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M E M O R A N D U M

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

FROM: SFWMD Staff Environmental Advisory Team

DATE: April 5, 2023

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

Limited rainfall is expected from Wednesday into Friday. However, shallow moisture from the Atlantic could be enough to fuel some light shower activity despite the overall dry conditions. Over the weekend, substantial moisture, combined with favorable upper-level dynamics, could support a widespread coverage of showers and thunderstorms, some of which could be heavy. On Sunday, a cold front could enter the District, which could support an additional day of widespread shower and thunderstorm activity. Near to above average rainfall is expected for the 7-day period ending next Tuesday morning.

Kissimmee

Releases were made from East Lake Toho and Lake Toho to continue their recessions to their respective low pools on June 1. Weekly average discharges on April 2, 2023 at S-65 and S-65A were 580 cfs and 520 cfs, respectively. Mean weekly water depth on the Kissimmee River floodplain of 0.14 ft was 0.2 feet lower than last week. The weekly average concentration of dissolved oxygen in the Kissimmee River was 7.0 mg/L for the week ending April 2, 2023 and had not changed from the previous week, above both the potentially lethal level and the physiologically stressful range for largemouth bass and other sensitive species.

Lake Okeechobee

Lake Okeechobee stage was 14.50 feet NGVD on April 2, 2023, with water levels 0.94 feet lower than a month ago. Lake stage is near (0.02 feet above) the upper limit of the ecological envelope. Average daily inflows (excluding rainfall) were similar to the previous week, going from 551 cfs to 559 cfs. Average daily outflows (excluding evapotranspiration) decreased from the previous week, going from 4,576 cfs to 3,710 cfs. Recent satellite imagery (April 3, 2023) showed low to moderate bloom potential in Fisheating Bay and no activity in the pelagic regions.

Estuaries

Total inflow to the St. Lucie Estuary averaged 339 cfs over the past week with 186 cfs coming from Lake Okeechobee. Mean salinities decreased at all sites in the estuary over the past week. Salinity in the middle estuary was in the optimal range (10-25) for adult eastern oysters.

Total inflow to the Caloosahatchee Estuary averaged 2,186 cfs over the past week with 1,502 cfs coming from Lake Okeechobee. Mean surface salinities remained the same at S-79 and Val I-75, increased at Sanibel, and decreased at the remaining sites in the estuary over the past week. Salinities were in the optimal range (0-10) for tape grass in the upper estuary. Salinities were in the optimal range for adult eastern oysters at Cape Coral (10-25) and in the upper stressed range at Shell Point and Sanibel (>25).

Stormwater Treatment Areas

For the week ending Sunday, April 2, 2023, 900 ac-ft of 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 40,600 ac-feet. The total amount of inflows to the STAs in WY2023 is approximately 1,026,000 ac-feet. Most STA cells are at or near target stage, except STA-5/6 where most cells are below target. 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 post-construction vegetation grow in. 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. STA-1E Eastern Flow-way contains nests of Migratory Bird Treaty Act protected species. This week, if 2008 LORS recommends Lake releases to the WCAs and conditions allow, releases will be sent to STA-2.

Everglades

Rates of stage change within the EPA slowed in response to rainfall last week, with many regions in the “good” range over the last week. Depths ascended to above ground in WCA-3A northwest last week, but dry conditions and public closures remain in effect. Foraging conditions are improving in WCA-1 for wading birds, but conditions in WCA-3A look to be limited and Great Egrets have recently abandoned nests. Wood storks are nesting in the Everglades, but dry conditions mean expectations for nest abandonment are high. The coastal colonies seem to be doing well. Once again Taylor slough stages fell at all gauges last week but remain above average. Average salinity increased again last week in Florida Bay, but the regions are all now in the 75th percentile.

Biscayne Bay

Total inflow to Biscayne Bay averaged 325 cfs and the previous 30-day mean inflow averaged 253 cfs. The seven-day mean salinity was 30.9 at BBCW8 and 31.5 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 April 2, 2023, mean daily lake stages were 56.1 feet NGVD (1.2 feet below schedule) in East Lake Toho, 53.0 feet NGVD (1.3 feet below schedule) in Lake Toho, and 50.1 feet NGVD (1.7 feet below the approved temporary deviation schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1, Figures KB-1-3**).

Lower Kissimmee

For the week ending April 2, 2023, mean weekly discharge was 580 cfs at S-65 and 520 cfs at S-65A. Mean weekly discharge from the Kissimmee River was 530 cfs at S-65D and 550 cfs at S-65E (**Table KB-2**). Mean weekly headwater stages were 46.4 feet NGVD at S-65A and 28.3 feet NGVD at S-65D on April 2, 2023. Mean weekly river channel stage of 34.5 ft NGVD on April 2, 2023 was 0.2 foot lower than the previous week's mean (**Figure KB-4**). Mean weekly water depth on the Kissimmee River floodplain of 0.14 ft for the week ending April 2, 2023 was 0.2 feet lower than the previous week's mean (**Table KB-2, Figure KB-5**). The weekly average concentration of dissolved oxygen in the Kissimmee River was 7.0 mg/L for the week ending April 2, 2023 and had not changed from the previous week (**Table KB-2, Figure KB-6**).

Water Management Recommendations

Continue stage recessions in Lake Toho and East Lake Toho to their June 1 low pools. If needed, reduce discharge at S-65A by up to 38 cfs/day until discharge is decreased to 300 cfs.

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) | |
|---|-----------|-----------------------|--|--|----------------------------|-----------------------------------|---|---------|
| | | | | | | | 4/2/23 | 3/26/23 |
| Lakes Hart and Mary Jane | S-62 | LKMJ | 0 | 60.3 | R | 60.7 | -0.4 | -0.4 |
| Lakes Myrtle, Preston and Joel | S-57 | S-57 | 0 | 60.3 | R | 60.7 | -0.4 | -0.3 |
| Alligator Chain | S-60 | ALLI | 0 | 63.5 | R | 63.6 | -0.1 | N/A |
| Lake Gentry | S-63 | LKGT | 16 | 61.0 | R | 61.1 | -0.1 | 0.0 |
| East Lake Toho | S-59 | TOHOE | 66 | 56.1 | R | 57.3 | -1.2 | -1.4 |
| Lake Toho | S-61 | TOHOW S-61 | 170 | 53.0 | R | 54.3 | -1.3 | -1.4 |
| Lakes Kissimmee, Cypress and Hatchineha | S-65 | KUB011 LKIS5B | 580 | 50.1 | T | 51.8 | -1.7 | -0.7 |

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.

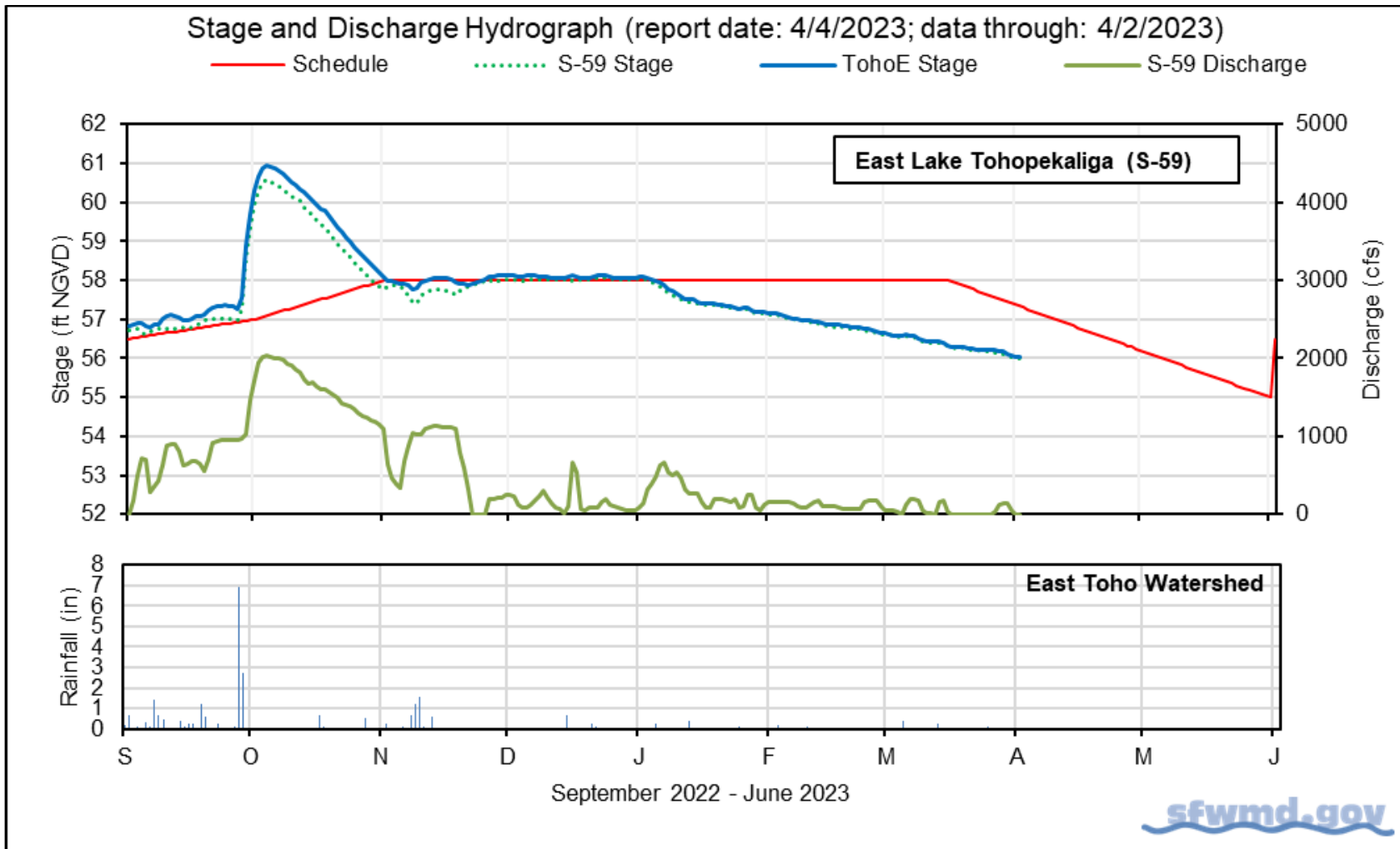


Figure KB-1. East Lake Toho regulation schedule, stage, discharge and rainfall.

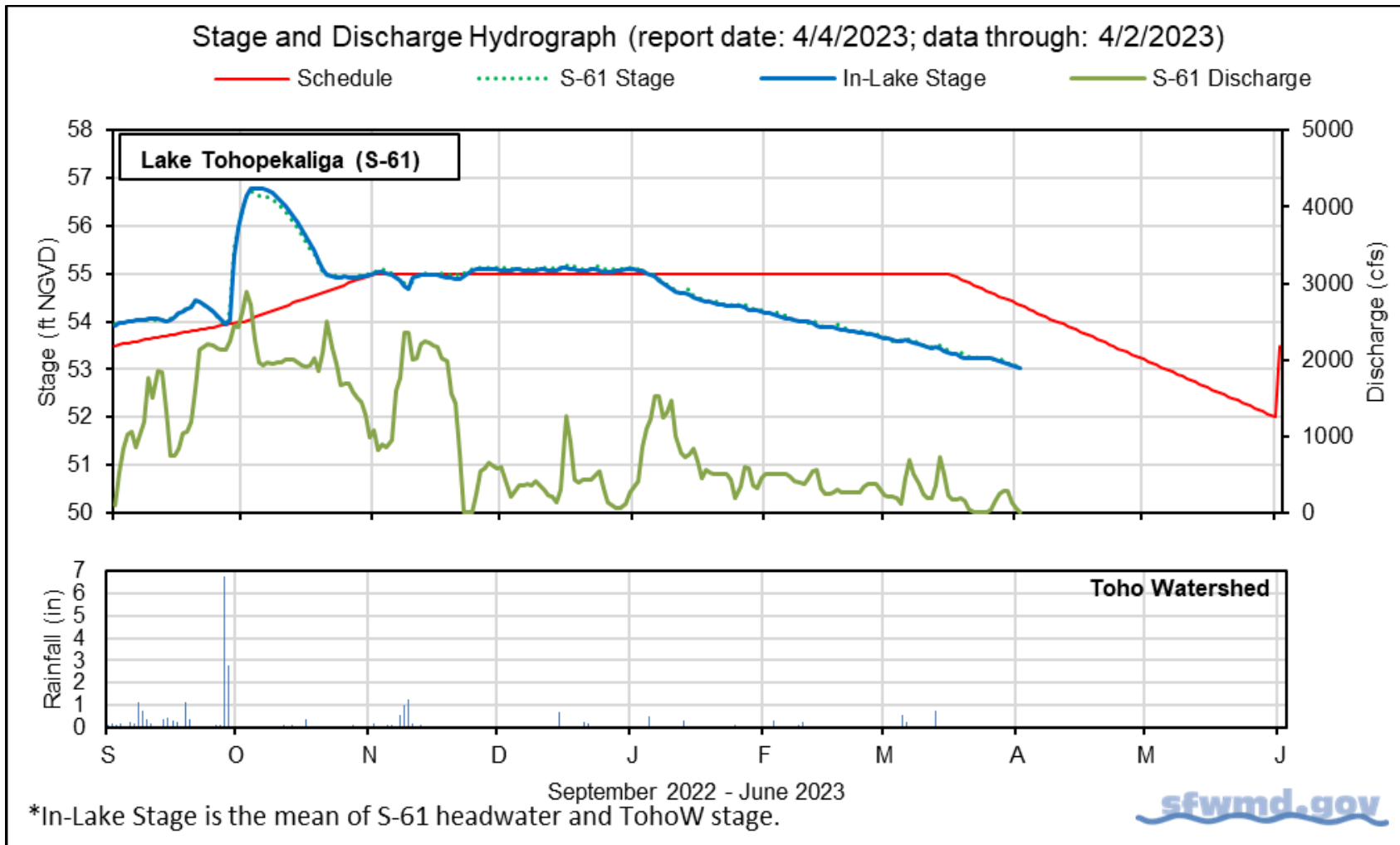


Figure KB-2. Lake Toho regulation schedule, stage, discharge, and rainfall.

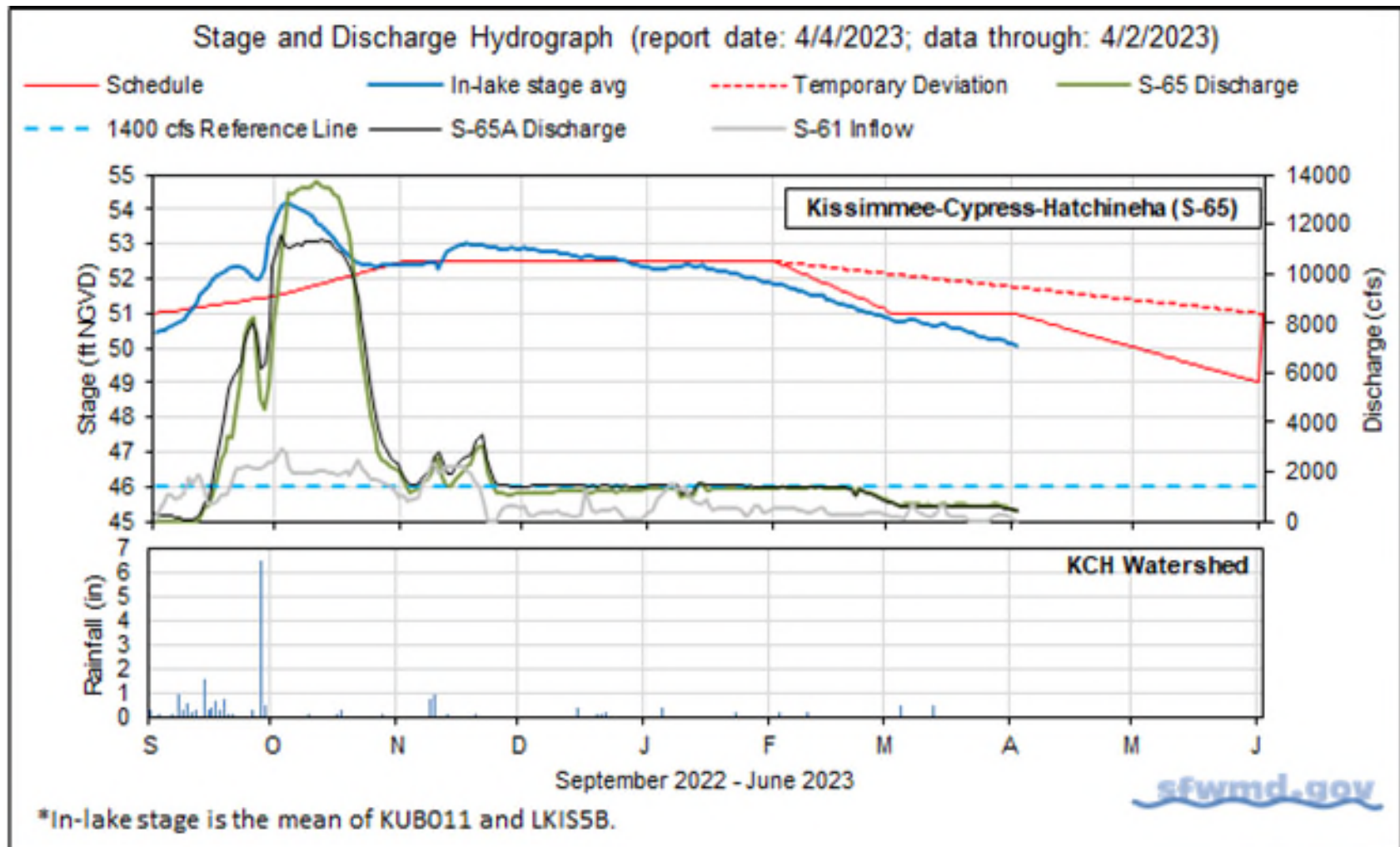


Figure KB-3. Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge, and rainfall.

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 | | | |
|---------------------------------------|-------------------------------|----------------------|---|---------|---------|---------|
| | | 4/2/23 | 4/2/23 | 3/26/23 | 3/19/23 | 3/12/23 |
| Discharge | S-65 | 420 | 580 | 660 | 670 | 680 |
| Discharge | S-65A ^a | 410 | 520 | 600 | 610 | 620 |
| Headwater Stage (feet NGVD) | S-65A | 46.4 | 46.4 | 46.3 | 46.4 | 46.3 |
| Discharge | S-65D ^b | 450 | 530 | 530 | 580 | 630 |
| Headwater Stage (feet NGVD) | S-65D ^c | 28.3 | 28.3 | 28.4 | 28.3 | 28.4 |
| Discharge (cfs) | S-65E ^d | 490 | 550 | 530 | 570 | 670 |
| Discharge (cfs) | S-67 | 0 | 0 | 0 | 0 | 0 |
| Dissolved Oxygen (mg/L) ^e | Phase I, II/III river channel | 6.6 | 7.0 | 7.0 | 6.0 | 5.4 |
| River channel mean stage ^f | Phase I river channel | 33.9 | 34.5 | 34.7 | 34.8 | 35.0 |
| Mean depth (feet) ^g | Phase I floodplain | 0.13 | 0.14 | 0.16 | 0.16 | 0.14 |

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).

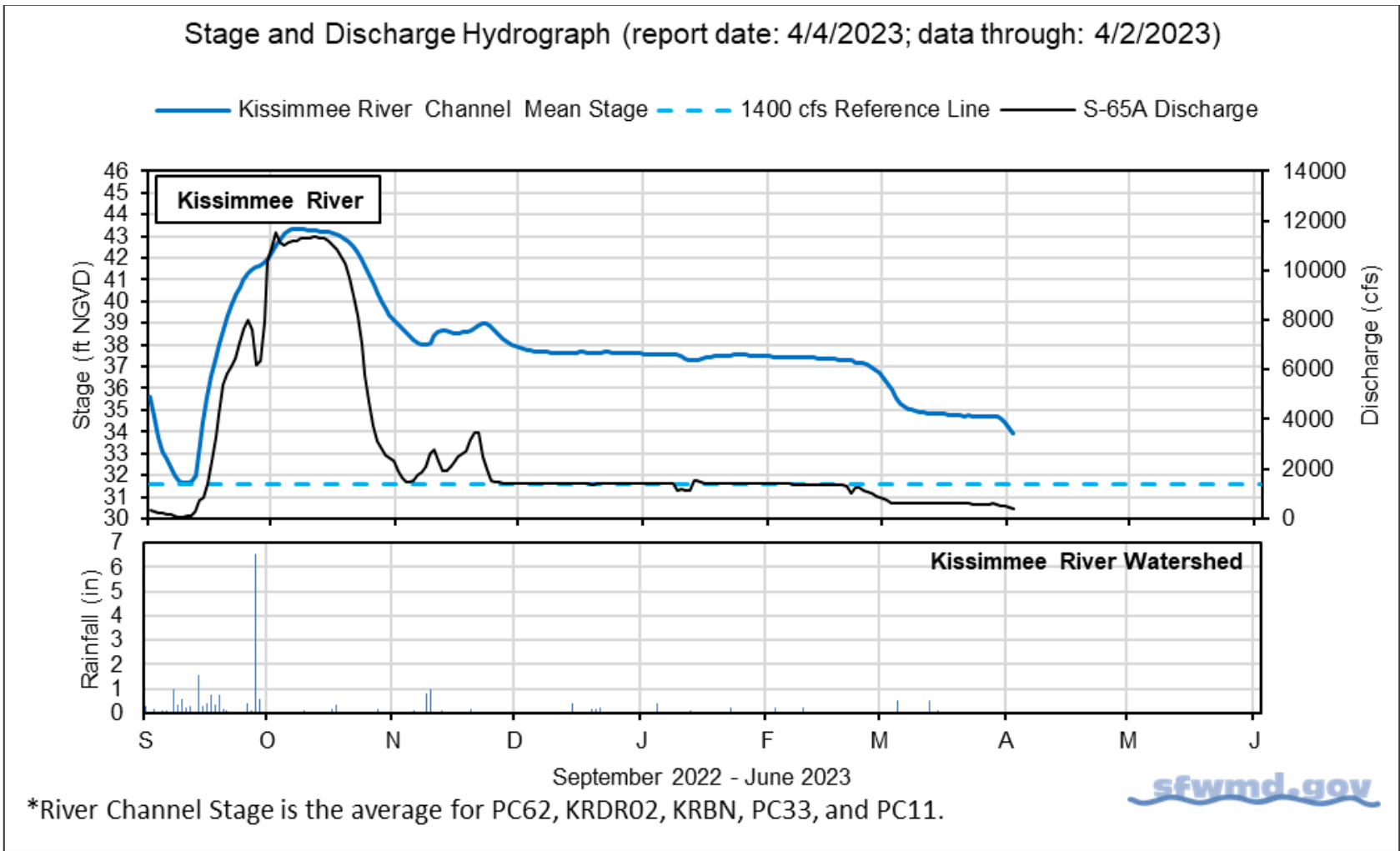


Figure KB-4. Kissimmee River stage, discharge, and rainfall.

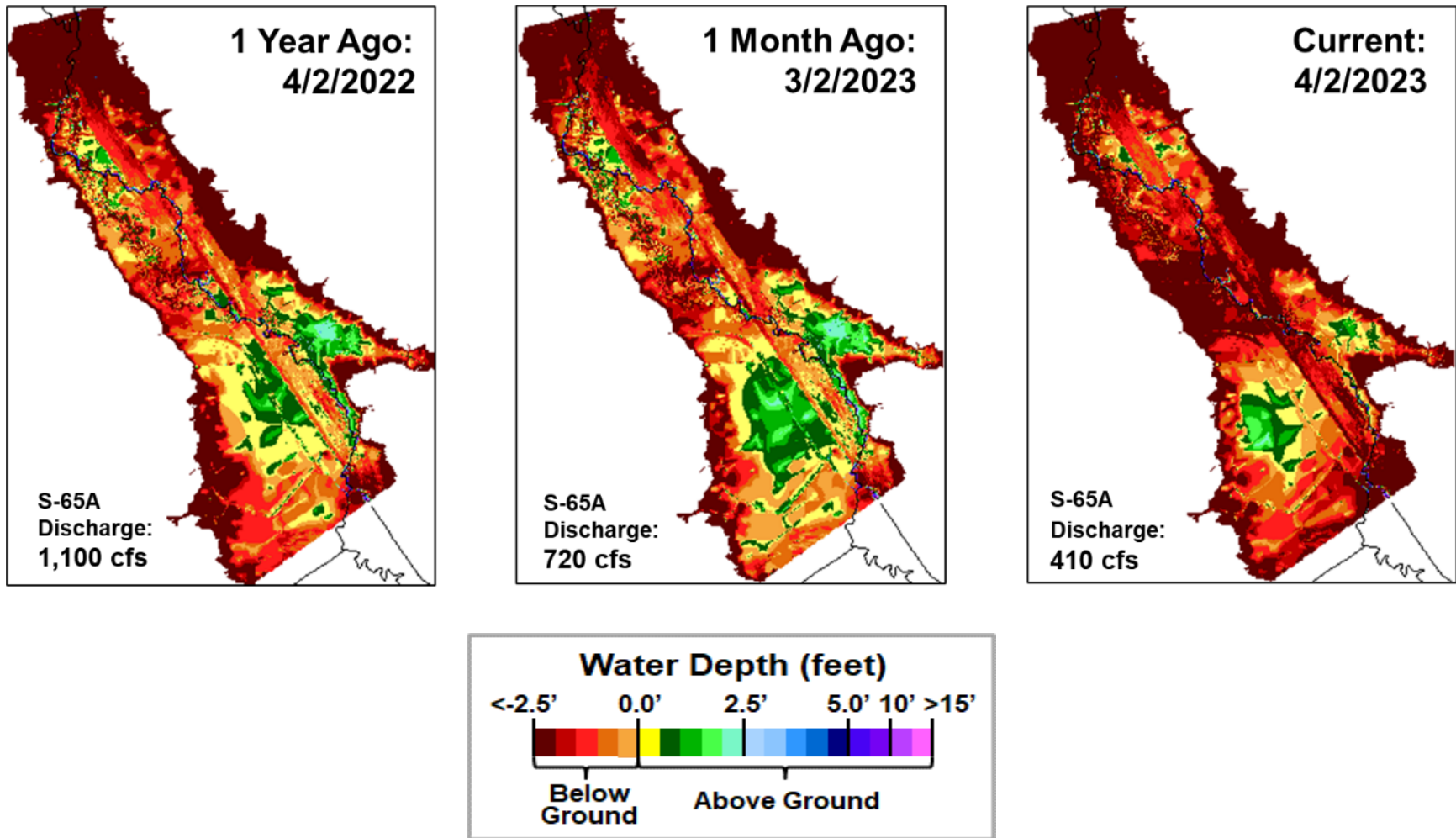
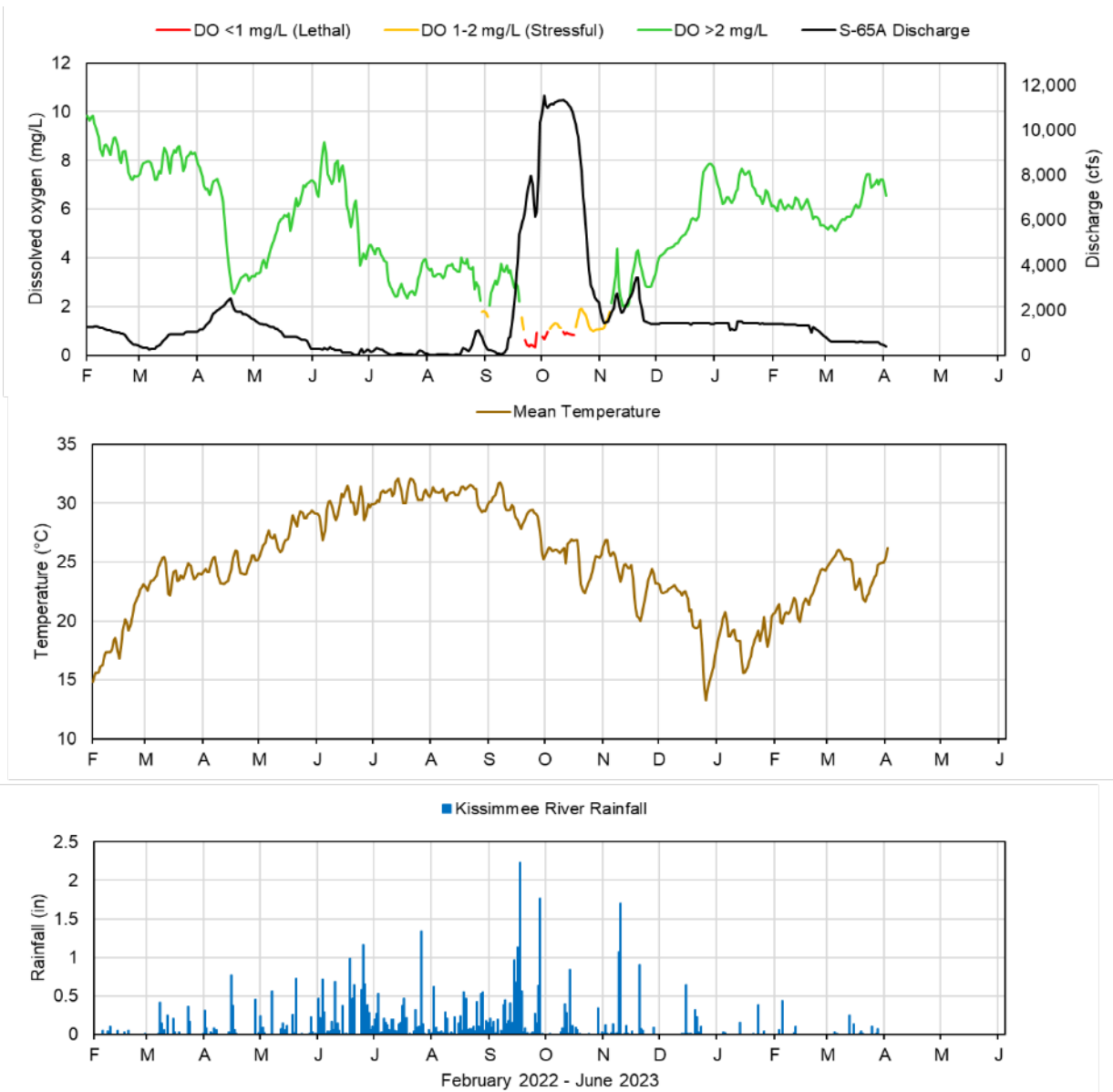


Figure KB-5. Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago, and current.



Report Date: 4/4/2023; data are through: 4/2/2023



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

Stage and Discharge Guidance for 2021-2022.

| Zone | KCH Stage (ft NGVD) | S-65/S-65A Discharge* |
|------|--|--|
| A | Above regulation schedule line. | Flood control releases as needed with no limits on the rate of discharge change. |
| B1 | In flood control buffer zone (0.5 ft below the schedule line). | Adjust S-65 discharge so that S-65A discharge is between 1400 cfs at the buffer zone line and 3000 cfs at the schedule line. |
| B2 | Between the Flood Control Buffer and the 50.0 ft line. | Adjust S-65 discharge to maintain at least 1400 cfs at S-65A. Use ± 0.2 ft buffer (gray band) above and below the 50.0 ft line to decide when to begin ramping up to 1400 cfs or down to 300 cfs; do not continue reducing discharge if stage rises back to or above the threshold stage line. |
| B3 | Between the 50.0 ft line and 49 ft. | Adjust S-65 discharge to maintain at least 300 cfs at S-65A. |
| B4 | Between 48.5 ft to 49 ft. | Adjust S-65 discharge to maintain S-65A discharge between 0 cfs at 48.5 ft and 300 cfs at 49 ft. |
| C | Below 48.5 ft. | 0 cfs. |

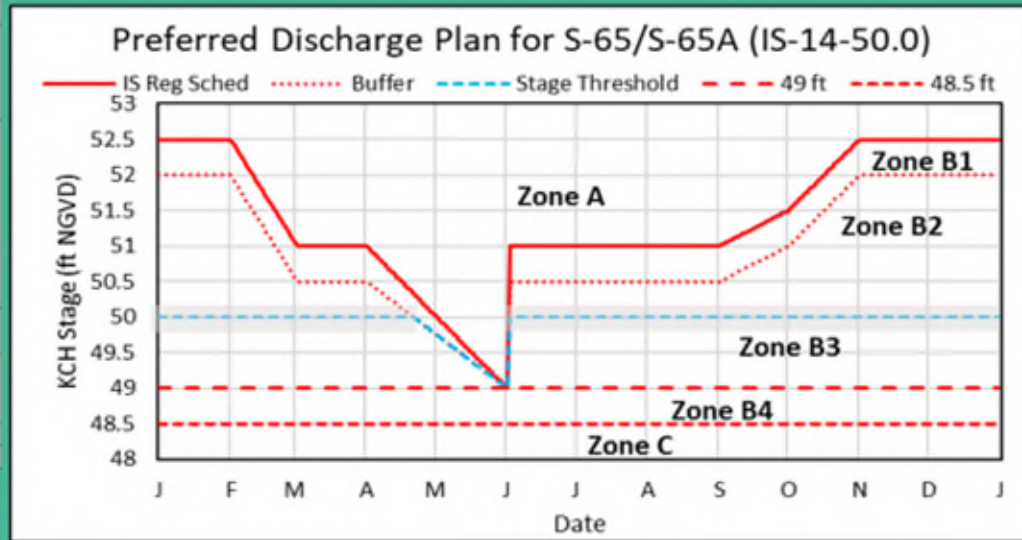
*Changes in discharge should not exceed limits in inset table below.

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

| Q (cfs) | Maximum rate of INCREASE (cfs/day) | Maximum rate of DECREASE (cfs/day) |
|-----------|------------------------------------|------------------------------------|
| 0-300 | 100 | -50 |
| 301-650 | 150 | -75 |
| 651-1400 | 300 | -150 |
| 1401-3000 | 600 | -600 |
| >3000 | 1000 | -2000 |

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2021-2022 Discharge Plan for S-65/S-65A



Other Considerations

- When possible, limit lake ascension rate in the Jun 1 - Aug 15 window to 0.25 ft per 7 days in Lakes Kissimmee, Cypress, Hatchineha (S-65), East Toho (S-59) and Toho (S-61).
- If outlook is for extreme dry conditions meet with KB staff to discuss modifications to this plan.

Slide Revised 1/3/2022

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 14.50 feet NGVD on April 2, 2023, which is 0.21 feet lower than the previous week and 0.94 feet lower than a month ago (**Figure LO-1**). Lake stage remained in the Low sub-band (**Figure LO-2**) and was 0.02 feet above the upper limit of the ecological envelope (**Figure LO-3**). According to NEXRAD, 0.42 inches of rain fell directly on the Lake last week.

Average daily inflows (excluding rainfall) were similar to the previous week, going from 551 cfs to 559 cfs. Average daily outflows (excluding evapotranspiration) decreased from the previous week, going from 4,576 cfs to 3,710 cfs. Most of the inflow came from the Kissimmee River (C-38 Canal; 546 cfs). Outflows to the west via the S-77 structure averaged 1,825 cfs for the week. Outflows to the east via the S-308 structure averaged 127 cfs and outflows south via the S-350 structures averaged 1,419 cfs. **Figures LO-4 and LO-5** show the combined average daily inflows and outflows for the Lake over the past eight weeks, and average inflows and outflows last week, respectively. These data are provisional and are subject to change.

The most recent satellite image (April 3, 2023) from NOAA's Harmful Algal Bloom Monitoring System showed moderate bloom potential in some nearshore regions of the Lake, especially in Fisheating Bay and the southern bays, but no activity in the pelagic region (**Figure LO-6**).

**1 Month Ago:
03/03/2023**

**Current:
04/02/2023**

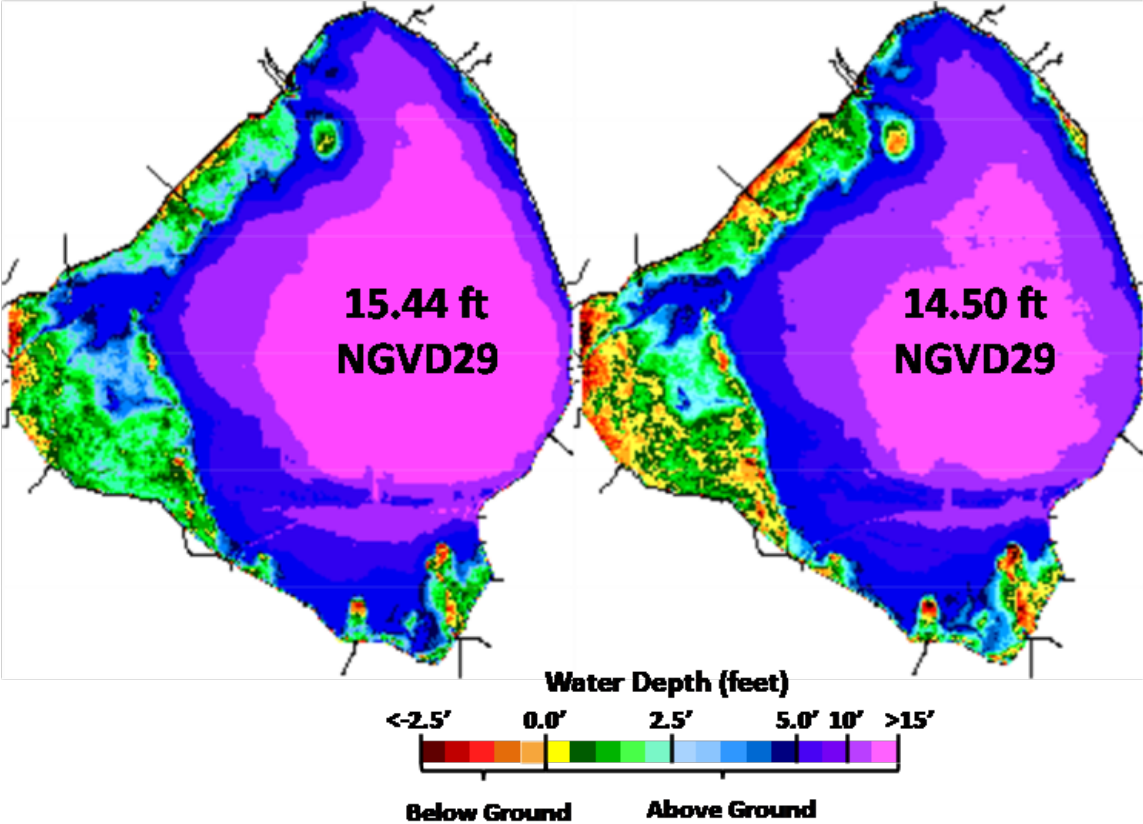


Figure LO-1. Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

Lake Okeechobee Water Level History and Projected Stages

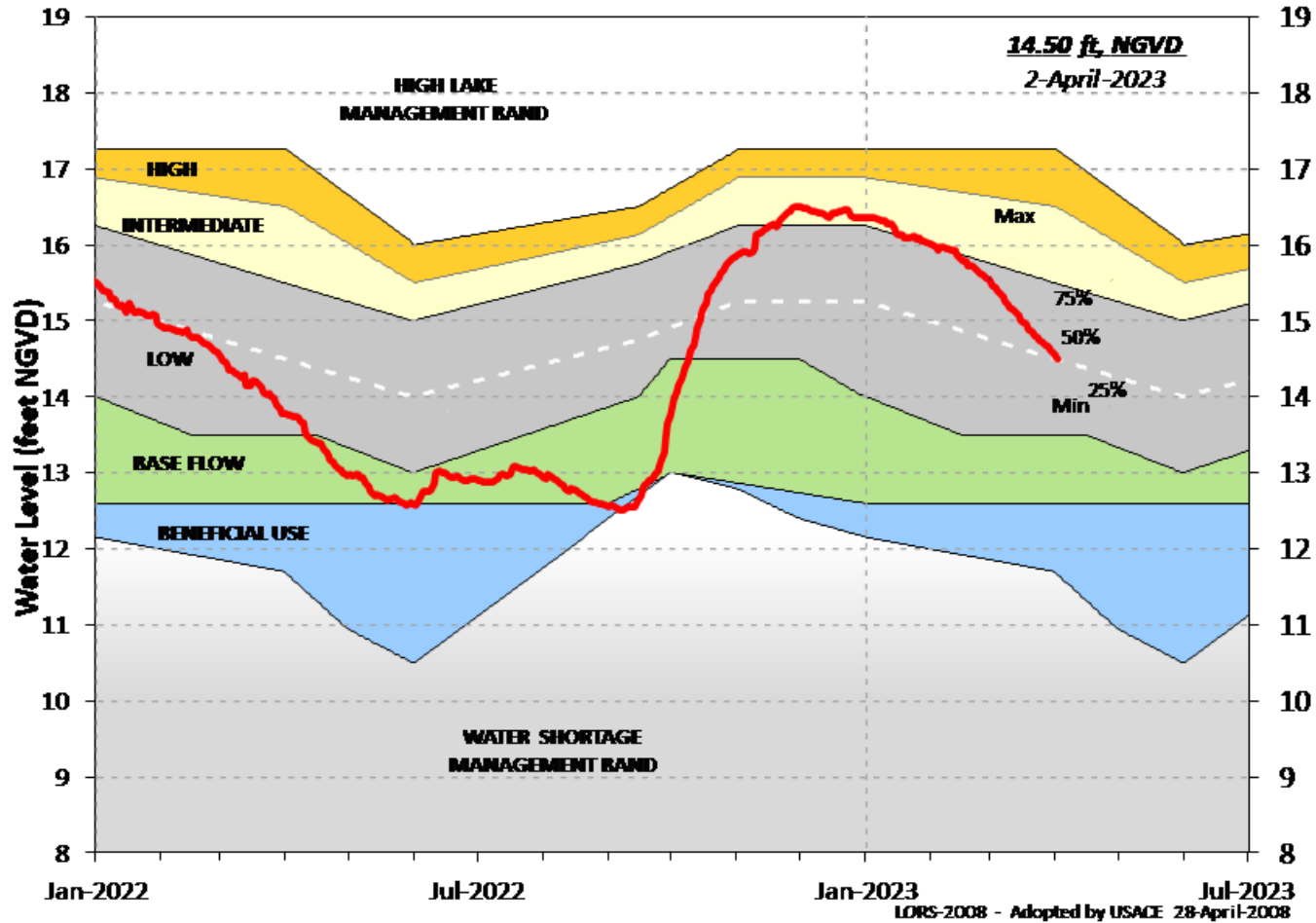


Figure LO-2. Recent Lake Okeechobee stages with projected stages based on a dynamic position analysis.

Lake Okeechobee Stage vs Ecological Envelope

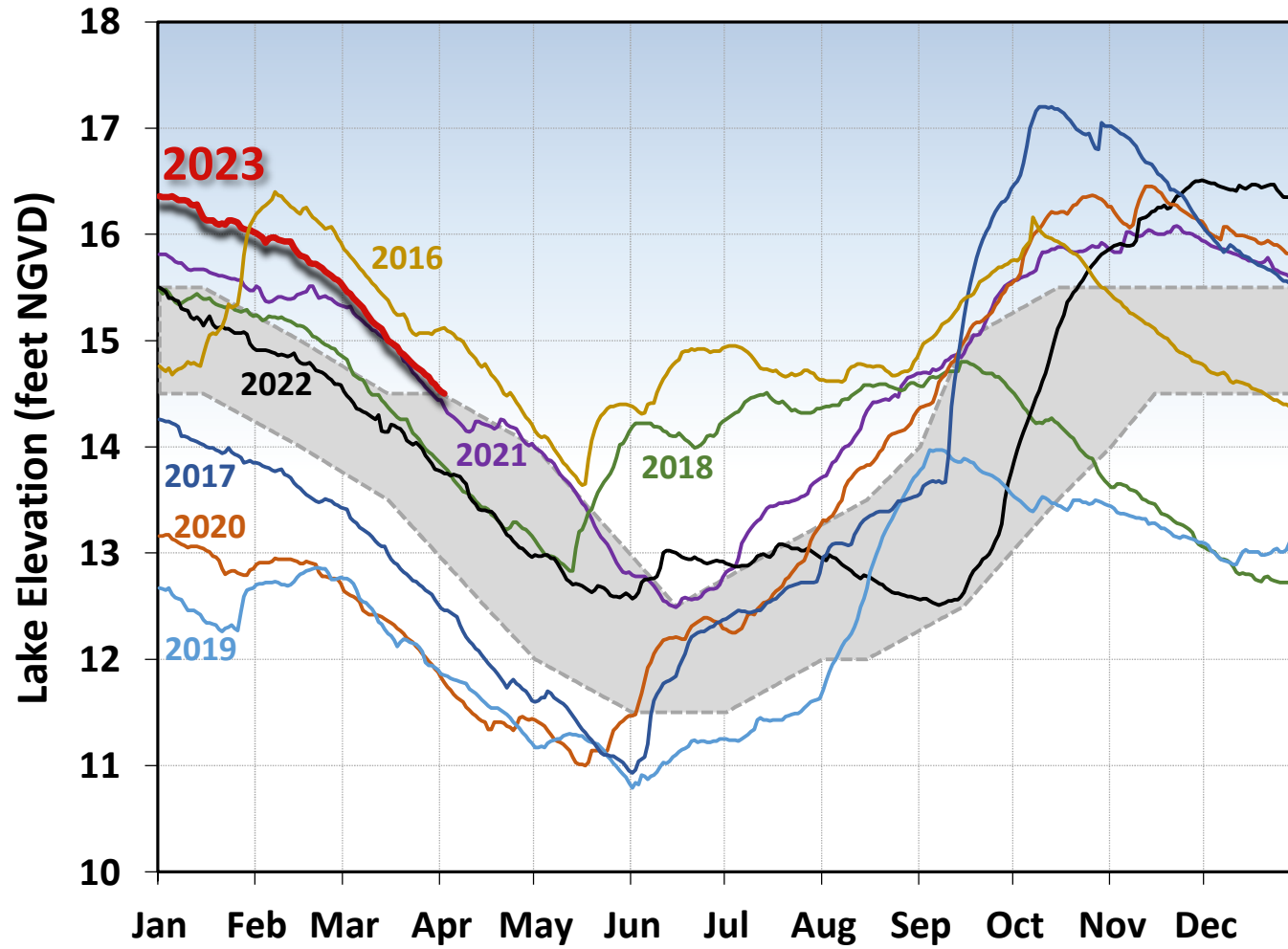


Figure LO-3. The prior seven years of annual stage hydrographs for Lake Okeechobee in comparison to the ecological envelope.

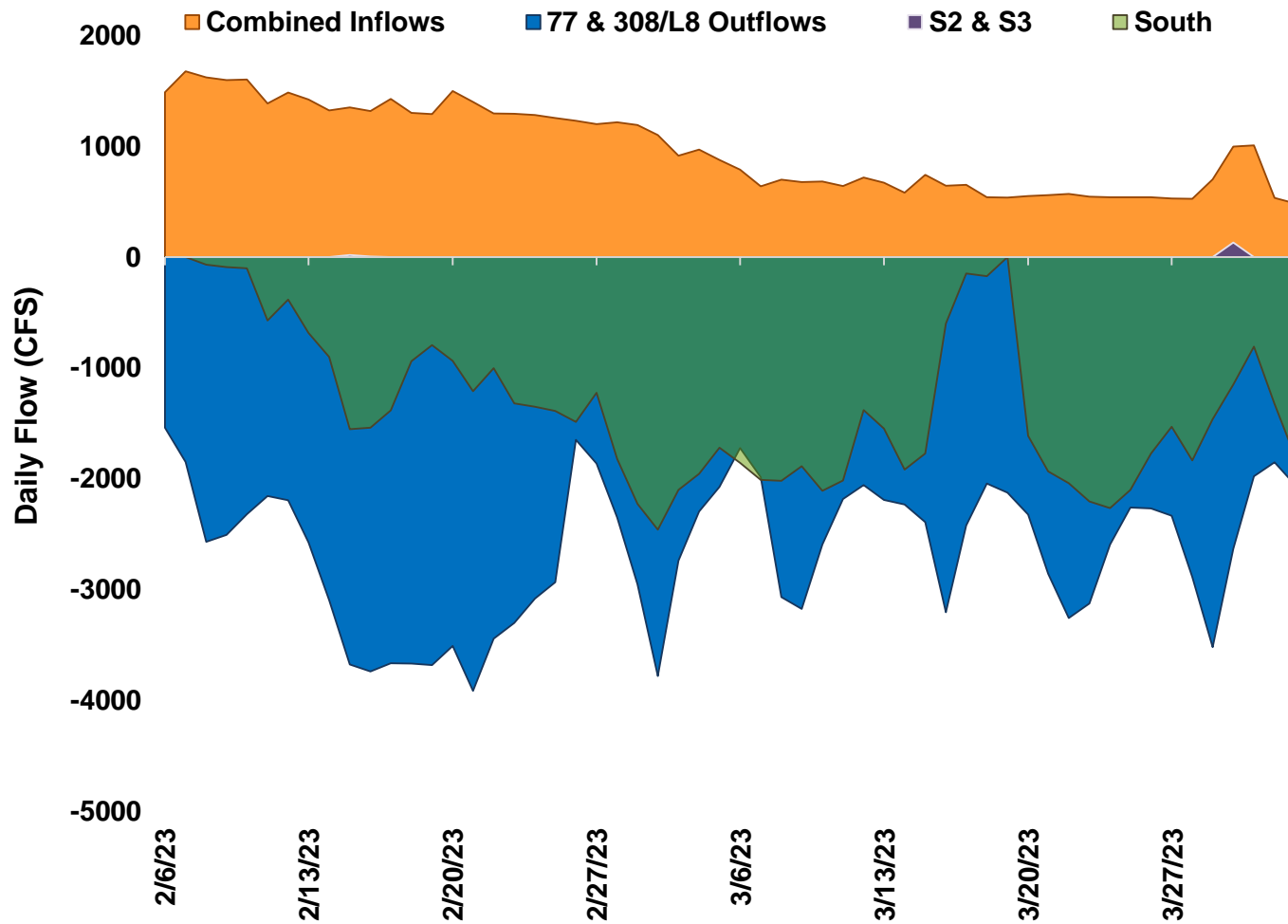


Figure LO-4. Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 (canal) through the S-308 are included as inflows. Conversely, flows from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

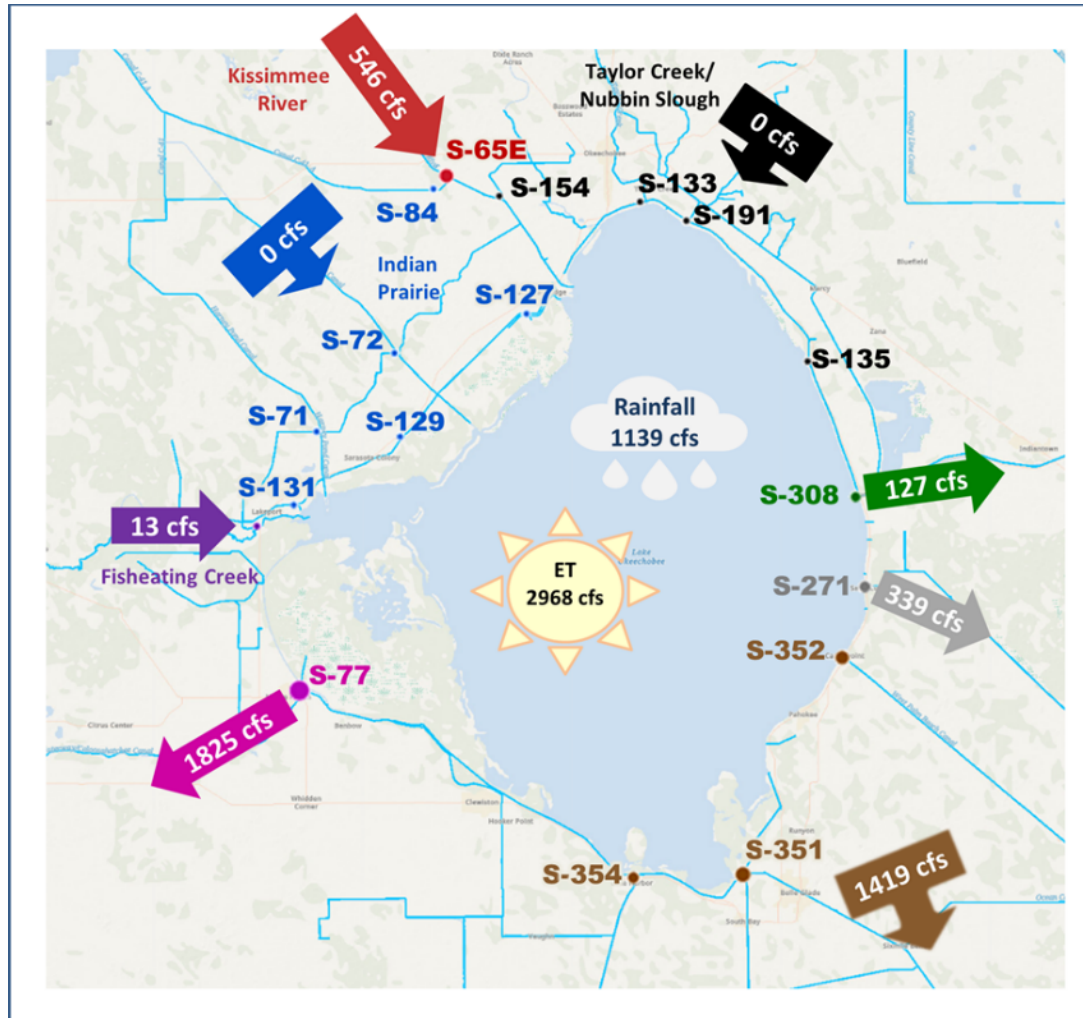


Figure LO-5. Inflows into Lake Okeechobee from Indian Prairie basins, Taylor Creek/Nubbin Slough, Kissimmee River and Fisheating Creek, and outflows to the west via S-77, to the east via S-308, to the south via S-351, S-352, S-354, and to southeast via S-271 (formerly Culvert 10A) for the week of March 27 – April 2, 2023.

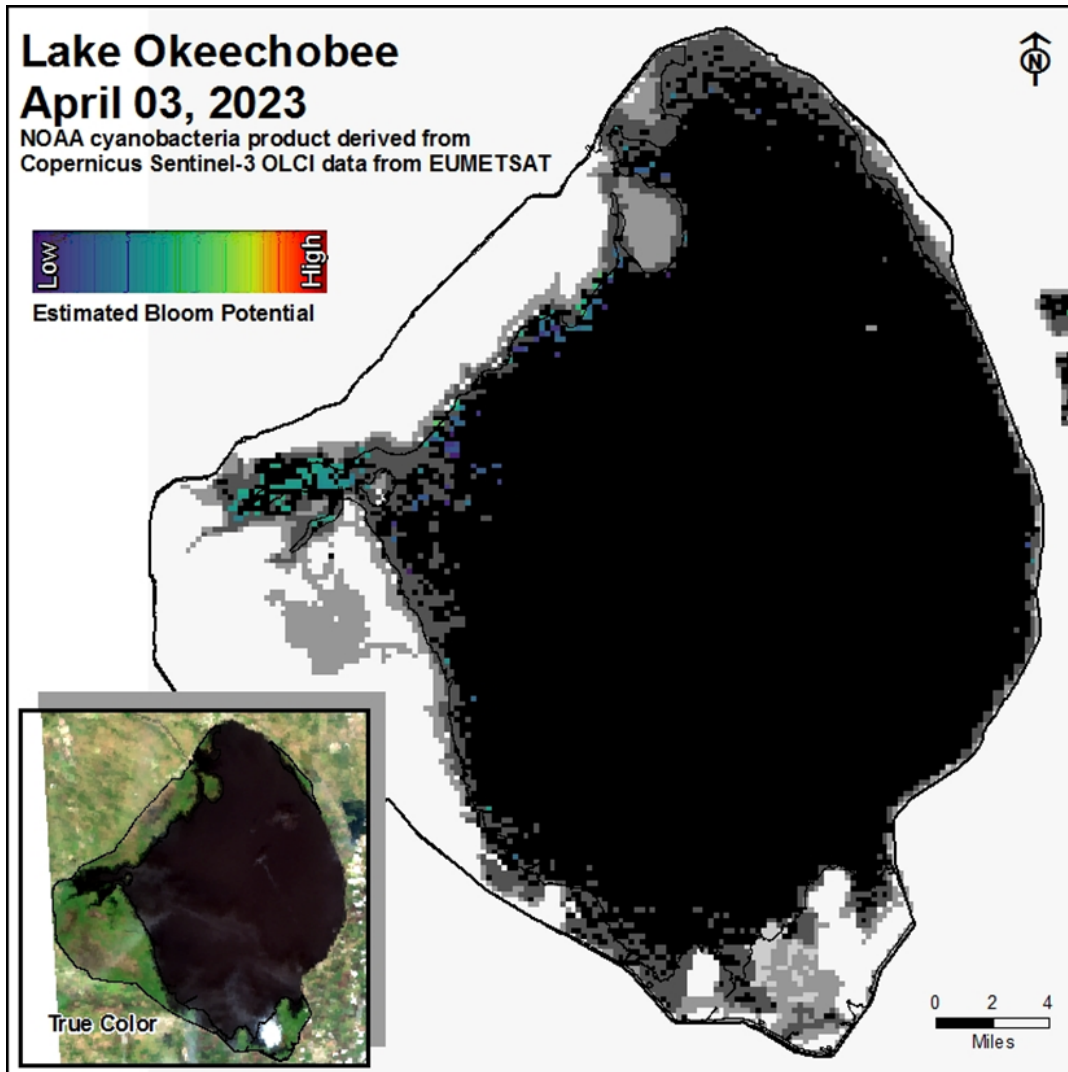


Figure LO-6. Cyanobacteria bloom potential on April 3, 2023, based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

Estuaries

St. Lucie Estuary

Over the past week, mean total inflow to the St. Lucie Estuary was 339 cfs (**Figures ES-1 and ES-2**), and the previous 30-day mean inflow was 101 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 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 20.1. Salinity conditions in the middle estuary were estimated to be within the optimal range for adult eastern oysters (**Figure ES-4**). The mean larval oyster recruitment rate reported by the Fish and Wildlife Research Institute (FWRI) was 0.01 spat/shell for February, which is normal for this time of year when most oysters are resting and not actively spawning (**Figure ES-5**).

Caloosahatchee River Estuary

Over the past week, mean total inflow to the Caloosahatchee River Estuary was 2,186 cfs (**Figures ES-6 and ES-7**), and the previous 30-day mean inflow was 2,024 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-7**.

Over the past week, surface salinities remained the same at S-79 and Val I-75, increased at Sanibel, and decreased at the remaining sites in the estuary (**Table ES-2 and Figures ES-8 and ES-9**). The seven-day mean salinities (**Table ES-2**) were in the optimal range (0-10) for tape grass in the upper estuary. The seven-day mean salinity values were within the optimal range for adult eastern oysters at Cape Coral and in the stressed range at Shell Point and Sanibel (**Figure ES-10**). The mean larval oyster recruitment rate reported by the Fish and Wildlife Research Institute was 0.03 spat/shell at Iona Cove and 0 spat/shell at Bird Island for February, which is normal for this time of year when most oysters are resting and not actively spawning (**Figures ES-11 and ES-12**).

Surface salinity at Val I-75 was forecast for the next two weeks using an autoregression model (Qiu and Wan, 2013¹) coupled with a linear reservoir model for the tidal basin. Model scenarios included pulse releases at S-79 ranging from 0 to 1,500 cfs, and a steady release at 2,000 cfs with estimated tidal basin inflows of 49 cfs. Model results from all scenarios predict daily salinity to be 1.4 or lower and the 30-day moving average surface salinity to be 0.4 or lower at Val I-75 at the end of the two-week period (**Table ES-3 and Figure ES-13**). This keeps predicted salinities in the upper estuary within the optimal salinity range (0-10) for tape grass.

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 March 31, 2023, that *Karenia brevis*, the Florida red tide dinoflagellate, was observed at bloom concentrations in seven samples collected from Charlotte County and three samples from Lee County over the past week. On the east coast, red tide was not observed in samples from Palm Beach County.

Water Management Recommendations

Lake stage is in the Low Sub-Band. Tributary conditions are dry. The LORS2008 release guidance suggests up to 450 cfs release at S-79 to the Caloosahatchee River Estuary and up to 200 cfs release at S-80 to the St. Lucie Estuary.

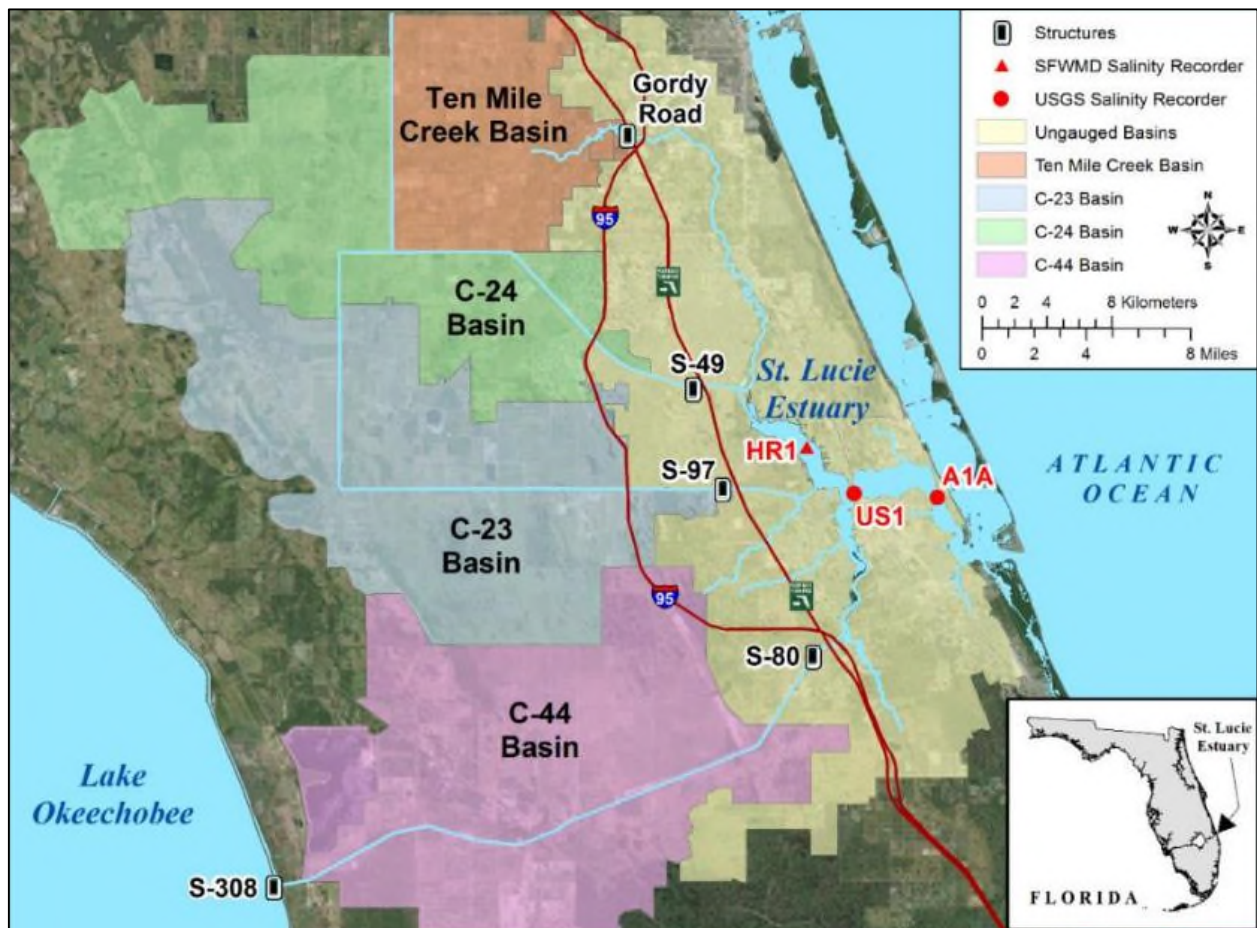


Figure ES-1. Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

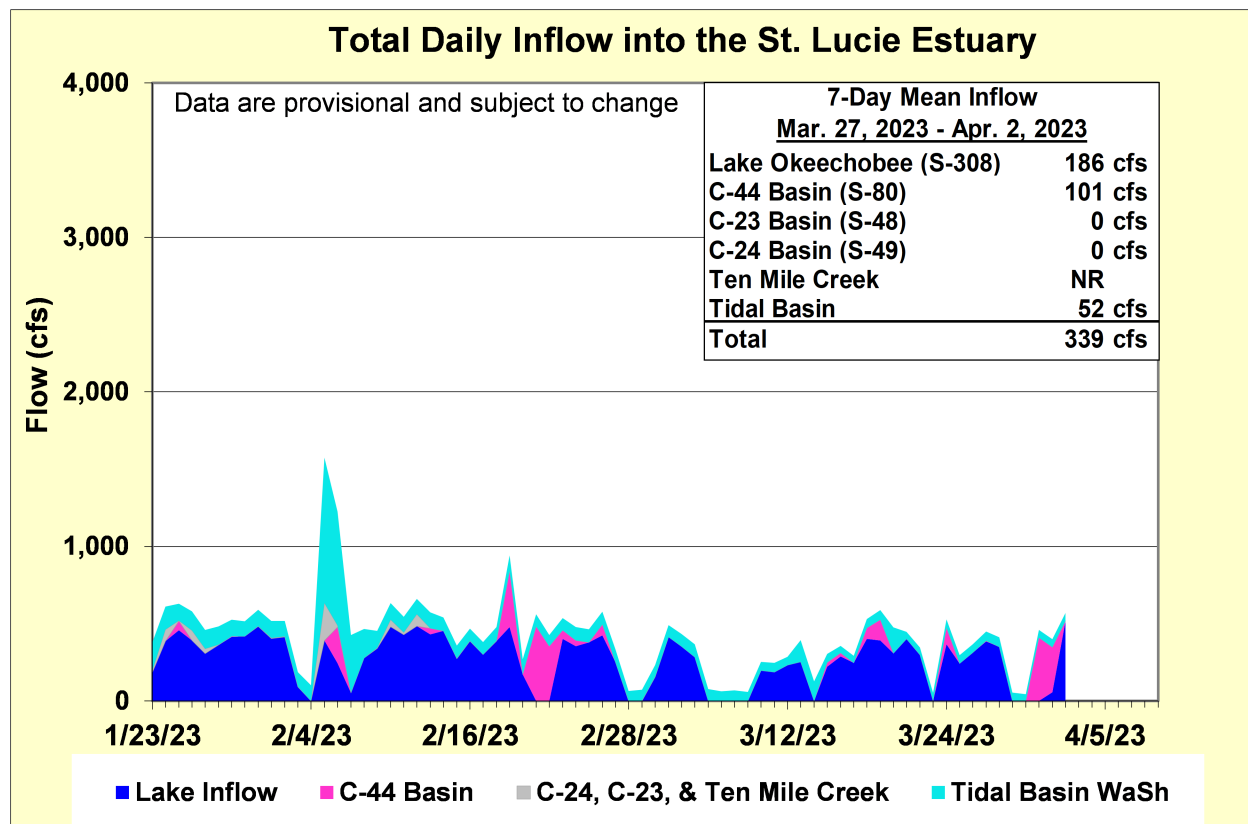


Figure ES-2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

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) | 17.6 (18.7) | 16.9 (19.1) | 10.0 – 25.0 |
| US1 Bridge | 19.4 (20.4) | 20.7 (20.9) | 10.0 – 25.0 |
| A1A Bridge | 27.1 (27.9) | 29.6 (29.7) | 10.0 – 25.0 |

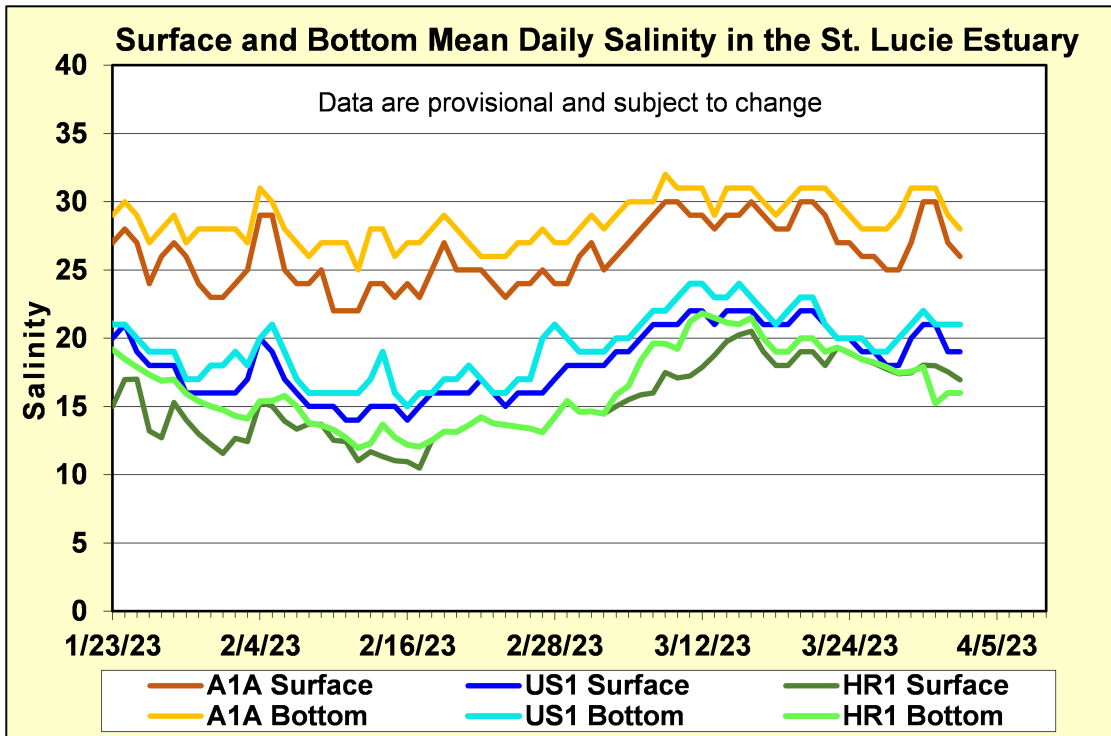


Figure ES-3. Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

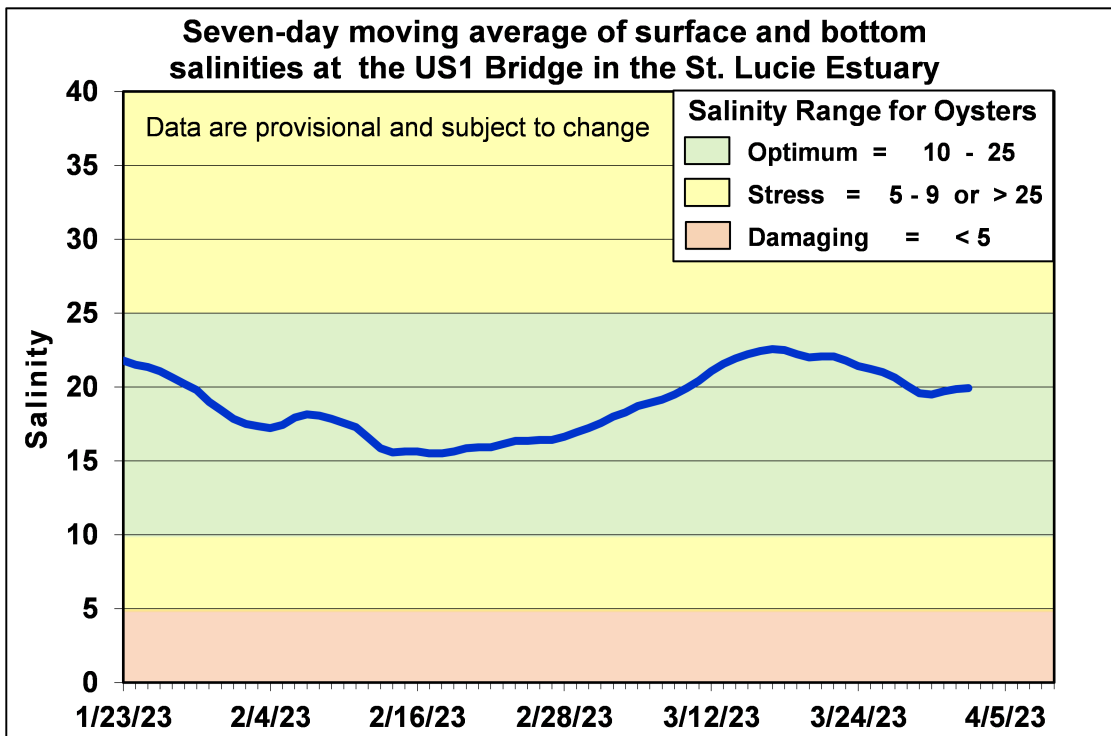


Figure ES-4. Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

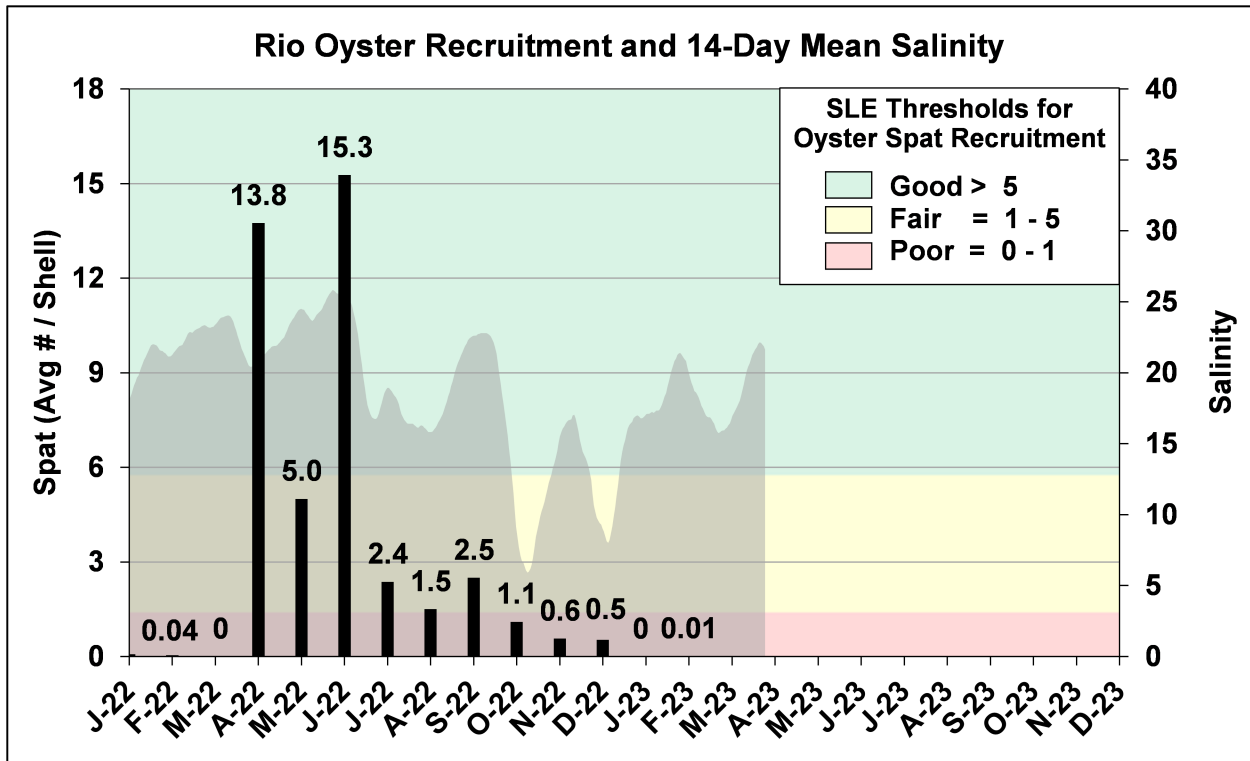


Figure ES-5. Mean oyster recruitment at the Rio oyster monitoring station and 14-day mean salinity at US1 Bridge.

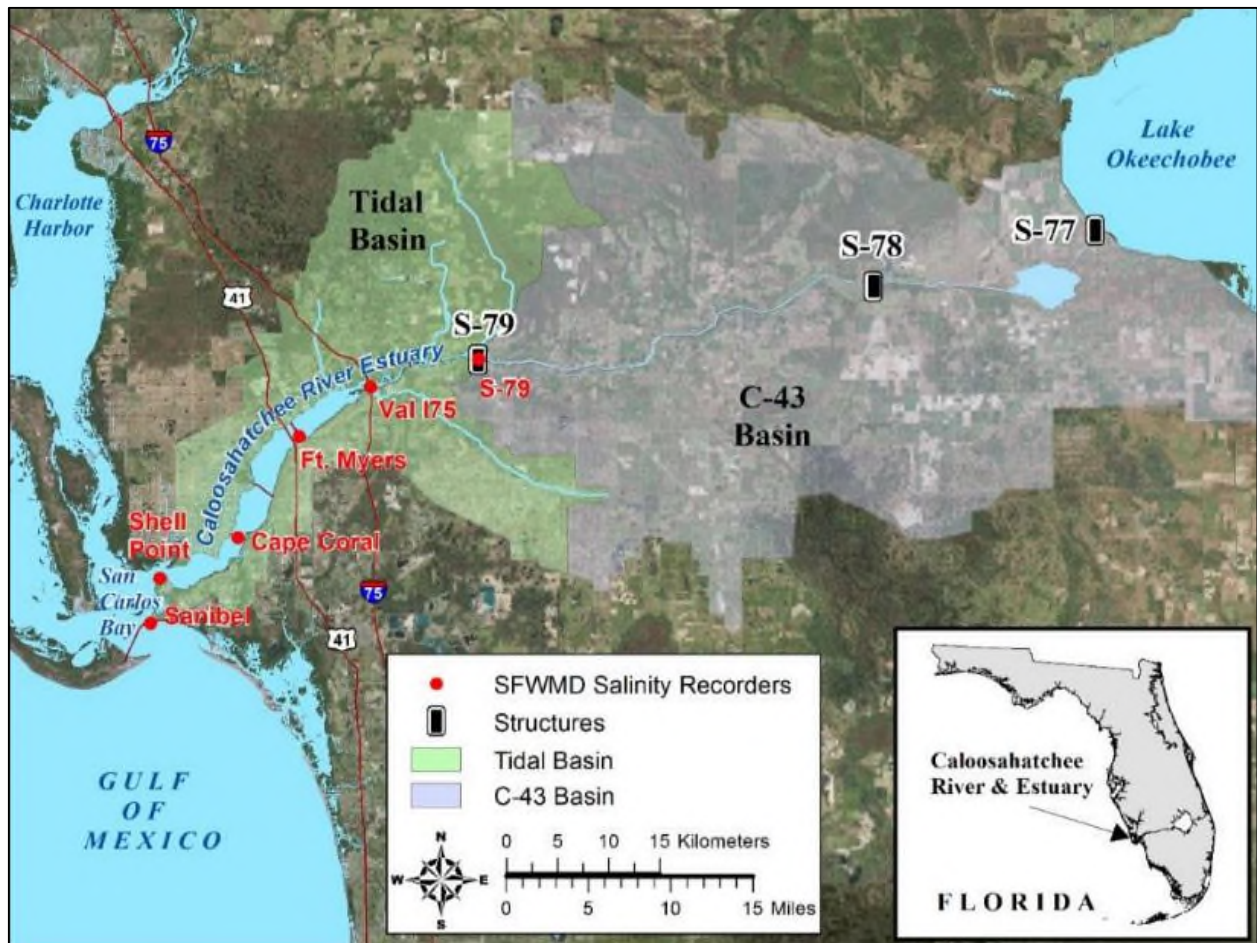


Figure ES-6. Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.

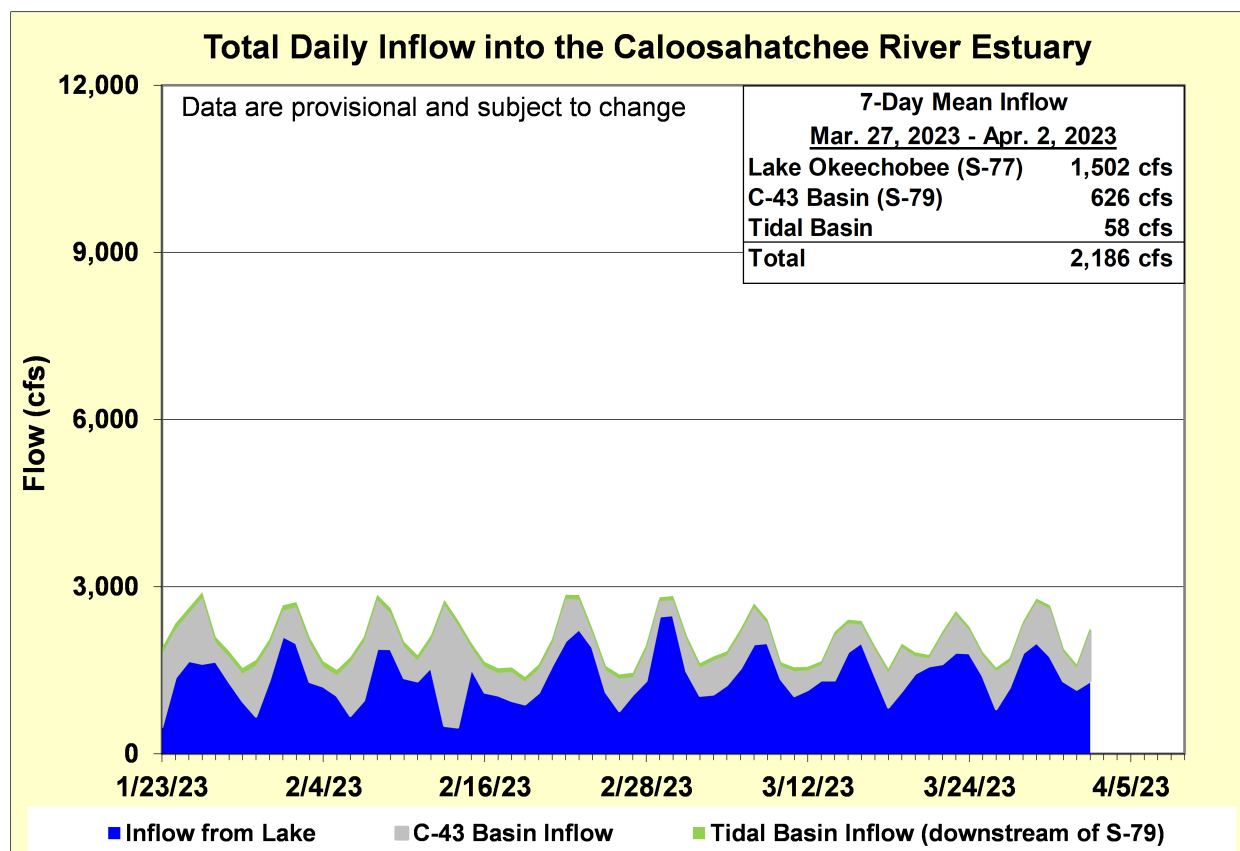


Figure ES-7. Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

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

| Sampling Site | Surface | Bottom | Optimum Envelope |
|------------------------|--------------------|--------------------|------------------|
| S-79 (Franklin Lock) | 0.2 (0.2) | 0.2 (0.2) | 0.0 – 10.0 |
| Val I-75 | 0.3 (0.3) | 0.3 (0.3) | 0.0 – 10.0 |
| Fort Myers Yacht Basin | 4.2 (4.4) | 6.6 (5.3) | 0.0 – 10.0 |
| Cape Coral | 11.3 (12.2) | 14.4 (13.8) | 10.0 – 25.0 |
| Shell Point | 27.4 (27.7) | 28.1 (28.3) | 10.0 – 25.0 |
| Sanibel | 33.4 (32.4) | 33.8 (32.8) | 10.0 – 25.0 |

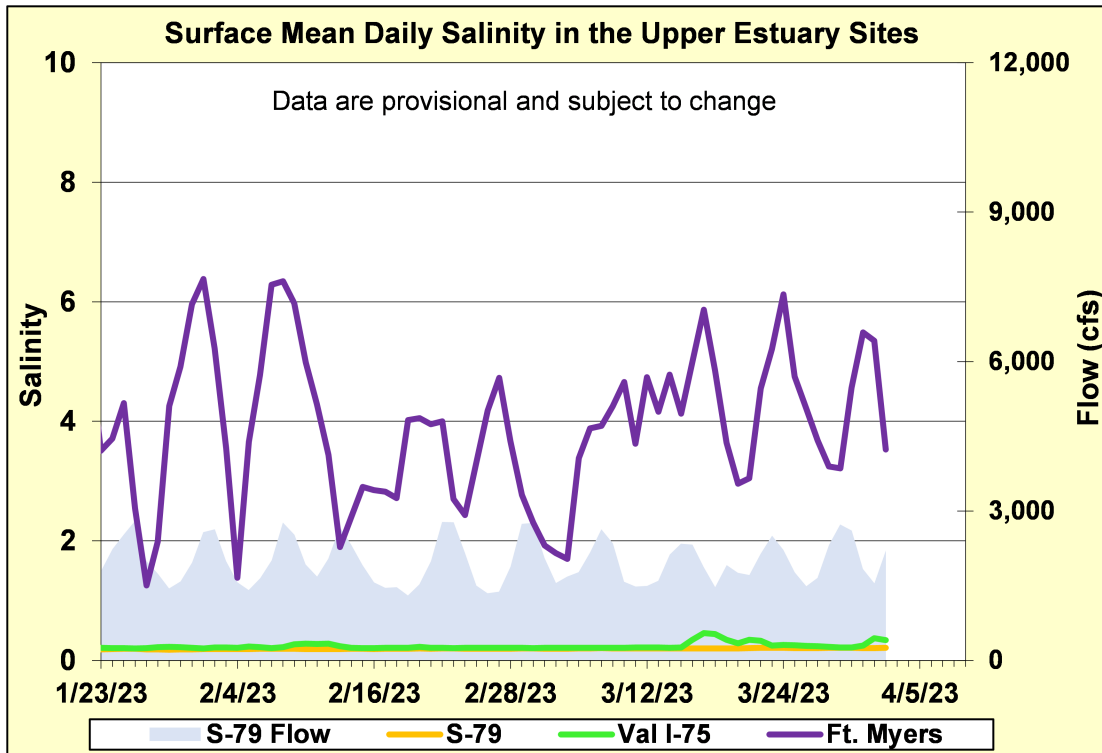


Figure ES-8. Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

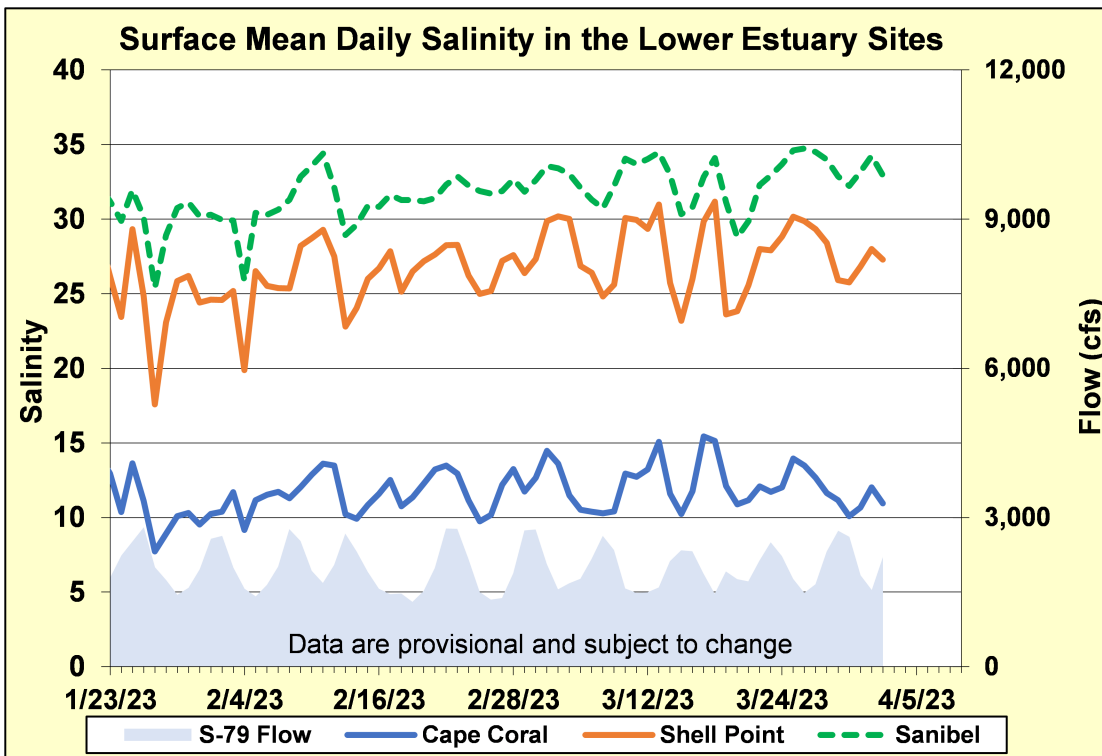


Figure ES-9. Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

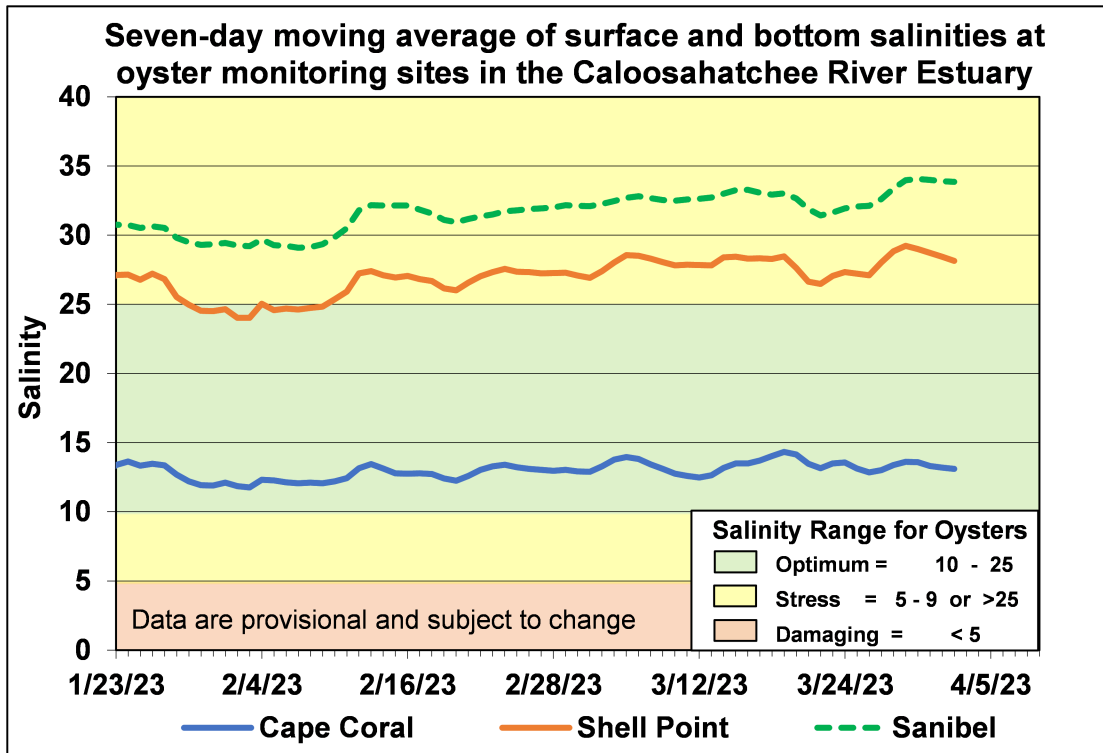


Figure ES-10. Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point, and Sanibel monitoring sites in the Caloosahatchee River Estuary.

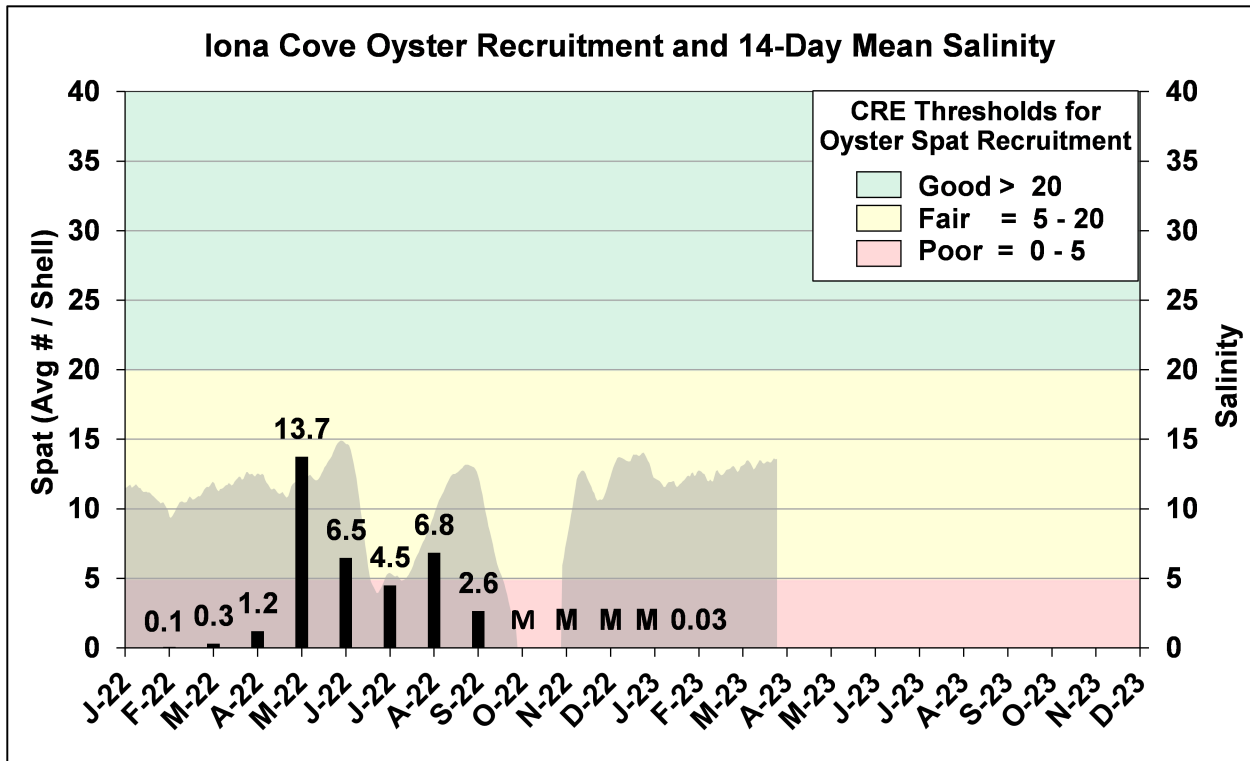


Figure ES-11. Mean oyster recruitment at the Iona Cove oyster monitoring station and 14-day mean salinity at Cape Coral.

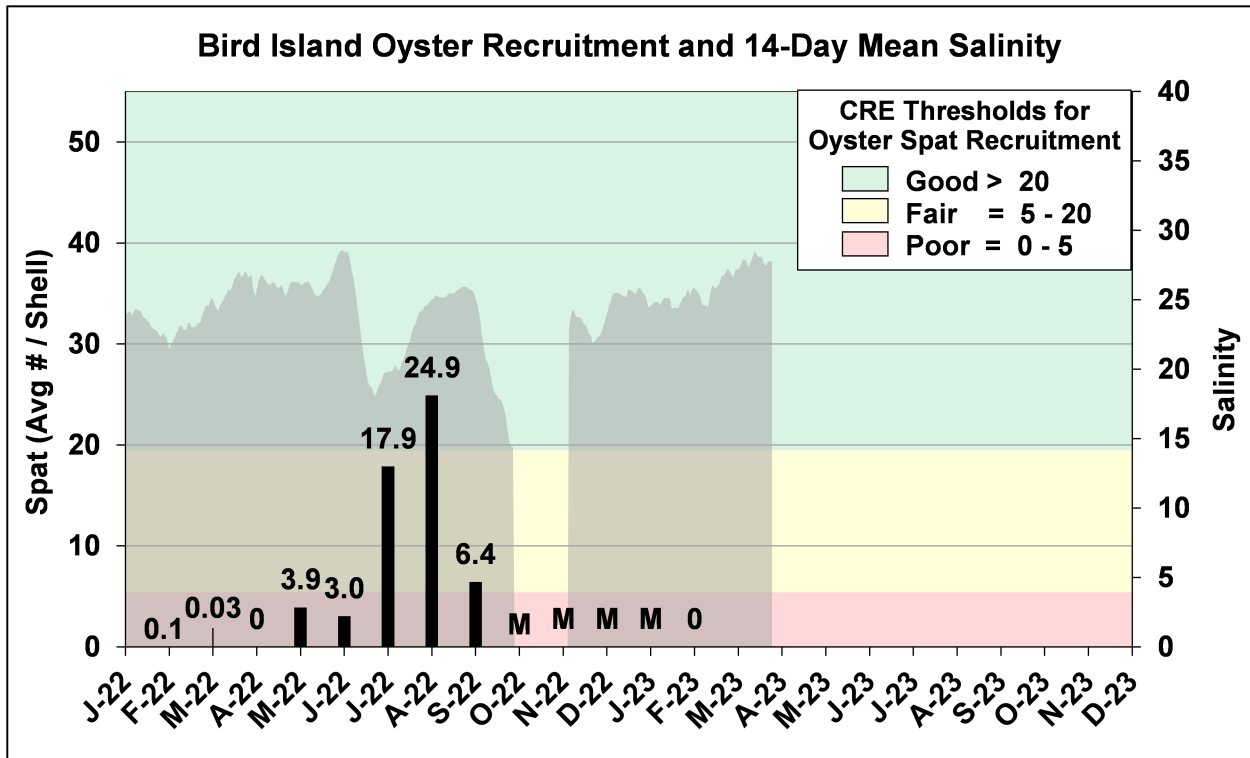


Figure ES-12. Mean oyster recruitment at the Bird Island oyster monitoring station and 14-day mean salinity at Shell Point.

Table ES-3. Predicted salinity at Val I-75 in the Caloosahatchee River Estuary at the end of the forecast period for various S-79 flow release scenarios.

| Scenario | Simulated S-79 Flow (cfs) | Tidal Basin Runoff (cfs) | Daily Salinity | 30-Day Mean Salinity |
|----------|---------------------------|--------------------------|----------------|----------------------|
| A | 0 | 49 | 1.4 | 0.4 |
| B | 450 | 49 | 0.7 | 0.3 |
| C | 750 | 49 | 0.5 | 0.3 |
| D | 1000 | 49 | 0.3 | 0.3 |
| E | 1500 | 49 | 0.3 | 0.3 |
| F | 2000 | 49 | 0.3 | 0.3 |

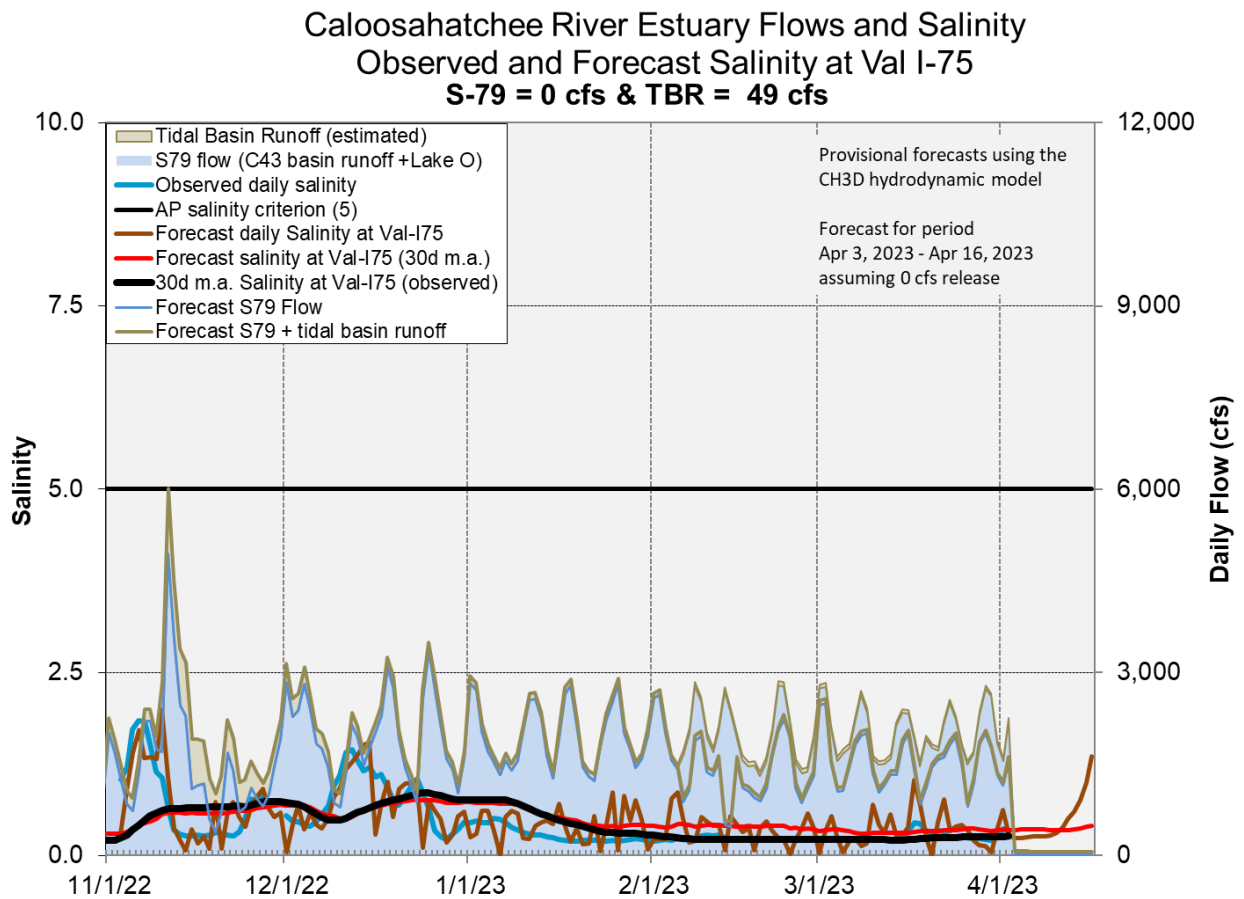


Figure ES-13. Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

Stormwater Treatment Areas

STA-1E: STA-1E Western Flow-way is offline for post-construction vegetation grow in. Operational restrictions are in place in STA-1E Central and Eastern Flow-ways for vegetation management activities. The Eastern Flow-way contains nests of species protected by the Migratory Bird Treaty Act. 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 rate (PLR) for the Eastern Flow-way is below $1.0 \text{ g/m}^2/\text{year}$. The 365-day PLR for the Central Flow-way is high (**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 $1.0 \text{ g/m}^2/\text{year}$. The 365-day PLRs for the Northern and Western Flow-way are high (**Figure S-2**).

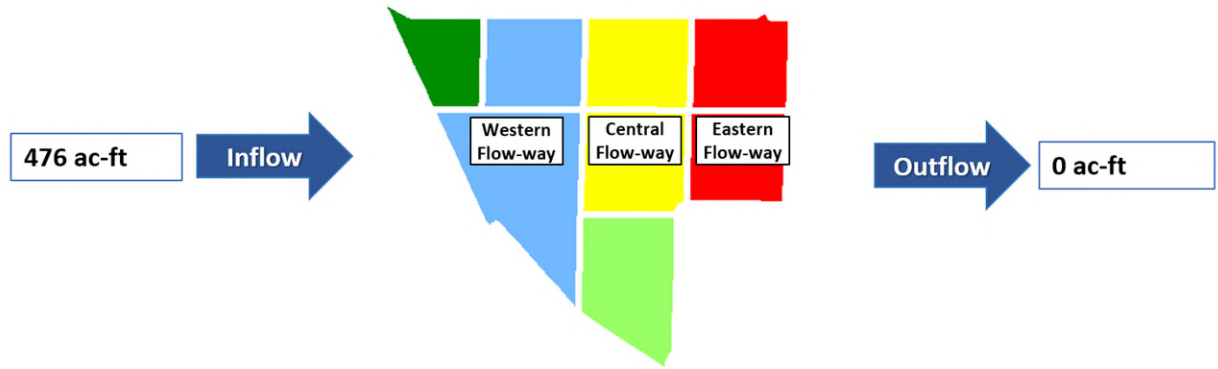
STA-2: STA-2 Flow-way 2 is offline for post-construction vegetation grow in. Operational restrictions are in place in STA-2 Flow-ways 3 and 4 for vegetation management activities. Online treatment cells are at or near target stage. Vegetation in Flow-ways 1 and 3 is stressed, and in Flow-ways 2, 4, and 5 is highly stressed. The 365-day PLRs for Flow-ways 4 and 5 are below $1.0 \text{ g/m}^2/\text{year}$. 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 at or near target stage. Vegetation in the Eastern and Central Flow-ways is highly stressed and in the Western Flow-way is stressed. The 365-day PLRs for the Central and Western Flow-ways are below $1.0 \text{ g/m}^2/\text{year}$ (**Figure S-4**).

STA-5/6: All flow-ways in STA-5/6 are online. Most treatment cells are below 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 $1.0 \text{ g/m}^2/\text{year}$, except Flow-ways 3 and 4 which are high (**Figure S-5** and **S-6**).

For definitions on STA operational language see glossary following figures.

STA-1E Weekly Status Report – 3/27/2023 through 4/2/2023



| STA-1E Flow-Way Status | | | | As of 4/2/2023 | | STA-1E Flow & Phosphorus Concentration | | | |
|---------------------------|--|--|---------------------------------------|---|--|--|-------|---------|---------|
| Flow-Way | Vegetation Status Healthy ----- Stressed ←-----→ | 365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal) | Online / Offline / Restrictions | Stage Based: Relative to Target Stage (TS) | | Total Inflow, ac-ft | 7-day | 28-day | 365-day |
| | | | | <ul style="list-style-type: none"> ■ 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) | | | | | |
| Eastern | ← → | | Vegetation management / Avian nesting | | | 476 | 476 | 125,734 | |
| Central | ← → | | Vegetation rehabilitation | | | --Lake Inflow, ac-ft | 500 | N/A | 3,600 |
| Western | Offline, post-construction grow in starting 3/28/2022 | | | | | Total Outflow, ac-ft | 0 | 29 | 99,747 |
| | | | | | | Inflow Conc., ppb | 56 | 56 | 115 |
| | | | | | | Outflow Conc., ppb | N/A | 18 | 25 |
| Includes Preliminary Data | | | | | | | | | |

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

STA-1W Weekly Status Report – 3/27/2023 through 4/2/2023



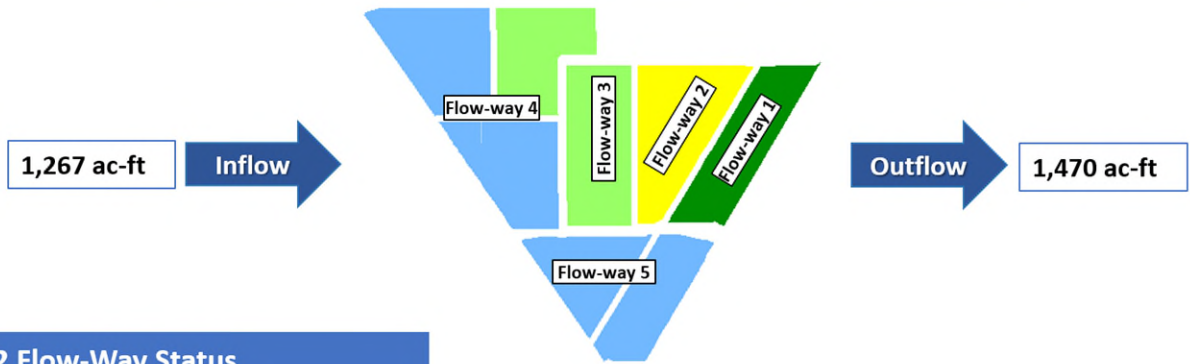
| STA-1W Flow-Way Status | | | |
|------------------------|---|--|---------------------------------|
| Flow-Way | Vegetation Status Healthy --- Stressed | 365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal) | Online / Offline / Restrictions |
| Northern | ← → | | Vegetation management |
| Western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

| As of 4/2/2023 | |
|--|---|
| 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-1W Flow & Phosphorus Concentration | | | |
|--|-------|--------|---------|
| | 7-day | 28-day | 365-day |
| Total Inflow, ac-ft | 0 | 3,818 | 144,547 |
| --Lake Inflow, ac-ft | 0 | N/A | 8,100 |
| Total Outflow, ac-ft | 0 | 0 | 147,436 |
| Inflow Conc., ppb | N/A | 155 | 201 |
| Outflow Conc., ppb | N/A | N/A | 20 |
| Includes Preliminary Data | | | |

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

STA-2 Weekly Status Report – 3/27/2023 through 4/2/2023



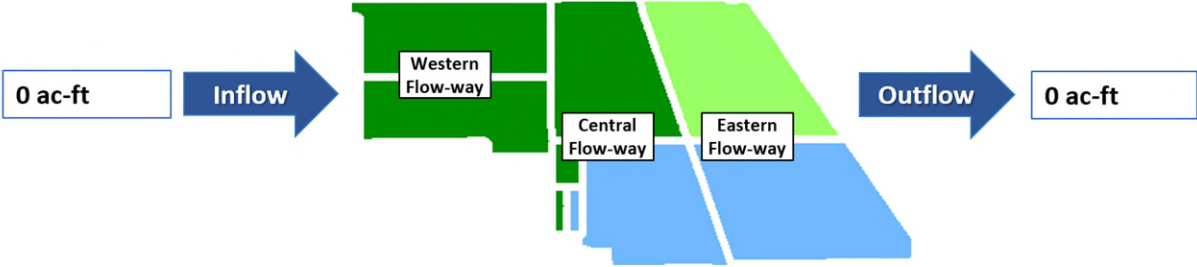
| STA-2 Flow-Way Status | | | |
|-----------------------|---|--|---------------------------------|
| Flow-Way | Vegetation Status Healthy ----- Stressed | 365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal) | Online / Offline / Restrictions |
| 1 | | | Online |
| 2 | Offline, post-construction grow in starting 1/23/2023 | | |
| 3 | | | Vegetation Rehab |
| 4 | | | Vegetation Rehab |
| 5 | | | Online |

| As of 4/2/2023 | |
|--|---|
| 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 | 1,267 | 15,192 | 318,489 |
| --Lake Inflow, ac-ft | 400 | N/A | 29,000 |
| Total Outflow, ac-ft | 1,470 | 9,081 | 338,478 |
| Inflow Conc., ppb | 31 | 49 | 114 |
| Outflow Conc., ppb | 16 | 16 | 29 |
| Includes Preliminary Data | | | |

Figure S-3. STA-2 Weekly Status Report

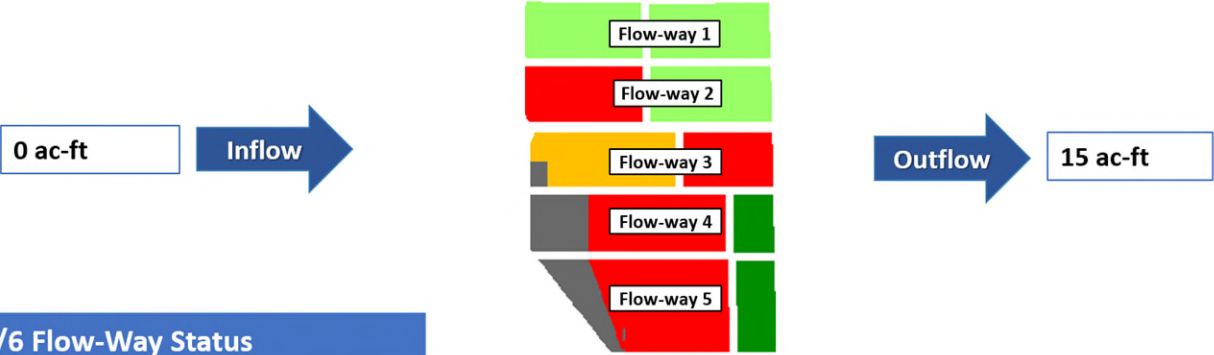
STA-3/4 Weekly Status Report – 3/27/2023 through 4/2/2023



| STA-3/4 Flow-Way Status | | | | As of 4/2/2023 | | STA-3/4 Flow & Phosphorus Concentration | | | |
|---------------------------|--|---|--|---|--|---|--------------|---------------|----------------|
| Flow-Way | Vegetation Status Healthy ----- Stressed | 365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal) | Online / Offline / Restrictions | Stage Based: Relative to Target Stage (TS) | | | 7-day | 28-day | 365-day |
| Eastern | Offline, vegetation management drawdown as of 3/1/2021 | | | | | Total Inflow, ac-ft | 0 | 28 | 299,667 |
| Central | | | Online | | | --Lake Inflow, ac-ft | 0 | N/A | 2,700 |
| Western | | | Online | | | Total Outflow, ac-ft | 0 | 0 | 291,803 |
| | | | | | | Inflow Conc., ppb | N/A | N/A | 94 |
| | | | | | | Outflow Conc., ppb | N/A | N/A | 16 |
| Includes Preliminary Data | | | | | | | | | |

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

STA-5/6 Weekly Status Report – 3/27/2023 through 4/2/2023



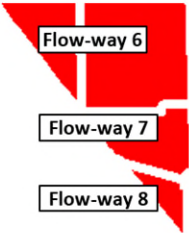
| STA-5/6 Flow-Way Status | | | |
|-------------------------|---|--|---------------------------------|
| Flow-Way | Vegetation Status Healthy ----- Stressed | 365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal) | Online / Offline / Restrictions |
| 1 | ← → | | Online |
| 2 | ← → | | Online |
| 3 | ← → | | Online |
| 4 | ← → | | Online |
| 5 | ← → | | Online |

| As of 4/2/2023 | |
|--|---|
| 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 | 0 | 0 | 152,473 |
| --Lake Inflow, ac-ft | 0 | N/A | 0 |
| Total Outflow, ac-ft | 15 | 21 | 148,187 |
| Inflow Conc., ppb | N/A | N/A | 289 |
| Outflow Conc., ppb | 98 | 145 | 40 |
| Includes Preliminary Data | | | |

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

STA-5/6 Weekly Status Report – 3/27/2023 through 4/2/2023



| STA-5/6 Flow-Way Status | | | | As of 4/2/2023 | |
|-------------------------|--|--|---------------------------------|--|---|
| Flow-Way | Vegetation Status Healthy ----- Stressed ←-----→ | 365-day P Loading Rate (below 1.0 g P /m ² /yr is optimal) | Online / Offline / Restrictions | Stage Based: Relative to Target Stage (TS) | |
| | | | | Color | Range |
| 6 | ←-----→ | 1.0 | Online | | Extreme Low Water (> 1.2' below TS) |
| 7 | ←-----→ | 1.0 | Online | | High Water Level (1.5' – 2.8' above TS) |
| 8 | ←-----→ | 1.0 | Online | | Deep Water Level (> 2.8' above 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, $\mu\text{g/L}$ or ppb. Inflow concentration refers to the flow-weighted mean TP from all inflow structures over a period of time.
- **Outflow Concentration:** The flow-weighted mean TP from all outflow structures over a period of time. The outflow concentration represents the reduction of inflow TP achieved by STA treatment of the inflow water.
- **WQBEL:** The STA outflow concentration that is required upon completion of the Restoration Strategies projects by December 2025. The outflow concentration shall not exceed 13 ppb as an annual flow weighted mean in more than 3 out of 5 water years on a rolling basis and shall not exceed 19 ppb as an annual flow weighted in any water year.
- **Flow-Way (FW):** One or more treatment cells connected in series. Cells typically have emergent aquatic vegetation (EAV) in the front portion of the flow-way followed by a mix of EAV and submerged aquatic vegetation (SAV)
- **Vegetation Status:** Healthy means the vegetation condition is good and will allow the STA to perform as designed. Stressed means the vegetation is showing signs of poor health, such as browning or areas of vegetation die-off, or the cell contains undesirable vegetation such as floating exotic vegetation requiring treatment. The TP reduction capability of the STA is affected when the vegetation condition is poor.
- **Phosphorus Loading Rate (PLR):** Mass of inflow TP in grams, divided by total treatment area of STA in square meters, per year. In general, a 365-day value of less than 1.0 is needed for an STA to perform optimally. A PLR of 2.0 is considered very high and a PLR of 3.0 is considered extremely high. The TP reduction capability of the STA is affected when the PLR is high, very high and extremely high.
- **Online:** Online status means the FW can receive and treat inflow.
- **Online with Restriction:** The FW can receive and treat inflow, but the amount of flow or water level may be limited temporarily. For example, a vegetation rehabilitation effort may require reduced flows through an area while the new plants are establishing, or nesting by protected species may require a certain water level not to be exceeded.
- **Offline:** The FW is unable to receive and treat inflow due to repairs, construction, or other prohibitive reasons.
- **Depth:** Difference between the average surface water level in a cell and the average ground elevation in that cell. Target depths, or depths between flow events, are between 1.25 ft to 1.5 ft. As depth approaches or drops below zero, an increasing percentage of the cell is considered dry and STA conditions deteriorate. An increase in depth above target depth is expected with increasing flow. However, as depth increases much above the target depth and is sustained over a period of time, it can be detrimental to vegetation health and overall STA treatment performance.
- **Note:** The data provided in this summary report were developed using a combination of provisional and quality-assured flow and water quality data. In some cases, best professional judgment was used to estimate missing data and revise questionable data. Values provided are not considered final but are appropriate for use in STA operational decision-making.

Everglades

Water Conservation Area Regulation Schedules

Last week the EPA received more rainfall than previous weeks, less to the south. WCA-1: Last week stage at the 1-8C continued to follow just below schedule. The average on Sunday was 0.18 feet below the falling Zone A1 regulation line. WCA-2A: Stage rose then fell at the 2-17 gauge last week. The average on Sunday was 0.80 feet above the flat regulation line. WCA-3A: The Three Gauge Average stage continues to recede faster than the slope of the schedule line. The average stage was 0.96 feet below the falling regulation line on Sunday. WCA-3A North: At gauge 62 (Northwest corner) stage climbed quickly to above ground last week, with the average on Sunday 1.47 feet below the flat Upper schedule line. (**Figures EV-1 through EV-4**).

Water Depths

The SFWDAT illustrates current stages in the EPA are very low in the west, with below ground conditions in northwestern WCA-3A and well below in southern BCNP. The upper reaches of the L-67s continue to dry down as more of that historically ponded region is now in the 0.5' to 1.5' depth category. Connectivity remains in SRS but continues to diminish both there and in Taylor Slough of ENP. Comparing current WDAT water depths to one month ago conditions within the EPA are shallower across the system but more so in the west. Looking back a year ago, conditions are also much dryer in the west, and dryer but less so to the east (**Figure EV-5 and Figure EV-6**). Comparing current conditions to the 20-year average on April 2: Conditions approach average in northern WCA-2A and return to above average in extreme northeastern WCA-3A; remain well below in central and southern WCA-3A; and above the 80th percentile in northeastern SRS and WCA-3B (**Figure EV-7**).

Taylor Slough and Florida Bay

Total weekly rainfall averaged 0.4 inches in Taylor Slough and Florida Bay over the past week (Monday-Sunday) based on the 18 gauges used for this report. Rainfall ranged from 0.03 inches in Whipray Basin (WB) in the central bay to 1.3 inches in Joe Bay in the eastern nearshore. Stages at all sites in Taylor Slough continued to decrease over the past week. Taylor Slough stage changes averaged a decrease of -0.15 feet and ranged from a decrease of -0.07 feet at Craighead Pond (CP) and EVER6 in southwestern Taylor Slough and lower C-111 area, respectively, to -0.34 feet at Taylor Slough Bridge (TSB) in northern Taylor Slough (**Figure EV-8 and Figure EV-9**). Taylor Slough water levels remain above the historical average for this time of year by +0.9 inches compared to before the Florida Bay initiative (starting in 2017), a decrease of -1.1 inches from last week.

Average Florida Bay salinity was 34.0, +0.2 higher than the previous week. Salinity changes ranged from a decrease of -1.5 in Terrapin Bay (TB) in the central nearshore to +1.3 at Buoy Key (BK) in the western bay (**Figure EV-8**). As of 4/2, salinity is back within the IQR for the Eastern, Central, and Western regions, as the IQR increases from March to April (**Figure EV-10**). Florida Bay salinity is +2.9 above its historical average for this time of year, down -0.4 from last week.

Water Management Recommendations

We recommend continued discussion and use of strategies that could prevent further drying of WCA3A North. Conserving water in this region will most likely prove critical for the upcoming wading bird nesting season. The focus for available inflows should remain on the northeast as that region continues to support an important nesting effort at the Alley North colony. Dry conditions mean that maintaining a minimum rate of stage recession within the marshes of WCAs and conserving water north in the system has an increased ecological benefit. As stages remain near the 90th percentile in SRS, discharge downstream through Taylor Slough when water is available. 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 | 0.96 | -0.04 |
| WCA-2A | 1.61 | +0.00 |
| WCA-2B | 1.58 | -0.10 |
| WCA-3A | 1.11 | +0.15 |
| WCA-3B | 1.59 | -0.01 |
| ENP | 0.45 | -0.02 |

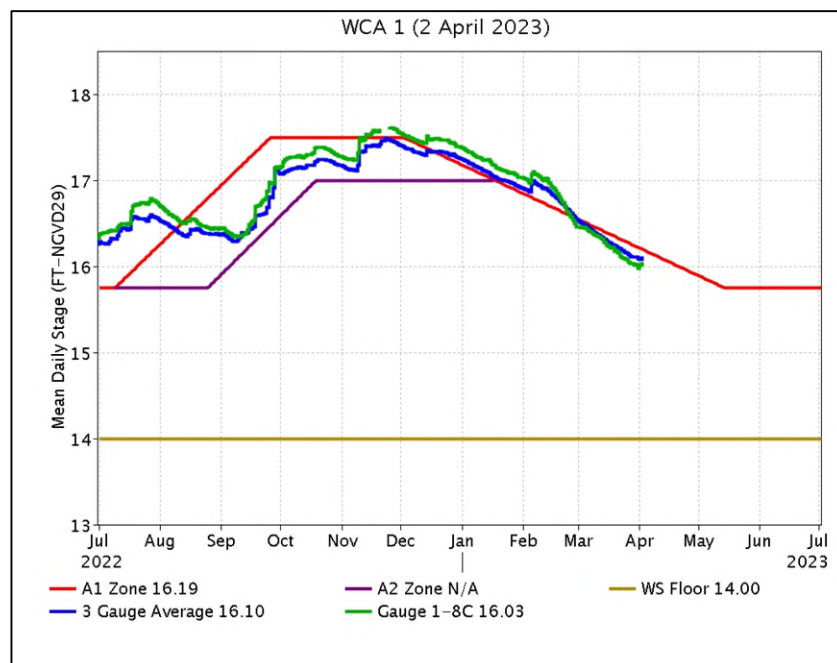


Figure EV-1. WCA-1 stage hydrographs and regulation schedule.



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

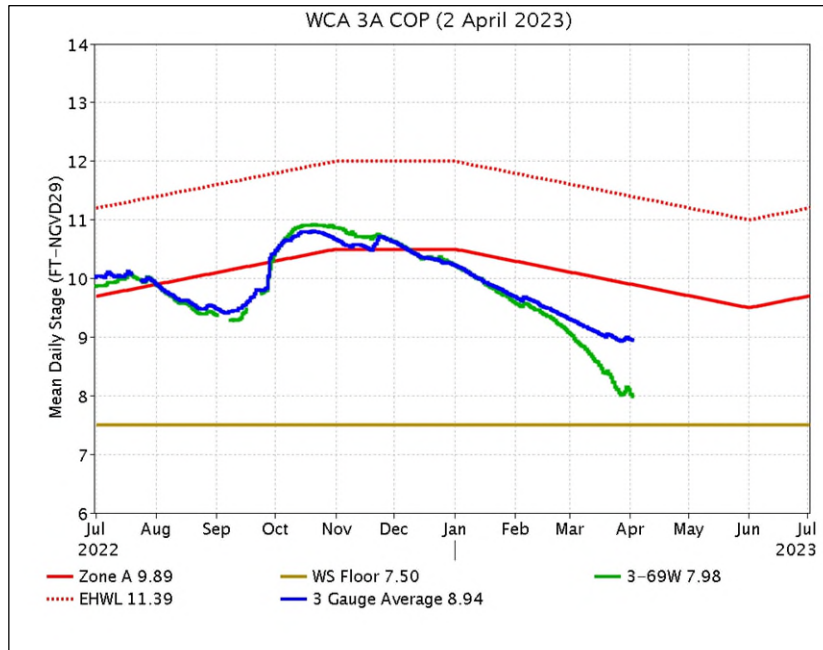


Figure EV-3. WCA-3A stage hydrographs (three-gauge average, 3-69W) and regulation schedule.

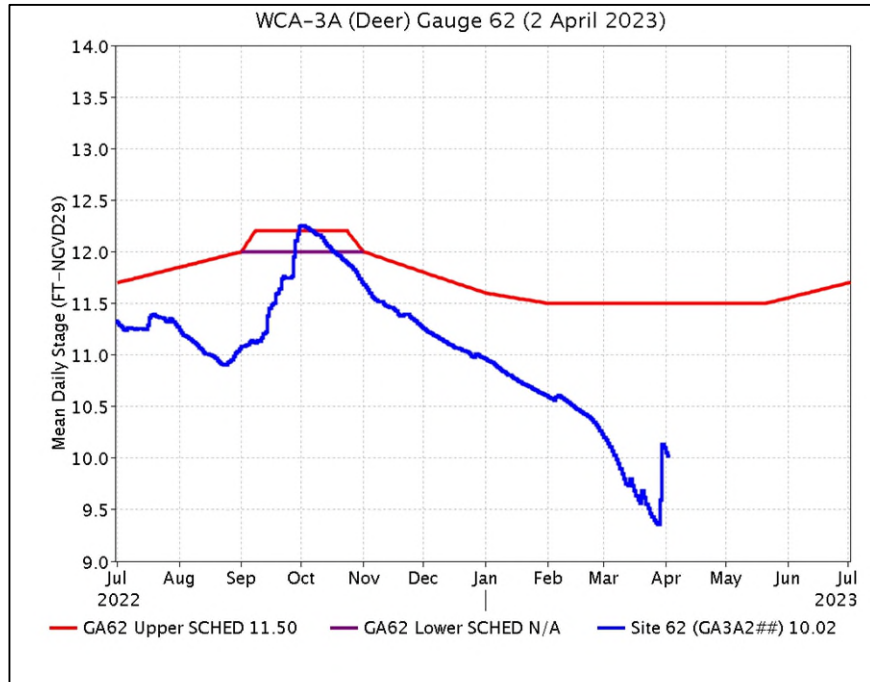


Figure EV-4. WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.

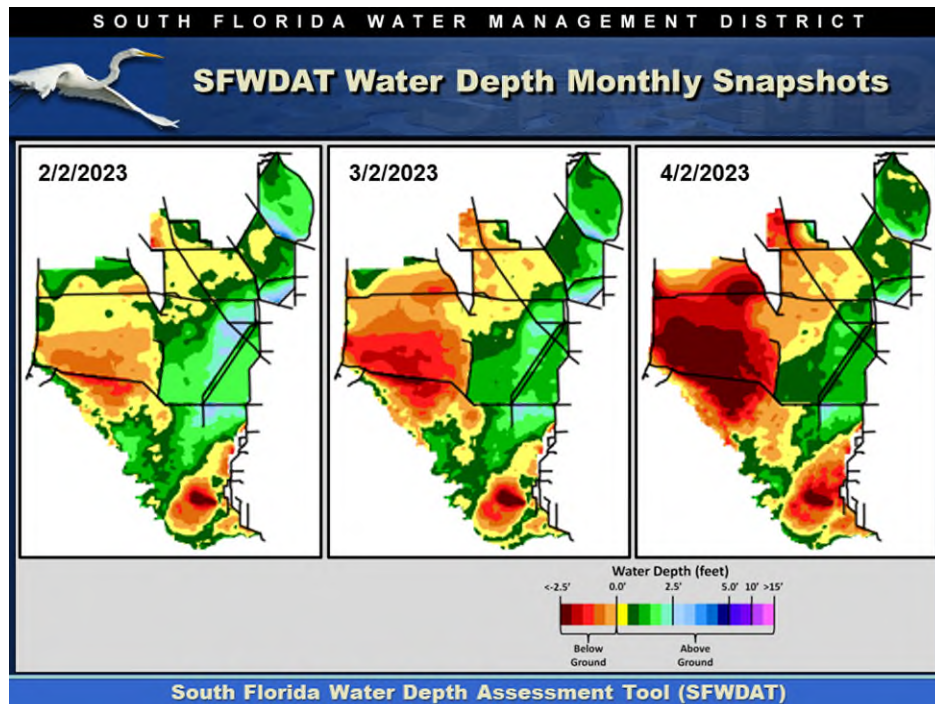


Figure EV-5. Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

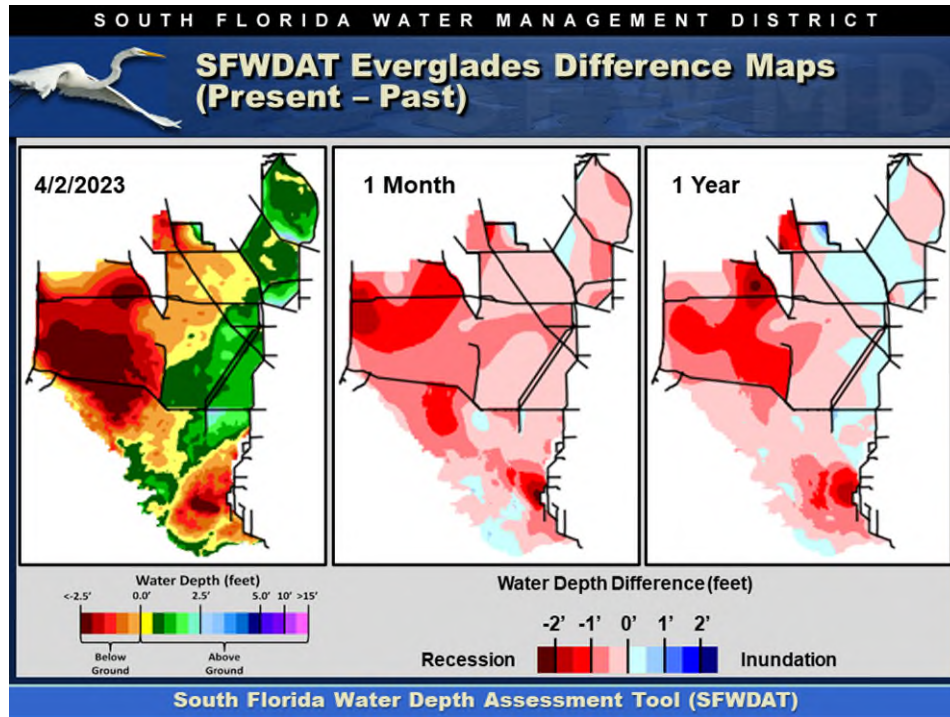


Figure EV-6. Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

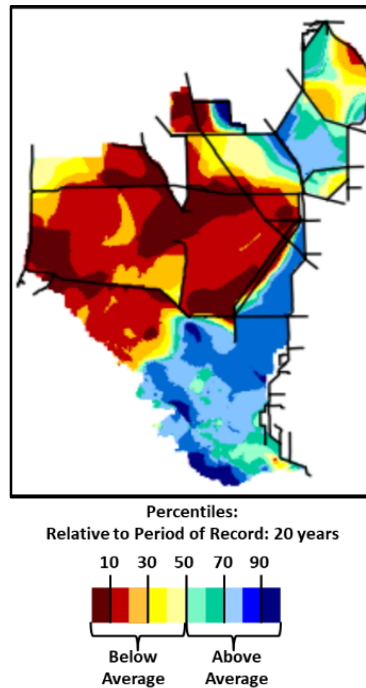


Figure EV-7. Present water depths (4/2/2023) compared to the day of year average over the previous 20 years.

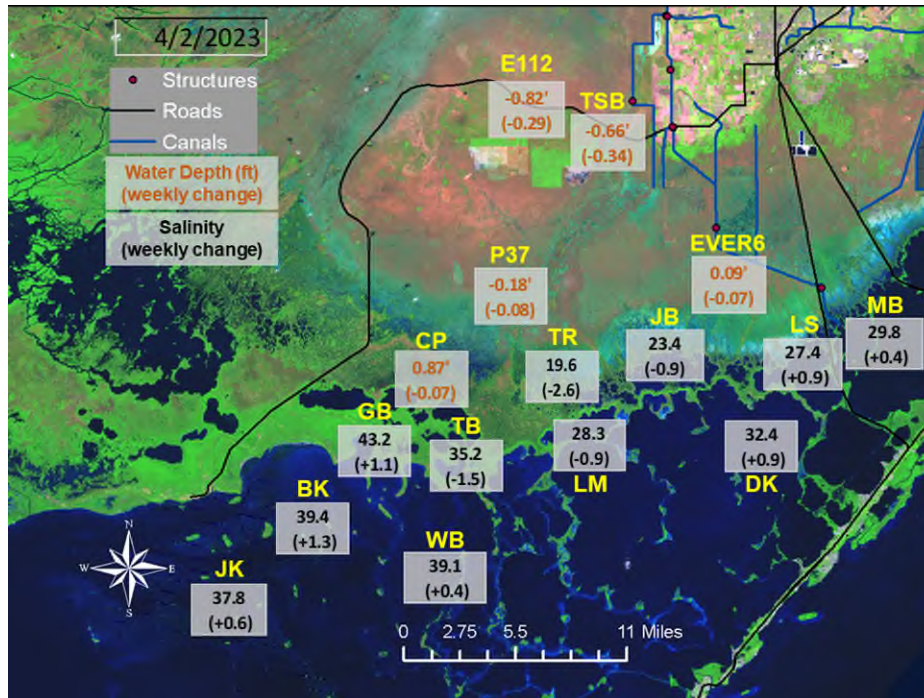


Figure EV-8. Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

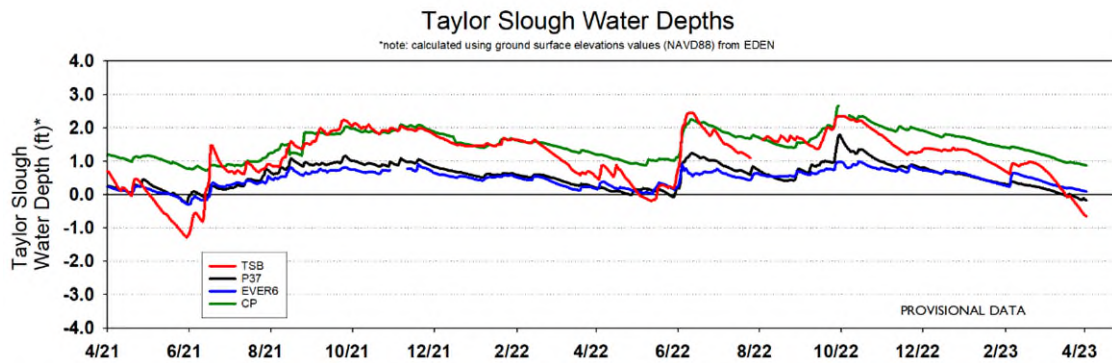


Figure EV-9. Taylor Slough water depth time series.

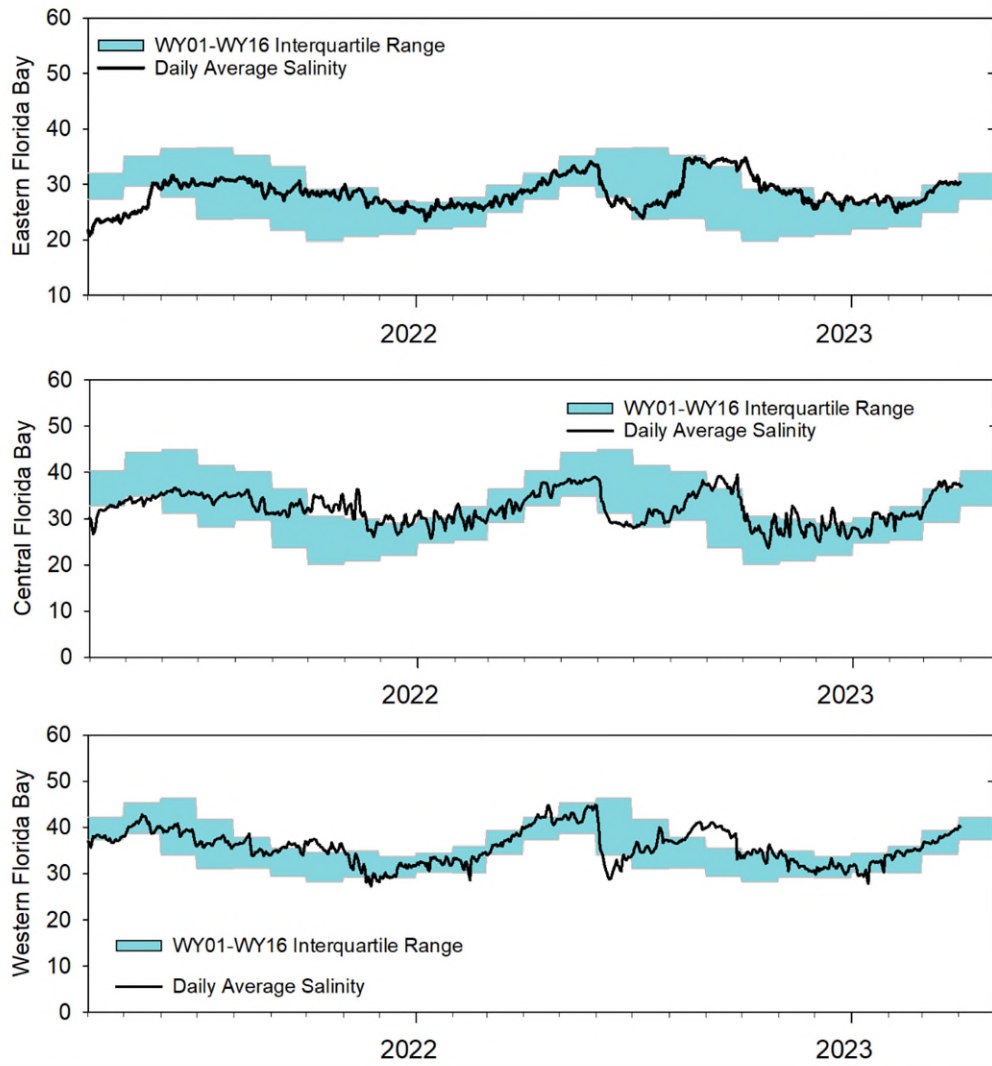


Figure EV-10. Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

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

| SFWMD Everglades Ecological Recommendations, April 4, 2023 (red is new) | | | |
|--|--|---|---|
| | Weekly change | Recommendation | Reasons |
| WCA-1 | Stage decreased by 0.04' | Conserve water in this basin as possible. Recession rate of less than 0.05' per week. | Protect within basin and downstream habitat and wildlife. |
| WCA-2A | Stage remained unchanged | Conserve water in this basin as possible. Recession rate of less than 0.05' 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 0.10' | Conserve water in this basin as possible. Recession rate of less than 0.05' 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 0.05' 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 increased by 0.61' | Conserve water in this basin as possible. Recession rate of less than 0.05' per week. | |
| Central WCA-3A S | Stage decreased by 0.01' | Conserve water in this basin as possible. Recession rate of less than 0.10' per week. | Protect within basin and downstream habitat and wildlife. |
| Southern WCA-3A S | Stage decreased by 0.12' | | |
| WCA-3B | Stage decreased by 0.01' | Recession rate of less than 0.10' 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 TTF 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 -0.23' to -0.01' | Move water southward as possible. | When available, provide freshwater buffer for downstream conditions. |
| FB- Salinity | Salinity changes ranged from -1.6 to +1.8 | 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 325 cfs and the previous 30-day mean inflow was 253 cfs. The seven-day mean salinity was 30.9 at BBCW8 and 31.5 at BBCW10, both within the ideal salinity range for estuarine organisms in this region (salinity less than 35). Data provided by Biscayne National Park.

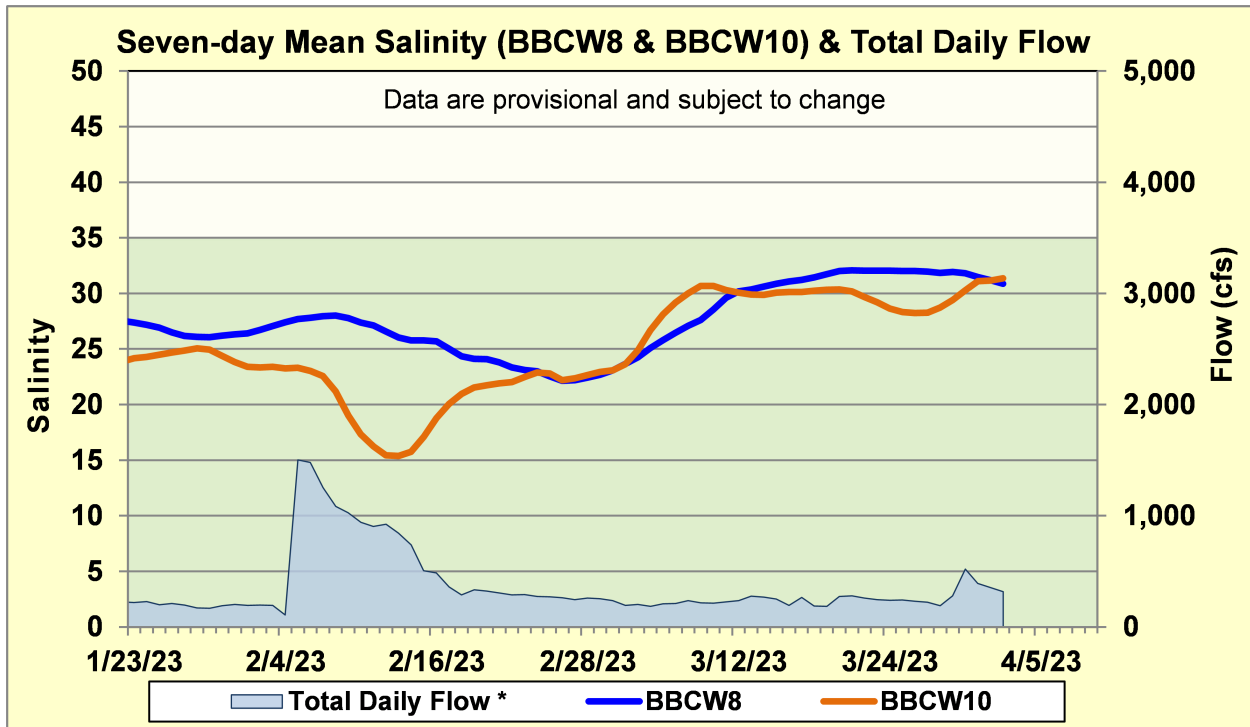


Figure BB-1. Seven-day mean salinity at BBCW8 and BBCW10 and total daily flow in Biscayne Bay. Total daily flow was calculated using flow from structures S20G, S20F, S21, S21A, S123, and S700P.