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 24, 2017

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

Scattered moderate to heavy showers/storms through tonight with a focus southwest through east of the Lake. A complex frontal system is moving slowly through the District. Look for showers/storms to increase in intensity and coverage as we move through the afternoon and evening as strong upper level energy digs through the southeast U.S. Showers will exit with the front Wednesday morning to yield a short-lived period of dry and pleasant conditions before rains likely return from the south predawn Saturday and possibly become heavy through Sunday morning.

Kissimmee

Tuesday morning stages and departures from schedule were 58.1 feet (0.4 feet above schedule) in East Lake Toho, 55.0 feet (0.3 feet above schedule) in Lake Toho, and 52.3 feet (0.1 feet above schedule) in Kissimmee Cypress Hatchineha; S65A headwater stage was 46.4 feet. Tuesday morning discharges were 1,665 cfs at S65, 1,785 cfs at S65A, and 9,155 cfs at S65E. Dissolved oxygen concentration in the Kissimmee River averaged 2.0 milligrams per liter (mg/L) for the week. Kissimmee River mean floodplain depth on Sunday was 1.77 feet.

Lake Okeechobee

Lake stage is 16.95 feet NGVD, down 0.21 feet over the past week, and down 0.25 feet from its peak of 17.20 feet the previous week. Lake stages are declining as inflows from the Kissimmee basin are slowing and as discharges to the east and west estuaries remain high. The submerged aquatic and emergent vegetation coverages in the nearshore areas of the Lake are expected to decline over the coming months and possibly years due to the high-water conditions and turbidity from resuspended Lake sediment associated with Hurricane Irma. The high inflows and resuspended Lake sediment have also significantly increased water column total phosphorus, which could lead to algal blooms as turbidity begins to decline.

Estuaries

Total discharge to the St. Lucie estuary averaged 5,739 cfs over the past week with 2,529 cfs (44%) coming from Lake Okeechobee. Salinities were low throughout the estuary. The seven-day average salinity at the US1 Bridge is in the poor range for adult oysters and has been for 45 days.

Total inflow to Caloosahatchee estuary averaged 9,486 cfs over the past week with 6,965 cfs (73%) coming from the Lake. The 30-day moving average surface salinity is 0.2 at Val I-75 and Ft. Myers. Salinity conditions between Val I-75 and Ft. Myers are good for tape grass. Salinity conditions are estimated to be in the good range for adult oysters at Sanibel, and are in the fair range at Shell Point

and in the poor range at Cape Coral. At Cape Coral, the seven-day average salinity has been below 5 for 59 days.

Stormwater Treatment Areas

Over the past week, the STAs/FEBs did not receive Lake releases. The total amount of Lake releases sent to the STAs/FEBs in WY2018 (since May 1, 2017) is approximately 21,700 acre-feet. Most STA cells are at or above target depths. Operational restrictions are in place for vegetation rehabilitation in STA-1E and STA-2. This week, if 2008 LORS recommends Lake releases to the WCAs and the conditions allow, releases will be sent to STA-1E Eastern Flowway.

Everglades

At the gauge locations monitored for this report, water depths dropped by an average of 0.10 feet. Water Depth Assessment Tool (WDAT) modeling for the most part agrees with that tool displaying only southern WCA-1 exhibiting an increase in depth over the past week.

Keeping depths below 2.5 feet at gauge 65 is important to moderate the stress to tree islands caused by flooding when durations last longer than 60-90 days. The depth on Sunday at that location was 4.71 feet (0.05 feet above last week), and has exceeded 2.5 feet for 129 days.

In Florida Bay, salinities range from 10 in the US Highway 1 corridor to 30 in the western Bay and are 1 to 6 psu below the historic averages for this time of year.

Supporting Information

KISSIMMEE BASIN

Kissimmee Basin Rainfall

The Upper Kissimmee Basin received 0.29 inches of rainfall in the past week and the Lower Basin received 0.22 inches (SFWMD Daily Rainfall Report 10/23/2017).

Upper Kissimmee Basin

Stages and departures in the Kissimmee Chain of Lakes (KCOL) are shown in Table1.

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: 10/24/2017

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)						
							10/22/17	10/15/17	10/8/17	10/1/17	9/24/17	9/17/17	9/10/17
Lakes Hart and Mary Jane	S62	460	LKMJ	61.0	R	60.7	**0.3**	1.1	1.4	1.7	2.1	2.3	0.1
Lakes Myrtle, Preston, and Joel	S57	224	S57	63.0	R	61.7	**1.3**	2.3	2.4	2.5	3.1	3.2	0.1
Alligator Chain	S60	67	ALLI	64.0	R	63.7	**0.3**	0.3	0.2	0.1	0.7	1.3	0.0
Lake Gentry	S63	105	LKGT	61.5	R	61.3	**0.2**	0.3	0.3	0.0	0.4	0.9	0.0
East Lake Toho	S59	775	TOHOE	58.0	R	57.7	**0.3**	0.7	1.4	2.0	2.4	2.6	0.0
Lake Toho	S61	882	TOHOW, S61	55.0	R	54.7	**0.3**	0.3	0.3	1.0	1.8	2.1	0.0
Lakes Kissimmee, Cypress, and Hatchineha	S65	2,281	KUB011, LKIS5B	52.3	R	52.2	**0.1**	0.4	0.5	0.9	1.8	2.7	1.3

[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] 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 12. Kissimmee River floodplain stages at selected stations are shown in Figure 13.

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: 10/24/2017

Metric	Location	1-Day Average	Average for the Preceeding 7-Days[1]									
		10/22/2017	10/22/17	10/15/17	10/8/17	10/1/17	9/24/17	9/17/17	9/10/17	9/3/17	8/27/17	8/20/17
Discharge (cfs)	S-65	1,941	**2,281**	3,069	6,671	11,491	12,054	5,535	1,809	1,209	1,152	958
Discharge (cfs)	S-65A	1,717	**2,262**	3,706	7,028	7,972	8,336	6,779	2,375	1,465	1,448	1,213
Discharge (cfs)	S-65D[2]	3,572	**4,287**	7,397	12,111	12,914	13,332	11,906	2,442	2,262	2,032	2,255
Discharge (cfs)	S-65E[2]	3,717	**4,501**	7,575	12,702	13,341	13,748	13,216	2,584	2,279	2,085	2,276
DO (mg/L)[3]	Phase I river channel	2.4	**2.0**	1.0	1.4	1.0	0.8	1.3	2.3	2.3	2.0	2.8
Mean depth (feet)[4]	Phase I floodplain	1.71	**1.95**	2.77	4.18	4.85	5.17	4.86	1.58	1.53	1.40	1.31

[1] Seven-day average of weighted daily means through Sunday midnight.
[2] S-65D discharge combines discharge at S-65D, S-65DX1, and S-65DX2; S65E discharge combines S65E and S65EX1.
[3] DO is the average for sondes at PC62 and PC33.
[4] 1-day spatial average from South Florida Water Depth Assessment Tool (SFWDAT).
DATA ARE PROVISIONAL; N/A indicates that data were not available.

Water Management Recommendations

Kissimmee Basin Adaptive Recommendations and Operational Actions

Date	Recommendation	Purpose	Outcome	Source
10/24/2017	No new recommendations.		N/A	
10/17/2017	No new recommendations.		N/A	
10/10/2017	No new recommendations.		N/A	
10/3/2017	No new recommendations.		N/A	
9/25/2017	No new recommendations.		N/A	
9/19/2017	No new recommendations.		N/A	
9/5/2017	No new recommendations.		N/A	
8/29/2017	No new recommendations.		N/A	
8/22/2017	No new recommendations.		N/A	
8/15/2017	No new recommendations.		N/A	
8/4/2017	Increase S65A discharge by 150 cfs to about 1400 cfs.	Reduce rate of stage rise in KCH.		SFWMD Water Mgt, KB Ops
8/1/2017	No new recommendations.		N/A	
7/25/2017	Hold current discharge at S65A, adjusting S65 discharge to maintain current flow to the Kissimmee River.	Maintain current S65A discharge.		SFWMD Water Mgt, KB Ops
7/23/2017	Increase S65A discharge slowly using Figure 8a toward the seasonal target of 1400 cfs. Hold at 1400 cfs while stage in KCH remains above 50 feet (+/- 0.2 foot).	Reduce current rapid rate of stage rise in KCH; provide Kissimmee River floodplain inundation if conditions stay wet.	Implemented	KB Ops
7/16/2017	Reduce S65A flow to ~600-650 cfs. As Pool A runoff diminishes keep S65A around 650 +/- 50 cfs by increasing flow from S65.	Maintain moderate discharge to the Kissimmee River from S65A while maintaining S65A headwater within its operating range using flow from S65.	Implemented	SFWMD Water Mgt, KB Ops
7/6/2017	Hold 450 cfs at S65A due to reduced forecast.	Reduced-rainfall forecast led to decision to hold 450 cfs at S65A rather than continuing to ramp up.	Implemented	KB Ops
7/5/2017	Increase S65A flow by 150 cfs today to 450 cfs and by another 150 cfs tomorrow.	Control stage in KCH and Pool A in anticipation of forecast significant rainfall; begin discharge rampup in anticipation of forecast rainfall.	Implemented	KB Ops
6/28/2017	Reduce S65A discharge by a maximum of 150 cfs per day until 300 cfs is reached.	Allow KCH stage to rise before transitioning to 2017 Wet Season discharge plan; facilitate DO recovery in the Kissimmee River by reducing depth in the river channel.	Implemented	KB Ops
6/26/2017	Hold 800 cfs at S65A until further notice.	Maintain reduced discharge to allow stages in KRR project area to decline to facilitate DO recovery.	Implemented	KB Ops
6/22/2017	Reduce discharge by 150 cfs each day on Thursday 6/22, Friday 6/23, Saturday 6/24, and Sunday 6/25. After the Sunday reduction hold at approximately 800 cfs through Monday when new DO data should be available to help guide next steps.	Attempt to allow Kissimmee River dissolved oxygen concentration to rise.	Implemented	KB Ops
6/20/2017	Maintain 1400 cfs at S65A as KCH stage continues to rise. Supplement declining S65A basin runoff by increasing discharge at S65 as needed.	Transition from current operations to 2017 Wet Season discharge plan.	Implemented	KB Ops, SFWMD Water Management
6/15/2017	Attempt to slow the rates of stage rise in Lakes Toho and East Toho by increasing discharge from S59 into Toho and S61 into KCH.	Slow rates of rise in Lakes Toho and East Toho.	Implemented	KB Ops, SFWMD Water Management
6/15/2017	Increase discharge from S65A as necessary using the discharge rates of change table in Figure 8a.	Lower stage in Pool A following rainfall directly over the S65A Basin.	Implemented	SFWMD Water Management, KB Ops

KCOL Hydrographs (through Sunday midnight)

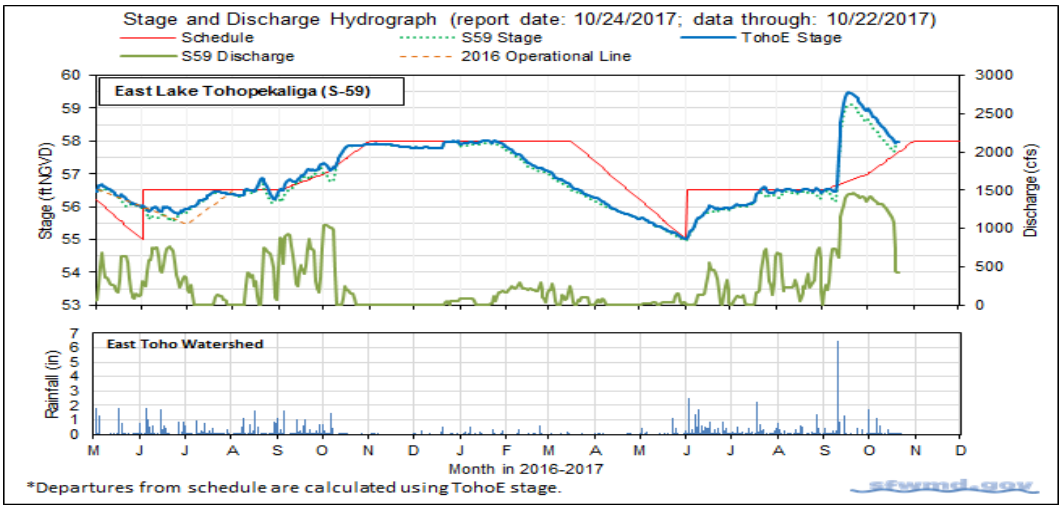


Figure 1.

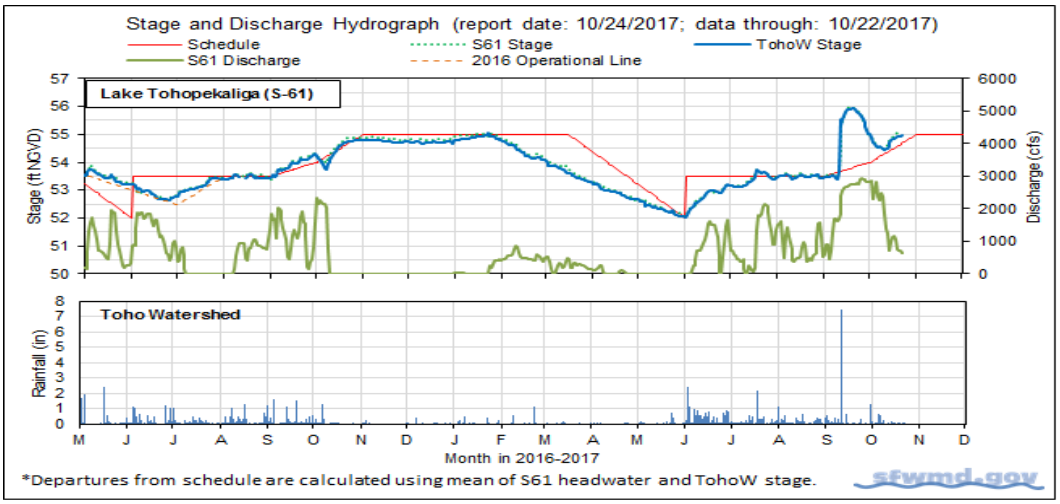


Figure 2.

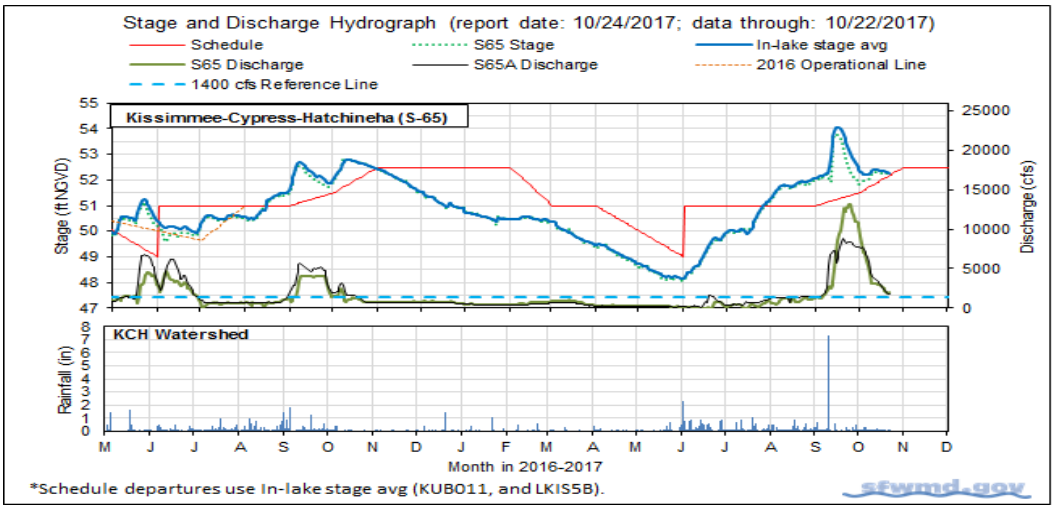


Figure 3.

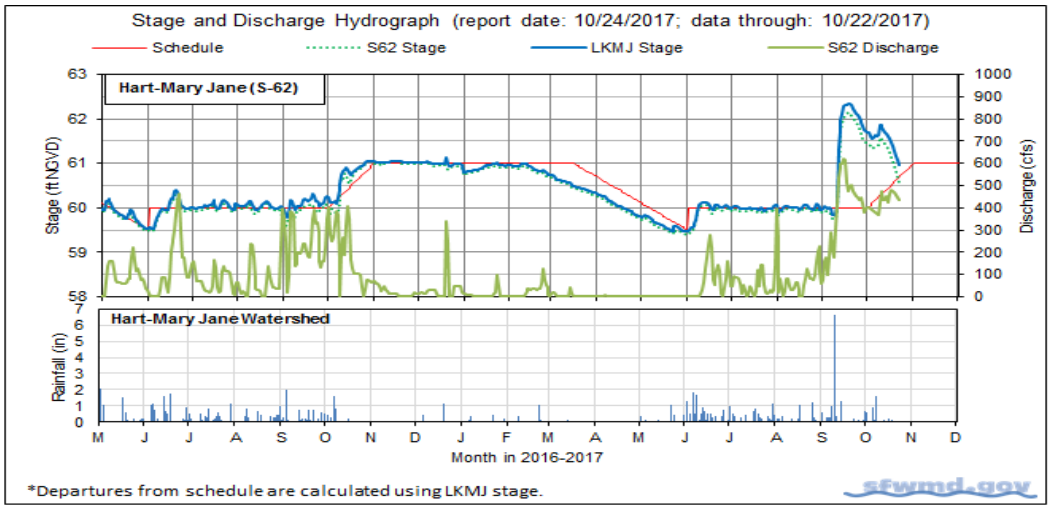


Figure 4.

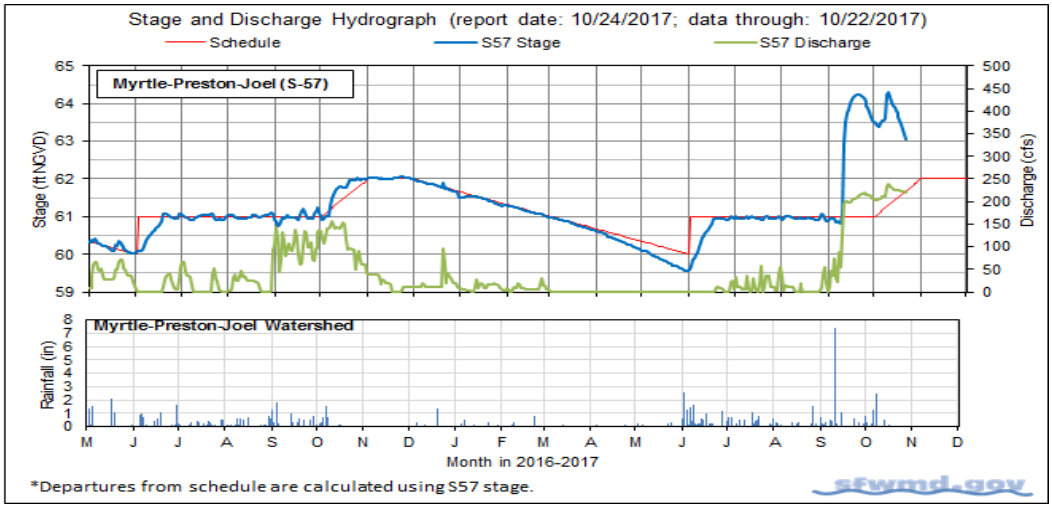


Figure 5.

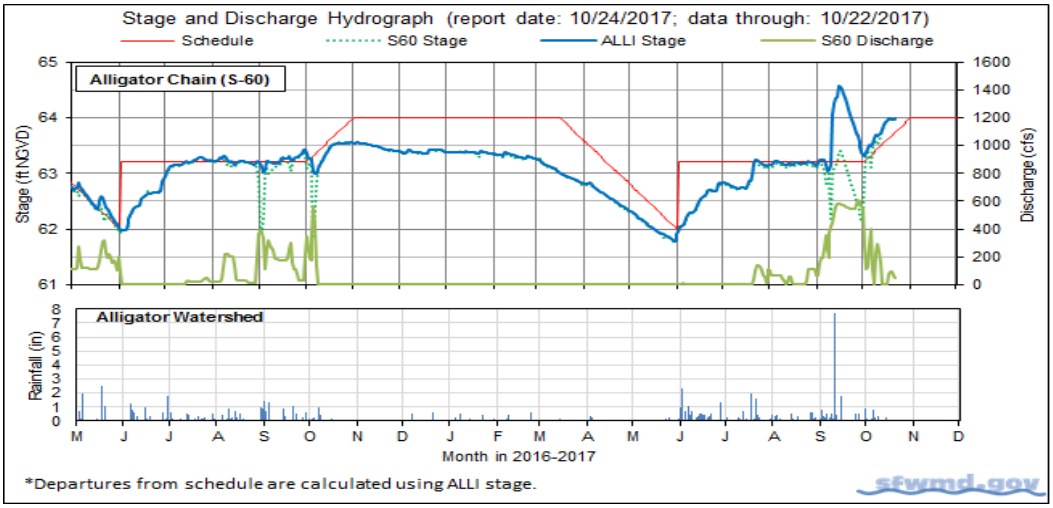


Figure 6.

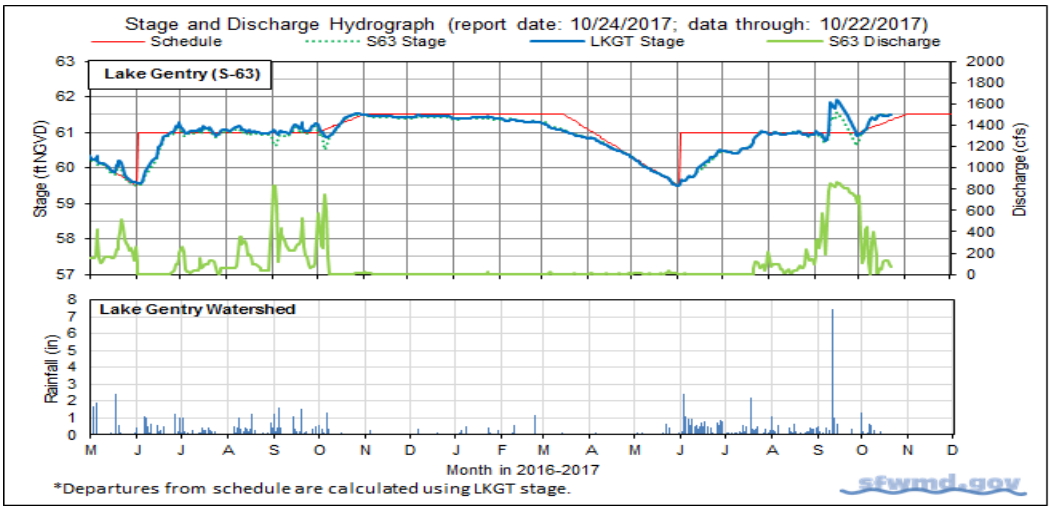


Figure 7.

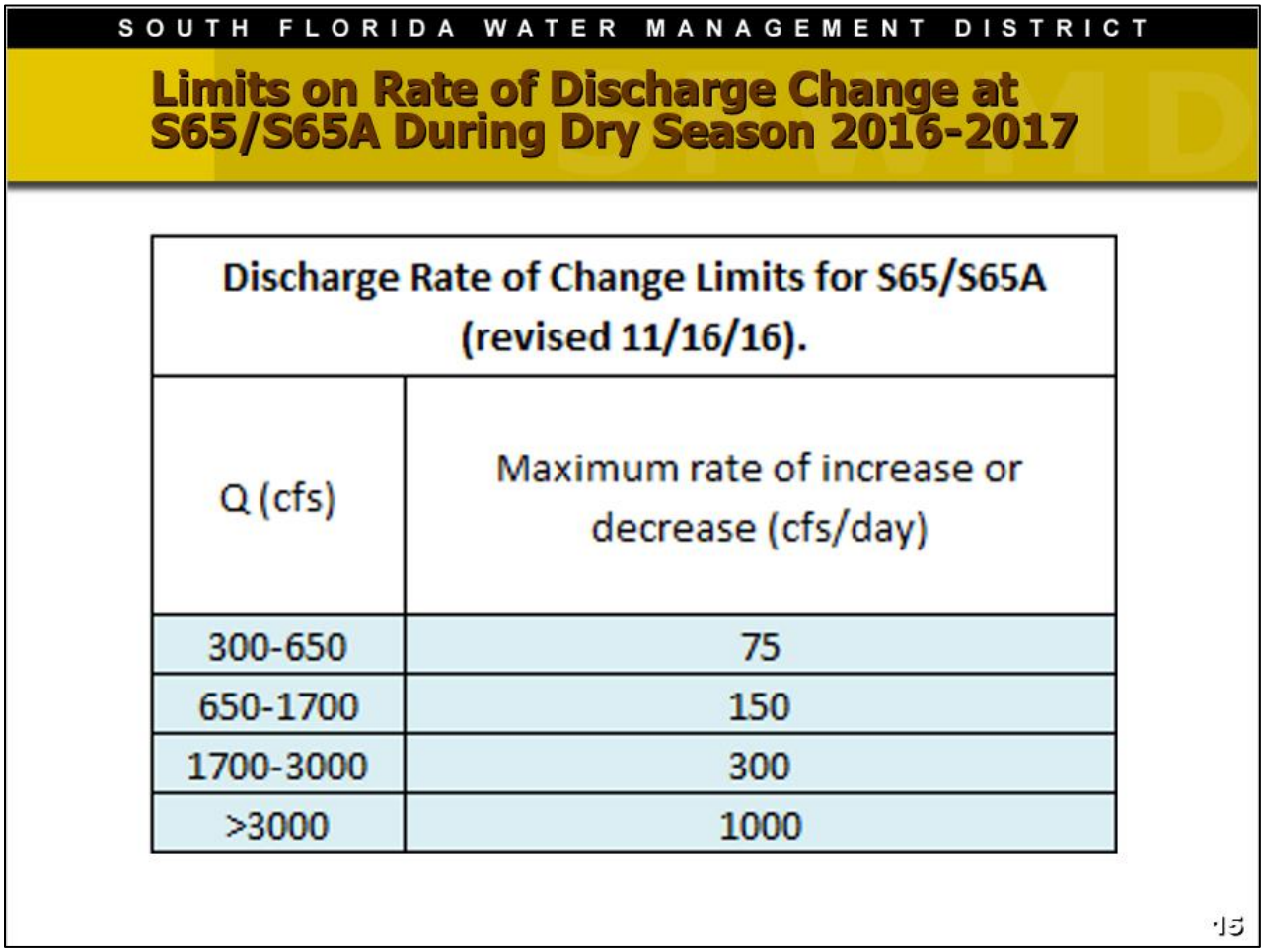


Figure 8. Limits on rate of discharge change at S65/S65A as of the 2016-2017 Dry Season.

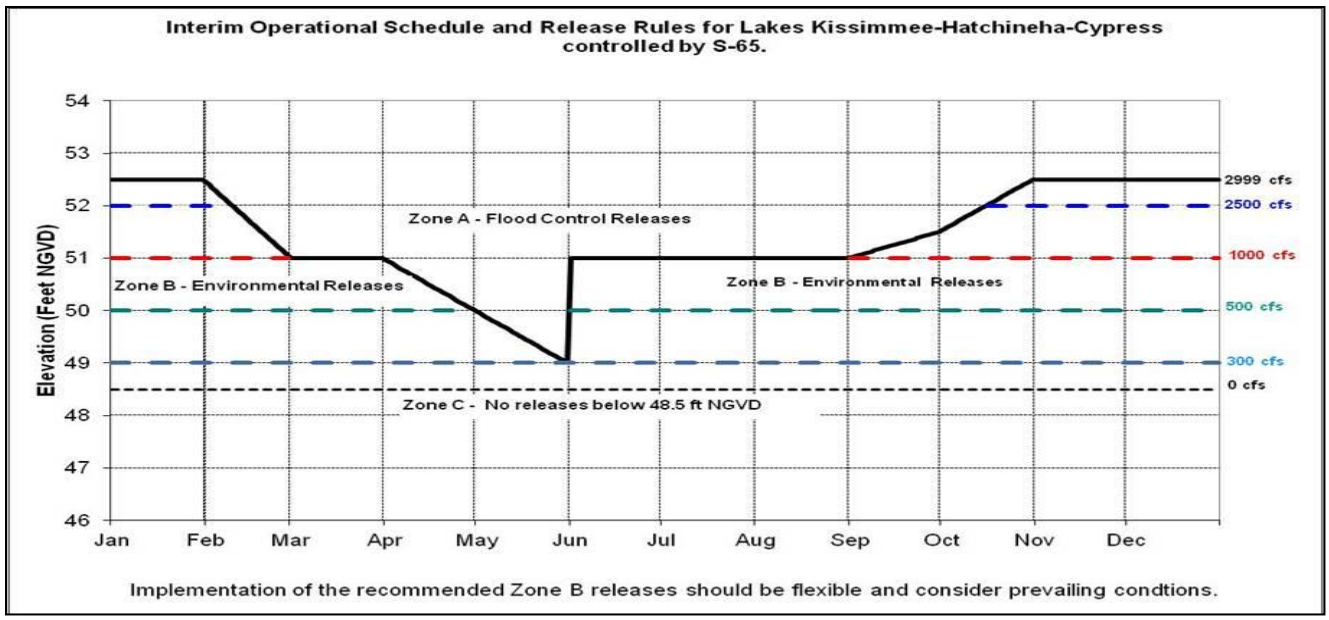


Figure 9. Interim operations schedule for S-65. The discharge schedule shown to the right has not been used in recent years.

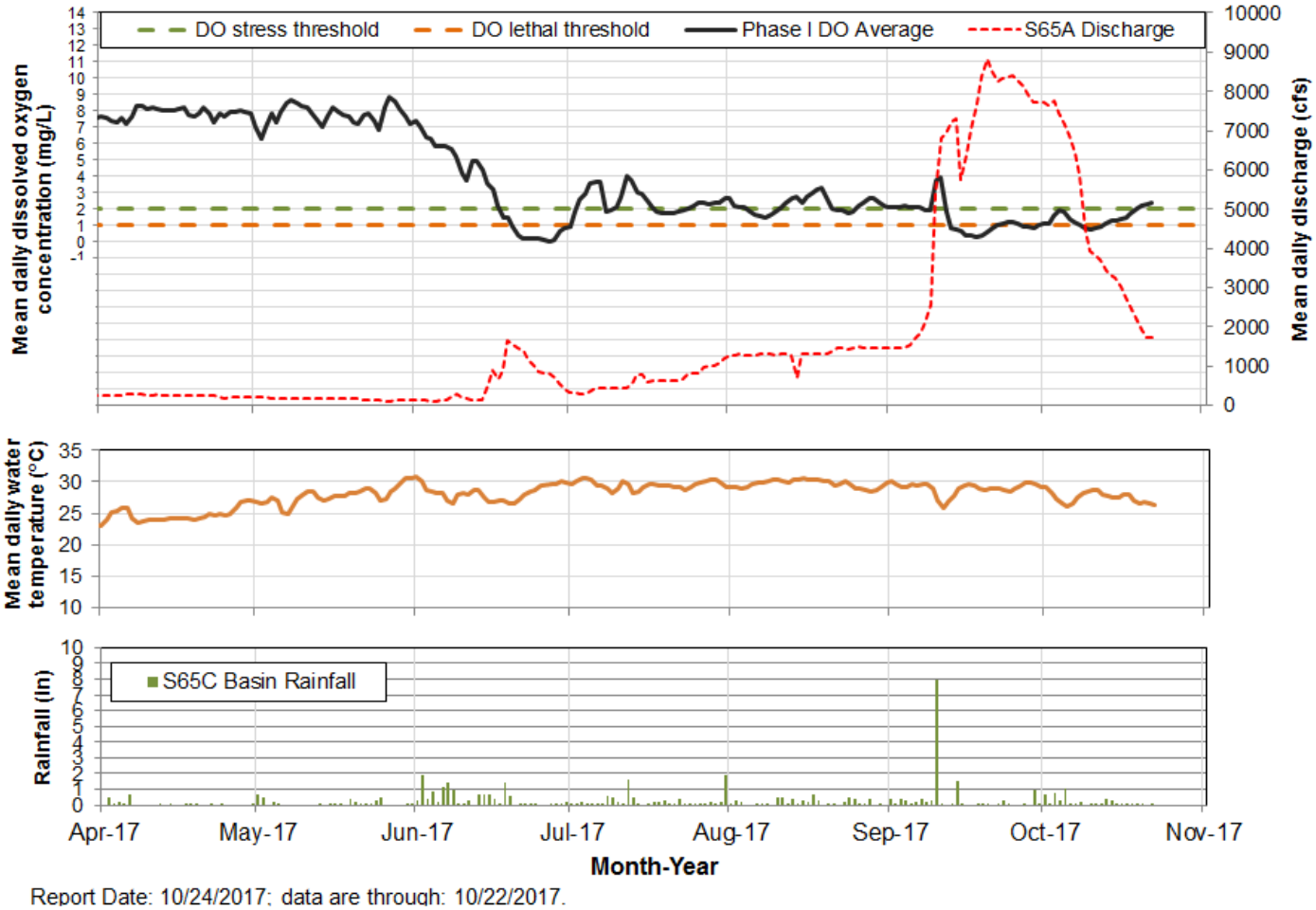


Figure 10. Mean daily Dissolved Oxygen, discharge, temperature and rainfall in the Phase I river channel.

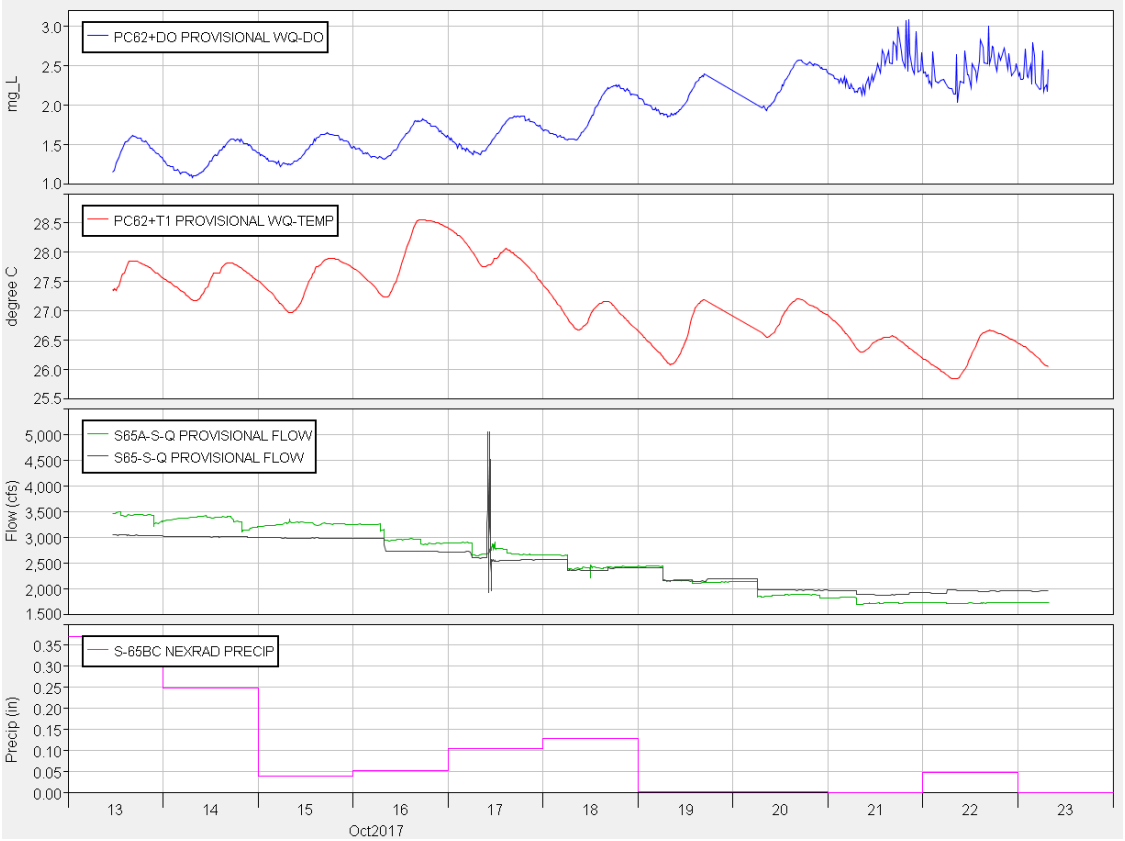


Figure 11. Phase I river channel dissolved oxygen and water temperature (measured at 15 minute intervals) and Pool BC daily rainfall.

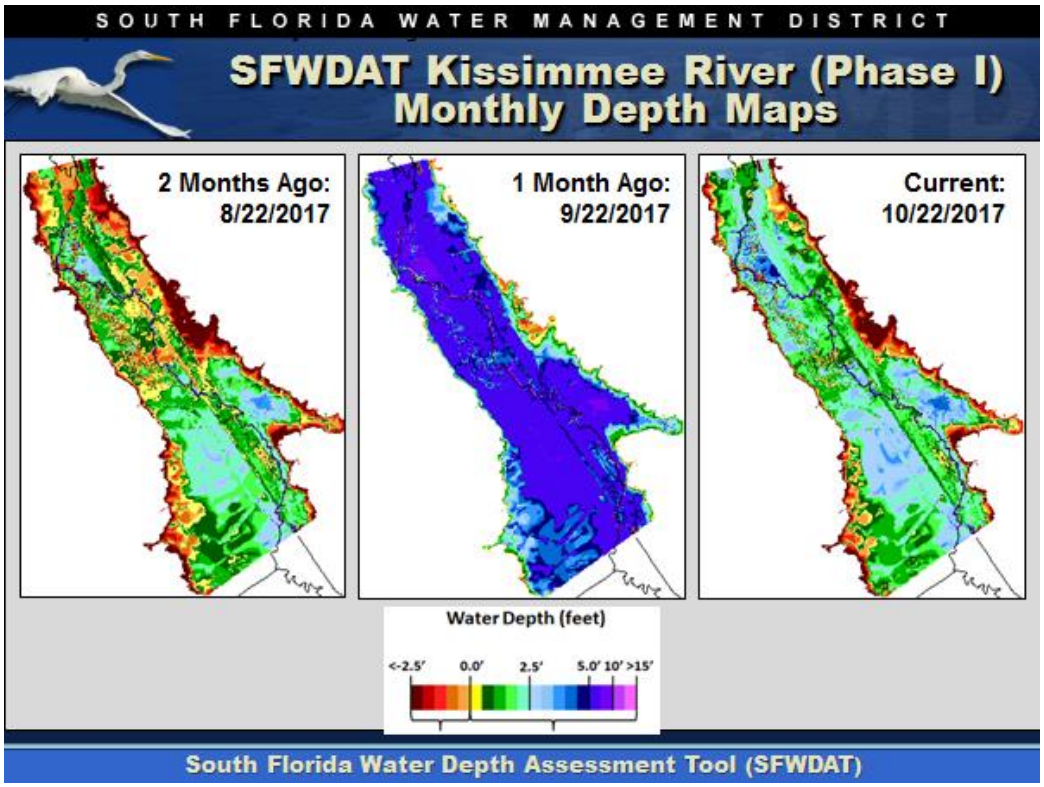
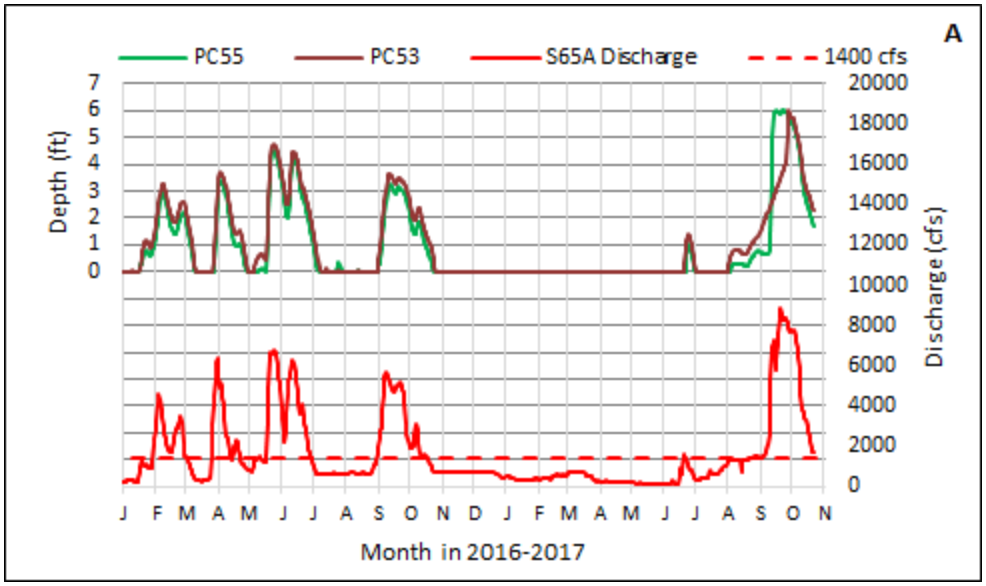
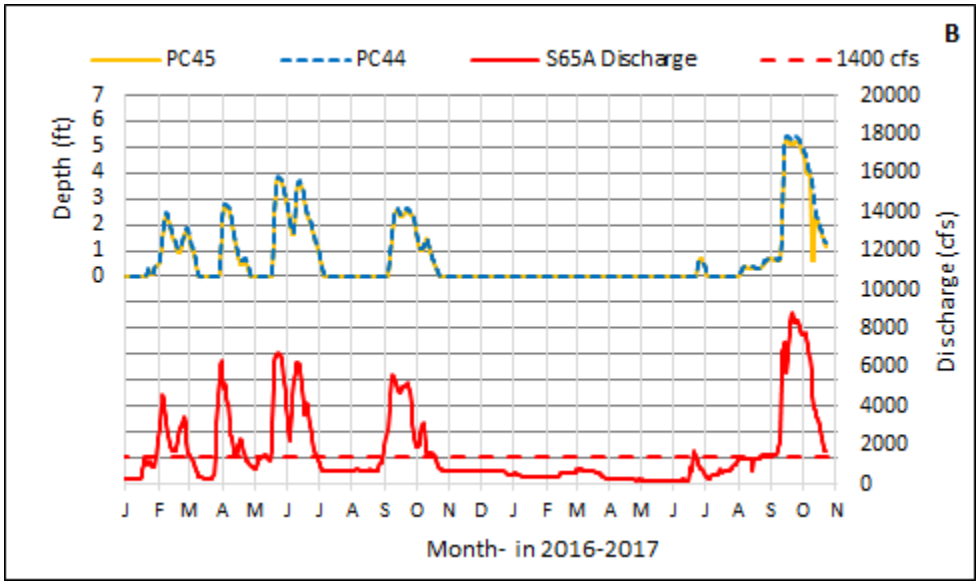


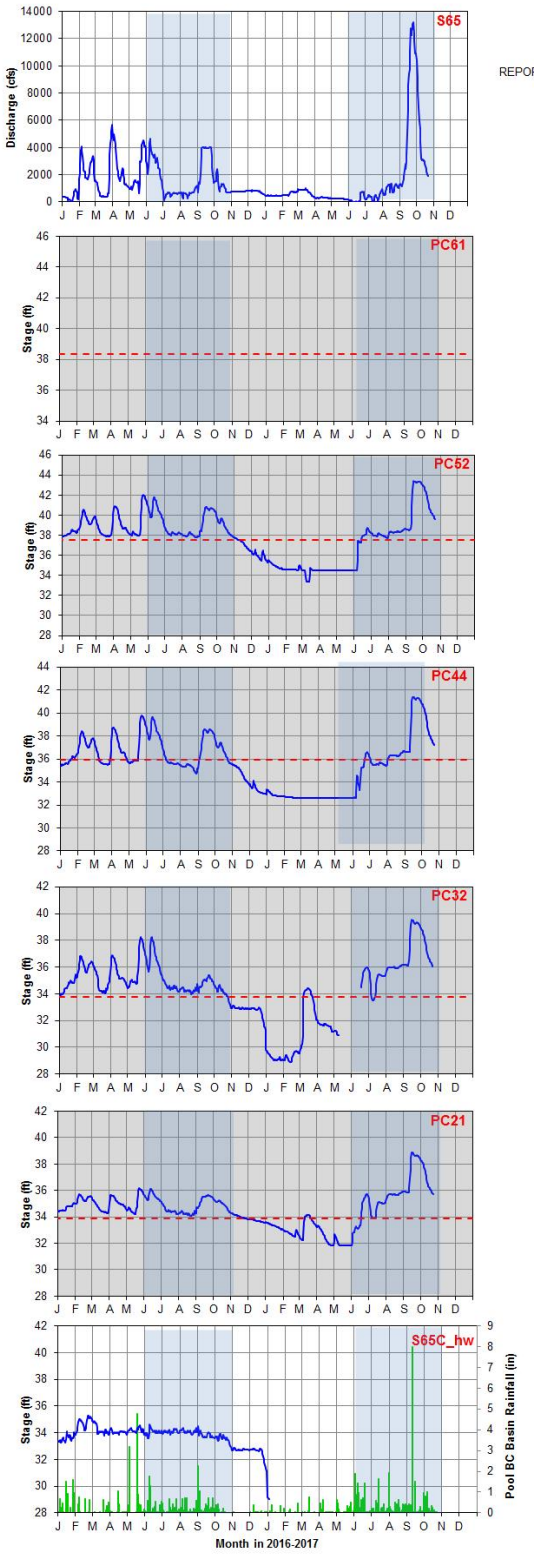
Figure 12. Phase I area floodplain water depths for this week, one month ago, and two months ago. Note that the WDAT color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to Jan. 16, 2012.





Insert. Water depth at selected northern Kissimmee River floodplain sites on (A) the PC5's transect and (B) the PC4's transect, with S65A discharge.

Kissimmee River Hydrographs



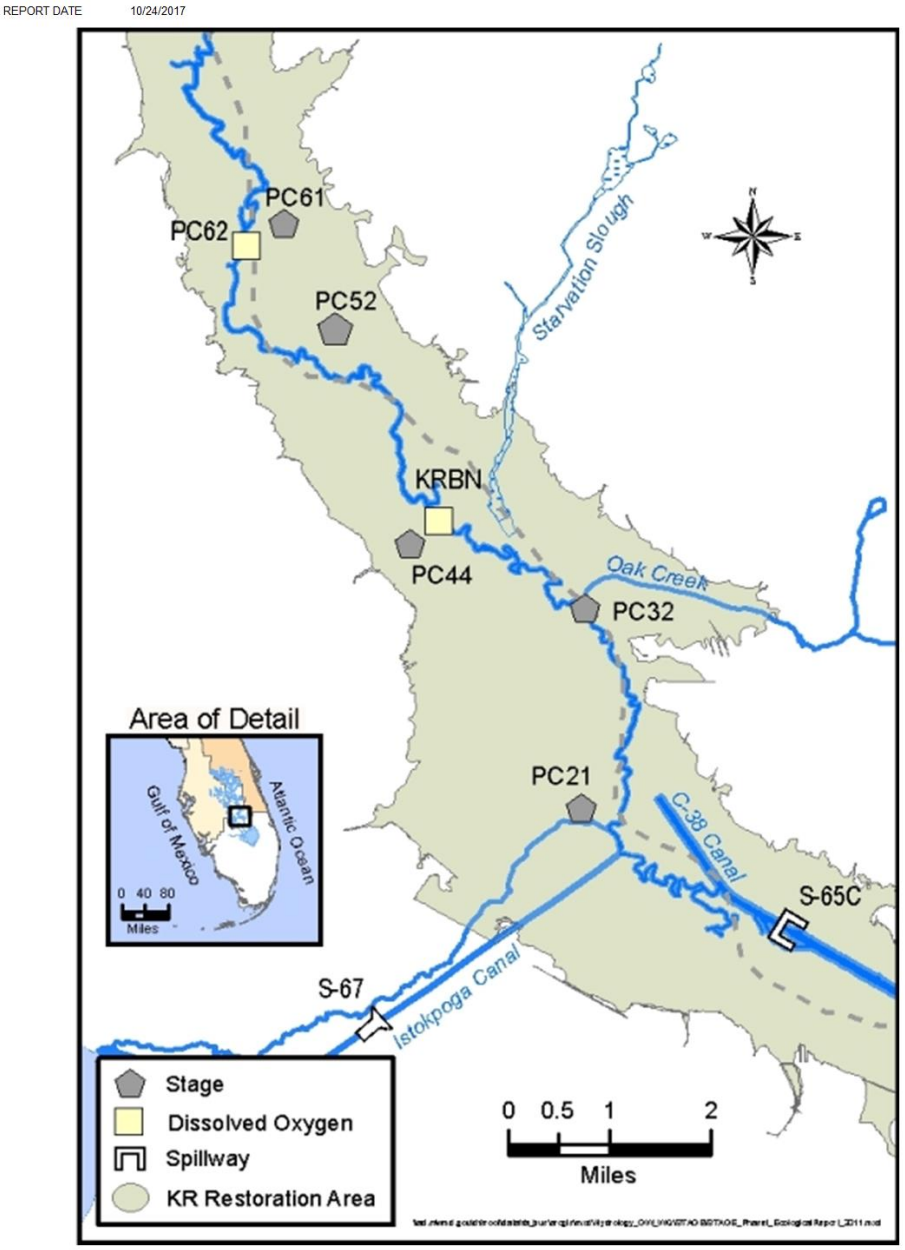


Figure 13. Discharge at S65, stages at five monitoring stations in the Phase I area of the Kissimmee River floodplain, and headwater stage at S65-C since January 1, 2015. The most recent data (~2 weeks) are provisional real-time data from SFWMD DualTrend; previous data are from SFWMD DB-HYDRO (validated). Dashed lines are ground elevations.

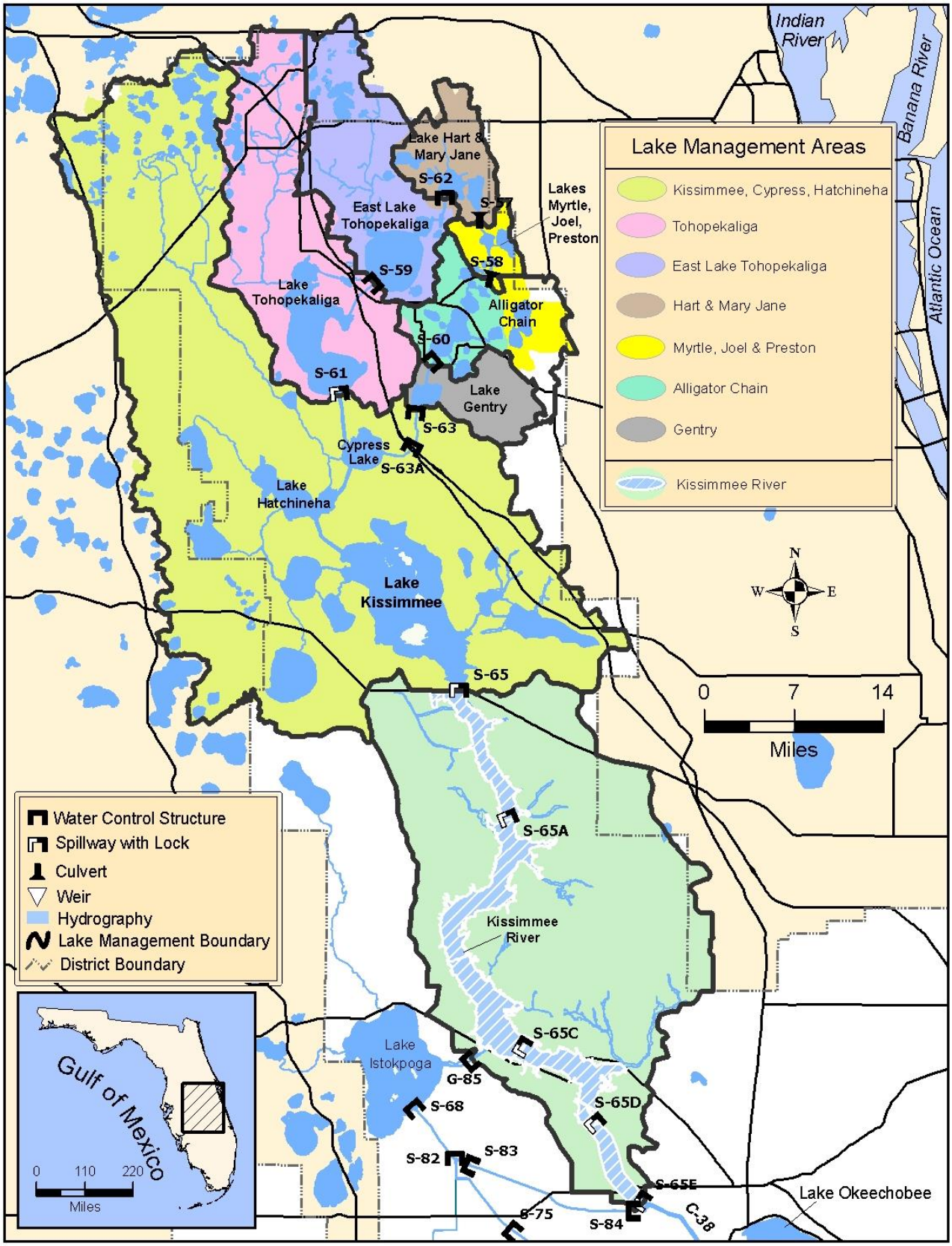


Figure 14. The Kissimmee Basin

LAKE OKEECHOBEE

According to the USACE web site, Lake Okeechobee stage is at 16.95 feet NGVD for the period ending at midnight on October 23, 2017. This value is based on the use of four interior Lake stations (L001, L005, L006 and LZ40) and four perimeter stations (S308, S352, S4 and S133). Lake stage peaked at 17.20 feet during the week prior, before declining to 16.95 feet on October 23. The Lake is still 0.88 feet higher than it was a month ago and 1.21 feet higher than it was a year ago (Figure 1). The Lake is currently in the High sub-band (Figure 2). According to RAINDAR, only 0.35 inches of rain fell directly over the Lake during the week October 17 - October 23 (Figure 3), which was the same amount as the previous week.

Average daily inflows to the Lake decreased by roughly 3,000 cfs over the past week, from 10,558 cfs to 7,668 cfs. Most of the inflows were from the Kissimmee River via the S65E and S84 structures, which averaged 4,520 cfs and 1,401 cfs daily, respectively.

Average daily outflows for the Lake also decreased over the past week, primarily due to reductions in discharges to the St Lucie estuary (via the S308). Outflows decreased from 11,304 cfs to 9,584 cfs, with S308 discharges going from 3,850 cfs to 2,539 cfs this past week. Most of the Lake discharges were through S77, which decreased slightly from 7,189 cfs to 7,026 cfs. Discharges to the L8 canal through Culvert 10A were near zero, estimated at only 19 daily cfs at the downstream gauge. There were no discharges south through the S350 structures. The corrected evapotranspiration value based on the L006 weather platform solar radiation data decreased slightly to 0.94 inches for the past week.

Total inflows and outflows for the last two weeks are detailed in Table 1, as well as the approximate change in Lake stage from each major structure's total flows over the period (midnight October 17, 2017 to midnight October 23, 2017). Figure 4 shows the combined average daily cfs for inflows and outflows for the Lake over the past eight weeks, as well as backpumping that occurred immediately following Hurricane Irma from S2 and S3. These data are provisional, and are subject to change.

Table 1

INFLOWS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)
S65E & S65EX1	4250	1.6
S71 & 72	301	0.1
S84 & 84X	1401	0.5
Fisheating Creek	1060	0.4
S154	133	0.0
S191	333	0.1
S133 P	62	0.0
S127 P	61	0.0
S129 P	17	0.0
S131 P	4	0.0
S135 P	46	0.0
S2 P	0	0.0
S3 P	0	0.0
S4 P	0	0.0
C5	0	0.0
Rainfall	956	0.3
Total	**8624**	**3.2**

OUTFLOWS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)
S77	7026	2.6
S308	2539	0.9
S351	0	0.0
S352	0	0.0
S354	0	0.0
L8	19	0.0
ET	2590	1.0
Total	**12175**	**4.5**

PROVISIONAL DATA

Water Management Recommendations

The Lake is 16.95 feet NGVD having decreased 0.25 feet from the peak of 17.20 feet less than two weeks ago. Submerged and emergent vegetation communities in the nearshore region have experienced stages >16 feet three times in less than two years, and are still near a 13-year high in water levels. These stages, combined with turbid conditions from Hurricane Irma's winds, will likely cause substantial declines in these communities over the coming months and/or years. Lower Lake stages near the end of WY2018 would help to recover these important communities, and long, steady recessions of water levels throughout the dry season may help promote another productive year for wading birds on the Lake as well.

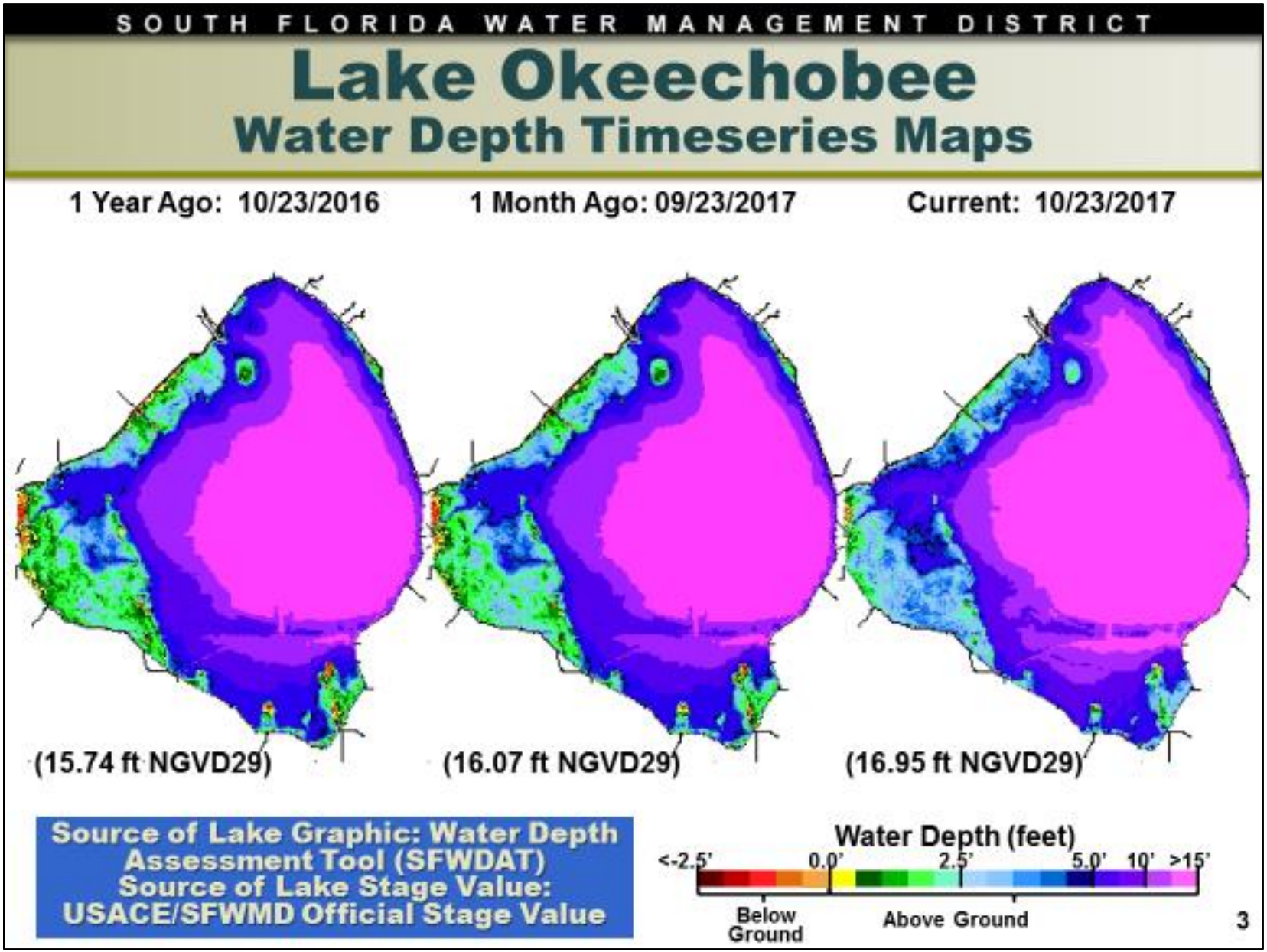

SOUTH FLORIDA WATER MANAGEMENT DISTRICT
Lake Okeechobee
Water Depth Timeseries Maps
1 Year Ago: 10/23/2016
1 Month Ago: 09/23/2017
Current: 10/23/2017
(15.74 ft NGVD29)
(16.07 ft NGVD29)
(16.95 ft NGVD29)
Source of Lake Graphic: Water Depth Assessment Tool (SFWDAT)
Source of Lake Stage Value: USACE/SFWMD Official Stage Value
Water Depth (feet)
<-2.5'
0.0'
2.5'
5.0'
10'
>15'
Below Ground
Above Ground
3

Figure 1

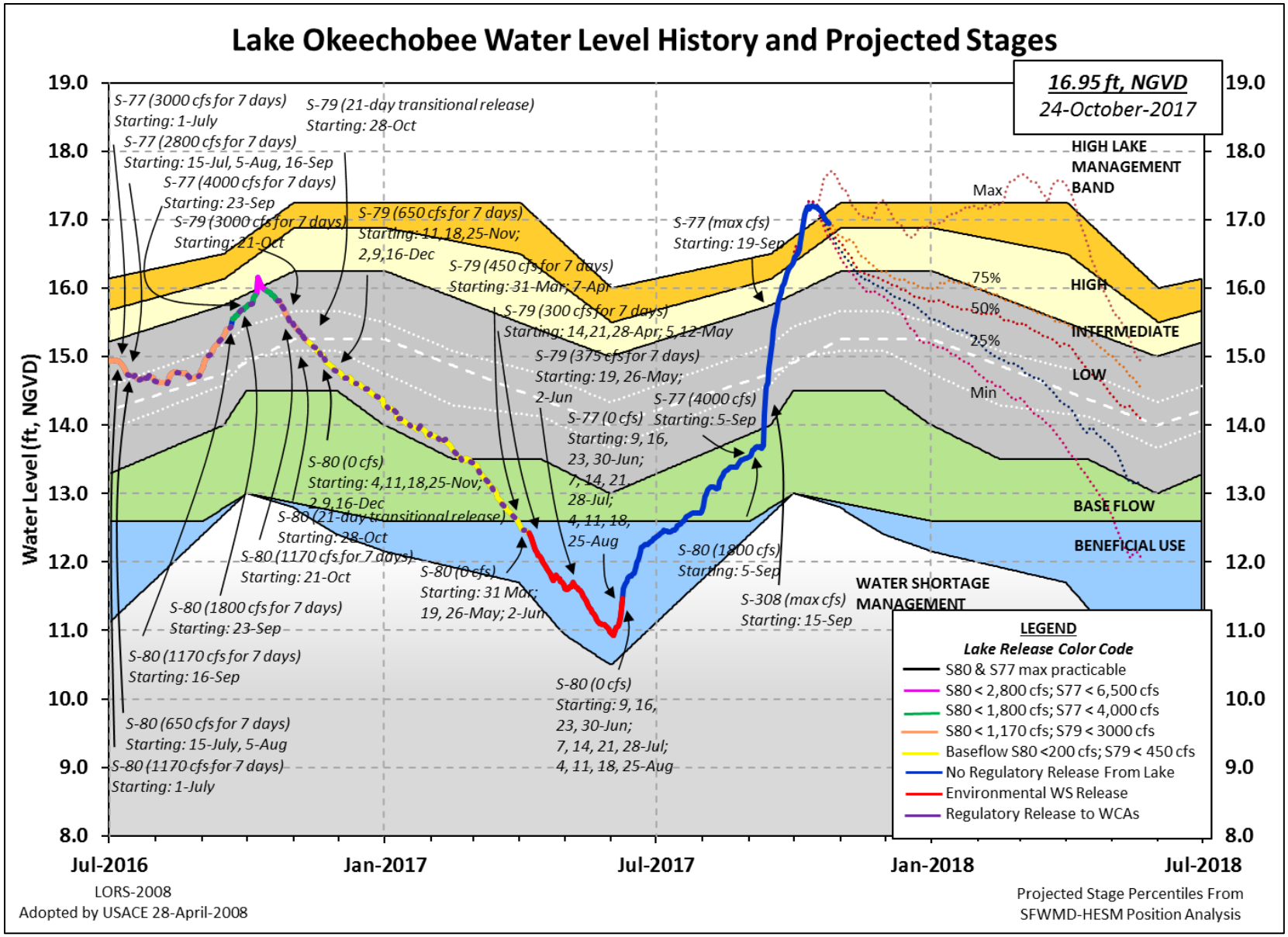

Lake Okeechobee Water Level History and Projected Stages
16.95 ft, NGVD
24-October-2017
Water Level (ft, NGVD)
19.0
18.0
17.0
16.0
15.0
14.0
13.0
12.0
11.0
10.0
9.0
8.0
Jul-2016
Jan-2017
Jul-2017
Jan-2018
Jul-2018
HIGH LAKE MANAGEMENT BAND
HIGH
INTERMEDIATE
LOW
BASE FLOW
BENEFICIAL USE
WATER SHORTAGE MANAGEMENT
Max
75%
50%
25%
Min
S-77 (3000 cfs for 7 days) Starting: 1-July
S-77 (2800 cfs for 7 days) Starting: 15-Jul, 5-Aug, 16-Sep
S-77 (4000 cfs for 7 days) Starting: 23-Sep
S-79 (3000 cfs for 7 days) Starting: 21-Oct
S-79 (21-day transitional release) Starting: 28-Oct
S-79 (650 cfs for 7 days) Starting: 11,18,25-Nov; 2,9,16-Dec
S-79 (450 cfs for 7 days) Starting: 31-Mar; 7-Apr
S-79 (300 cfs for 7 days) Starting: 14,21,28-Apr; 5,12-May
S-79 (375 cfs for 7 days) Starting: 19, 26-May; 2-Jun
S-77 (max cfs) Starting: 19-Sep
S-77 (0 cfs) Starting: 9, 16, 23, 30-Jun; 7, 14, 21, 28-Jul; 4, 11, 18, 25-Aug
S-77 (4000 cfs) Starting: 5-Sep
S-80 (0 cfs) Starting: 4,11,18,25-Nov; 2,9,16-Dec
S-80 (21-day transitional release) Starting: 28-Oct
S-80 (1170 cfs for 7 days) Starting: 21-Oct
S-80 (1800 cfs for 7 days) Starting: 23-Sep
S-80 (1170 cfs for 7 days) Starting: 16-Sep
S-80 (650 cfs for 7 days) Starting: 15-July, 5-Aug
S-80 (1170 cfs for 7 days) Starting: 1-July
S-80 (0 cfs) Starting: 31 Mar; 19, 26-May; 2-Jun
S-80 (0 cfs) Starting: 9, 16, 23, 30-Jun; 7, 14, 21, 28-Jul; 4, 11, 18, 25-Aug
S-80 (1800 cfs) Starting: 5-Sep
S-308 (max cfs) Starting: 15-Sep
LEGEND
Lake Release Color Code
S80 & S77 max practicable
S80 < 2,800 cfs; S77 < 6,500 cfs
S80 < 1,800 cfs; S77 < 4,000 cfs
S80 < 1,170 cfs; S79 < 3000 cfs
Baseflow S80 <200 cfs; S79 < 450 cfs
No Regulatory Release From Lake
Environmental WS Release
Regulatory Release to WCAs
LORS-2008
Adopted by USACE 28-April-2008
Projected Stage Percentiles From SFWMD-HESM Position Analysis

Figure 2

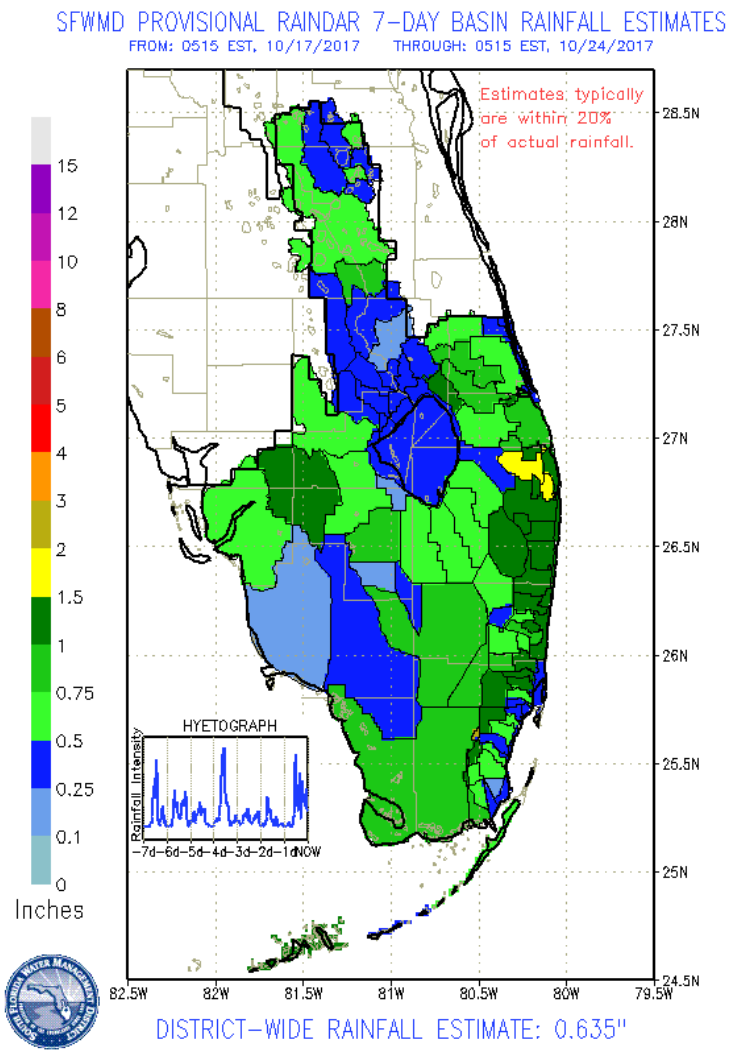


Figure 3

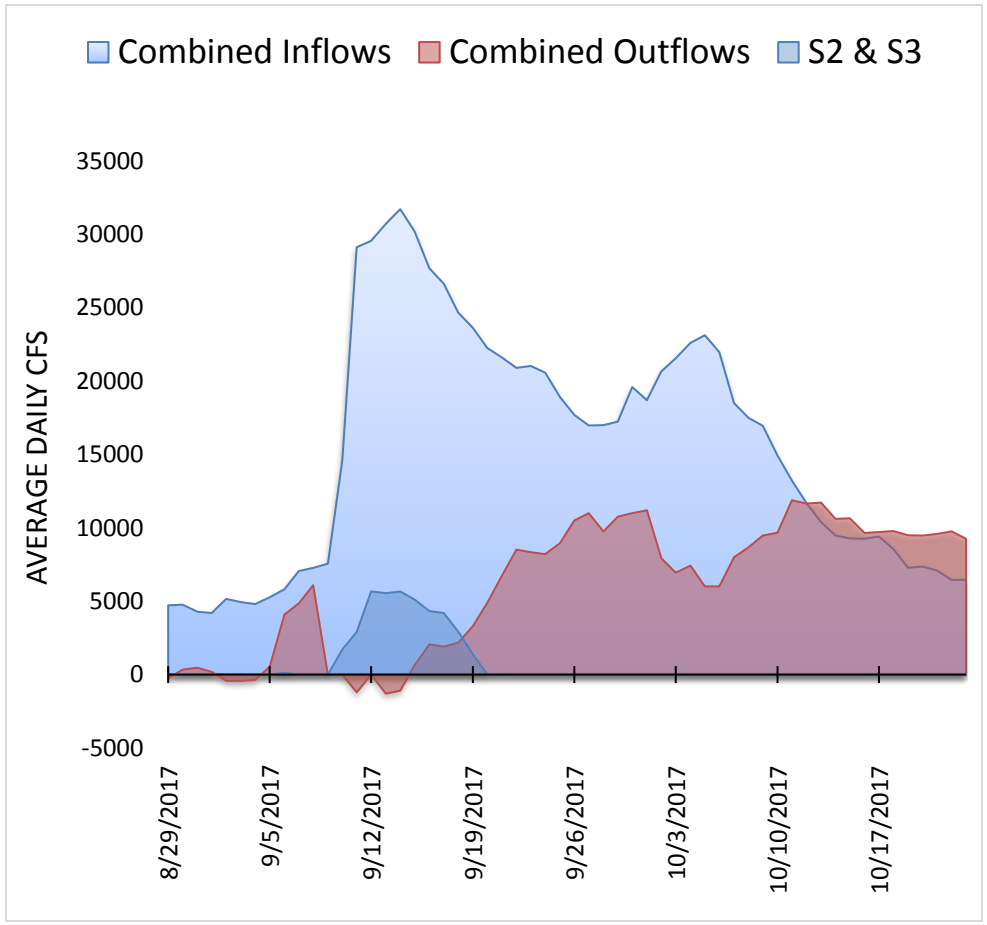


Figure 4

LAKE ISTOKPOGA

Lake Istokpoga stage is 39.21 feet NGVD as of midnight October 23, 2017 and is currently 0.29 feet below its regulation schedule to accommodate construction on downstream structures (Figure 5). Average daily flows into the Lake from Josephine Creek for the week October 17 – October 23 decreased from the previous week, from 342 cfs to 206 cfs. No data have been reported for Arbuckle Creek since July 4 as the gauge is being recalibrated after construction in the area. Average daily discharge from S68 and S68X over the past week decreased from the previous week as well, from 1,907 cfs to 1,401 cfs. According to RAINDAR, 0.36 inches of rain fell in the Lake Istokpoga basin in the past week.

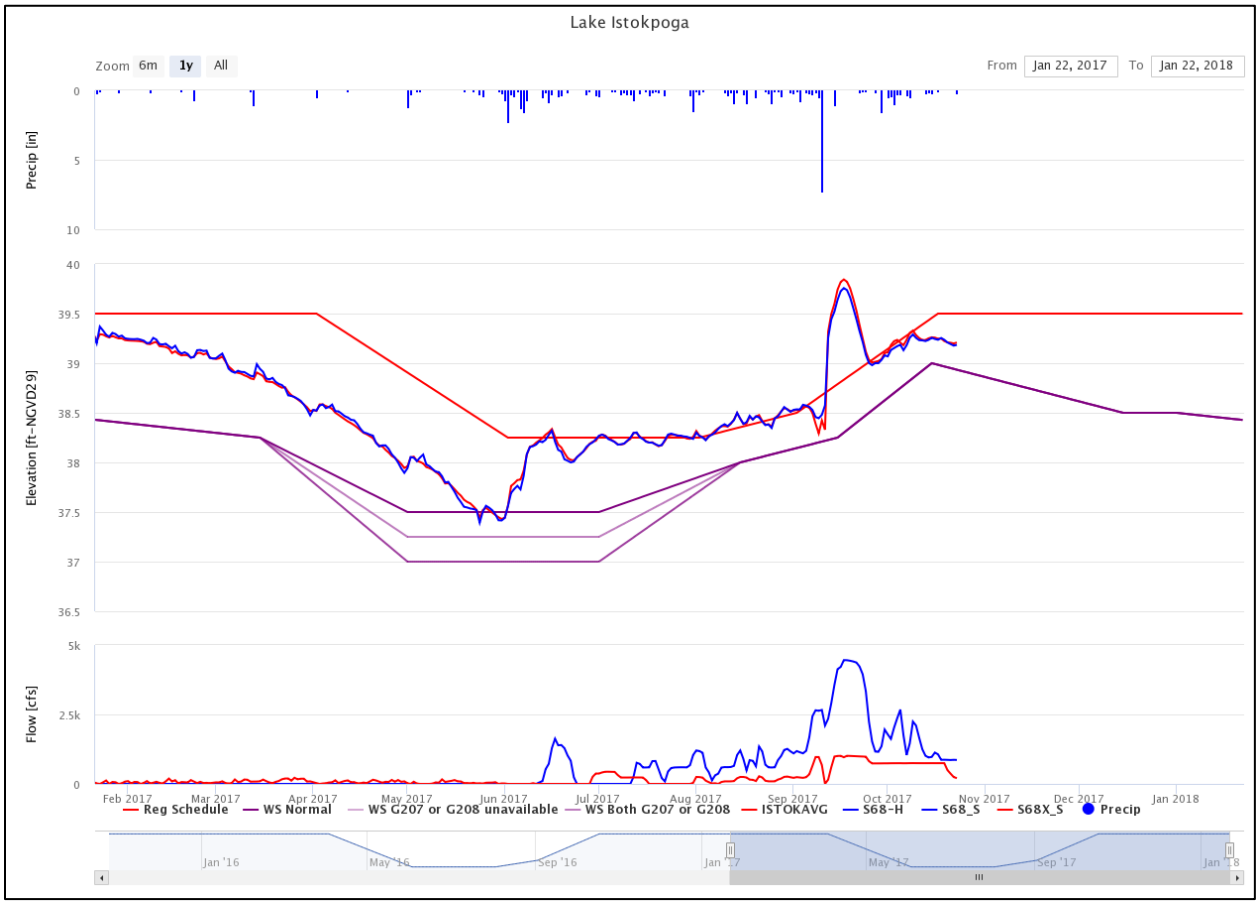


Figure 5

ESTUARIES

St. Lucie Estuary

Over the past week, provisional flows averaged about 4,242 cfs at S-80, 2,529 cfs at S-308, 361 cfs at S-49 on C-24, 544 cfs at S-97 on C-23, and 158 cfs from Ten Mile Creek at the Gordy Road Structure. Average inflow from tidal basin tributaries is estimated to be 434 cfs (Figures 1 and 2). Total inflow averaged about 5,739 cfs last week and 7,073 cfs over last month.

Over the past week in the estuary, salinity increased at and downstream of A1A Bridge (Table 1, 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 0.4. Salinity conditions in the middle estuary are in the poor range for the adult eastern oysters.

Table 1. Seven-day average salinity at three monitoring stations 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 (N. Fork)	**0.3** (0.2)	**0.3** (0.2)	NA[1]
US1 Bridge	**0.2** (0.2)	**0.5** (0.6)	10.0-26.0
A1A Bridge	**3.1** (1.7)	**10.9** (7.5)	NA[1]

[1]Envelope not applicable

Continuous monitoring of water quality is conducted at HR1 in the North Fork. Weekly dissolved oxygen data are summarized in Table 2.

Table 2. Weekly dissolved oxygen conditions at HR1 in the North Fork of the St. Lucie Estuary.

Location	Depth	Average DO (mg/l)	Minimum DO (mg/l)	Maximum DO (mg/l)
HR1	surface	5.97	2.47	7.65
HR1	bottom	5.47	2.10	7.53

Continuous monitoring of water quality is conducted at five Land/Ocean Biogeochemical Observatory (LOBO) stations located in the St. Lucie Estuary and maintained by Florida Atlantic University/Harbor Branch Oceanographic Institute (FAU-HBOI). Data are summarized in Table 3 and station location map is shown in Figure 5.

Table 3. Weekly ranges of Instrument Depth, Chlorophyll *a* (a measure of algal biomass) and dissolved oxygen concentrations at five FAU-HBOI LOBO stations located in the St. Lucie Estuary.

Location	Depth (m)	Chlorophyll *a* (µg/l)	Average DO (mg/l)	Minimum DO (mg/l)	Maximum DO (mg/l)
SF2	3.30	4.19 - 4.75	N/A	N/A	N/A
SF	1.93	4.84 - 5.42	6.95	6.43	7.67
NF	2.43	6.68 - 7.52	5.54	3.26	6.80
ME	2.17	4.42 - 6.62	6.93	6.31	7.34
IRL-SLE	N/A	N/A	N/A	N/A	N/A

NA = Data is not available or unreliable.

NOAA satellite imagery was unavailable due to cloud coverage in the St. Lucie estuary.

Caloosahatchee Estuary

During the past week, provisional flows averaged approximately 7,026 cfs at S-77, 7,001 cfs at S-78, and 9,028 cfs at S-79. Average inflow from tidal basin tributaries is estimated to be 458 cfs (Figures 6 & 7). Total inflow averaged 9,486 cfs last week and 11,854 cfs over last month.

Over the past week, salinity increased downstream of Cape Coral Bridge (Table 4, Figures 8 and 9). The seven-day average salinity values are within the poor range for adult oysters at Cape Coral and within the fair range at Shell Point (Figure 10). Salinity data were not available for Sanibel. The 30-day moving average surface salinity is 0.2 at Val I-75 and 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)	**0.2** (0.2)	**0.2** (0.2)	NA[1]
*Val I75	**0.2** (0.2)	**0.2** (0.2)	0.0-5.0[2]
Ft. Myers Yacht Basin	**0.2** (0.2)	**0.2** (0.2)	NA
Cape Coral	**0.3** (0.2)	**0.4** (0.2)	10.0-30.0
Shell Point	**8.3** (5.7)	**9.5** (9.7)	10.0-30.0
Sanibel	**NR**[3](NR)	**NR** (NR)	10.0-30.0

[1]Envelope not applicable, [2]Envelope is based on a 30-day average, and [3]Not Reporting.
*Val I75 is temporarily unavailable (salinity values are estimated using models developed for this site).

Monitoring data collected by the River, Estuary and Coastal Observing Network of Sanibel-Captiva Conservation Foundation using continuous sensors are summarized in Table 5 as concentration ranges of chlorophyll *a* and dissolved oxygen at Beautiful Island, Ft. Myers, and Shell Point in the Caloosahatchee Estuary.

Table 5. Weekly ranges of Chlorophyll *a* (a measure of algal biomass) and dissolved oxygen concentrations at three monitoring stations maintained by the Sanibel-Captiva Conservation Foundation.

	RECON Monitoring Stations		
	Beautiful Island	**Ft. Myers**	**Shell Point**
Chlorophyll *a* (µg/l)	Down for maintenance	2.96 - 4.43	2.86 - 5.10
Dissolved Oxygen (mg/l)	Down for maintenance	No Data	5.49 - 7.84

The Florida Fish and Wildlife Research Institute reported on October 20, 2017, that *Karenia brevis*, the Florida red tide dinoflagellate, was not present in samples collected from Lee County.

NOAA satellite imagery is unavailable due to cloud coverage in the Caloosahatchee estuary.

Water Management Recommendations

Lake stage is in the High sub band of 2008 LORS. Tributary hydrological conditions are very wet. The 2008 LORS recommends up to 6,500 cfs at S-77 and up to 2,800 cfs at S-80. Given the current estuarine conditions, there are no ecological benefits associated with freshwater releases from Lake Okeechobee.

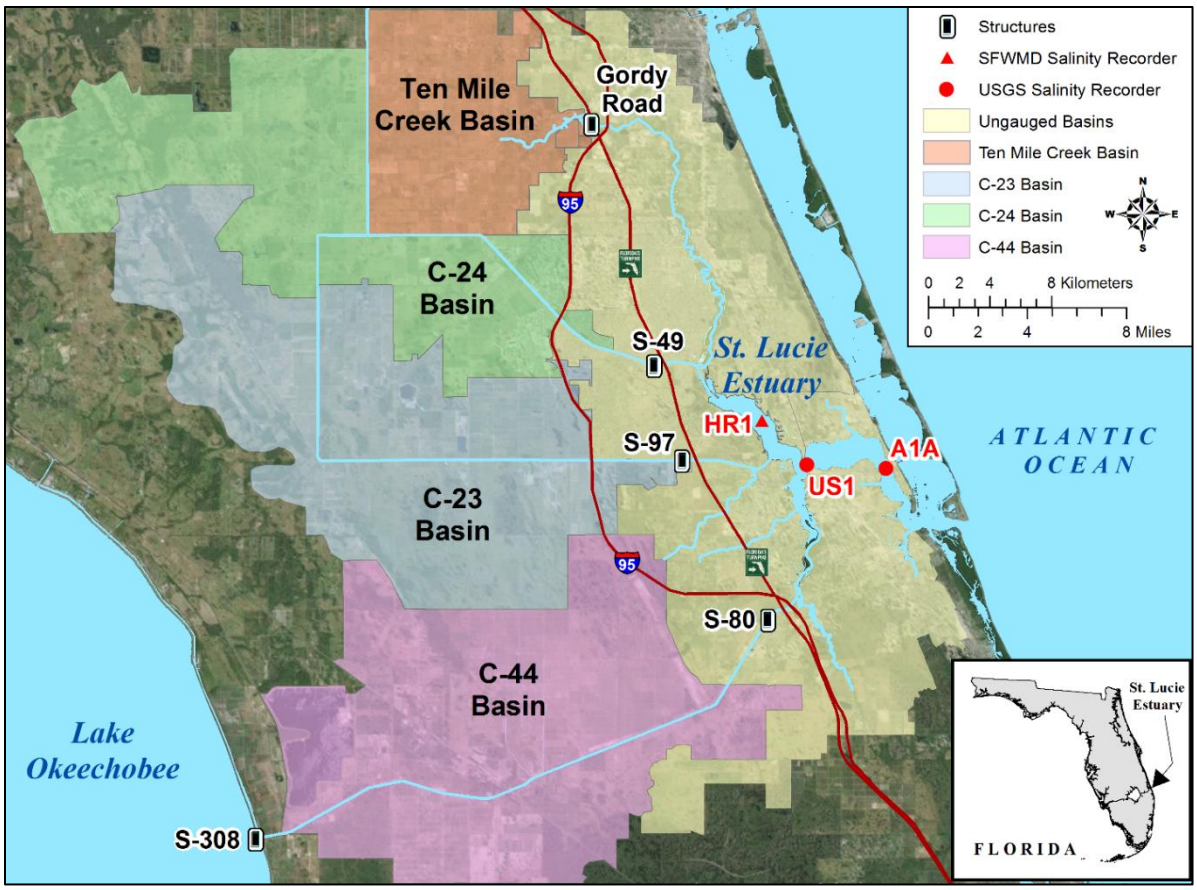


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

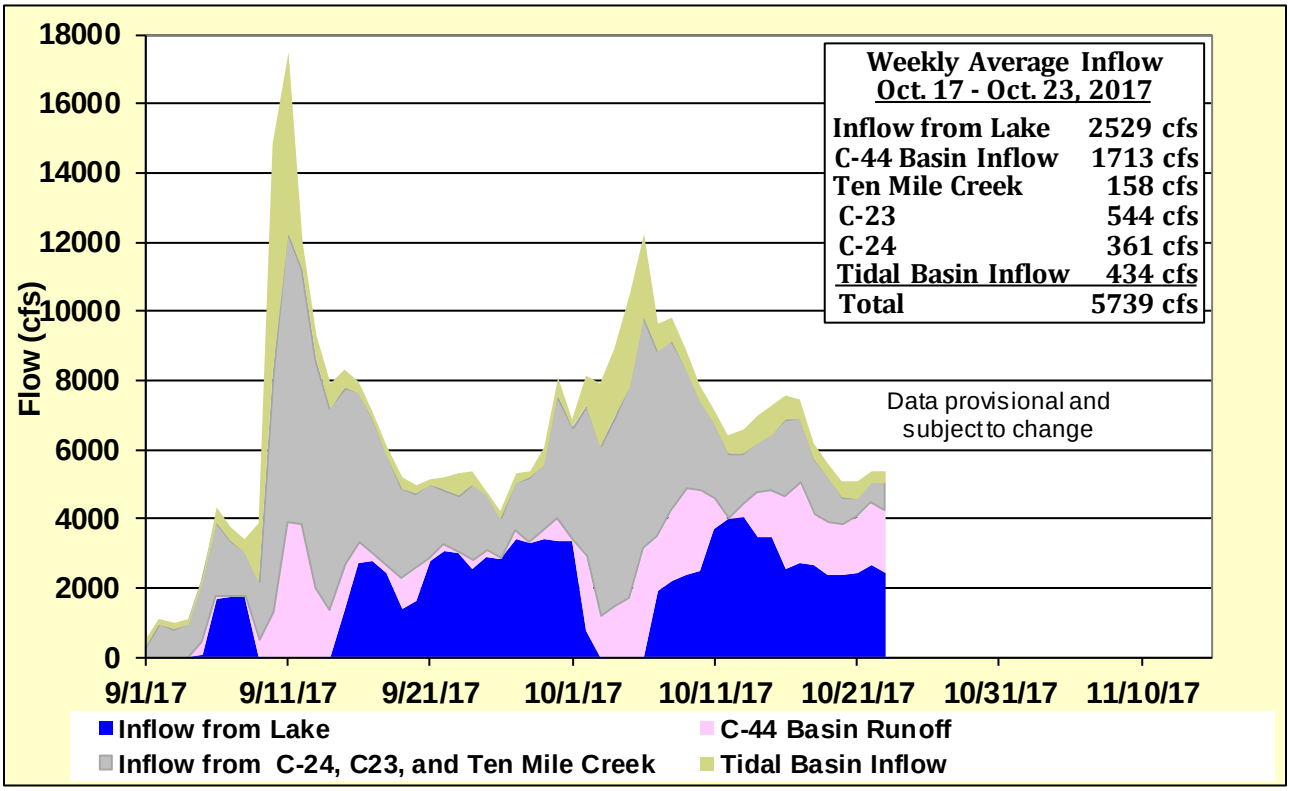


Figure 2. Estimated surface freshwater inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basins into the St. Lucie Estuary.

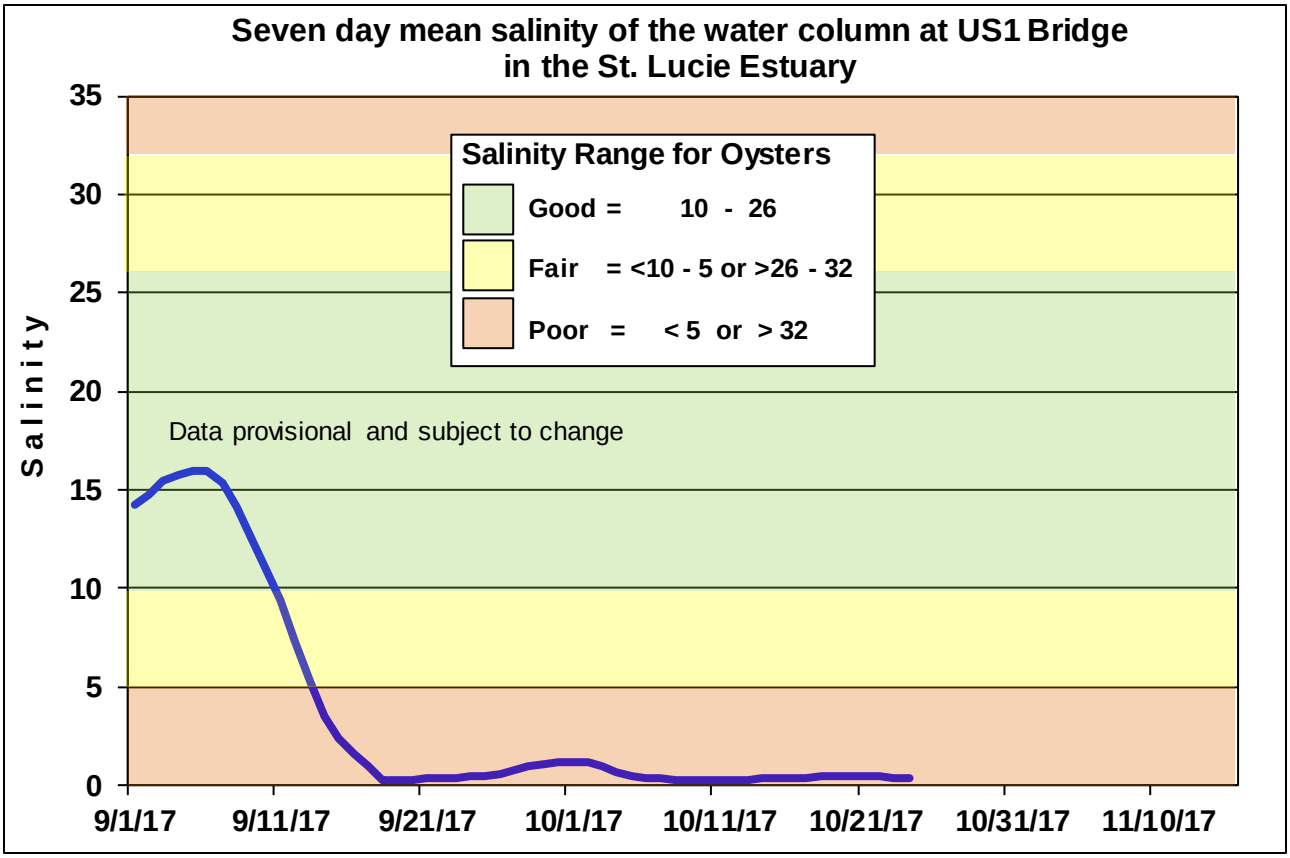


Figure 3. Seven-day mean salinity of the water column at the U.S. Highway 1 Bridge.

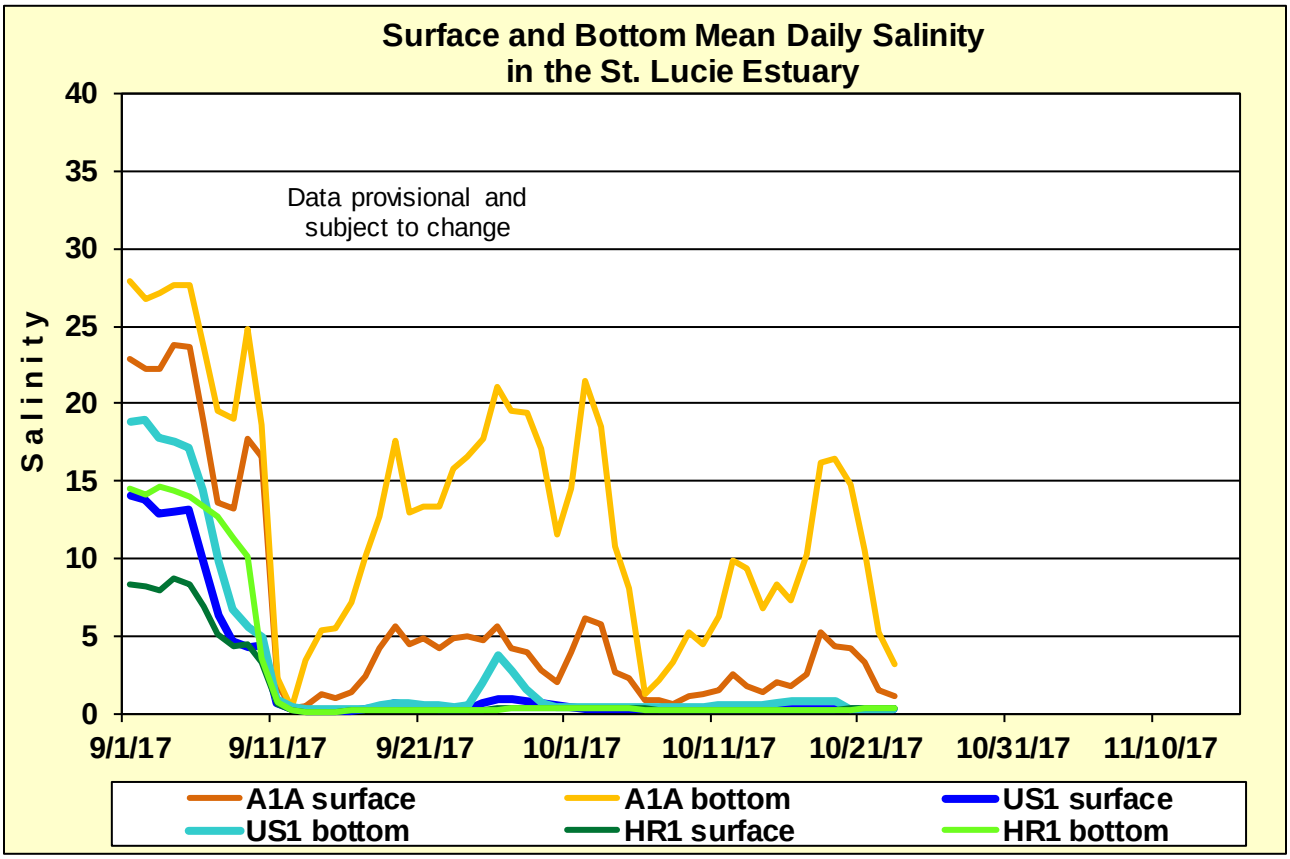


Figure 4. Daily mean salinity at the A1A, US1 and estimated HR1 stations.

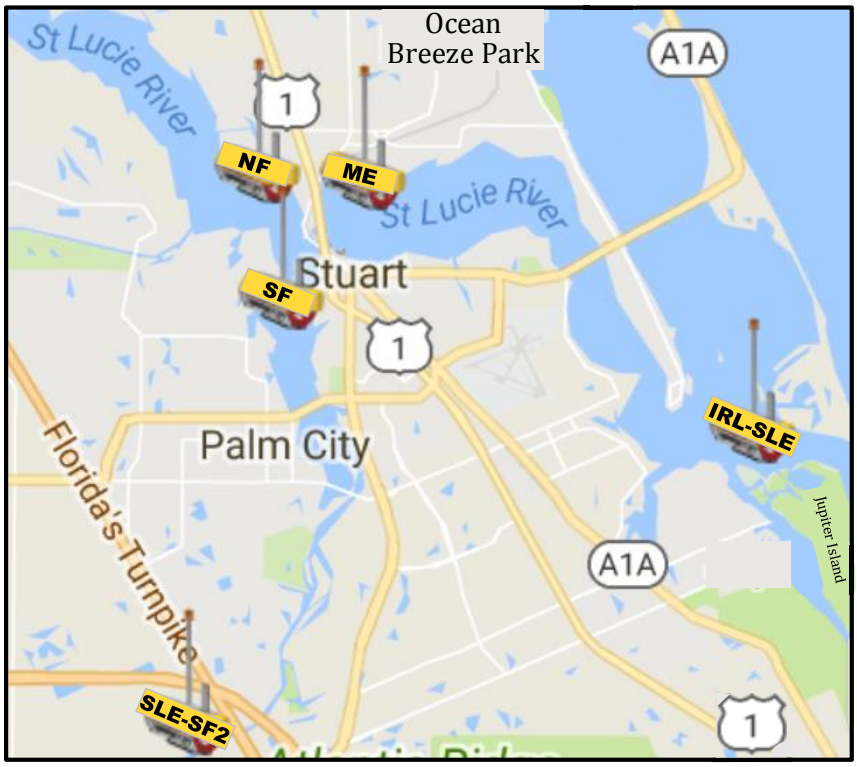


Figure 5. Location of FAU-HBOI LOBO water quality stations in the St. Lucie Estuary.

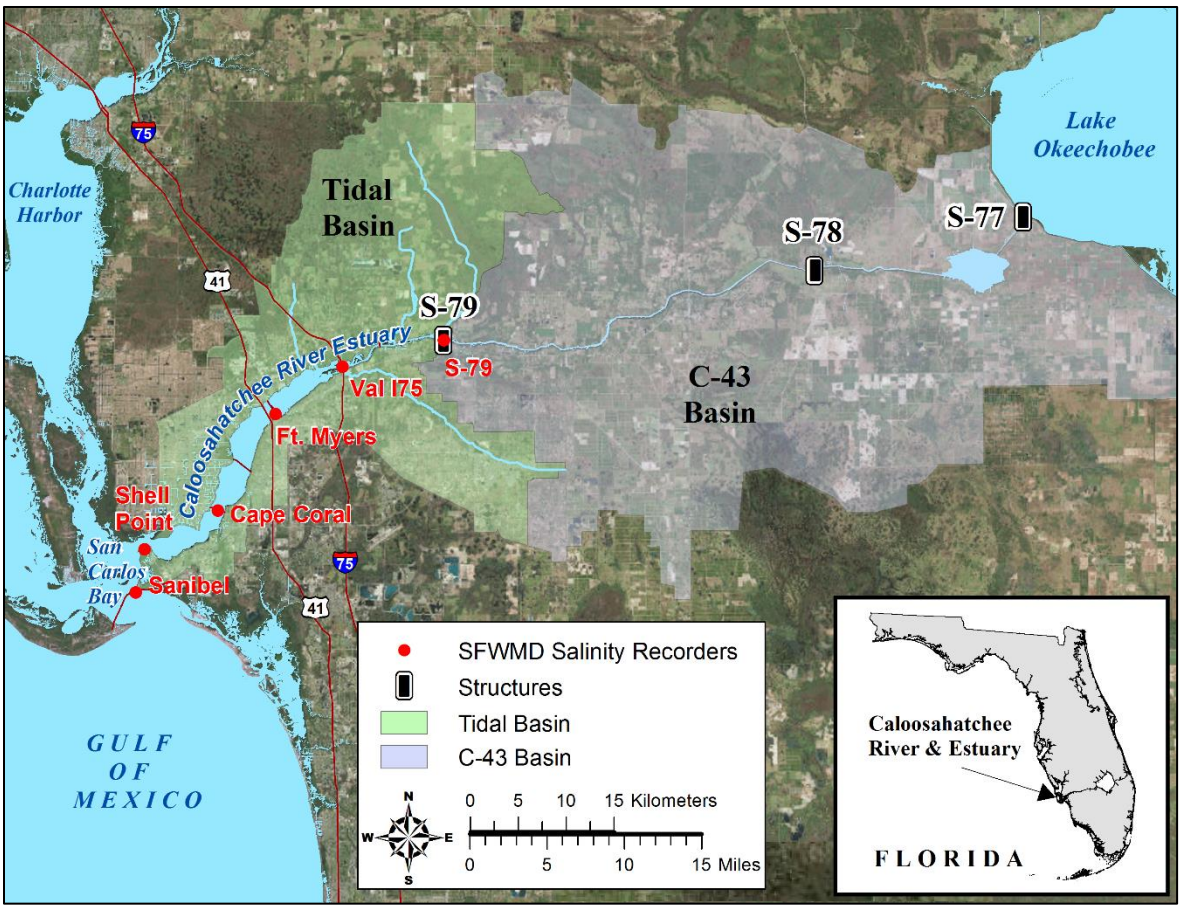


Figure 6. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

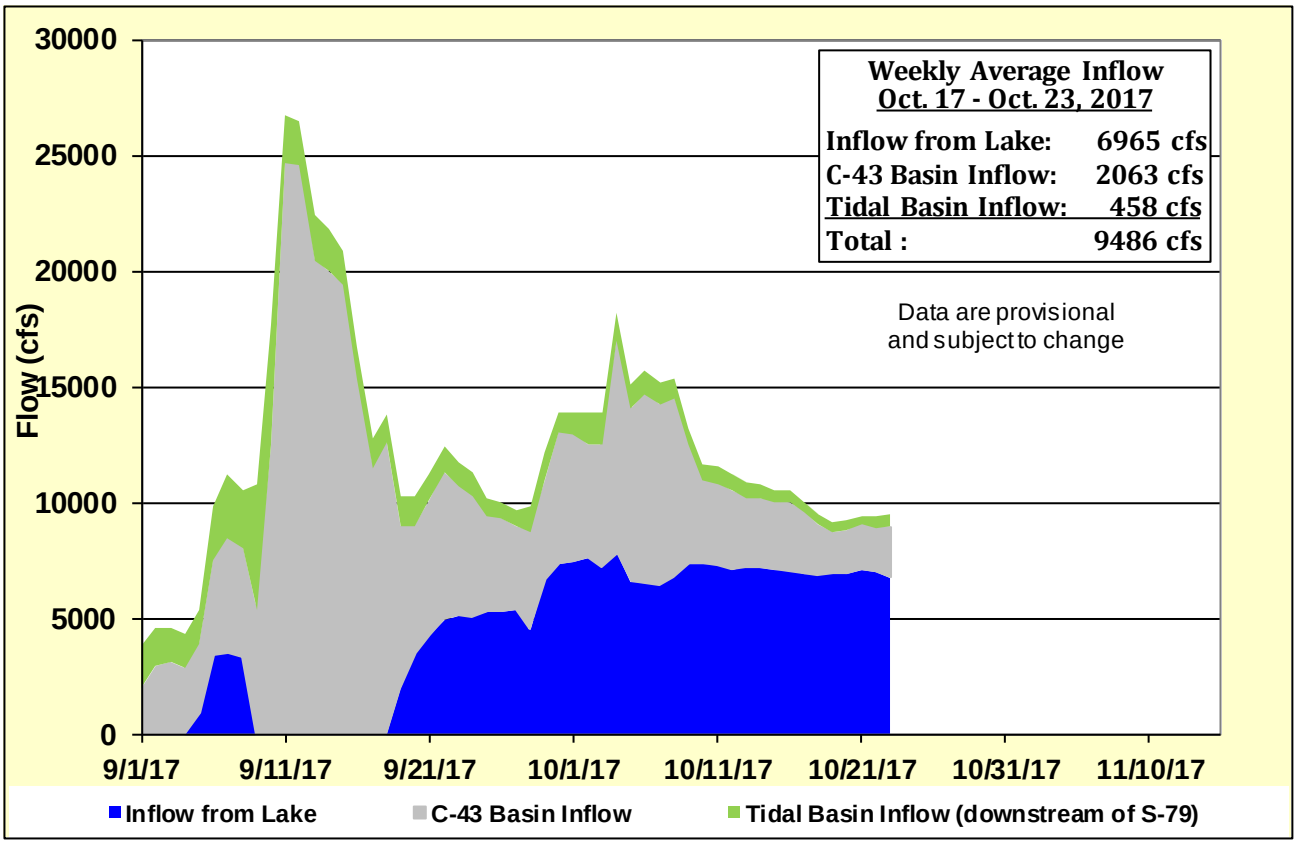
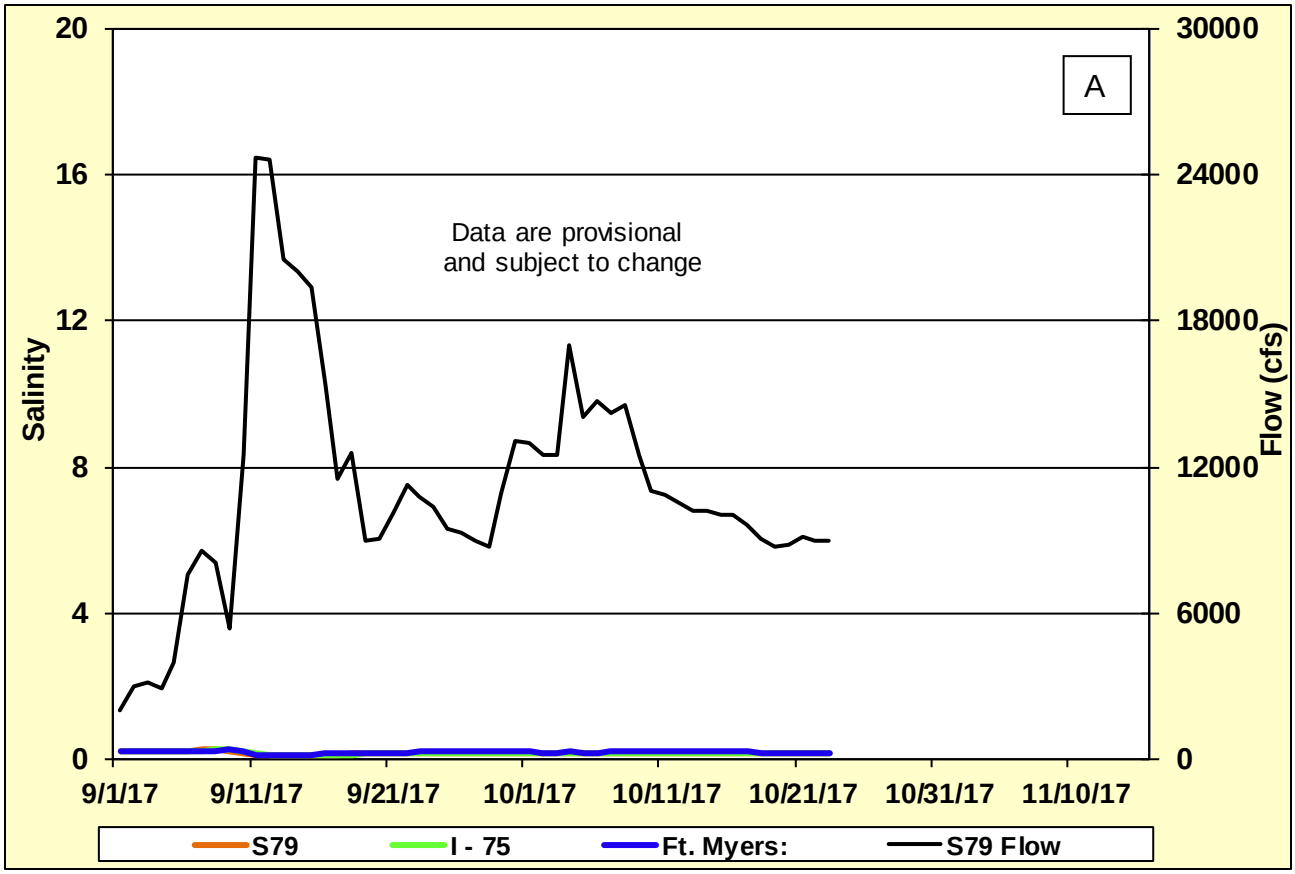


Figure 7. Freshwater inflows from Lake Okeechobee, runoff from the C-43 basin, and tributaries in the tidal basin into the Caloosahatchee River Estuary.



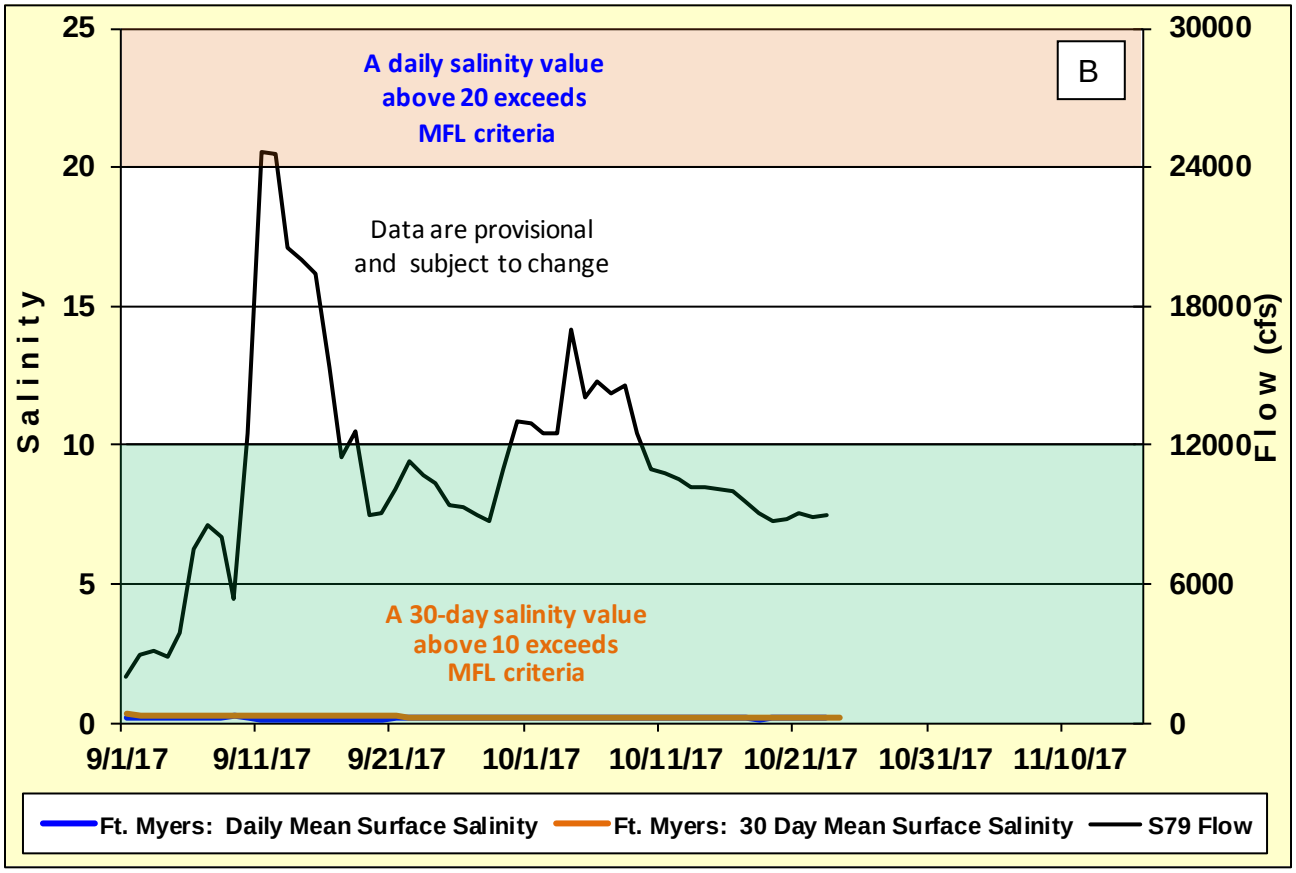


Figure 8. Daily mean flows at S-79 and salinity at upper estuary monitoring stations (A) and 30-day moving average salinity at Ft. Myers (B).

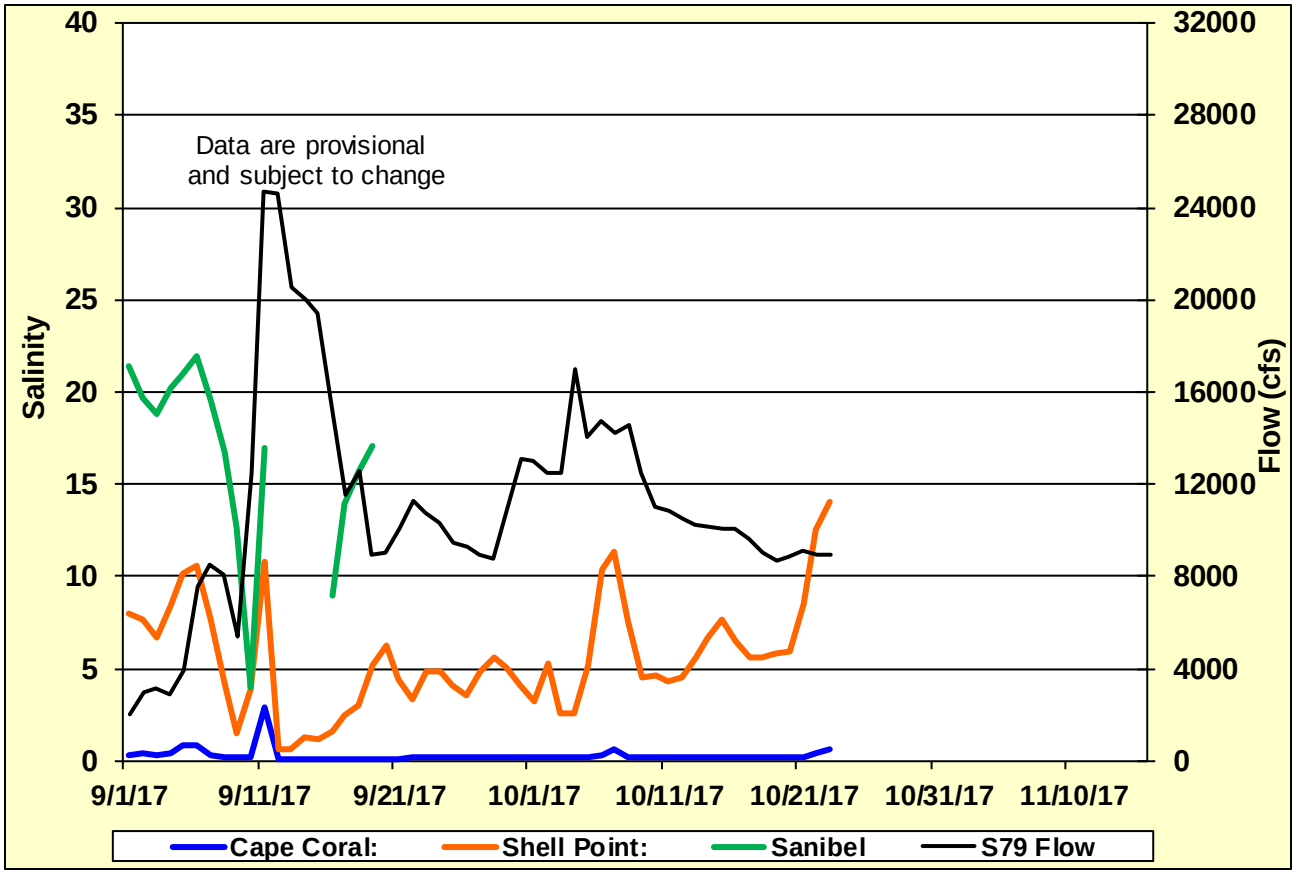


Figure 9. Daily mean flows at S-79 and salinity at lower estuary stations.

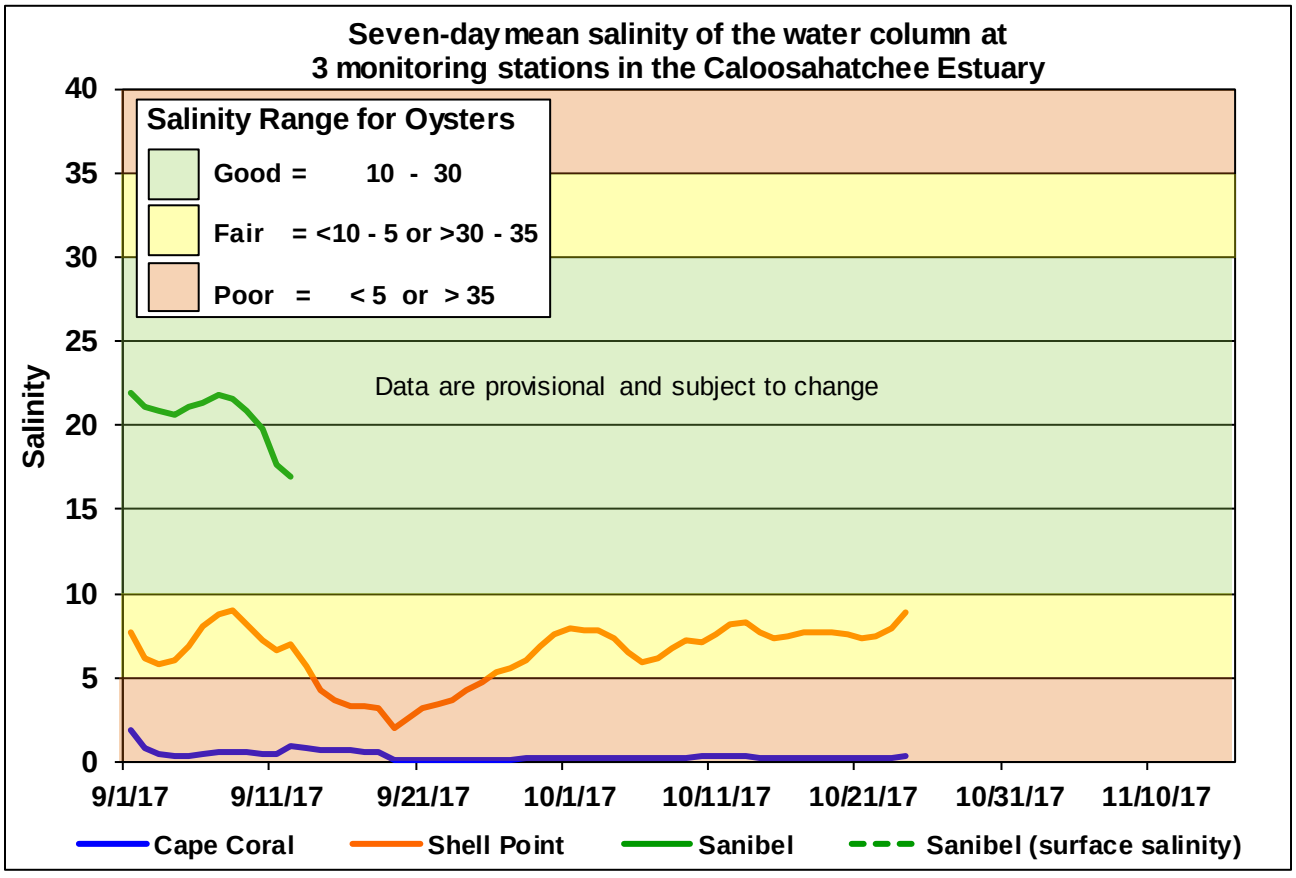
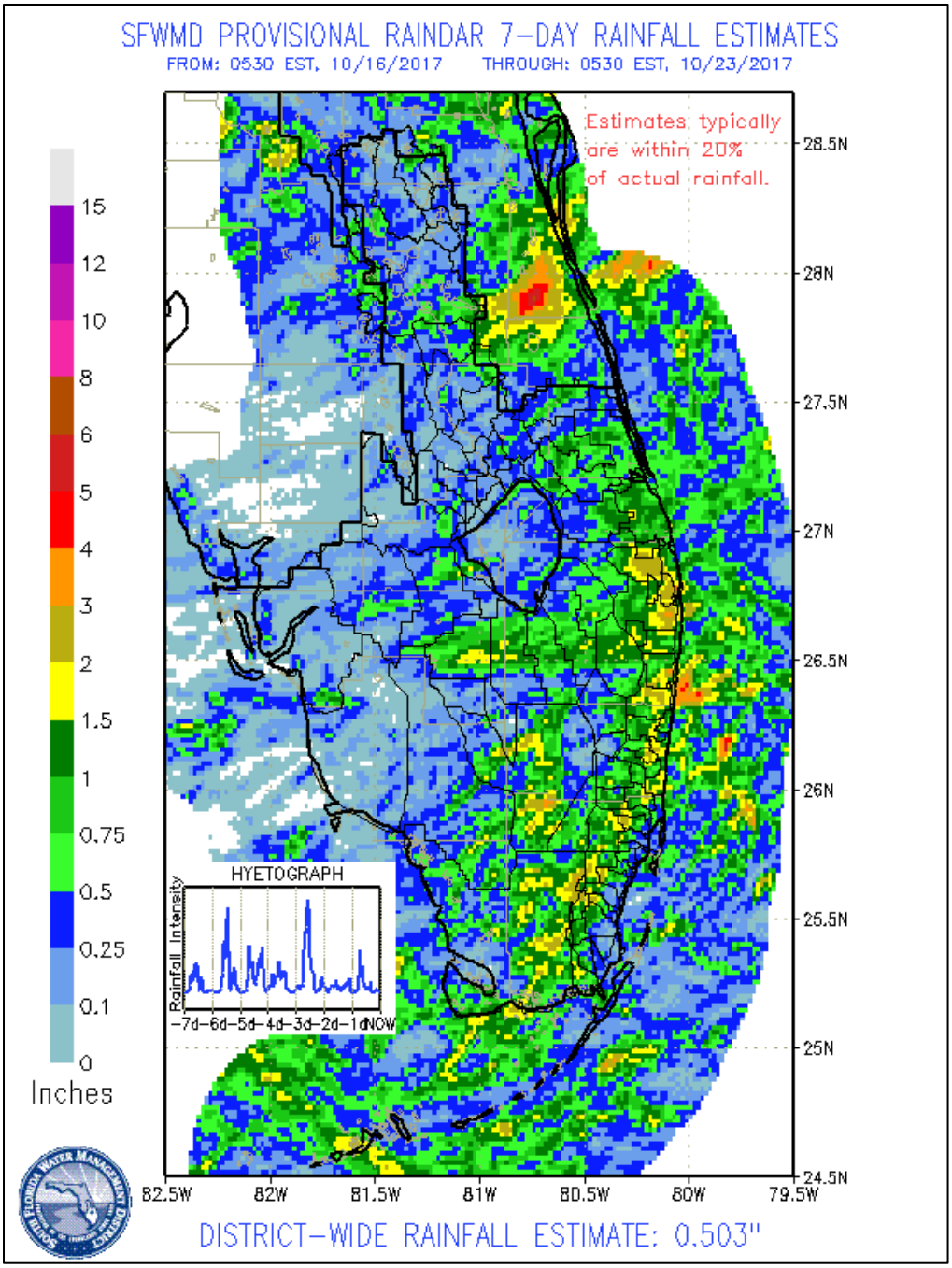


Figure 10. Seven-day mean salinity at Cape Coral Bridge, Shell Point and Sanibel Bridge monitoring stations.

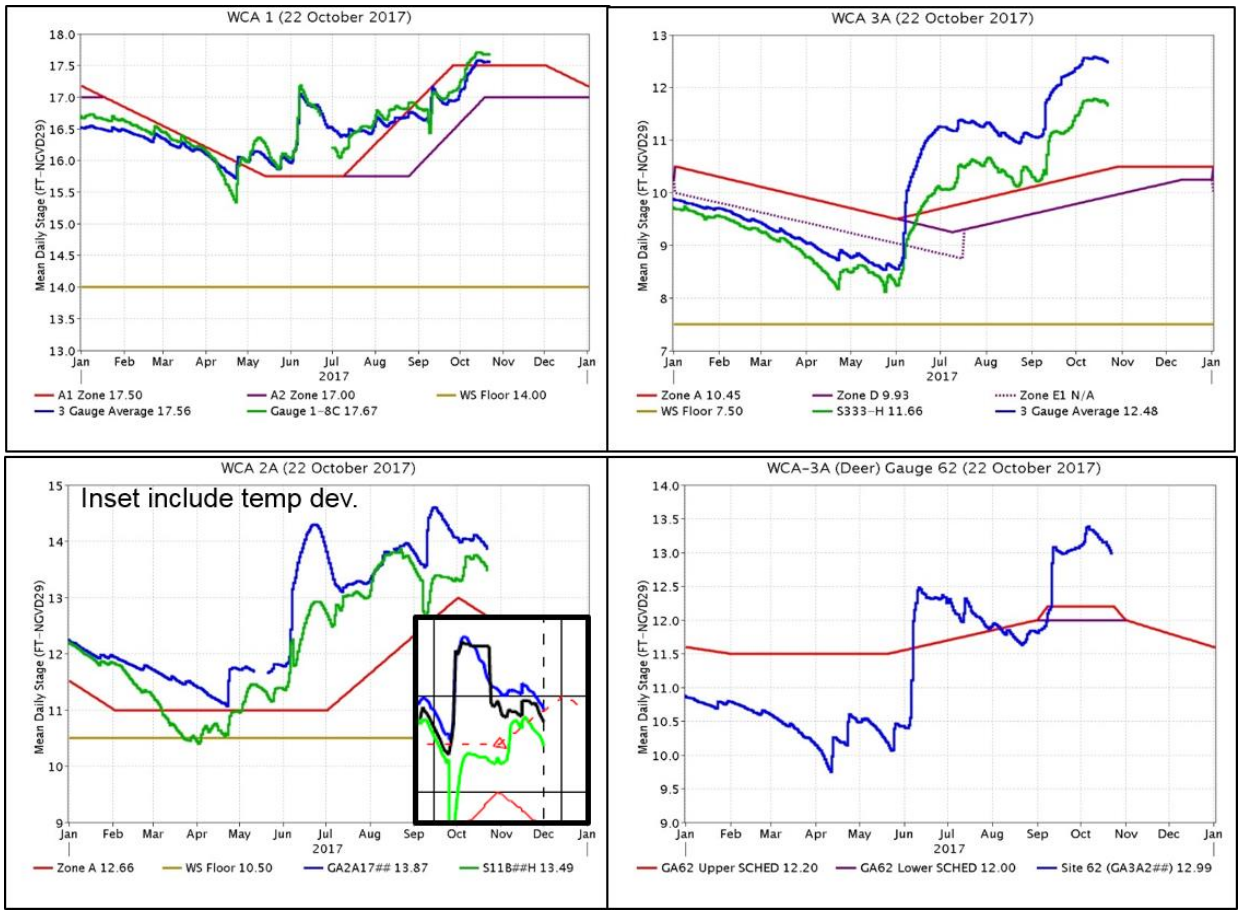
EVERGLADES

Average to below average rainfall occurred across the Everglades last week. Water depths fell or remained stable at all gauge locations monitored for this report. WCA-1 is at regulation schedule and tracking the line. WCA-2A and 3A are well above the zone A schedule but trending towards the line.

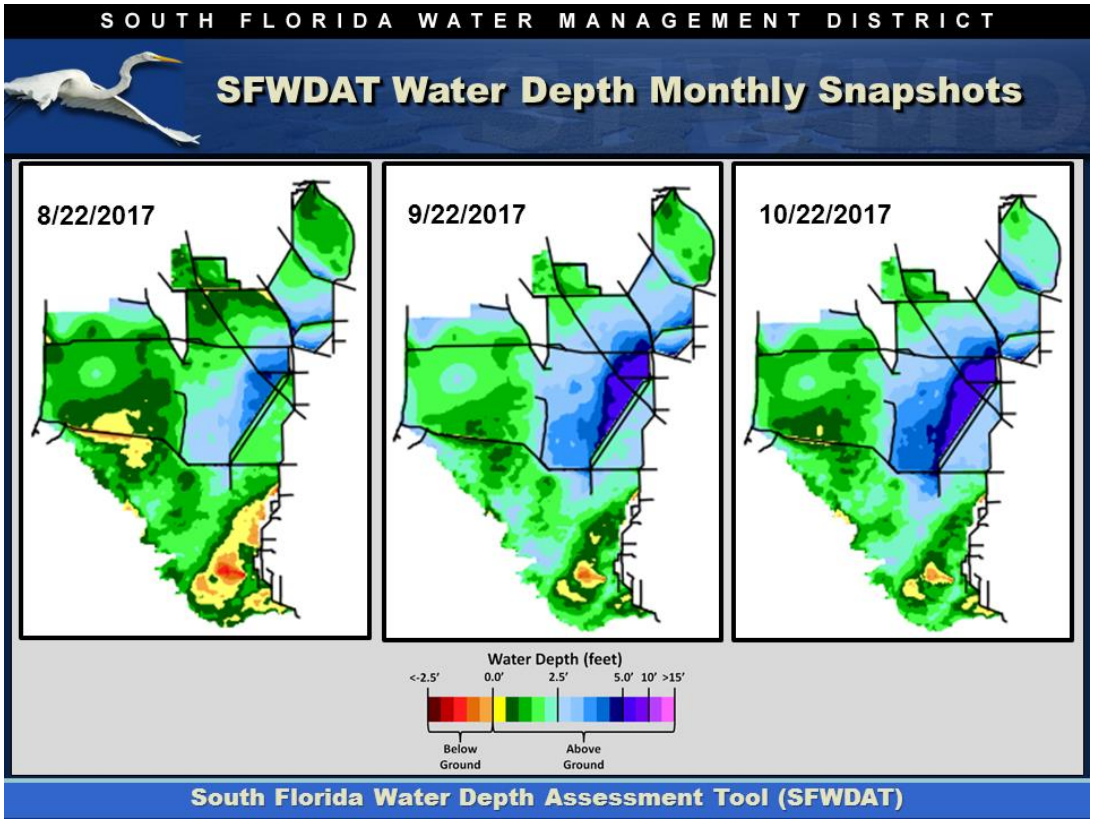
Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	0.92	−0.02
WCA-2A	0.53	−0.23
WCA-2B	0.36	−0.11
WCA-3A	0.80	−0.12
WCA-3B	0.71	−0.05
ENP	0.76	NA

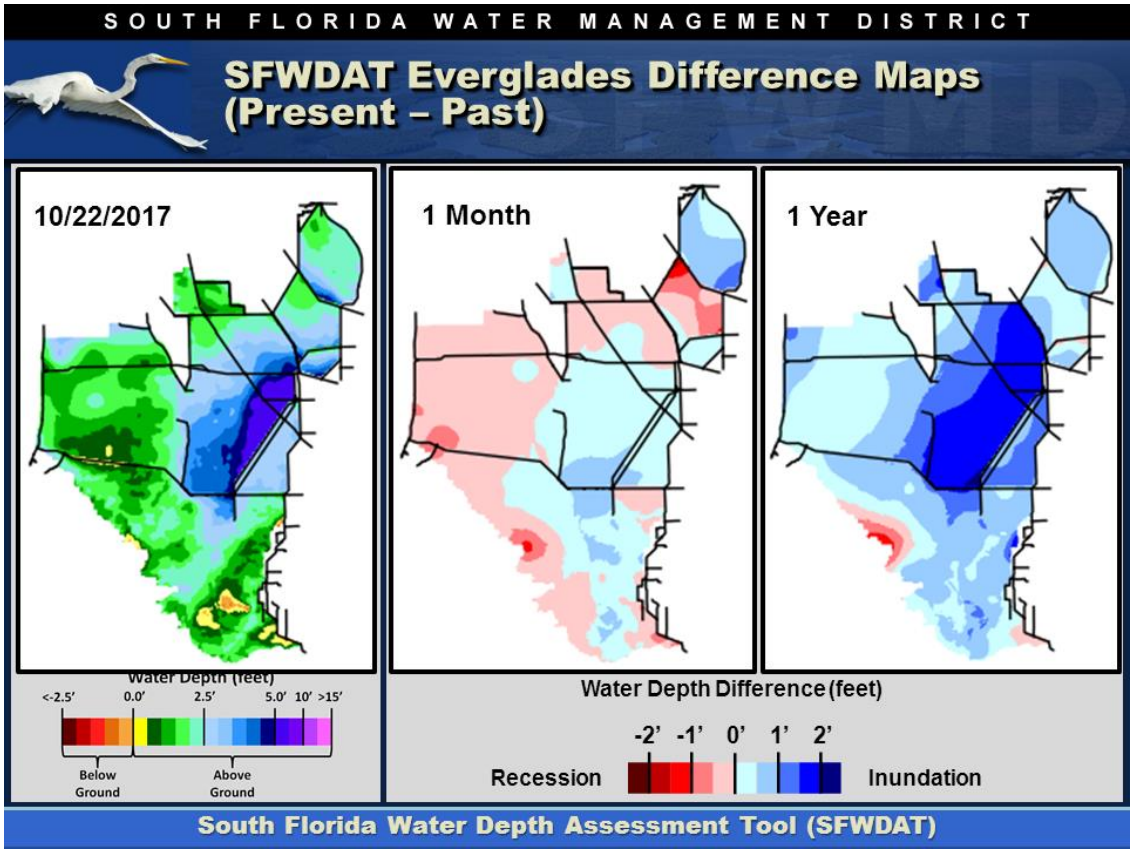


Regulation Schedules: WCA-1 three-gauge average is 0.06 feet above Zone A1, and stage difference between the marsh and the canal is 0.11 feet. WCA-2A marsh stage at gauge GA2A17 is currently 1.21 feet above zone A and at or just below the temporary deviation. Marsh stage is 0.38 feet above canal stage at S11B. WCA-3A three-gauge average stage is 2.03 feet above zone A, and 0.82 higher than canal stage. WCA-3A at gauge 62 (Northwest corner) is 0.79 feet above the upper schedule.



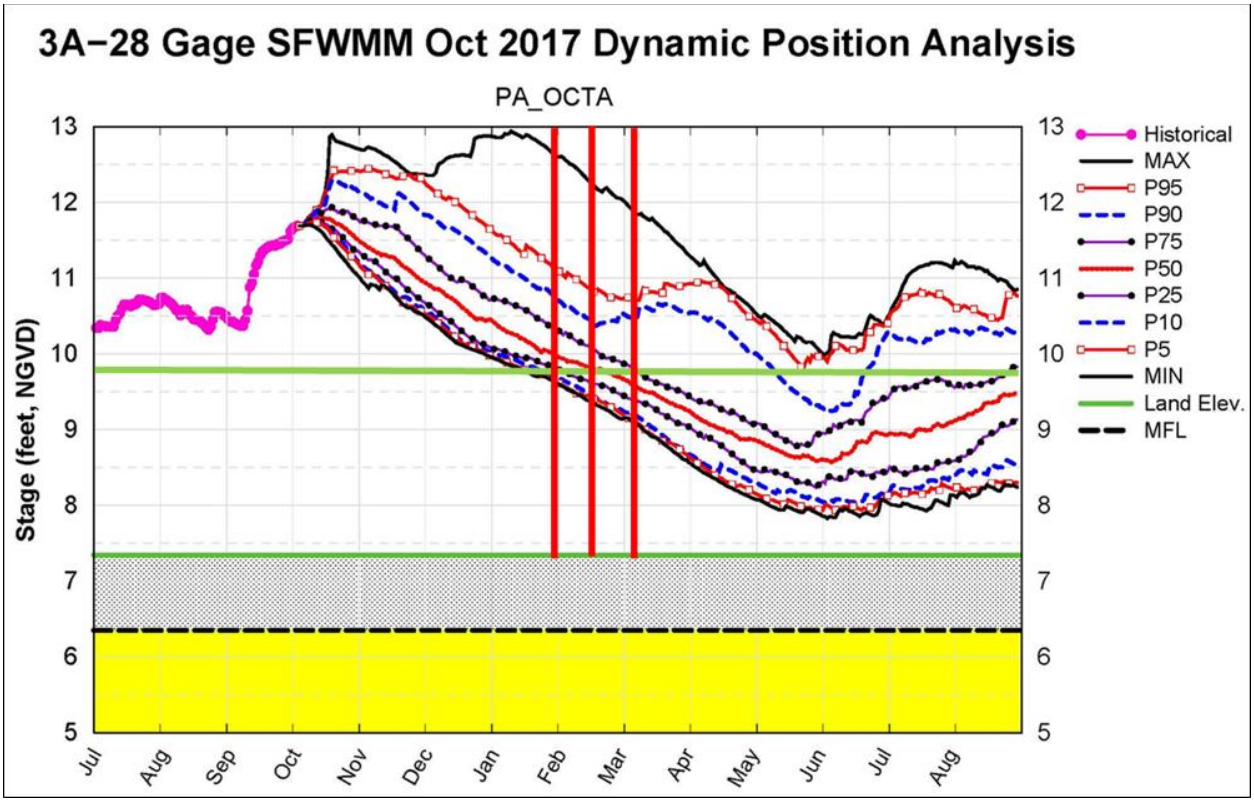
Water Depths and Changes: The WDAT tool for spatial interpolation of depth indicates a range from a low of 1.5 feet to 2.0 feet in Northern WCA-1 to a high of 5.0+ along the L-67A canal in WCA-3A South. Over the last week individual gauge changes ranged from +0.01 feet (WCA-1) to −0.23 feet (WCA-2A). Comparing WDAT water levels from present, water depths fell across WCA-3A and 2A last week. WCA-2A is significantly drier than it was a month ago. Pan evaporation fell slightly this week, estimated at 1.31 inches, above the pre-project 1.12 inches.





Potential for continued flooding of tree islands in WCA-3A:
At gauge location 65: The figure below illustrates how the October Dynamic Position Analysis generated for 3A-28 or gauge 65 can be used to predict when depths might drop below 2.5 feet and duration of the current high-water event. If stage recession follows the 50th percentile, depths would fall below the

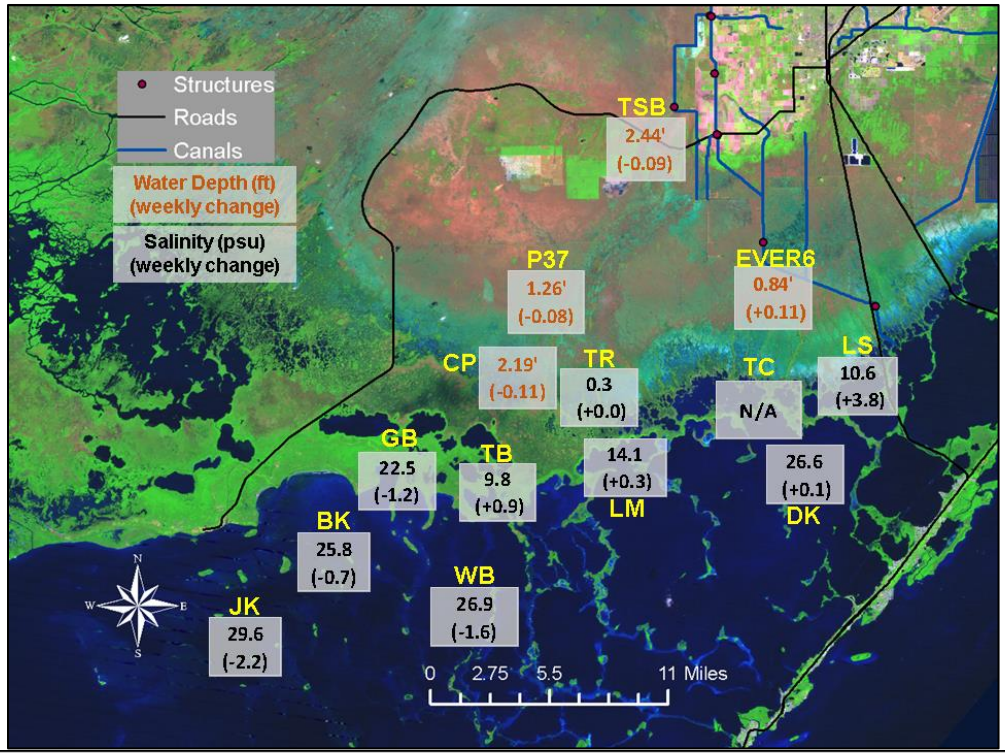
threshold around February 14, 2018, meaning a duration of 242 days. Based on the period of record data, the average day that depths recede below 2.5 feet at that location is March 14, which would mean the duration of the current high-water event would be 270 days. Maximum duration of these high-water events in the period of record is 274 days.

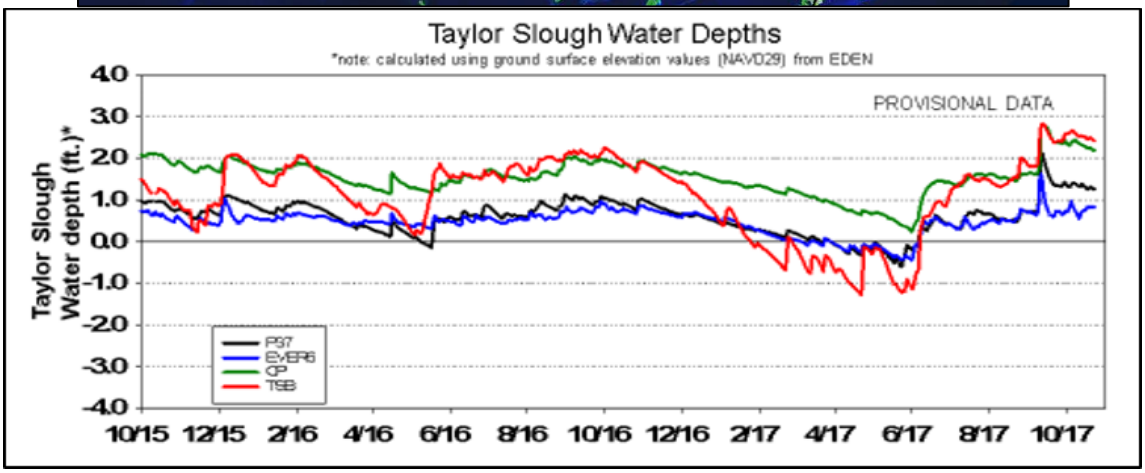


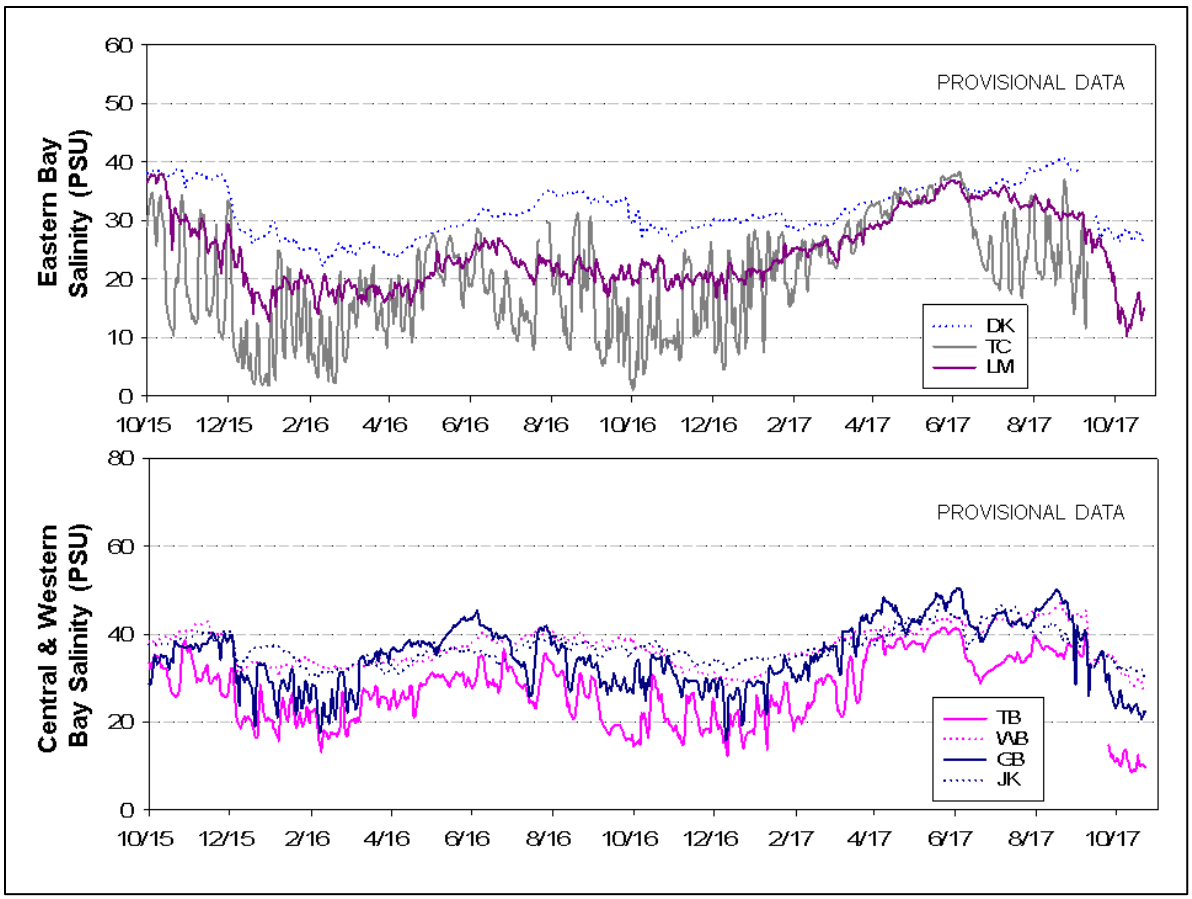
At gauge location 64: Analyzing the period of record data, depths at gauge 64 have only exceeded 2.5 feet for more than 120 days three times in 1994, 1995 and 2005. The maximum duration was in 1994 and 1995 at 185 days. At this gauge location depth typically falls below 2.5 feet in mid-December meaning the potential for around 170 days of high water.

Taylor Slough stages: Water levels in Taylor Slough continue to decrease with the largest change of −0.11 feet in southwest Taylor Slough. The Everglades panhandle area is increasing with a weekly change of +0.11 feet. Water levels are 3 to 10 inches above the historic average for this time of year with the highest divergence occurring in northern Taylor Slough.

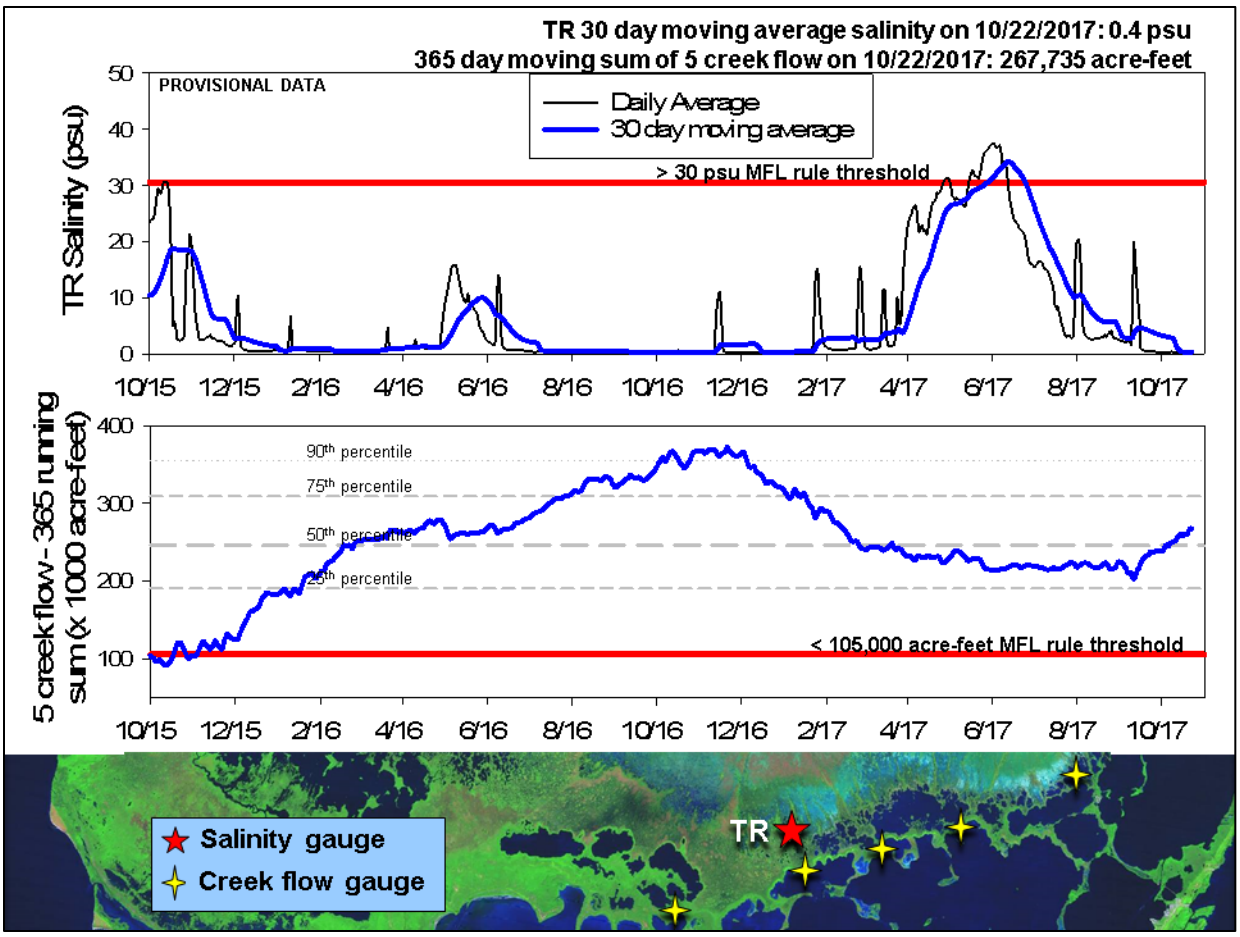
Salinity changes for the last week ranged from −2 to +4 psu with the largest increase occurring in the US Highway 1 corridor. Currently, salinities range from 10 in the US Highway 1 corridor to 30 in the western Bay and are 1 to 6 psu below the historic averages for this time of year.


Structures
Roads
Canals
Water Depth (ft) (weekly change)
Salinity (psu) (weekly change)
TSB
2.44'
(-0.09)
P37
1.26'
(-0.08)
EVER6
0.84'
(+0.11)
CP
2.19'
(-0.11)
TR
0.3
(+0.0)
TC
N/A
LS
10.6
(+3.8)
GB
22.5
(-1.2)
TB
9.8
(+0.9)
14.1
(+0.3)
LM
26.6
(+0.1)
DK
BK
25.8
(-0.7)
WB
26.9
(-1.6)
JK
29.6
(-2.2)
N
W
E
S
0 2.75 5.5 11 Miles


Taylor Slough Water Depths
*note: calculated using ground surface elevation values (NAVD29) from EDEN
PROVISIONAL DATA
Taylor Slough Water depth (ft.)*
4.0
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
-4.0
P37
EVER6
CP
TSB
10/15 12/15 2/16 4/16 6/16 8/16 10/16 12/16 2/17 4/17 6/17 8/17 10/17



Florida Bay MFL: Mangrove zone daily average salinity remains near fresh at 0.3 psu. The 30-day moving average decreased 0.1 psu to reach 0.4 psu. The weekly cumulative flow from the five creeks denoted by the yellow stars on the map was 3,996 acre-feet. This is one third of the historic average for this time of year. The 365-day moving sum of flow from the five creeks identified by stars on the map is now 267,735 acre-feet (greater than the long-term average of 257,628 acre-feet). Creek flow is provisional data from the USGS and is highly variable.



Water Management Recommendations

Deep water conditions persist in WCA-3A and across most the Everglades. All practicable and novel management options should be explored in order to relieve high water conditions particularly in WCA-3A South. Based on the limited analysis outlined above, current conditions are suggesting a potential for near record breaking high water conditions in that sensitive ecological area. One measure of stress to the ecology of Everglades' tree islands is continuous water depths above 2.5 feet at gauge 65 in Southern WCA-3A beyond 90 days. The water depth at that location on Sunday was 4.71 feet and as of today had exceeded that mark for 129 days.

More specific recommendations appear in the summary table below. The red text represents new or modified information or recommendations.

Everglades Ecological Recommendations, October 24th, 2017 (red is new)

Area	Current Condition	Cause(s)	Recommendation	Reasons
WCA-1	Stages decreased −0.03'	Rainfall, ET, management	Maintain depths at high water targets (17.5 ft) at regulation schedule or slightly above.	Protect habitat and facilitate invasive plant treatments.
WCA-2A	Stages decreased −0.23'	Rainfall, ET, management	Moderate ascension rates as possible. Maintain depths at temporary regulation schedule or slightly above.	Protect habitat and wildlife from high water stress.
WCA-2B	Stages decreased -0.11'	Rainfall, ET, management	Moderate ascension rates as possible.	Protect habitat and wildlife from high water stress.
WCA-3A NE	Stages decreased -0.15'	Rainfall, ET, management	Moderate ascension rates as possible. Manage for relief of high water conditions.	Protect habitat and wildlife from high water stress.
WCA-3A NW	Stages decreased -0.19'	Rainfall, ET, management		
Central WCA-3A S	Stages decreased -0.07'	Rainfall, ET, management	Moderate ascension rates as possible. Manage for relief of high water conditions.	Water depths above 2.5 feet at gauge 65 are indicative that tree islands are flooded and under stress. Depths exceeded that mark on 18 June, meaning the tree islands have been flooded for 129 days.
Southern WCA-3A S	Stages decreased -0.05'	Rainfall, ET, management		
WCA-3B	Stages decreased -0.05'	Rainfall, ET, management	Moderate ascension rates as possible..	Protect habitat, wildlife and support apple snail reproduction.
ENP-SRS	N/A	ET, rainfall, topography, management	Make discharges to the Park according to the 2012 WCP rainfall plan.	Keep peat wet to promote native habitat and maintain wetland plant and animal communities. Protect habitat and wildlife, including apple snail reproduction.
Taylor Slough	Stage changes ranged from −0.11' to +0.11'	Rain, ET, inflows	Move water southward as possible	When available provide freshwater buffer for ecosystems and slow recession rates.
FB- Salinity	Salinity changes ranged -2.2 to +3.8 psu	Rain, ET, inflows, wind	Move water southward as possible	When available, provide freshwater to produce low salinity wet season conditions.