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, Engineering and Construction Bureau
Paul Linton, Administrator, Water Control Operations Section

FROM: SFWMD Staff Environmental Advisory Team

DATE: October 25, 2016

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

It is expected to be mainly dry through tomorrow afternoon before showers return extreme south tomorrow night. High pressure will dominate even as a weak frontal boundary slides southward down the peninsula tomorrow before stalling over the Straits on Thursday. Winds are expected to increase as the gradient between high pressure to our north and lower pressure over the northwest Caribbean tightens. Favorable upper level winds will help the frontal boundary become active with showers forming along it tomorrow night then showers/storms on Thursday; but, heavier rains are expected to be over the Keys and Straits at this point.

Kissimmee

On Sunday, stage in East Lake Toho, Lake Toho, and Kissimmee-Cypress-Hatchineha was above schedule by 0.2, 0.1, and 0.4 feet, respectively. Over the past week, discharge at S65, S65A, and S65E averaged 1,019, 1,147, and 2,230 cfs, respectively. Tuesday morning discharges were ~681 cfs, ~710 cfs, ~1,670 cfs, and ~1,705 cfs, respectively at S65, S65A, S65C, and S65E. Dissolved oxygen in the Kissimmee River averaged 4.84 mg/L over the past week. Kissimmee River mean floodplain depth on Sunday was 0.66 feet. There were no new recommendations this week.

Lake Okeechobee

Lake stage, which is currently at 15.70 feet, has fallen 0.20 feet over the past week and is currently in the Low sub-band. Lake stage remains above the top of the preferred stage envelope (15.5 feet NGVD). A post-hurricane assessment of the submerged aquatic vegetation (SAV) indicated little change in the community compared to the August 2016 quarterly mapping results. Future short-term recommendations are to lower Lake levels. Further increases in stage will result in additional ecological damage. Near optimal stages will be necessary this coming spring and summer to provide conditions conducive to the reestablishment of the submerged aquatic vegetation.

Estuaries

Total discharge to the St. Lucie estuary averaged 1,133 cfs over the past week with 580 cfs (51%) coming from Lake Okeechobee. The seven-day average salinity at the US1 Bridge is in the fair range for adult oysters. Salinity increased throughout the estuary with the decrease in total flow from the previous week. Total inflow to the Caloosahatchee estuary averaged 4,102 cfs over the past week with 2,883 cfs (70%) coming from the Lake. Salinity conditions are good for tape grass in the upper estuary. Salinity conditions are good for adult oysters at the Sanibel Causeway and Shellpoint, but in the poor range at the Cape Coral Bridge. Given the current estuarine conditions, there are no ecological benefits associated with additional releases from Lake Okeechobee.

Stormwater Treatment Areas

Over the past week, the STAs/FEBs received 1,500 acre-feet of Lake regulatory releases. The total amount of Lake regulatory releases sent to the STAs/FEBs in WY2017 (since May 1, 2016) is approximately 72,300 acre-feet. All STA cells are at or above target depths. Operational restrictions are in place for structure repairs in STA-1E. This week, if 2008 LORS recommends Lake releases to the WCAs and the conditions allow, releases will be sent to STA-1E, STA-1W and the A-1 FEB. The A-1 FEB releases will then be sent to STA-2.

Everglades

Rainfall was light and evaporation was high. Stages in the Everglades decreased between −0.04 feet and -0.19 feet. The Florida Fish and Wildlife Conservation Commission (FWC) closures within the WCAs were lifted Monday. The 30-day moving average salinity at the Florida Bay Minimum Flows and Levels (MFL) site remains 0.3 psu and the cumulative 365-day inflow from the five creeks into Florida Bay decreased again to 350,050 acre-feet. There are no new changes on WCA operational recommendations. Water levels in WCA-3A and WCA-2A should be lowered. Water depths in southern WCA-3A should remain below 2.5 feet throughout the wet season to protect tree island forests. Ascension rates need to remain under 0.25 feet per week to protect habitat and wildlife.

Supporting Information

KISSIMMEE BASIN

Kissimmee Basin Rainfall

The Upper Kissimmee Basin received 0.00 inches of rainfall in the past week and the Lower Basin received 0.00 inches (SFWMD Daily Rainfall Report 10/24/2016).

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: 10/25/2016

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)	Sunday Departure (feet)						
							10/23/16	10/16/16	10/9/16	10/2/16	9/25/16	9/18/16	9/11/16
Lakes Hart and Mary Jane	S62	106	LKMJ	60.9	R	60.7	0.2	0.2	0.2	0.1	0.0	0.2	0.1
Lakes Myrtle, Preston, and Joel	S57	98	S57	62.0	R	61.7	0.3	0.3	0.3	-0.1	0.0	0.1	0.0
Alligator Chain	S60	0	ALLI	63.5	R	63.8	-0.3	-0.1	-0.3	0.1	0.1	0.1	0.0
Lake Gentry	S63	0	LKGT	61.5	R	61.4	0.1	0.1	-0.2	0.1	0.0	0.1	0.0
East Lake Toho	S59	108	TOHOE	57.9	R	57.7	0.2	0.3	0.0	0.3	0.2	0.2	0.1
Lake Toho	S61	0	TOHOW, S61	54.8	R	54.7	0.1	0.1	-0.2	0.2	0.2	0.2	0.1
Lakes Kissimmee, Cypress, and Hatchineha	S65	1019	LKISSP, KUB011, LKIS5B	52.6	R	52.2	0.4	0.7	1.0	0.6	0.6	0.9	1.4

* 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: 10/25/2016

Metric	Location	Sunday's 1-day average	Weekly Average**									
			10/23/16	10/16/16	10/9/16	10/2/16	9/25/16	9/18/16	9/11/16	9/4/16	8/28/16	8/21/16
Discharge (cfs)	S-65	697	**1019**	1131	1718	1968	4001	3991	3290	1080	841	624
Discharge (cfs)	S-65A	750	**1147**	1570	2557	2557	4966	4861	5101	2538	808	666
Discharge (cfs)	S-65C	1839	**2164**	3124	3250	4459	5247	5054	3760	2124	928	1024
Headwater stage (feet NGVD)		33.5	**33.5**	33.7	33.6	33.6	33.8	33.7	33.8	34.1	34.1	34.0
Discharge (cfs)	S-65D****	2615	**2922**	3859	4185	5532	6302	5224	3971	2172	1181	1140
Discharge (cfs)	S-65E	1819	**2230**	3553	3841	4960	5802	5246	4077	2900	910	1061
DO concentration (mg/L)***	Phase I river channel	5.56	**4.84**	3.38	2.83	1.78	1.55	1.20	1.35	3.88	4.75	4.04
Mean depth (feet)*	Phase I floodplain	0.66	**0.80**	1.25	1.55	2.11	2.49	2.28	1.71	0.65	0.28	0.37

* 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 PC62 and PC33 starting June 2.PC33 omitted for week of Aug16. DO for week of Sept 15-22 is for PC33 only.

**** S-65D discharge combines discharge at S-65D, S-65DX1, and S-65DX2

DATA ARE PROVISIONAL

Water Management Recommendations

Kissimmee Basin Adaptive Recommendations and Operational Actions

Date	Recommendation	Purpose	Outcome	Source
10/24/2016	No new recommendations.			
10/17/2016	Temporarily reduce discharge at S65A to 700 cfs following the discharge rampdown schedule in Figure 8a.	To facilitate MacArthur Ditch backfilling over the next 2-3 weeks.	Implemented	KB Operations
10/10/2016	No new recommendations.			
10/3/2016	No new recommendations.			
9/27/2016	• Begin reducing discharge when Ops and management feel the time is right (could be now) • Use the discharge table below to ramp down to 1400 cfs; however, if stage should stop declining or start to rise during the rampdown, hold the current discharge unless stage begins to decline again • If KCH stage reaches ~50.5 ft, hold ~1400 cfs while KCH stage is at or above ~50.5 ft, then: • If KCH stage declines below ~50.5 ft, continue reducing discharge, potentially to minimum discharge. However, if stage stops declining or starts to rise during the rampdown, hold or increase current discharge until stage begins to decline again or until it rises to ~50.5 ft • If KCH stage rises or stays above ~50.5 ft, hold ~1400 cfs unless stage approaches ~0.25 ft below the regulation line. If stage continues to rise into this buffer zone, use the discharge table to ramp up in anticipation of flood control releases	To the extent possible, avoid repeated wet/dry cycles in the Kissimmee River floodplain and extend the period of continuous floodplain inundation without decreasing lake stage too much. The recommendation is similar to the discharge plan used last wet season that balanced the river, the KCOL, and downstream waterbodies.	TBD	KB Operations
9/20/2016	No new recommendations.			
9/13/2016	No new recommendations.			
9/6/2016	No new recommendations.			
8/30/2016	Use figure 8a as possible for discharge rampup/rampdown at S65/S65A.			
8/23/2016	No new recommendations.			
8/16/2016	No new recommendations.			
8/9/2016	No new recommendations.			
8/2/2016	No new recommendations.			
7/26/2016	No new recommendations.			
7/19/2016	No new recommendations.			
7/12/2016	No new recommendations.			
6/30/2016	Ramp down S65/S65A discharge by 150 cfs per day to 650 cfs and hold at 650 cfs until lake stage rises to Zone A of the schedule. When stage enters Zone A, ramp up S65 discharge to 1,400 cfs as stage rises from 0.0 to 0.6 feet above the regulation line unless there is a large rainfall event. This ramp up schedule will be reevaluated when the regulation schedule reaches 52.0 feet NGVD.	The ramp down in S65/S65A discharge is intended to lessen the impact of Lake Okeechobee releases on naturally occurring algal blooms. Holding discharge at 650 cfs reflects consideration for the Snail Kites nesting in the Kissimmee River floodplain.	Implemented	SFWMD Operations Control
6/28/2016	No new recommendations.			
6/21/2016	No new recommendations.			
6/14/2016	No new recommendations.			
6/7/2016	No new recommendations.			
5/31/2016	No new recommendations.			
5/24/2016	No new recommendations.			
5/17/2016	No new recommendations.			
5/10/2016	No new recommendations.			
5/3/2016	No new recommendations.			

KCOL Hydrographs (through Sunday midnight)

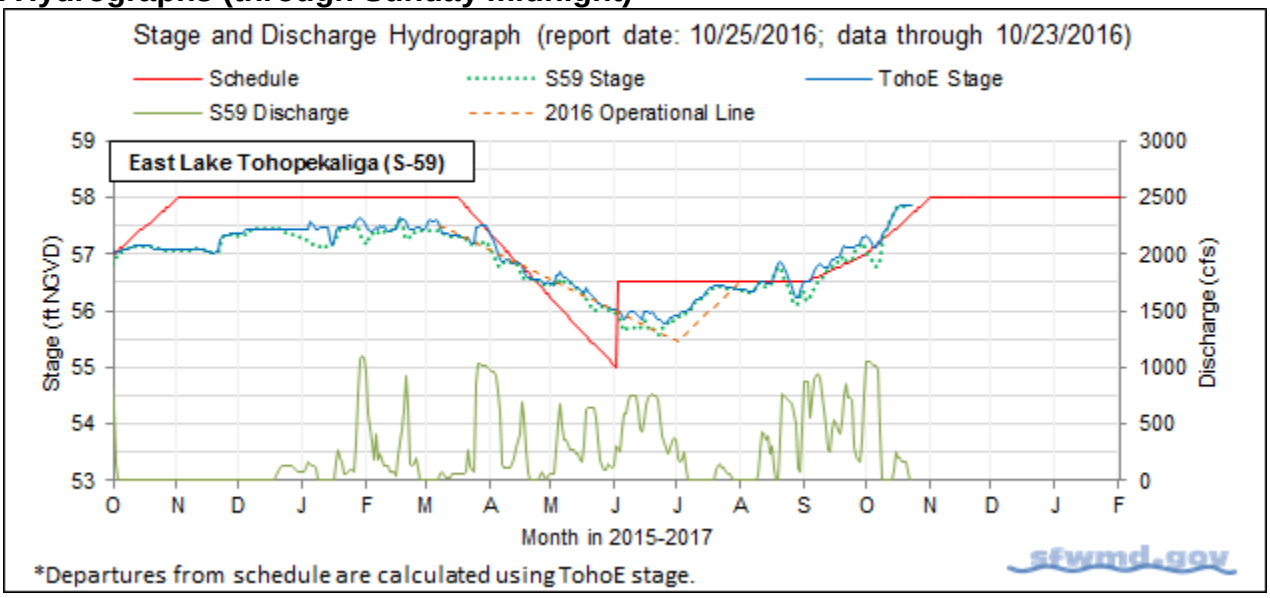


Figure 1.

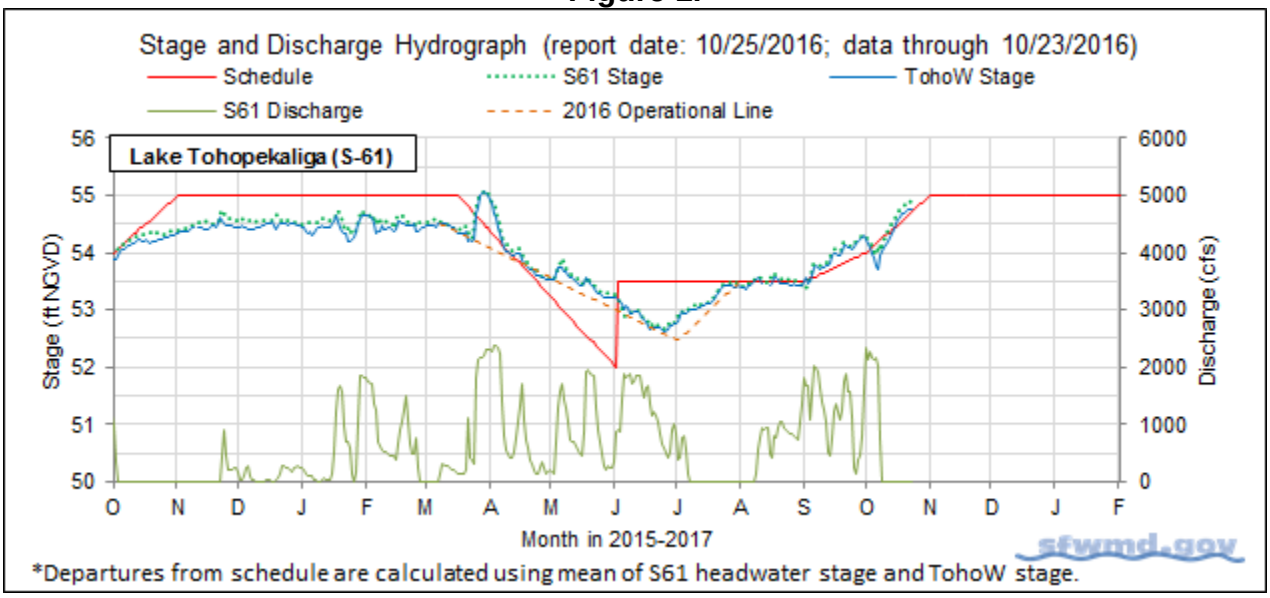


Figure 2.

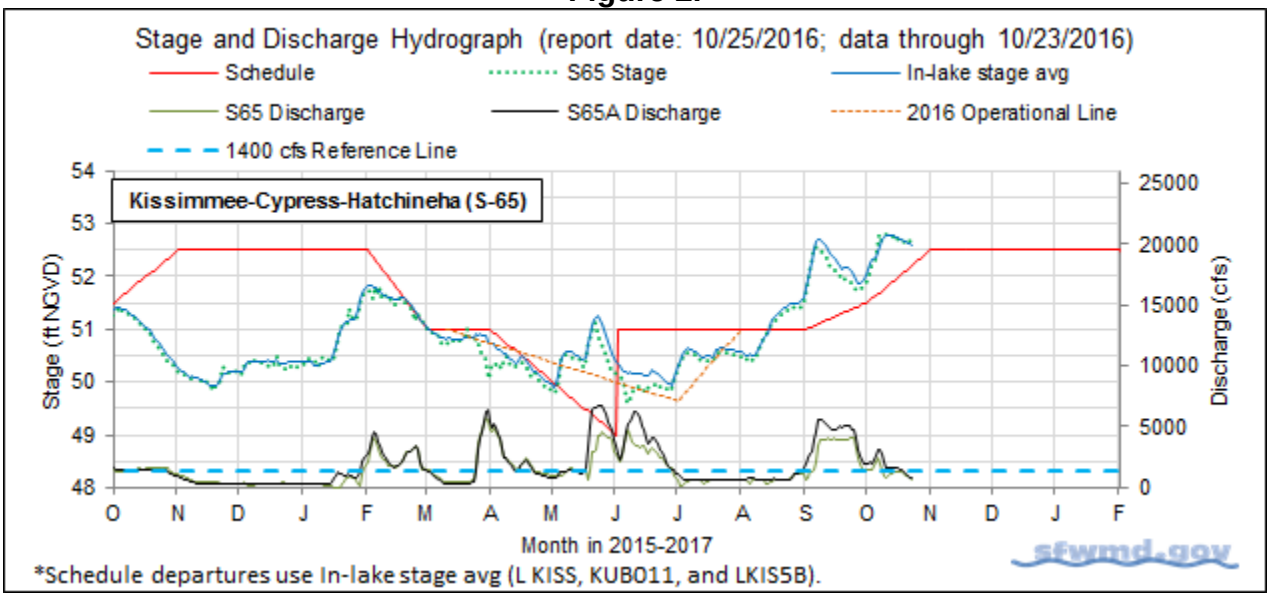


Figure 3.

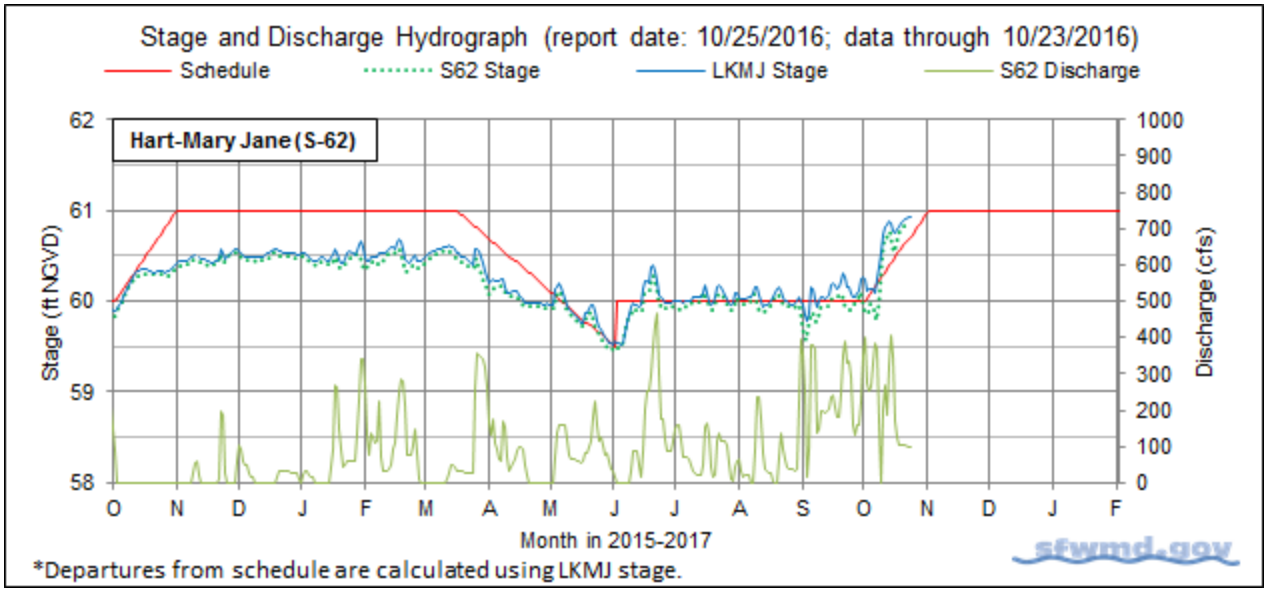


Figure 4.

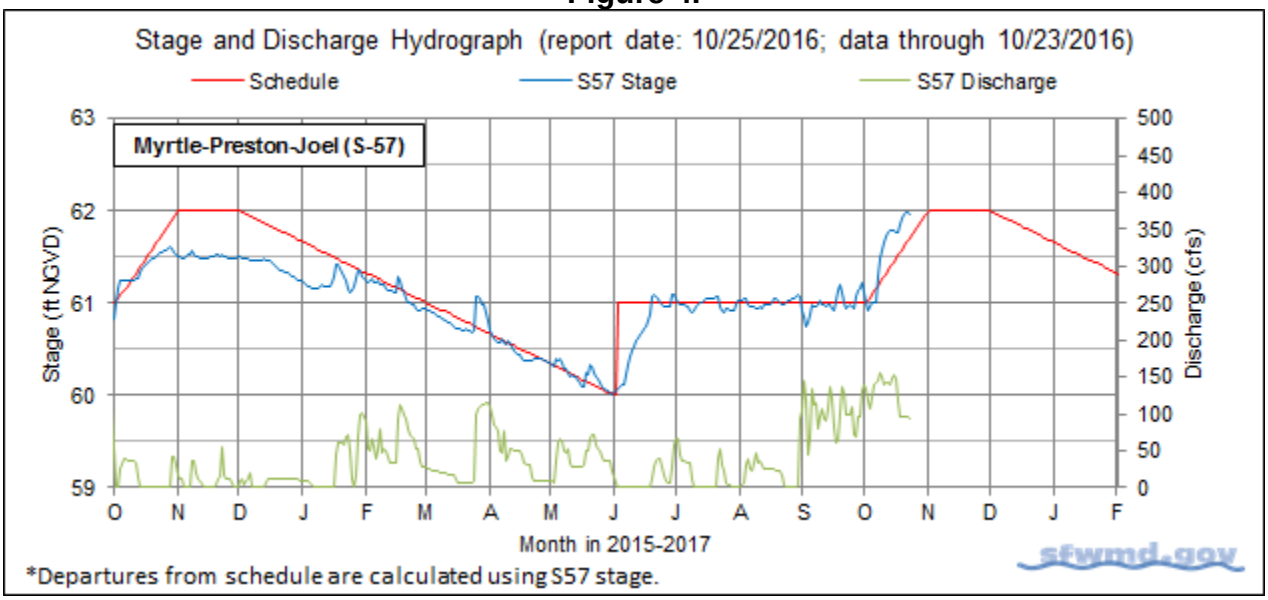


Figure 5.

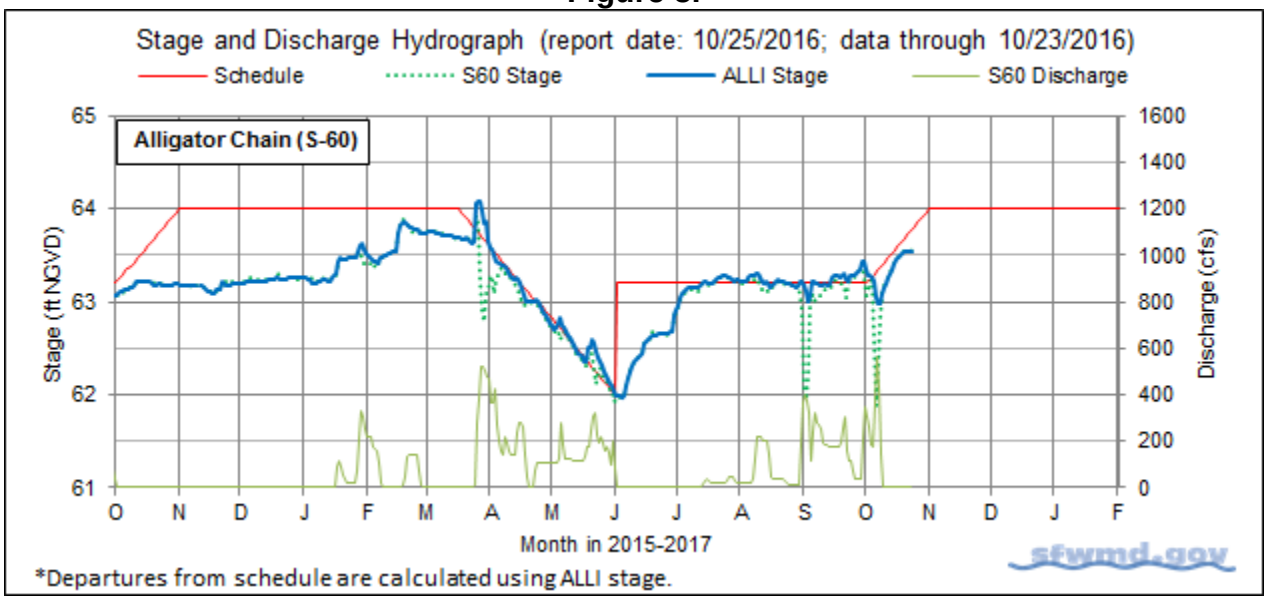


Figure 6.

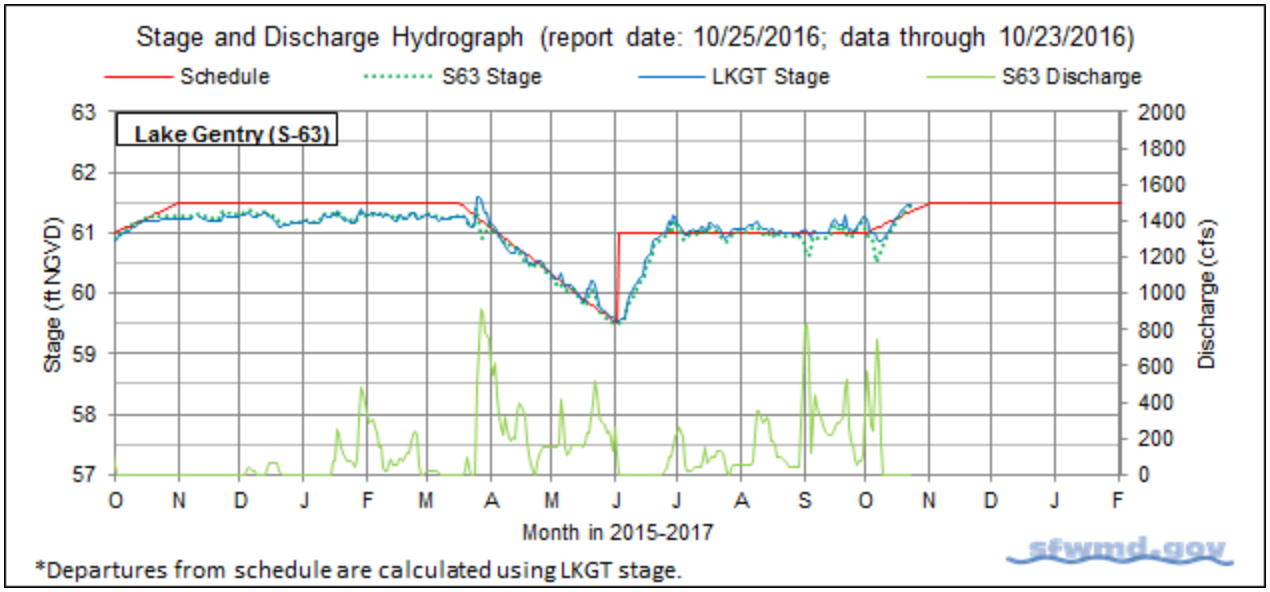


Figure 7.

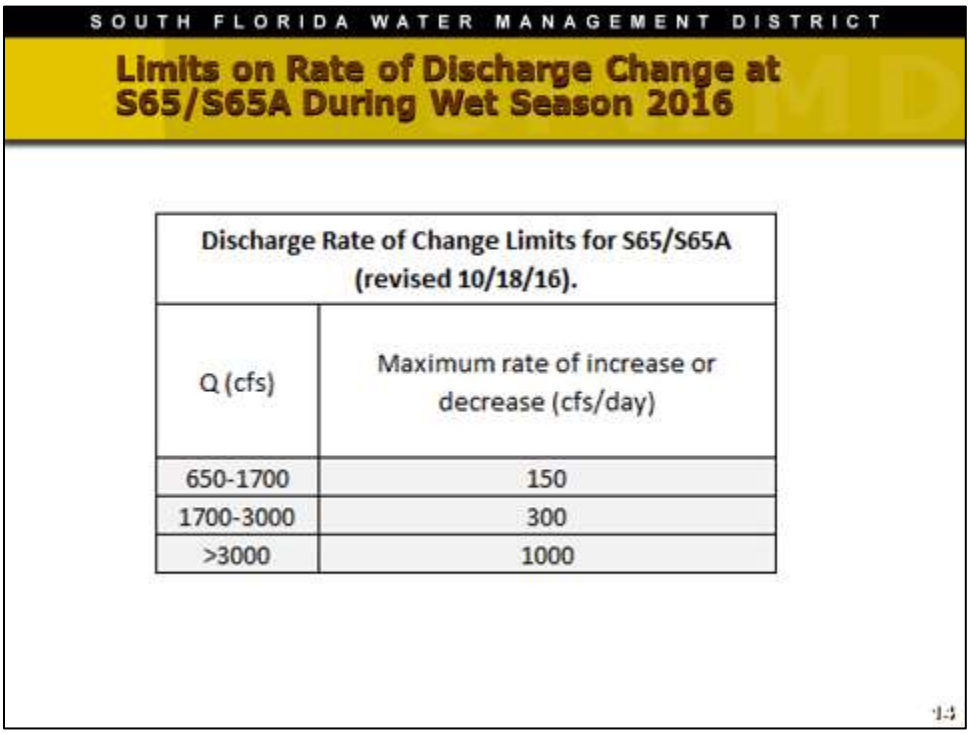


Figure 8a. Limits on rate of discharge change at S65/S65A for the 2016 Wet Season.

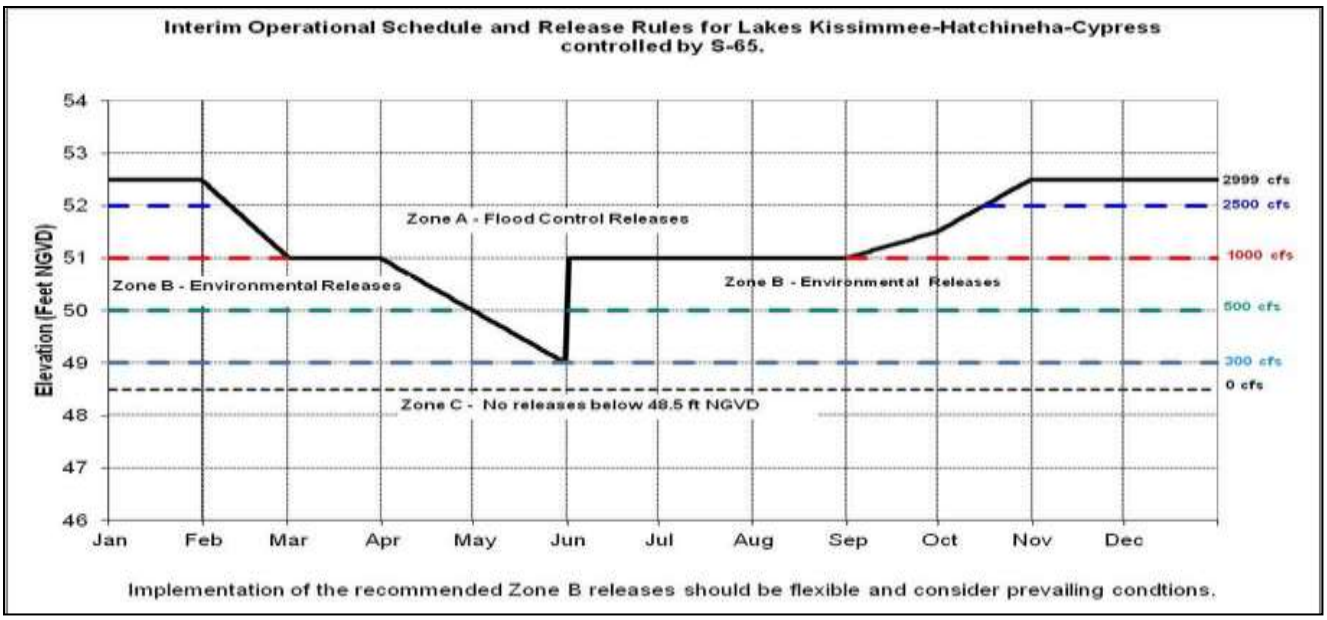


Figure 8b. Interim operations schedule for S-65. The discharge schedule shown to the right has not been used in recent years or in Wet Season 2015.

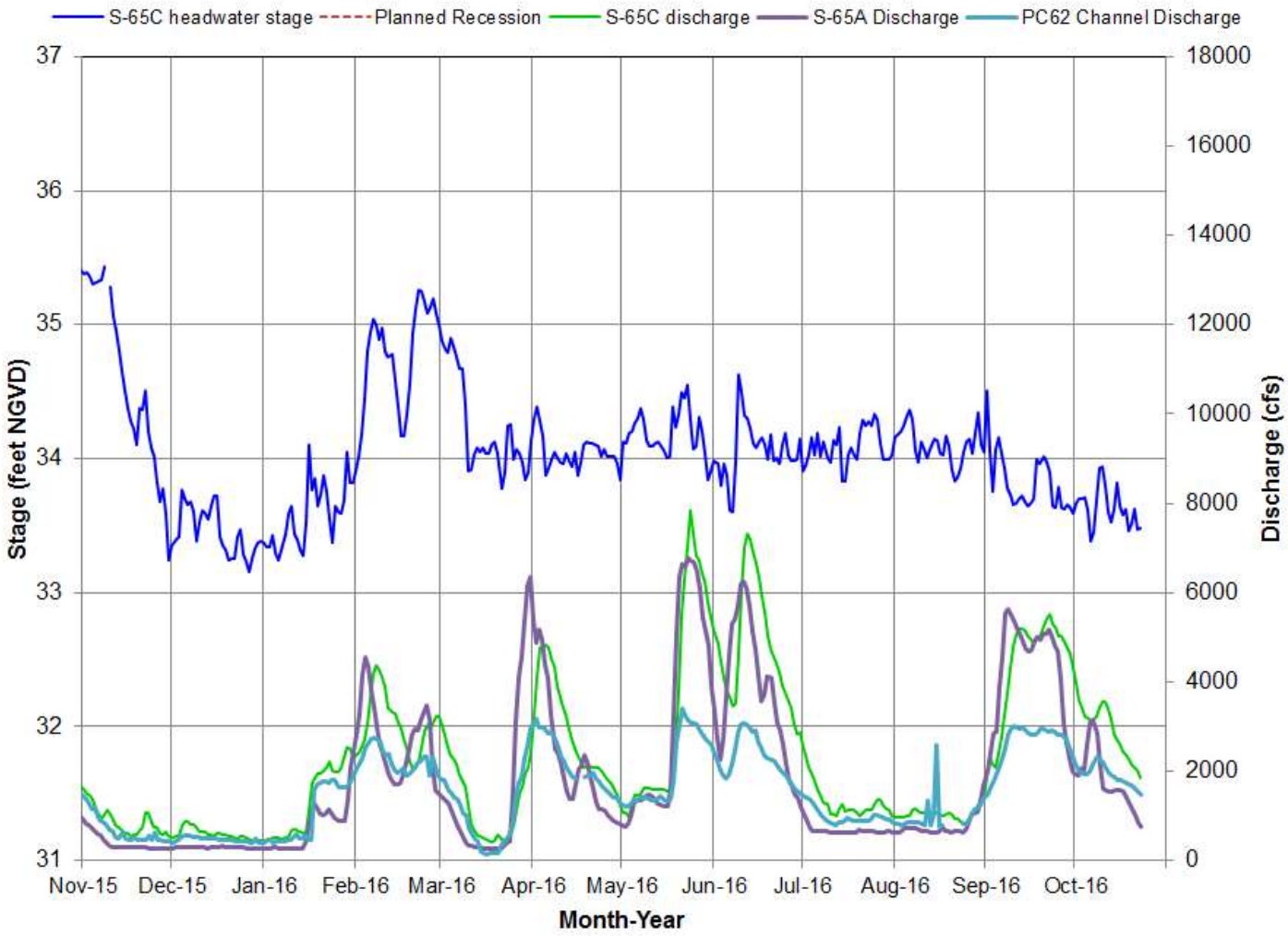


Figure 9. S-65C headwater stage in relation to discharge at S-65C, S-65A, and PC62.

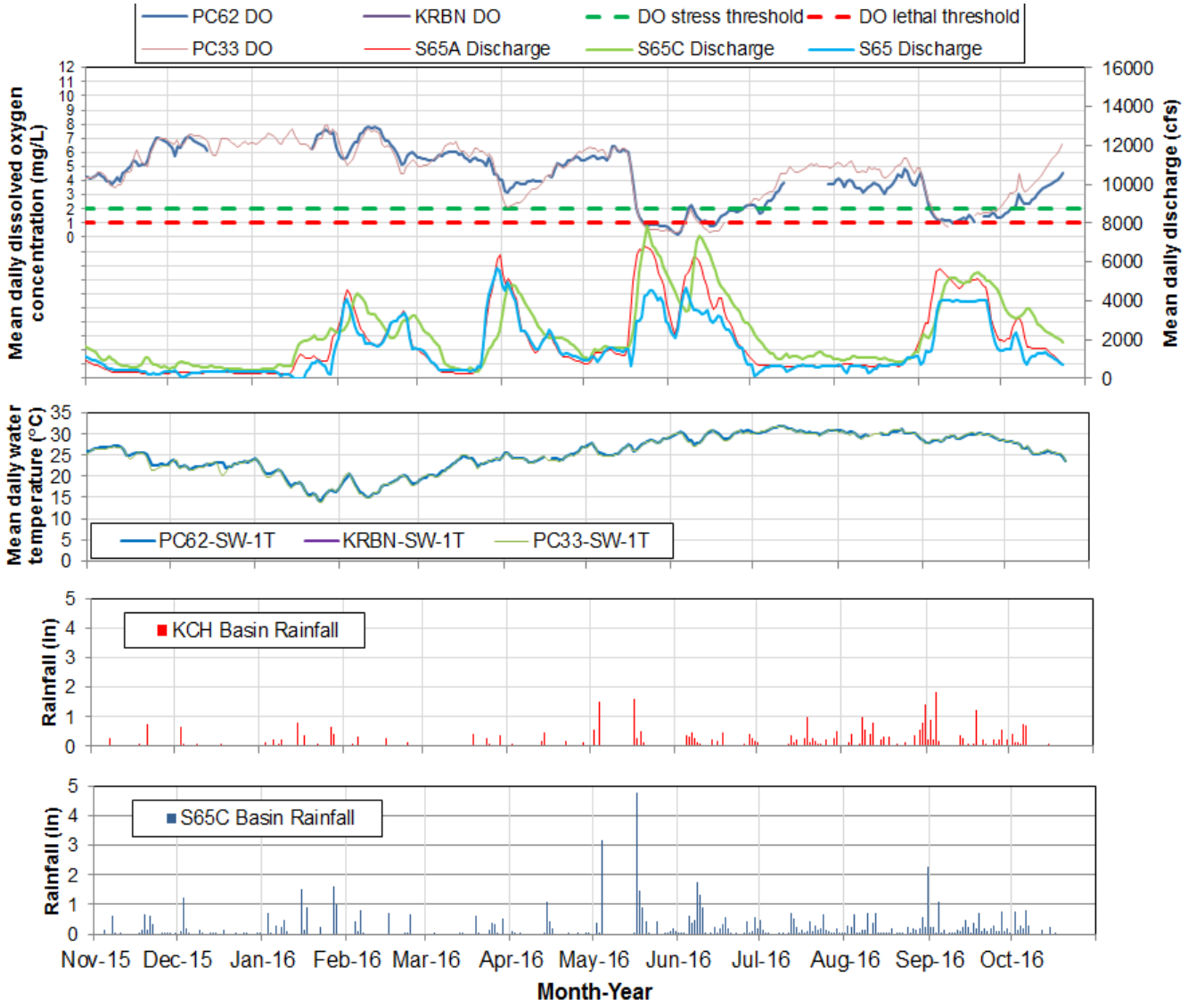


Figure 10. Mean daily Dissolved Oxygen, discharge, temperature and rainfall in the Phase I river channel.

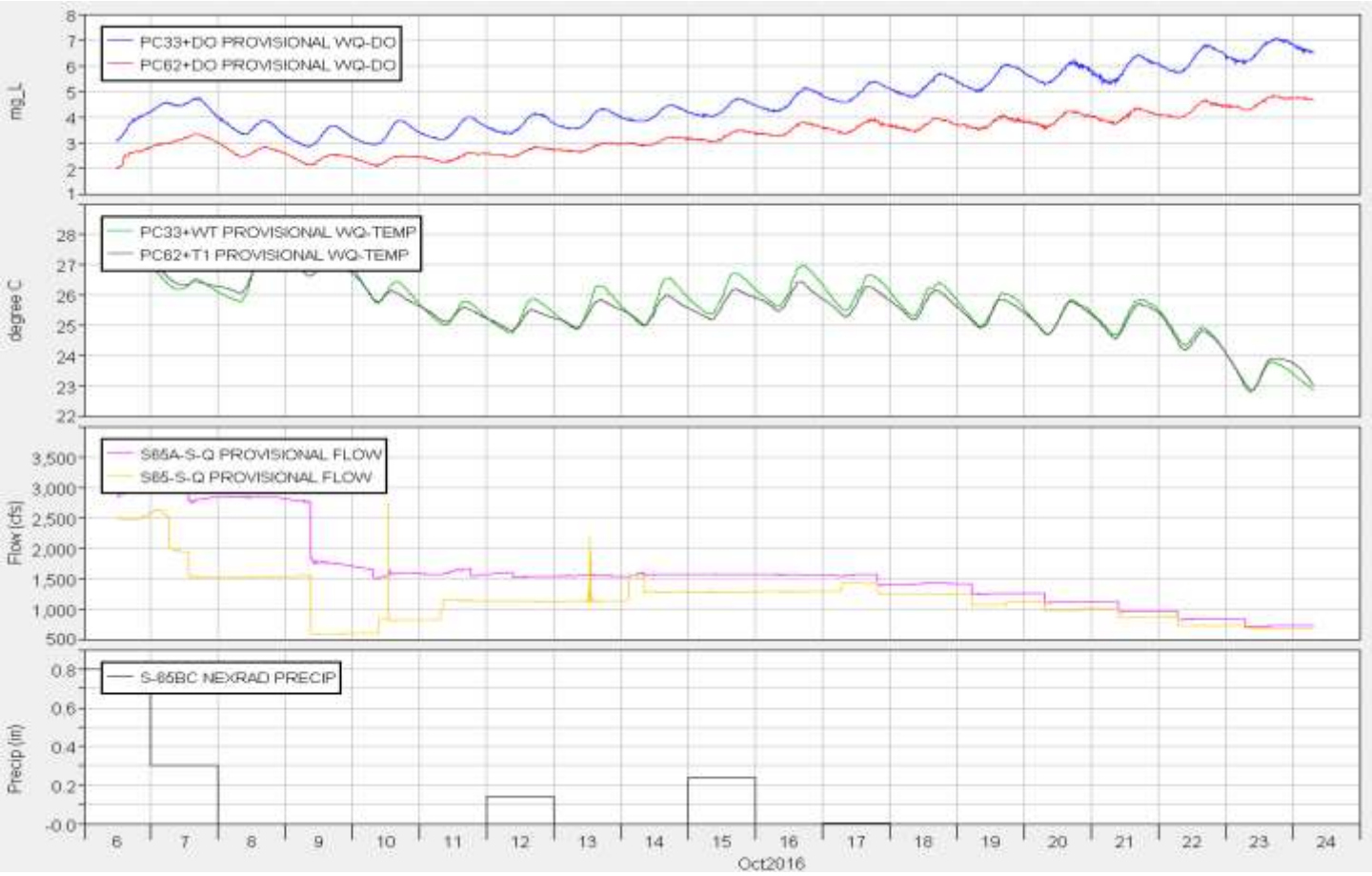


Figure 11. Phase I river channel dissolved oxygen and water temperature (measured at 15 minute intervals) and Pool BC daily rainfall.

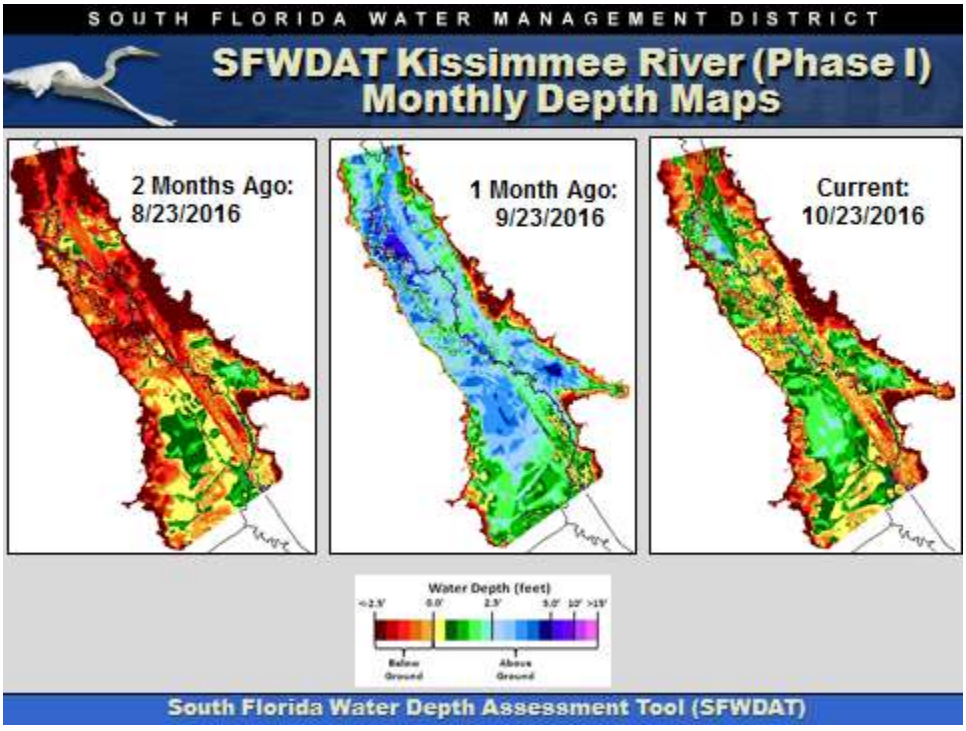
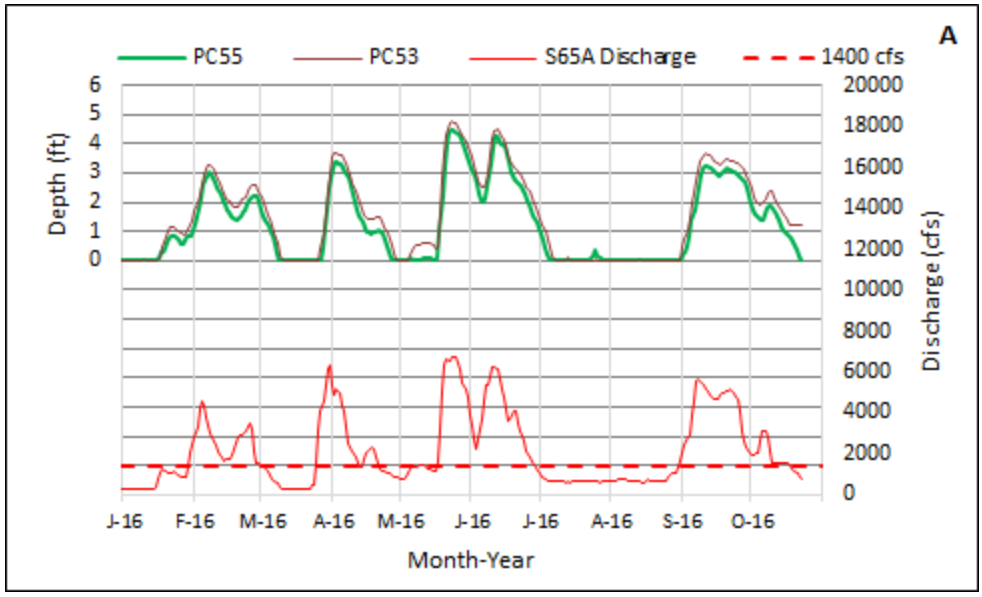
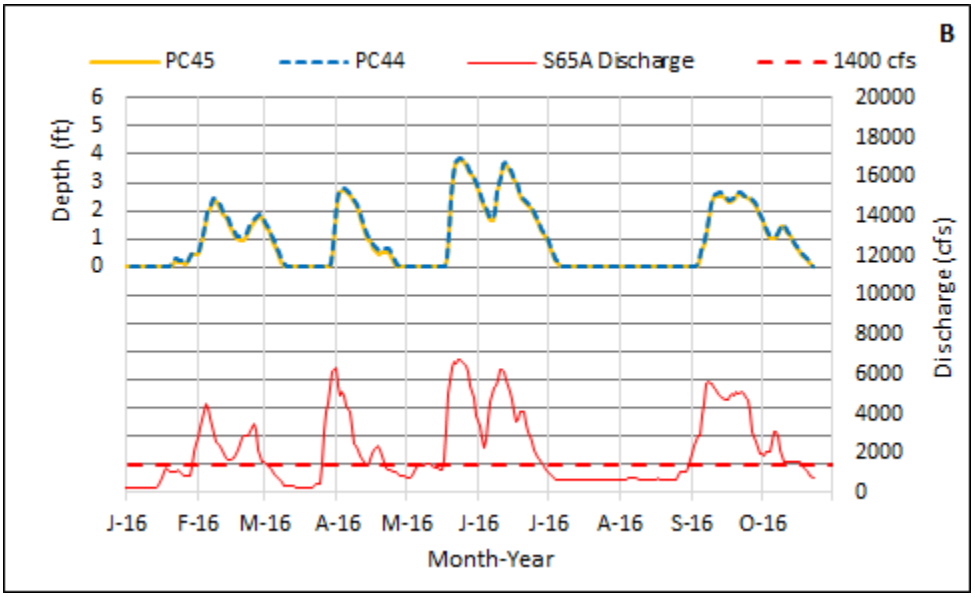


Figure 12. Phase I area floodplain water depths for this week, one month ago, and two months ago. Note that the WDAT color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to Jan. 16, 2012.





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

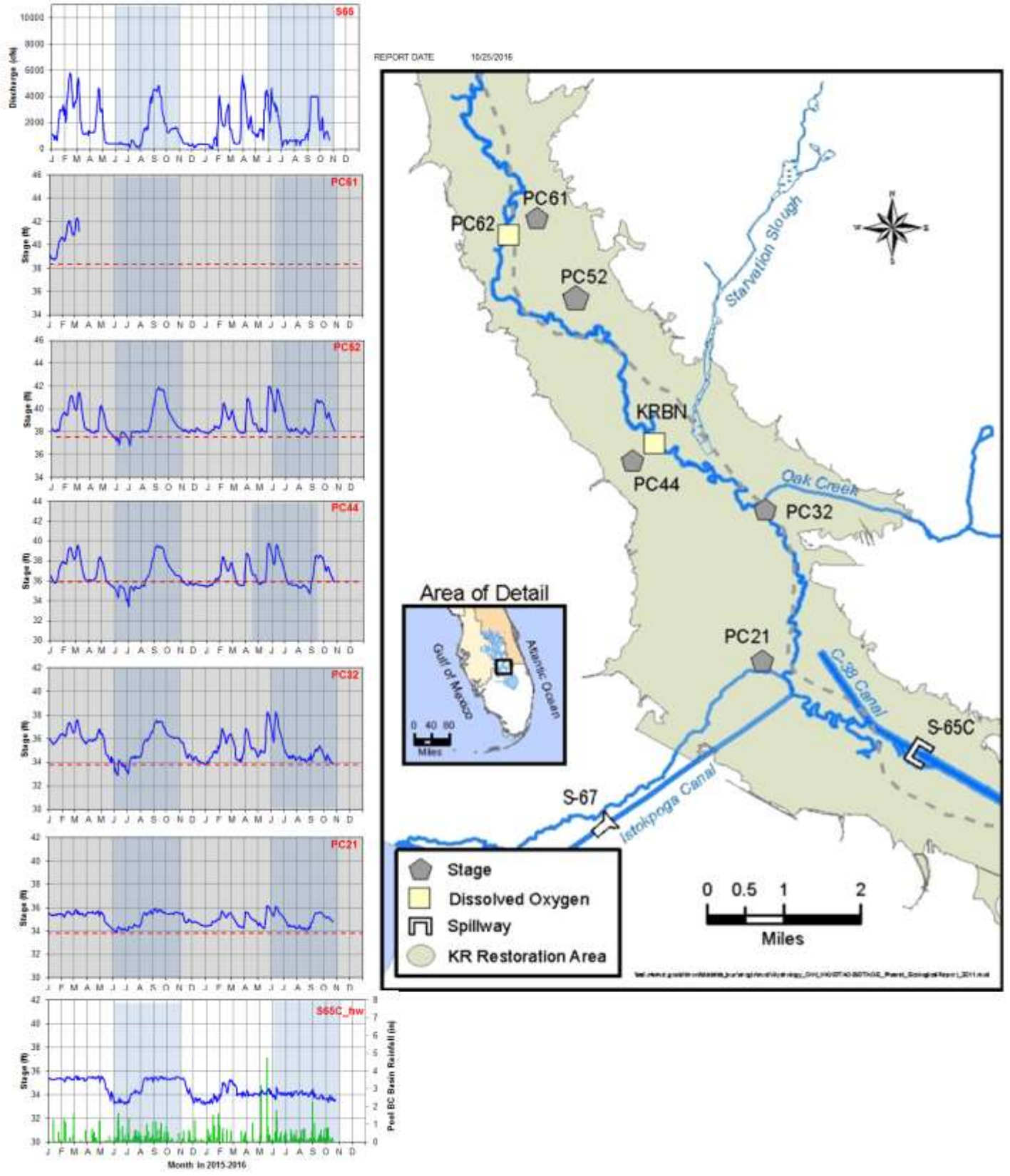


Figure 13. Discharge at S65, stages at five monitoring stations in the Phase I area of the Kissimmee River floodplain, and headwater stage at S65-C since January 1, 2015. The most recent data (~2 weeks) are provisional real-time data from SFWMD DualTrend; previous data are from SFWMD DB-HYDRO (validated).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

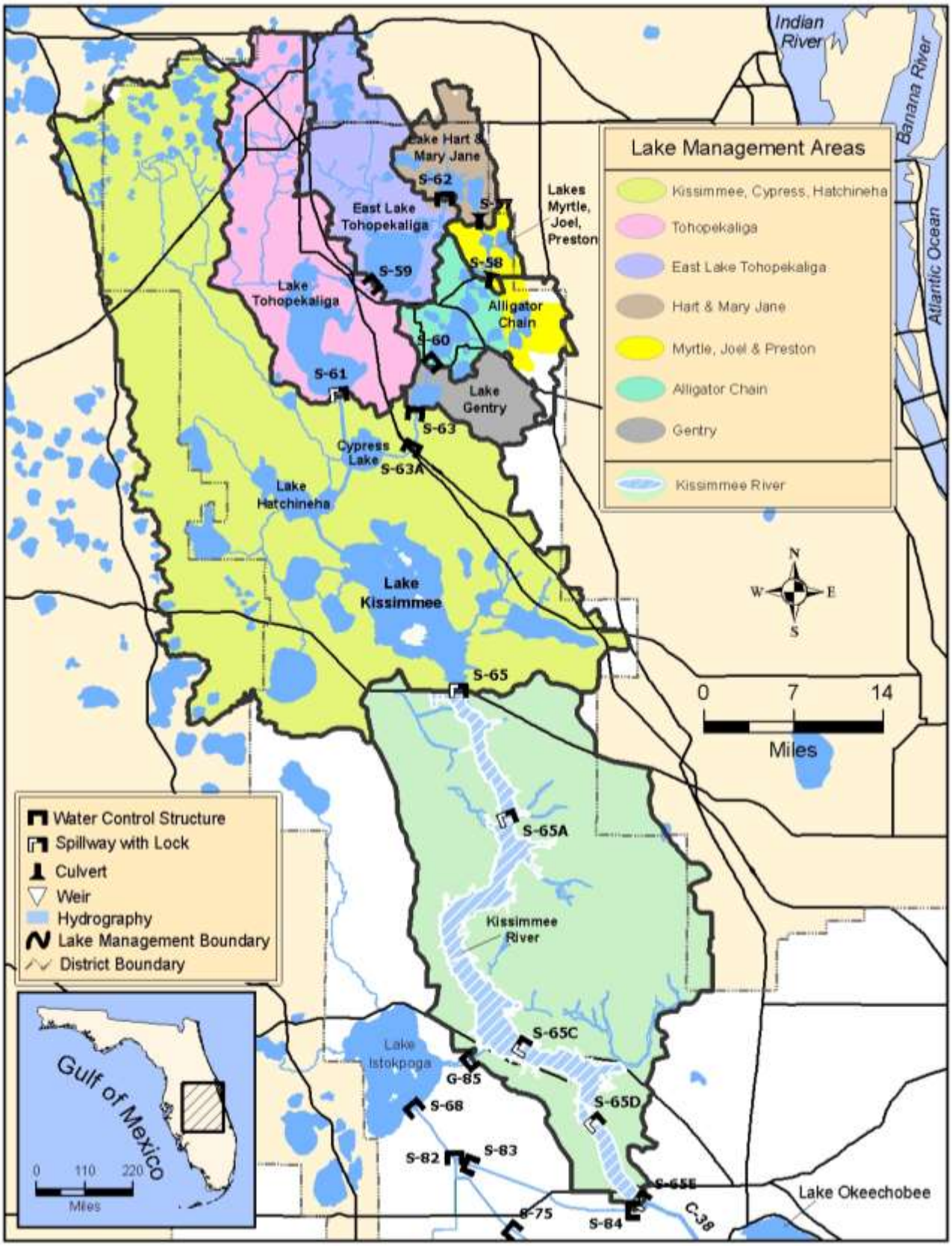


Figure 14. The Kissimmee Basin

LAKE OKEECHOBEE

According to the USACE web site, Lake Okeechobee stage is at 15.70 feet NGVD for the period ending at midnight on October 24, 2016. This value is based on the use of four interior Lake stations (L001, L005, L006, and LZ40) and four perimeter stations (S352, S4, S308 and S133). Lake stage decreased by 0.20 feet over the past week but is still 0.06 feet higher than it was a month ago and 1.06 feet higher than it was a year ago (Figure 1). The Lake is currently in the Low sub-band (Figure 2). According to RAINDAR, 0.021 inches of rain fell directly over the Lake during the past seven days (Figure 3). Less amounts fell in the upper Kissimmee Valley and slightly greater amounts fell along the coast. Similar amounts fell in the remaining surrounding watershed.

Based on USACE reported values, current Lake inflow is approximately 2,036 cfs as detailed below.

Structure	**Flow cfs**
S65E	1685
S154	86
S84 & 84X	225
S71	0
S72	0
C5 (Nicodemus slough dispersed storage)	-107
S191	0
S133 PUMPS	0
S127 PUMPS	0
S129 PUMPS	0
S131 PUMPS	0
S135 PUMPS	0
Fisheating Creek	147
S2 Pumps	0
S3 Pumps	0
S4 Pumps	0

Current Lake outflow is approximately 5,379 cfs with 3,181 cfs exiting at S77, 1,240 cfs exiting at S308 and 147 cfs exiting the L8 canal through Culvert 10A. Approximately 811 cfs exited through S351, S352 and S354 combined. Corrected evapotranspiration value based on the L006 weather platform solar radiation data for this past week was 2,012 cfs.

Change in elevation equivalents and average weekly flows for major structures are presented in Figure 4. Weekly average values for S77 and S308 are based on USGS data for the below structure gauges.

The most recent MODIS imagery (October 22 and 23, 2016) indicated low potential for bloom conditions (Figure 5).

A post-hurricane assessment of the submerged aquatic vegetation (SAV) indicated little change in the community compared to the August 2016 quarterly mapping results (Figure 6). In August there were thirty-two sites with no plants while the most recent survey (October 2016) recorded thirty-three sites with no plants. The biggest difference was seen in the western Fisheating Bay area where three fewer sites had plants this month.

Water Management Recommendations

Lake stage decreased over the past week; however, levels remain above the top of the preferred stage envelope (15.5 feet NGVD). Future short-term recommendations are to lower Lake levels. From an ecological perspective, the Lake is too high for this time of year and levels have been too high since the February rain event resulting in a loss of submerged aquatic vegetation and increased cyanobacterial blooms and associated toxins. If elevated Lake levels persist into the next growing season we expect additional damage to submerged aquatic vegetation and a resurgence of the bloom conditions that characterized this past wet season.

The goal should be to continue the downward trend in Lake stage as levels have moved past the top of the preferred stage envelope. Further increases in stage will result in additional ecological damage. Near optimal Lake stages will be necessary this coming spring and summer to provide conditions conducive to the reestablishment of the submerged aquatic vegetation acreage lost this year due to high Lake stages.

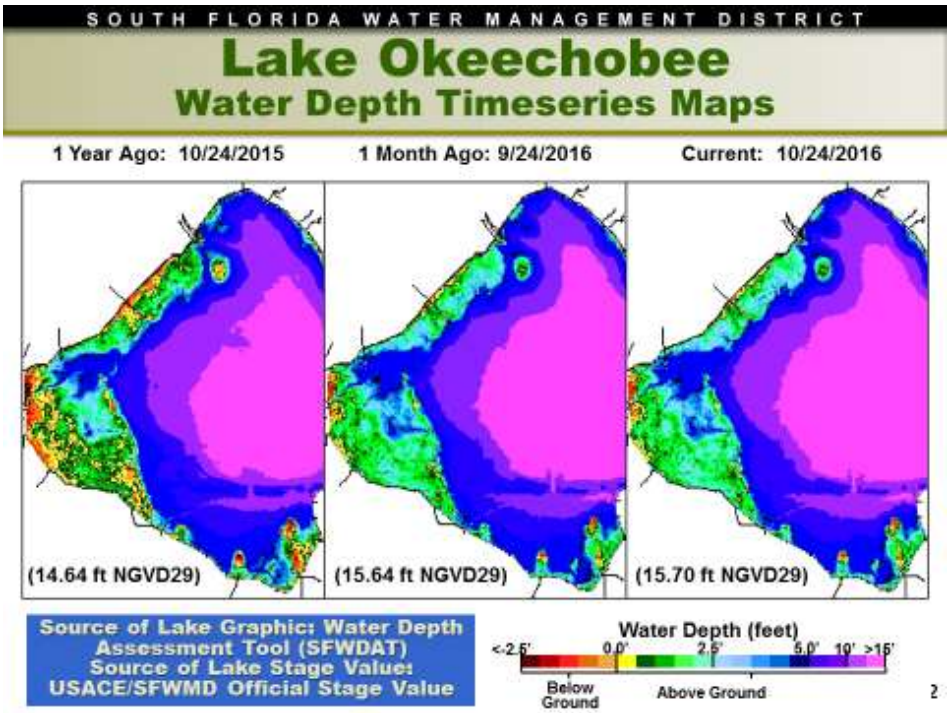


Figure 1

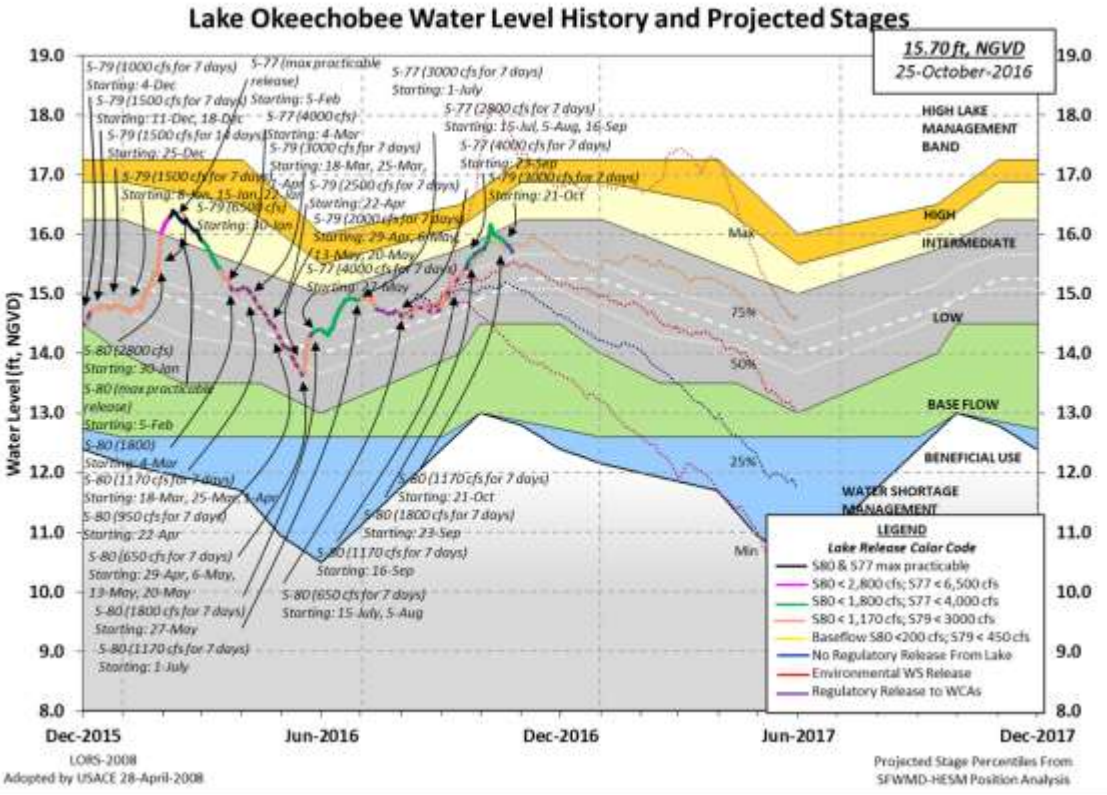

Lake Okeechobee Water Level History and Projected Stages
15.70 ft, NGVD
25-October-2016
HIGH LAKE MANAGEMENT BAND
HIGH
INTERMEDIATE
LOW
BASE FLOW
BENEFICIAL USE
WATER SHORTAGE MANAGEMENT
Max
75%
50%
25%
Min
Water Level (ft, NGVD)
19.0
18.0
17.0
16.0
15.0
14.0
13.0
12.0
11.0
10.0
9.0
8.0
Dec-2015
Jun-2016
Dec-2016
Jun-2017
Dec-2017
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

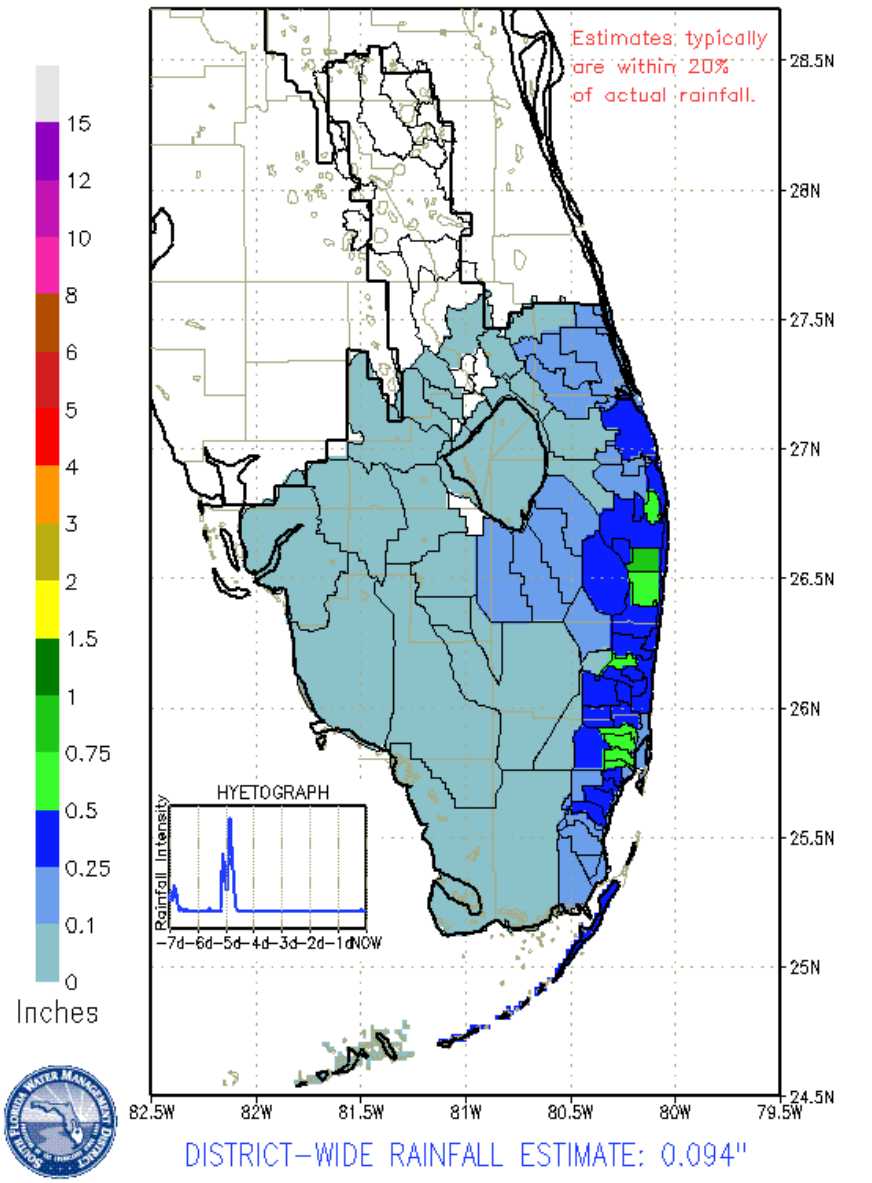

SFWMD PROVISIONAL RAINDAR 7-DAY BASIN RAINFALL ESTIMATES
FROM: 0815 EST, 10/18/2016 THROUGH: 0815 EST, 10/25/2016
Estimates typically are within 20% of actual rainfall.
15
12
10
8
6
5
4
3
2
1.5
1
0.75
0.5
0.25
0.1
0
Inches
HYETOGRAPH
Rainfall Intensity
-7d-6d-5d-4d-3d-2d-1d NOW
28.5N
28N
27.5N
27N
26.5N
26N
25.5N
25N
24.5N
82.5W
82W
81.5W
81W
80.5W
80W
79.5W
DISTRICT-WIDE RAINFALL ESTIMATE: 0.094"

Figure 3

INFLOWS	Average Daily Flow Past Week cfs	Feet of Change Past Week
S65E	2199	0.070
S71 & 72	119	0.004
S84 & 84X	288	0.009
Fisheating Creek	509	0.016
Rainfall	N.A.	0.002
OUTFLOWS	**Average Daily Flow Past Week cfs**	**Feet of Change Past Week**
S77	3911	0.125
S308	691	0.022
S351	372	0.012
S352	132	0.004
S354	224	0.007
L8	81	0.003
ET	2012	0.064

Figure 4

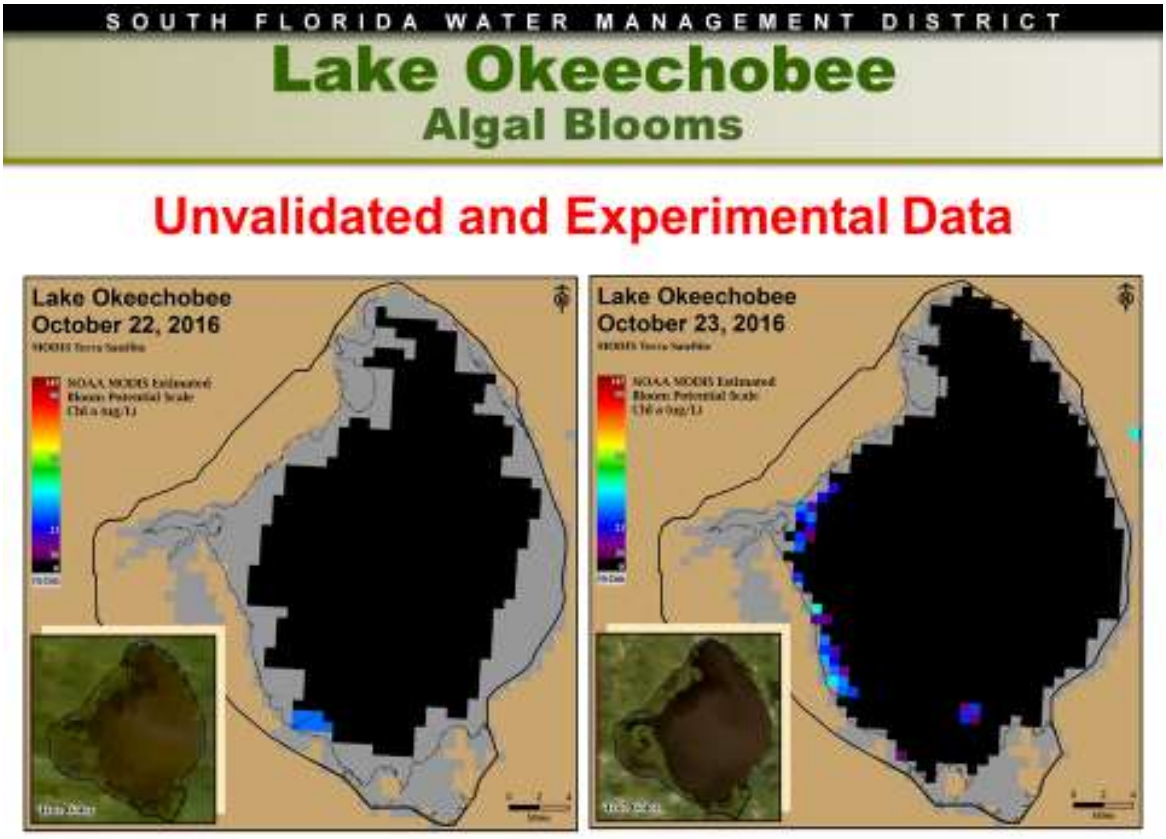


Figure 5

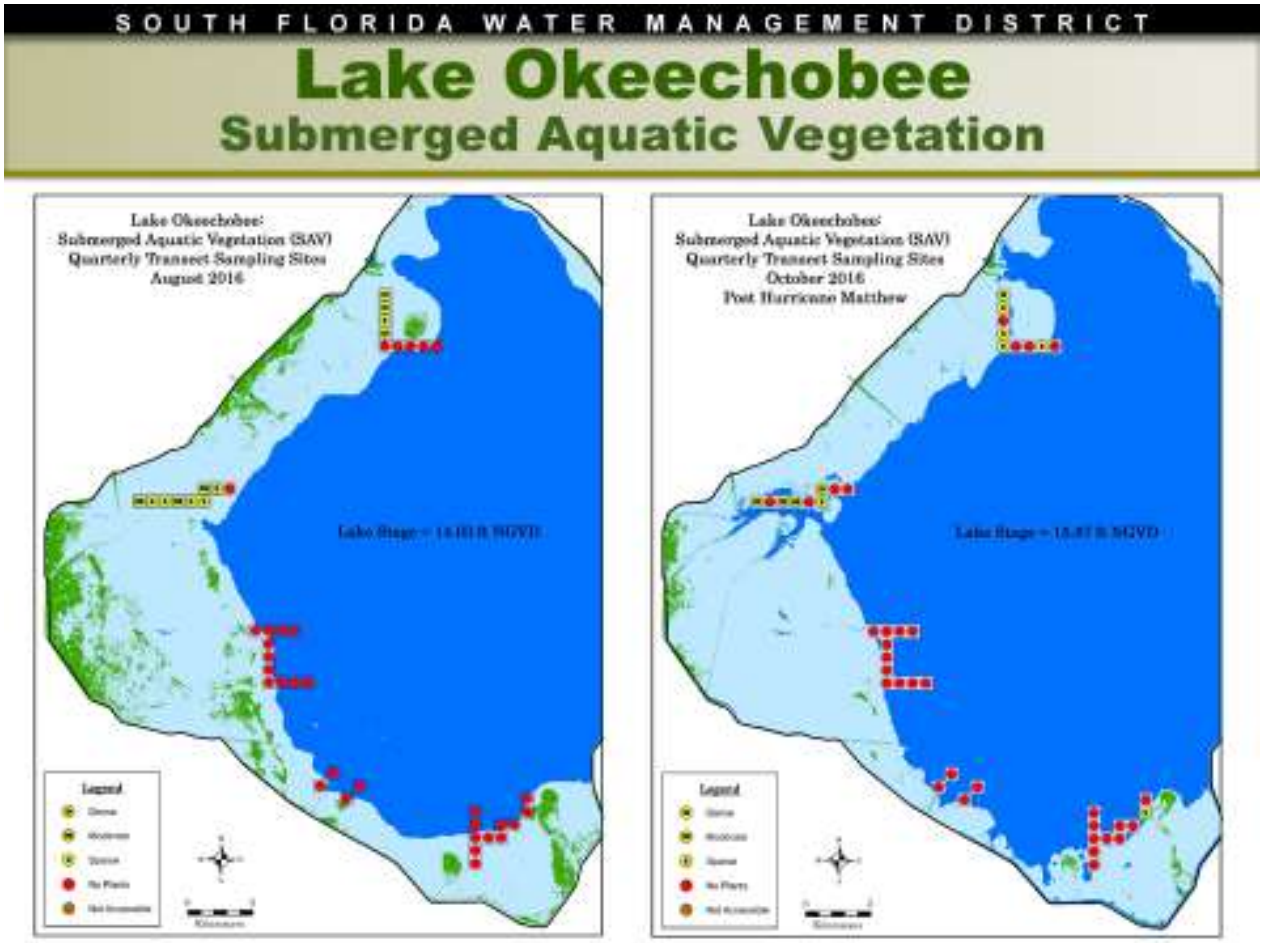


Figure 6

Lake Istokpoga

The Lake Istokpoga regulation schedule has reached winter pool stage of 39.50 feet NGVD. Lake stage is 39.51 feet NGVD and is currently 0.01 feet above regulation stage (Figure 7). Average flows into the Lake from Arbuckle and Josephine creeks were 487 cfs and 84 cfs respectively, a decrease in total flow from the previous week. Average discharge from S68 and S68X this past week was 307 cfs, an increase from the preceding week. According to RAINDAR, 0.002 inches of rain fell in the Lake Istokpoga watershed during the past seven days.

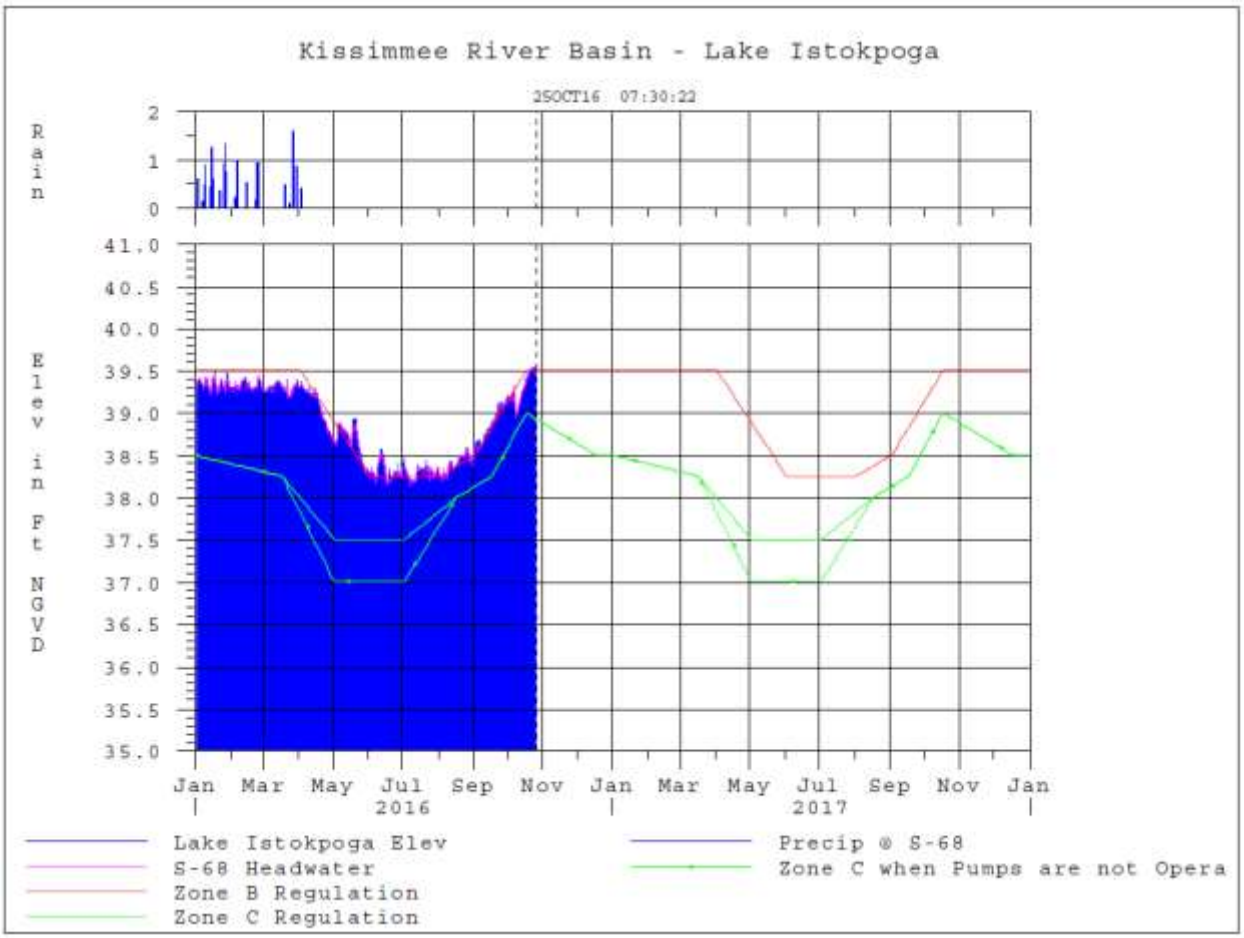


Figure 7

ESTUARIES

St. Lucie Estuary

Over the past week, provisional flows averaged about 641 cfs at S-80, 691 cfs downstream of S-308, 91 cfs at S-49 on C-24, 81 cfs at S-97 on C-23, and 137 cfs from Ten Mile Creek at the Gordy Road Structure. Average inflow from tidal basin tributaries is estimated to be 183 cfs (Figures 1 and 2). Total inflow averaged about 1,133 cfs last week and 3,335 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 at the US1 Bridge is about 7.8. Salinity conditions in the middle estuary are in the fair range for the adult eastern oyster.

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)	**2.0** (0.3)	**5.7** (0.6)	NA[1]
US1 Bridge	**5.6** (2.0)	**10.0** (3.8)	10.0-26.0
A1A Bridge	**15.8** (13.3)	**24.0** (22.6)	NA

[1]Envelope not applicable

Caloosahatchee Estuary

During the past week, provisional flows averaged approximately 3,911 cfs downstream of S-77, 2,922 cfs at S-78, and 3,638 cfs at S-79. Average inflow from tidal basin tributaries is estimated to be 464 cfs (Figures 5 and 6). Total inflow averaged 4,102 cfs last week and 7,025 cfs over last month.

Over the past week in the estuary, salinity remained about fresh to Ft. Myers Yacht Basin and increased downstream (Table 2, Figures 7 and 8). The seven-day average salinity values are within the good range for adult oysters at Shell Point and at Sanibel and in the poor range at Cape Coral (Figure 9). The 30-day moving average surface salinity is 0.2 at Val I-75 and 0.2 at Ft. Myers. Salinity conditions at Val I-75 are in the good range for tape grass.

Table 2. 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	**3.5** (1.5)	**6.0** (2.5)	10.0-30.0
Shell Point	**13.8** (12.0)	**17.6** (16.4)	10.0-30.0
Sanibel	**26.1** (25.2)	**27.9** (27.2)	10.0-30.0

[1]Envelope not applicable and [2]Envelope is based on a 30-day average.
*Val I75 is temporarily offline due to site construction,
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 3 as concentration ranges of Chlorophyll *a* and dissolved oxygen at Beautiful Island, Ft. Myers, and Shell Point in the Caloosahatchee Estuary.

Table 3. 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)	4.1 – 10.9	4.8 – 5.55	2.3 – 6.0
Dissolved Oxygen (mg/l)	4.5 – 5.8	6.4 – 7.8	5.5 – 7.5

The Florida Fish and Wildlife Research Institute reported on October 14, 2016, that *Karenia brevis*, the Florida red tide organism, was observed in background to low concentrations in seven samples and medium concentration in two samples (Boca Grande Pass and Mondongo Island) collected from Lee County. Concentrations in the Caloosahatchee area were not present or were very low.

Water Management Recommendations

Given the current estuarine conditions, there are no ecological benefits associated with additional releases from Lake Okeechobee.

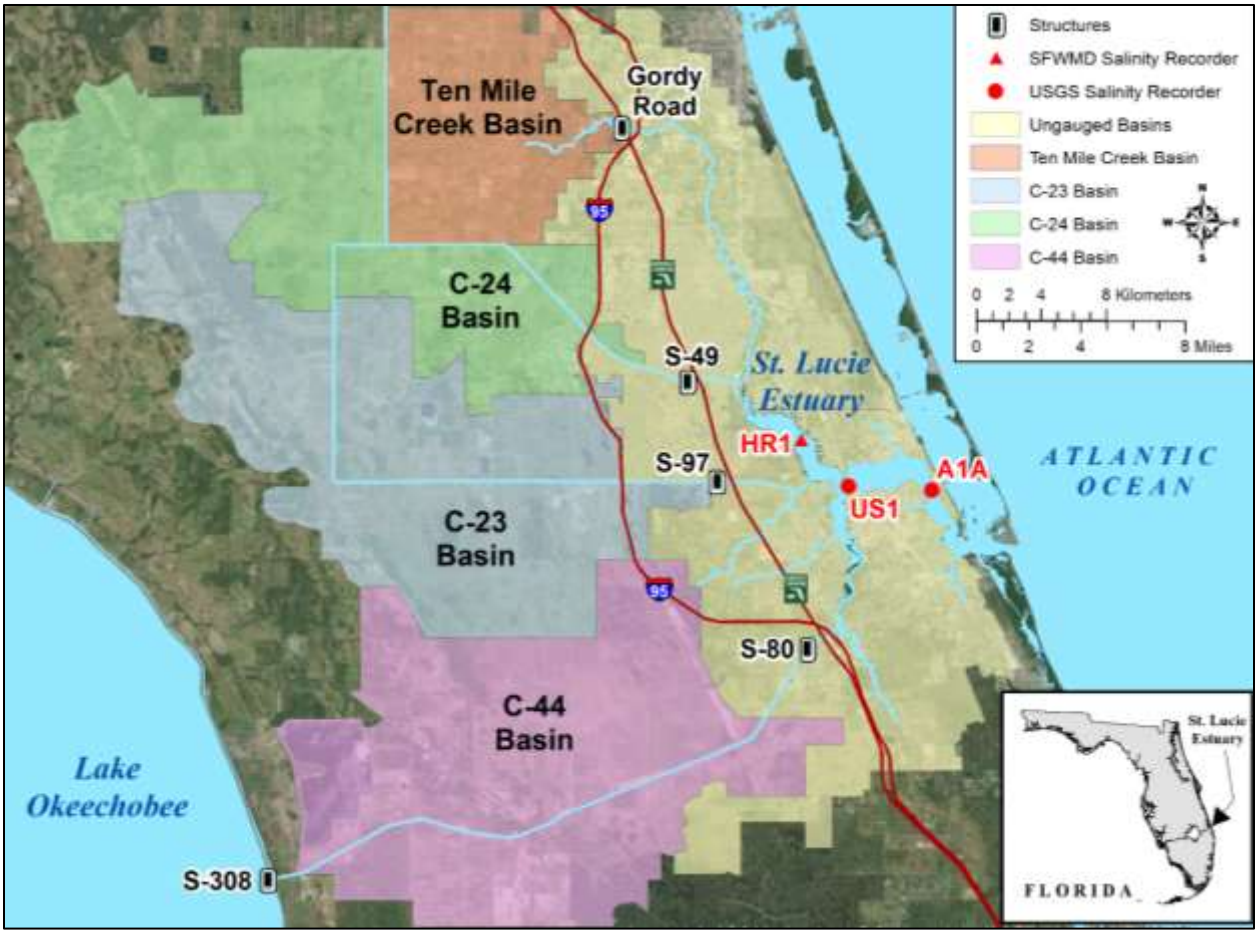


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

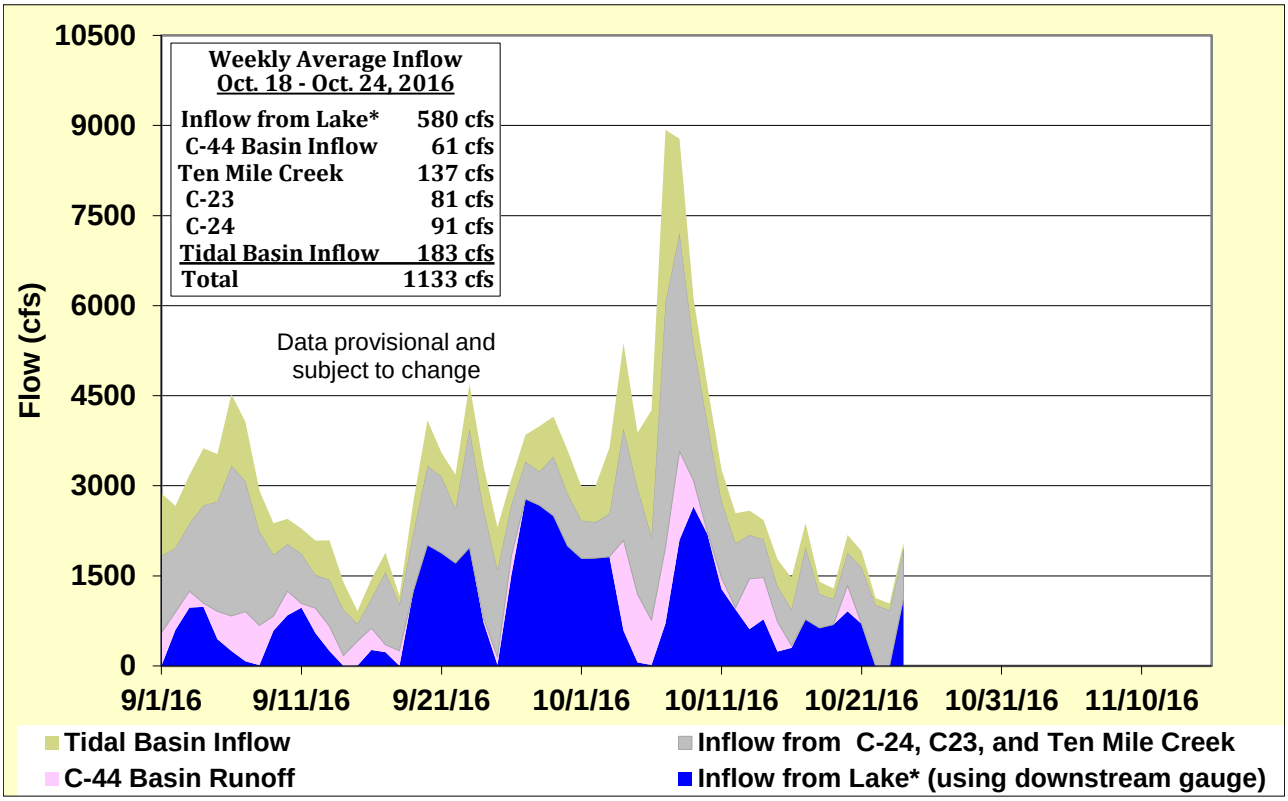


Figure 2. Estimated surface freshwater inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basins into the St. Lucie Estuary.

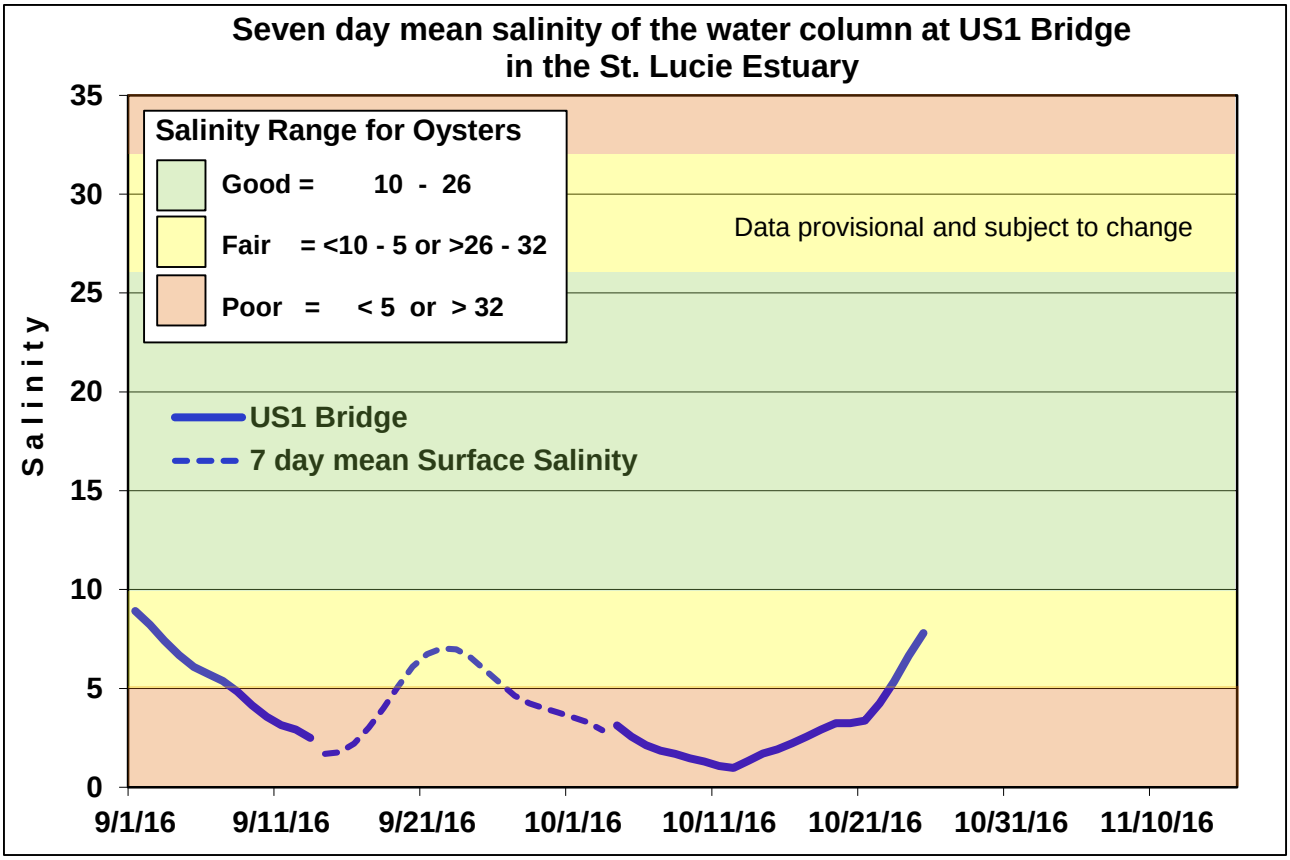


Figure 3. Seven-day mean salinity of the water column at the U.S. Highway 1 Bridge.

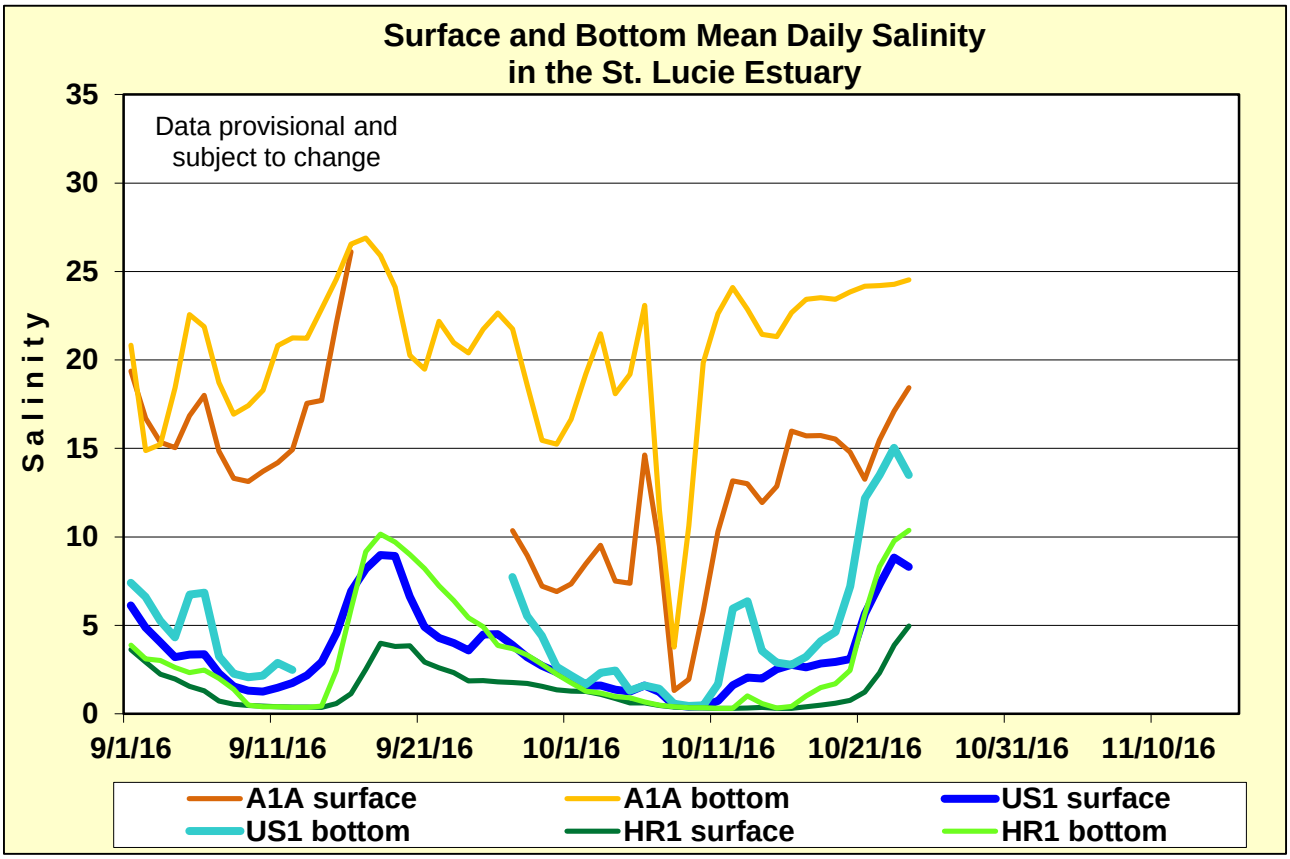


Figure 4. Daily mean salinity at the A1A, US1 and estimated HR1 stations.

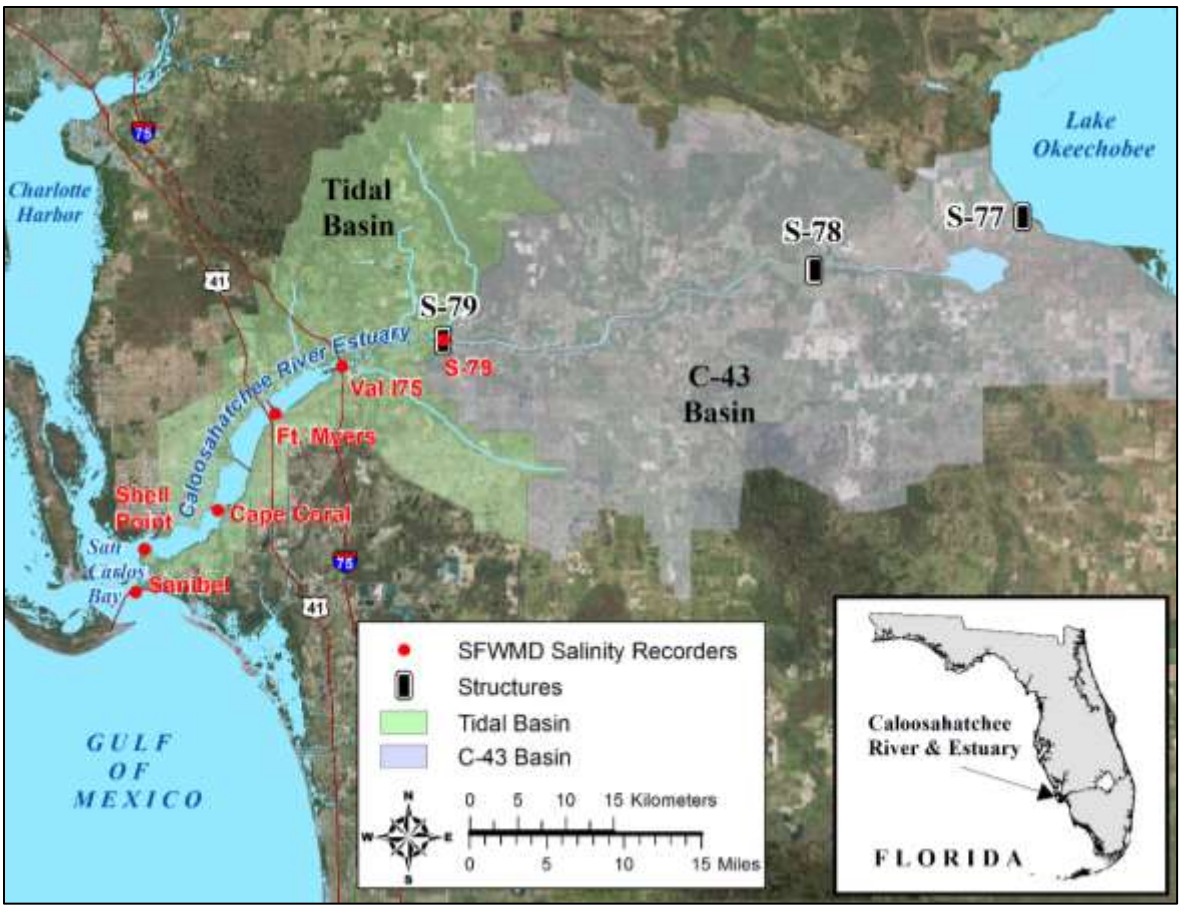


Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

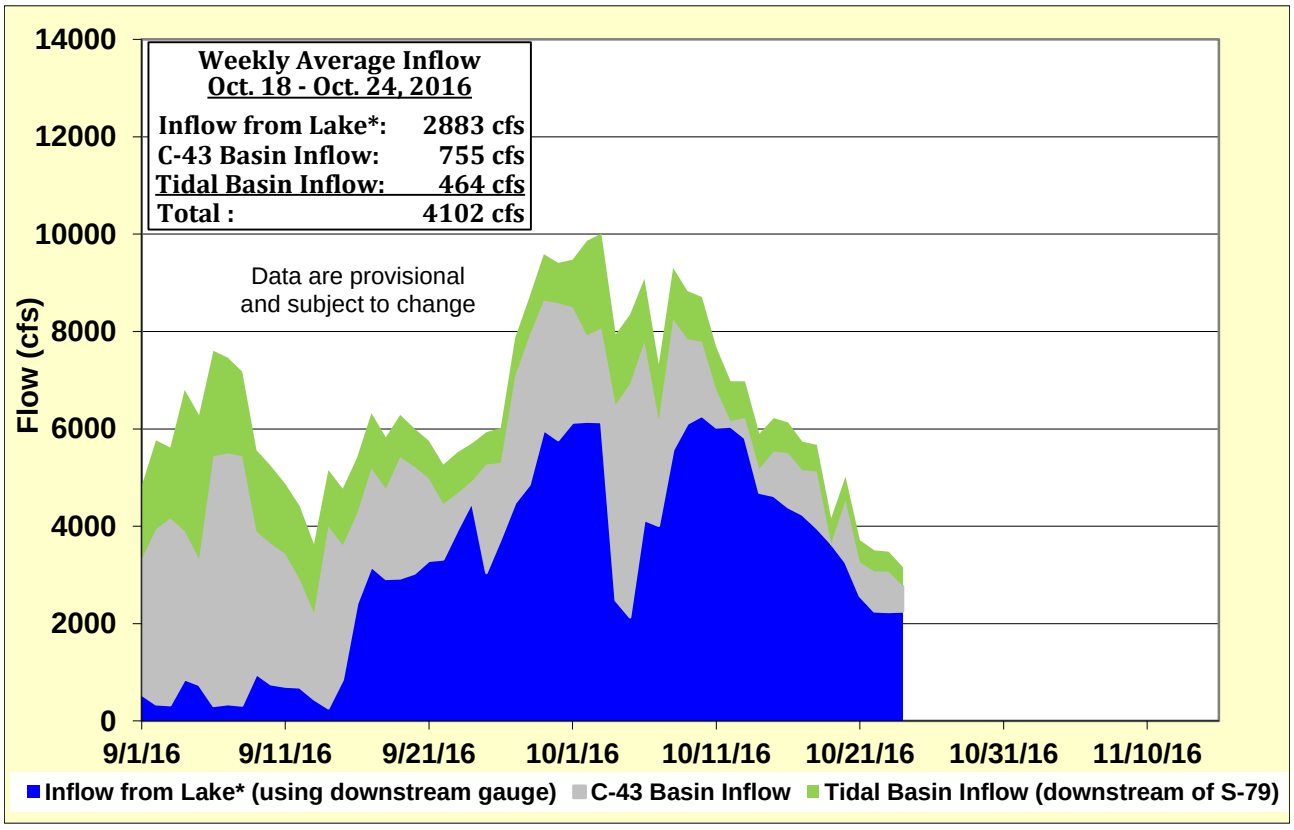
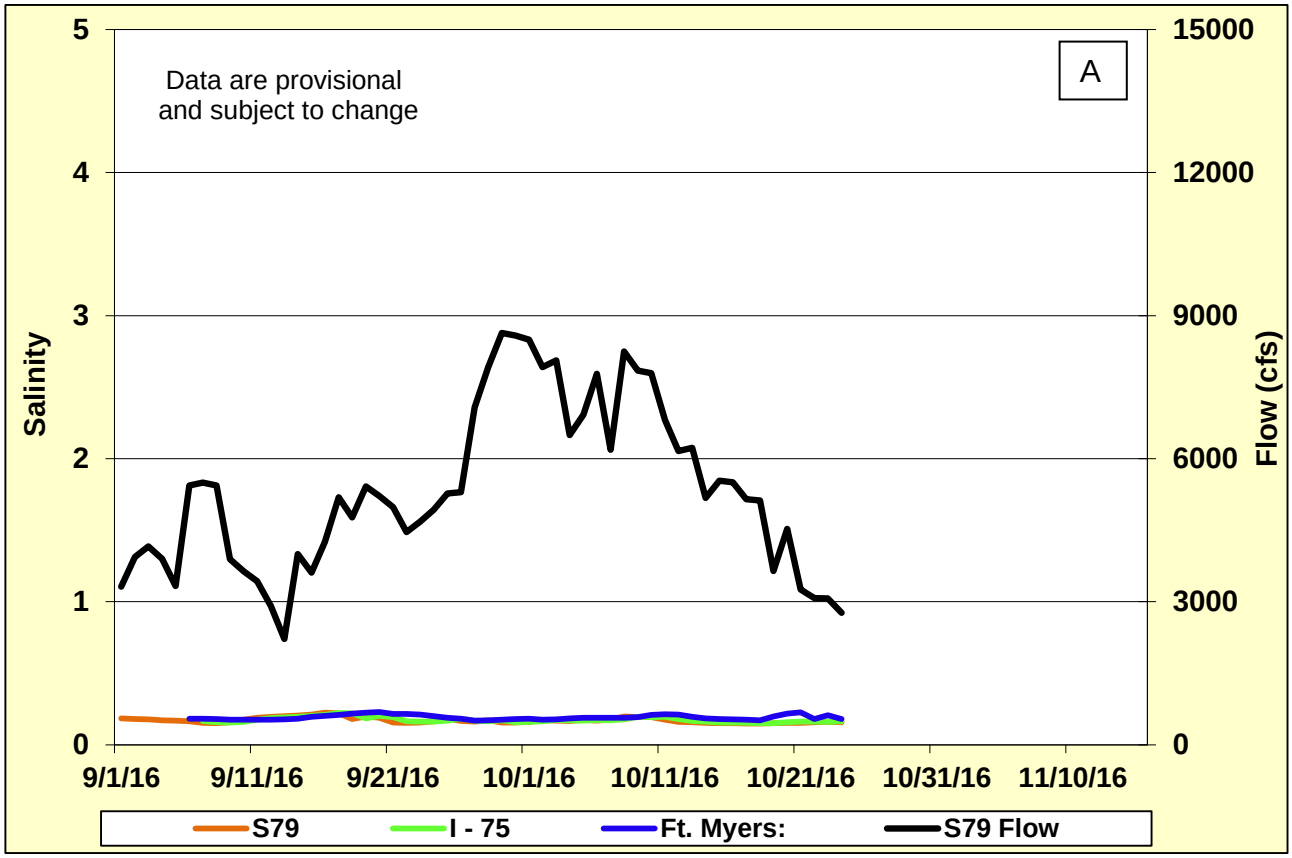


Figure 6. Freshwater inflows from Lake Okeechobee, runoff from the C-43 basin, and tributaries in the tidal basin into the Caloosahatchee River Estuary.



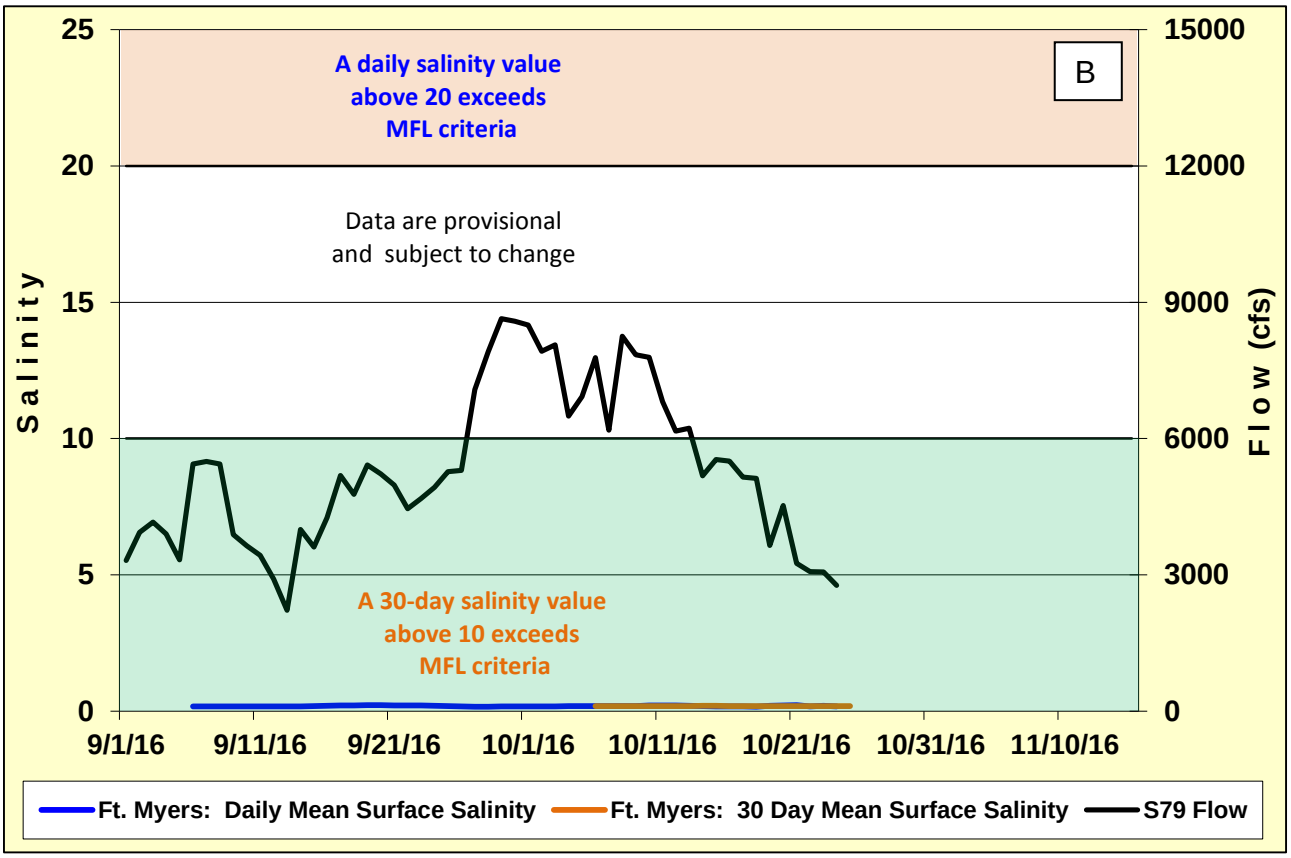


Figure 7. Daily mean flows at S-79 and salinity at upper estuary monitoring stations (A) and 30-day moving average salinity at Ft. Myers (B).

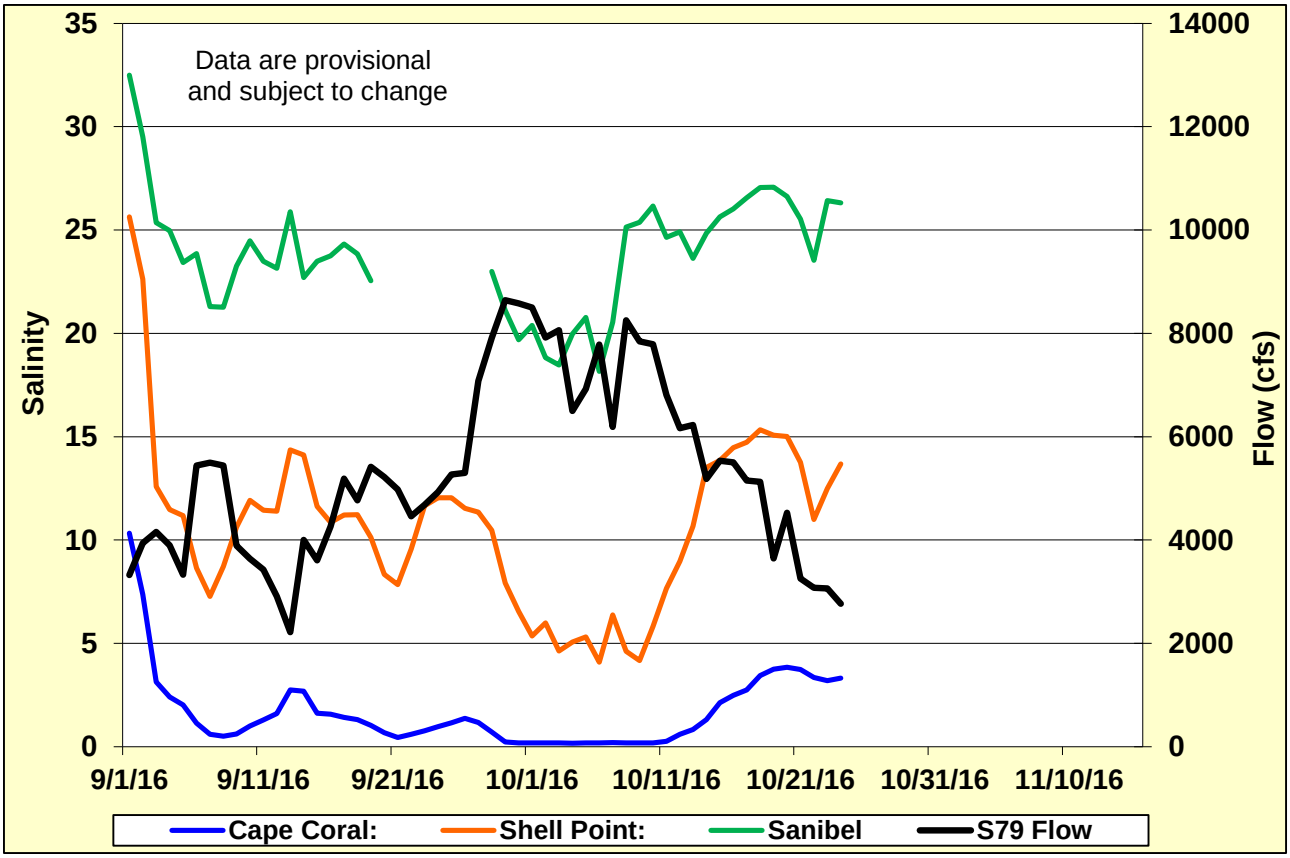


Figure 8. Daily mean flows at S-79 and salinity at lower estuary stations.

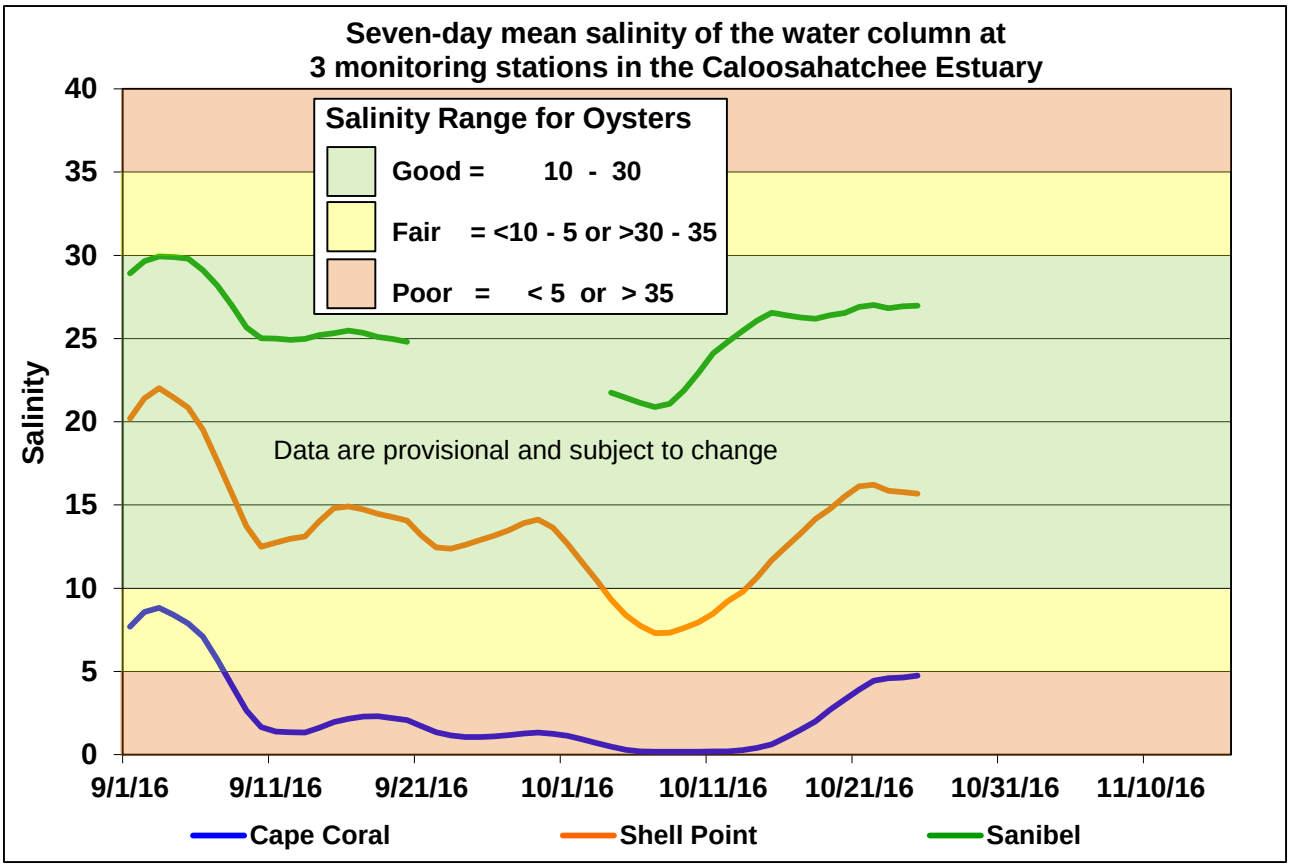
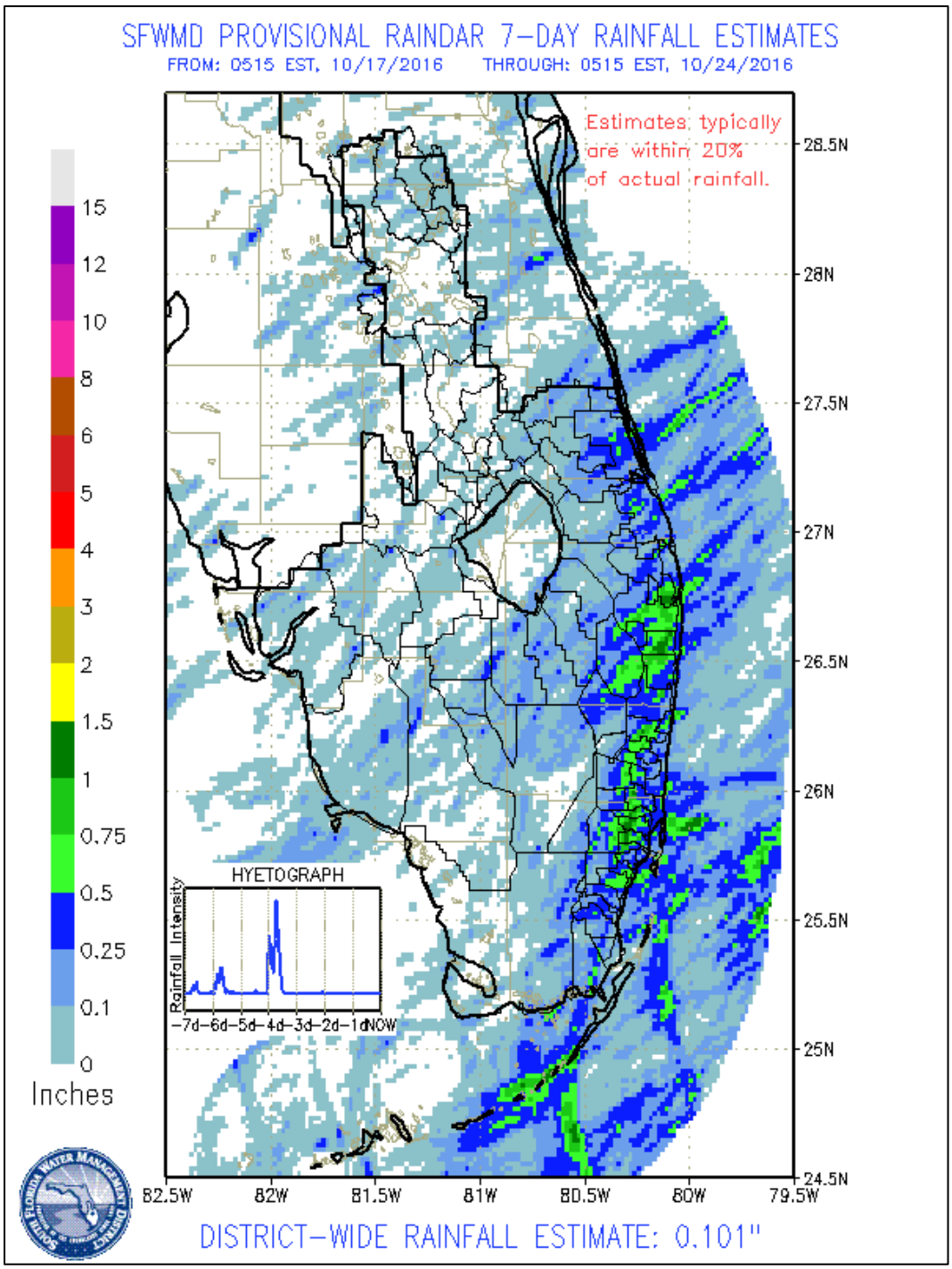


Figure 9. Seven-day mean salinity at Cape Coral Bridge, Shell Point and Sanibel Bridge monitoring stations.

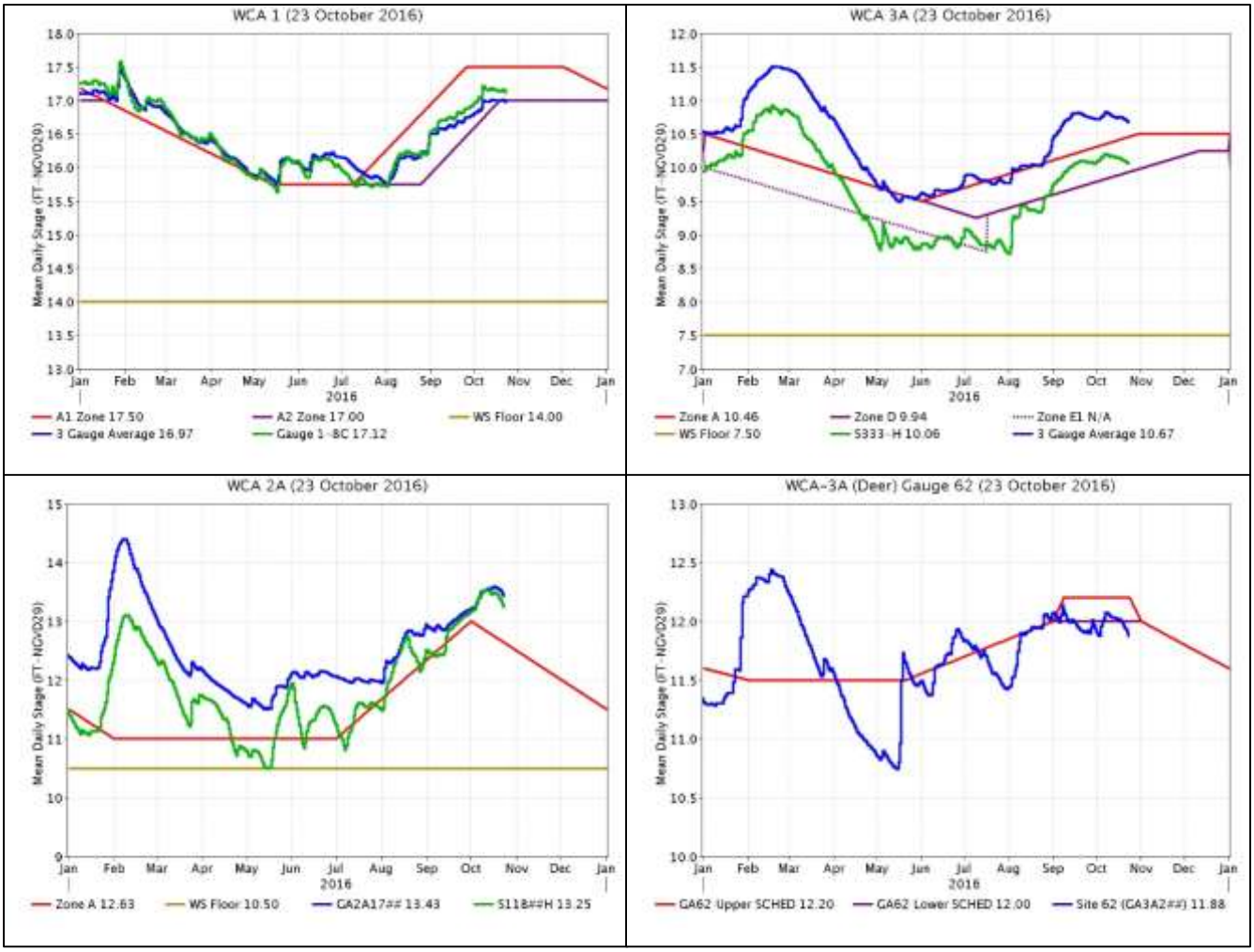
GREATER EVERGLADES

Rainfall was low this week with basin averages ranging from 0.06 to 0.39 inches. The highest maximum local rainfall was 0.84 inches in WCA-1. Stages decreased from -0.19 to -0.04 feet. Pan evaporation was 1.32 inches, which is 25 percent higher than the pre-project average of 1.06 inches.

Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	0.39	-0.04
WCA-2A	0.24	-0.19
WCA-2B	0.08	-0.05
WCA-3A	0.07	-0.12
WCA-3B	0.08	-0.05
ENP	0.06	-0.08

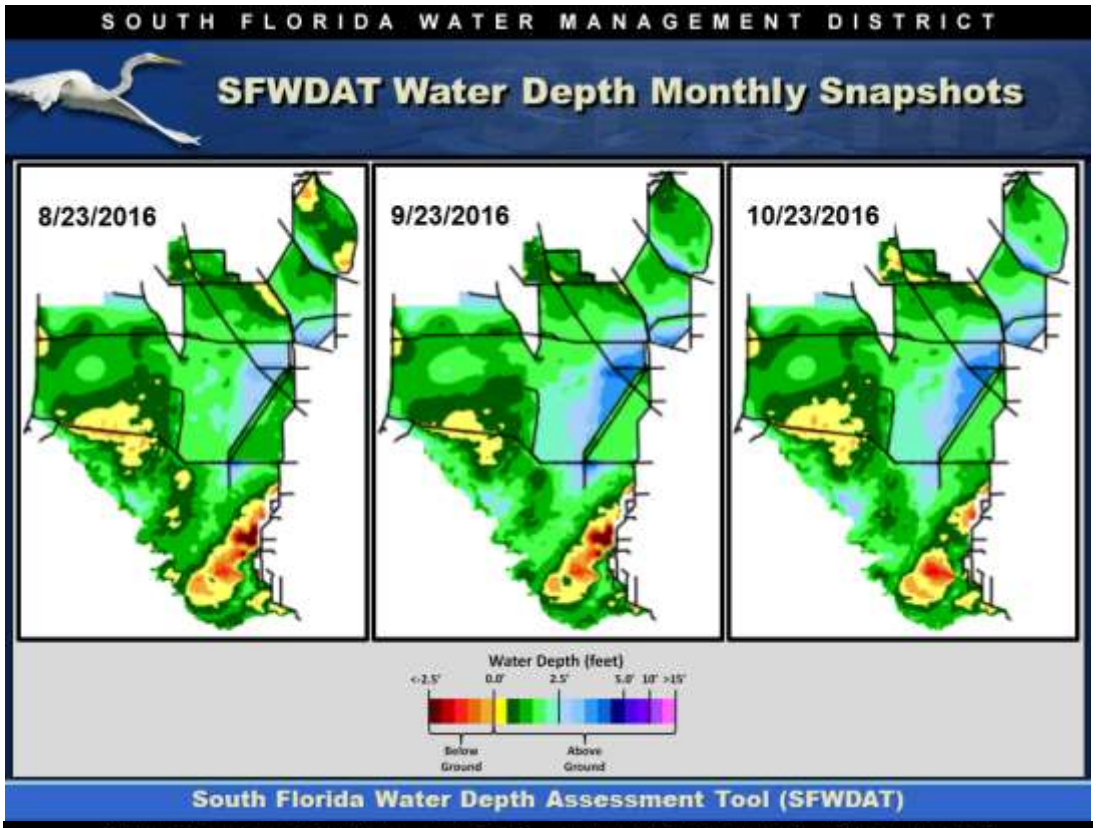


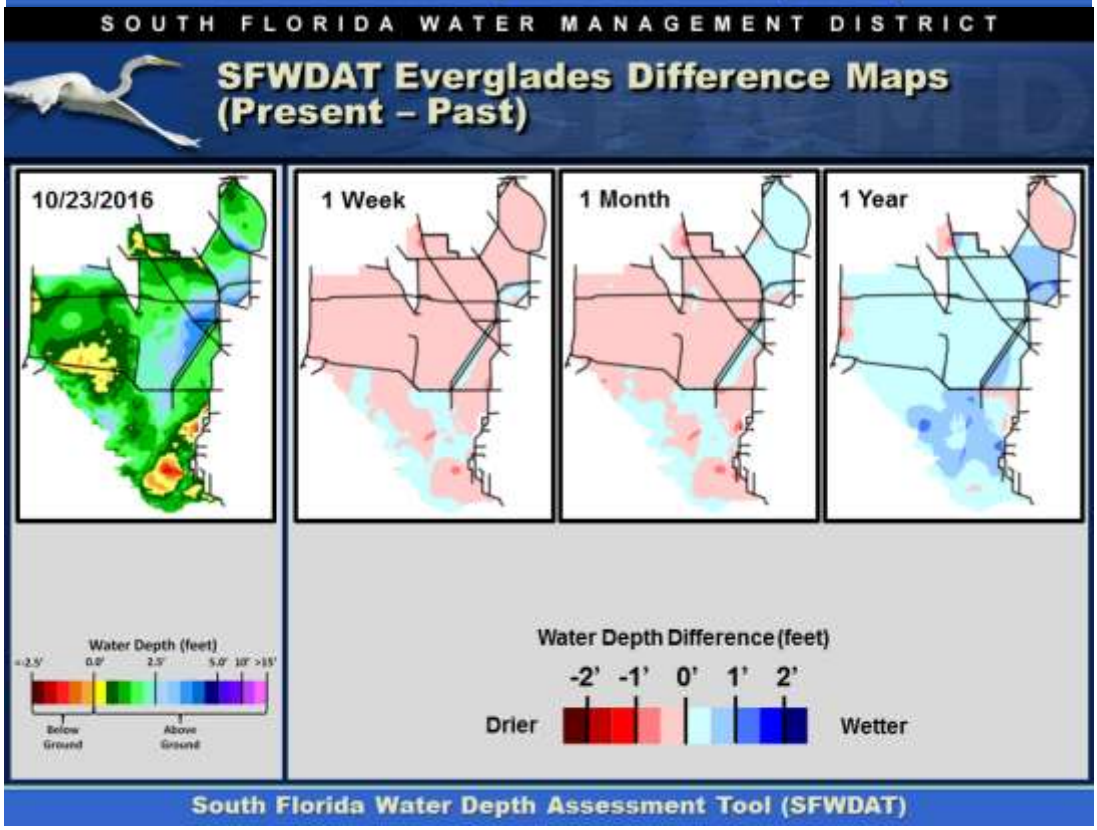
Regulation Schedules: Stages remain above regulation for two of the four areas. The WCA-1 three-gauge average is −0.53 feet below zone A1, and the northwestern WCA-3A gauge stage (gauge 62) is −0.32 feet below the upper schedule. The other two areas remain above schedule: WCA-2A stage is 0.80 feet above regulation (which is decreasing at this time of year) and the WCA-3A three-gauge average stage is 0.21 feet above regulation.



Water Depths and Changes: Water levels in WCA-1 and -2A are higher than those in September and August while other areas are mixed in comparison. This month's depths map reflects a calculation adjustment in the area just north of northern Taylor River. Water depths at monitored gauges other than in WCA-2B range from 1.54 feet to 2.76 feet. The two-gauge average for northern WCA-3A has decreased to 11.47 feet. With the declining stages, FWC has re-opened the WCAs to normal use except for hunting and use of guns.

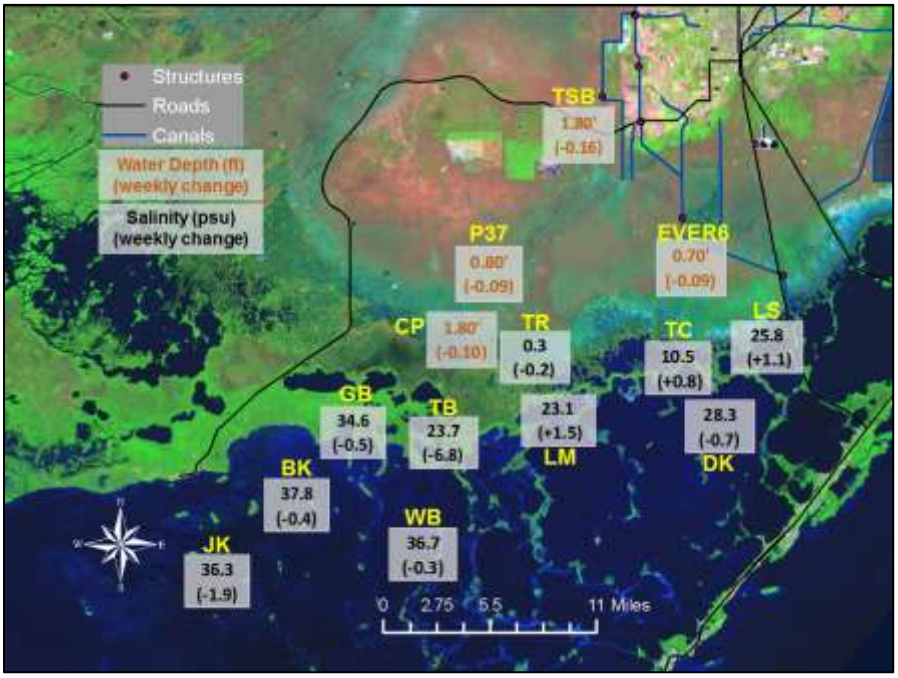
Stage changes decreased in most areas, but were slightly higher south of WCA-3A and coastal Everglades National Park (ENP). Individual gauge changes ranged from 0.0 feet to -0.19 feet. Stage differences are mixed compared to a month ago, but are generally higher than a year ago.

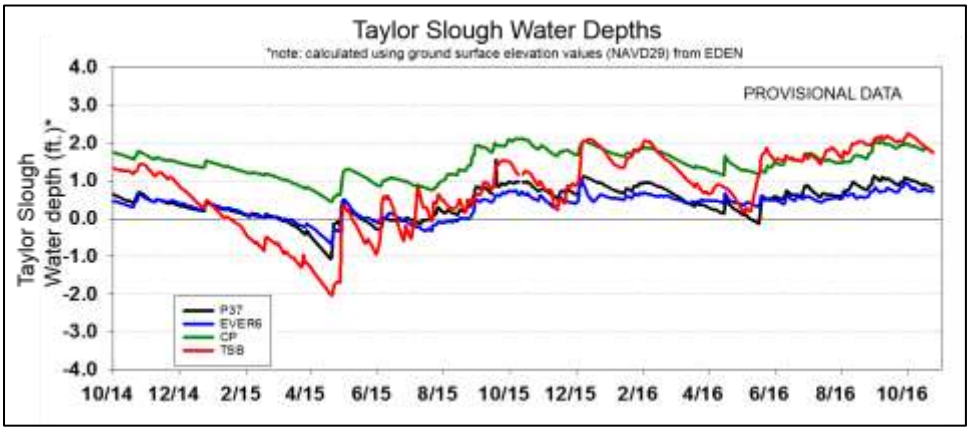




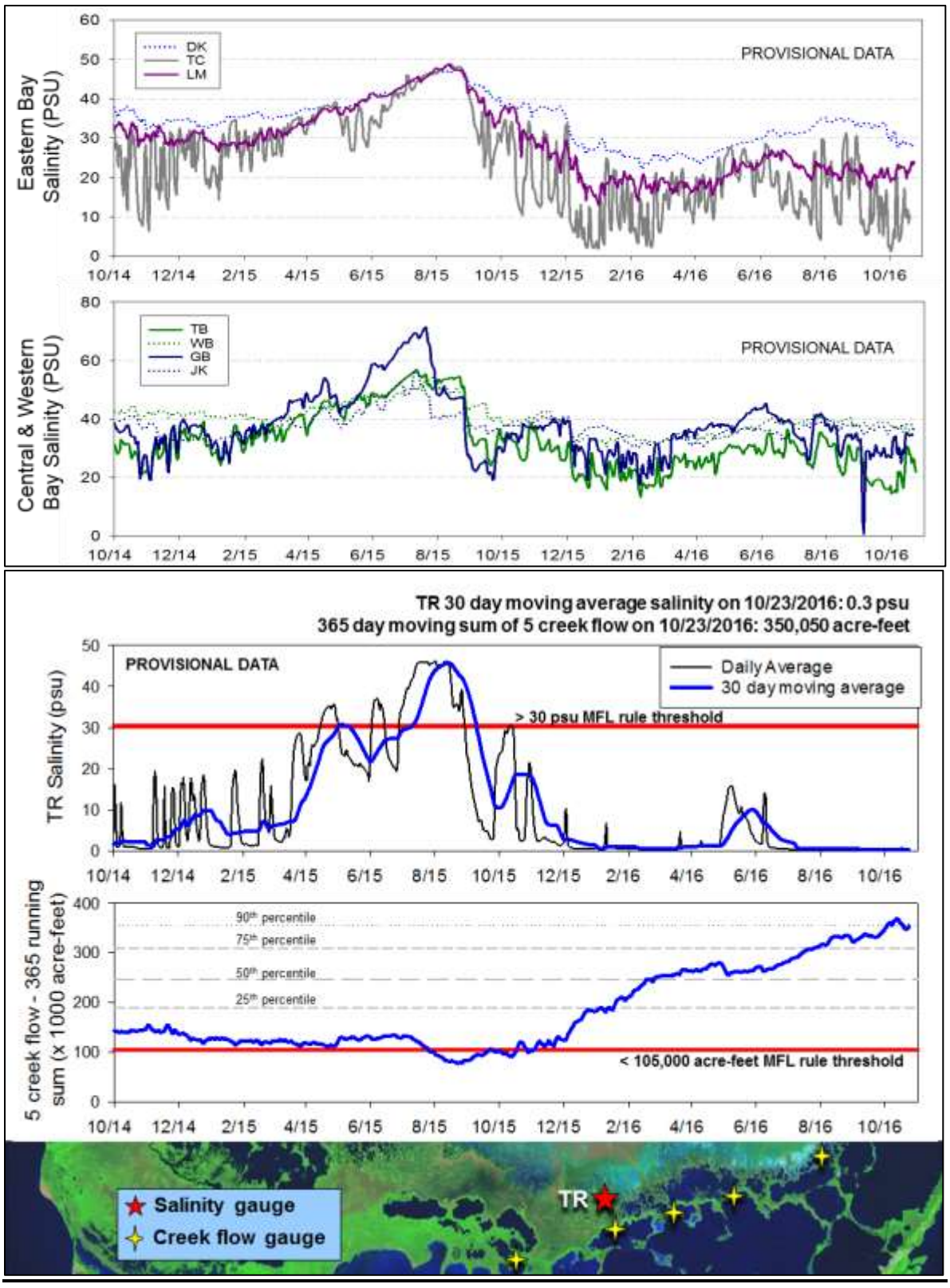
Taylor Slough and Florida Bay: Water levels decreased last week in Taylor Slough and the C-111 panhandle. All areas are within two inches of average with northern Taylor Slough still showing the greatest difference from average (+two inches). Compared to a month ago, depths in northern and eastern Taylor Slough have decreased while the panhandle depths have increased slightly.

Most salinities in Florida Bay changed less than 2 psu. The central nearshore area was the only area with a larger change as last week's saline water was flushed back out. The central and western nearshore embayments also diverge the most from average (+9 to +10 psu).





Florida Bay MFL: The MFL sentinel site TR in the mangrove zone remains near fresh at 0.3 psu, and the 30-day moving average salinity at TR is also at a seasonal 0.3 psu. The 365-day running sum of the cumulative flow from the five creeks feeding Florida Bay decreased about 9,600 acre-feet last week to 350,050 acre-feet (above the average of 257,628 acre-feet). Creek flow is provisional data from the USGS and is highly variable.



Water Management Recommendations

- Water levels in WCA-3A and WCA-2A should be lowered. With the declining stages, FWC has re-opened the WCAs to normal use except for hunting and use of guns.

- The depth at gauge 65 (southern WCA-3A) is at 2.76 feet and has been above 2.5 feet for eight consecutive weeks. We recommend that water depths in southern WCA-3A should be reduced and remain below 2.5 feet throughout the wet season to protect tree island forests that were inundated for over 20 weeks in the dry season.

- Ascension rates need to remain under 0.25 feet per week to protect habitat and wildlife, including apple snails, prey of the endangered snail kite.

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

Everglades Ecological Recommendations, Oct. 25, 2016 (red is new)

Area	Current Condition	Cause(s)	Recommendation	Reasons
WCA-1	Stages changed −0.03' to -0.05'	Rainfall, ET, management	Limit ascension rates to a maximum of 0.25 ft/week.	Ascension rates of <0.25'/week will protect habitat and wildlife including reproducing apple snails.
WCA-2A	Stages fell -0.19'	Rainfall, ET, management	Maintain ascension rates <0.25 ft/week. FWC has lifted WCA closures with decreasing water levels.	Ascension rates of <0.25'/week will protect habitat and wildlife including reproducing apple snails, prey for endangered snail kites.
WCA-2B	Stages fell −0.05'	Rainfall, ET, management	Limit ascension rates to extent possible with a maximum of 0.25 ft/week.	Ascension rates of <0.25'/week will protect habitat and wildlife including reproducing apple snails.
WCA-3A NE	Stage fell −0.09'	Rainfall, ET, management	Reduce stages in northern WCA-3A. FWC has lifted WCA closures with decreasing water levels. Ascension rates should be limited to the extent possible of <0.25 ft/week.	Closures may eliminate deer hunting and possibly hunting of other species. They will also eliminate access to tree islands in WCAs -3A and -2A. Ascension rates not exceeding 0.25'/week will protect habitat and wildlife including reproducing apple snails.
WCA-3A NW	Stage fell −0.18'	Rainfall, ET, management		
Central WCA-3A S	Stage fell −0.12'	Rainfall, ET, management	Lower water depth at gauge 65. Slow the ascension rates to the extent possible with a maximum of 0.25 ft/week. When flows are changed a gradual reduction is recommended (stepping down over several days). FWC has lifted WCA closures with decreasing water levels.	Water depths at gauge 65 should remain below 2.5 feet over this upcoming wet season. Keeping depths below 2.5' at gauge 65 is important to allow tree island vegetation to recover from stress of the recent extended inundation duration. Ascension rates of <0.25'/week will protect habitat and wildlife including reproducing apple snails.
Southern WCA-3A S	Stage fell −0.10'	Rainfall, ET, management		
WCA-3B	Stages fell 0.00' to -0.10'	Rainfall, ET, management	Limit ascension rates to extent possible with a maximum of 0.25 ft/week.	Ascension rates of <0.25'/week will protect habitat and wildlife including reproducing apple snails.
ENP-SRS	Stage fell −0.08'	ET, rainfall, topography, management	Make discharges to the Park according to the ERTP rainfall plan.	Keep peat wet to promote native habitat and maintain wetland plant and animal communities.
ENP-CSSS habitats	S-12A and S-12B are open	Rainfall, ET, management	Follow rainfall plan for releases. Decreases in flow should be gradual through S333 and the S-12 structures when they occur (stepping down over several days). Follow guidance in C-111 Western Spreader Canal Project operations manual.	Sparrows have ceased breeding for 2016. Future operations need to continue to provide appropriate hydrological and habitat conditions for breeding in subpopulation A.
Taylor Slough	Average to 2 inches above average	Rain, ET, inflows	Move water southward as needed	Provide freshwater buffer for ecosystems and maintain low salinity conditions downstream
FB- Salinity	Average to 10 psu above average	Rain, ET, inflows, wind	Move water southward as needed	Maintain lower salinity levels.