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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: January 17, 2017

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

Limited shower activity through Thursday. High pressure is bringing mostly dry conditions to the area but a few light showers will blow in from the east each day through Thursday. A low is forecast to move across the eastern U.S. Friday and its trailing cold front will stall across north Florida. This frontal boundary will help flare up scattered afternoon shower and thunderstorm activity mainly over the interior Friday and Saturday. A stronger cold front is then forecast to push through the District Sunday night and Monday with moderate to heavy rains.

Kissimmee

On Sunday, stages in East Lake Toho and Lake Toho were on their respective regulation schedules; stage in Kissimmee-Cypress-Hatchineha was 2.0 feet below schedule. Over the past week, discharge at S65, S65A, and S65E averaged 466, 367, and 392 cfs, respectively. Tuesday morning discharges were ~468 cfs, ~362 cfs, and ~400 cfs, respectively at S65, S65A, and S65E (S65C discharge was not available). Dissolved oxygen data in the Kissimmee River were not available over the past week. Mean floodplain depth on Sunday was 0.07 feet. No new recommendations.

Lake Okeechobee

Lake stage is 14.02 feet NGVD and continues to fall. The current weekly recession rate of 0.08 feet equates to a monthly recession rate of 0.32 feet, which is within the preferred rate of recession. The goal should be to continue to lower Lake levels but at a rate of no more than 0.50 feet per month. A wading bird foraging survey was conducted on Thursday, January 12, 2017 and approximately 3,906 birds were located in 16 flocks. The 2017 snail kite nesting season has begun on the Lake with three new nests in the Moonshine Bay cattail treatment area.

Estuaries

Total discharge to the St. Lucie estuary averages 132 cfs over the past week with 0 cfs (0%) coming from Lake Okeechobee as the USACE has stopped flow through the S-80 structure for the foreseeable future. Salinities increased slightly throughout the estuary. The seven-day average salinity at the US1 Bridge is at the top of the good range for adult oysters. Total inflow to the Caloosahatchee estuary averaged 675 cfs over the past week with 408 cfs (60%) coming from the Lake. The 30-day average surface salinity at the Ft. Myers monitoring station reached 10 on January 2, 2017 and is now at 10.9 constituting 16 consecutive days of exceedance of the Caloosahatchee Minimum Flow and Level. The 30-day average surface salinity at Val I-75 is 5. Salinity conditions for tape grass in the upper estuary are deteriorating. Salinity conditions are good for adult oysters at the Cape Coral Bridge and Shellpoint, while in the fair range at the Sanibel Causeway. The 30-day moving average salinity at the I-75 Bridge

is forecast to reach 7.2 in the next two weeks if no flow comes through the S-79 structure. A flow of 650 cfs is forecast to keep salinity at the I-75 Bridge below 5.

Stormwater Treatment Areas

Over the past week, the STAs/FEBs received approximately 6,100 acre-feet of Lake releases. The total amount of Lake releases sent to the STAs/FEBs in WY2017 (since May 1, 2016) is approximately 158,000 acre-feet. Most STA cells are at or near target depths, except STA-5/6 emergent aquatic vegetation (EAV) cells, which are below target. Operational restrictions are in place for structure repairs and vegetation rehabilitation in STA-1E. This week, if Lake releases are sent to the WCAs and the conditions allow, releases will be sent to STA-2 and STA-3/4.

Everglades

The recession rates ranged from -0.02 to -0.10 feet last week, while the preferred range of recession rates for wading bird foraging during their breeding season is less than -0.09 feet per week, and where possible closer to -0.05 feet per week. There is continued concern that relatively dry conditions and rapid recession rates in the WCAs will negatively impact wading bird breeding as the season progresses. The 30-day moving average salinity at the Florida Bay Minimum Flows and Levels (MFL) site remains at 0.4 psu, and the five creek 365-day cumulative flow into Florida Bay is 311,392 acre-feet (higher than the historic average of 257,628 acre feet).

Supporting Information

KISSIMMEE BASIN

Kissimmee Basin Rainfall

The Upper Kissimmee Basin received 0.53 inches of rainfall in the past week and the Lower Basin received 0.26 inches (SFWMD Daily Rainfall Report 01/13/2017).

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: 1/17/2017		Sunday Departure (feet)											
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)	1/15/17	1/8/17	1/1/17	12/25/16	12/18/16	12/11/16	12/4/16
Lakes Hart and Mary Jane	S62	0	LKMJ	60.9	R	61.0	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0
Lakes Myrtle, Preston, and Joel	S57	15	S57	61.5	R	61.5	0.0	-0.1	-0.1	0.0	0.0	0.0	0.0
Alligator Chain	S60	0	ALLI	63.4	R	64.0	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
Lake Gentry	S63	0	LKGT	61.4	R	61.5	-0.1	-0.1	-0.1	0.0	0.0	-0.1	-0.1
East Lake Toho	S59	28	TOHOE	58.0	R	58.0	0.0	0.1	-0.1	0.0	-0.2	-0.2	-0.2
Lake Toho	S61	0	TOHOW, S61	55.0	R	55.0	0.0	-0.1	-0.2	-0.2	-0.2	-0.2	-0.3
Lakes Kissimmee, Cypress, and Hatchineha	S65	466	LKISSP, KUB011, LKISSB	50.5	R	52.5	-2.0	-1.8	-1.7	-1.6	-1.5	-1.3	-1.1

* 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: 1/17/2017												
Metric	Location	Sunday's 1-day average	Weekly Average**									
			1/15/17	1/8/17	1/1/17	12/25/16	12/18/16	12/11/16	12/4/16	11/27/16	11/20/16	11/13/16
Discharge (cfs)	S-65	468	466	489	555	759	809	821	822	789	777	766
Discharge (cfs)	S-65A	370	367	371	454	639	700	699	698	693	691	695
Discharge (cfs)	S-65C	N/A	N/A	587	700	892	887	909	895	880	898	924
Headwater stage (feet NGVD)		N/A	N/A	30.3	31.2	32.5	32.7	32.8	32.7	32.7	32.7	32.7
Discharge (cfs)	S-65D****	1273	1273	1175	1339	1607	1638	1700	1610	1631	1700	1752
Discharge (cfs)	S-65E	362	392	432	581	774	779	773	781	800	811	849
DO concentration (mg/L)***	Phase I river channel	N/A	7.62	N/A	N/A	7.02	7.17	7.06	7.46	7.28	6.65	6.78
Mean depth (feet)*	Phase I floodplain	0.07	0.07	0.07	0.09	0.12	0.13	0.14	0.15	0.16	0.19	0.22

* 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

Water Management Recommendations

Kissimmee Basin Adaptive Recommendations and Operational Actions

Date	Recommendation	Purpose	Outcome	Source
1/17/2017	No new recommendations.			
1/10/2017	No new recommendations.			
12/2/2016-1/3/2017	Reduce discharge at S65 to minimum (300 cfs +/- 50 cfs) using the table in Figure 8a. Continue reducing headwater stage at S65C at a rate of ~1 ft/week through mid-January per request from USACE.	To facilitate KRRP construction in Pool BC.	Implemented	USACE/WCO /KB Ops
12/20/2016	No new recommendations.			
12/13/2016	No new recommendations.			
12/6/2016	No new recommendations.			
11/29/2016	No new recommendations.			
11/22/2016	No new recommendations.			
11/15/2016	No new recommendations.			
11/8/2016	No new recommendations.			
10/25/2016	Allow S65C headwater stage to decline to approximately 33 feet NGVD over the next few days.	To help reduce stage in Pool C to facilitate MacArthur Ditch backfilling	Implemented	USACE/ KB Ops
10/24/2016	No new recommendations.			
10/17/2016	Temporarily reduce discharge at S65A to 700 cfs following the discharge rampdown schedule in Figure 8a.	To facilitate MacArthur Ditch backfilling over the next 2-3 weeks.	Implemented	KB Operations
10/10/2016	No new recommendations.			
10/3/2016	No new recommendations.			
9/27/2016	<ul style="list-style-type: none"> • Begin reducing discharge when Ops and management feel the time is right (could be now) • Use the discharge table below to ramp down to 1400 cfs; however, if stage should stop declining or start to rise during the rampdown, hold the current discharge unless stage begins to decline again • If KCH stage reaches ~50.5 ft, hold ~1400 cfs while KCH stage is at or above ~50.5 ft, then: <ul style="list-style-type: none"> • If KCH stage declines below ~50.5 ft, continue reducing discharge, potentially to minimum discharge. However, if stage stops declining or starts to rise during the rampdown, hold or increase current discharge until stage begins to decline again or until it rises to ~50.5 ft • If KCH stage rises or stays above ~50.5 ft, hold ~1400 cfs unless stage approaches ~0.25 ft below the regulation line. If stage continues to rise into this buffer zone, use the discharge table to ramp up in anticipation of flood control releases 	To the extent possible, avoid repeated wet/dry cycles in the Kissimmee River floodplain and extend the period of continuous floodplain inundation without decreasing lake stage too much. The recommendation is similar to the discharge plan used last wet season that balanced the river, the KCOL, and downstream waterbodies.	TBD	KB Operations
9/20/2016	No new recommendations.			
9/13/2016	No new recommendations.			
9/6/2016	No new recommendations.			
8/30/2016	Use figure 8a as possible for discharge rampup/rampdown at S65/S65A.			
8/23/2016	No new recommendations.			
8/16/2016	No new recommendations.			
8/9/2016	No new recommendations.			
8/2/2016	No new recommendations.			
7/26/2016	No new recommendations.			
7/19/2016	No new recommendations.			
7/12/2016	No new recommendations.			

KCOL Hydrographs (through Sunday midnight)

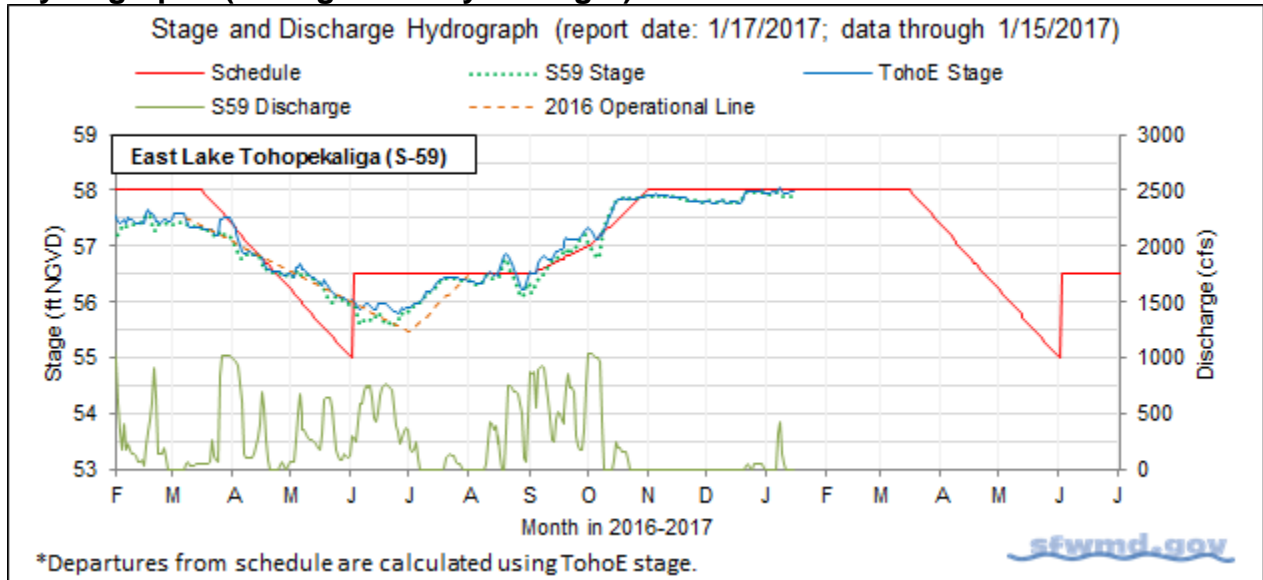


Figure 1.

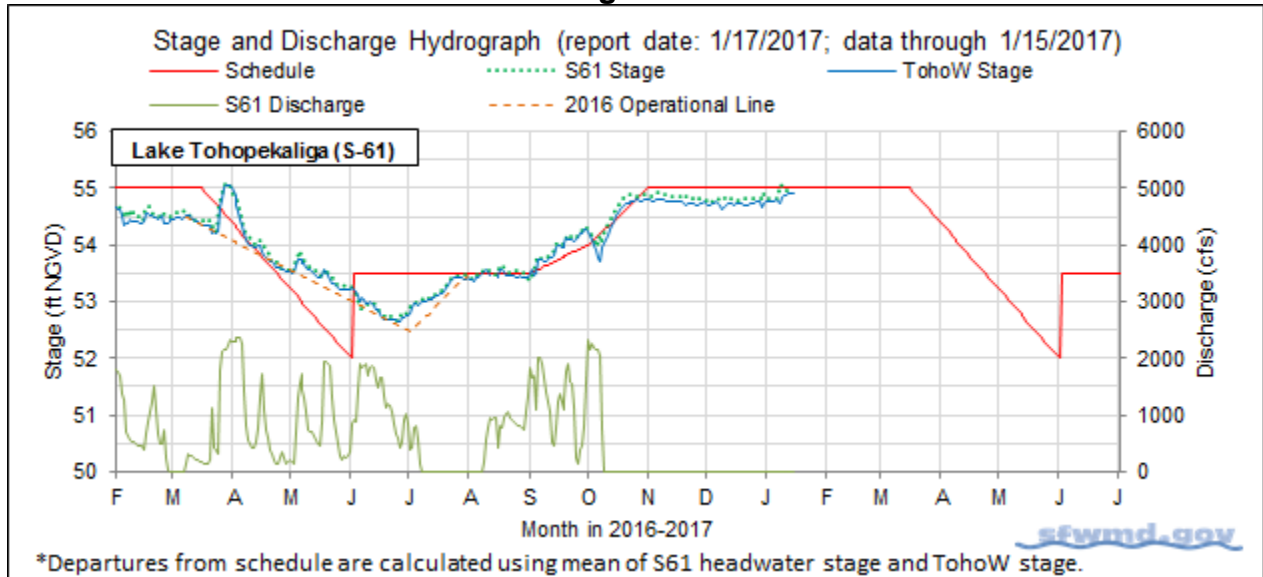


Figure 2.

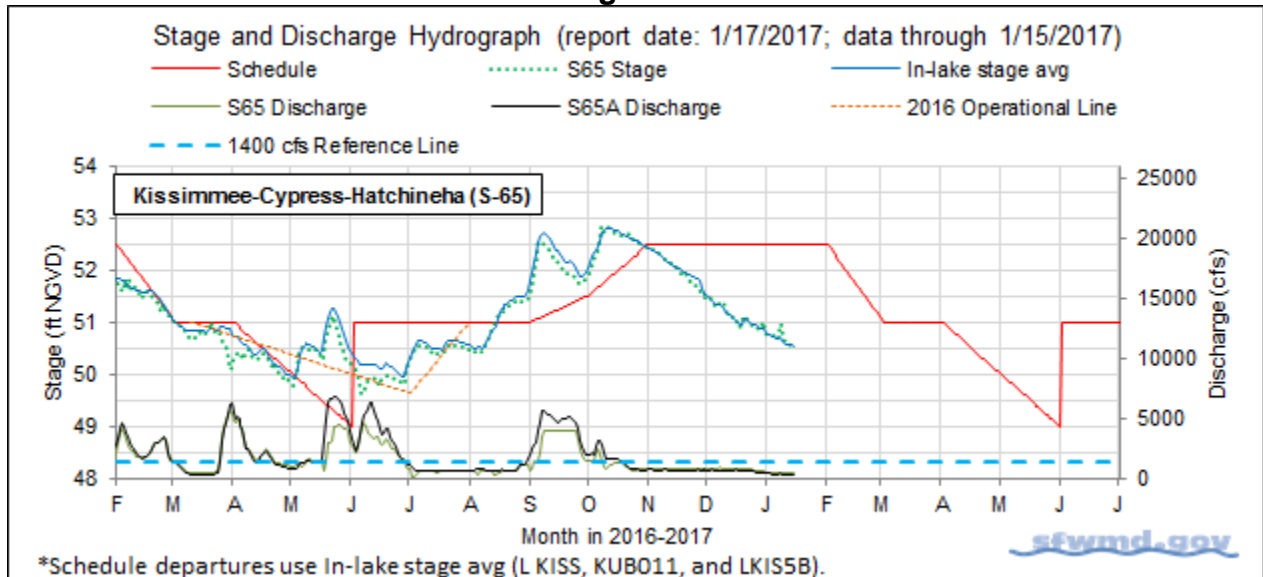


Figure 3.

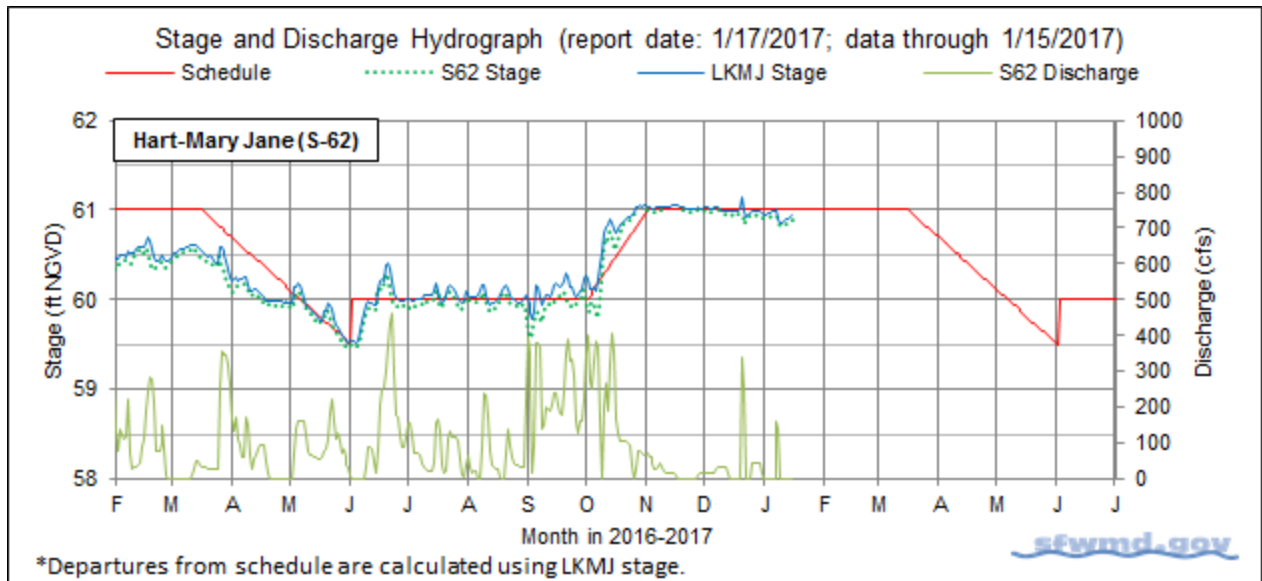


Figure 4.

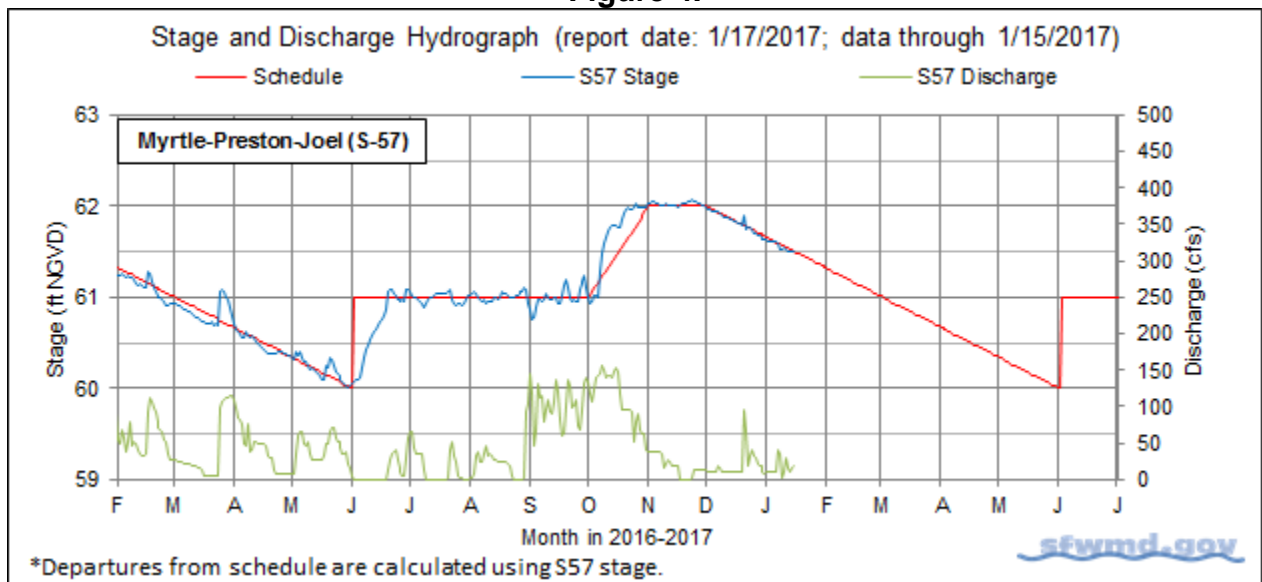


Figure 5.

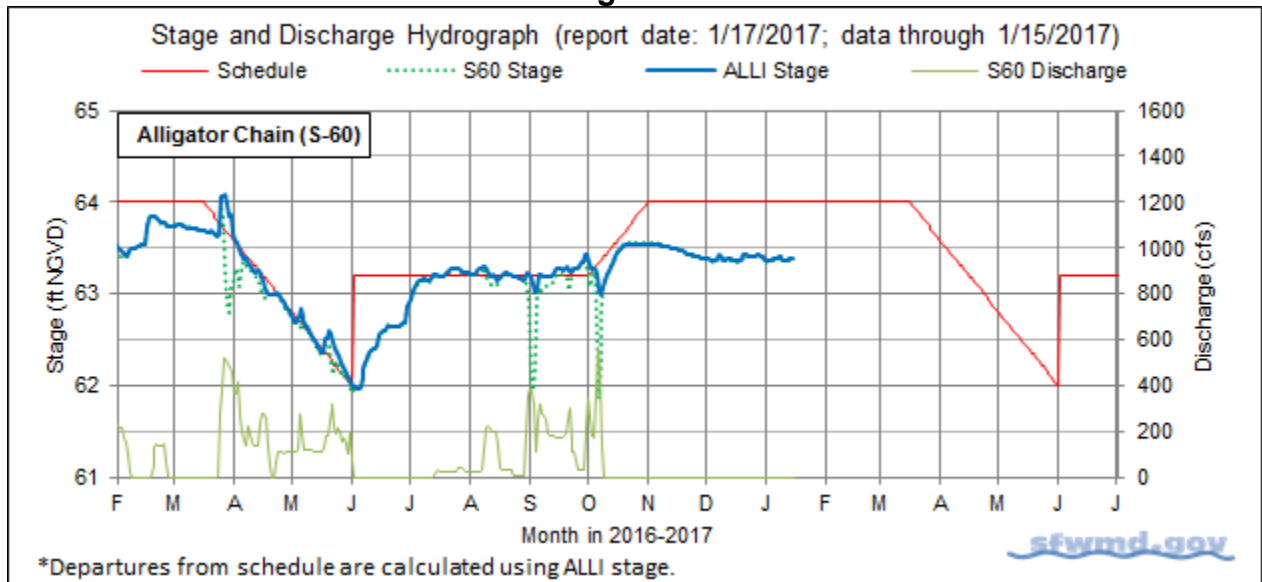


Figure 6.

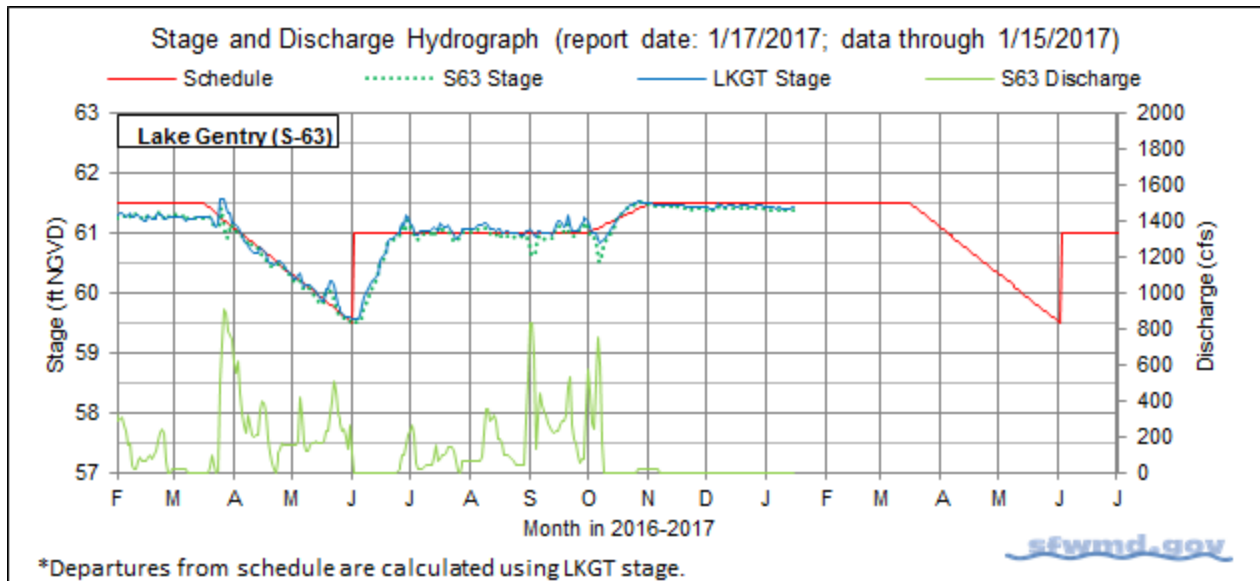


Figure 7.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Limits on Rate of Discharge Change at S65/S65A During Dry Season 2016-2017

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

15

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

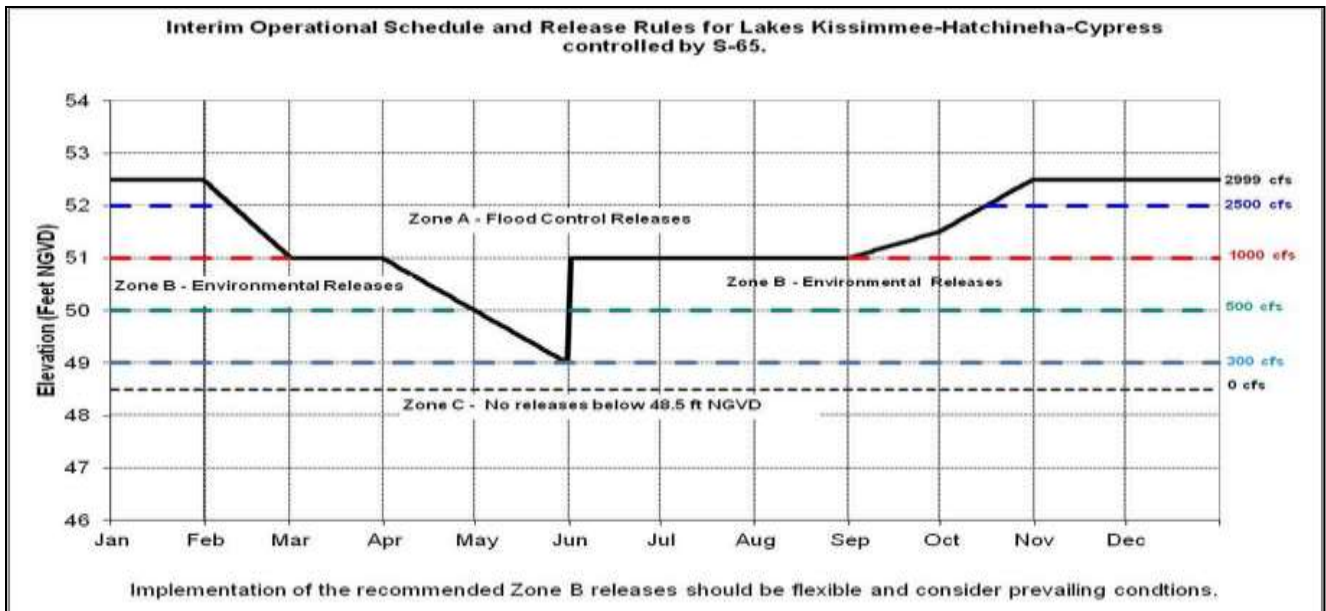


Figure 8b. Interim operations schedule for S-65. The discharge schedule shown to the right has not been used in recent years or in Wet Season 2015.

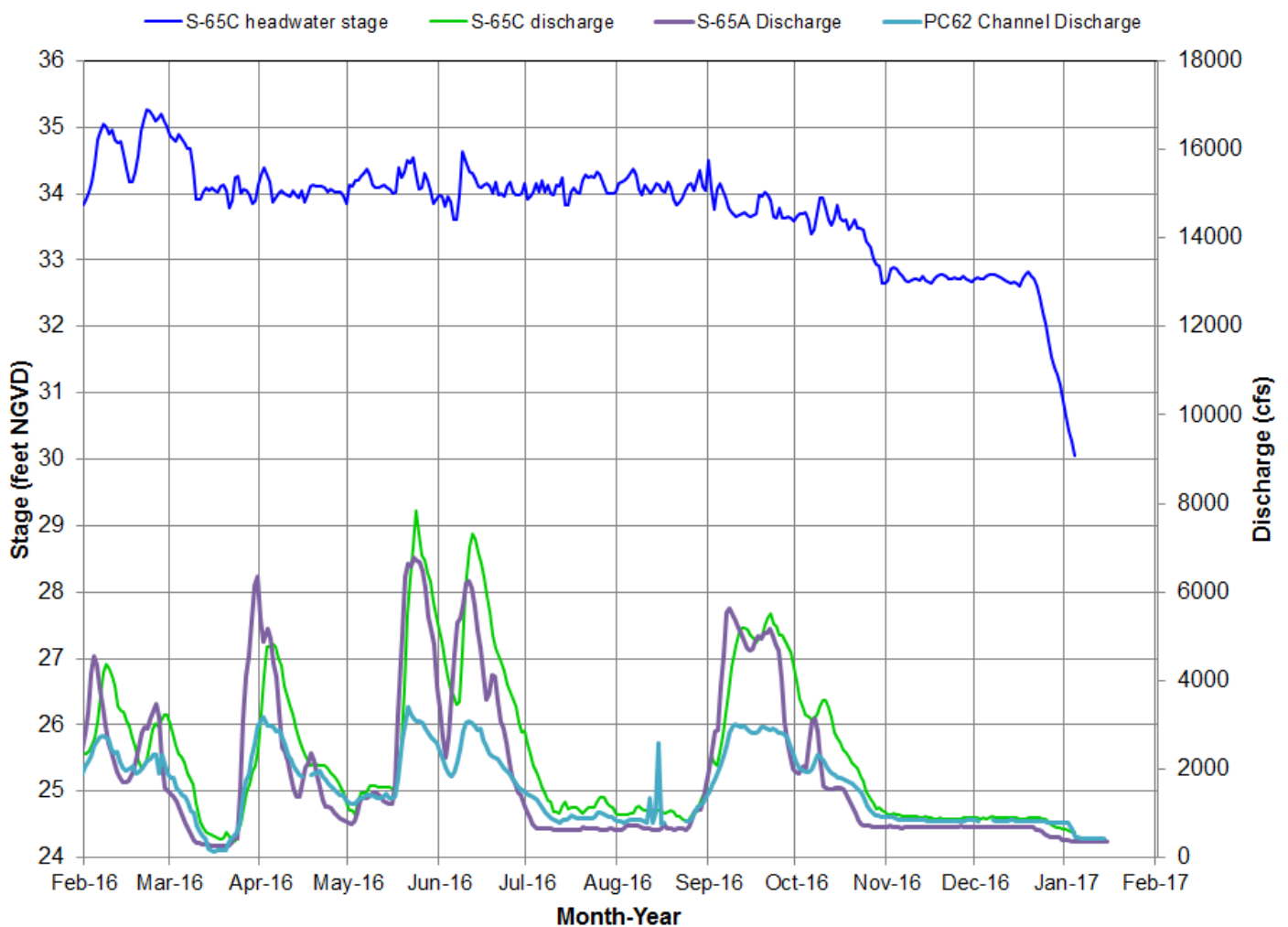


Figure 9. S-65C headwater stage in relation to discharge at S-65C, S-65A, and PC62.

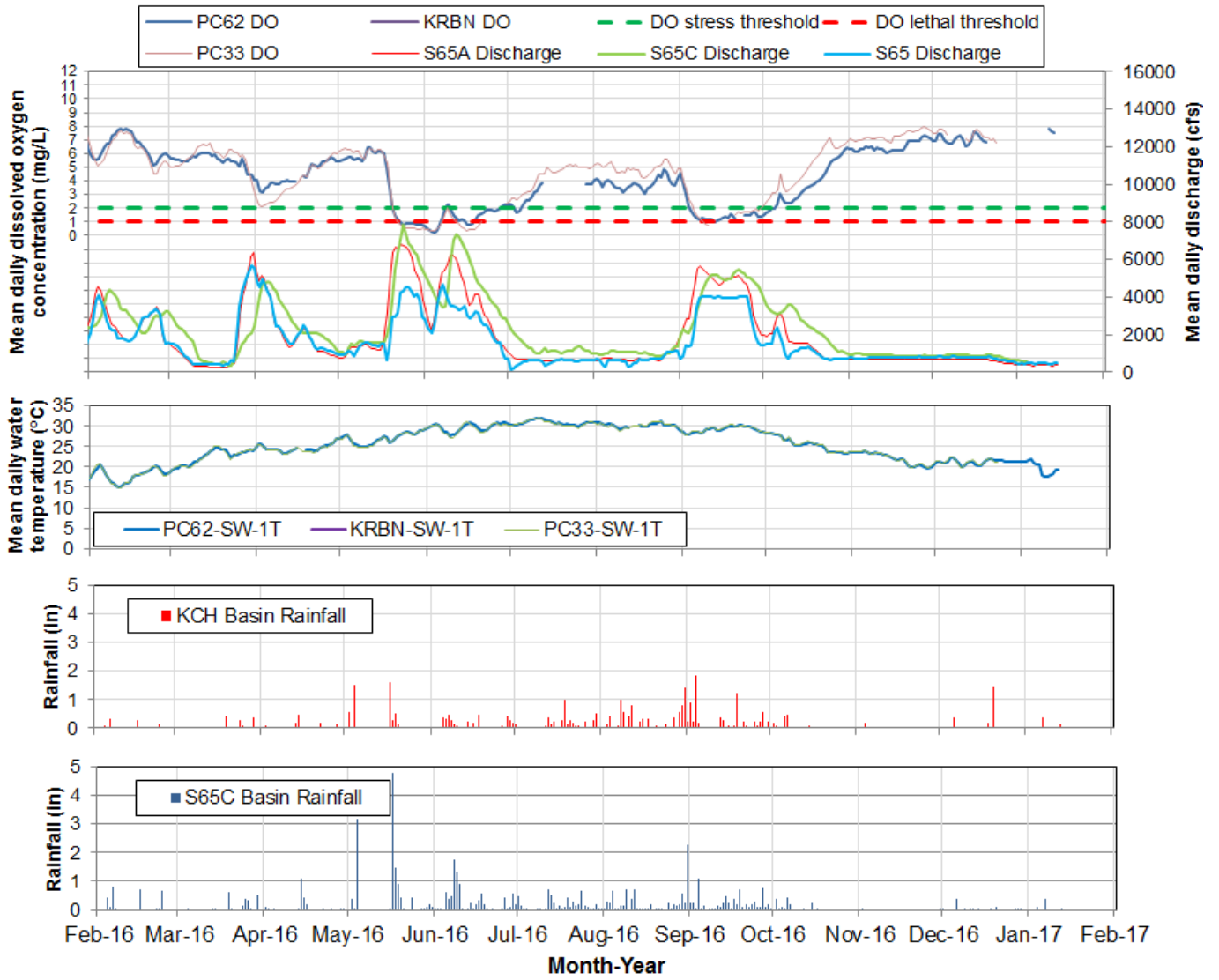


Figure 10. Mean daily Dissolved Oxygen, discharge, temperature and rainfall in the Phase I river channel.

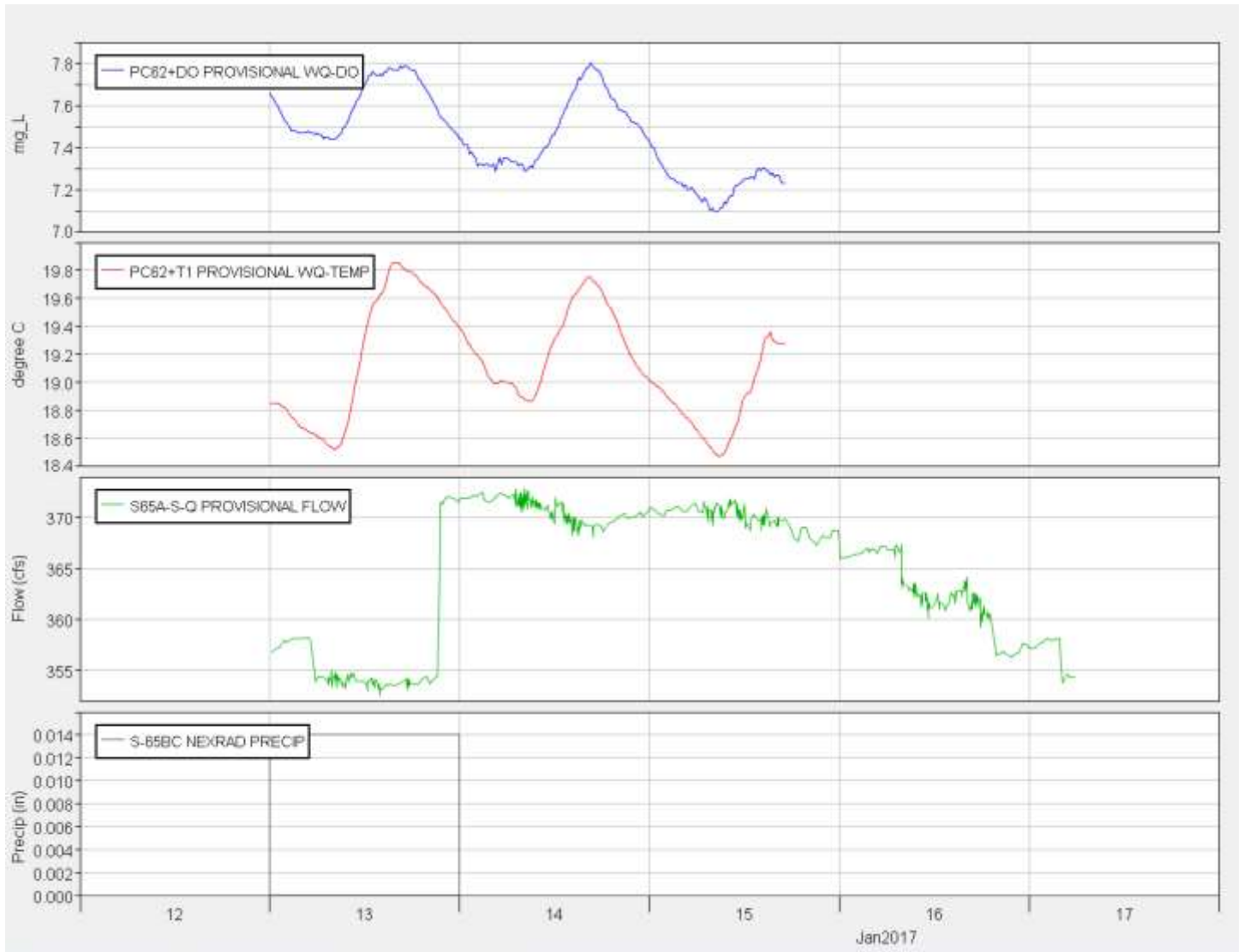


Figure 11. Phase I river channel dissolved oxygen and water temperature (measured at 15 minute intervals) and Pool BC daily rainfall.

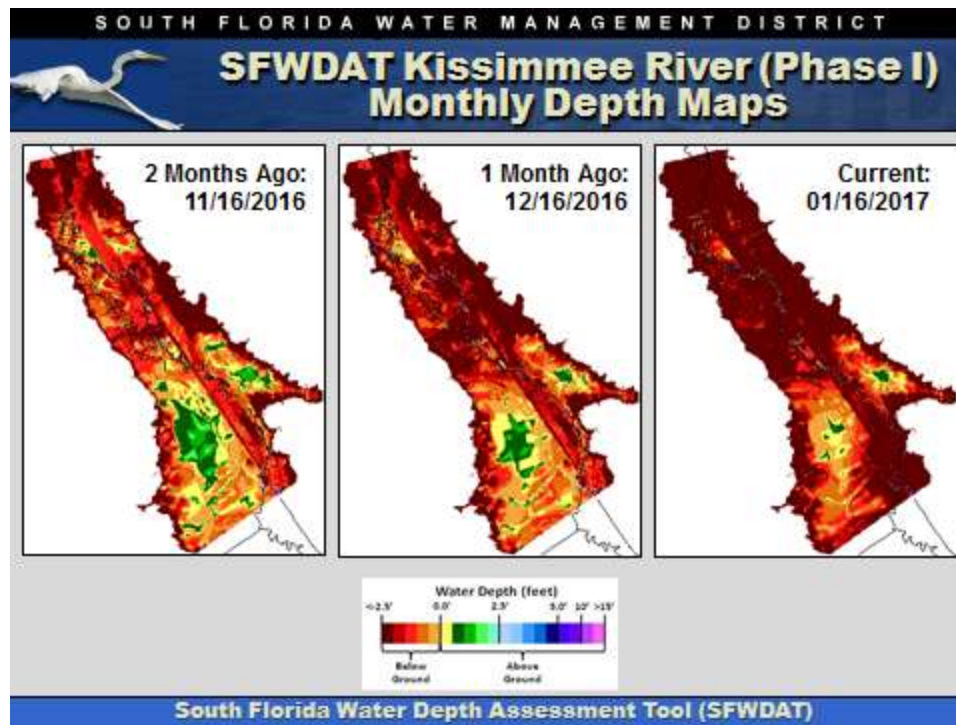
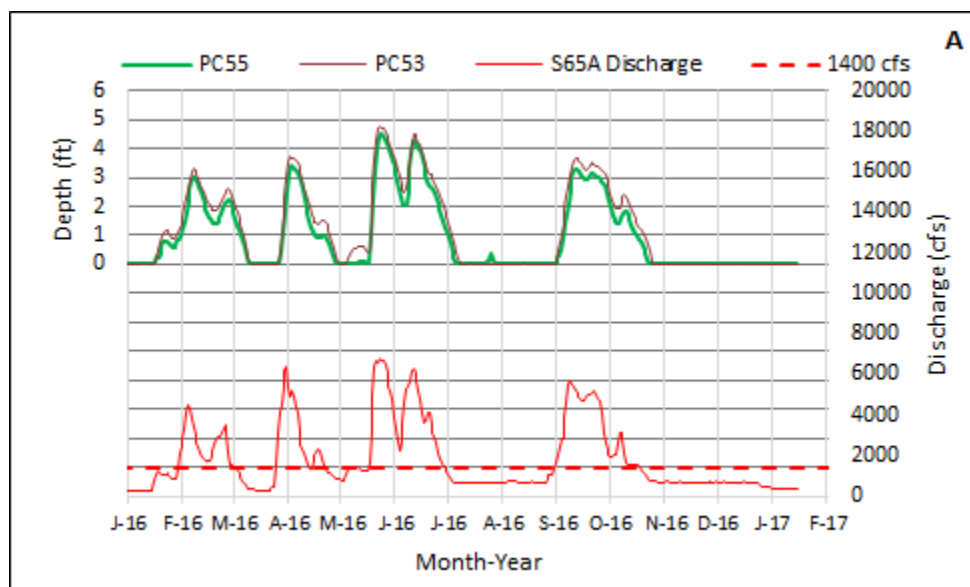
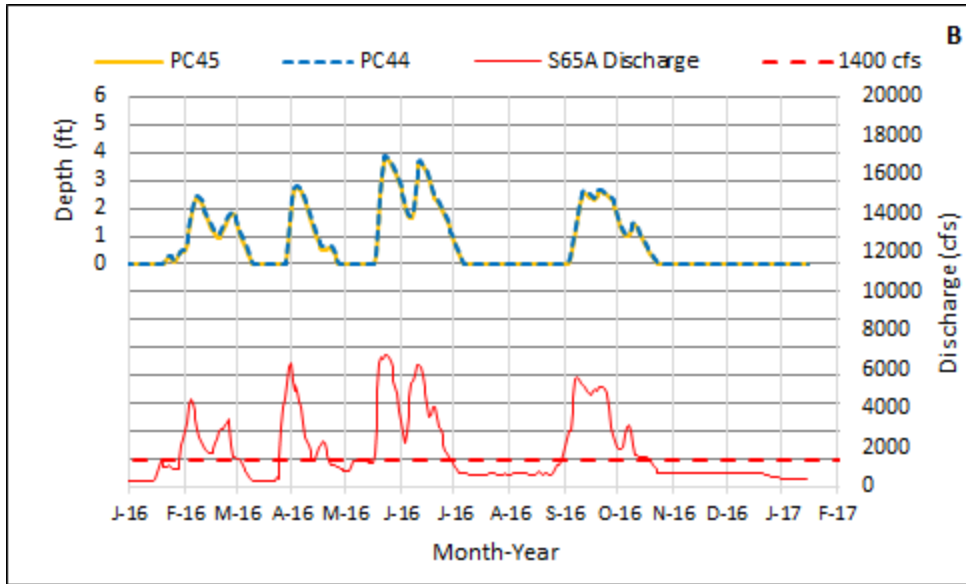


Figure 12. Phase I area floodplain water depths for this week, one month ago, and two months ago. Note that the WDAT color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to Jan. 16, 2012.





Insert. Water depth at selected northern Kissimmee River floodplain sites on (A) the PC5's transect and (B) the PC4's transect, with S65A discharge.

Kissimmee River Hydrographs

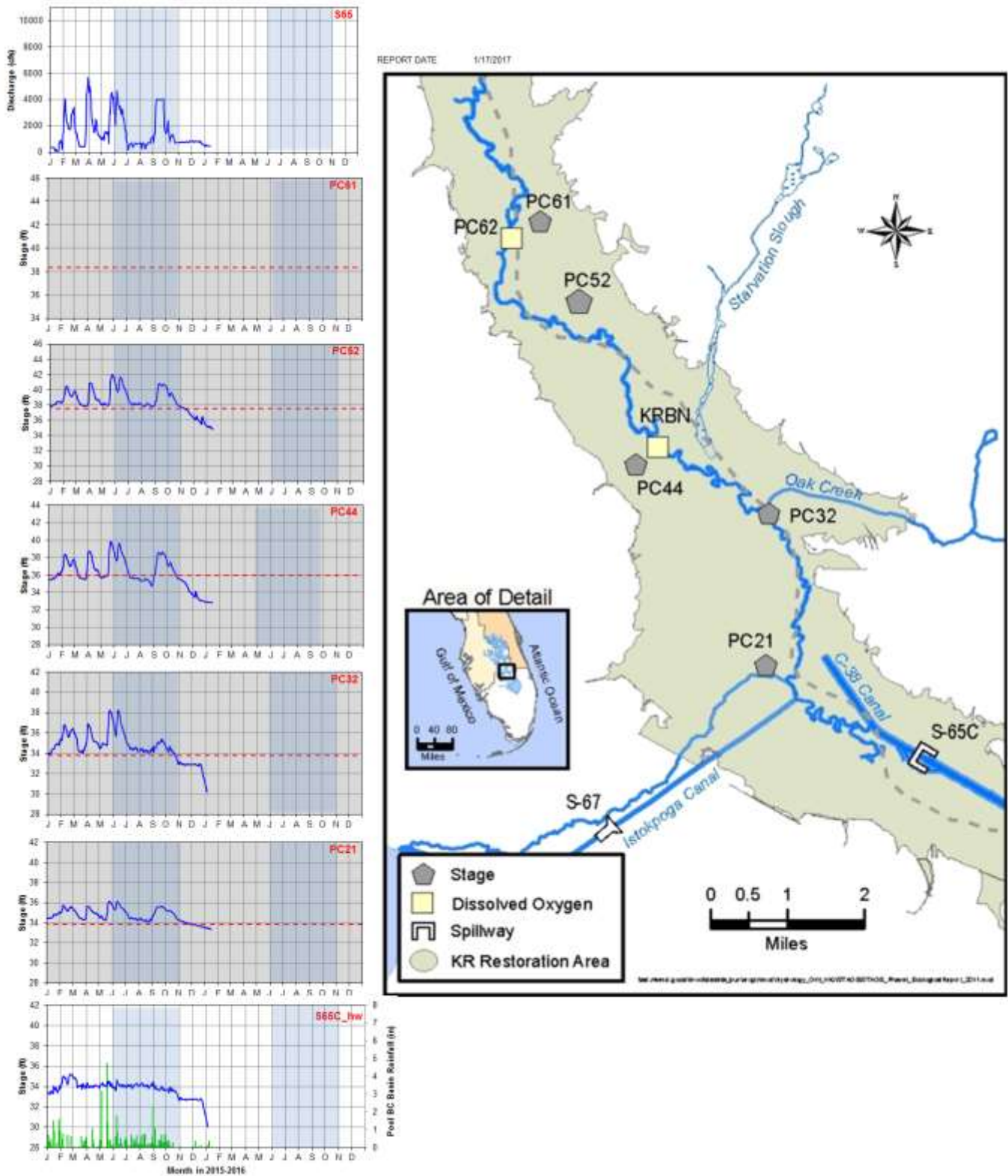


Figure 13. Discharge at S65, stages at five monitoring stations in the Phase I area of the Kissimmee River floodplain, and headwater stage at S65-C since January 1, 2015. The most recent data (~2 weeks) are provisional real-time data from SFWMD DualTrend; previous data are from SFWMD DB-HYDRO (validated).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

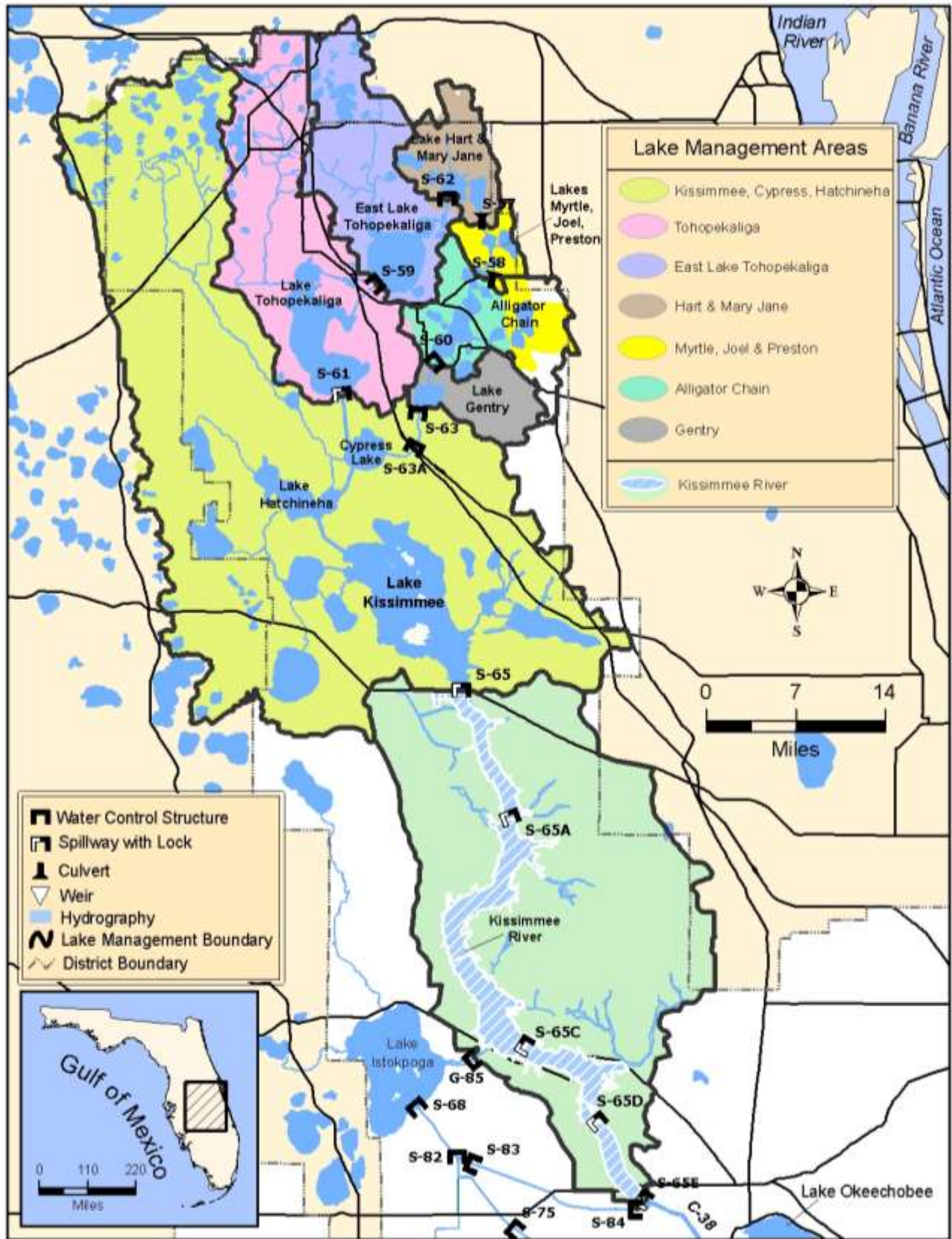


Figure 14. The Kissimmee Basin

LAKE OKEECHOBEE

According to the USACE web site, Lake Okeechobee stage is at 14.02 feet NGVD for the period ending at midnight on January 15, 2017. This value is based on the use of four interior Lake stations (L001, L005, L006, and LZ40) and four perimeter stations (S352, S4, S308 and S133). Lake stage decreased by 0.08 feet over the past week and is 0.53 feet lower than it was a month ago and 0.85 feet lower than it was a year ago (Figure 1). The Lake is currently in the Low sub-band (Figure 2). According to RAINДАР, 0.002 inches of rain fell directly over the Lake during the past seven days (Figure 3). The Kissimmee Valley and areas to the south east of the Lake experienced slightly greater amounts while the highest rainfall was along the lower east coast.

Based on USACE reported values, current Lake inflow is approximately 238 cfs as detailed below.

Structure	Flow cfs
S65E	362
S154	0
S84 & 84X	0
S71	2
S72	0
C5 (Nicodemus slough dispersed storage)	-127
S191	0
S133 PUMPS	0
S127 PUMPS	0
S129 PUMPS	0
S131 PUMPS	0
S135 PUMPS	0
Fisheating Creek	1
S2 Pumps	0
S3 Pumps	0
S4 Pumps	0

Current Lake outflow is approximately 2,753 cfs with 1,369 cfs exiting at S77, 213 cfs exiting at S308 and 239 cfs exiting the L8 canal through Culvert 10A. Approximately 941 cfs is being directed south through S351, S352 and S354. An additional 9 cfs is backflowing at Culvert S127. Corrected evapotranspiration value based on the L006 weather platform solar radiation data for this past week was 1,717 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.

Based on the Lake Okeechobee wading bird habitat suitability index, there are currently approximately 46,591 acres of suitable foraging habitat for long-legged birds and 25,591 acres for long and short-legged birds on the Lake (Figure 5). A wading bird foraging survey was conducted on Thursday, January 12 and approximately 3,906 birds were located in 16 flocks (Figure 6).

The Fish and Wildlife Commission reported that the 2017 snail kite nesting season has begun. The survey crew found three nests in the Moonshine Bay cattail treatment area (Figure 7). This area was heavily utilized by the snail kites last year.

The most recent available MODIS satellite images (January 6 and 9, 2017) indicate low bloom potential; however, effects of cloud cover make interpretation difficult on the January 9 image (Figure 8).

Water Management Recommendations

Lake stage is 14.02 feet NGVD and continues to fall. The current weekly recession rate of 0.08 feet equates to a monthly recession rate of 0.32 feet, which is within the preferred range. A too rapid decrease in Lake levels may jeopardize the upcoming wading bird season by drying out foraging locations too early in the winter.

From an ecological perspective, high Lake levels over the past spring and summer resulted in a loss of submerged aquatic vegetation (SAV) and increased cyanobacterial blooms and associated toxins. Near optimal Lake stages will be necessary this coming spring and summer to provide conditions conducive to the reestablishment of the submerged aquatic vegetation acreage lost this year due to high Lake stages.

The goal should be to continue to lower Lake levels but at a rate of no more than 0.50 feet per month. Actions which contribute to a steady but slow recession and avoid reversals are essential to protect critical components of the Lake's floral (bulrush and SAV) and faunal (wading birds, snail kites and fish) communities.

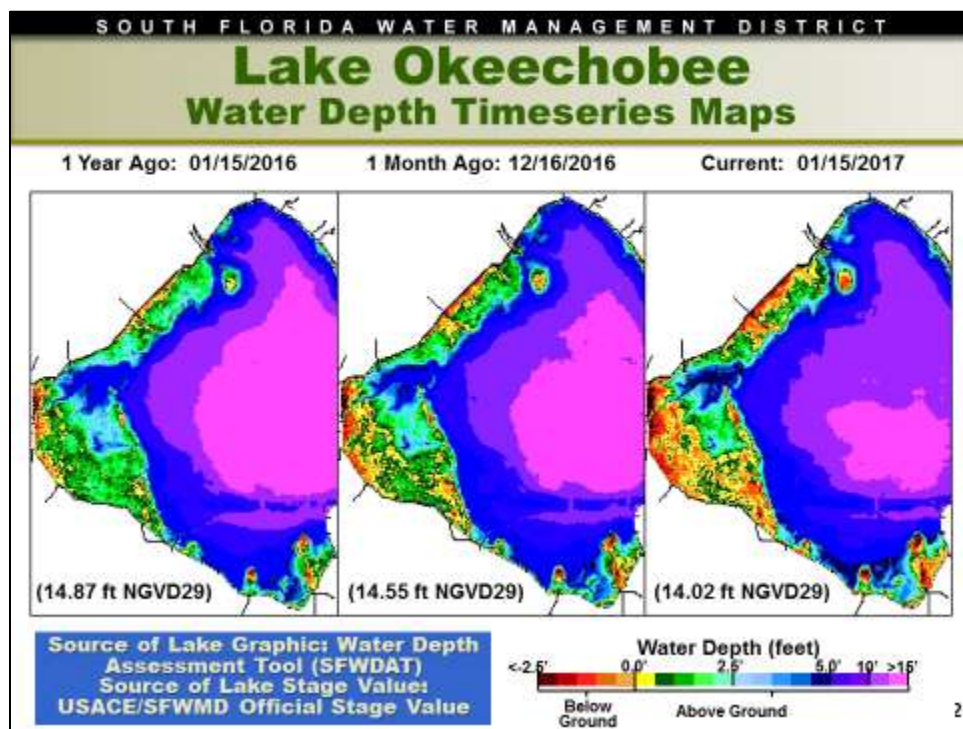


Figure 1

Weekly Stage Hydrograph

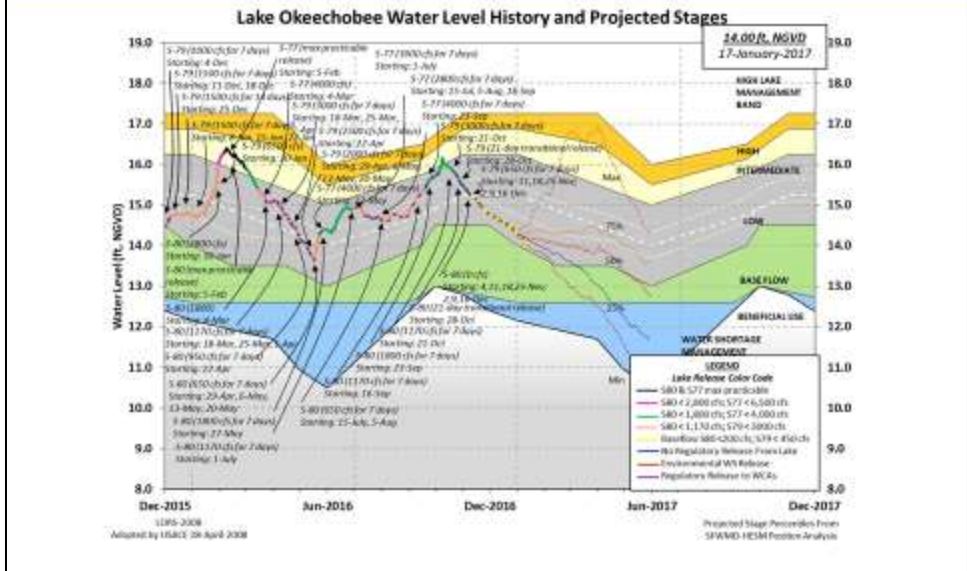
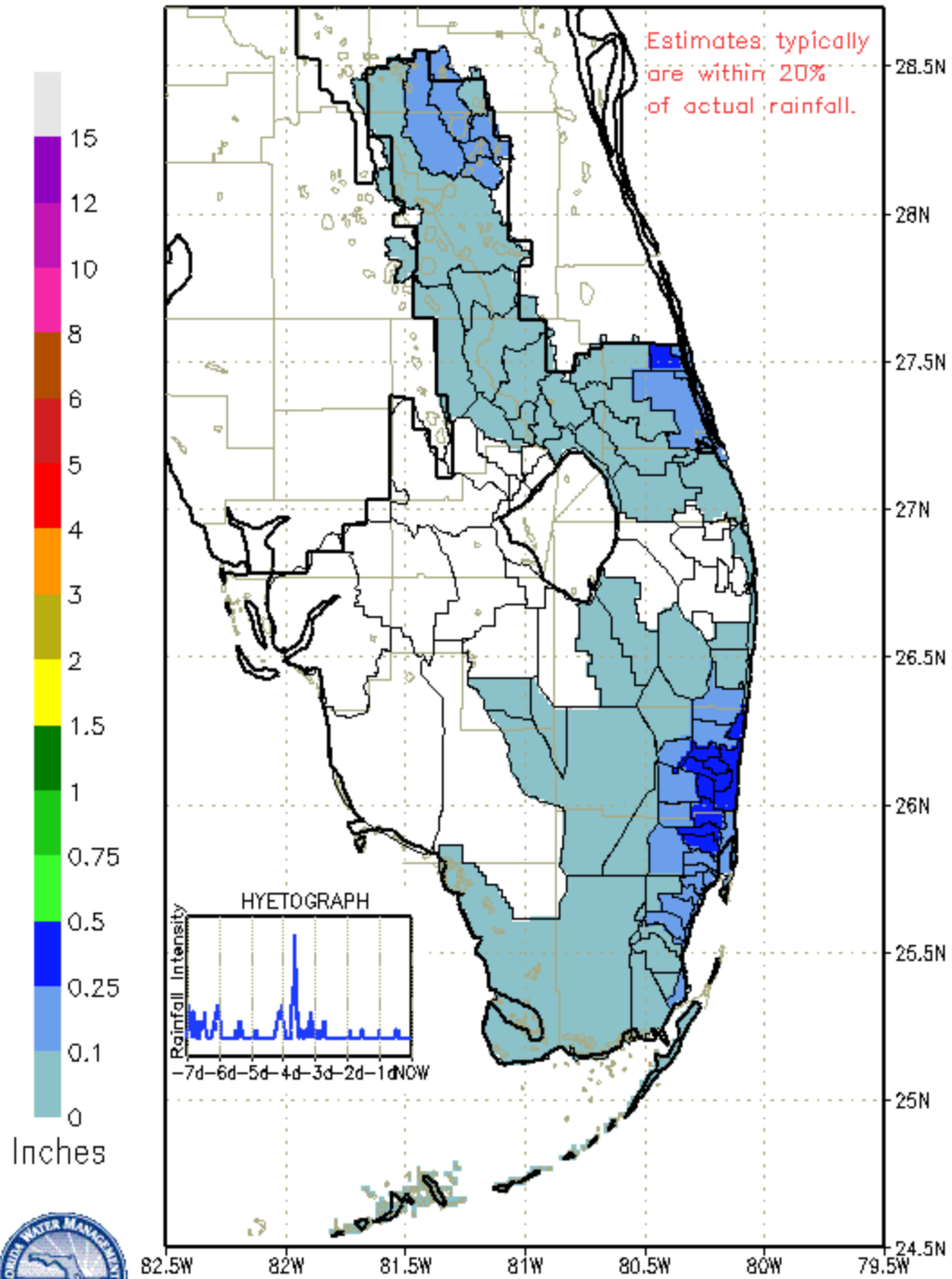


Figure 2

SFWMD PROVISIONAL RAINFAR 7-DAY BASIN RAINFALL ESTIMATES

FROM: 0615 EST, 01/10/2017 THROUGH: 0615 EST, 01/17/2017



DISTRICT-WIDE RAINFALL ESTIMATE: 0.043"

Figure 3

INFLOWS	Average Daily Flow Past Week cfs	Feet of Change Past Week
S65E	393	0.014
S71 & 72	0	0.000
S84 & 84X	0	0.000
Fisheating Creek	9	0.000
Rainfall	N.A.	0.000
OUTFLOWS	Average Daily Flow Past Week cfs	Feet of Change Past Week
S77	875	0.030
S308	170	0.006
S351	729	0.025
S352	512	0.018
S354	415	0.014
L8	321	0.011
ET	1717	0.059

Figure 4

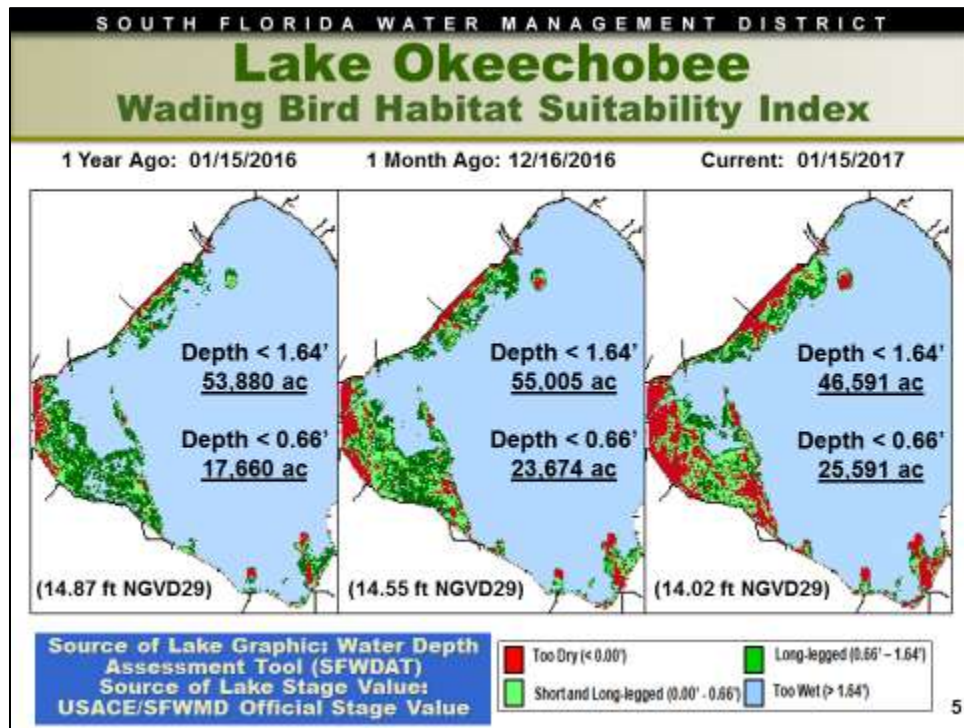


Figure 5

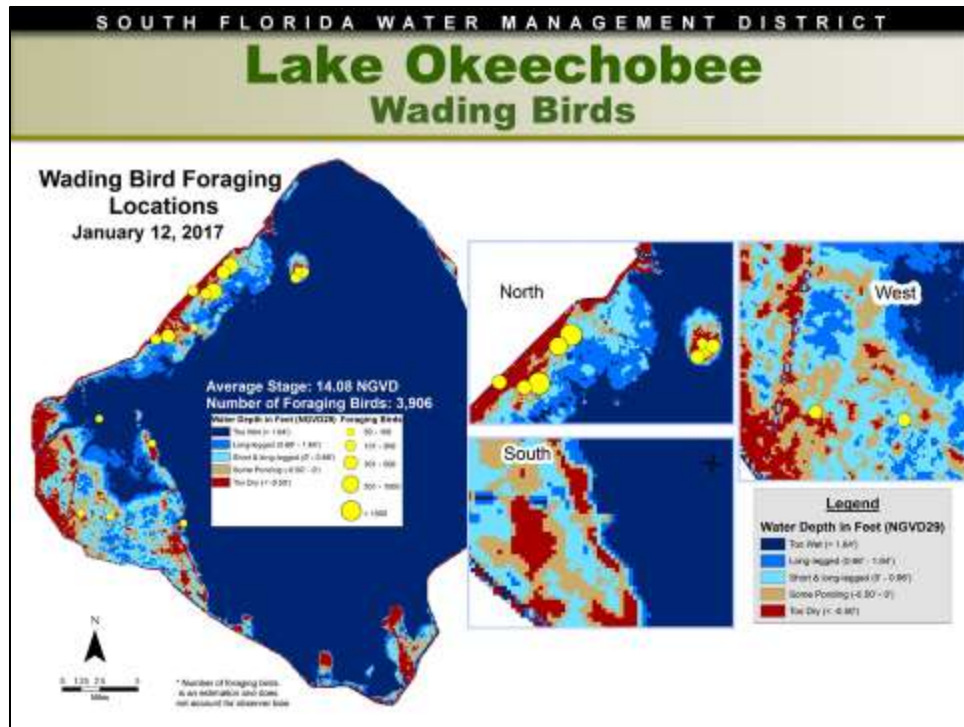


Figure 6



Figure 7

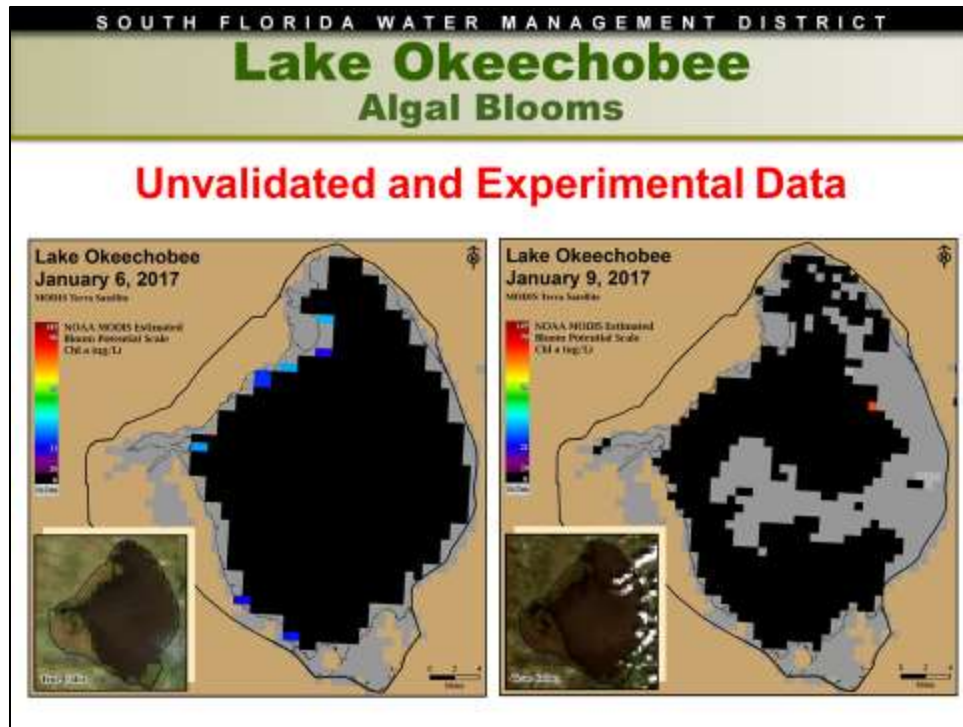


Figure 8

Lake Istokpoga

The Lake Istokpoga regulation schedule is at winter pool stage of 39.50 feet NGVD. Lake stage is 39.35 feet NGVD and is currently 0.15 feet below regulation stage (Figure 9). Average flows into the Lake from Arbuckle and Josephine creeks were 88 cfs and 20 cfs respectively, which is similar to last week's total flows. Average discharge from S68 and S68X this past week was 106 cfs, which is also similar to the previous week flows. According to RAINДАР, 0.018 inches of rain fell in the Lake Istokpoga watershed during the past seven days.

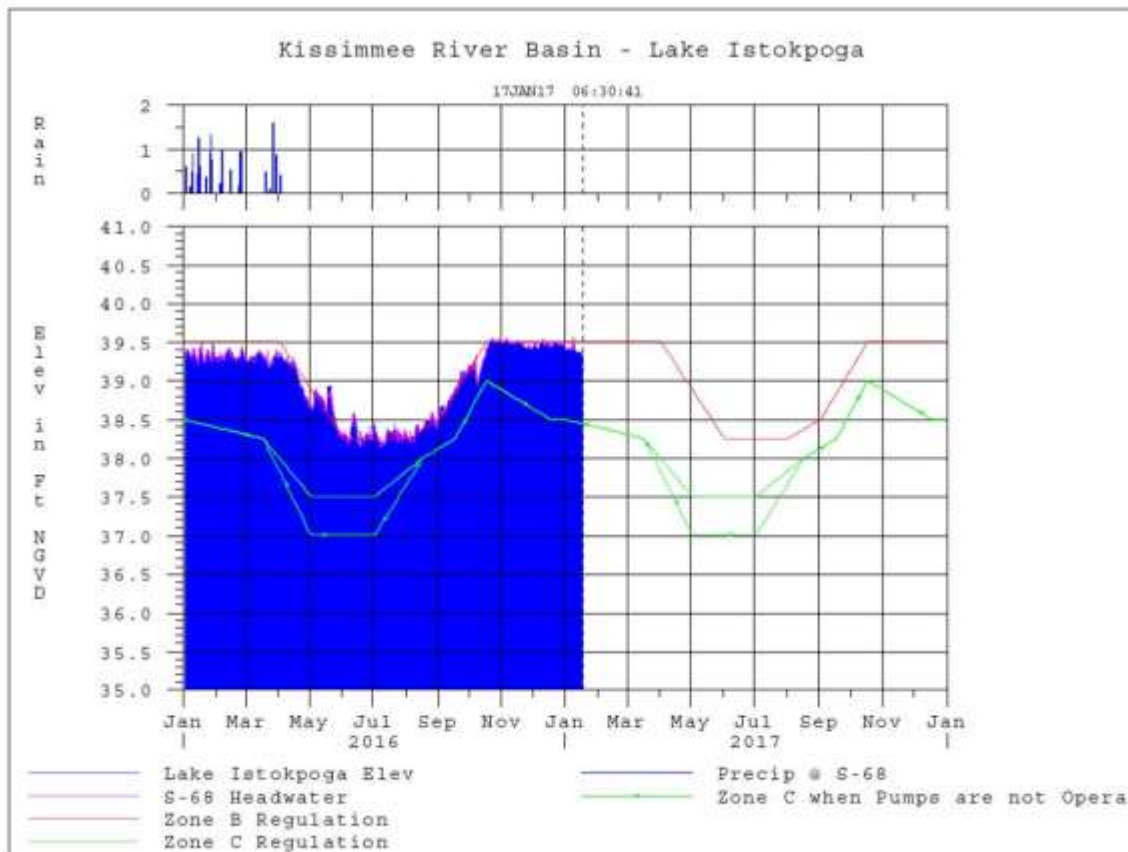


Figure 9

ESTUARIES

St. Lucie Estuary

Over the past week, provisional flows averaged about 0 cfs at S-80, 170 cfs downstream of S-308, 0 cfs at S-49 on C-24, 0 cfs at S-97 on C-23, and 65 cfs from Ten Mile Creek at the Gordy Road Structure. Average inflow from tidal basin tributaries is estimated to be 67 cfs (Figures 1 and 2). Total inflow averaged about 132 cfs last week and 144 cfs over last month.

Over the past week, salinity increased throughout the estuary (Table 1, Figures 3 and 4). The seven-day moving average salinity of the water column at the US1 Bridge is about 25.8. Salinity conditions in the middle estuary are 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)	23.0 (21.6)	24.2 (23.7)	NA ¹
US1 Bridge	25.6 (24.8)	26.0 (25.5)	10.0-26.0
A1A Bridge	31.0 (30.6)	32.1 (31.5)	NA

¹Envelope not applicable

Caloosahatchee Estuary

During the past week, provisional flows averaged approximately 875 cfs at S-77, 414 cfs at S-78, and 596 cfs at S-79. Average inflow from tidal basin tributaries is estimated to be 79 cfs (Figures 5 and 6). Total inflow averaged 675 cfs last week and 616 cfs over last month.

Over the past week in the estuary, salinity increased to Ft. Myers Yacht Basin and remained about the same downstream (Table 2, Figures 7 and 8). The seven-day average salinity values are within the good range for adult oysters at Cape Coral and at Shell Point and in the fair range at Sanibel (Figure 9). The 30-day moving average surface salinity is 5.0 at Val I-75 and 10.9 at Ft. Myers. The 30-day moving average salinity at Ft. Myers has been over 10 for 16 consecutive days. Salinity conditions between Val I-75 and Ft. Myers are likely to result in tape grass deterioration. Without discharges at S-79, the 30-day moving average salinity at Val I-75 is forecast to be over 5 within two weeks (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)	5.3 (3.0)	5.3 (2.9)	NA ¹
*Val I75	5.4 (4.1)	8.1 (6.2)	0.0-5.0 ²
Ft. Myers Yacht Basin	11.8 (10.2)	15.0 (11.2)	NA
Cape Coral	17.9 (18.2)	20.7 (19.3)	10.0-30.0
Shell Point	27.5 (27.0)	28.5 (28.0)	10.0-30.0
Sanibel	29.1 (29.5)	31.7 (31.2)	10.0-30.0

¹Envelope not applicable, ²Envelope 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. Live data will be unavailable until website upgrades are complete.

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 <i>a</i> (µg/l)	3.57 – 6.32	3.83 – 14.49	1.99 – 15.78 one spike to 48.39
Dissolved Oxygen (mg/l)	7.42 – 9.19	6.65 – 8.70	Negative Readings

The Florida Fish and Wildlife Research Institute reported on January 13, 2017, that *Karenia brevis*, the Florida red tide organism, was observed in background concentrations in seven samples collected from Lee County.

Water Management Recommendations

Given the current estuarine conditions, it is recommended that runoff from the C-43 basin be supplemented with Lake Okeechobee water as a pulsed release of 650 cfs through S-79 as per the Adaptive Protocols.

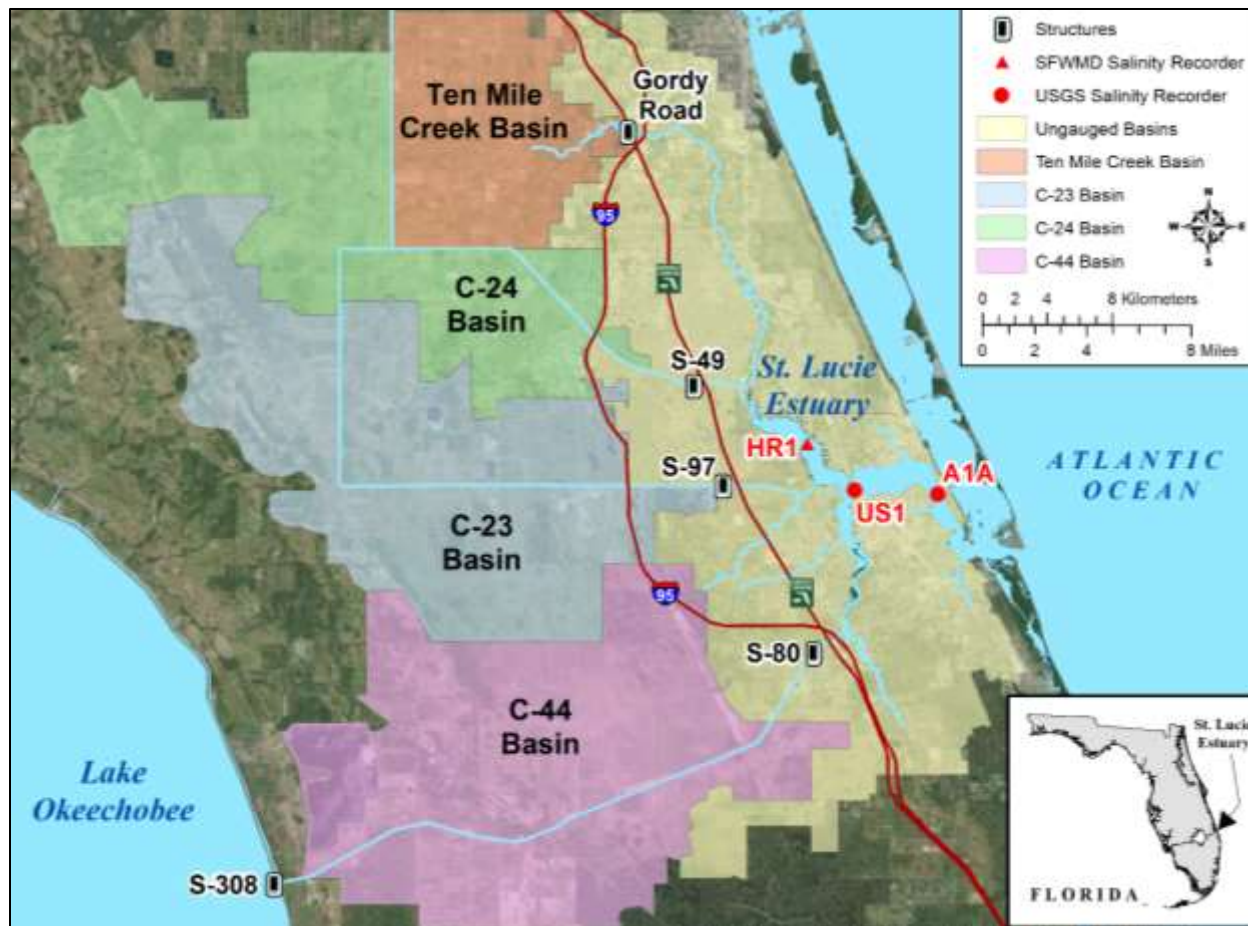


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

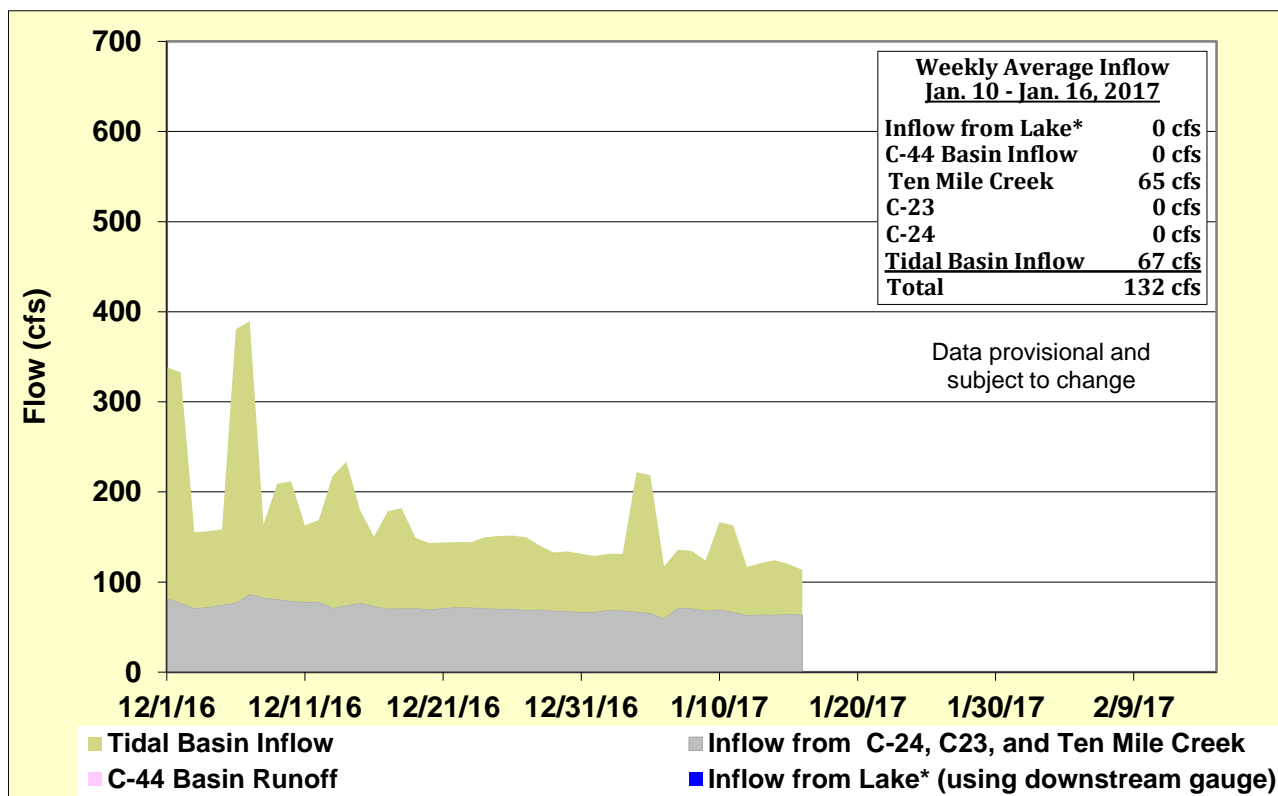


Figure 2. Estimated surface freshwater inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basins into the St. Lucie Estuary.

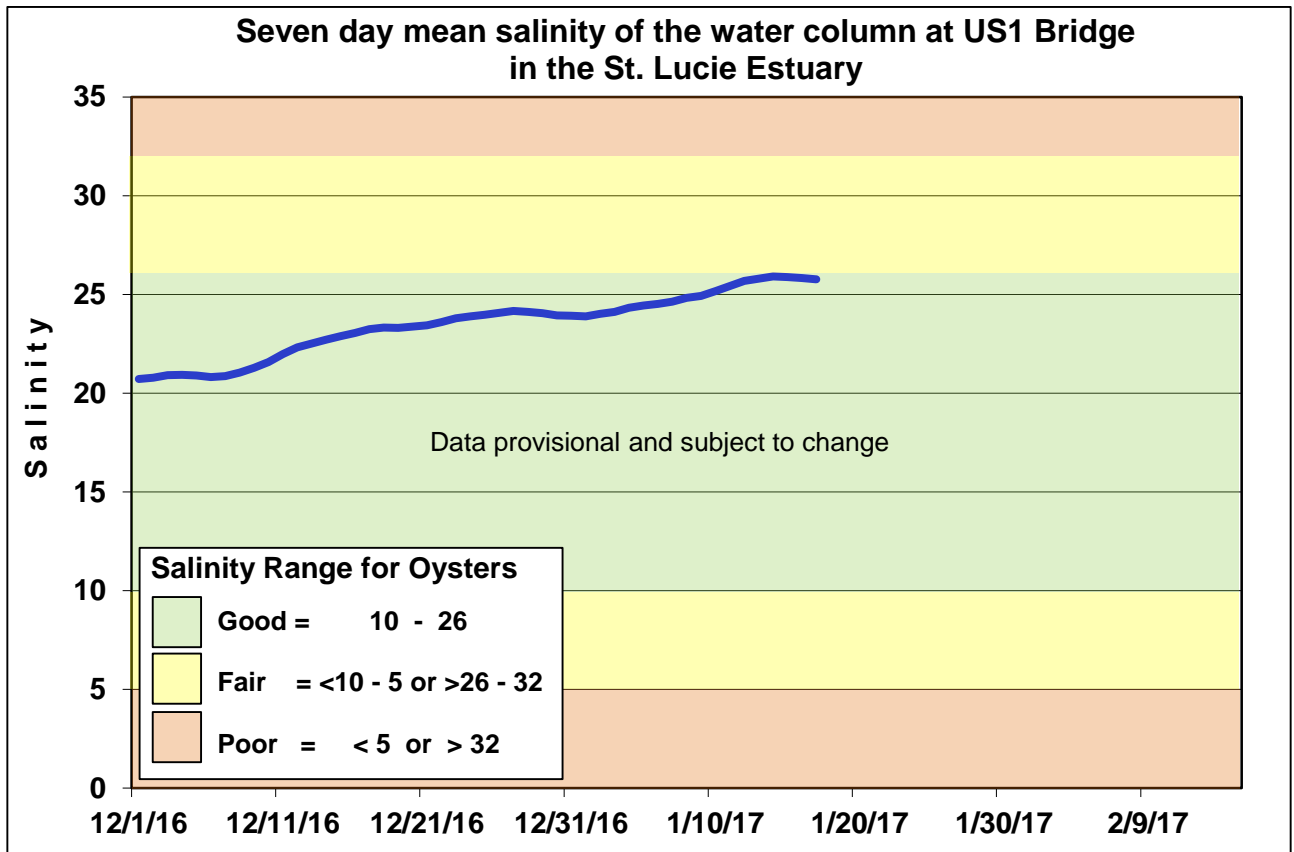


Figure 3. Seven-day mean salinity of the water column at the U.S. Highway 1 Bridge.

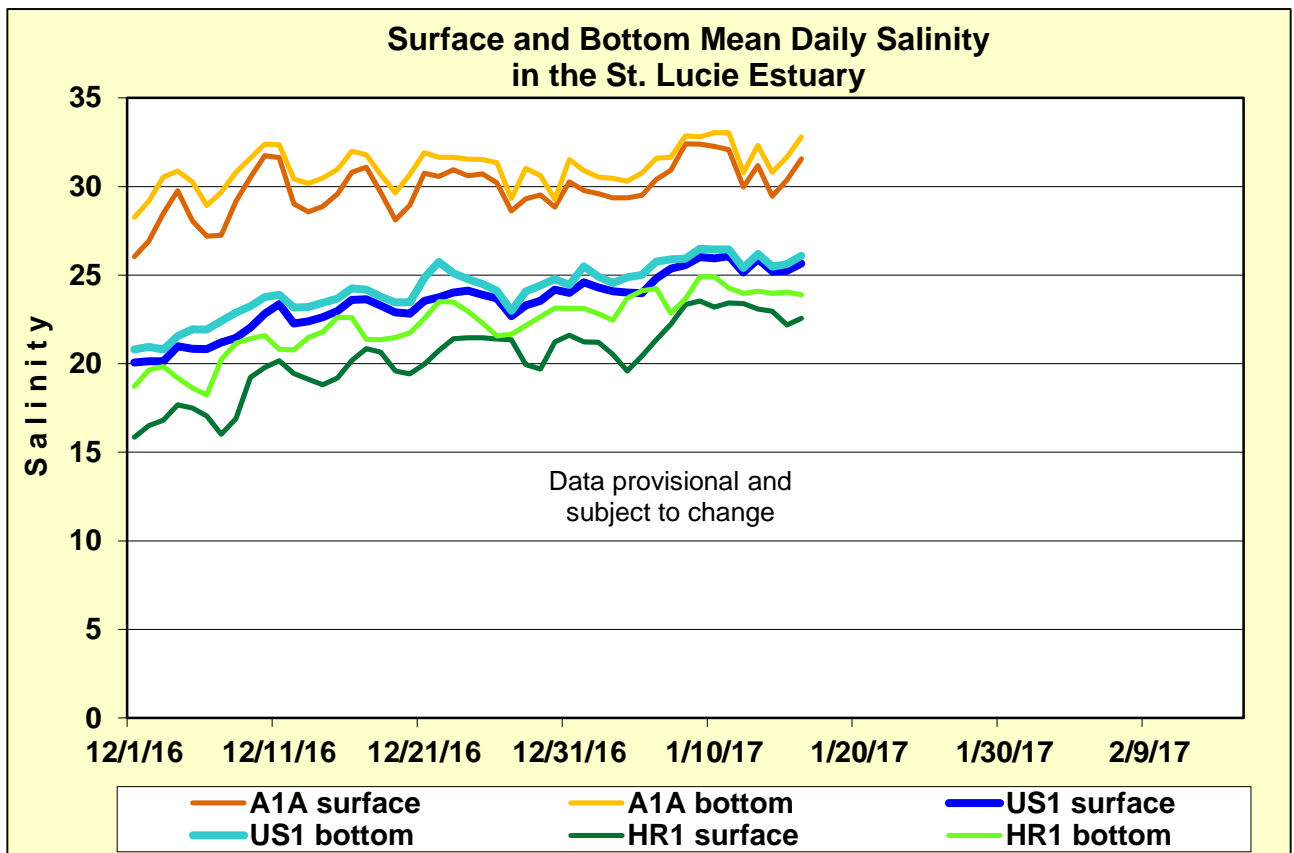


Figure 4. Daily mean salinity at the A1A, US1 and estimated HR1 stations.

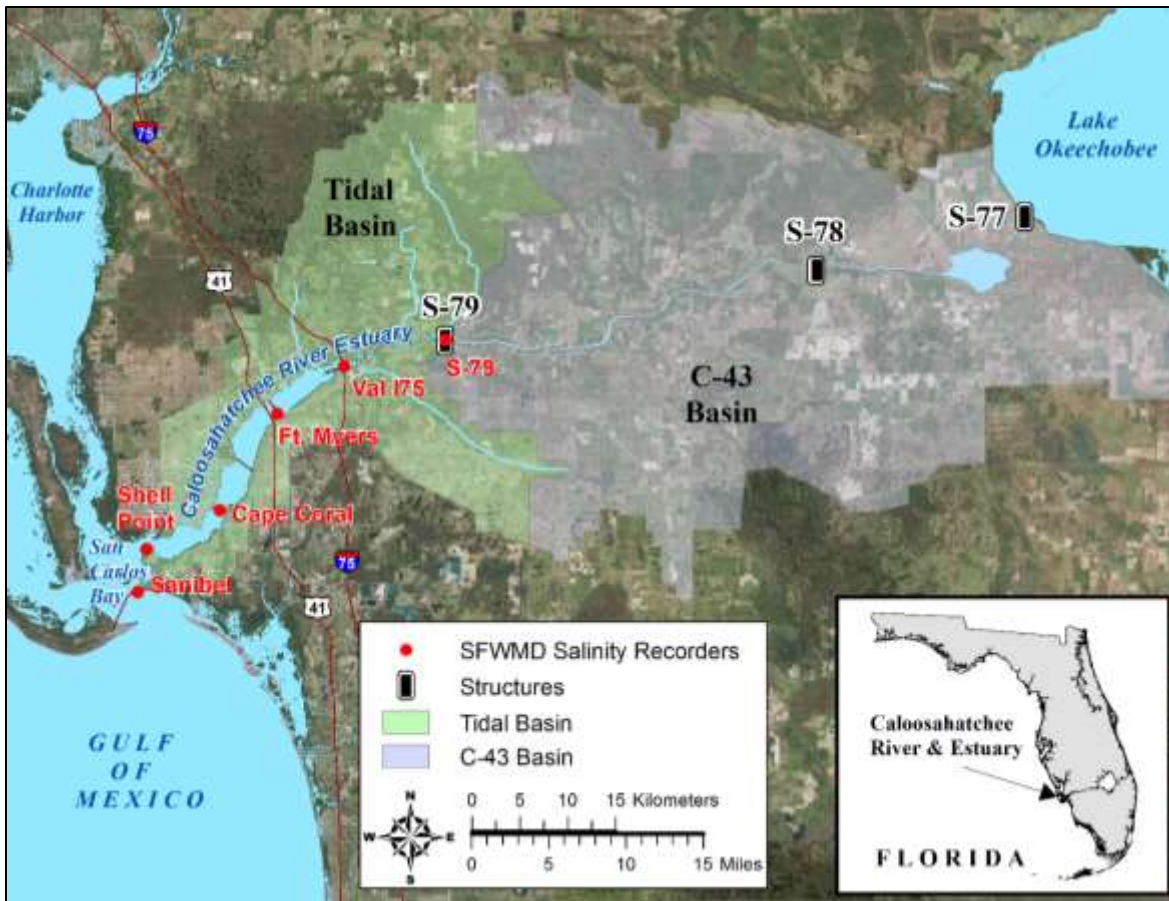


Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

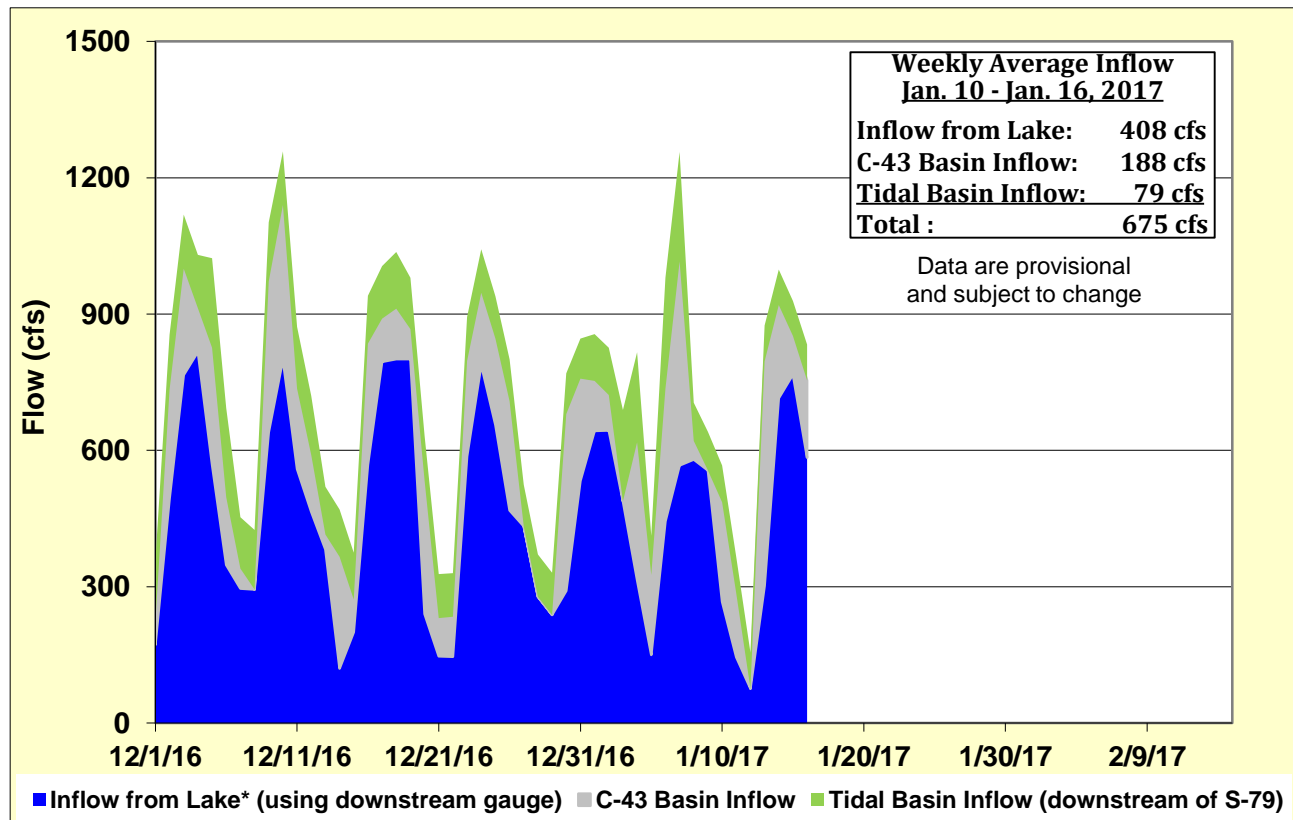


Figure 6. Freshwater inflows from Lake Okeechobee, runoff from the C-43 basin, and tributaries in the tidal basin into the Caloosahatchee River Estuary.

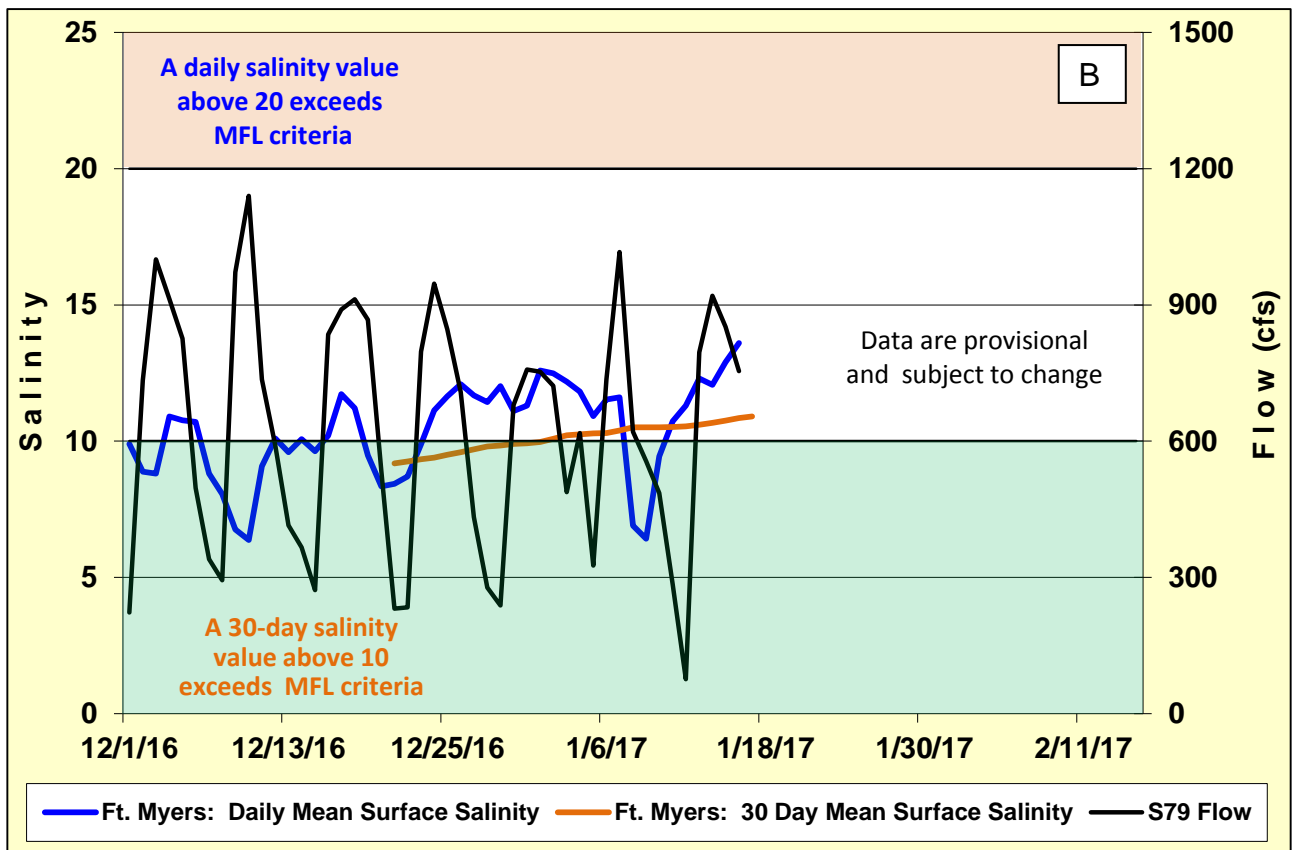
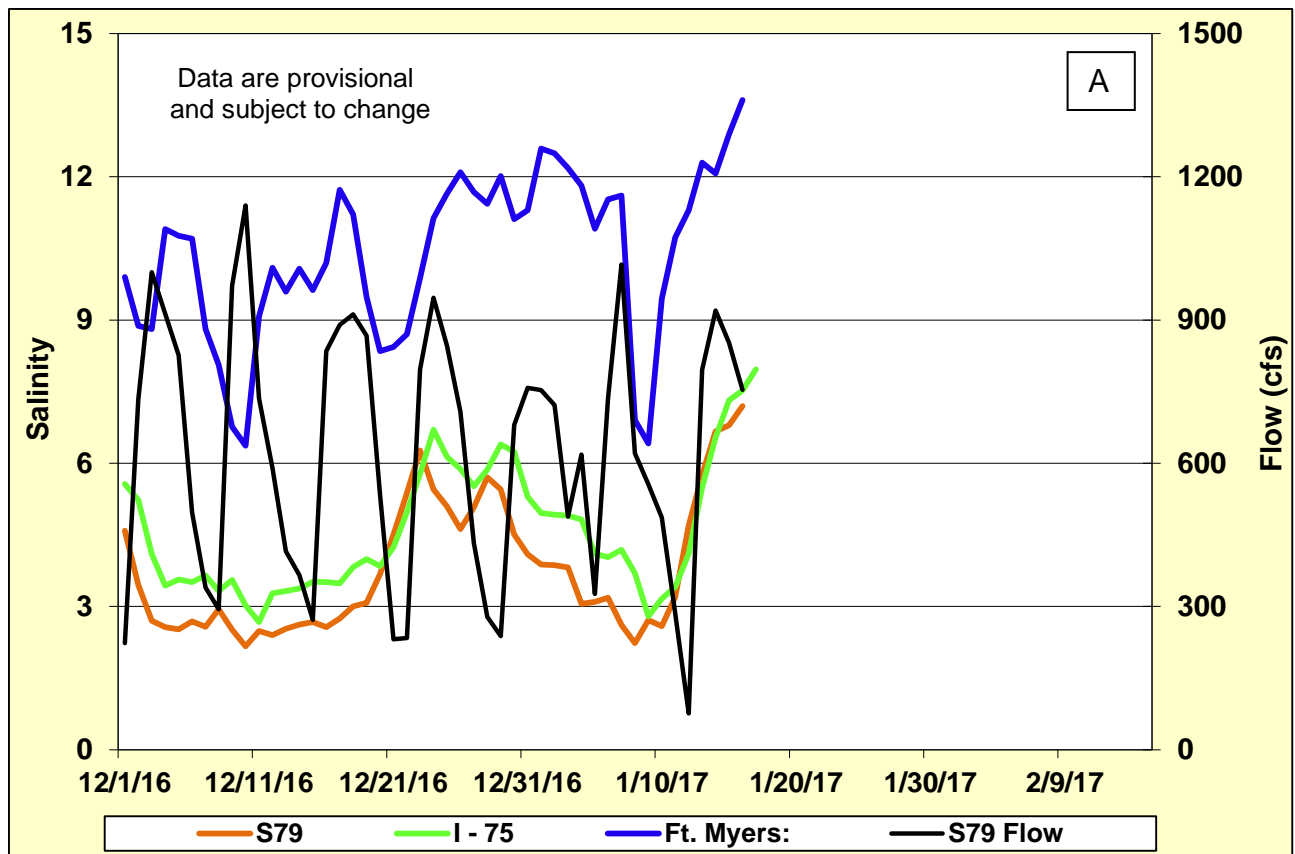


Figure 7. Daily mean flows at S-79 and salinity at upper estuary monitoring stations (A) and 30-day moving average salinity at Ft. Myers (B).

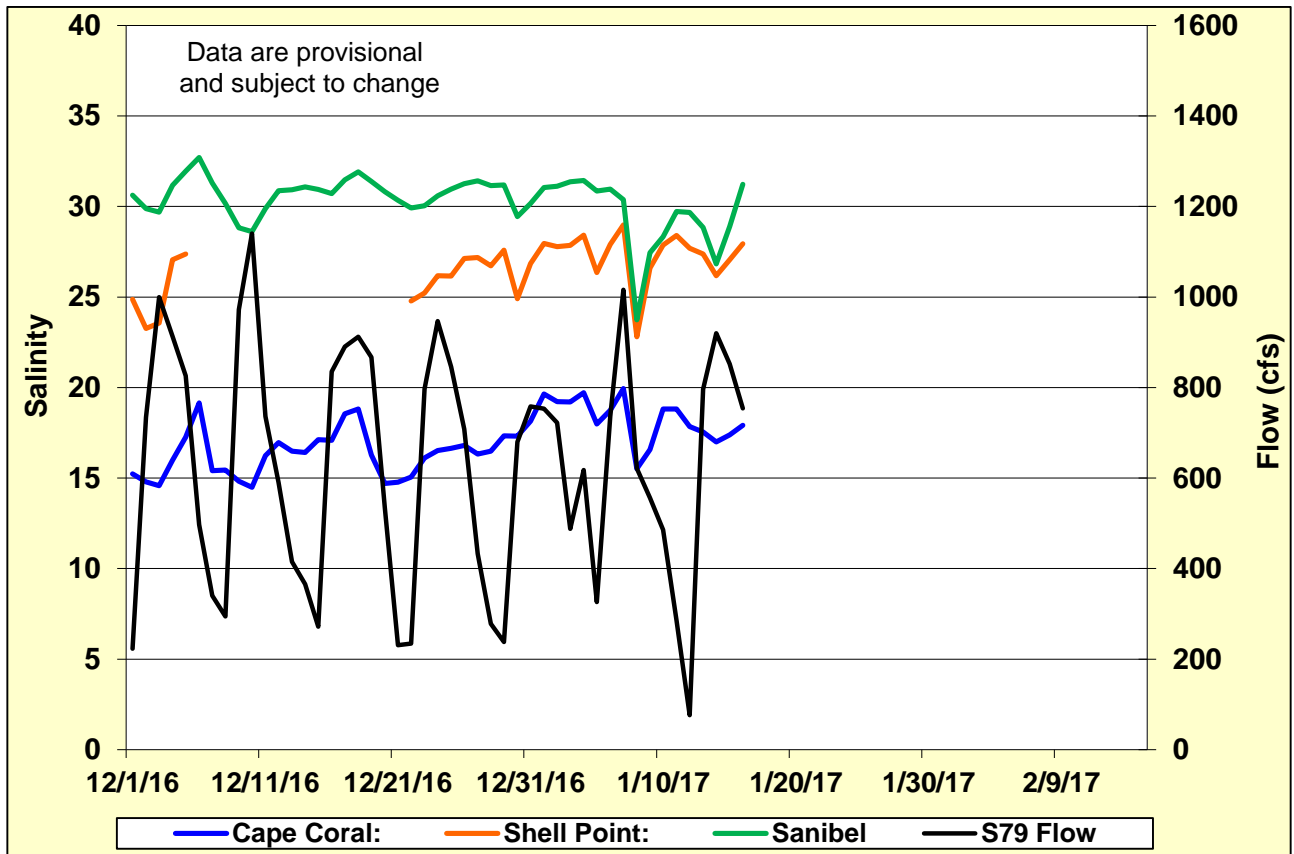


Figure 8. Daily mean flows at S-79 and salinity at lower estuary stations.

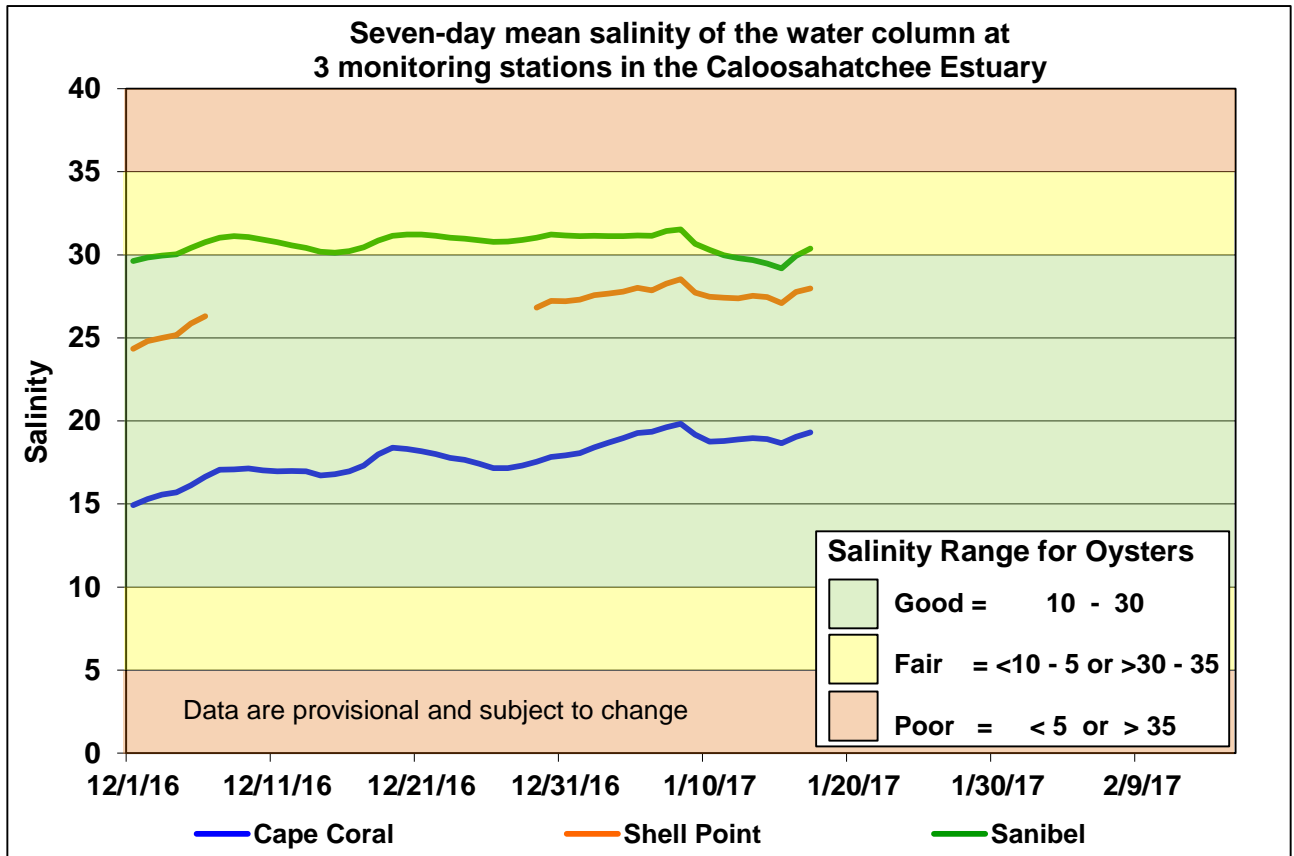


Figure 9. Seven-day mean salinity at Cape Coral Bridge, Shell Point and Sanibel Bridge monitoring stations.

Caloosahatchee Estuary Flows and Salinity Observed and Forecast Salinity at Val I-75

Forecast 1: S-79 = 0 cfs & TBR = 110 cfs

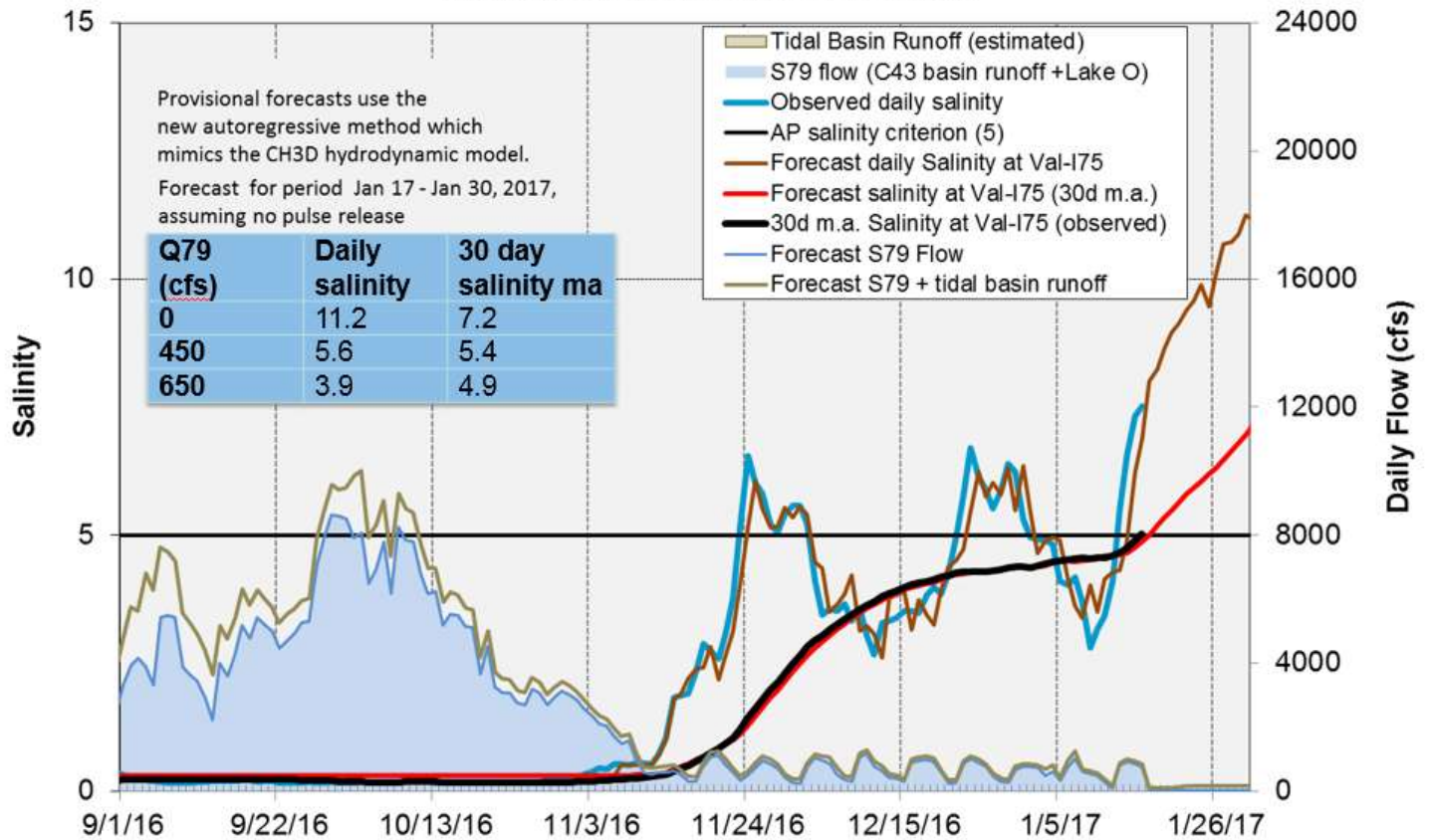


Figure 10. 14-day salinity forecast at Val I-75 assuming no releases at S-79.

GREATER EVERGLADES

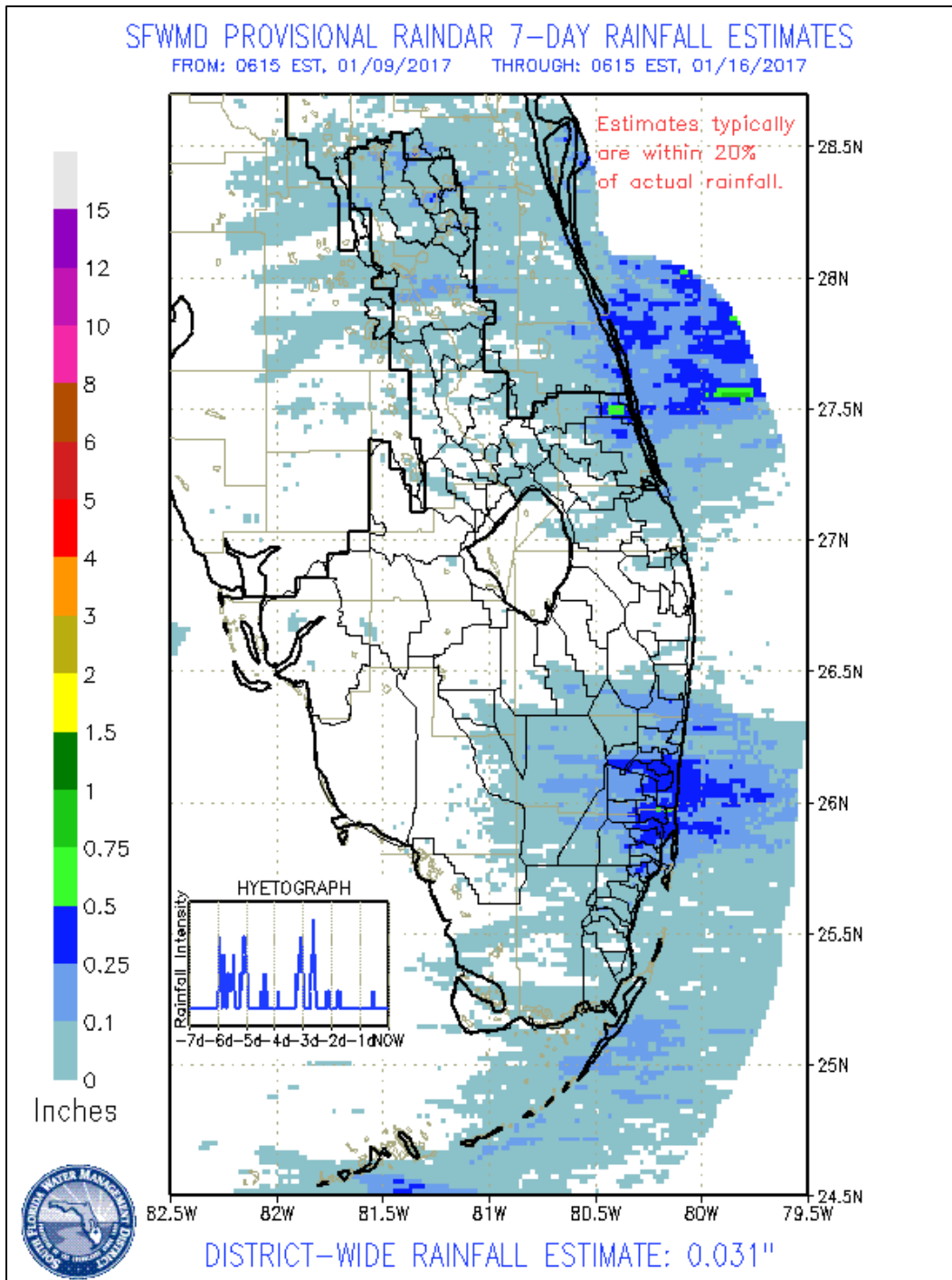
Rainfall in the WCAs and Everglades National Park (ENP) ranged from 0.01 inches to 0.17 inches with the highest amount falling in WCA-2B. Water levels decreased in all the WCAs and northeastern ENP. Only WCA-2A decreased faster than the recommended less than -0.09 inches per week.

Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	0.04	-0.05
WCA-2A	0.06	-0.10
WCA-2B	0.17	-0.08
WCA-3A	0.05	-0.04
WCA-3B	0.08	-0.04
ENP	0.01	-0.07

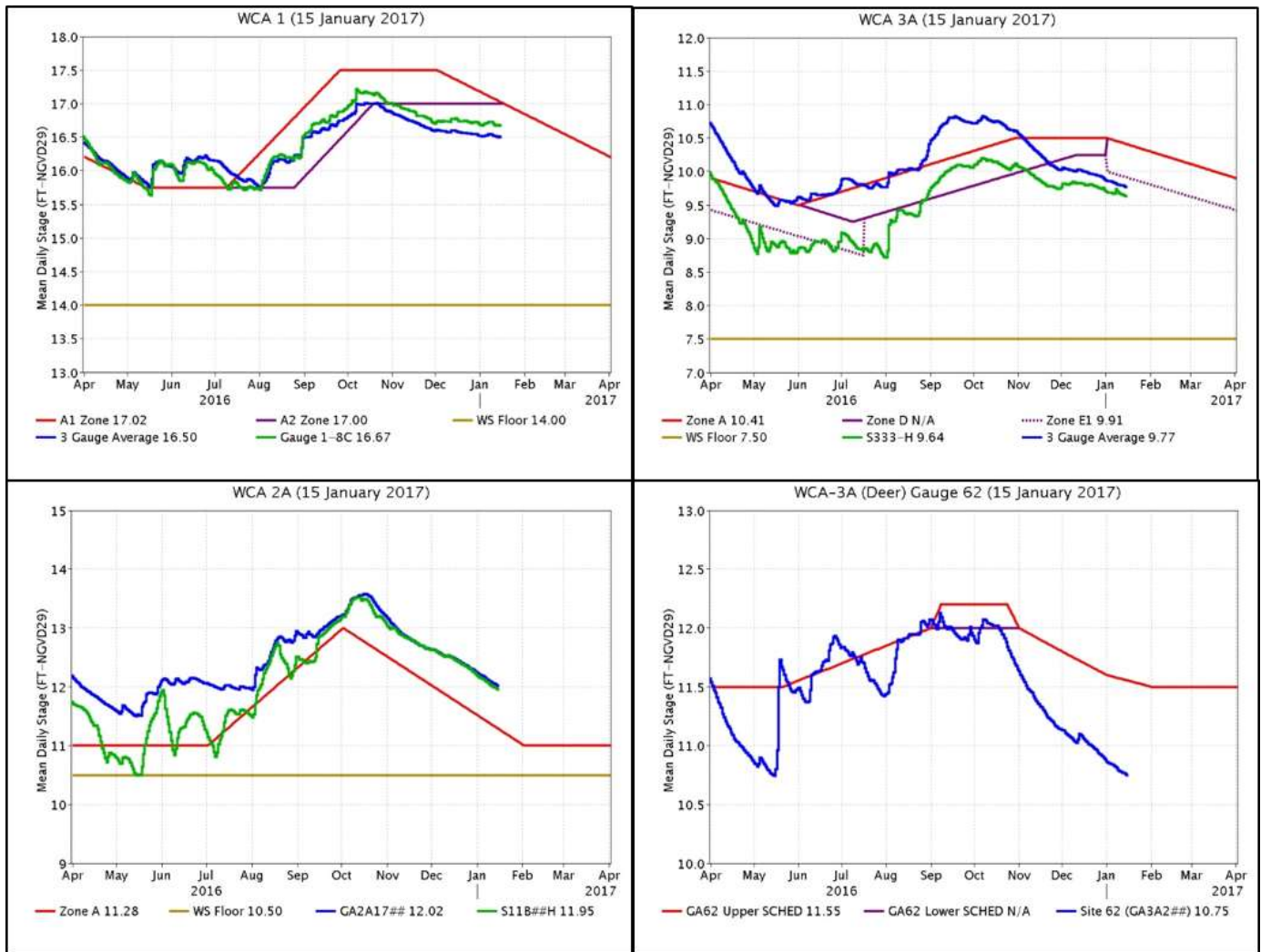
	Good
	Fair
	Poor

SFWM District Provisional Raindar 7-Day Rainfall Estimates

FROM: 0615 EST, 01/09/2017 THROUGH: 0615 EST, 01/16/2017

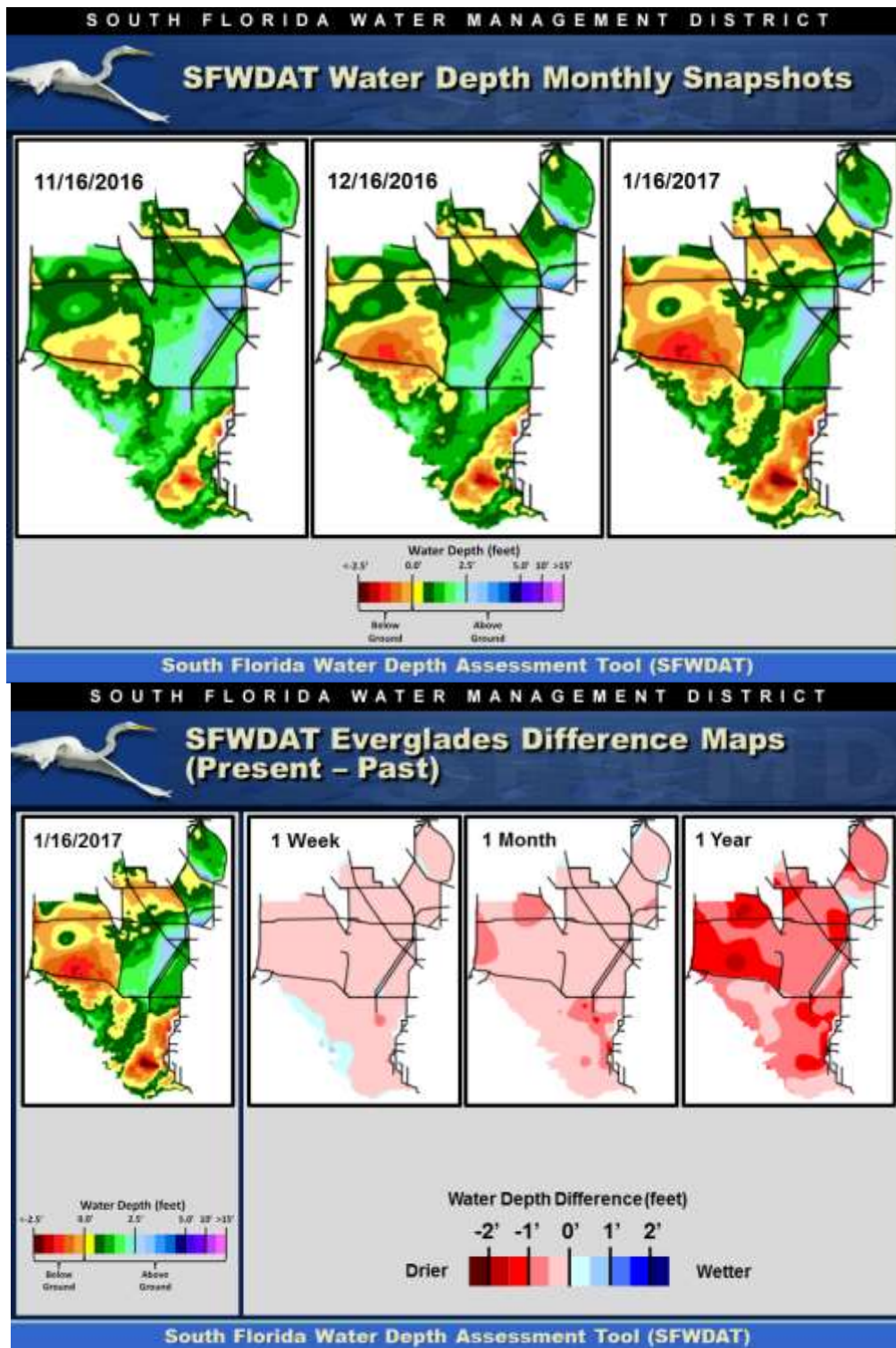


Regulation Schedules: Stages are below regulation for three of the four areas. The WCA-1 three-gauge average is -0.50 feet below zone A2, the northwestern WCA-3A gauge stage (gauge 62) is -0.80 feet below the upper schedule, and the WCA-3A three-gauge average stage is still -0.14 feet below zone E1. The WCA-2A stage remains above regulation by 0.74 feet (almost the same as last week's 0.73 feet) so the rate of change is tracking the regulation schedule but is too rapid for optimal wading bird foraging.



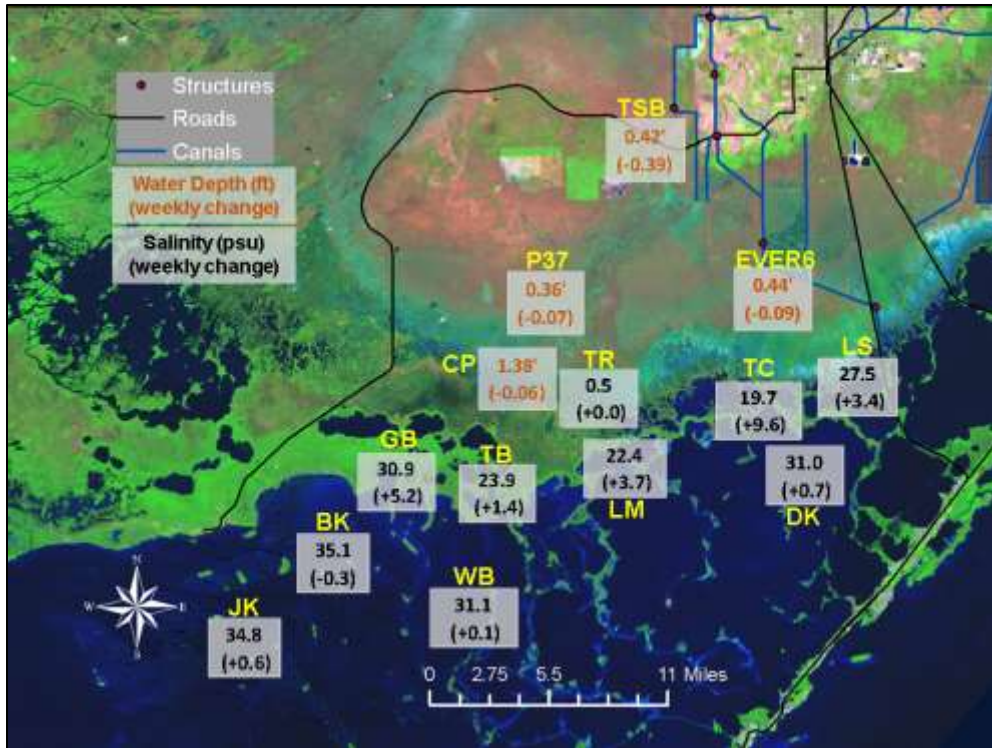
Water Depths and Changes: Water levels continued decreasing this week. Water levels remain lower than they were one and two months ago. This week's water depths at monitored gauges other than in WCA-2B range from 0.65 feet (northwest WCA-3A) to 2.31 feet (southern WCA-3A).

Stages were mostly decreasing this past week. Individual gauge changes ranged from -0.02 feet to -0.10 feet. Stages are mostly lower than a month ago and a year ago.



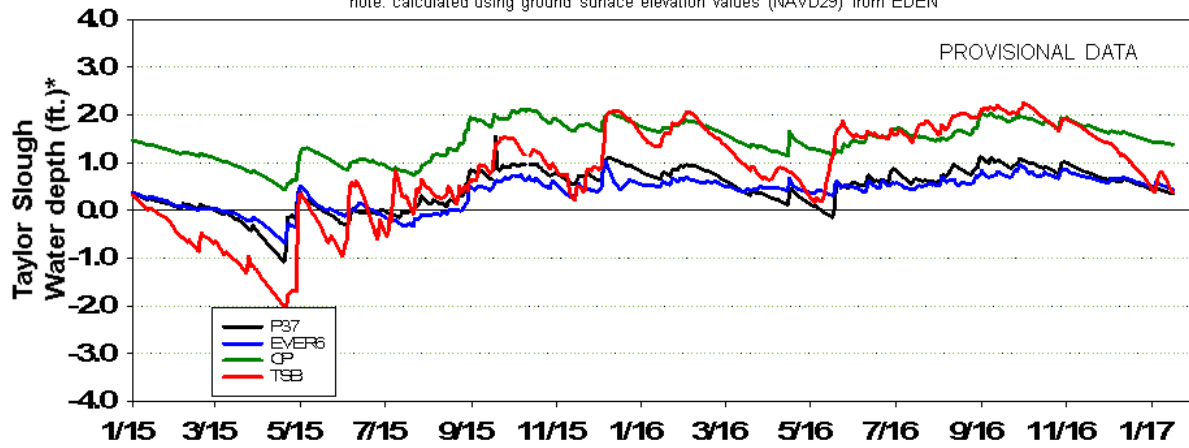
Wading Birds: Wading Bird surveys on January 5 found that wood storks, great egrets, and roseate spoonbills have started nesting in ENP and the WCA-3A, which is at least a full month earlier than normal. Rapidly declining water levels and current dry conditions have raised concerns about fledging success this year due to potential for starvation and predation during the latter part of the season.

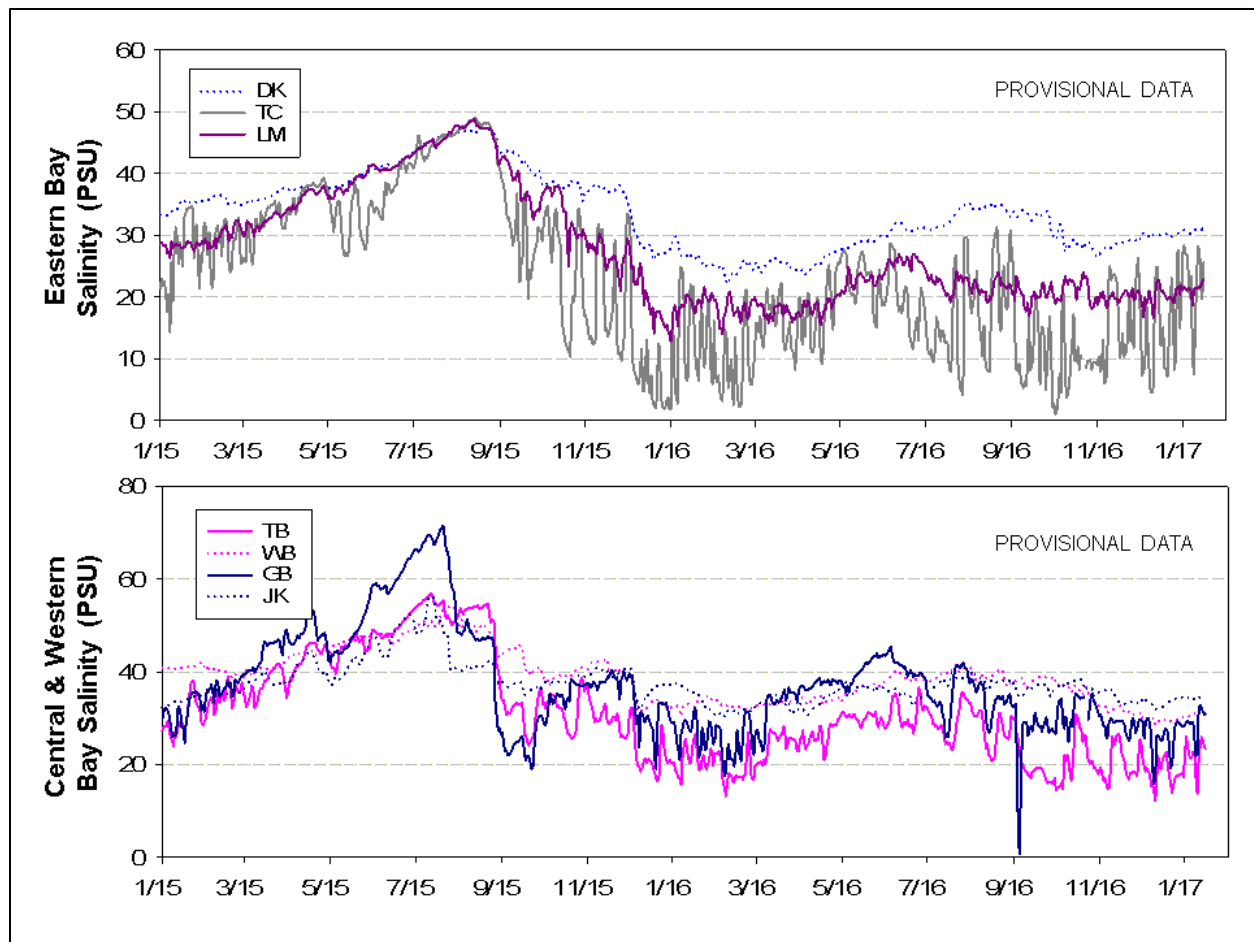
Taylor Slough and Florida Bay: Water level decreases ranged from -0.05 feet in the ENP panhandle to -0.39 feet in northern Taylor Slough (0.04 feet greater than last week's increase). Water levels are average to three inches above average for this time of year with the highest divergence being in the ENP panhandle region still. Salinities changes ranged from -0.3 psu in the west to $+9.6$ in the eastern nearshore area. Salinities currently range from 20 psu to 35 psu and are -1 psu below average in the central bay to $+4$ psu above average in the western nearshore area.



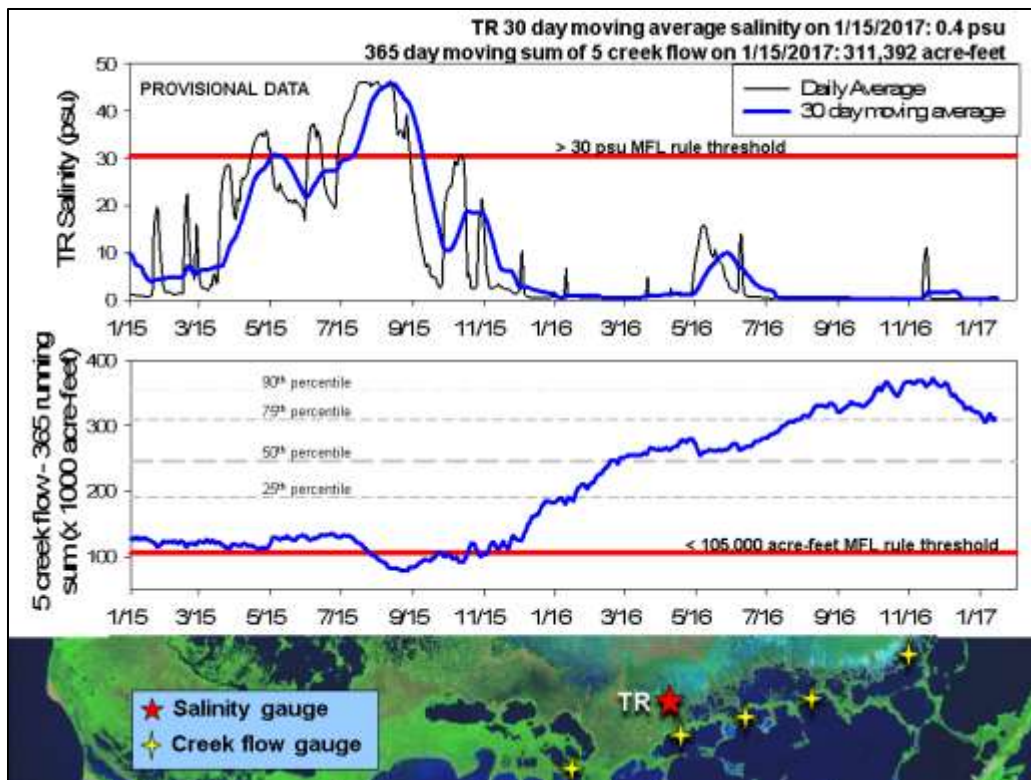
Taylor Slough Water Depths

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





Florida Bay MFL: The daily average salinity at MFL sentinel site TR in the mangrove zone is still slowly increasing and is at 0.5 psu. The 30-day moving average is still 0.4 psu. The 365-day moving sum of flow from the five creeks identified by stars on the map decreased to 311,392 acre-feet (still above the average of 257,628-acre feet). Creek flow is provisional data from the USGS and is highly variable.



Water Management Recommendations

- Recession rates throughout the regions should be no more than -0.09 feet per week, and where possible closer to -0.05 feet per week, to provide good foraging for wading birds during their breeding season.
- Water should be moved into northern WCA-3A because current dry conditions and recession rates threaten foraging conditions for wading bird foraging and increase fire risk for later in the season.
- Water depths in southern WCA-3A should stay below 2.5 feet throughout the dry season to protect tree island forests from further high water conditions like those experienced in 2016.
- The seasonal Multispecies Management Team (interagency group related to the Everglades Restoration Transition Plan regulation schedule) is concerned that water levels in the WCAs are too low at the start of the breeding season. Water should continue to move into the WCAs and ENP, and future rainfall should be retained to improve hydrologic conditions.

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

Everglades Ecological Recommendations, Jan. 17, 2017 (red is new)

Area	Current Condition	Cause(s)	Recommendation	Reasons
WCA-1	Stages fell -0.03' to -0.06'	Rainfall, ET, management	Operate for dry season conditions and, when possible, restrict recession rates to -0.03' to -0.07' per week.	Retain water for the upcoming dry season while protecting habitat and wildlife and preparing for wading bird breeding season.
WCA-2A	Stages fell -0.10'	Rainfall, ET, management	Maintain slower recession rates. When possible, retain water and restrict recession rates to less than -0.09' per week.	Protect habitat and wildlife and prepare for wading bird breeding season.
WCA-2B	Stages fell -0.07' to -0.08'	Rainfall, ET, management	When possible, restrict recession rates to -0.05' to -0.09' per week.	Protect habitat and wildlife and prepare for wading bird breeding season.
WCA-3A NE	Stage fell -0.07'	Rainfall, ET, management	When possible, restrict recession rates to -0.05' to -0.09' per week. Keep recession rates on lower end because area is drying out too quickly.	Protect habitat and wildlife and prepare for wading bird breeding season. Reduce fire risk as season progresses.
WCA-3A NW	Stage fell -0.05'	Rainfall, ET, management	Continue moving water through S-150 as possible. Multispecies group requests prioritization of S-11C over S-11A to get water near the Alley North Colony.	
Central WCA-3A S	Stage fell -0.03'	Rainfall, ET, management	When possible, restrict recession rates to -0.05' to -0.09' per week. When flows are changed a gradual reduction is recommended (stepping down over several days).	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. Protect habitat and wildlife and prepare for wading bird breeding season.
Southern WCA-3A S	Stage fell -0.02'	Rainfall, ET, management		
WCA-3B	Stages fell -0.04'	Rainfall, ET, management	When possible, restrict recession rates to -0.05' to -0.09' per week.	Protect habitat and wildlife and prepare for wading bird breeding season.
ENP-SRS	Stage decreased -0.07'	ET, rainfall, topography, management	Make discharges to the Park according to the ERTTP rainfall plan.	Keep peat wet to promote native habitat and maintain wetland plant and animal communities. Protect habitat and wildlife and prepare for wading bird breeding season.
ENP-CSSS habitats	S-12A is closed.	Rainfall, ET, management	Follow rainfall plan for releases. Follow guidance in C-111 Western Spreader Canal Project operations manual. Care should be taken to avoid overdrying eastern subpopulations C and F.	Future operations need to continue to provide appropriate hydrological and habitat conditions for CSSS. Current and forecasted conditions are conducive for a successful sparrow breeding season. Dry conditions are expected for much of the sparrow breeding season.
Taylor Slough	Stage changed -0.05' to -0.39'	Rain, ET, inflows	Move water southward as possible	Provide freshwater buffer for ecosystems, maintain low salinity conditions downstream, and maintain slow recession rates.
FB- Salinity	-1 psu below to +4 psu above average	Rain, ET, inflows, wind	Move water southward as possible	Maintain low salinity conditions and prevent early salinity increases.