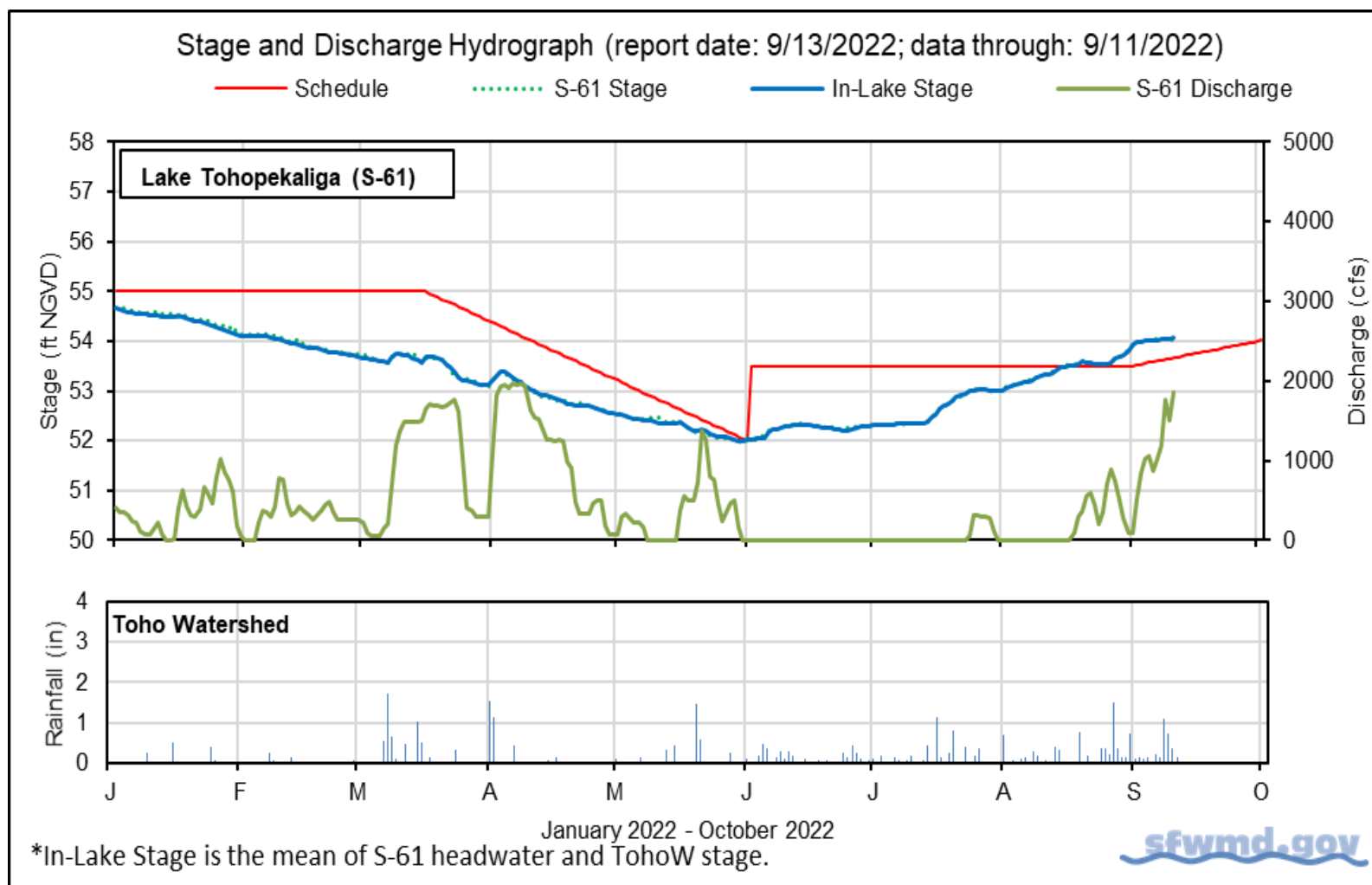


Figure KB-2. Lake Toho regulation schedule, stage, discharge and rainfall.

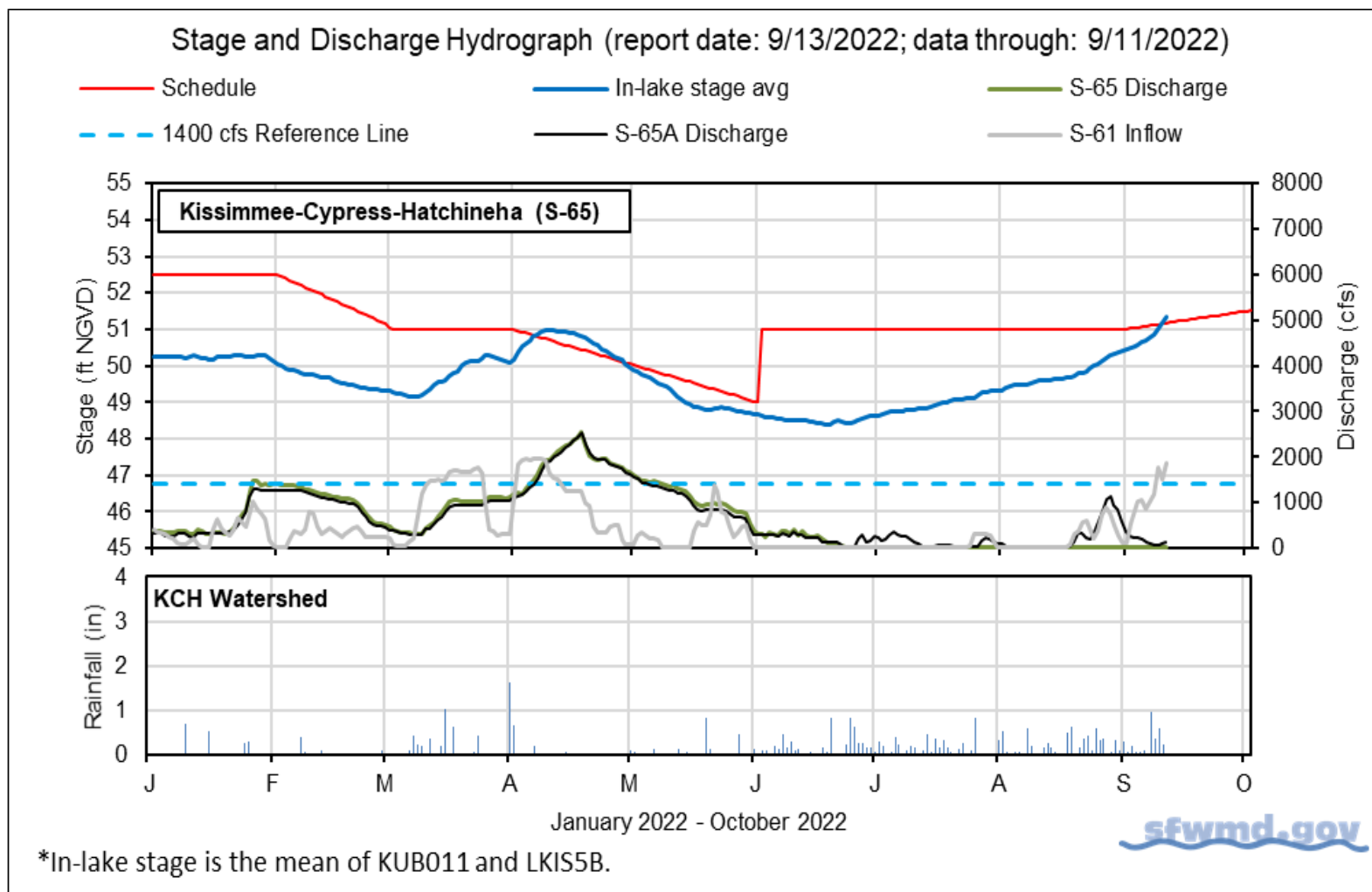


Figure KB-3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

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

Metric	Location	Daily Average	Average for Previous Seven Day Periods			
		9/11/22	9/11/22	9/4/22	8/28/22	8/21/22
Discharge	S-65	0	0	0	0	0
Discharge	S-65A ^a	120	110	490	630	130
Headwater Stage (feet NGVD)	S-65A	46.5	46.3	46.5	47.0	46.5
Discharge	S-65D ^b	200	240	800	400	80
Headwater Stage (feet NGVD)	S-65D ^c	26.1	26.2	26.3	26.2	26.2
Discharge (cfs)	S-65E ^d	160	230	740	380	86
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) ^e	Phase I, II/III river channel	3.4	3.3	2.0	3.3	3.6
Mean depth (feet) ^f	Phase I floodplain	0.17	0.14	0.20	0.10	0.11

a. Combined discharge from main and auxiliary structures.

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

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

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

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

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

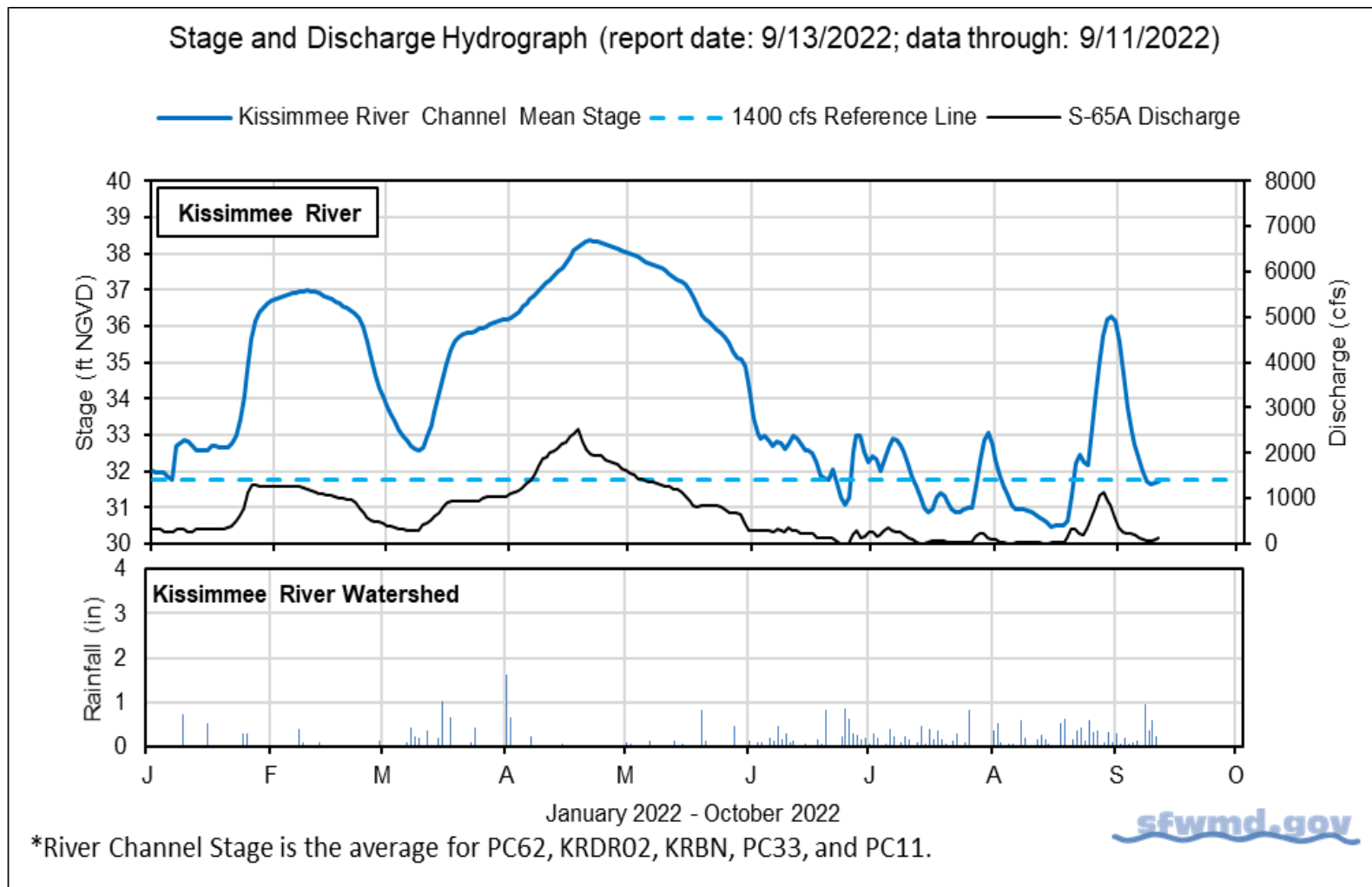


Figure KB-4. Kissimmee River stage, discharge and rainfall.

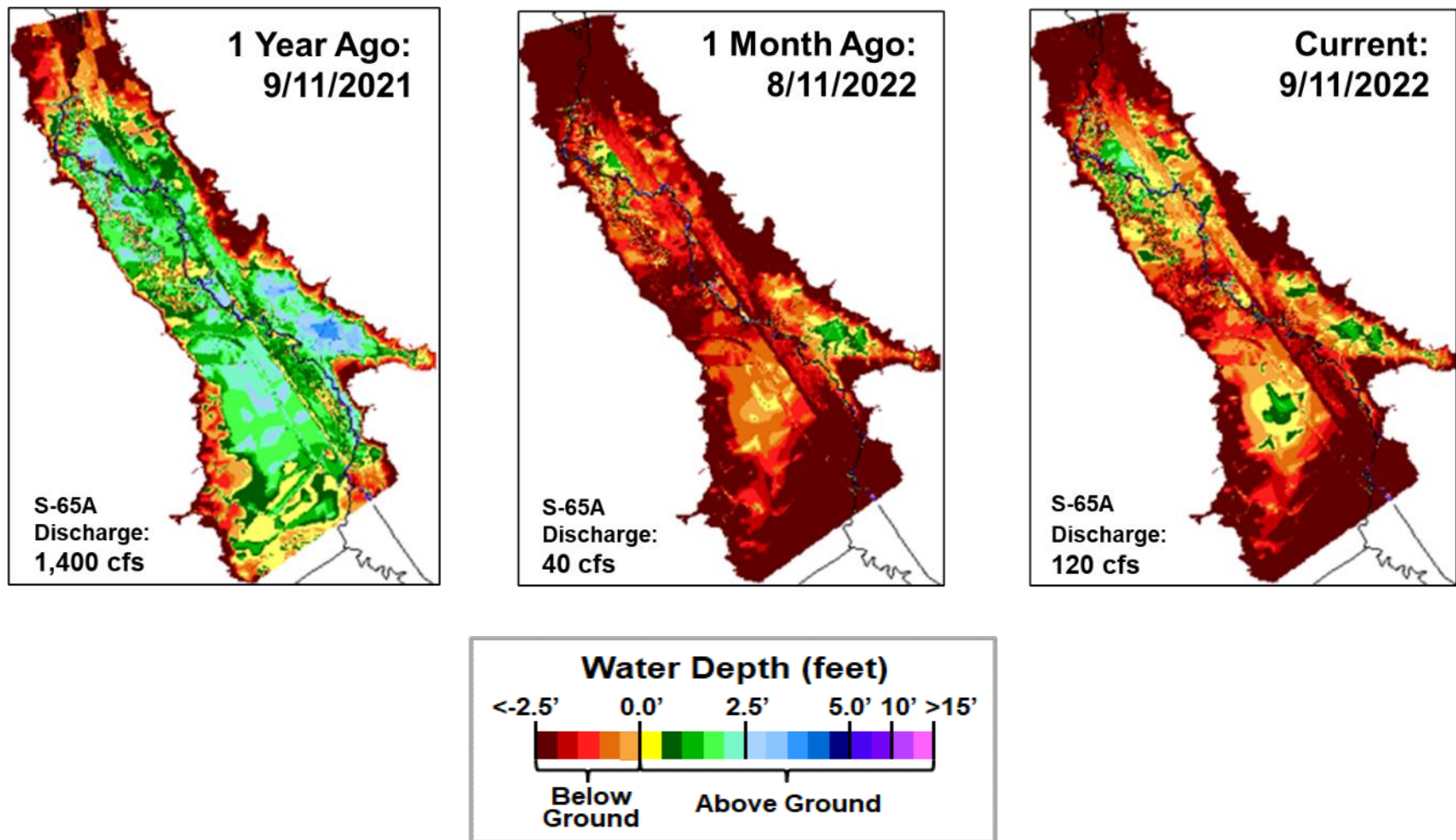
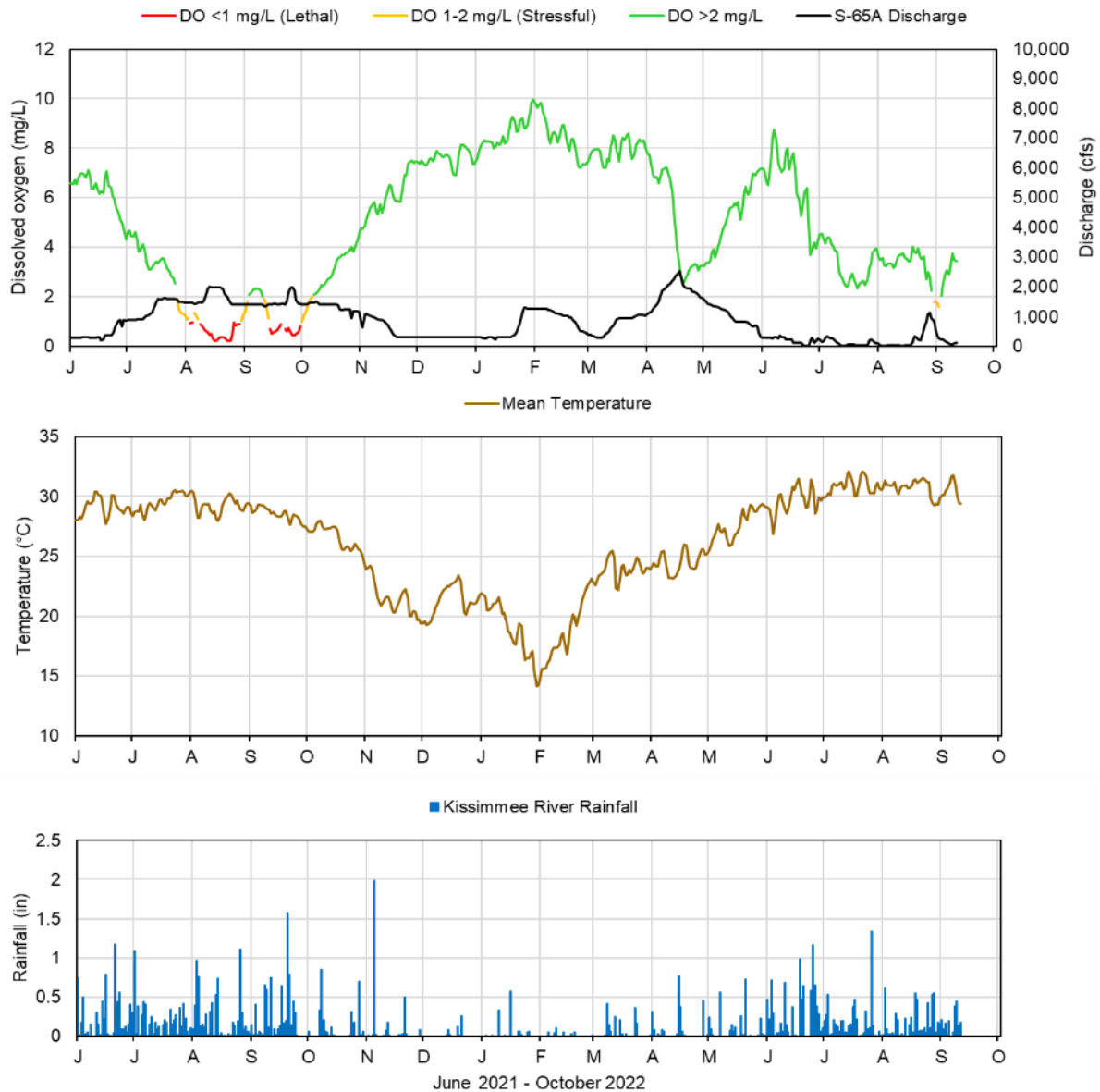


Figure KB-5. Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.



Report Date: 9/13/2022; data are through: 9/11/2022

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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.

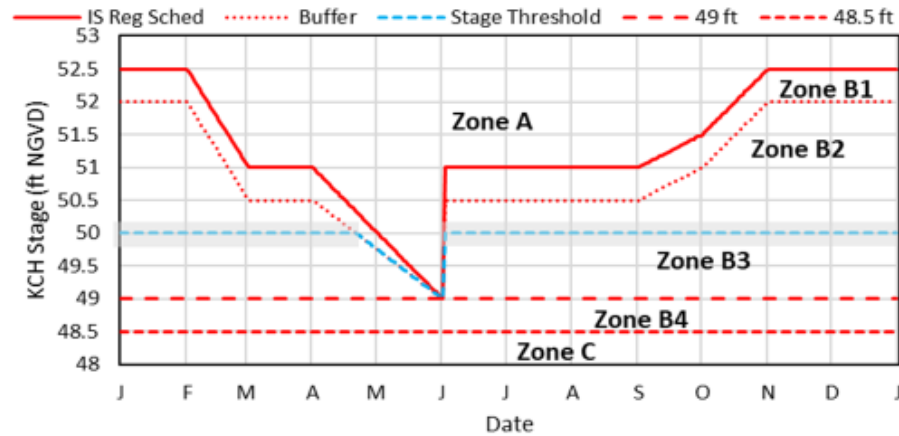
Table KB-3. Discharge Rate of Change Limits for S65/S65A (revised 1/14/19).

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 12.55 feet NGVD on September 11, 2022, with water levels 0.23 feet lower than a month ago (**Figure LO-1**). Lake stage was in the Water Shortage Management band (**Figure LO-2**) and within the ecological envelope (0.11 feet above the lower limit of the envelope) where it has been for more than 90% of 2022 (**Figure LO-3**). According to NEXRAD, 1.26 inches of rain fell directly on the Lake last week.

Average daily inflows (excluding rainfall) decreased from the previous week, going from 877 cfs to 701 cfs. Average daily outflows (excluding evapotranspiration) increased, going from 266 cfs to 365 cfs. The highest inflow came from Fisheating Creek (394 cfs). There was no outflow to the east via the S-308 structure and to the west via the S-77 structure. Outflow to the southeast via the S-271 into the L-8 Canal was 97 cfs, and to the south via the S-350 structures was 268 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 (September 11, 2022) from NOAA's Harmful Algal Bloom Monitoring System showed that bloom potential was moderate to high in the western, northwestern, and southwestern parts of the lake. The bloom potential decreased along the northern and northeastern areas of the Lake since the previous week (**Figure LO-6**).

The September 6-7 routine survey found no microcystins at any station on the Lake. Chlorophyll *a* exceeded 40 µg/L (Lake-wide bloom threshold) at 28% of the sites, with the highest value (58.3 µg/L) recorded at the PALMOUT location (**Figure LO-7**). The survey also revealed that communities at 19% of the sites were dominated by *Microcystis aeruginosa*, 59% of the sites had mixed communities, 12% of sites were dominated by either *Planktolyngbya limnetica* or *Cylindrospermopsis raciborskii* or were co-dominated by these two species. The S-308 site had communities dominated by *Carteria cordiformis* green algae.

Changes in Water Depth

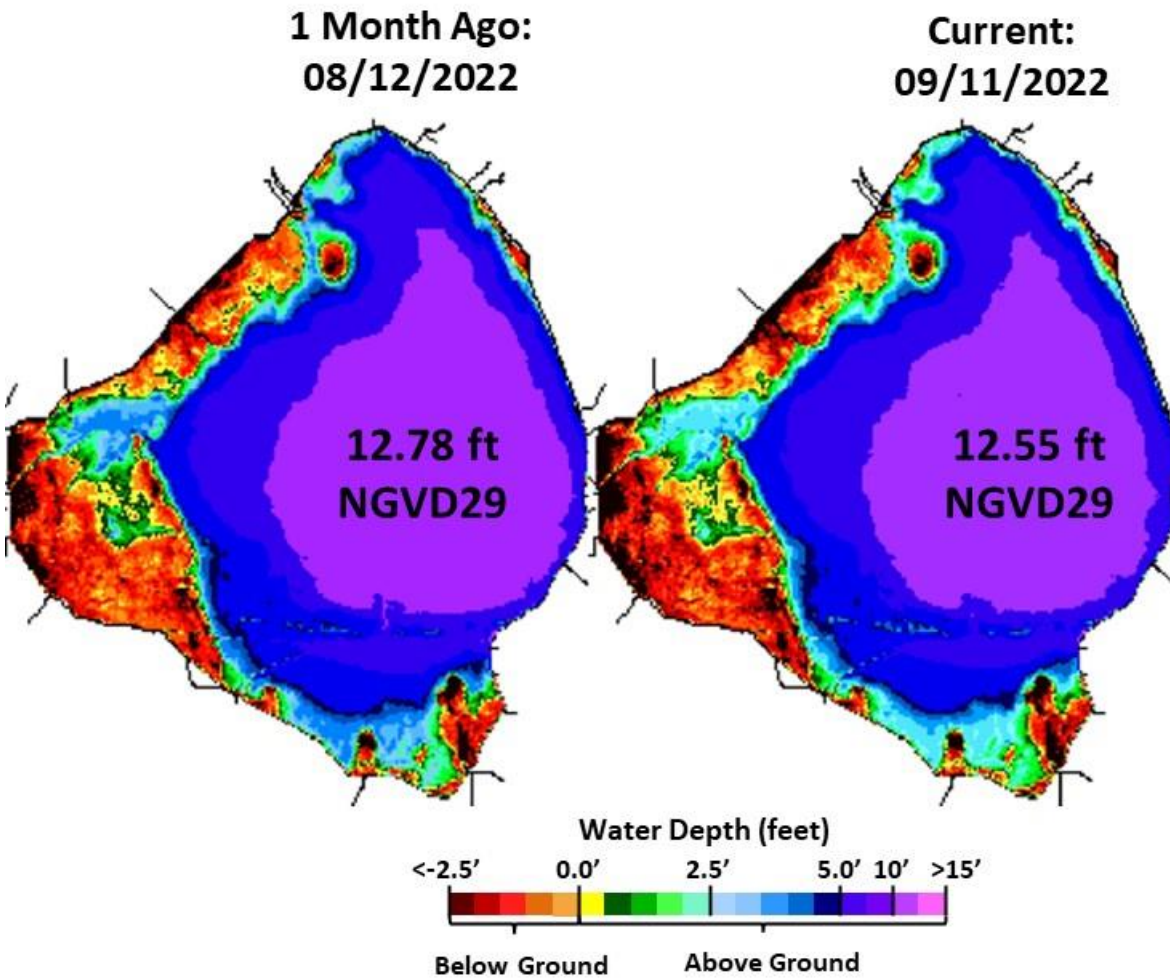


Figure LO-1. Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

Lake Okeechobee Water Level History and Projected Stages

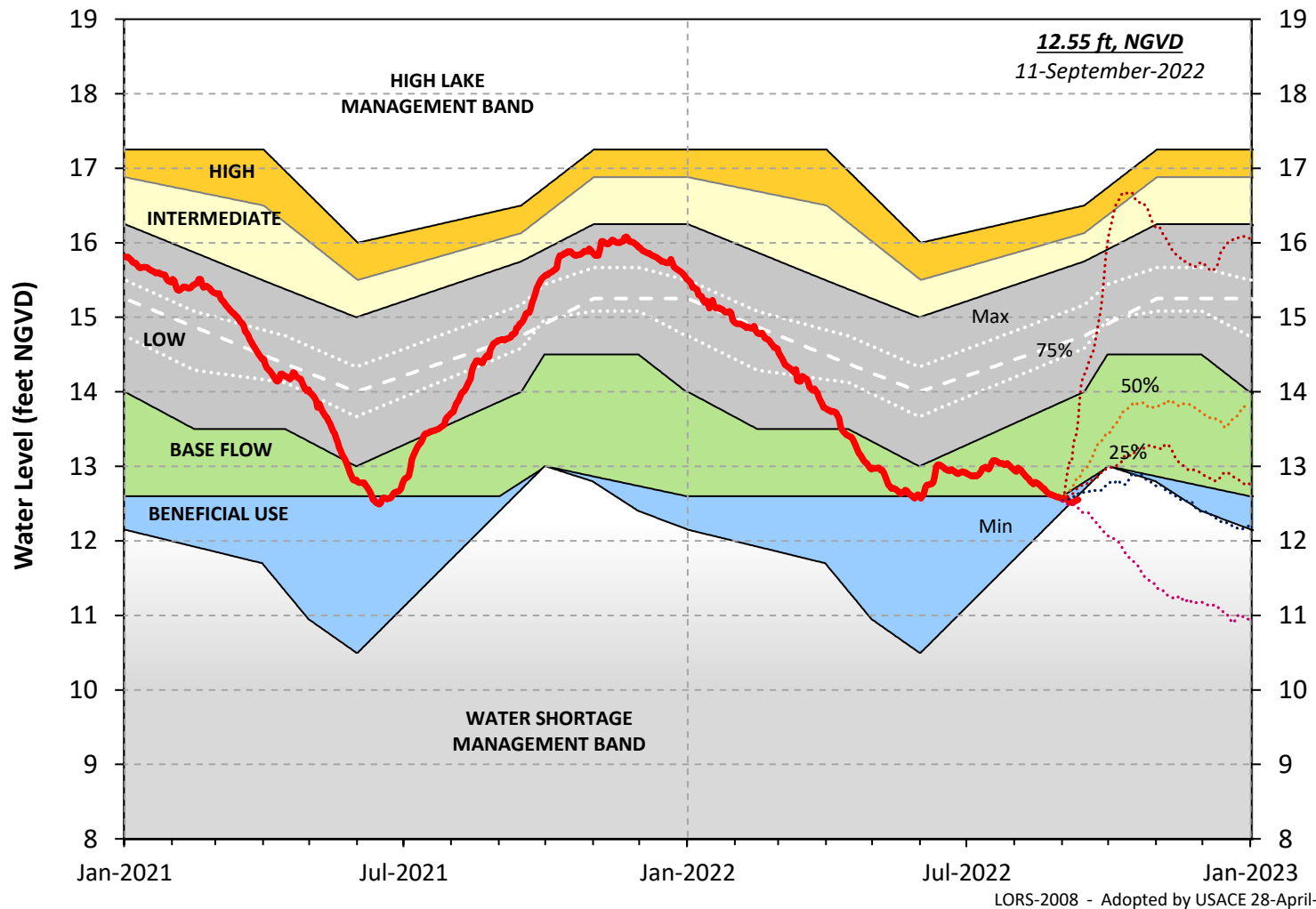


Figure LO-2. Recent Lake Okeechobee stages with projected stages based on a dynamic position analysis.

LORS-2008 - Adopted by USACE 28-April-

Lake Okeechobee Stage vs Ecological Envelope

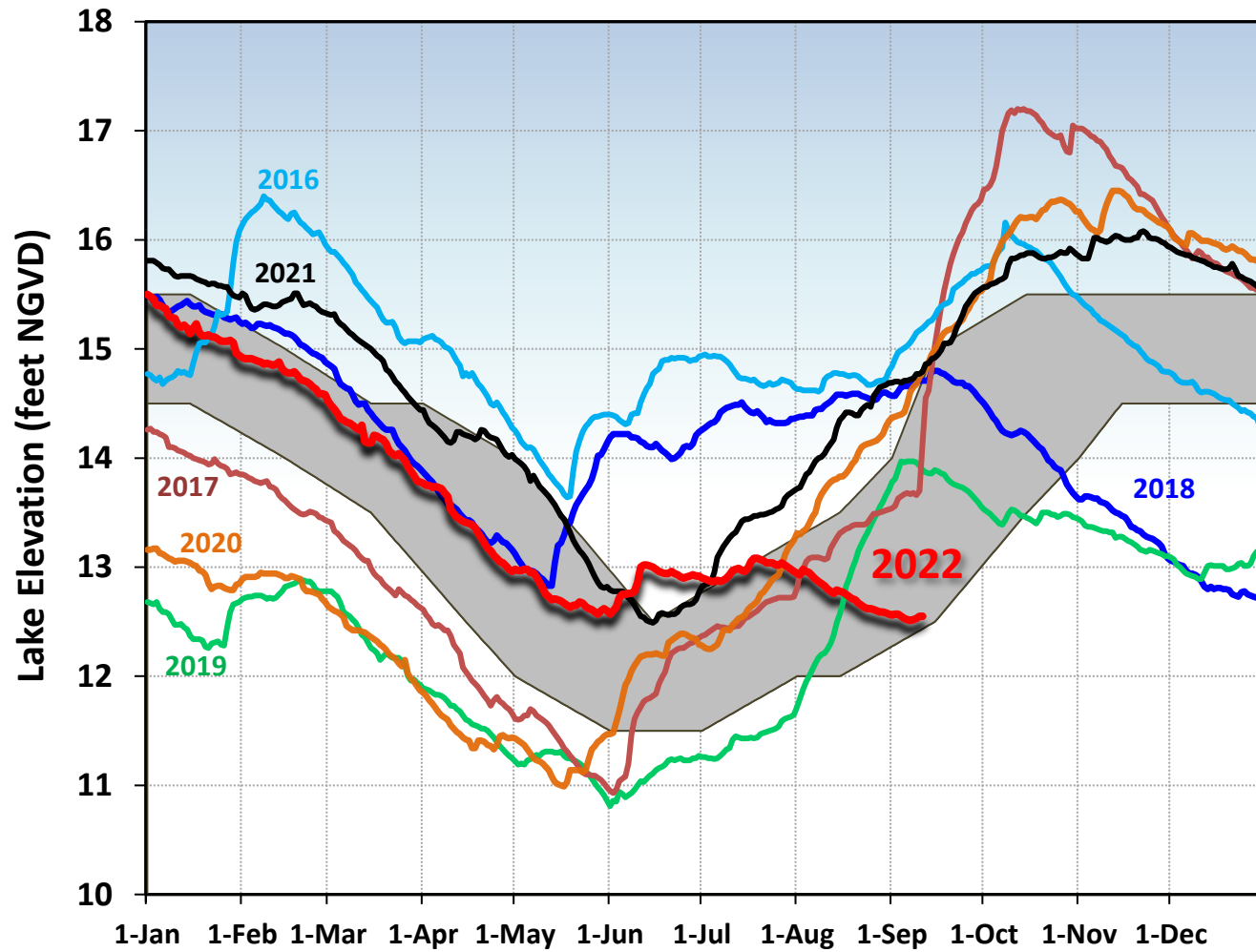


Figure LO-3. The prior six years of annual stage hydrographs for Lake Okeechobee in comparison to the ecological envelope.

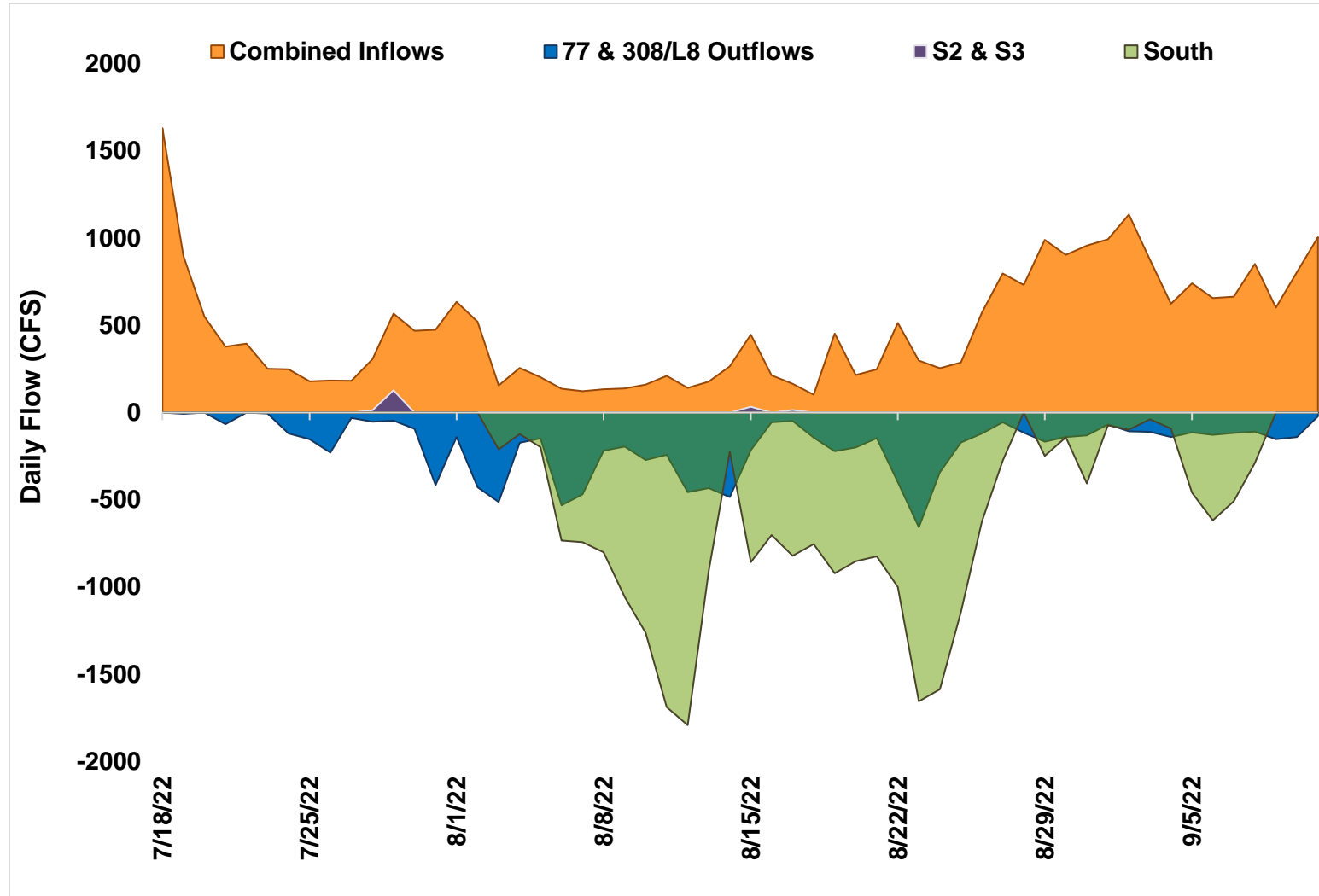


Figure LO-4. Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows from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

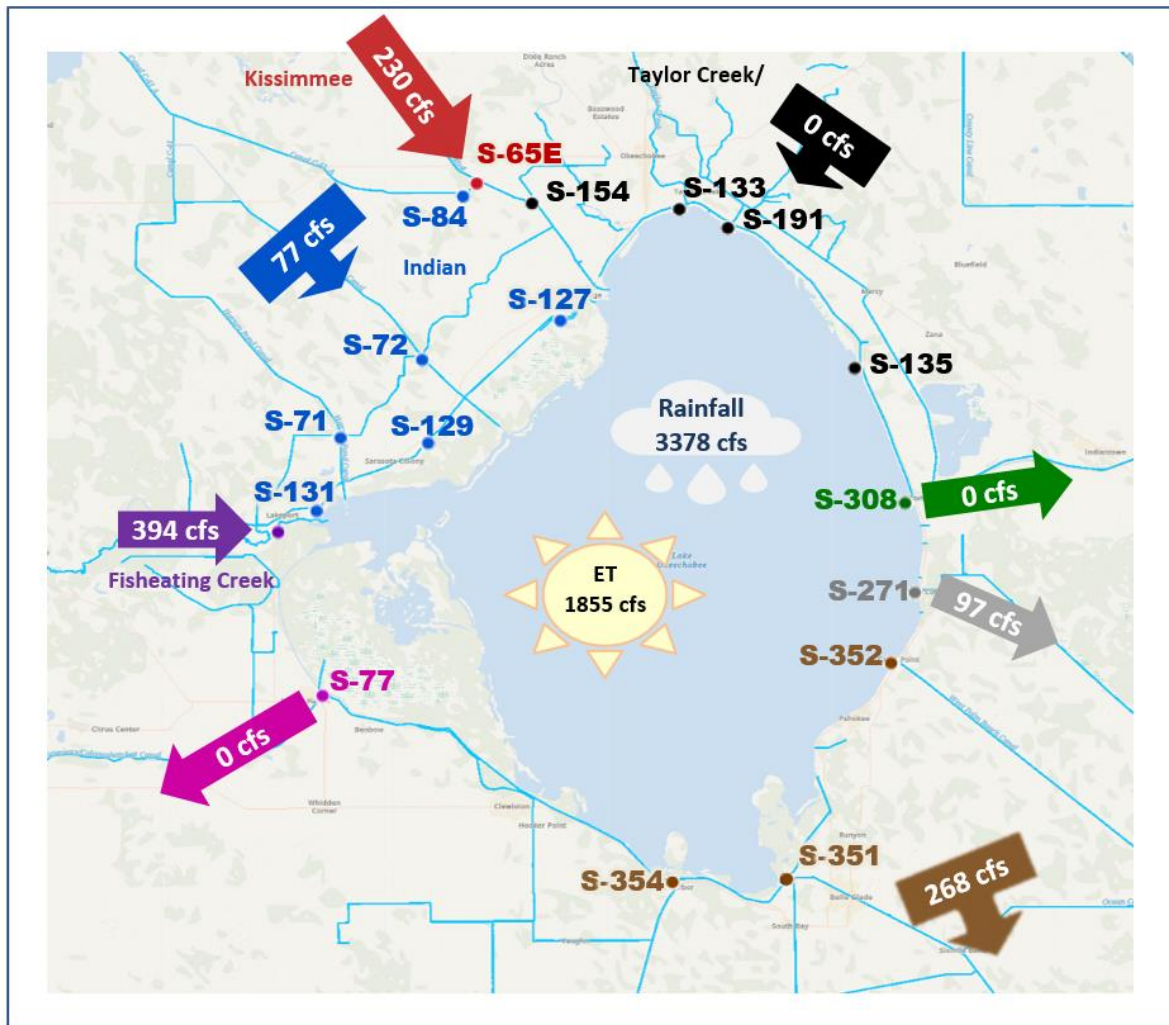


Figure LO-5. Inflows into Lake Okeechobee from Indian Prairie basins, Taylor Creek/Nubbin Slough, Kissimmee River and Fisheating Creek, and outflows to the west via S-77, to the east via S-308, to the south via S-351, S-352, S-354, and to southeast via S-271 (formerly Culvert 10A) for the week of September 5 - 11, 2022.

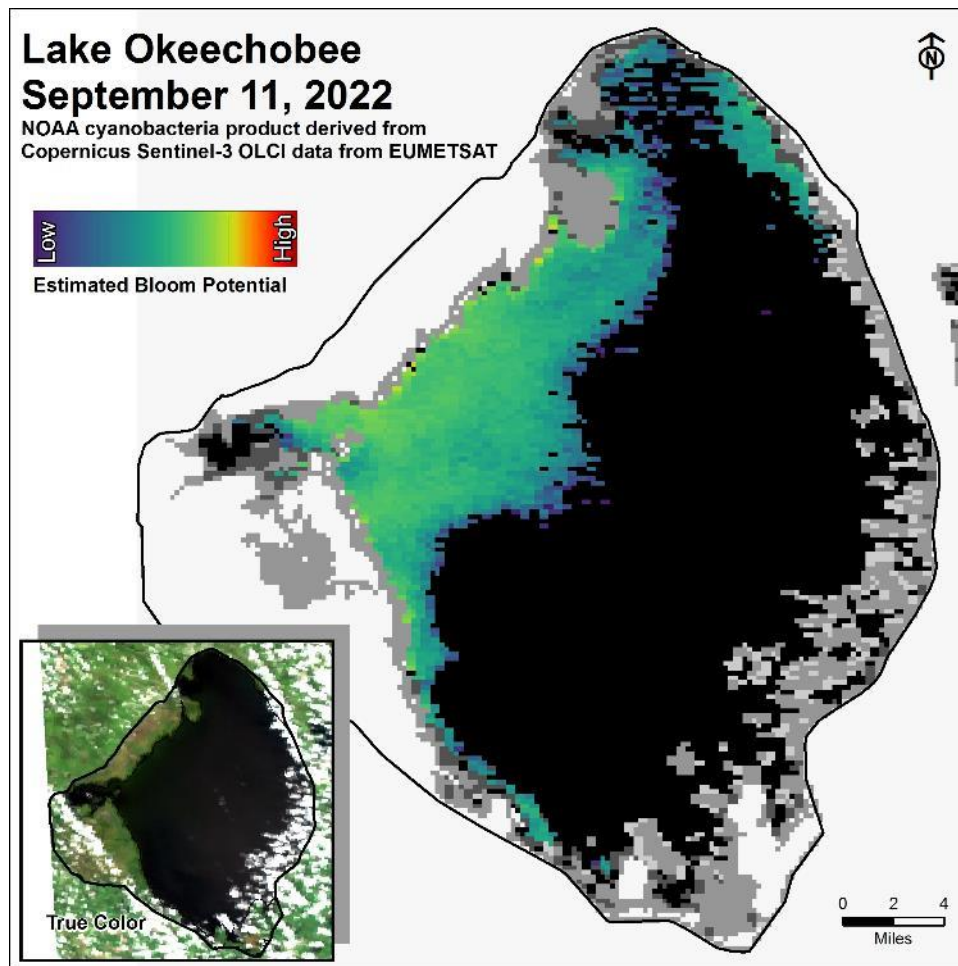


Figure LO-6. Cyanobacteria bloom potential on September 11, 2022 based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

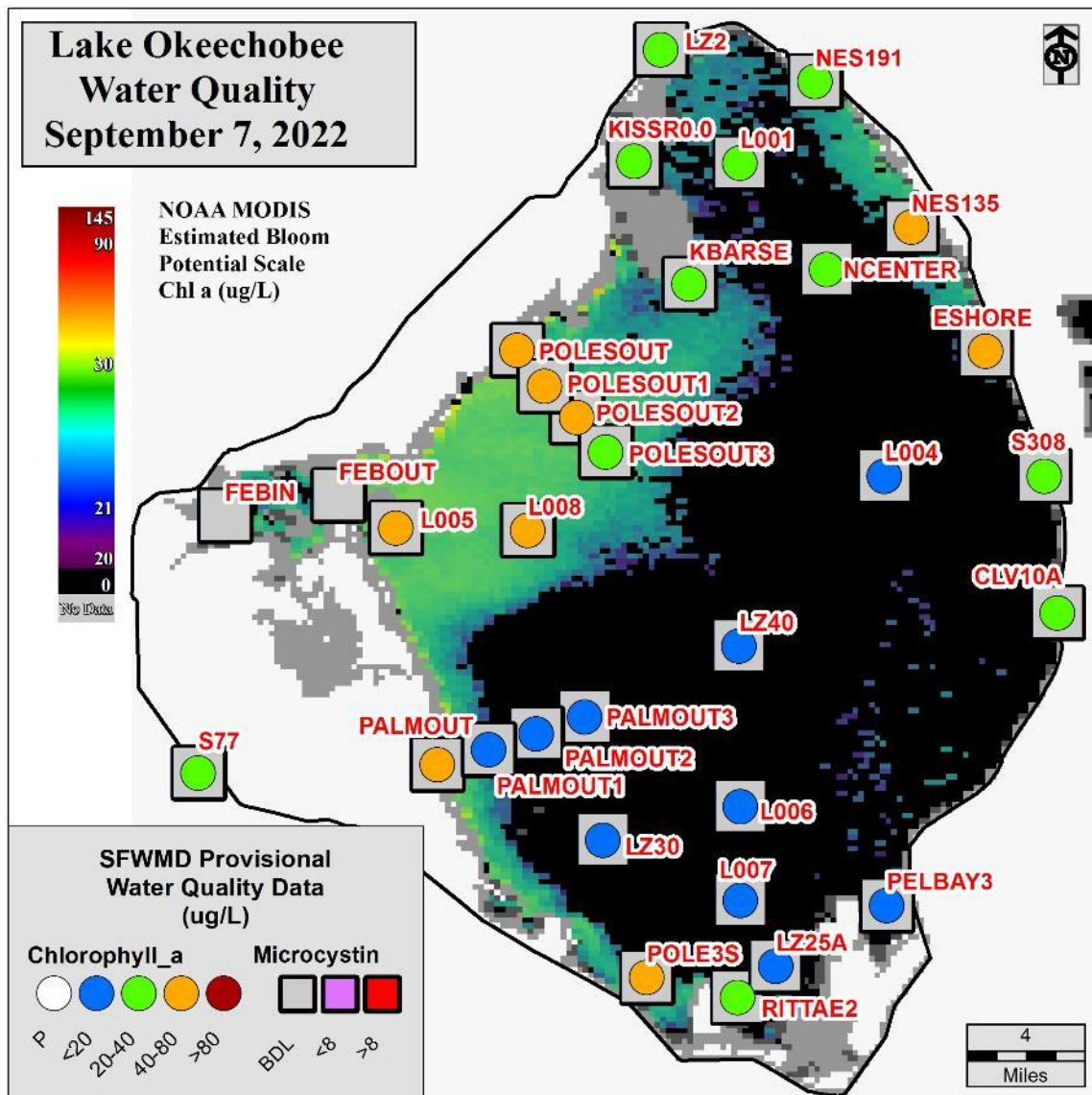


Figure LO-7. Expanded monitoring network and provisional chlorophyll *a* ($\mu\text{g/L}$) and total microcystins ($\mu\text{g/L}$) concentrations results from samples collected September 6-7, 2022.

Estuaries

St. Lucie Estuary

Over the past week, mean total inflow to the St. Lucie Estuary was 669 cfs (**Figures ES-1 and ES-2**) and the previous 30-day mean inflow was 430 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-2**.

Over the past week, salinities remained similar to the previous week 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 22.5. Salinity conditions in the middle estuary were estimated to be within the optimal range for adult eastern oysters (**Figure ES-4**). The mean larval oyster recruitment rate reported by the Fish and Wildlife Research Institute was 1.5 spat/shell in August (**Figure ES-5**).

Caloosahatchee River Estuary

Over the past week, mean total inflow to the Caloosahatchee River Estuary was 3,752 cfs (**Figures ES-6 and ES-7**) and the previous 30-day mean inflow was 2,741 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-7**.

Over the past week, surface salinities remained the same at S-79 and Shell Point and decreased at the remaining sites in the estuary (**Table ES-2 and Figures ES-8 and ES-9**). The seven-day mean salinities (**Table ES-2**) were in the optimal range (0-10) for tape grass in the upper estuary. The seven-day mean salinity values were within the optimal range for adult eastern oysters at Shell Point, and in the stressed range at Cape Coral and Sanibel (**Figure ES-10**). The mean larval oyster recruitment rate reported by the Fish and Wildlife Research Institute was 6.8 spat/shell at Iona Cove and 24.9 spat/shell at Bird Island in August (**Figures ES-11 and ES-12**).

Surface salinity at Val I-75 was forecasted for the next two weeks, using an autoregression model (Qiu and Wan, 2013¹) coupled with a linear reservoir model for the tidal basin. Model scenarios included pulse releases at S-79 ranging from 0 to 1,500 cfs, and a steady release at 2,000 cfs with estimated tidal basin inflows of 1,707 cfs. Model results from all scenarios predict daily salinity to be 1.0 or lower and the 30-day moving average surface salinity to be 0.5 or lower at Val I-75 at the end of the two-week period (**Table ES-3 and Figure ES-13**). This keeps predicted salinities in the upper estuary within the optimal salinity range (0-10) for tape grass.

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

Red Tide

The Florida Fish and Wildlife Research Institute reported on September 9, 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 observed in samples from St. Lucie and Martin counties.

Water Management Recommendations

Lake stage is in the Water Shortage Management Band. Tributary conditions are dry. The LORS2008 release guidance suggests no lake releases to the Caloosahatchee River Estuary or the St. Lucie Estuary to manage Lake stages.

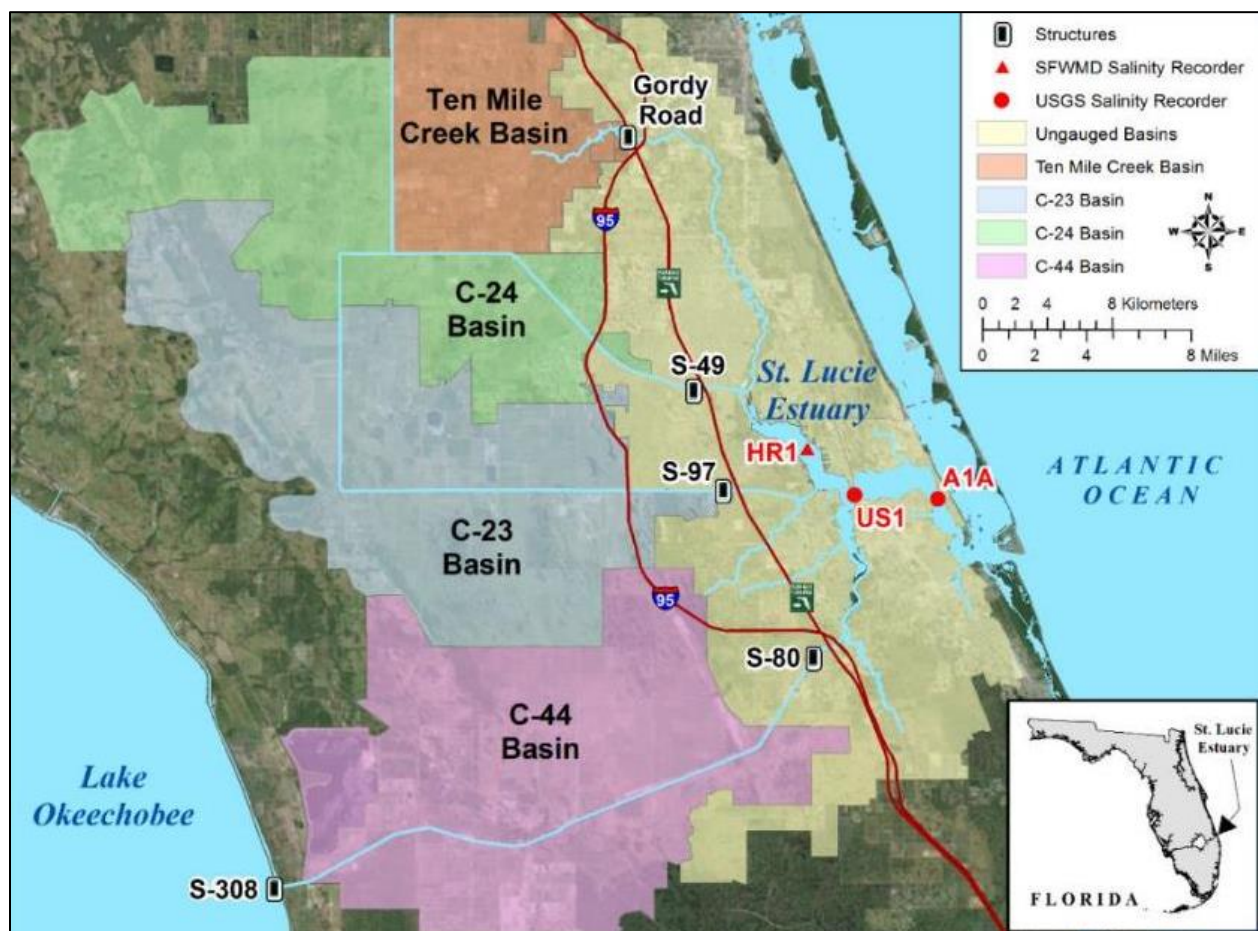


Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

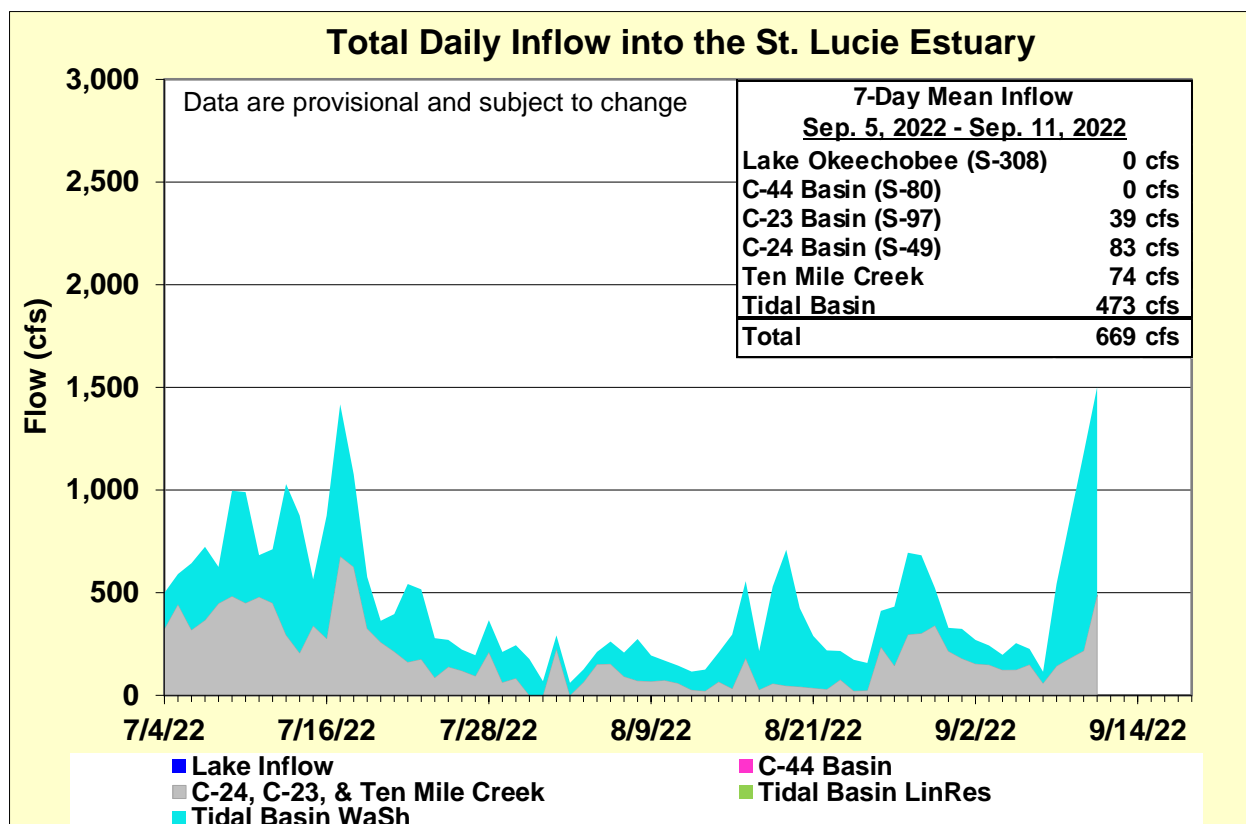


Figure ES-2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

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

Sampling Site	Surface	Bottom	Optimum Envelope
HR1 (North Fork)	15.8 (15.2)	19.9 (19.8)	10.0 – 25.0
US1 Bridge	22.1 (22.7)	22.9 (23.0)	10.0 – 25.0
A1A Bridge	29.0 (29.1)	30.1 (30.7)	10.0 – 25.0

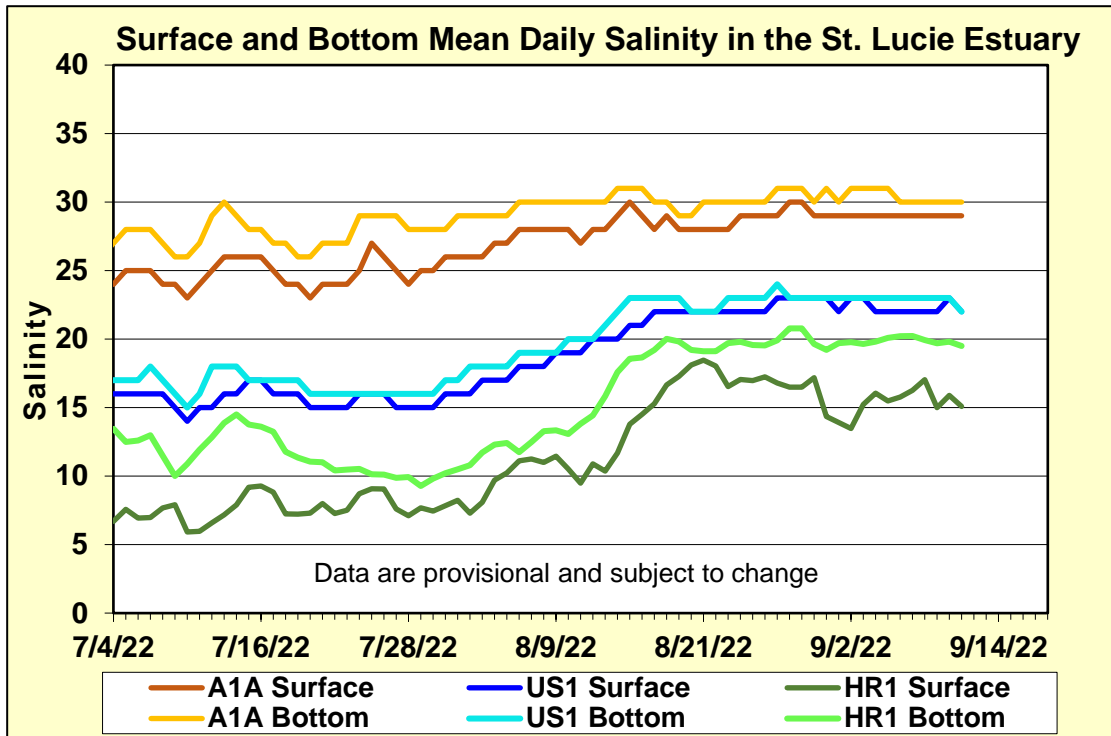


Figure ES-3. Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

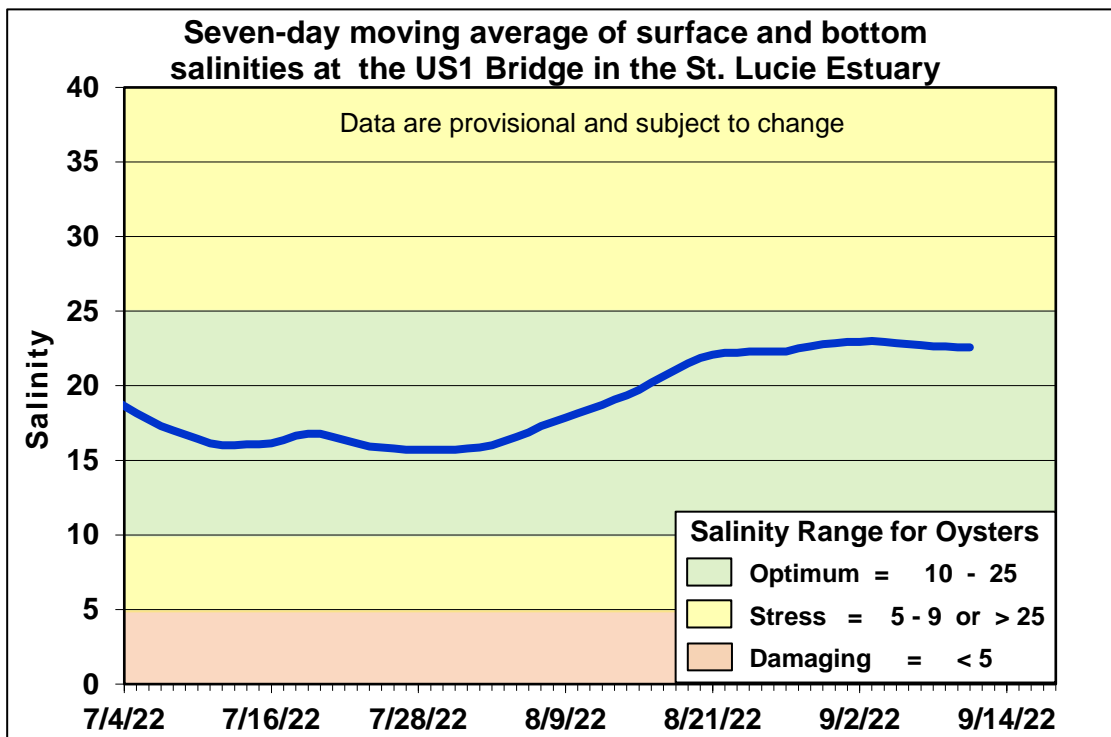


Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

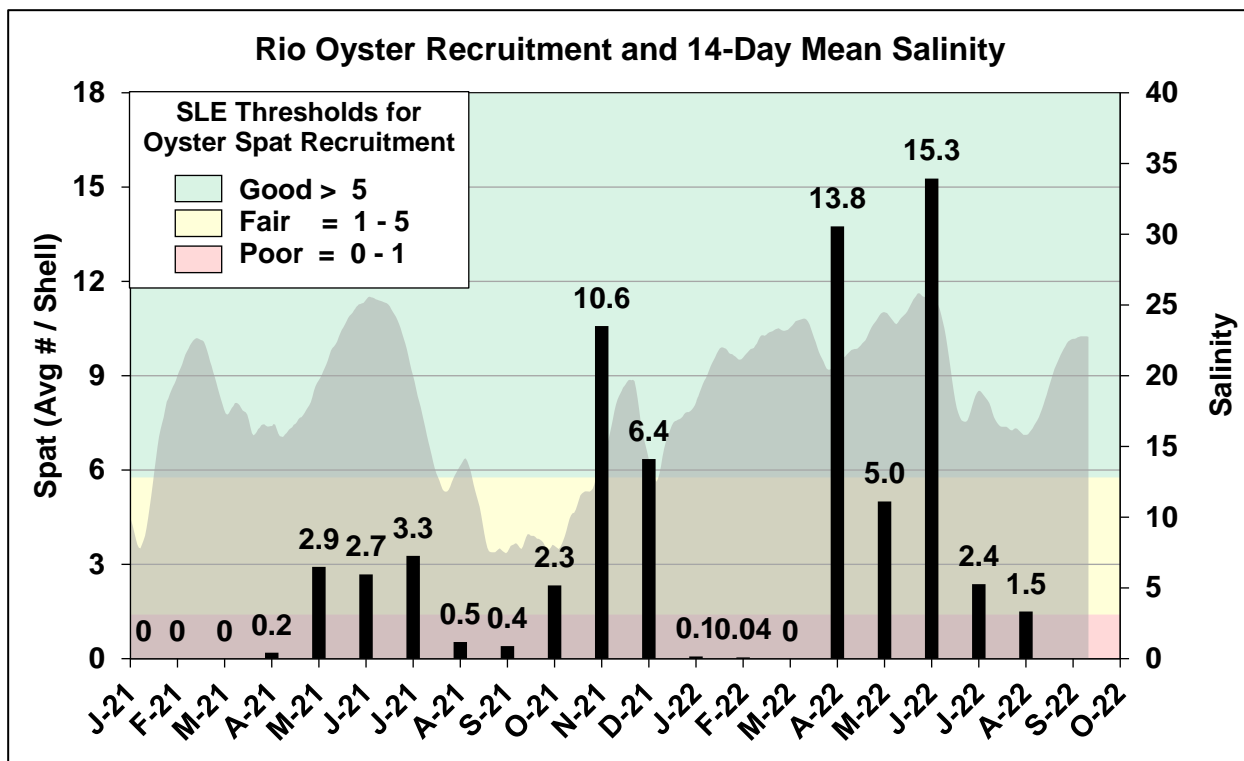


Figure ES-5. Mean oyster recruitment at the Rio oyster monitoring station and 14-day mean salinity at US1 Bridge.

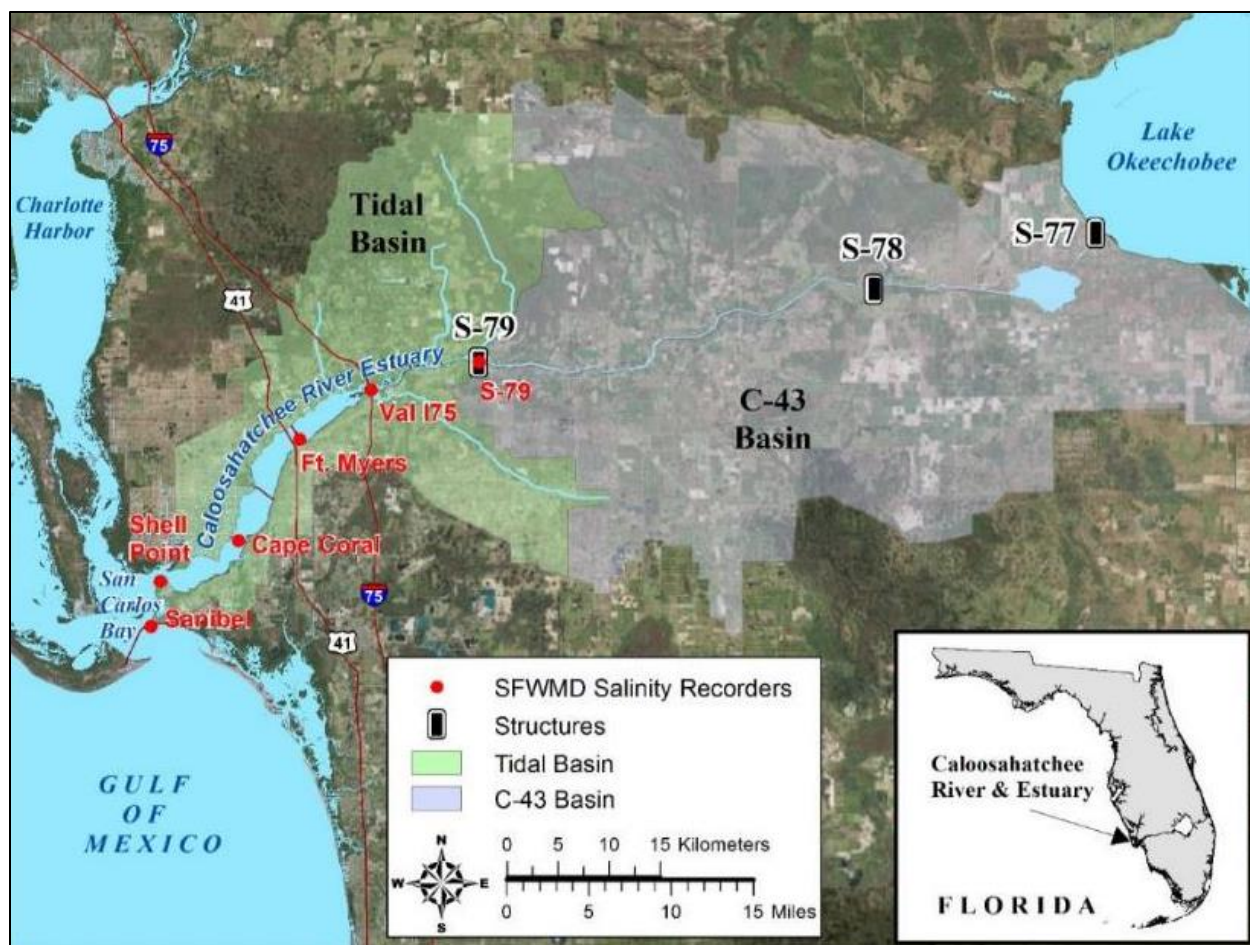


Figure ES-6. Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.

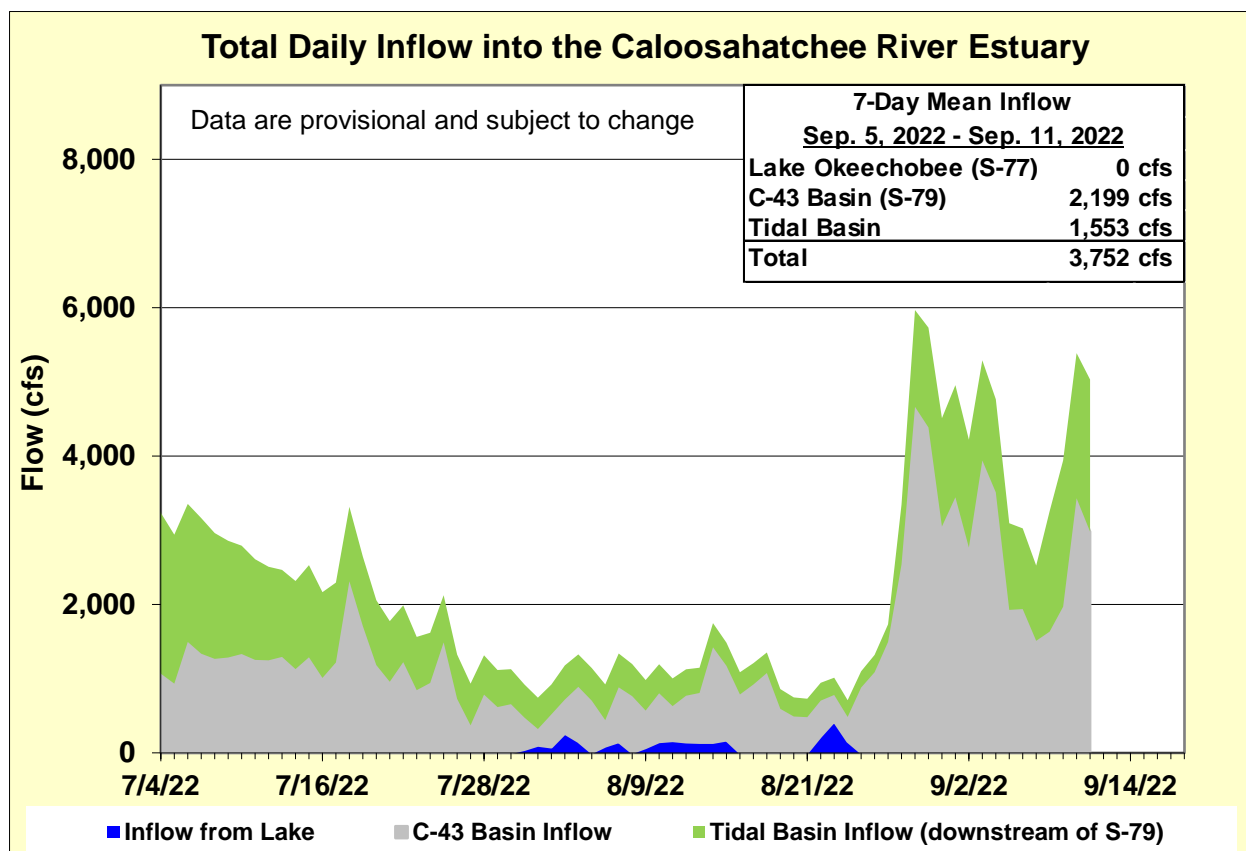


Figure ES-7. Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

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

Sampling Site	Surface	Bottom	Optimum Envelope
S-79 (Franklin Lock)	0.2 (0.2)	0.2 (0.2)	0.0 – 10.0
Val I-75	0.2 (0.4)	0.2 (0.4)	0.0 – 10.0
Fort Myers Yacht Basin	0.4 (1.8)	0.5 (2.3)	0.0 – 10.0
Cape Coral	5.6 (7.5)	6.7 (8.0)	10.0 – 25.0
Shell Point	20.0 (19.9)	18.1 (18.7)	10.0 – 25.0
Sanibel	28.7 (30.0)	28.3 (29.4)	10.0 – 25.0

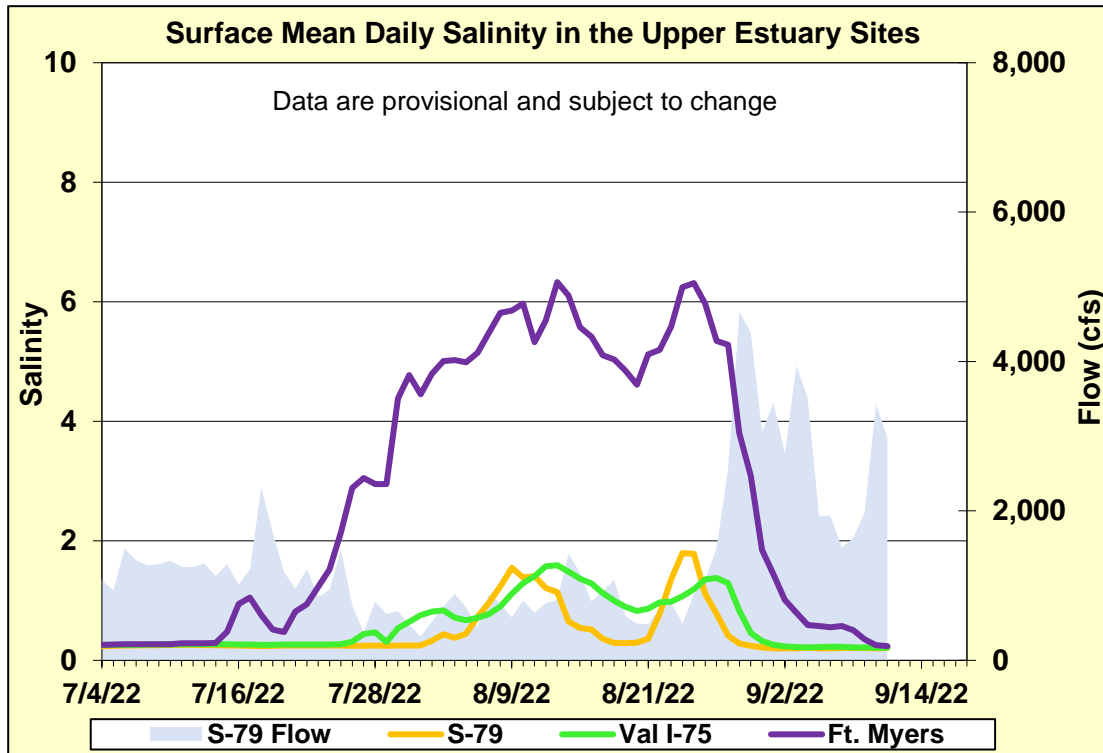


Figure ES-8. Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

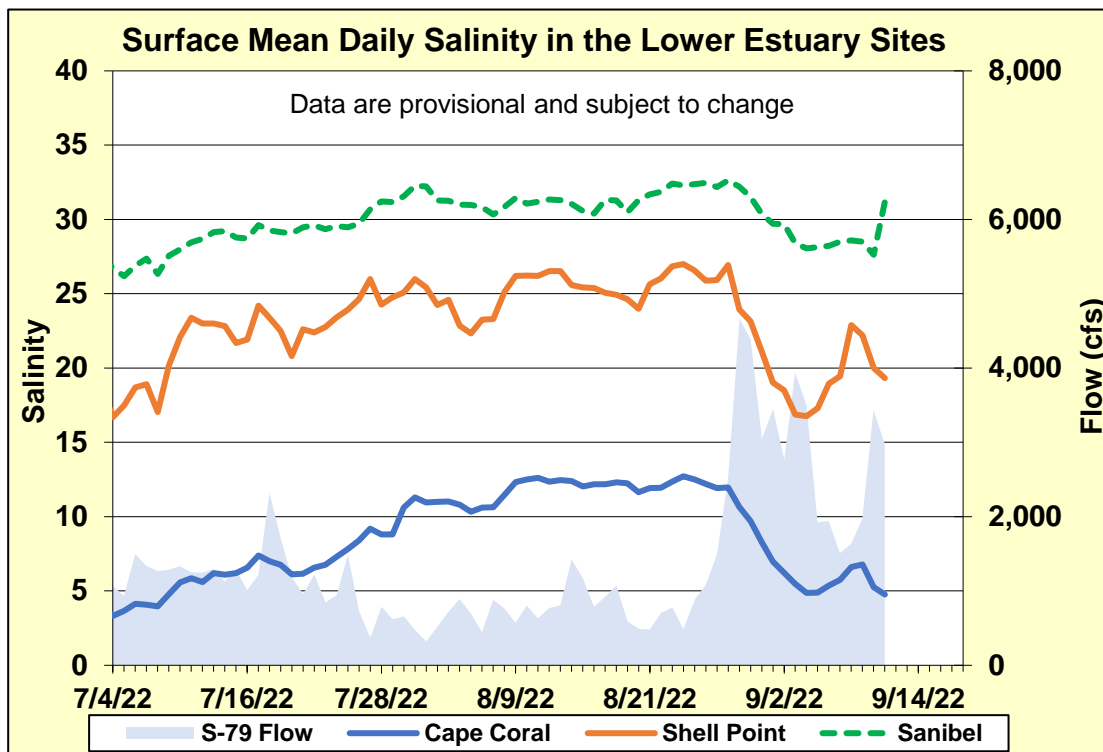


Figure ES-9. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

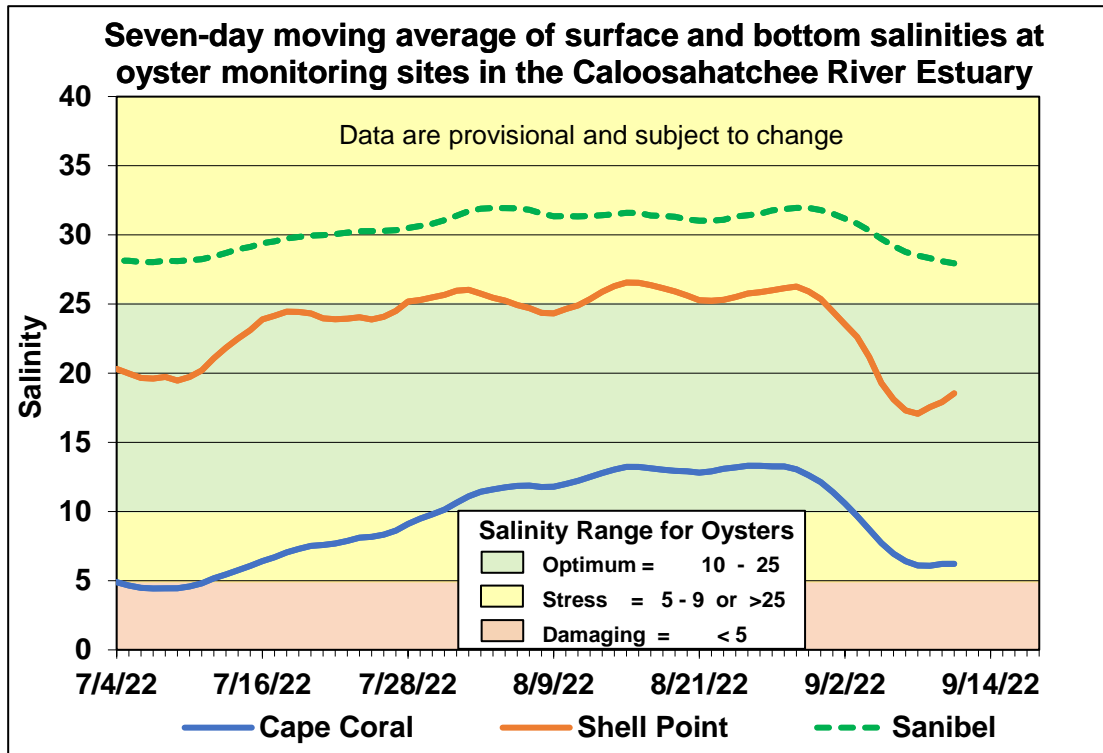


Figure ES-10. Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

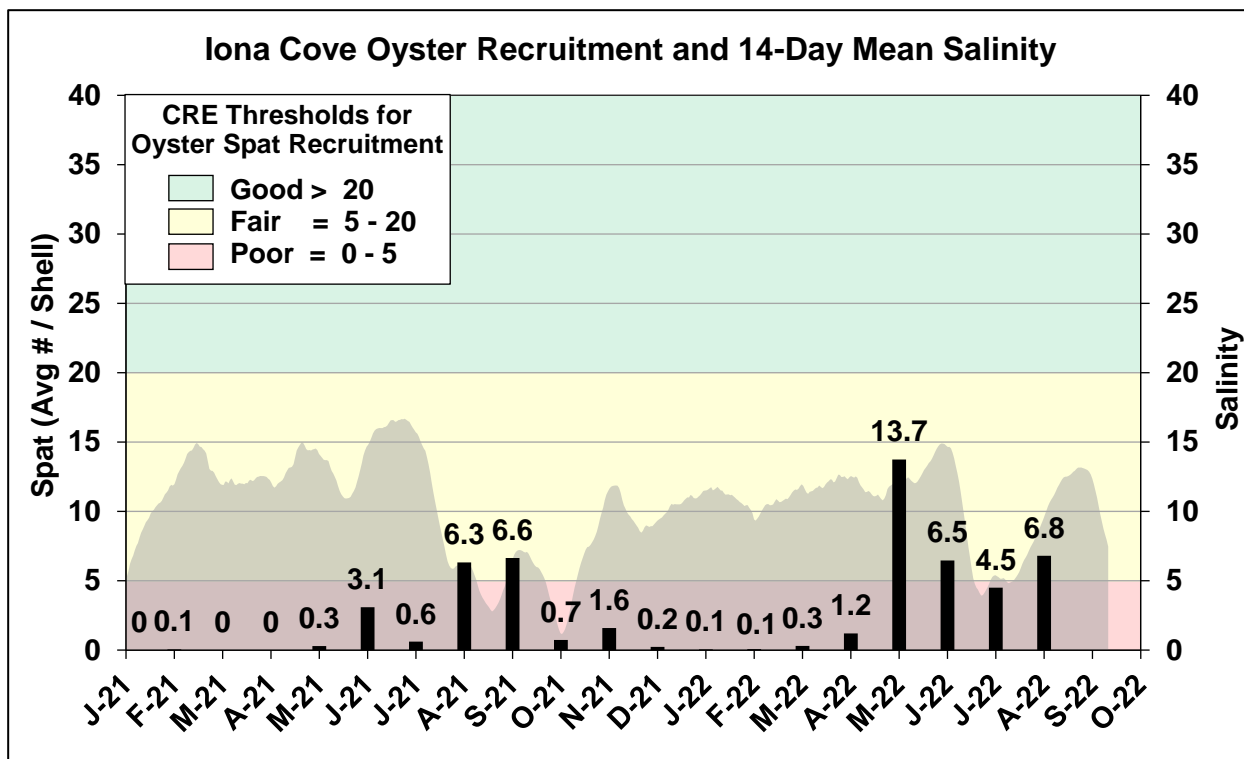


Figure ES-11. Mean oyster recruitment at the Iona Cove oyster monitoring station and 14-day mean salinity at Cape Coral.

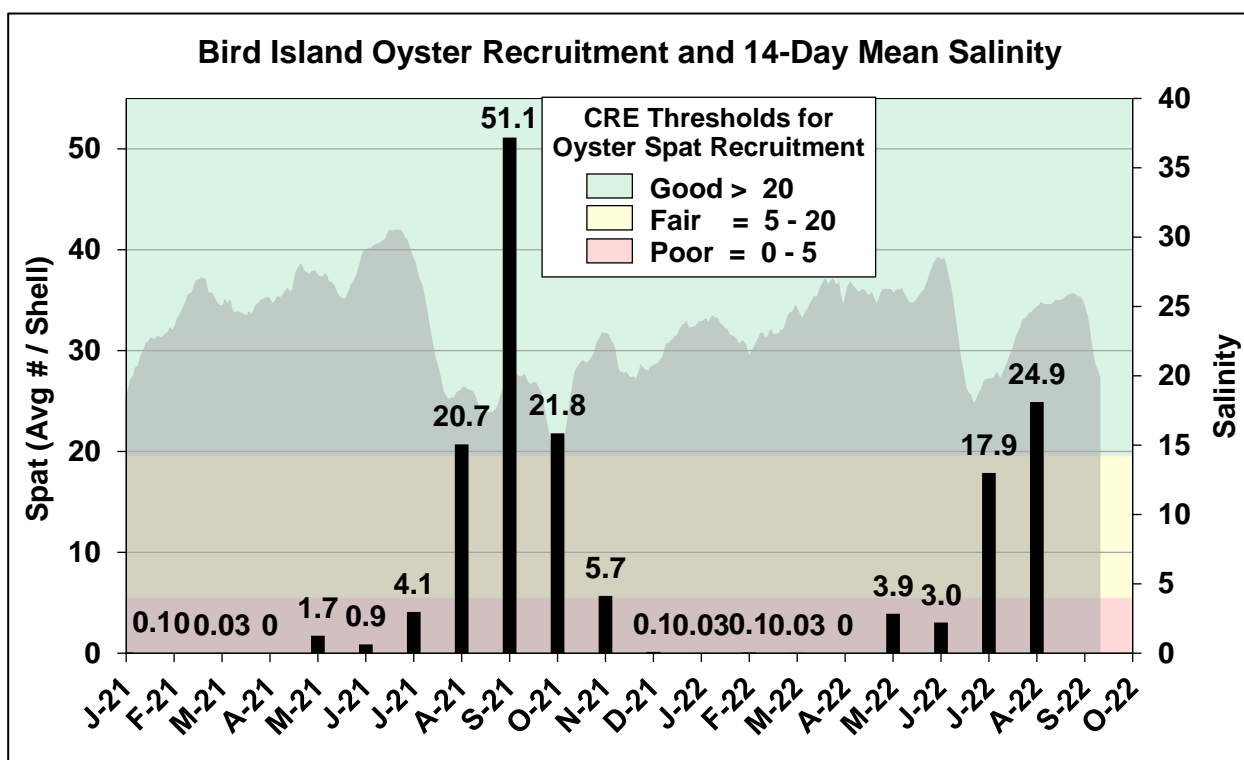


Figure ES-12. Mean oyster recruitment at the Bird Island oyster monitoring station and 14-day mean salinity at Shell Point.

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	1707	1.0	0.5
B	450	1707	0.6	0.4
C	800	1707	0.4	0.4
D	1000	1707	0.3	0.4
E	1500	1707	0.3	0.4
F	2000	1707	0.3	0.4

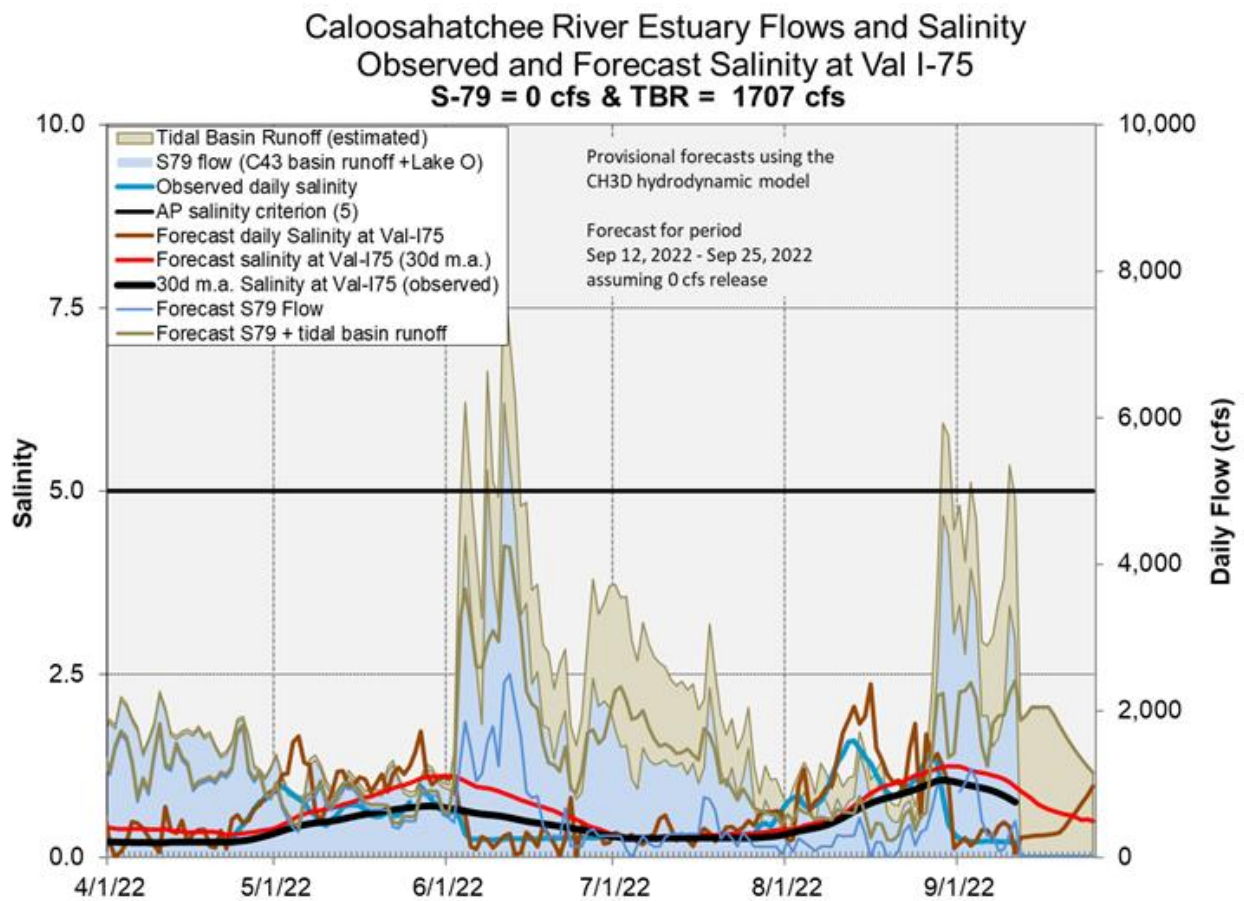


Figure ES-13. Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

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 at or near target stage. Vegetation in the flow-ways is stressed and highly stressed. The 365-day PLRs for the Northern, Western, and Eastern Flow-ways are below $1.0 \text{ g/m}^2/\text{year}$ (**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 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: All flow-ways in STA-5/6 are online. Treatment cells are at or near target stage. All treatment cells have highly stressed vegetation conditions except Flow-ways 7 and 8 which are healthy. The 365-day PLRs for most flow-ways are below $1.0 \text{ g/m}^2/\text{year}$, except Flow-way 4 which is high. (**Figure S-5** and **S-6**).

For definitions on STA operational language see glossary following figures.

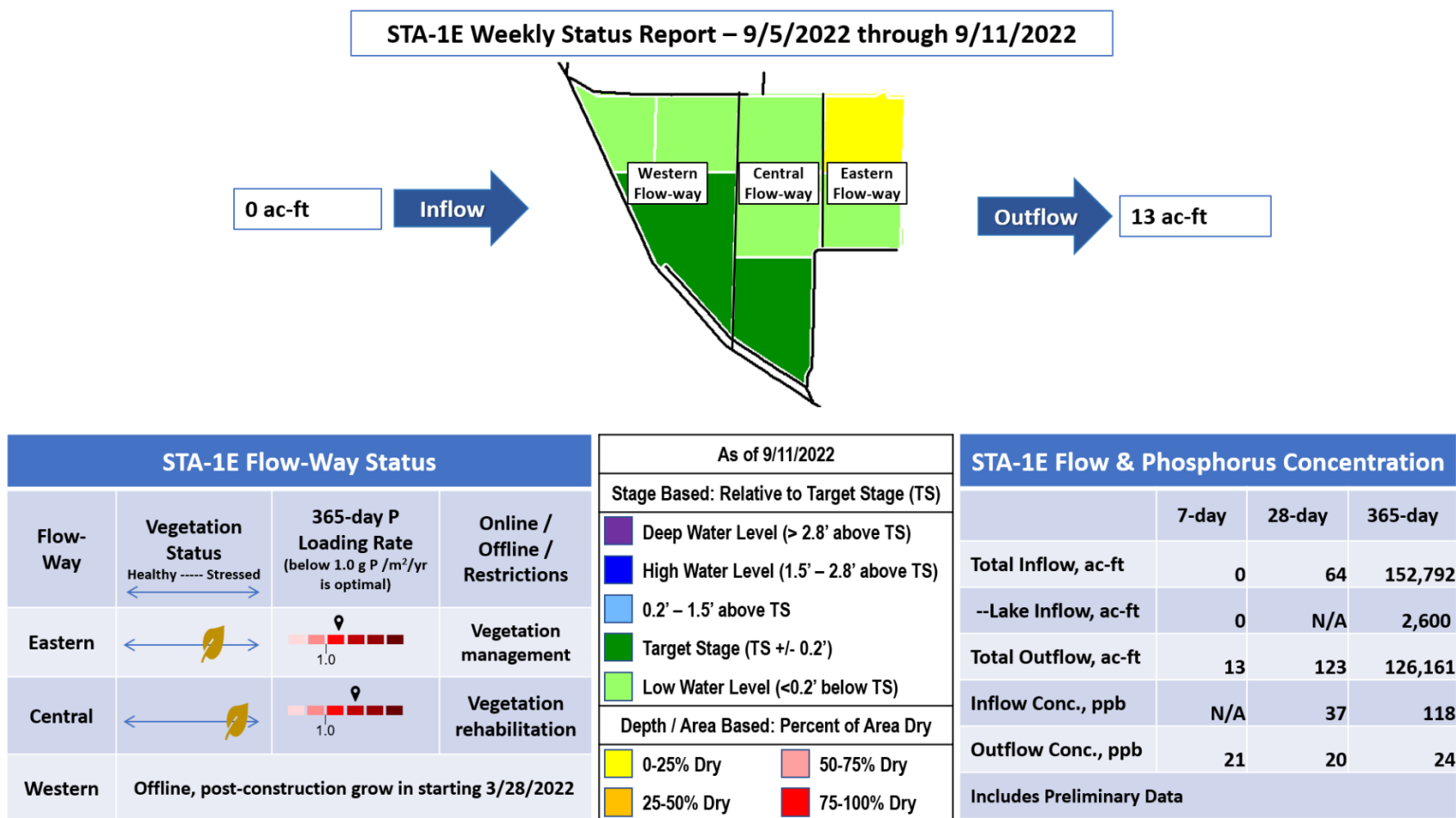
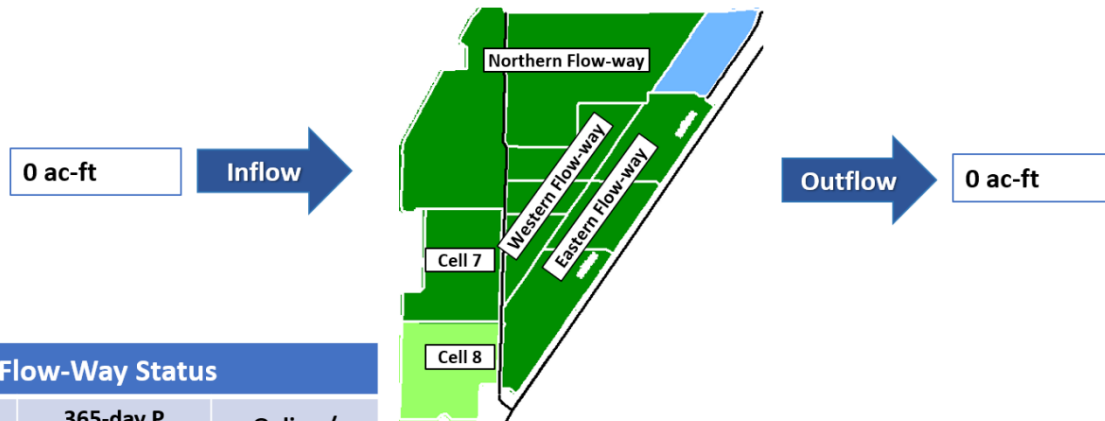


Figure S-1. STA-1E Weekly Status Report

STA-1W Weekly Status Report – 9/5/2022 through 9/11/2022



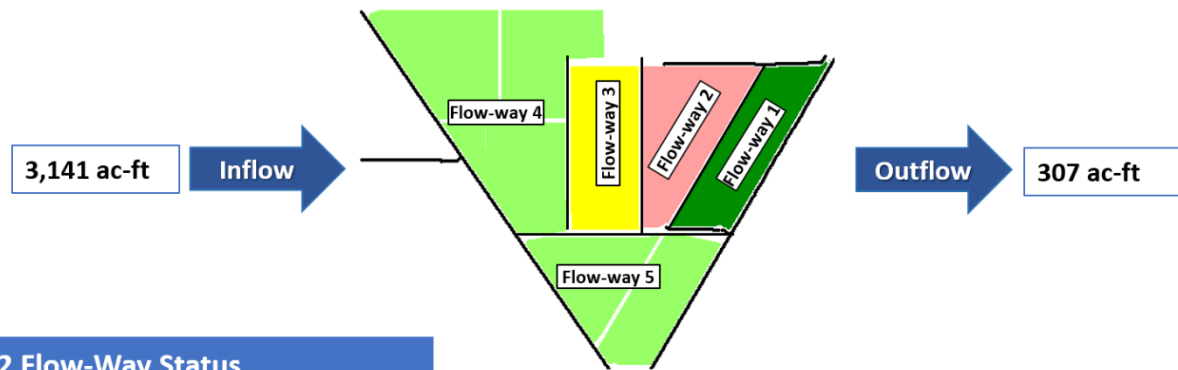
STA-1W Flow-Way Status			
Flow-Way	Vegetation Status Healthy --- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions
Northern	← →	1.0	Vegetation management
Western	← →	1.0	Vegetation management
Eastern	← →	1.0	Vegetation management
Cell 7	← →	N/A	Online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

As of 9/11/2022	
Stage Based: Relative to Target Stage (TS)	
Deep Water Level (> 2.8' above TS)	
High Water Level (1.5' – 2.8' above TS)	
0.2' – 1.5' above TS	
Target Stage (TS +/- 0.2')	
Low Water Level (<0.2' below TS)	
Depth / Area Based: Percent of Area Dry	
0-25% Dry	50-75% Dry
25-50% Dry	75-100% Dry

STA-1W Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	0	347	65,563
--Lake Inflow, ac-ft	0	N/A	2,000
Total Outflow, ac-ft	0	40	65,151
Inflow Conc., ppb	N/A	88	168
Outflow Conc., ppb	N/A	18	24
Includes Preliminary Data			

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

STA-2 Weekly Status Report – 9/5/2022 through 9/11/2022



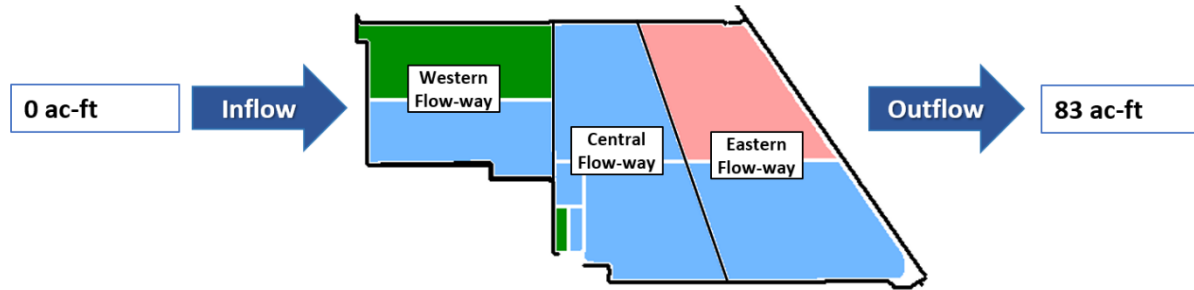
STA-2 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal)	Online / Offline / Restrictions
1			Online
2	Offline, construction activities as of 9/7/2021		
3			Vegetation Rehab
4			Vegetation Rehab
5			Online


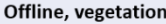










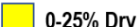
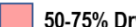
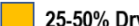
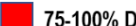
As of 9/11/2022	
Stage Based: Relative to Target Stage (TS)	
	Deep Water Level (> 2.8' above TS)
	High Water Level (1.5' – 2.8' above TS)
	0.2' – 1.5' above TS
	Target Stage (TS +/- 0.2')
	Low Water Level (<0.2' below TS)
Depth / Area Based: Percent of Area Dry	
	0-25% Dry
	25-50% Dry
	50-75% Dry
	75-100% Dry

STA-2 Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	3,141	2,194	264,756
--Lake Inflow, ac-ft	0	N/A	27,600
Total Outflow, ac-ft	307	863	282,599
Inflow Conc., ppb	150	203	108
Outflow Conc., ppb	13	14	24
Includes Preliminary Data			

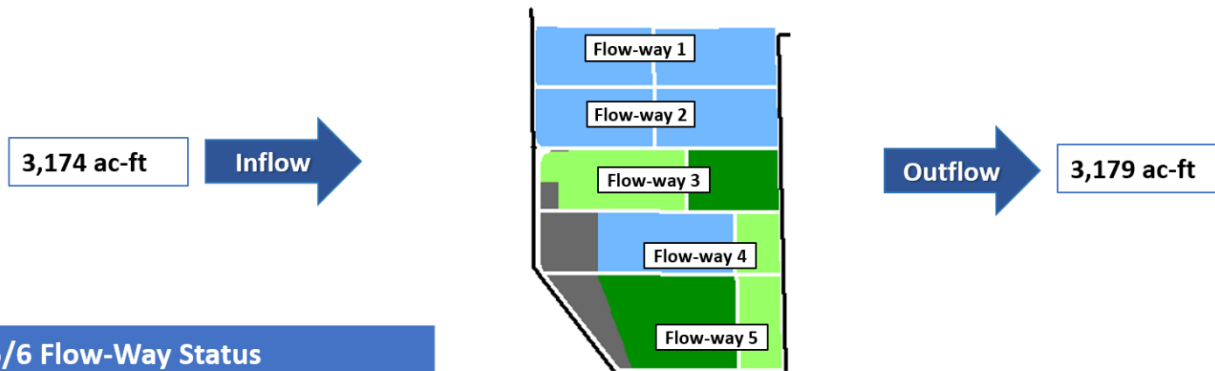
Figure S-3. STA-2 Weekly Status Report

STA-3/4 Weekly Status Report – 9/5/2022 through 9/11/2022



STA-3/4 Flow-Way Status				STA-3/4 Flow & Phosphorus Concentration			
Flow-Way	Vegetation Status <small>Healthy ----- Stressed</small> 	365-day P Loading Rate <small>(below 1.0 g P /m²/yr is optimal)</small>	Online / Offline / Restrictions	As of 9/11/2022			
				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		
				Total Inflow, ac-ft			
				--Lake Inflow, ac-ft			
				Total Outflow, ac-ft			
				Inflow Conc., ppb			
				Outflow Conc., ppb			
				Includes Preliminary Data			

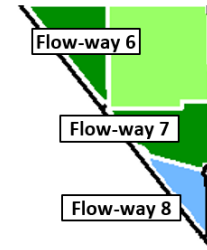
STA-5/6 Weekly Status Report – 9/5/2022 through 9/11/2022



STA-5/6 Flow-Way Status				STA-5/6 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	As of 9/11/2022			
				Stage Based: Relative to Target Stage (TS)			
				<div>Deep Water Level (> 2.8' above TS)</div> <div>High Water Level (1.5' – 2.8' above TS)</div> <div>0.2' – 1.5' above TS</div> <div>Target Stage (TS +/- 0.2')</div> <div>Low Water Level (<0.2' below TS)</div>			
				Depth / Area Based: Percent of Area Dry			
				<div>0-25% Dry</div> <div>25-50% Dry</div> <div>50-75% Dry</div> <div>75-100% Dry</div>			
1			Online		Total Inflow, ac-ft	3,174	148,554
2			Online		--Lake Inflow, ac-ft	0	0
3			Online		Total Outflow, ac-ft	3,179	134,516
4			Online		Inflow Conc., ppb	166	221
5			Online		Outflow Conc., ppb	18	46
				Includes Preliminary Data			

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

STA-5/6 Weekly Status Report – 9/5/2022 through 9/11/2022



STA-5/6 Flow-Way Status				As of 9/11/2022
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 continued a slow trend downwards recovering slightly at the end of the week. The average on Sunday was 0.84 feet below the rising Zone A1 regulation line. WCA-2A: Stage at the 2-17 gauge rose over the week. The average on Sunday was 0.33 feet below the rising regulation line. WCA-3A: Last week the Three Gauge Average stages rose in parallel to the slope of the Zone A reg line. The average stage remained 0.71 feet below the rising regulation line on Sunday. WCA-3A North: At gauge 62 (Northwest corner) stage continued to ascend, the average on Sunday was 1.04 feet below the now flat Upper schedule line. (**Figures EV-1 through EV-4**).

Water Depths

The SFWDAT tool indicates that within the last month, northeastern WCA-3A has recovered some depths. Along the northern reach of the L-67s, depths continue to recede and the spatial extent of those deeper conditions continue to decrease. Southern BCNP (north of US41) looks to have recovered some depths over the last month. Connectivity in the western sloughs of ENP looks to have been restored, while within the eastern sloughs, connectivity remains strong. Comparing current WDAT water depths to one month ago, the western EPA is higher (and northeastern WCA-3A) but lower to the east; including central WCA-1, most of WCA-2A and eastern WCA-3A South. Looking back a year ago, northern WCA-2A, central WCA-1 and east central WCA-3A are shallower; conditions are deeper to the south, significantly so within portions of ENP and northeastern WCA-3A (**Figure EV-5 and Figure EV-6**). Comparing current conditions to the 20-year median: All of WCA-2A and WCA-3A south of the northern perimeter remain near the 10th percentile, southern BCNP/western ENP is also well below average; WCA-3B and NESRS remains in the upper percentiles (**Figure EV-7**).

Taylor Slough and Florida Bay

Taylor Slough and Florida Bay received an average of 0.97 inches of total rain this past week, almost 0.4 inches less than the previous week based on the 18 gauges used in this report. Overall, stages in Taylor Slough increased slightly in the past week, with an average difference of +0.015 feet (**Figure EV-8 and Figure EV-9**). However, Taylor Slough water levels are now just below the historical average for this time of year by -0.30 inches compared to before the Florida Bay initiative (starting in 2017).

Average Florida Bay salinity is 36.8, an increase of +2.1 for the week from 9/4 to 9/11. Salinities increased at most stations; the greatest increase was +9.1 in Joe Bay (JB). Salinity decreased by -1.4 and -2.3 at Johnson Key (JK) and Buoy Key (BK), respectively in the western bay (**Figure EV-8**). Last week on 9/4, salinity downstream of JB at Trout Creek (TC; not shown) in the eastern nearshore region decreased by -13.5, coinciding with an increase in flows from 8/23-9/4. This week, salinities increased by +9.9 at TC, following negative flows from 9/6-9/10 that corresponded with winds from the south (including southeast and southwest). All regions in the bay exceed the 2001-2016

Interquartile Range, (**Figure EV-10**). Florida Bay salinity is 8.3 above its historical average for this time of year, an increase from last week when salinity was higher by 6.6.

Water Management Recommendations

We recommend a continuation of high-level discussions on strategies that could prevent further degradation of NE-WCA3A. 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. 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	1.59	+0.05
WCA-2A	1.60	+0.07
WCA-2B	0.92	-0.11
WCA-3A	2.64	+0.08
WCA-3B	1.64	+0.00
ENP	2.10	-0.02

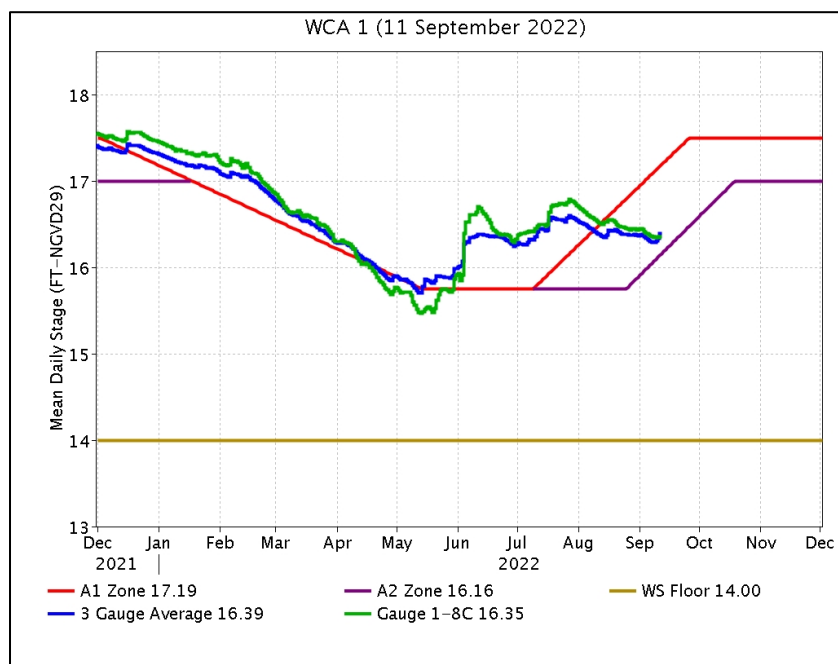


Figure EV-1. WCA-1 stage hydrographs and regulation schedule.

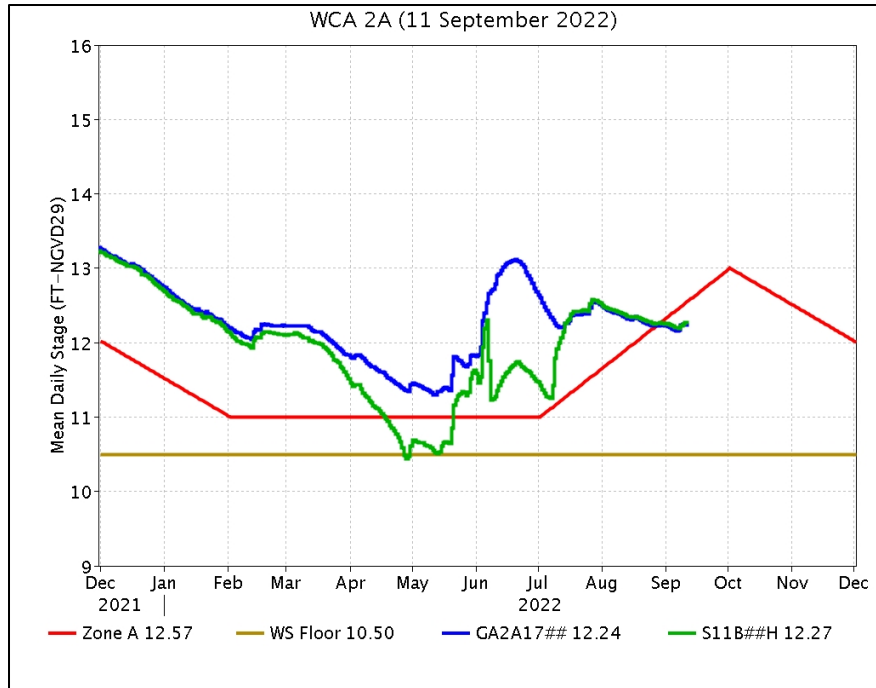


Figure EV-2. WCA-2A stage hydrographs and regulation schedule.

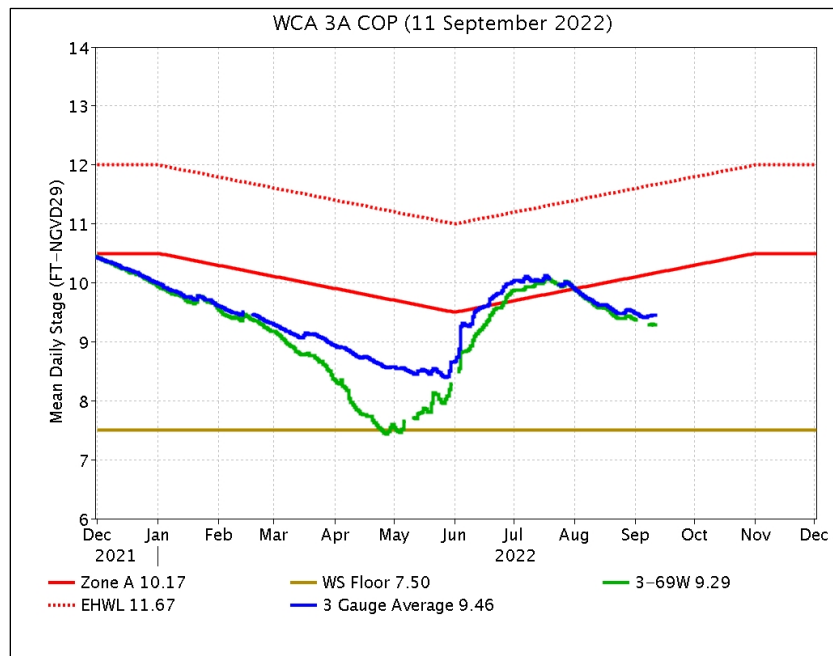


Figure EV-3. WCA-3A stage hydrographs (three-gauge average, S-333 headwater) and regulation schedule.

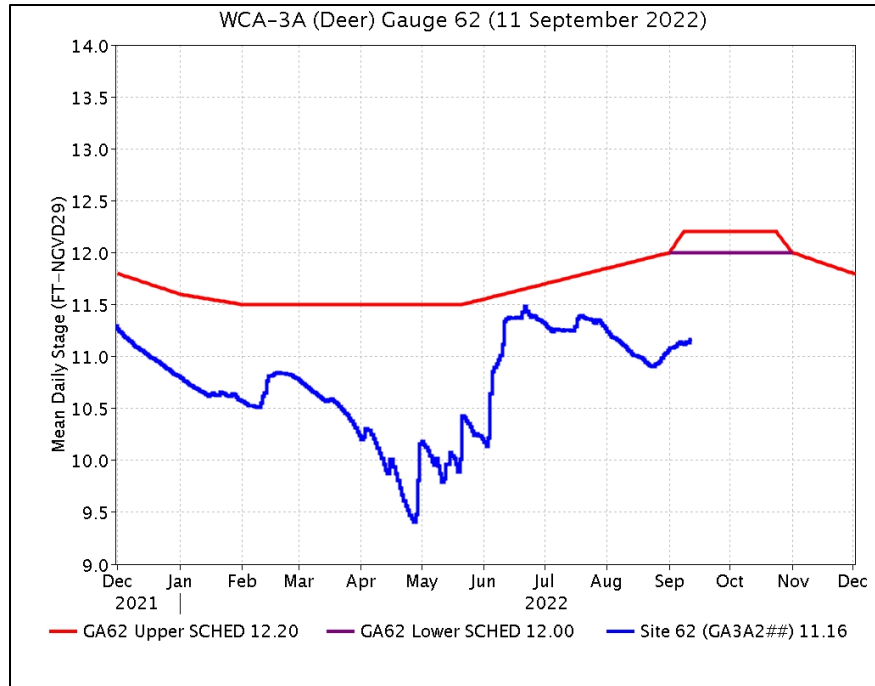


Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.

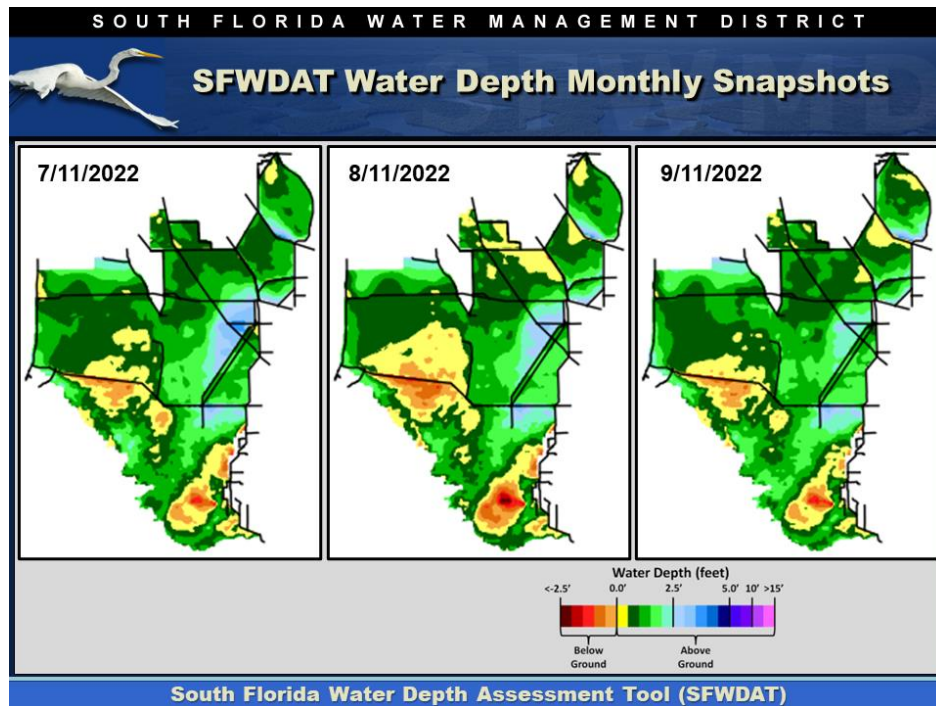


Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

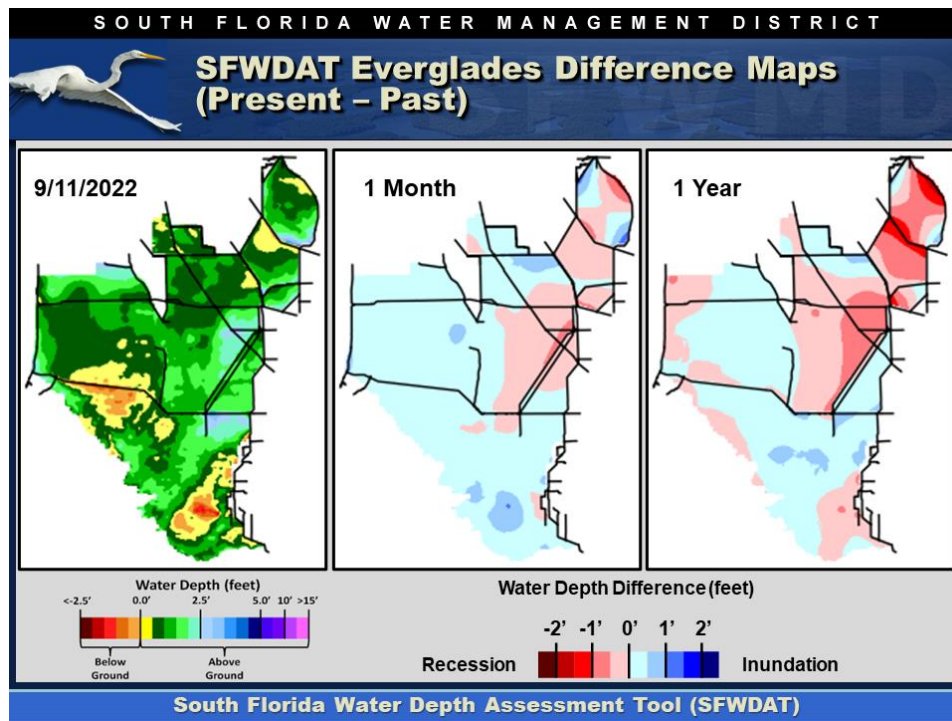


Figure EV-6. Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

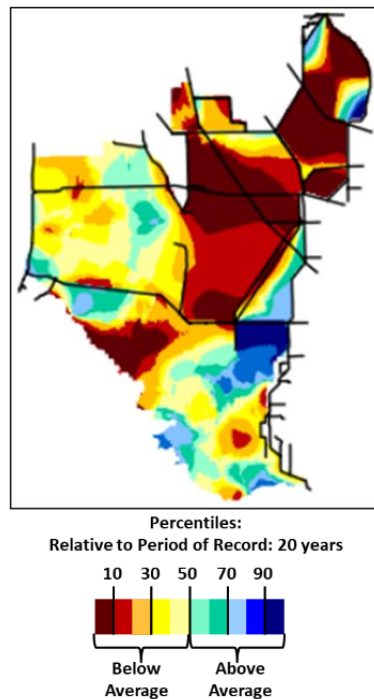


Figure EV-7. Present water depths (9/11/2022) compared to the day of year median over the previous 20 years.

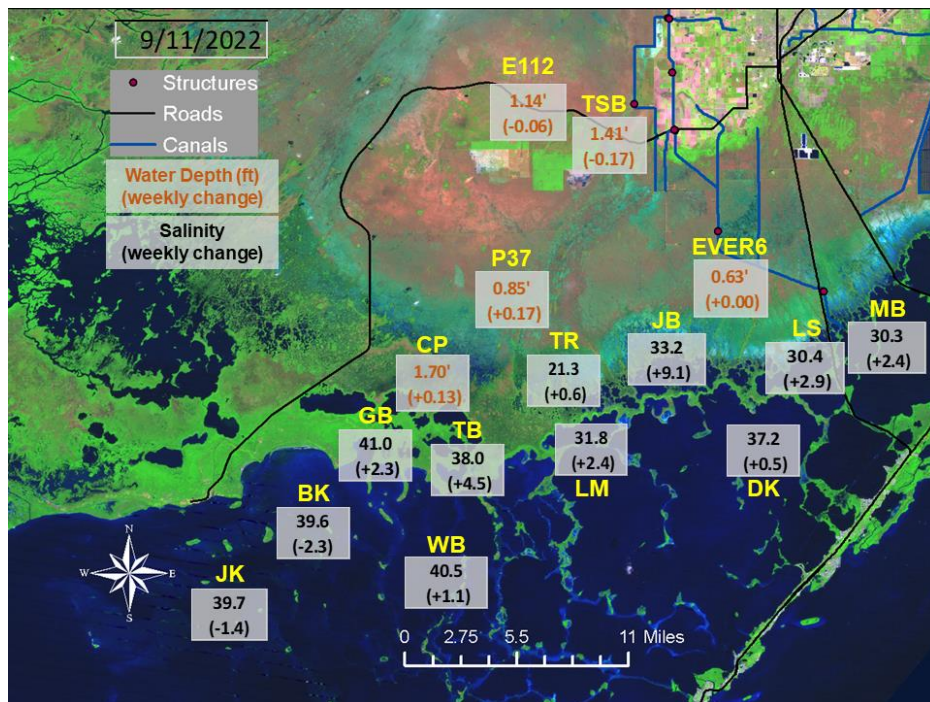


Figure EV-8. Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

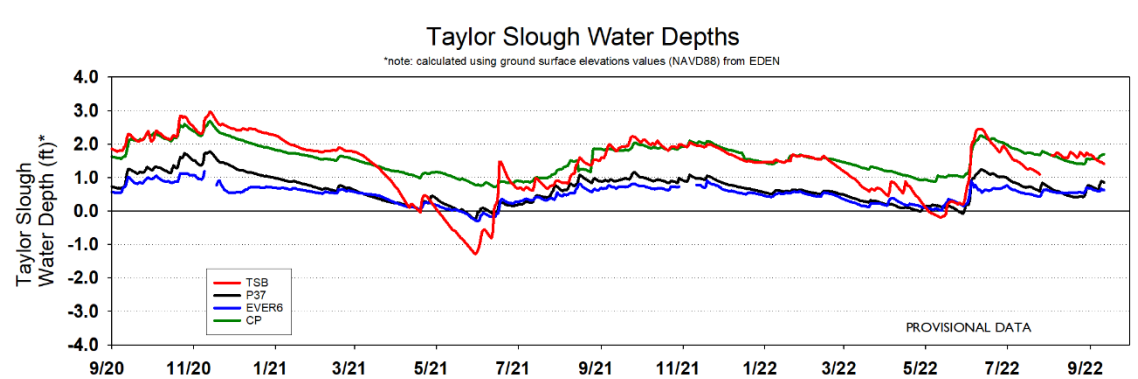


Figure EV-9. Taylor Slough water depth time series.

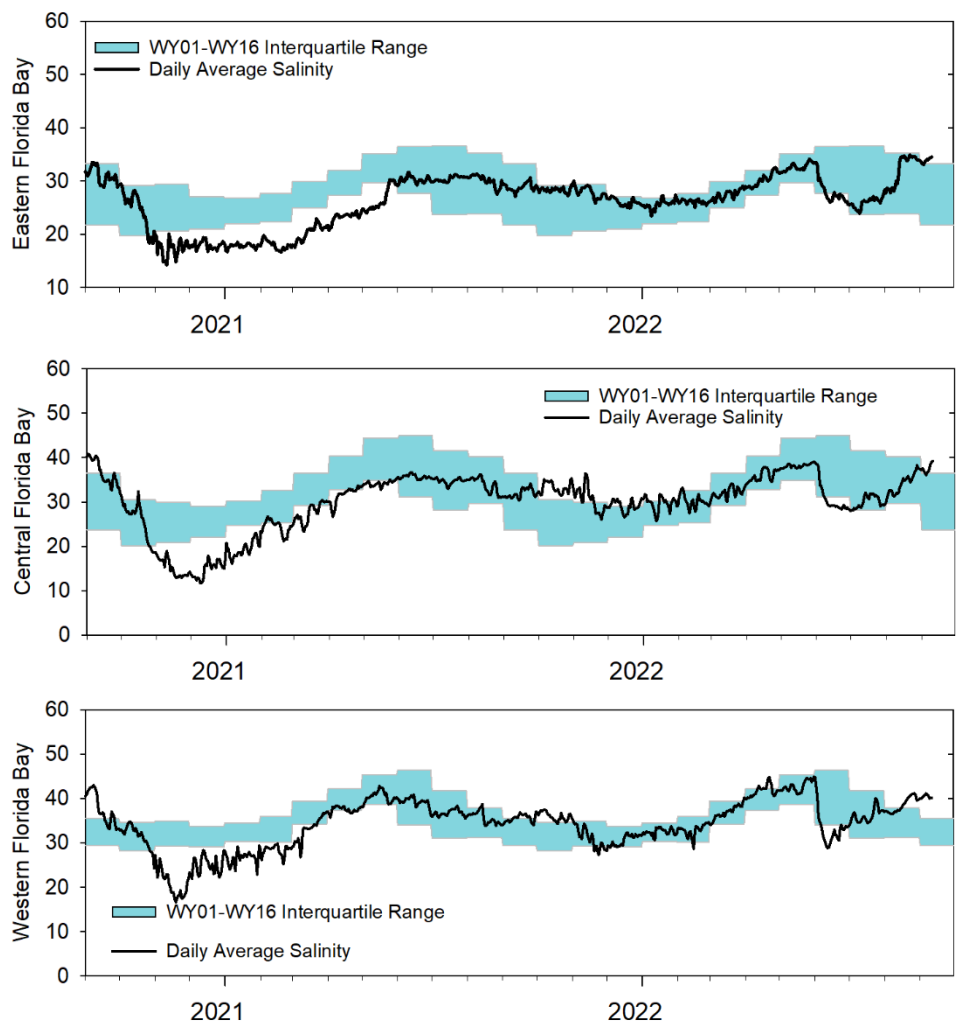


Figure EV-10. Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

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

SFWMD Everglades Ecological Recommendations, September 13th, 2022 (red is new)			
Area	Weekly change	Recommendation	Reasons
WCA-1	Stage increased by 0.05'	Ascension rate of less than 0.25 feet per week.	Protect within basin and downstream habitat and wildlife.
WCA-2A	Stage increased by 0.07'	Ascension rate of less than 0.25 feet per week.	Protect within basin and downstream habitat and wildlife.
WCA-2B	Stage decreased by 0.11'	Ascension rate of less than 0.25 feet per week.	Protect within basin and downstream habitat and wildlife.
WCA-3A NE	Stage increased by 0.20'	Maintain ascension rate of less than 0.25 feet per week.	Protect within basin and downstream habitat and wildlife. Lower fire risk.
WCA-3A NW	Stage increased by 0.10'	Ascension rate of less than 0.25 feet per week.	
Central WCA-3A S	Stage increased by 0.04'	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 0.01'		
WCA-3B	Stage remained unchanged	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. Discussions on water management within the system should be continued.	Protect within basin and upstream habitat and wildlife.
Taylor Slough	Stage changes ranged from -0.175' to +0.165'	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged -2.3 to +9.1	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 438 cfs and the previous 30-day mean inflow was 318 cfs. The seven-day mean salinity was 32.1 at BBCW8 and 34.1 at BBCW10, both below the preferred maximum salinity of 35 for these sites. Data provided by Biscayne National Park.

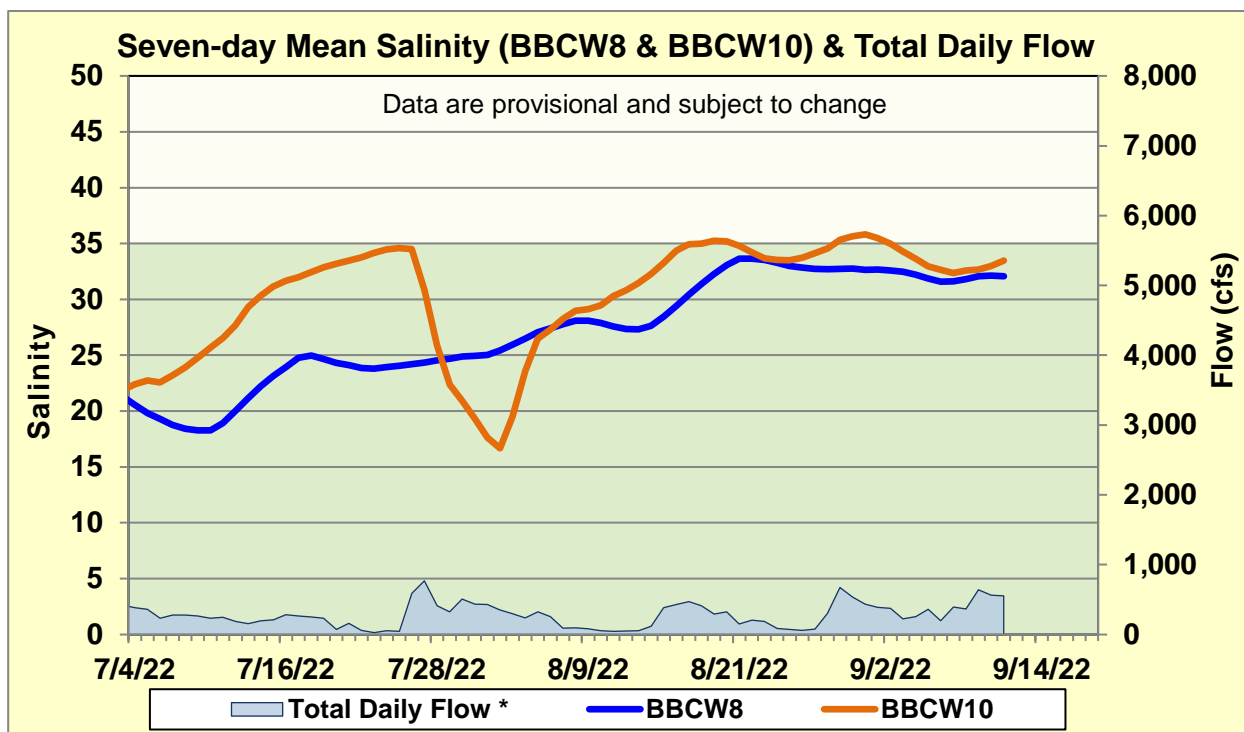


Figure BB-1. Seven-day mean salinity at BBCW8 and BBCW10 and total daily flow in Biscayne Bay. Total daily flow was calculated using flow from structures S20G, S20F, S21, S21A, S123, and S700P.