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: December 19, 2017

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

Weather is forecast to be mainly dry and warm through Christmas Eve. Moderate strength high pressure will dominate the skies over the District until a cold front arrives around Christmas Day. That front should provide a brief cool down next week but little or no rainfall is expected through the next 10 days.

Kissimmee

Tuesday morning stages were 58.0 feet NGVD (at schedule) in East Lake Toho, 55.0 feet NGVD (at schedule) in Toho, and 51.2 feet NGVD (1.3 feet below schedule) in Kissimmee-Cypress-Hatchineha; S65A headwater stage was 46.3 feet NGVD. Tuesday morning discharges were: 565 cfs at S65, 444 cfs at S65A, and 836 cfs at S65E. Dissolved oxygen concentration in the Kissimmee River averaged 6.6 milligrams per liter (mg/L) for the week. Kissimmee River mean floodplain depth on Sunday was 0.29 feet. Recommendation is to begin a stage recession on January 1, 2018 in Lakes Kissimmee-Cypress-Hatchineha and begin stage recessions on January 15, 2018 in Lakes East Toho and Toho.

Lake Okeechobee

Lake Okeechobee stage is 15.71 feet NGVD having decreased 0.14 feet over the past week and 0.81 feet over the last month. Following Hurricane Irma, stages exceeded 16.0 feet NGVD for 72 days, the longest period since late 2004, which was 73 days. Stages have also exceeded 15.5 feet NGVD for 93 days and counting, the longest period since late 2005. The submerged aquatic and emergent vegetation coverage in the nearshore areas of the Lake are expected to decline over the coming months and possibly years due to the high water and turbidity from resuspended lake sediment. The high inflows and resuspended lake sediment associated with Hurricane Irma also increased water column total phosphorus (TP), which could lead to algal blooms as turbidity begins to decline and water temperatures rise. 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.

Estuaries

Total inflow to St. Lucie estuary averaged 1,989 cfs over the past week with 1,037 cfs coming from Lake Okeechobee. Salinity increased throughout the estuary. The seven-day average salinity at the US1 Bridge is in the fair range for adult oysters. Average chlorophyll *a* concentration levels at the LOBO stations remain low (1.81 – 7.2 µg/L), with highest values reported in the North Fork (3.89 – 7.2 µg/L). Average dissolved oxygen levels were at 6.64 – 8.43 mg/L.

Total inflow to Caloosahatchee estuary averaged 3,192 cfs over the past week with 2,072 cfs coming from the Lake. Salinity stayed the same in the upper estuary and increased slightly in the lower estuary. The 30-day moving average surface salinity is 0.1 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 good range for adult oysters at Shell Point and in the poor range at Cape Coral. Chlorophyll *a* measurements show low chlorophyll *a* concentration levels near Shell Point (2.71 - 6.30 µg/L) over the past week. Average dissolved oxygen levels at Shell Point were 6.87 – 8.48 mg/L. *Karenia brevis* (red tide dinoflagellate) was observed in background to medium concentrations in thirty samples collected from Lee County. 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/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 21,800 acre-feet. Most STA cells are at or near 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 Flow-way and STA-2 Flow-way 1.

Everglades

The Everglades received no rainfall last week, benefitting water management efforts to relieve continued high water conditions. WCA-1 and WCA-2A remained near schedule and WCA-3A continued trending towards the regulation schedule. Managers may want to consider the transition (rate of recession) in WCA-3A as that basin approaches the regulation schedule. Keeping depths below 2.5 feet at gauge 65 in WCA-3A is important to moderate the stress to tree islands caused by flooding when durations last longer than 60-90 days. The depth on Sunday at that location was 3.01 feet, and has exceeded 2.5 feet for 185 days. In Taylor Slough, water levels are still 3 to 14 inches above the historic average for this time of year, and Florida Bay salinities are within 6 psu of the historic averages for this time of year.

Area-specific recommendations are summarized in the table at the end of this report.

Supporting Information

KISSIMMEE BASIN

Kissimmee Basin Rainfall

The Upper Kissimmee Basin and the Lower Basin received no rainfall over the past week (SFWMD Daily Rainfall Report 12/19/2017).

Upper Kissimmee Basin

Stages and departures in the Kissimmee Chain of Lakes (KCOL) are shown in Table 1.

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: 12/19/2017

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)						
							12/17/17	12/10/17	12/3/17	11/26/17	11/19/17	11/12/17	11/5/17
Lakes Hart and Mary Jane	S62	8	LKMJ	60.9	R	61.0	-0.1	0.0	0.0	0.0	0.0	0.1	0.1
Lakes Myrtle, Preston, and Joel	S57	12	S57	61.8	R	61.8	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Alligator Chain	S60	1	ALLI	63.9	R	64.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0
Lake Gentry	S63	0	LKGT	61.5	R	61.5	0.0	0.0	0.1	0.0	0.0	0.0	0.0
East Lake Toho	S59	0	TOHOE	58.0	R	58.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lake Toho	S61	1	TOHOW, S61	55.0	R	55.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lakes Kissimmee, Cypress, and Hatchineha	S65	540	KUB011, LKIS5B	51.2	R	52.5	-1.3	-1.1	-1.1	-1.0	-0.9	-0.7	-0.5

[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: 12/19/2017

Metric	Location	1-Day Average	Average for the Preceeding 7-Days[1]									
		12/17/2017	12/17/17	12/10/17	12/3/17	11/26/17	11/19/17	11/12/17	11/5/17	10/29/17	10/22/17	10/15/17
Discharge (cfs)	S-65	561	540	368	586	925	1,097	1,349	1,439	1,564	2,319	3,200
Discharge (cfs)	S-65A	444	441	306	486	817	1,038	1,346	1,638	1,703	2,265	3,723
Discharge (cfs)	S-65D[2]	759	796	595	989	1,425	1,925	2,467	3,714	3,240	4,298	7,381
Discharge (cfs)	S-65E[2]	844	865	658	980	1,436	1,988	2,519	3,938	3,453	4,551	7,568
DO (mg/L)[3]	Phase I river channel	6.8	6.6	5.2	5.7	5.8	5.0	4.1	4.2	3.4	2.0	1.1
Mean depth (feet)[4]	Phase I floodplain	0.29	0.31	0.26	0.34	0.53	0.81	1.09	1.48	1.43	1.94	2.77

[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
12/19/2017	Begin a stage recession on January 1 in Lakes Kissimmee-Cypress-Hatchineha starting at stage on January 1 to reach low pool on May 31. Recession rate not to exceed 0.2 ft/week as possible. Subject to SFWMD planned operations hierarchy.	Achieve fish and wildlife benefits by slowing lake stage recession rates relative to the regulation schedule recession rates.	-	KB Ops/SFWMD Water Mgt
12/19/2017	Begin stage recessions on January 15 in Lakes East Toho and Toho starting at stage on January 15, to reach low pools on May 31. Recession rate not to exceed 0.2 ft/week if possible. Subject to SFWMD planned operations hierarchy.	Achieve fish and wildlife benefits by slowing lake stage recession rates relative to the regulation schedule recession rates.	-	KB Ops/SFWMD Water Mgt
12/12/2017	No new recommendations.		N/A	
12/5/2017	No new recommendations.		N/A	
11/28/2017	No new recommendations.		N/A	
11/21/2017	No new recommendations.		N/A	
11/13/2017	No new recommendations.		N/A	
11/1/2017	No new recommendations.		N/A	
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

KCOL Hydrographs (through Sunday midnight)

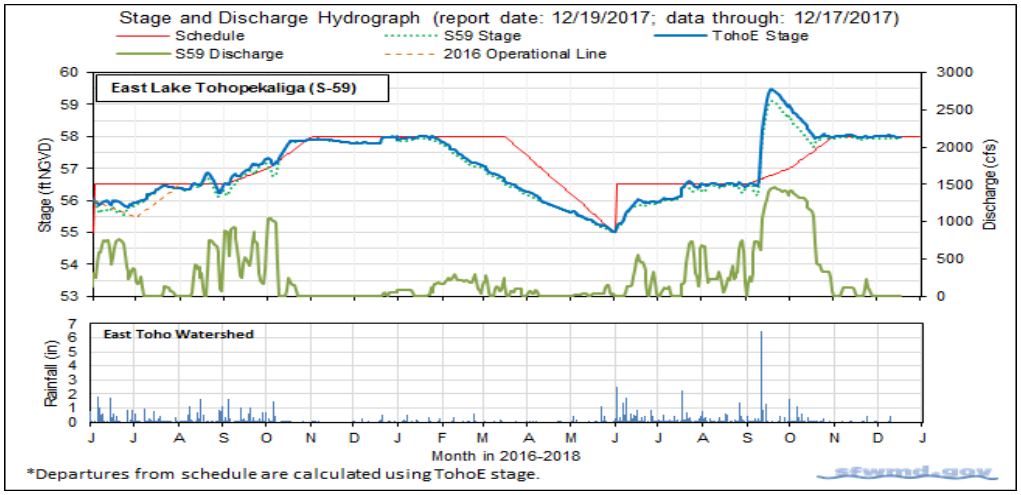


Figure 1.

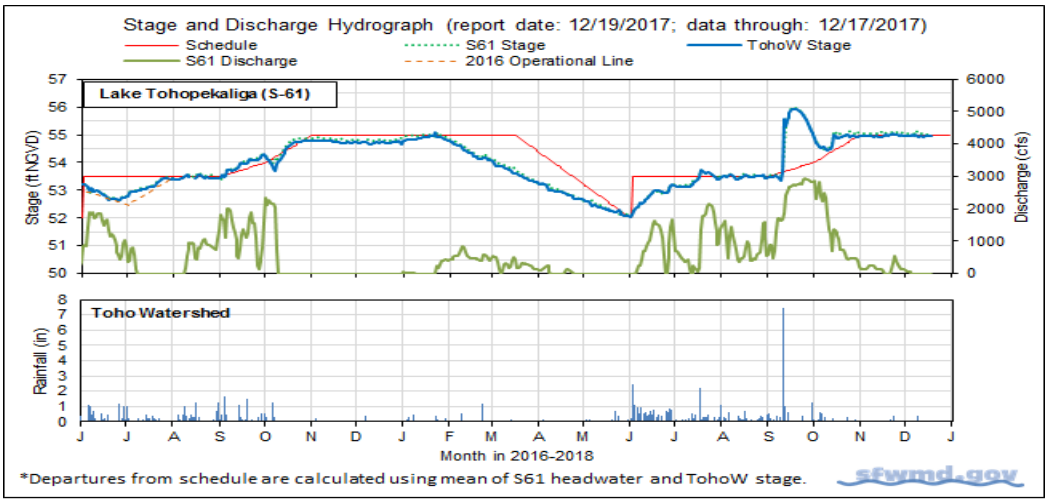


Figure 2.

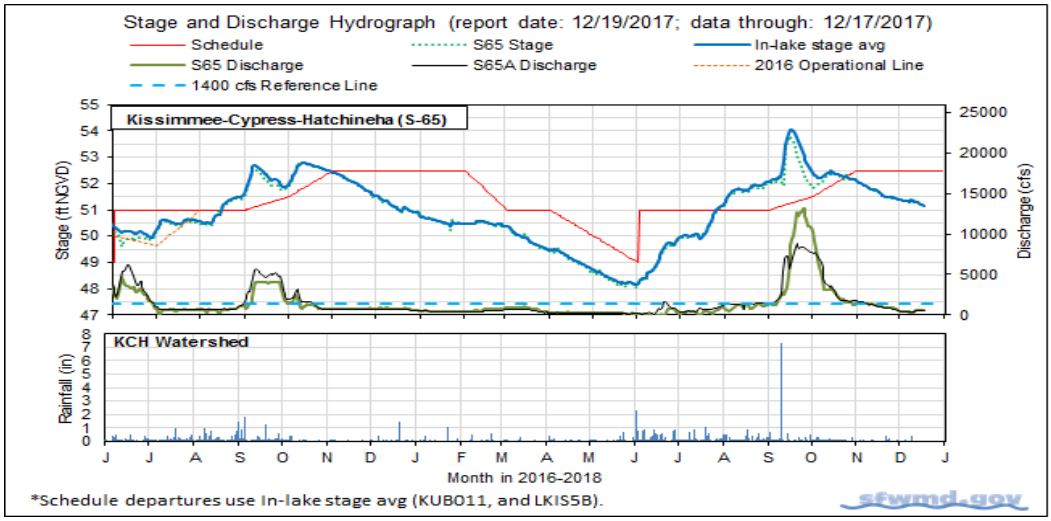


Figure 3.

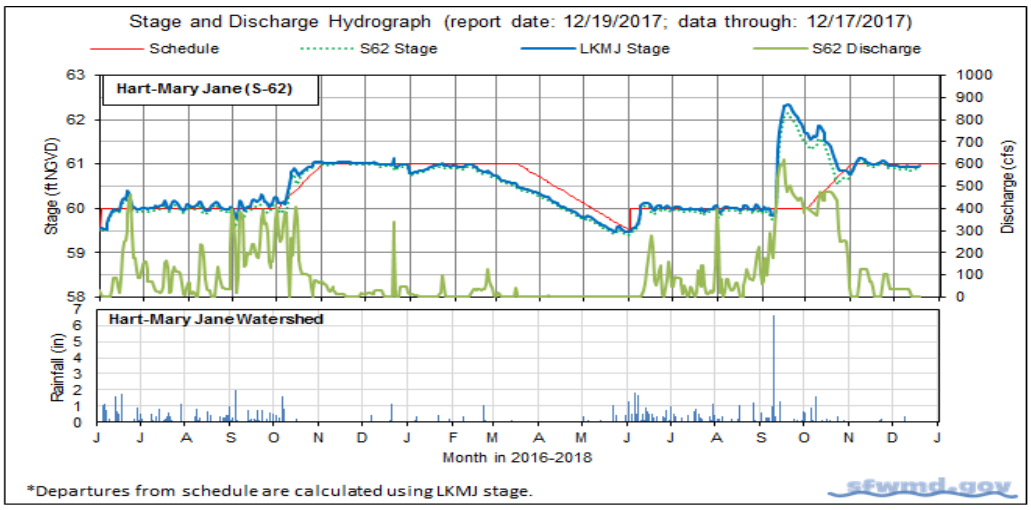


Figure 4.

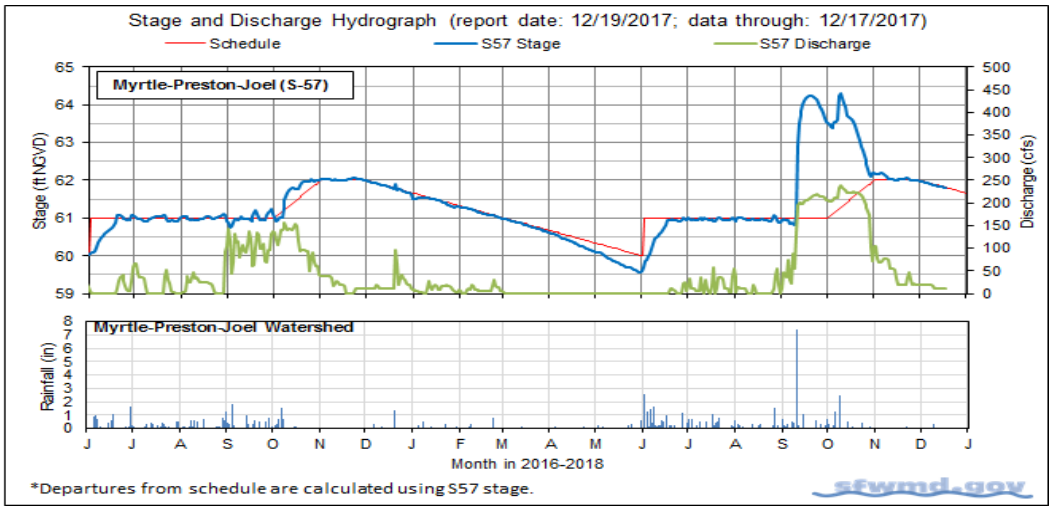


Figure 5.

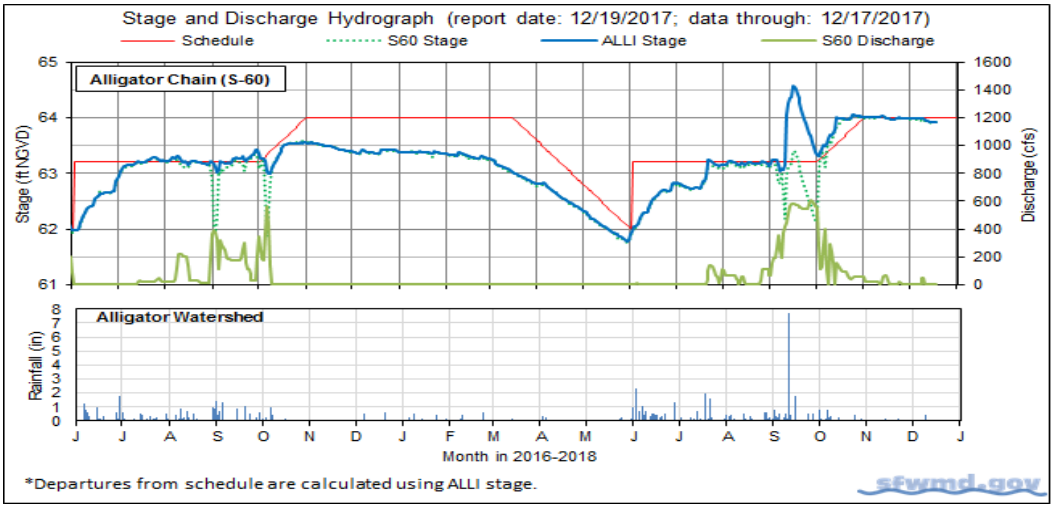


Figure 6.

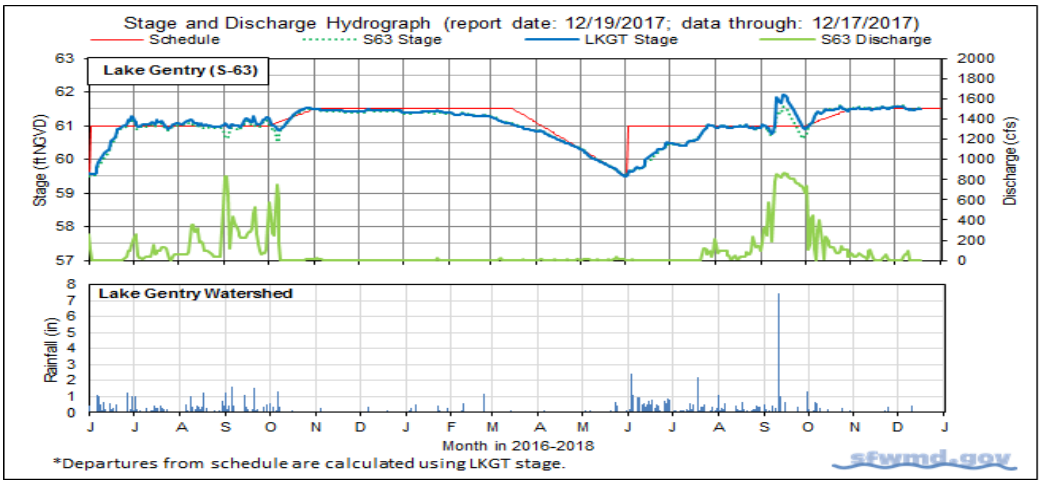


Figure 7.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

S65/S65A Limits on Rate of Change in Discharge

Discharge Rate of Change Limits for S65/S65A (revised 11/16/16).	
Q (cfs)	Maximum rate of increase or decrease (cfs/day)
300-650	75
650-1700	150
1700-3000	300
>3000	1000

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

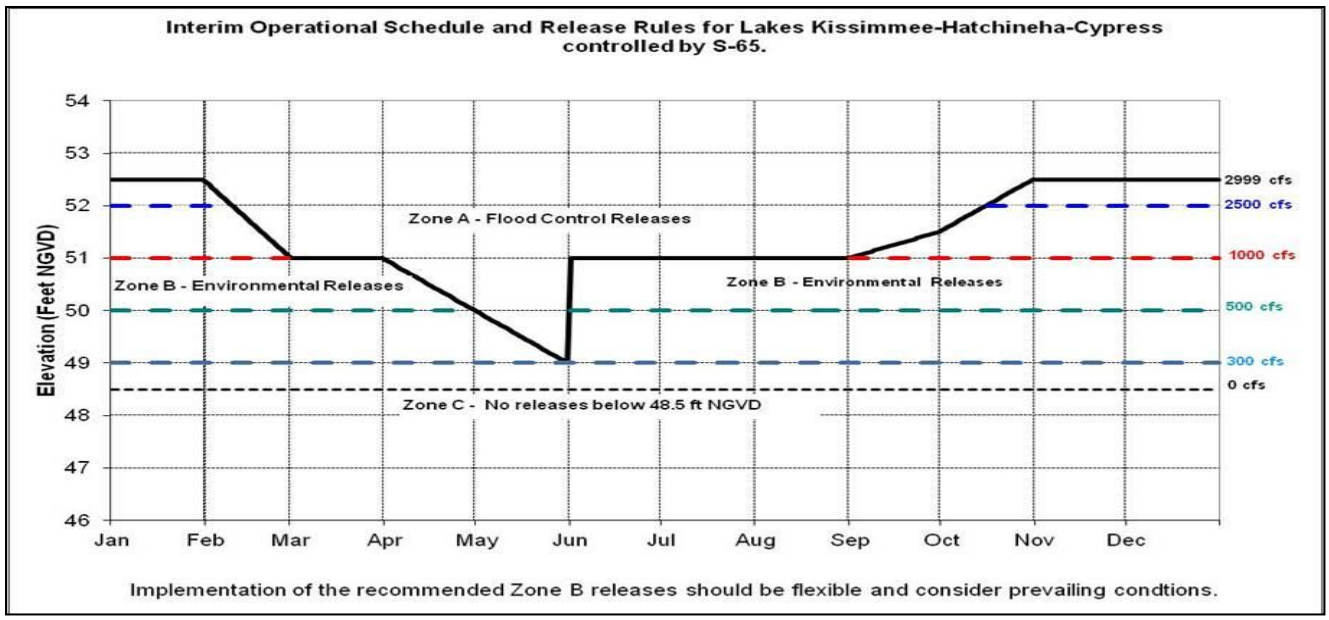


Figure 9. Interim operations schedule for S-65. The discharge schedule shown to the right has not been used in recent years.

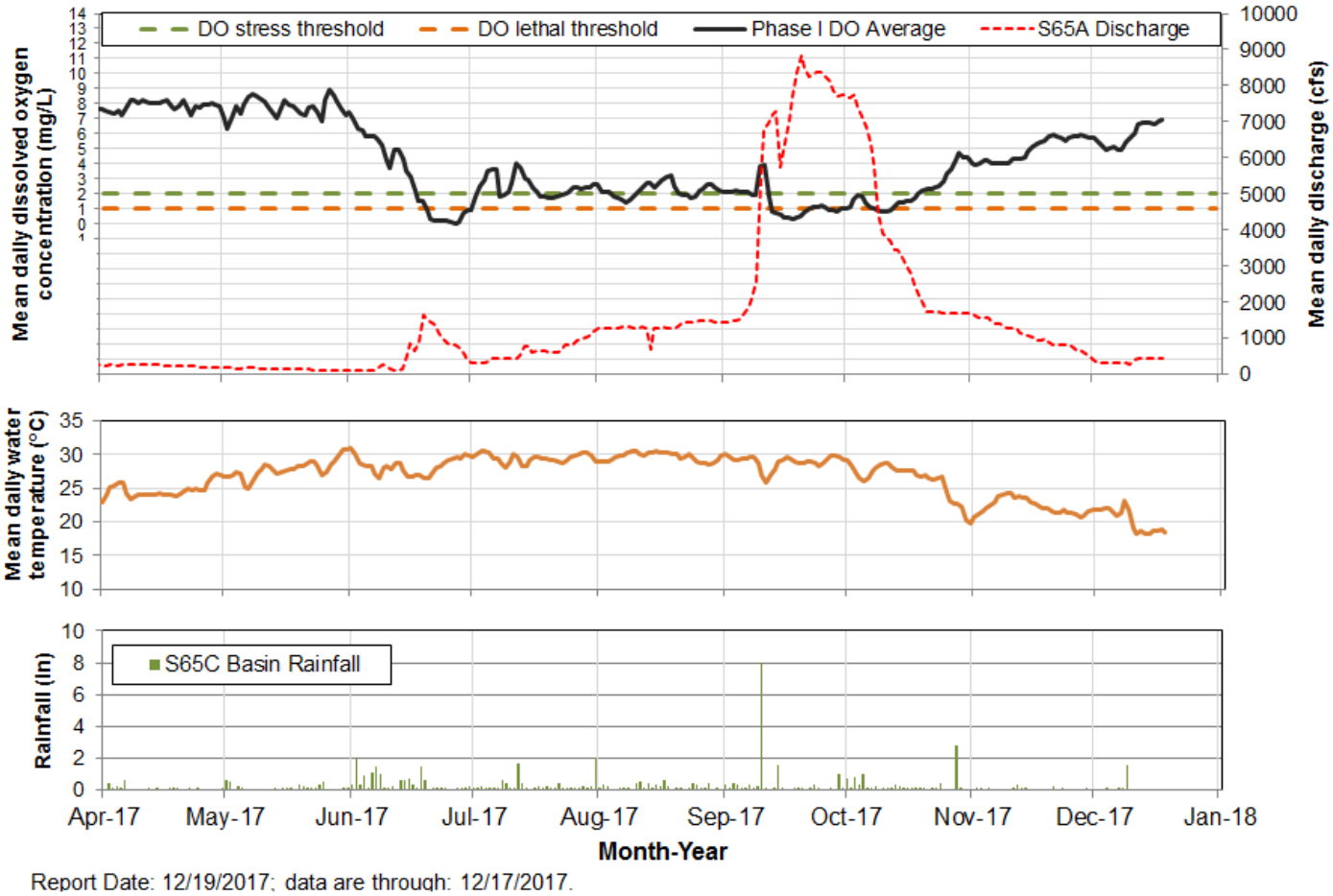


Figure 10. Mean daily Dissolved Oxygen, discharge, temperature and rainfall in the Phase I river channel.

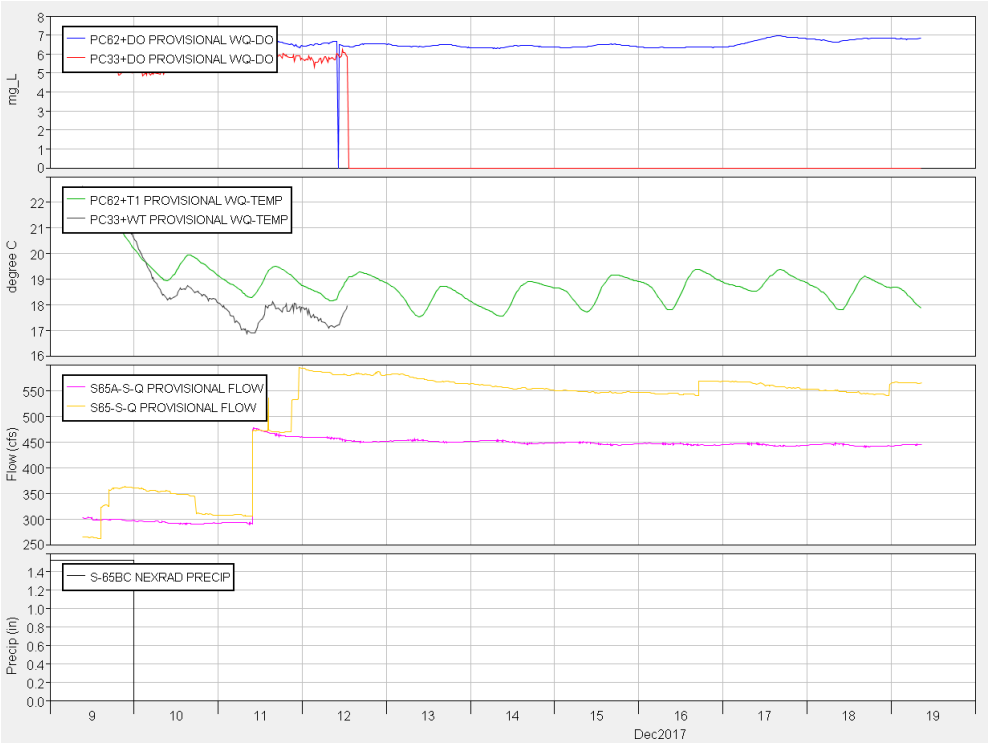


Figure 11. Phase I river channel dissolved oxygen and water temperature (measured at 15 minute intervals) and Pool BC daily rainfall.

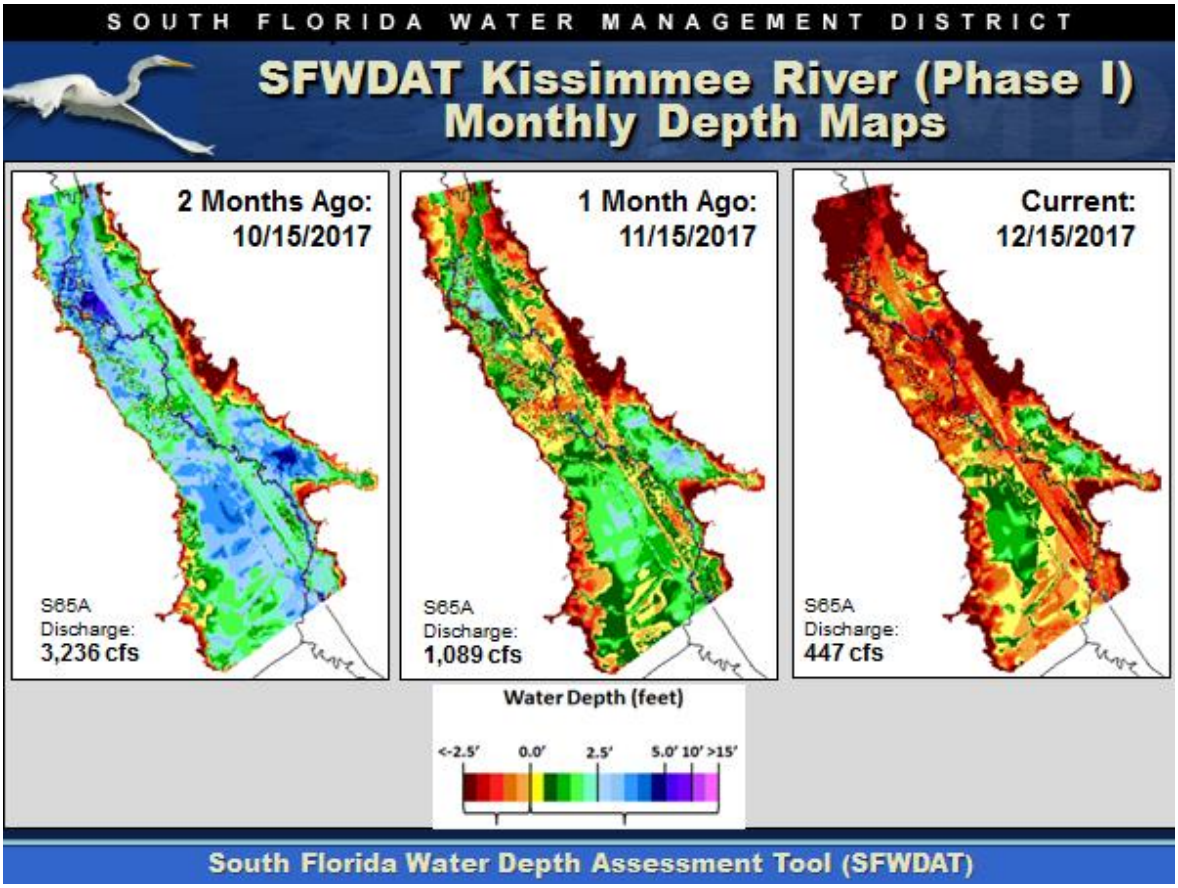
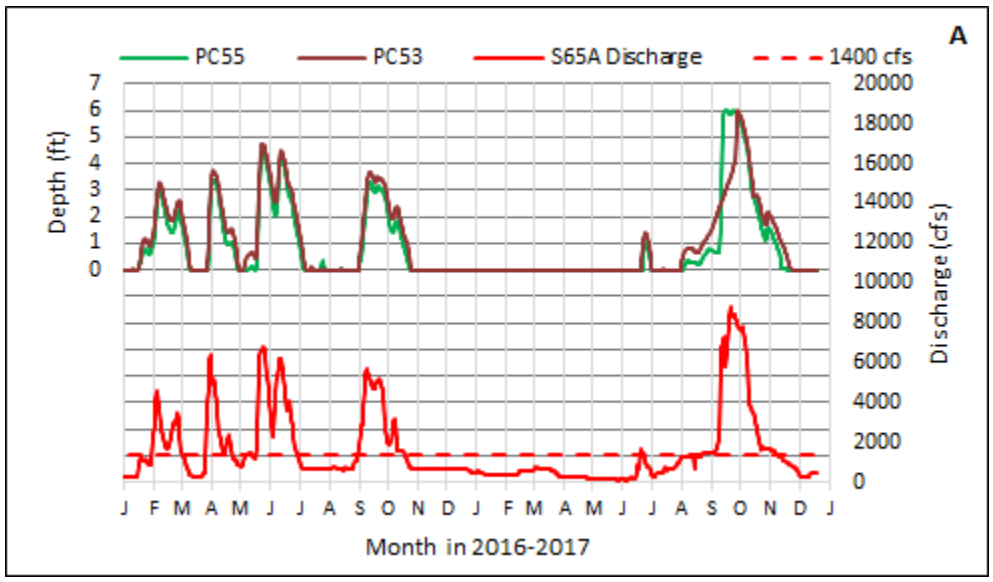
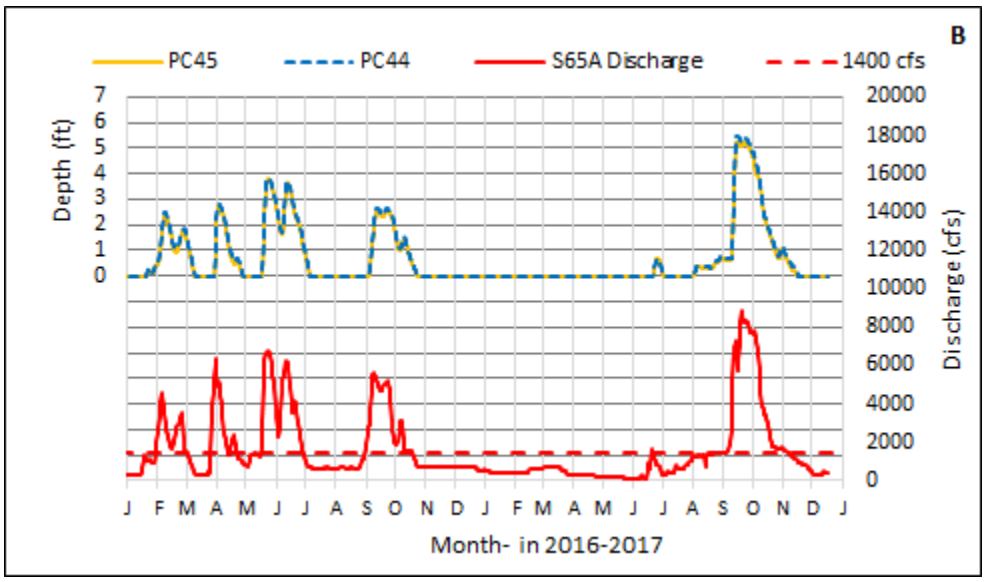


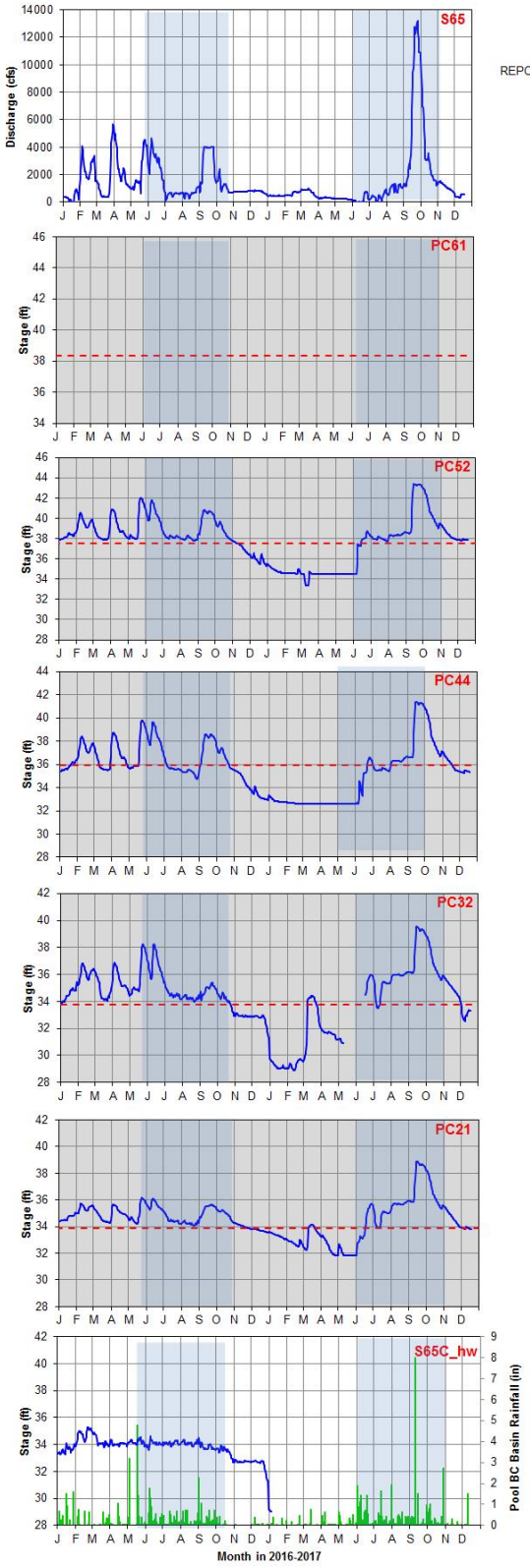
Figure 12. Phase I area floodplain water depths for this week, one month ago, and two months ago. Note that the WDAT color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to January 16, 2012.





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



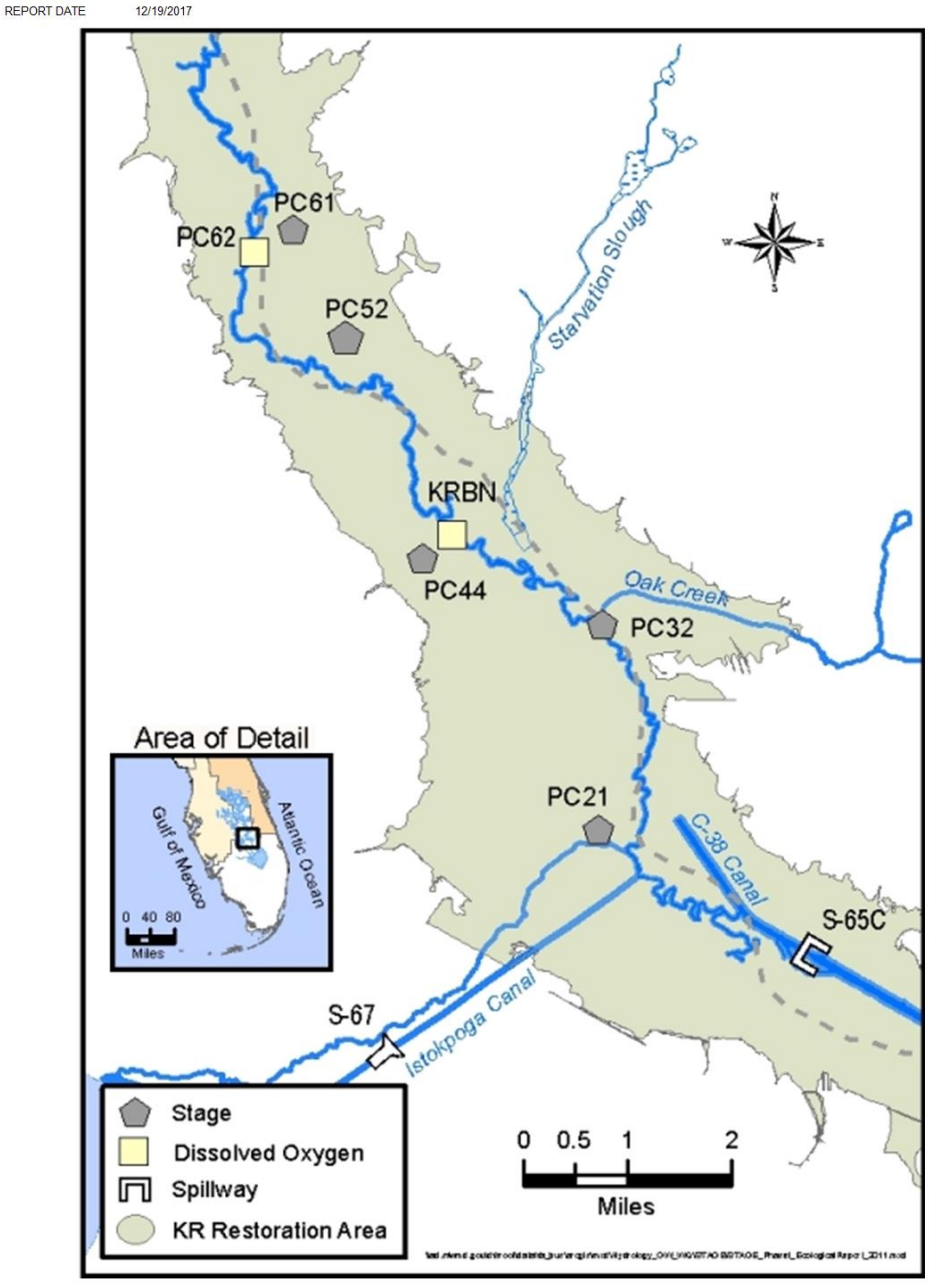


Figure 13. Discharge at S65, stages at five monitoring stations in the Phase I area of the Kissimmee River floodplain, and headwater stage at S65-C since January 1, 2016. The most recent data (~2 weeks) are provisional real-time data from SFWMD DualTrend; previous data are from SFWMD DBHYDRO (validated). Dashed lines are ground elevations.

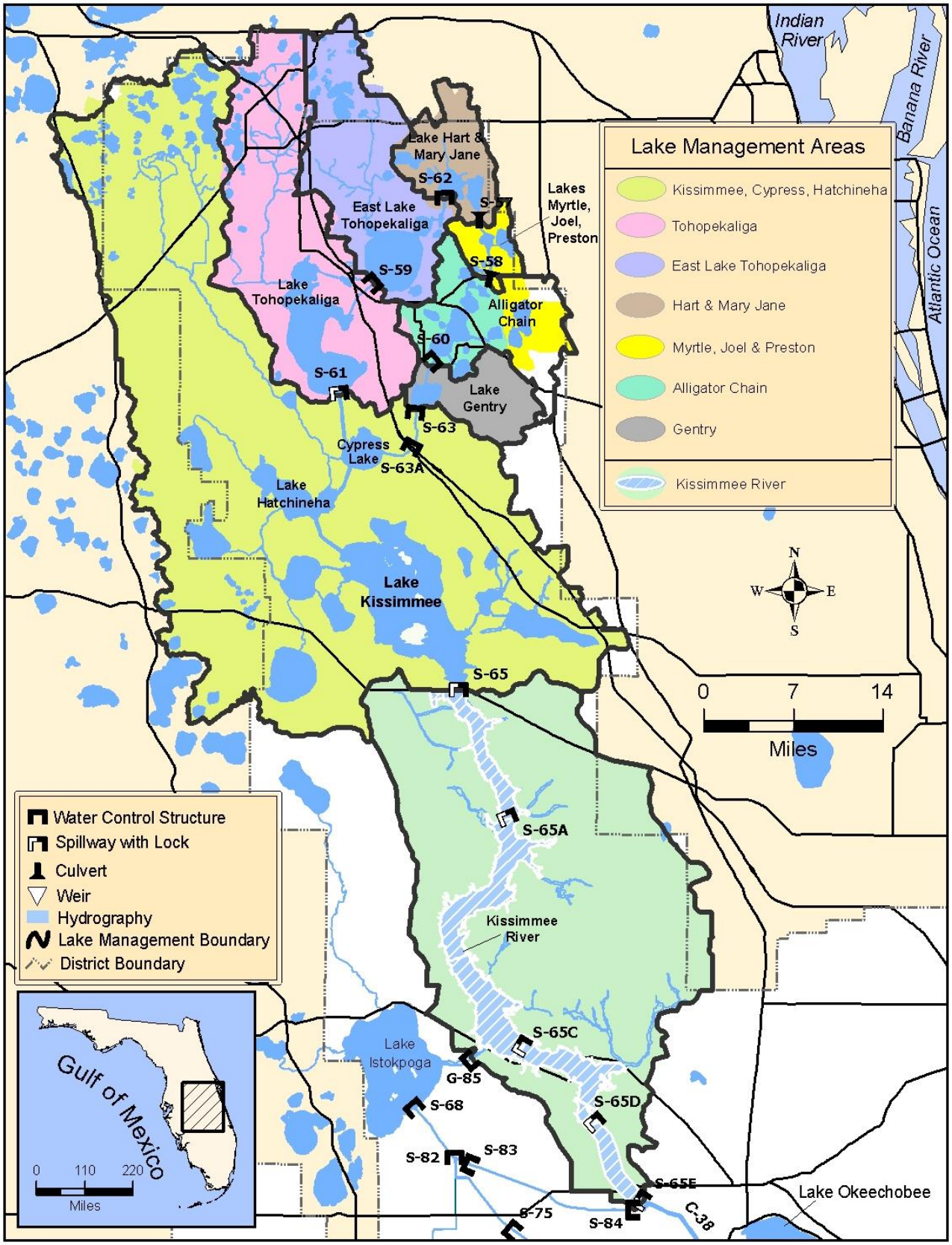


Figure 14. The Kissimmee Basin.

LAKE OKEECHOBEE

According to the USACE web site, Lake Okeechobee stage is at 15.71 feet NGVD for the period ending at midnight on December 18, 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 last peaked at 17.20 feet NGVD on October 13, 2017 before declining to 16.8 feet NGVD on October 28, 2017 and then back up to 17.02 feet NGVD. The Lake is now 0.81 feet lower than it was a month ago, but 1.18 feet higher than a year ago (Figure 1). The Lake is now in the Low sub-band (Figure 2). According to RAINDAR, no rain fell over the Lake or its watershed during the week December 12, 2017 - December 18, 2017 (Figure 3).

Average daily inflows to the Lake decreased over the past week, from 2,751 cfs to 2,016 cfs. Most of the inflows were from the Kissimmee River via the S65E and S84 structures, which averaged 875 cfs and 83 cfs daily, respectively. S71 and S72 structures, along with Fisheating Creek, contributed a combined 807 average daily cfs as well.

Average daily outflows for the Lake also decreased from the previous week, going from 5,144 cfs to 3,429 cfs, from reductions in S77 and S308 discharges. S77 discharges decreased from 3,322 cfs the previous week to 2,272 cfs this past week, while S308 discharges went from 1,624 cfs to 1,153 cfs. No discharges were made to the south through the S350 structures, down from 189 average daily cfs the previous week. There were no discharges through to the L8 canal via Culvert 10A (only 4 average daily cfs). The corrected evapotranspiration value based on the L006 weather platform solar radiation data increased slightly to 0.11 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 December 12, 2017 to midnight December 18, 2017). 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.

Table 1

INFLOWS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)
S65E & S65EX1	875	0.3
S71 & 72	153	0.1
S84 & 84X	83	0.0
Fisheating Creek	654	0.3
S154	23	0.0
S191	82	0.0
S133 P	57	0.0
S127 P	29	0.0
S129 P	14	0.0
S131 P	9	0.0
S135 P	37	0.0
S2 P	0	0.0
S3 P	0	0.0
S4 P	0	0.0
C5	0	0.0
Rainfall	0	0.0
Total	**2016**	**0.8**

OUTFLOWS	Avg Daily Flow cfs	Equivalent Depth Week Total (in)
S77	2272	0.9
S308	1153	0.4
S351	0	0.0
S352	0	0.0
S354	0	0.0
L8	4	0.0
ET	2177	0.8
Total	**5606**	**2.2**

PROVISIONAL DATA

Satellite imagery indicates that algal bloom potential has remained very low over the past three months, based on NOAA's cyanobacteria monitoring product derived from the OLCI satellite sensor. Potential for elevated cyanobacterial levels were last observed in the northern portion of the Lake in early September (Figure 5). Along with decreasing temperatures, high winds from Hurricane Irma may have further reduced bloom potential on the Lake by increasing turbidity, but elevated TP levels from high inflows and resuspended lake sediment are expected to produce high bloom potentials next year as turbidity declines and temperatures increase.

Water Management Recommendations

The Lake is at 15.71 feet NGVD having decreased 0.14 feet from the week prior, and 0.81 feet over the past month. Submerged and emergent vegetation communities in the nearshore region have experienced stages >16.0 feet NGVD three times in less than two years, and for 72 consecutive days this past wet season, the longest period since late 2004 which was 73 consecutive days. 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.

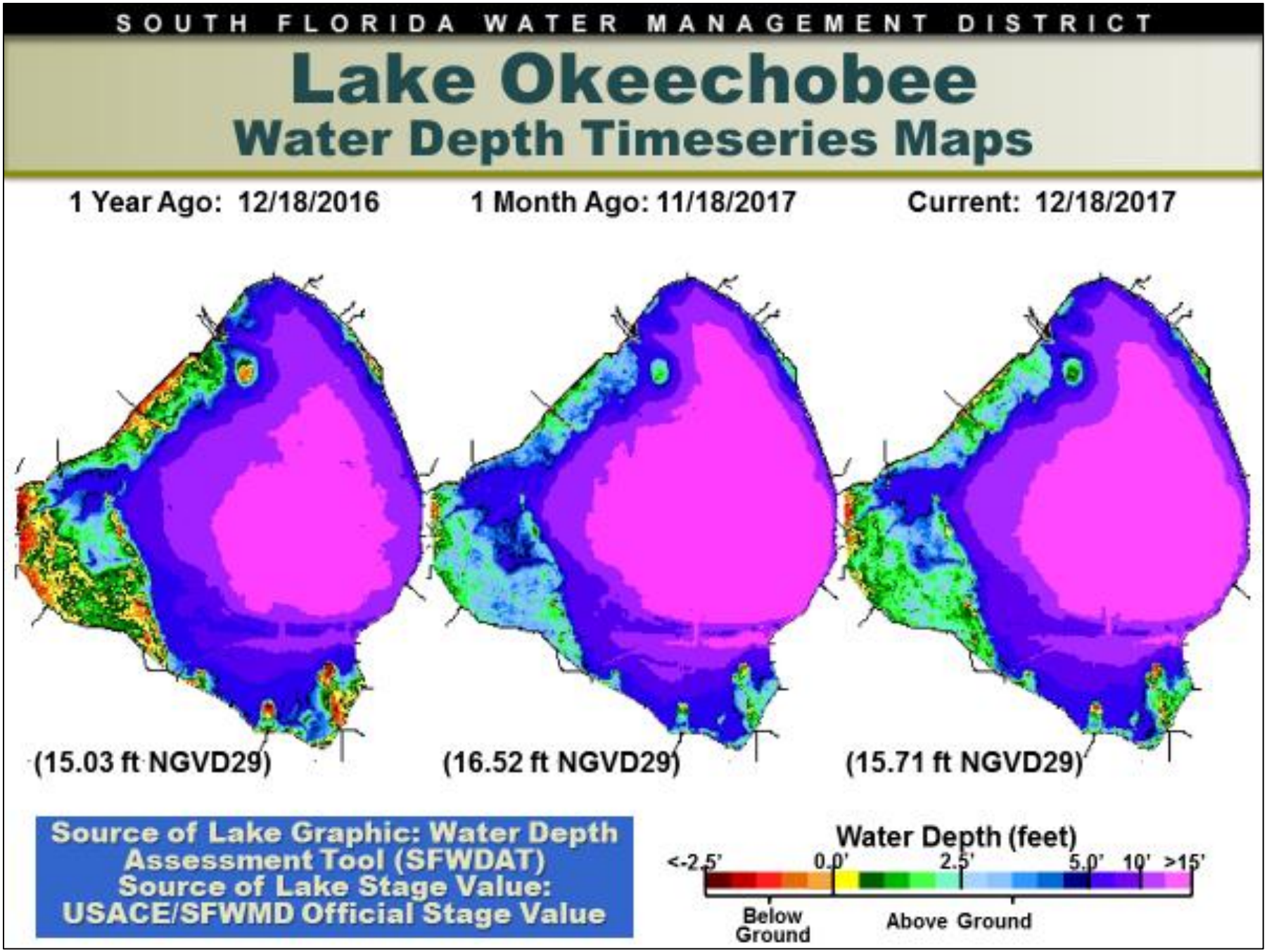
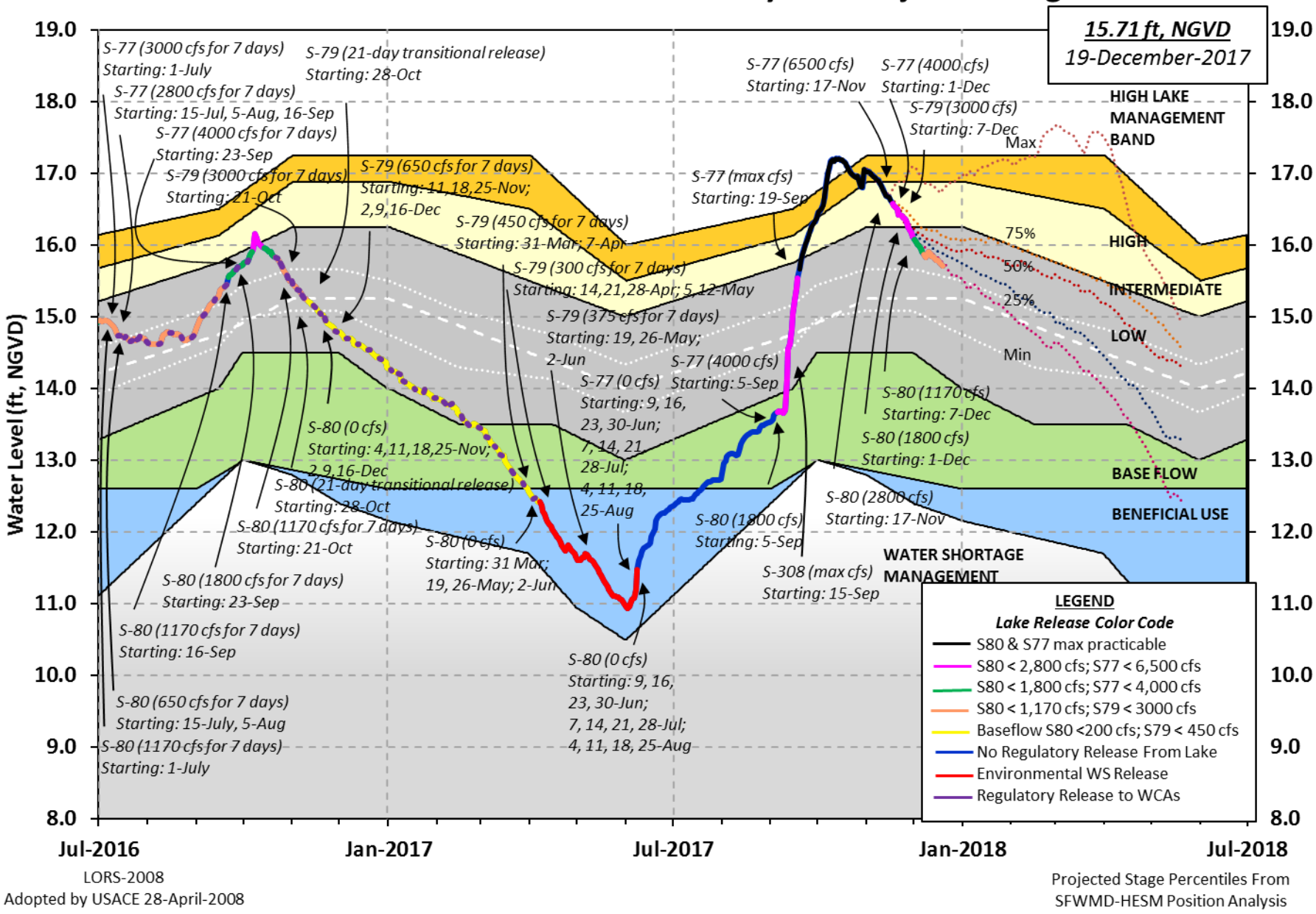

SOUTH FLORIDA WATER MANAGEMENT DISTRICT
Lake Okeechobee
Water Depth Timeseries Maps
1 Year Ago: 12/18/2016
1 Month Ago: 11/18/2017
Current: 12/18/2017
(15.03 ft NGVD29)
(16.52 ft NGVD29)
(15.71 ft NGVD29)
Source of Lake Graphic: Water Depth Assessment Tool (SFWDAT)
Source of Lake Stage Value: USACE/SFWMD Official Stage Value
Water Depth (feet)
<-2.5'
0.0'
2.5'
5.0'
10'
>15'
Below Ground
Above Ground

Figure 1

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

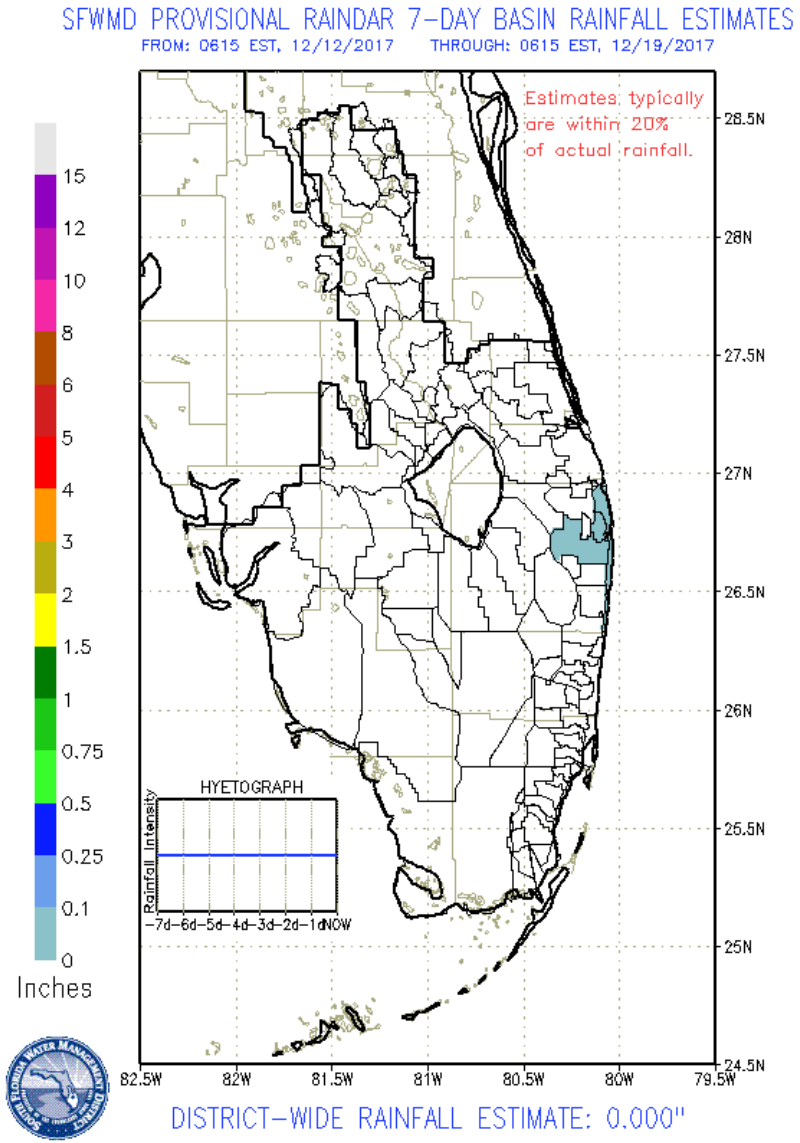


Figure 3

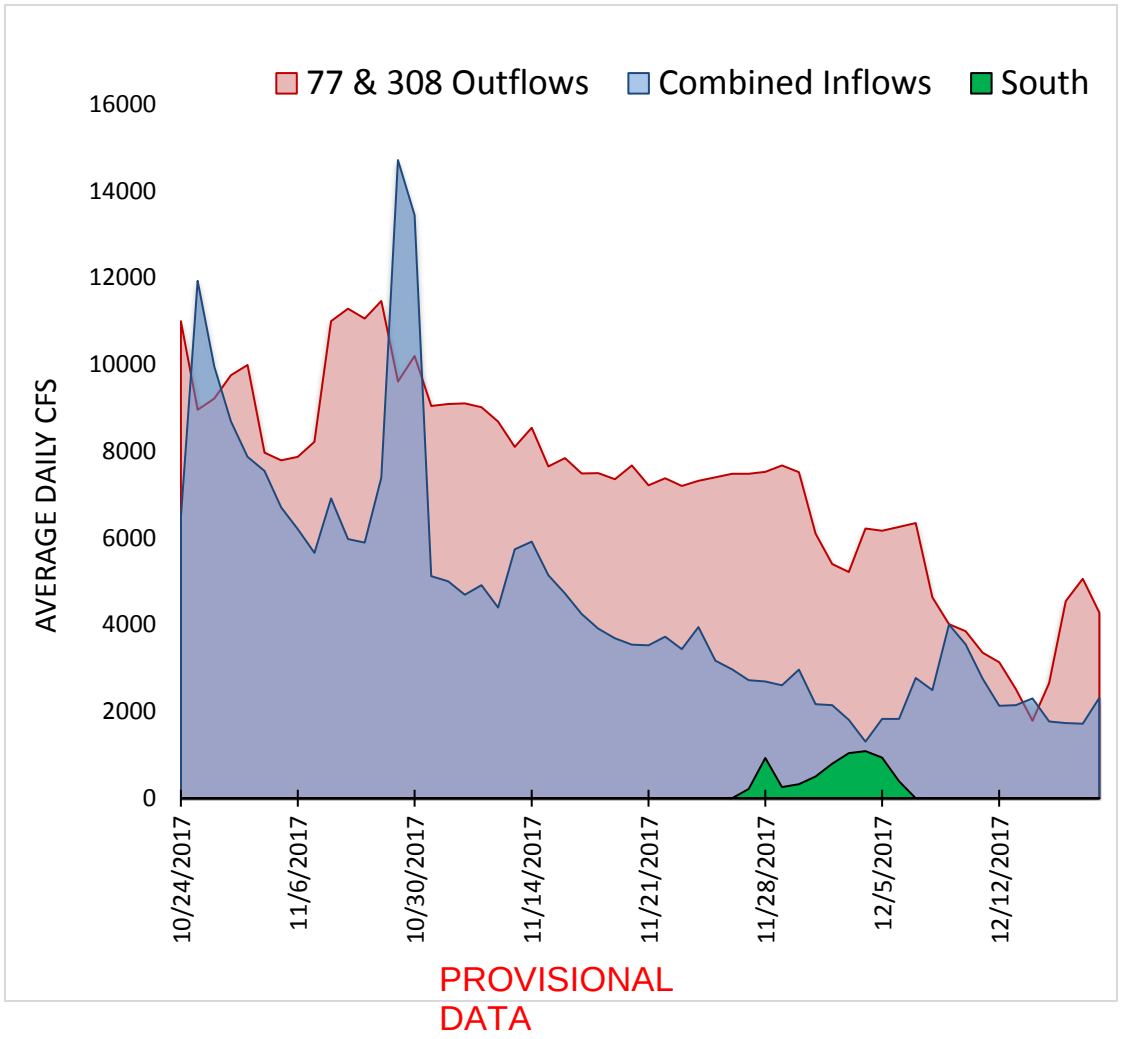


Figure 4

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Lake Okeechobee
Cyanobacteria Bloom Potential

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

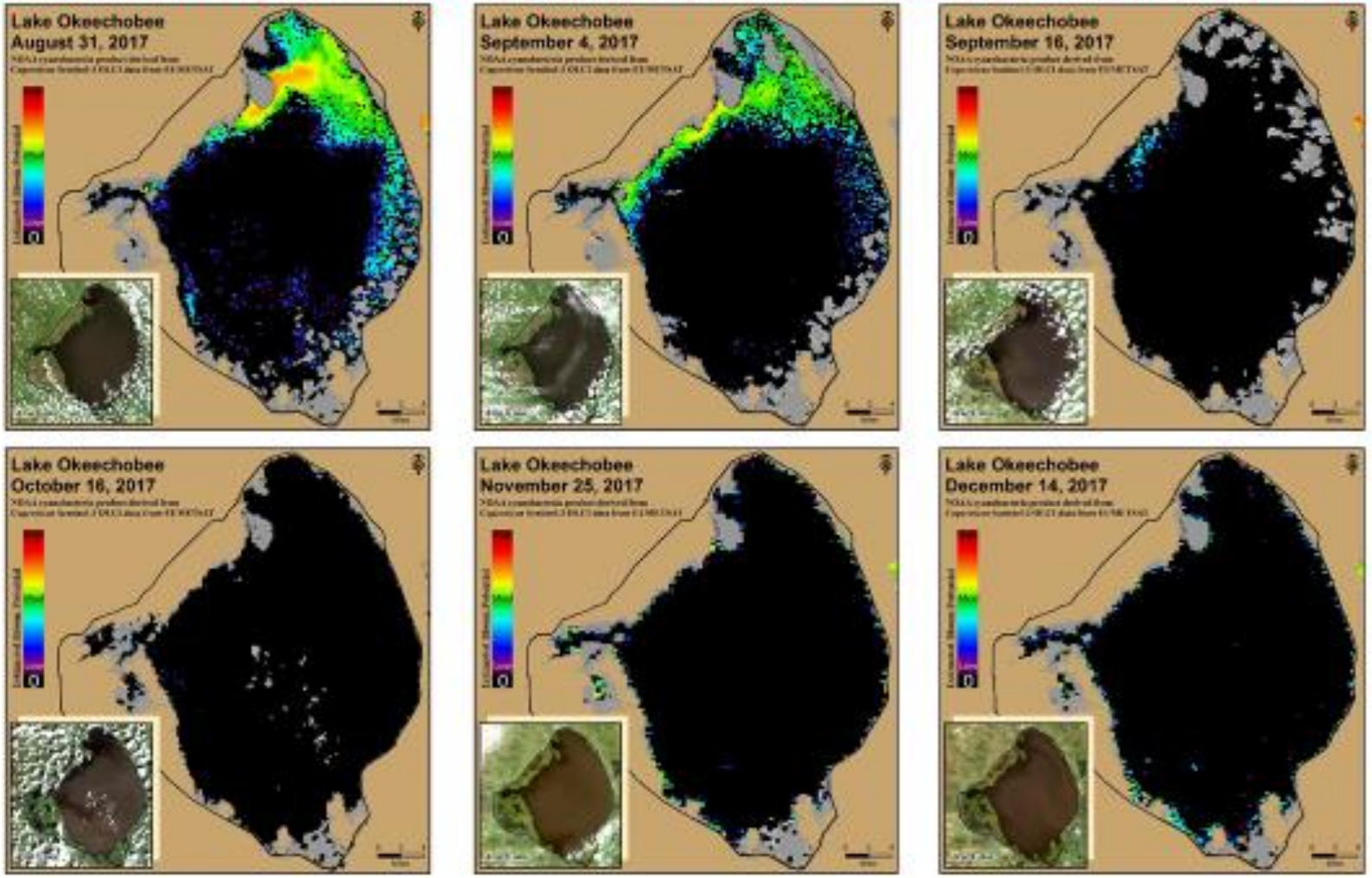


Figure 5

LAKE ISTOKPOGA

Lake Istokpoga stage is 39.41 feet NGVD as of midnight December 18, 2017 and is currently 0.09 feet below its regulation schedule to accommodate construction on downstream structures (Figure 6). Average daily flows into the Lake from Josephine Creek for the week December 12, 2017 – December 18, 2017 were down from the previous week, at 82 cfs. No data have been reported for Arbuckle Creek since July 4, 2017 as the gauge is being recalibrated after construction in the area. Average daily discharge from S68 and S68X over the past week was 0 cfs, down significantly from 888 cfs the week prior. According to RAINDAR, no rain fell in the Lake Istokpoga basin over the past week.

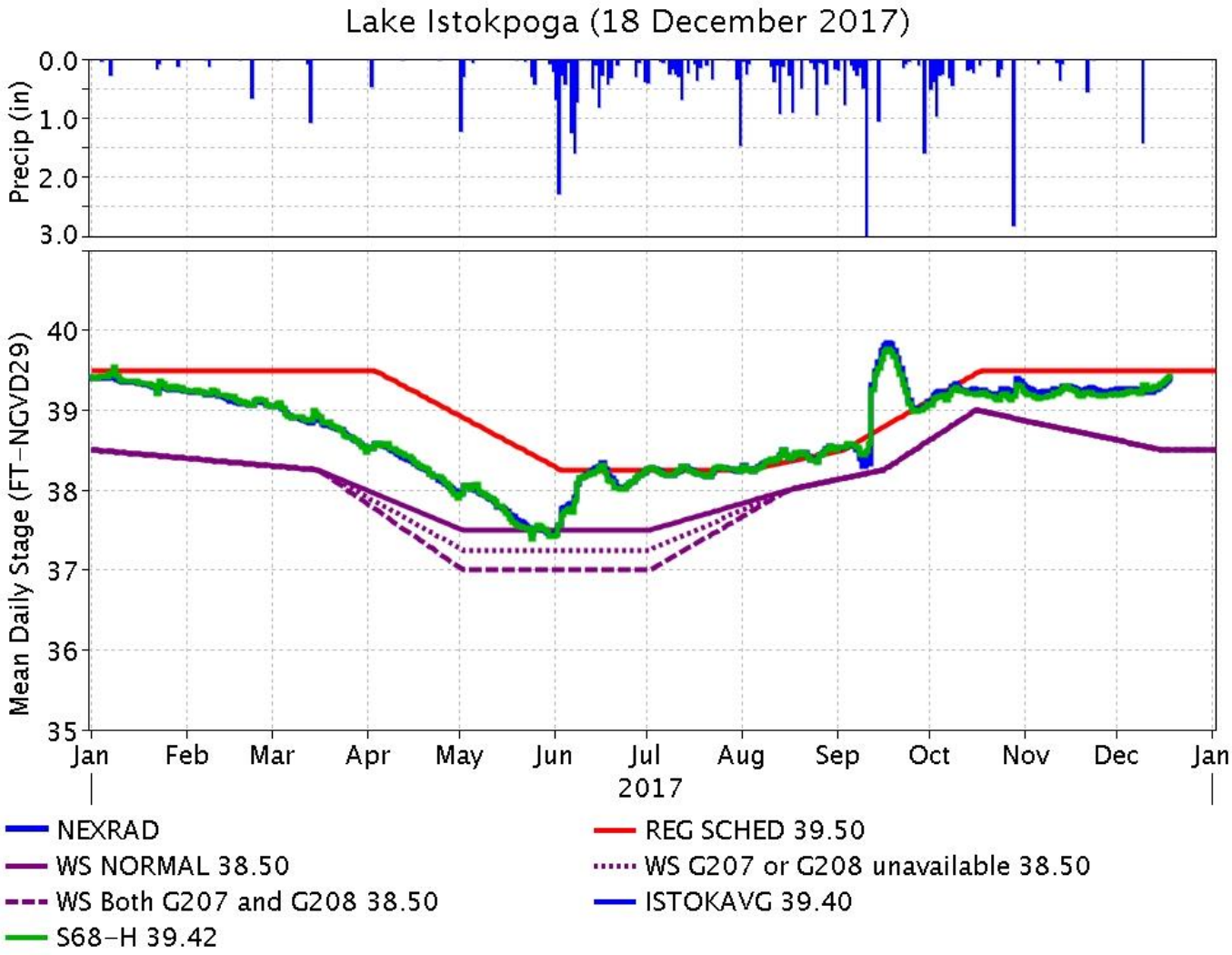


Figure 6

ESTUARIES

St. Lucie Estuary:

Last week total inflow into the St. Lucie Estuary averaged about 1,989 cfs (Figures 1 and 2) and last month inflow averaged about 3,249 cfs. Last week provisional averaged inflows from the tidal basin and the structures are shown in Table 1.

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

Location	Flow (cfs)
Tidal Basin Inflow	170
S-80	1,267
S-308	1,079
S-49 on C-24	281
S-97 on C-23	120
Gordy Rd. structure on Ten Mile Creek	153

Over the past week, salinity increased throughout the estuary (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 7.2. Salinity conditions in the middle estuary are in the fair range for the adult eastern oysters (Figure 3).

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

Sampling Site	Surface	Bottom	Envelope
HR1 (North Fork)	**3.1** (2.0)	**6.0** (4.3)	NA[1]
US1 Bridge	**5.3** (4.3)	**11.2** (9.7)	10.0-26.0
A1A Bridge	**11.9** (11.6)	**19.8** (19.0)	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 3.

Table 3. 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	7.96	6.72	9.05
HR1	bottom	6.81	5.34	8.07

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 4 and station location map is shown in Figure 5.

Table 4. 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	2.76	4.72 - 5.28	7.85	7.43	8.14
SF	1.66	4.84 - 6.23	8.43	7.60	9.24
NF	2.10	3.89 - 7.2	7.85	6.94	8.93
ME	1.88	3.66 - 6.19	7.89	7.11	8.63
IRL-SLE	3.47	1.81 - 4.67	6.64	5.93	7.32

[1]Not available.

NOAA satellite imagery indicates low-mediate potential for cyanobacteria blooms in the South Fork of the St. Lucie Estuary (Figure 6).

Caloosahatchee Estuary:
Last week total inflow into the Caloosahatchee Estuary averaged about 3,192 cfs (Figures 7 and 8) and last month inflow averaged about 5,884 cfs. Last week provisional averaged inflows from the structures are shown in Table 5.

Table 5. Weekly average inflows (data is provisional)

Location	Flow (cfs)
S-77	2,130
S-78	2,217
S-79	3,059

Over the past week, salinity stayed the same in the upper estuary and increased in the lower estuary (Table 6, Figures 9 & 10). The seven-day average salinity values are within the poor range for the adult eastern oysters at Cape Coral and in the good range at Shell Point (Figure 11). Salinity data was not available at Sanibel. The 30-day moving average surface salinity is 0.1 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 6. 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	**3.6** (2.7)	**6.1** (4.0)	10.0-30.0
Shell Point	**15.8** (14.1)	**17.6** (15.5)	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 7 as concentration ranges of chlorophyll *a* and dissolved oxygen at Beautiful Island, Ft. Myers, and Shell Point in the Caloosahatchee Estuary.

Table 7. 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.

Parameter Name	RECON Monitoring Stations		
	Beautiful Island	**Ft. Myers**	**Shell Point**
Chlorophyll *a* (µg/l)	Down for maintenance	No Data	2.71 – 6.30
Dissolved Oxygen (mg/l)	Down for maintenance	No Data	6.87 – 8.48

The Florida Fish and Wildlife Research Institute reported on December 15, 2017, that *Karenia brevis*, the Florida red tide dinoflagellate, was observed in background to high concentrations in thirty samples collected from Lee County. However small-scale fish kills were reported along Lee County over the past week. Slight respiratory irritation was reported along Lee County on 12/13/17.

NOAA satellite imagery indicates low potential for cyanobacteria blooms in the Caloosahatchee River Estuary (Figure 12).

Water Management Recommendations

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

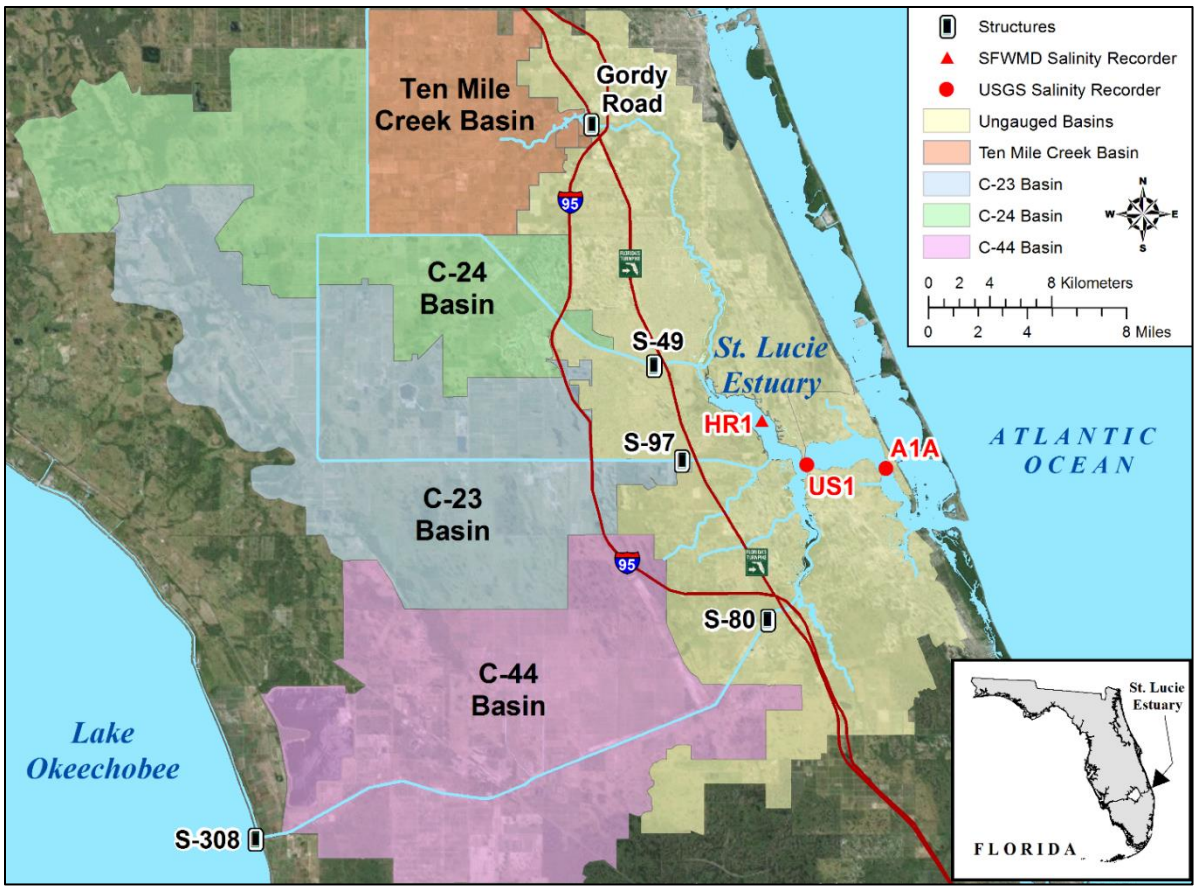


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

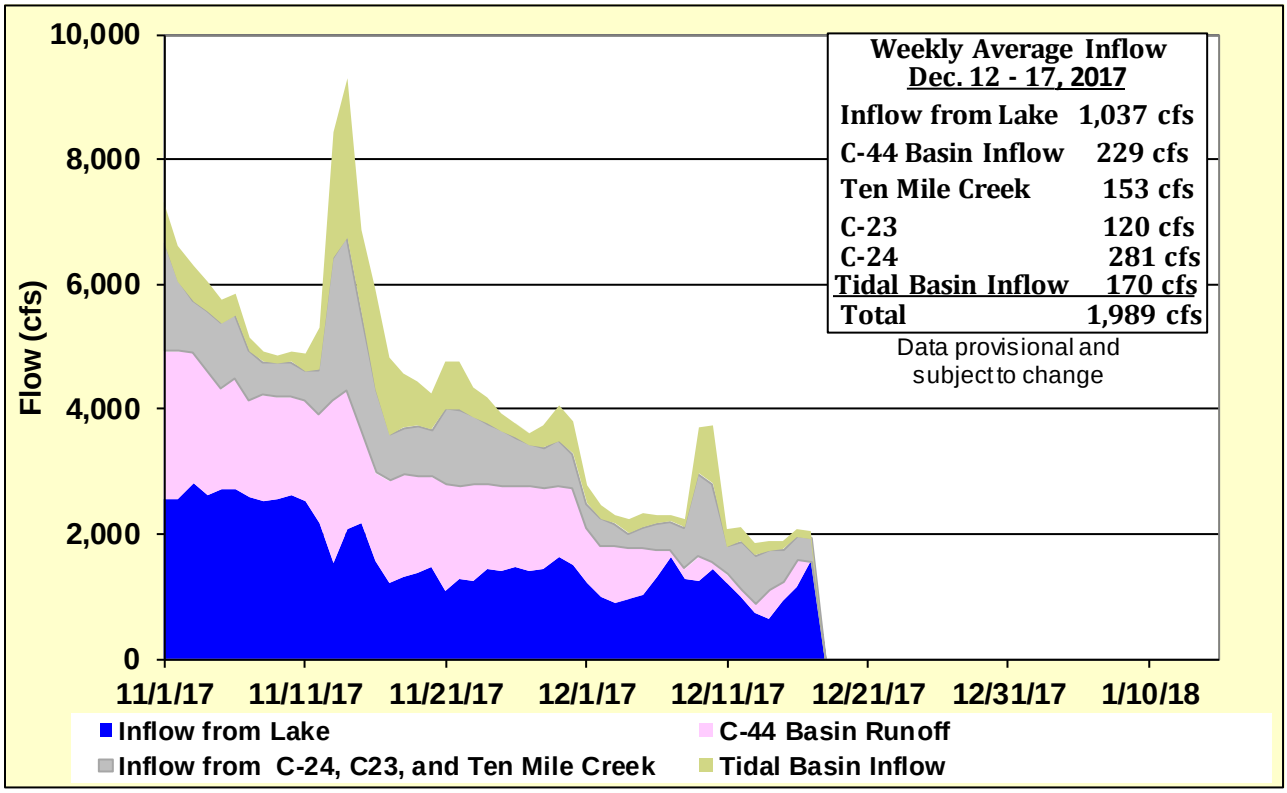


Figure 2. Estimated surface freshwater inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basins into the St. Lucie Estuary.

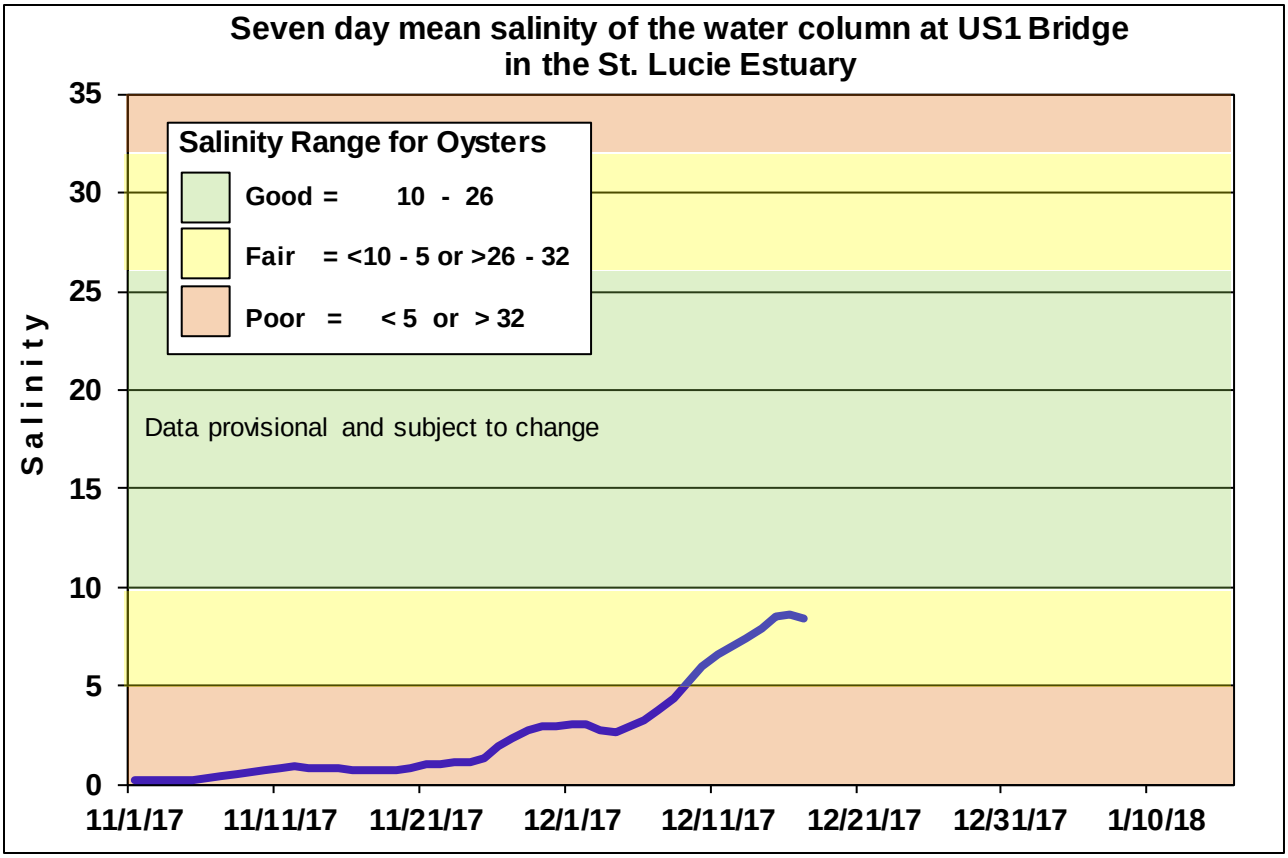


Figure 3. Seven-day mean salinity of the water column at the U.S. Highway 1 Bridge.

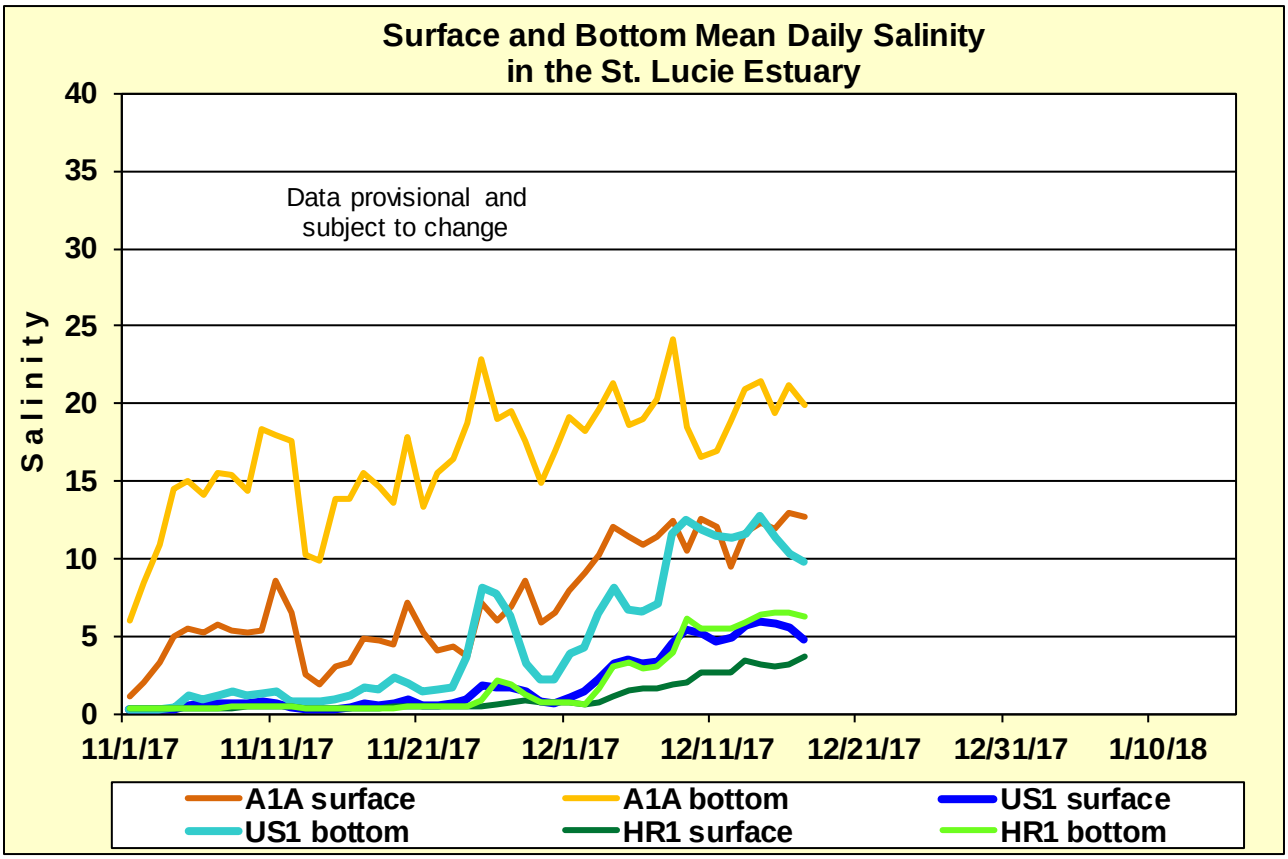


Figure 4. Daily mean salinity at the A1A, US1 and estimated HR1 stations.

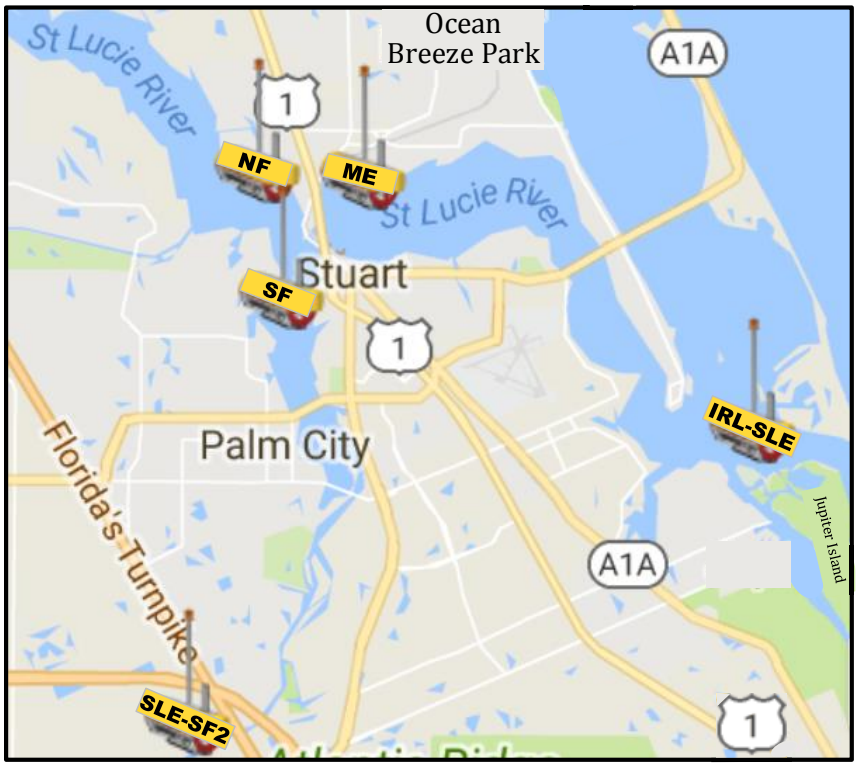


Figure 5. Location of FAU-HBOI LOBO water quality stations in the St. Lucie Estuary.

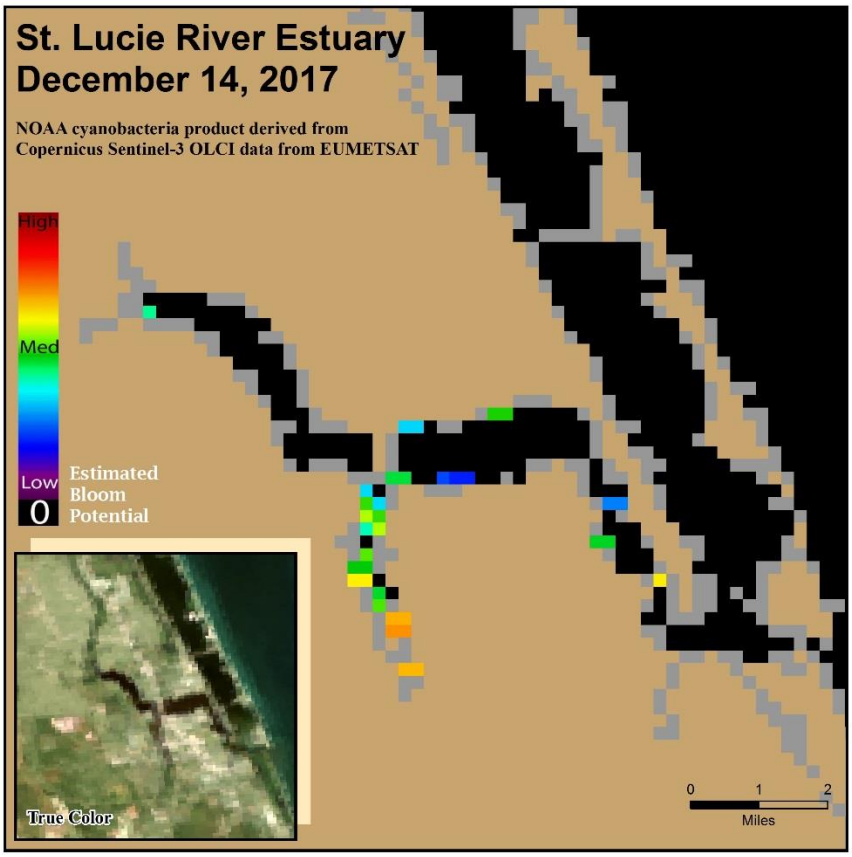


Figure 6. Sentinel 3a Satellite imagery provided by NOAA uses Ocean and Land Color Instrument (OLCI) to estimate cyanobacteria bloom potential in St. Lucie Estuary

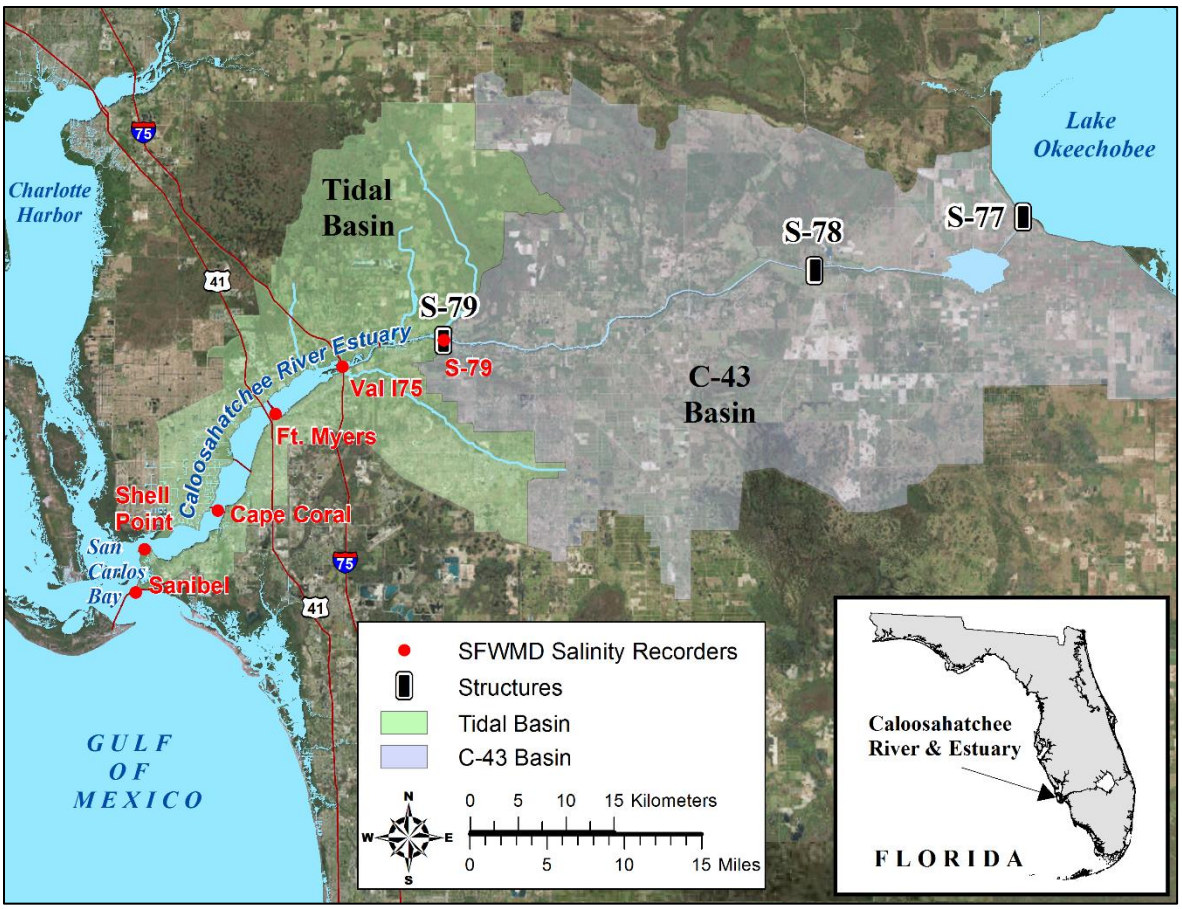


Figure 7. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

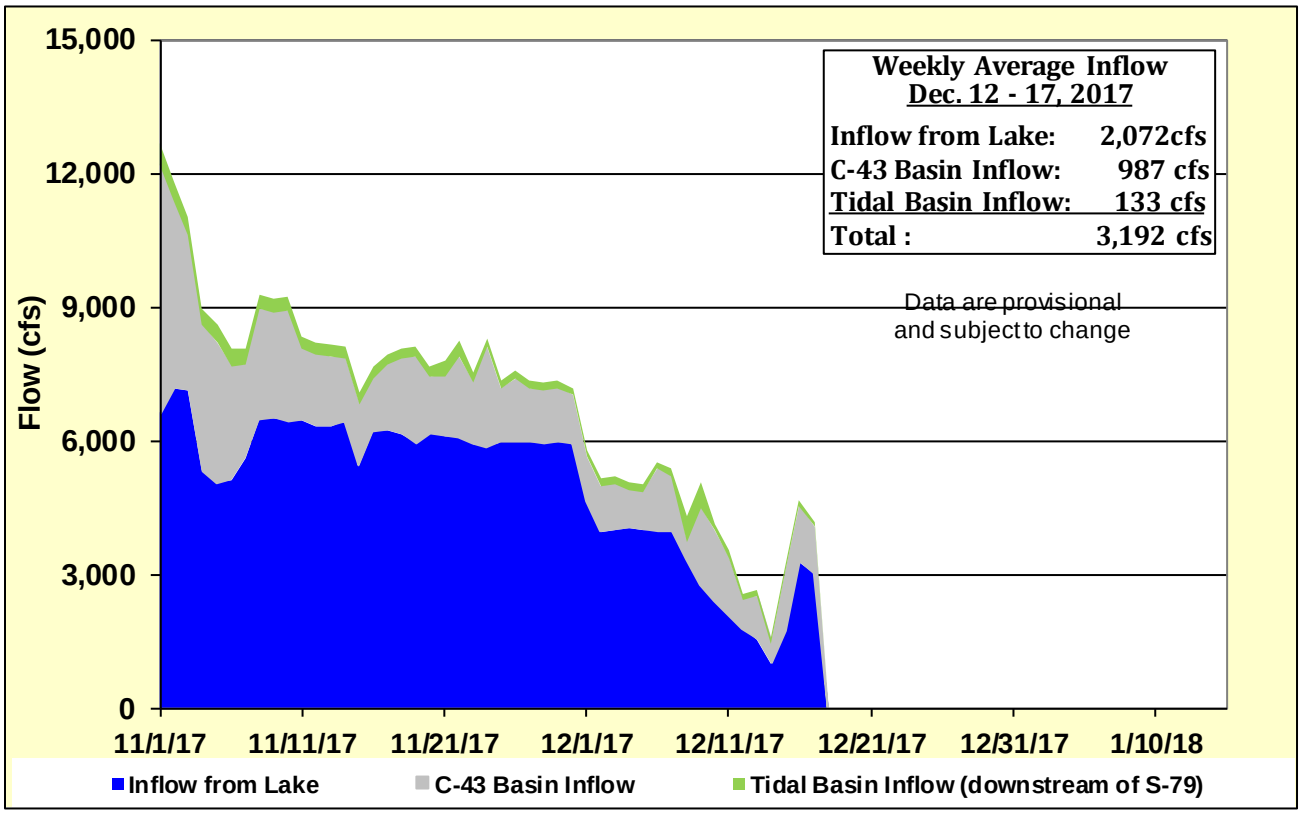


Figure 8. Freshwater inflows from Lake Okeechobee, runoff from the C-43 basin, and tributaries in the tidal basin into the Caloosahatchee River Estuary.

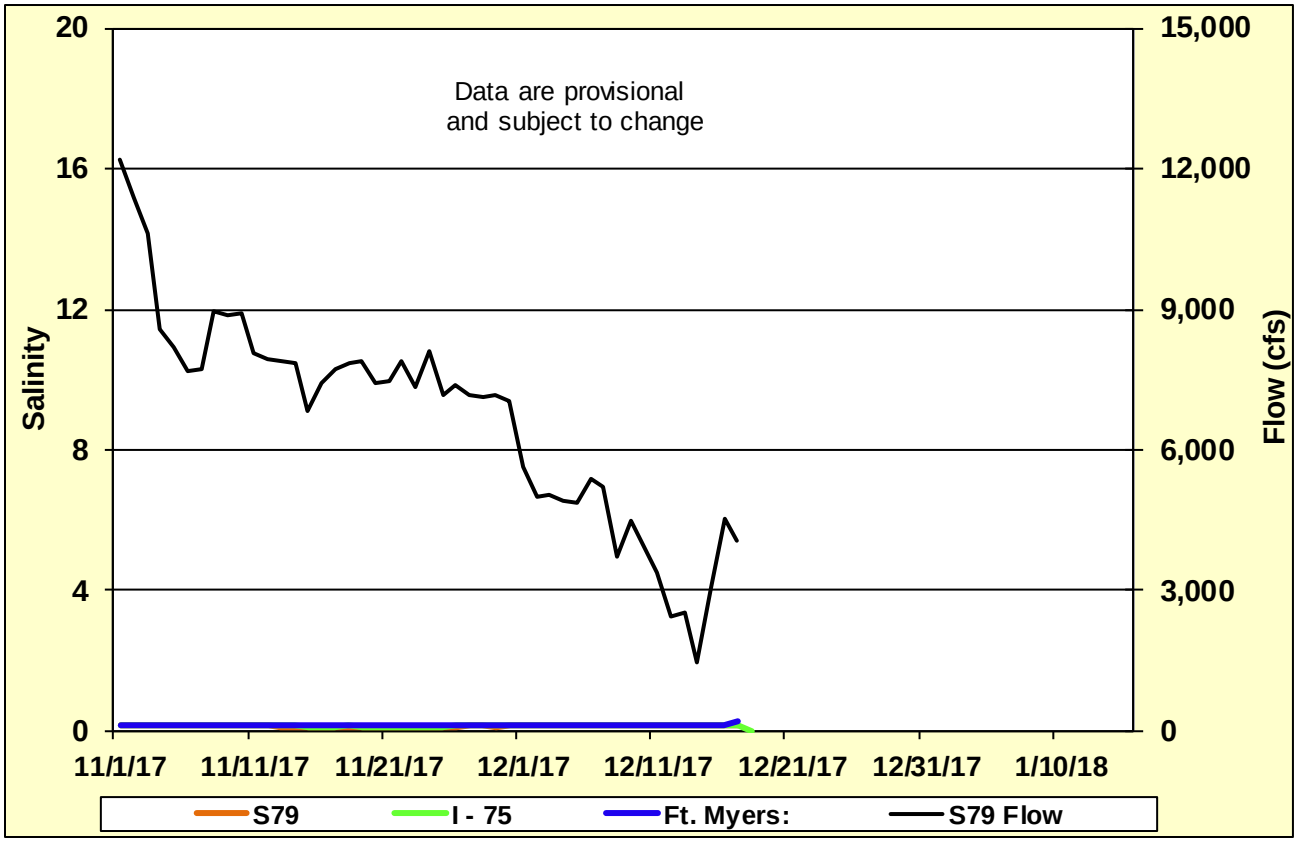


Figure 9. Daily mean flows at S-79 and salinity at upper estuary monitoring stations.

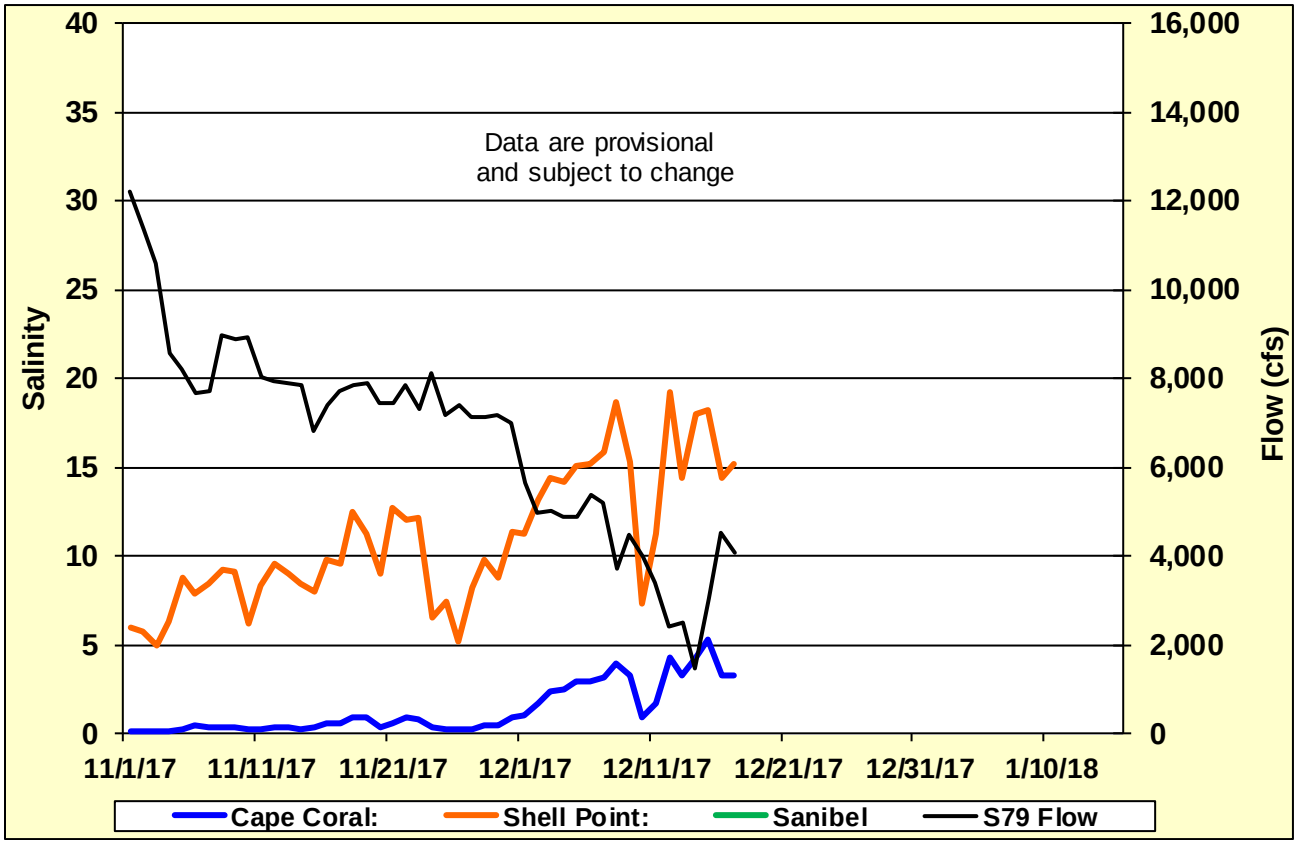


Figure 10. Daily mean flows at S-79 and salinity at lower estuary stations.

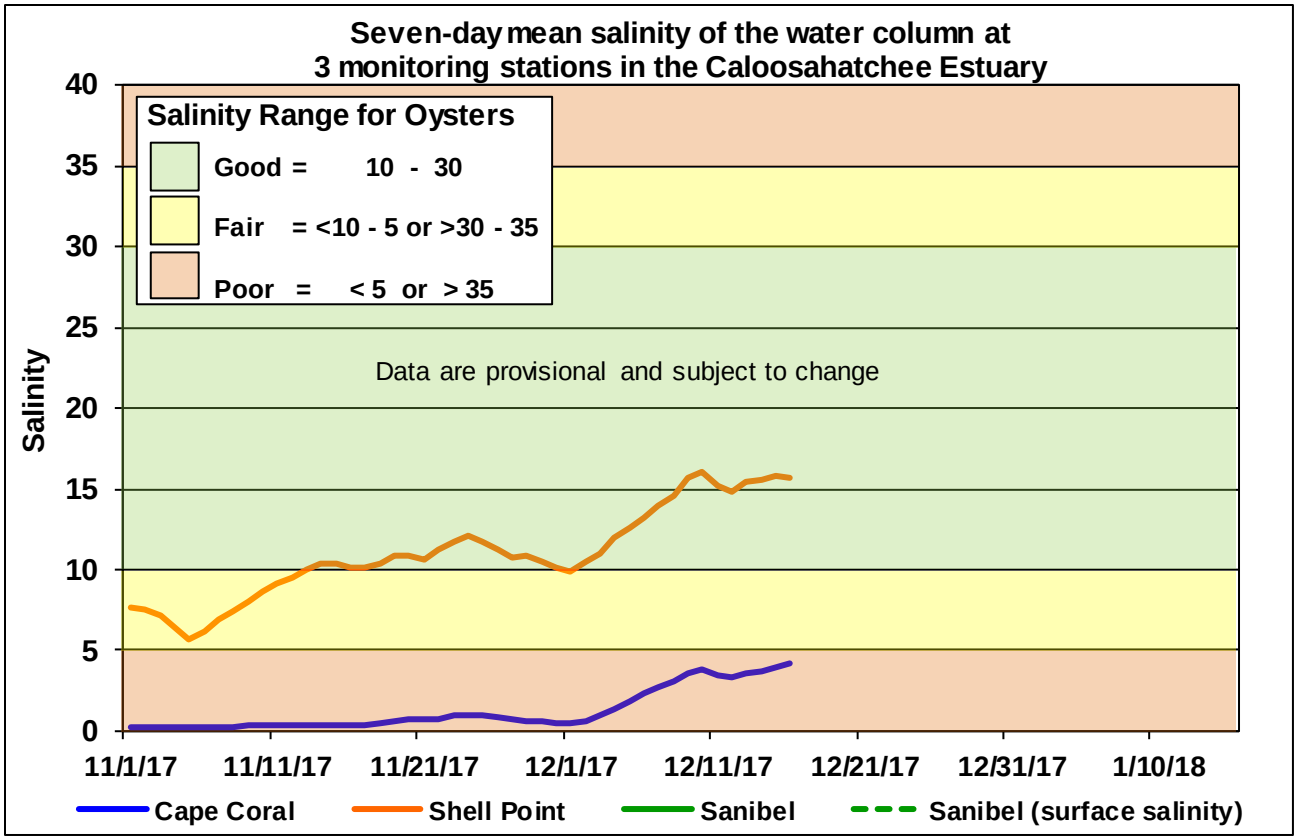


Figure 11. Seven-day mean salinity at Cape Coral Bridge, Shell Point and Sanibel Bridge monitoring stations.

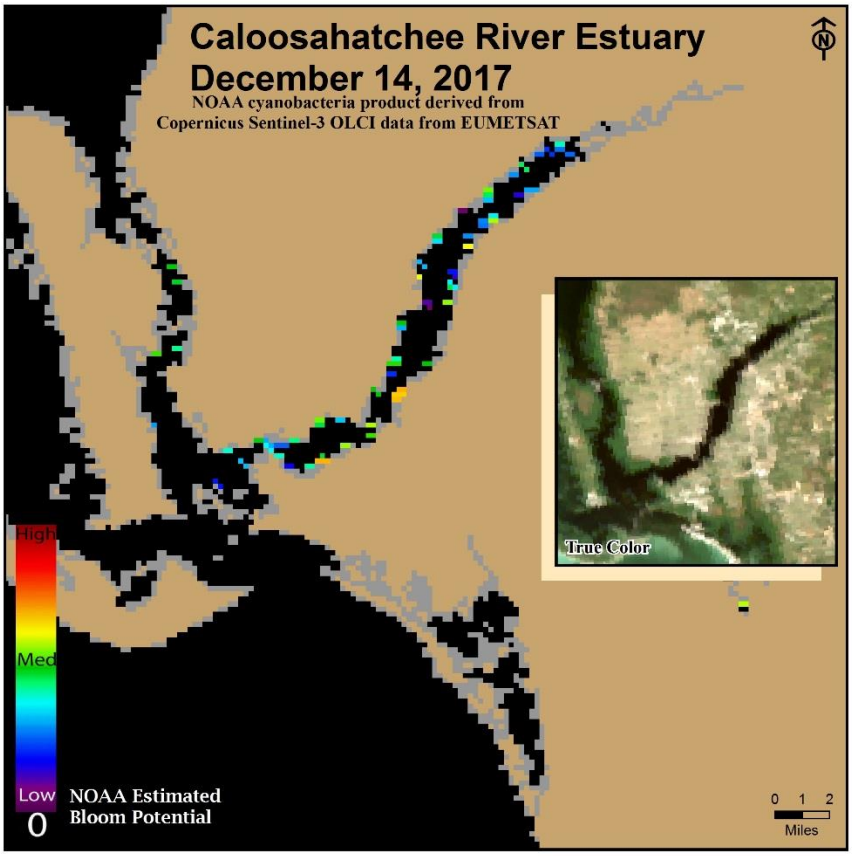
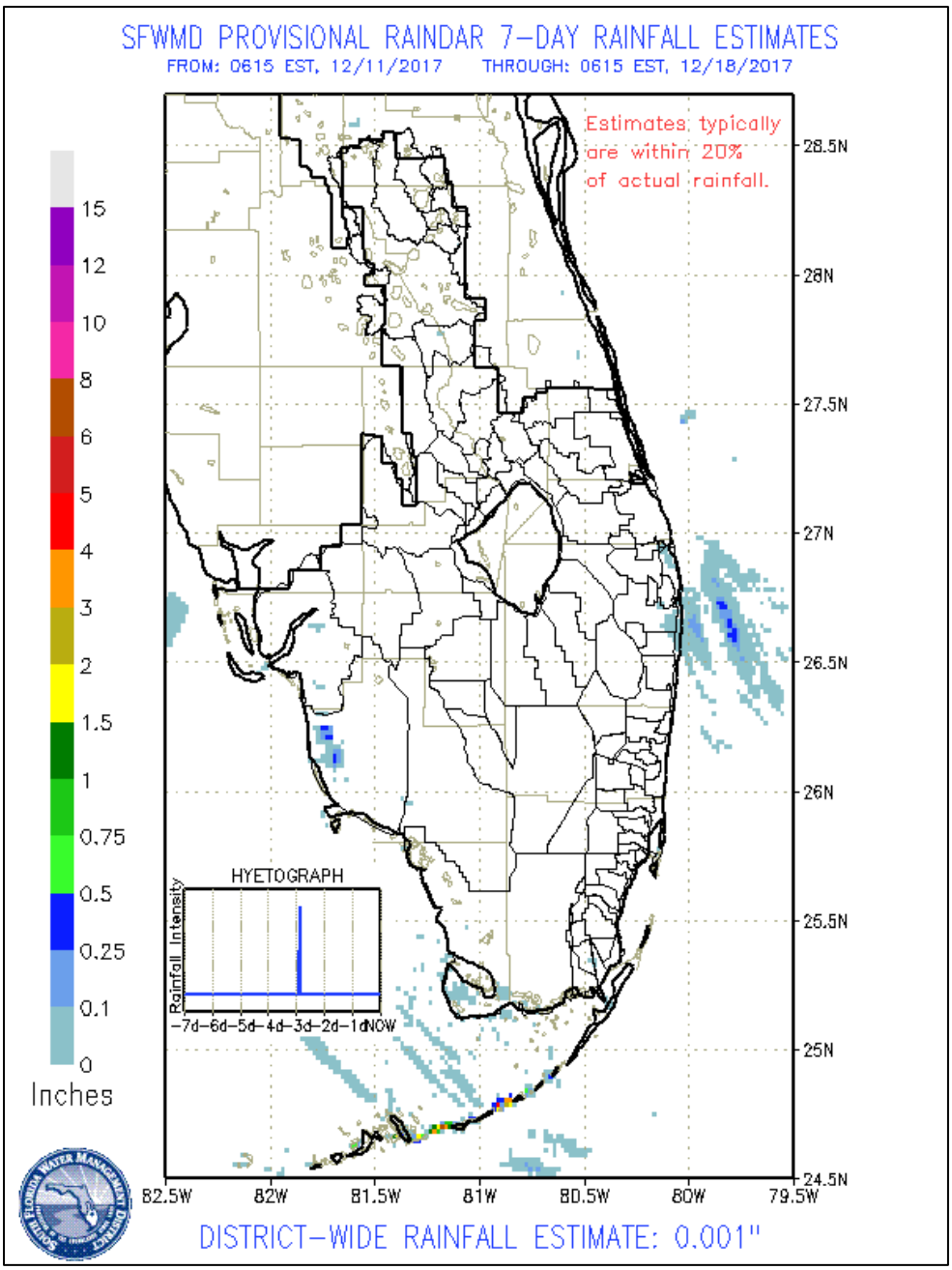


Figure 12. Sentinel 3a Satellite imagery provided by NOAA uses Ocean and Land Color Instrument (OLCI) to estimate cyanobacteria bloom potential in Caloosahatchee River Estuary.

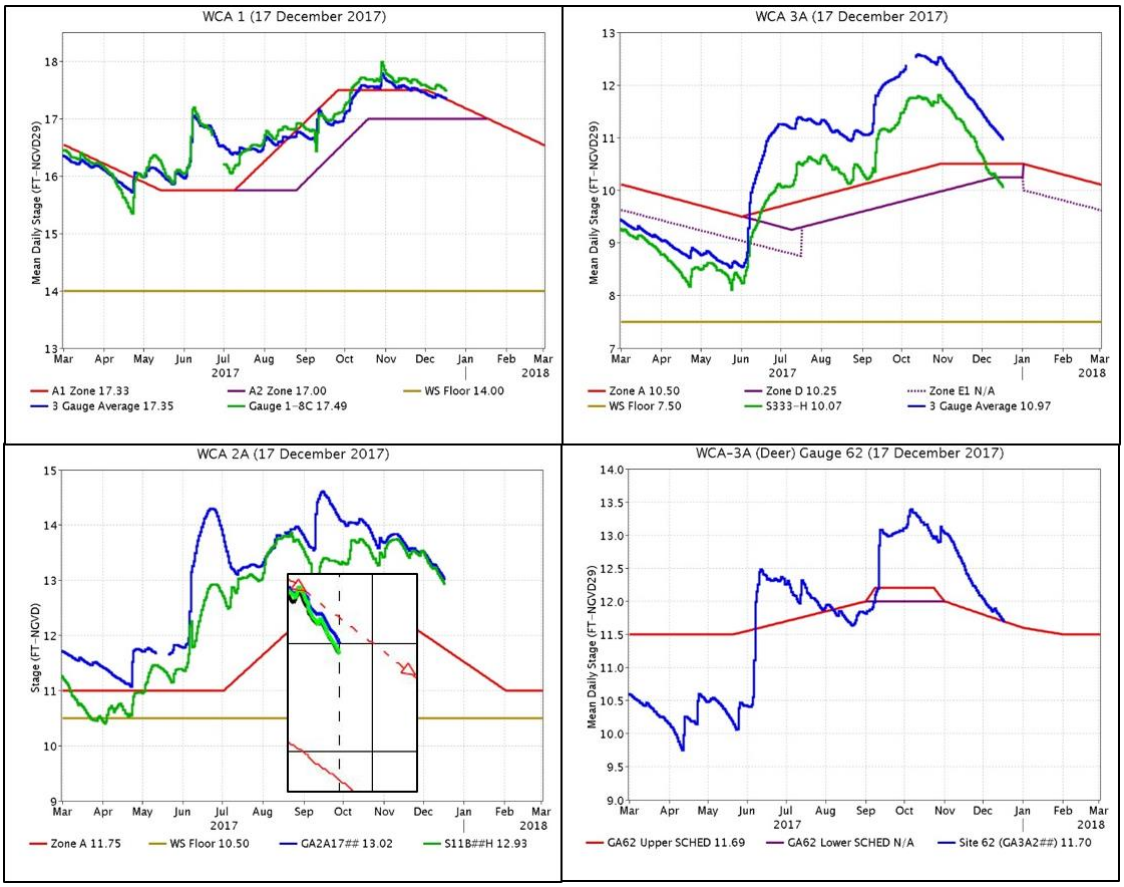
EVERGLADES

WCA-1 stages remained steady, WCA-2A dropped below the current temporary schedule, and WCA-3A continued the steady yet swift decrease towards schedule. Stages at all the gauges monitored for this report fell over the last week (Everglades National Park was unchanged) by an average of 0.14 feet.

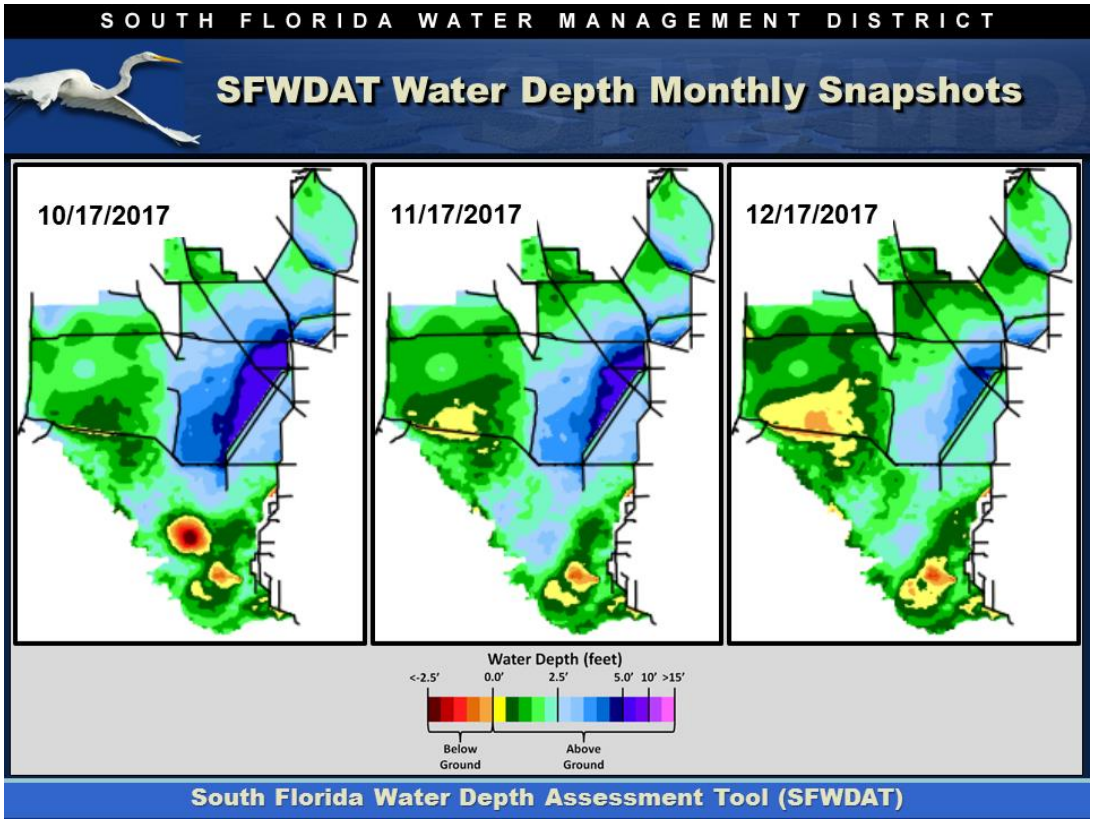
Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	0.00	−0.05
WCA-2A	0.00	−0.26
WCA-2B	0.00	−0.14
WCA-3A	0.00	−0.19
WCA-3B	0.00	−0.15
ENP	<0.01	+0.00

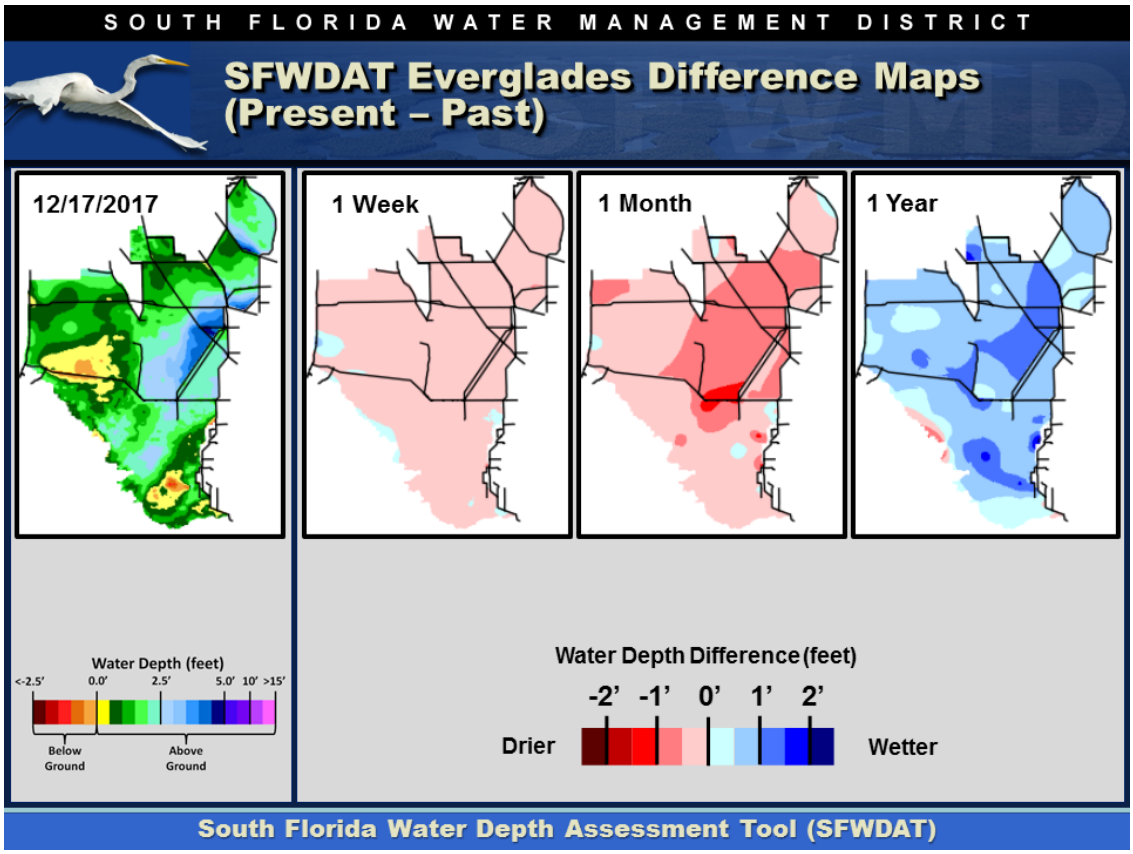


Regulation Schedules: WCA-1 three-gauge average continues trending along the top of the Zone A1 schedule, only 0.02 feet above. WCA-2A (subject to a temporary deviation – see inset) marsh stage at gauge GA2A17 is 1.27 feet above Zone A1 and below the temporary schedule, trending slightly away from temporary schedule. WCA-3A three-gauge average stage is 0.47 feet above Zone A and continues to decrease. Stage difference between marsh and canal is 0.90 feet. WCA-3A at gauge 62 (northwest corner) is at the upper schedule.



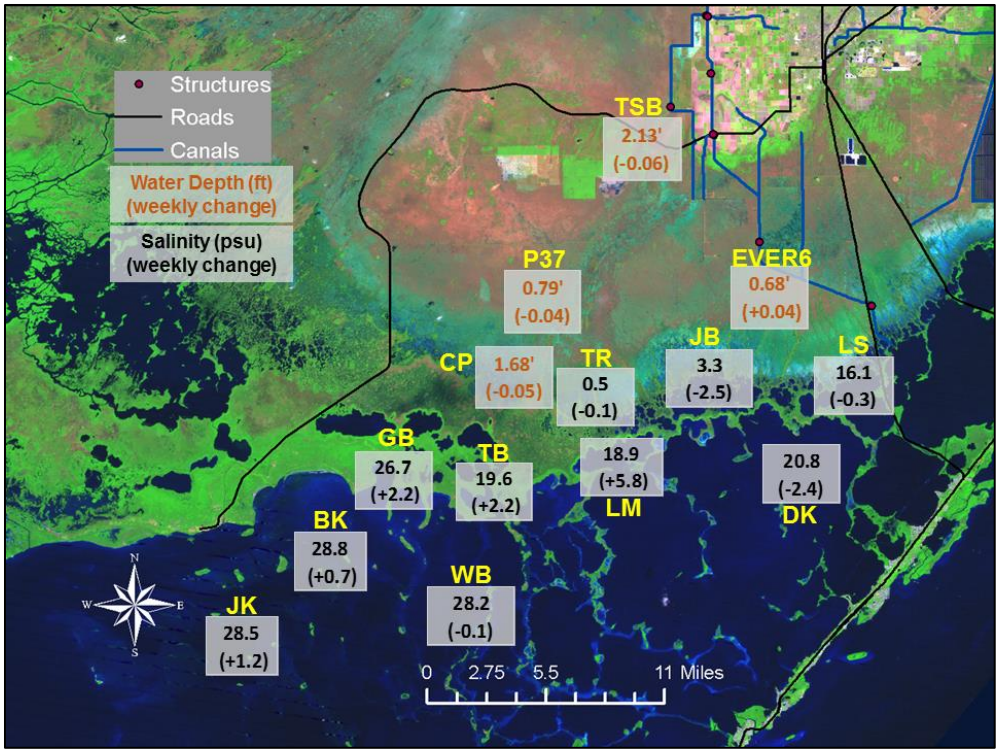
Water Depths and Changes: The WDAT tool for spatial interpolation of depth indicates a range from a low of 0.0 feet to 0.5 feet in a tiny pocket within extreme northeast WCA-3A to a high of 4.5 feet to 5.0 feet in small pockets along the northern L-67A canal in southern WCA-3A. Comparing WDAT water levels from present, water depths over the last week fell across the entire Everglades. Looking back one month, stages across a majority of the WCAs are significantly lower; only the northeastern perimeter of WCA-1 is higher. Over the last week, individual gauge changes in the WCAs ranged from 0.0 feet (ENP) to −0.26 feet (WCA-2A). Pan evaporation was estimated at 0.85 inches last week.

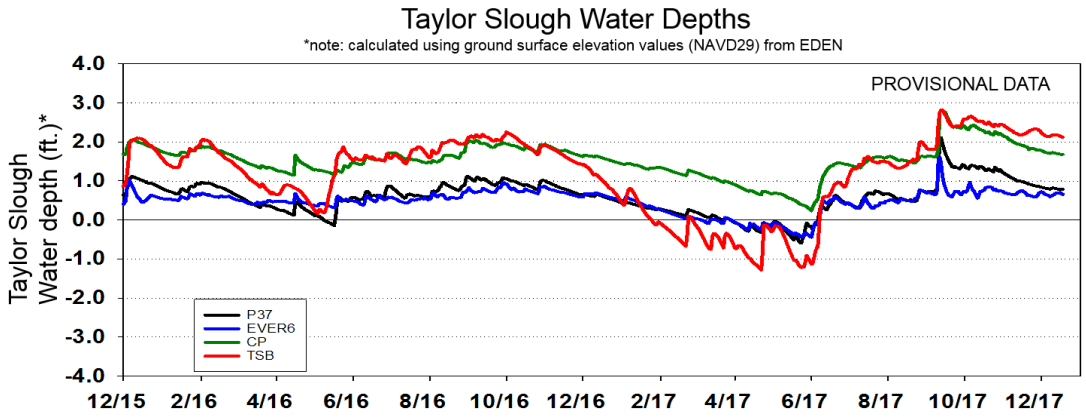


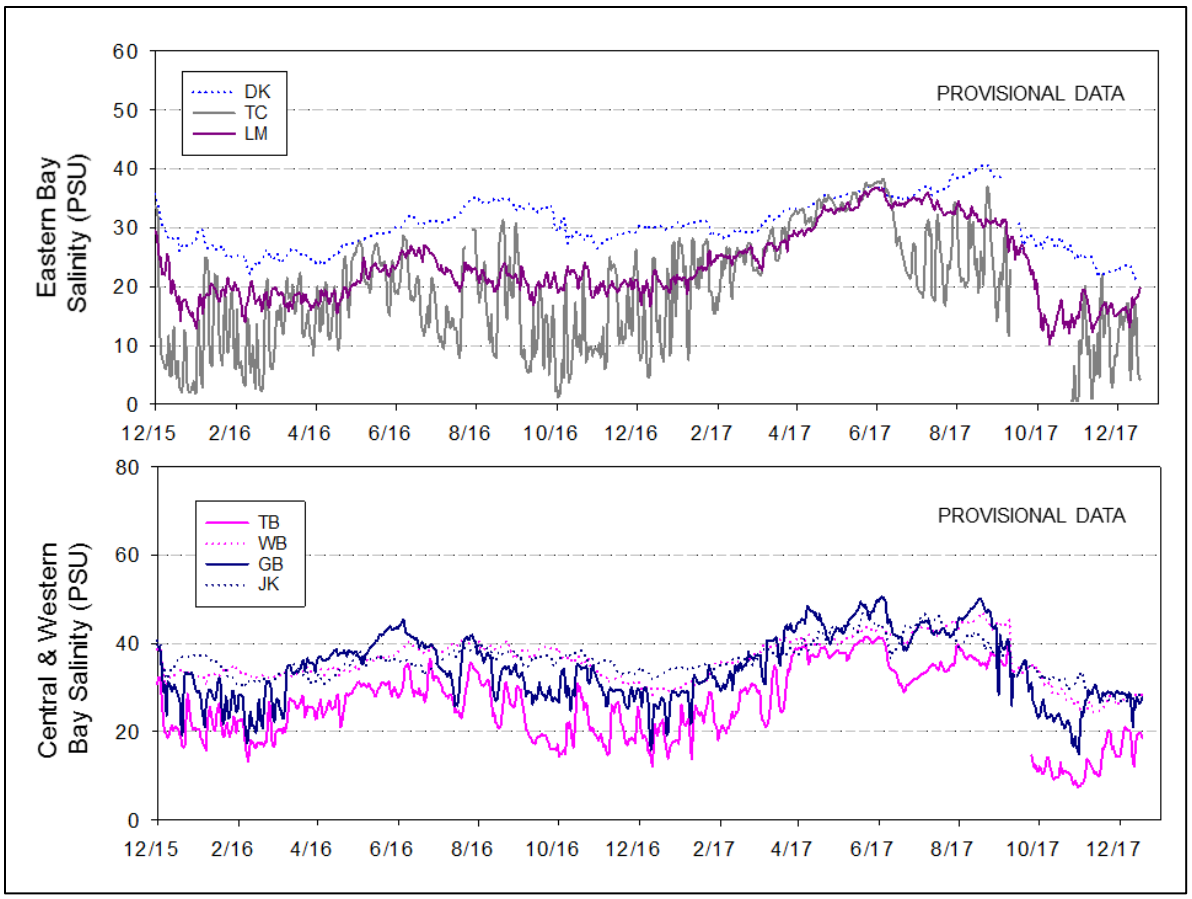


Taylor Slough stages: Water level changes ranged from −0.06 feet in northern Taylor Slough to +0.04 feet in the Everglades National Park panhandle. Weekly rainfall was very sparse with the highest recording at a single station being 0.69 inches for the week. Water levels are still 3 to 14 inches above the historic average for this time of year with the highest divergence occurring in northern Taylor Slough.

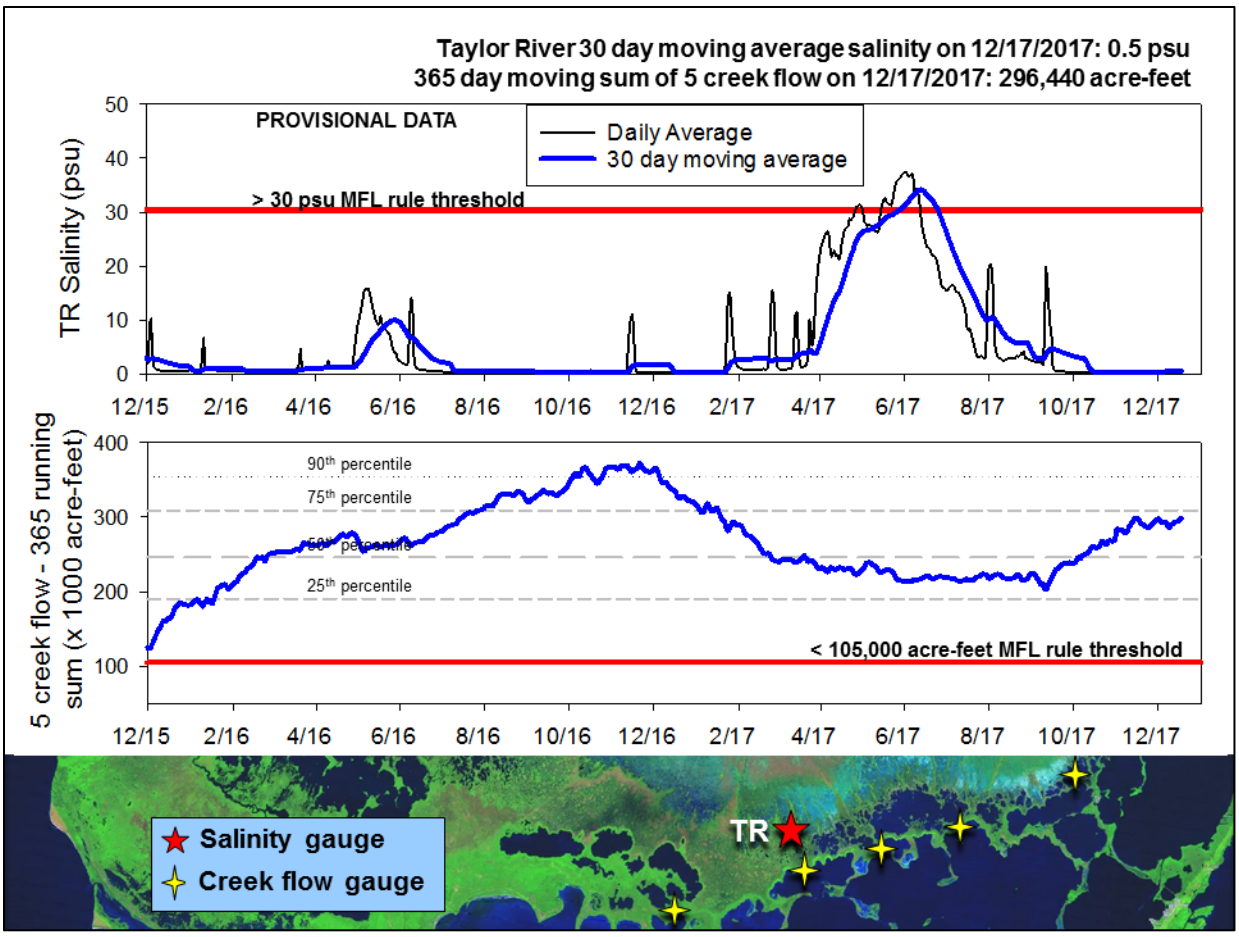
Florida Bay Salinities: Salinity changes for the last week were mostly less than 2.5 psu with only one station having a weekly change of greater than 5 psu. Current salinities range from 3 psu in the northeastern nearshore to 29 in the western bay. Salinities are within 6 psu of the historic averages for this time of year.







Florida Bay MFL: Mangrove zone daily average salinity remains near fresh at 0.5 psu, but is very slowly increasing. The 30-day moving average is 0.5 psu. The weekly cumulative flow from the five creeks denoted by yellow stars on the map doubled to 11,200 acre-feet and this is double the average for this time of year. Flows are expected to decrease as the dry season progresses. The 365-day moving sum of flow from the five creeks identified by yellow stars on the map increased about 21,000 acre-feet this past week to end at 296,440 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 however the severity is lessening. Water managers may want to consider a transition in recession rates as that basin's stage approaches the regulation schedule. WCA-2A continues to be managed at a high level under a temporary deviation. This area has historically served as important wading bird foraging habitat. More specific recommendations appear in the summary table below. The red text represents new or modified information or recommendations.

Everglades Ecological Recommendations, December 19th, 2017 (red is new)

Area	Current Condition	Cause(s)	Recommendation	Reasons
WCA-1	Stage decreased −0.05'	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 −0.26'	Rainfall, ET, management	Maintain depths at temporary regulation schedule or slightly above.	Protect habitat and wildlife from high water stress.
WCA-2B	Stages decreased −0.14'	Rainfall, ET, management	Maintain depths at regulation schedule or slightly above.	Protect habitat and wildlife from high water stress.
WCA-3A NE	Stages decreased −0.21'	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 −0.18'	Rainfall, ET, management		
Central WCA-3A S	Stages decreased −018'	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 185 days.
Southern WCA-3A S	Stages decreased −0.20'	Rainfall, ET, management		
WCA-3B	Stages decreased −0.15'	Rainfall, ET, management	Maintain depths at regulation schedule.	Protect habitat and wildlife from high water stress.
ENP-SRS	Stage did not change	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 −0.06' to +0.04'	Rain, ET, inflows	Move water southward as possible	When available provide freshwater buffer for ecosystems.
FB- Salinity	Salinity changes ranged −2.5 to +5.8 psu.	Rain, ET, inflows, wind	Move water southward as possible	When available, provide freshwater to main low salinity buffer and promote water movement.