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:** December 14, 2022

**SUBJECT:** Weekly Environmental Conditions for Systems Operations

## Summary

### Weather Conditions and Forecast

Shower activity is expected into mid-day Wednesday before winding down. A cold front will arrive Thursday evening preceded by tropical moisture and a warm airmass triggering widespread showers and thunderstorms across the SFWMD with the heaviest rainfall occurring along the southwest coast and the northwestern interior. Aerial average rainfall in excess of 0.25” will be possible in these areas. As the front travels southeastward Thursday night, shower activity will diminish, limiting rainfall over the east coast. Another round of moderate-to-heavy showers and storms are expected to resume over the lower east coast and far south on Friday night while the cold front continues its trek southward. On Saturday evening, widespread light, non-thunderous, and mostly uniform rainfall will develop over the SFWMD continuing into early Sunday morning. The rainfall should subside by afternoon Sunday while a new frontal passage pushes southward across the SFWMD. No rainfall is expected on Monday. Above average rainfall is expected for the 7-day period ending next Monday morning. This active storm pattern is likely to continue into next week, with week 2 featuring above average rainfall as well.

### Kissimmee

In most lakes, stage has returned to the regulation schedule, although releases continue to be made from some lakes for local basin runoff. Weekly average discharges on December 11, 2022, at S-65 and S-65A were 1,200 cfs and 1,400 cfs, respectively, both of which had not changed from the previous week. Mean weekly water depth on the Kissimmee River floodplain decreased from the previous week to 0.58 feet. The weekly average concentration of dissolved oxygen in the Kissimmee River increased from 3.6 mg/L the previous week to 4.4 mg/L for the week ending December 11, 2022, above both the potentially lethal level and the physiologically stressful range for largemouth bass and other sensitive species.

## Lake Okeechobee

Lake Okeechobee stage was 16.41 feet NGVD on December 11, 2022, 0.07 feet lower than the previous week and 0.26 feet higher than a month ago. Lake stage remained in the Intermediate sub-band and was 0.91 feet above the upper limit of the ecological envelope. According to NEXRAD, no rain fell directly on the Lake last week. This is the third year in a row Lake stages have exceeded 16 feet NGVD at the beginning of the dry season and is the highest lake stage at this time of year for more than two decades. Average daily inflows (excluding rainfall) decreased from the previous week, going from 3,714 cfs to 2,395 cfs. Average daily outflows (excluding evapotranspiration) increased from the previous week going from 1,647 cfs to 1,954 cfs. The most recent satellite image (December 10, 2022) from NOAA's Harmful Algal Bloom Monitoring System showed very patchy low-moderate bloom potential along most of the nearshore areas of the Lake.

## Estuaries

Total inflow to the St. Lucie Estuary averaged 485 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 1,746 cfs over the past week with 918 cfs coming from Lake Okeechobee. Mean surface salinities increased at S-79, Val I-75, Ft. Myers and Sanibel, and decreased at Cape Coral and Shell Point 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 upper stressed range at Sanibel (>25).

## Stormwater Treatment Areas

For the week ending Sunday, December 11, 2022, no Lake Okeechobee water was delivered to the FEBs/STAs. The total amount of Lake releases sent to the FEBs/STAs in WY2023 (since May 1, 2022) is approximately 12,600 ac-feet. The total amount of inflows to the STAs in WY2023 is approximately 964,000 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 the WCAs remained in the "fair" or "poor" category as the recession was faster than optimal in many regions. Depths are above average in WCA-3A northeast, maintaining that condition could be important for wading bird nesting in that region. Wading birds are foraging in great numbers in WCA-3A North but conditions are similar to last year, which was a poor to moderate wading bird nesting season. Taylor

slough stages fell at all stations last week but remains above the pre-Florida Bay initiative average. Average salinity increased last week in Florida Bay and remains above average. Salinities in the eastern bay moved above the IQR last week.

**Biscayne Bay**

Total inflow to Biscayne Bay averaged 832 cfs and the previous 30-day mean inflow averaged 994 cfs. The seven-day mean salinity was 23.1 at BBCW8 and 16.9 at BBCW10, both within the ideal salinity range for estuarine organisms in this region (salinity less than 35). Data provided by Biscayne National Park.

## Supporting Information

## Kissimmee Basin

### *Upper Kissimmee*

On December 11, 2022, mean daily lake stages were 58.1 feet NGVD (0.1 feet above schedule) in East Lake Toho, 55.1 feet NGVD (0.1 above schedule) in Lake Toho, and 52.7 feet NGVD (0.2 above schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1**, **Figures KB-1-3**).

### *Lower Kissimmee*

For the week ending December 11, 2022, mean weekly discharge was 1,200 cfs at S-65 and 1,400 cfs at S-65A. Mean weekly discharge from the Kissimmee River was 1,700 cfs at both S-65D and S-65E (**Table KB-2**). Mean weekly headwater stages were 46.3 feet NGVD at S-65A and 28.3 feet NGVD at S-65D on December 11, 2022. Mean weekly river channel stage decreased from the previous week's mean of 37.9 feet to 37.7 feet (**Figure KB-4**). Mean weekly water depth on the Kissimmee River floodplain decreased from 0.66 feet the previous week to 0.58 feet on December 11, 2022 (**Table KB-2**, **Figure KB-5**). The weekly average concentration of dissolved oxygen in the Kissimmee River increased from 3.6 mg/L the previous week to 4.4 mg/L for the week ending December 11, 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) | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | *12/11/22* | *12/4/22* |
| Lakes Hart and Mary Jane | S-62 | LKMJ | 76 | 61.1 | R | 61.0 | 0.1 | 0.1 |
| Lakes Myrtle, Preston and Joel | S-57 | S-57 | 34 | 62.0 | R | 61.9 | 0.1 | 0.1 |
| Alligator Chain | S-60 | ALLI | 57 | 64.1 | R | 64.0 | 0.1 | 0.1 |
| Lake Gentry | S-63 | LKGT | 75 | 61.6 | R | 61.5 | 0.1 | 0.1 |
| East Lake Toho | S-59 | TOHOE | 180 | 58.1 | R | 58.0 | 0.1 | 0.1 |
| Lake Toho | S-61 | TOHOW<br>S-61 | 360 | 55.1 | R | 55.0 | 0.1 | 0.1 |
| Lakes Kissimmee, Cypress and Hatchineha | S-65 | KUB011<br>LKIS5B | 1200 | 52.7 | R | 52.5 | 0.2 | 0.3 |

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.

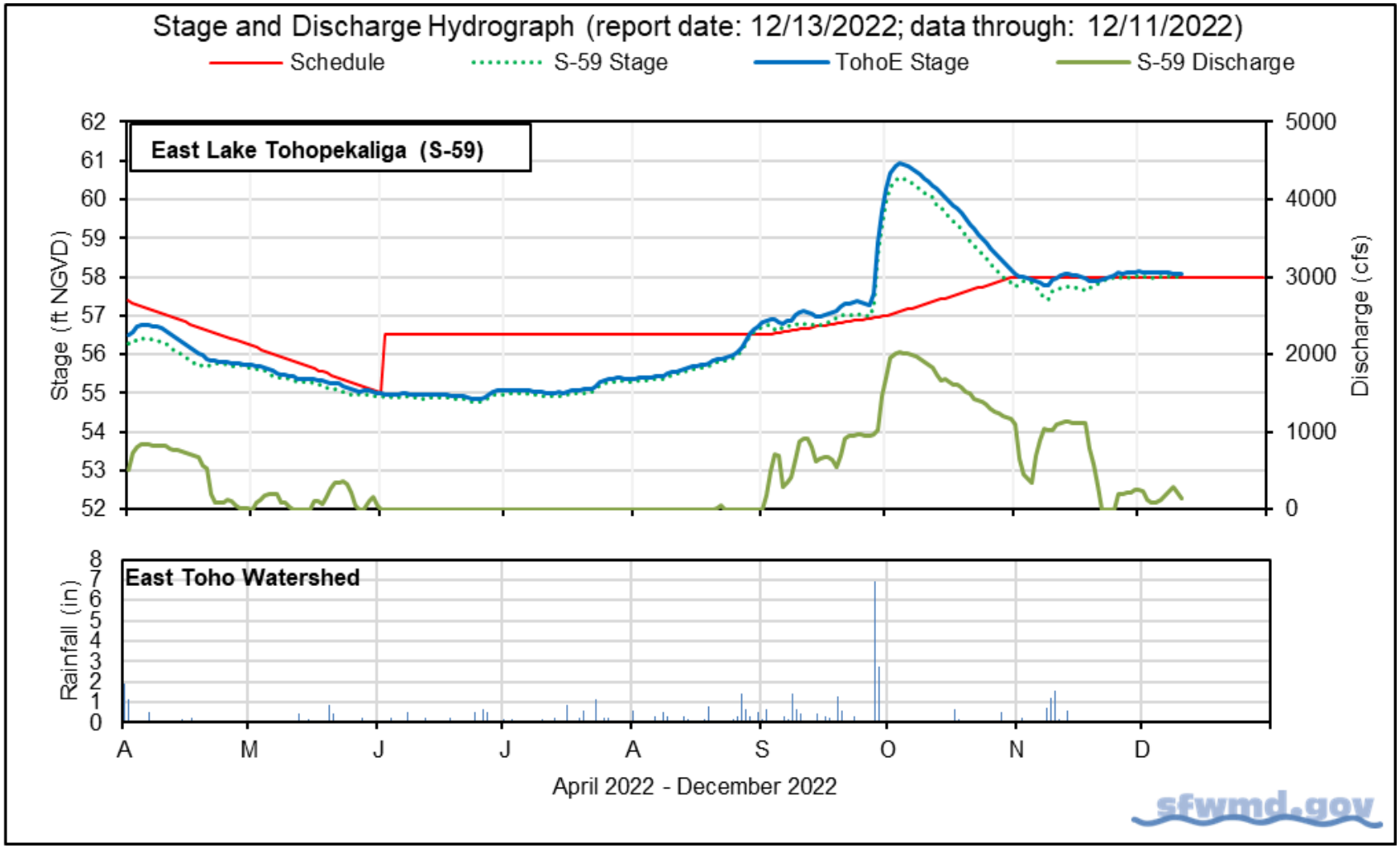



**Figure KB-1.** East Lake Toho regulation schedule, stage, discharge and rainfall.

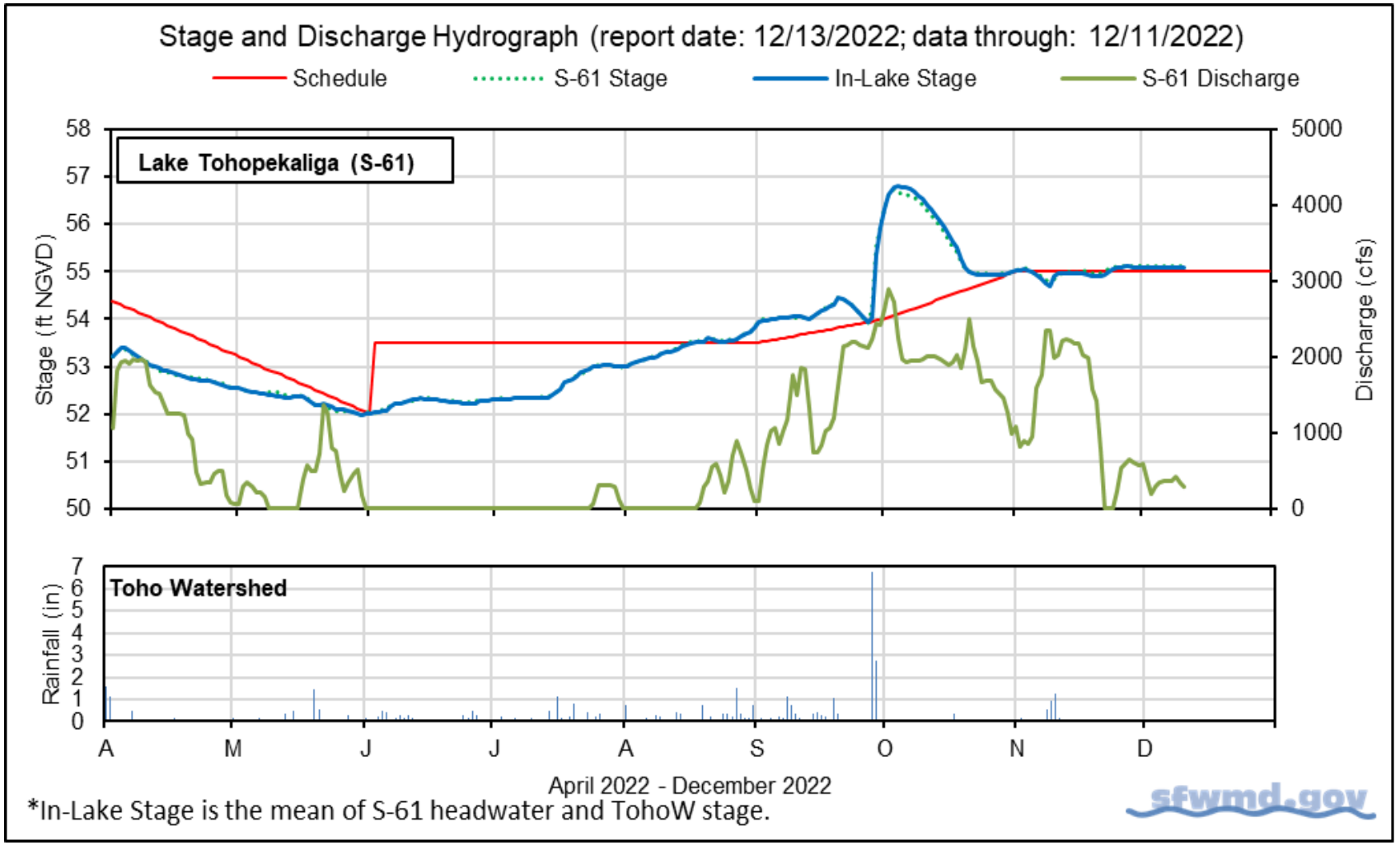



**Figure KB-2.** Lake Toho regulation schedule, stage, discharge and rainfall.

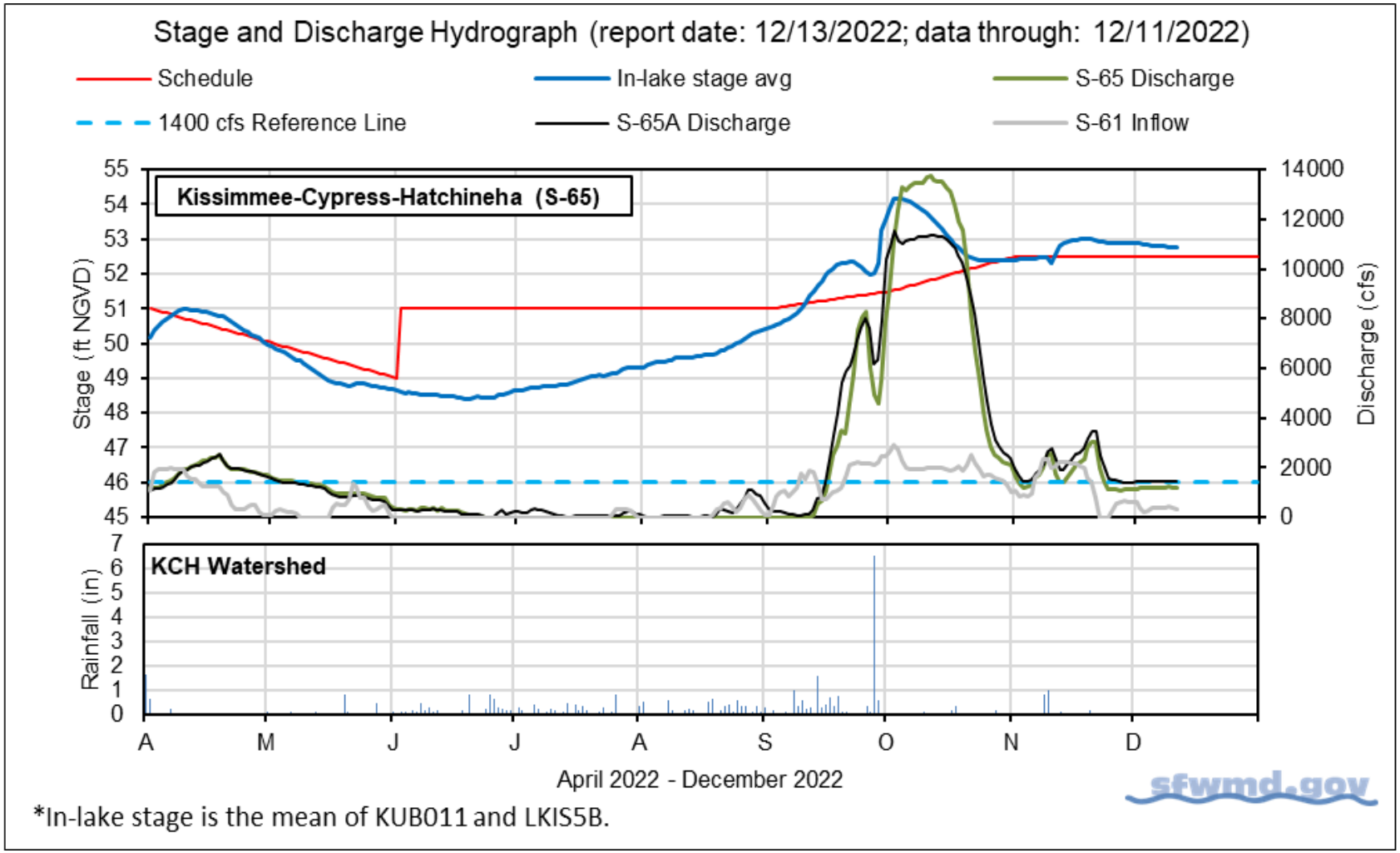



**Figure KB-3.** Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

**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 | | | |
|---|---|---|---|---|---|---|
| | | 12/11/22 | 12/11/22 | 12/4/22 | 11/27/22 | 11/20/22 |
| Discharge | S-65 | 1,200 | 1,200 | 1,200 | 1,600 | 2,300 |
| Discharge | S-65A[a] | 1,400 | 1,400 | 1,400 | 2,000 | 2,700 |
| Headwater Stage (feet NGVD) | S-65A | 46.3 | 46.3 | 46.3 | 46.5 | 46.5 |
| Discharge | S-65D[b] | 1,600 | 1,700 | 2,500 | 3,300 | 3,000 |
| Headwater Stage (feet NGVD) | S-65D[c] | 28.4 | 28.3 | 28.3 | 28.4 | 28.5 |
| Discharge (cfs) | S-65E[d] | 1,600 | 1,700 | 2,500 | 3,400 | 3,000 |
| Discharge (cfs) | S-67 | 0 | 0 | 0 | 0 | 0 |
| Dissolved Oxygen (mg/L) [e] | Phase I, II/III river channel | 4.6 | 4.4 | 3.6 | 3.3 | 2.9 |
| River channel mean stage[f] | Phase I river channel | 37.6 | 37.7 | 37.9 | 38.7 | 38.6 |
| Mean depth (feet) [g] | Phase I floodplain | 0.56 | 0.58 | 0.66 | 0.98 | 1.19 |

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).

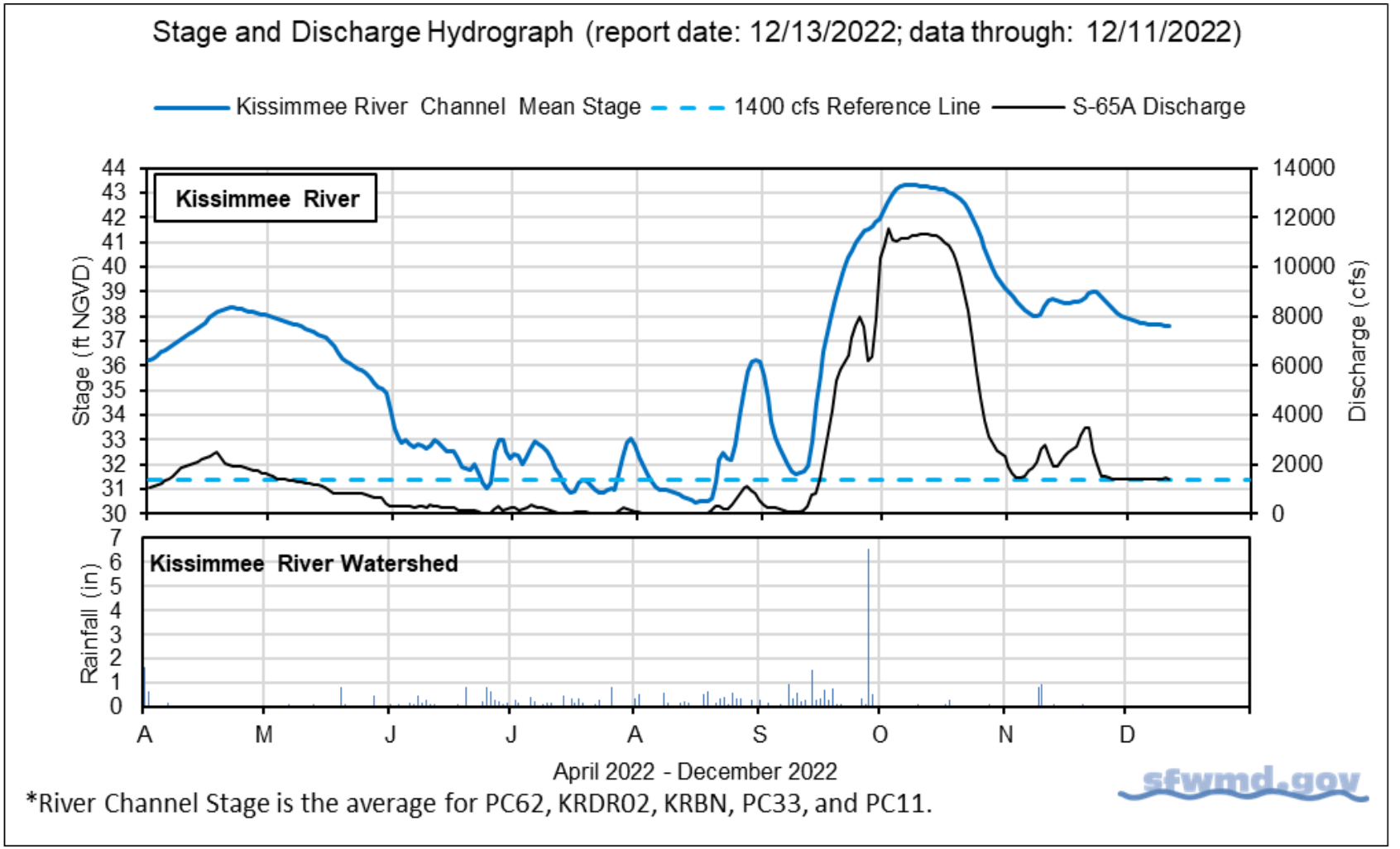



**Figure KB-4.** Kissimmee River stage, discharge and rainfall.

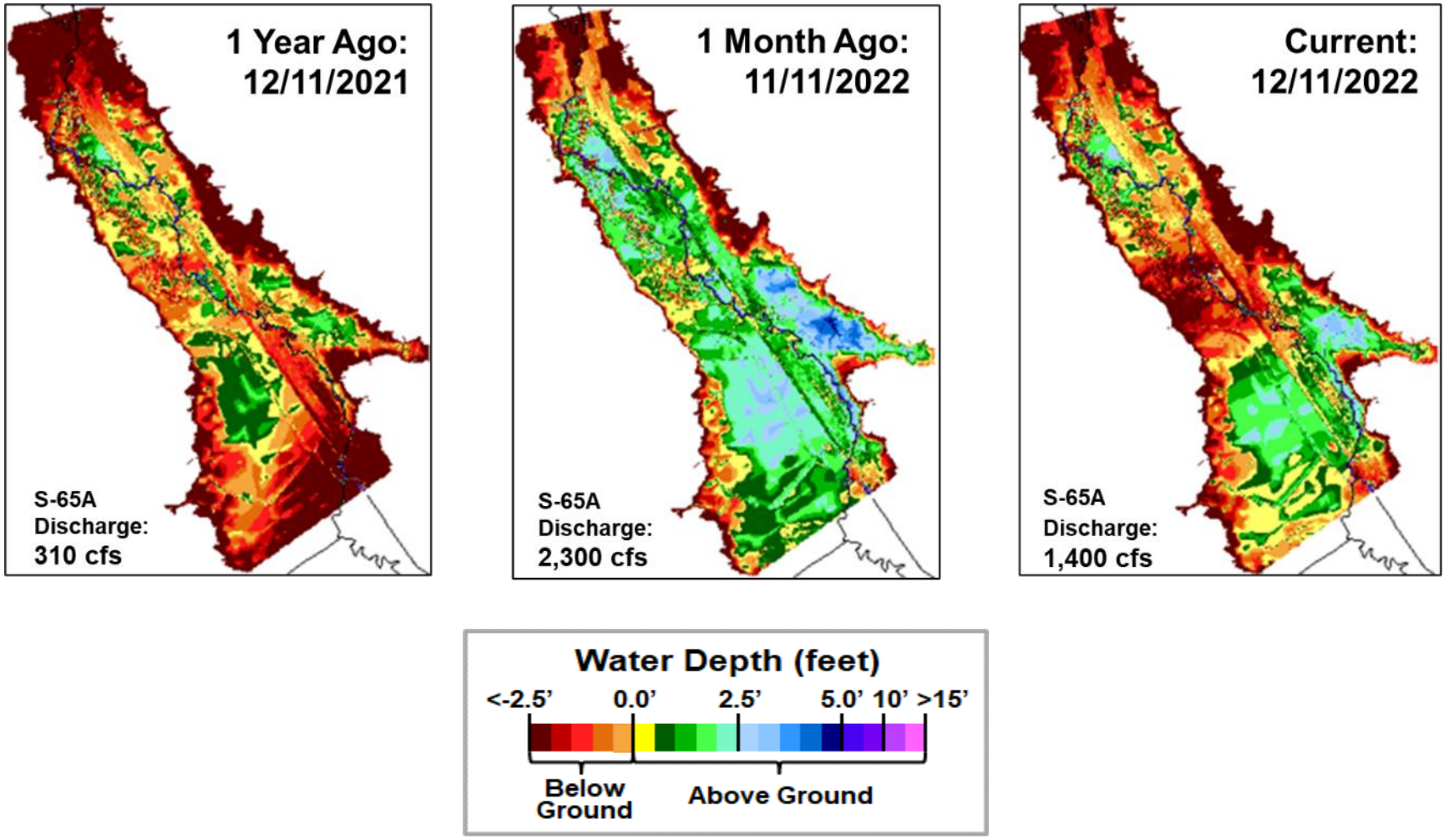



**Figure KB-5.** Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.

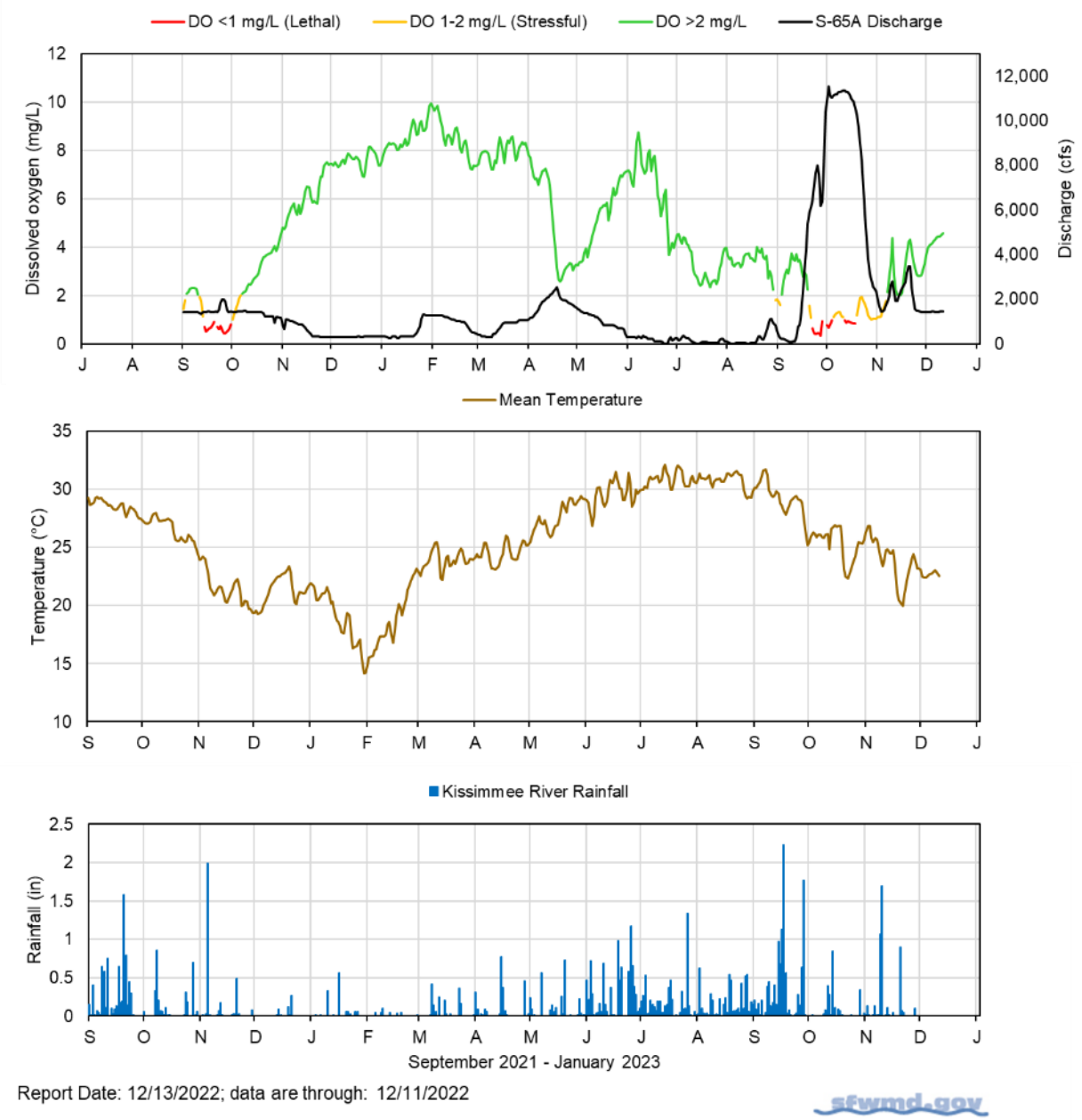



**Figure KB-6.** Restored Kissimmee river channel mean daily dissolved oxygen concentration (mg/L), S-65A discharge (cfs), temperature (°C) and rainfall (inches). Dissolved oxygen (DO) and temperature are mean daily values averaged for PC62, KRDR02, KRBN, PC33, PC11, PD62R, and PD42R with an average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

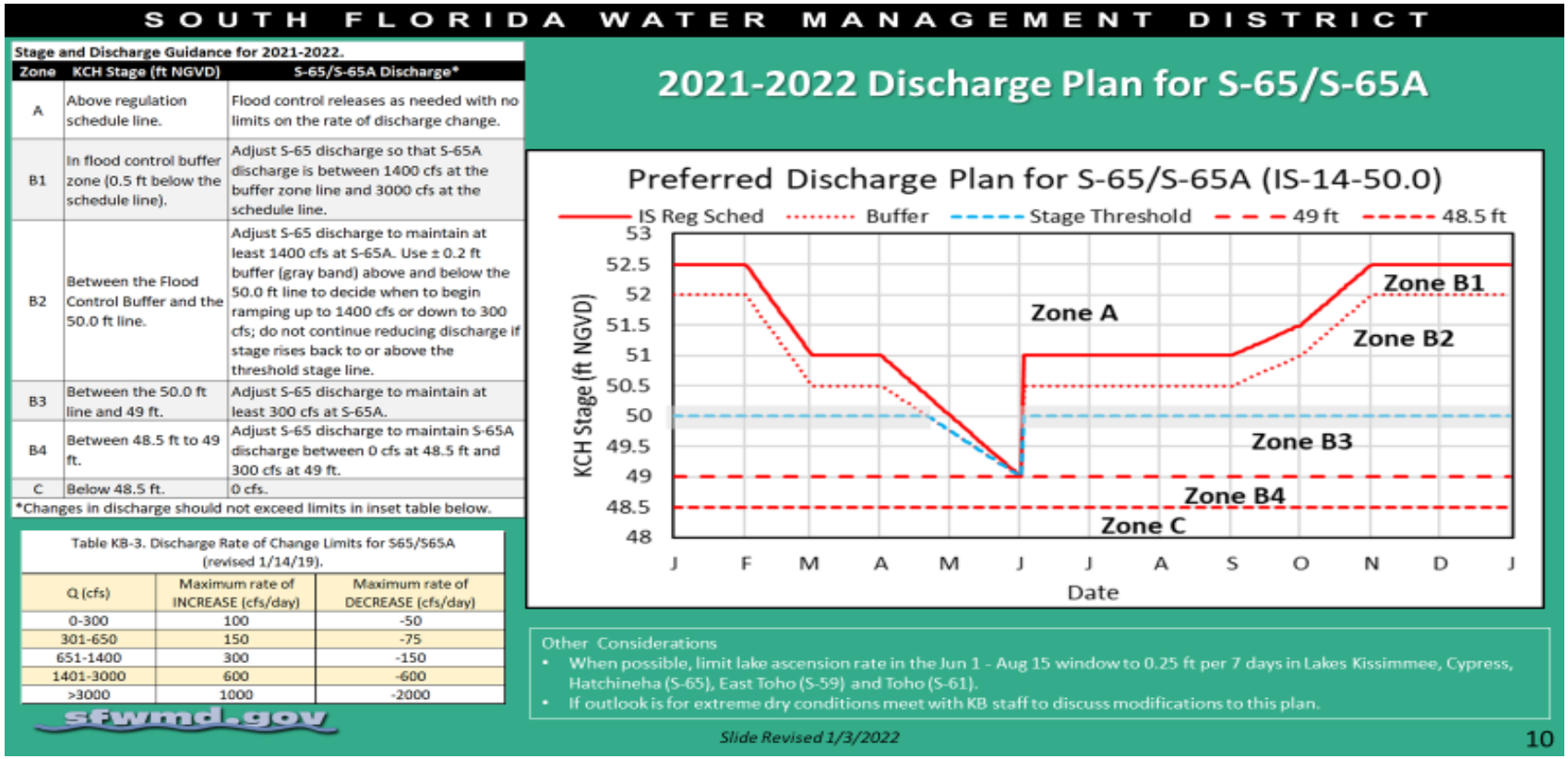



**Figure KB-7.** IS-14-50 Discharge Plan for S65/S65A with discharge rate of change limits (revised 1/14/19).

## Lake Okeechobee

Lake Okeechobee stage was 16.41 feet NGVD on December 11, 2022, 0.07 feet lower than the previous week and 0.26 feet higher than a month ago (**Figure LO-1**). Lake stage remained in the Intermediate sub-band (**Figure LO-2**) and was 0.91 feet above the upper limit of the ecological envelope (**Figure LO-3**). According to NEXRAD, no rain fell directly on the Lake last week.

Average daily inflows (excluding rainfall) decreased from the previous week, going from 3,714 cfs to 2,395 cfs. Average daily outflows (excluding evapotranspiration) increased from the previous week going from 1,647 cfs to 1,954 cfs. The highest inflow came from the Kissimmee River (C-38 Canal; 1,744 cfs), followed by the S-71 & S-72 structures (238 cfs from Indian Prairie). Outflows to the west via the S-77 structure were reinitiated on November 28 and averaged 1,041 cfs for the week. Outflows to the south via the S-350 structures averaged 854 cfs, and an average of 59 cfs flowed into the L-8 canal through the S-271 structure, after predominantly backflowing into the Lake since mid-September. There was no flow 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 (December 10, 2022) from NOAA's Harmful Algal Bloom Monitoring System showed very patchy low-moderate bloom potential along most of the nearshore areas of the Lake (**Figure LO-6**).

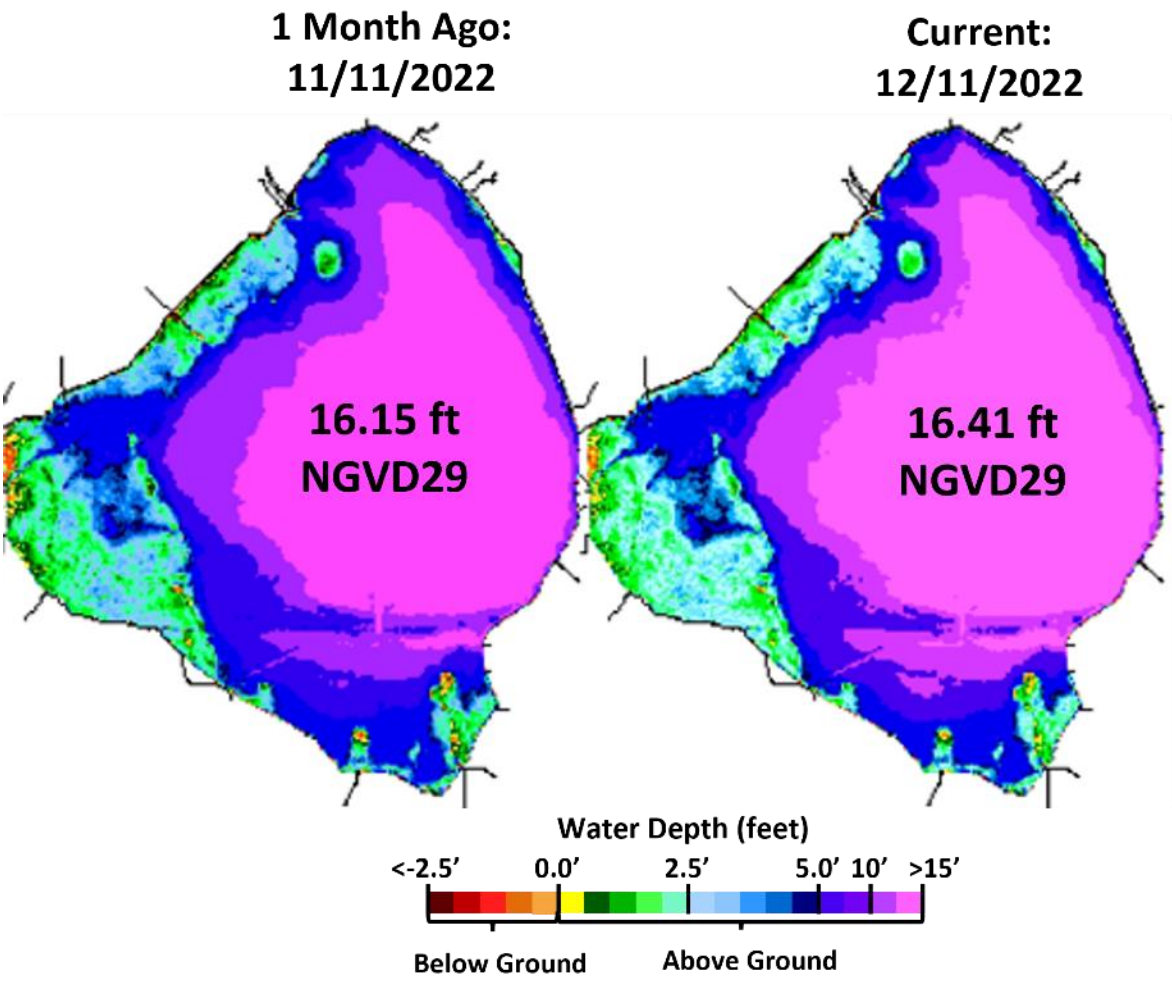



**Figure LO-1.** Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

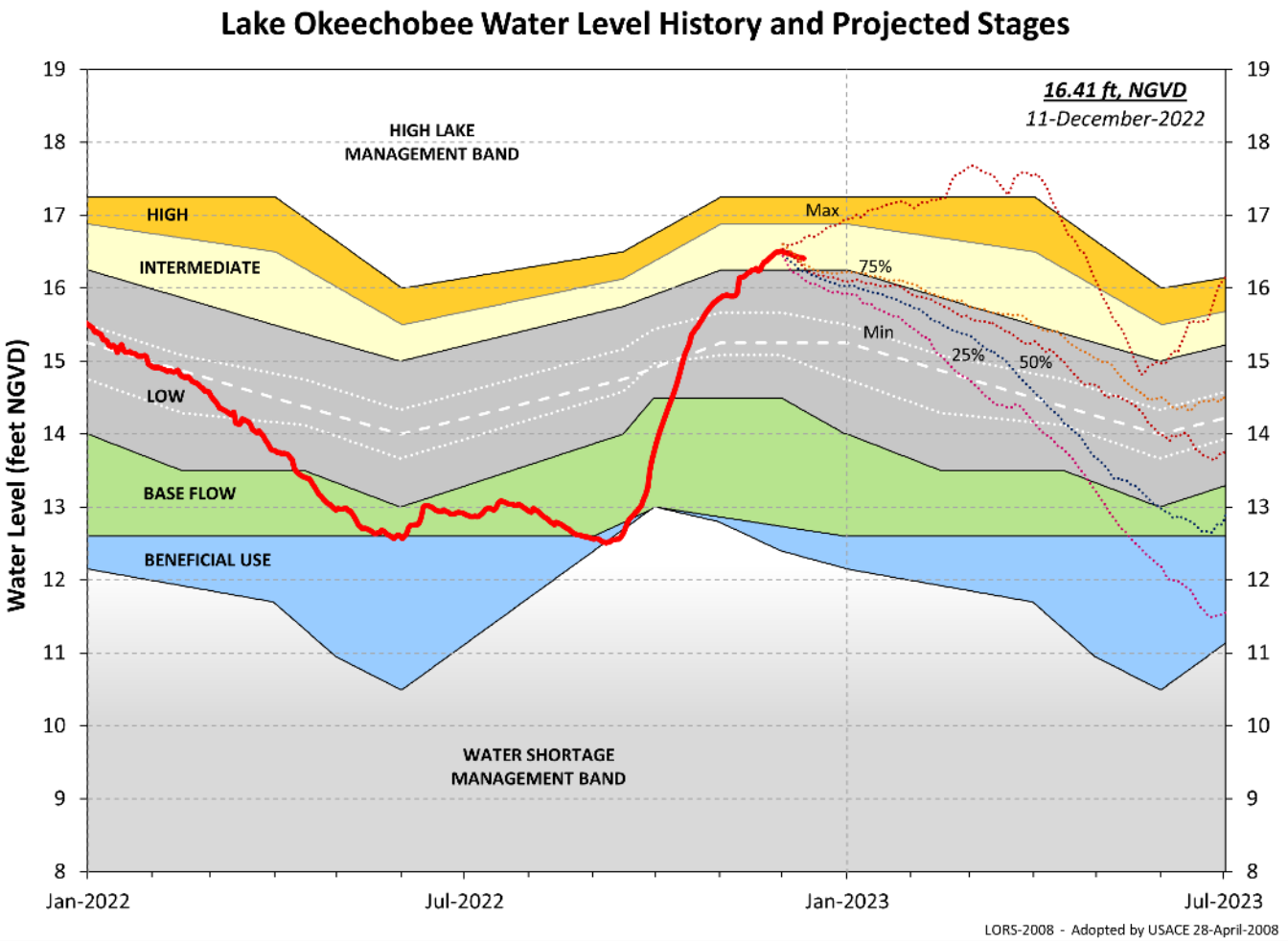



**Figure LO-2.** Recent Lake Okeechobee stages with projected stages based on a dynamic position analysis.

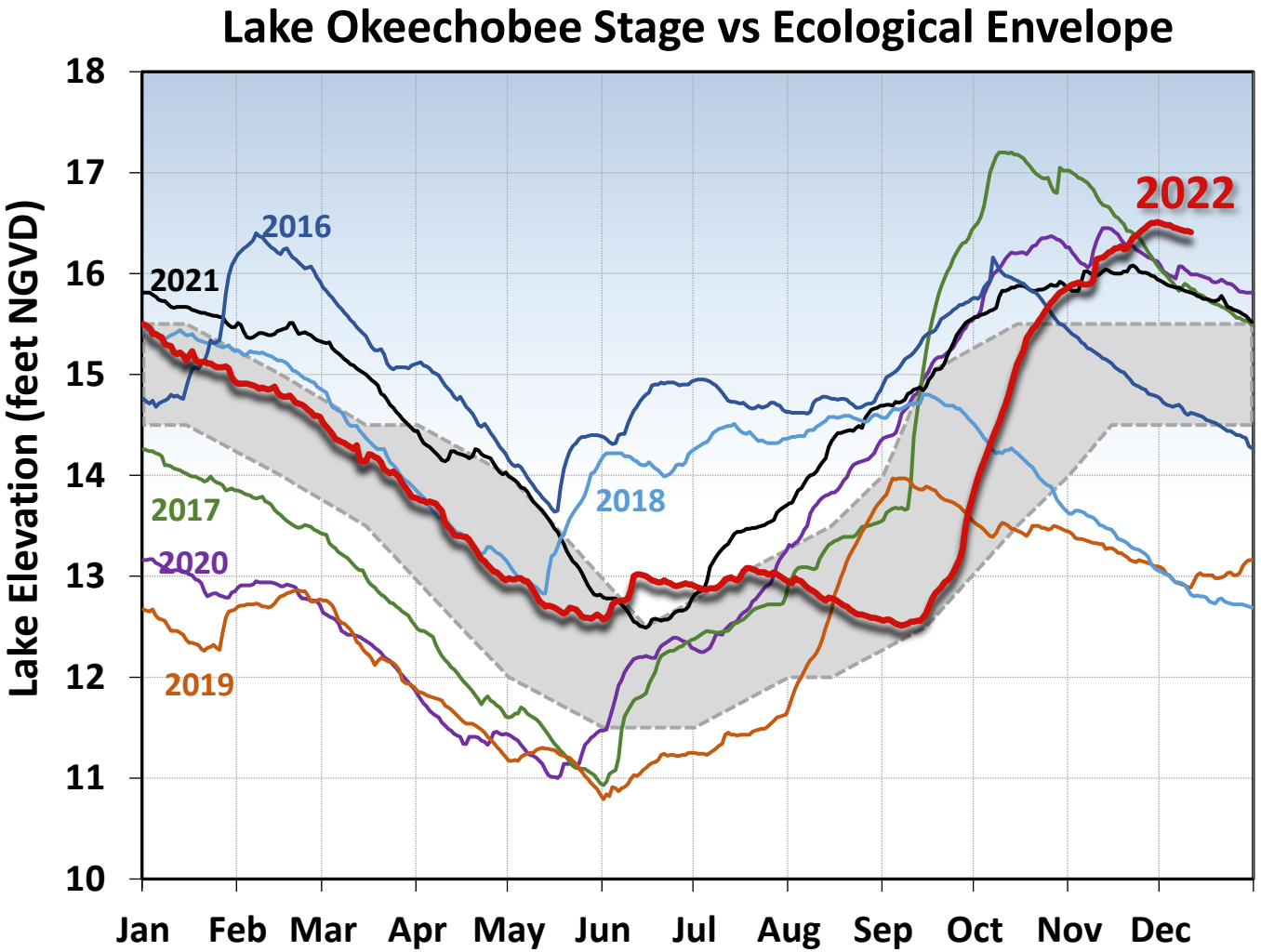



**Figure LO-3.** The prior six years of annual stage hydrographs for Lake Okeechobee in comparison to the ecological envelope.

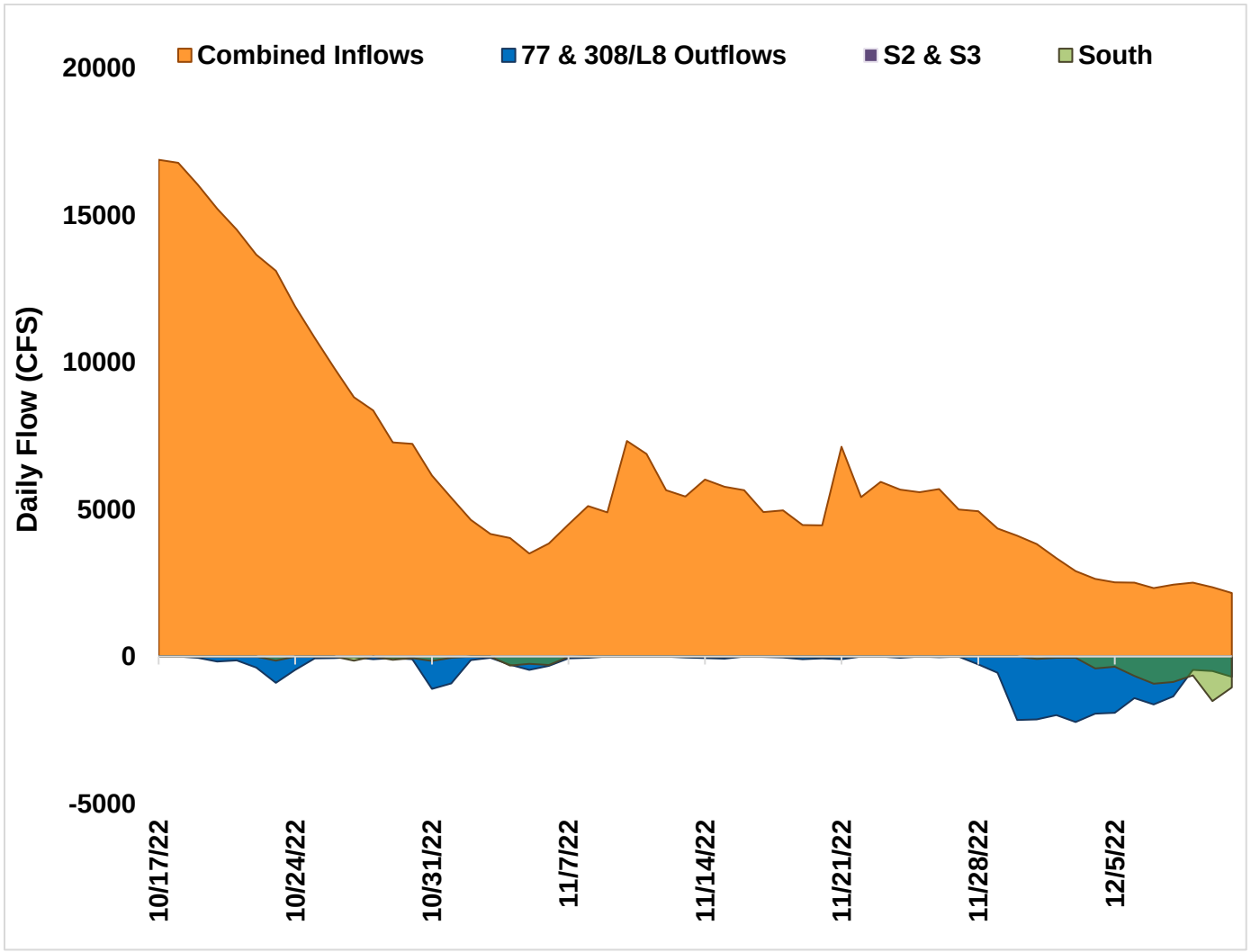



**Figure LO-4.** Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows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

ed on downstream gauges to include flows to lock openings for navigation.

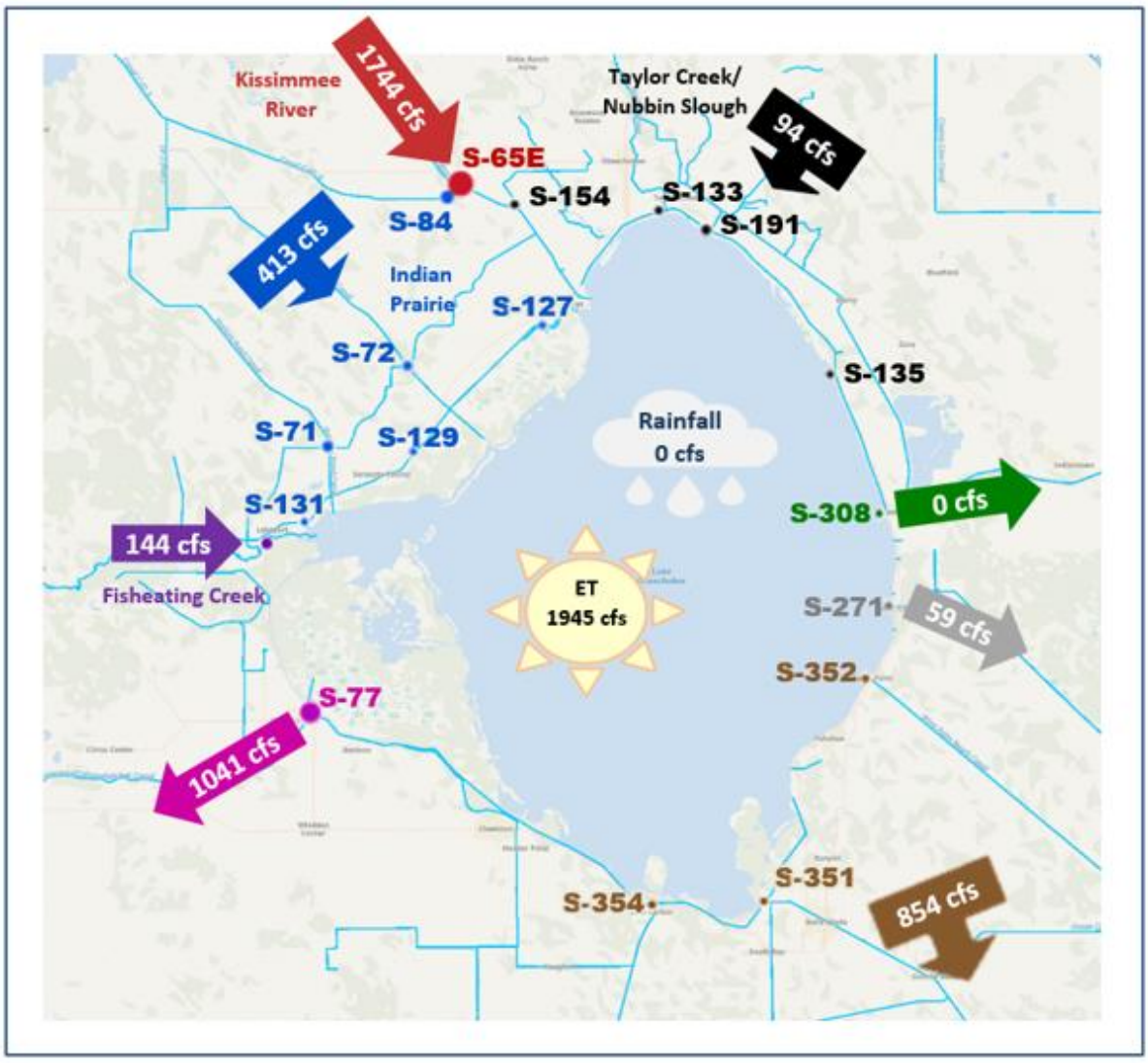



**Figure LO-5.** Inflows into Lake Okeechobee from Indian Prairie basins, Taylor Creek/Nubbin Slough, Kissimmee River and Fisheating Creek, and outflows to the west via S-77, to the east via S-308, to the south via S-351, S-352, S-354, and to southeast via S-271 (formerly Culvert 10A) for the week of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

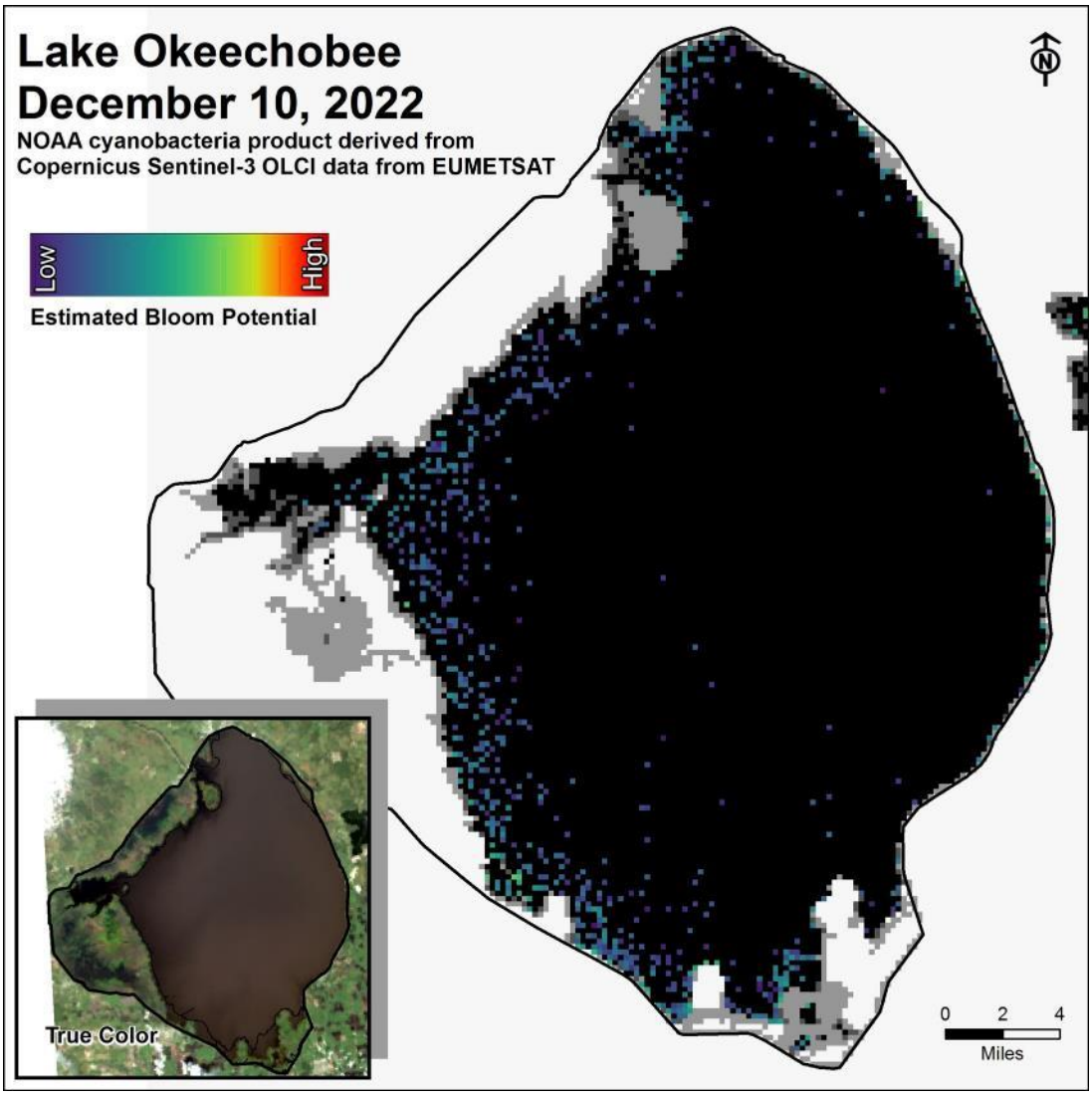



**Figure LO-6.** Cyanobacteria bloom potential on December 10, 2022, based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

## Estuaries

### *St. Lucie Estuary*

Over the past week, mean total inflow to the St. Lucie Estuary was 485 cfs (**Figures ES-1** and **ES-2**) and the previous 30-day mean inflow was 1,427 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 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 0.6 spat/shell for November (**Figure ES-5**).

### *Caloosahatchee River Estuary*

Over the past week, mean total inflow to the Caloosahatchee River Estuary was 1,746 cfs (**Figures ES-6** and **ES-7**) and the previous 30-day mean inflow was 2,059 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-7**.

Over the past week, surface salinities increased at S-79, Val I-75, Ft. Myers, and Sanibel, and decreased at Cape Coral and Shell Point (**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 upper 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 168 cfs. Model results from all scenarios predict daily salinity to be 2.2 or lower and the 30-day moving average surface salinity to be 0.8 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 December 9, 2022, that *Karenia brevis*, the Florida red tide dinoflagellate, was not observed in any samples collected within the District region. On the east coast, red tide was not observed in any samples from St. Lucie or Martin counties.

***Water Management Recommendations***

Lake stage is in the Intermediate Sub-Band. Tributary conditions are normal. The LORS2008 release guidance suggests up to 4,000 cfs release at S-77 to the Caloosahatchee River Estuary and up to 1,800 cfs release at S-80 to the St. Lucie Estuary.

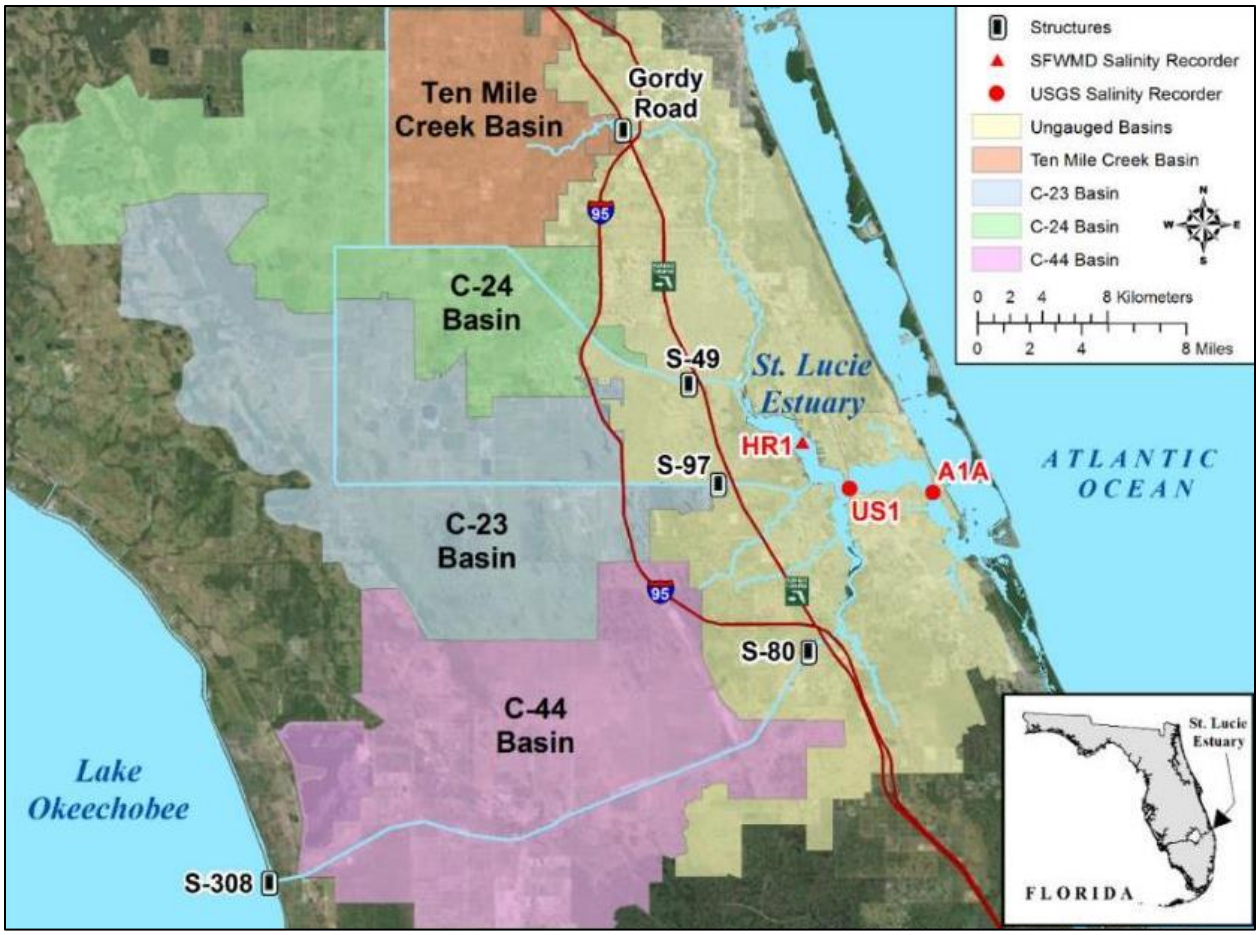



**Figure ES-1.** Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

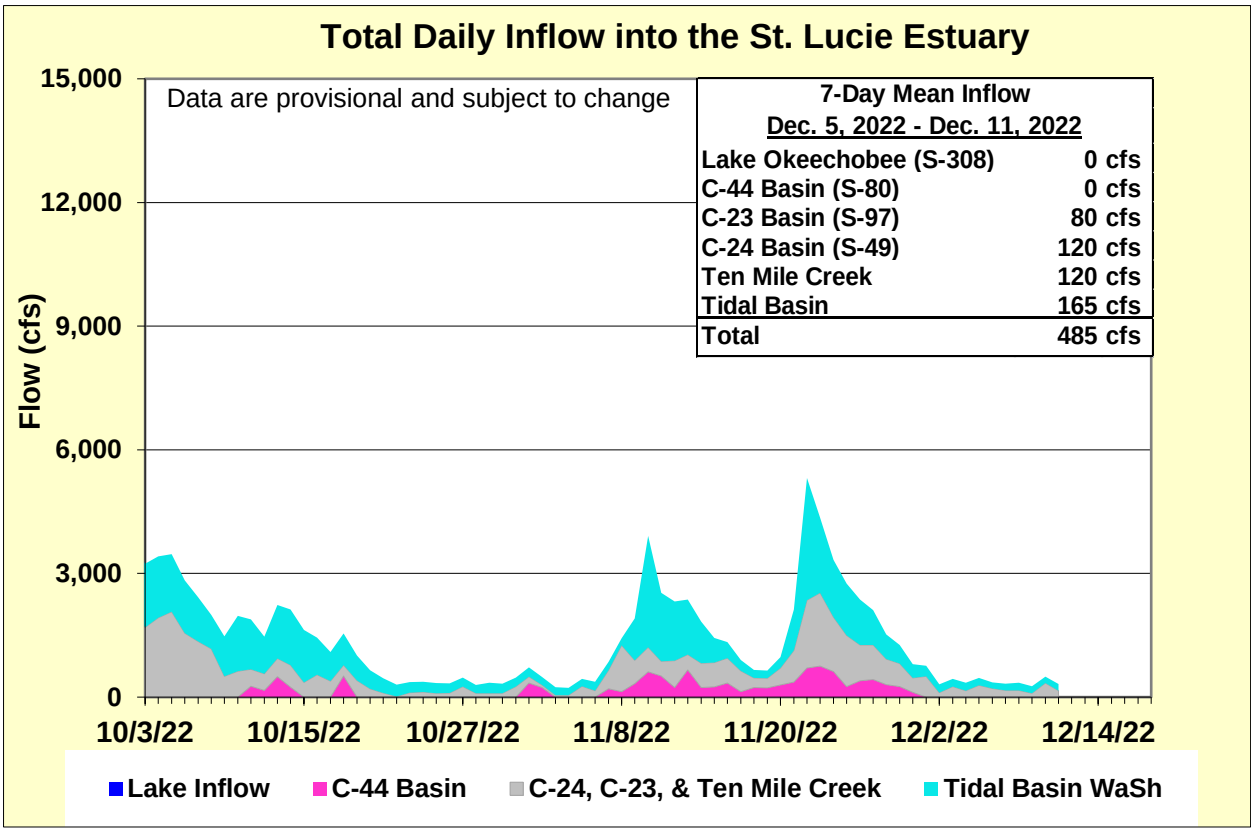



**Figure ES-2.** Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

**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) | **6.4** (3.4) | **10.9** (5.3) | 10.0 – 25.0 |
| US1 Bridge | **12.1** (7.8) | **16.7** (10.2) | 10.0 – 25.0 |
| A1A Bridge | **21.1** (18.7) | **27.3** (24.7) | 10.0 – 25.0 |

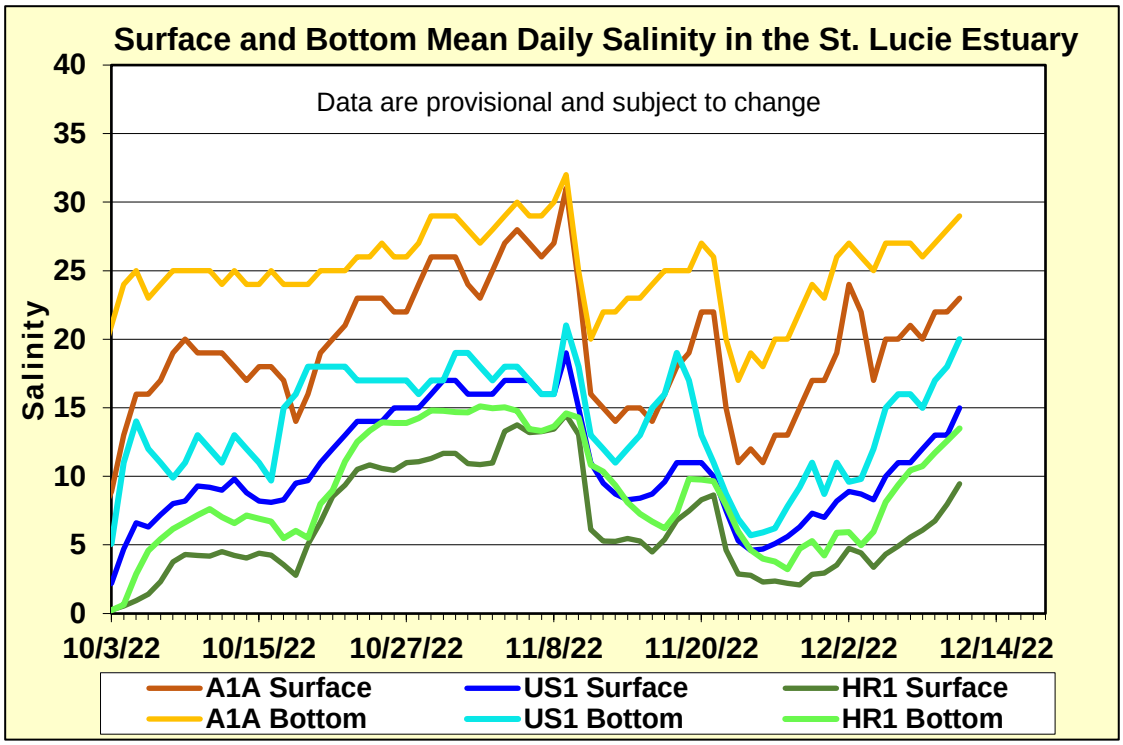



**Figure ES-3.** Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

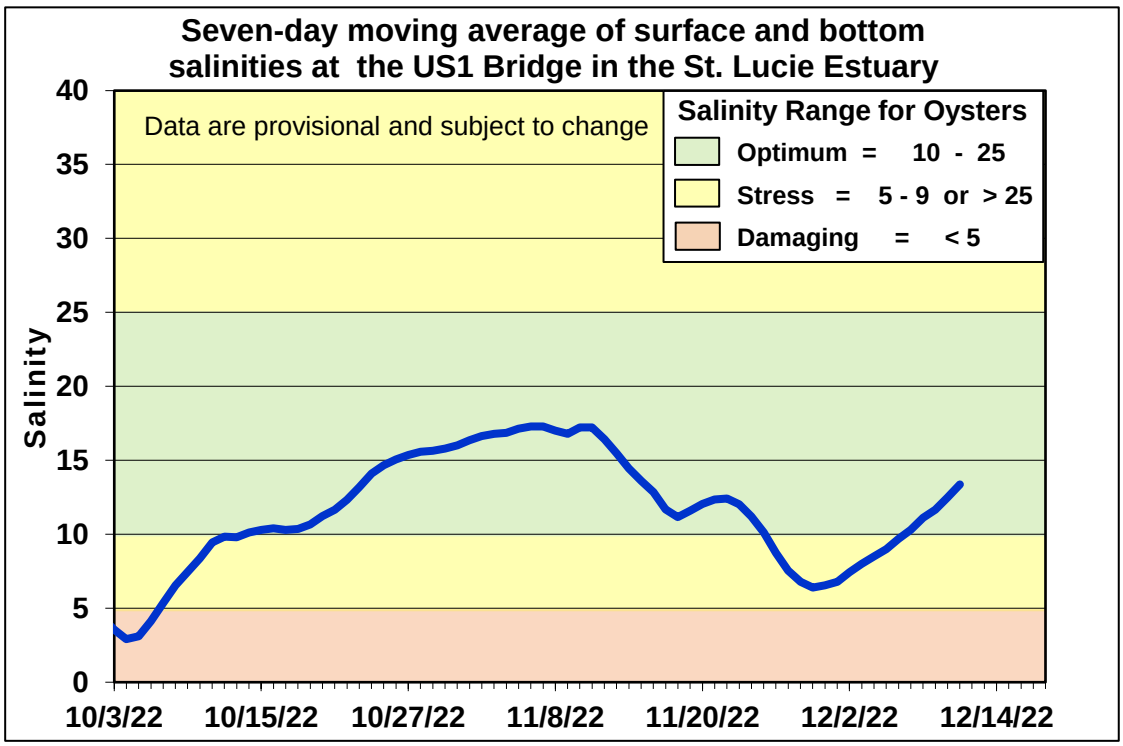



**Figure ES-4.** Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

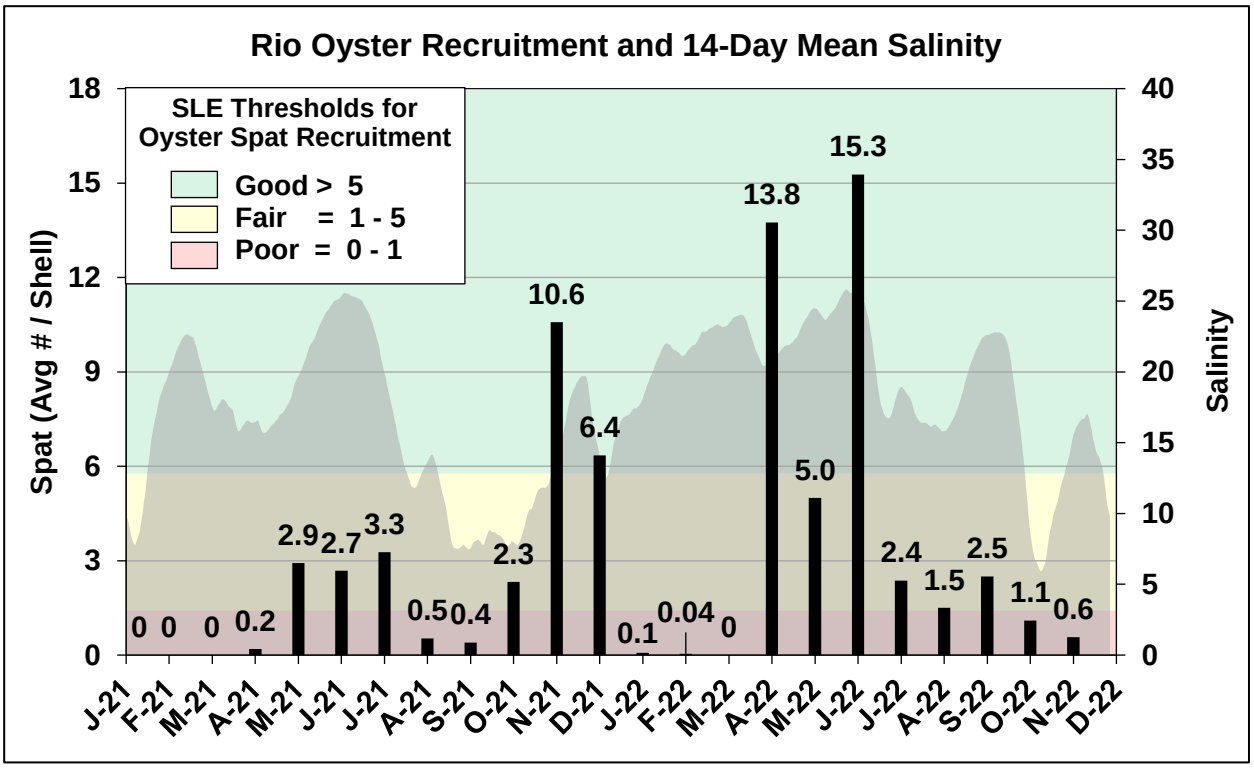



**Figure ES-5.** Mean oyster recruitment at the Rio oyster monitoring station and 14-day mean salinity at US1 Bridge.

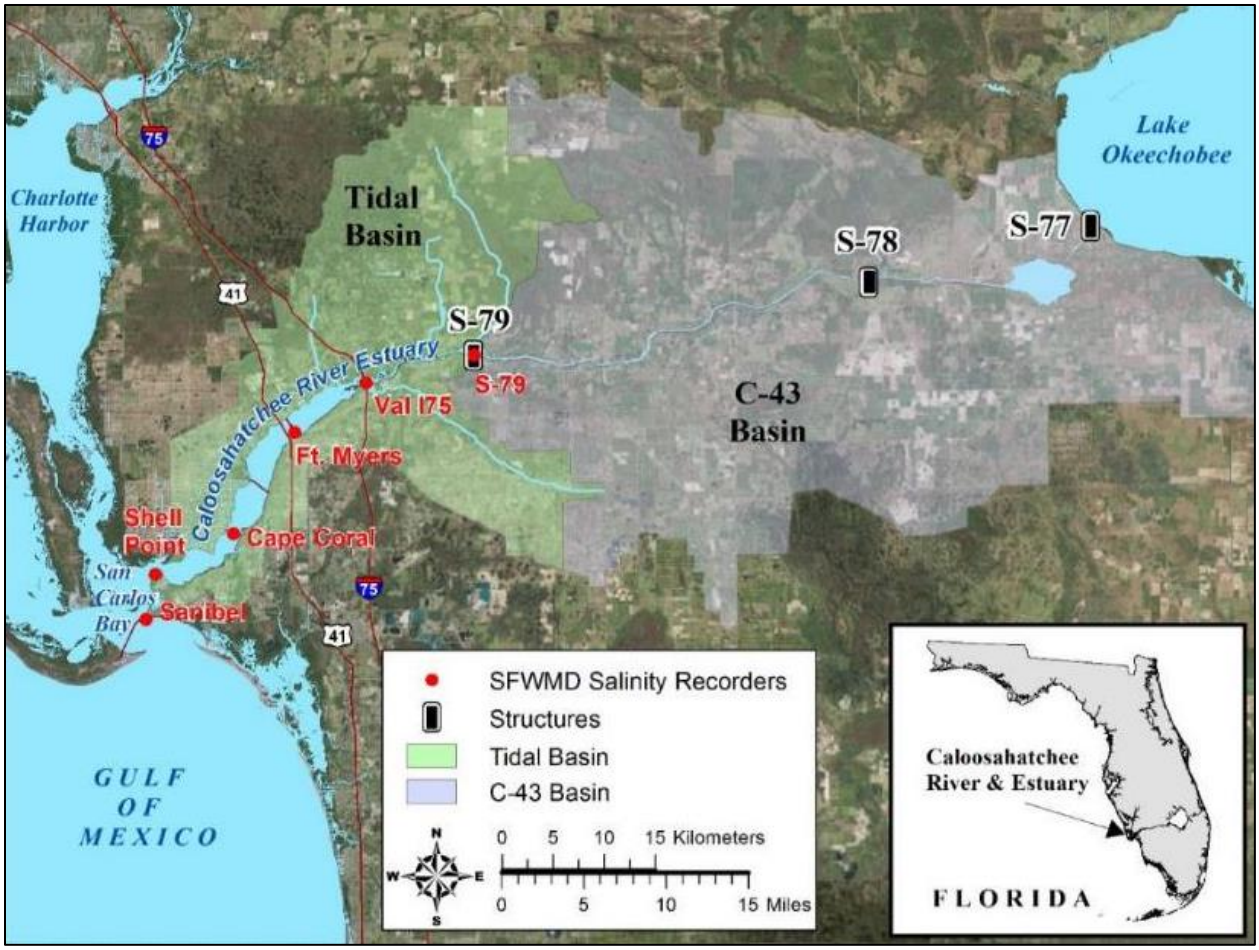



**Figure ES-6.** Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.

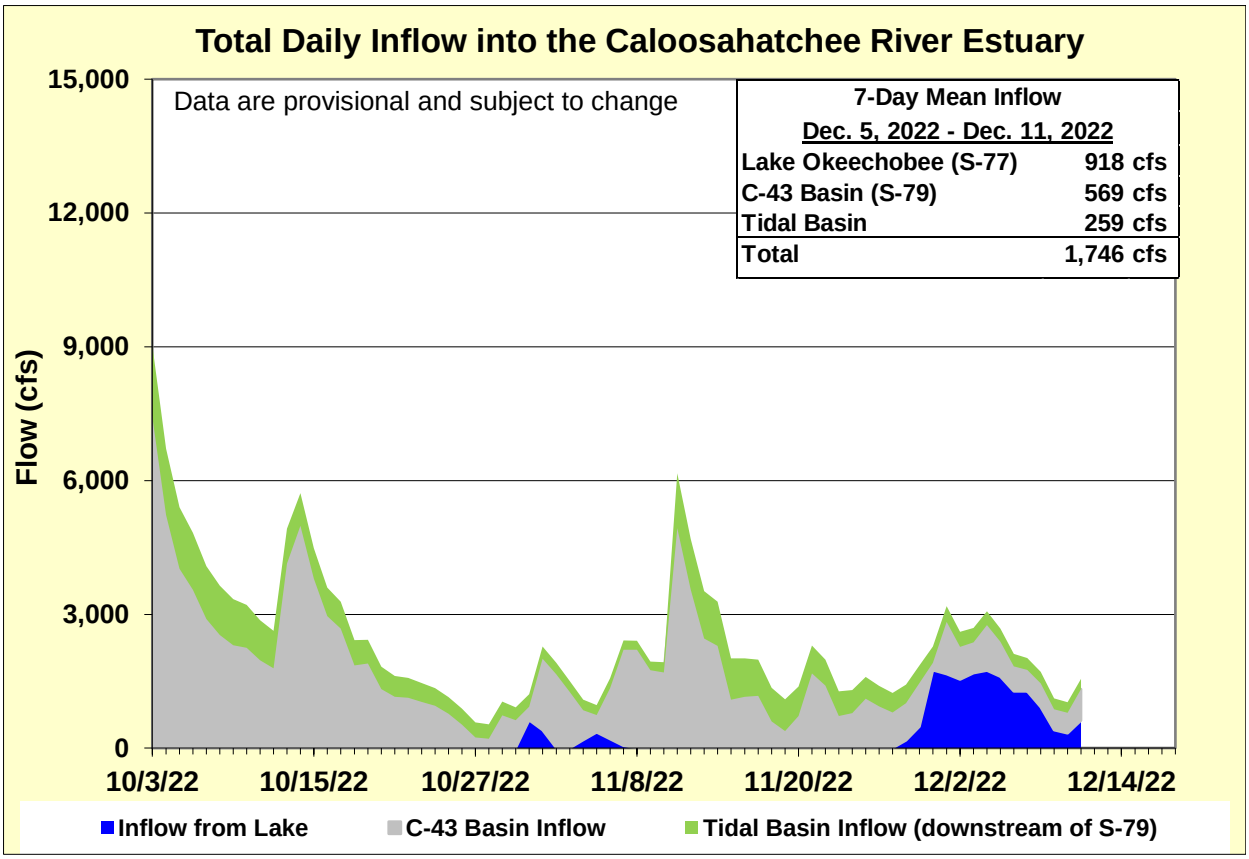



**Figure ES-7.** Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

**Table ES-2.** Seven-day mean salinity at six monitoring sites in the Caloosahatchee River Estuary. Current means are in bold font; previous week's means are in parentheses. 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) | **0.8** (0.3) | **0.9** (NR) | 0.0 – 10.0 |
| Val I-75 | **0.8** (0.6) | **1.9** (1.0) | 0.0 – 10.0 |
| Fort Myers Yacht Basin | **7.2** (6.7) | **8.3** (8.1) | 0.0 – 10.0 |
| Cape Coral | **11.8** (12.8) | **14.3** (15.0) | 10.0 – 25.0 |
| Shell Point | **24.8** (25.2) | **25.1** (25.8) | 10.0 – 25.0 |
| Sanibel | **34.3** (33.6) | **31.6** (32.0) | 10.0 – 25.0 |

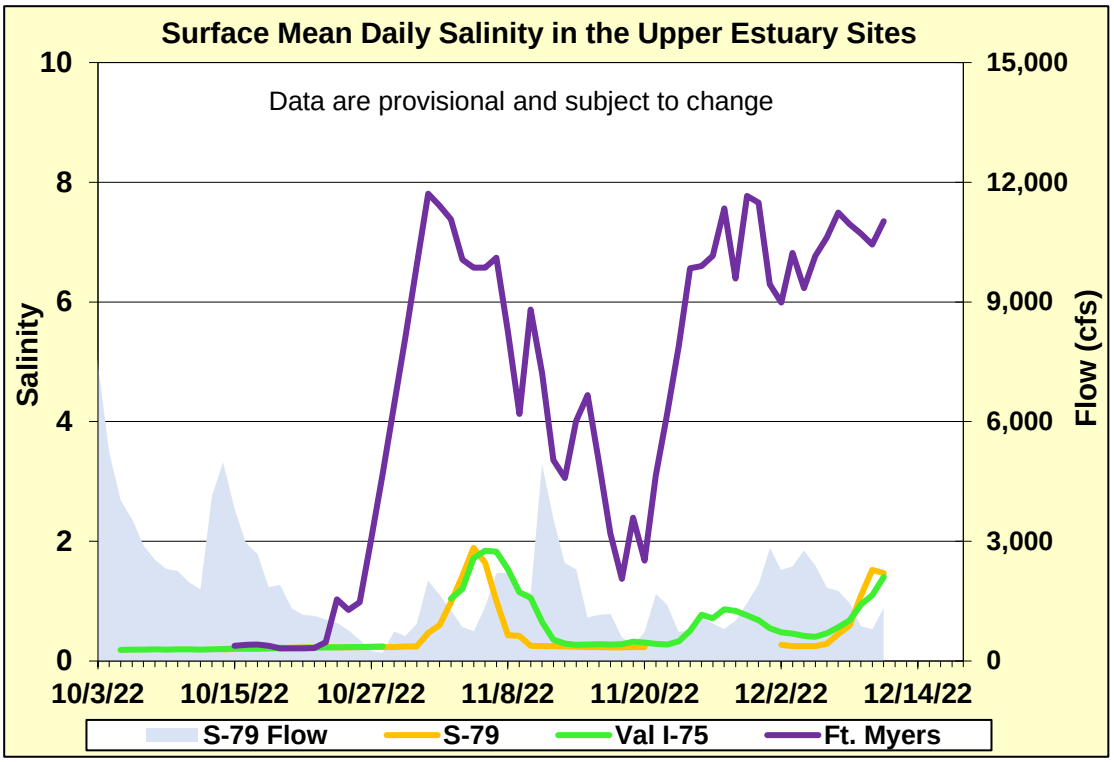



**Figure ES-8.** Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

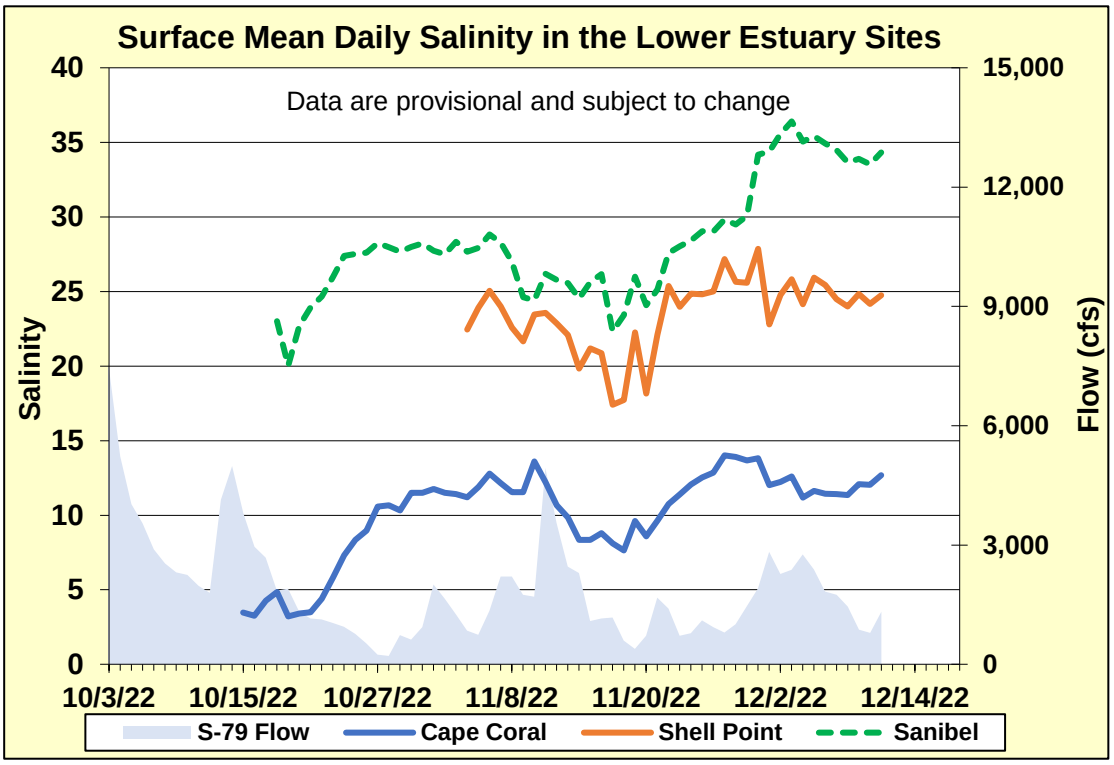



**Figure ES-9.** Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

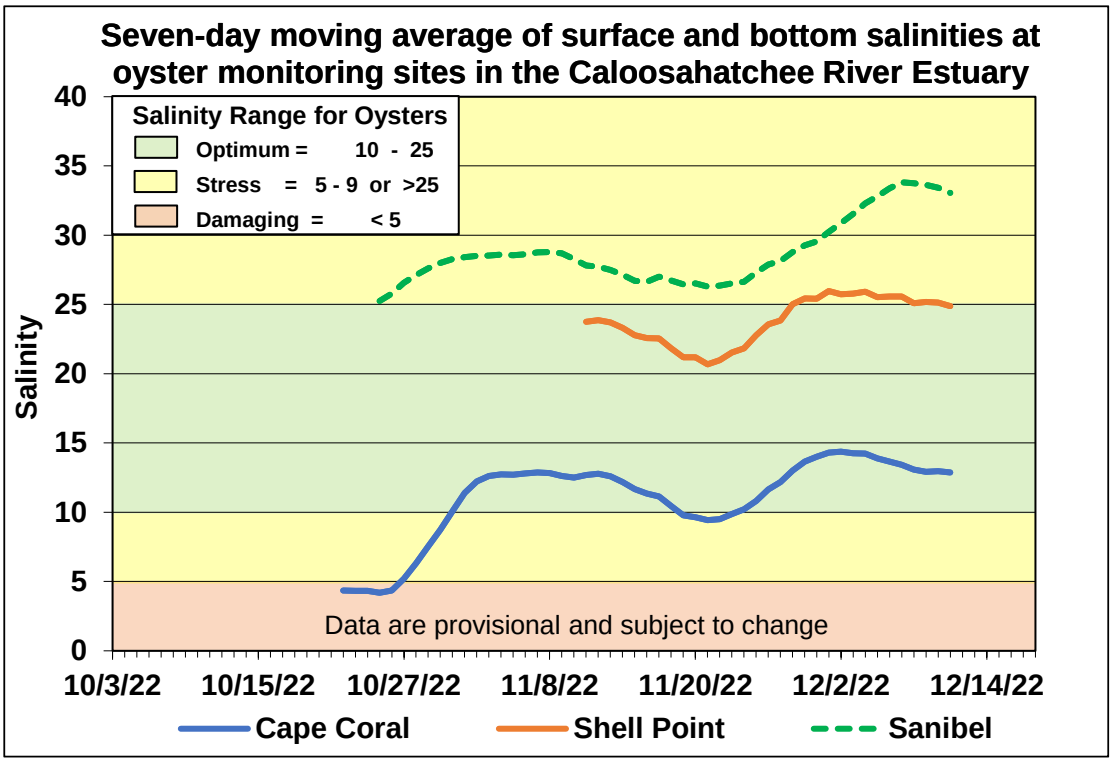



**Figure ES-10.** Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

**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 | 168 | 2.2 | 0.8 |
| B | 450 | 168 | 1.2 | 0.6 |
| C | 750 | 168 | 0.7 | 0.6 |
| D | 1000 | 168 | 0.4 | 0.5 |
| E | 1500 | 168 | 0.3 | 0.5 |
| F | 2000 | 168 | 0.3 | 0.5 |

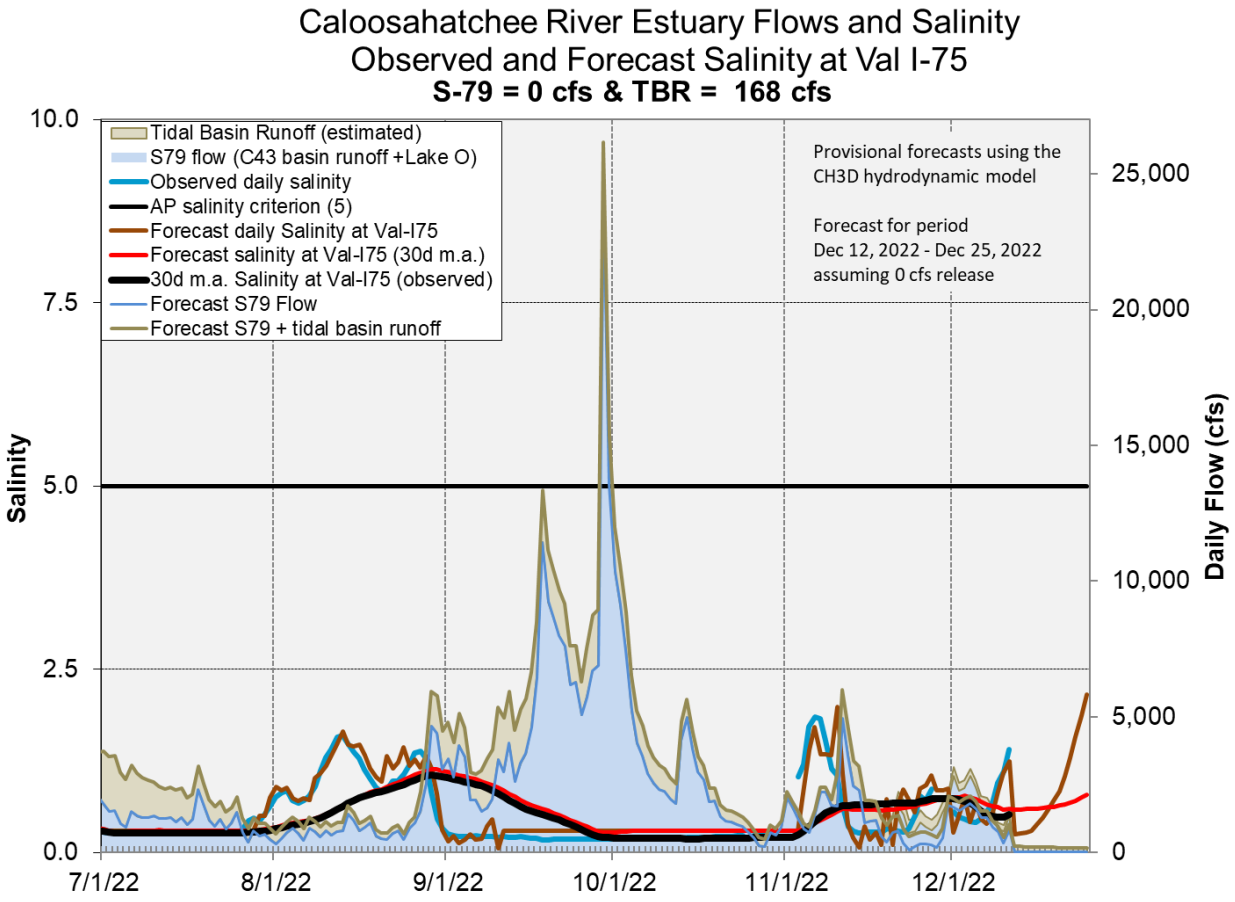



**Figure ES-11.** Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

## 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 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 at or 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.

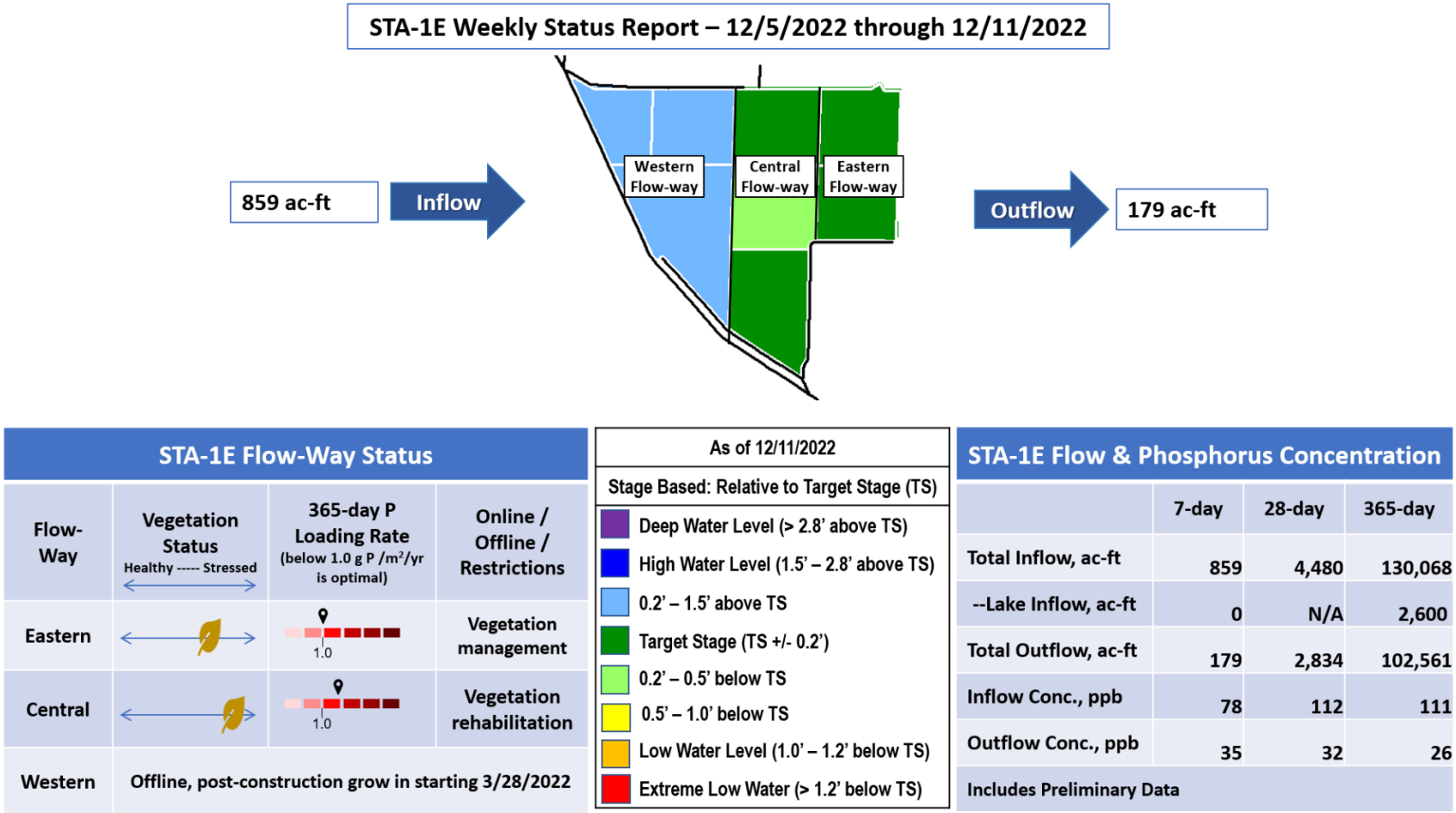



**Figure S-1.** STA-1E Weekly Status Report

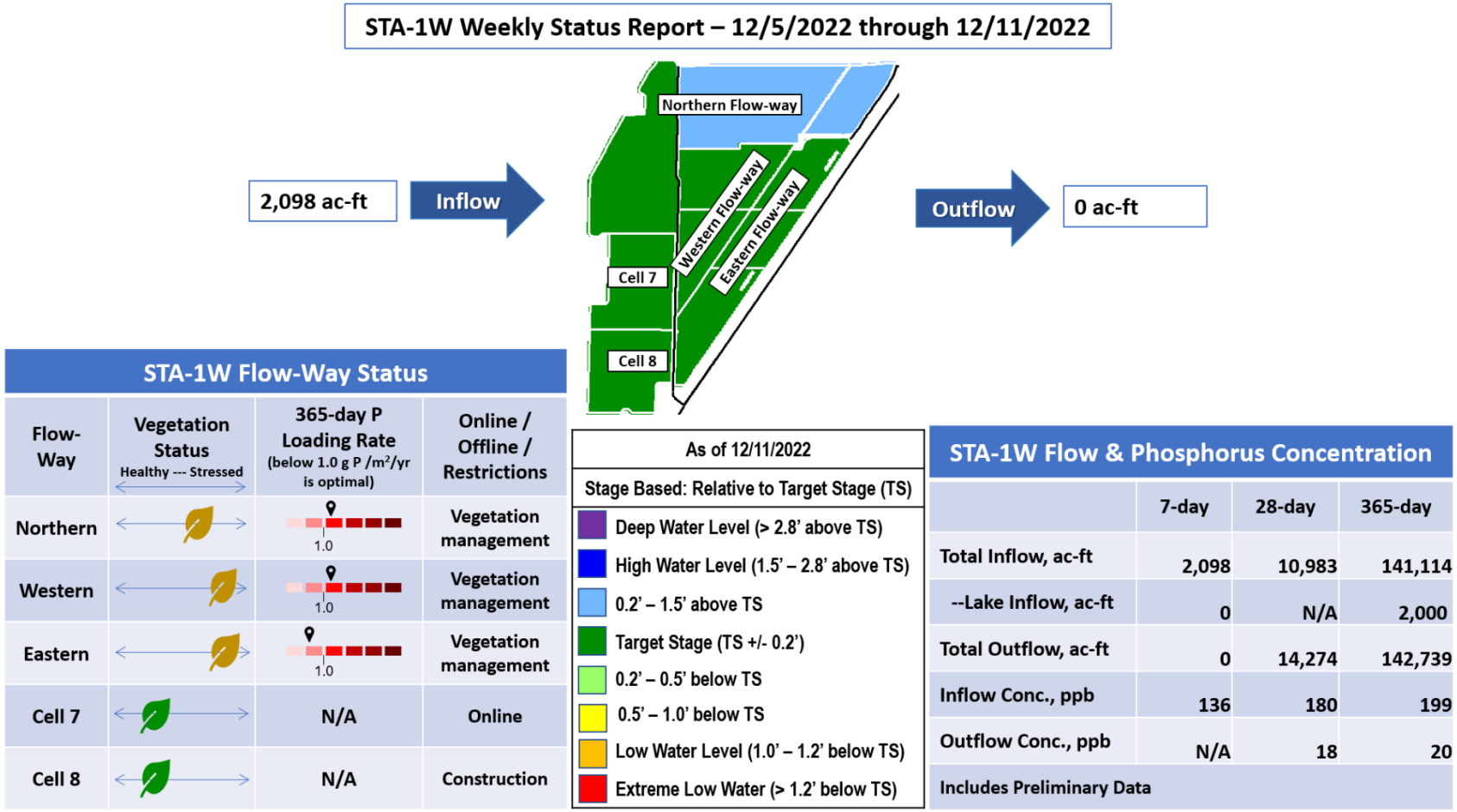
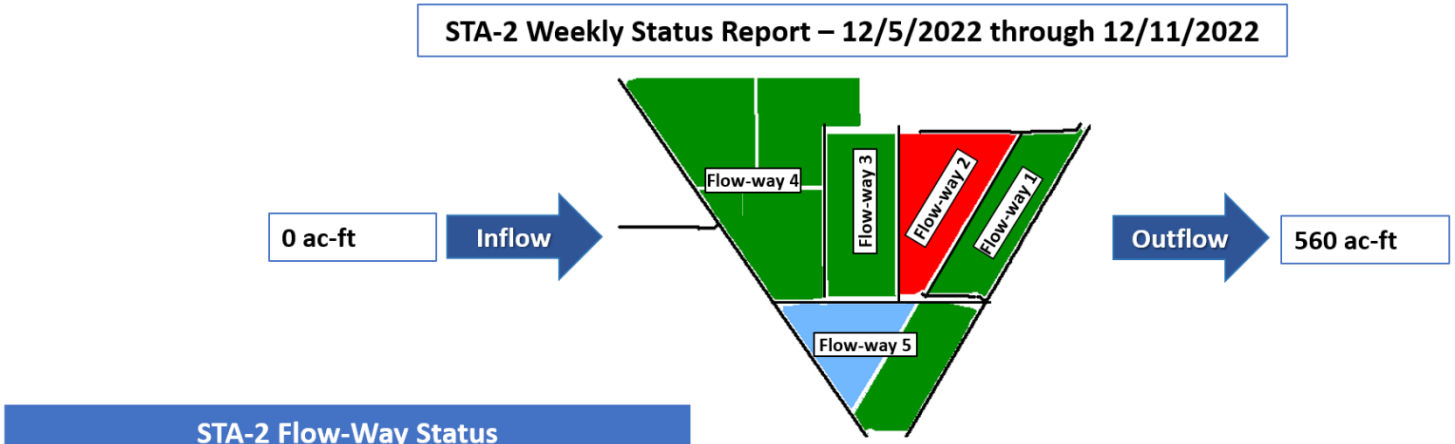



**Figure S-2.** STA-1W Weekly Status Report




## 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 12/11/2022 |
|---|
| Stage Based: Relative to Target Stage (TS) |
| Deep Water Level (> 2.8' above TS) |
| High Water Level (1.5' – 2.8' above TS) |
| 0.2' – 1.5' above TS |
| Target Stage (TS +/- 0.2') |
| 0.2' – 0.5' below TS |
| 0.5' – 1.0' below TS |
| Low Water Level (1.0' – 1.2' below TS) |
| Extreme Low Water (> 1.2' below TS) |

## STA-2 Flow & Phosphorus Concentration

| | 7-day | 28-day | 365-day |
|---|---|---|---|
| Total Inflow, ac-ft | 0 | 6,744 | 312,906 |
| --Lake Inflow, ac-ft | 0 | N/A | 27,700 |
| Total Outflow, ac-ft | 560 | 12,827 | 333,159 |
| Inflow Conc., ppb | N/A | 53 | 114 |
| Outflow Conc., ppb | 20 | 19 | 30 |
| Includes Preliminary Data | | | |

**Figure S-3.** STA-2 Weekly Status Report

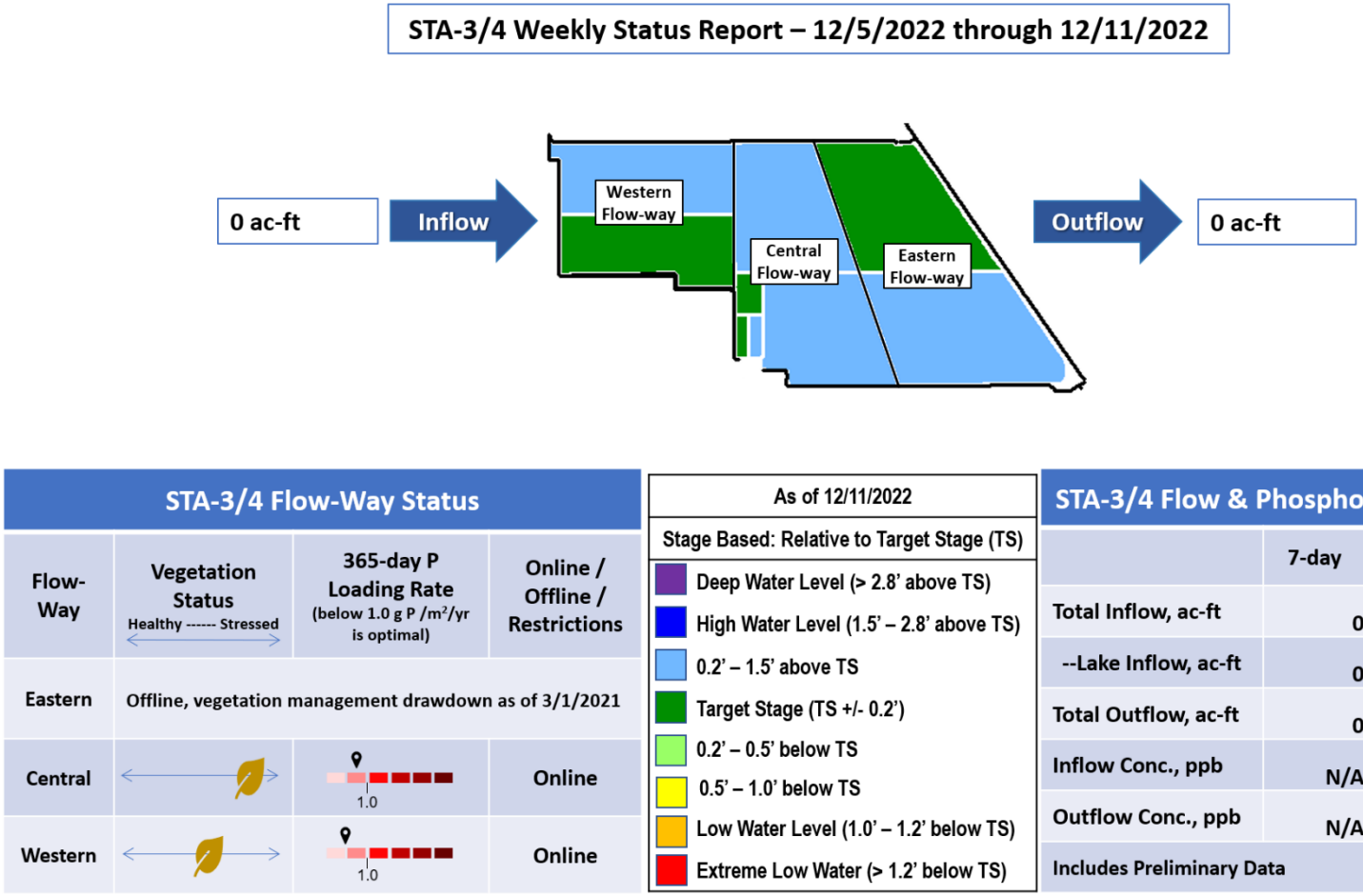
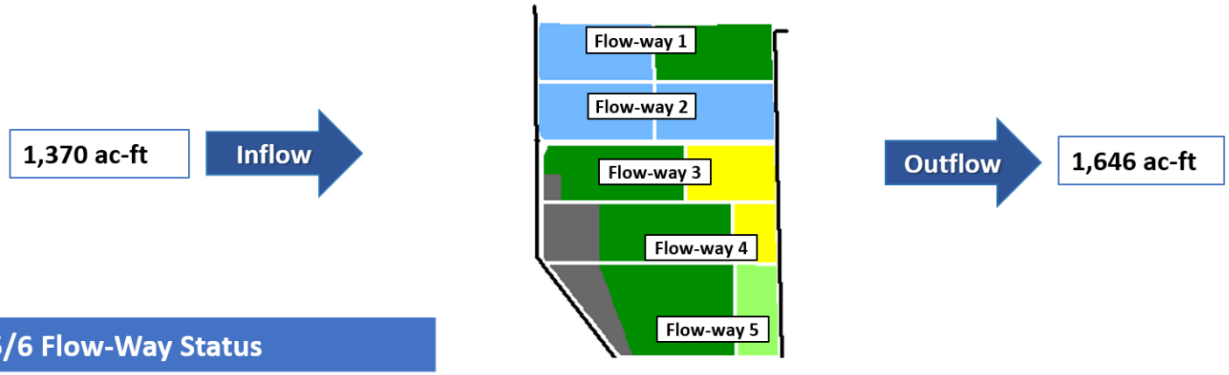



**Figure S-4.** STA-3/4 Weekly Status Report

## STA-5/6 Weekly Status Report – 12/5/2022 through 12/11/2022




### 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 |

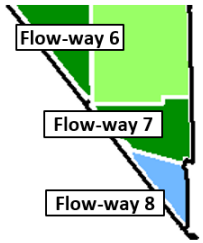
| As of 12/11/2022 |
|---|
| Stage Based: Relative to Target Stage (TS) |
| Deep Water Level (> 2.8' above TS) |
| High Water Level (1.5' – 2.8' above TS) |
| 0.2' – 1.5' above TS |
| Target Stage (TS +/- 0.2') |
| 0.2' – 0.5' below TS |
| 0.5' – 1.0' below TS |
| Low Water Level (1.0' – 1.2' below TS) |
| Extreme Low Water (> 1.2' below TS) |

### STA-5/6 Flow & Phosphorus Concentration

| | 7-day | 28-day | 365-day |
|---|---|---|---|
| Total Inflow, ac-ft | 1,370 | 12,765 | 154,565 |
| --Lake Inflow, ac-ft | 0 | N/A | 0 |
| Total Outflow, ac-ft | 1,646 | 11,989 | 144,546 |
| Inflow Conc., ppb | 627 | 351 | 284 |
| Outflow Conc., ppb | 15 | 26 | 40 |
| Includes Preliminary Data | | | |

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

**STA-5/6 Weekly Status Report – 12/5/2022 through 12/11/2022**




| STA-5/6 Flow-Way Status | | | |
|---|---|---|---|
| Flow-Way | Vegetation Status<br>Healthy ------ Stressed | 365-day P Loading Rate<br>(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 12/11/2022 |
|---|
| Stage Based: Relative to Target Stage (TS) |
| Deep Water Level (> 2.8' above TS) |
| High Water Level (1.5' – 2.8' above TS) |
| 0.2' – 1.5' above TS |
| Target Stage (TS +/- 0.2') |
| 0.2' – 0.5' below TS |
| 0.5' – 1.0' below TS |
| Low Water Level (1.0' – 1.2' below TS) |
| Extreme Low Water (> 1.2' below TS) |

**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*

Last week the EPA received essentially no rainfall. At the gauges monitored for this report, stage once again fell an average of 0.10 feet. WCA-1: Stage at the 1-8C continues a gradual recession. The average on Sunday was 0.06 feet above the falling Zone A1 regulation line. WCA-2A: Stage at the 2-17 gauge continued to recede faster than the slope of the regulation line last week. The average on Sunday was 1.11 feet above the falling regulation line. WCA-3A: Over the last week the Three Gauge Average stages steadily receded into Zone B. The average stage was 0.08 feet below the flat regulation line on Sunday. WCA-3A North: At gauge 62 (Northwest corner) stage continued a recession falling faster than the slope of the Upper schedule line, the average on Sunday was 0.59 feet below (**Figures EV-1** through **EV-4**).

### *Water Depths*

Comparing current WDAT water depths to one month ago conditions within the EPA are generally shallower with some indication of increasing depths in WCA-3A NE. Looking back a year ago, most of WCA-3A is deeper; conditions are significantly deeper in northeastern WCA-3A, and northern ENP. (**Figure EV-5 and Figure EV-6)**. Comparing current conditions to the 20-year average on December 11th: Conditions are above average in northeastern WCA-3A, -3B; significantly above average in WCA-1 and northeastern SRS. (**Figure EV-7**).

### *Taylor Slough and Florida Bay*

Taylor Slough and Florida Bay received an average of 0.04 inches of total rain this past week based on 18 gauges used in this report. Weekly totals ranged from 0.0 inches (at multiple gauges) to 0.15 inches at Buoy Key (BK) in the central/western bay. Taylor Slough stages decreased at all stations, with a maximum decline of -0.11 at E-146 in the middle slough north of Taylor River and an average decline of −0.06 feet (**Figure EV-8 and Figure EV-9**). Taylor Slough water levels remain above the historical average for this time of year by +4.4 inches compared to before the Florida Bay initiative (starting in 2017), a decrease of -0.6 inches from last week.

Average Florida Bay salinity is 26.8, an increase of +1.1 from the previous week. Salinity changes ranged from a decrease of −1.9 in Garfield Bight (GB) to an increase of +17.2 in highly variable Trout Cove (TC) (**Figure EV-8**). Salinities in the Central and Western regions remain within the historical IQR with the Eastern region moving above its IQR in the past week (**Figure EV-10**). Florida Bay salinity is +3.1 above its historical average for this time of year, an increase of +1.6 from the previous week.

### *Water Management Recommendations*

We recommend continuing a discussion and utilize strategies that could prevent further degradation of WCA3A North. Conserving water in this region will most likely prove critical for the upcoming wading bird nesting season. Optimizing 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. 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. Moderating the recession rate in WCA-2A by decreasing outflows could help serve this purpose. 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 | 0.00 | −0.06 |
| WCA-2A | 0.00 | −0.19 |
| WCA-2B | 0.00 | −0.13 |
| WCA-3A | <0.01 | −0.12 |
| WCA-3B | 0.01 | −0.07 |
| ENP | <0.01 | −0.02 |

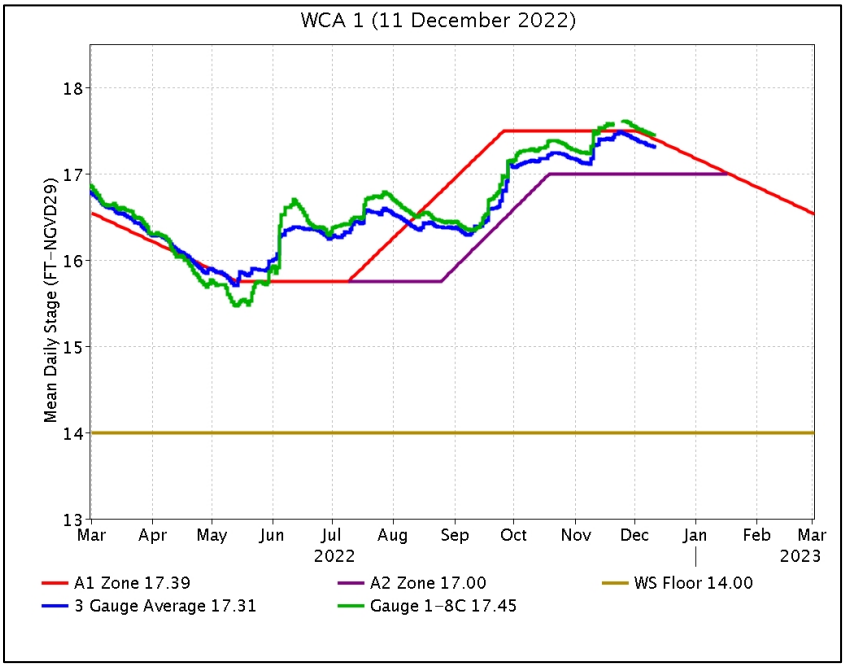



**Figure EV-1.** WCA-1 stage hydrographs and regulation schedule.

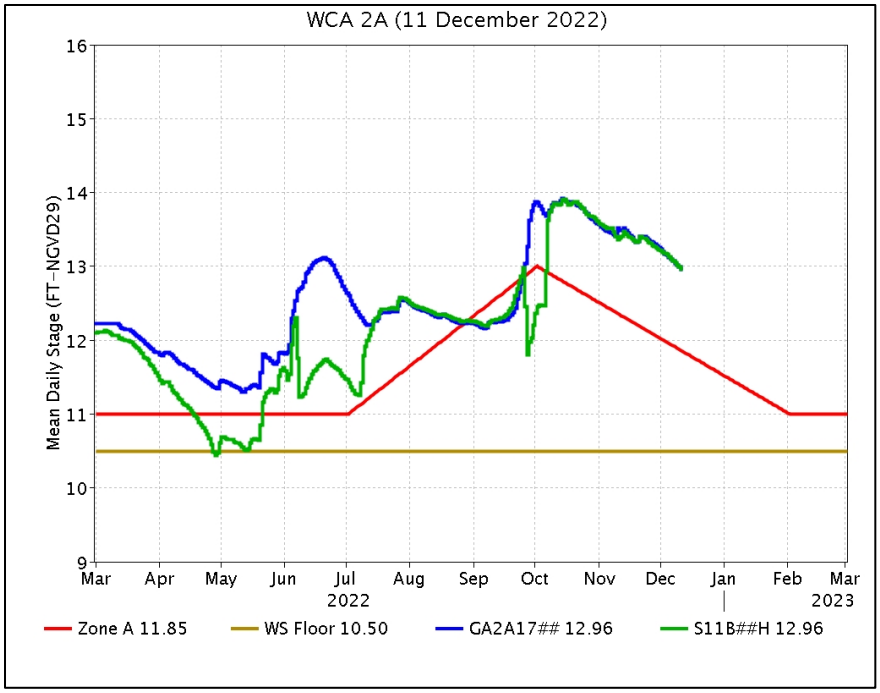



**Figure EV-2.** WCA-2A stage hydrographs and regulation schedule.

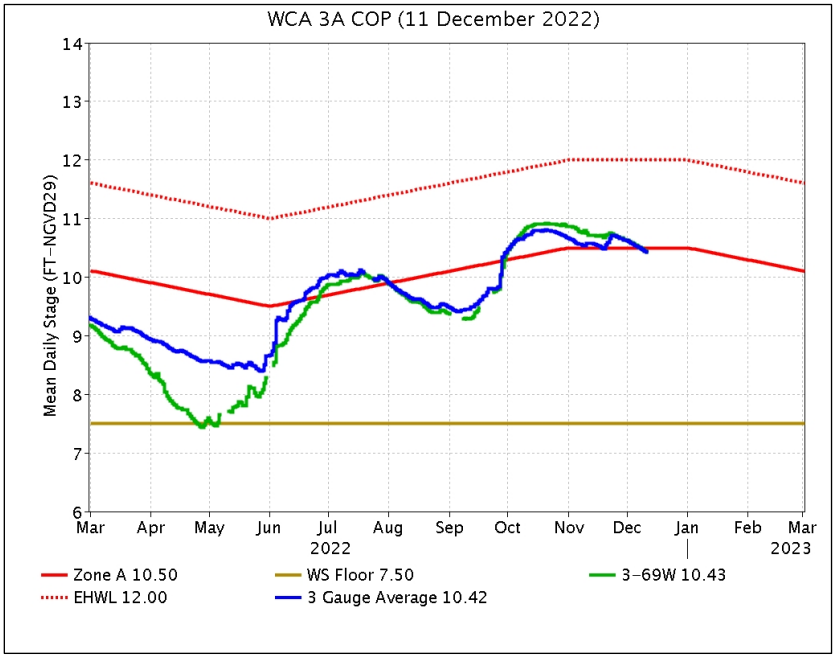



**Figure EV-3.** WCA-3A stage hydrographs (three-gauge average, S-333 headwater) and regulation schedule.

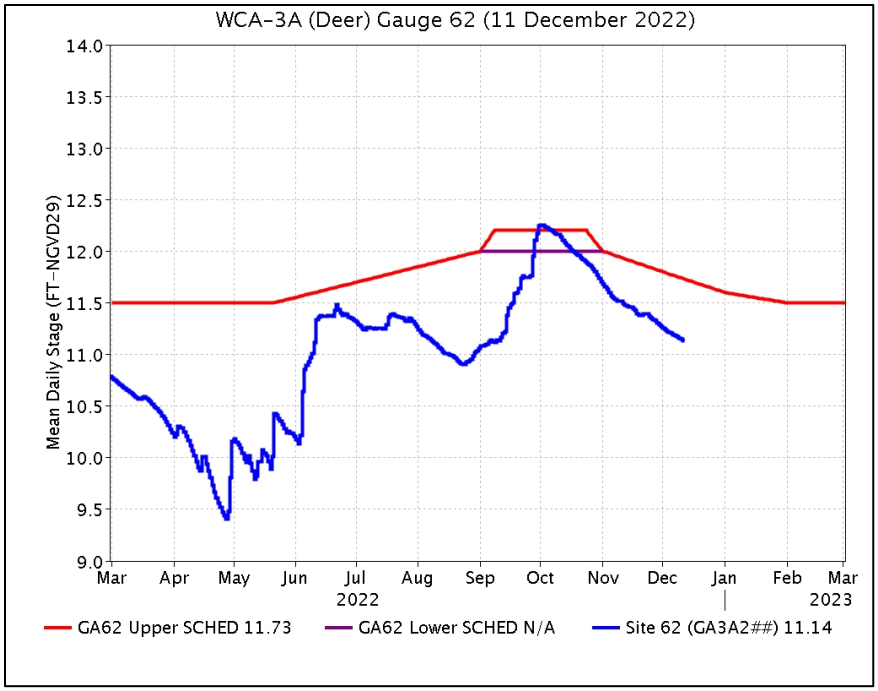



**Figure EV-4.** WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.

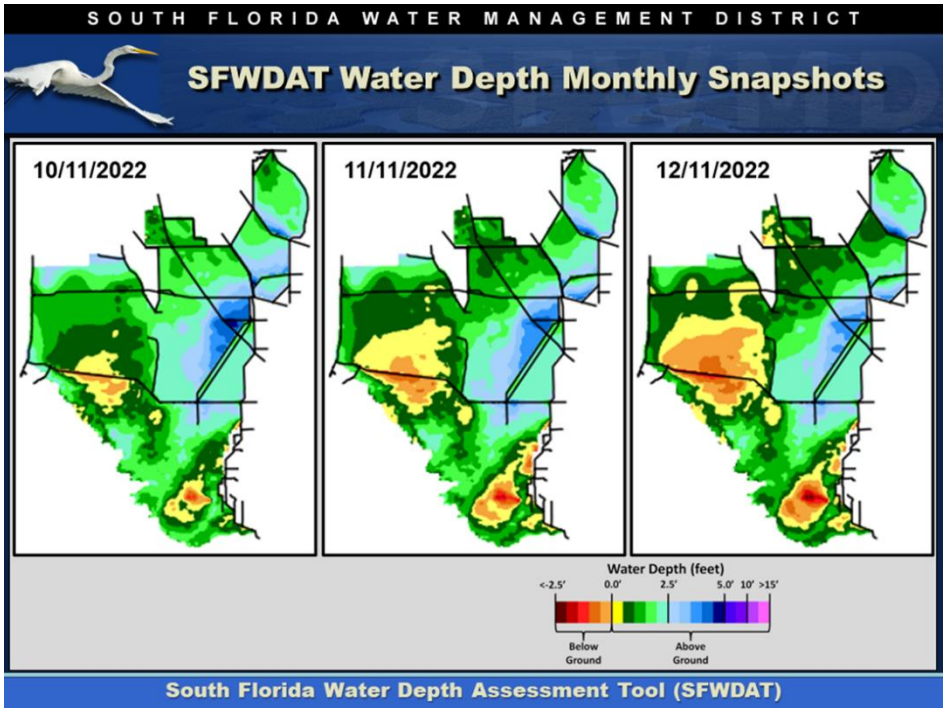



**Figure EV-5.** Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

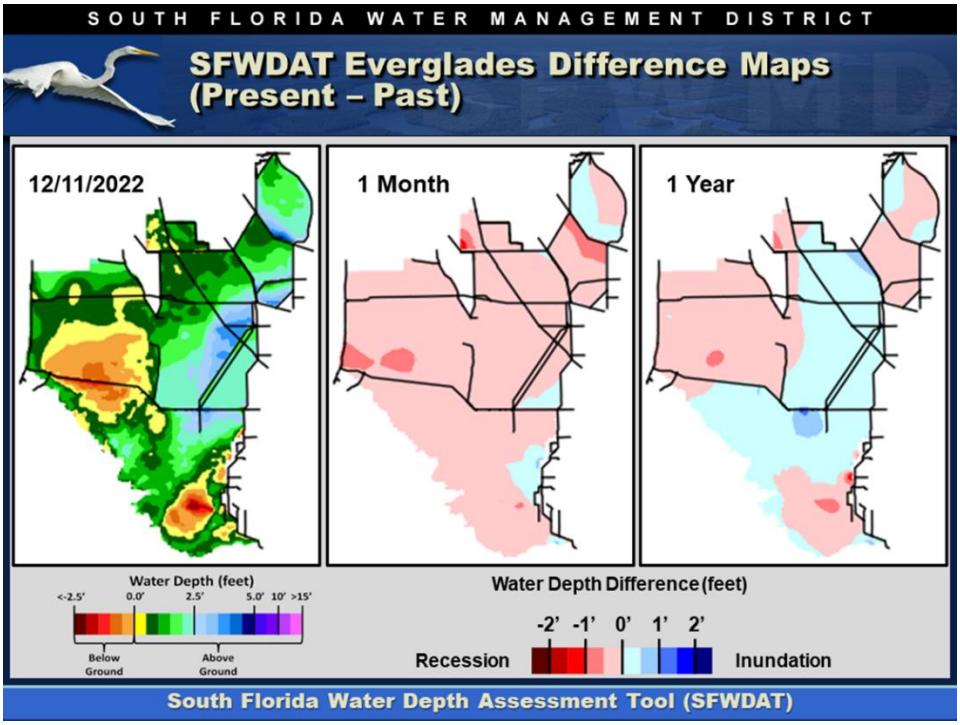



**Figure EV-6.** Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

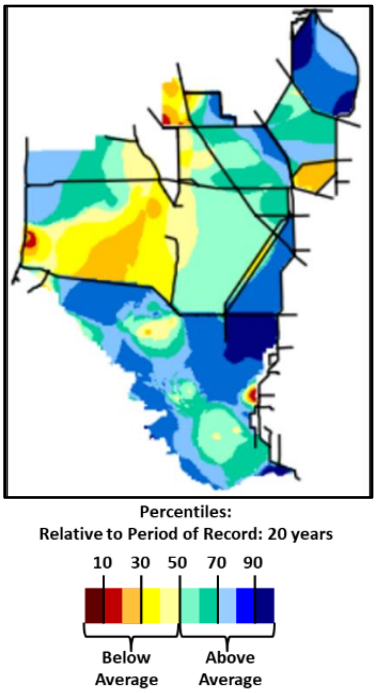



**Figure EV-7.** Present water depths (12/11/2022) compared to the day of year average over the previous 20 years.

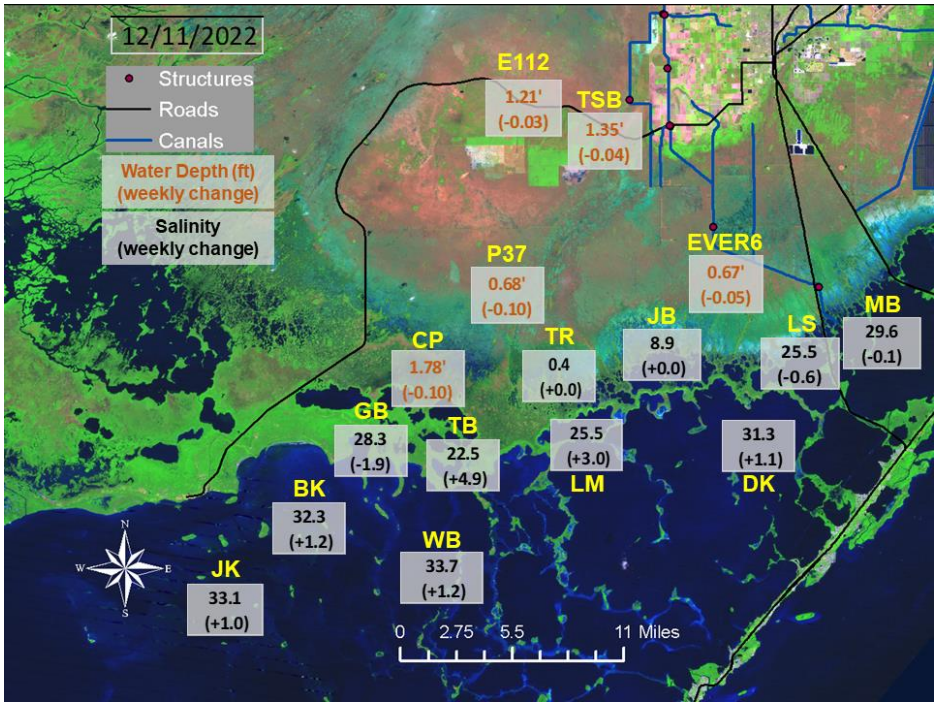



**Figure EV-8.** Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

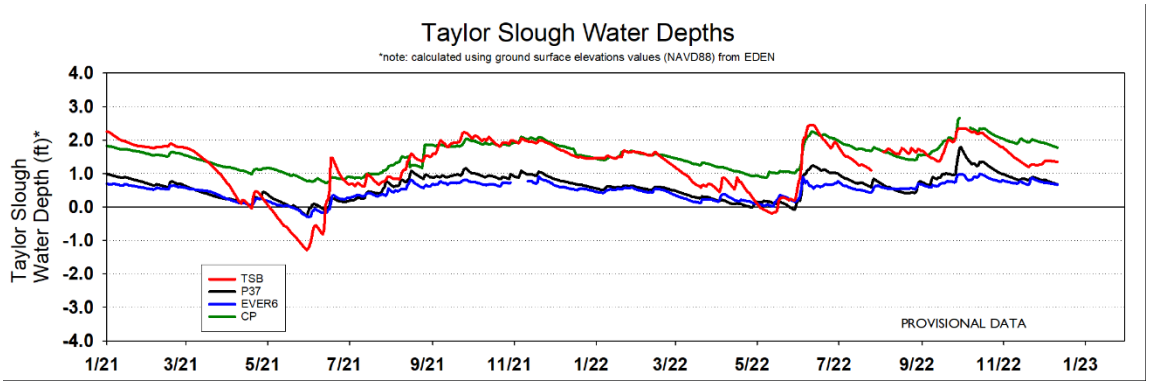



**Figure EV-9.** Taylor Slough water depth time series.

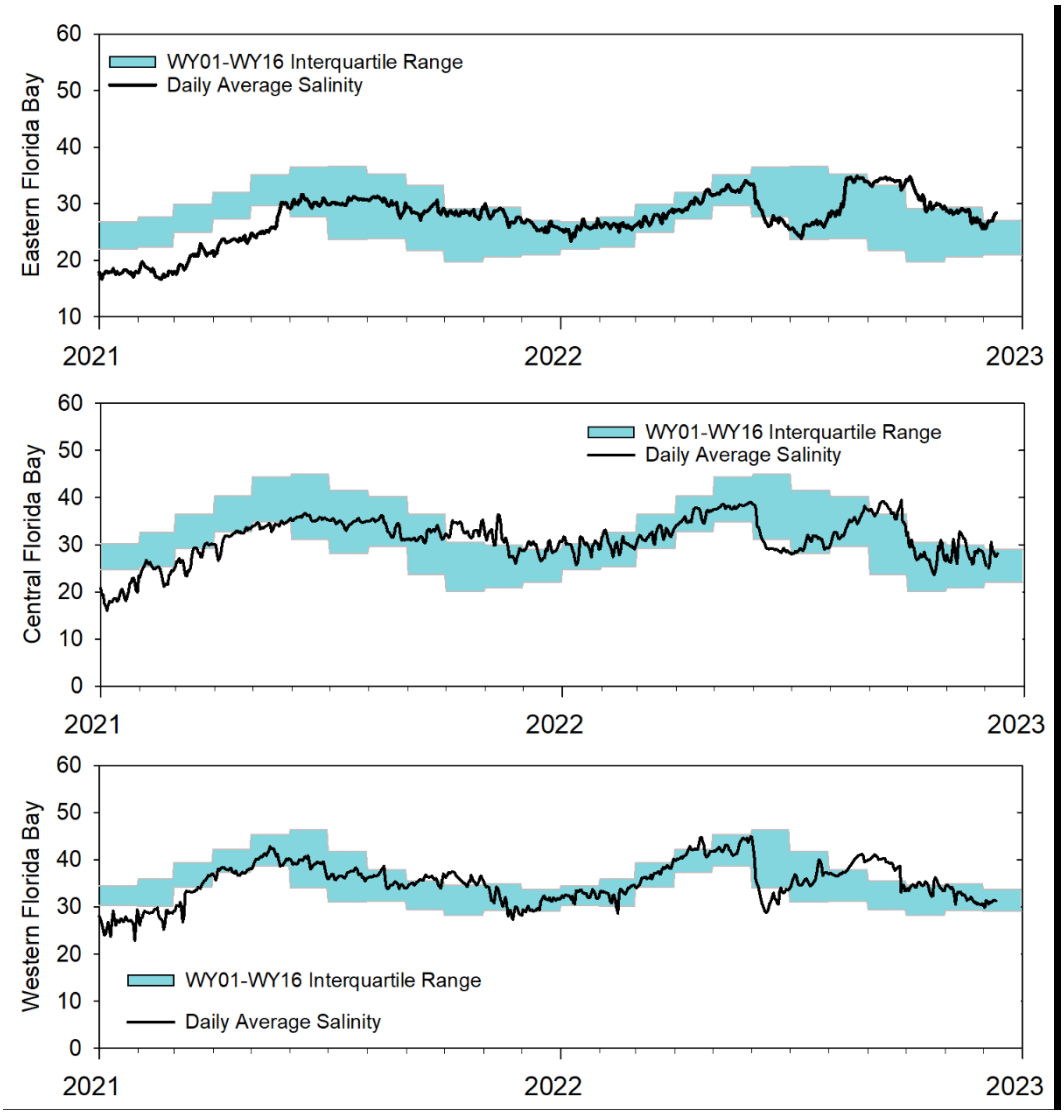



**Figure EV-10.** Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

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

| **SFWMD Everglades Ecological Recommendations, November 29th, 2022 (red is new)** | | | |
|---|---|---|---|
| **Area** | Weekly change | Recommendation | Reasons |
| **WCA-1** | Stage decreased by 0.06’ | 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 decreased by 0.19’ | 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 decreased by 0.13’ | 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-3A NE** | Stage decreased by 0.15’ | 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. Lower fire risk and protect peat soils. |
| **WCA-3A NW** | Stage decreased by 0.08’ | Conserve water in this basin as possible. Recession rate of less than 0.04’ per week | |
| **Central WCA-3A S** | Stage increased by 0.13’ | 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 increased by 0.12’ | | |
| **WCA-3B** | Stage decreased by 0.07’ | Recession rate of less than 0.12’ per week. | Protect within basin and downstream habitat and wildlife. |
| **ENP-SRS** | Stage decreased by 0.02’ | Make discharges to ENP according to COP and TTFF protocol while adaptively considering upstream and downstream ecological conditions. Discussions on water management within the system should be continued. | Protect within basin and upstream habitat and wildlife. |
| **Taylor Slough** | Stage changes ranged from −0.08’ to +0.13’ | Move water southward as possible. | When available, provide freshwater buffer for downstream conditions. |
| **FB- Salinity** | Salinity changes ranged from −7.1 to +2.3 | 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 832 cfs and the previous 30-day mean inflow was 994 cfs. The seven-day mean salinity was 23.1 at BBCW8 and 16.9 at BBCW10, both within the ideal salinity range for estuarine organisms in this region (salinity less than 35). Data provided by Biscayne National Park.

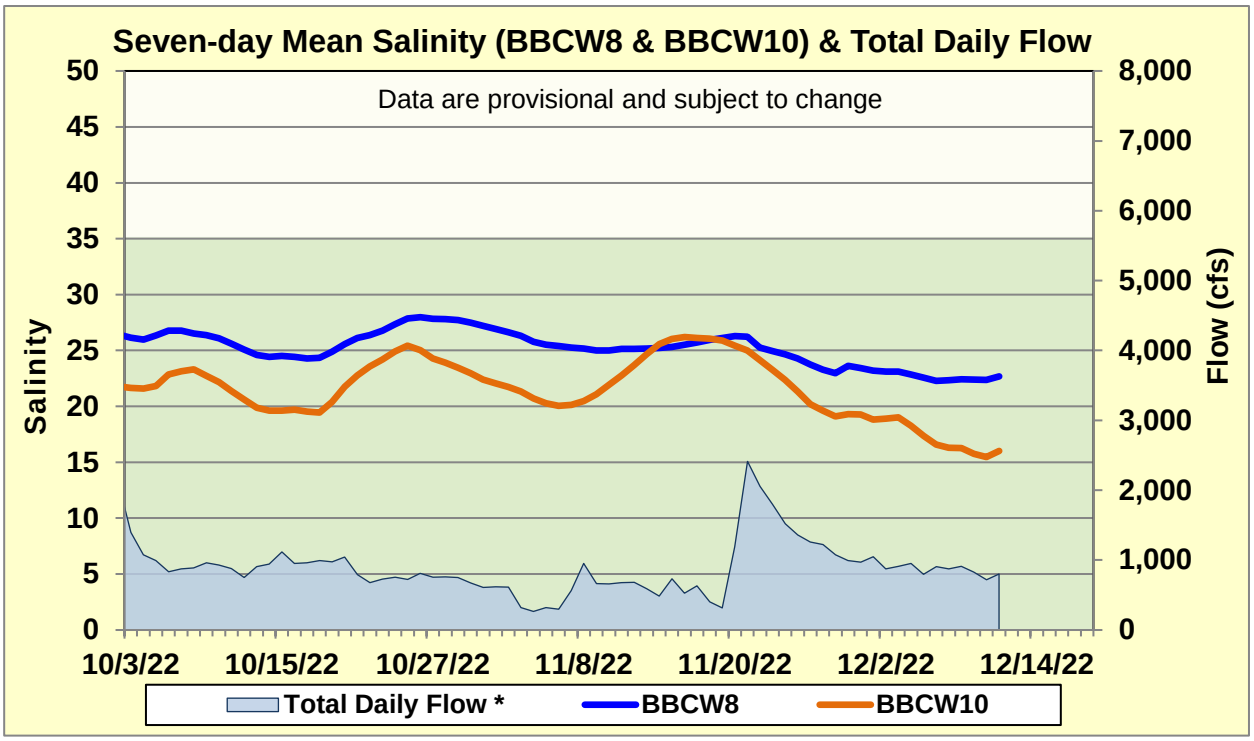



**Figure BB-1.** Seven-day mean salinity at BBCW8 and BBCW10 and total daily flow in Biscayne Bay. Total daily flow was calculated using flow from structures S20G, S20F, S21, S21A, S123, and S700P.