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: December 8, 2015

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Kissimmee

On Sunday, stages in East Lake Toho were ~0.5 below schedule and Toho was ~0.6 feet below schedule; Kissimmee-Cypress-Hatchineha (KCH) was 2.1 feet below schedule. With stage in KCH below 50.5 feet, S65 has been reduced to minimum discharge to the Kissimmee River (~300 cfs +/- 50 cfs). If KCH stage rises above 50.5 feet, discharge will be managed according the dry season standing recommendation subject to adaptive modifications (see recommendations). Over the past week, discharge at S65 averaged 272 cfs and at S65A 300 cfs; discharge at S65E averaged 917 cfs over the past week. Monday afternoon discharges: S65 ~170 cfs; S65A ~300 cfs; S65C ~805 cfs; S65E ~1115cfs. Dissolved oxygen in the Kissimmee River averaged 6.56 mg/L over the past week and 6.64 mg/L on Sunday. Kissimmee River mean floodplain depth is currently 0.61 feet.

Lake Okeechobee

A reversal resulting in a Lake stage increase of 0.2 plus feet occurred over the past week. Lake stage is at 14.72 feet NGVD, and is in the Low Flow Sub-band. Ecological conditions continue to be good. MODIS satellite imagery indicated a few small areas in the north and west nearshore zone with potential elevated chlorophyll values.

Estuaries

Over past week, total freshwater inflow averaged 2713 cfs to the St. Lucie with no releases from Lake Okeechobee and 3187 cfs to the Caloosahatchee with 112 cfs Lake releases. In the St. Lucie Estuary, salinity decreased further but remained in the good range for adult oysters in the mid-estuary. In the Caloosahatchee Estuary, salinities also decreased and were in the good range for adult oysters at Cape Coral, Shell Point, and Sanibel. Salinities were also in the good range for tape grass in the upper Caloosahatchee Estuary. Releases under LORS guidance will help reduce the risk of detrimental high inflows under the influence of current strong El Nino.

Everglades

Heavy rainfall led to rapid water level increases in the Everglades. Water levels are higher than a month ago, two months ago, and a year ago. The 30-day salinity at the Florida Bay Minimum Flows and Levels (MFL) site has decreased to 2.9 psu and the cumulative inflow from the five creeks into Florida Bay has increased to 137,500 acre-feet (53 percent of the average annual inflow of 257,800 acre-feet). Salinity in Florida Bay has decreased because of the rainfall, but much more rainfall and inflow are required to approach seasonally normal conditions in Florida Bay and Everglades National Park (ENP).

Weather Conditions and Forecast

Showers and thunderstorms southeast today. An old frontal boundary that had been across the southern end of the District has now moved into the Florida Straits. An energy impulse moving across the eastern Gulf of Mexico will move across the District this evening and generate scattered showers and thunderstorms mainly southeast during the day today. Daytime heating will help develop some scattered afternoon showers and thunderstorms south Wednesday. High pressure will then build over the area Wednesday night and Thursday as the upper level trough, which has been over the area, shifts east of the District. Some widely scattered showers will linger over the area Thursday before drier conditions spread over the District Thursday night and into the weekend.

KISSIMMEE BASIN

Kissimmee Basin Rainfall

The Upper Kissimmee Basin received 0.78 inches of rainfall in the past week and the Lower Basin received 2.10 inches (SFWMD Daily Rainfall Report 12/7/2015).

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: 12/8/2015

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)						
							12/6/15	11/29/15	11/22/15	11/15/15	11/8/15	11/1/15	10/25/15
Lakes Hart and Mary Jane	S62	62	LKMJ	60.5	R	61.0	**-0.5**	-0.4	-0.4	-0.6	-0.5	-0.6	-0.5
Lakes Myrtle, Preston, and Joel	S57	9	S57	61.5	R	61.9	**-0.4**	-0.5	-0.5	-0.5	-0.4	-0.5	-0.2
Alligator Chain	S60	0	ALLI	63.2	R	64.0	**-0.8**	-0.8	-0.8	-0.9	-0.8	-0.8	-0.7
Lake Gentry	S63	15	LKGT	61.3	R	61.5	**-0.2**	-0.2	-0.2	-0.3	-0.2	-0.3	-0.2
East Lake Toho	S59	0	TOHOE	57.5	R	58.0	**-0.5**	-0.6	-0.7	-0.9	-0.9	-0.9	-0.7
Lake Toho	S61	143	TOHOW	54.4	R	55.0	**-0.6**	-0.6	-0.4	-0.6	-0.6	-0.7	-0.6
Lakes Kissimmee, Cypress, and Hatchineha	S65	272	LKISSP, KUB011, LKIS5B	50.4	R	52.5	**-2.1**	-2.3	-2.4	-2.5	-2.4	-2.2	-1.7

* 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 11. Kissimmee River floodplain stages at selected stations are shown in Figure 12.

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: **12/8/2015**

Metric	Location	Sunday's 1-day average	Weekly Average**									
			12/6/15	11/29/15	11/22/15	11/15/15	11/8/15	11/1/15	10/25/15	10/18/15	10/11/15	10/4/15
Discharge (cfs)	S-65	107	**272**	267	402	443	828	1317	1593	1540	1370	1534
Discharge (cfs)	S-65A	302	**296**	272	290	325	656	1133	1419	1457	1483	1694
Discharge (cfs)	S-65C	864	**674**	749	687	840	1211	1713	1758	2151	2579	3300
Headwater stage (feet NGVD)		33.7	**33.5**	33.9	34.3	34.9	35.4	35.4	35.5	35.4	35.3	35.3
Discharge (cfs)	S-65D****	1007	**834**	1016	860	957	1316	1978	1790	2291	2882	3891
Discharge (cfs)	S-65E	1112	**917**	1026	806	769	1170	1771	1677	2203	2787	3853
DO concentration (mg/L)***	Phase I river channel	6.64	**6.56**	6.51	5.22	3.99	4.32	4.25	4.18	2.50	1.65	0.93
Mean depth (feet)*	Phase I floodplain	**0.61**	N/A	0.52	0.69	0.59	0.90	1.05	1.17	1.25	1.44	1.64

* 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

***** 1-day spatial average from field measurements in Pools A and BC

N/A Not applicable or data not available.

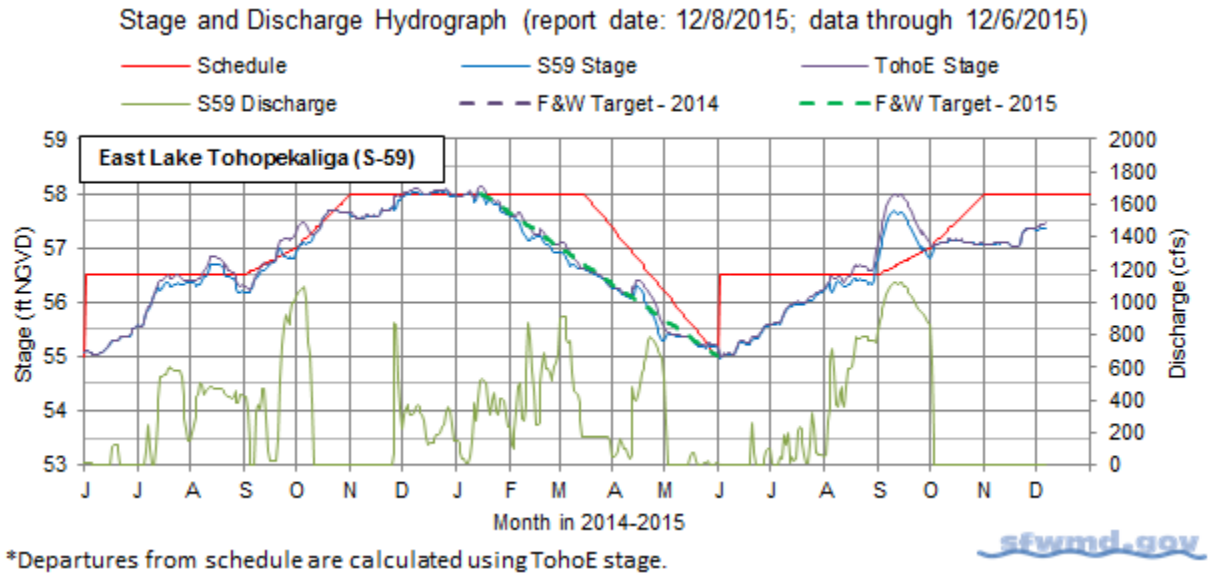
DATA ARE PROVISIONAL

Water Management Recommendations

Kissimmee Basin Recommendations and Operational Actions

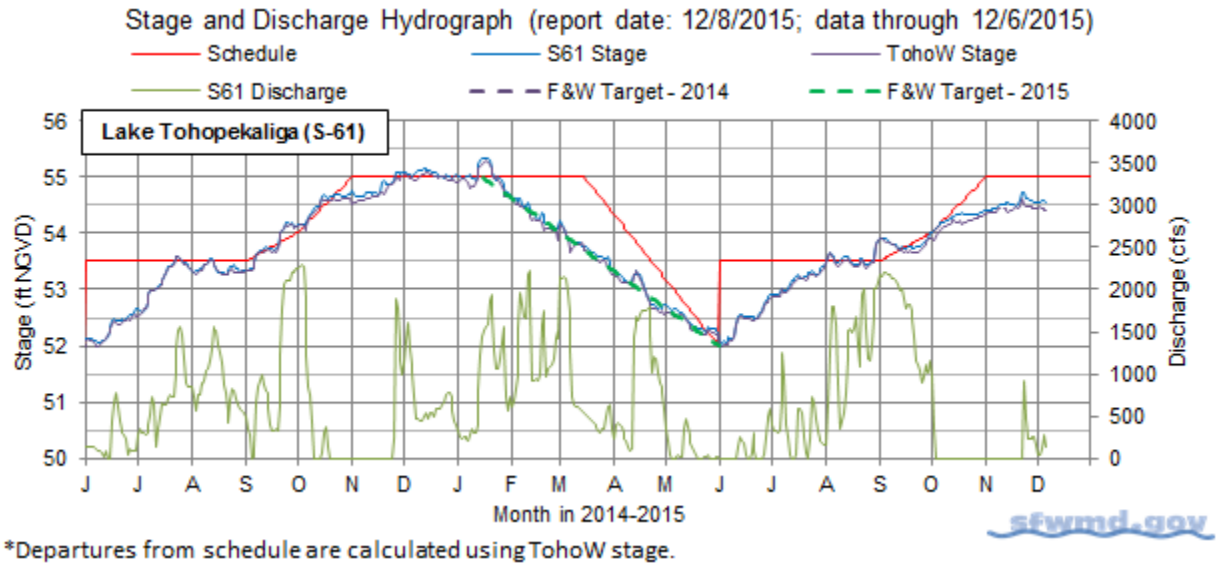
Date	Recommendation	Purpose	Outcome	Source
12/2/2015	Temporary modification of draft Dry Season SR for rainfall forecast the week of Nov. 30. If stage in KCH increases to 50.5 ft, begin increasing S65 discharge to 1400 cfs at a rate of up to 150 cfs per 2 days rather than every day – this is half the discharge increase rate in Table 1 of the draft 2015-2016 Dry Season SR.	The slower discharge increase rate is a temporary change that is intended to allow time to assess whether or not we have entered a wetter period that would allow 1400 cfs to be sustained.	TBD	KB Ops
12/1/2015	No new recommendations.			
11/24/2015	No new recommendations.			
11/17/2015	No new recommendations.			
11/10/2015	No new recommendations.			
11/3/2015	No new recommendations.			
10/27/2015	No new recommendations.			
10/20/2015	No new recommendations.			
10/13/2015	No new recommendations.			
10/6/2015	No new recommendations.			
9/28/2015	No new recommendations.			
9/22/2015	No new recommendations.			
9/15/2015	No new recommendations.			
9/8/2015	No new recommendations.			
9/1/2015	No new recommendations.			
8/25/2015	No new recommendations.			
8/18/2015	No new recommendations.			
8/11/2015	No new recommendations.			
8/4/2015	No new recommendations.			
7/28/2015	No new recommendations.			
7/14/2015	No new recommendations.			
6/30/2015	No new recommendations.			
6/23/2015	No new recommendations.			
6/16/2015	No new recommendations.			
6/9/2015	No new recommendations.			
6/1/2015	For S65/65A maintain 300 cfs as long as stage is above 48.5 ft. When stage approaches 50.5 ft begin transitioning to 1400 cfs using the rampup/rampdown guidelines in standing recommendation.	Allow KCH lake stage to rise	Implemented	KB Operations
5/29/2015	2015 KB Wet Season Standing Recommendations provided to Operations Control	Comprehensive wet season guidance	Implemented	KB Operations
5/26/2015	No new recommendations.			
5/19/2015	No new recommendations.			
5/12/2015	No new recommendations.			
5/5/2015	No new recommendations.			
4/7/2015	No new recommendations.			
3/31/2015	No new recommendations.			
3/24/2015	No new recommendations.			
3/17/2015	No new recommendations.			
3/9/2015	No new recommendations.			
3/4/2015	No new recommendations.			
2/23/2015	No new recommendations.			
2/17/2015	No new recommendations.			
2/10/2015	No new recommendations.			
2/3/2015	No new recommendations.			
1/27/2015	Starting today, follow a new SK recession line for KCH, which will be drawn from today's stage to regulation stage on March 1.	Snail kite recession in KCH	Implemented	

KCOL Hydrographs (through Sunday midnight)



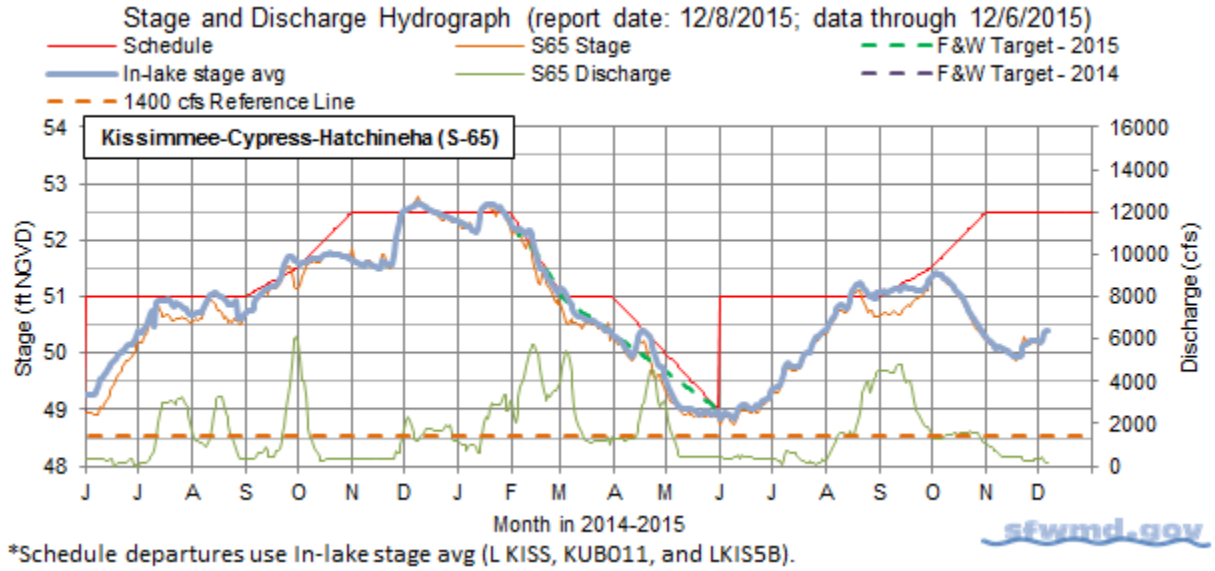
*Departures from schedule are calculated using TohoE stage.

Figure 1.



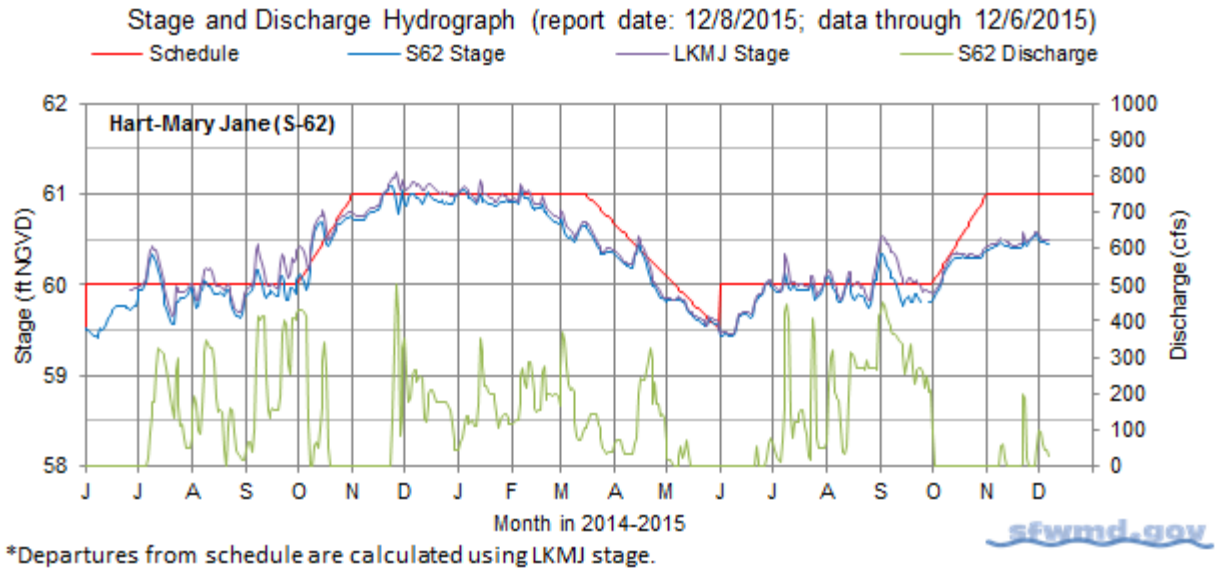
*Departures from schedule are calculated using TohoW stage.

Figure 2.



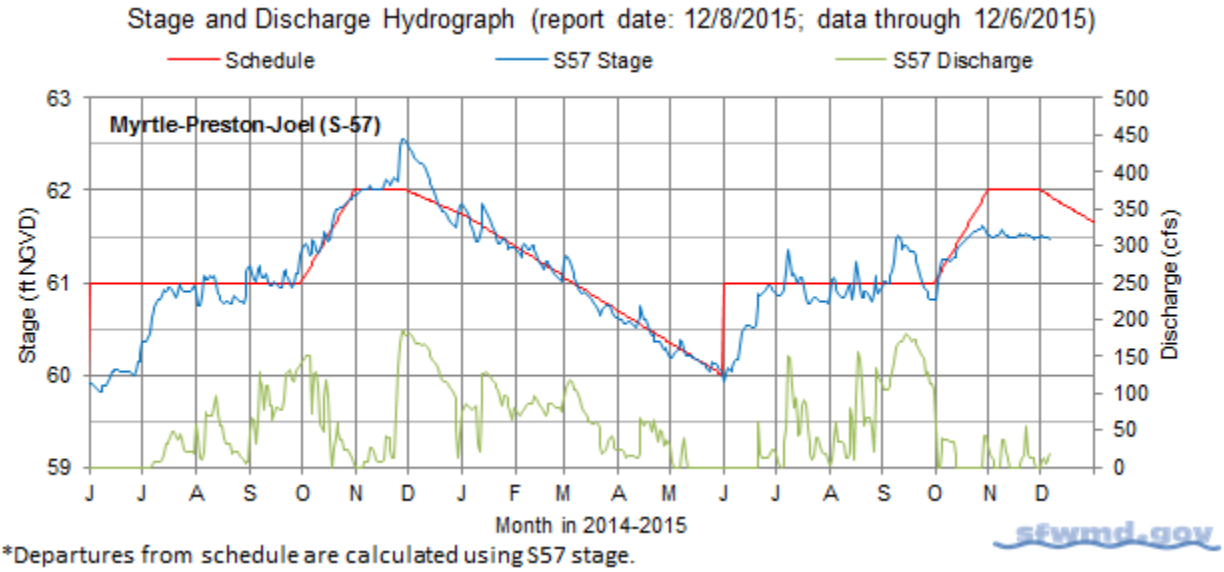
*Schedule departures use In-lake stage avg (L KISS, KUB011, and LKIS5B).

Figure 3.



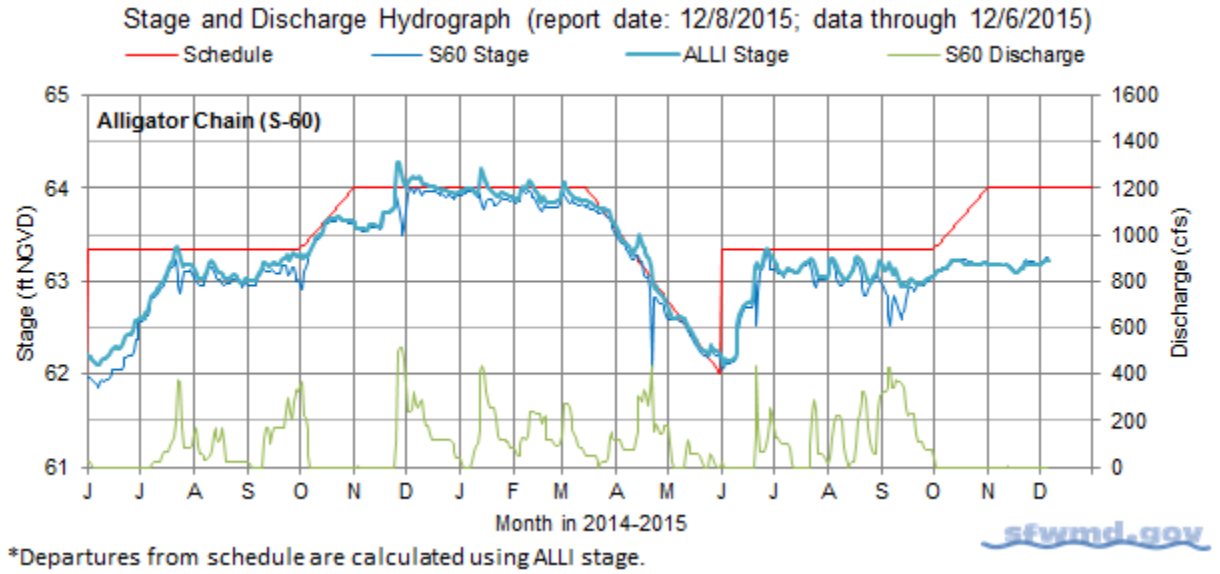
*Departures from schedule are calculated using LKMJ stage.

Figure 4.



*Departures from schedule are calculated using S57 stage.

Figure 5.



*Departures from schedule are calculated using ALLI stage.

Figure 6.

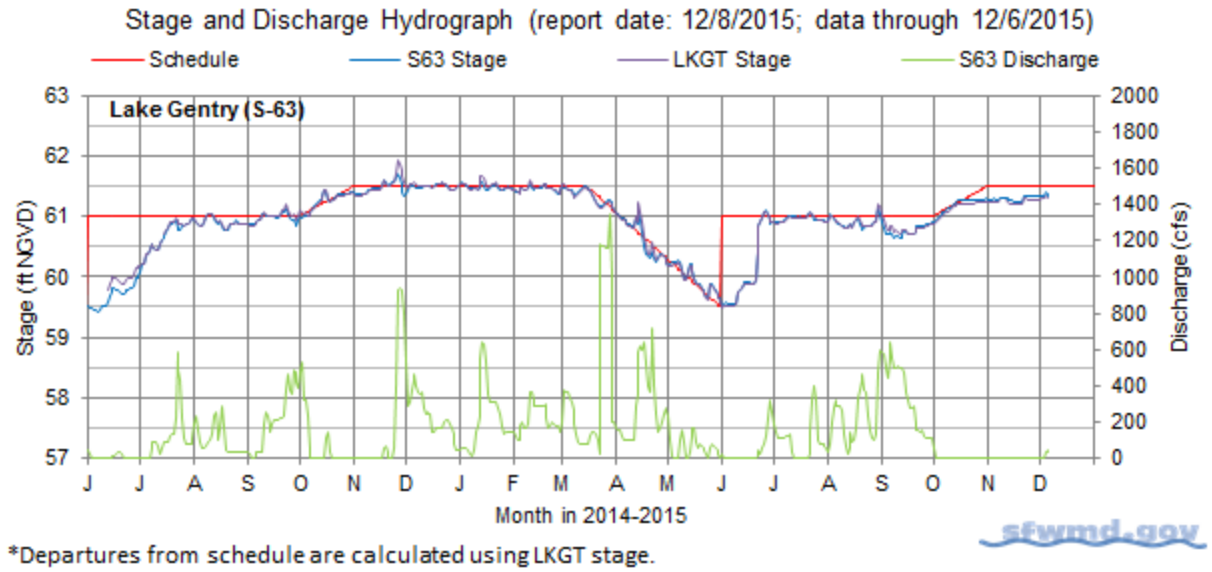


Figure 7.

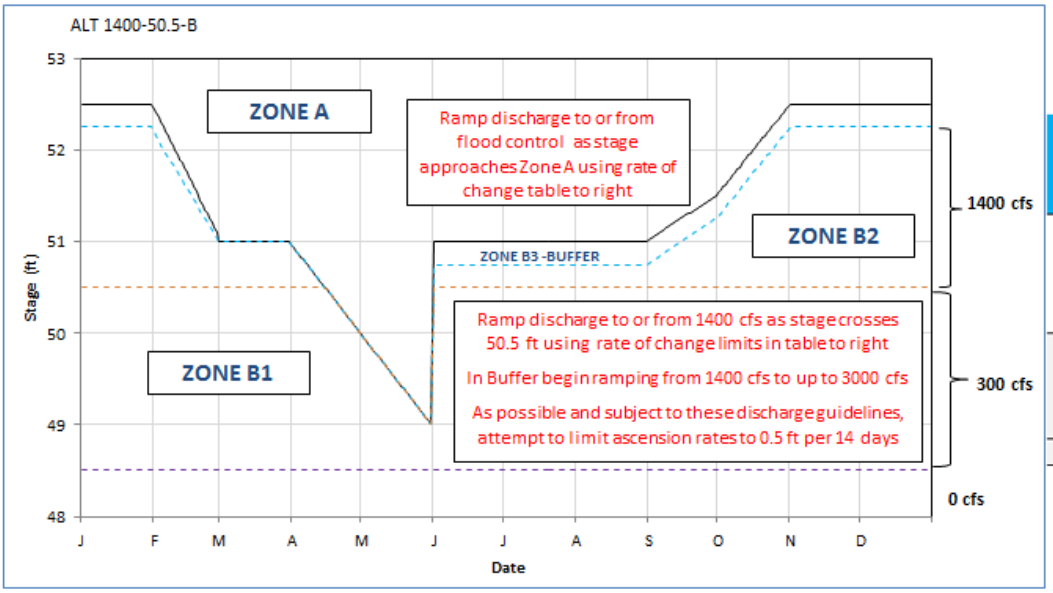


Table 1. Discharge Rate of Change Limits for S65/S65A
****Rate limits apply only in Zone B****

	Q (cfs)	Maximum rate of increase (cfs/day)	Maximum rate of decrease (cfs/day)
Zone B	0-300	50	-50
	300-1400	150	-75
	1400-2500	300	-300
	2500-3000	1000	-1000
Zone A	No limits		

Figure 8a. S65 discharge plan for Wet Season 2015 and November 2015 – January 2016. F&W recession line to begin February 1 2016 (recession rate to be determined).

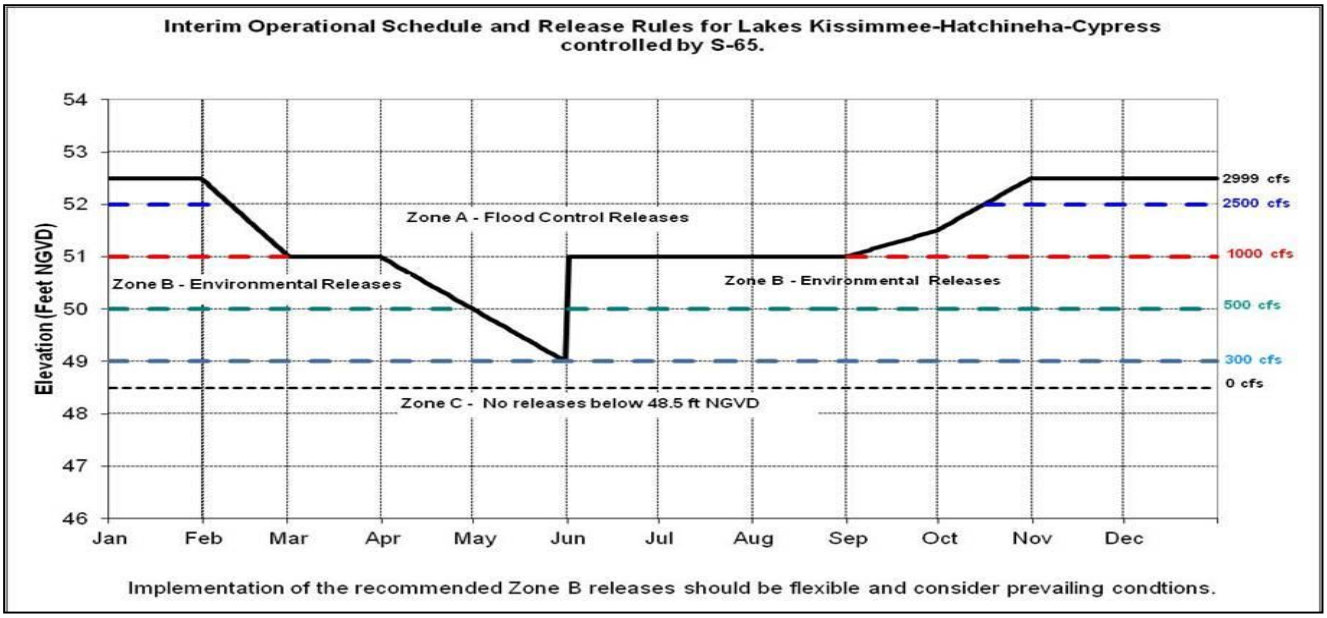


Figure 8b. Interim operations schedule for S-65. The discharge schedule shown to the right has not been used in recent years or in Wet Season 2015.

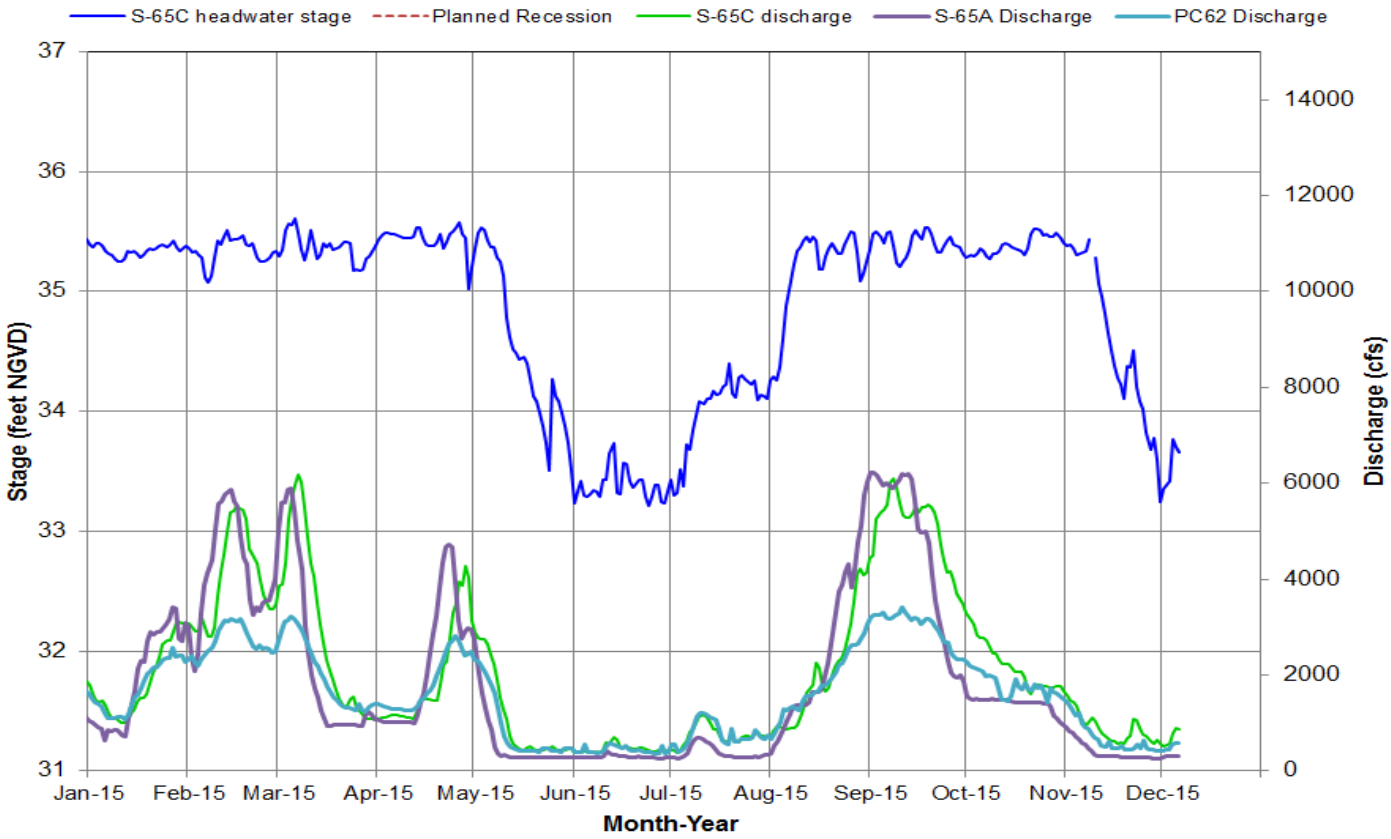


Figure 9. S-65C headwater stage in relation to discharge at S-65C, S-65A, and PC62.

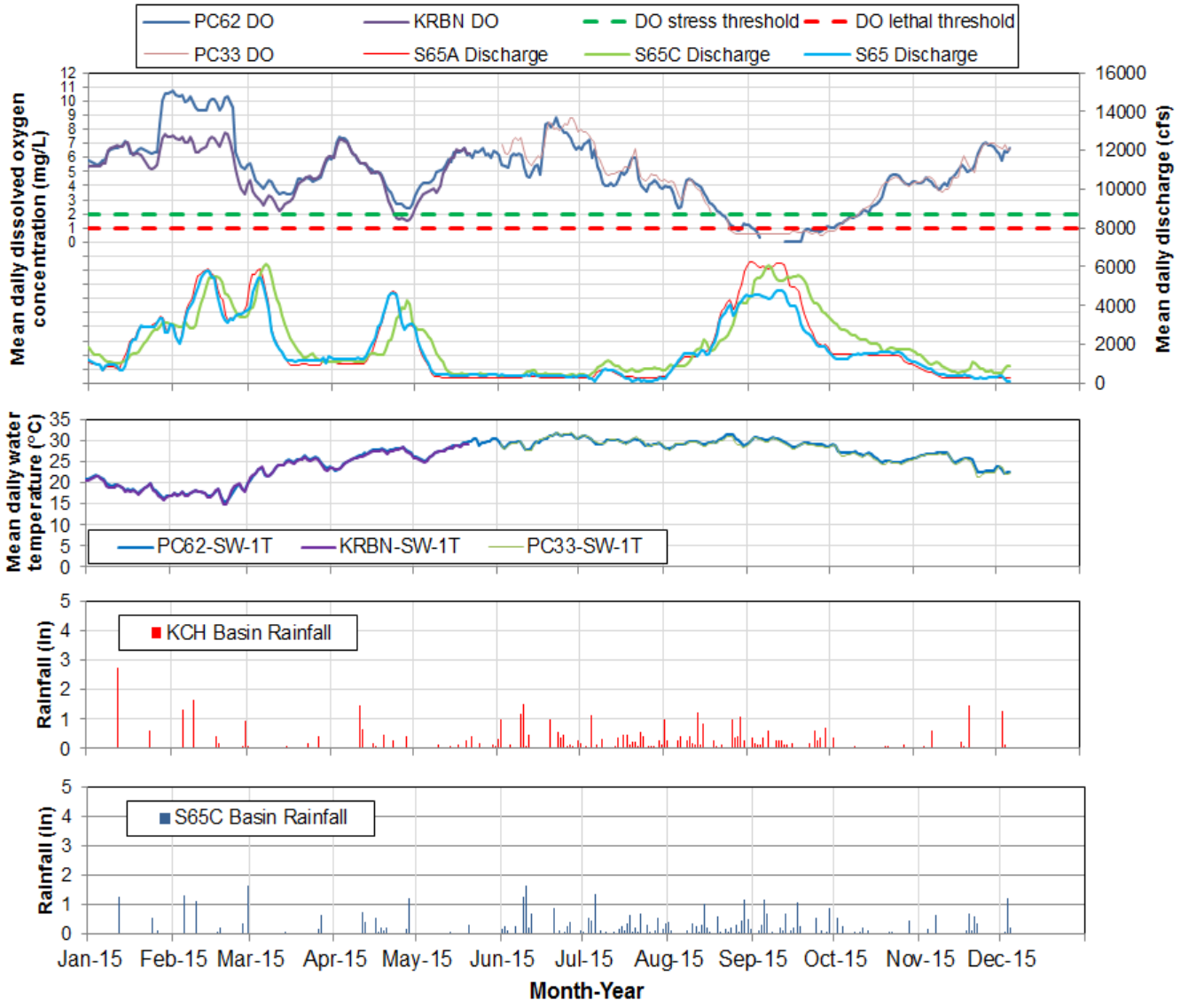
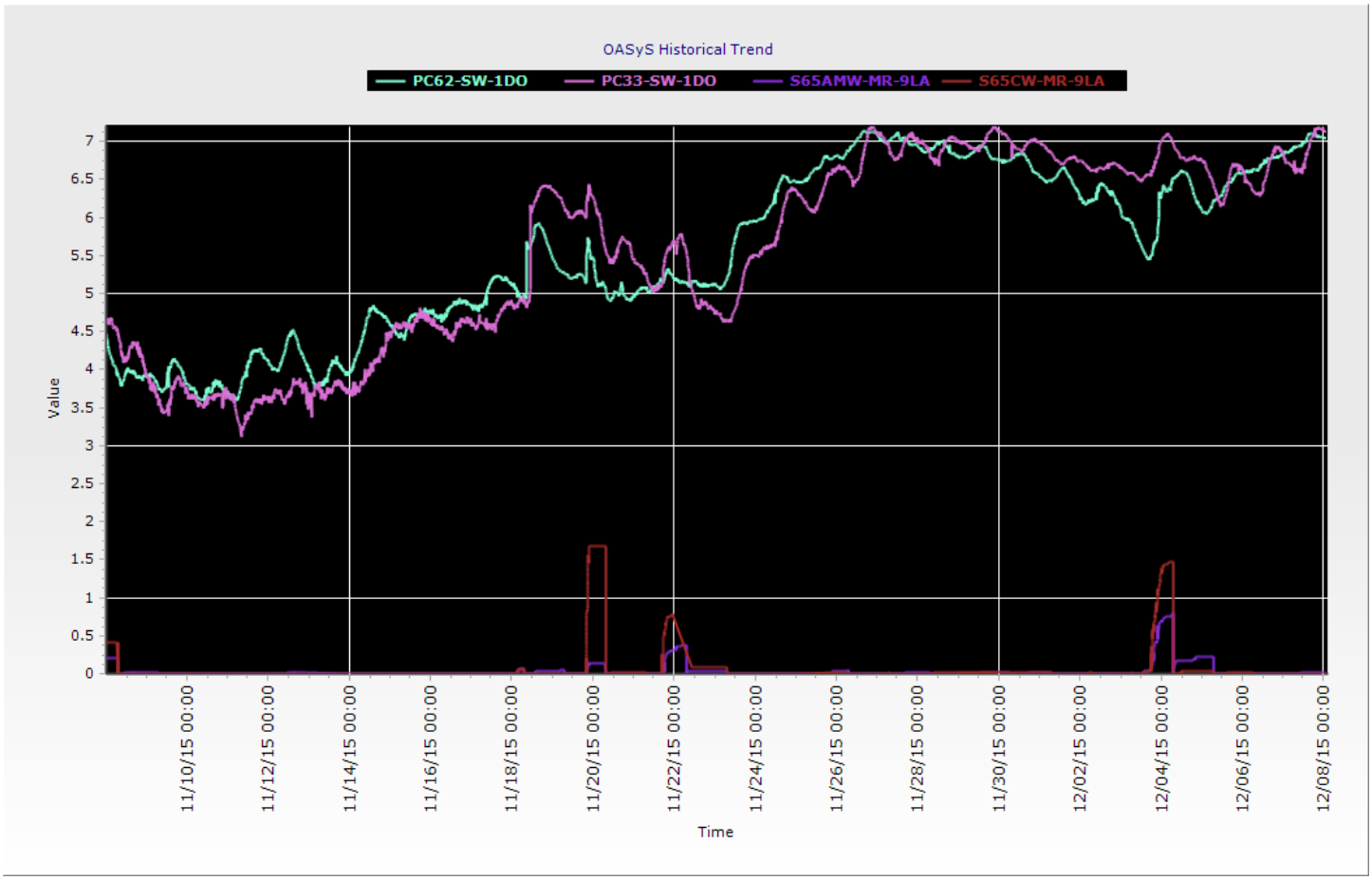


Figure 10. Mean daily Dissolved Oxygen, discharge, temperature and rainfall in the Phase I river channel.



Insert A. Phase I river channel Dissolved Oxygen (measured at 15 minute intervals) and rainfall at S65A and S65C.

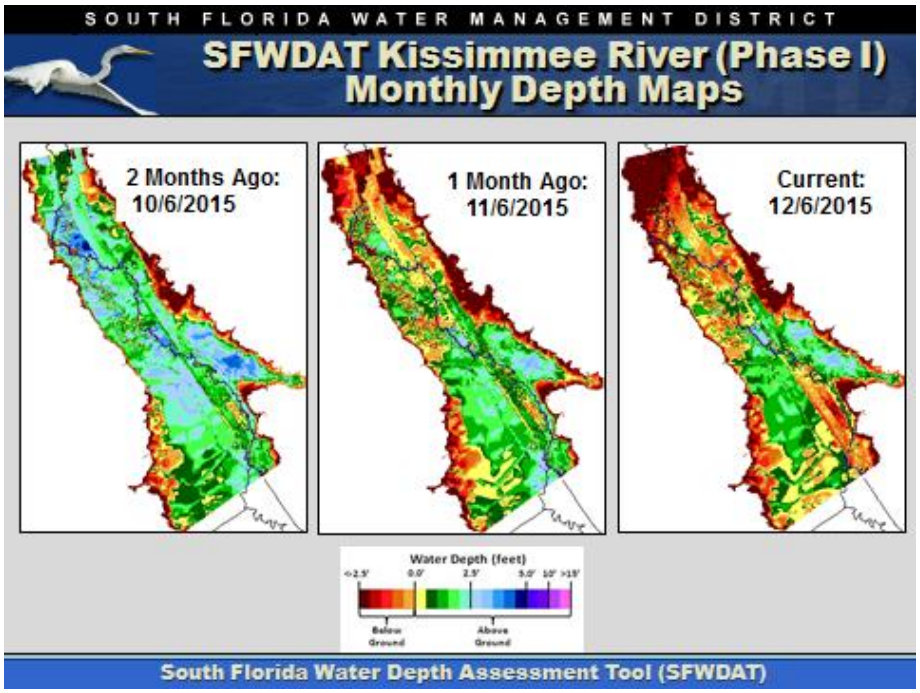
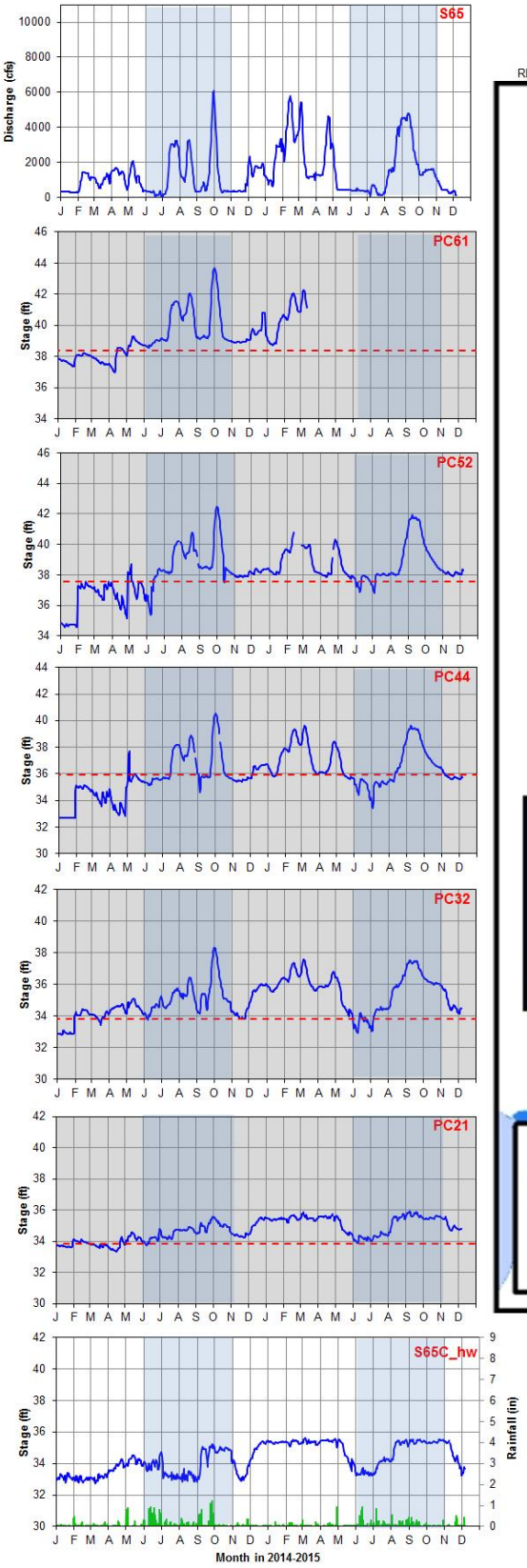


Figure 11. Phase I area floodplain water depths for this week, one month ago, and two months ago. Note that the WDAT color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to Jan. 16, 2012.

Kissimmee River Hydrographs



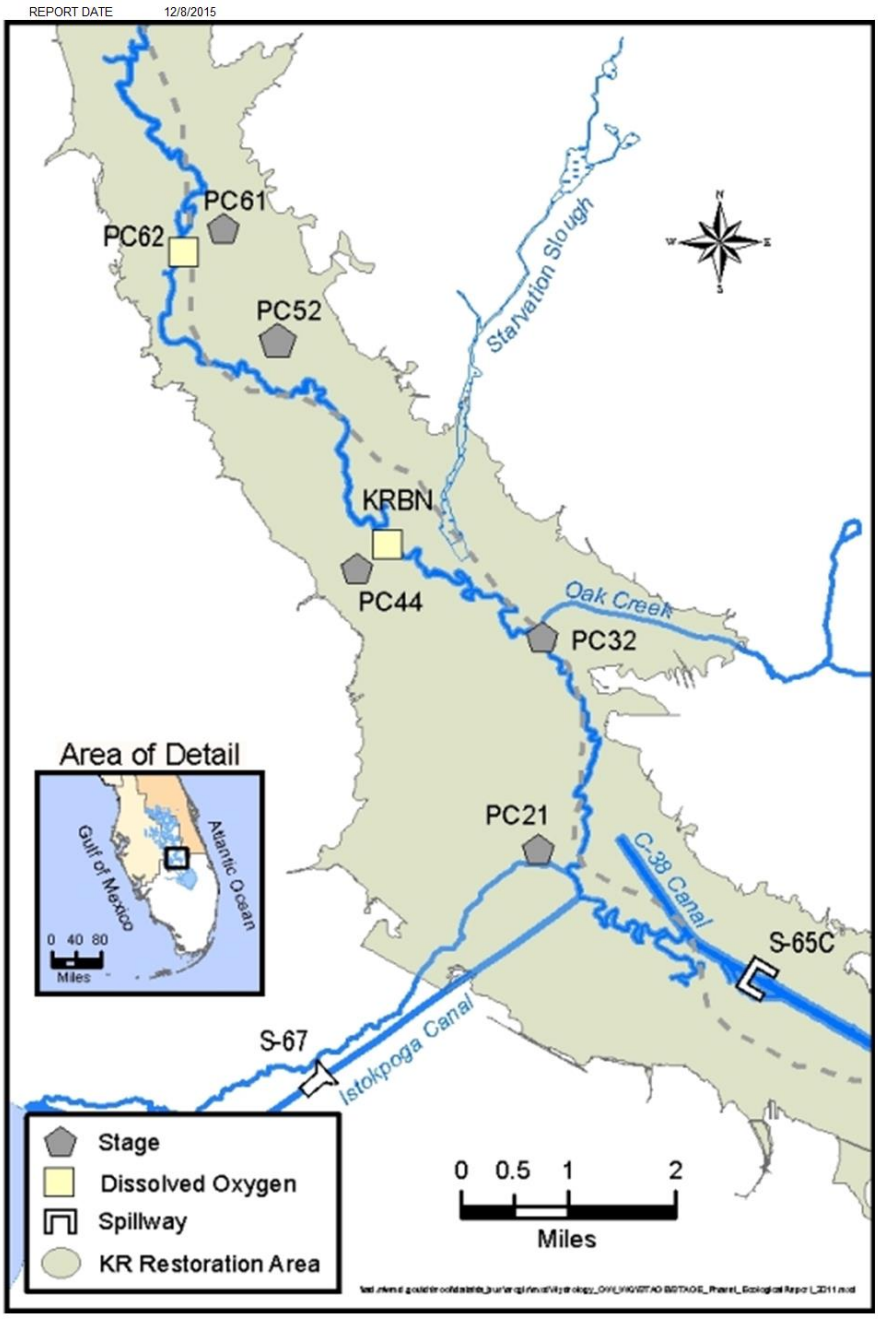


Figure 12. Discharge at S65, stages at five monitoring stations in the Phase I area of the Kissimmee River floodplain, and headwater stage at S65-C since January 1, 2013. The most recent data (~2 weeks) are provisional real-time data from SFWMD DualTrend; previous data are from SFWMD DB-HYDRO (validated). Dashed lines are ground elevations.

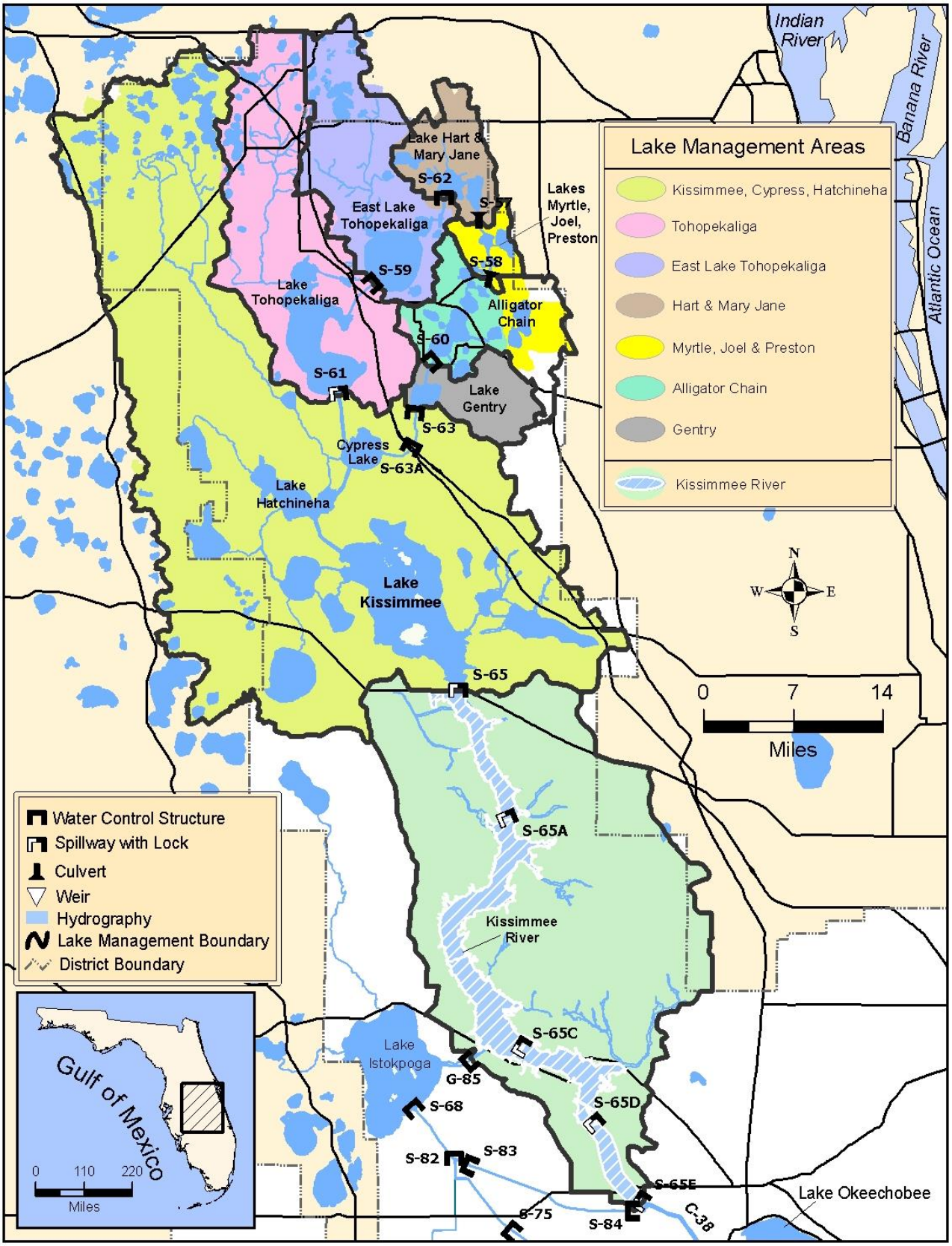


Figure 13. The Kissimmee Basin

LAKE OKEECHOBEE

According to the United States Army Corps of Engineers (USACE) web site, Lake Okeechobee stage is at 14.72 feet NGVD for the period ending at midnight on December 7, 2015. Lake stage increased by 0.24 feet over the past week. The Lake is now 0.27 feet higher than it was a month ago and 0.83 feet lower than it was a year ago (Figure 1). The Lake is in the Low Flow Sub-band (Figure 2). According to RAINDAR, 1.55 inches of rain fell directly over the Lake during the past seven days. Similar to slightly higher amounts fell in most of the surrounding watershed with slightly lower amounts falling in the upper Kissimmee Valley and over the southern portions of the Lake and watershed. (Figure 3).

Based on USACE reported values, current Lake inflow is approximately 5668 cfs, consisting of flows as indicated below.

Structure	Flow cfs
S65E	1278
S154	130
S84 & 84X	1331
S71	1177
S72	294
C5	0
S191	203
S133 PUMPS	152
S127 PUMPS	134
S129 PUMPS	68
S131 PUMPS	42
S135 PUMPS	162
Fisheating Creek	697
S2 Pumps	0
S3 Pumps	0
S4 Pumps	0

Current Lake outflow is approximately 153 cfs, exiting to the L8 canal through Culvert 10A. Corrected evapotranspiration this past week was equivalent to an outflow of 551 cfs.

Change in elevation equivalents and average weekly flows for major structures are presented in Figure 4.

Monthly water quality monitoring indicated that November mean total phosphorus and total suspended solids concentrations were slightly lower compared to October mean values in the nearshore and pelagic regions (Figure 5). The associated chlorophyll monitoring which does not include data from five sites indicates that no sites had algal bloom level chlorophyll *a* concentrations. Microcystin values >0.2 µg/L occurred at two of the six sites monitored for cyanobacterial toxins; L005 and KissRiv0 (Figure 6). MODIS satellite imagery indicated small areas of potential algal bloom conditions in the north and west portions of the nearshore region, although there was a lot of cloud cover (Figure 7).

Based on the Lake Okeechobee wading bird habitat suitability index, there are currently approximately 55,033 acres of suitable foraging habitat on the Lake. (Figure 8).

Water Management Recommendations

The winter/spring Lake stage recession was interrupted by another reversal this past week due to a large rain event. Potential negative consequences of reversals increase as the peak of wading bird and snail kite breeding seasons draw closer.

Future short-term recommendations will depend in large measure on the near-term rainfall patterns and amounts. Any activities, which contribute to re-establishing the dry season recession, would be ecologically beneficial.

The operational goal continues to be to maintain a small but steady decrease in water levels not to exceed 0.4 feet per month (0.09 feet/week) to achieve a Lake stage of approximately 12.5 feet NGVD by the end of the dry season and avoid further reversals in Lake Stage.

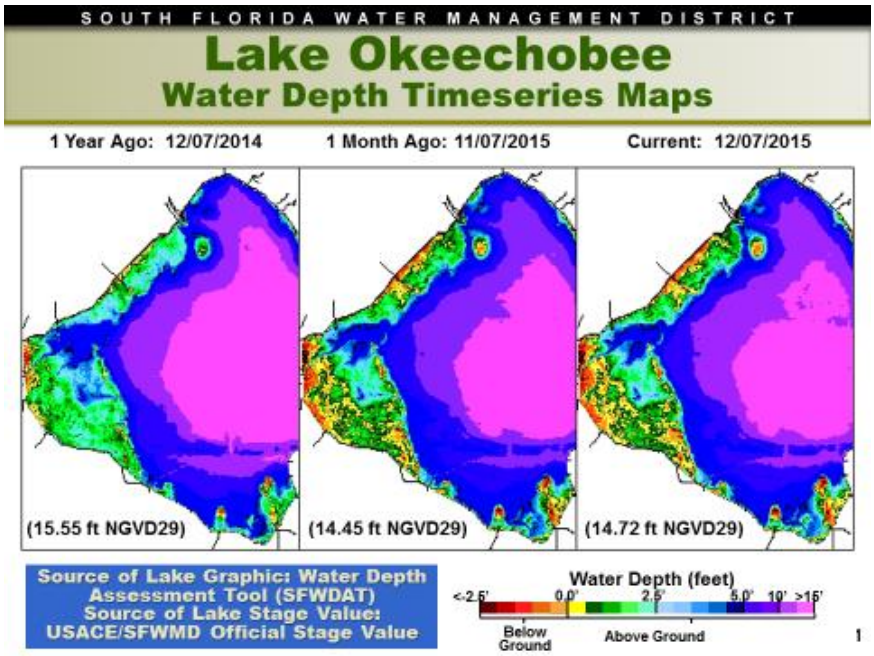


Figure 1

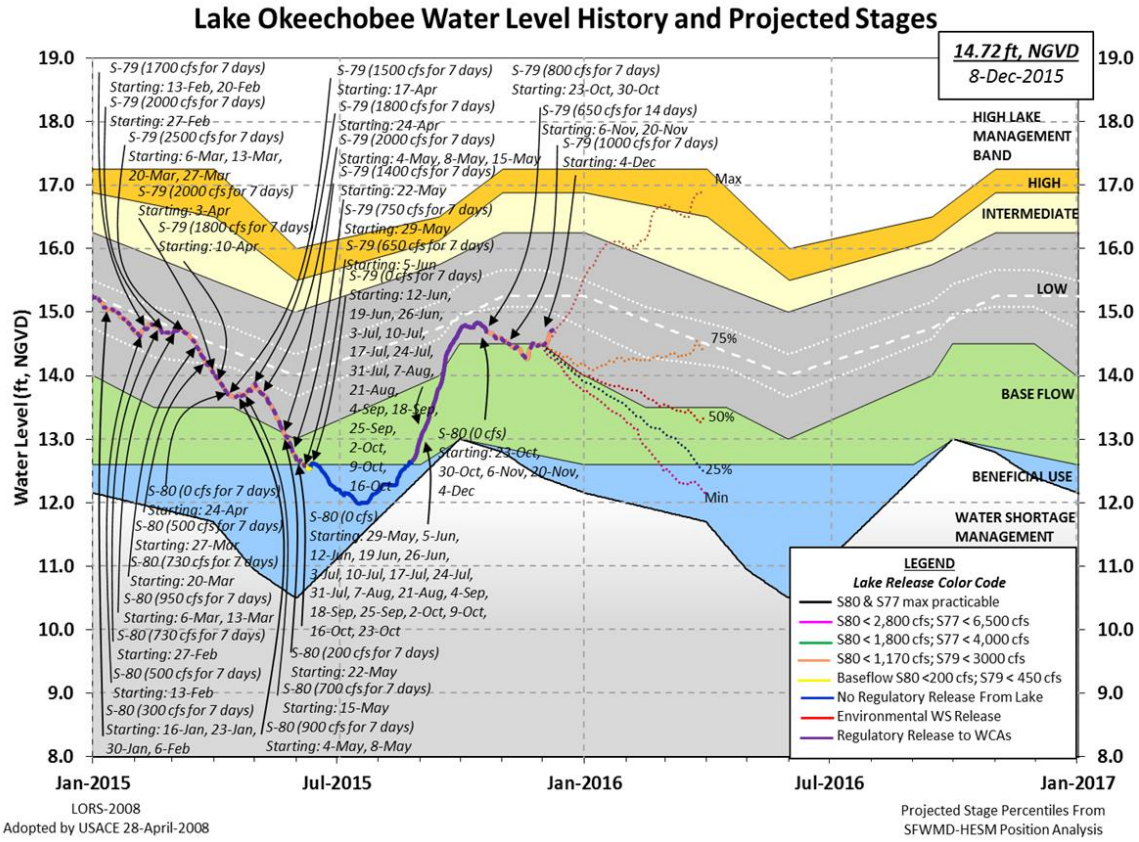

Lake Okeechobee Water Level History and Projected Stages
14.72 ft, NGVD
8-Dec-2015
Water Level (ft, NGVD)
19.0
18.0
17.0
16.0
15.0
14.0
13.0
12.0
11.0
10.0
9.0
8.0
Jan-2015
Jul-2015
Jan-2016
Jul-2016
Jan-2017
HIGH LAKE MANAGEMENT BAND
HIGH
INTERMEDIATE
LOW
BASE FLOW
BENEFICIAL USE
WATER SHORTAGE MANAGEMENT
Max
75%
50%
25%
Min
S-79 (1700 cfs for 7 days) Starting: 13-Feb, 20-Feb
S-79 (2000 cfs for 7 days) Starting: 27-Feb
S-79 (2500 cfs for 7 days) Starting: 6-Mar, 13-Mar, 20-Mar, 27-Mar
S-79 (2000 cfs for 7 days) Starting: 3-Apr
S-79 (1800 cfs for 7 days Starting: 10-Apr
S-79 (1500 cfs for 7 days) Starting: 17-Apr
S-79 (1800 cfs for 7 days) Starting: 24-Apr
S-79 (2000 cfs for 7 days) Starting: 4-May, 8-May, 15-May
S-79 (1400 cfs for 7 days) Starting: 22-May
S-79 (750 cfs for 7 days) Starting: 29-May
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 (800 cfs for 7 days) Starting: 23-Oct, 30-Oct
S-79 (650 cfs for 14 days) Starting: 6-Nov, 20-Nov
S-79 (1000 cfs for 7 days) Starting: 4-Dec
S-80 (0 cfs) Starting: 23-Oct, 30-Oct, 6-Nov, 20-Nov, 4-Dec
S-80 (0 cfs for 7 days) Starting: 24-Apr
S-80 (500 cfs for 7 days) Starting: 27-Mar
S-80 (730 cfs for 7 days) Starting: 20-Mar
S-80 (950 cfs for 7 days) Starting: 6-Mar, 13-Mar
S-80 (730 cfs for 7 days) Starting: 27-Feb
S-80 (500 cfs for 7 days) Starting: 13-Feb
S-80 (300 cfs for 7 days) Starting: 16-Jan, 23-Jan, 30-Jan, 6-Feb
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 (200 cfs for 7 days) Starting: 22-May
S-80 (700 cfs for 7 days) Starting: 15-May
S-80 (900 cfs for 7 days) Starting: 4-May, 8-May
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

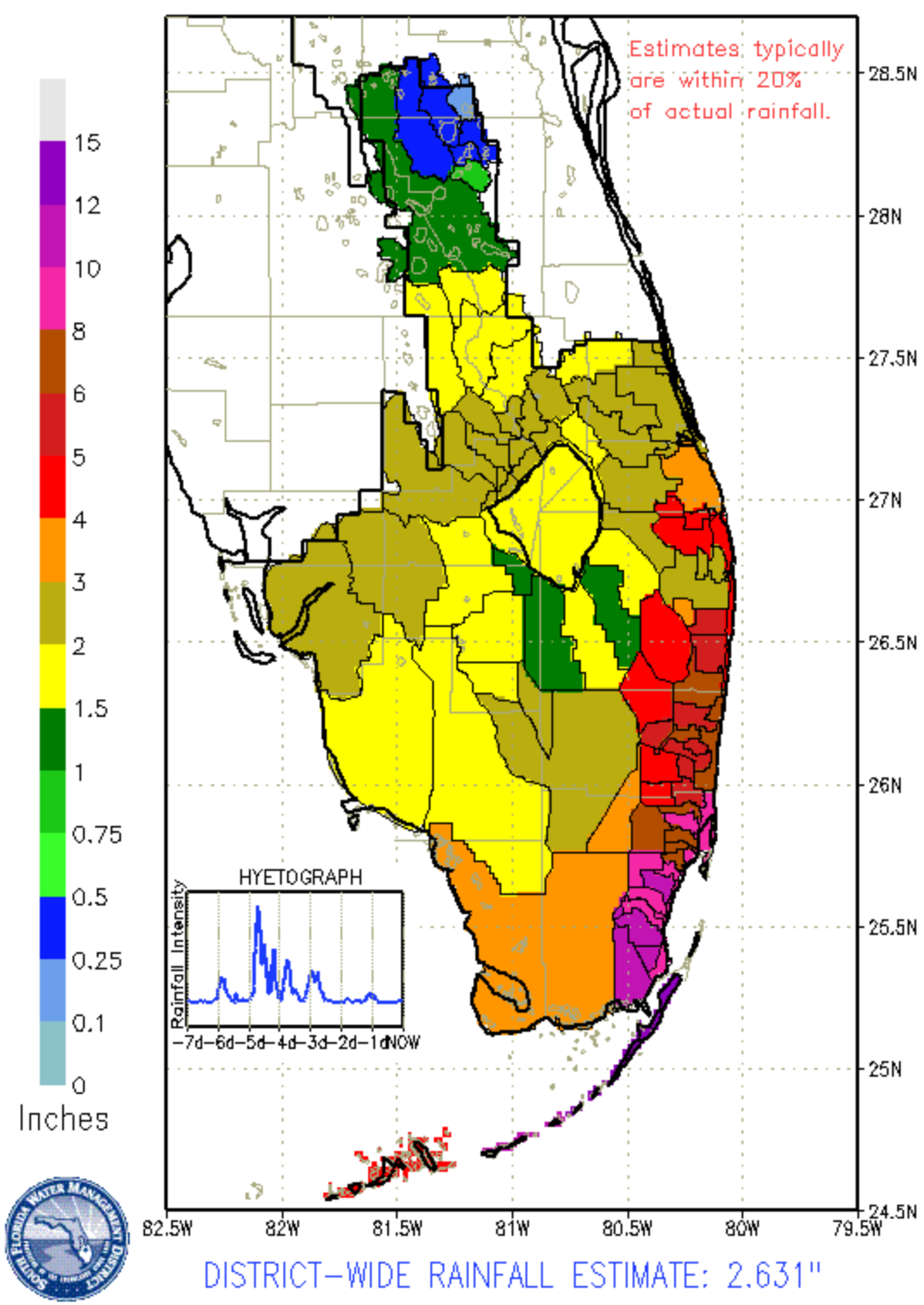

SFWMD PROVISIONAL RAINDAR 7-DAY BASIN RAINFALL ESTIMATES
FROM: 1215 EST, 12/01/2015 THROUGH: 1215 EST, 12/08/2015
Estimates typically are within 20% of actual rainfall.
15
12
10
8
6
5
4
3
2
1.5
1
0.75
0.5
0.25
0.1
0
Inches
HYETOGRAPH
Rainfall Intensity
-7d-6d-5d-4d-3d-2d-1dNOW
28.5N
28N
27.5N
27N
26.5N
26N
25.5N
25N
24.5N
82.5W
82W
81.5W
81W
80.5W
80W
79.5W
DISTRICT-WIDE RAINFALL ESTIMATE: 2.631"

Figure 3

INFLOWS	Average Daily Flow Past Week cfs	Feet of Change Past Week
S65E	989	0.033
S71 & 72	932	0.031
S84 & 84X	1272	0.042
Fisheating Creek	315	0.010
Rainfall	N.A.	0.129
OUTFLOWS	**Average Daily Flow Past Week cfs**	**Feet of Change Past Week**
S77	263	0.009
S308	0	0.000
S351	0	0.000
S352	0	0.000
S354	0	0.000
L8	196	0.007
ET	551	0.018

Figure 4

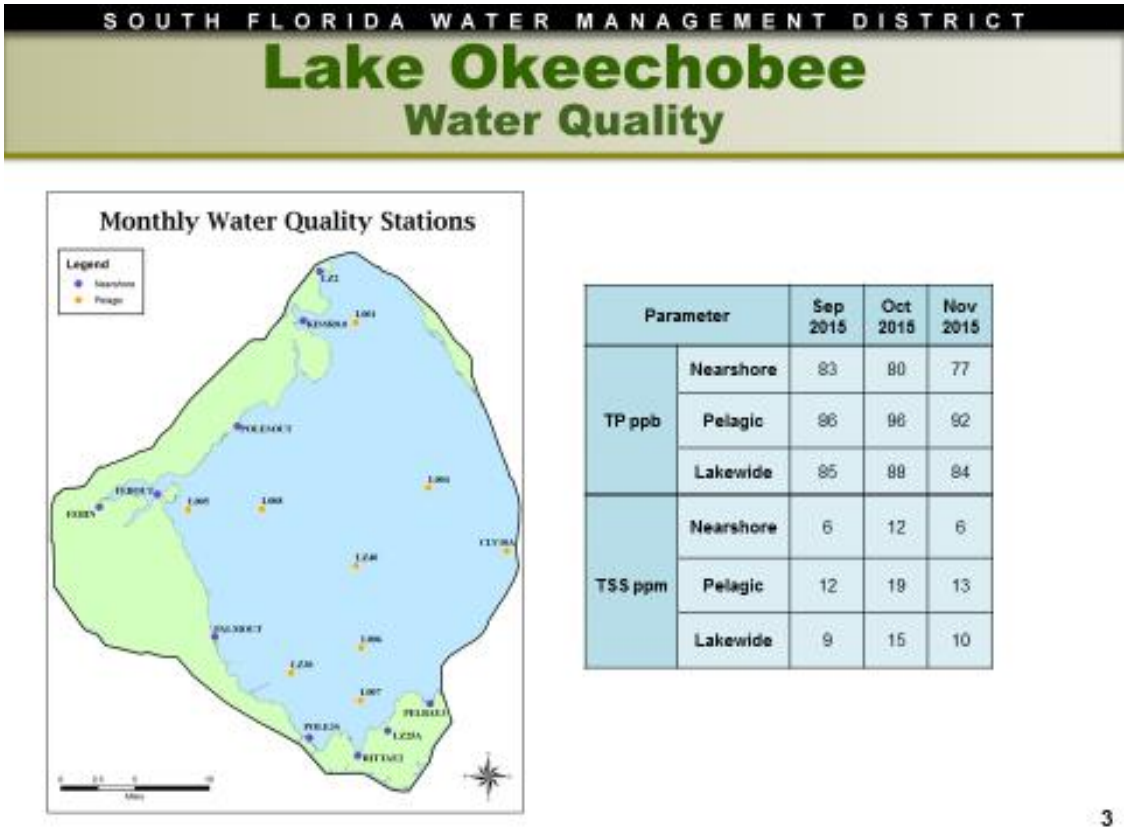


Figure 5

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Lake Okeechobee
Algal Blooms

November 3-4, 2015		
Site	Chlorophyll a ug/L	Microcystin ug/L
LZ2		BDL
KISSR0.0		0.46
PALMOUT	35.7	
PELBAY3	5.43	
POLE3S	32.5	
POLESOUT		BDL
RITTAE2	12.9	
LZ25A	6.26	
L005		0.23
L006	10.9	
L007	5.66	
LZ30	6.45	BDL
CLV10A		BDL

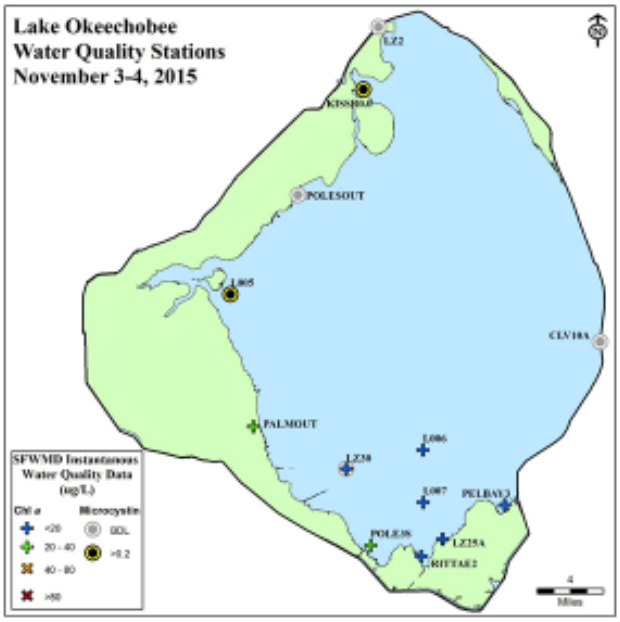


Figure 6

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Lake Okeechobee
Algal Blooms

Unvalidated and Experimental Data

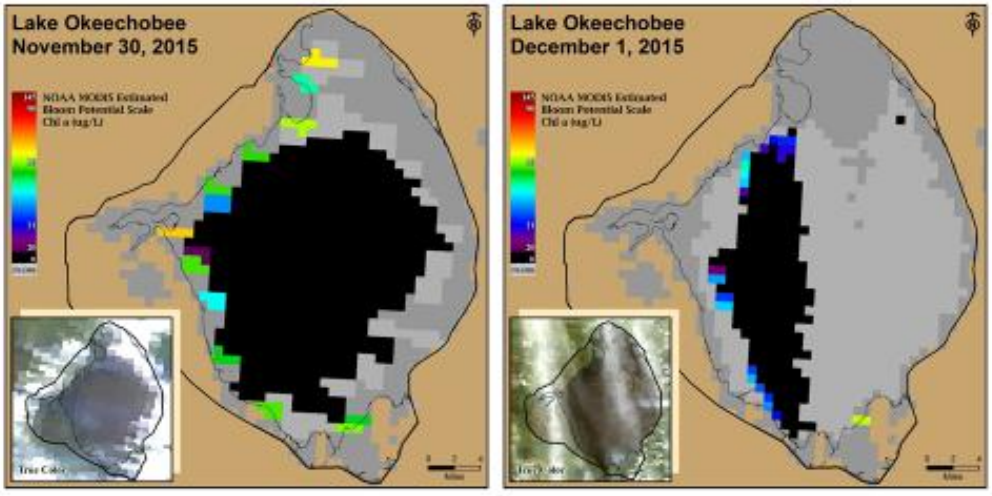


Figure 7

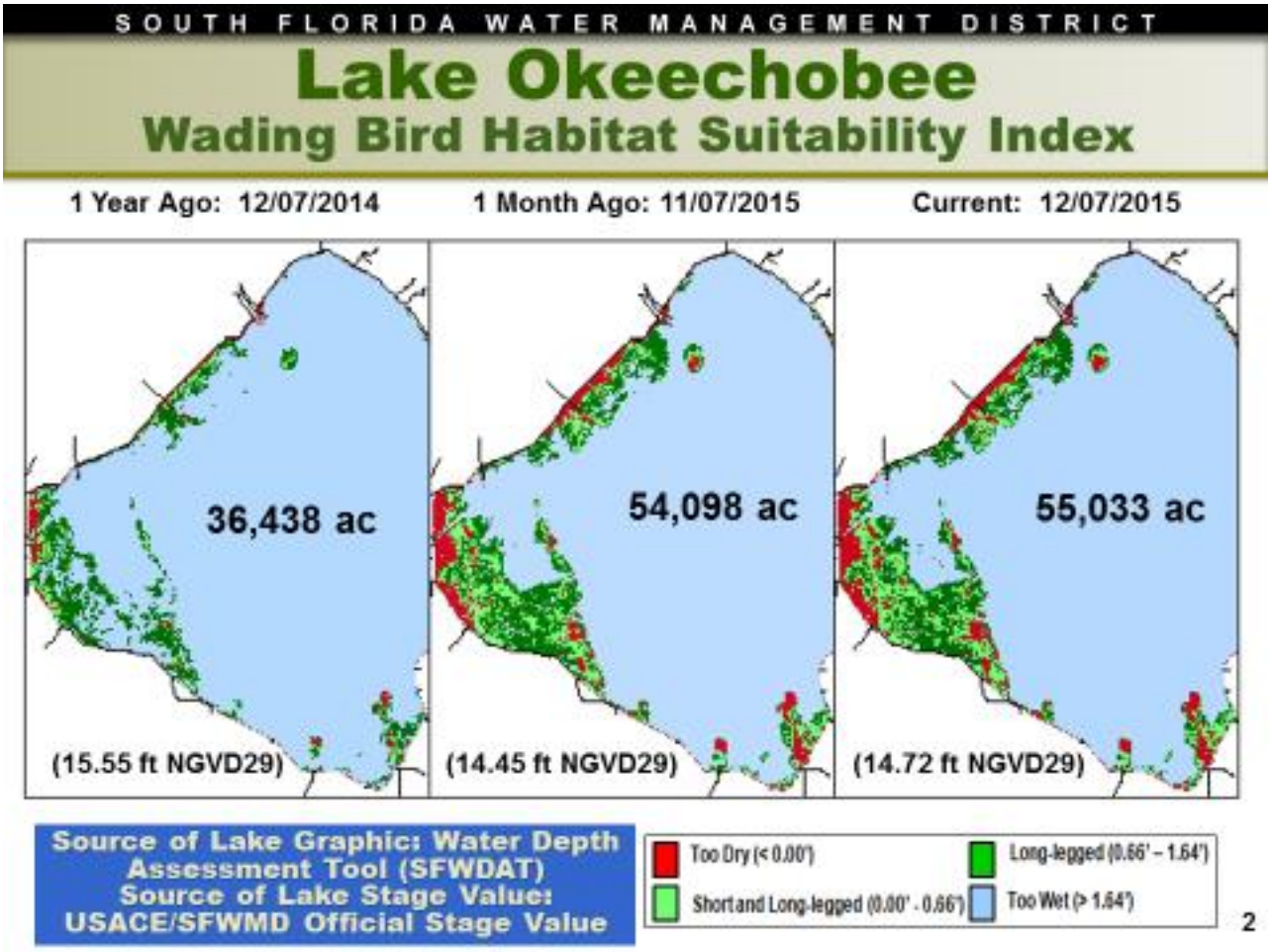


Figure 8

Lake Istokpoga

Lake Istokpoga stage is 39.27 feet NGVD today and is currently 0.23 feet below its regulation schedule of 39.50 feet NGVD, which remains at peak high pool (Figure 9). Average flows into the Lake from Arbuckle and Josephine creeks were 484 and 105 cfs respectively, a small increase of 15% and 5% for both creeks from last week. Average discharge from S68 and S68X this past week was 923 cfs, an increase of approximately 60% from the preceding week. According to RAINDAR, 1.55 inches of rain fell in the Lake Istokpoga watershed during the past seven days.

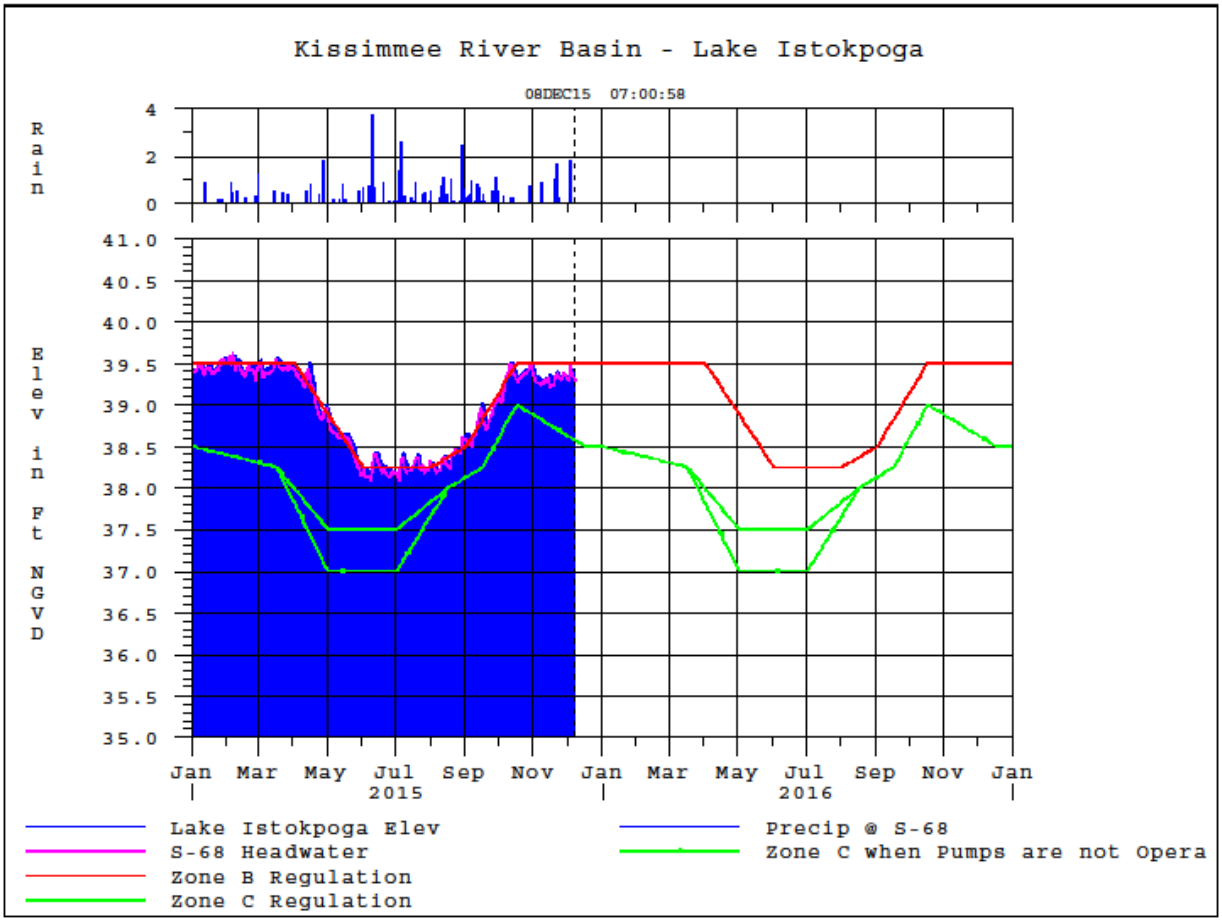


Figure 9

ESTUARIES

Lucie Estuary:
Over the past week, provisional flows averaged 522 cfs at S-80, 54 cfs at S-308, 543 cfs at S-49 on C-24, 424 cfs at S-97 on C-23, and 300 cfs from Ten Mile Creek at the Gordy Road Structure. Average inflow from tidal basin tributaries is estimated to be 924 cfs (Figures 1 and 2). Total inflow averaged about 2713 cfs last week and 1294 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 was 11.6 at the US1 Bridge. Salinity conditions in the middle estuary remained in the good 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)	**6.5** (9.5)	**NR**[2] (12.6)	NA[1]
US1 Bridge	**10.3** (13.9)	**12.9** (15.1)	10.0-26.0
A1A Bridge	**19.0** (25.0)	**25.0** (28.9)	NA

[1]Envelope not applicable, [2]Not Reporting

Caloosahatchee Estuary:
During the past week, provisional flows averaged approximately 179 cfs at S-77, 644 cfs at S-78, and 1536 cfs at S-79. Average inflow from tidal basin tributaries is estimated to be 1651 cfs (Figures 5 and 6). Total inflow averaged 3187 cfs last week and 1732 cfs over last month.

Over the past week, surface salinity decreased throughout the estuary (Table 2, Figures 7 & 8). The seven-day average salinity values are within the good range for oysters at Cape Coral, Shell Point, and Sanibel (Figure 9). The 30-day moving average surface salinity is 3.6 at Val I-75 and 8.4 at Ft. Myers. Salinity conditions at Val I-75 are in the good range for tape grass, and are forecasted to remain so in the following two weeks even without discharges at S-79 (Figure 10).

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)	**2.7** (2.9)	**2.7** (2.8)	NA[1]
*Val I75	**3.5*** (3.7*)	**6.0*** (5.0*)	0.0-5.0[2]
Ft. Myers Yacht Basin	**7.3** (9.0)	**11.5** (10.6)	NA
Cape Coral	**13.5** (15.2)	**15.3** (16.6)	10.0-30.0
Shell Point	**22.0** (25.4)	**23.3** (26.2)	10.0-30.0
Sanibel	**27.8** (29.1)	**29.2** (29.8)	10.0-30.0

[1]Envelope not applicable, [2]Envelope is based on a 30-day average.
*Val I75 is temporarily offline due to bridge 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)	NA	3.7 – 6.5 with a spike to 16	1.7 – 4.3
Dissolved Oxygen (mg/l)	NA	6.0 – 8.4	5.2 – 6.95

The Florida Fish and Wildlife Research Institute reported on December 4, 2015, that a bloom of *Karenia brevis*, the Florida red tide organism, was detected in background to very low concentrations in six samples collected in, along, and offshore of Lee County.

Water Management Recommendations

Lake Okeechobee's water level is within the Low Operational Sub-band; the tributary hydrological conditions are Wet; and the seasonal and multi-seasonal forecasts are Wet and Wet, respectively. The Lake Okeechobee Regulation Schedule (LORS) recommends discharges to the Caloosahatchee of up to 3000 cfs at S-79 and to the St. Lucie of up to 1170 cfs at S-80.

Currently, the USACE is implementing Seven-day releases averaging 1000 cfs at S-79 and 0 cfs at S-80. Such releases, while helping maintain salinity conditions favorable for submerged aquatic

vegetation and oysters in the estuaries, should be conducted in a pulse pattern to mitigate potential stratification and phytoplankton accumulation in the water column (Table 4).

Table 4. Schedules for 7-day pulse releases at S-80 and S-79

	7-day pulses at S-80							
Day	200 cfs	300 cfs	400 cfs	500 cfs	650 cfs	800 cfs	950 cfs	1170 cfs
1	200	300	400	500	650	800	950	1290
2	600	700	800	900	1100	1200	1400	1800
3	300	500	650	800	900	1100	1200	1500
4	200	300	450	600	800	900	1100	1300
5	100	200	300	400	600	700	900	1000
6	0	100	200	300	400	600	700	800
7	0	0	0	0	100	300	400	500
	7-day pulses at S-79							
Day	450 cfs	650 cfs	1000 cfs	1200 cfs	1500 cfs	2000 cfs	2600 cfs	3000 cfs
1	850	1150	1500	1700	2000	2500	3100	3500
2	1000	1400	1900	2100	2400	3100	3900	4300
3	700	900	1600	1800	2100	2600	3400	3800
4	300	600	900	1100	1400	1900	2500	2900
5	200	400	700	900	1200	1700	2300	2700
6	100	100	400	600	900	1400	2000	2400
7	0	0	0	200	500	800	1000	1400

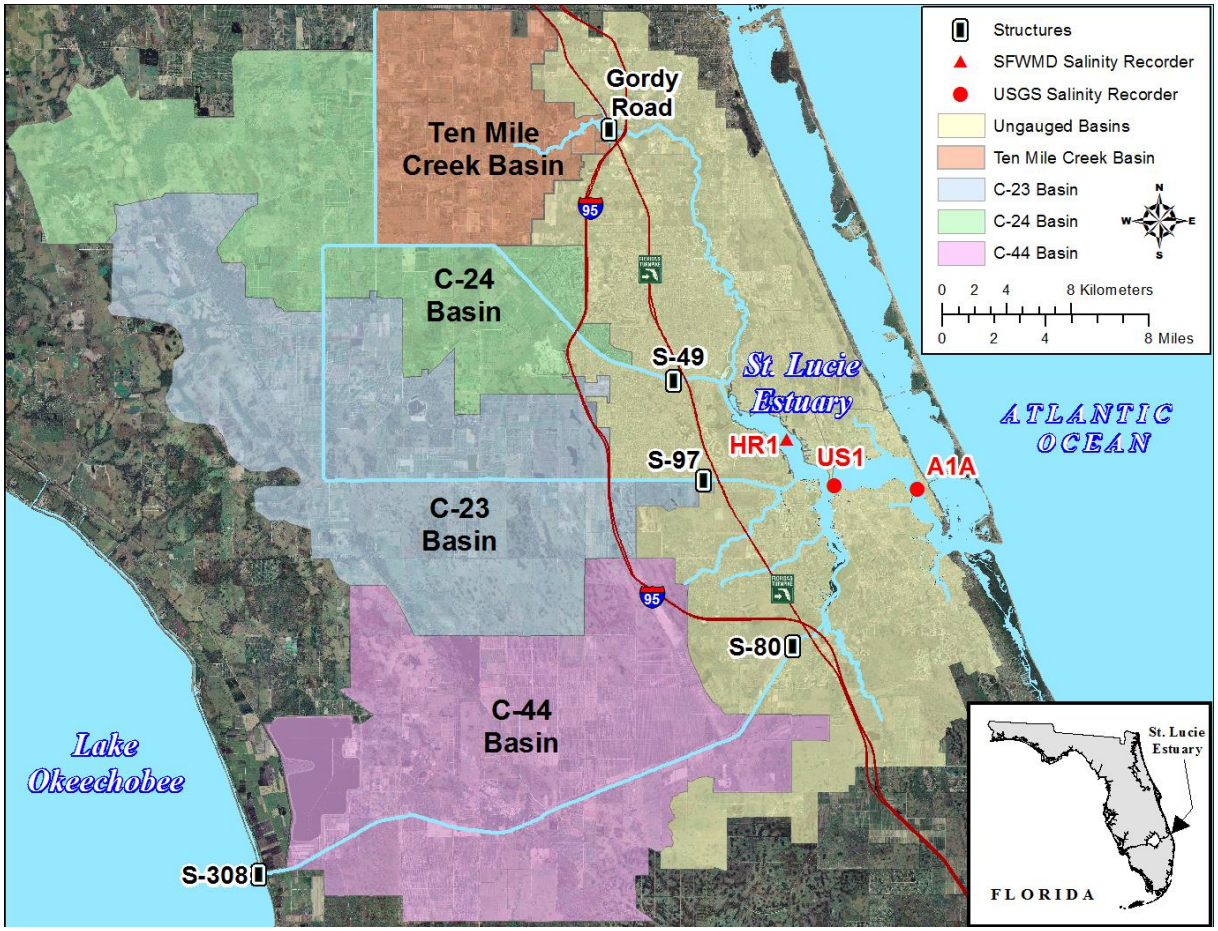


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

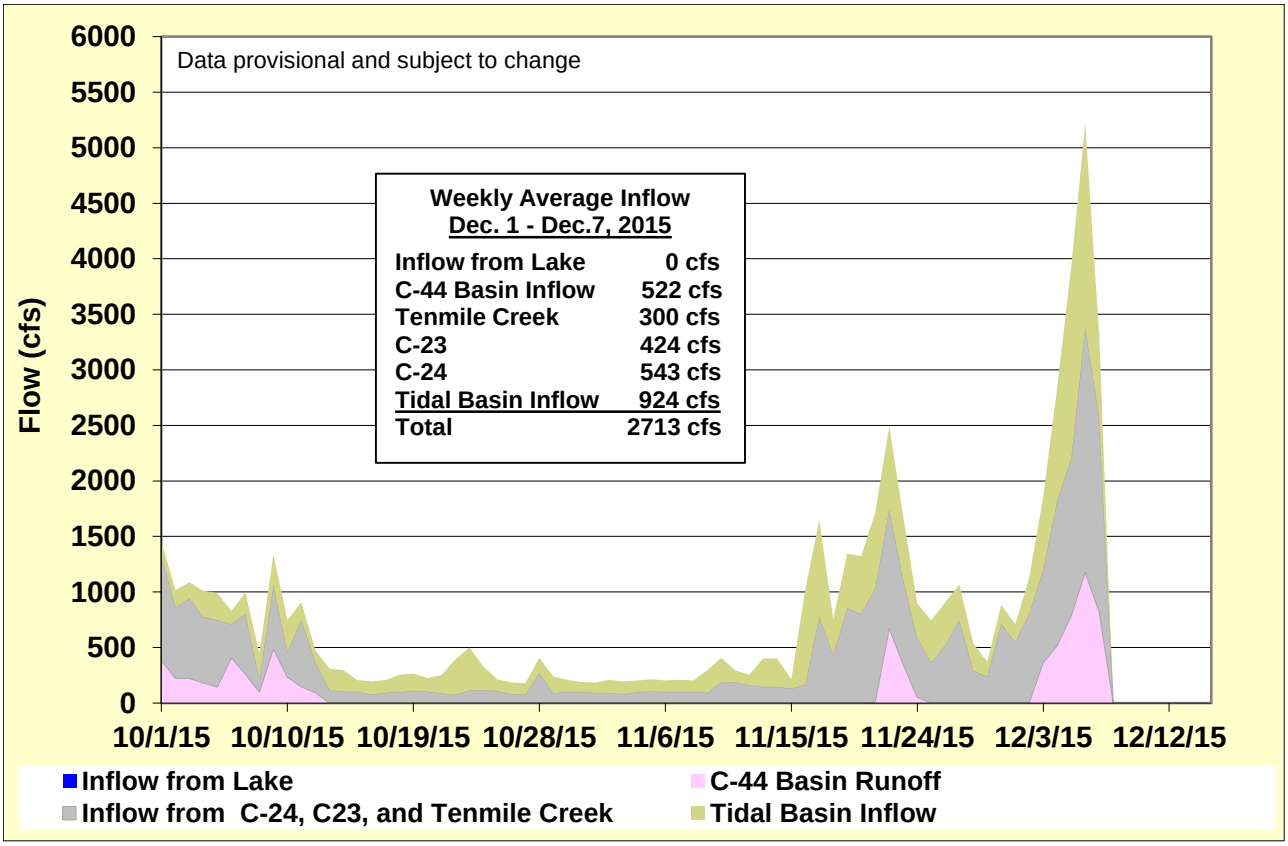


Figure 2. Estimated surface freshwater inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basins into the St. Lucie Estuary.

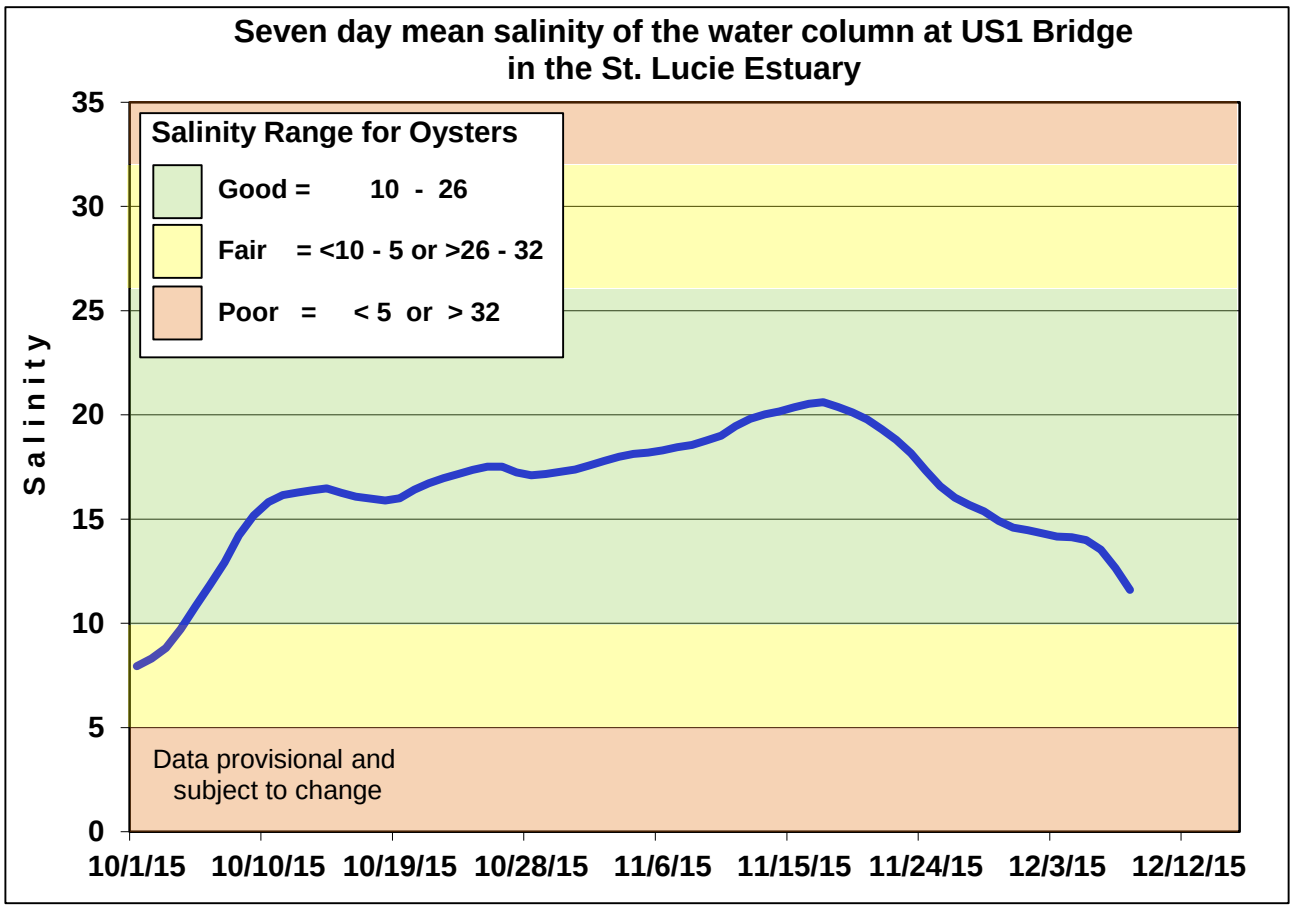


Figure 3. Seven-day mean salinity of the water column at the U.S. Highway 1 Bridge.

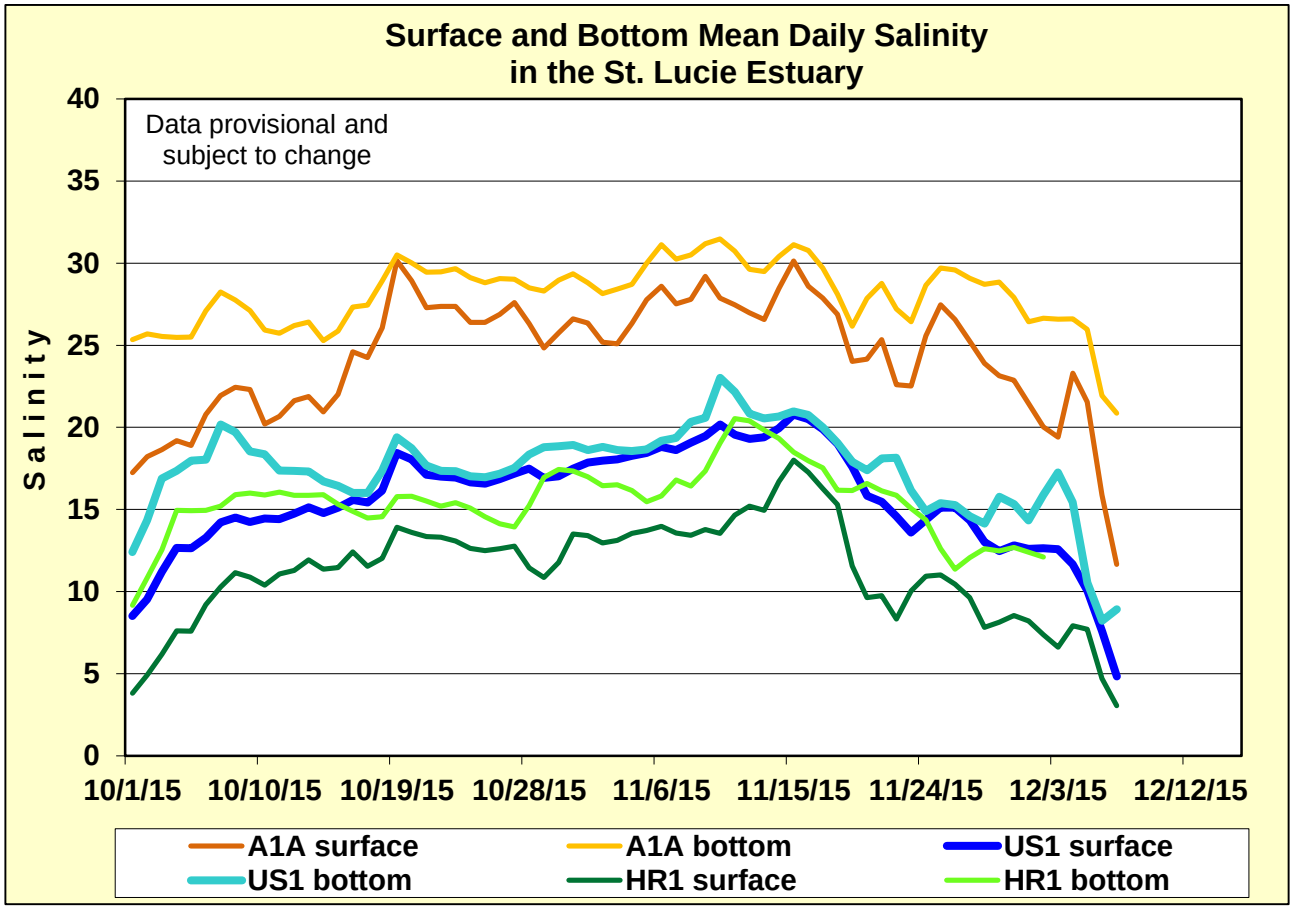


Figure 4. Daily mean salinity at the A1A, US1 and estimated HR1 stations.

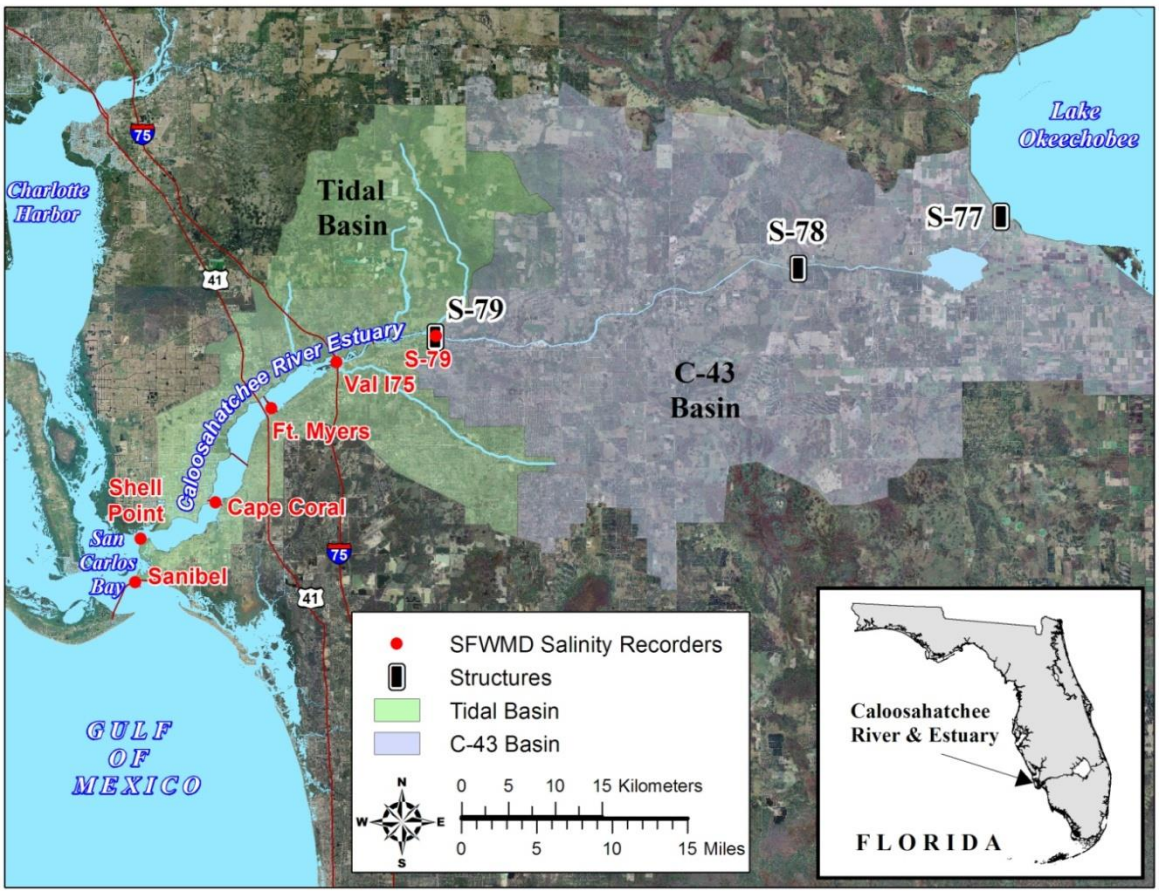


Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

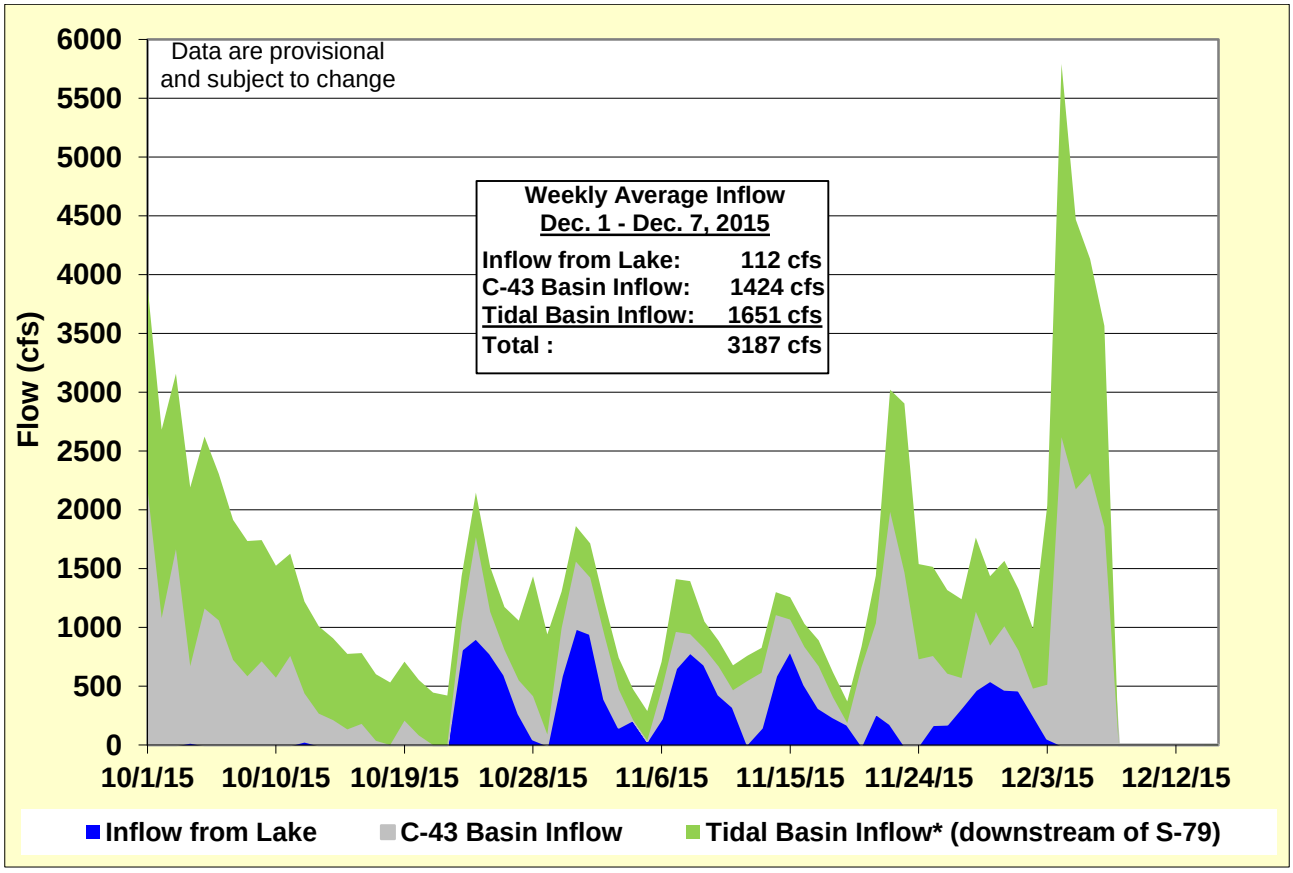
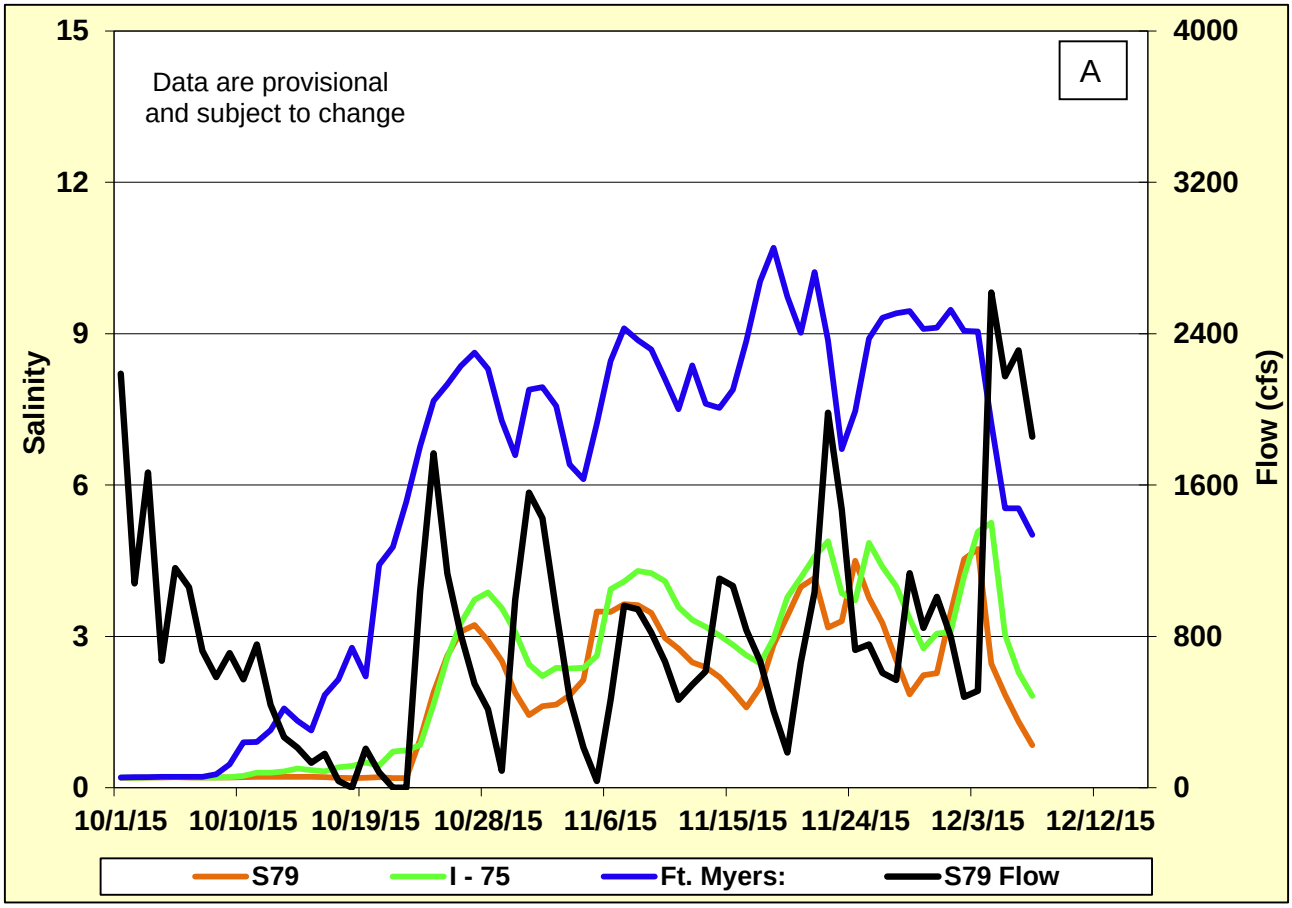


Figure 6. Surface freshwater inflows from Lake Okeechobee, runoff from the C-43 basin, and tributaries in the tidal basin into the Caloosahatchee River Estuary.



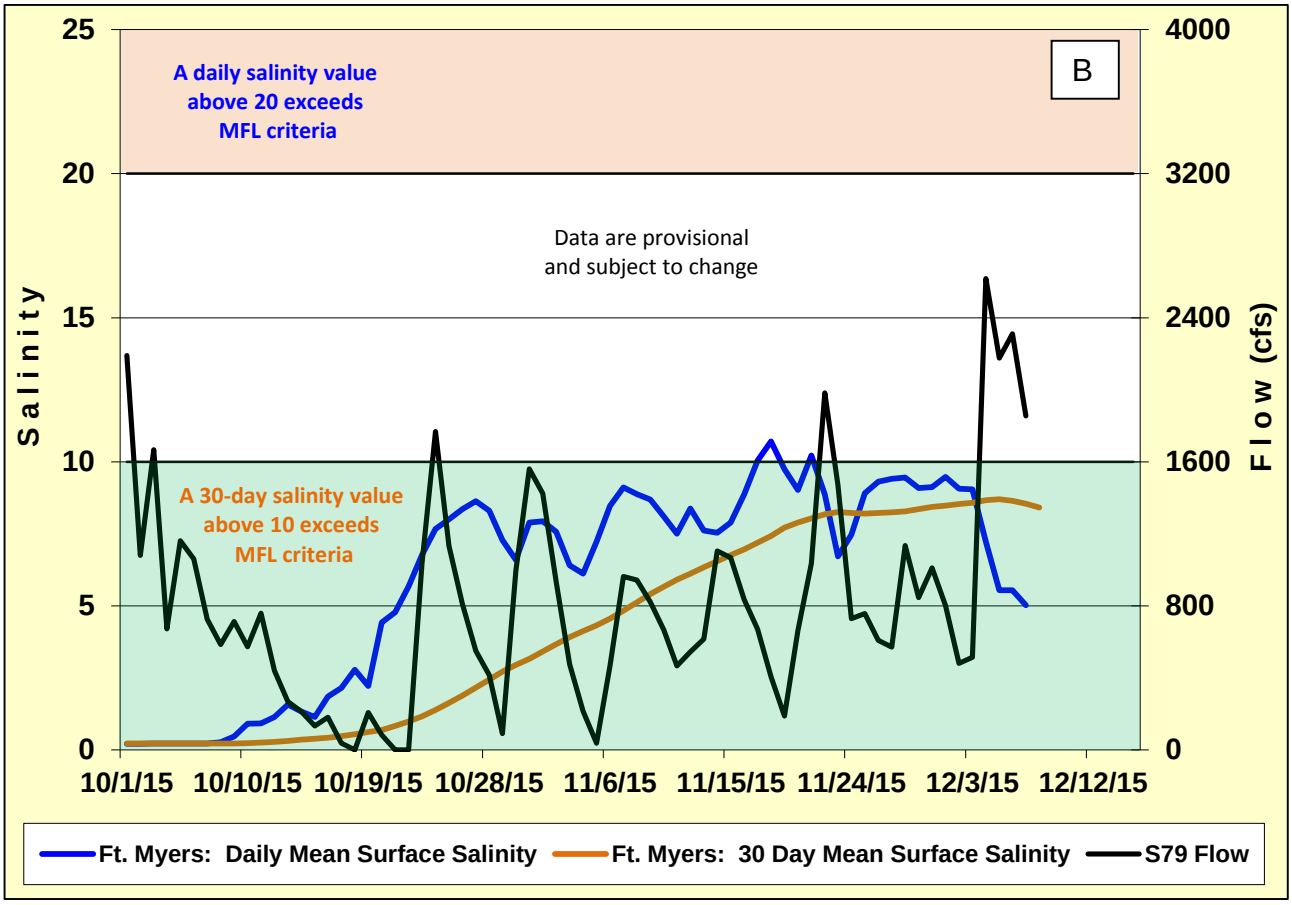


Figure 7. Daily mean flows at S-79 and salinity at upper estuary monitoring stations (A) and 30-day moving average salinity at Ft. Myers (B).

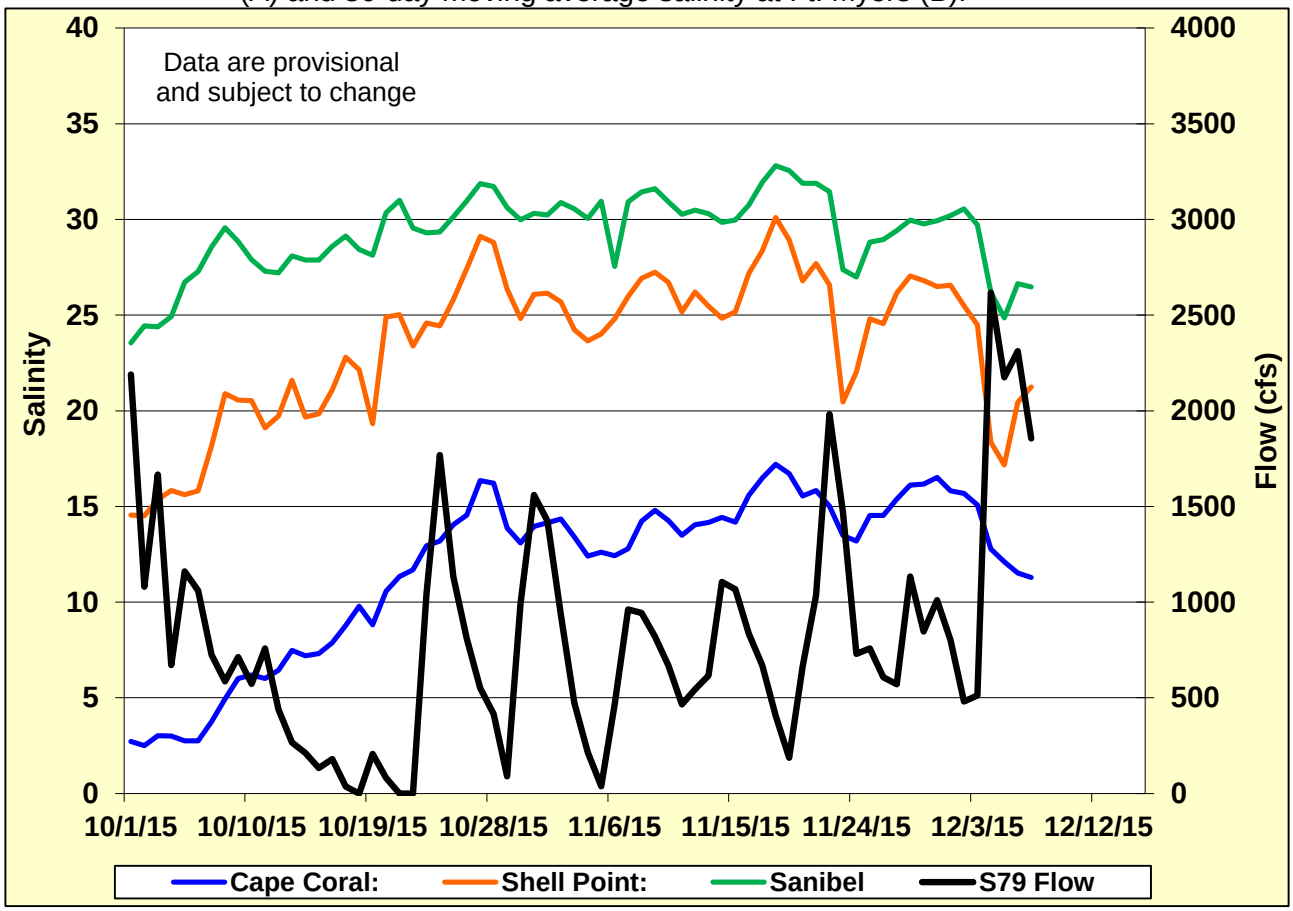


Figure 8. Daily mean flows at S-79 and salinity at lower estuary stations.

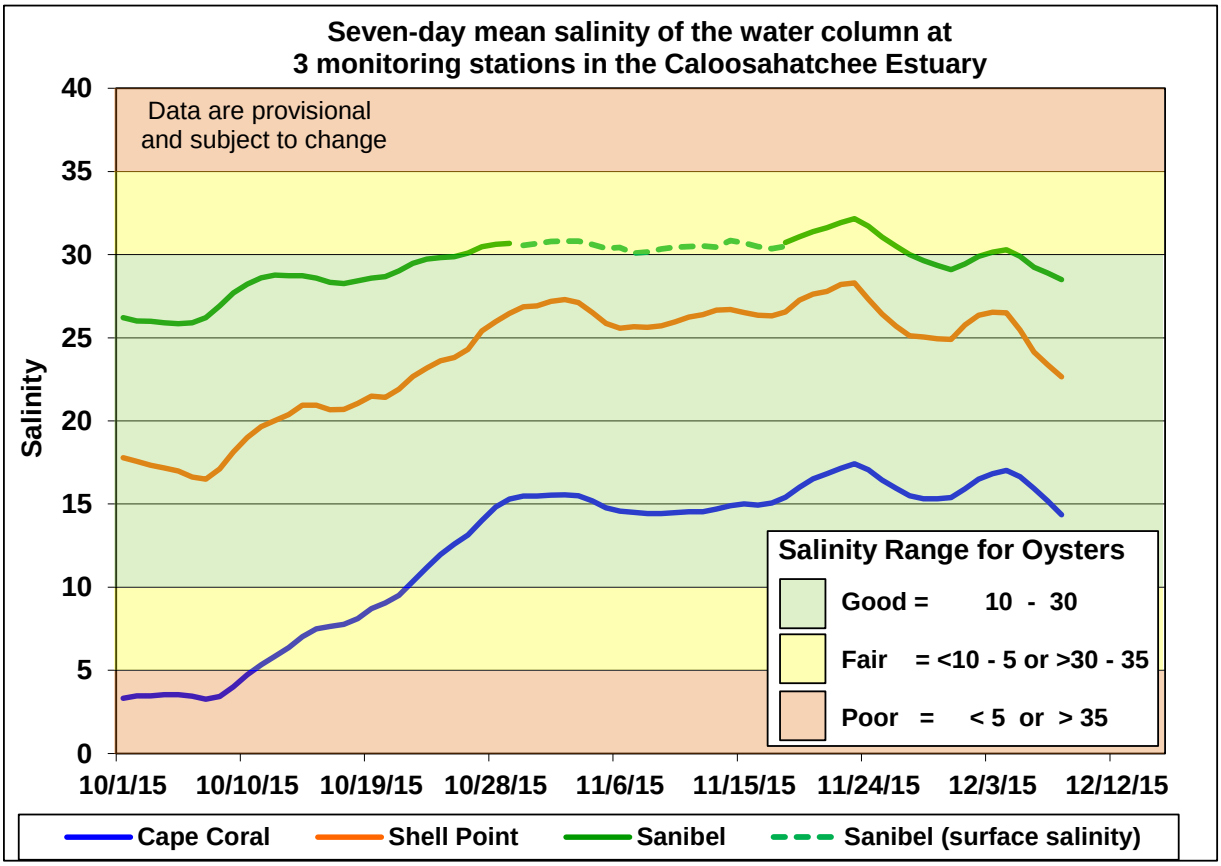


Figure 9. Seven-day mean salinity at Cape Coral Bridge, Shell Point and Sanibel Bridge monitoring stations.

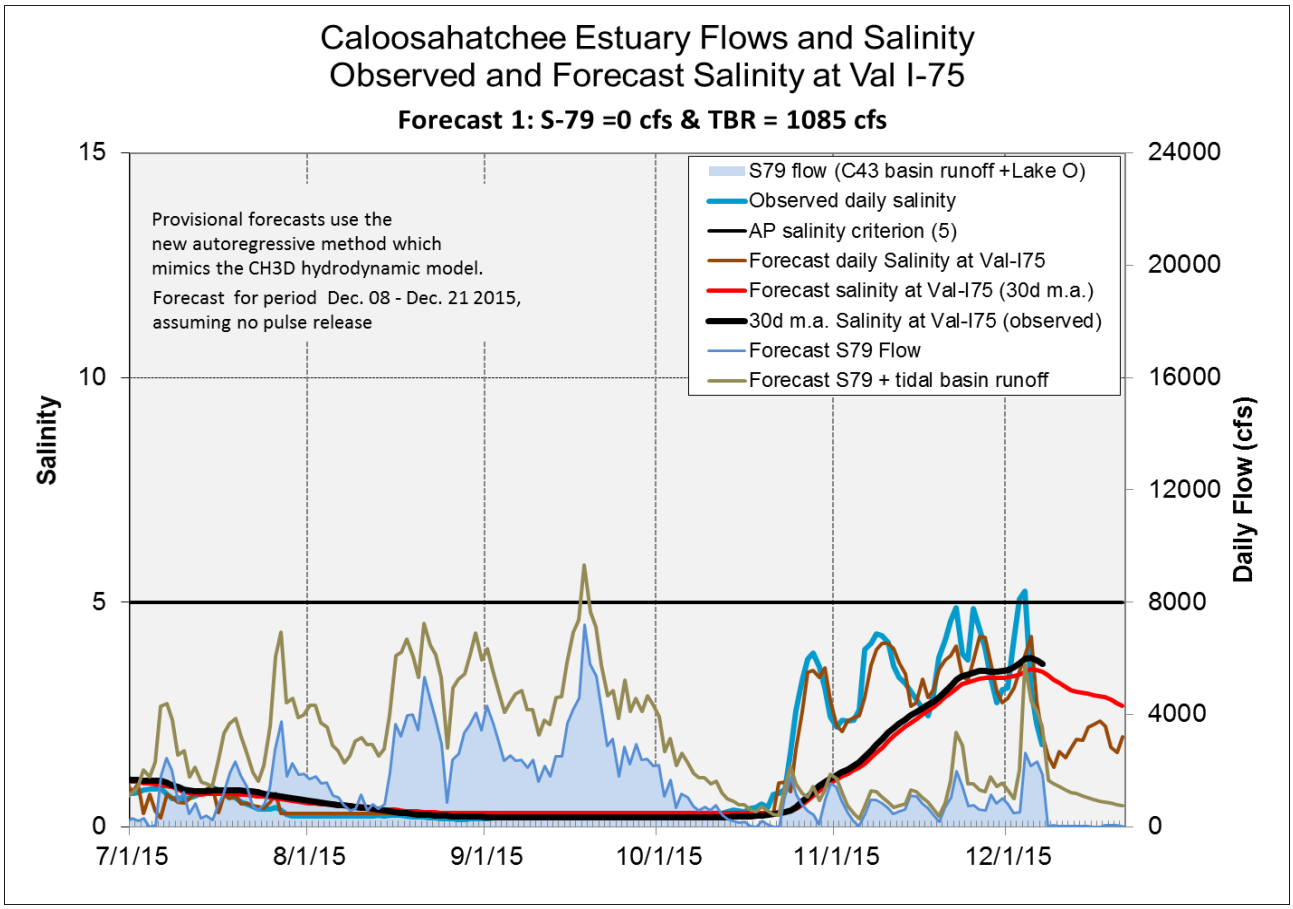
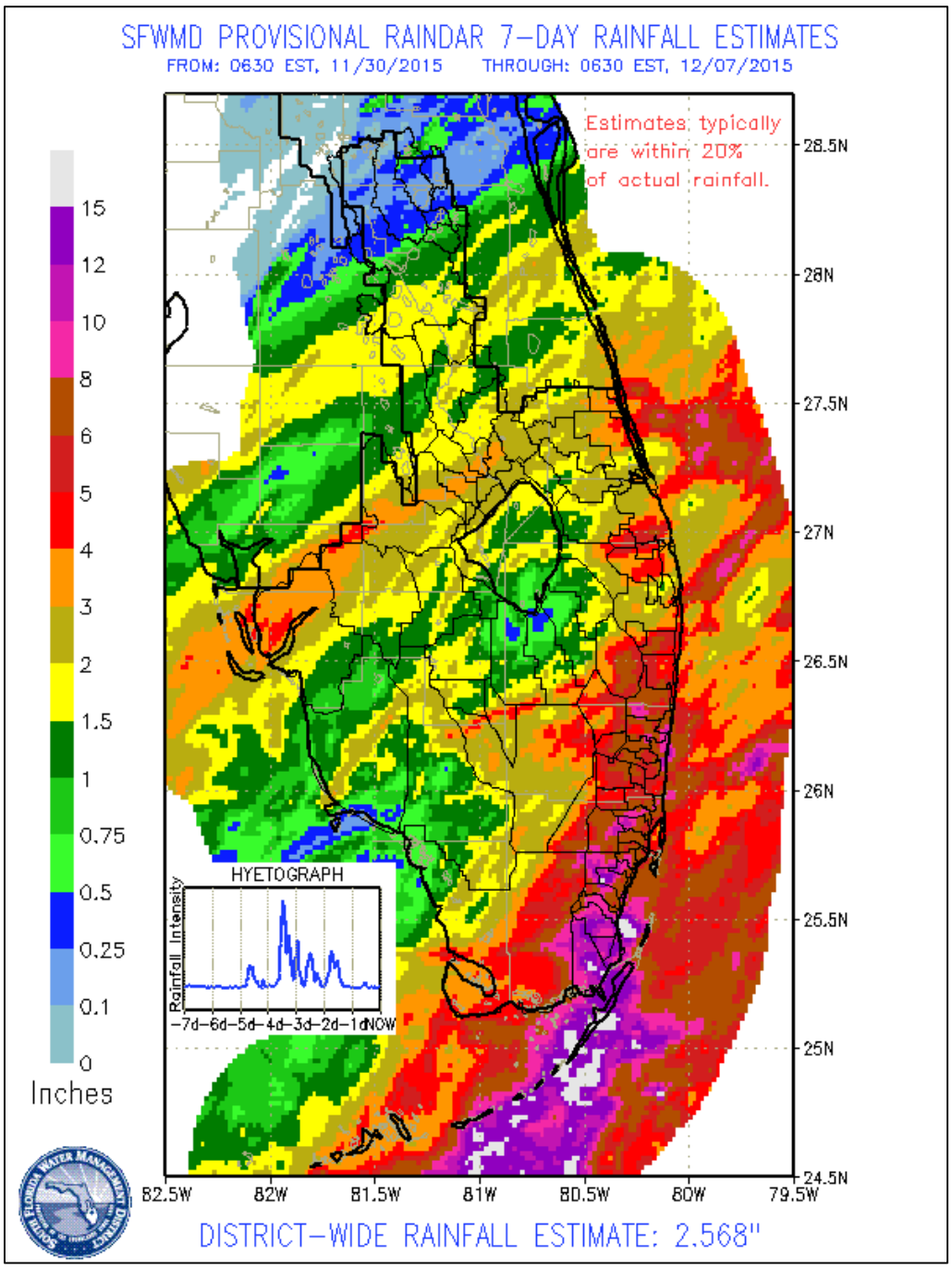


Figure 10. 14-day salinity forecast at Val I-75 assuming no releases at S-79.

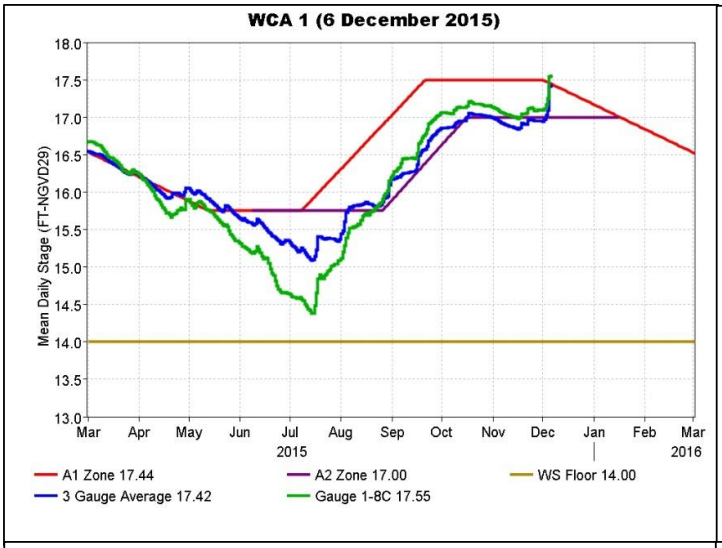
GREATER EVERGLADES

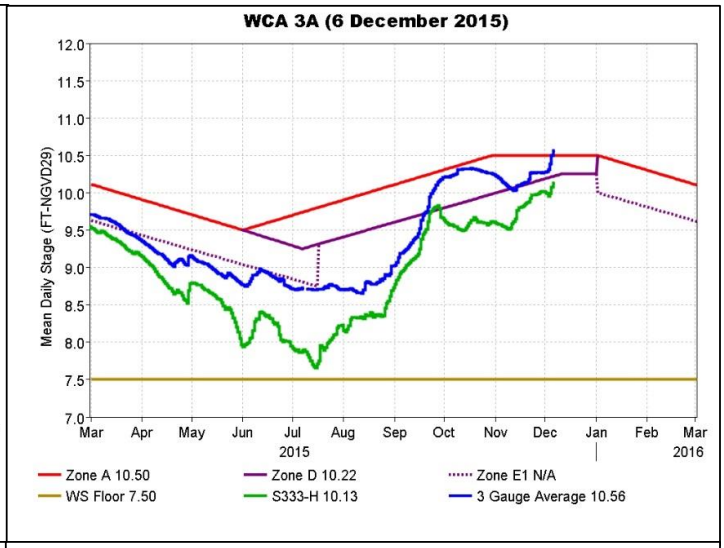
Rainfall was heavy, with basin averages ranging from 2.90 inches to 5.86 inches and the maximum local rainfall of 10.38 inches in Everglades National Park (ENP). Stages increased from 0.24 feet to 0.45 feet throughout the region. Pan evaporation was 0.80 inches, the same as the pre-project average.

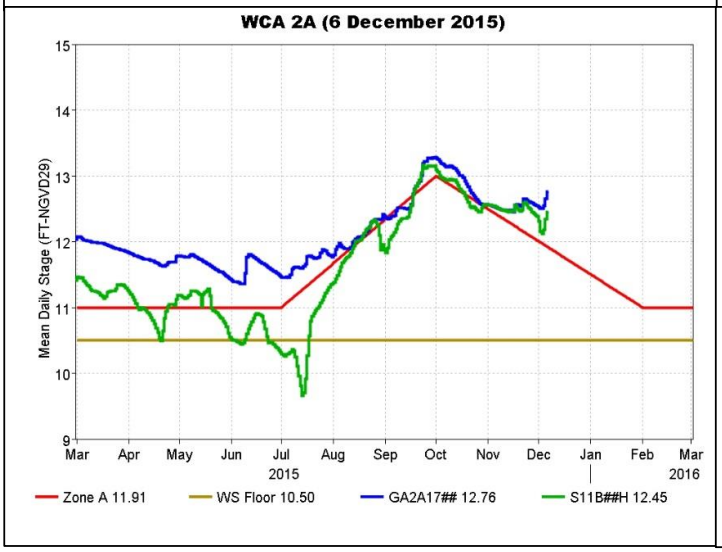
Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	4.53	0.44
WCA-2A	4.38	0.24
WCA-2B	5.86	0.43
WCA-3A	2.90	0.29
WCA-3B	4.46	0.36
ENP	3.91	0.36

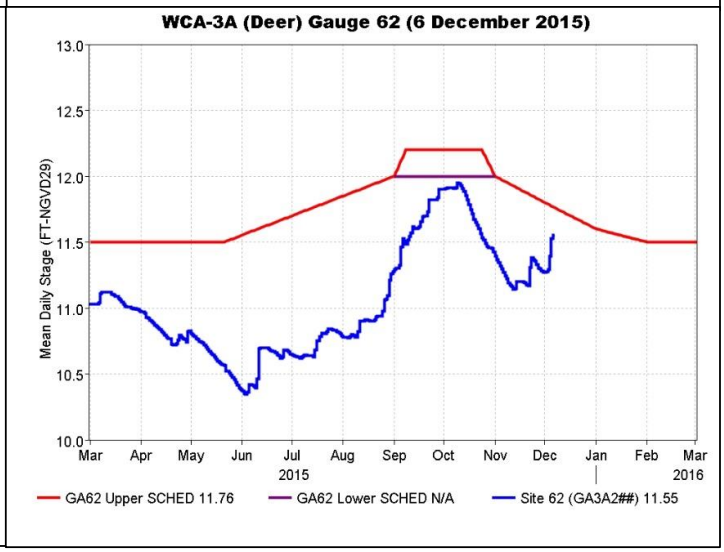


Regulation Schedules: Stage changes rose rapidly at the regulation schedule sites last week and all stages are much higher than they were last week. The WCA-1 stage increased to only 0.02 feet below regulation. The WCA-2A stage is 0.85 feet above the declining regulation line. The three-gauge average stage in WCA-3A has risen into Zone A and is 0.06 feet above regulation. The stage at the northwestern WCA-3A gauge stage (gauge 62) is 0.21 feet below the upper regulation schedule.



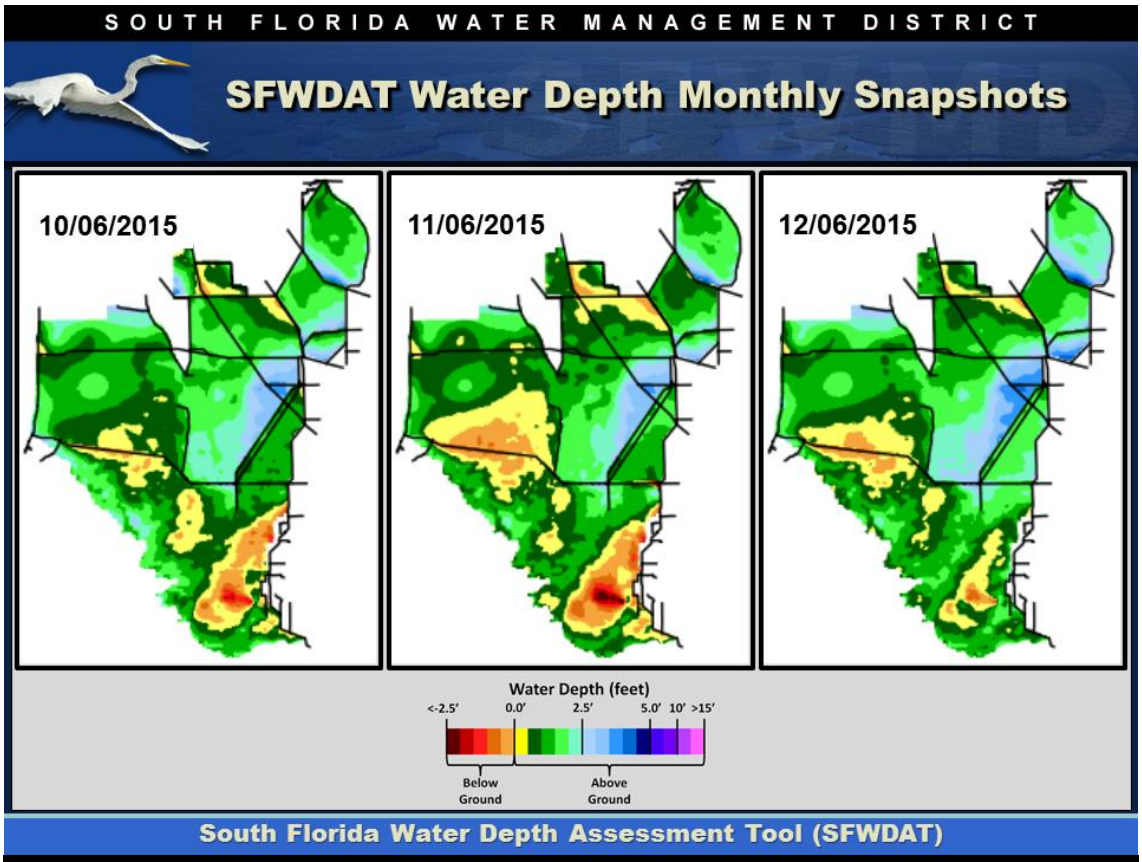


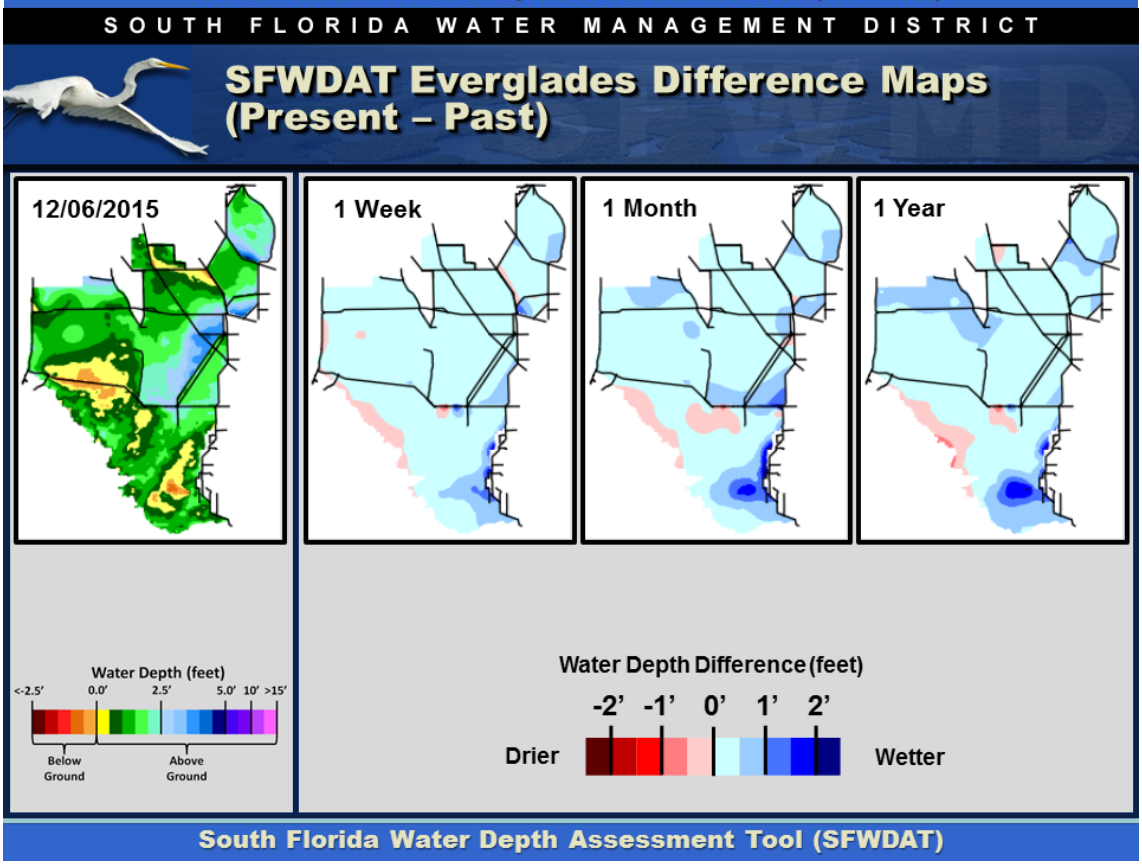




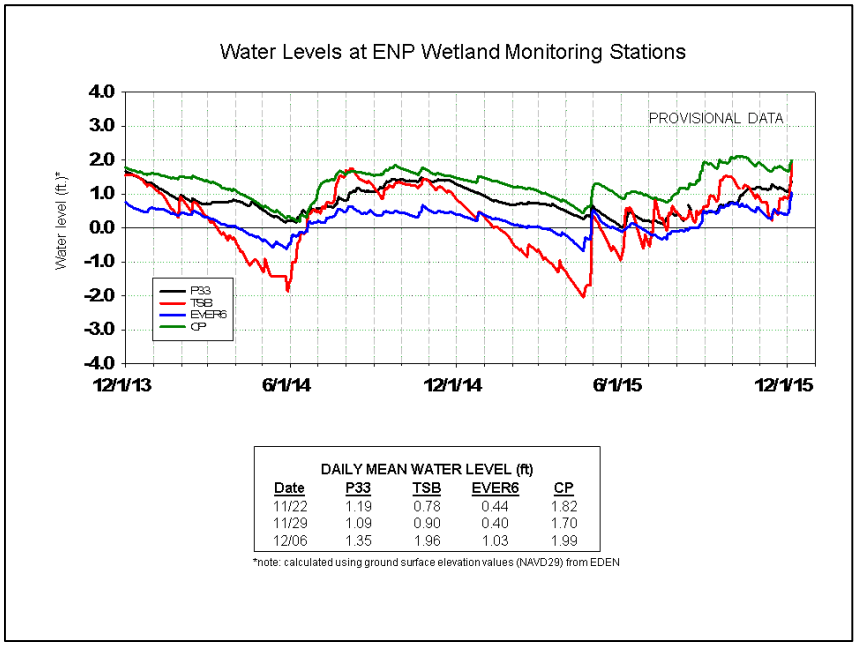
Water Depths and Changes: Water levels in the WCAs and ENP have risen dramatically in the last week and are higher than those one and two months ago. Water depths at the monitored gauges range from 1.46 feet to 2.84 feet (both in WCA-3A), excluding WCA-2B.

Stages are above those last week, a month ago, and a year ago. Stages in the southeastern parts of WCAs 1, 3B, and ENP are over a half foot above those a week ago, and stages are over 1.5 feet above those a month and a year ago in ENP. Individual stage gauges rose from 0.17 feet to 0.46 feet.





Everglades National Park (ENP) and Florida Bay: Water levels increased because of the rain and are now higher than last week and a month ago. Water levels in Taylor Slough are at least six inches above average.



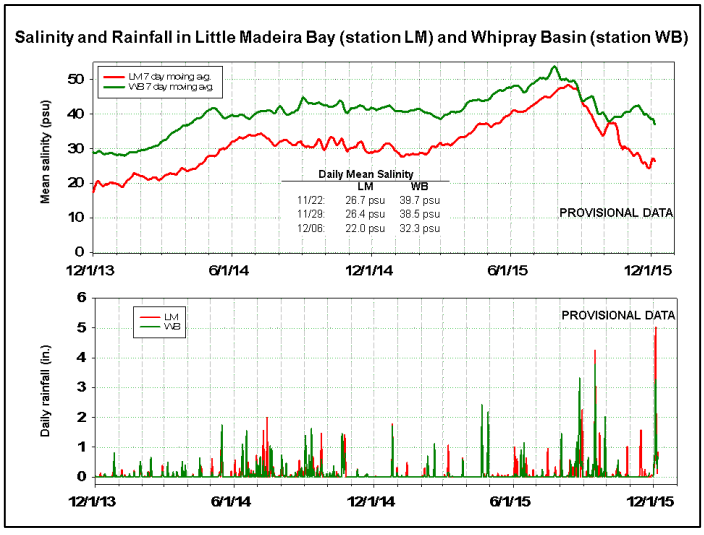
DAILY MEAN WATER LEVEL (ft)

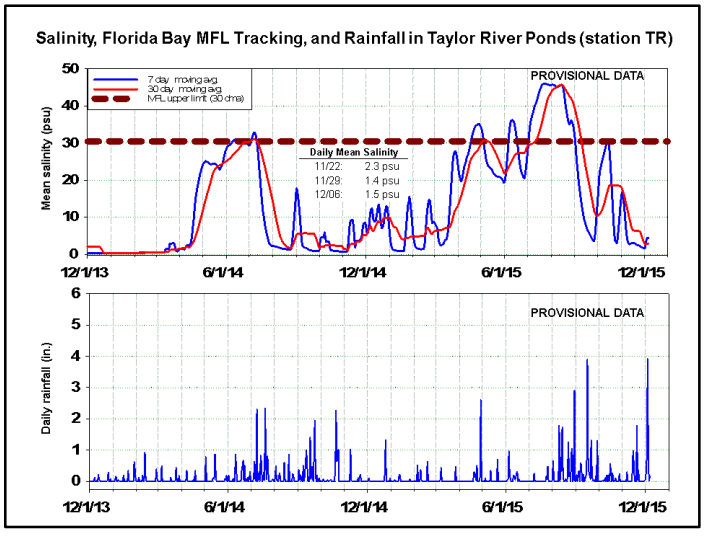
Date	P33	TSB	EVER6	CP
11/22	1.19	0.78	0.44	1.82
11/29	1.09	0.90	0.40	1.70
12/06	1.35	1.96	1.03	1.99

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

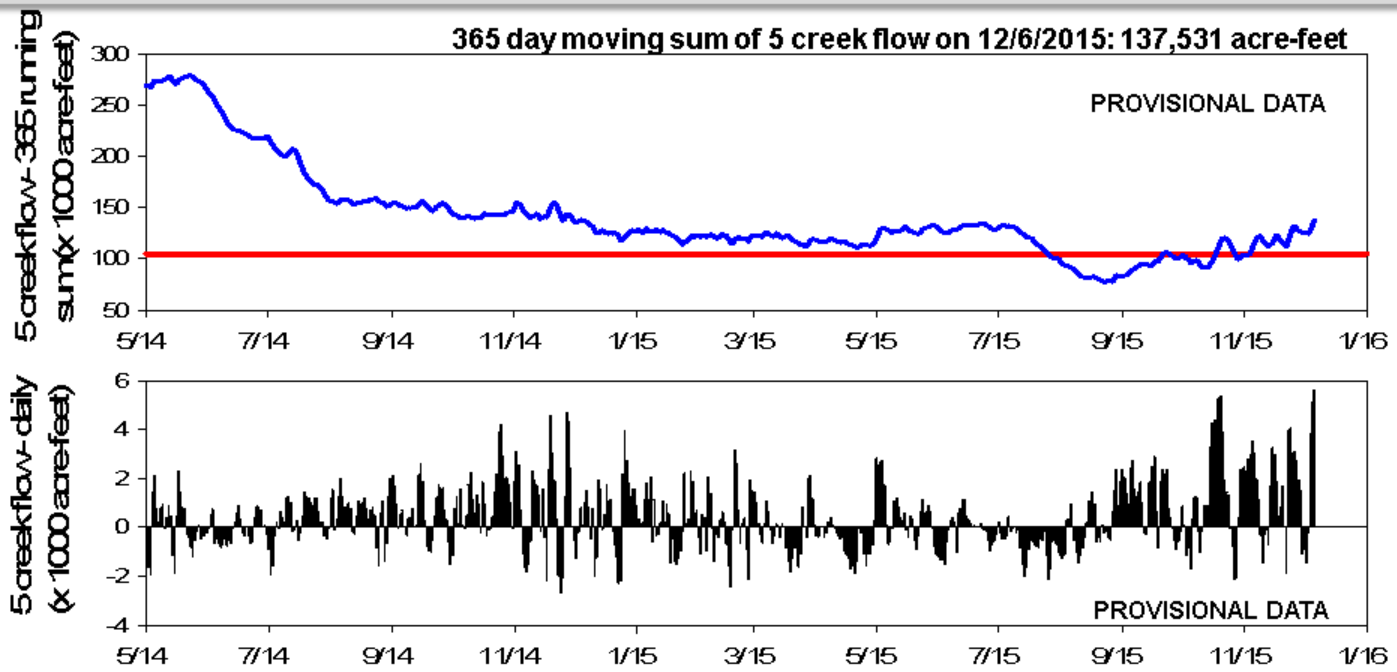
Salinities decreased across the bay as a result of the rain. The largest change this past week was a decrease of 11.7 psu in the C-111 basin nearshore embayments (Long Sound on the west side of US Highway 1). Salinities are still slightly above average with the highest divergence being seven psu in the western nearshore embayments. (Last week, seven psu was the smallest divergence from historic average.) The daily average salinity at the MFL sentinel site of TR returned to 1.5 psu (near average) after a brief pulse up to 10.0 psu last week. The 30-day moving average salinity decreased to 2.9 psu.

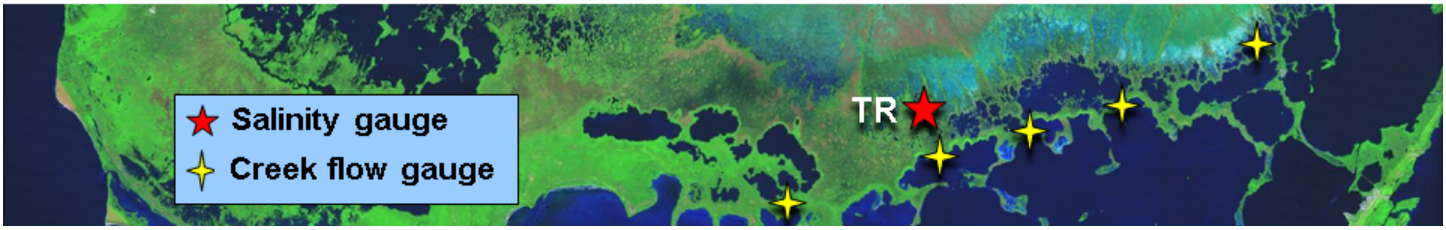
This week, the 365-day running sum of the cumulative flow from the five creeks feeding Florida Bay increased to 137,531 acre-feet. Daily differences in the 365-day running sum of the cumulative flow from the five creeks represents the difference between current daily flow and flow a year ago. For comparison purposes, the average 365-day running sum for the creek flow over the period of WY1997-2014 is 257,628 acre-feet. Cumulative flow from the five creeks last week (November 23-29) was 10,939 acre-feet, about 4,800 acre-feet higher than the average for this time of year and lower than last week (20,300 acre-feet, about 14,000 acre-feet above average). Creek flow is provisional data from the United States Geological Survey (USGS) and is highly variable from day to day.





5 Creek Cumulative Flow and Florida Bay MFL Flow Criteria Tracking





<u>Water management recommendations</u>:

- We recommend moving as much water south into ENP and Florida Bay as possible and for as long as possible because conditions there remain hydrologically poor. The heavy rainfall has provided some short-term improvements.

- Starting in January, regular dry season recession rates are needed to support wading bird foraging and nesting.

- In the short term, no additional inflow into northeastern and northwestern WCA-3A is needed. The average stage for gauges 62 and 63 should remain under 11.60 feet to protect terrestrial wildlife in northern WCA-3A. Currently, this stage is 11.24 feet.

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

Summary of Everglades Recommendations, Dec. 8, 2015 (SFWMD) (red is new text)

Area	Current Condition	Cause(s)	Recommendation	Reasons
WCA-1	Stage increased from 0.44' to 0.45'	Rainfall, ET, management	Follow normal seasonal practices.	Promote native habitat and maintain wetland plant communities. Provide moderate ascension rates to protect habitats and sensitive species and to take advantage of rain events.
WCA-2A	Stage increased 0.24'	Rainfall, ET, management	Follow normal seasonal practices.	Promote native habitat and maintain wetland plant communities. Provide moderate ascension rates to protect habitats and sensitive species and to take advantage of rain events.
WCA-2B	Stage increased 0.42' to 0.44'	Rainfall, ET, management	Follow normal seasonal practices.	High stages generally preclude wading bird use, but can provide good habitat for wading bird foraging as stages drop at the end of the dry season.
WCA-3A NE	Stage increased 0.45'	Rainfall, ET, management	Releases into far northeastern and northwestern 3A are optional for the next few weeks. The average water stage of gauges 62 and 63 should remain under 11.60 feet (11.24' on 12/7) for terrestrial wildlife.	Promote native habitat and maintain wetland plant communities. Provide moderate ascension rates to protect habitats and sensitive species in 3A, and also to allow taking advantage of rain events.
WCA-3A NW	Stage increased 0.29'	Rainfall, ET, management		
Central WCA-3A S	Stage increased 0.24'	Rainfall, ET, management	If El Nino conditions produce higher than normal dry season stages, then additional inflow will not be needed. Stage changes should remain under 0.25' per week and 0.5' over a 2-week period.	Promote native habitat and maintain wetland plant communities. Provide moderate ascension rates to protect habitats and sensitive species in 3A, and take advantage of rain events.
Southern WCA-3A S	Stage increased 0.17'	Rainfall, ET, management		
WCA-3B	Stages increased from 0.31' to 0.46'	Rainfall, ET, management	Follow normal seasonal practices.	Promote native habitat and maintain wetland plant communities. Provide foraging habitat for wading birds.
ENP-SRS	Stage increased 0.36'	ET, rainfall, topography, management	Make discharges to the Park according to the ERTP rainfall plan.	Promote native habitat and maintain wetland plant communities.
ENP-CSSS habitats	S-12A and S-12B are closed to begin the pre-nesting dry-down for spring breeding	Rainfall, ET, management	Follow rainfall plan for releases	Provide habitat and appropriate nesting conditions for CSSS.
Taylor Slough	6-13 inches above average	Rain, ET, inflows	Move water southward as possible	Provide freshwater buffer for ecosystems and freshen saline conditions downstream
FB- Salinity	2-7 psu above average	Rain, ET, inflows, wind	Move water southward as possible	Southward flows are still needed to reverse/slow salinity increases