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 20, 2016

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

Afternoon thunderstorms north and east today. A trough is lying across north-central Florida it should provide the focus for afternoon thunderstorm activity today with heaviest activity north and east. The trough should slide south on Wednesday and focus afternoon seabreeze thunderstorms over the southern half of the District Wednesday. Steering winds should then focus afternoon thunderstorms over the interior and west Thursday. Favorable upper level winds should increase thunderstorm activity northeast Friday and then east Saturday.

Kissimmee

On Sunday, stages in East Lake Toho, Lake Toho, and Kissimmee-Cypress-Hatchineha were above schedule by 0.2, 0.2 and 0.9 feet, respectively. Over the past week, discharge at S65, S65A, and S65E averaged 3,991, 4,861, and 5,246 cfs, respectively. Tuesday morning discharges were ~3,981 cfs, ~5,077 cfs, ~5,124 cfs, and ~5,710 cfs, respectively at S65, S65A, S65C, and S65E. Dissolved oxygen in the Kissimmee River averaged 1.20 mg/L over the past week. Kissimmee River mean floodplain depth on Sunday was 2.40 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 15.50 feet NGVD having increased by 0.25 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 but is too high for this time of year given the potential for continuing rise into an ecologically damaging range if the wet season persists or another tropical system passes over or near the Lake.

Estuaries

Over the past week total inflow to the St. Lucie Estuary averaged 1,645 cfs with 285 (17%) coming from Lake Okeechobee. Salinity increased in the SLE and is in the fair range for adult oysters at the US 1 Bridge. In the Caloosahatchee, total inflow average 5,653 cfs with 1,855 cfs (33%) coming from Lake Okeechobee. Salinity did not change appreciably over the past week and was in the good range for adult oysters at Shell Point and the Sanibel Causeway, but in the poor range further upstream at the Cape Coral Bridge. Salinity conditions in the upper estuary remain in the good range for Tape Grass.

Stormwater Treatment Areas

Over the past week, the STAs/FEBs received approximately 300 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 69,200 acre-feet. All STA cells are at or above target depths. Operational restrictions are in place for vegetation rehabilitation in 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

Stage changes in the WCAs and northeastern ENP ranged from −0.05 feet to +0.17 feet. The FWC closures within the WCAs are still in effect due to high water levels. The 30-day moving average salinity at the Florida Bay MFL site is 0.4 psu and the cumulative 365-day inflow from the five creeks into Florida Bay decreased to 335,055 acre-feet.

KISSIMMEE BASIN

Kissimmee Basin Rainfall

The Upper Kissimmee Basin received 1.40 inches of rainfall in the past week and the Lower Basin received 1.48 inches (SFWMD Daily Rainfall Report 09/19/2016).

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: 9/20/2016

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)						
							9/18/16	9/11/16	9/4/16	8/28/16	8/21/16	8/14/16	8/7/16
Lakes Hart and Mary Jane	S62	206	LKMJ	60.2	R	60.0	**0.2**	0.1	-0.1	0.0	0.1	0.0	0.1
Lakes Myrtle, Preston, and Joel	S57	94	S57	61.1	R	61.0	**0.1**	0.0	-0.1	0.1	0.0	0.0	0.0
Alligator Chain	S60	178	ALLI	63.3	R	63.2	**0.1**	0.0	-0.1	0.0	0.0	0.0	0.1
Lake Gentry	S63	247	LKGT	61.1	R	61.0	**0.1**	0.0	-0.1	0.0	0.0	0.0	0.1
East Lake Toho	S59	410	TOHOE	57.0	R	56.8	**0.2**	0.1	-0.1	-0.3	0.3	0.0	-0.2
Lake Toho	S61	955	TOHOW, S61	54.0	R	53.8	**0.2**	0.1	0.0	0.0	0.0	0.0	0.0
Lakes Kissimmee, Cypress, and Hatchineha	S65	3991	LKISSP, KUB011, LKIS5B	52.2	R	51.3	**0.9**	1.4	1.2	0.5	0.4	-0.1	-0.5

* 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: **9/20/2016**

Metric	Location	Sunday's 1-day average	Weekly Average**									
			9/18/16	9/11/16	9/4/16	8/28/16	8/21/16	8/14/16	8/7/16	7/31/16	7/24/16	7/17/16
Discharge (cfs)	S-65	3982	**3991**	3290	1080	841	624	532	579	643	642	545
Discharge (cfs)	S-65A	5013	**4861**	5101	2538	808	666	661	694	638	660	633
Discharge (cfs)	S-65C	4954	**5054**	3760	2124	928	1024	1081	1000	1219	1091	1119
Headwater stage (feet NGVD)		34.0	**33.7**	33.8	34.1	34.1	34.0	34.1	34.3	34.1	34.0	34.1
Discharge (cfs)	S-65D****	4948	**5224**	3971	2172	1181	1140	1142	1037	1284	1263	1272
Discharge (cfs)	S-65E	5037	**5246**	4077	2900	910	1061	1137	986	1158	1181	1147
DO concentration (mg/L)***	Phase I river channel	1.30	**1.20**	1.35	3.88	4.75	4.04	4.09	4.58	4.76	4.91	4.40
Mean depth (feet)*	Phase I floodplain	2.40	**2.28**	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
9/20/2016	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.			
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)

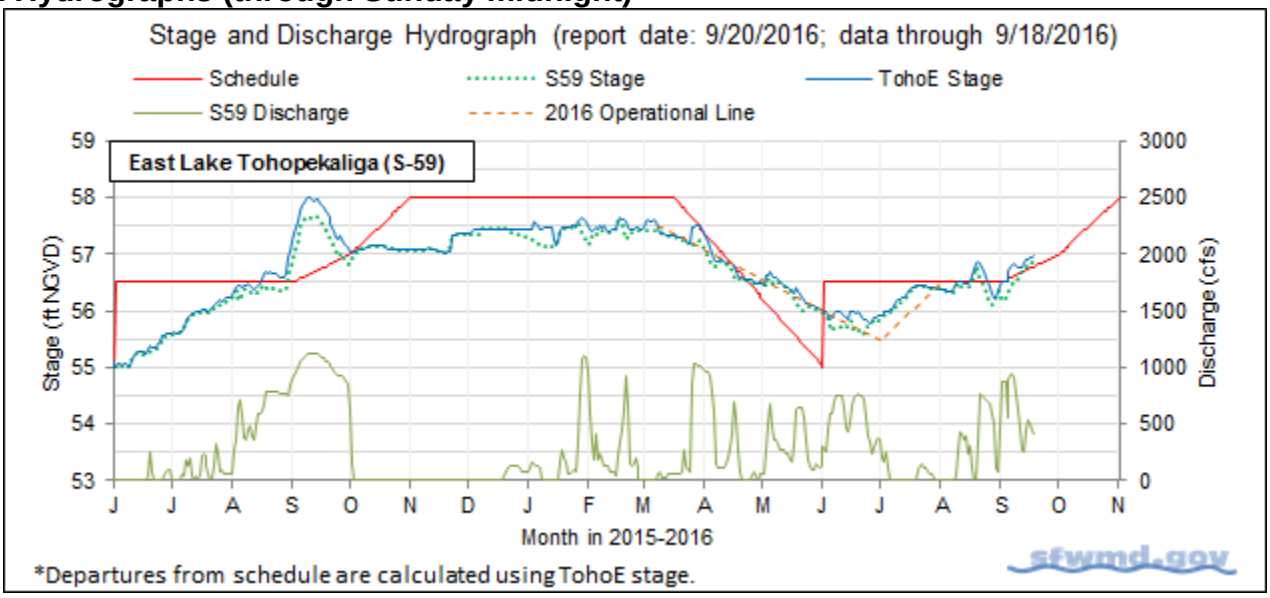


Figure 1.

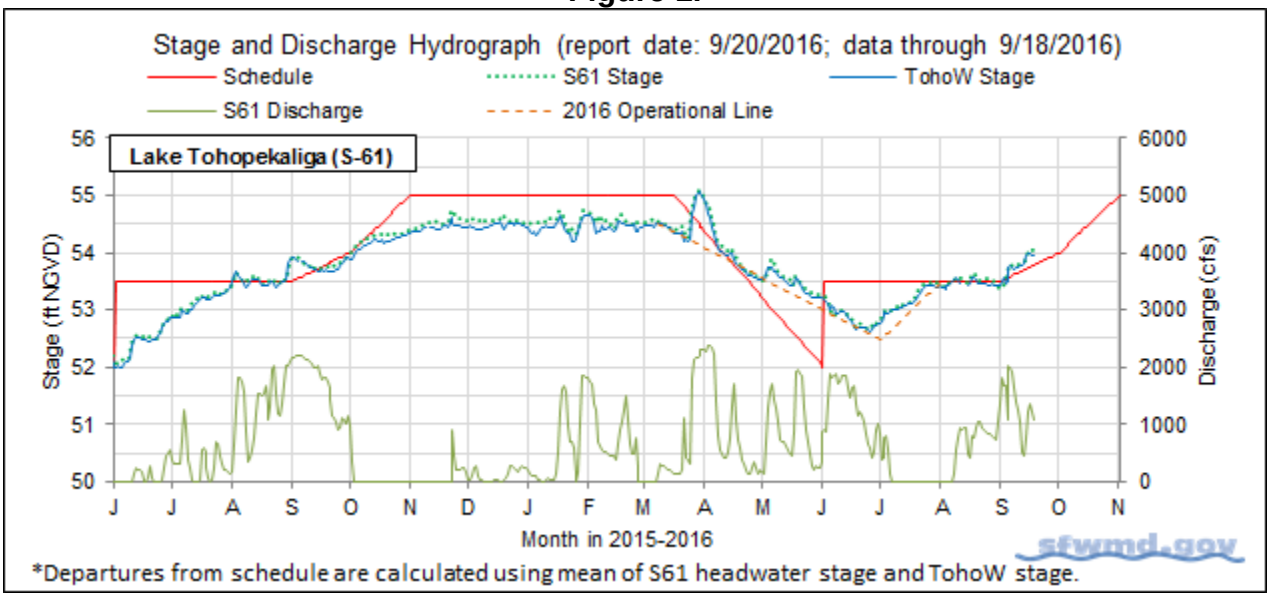


Figure 2.

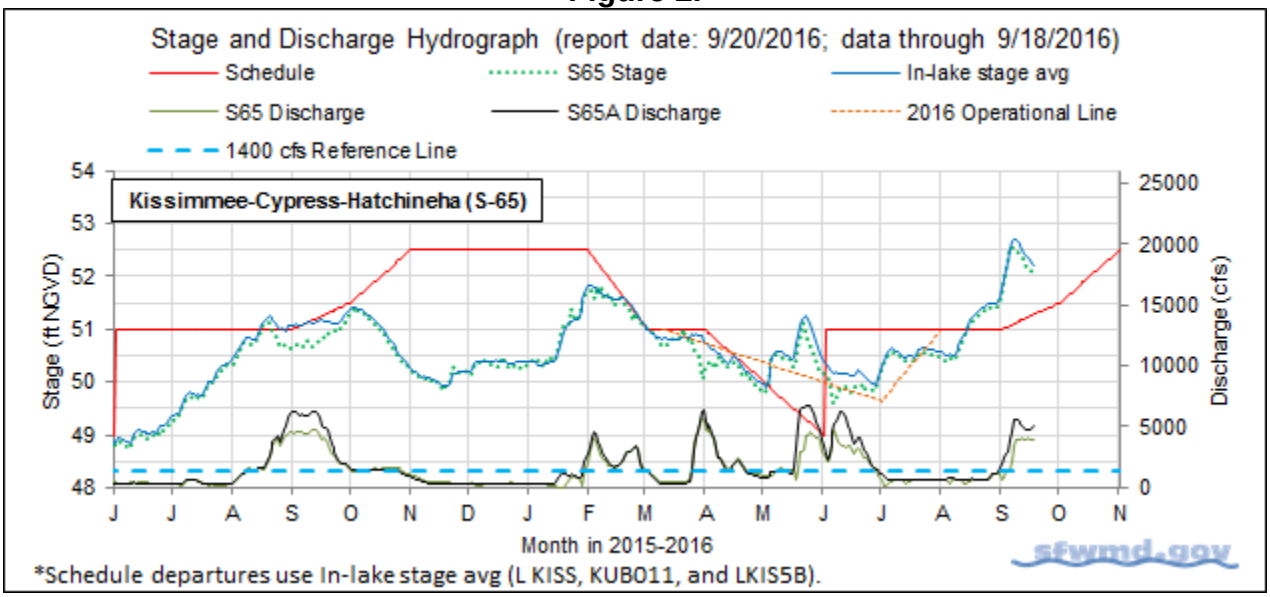


Figure 3.

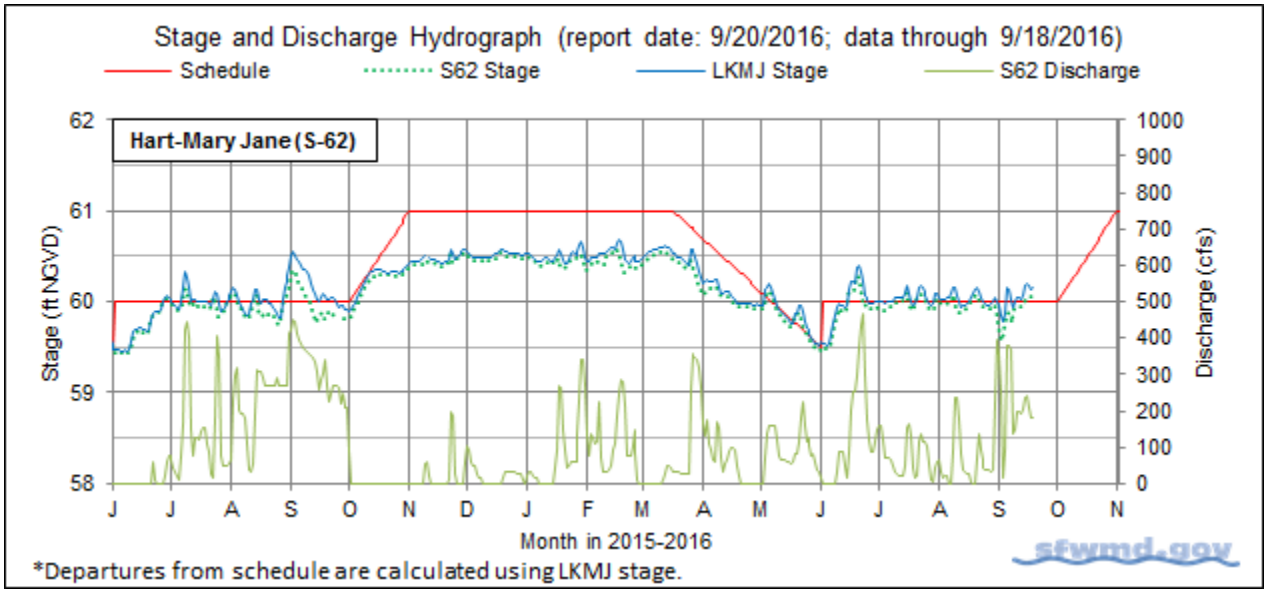


Figure 4.

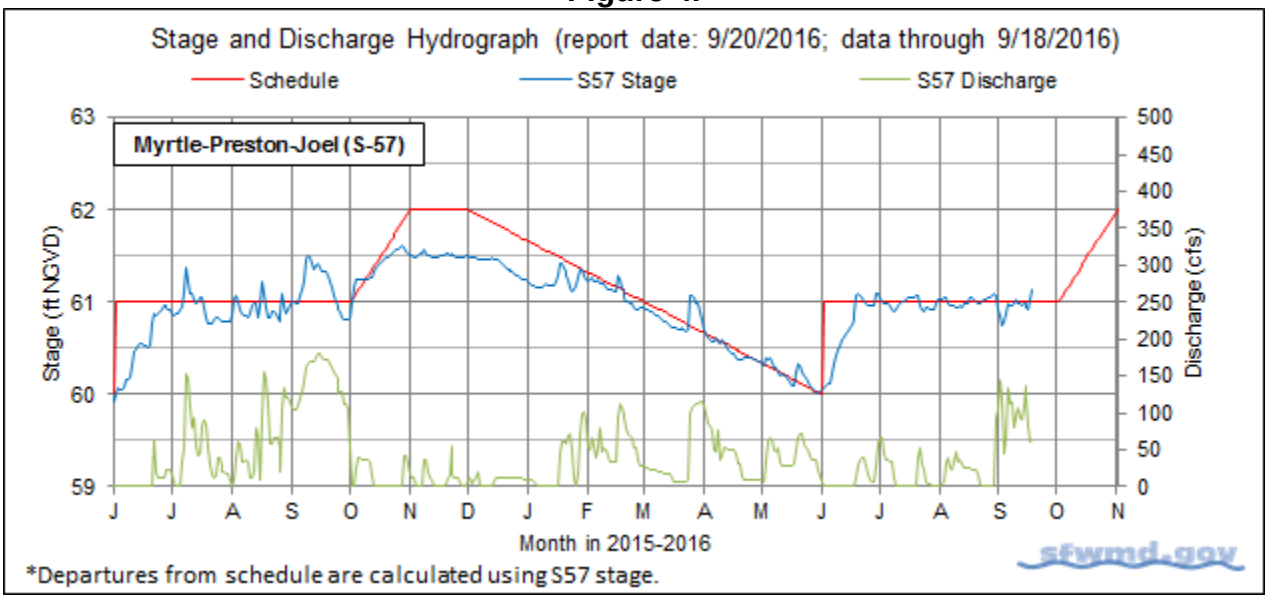


Figure 5.

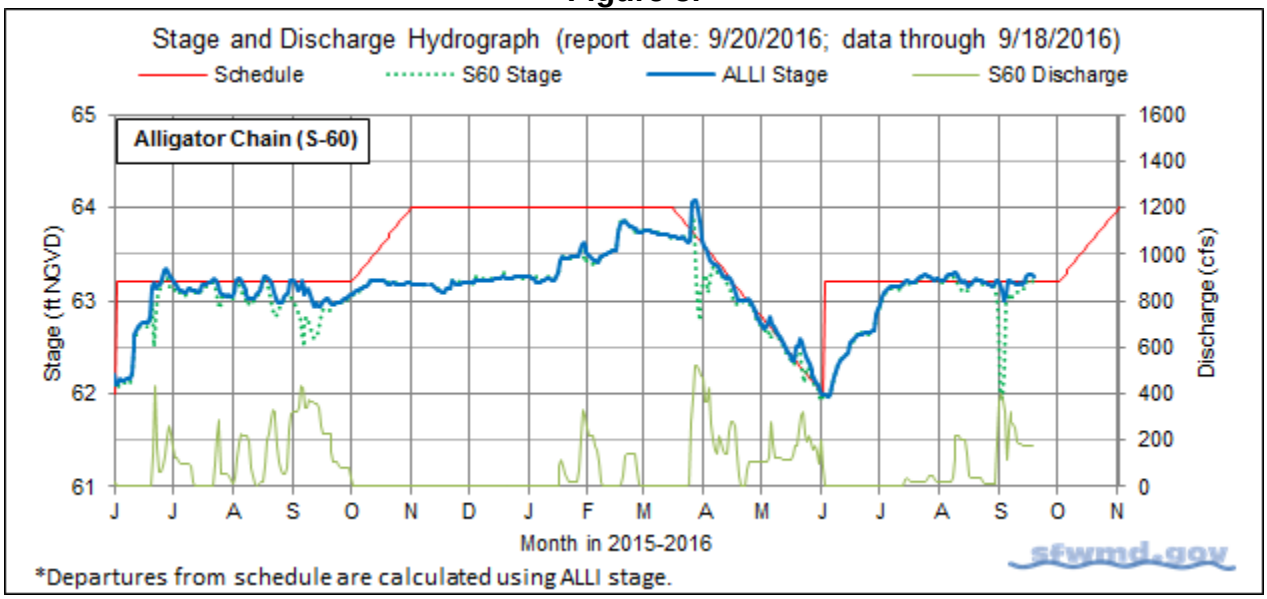


Figure 6.

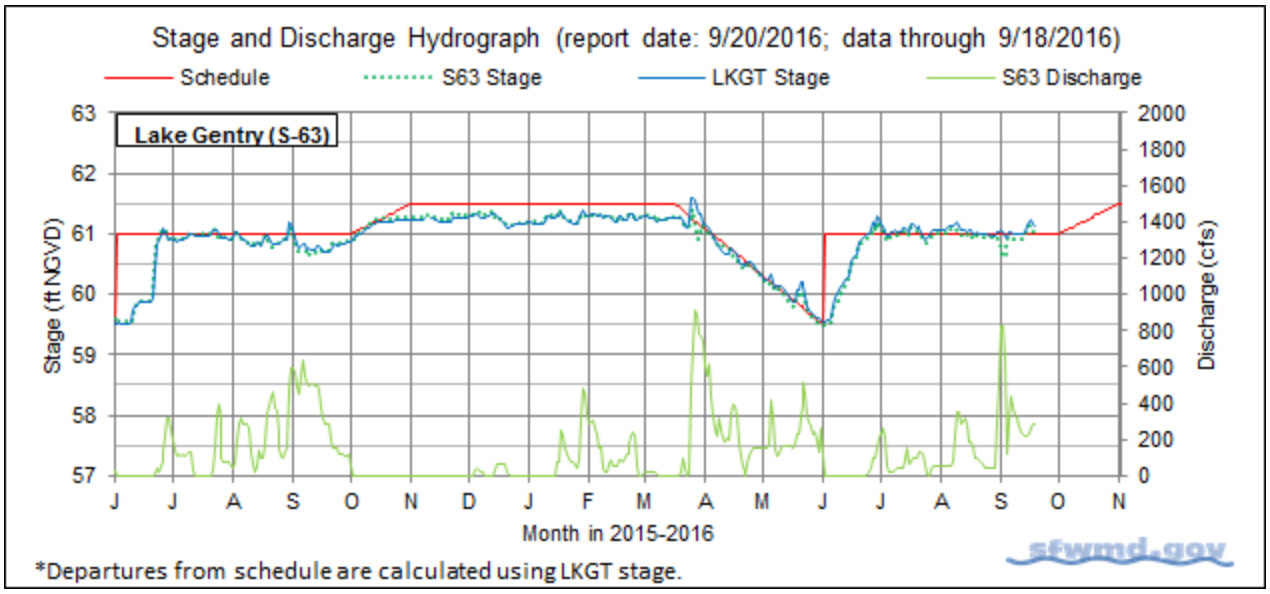


Figure 7.

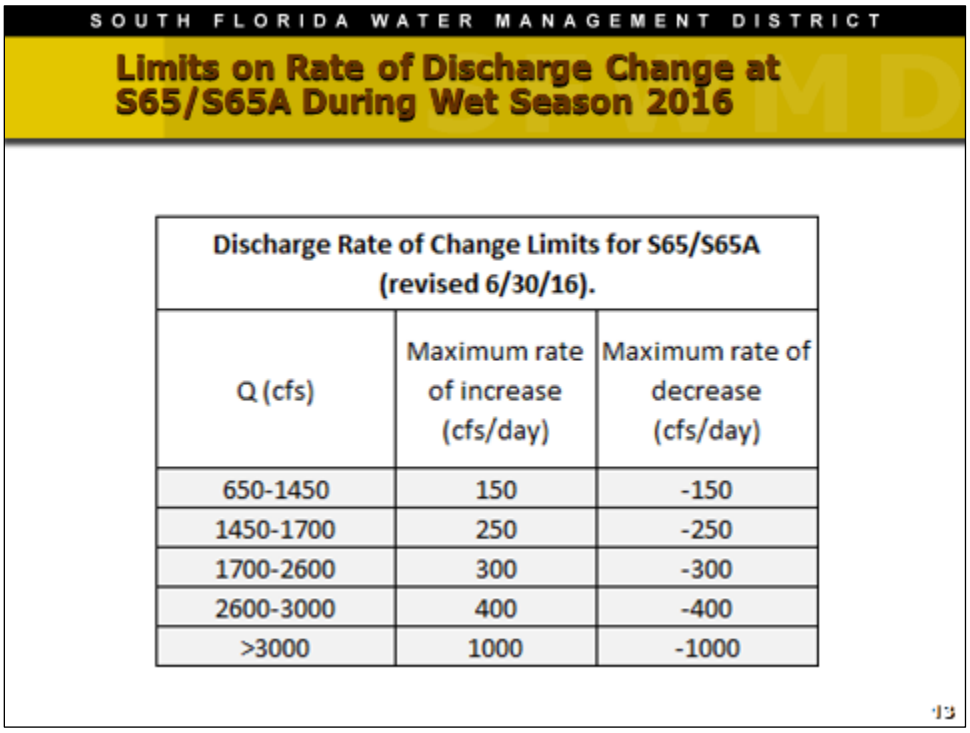


Figure 8a. Limits on rate of discharge change at S65/S65A for the 2016 Wet Season.

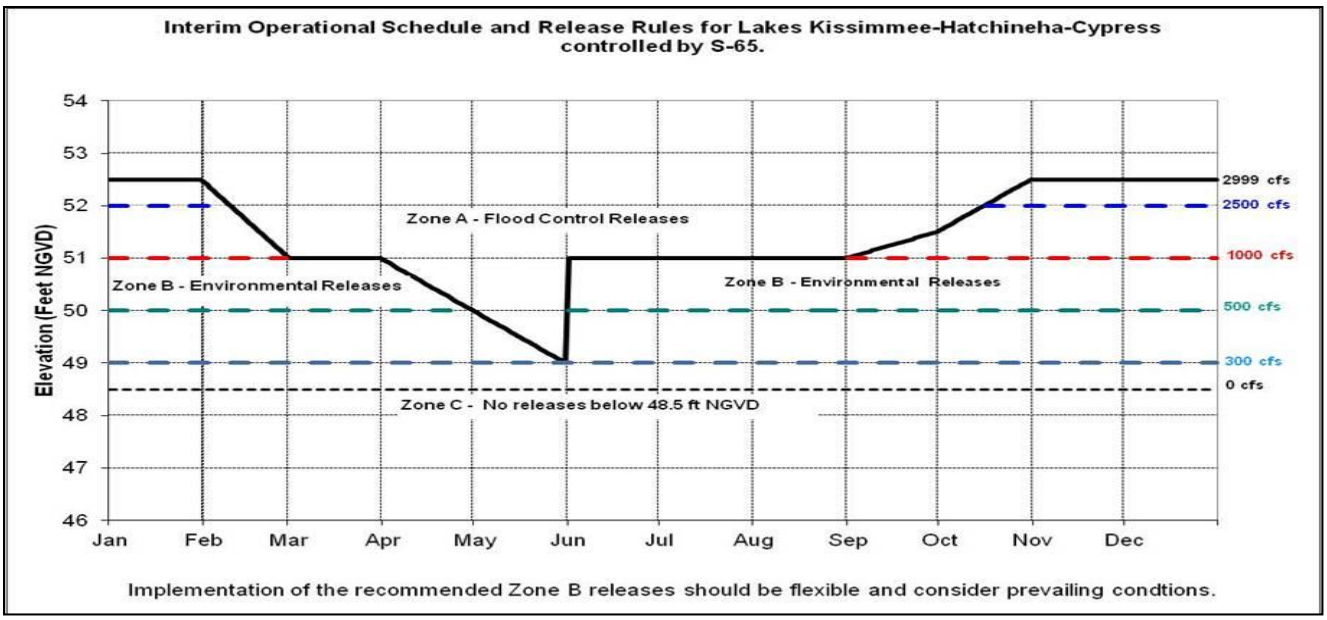


Figure 8b. Interim operations schedule for S-65. The discharge schedule shown to the right has not been used in recent years or in Wet Season 2015.

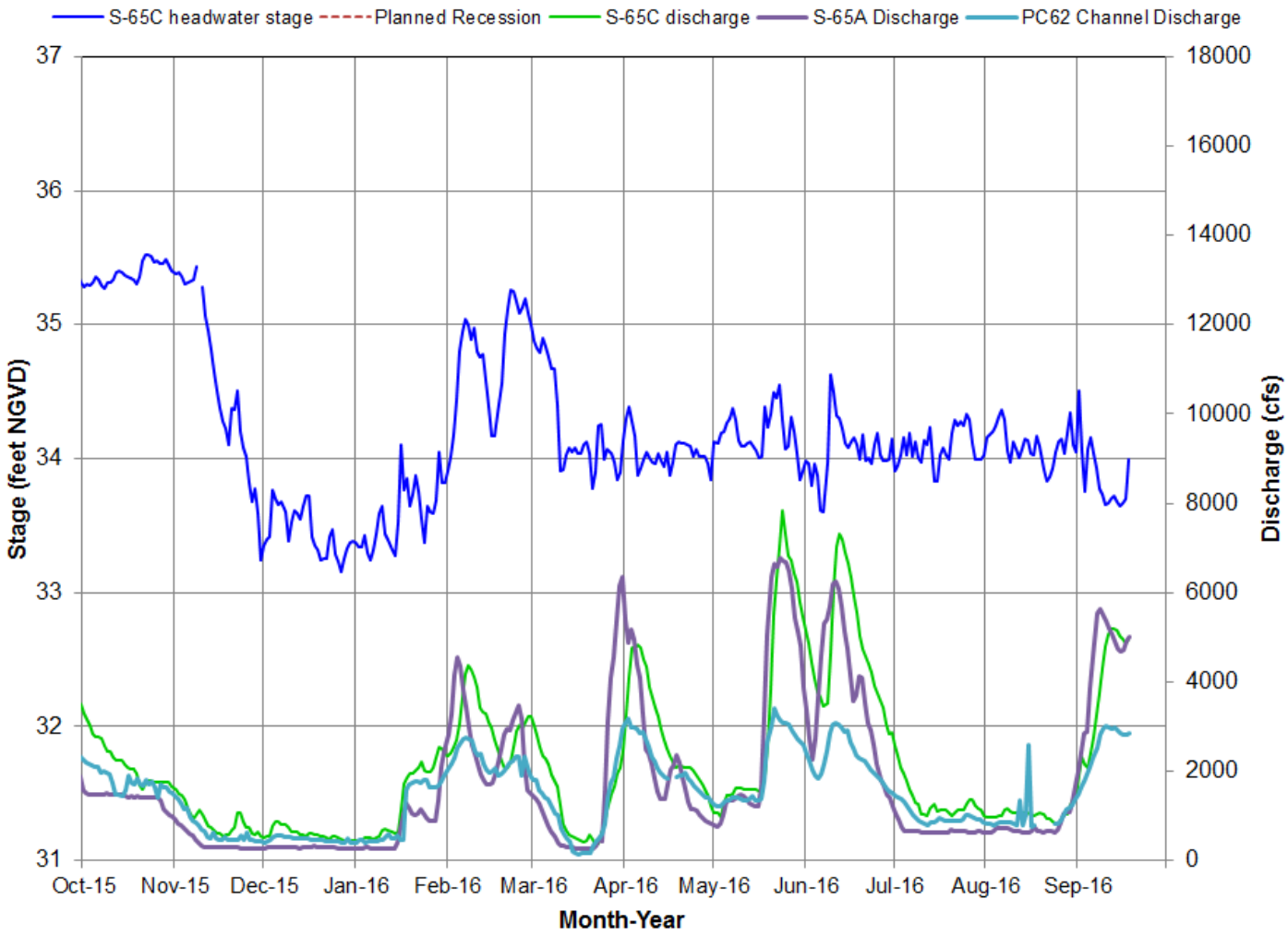


Figure 9. S-65C headwater stage in relation to discharge at S-65C, S-65A, and PC62.

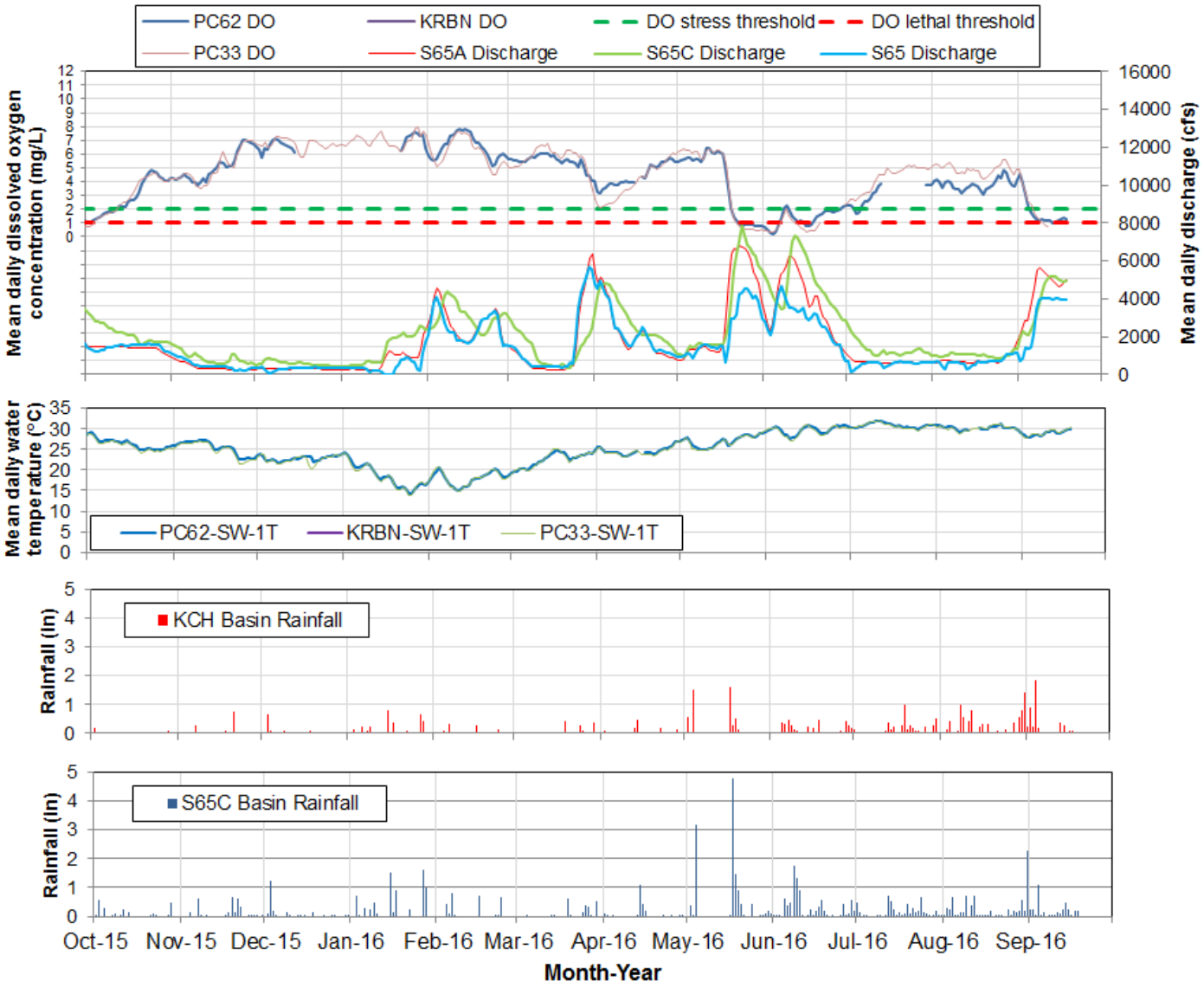


Figure 10. Mean daily Dissolved Oxygen, discharge, temperature and rainfall in the Phase I river channel.

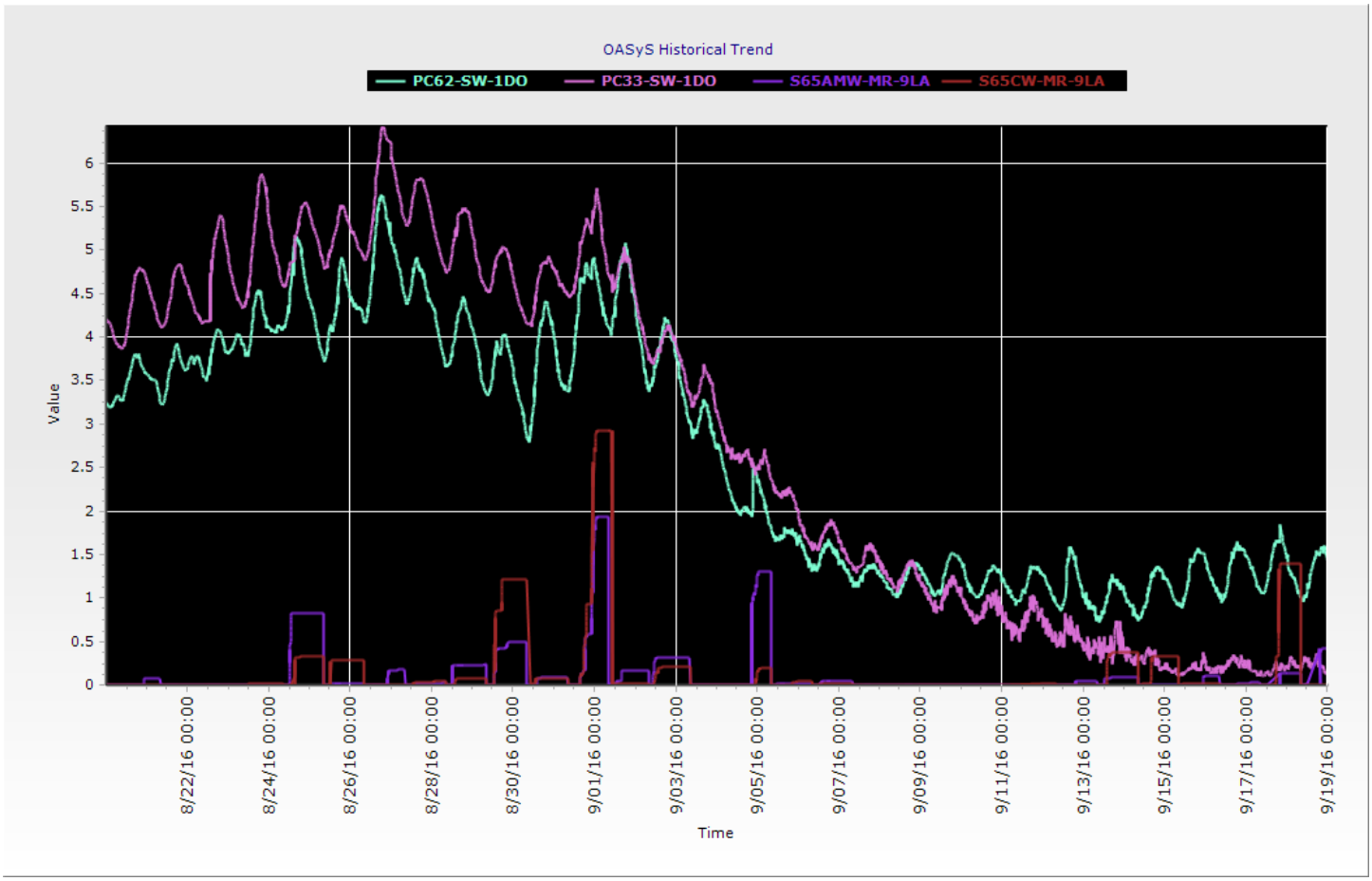


Figure 11. Phase I river channel dissolved oxygen (measured at 15 minute intervals) and rainfall at S65A and S65C.

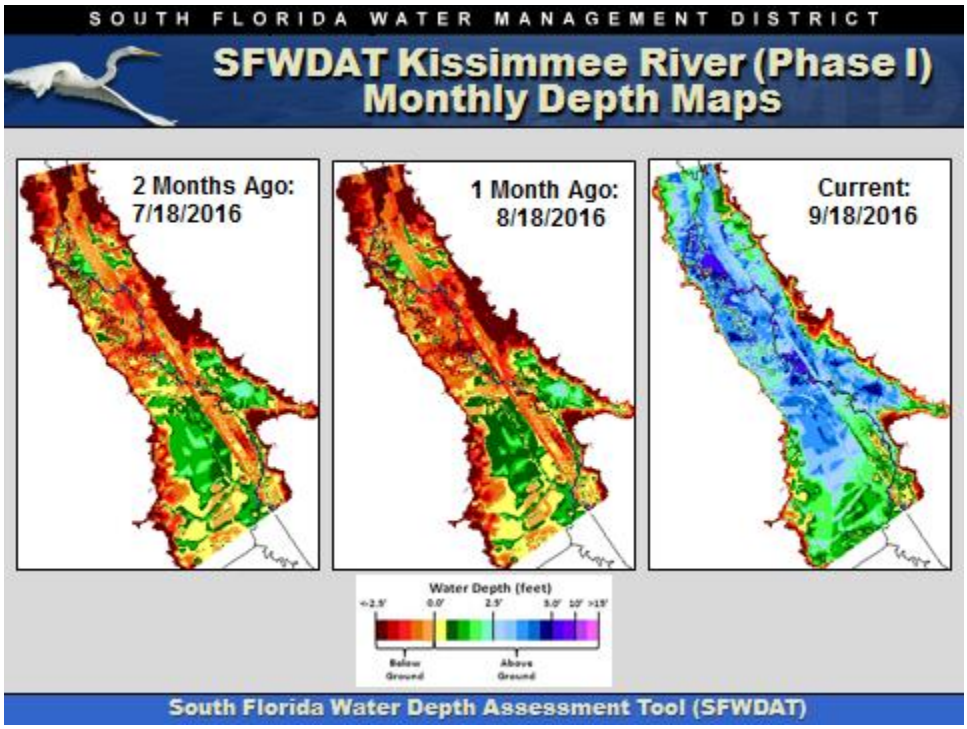
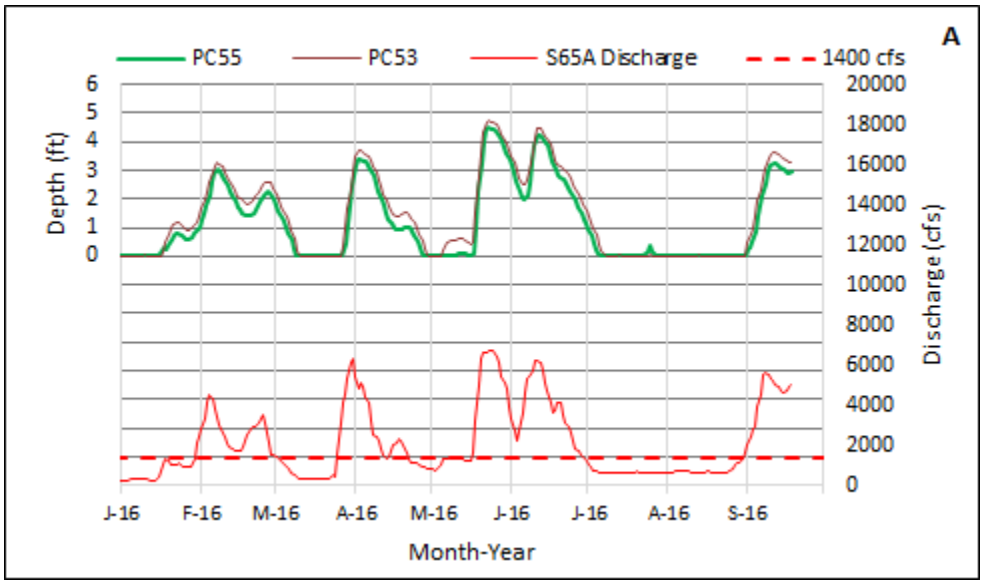
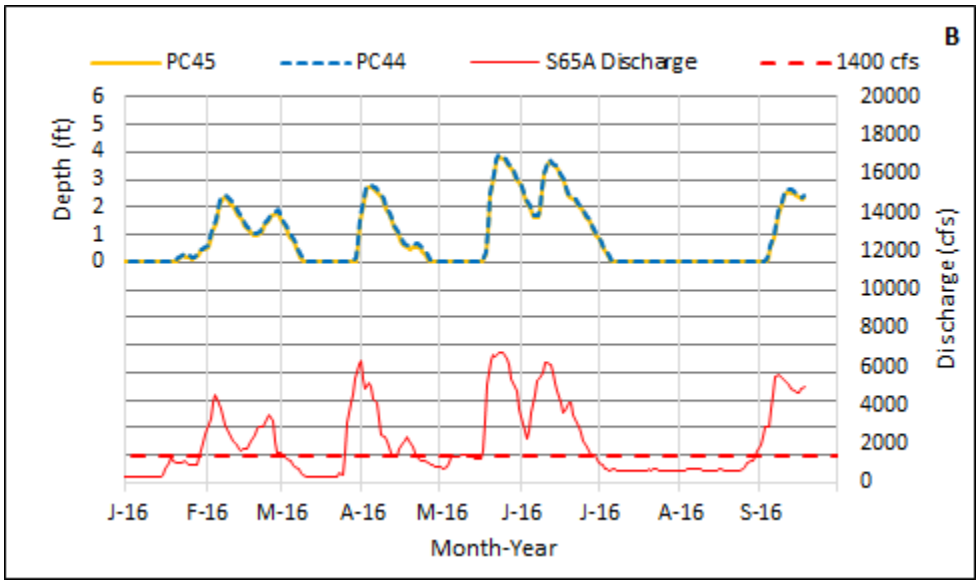


Figure 12. Phase I area floodplain water depths for this week, one month ago, and two months ago. Note that the WDAT color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to Jan. 16, 2012.





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

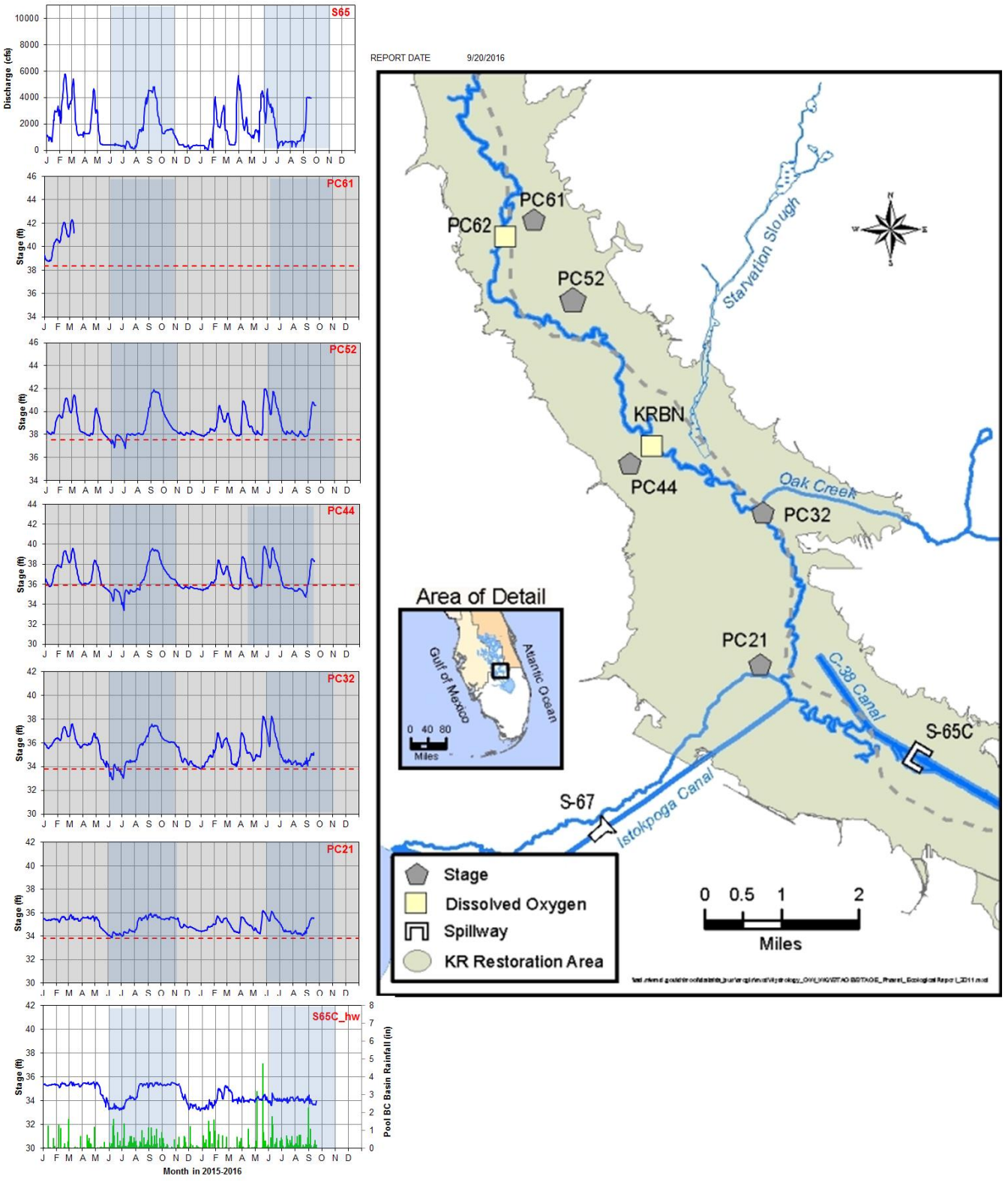


Figure 13. Discharge at S65, stages at five monitoring stations in the Phase I area of the Kissimmee River floodplain, and headwater stage at S65-C since January 1, 2015. The most recent data (~2 weeks) are provisional real-time data from SFWMD DualTrend; previous data are from SFWMD DB-HYDRO (validated).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

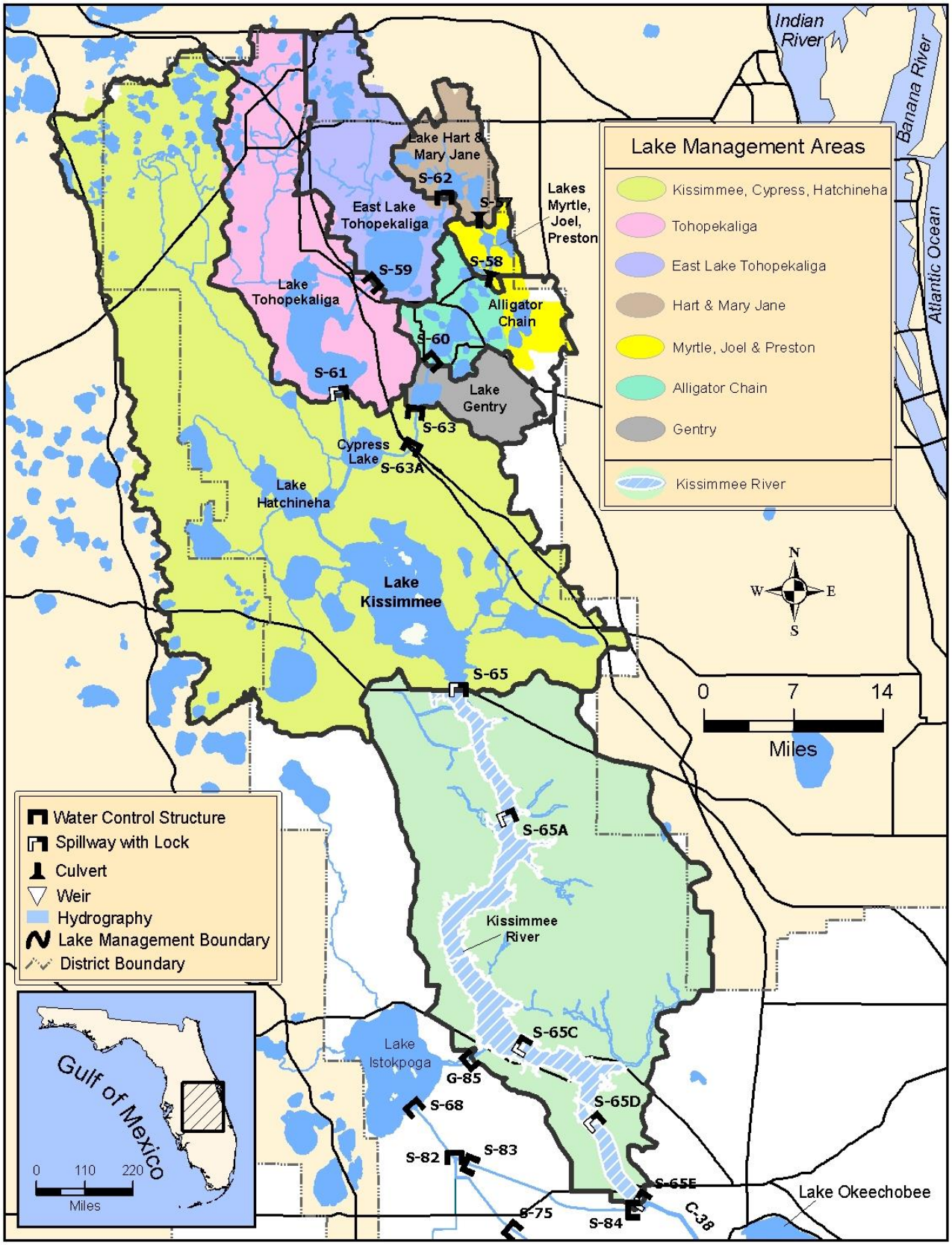


Figure 14. The Kissimmee Basin.

LAKE OKEECHOBEE

According the United States Army Corps of Engineers (USACE) web site Lake Okeechobee stage is at 15.50 feet NGVD for the period ending at midnight on September 19, 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 0.25 feet over the past week and is 0.75 feet higher than it was a month ago and 1.19 feet higher than it was a year ago (Figure 1). The Lake is in the low flow sub-band (Figure 2). According to RAINDAR, 1.69 inches of rain fell directly over the Lake during the past seven days. With the exception of the lower east coast, the surrounding watershed experienced similar or greater rainfall amounts (Figure 3).

Based on USACE reported values, current Lake inflow is approximately 9,357 cfs as detailed below.

Structure	Flow cfs
S65E	5493
S154	156
S84 & 84X	1215
S71	268
S72	170
C5(Nicodemus slough dispersed storage)	-85
S191	763
S133 PUMPS	119
S127 PUMPS	76
S129 PUMPS	68
S131 PUMPS	49
S135 PUMPS	133
Fisheating Creek	932
S2 Pumps	0
S3 Pumps	0
S4 Pumps	0

Current Lake outflow is approximately 4,415 cfs with 2,857 cfs exiting at S77 and 1,564 cfs exiting at S308. There is no flow through S351, S352 or S354 and -6 cfs is back flowing from the L8 canal through Culvert 10A. Corrected ET value based on the L006 weather platform solar radiation data for this past week was 2,701 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 September 14 and 16) (Figure 5) indicate low potential for bloom conditions.

Water Management Recommendations

Lake stage continued to increase this past week and is now at the top of the preferred stage envelope (15.5 feet NGVD), a month and a half earlier than desired.

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 SAV, increased cyanobacterial blooms, and associated toxins.

The goal should be to decrease Lake stage as levels will move past the top of the preferred stage envelope with the potential of continuing to rise into an ecologically damaging range if the wet season persists or a tropical system passes over or near the lake . Near optimal Lake stages will be necessary this coming spring and summer to provide conditions conducive to the reestablishment of the SAV acreage lost this year due to high lake stages.

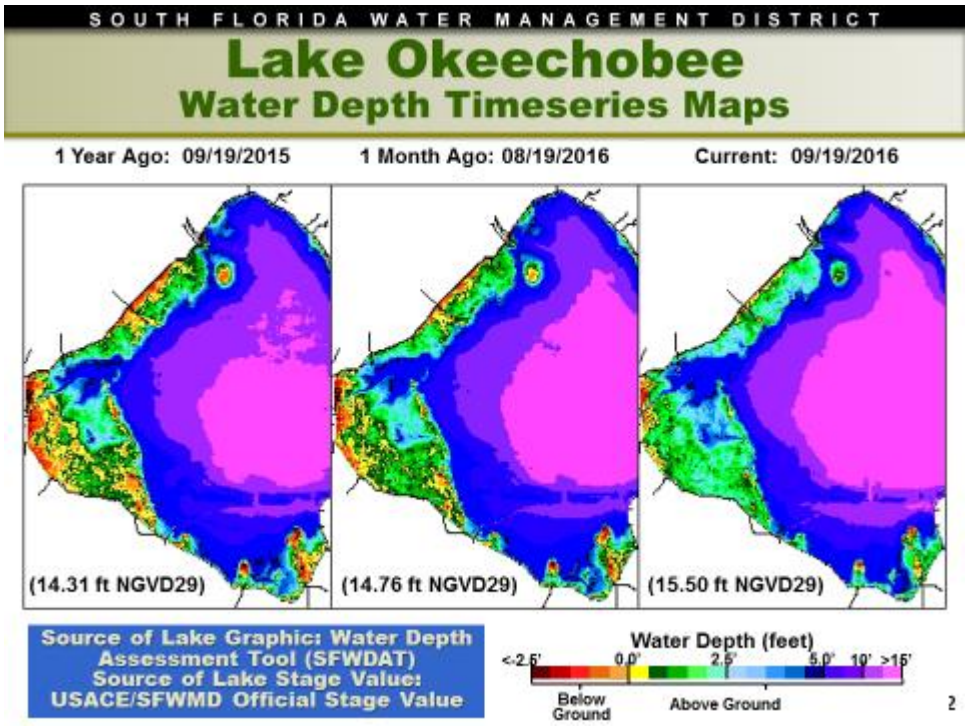


Figure 1

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Weekly Stage Hydrograph

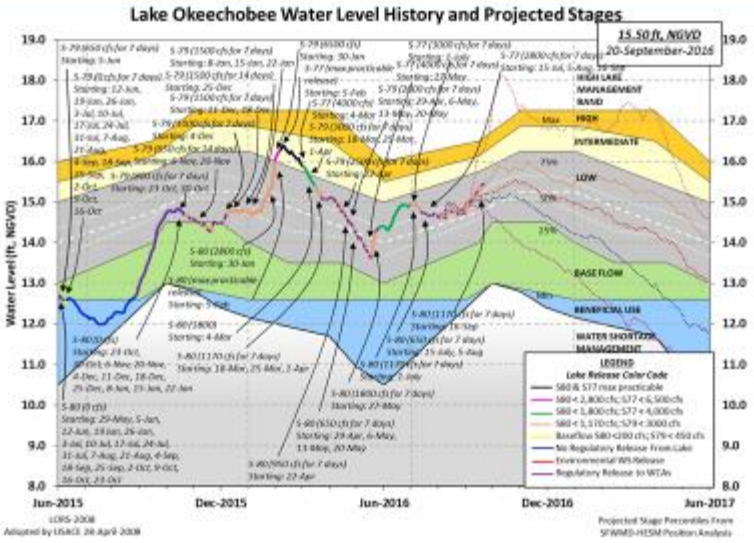


Figure 2

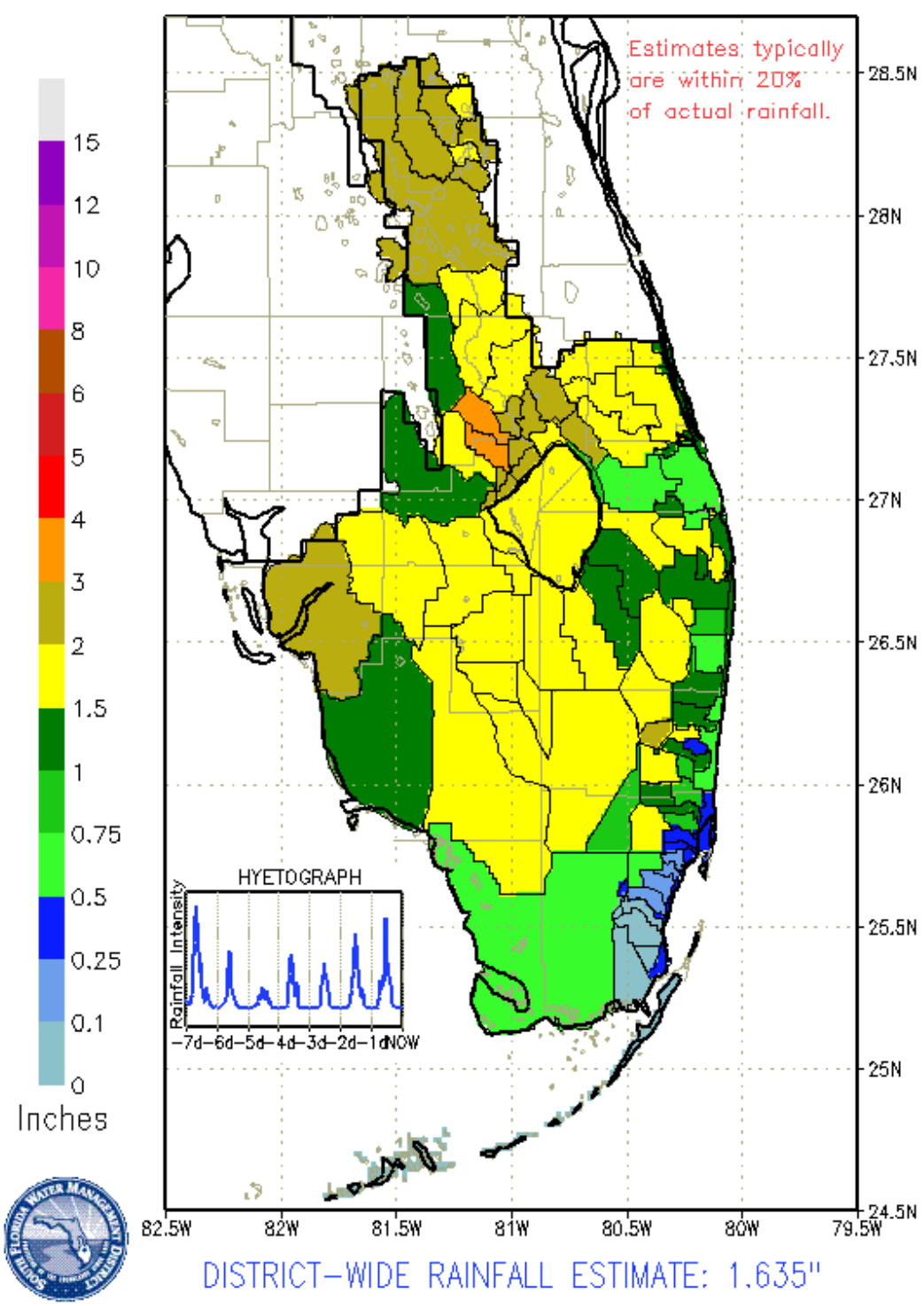

SFWMD PROVISIONAL RAINDAR 7-DAY BASIN RAINFALL ESTIMATES
FROM: 0515 EST, 09/13/2016 THROUGH: 0515 EST, 09/20/2016
Estimates typically are within 20% of actual rainfall.
15
12
10
8
6
5
4
3
2
1.5
1
0.75
0.5
0.25
0.1
0
Inches
HYETOGRAPH
Rainfall Intensity
-7d-6d-5d-4d-3d-2d-1dNOW
28.5N
28N
27.5N
27N
26.5N
26N
25.5N
25N
24.5N
82.5W
82W
81.5W
81W
80.5W
80W
79.5W
DISTRICT-WIDE RAINFALL ESTIMATE: 1.635"

Figure 3

INFLOWS	Average Daily Flow Past Week cfs	Feet of Change Past Week
S65E	5265	0.170
S71 & 72	547	0.018
S84 & 84X	972	0.031
Fisheating Creek	1120	0.036
Rainfall	N.A.	0.141
OUTFLOWS	**Average Daily Flow Past Week cfs**	**Feet of Change Past Week**
S77	1855	0.060
S308	334	0.011
S351	0	0.000
S352	25	0.001
S354	0	0.000
L8	78	0.003
ET	2701	0.087

Figure 4

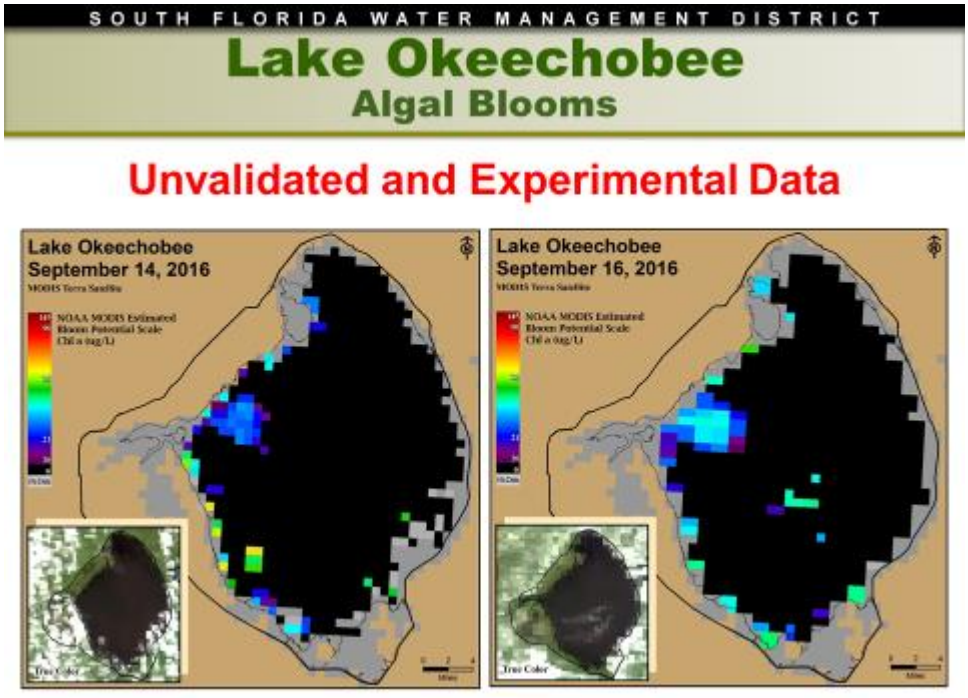


Figure 5

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 38.93 feet NGVD and is currently 0.03 feet above its regulation stage of 38.90 feet NGVD (Figure 6). Average flows into the Lake from Arbuckle and Josephine creeks were 873 cfs and 142 cfs respectively, a decrease from the previous week. Average discharge from S68 and S68X this past week was 945 cfs, also a decrease from the preceding week. According to RAINDAR 1.50 inches of rain fell in the Lake Istokpoga watershed during the past seven days.

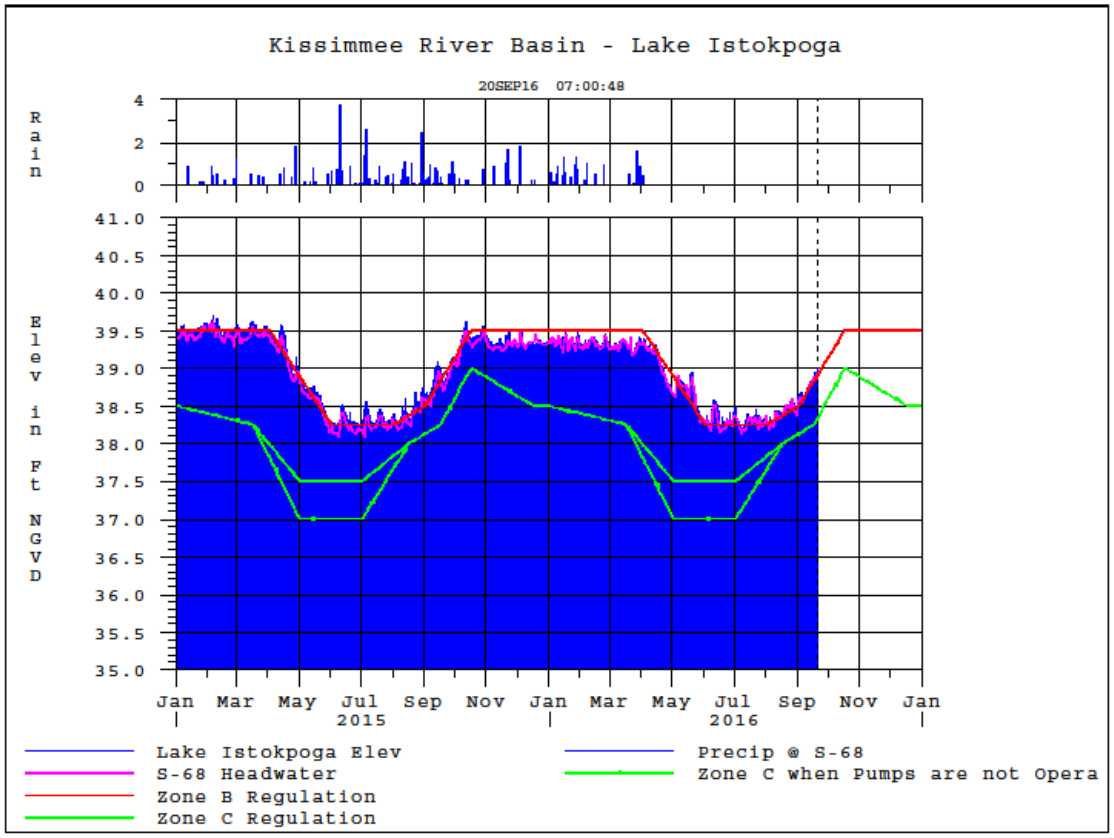


Figure 6

ESTUARIES

St. Lucie Estuary:
Over the past week, provisional flows averaged about 532 cfs at S-80, 319 cfs downstream of S-308, 268 cfs at S-49 on C-24, 178 cfs at S-97 on C-23, and 310 cfs from Ten Mile Creek at the Gordy Road Structure. Average inflow from tidal basin tributaries is estimated to be 357 cfs (Figures 1 and 2). Total inflow averaged about 1,645 cfs last week and 2,249 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 unavailable, but the seven-day surface salinity is 6.1. Salinity conditions in the middle estuary are at least 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)	**1.8** (0.6)	**5.5** (1.1)	NA[1]
US1 Bridge	**6.1** (1.9)	**EM**[2](3.1)	10.0-26.0
A1A Bridge	**23.9** (14.6)	**24.6** (19.3)	NA

[1]Envelope not applicable, [2]Equipment Malfunction

Caloosahatchee Estuary:
During the past week, provisional flows averaged approximately 1,855 cfs downstream of S-77, 2,383 cfs at S-78, and 4,491 cfs at S-79. Average inflow from tidal basin tributaries is estimated to be 1,162 cfs (Figures 5 and 6). Total inflow averaged 5,653 cfs last week and 4,976 cfs over last month.

Over the past week in the estuary, surface salinity remained about fresh to 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 poor 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	**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	**1.8** (1.0)	**2.4** (1.7)	10.0-30.0
Shell Point	**11.9** (10.0)	**16.2** (16.2)	10.0-30.0
Sanibel	**~ 23.8** (23.0)	**25.8** (27.0)	10.0-30.0

[1]Envelope not applicable, [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)	5.2 – 6.3	5.5 – 6.9	1.7 – 4.5
Dissolved Oxygen (mg/l)	3.2 – 4.9	4.8 – 6.2	4.6 – 6.3

The Florida Fish and Wildlife Research Institute reported on September 16, 2016, that *Karenia brevis,* the Florida red tide organism, was observed in background concentrations in one sample collected from Lee County.

Water Management Recommendations

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

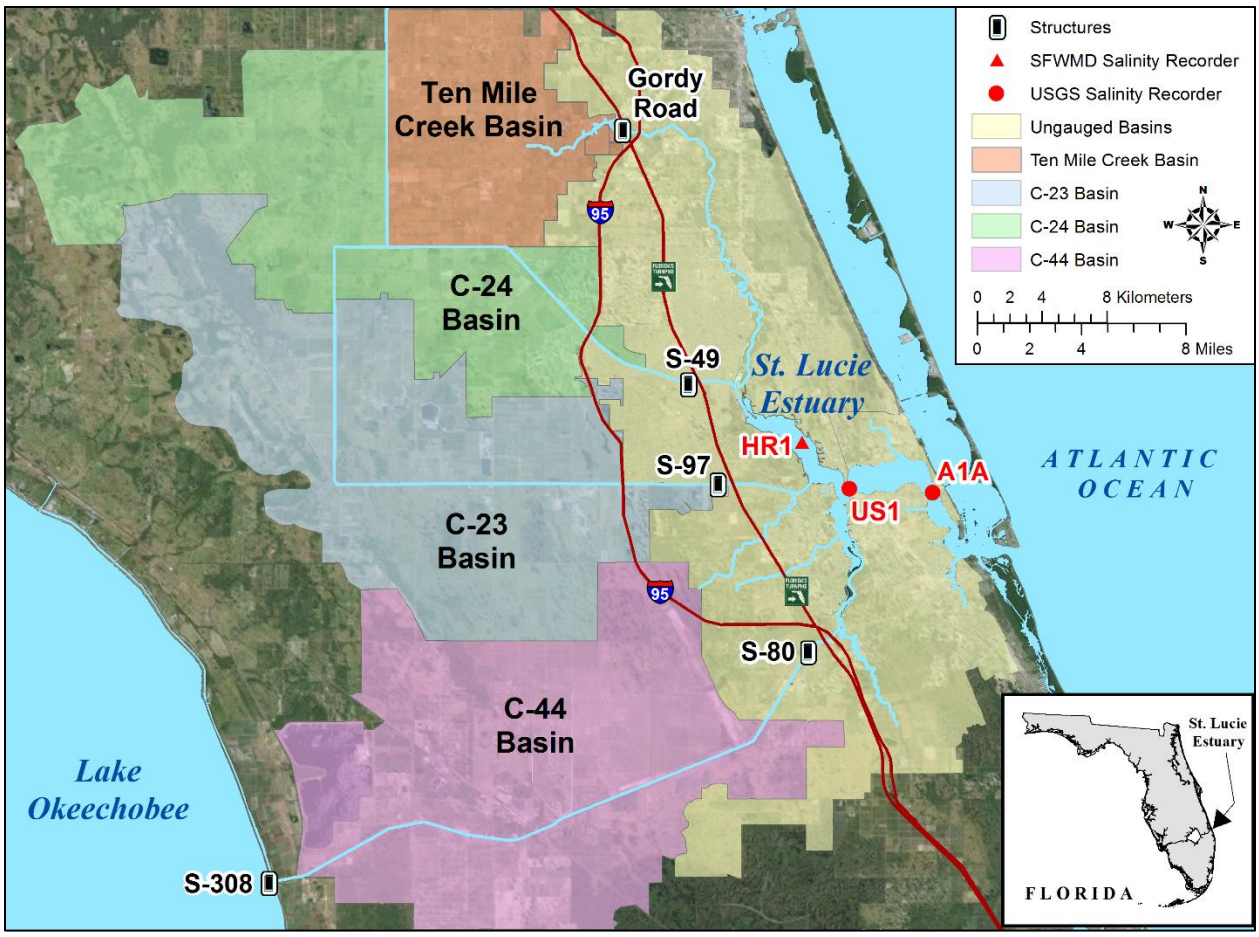


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

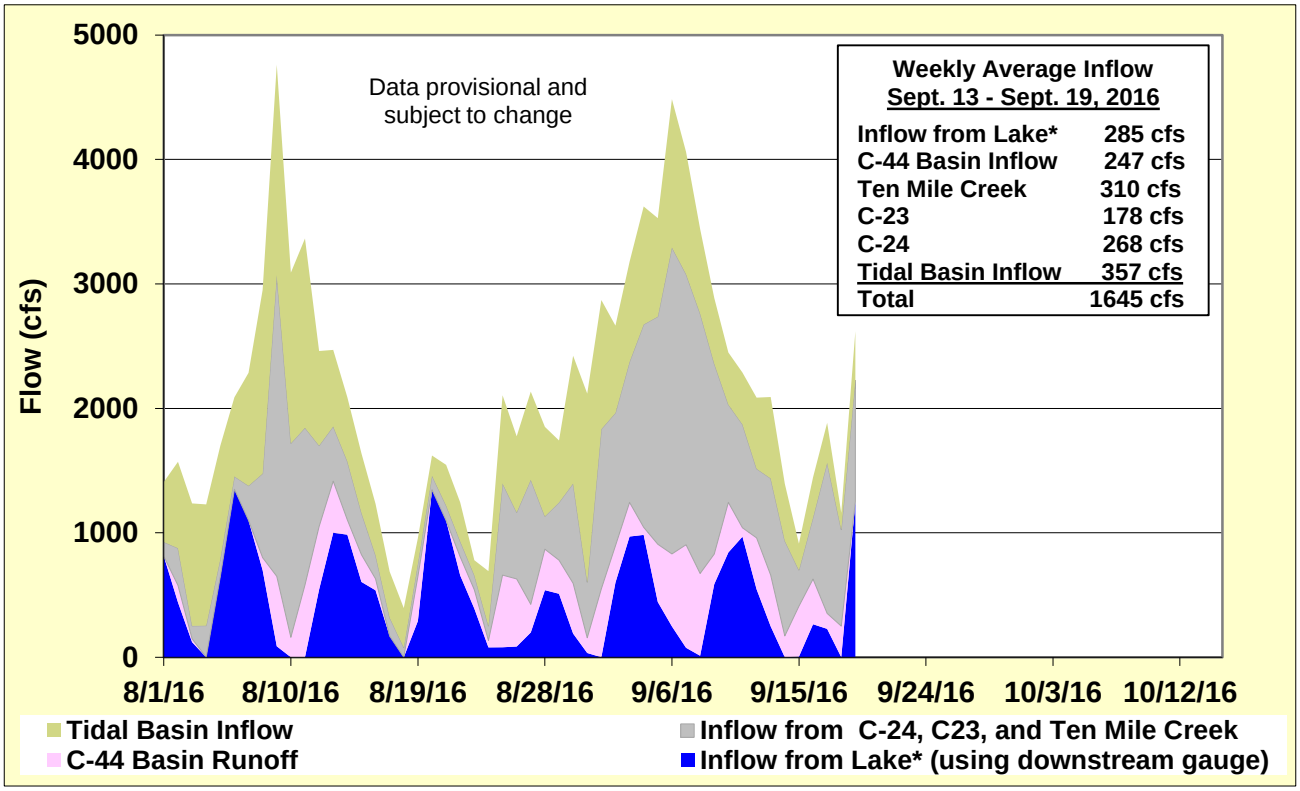


Figure 2. Estimated surface freshwater inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basins into the St. Lucie Estuary.

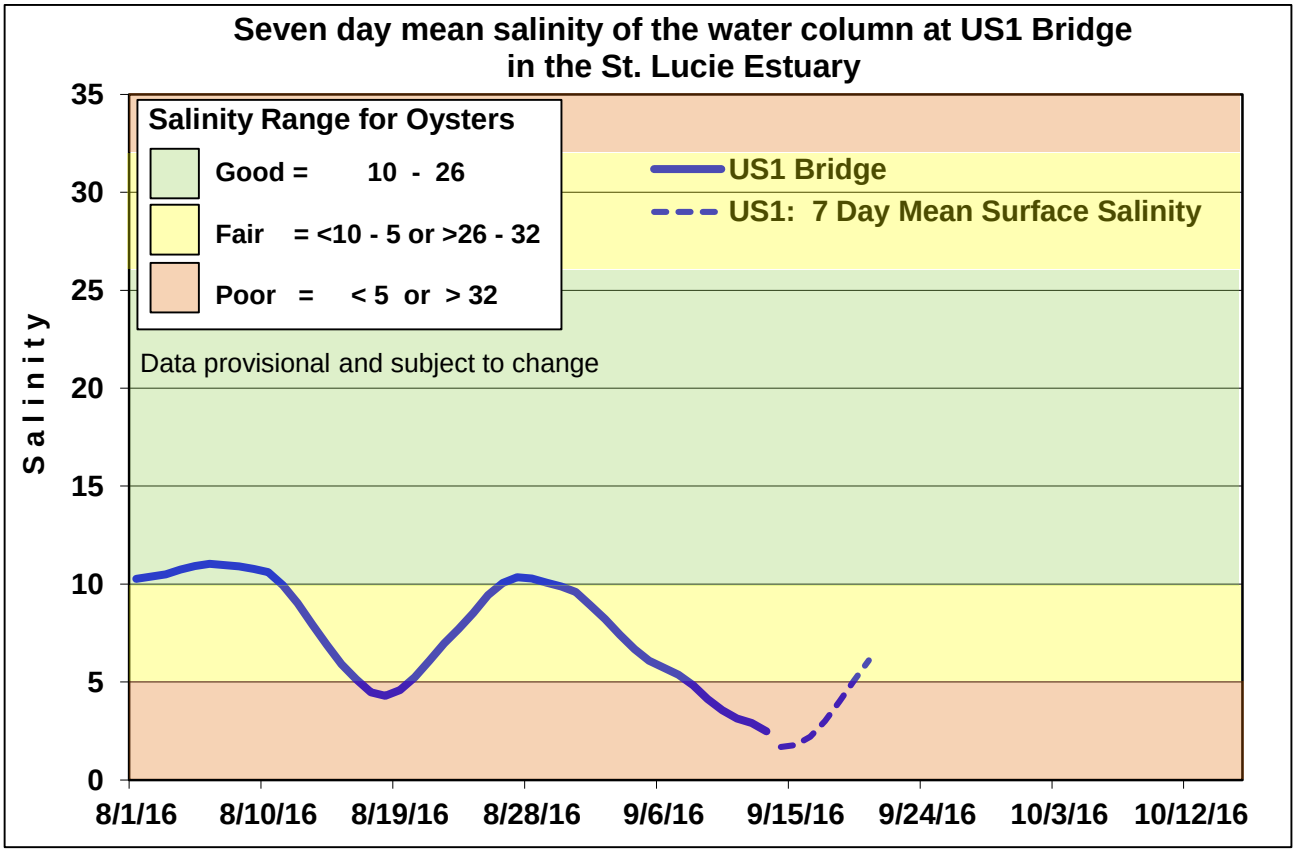


Figure 3. Seven-day mean salinity of the water column at the U.S. Highway 1 Bridge.

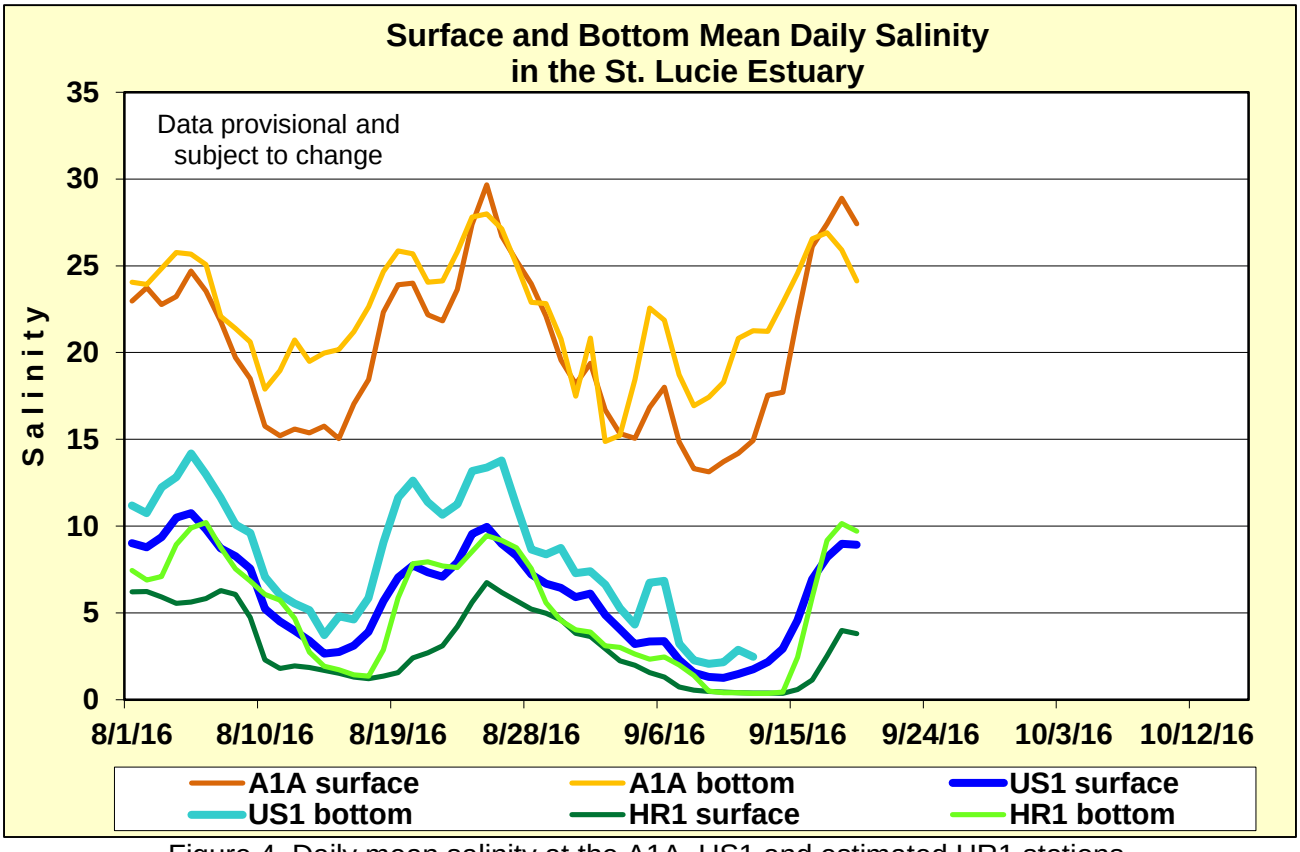


Figure 4. Daily mean salinity at the A1A, US1 and estimated HR1 stations.

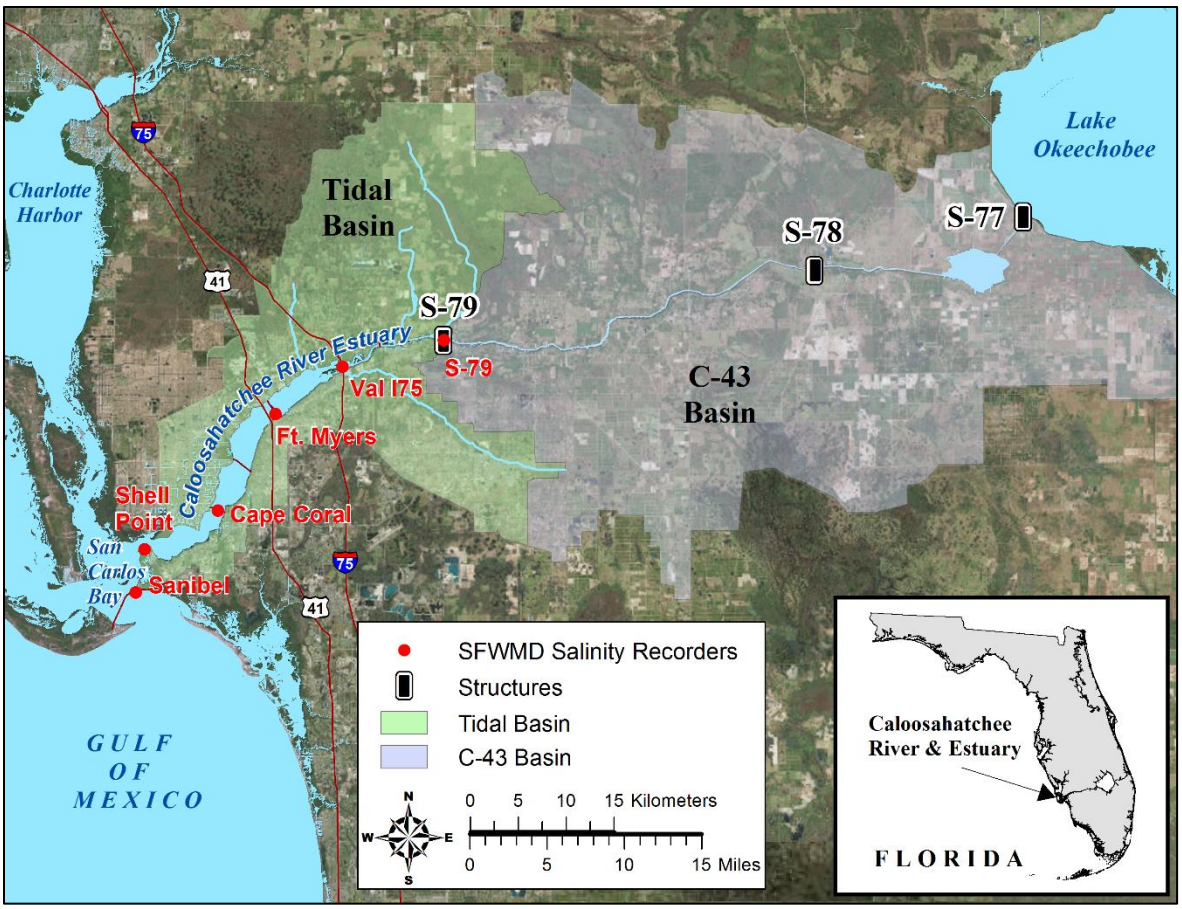


Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

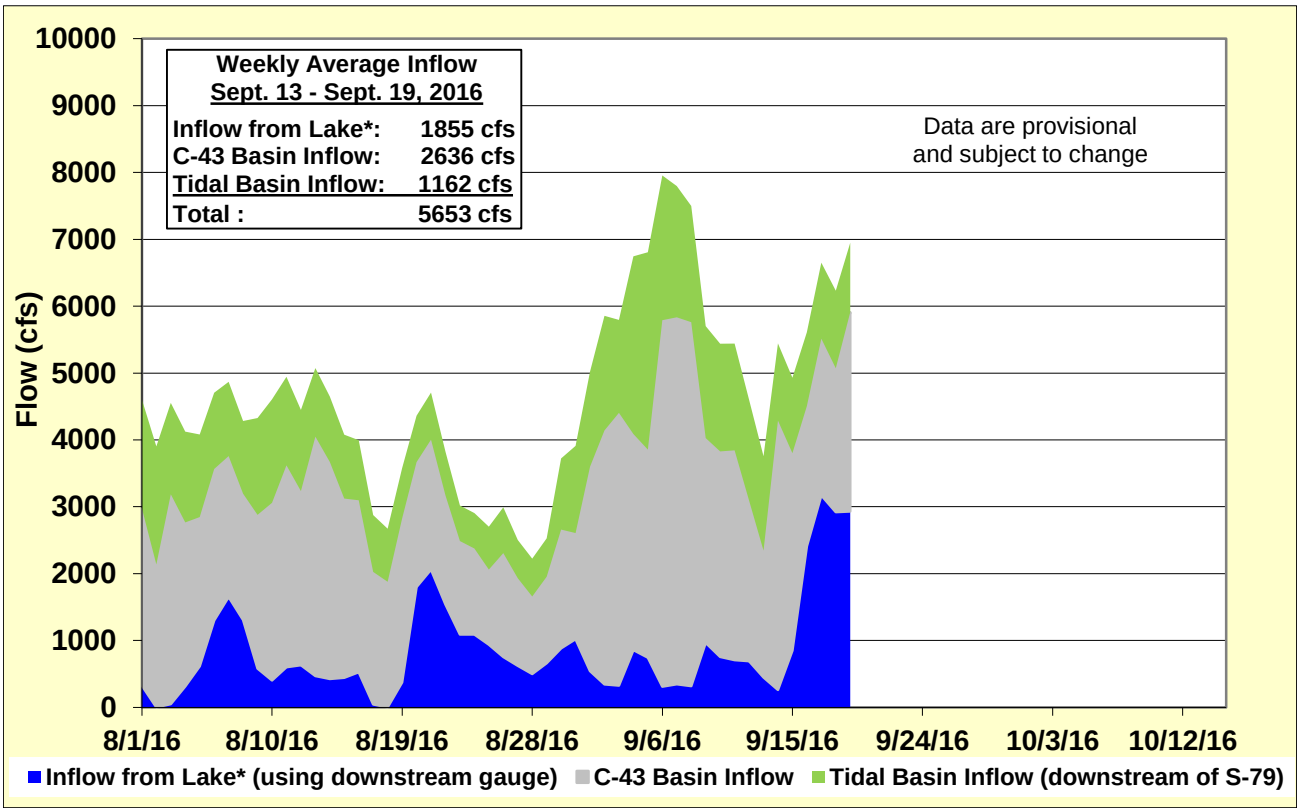


Figure 6. Freshwater inflows from Lake Okeechobee, runoff from the C-43 basin, and tributaries in the tidal basin into the Caloosahatchee River Estuary.

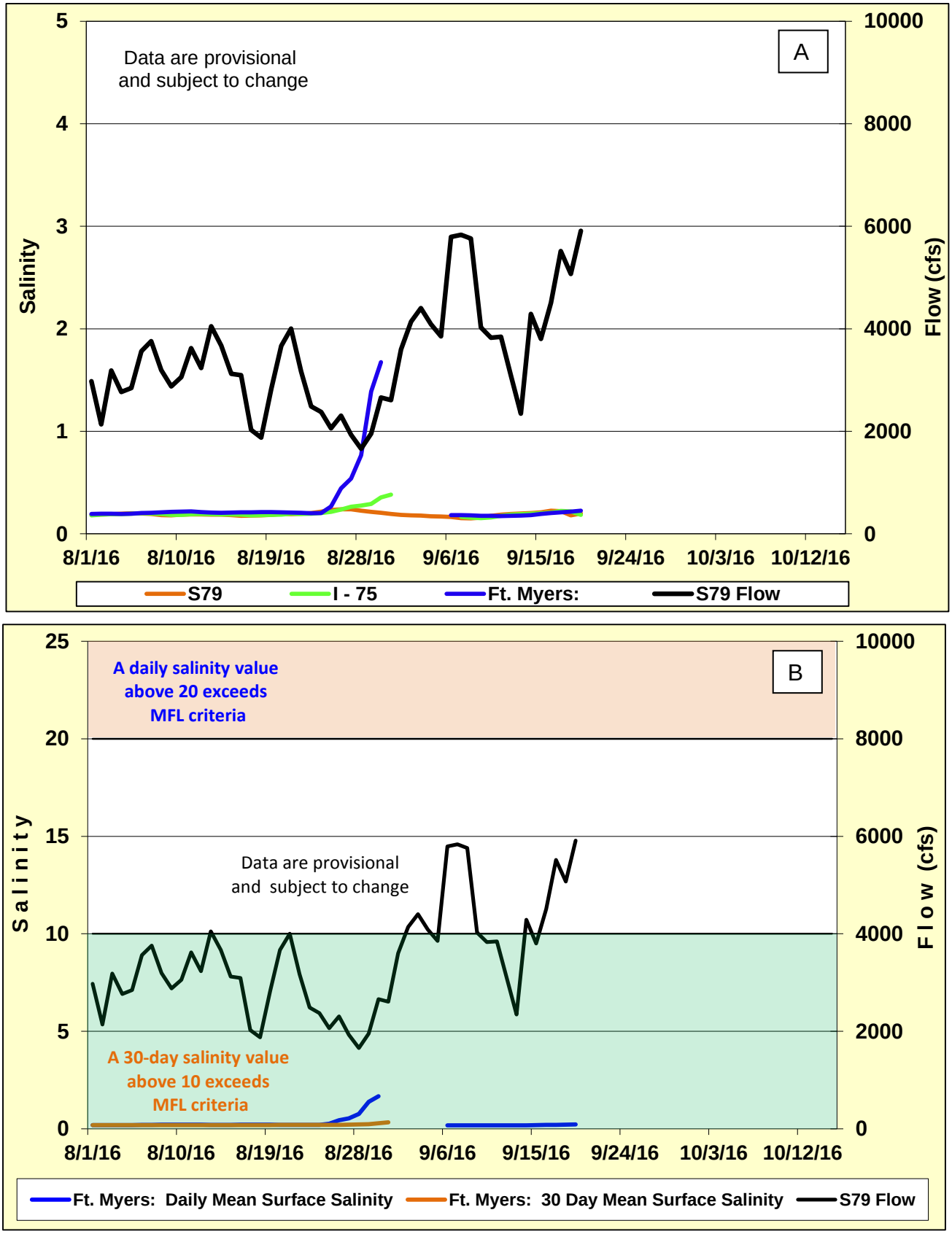


Figure 7. Daily mean flows at S-79 and salinity at upper estuary monitoring stations (A) and 30-day moving average salinity at Ft. Myers (B).

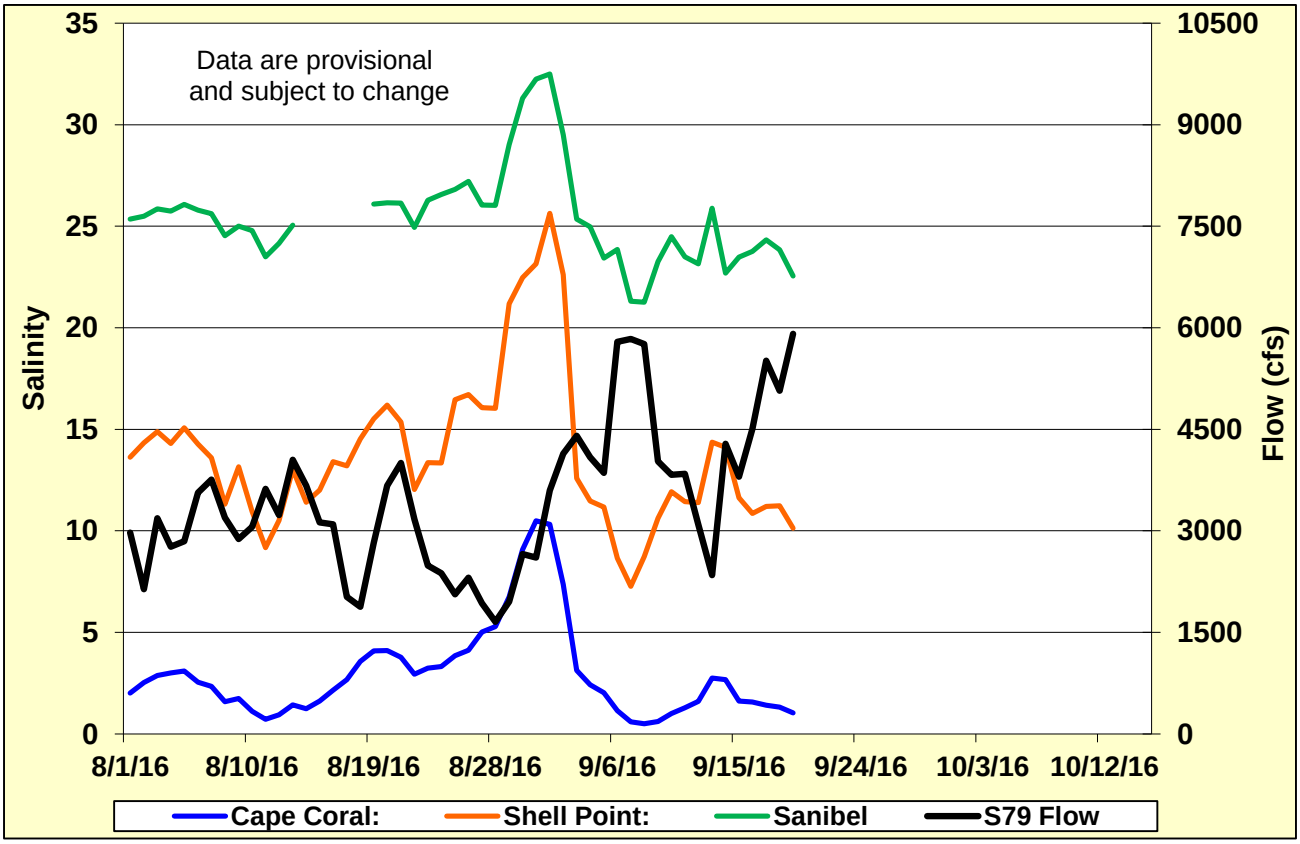


Figure 8. Daily mean flows at S-79 and salinity at lower estuary stations.

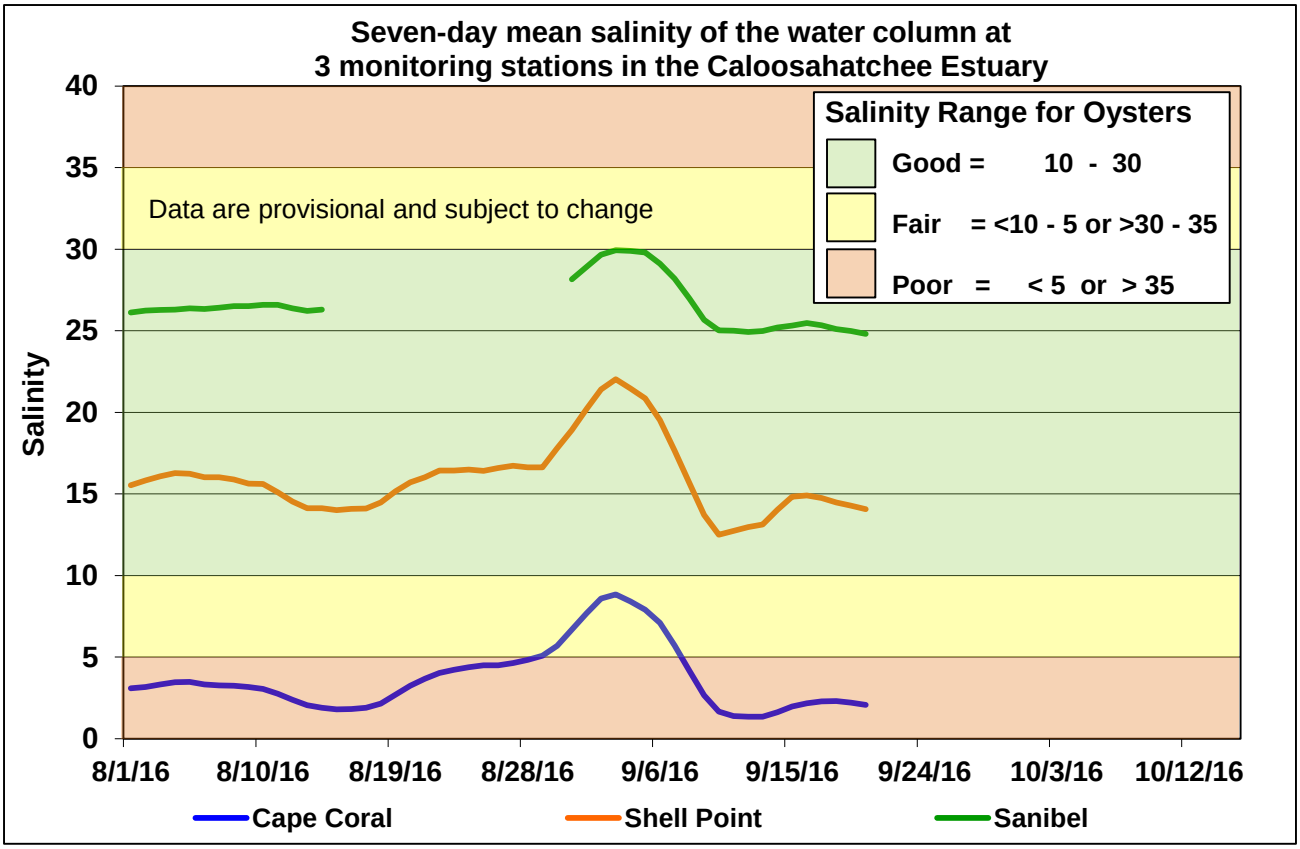
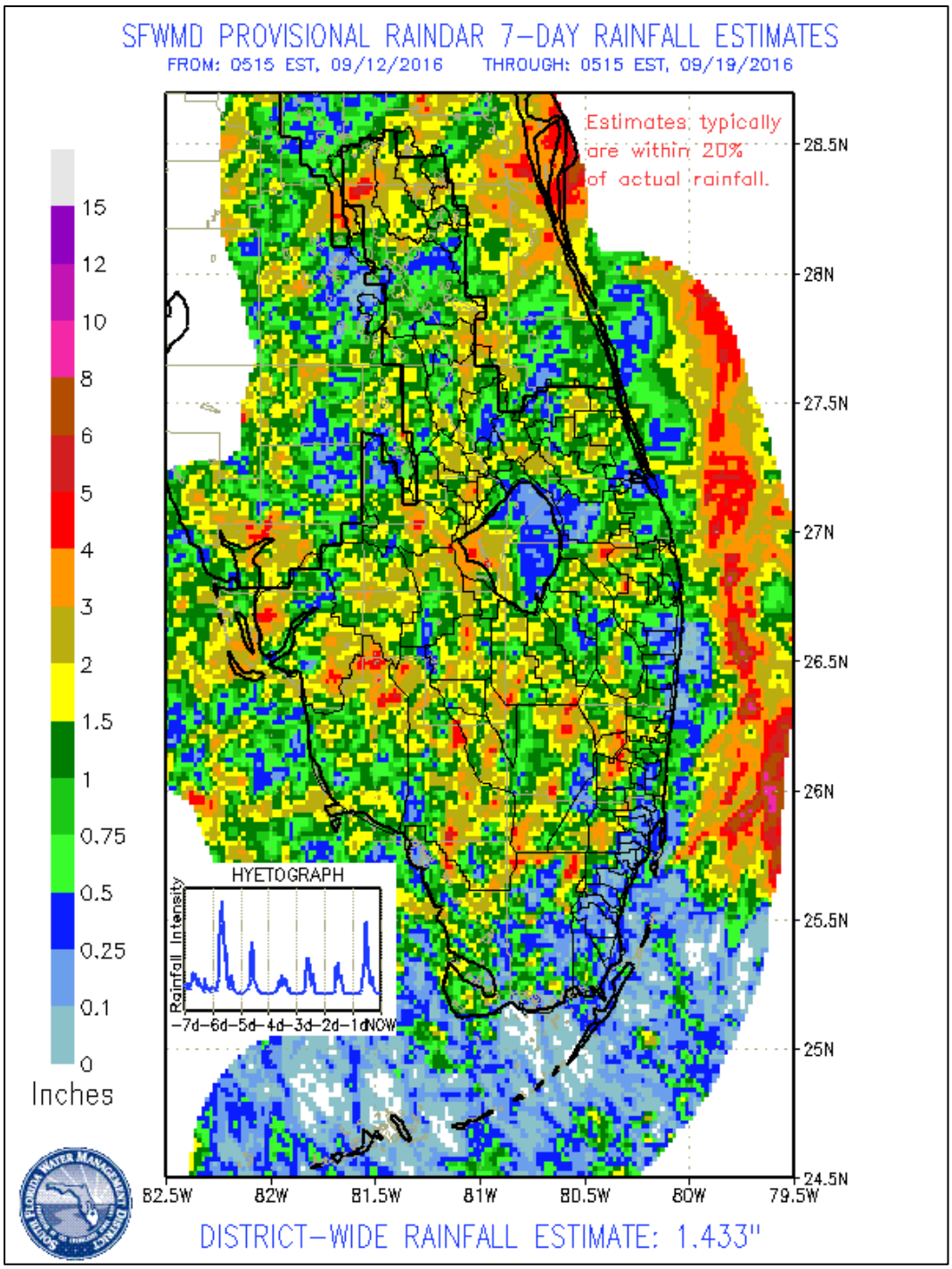


Figure 9. Seven-day mean salinity at Cape Coral Bridge, Shell Point and Sanibel Bridge monitoring stations.

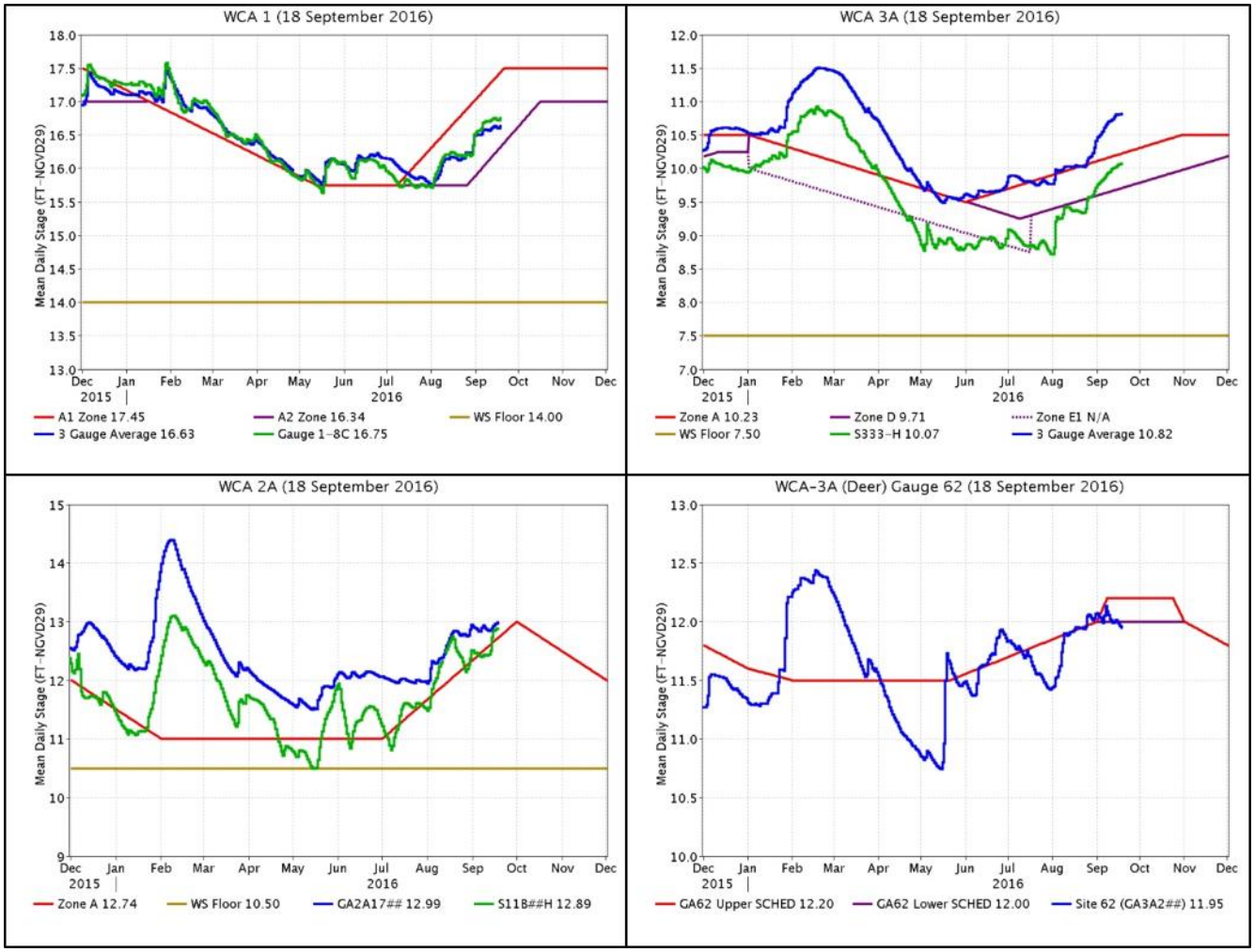
GREATER EVERGLADES

Rainfall in the region was similar to last week but the WCAs and northern ENP received most of the rain. The largest weekly rainfall amount recorded in western and central Florida Bay was 0.26 inches. This week's pan evaporation of 1.54 inches is higher than the pre-project average of 1.27 inches.

Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	1.33	0.07
WCA-2A	1.76	0.17
WCA-2B	2.78	0.06
WCA-3A	1.75	0.05
WCA-3B	1.07	0.02
ENP	1.06	0.10

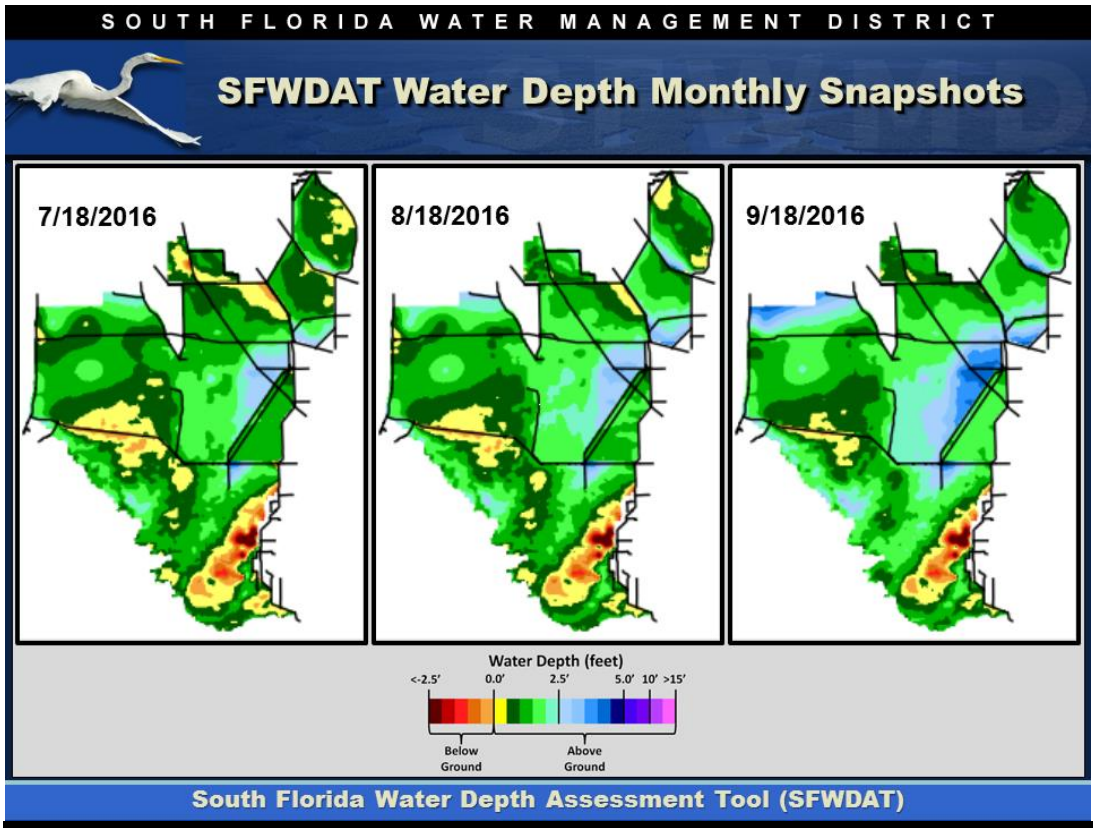


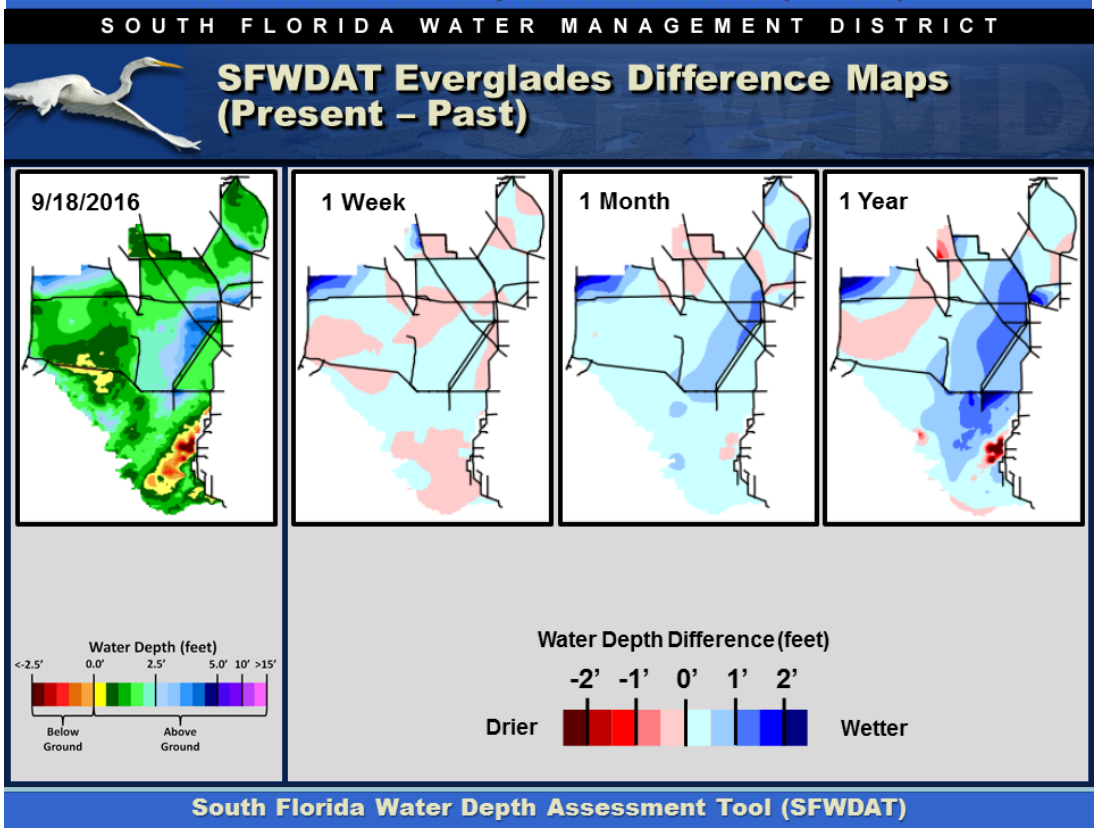
Regulation Schedules: Stages remain above regulation for two of the four areas. The WCA-1 three-gauge average is −0.82 feet below zone A1 and 0.29 feet above zone A2, and the northwestern WCA-3A gauge stage (gauge 62) is −0.05 feet below the lower schedule. The other two areas remain above schedule: WCA-2A stage is 0.25 feet above regulation and the WCA-3A three-gauge average stage is 0.59 feet above regulation.



Water Depths and Changes: Water levels remain higher than those in August and July. Water depths at monitored gauges other than in WCA-2B range from 1.35 feet to 2.88 feet.

Stage changes were mixed again last week. Individual gauge changes ranged from -0.05 feet (WCA-3B) to 0.17 feet (WCA-3A and -2A). Stages are higher than a month ago and a year ago in most areas.

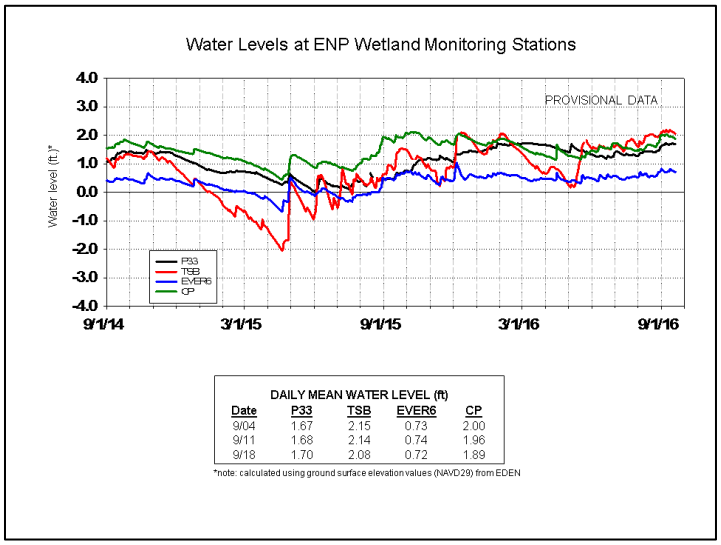




Everglades National Park (ENP) and Florida Bay: Water levels decreased this past week in Taylor Slough and the C-111 panhandle area with the largest change being a decrease of -0.06 feet in northern Taylor Slough. All areas are still higher than a month ago and are average to five inches above average with northern Taylor Slough being the furthest from average.

Salinities in Florida Bay mostly increased over the past week due to the low rainfall and are −1 psu below to five psu above average. Daily average salinities now range from 15 to 39 psu with the highest salinity still in central Florida Bay.

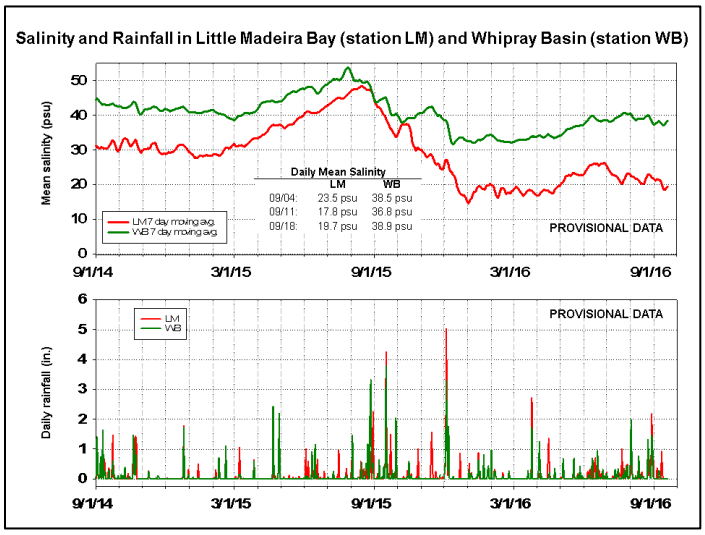
The MFL sentinel site TR in the mangrove zone remains near fresh at 0.3 psu, and the 30-day moving average salinity at TR is also at a seasonal 0.4 psu.

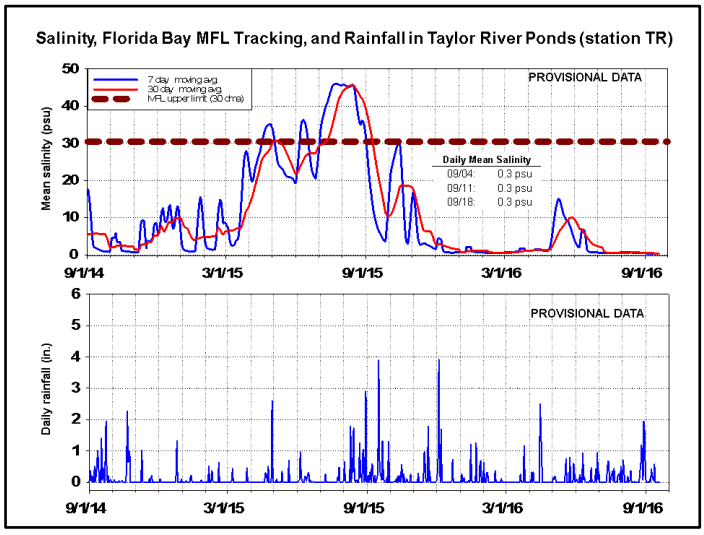


DAILY MEAN WATER LEVEL (ft)

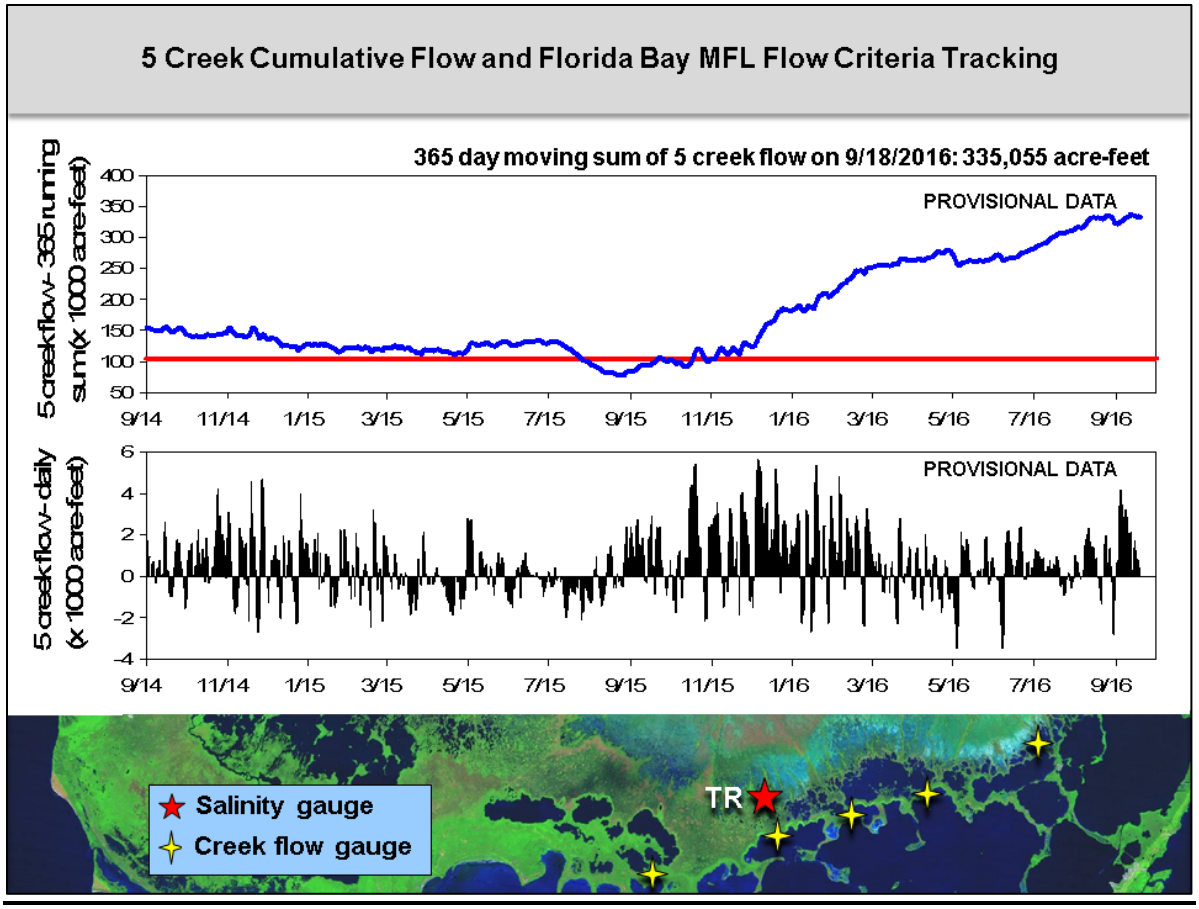
Date	P33	TSB	EVER6	CP
9/04	1.67	2.15	0.73	2.00
9/11	1.68	2.14	0.74	1.96
9/18	1.70	2.08	0.72	1.89

*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 decreased 453 acre-feet to 335,055 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. Closures initiated by FWC in the WCAs are still in effect due to highwater levels.

- The depth at gauge 65 (southern WCA-3A) has risen this week to 2.88 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. 20, 2016 (red is new)

Area	Current Condition	Cause(s)	Recommendation	Reasons
WCA-1	Stages rose 0.05' to 0.09'	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 rose 0.17'	Rainfall, ET, management	Maintain ascension rates <0.25 ft/week. FWC has initiated closures to protect wildlife due to high 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 rose 0.05' to 0.06'	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 −0.02'	Rainfall, ET, management	Reduce stages in northern WCA-3A. FWC has initiated closures to protect wildlife due to high 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 −0.05'	Rainfall, ET, management		
Central WCA-3A S	Stage rose 0.09'	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 initiated closures to protect wildlife due to high 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 rose 0.17'	Rainfall, ET, management		
WCA-3B	Stages changed −0.05' to 0.06'	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 0.10'	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	Average to 5 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 -1 psu to 5 psu above average	Rain, ET, inflows, wind	Move water southward as needed	Maintain lower salinity levels.