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: September 6, 2016

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

An upper level trough and its associated surface trough across the Florida peninsula are bringing favorable conditions for thunderstorm development over the southern half of the District today but dry air moving into central Florida should decrease shower development over the Kissimmee Valley. An upper level low is forecasted to spin up in the base of this trough over Florida tonight and move westward. This upper level low should keep shower activity along the east coast overnight and then bring some moisture and favorable upper level wind flow to the southern half of the District Wednesday, particularly west. Afternoon seabreeze, thunderstorm activity should be focused over the interior and west Thursday, Friday, and Saturday.

Kissimmee

On Sunday, stage in East Lake Toho was 0.1 feet below schedule, Lake Toho was at schedule, and Kissimmee-Cypress-Hatchineha were above schedule by 1.2 feet, respectively. Over the past week, discharge at S65, S65A, and S65E averaged 1,080, 2,538, and 2,900 cfs, respectively. Tuesday morning discharges were: ~1,442 cfs, ~3,931 cfs, ~2,684 cfs, and ~3,479 cfs, respectively at S65, S65A, S65C, and S65E. Dissolved oxygen has continued to decline since Sunday. Dissolved oxygen in the Kissimmee River averaged 3.88 mg/L over the past week and 2.44 mg/L on Sunday and has continued to decline since Sunday. Kissimmee River mean floodplain depth on Sunday was 0.91 feet. As discharge is ramped up or down at S65/S65A we recommend using the rampup/rampdown schedule shown in Figure 8a.

Lake Okeechobee

Lake Okeechobee is at 15.03 feet NGVD having increased by 0.30 feet over the past week in response to the heavy rainfall associated with the recent tropical depression. The Lake remains in the low flow sub-band. Algal bloom conditions appear to be currently dissipating. Snail kites continue to nest in the recently treated Moonshine Bay area.

Estuaries

Total discharge to the St. Lucie estuary average 2,680 over the past week with 460 cfs (17%) coming from Lake Okeechobee. Salinity at the US1 Bridge is in the fair range for oysters. Total inflow to the Caloosahatchee estuary averaged 5,407 cfs over the past week with 674 cfs (12%) coming from the Lake. Salinity conditions are good for tape grass in the upper estuary. Salinity conditions are good for oysters at the Sanibel Causeway and Shellpoint, but in the fair range at the Cape Coral Bridge

Stormwater Treatment Areas

Over the past week, the STAs/FEBs received approximately 3,400 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 66,800 acre-feet. All STA cells are at or above target depths. Operational restrictions are in place for vegetation rehabilitation in STA-1E and STA-5/6 and structure repairs are underway in STA-1E. In addition, nests of Endangered Species Act (ESA) protected species have been observed in STA-5/6. This week, as conditions allow, Lake releases will be sent to STA-1E and STA-1W.

Everglades

Rainfall was high last week, ranging from 2.22 inches to 4.41 inches. Stage changes rose from 0.02 feet to 0.33 feet. High water levels have caused closure of the Miccosukee tribal lands in western WCA-3A and may lead to further closures of WCAs 3A and 2A by FWC to protect wildlife. The 30-day moving average salinity at the Florida Bay MFL site is 0.5 psu and the cumulative 365-day inflow from the five creeks into Florida Bay decreased to 325,741 acre-feet.

KISSIMMEE BASIN

Kissimmee Basin Rainfall

The Upper Kissimmee Basin received 5.32 inches of rainfall in the past week and the Lower Basin received 4.54 inches (SFWMD Daily Rainfall Report 09/05/2016).

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: 9/6/2016

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)						
							9/4/16	8/28/16	8/21/16	8/14/16	8/7/16	7/31/16	7/24/16
Lakes Hart and Mary Jane	S62	177	LKMJ	59.9	R	60.0	**-0.1**	0.0	0.1	0.0	0.1	0.1	0.1
Lakes Myrtle, Preston, and Joel	S57	94	S57	60.9	R	61.0	**-0.1**	0.1	0.0	0.0	0.0	0.0	-0.1
Alligator Chain	S60	303	ALLI	63.1	R	63.2	**-0.1**	0.0	0.0	0.0	0.1	0.0	0.1
Lake Gentry	S63	605	LKGT	60.9	R	61.0	**-0.1**	0.0	0.0	0.0	0.1	0.1	-0.1
East Lake Toho	S59	790	TOHOE	56.5	R	56.6	**-0.1**	-0.3	0.3	0.0	-0.2	-0.1	-0.1
Lake Toho	S61	1567	TOHOW, S61	53.6	R	53.6	**0.0**	0.0	0.0	0.0	0.0	-0.1	-0.1
Lakes Kissimmee, Cypress, and Hatchineha	S65	1080	LKISSP, KUB011, LKIS5B	52.3	R	51.1	**1.2**	0.5	0.4	-0.1	-0.5	-0.4	-0.4

* 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: **9/6/2016**

Metric	Location	Sunday's 1-day average	Weekly Average**									
			9/4/16	8/28/16	8/21/16	8/14/16	8/7/16	7/31/16	7/24/16	7/17/16	7/10/16	7/3/16
Discharge (cfs)	S-65	1338	**1080**	841	624	532	579	643	642	545	552	857
Discharge (cfs)	S-65A	2875	**2538**	808	666	661	694	638	660	633	660	1211
Discharge (cfs)	S-65C	2096	**2124**	928	1024	1081	1000	1219	1091	1119	1489	2741
Headwater stage (feet NGVD)		34.1	**34.1**	34.1	34.0	34.1	34.3	34.1	34.0	34.1	34.2	34.0
Discharge (cfs)	S-65D****	2905	**2172**	1181	1140	1142	1037	1284	1263	1272	1835	3108
Discharge (cfs)	S-65E	3068	**2900**	910	1061	1137	986	1158	1181	1147	1755	2991
DO concentration (mg/L)***	Phase I river channel	2.44	**3.88**	4.75	4.04	4.09	4.58	4.76	4.91	4.40	2.74	2.21
Mean depth (feet)*	Phase I floodplain	0.91	**0.65**	0.39	0.36	0.44	0.63	0.62	1.18	1.93	2.33	3.12

* 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
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.			
4/26/2016	No new recommendations.			
4/19/2016	No new recommendations.			
4/12/2016	No new recommendations.			
4/5/2016	No new recommendations.			
3/29/2016	No new recommendations.			
3/22/2016	No new recommendations.			
3/15/2016	No new recommendations.			
3/8/2016	No new recommendations.			
3/1/2016	No new recommendations.			
2/23/2016	No new recommendations.			
2/16/2016	No new recommendations.			
2/9/2016	No new recommendations.			
2/1/2016	Begin F&W recessions in East Toho, Toho, and KCH per the requested recession lines shown in the 2015-16 Dry Season Standing Recommendation (SR). Use Table 2 for guidance on rates of change in discharge to control departures from the line in KCH, and the reversal guidelines shown in the SR for Toho and East.	Initiate and manage lake stage recessions in East Toho, Toho, and KCH for the benefit of fish and wildlife, while avoiding harm to the Kissimmee River	TBD	KB Tech Team

KCOL Hydrographs (through Sunday midnight)

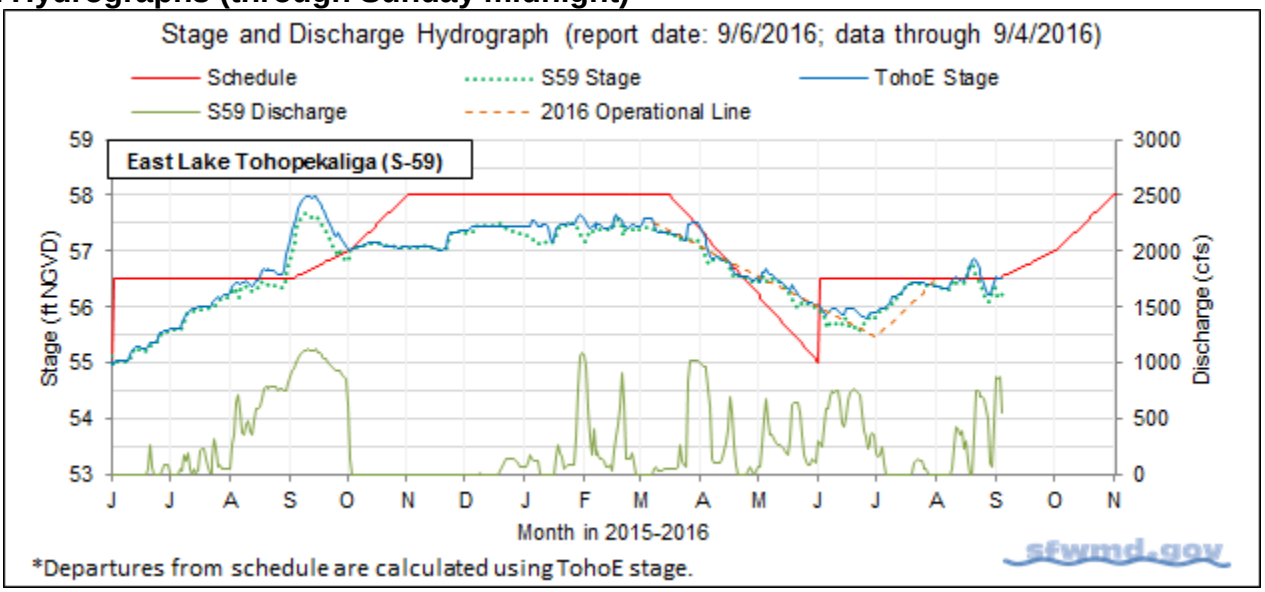


Figure 1.

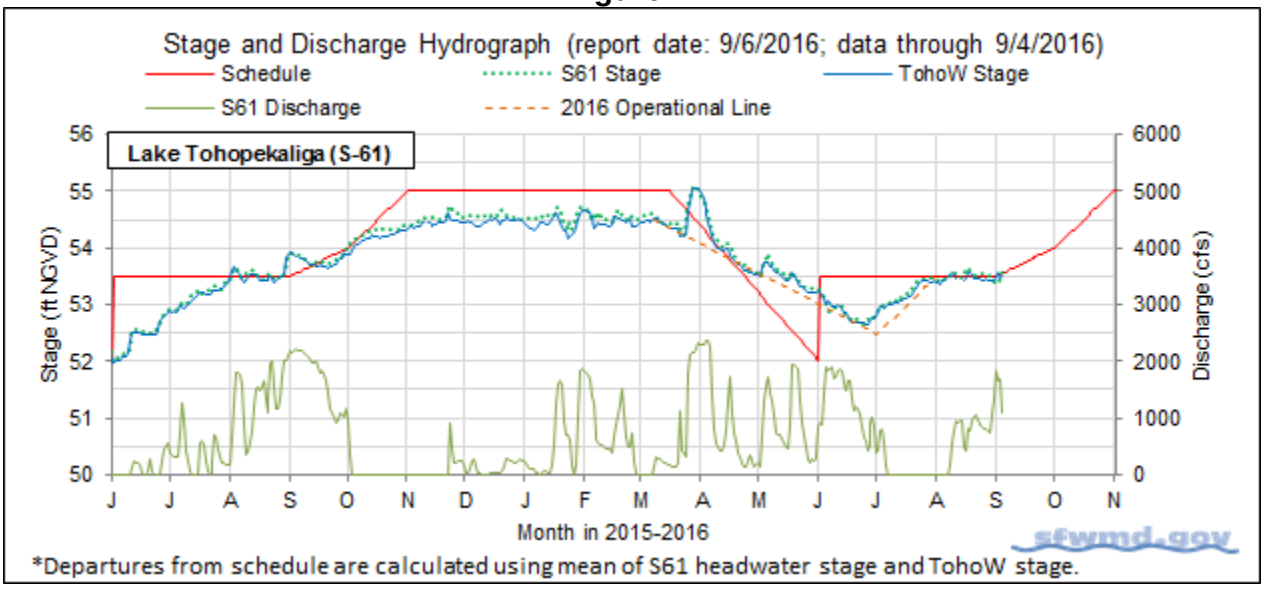


Figure 2.

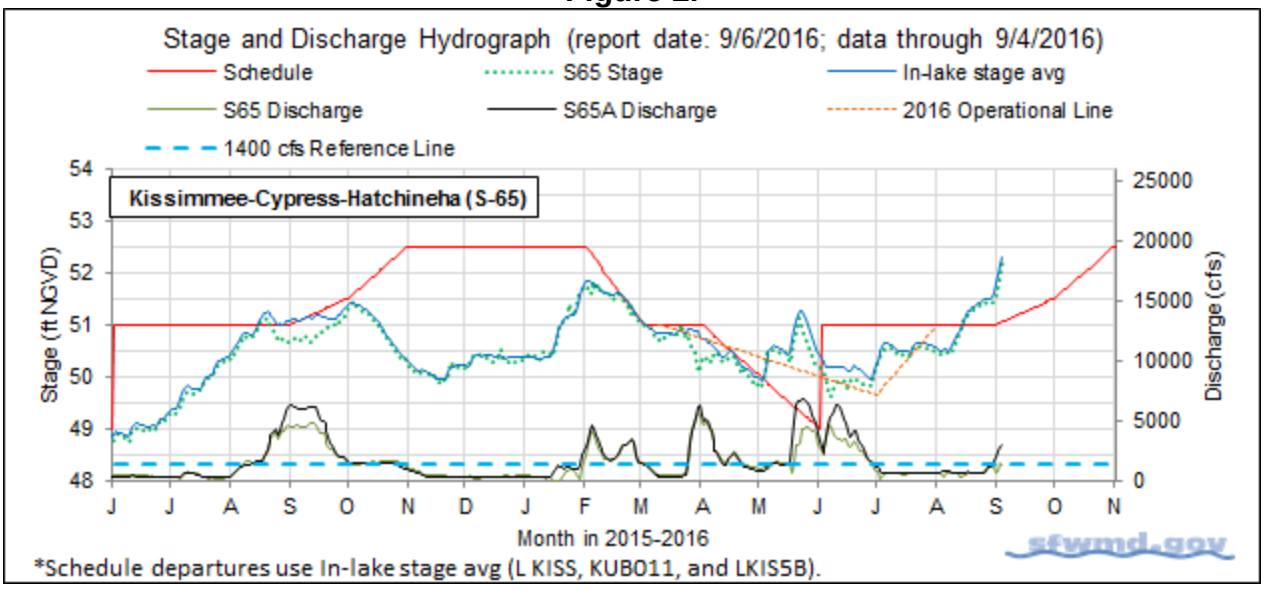


Figure 3.

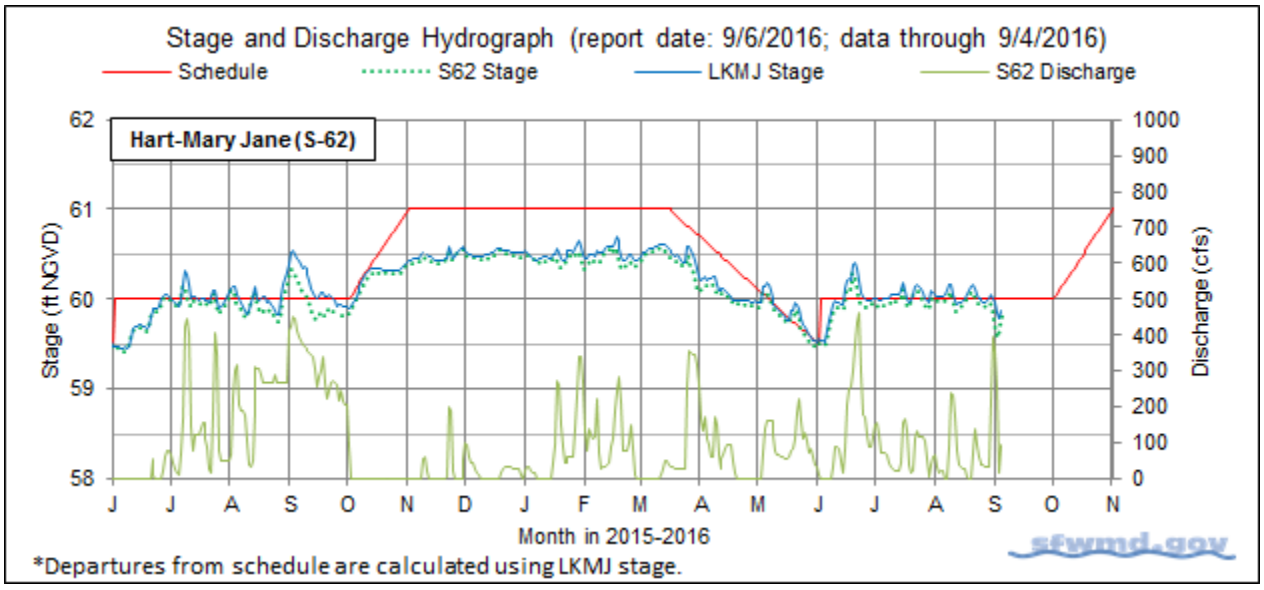


Figure 4.

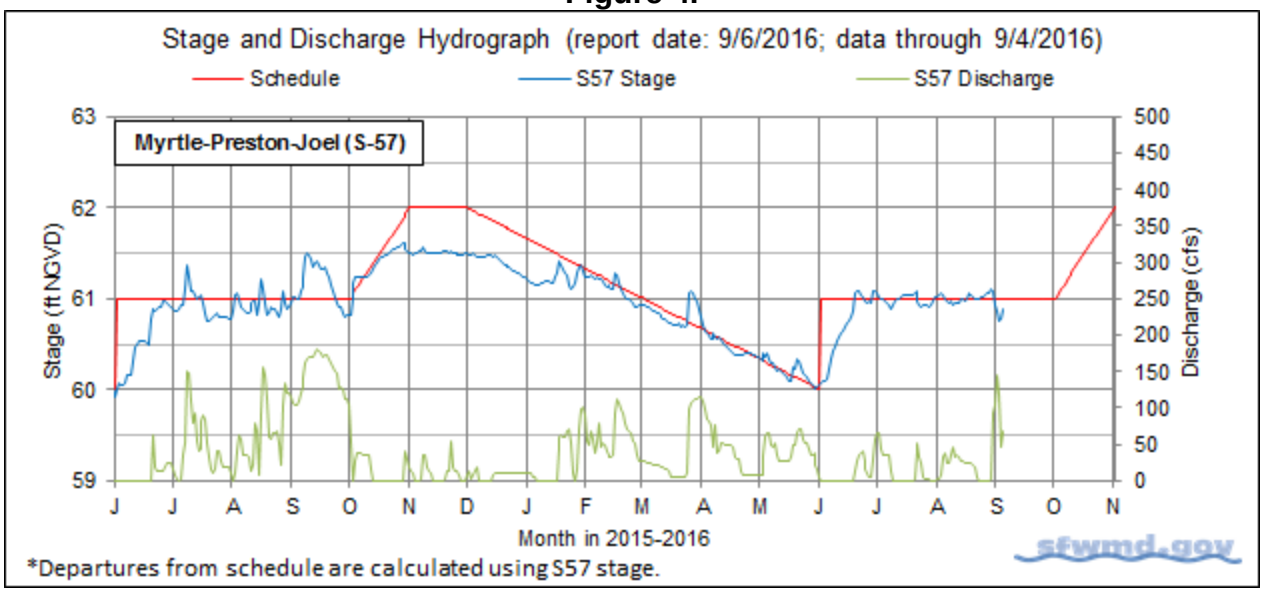


Figure 5.

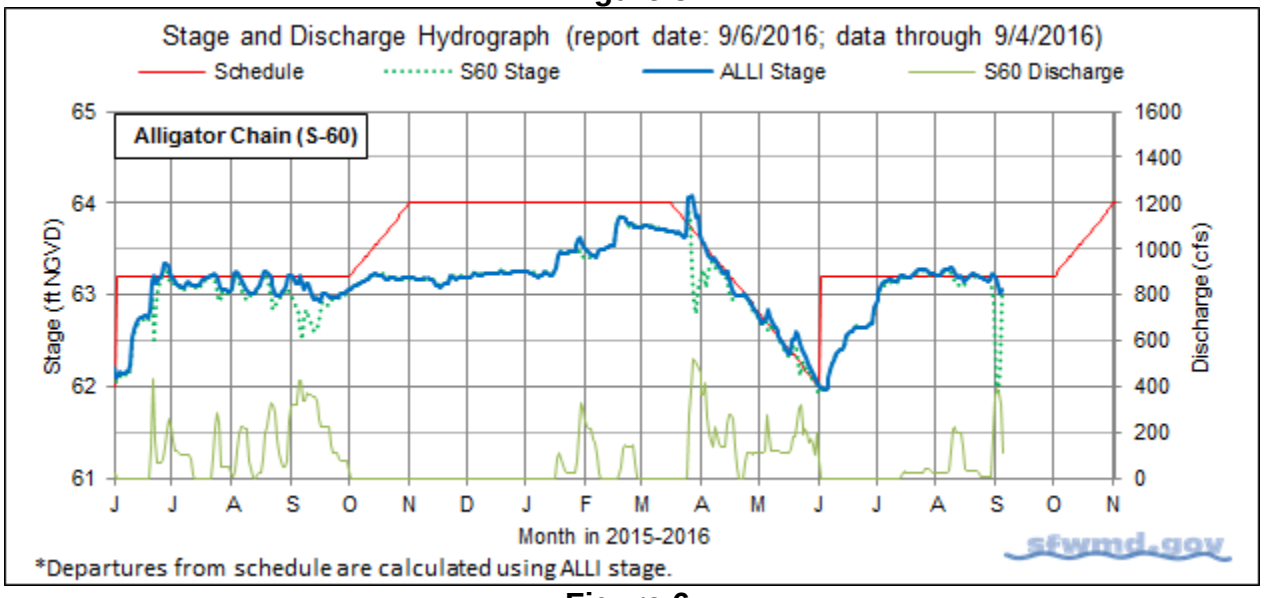


Figure 6.

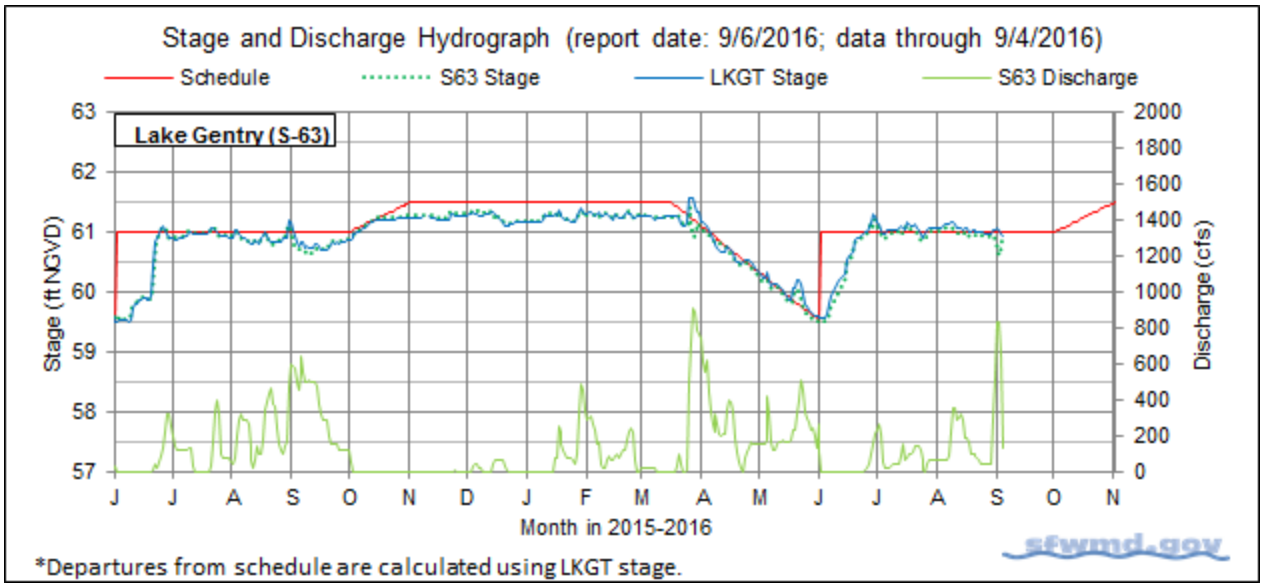
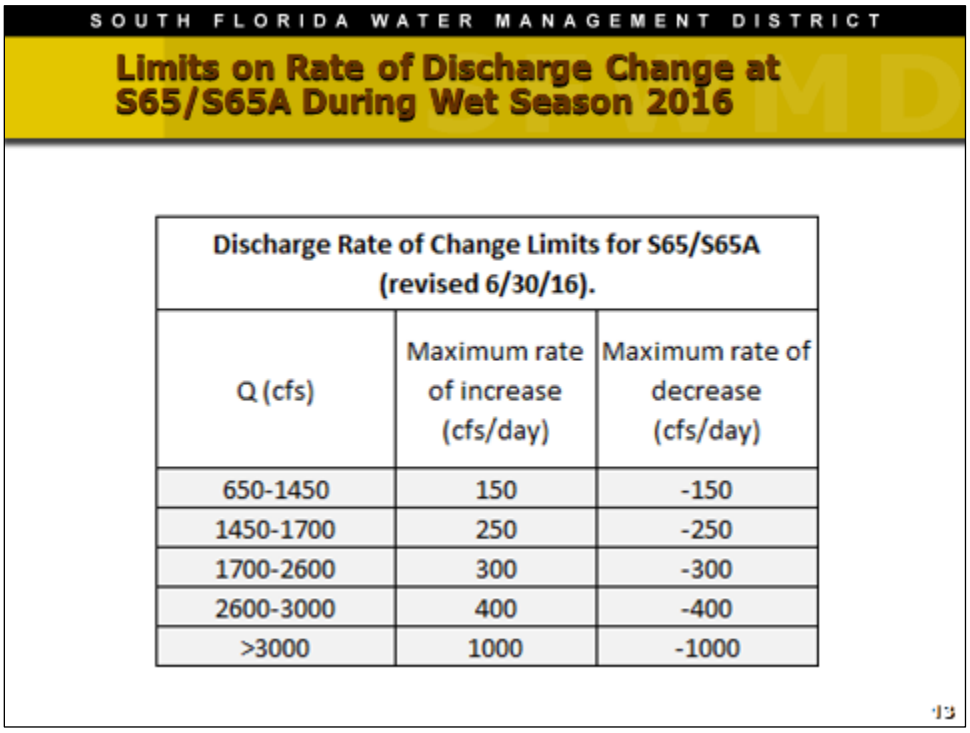


Figure 7.



Discharge Rate of Change Limits for S65/S65A (revised 6/30/16).		
Q (cfs)	Maximum rate of increase (cfs/day)	Maximum rate of decrease (cfs/day)
650-1450	150	-150
1450-1700	250	-250
1700-2600	300	-300
2600-3000	400	-400
>3000	1000	-1000

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

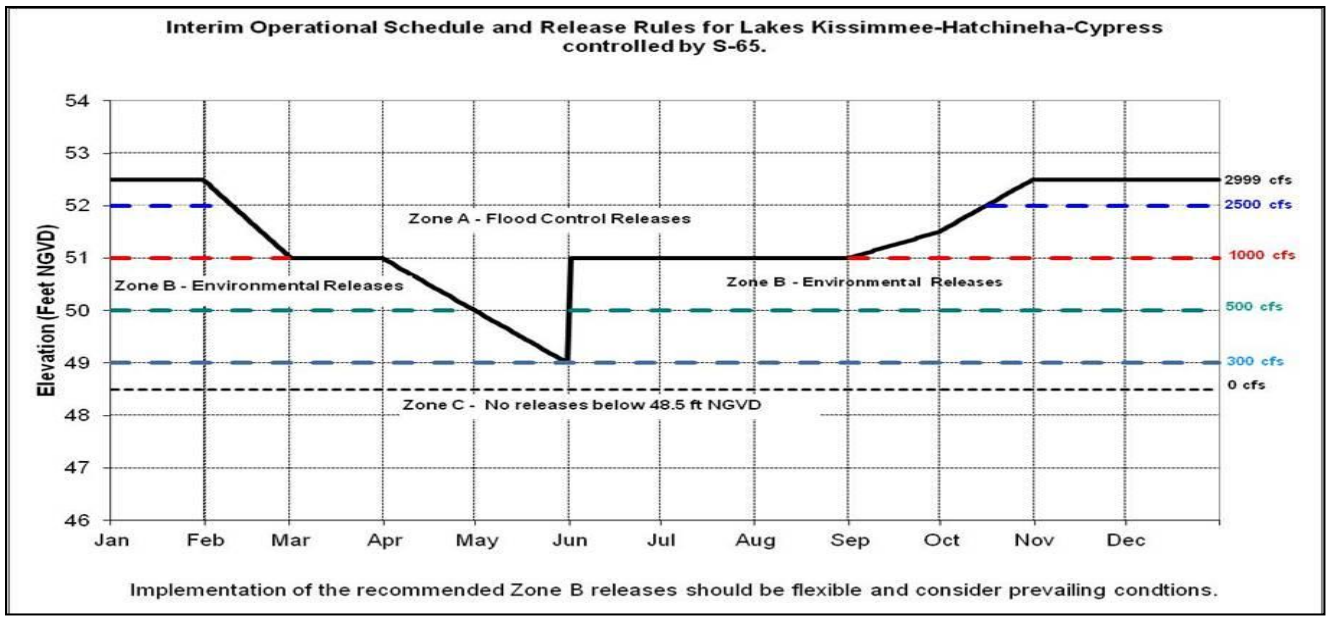


Figure 8b. Interim operations schedule for S-65. The discharge schedule shown to the right has not been used in recent years or in Wet Season 2015.

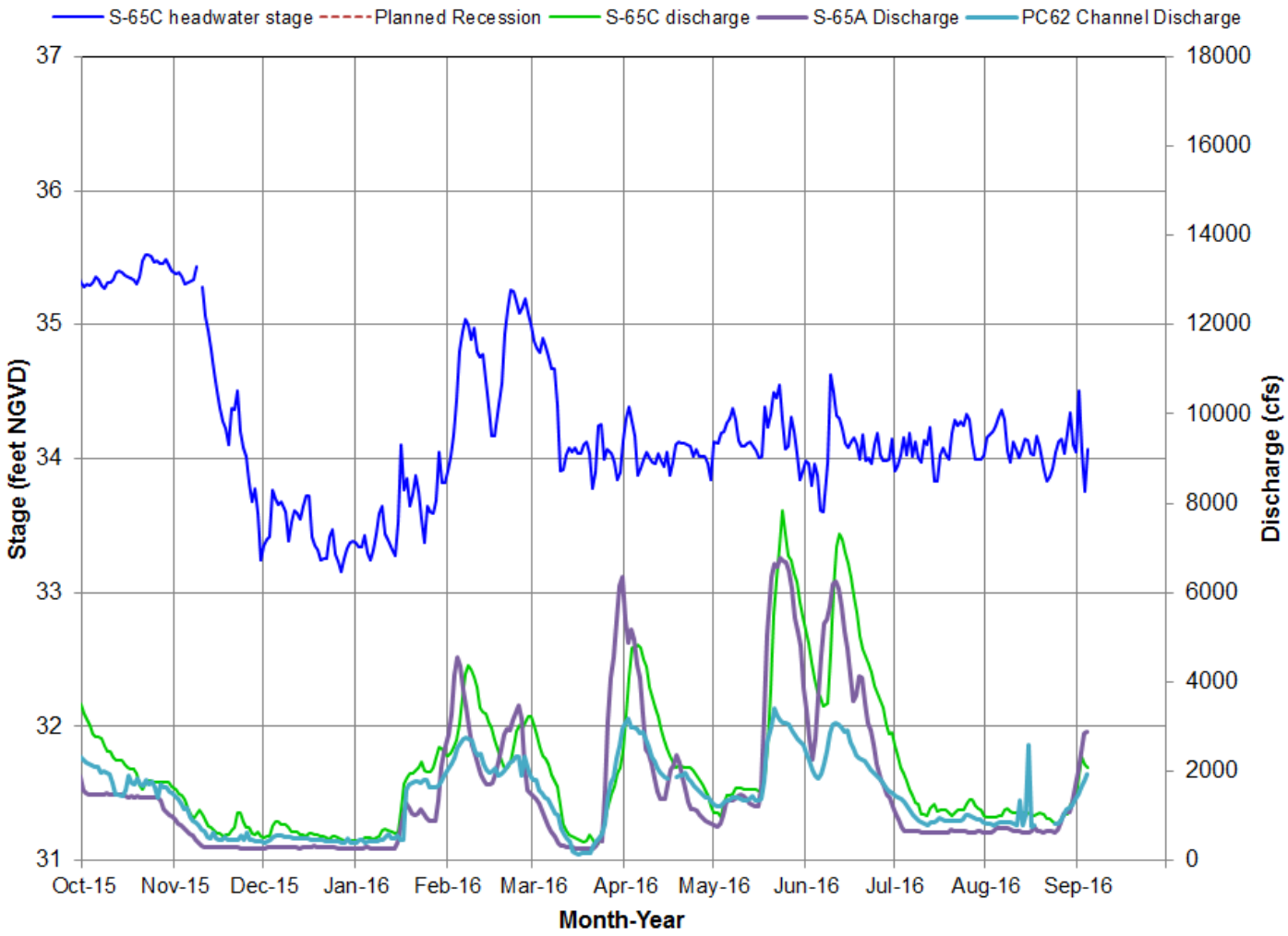


Figure 9. S-65C headwater stage in relation to discharge at S-65C, S-65A, and PC62.

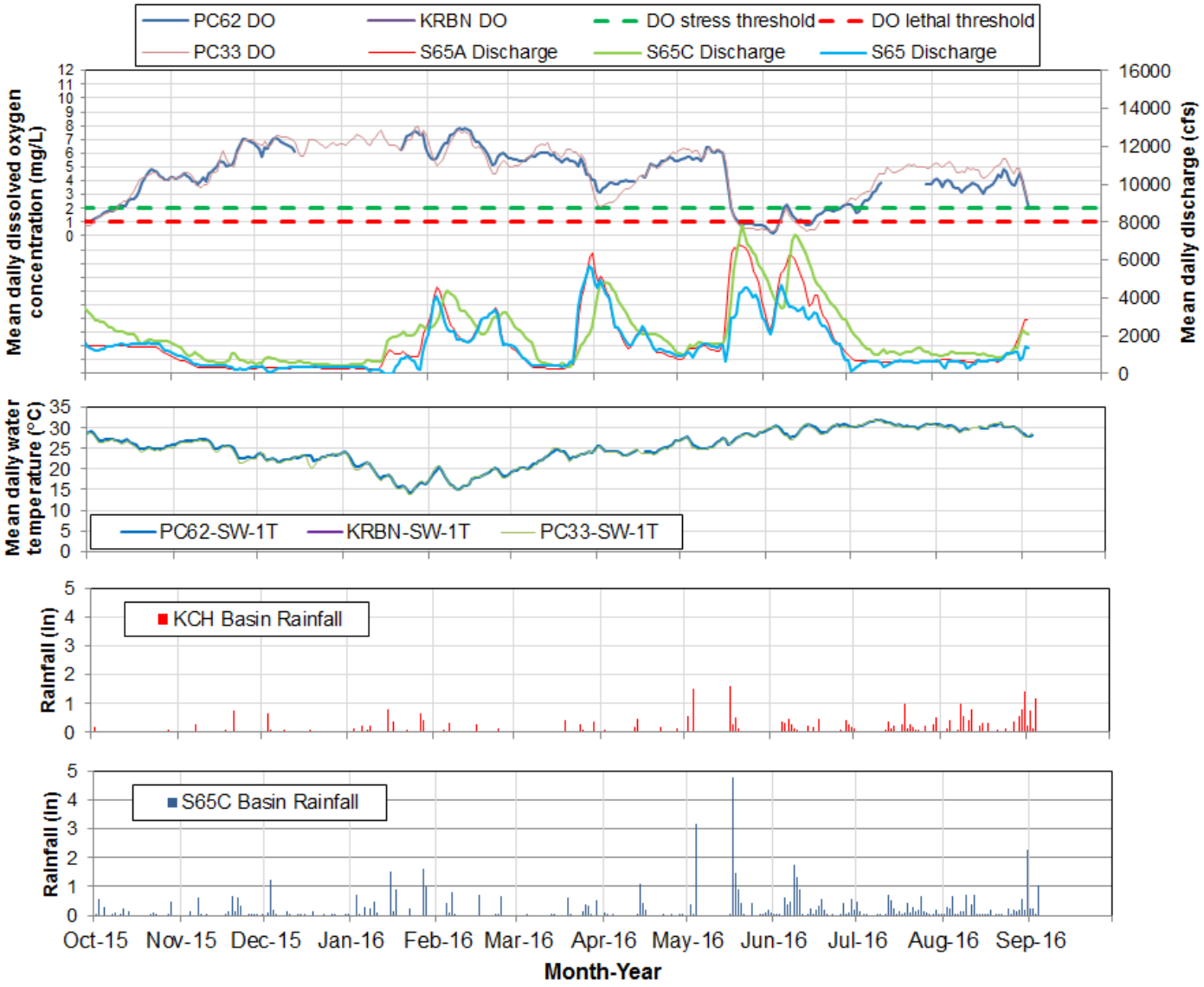


Figure 10. Mean daily Dissolved Oxygen, discharge, temperature and rainfall in the Phase I river channel.

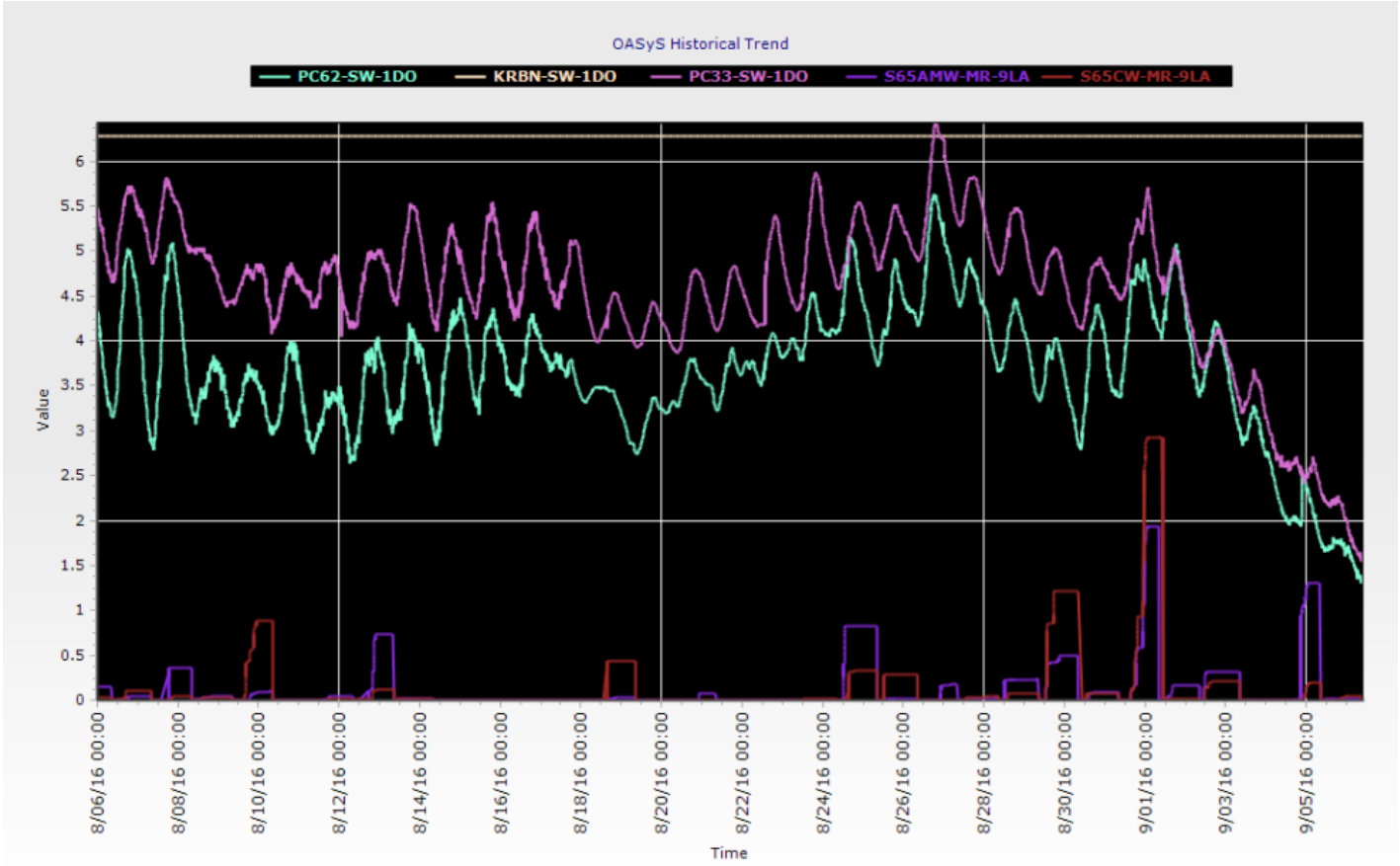


Figure 11. Phase I river channel dissolved oxygen (measured at 15 minute intervals) and rainfall at S65A and S65C.

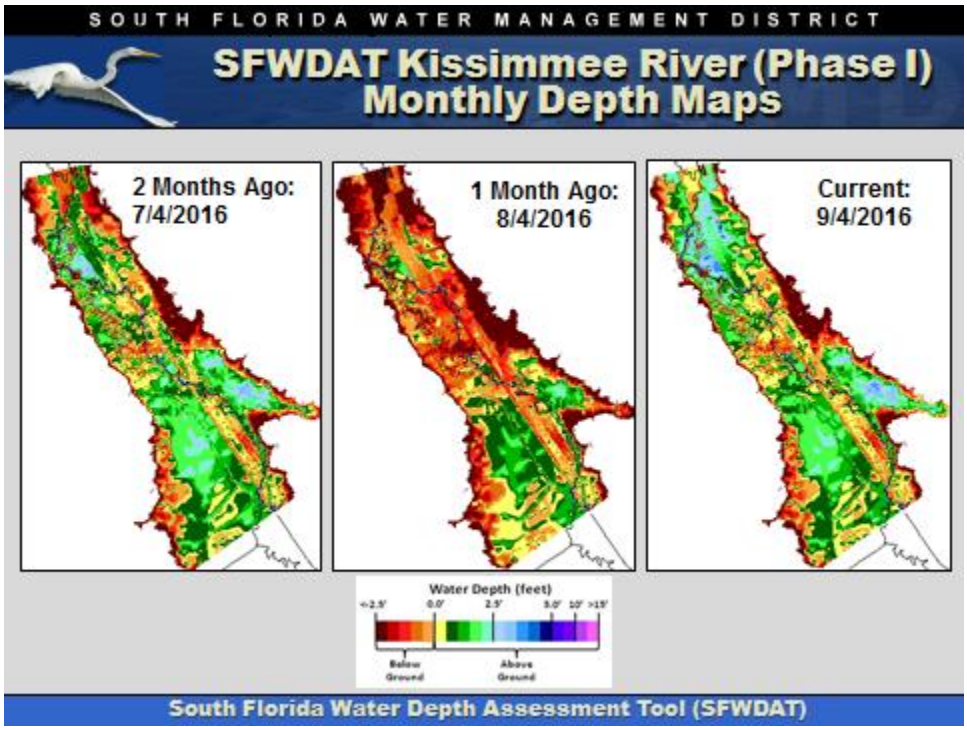
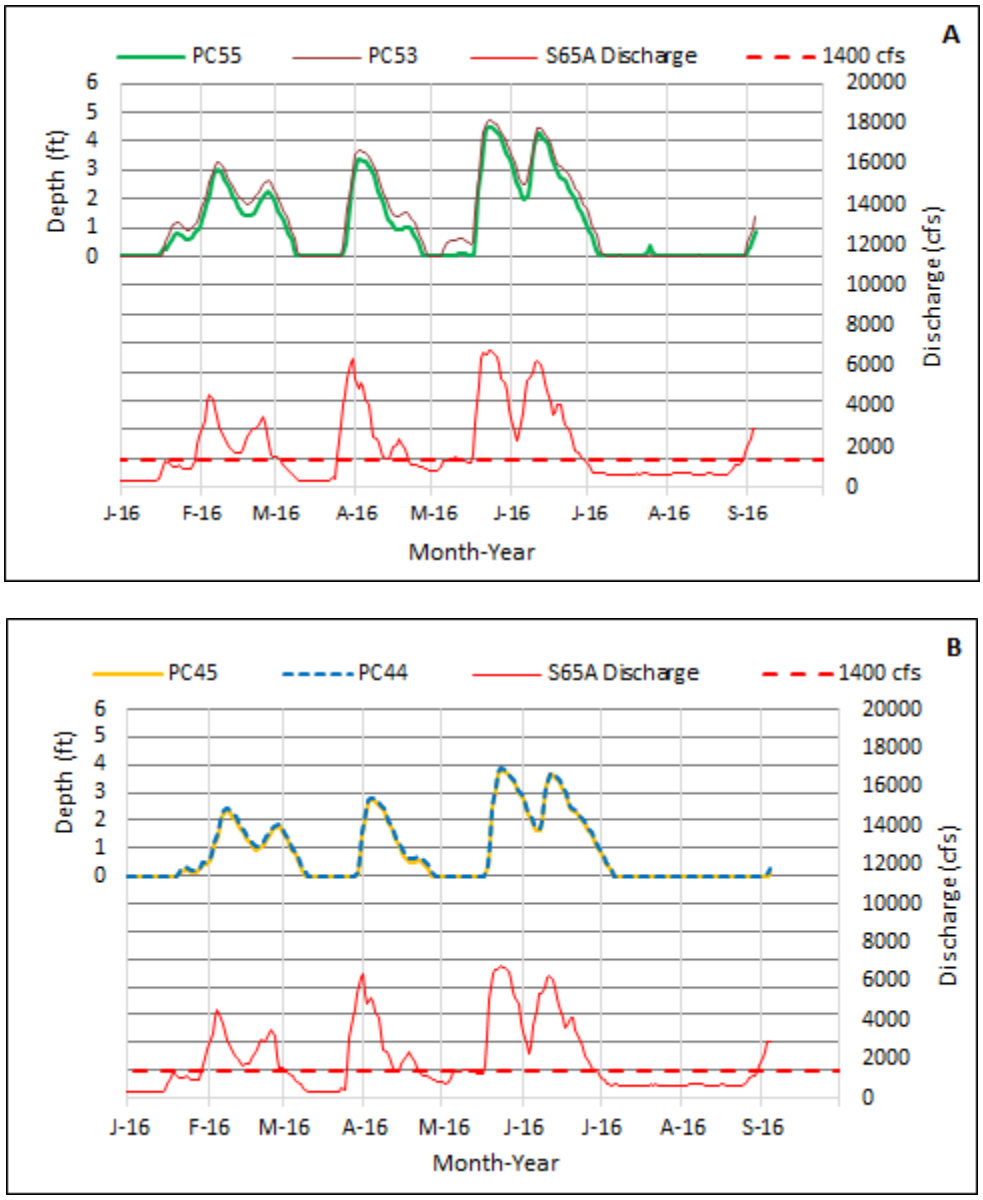


Figure 12. Phase I area floodplain water depths for this week, one month ago, and two months ago. Note that the WDAT color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to Jan. 16, 2012.



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

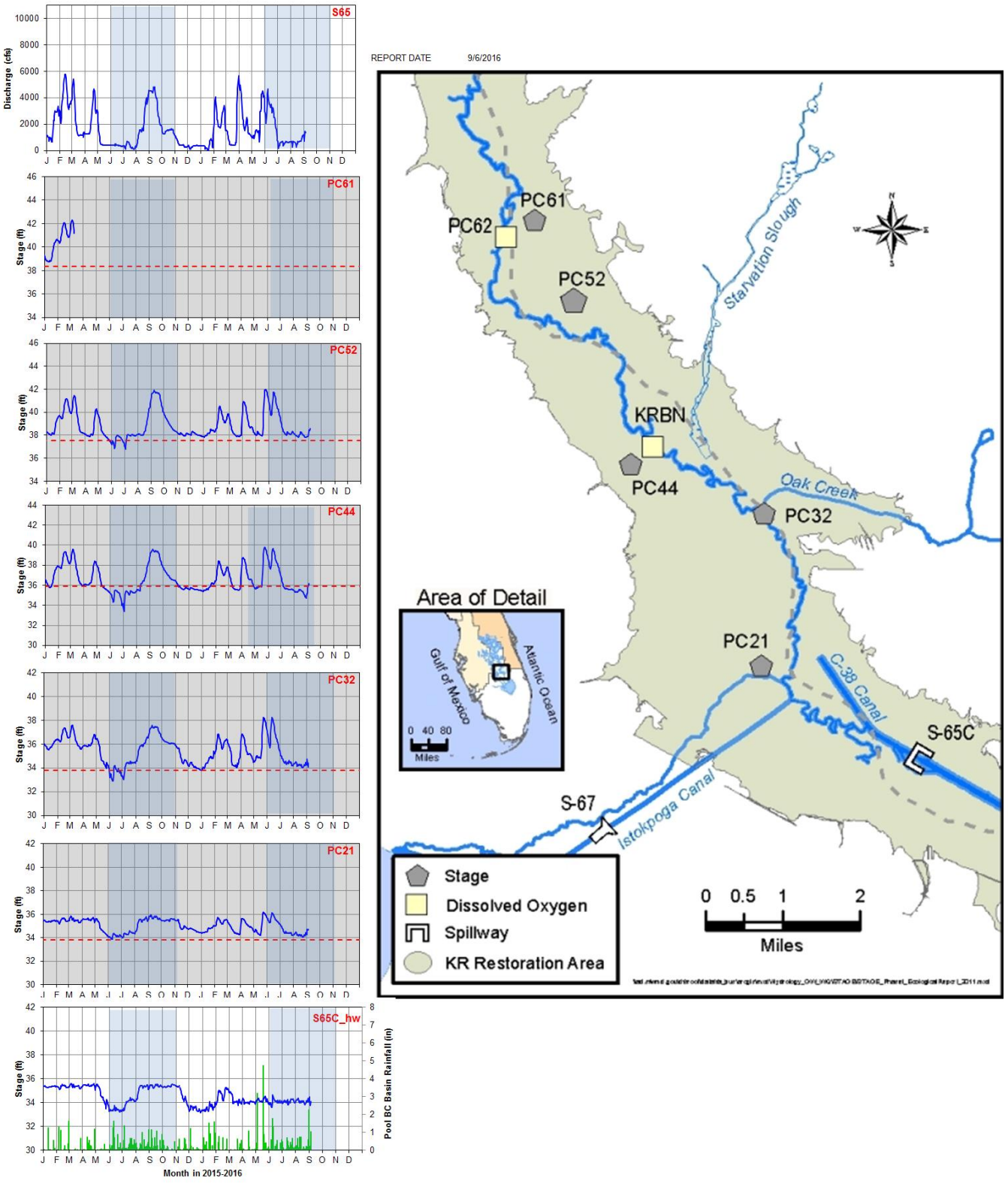


Figure 13. Discharge at S65, stages at five monitoring stations in the Phase I area of the Kissimmee River floodplain, and headwater stage at S65-C since January 1, 2015. The most recent data (~2 weeks) are provisional real-time data from SFWMD DualTrend; previous data are from SFWMD DB-HYDRO (validated).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

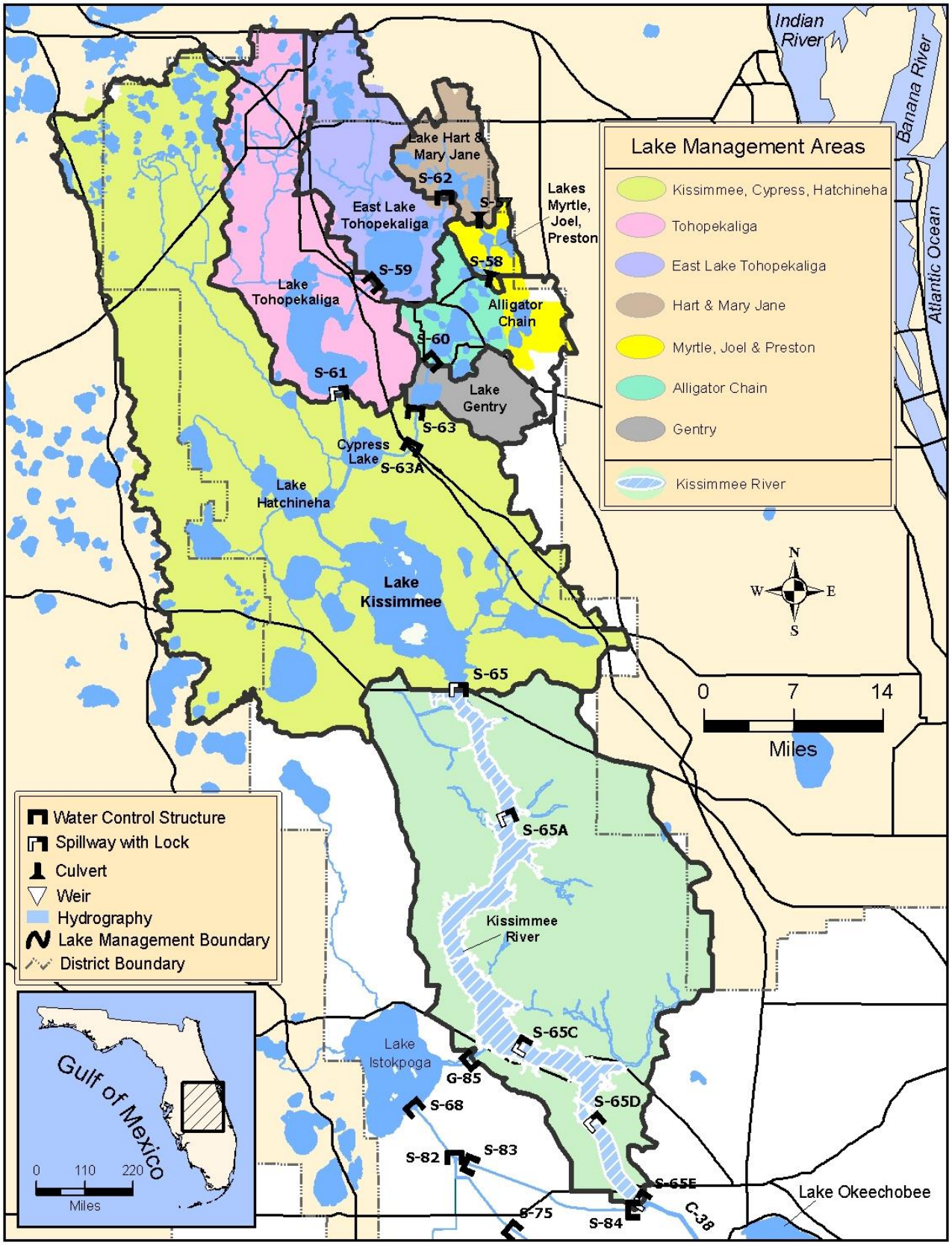


Figure 14. The Kissimmee Basin.

LAKE OKEECHOBEE

According the ;United States Army Corps of Engineers (USACOE) web site Lake Okeechobee stage is at 15.03 feet NGVD for the period ending at midnight on September 5, 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 increased by 0.30 feet over the past week and is 0.41 feet higher than it was a month ago and 1.77 feet higher than it was a year ago (Figure 1). The Lake is in the low flow sub-band (Figure 2). According to RAINDAR, 1.97 inches of rain fell directly over the Lake during the past seven days. The surrounding watershed experienced similar rainfall amounts immediately south of the lake and along the southeast coastal areas but higher amounts in the remaining areas (Figure 3).

Based on USACOE reported values, current Lake inflow is approximately 9,919 cfs as detailed below.

Structure	Flow cfs
S65E	3128
S154	111
S84 & 84X	2325
S71	950
S72	134
C5(Nicodemus slough dispersed storage)	-77
S191	1343
S133 PUMPS	331
S127 PUMPS	132
S129 PUMPS	0
S131 PUMPS	0
S135 PUMPS	0
Fisheating Creek	1542
S2 Pumps	0
S3 Pumps	0
S4 Pumps	0

Current Lake outflow is approximately 1,379 cfs exiting at S77 (597 cfs), S308 (451 cfs) and to the L8 canal through Culvert 10A (4 cfs). Additionally, approximately 327 cfs exited through S352 and no water exited through S351 or S354. Corrected ET value based on the L006 weather platform solar radiation data for this past week was 2,122 cfs, down from last week's value of 2,816 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 satellite images (MODIS for August 22 and September 4) (Figure 5) indicate a possible lessening of bloom conditions over the past week with fewer intense (hot) colors in the central and southern regions.

The FWC snail kite coordinator reported that during the last August 2016 Lake Okeechobee survey 18 new nests were identified; most of them in the Moonshine Bay area (Figure 6). There are currently 93 active nest on the Lake. So far, twenty-seven successful kite nests have been recorded out of a total of 197 nesting attempts for Lake Okeechobee.

Water Management Recommendations

Although lake stage has remained essentially static over the past two months, it increased over the past week and is expected to continue to increase in response to the heavy rainfall associated with the recent tropical depression. From an ecological perspective, lake stage has been above optimal levels since the February rain event resulting in the loss of SAV and an increase in the occurrence of cyanobacterial blooms relative to recent years.

Future short-term recommendations are highly dependent on near-term rainfall patterns and amounts. The goal should be to limit the rate of lake stage increase to avoid exceeding the top of the preferred stage envelope (15.5 feet NGVD) during the wet season.

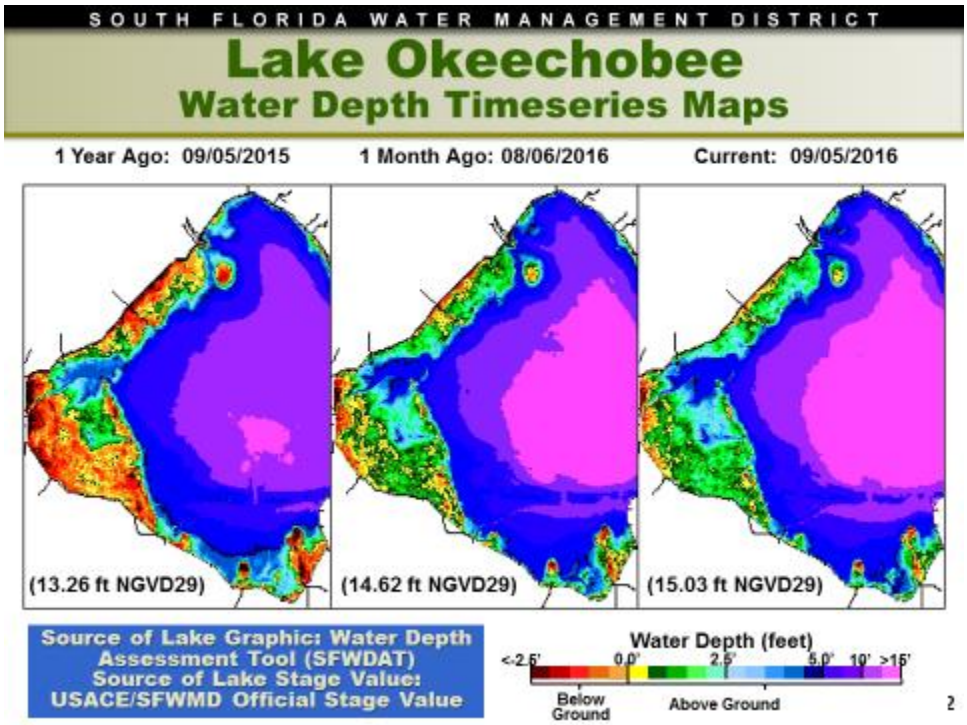


Figure 1

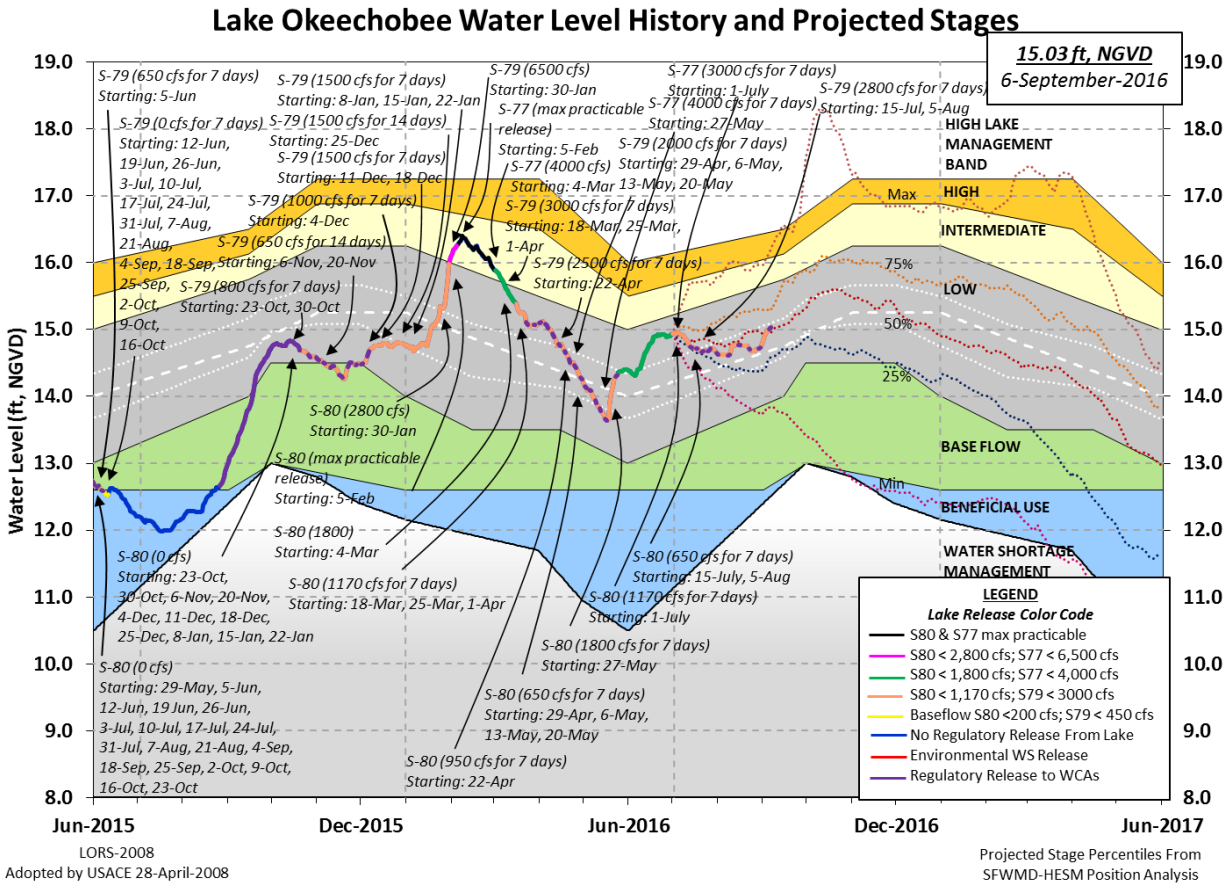

Lake Okeechobee Water Level History and Projected Stages
15.03 ft, NGVD
6-September-2016
Water Level (ft, NGVD)
19.0
18.0
17.0
16.0
15.0
14.0
13.0
12.0
11.0
10.0
9.0
8.0
Jun-2015
Dec-2015
Jun-2016
Dec-2016
Jun-2017
HIGH LAKE MANAGEMENT BAND
HIGH
INTERMEDIATE
LOW
BASE FLOW
BENEFICIAL USE
WATER SHORTAGE MANAGEMENT
Max
75%
50%
25%
Min
S-79 (650 cfs for 7 days) Starting: 5-Jun
S-79 (0 cfs for 7 days) Starting: 12-Jun, 19-Jun, 26-Jun, 3-Jul, 10-Jul, 17-Jul, 24-Jul, 31-Jul, 7-Aug, 21-Aug, 4-Sep, 18-Sep, 25-Sep, 2-Oct, 9-Oct, 16-Oct
S-79 (1500 cfs for 7 days) Starting: 8-Jan, 15-Jan, 22-Jan
S-79 (1500 cfs for 14 days) Starting: 25-Dec
S-79 (1500 cfs for 7 days) Starting: 11-Dec, 18-Dec
S-79 (1000 cfs for 7 days) Starting: 4-Dec
S-79 (650 cfs for 14 days) Starting: 6-Nov, 20-Nov
S-79 (800 cfs for 7 days) Starting: 23-Oct, 30-Oct
S-79 (6500 cfs) Starting: 30-Jan
S-77 (max practicable release) Starting: 5-Feb
S-77 (4000 cfs) Starting: 4-Mar
S-79 (3000 cfs for 7 days) Starting: 18-Mar, 25-Mar, 1-Apr
S-79 (2500 cfs for 7 days) Starting: 22-Apr
S-77 (3000 cfs for 7 days) Starting: 1-July
S-77 (4000 cfs for 7 days) Starting: 27-May
S-79 (2000 cfs for 7 days) Starting: 29-Apr, 6-May, 13-May, 20-May
S-79 (2800 cfs for 7 days) Starting: 15-Jul, 5-Aug
S-80 (2800 cfs) Starting: 30-Jan
S-80 (max practicable release) Starting: 5-Feb
S-80 (1800) Starting: 4-Mar
S-80 (1170 cfs for 7 days) Starting: 18-Mar, 25-Mar, 1-Apr
S-80 (0 cfs) Starting: 23-Oct, 30-Oct, 6-Nov, 20-Nov, 4-Dec, 11-Dec, 18-Dec, 25-Dec, 8-Jan, 15-Jan, 22-Jan
S-80 (0 cfs) Starting: 29-May, 5-Jun, 12-Jun, 19 Jun, 26-Jun, 3-Jul, 10-Jul, 17-Jul, 24-Jul, 31-Jul, 7-Aug, 21-Aug, 4-Sep, 18-Sep, 25-Sep, 2-Oct, 9-Oct, 16-Oct, 23-Oct
S-80 (950 cfs for 7 days) Starting: 22-Apr
S-80 (650 cfs for 7 days) Starting: 29-Apr, 6-May, 13-May, 20-May
S-80 (1800 cfs for 7 days) Starting: 27-May
S-80 (1170 cfs for 7 days) Starting: 1-July
S-80 (650 cfs for 7 days) Starting: 15-July, 5-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

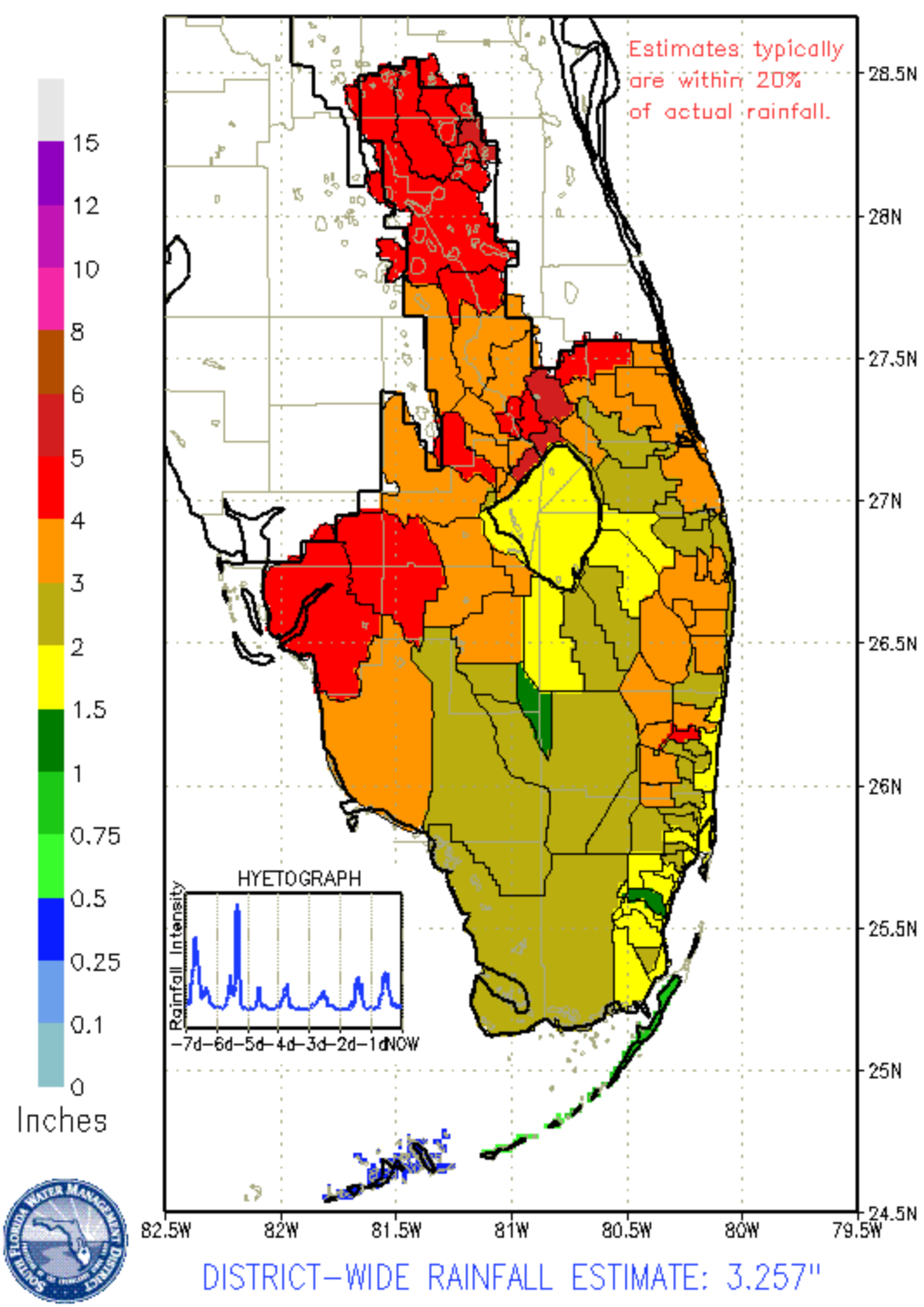

SFWMD PROVISIONAL RAINDAR 7-DAY BASIN RAINFALL ESTIMATES
FROM: 0515 EST, 08/30/2016 THROUGH: 0515 EST, 09/06/2016
Estimates typically are within 20% of actual rainfall.
15
12
10
8
6
5
4
3
2
1.5
1
0.75
0.5
0.25
0.1
0
Inches
HYETOGRAPH
Rainfall Intensity
-7d-6d-5d-4d-3d-2d-1dNOW
28.5N
28N
27.5N
27N
26.5N
26N
25.5N
25N
24.5N
82.5W
82W
81.5W
81W
80.5W
80W
79.5W
DISTRICT-WIDE RAINFALL ESTIMATE: 3.257"

Figure 3

INFLOWS	Average Daily Flow Past Week cfs	Feet of Change Past Week
S65E	**2426**	**0.080**
S71 & 72	**832**	**0.027**
S84 & 84X	**1123**	**0.037**
Fisheating Creek	**379**	**0.012**
Rainfall	N.A.	**0.164**
OUTFLOWS	**Average Daily Flow Past Week cfs**	**Feet of Change Past Week**
S77	**693**	**0.023**
S308	**446**	**0.015**
S351	**0**	**0.000**
S352	**214**	**0.007**
S354	**0**	**0.000**
L8	**-3**	**0.000**
ET	**2122**	**0.070**

Figure 4

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Lake Okeechobee
Algal Blooms

Unvalidated and Experimental Data

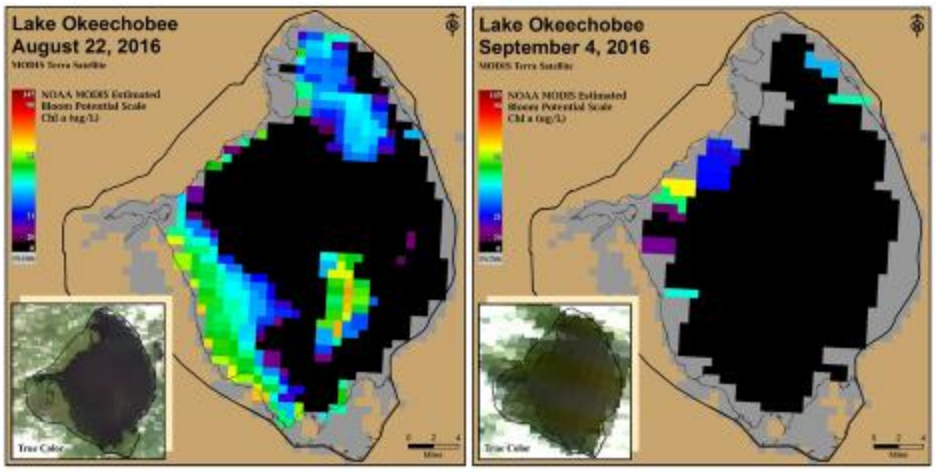


Figure 5

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Lake Okeechobee
Snail Kites

- **Total Nests – 197**
- **Successful – 27**
- **Failed – 77**
- **Still Active – 93 (60+ with young)**

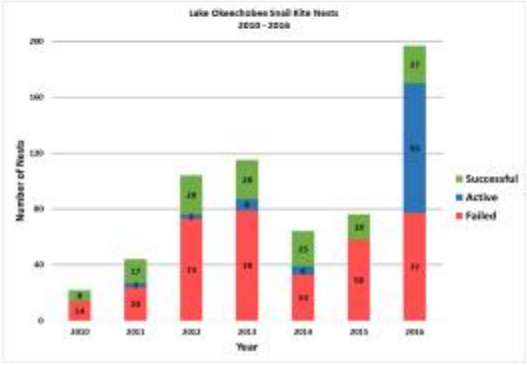


Figure 6

Lake Istokpoga:

The Lake Istokpoga regulation schedule began its ascension towards winter pool stage of 39.50 feet NGVD on August 2, 2016. Lake Stage is 38.61 feet NGVD and is currently 0.02 feet above its regulation stage of 38.59 feet NGVD (Figure 7). Average flows into the Lake from Arbuckle and Josephine creeks were 560 cfs and 271 cfs respectively. Average discharge from S68 and S68X this past week was 1,037 cfs, an increase from the preceding week. According to RAINDAR 3.81 inches of rain fell in the Lake Istokpoga watershed during the past seven days.

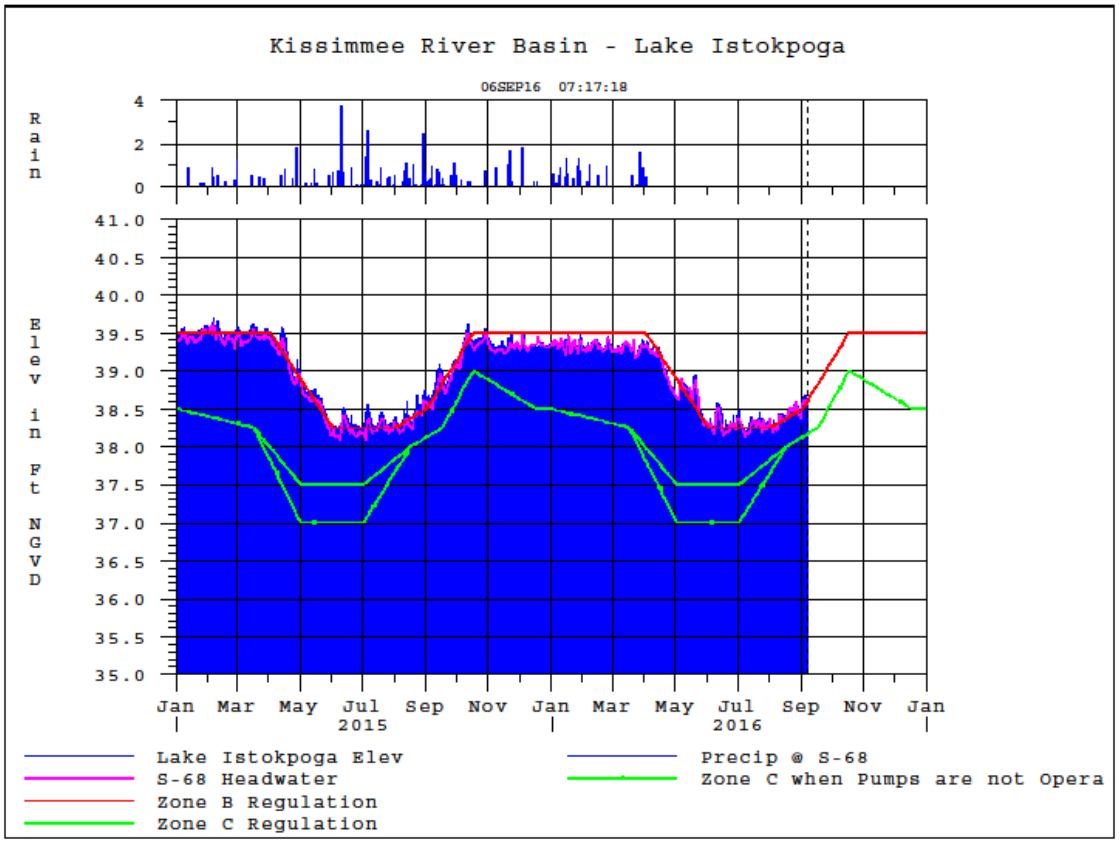


Figure 7

ESTUARIES

St. Lucie Estuary:
Over the past week, provisional flows averaged about 770 cfs at S-80, 446 cfs downstream of S-308, 437 cfs at S-49 on C-24, 349 cfs at S-97 on C-23, and 158 cfs from Ten Mile Creek at the Gordy Road Structure. Average inflow from tidal basin tributaries is estimated to be 966 cfs (Figures 1 and 2). Total inflow averaged about 2,680 cfs last week and 2,018 cfs over last month.

Over the past week, salinity decreased 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 5.7. 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)	**3.0** (5.5)	**3.4** (8.1)	NA[1]
US1 Bridge	**4.9** (8.4)	**6.6** (11.4)	10.0-26.0
A1A Bridge	**17.3** (25.5)	**18.6** (25.6)	NA

[1]Envelope not applicable

Caloosahatchee Estuary:
During the past week, provisional flows averaged approximately 693 cfs downstream of S-77, 1,212 cfs at S-78, and 3,622 cfs at S-79. Average inflow from tidal basin tributaries is estimated to be 1,785 cfs (Figures 5 and 6). Total inflow averaged 5,407 cfs last week and 4,132 cfs over last month.

Over the past week in the estuary, salinity remained about fresh to upstream of Cape Coral Bridge 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 fair range at Cape Coral (Figure 9). The 30-day moving average surface salinity at Val I-75 and Ft. Myers are unavailable. Salinity conditions at Val I-75 are still 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	**NE**[*] (0.2[*])	**NE**[*](0.3[*])	0.0-5.0[2]
Ft. Myers Yacht Basin	**NR**[3](0.5)	**NR** (0.8)	NA
Cape Coral	**6.4** (4.5)	**7.8** (6.8)	10.0-30.0
Shell Point	**18.5** (16.2)	**20.6** (19.4)	10.0-30.0
Sanibel	**28.5** (26.9)	**29.7** (28.3)	10.0-30.0

[1]Envelope not applicable, [2]Envelope is based on a 30-day average, [3]Not Reporting.
*No Estimate: 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)	5.1 – 6.05	4.95 – 6.1	1.9 – 6.7
Dissolved Oxygen (mg/l)	4.2 – 6.3	5.3 – 7.4	4.7 – 7.1

The Florida Fish and Wildlife Research Institute reported on September 2, 2016, that *Karenia brevis, the Florida red tide organism,* was observed in background concentrations in two samples collected from Lee County.

Water Management Recommendations

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

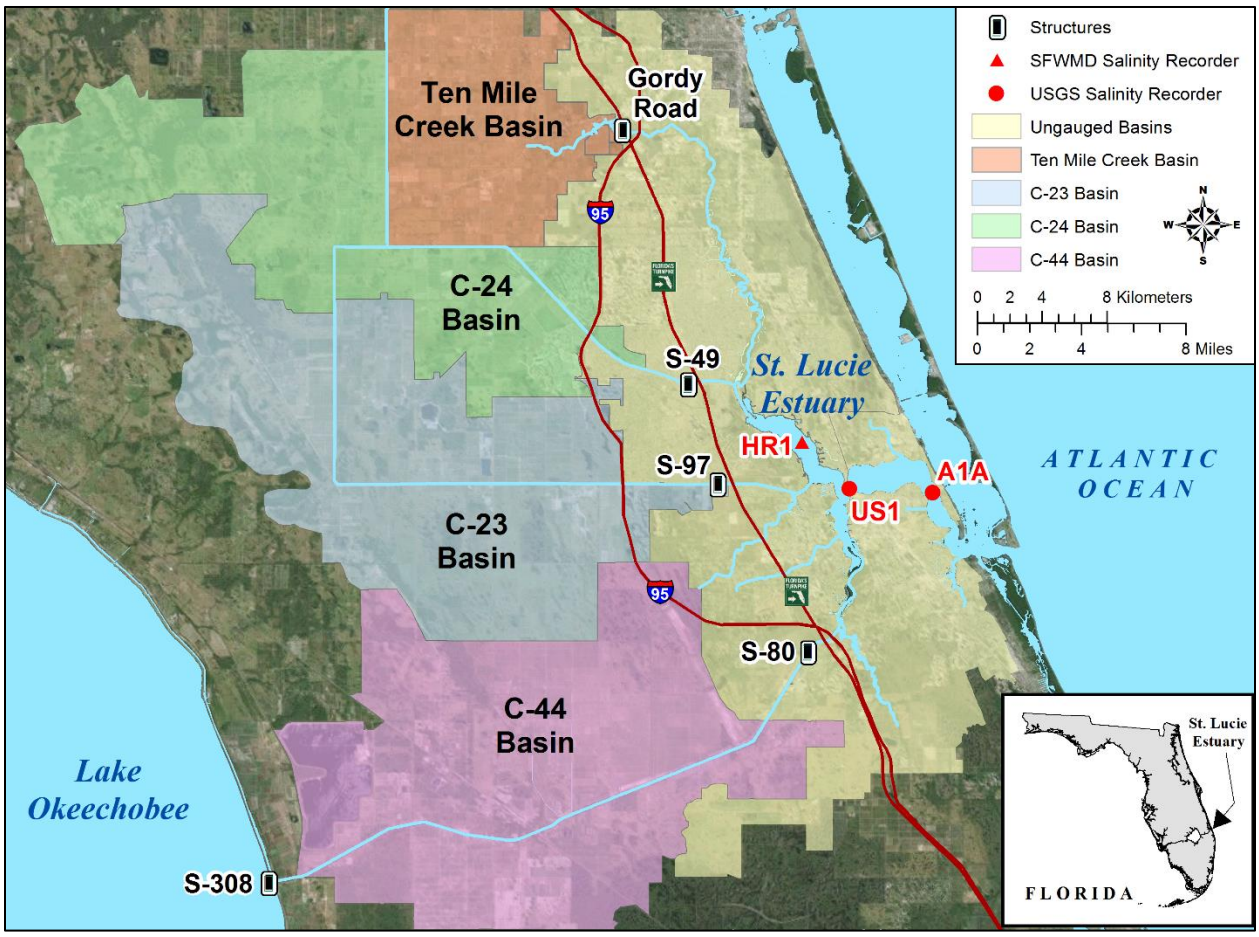


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

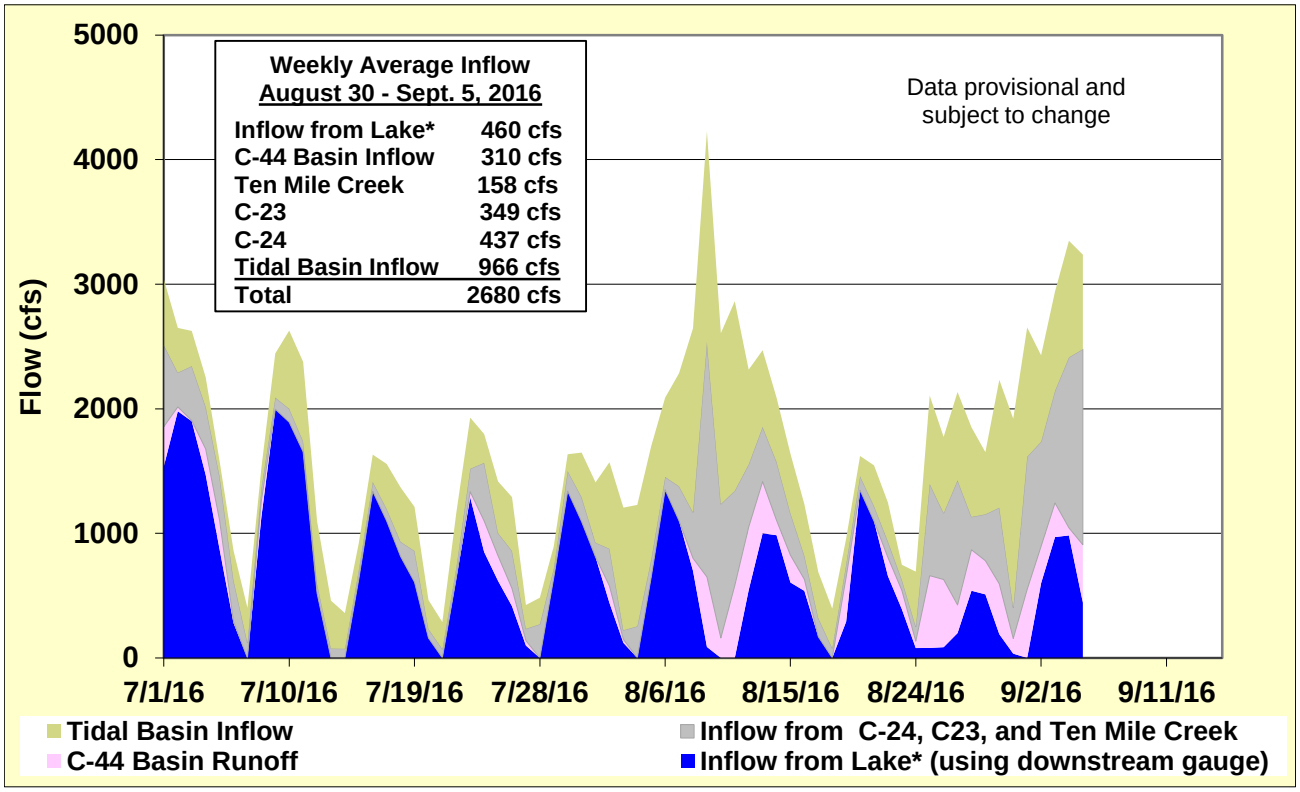


Figure 2. Estimated surface freshwater inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basins into the St. Lucie Estuary.

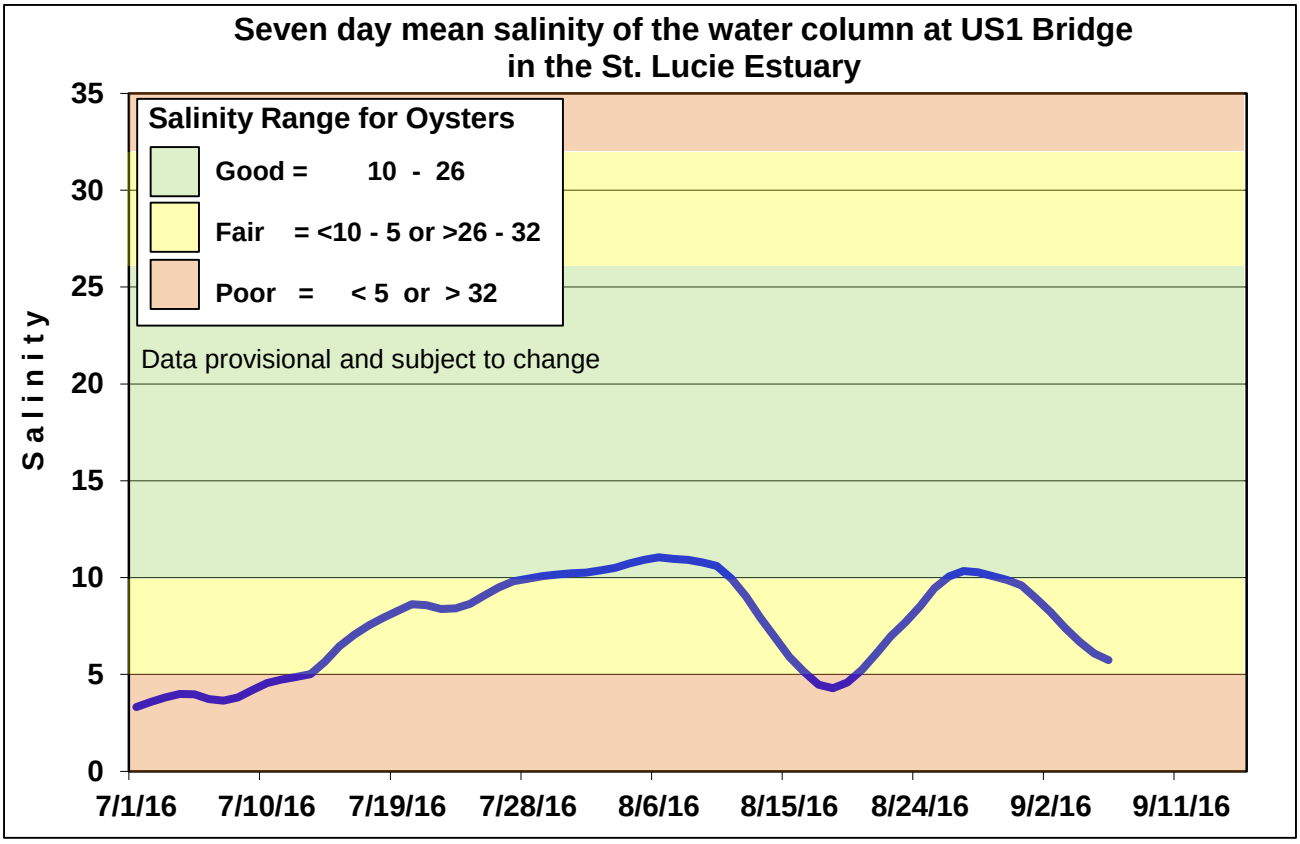


Figure 3. Seven-day mean salinity of the water column at the U.S. Highway 1 Bridge.

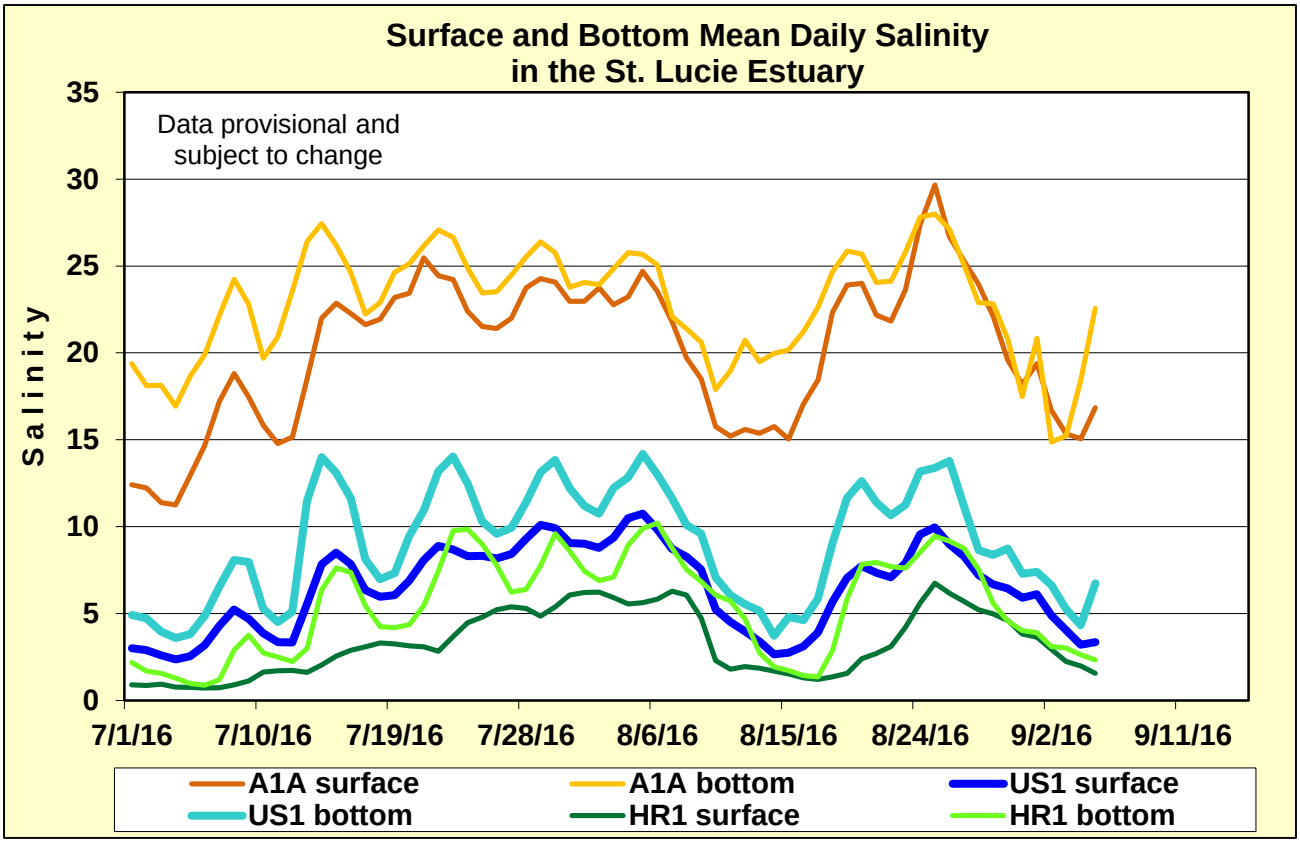


Figure 4. Daily mean salinity at the A1A, US1 and estimated HR1 stations.

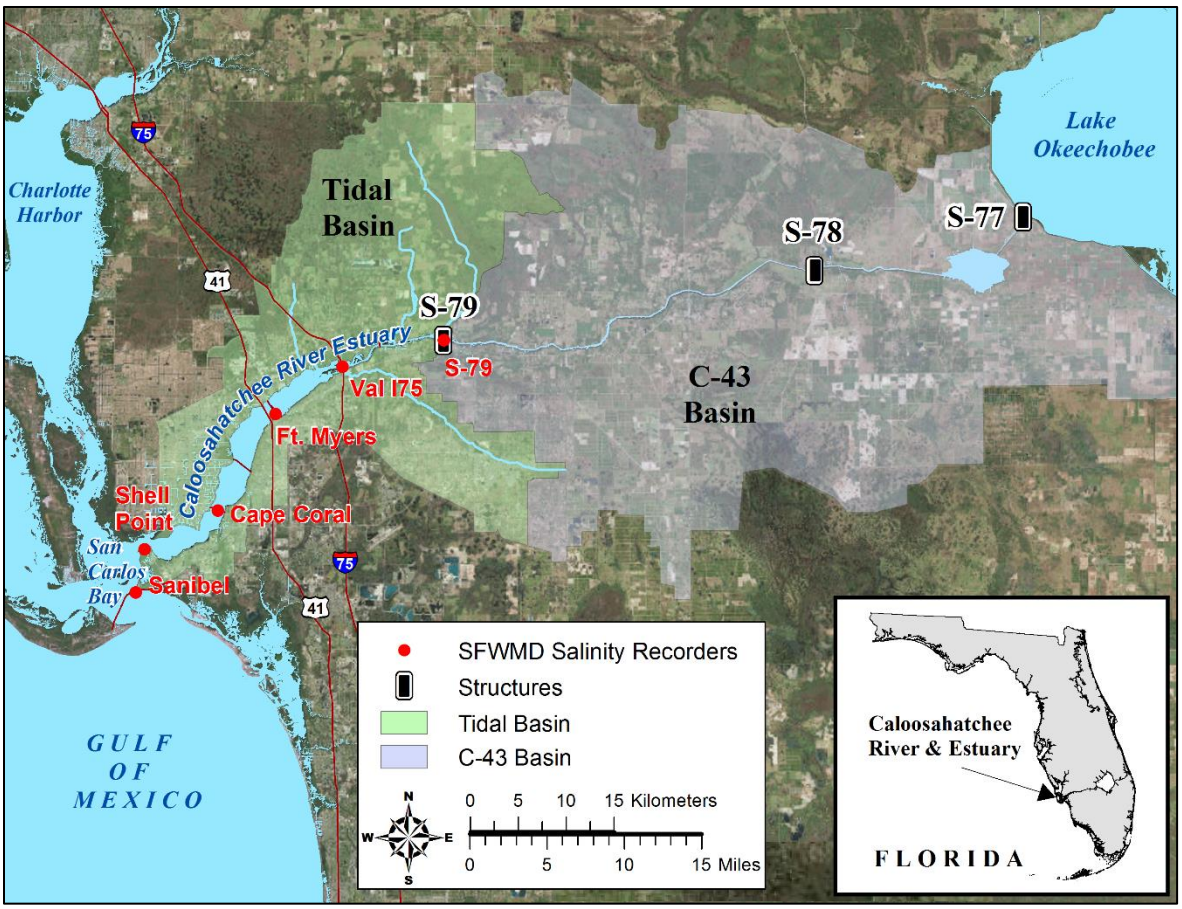


Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

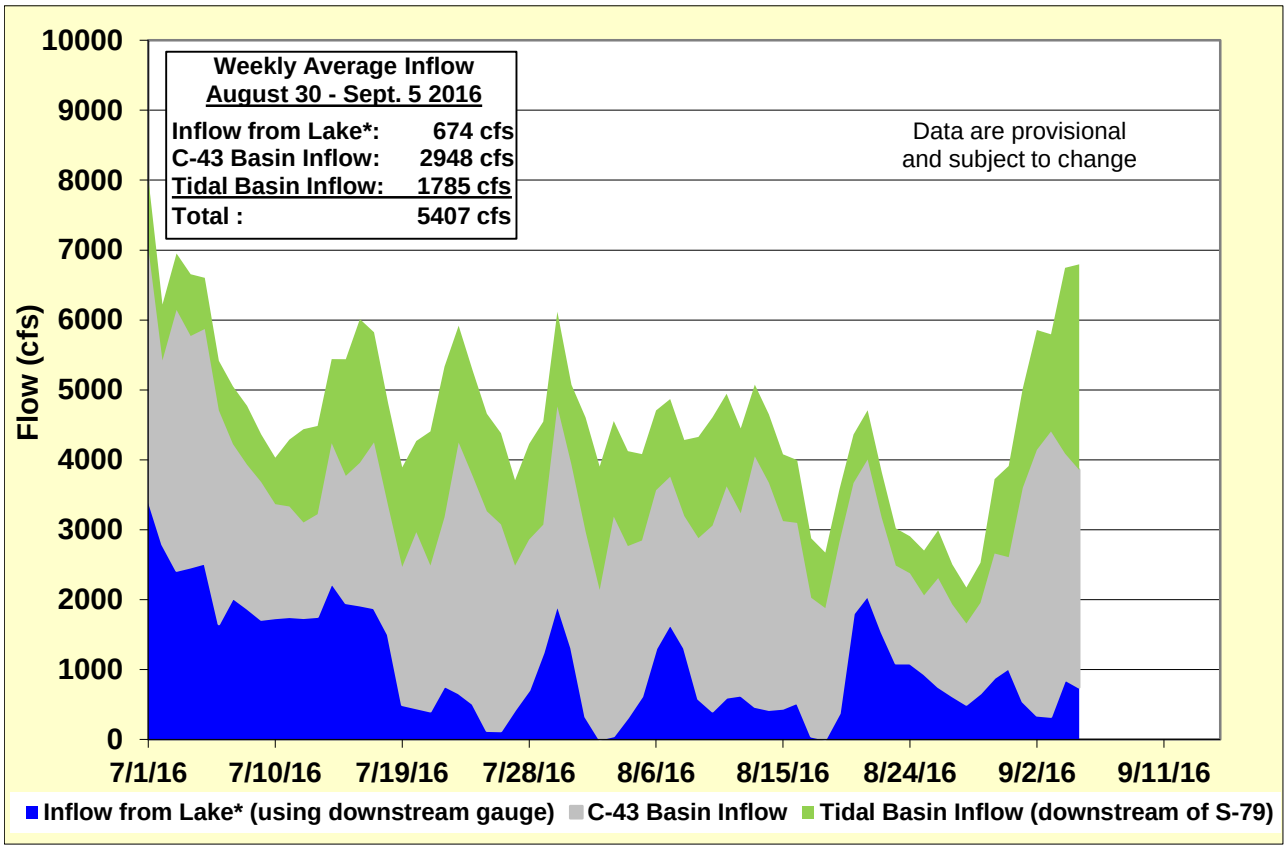
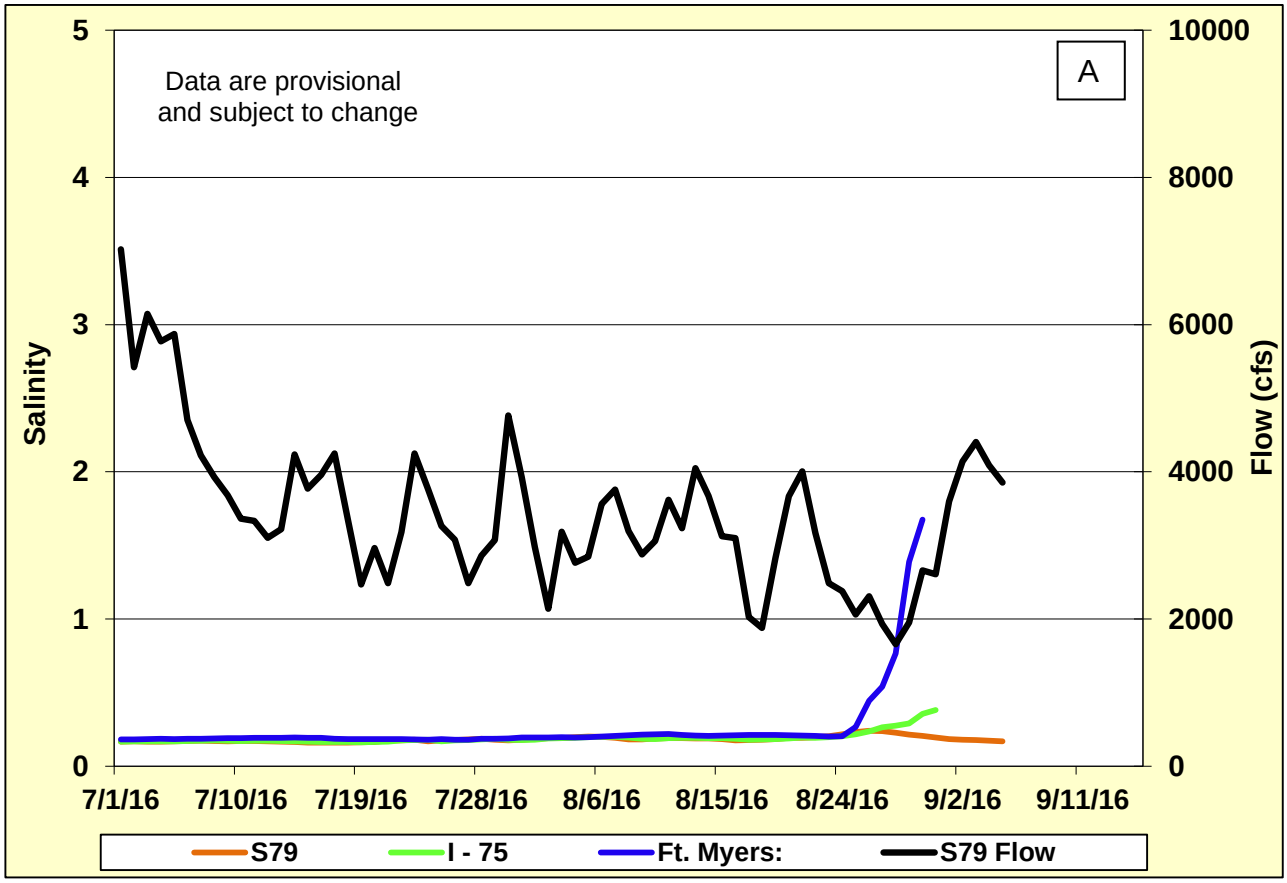


Figure 6. Freshwater inflows from Lake Okeechobee, runoff from the C-43 basin, and tributaries in the tidal basin into the Caloosahatchee River Estuary.



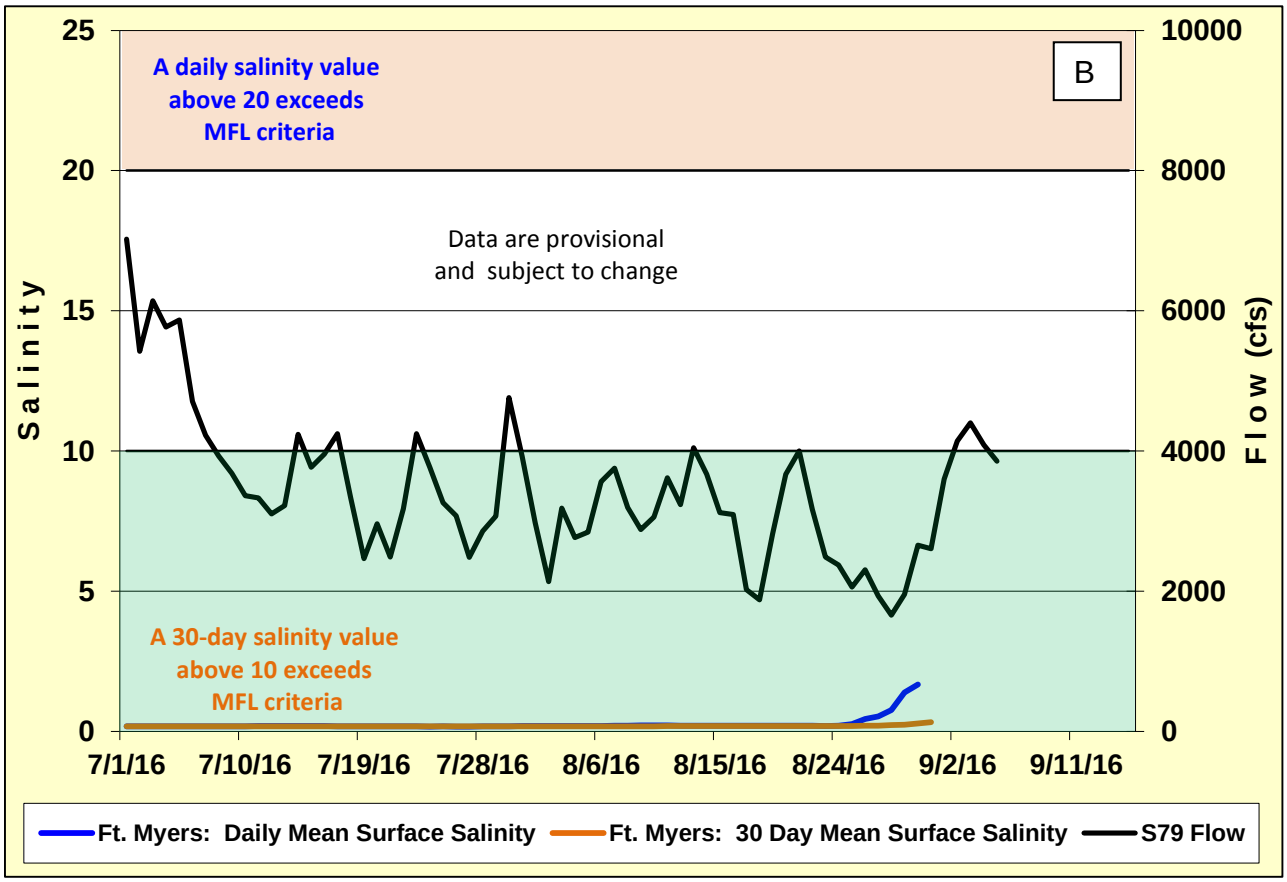


Figure 7. Daily mean flows at S-79 and salinity at upper estuary monitoring stations (A) and 30-day moving average salinity at Ft. Myers (B).

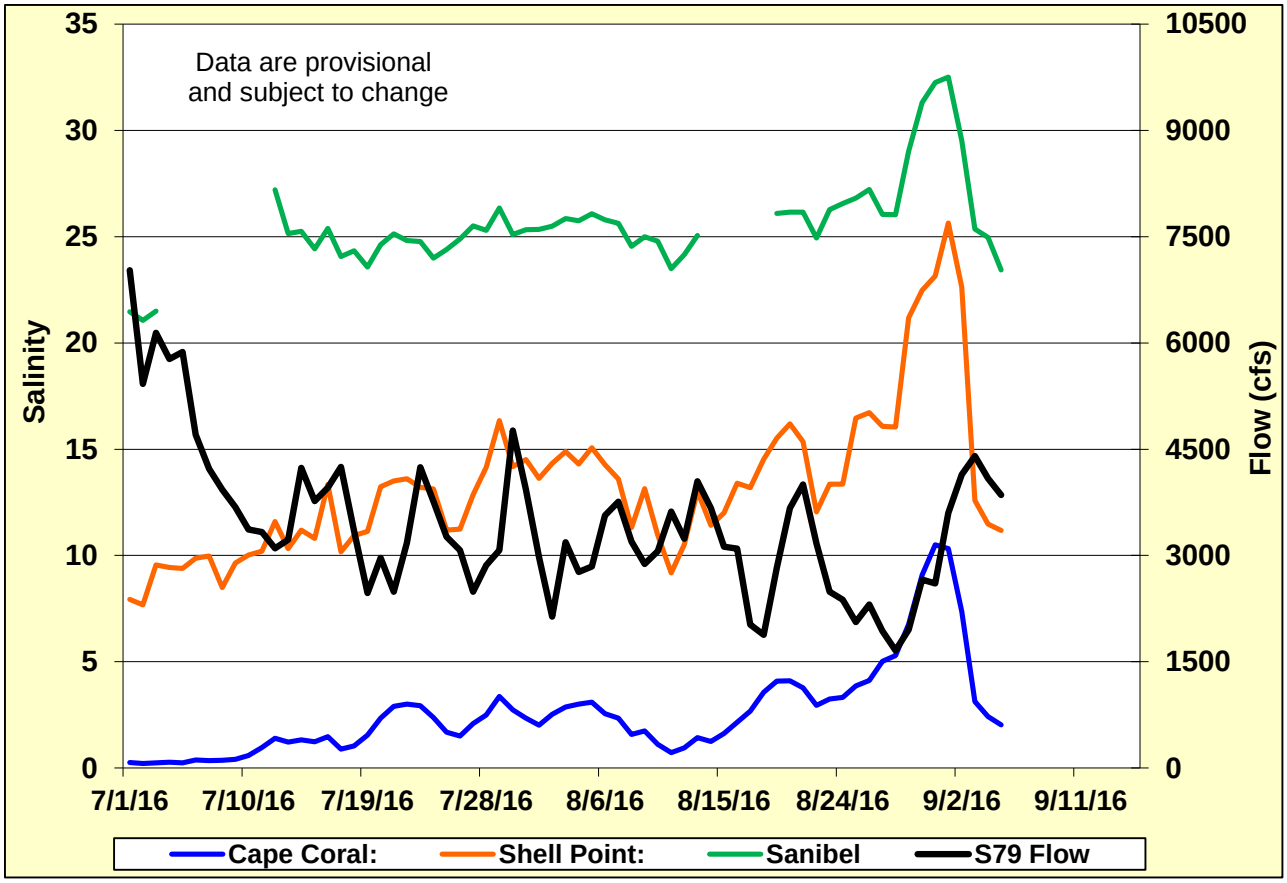


Figure 8. Daily mean flows at S-79 and salinity at lower estuary stations.

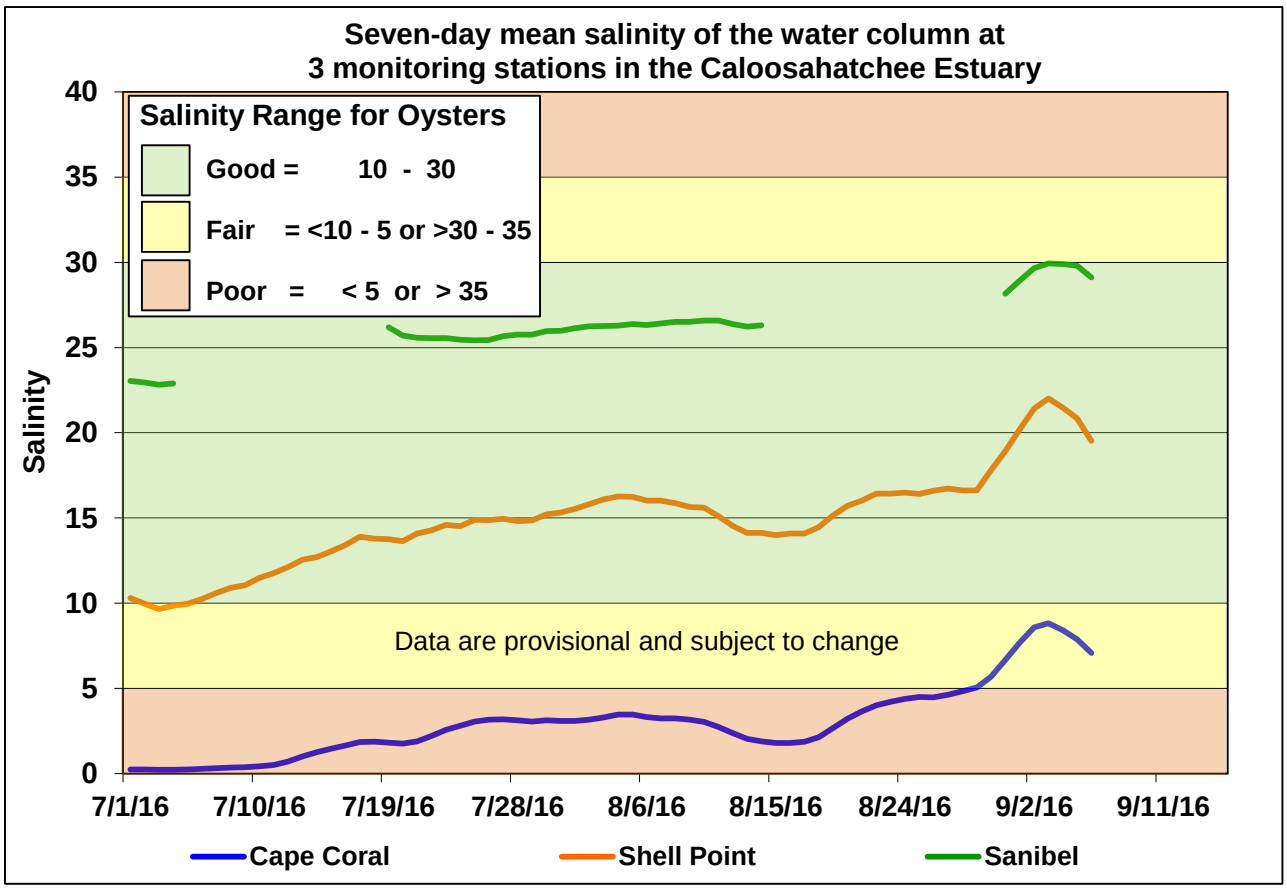
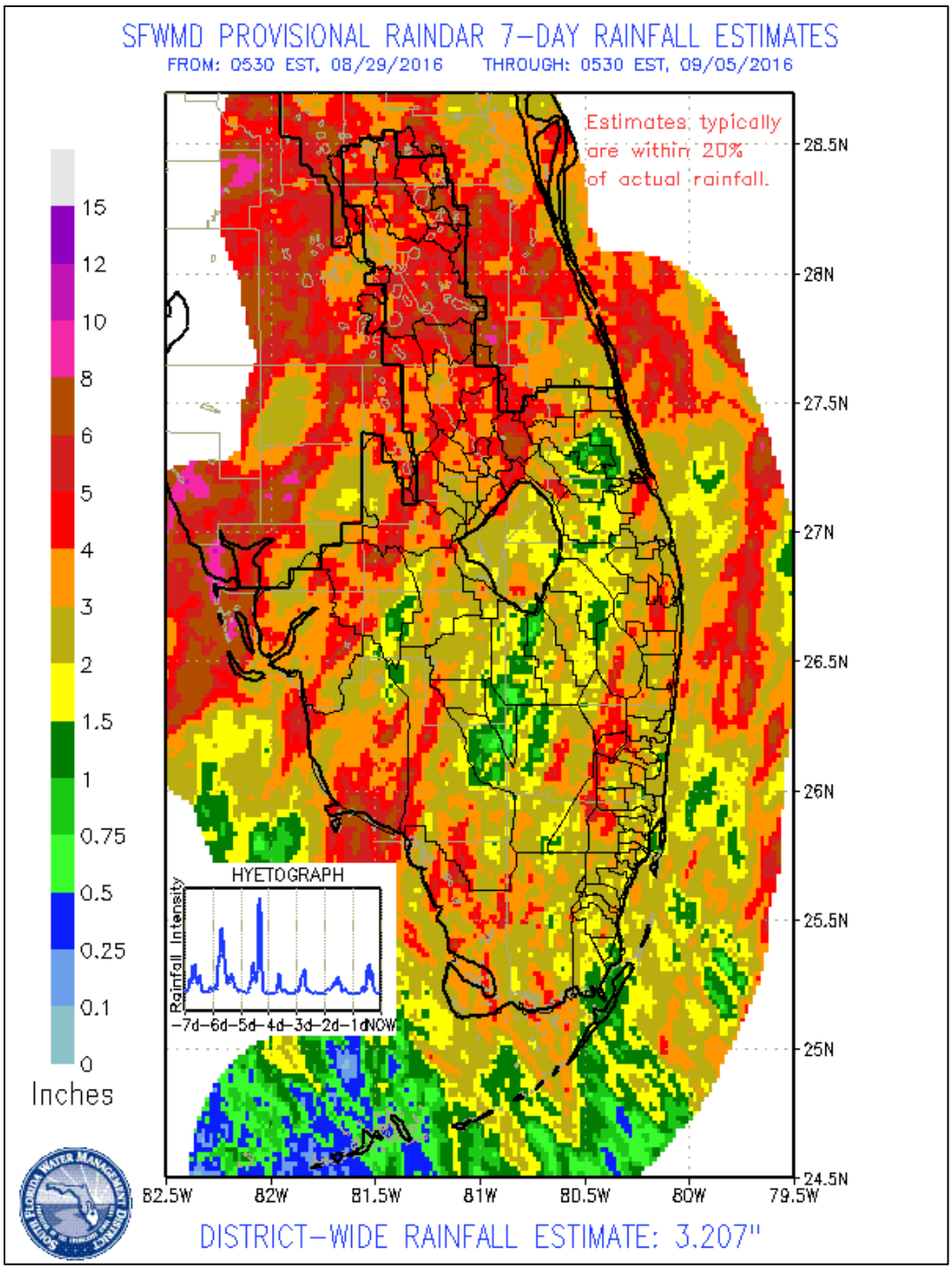


Figure 9. Seven-day mean salinity at Cape Coral Bridge, Shell Point and Sanibel Bridge monitoring stations.

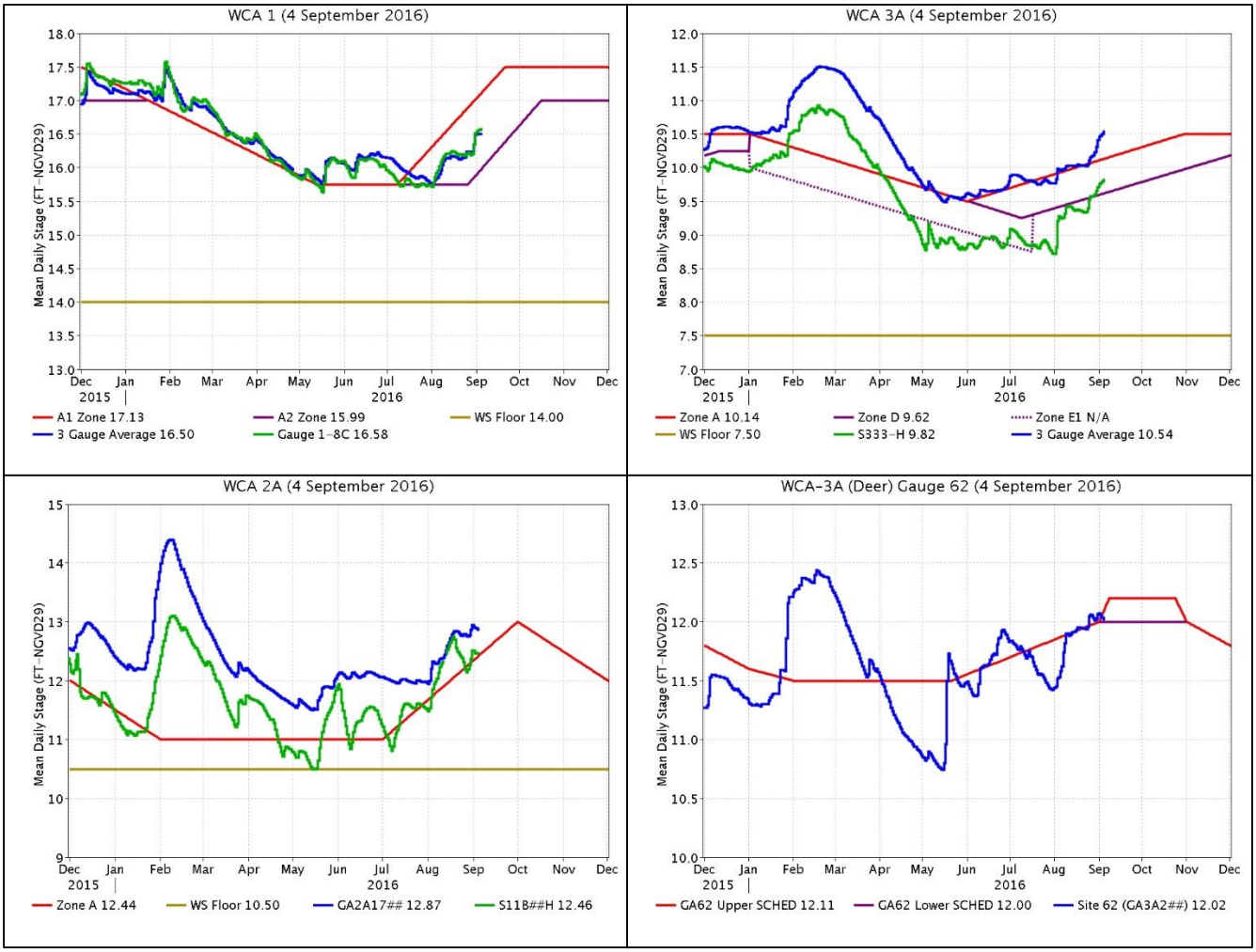
GREATER EVERGLADES

Rainfall was high last week throughout the region, with basin-wide averages ranging from 2.22 inches to 4.41 inches. The highest local rainfall of 6.73 inches occurred in Everglades National Park (ENP), but all the WCAs had maxima over 5 inches.

Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	3.02	0.25
WCA-2A	3.27	0.07
WCA-2B	4.41	0.33
WCA-3A	2.22	0.24
WCA-3B	2.97	0.19
ENP	3.19	0.02

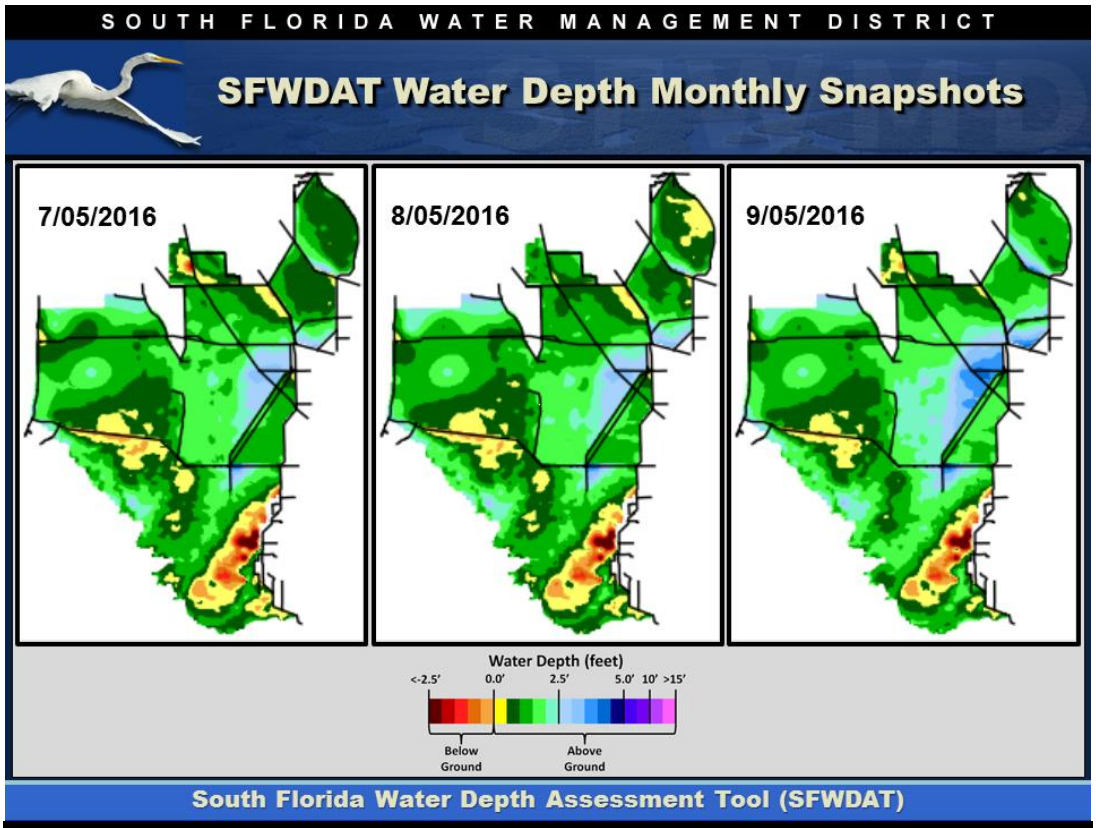


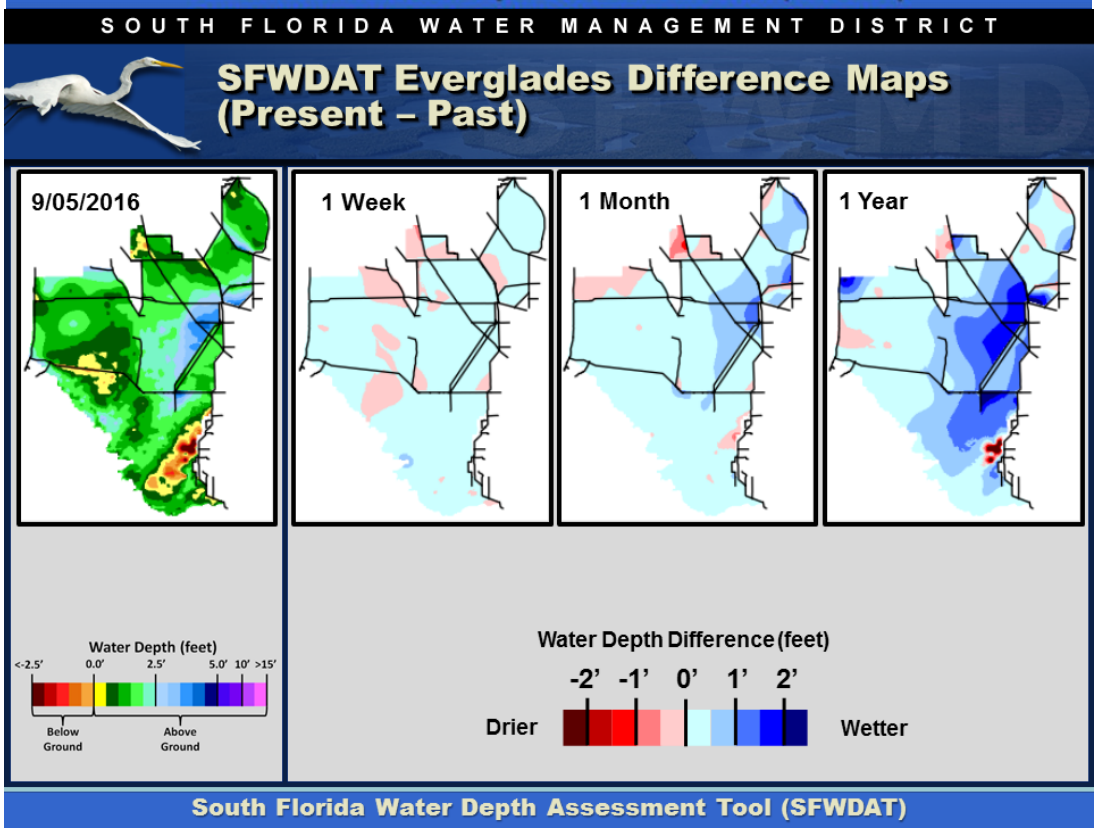
Regulation Schedules: Stages are above regulation for two of the four areas. The WCA-1 three-gauge average is below regulation by 0.63 feet and the northwestern WCA-3A gauge stage (gauge 62) is 0.09 feet below the upper schedule. The other two areas are above schedule: WCA-2A stage is 0.43 feet above regulation and the WCA-3A three-gauge average stage is 0.40 feet above regulation.



Water Depths and Changes: Water levels are higher than those in early August and July. Water depths at monitored gauges other than in WCA-2B range from 1.23 feet to 2.52 feet.

Stages were higher in most parts of the Everglades last week with the heavy rainfall. Individual gauge changes ranged from -0.02 feet (WCA-3A) to 0.42 feet (WCA-3A). Stages are mixed but generally higher than a month ago and higher than a year ago.

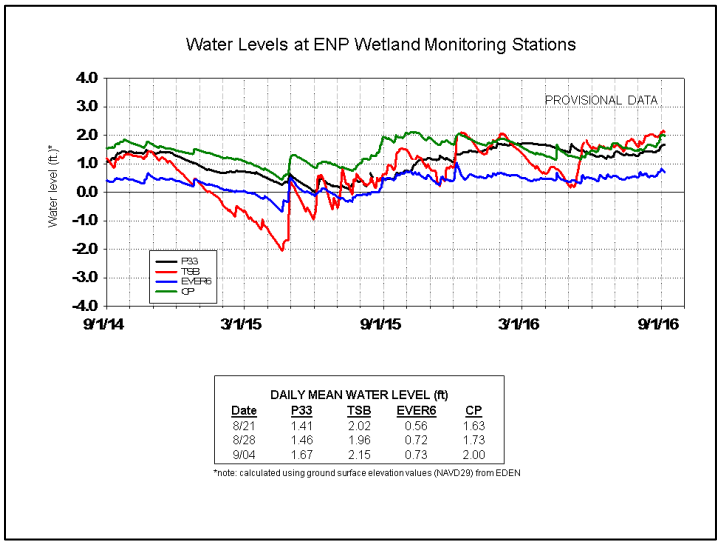




Everglades National Park (ENP) and Florida Bay: Water levels increased last week and are still higher than a month ago. All areas are one to seven inches above average.

Salinities across Florida Bay are average to five psu above average except for the western nearshore area; it is currently 24 psu below average after dropping 28 psu over two days. Daily average salinities now range from four to 38 psu with the highest salinity still in central Florida Bay.

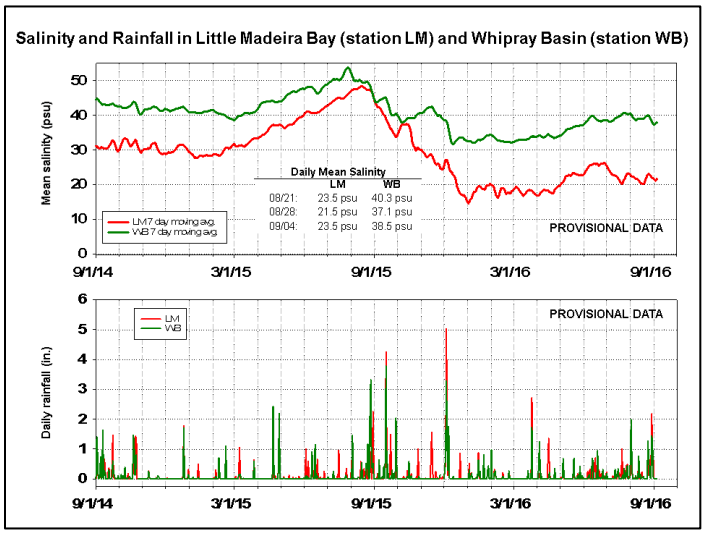
The MFL sentinel site TR in the mangrove zone remains near fresh at 0.3 psu, and the 30-day moving average salinity at TR is also at a seasonal 0.5 psu.

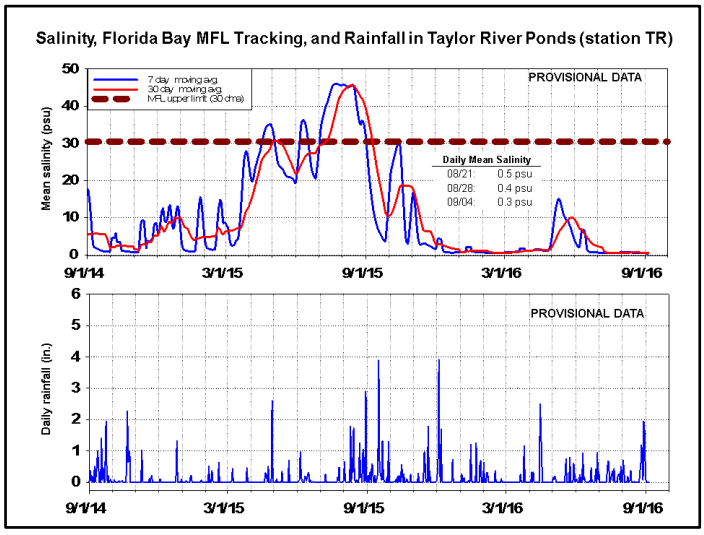


DAILY MEAN WATER LEVEL (ft)

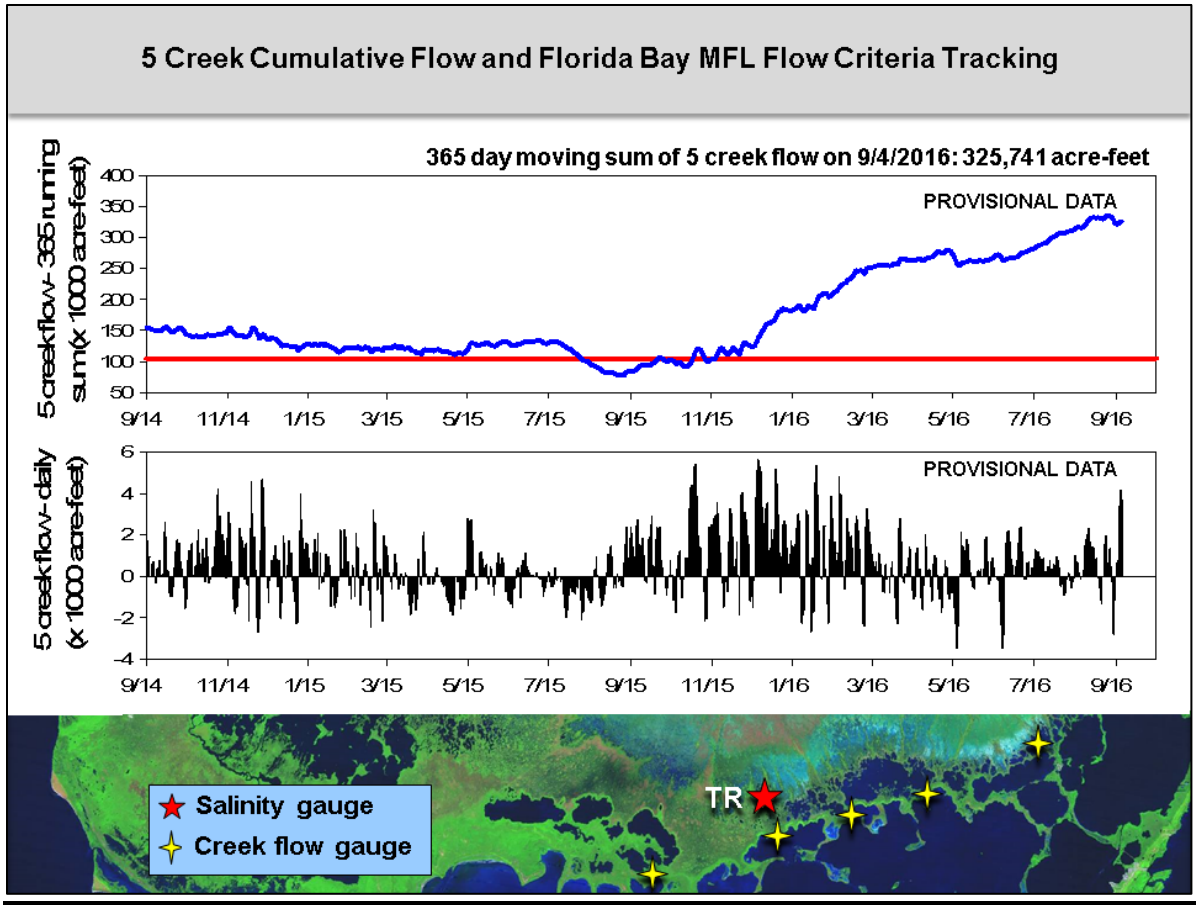
Date	P33	TSB	EVER6	CP
8/21	1.41	2.02	0.56	1.63
8/28	1.46	1.96	0.72	1.73
9/04	1.67	2.15	0.73	2.00

*note: calculated using ground surface elevation values (NAVD29) from EDEN





The 365-day running sum of the cumulative flow from the five creeks feeding Florida Bay has decreased slightly to 325,741 acre-feet (above the average of 257,628 acre feet). Alligator Creek, which is further west than the five reported creeks, had continuous positive flow (inflow into the Bay) over the weekend, which accounts for the rapid decrease in salinity in the western embayments. 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. Depths are almost at the 11.60 feet high water closure stage that FWC uses to protect wildlife and FWC indicates it may eliminate most hunting this year. The Miccosukee Tribe closed tribal lands in western WCA-3A because of high water last week.

- The depth at gauge 65 (southern WCA-3A) has risen this week to 2.52 feet. We recommend that water depths in southern WCA-3A should 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, Sept. 6, 2016 (red is new)

Area	Current Condition	Cause(s)	Recommendation	Reasons
WCA-1	Stages rose 0.15' to 0.36'	Rainfall, ET, management	Slow ascension rates. 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	Stage rose 0.07'	Rainfall, ET, management	Maintain ascension rates <0.25 ft/week.	Ascension rates of <0.25'/week will protect habitat and wildlife including reproducing apple snails, prey for endangered snail kites.
WCA-2B	Stages rose 0.27' to 0.39'	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 rose 0.42'	Rainfall, ET, management	Reduce stages in northern WCA-3A. Stages are high, close to FWC's 11.60 foot closure stage for wildlife protection. 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 -0.02'	Rainfall, ET, management		
Central WCA-3A S	Stage rose 0.35'	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).	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 rose 0.20'	Rainfall, ET, management		
WCA-3B	Stages changed 0.11' to 0.28'	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 rose 0.02'	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 have been opened.	Rainfall, ET, management	Follow rainfall plan for releases. Gradual reduction in flows through S333, and the S-12 structures when they decrease is recommended (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	1 to 7 inches above average	Rain, ET, inflows	Move water southward as needed	Provide freshwater buffer for ecosystems and maintain low salinity conditions downstream
FB- Salinity	From -24 psu to 5 psu above average	Rain, ET, inflows, wind	Move water southward as needed	Maintain lower salinity levels.