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: November 09, 2022

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

Subtropical Storm Nicole is forecast to acquire tropical cyclone characteristics and turn abruptly west-southwestward toward Florida in response to strong surface to mid-level high pressure. The steep pressure gradient between the high pressure to the north and Nicole (low pressure) to the south will support increasingly stronger and gusty northeasterly winds across the SFWMD as well as light shower activity with a few embedded moderately heavy rain over the eastern part of the SFWMD. Heavy rains will overspread the SFWMD by early Wednesday morning along the east coast that should spread inland through at least the eastern half of the area with the northeastern half of the area likely seeing the greatest areal average rainfall. More than half of an inch is the median area-averaged rainfall for basins along the east coast, a quarter or a third of an inch elsewhere through the eastern interior, and less over the western half of the area. Nicole's motion should become westerly on Wednesday on a path toward the northwestern Bahamas and the east coast of Florida as high pressure situates itself directly north of the cyclone. The westward track of Nicole over warm waters is likely to cause the storm to strengthen as it nears the upper or middle east coasts of the SFWMD late Wednesday, and ultimately makes landfall early Thursday morning probably as a hurricane. Tropical-storm-force winds are expected to reach the middle and upper east coasts during the morning to around noon and affect the northern half or two-thirds of the area by the time Nicole makes landfall due to the large size of Nicole's wind field. A small area of the upper and middle east coasts of the SFWMD could experience hurricane conditions. In addition the heavy rains and wind, a long duration of significant coastal flooding to coincide with the peak of King Tides around full moon will occur along the east coast, which will turn into storm surge flooding of 2 to 4 ft as the center of Nicole approaches the east coast. Before Nicole exits to the northwest or north of the SFWMD Thursday afternoon, additional heavy rains and some strong winds are likely north and west of Lake Okeechobee, while a drying occurs in the southeast that will eventually overspread the remainder of the area by later in the day. On Friday, bands of shower activity wrapping into Nicole's circulation over or near the southeast U.S. will cause a widespread coverage of mostly light rainfall. However, a band of heavier rains could occur north and west of Lake Okeechobee during

the afternoon. Next, a cold front will push into Florida resulting in fast-moving shower activity with a few embedded areas of heavier rain from around Lake Okeechobee southward Saturday morning and afternoon. This should be followed by drier and cooler weather on Sunday and over nearly the entire area on Monday. For the week ending next Tuesday morning, total SFWMD rainfall is likely to be much, much above normal, with the greatest weekly rains over the eastern and northern halves of the SFWMD.

Kissimmee

More than five weeks after Hurricane Ian, water levels have continued declining with all lake stages at their regulation schedules. Most lakes continue to make releases for local basin runoff. Weekly average discharges on November 6, 2022, at S-65 and S-65A were 1,500 cfs and 1,700 cfs, respectively, both of which were lower than the previous week. Mean weekly water depth on the Kissimmee River floodplain decreased from the previous week to 1.29 feet. The weekly average concentration of dissolved oxygen in the Kissimmee River increased from 1.2 mg/L the previous week to 1.3 mg/L on November 6, 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 15.89 feet NGVD on November 6, 2022, with water levels 0.06 feet higher than previous week and 1.51 feet higher than a month ago. Lake stage was in the Low sub-band and 0.39 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 (November 6, 2022) from NOAA’s Harmful Algal Bloom Monitoring System showed very low bloom potential for the Lake.

Estuaries

Total inflow to the St. Lucie Estuary averaged 423 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 1,504 cfs over the past week with 253 cfs coming from Lake Okeechobee. Mean salinities increased at all sites over the past week. No salinity data was available at the Shell Point site. Salinities were in the optimal range (0-10) for tape grass in the upper estuary. Salinities were in the optimal range for adult eastern oysters at Cape Coral (10-25) and in the stressed range at Sanibel (>25).

Stormwater Treatment Areas

For the week ending Sunday, November 6, 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 886,000 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 in WCA-2A and WCA-3A North remained in the “poor” category as those regions continue to experience elevated recession rates. Depths are very near average across WCA-3A and average conditions in that basin aren’t ecologically advantageous (too dry in the north, too wet in the south). Taylor slough stages fell at all stations again last week but remain above average. On average, salinities increased last week in Florida Bay and remain above average, and the Central region moved above the IQR.

Biscayne Bay

Total inflow to Biscayne Bay averaged 432 cfs and the previous 30-day mean inflow averaged 757 cfs. The seven-day mean salinity was 25.3 at BBCW8 and 20.1 at BBCW10, both below the maximum salinity of 35. Salinity data provided as a courtesy by Biscayne National Park.

Supporting Information

Kissimmee Basin

Upper Kissimmee

On November 6, 2022, mean daily lake stages were 57.9 feet NGVD (0.1 feet below schedule) in East Lake Toho, 54.9 feet NGVD (0.1 below schedule) in Lake Toho, and 52.4 feet NGVD (0.1 below schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1**, **Figures KB-1-3**).

Lower Kissimmee

On November 6, 2022, mean weekly discharge was reduced to 1,500 cfs at S-65 and 1,700 cfs at S-65A as water levels in KCH and Pool A continued to decline. Mean weekly discharge from the Kissimmee River was 3,700 cfs at S-65D and 3,700 cfs at S-65E (**Table KB-2**). Mean weekly headwater stages were 46.3 feet NGVD at S-65A and 28.4 feet NGVD at S-65D on November 6, 2022. With S-65A discharge declining, mean weekly river channel stage decreased from the previous week's mean of 40.4 feet to 38.6 feet on November 6, 2022 (**Figure KB-4**). Mean weekly water depth on the Kissimmee River floodplain decreased from 2.67 feet the previous week to 1.29 feet on November 6, 2022 (**Table KB-2**, **Figure KB-5**). The weekly average concentration of dissolved oxygen in the Kissimmee River increased from 1.2 mg/L the previous week to 1.3 mg/L on November 6, 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)	
							11/6/22	*10/30/22*
Lakes Hart and Mary Jane	S-62	LKMJ	150	60.9	R	61.0	-0.1	0.0
Lakes Myrtle, Preston and Joel	S-57	S-57	110	61.9	R	62.0	-0.1	0.1
Alligator Chain	S-60	ALLI	80	64.0	R	64.0	0.0	0.0
Lake Gentry	S-63	LKGT	120	61.5	R	61.5	0.0	0.0
East Lake Toho	S-59	TOHOE	680	57.9	R	58.0	-0.1	0.4
Lake Toho	S-61	TOHOW S-61	1000	54.9	R	55.0	-0.1	0.0
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	1500	52.4	R	52.5	-0.1	0.0

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.

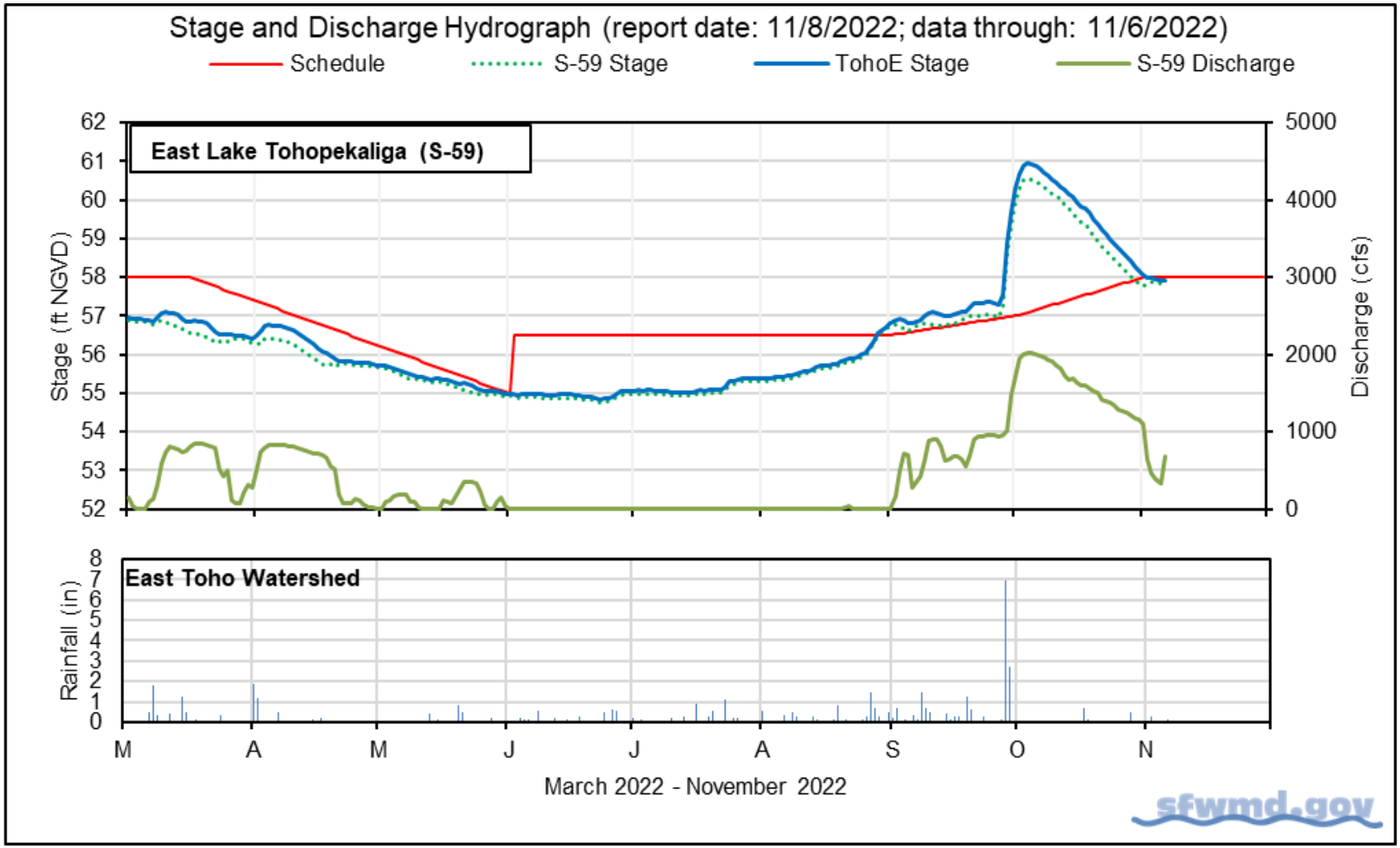


Figure KB-1. East Lake Toho regulation schedule, stage, discharge and rainfall.

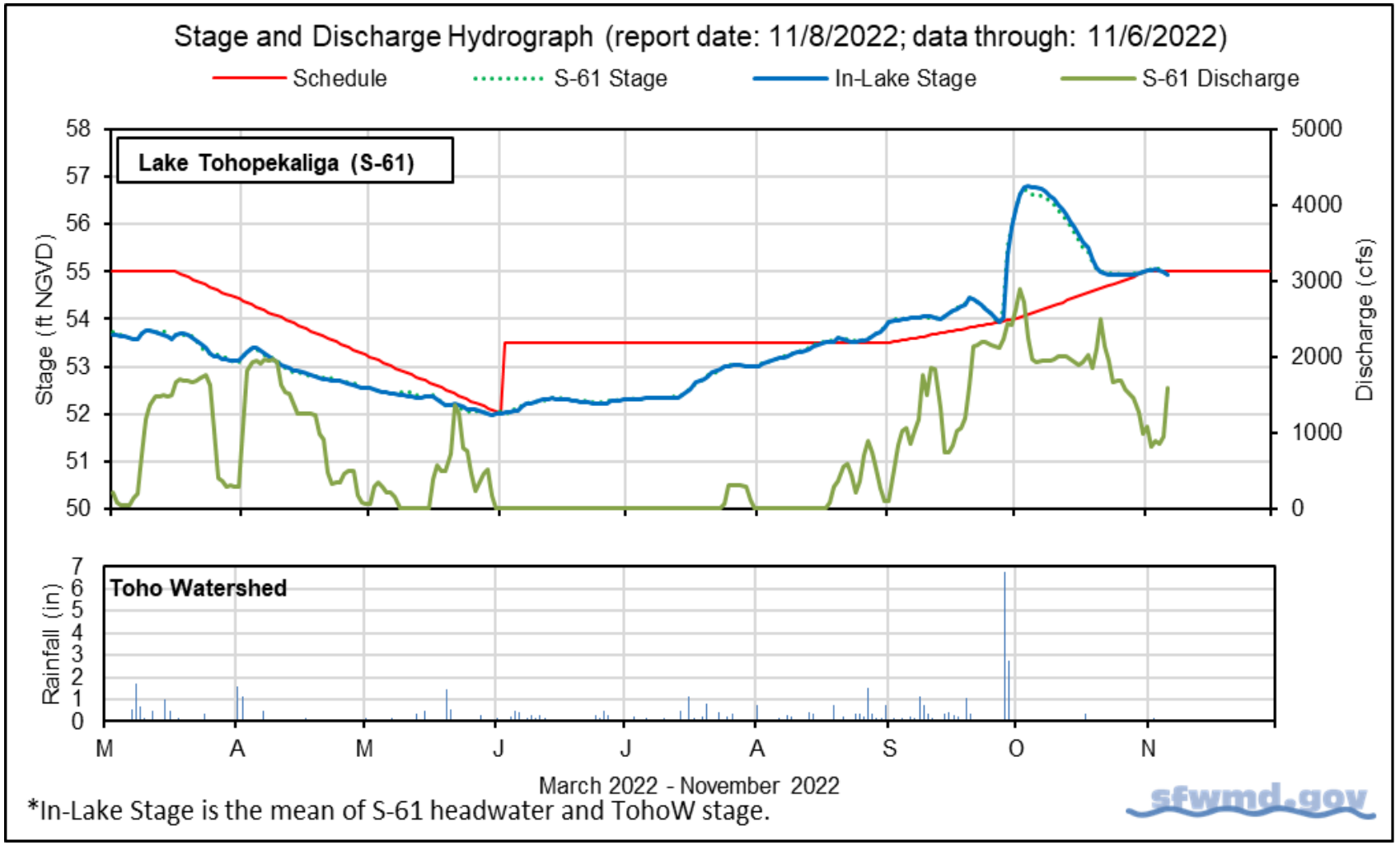


Figure KB-2. Lake Toho regulation schedule, stage, discharge and rainfall.

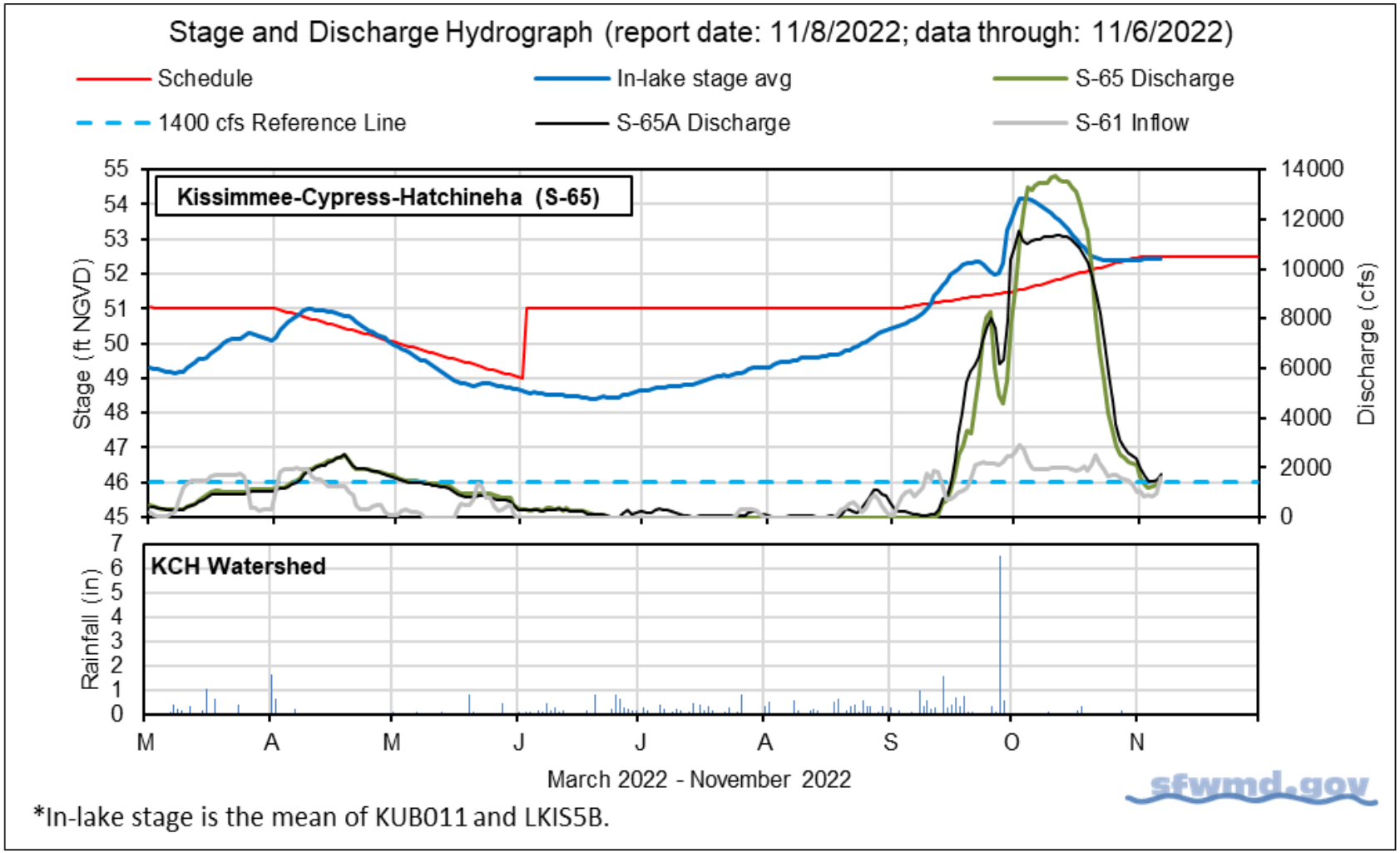


Figure KB-3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

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			
		11/6/22	11/6/22	10/30/22	10/23/22	10/16/22
Discharge	S-65	1,600	1,500	2,800	9,500	13,000
Discharge	S-65A[a]	1,700	1,700	3,600	9,400	11,000
Headwater Stage (feet NGVD)	S-65A	46.3	46.3	46.7	49.7	50.9
Discharge	S-65D[b]	2,700	3,700	8,100	13,000	14,000
Headwater Stage (feet NGVD)	S-65D[c]	28.3	28.4	28.5	28.5	28.5
Discharge (cfs)	S-65E[d]	2,800	3,700	7,900	12,000	14,000
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) [e]	Phase I, II/III river channel	1.8	1.3	1.2	1.4	1.0
River channel mean stage[f]	Phase I river channel	38.1	38.6	40.4	42.6	43.2
Mean depth (feet) [g]	Phase I floodplain	1.05	1.29	2.67	4.53	5.03

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. Mean of five river channel stations (PC62, KRDR02, KRBN, PC33, PC11) in the Phase I area.

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

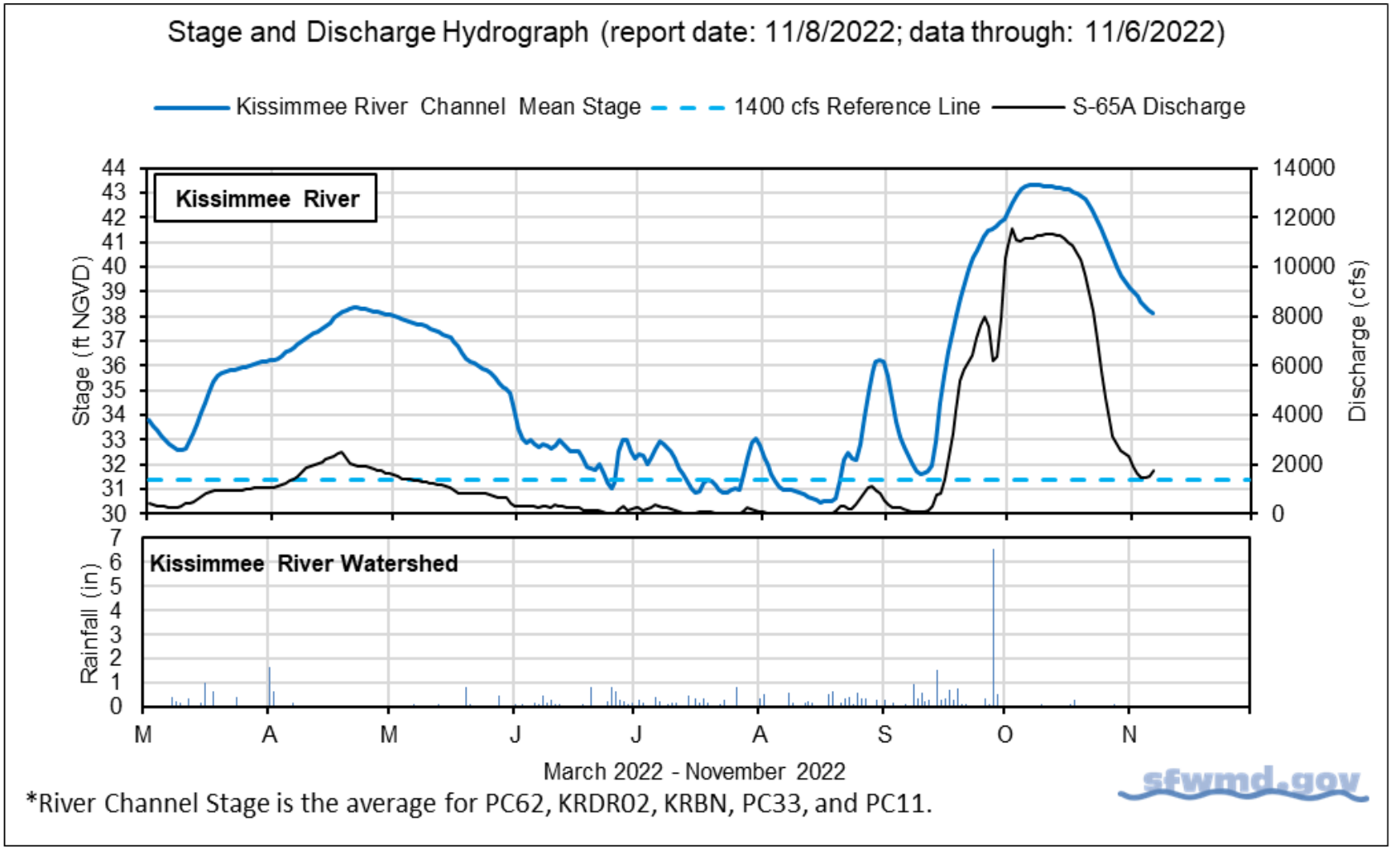


Figure KB-4. Kissimmee River stage, discharge and rainfall.

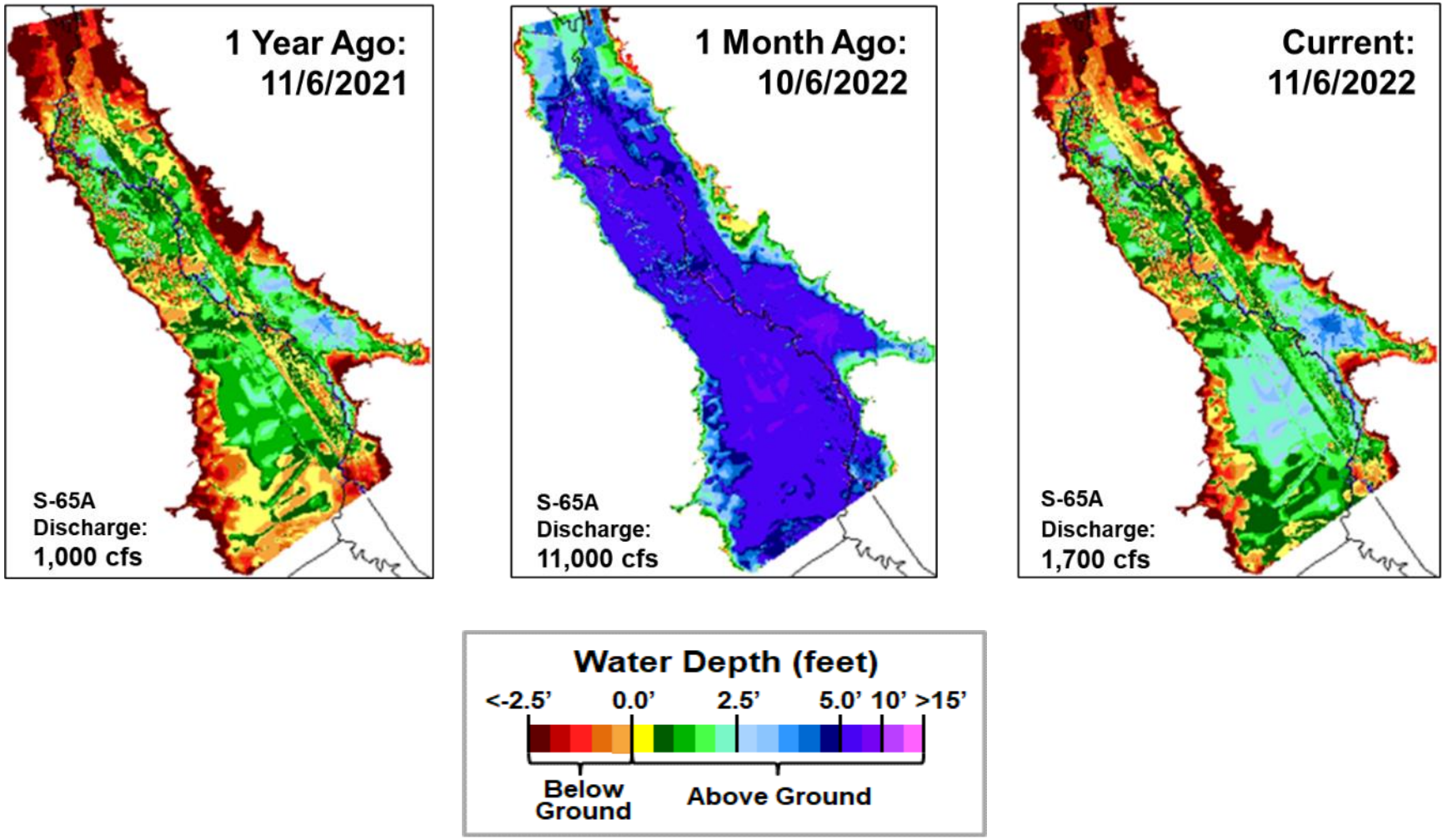


Figure KB-5. Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.

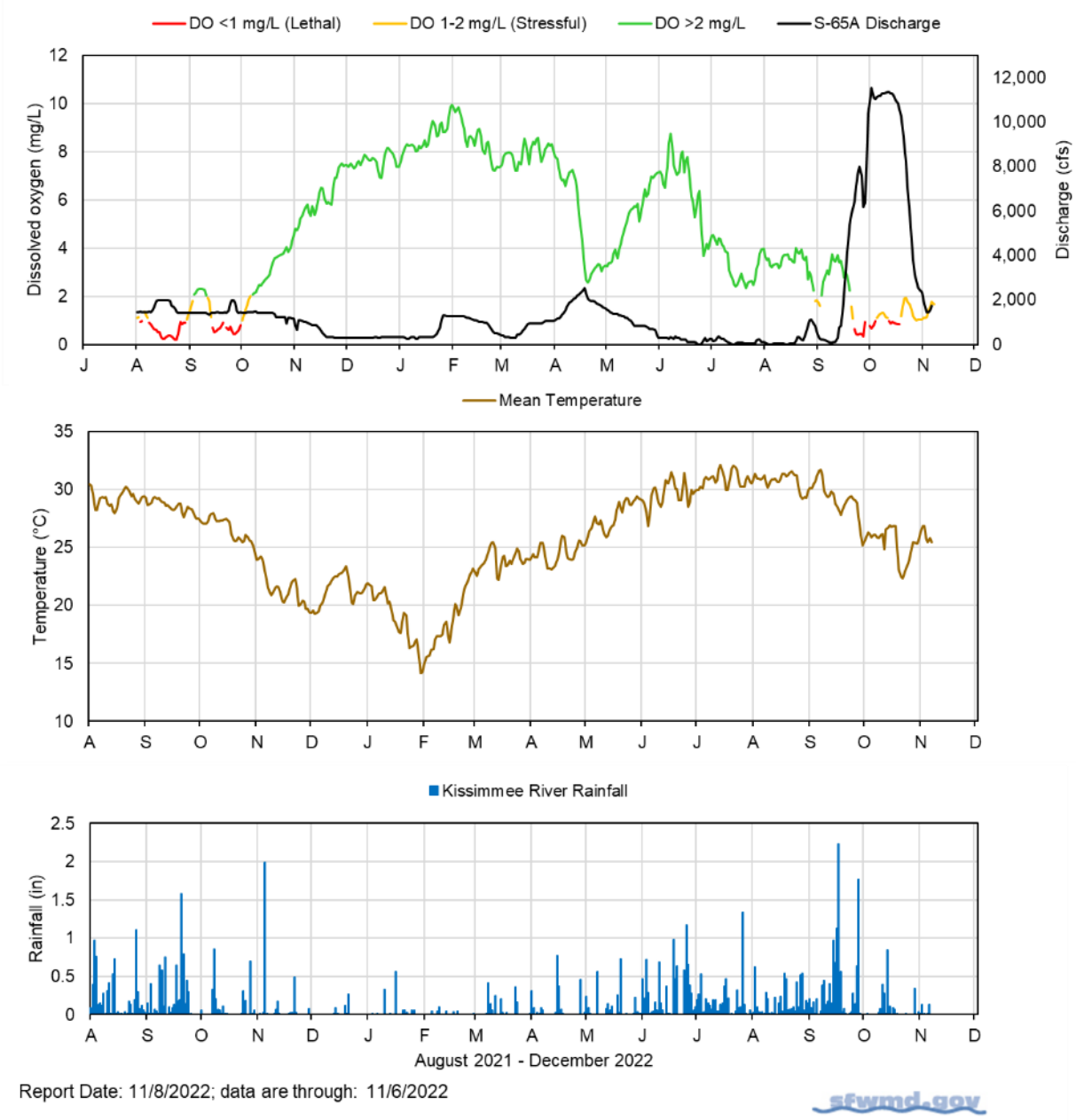


Figure KB-6. Restored Kissimmee river channel mean daily dissolved oxygen concentration (mg/L), S-65A discharge (cfs), temperature (°C) and rainfall (inches). Dissolved oxygen (DO) and temperature are mean daily values averaged for PC62, KRDR02, KRBN, PC33, PC11, PD62R, and PD42R with an average of five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

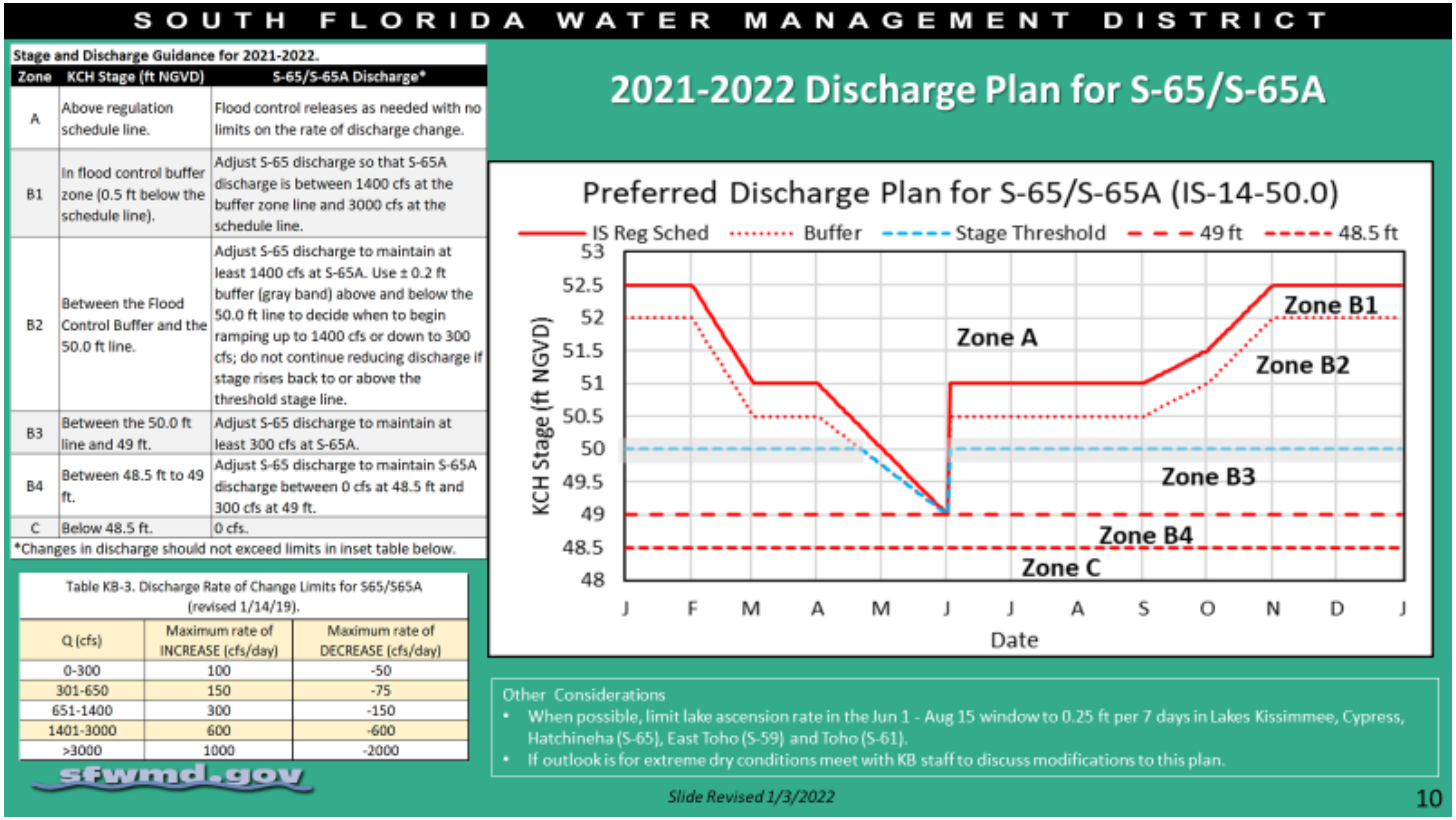


Figure KB-7. IS-14-50 Discharge Plan for S65/S65A with discharge rate of change limits (revised 1/14/19).

Lake Okeechobee

Lake Okeechobee stage was 15.89 feet NGVD on November 6, 2022, with water levels 0.06 feet higher than the previous week and 1.51 feet higher than a month ago (**Figure LO-1**). After rising more than 3 feet since mid-September, water levels appear to be plateauing. Lake stage remains within the Low sub-band (**Figure LO-2**) and is currently 0.39 feet above the upper limit of the ecological envelope (**Figure LO-3**). According to NEXRAD, 0.28 inches of rain fell directly on the Lake last week.

Average daily inflows (excluding rainfall) decreased from the previous week, going from 9,176 cfs to 4,535 cfs. Average daily outflows (excluding evapotranspiration) increased from the previous week going from 112 cfs to 554 cfs. The highest inflow came from the Kissimmee River (C-38 Canal; 3,739 cfs), followed by the C-41A Canal (427 cfs via S-84 & S-84X) and Fisheating Creek (229 cfs). For the first time since late-August, there was outflow to the west via the S-77 structure into the C-43 Canal at a daily average of 384 cfs. Flows to the south via the S-350 structures averaged 170 cfs. There was no outflow to the east via the S-308 structure. **Figures LO-4 and LO-5** show the combined average daily inflows and outflows for the Lake over the past eight weeks, and average inflows and outflows last week, respectively. These data are provisional and are subject to change.

The most recent satellite image (November 6, 2022) from NOAA's Harmful Algal Bloom Monitoring System showed very low bloom potential for the lake (**Figure LO-6**).

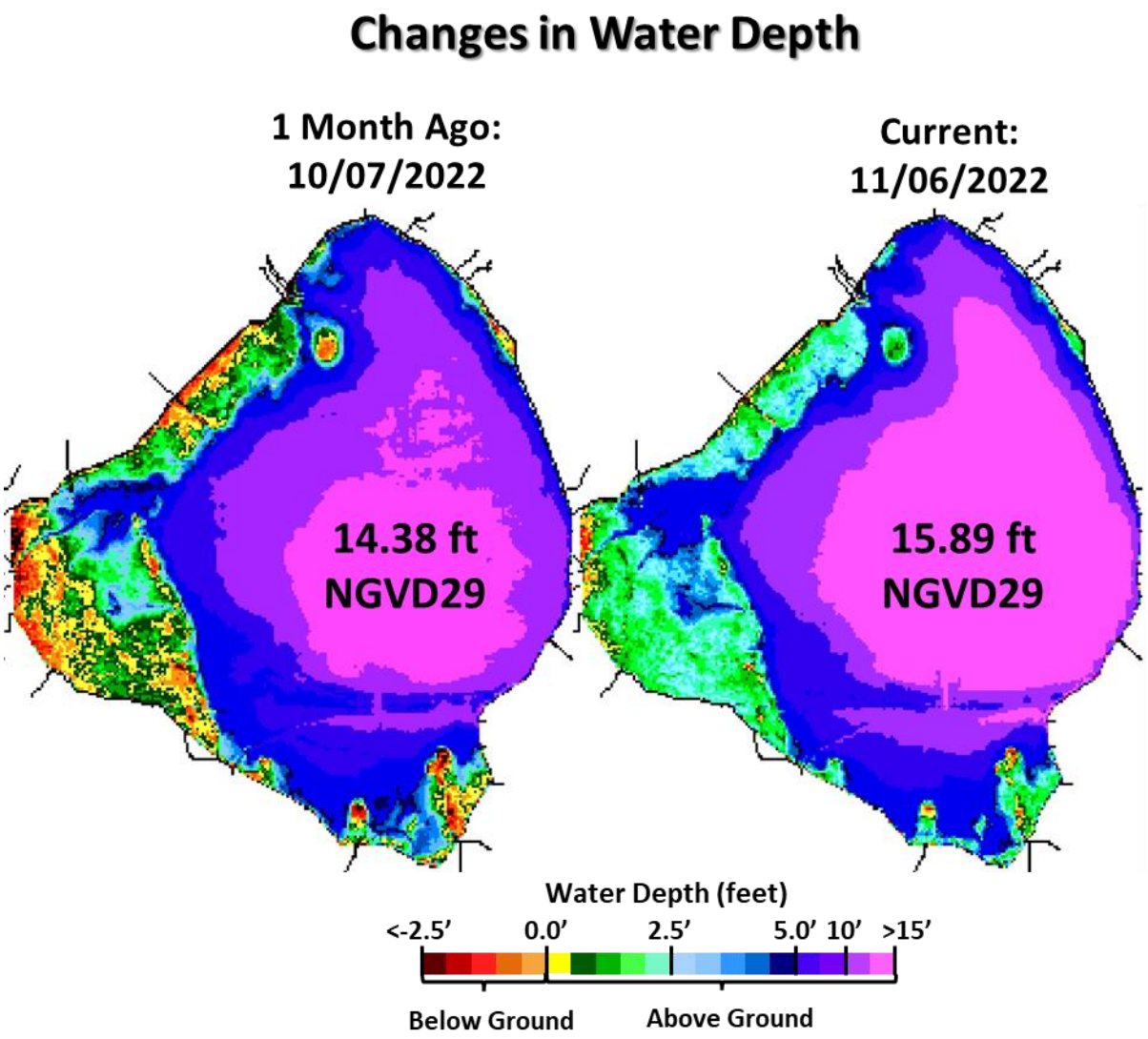


Figure LO-1. Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

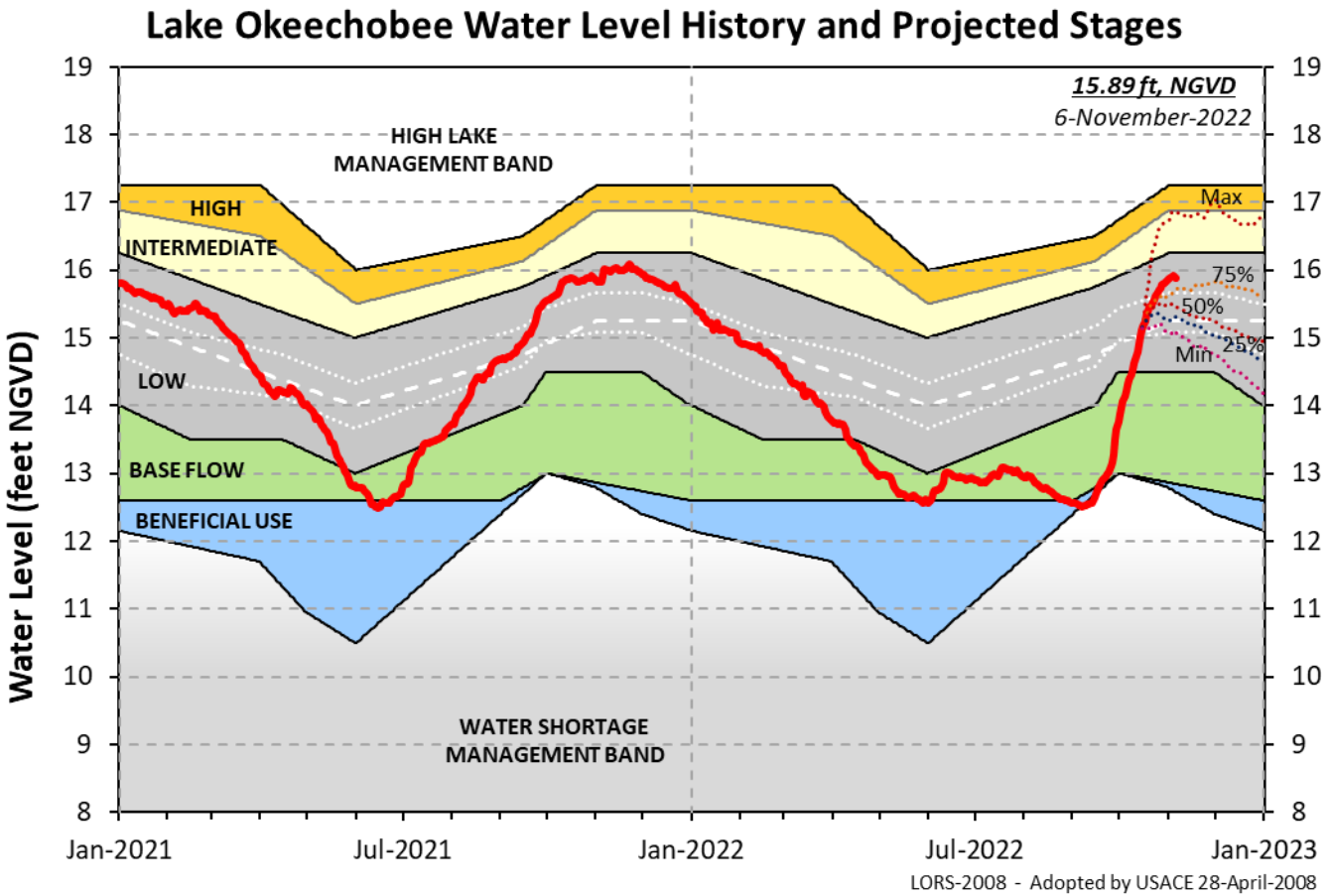


Figure LO-2. Recent Lake Okeechobee stages with projected stages based on a dynamic position analysis.

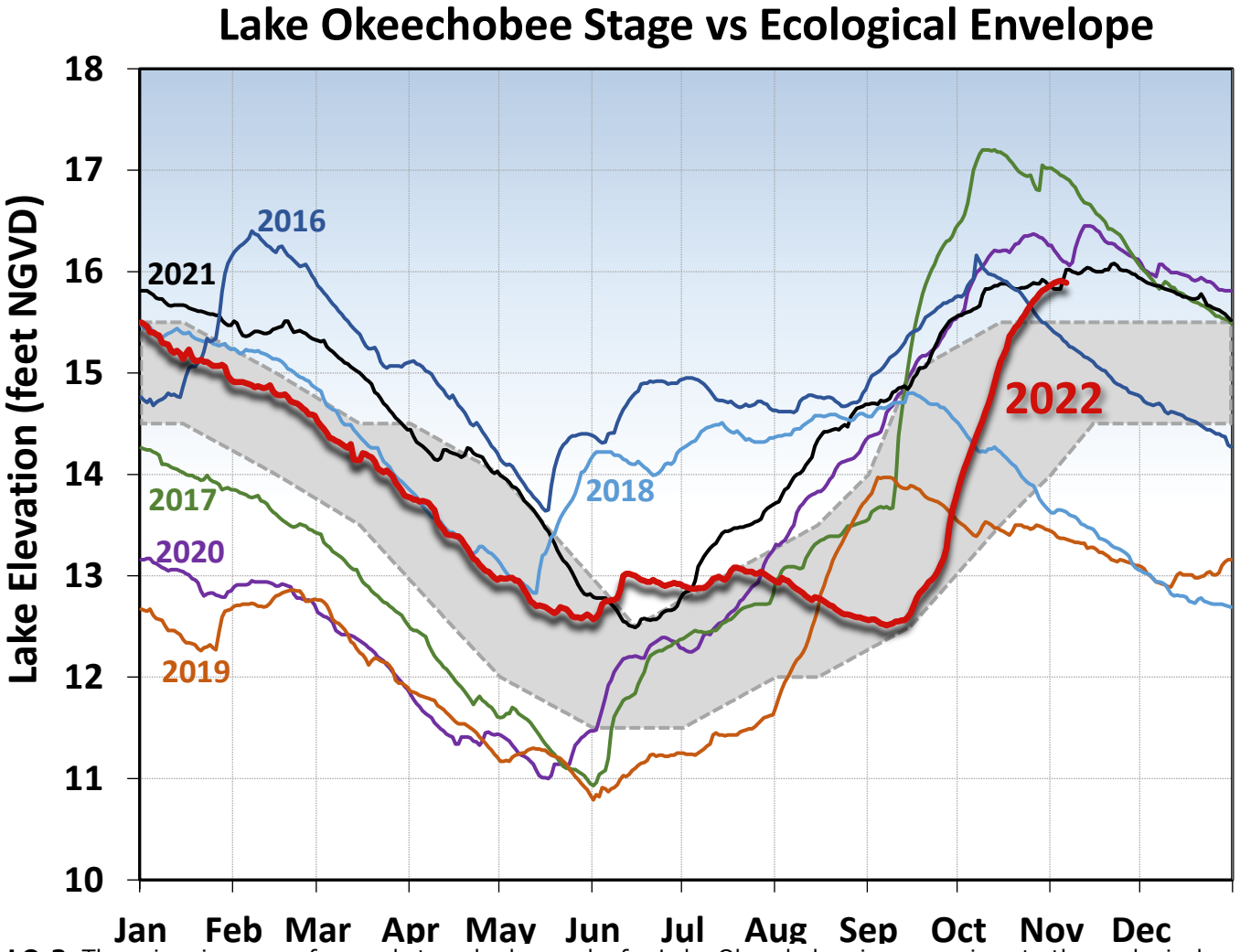


Figure LO-3. The prior six years of annual stage hydrographs for Lake Okeechobee in comparison to the ecological envelope.

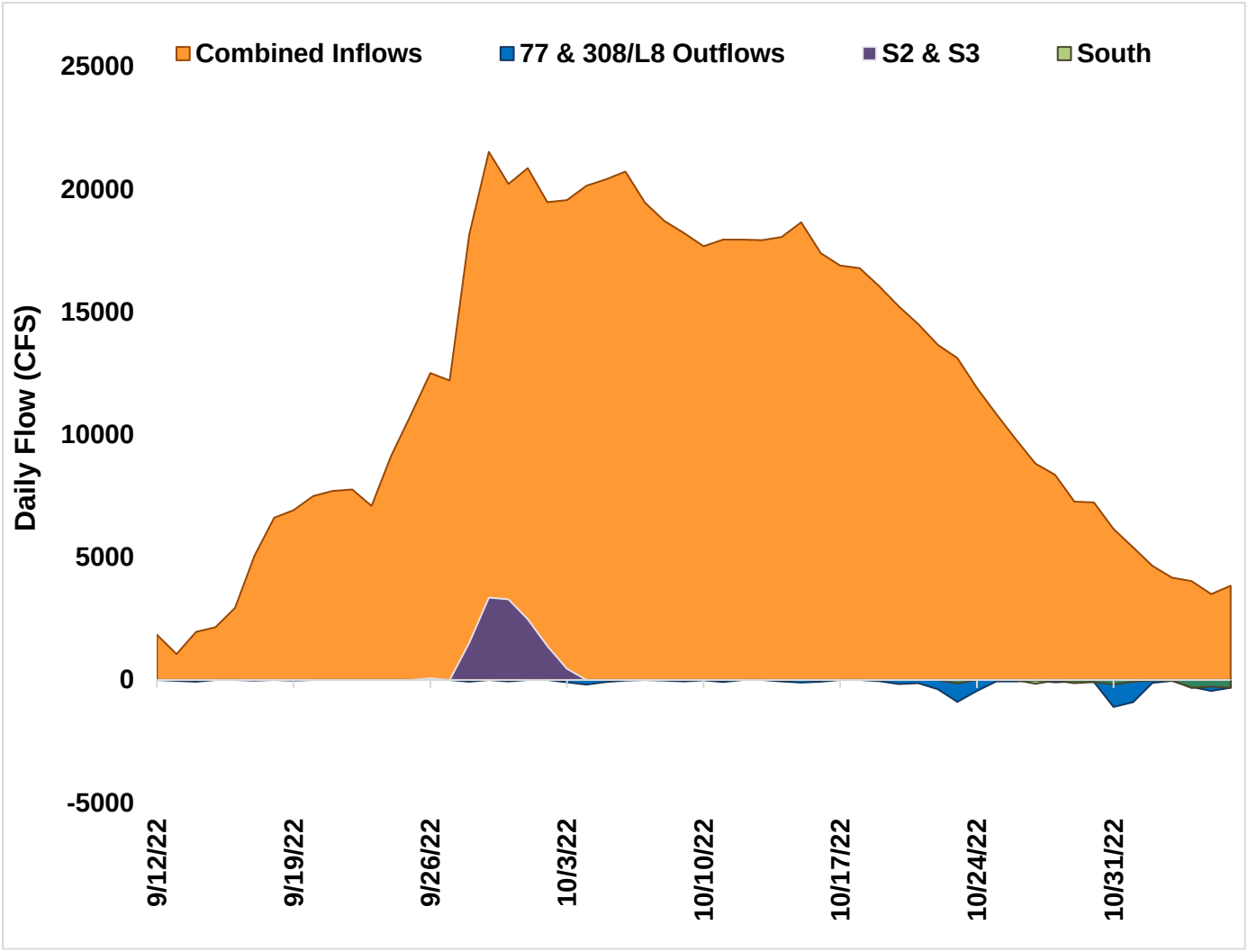


Figure LO-4. Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows from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

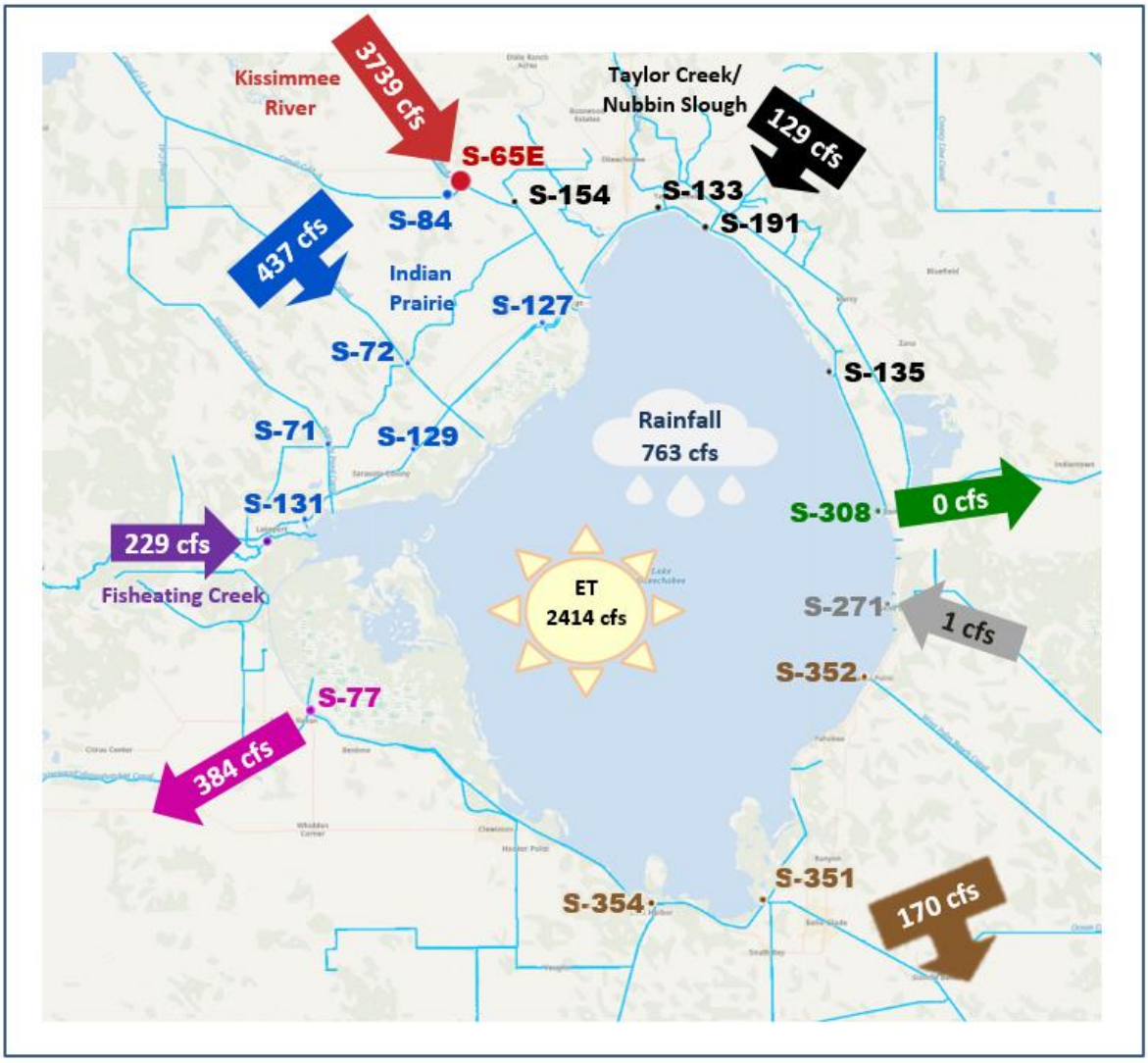


Figure LO-5. Inflows into Lake Okeechobee from Indian Prairie basins, Taylor Creek/Nubbin Slough, Kissimmee River and Fisheating Creek, and outflows to the west via S-77, to the east via S-308, to the south via S-351, S-352, S-354, and to southeast via S-271 (formerly Culvert 10A) for the week of October 31 – November 6, 2022.

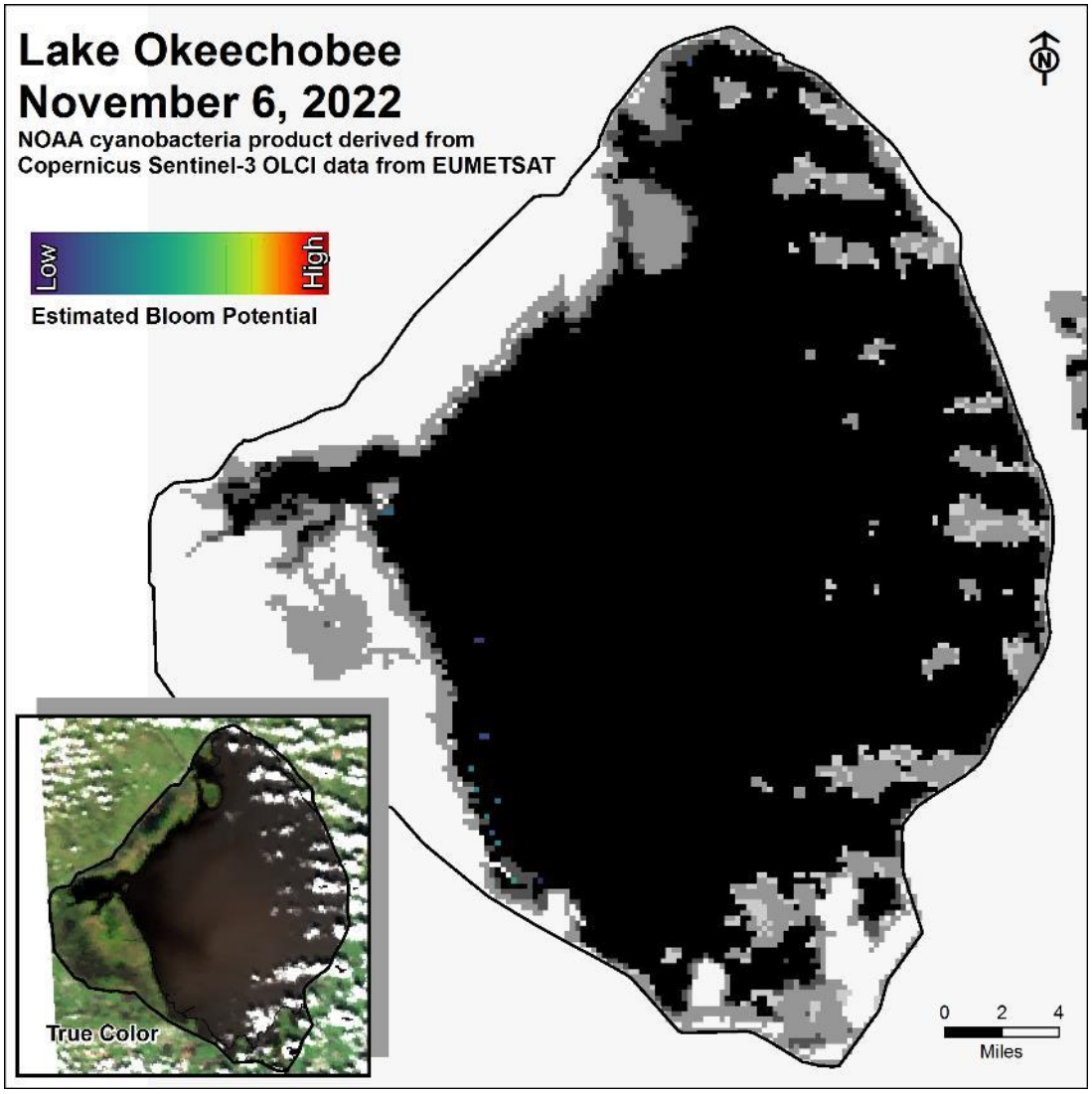


Figure LO-6. Cyanobacteria bloom potential on November 6, 2022 based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover

Estuaries

St. Lucie Estuary

Over the past week, mean total inflow to the St. Lucie Estuary was 423 cfs (**Figures ES-1** and **ES-2**) and the previous 30-day mean inflow was 902 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 within the estuary (**Table ES-1** and **Figure ES-3**). The seven-day moving average of the surface and bottom salinities at the US1 Bridge was 17.3. 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 (FWRI) was 1.1 spat/shell for October (**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. All South Florida Water Management District water quality sensors in the estuary that were affected by the storm are currently functioning except at the Shell Point site.

Over the past week, mean total inflow to the Caloosahatchee River Estuary was 1,504 cfs (**Figures ES-6** and **ES-7**) and the previous 30-day mean inflow was 2,201 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-7**.

Over the past week, salinities increased at all sites within the estuary (**Table ES-2** and **Figures ES-8** and **ES-9**). The seven-day mean salinities (**Table ES-2**) were in the optimal range (0-10) for tape grass in the upper estuary. The seven-day mean salinity values were within the optimal range for adult eastern oysters at Cape Coral and in the stressed range at Sanibel (**Figure ES-10**). Oyster recruitment data in the CRE are not available at this time; FWRI will redeploy recruitment collectors once water quality conditions improve.

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 a steady release at 2,000 cfs with estimated tidal basin inflows of 162 cfs. Model results from all scenarios predict daily salinity to be 3.4 or lower and the 30-day moving average surface salinity to be 0.9 or lower at Val I-75 at the end of the two-week period (**Table ES-3** and **Figure ES-11**). This keeps predicted salinities in the upper estuary within the optimal salinity range (0-10) for tape grass.

[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.

Red Tide

The Florida Fish and Wildlife Research Institute reported on November 4, 2022, that *Karenia brevis*, the Florida red tide dinoflagellate, was observed at bloom concentrations in samples collected from Charlotte County over the past week. On the east coast, red tide was not observed in samples from Palm Beach, Broward, or Miami-Dade counties.

Water Management Recommendations

Lake stage is in the Low Sub-Band. Tributary conditions are wet. The LORS2008 release guidance suggests up to 3,000 cfs release at S-79 to the Caloosahatchee River Estuary and up to 1,170 cfs release at S-80 to the St. Lucie Estuary.

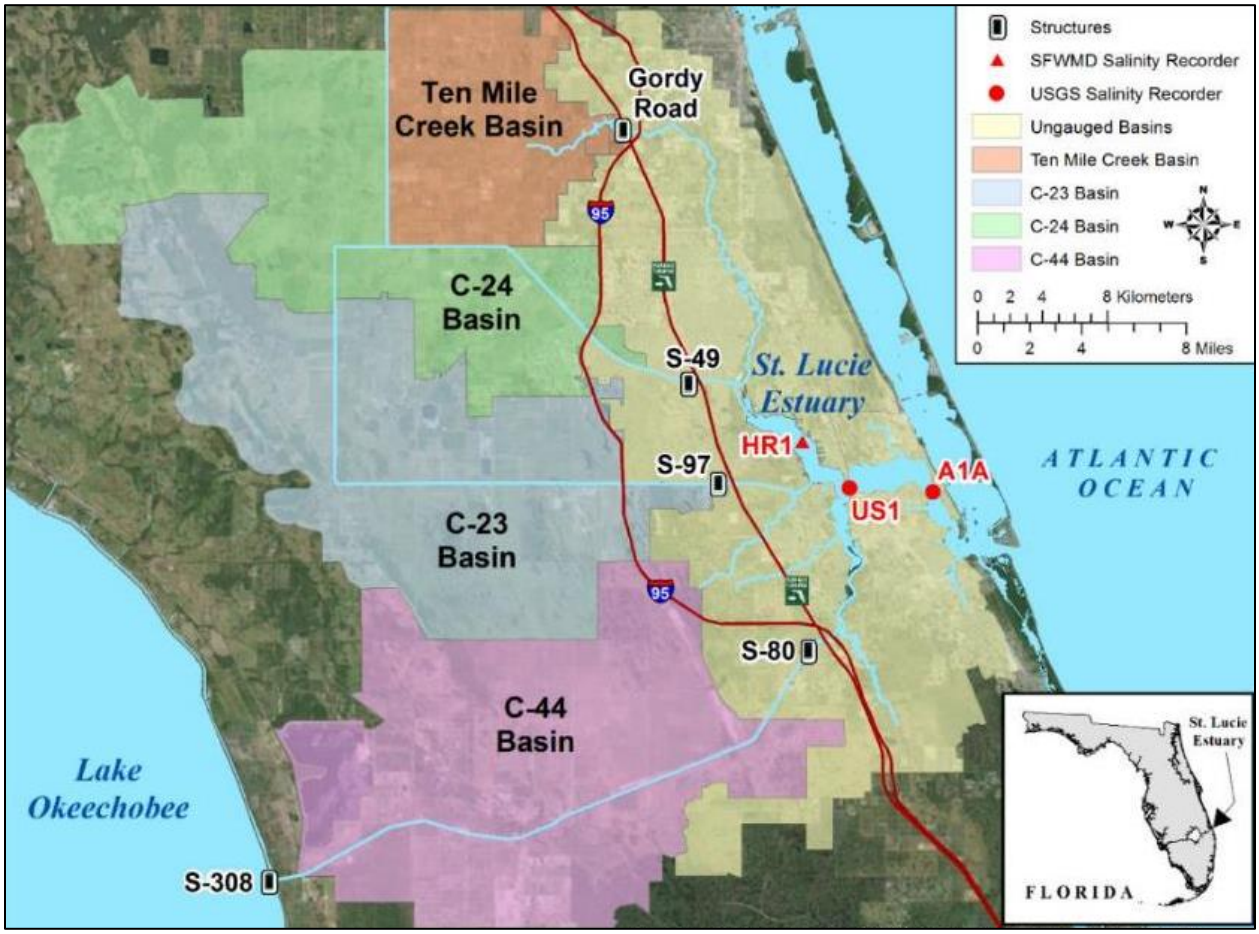


Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

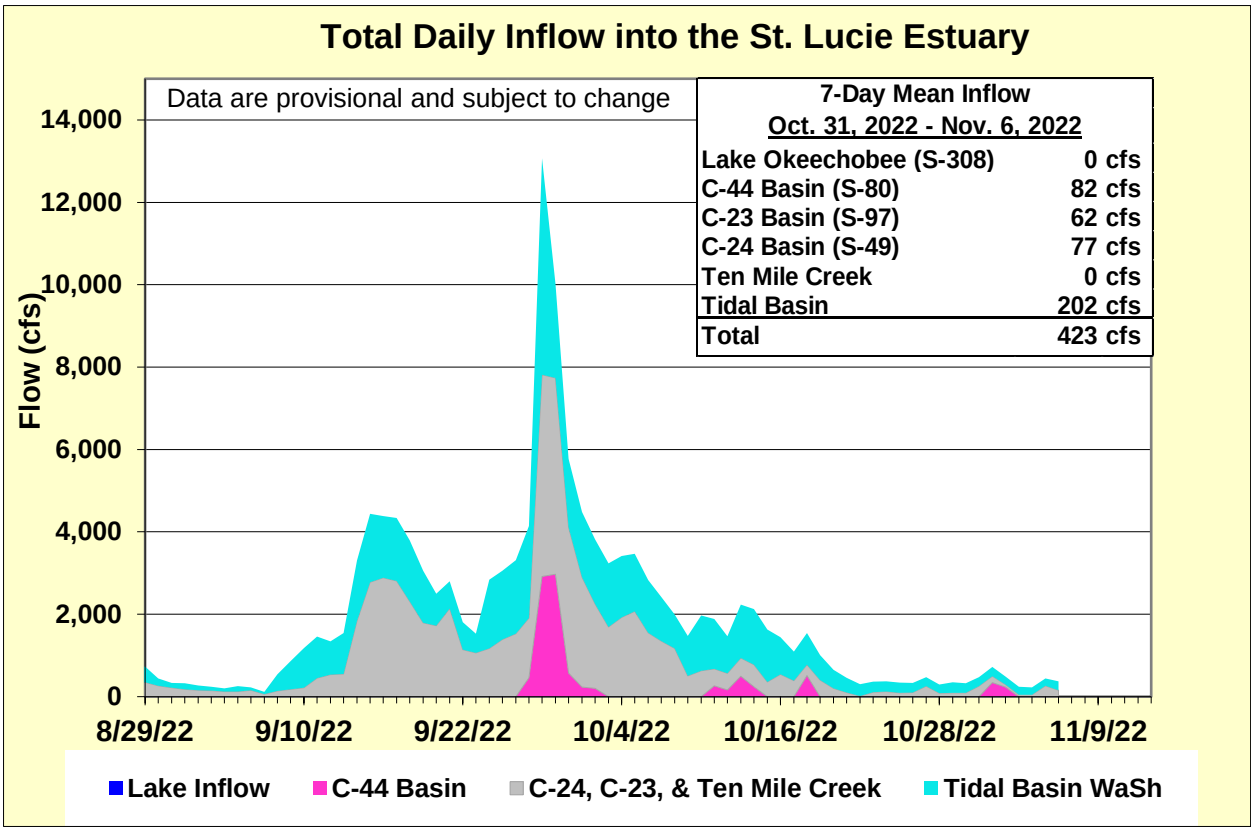


Figure ES-2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

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

Sampling Site	Surface	Bottom	Optimum Envelope
HR1 (North Fork)	**12.1** (11.0)	**14.7** (14.1)	10.0 – 25.0
US1 Bridge	**16.6** (15.1)	**18.0** (16.9)	10.0 – 25.0
A1A Bridge	**25.7** (23.7)	**28.6** (27.1)	10.0 – 25.0

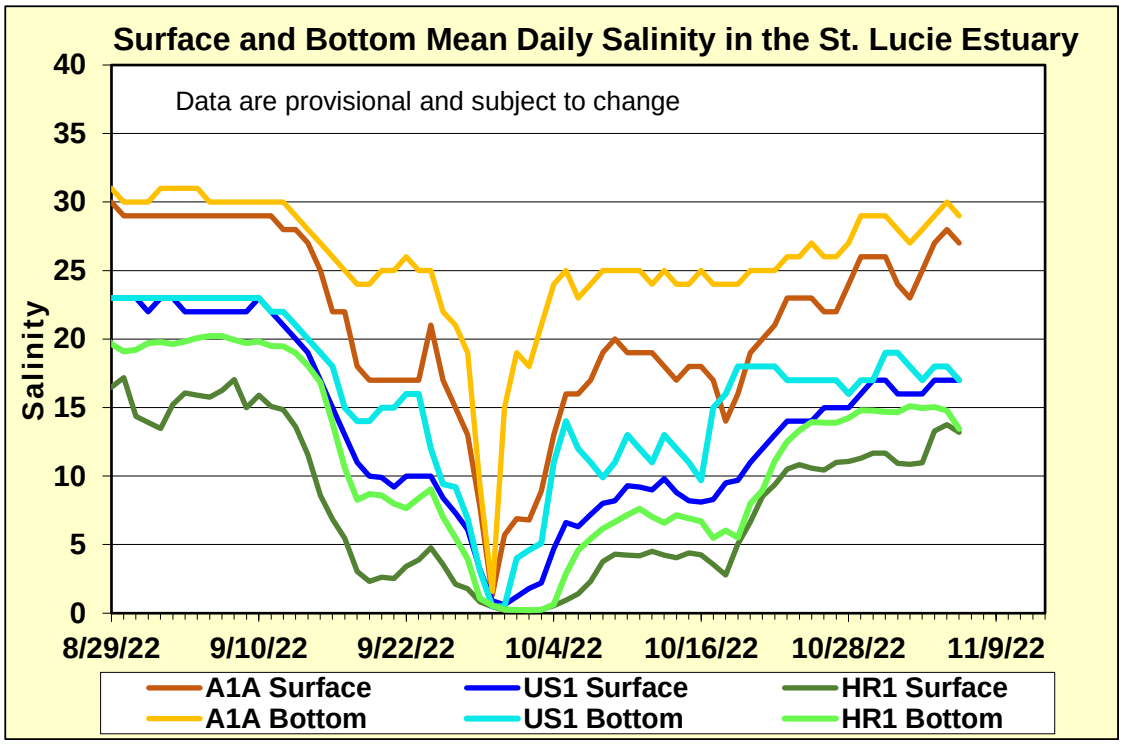


Figure ES-3. Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

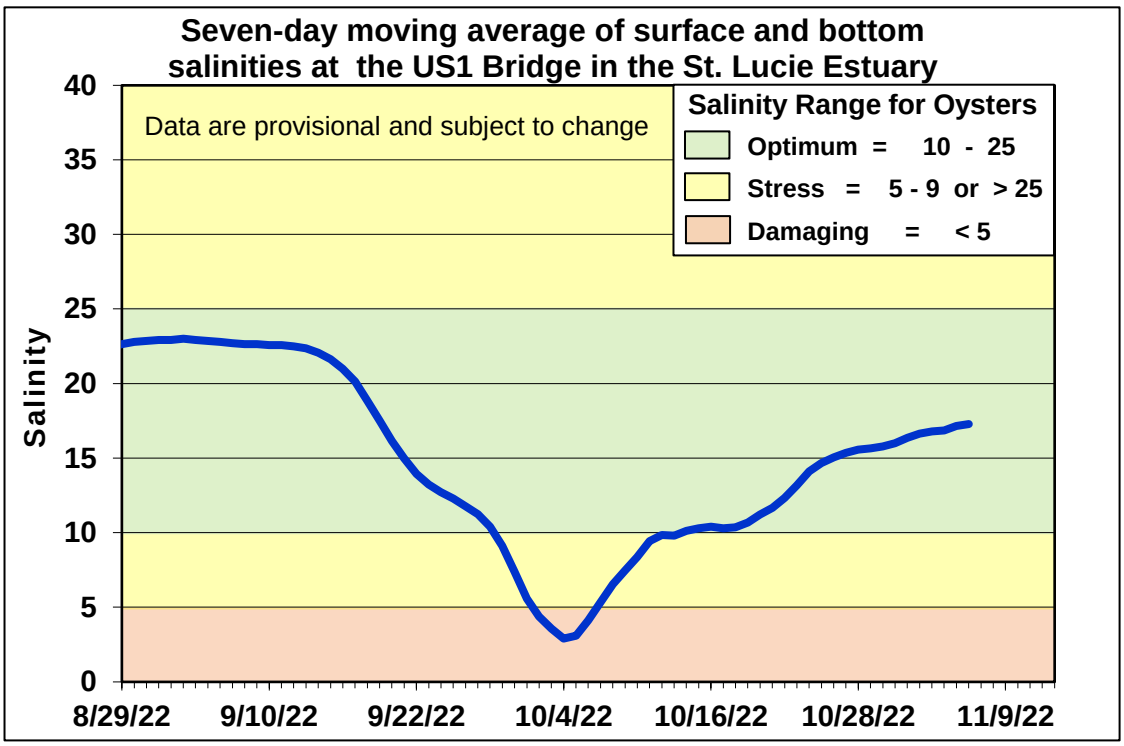


Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

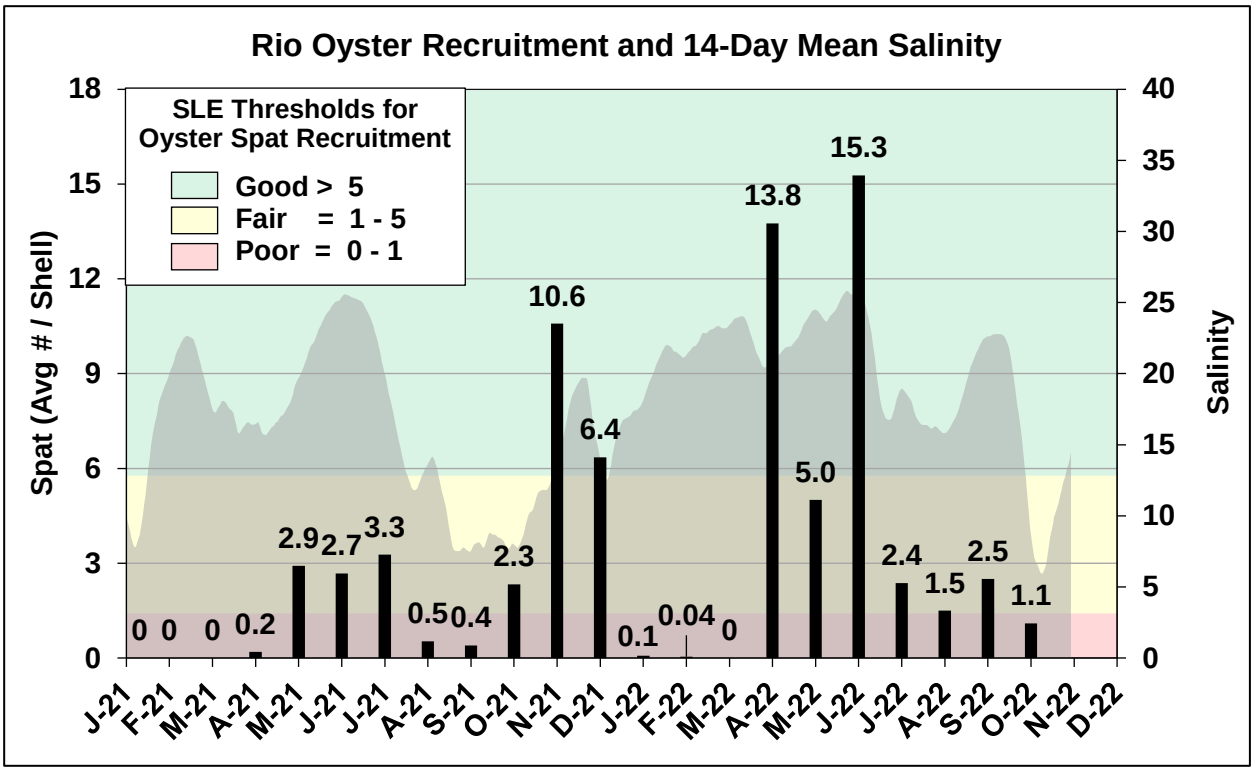


Figure ES-5. Mean oyster recruitment at the Rio oyster monitoring station and 14-day mean salinity at US1 Bridge.

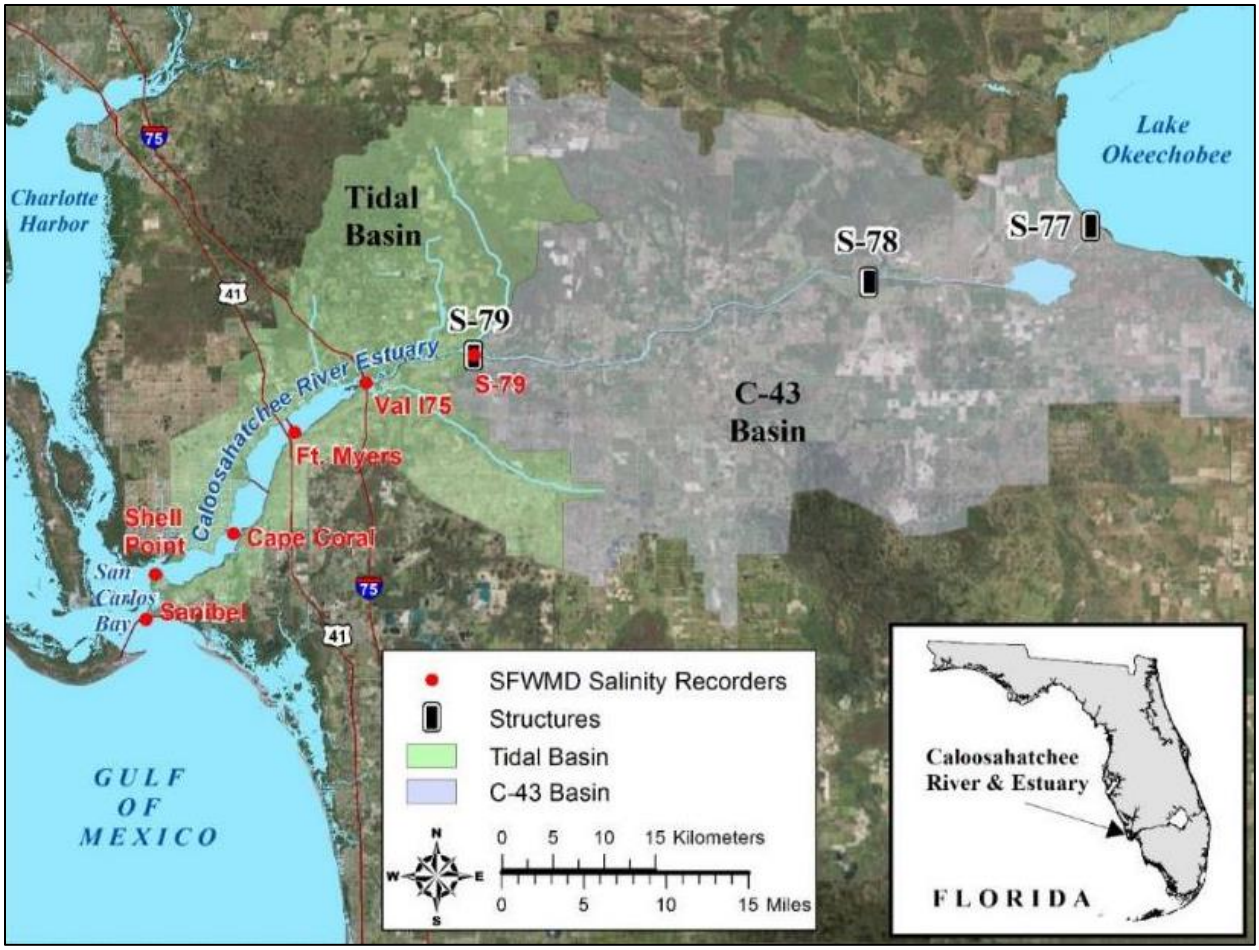


Figure ES-6. Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.

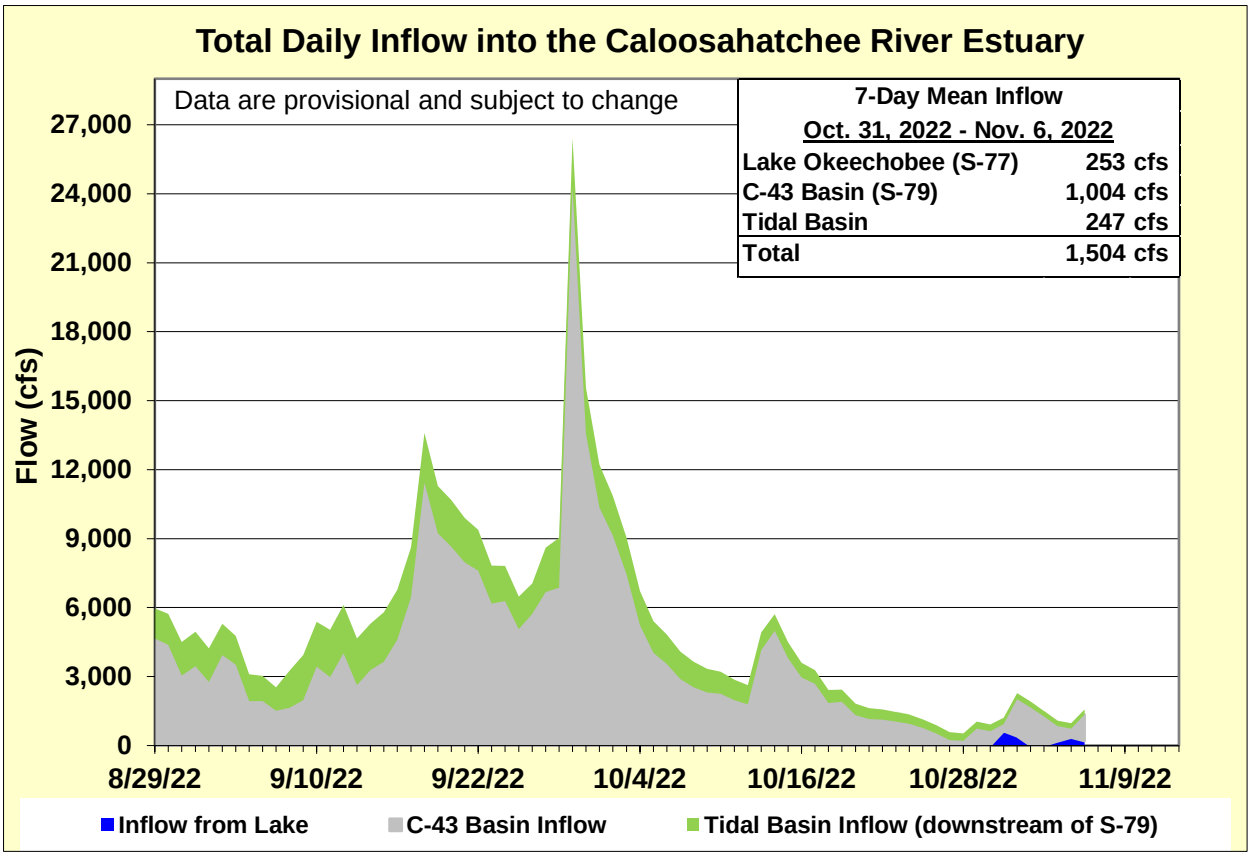


Figure ES-7. Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

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

Sampling Site	Surface	Bottom	Optimum Envelope
S-79 (Franklin Lock)	**1.0** (0.2)	**1.1** (0.2)	0.0 – 10.0
Val I-75	**1.5** (0.2)	**2.6** (0.2)	0.0 – 10.0
Fort Myers Yacht Basin	**7.0** (2.5)	**8.1** (4.5)	0.0 – 10.0
Cape Coral	**11.7** (9.7)	**14.0** (10.5)	10.0 – 25.0
Shell Point	**NR** (NR)	**NR** (NR)	10.0 – 25.0
Sanibel	**28.0** (27.8)	**29.5** (28.8)	10.0 – 25.0

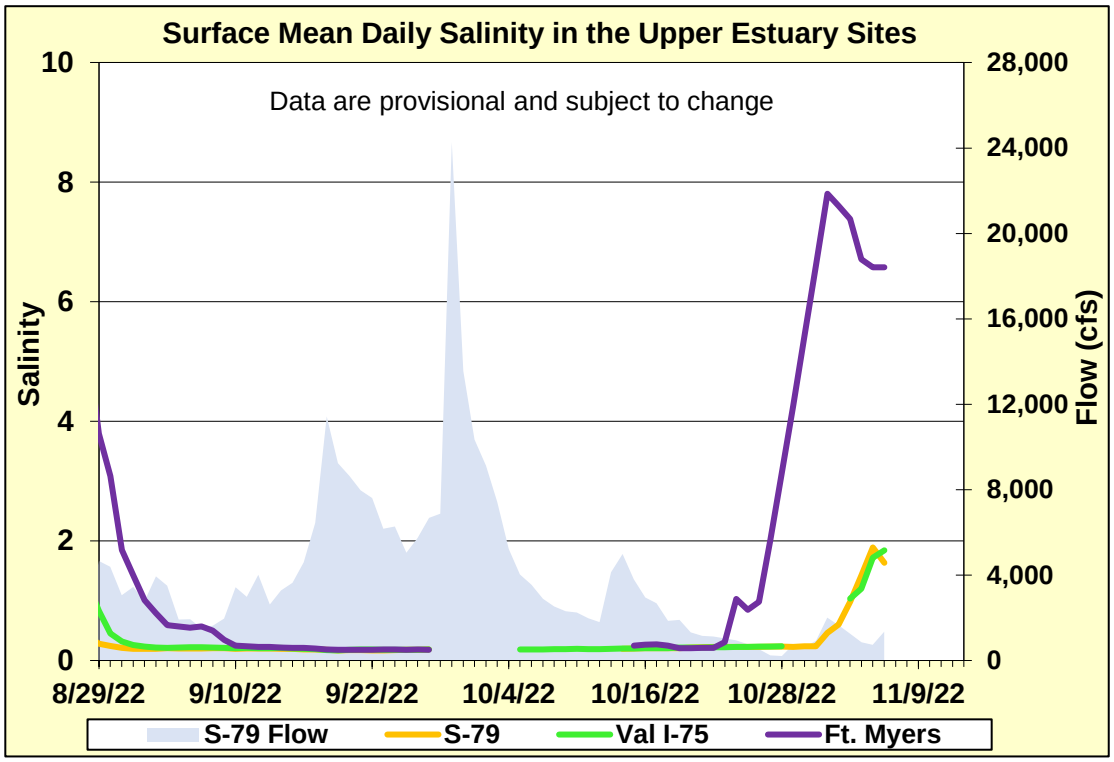


Figure ES-8. Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

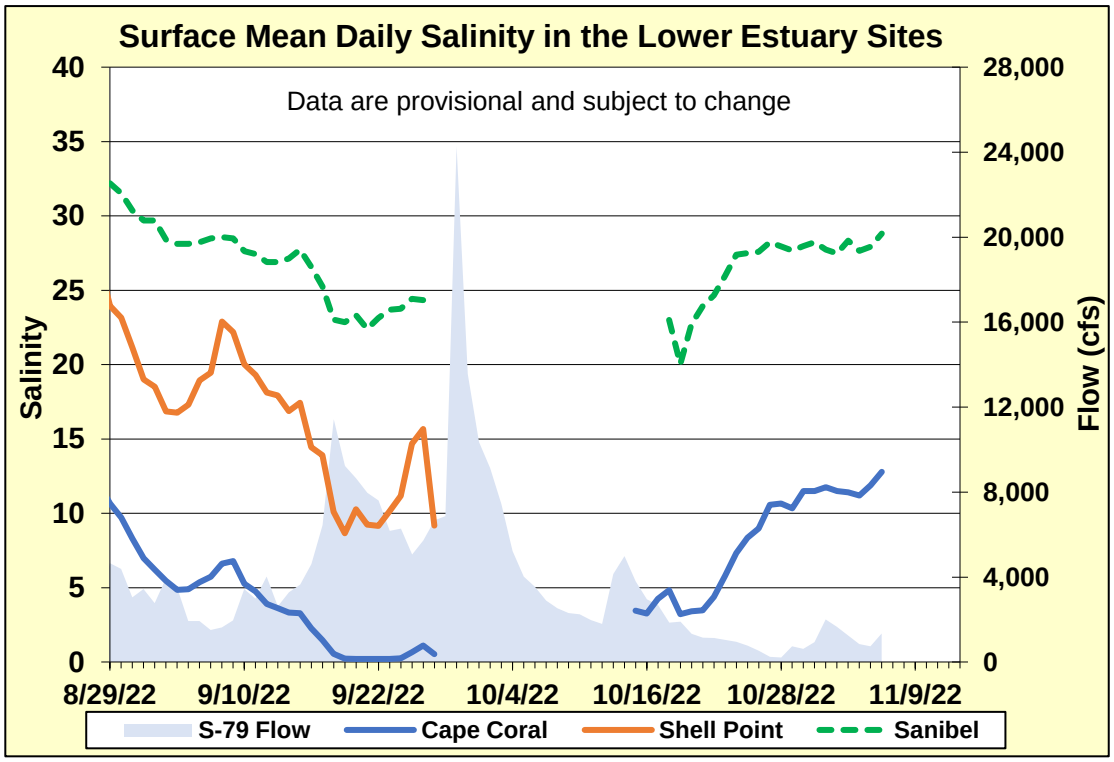


Figure ES-9. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

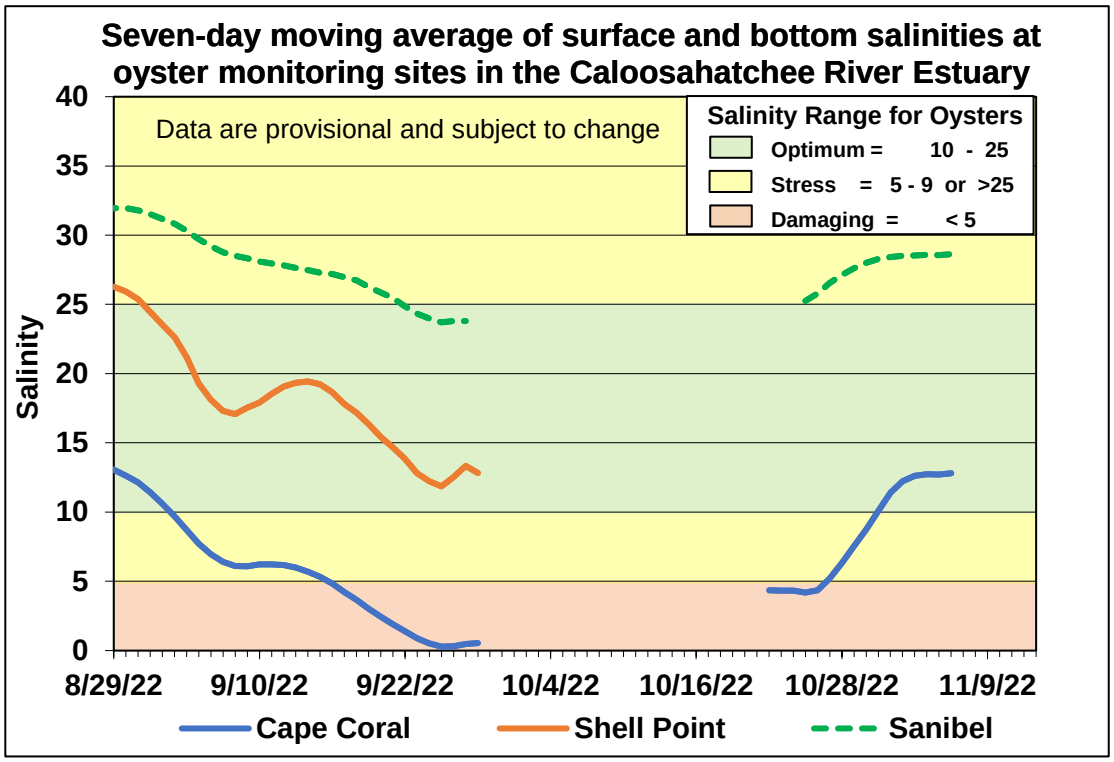


Figure ES-10. Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

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	162	3.4	0.9
B	450	162	2.2	0.7
C	750	162	1.5	0.6
D	1000	162	0.9	0.5
E	1500	162	0.4	0.4
F	2000	162	0.3	0.4

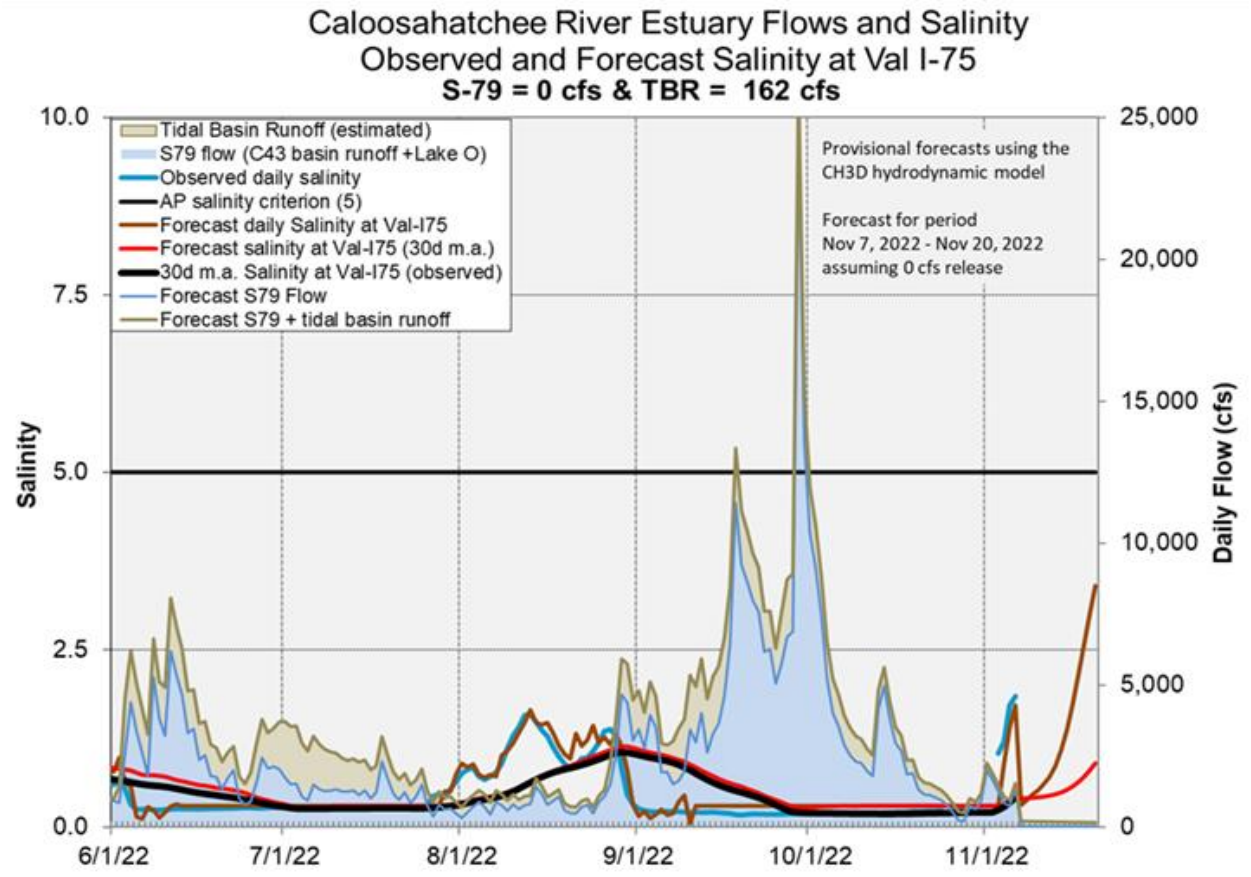


Figure ES-11. Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

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**).

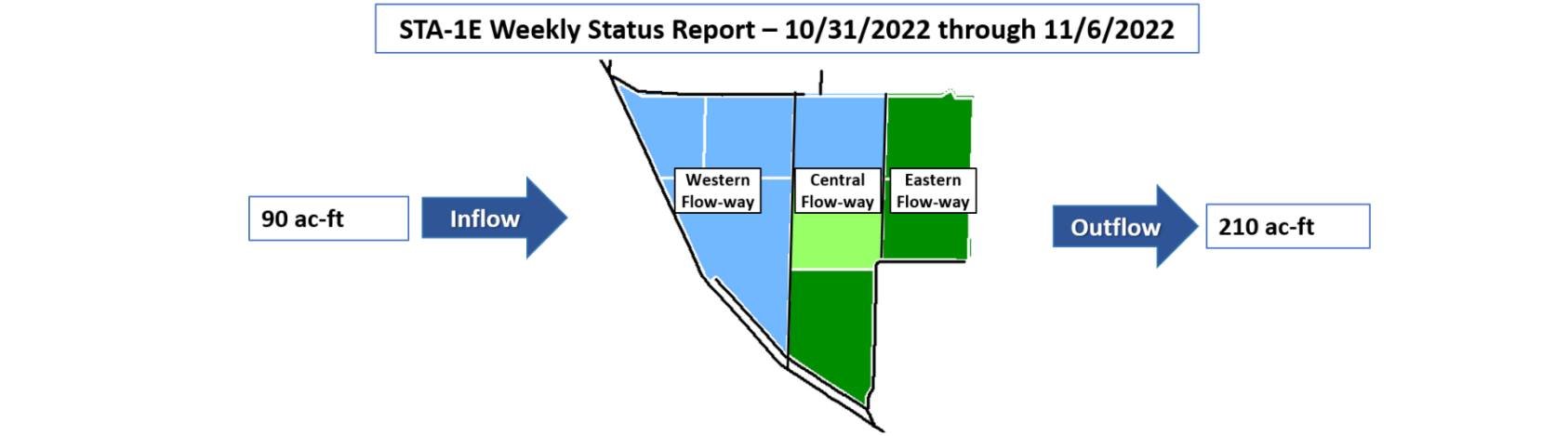
STA-1W: Operational restrictions are in place in STA-1W Western, Eastern, and Northern Flow-ways for vegetation management activities. Treatment cells are at target stage. Vegetation in the flow-ways is stressed and highly stressed. The 365-day PLRs for the Northern, Western, and Eastern Flow-ways are 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 near or 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 11/6/2022	
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	90	4,239	136,656
--Lake Inflow, ac-ft	0	N/A	2,600
Total Outflow, ac-ft	210	3,675	109,290
Inflow Conc., ppb	30	113	109
Outflow Conc., ppb	36	39	25
Includes Preliminary Data			

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

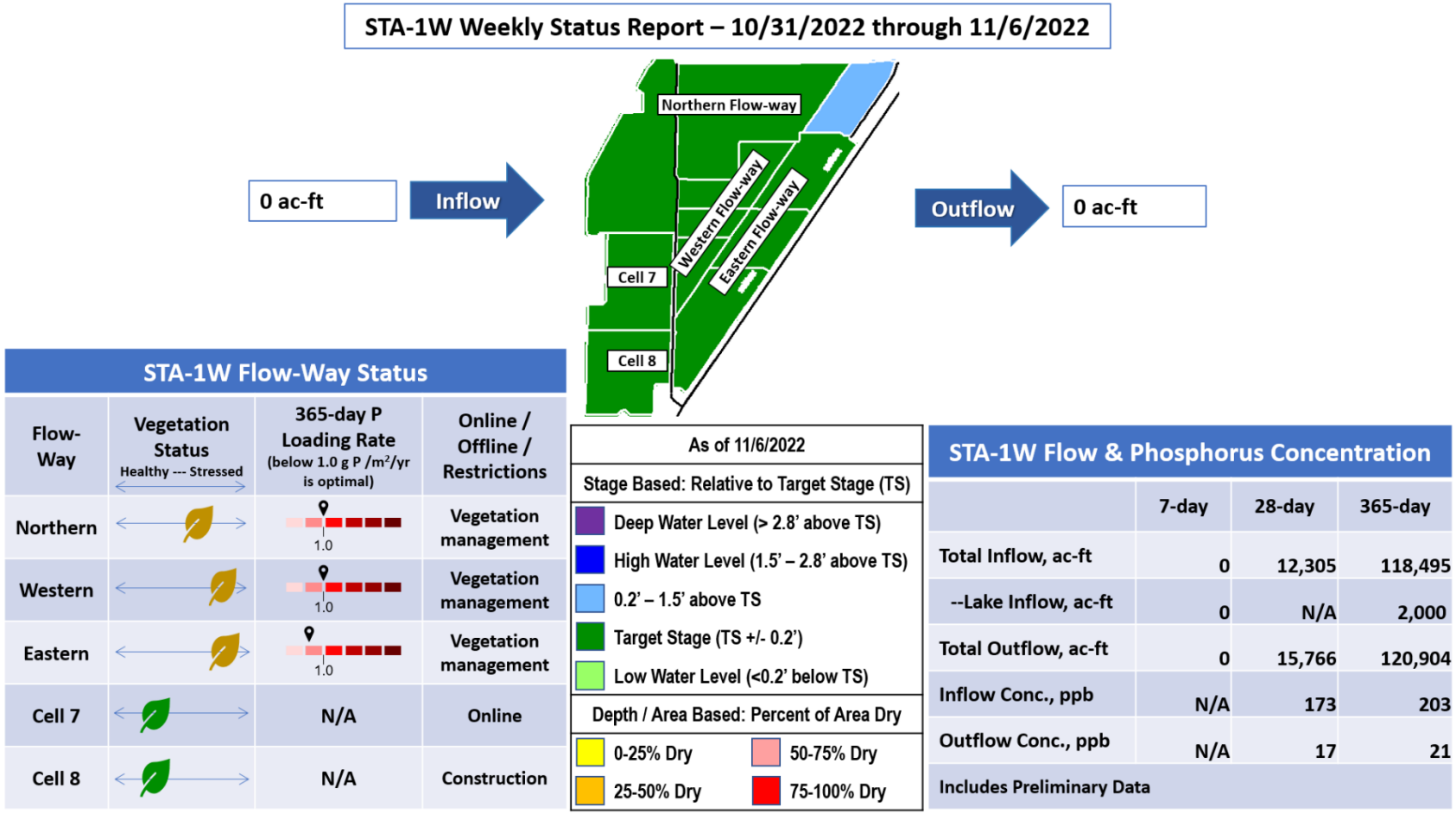
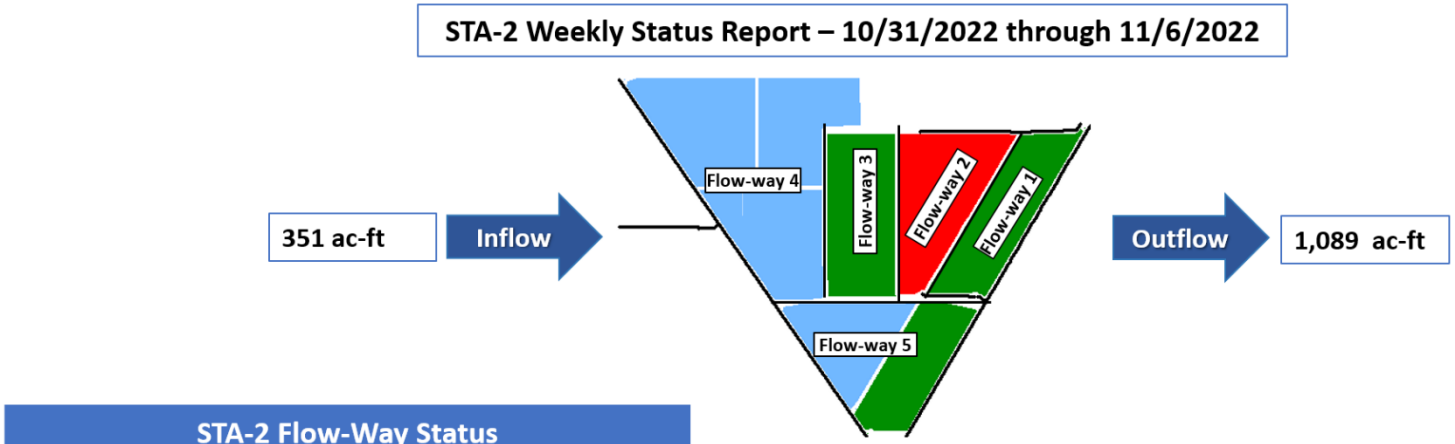


Figure S-2. STA-1W Weekly Status Report



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

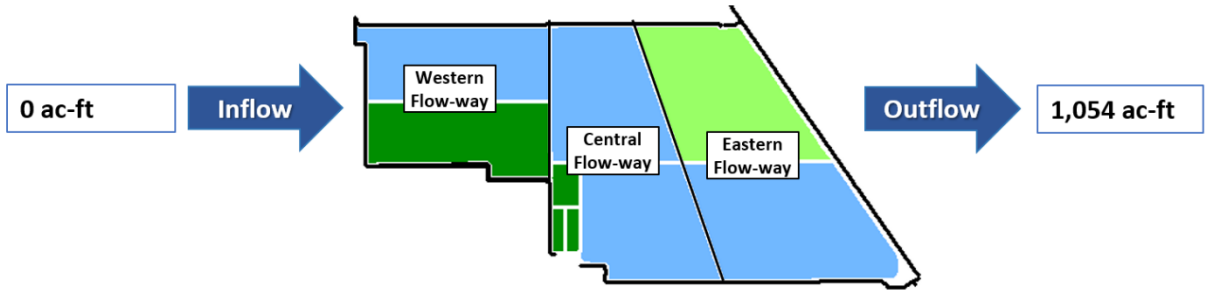
As of 11/6/2022	
Stage Based: Relative to Target Stage (TS)	
Deep Water Level (> 2.8' above TS)	
High Water Level (1.5' – 2.8' above TS)	
0.2' – 1.5' above TS	
Target Stage (TS +/- 0.2')	
Low Water Level (<0.2' below TS)	
Depth / Area Based: Percent of Area Dry	
0-25% Dry	50-75% Dry
25-50% Dry	75-100% Dry

STA-2 Flow & Phosphorus Concentration

	7-day	28-day	365-day
Total Inflow, ac-ft	351	21,147	304,990
--Lake Inflow, ac-ft	0	N/A	27,700
Total Outflow, ac-ft	1,089	31,127	331,812
Inflow Conc., ppb	58	84	115
Outflow Conc., ppb	18	33	29
Includes Preliminary Data			

Figure S-3. STA-2 Weekly Status Report

STA-3/4 Weekly Status Report – 10/31/2022 through 11/6/2022



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 11/6/2022	
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

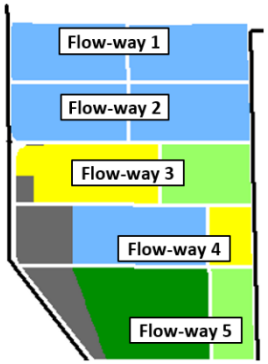
	7-day	28-day	365-day
Total Inflow, ac-ft	0	29,873	309,905
--Lake Inflow, ac-ft	0	N/A	5,300
Total Outflow, ac-ft	1,054	36,345	303,068
Inflow Conc., ppb	N/A	64	92
Outflow Conc., ppb	16	13	16

Includes Preliminary Data

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

STA-5/6 Weekly Status Report – 10/31/2022 through 11/6/2022

3,179 ac-ft **Inflow**



Outflow 2,564 ac-ft

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
1		1.0	Online
2		1.0	Online
3		1.0	Online
4		1.0	Online
5		1.0	Online

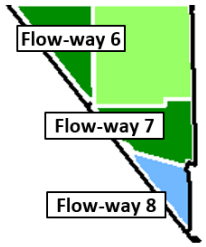
As of 11/6/2022	
Stage Based: Relative to Target Stage (TS)	
Deep Water Level (> 2.8' above TS)	
High Water Level (1.5' – 2.8' above TS)	
0.2' – 1.5' above TS	
Target Stage (TS +/- 0.2')	
Low Water Level (<0.2' below TS)	
Depth / Area Based: Percent of Area Dry	
0-25% Dry	50-75% Dry
25-50% Dry	75-100% Dry

STA-5/6 Flow & Phosphorus Concentration

	7-day	28-day	365-day
Total Inflow, ac-ft	3,179	34,910	154,697
--Lake Inflow, ac-ft	0	N/A	0
Total Outflow, ac-ft	2,564	36,124	149,413
Inflow Conc., ppb	116	269	255
Outflow Conc., ppb	23	51	38
Includes Preliminary Data			

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

STA-5/6 Weekly Status Report – 10/31/2022 through 11/6/2022



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		1.0	Online
7		1.0	Online
8		1.0	Online

As of 11/6/2022	
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 continues a gradual recession last week. The average on Sunday was 0.25 feet below the flat Zone A1 regulation line. WCA-2A: Stage recession at the 2-17 gauge slowed last week. The average on Sunday was 1.05 feet above the falling regulation line. WCA-3A: Over the last week the Three Gauge Average receded at a faster rate than the previous week. The average stage was 0.07 feet above the flat regulation line on Sunday. WCA-3A North: At gauge 62 (Northwest corner) stage continues a steep descent, the average on Sunday was 0.41 feet below the falling Upper schedule line. (**Figures EV-1** through **EV-4**).

Water Depths

The SFWDAT tool illustrates current conditions in the WCAs are drier than one month ago but wetter than two months ago. The Big Cypress basin is returning to drier conditions. Currently WCA-2A depths are above 2.5 feet in the southern one-quarter of that basin. Along the northern reach of the L-67s the spatial extent of the area with depths over 4.0 feet have decreased but the extent of the "ponded" region has expanded 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 drier significantly so in WCA-3A North and northern WCA-2A. Looking back a year ago, WCA-1 and WCA-2A are shallower; conditions are deeper in eastern WCA-3A (**Figure EV-5 and Figure EV-6)**. Comparing current conditions to the 20-year average on November 6th: Conditions continue to move closer to average in most regions of the EPA with water depths in northeastern SRS remaining well above the average for this time of year (**Figure EV-7**).

Taylor Slough and Florida Bay

Taylor Slough and Florida Bay received an average of 0.20 inches of total rain this past week based on 18 gauges used in this report. Average total rainfall was almost 0.1 inch less than the previous week (0.29 inches). Precipitation ranged from 0.03 inches in Terrapin Bay (TB) in the central nearshore region of Florida Bay to 0.5 inches at Highway Creek (HC) in the eastern nearshore north of Long Sound (LS). Taylor Slough stages continued to decrease at all stations. The average change was −0.113 feet (**Figure EV-8 and Figure EV-9**). Taylor Slough water levels remain above the historical average for this time of year by +3.08 inches compared to before the Florida Bay initiative (starting in 2017), a decrease of 1.0 inch from last week.

Average Florida Bay salinity is 28.5, an increase of +1.7 from the previous week. Salinity changes ranged from a decrease of −2.1 at Little Madeira (LM) downstream of Taylor River to an increase of +8.2 in Terrapin Bay (TB) in the central nearshore region (**Figure EV-8**). Salinities in Central Florida Bay now exceed the 75th percentile for this time of year. In the Eastern and Western regions, salinities remain within the IQR. (**Figure EV-10**). Florida Bay salinity is 5.5 above its historical average for this time of year, an increase of 1.4 from the previous 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 abrupt changes in water depth and conserving water north in the system has an ecological benefit. Given current stages, continuing to maximize the volume of water moving (via pumping in the northwest versus gravity flow in the northeast) into the northern perimeter of WCA-3A will benefit the ecology of that region by providing an overall greater volume of water into the basin as conditions transition to a dry season predicted to be drier than average. Priority of flows from the west to the east is expected to change as the dry season progresses. 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	0.44	−0.04
WCA-2A	0.40	−0.13
WCA-2B	0.26	+0.16
WCA-3A	0.28	−0.13
WCA-3B	0.27	−0.05
ENP	0.21	+0.00

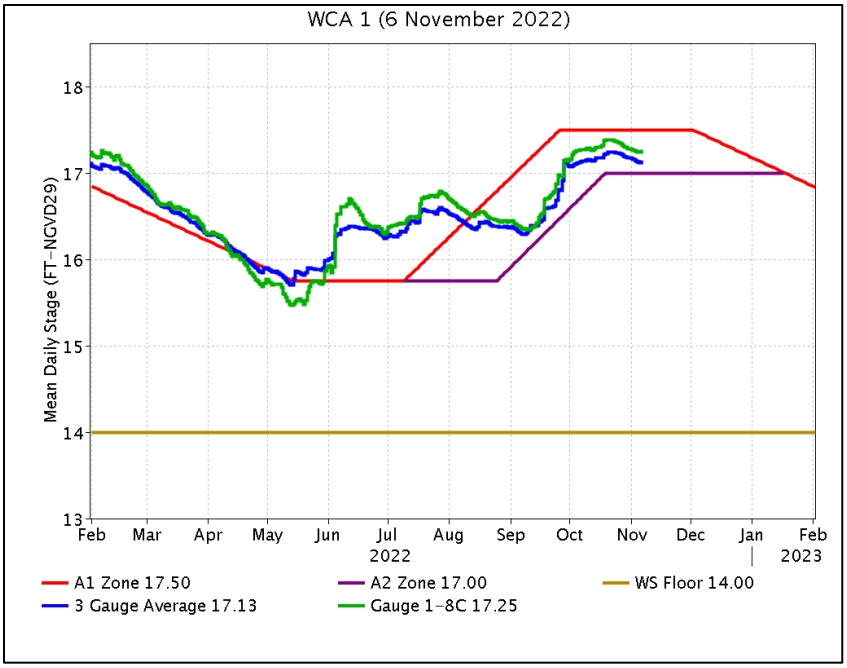


Figure EV-1. WCA-1 stage hydrographs and regulation schedule.

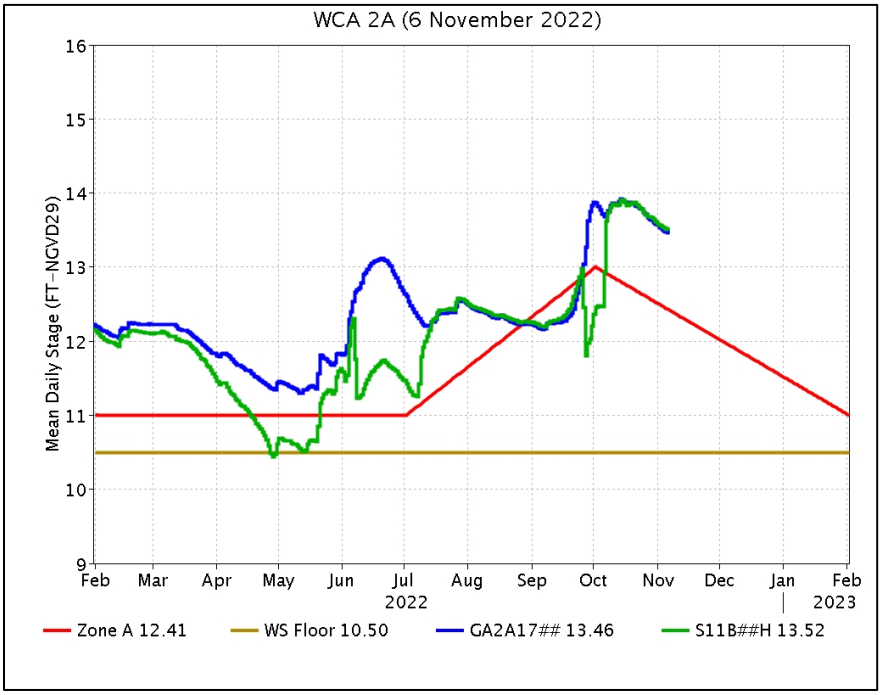


Figure EV-2. WCA-2A stage hydrographs and regulation schedule.

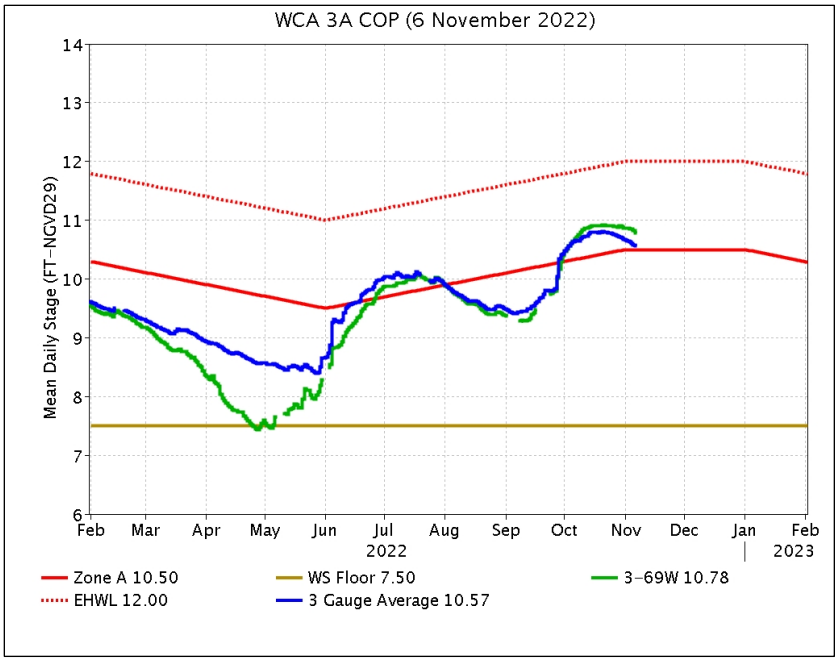


Figure EV-3. WCA-3A stage hydrographs (three-gauge average, S-333 headwater) and regulation schedule.

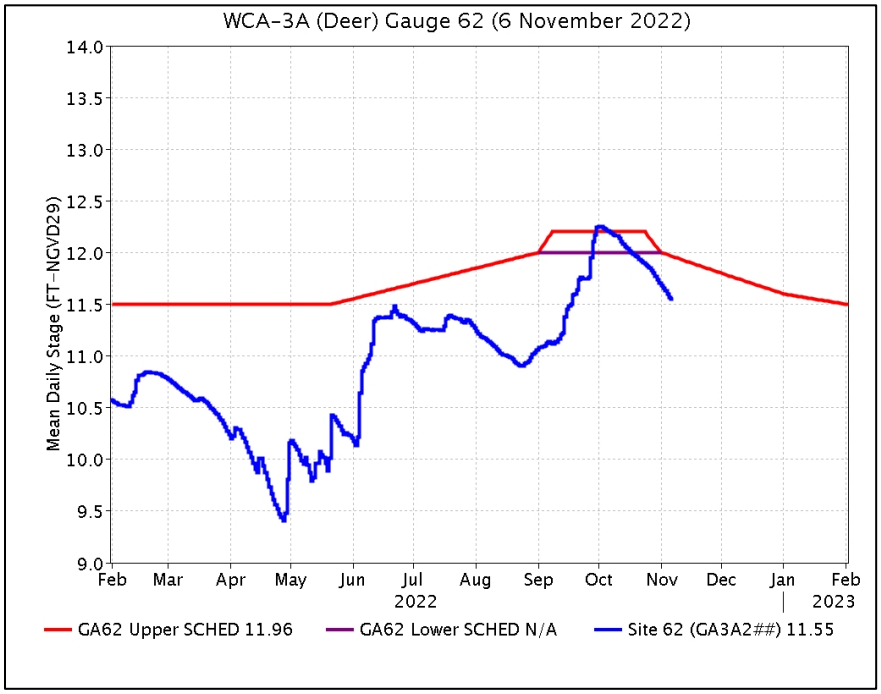


Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.

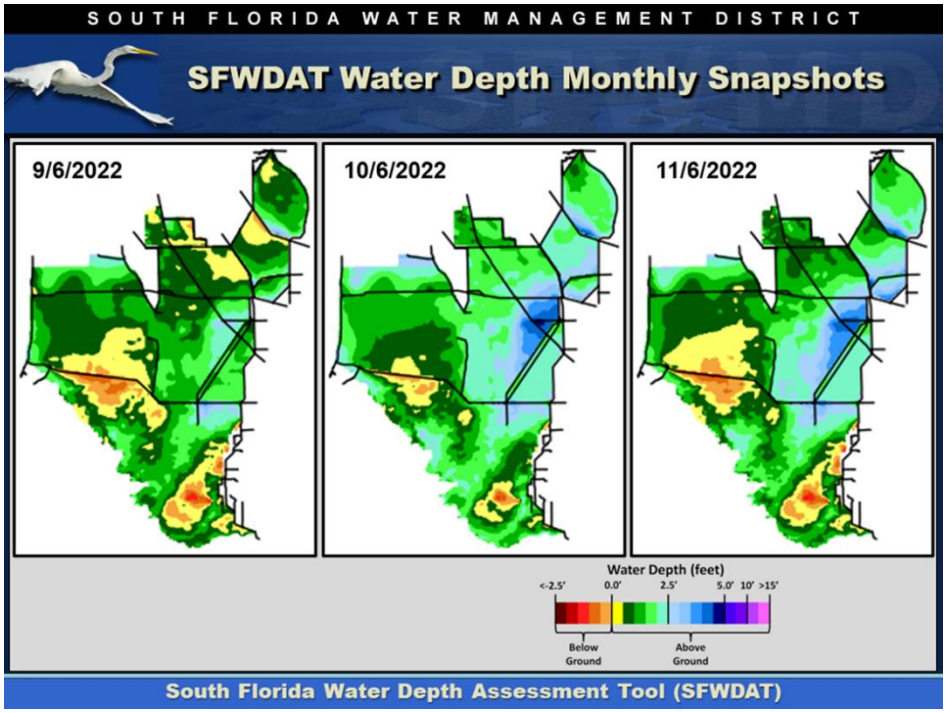


Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

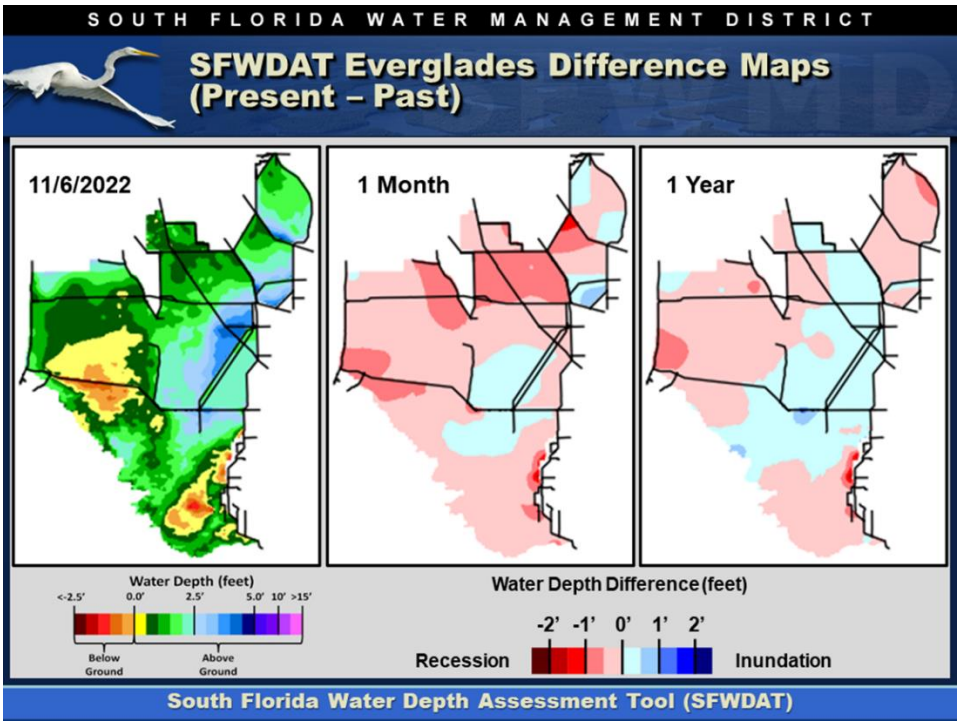


Figure EV-6. Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

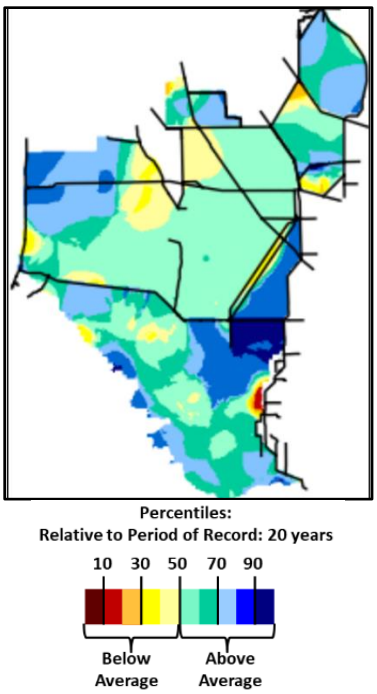


Figure EV-7. Present water depths (11/6/2022) compared to the day of year average over the previous 20 years.

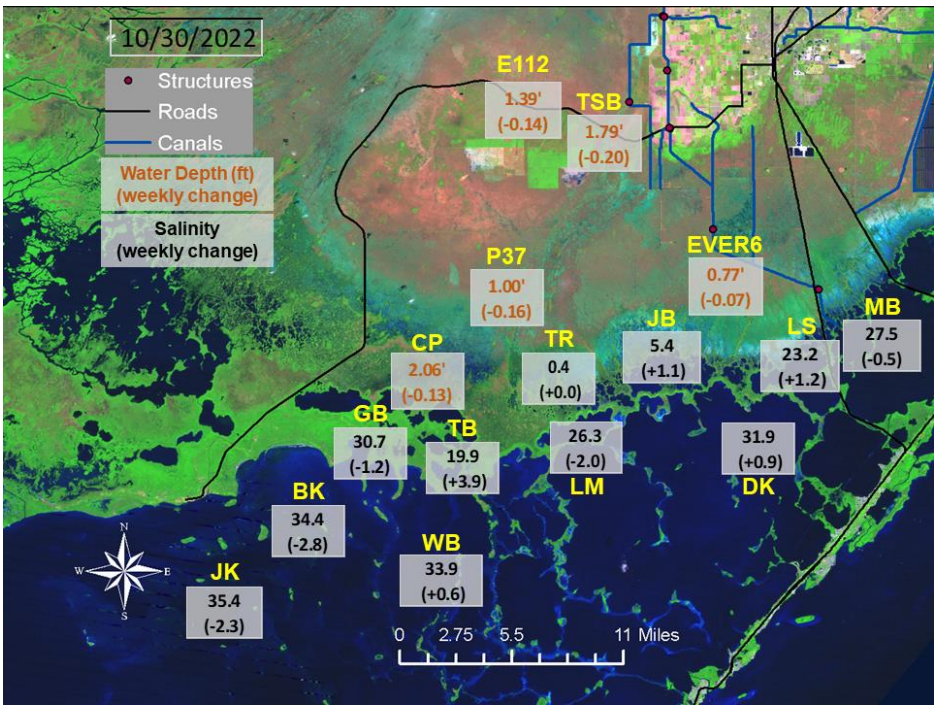


Figure EV-8. Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

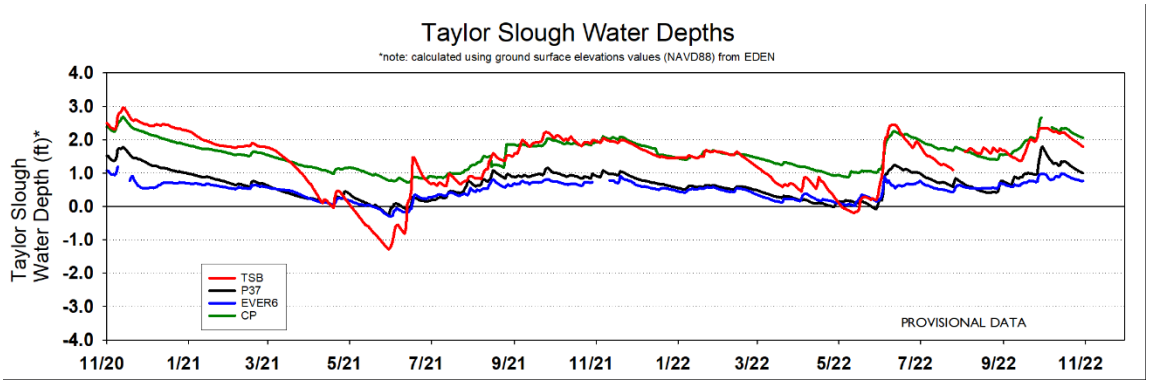


Figure EV-9. Taylor Slough water depth time series.

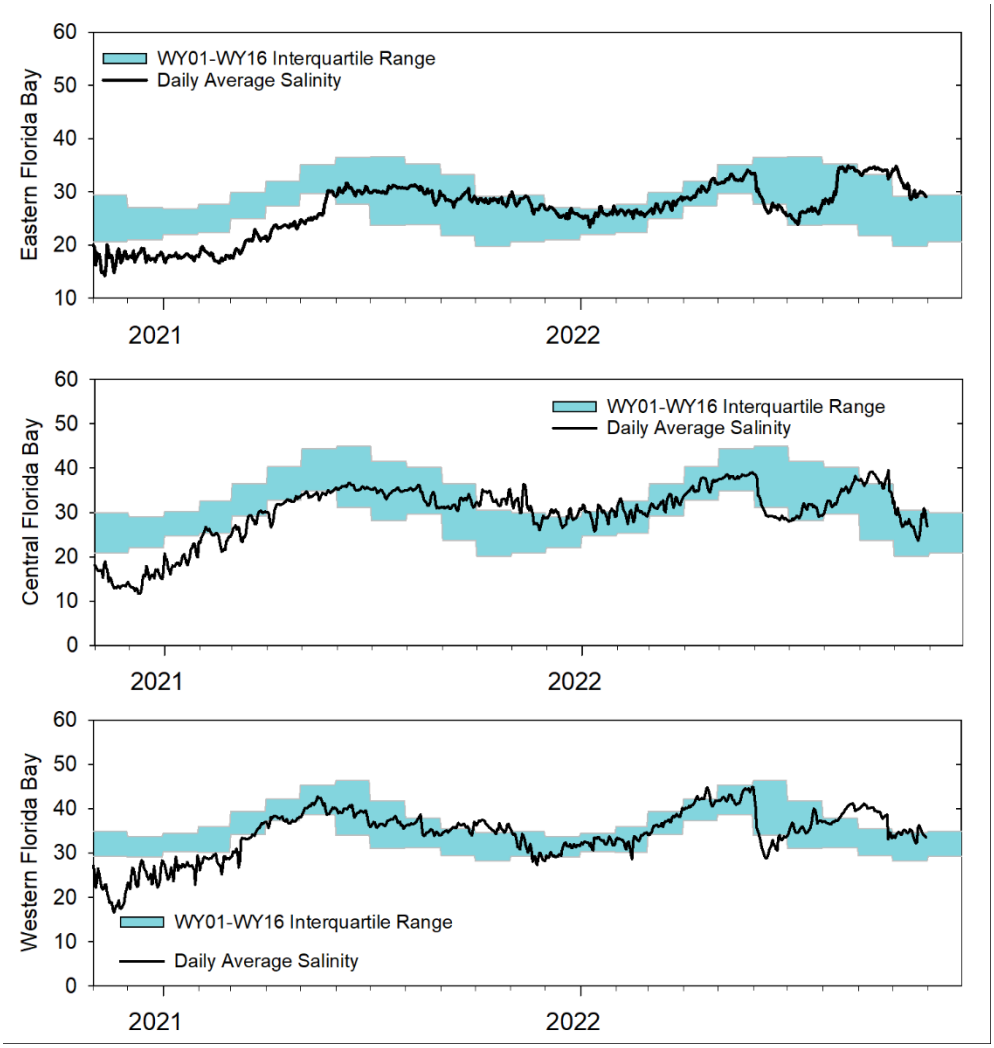


Figure EV-10. Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

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

SFWMD Everglades Ecological Recommendations, November 8th, 2022 (red is new)			
Area	Weekly change	Recommendation	Reasons
WCA-1	Stage decreased by 0.04’	Conserve water in this basin as possible. Recession rate of less than 0.06’ per week.	Protect within basin and downstream habitat and wildlife.
WCA-2A	Stage decreased by 0.13’	Conserve water in this basin as possible. Recession rate of less than 0.06’ per week.	Protect within basin and downstream habitat and wildlife. Protect conditions conducive to wading bird foraging later in the season.
WCA-2B	Stage increased by 0.16’	Ascension rate of less than 0.25 feet per week.	Protect within basin and downstream habitat and wildlife.
WCA-3A NE	Stage decreased by 0.21’	Conserve water in this basin as possible. Recession rate of less than 0.06’ 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 0.17’	Conserve water in this basin as possible. Recession rate of less than 0.06’ per week	
Central WCA-3A S	Stage decreased by 0.09’	Conserve water in this basin as possible. Recession rate of less than 0.12’ per week	Protect within basin and downstream habitat and wildlife.
Southern WCA-3A S	Stage decreased by 0.03’		
WCA-3B	Stage decreased by 0.05’	Recession rate of less than 0.12’ per week.	Protect within basin and downstream habitat and wildlife. Lower fire risk.
ENP-SRS	Stage remained unchanged	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 −0.205’ to −0.029’	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged from −2.1 to +8.2	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 432 cfs and the previous 30-day mean inflow was 757 cfs. The seven-day mean salinity was 25.3 at BBCW8 and 20.1 at BBCW10, both below the preferred maximum salinity of 35 for these sites. Data provided by Biscayne National Park.

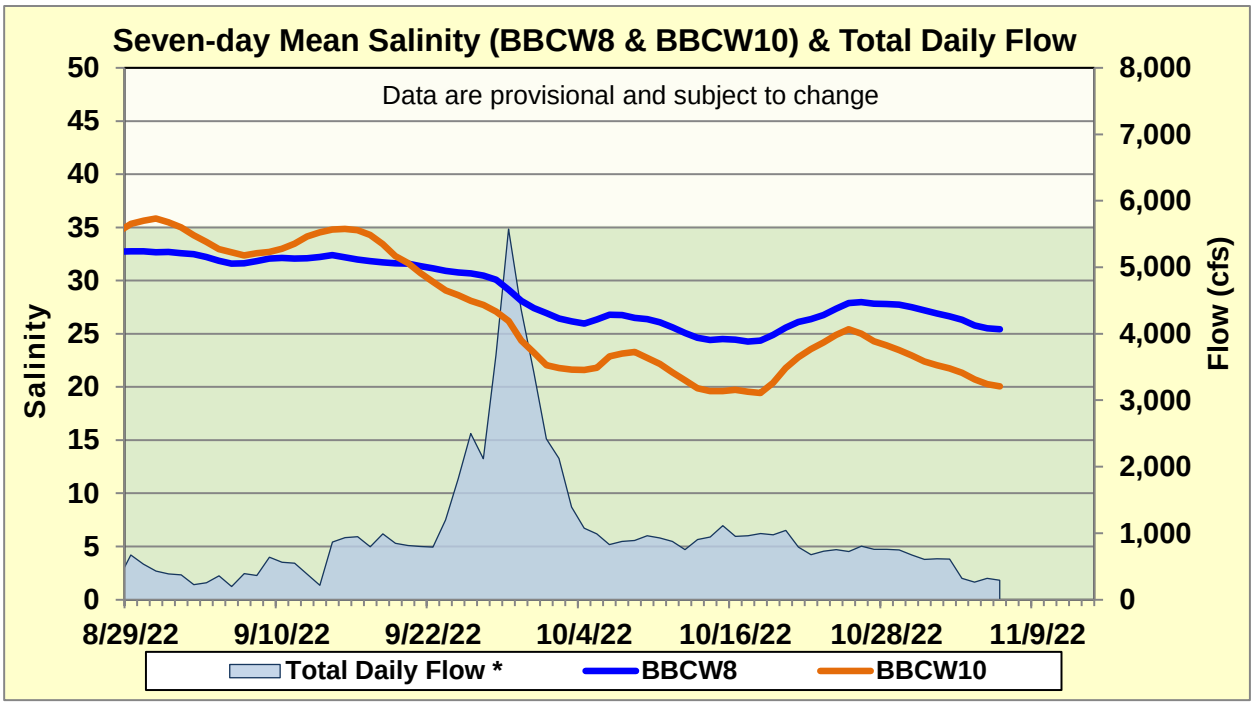


Figure BB-1. Seven-day mean salinity at BBCW8 and BBCW10 and total daily flow in Biscayne Bay. Total daily flow was calculated using flow from structures S20G, S20F, S21, S21A, S123, and S700P.