

Disclaimer: Information contained in the report addresses environmental conditions only and is not the official South Florida Water Management District operations recommendation or decision.

MEMORANDUM

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

FROM: SFWMD Staff Environmental Advisory Team

DATE: April 29, 2020

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

Surface high pressure located over the southeastern United States this morning will move into the western Atlantic later today as a storm system forms and intensifies over the Midwest. A lack of moisture and strong atmospheric stability associated with the high-pressure area should ensure dry conditions across the District through tonight, with a warming trend evident as the winds veer easterly from the Atlantic waters. The displacement of the high-pressure area even farther east into the central Atlantic on Wednesday should cause the winds to shift southeasterly by Wednesday afternoon, which should allow for greater moisture transport across the area. While the increasing moisture supply would favor a marginal increase of shower activity over the southeast, the shallow nature of the moisture and a continued stable atmosphere could limit prospects for rain or at least confine the shower activity close to or along the east coast and far south. A cold front associated with the strong storm system moving out of the Midwest is forecast to reach north Florida on Thursday morning, ahead of which a plume of moisture and a narrow region of highly favorable environmental conditions for rain will develop. The high degree of favorability, strong wind shear, and dynamical 'forcing' could result in a line of storms (a squall line) to push into the northwestern part of the District by or just after daybreak Thursday morning and overspread the District from northwest to southeast while potentially producing severe weather. Meanwhile, scattered activity could form ahead of the main line of storms during the morning and afternoon and a region of lighter rain could occur in its wake. Overall, widespread coverage of rain is possible on Thursday, some of it heavy. However, there remains large differences in the model solutions for Thursday's rains, making the forecast have lower confidence. Rains are likely to end on Thursday by afternoon or early evening at the latest over the northwestern part of the District and by the evening over the southeast. The cold front should reach south Florida around daybreak on Friday and push southeastward into the Florida Straits by Friday afternoon, ushering in another cool and substantially drier air mass. While the air mass will gradually modify over the weekend and temperatures will begin to warm, large-scale upper-level convergence on the backside of a trough over the western Atlantic and Florida will likely favor dry weather from Friday through early next week.

Kissimmee

Tuesday morning stages were 52.6 feet NGVD (3.6 feet below schedule) in East Lake Toho, 52.7 feet NGVD (0.6 feet below schedule) in Toho, and 50.1 feet NGVD (at schedule) in Kissimmee-Cypress-Hatchineha; headwater stages were 46.3 feet NGVD at S-65A and 25.7 feet NGVD at S-65D. Tuesday morning discharges were 777 cfs at S-65, 691 cfs at S-65A, 756 cfs at S-65D and 641 cfs at S-65E. Dissolved oxygen concentration in the Kissimmee River averaged 7.8 mg/L for the week through Sunday. Kissimmee River mean floodplain depth on Sunday was 0.17 feet. **Today's recommendations:** Continue the snail kite recession on Lake Tohopekaliga to reach low pool (52 feet) on June 1st. Continue the recession on Lakes Kissimmee-Cypress-Hatchineha to reach 49 feet on June 1st.

Lake Okeechobee

Lake Okeechobee stage was 11.46 feet NGVD on April 28, 2020, up 0.05 feet from the previous week, and down 0.52 feet from the previous month. The Lake entered the Beneficial Use sub-band on March 4, 2020 and is now 0.44 feet above the Water Shortage sub-band. Water levels moved below the ecological envelope (which varies seasonally from 12 – 15 feet NGVD +/- 0.5 feet) on October 15, 2019 and are currently 0.66 feet below the bottom of the envelope. Lake stages below the ecological envelope will continue to benefit recovering submerged and emergent marsh vegetation at low elevations but will reduce aquatic habitat for fish and wildlife in the marshes. Wading bird and snail kite nesting efforts are likely to be lower for the second consecutive year on the Lake due to low lake stages during the breeding season.

Estuaries

Total inflow to the St. Lucie Estuary averaged 1,421 cfs over the past week with no flow coming from Lake Okeechobee. The seven-day average salinities decreased throughout the estuary over the past week. Salinity at the US1 Bridge is in the good range for adult eastern oysters. Total inflow to the Caloosahatchee Estuary averaged 557 cfs over the past week with 311 cfs coming from the Lake. The seven-day average salinity little changed in the estuary over the past week. Salinities are in the good range for tape grass at Val I-75 and in the fair range at Ft. Myers. Salinities are in the good range for adult eastern oysters at Cape Coral and in the fair range at Shell Point and Sanibel. Lake stage is in the Beneficial Use sub-band of 2008 LORS. Tributary hydrological conditions are normal. The SFWMD's Lake Okeechobee Adaptive Protocol's Release Guidance suggests no release to the Caloosahatchee Estuary.

Stormwater Treatment Areas

Over the past week, 2,800 ac-ft of Lake Okeechobee water was delivered to the FEBs/STAs. The total amount of Lake releases sent to the FEBs/STAs in WY2020 (since May 1, 2019) is approximately 153,000 ac-feet. The total amount of inflows to the STAs in WY2020 is approximately 1,001,000 ac-feet. Most STA cells are above or near target stage, except STA-5/6 cells that continue to dry out. 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-1W Northern Flow-way related to STA-1W Expansion #1 startup activities, in STA-3/4 Western Flow-way for repairs to the G-384 stage sensor, in STA-1E Central Flow-way, STA-2 Flow-way 1, STA-2 Flow-way 2, STA-2 Flow-way 3, STA-2 Flow-way 4, STA-3/4 Eastern Flow-way, and STA-3/4 Central Flow-way for vegetation management activities, and 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-1E and STA-1W. This week, there is no capacity for Lake releases in the STAs.

Everglades

Current stages in northeastern WCA-3A remain well below average (Site 62 in the northwest is 0.60 feet below average and Site 63 in the northeast is 0.78 feet below average) for this time of year. Conserving fresh water in the Everglades, distributing it to where depths are low (WCA-3A NE and WCA-3A NW), then allowing it to flow south has important ecological benefit. The recession rates in WCA-3A South exceeded the optimal range of -0.09 feet last week where wading bird nesting is focused within the WCAs this year. Slowing those recession rates when possible has ecological benefit because it could maintain water levels above ground longer into the nesting effort. Rain fell over Taylor Slough and Florida Bay last week, however, on average, stage decreased slightly and remain below the historical average in northern Taylor slough. Locally heavy rains on Saturday did decrease some salinities in the central and western bay, but the eastern bay continued to rise and is above the 90th percentile.

Supporting Information

KESSIMMEE BASIN

Kissimmee Basin Rainfall

The Upper Kissimmee Basin received 1.59 inches of rainfall in the past week and the Lower Basin received 2.22 inches (SFWMD Daily Rainfall Report 4/27/2020).

Upper Kissimmee Basin

Stages and departures in the Kissimmee Chain of Lakes (KCOL) are shown in **Table 1**. KCOL stage hydrographs with respective regulation schedules and rainfall are shown in Figures 1-3.

Table 1. Average discharge (cfs) for the preceding seven days, one-day stage (feet NGVD), and departures from KCOL flood regulation (R) or temporary schedules (T, A, or S). Provisional, real-time data are from SFWMD. **Report Date: 4/28/2020**

| Water Body | Structure | 7-day Average Discharge (cfs) ¹ | Stage Monitoring Site ² | Lake Stage (feet) | Schedule Type ³ | Schedule Stage (feet) | Daily Departure (feet) | | | | | | |
|--|-----------|--|------------------------------------|-------------------|----------------------------|-----------------------|------------------------|---------|---------|--------|---------|---------|---------|
| | | | | | | | 4/26/20 | 4/19/20 | 4/12/20 | 4/5/20 | 3/29/20 | 3/22/20 | 3/15/20 |
| Lakes Hart and Mary Jane | S-62 | 14 | LKMJ | 60.0 | R | 60.2 | -0.2 | -0.2 | -0.3 | -0.4 | -0.4 | -0.4 | -0.4 |
| Lakes Myrtle, Preston, and Joel | S-57 | 3 | S-57 | 60.5 | R | 60.4 | 0.1 | 0.0 | -0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| Alligator Chain | S-60 | 8 | ALLI | 63.0 | R | 62.9 | 0.1 | -0.2 | -0.4 | -0.5 | -0.6 | -0.6 | -0.7 |
| Lake Gentry | S-63 | 74 | LKGT | 60.5 | R | 60.4 | 0.1 | 0.1 | 0.1 | 0.0 | -0.1 | -0.1 | -0.2 |
| East Lake Toho | S-59 | 0 | TOHOE | 52.6 | R | 56.4 | -3.8 | -4.1 | -4.5 | -4.6 | -4.8 | -5.0 | -5.2 |
| Lake Toho | S-61 | 345 | TOHOW, S-61 | 52.8 | R | 53.4 | -0.6 | -0.7 | -0.9 | -0.9 | -1.1 | -1.3 | -1.3 |
| Lakes Kissimmee, Cypress, and Hatchineha | S-65 | 611 | KUB011, LKIS5B | 50.1 | R | 50.2 | -0.1 | -0.3 | -0.4 | -0.5 | -0.5 | -0.2 | 0.0 |

¹ Seven-day average of weighted daily means through midnight.

² Names of in-lake monitoring sites and structures used to determine lake stage; if more than one site is listed, an average is reported.

³ A = projected ascension line, R = USACE regulation schedule, S = temporary recession target line, T = temporary schedule, N/A = not applicable or data not available.

DATA ARE PROVISIONAL

Lower Kissimmee Basin

Discharges at Lower Basin structures are shown in Table 2. SFWDAT depth maps for the Phase I restoration area are shown in Figure 8. Kissimmee River floodplain stages at selected stations are shown in Figure 9.

Table 2. One-day and seven-day averages of discharge at S-65x structures, of dissolved oxygen concentration in the Phase I area river channel, and water depth in the Phase I area floodplain. Data are provisional real-time data from SFWMD.

Report Date: 4/28/2020

| Metric | Location | 1-Day Average | | Average for the Preceding 7-Days ¹ | | | | | | | |
|--------------------------------|---------------------------------|---------------|---------|---|---------|--------|---------|---------|---------|--------|--------|
| | | 4/26/2020 | 4/26/20 | 4/19/20 | 4/12/20 | 4/5/20 | 3/29/20 | 3/22/20 | 3/15/20 | 3/8/20 | 3/1/20 |
| Discharge (cfs) | S-65 | 773 | 611 | 372 | 365 | 357 | 448 | 690 | 920 | 1,013 | 983 |
| Discharge (cfs) | S-65A ² | 681 | 550 | 353 | 323 | 310 | 350 | 592 | 837 | 956 | 956 |
| Discharge (cfs) | S-65D ² | 660 | 485 | 317 | 308 | 302 | 476 | 699 | 940 | 968 | 985 |
| Headwater Stage (feet NGVD) | S-65D ² | 25.83 | 25.84 | 25.83 | 25.75 | 25.78 | 25.71 | 25.75 | 25.85 | 25.69 | 25.80 |
| Discharge (cfs) | S-65E ² | 531 | 435 | 282 | 283 | 262 | 433 | 653 | 864 | 891 | 905 |
| Discharge (cfs) | S-67 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| DO (mg/L) ³ | Phases I & II/III river channel | 7.0 | 7.8 | 7.9 | 7.4 | 7.4 | 6.9 | 7.6 | 8.0 | 8.3 | 8.0 |
| Mean depth (feet) ⁴ | Phase I floodplain | 0.17 | 0.10 | 0.06 | 0.07 | 0.07 | 0.08 | 0.11 | 0.20 | 0.24 | 0.26 |

¹ Seven-day average of weighted daily means through Sunday midnight.

² S-65A discharge combines S-65A with auxiliary structures; S-65D discharge combines S-65D, S-65DX1, and S-65DX2; S-65D stage averages stage at S-65D and S-65DX1; S-65E discharge combines S-65E and S-65EX1.

³ DO is the average for sondes at KRBN, PC62, PC33, PD62R, and PD42R.

⁴ 1-day spatial average from South Florida Water Depth Assessment Tool (SFWDAT).

DATA ARE PROVISIONAL; N/A indicates that data were not available.

KCOL Hydrographs (through Sunday midnight)

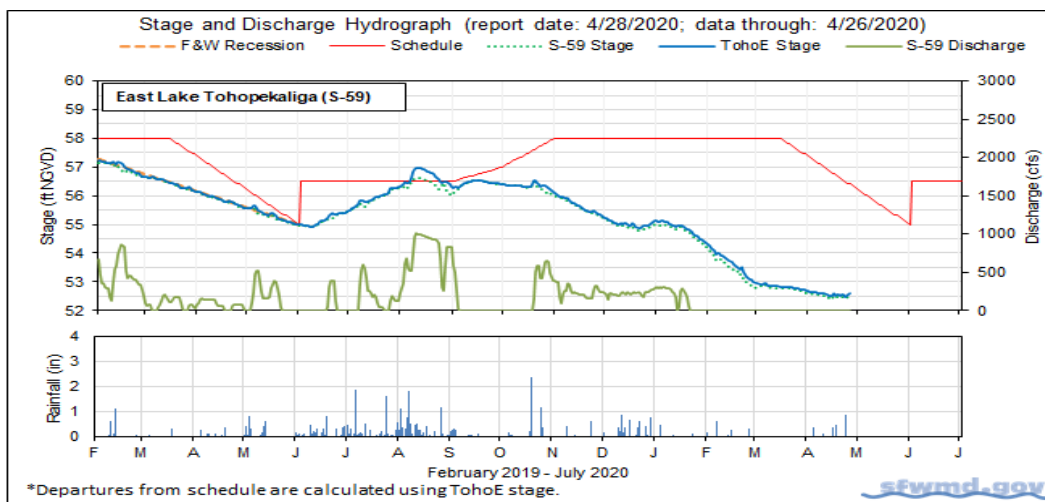


Figure 1.

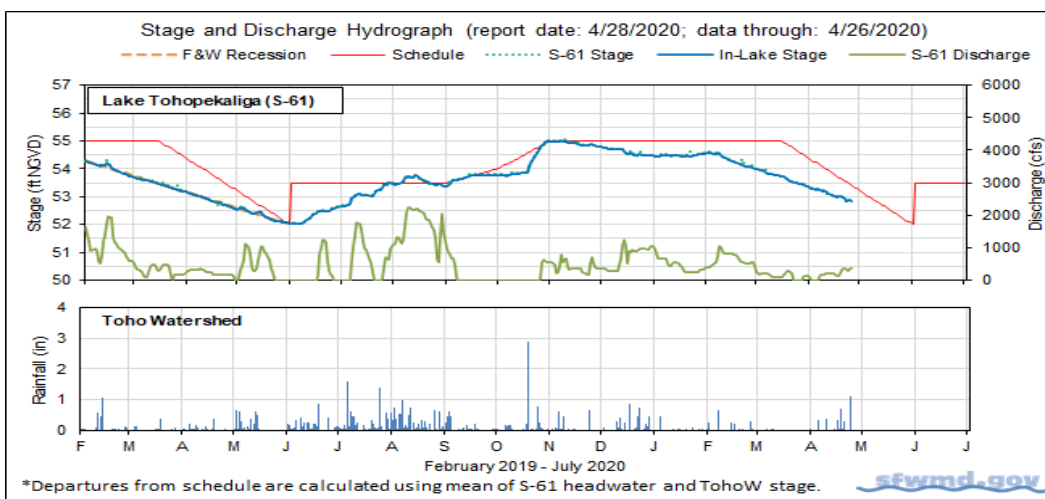


Figure 2.

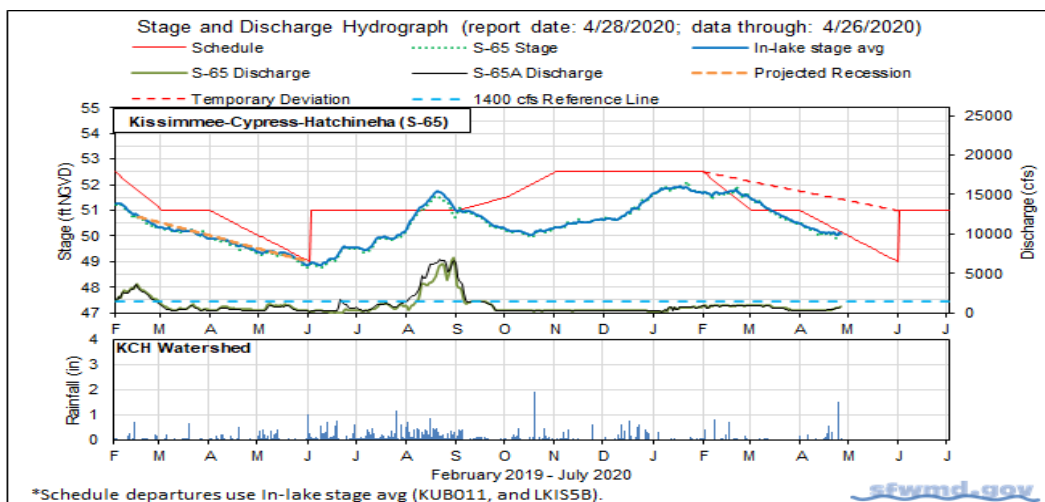


Figure 3.

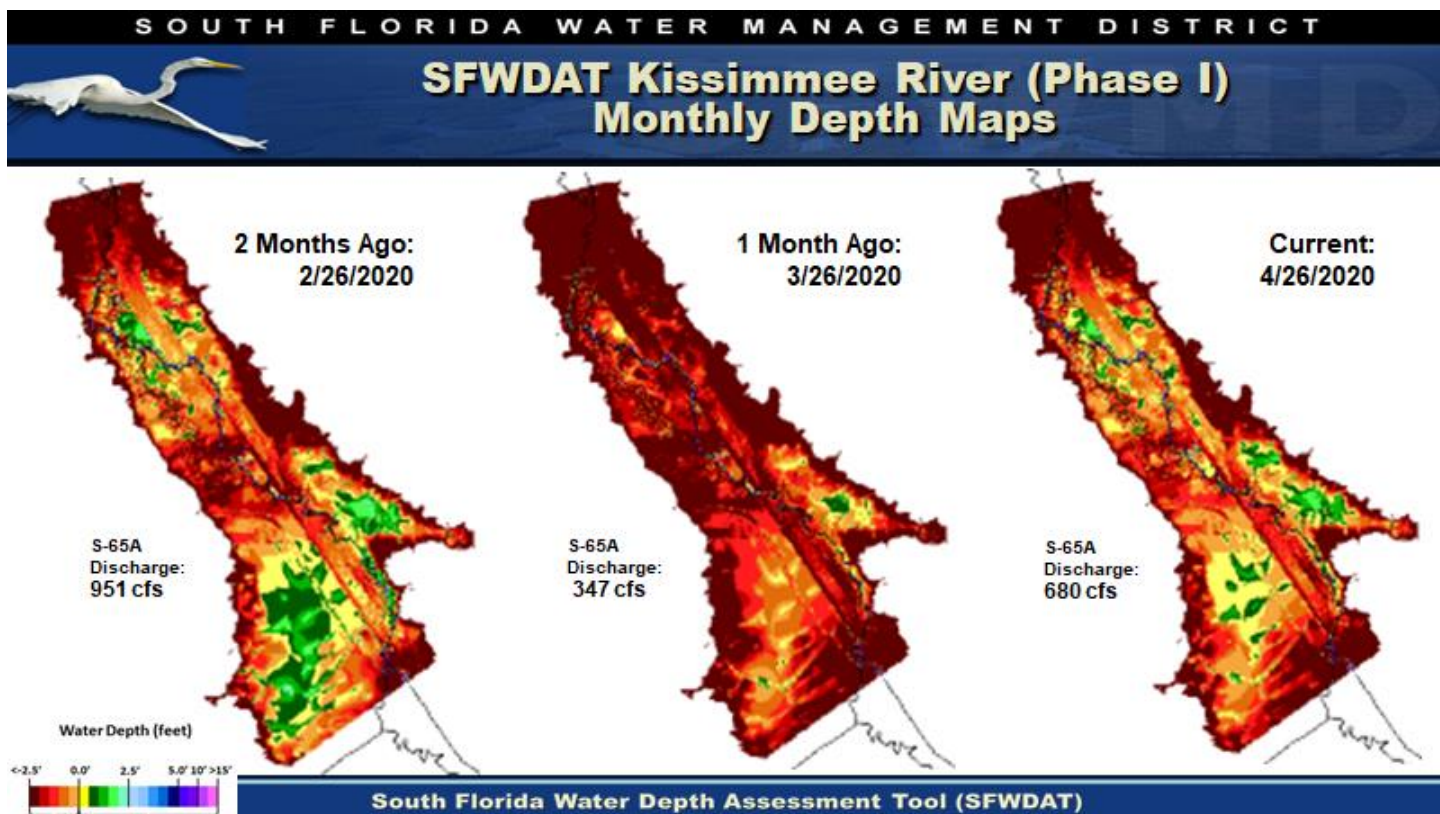
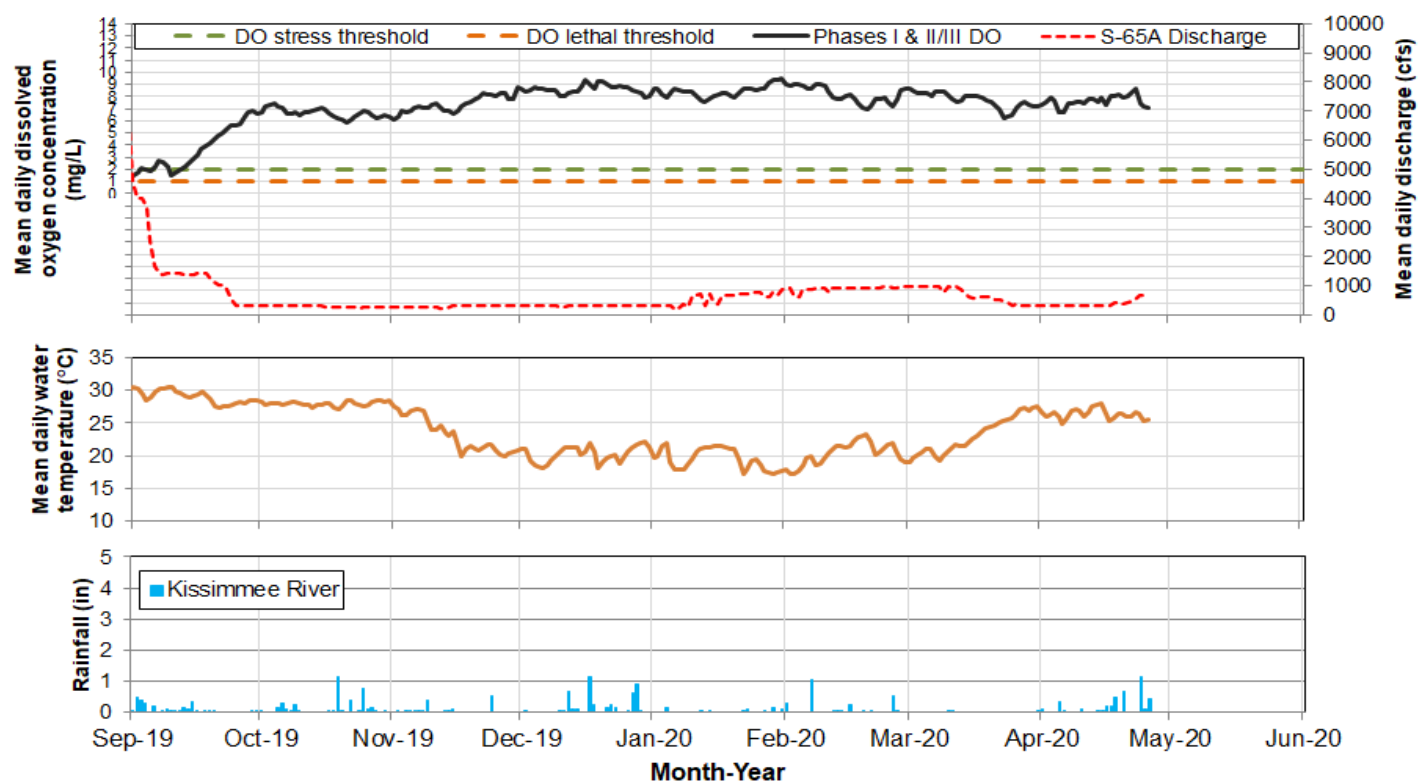


Figure 4. Phase I area floodplain water depths for this week, one month ago, and two months ago. Note that the WDAT color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to January 16, 2012.



Report Date: 4/28/2020; data are through: 4/26/2020.

Figure 5. Mean daily dissolved oxygen, discharge, temperature and rainfall in the Phases I/II/III river channel.

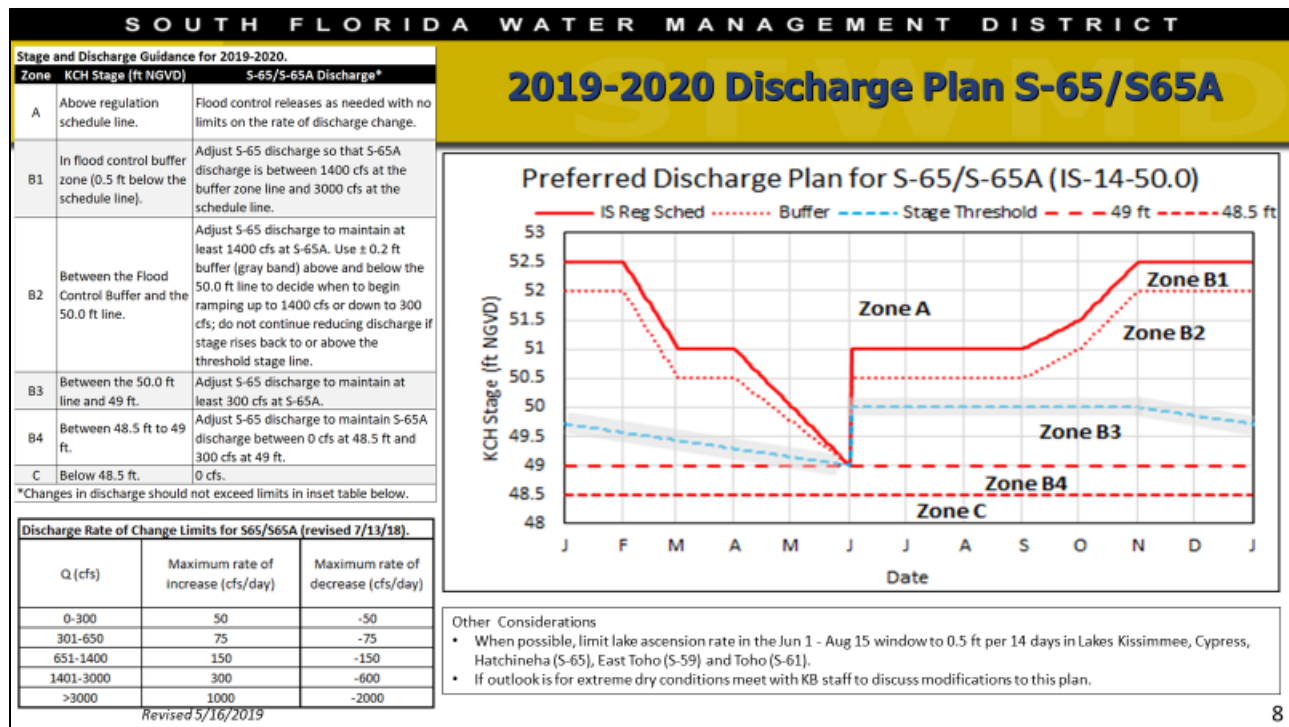


Figure 6. The 2019-2020 Discharge Plan for S-65/S-65A.

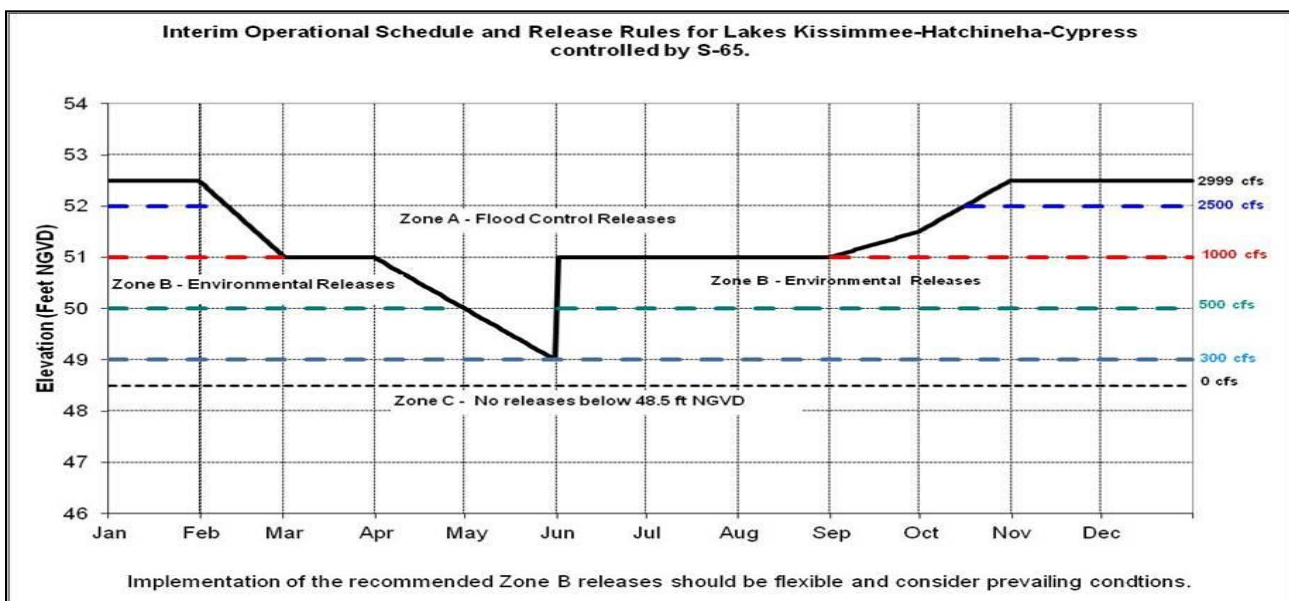


Figure 7. Interim operations schedule for S-65. The discharge schedule shown to the right has not been used in recent years.

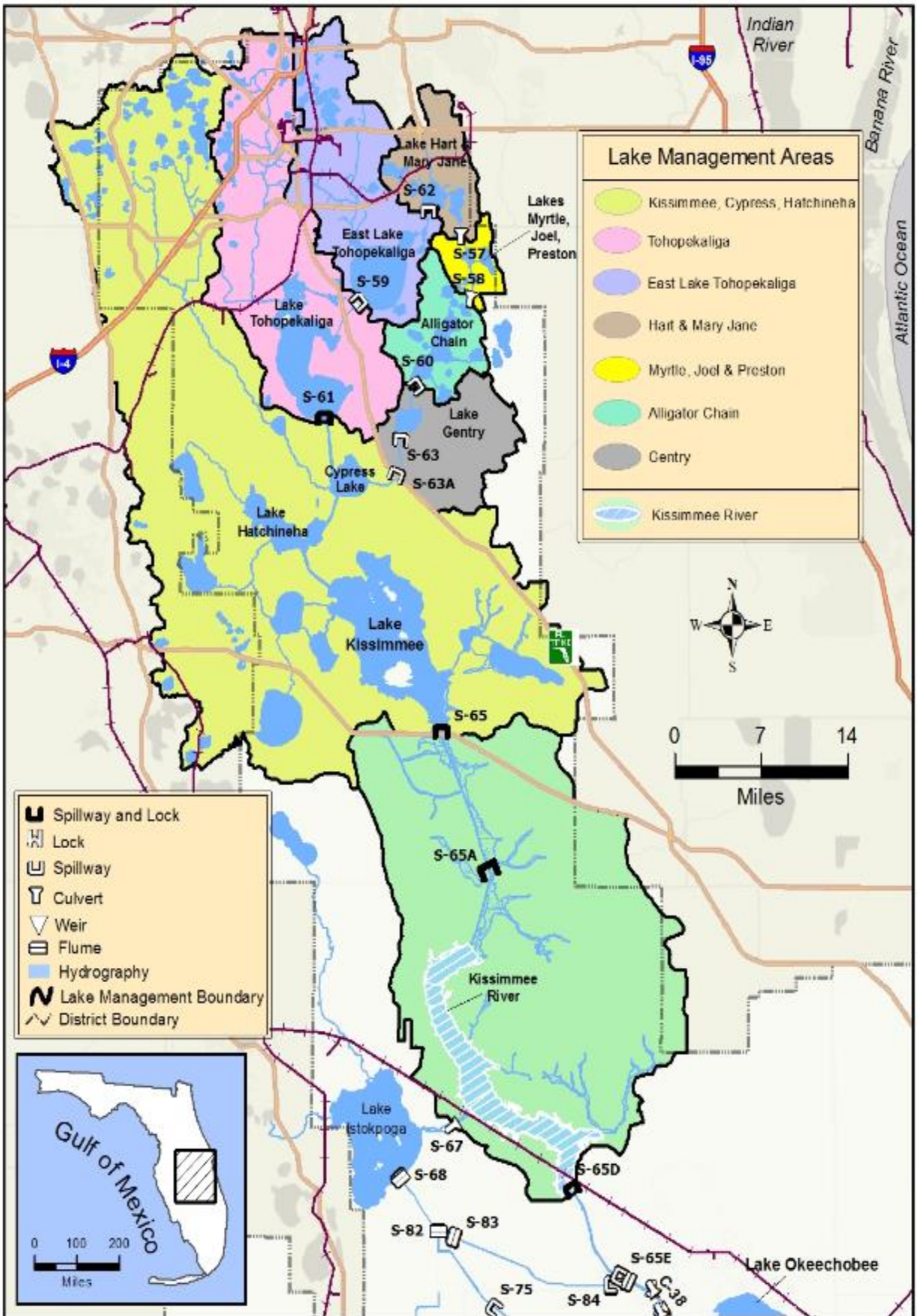


Figure 8. The Kissimmee Basin.

LAKE OKEECHOBEE

Lake Okeechobee stage is 11.46 feet NGVD, 0.52 feet lower than a month ago and 0.15 feet higher than one year ago (Figure 1). The Lake is currently 0.66 feet below the preferred ecological envelope (Figure 2). Lake stages moved into the Base Flow sub-band on September 11, 2019 and entered the Beneficial Use sub-band on March 4, 2020 (Figure 3). Lake stage had been slowly declining since about mid-February 2020, but rain events over the past two weeks have resulted in an increase in lake stage. According to RAINДАР, 1.72 inches of rain fell directly over the Lake during the past week (Figure 4). The regions to the north of the Lake received between 1 and 3 inches of rain while most of the southern regions received less than an inch of rain.

The average daily inflows (minus rainfall) increased going from 319 cfs to 586 cfs, and average daily outflows (minus evapotranspiration) decreased by almost 1,400 cfs from the previous week to total 740 cfs. Almost all the inflow (501 cfs) came from the Kissimmee River (S-65E & S-65EX1). An additional 70 cfs came from Fisheating Creek and the northwest canals (S-71, S-72 and S-84), combined, while passive flow from the S-308 structure and the L8 Canal accounted for 132 cfs from the east. Outflows of 545 cfs were released to the west through S-77 (C-43/Caloosahatchee Canal) and 312 cfs south through the S-350 structures. Total lake inflows and outflows for the past week are detailed in Table 1, as well as the approximate change in lake stage from each major structure's total flows over the period. Figure 5 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.

Current satellite imagery (April 21, 2020) using NOAA's cyanobacteria monitoring product derived from EUMETSAT's Sentinel 3 OLCI sensor data suggested low/moderate potential for cyanobacterial blooms along the northwest and northern shorelines of the Lake, similar to this time last year (Figure 6). Cloud cover obscured much of the southern shorelines. Blooms during this time of year tend to be ephemeral in nature with slight changes occurring in intensity and location along the western and northern sides of the lake from week to week.

Water Management Summary

Lake Okeechobee stage was 11.46 feet NGVD on April 28, 2020, up 0.05 feet from the previous week, and down 0.52 feet from the previous month. The Lake entered the Beneficial Use sub-band on March 4, 2020 and is now 0.44 feet above the Water Shortage sub-band. Water levels moved below the updated ecological envelope (which varies seasonally from 12 – 15 feet NGVD +/- 0.5 feet) on October 15, 2019 and are currently 0.66 feet below the bottom of the envelope. Lake stages below the ecological envelope will continue to benefit recovering submerged and emergent marsh vegetation at low elevations but will reduce aquatic habitat for fish and wildlife in the marshes. Wading bird and snail kite nesting efforts are likely to be lower for the second consecutive year on the Lake due to low lake stages during the breeding season.

Table 1. Average daily inflows and outflows and the approximate depth equivalents on Lake Okeechobee for various structures.

| INFLOWS | Previous week Avg Daily CFS | Avg Daily Flow cfs | Equivalent Depth Week Total (in) |
|------------------|-----------------------------|--------------------|----------------------------------|
| S-65E & S-65EX1 | 272 | 501 | 0.2 |
| S-71 & S-72 | 31 | 17 | 0.0 |
| S-84 & S-84X | 12 | 47 | 0.0 |
| Fisheating Creek | 5 | 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 | 0 | 0 | 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 | | 15 | 0.0 |
| Rainfall | 3802 | 3583 | 1.7 |
| Total | 4121 | 4168 | 2.0 |

| OUTFLOWS | Previous week Avg Daily CFS | Avg Daily Flow cfs | Equivalent Depth Week Total (in) |
|--------------|-----------------------------|--------------------|----------------------------------|
| S-77 | 578 | 545 | 0.3 |
| S-308 | -24 | -117 | -0.1 |
| S-351 | 820 | 305 | 0.1 |
| S-352 | 349 | 7 | 0.0 |
| S-354 | 372 | 0 | 0.0 |
| L-8 Outflow | 38 | | |
| ET | 2030 | 1891 | 0.9 |
| Total | 4162 | 2630 | 1.3 |

Provisional Data

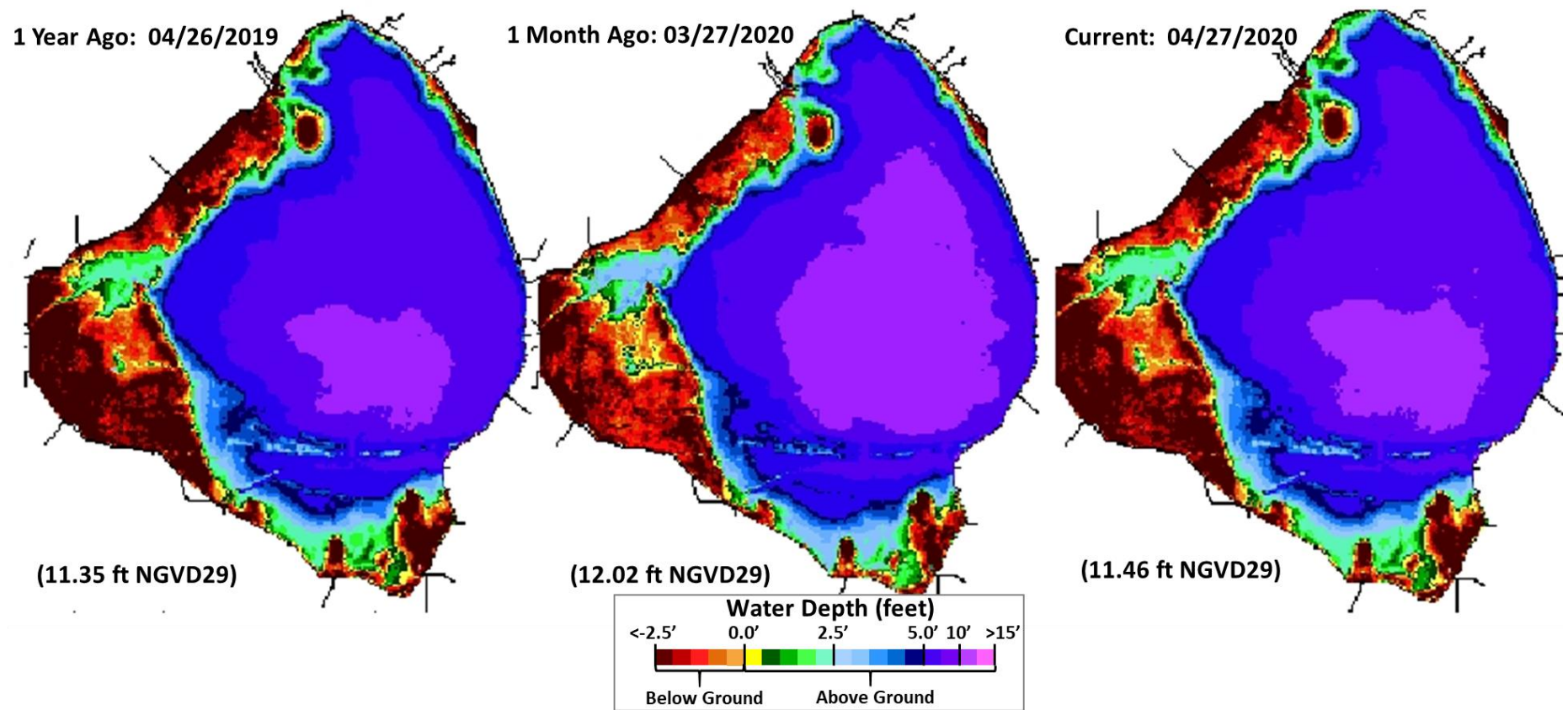


Figure 1. Water depth estimates on Lake Okeechobee based on the South Florida Water Depth Assessment Tool.

Lake Okeechobee Stage vs Updated Ecological Envelope

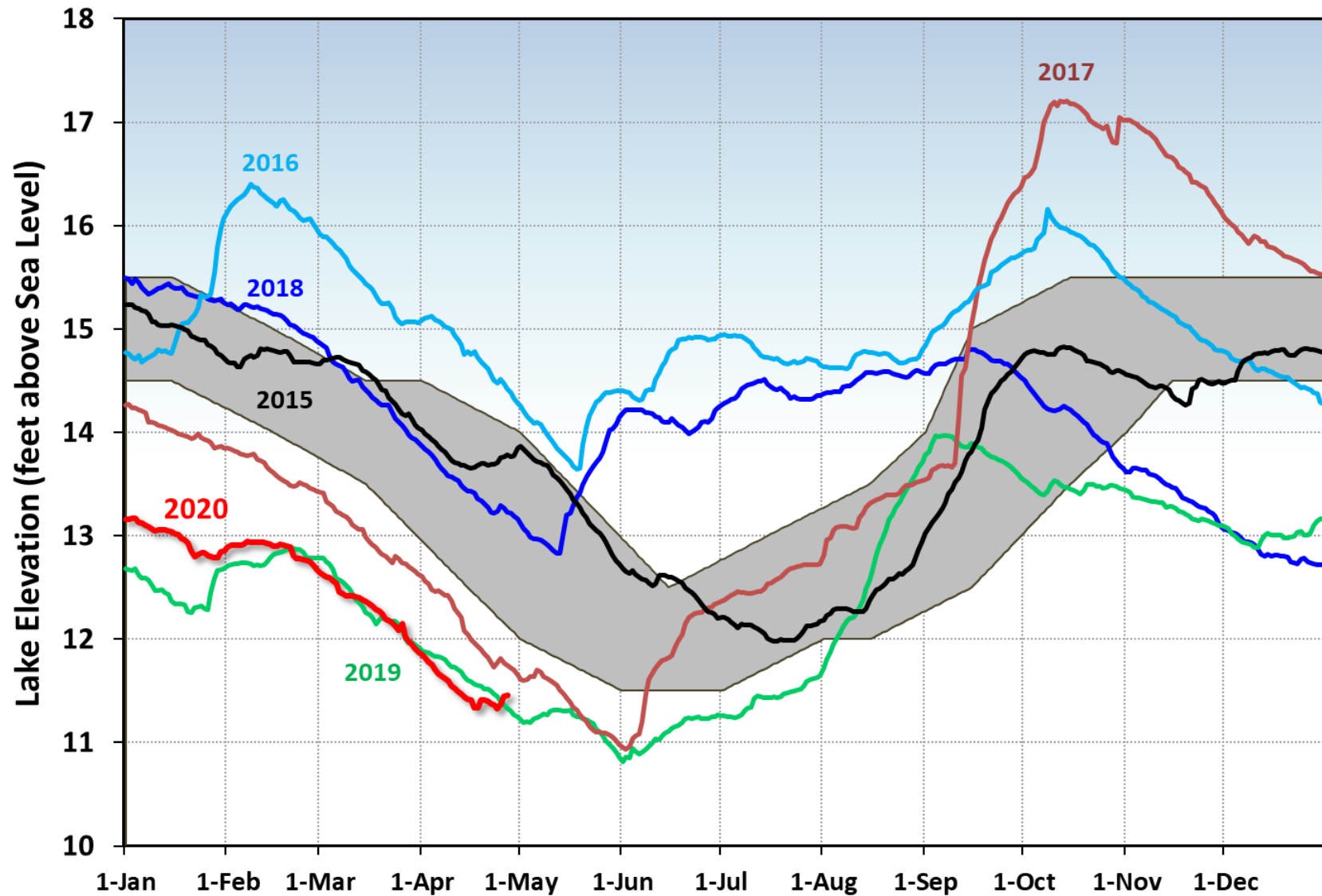
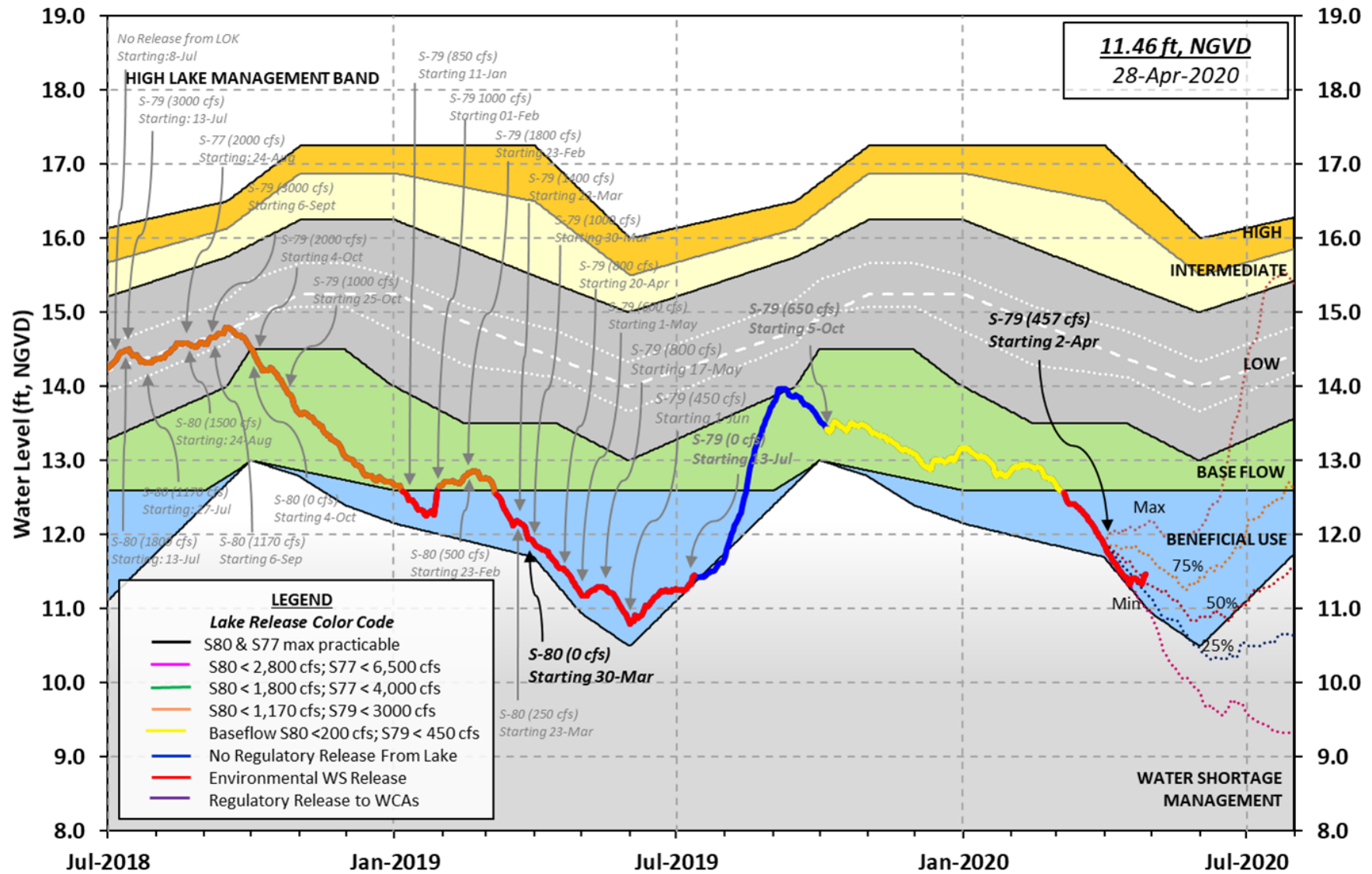


Figure 2. Select annual stage hydrographs for Lake Okeechobee in comparison to the updated Ecological Envelope.

Lake Okeechobee Water Level History and Projected Stages



LORS-2008
Adopted by USACE 28-April-2008

Projected Stage Percentiles From
SFWMD-HESM Position Analysis

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

SFWMD PROVISIONAL RAINDAR 7-DAY BASIN RAINFALL ESTIMATES

FROM: 0400 EST, 04/21/2020 THROUGH: 0400 EST, 04/28/2020

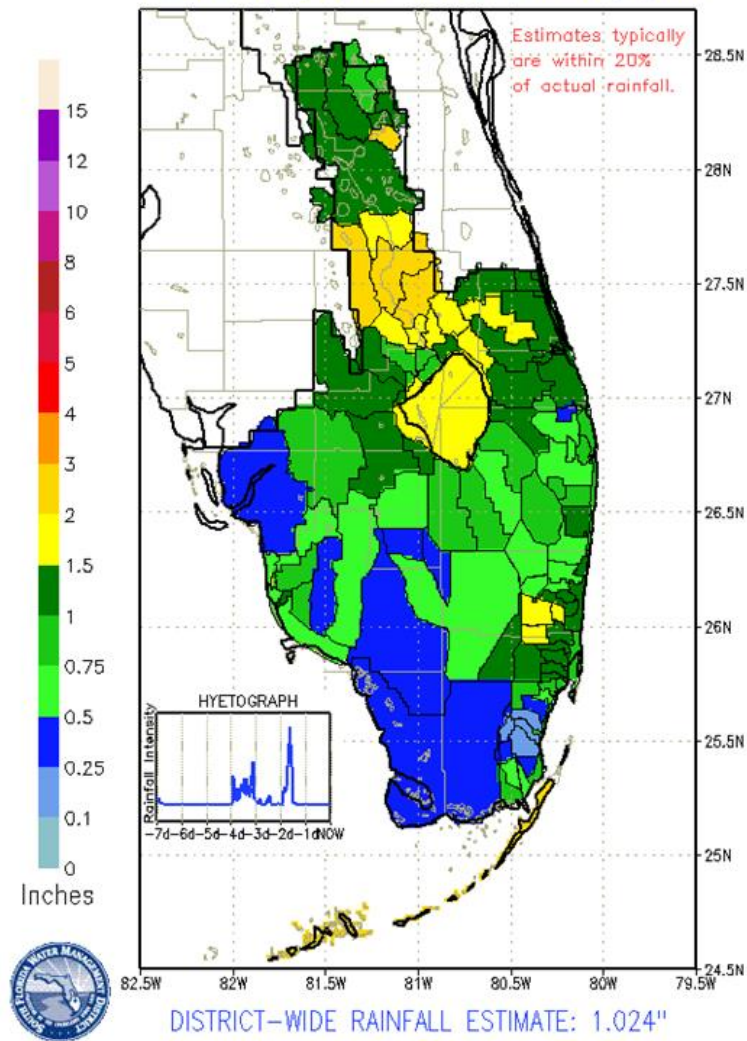


Figure 4. 7-Day rainfall estimates by RAINDAR.

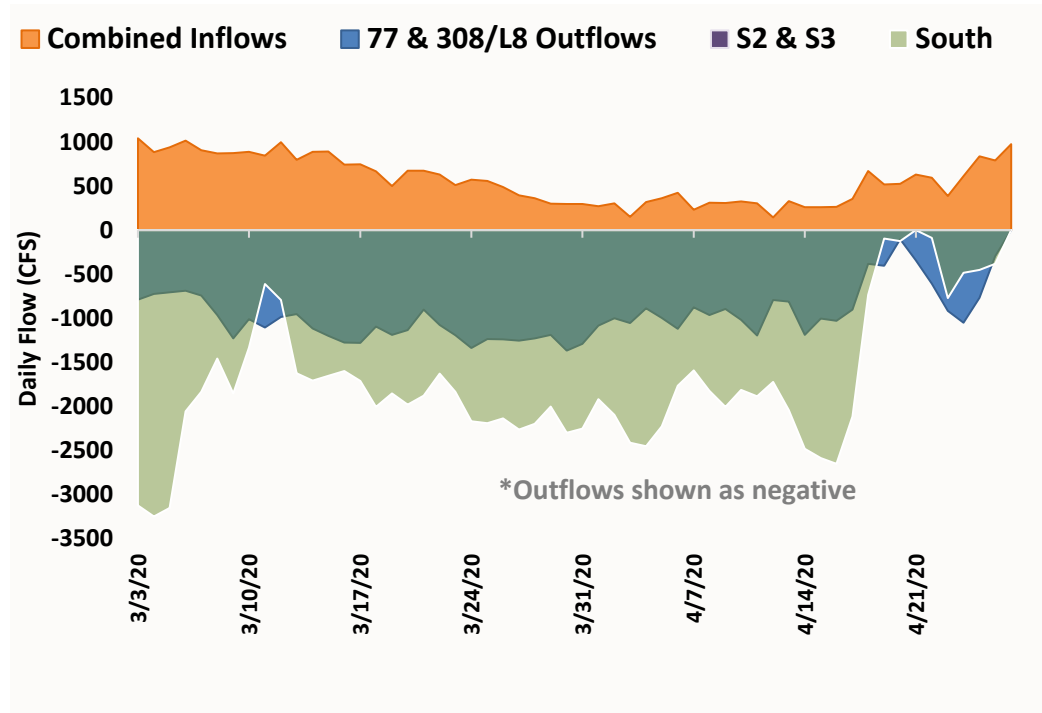


Figure 5. Major inflows (orange) and outflows (blue) of Lake Okeechobee, including the S-350 structures designated as South (green). The L-8 Canal flows through Culvert 10A are included as outflows when positive, and as inflows when backflowing into the Lake. All inflows and outflows are shown as positive and negative, respectively, for visual purposes. Outflows through the S-77 and S-308 structures are shown based on their downstream gauges to account for lock openings for navigation.

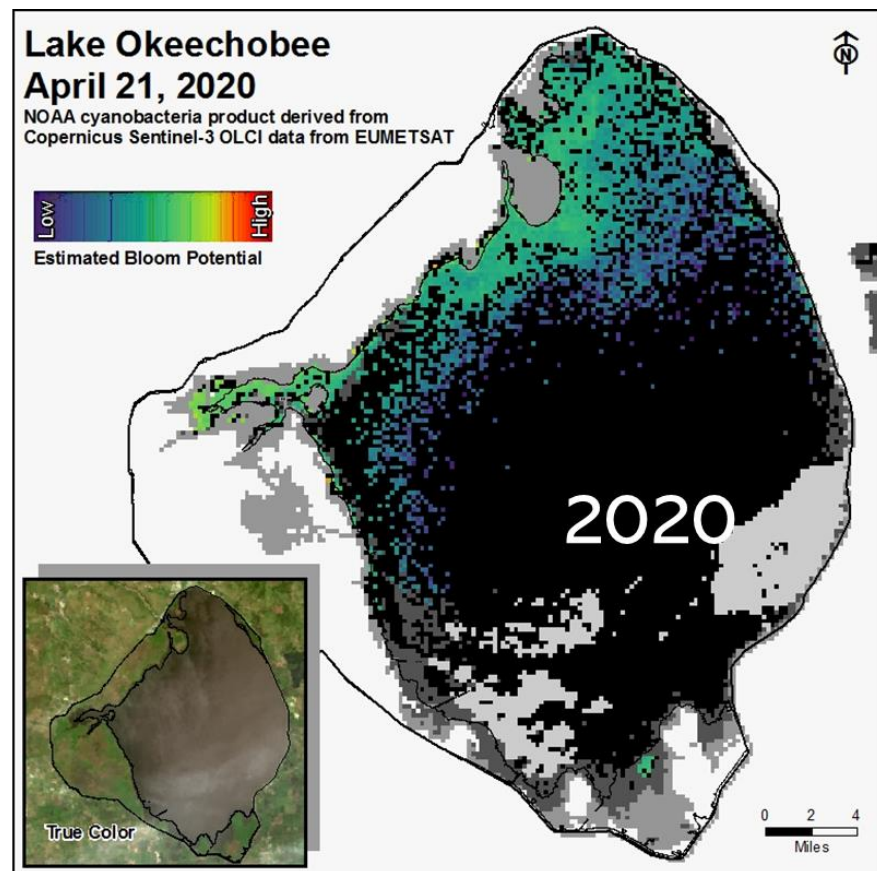
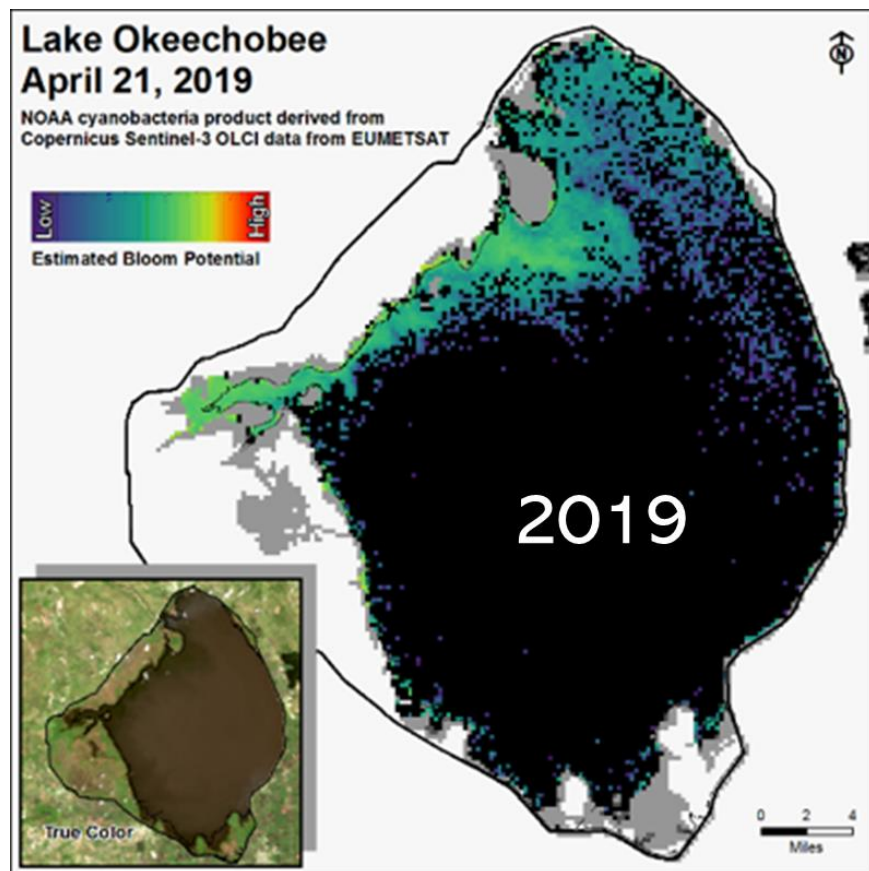


Figure 6. Potential for cyanobacterial blooms on Lake Okeechobee in mid-April 2019 and 2020, based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

ESTUARIES

St. Lucie Estuary:

Last week total inflow to the St. Lucie Estuary averaged approximately 1,421 cfs (Figures 1 and 2) and last month inflow averaged about 742 cfs. Last week's provisional averaged inflows from the tidal basin and the structures are shown in Table 1.

Table 1. Weekly average inflows (data are provisional).

| Location | Flow (cfs) |
|--|-------------------|
| Tidal Basin Inflow | 1327 |
| S-80 | 0 |
| S-308 | -117 |
| S-49 on C-24 | 0 |
| S-97 on C-23 | 1 |
| Gordy Rd. structure on Ten Mile Creek | 93 |

Over the past week, salinity decreased throughout the estuary (Table 2, Figures 3 and 4). The seven-day moving average of the water column (an average of the surface and bottom salinity) at the US1 Bridge is 23.7. Salinity conditions in the middle estuary are estimated to be within the good range for adult eastern oysters (Figure 3).

Table 2. Seven-day average salinity at three monitoring sites in the St. Lucie Estuary. Current average is in bold face type, previous average in parentheses. The envelope reflects the preferred salinity range for adult eastern oysters (*Crassostrea virginica*) in the middle estuary.

| Sampling Site | Surface | Bottom | Envelope |
|----------------------|--------------------|--------------------|-----------------|
| HR1 (North Fork) | 20.1 (22.4) | 22.1 (23.5) | NA ¹ |
| US1 Bridge | 23.2 (25.2) | 23.9 (25.5) | 10.0-26.0 |
| A1A Bridge | 29.0 (30.8) | 30.0 (31.4) | NA ¹ |

¹Envelope not applicable

Caloosahatchee Estuary:

Last week total inflow to the Caloosahatchee Estuary averaged approximately 557 cfs (Figures 5 and 6) and last month inflow averaged about 492 cfs. Last week's provisional averaged inflows from the structures and the tidal basin are shown in Table 3.

Table 3. Weekly average inflows (data is provisional).

| Location | Flow (cfs) |
|--------------------|-------------------|
| S-77 | 545 |
| S-78 | 386 |
| S-79 | 483 |
| Tidal Basin Inflow | 74 |

Over the past week, salinity remained about the same throughout the estuary (Table 4, Figures 7 & 8). The seven-day average salinity values are within the good range for adult eastern oysters at Cape Coral and in the fair range at Shell Point and at Sanibel (Figure 9). The seven-day average surface salinities (Table 4) are in the good range for tape grass at Val I-75 and in the fair range at Ft. Myers.

Table 4. Seven-day average salinity at six monitoring stations in the Caloosahatchee Estuary. Current average is in bold, previous average in parentheses. The envelope at Val I-75 is for the protection of tape grass in the upper estuary and the envelope in the lower estuary reflects the preferred salinity range for adult eastern oysters (*Crassostrea virginica*).

| Sampling Site | Surface | Bottom | Envelope |
|-----------------------|--------------------|--------------------|----------------------|
| S-79 (Franklin Lock) | 1.6 (2.5) | 3.0 (3.6) | NA ¹ |
| Val I75 | 5.6 (5.3) | 6.9 (6.1) | 0.0-5.0 ² |
| Ft. Myers Yacht Basin | 13.9 (13.7) | 15.6 (14.7) | NA |
| Cape Coral | 23.0 (22.6) | 24.0 (23.7) | 10.0-30.0 |
| Shell Point | 31.8 (32.1) | 32.6 (32.4) | 10.0-30.0 |
| Sanibel | 34.4 (34.7) | 35.1 (35.4) | 10.0-30.0 |

¹Envelope not applicable and ²Envelope is based on a 2-week forecast 30-day average.

Forecast of surface salinity (Table 5 and Figure 10) at Val I-75 for the next two weeks using the autoregression model (Qiu and Wan, 2013) coupled with a linear reservoir model for the tidal basin predicts daily salinity ranging from 5.2 to 8.2 at the end of the two-week period for pulse release at S-79 ranging from 0 to 800 cfs and estimated Tidal Basin inflows of 60 cfs. The 30-day moving average surface salinity at Val I-75 is forecast to be between 5.1 and 6.2 (Table 5). The current salinity conditions at Val I-75 are outside of the envelope of salinity 0.0-5.0 for this site (Table 4).

Table 5. Predicted salinity at Val I-75 at the end of forecast period

| Scenario | Q79 (cfs) | TB runoff (cfs) | Daily salinity | 30 day Mean |
|----------|-----------|-----------------|----------------|-------------|
| A | 0 | 60 | 8.2 | 6.2 |
| B | 300 | 60 | 7.9 | 6.0 |
| C | 450 | 60 | 6.8 | 5.6 |
| D | 650 | 60 | 5.3 | 5.2 |
| E | 800 | 60 | 5.2 | 5.1 |

Red tide

The Florida Fish and Wildlife Research Institute reported on April 24, 2020, that *Karenia brevis*, the Florida red tide dinoflagellate, was not observed in samples collected from offshore of Lee or Palm Beach counties (no samples were analyzed this week from St. Lucie, Martin, Broward or Miami-Dade counties).

Water Management Recommendations

Lake stage is in the Beneficial Use Flow sub-band. Tributary conditions are normal. The South Florida Water Management District's Lake Okeechobee Adaptive Protocol's Release Guidance suggests no release from the Lake to the Caloosahatchee Estuary.

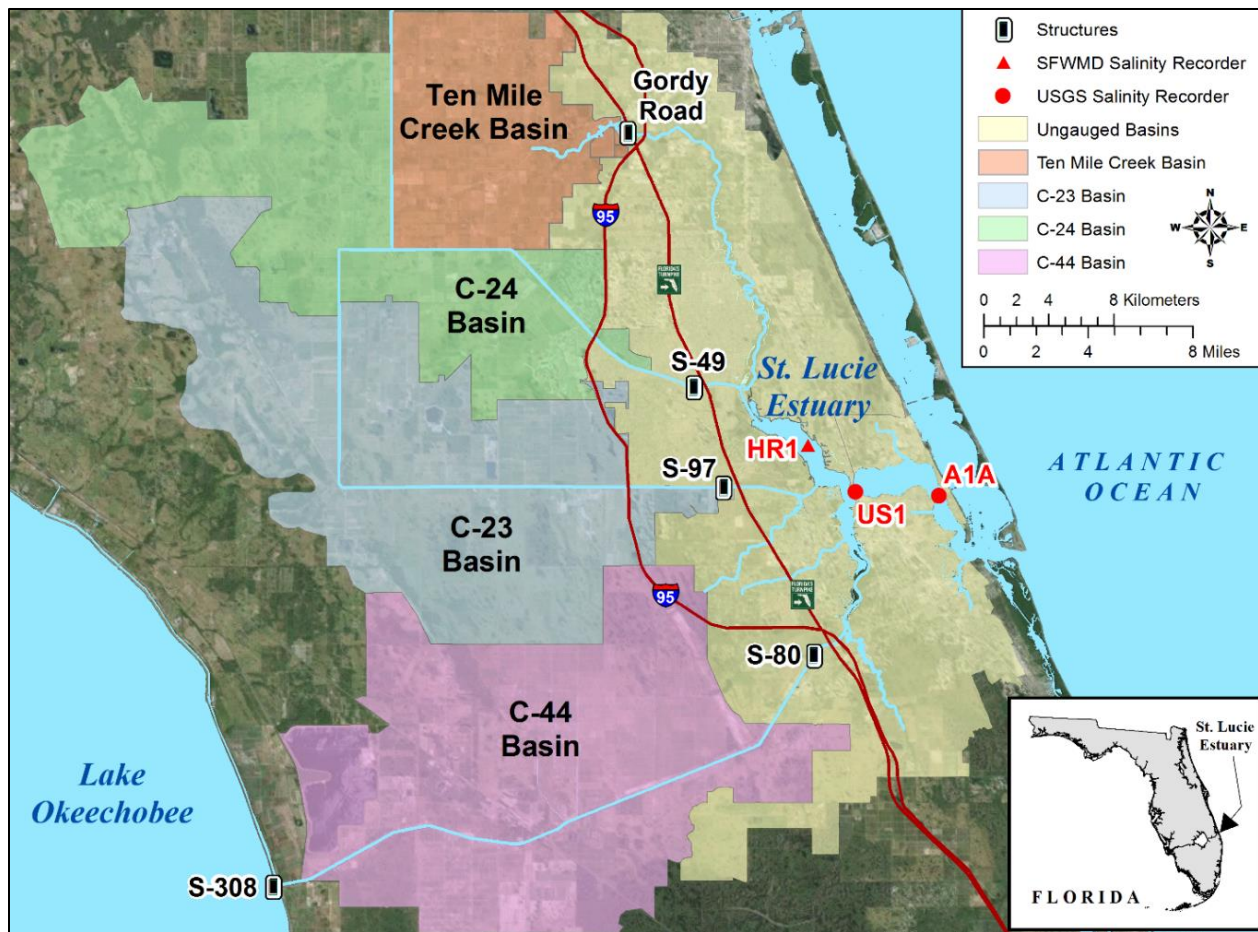


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

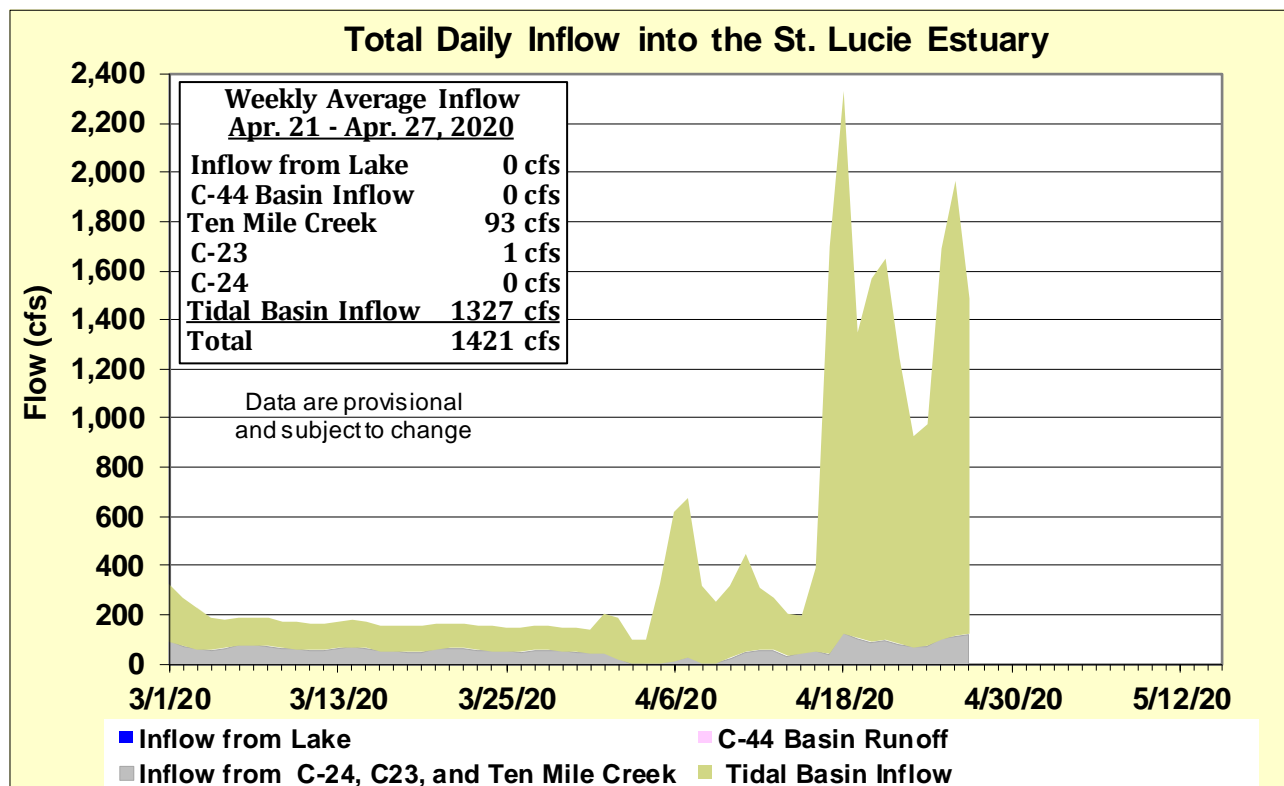


Figure 2. Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile

Creek, and tidal basin into the St. Lucie Estuary.

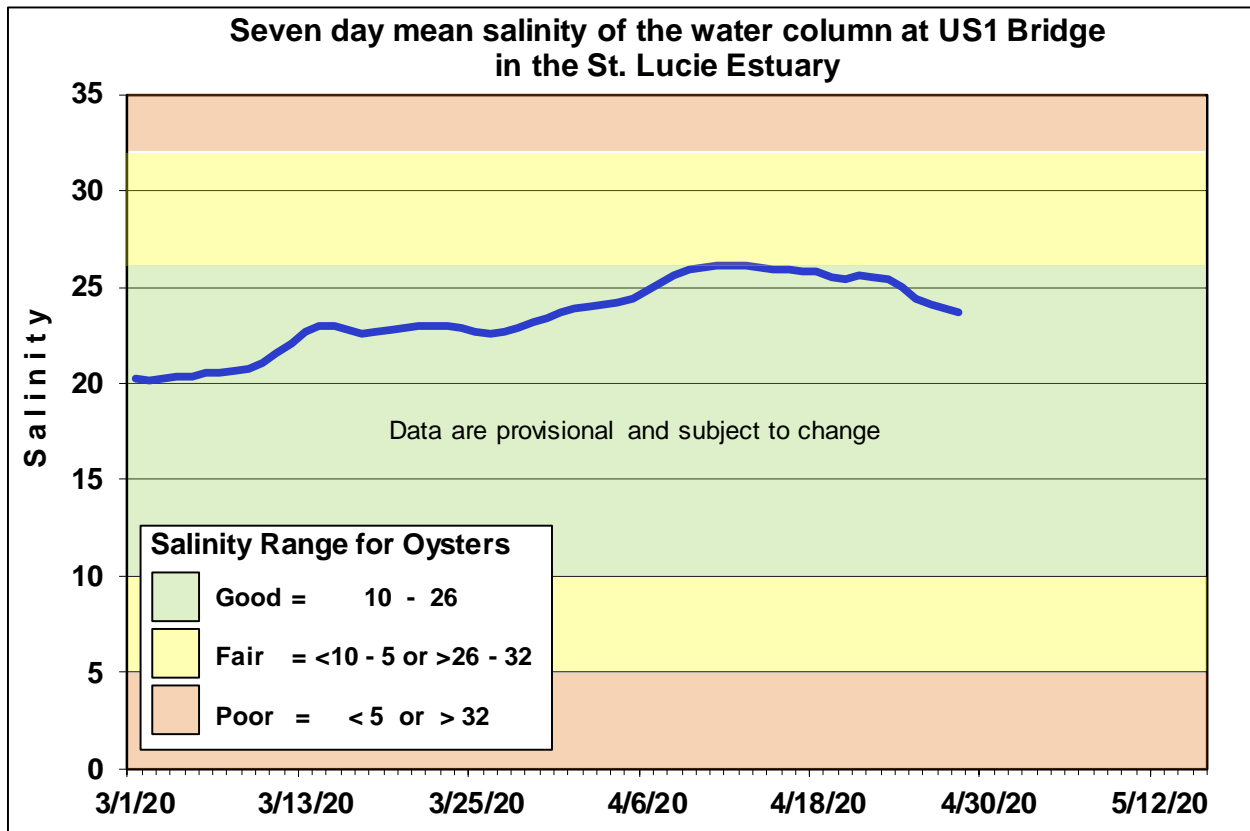


Figure 3. Seven-day mean salinity of the water column at the US1 Bridge.

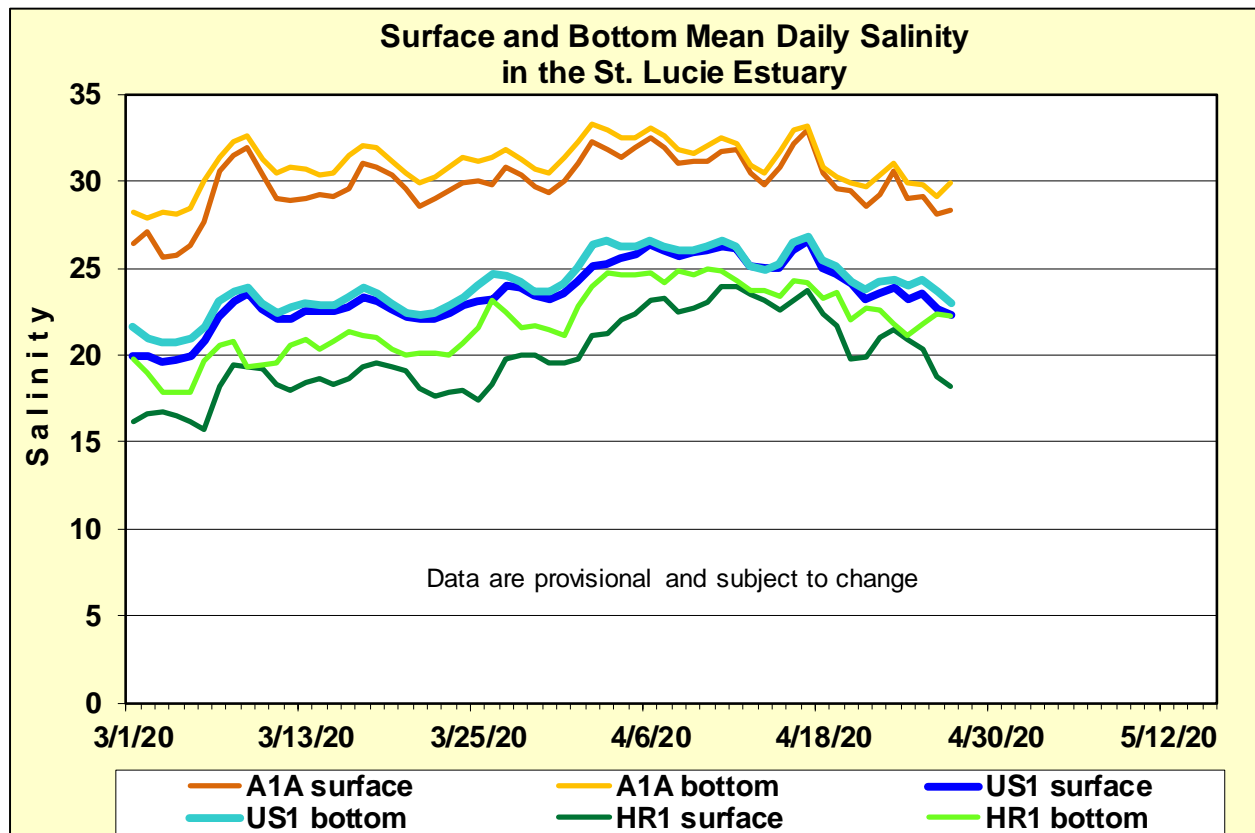


Figure 4. Daily mean salinity at the A1A, US1, and HR1 stations.

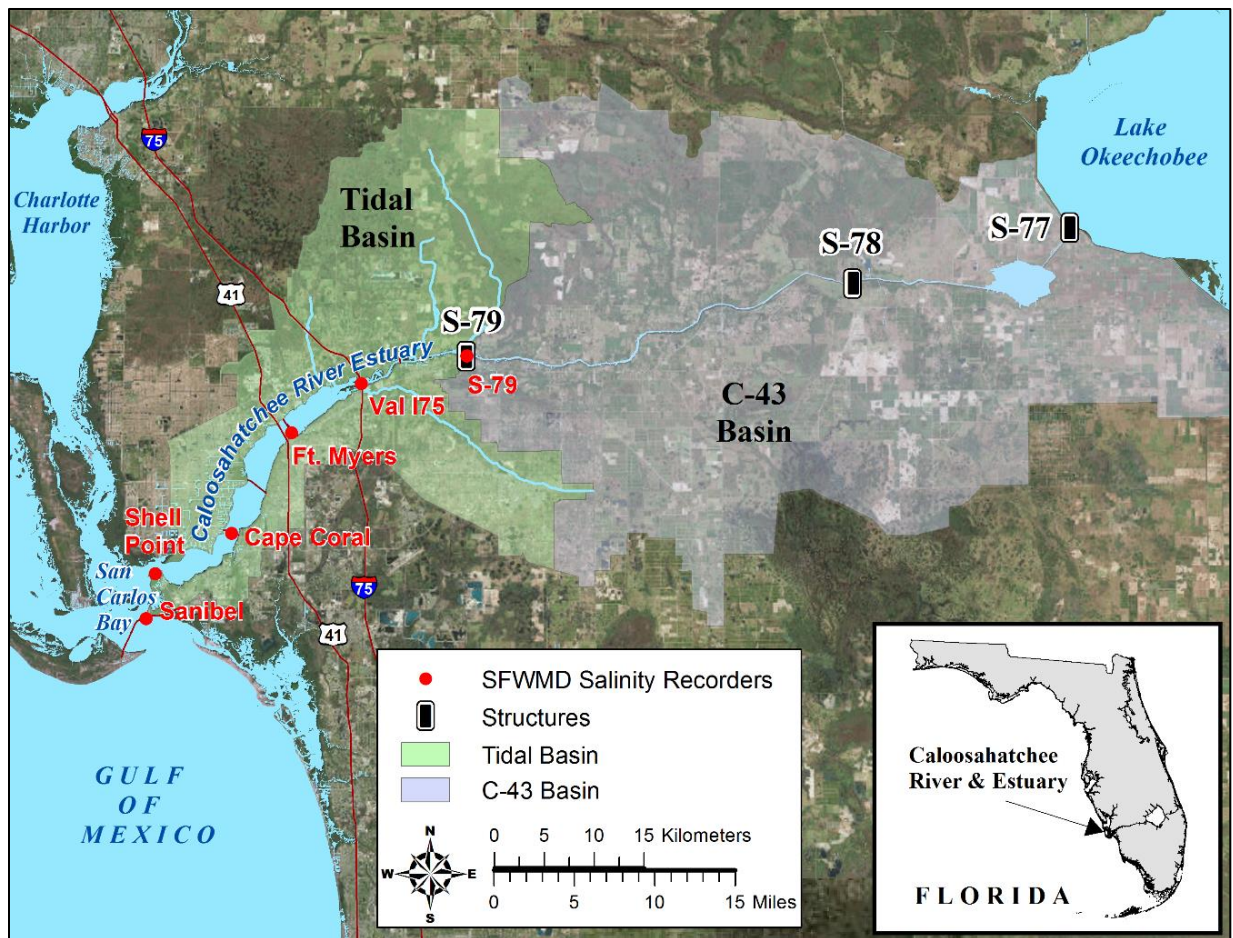


Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

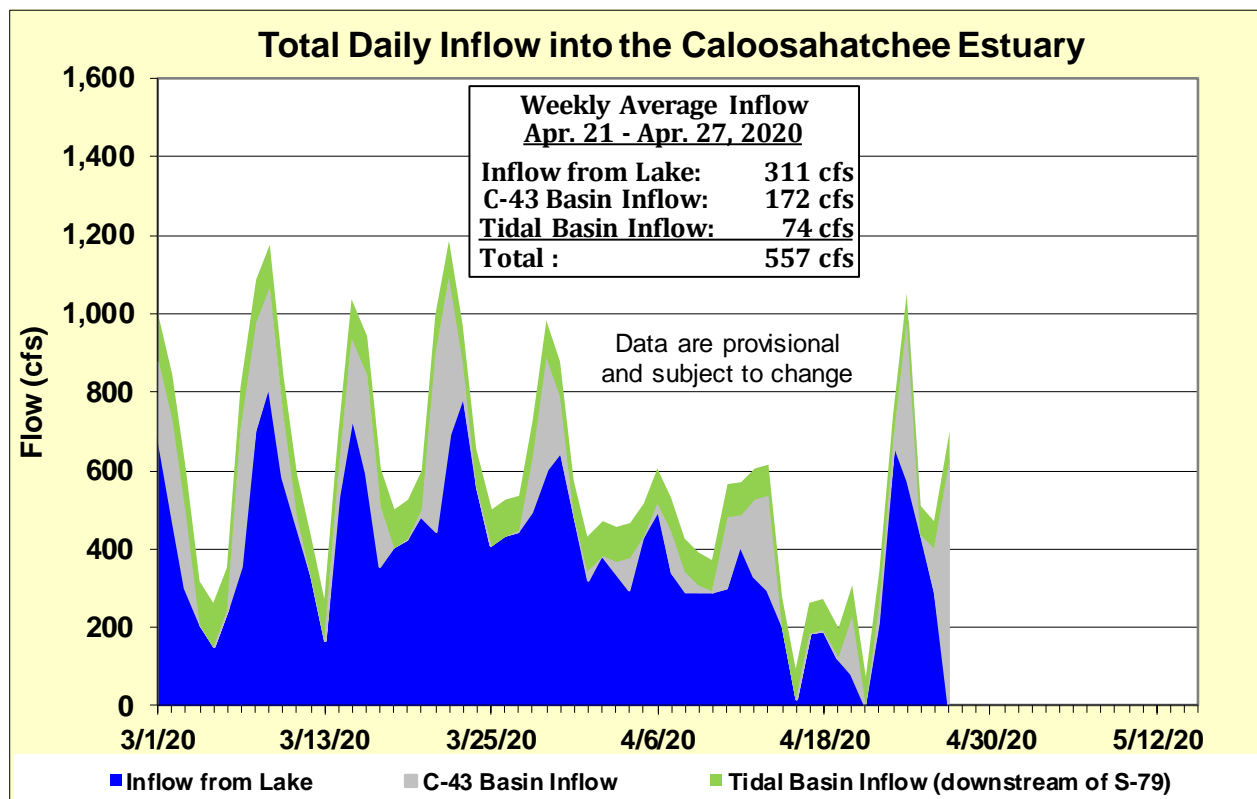


Figure 6. Total daily inflows from Lake Okeechobee, runoff from the C-43 basin

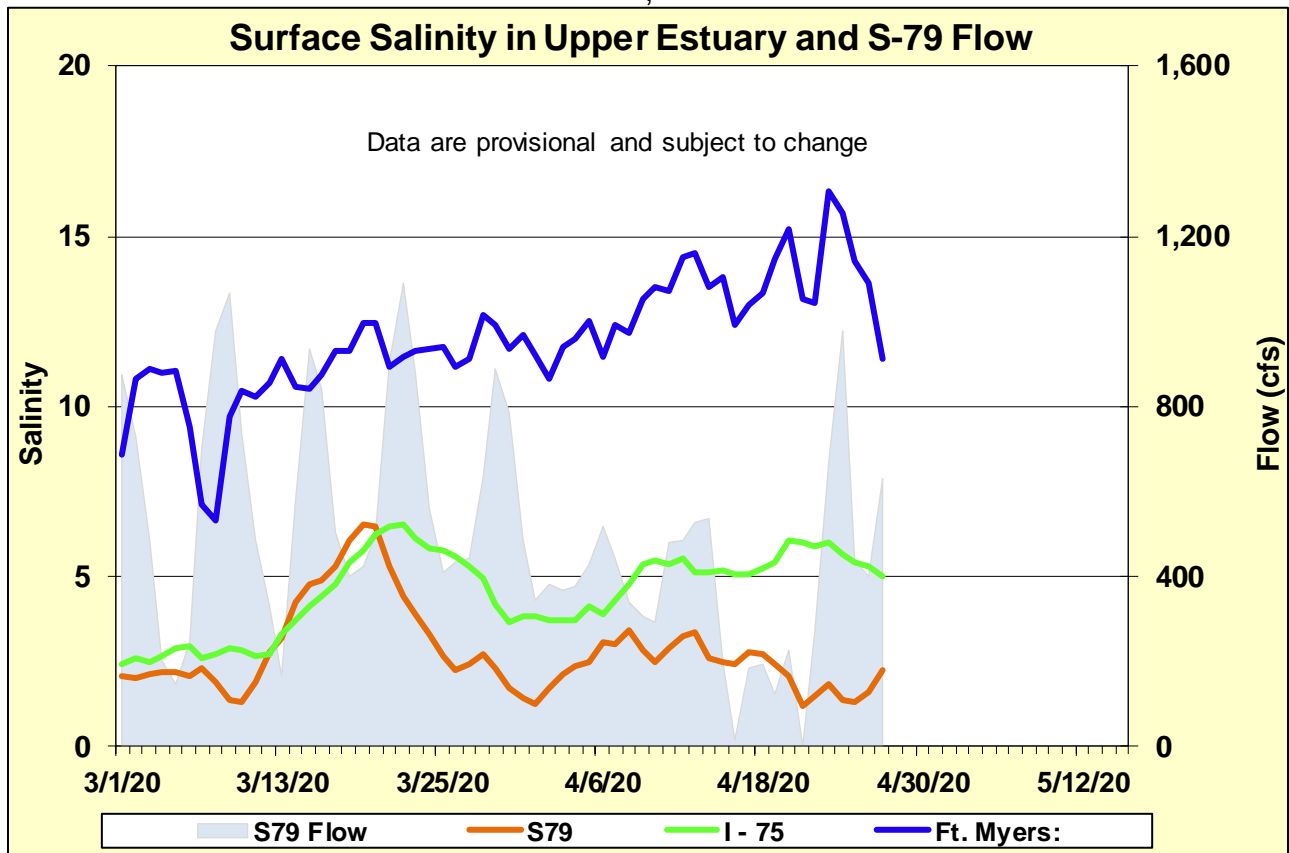


Figure 7. Daily mean flows at S-79 and salinity at upper estuary monitoring stations.

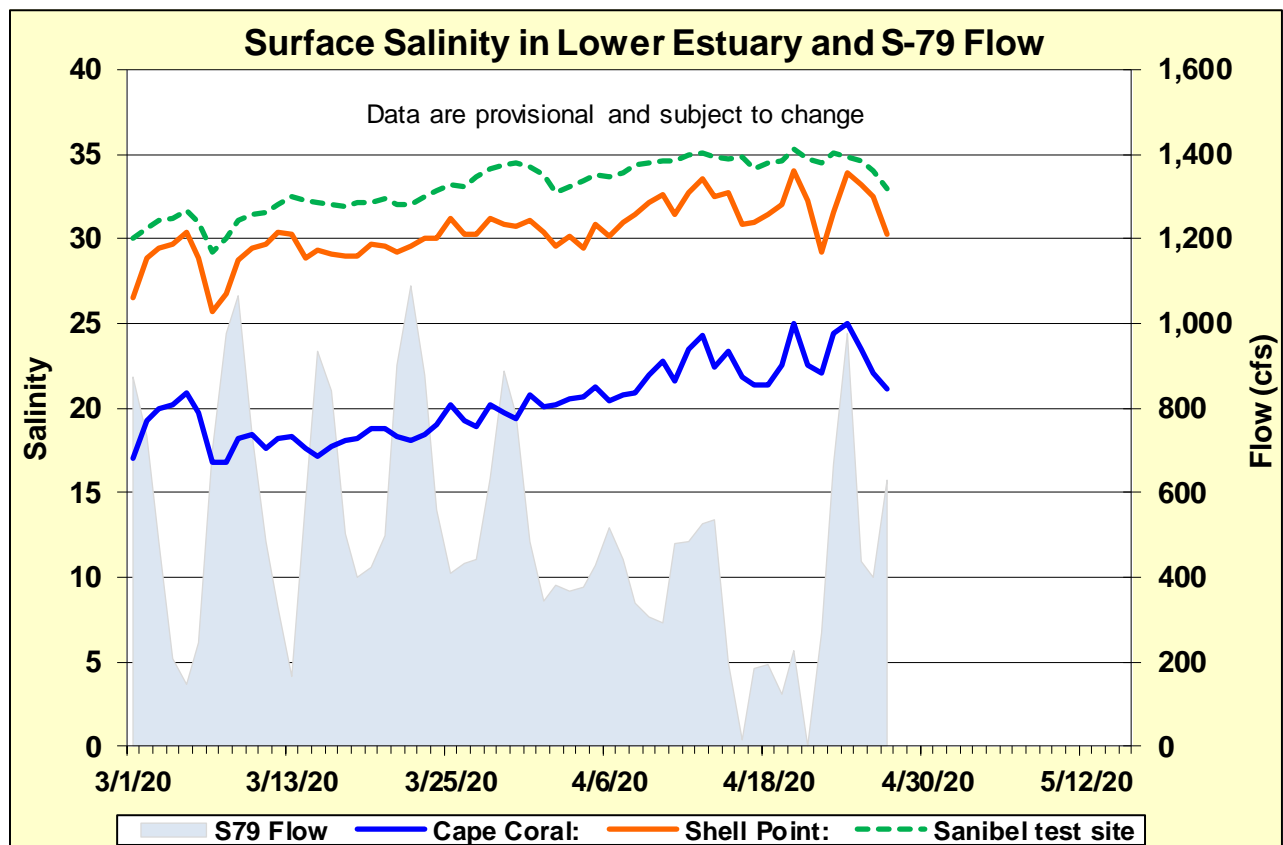


Figure 8. Daily mean flows at S-79 and salinity at lower estuary stations.

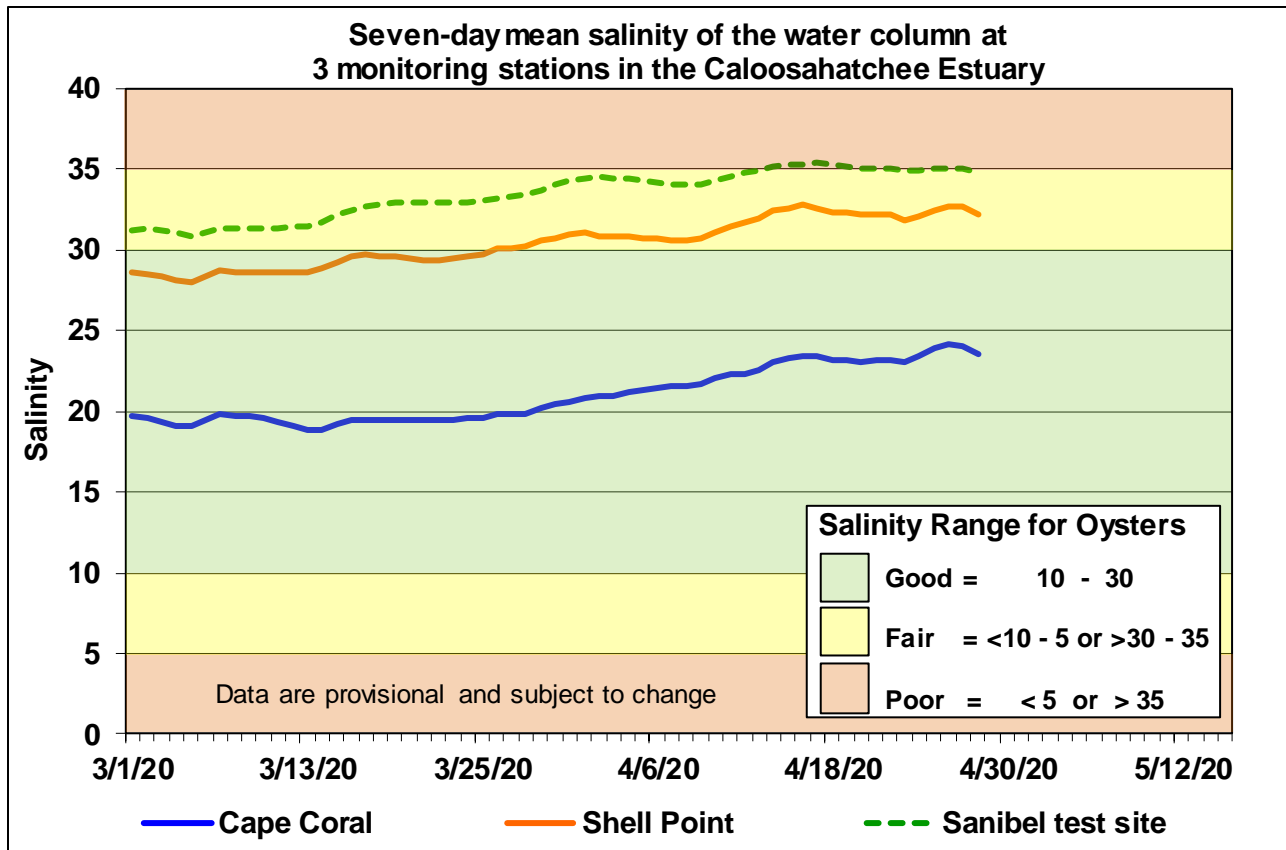


Figure 9. Seven-day mean salinity at Cape Coral, Shell Point, and Sanibel monitoring stations.

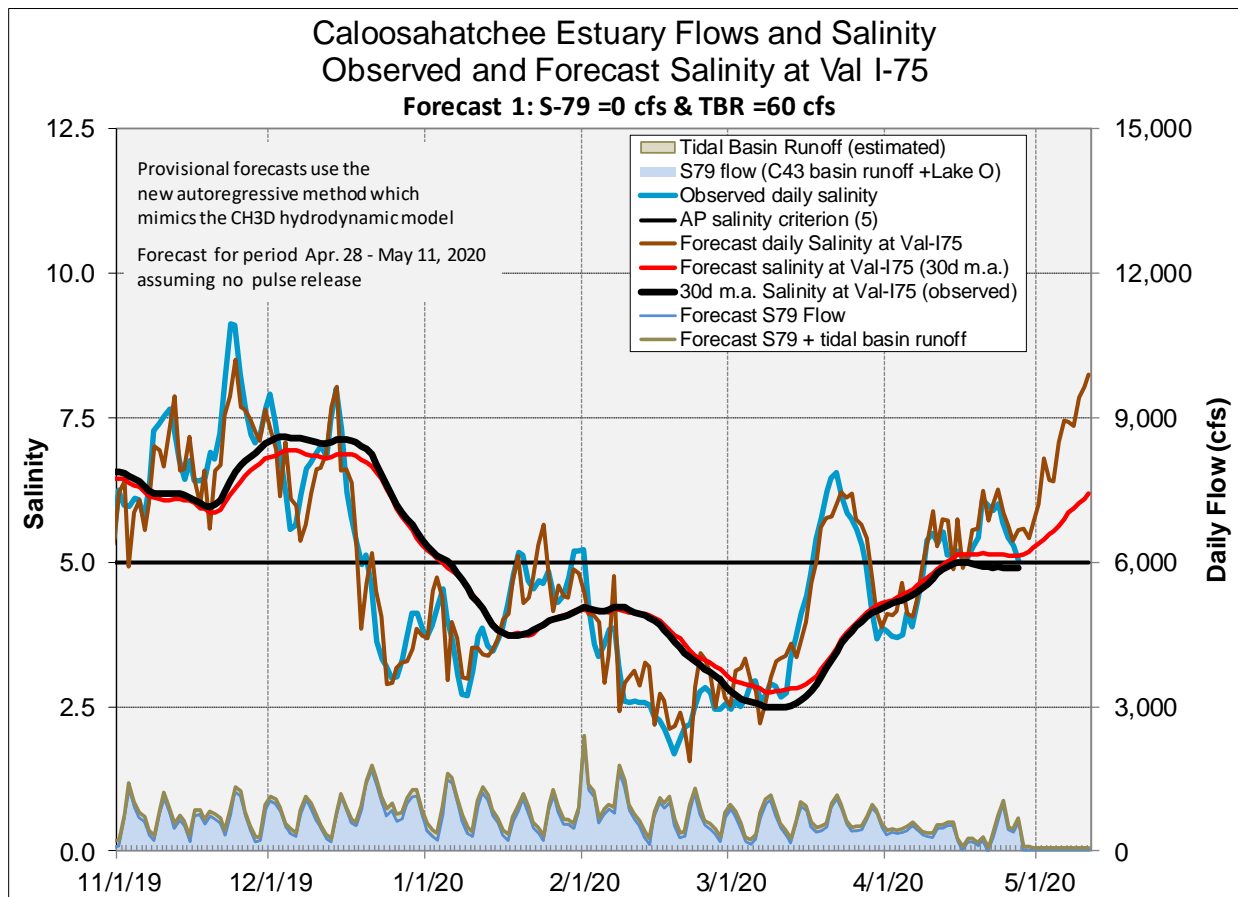

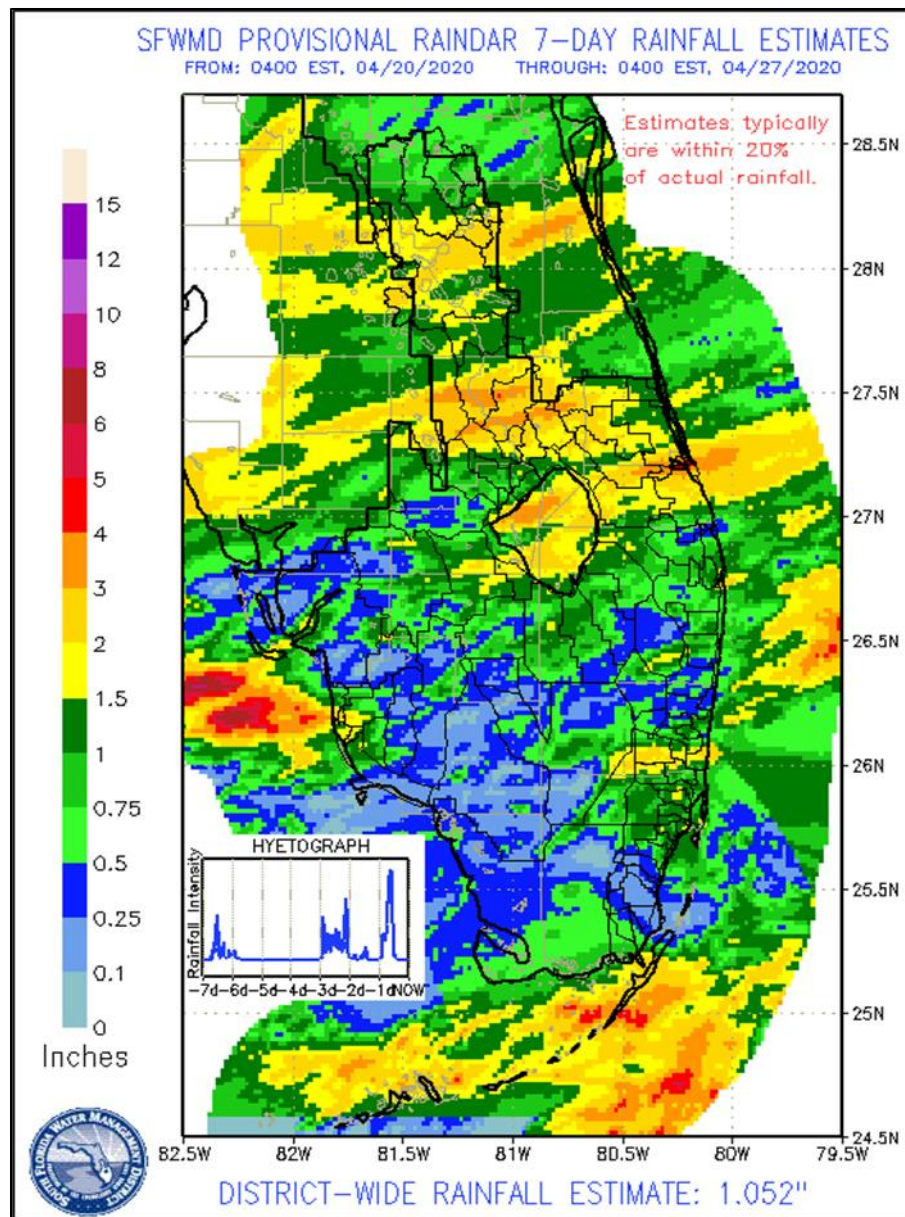


Figure 10. Forecasted Val I-75 surface salinity assuming no pulse release at S-79.

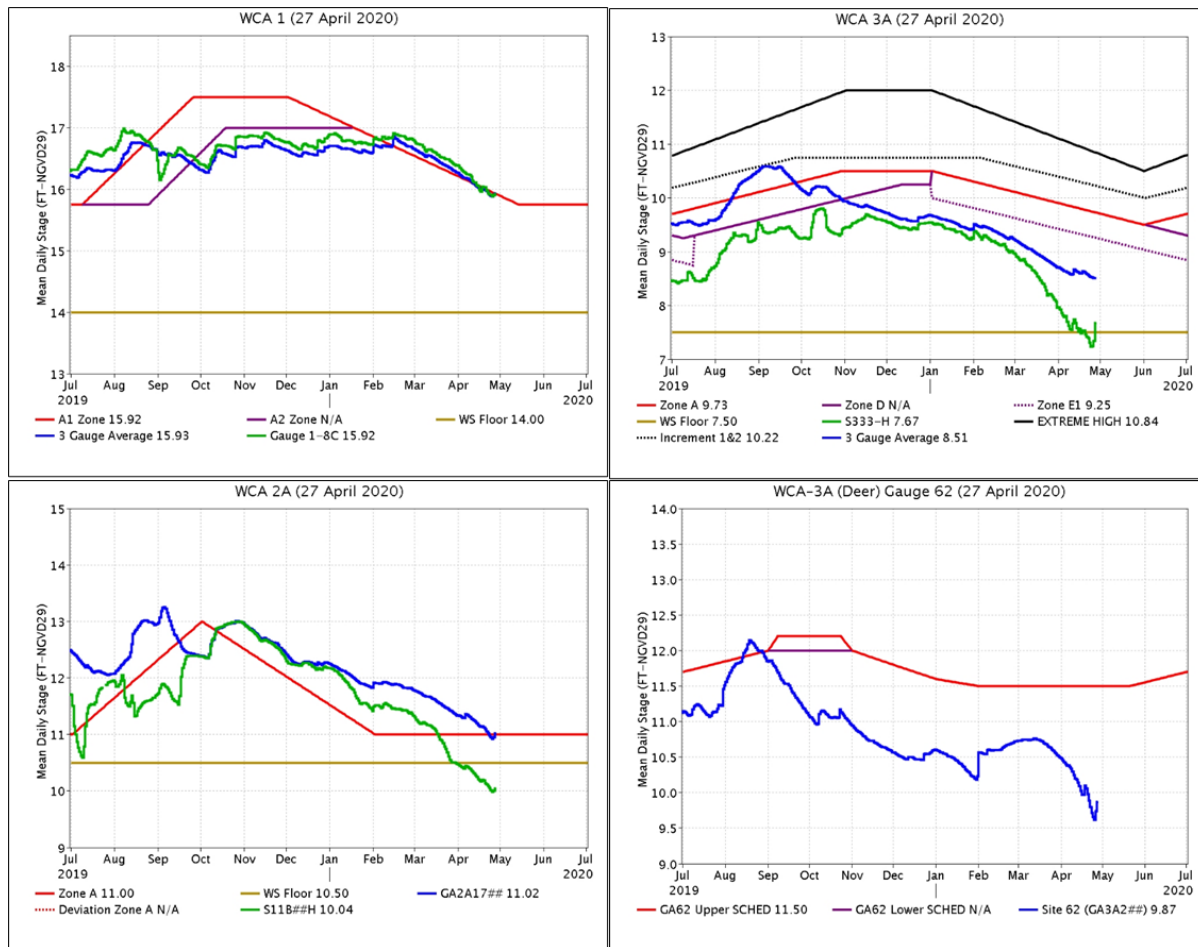
EVERGLADES

Near-average rainfall was recorded across the Everglades last week, with northern WCA-3B receiving well-above average rainfall. However, stages fell on average 0.08 feet last week, and changes ranged from -0.20 to +0.08 feet. Evaporation was estimated at 1.86 inches last week.

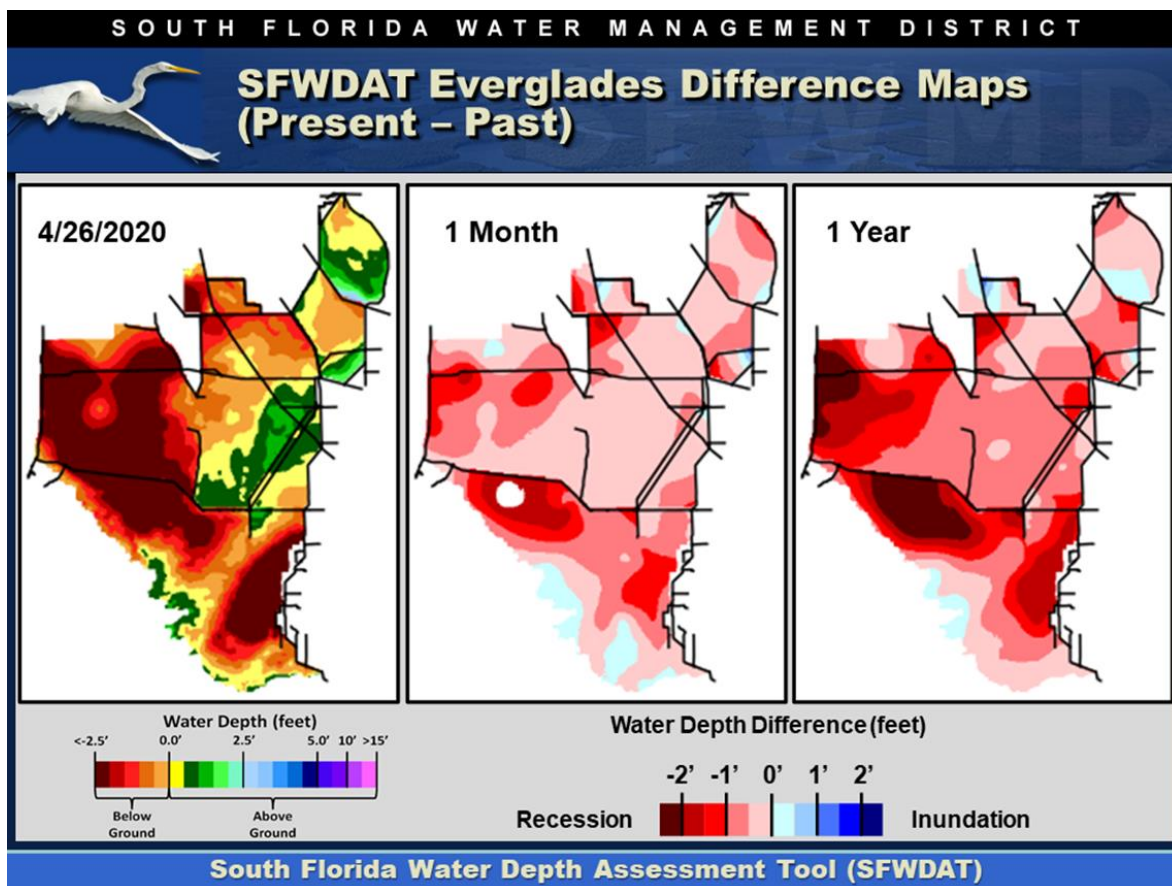
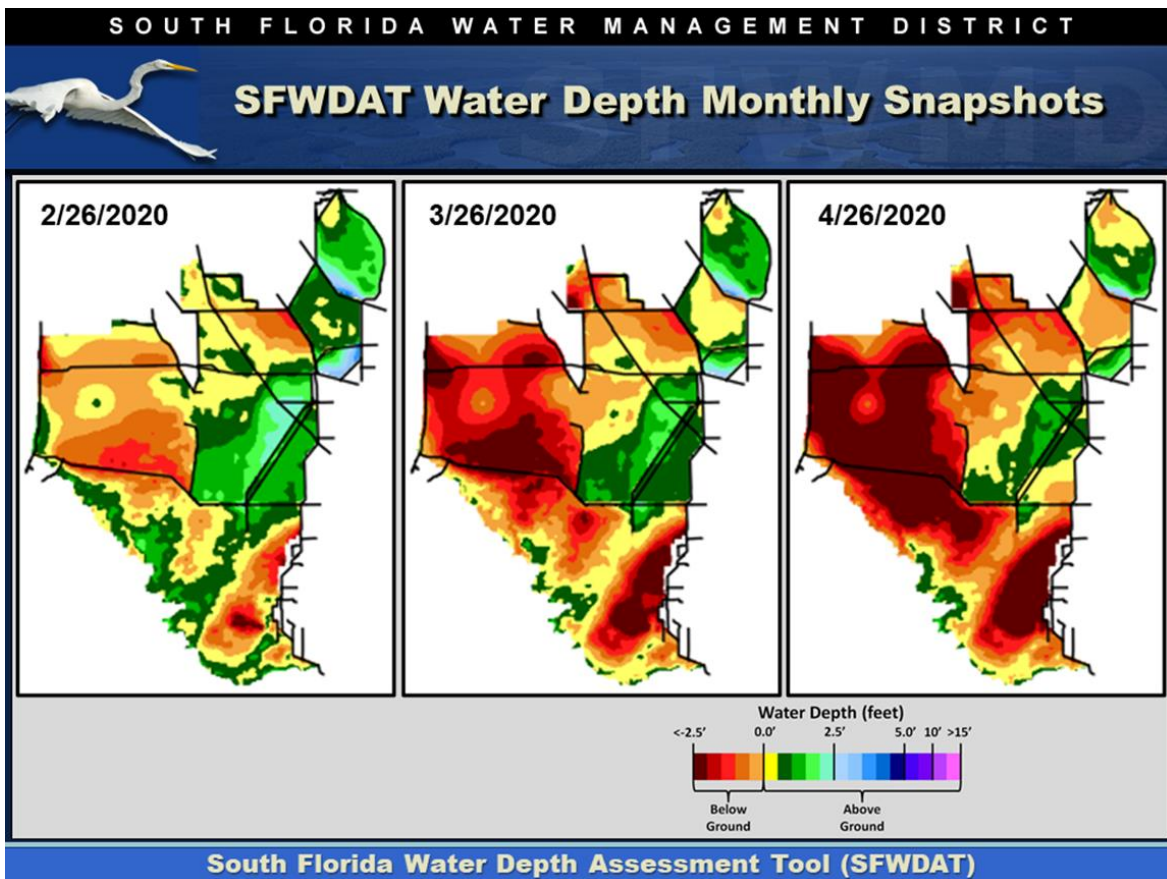
| Everglades Region | Rainfall (Inches) | Stage Change (feet) |  Good Fair Poor |
|-------------------|-------------------|---------------------|--|
| WCA-1 | 0.68 | -0.05 | |
| WCA-2A | 0.58 | -0.08 | |
| WCA-2B | 0.50 | -0.15 | |
| WCA-3A | 0.51 | -0.10 | |
| WCA-3B | 1.10 | -0.01 | |
| ENP | 0.48 | -0.17 | |



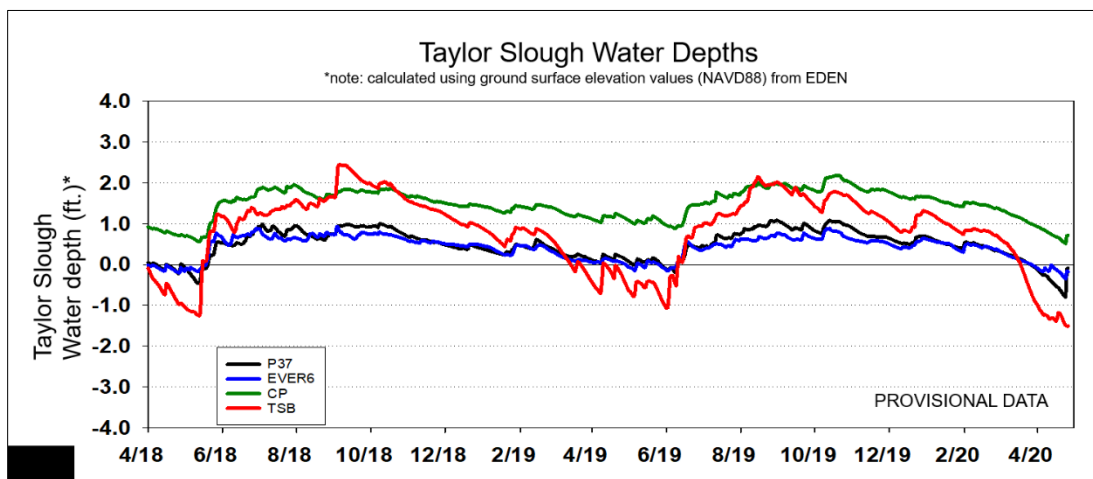
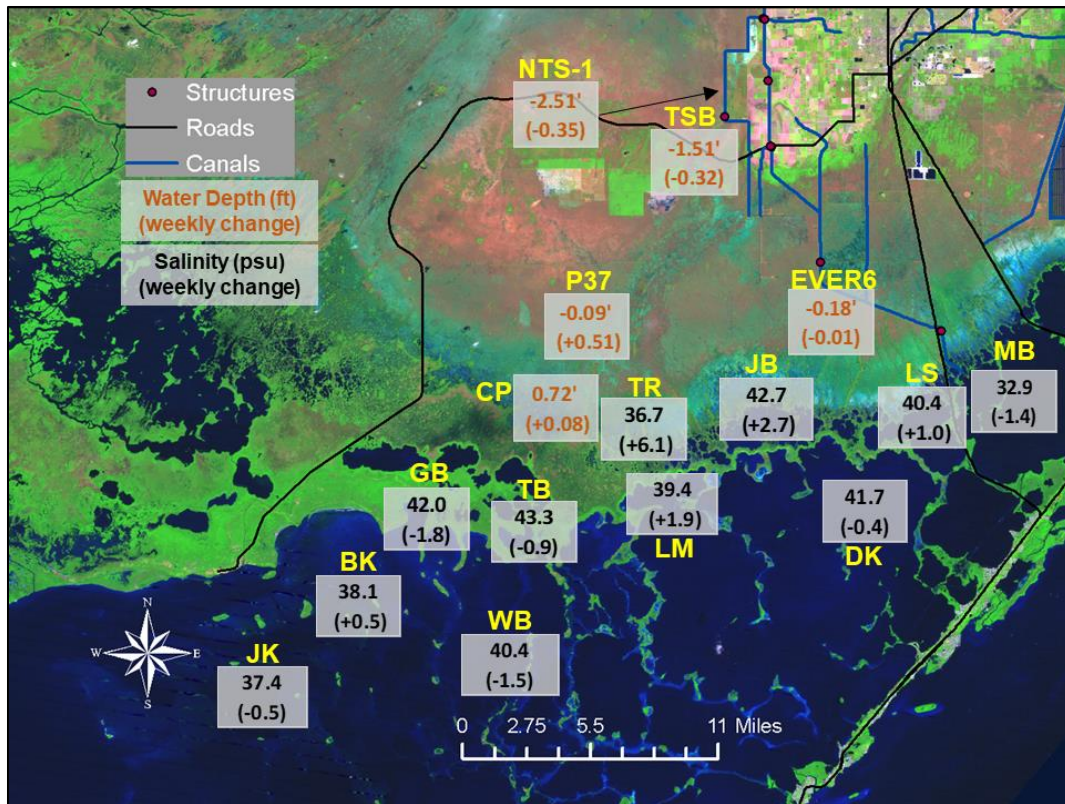
Regulation Schedules: WCA-1: Stage at the 1-8C Gauge continues to trends near parallel to the falling regulation line last week, now at the Zone A1 line. WCA-2A: Stage at Gauge S11-B remained below the water supply floor of the regulation schedule last week and trends downward, currently 0.46 feet below. WCA-3A: The Three Gauge Average stage trends away from regulation last week, still well below the falling Zone E1 regulation line, presently 0.74 feet below. S333-Hw is 0.17' above the water supply floor. WCA-3A at gauge 62 (Northwest corner): Stage rose towards the Upper Schedule but remains 1.63 feet below the stable regulation line.

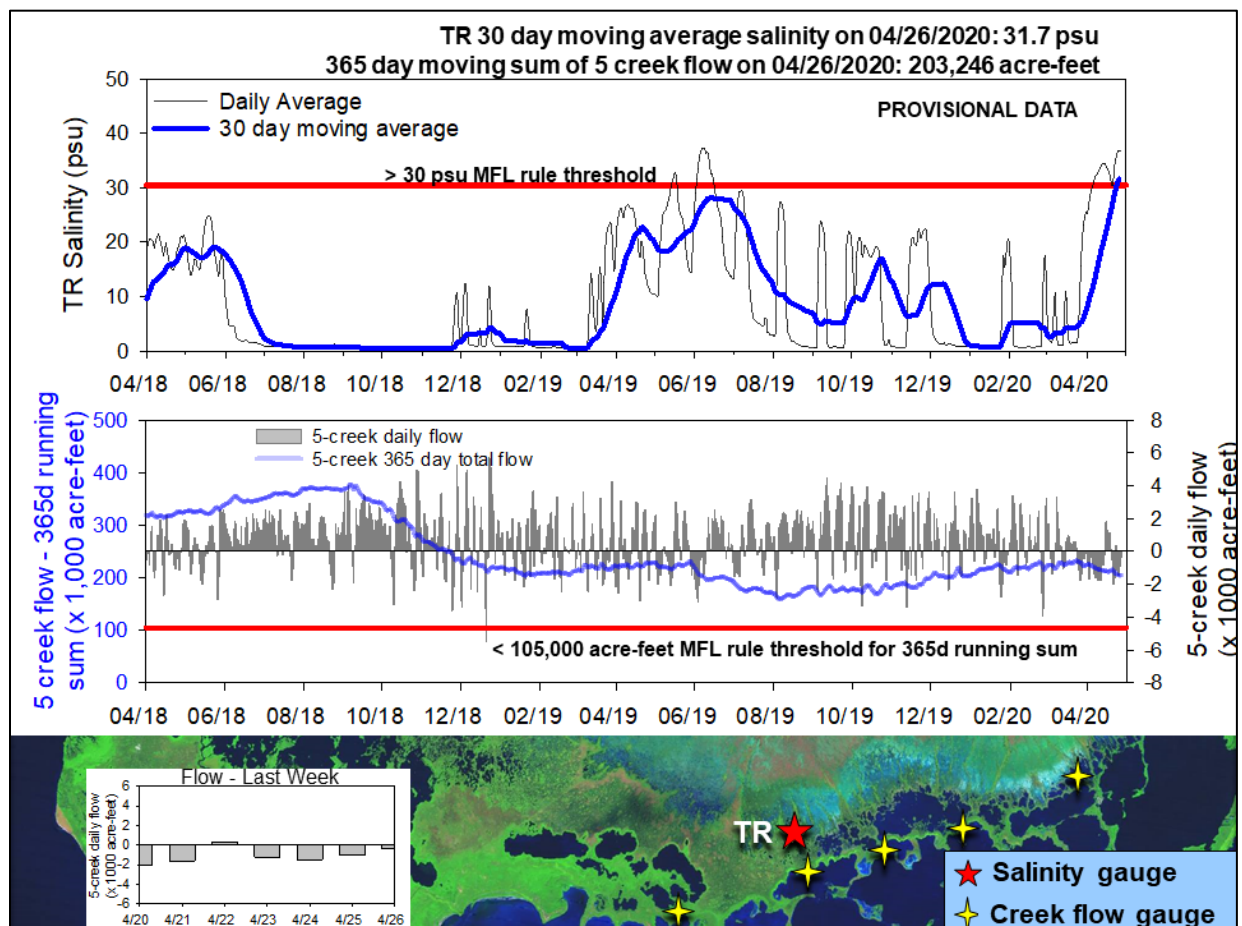
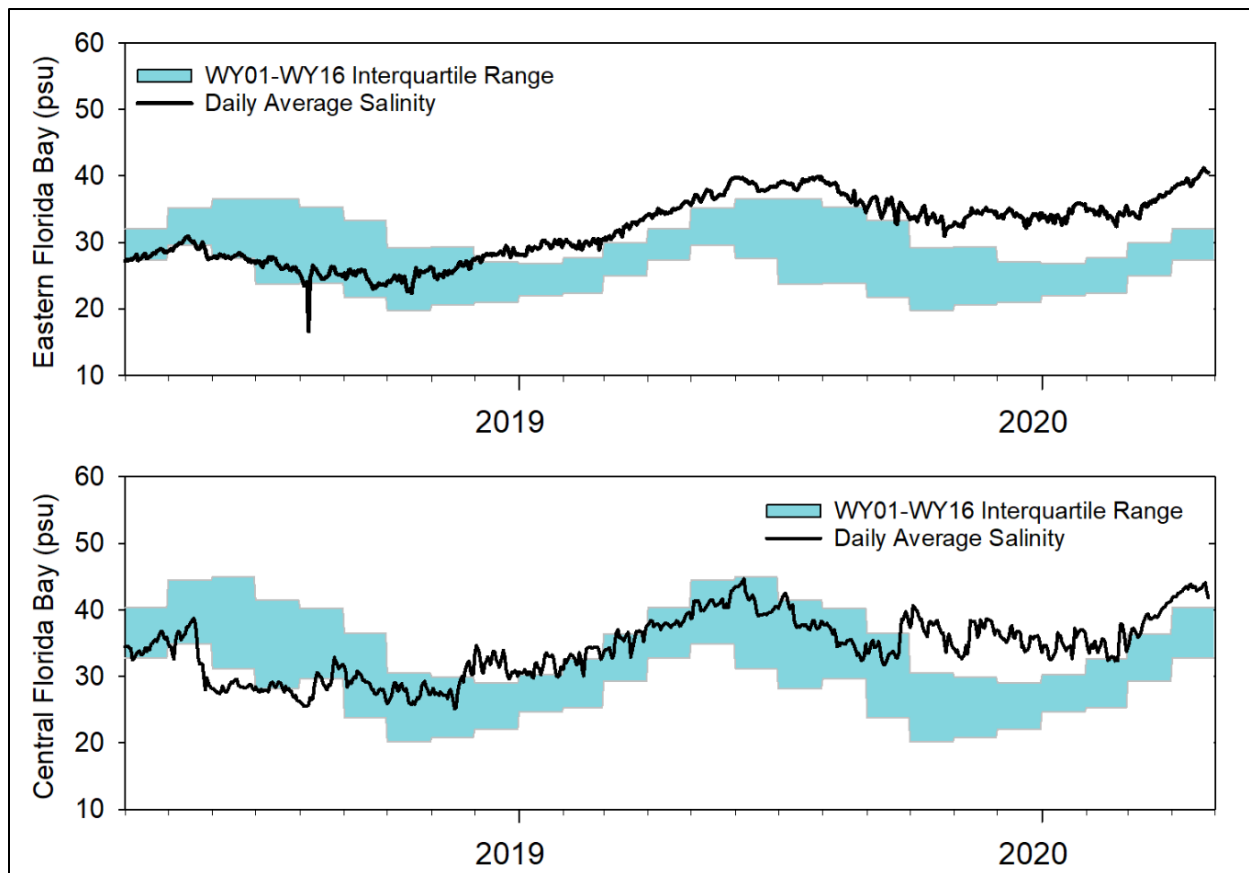


Water Depths: The WDAT tool for spatial interpolation of depth monthly snapshots indicate depths significantly below ground across WCA-3A North, and more than a foot below in the extreme northeast (for 2 months) and up to 1.5 feet below in the northwest regions with little potential for surface water in that basin. The interior of WCA-2A is drying down to ground surface, with the northern area of cattail expansion along the L39 and south now below ground. WCA-1 depths look stable and drawing down from north to south. All the sloughs in ENP have all dried down to ground surface or near. Comparing WDAT water levels from present, over the last month there was a significant recession in all the WCAs, the most rapid in northwestern corner of WCA-3A North. Looking back one year the stage difference patterns are similar and more dramatic. The entirety of WCA-3A and 2A are significantly lower in stage. WCA-2A is most dramatically lower in stage in the northeastern regions of that basin and WCA-3A in the northwest and in the northern reaches of the L-67 canals. WCA-1 stages are slightly lower than they were a year ago, particularly in the north. The WDAT model indicates a much drier condition in the western basins compared to a month and a year ago.



Taylor Slough Water Levels: An average of 0.88 inches of rain fell over Taylor Slough and Florida Bay this last week, however stage still decreased an average of 0.02 feet. Northern Taylor Slough is averaging 13 inches below the historical average while the ENP panhandle region is still 1.5 inches above the historical average this week.





Florida Bay Salinities: Average salinity in Florida Bay increased 0.1 psu this week. Florida Bay average salinity is still 5 psu higher than the historical average for this time of year, but locally heavy rains on Saturday did cause small decreases to the high salinities in central and western Florida Bay. Eastern Florida Bay salinities continued to rise and are above the 90th percentile of historical data for that region during April.

Florida Bay MFL: Salinity at the TR station in the mangrove zone (tracked for the Florida Bay MFL) increased to 37 psu over the last week. The 30-day moving average increased 5.5 psu to end at 31.7 psu. Weekly flow from the 5 creeks identified by yellow stars on the map totaled about -7,500 acre-feet last week with positive flows on only a single day. The 365-day moving sum of flow from the five creeks (tracked as part of the Florida Bay MFL criteria) decreased 8,000 acre-feet this week to end at 203,246 acre-feet, between the 25th percentile (192,885 acre-feet) and the median (249,091 acre-feet). Creek flow are provisional USGS data.

Water Management Recommendations

Discharges into historically over drained northeastern WCA-3A have the potential to maintain saturated soils and protect these over-drained portions of the Everglades. The ecological benefits include conserving peat and lowering the risk of muck fires especially as depths near the seasonal low in regions with muck fire potential, stages at Gauge 3A-NE in northeastern WCA-3A are more than 2.0 feet below ground. While the moderation of recession rates in any part of WCA-3A North are beneficial, available water sent through the S-150 into Northeastern WCA-3A would have greater ecological value than the same amount of water discharged in Northwestern 3A. This is due in part to the greater potential for muck fire in the northeastern region versus the northwestern regions of that basin. Flows towards Taylor Slough and Florida Bay freshen salinity conditions within the nearshore areas of Florida Bay and decrease the currently stressful conditions for seagrasses and fauna as nearshore salinities remain elevated, decreasing the estuarine gradient within the Bay. More specific recommendations appear in the summary table below. The red text represents new or modified information or recommendations.

SFWMD Everglades Ecological Recommendations, April 28th, 2020 (red is new)

| Area | Weekly change | Recommendation | Reasons |
|-------------------|--|---|--|
| WCA-1 | Stage decreased by 0.05' | Conserving water in this basin has ecological benefit. | Protect downstream habitat and wildlife. Provide wading bird foraging opportunities as wading bird nesting continues in this basin. |
| WCA-2A | Stage decreased by 0.08' | Moderating the recession rate and conserving water in this basin has ecological benefit. | Protect upstream/downstream habitat and wildlife. Provide wading bird foraging opportunities as wading bird nesting continues in this basin. |
| WCA-2B | Stage decreased by 0.15' | Conserving water in this basin has benefit. | Protect upstream/downstream habitat and wildlife. |
| WCA-3A NE | Stage decreased by 0.04' | Conserving water and slowing the recession in this basin has ecological benefit as current water depths are well below seasonal averages. Inflows to this region have ecological benefit. | Protect and conserve peat soils, prevent muck fires. |
| WCA-3A NW | Stage decreased by 0.12' | Conserving water and slowing the recession in this basin has ecological benefit as current water depths. Inflows to this region have ecological benefit. | |
| Central WCA-3A S | Stage decreased by 0.12' | Conserving water and slowing the recession in this region has ecological benefit as current water depths are below seasonal averages. Inflows to this region have great ecological benefit. | Protect upstream/downstream habitat and wildlife. Protect wading bird foraging as nesting continues. |
| Southern WCA-3A S | Stage decreased by 0.14' | | |
| WCA-3B | Stage changes ranged from -0.06' to +0.08' | Conserving water in this basin has benefit. | Protect tree islands, upstream/downstream habitat and wildlife. |
| ENP-SRS | Stage decreased 0.17' | Make discharges to the Park according to the 2012 WCP rainfall plan | Protect upstream/downstream habitat and wildlife. |
| Taylor Slough | Stage changes ranged from -0.35' to +0.51' | Move water southward as possible | When available, provide freshwater buffer for downstream conditions. |
| FB- Salinity | Salinity changes ranged -1.8 to +2.7 psu | Move water southward as possible | When available, provide freshwater to maintain low salinity buffer and promote water movement. |