

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, Chief, Operations, Engineering and Construction Bureau  
Paul Linton, Chief, Operations Section

**FROM:** SFWMD Staff Environmental Advisory Team

**DATE:** July 24, 2018

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

### **Summary**

#### **Weather Conditions and Forecast**

Widespread thunderstorm activity today. An upper level trough over the eastern Gulf of Mexico will trap moisture over the District and generate widespread thunderstorm activity with areas of heavy rain today. Scattered thunderstorm activity is developing inland off the west coast and this activity should increase in coverage as it moves northeast through the day with heaviest activity focused along the east coast as well as north of Lake Okeechobee. Scattered shower activity will redevelop mainly west after midnight. The upper trough is forecast to shift westward to the central Gulf of Mexico on Wednesday so moderately active thunderstorm days with near average coverage are expected Wednesday and Thursday. A tropical wave is expected to pass mainly to the south of the District Thursday and Thursday night and moisture associated with the wave should increase shower activity south Thursday night and over the District Friday afternoon. Average to above average daily thunderstorm activity is then expected to persist through the end of the month with heaviest activity focused over western areas.

#### **Kissimmee**

Tuesday morning stages were 56.9 feet NGVD (0.4 feet above schedule) in East Lake Toho, 53.9 feet NGVD (0.4 feet above schedule) in Toho, and 51.4 feet NGVD (0.4 feet above schedule) in Kissimmee-Cypress-Hatchineha; headwater stages were 46.3 feet NGVD at S-65A and 26.6 feet NGVD at S-65D. Tuesday morning discharges were: 3,260 cfs at S-65, 3,127 cfs at S-65A, and 2,109 cfs at S-65E. Dissolved oxygen concentration in the Kissimmee River averaged 2.6 mg/L for the week. Kissimmee River mean floodplain depth on Sunday was 0.94 feet. Recommendations were made to follow components of the revised 2018 Wet Season Discharge Plan, including use of a 50 feet stage threshold to determine when discharge should be reduced below 1400 cfs, and a 0.5 feet flood control buffer. The purpose is to maintain sufficient discharge to keep areas under snail kite nests in Pool D hydrated until nestlings fledge, while avoiding large increases in discharge that might flood the nests to the extent possible. See revised discharge plan below.

#### **Lake Okeechobee**

Lake Okeechobee stage is 14.35 feet NGVD having decreased 0.09 feet over the past week and increased 0.33 feet over the past month. The Lake was below 13 feet NGVD for just 10 days this past dry season and likely rose too quickly for many recovering submerged aquatic vegetation (SAV) communities to stay in optimal light conditions. The seasonal low for the 2018 growing season of 12.83 feet NGVD was the third highest since 2011, and also the third time in six years that stage did not reach the bottom of the preferred stage envelope (12.5 – 15.5 feet NGVD). Due to record rainfall in May, the SAV coverage on the Lake will likely remain at minimal levels throughout the summer and well into next year, prolonging impacts from high stages in 2016 and Hurricane Irma in 2017. Cyanobacteria blooms increased rapidly in late-June to early July, with NOAA's analysis of satellite data (see supporting

information below) suggesting most of the Lake had high potential for a visible algal bloom. The late-July imagery suggests conditions have improved, with only a few areas in the nearshore regions showing elevated potential for cyanobacterial blooms. However, conditions will likely remain favorable for some level of recurring blooms throughout the remainder of the summer, particularly after more nutrient inputs from the watershed from rain events, or during stretches of low wind and high temperature on the Lake.

### **Estuaries**

Total inflow to the St. Lucie Estuary averaged 3,296 cfs over the past week with 1,977 cfs coming from Lake Okeechobee. Surface salinity decreased at US1 and A1A Bridges and remained the same at HR1, while bottom salinity decreased at HR1 and A1A Bridge. The seven-day average salinity at the US1 Bridge is in the poor range for adult eastern oysters.

Total inflow to the Caloosahatchee Estuary averaged 5,351 cfs over the past week with 2,760 cfs coming from the Lake. Salinity remained about the same up to Ft. Myers Yacht Basin and decreased at Shell Point and Sanibel. The 30-day moving average surface salinity is 0.2 at Val I-75 and 0.2 at Ft. Myers. Salinity conditions between Val I-75 and Ft. Myers are good for tape grass. Salinity conditions are in the poor range for adult eastern oysters at Cape Coral and in the fair range at Shell Point.

### **Stormwater Treatment Areas**

Over the past week, the STAs received approximately 32,400 acre-feet of inflows (which includes approximately 15,800 acre-feet of Lake releases). The total amount of inflows to the STAs in WY2019 (since May 1, 2018) is approximately 593,181 acre-feet, which includes approximately 53,200 acre-feet of Lake releases. Most STA cells are at or above target depths. Operational restrictions are in place for vegetation rehabilitation in STA-1E and STA-2, and for construction related activities in STA-1W. STA-5/6 Flow-ways 2 and 3 are offline for initiation of a Restoration Strategies project to grade non-effective treatment areas. The nests of Migratory Bird Treaty Act and Endangered Species Act protected species have been observed in STA-1E. This week, if 2008 LORS recommends Lake releases to the WCAs and the conditions allow, releases will be sent to the STA-1E, A-1 FEB/STA-3/4 and STA-2.

### **Everglades**

Marsh stage in WCA-1 fell to just above the regulation schedule as of 7/23/18, WCA-2A is just below the temporary deviation schedule and WCA-3A remains above schedule but continues a downward trend. Water depths fell across the Everglades with the exception of WCA-2 and the increase in stage there stayed within the recommended weekly ascension rate in all basins. Keeping depths below 2.5' at gauge 65 in WCA-3A is important to moderate the stress to tree islands caused by flooding when durations last longer than 60-90 days. Stages equaled that mark on June 13 (5 days earlier than last year). The depth on Sunday at that location was 2.55 feet, a decrease of 0.07 feet over the last week. In Taylor slough the average water depth decreased by 0.10 feet, water depths there are 3 to 4 inches above the historical average. Florida Bay salinities are stable, only increasing 0.3 psu on average in Florida Bay last week.

## Supporting Information

### KISSIMMEE BASIN

#### Kissimmee Basin Rainfall

The Upper Kissimmee Basin received 3.56 inches of rainfall in the past week and the Lower Basin received 1.08 inches (SFWMD Daily Rainfall Report 7/23/2018).

#### 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 1-7.

**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: 7/24/2018**

| Water Body                               | Structure | 7-day<br>Average<br>Discharge<br>(cfs) <sup>1</sup> | Stage Monitoring<br>Site <sup>2</sup> | Lake Stage<br>(feet) | Schedule<br>Type <sup>3</sup> | Schedule<br>Stage<br>(feet) | Daily Departure (feet) |         |        |        |         |         |         |
|--|-----------|---|---------------------------------------|----------------------|-------------------------------|-----------------------------|------------------------|---------|--------|--------|---------|---------|---------|
|  |           |   |                                       |                      |                               |                             | 7/22/18                | 7/15/18 | 7/8/18 | 7/1/18 | 6/24/18 | 6/17/18 | 6/10/18 |
| Lakes Hart and Mary Jane                 | S-62      | 123   | LKMJ                                  | 60.1                 | R                             | 60.0                        | 0.1                    | 0.1     | 0.1    | 0.2    | 0.0     | 0.0     | 0.0     |
| Lakes Myrtle, Preston, and Joel          | S-57      | 59  | S-57                                  | 61.0                 | R                             | 61.0                        | 0.0                    | 0.0     | 0.0    | 0.0    | 0.0     | 0.0     | -0.4    |
| Alligator Chain                          | S-60      | 191   | ALLI                                  | 63.2                 | R                             | 63.2                        | 0.0                    | 0.1     | 0.1    | 0.2    | 0.0     | -0.1    | -0.6    |
| Lake Gentry                              | S-63      | 275   | LKGT                                  | 61.0                 | R                             | 61.0                        | 0.0                    | 0.0     | 0.0    | 0.1    | -0.5    | -0.6    | -1.0    |
| East Lake Toho                           | S-59      | 218   | TOHOE                                 | 56.6                 | R                             | 56.5                        | 0.1                    | -0.1    | -0.1   | -0.5   | -0.9    | -1.0    | -1.2    |
| Lake Toho                                | S-61      | 609   | TOHOW, S-61                           | 53.4                 | R                             | 53.5                        | -0.1                   | 0.0     | -0.1   | -0.4   | -0.9    | -0.9    | -1.2    |
| Lakes Kissimmee, Cypress, and Hatchineha | S-65      | 1,533   | KUB011,<br>LKIS5B                     | 51.2                 | R                             | 51.0                        | 0.2                    | 0.1     | 0.3    | -0.4   | -0.9    | -0.9    | -0.9    |

<sup>1</sup> Seven-day average of weighted daily means through midnight.

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

<sup>3</sup> T = temporary schedule, R = USACE flood control schedule, S = temporary snail kite schedule, A = projected ascension line, 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: 7/24/2018

| Metric                         | Location              | 1-Day Average |         | Average for the Preceding 7-Days <sup>1</sup> |        |        |         |         |         |        |         | 5/20/18 |
|--------------------------------|-----------------------|---------------|---------|---|--------|--------|---------|---------|---------|--------|---------|---------|
|                                |                       | 7/22/2018     | 7/22/18 | 7/15/18                                       | 7/8/18 | 7/1/18 | 6/24/18 | 6/17/18 | 6/10/18 | 6/3/18 | 5/27/18 |         |
| Discharge (cfs)                | S-65                  | 1,563         | 1,533   | 2,561   | 1,287  | 514    | 834     | 1,110   | 915     | 1,092  | 1,271   | 854     |
| Discharge (cfs)                | S-65A <sup>2</sup>    | 1,425         | 1,430   | 2,615   | 1,294  | 466    | 801     | 1,224   | 1,043   | 1,139  | 1,142   | 700     |
| Discharge (cfs)                | S-65D <sup>2</sup>    | 2,271         | 2,646   | 2,226   | 1,827  | 1,608  | 2,094   | 2,062   | 1,925   | 1,869  | 1,495   | 781     |
| Headwater Stage (feet NGVD)    | S-65D <sup>2</sup>    | 26.60         | 26.68   | 26.77   | 26.80  | 26.79  | 26.79   | 26.82   | 26.86   | 27.00  | 26.08   | 25.72   |
| Discharge (cfs)                | S-65E <sup>2</sup>    | 2,418         | 2,768   | 2,399   | 2,000  | 1,834  | 2,347   | 2,261   | 2,107   | 2,082  | 1,623   | 824     |
| Discharge (cfs)                | S-67                  | 231           | 190     | 217   | 292    | 298    | 277     | 273     | 278     | 282    | 298     | 332     |
| DO (mg/L) <sup>3</sup>         | Phase I river channel | 3.6           | 2.6     | 2.7   | 2.9    | 3.4    | 2.0     | 1.4     | 1.7     | 3.4    | 4.8     | 5.7     |
| Mean depth (feet) <sup>4</sup> | Phase I floodplain    | 0.94          | 1.11    | 1.20  | 0.60   | 0.46   | 0.75    | 0.84    | 0.76    | 0.66   | 0.47    | 0.17    |

<sup>1</sup>Seven-day average of weighted daily means through Sunday midnight.

<sup>2</sup>S-65A discharge combines S-65A with auxiliary structures; S-65D discharge combines discharge at 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.

<sup>3</sup>DO is the average for sondes at PC62 and PC33.

<sup>4</sup>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)

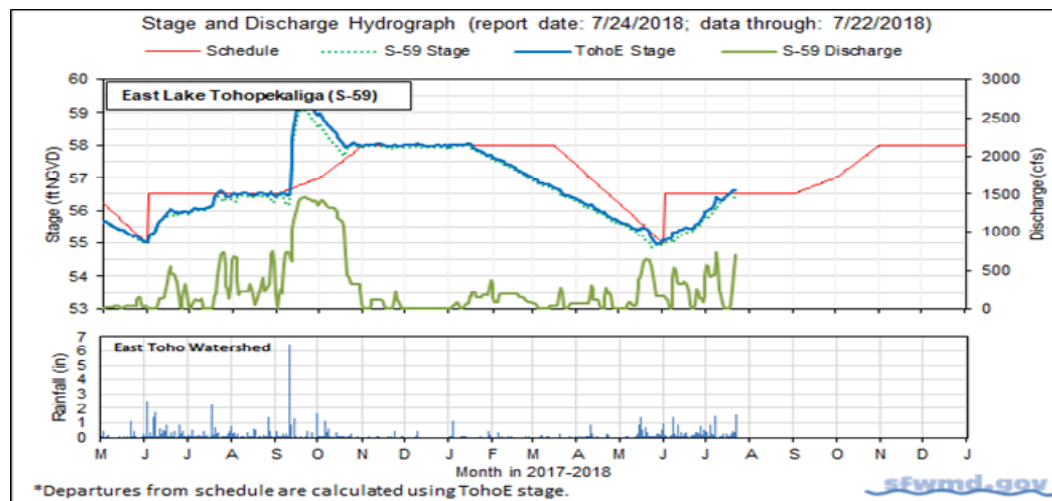


Figure 1.



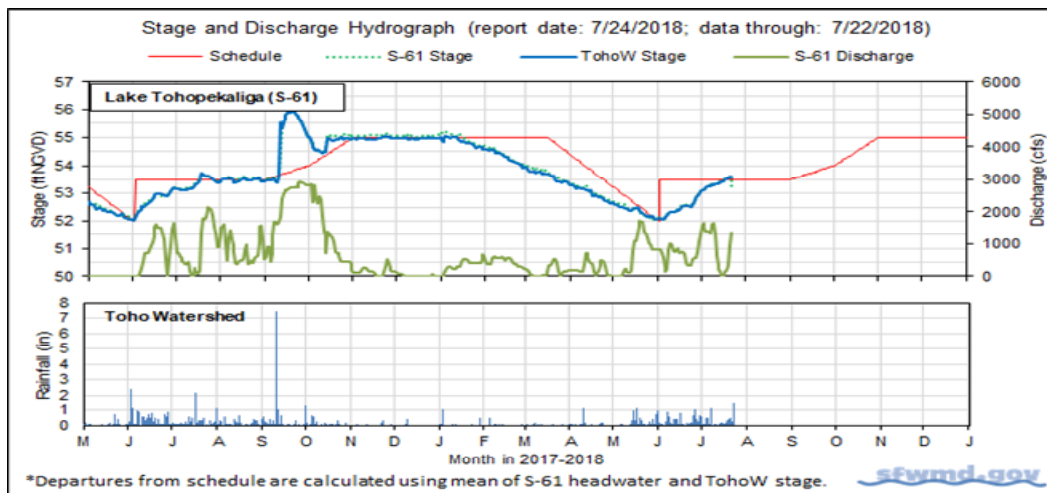


Figure 2.

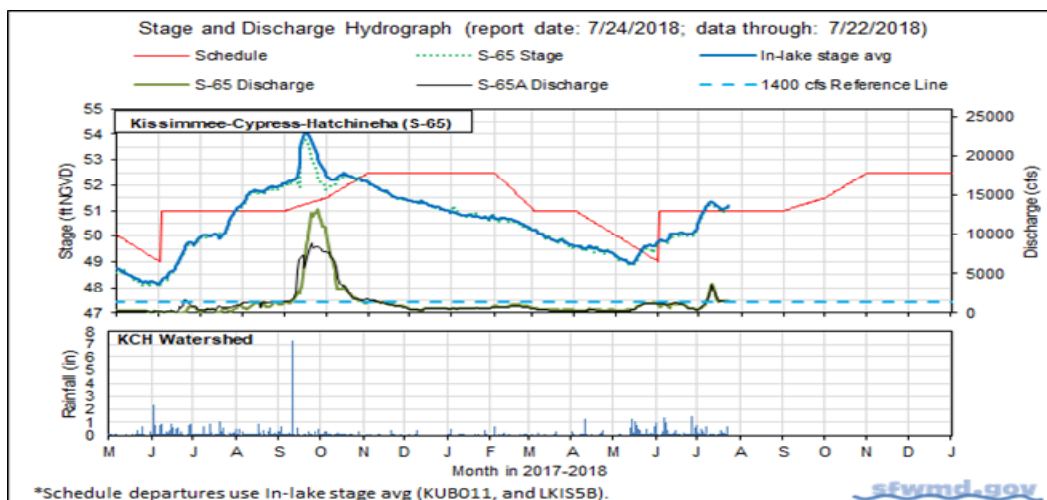


Figure 3.

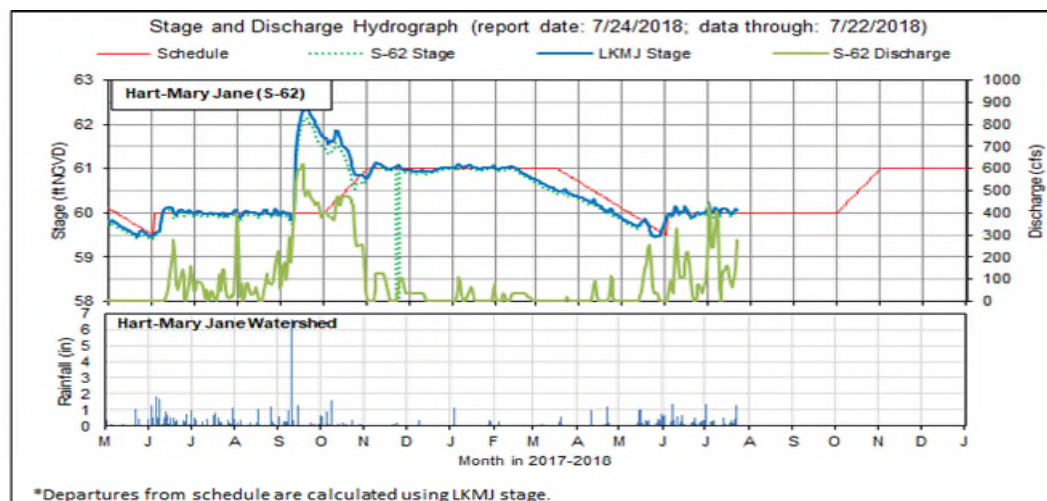


Figure 4.

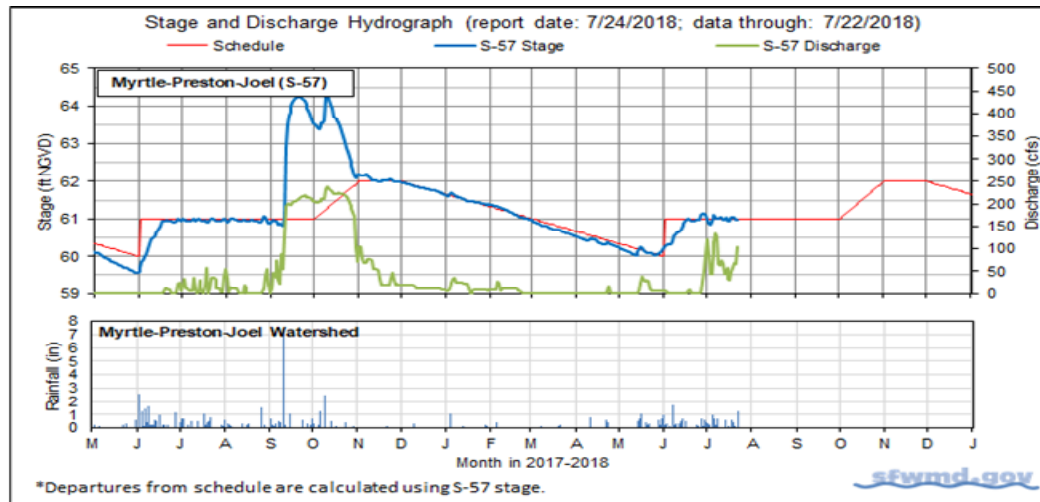


Figure 5.

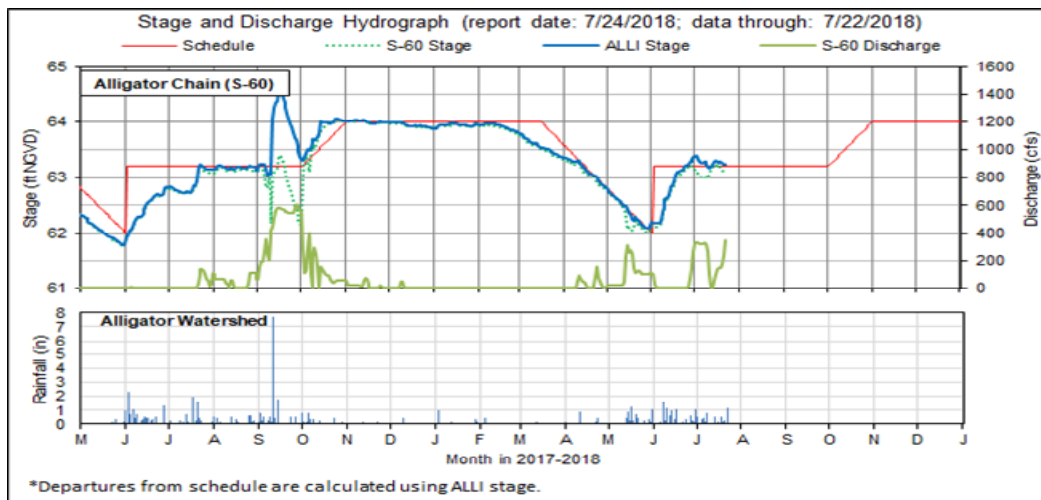


Figure 6.

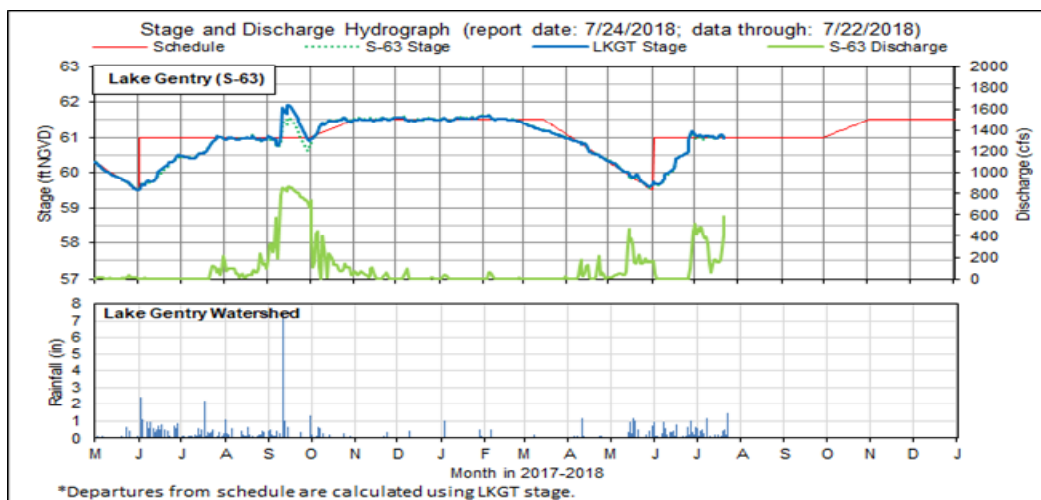
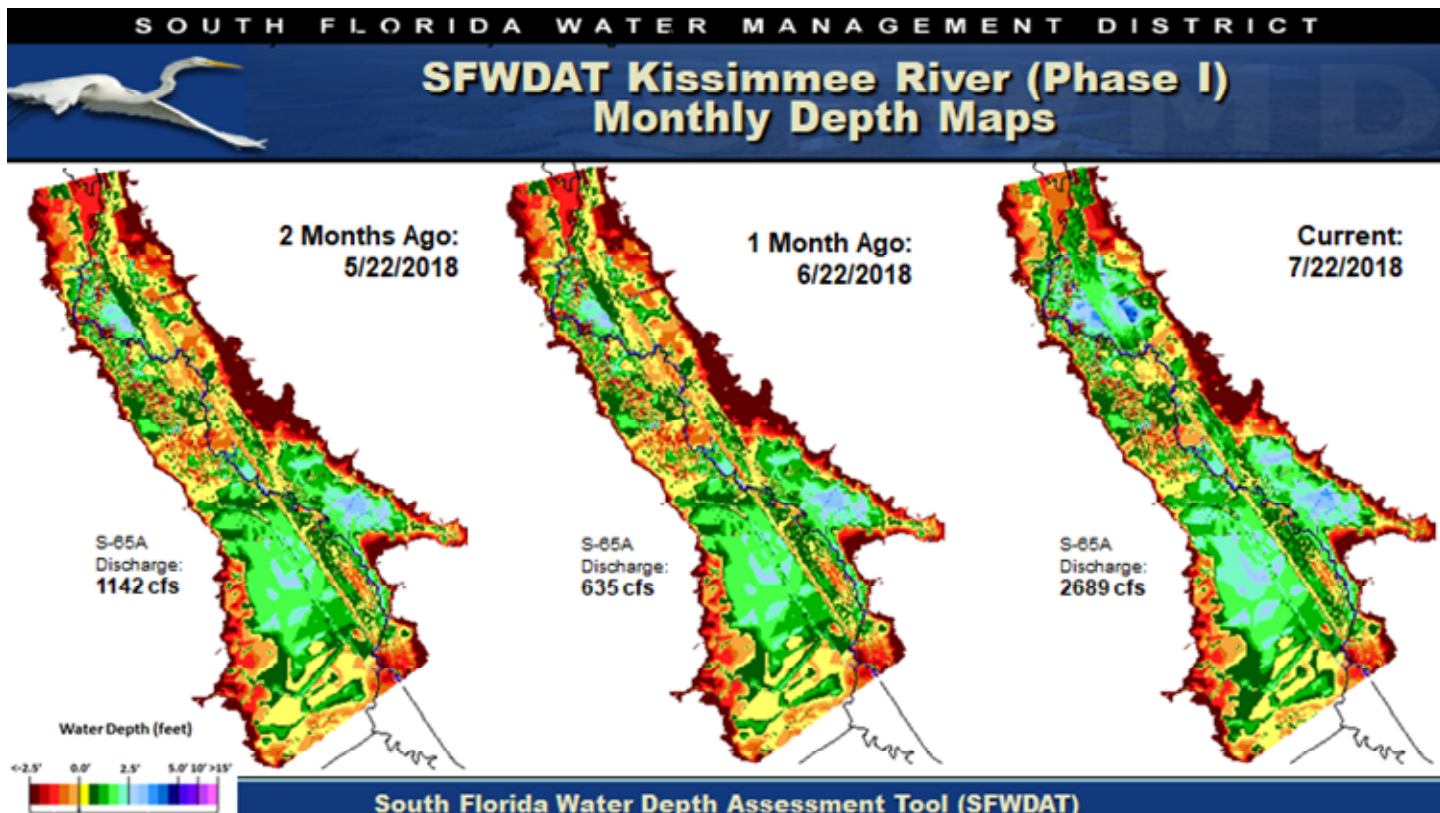
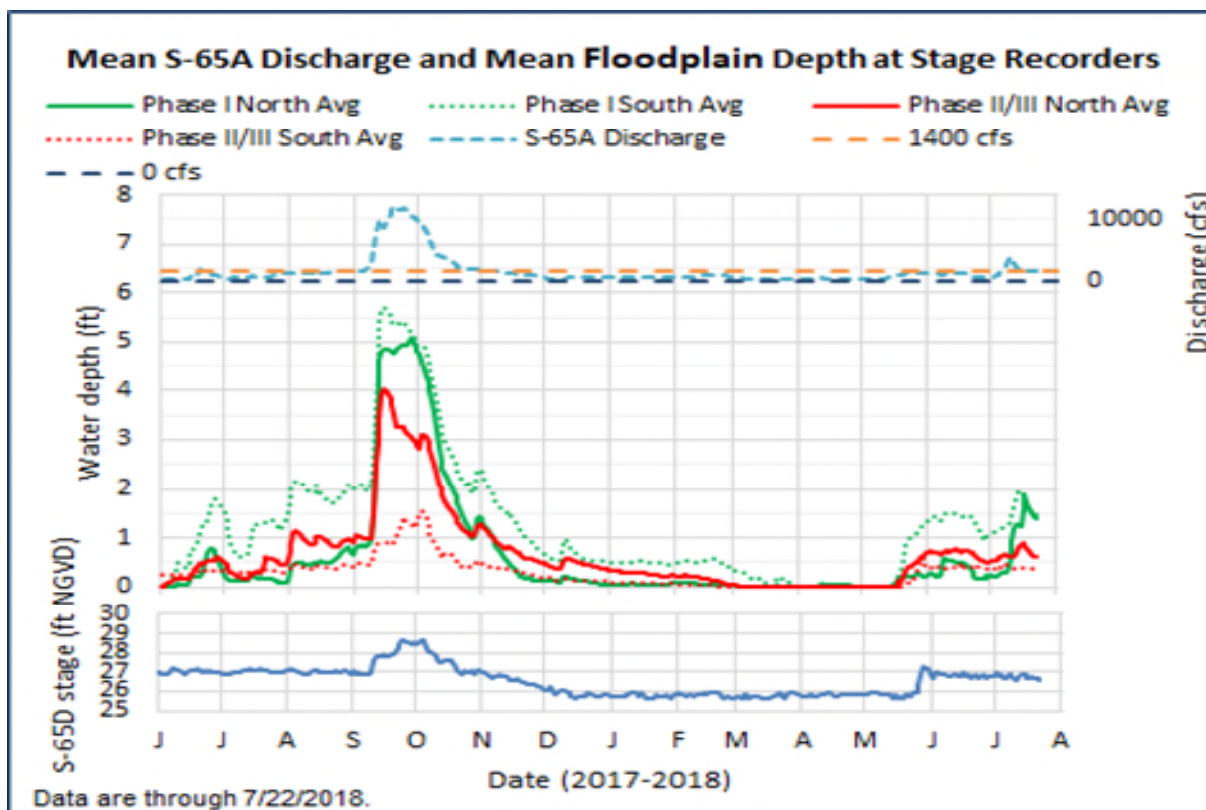


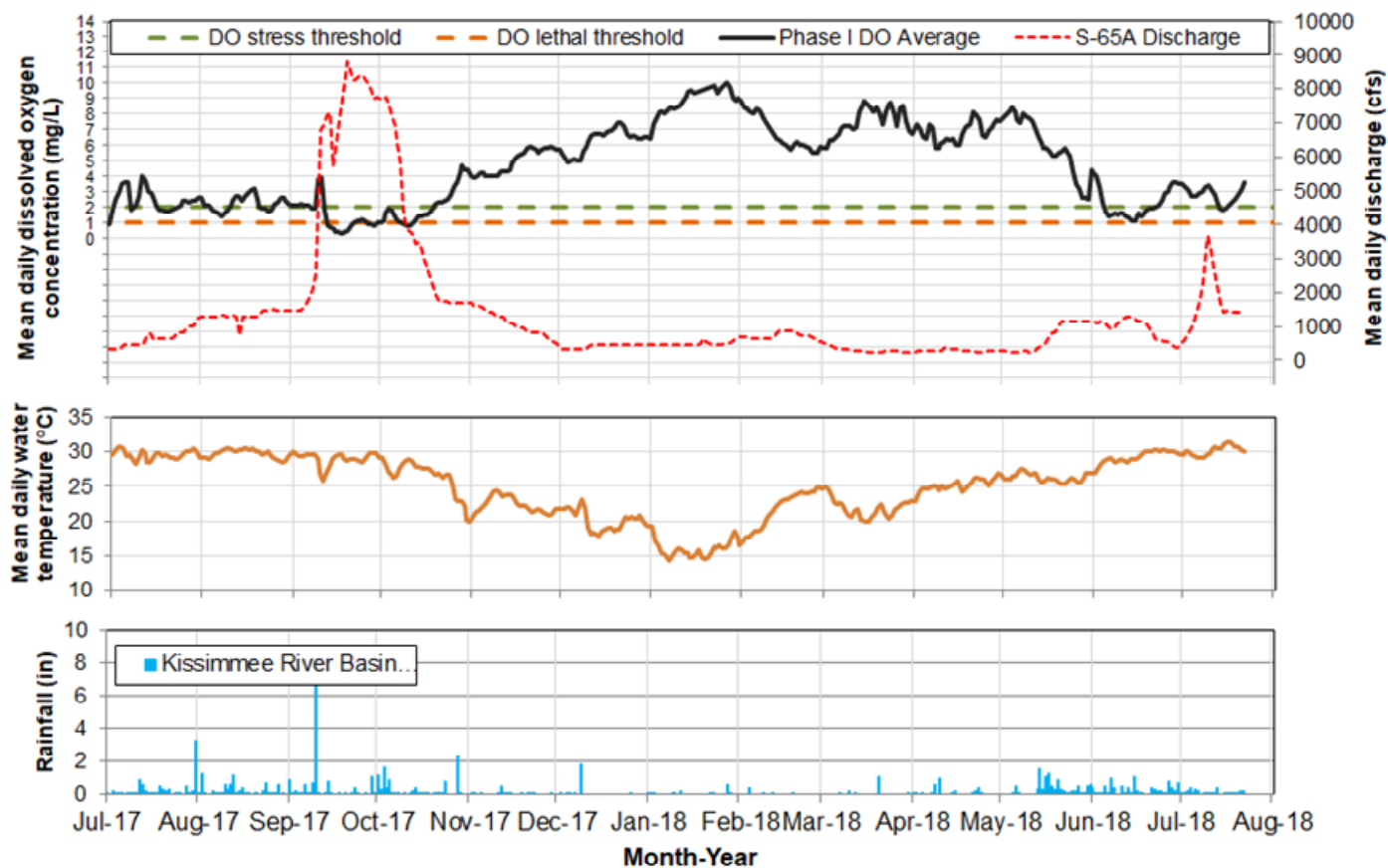
Figure 7.



**Figure 8.** 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.



**Figure 9.** Mean water depth at stage recorders in the northern Phase I, southern Phase I, northern Phase II/III, and southern Phase II/III areas in relation to the S-65A discharge and S-65D headwater stage.

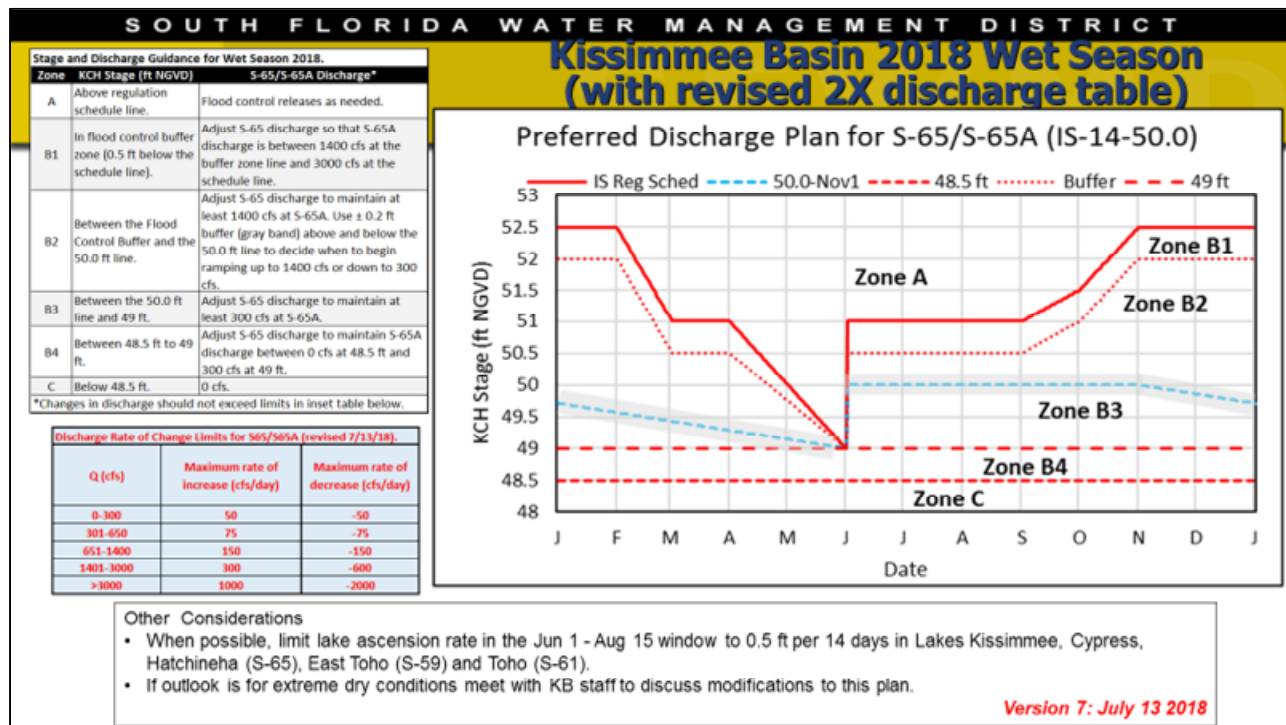


**Figure 10.** Mean daily dissolved oxygen, discharge, temperature and rainfall in the Phase I river channel.

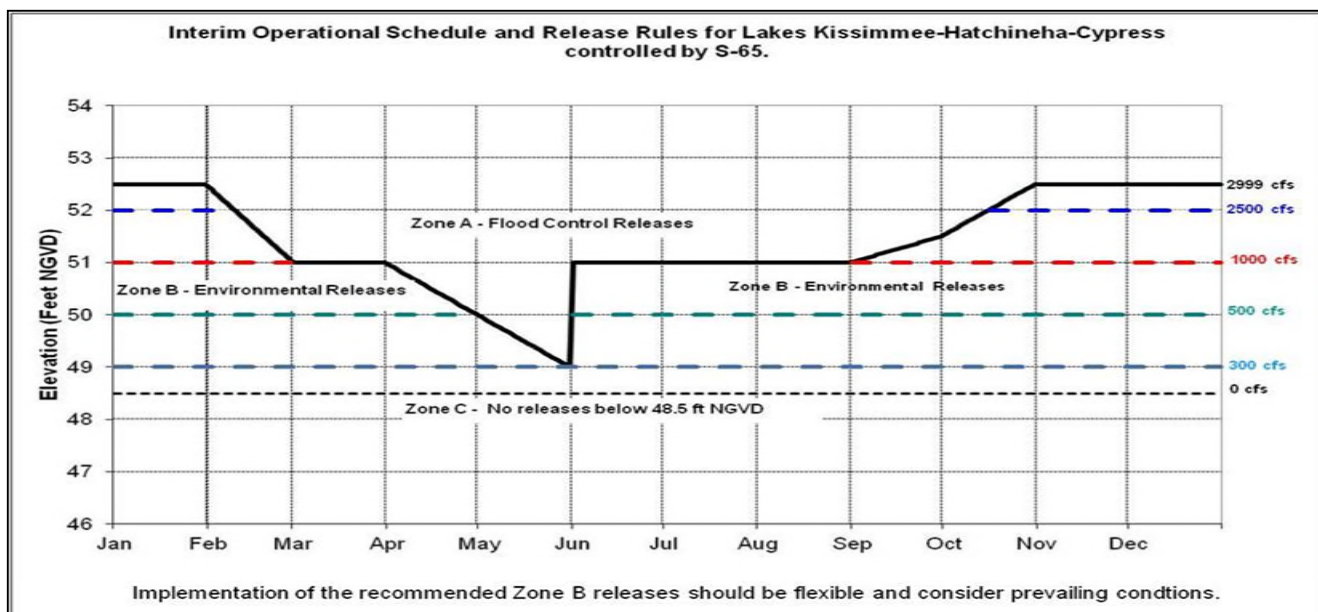


## Water Management Recommendations

| Recommendation Date | Recommendation   | Purpose  | Outcome     | Source                         | Report Date |
|---------------------|--|--|-------------|--------------------------------|-------------|
| 7/19/2018           | Follow Revised (X2) 2018 Wet Season Discharge Plan to the extent possible, including 50 foot stage threshold and 0.5 foot flood control buffer.  | To the extent possible, maintain sufficient discharge to keep areas under snail kite nests in Pool D hydrated until nests fledge, while avoiding large increases in discharge that might flood the nests.                                  | N/A         | KB Ops                         | 7/24/2018   |
| 7/13/2018           | Maintain at least 1400 cfs at S-65A while Lake Kissimmee stage is above 50 feet. (See revised 2018 discharge plan).  | To the extent possible, maintain sufficient discharge to keep areas under snail kite nests in Pool D hydrated until nests fledge.  | N/A         | KB Ops                         | 7/17/2018   |
| 7/13/2018           | Reduce S-65/S-65A discharge by 600 cfs/day until 1400 cfs is reached. (See revised 2018 discharge plan, below).  | Reach 1400 cfs faster to help stabilize Lake Kissimmee stage.  | Implemented | SFWMD Water Mgt/KB Ops         | 7/17/2018   |
| 7/9/2018            | Increase S-65/S-65A discharge by 300 cfs if needed.  | Stabilize Lake Kissimmee stage.  | N/A         | SFWMD Water Mgt/KB Ops         | 7/10/2018   |
| 7/8/2018            | Increase S-65/S-65A discharge by 900 cfs today in 3 increments of 300 cfs each.  | Stabilize Lake Kissimmee stage.  | Implemented | KB Ops                         | 7/10/2018   |
| 7/5/2018            | Increase S-65/S-65A discharge by 300 cfs/day (double the prescribed rate of increase) Thursday through Sunday.   | Stabilize Lake Kissimmee stage.  | Implemented | SFWMD Water Mgt                | 7/10/2018   |
| 7/2/2018            | Increase S-65/S-65A discharge by 150 cfs/day (double the prescribed rate of increase).   | Stabilize Lake Kissimmee stage.  | Implemented | SFWMD Water Mgt/KB Ops         | 7/10/2018   |
| 6/30/2018           | Increase S-65/S-65A discharge as slowly as feasible  | Slow stage ascension in Kissimmee-Cypress-Hatchineha   | Implemented | KB Ops/SFWMD Water Mgt         | 7/3/2018    |
| 6/28/2018           | Continue to reduce discharge at S-65/S-65A as slowly as feasible.  | Prevent stage decline in Kissimmee-Cypress-Hatchineha.   | Implemented | KB Ops/SFWMD Water Mgt         | 7/3/2018    |
| 6/21/2018           | Reduce discharge at S-65/S-65A as slowly as feasible.  | Prevent stage decline in Kissimmee-Cypress-Hatchineha.   | Implemented | KB Ops/SFWMD Water Mgt         | 6/26/2018   |
| 6/15/2018           | Reduce S-65A discharge by 150-300 cfs over the weekend.  | Slow or stop DO decline in Kissimmee River.  | Implemented | KB Ops                         | 6/19/2018   |
| 6/12/2018           | No new recommendations.  |  | N/A         |                                | 6/12/2018   |
| 6/5/2018            | No new recommendations.  |  | N/A         |                                | 6/5/2018    |
| 5/29/2018           | Begin implementation of the 2018 Wet Season Discharge Plan for S-65/S-65A on June 1 (see figure).  | Provide variable flow from S-65/S-65A to balance Kissimmee River and Headwaters Lakes objectives including Kissimmee River floodplain inundation, moderated rates of change in discharge, and constrained rate of stage rise in the lakes. | Planned     | KB Ops/SFWMD Water Mgt/FWC/FWS | 5/29/2018   |
| 5/22/2018           | Hold Kissimmee-Cypress-Hatchineha at current stage of approximately 49.5 ft until June 1.  | (a) Reduce impacts of rising water on DO in the Kissimmee River; and (b) limit stage reversal in KCH to <1 foot to protect snail kite nests.   | Implemented | KB Ops/SFWMD Water Mgt         | 5/29/2018   |
| 5/18/2018-5/20/2018 | Increase discharge gradually in response to rainfall in consultation with KB staff.  | (a) Reduce impacts of rising water on DO in the Kissimmee River; and (b) limit stage reversal in KCH to <1 foot to protect snail kite nests.   | Implemented | KB Ops                         | 5/22/2018   |
| 5/15/2018           | Adjust S-65/S-65A discharge over the next few days to avoid additional stage rise in Kissimmee-Cypress-Hatchineha. Make any needed discharge changes gradually in consultation with Kissimmee Basin staff to reduce potential effects on Kissimmee River dissolved oxygen. | Protect Lake Kissimmee snail kite nests from rising water if there is additional rainfall.   | N/A         | KB Ops                         | 5/22/2018   |
| 5/8/2018            | No new recommendations.  |  | N/A         |                                | 5/8/2018    |
| 5/1/2018            | No new recommendations.  |  | N/A         |                                | 5/1/2018    |
| 4/24/2018           | No new recommendations.  |  | N/A         |                                | 4/24/2018   |
| 4/17/2018           | No new recommendations.  |  | N/A         |                                | 4/17/2018   |
| 4/10/2018           | No new recommendations.  |  | N/A         |                                | 4/10/2018   |
| 4/3/2018            | No new recommendations.  |  | N/A         |                                | 4/3/2018    |
| 3/27/2018           | No new recommendations.  |  | N/A         |                                | 3/27/2018   |
| 3/20/2018           | No new recommendations.  |  | N/A         |                                | 3/20/2018   |
| 3/13/2018           | No new recommendations.  |  | N/A         |                                | 3/13/2018   |
| 3/6/2018            | No new recommendations.  |  | N/A         |                                | 3/6/2018    |
| 2/27/2018           | No new recommendations.  |  | N/A         |                                | 2/27/2018   |
| 2/20/2018           | No new recommendations.  |  | N/A         |                                | 2/20/2018   |



**Figure 11.** The 2018 Wet Season Discharge Plan for S-65/S-65A.



**Figure 12.** Interim operations schedule for S-65. The discharge schedule shown to the right has not been used in recent years.



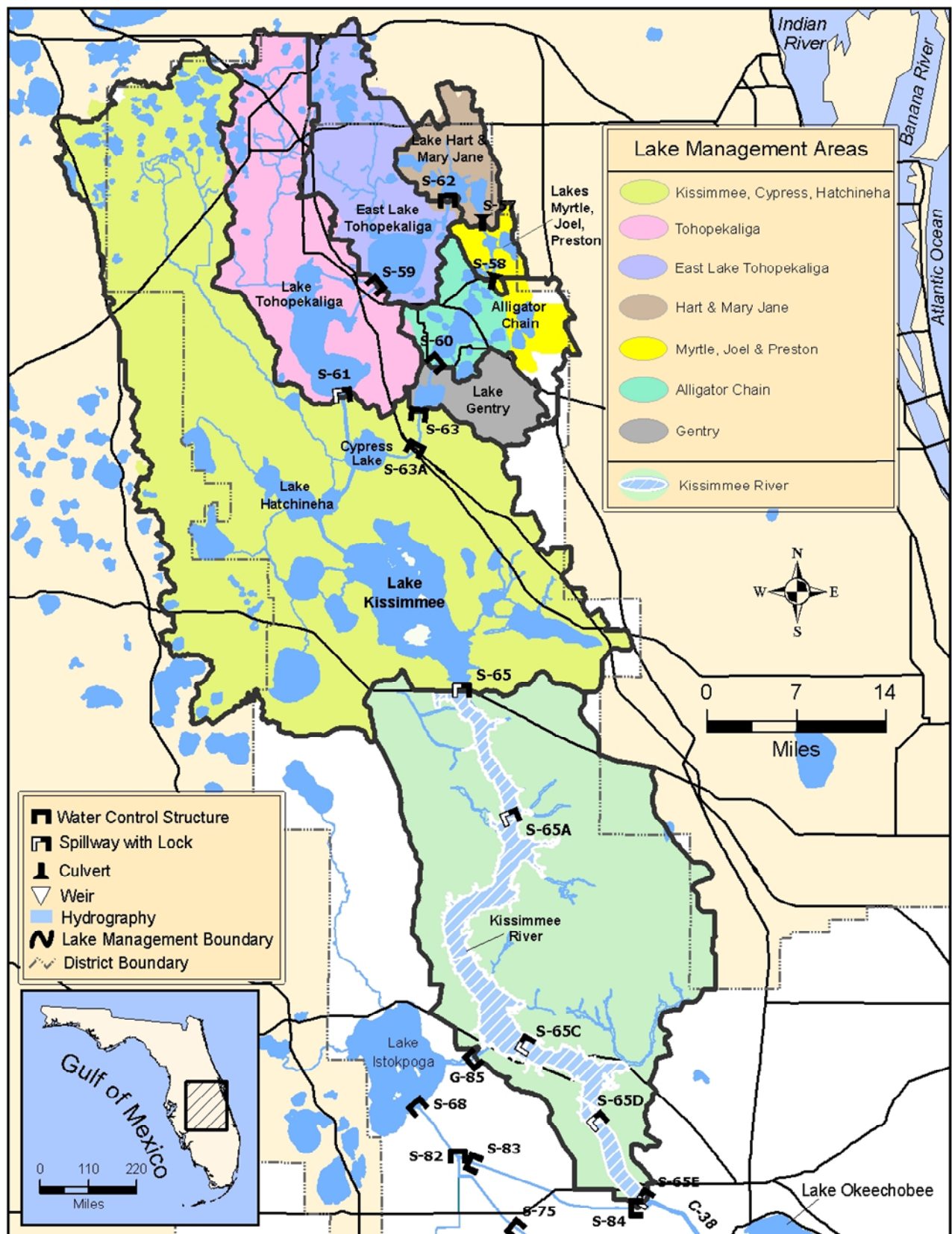


Figure 13. The Kissimmee Basin.



## **LAKE OKEECHOBEE**

According to the USACE web site, Lake Okeechobee stage is at 14.35 feet NGVD for the period ending at midnight on July 23, 2018. This value is based on the use of four interior lake stations (L001, L005, L006 and LZ40) and four perimeter stations (S-308, S-352, S-4 and S-133). The Lake is now 0.33 feet higher than it was a month ago and 1.65 feet higher than a year ago (Figure 1). The Lake remains in the Low sub-band (Figure 2). According to RAINDAR, 1.33 inches of rain fell over the Lake during the week July 17, 2018 – July 23, 2018. Rainfall varied throughout the watershed, with the Kissimmee Basin receiving between 3.0 – 5.0 inches, and the rest of the watershed mostly between 1.0 – 2.0 inches (Figure 3).

Average daily inflows to the Lake were slightly lower than the previous week, going from 4,273 cfs to 3,955 cfs. The decrease was primarily from the Indian Prairie basin (S-71 & S-72 structures), which fell from 827 cfs the previous week to 285 cfs this past week. Inflows from the Kissimmee River (S-65E structures) and Lake Istokpoga (S-84 structures) increased slightly, going from 2,540 cfs and 531 cfs, respectively, the previous week to 2,641 cfs and 744 cfs, respectively, this past week. There was essentially no inflow or outflow through Culvert 10A from the L-8 canal again this past week (Table 1). There have been no back-pumping operations from the S-2 or S-3 pumps during the wet season thus far.

Total outflows increased again from the previous week as discharges to the estuaries and to the south increased; going from 4,043 total cfs the previous week to 7,130 cfs this past week. Discharges via the S-77 and S-308 structures increased from 2,145 cfs and 829 cfs, respectively, the previous week to an average of 2,989 cfs and 2,228 cfs, respectively, this past week. Outflows to the south through the S-350 structures increased from 1,069 cfs average daily cfs the previous week to 1,912 cfs this past week. The corrected average daily evapotranspiration value for the week based on the L006 weather platform solar radiation was the same at 0.19 inches.

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 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 imagery (July 22) using the cyanobacteria monitoring product derived from NOAA's analysis of EUMETSAT's OLCI satellite sensor showed the potential for a cyanobacteria bloom decreased from the July 2 and July 14 images over much of the Lake, with remaining areas of elevated bloom potential occurring in the shallower, nearshore regions along the shore (Figure 5).

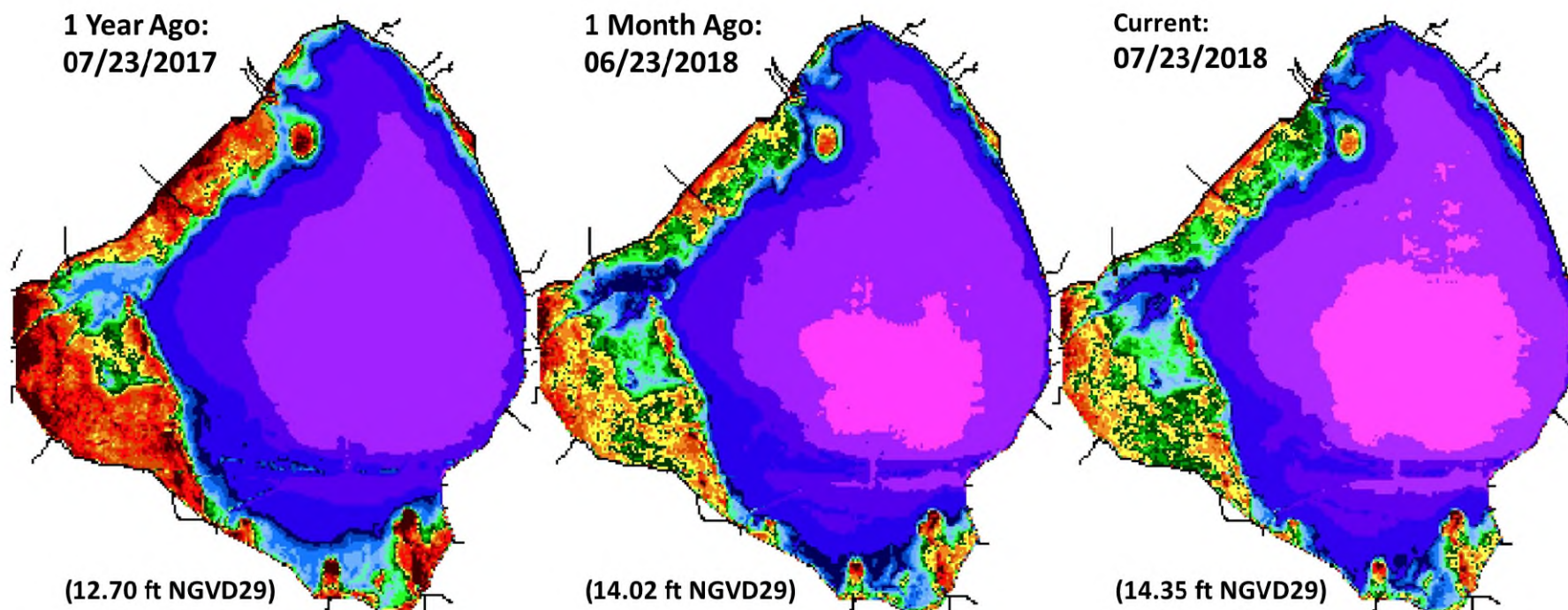
**Table 1.** Average daily inflows and outflows and the approximate depth equivalents on Lake Okeechobee for various structures.

| INFLOWS          | Previous Week Avg Daily cfs | Avg Daily Inflow cfs | Equivalent Depth Week Total (in) | OUTFLOWS     | Previous Week Avg Daily cfs | Avg Daily Outflow cfs | Equivalent Depth Week Total (in) |
|------------------|-----------------------------|----------------------|----------------------------------|--------------|-----------------------------|-----------------------|----------------------------------|
| S65E & S65EX1    | 2540                        | 2641                 | 1.1                              | S77          | 2145                        | 2989                  | 1.2                              |
| S71 & 72         | 827                         | 285                  | 0.1                              | S308         | 829                         | 2228                  | 0.9                              |
| S84 & 84X        | 531                         | 744                  | 0.3                              | S351         | 385                         | 510                   | 0.2                              |
| Fisheating Creek | 219                         | 175                  | 0.1                              | S352         | 0                           | 36                    | 0.0                              |
| S154             | 17                          | 18                   | 0.0                              | S354         | 684                         | 1366                  | 0.6                              |
| S191             | 51                          | 18                   | 0.0                              | L8 Outflow   | 1                           | 0                     | 0.0                              |
| S133 P           | 40                          | 29                   | 0.0                              | ET           | 3610                        | 3720                  | 1.5                              |
| S127 P           | 17                          | 32                   | 0.0                              | <b>Total</b> | <b>7653</b>                 | <b>10850</b>          | <b>4.4</b>                       |
| S129 P           | 12                          | 9                    | 0.0                              |              |                             |                       |                                  |
| S131 P           | 4                           | 1                    | 0.0                              |              |                             |                       |                                  |
| S135 P           | 13                          | 0                    | 0.0                              |              |                             |                       |                                  |
| S2 P             | 0                           | 0                    | 0.0                              |              |                             |                       |                                  |
| S3 P             | 0                           | 0                    | 0.0                              |              |                             |                       |                                  |
| S4 P             | 0                           | 0                    | 0.0                              |              |                             |                       |                                  |
| L8 Backflow      | 0                           | 3                    | 0.0                              |              |                             |                       |                                  |
| Rainfall         | 3858                        | 3665                 | 1.3                              |              |                             |                       |                                  |
| <b>Total</b>     | <b>8131</b>                 | <b>7620</b>          | <b>2.9</b>                       |              |                             |                       |                                  |

PROVISIONAL DATA

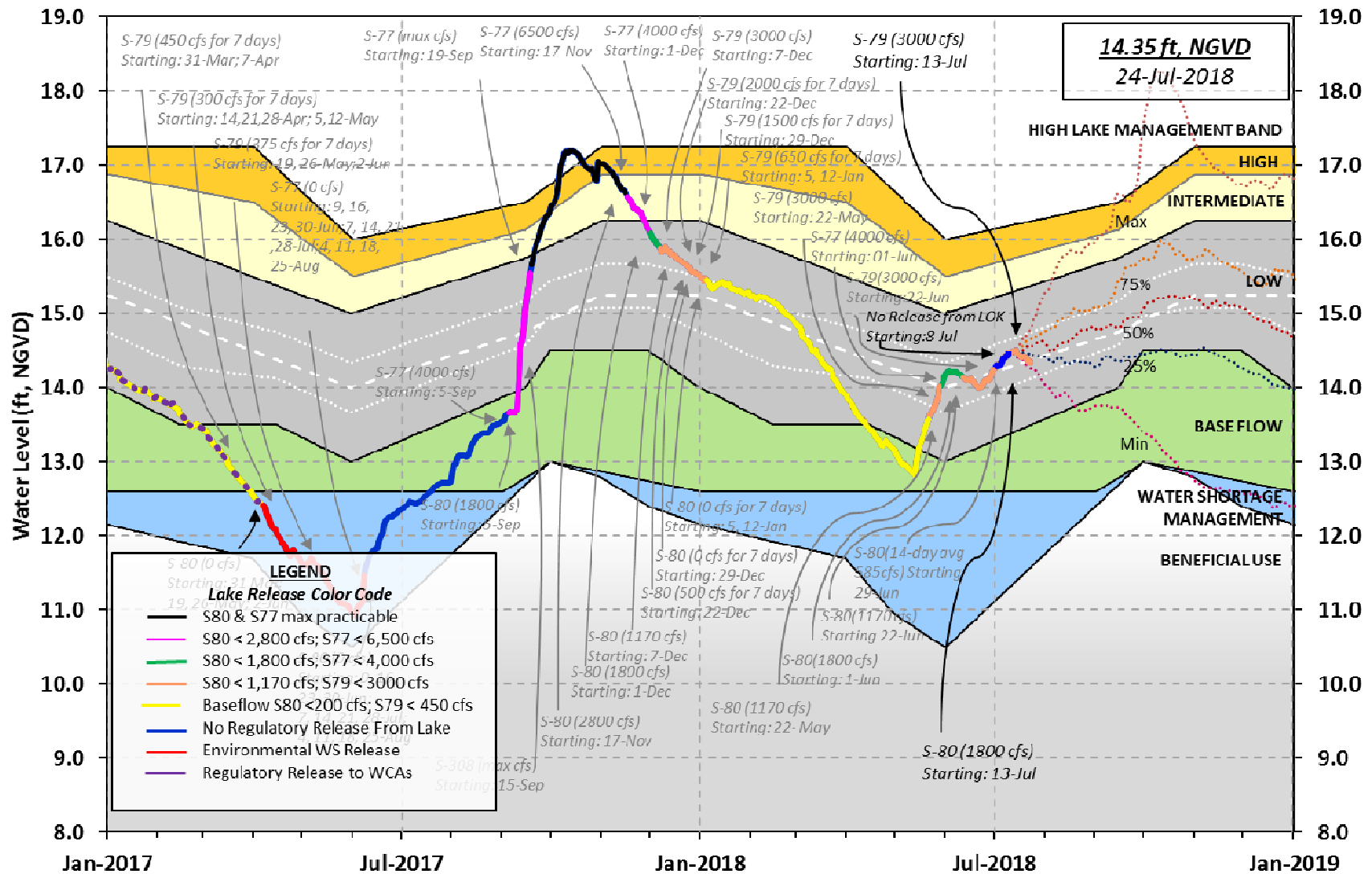
### Water Management Recommendations

Lake Okeechobee stage is 14.35 feet NGVD having decreased 0.09 feet over the past week and increased 0.33 feet over the past month. The Lake was below 13 feet NGVD for just 10 days this past dry season and likely rose too quickly for many recovering submerged aquatic vegetation (SAV) communities to stay in optimal light conditions. The seasonal low for the 2018 SAV growing season of 12.83 feet NGVD was the third highest since 2011, and also the third time in six years that stage did not reach the bottom of the preferred stage envelope (12.5 – 15.5 feet NGVD). Due to record rainfall in May, the SAV coverage on the Lake will likely remain at minimal levels throughout the summer and well into next year, prolonging impacts from high stages in 2016 and Hurricane Irma in 2017. Recovery of SAV in the nearshore zone will require low lake stages in the summer of 2019, so efforts to prepare for such an event will help speed the rebound of this important community.



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

## Lake Okeechobee Water Level History and Projected Stages



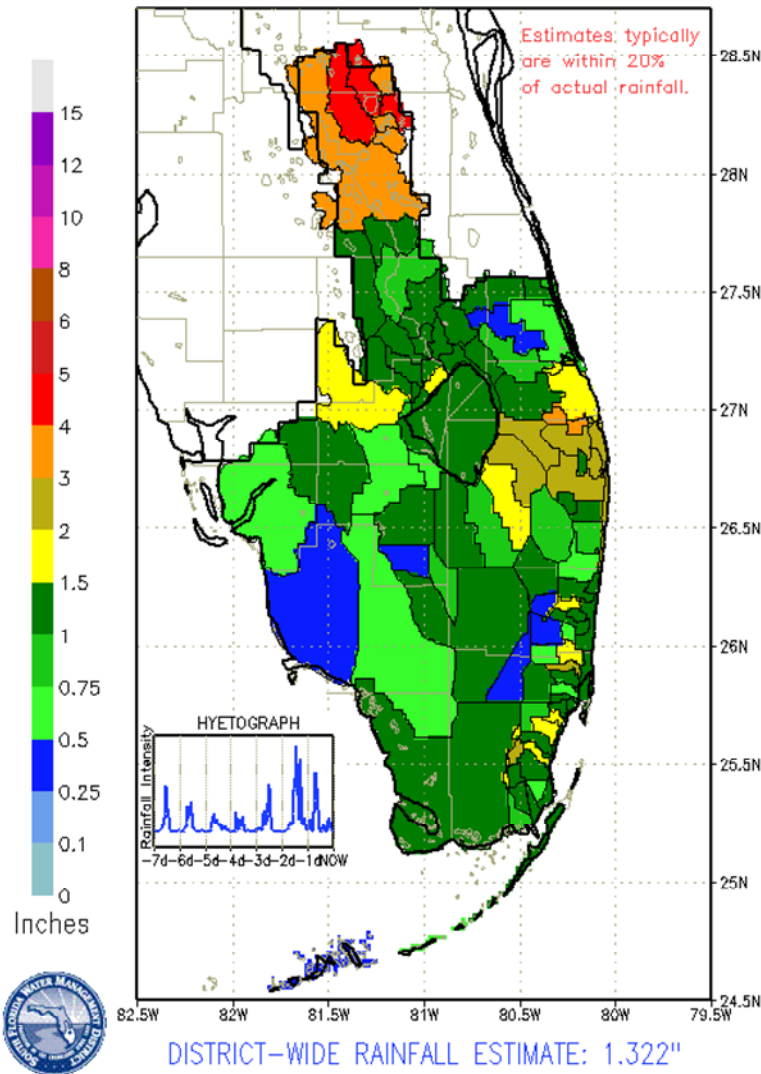
LORS-2008  
Adopted by USACE 28-April-2008

Projected Stage Percentiles From  
SFWMD-HESM Position Analysis

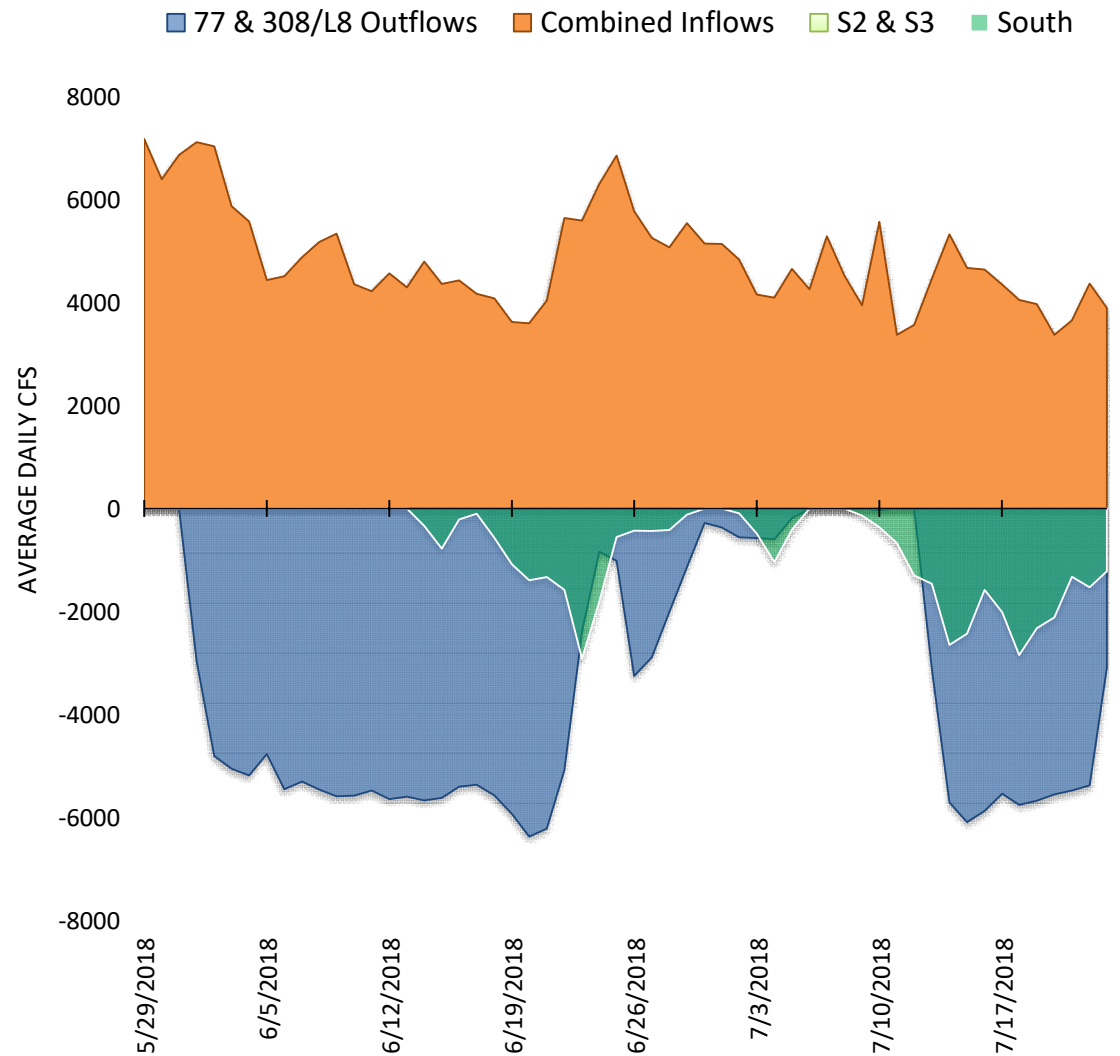
**Figure 2.** Recent Lake Okeechobee stage and releases, with projected stages based on a dynamic position analysis.

# SFWMD PROVISIONAL RAINDAR 7-DAY BASIN RAINFALL ESTIMATE

FROM: 0530 EST, 07/17/2018 THROUGH: 0530 EST, 07/24/2018

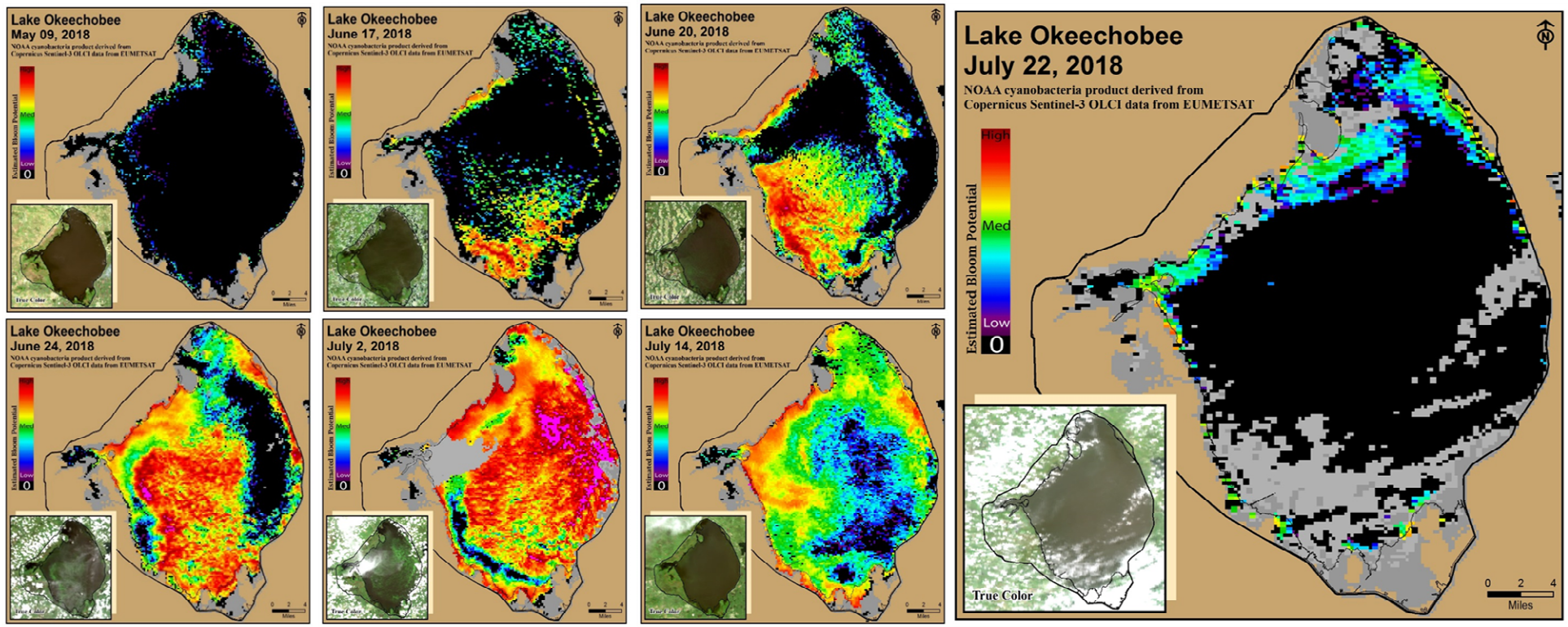


**Figure 3.** Rainfall estimates by basin.



**Figure 4.** Major inflows and outflows of Lake Okeechobee, including the S350 structures designated as South. The L8 canal flows through culvert 10A are included as outflows when positive, and as inflows when backflowing into the lake. Inflows and outflows are shown as positive and negative, respectively, for visual purposes.





Gray = Cloud Cover

NOAA cyanobacteria product derived from Copernicus Sentinel-3 OLCI data from EUMETSAT

Unvalidated and Experimental Data

**Figure 5.** Potential for cyanobacterial blooms on Lake Okeechobee based on NOAA's harmful algal bloom monitoring system derived from Copernicus Sentinel-3 OLCI data from EUMETSAT. Gray indicates cloud cover. All data are experimental and unvalidated at this point in product development.

## **ESTUARIES**

### **St. Lucie Estuary:**

Last week total inflow to the St. Lucie Estuary averaged about 3,296 cfs (Figures 1 and 2) and last month inflow averaged about 2,807 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).

| <b>Location</b>                          | <b>Flow (cfs)</b> |
|--|-------------------|
| Tidal Basin Inflow                       | 280               |
| S-80                                     | 1,977             |
| S-308                                    | 2,228             |
| S-49 on C-24                             | 72                |
| S-97 on C-23                             | 98                |
| Gordy Rd. structure<br>on Ten Mile Creek | 869               |

Over the past week, surface salinity decreased at US1 and A1A Bridges and remained the same at HR1, while bottom salinity decreased at HR1 and A1A Bridge (Table 2, Figures 3 and 4). The seven-day moving average salinity of the water column (an average of the surface and bottom salinity) at the US1 Bridge is unavailable but estimated less than 5. Salinity conditions in the middle estuary are within the poor 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.

| <b>Sampling Site</b> | <b>Surface</b>     | <b>Bottom</b>               | <b>Envelope</b> |
|----------------------|--------------------|-----------------------------|-----------------|
| HR1 (North Fork)     | <b>3.1</b> (3.0)   | <b>3.4</b> (5.4)            | NA <sup>1</sup> |
| US1 Bridge           | <b>3.7</b> (6.0)   | <b>NR</b> <sup>2</sup> (NR) | 10.0-26.0       |
| A1A Bridge           | <b>10.2</b> (15.7) | <b>18.8</b> (23.1)          | NA <sup>1</sup> |

<sup>1</sup>Envelope not applicable and <sup>2</sup>Not Reporting

### **Caloosahatchee Estuary:**

Last week total inflow to the Caloosahatchee Estuary averaged about 5,351 cfs (Figures 5 and 6) and last month inflow averaged about 5,784 cfs. Last week's provisional averaged inflows from the structures are shown in Table 3.

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

| <b>Location</b>    | <b>Flow (cfs)</b> |
|--------------------|-------------------|
| S-77               | 2,989             |
| S-78               | 3,029             |
| S-79               | 4,455             |
| Tidal Basin Inflow | 896               |

Over the past week, salinity remained about the same up to Ft. Myers Yacht Basin and decreased at Shell Point and Sanibel (Table 4, Figures 7 & 8). The seven-day average salinity values are in the fair range for adult eastern oysters at Shell Point, in the poor range at Cape Coral (Figure 9) and were not available at Sanibel. The 30-day moving average surface salinity is 0.2 at Val I-75 and 0.2 at Ft. Myers. Salinity conditions between Val I-75 and Ft. Myers are good for tape grass.



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

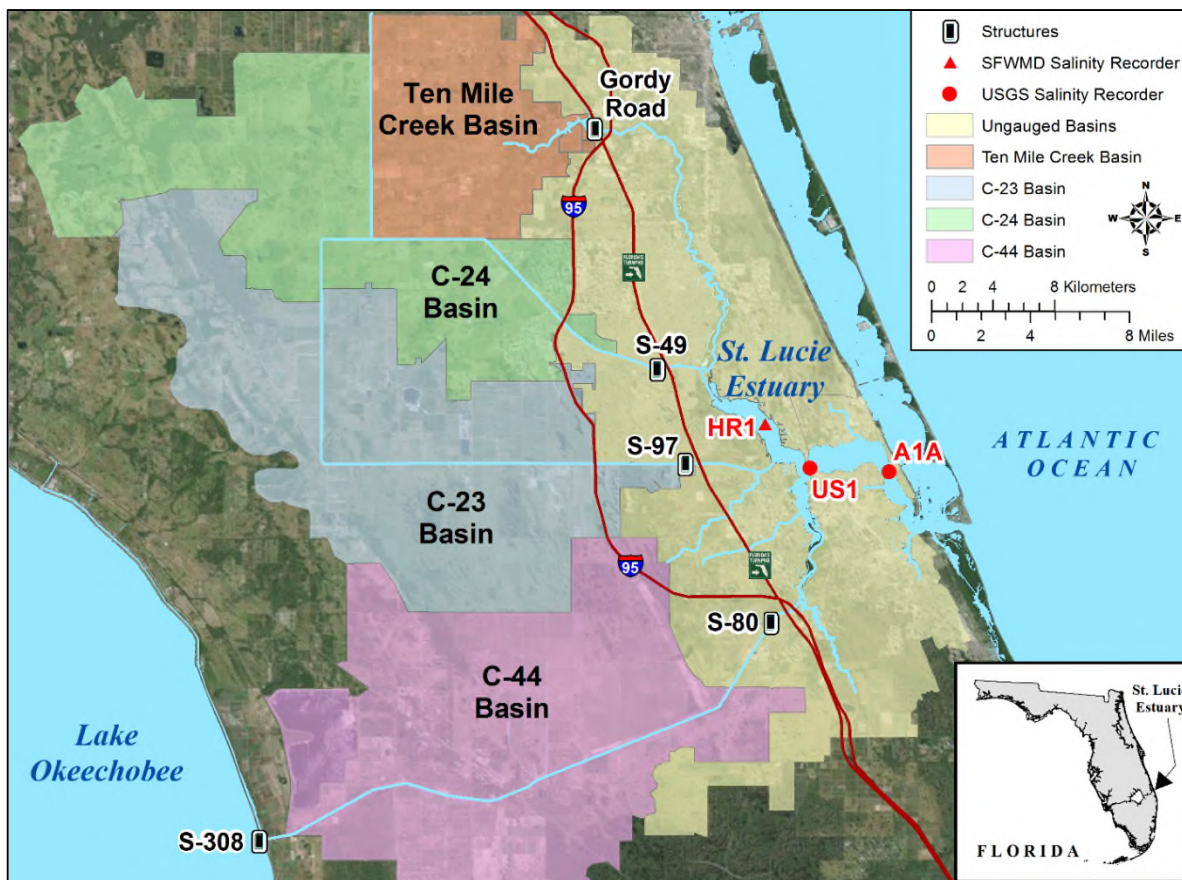
| Sampling Site         | Surface                       | Bottom             | Envelope             |
|-----------------------|-------------------------------|--------------------|----------------------|
| S-79 (Franklin Lock)  | <b>0.2</b> (0.2)              | <b>0.2</b> (0.2)   | NA <sup>1</sup>      |
| Val I75               | <b>0.2</b> (0.2)              | <b>0.2</b> (0.2)   | 0.0-5.0 <sup>2</sup> |
| Ft. Myers Yacht Basin | <b>0.2</b> (0.2)              | <b>0.2</b> (0.2)   | NA                   |
| Cape Coral            | <b>0.3</b> (1.6)              | <b>0.4</b> (2.1)   | 10.0-30.0            |
| Shell Point           | <b>~9.0</b> (13.3)            | <b>~9.0</b> (12.1) | 10.0-30.0            |
| Sanibel               | <b>NR</b> <sup>3</sup> (23.2) | <b>NR</b> (26.1)   | 10.0-30.0            |

<sup>1</sup>Envelope not applicable, <sup>2</sup>Envelope is based on a 30-day average, <sup>3</sup>Not Reporting, Shell Point stopped recording on July 21, 2018, maintenance scheduled this week, and Sanibel test site until permanent equipment is reconstructed.

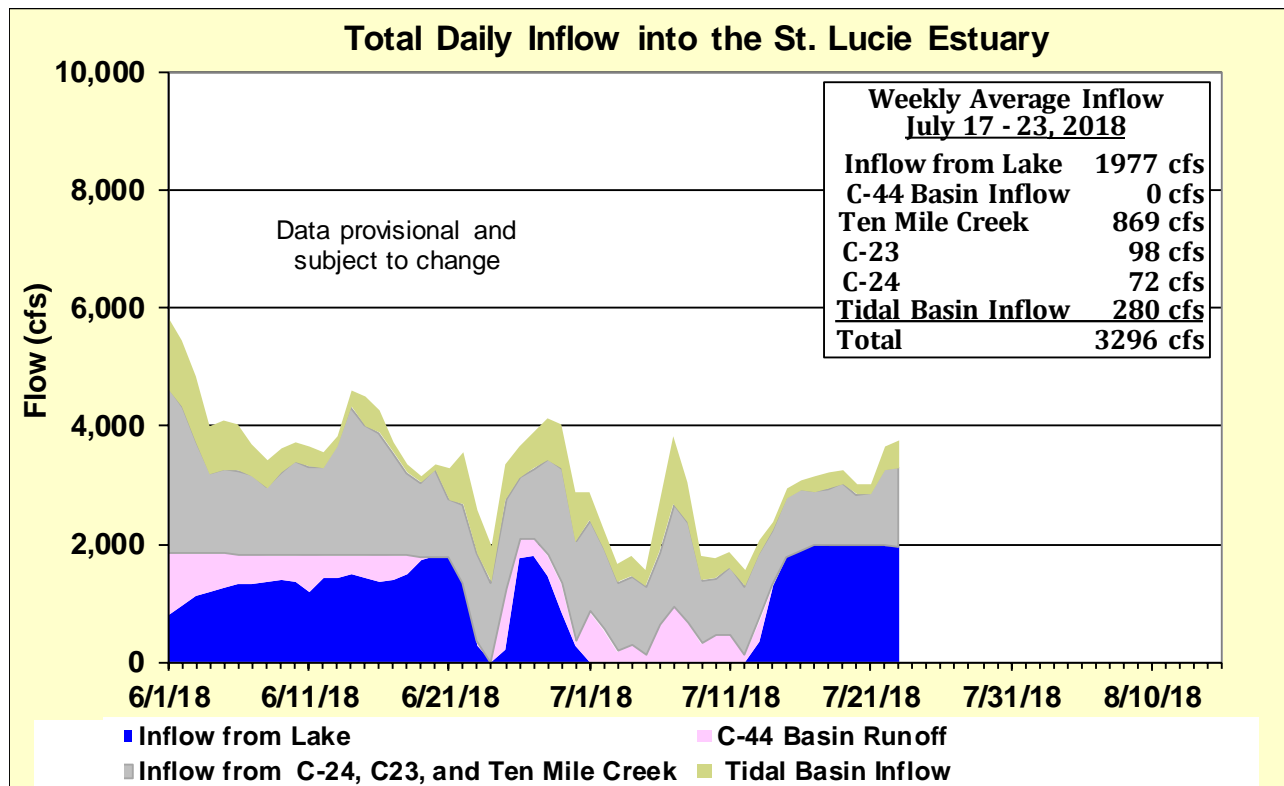
The Florida Fish and Wildlife Research Institute reported on July 20, 2018, that *Karenia brevis*, the Florida red tide dinoflagellate, was observed at background to high concentrations in 20 samples collected from or offshore of Lee County. Fish kills and respiratory irritation were reported in Lee County over the past week.

### Water Management Recommendations

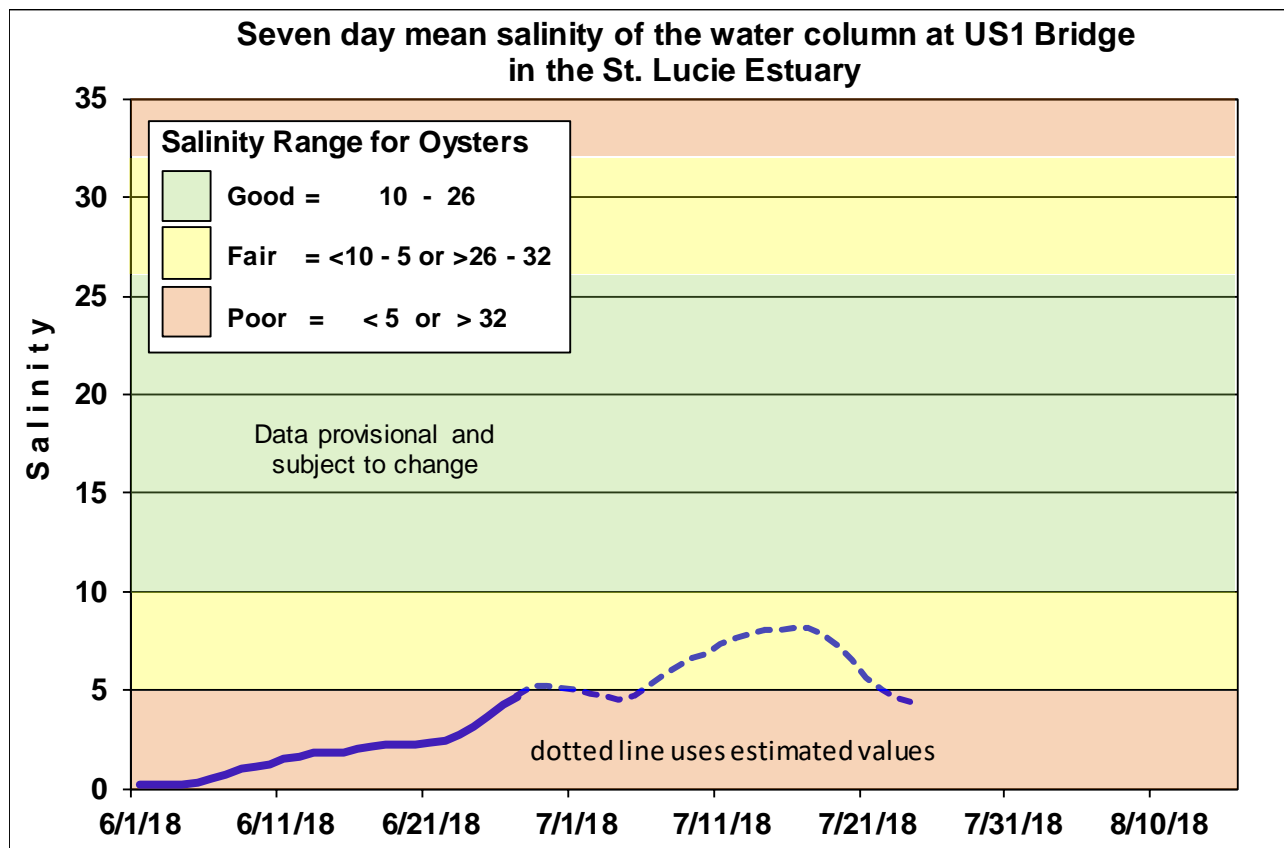
Lake stage is in the Low sub-band of 2008 LORS. Tributary hydrological conditions are wet. The 2008 LORS recommends up to 3,000 cfs at S-79 and up to 1,170 cfs at S-80. Given the current estuarine conditions, there are no ecological benefits associated with freshwater releases from Lake Okeechobee.



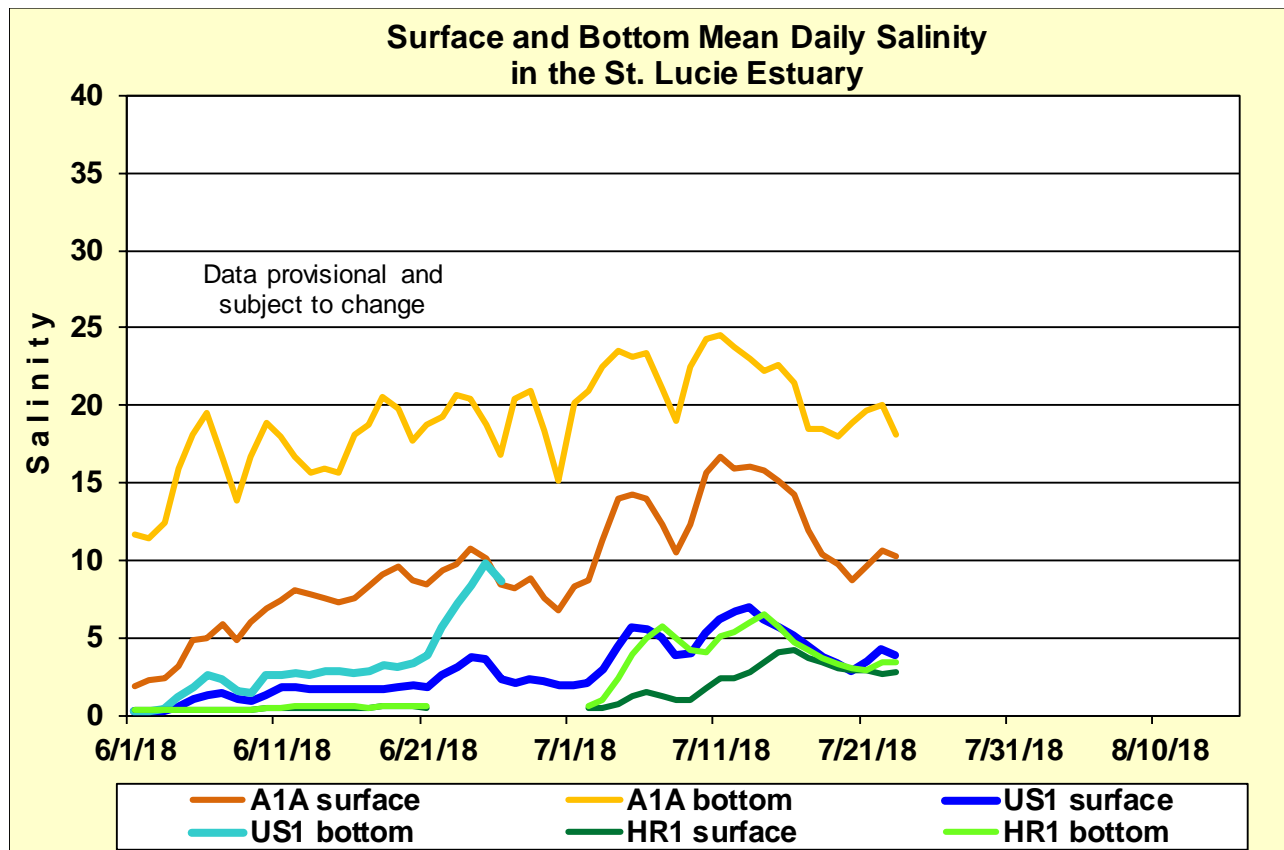
**Figure 1.** Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.



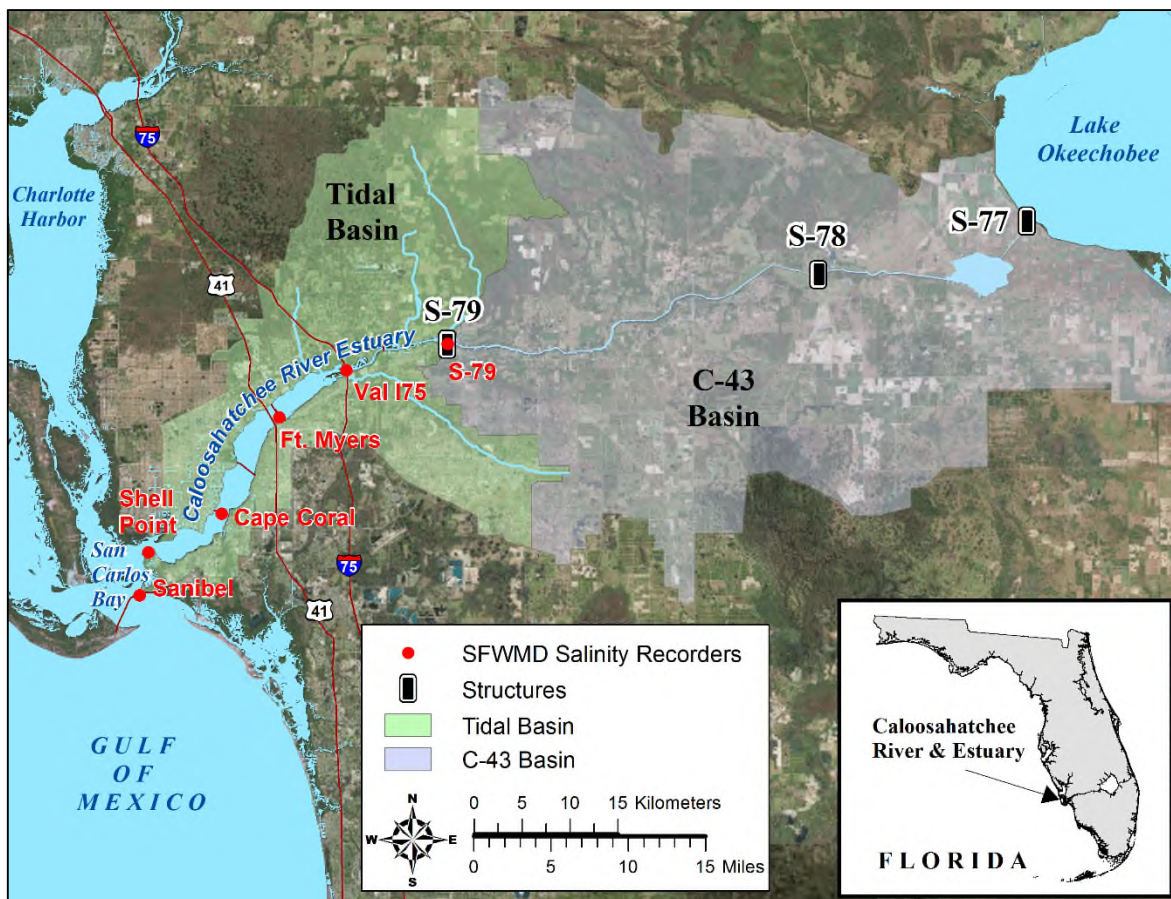
**Figure 2.** Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basins into the St. Lucie Estuary.



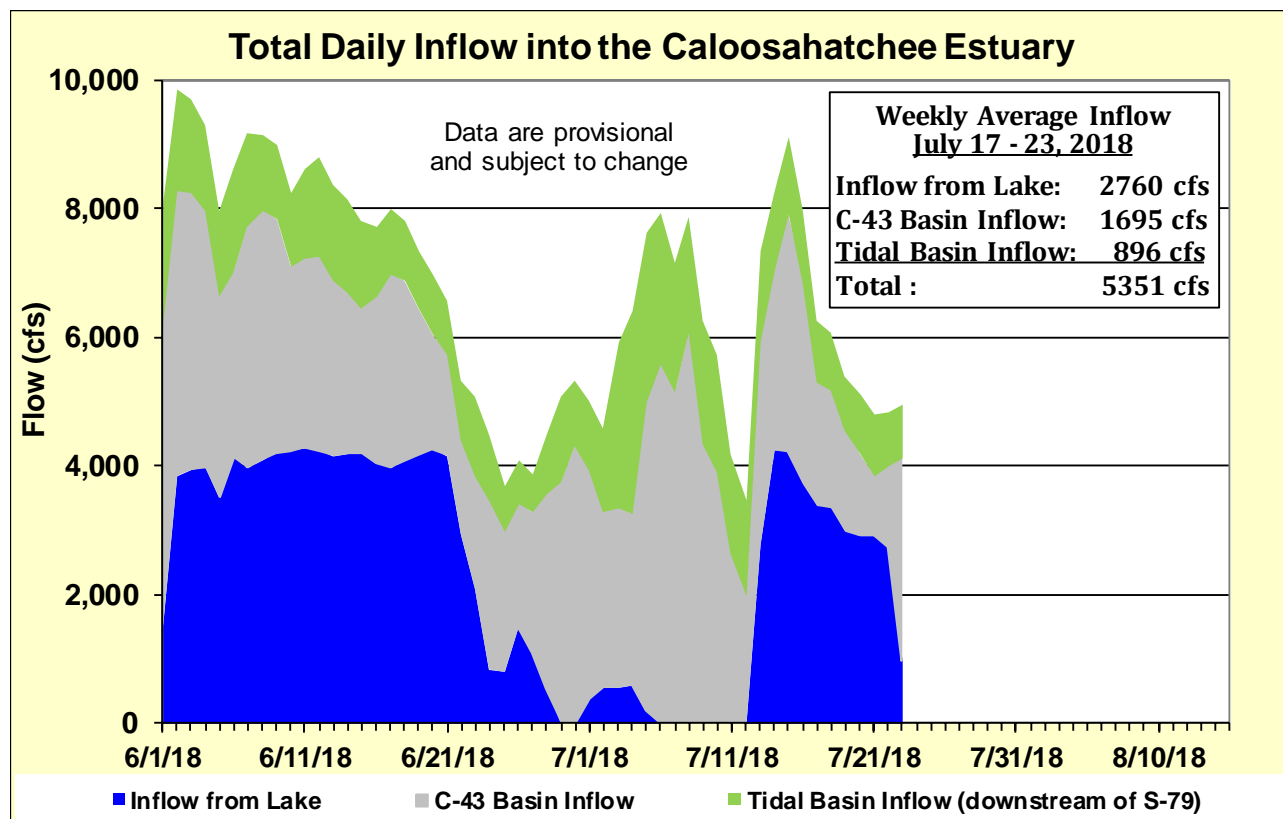
**Figure 3.** Seven-day mean salinity of the water column at the US1 Bridge.



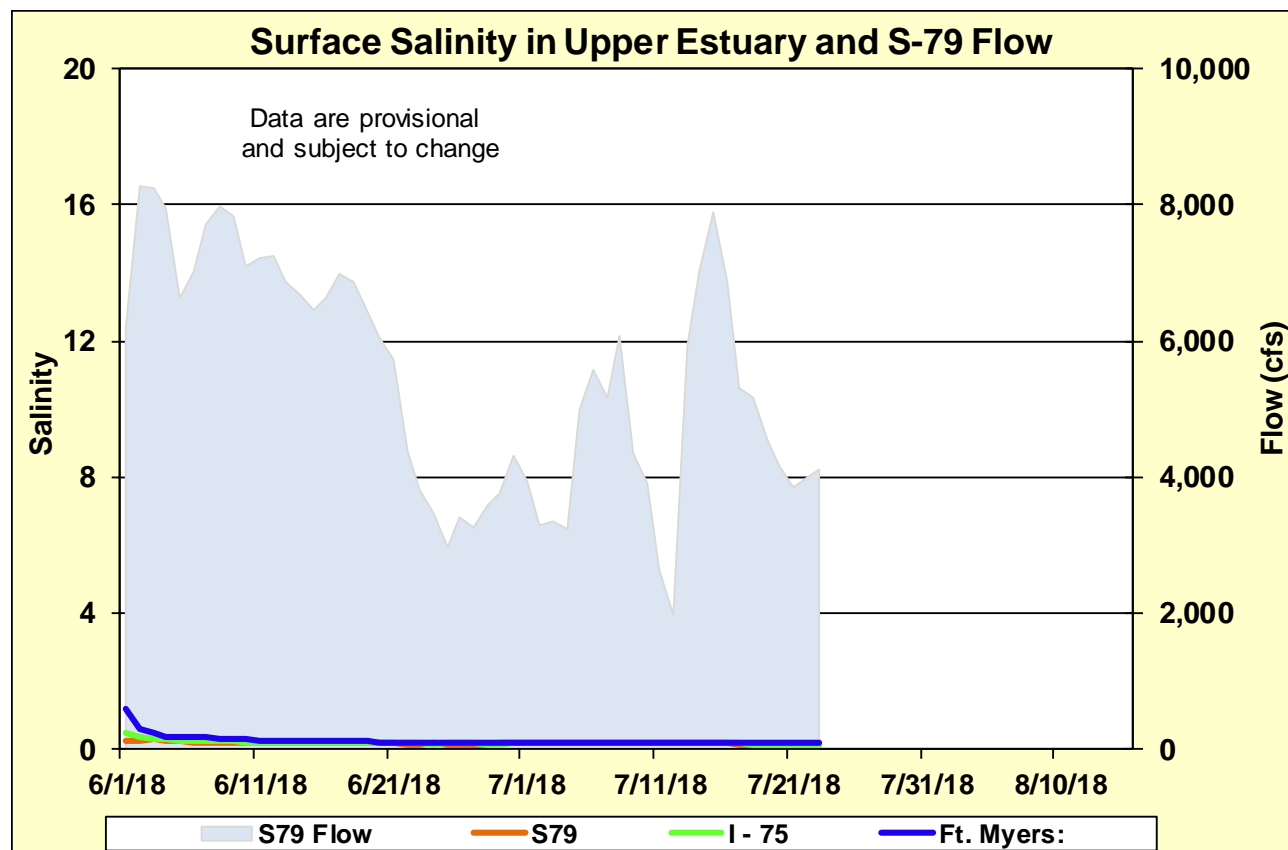
**Figure 4.** Daily mean salinity at the A1A, US1 and estimated HR1 stations.



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

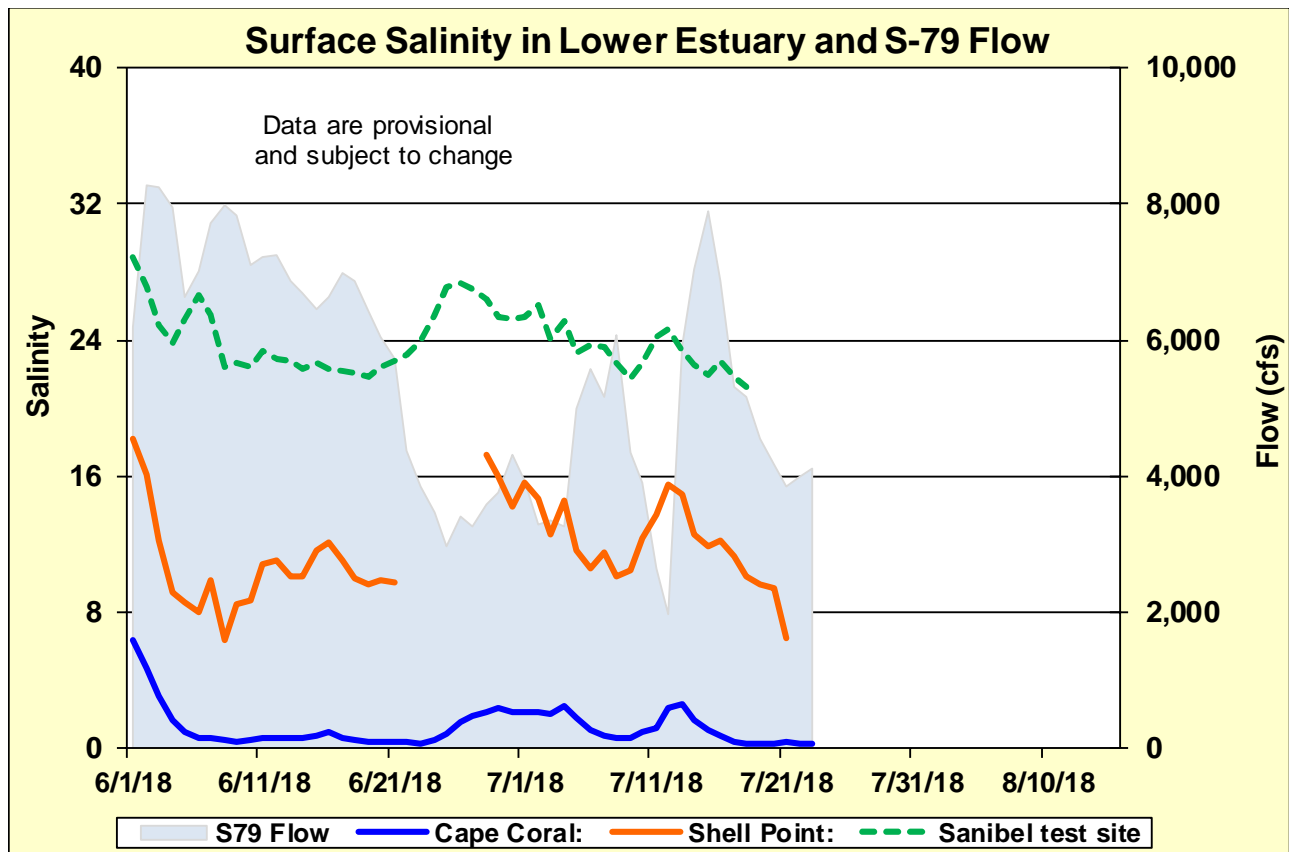


**Figure 6.** Total daily inflows from Lake Okeechobee, runoff from the C-43 basin, and tributaries in the tidal basin into the Caloosahatchee River Estuary.

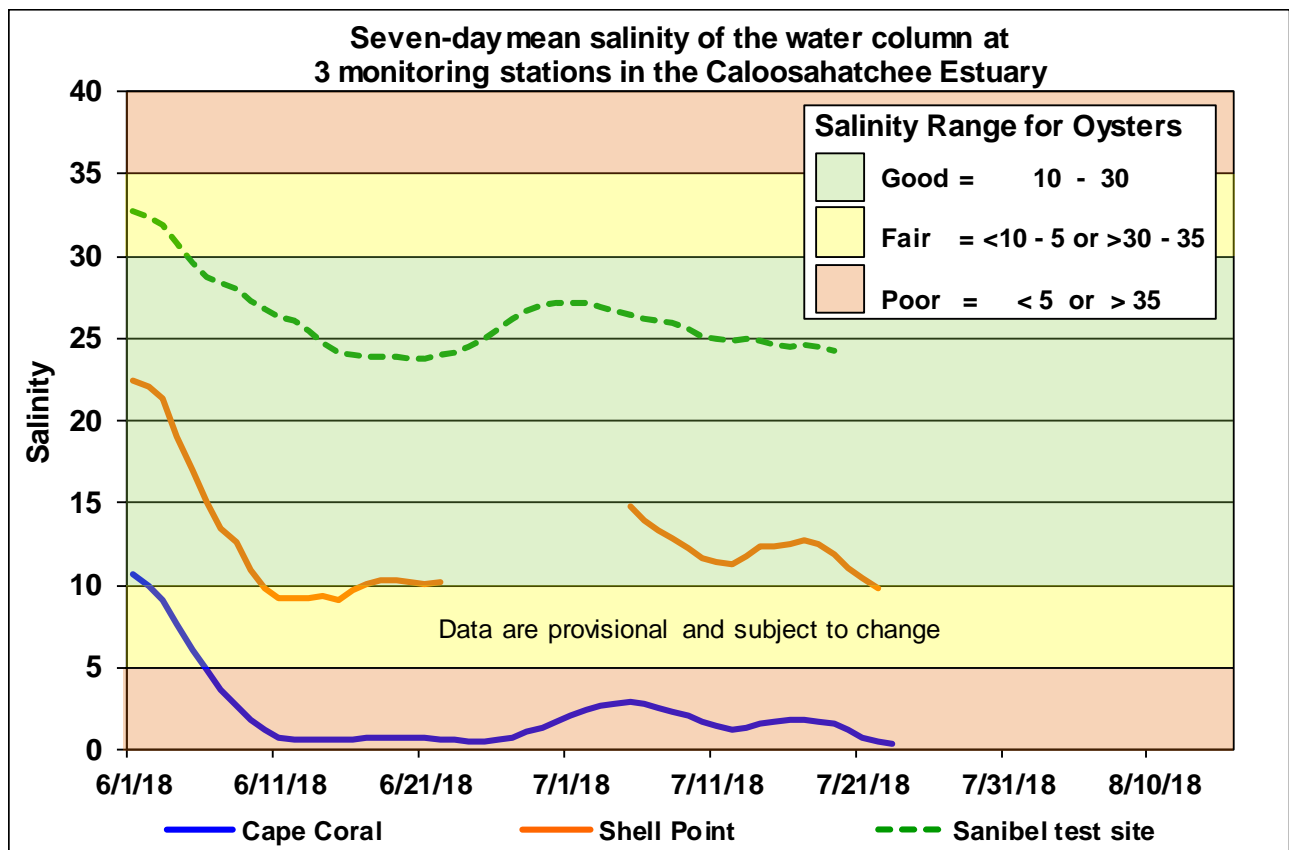


**Figure 7.** Daily mean flows at S-79 and salinity at upper estuary monitoring stations.





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

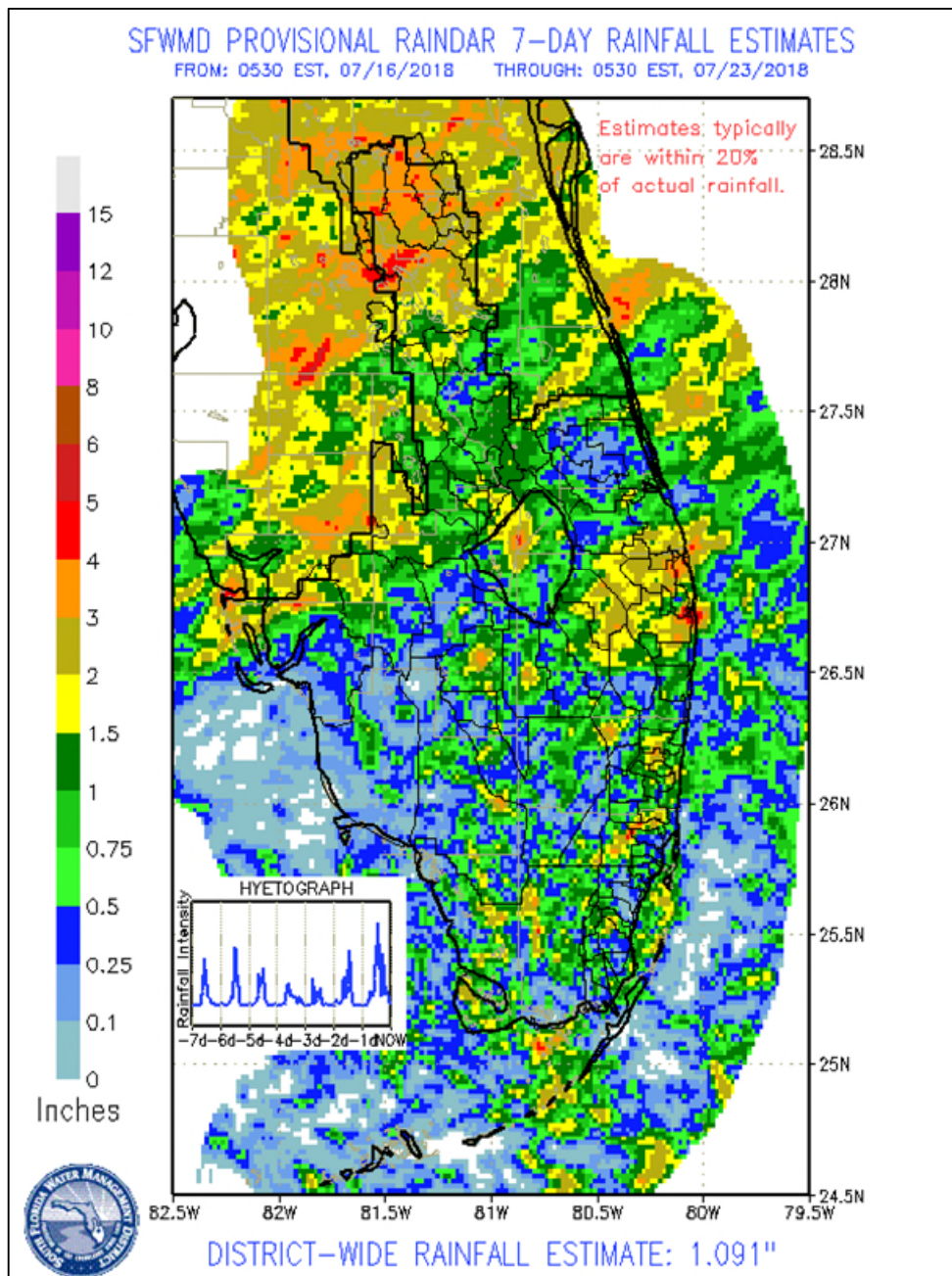


**Figure 9.** Seven-day mean salinity at Cape Coral, Shell Point, and Sanibel monitoring stations.

## **EVERGLADES**

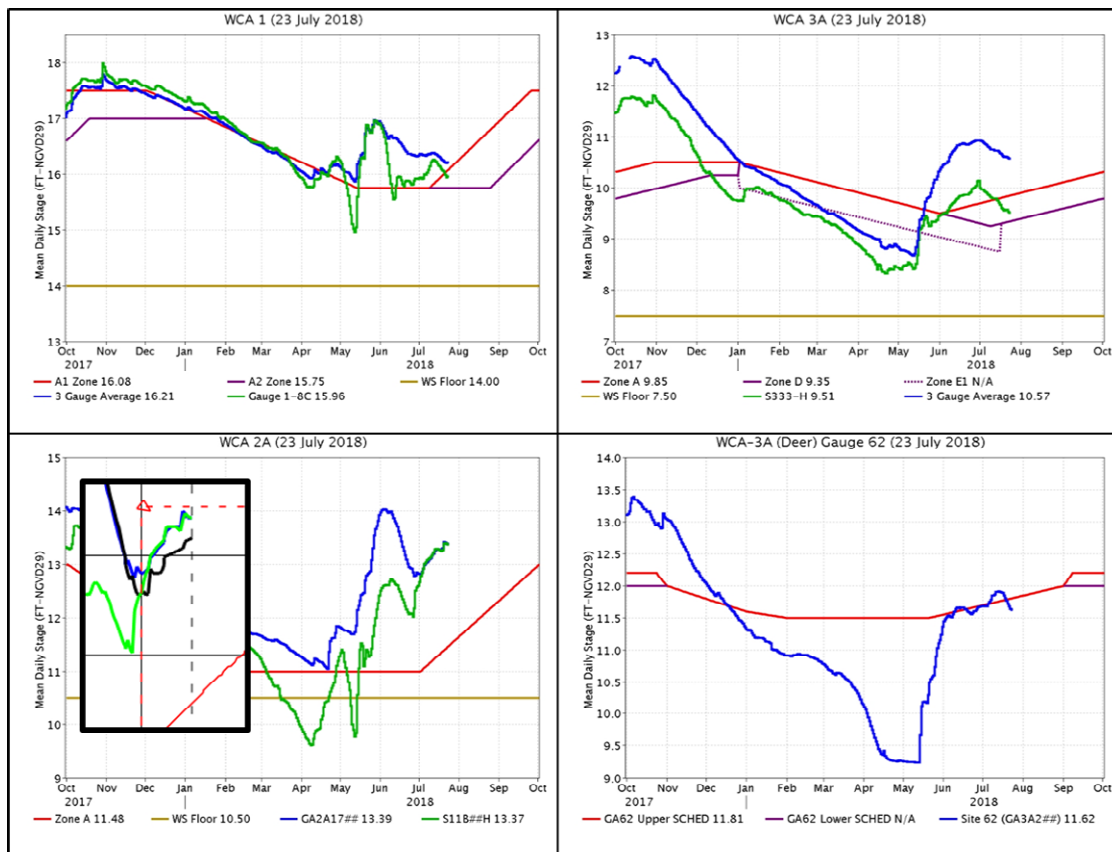
At the gauge locations monitored for this report water depths fell 0.06' on average last week. The most extreme individual gauge changes within the WCAs ranged from -0.27 feet (WCA-3A northwest) to +0.09 feet (WCA-2A and 2B). Pan evaporation was estimated at 1.69 inches.

| <b>Everglades<br/>Region</b> | <b>Rainfall<br/>(Inches)</b> | <b>Stage<br/>Change<br/>(feet)</b> |
|------------------------------|------------------------------|------------------------------------|
| WCA-1                        | 0.95                         | -0.10                              |
| WCA-2A                       | 1.04                         | +0.09                              |
| WCA-2B                       | 0.54                         | +0.09                              |
| WCA-3A                       | 0.64                         | -0.16                              |
| WCA-3B                       | 0.65                         | -0.05                              |
| ENP                          | 0.81                         | +0.02                              |

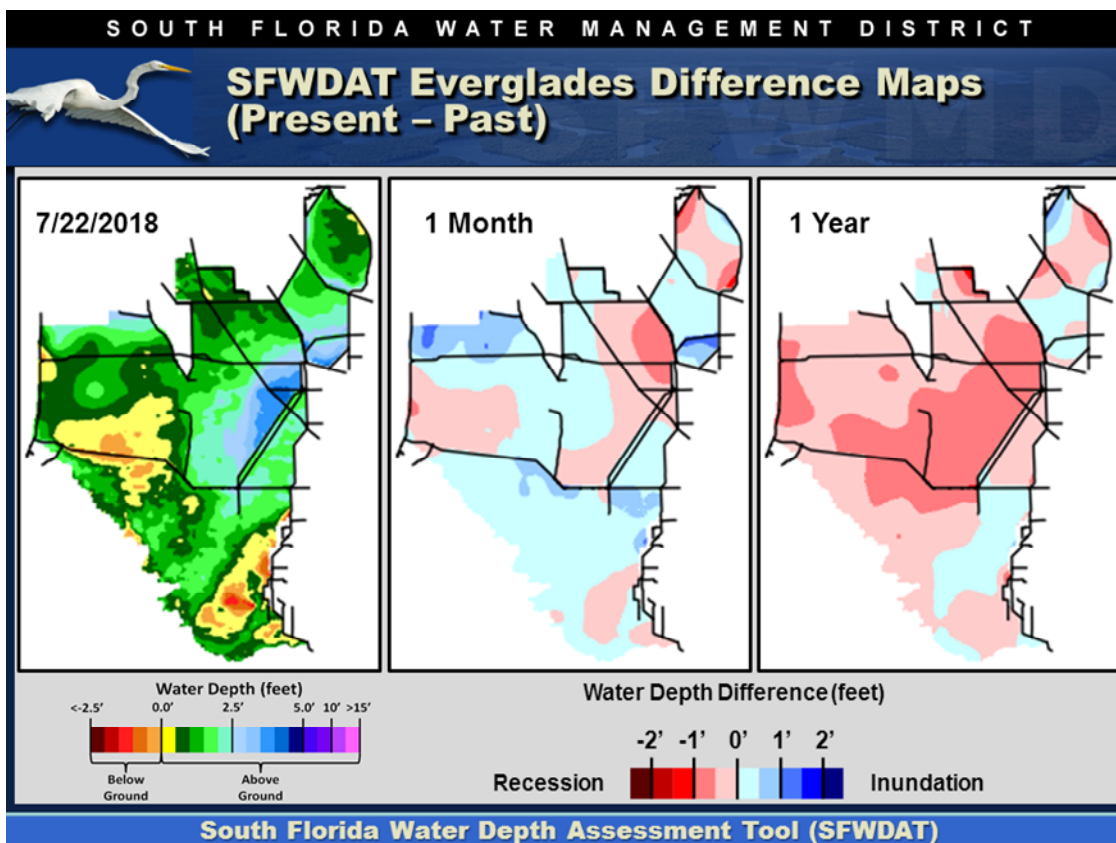
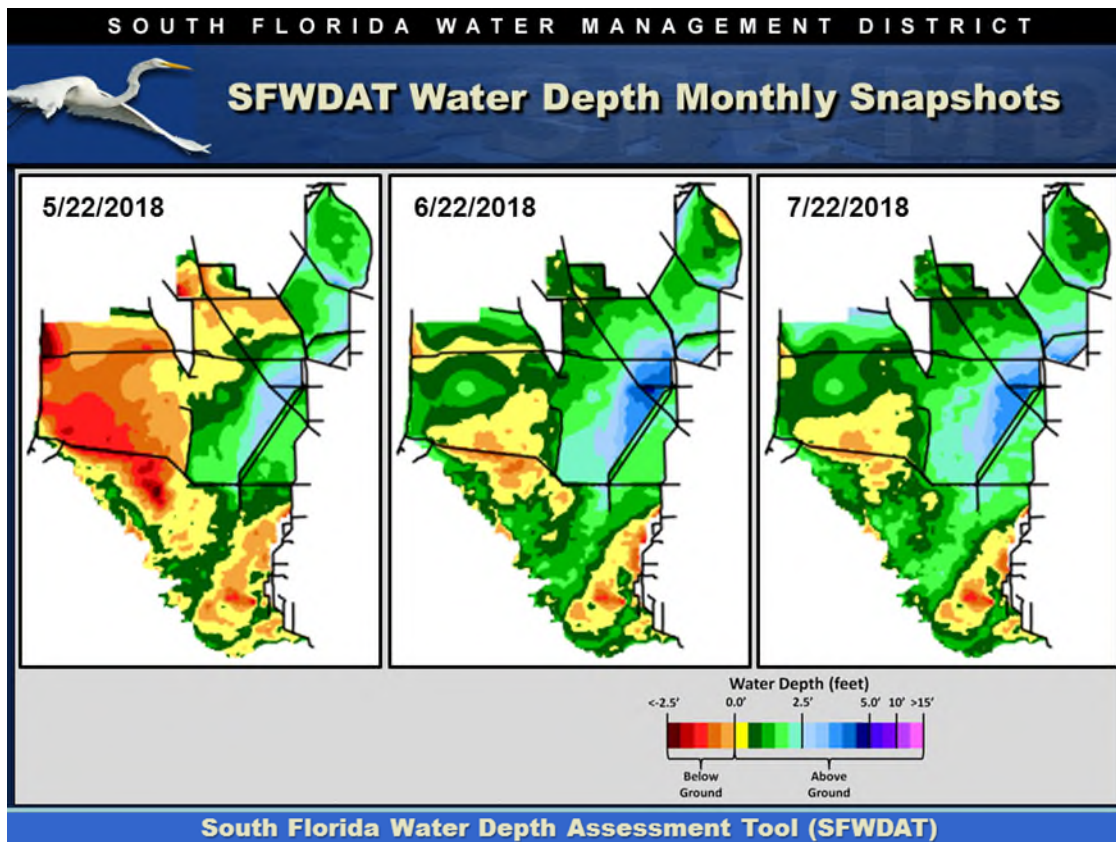


Regulation Schedules: WCA-1 three-gauge average is 0.13 feet above Zone A1, gauge 1-8C is 0.12 feet below. WCA-2A marsh stage is 1.91 feet above Zone A. S11B Headwater stage is 1.89 feet above. S11B is 0.12 below temporary deviation schedule. WCA-3A three-gauge average stage is now 0.72 feet above Zone A and continues to trend downward. WCA-3A at gauge 62 (northwest) stage fell to 0.19 feet below the Upper Schedule.





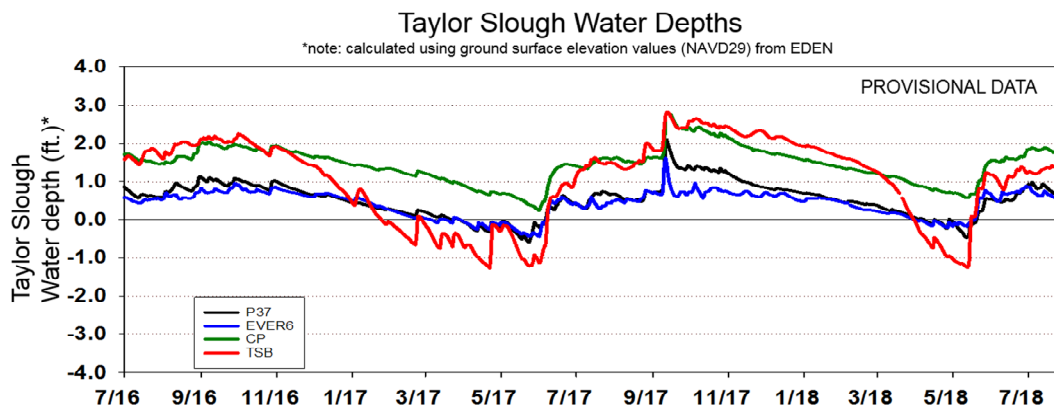
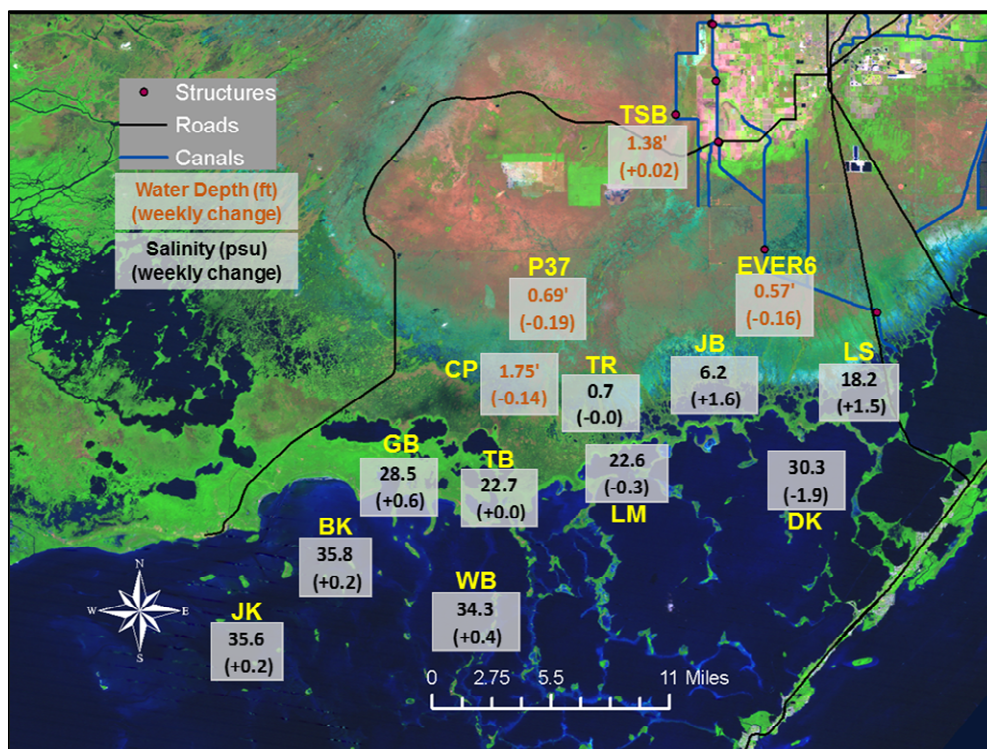
Water Depths and Changes: The WDAT tool for spatial interpolation of depth monthly snapshots indicate a relatively stable WCA-3A over the last month, and lower ponding depths along the northern reaches of the L-67 in WCA-3A South. In WCA-2A water depths have increased moderately over the last month. WDAT output indicates that water levels decreased over the previous month across central WCA-1, and northeastern and central WCA-3A while increasing slightly in WCA-2A, Shark River Slough and significantly so in WCA-2B and downstream of Tamiami trail. WCA-3A is significantly drier currently than it was a year ago.

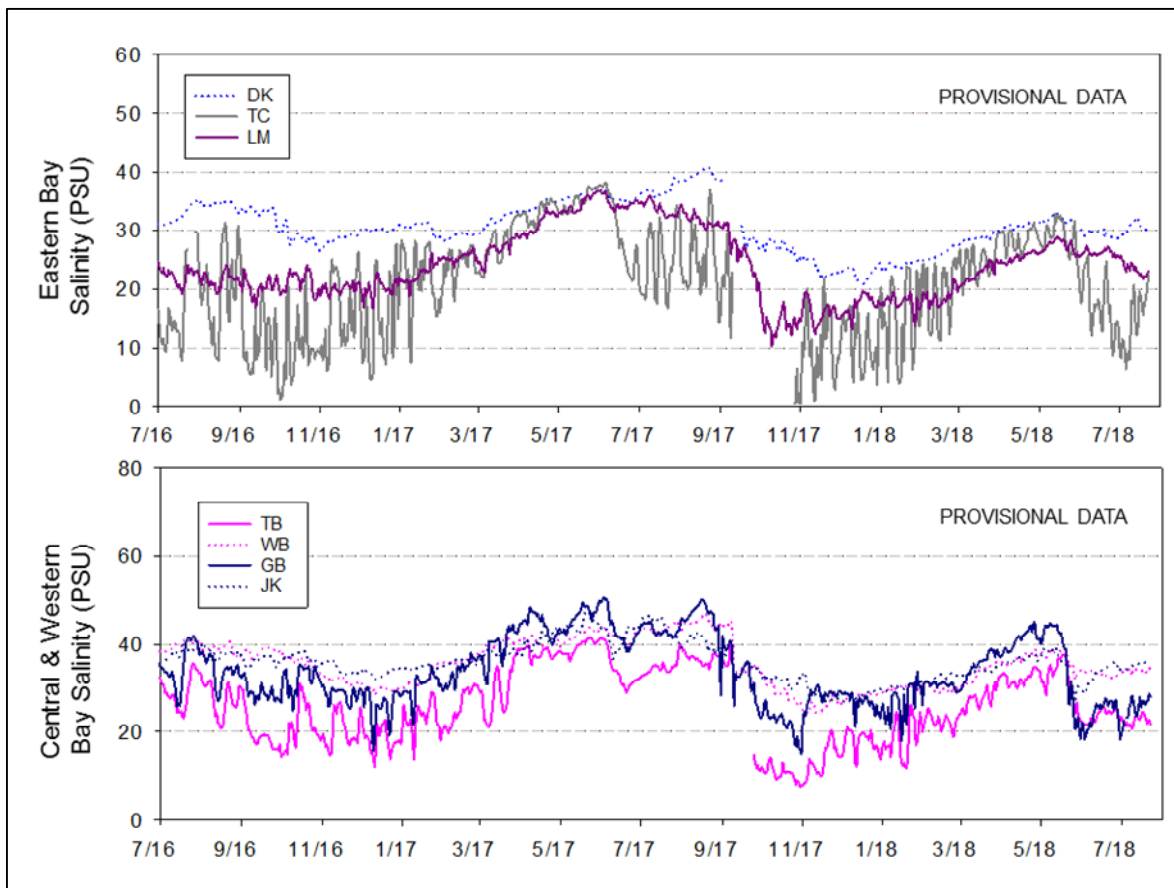


Tree Island Risk Assessment – Work in Progress: Current rough estimates using WDAT. 41% of the tree islands are inundated. The longest duration of continuous inundation is 69 days. 20% of tree islands have been inundated for more than 45 days, an increase of 7% from last week's report.

Taylor Slough Water Levels: An average of 0.5 inches of rain fell on Taylor Slough and Florida Bay. Stages decreased an average of 0.11 feet this past week with individual station changes ranging from -0.19 feet to +0.02 feet. Water depths are 3 to 4 inches above the historical averages.

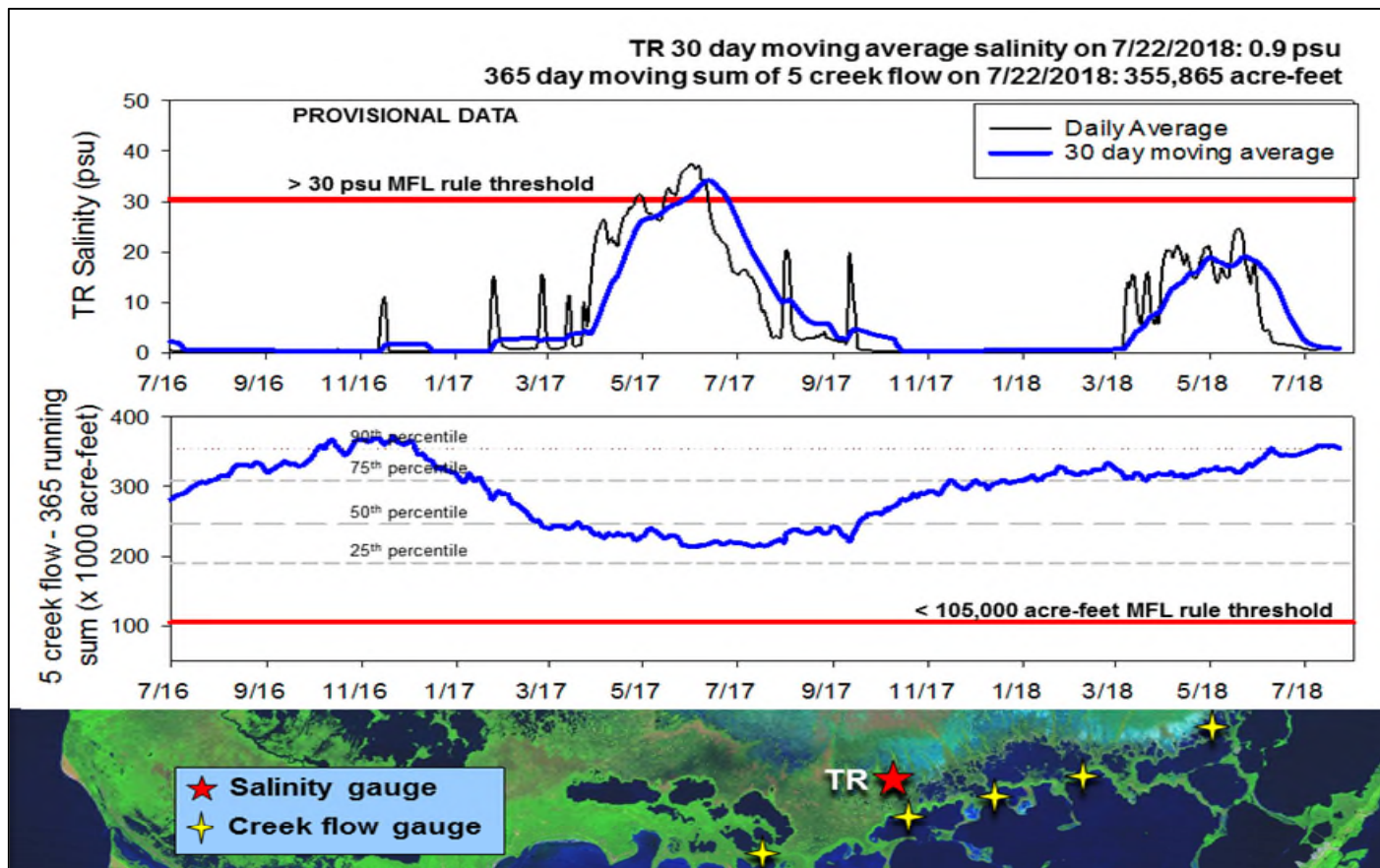
Florida Bay Salinities: Salinities are stable across Florida Bay with an average weekly increase of 0.3 psu and individual station changes ranging from -1.9 psu to +1.6 psu. Salinities ranged from 6 psu in the northeast to 36 psu in the western bay. This range is 3 psu below the historical average for the bay with individual stations ranging from 1 psu to 7 psu below the historical averages.





Florida Bay MFL: Mangrove zone daily average remains near fresh this week at 0.7 psu. The 30-day moving average decreased 0.2 psu over the week to end at 0.9 psu. The weekly cumulative flow from the five creeks denoted by yellow stars on the map totaled about 2,300 acre-feet for the last week. The 365-day moving sum of flow from the five creeks ended the last week at 355,865 acre-feet (still greater than the long-term average of 257,628 acre-feet and just above the 90th percentile). Creek flow is provisional data from the USGS and is highly variable.





### **Water Management Recommendations**

Inflows to northernmost WCA-3A create the least ecological stress when compared to flows to more southern WCA-3A. Incremental change in the rate of structure flows (i.e., when changing flow rates from 0 cfs to 1,000 cfs, make 500 cfs adjustment per week) to the WCAs is more ecologically sensitive than abrupt rate changes. Ascension rates are now critical for apple snail reproduction in the Everglades. The current recommended stage ascension rate is less than 0.25 feet per week (or 0.5 feet per 2 weeks). Due to elevated levels of phosphorus in the S-332D detention area and the Frog Pond detention area, a recommendation is being made to limit the increase in depths within the L-31W to no more than 3 inches per day over the course of 3 to 4 weeks when S-332D, S-328, and/or G-737 are opened. More specific recommendations appear in the summary table below. The red text represents new or modified information or recommendations.

## SFWMD Everglades Ecological Recommendations, July 24th, 2018 (red is new)

| Area              | Weekly change                              | Recommendation   | Reasons   |
|-------------------|--|--|---|
| WCA-1             | Stage decreased by 0.10'                   | Maintain depths at regulation schedule.  | Protect habitat and wildlife.   |
| WCA-2A            | Stage increased by 0.09'                   | Maintain depths at temporary regulation schedule. Manage for a rate of ascension less than +0.25' per week, or less than +0.5 per 2 weeks.                       | Protect upstream/downstream habitat and wildlife.   |
| WCA-2B            | Stage increased by 0.09'                   | Maintain depths at temporary regulation schedule. Manage for a rate of ascension less than +0.25' per week, or less than +0.5 per 2 weeks.                       | Protect upstream/downstream habitat and wildlife.   |
| WCA-3A NE         | Stage decreased by 0.27'                   | Maintain depths at regulation schedule.  | Protect habitat including peat soil development, tree islands and wildlife.   |
| WCA-3A NW         | Stage decreased by 0.11'                   | Maintain depths at regulation schedule.  |   |
| Central WCA-3A S  | Stage decreased by 0.07'                   | Maintain depths at regulation schedule.  | Protect habitat including peat soil development, tree islands and wildlife.   |
| Southern WCA-3A S | Stage decreased by 0.10'                   |  |   |
| WCA-3B            | Stage decreased 0.05'                      | Maintain depths at or above regulation schedule. Manage for a rate of ascension less than +0.25' per week, or less than +0.5 per 2 weeks.                        | Protect upstream/downstream habitat and wildlife.   |
| ENP-SRS           | Stage increased by 0.02'                   | Make discharges to the Park according to the 2012 WCP rainfall plan.   | Protect upstream/downstream habitat and wildlife.   |
| Taylor Slough     | Stage changes ranged from +0.02' to +0.14' | Move water southward as possible. Limit increases in the L-31W to less than 3 inches per day for 3-4 weeks to allow for reductions in phosphorus concentrations. | When available, provide freshwater buffer for downstream conditions. Decrease potential for high phosphorus input to ENP. |
| FB- Salinity      | Salinity changes ranged -0.7 to +2.3 psu.  | Move water southward as possible   | When available, provide freshwater to maintain low salinity buffer and promote water movement.                            |