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: September 5, 2017

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

Daytime heating should generate scattered afternoon thunderstorms focused west and north today. An upper level trough is forecast to move into the southeastern US bringing a cold front into Florida's panhandle Wednesday and north-central Florida on Thursday. This system should help increase thunderstorm activity over interior and east on Wednesday and then west and north on Thursday. Hurricane Irma is forecast to move between/near the Bahamas and eastern Cuba Friday. Breezy winds ahead of this system will help generate scattered showers and thunderstorms mainly north and west on Friday. In the extended forecast, heavy rains and strong winds associated with Irma would be expected to move over portions of the District Saturday and Sunday.

Kissimmee

Tuesday morning stages and departures from schedule were 56.5 feet (0.1 feet below schedule) in East Lake Toho, 53.5 feet (0.1 feet below schedule) in Toho, and 52.2 feet (1.1 feet above schedule) in KCH; S65A headwater stage was 46.4 feet. Tuesday morning discharges were: 1,148 cfs at S65, 1,463 cfs at S65A, and 2,346 cfs at S65E. Dissolved oxygen concentration in the Kissimmee River averaged 2.3 milligrams per liter (mg/L) for the week. Kissimmee River mean floodplain depth on Sunday was 1.30 feet. Recommendations: No new recommendations.

Lake Okeechobee

Lake stage is 13.67 feet NGVD, having increased by 0.16 feet over the past week and 0.58 feet over the past month. NOAA's cyanobacteria monitoring product that uses OLCI satellite sensor data suggests conditions are less favorable for algal blooms throughout the lake compared to earlier in the month, though the western shoreline along the Indian Prairie marsh still shows some low potential. Snail kites continue to nest late on the Lake in the same area of Moonshine Bay as last year, where managers have been actively removing dense vegetation since 2015. A total of 26 new nests were located last week, bringing the total to over 40 active nests in Moonshine Bay. Maintaining a moderate

ascension rate in Lake Okeechobee will remain ecologically beneficial at this time and would be protective of the Lake's emergent and submerged aquatic flora and its associated fauna.

Estuaries

Total discharge to the St. Lucie estuary averaged 726 cfs over the past week with none coming from Lake Okeechobee. Salinities at the three monitoring stations were higher compared to the week before. The seven-day average salinity at the US1 Bridge is in the good range for adult oysters. Low oxygen levels (<3 mg/L) were recorded near S-80. Total inflow to Caloosahatchee estuary averaged 4,654 cfs over the past week with no flow coming from the Lake. The 30-day moving average surface salinity is 0.3 at Val I-75 and 0.3 at Ft. Myers. Salinity at Val I-75 is forecast to be 0.3 in two weeks with no flow through S-79. Salinity conditions between Val I-75 and Ft. Myers are good for tape grass. Salinity conditions are in the good range for adult oysters at Sanibel, in the fair range at Shell Point, and in the poor range at the Cape Coral. Low oxygen levels (<3 mg/L) were recorded at Ft. Myers. 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 L-8 FEB received 1,800 acre-feet of Lake releases, but the STAs did not receive Lake releases. The total amount of Lake releases sent to the STAs/FEBs in WY2018 (since May 1, 2017) is approximately 21,400 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. Due to basin runoff, it is recommended that no Lake Releases be sent to the STAs/FEBs this week.

Everglades

Stages decreased at all the gauges monitored for this report except gauge 62 in the northwest corner of WCA-3A (+0.05'), and depth modeling indicates most areas of the Everglades decreased in stage over the last 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 3.24 feet, and has exceeded 2.5' for 78 days.

Salinities in Florida Bay continue to decrease across the bay with the exception of the central bay. Salinities currently range from 22 psu in the US Highway-1 area to 44 psu in the central bay. Current salinities are 1 to 11 psu above average with the western nearshore still furthest from average.

Supporting Information

KISSIMMEE BASIN

Kissimmee Basin Rainfall

The Upper Kissimmee Basin received 2.05 inches of rainfall in the past week and the Lower Basin received 1.32 inches (SFWMD Daily Rainfall Report 9/1/2017).

Upper Kissimmee Basin

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

Table 1. Departures from KCOL flood regulation (F) or temporary schedules (T, A, or S) (feet NGVD). Discharge and stage data are provisional real-time data from SFWMD OASyS DualTrend; reported values are averages through midnight of the Sunday prior to the report date unless otherwise specified.

Report Date: 9/5/2017

Water Body	Structure/Site	Discharge (cfs), week's average**	Stage Monitoring Site***	Lake Stage (feet)	Schedule*	Regulation (R) or Target (S or T) Stage (feet)	Daily Departure (feet)						
							9/3/17	8/27/17	8/20/17	8/13/17	8/6/17	7/30/17	7/23/17
Lakes Hart and Mary Jane	S62	144	LKMJ	60.0	R	60.0	**0.0**	0.1	0.1	0.0	0.0	0.1	-0.1
Lakes Myrtle, Preston, and Joel	S57	31	S57	60.9	R	61.0	**-0.1**	0.1	0.0	0.0	0.0	0.0	0.0
Alligator Chain	S60	117	ALLI	63.2	R	63.2	**0.0**	0.0	0.0	0.0	0.0	-0.1	0.0
Lake Gentry	S63	189	LKGT	61.0	R	61.0	**0.0**	-0.1	0.0	0.0	0.0	0.0	-0.1
East Lake Toho	S59	390	TOHOE	56.5	R	56.5	**0.0**	0.1	0.0	0.0	0.0	-0.1	0.1
Lake Toho	S61	1018	TOHOW, S61	53.5	R	53.5	**0.0**	0.0	0.0	0.0	0.1	-0.1	0.1
Lakes Kissimmee, Cypress, and Hatchineha	S65	1209	KUB011, LKIS5B	52.2	R	51.0	**1.2**	1.0	0.9	0.8	0.7	0.2	-0.3

* 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.

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

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

DATA ARE PROVISIONAL

Lower Kissimmee Basin

Discharges and stages 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. Mean weekly discharge at S-65x structures, and mean weekly Phase I area river channel dissolved oxygen and floodplain mean water depth. Discharge and stage data are provisional real-time data from SFWMD OASyS DualTrend; reported values are averages through midnight of the Sunday prior to the report date unless otherwise specified.

Report Date: **9/5/2017**

Metric	Location	Sunday's 1-day average	Weekly Average**									
			9/3/17	8/27/17	8/20/17	8/13/17	8/6/17	7/30/17	7/23/17	7/16/17	7/9/17	7/2/17
Discharge (cfs)	S-65	1203	**1209**	1152	958	1181	665	616	342	160	392	407
Discharge (cfs)	S-65A	1479	**1465**	1448	1213	1298	1274	927	638	575	393	564
Discharge (cfs)	S-65D****	2268	**2262**	2032	2255	2154	2234	1180	1236	838	875	1715
Discharge (cfs)	S-65E****	2276	**2279**	2085	2276	2195	2319	1293	1321	886	915	1698
DO concentration (mg/L)***	Phase I river channel	2.1	**2.3**	2.0	2.8	2.0	2.2	2.3	1.8	3.0	2.9	0.7
Mean depth (feet)*	Phase I floodplain	1.30	**1.30**	1.18	1.08	1.10	1.00	0.63	0.68	0.46	0.37	1.00

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

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

*** DO is the average for manual sondes at PC62 and PC33; telemetry sondes have been taken offline.

**** S-65D discharge combines discharge at S-65D, S-65DX1, and S-65DX2; S65E discharge combines S65E and S65EX1.

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
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
6/13/2017	No new recommendations.			
6/6/2017	No new recommendations.			
5/30/2017	No new recommendations.			
5/22/2017	No new recommendations.			
5/15/2017	Reduce discharge at S65/S65A by 40-50 cfs	Reduce rate of stage decline in KCH while maintaining discharge to the Kissimmee River.	Implemented	KB Ops
5/9/2017	No new recommendations.			
5/3/2017	Reduce discharge at S65/S65A by 50 cfs	Reduce rate of stage decline in KCH		SFWMD Water Management/KB Ops

KCOL Hydrographs (through Sunday midnight)

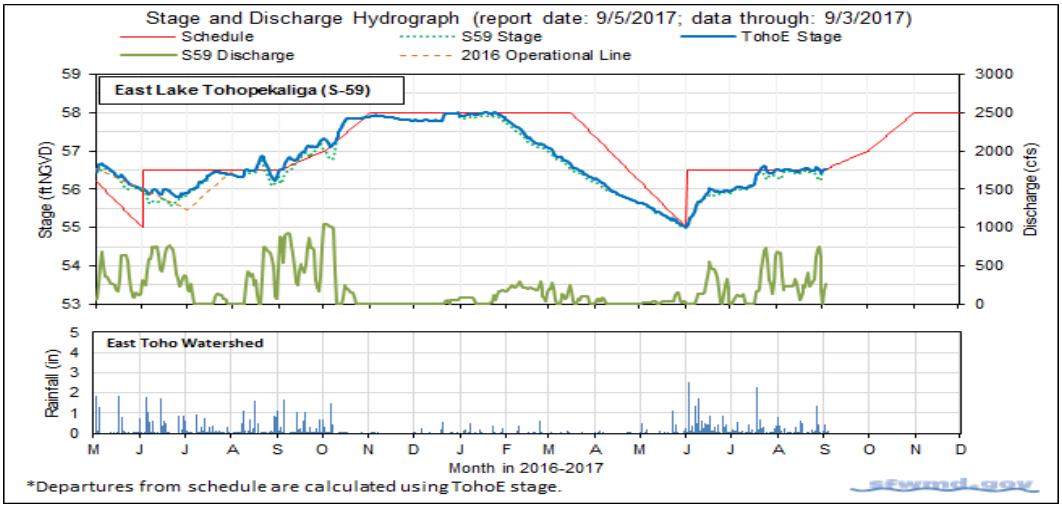


Figure 1.

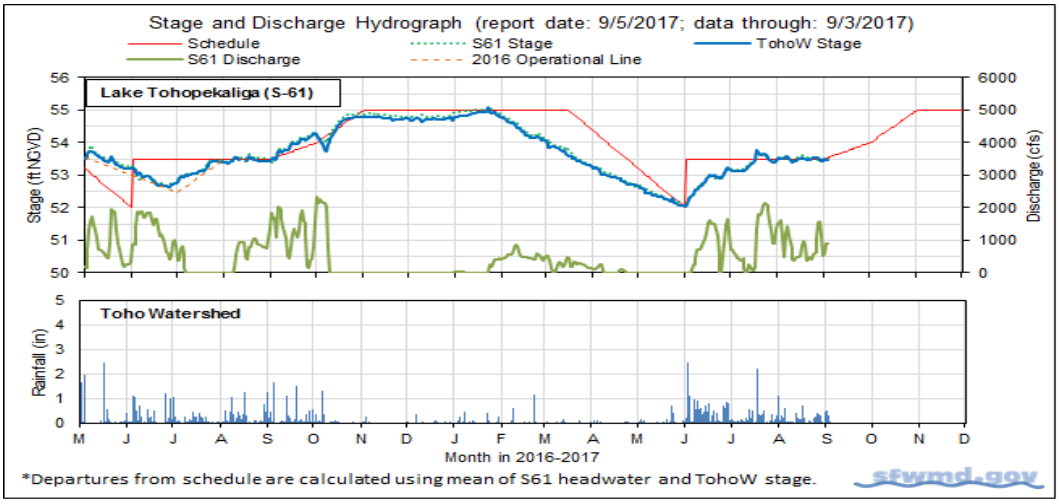


Figure 2.

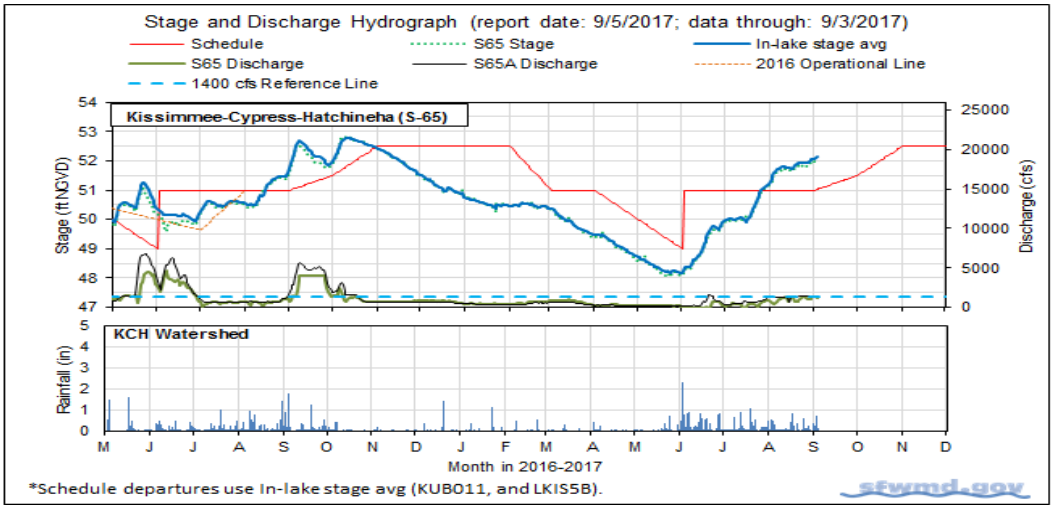


Figure 3.

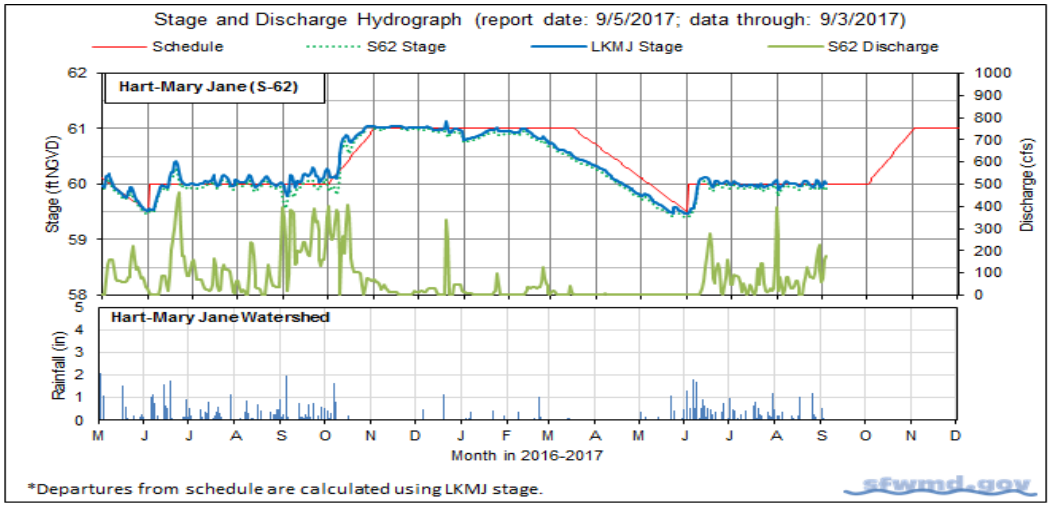


Figure 4.

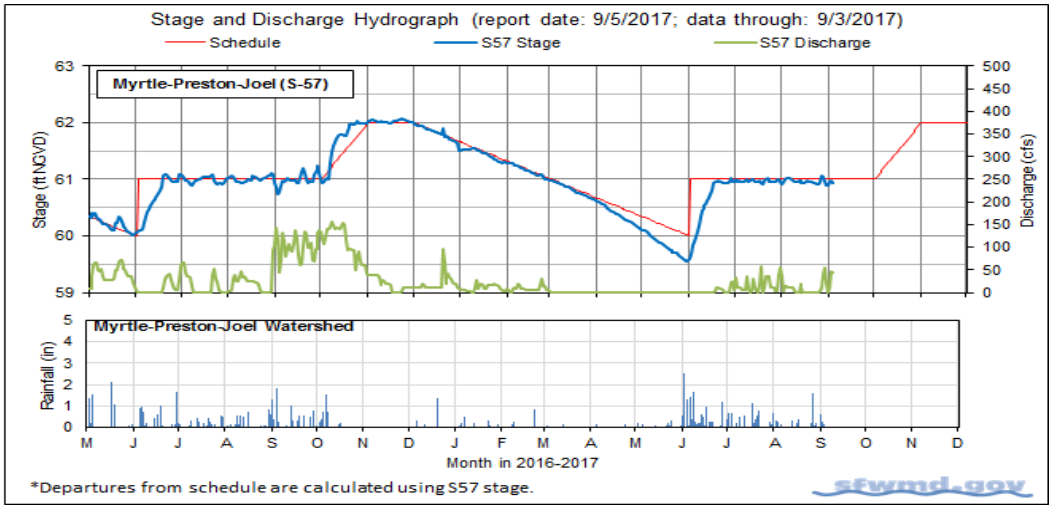


Figure 5.

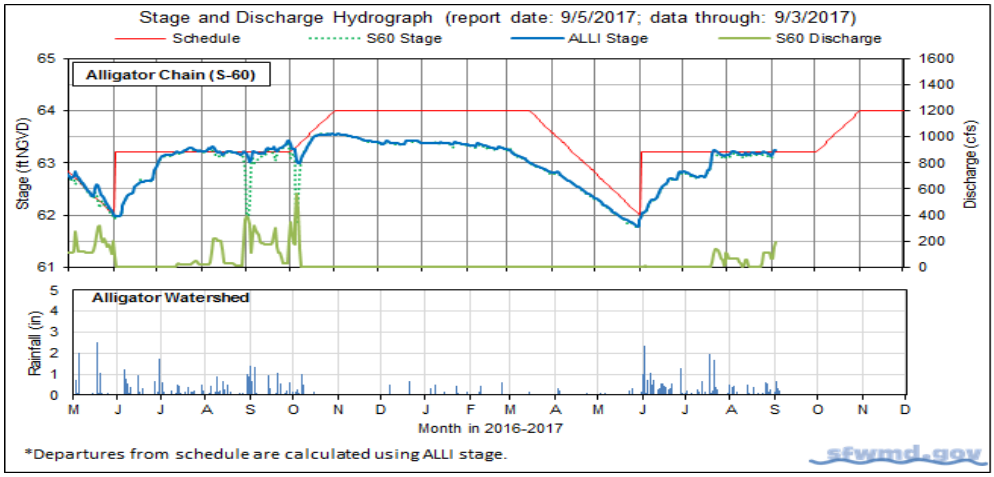


Figure 6.

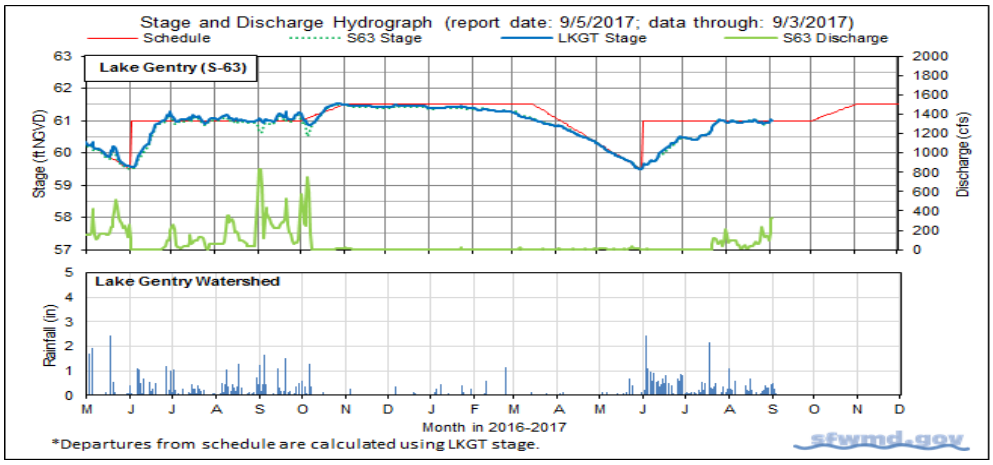


Figure 7.

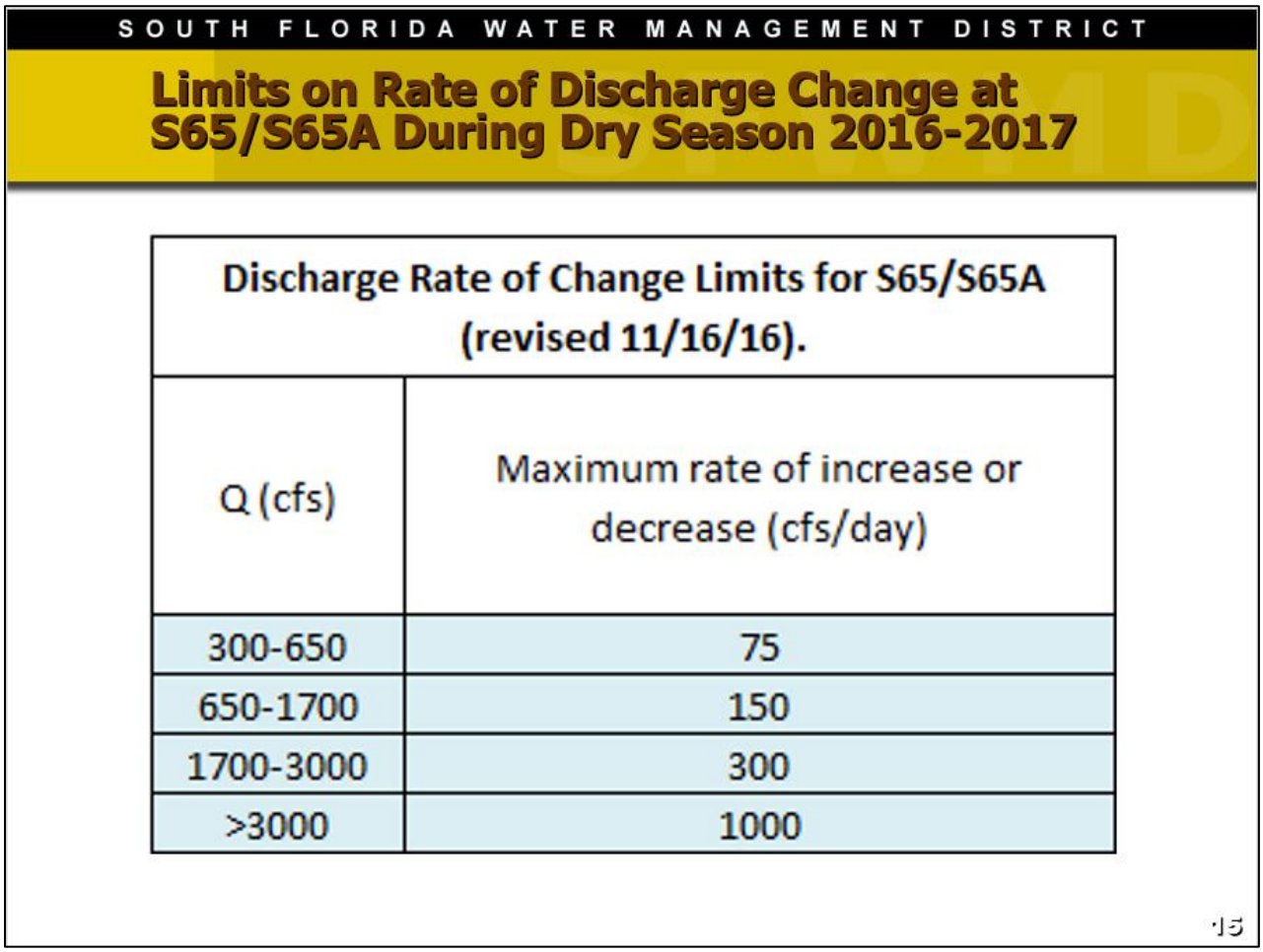


Figure 8. Limits on rate of discharge change at S65/S65A for the 2016-2017 Dry Season.

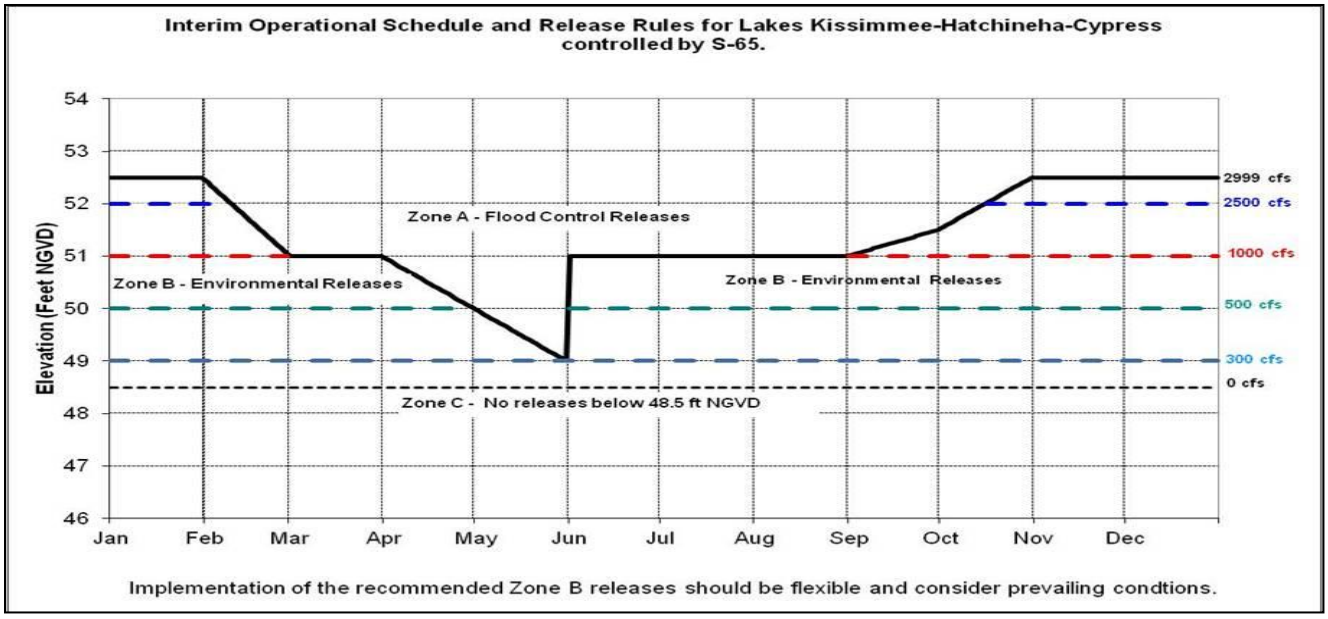


Figure 9. Interim operations schedule for S-65. The discharge schedule shown to the right has not been used in recent years or in Wet Season 2015.

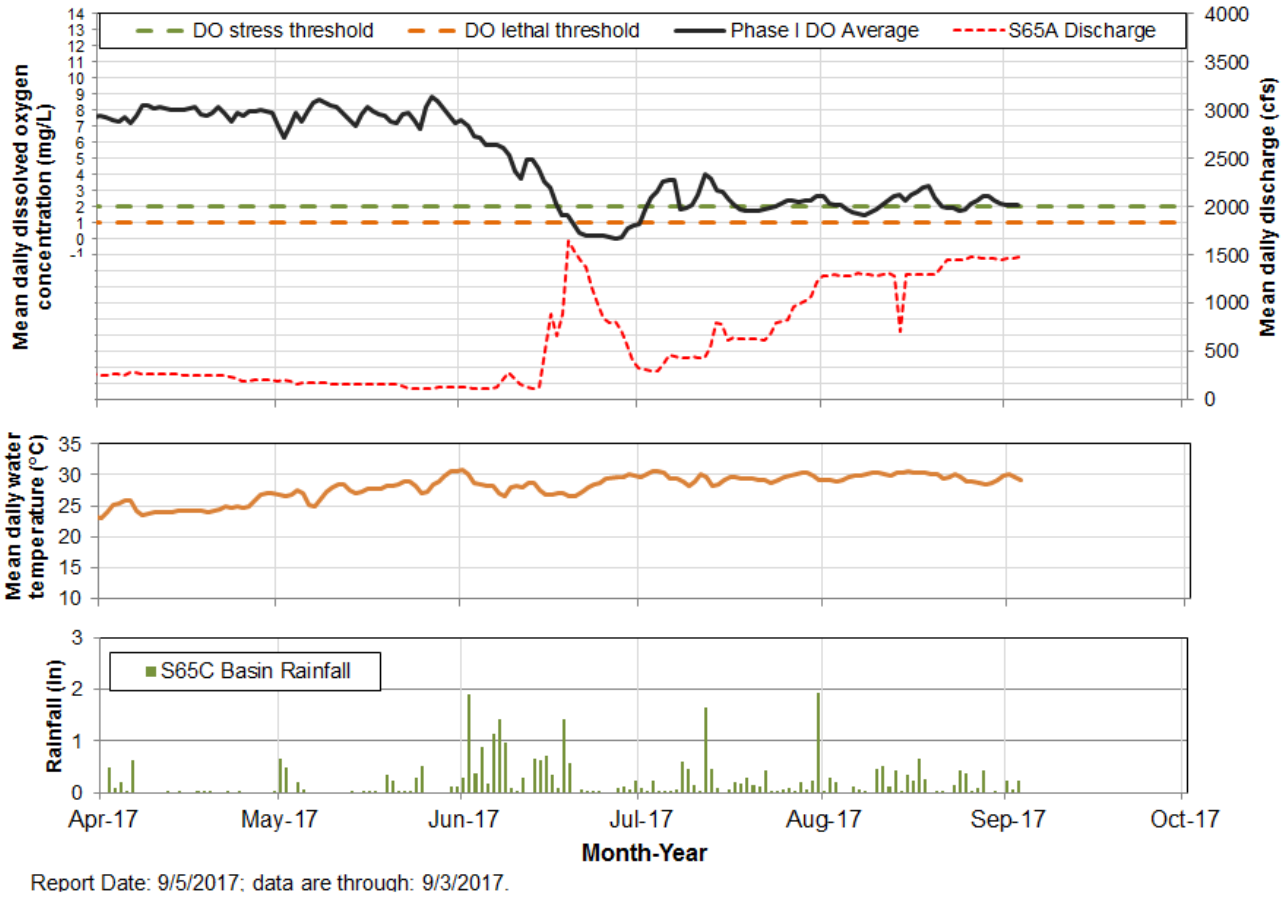


Figure 10. Mean daily Dissolved Oxygen, discharge, temperature and rainfall in the Phase I river channel.

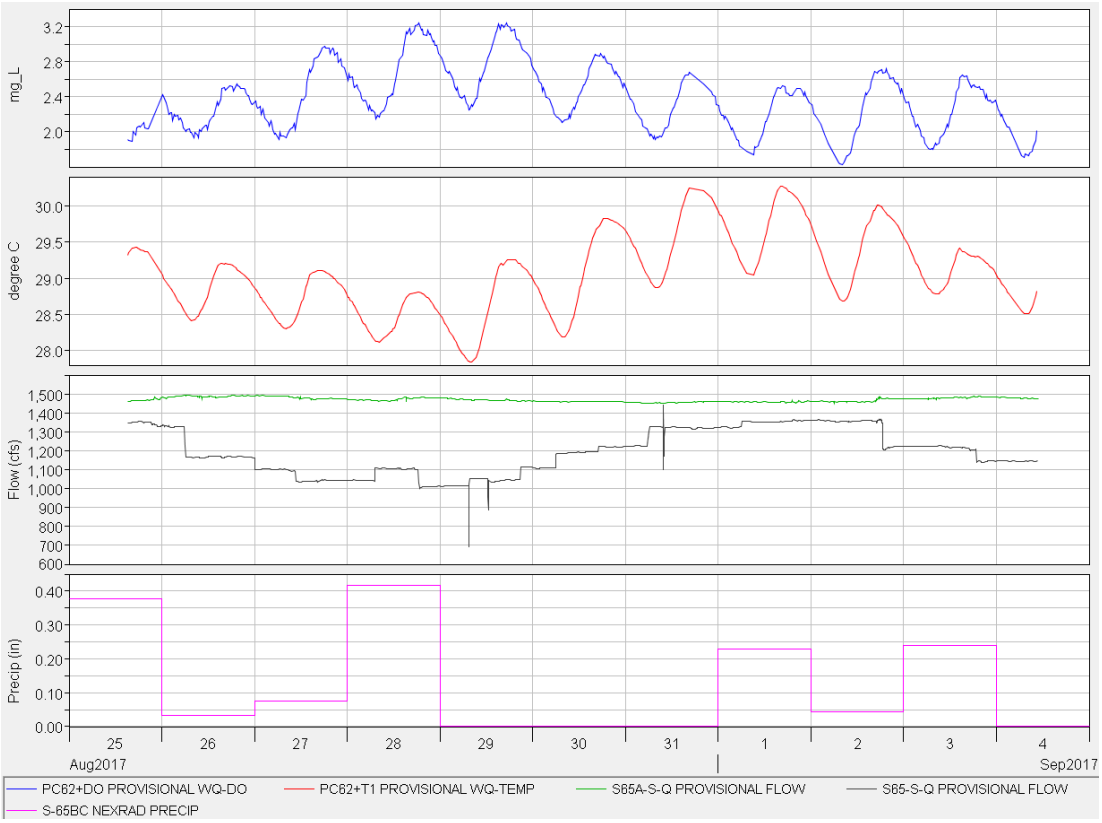


Figure 11. Phase I river channel dissolved oxygen and water temperature (measured at 15 minute intervals) and Pool BC daily rainfall.

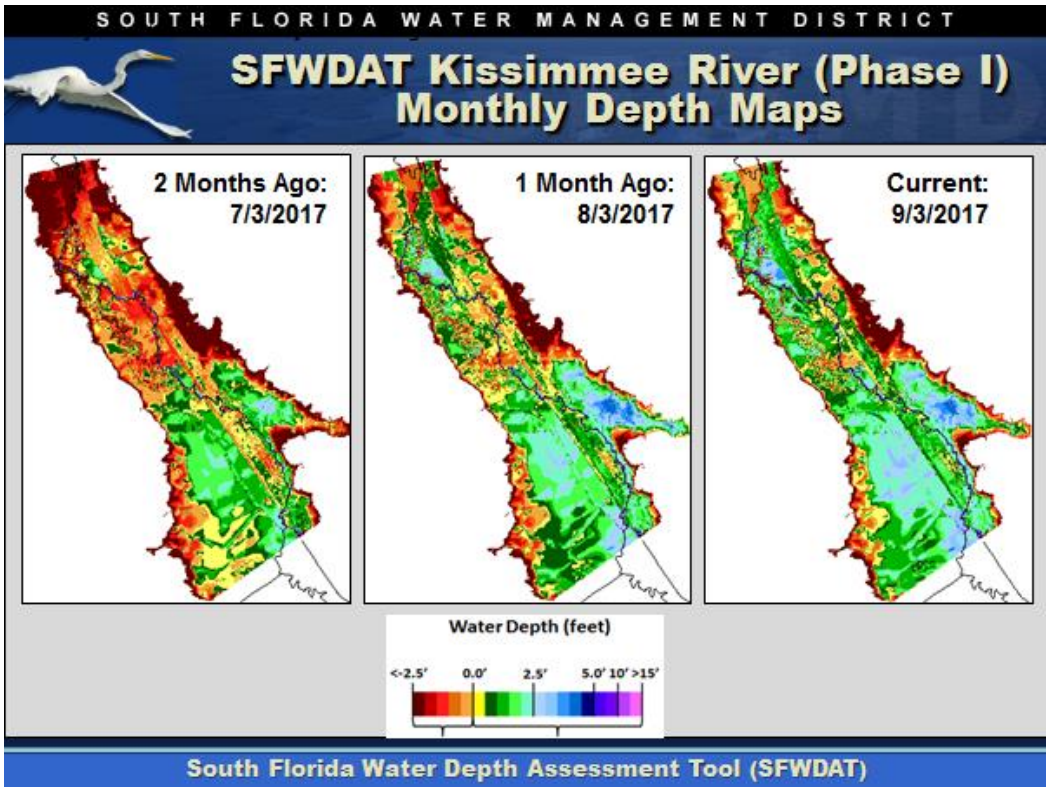
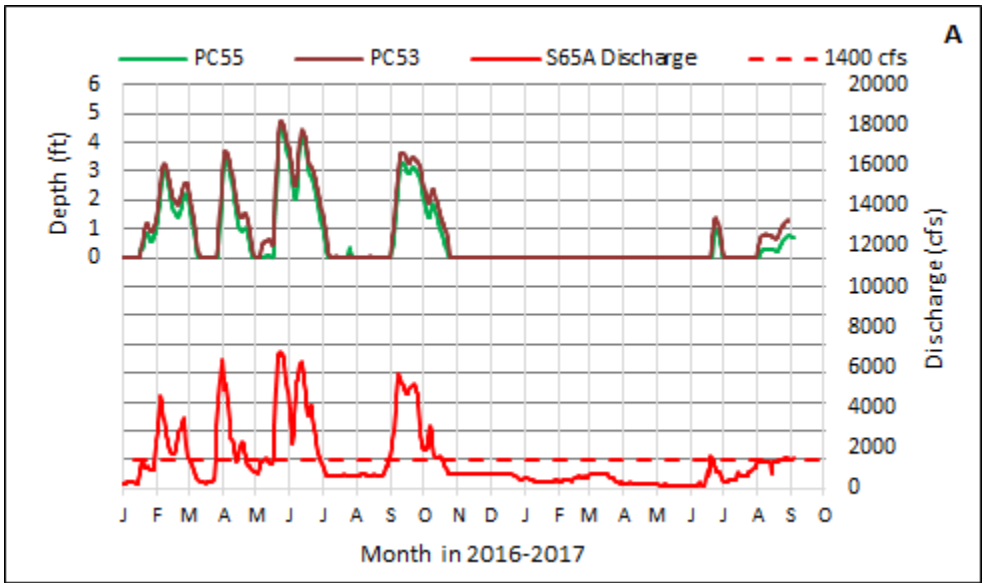
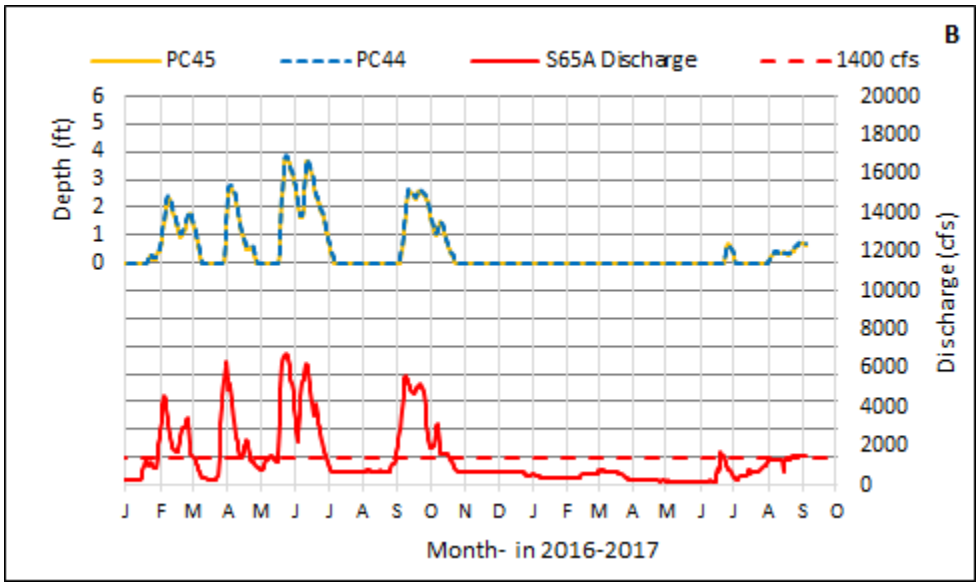


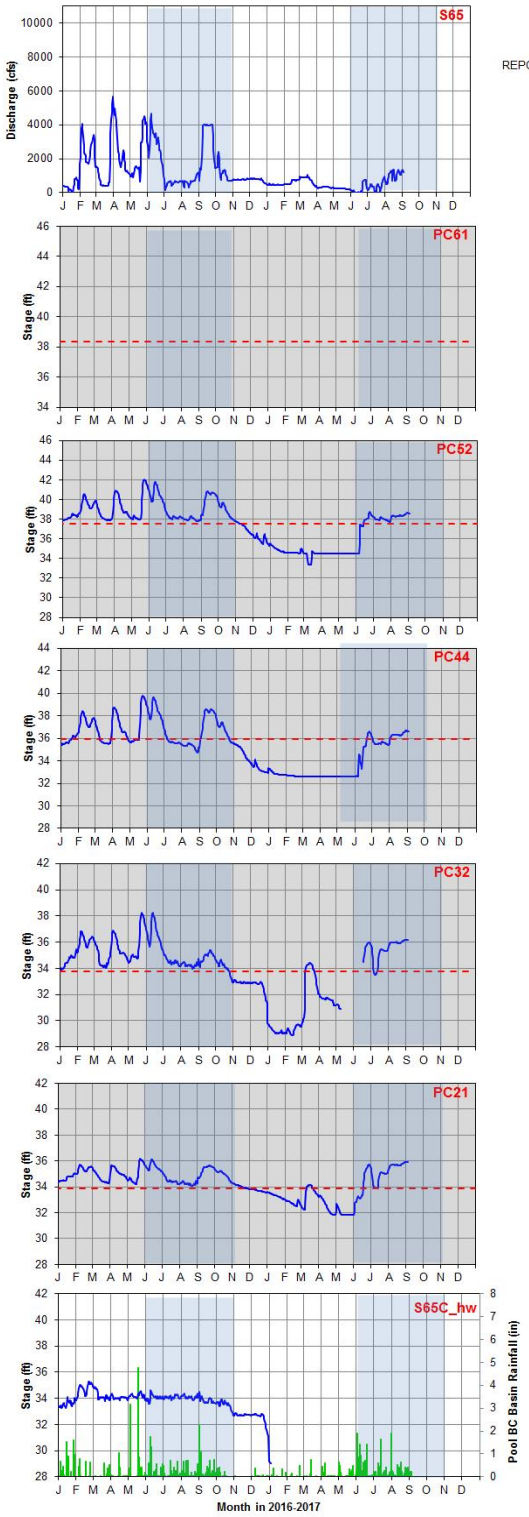
Figure 12. Phase I area floodplain water depths for this week, one month ago, and two months ago. Note that the WDAT color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to Jan. 16, 2012.





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



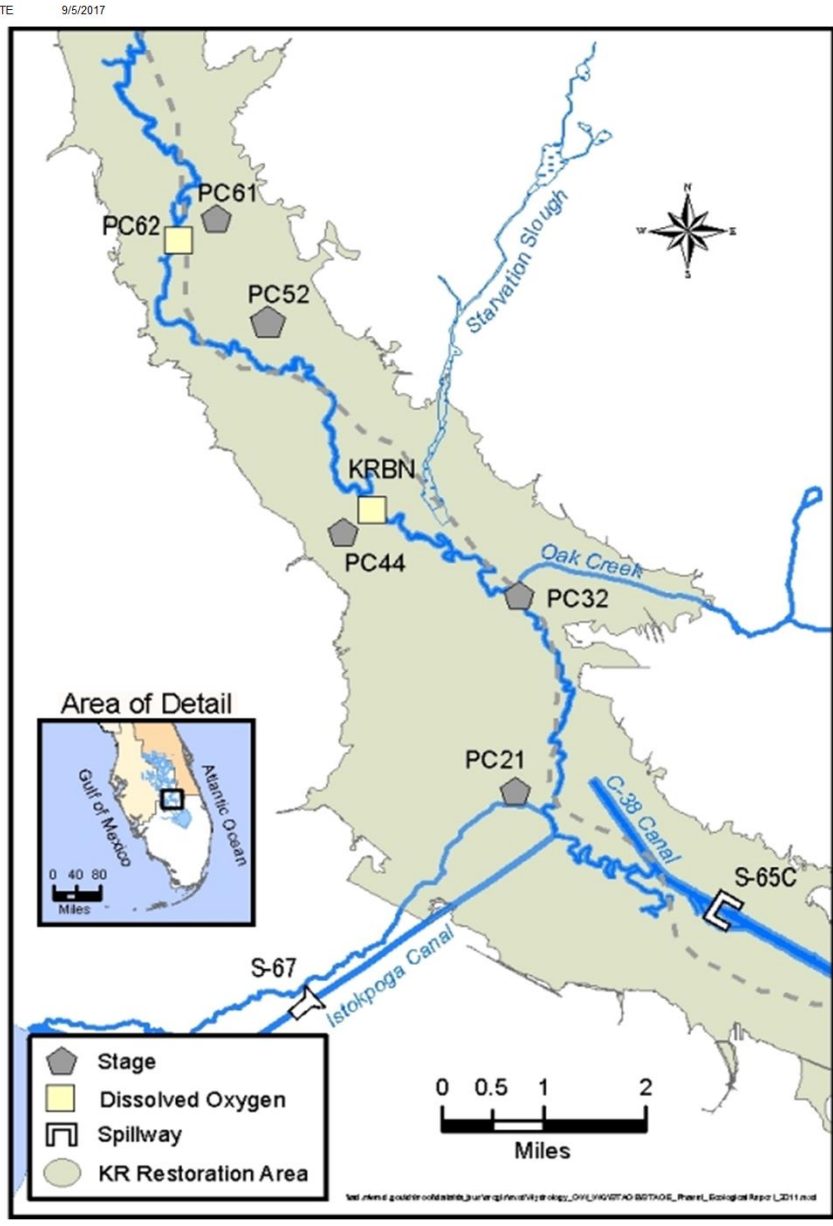


Figure 13. Discharge at S65, stages at five monitoring stations in the Phase I area of the Kissimmee River floodplain, and headwater stage at S65-C since January 1, 2015.

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.

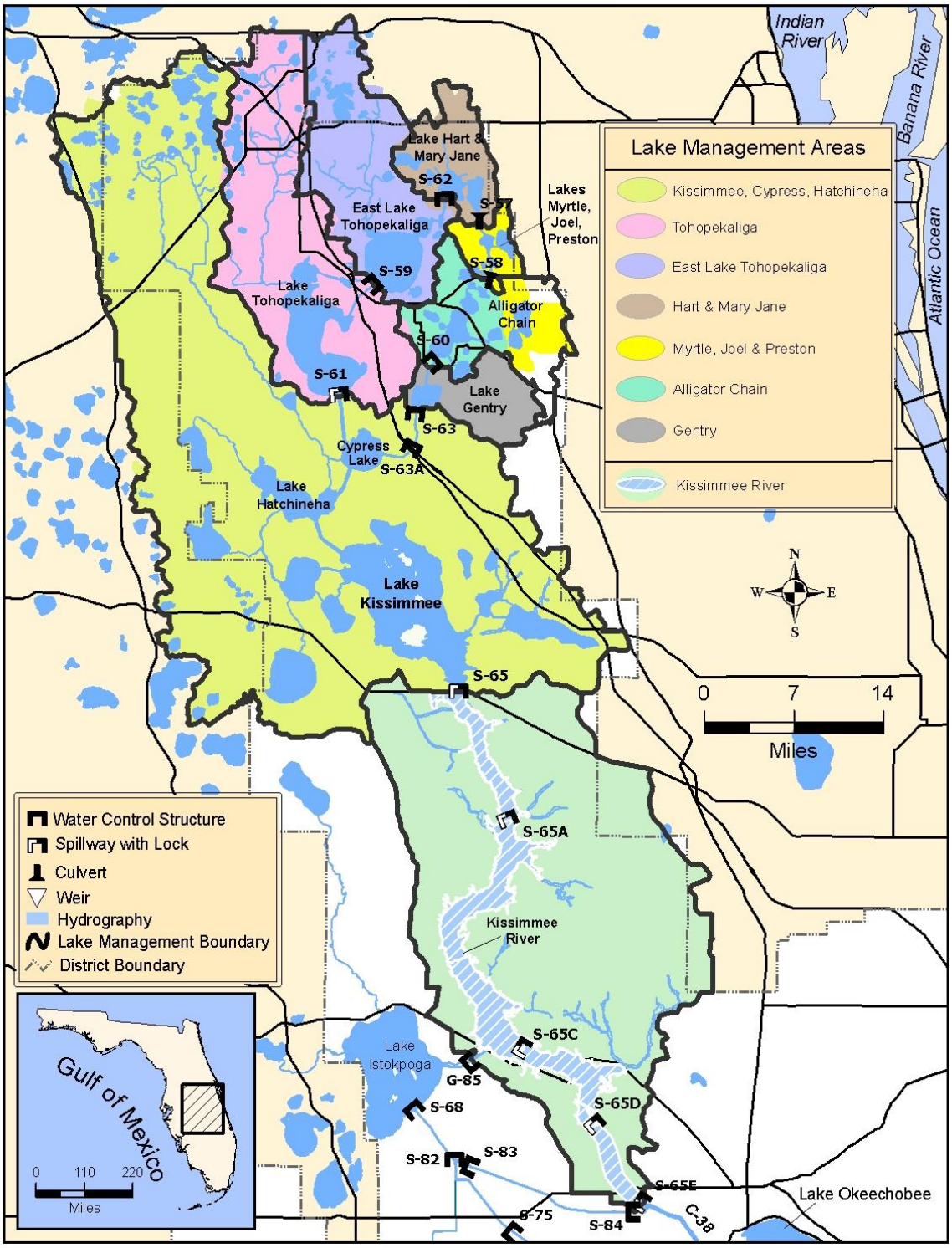


Figure 14. The Kissimmee Basin.

LAKE OKEECHOBEE

According to the United States Army Corp of Engineers (USACOE) web site, Lake Okeechobee stage is at 13.67 feet NGVD for the period ending at midnight on September 4, 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 increased by 0.16 feet over the past week and is 0.58 feet higher than it was a month ago and 1.34 feet lower than it was a year ago (Figure 1). The Lake is currently in the Base Flow sub-band (Figure 2). According to RAINDAR, 1.10 inches of rain fell directly over the Lake during the week Aug 29 - Sep 04 (Figure 3). Most of the watershed had similar amounts of rainfall, but areas to the northeast, and northwest were a little wetter with 1.5-2.0 inches.

Average daily inflows and outflows for the last week are detailed below, as well as the approximate change in lake stage from each major structure's total weekly flows (midnight August 29, 2017 to midnight September 04, 2017).

INFLOWS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)
S65E & S65EX1	2298	1.0
S71 & 72	368	0.2
S84 & 84X	1366	0.6
Fisheating Creek	503	0.2
S154	43	0.0
S191	61	0.0
S133 P	0	0.0
S127 P	4	0.0
S129 P	9	0.0
S131 P	2	0.0
S135 P	55	0.0
S2 P	0	0.0
S3 P	0	0.0
S4 P	2	0.0
C5	0	0.0
Rainfall	3031	1.1
Total	**7741**	**3.1**

OUTFLOWS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)
S77	0	0.0
S308	-266	-0.1
S351	0	0.0
S352	185	0.1
S354	0	0.0
L8	23	0.0
ET	2453	1.0
Total	**2395**	**1.0**

Average daily outflows for the Lake have been negative since the beginning of June with the exception of one week in mid-August. The previous week averaged -48 daily cfs flowing back into the lake through outflow structures, which was due to -266 daily cfs through the S308. Outflow via the L8 canal through Culvert 10A averaged 23 cfs while S352 averaged 185 cfs. There were no discharges through S77 or S351 and S354 structures. The corrected evapotranspiration value based on the L006 weather platform

solar radiation data was 0.89 inches for the week. Figure 4 shows the combined average daily cfs for inflows and outflows for the Lake over the past eight weeks.

Late-August satellite imagery indicates that the bloom potential continues to decline over the past couple weeks, based on NOAA's cyanobacteria monitoring product derived from the OLCI satellite sensor. A portion of the west/northwest shoreline along the Indian Prairie Marsh has some potential for blooms but appears much reduced from the conditions seen in July and early-mid August (Figure 5).

Snail kite nesting activity continues in the Moonshine Bay area were cattail and prescribed treatments occurred in 2015/2016, with 45 nests still active (26 found in late August). This is currently the largest concentration of active nests in the state.

Water Management Recommendations

The Lake is 13.51 feet NGVD having increased 0.12 feet over the past week due to rainfall and inflows mainly from the Kissimmee River basin. The submerged and emergent vegetation communities recovering in the nearshore region after high water levels in February and October of 2016 are still vulnerable to rapid ascension rates that may limit new growth.

Activities that maintain a moderate ascension rate in Lake Okeechobee will remain ecologically beneficial at this time and would be protective of the Lake's emergent wetland and submerged aquatic flora and its associated fauna.

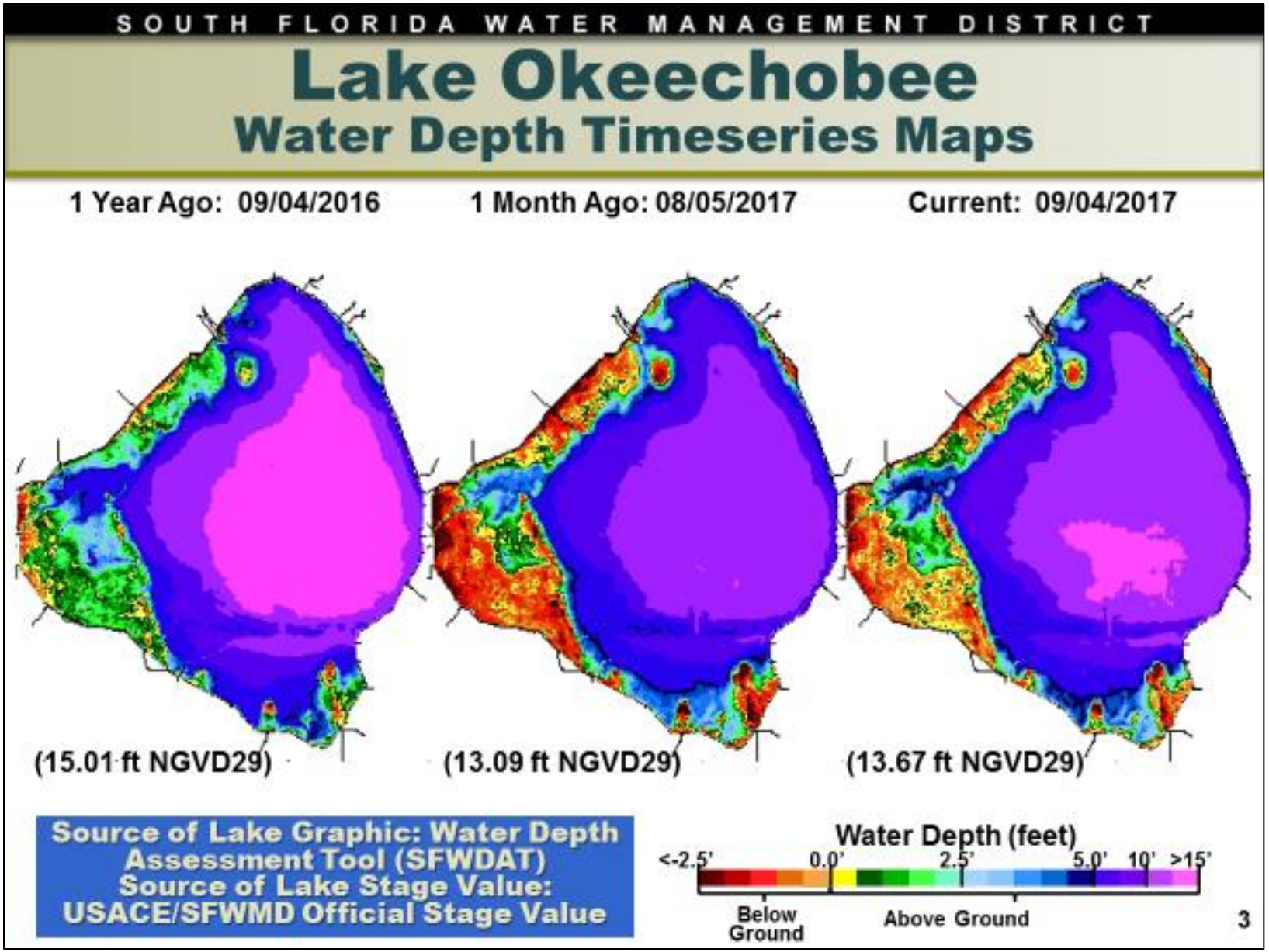

SOUTH FLORIDA WATER MANAGEMENT DISTRICT
Lake Okeechobee
Water Depth Timeseries Maps
1 Year Ago: 09/04/2016
1 Month Ago: 08/05/2017
Current: 09/04/2017
(15.01 ft NGVD29)
(13.09 ft NGVD29)
(13.67 ft NGVD29)
Source of Lake Graphic: Water Depth Assessment Tool (SFWDAT)
Source of Lake Stage Value: USACE/SFWMD Official Stage Value
Water Depth (feet)
<-2.5'
0.0'
2.5'
5.0'
10'
>15'
Below Ground
Above Ground
3

Figure 1

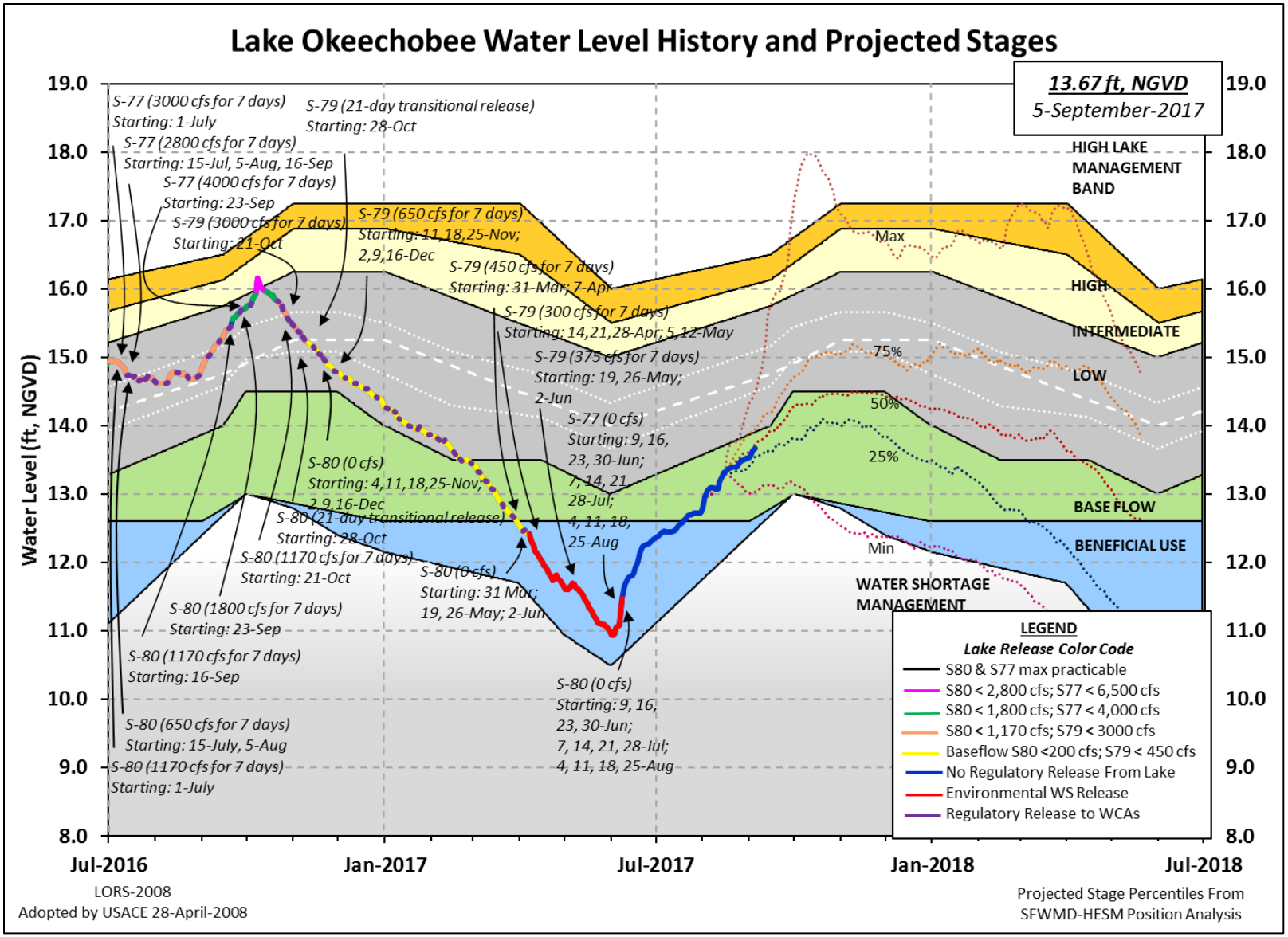

Lake Okeechobee Water Level History and Projected Stages
13.67 ft, NGVD
5-September-2017
Water Level (ft, NGVD)
19.0
18.0
17.0
16.0
15.0
14.0
13.0
12.0
11.0
10.0
9.0
8.0
Jul-2016
Jan-2017
Jul-2017
Jan-2018
Jul-2018
HIGH LAKE MANAGEMENT BAND
HIGH
INTERMEDIATE
LOW
BASE FLOW
BENEFICIAL USE
WATER SHORTAGE 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 (0 cfs) Starting: 9, 16, 23, 30-Jun; 7, 14, 21 28-Jul; 4, 11, 18, 25-Aug
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
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

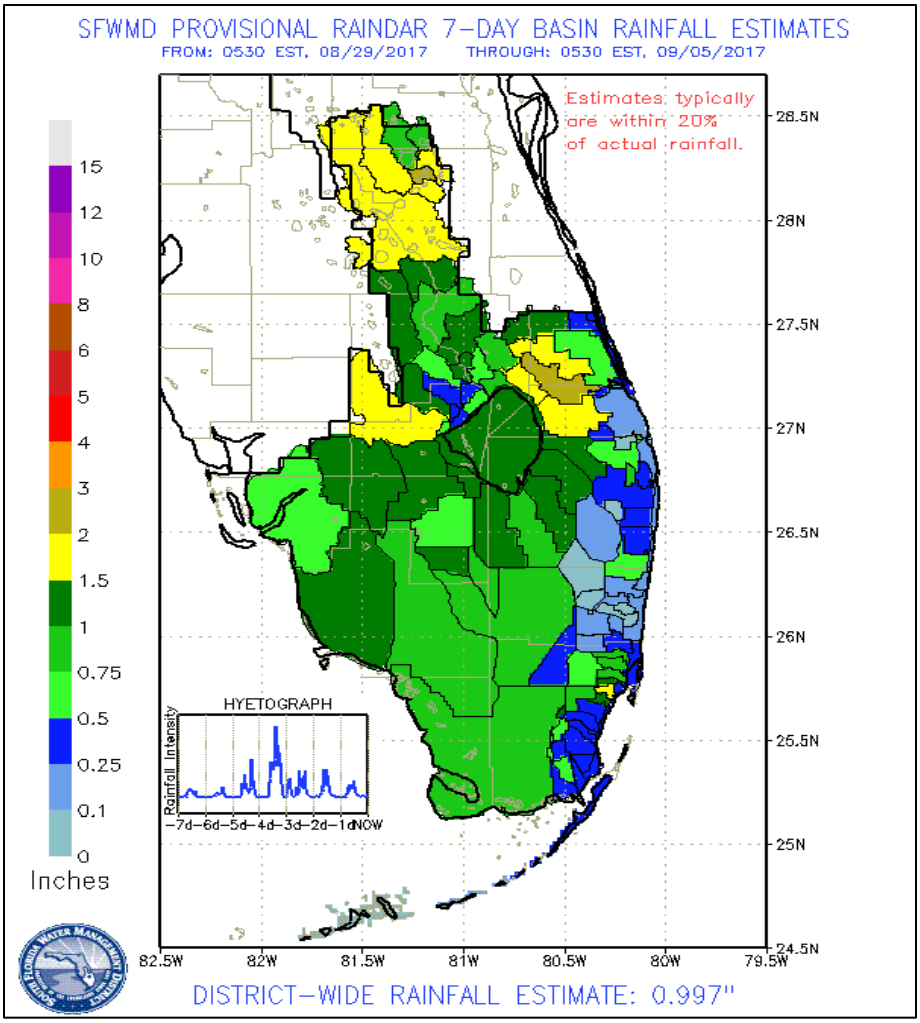


Figure 3

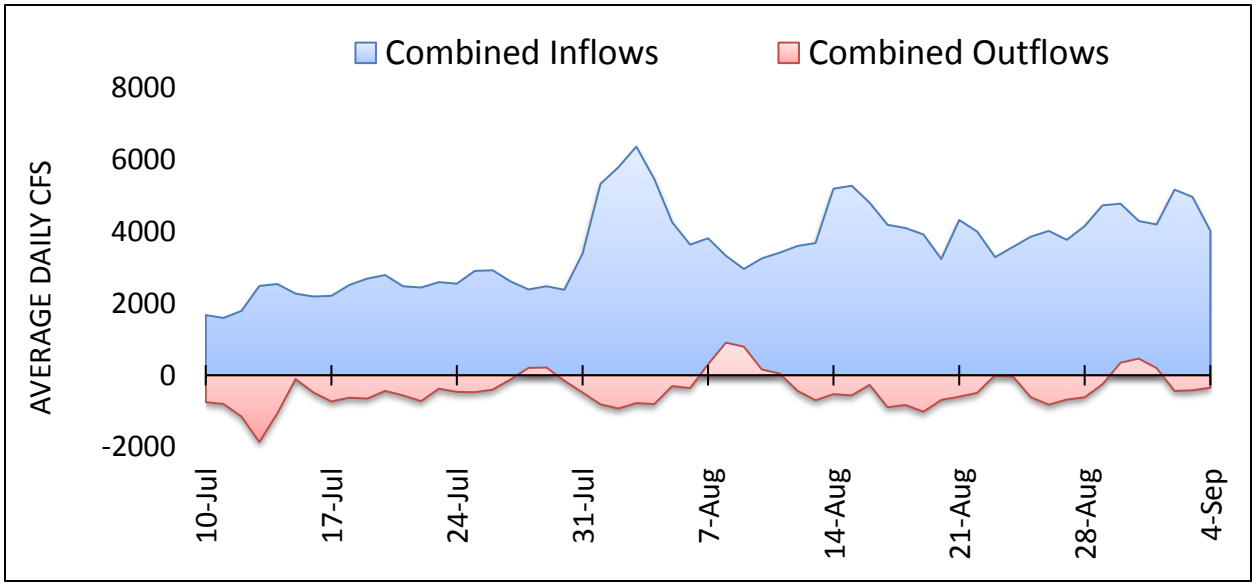


Figure 4

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Lake Okeechobee
Algal Bloom Potential

Unvalidated and Experimental Data

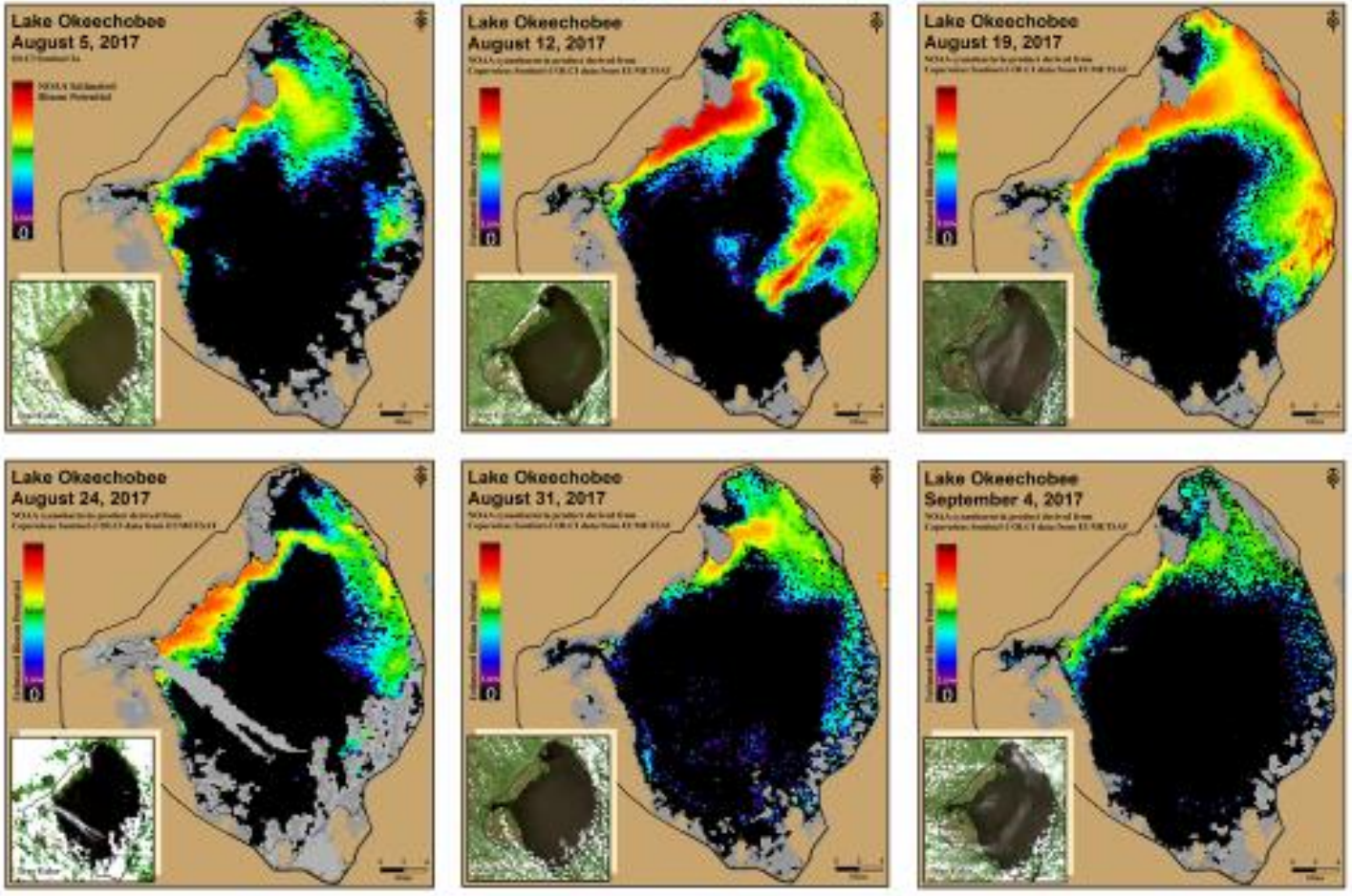
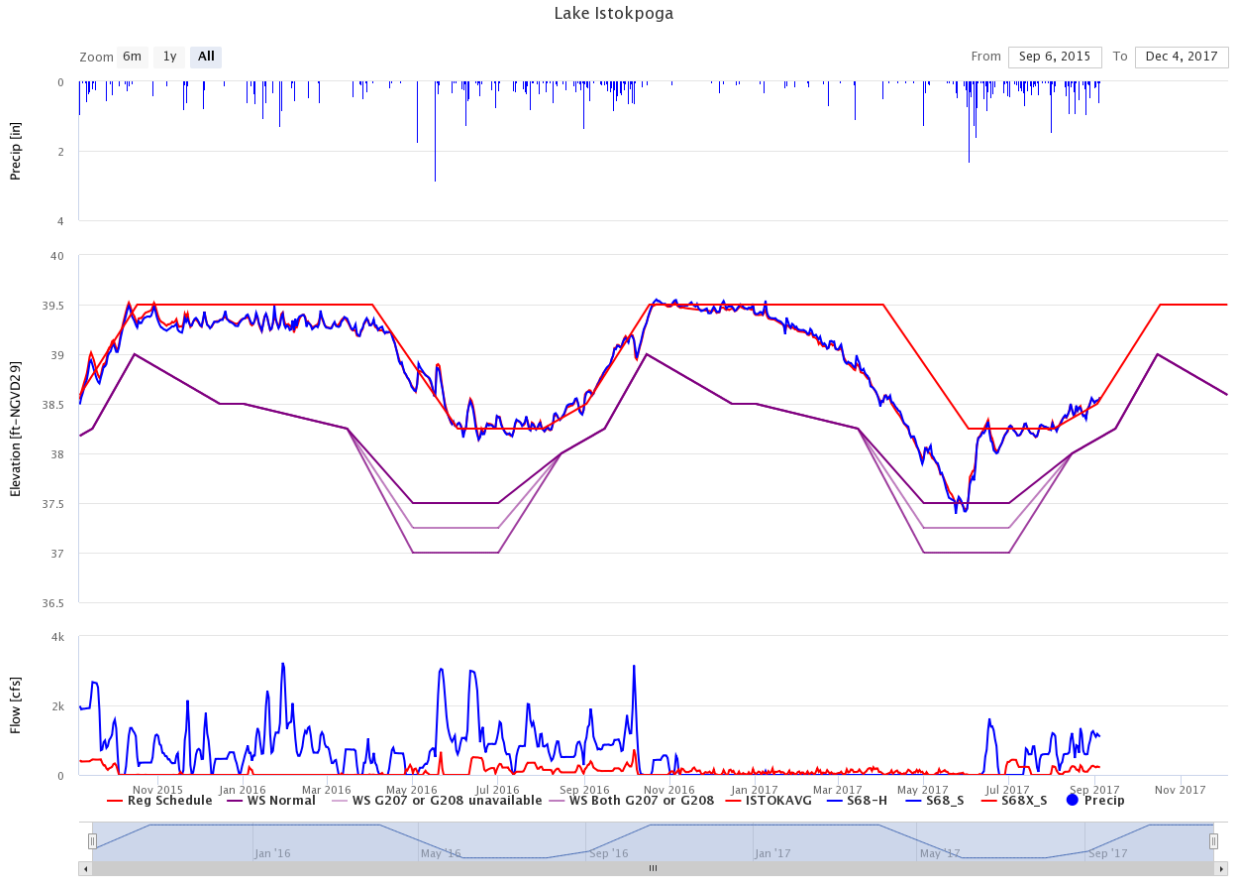


Figure 5

LAKE ISTOKPOGA

Lake Istokpoga stage is 38.53 feet NGVD as of midnight September 04, 2017 and is currently 0.04 feet below its regulation schedule of 38.57 feet NGVD (Figure 6). Average daily flows into the lake from Josephine Creek over the past week were up slightly to 192 cfs from 173 cfs, but no data have been reported for Arbuckle Creek since July 4. Average daily discharge from S68 and S68X this past week increased to 1,406 cfs, from the previous week's flow of 925 cfs. According to RAINDAR, 1.26 inches of rain fell in the Lake Istokpoga basin from August 29 - September 04.

Figure 6



ESTUARIES

St. Lucie Estuary:
Over the past week, provisional flows averaged about 0 cfs at S-80, 200 cfs flowing into Lake Okeechobee, 195 cfs at S-49 on C-24, 186 cfs at S-97 on C-23, and 110 cfs from Ten Mile Creek at the Gordy Road Structure. Average inflow from tidal basin tributaries is estimated to be 235 cfs (Figures 1 and 2). Total inflow averaged about 726 cfs last week and 1,018 cfs over last month.

Over the past week, salinity increased throughout the estuary (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 16.0. Salinity conditions in the middle estuary are in the good 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)	**7.6** (4.6)	**14.8** (10.4)	NA[1]
US1 Bridge	**13.2** (10.9)	**18.7** (13.9)	10.0-26.0
A1A Bridge	**22.6** (20.5)	**27.8** (25.8)	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	5.37	1.81	8.33
HR1	bottom	3.50	0.98	5.94

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 is 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	2.66	4.32 - 4.99	0.80	0.06	2.07
SF	1.63	4.07 - 8.82	5.56	4.43	8.66
NF	2.14	3.68 - 8	5.02	2.87	7.42
ME	1.89	3.22 - 11.23	5.80	4.33	8.99
IRL-SLE	3.62	0.66 - 4.11	5.59	4.98	6.25

NOAA satellite imagery indicates no potential cyanobacterial presence in the St. Lucie estuary (Figure 6).

Caloosahatchee Estuary:
During the past week, provisional flows averaged approximately 0 cfs at S-77, 340 cfs at S-78, and 2,859 cfs at S-79. Average inflow from tidal basin tributaries is estimated to be 1,795 cfs (Figures 7 & 8). Total inflow averaged 4,654 cfs last week and 3,726 cfs over last month.

Over the past week, salinity decreased throughout the estuary (Table 4, Figures 9 and 10). The seven-day average salinity values are within the poor range for adult oysters at Cape Coral, within the fair range at Shell Point, and within the good range at Sanibel (Figure 11). The 30-day moving average surface salinity is 0.3 at Val I-75 and 0.3 at Ft. Myers. Salinity at Val I-75 is forecast to be 0.3 in two weeks with no flow through S-79 (Figure 12). 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** (0.3)	**0.2** (0.2)	NA[1]
*Val I75	**0.2** (0.3)	**0.2** (0.3)	0.0-5.0[2]
Ft. Myers Yacht Basin	**0.2** (0.4)	**0.2** (0.5)	NA
Cape Coral	**0.3** (4.3)	**0.4** (5.3)	10.0-30.0
Shell Point	**5.6** (13.5)	**8.2** (13.8)	10.0-30.0
Sanibel	**18.9** (23.0)	**23.2** (26.8)	10.0-30.0

[1]Envelope not applicable and [2]Envelope is based on a 30-day average.
*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	1.01 – 5.93	2.48 – 14.02 spikes to 51.25 on 8/30/17
Dissolved Oxygen (mg/l)	Down for maintenance	1.06 – 3.33	No Data

NOAA satellite imagery indicates minimal potential cyanobacterial presence in the Caloosahatchee estuary (Figure 13).

The Florida Fish and Wildlife Research Institute reported on September 1, 2017, that *Karenia brevis, the Florida red tide dinoflagellate,* was not observed in samples collected from Lee County.

Water Management Recommendations

Lake stage is in the Base flow sub-band of 2008 LORS. The 2008 LORS recommends up to 450 cfs at S-79 and 200 cfs at S-80 and no releases from the Lake at S-77. Given the current estuarine conditions, there are no ecological benefits associated with freshwater releases from Lake Okeechobee.

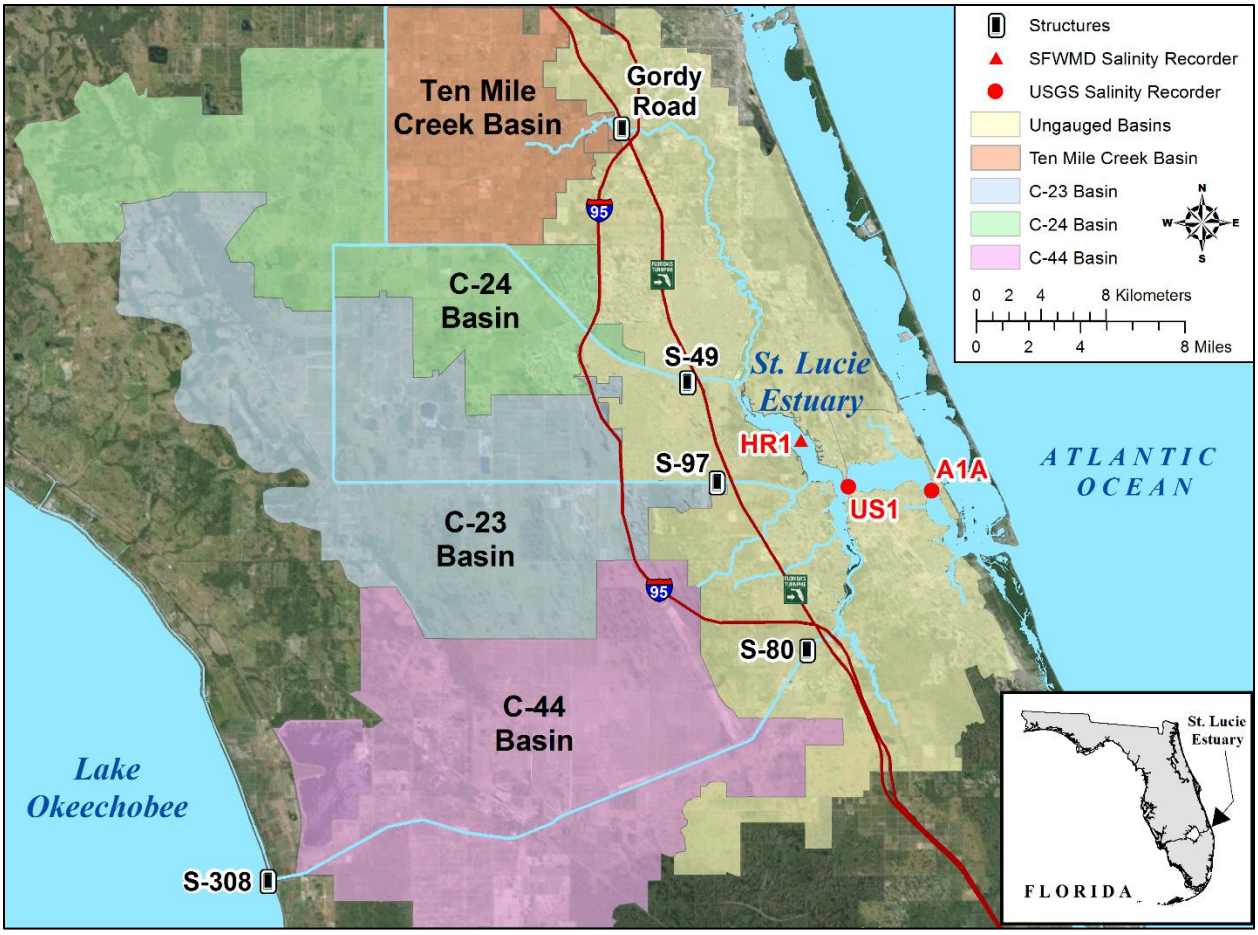


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

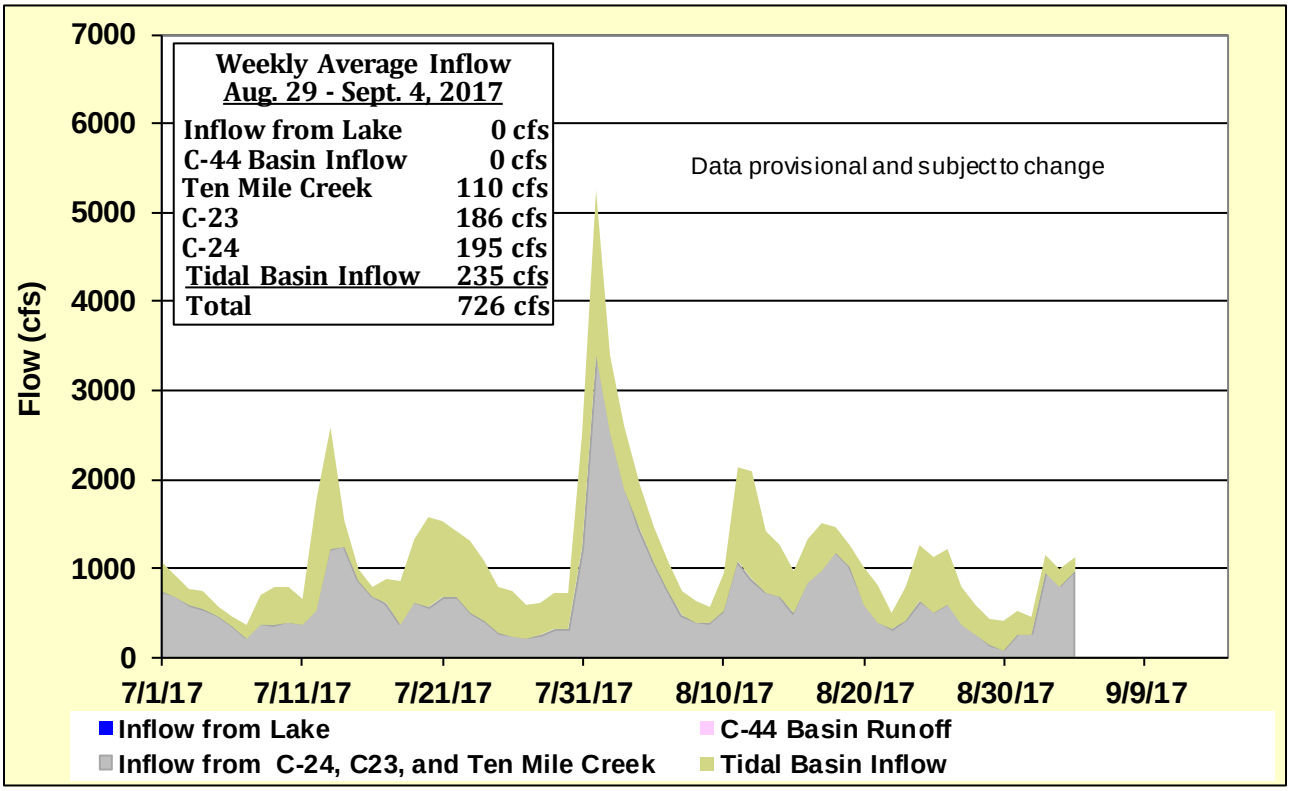


Figure 2. Estimated surface freshwater inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basins into the St. Lucie Estuary.

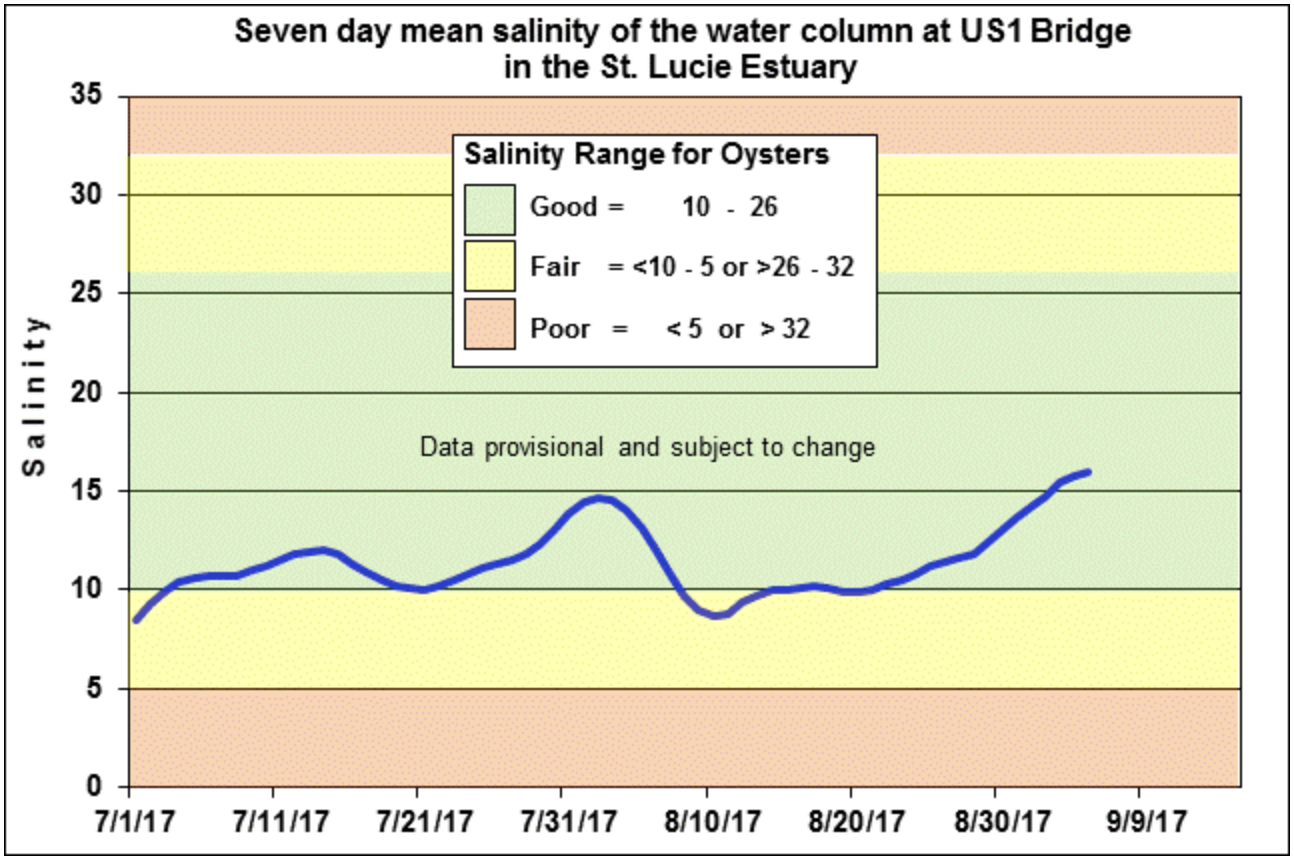


Figure 3. Seven-day mean salinity of the water column at the U.S. Highway 1 Bridge.

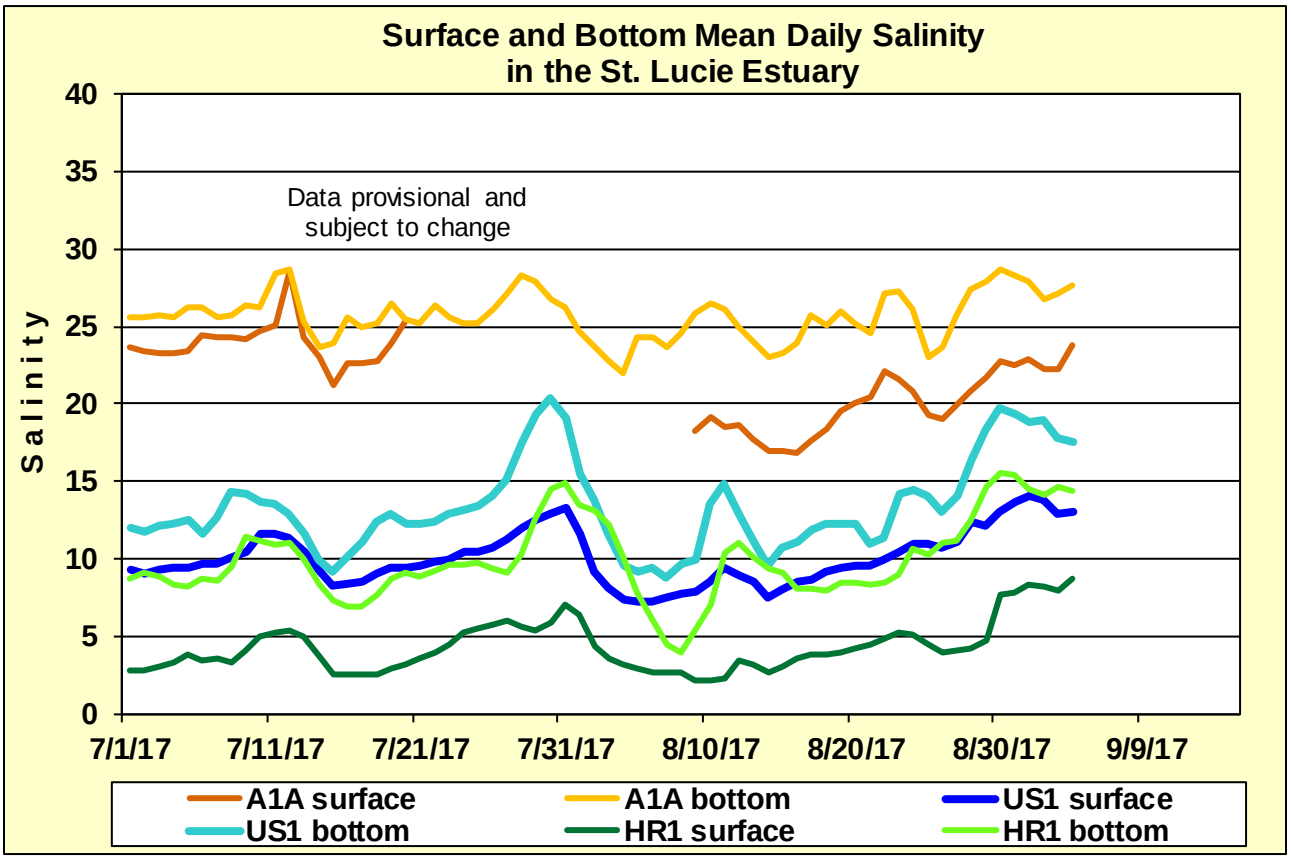


Figure 4. Daily mean salinity at the A1A, US1 and estimated HR1 stations.

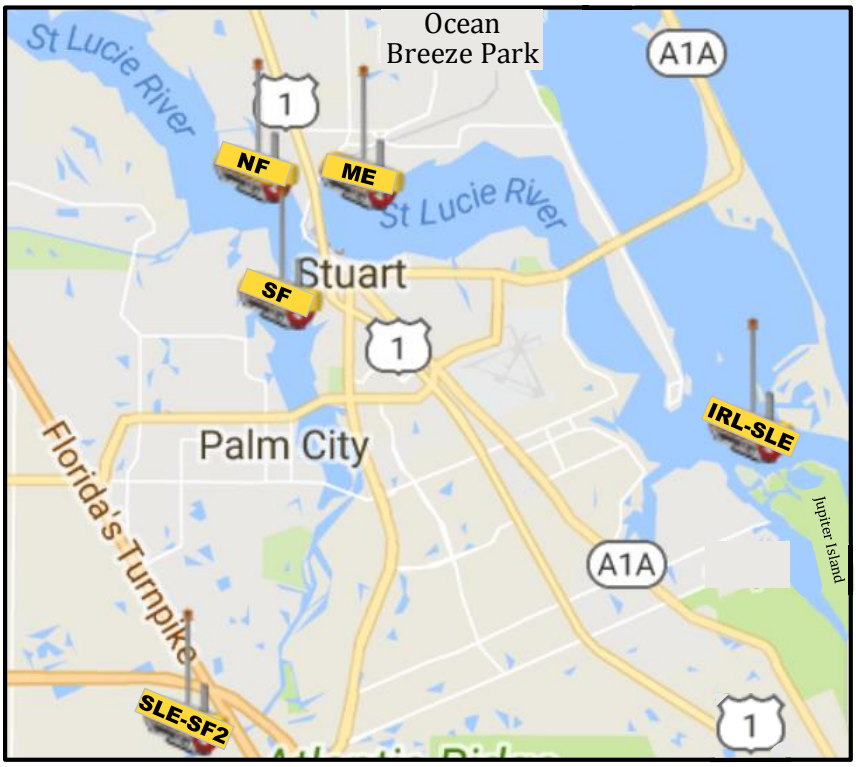


Figure 5. Location of FAU-HBOI LOBO water quality stations in the St. Lucie Estuary.

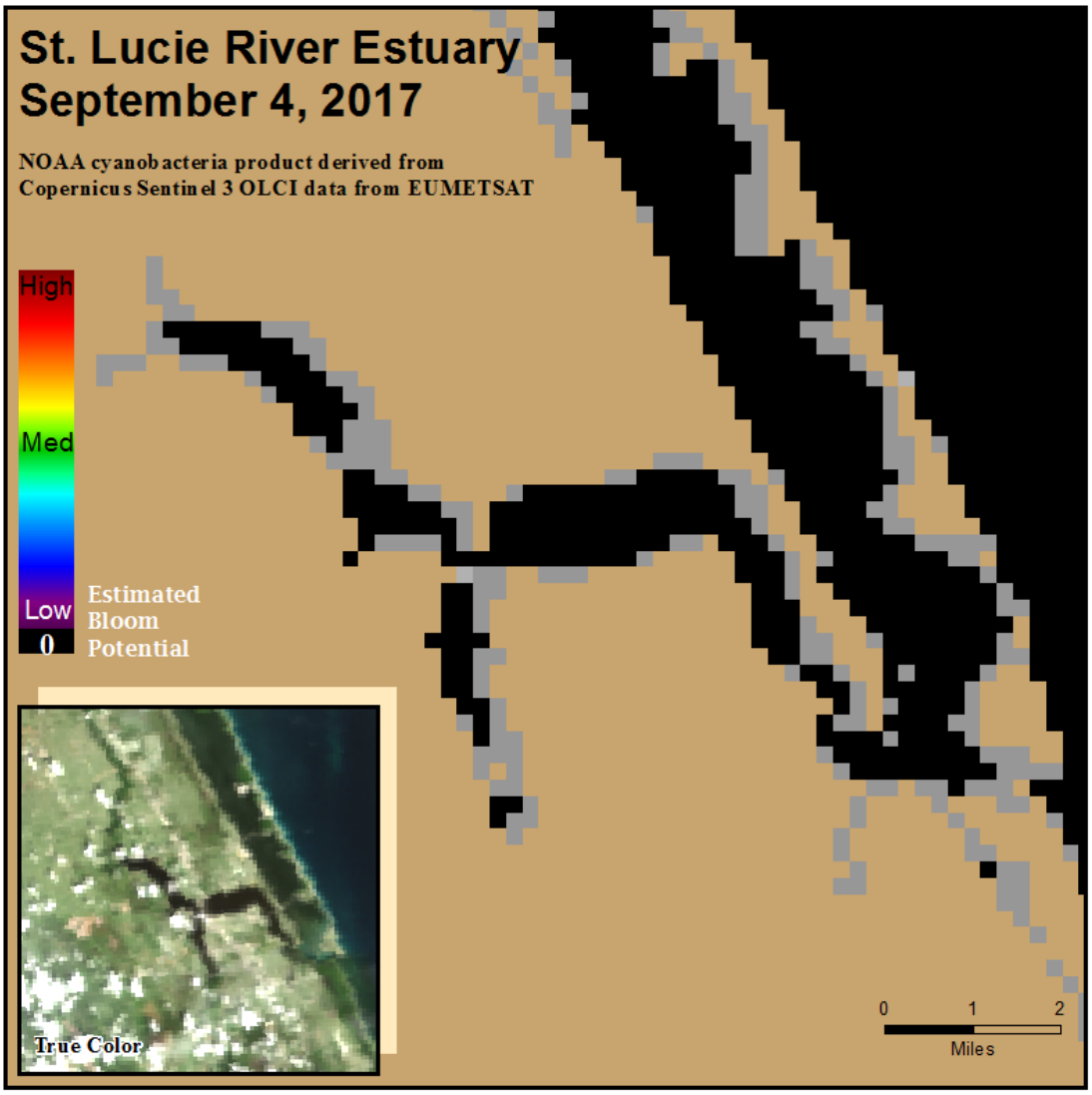


Figure 6. Sentinel 3a Satellite imagery provided by NOAA uses Ocean and Land Color Instrument (OLCI) to estimate cyanobacteria bloom potential in St. Lucie Estuary.

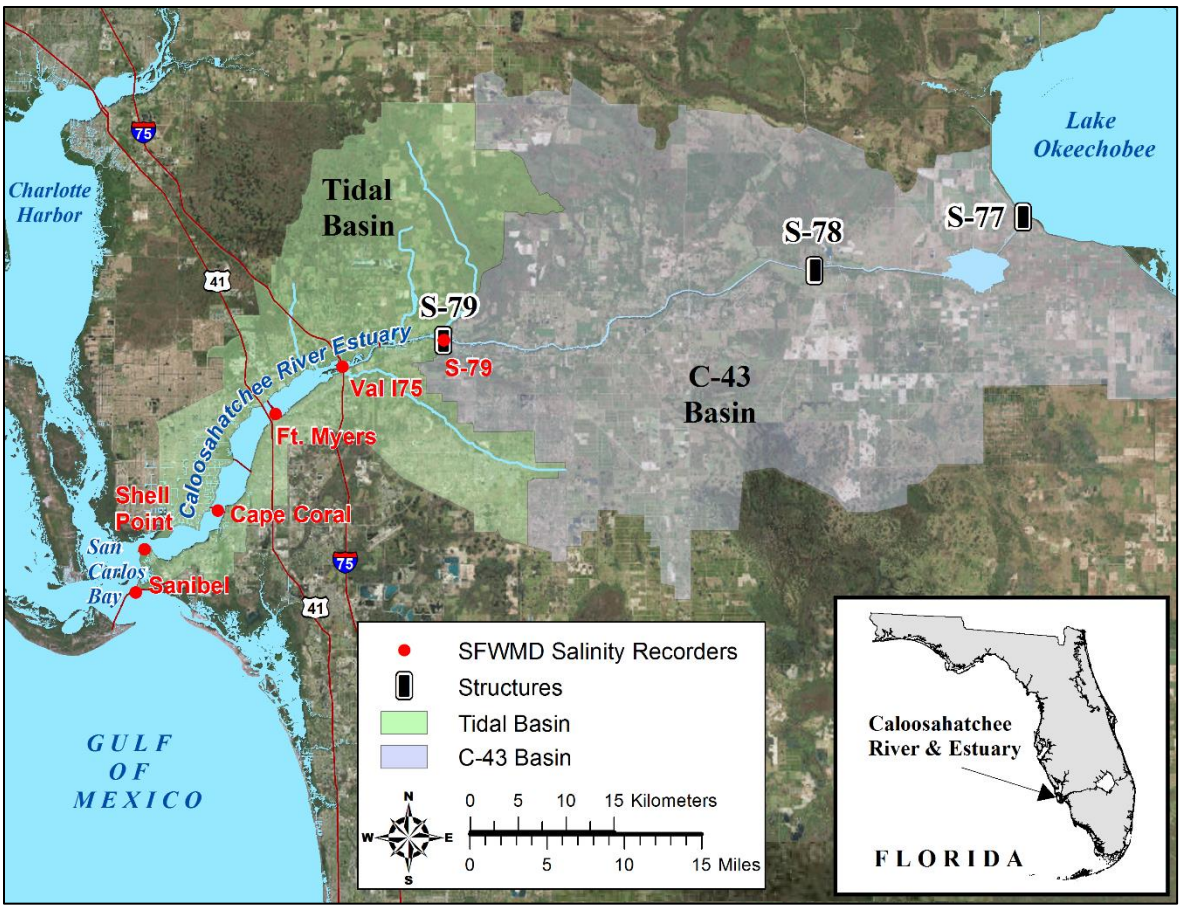


Figure 7. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

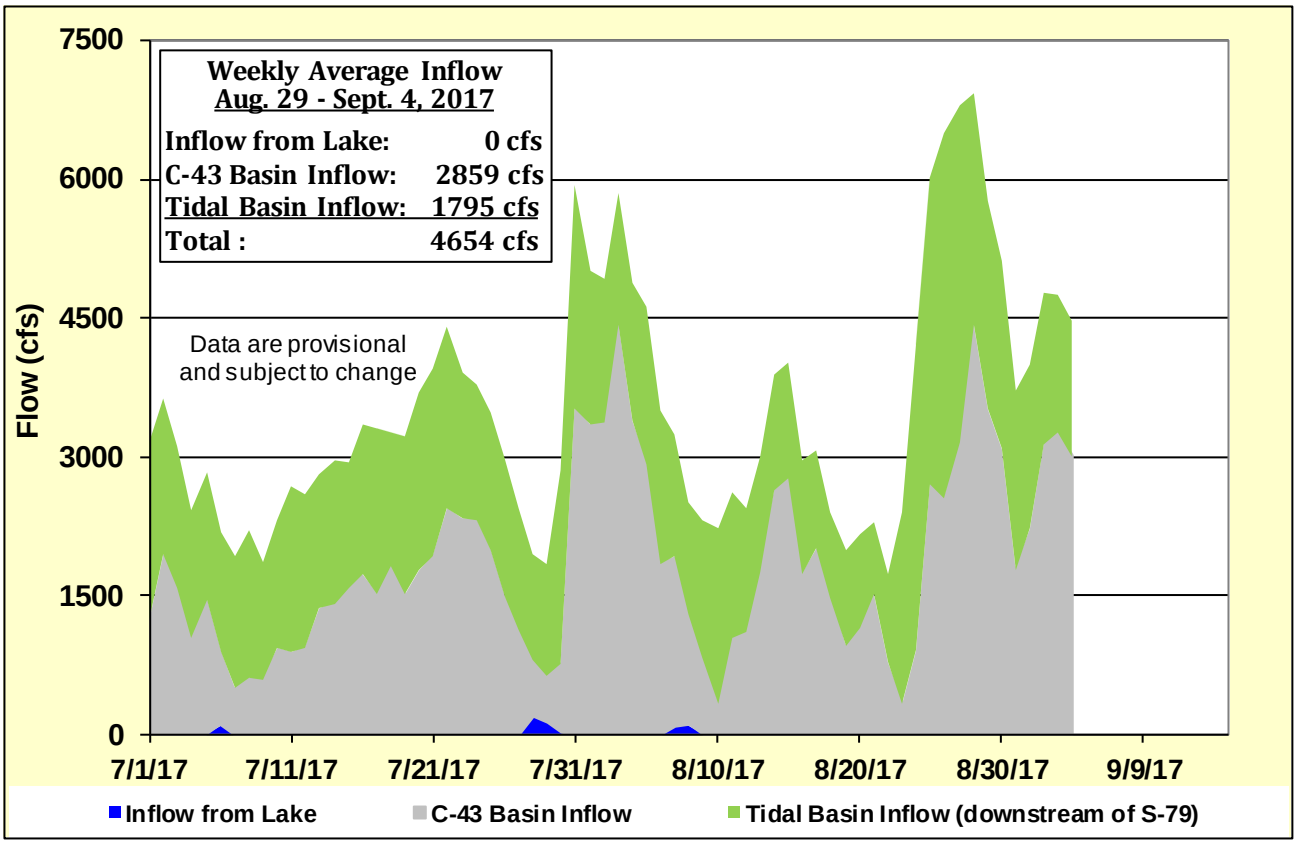
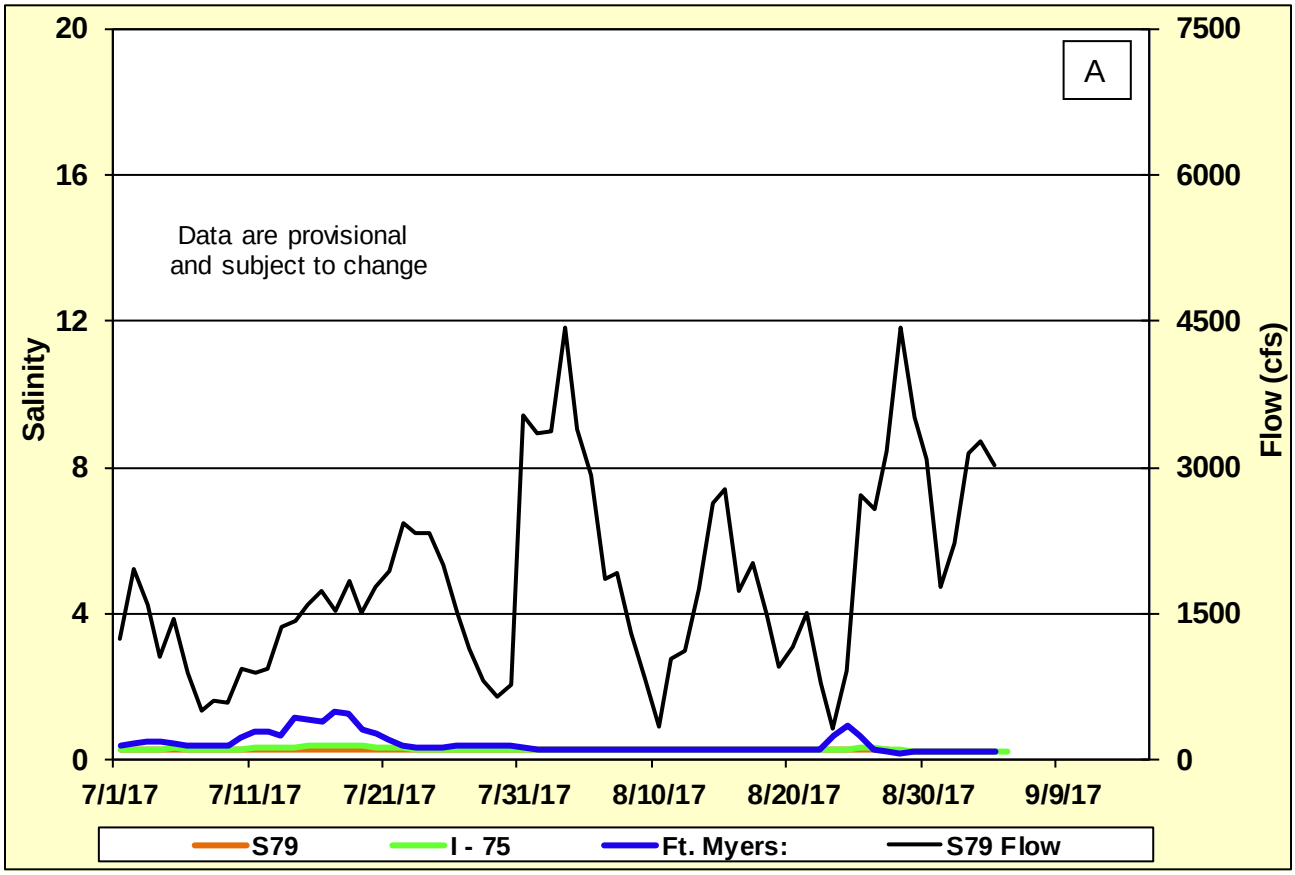


Figure 8. Freshwater inflows from Lake Okeechobee, runoff from the C-43 basin, and tributaries in the tidal basin into the Caloosahatchee River Estuary.



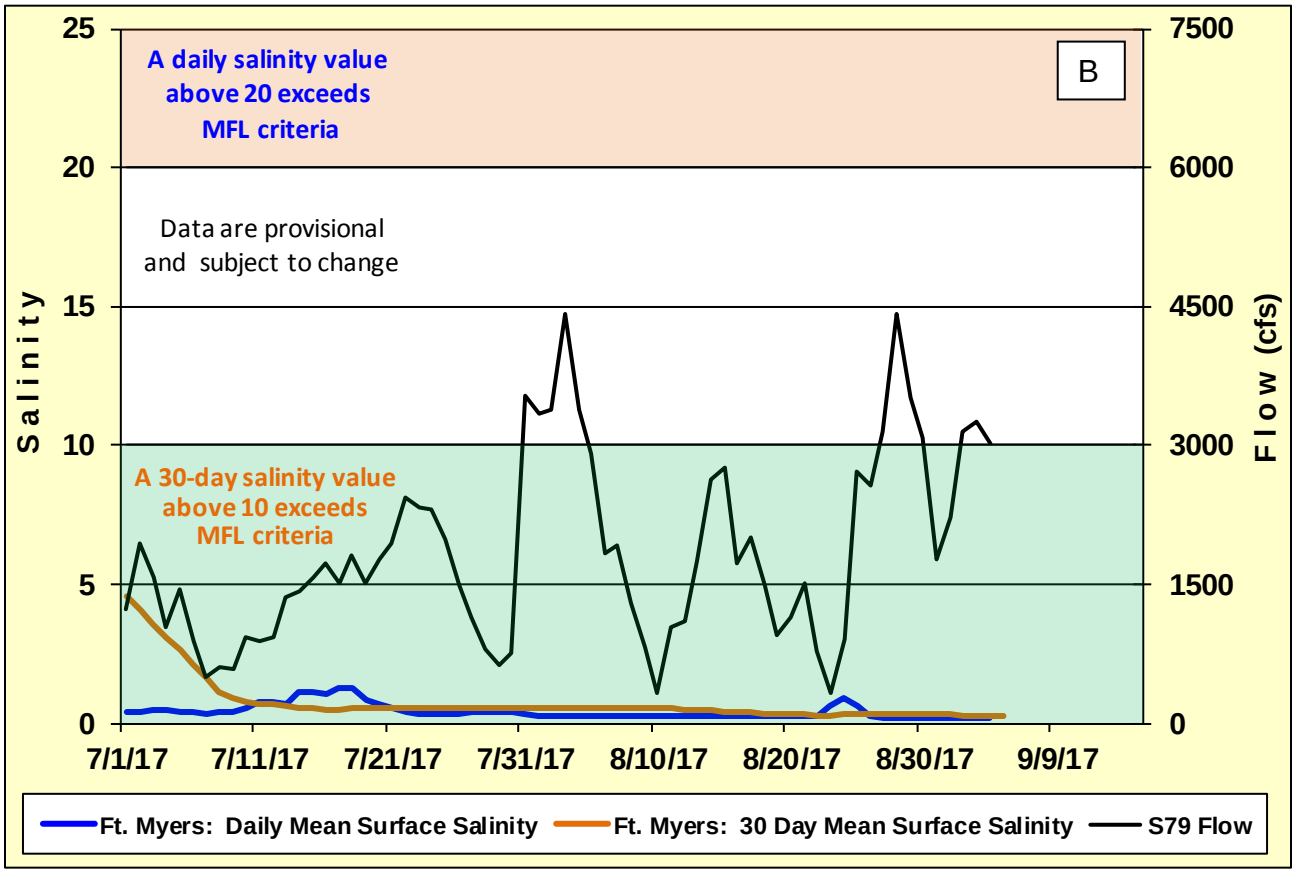


Figure 9. Daily mean flows at S-79 and salinity at upper estuary monitoring stations (A) and 30-day moving average salinity at Ft. Myers (B).

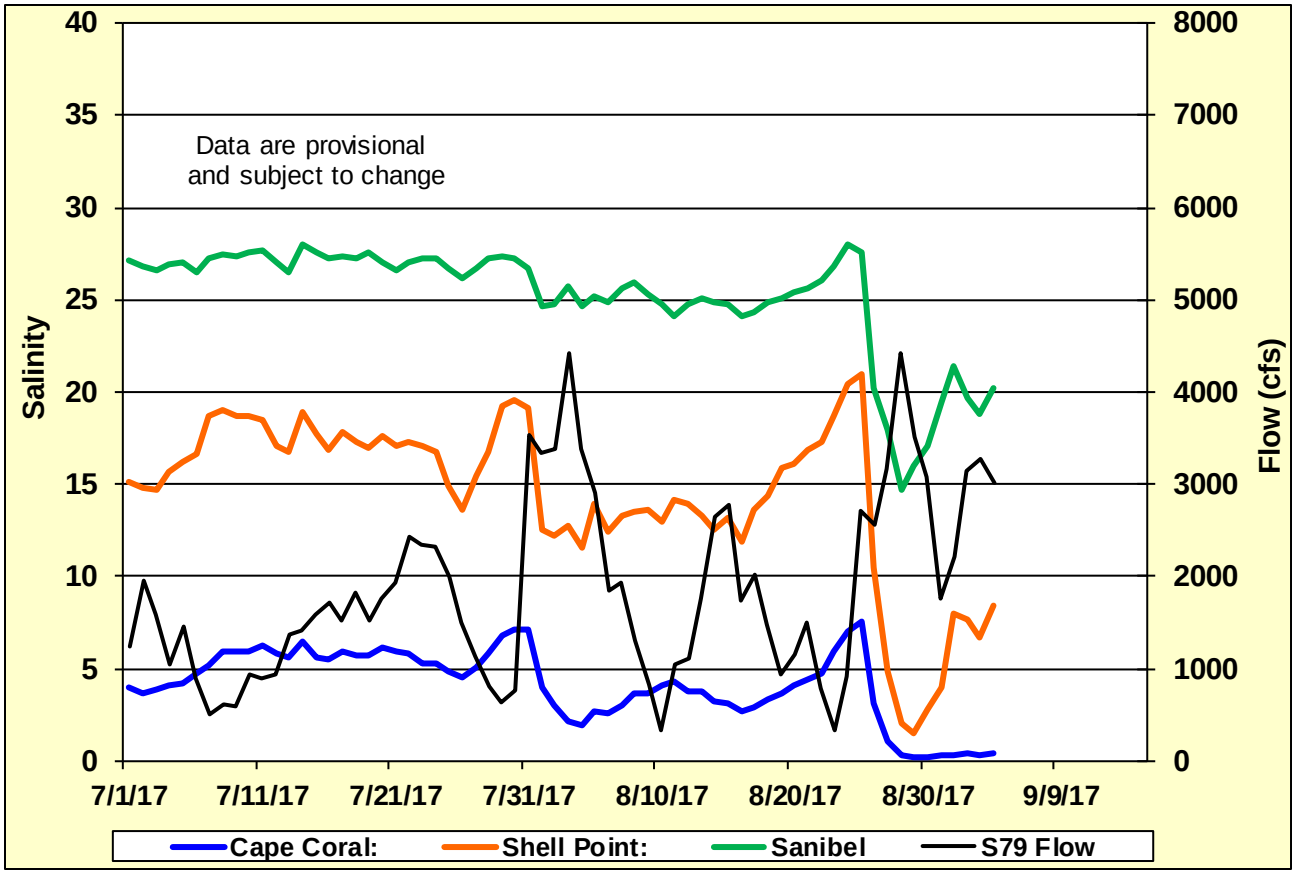


Figure 10. Daily mean flows at S-79 and salinity at lower estuary stations.

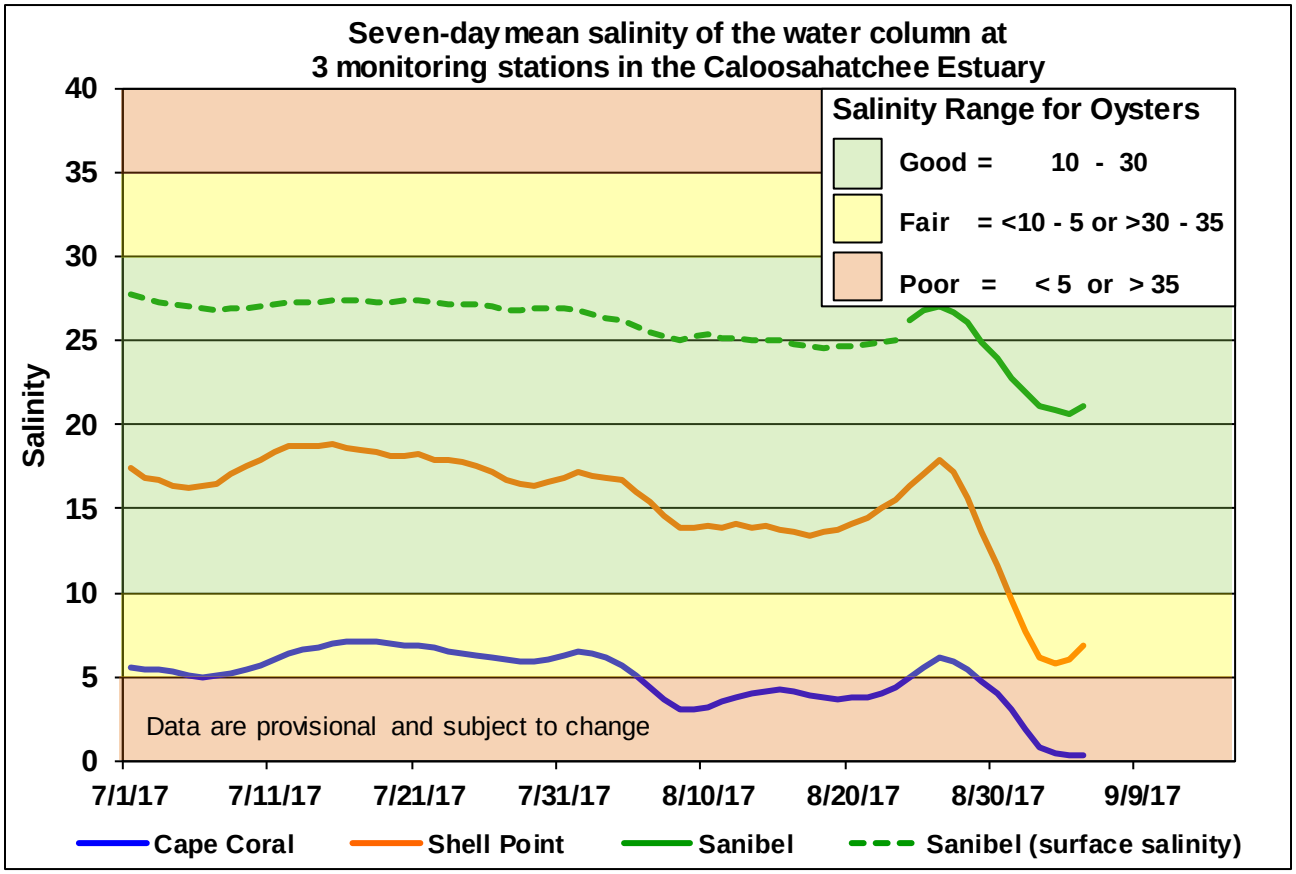


Figure 11. Seven-day mean salinity at Cape Coral Bridge, Shell Point and Sanibel Bridge monitoring stations.

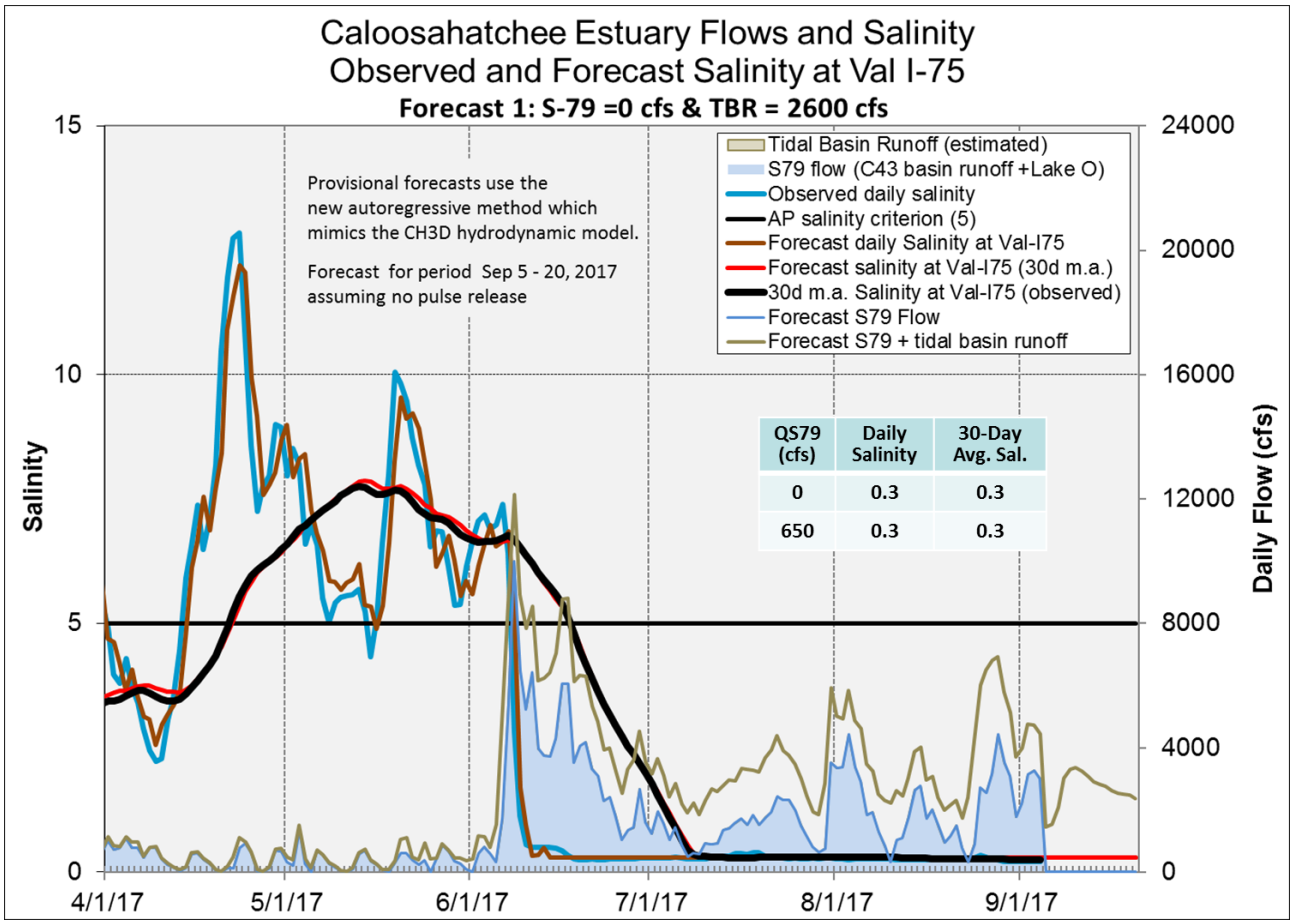


Figure 12. 14-day salinity forecast at Val I-75 assuming no releases at S-79.

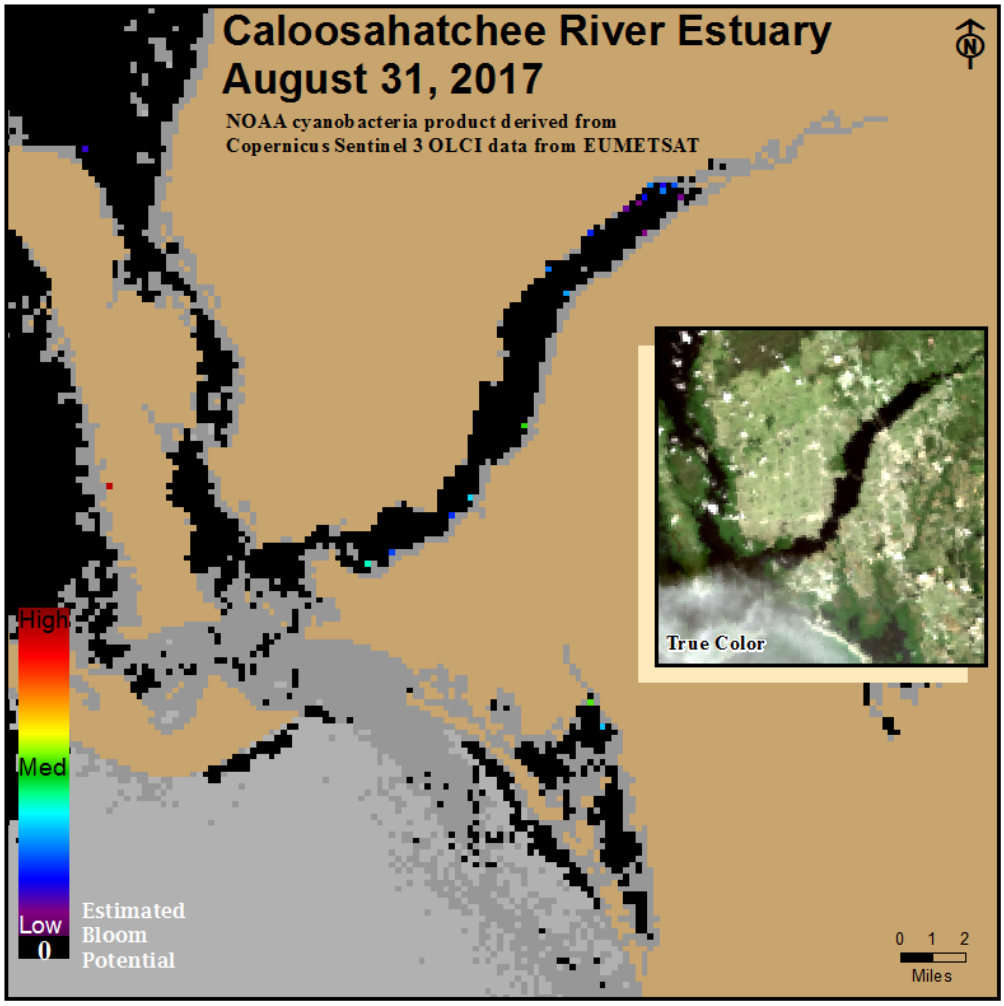
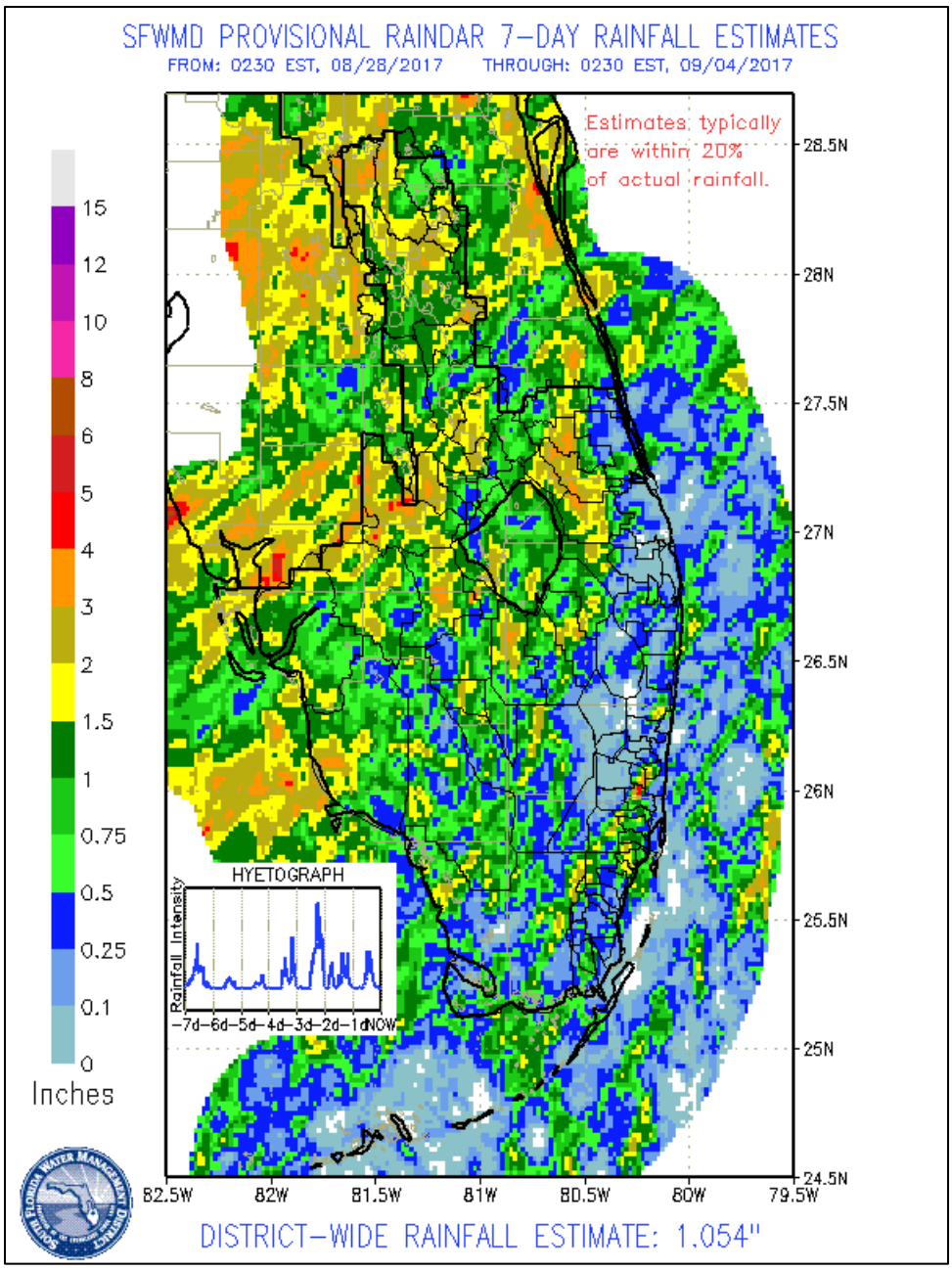


Figure 13. Sentinel 3a Satellite imagery provided by NOAA uses Ocean and Land Color Instrument (OLCI) to estimate cyanobacteria bloom potential in Caloosahatchee Estuary.

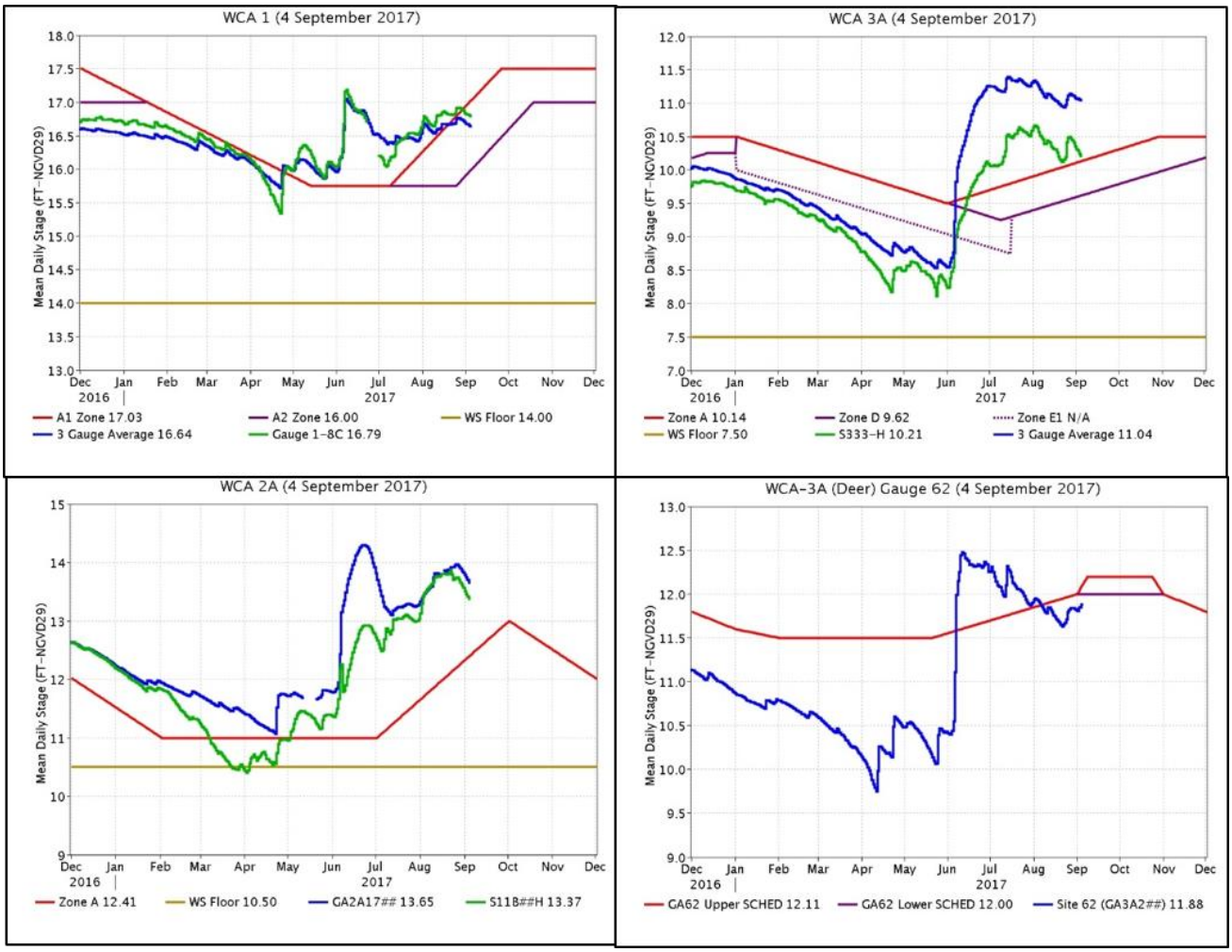
EVERGLADES

Below average rainfall fell across the Everglades last week. WCA-2A and 3A are above regulation and WCA-1 is just below.

Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	0.22	−0.11
WCA-2A	0.09	−0.27
WCA-2B	0.09	−0.14
WCA-3A	0.69	−0.05
WCA-3B	0.36	−0.12
ENP	0.65	−0.05



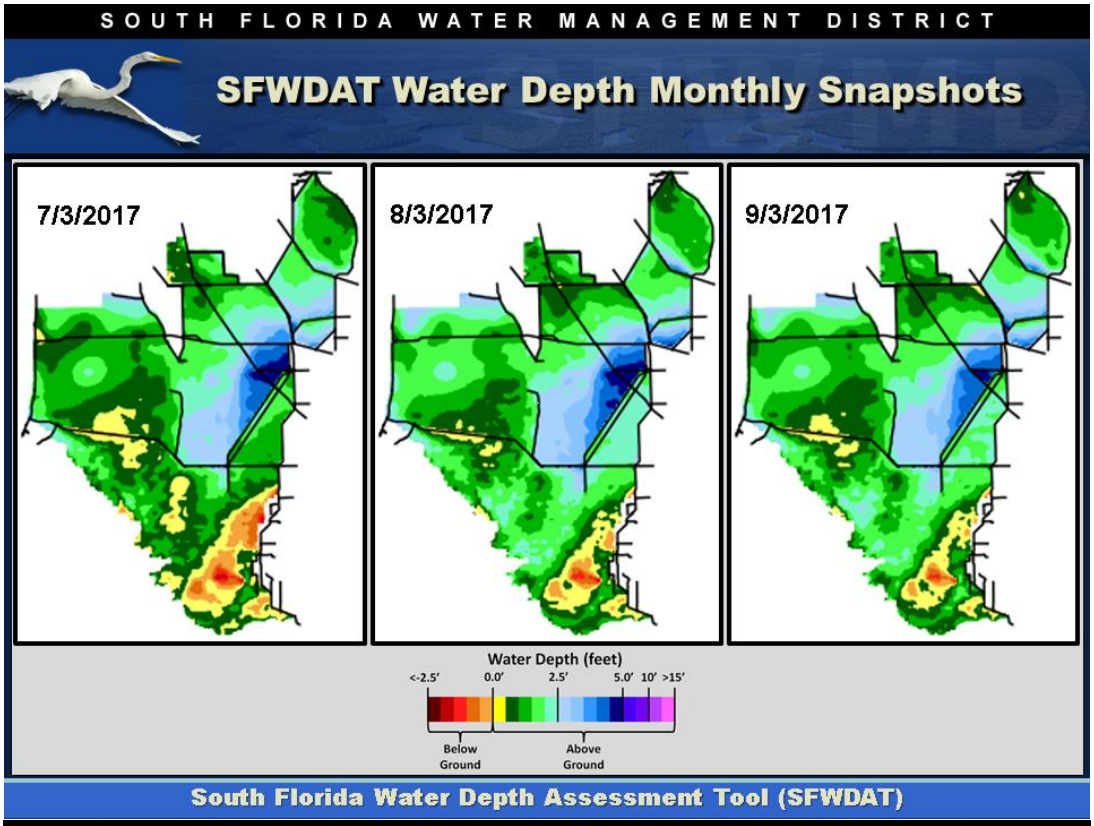
Regulation Schedules: WCA-1 three-gauge average is 0.39 feet below Zone A, and stage difference between the marsh and the canal is 0.15 feet. WCA-2A the marsh stage at gauge GA2A17 is currently 1.24 feet above zone A. Marsh stage is .28 above canal stage at S11B. WCA-3A three-gauge average stage is 0.90 feet above zone A, and .83 feet higher than canal stage. WCA-3A at gauge 62 (Northwest corner) is 0.12 feet below the lower schedule.

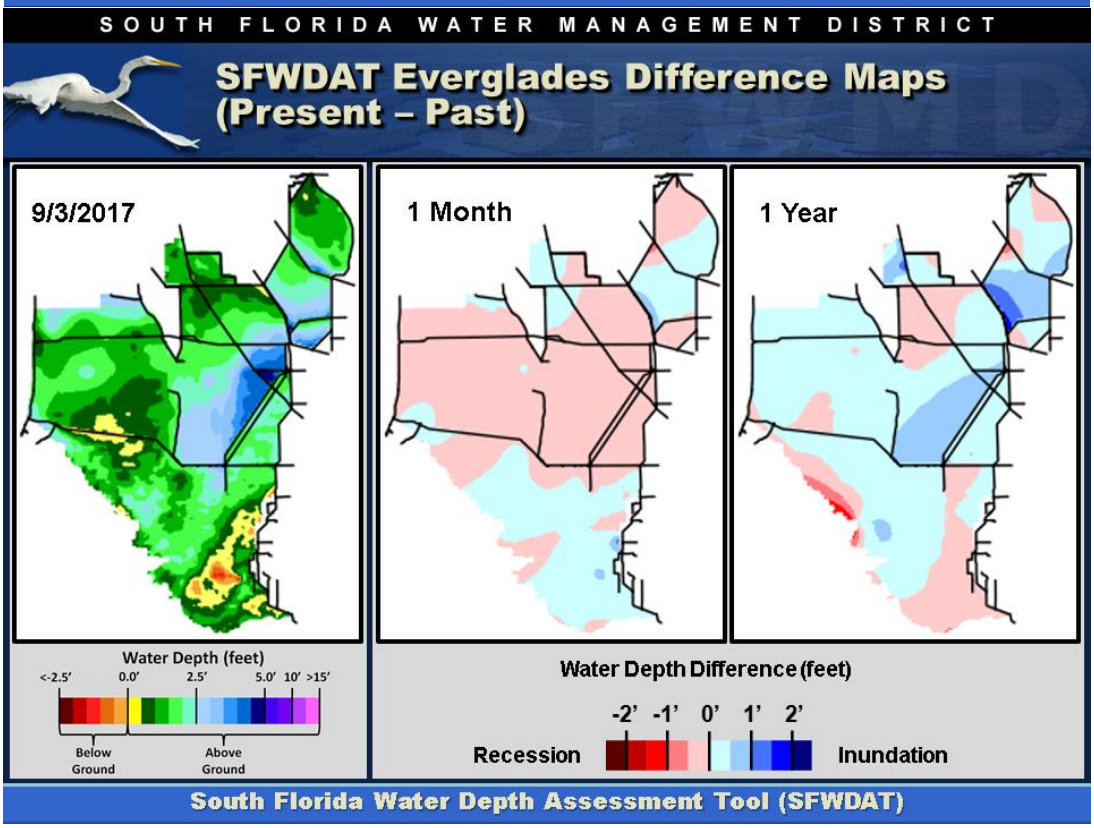


Blue – wetlands
Green – canals

Water Depths and Changes: The WDAT tool for spatial interpolation of depth indicates a range from a low of 0.5 feet in extreme Northeastern WCA-3A and portions of WCA-1 to a high of 4.5 feet along the L-67A canal in Eastern WCA-3A. The ponded area in the southeastern portion of WCA-3A is receding in spatial extent. More of WCA-2A is now in the 2.5 to 3.5 feet depth.

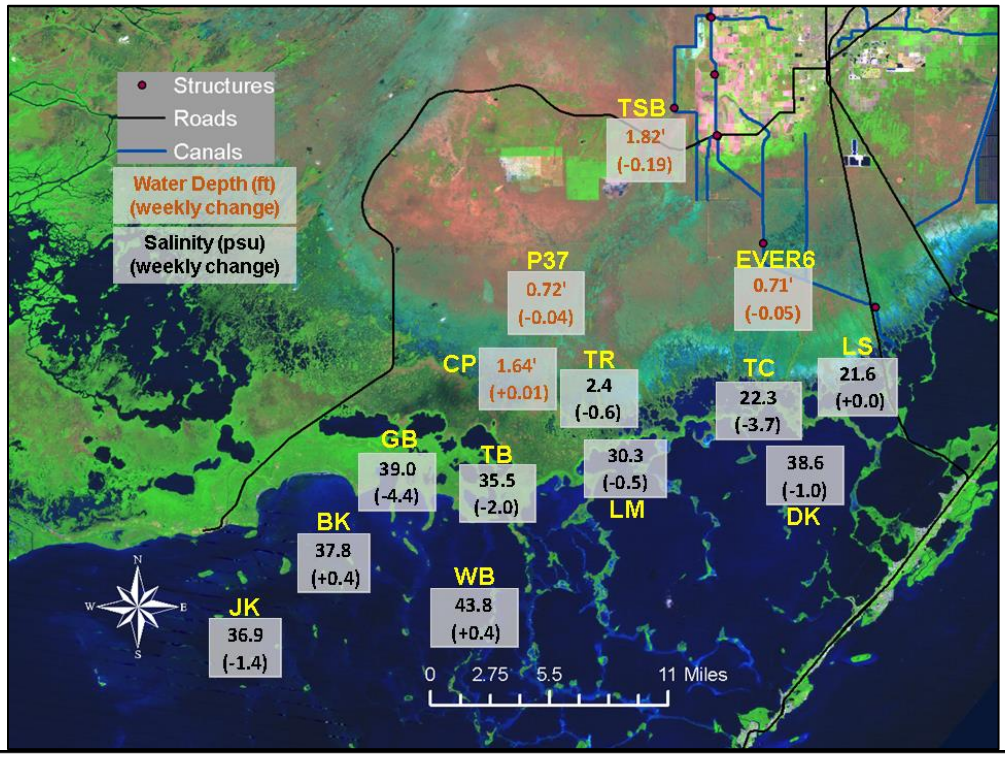
Over the last week individual gauge changes ranged from +0.05 feet (WCA-3A) to -0.27 feet (WCA-2A). Comparing WCA-3A WDAT water levels from present, current water depths for a majority of the area are lower than one week and one month ago.

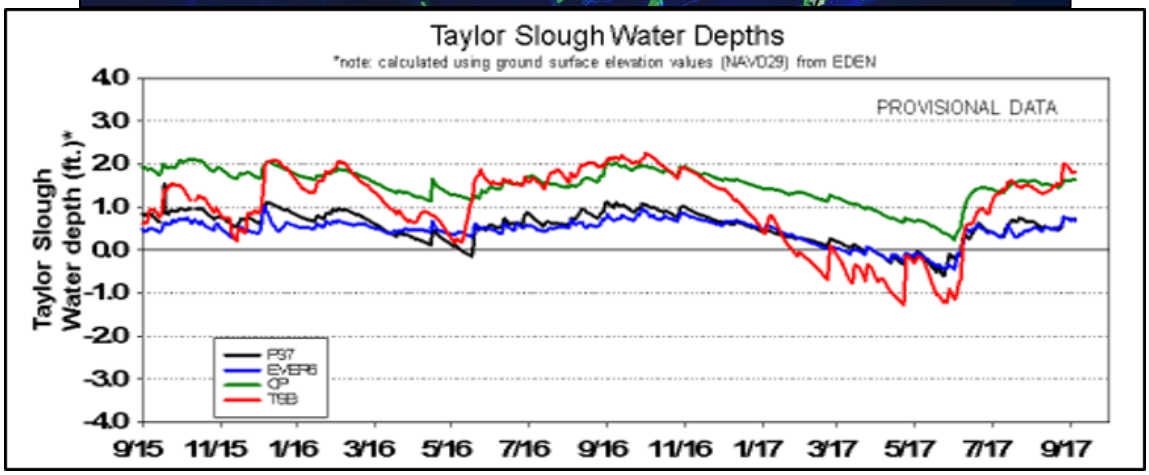


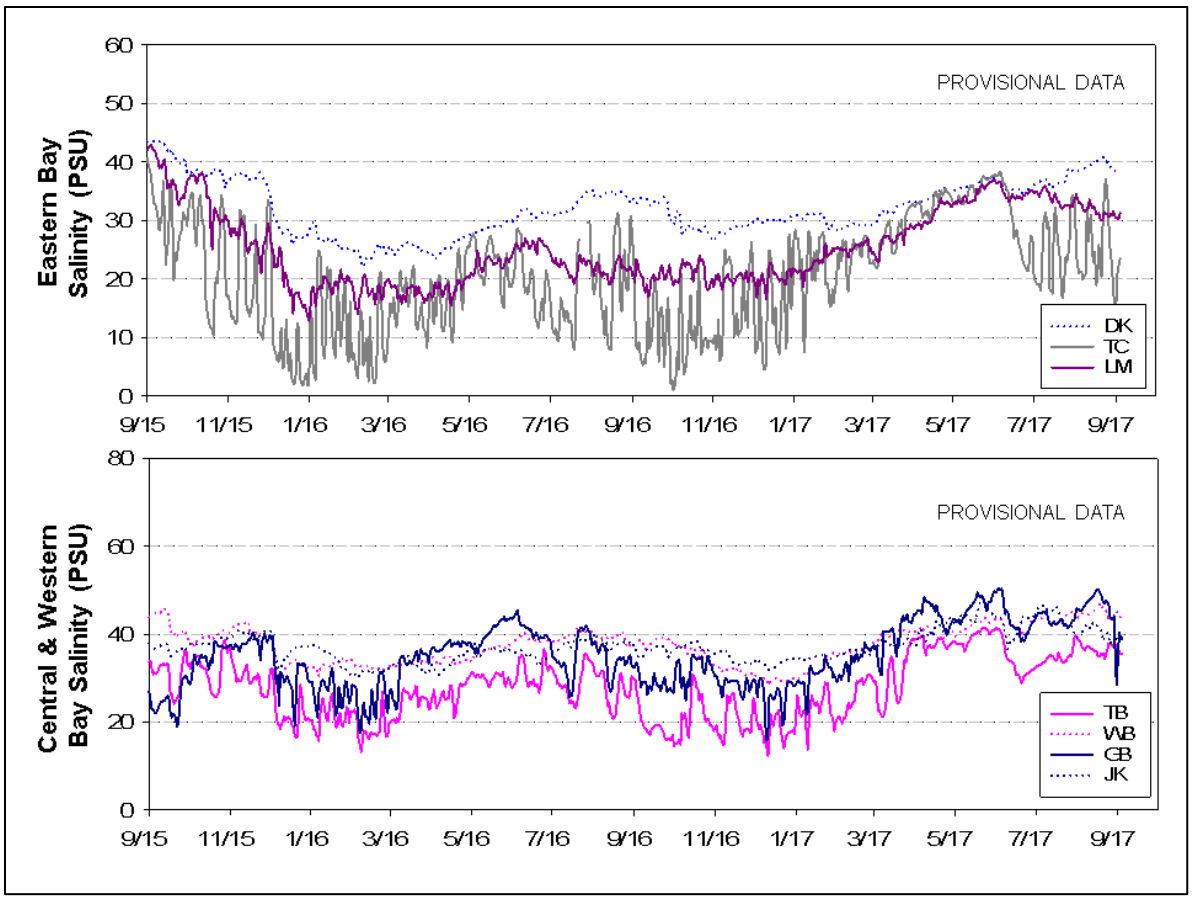


Taylor Slough stages: Less than an inch of rain fell over most areas of Taylor Slough and Florida Bay last week, with the western nearshore are being the exception at 2 inches of rain. Water level changes ranged from −0.19 feet to +0.01 feet this past week. All areas are −1 inch below (Southwest Taylor Slough) to 3 inches above (Northern Taylor Slough) the historic average for this time of year.

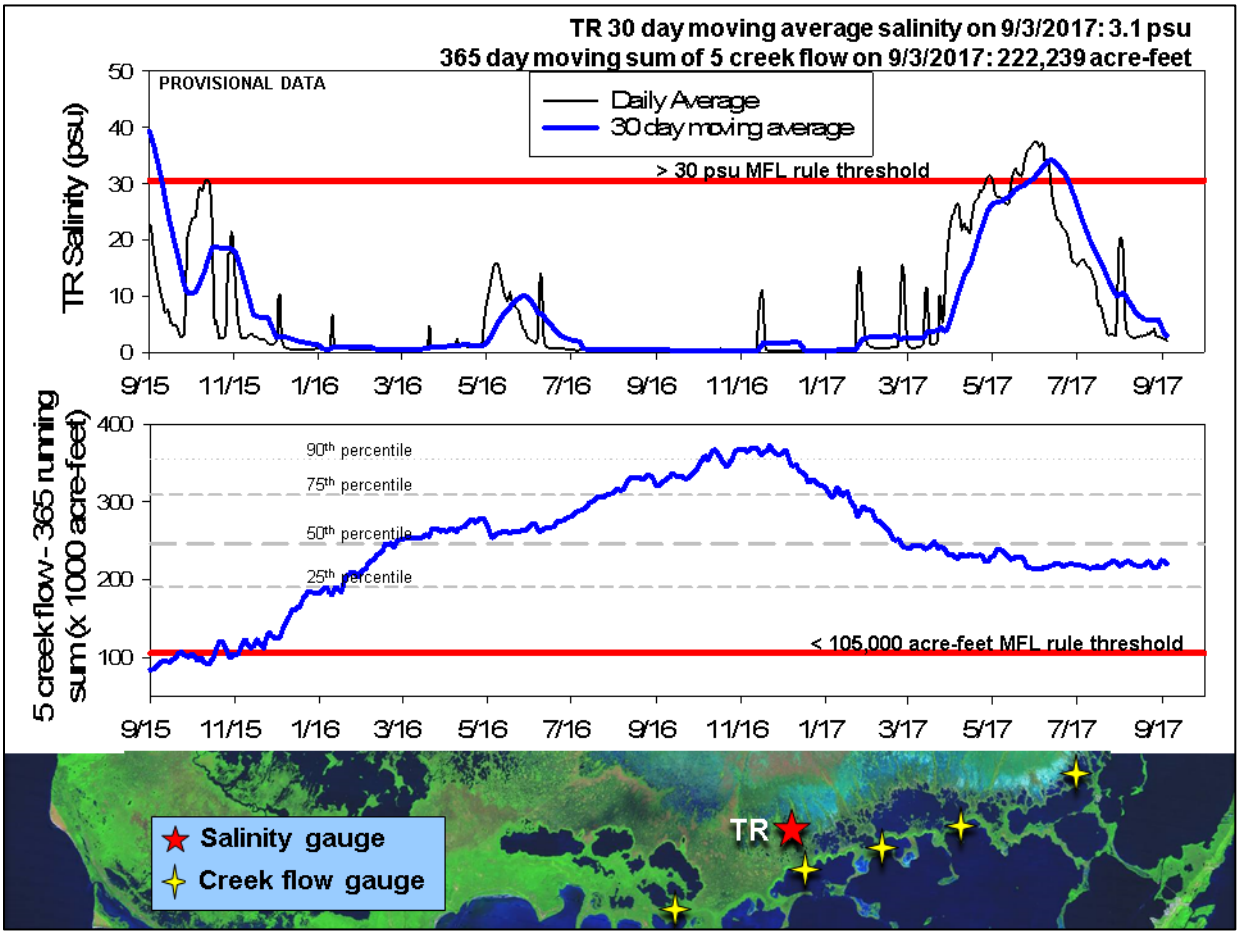
Florida Bay salinity: Salinities are still decreasing across the bay with the exception of the central bay. Salinities currently range from 22 psu in the US Highway 1 area to 44 psu in the central bay. Compared to historic averages, current salinities are 1 to 11 psu above average with the western nearshore still furthest from average.







Florida Bay MFL: Mangrove zone daily average salinity is at 2 psu. The 30-day moving average changed −2.8 to end the week at 3.1 psu. The cumulative weekly flow from the five creeks identified by the stars on the map was approximately 7,700 acre-feet. This is still about 2,200 acre-feet lower than historic average for this time of year. The 365-day moving sum of flow from the five creeks identified by stars on the map increased about 7,000 acre-feet this week to 222,239 acre-feet (still below the long-term average of 257,628 acre feet). Creek flow is provisional data from the USGS and is highly variable.



Water Management Recommendations

The rate of stage change should be moderated as possible in all the WCAs, as apple snail production can be negatively affected by rapid changes in water depth. Limiting ascensions to 0.25 feet per week will help to avoid drowning of apple snail egg clusters.

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 as of Sunday the tree islands have been flooded for **78** days.

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

Everglades Ecological Recommendations, September 5th, 2017 (red is new)				
Area	**Current Condition**	**Cause(s)**	**Recommendation**	**Reasons**
WCA-1	Stages decreased from -0.09' to -0.12'	Rainfall, ET, management	Moderate ascension rates as possible. Maintaining water levels a minimum of 0.1 ft above WRS until early July is also recommended.	Achieve high water targets (17.5 ft) to protect habitat and facilitate invasive plant treatments.
WCA-2A	Stages decreased -0.27'	Rainfall, ET, management	Moderate ascension rates as possible. Limit to +.25 feet per week.	Protect habitat, wildlife and support apple snail reproduction.
WCA-2B	Stages decreased -0.14'	Rainfall, ET, management	Moderate ascension rates as possible.	Protect habitat, wildlife and support apple snail reproduction.
WCA-3A NE	Stages decreased -0.06'	Rainfall, ET, management	Moderate ascension rates as possible.	Protect habitat, wildlife and support apple snail reproduction.
WCA-3A NW	Stages increased +0.05'	Rainfall, ET, management		
Central WCA-3A S	Stages decreased -0.06'	Rainfall, ET, management	Moderate ascension rates as possible.	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 78 days.
Southern WCA-3A S	Stages decreased -0.14'	Rainfall, ET, management		
WCA-3B	Stages decreased from -0.02' to -0.08'	Rainfall, ET, management	Moderate ascension rates as possible..	Protect habitat, wildlife and support apple snail reproduction.
ENP-SRS	Stages decreased -0.05'	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 −0.19' to +0.01'	Rain, ET, inflows	Move water southward as possible	When available provide freshwater buffer for ecosystems and slow recession rates.
FB- Salinity	Salinity changes ranged −4.4 to +0.4 psu.	Rain, ET, inflows, wind	Move water southward as possible	When available, provide freshwater to produce low salinity wet season conditions.