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:** June 23, 2021

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

## Summary

### Weather Conditions and Forecast

A trailing band of moisture left behind by Tropical Storm Claudette is lying across the northern portion of the Florida peninsula and will help generate thunderstorms mainly north and east. A cold front is forecast to stall across north Florida Wednesday as a westward-moving tropical wave moves through the area Wednesday night and early Thursday. An upper level trough extending through the southeastern US is forecast to bring favorable upper level flow and generate an increase in thunderstorm coverage Wednesday and Thursday. An upper level low is then forecast to spin up in the base of the upper trough to our north and migrate west southwestward through the Gulf of Mexico. This upper low and the easterly wind flow behind the tropical wave should focus morning showers east and afternoon thunderstorms west on Friday and Saturday. A second upper level low, which is forecast to develop northeast and north of the Bahamas, should then bring less favorable wind flow to the area and a decrease in thunderstorm activity Sunday and Monday with activity focused west. Total rainfall is forecast to be near the historical average during the first 7-day period (Week 1) and then near the historical average again during the second 7-day period (Week 2).

### Kissimmee

Flow at S-65A continues to be too low for extensive inundation of the Kissimmee River floodplain, and mean floodplain depth remains at 0.07 feet on June 20. Dissolved oxygen concentration in the Kissimmee River averaged 6.9 mg/L for the week, well above the 2.0 mg/L threshold considered harmful to sportfish.

### Lake Okeechobee

Lake Okeechobee stage was 12.56 feet NGVD on June 20, 2021, 0.64 feet lower than a month ago, and 0.25 feet higher than one year ago (**Figure LO-1**). Lake stages were above the ecological envelope from August 1, 2020 to March 30, 2021 but are currently following along the upper threshold of the envelope (**Figure LO-2**). The Lake has been within the envelope around a third of the time since January 1, 2021. Recent satellite imagery (June 20, 2021) shows a medium to high bloom potential in the northeastern, eastern and central parts of the Lake.

## Estuaries

Total inflow to the St. Lucie Estuary averaged approximately 778 cfs over the past week with no flow coming from Lake Okeechobee. Mean surface salinities decreased at all sites in the estuary over the past week. Salinity at the US1 Bridge was in the good range (10-26) for adult eastern oysters.

Total inflow to the Caloosahatchee Estuary averaged 1,194 cfs over the past week with approximately 594 cfs coming from Lake Okeechobee. Mean salinities increased at Cape Coral and decreased at Shell Point and Sanibel over the past week. Salinities were in the good range (0-10) for tape grass at Val I-75 and Ft. Myers. Salinities were also in the good range (10-30) for adult eastern oysters at Cape Coral, and in the fair range at Shell Point and Sanibel.

## Stormwater Treatment Areas

For the week ending Sunday, June 20, 2021, approximately 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 WY2022 (since May 1, 2021) is approximately 53,000 ac-feet. The total amount of inflows to the STAs in WY2022 is approximately 78,000 ac-feet. Most STA cells are near target stage, except for several cells in STA-5/6 that are drying out. STA-1E Western Flow-way is offline for the Restoration Strategies project to fill and grade Cells 5 and 7, and STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown. Operational restrictions are in place in STA-1W Western, Eastern, and Northern Flow-ways, and STA-2 Flow-way 2 for construction activities. Operational restrictions are in effect in STA-1E Central Flow-way and STA-2 Flow-ways 3 and 4 for vegetation management activities. Operational restrictions are also in effect in STA-5/6 Flow-ways 2 and 3 following the Restoration Strategies project to grade non-effective treatment areas. Nests of Migratory Bird Treaty Act (MBTA) protected species have been observed in STA-1W and STA-5/6. This week, if 2008 LORS recommends Lake releases to the WCAs and conditions allow, releases should be sent to STA-2.

## Everglades

Record wading bird nesting continues, and what foraging remains is found in the southern portions of WCA-1, WCA-2A and WCA-3A. The Alley North colony has largely completed nesting. A large proportion of White Ibis and Wood Storks have successfully fledged, meaning this could be an even more productive year than the record 2018 season. Dry conditions persist in northeastern WCA-3A, but the northwestern side recovered rapidly last week, and public access was reestablished to the WMAs. The wildfire in Holeyland WMA was declared extinguished last Thursday and inflows last week were helpful to quench muck fires. In Florida Bay salinities generally decreased, and stages increased in Taylor Slough as freshwater began to move westward and direct rainfall was locally heavy.

## Supporting Information

## Kissimmee Basin

### *Upper Kissimmee*

On June 20, 2021, lake stages were 55.1 feet NGVD (1.4 feet below schedule) in East Lake Toho, 52.4 feet NGVD (1.1 feet below schedule) in Lake Toho, and 50.1 feet NGVD (0.9 feet below schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1**, **Figures KB-1-3**).

### *Lower Kissimmee*

Kissimmee River (headwater) stages were 46.5 feet NGVD at S-65A and 25.8 feet NGVD at S-65D on June 20, 2021, while discharges were 450 cfs at S-65, 380 cfs at S-65A, 250 cfs at S-65D, and 220 cfs at S-65E (**Table KB-2**). Dissolved oxygen concentration in the Kissimmee River averaged 6.9 mg/L for the week ending on June 20, 2021, well above the 2.0 mg/L threshold considered harmful to sportfish (**Figure KB-4**). Flow at S-65A remains too low for extensive inundation of the Kissimmee River floodplain, and mean floodplain depth remains at 0.07 feet on June 20, 2021 (**Figure KB-5**).

### *Water Management Recommendations*

Hold stage in KCH flat or receding by increasing S-65 discharge without exceeding the USACE discharge limit of 900 cfs at S-65A. The objective is to protect recently completed construction in the Lower Basin by slowly increasing flow at S-65A over the next few weeks as possible, rather than allowing stage in KCH to rise. Continue to use the following limits: Follow the USACE request to hold S-65A discharge below 800-900 cfs to facilitate construction for the Kissimmee River Restoration Project. Follow the recommended S-65A discharge rate of change limits (**Table KB-3**) when adjustments in discharge are made. Limit ascension (stage rise) rates to 0.5 ft/14 days in East Lake Toho, Toho and KCH to the extent possible while maintaining the discharge rate of change limits. If lake stage begins to decline, attempt to limit the recession rate to a maximum of 0.18 ft/week.

**Table KB-1.** Average discharge for the preceding seven days and Sunday's average daily stage and departures from KCL flood regulation or temporary schedules. All data are provisional.

| Water Body | Structure | Stage Monitoring Site | 7-Day Average Discharge (cfs) | Lake Stage (feet NGVD)[a] | Schedule Type[b] | Schedule Stage (feet NGVD) | Departure from Regulation (feet) | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | 6/20/21 | 6/13/21 |
| Lakes Hart and Mary Jane | S-62 | LKMJ | 0 | 59.6 | R | 60.0 | -0.4 | -0.7 |
| Lakes Myrtle, Preston and Joel | S-57 | S-57 | 0 | 60.0 | R | 61.0 | -1.0 | -1.2 |
| Alligator Chain | S-60 | ALLI | 0 | 62.2 | R | 63.2 | -1.0 | -1.2 |
| Lake Gentry | S-63 | LKGT | 0 | 59.7 | R | 61.0 | -1.3 | -1.4 |
| East Lake Toho | S-59 | TOHOE | 0 | 55.1 | R | 56.5 | -1.4 | -1.6 |
| Lake Toho | S-61 | TOHOW S-61 | 53 | 52.4 | R | 53.5 | -1.1 | -1.4 |
| Lakes Kissimmee, Cypress and Hatchineha | S-65 | KUB011 LKIS5B | 351 | 50.1 | R | 51.0 | -0.9 | -1.0 |

a. Names of in-lake monitoring sites and structures used to determine lake stage. If more than one site is listed, an average is reported.

b. A: projected recession line; R: USACE regulation schedule; S: temporary recession target line; T: temporary schedule; NA: not applicable or not available.

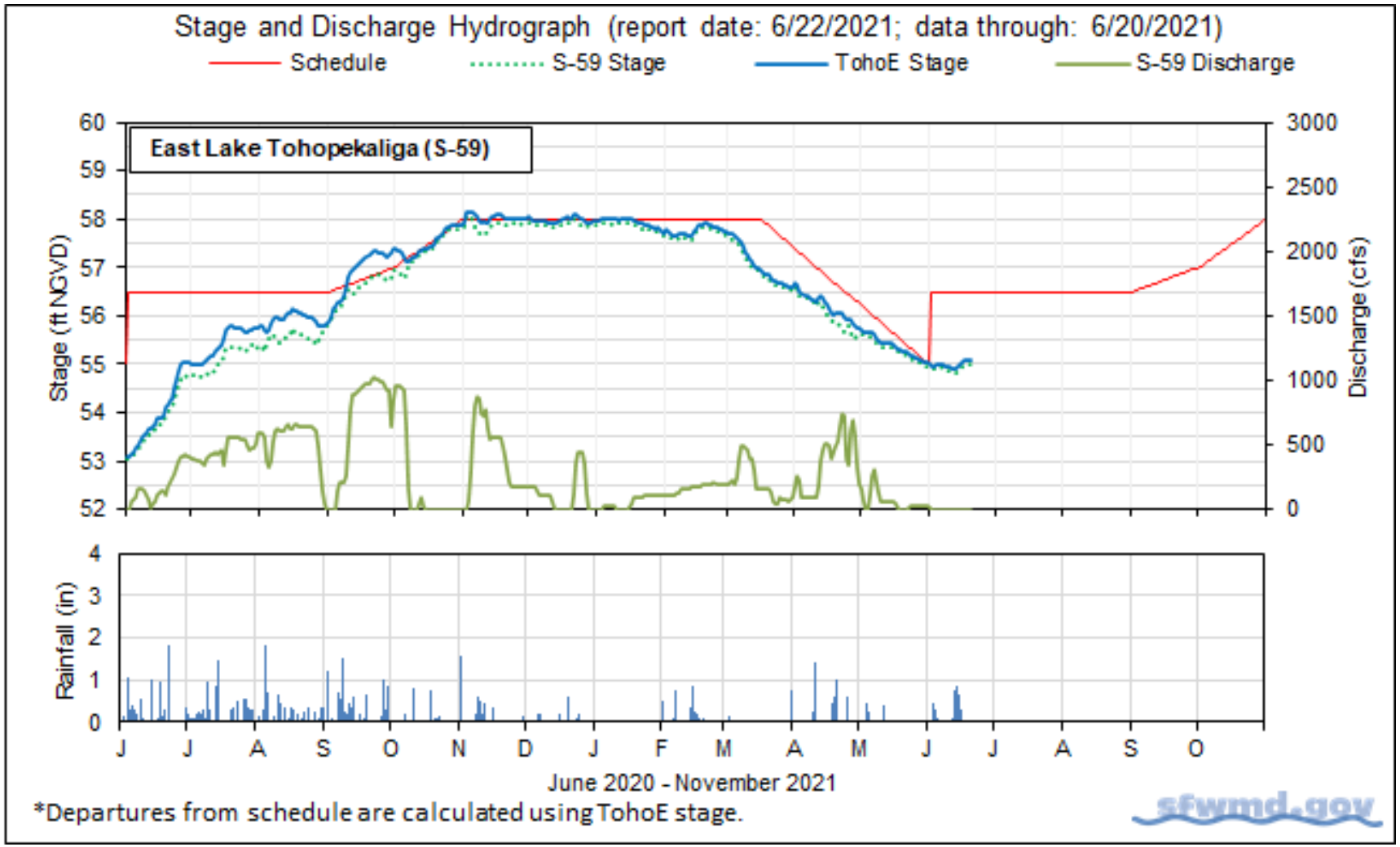



**Figure KB-1.** East Lake Toho regulation schedule, stage, discharge and rainfall.

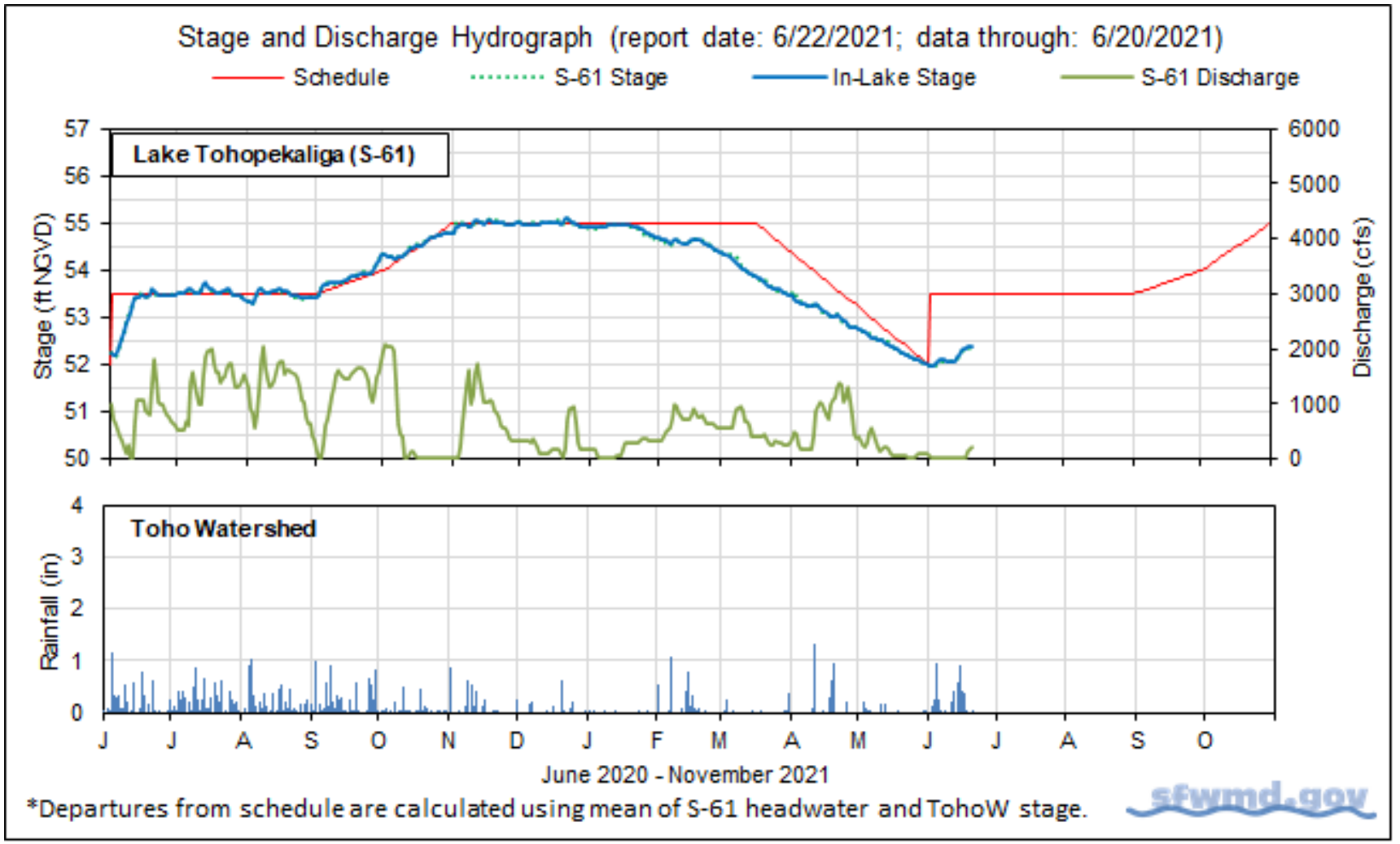



**Figure KB-2.** Lake Toho regulation schedule, stage, discharge and rainfall.

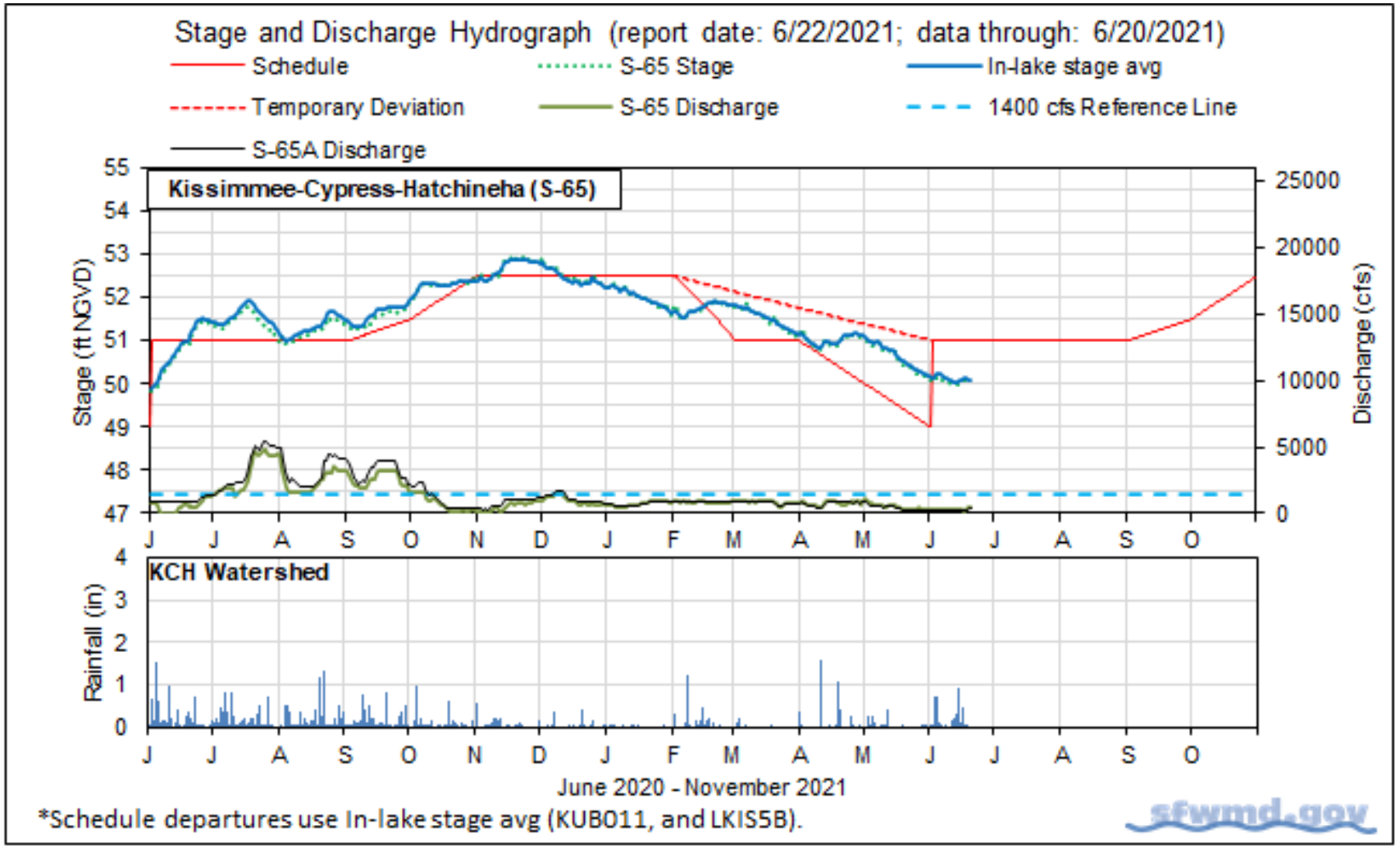



**Figure KB-3.** Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.

**Table KB-2.** One- and seven-day average discharge and stage at Lower Kissimmee basin structures, river channel dissolved oxygen concentrations and water depths in the Phase I area floodplain. All data are provisional.

| Metric | Location | Daily Average | Average for Previous Seven Day Periods | | | |
|---|---|---|---|---|---|---|
| | | 6/20/21 | 6/20/21 | 6/13/21 | 6/6/21 | 5/30/21 |
| Discharge | S-65 | 453 | 351 | 341 | 355 | 353 |
| Discharge | S-65A[a] | 377 | 300 | 299 | 296 | 267 |
| Headwater Stage (feet NGVD) | S-65A | 46.50 | 46.40 | 46.47 | 46.41 | 46.30 |
| Discharge | S-65D[b] | 251 | 268 | 266 | 314 | 262 |
| Headwater Stage (feet NGVD) | S-65D[c] | 25.80 | 25.83 | 25.70 | 25.71 | 25.76 |
| Discharge (cfs) | S-65E[d] | 216 | 248 | 253 | 302 | 245 |
| Discharge (cfs) | S-67 | 0 | 0 | 0 | 0 | 0 |
| Dissolved Oxygen (mg/L) [e] | Phase I, II/III river channel | 8.1 | 6.9 | 6.7 | 6.6 | 7.9 |
| Mean depth (feet) [f] | Phase I floodplain | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 |

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.

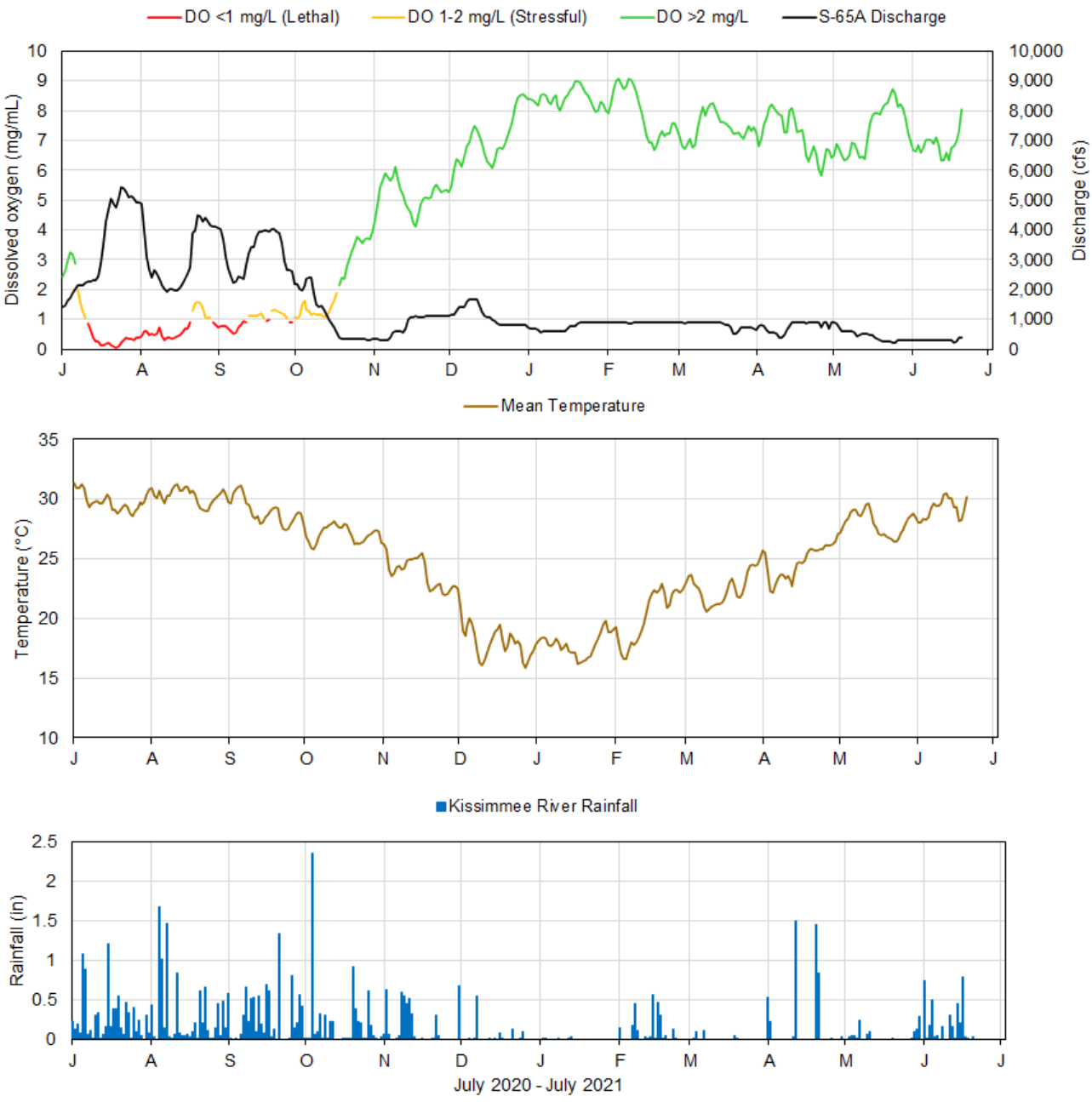
d. Combined discharge from S-65E and S-65EX1.

e. Dissolved oxygen is the average of values from sondes KRBN, PC62, PC63, PD62R and PD42R.

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

**Table KB-3.** Discharge rate of change limits for S65/S-65A (revised 7/13/18).

| Discharge (cfs) | Maximum Rate of Increase (cfs/day) | Maximum Rate of Decrease (cfs/day) |
|---|---|---|
| 0-300 | 50 | -50 |
| 301-650 | 75 | -75 |
| 651-1,400 | 150 | -150 |
| 1,401-3,000 | 300 | -600 |
| >3,000 | 1,000 | -2,000 |




Report Date: 6/22/2021; data are through: 6/20/2021

sfwmd.gov

**Figure KB-4.** 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, KRBN, PC33, PD62R, and PD42R with an average of four stations reporting this week. Rainfall values are daily totals for Kissimmee River (Pool BCD) AHED watershed.

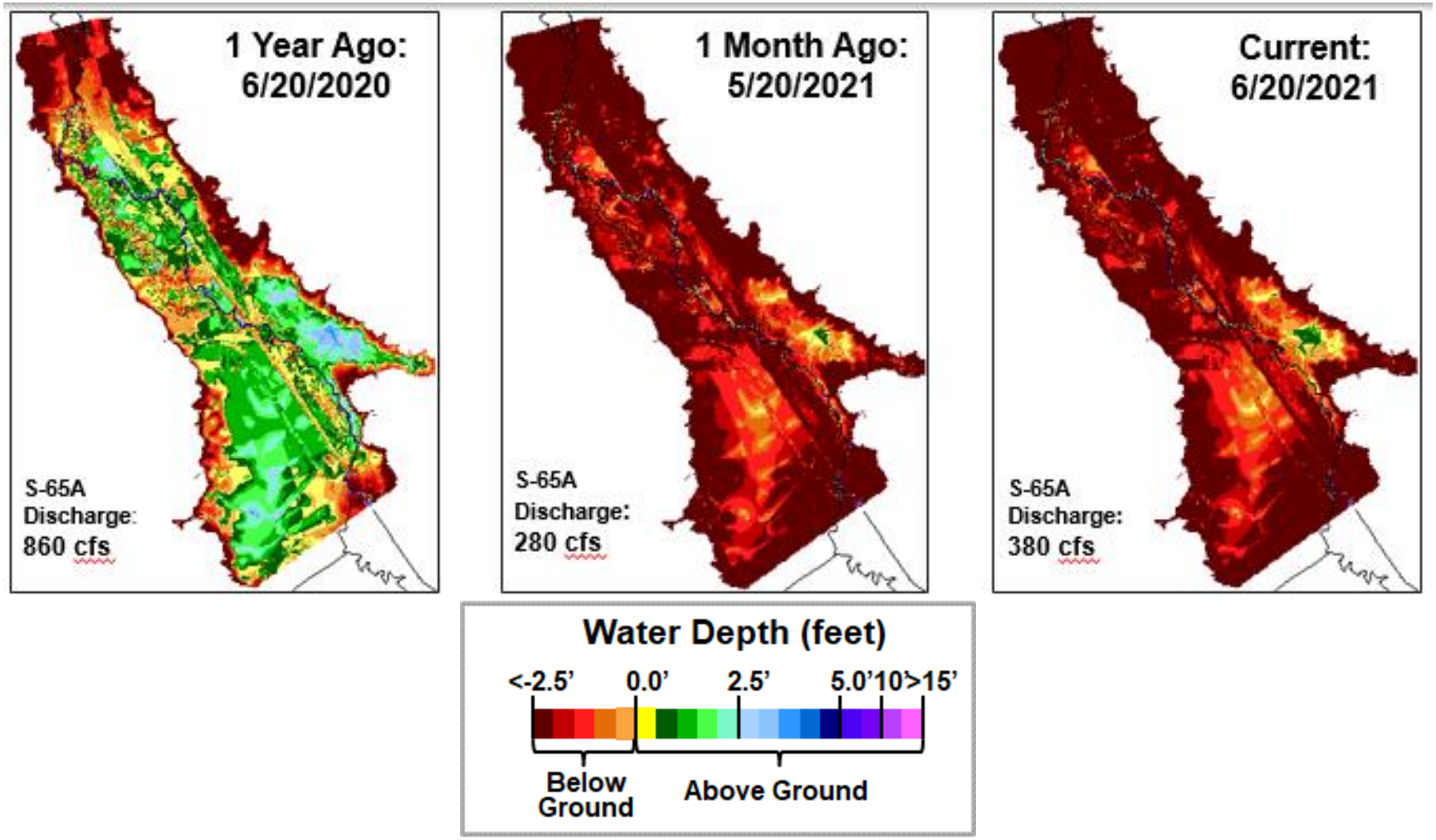



**Figure KB-5.** Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.

## Lake Okeechobee

Lake Okeechobee stage was 12.56 feet NGVD on June 20, 2021, 0.64 feet lower than a month ago, and 0.25 feet higher than one year ago (**Figure LO-1**). Lake stages were above the ecological envelope from August 1, 2020 to March 30, 2021 but are currently following along the upper threshold of the envelope (**Figure LO-2**). The Lake has been within the envelope around a third of the time since January 1, 2021. Lake stage declined slowly from mid-November 2020 through mid-February 2021, before recession rates increased; stage has declined over 2.5 feet since mid-March, averaging a roughly 0.19 feet per week recession rate (**Figure LO-3**). According to NEXRAD, 2.09 inches of rain fell directly on the Lake last week.

Average daily inflows (excluding rainfall) decreased from the previous week, going from 285 cubic feet per second (cfs) to 270 cfs. Outflows (excluding evapotranspiration) decreased, going from 3,486 cfs to 941 cfs. The majority of the inflow came from the Kissimmee River (248 cfs through S-65E and S-65EX1). Releases to the west via S-77 increased from 790 cfs to 809 cfs and releases east via S-308 increased from 11 cfs to 27 cfs. Releases south through the S-350 structures decreased from 2,612 cfs to 66 cfs. Average inflows and outflows through water control structures surrounding the Lake for the previous two weeks (cfs) are shown in **Table LO-1**, as is the resultant Lake elevation change in inches (in) due to each structure's flow for the past week. **Figure LO-4** shows the combined average daily cfs for inflows and outflows for the Lake over the past eight weeks. These data are provisional and are subject to change.

The most recent satellite image (June 20, 2021) from the NOAA cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3 OLCI sensor data showed medium to high bloom potential in northeast, east and central parts of the Lake. Overall, the bloom potential increased on the Lake from the previous week (**Figure LO-5**).

A total of 20 out of 32 water quality samples (or 97%) had microcystin concentrations below the EPA recommended human health recreational standard (8 µg/L) and 34% had toxin concentrations below detection limits (**Table LO-2** and **Figure LO-6**). The highest microcystin concentration (13 µg/L) was detected at POLESOUT1 in the NW part of the Lake. Overall, toxin concentration gradually decreased since early May, especially in the southern part of the Lake. Sixty-three percent of the sites had communities dominated by *Microcystis aeruginosa.* The remaining 37% had mixed communities. The percentage of samples with mixed communities gradually increased since early May. Based on currently available chlorophyll *a* data, 7 out of 25 (or 28%) samples had chlorophyll *a* concentration above the 40 µg/L threshold. The highest value (122 µg/L) was recorded at FEBOUT location in NW part of the Lake. Compared to May surveys, biomass concentration decreased in northern part of the Lake and remained above the threshold in northwestern part of the Lake.

**Table LO-1.** Weekly Lake Okeechobee inflows and outflows (cfs) and as change in elevation (in). Provisional data.

| Inflows | Previous Week's Average Daily Flow (cfs) | This Week's Average Daily Flow (cfs) | Equivalent Depth Week Total (in) |
|---|---|---|---|
| S-65E & S-65EX1 | 253 | 248 | 0.1 |
| S-71 & S-72 | 0 | 5 | 0.0 |
| S-84 & S-84X | 0 | 2 | 0.0 |
| Fisheating Creek | 12 | 6 | 0.0 |
| S-154 | 0 | 0 | 0.0 |
| S-191 | 0 | 0 | 0.0 |
| S-133 P | 0 | 0 | 0.0 |
| S-127 P | 0 | 0 | 0.0 |
| S-129 P | 0 | 0 | 0.0 |
| S-131 P | 20 | 9 | 0.0 |
| S-135 P | 0 | 0 | 0.0 |
| S-2 P | 0 | 0 | 0.0 |
| S-3 P | 0 | 0 | 0.0 |
| S-4 P | 0 | 0 | 0.0 |
| L-8 Backflow | | | |
| Rainfall | 1090 | 5607 | 2.5 |
| **Totals** | **1376** | **5877** | **2.6** |

| Outflows | Previous Week's Average Daily Flow (cfs) | This Week's Average Daily Flow (cfs) | Equivalent Depth Week Total (in) |
|---|---|---|---|
| S-77 | 790 | 809 | 0.4 |
| S-308 | 11 | 27 | 0.0 |
| S-351 | 1144 | 22 | 0.0 |
| S-352 | 481 | 14 | 0.0 |
| S-354 | 987 | 30 | 0.0 |
| L-8 Outflow | 72 | 39 | 0.0 |
| Evapotranspiration | 2914 | 1750 | 0.8 |
| **Totals** | **6399** | **2691** | **1.2** |

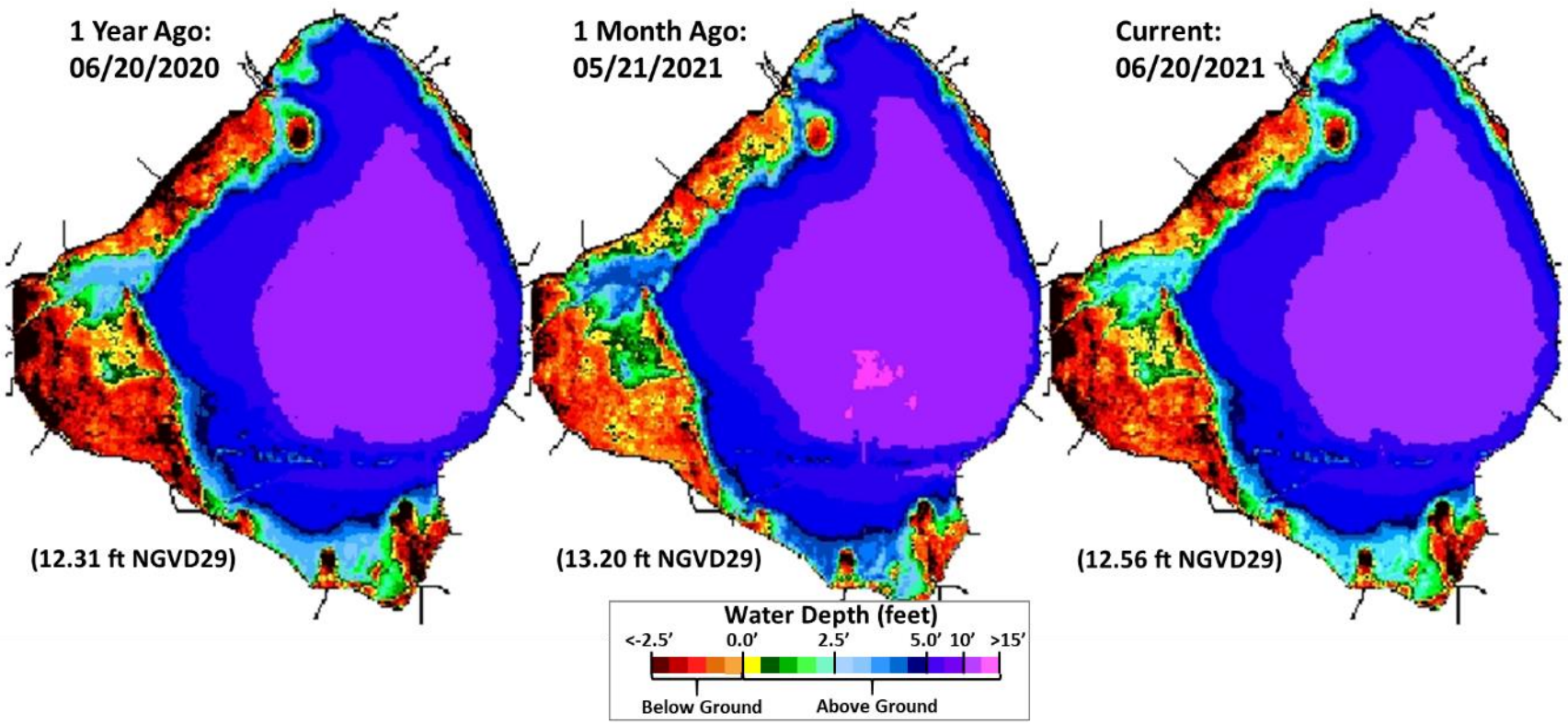



**Figure LO-1.** Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).

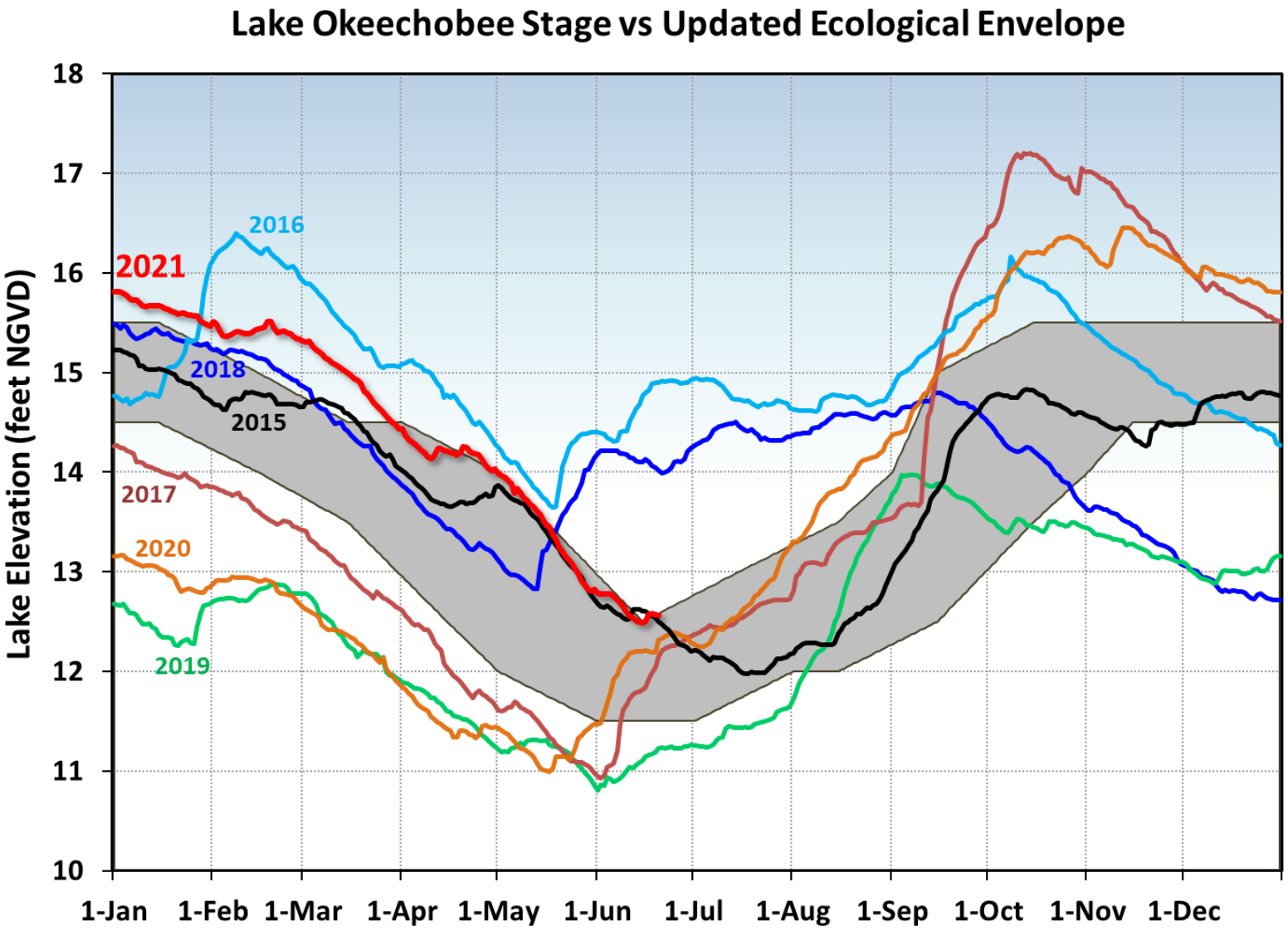



**Figure LO-2.** Select annual stage hydrographs for Lake Okeechobee in comparison to the updated ecological envelope.

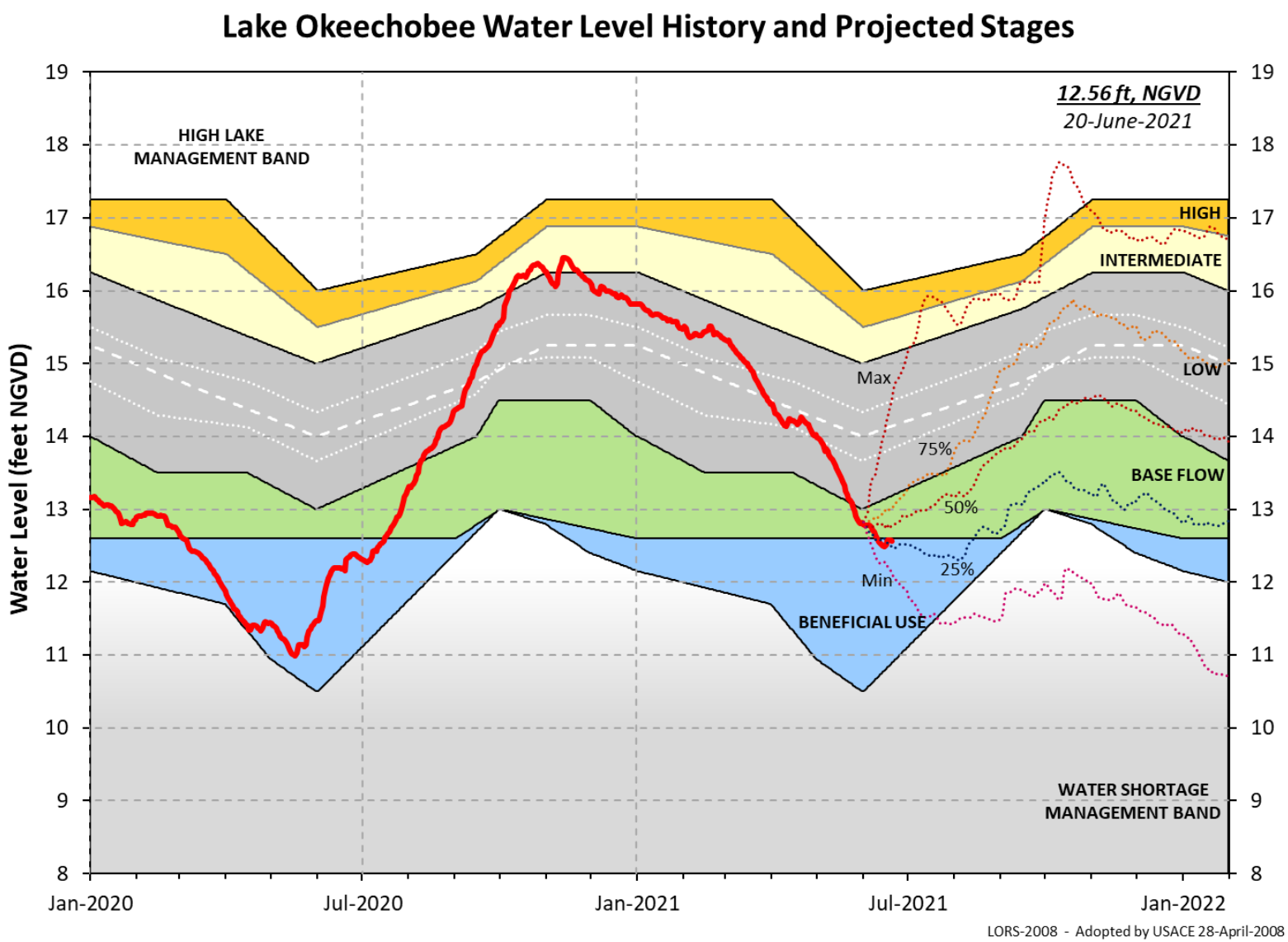



**Figure LO-3.** Recent Lake Okeechobee stages and releases, with projected stages based on a dynamic position analysis.

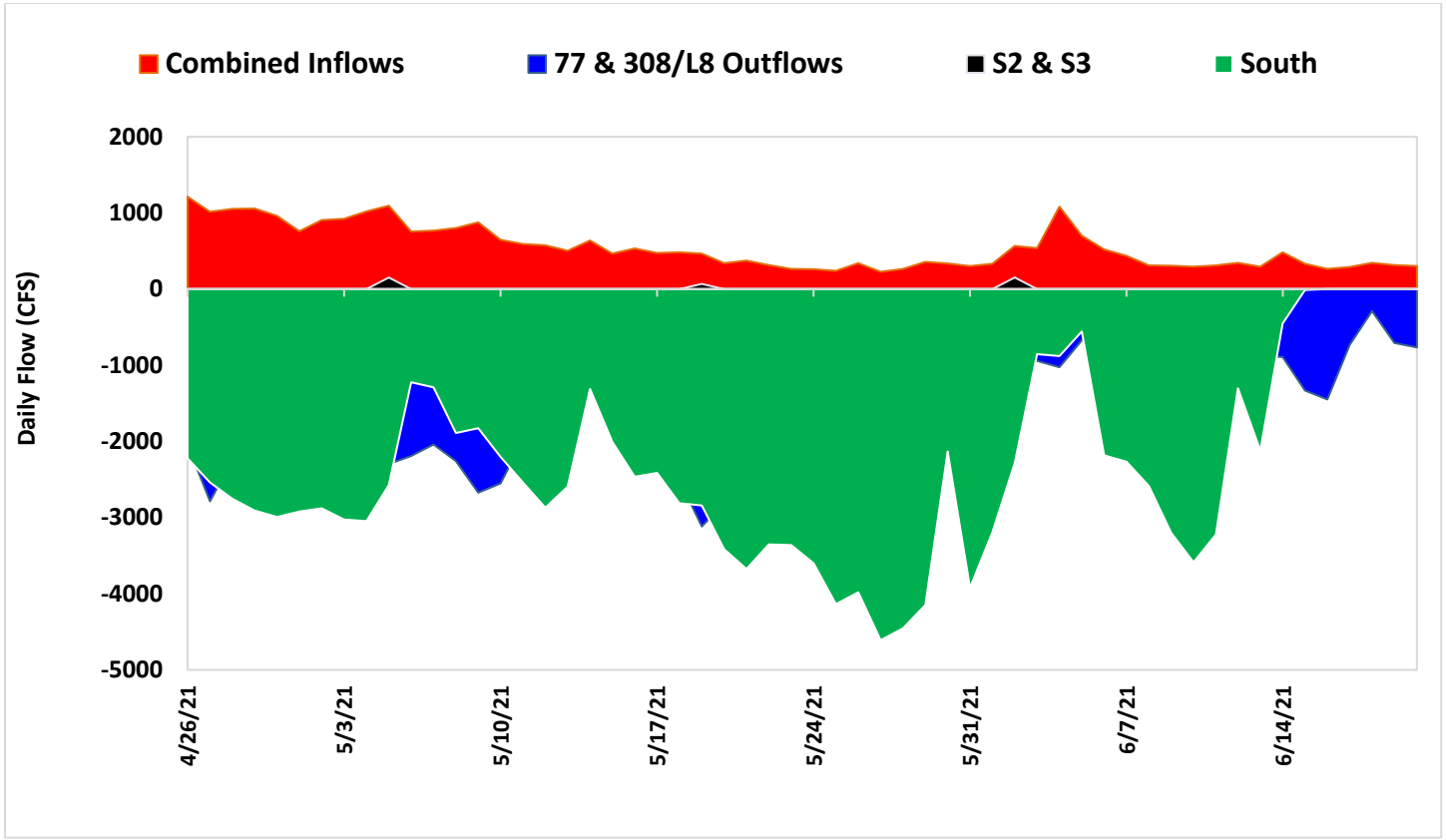



**Figure LO-4.** Major inflows (red) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) are included as inflows. Conversely, flows from Lake Okeechobee into the L-8 Canal are 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 due to lock openings for navigation.

**Table LO-2.** Provisional results of chlorophyll *a* concentrations and cyanobacteria taxa from sampling trips on June 7-9, 2021.

| Station | Chl *a* (µg/L) | Toxin (µg/L) | Taxa | Station | Chl *a* (µg/L) | Toxin (µg/L) | Taxa |
|---|---|---|---|---|---|---|---|
| FEBIN | 96.4 | BDL | mixed | **L001** | 13.7 | 5.2 | *Microcys* |
| FEBOUT | 122.0 | 0.3 | mixed | **L004** | 8.3 | 0.3 | mixed |
| **KISSR0.0** | 31.8 | 7.4 | *Microcys* | **L006** | 6.8 | 0.3 | *Microcys* |
| **L005** | 16.4 | 2.2 | *Microcys* | L007 | P | BDL | mixed |
| LZ2 | 117.0 | 0.7 | mixed | **L008** | 9.3 | 0.5 | mixed |
| **KBARSE** | 46.4 | 2.0 | *Microcys* | LZ30 | 6.3 | BDL | *Microcys* |
| RITTAE2 | P | BDL | mixed | **LZ40** | 8.5 | BDL | *Microcys* |
| PELBAY3 | P | BDL | mixed | CLV10A | 17.2 | BDL | *Microcys* |
| POLE3S | P | BDL | mixed | **NCENTER** | 9.7 | 1.4 | mixed |
| LZ25A | P | BDL | mixed | Outflow Structures | | | |
| **PALMOUT** | 18.5 | 1.5 | *Microcys* | **S308C** | P | BDL | mixed |
| **PALMOUT1** | 5.4 | 1.9 | *Microcys* | **S77** | P | 0.4 | *Microcys* |
| PALMOUT2 | 4.0 | BDL | *Microcys* | | | | |
| **PALMOUT3** | 5.6 | 1 | *Microcys* | | | | |
| **POLESOUT** | 48.1 | 0.6 | *Microcys* | | | | |
| **POLESOUT1** | 57.4 | 13.0 | *Microcys* | | | | |
| **POLESOUT2** | 14.9 | 0.8 | *Microcys* | | | | |
| POLESOUT3 | 10.9 | 2.3 | *Microcys* | | | | |
| EASTSHORE | 15.6 | 0.8 | *Microcys* | | | | |
| NES135 | 30.1 | 1.2 | *Microcys* | | | | |

- SFWMD considers > 40 µg/L chlorophyll *a* (Chl*a*) an algal bloom.
- BDL: below detectable limit of 0.25 µg/L
- ND: no dominant taxa
- P: pending
- NS: not sampled
- Bold font: crew observed possible blue-green algae
- Chl*a* analyzed by SFWMD
- Toxin and taxa analyzed by FDEP

*Cylindro: Cylindrospermopsis*
*Planktal: Planktalyngbya*
*Dolicho: Dolichospermum*
*Microcys: Microcystis*

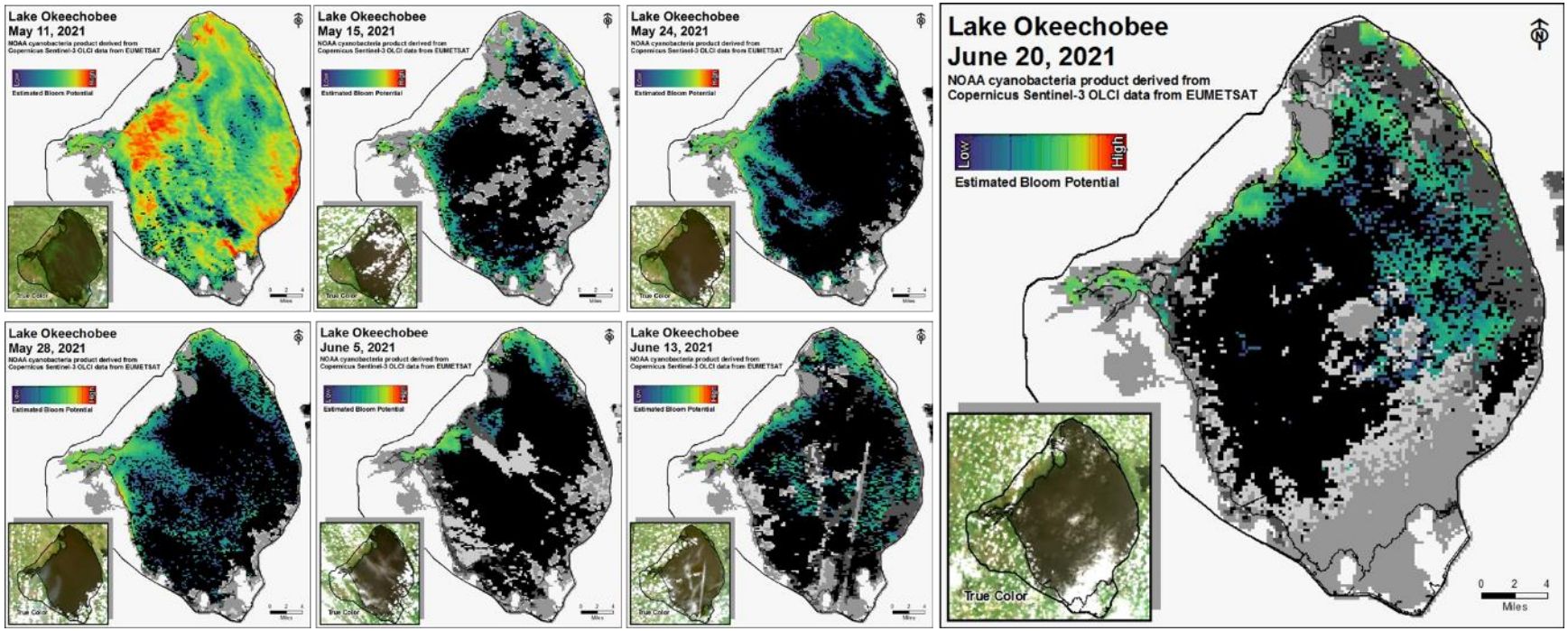



**Figure LO-5.** Cyanobacteria bloom potential based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

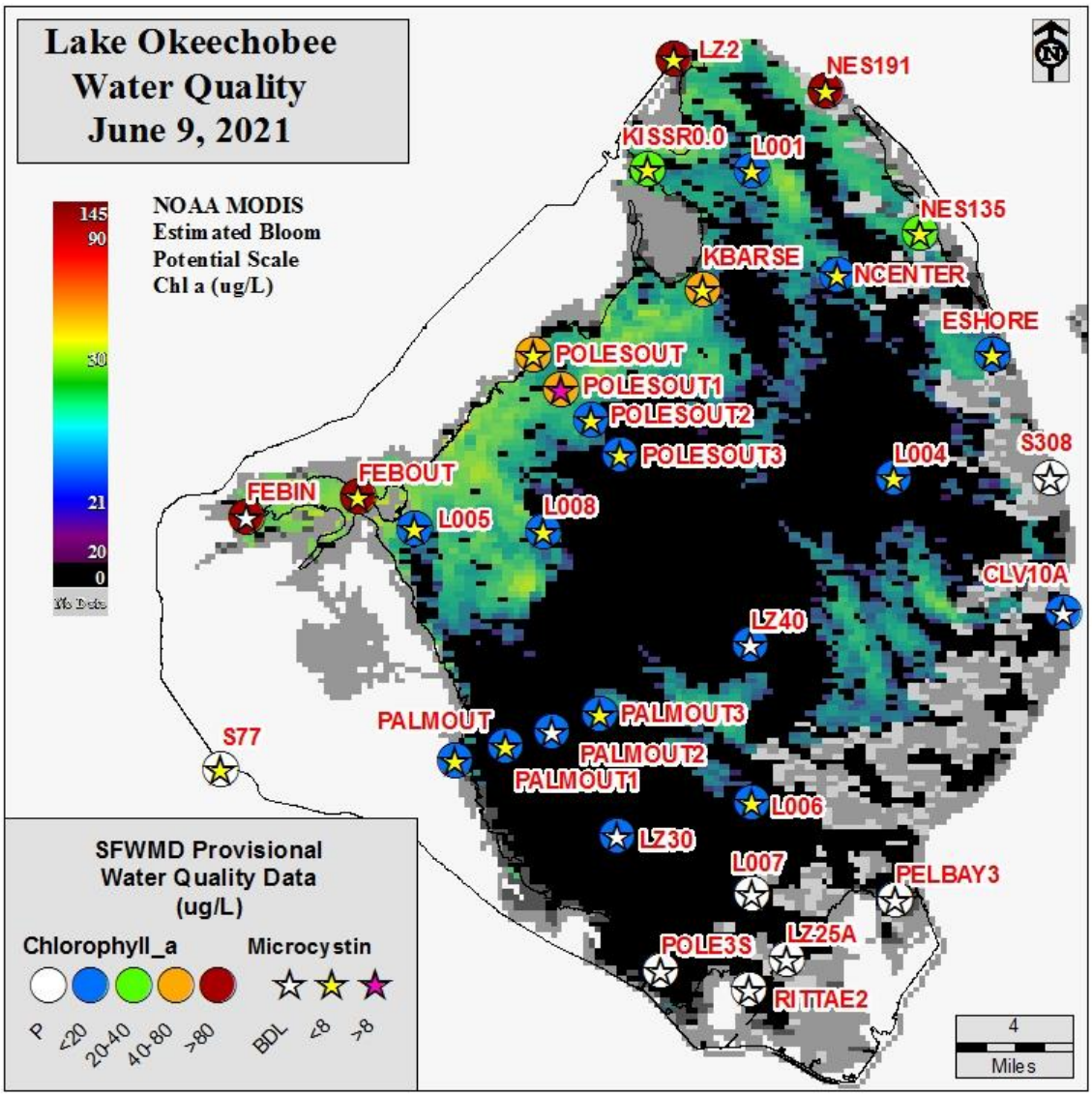



**Figure LO-6.** Expanded monitoring network and provisional results from samples collected June 7-9, 2021

## Estuaries

### *St. Lucie Estuary*

Over the past week, mean total inflow to the St. Lucie Estuary was approximately 778 cfs (**Figures ES-1** and **ES-2**) and the previous 30-day mean inflow was approximately 364 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-2**.

Over the past week, mean surface salinity decreased at all sites in the estuary (**Table ES-1** and **Figure ES-3**). The seven-day moving average of the surface and bottom salinities at the US1 Bridge was 23.7. Salinity conditions in the middle estuary were estimated to be within the good range for adult eastern oysters (**Figure ES-4**).

### *Caloosahatchee River Estuary*

Over the past week, mean total inflow to the Caloosahatchee River Estuary was approximately 1,194 cfs (**Figures ES-5** and **ES-6**) and the previous 30-day mean inflow was approximately 1,266 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-6**.

Over the past week, salinities increased at Cape Coral and decreased at Shell Point and Sanibel (**Table ES-2; Figures ES-7** and **ES-8**). The seven-day mean surface salinities (**Table ES-2**) were in the good range (0-10) for tape grass at Val I-75 and at Ft. Myers. The seven-day mean surface salinity values were within the good range for adult eastern oysters at Cape Coral and in the fair range at Shell Point and Sanibel (**Figure ES-9**).

Surface salinity at Val I-75 was forecasted for the next two weeks using an autoregression model (Qiu and Wan, 2013[1]) coupled with a linear reservoir model for the tidal basin. Model scenarios included pulse releases at S-79 ranging from 0 to 1500 cfs and steady releases at 2,000 cfs, with estimated tidal basin inflows of 88 cfs. Model results from all scenarios predict daily salinity to be 5.2 or lower, and the 30-day moving average surface salinity to be 2.2 or lower at Val I-75 at the end of the two-week period (**Table ES-3** and **Figure ES-10**). This keeps predicted salinities at Val I-75 within the LORS 2008 salinity range (0.0-5.0).

### *Red Tide*

The Florida Fish and Wildlife Research Institute reported on June 18, 2021, that *Karenia brevis*, the Florida red tide dinoflagellate, was observed at very low to medium concentrations in and offshore of Charlotte County, and background to very low

[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.

concentrations in and offshore of Lee and Collier Counties. On the east coast, red tide samples were not collected from any District counties.

***Water Management Recommendations***

Lake stage is in the Beneficial Use Sub-Band. Tributary conditions are Dry. The LORS2008 release guidance suggests no releases to the Caloosahatchee River Estuary or the St. Lucie Estuary.

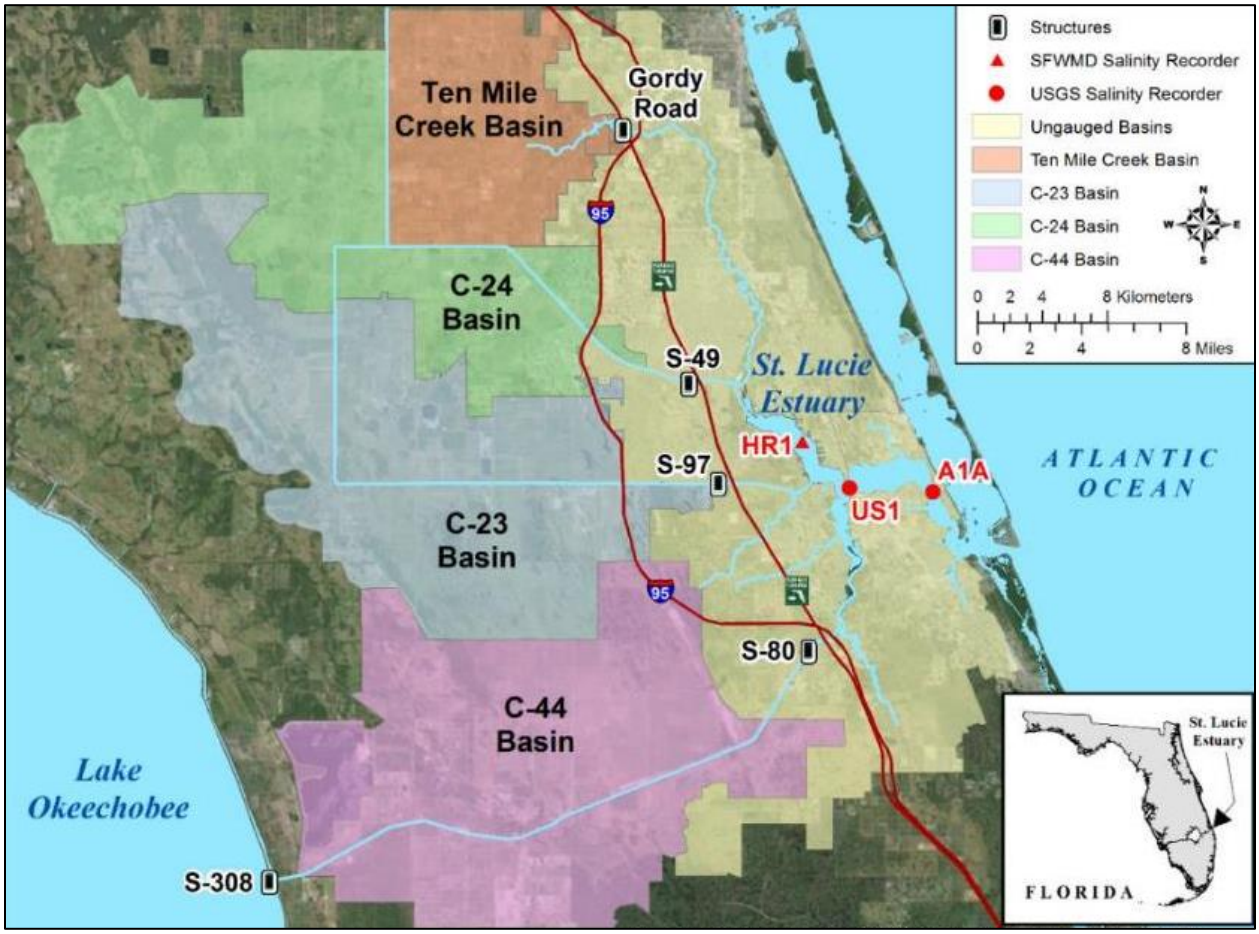



**Figure ES-1.** Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

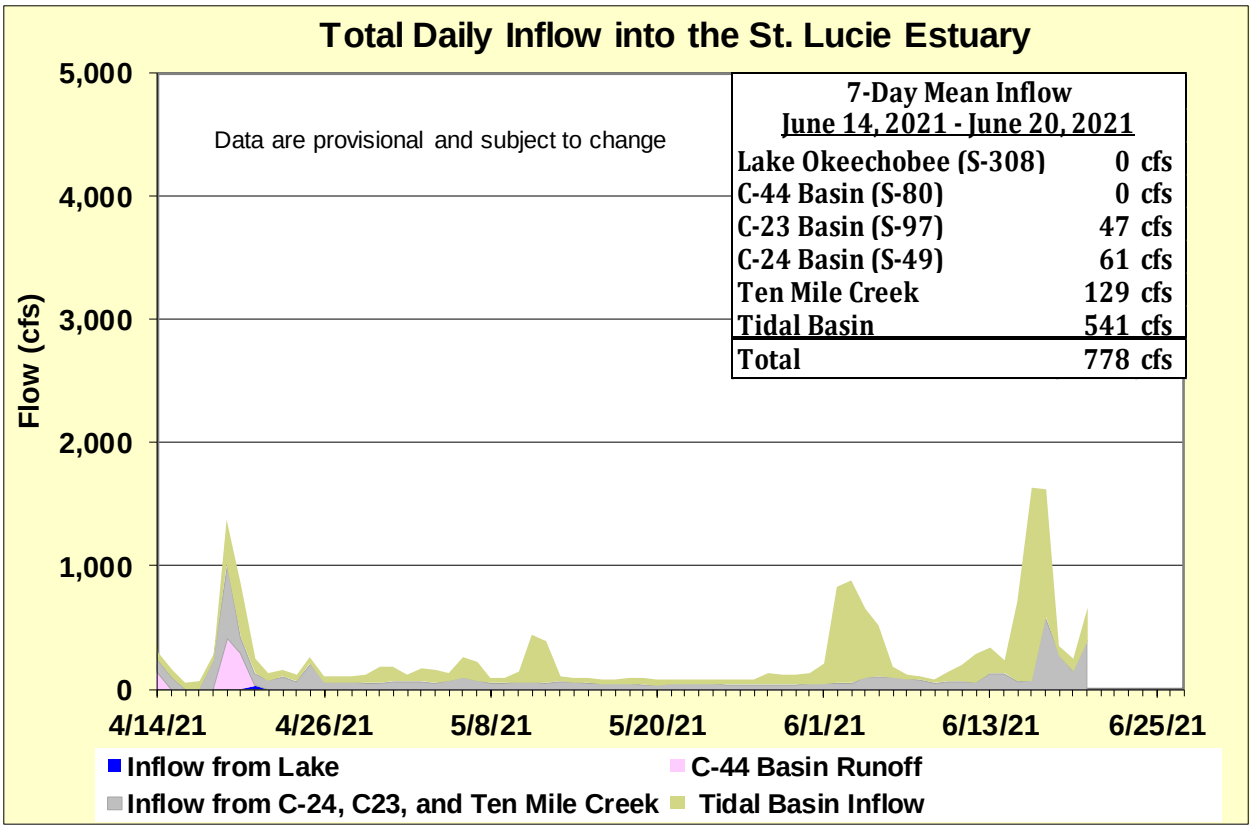



**Figure ES-2.** Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

**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 preferred salinity range for adult eastern oysters (*Crassostrea virginica*) in the middle estuary. Data are provisional.

| Sampling Site | Surface | Bottom | Envelope |
|---|---|---|---|
| HR1 (Nork Fork) | **15.7** (19.2) | **22.0** (21.4) | NA [a] |
| US1 Bridge | **23.1** (24.3) | **24.3** (24.9) | 10.0 – 26.0 |
| A1A Bridge | **29.4** (30.6) | **30.2** (31.1) | NA [a] |

a. The envelope is not applicable.

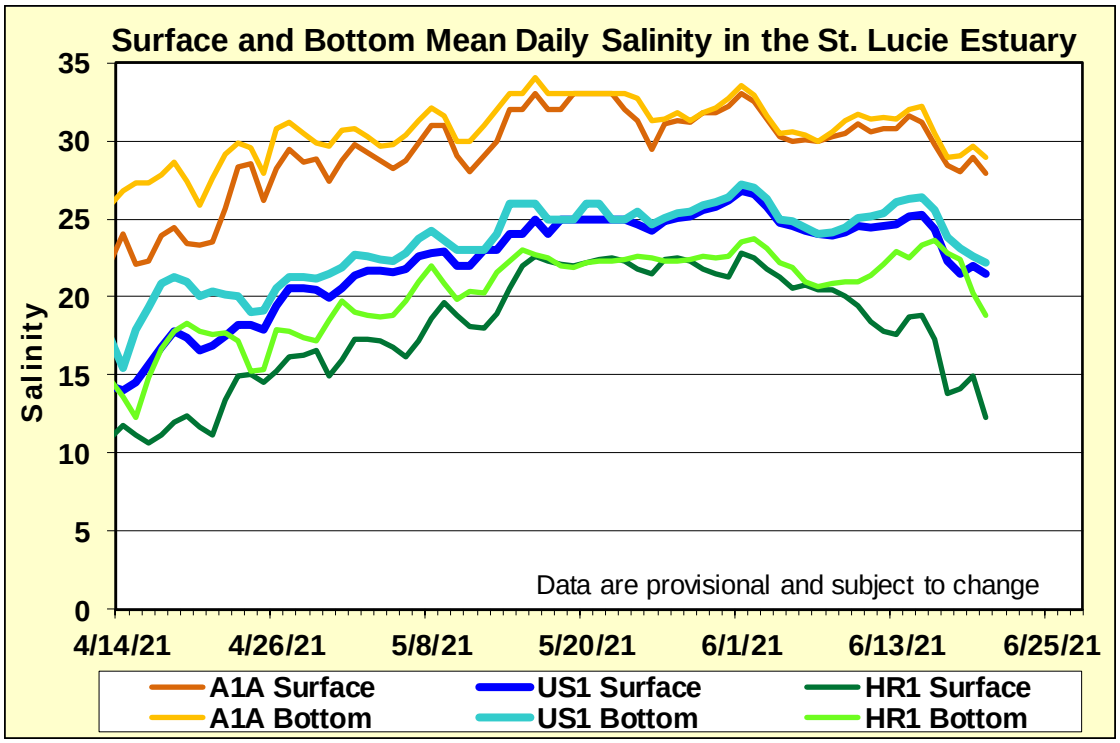



**Figure ES-3.** Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.

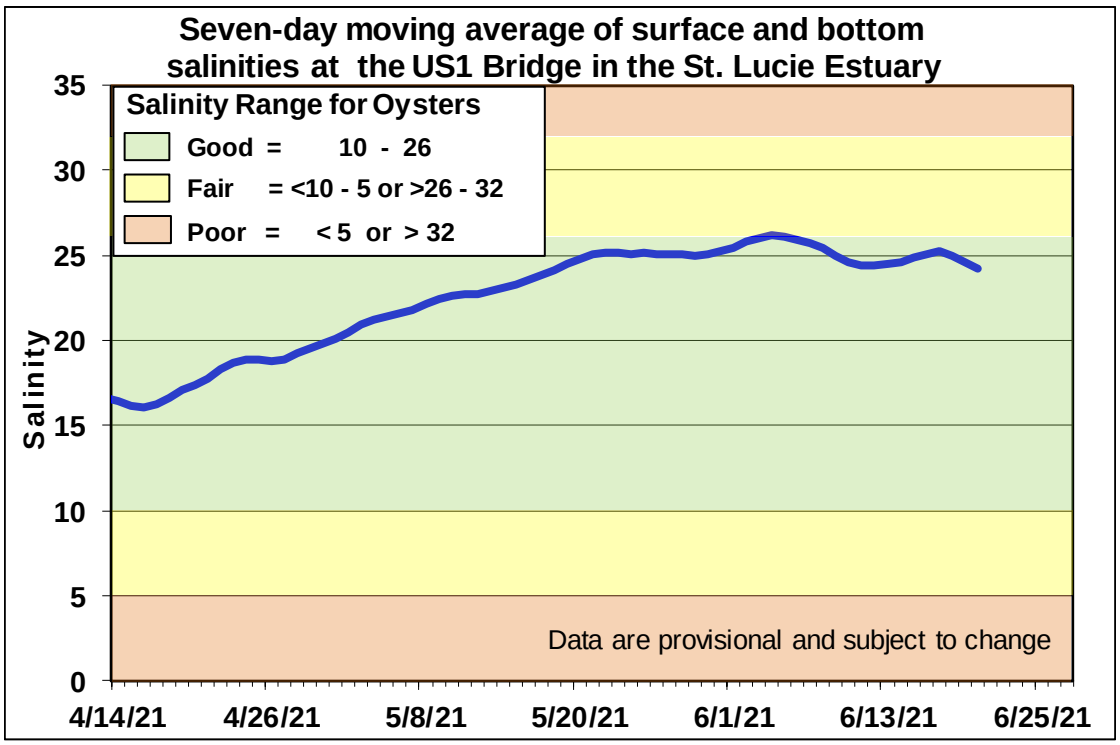



**Figure ES-4.** Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.

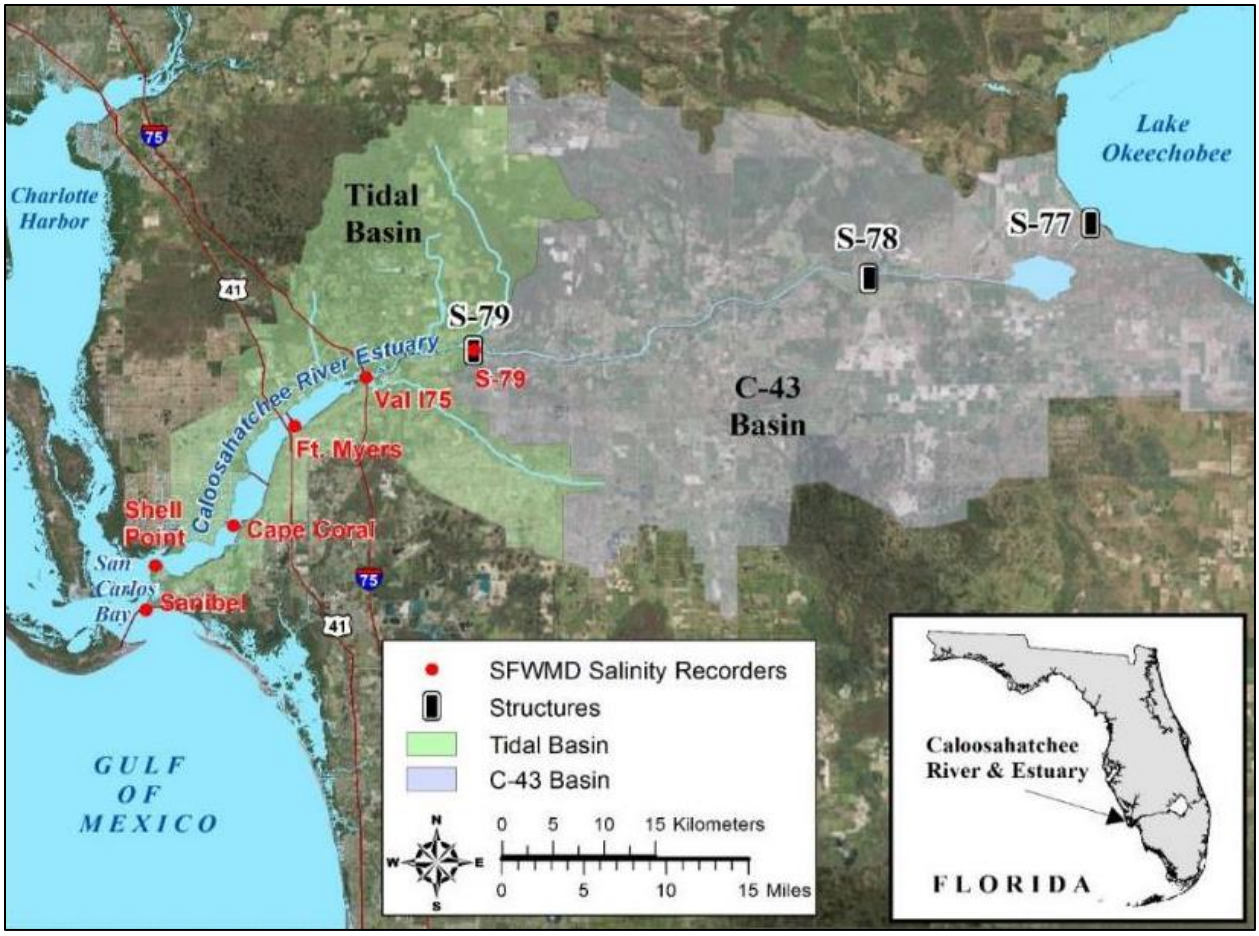



**Figure ES-5.** Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.

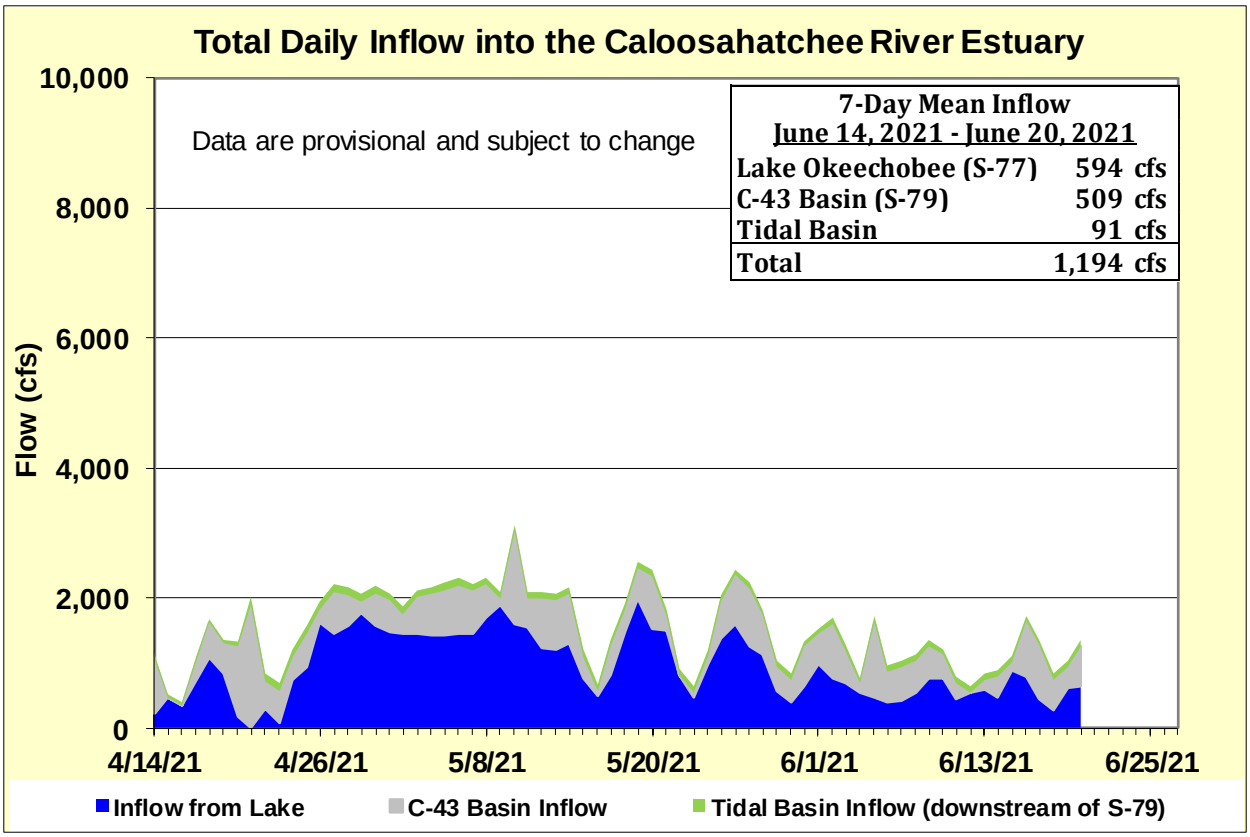



**Figure ES-6.** Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

**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 at I-75 is for the protection of tape grass in the upper estuary and the envelope in the lower estuary is the preferred salinity range for adult eastern oysters (*Crassostrea virginica*). Data are provisional.

| Sampling Site | Surface | Bottom | Envelope |
|---|---|---|---|
| S-79 (Franklin Lock) | **0.5** (1.5) | **0.5** (1.5) | NA [a] |
| Val I-75 | **1.4** (2.3) | **1.9** (2.7) | 0.0 – 5.0 [b] |
| Fort Myers Yacht Basin | **6.9** (7.5) | **7.8** (8.0) | NA [a] |
| Cape Coral | **15.7** (15.5) | **17.7** (17.4) | 10.0 – 30.0 |
| Shell Point | **29.8** (30.7) | **30.4** (31.3) | 10.0 – 30.0 |
| Sanibel | **33.7** (34.4) | **33.0** (34.9) | 10.0 – 30.0 |

a. The envelope is not applicable.
b. The envelope is based on the predicted 30-day mean for the next two weeks.

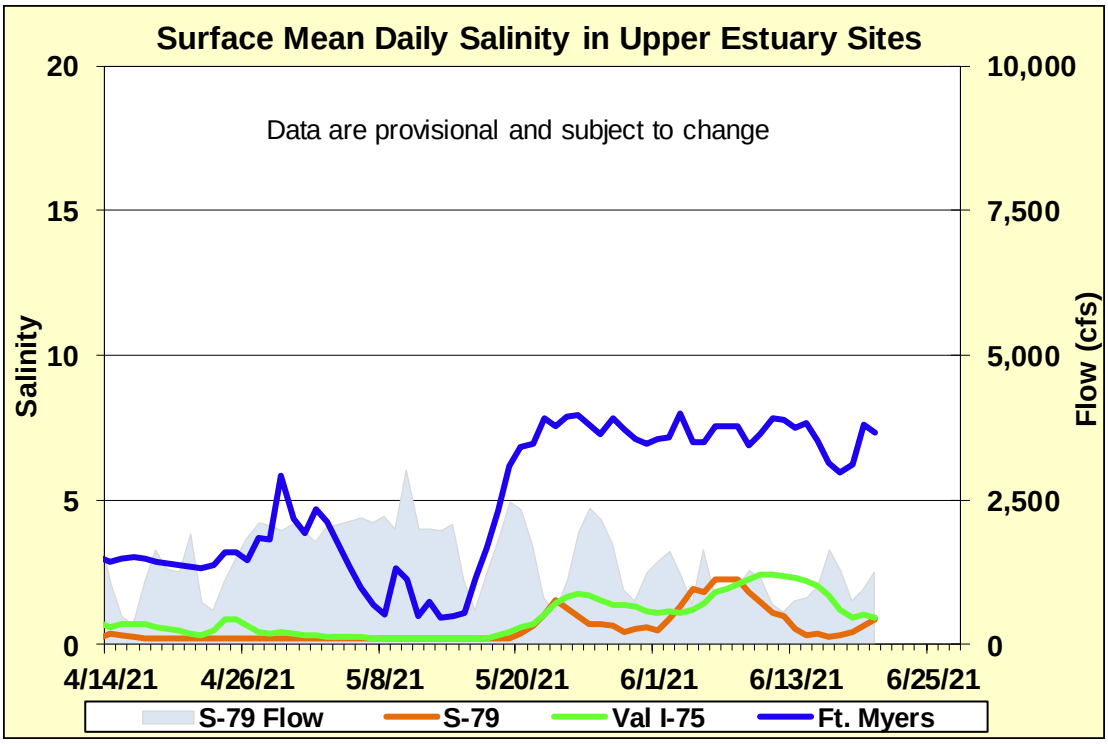



**Figure ES-7.** Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

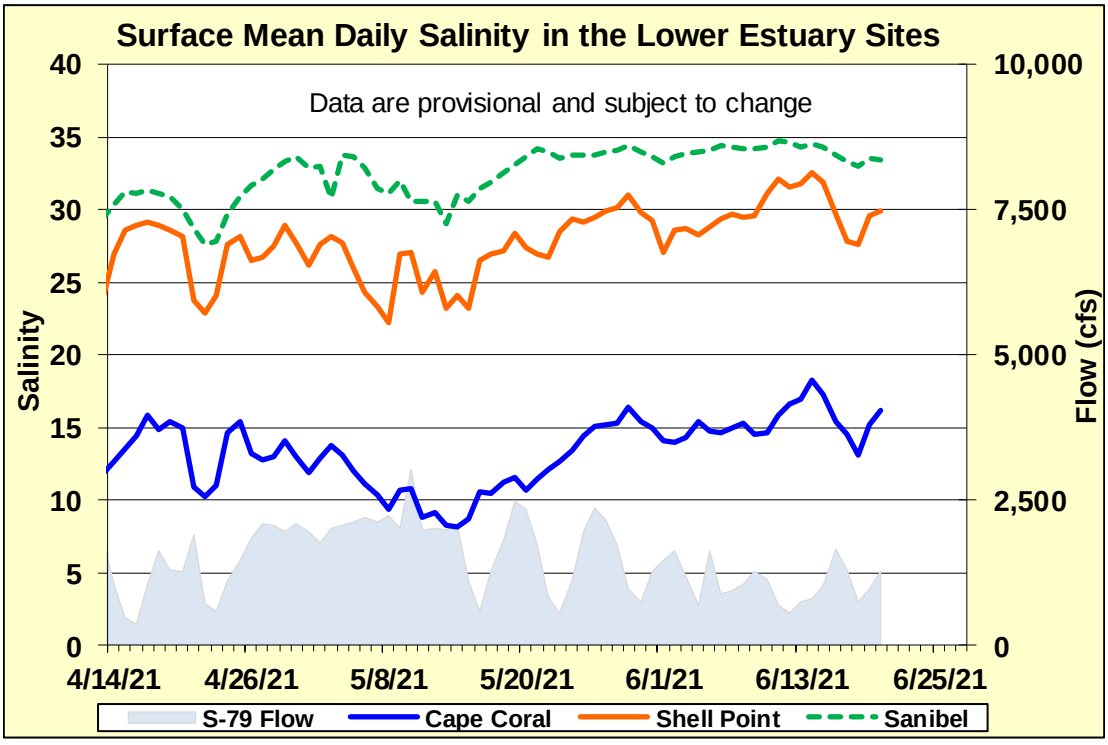



**Figure ES-8.** Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.

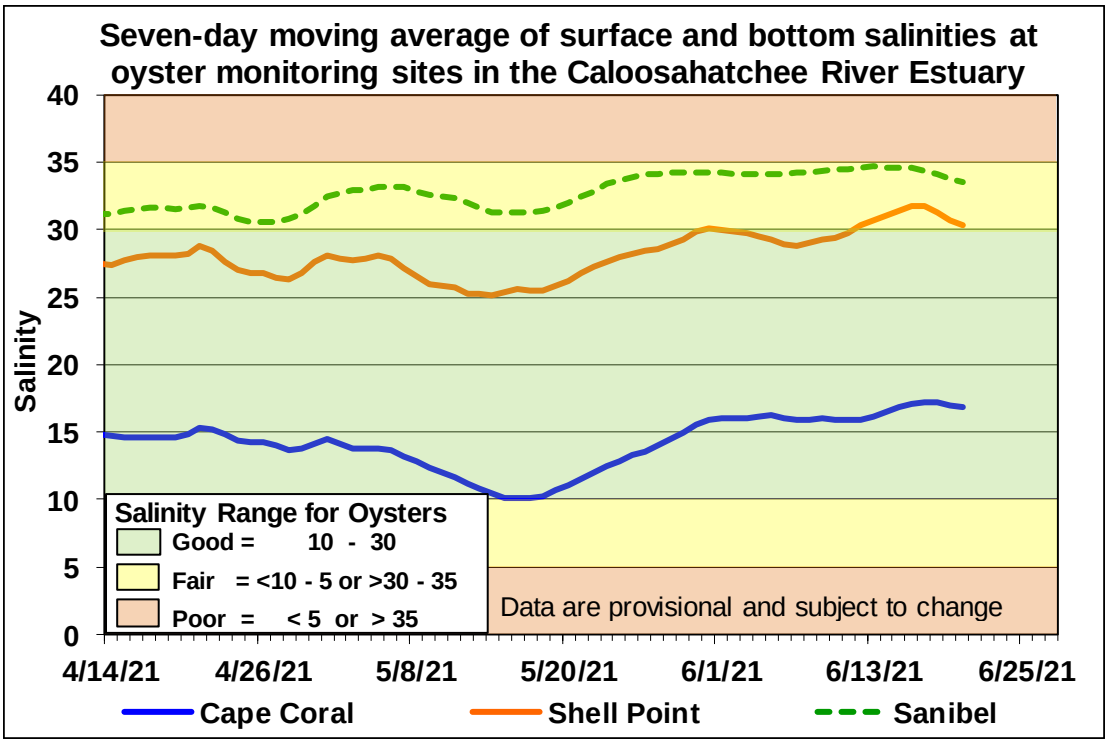



**Figure ES-9.** Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.

**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 | 88 | 5.2 | 2.2 |
| B | 450 | 88 | 2.8 | 1.9 |
| C | 800 | 88 | 1.6 | 1.6 |
| D | 1000 | 88 | 1.3 | 1.5 |
| E | 1500 | 88 | 0.5 | 1.2 |
| F | 2000 | 88 | 0.3 | 1.1 |

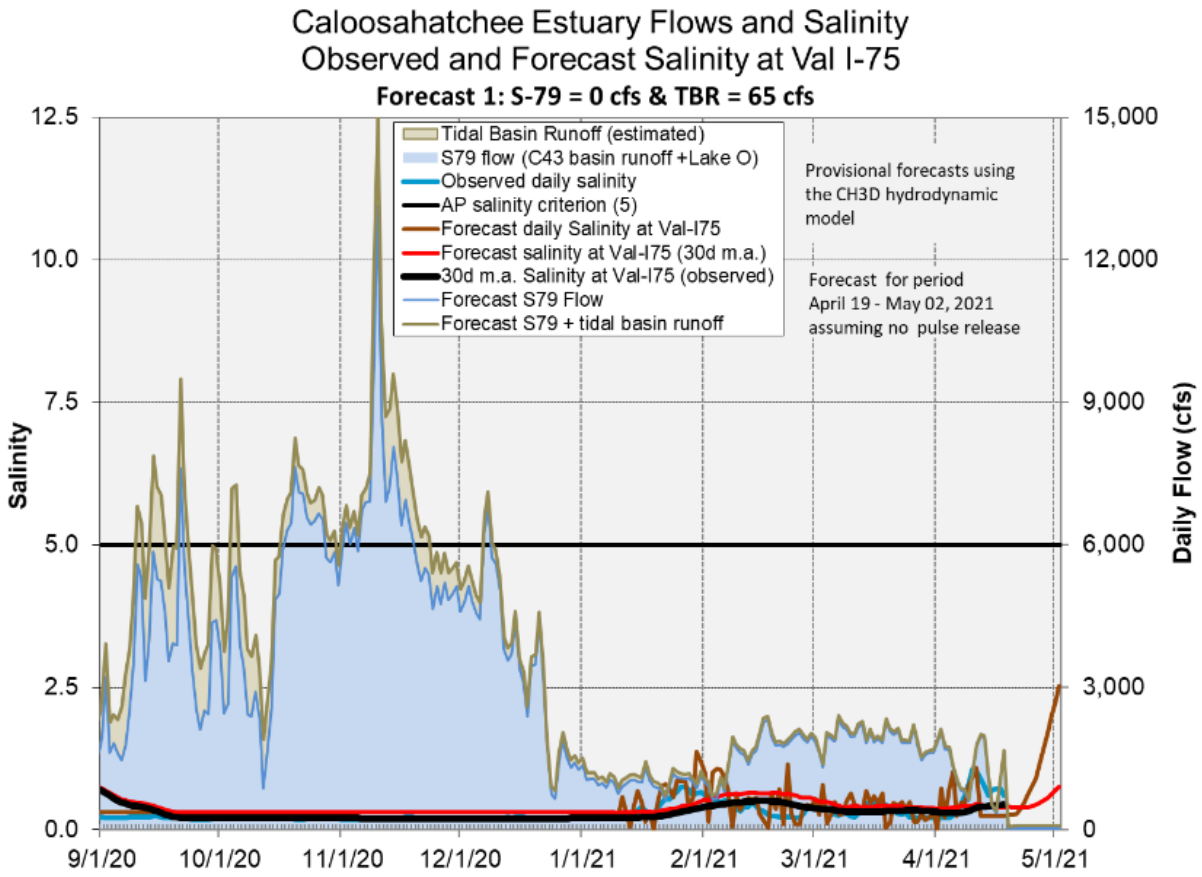



**Figure ES-10.** Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.

## Stormwater Treatment Areas

**STA-1E:** STA-1E Western Flow-way is offline for the Restoration Strategies project to fill and grade Cells 5 and 7. Operational restrictions are in place in STA-1E Central Flow-way for vegetation management activities. Online treatment cells are at or above target stage. Vegetation in these cells is highly stressed. The 365-day phosphorus loading rates (PLR) for these flow-ways are very high (**Figure S-1**).

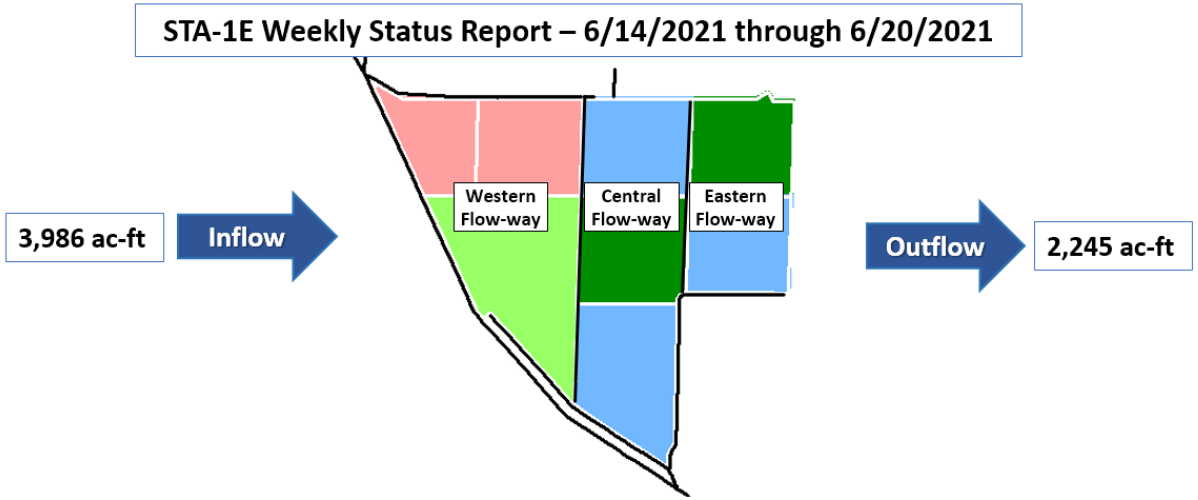
**STA-1W:** Operational restrictions are in place in STA-1W Western, Eastern, and Northern Flow-ways due to construction activities. All three flow-ways contain nests of Migratory Bird Treaty Act protected species. Treatment cells are at or below target stage. Vegetation in all flow-ways is highly stressed. The 365-day PLRs for all flow-ways are high (**Figure S-2**).

**STA-2:** Operational restrictions are in place in STA-2 Flow-ways 3 and 4 for vegetation management activities and in Flow-way 2 for construction activities. Most treatment cells are at or above target stage. Vegetation in Flow-ways 1, 2 and 3 is stressed, and in Flow-ways 4 and 5 is highly stressed. The 365-day PLRs for the flow-ways are at or below 1.0 $g/m^2$/year except Flow-way 1 which is high and Flow-way 2 which is very high (**Figure S-3)**.

**STA-3/4:** STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown. Online treatment cells are above target stage. Vegetation in the Eastern and Central Flow-ways is highly stressed and in the Western Flow-way is stressed. The 365-day PLRs for all flow-ways are below 1.0 $g/m^2$/year (**Figure S-4**).

**STA-5/6:** Operational restrictions are in place in STA-5/6 Flow-ways 2 and 3 following the Restoration Strategies project to grade non-effective treatment areas. Flow-way 3 contains nests of a Migratory Bird Treaty Act protected species. Some treatment cells are at or near target stage while several cells are drying out. The 365-day PLRs for most flow-ways are near 1.0 $g/m^2$/year. All treatment cells have highly stressed vegetation conditions, except for Flow-ways 7 and 8 which are healthy (**Figure S-5** and **S-6**).

For definitions on STA operational language see glossary following figures.




## STA-1E Flow-Way Status

| Flow-Way | Vegetation Status (Healthy ----- Stressed) | 365-day P Loading Rate (below 1.0 g P /m²/yr is optimal) | Online / Offline / Restrictions |
|---|---|---|---|
| Eastern | | 1.0 | Online |
| Central | | 1.0 | Vegetation Rehab |
| Western | Offline, construction activities starting 11/01/2019 | | |

As of 6/20/2021

Stage Based: Relative to Target Stage (TS)

- Deep Water Level (> 2.8' above TS)
- High Water Level (1.5' – 2.8' above TS)
- 0.2' – 1.5' above TS
- Target Stage (TS +/- 0.2')
- Low Water Level (<0.2' below TS)

Depth / Area Based: Percent of Area Dry

- 0-25% Dry
- 25-50% Dry
- 50-75% Dry
- 75-100% Dry

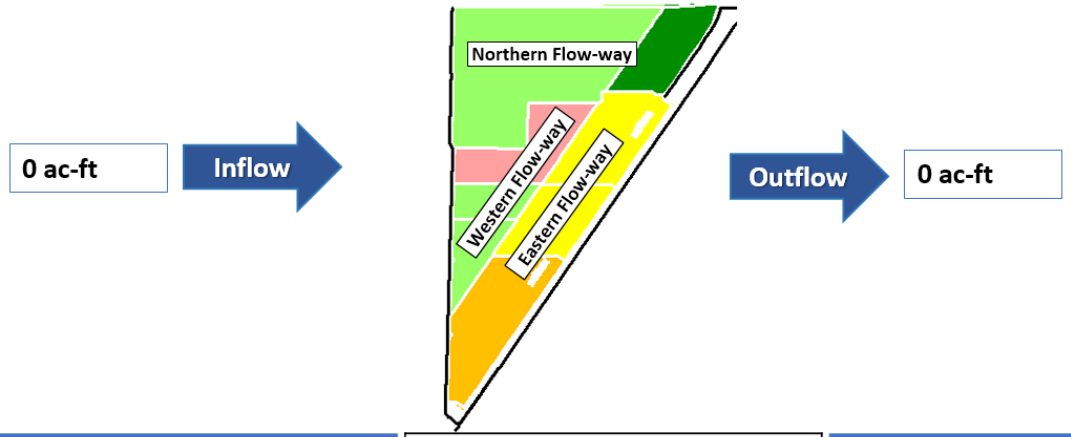
## STA-1E Flow & Phosphorus Concentration

| | 7-day | 28-day | 365-day |
|---|---|---|---|
| Total Inflow, ac-ft | 3,986 | 8,339 | 292,432 |
| --Lake Inflow, ac-ft | 200 | N/A | 26,000 |
| Total Outflow, ac-ft | 2,245 | 5,288 | 251,307 |
| Inflow Conc., ppb | 129 | 141 | 137 |
| Outflow Conc., ppb | 25 | 30 | 40 |

Includes Preliminary Data

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

## STA-1W Weekly Status Report – 6/14/2021 through 6/20/2021




### STA-1W 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 |
|---|---|---|---|
| Northern | | 1.0 | Construction / Avian Nesting |
| Western | | 1.0 | Construction / Avian Nesting |
| Eastern | | 1.0 | Construction/ Avian Nesting |

As of 6/20/2021

Stage Based: Relative to Target Stage (TS)

- Deep Water Level (> 2.8' above TS)
- High Water Level (1.5' – 2.8' above TS)
- 0.2' – 1.5' above TS
- Target Stage (TS +/- 0.2')
- Low Water Level (<0.2' below TS)

Depth / Area Based: Percent of Area Dry

- 0-25% Dry
- 25-50% Dry
- 50-75% Dry
- 75-100% Dry

### STA-1W Flow & Phosphorus Concentration

| | 7-day | 28-day | 365-day |
|---|---|---|---|
| Total Inflow, ac-ft | 0 | 578 | 134,595 |
| --Lake Inflow, ac-ft | 0 | N/A | 8,200 |
| Total Outflow, ac-ft | 0 | 0 | 149,030 |
| Inflow Conc., ppb | N/A | 148 | 248 |
| Outflow Conc., ppb | N/A | N/A | 41 |

Includes Preliminary Data

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

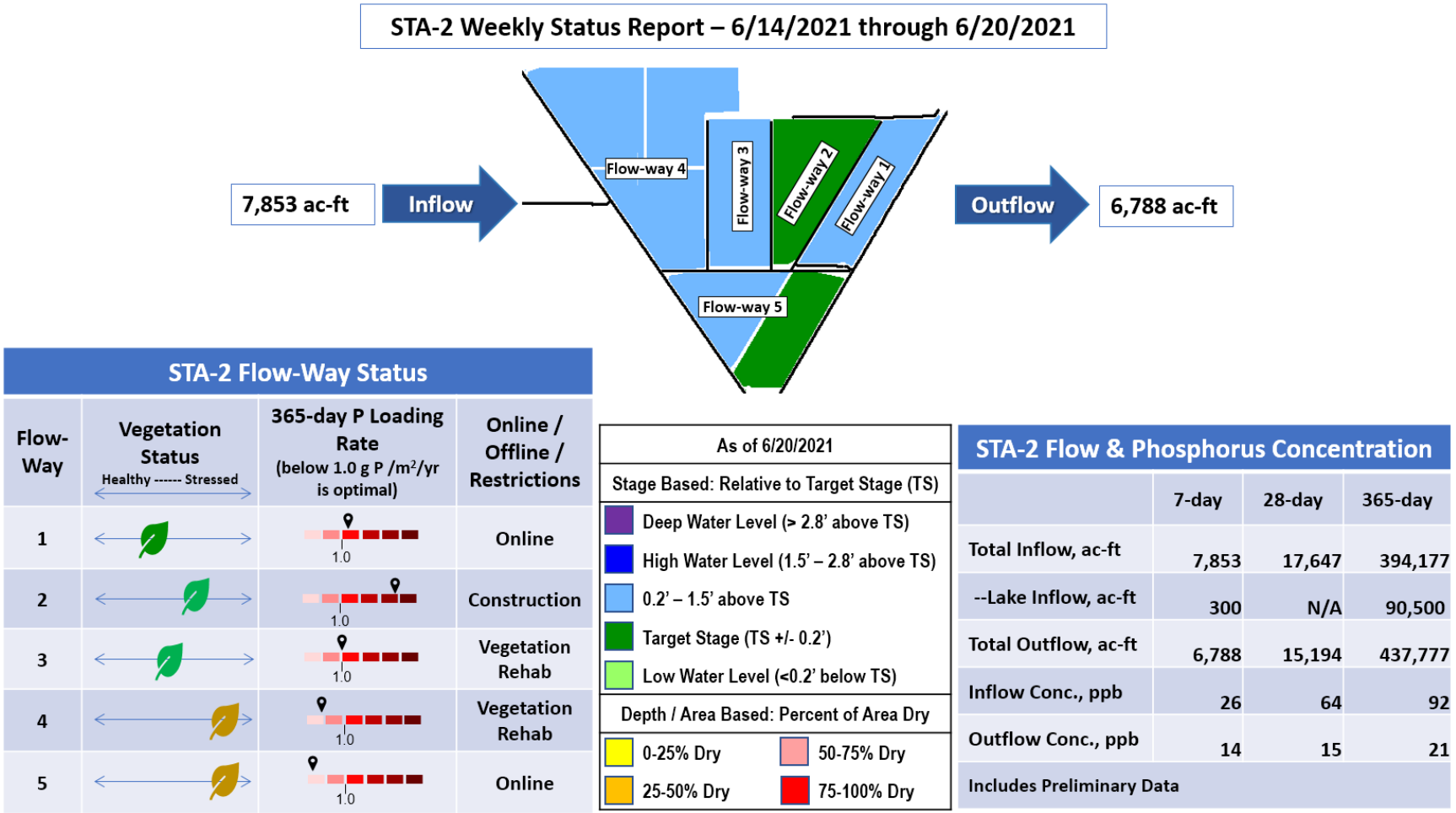
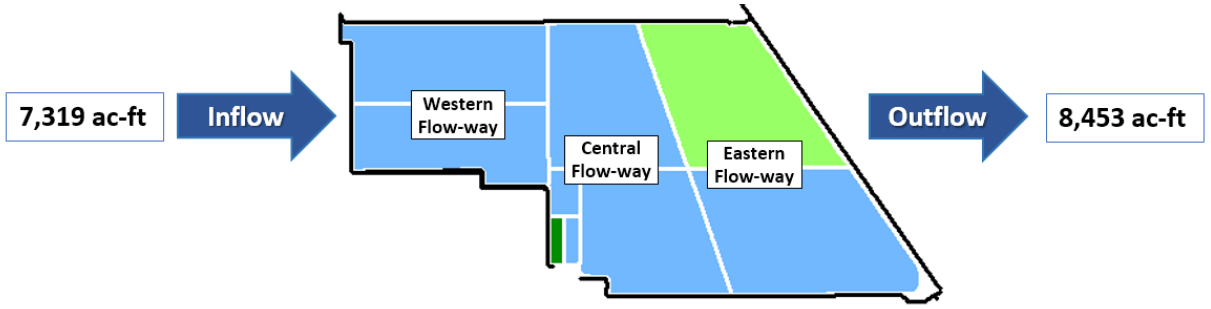



**Figure S-3.** STA-2 Weekly Status Report.

## STA-3/4 Weekly Status Report – 6/14/2021 through 6/20/2021




### STA-3/4 Flow-Way Status

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

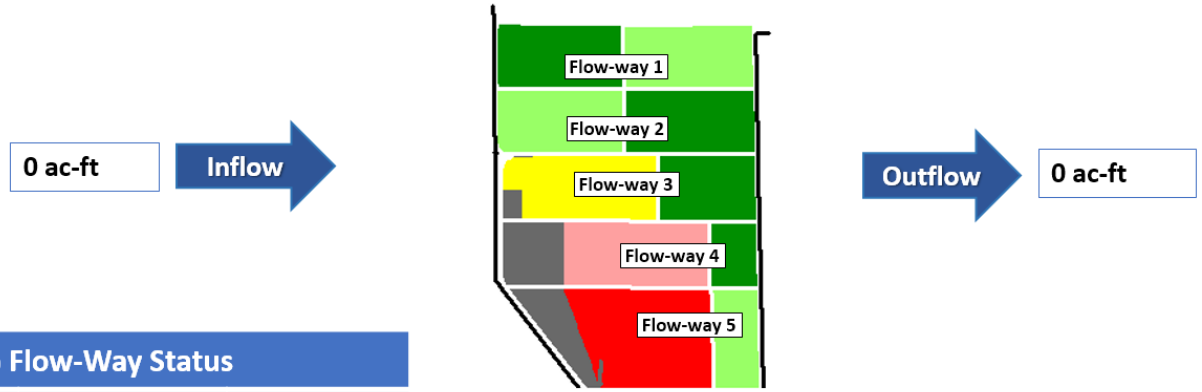
| As of 6/20/2021 | |
|---|---|
| Stage Based: Relative to Target Stage (TS) | |
| Deep Water Level (> 2.8' above TS) | |
| High Water Level (1.5' – 2.8' above TS) | |
| 0.2' – 1.5' above TS | |
| Target Stage (TS +/- 0.2') | |
| Low Water Level (<0.2' below TS) | |
| Depth / Area Based: Percent of Area Dry | |
| 0-25% Dry | 50-75% Dry |
| 25-50% Dry | 75-100% Dry |

### STA-3/4 Flow & Phosphorus Concentration

| | 7-day | 28-day | 365-day |
|---|---|---|---|
| Total Inflow, ac-ft | 7,319 | 20,946 | 512,475 |
| --Lake Inflow, ac-ft | 400 | N/A | 62,200 |
| Total Outflow, ac-ft | 8,453 | 19,353 | 488,230 |
| Inflow Conc., ppb | 98 | 97 | 55 |
| Outflow Conc., ppb | 21 | 18 | 12 |
| Includes Preliminary Data | | | |

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

## STA-5/6 Weekly Status Report – 6/14/2021 through 6/20/2021




### 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 | | N/A | Post-construction |
| 3 | | N/A | Post-construction & Avian Nesting |
| 4 | | 1.0 | Online |
| 5 | | 1.0 | Online |

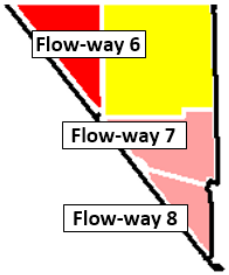
| As of 6/20/2021 | |
|---|---|
| Stage Based: Relative to Target Stage (TS) | |
| Deep Water Level (> 2.8' above TS) | |
| High Water Level (1.5' – 2.8' above TS) | |
| 0.2' – 1.5' above TS | |
| Target Stage (TS +/- 0.2') | |
| Low Water Level (<0.2' below TS) | |
| Depth / Area Based: Percent of Area Dry | |
| 0-25% Dry | 50-75% Dry |
| 25-50% Dry | 75-100% Dry |

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

| | 7-day | 28-day | 365-day |
|---|---|---|---|
| Total Inflow, ac-ft | 0 | 0 | 119,313 |
| --Lake Inflow, ac-ft | N/A | N/A | N/A |
| Total Outflow, ac-ft | 0 | 0 | 149,924 |
| Inflow Conc., ppb | N/A | N/A | 275 |
| Outflow Conc., ppb | N/A | N/A | 77 |
| Includes Preliminary Data | | | |

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

## STA-5/6 Weekly Status Report – 6/14/2021 through 6/20/2021




### STA-5/6 Flow-Way Status

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

| As of 6/20/2021 | |
|---|---|
| Stage Based: Relative to Target Stage (TS) | |
| Deep Water Level (> 2.8' above TS) | |
| High Water Level (1.5' – 2.8' above TS) | |
| 0.2' – 1.5' above TS | |
| Target Stage (TS +/- 0.2') | |
| Low Water Level (<0.2' below TS) | |
| Depth / Area Based: Percent of Area Dry | |
| 0-25% Dry | 50-75% Dry |
| 25-50% Dry | 75-100% Dry |

**Figure S-6.** STA-5/6 Weekly Status Report (Flow-ways 6 – 8).

**Basic Concepts and Definitions for STA Weekly Status Report**

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

## Everglades

### *Water Conservation Area Regulation Schedules*

WCA-1: Stage at the 1-8C Gauge continue upwards last week. On Sunday, stage was below the flat Zone A1 regulation line by 0.28 feet. WCA-2A: Stage at S11B-HW rose quickly last week to 0.42 feet above the flat regulation line on Sunday. WCA-3A: The Three Gauge Average trended towards the Zone A regulation line last week. On Sunday, stage was 1.06 feet below the rising Zone A line and the 3-69W gauge came up quickly above the water supply floor. WCA-3A: Stage at gauge 62 (Northwest corner) made another sharp turn last week. The average on Sunday was 1.09 feet below the rising Upper Schedule. (**Figures EV-1** - **EV-4**).

### *Water Depths*

The WDAT tool for spatial interpolation of water depth monthly snapshots indicate that WCA-3A North continues to dry down in the northeast, particularly along the upper reach of the L-38W. North to South hydrologic connectivity strengthens in Shark River Slough (SRS) in Everglades National Park (ENP) and returns to Taylor Slough. Big Cypress National Preserve (BCNP) recovers water depths to near surface across most of that area (**Figure EV-5**). Over the last month, stages rose significantly in Big Cypress National Preserve (BCNP) and along the eastern boundary of ENP. The Everglades are significantly drier than one year ago, with SRS the exception, as wet season rains had begun by this time last year. Conditions move much closer to average across much of the system, with WCA-3A along the L-67 canals remaining below average. (**Figure EV-6**).

### *Wading Birds*

Record nesting nears the end and the provisional estimate of total nests in the Everglades in 2021 is approximately 81,000 nests. This number may be revised upwards as more of the smaller wading bird nests are counted. Some foraging remains in the southern portions of the WCAs, but flocks are dispersing as a large percentage of the chicks have fledged and juveniles are foraging on their own. It is likely that given the low mortality noted and optimal foraging conditions throughout most of the nesting season that 2021 will surpass 2018 in the production of fledglings.

### *Taylor Slough and Florida Bay*

An average of 2.0 inches of rain fell over Taylor Slough and Florida Bay over the week ending Sunday (June 20) with the largest volume over northern Taylor Slough again. Stage increased by 1.0 foot in the northern area and 0.55 feet overall for the week (**Figure EV-7** and **Figure EV-8**). Depths are now averaging 2.5 inches higher than the historical average for this time of year. Westward water movement has begun at the S-332s, but the westernmost structures (S-328 and G-737) still had phosphorus levels as high as 93 µg/L as of June 15. The phosphorus levels will decrease at these structures as the area rehydrates. In previous years, it took about three weeks after westward water movements began for the phosphorus levels to reach less than the 8 µg/L threshold.

Salinities in Florida Bay averaged a decrease of 1.3 for the week ending June 20, but individual stations had weekly changes ranging from −3.1 to +0.2 (**Figure EV-7**). All of the central and western Florida Bay stations salinities are under 40 after 9 weeks of at least one station being above 40. All stations salinities are within 2.0 of their historical averages, and the regional averages are decreasing (**Figure EV-9**). Salinities in the nearshore area should experience the seasonal rapid freshening within the next two weeks if rains and westward water deliveries continue.

Florida Bay MFL: The TR station in the mangrove zone (tracked for the Florida Bay MFL) decreased from 21 to 16 over the week ending June 20, but the 30-day moving average increased 3.8 over the week to end at 15.7 (**Figure EV-10**). Weekly flow from the five creeks monitored for the Florida Bay MFL totaled approximately 2,200 acre-feet, with a pulse of positive flow in the middle of the week that decreased towards the end of the week (see inset on **Figure EV-10**). The 365-day moving sum of flow from the five creeks (tracked as part of the Florida Bay MFL criteria) decreased 9,000 acre-feet over the week to end at 392,795 acre-feet on Sunday June 20. The 365-day cumulative flows are now approaching the 95th percentile of historical data (390,830 acre-feet). Creek flows are provisional USGS data.

***Water Management Recommendations***

Accession rates that do not exceed 0.25 feet per week or 0.50 feet per two weeks are considered ecologically healthy. Flows into northern WCA-3A, with a focus on the northeastern region downstream of S -150 have a great ecological benefit at this time in the dry season. Rehydration of northern Taylor Slough has begun, however the most western structures (S-328 and G-737) are mostly dry and have elevated levels of phosphorus. These structures should not be opened until the phosphorus levels return to below 8 ppb at these locations.

**Table EV-2.** Previous week's rainfall and water depth changes in Everglades regions.

| Everglades Region | Rainfall (inches) | Stage change (feet) |
|---|---|---|
| WCA-1 | 2.16 | +0.20 |
| WCA-2A | 2.50 | +0.38 |
| WCA-2B | 4.24 | +0.53 |
| WCA-3B | 3.16 | +0.35 |
| ENP | 3.22 | +0.23 |


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

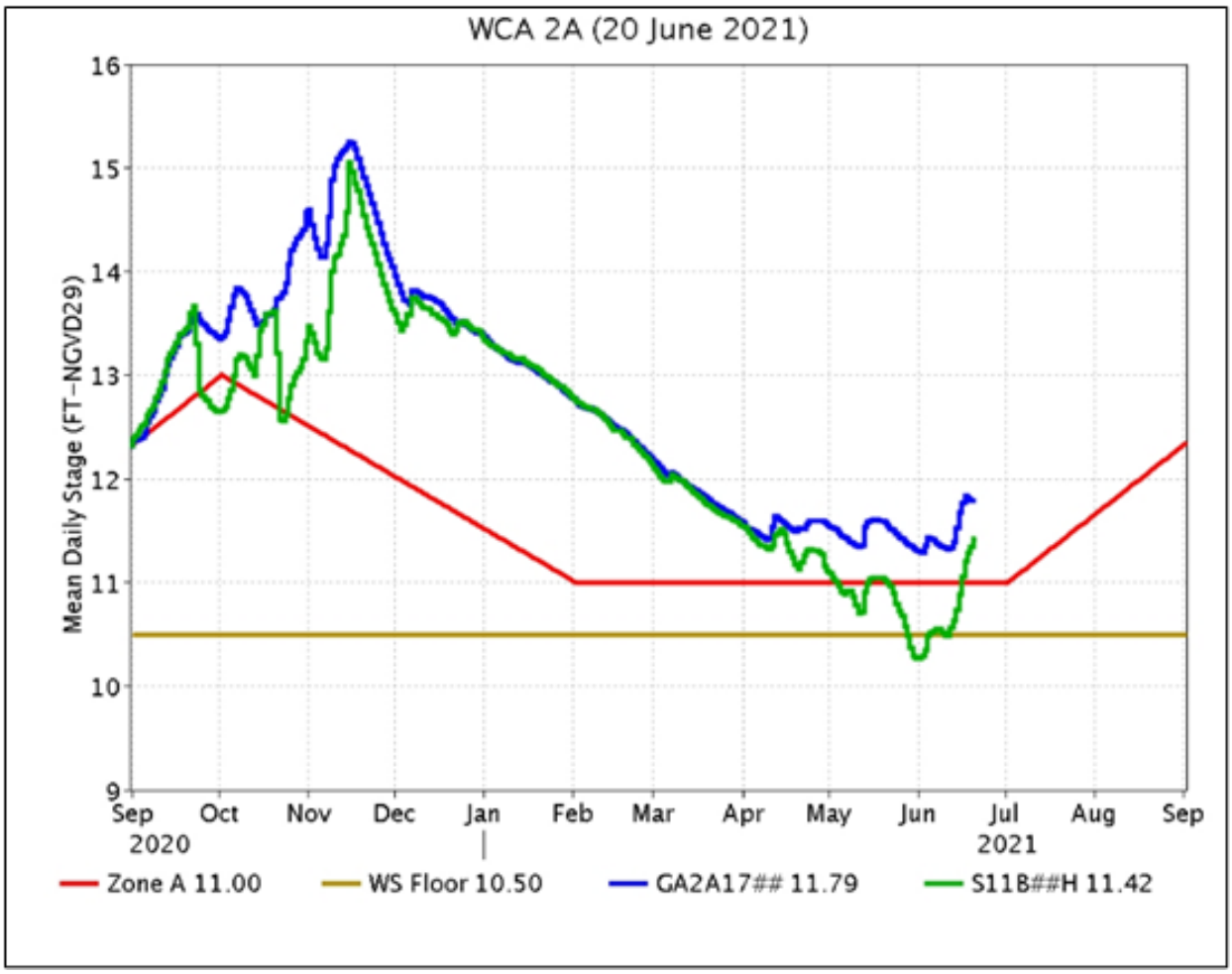



**Figure EV-2.** WCA-2A stage hydrographs and regulation schedule.

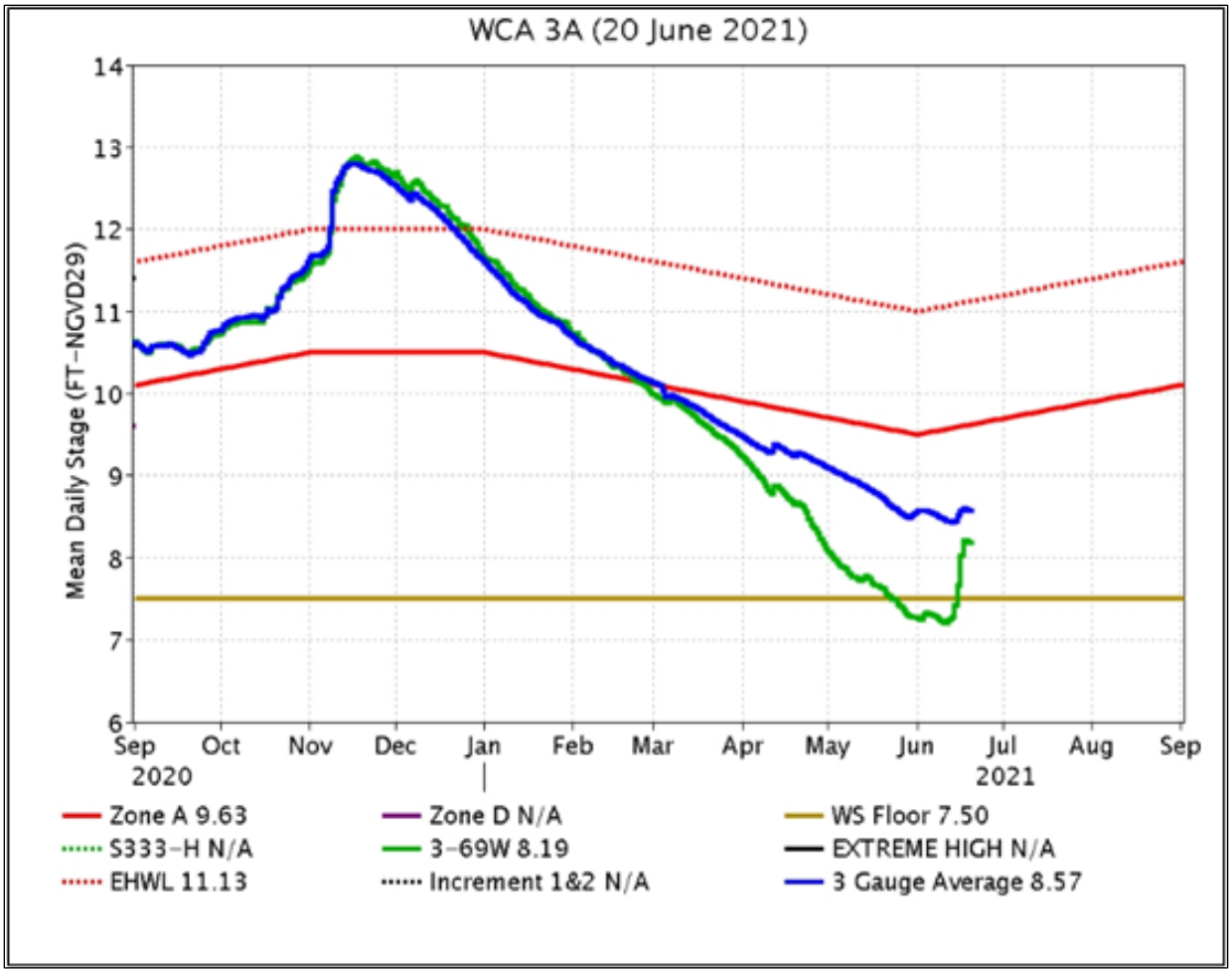



**Figure EV-3.** WCA-3A stage hydrographs (three-gauge average, S-333 headwater) and regulation schedule.

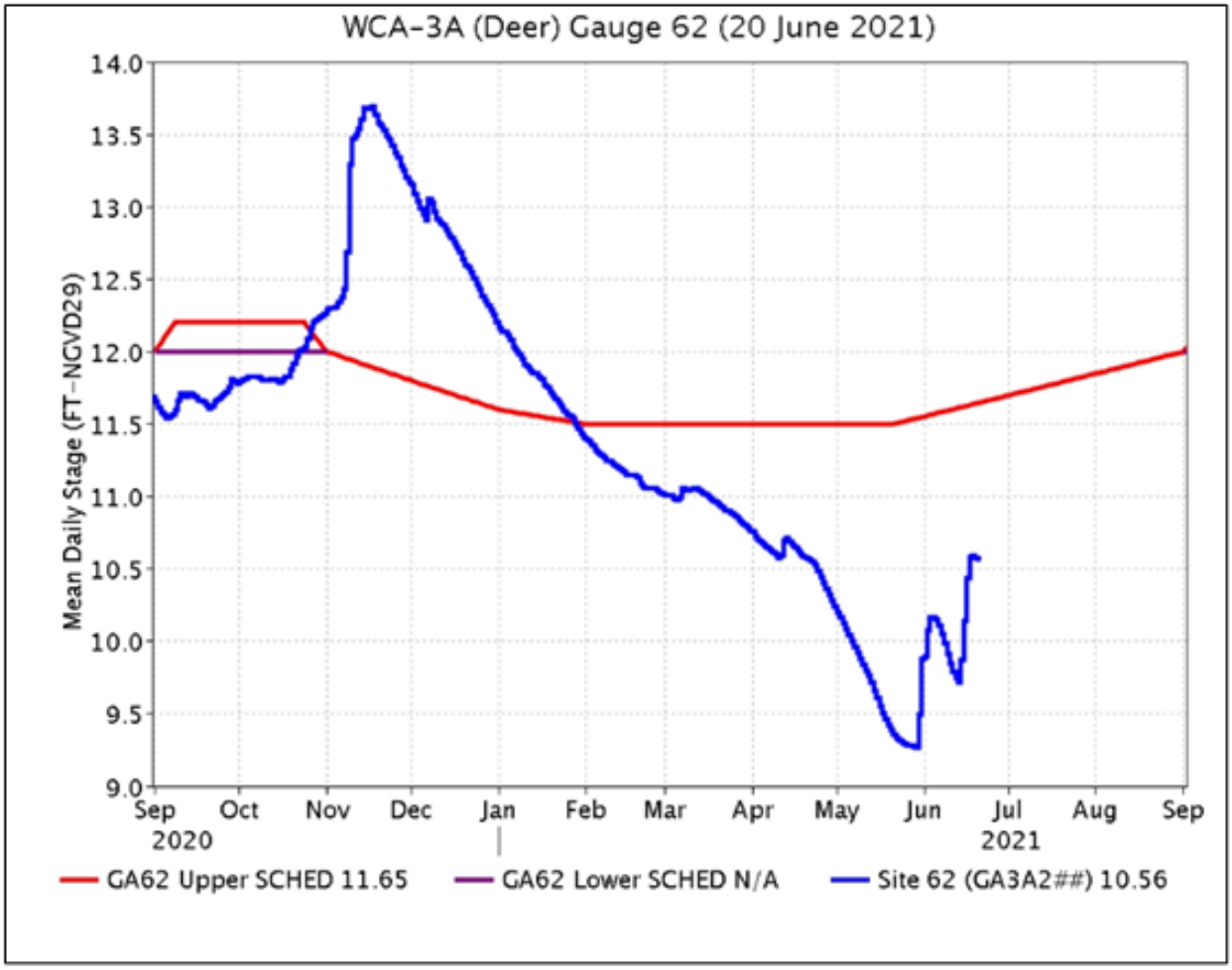



**Figure EV-4.** WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.

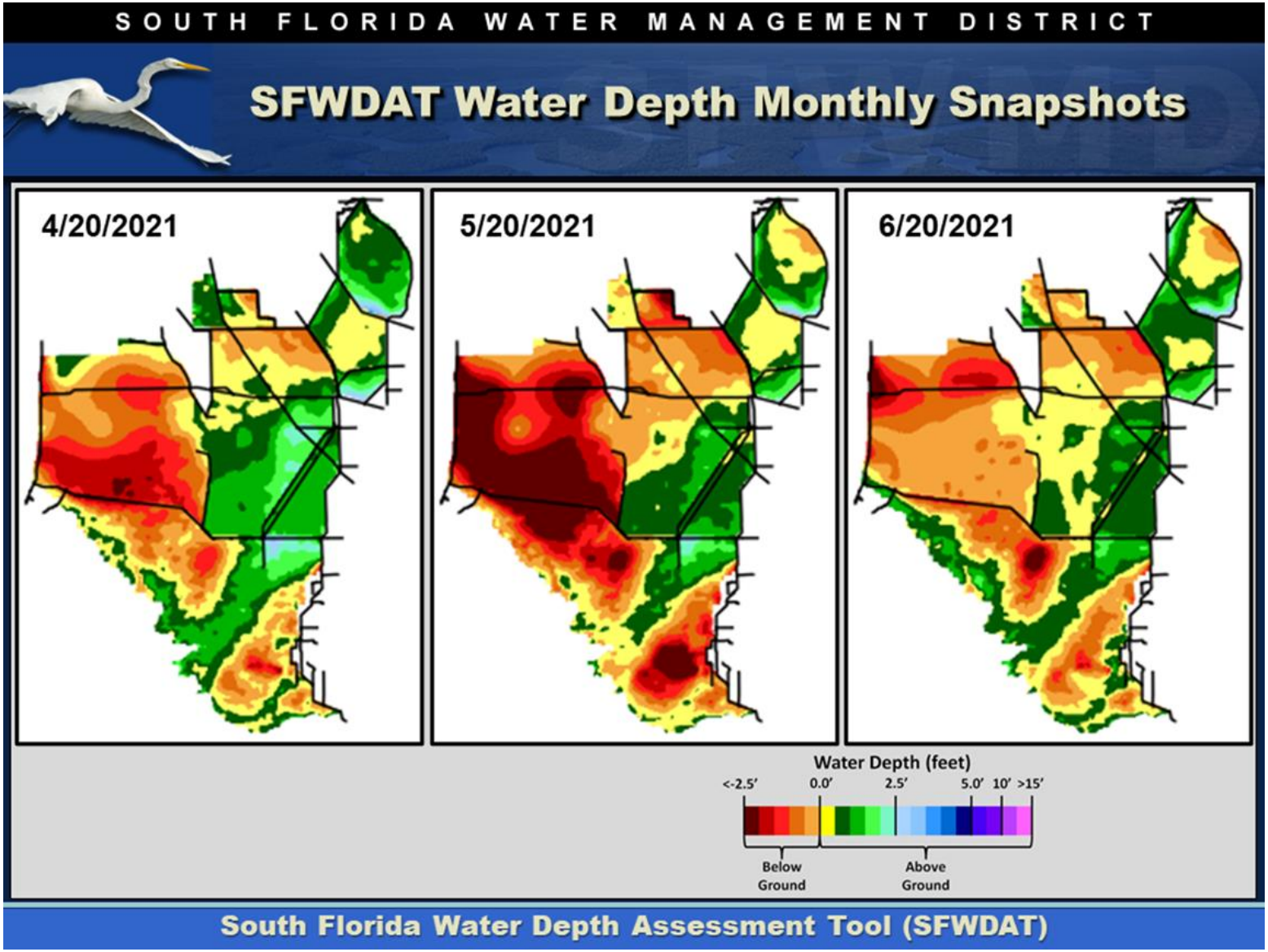



**Figure EV-5.** Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.

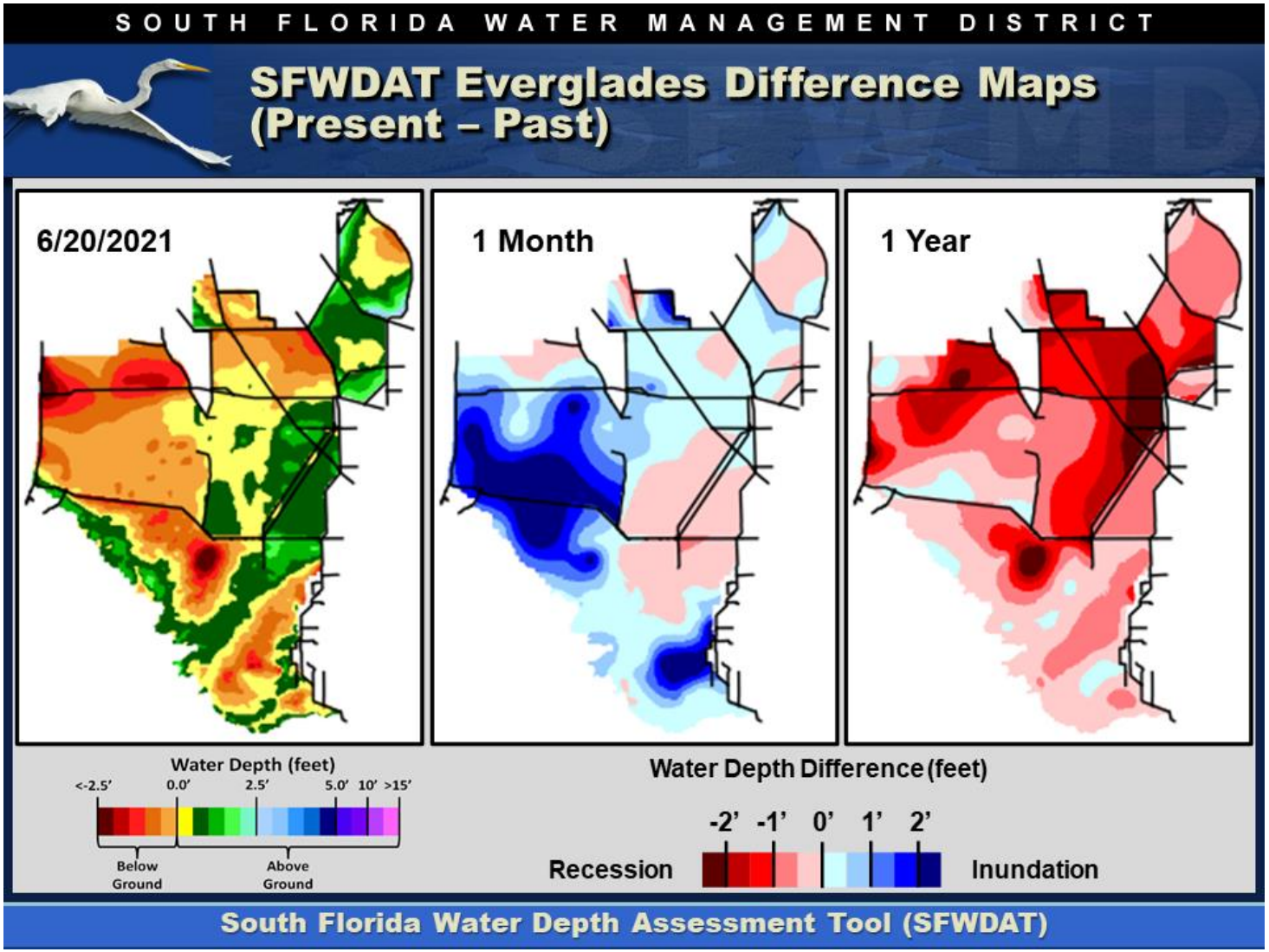



**Figure EV-6.** Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.

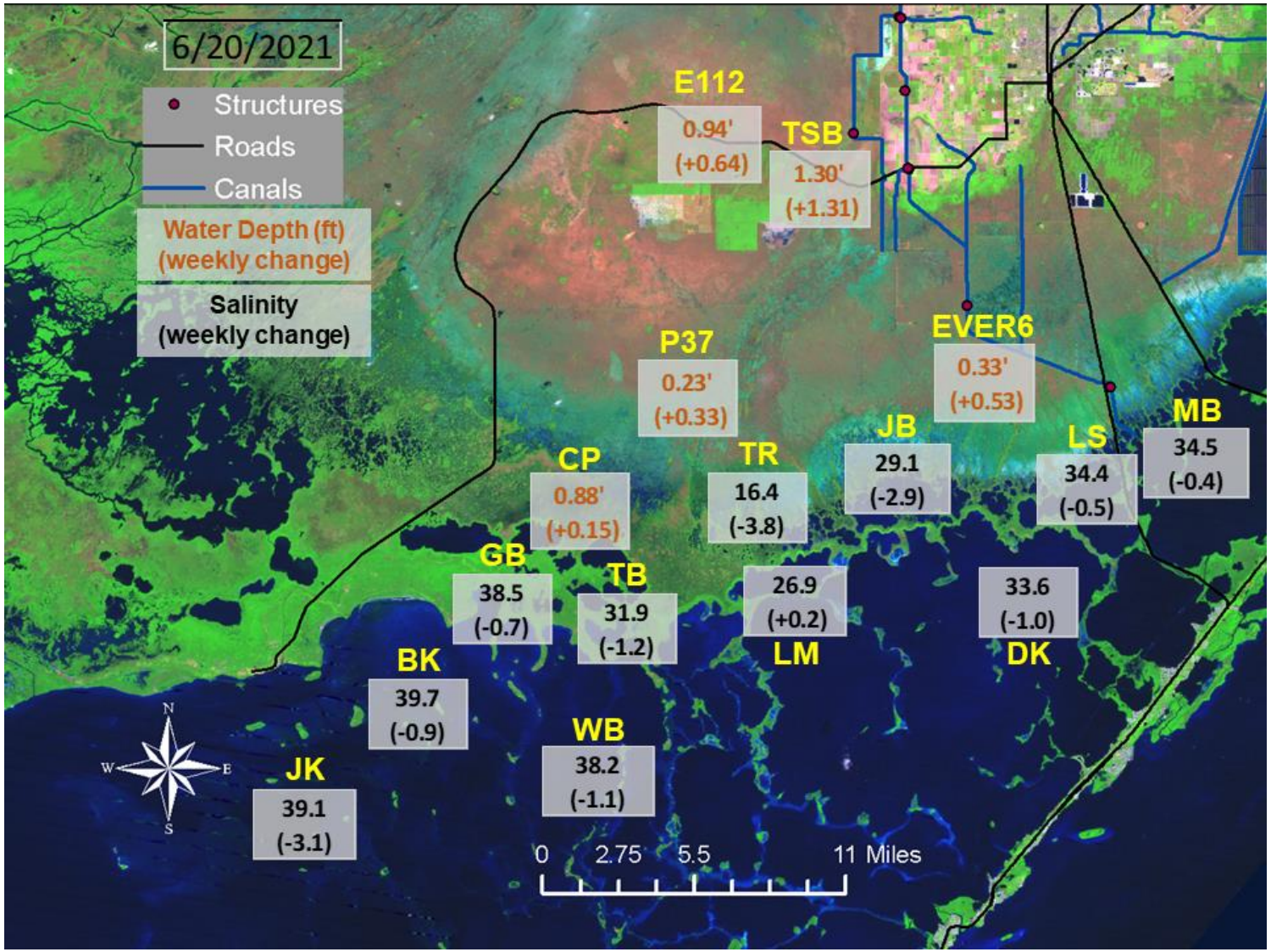



**Figure EV-7.** Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.

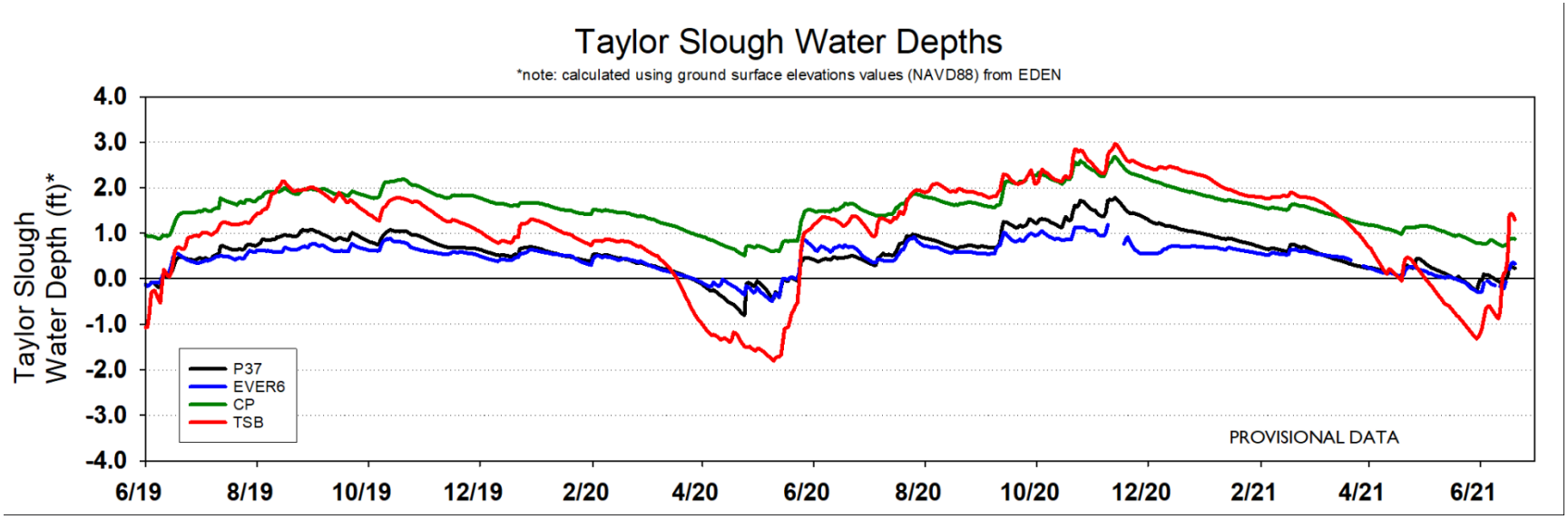



**Figure EV-8.** Taylor Slough water depth time series.

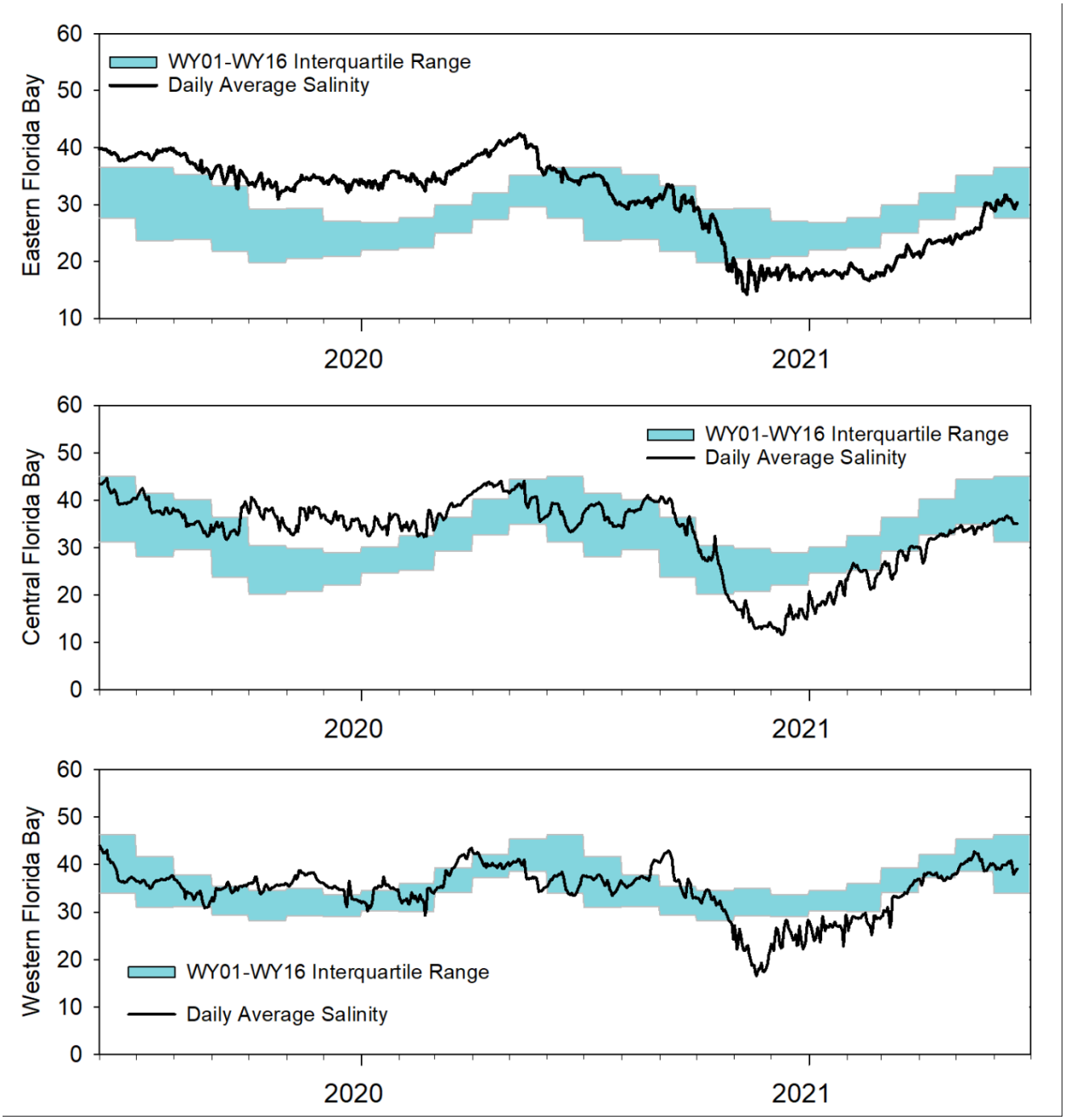



**Figure EV-9.** Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

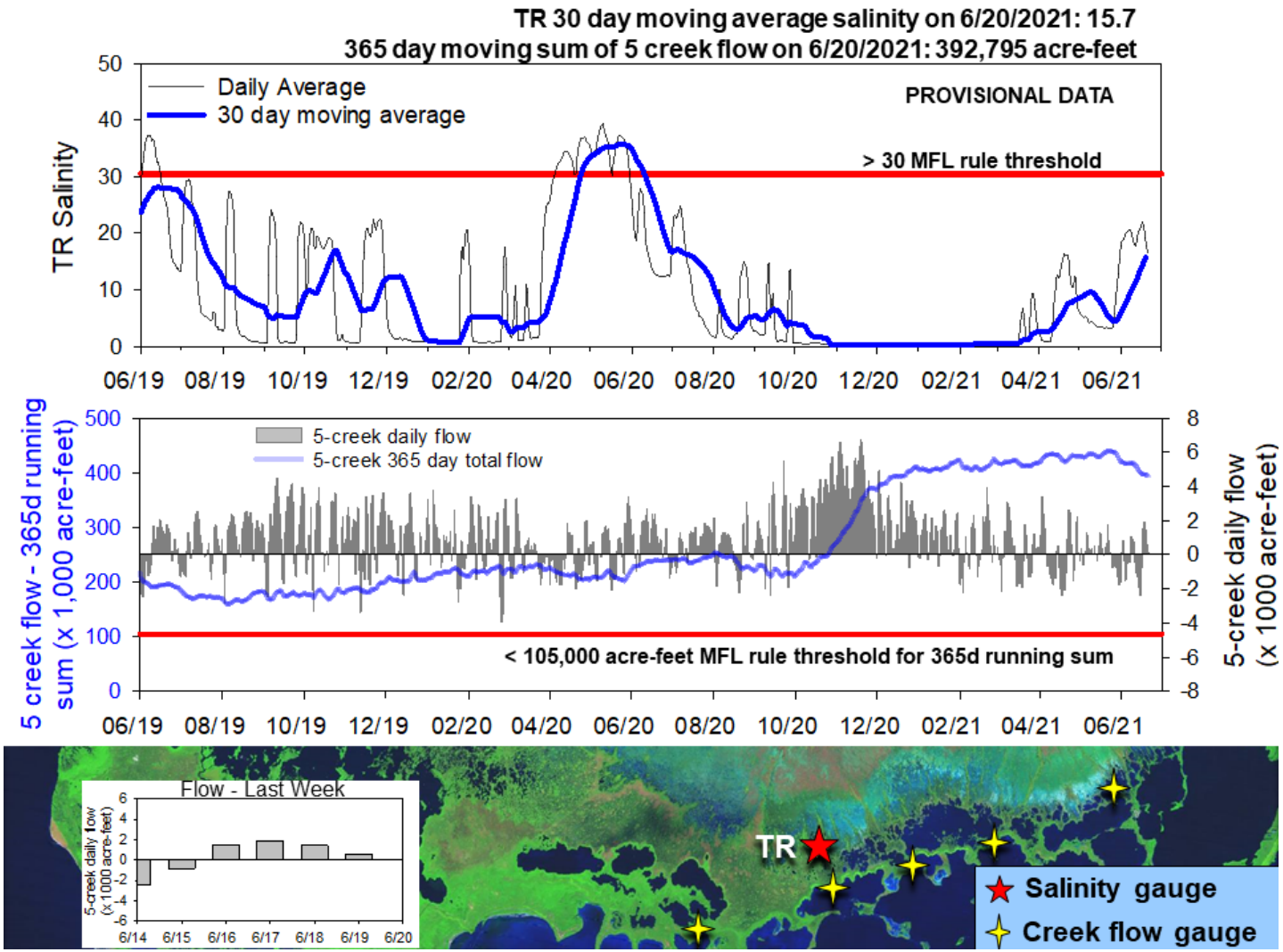



**Figure EV-10.** Top panel: Taylor River 30-day moving average salinity (blue), daily average salinity (gray) with salinity threshold; middle panel: Five-creek total flow for past 365 days (blue), daily flow (gray) with 365-day flow threshold; bottom panel: map of monitoring locations for the five creeks.

**Table EV-11.** Weekly water depth changes and water management recommendations

| SFWMD Everglades Ecological Recommendations: June 22, 2021 (red is new) | | | |
|---|---|---|---|
| **Area** | Weekly change | Recommendation | Reasons |
| **WCA-1** | Stage increased by 0.20' | Maintain ascension rates between 0.01 and 0.25 feet per week. | Protect within basin and downstream habitat and wildlife. Protect wading bird foraging. |
| **WCA-2A** | Stage increased by 0.38' | Moderate ascension rate to between 0.01 and 0.25 feet per week | Protect within basin and downstream habitat and wildlife. |
| **WCA-2B** | Stage increased by 0.53' | Moderate ascension rate to between 0.01 and 0.25 feet per week | Protect within basin wading bird foraging. |
| **WCA-3A NE** | Stage increased by 0.22’ | Maintain ascension rates between 0.01 and 0.25 feet per week | Protect within basin habitat and wildlife. Inflows and rehydration preserve peat soils and prevents wildfire. |
| **WCA-3A NW** | Stage increased by 0.89 | Moderate ascension rate to between 0.01 and 0.25 feet per week | |
| **Central WCA-3A S** | Stage increased by 0.19' | Moderate ascension rate to between 0.01 and 0.10 feet per week | Protect within basin wading bird foraging. |
| **Southern WCA-3A S** | Stage increased by 0.08' | | |
| **WCA-3B** | Stage increased by 0.23' | Maintain ascension rates between 0.01 and 0.25 feet per week | Protect within basin and downstream habitat and wildlife. |
| **ENP-SRS** | Stage increased by 0.17' | Make discharges to the Park according to COP and TTFF protocol while considering upstream and downstream ecological conditions. | Protect within basin and upstream habitat and wildlife. |
| **Taylor Slough** | Stage changes ranged from +0.15’ to +1.31’ | Move water southward as possible. | When available, provide freshwater buffer for downstream conditions. |
| **FB- Salinity** | Salinity changes ranged −3.1 to +0.2 | Move water southward as possible. | When available, provide freshwater to maintain low salinity buffer and promote water movement. |