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 16, 2022

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

Mid-level high pressure and its associated sinking air will suppress most shower activity today by drying out and stabilizing the mid-layers of the atmosphere. However, an isolated shower or thunderstorm is possible over the southeast this afternoon. A fast-moving upper disturbance soon to enter the Ohio Valley will send a cold front southward into Florida tomorrow. However, with dry antecedent conditions, only light shower activity is expected along the frontal boundary when it passes through Lake Okeechobee tomorrow afternoon. Following the frontal passage, a return to northeasterly flow on Thursday could support some light shower activity along the lower east coast. Next, a deep upper trough will dig in over the southeastern U.S. on Saturday, which will send a cold front southward into the Gulf of Mexico, crossing through central Florida. An increase in precipitation is expected along and south of the frontal boundary on Friday and Saturday. Widely scattered showers and thunderstorms could result area-wide, but with generally low aerial average rainfall expected. When the front moves south later in the week, most places should dry out. However, the wind direction behind the front will veer northeasterly, which will favor some light shower activity along the lower east coast. Below average rainfall is expected for the 7-day period ending next Tuesday morning.

Kissimmee

Hurricane Nicole had relatively small and short-lived effects on the Kissimmee Basin compared to Hurricane Ian about six weeks earlier. Most lakes continue to make releases for local basin runoff. Weekly average discharges on November 13, 2022, at S-65 and S-65A were 1,900 cfs and 2,200 cfs, respectively, both of which were higher than the previous week. Mean weekly water depth on the Kissimmee River floodplain decreased from the previous week to 1.04 feet. The weekly average concentration of dissolved oxygen in the Kissimmee River increased from 1.3 mg/L the previous week to 2.8 mg/L on November 13, 2022, above both the potentially lethal level and the physiologically stressful range for largemouth bass and other sensitive species. However, the daily average was trending down quickly, finishing the week at 2.0 mg/L.

Lake Okeechobee

Lake Okeechobee stage was 16.18 feet NGVD on November 13, 2022, with water levels 0.29 feet higher than previous week and 1.17 feet higher than a month ago. Lake stage was in the Low sub-band and 0.68 inches above the upper limit of the ecological envelope. This makes the third year in a row lake stages have exceeded 16 feet NGVD at the beginning of the dry season. Average daily inflows (excluding rainfall) increased, and outflows (excluding evapotranspiration) decreased from the previous week. The most recent satellite image (November 13, 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 2,204 cfs over the past week with no flow coming from Lake Okeechobee. Mean salinities decreased 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 3,296 cfs over the past week with 8 cfs coming from Lake Okeechobee. Mean salinities decreased at all sites over the past week. Salinities were in the optimal range (0-10) for tape grass in the upper estuary. Salinities were in the optimal range for adult eastern oysters at Cape Coral and Shell Point (10-25) and in the stressed range at Sanibel (>25).

Stormwater Treatment Areas

For the week ending Sunday, November 13, 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 12,600 ac-feet. The total amount of inflows to the STAs in WY2023 is approximately 923,000 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 most regions of the WCAs moved into the "fair" or "good" category as depths remained fairly stable over the week as storm activity from Hurricane Nicole was moderate. Depths are near average across WCA-3A which is not ecologically advantageous as conditions can be too dry in the north and too wet in the south. Taylor slough stages fell at some stations last week but overall remains above average. On average salinities increased last week in Florida Bay and remain above average, and the Central region remains above the IQR.

Biscayne Bay

Total inflow to Biscayne Bay averaged 682 cfs and the previous 30-day mean inflow averaged 708 cfs. The seven-day mean salinity was 25.2 at BBCW8 and 25.6 at BBCW10, both are within the ideal salinity range for estuarine animals in this region (salinity less than 35). Data provided by Biscayne National Park.

Supporting Information

Kissimmee Basin

Upper Kissimmee

On November 13, 2022, mean daily lake stages were 58.1 feet NGVD (0.1 feet above schedule) in East Lake Toho, 55.0 feet NGVD (0.0 schedule) in Lake Toho, and 52.9 feet NGVD (0.4 above schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1**, **Figures KB-1-3**).

Lower Kissimmee

On November 13, 2022, mean weekly discharge was increased to 1,900 cfs at S-65 and 2,200 cfs at S-65A in response to rising water levels in KCH and Pool A. Mean weekly discharge from the Kissimmee River was 2,600 cfs at S-65D and 2,700 cfs at S-65E (**Table KB-2**). Mean weekly headwater stages were 46.7 feet NGVD at S-65A and 28.3 feet NGVD at S-65D on November 13, 2022. With S-65A discharge rising, mean weekly river channel stage decreased from the previous week's mean of 38.6 feet to 38.4 feet on November 13, 2022 (**Figure KB-4**). Mean weekly water depth on the Kissimmee River floodplain decreased from 1.27 feet the previous week to 1.04 feet on November 13, 2022 (**Table KB-2**, **Figure KB-5**). The weekly average concentration of dissolved oxygen in the Kissimmee River increased from 1.3 mg/L the previous week to 2.8 mg/L on November 13, 2022, but daily averages were trending quickly downward in the latter part of the week (**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)	
							11/13/22	*11/6/22*
Lakes Hart and Mary Jane	S-62	LKMJ	280	61.2	R	61.0	0.2	-0.1
Lakes Myrtle, Preston and Joel	S-57	S-57	79	62.4	R	62.0	0.4	-0.1
Alligator Chain	S-60	ALLI	220	64.0	R	64.0	0.0	0.0
Lake Gentry	S-63	LKGT	340	61.5	R	61.5	0.0	0.0
East Lake Toho	S-59	TOHOE	1000	58.1	R	58.0	0.1	-0.1
Lake Toho	S-61	TOHOW S-61	2100	55.0	R	55.0	0.0	-0.1
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	1900	52.9	R	52.5	0.4	-0.1

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.

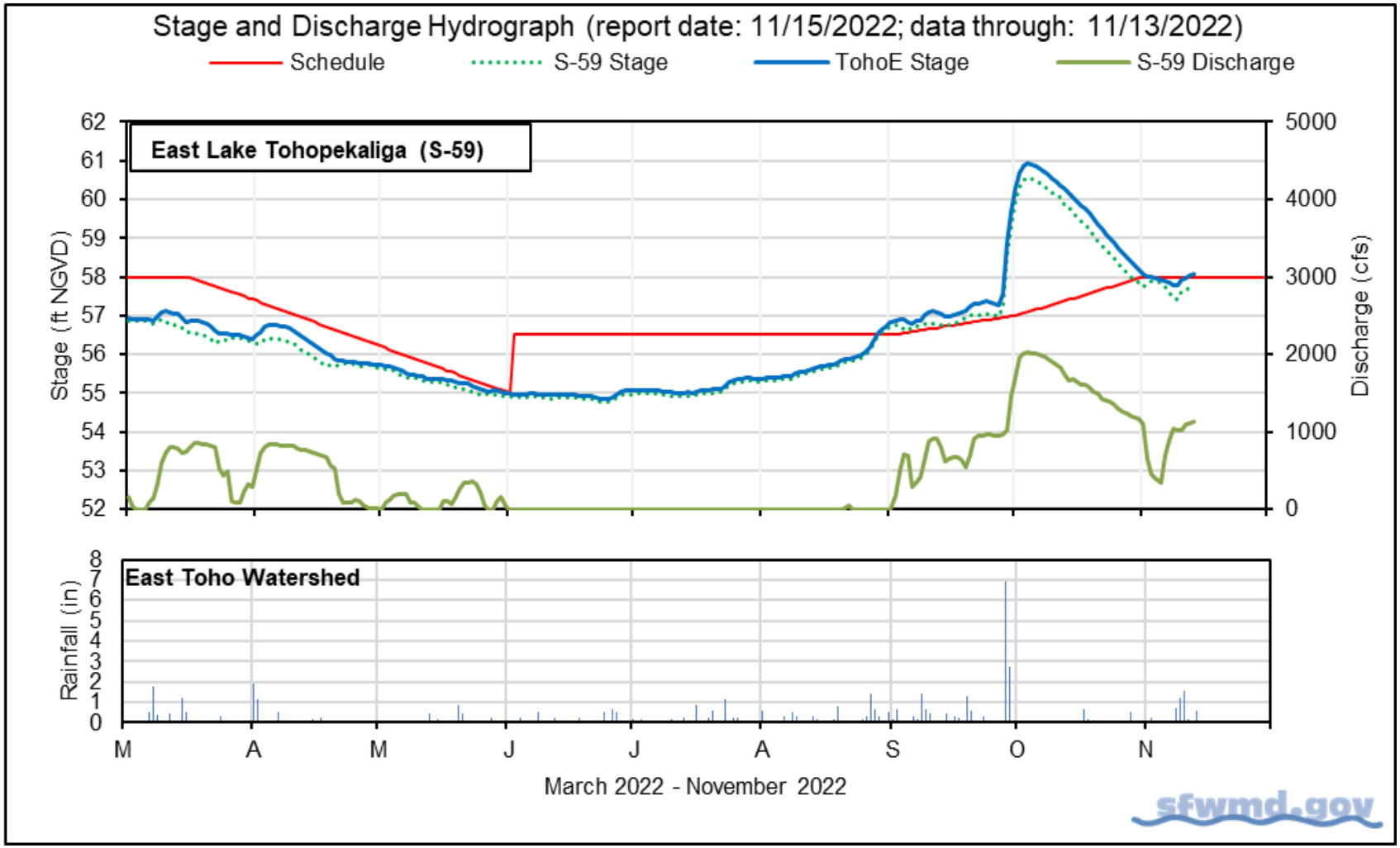


Figure KB-1. East Lake Toho regulation schedule, stage, discharge and rainfall.

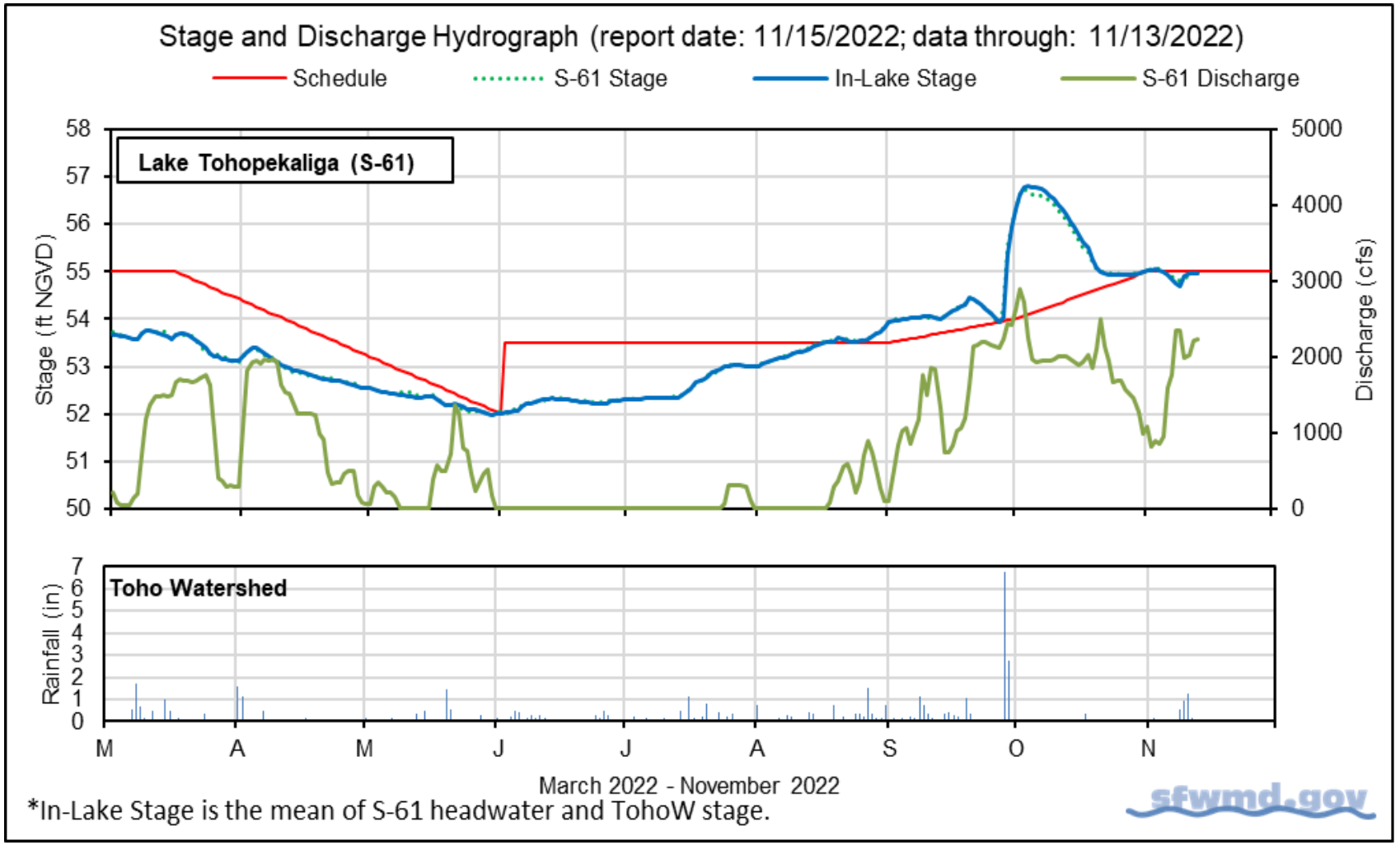


Figure KB-2. Lake Toho regulation schedule, stage, discharge and rainfall.

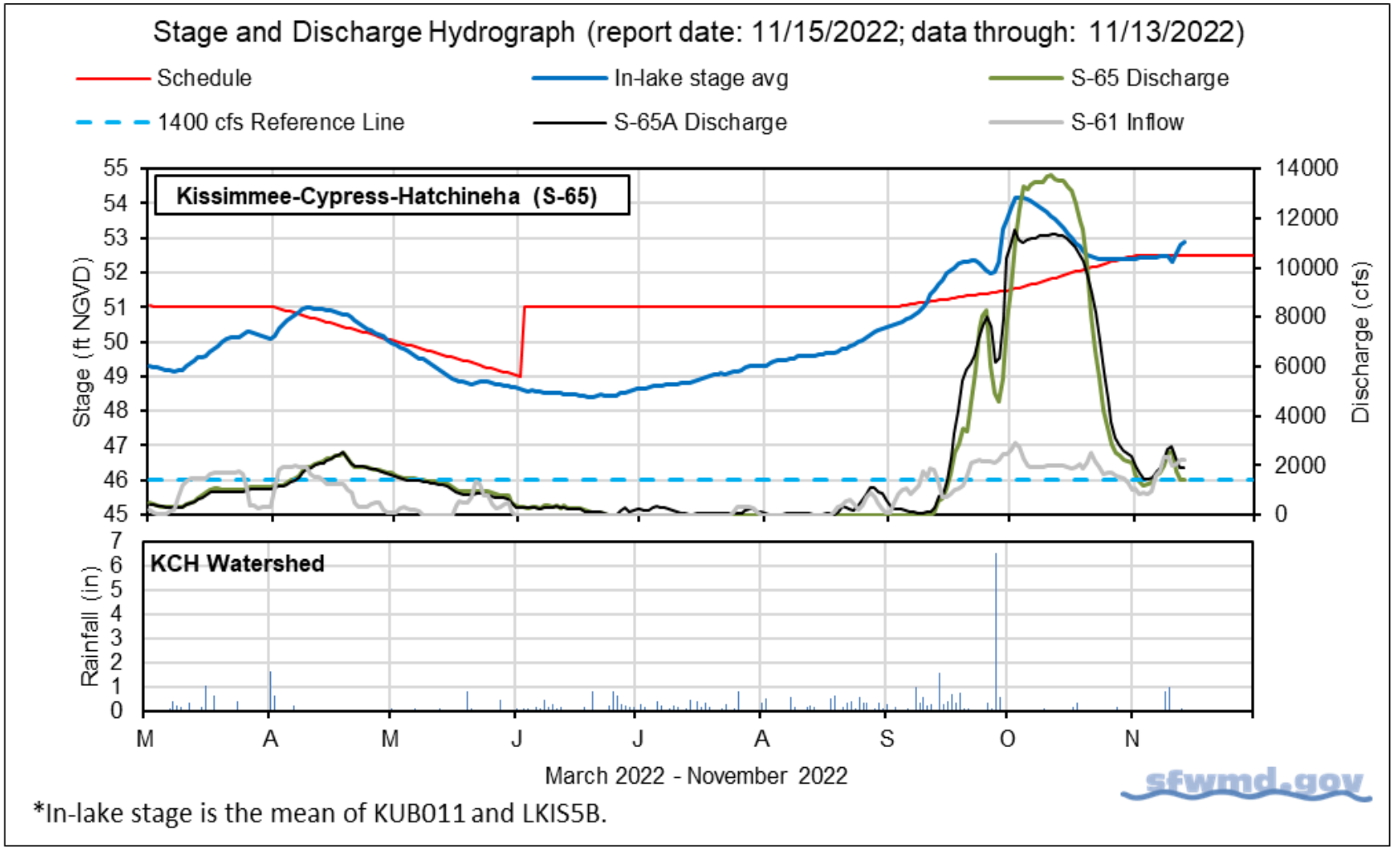


Figure KB-3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

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			
		11/13/22	11/13/22	11/6/22	10/30/22	10/23/22
Discharge	S-65	1,400	1,900	1,500	2,800	9,500
Discharge	S-65A[a]	1,900	2,200	1,700	3,600	9,400
Headwater Stage (feet NGVD)	S-65A	46.6	46.7	46.3	46.7	49.7
Discharge	S-65D[b]	3,000	2,600	3,700	8,100	13,000
Headwater Stage (feet NGVD)	S-65D[c]	28.4	28.3	28.4	28.5	28.5
Discharge (cfs)	S-65E[d]	3,000	2,700	3,700	7,900	12,000
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) [e]	Phase I, II/III river channel	2.0	2.8	1.3	1.2	1.4
River channel mean stage[f]	Phase I river channel	38.7	38.4	38.6	40.4	42.6
Mean depth (feet) [g]	Phase I floodplain	1.22	1.04	1.27	2.66	4.53

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).

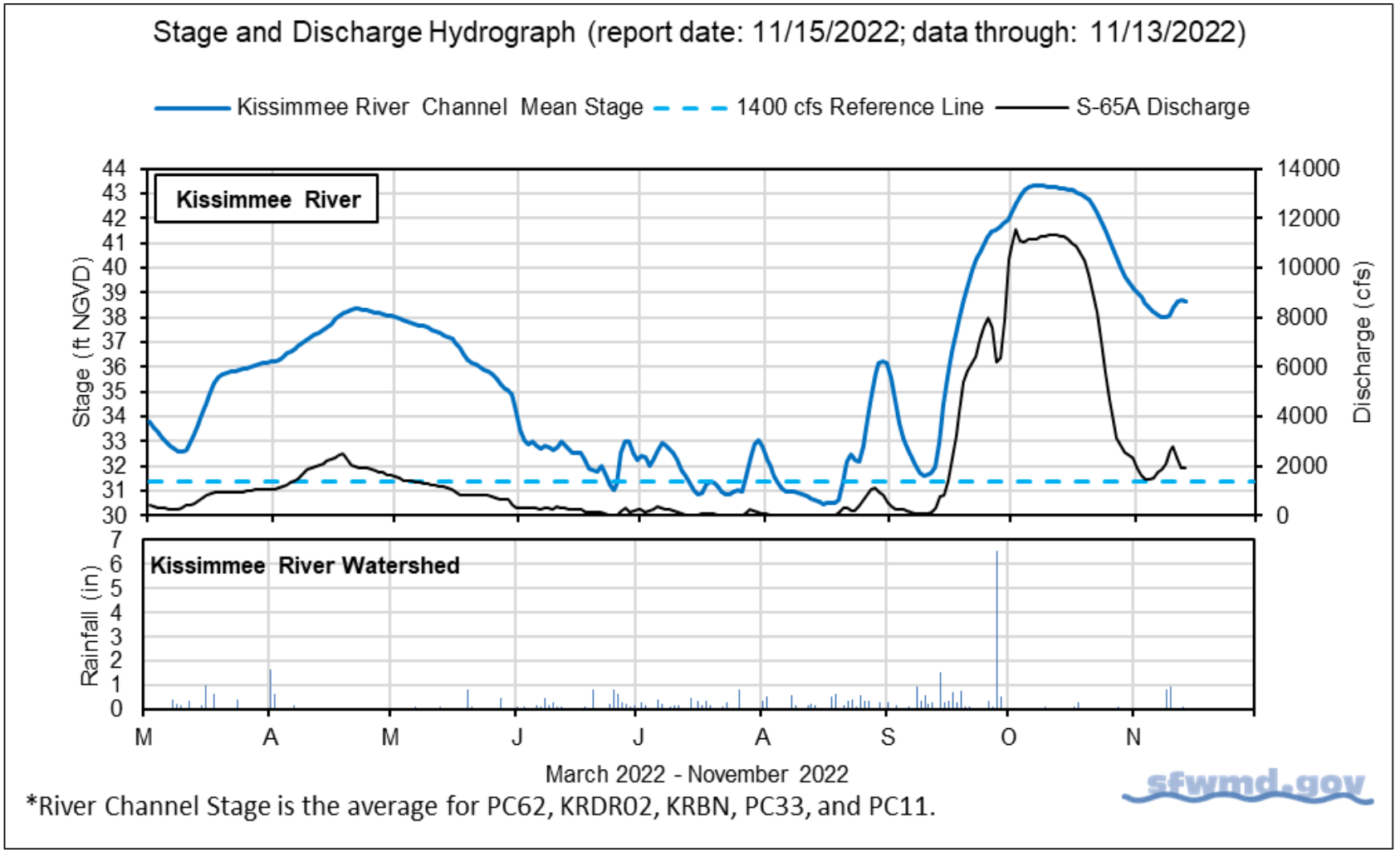


Figure KB-4. Kissimmee River stage, discharge and rainfall.

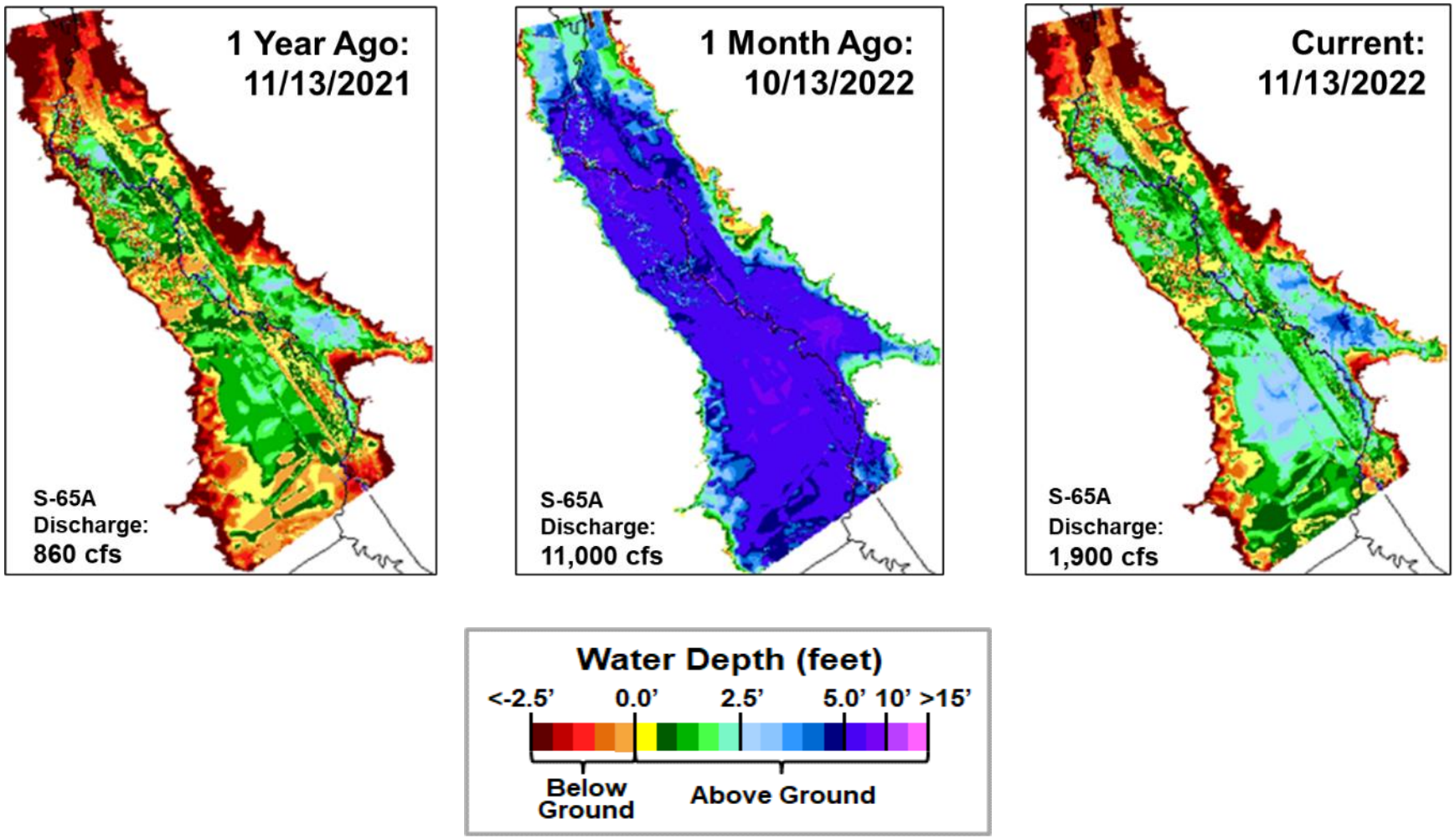


Figure KB-5. Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.

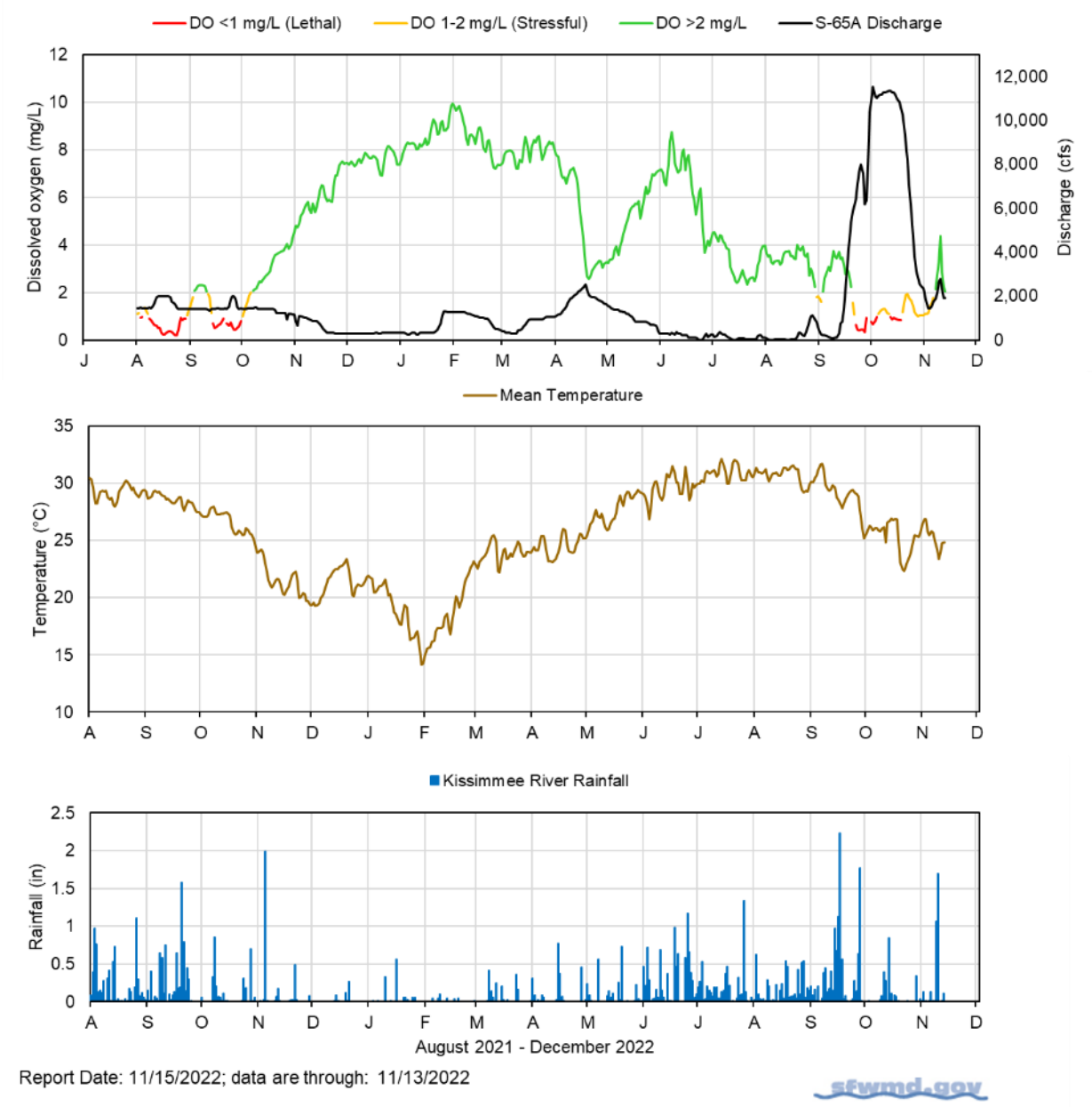


Figure KB-6. Restored Kissimmee river channel mean daily dissolved oxygen concentration (mg/L), S-65A discharge (cfs), temperature (°C) and rainfall (inches). Dissolved oxygen (DO) and temperature are mean daily values averaged for PC62, KRDR02, KRBN, PC33, PC11, PD62R, and PD42R with an average of six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

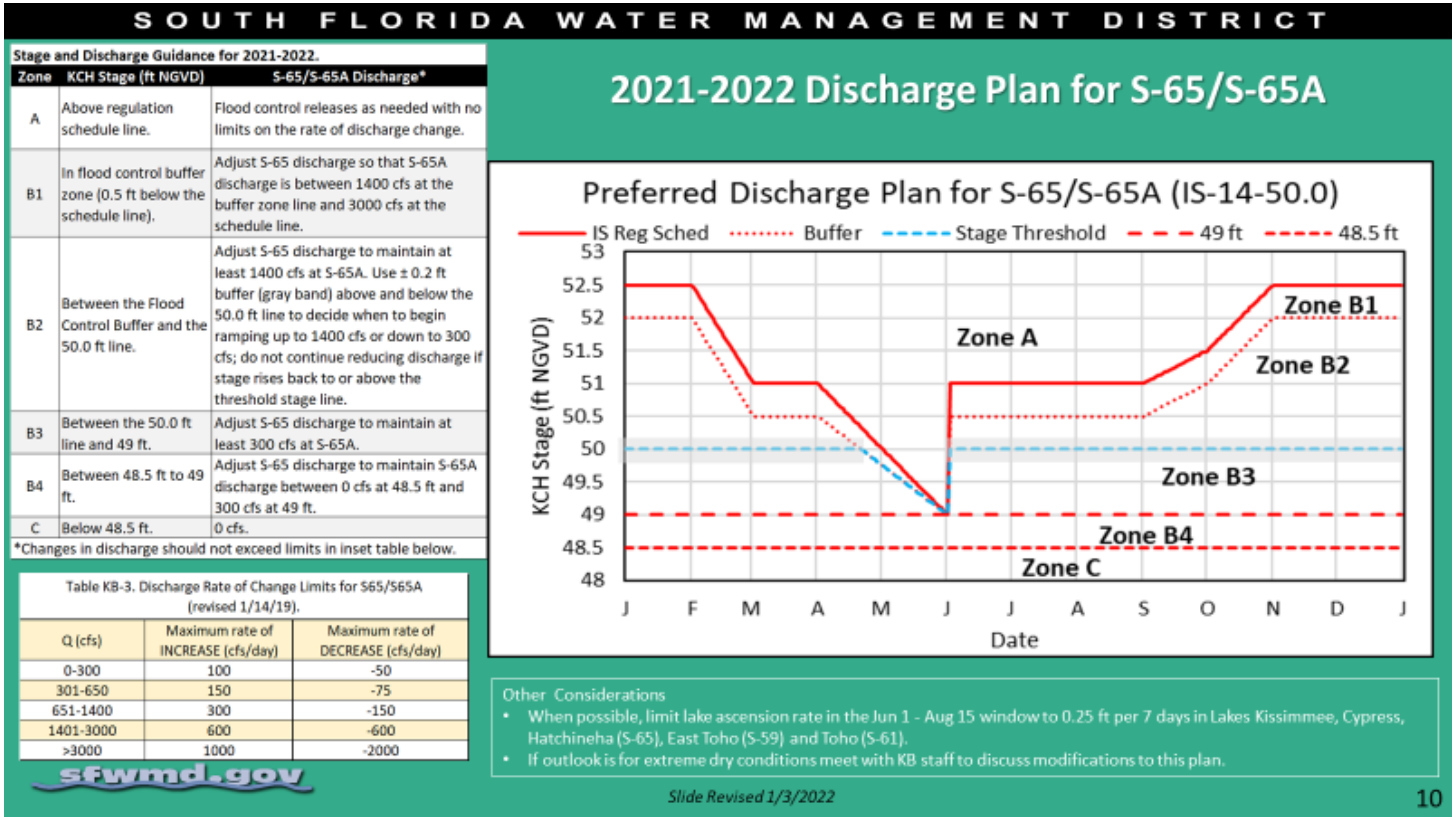


Figure KB-7. IS-14-50 Discharge Plan for S65/S65A with discharge rate of change limits (revised 1/14/19).

Lake Okeechobee

Lake Okeechobee stage was 16.18 feet NGVD on November 13, 2022, with water levels 0.29 feet higher than the previous week and 1.17 feet higher than a month ago (**Figure LO-1**). During the passage of tropical storm Nicole, water levels rose more than 3 inches in 2 days. Lake stage remains within the Low sub-band (**Figure LO-2**) and is currently 0.68 feet above the upper limit of the ecological envelope (**Figure LO-3**). According to NEXRAD, 2.53 inches of rain fell directly on the Lake last week.

Average daily inflows (excluding rainfall) increased from the previous week, going from 4,535 cfs to 5,644 cfs. Average daily outflows (excluding evapotranspiration) decreased from the previous week going from 554 cfs to 32 cfs. The highest inflow came from the Kissimmee River (C-38 Canal; 2,656 cfs), followed by the C-41A Canal (1,419 cfs via S-84 & S-84X) and the C-41 Canal (434 cfs via S-71). Outflow to the west via the S-77 structure into the C-43 Canal was minimal, with a daily average of 8 cfs. Flows to the south via the S-350 structures averaged 25 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 13, 2022) from NOAA's Harmful Algal Bloom Monitoring System showed very low bloom potential for the lake (**Figure LO-6**).

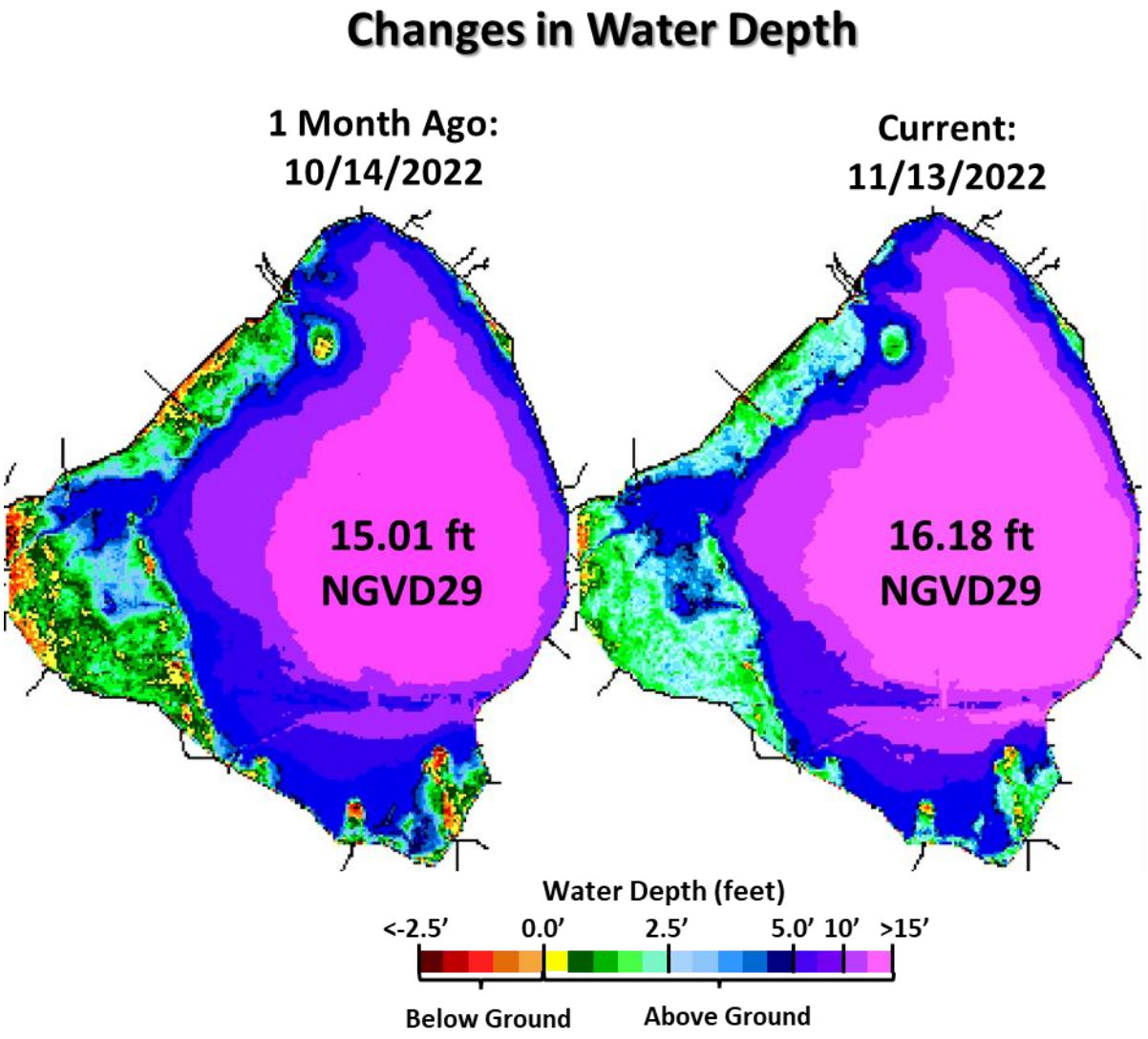


Figure LO-1. Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

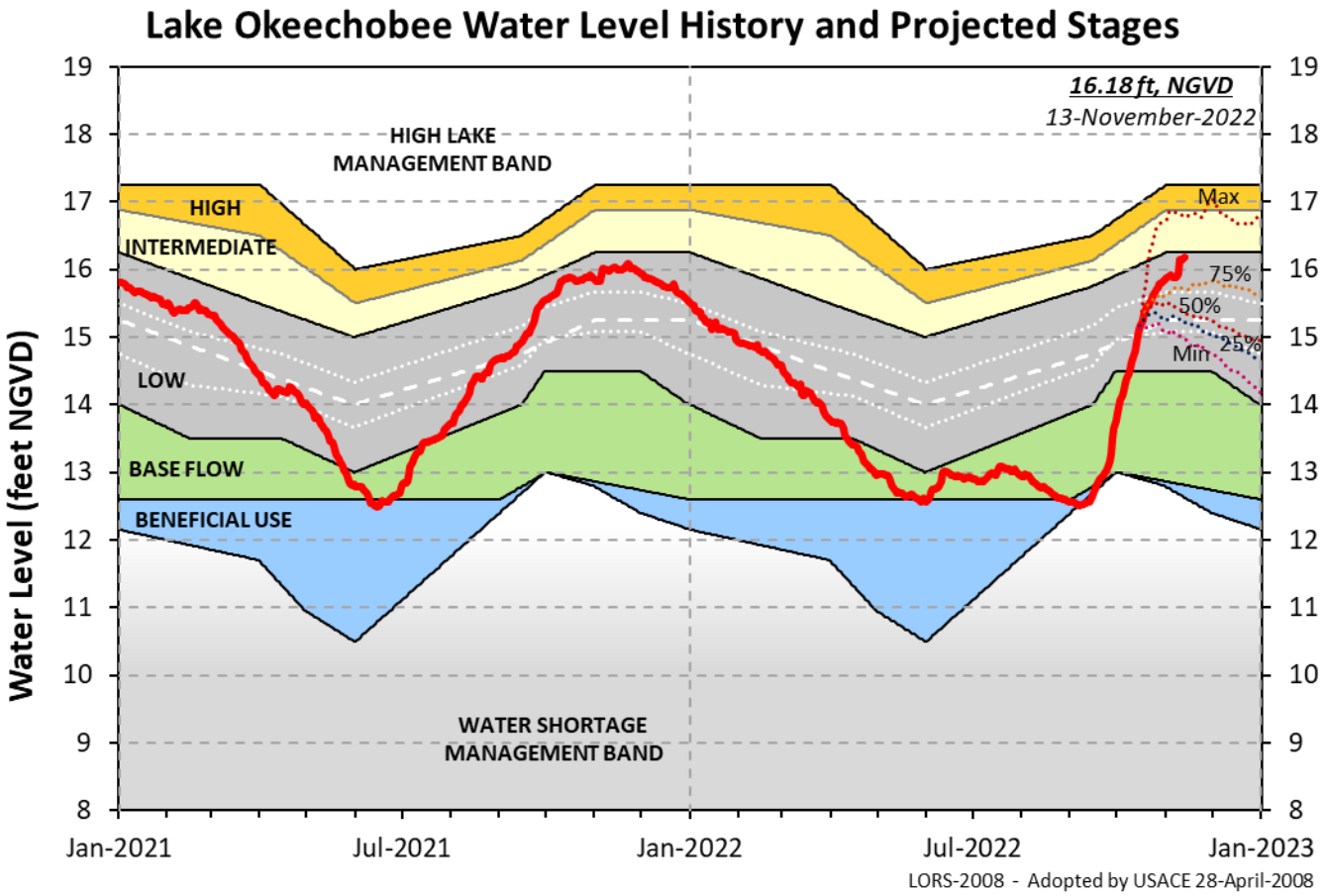


Figure LO-2. Recent Lake Okeechobee stages with projected stages based on a dynamic position analysis.

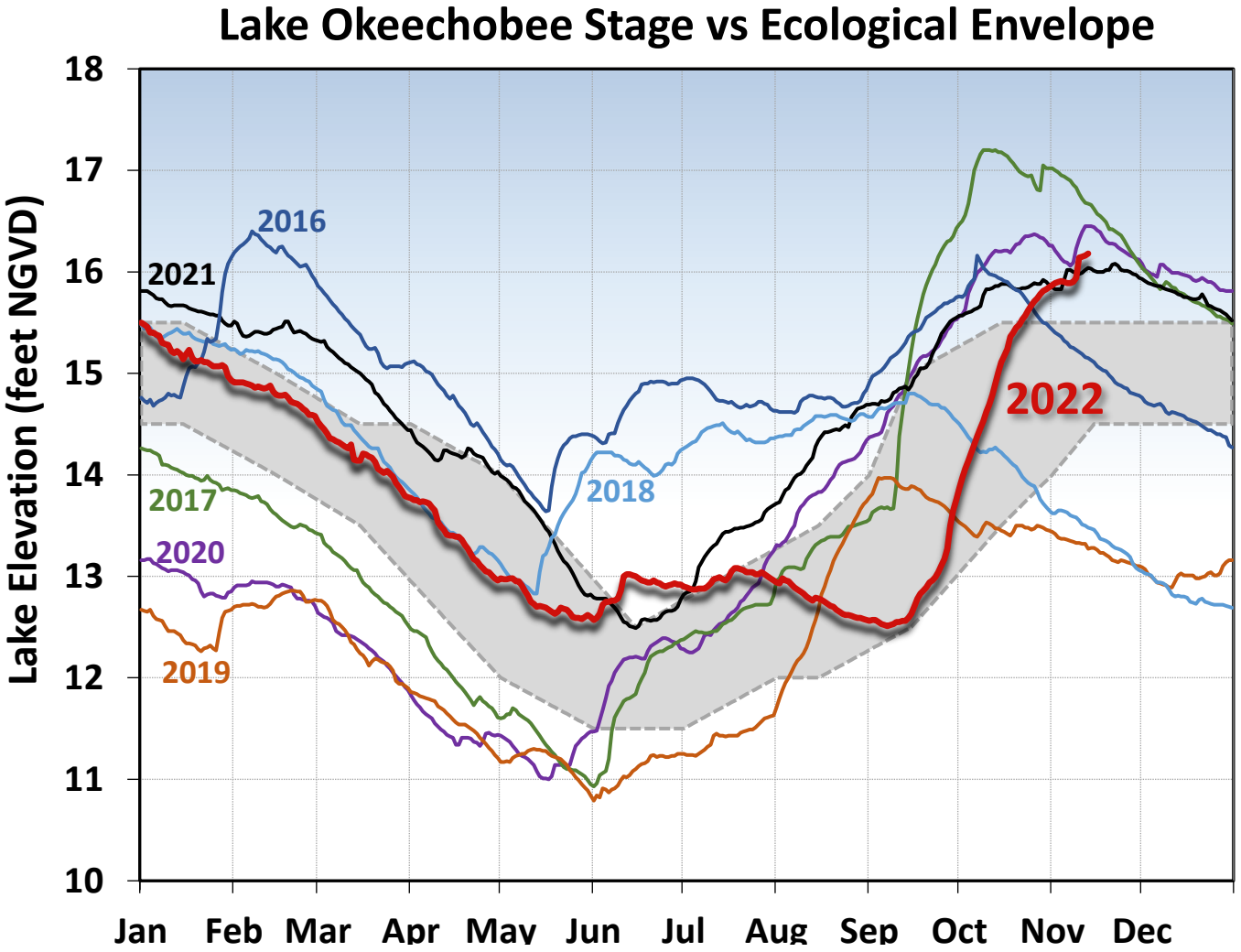


Figure LO-3. The prior six years of annual stage hydrographs for Lake Okeechobee in comparison to the ecological envelope.

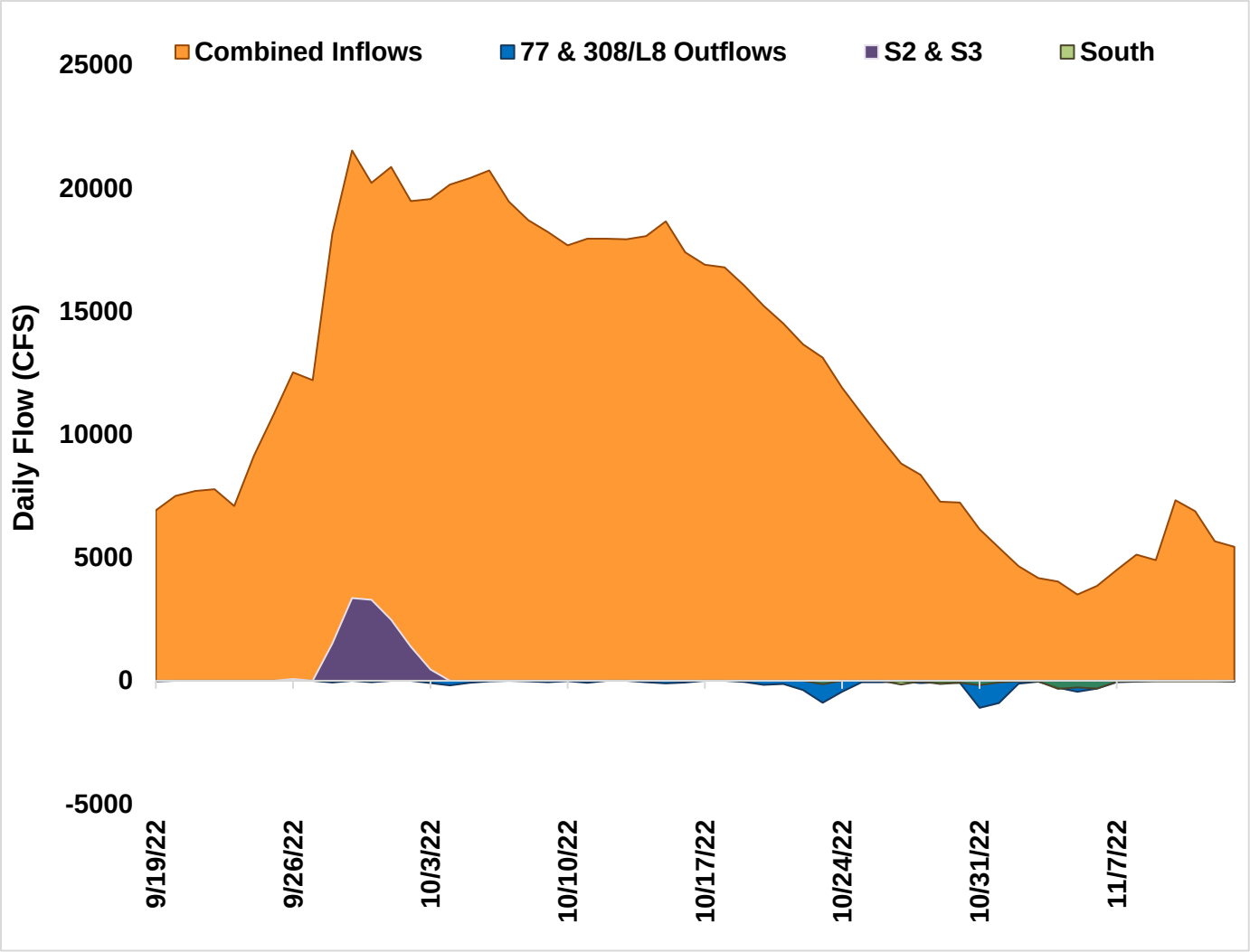


Figure LO-4. Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows from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

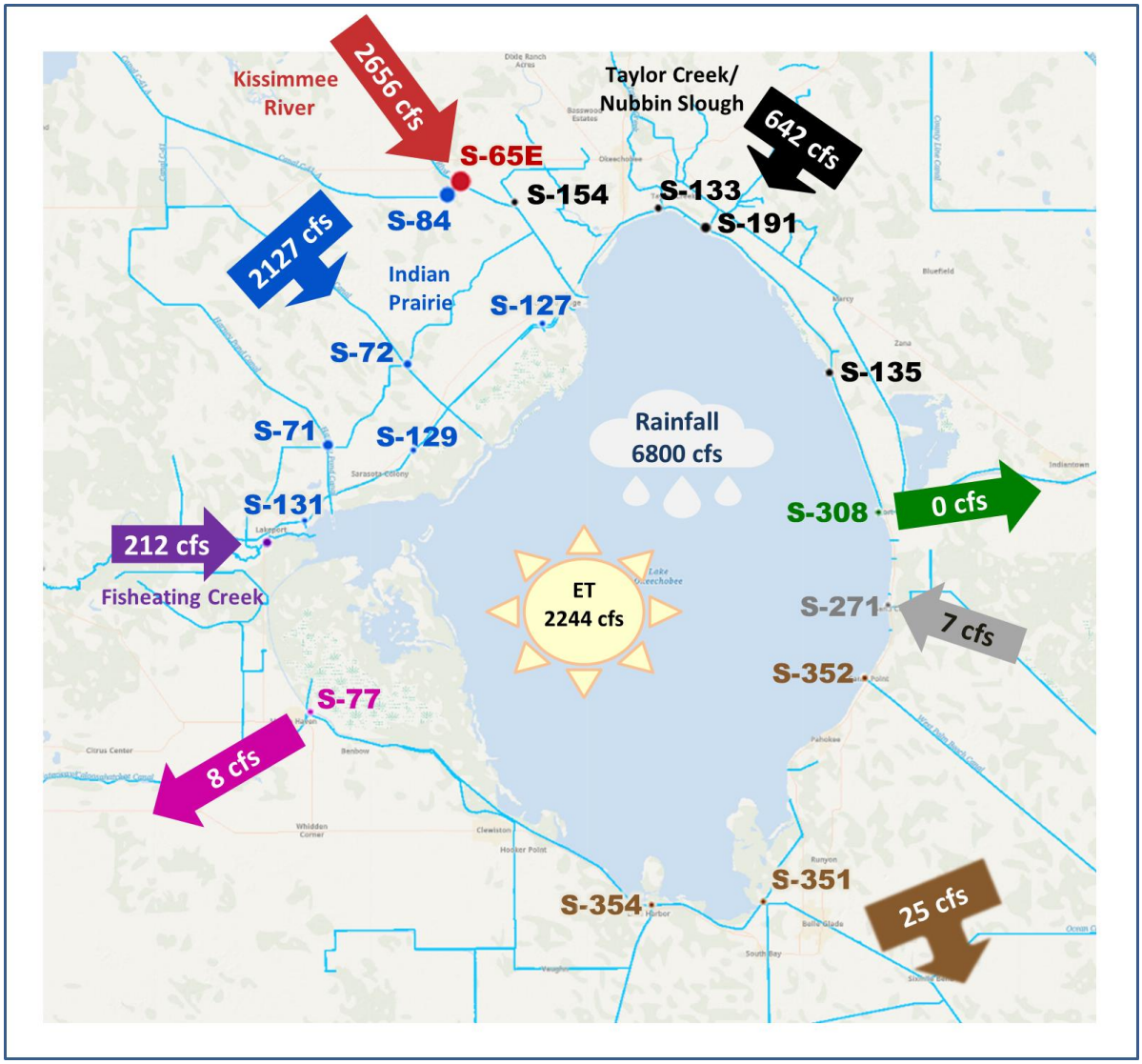


Figure LO-5. Inflows into Lake Okeechobee from Indian Prairie basins, Taylor Creek/Nubbin Slough, Kissimmee River and Fisheating Creek, and outflows to the west via S-77, to the east via S-308, to the south via S-351, S-352, S-354, and to southeast via S-271 (formerly Culvert 10A) for the week of November 7 - 13, 2022.

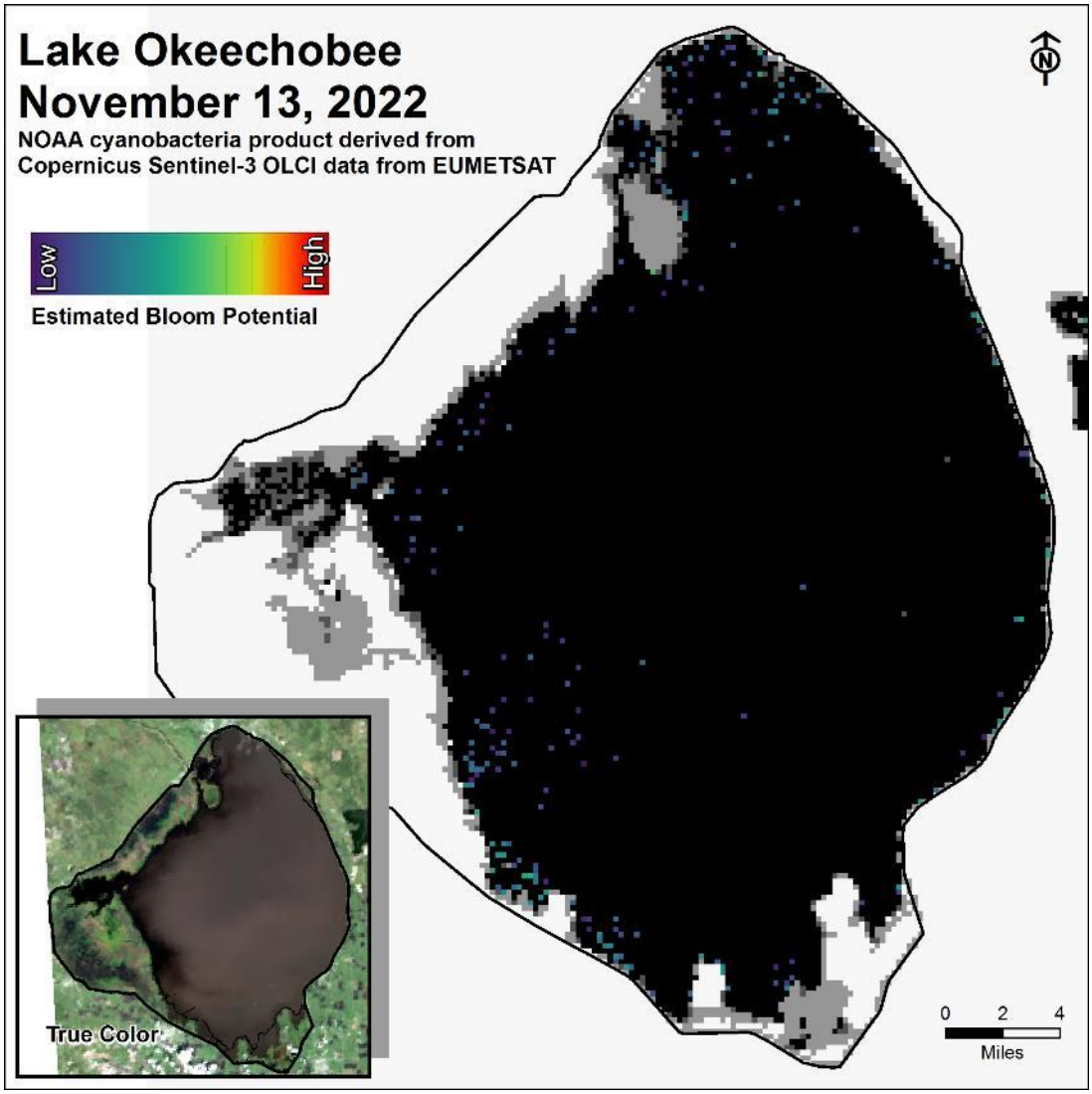


Figure LO-6. Cyanobacteria bloom potential on November 13, 2022, based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

Estuaries

St. Lucie Estuary

Over the past week, mean total inflow to the St. Lucie Estuary was 2,204 cfs (**Figures ES-1** and **ES-2**) and the previous 30-day mean inflow was 979 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-2**.

Over the past week, salinities decreased at all sites in the estuary (**Table ES-1** and **Figure ES-3**). The seven-day moving average of the surface and bottom salinities at the US1 Bridge was 14.4. 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

Over the past week, mean total inflow to the Caloosahatchee River Estuary was 3,296 cfs (**Figures ES-6** and **ES-7**) and the previous 30-day mean inflow was 2,092 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-7**.

Over the past week, salinities decreased at all sites in the estuary (**Table ES-2** and **Figures ES-8** and **ES-9**). The seven-day mean salinities (**Table ES-2**) were in the optimal range (0-10) for tape grass in the upper estuary. The seven-day mean salinity values were within the optimal range for adult eastern oysters at Cape Coral and Shell Point, 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 1,500 cfs, and a steady release at 2,000 cfs with estimated tidal basin inflows of 589 cfs. Model results from all scenarios predict daily salinity to be 1.1 or lower and the 30-day moving average surface salinity to be 0.7 or lower at Val I-75 at the end of the two-week period (**Table ES-3** and **Figure ES-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 9, 2022, that *Karenia brevis*, the Florida red tide dinoflagellate, was observed at bloom concentrations in 11 samples collected from Charlotte County and one sample from Lee County over the past week. On the east coast, red tide was not observed in any samples collected.

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.

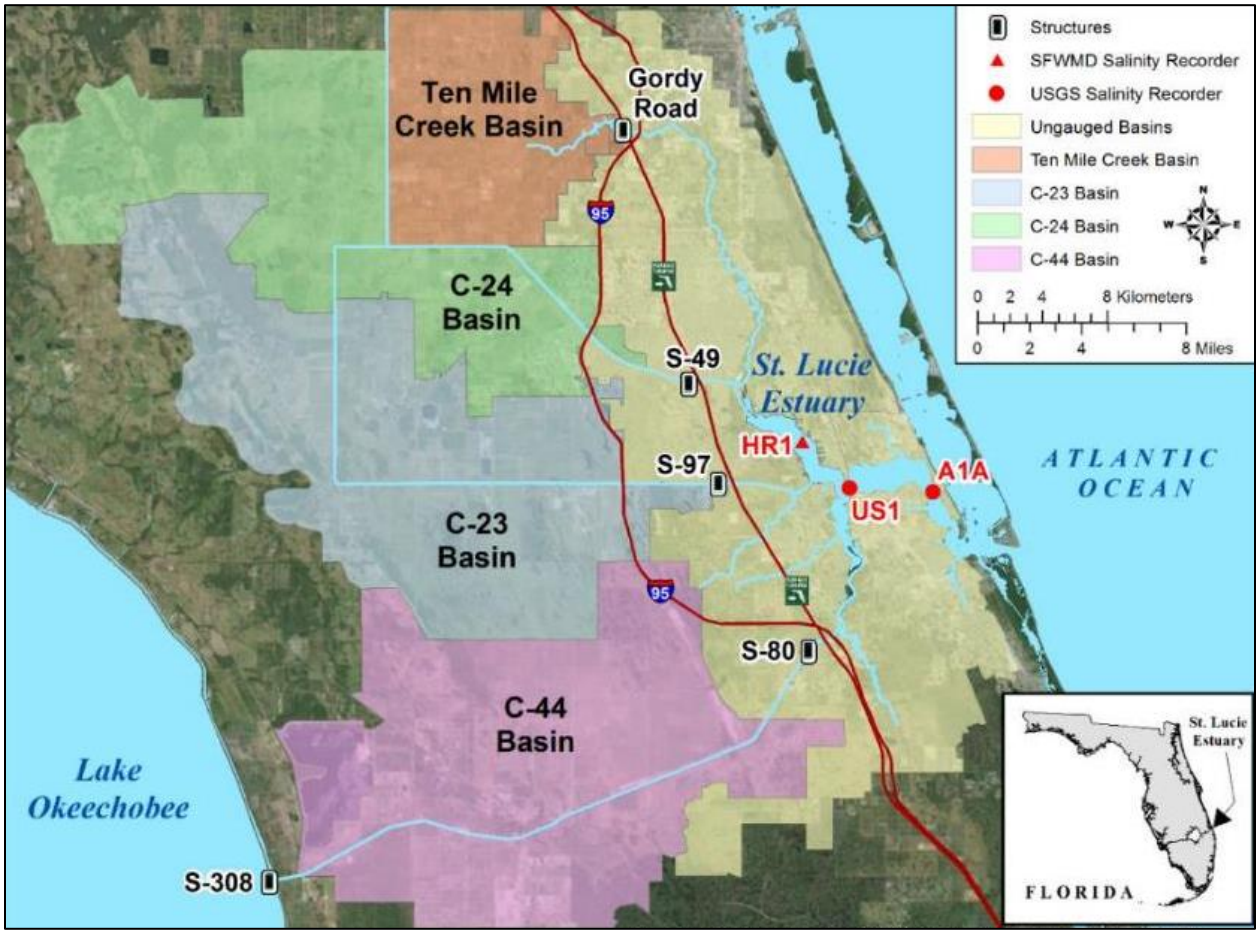


Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

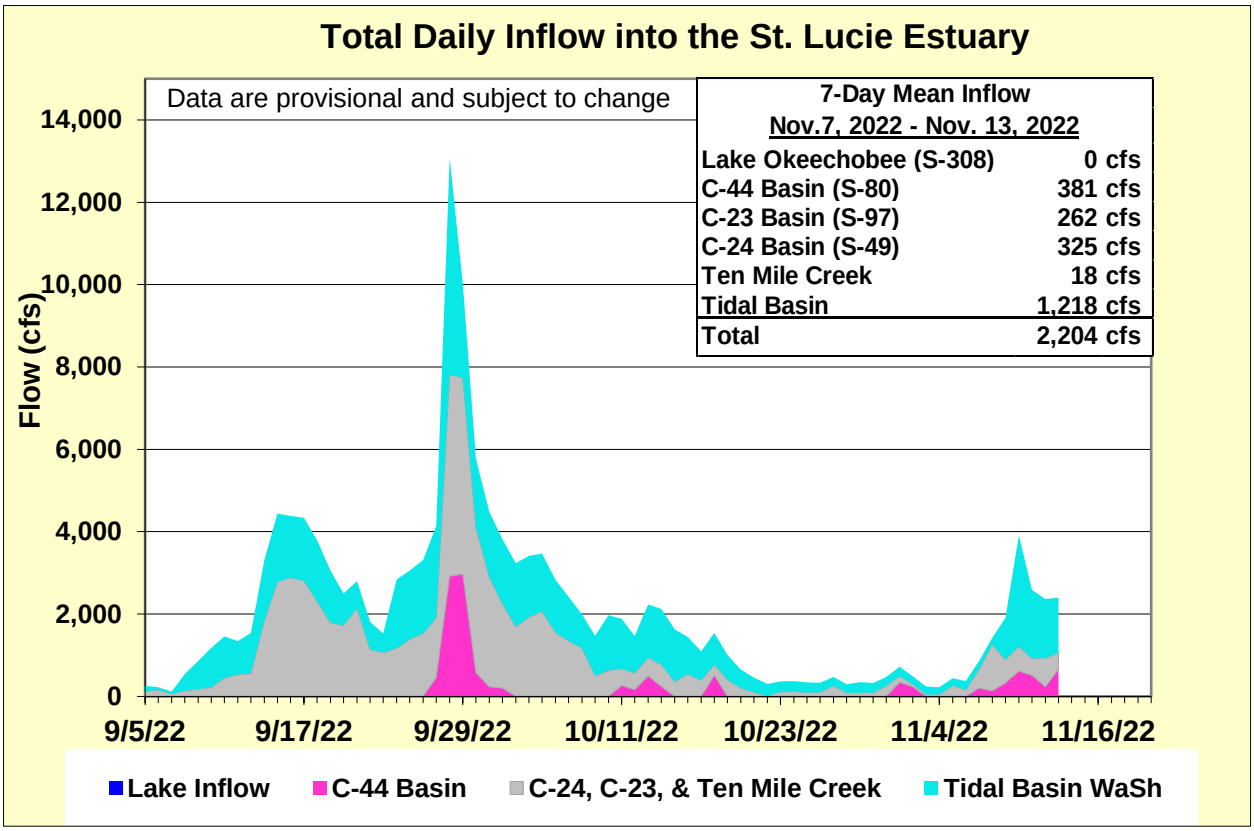


Figure ES-2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

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)	**10.1** (12.1)	**12.3** (14.7)	10.0 – 25.0
US1 Bridge	**13.6** (16.6)	**15.3** (18.0)	10.0 – 25.0
A1A Bridge	**21.9** (25.7)	**25.7** (28.6)	10.0 – 25.0

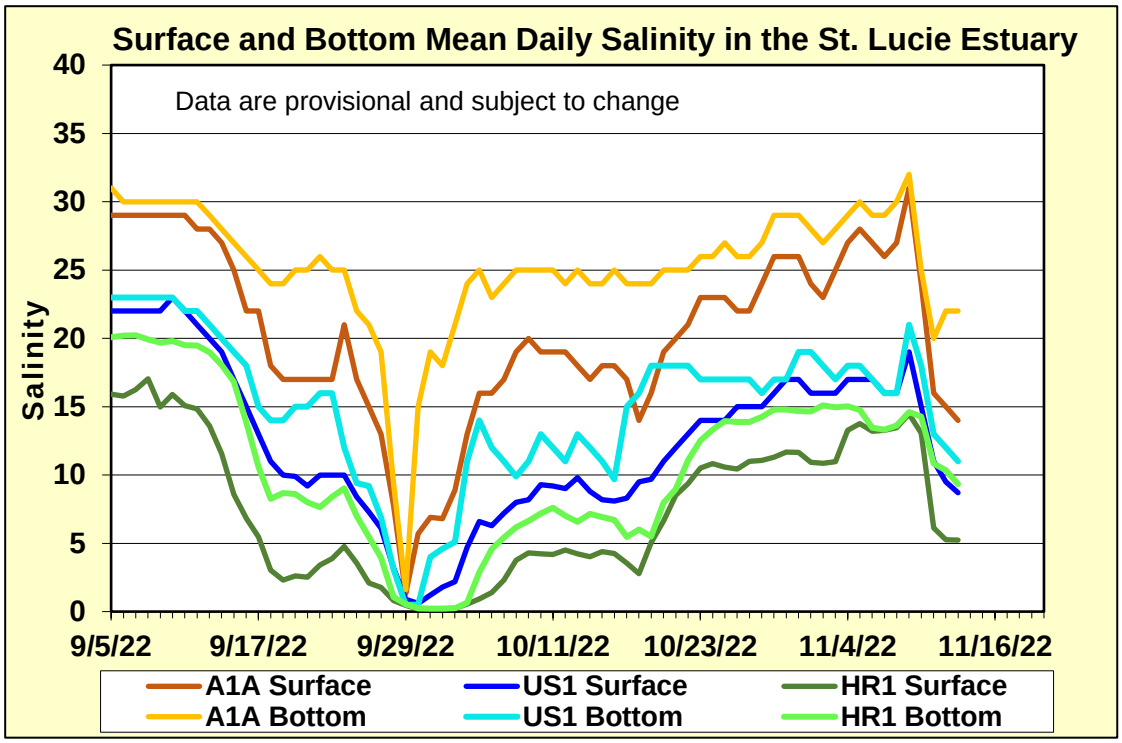


Figure ES-3. Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

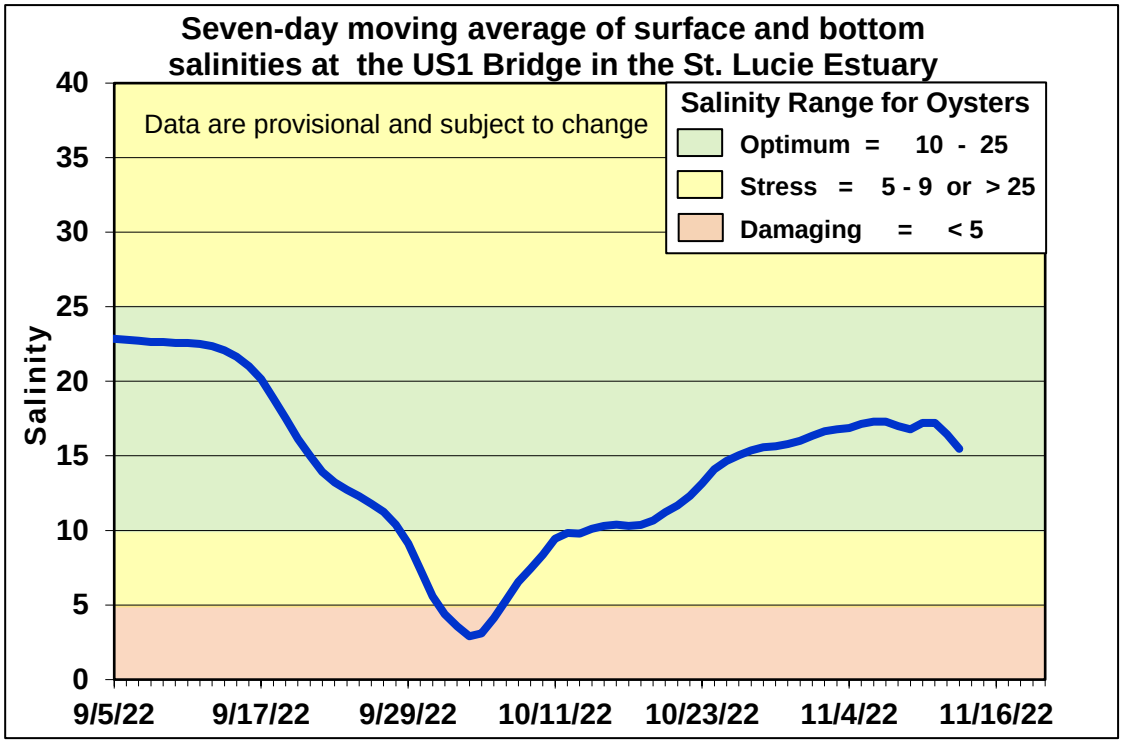


Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

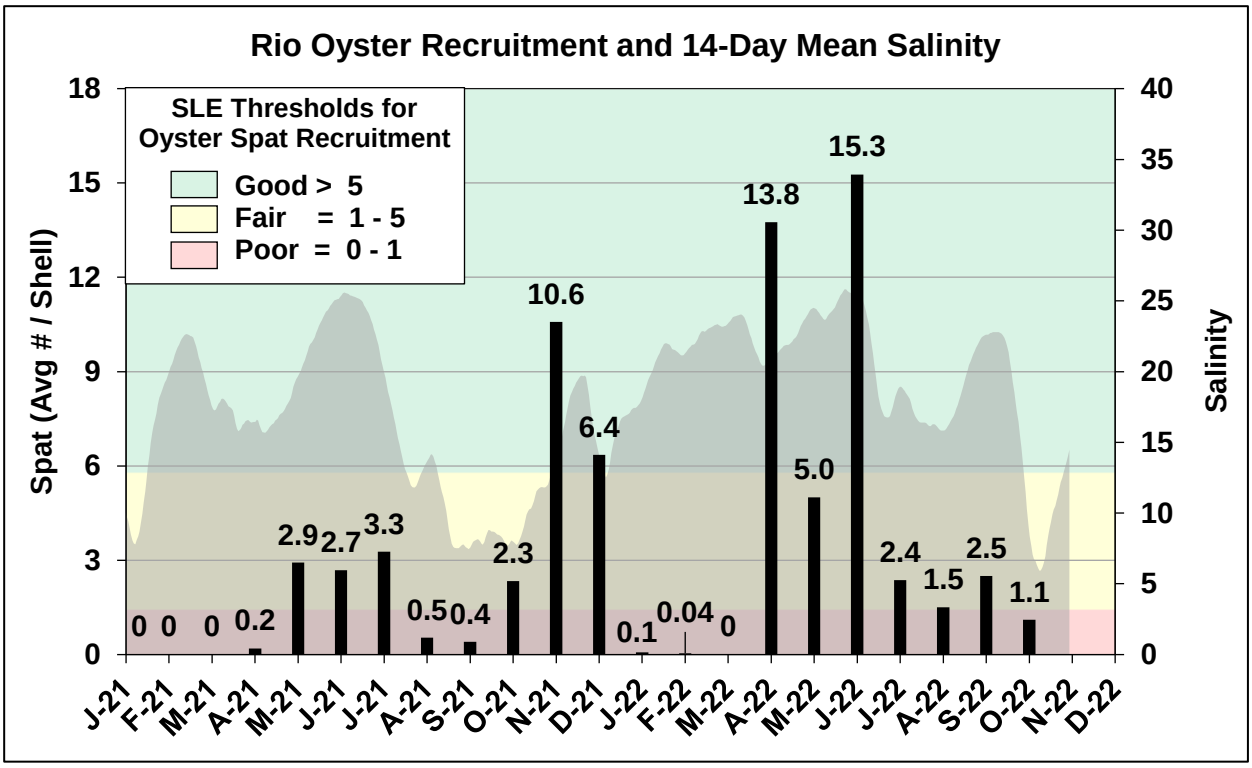


Figure ES-5. Mean oyster recruitment at the Rio oyster monitoring station and 14-day mean salinity at US1 Bridge.

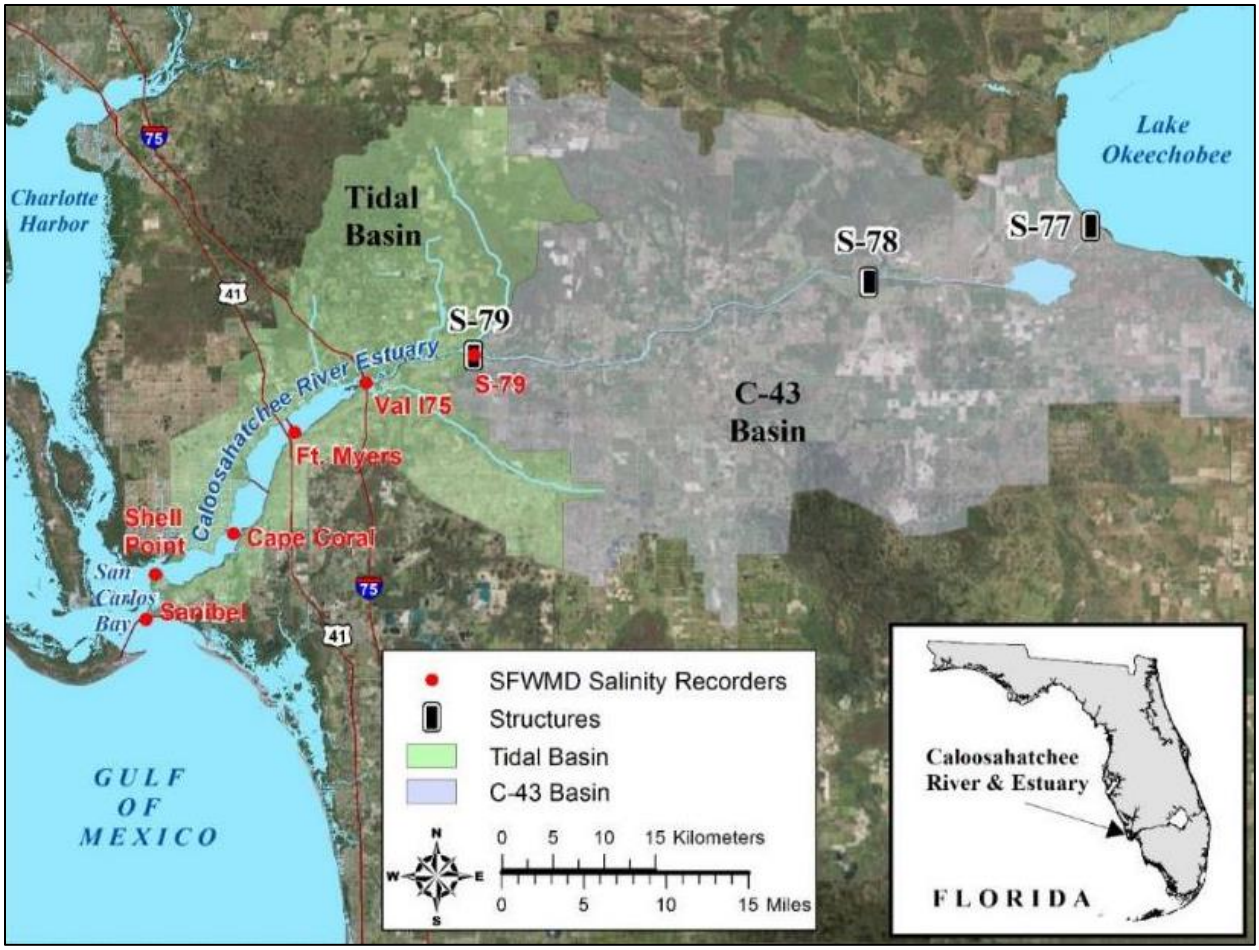


Figure ES-6. Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.

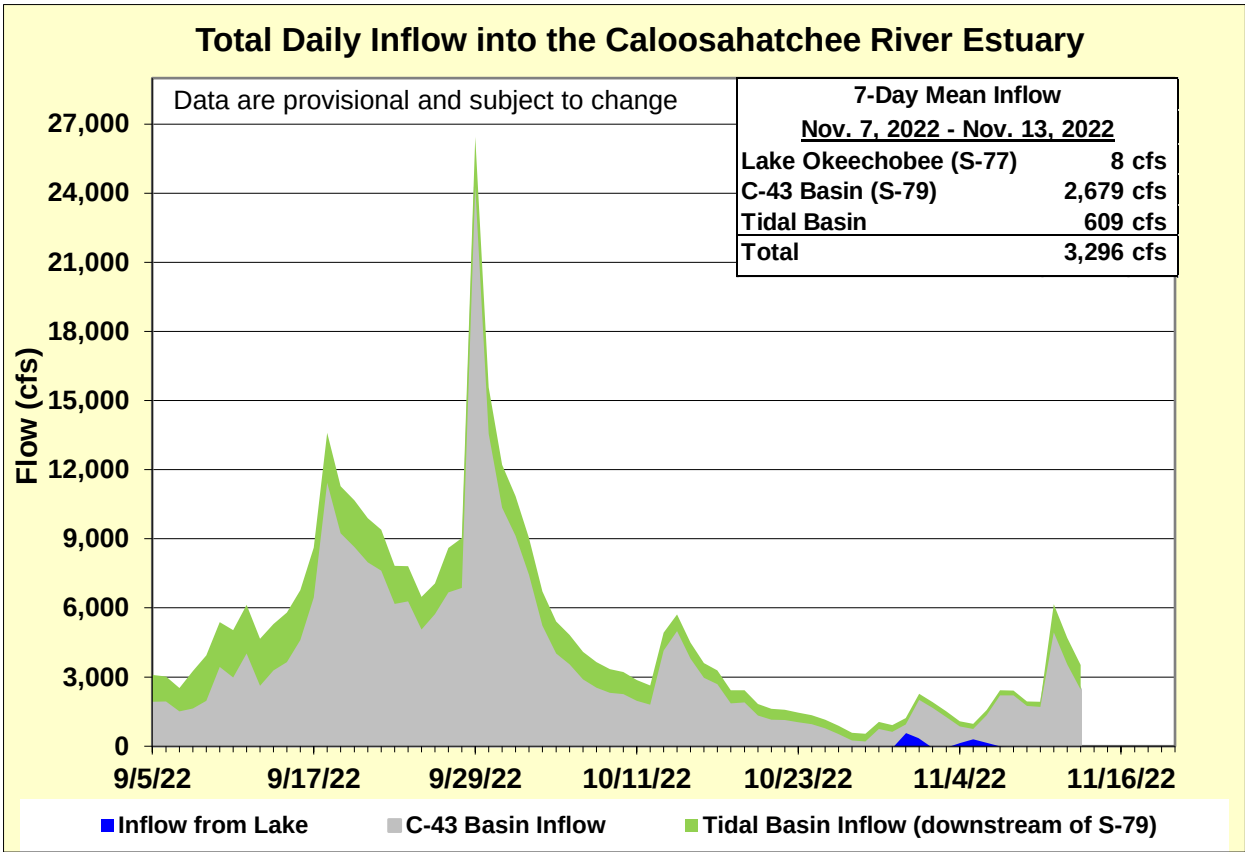


Figure ES-7. Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

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

Sampling Site	Surface	Bottom	Optimum Envelope
S-79 (Franklin Lock)	**0.4** (1.0)	**0.4** (1.1)	0.0 – 10.0
Val I-75	**1.0** (1.5)	**1.1** (2.6)	0.0 – 10.0
Fort Myers Yacht Basin	**4.8** (7.0)	**5.0** (8.1)	0.0 – 10.0
Cape Coral	**11.7** (11.7)	**12.7** (14.0)	10.0 – 25.0
Shell Point	**22.9** (23.8)	**23.7** (24.6)	10.0 – 25.0
Sanibel	**26.0** (28.0)	**28.3** (29.5)	10.0 – 25.0

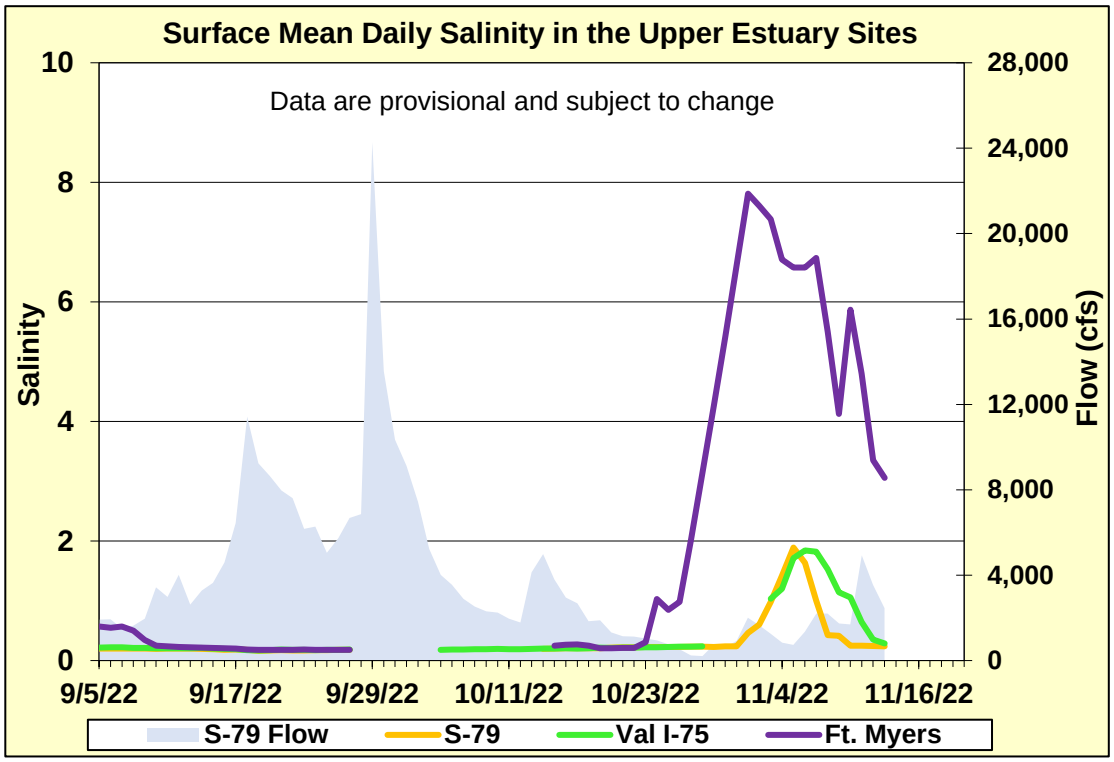


Figure ES-8. Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

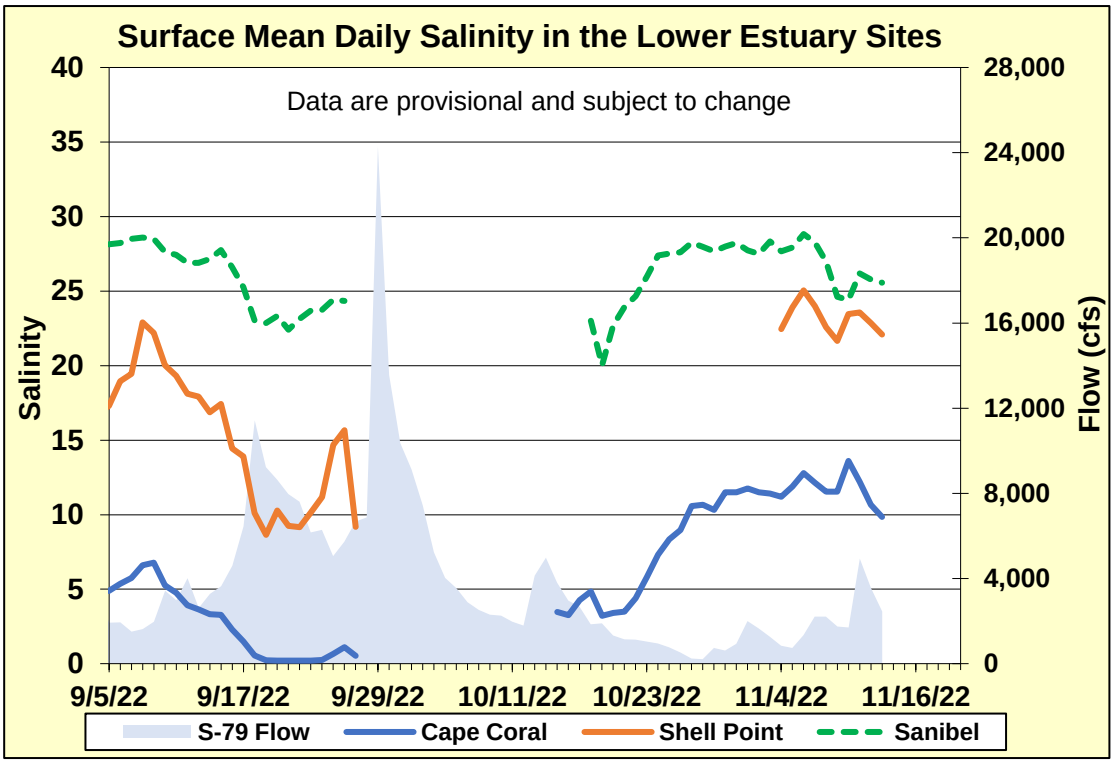


Figure ES-9. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

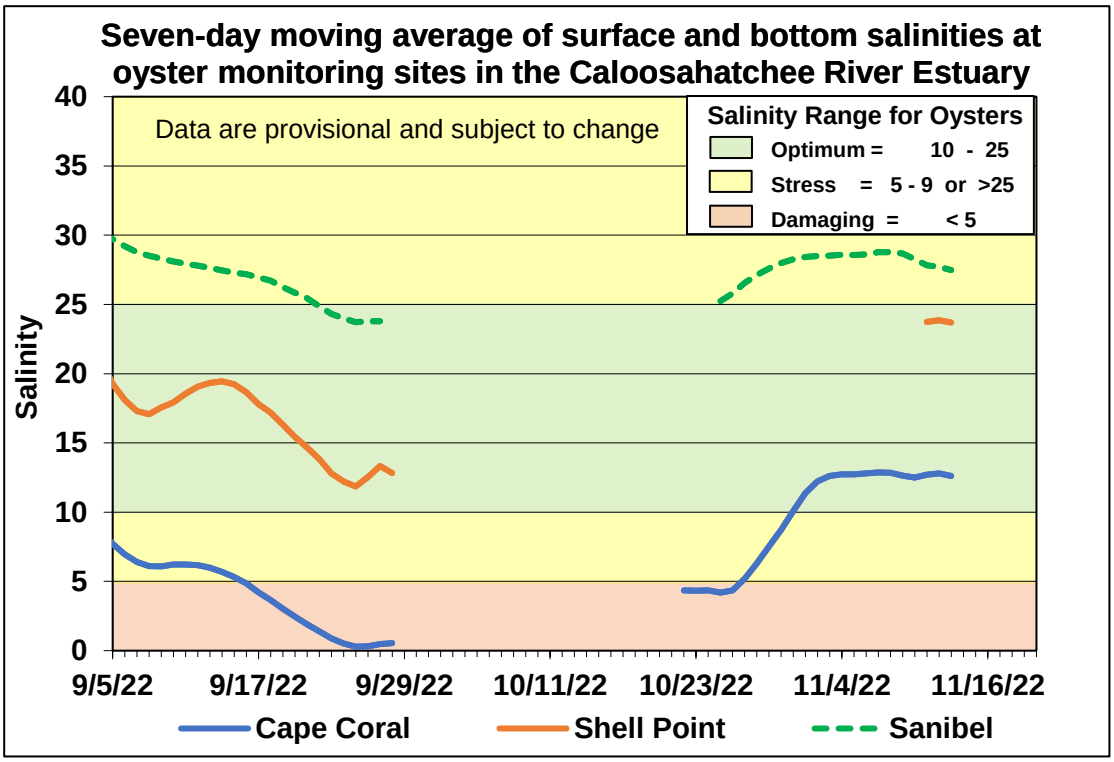


Figure ES-10. Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

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	589	1.1	0.7
B	450	589	0.6	0.7
C	750	589	0.4	0.6
D	1000	589	0.3	0.6
E	1500	589	0.3	0.6
F	2000	589	0.3	0.6

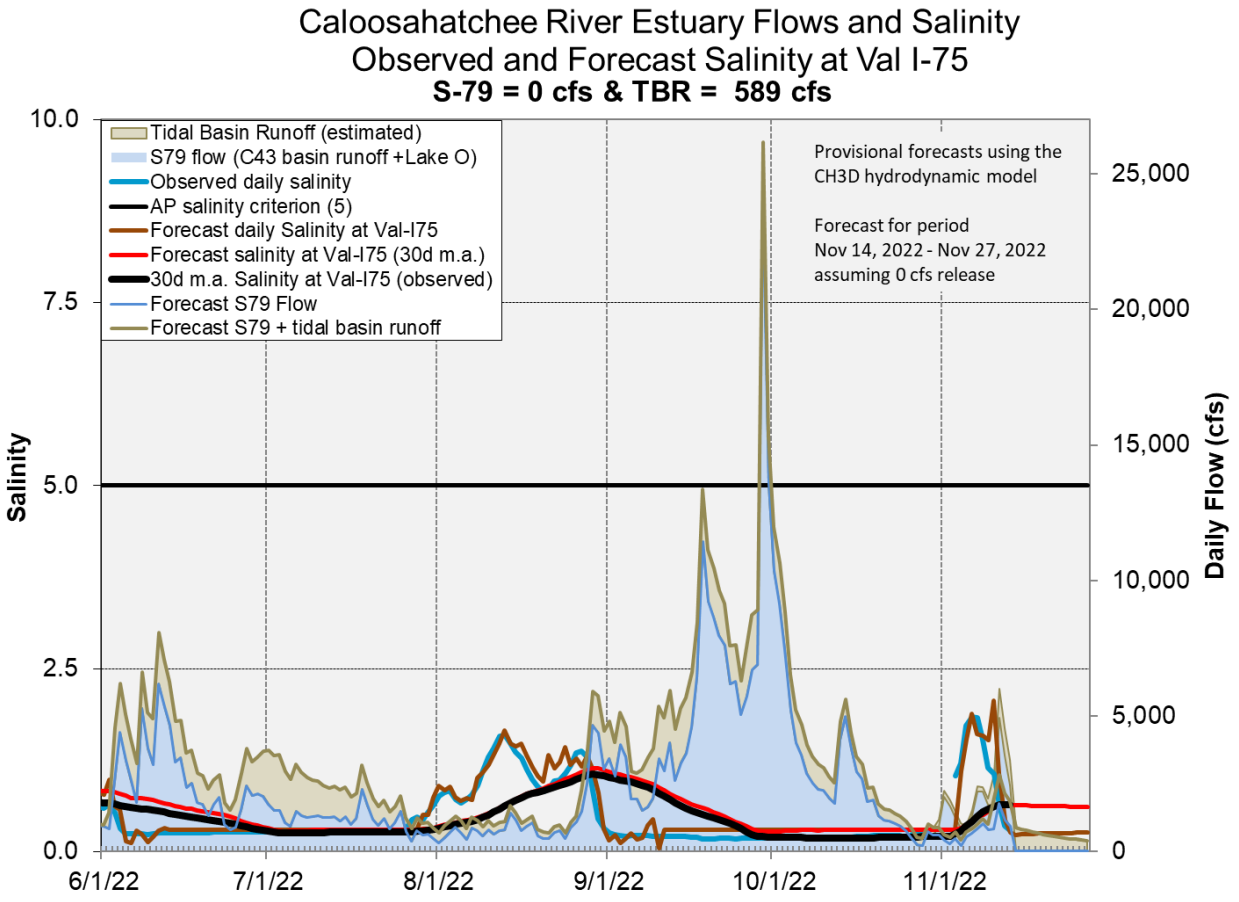


Figure ES-11. Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

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 or near target stage. Vegetation in the flow-ways is stressed and highly stressed. The 365-day PLR for the Eastern Flow-way is below 1.0 g/m^2/year. The 365-day PLRs for the Northern and Western Flow-way are high (**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.

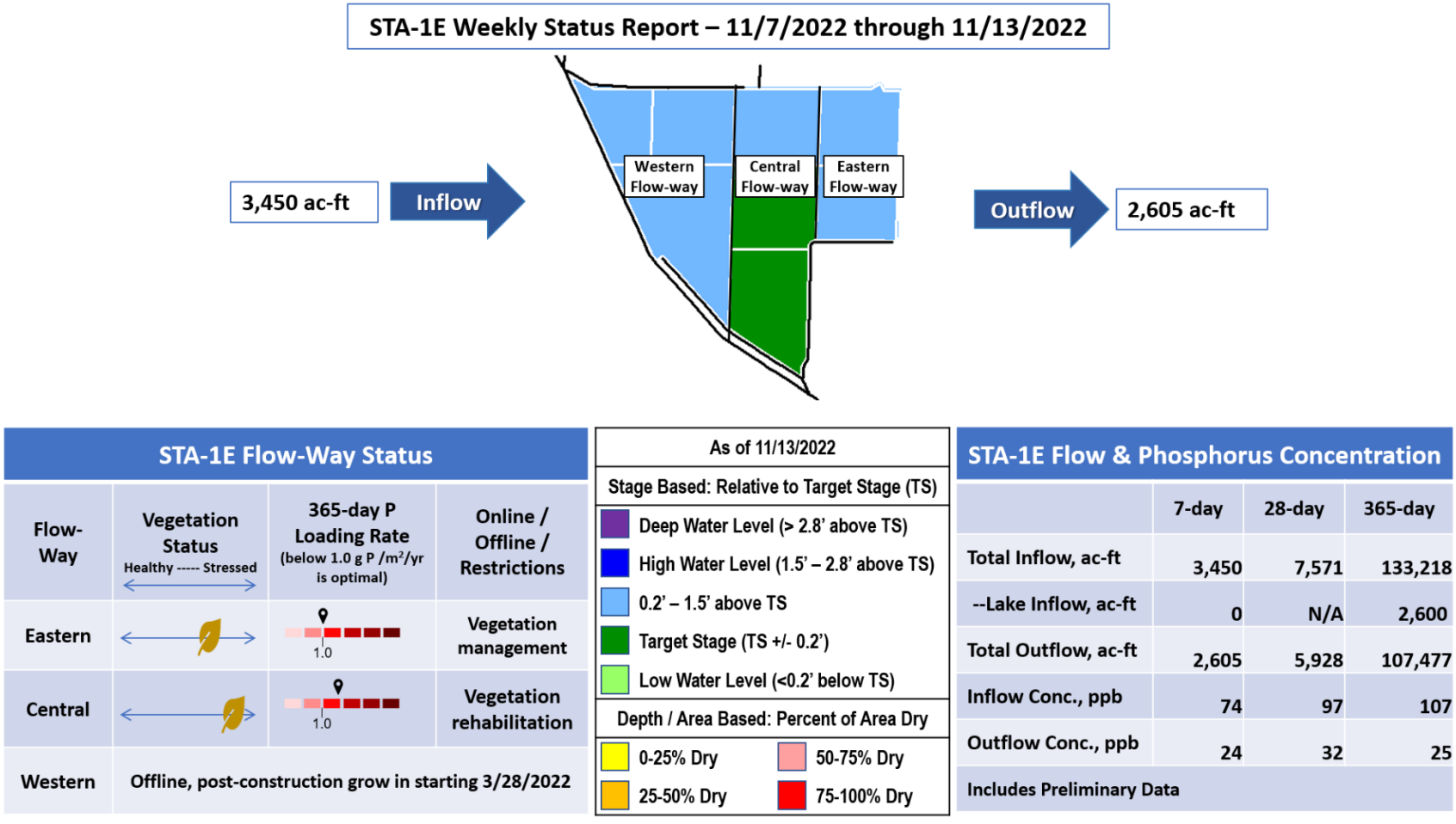


Figure S-1. STA-1E Weekly Status Report

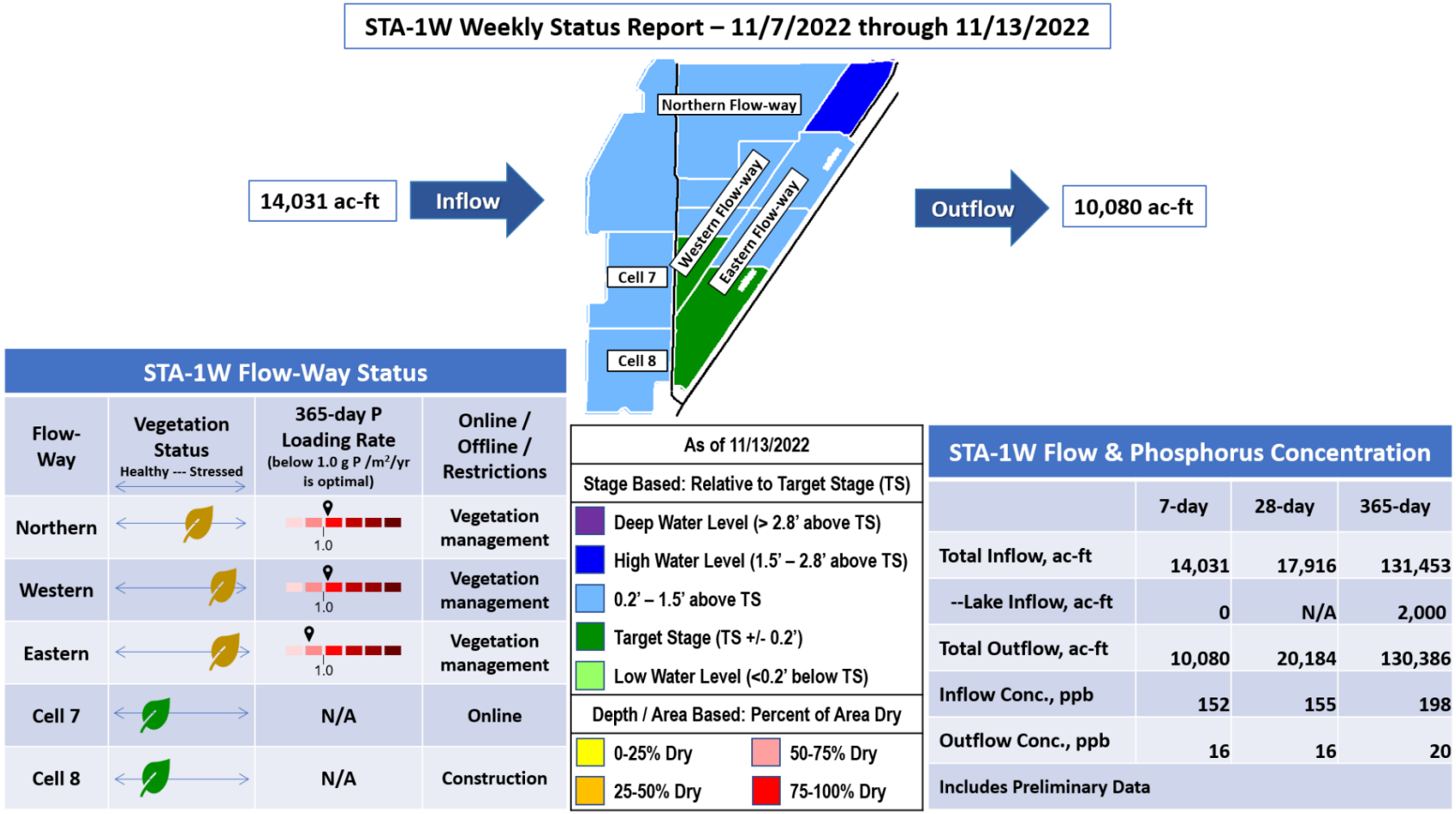
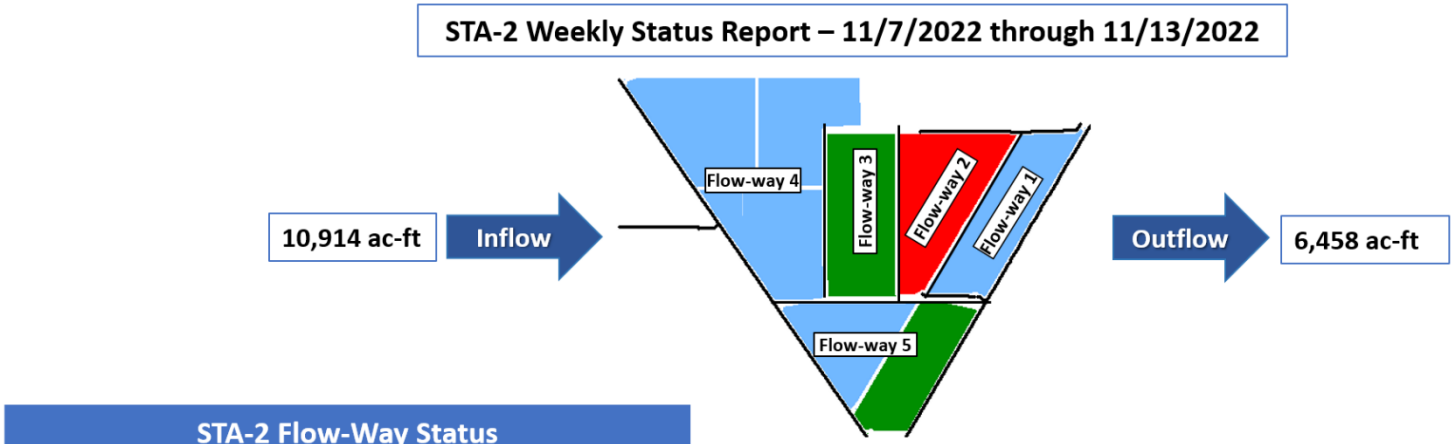


Figure S-2. STA-1W Weekly Status Report



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

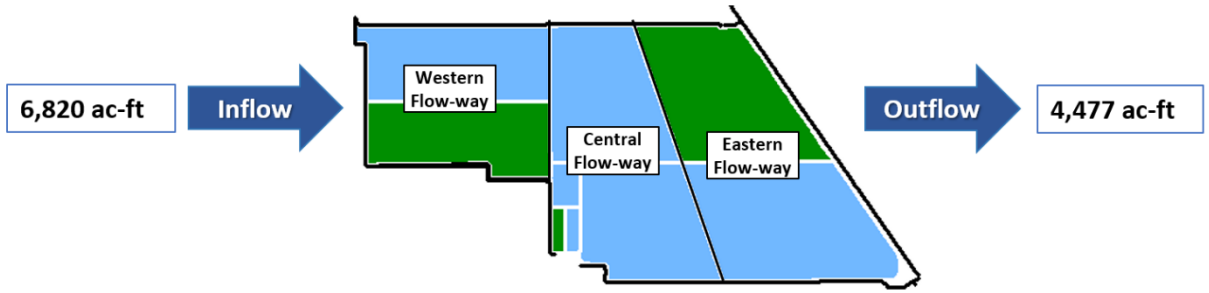
As of 11/13/2022	
Stage Based: Relative to Target Stage (TS)	
Deep Water Level (> 2.8' above TS)	
High Water Level (1.5' – 2.8' above TS)	
0.2' – 1.5' above TS	
Target Stage (TS +/- 0.2')	
Low Water Level (<0.2' below TS)	
Depth / Area Based: Percent of Area Dry	
0-25% Dry	50-75% Dry
25-50% Dry	75-100% Dry

STA-2 Flow & Phosphorus Concentration

	7-day	28-day	365-day
Total Inflow, ac-ft	10,914	20,425	311,413
--Lake Inflow, ac-ft	0	N/A	27,700
Total Outflow, ac-ft	6,458	26,388	330,381
Inflow Conc., ppb	70	73	115
Outflow Conc., ppb	14	27	29
Includes Preliminary Data			

Figure S-3. STA-2 Weekly Status Report

STA-3/4 Weekly Status Report – 11/7/2022 through 11/13/2022



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 11/13/2022	
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

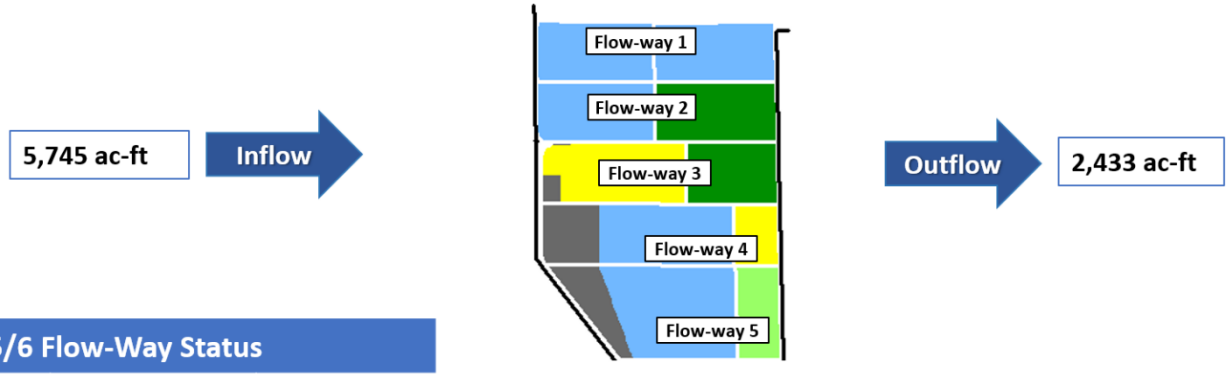
STA-3/4 Flow & Phosphorus Concentration

	7-day	28-day	365-day
Total Inflow, ac-ft	6,820	16,406	303,394
--Lake Inflow, ac-ft	0	N/A	5,300
Total Outflow, ac-ft	4,477	24,870	299,425
Inflow Conc., ppb	188	137	96
Outflow Conc., ppb	19	14	16

Includes Preliminary Data

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

STA-5/6 Weekly Status Report – 11/7/2022 through 11/13/2022



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

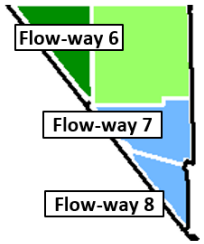
As of 11/13/2022	
Stage Based: Relative to Target Stage (TS)	
Deep Water Level (> 2.8' above TS)	
High Water Level (1.5' – 2.8' above TS)	
0.2' – 1.5' above TS	
Target Stage (TS +/- 0.2')	
Low Water Level (<0.2' below TS)	
Depth / Area Based: Percent of Area Dry	
0-25% Dry	50-75% Dry
25-50% Dry	75-100% Dry

STA-5/6 Flow & Phosphorus Concentration

	7-day	28-day	365-day
Total Inflow, ac-ft	5,745	25,632	150,651
--Lake Inflow, ac-ft	0	N/A	0
Total Outflow, ac-ft	2,433	25,647	143,760
Inflow Conc., ppb	905	411	289
Outflow Conc., ppb	22	43	39
Includes Preliminary Data			

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

STA-5/6 Weekly Status Report – 11/7/2022 through 11/13/2022



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 11/13/2022	
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 sharply last week. The average on Sunday was 0.03 feet above the flat Zone A1 regulation line. WCA-2A: Stage receded then rose late in the week at the 2-17 gauge. The average on Sunday was 1.22 feet above the falling regulation line. WCA-3A: Over the last week the Three Gauge Average receded then rose late in the week. The average stage was 0.08 feet above the flat regulation line on Sunday. WCA-3A North: At gauge 62 (Northwest corner) stage fell at a slower rate than previous weeks, the average on Sunday was 0.44 feet below the falling Upper schedule line (**Figures EV-1** through **EV-4**).

Water Depths

The SFWDAT illustrates current stages in the WCAs were affected little by last week's tropical precipitation. Regions with depths over 2.5 feet expanded in southern WCA-1 but decreased in WCA-2A and -3A. Along the northern reach of the L-67s the spatial extent of the area with depths over 4.0 feet decreased and the extent of the "ponded" contracted over the last month. Drier conditions are expanding in northern WCA-3A and in contrast connectivity within the sloughs of ENP remains strong. Comparing current WDAT water depths to one month ago conditions within the EPA are generally drier, significantly so in WCA-3A North and southern WCA-2A. Looking back a year ago, WCA-1 and WCA-2A are slightly shallower; conditions are slightly deeper in eastern WCA-3A and northern ENP (**Figure EV-5 and Figure EV-6)**. Comparing current conditions to the 20-year average on November 13th: Conditions remain close to average in WCA-3A with northeastern SRS and WCA-1 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 0.19 inches of total rain this past week based on 18 gauges used in this report. Average total rainfall was nearly the same as the previous week (0.20 inches). Weekly totals ranged from 0.01 inches in Garfield Bight (GB) in the western nearshore region of Florida Bay and P37 in western Taylor Slough to 1.16 inches at Craighead Pond (CP) in southwestern Taylor Slough. Taylor Slough stages increased at several locations by as much as 0.07 feet. Despite an increase at some locations, the average stage change was −0.197 feet (**Figure EV-8 and Figure EV-9**). Taylor Slough water levels remain above the historical average for this time of year by +3.67 inches compared to before the Florida Bay initiative (starting in 2017), an increase of 0.13 inches from last week.

Average Florida Bay salinity is 30.4, an increase of +1.9 from the previous week. Salinity changes ranged from a decrease of −3.7 at Buoy Key (BK) in the western bay to an increase of +16.6 in Joe Bay (JB) in the nearshore region (**Figure EV-8**). Salinities in Central Florida Bay continue to 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 5.01 above its historical average for this time of year, a decrease of 0.5 from the previous week.

Water Management Recommendations

Maintaining a moderate rate of stage change within the marshes of WCAs, avoiding abrupt changes in water depth and conserving water north in the system has an ecological benefit. 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. Given current stages in WCA-3A northwest, continuing to maximize the volume of water moving into the northern perimeter of WCA-3A will benefit the ecology of that region as conditions transition to a dry season predicted to be drier than average. 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	2.76	+0.27
WCA-2A	2.66	+0.03
WCA-2B	1.62	+0.08
WCA-3A	0.82	−0.03
WCA-3B	0.84	+0.04
ENP	0.29	+0.08

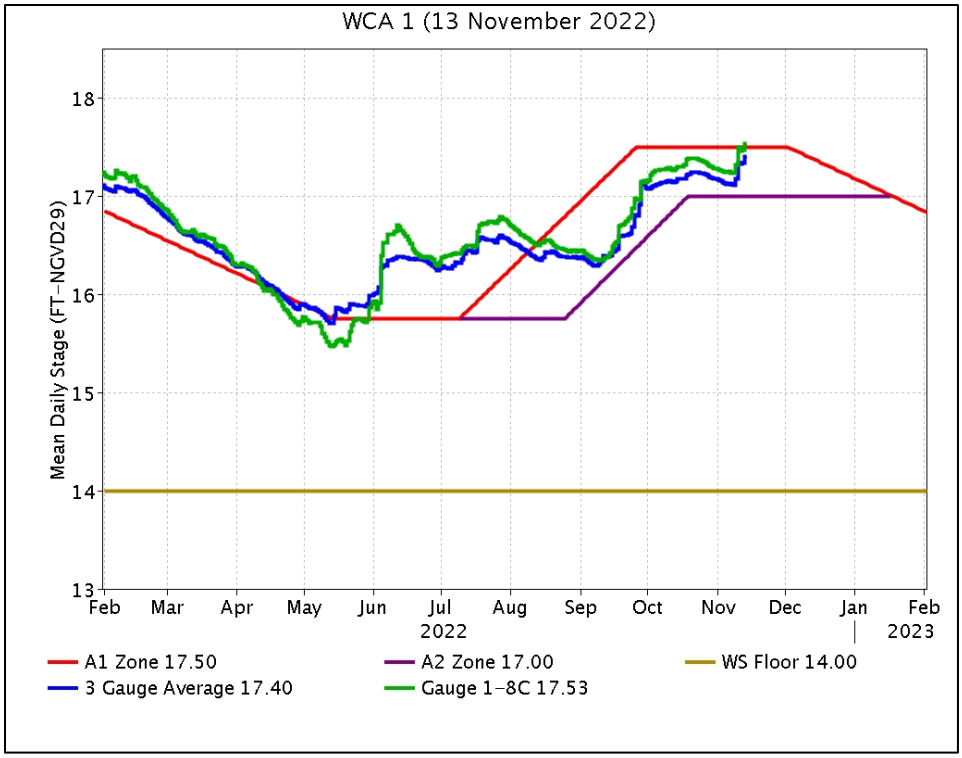


Figure EV-1. WCA-1 stage hydrographs and regulation schedule.

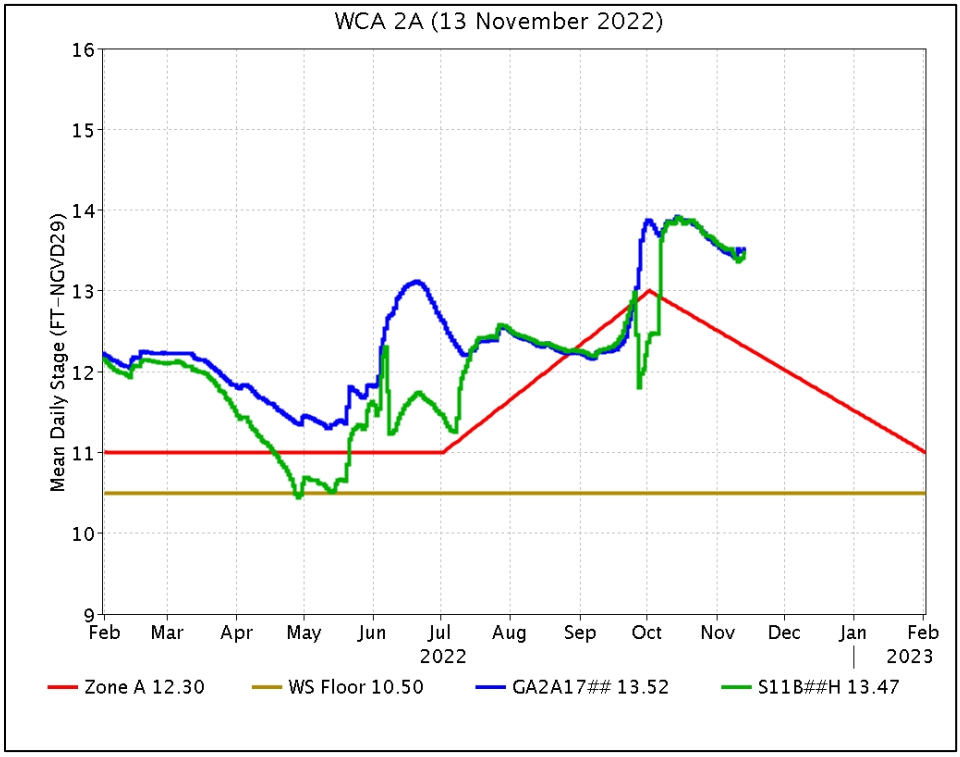


Figure EV-2. WCA-2A stage hydrographs and regulation schedule.

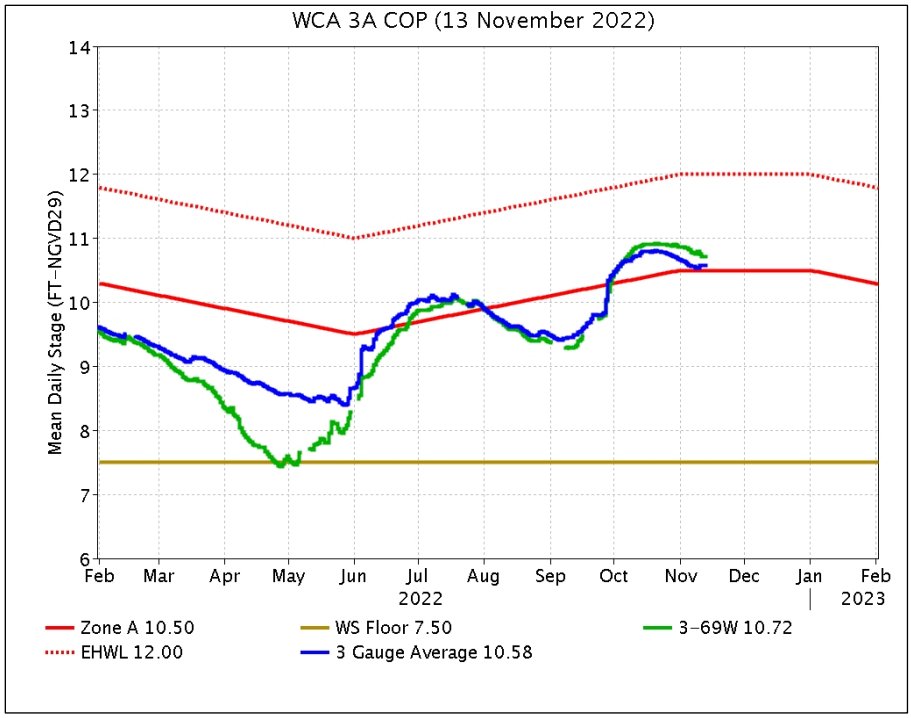


Figure EV-3. WCA-3A stage hydrographs (three-gauge average, S-333 headwater) and regulation schedule.

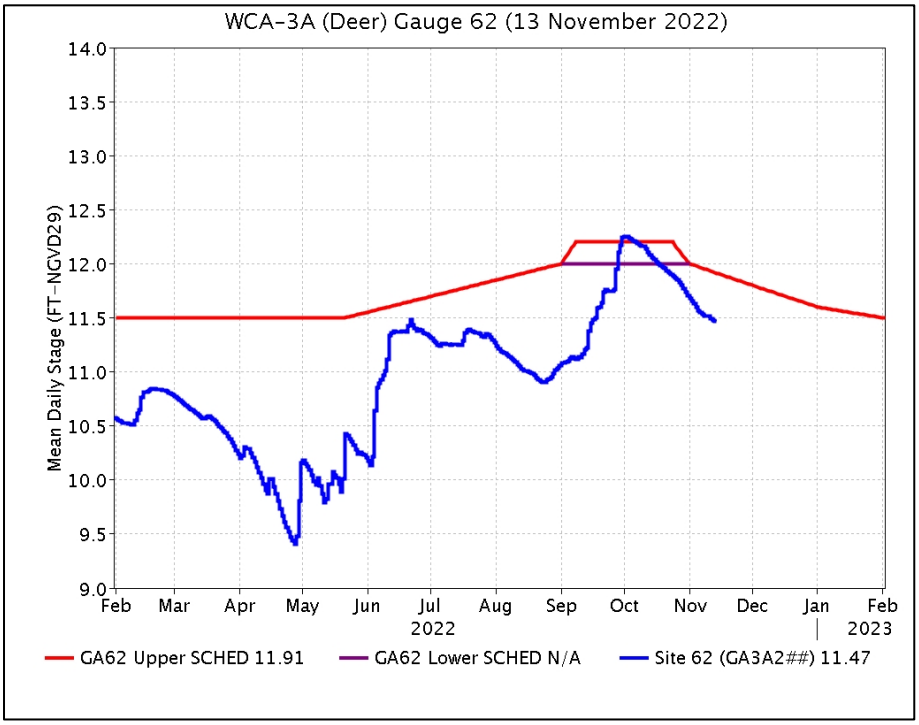


Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.

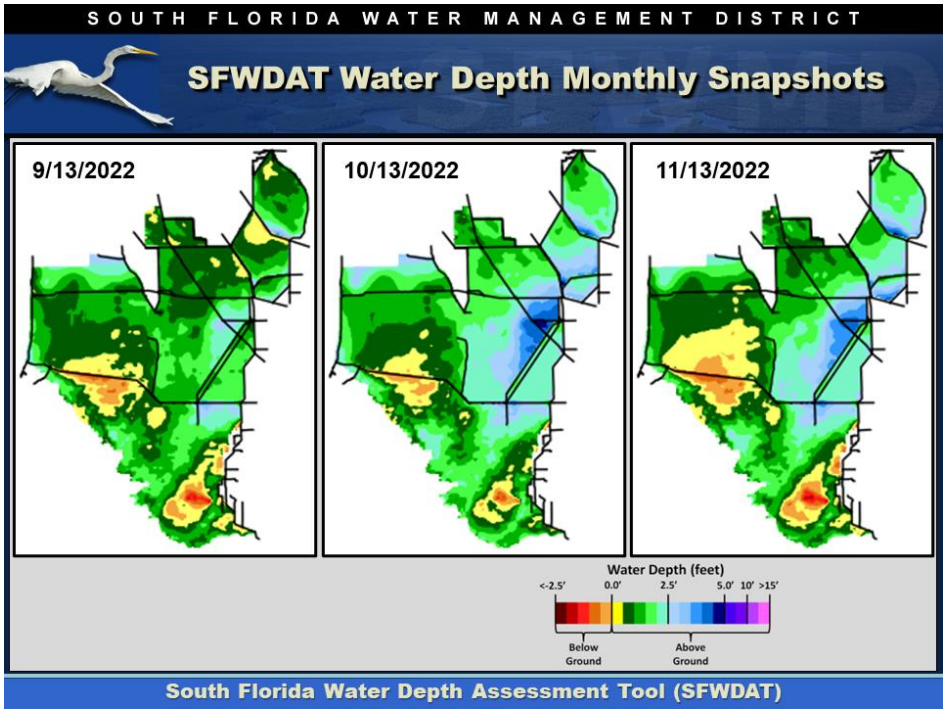


Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

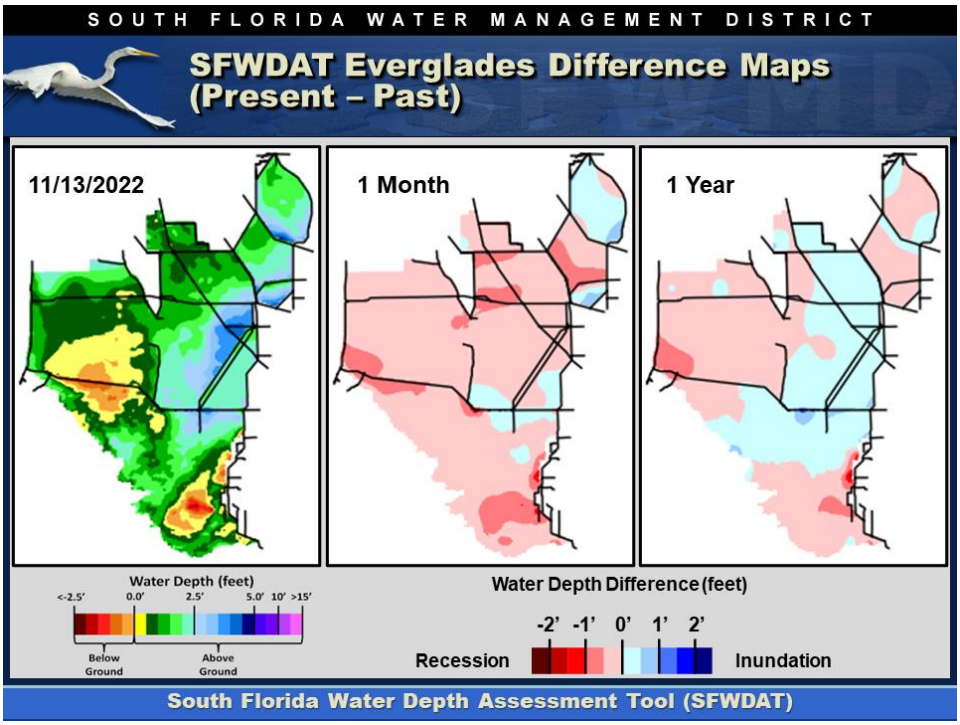


Figure EV-6. Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

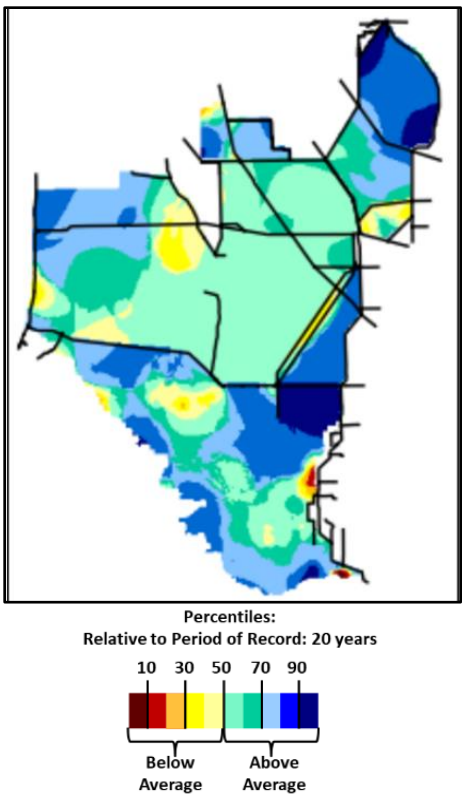


Figure EV-7. Present water depths (11/13/2022) compared to the day of year average over the previous 20 years.

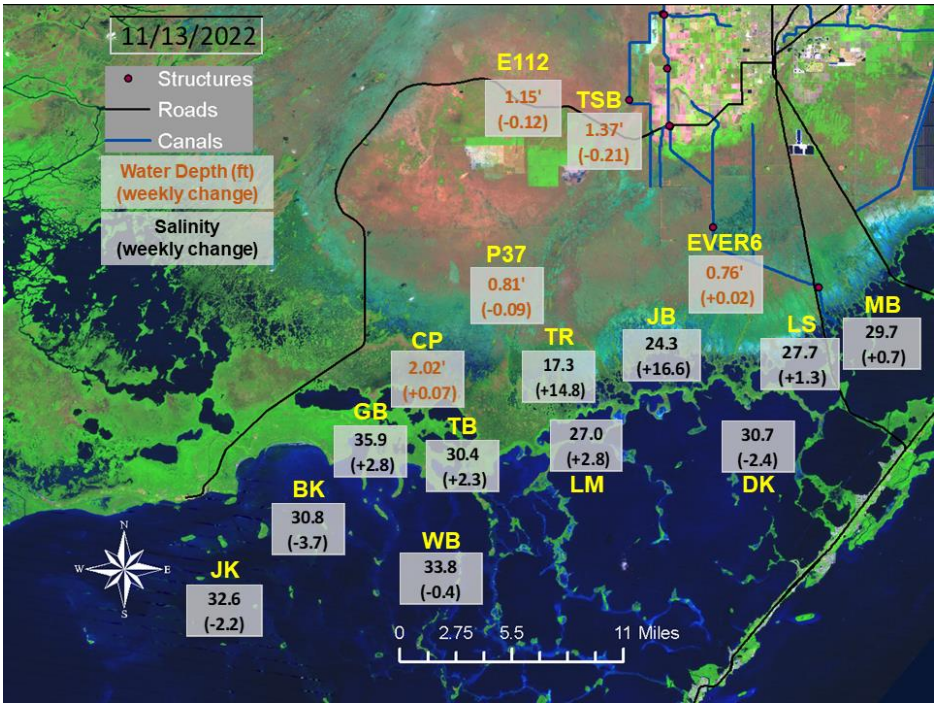


Figure EV-8. Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

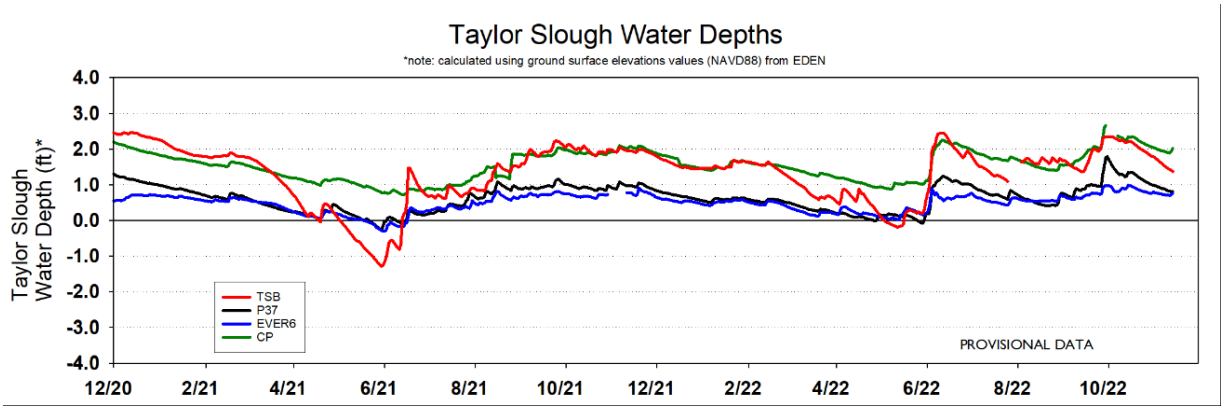


Figure EV-9. Taylor Slough water depth time series.

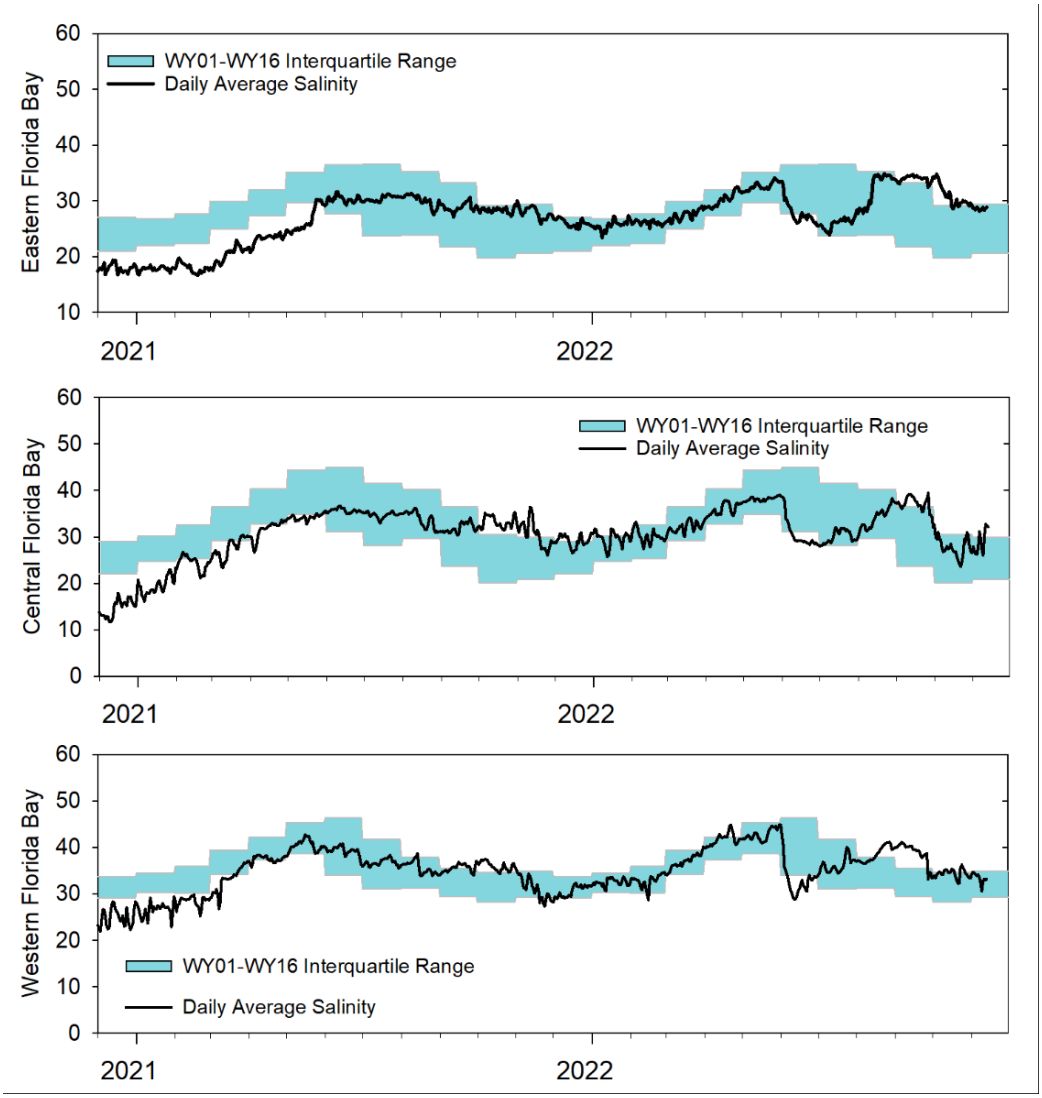


Figure EV-10. Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

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

SFWMD Everglades Ecological Recommendations, November 15th, 2022 (red is new)			
Area	Weekly change	Recommendation	Reasons
WCA-1	Stage increased by 0.27’	Conserve water in this basin as possible. Recession rate of less than 0.04’ per week.	Protect within basin and downstream habitat and wildlife.
WCA-2A	Stage increased by 0.03’	Conserve water in this basin as possible. Recession rate of less than 0.04’ 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 0.08’	Ascension rate of less than 0.25 feet per week.	Protect within basin and downstream habitat and wildlife.
WCA-3A NE	Stage increased by 0.11’	Conserve water in this basin as possible. Recession rate of less than 0.04’ 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 0.09’	Conserve water in this basin as possible. Recession rate of less than 0.04’ per week	
Central WCA-3A S	Stage decreased by 0.10’	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 increased by 0.04’	Recession rate of less than 0.12’ per week.	Protect within basin and downstream habitat and wildlife. Lower fire risk.
ENP-SRS	Stage increased by 0.08’	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 −0.862’ to +0.067’	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged from −3.7 to +16.6	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 682 cfs and the previous 30-day mean inflow was 708 cfs. The seven-day mean salinity was 25.2 at BBCW8 and 25.6 at BBCW10, both are within the ideal salinity range for estuarine animals in this region (salinity less than 35). Data provided by Biscayne National Park.

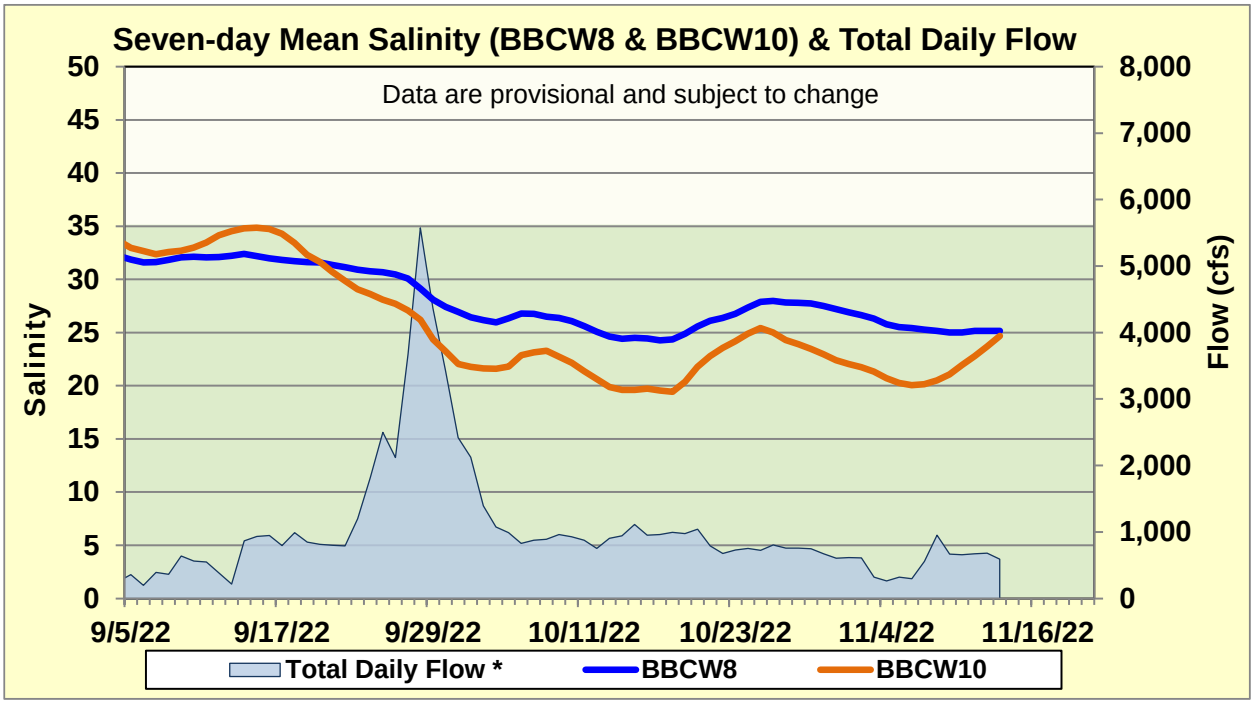


Figure BB-1. Seven-day mean salinity at BBCW8 and BBCW10 and total daily flow in Biscayne Bay. Total daily flow was calculated using flow from structures S20G, S20F, S21, S21A, S123, and S700P.