Disclaimer: Information contained in the report addresses environmental conditions only and is not the official South Florida Water Management District operations recommendation or decision.

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: October 26, 2022

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

The strong sinking air over the District, along with a dry air mass, will inhibit rainfall area wide through Wednesday afternoon. A cold front will enter and stall either over north-central Florida or the far northern part of the SFWMD late Thursday or early Friday. A swath of greater moisture in advance of the cold front should begin reaching the far northwestern part of the SFWMD later Wednesday afternoon and overnight, resulting in some shower activity developing over this region. Even though moisture will be increasing, the strong stability of the atmosphere should keep rainfall amounts light, although there is a low chance for localized heavier rain. The narrow zone of significantly greater moisture will overspread the SFWMD on Thursday when the cold front becomes stationary either over the far northern part of the SFWMD or just to the north of there. A good coverage of rainfall will be possible across the SFWMD, mainly from afternoon rains. The models currently are showing the rains focused over the central and northern parts of the District, especially northwest of Lake Okeechobee. On Friday, the front will lift north with good levels of moisture allowing for widely scattered shower activity, mostly light, north and northeast of Lake Okeechobee with little to none south of Lake Okeechobee. Saturday, a northeasterly wind flow will transport shallow moisture across the SFWMD, resulting in some east-coast showers that occasionally could extend inland through the eastern half of the SFWMD while the western half of the area remains dry. However, total SFWMD should remain below normal. While there is moderate confidence in the weekend forecast, there is less confidence regarding the spatial distribution of rains on Monday next week. For the week ending next Tuesday morning, total SFWMD rainfall is forecast to be much below normal. Given the forecast between now and then end of the month, total October SFWMD rainfall is not expected to finish much past the 20th percentile.

Kissimmee

Lake water levels remained high in the Kissimmee Basin because of Hurricane Ian, with stages declining but still above their respective regulation schedules. Discharges out of most lakes are being reduced to slow the rate of stage decline. For the week ending

October 23, 2022, average discharge at S-65 and S-65A were 9,500 cfs and 9,400 cfs, respectively, both of which are less than the previous week. Average weekly water depth on the Kissimmee River floodplain decreased from the previous week to 4.76 feet. The weekly average concentration of dissolved oxygen in the Kissimmee River increased from 1.0 mg/L the previous week to 1.4 mg/L for the week ending October 23, 2022, above the potentially lethal level for largemouth bass and other sensitive species, but still within the physiologically stressful range.

Lake Okeechobee

Lake Okeechobee stage was 15.57 feet NGVD on October 23, 2022, with water levels 0.40 feet higher than previous week and 2.58 feet higher than a month ago. Lake stage was in the Low sub-band and 0.07 inches above the upper limit of the ecological envelope. Average daily inflows (excluding rainfall) decreased, and outflows (excluding evapotranspiration) increased from the previous week. The most recent satellite image (October 23, 2022) from NOAA's Harmful Algal Bloom Monitoring System showed that bloom potential was very low in the western part of the lake. Bloom potential decreased in the western part of the Lake since previous week. The other parts of the lake remain bloom-free. The October 17-19, 2022 routine water quality and phytoplankton survey on the lake revealed that communities were mixed and microcystin toxins were below detection limit at all lake monitoring sites**.**

Estuaries

Total inflow to the St. Lucie Estuary averaged 790 cfs over the past week with no flow coming from Lake Okeechobee. Mean salinities increased at all sites over the past week. Salinity in the middle estuary was in the optimal range (10-25) for adult eastern oysters.

Total inflow to the Caloosahatchee Estuary averaged 2,090 cfs over the past week with no flow coming from Lake Okeechobee. Over the past week, salinities remained the same at S-79 and Val I-75 and decreased at Ft. Myers. Except for the sensor at Shell Point, all sensors in the Caloosahatchee River estuary are again functioning properly as of October 17, 2022. Salinities in the upper estuary were within the optimal range (0-10) for tape grass.

Stormwater Treatment Areas

For the week ending Sunday, October 23, 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 878,000 ac-feet. STA cells are at or near target stage. STA-1E Western Flow-way is offline for post-construction vegetation grow in, STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown, and STA-2 Flow-way 2 is offline for construction activities. Operational restrictions are in effect in STA-1E Central and Eastern Flow-ways, STA-1W Eastern, Western, and Northern Flow-ways, and STA-2 Flow-ways 3 and 4 for vegetation management activities. This week, there is no capacity for Lake releases in the STAs.

Everglades

Last week rates of stage change remained in the “fair” or “good” category as rates of change continue to be slow post Hurricane Ian. Depths remain above average for this time of year in WCA-3A North, and above average stages have the potential to be favorable for wading bird nesting in that region. Depths more than 2.5 feet continue to build in the southern regions of the WCAs. Taylor slough stages lowered last week but remain above average. On average, salinities declined last week in Florida Bay; however, Bay-wide salinities remain above average. As the wet season ends salinity conditions in Florida Bay could be better (lower), however higher than average stages in Taylor River could help moderate salinity as the dry season progresses.

Biscayne Bay

Total inflow to Biscayne Bay averaged 850 cfs and the previous 30-day mean inflow averaged 1,560 cfs. The seven-day mean salinity was 27.4 at BBCW8 and 24.9 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 October 23, 2022, lake stages were 59.1 feet NGVD (1.4 feet above schedule) in East Lake Toho, 54.9 feet NGVD (0.2 feet above schedule) in Lake Toho, and 52.4 feet NGVD (0.2 feet above schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1**, **Figures KB-1-3**).

Lower Kissimmee

On October 23, 2022, average daily discharge was reduced to 5,500 cfs at S-65 and 7,000 cfs at S-65A as water levels in KCH and Pool A continued to decline. Average daily discharge from the Kissimmee River was 12,000 cfs at S-65D and 11,000 cfs at S-65E (**Table KB-2**). Daily average headwater stages were 48.3 feet NGVD at S-65A and 28.5 feet NGVD at S-65D on October 23, 2022. With S-65A discharge being reduced, October 23 daily mean river channel stage decreased from the previous day’s mean to 42.0 feet (**Figure KB-4**) and average daily water depth on the Kissimmee River floodplain decreased to a mean depth of 4.52 feet (**Figure KB-5**). The weekly average concentration of dissolved oxygen in the Kissimmee River increased from 1.0 mg/L the previous week to 1.4 mg/L over the week ending on October 23, 2022 (**Table KB-2**, **Figure KB-6**).

Water Management Recommendations

Per the IS-14-50.0 discharge plan, adjust S-65 discharge to maintain a minimum flow of at least 1,400 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, Sunday's average daily stage and Sunday's average daily departure from KCOL flood regulation lines or temporary schedules. All data are provisional.

Water Body	Structure	Stage Monitoring Site	Weekly (7-Day) Average Discharge (cfs)	Sunday Lake Stage (feet NGVD)[a]	Schedule Type[b]	Sunday Schedule Stage (feet NGVD)	Sunday Departure from Regulation (feet)	
							10/23/22	*10/16/22*
Lakes Hart and Mary Jane	S-62	LKMJ	410	61.5	R	60.7	0.8	2.3
Lakes Myrtle, Preston and Joel	S-57	S-57	0	64.1	R	61.7	2.4	3.5
Alligator Chain	S-60	ALLI	510	64.0	R	63.8	0.2	0.6
Lake Gentry	S-63	LKGT	650	61.5	R	61.4	0.1	0.1
East Lake Toho	S-59	TOHOE	1500	59.1	R	57.7	1.4	2.5
Lake Toho	S-61	TOHOW S-61	2100	54.9	R	54.7	0.2	1.3
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	9500	52.4	R	52.2	0.2	1.0

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.

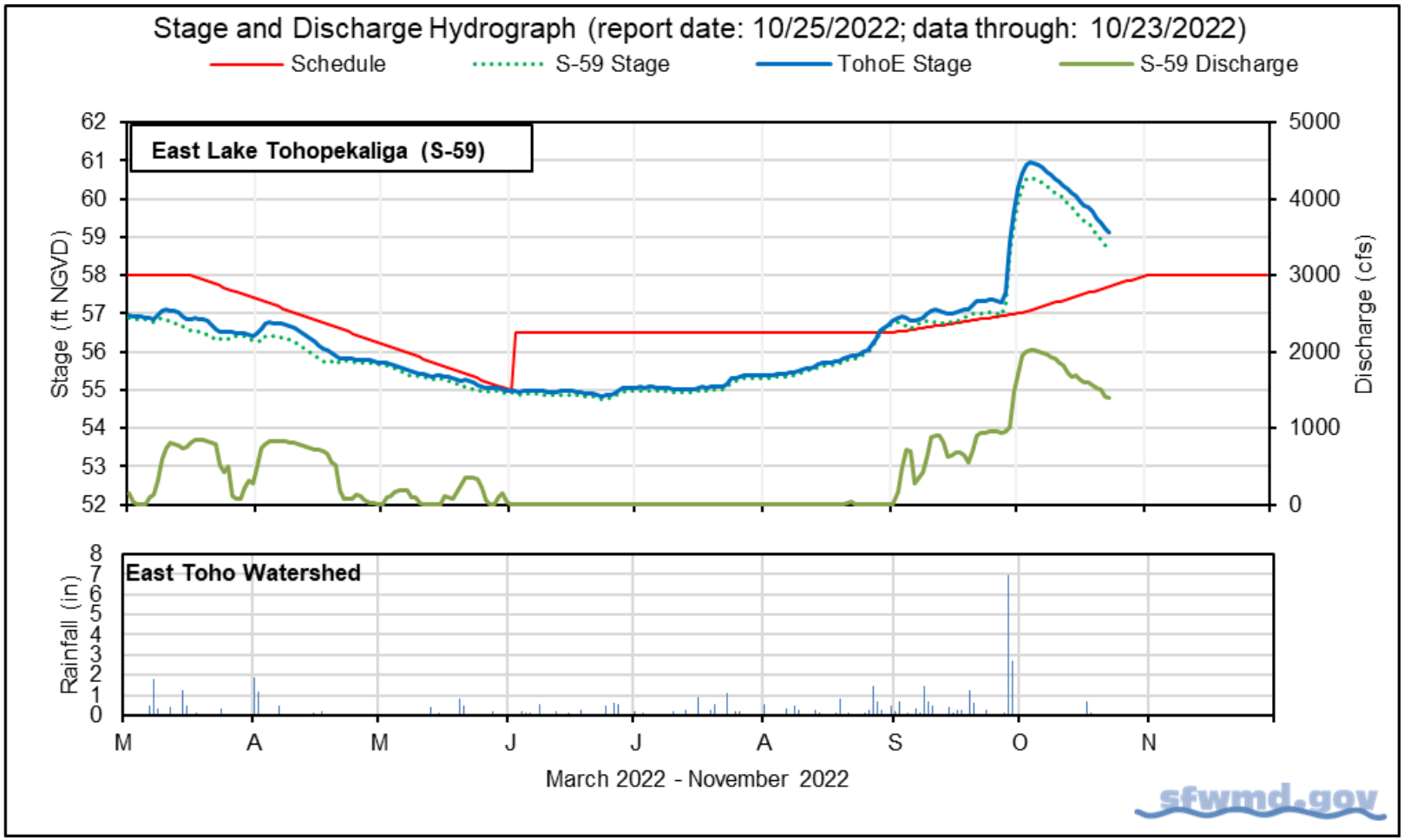


Figure KB-1. East Lake Toho regulation schedule, stage, discharge and rainfall.

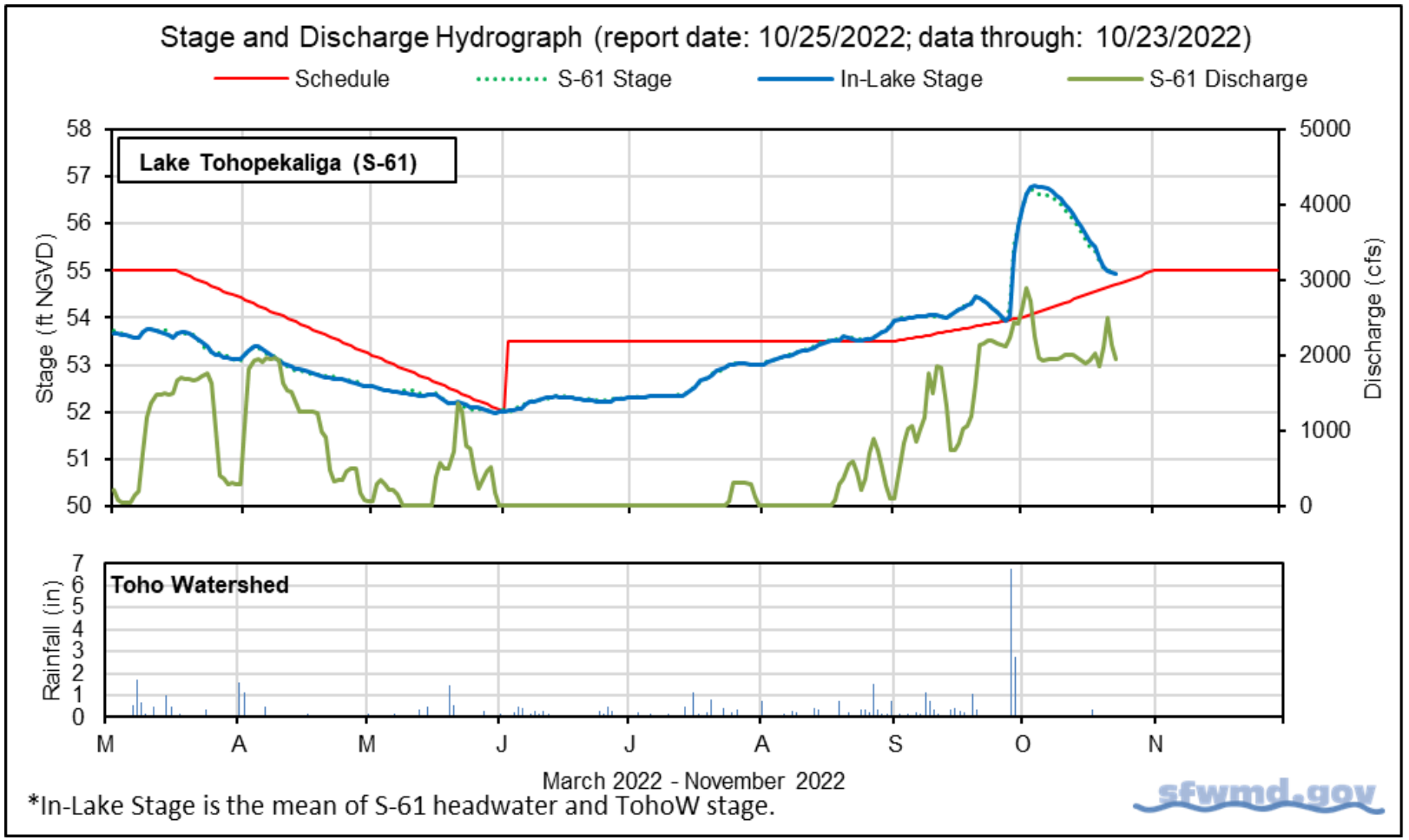


Figure KB-2. Lake Toho regulation schedule, stage, discharge and rainfall.

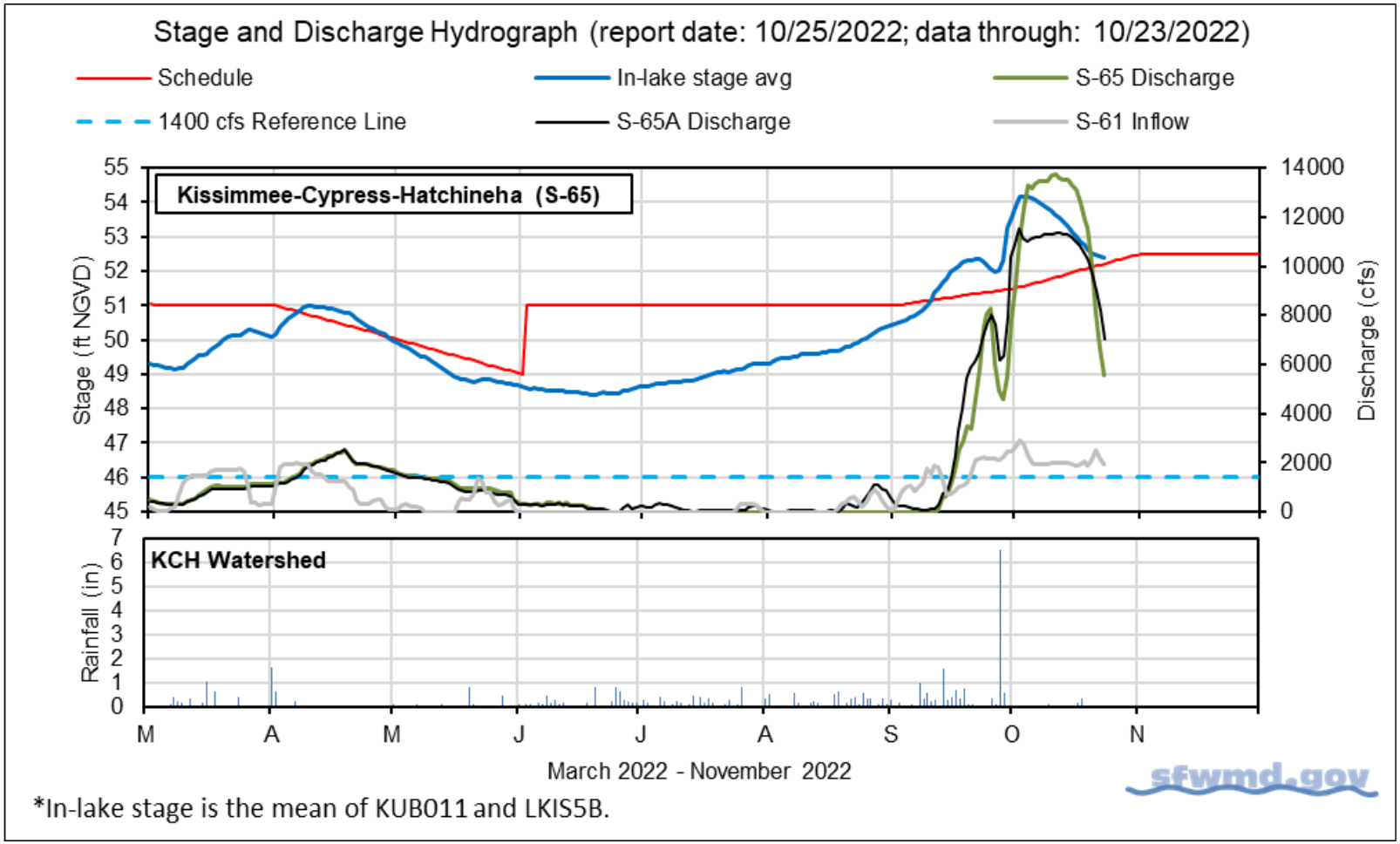


Figure KB-3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

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	Sunday Daily Average	Weekly Average for Previous Seven Day Periods			
		10/23/22	10/23/22	10/16/22	10/9/22	10/2/22
Discharge	S-65	5,500	9,500	13,000	13,000	7,000
Discharge	S-65A[a]	7,000	9,400	11,000	11,000	8,700
Headwater Stage (feet NGVD)	S-65A	48.3	49.7	50.9	51.0	49.2
Discharge	S-65D[b]	12,000	13,000	14,000	12,000	7,800
Headwater Stage (feet NGVD)	S-65D[c]	28.5	28.5	28.5	28.7	28.6
Discharge (cfs)	S-65E[d]	11,000	12,000	14,000	12,000	7,600
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) [e]	Phase I, II/III river channel	1.8	1.4	1.0	1.1	1.0
Mean depth (feet) [f]	Phase I floodplain	4.52	4.76	5.15	5.10	3.81

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).

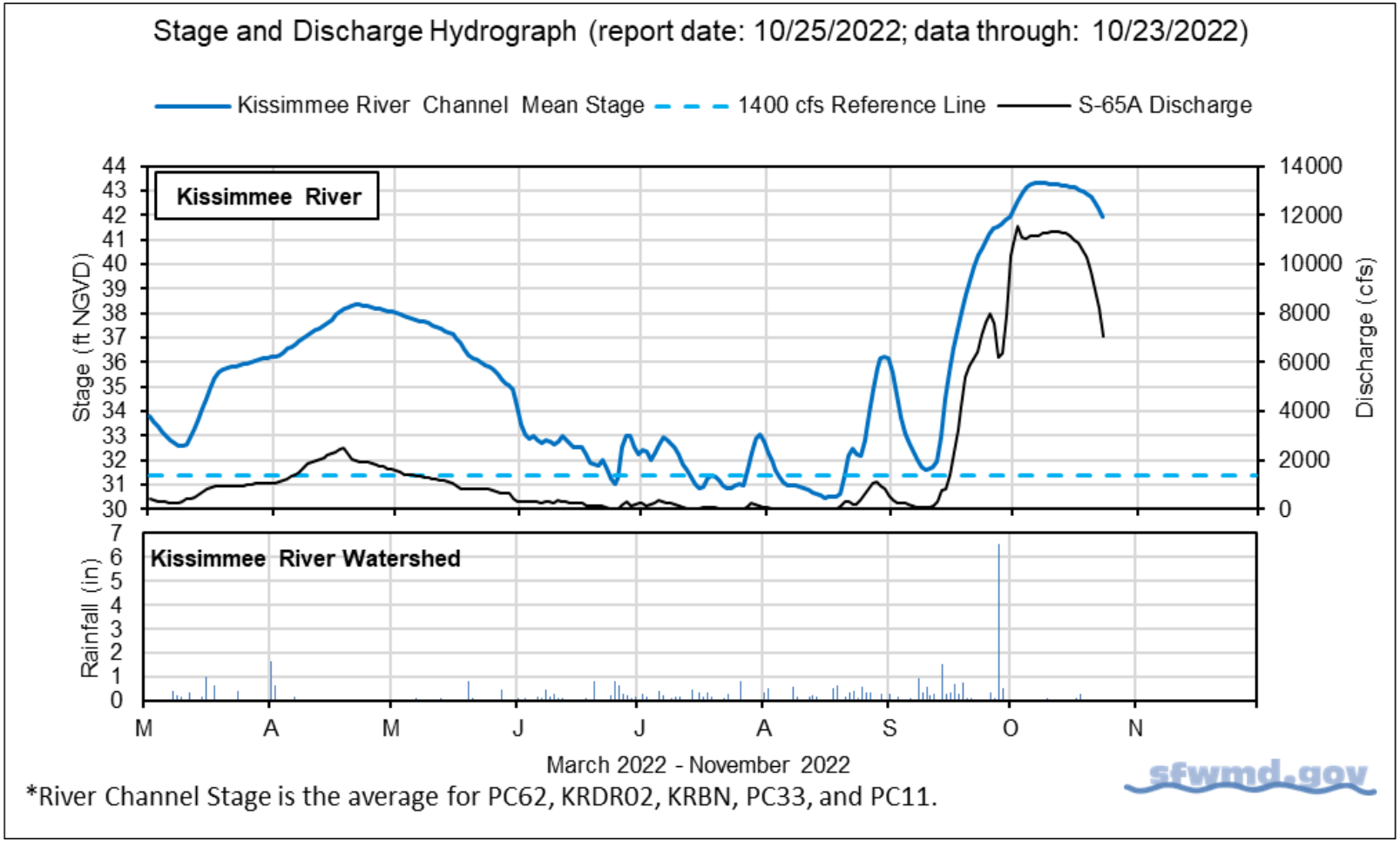


Figure KB-4. Kissimmee River stage, discharge and rainfall.

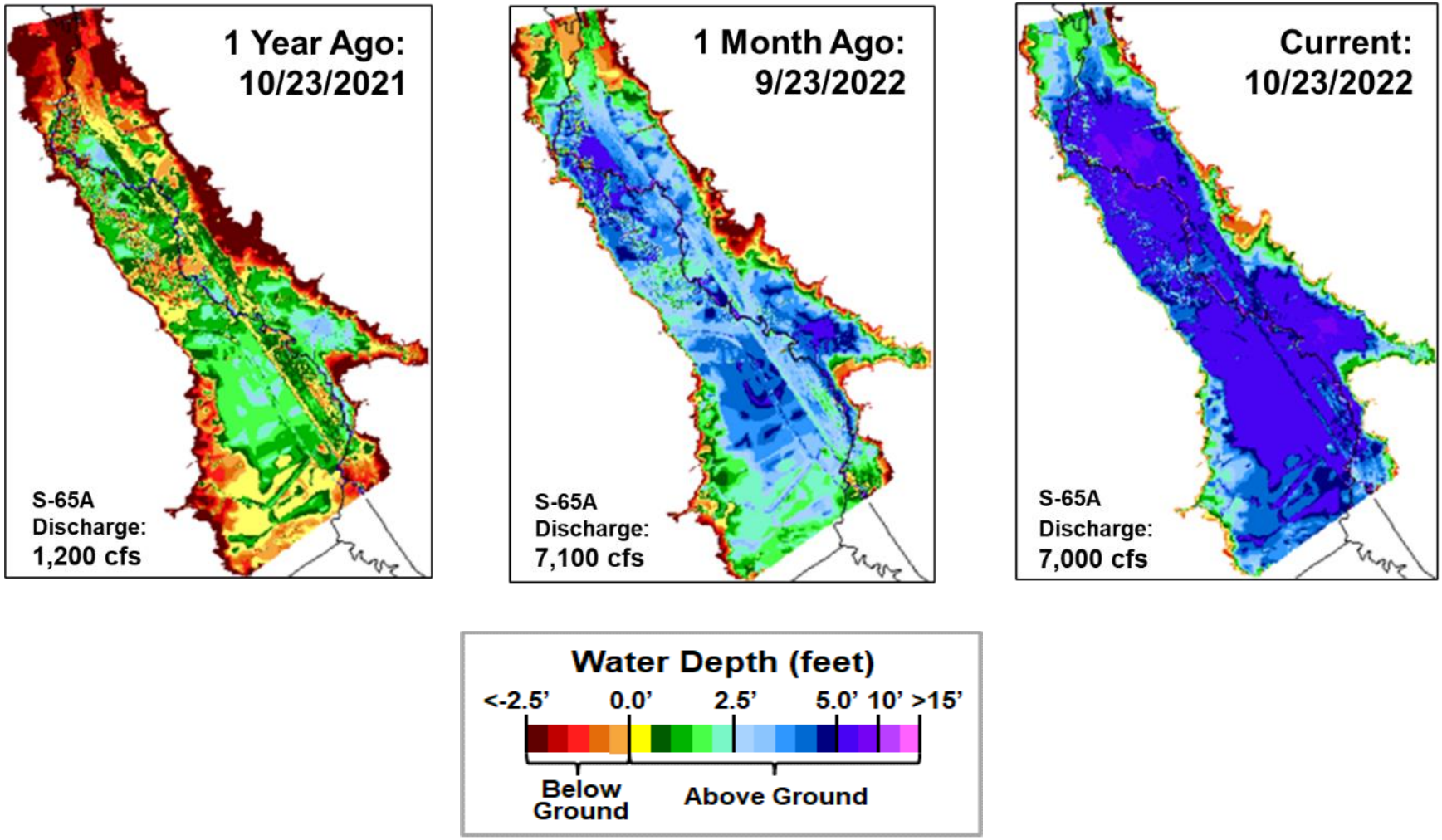


Figure KB-5. Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.

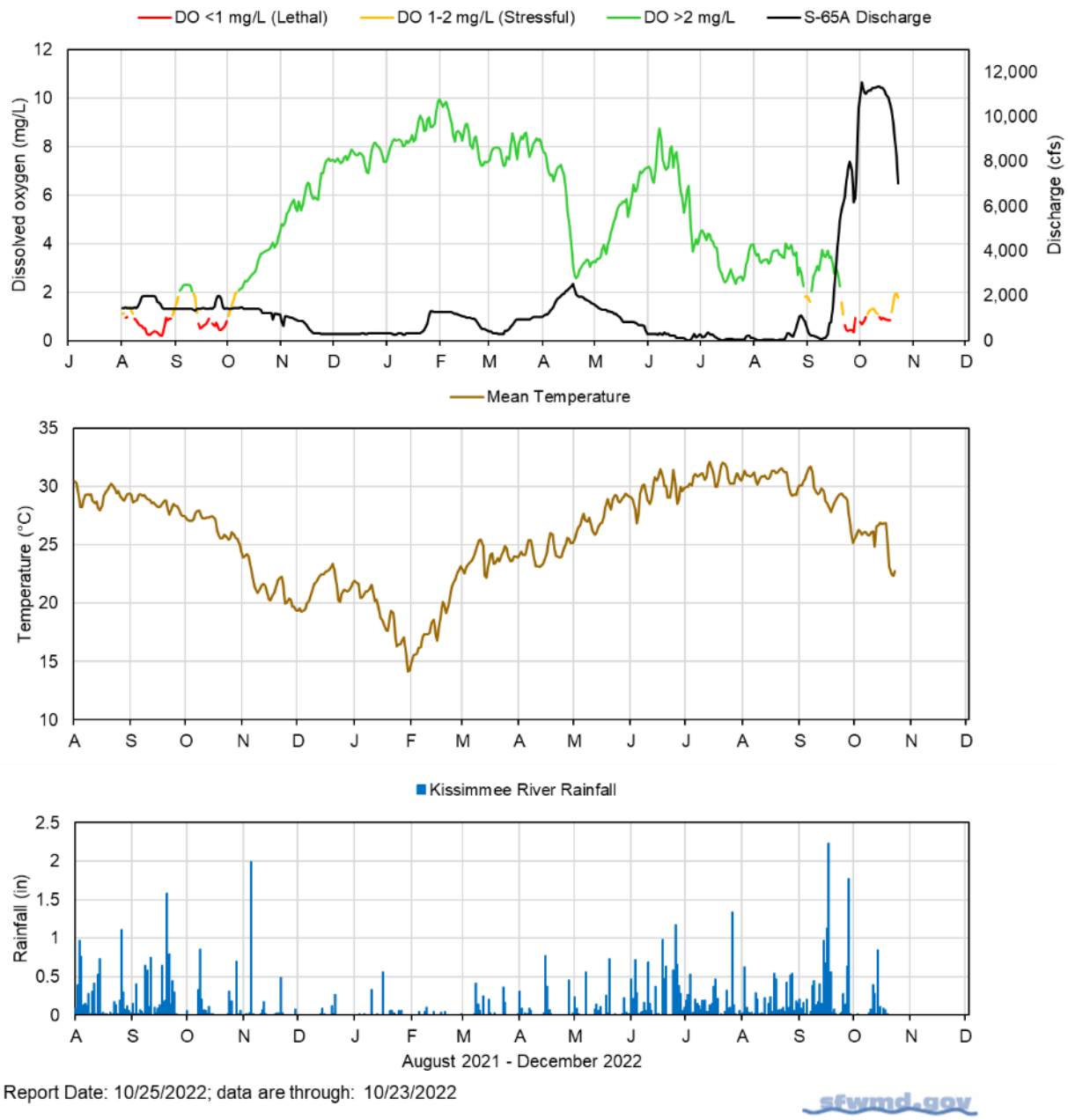


Figure KB-6. Restored Kissimmee river channel mean daily dissolved oxygen concentration (mg/L), S-65A discharge (cfs), temperature (°C) and rainfall (inches). Dissolved oxygen (DO) and temperature are mean daily values averaged for PC62, KRDR02, KRBN, PC33, PC11, PD62R, and PD42R with an average of four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

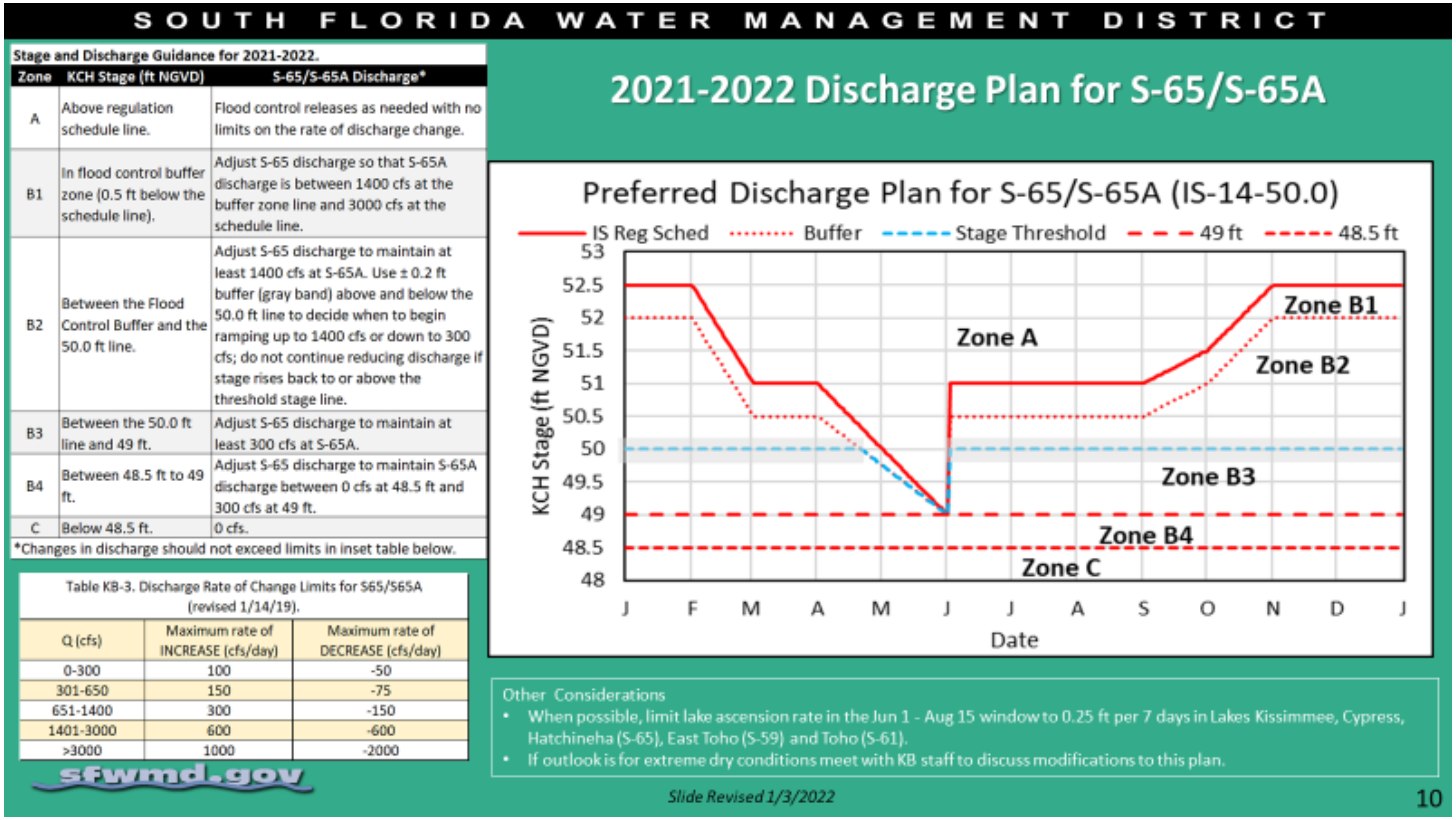


Figure KB-7. IS-14-50 Discharge Plan for S65/S65A with discharge rate of change limits (revised 1/14/19).

Lake Okeechobee

Lake Okeechobee stage was 15.57 feet NGVD on October 23, 2022, with water levels 0.40 feet higher than the previous week and 2.58 feet higher than a month ago (**Figure LO-1**). Lake stage remains within the Low sub band (**Figure LO-2**) and is currently 0.07 feet above the upper limit of the ecological envelope (**Figure LO-3**). According to NEXRAD, 0.27 inches of rain fell directly on the Lake last week.

Average daily inflows (excluding rainfall) decreased from the previous week, going from 17,930 cfs to 15,143 cfs. Average daily outflows (excluding evapotranspiration) increased from the previous week going from 0 cfs to 170 cfs. The highest inflow came from the Kissimmee River (C-38 Canal; 12,424 cfs), followed by inflow via the S-84 & S-84X structures from the C-41A Canal (1,418 cfs) and Fisheating Creek (758 cfs). Back flow was recorded from the L-8 Canal via the S-271 structure at an average daily rate of 96 cfs. Outflow to the east via the S-308 structure into the C-44 Canal was 150 cfs and to the south via the S-354 into the L-25 Canal was 20 cfs. There was no outflow to the west via the S-77 structure. **Figures LO-4 and LO-5** show the combined average daily inflows and outflows for the Lake over the past eight weeks, and average inflows and outflows last week, respectively. These data are provisional and are subject to change.

The October 17-19, 2022 routine water quality and phytoplankton monitoring on the lake revealed that communities at all sites were mixed and total microcystin concentrations were below the detection limit.

The most recent satellite image (October 23, 2022) from NOAA's Harmful Algal Bloom Monitoring System showed that bloom potential was very low in the western part of the lake. Bloom potential decreased in the western part of the Lake since previous week. The other parts of the lake remain bloom-free (**Figure LO-6**).

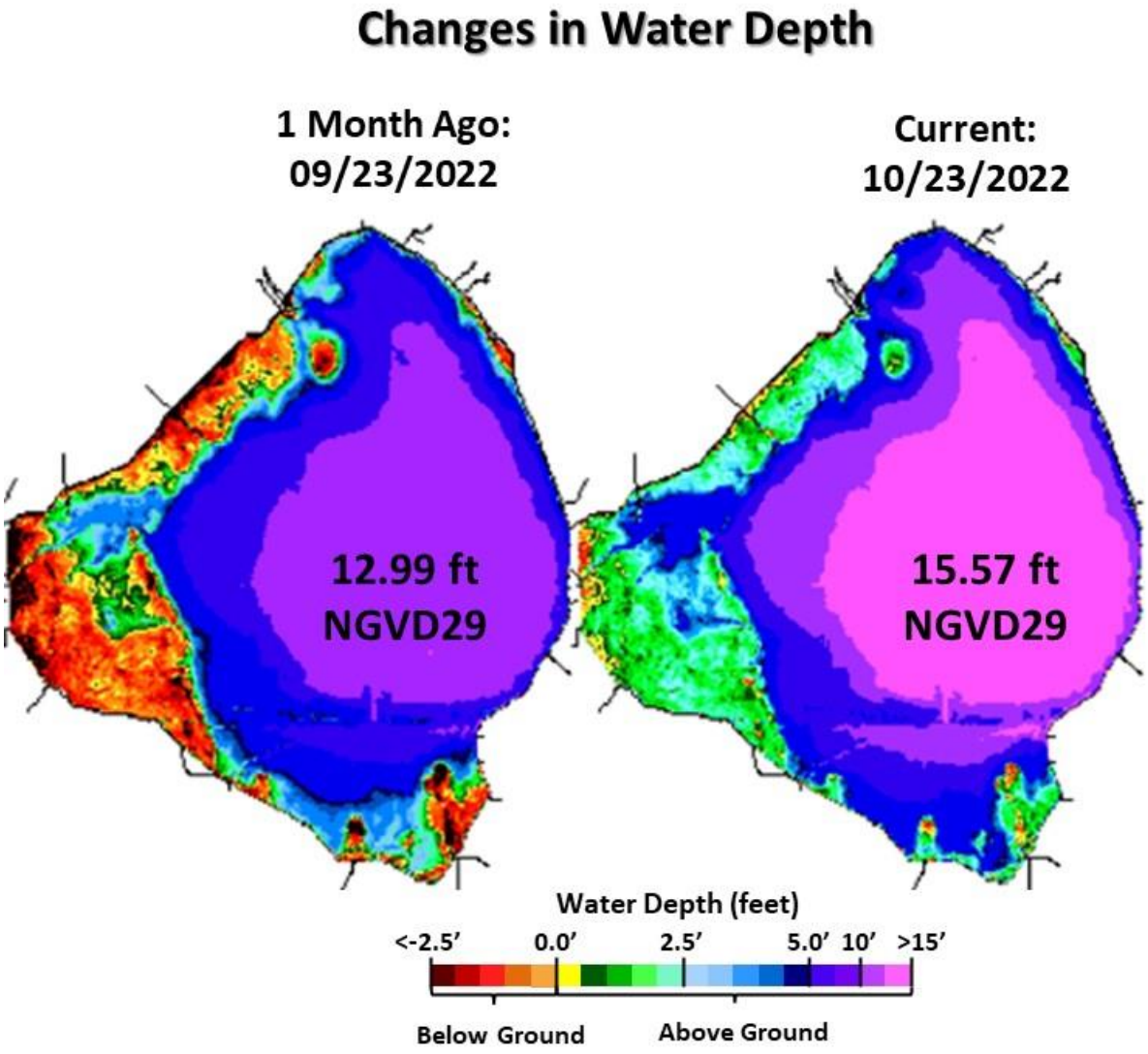


Figure LO-1. Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

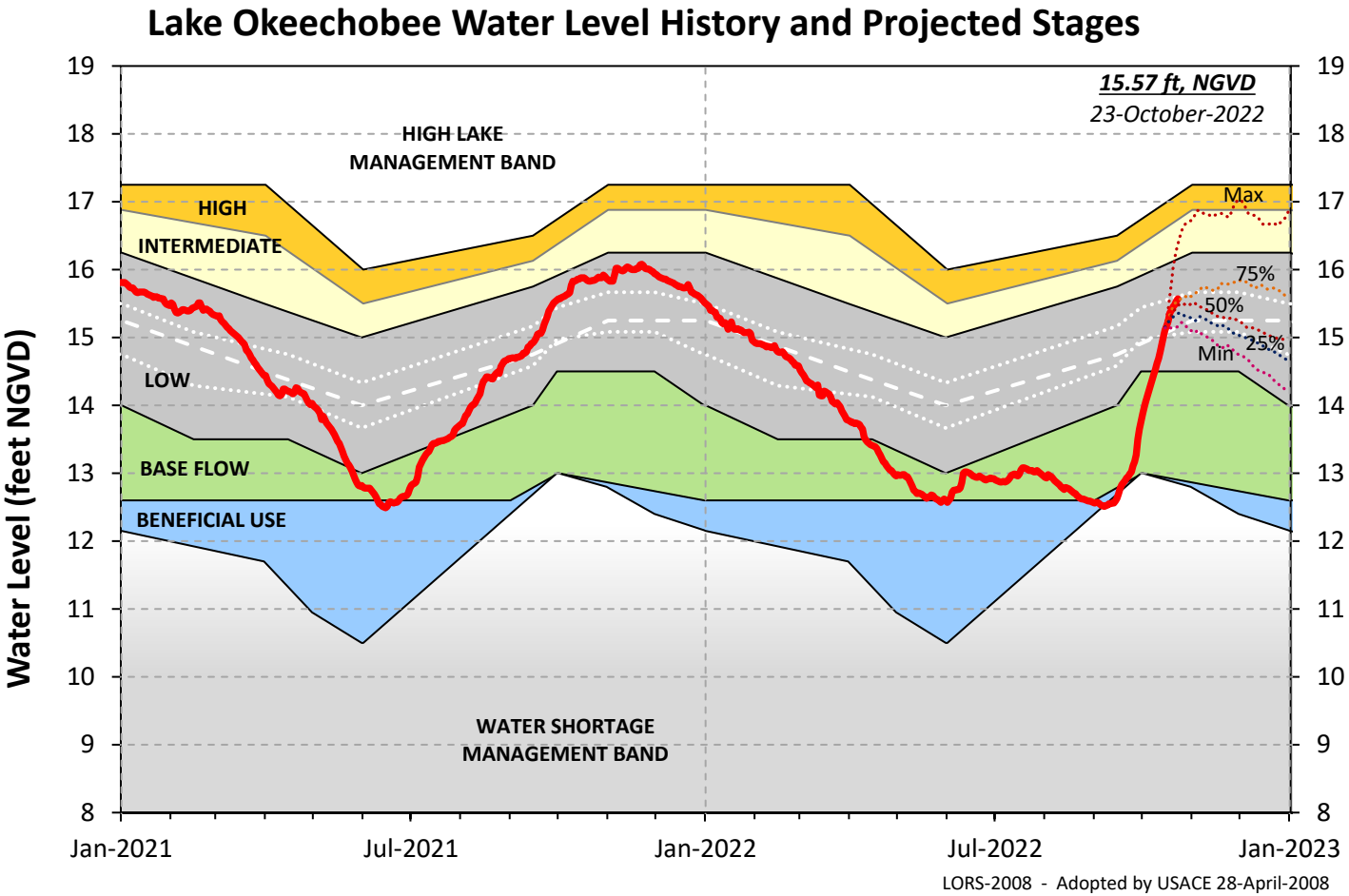


Figure LO-2. Recent Lake Okeechobee stages with projected stages based on a dynamic position analysis.

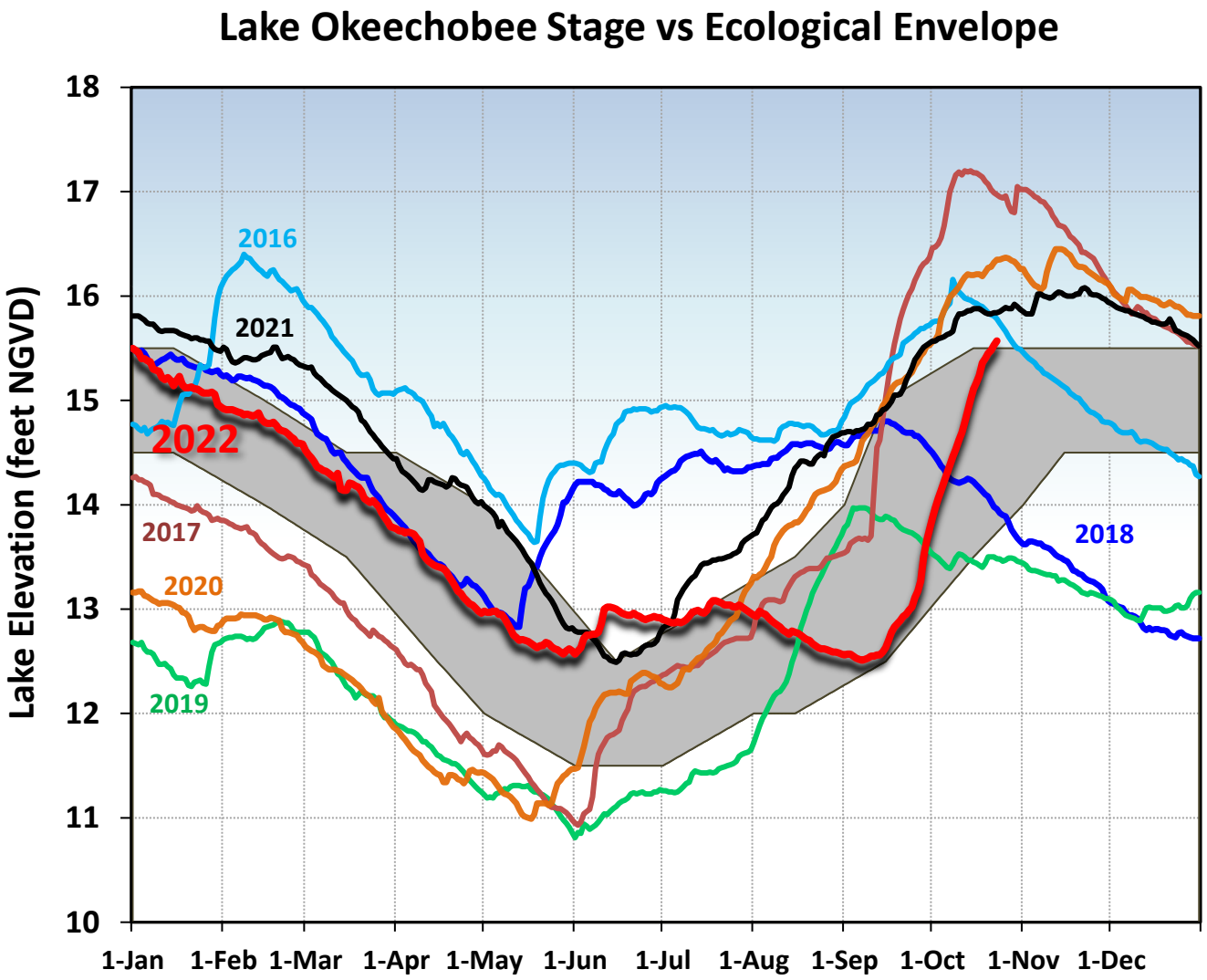


Figure LO-3. The prior six years of annual stage hydrographs for Lake Okeechobee in comparison to the ecological envelope.

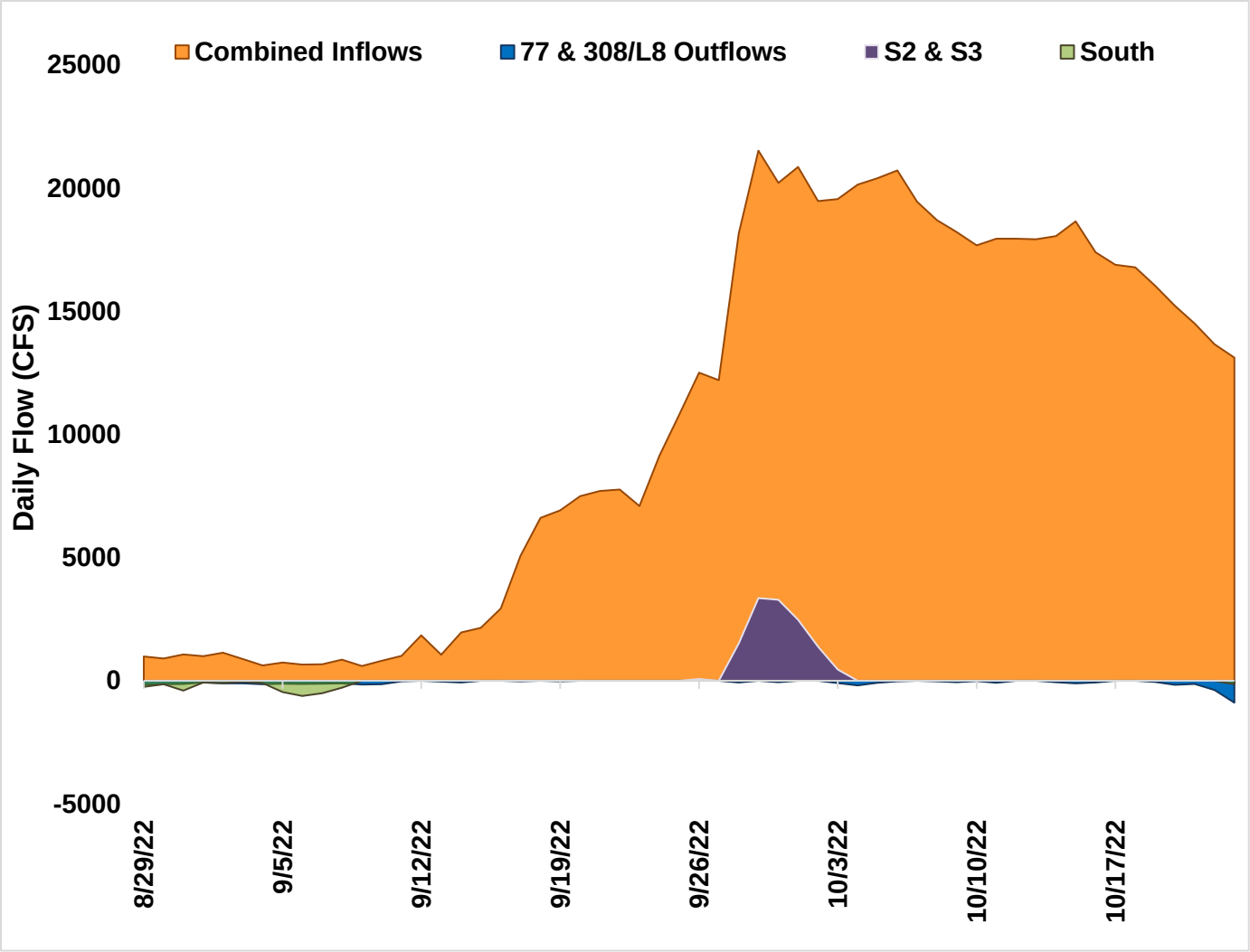


Figure LO-4. Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows from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

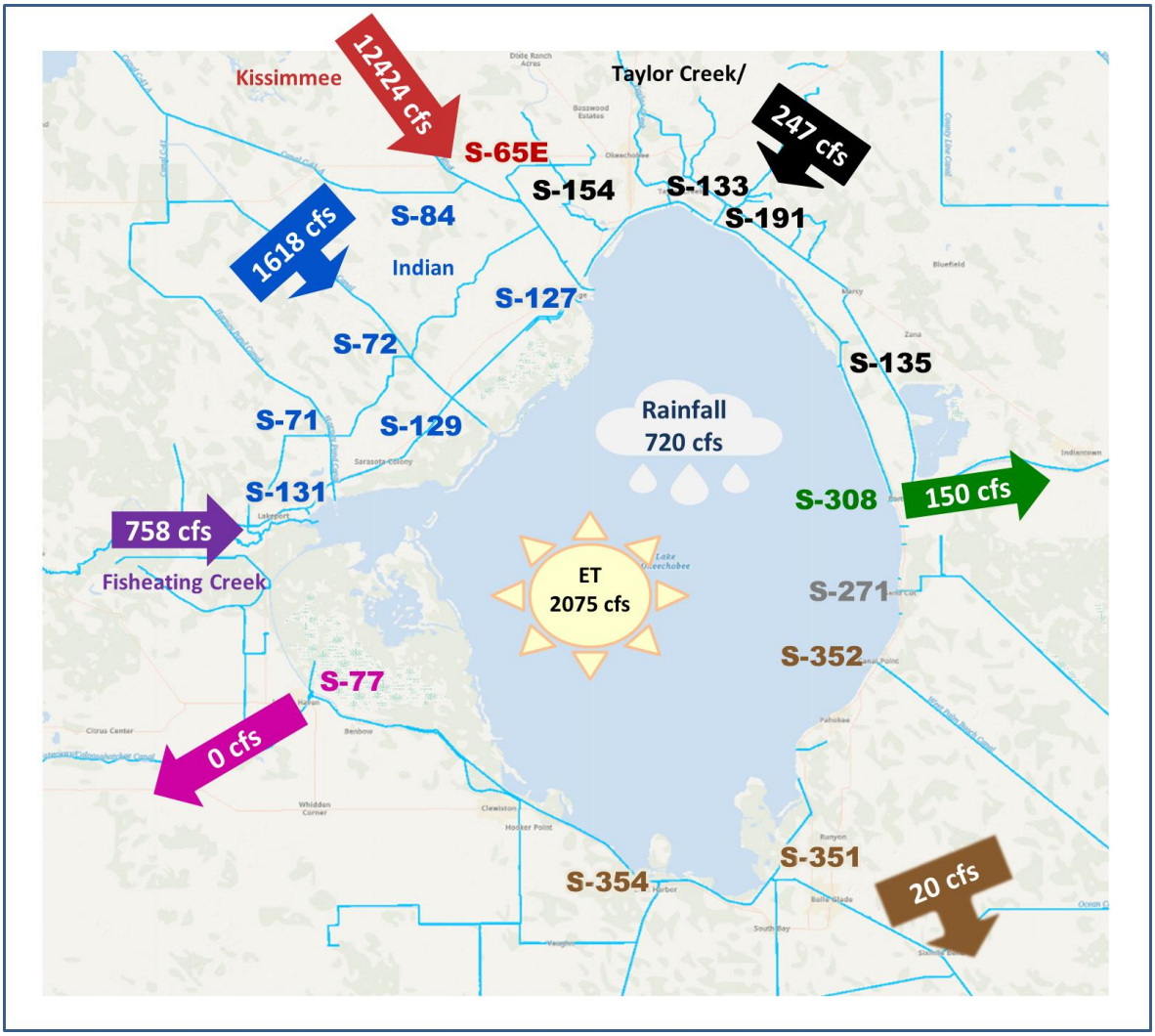


Figure LO-5. Inflows into Lake Okeechobee from Indian Prairie basins, Taylor Creek/Nubbin Slough, Kissimmee River and Fisheating Creek, and outflows to the west via S-77, to the east via S-308, to the south via S-351, S-352, S-354, and to southeast via S-271 (formerly Culvert 10A) for the week of October 17 - 23, 2022.

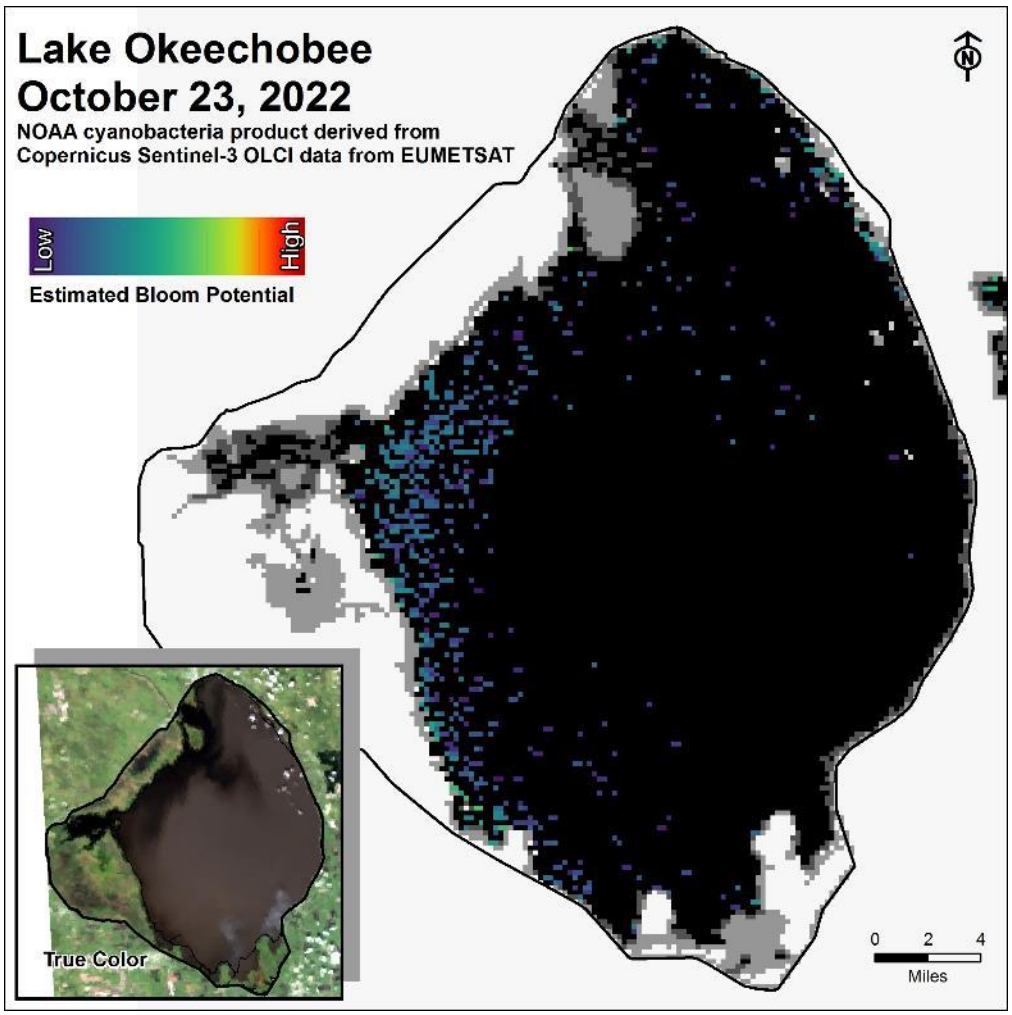


Figure LO-6. Cyanobacteria bloom potential on October 23, 2022 based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

Estuaries

St. Lucie Estuary

The St. Lucie estuary was impacted by Hurricane Ian on September 27 and 28, 2022 with most of the freshwater inflow coming from the basins (**Figure ES-2**). This inflow resulted in a rapid decrease in salinity throughout the estuary, but salinity began recovering quickly (**Figure ES-3**). Long-term impacts to oyster populations are unlikely but will be monitored.

Over the past week, mean total inflow to the St. Lucie Estuary was 790 cfs (**Figures ES-1** and **ES-2**) and the previous 30-day mean inflow was 3,370 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-2**.

Over the past week, salinities increased 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 14.1. Salinity conditions in the middle estuary were estimated to be within the optimal range for adult eastern oysters (**Figure ES-4**). The mean larval oyster recruitment rate reported by the Fish and Wildlife Research Institute in September was 2.5 spat/shell (**Figure ES-5**).

Caloosahatchee River Estuary

The Caloosahatchee River Estuary received system-wide impacts from damaging winds and large storm surge following the landfall of Hurricane Ian 20 miles WNW of Fort Myers, Florida at 3:05 PM Wednesday, September 28, 2022 as a category 4 storm. All South Florida Water Management District water quality sensors in the estuary were affected by the storm and ceased to function on September 28, 2022. The sensor at the Val I-75 station began functioning and reporting again on October 5, the sensor at S-79 began functioning again on October 14, the sensors at Fort Myers and Cape Coral began functioning again on October 15, and the sensor at Sanibel began functioning again on October 17, 2022.

Over the past week, mean total inflow to the Caloosahatchee River Estuary was 2,090 cfs (**Figures ES-6** and **ES-7**) and the previous 30-day mean inflow was 6,110 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-7**.

Over the past week, salinities remained the same at S-79 and Val I-75 and decreased at Ft. Myers. Except for the sensor at Shell Point, all sensors in the Caloosahatchee River estuary are again functioning properly as of October 17, 2022 (**Table ES-2** and **Figures ES-8** and **ES-9**). The seven-day mean salinities (**Table ES-2**) were in the optimal range (0-10) for tape grass in the upper estuary. The seven-day mean salinity values were within the optimal range for adult eastern oysters at Cape Coral and Shell Point, and in the stressed range at Sanibel (**Figure ES-10**). The mean larval oyster recruitment rate reported by the Fish and Wildlife Research Institute in September was 2.6 spat/shell at Iona Cove and 6.4 spat/shell 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, 2013[1]) 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 264 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 0.4 or lower at Val I-75 at the end of the two-week period (**Table ES-3** and **Figure ES-13**). This keeps predicted salinities in the upper estuary within the optimal salinity range (0-10) for tape grass.

Red Tide

The Florida Fish and Wildlife Research Institute reported on October 21, 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 Palm Beach County.

Water Management Recommendations

Lake stage is in the Low Sub-Band. Tributary conditions are very wet. The LORS2008 release guidance suggests up to 3000 cfs release at S-79 to the Caloosahatchee River Estuary and up to 1170 cfs release at S-80 to the St. Lucie Estuary.

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

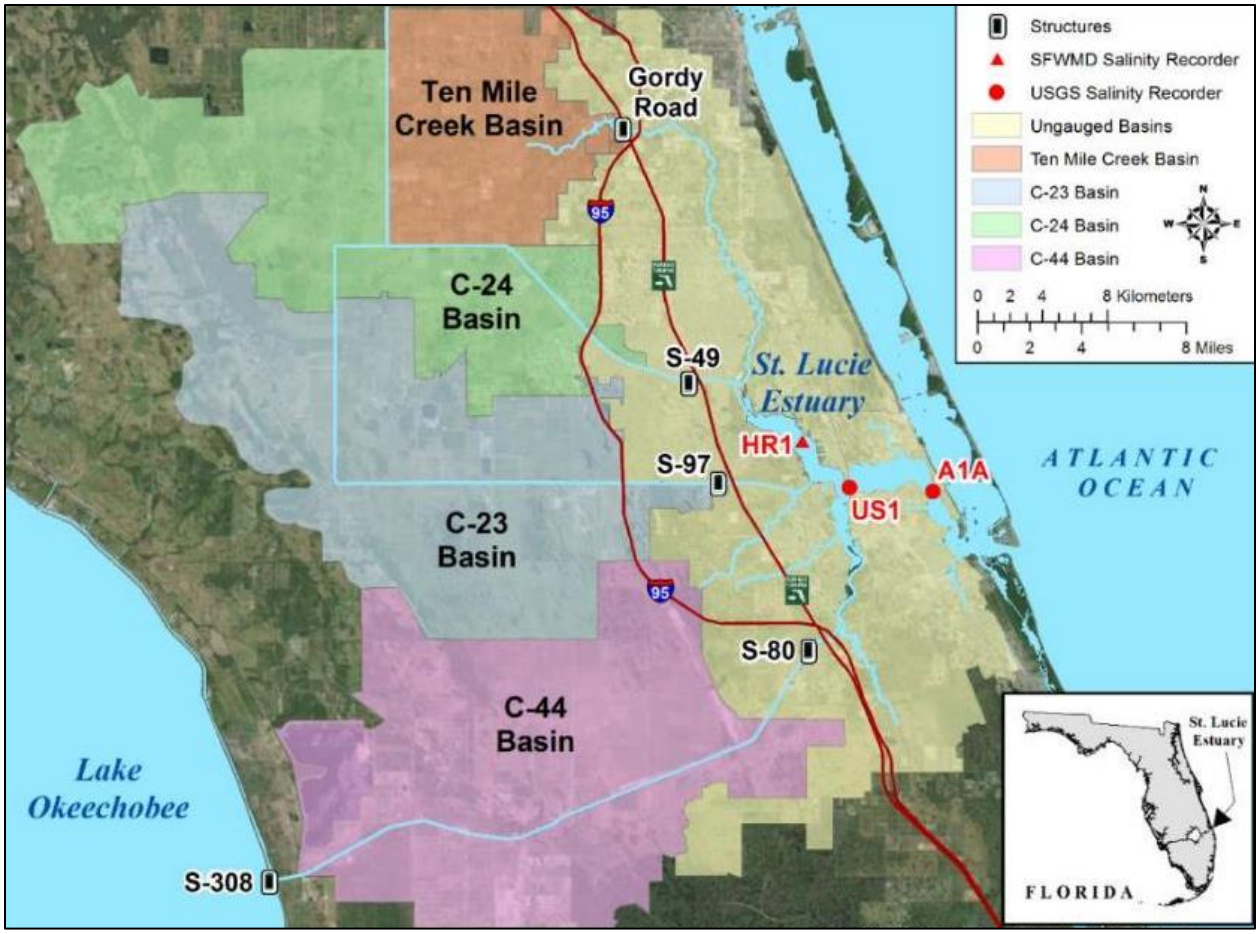


Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

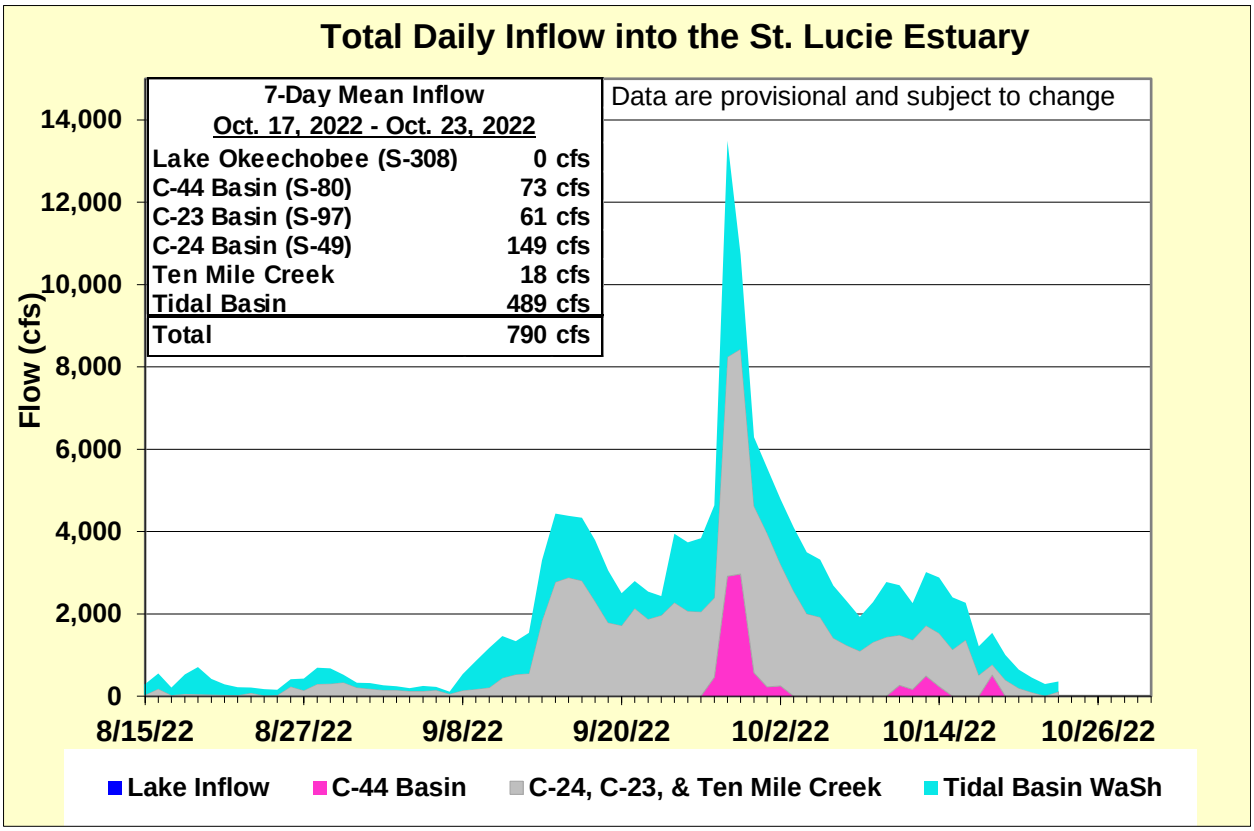


Figure ES-2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

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

Sampling Site	Surface	Bottom	Optimum Envelope
HR1 (North Fork)	**6.6** (4.3)	**8.2** (7.0)	10.0 – 25.0
US1 Bridge	**11.1** (8.9)	**17.1** (12.3)	10.0 – 25.0
A1A Bridge	**18.6** (18.3)	**24.7** (24.7)	10.0 – 25.0

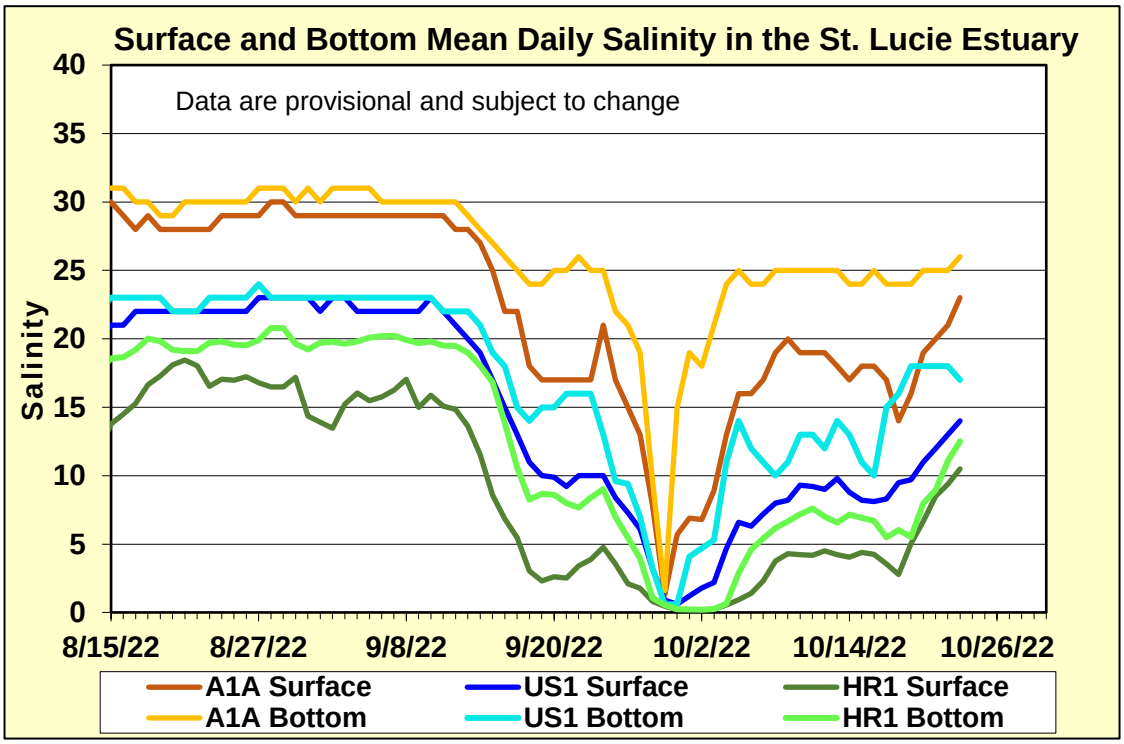


Figure ES-3. Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

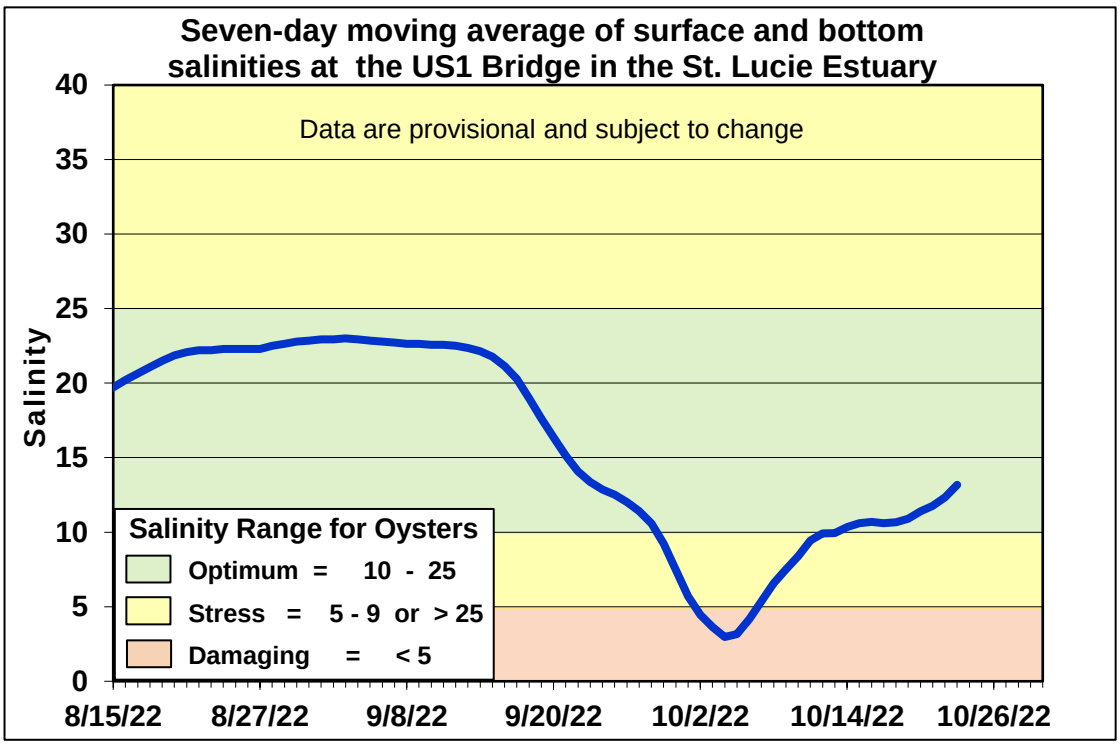


Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

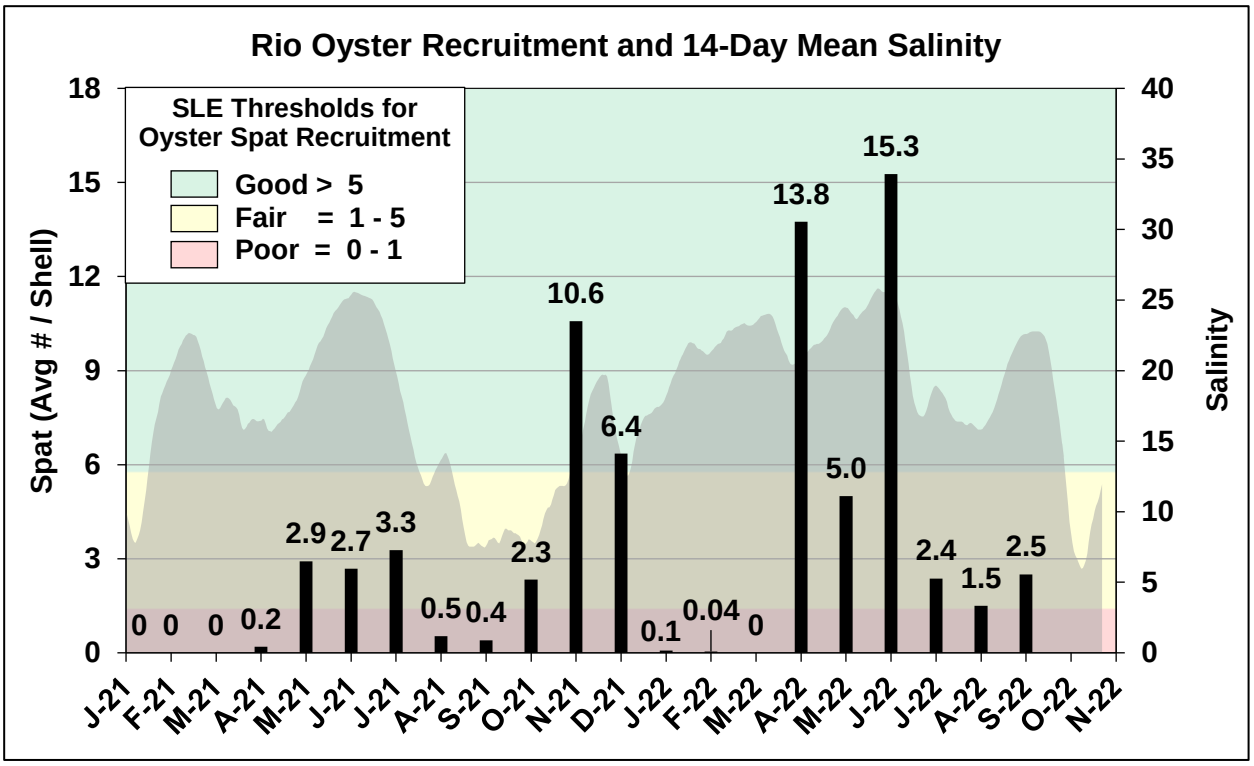


Figure ES-5. Mean oyster recruitment at the Rio oyster monitoring station and 14-day mean salinity at US1 Bridge.

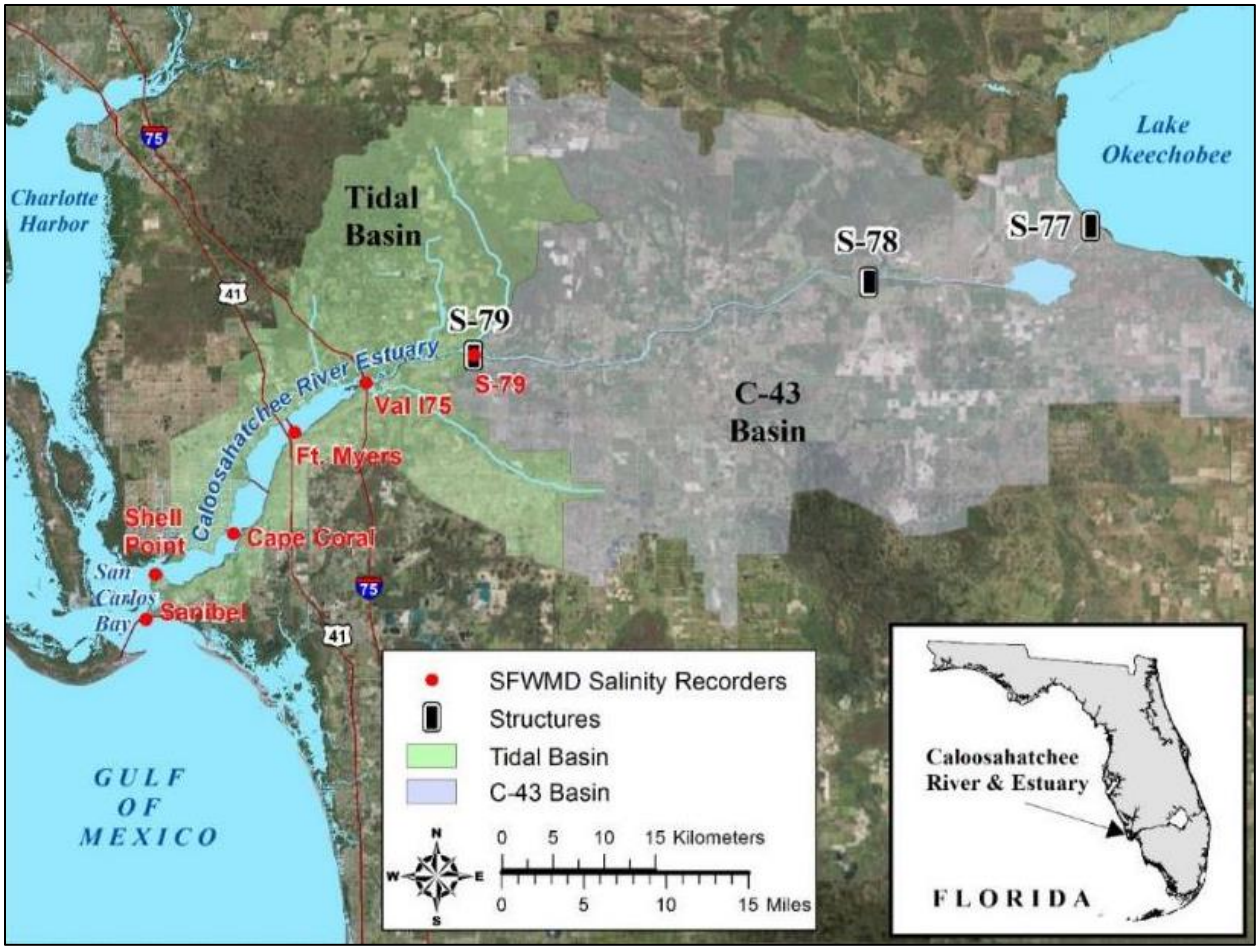


Figure ES-6. Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.

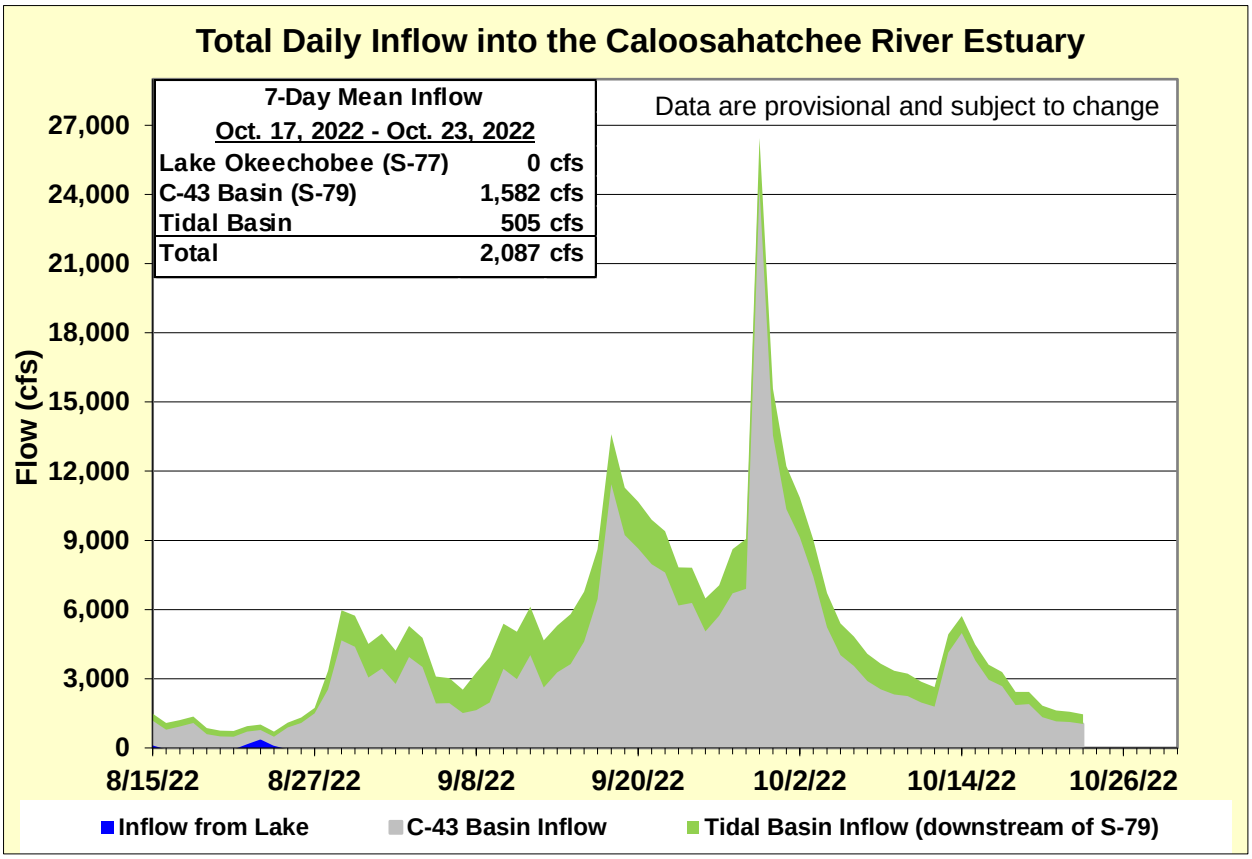


Figure ES-7. Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

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. Salinity data are not reported (NR) at any sites after 9/28/2022 when Hurricane Ian damaged equipment; however, the sensor at Val I-75 began reporting again on 10/5/2022, the sensor at S-79 began reporting again on 10/14/2022, the sensors at Fort Myers and Cape Coral began functioning again on October 15, 2022, and the sensor at Sanibel began functioning again on October 17, 2022. The envelope in the upper estuary sites is for the protection of tape grass and the envelope in the lower estuary is the optimum salinity range for adult eastern oysters (*Crassostrea virginica*). Data are provisional.

Sampling Site	Surface	Bottom	Optimum Envelope
S-79 (Franklin Lock)	**0.2** (0.2)	**0.2** (0.2)	0.0 – 10.0
Val I-75	**0.2** (0.2)	**0.2** (0.2)	0.0 – 10.0
Fort Myers Yacht Basin	**0.2** (0.3)	**0.3** (0.4)	0.0 – 10.0
Cape Coral	**4.0** (3.4)	**6.3** (3.9)	10.0 – 25.0
Shell Point	**NR** (NR)	**NR** (NR)	10.0 – 25.0
Sanibel	**18.8** (NR)	**20.9** (NR)	10.0 – 25.0

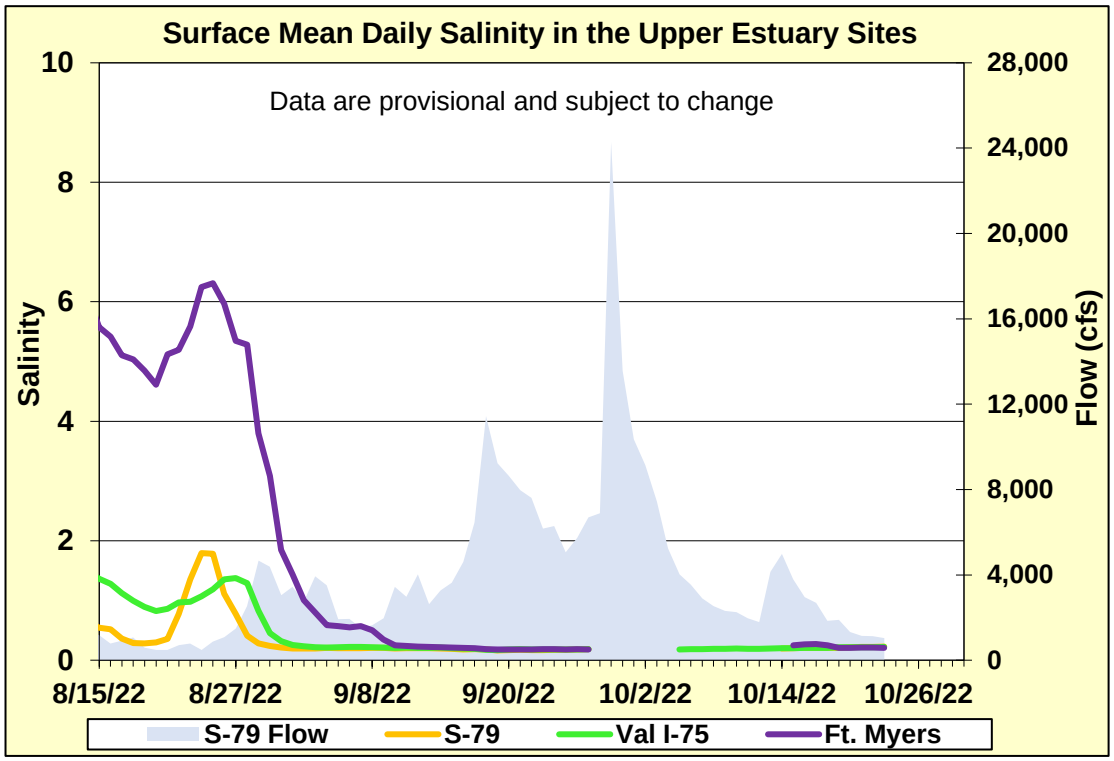


Figure ES-8. Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

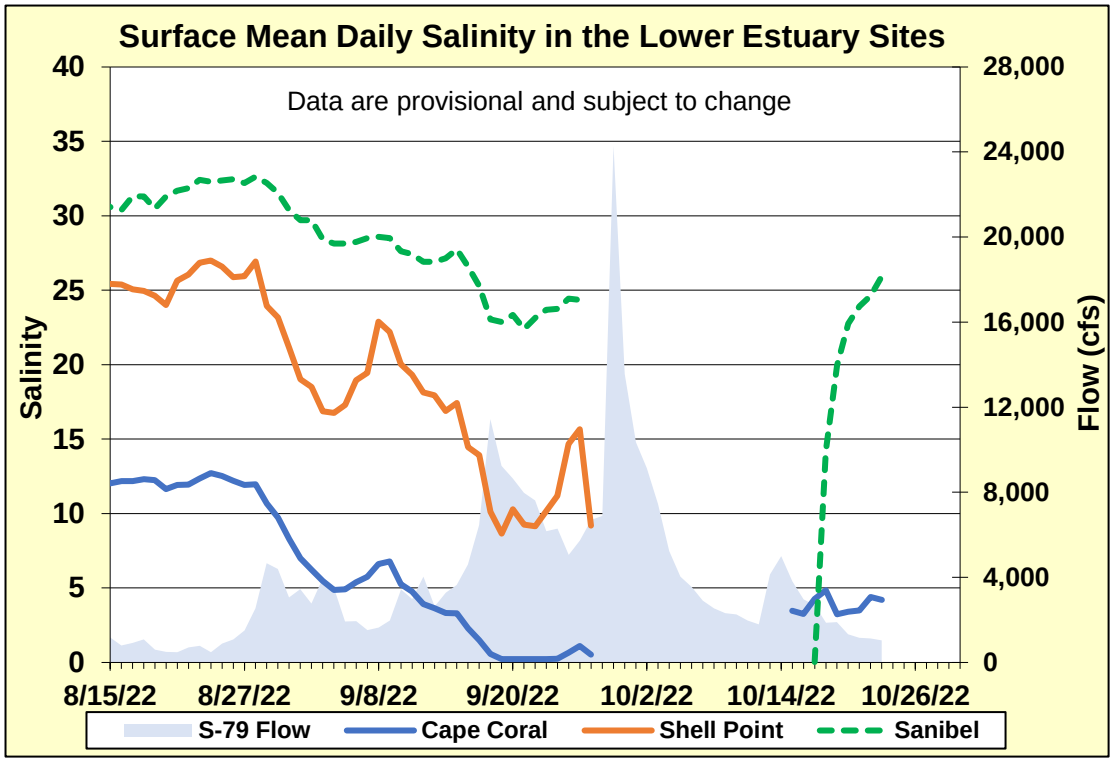


Figure ES-9. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

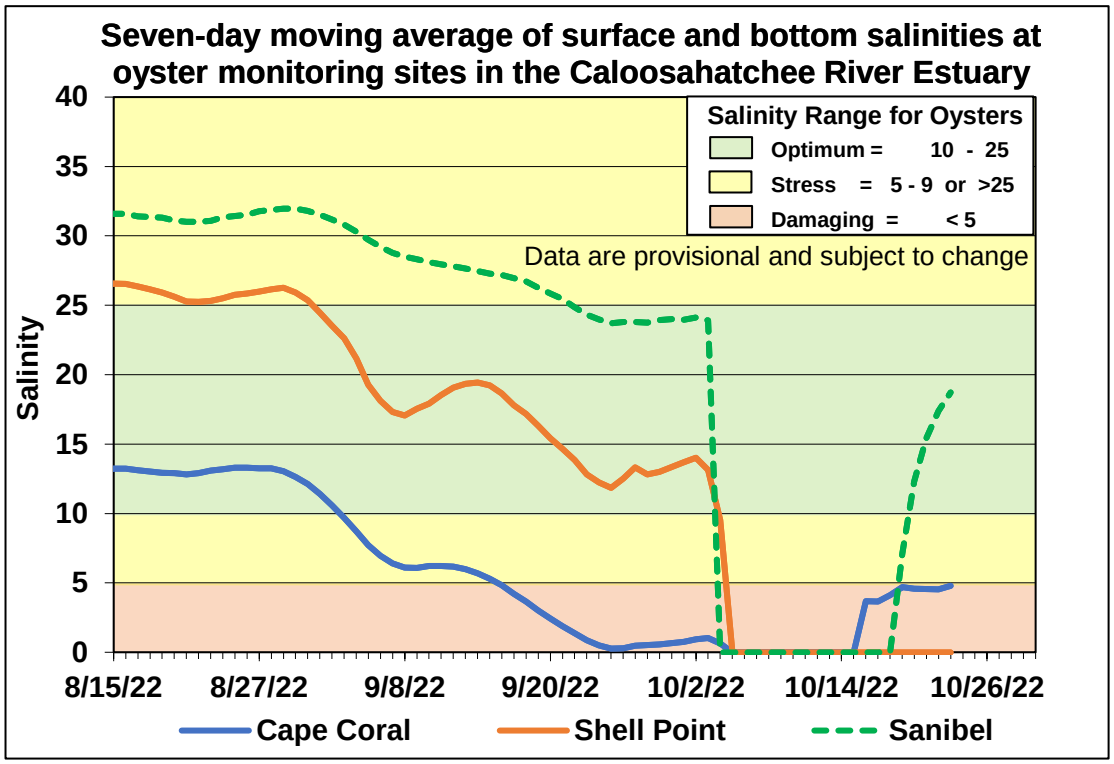


Figure ES-10. Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

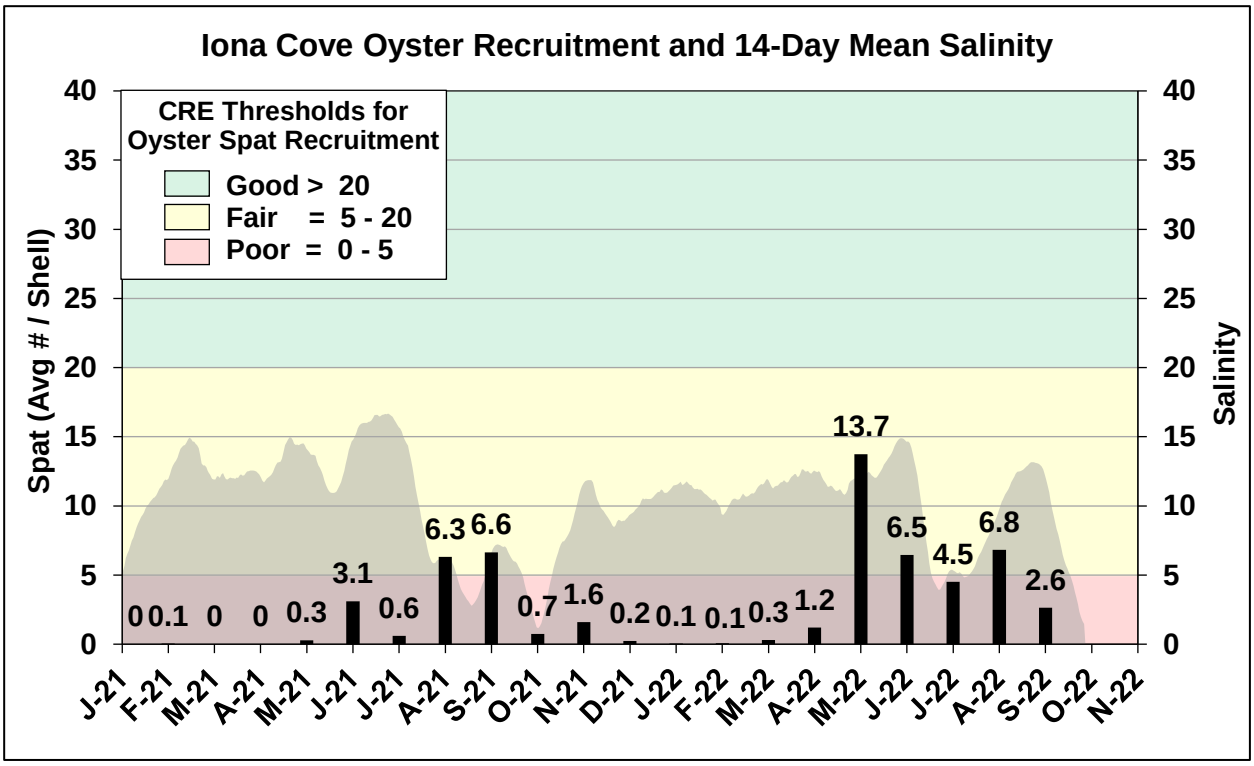


Figure ES-11. Mean oyster recruitment at the Iona Cove oyster monitoring station and 14-day mean salinity at Cape Coral.

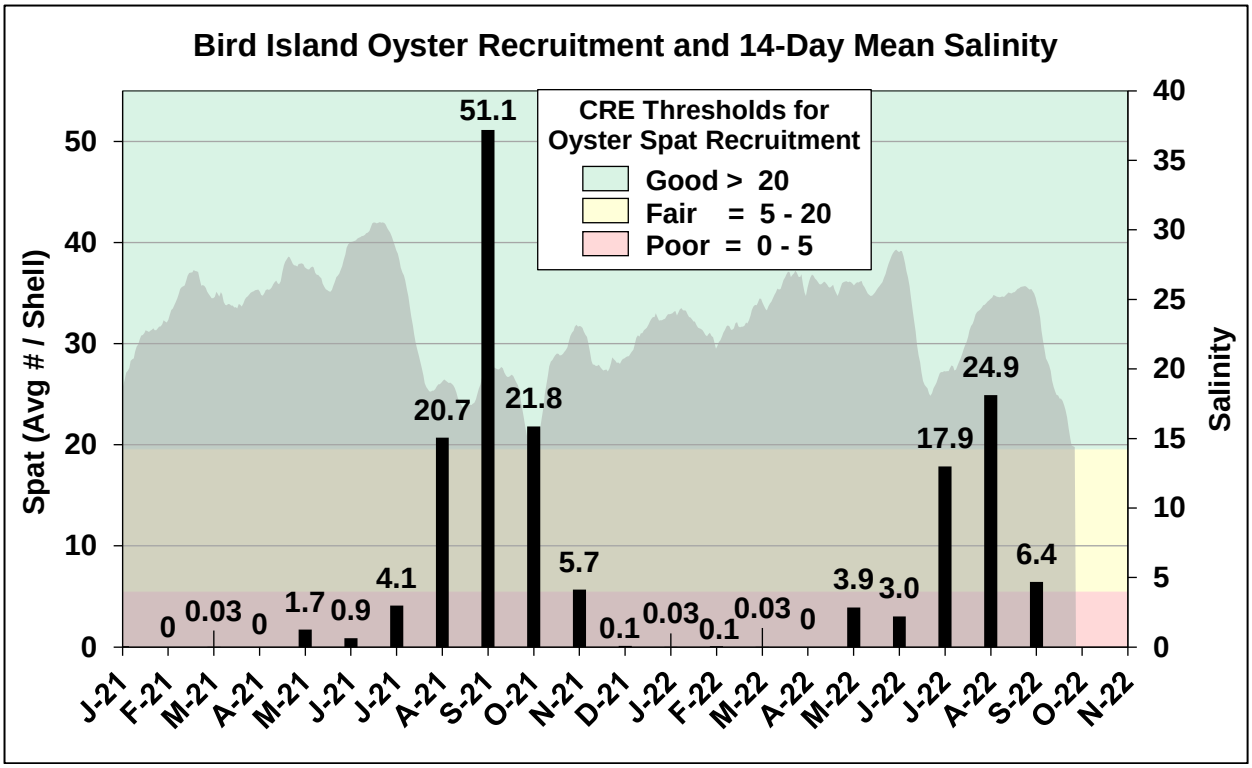


Figure ES-12. Mean oyster recruitment at the Bird Island oyster monitoring station and 14-day mean salinity at Shell Point.

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	264	1.0	0.4
B	450	264	0.6	0.3
C	800	264	0.4	0.3
D	1000	264	0.3	0.3
E	1500	264	0.3	0.3
F	2000	264	0.3	0.3

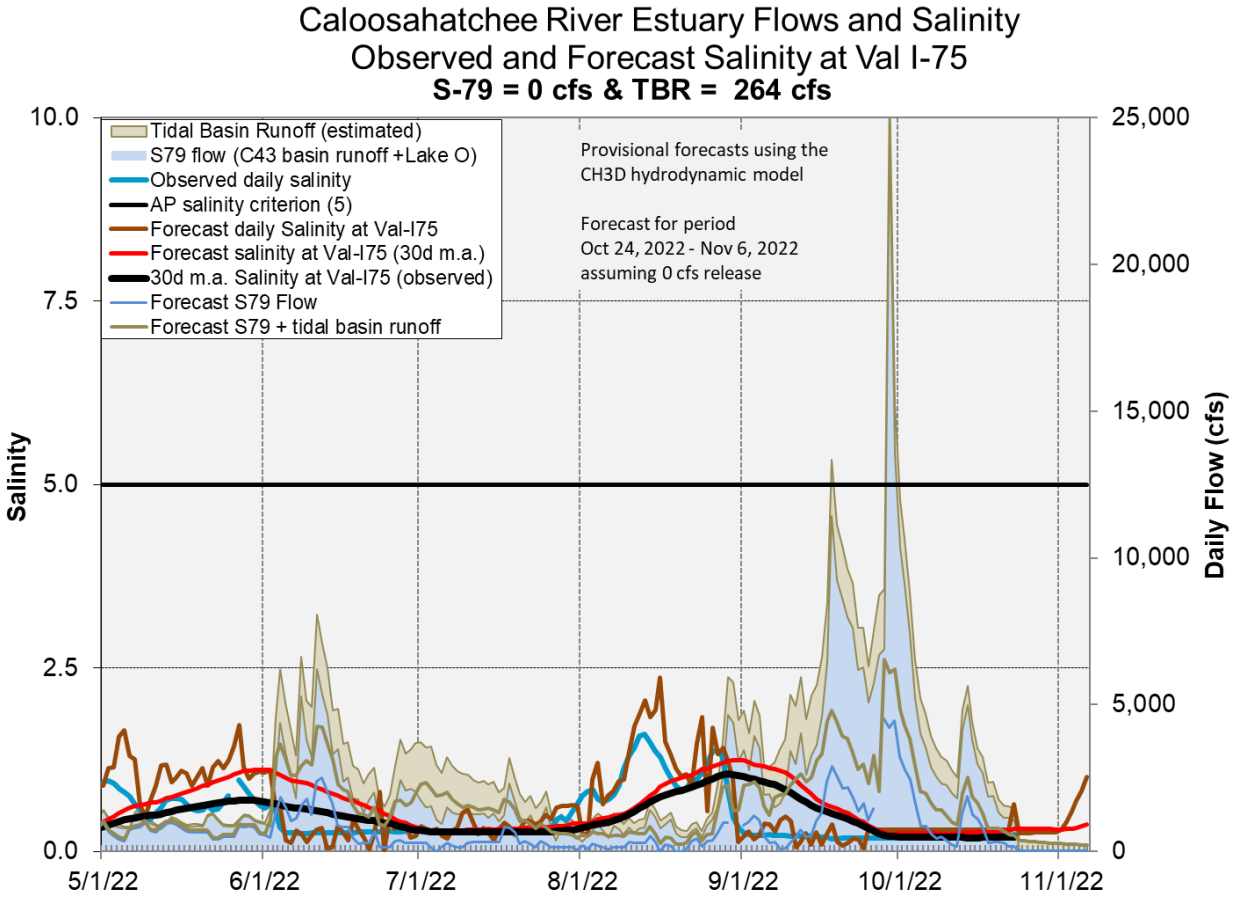


Figure ES-13. Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

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 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**).

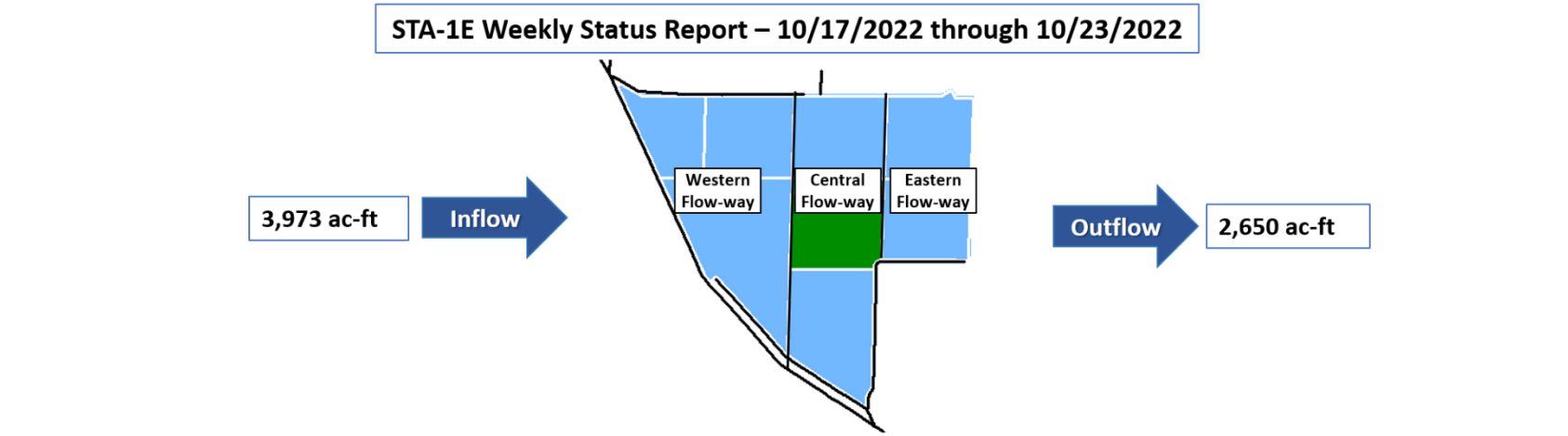
STA-1W: Operational restrictions are in place in STA-1W Western, Eastern, and Northern Flow-ways for vegetation management activities. Treatment cells are at or near target stage. Vegetation in the flow-ways is stressed and highly stressed. The 365-day PLRs for the Northern, Western, and Eastern Flow-ways are at or below 1.0 g/m^2/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 at or near 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 4 and 5 are below 1.0 g/m^2/year. The 365-day PLR for Flow-ways 1 and 3 are 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/m^2/year (**Figure S-4**).

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

For definitions on STA operational language see glossary following figures.



STA-1E Flow-Way Status

Flow-Way	Vegetation Status (Healthy ----- Stressed)	365-day P Loading Rate (below 1.0 g P /m²/yr is optimal)	Online / Offline / Restrictions
Eastern		1.0	Vegetation management
Central		1.0	Vegetation rehabilitation
Western	Offline, post-construction grow in starting 3/28/2022		

As of 10/23/2022	
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-1E Flow & Phosphorus Concentration

	7-day	28-day	365-day
Total Inflow, ac-ft	3,973	21,303	140,419
--Lake Inflow, ac-ft	0	N/A	2,600
Total Outflow, ac-ft	2,650	22,109	111,406
Inflow Conc., ppb	90	133	108
Outflow Conc., ppb	29	26	24
Includes Preliminary Data			

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

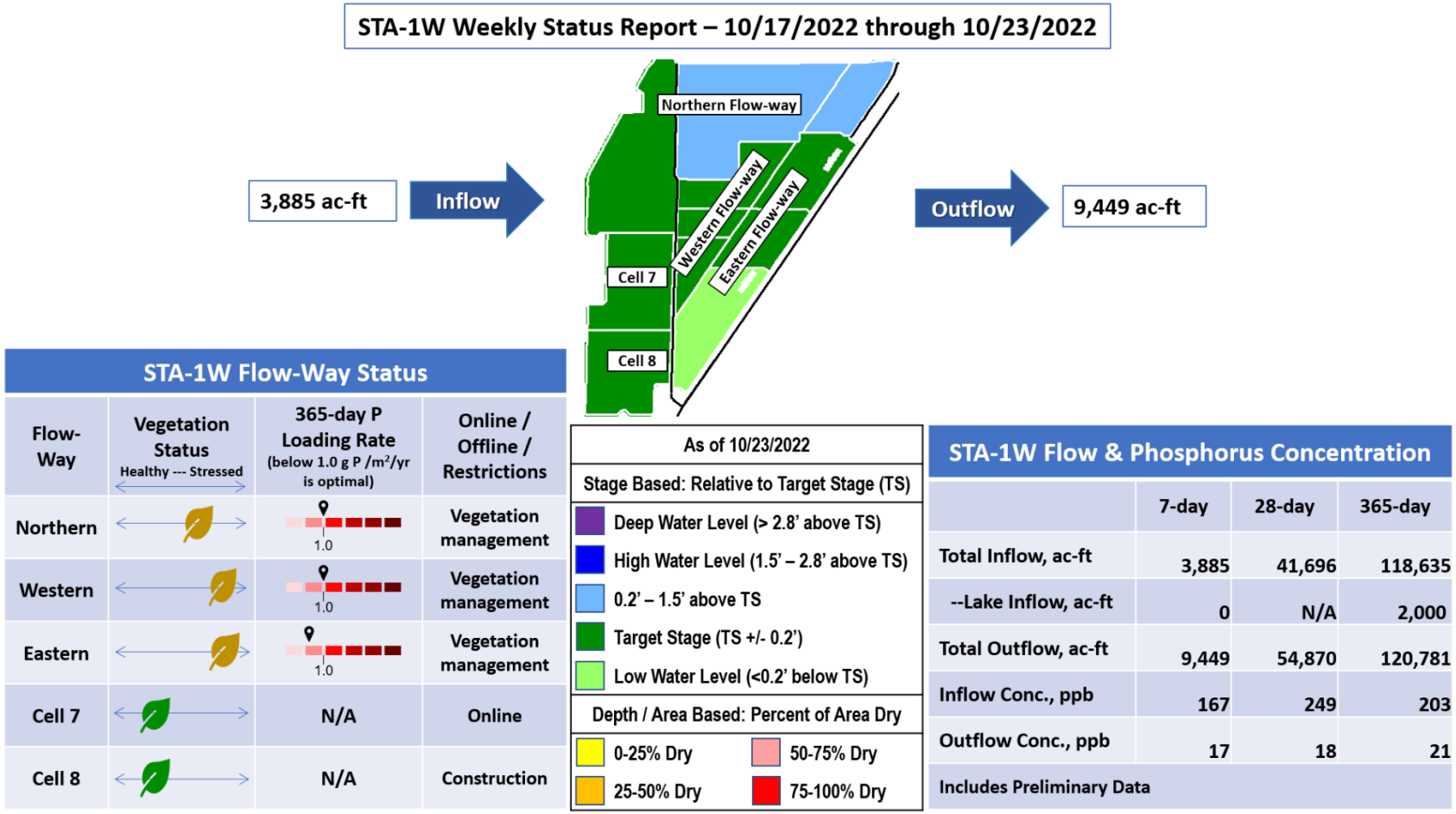
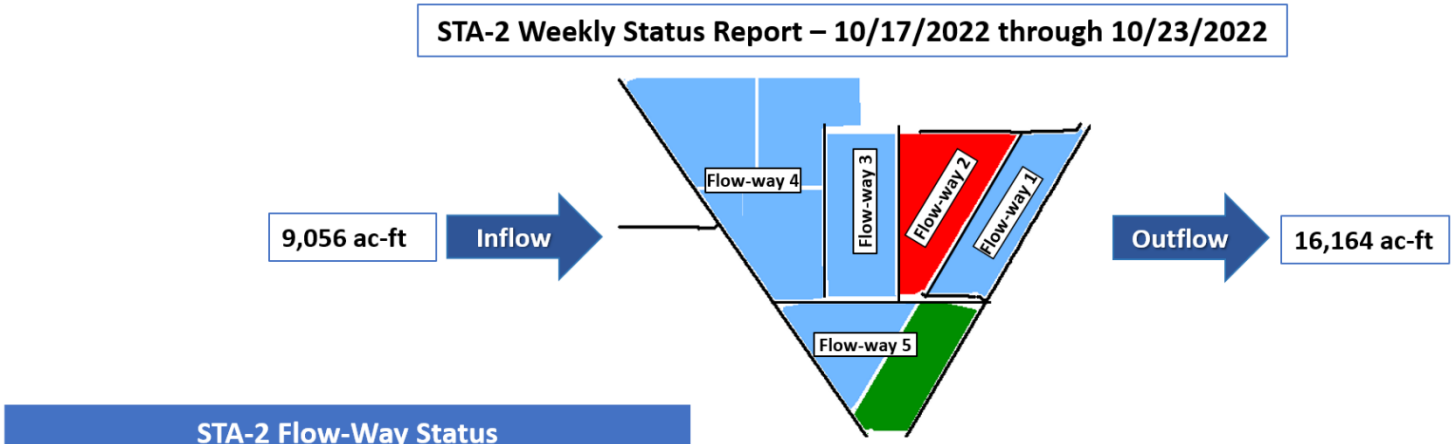


Figure S-2. STA-1W Weekly Status Report



STA-2 Flow-Way Status

Flow-Way	Vegetation Status (Healthy ------ Stressed)	365-day P Loading Rate (below 1.0 g P /m²/yr is optimal)	Online / Offline / Restrictions
1		1.0	Online
2	Offline, construction activities as of 9/7/2021		
3		1.0	Vegetation Rehab
4		1.0	Vegetation Rehab
5		1.0	Online

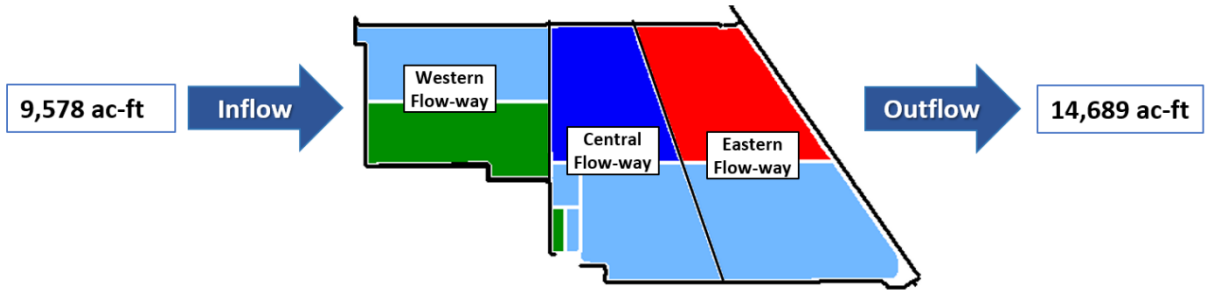
As of 10/23/2022	
Stage Based: Relative to Target Stage (TS)	
Deep Water Level (> 2.8' above TS)	
High Water Level (1.5' – 2.8' above TS)	
0.2' – 1.5' above TS	
Target Stage (TS +/- 0.2')	
Low Water Level (<0.2' below TS)	
Depth / Area Based: Percent of Area Dry	
0-25% Dry	50-75% Dry
25-50% Dry	75-100% Dry

STA-2 Flow & Phosphorus Concentration

	7-day	28-day	365-day
Total Inflow, ac-ft	9,056	66,927	312,557
--Lake Inflow, ac-ft	0	N/A	27,600
Total Outflow, ac-ft	16,164	93,526	333,652
Inflow Conc., ppb	78	128	114
Outflow Conc., ppb	33	33	29
Includes Preliminary Data			

Figure S-3. STA-2 Weekly Status Report

STA-3/4 Weekly Status Report – 10/17/2022 through 10/23/2022



STA-3/4 Flow-Way Status

Flow-Way	Vegetation Status (Healthy ------ Stressed)	365-day P Loading Rate (below 1.0 g P /m²/yr is optimal)	Online / Offline / Restrictions
Eastern	Offline, vegetation management drawdown as of 3/1/2021		
Central		1.0	Online
Western		1.0	Online

As of 10/23/2022	
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-3/4 Flow & Phosphorus Concentration

	7-day	28-day	365-day
Total Inflow, ac-ft	9,578	89,727	312,671
--Lake Inflow, ac-ft	0	N/A	5,300
Total Outflow, ac-ft	14,689	98,948	299,732
Inflow Conc., ppb	181	114	95
Outflow Conc., ppb	11	13	16
Includes Preliminary Data			

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

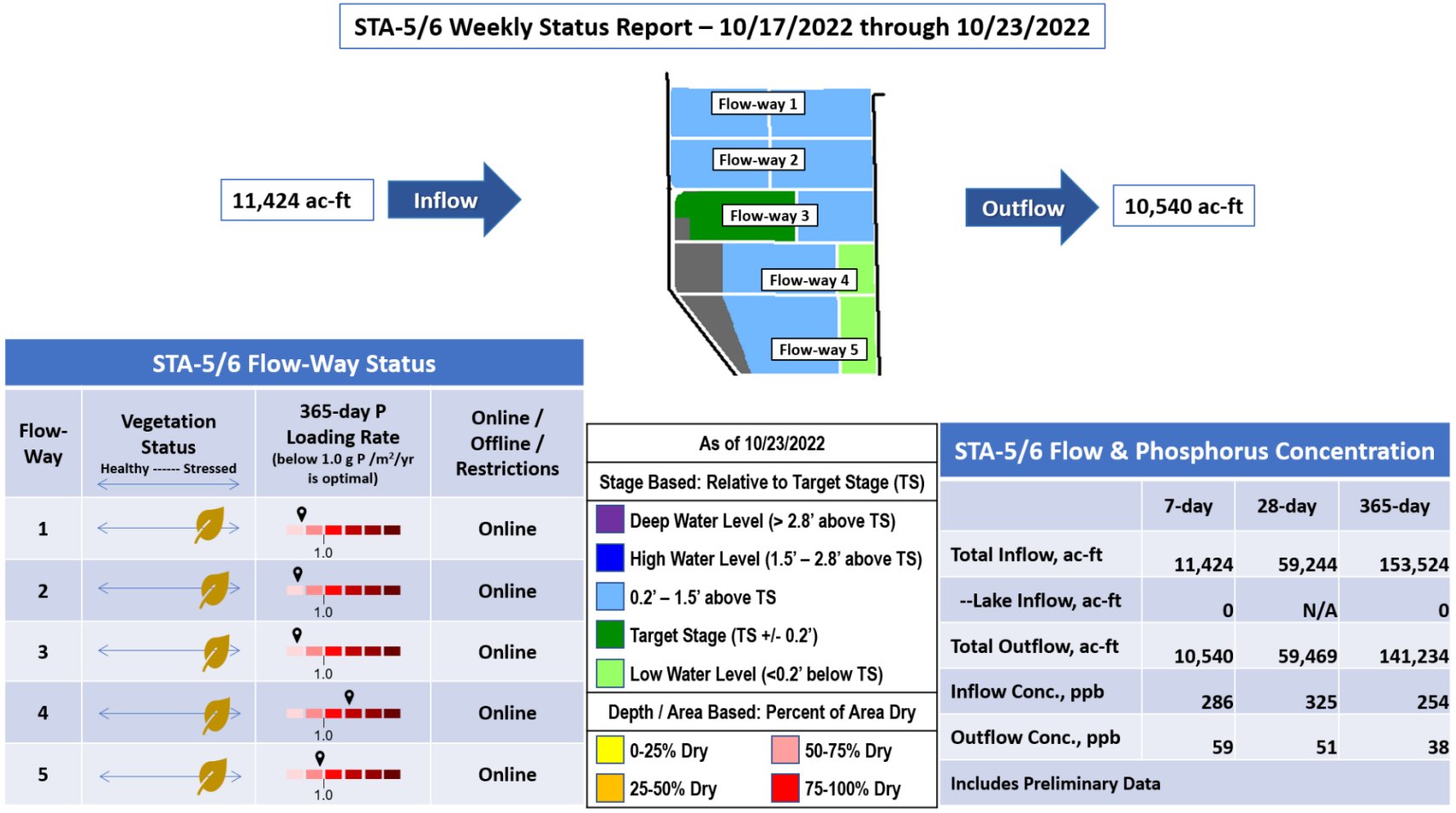
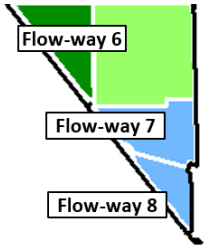
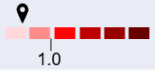
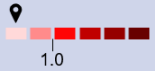
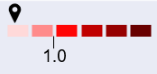


Figure S-5. STA-5/6 Weekly Status Report (Flow-ways 1 – 5)

STA-5/6 Weekly Status Report – 10/17/2022 through 10/23/2022



STA-5/6 Flow-Way Status

Flow-Way	Vegetation Status (Healthy ------ Stressed)	365-day P Loading Rate (below 1.0 g P /m²/yr is optimal)	Online / Offline / Restrictions
6			Online
7			Online
8			Online

As of 10/23/2022	
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

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, µg/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 rose slowly again last week. The average on Sunday, October 23 was 0.13 feet below the flat Zone A1 regulation line. WCA-2A: Stage at the 2-17 gauge receded steadily last week. The average on Sunday was 1.16 feet above the falling regulation line. WCA-3A: Last week the Three Gauge Average once again remained almost flat for the week. The average stage was 0.33 feet above the rising regulation line on Sunday. WCA-3A North: At gauge 62 (Northwest corner) stage continued to fall last week, the average on Sunday was 0.10 feet below the flat Lower schedule line. (**Figures EV-1** through **EV-4**).

Water Depths

The SFWDAT tool illustrates the response in water depths to tropical rainfall comparing depths over the last two months. Currently WCA-2A depths are above 2.5 feet in the southern half of that basin. Along the northern reach of the L-67s depths continue to increase and the spatial extent of those deeper conditions expands to the south and west. Connectivity in the sloughs of ENP remains strong. Comparing current WDAT water depths to one month ago conditions within the EPA are much wetter (central BCNP the exception), significantly deeper in eastern WCA-3A and southern WCA-2A. Looking back a year ago, WCA-1 is shallower; conditions are significantly deeper east of the Miami Canal in WCA-3A. (**Figure EV-5 and Figure EV-6)**. Comparing current conditions to the 20-year median: Above average conditions remain in WCA-3A and most of WCA-2A is now well above the median depth. ENP conditions move to average in the west and remain much wetter in northeast Shark River Slough (**Figure EV-7**).

Taylor Slough and Florida Bay

Taylor Slough and Florida Bay received an average of 0.18 inches of total rain this past week based on 17 gauges available for this report. This was almost an order of magnitude less than the previous week (1.62 inches). Precipitation ranged from 0.01 inches at Manatee Bay in the far eastern region to 0.95 inches in Taylor River (TR). After increasing at most sites last week, Taylor Slough stages decreased at nearly all locations. The average change was −0.176 feet (Figure EV-8 and Figure EV-9). Taylor Slough water levels remain above the historical average for this time of year by +4.40 inches compared to before the Florida Bay initiative (starting in 2017), a decrease of over 1 inch from last week.

Average Florida Bay salinity is 26.8, a decrease of almost 1.0 from the previous week. Salinity changes ranged from a decrease of 4.0 in Joe Bay (JB) in the eastern nearshore region to an increase of 4.8 in Little Madeira Bay (LM), downstream of Taylor River on 10/23 (Figure EV-8). Salinities continued to decrease in Central Florida Bay and are near the 50th percentile for this time of year. In the Eastern region, salinities are relatively stable at the 75th percentile and just exceed the IQR in the Western Bay. (Figure EV-10). Florida Bay salinity is 4.40 above its historical average for this time of year, nearly the same as last week.

Water Management Recommendations

We continue to recommend high level discussions on strategies that could prevent further degradation of NE-WCA3A. Conserving water in this region may prove critical for the upcoming wading bird nesting season. Maintaining a moderate rate of stage change within the marsh of WCA-2A and northern WCA-3A, avoiding large abrupt changes in water depth as flow through diminishes has an ecological benefit. Steady flows into northern perimeter WCA-3A would continue to benefit the ecology of that region by helping to provide enough water to protect recession rates needed to sustain surface water in the Alley North region 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	0.71	+0.06
WCA-2A	1.02	−0.07
WCA-2B	0.61	+0.22
WCA-3A	0.46	−0.04
WCA-3B	0.65	+0.01
ENP	0.29	−0.02

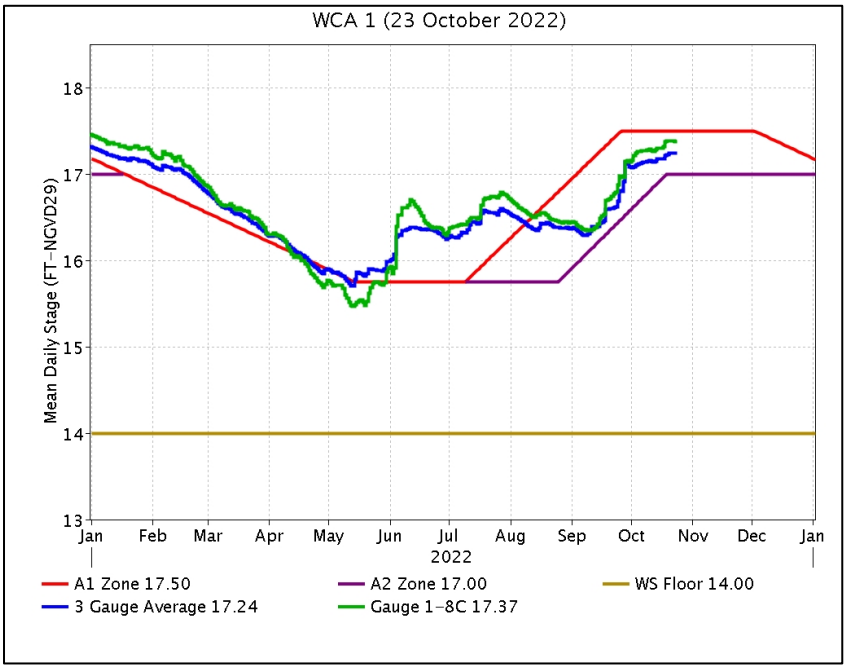


Figure EV-1. WCA-1 stage hydrographs and regulation schedule.

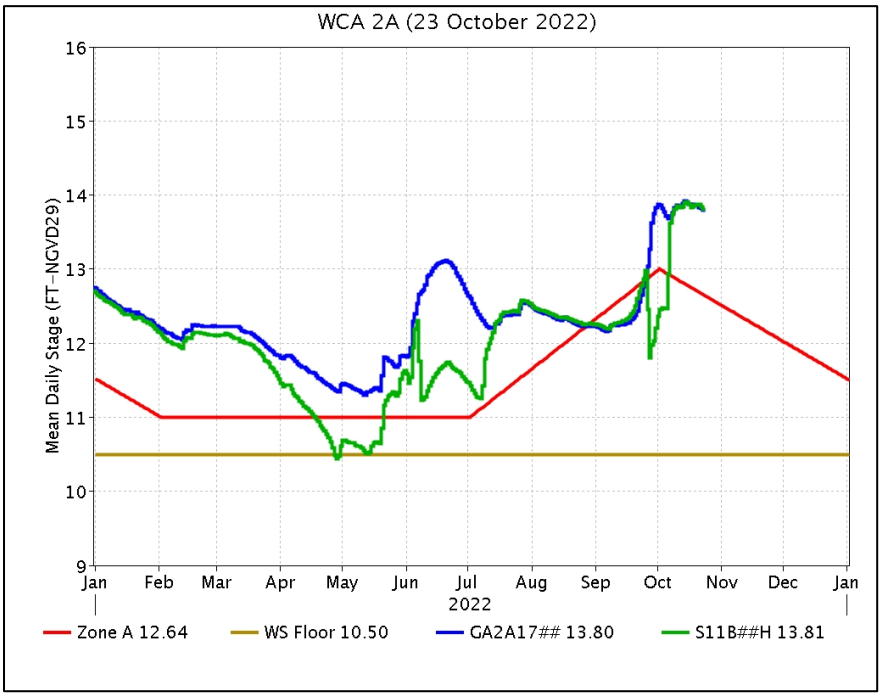


Figure EV-2. WCA-2A stage hydrographs and regulation schedule.

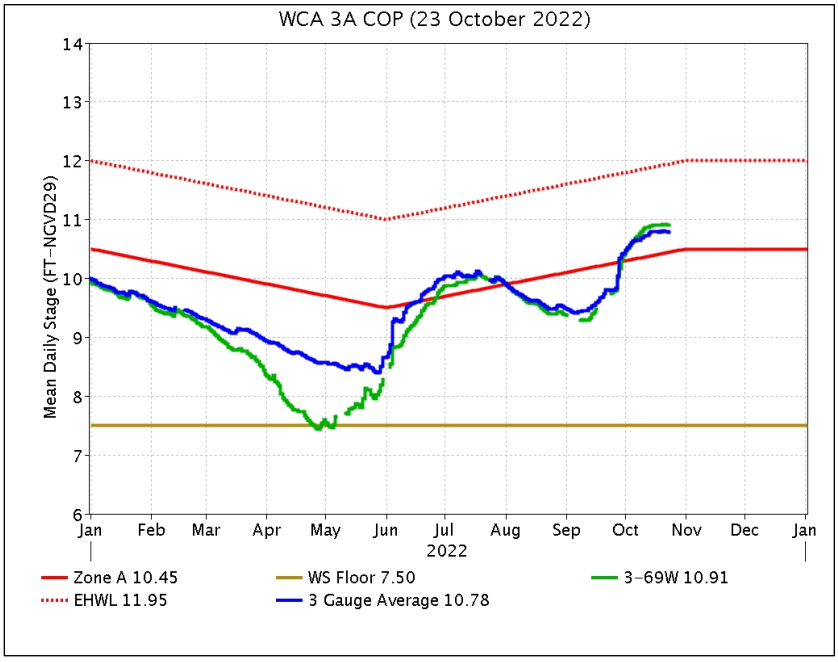


Figure EV-3. WCA-3A stage hydrographs (three-gauge average, S-333 headwater) and regulation schedule.

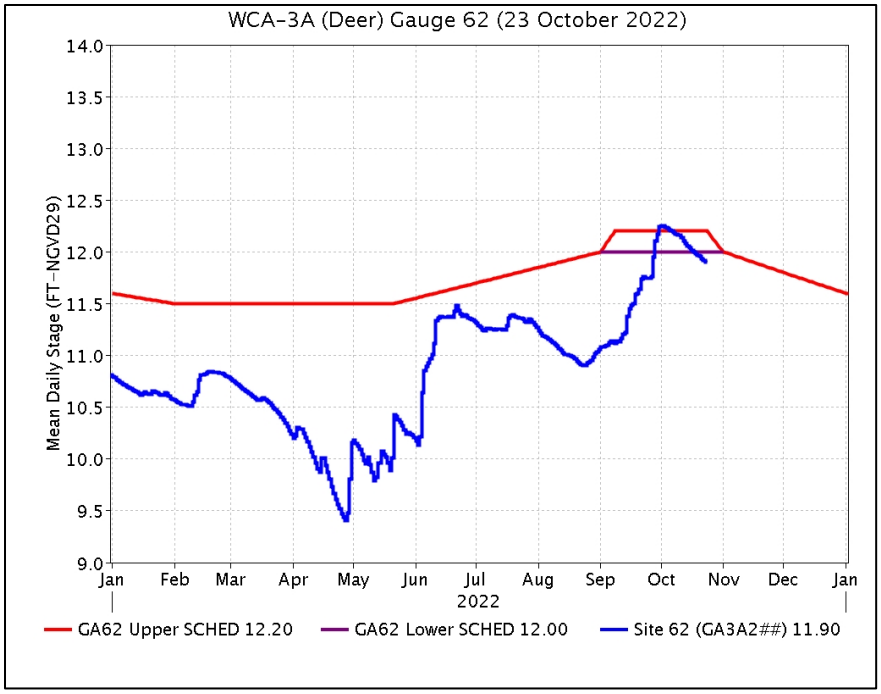


Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.

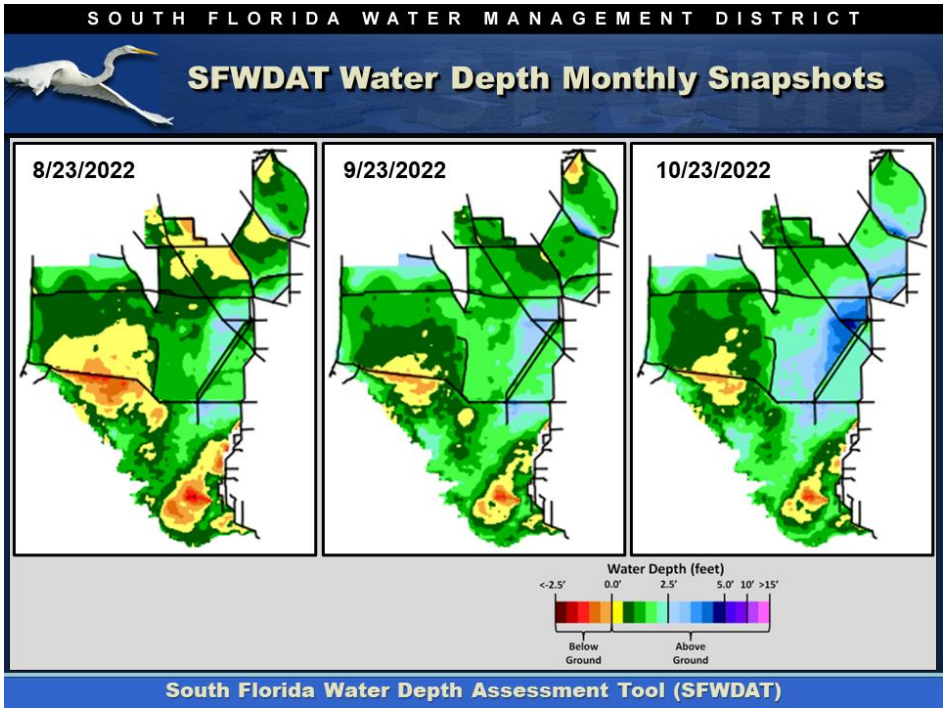


Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

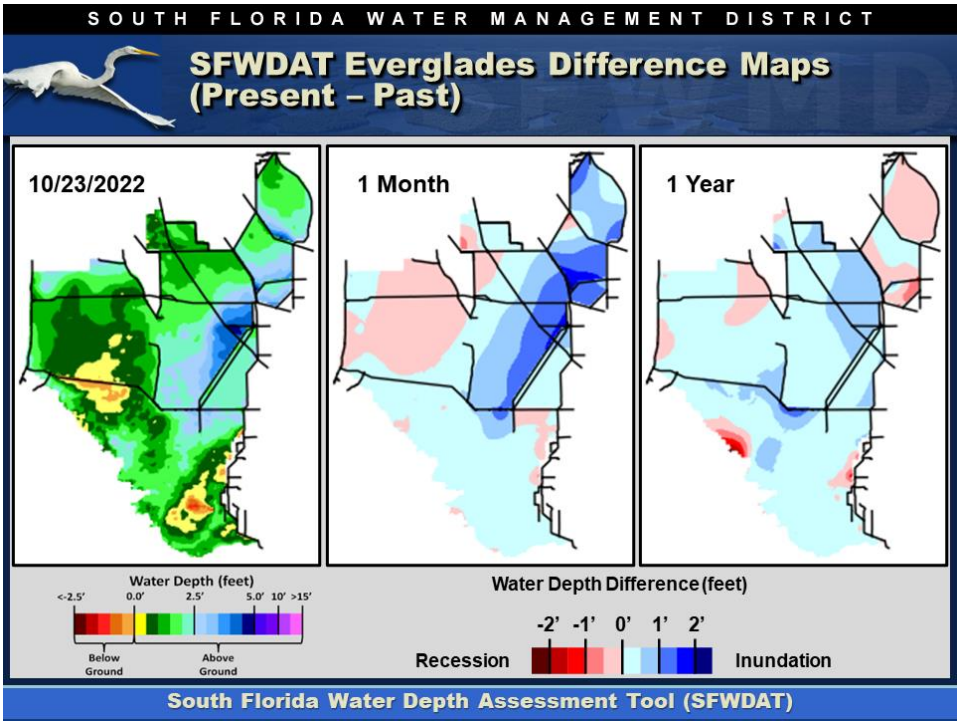


Figure EV-6. Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

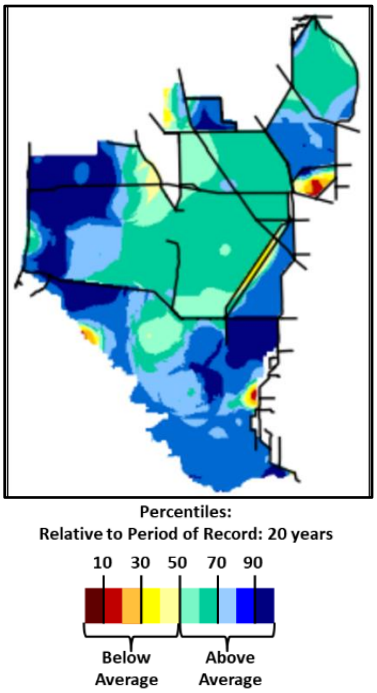


Figure EV-7. Present water depths (10/23/2022) compared to the day of year median over the previous 20 years.

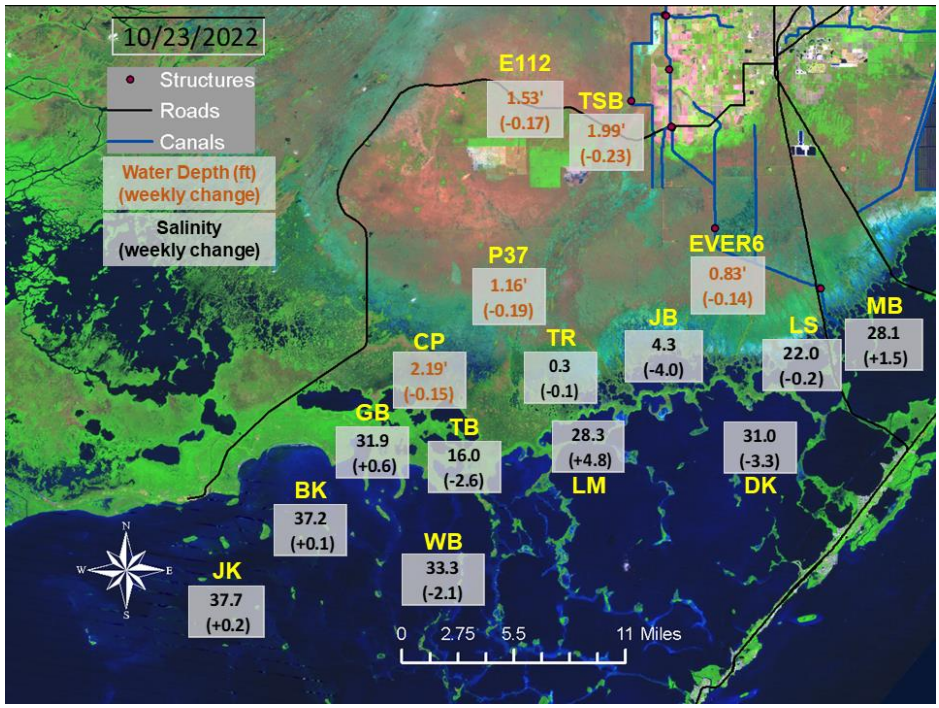


Figure EV-8. Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

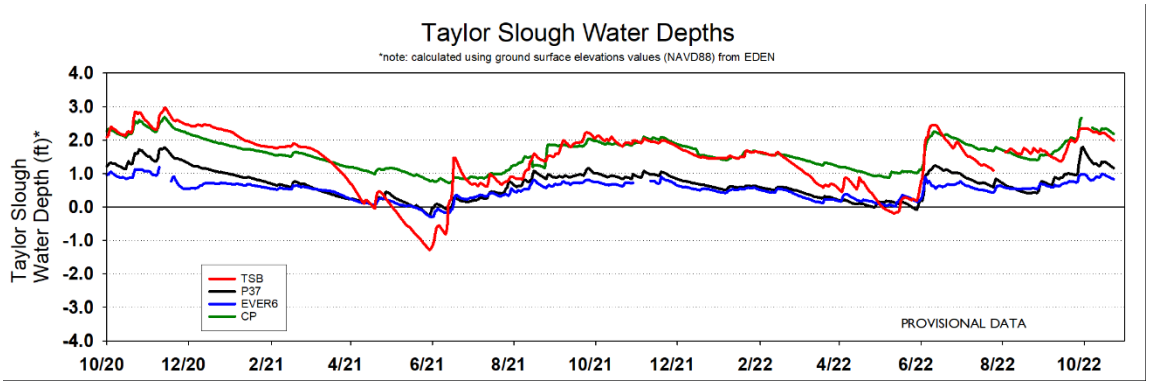


Figure EV-9. Taylor Slough water depth time series.

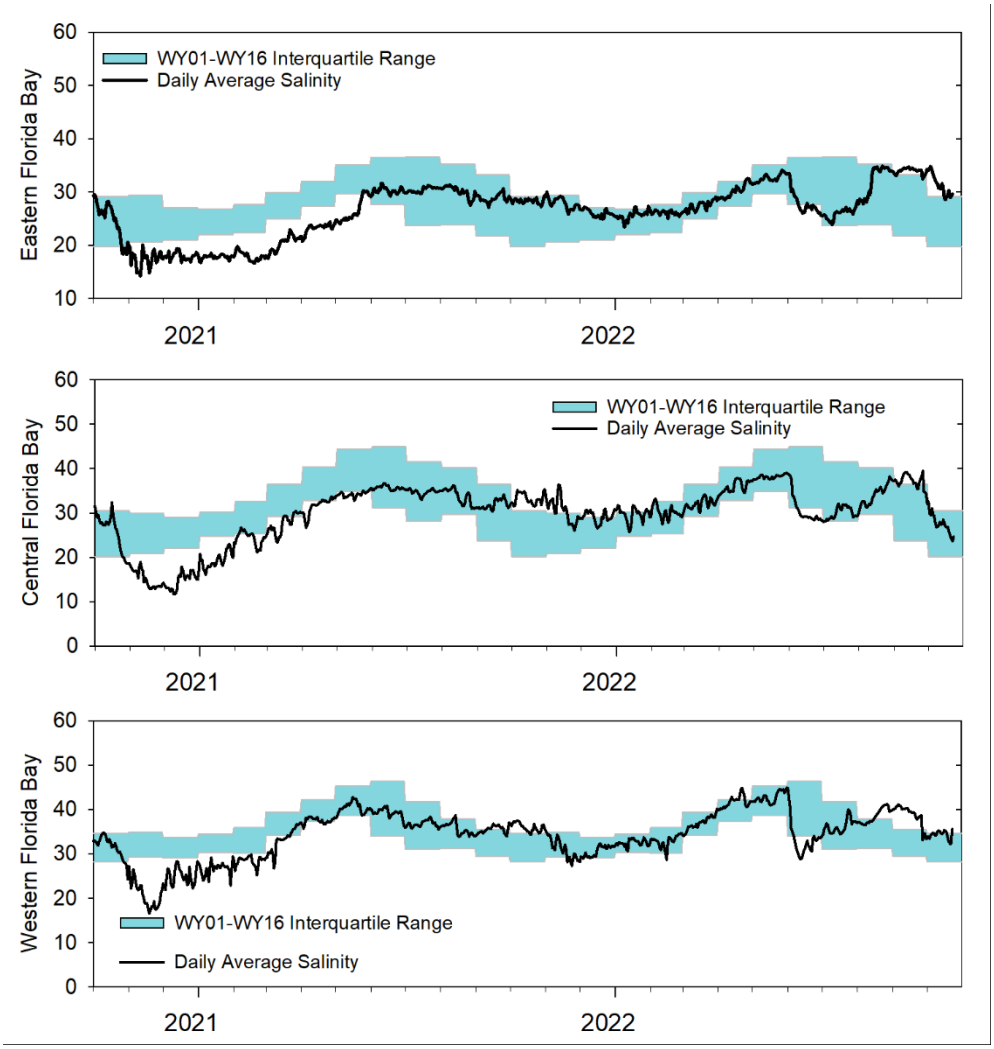


Figure EV-10. Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

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

SFWMD Everglades Ecological Recommendations, October 25th, 2022 (red is new)			
Area	Weekly change	Recommendation	Reasons
WCA-1	Stage increased by 0.06’	Ascension rate of less than 0.25 feet per week.	Protect within basin and downstream habitat and wildlife.
WCA-2A	Stage decreased by 0.07’	Moderate stage change as depths recede.	Protect within basin and downstream habitat and wildlife. Protect conditions conducive to wading bird foraging later in the season.
WCA-2B	Stage increased by 0.22’	Ascension rate of less than 0.25 feet per week.	Protect within basin and downstream habitat and wildlife.
WCA-3A NE	Stage decreased by 0.09’	Ascension rate of less than 0.25 feet per week.	Protect within basin and downstream habitat and wildlife. Protect conditions conducive to wading bird foraging later in the season.
WCA-3A NW	Stage decreased by 0.12’	Ascension rate of less than 0.25 feet per week.	
Central WCA-3A S	Stage decreased by 0.01’	Ascension rate of less than 0.25 feet per week.	Protect within basin and downstream habitat and wildlife.
Southern WCA-3A S	Stage increased by 0.07’		
WCA-3B	Stage increased by 0.01’	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 −0.03’ to +0.11’	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged from −4.7 to +3.2	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 850 cfs and the previous 30-day mean inflow was 1560 cfs. The seven-day mean salinity was 27.4 at BBCW8 and 24.9 at BBCW10, both below the preferred maximum salinity of 35 for these sites. Data provided by Biscayne National Park.

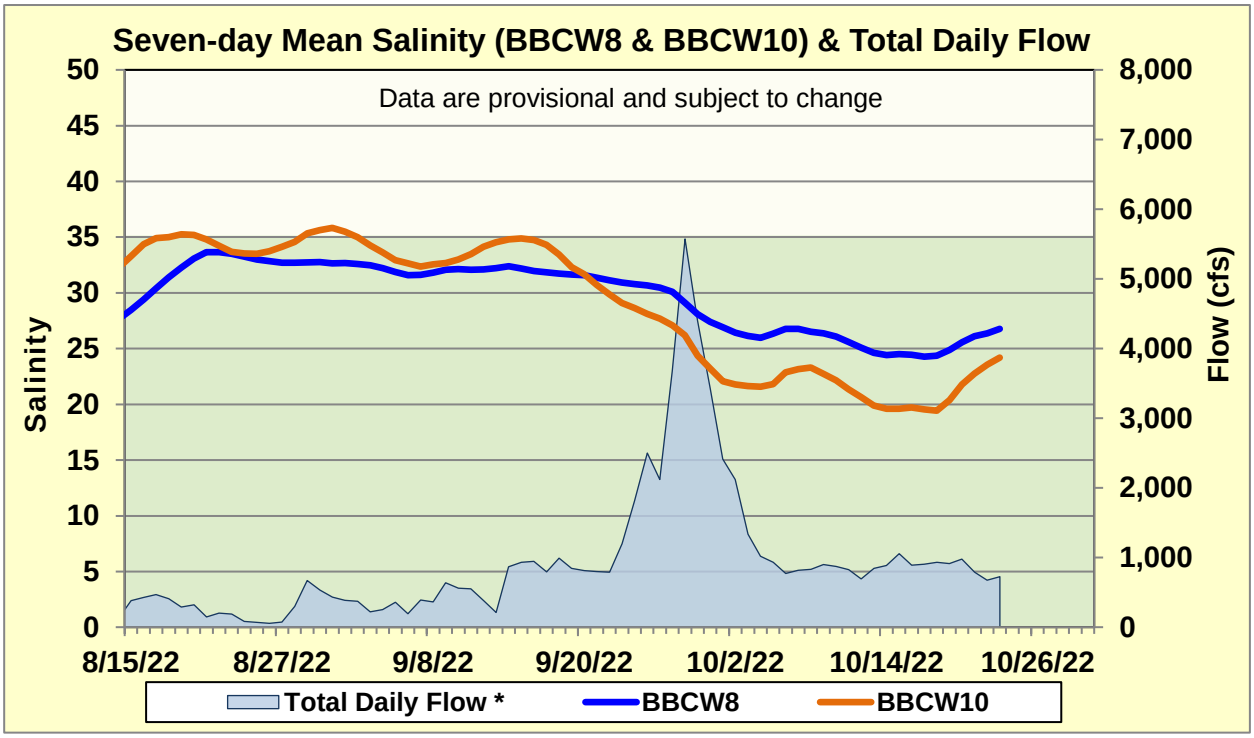


Figure BB-1. Seven-day mean salinity at BBCW8 and BBCW10 and total daily flow in Biscayne Bay. Total daily flow was calculated using flow from structures S20G, S20F, S21, S21A, S123, and S700P.