

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:** October 02, 2018

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

### **Summary**

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

Below average shower activity this week; potential for increasing rains early next week. A surge of moisture moving through the District from the northeast is bringing scattered shower activity to the east coast. Expect this activity to persist through the day and spread to some western areas as well. Shower activity will end after sunset as dry air moves in behind the moisture tonight. This dry air will limit afternoon shower development Wednesday but then a second round of moisture is forecast to move in from the east which should increase shower activity east Wednesday night and then across the southern two-thirds of the District Thursday. Very dry air is then forecast to move in late Thursday night and squelch out most shower development except for some widely scattered light showers over the interior Friday. East winds will then bring some scattered showers mostly near the east coast Saturday and Sunday. Moisture currently over the southwestern Caribbean is forecast to work its way northward and bring an increase rain chances over the District beginning Monday.

#### **Kissimmee**

Tuesday morning stages were 57.1 feet NGVD (0.1 feet above schedule) in East Lake Toho, 54.2 feet NGVD (0.2 feet above schedule) in Toho, and 51.3 feet NGVD (0.1 feet below schedule) in Kissimmee-Cypress-Hatchineha; headwater stages were 46.4 feet NGVD at S-65A and 27.9 feet NGVD at S-65D. Tuesday morning discharges were: 1,518 cfs at S-65, 1,385 cfs at S-65A, and 1,838 cfs at S-65E. Dissolved oxygen concentration in the Kissimmee River averaged 3.3 mg/L for the week. Kissimmee River mean floodplain depth on Sunday was 0.69 feet. No new recommendations were made this week.

#### **Lake Okeechobee**

Lake Okeechobee stage is 14.50 feet NGVD, falling 0.19 feet from the previous week and 0.07 feet over the last 30 days. Lake stages are now the lowest they have been for this time of year since 2011 but are in the middle of the preferred ecological envelope, which varies seasonally from 12.5 – 15.5 feet NGVD. Cyanobacterial bloom potential remained high along the western shore over the last week, based on NOAA's analysis of satellite data (see supporting information below). The latest image (September 28) showed high potential for a bloom north of Fisheating Bay along Indian Prairie. Conditions will likely remain favorable for some level of recurring blooms over the next week but may subside with increasing wind and rainfall potential the following week.

## **Estuaries**

Total inflow to the St. Lucie Estuary averaged 1,447 cfs over the past week with 1,072 cfs coming from Lake Okeechobee. Surface salinity slightly changed. The seven-day average salinity at the US1 Bridge remains in the fair range for adult eastern oysters. Total inflow to the Caloosahatchee Estuary averaged 3,744 cfs over the past week with 1,602 cfs coming from the Lake. Salinity remained near 0 down to Ft. Myers Yacht Basin and decreased downstream. 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 good range at Shell Point. Officials confirmed on Monday October 1 that red tide has reached waters off Palm Beach County on Florida's East Coast. Given the current estuarine conditions, there are no ecological benefits associated with freshwater releases from Lake Okeechobee.

## **Stormwater Treatment Areas**

Over the past week, the STAs received approximately 35,000 acre-feet of inflows (which includes approximately 18,700 acre-feet of Lake releases). The total amount of inflows to the STAs in WY2019 (since May 1, 2018) is approximately 1,020,000 acre-feet, which includes approximately 195,000 acre-feet of Lake releases. Most STA cells are at or above target depths. Operational restrictions are in place for construction related activities in STA-1W (all flow-ways) and maintenance activities in STA-2 Flow-way 3. STA-5/6 Flow-ways 2 and 3 are offline for initiation of a Restoration Strategies project to grade non-effective treatment areas. 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**

Over the last week water depths declined on average across the Water Conservation Areas and depths in Everglades National Park rose slightly. Conditions within the Everglades are stable but drying as stages drop to very near or below the regulation lines. The average water depth at the gauges located in WCA-3A North fell significantly for the second consecutive week and are at their lowest levels since the end of May. As of Sunday, Gauge 65 is at the threshold that indicates flooding stress to tree islands. Northern WCA-1 continues to dry out as indicated by the WDAT model output. This week below average precipitation fell on Taylor Slough and Florida Bay, and on average depths there fell slightly but remain above average for this time of year. Salinities in Florida Bay were mostly stable this past week, however conditions at the western stations are higher than their historical averages for this time of year.

## Supporting Information

### KISSIMMEE BASIN

#### Kissimmee Basin Rainfall

The Upper Kissimmee Basin received 0.34 inches of rainfall in the past week and the Lower Basin received 0.35 inches (SFWMD Daily Rainfall Report 10/1/2018).

#### 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: 10/2/2018**

Water Body	Structure	7-day Average Discharge (cfs) <sup>1</sup>	Stage Monitoring Site <sup>2</sup>	Lake Stage (feet)	Schedule Type <sup>3</sup>	Schedule Stage (feet)	Daily Departure (feet)						
							9/30/18	9/23/18	9/16/18	9/9/18	9/2/18	8/26/18	8/19/18
Lakes Hart and Mary Jane	S-62	20	LKMJ	60.0	R	60.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0
Lakes Myrtle, Preston, and Joel	S-57	6	S-57	61.1	R	61.0	0.1	0.0	0.0	0.2	0.1	0.0	0.0
Alligator Chain	S-60	41	ALLI	63.2	R	63.2	0.0	0.0	0.1	0.1	0.2	0.1	0.1
Lake Gentry	S-63	76	LKGT	61.1	R	61.0	0.1	0.1	0.0	0.1	0.0	0.0	0.0
East Lake Toho	S-59	46	TOHOE	57.1	R	57.0	0.1	0.1	0.0	0.1	0.0	0.0	0.0
Lake Toho	S-61	405	TOHOW, S-61	54.2	R	54.0	0.2	0.1	0.1	0.1	0.1	0.1	0.0
Lakes Kissimmee, Cypress, and Hatchineha	S-65	1,485	KUB011, LKIS5B	51.1	R	51.5	-0.4	-0.1	0.1	0.2	0.5	0.1	0.1

<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: 10/2/2018

Metric	Location	1-Day Average		Average for the Preceding 7-Days <sup>1</sup>								7/29/18
		9/30/2018	9/30/18	9/23/18	9/16/18	9/9/18	9/2/18	8/26/18	8/19/18	8/12/18	8/5/18	
Discharge (cfs)	S-65	1,519	1,485	1,560	1,544	3,538	3,088	1,806	3,282	4,337	4,407	4,179
Discharge (cfs)	S-65A <sup>2</sup>	1,391	1,416	1,532	1,634	3,808	3,315	1,765	3,443	4,674	4,980	4,267
Discharge (cfs)	S-65D <sup>2</sup>	1,816	1,982	2,221	3,351	4,313	2,699	3,077	4,254	4,617	4,458	2,264
Headwater Stage (feet NGVD)	S-65D <sup>2</sup>	27.91	27.81	27.75	27.67	27.86	27.88	27.70	27.00	26.63	26.78	26.75
Discharge (cfs)	S-65E <sup>2</sup>	1,881	2,062	2,296	3,458	4,259	2,902	3,219	3,860	4,848	4,566	2,400
Discharge (cfs)	S-67	314	310	288	215	176	190	187	169	160	157	209
DO (mg/L) <sup>3</sup>	Phase I river channel	4.0	3.3	2.8	2.5	2.9	2.7	2.5	2.8	3.0	3.1	3.8
Mean depth (feet) <sup>4</sup>	Phase I floodplain	0.69	0.75	0.80	1.12	1.79	1.24	1.16	1.76	2.02	2.08	1.25

<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)

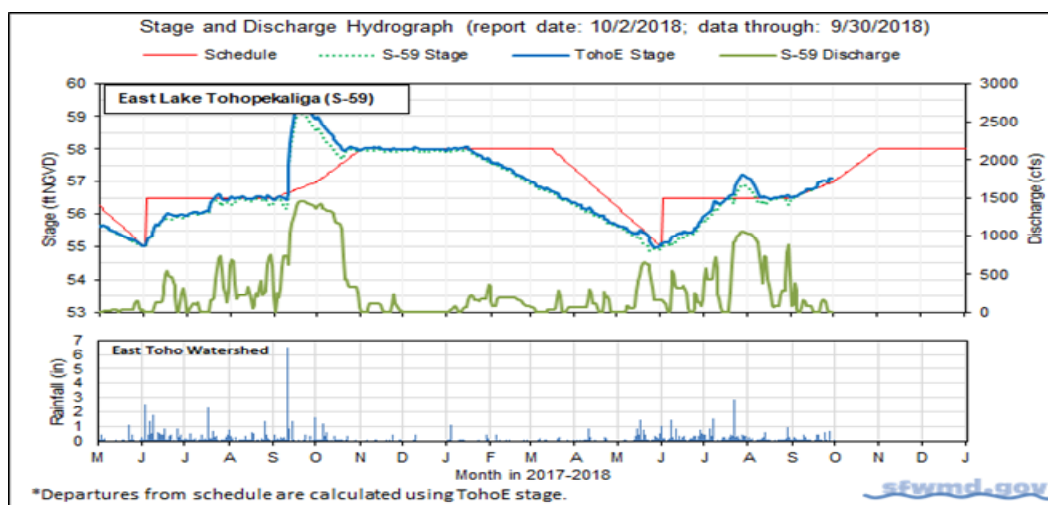


Figure 1.



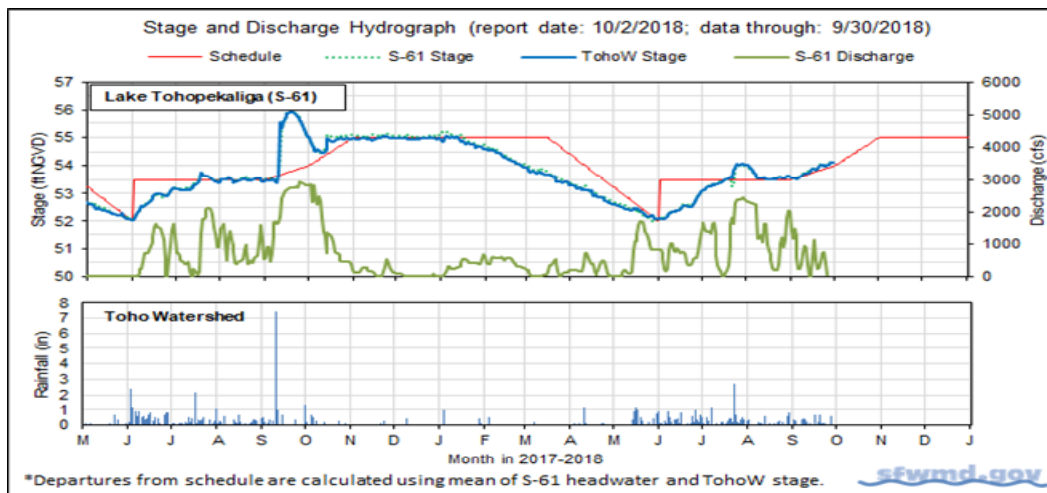


Figure 2.

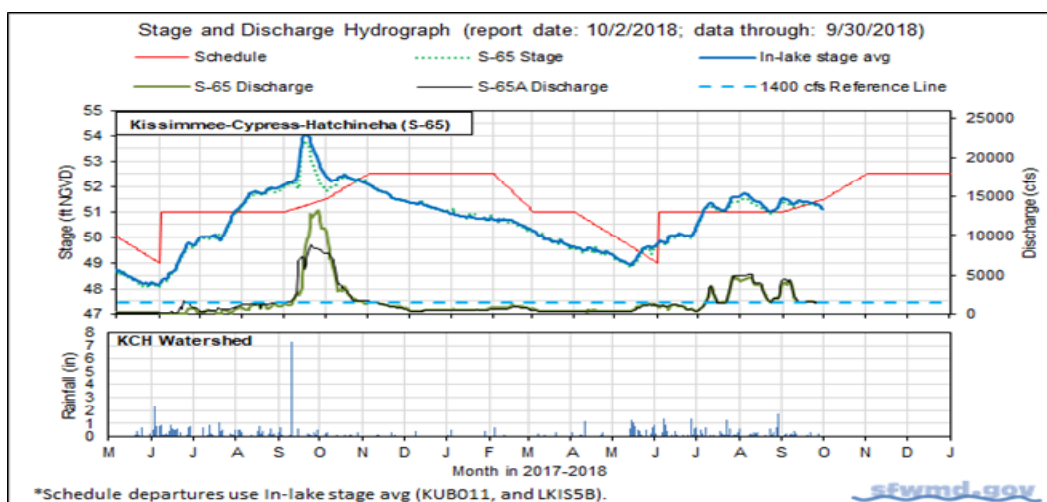


Figure 3.

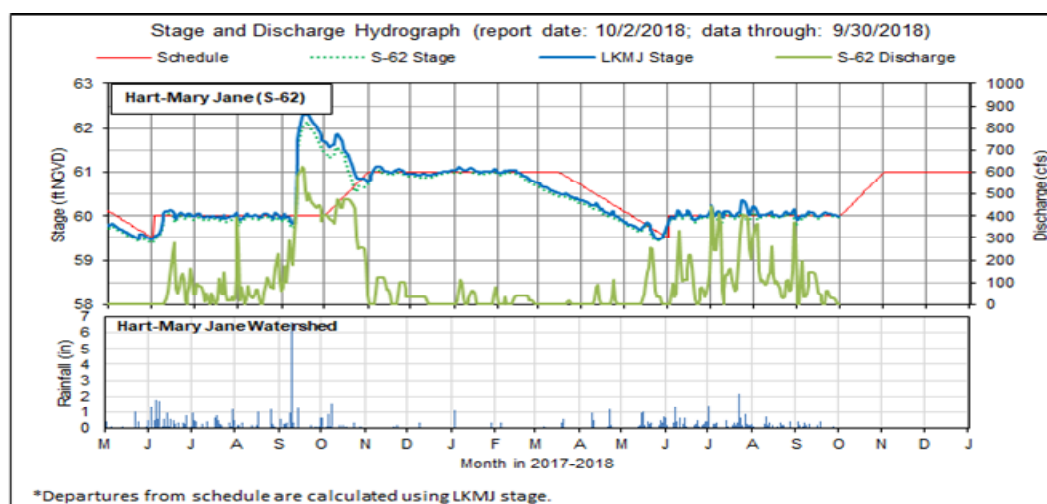


Figure 4.

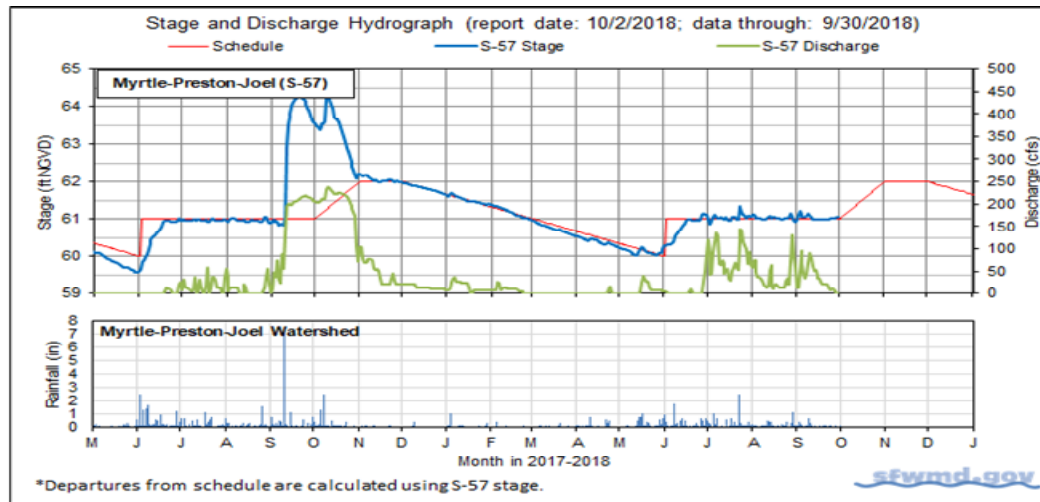


Figure 5.

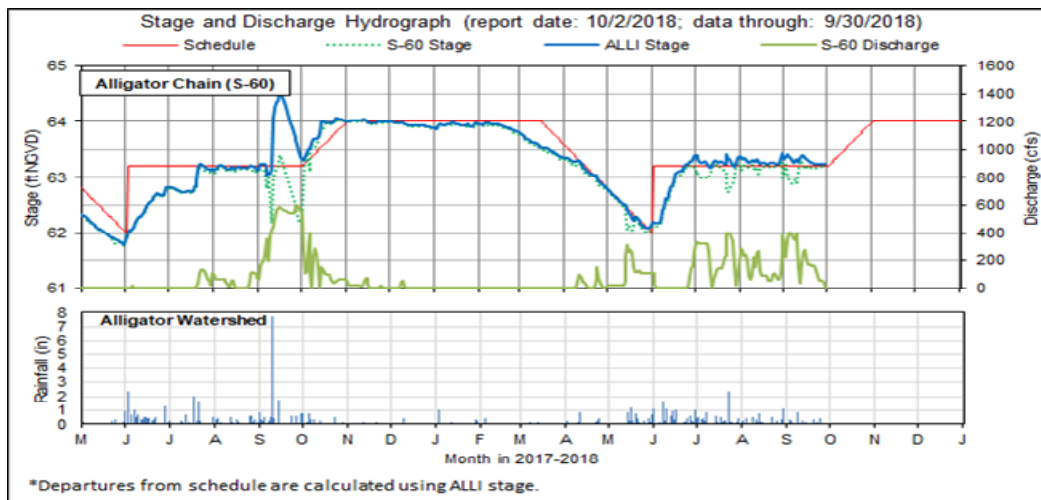


Figure 6.

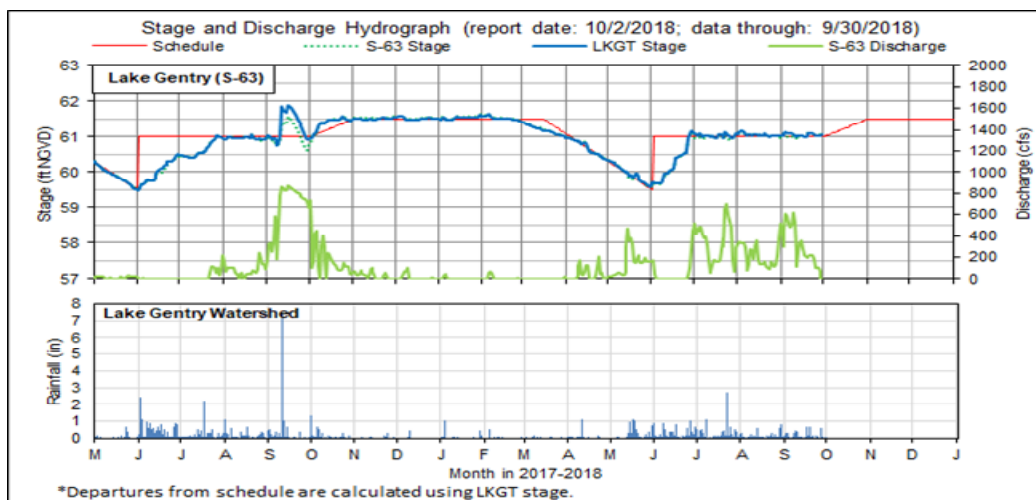
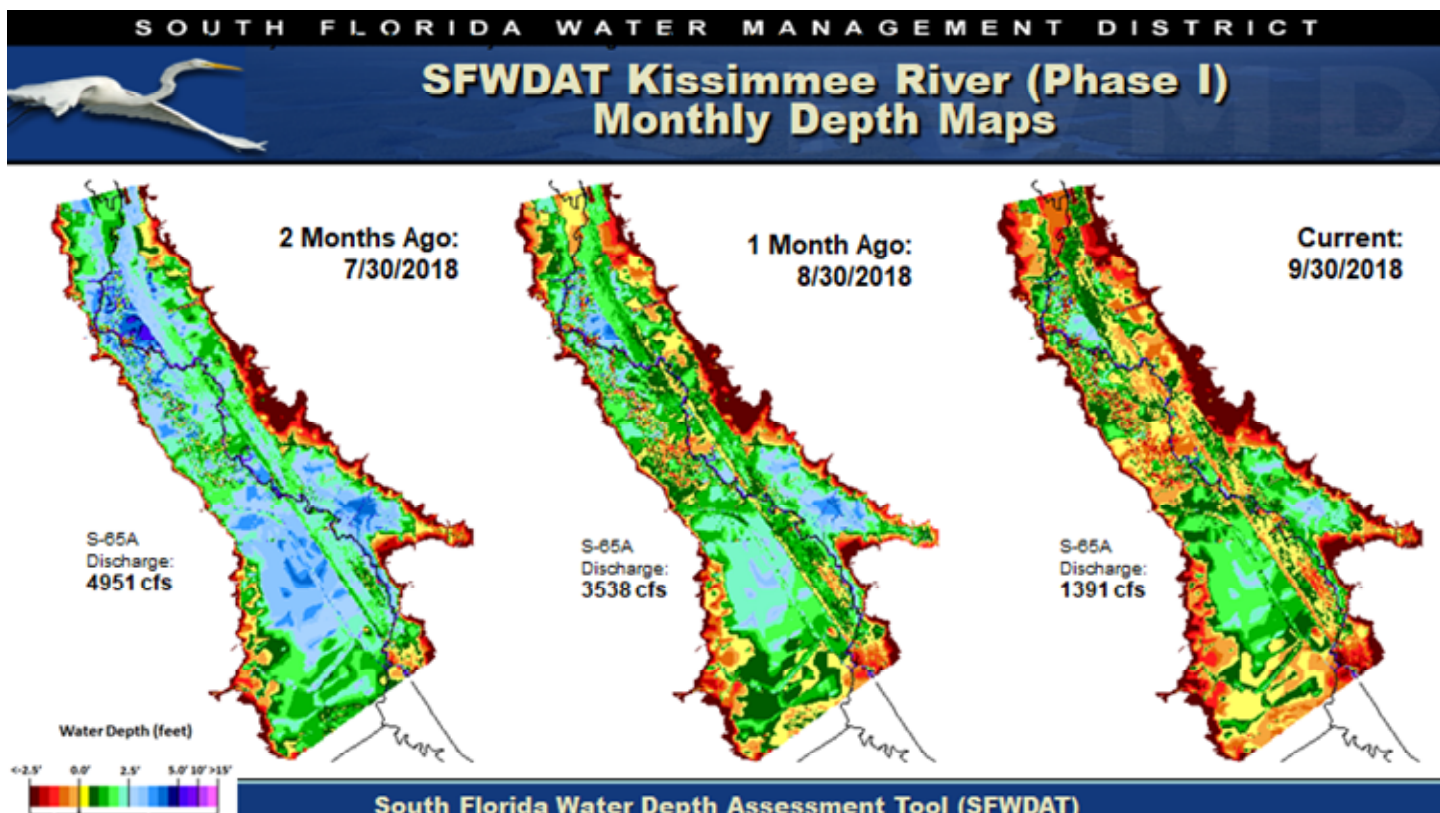
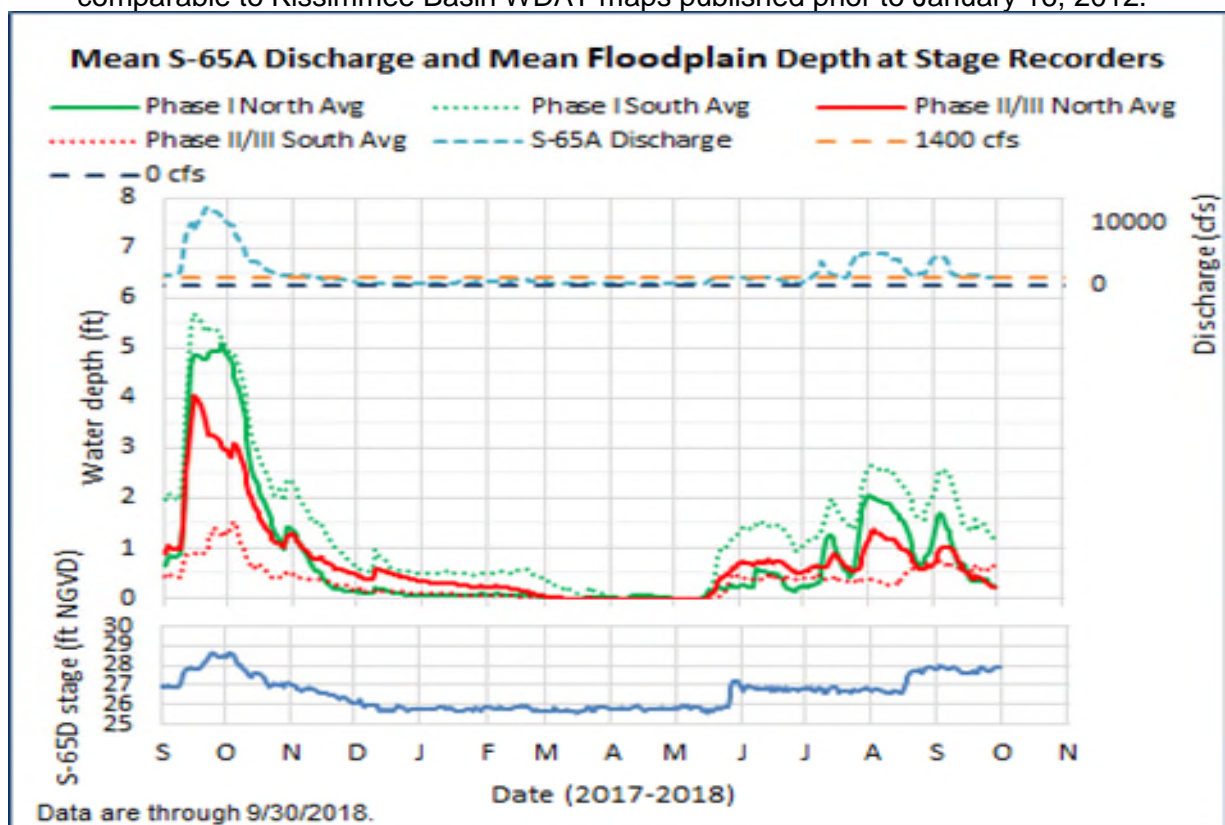


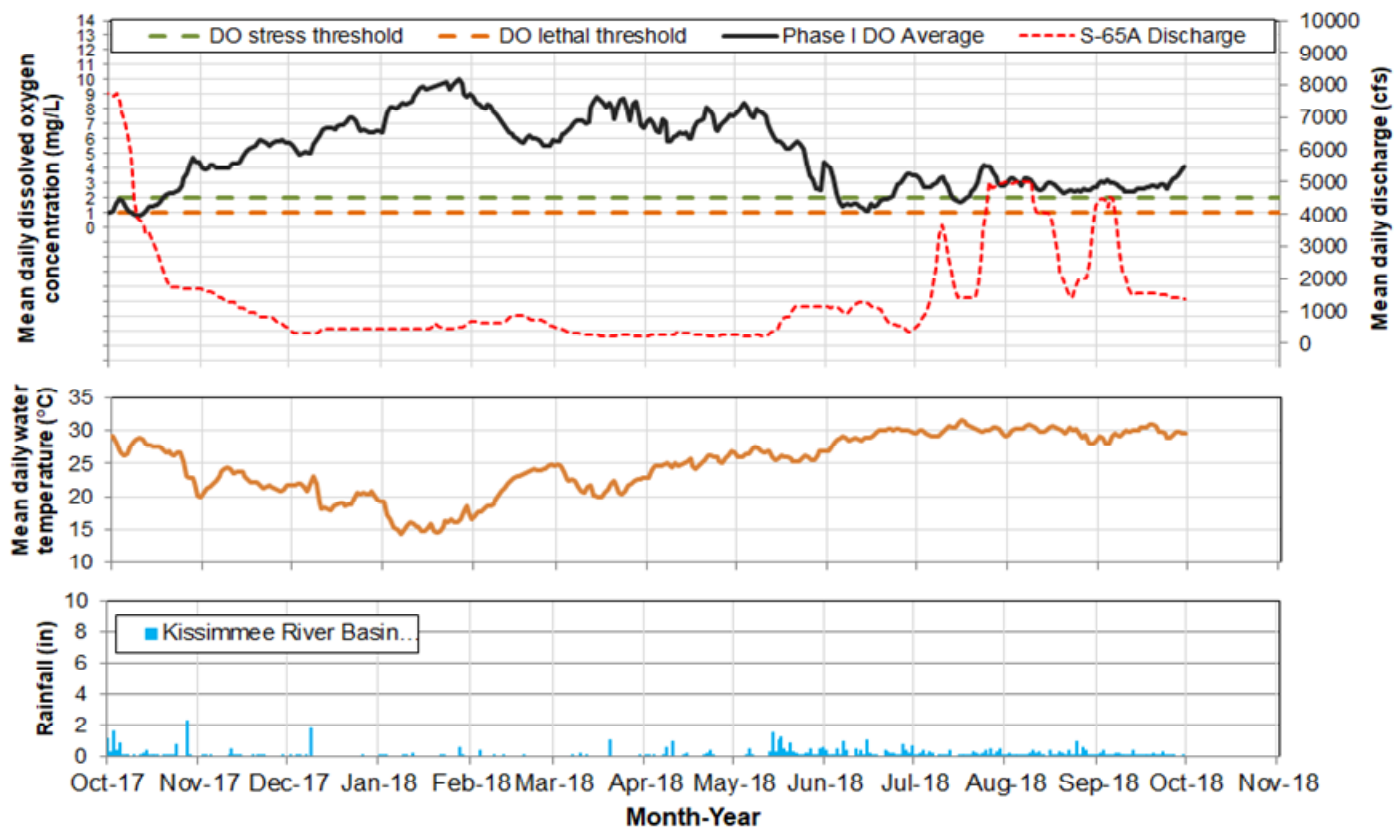
Figure 7.



**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.



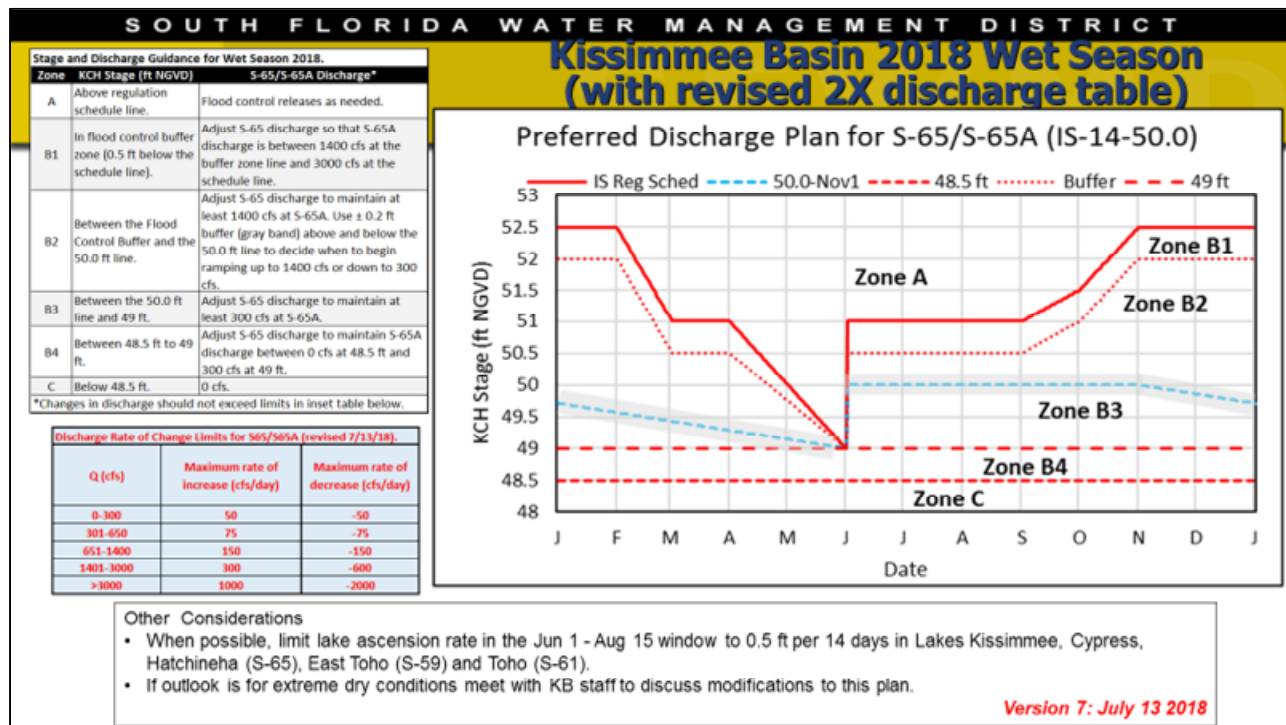
Report Date: 10/2/2018; data are through: 9/30/2018.

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

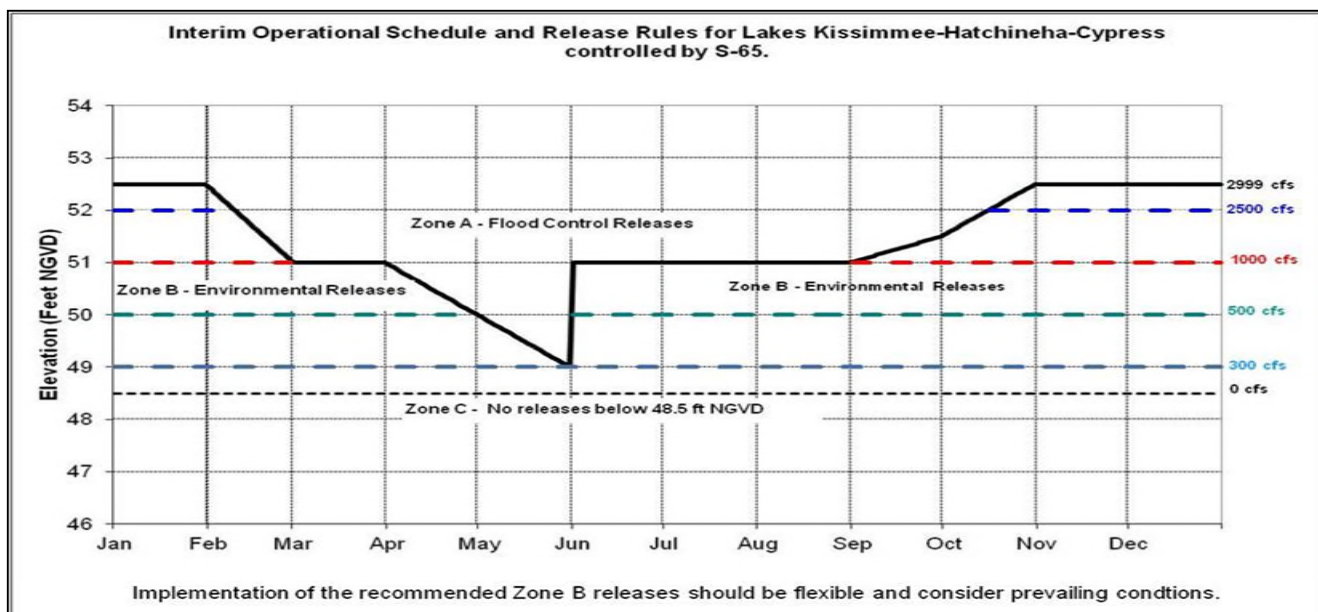


## Water Management Recommendations

Recommendation Date	Recommendation	Purpose	Outcome	Source	Report Date
10/2/2018	No new recommendations.		N/A		8/7/2018
9/25/2018	No new recommendations.		N/A		8/7/2018
9/18/2018	No new recommendations.		N/A		8/7/2018
9/11/2018	No new recommendations.		N/A		8/7/2018
9/4/2018	No new recommendations.		N/A		8/7/2018
8/28/2018	No new recommendations.		N/A		8/7/2018
8/21/2018	No new recommendations.		N/A		8/7/2018
8/14/2018	No new recommendations.		N/A		8/7/2018
8/7/2018	No new recommendations.		N/A		8/7/2018
7/23/2018-7/24/2018	Increase discharge from 1400 cfs to 3000 cfs, then 3200 cfs and 3500 cfs.	For flood control in Lake Kissimmee.	Implemented	SFWMD Water Mgt/KB Ops	7/31/2018
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



**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.



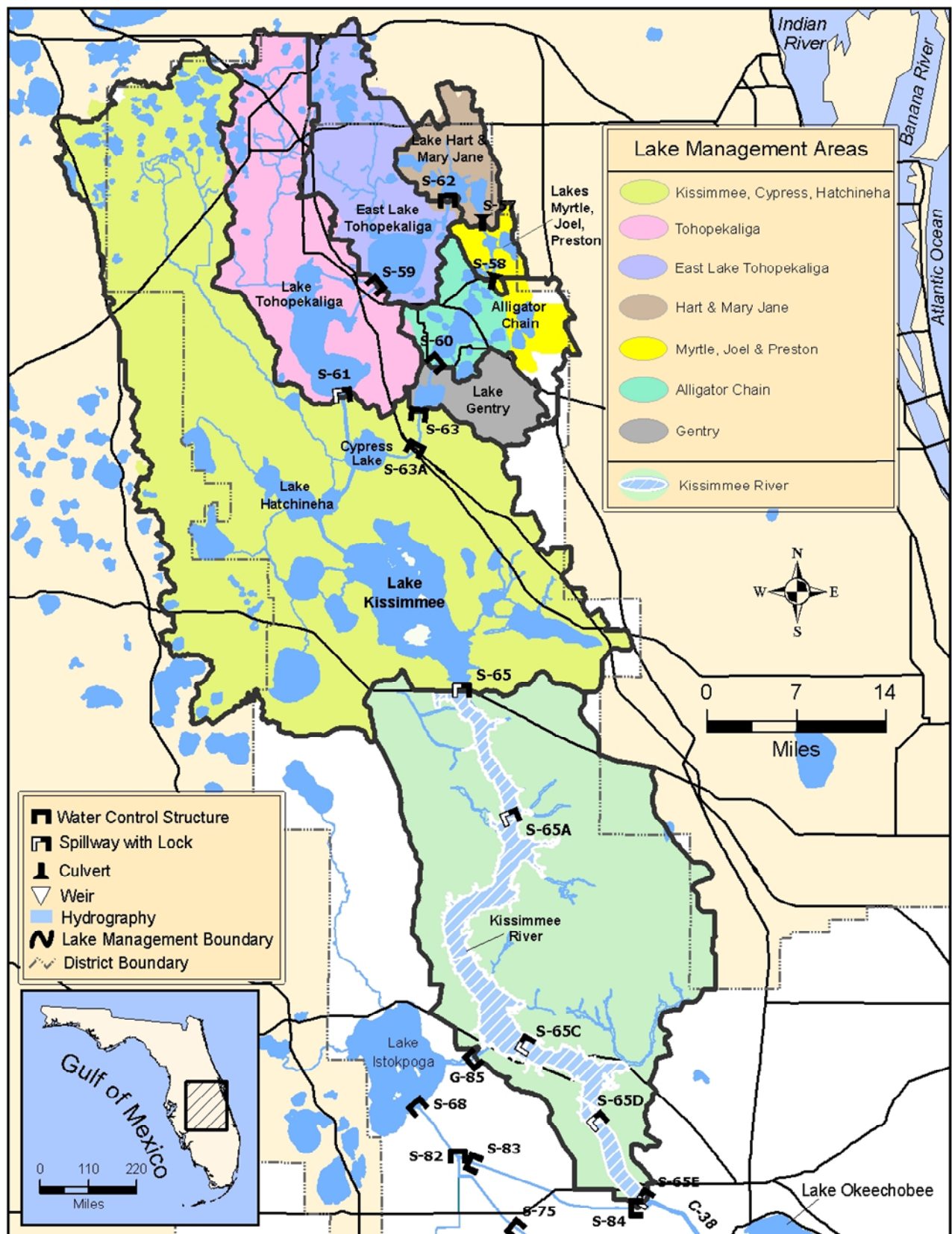


Figure 13. The Kissimmee Basin.

## **LAKE OKEECHOBEE**

According to the USACE web site, Lake Okeechobee stage is at 14.50 feet NGVD for the period ending at midnight on October 1, 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 0.07 feet lower than it was a month ago and 1.97 feet lower than a year ago (Figure 1). The Lake is on the border between the Low and Base-Flow sub-bands (Figure 2). According to RAINDAR, 0.30 inches of rain fell over the Lake during the week September 25, 2018 – October 1, 2018. Most of the surrounding watershed received similar or less rainfall, between 0 and 0.5 inches, except for the eastern watersheds, which received between 0.5 – 0.75 inches of rain (Figure 3).

Average daily inflows to the Lake decreased slightly from the previous week, going from 2,632 cfs to 2,345 cfs. The decrease in inflows was from the Kissimmee River via the S-65E structures, going from 2,304 cfs the previous week to 1,997 cfs 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 from the previous week again, going from 3,597 average daily cfs the previous week to 4,939 cfs this past week. The increases in outflows were primarily in discharges west via the S-77 structure and south through the S-350 structures. Discharges via the S-308 remained similar to the previous week at 1,087 cfs, while S-77 discharges went from 1,505 cfs to 1,956 cfs this past week. Outflows south through the S-350 structures increased from 1,038 cfs the previous week to 1,896 cfs this past week. The corrected average daily evapotranspiration value for the week based on the L006 weather platform solar radiation remained the same at 0.12 inches this past week.

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 (September 28) using the cyanobacteria monitoring product derived from NOAA's analysis of EUMETSAT's OLCI satellite sensor showed the high potential for a bloom north of Fisheating Bay along Indian Prairie continued this past week. Conditions will likely remain favorable for some level of recurring blooms over the next week but may subside with increasing wind and rainfall potential the following week (Figure 5).

## **Water Management Recommendations**

Lake Okeechobee stage is 14.50 feet NGVD, 0.19 feet lower than last week and 0.07 feet lower than 30 days ago. Lake stages are now the lowest they have been for this time of year since 2011 but are in the middle of the preferred ecological envelope, which varies seasonally from 12.5 – 15.5 feet NGVD. Recovery of vegetation in the nearshore zone from Hurricane Irma impacts and 2016 El Niño-associated rainfall will require lake stages in the lower portion of the ecological envelope for extended periods, so efforts to prepare for such an event will help speed the rebound of this important vegetation community.

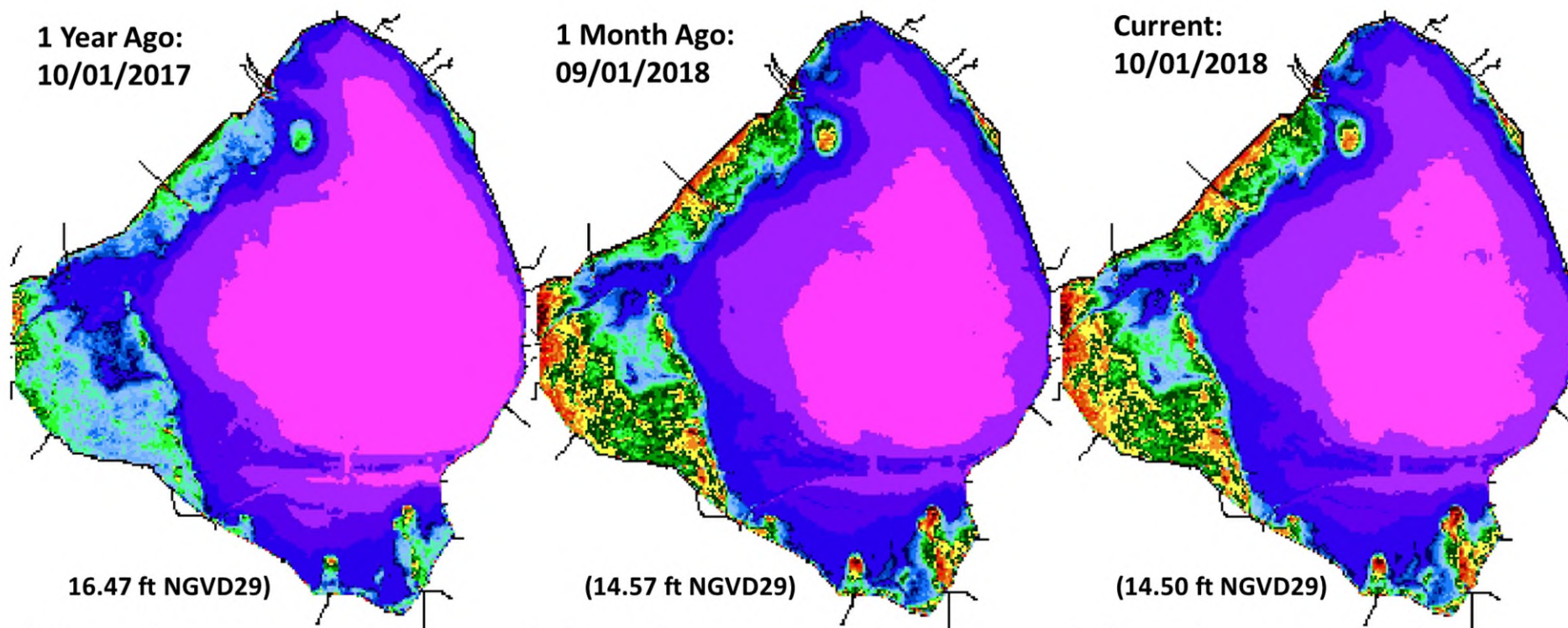


**Table 1.** Average daily inflows and outflows and the approximate depth equivalents on Lake Okeechobee for various structures.

INFLOWS	Previous Week Avg Daily cfs	Avg Daily Inflow cfs	Equivalent Depth Week Total (in)
S65E & S65EX1	2304	1997	0.8
S71 & 72	94	134	0.1
S84 & 84X	41	44	0.0
Fisheating Creek	144	98	0.0
S154	0	0	0.0
S191	0	0	0.0
S133 P	34	41	0.0
S127 P	4	3	0.0
S129 P	6	0	0.0
S131 P	2	0	0.0
S135 P	0	28	0.0
S2 P	0	0	0.0
S3 P	0	0	0.0
S4 P	0	0	0.0
L8 Backflow	2	0	0.0
Rainfall	1750	827	0.3
<b>Total</b>	<b>4382</b>	<b>3172</b>	<b>1.2</b>

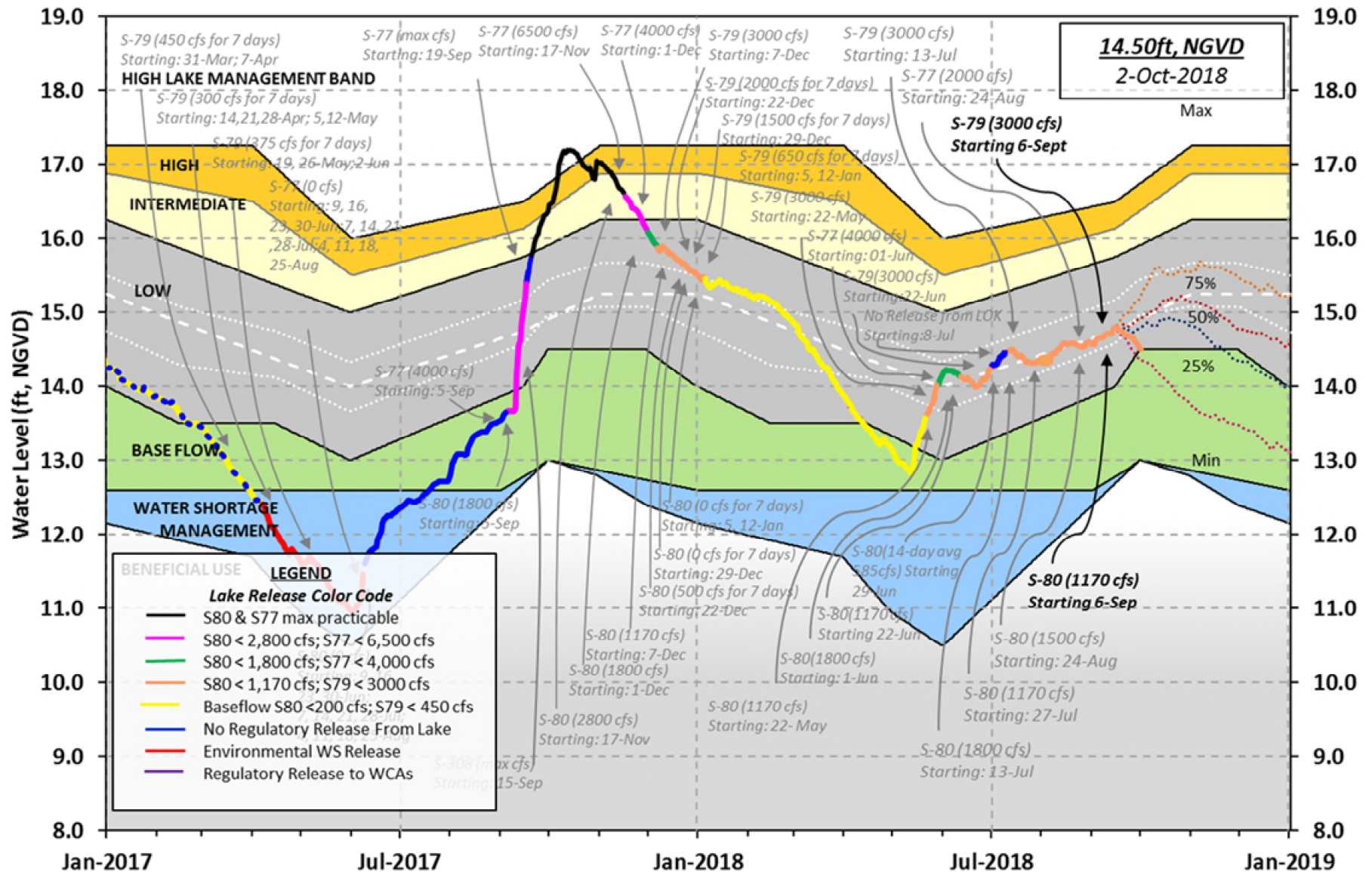
OUTFLOWS	Previous Week Avg Daily cfs	Avg Daily Outflow cfs	Equivalent Depth Week Total (in)
S77	1505	1956	0.8
S308	1055	1087	0.4
S351	230	478	0.2
S352	71	347	0.1
S354	737	1071	0.4
L8 Outflow	0	1	0.0
ET	2342	2370	1.0
<b>Total</b>	<b>5939</b>	<b>7309</b>	<b>3.0</b>

PROVISIONAL DATA



**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



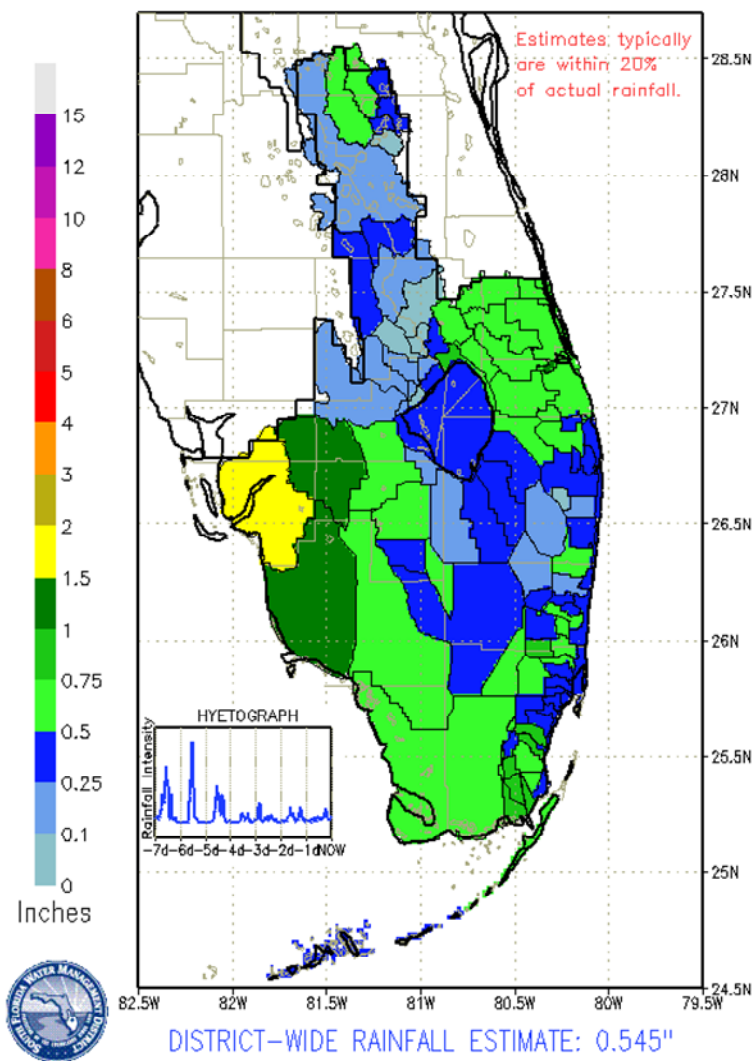
LORS-2008  
Adopted by USACE 28-April-2008

Projected Stage Percentiles From  
SFWMD-HESM Position Analysis

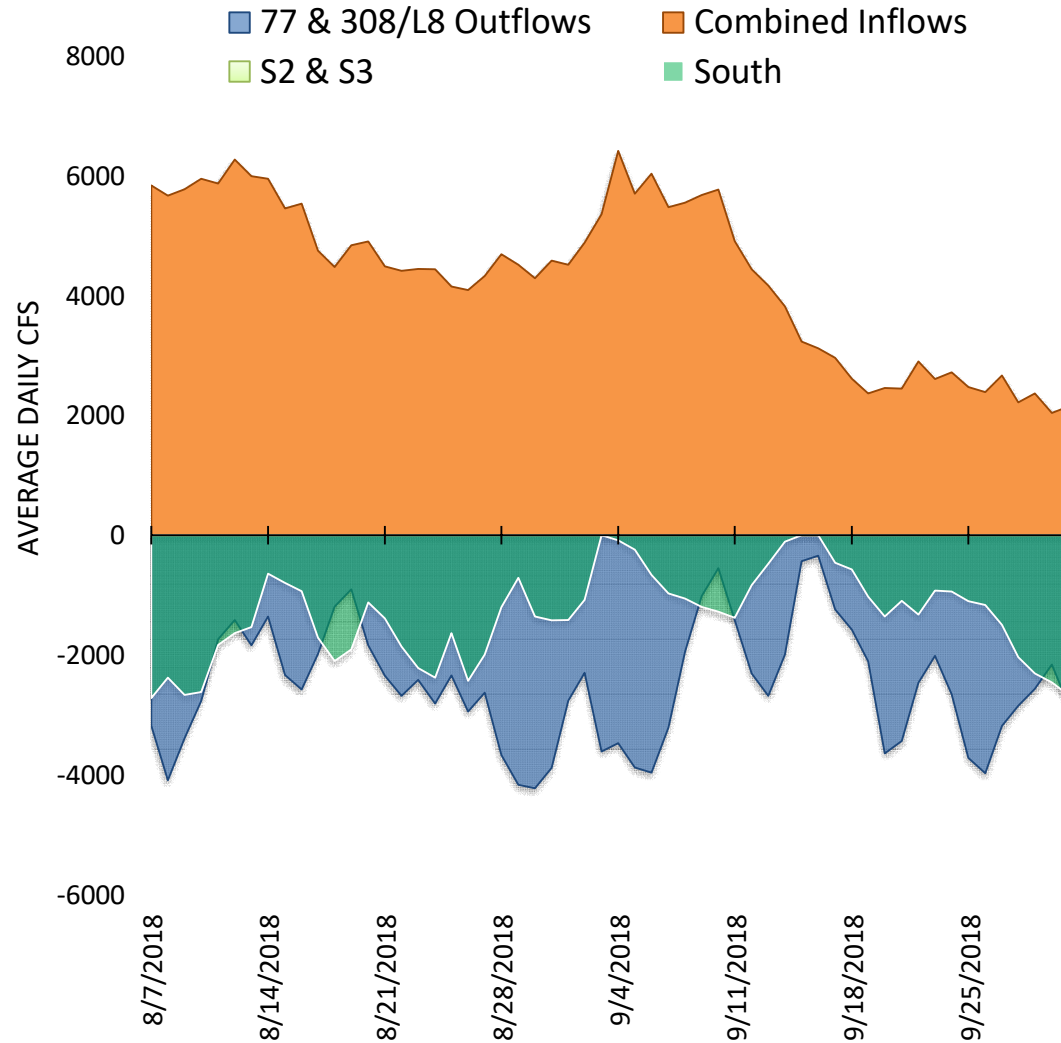
**Figure 2.** Recent Lake Okeechobee stage and releases, with projected stages based on a dynamic position analysis.



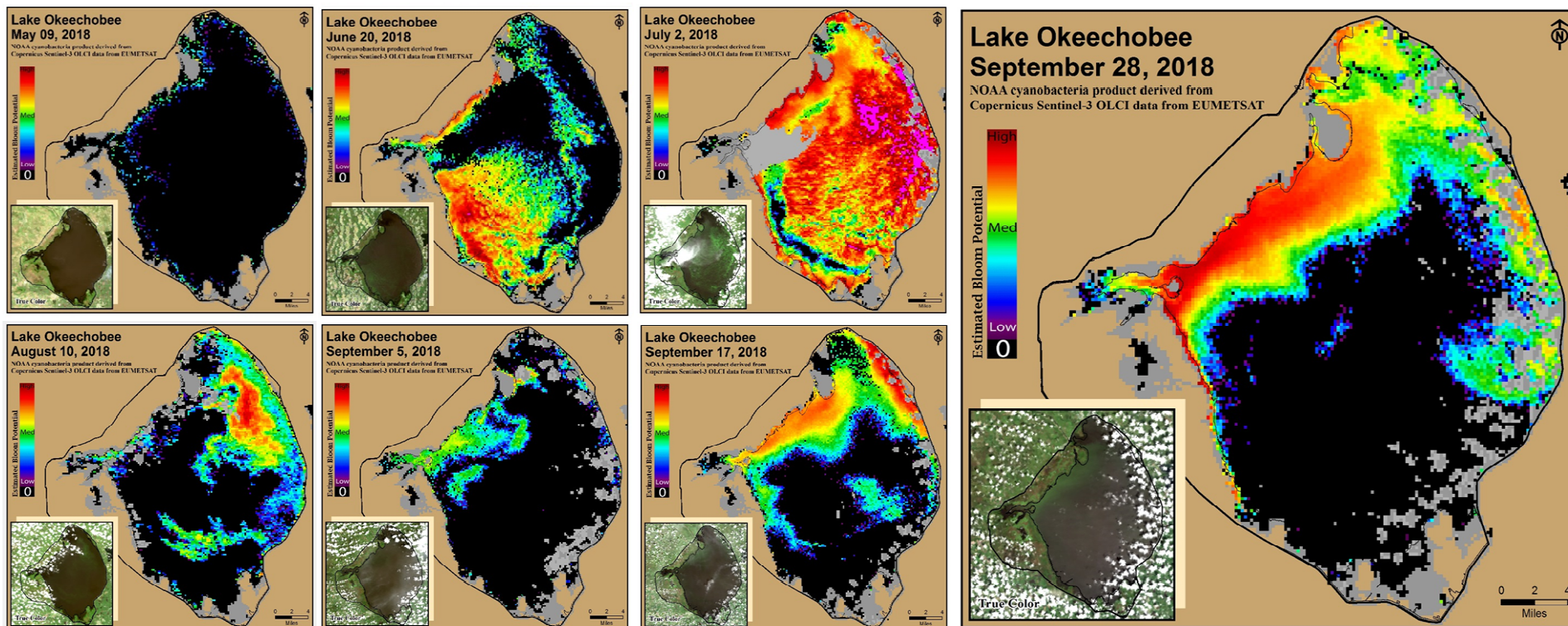
SFWMD PROVISIONAL RAINDAR 7-DAY BASIN RAINFALL ESTIMATES  
FROM: 0530 EST. 09/25/2018 THROUGH: 0530 EST. 10/02/2018



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



**Figure 4.** Major inflows and outflows of Lake Okeechobee, including the S-350 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.



**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 1,447 cfs (Figures 1 and 2) and last month inflow averaged about 1,798 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	205
S-80	1,162
S-308	1,087
S-49 on C-24	0
S-97 on C-23	6
Gordy Rd. structure on Ten Mile Creek	74

Over the past week in the estuary, surface salinity remained the same at HR1, decreased at US1 Bridge, and increased at 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 6.7. Salinity conditions in the middle estuary are within the fair 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>
HR1 (North Fork)	<b>4.0</b> (4.0)	<b>4.5</b> (5.0)
US1 Bridge	<b>6.5</b> (7.1)	<b>6.8</b> (8.7)
A1A Bridge	<b>16.3</b> (15.6)	<b>22.3</b> (23.5)

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

### **Caloosahatchee Estuary:**

Last week total inflow to the Caloosahatchee Estuary averaged about 3,744 cfs (Figures 5 and 6) and last month inflow averaged about 4,362 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	1,956
S-78	1,649
S-79	2,970
Tidal Basin Inflow	774

Over the past week, salinity was near 0 down to Ft. Myers Yacht Basin and remained about the same downstream (Table 4, Figures 7 & 8). The seven-day average salinity values are estimated to be within the poor range for adult eastern oysters at Cape Coral, in the good range at Shell Point, and were not available at Sanibel (Figure 9). 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.

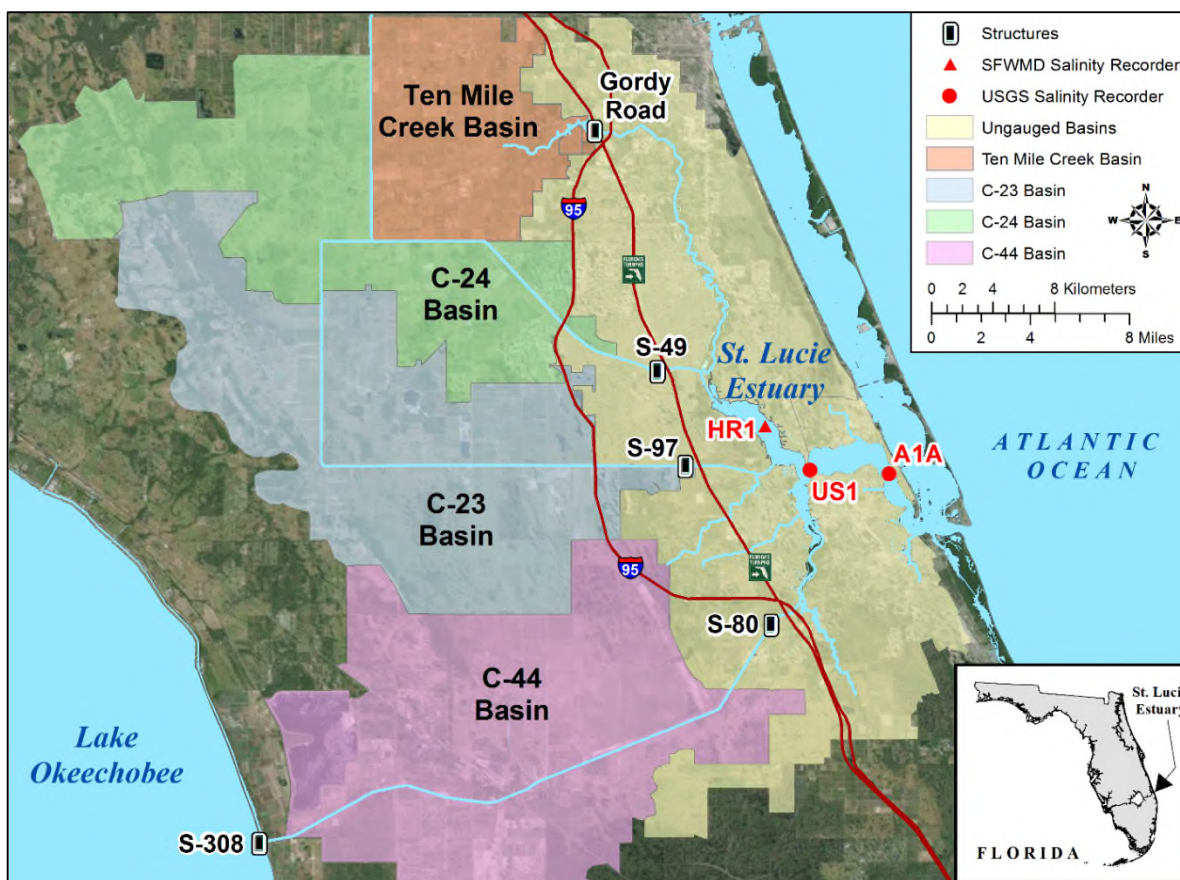
Sampling Site	Surface	Bottom
S-79 (Franklin Lock)	<b>0.2</b> (0.2)	<b>0.2</b> (0.2)
Val I75	<b>0.2</b> (0.2)	<b>0.2</b> (0.2)
Ft. Myers Yacht Basin	<b>0.2</b> (0.2)	<b>0.2</b> (0.2)
Cape Coral	<b>3.1</b> (2.7)	<b>4.5</b> (4.5)
Shell Point	<b>14.0</b> (14.1)	<b>NR</b> (14.2)
Sanibel	<b>NR</b> <sup>3</sup> (NR)	<b>NR</b> (NR)

<sup>1</sup>Envelope not applicable, <sup>2</sup>Envelope is based on a 30-day average, and <sup>3</sup>Not Reporting.

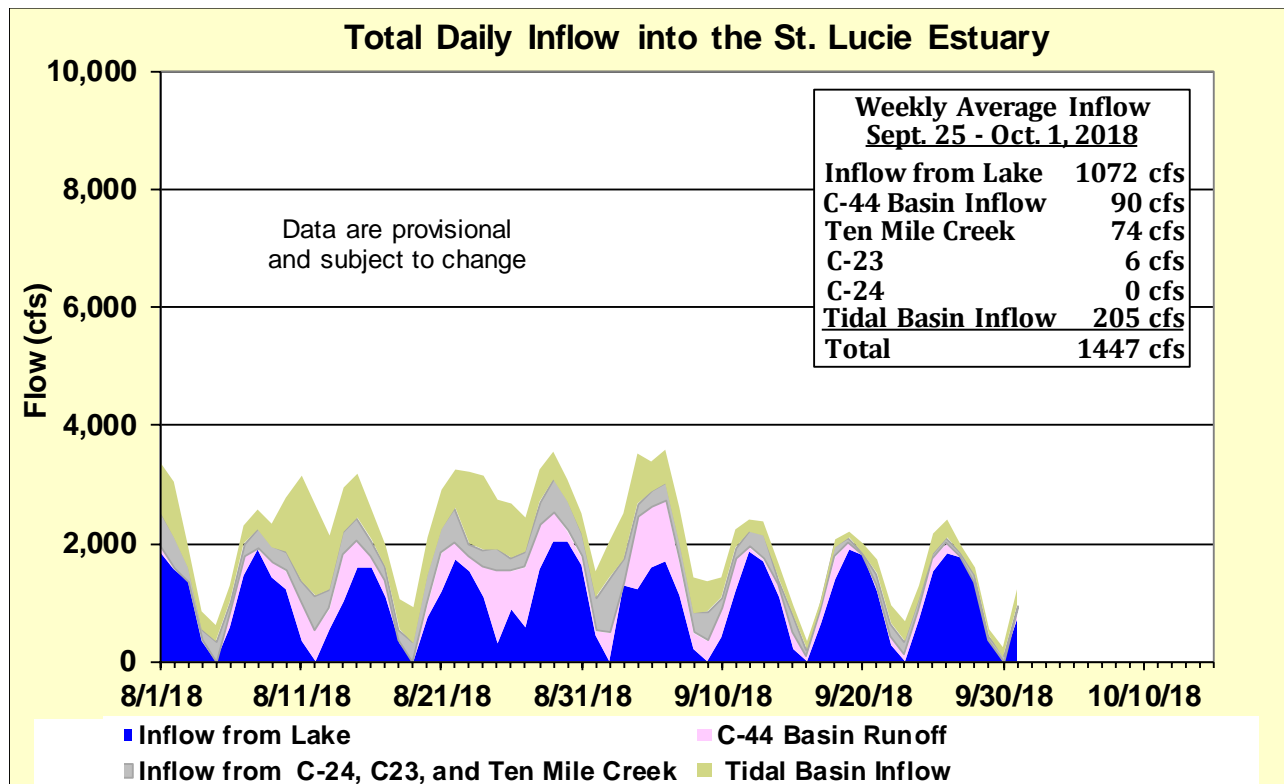
Officials confirmed on Monday October 1 that red tide has reached waters off Palm Beach County on Florida's East Coast. The Florida Fish and Wildlife Conservation Commission said in a release that it had detected "low to medium concentrations of naturally occurring red tide" in water samples taken Sunday off the coast of Palm Beach County.

### Water Management Recommendations

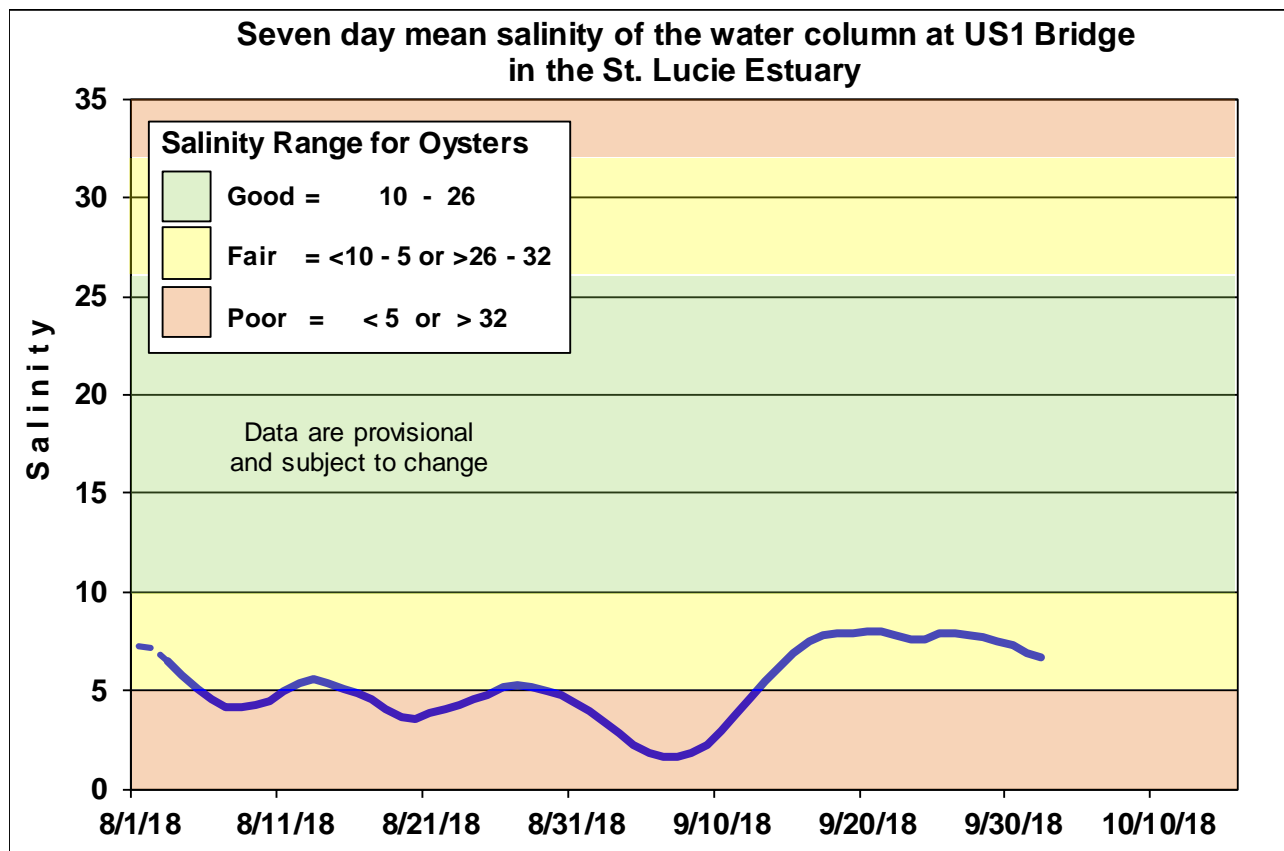
Lake Okeechobee stage is in the Low sub-band of 2008 LORS. Tributary hydrological conditions are normal. The 2008 LORS recommends up to 3,000 cfs at S-79 and up to 1,170 cfs at S-80. Given the current estuarine conditions, there are no ecological benefits associated with freshwater releases from Lake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



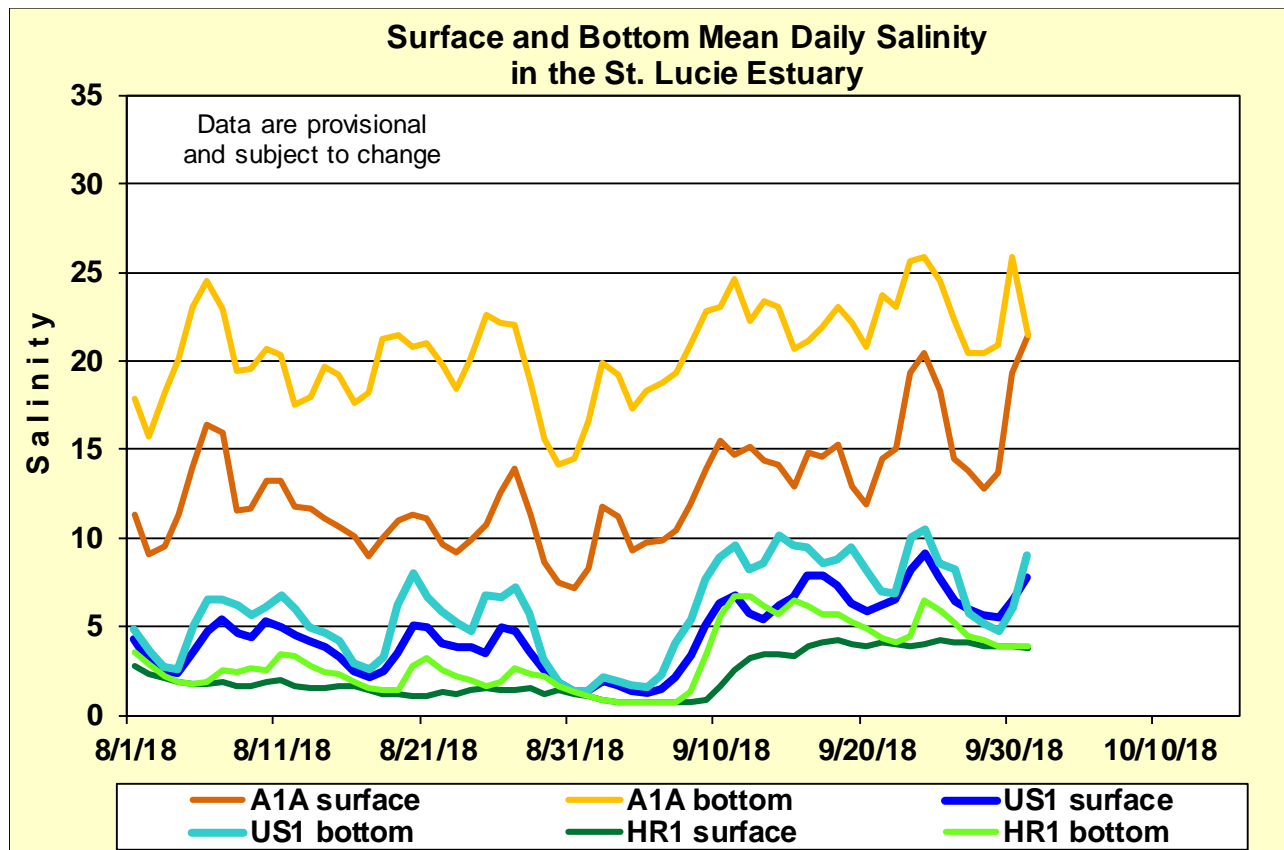


Figure 4. Daily mean salinity at the A1A, US1 and estimated HR1 stations.

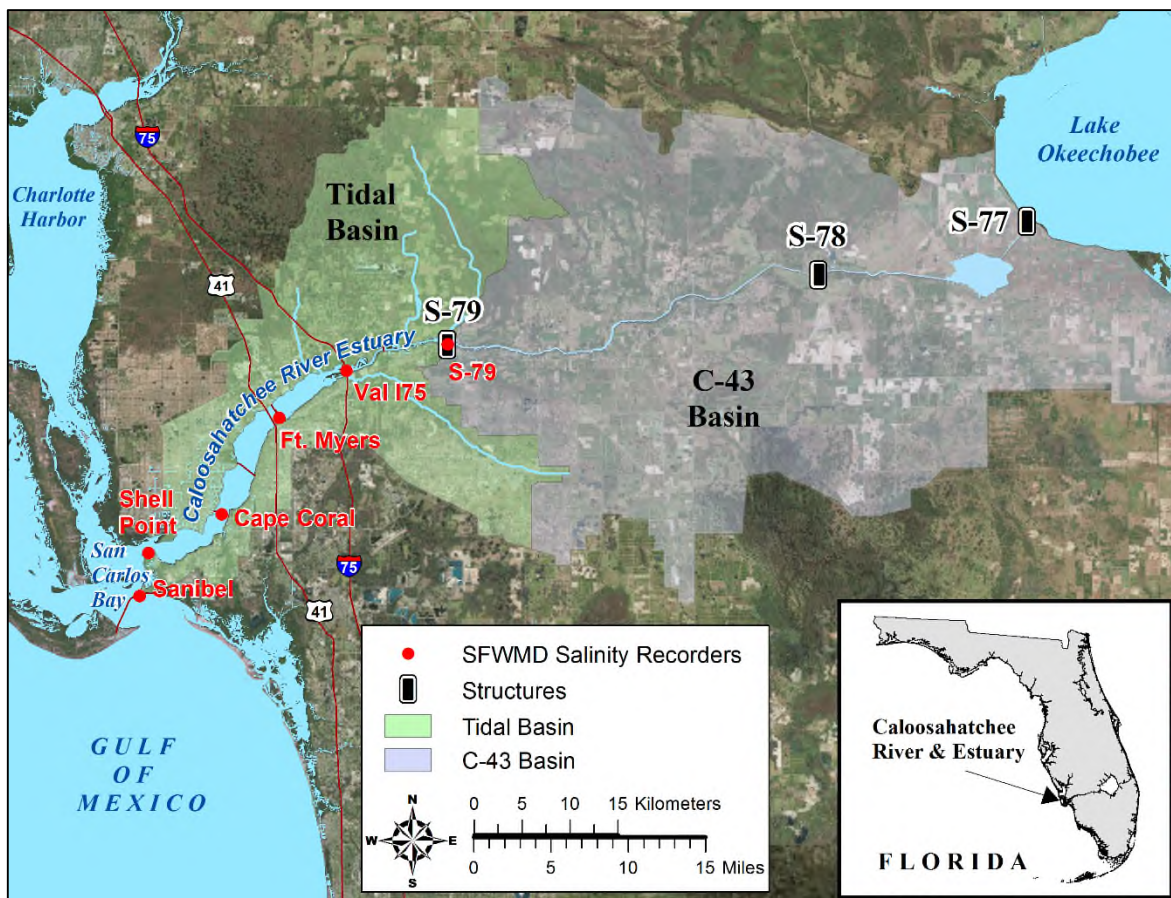
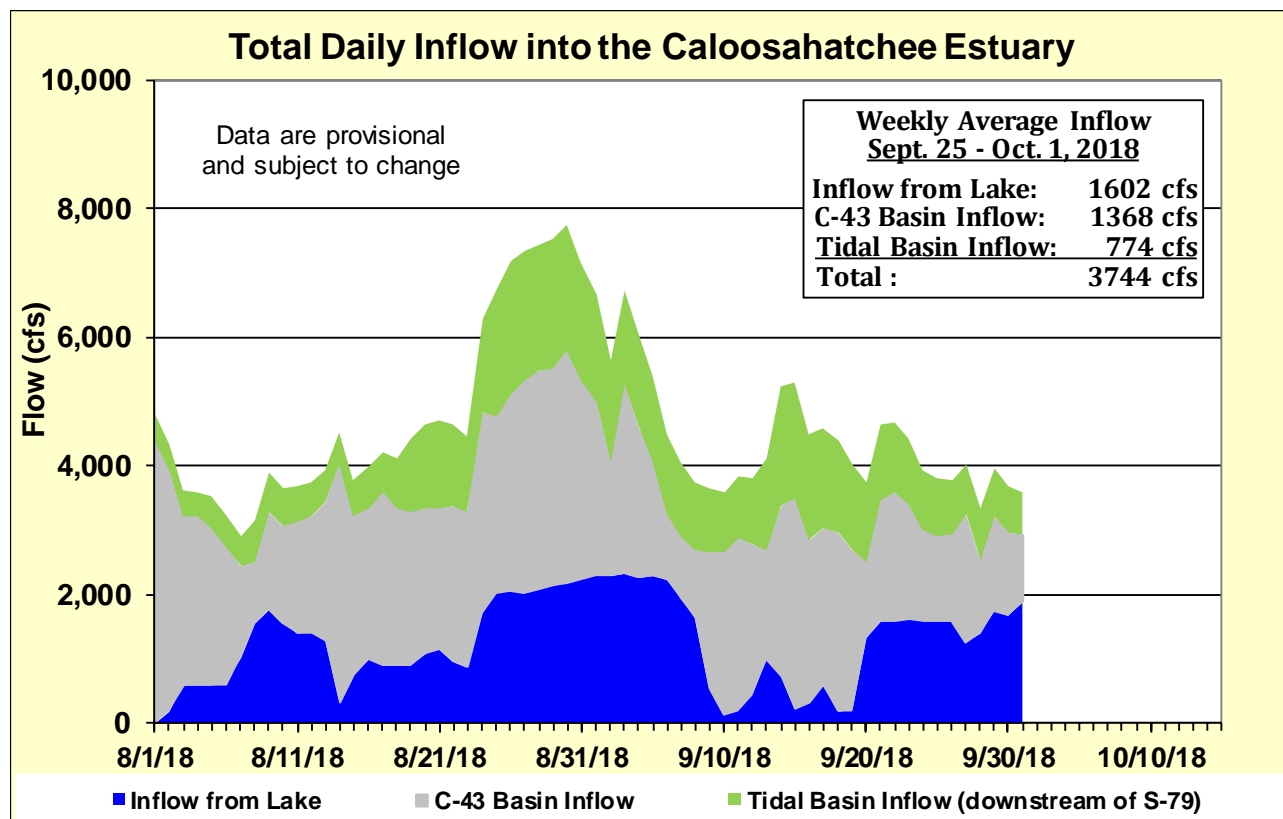
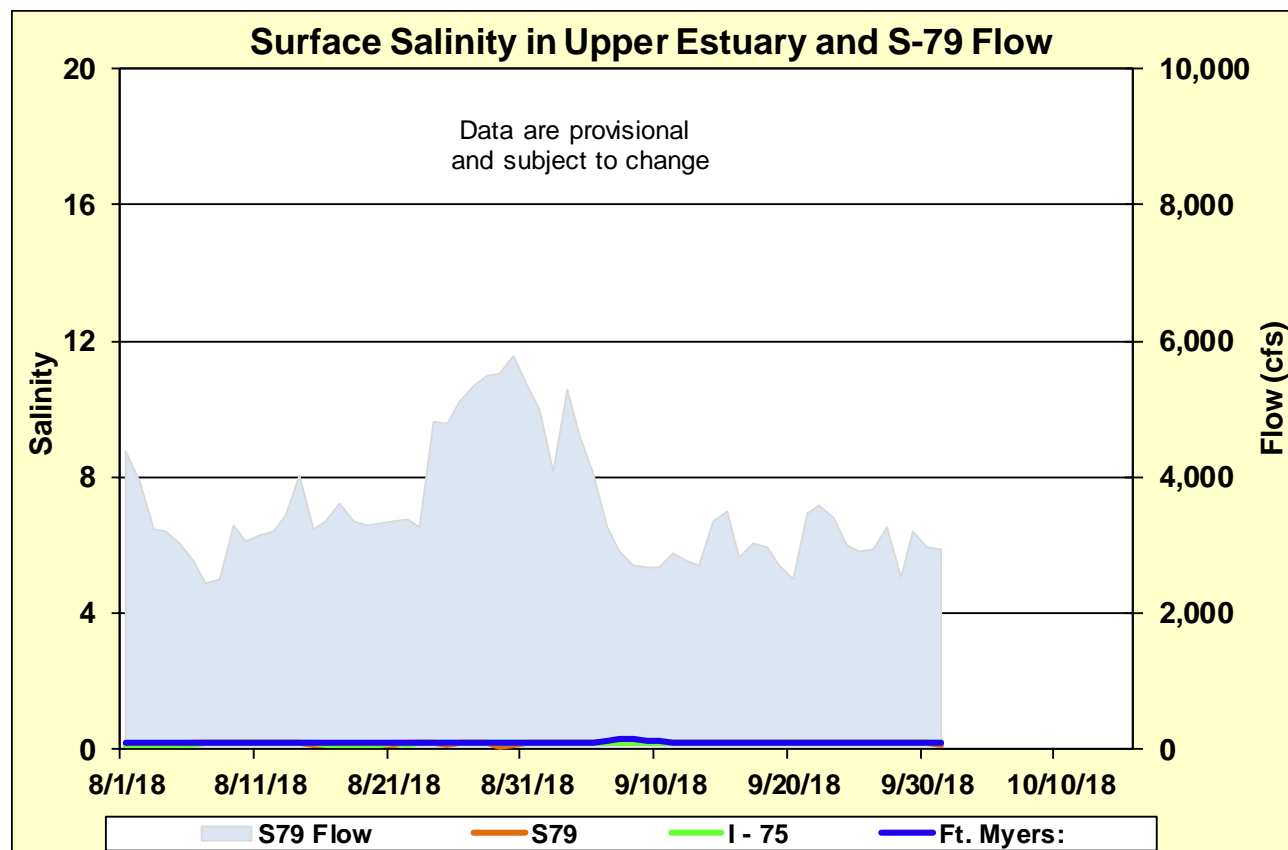


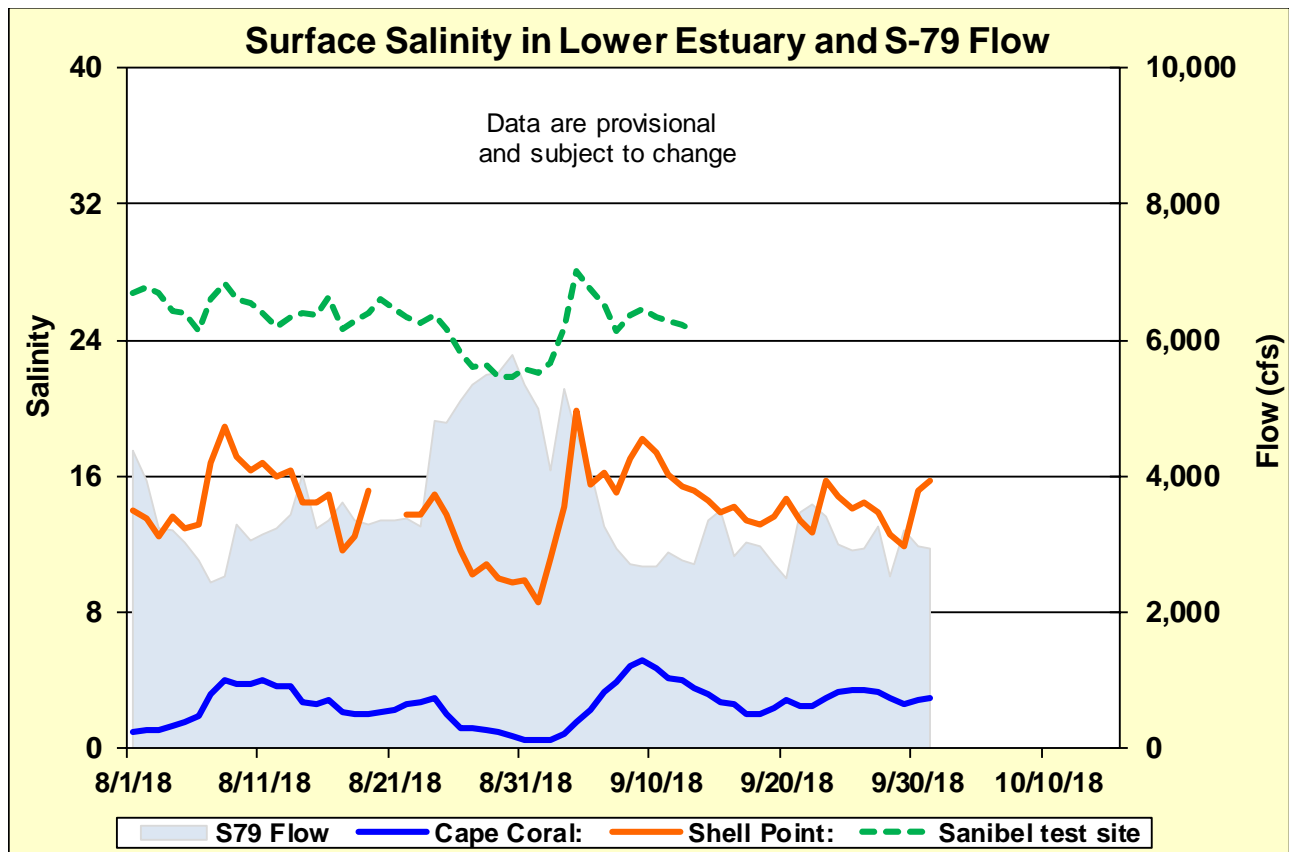
Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.



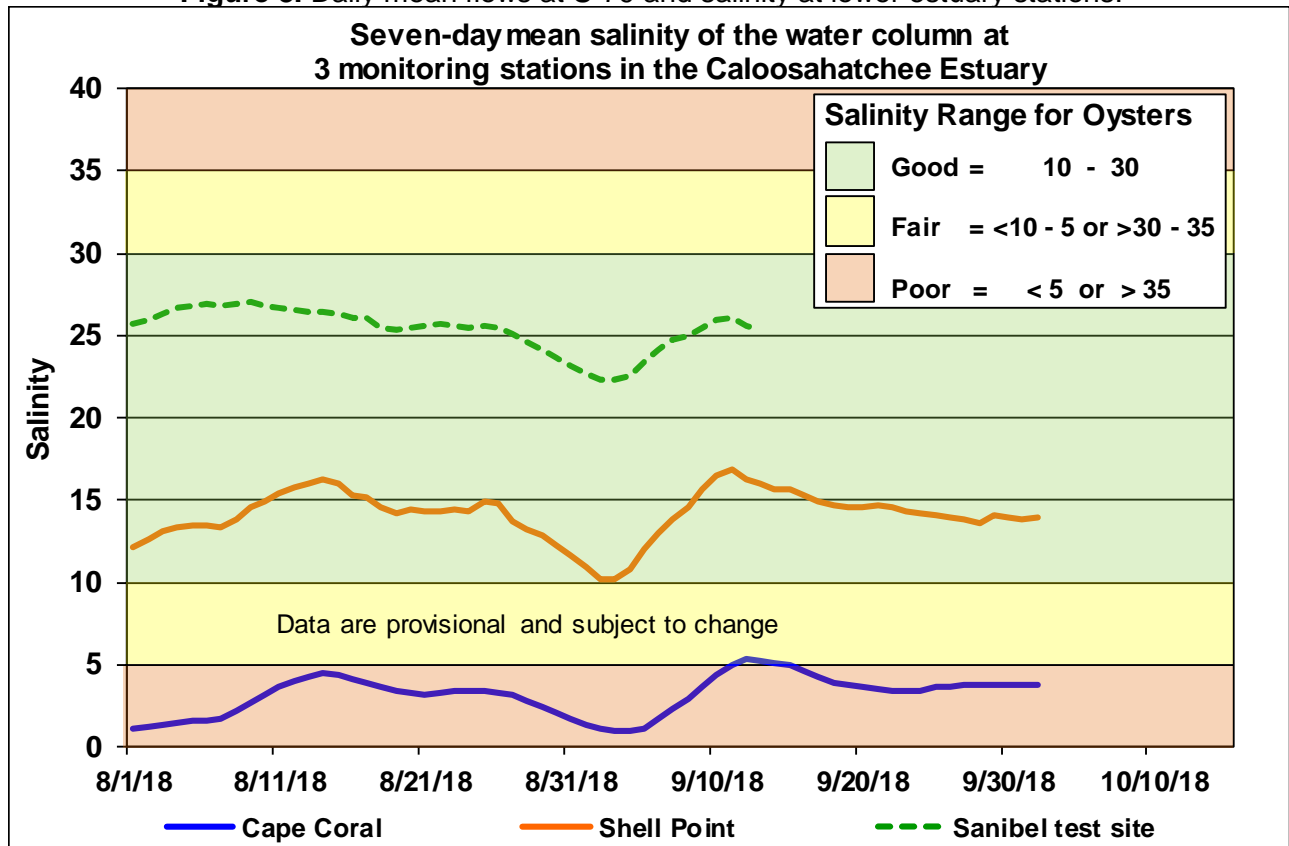
**Figure 6.** Total daily inflows from Lake Okeechobee, runoff from the C-43 basin, and tributaries in the tidal basin into the Caloosahatchee River Estuary.



**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.

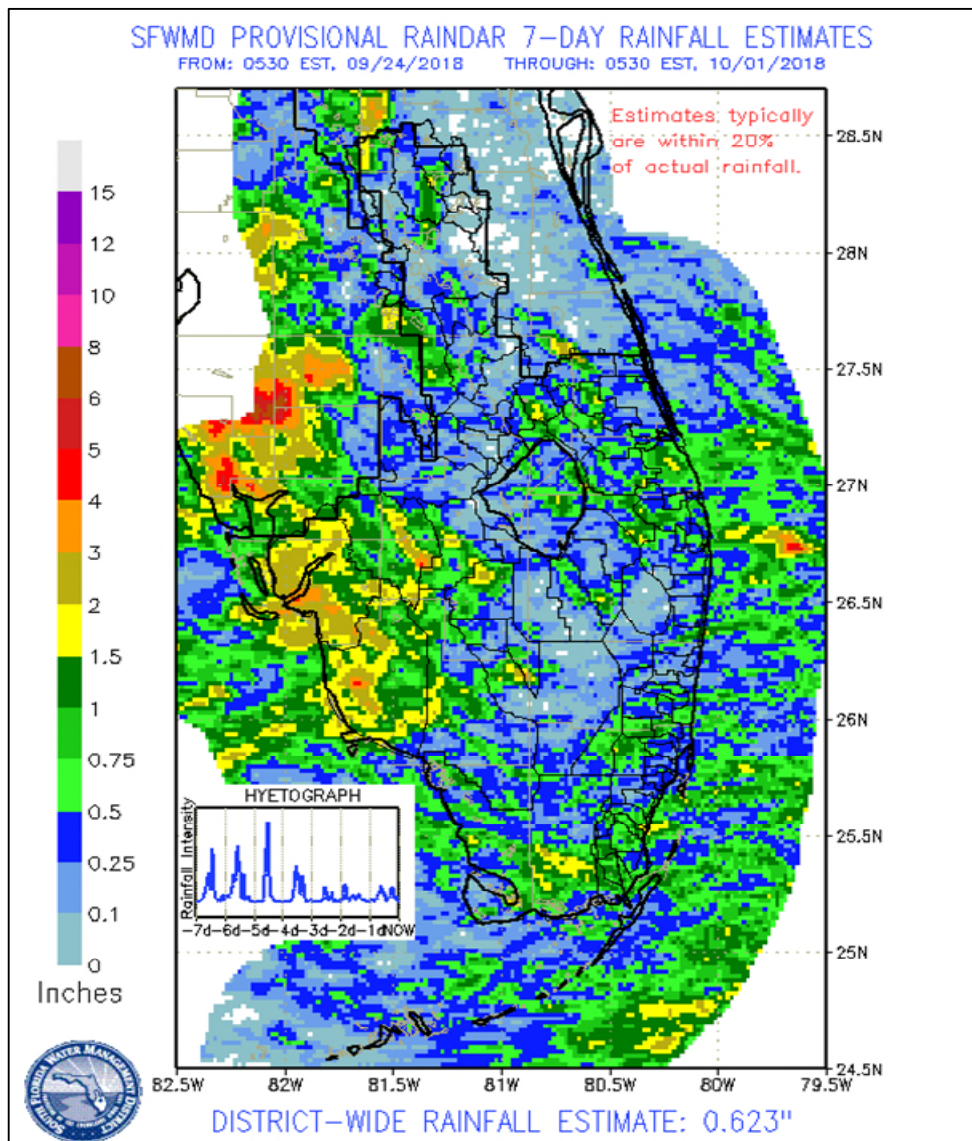


**Figure 9.** Seven-day mean salinity at Cape Coral, Shell Point, and Sanibel monitoring stations.

## **EVERGLADES**

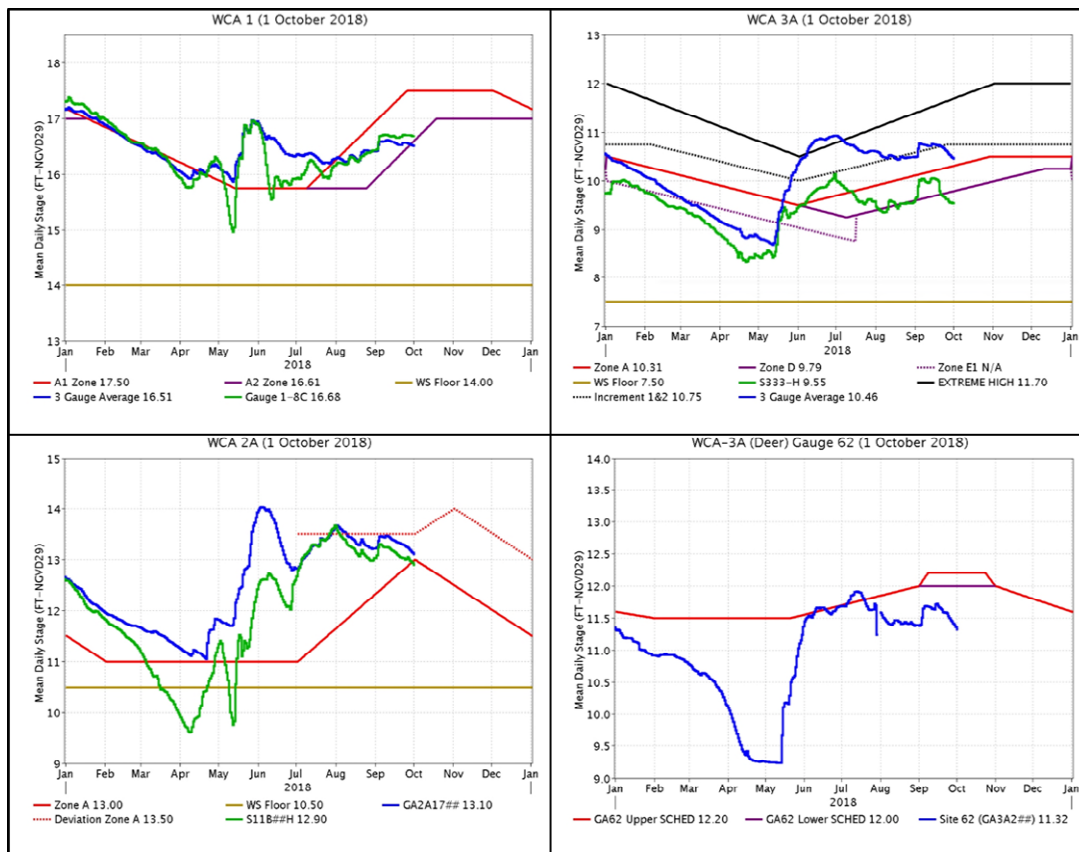
At the gauge locations monitored for this report, stages within the Everglades fell 0.10 feet on average over the last week. WCA-3A North experienced a significant drop of 0.21 feet. The most extreme individual gauge changes within the WCAs ranged from +0.04 feet (ENP) to -0.22 feet (WCA-3A northwest). Pan evaporation was estimated at 1.42 inches this week.

<b>Everglades Region</b>	<b>Rainfall (Inches)</b>	<b>Stage Change (feet)</b>
WCA-1	0.15	-0.06
WCA-2A	0.19	-0.16
WCA-2B	0.28	-0.07
WCA-3A	0.27	-0.19
WCA-3B	0.53	-0.08
ENP	0.63	+0.04

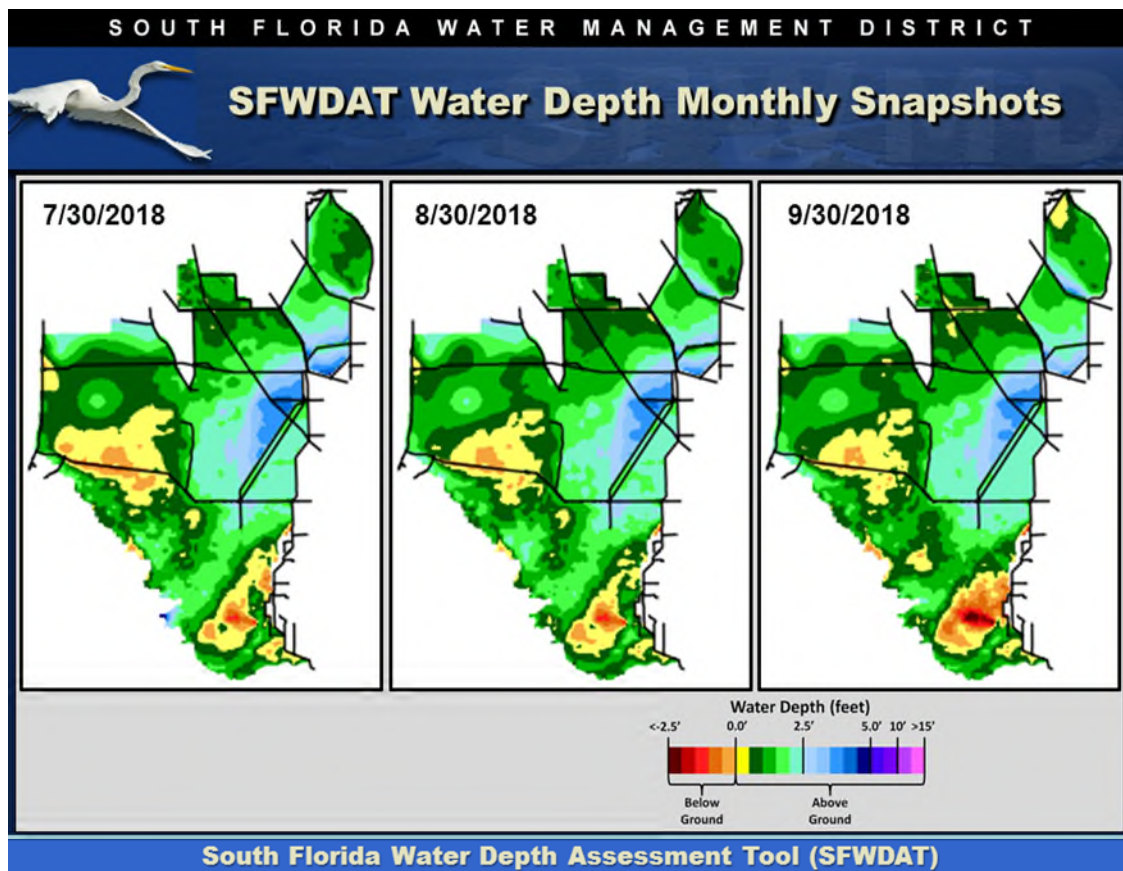
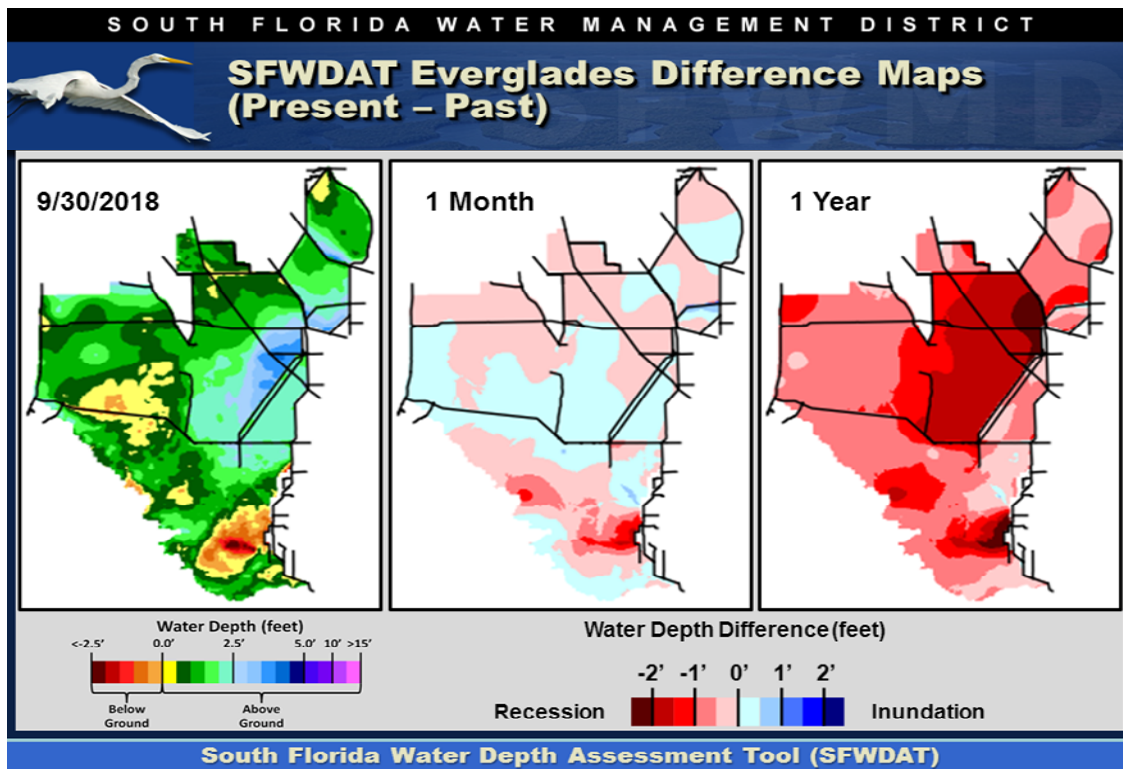


Regulation Schedules: WCA-1 three-gauge average stage is 0.99 feet below Zone A1, and 0.10 feet below the Zone A2 regulation line. WCA-2A marsh stage is 0.40 feet below Dev. Zone A. S11B Headwater stage is 0.60 feet below the Deviation, and 0.10 feet below the Zone A regulation line. WCA-3A three-gauge average stage is 0.29 feet below Increment 1&2, and 0.15 feet above the Zone A regulation line. WCA-3A stage at gauge 62 (northwest corner) remains 0.88 feet below the Upper Schedule and continues to fall away from the regulation line.



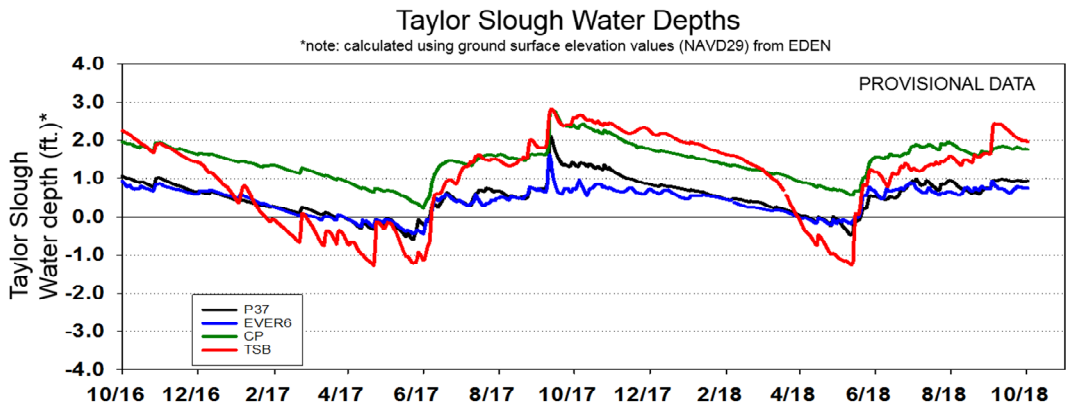
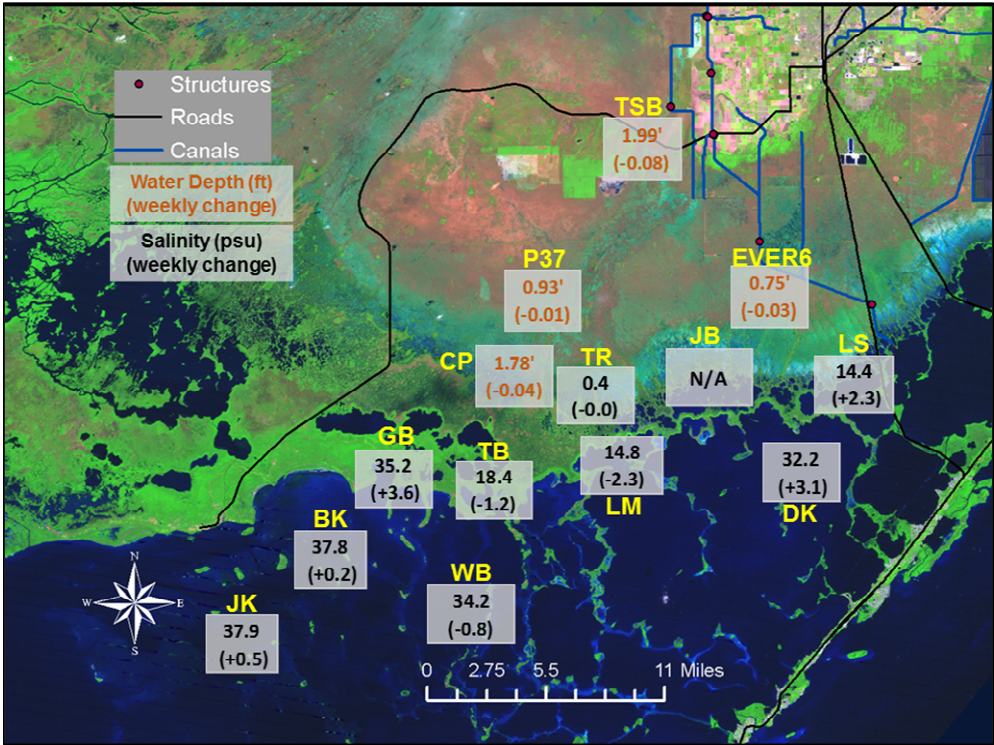


Water Depths and Changes: The WDAT tool for spatial interpolation of depth monthly snapshots indicate slightly wetter conditions; the spatial extent of ponded depths along the L-67 and in WCA-3A South has expanded compared with last month. The model is showing pockets of habitat again with depths down to 0.0 feet in WCA-3A North, and those conditions continue to expand spatially in northern WCA-1. WDAT difference output indicates that water depth changes across most of South Florida are mixed but not highly significant. Changes of note are dryer conditions than one month ago in WCA-3A's northwest corner, and wetter in the central and southern regions of that basin, as well as drier conditions in northern WCA-1. In the "1 Year" inset we see the comparison between current depth conditions and post Hurricane Irma's (9/10/17) impact on water depths.

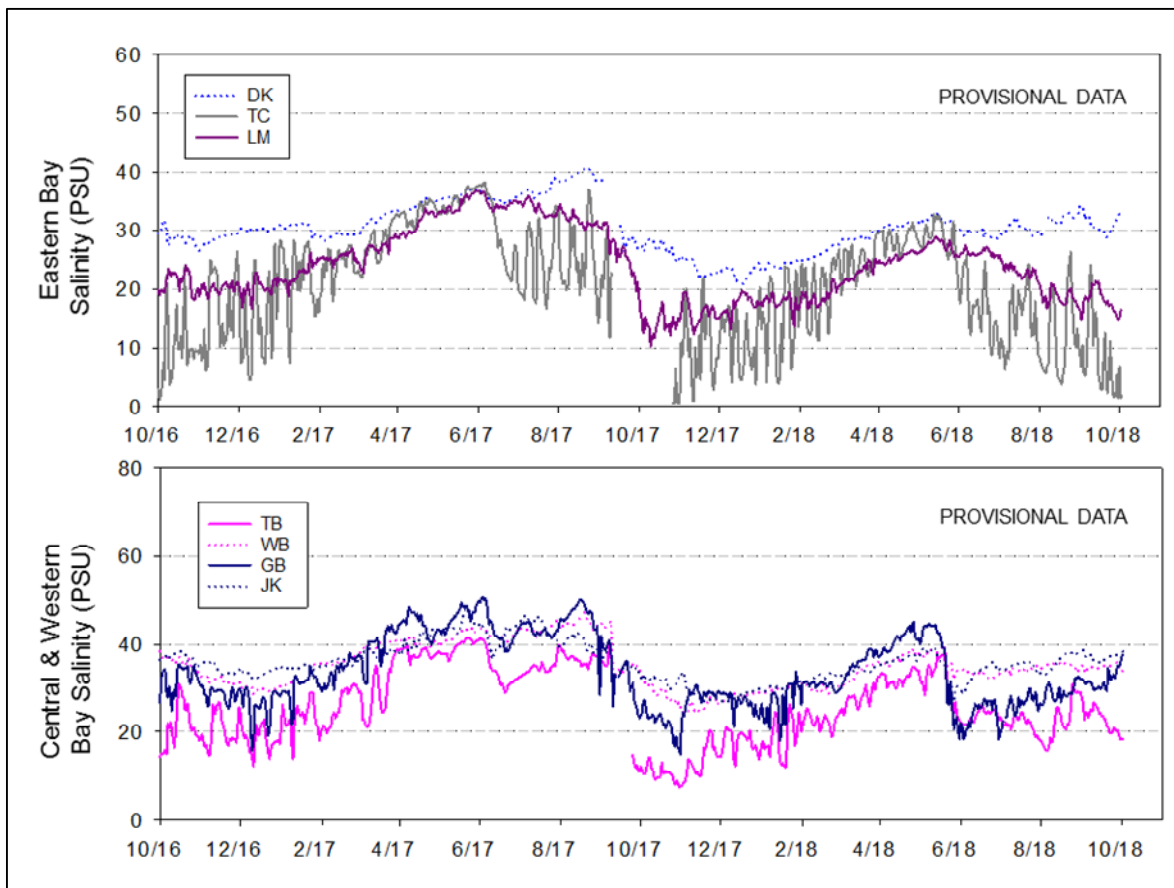


Taylor Slough Water Levels: An average of only 0.5 inches of rain fell on Taylor Slough and Florida Bay this past week, and stages decreased an average of 0.03 feet last week. Water depths averaged 1.24 feet across Taylor Slough which is 0.8 inches higher than the historical averages for this time of year. Water depth conditions are typical for this time of year.

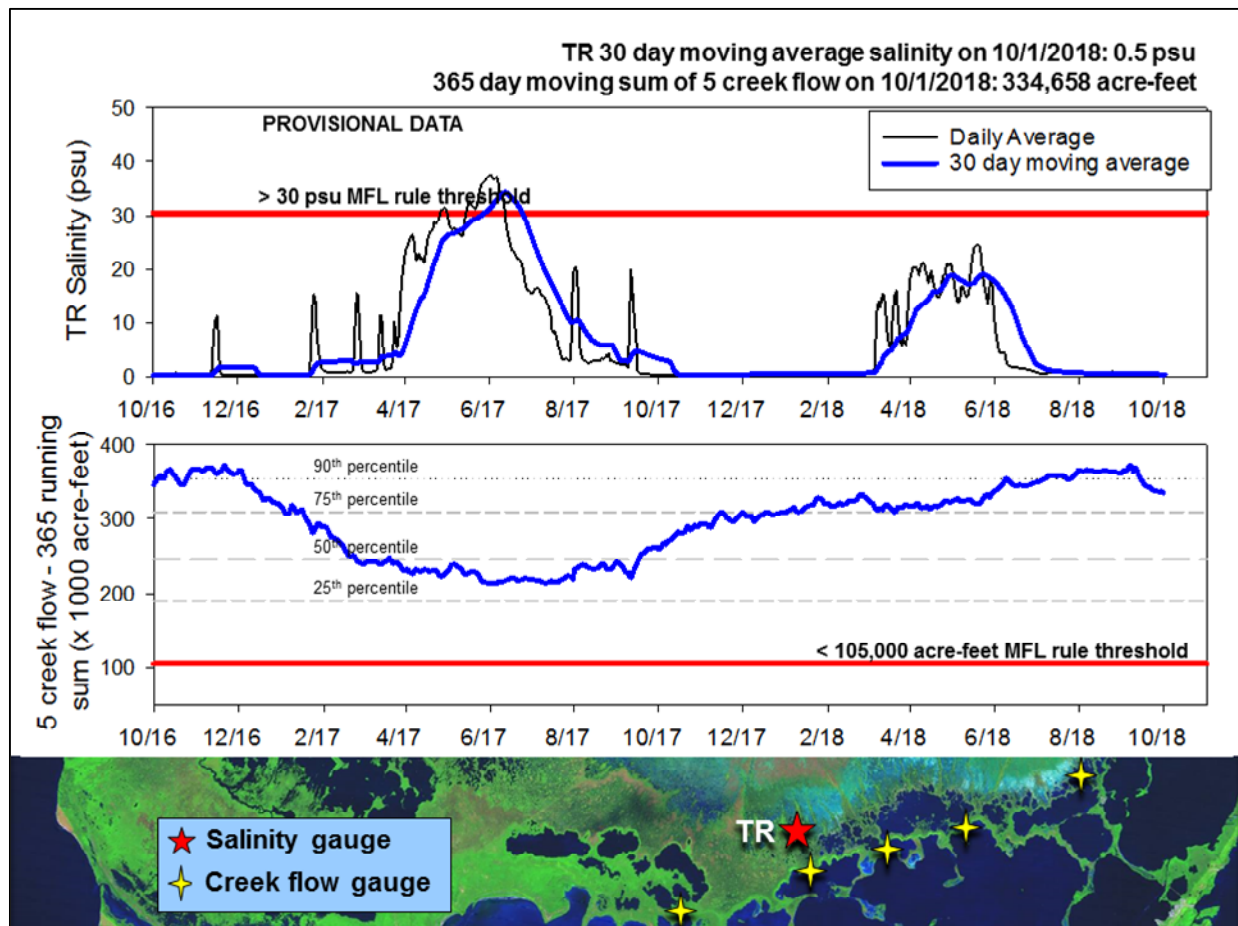
Florida Bay Salinities: Salinities were mostly stable this past week with changes staying less than 4 psu for the week again. Salinities range from 2 psu in the northeast to 38 psu in the west. Conditions in western Florida Bay are 3 to 11 psu higher than their historic averages for this time of year which is undesirable this late in the wet season.







Florida Bay MFL: Mangrove zone daily average salinity stayed at 0.4 psu this past week, and the 30-day moving average is still 0.5 psu. The weekly cumulative flow from the five creeks denoted by yellow stars on the map totaled about 10,500 acre-feet for the last week which is about 4,000 acre-feet less than the average for this time of year. September and October tend to be the peak flows for the year. The 365-day moving sum of flow from the five creeks was 334,658 acre-feet (still greater than the long-term average of 257,628 acre-feet and above the 75th percentile). Creek flow is provisional data from the USGS and is highly variable.



### Water Management Recommendations

Inflows to northernmost WCA-3A create lower ecological stress when compared to flows to more southern WCA-3A. WDAT output indicates that most of WCA-3A North's water depths are between 0.0 to 1.5 feet. These conditions contrast with conditions in WCA-3A South where depths along the L-67 are 2.5 to 4.5 feet. After last year's above average wet season depth conditions in WCA-3A South, maintaining lower stages within that basin has ecological benefit to tree islands that have been stressed by flooding. WCA-2A and WCA-3B have also experienced relatively deep-water conditions over the past two wet seasons. Water management that minimizes high water stress during the wet season but protects peat soils (especially in WCA-3A North) as the dry season approaches has increased ecological benefit this water year by allowing ecological processes time to recover from flooding. According to the WDAT modeling, depths in the northern portion of WCA-1 are at and nearing ground level. This historically dry area would benefit from hydration as the 3-gauge average stage dips below the Zone A2 regulation line. 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. More specific recommendations appear in the summary table below. The red text represents new or modified information or recommendations.

## SFWMD Everglades Ecological Recommendations, October 2nd, 2018 (red is new)

Area	Weekly change	Recommendation	Reasons
WCA-1	Stage decreased by 0.06'	Maintain depths at 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-2A	Stage decreased by 0.16'	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 decreased by 0.07'	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 0.22'	Maintain depths at regulation schedule.	Protect habitat including <u>peat soil</u> development, tree islands and wildlife.
WCA-3A NW	Stage decreased by 0.20'	Maintain depths at regulation schedule.	
Central WCA-3A S	Stage decreased by 0.17'	Maintain depths at regulation schedule. Manage for a rate of ascension less than +0.25' per week, or less than +0.5 per 2 weeks.	Protect habitat including peat soil development, <u>tree islands</u> and wildlife.
Southern WCA-3A S	Stage decreased by 0.15'		
WCA-3B	Stage decreased by 0.08'	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.
ENP-SRS	Stage increased by 0.04'	Make discharges to the Park according to the 2012 WCP rainfall plan.	Protect upstream/downstream habitat and wildlife.
Taylor Slough	Stage changes ranged from -0.01' to -0.11'	Move water southward as possible	When available, provide freshwater buffer for downstream conditions.
FB- Salinity	Salinity changes ranged -2.3 to +4.0 psu.	Move water southward as possible	When available, provide freshwater to maintain low salinity buffer and promote water movement.