

Disclaimer: Information contained in the report addresses environmental conditions only and is not the official South Florida Water Management District operations recommendation or decision.

## MEMORANDUM

**TO:** John Mitnik, Chief, Engineering and Construction Bureau  
Paul Linton, Administrator, Water Control Operations Section

**FROM:** SFWMD Staff Environmental Advisory Team

**DATE:** February 23, 2016

**SUBJECT:** Weekly Environmental Conditions for Systems Operations

### Summary

#### Kissimmee

On Sunday, stage in East Lake Toho and Toho was 0.5 feet below schedule and in Kissimmee-Cypress-Hatchineha (KCH); it was 0.0 feet below schedule. Discharge from East Toho, Toho, and KCH is being managed to hold Lake stages at 0.2 - 0.5 feet below their respective regulation schedules while following the discharge ramp up/ramp down rates for S65/S65A as possible. Over the past week, discharge at S65 and S65A averaged at 2,257 and 2,261 cfs, respectively, while discharge at S65E averaged at 2,880 cfs. Tuesday morning discharges were: S65 ~3,241 cfs; S65A ~3,237 cfs; S65C ~2,527 cfs; and S65E ~2,665 cfs. Dissolved oxygen in the Kissimmee River averaged 6.82 mg/L over the past week and 6.17 mg/L on Sunday. Kissimmee River mean floodplain water depth is currently 1.44 feet. There are no new recommendations for this week.

#### Lake Okeechobee

A small recession in Lake stage continued this past week, dropping the Lake level by 0.11 feet. The Lake is at 16.08 feet NGVD and is in the Intermediate Flow Sub-band. Ecological conditions for wading birds, snail kites, and species in the nearshore region remain poor but may begin to improve slightly if the recession continues. Both total phosphorus and total suspended solids concentrations decreased in February. Actions which contribute to continuing the recession are essential to protect critical components of the Lake's vegetation and faunal (wading birds, snail kites and fish) communities. The operational goal is to maintain a small but steady decrease in water levels not to exceed 1.0 feet per month (0.26 feet/week) to achieve a Lake stage of approximately 12.5 feet NGVD by the end of the dry season and avoid additional reversals in Lake stage.

#### Estuaries

High discharges to the estuaries continued over the past week. In the St. Lucie Estuary, total freshwater inflow averaged 7,490 cfs with 3,557 cfs Lake Okeechobee releases. Salinities remained in the poor range for adult oysters in the mid-estuary. In the Caloosahatchee Estuary, total freshwater inflow averaged 9,623 cfs with 6,307 cfs Lake Okeechobee releases. Salinities were in the poor range at Cape Coral and in the good range between Shell Point and Sanibel for adult oysters. The sustained high discharges and low salinities may have also negatively impacted the seagrass bed near the inlet of the St. Lucie Estuary and San Carlos Bay of the Caloosahatchee Estuary. Given the current estuarine conditions, there are no ecological benefits associated with additional releases from Lake Okeechobee.

#### Stormwater Treatment Areas

Over the past week, the STAs/FEBs received no Lake regulatory releases. The total amount of Lake regulatory releases sent to the STAs/FEBs in WY2016 (since May 1) is approximately 174,000 acre-feet. Over the past week, A-1 FEB releases were sent to STA-3/4 creating capacity for future

rainfall/runoff events. All STA cells are at or above target depths and restrictions remain in place for structure repairs in STA-1E and vegetation rehabilitation in STA-1W. Due to high water levels in the Water Conservation Areas this week, no Lake releases are recommended to be sent to the STAs and the FEBs.

### Everglades

Stage changes in the Everglades ranged from -0.40 feet to 0.16 feet. Stages increased except in WCA-2A where stages decreased. Water levels are close to or over two feet deep in most of the wetlands. Most of WCA-2A and WCA-3A remain closed because of high water and its effects on terrestrial wildlife and will reopen only after stages drop below 11.60 feet. Deep water has prevented wading bird foraging, and there are no indication of nesting in the WCAs and Everglades National Park. Southern WCA-3A depths have exceeded 2.5 feet, the depth monitored for tree island inundation and duration, for 13 weeks, and the other gauges used for the three gauge average have also exceed 2.5 feet for a fourth week. Habitats for the Cape Sable Seaside Sparrows are mostly inundated making conditions unfavorable for early season breeding. The 30-day moving average salinity at the Florida Bay MFL site declined to 0.5 psu and the cumulative inflow from the five creeks into Florida Bay has risen to 246,165 acre-feet. Florida Bay salinities average at 6 psu below average for this time of year. There are no new recommendations, except for the need to lower water levels in southern and central WCA-3A.

### **Weather Conditions and Forecast**

Showers and thunderstorm are expected Wednesday afternoon and Wednesday night. Daytime heating will help generate scattered afternoon showers and thunderstorms mainly over the interior and northeast today, as a stalled frontal boundary remains across the southeastern U.S. A strong low is developing along the front over Texas and it is forecast to move east and then northeast today and Wednesday bringing the cold front into Florida's panhandle Wednesday morning. This cold front is expected to move through the District Wednesday afternoon and Wednesday night bringing moderate to heavy showers and thunderstorms to the area. Cool and dry conditions will move in behind the front Thursday and last through the coming weekend with chilly temperatures Friday and Saturday mornings. Another cold front is expected to bring another round of moderate to heavy rains next Thursday (nine days out).

## **KISSIMMEE BASIN**

### **Kissimmee Basin Rainfall**

The Upper Kissimmee Basin received 0.91 inches of rainfall in the past week and the Lower Basin received 0.65 inches (SFWMD Daily Rainfall Report 2/22/2016).

### **Upper Kissimmee Basin**

Stages and departures in the Kissimmee Chain of Lakes (KCOL) are shown in Table 1.

**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: 2/23/2016							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)	2/21/16	2/14/16	2/7/16	1/31/16	1/24/16	1/17/16	1/10/16
Lakes Hart and Mary Jane	S62	200	LKMJ	60.4	R	61.0	-0.6	-0.4	-0.5	-0.5	-0.5	-0.4	-0.5
Lakes Myrtle, Preston, and Joel	S57	88	S57	61.0	R	61.1	-0.1	-0.1	0.0	-0.1	-0.3	-0.1	-0.4
Alligator Chain	S60	48	ALLI	63.8	R	64.0	-0.2	-0.5	-0.5	-0.5	-0.5	-0.6	-0.8
Lake Gentry	S63	92	LKGT	61.3	R	61.5	-0.2	-0.3	-0.2	-0.2	-0.3	-0.1	-0.2
East Lake Toho	S59	461	TOHOE	57.5	R	58.0	-0.5	-0.6	-0.5	-0.4	-0.5	-0.6	-0.5
Lake Toho	S61	981	TOHOW	54.5	R	55.0	-0.5	-0.6	-0.6	-0.4	-0.8	-0.4	-0.5
Lakes Kissimmee, Cypress, and Hatchineha	S65	2257	LKISSP, KUB011, LKISSB	51.5	R	51.5	0.0	-0.2	-0.5	-0.7	-1.3	-1.8	-2.1

\* 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 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: 2/23/2016

Metric	Location	Sunday's 1-day average	Weekly Average**									
			2/21/16	2/14/16	2/7/16	1/31/16	1/24/16	1/17/16	1/10/16	1/3/16	12/27/15	12/20/15
Discharge (cfs)	S-65	2976	2257	1997	3248	802	477	130	347	376	375	358
Discharge (cfs)	S-65A	2935	2261	2223	3772	1355	1115	463	286	270	288	310
Discharge (cfs)	S-65C	2075	2515	3805	2987	2261	2017	877	536	459	512	584
Headwater stage (feet NGVD)		35.1	34.5	34.8	34.5	33.7	33.7	33.5	33.4	33.3	33.3	33.5
Discharge (cfs)	S-65D****	2294	2810	4355	3811	3336	2716	1318	726	553	621	718
Discharge (cfs)	S-65E	2348	2880	4513	3975	3703	2779	1369	582	434	518	650
DO concentration (mg/L)***	Phase I river channel	6.17	6.82	7.39	5.85	7.36	6.56	7.12	7.08	6.66	6.71	6.31
Mean depth (feet)*	Phase I floodplain	1.44	N/A	1.64	2.19	1.10	0.92	0.79	0.54	0.40	0.41	0.45

\* 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 Adaptive Recommendations and Operational Actions

Date	Recommendation	Purpose	Outcome	Source
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	Implemented	KB Tech Team
1/20/2016	Continue to adjust discharge at S65 to follow the 2015-16 Dry Season SR guidelines for rampdown at S65A. Balance discharge at the two structures to maintain at least minimum discharge to the river. As stage rises above 51 ft in KCH, temporarily bypass the Fig 1 discharge plan in the SR and manage discharge to let KCH stage rise to 51.5 ft (the Feb 1 recession starting stage) if conditions allow while following rampdown guidelines. If KCH stage rises further than 51.5 ft, we will reevaluate. As changes in discharge become necessary, continue to follow the Table 1 guidelines in the SR. Switch to Table 2 rampup/rampdown guidelines on Feb 1 or when the recession line is intercepted for management of the recession in KCH.	If conditions allow, to let stage increase to 51.5 ft to intersect the Feb 1 starting stage for KCH F&W recession line.	Implemented	KB Tech Team
12/10/2015	Temporarily raise from 50.5 ft to 51 ft the threshold stage for increasing discharge at S65/S65A to 1400 cfs. This is a temporary modification of the current draft 2015-16 dry season Standing Recommendation (SR). Discontinue last week's temporary change in the rate of discharge increase and return to the original per-day rates shown in Table 1 of the draft SR - i.e., increase discharge to 1400 cfs at a rate of 150 cfs/day rather than 150 cfs/2 days. If KCH stage should start to decline while ramping up but before reaching 1400 cfs, begin to ramp back down using the rates in Table 1.	Slow the effect of discharge on KCH stage, balance KCH stage and KRRP discharge objectives.	Implemented	KB Tech Team
12/9/2015	Maintain ~300 cfs at S65/S65A until average stage in KCH rises to 51 ft. This is a temporary modification of the current draft dry season SR raising the stage threshold for discharge rampup from 50.5 ft to 51 ft. Once stage reaches 51 ft, begin increasing discharge at a rate of 150 cfs/day per Table 1 in the draft 2015-16 Dry Season SR. Discontinue the temporary guidance provided below (12/2/2015) and return to the original guidelines for rate of discharge rampup per Table 1 (150 cfs/day rather than 150 cfs/2 days).	Slow the effect of discharge on KCH stage, balance KCH stage and KRRP discharge objectives.	Implemented	KB Tech Team
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

# KCOL Hydrographs (through Sunday midnight)

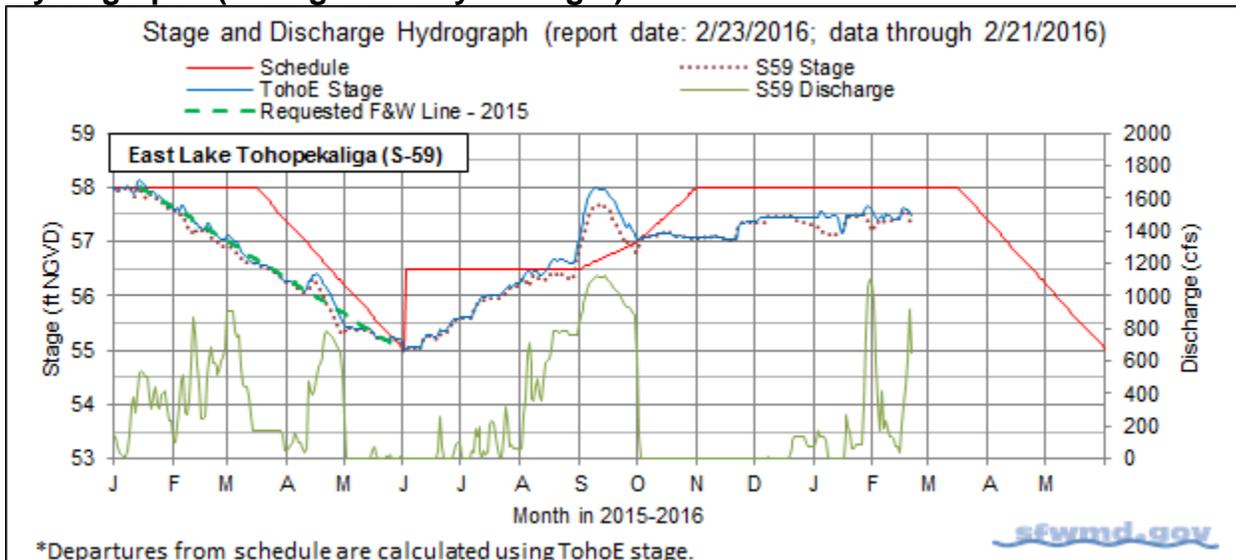


Figure 1.

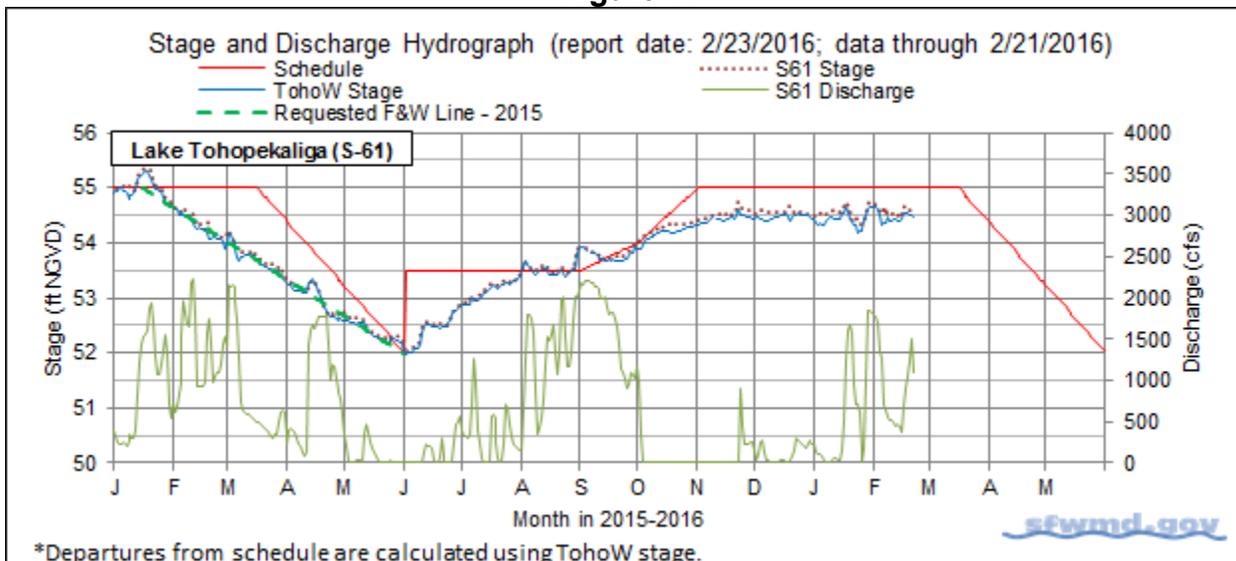


Figure 2.

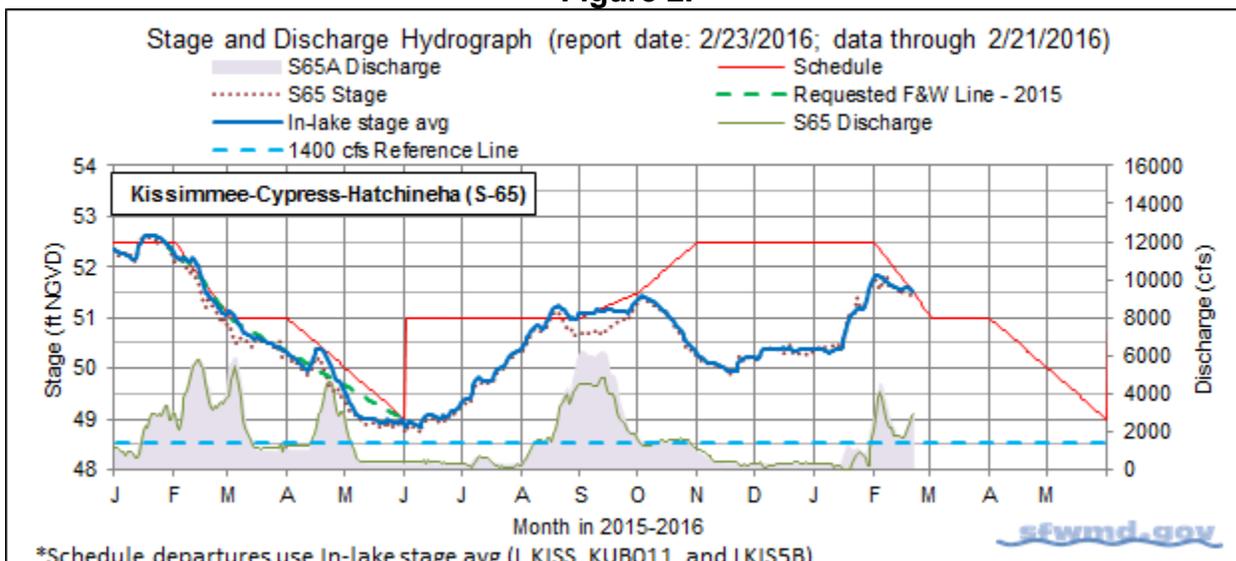


Figure 3.

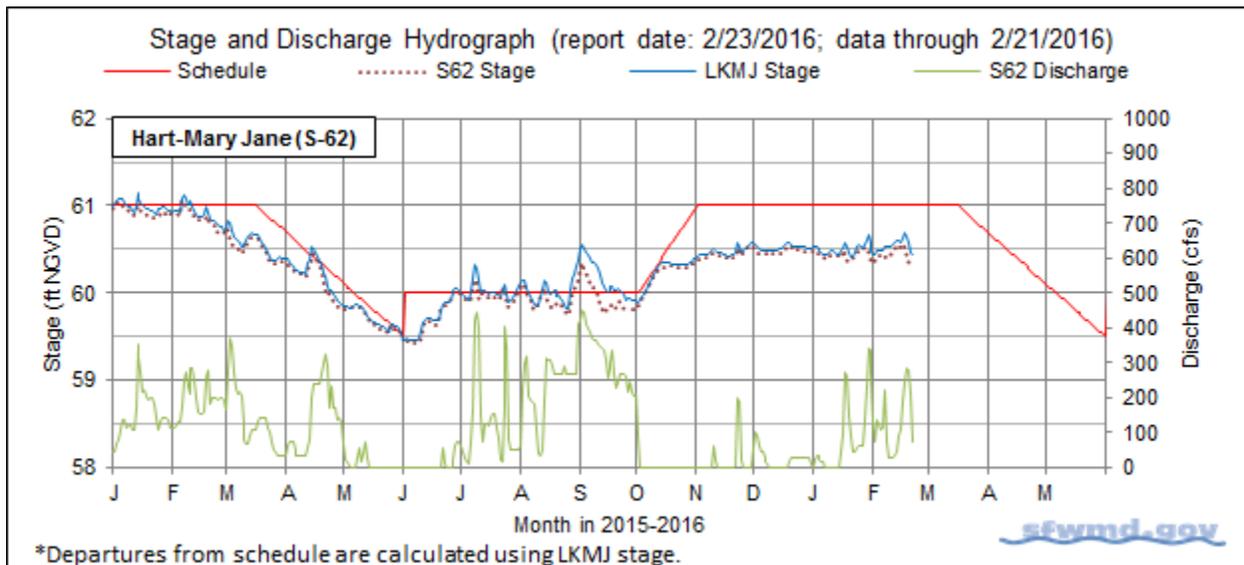


Figure 4.

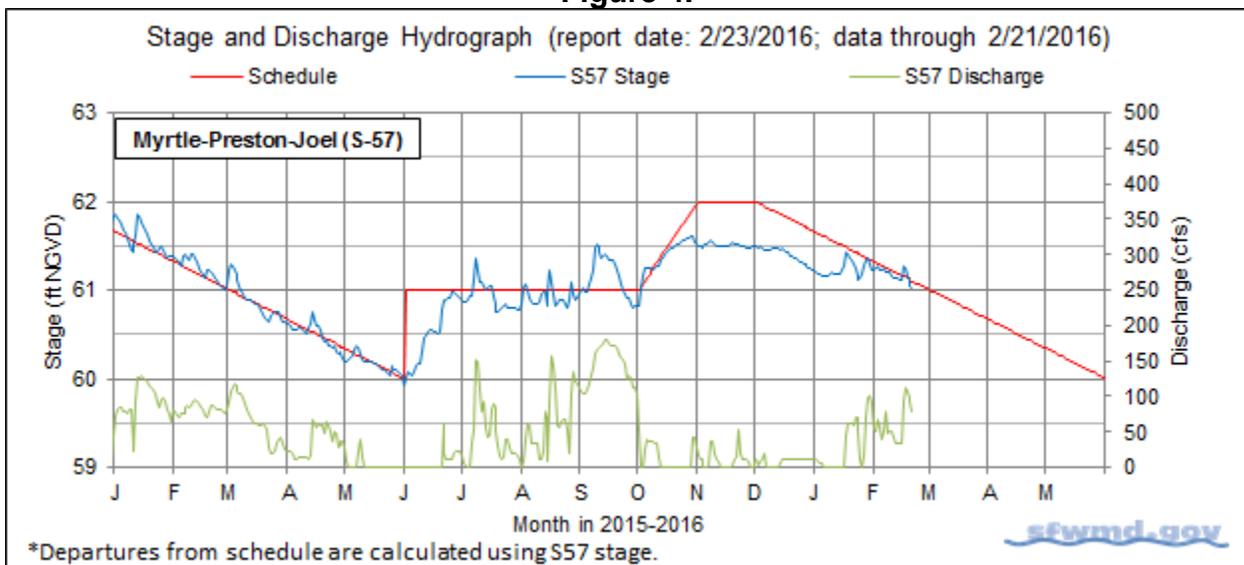


Figure 5.

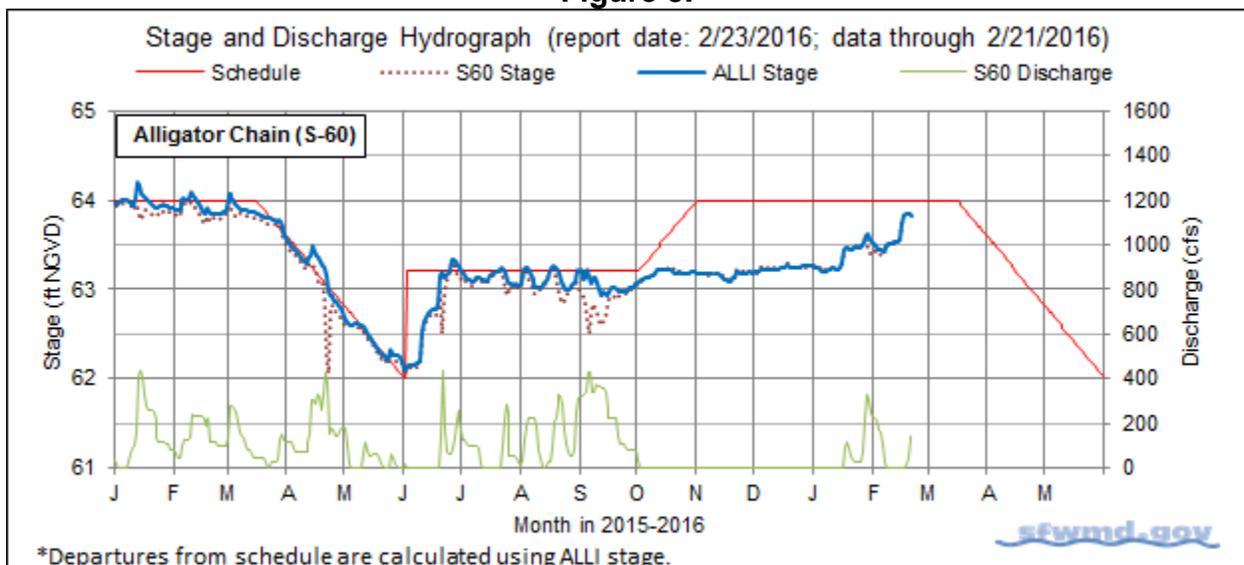


Figure 6.

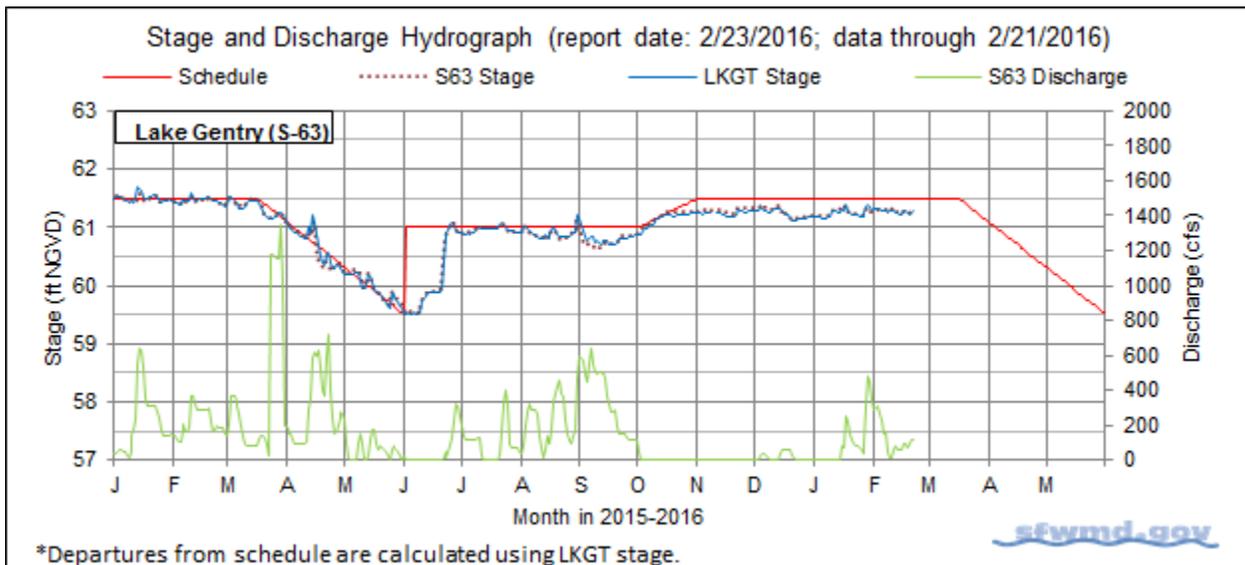


Figure 7.

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**Limits on Rate of Discharge Change at S65/S65A During F&W Recessions for Dry Season 2015-2016**

**Table 2. Maximum discharge rate of change limits for S65/S65A for use during departures after stage has intersected the KCH F&W recession line. These are maximum rates and should be implemented with discretion and as slowly as possible.**

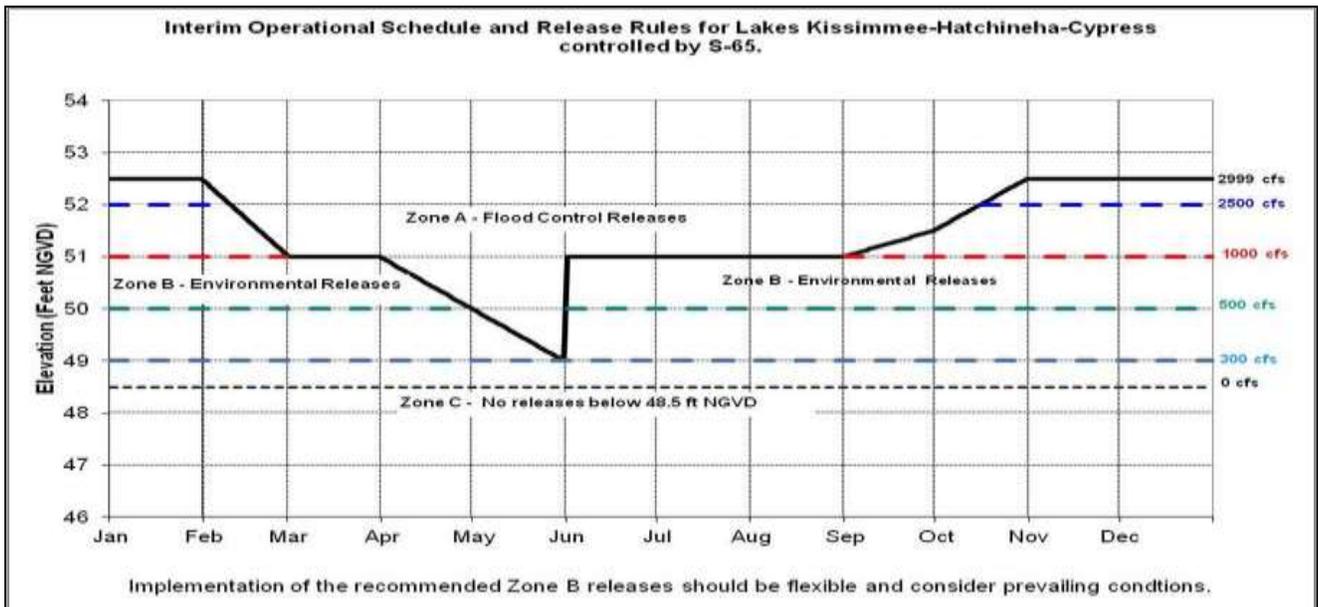
**\*\*Rate limits apply only in Zone B\*\***

	Q (cfs)	Departure (ft) above the F&W line				Departure (ft) below the F&W line				
		≤ 0.5	> 0.5	> 0.75	> 1.0	≥ -0.3	< -0.3	< -0.5	< -0.75	< -1.0
		Maximum rate of increase (cfs/day)				Maximum rate of decrease (cfs/day)				
Zone B	0-300	50	100	150	200	-50	-100	-150	-200	-250
	300-1400	150	300	450	600	-75	-150	-225	-300	-375
	1400-2500	300	600	800	800	-300	-600	-600	-600	-600
	2500-3000	1000	1000	1000	1000	-600	-600	-600	-600	-600
Zone A		No limits								

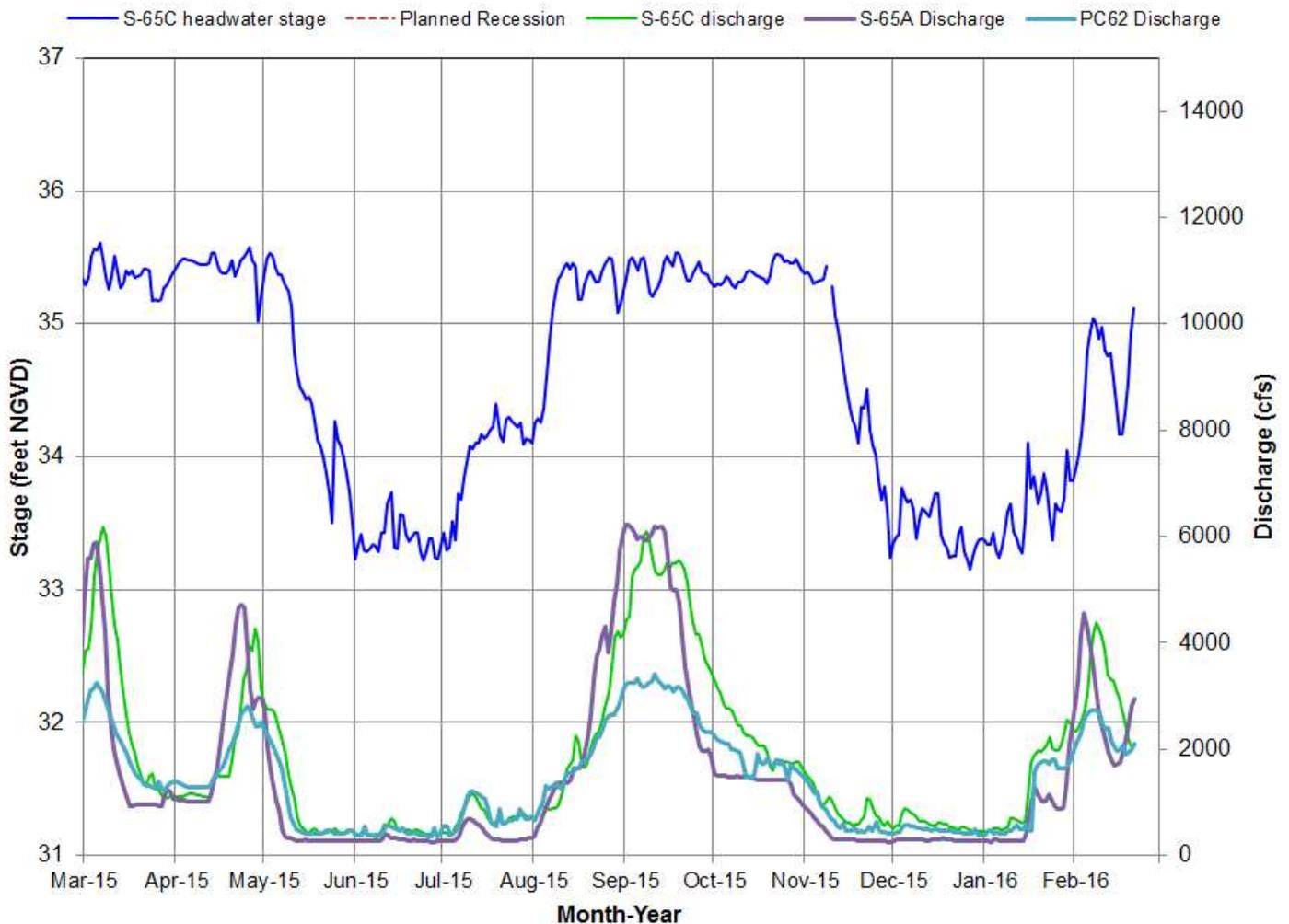
\*S65 discharge plan for Wet Season 2015 was discontinued on January 20, 2016 to allow lake stage to rise by Feb 1 as conditions permit. From 2015-2016 dry season standing recommendation.

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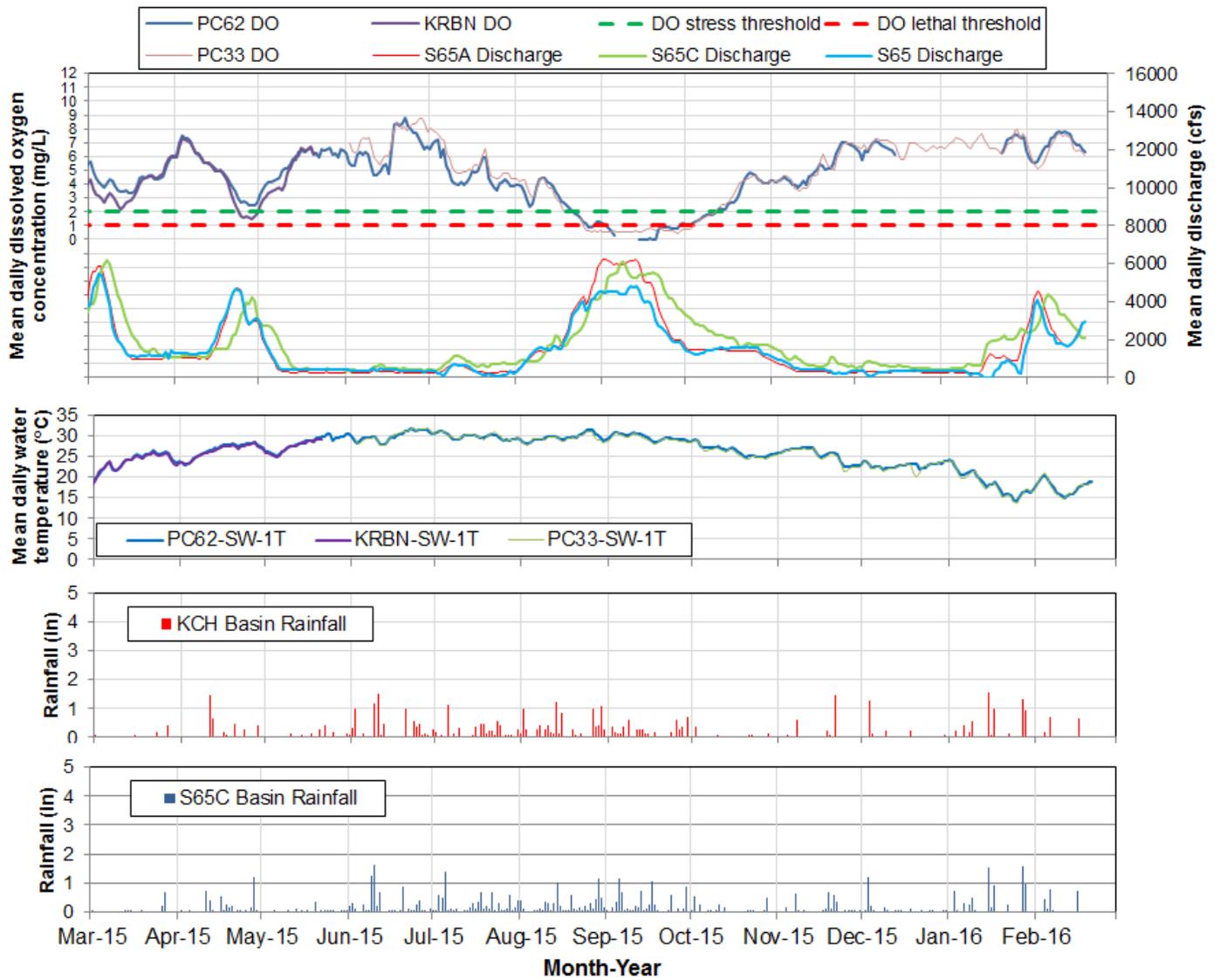
Figure 8a. Limits on rate of discharge change at S65/S65A during F&W recession for dry season 2015-2016. Table 2 is from the 2015-2016 Dry Season Standing Recommendation.



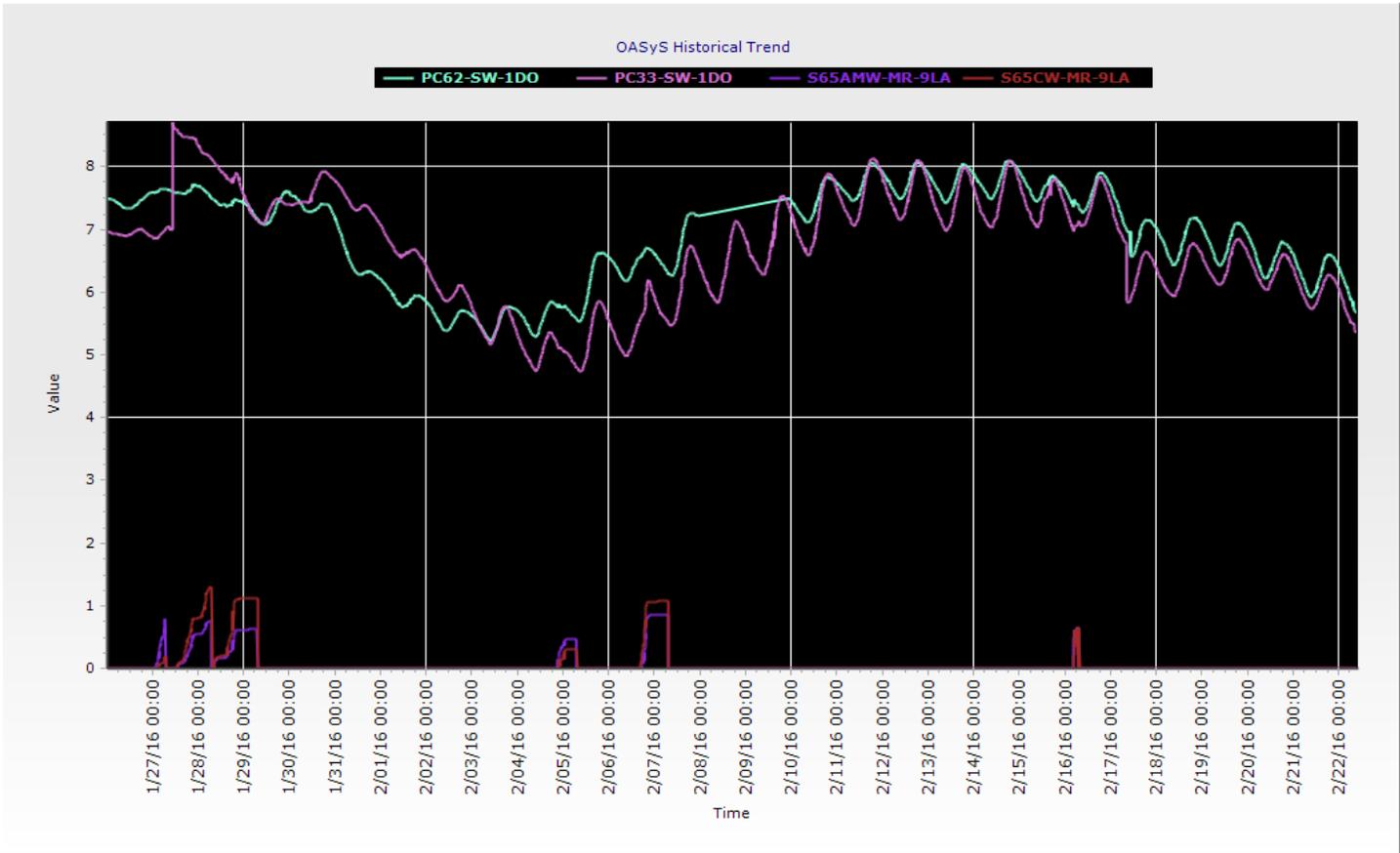
**Figure 8b.** Interim operations schedule for S-65. The discharge schedule shown to the right has not been used in recent years or in Wet Season 2015.



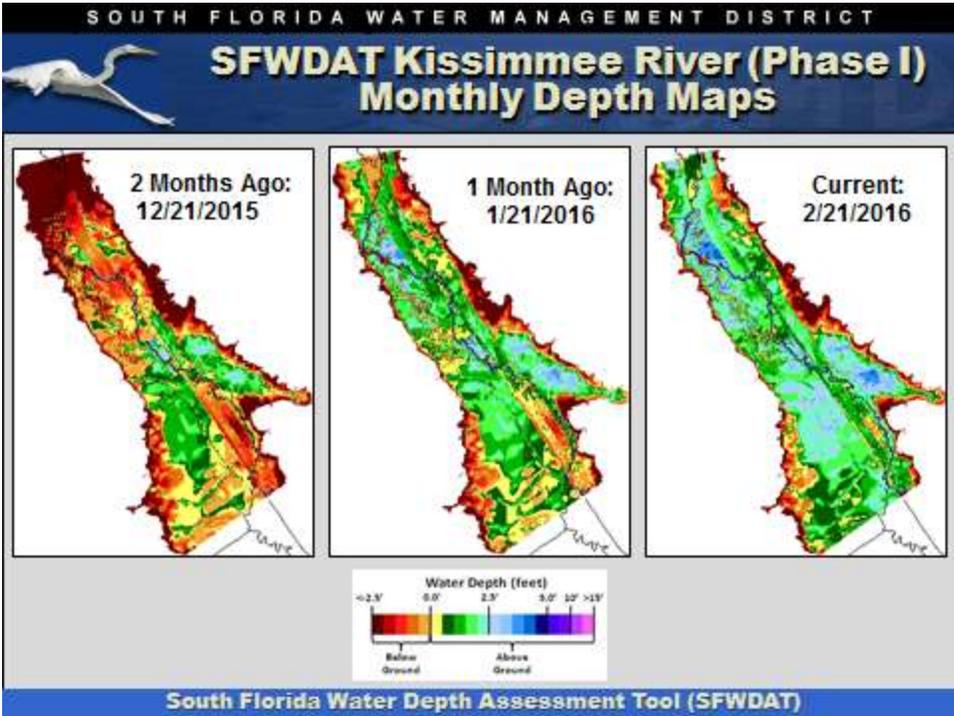
**Figure 9.** S-65C headwater stage in relation to discharge at S-65C, S-65A, and PC62.



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

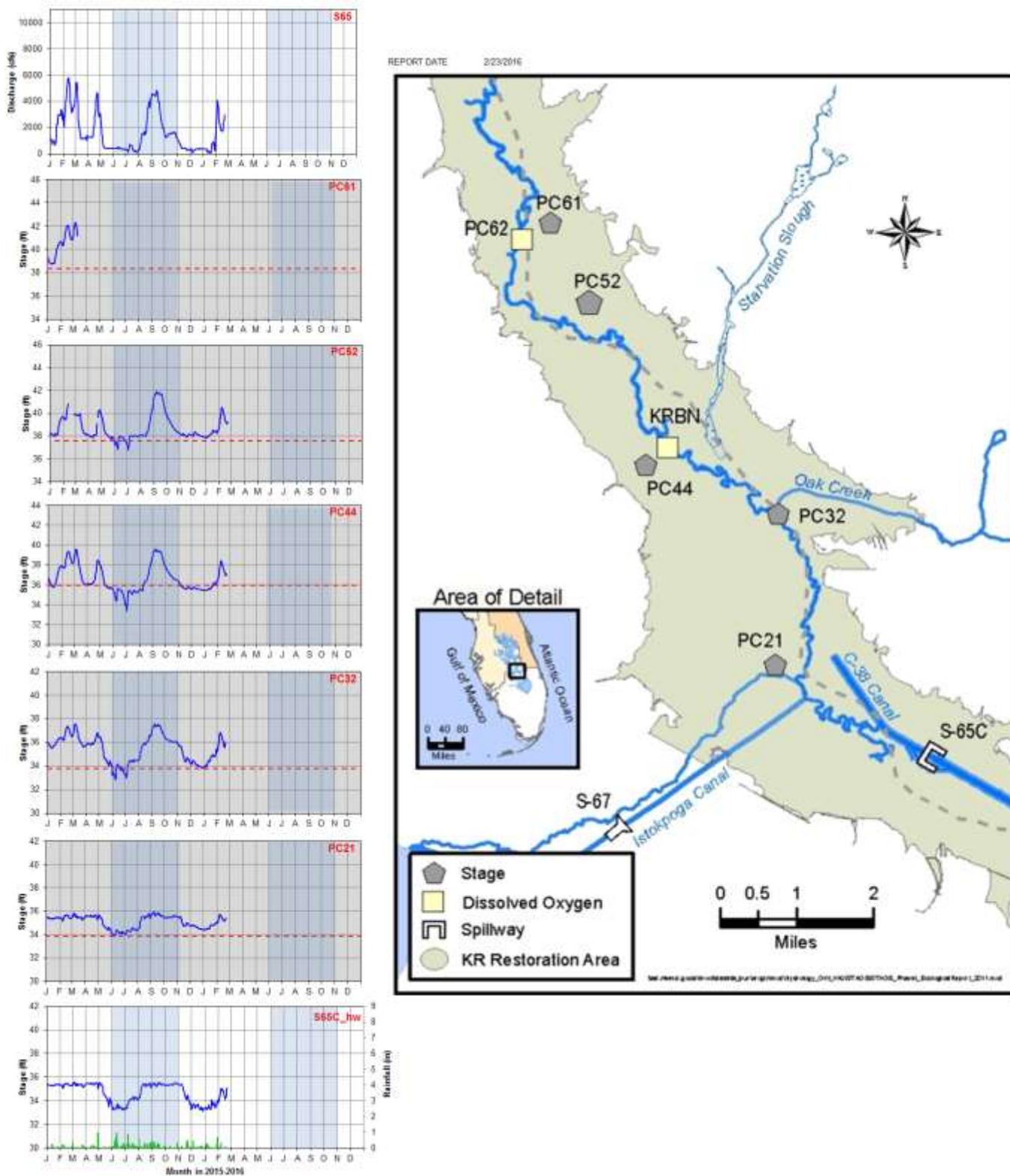


**Insert A.** Phase I river channel Dissolved Oxygen (measured at 15 minute intervals) and rainfall at S65A and S65C.



**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.

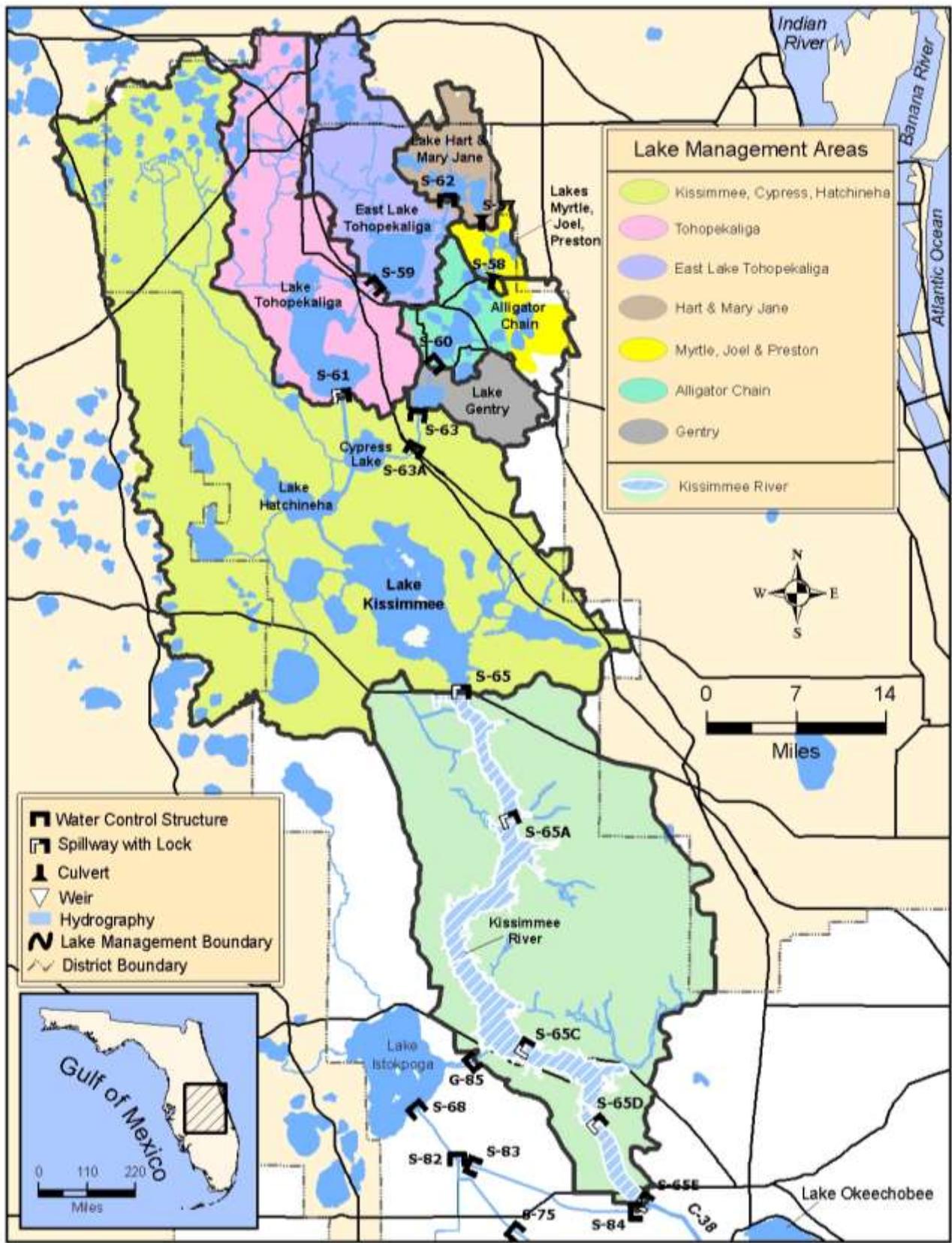


Figure 13. The Kissimmee Basin.

## LAKE OKEECHOBEE

According to the USACE web site, Lake Okeechobee stage is at 16.08 feet NGVD for the period ending at midnight on February 22, 2016. This value is based on the use of four interior Lake stations (L001, L005, L006, and LZ40) and four perimeter stations (S352, S4, S308 and S133). Lake stage decreased by 0.11 feet over the past week. The Lake is 0.74 feet higher than it was a month ago and 1.40 feet higher than it was a year ago (Figure 1). The Lake is in the Intermediate Flow Sub-band (Figure 2). According to RAINDAR, 0.85 inches of rain fell directly over the Lake during the past seven days. Similar to slightly lower amounts of rain fell in the western and most of the northern portions of the watershed while similar to slightly higher amounts fell in the eastern, southern and a small portion of northern watershed (Figure 3).

Based on USACE reported values, current Lake inflow is approximately 4,490 cfs, consisting of flows as indicated below.

<b>Structure</b>	<b>Flow cfs</b>
S65E	2619
S154	45
S84 & 84X	589
S71	88
S72	293
C5(Nicodemus slough dispersed storage)	-138
S191	76
S133 PUMPS	95
S127 PUMPS	54
S129 PUMPS	42
S131 PUMPS	27
S135 PUMPS	176
Fisheating Creek	524
S2 Pumps	0
S3 Pumps	0
S4 Pumps	0

Current Lake outflow is approximately 9,823 cfs exiting at S77 (6,222 cfs), S308 (3,553 cfs) and to the L8 canal through Culvert C10A (47 cfs). Corrected evapotranspiration value based on the L006 weather platform solar radiation data for this past week was 1,350 cfs.

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

Based on the Lake Okeechobee wading bird habitat suitability index, there are currently approximately 19,467 acres of potentially suitable foraging habitat on the Lake for long-legged wading birds and 3,553 acres of potentially suitable foraging habitat for short-legged wading birds, reflecting a gradually increasing trend since the recession was re-initiated (Figure 5). Florida Fish and Wildlife Conservation Commission reported four nests (two new) and six potential nests during their February snail kite nest survey (Figure 6).

The lake-wide mean February total phosphorus (106 ppb) and total suspended solids (10 ppm) concentrations decreased by 29% and 76%, respectively (Figure 7). Potential algal bloom conditions

based on chlorophyll a concentrations existed at L005 (45 µg/L) and chlorophyll a concentrations were in the intermediate range (20-40 µg/L) at four nearshore and three pelagic sites. Microcystin was above the detection limit at the KissR0.0 site (Figure 8). The most recent MODIS satellite image indicates the absence of potential algal bloom conditions on the Lake. Colored pixels associated with cloud cover reflect edge effects (Figure 9).

### Water Management Recommendations

The winter/spring dry season recession has continued for two weeks with a decrease of 0.11 feet this past week. Future short-term recommendations will depend in large measure on the near-term rainfall patterns and amounts. Actions which contribute to continuing the recession are essential to protect critical components of the Lake's floral (bulrush and submerged aquatic vegetation and faunal (wading birds, snail kites and fish) communities. The operational goal continues to be to maintain a small but steady decrease in water levels not to exceed 1.0 feet per month (0.26 feet/week) to achieve a Lake stage of approximately 12.5 feet NGVD by the end of the dry season and avoid additional reversals in Lake stage.

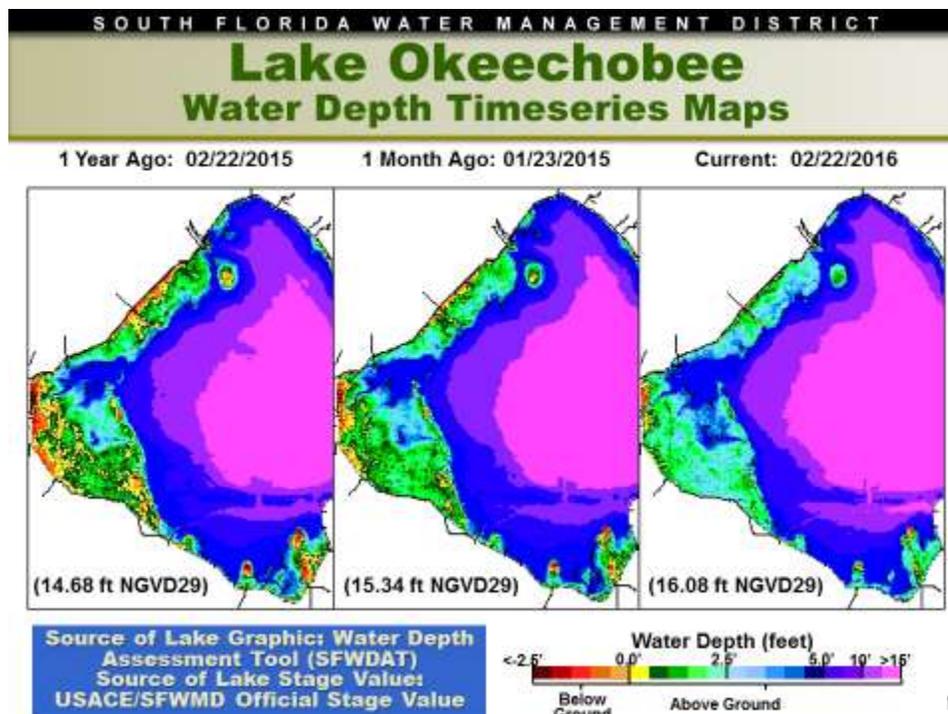


Figure 1

### Lake Okeechobee Water Level History and Projected Stages

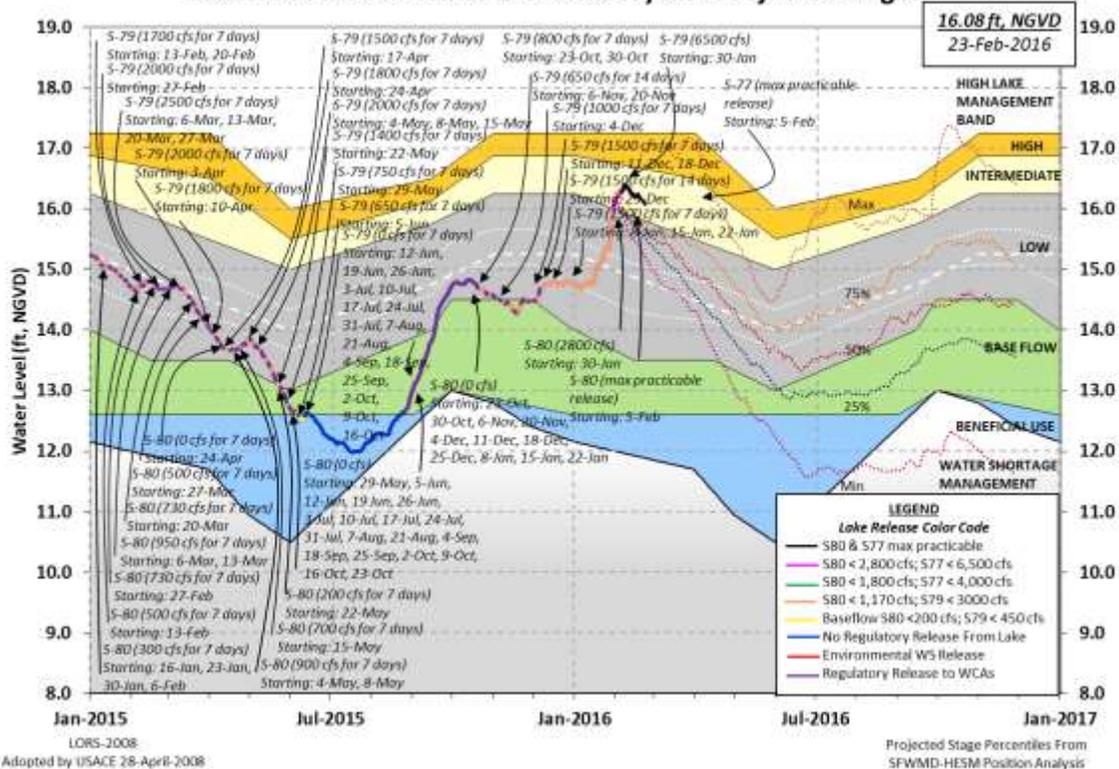
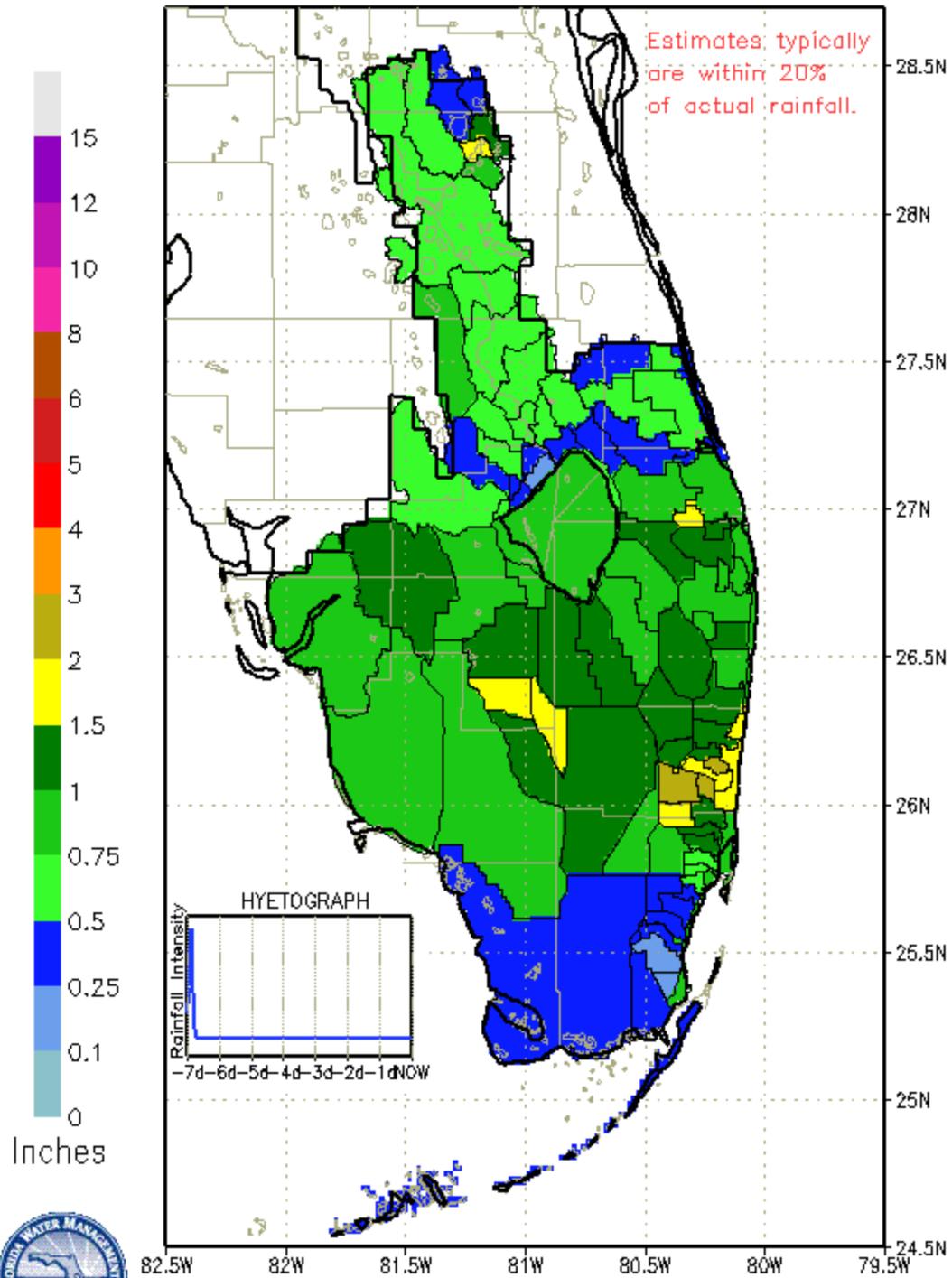


Figure 2

# SFWMD PROVISIONAL RAINFAR 7-DAY BASIN RAINFALL ESTIMATES

FROM: 0315 EST, 02/16/2016 THROUGH: 0315 EST, 02/23/2016



DISTRICT-WIDE RAINFALL ESTIMATE: 0.858"



Figure 3

INFLOWS	Average Daily Flow Past Week cfs	Feet of Change Past Week
S65E	2852	0.090
S71 & 72	291	0.009
S84 & 84X	1186	0.038
Fisheating Creek	934	0.030
Rainfall	N.A.	0.071
OUTFLOWS	Average Daily Flow Past Week cfs	Feet of Change Past Week
S77	7370	0.233
S308	4221	0.133
S351	0	0.000
S352	0	0.000
S354	0	0.000
L8	57	0.002
ET	1350	0.043

Figure 4

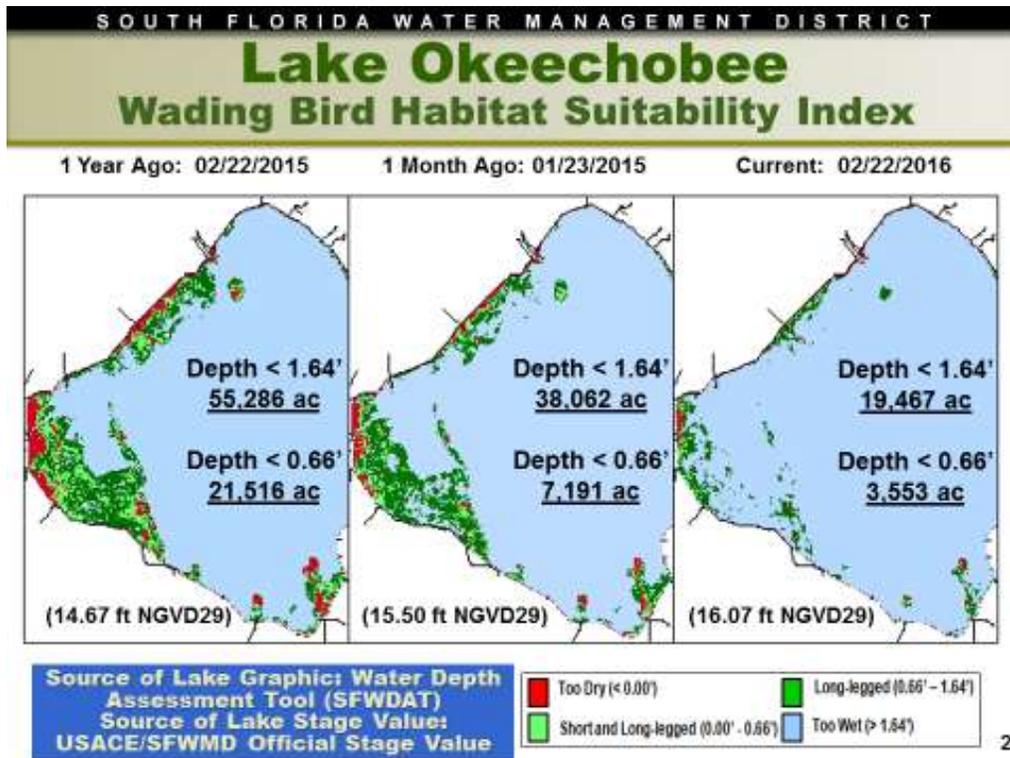


Figure 5

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# Lake Okeechobee

## Snail Kites



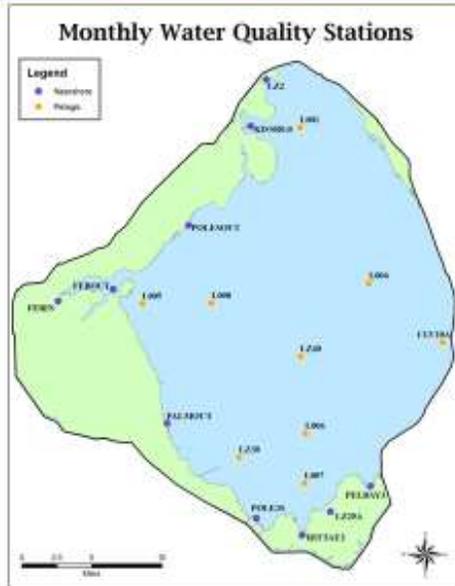
February 2016  
 4 Active Nests (2 new)  
 6 More Potential Nests

Figure 6

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# Lake Okeechobee

## Water Quality



Parameter		Dec 2015	Jan 2016	Feb 2016
TP ppb	Nearshore	87	114	97
	Pelagic	113	188	116
	Lakewide	99	149	106
TSS ppm	Nearshore	6	22	6
	Pelagic	21	65	15
	Lakewide	13	42	10

Figure 7

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# Lake Okeechobee Algal Blooms

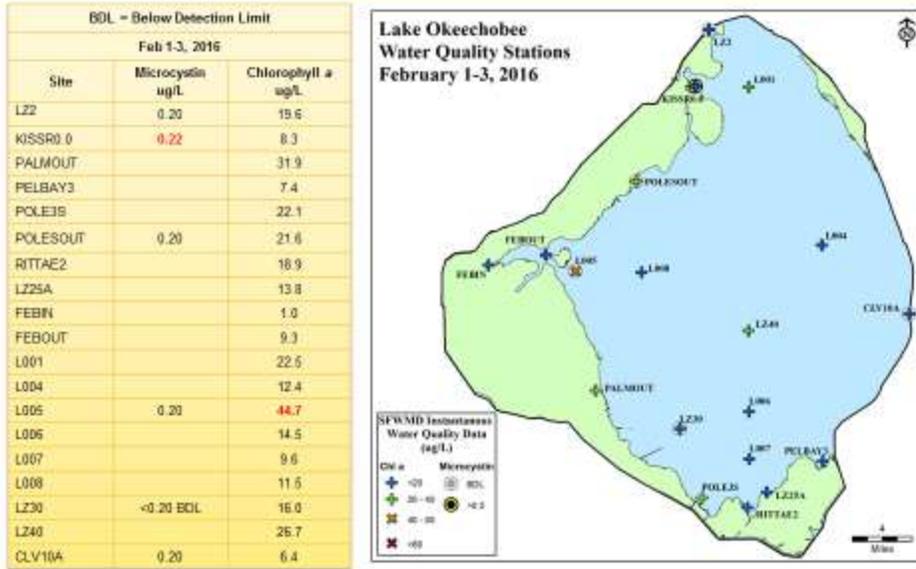


Figure 8

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# Lake Okeechobee Algal Blooms

## Unvalidated and Experimental Data

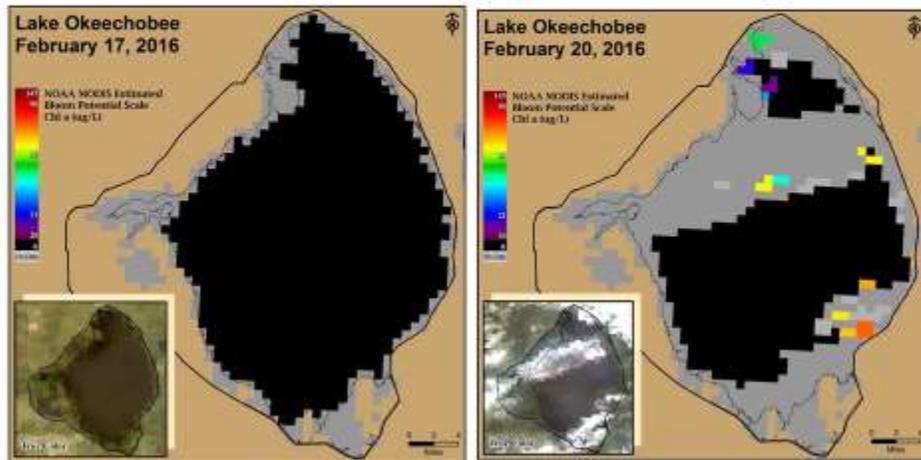


Figure 9

## Lake Istokpoga

Lake Istokpoga stage is 39.29 feet NGVD today and is currently 0.21 feet below its regulation schedule of 39.50 feet NGVD, which remains at peak high pool (Figure 10). Average flows into the Lake from Arbuckle and Josephine creeks were 565 and 184 cfs respectively, an overall decrease of approximately 8% compared to the preceding week. Average discharge from S68 and S68X this past week was 906 cfs, an increase of approximately 3% compared to the preceding week. According to RAINDAR, 0.80 inches of rain fell in the Lake Istokpoga watershed during the past seven days.

Fish and Wildlife Commission reported that the February snail kite survey indicated the presence of four active nests (one new) and three potential nests.

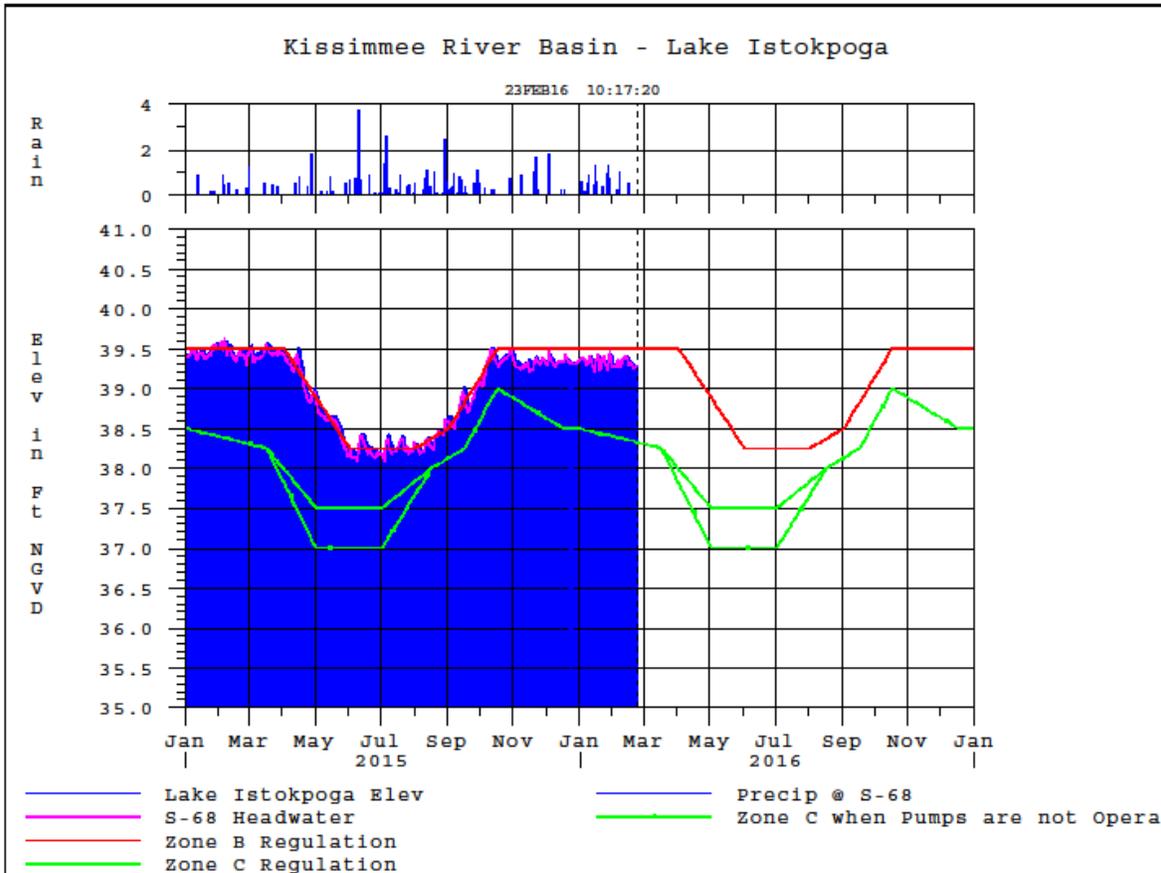


Figure 10

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## Lake Istokpoga Snail Kites

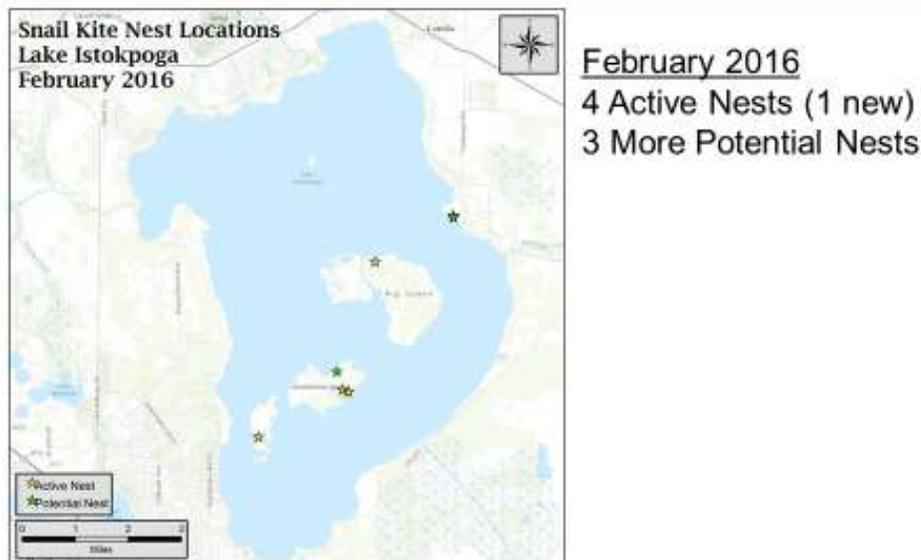


Figure 11

## ESTUARIES

### **St. Lucie Estuary**

Over the past week, provisional flows averaged 6,473 cfs at S-80, 3,557 cfs below S-308, 266 cfs at S-49 on C-24, 291 cfs at S-97 on C-23, and 160 cfs from Ten Mile Creek at the Gordy Road Structure. Average inflow from tidal basin tributaries is estimated to be 300 cfs (Figures 1 and 2). Total inflow averaged about 7,490 cfs last week and 6,752 cfs over last month.

Over the past week, surface salinity remained about the same 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 0.3. Salinity conditions in the middle estuary are in the poor range for the adult eastern oyster. Low salinities may have also negatively impacted seagrasses in the lower estuary.

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)	<b>0.4</b> (0.4)	<b>0.4</b> (0.4)	NA <sup>1</sup>
US1 Bridge	<b>0.3</b> (0.8)	<b>0.3</b> (1.0)	10.0-26.0
A1A Bridge	<b>3.3</b> (4.7)	<b>12.7</b> (12.6)	NA

<sup>1</sup>Envelope not applicable

### **Caloosahatchee Estuary**

During the past week, provisional flows averaged approximately 6,325 cfs below S-77, 6,365 cfs at S-78, and 8,996 cfs at S-79. Average inflow from tidal basin tributaries is estimated to be 627 cfs (Figures 5 and 6). Total inflow averaged 9,623 cfs last week and 10,341 cfs over last month.

Over the past week, salinity remained about fresh upstream of Cape Coral and were slightly higher than previous week downstream of Shell Point (Table 2, Figures 7 & 8). The seven-day average salinity

values are within the poor range for adult oysters at Cape Coral and within the good range at Shell Point and Sanibel, (Figure 9). Salinities this low may have also negatively impacted seagrasses in the lower estuary and San Carlos Bay. The 30-day moving average surface salinity is 0.2 at Val I-75 and 0.2 at Ft. Myers. Salinity conditions at Val I-75 are in the good range for tape grass.

Table 2. Seven-day average salinity at six monitoring stations in the Caloosahatchee Estuary. Current average is in bold face type, previous average in parentheses. The envelope reflects the preferred salinity range for tape grass (*Vallisneria americana*) at Val I-75 and for adult eastern oysters (*Crassostrea virginica*) elsewhere.

Sampling Site	Surface	Bottom	Envelope
S-79 (Franklin Lock)	<b>0.2</b> (0.2)	<b>0.2</b> (0.2)	NA <sup>1</sup>
*Val I75	<b>0.2</b> *(0.2*)	<b>0.2</b> *(0.2*)	0.0-5.0 <sup>2</sup>
Ft. Myers Yacht Basin	<b>0.2</b> (0.2)	<b>0.2</b> (0.2)	NA
Cape Coral	<b>0.3</b> (0.3)	<b>0.3</b> (0.3)	10.0-30.0
Shell Point	<b>8.3</b> (8.3)	<b>12.8</b> (10.5)	10.0-30.0
Sanibel	<b>21.8</b> (20.1)	<b>24.2</b> (21.4)	10.0-30.0

<sup>1</sup>Envelope not applicable, <sup>2</sup>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 (Feb12-15)
Chlorophyll <i>a</i> (µg/l)	5.5 – 13.3, Feb 22 <sup>nd</sup> spikes to 53 & 75	4.7 – 5.8	5.7 – 15.5
Dissolved Oxygen (mg/l)	6.2 – 7.6	6.5 – 8.5	6.9 – 8.6

The Florida Fish and Wildlife Research Institute reported on February 19, 2016, that there were background to very low concentrations of *Karenia brevis* in nine samples collected in, along, and offshore of Lee County.

### Water Management Recommendations

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

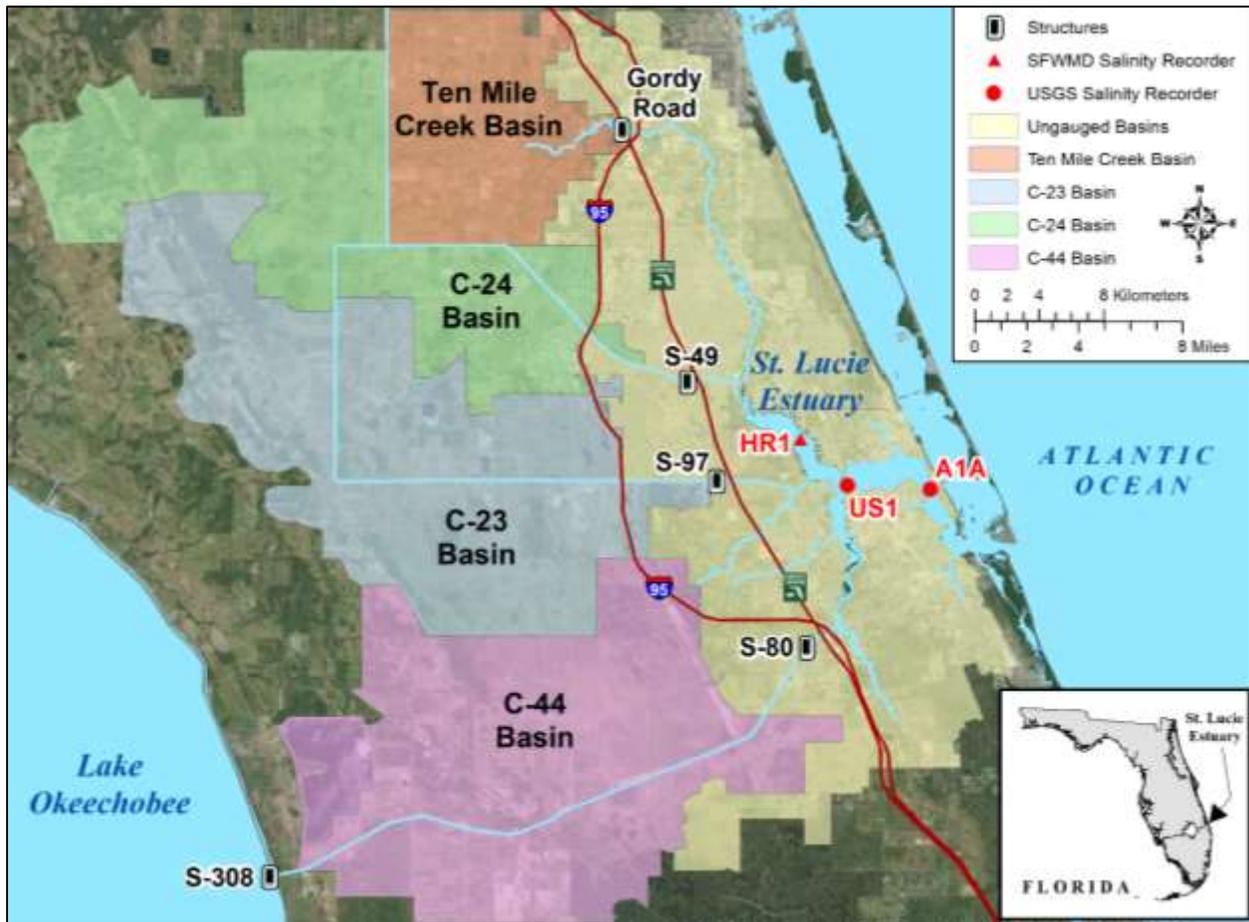


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

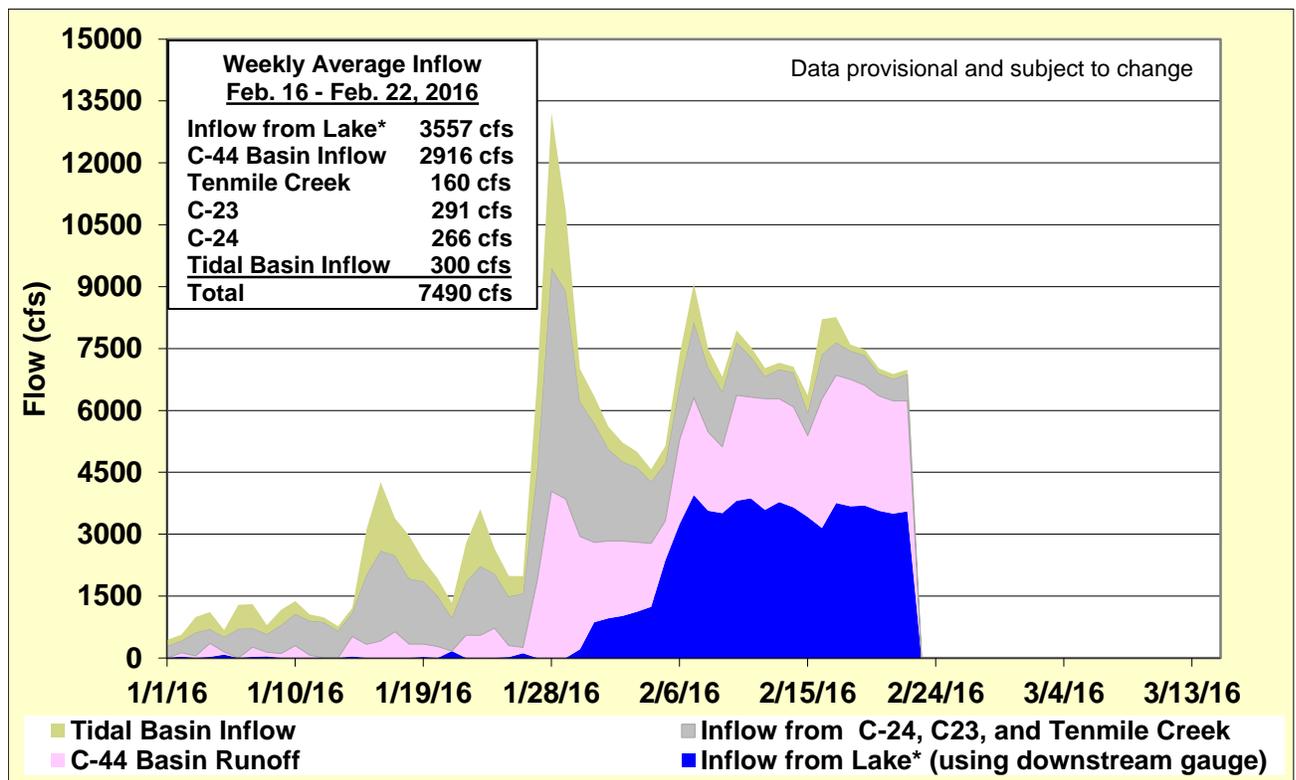


Figure 2. Estimated surface freshwater inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basins into the St. Lucie Estuary.

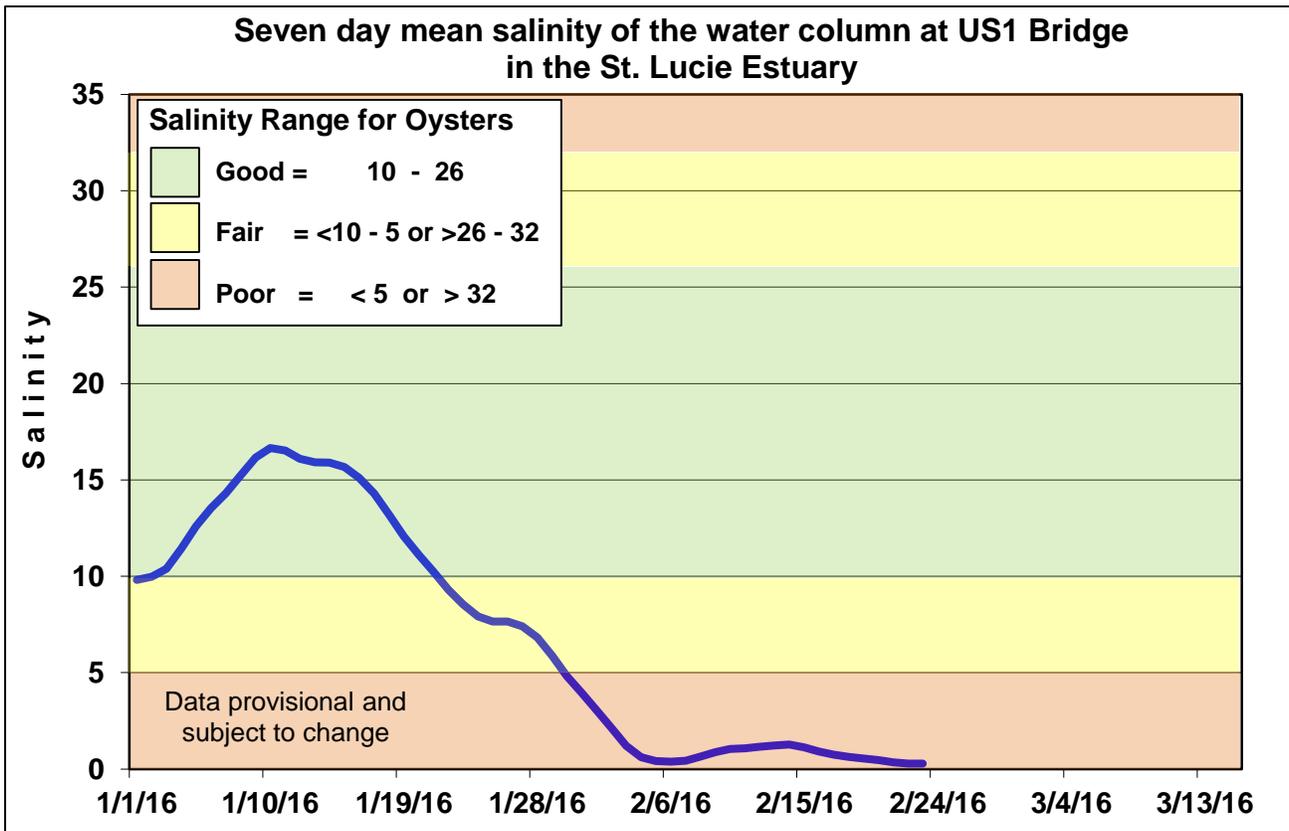


Figure 3. Seven-day mean salinity of the water column at the U.S. Highway 1 Bridge.

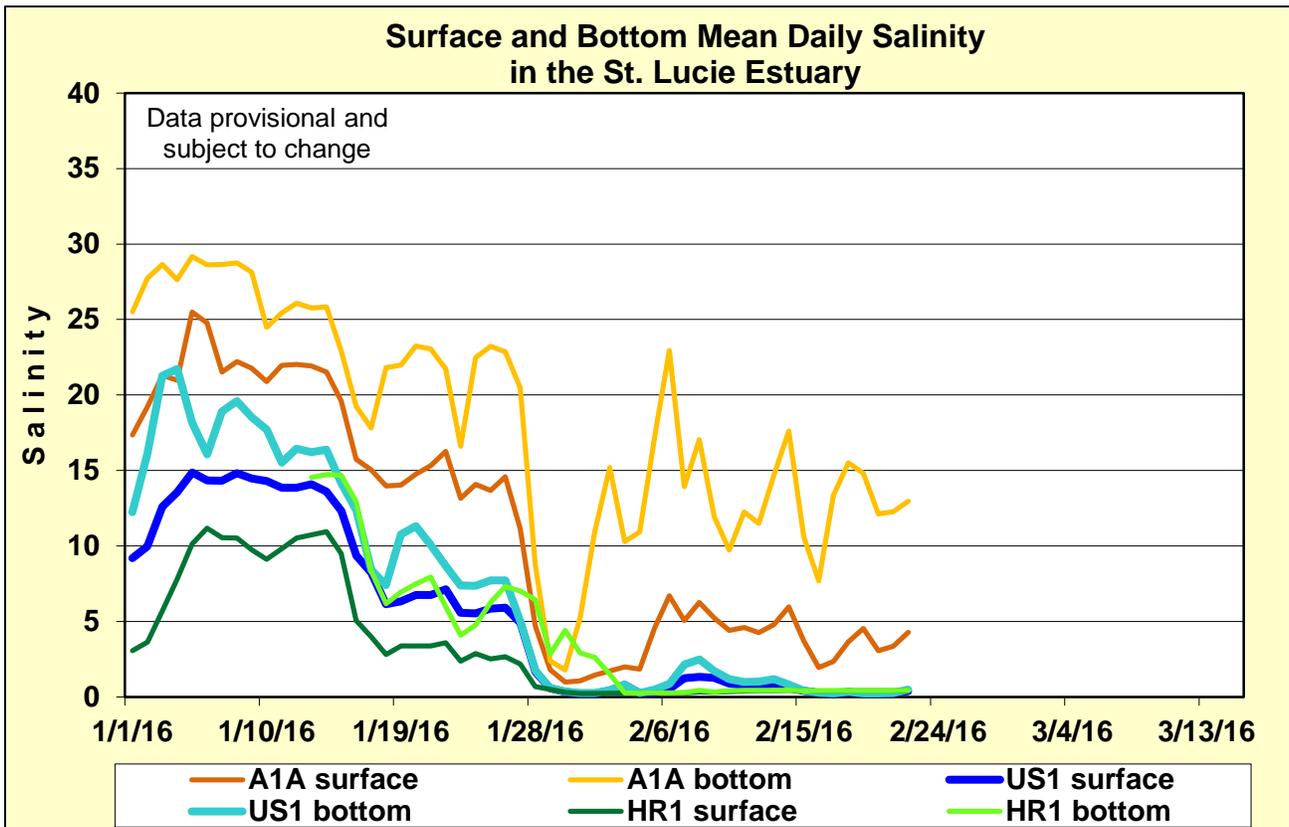


Figure 4. Daily mean salinity at the A1A, US1 and estimated HR1 stations.

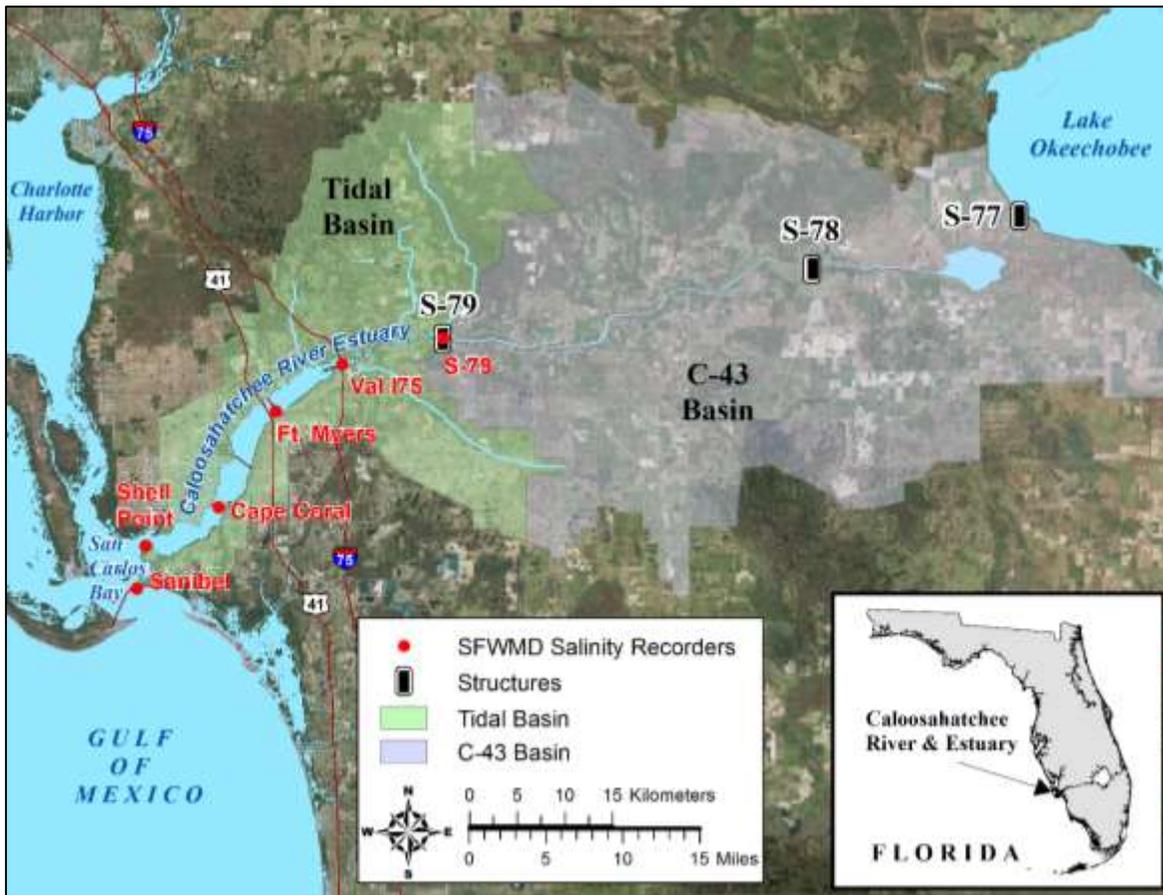


Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

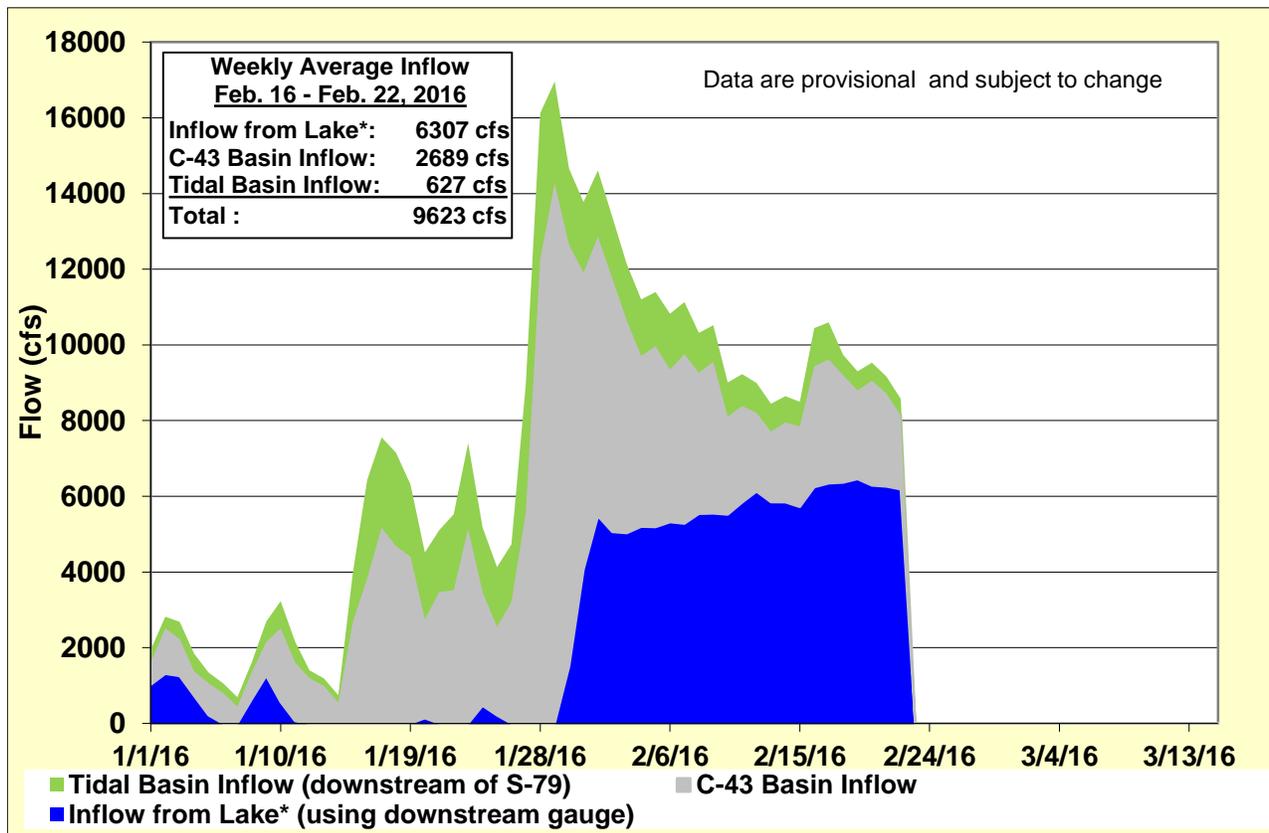


Figure 6. Freshwater inflows from Lake Okeechobee, runoff from the C-43 basin, and tributaries in the tidal basin into the Caloosahatchee River Estuary.

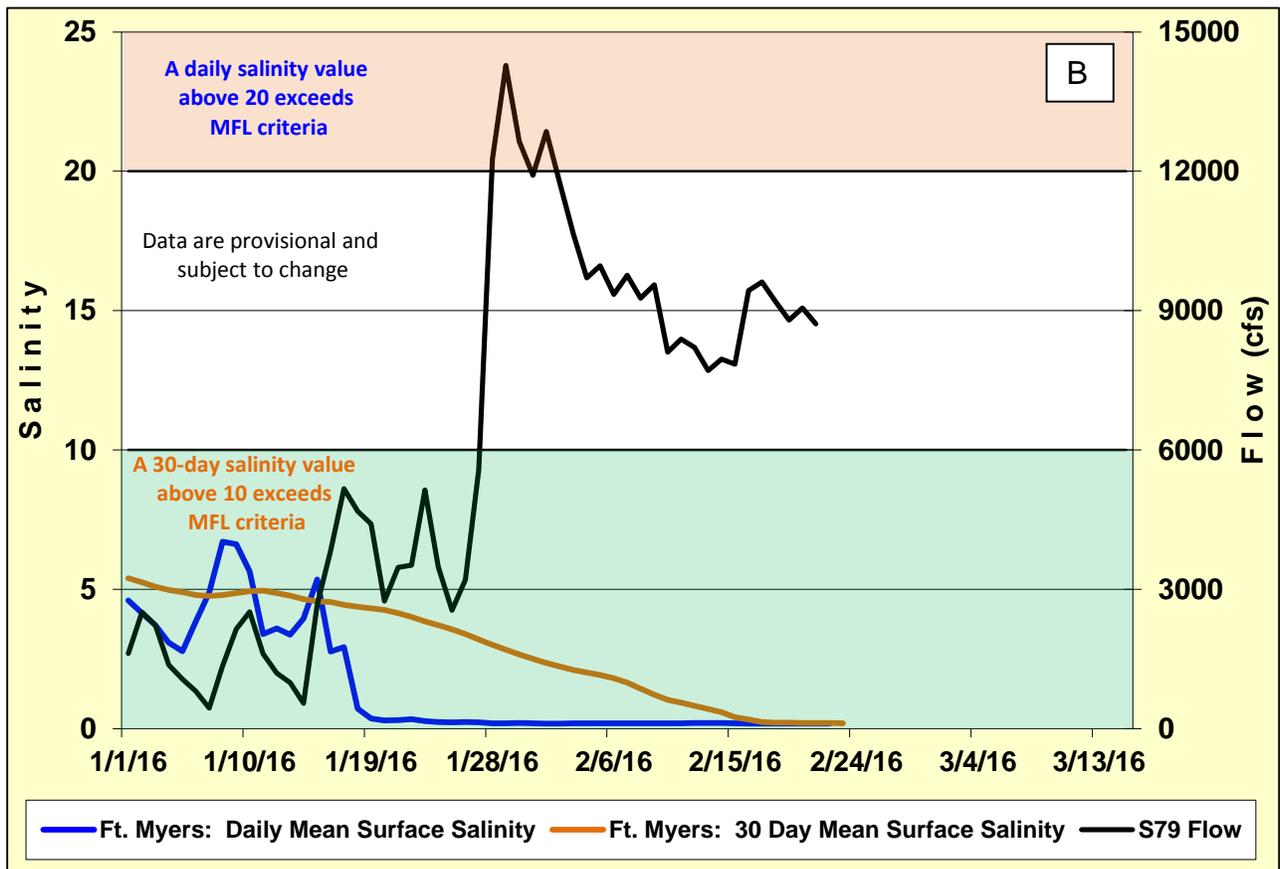
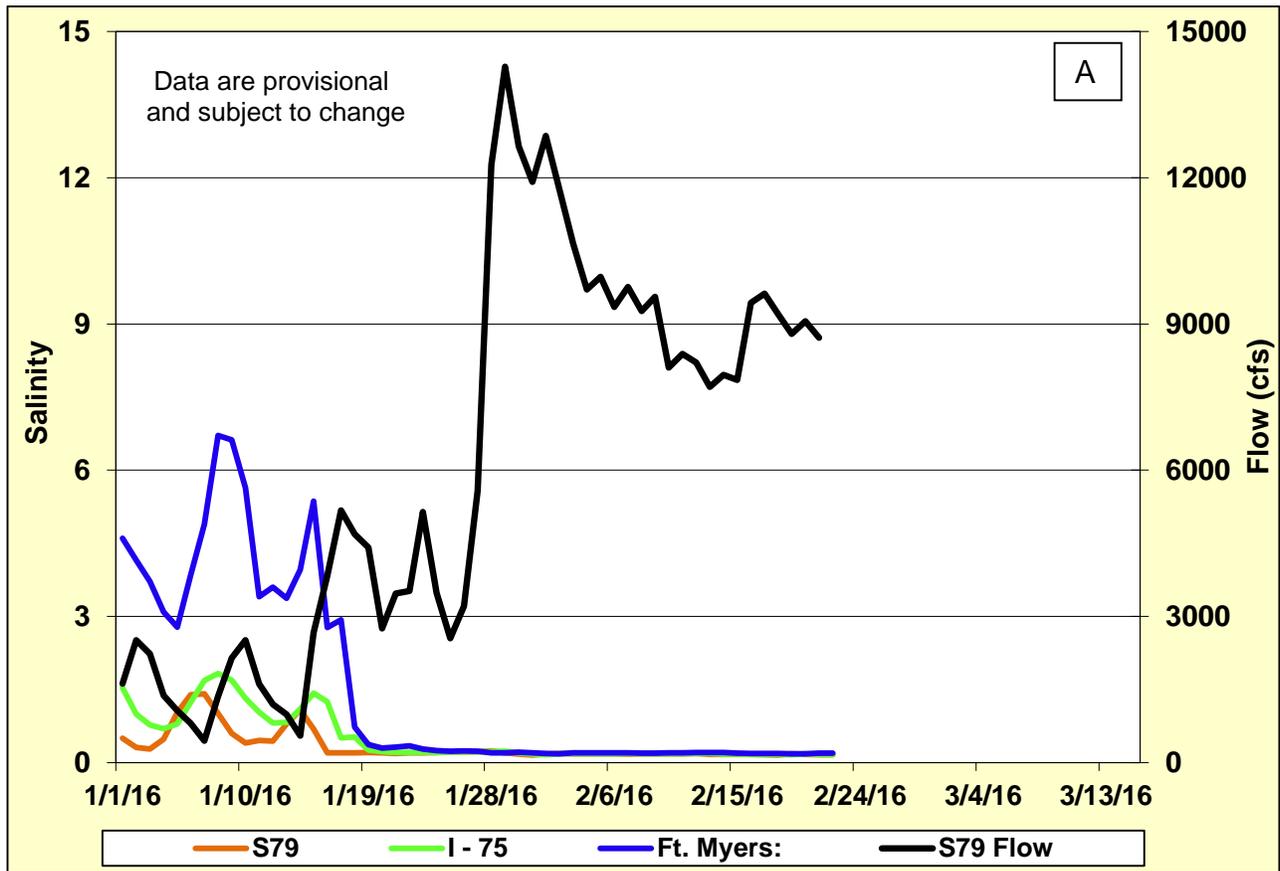


Figure 7. Daily mean flows at S-79 and salinity at upper estuary monitoring stations (A) and 30-day moving average salinity at Ft. Myers (B).

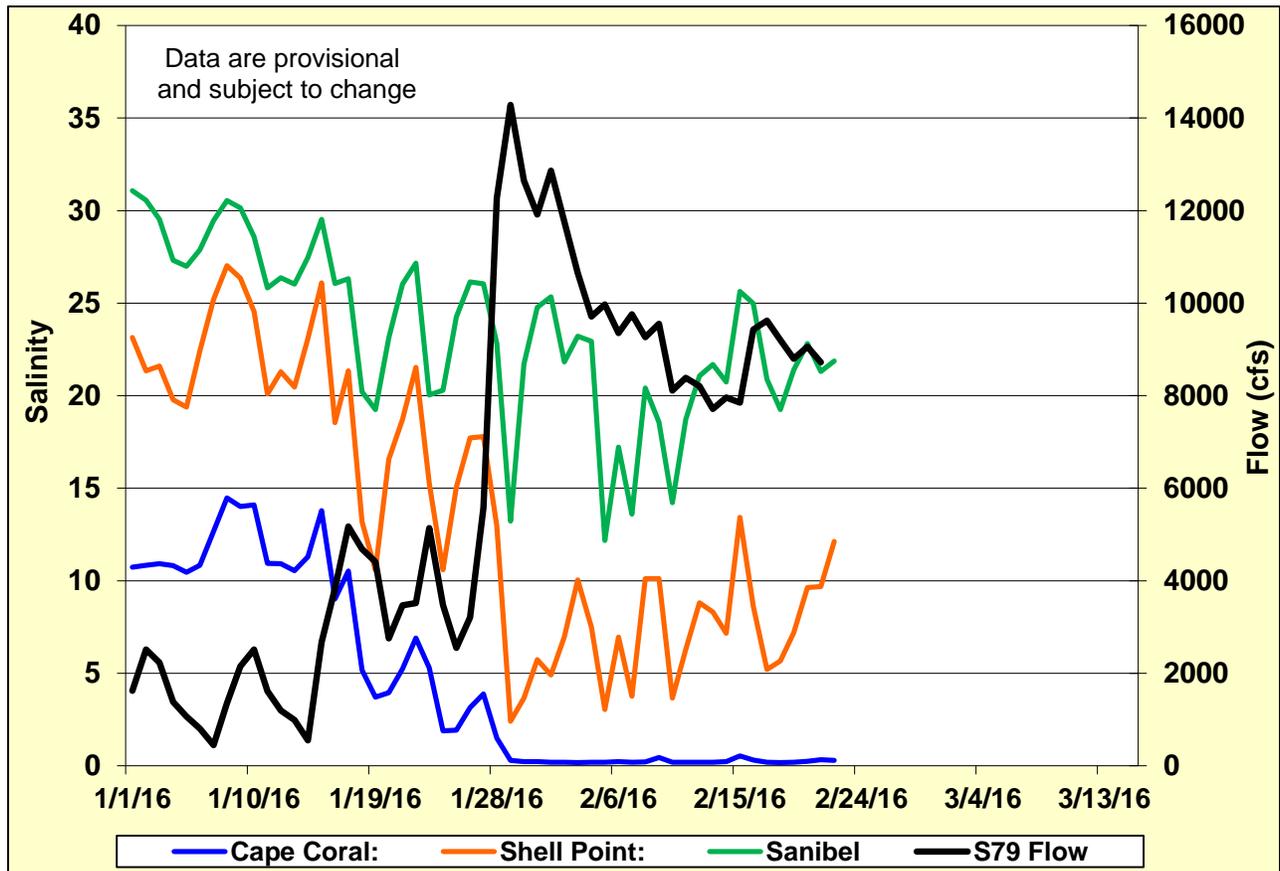


Figure 8. Daily mean flows at S-79 and salinity at lower estuary stations.

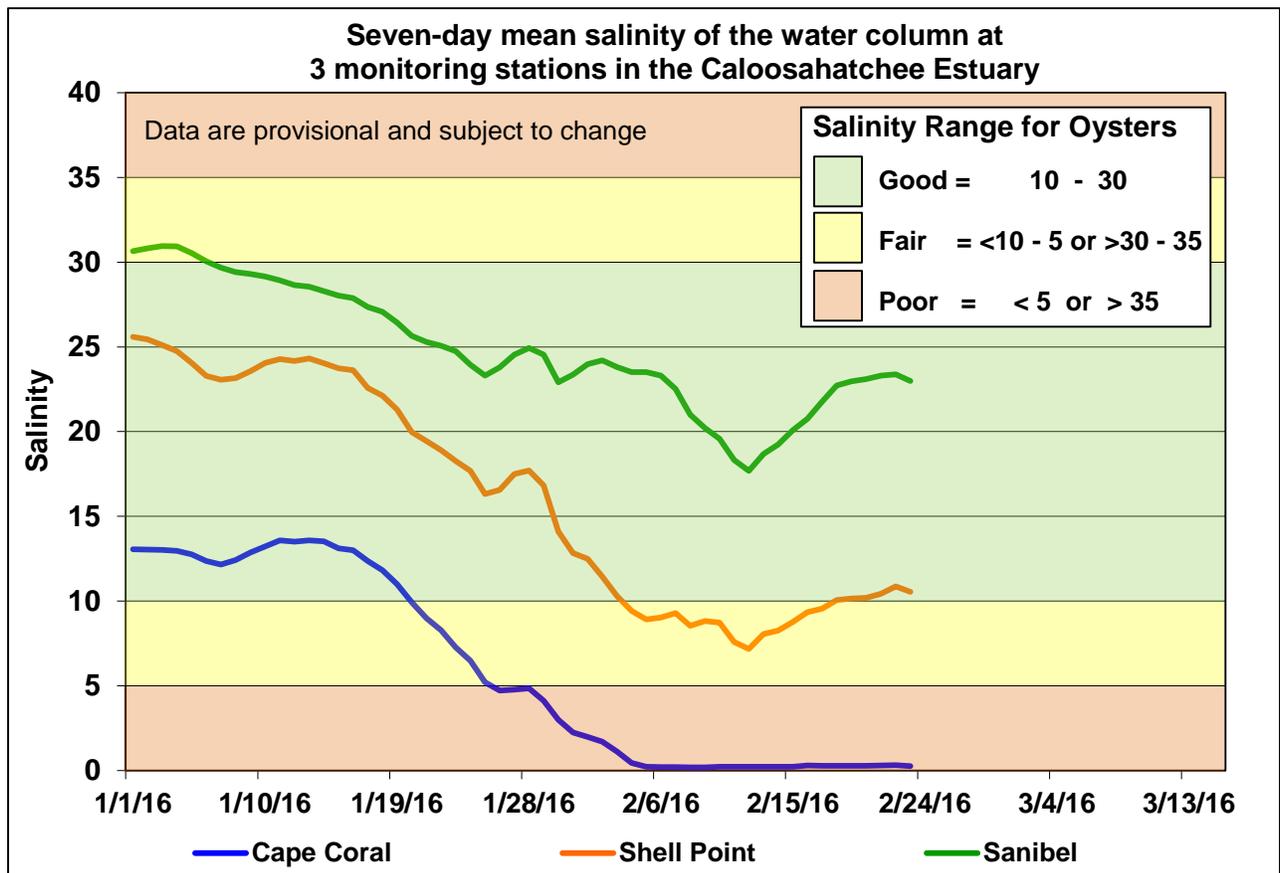


Figure 9. Seven-day mean salinity at Cape Coral Bridge, Shell Point and Sanibel Bridge monitoring stations.

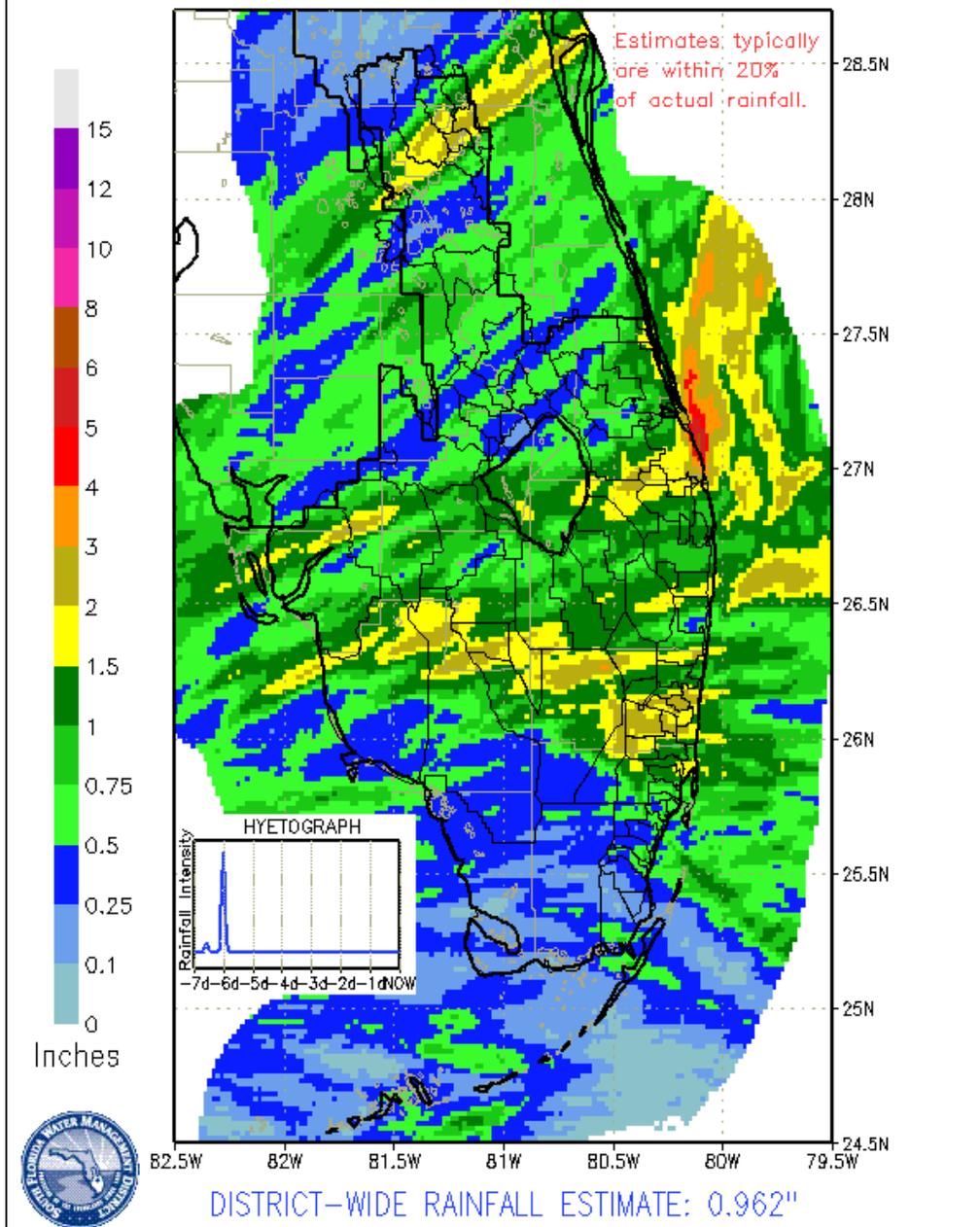
## **GREATER EVERGLADES**

Last week, more rain fell over the northern parts of the Everglades than the south with WCA-2A receiving the highest amount at 1.45 inches. Over the week, stage changes ranged from -0.40 feet to 0.16 feet and only WCA-2A experienced a decrease. At 1.25 inches, pan evaporation was higher than the pre-project average of 1.08 inches.

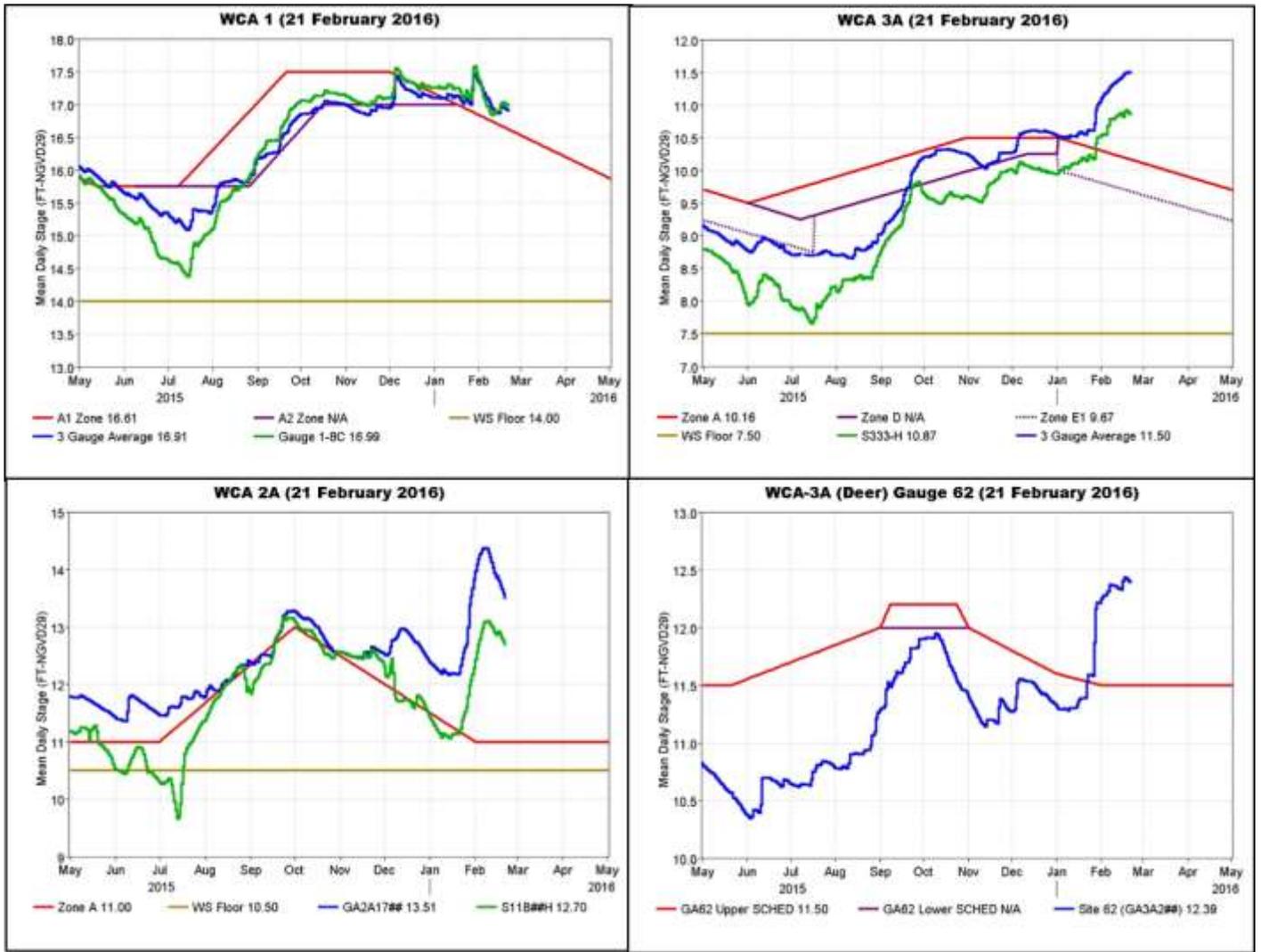
<b>Everglades Region</b>	<b>Rainfall (Inches)</b>	<b>Stage Change (feet)</b>
WCA-1	1.16	0.04
WCA-2A	1.45	-0.40
WCA-2B	1.38	0.04
WCA-3A	1.24	0.07
WCA-3B	1.00	0.08
ENP	0.30	0.16

# SFWM D PROVISIONAL RAINDAR 7-DAY RAINFALL ESTIMATES

FROM: 0615 EST, 02/15/2016 THROUGH: 0615 EST, 02/22/2016



Regulation Schedules: Stages rose in the WCAs this week except in WCA-2A; wetland stages are well above regulation. The WCA-1 stage is now 0.30 feet above regulation, the WCA-2A stage has dropped to 2.51 feet above regulation, and the three-gauge average stage in WCA-3A rose to 1.34 feet above regulation. The northwestern WCA-3A gauge stage (gauge 62) has increased slightly to 0.89 feet above regulation.

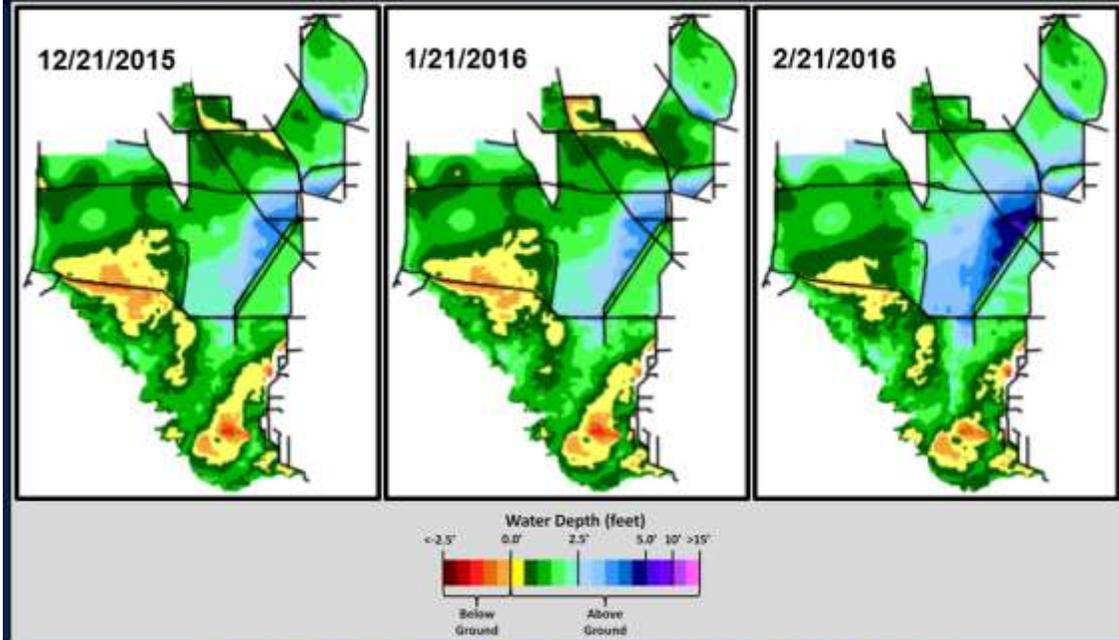


Water Depths and Changes: Water levels in the WCAs and ENP remain much higher than those one and two months ago. Most areas including Shark Slough in ENP are now close to or above 2.0 feet deep. Water depths at the monitored gauges other than WCA-2B range from 1.57 to 3.76 feet. Stages at gauge 65 in southern WCA-3A have exceeded 2.5 feet, the stage of note for tree island inundation-duration, for 13 weeks (it is now 3.76 feet). Stages at gauges 63 and 64 have exceeded 2.5 feet for four weeks.

Stages are mixed overall compared to a week ago, but WCA-3A and Holeyland WMA are mostly higher than a week ago. Stages are still mostly higher than a month ago and mostly one to two feet higher than a year ago.



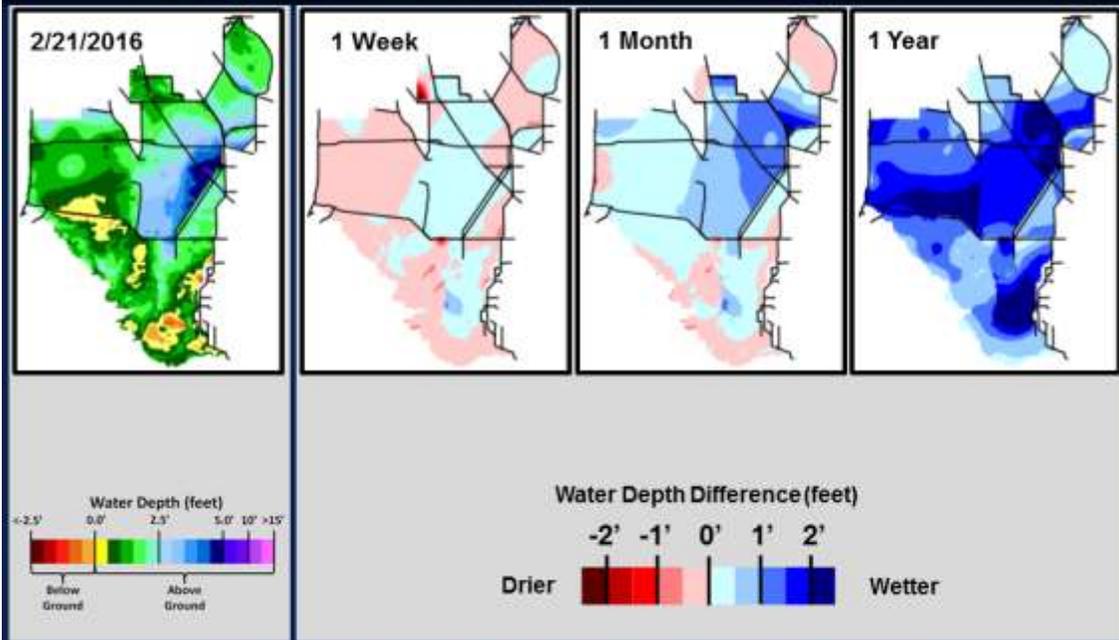
### SFWDAT Water Depth Monthly Snapshots



South Florida Water Depth Assessment Tool (SFWDAT)



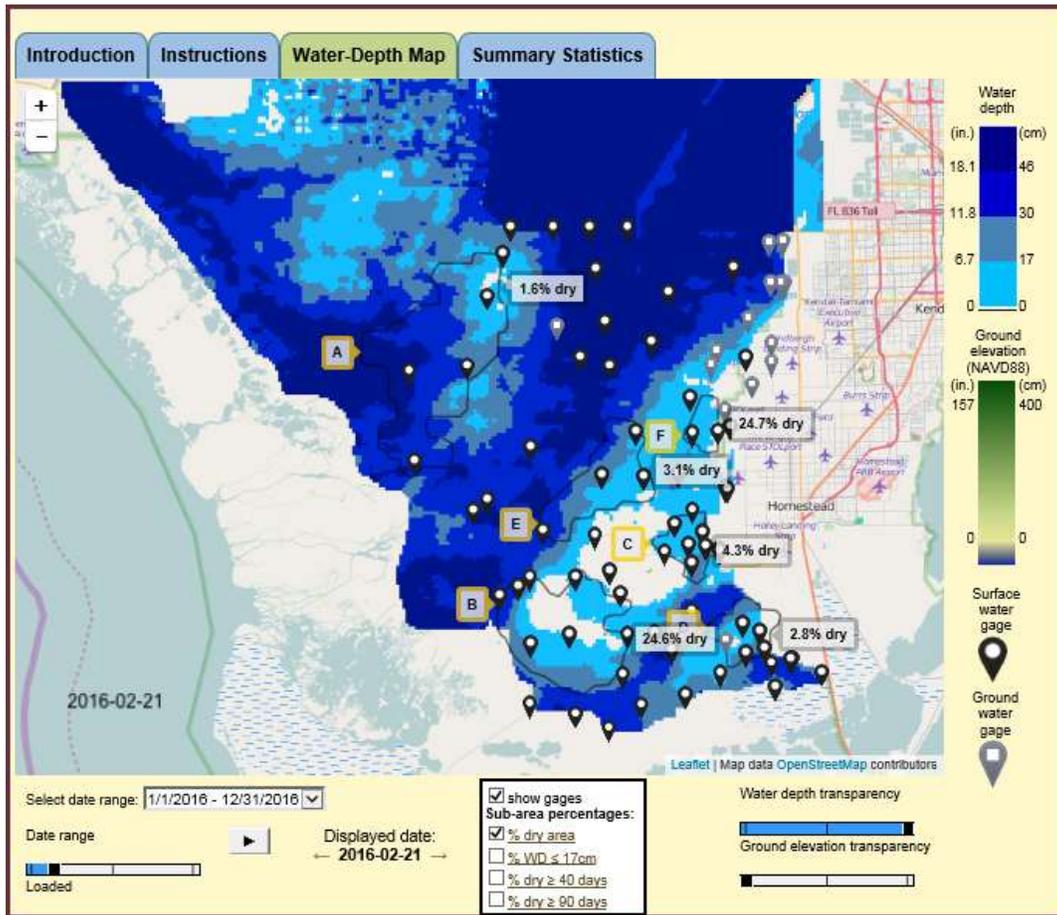
### SFWDAT Everglades Difference Maps (Present - Past)



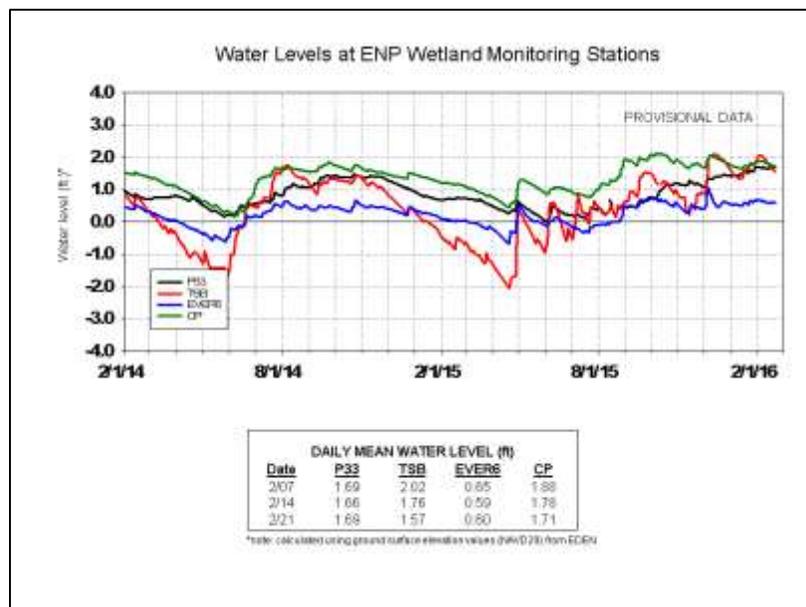
South Florida Water Depth Assessment Tool (SFWDAT)

Wading Bird Status: Current conditions are poor for nesting.

Cape Sable Seaside Sparrow: All of the sparrow habitats dried out slightly but remain mostly inundated as of February 21. Conditions are not favorable for early season breeding.

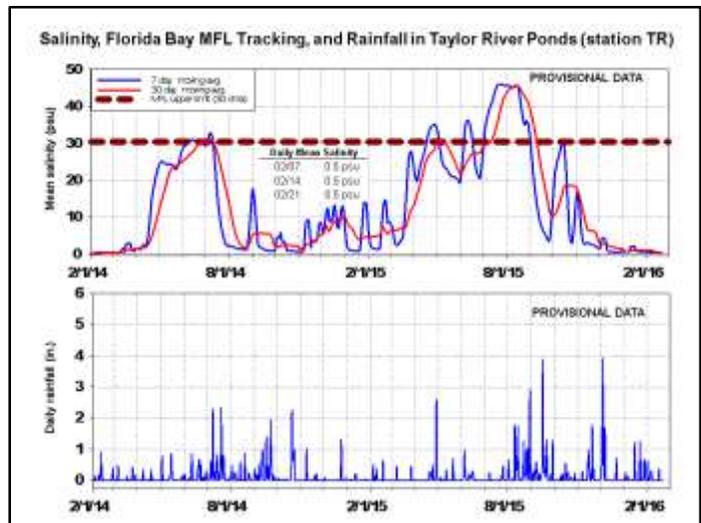


Everglades National Park (ENP) and Florida Bay: Water levels decreased this past week in Taylor Slough but increased in the ENP panhandle where more rain had fallen. Water levels remain 20 inches above average in northern Taylor Slough and seven to nine inches above average in the southern areas. From now until June, the historic averages will be decreasing, so the difference from average is likely to increase as the season progresses.

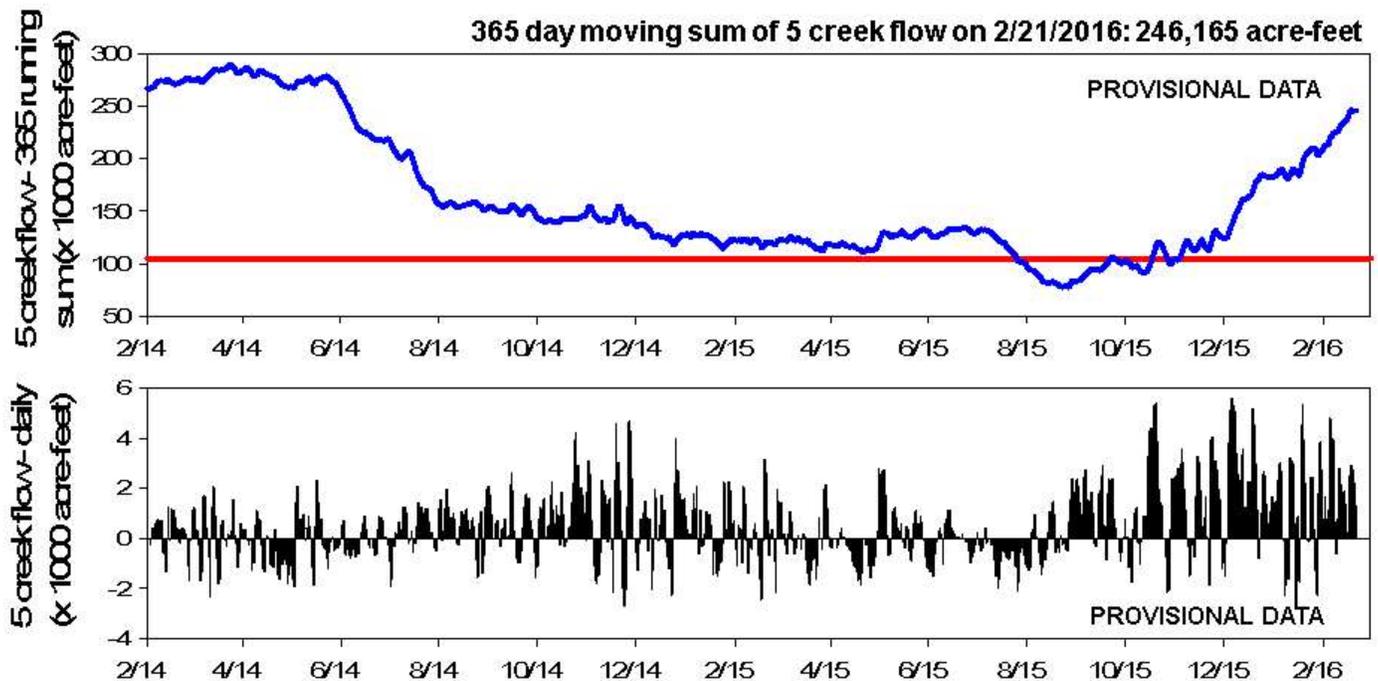


Salinities changes this past week were mixed, but less than 2 psu in either direction. Salinities in the bay range from 15 – 32 psu (similar to last week), and compared to historic averages, salinities range from average (Whipray Basin in central Florida Bay) to -11 psu below average (Garfield Bight in western nearshore embayments). This is the same patterning as last week. The daily average salinity at the MFL sentinel site of TR remained 0.5 psu on February 21, which is below the seasonal average of 4 psu. The seasonal averages of all stations will be rising from now through June. The 30-day moving average salinity at TR decreased to 0.5 while the typical 30-day moving average salinity for this time of year is 1 psu.

The 365-day running sum of the cumulative flow from the five creeks feeding Florida Bay rose to 246,165 acre-feet this week (96% of the average 365-day running sum for the five creek flow over the period of 257,628 acre-feet which is not seasonal). The weekly (Feb. 15-21) cumulative flow from the five creeks was 13,237 acre-feet which is about 11,500 acre-feet higher than the average for this time of year and was higher than last week's total (9,527 acre-feet which was about 7,200 acre-feet above average).



## 5 Creek Cumulative Flow and Florida Bay MFL Flow Criteria Tracking



### Water Management Recommendations

- Until WCAs 2A and 3A are open again (below 11.60 feet), additional discharges into these WCAs should be avoided because of high stages.
- Water levels at gauge 65 have exceeded 2.5 feet, the stage monitored for tree island inundation and duration, for 13 weeks (now 3.76 feet deep). Gauges 64 and 63 have exceeded 2.5 feet for four weeks.
- Current conditions are too wet, too deep, and too variable for wading birds, so expectations should be low for their nesting effort and breeding success this year. As stages improve, manage for recession rates through the end of May to support foraging activities of the wading birds.
- We recommend continuing to move water south into ENP to Florida Bay to provide continued buffering against the seasonal increase in downstream salinity.

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

## Summary of Everglades Recommendations, Feb. 23, 2016 (SFWMD) (red is new text)

Area	Current Condition	Cause(s)	Recommendation	Reasons
<b>WCA-1</b>	Stages changed from -0.05' to 0.09'	Rainfall, ET, management	Match inflows with outflows to achieve regulation schedule recession while allowing water levels to reflect variation in annual rainfall. Prevent repeated or ongoing reversals as much as possible.	Provide moderate recession rates to support wading bird foraging, necessary for successful nesting. Keep peat wet to promote native habitat and maintain wetland plant and animal communities.
<b>WCA-2A</b>	Stage decreased - 0.04'	Rainfall, ET, management	Lower stages. Prevent repeated or ongoing reversals as much as possible.	Provide moderate recession rates to support wading bird foraging, necessary for successful nesting. Keep peat wet to promote native habitat and maintain wetland plant and animal communities.
<b>WCA-2B</b>	Stage increased from 0.03' to 0.04'	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 decline at the end of the dry season.
<b>WCA-3A NE</b>	No change	Rainfall, ET, management	<b>WCA-2A and northern WCA-3A cannot accept inflow because of high water. Attempt to lower stages throughout the WCAs.</b>	Provide moderate recession rates to support wading bird foraging and nesting. Northern WCA-3A and WCA-2A have been closed to the public because of high water effects on wildlife. These areas cannot accept more water until stages decline below 11.60' average of gauges 62 and 63. Keep peat wet to promote native habitat and maintain wetland plant and animal communities.
<b>WCA-3A NW</b>	Stage increased 0.06'	Rainfall, ET, management		
<b>Central WCA-3A S</b>	Stage increased 0.11'	Rainfall, ET, management	Prevent repeated or ongoing reversals. <b>Lower the stages. Stages at gauge 65 have exceeded 2.5' since Nov. 23 (13 weeks, now 3.76') and gauges 63 and 64 have now exceeded 2.5' for 4 weeks.</b>	Provide moderate recession rates to support wading bird foraging, necessary for successful nesting. Keep peat wet to promote native habitat and maintain wetland plant and animal communities.
<b>Southern WCA-3A S</b>	Stage increased 0.11'	Rainfall, ET, management		
<b>WCA-3B</b>	Stages increased 0.05' to 0.15'	Rainfall, ET, management	Follow normal seasonal practices. Prevent repeated or ongoing reversals as much as possible.	Provide moderate recession rates to support wading bird foraging, necessary for successful nesting. Keep peat wet to promote native habitat and maintain wetland plant and animal communities.
<b>ENP-SRS</b>	Stage increased 0.16'	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.
<b>ENP-CSSS habitats</b>	S-12A and S-12B are closed to enhance pre-breeding dry-down, but will be cracked to relieve overtopping.	Rainfall, ET, management	Follow rainfall plan for releases. Adhere to ERTTP closures for S12-A and B. Maximize flows through S333 as possible.	Provide habitat and appropriate nesting conditions for CSSS.
<b>Taylor Slough</b>	7-20 inches above average	Rain, ET, inflows	Move water southward as needed	Provide freshwater buffer for ecosystems and maintain low salinity conditions downstream
<b>FB- Salinity</b>	Average to -6 psu of average	Rain, ET, inflows, wind	Move water southward as needed	Maintain lower salinity levels.