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MEMORANDUM

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

FROM: SFWMD Staff Environmental Advisory Team

DATE: March 1, 2016

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Kissimmee

On Sunday, stage in East Lake Toho and Toho was 0.6 feet below schedule; Kissimmee-Cypress-Hatchineha (KCH) was 0.1 feet below schedule. Discharge from East Toho and Toho is being managed to hold Lake stages 0.5 feet below their respective regulation schedules; discharge from KCH is being managed to lower Lake stage according to the regulation schedule while following the discharge ramp up/ramp down rates for S65/S65A as possible. Over the past week, discharge at S65 averaged 2,770 cfs and at S65A 2,817 cfs; discharge at S65E averaged 3,101 cfs. Tuesday morning discharges: S65 ~1,592 cfs; S65A ~1,545 cfs; S65C ~3,164 cfs; S65E ~3,124 cfs. Dissolved oxygen in the Kissimmee River averaged 5.37 mg/L over the past week and 5.75 mg/L on Sunday. Kissimmee River mean floodplain depth is currently 1.81 feet.

Lake Okeechobee

The recession in Lake stage continued this past week, dropping the Lake 0.19 feet. The Lake is at 15.89 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 improving if the recession continues.

Estuaries

High discharges continued over the past week. In the St. Lucie Estuary, total freshwater inflow averaged 6,570 cfs with 3,670 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 7,954 cfs with 5,844 cfs Lake Okeechobee releases. Salinities were in the poor range at Cape Coral, the fair range at Shell Point, and the good range at 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.

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.

Everglades

Rainfall was light last week, and with water management, stage changes ranged from -0.40 feet to 0.14 feet. Stages in Shark River Slough increased while they receded throughout the WCAs. Water levels

are close to or over two feet deep in most of the wetlands. Most of WCA-2A and -3A remain closed because of high water and its effects on terrestrial wildlife and will reopen only after stages in northern WCA-3A drop below 11.60 feet. Deep water has prevented wading bird foraging. No nesting birds have been seen in the WCAs and Everglades National Park (ENP), and conditions are poor for the Cape Sable Seaside Sparrow early breeding season. The 30-day moving average salinity at the Florida Bay MFL site remains 0.5 psu and the cumulative inflow from the five creeks into Florida Bay has risen to 251,400 acre-feet. Florida Bay salinities are average to 10 psu below average for this time of year. WCA-3A water levels have exceeded 2.5 feet, the depth monitored for tree island inundation and duration, for five to 14 weeks.

Weather Conditions and Forecast

Mainly dry this week. High pressure over the peninsula will push into the Atlantic today before the first of two cold fronts moves down to the Lake Okeechobee area tomorrow night/early Thursday followed by reinforcing cold front that will push through the peninsula on Friday. The main energy and attendant low pressure will pass well to our north, so prospects for appreciable rainfall look poor with this pair of fronts. High pressure should then dominate again over the weekend and through the middle of next week. The next chance for significant, widespread rainfall appears the end of next week.

KISSIMMEE BASIN

Kissimmee Basin Rainfall

The Upper Kissimmee Basin received 0.48 inches of rainfall in the past week and the Lower Basin received 0.82 inches (SFWMD Daily Rainfall Report 2/29/2016).

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: 3/1/2016							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)	2/28/16	2/21/16	2/14/16	2/7/16	1/31/16	1/24/16	1/17/16
Lakes Hart and Mary Jane	S62	71	LKMJ	60.4	R	61.0	-0.6	-0.6	-0.4	-0.5	-0.5	-0.5	-0.4
Lakes Myrtle, Preston, and Joel	S57	54	S57	60.9	R	61.0	-0.1	-0.1	-0.1	0.0	-0.1	-0.3	-0.1
Alligator Chain	S60	92	ALLI	63.7	R	64.0	-0.3	-0.2	-0.5	-0.5	-0.5	-0.5	-0.6
Lake Gentry	S63	130	LKGT	61.3	R	61.5	-0.2	-0.2	-0.3	-0.2	-0.2	-0.3	-0.1
East Lake Toho	S59	107	TOHOE	57.4	R	58.0	-0.6	-0.5	-0.6	-0.5	-0.4	-0.5	-0.6
Lake Toho	S61	379	TOHOW	54.4	R	55.0	-0.6	-0.5	-0.6	-0.6	-0.4	-0.8	-0.4
Lakes Kissimmee, Cypress, and Hatchineha	S65	2770	LKISSP, KUB011, LKISSB	51.1	R	51.2	-0.1	0.0	-0.2	-0.5	-0.7	-1.3	-1.8

* 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: 3/1/2016												
Metric	Location	Sunday's 1-day average	Weekly Average**									
			2/28/16	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
Discharge (cfs)	S-65	1517	2770	2257	1997	3248	802	477	130	347	376	375
Discharge (cfs)	S-65A	1566	2817	2261	2223	3772	1355	1115	463	286	270	288
Discharge (cfs)	S-65C	3240	2850	2515	3805	2987	2261	2017	877	536	459	512
Headwater stage (feet NGVD)		35.1	35.2	34.5	34.8	34.5	33.7	33.7	33.5	33.4	33.3	33.3
Discharge (cfs)	S-65D****	3542	3112	2810	4355	3811	3336	2716	1318	726	553	621
Discharge (cfs)	S-65E	3532	3101	2880	4513	3975	3703	2779	1369	582	434	518
DO concentration (mg/L)***	Phase I river channel	5.75	5.37	6.82	7.39	5.85	7.36	6.56	7.12	7.08	6.66	6.71
Mean depth (feet)*	Phase I floodplain	1.81	N/A	1.44	1.64	2.19	1.10	0.92	0.79	0.54	0.40	0.41

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

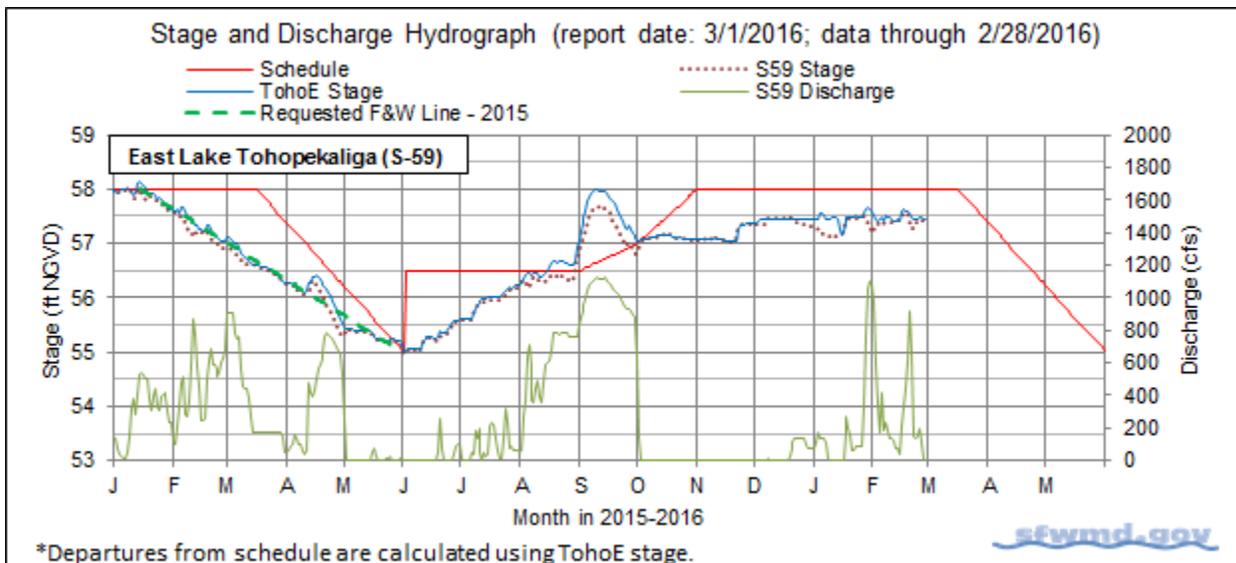


Figure 1.

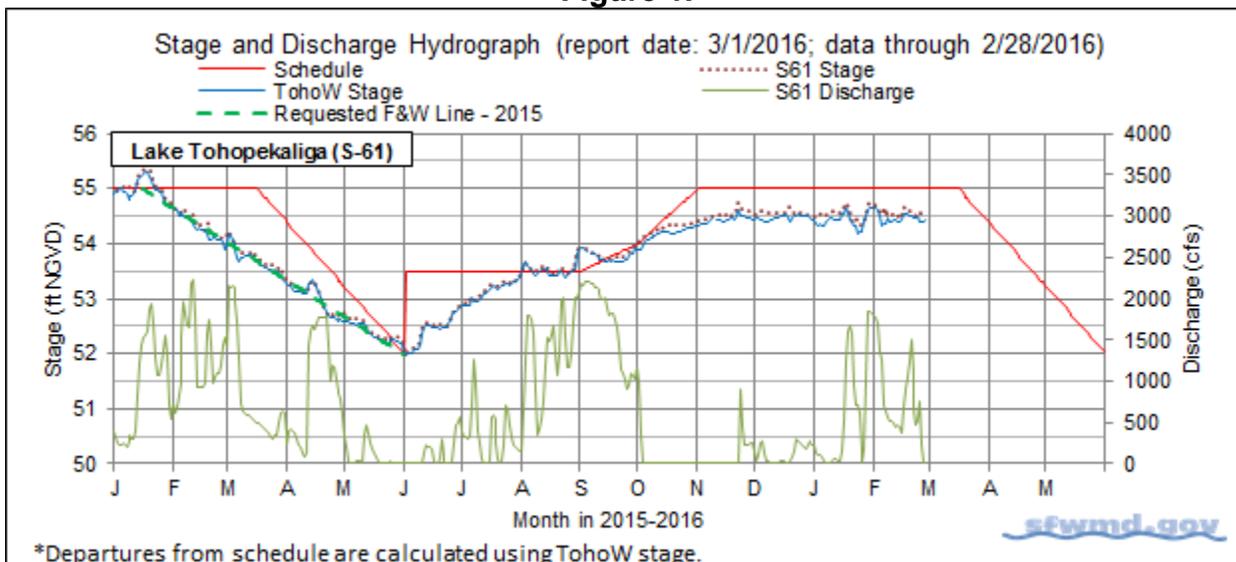


Figure 2.

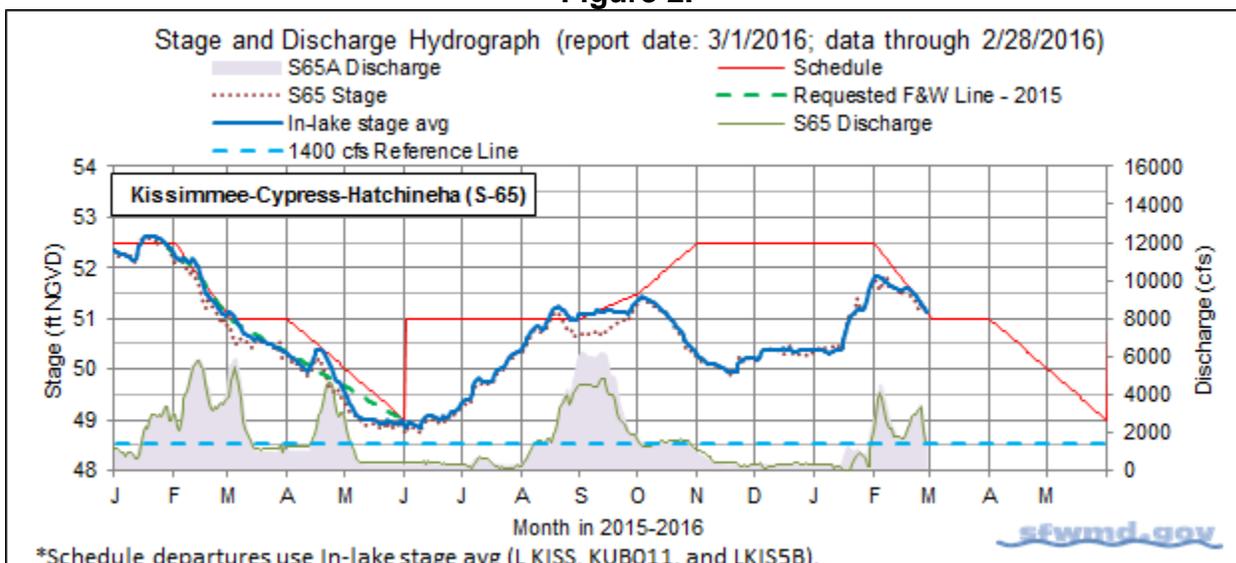


Figure 3.

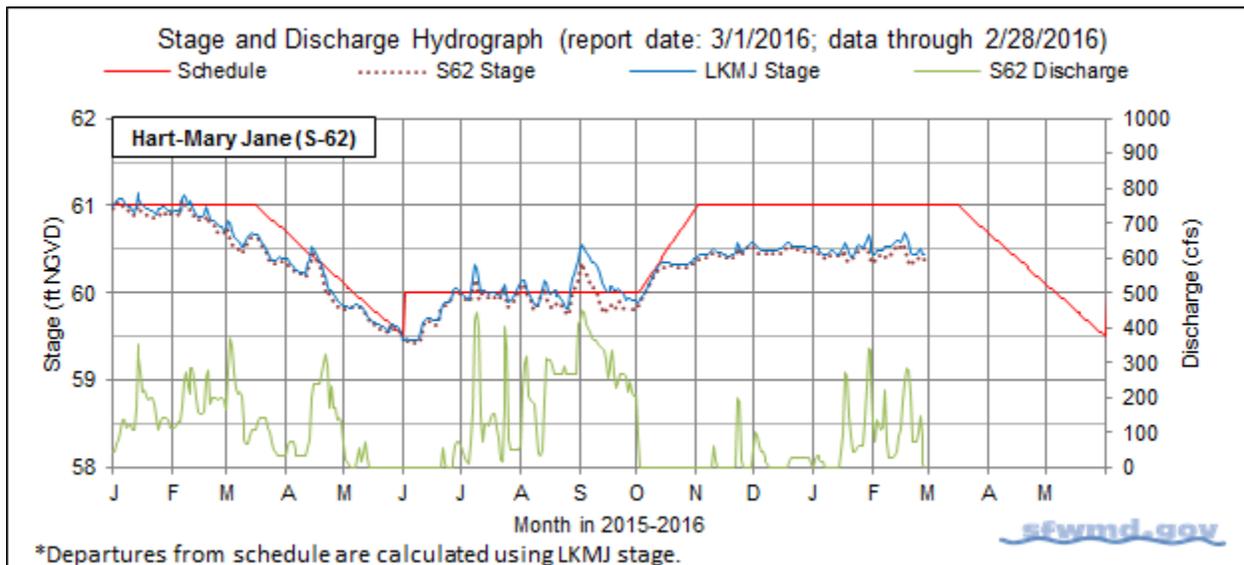


Figure 4.

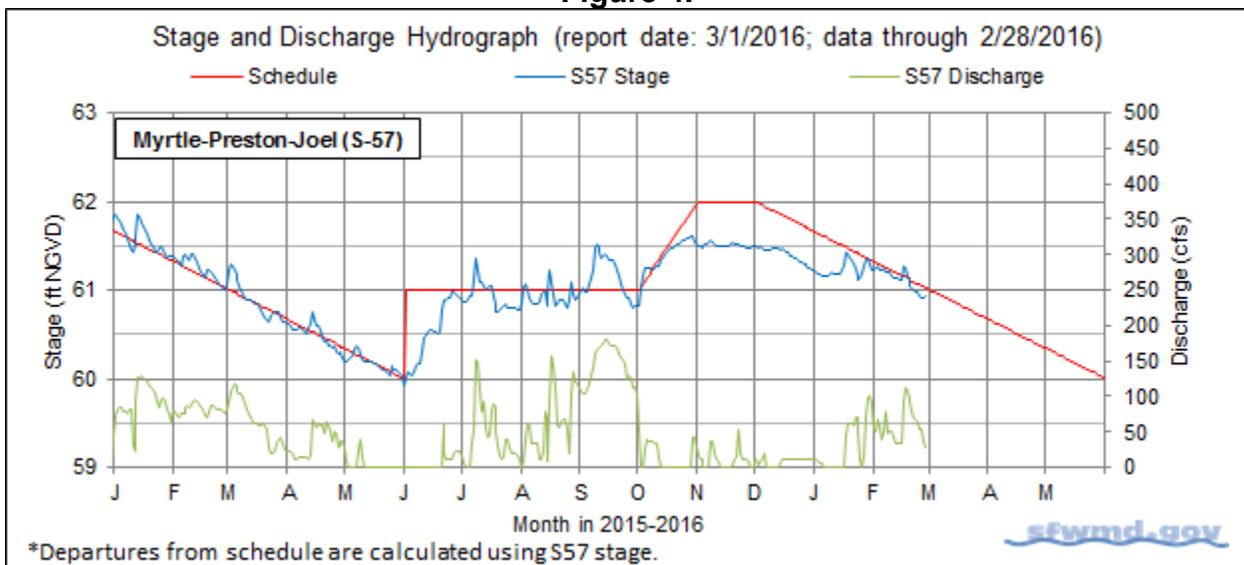


Figure 5.

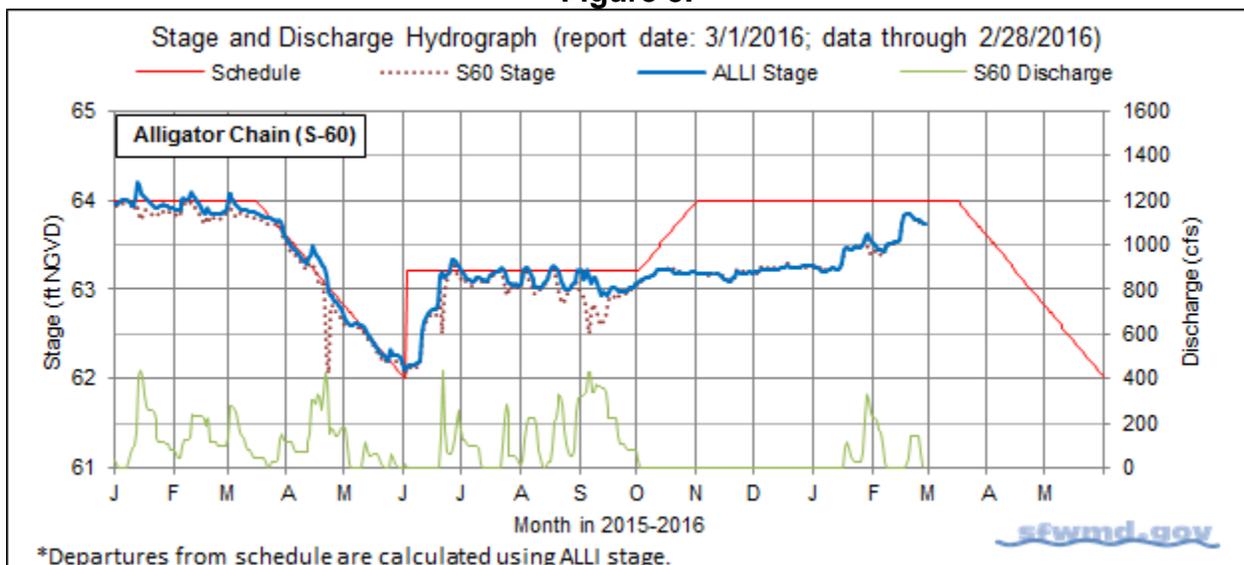


Figure 6.

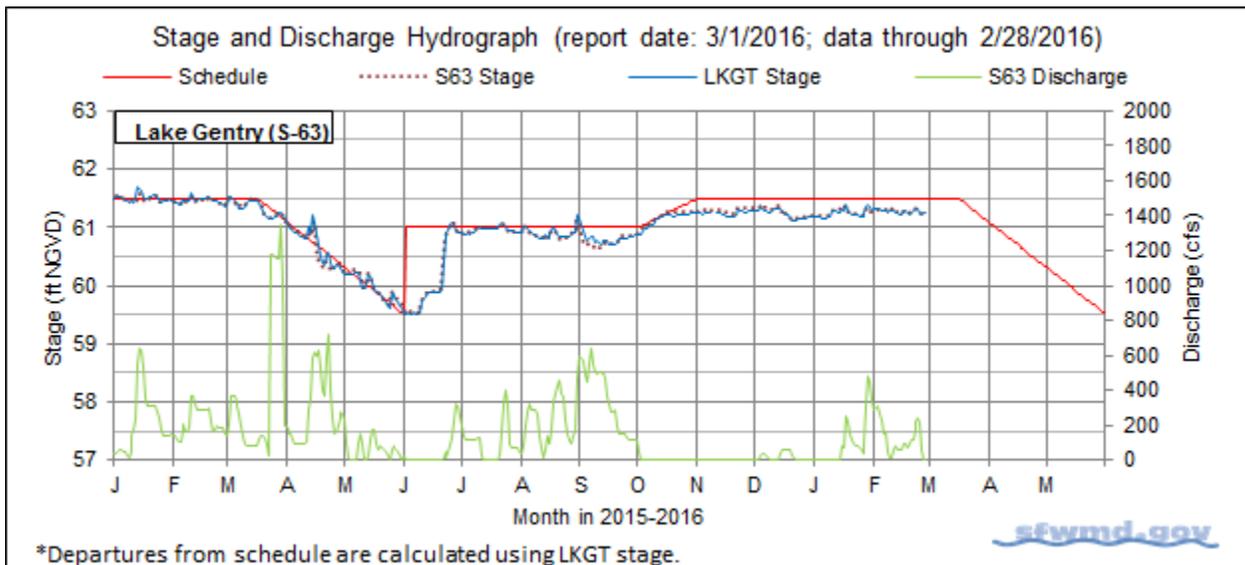


Figure 7.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

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.

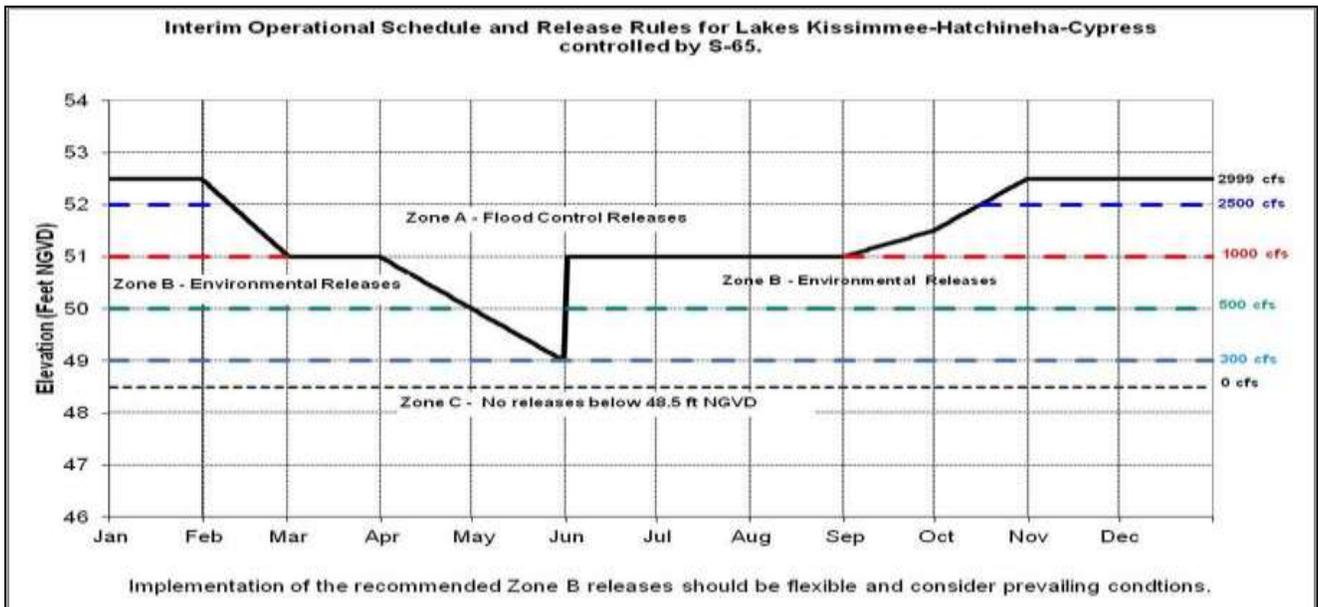


Figure 8b. Interim operations schedule for S-65. The discharge schedule shown to the right has not been used in recent years or in Wet Season 2015.

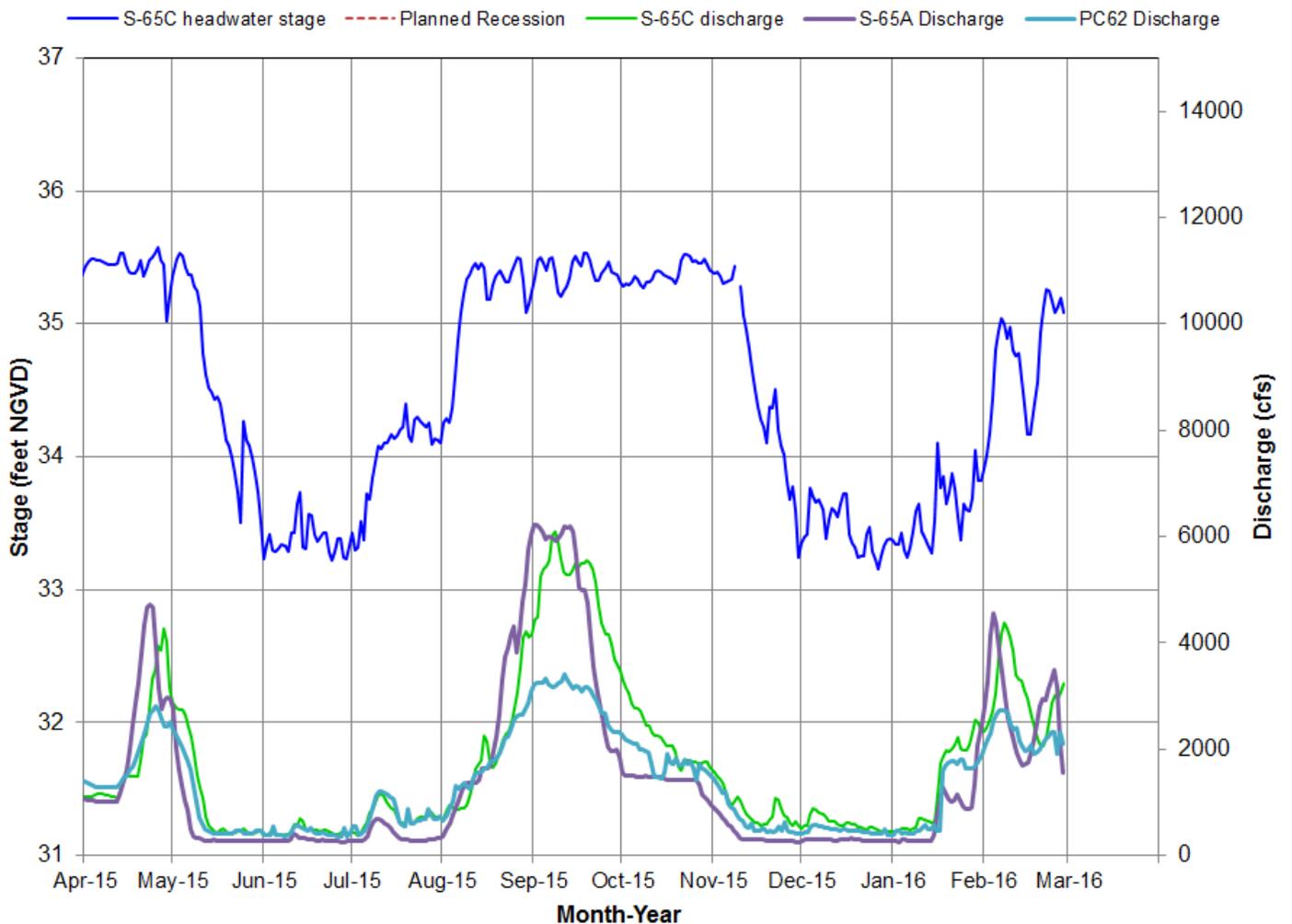


Figure 9. S-65C headwater stage in relation to discharge at S-65C, S-65A, and PC62.

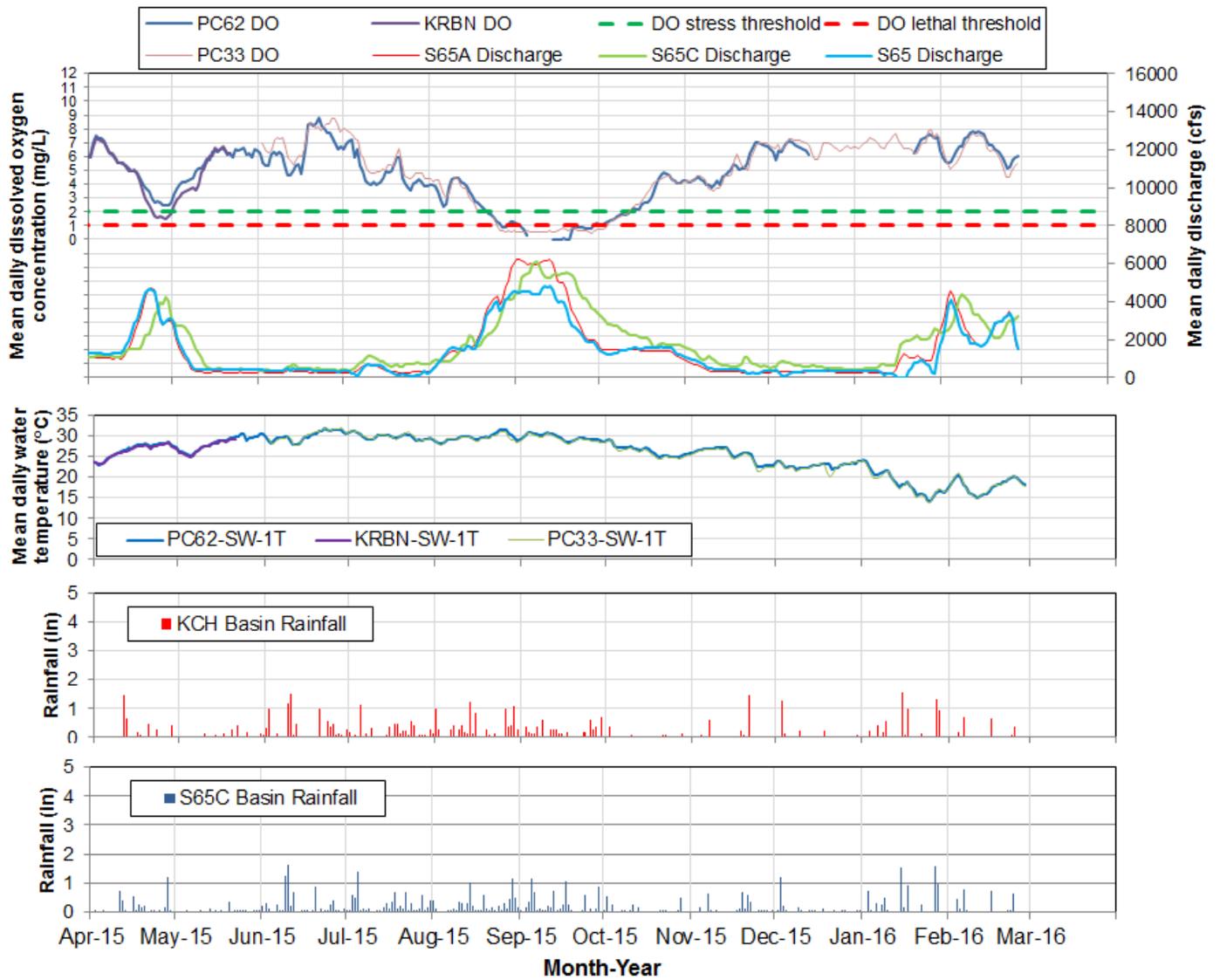
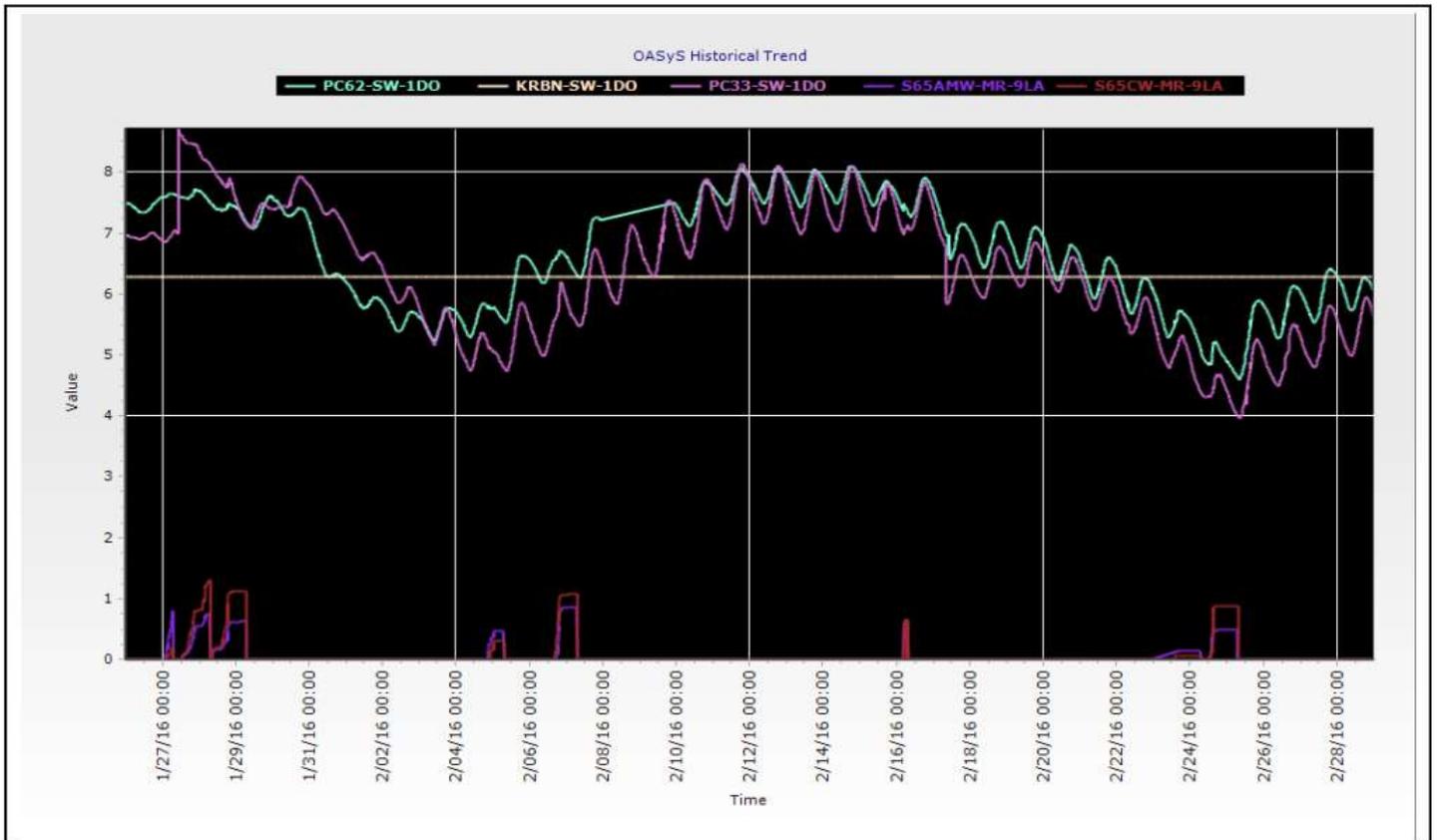


Figure 10. Mean daily Dissolved Oxygen, discharge, temperature and rainfall in the Phase I river channel.



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

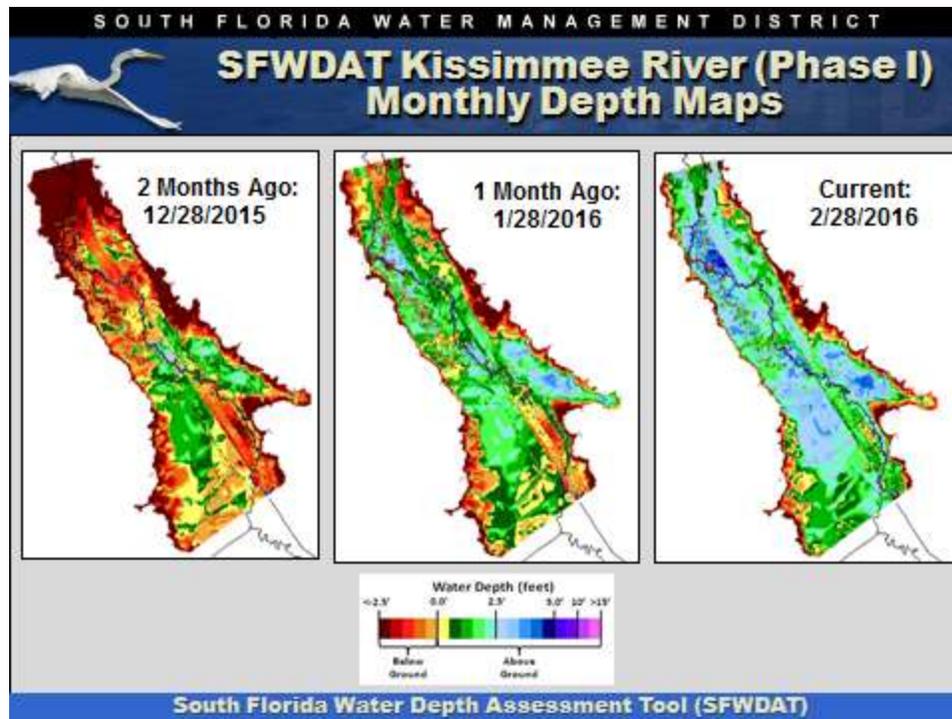


Figure 11. Phase I area floodplain water depths for this week, one month ago, and two months ago. Note that the WDAT color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to Jan. 16, 2012.

Kissimmee River Hydrographs

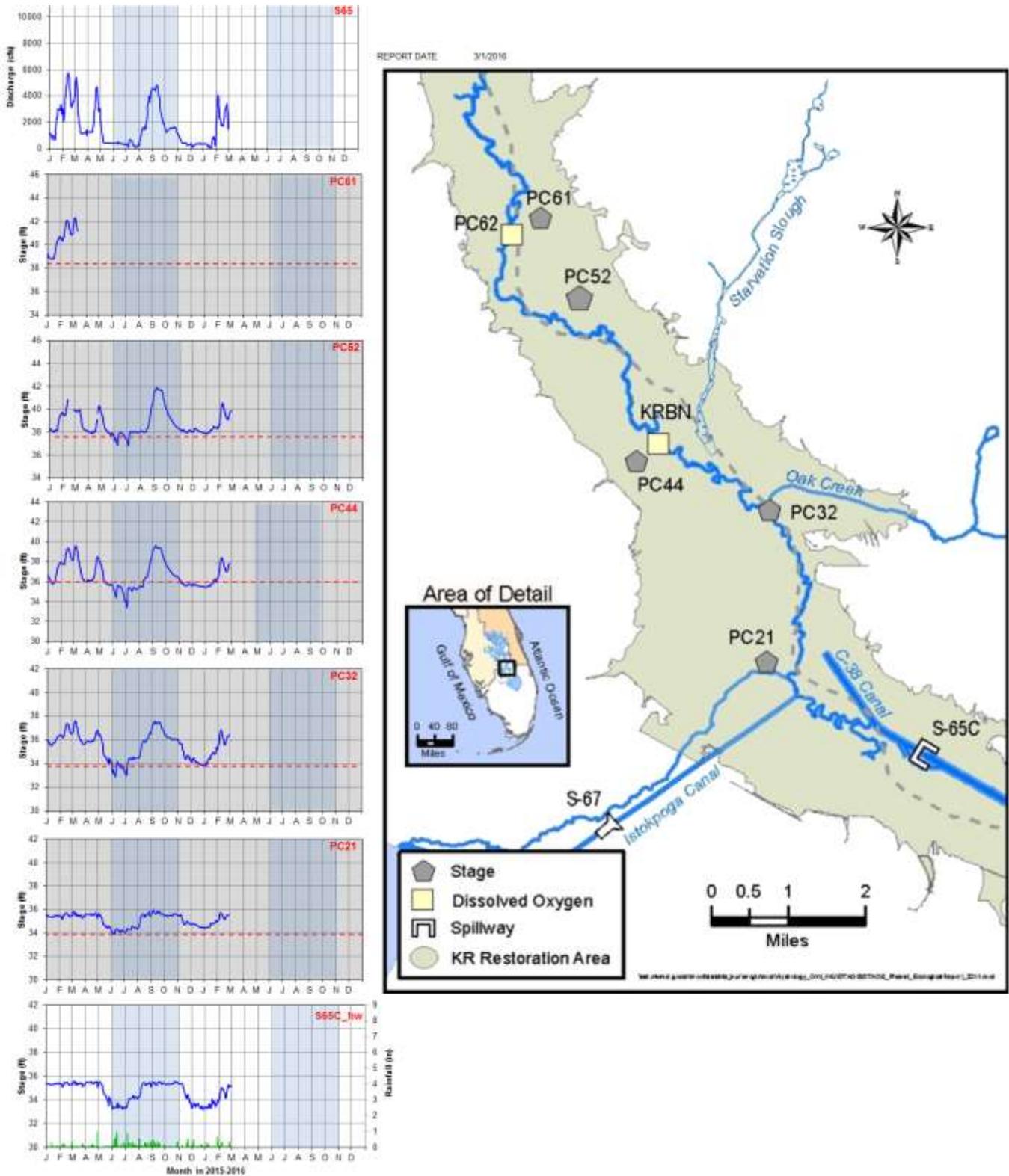


Figure 12. Discharge at S65, stages at five monitoring stations in the Phase I area of the Kissimmee River floodplain, and headwater stage at S65-C since January 1, 2013. The most recent data (~2 weeks) are provisional real-time data from SFWMD DualTrend; previous data are from SFWMD DB-HYDRO (validated).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

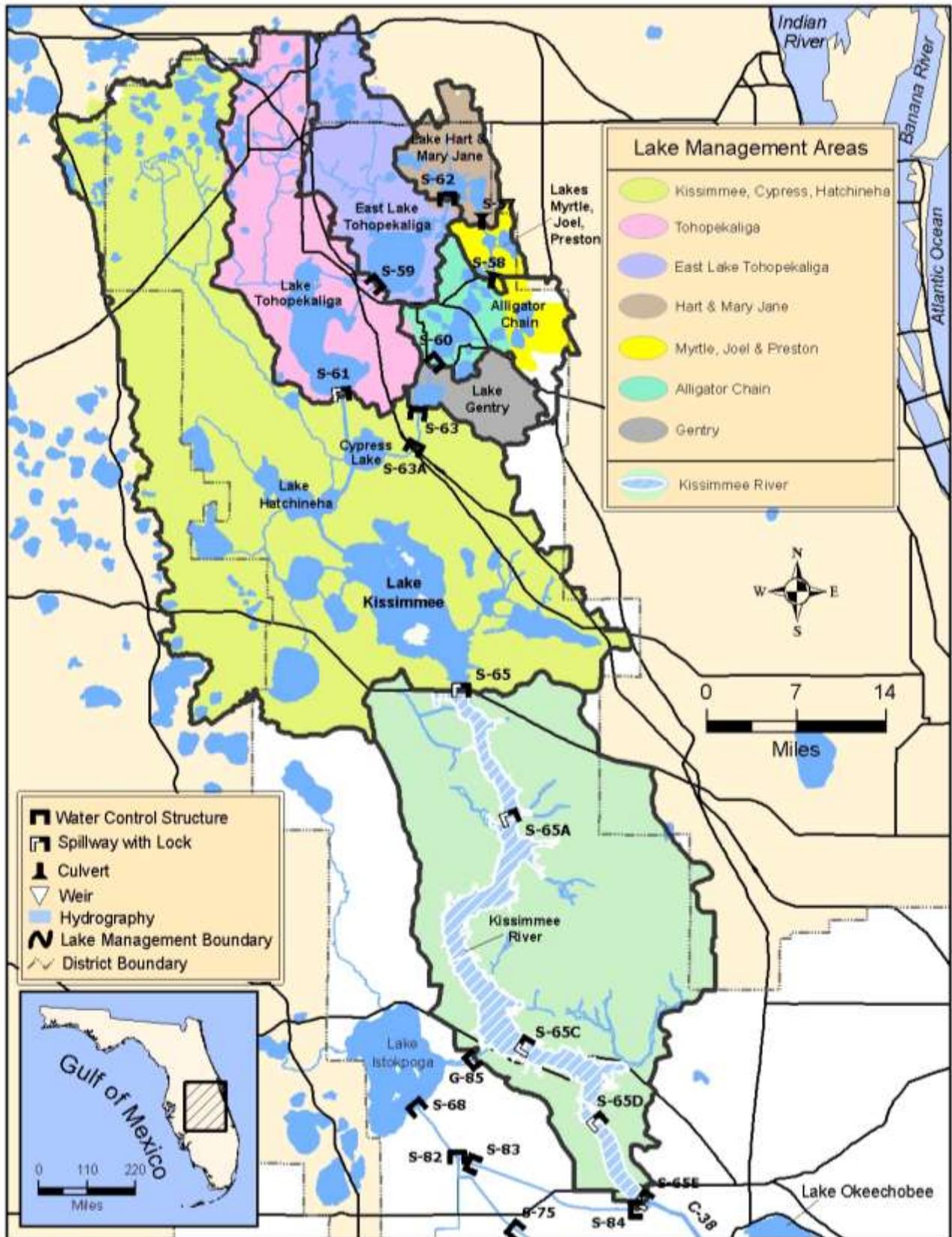


Figure 13. The Kissimmee Basin

LAKE OKEECHOBEE

According to the USACE web site, Lake Okeechobee stage is at 15.89 feet NGVD for the period ending at midnight on February 29, 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 0.19 feet over the past week. The Lake is 0.19 feet lower than it was a month ago and 1.19 feet higher than it was a year ago (Figure 1). The Lake is in the Intermediate Flow Sub-band (Figure 2). According to RAINDAR, 0.51 inches of rain fell directly over the Lake during the past seven days. Similar amounts of rain fell in most of the southern watershed while higher amounts fell to the north, east and west, with the exception of the upper Kissimmee valley where rainfall amounts were lower (Figure 3).

Based on USACE reported values, current Lake inflow is approximately 6,416 cfs, consisting of flows as indicated below.

Structure	Flow cfs
S65E	3697
S154	34
S84 & 84X	770
S71	460
S72	176
C5(Nicodemus slough dispersed storage)	-123
S191	0
S133 PUMPS	0
S127 PUMPS	38
S129 PUMPS	54
S131 PUMPS	0
S135 PUMPS	0
Fisheating Creek	1310
S2 Pumps	0
S3 Pumps	0
S4 Pumps	0

Current Lake outflow is approximately 9,644 cfs exiting at S77 (6,149 cfs), S308 (3,309 cfs) and to the L8 canal through Culvert C10A (18 cfs). Corrected evapotranspiration value based on the L006 weather platform solar radiation data for this past week was 1,200 cfs.

Change in elevation equivalents and average weekly flows for major structures are presented in Figure 4. Values for S77 and S308 are based on the upper, rather than the lower structure gauges while instantaneous values presented above are based on the lower gauges.

Based on the Lake Okeechobee wading bird habitat suitability index, there are currently approximately 24,587 acres of potentially suitable foraging habitat on the Lake for long-legged wading birds, and 4,454 acres of potentially suitable foraging habitat for short-legged wading birds (Figure 5). However, during the most recent wading bird foraging flight on February 23, no foraging flocks were encountered on the Lake.

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 6).

Water Management Recommendations

The winter/spring dry season recession has continued for two weeks with a decrease of 0.19 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.

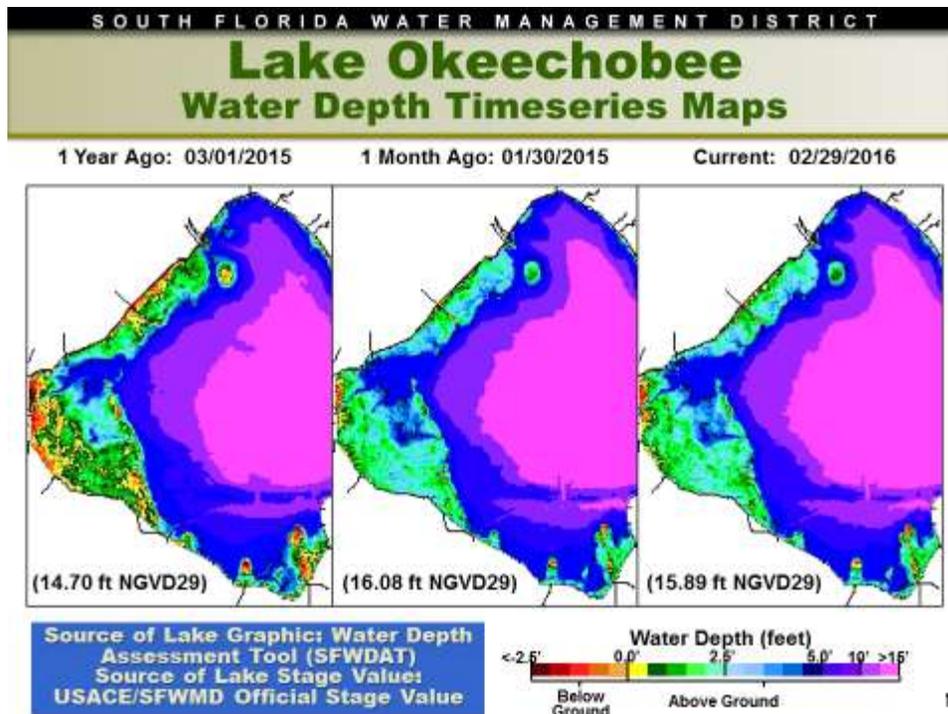


Figure 1

Lake Okeechobee Water Level History and Projected Stages

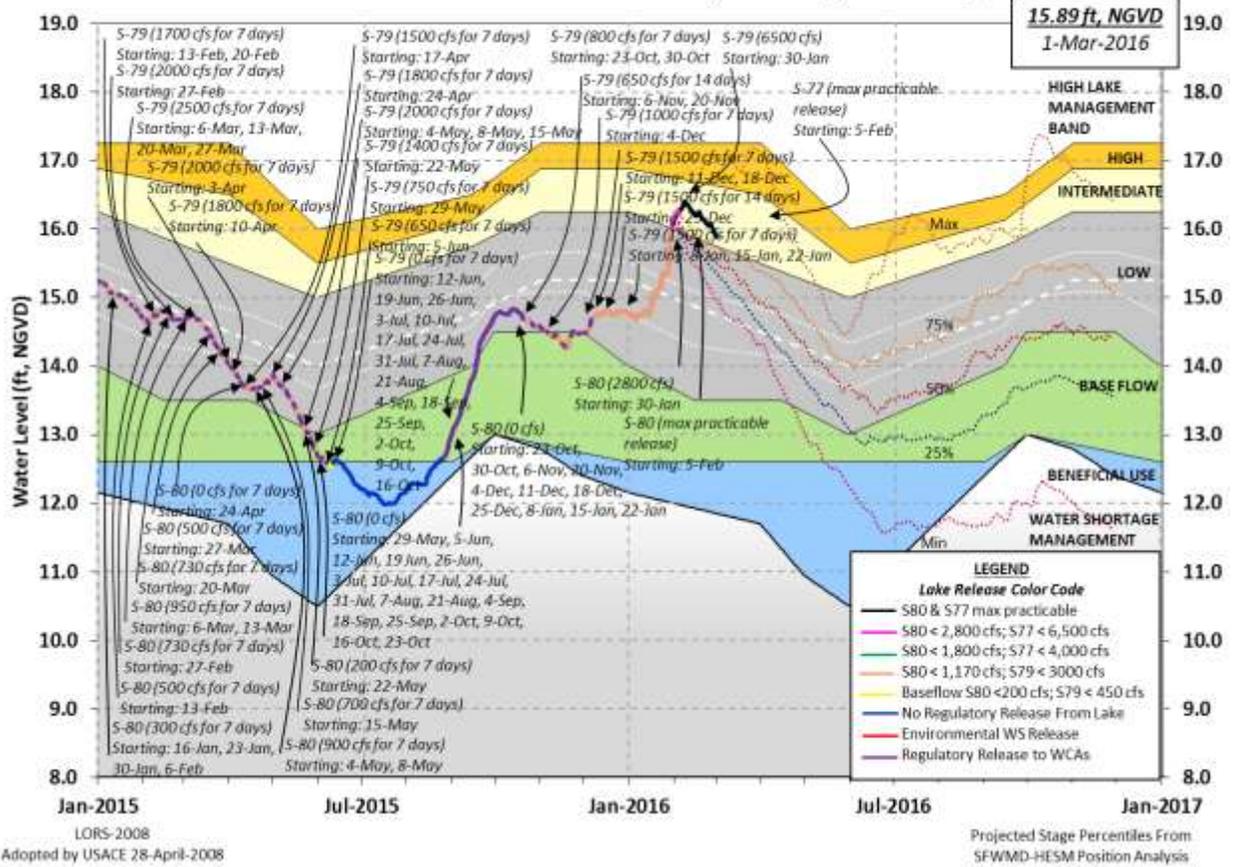
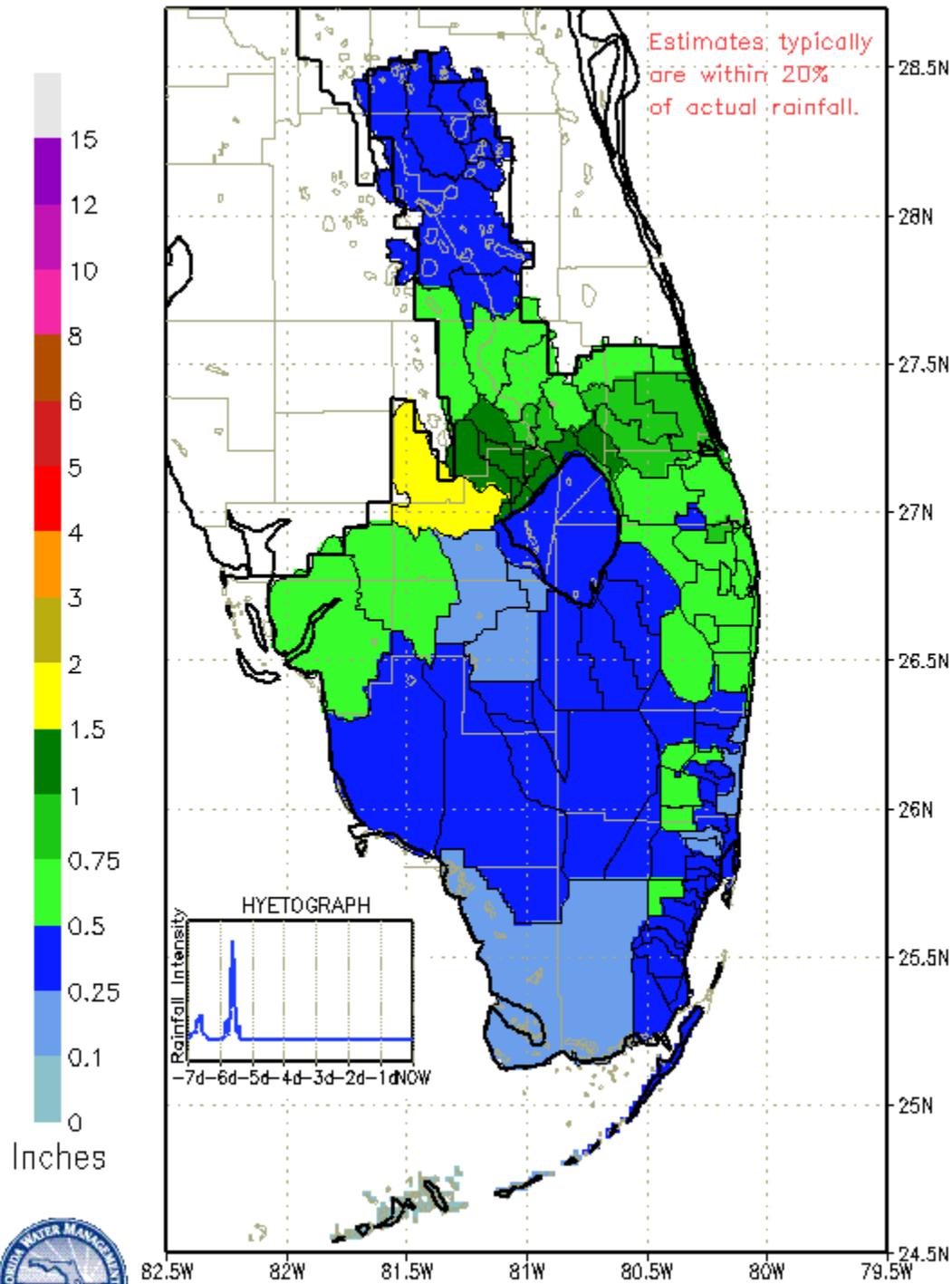


Figure 2

SFWMD PROVISIONAL RAINDAR 7-DAY BASIN RAINFALL ESTIMATES

FROM: 0615 EST, 02/23/2016 THROUGH: 0615 EST, 03/01/2016



DISTRICT-WIDE RAINFALL ESTIMATE: 0.550"

Figure 3

	Average Daily Flow Past Week cfs	Feet of Change Past Week
S65E	3217	0.102
S71 & 72	703	0.022
S84 & 84X	1010	0.032
Fisheating Creek	561	0.018
Rainfall	N.A.	0.043
OUTFLOWS	Average Daily Flow Past Week cfs	Feet of Change Past Week
S77	7444	0.237
S308	5004	0.159
S351	0	0.000
S352	34	0.001
S354	0	0.000
L8	14	0.000
ET	1200	0.038

Figure 4

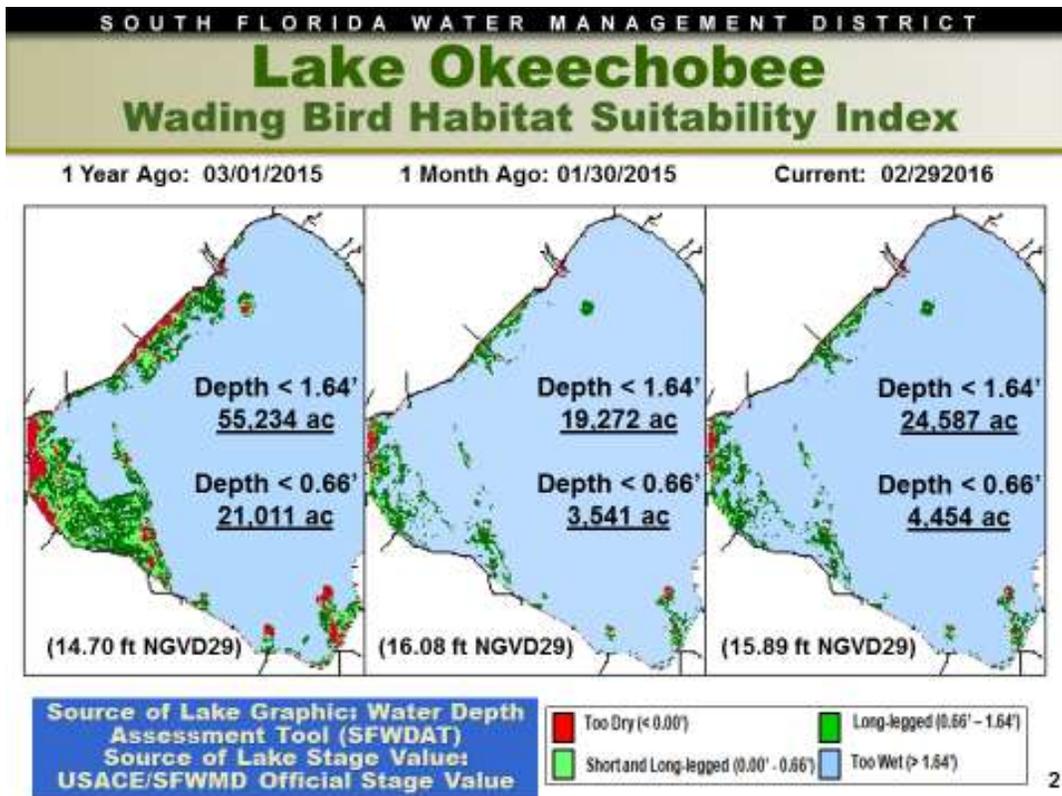


Figure 5

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Lake Okeechobee

Algal Blooms

Unvalidated and Experimental Data

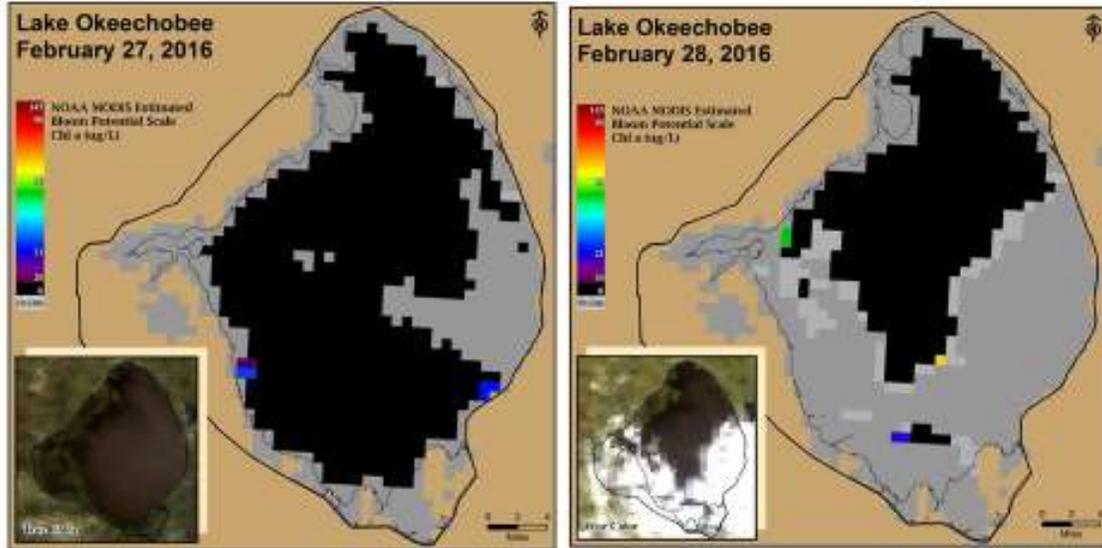


Figure 6

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 7). Average flows into the Lake from Arbuckle and Josephine creeks were 490 and 197 cfs respectively, an overall decrease from the preceding week. Average discharge from S68 and S68X this past week was 976 cfs, a small increase compared to the preceding week. According to RAINDAR, 0.56 inches of rain fell in the Lake Istokpoga watershed during the past seven days.

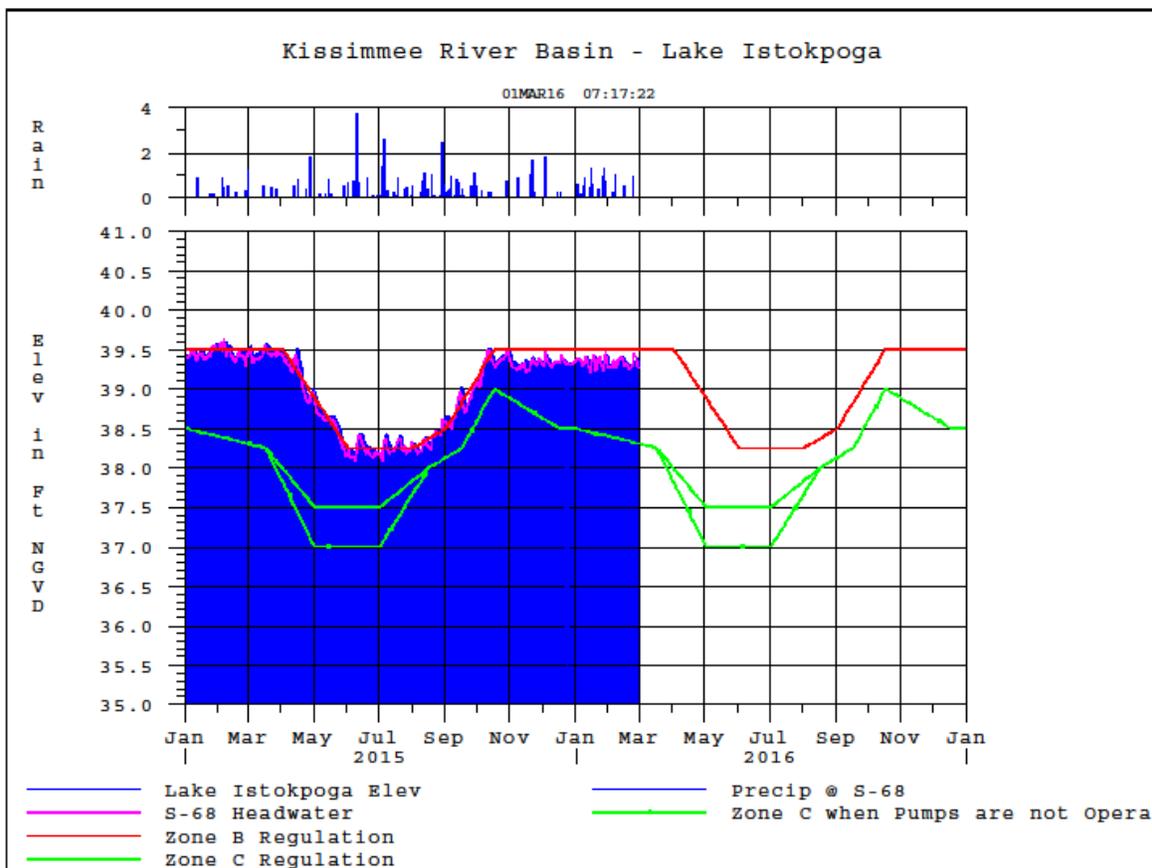


Figure 7

ESTUARIES

St. Lucie Estuary

Over the past week, provisional flows averaged 6,570 cfs at S-80, 3,670 cfs downstream of S-308, 220 cfs at S-49 on C-24, 248 cfs at S-97 on C-23, and 138 cfs from Ten Mile Creek at the Gordy Road Structure. Average inflow from tidal basin tributaries is estimated to be 236 cfs (Figures 1 and 2). Total inflow averaged about 7,412 cfs last week and 7,001 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 0.6. 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)	0.4 (0.4)	0.4 (0.4)	NA ¹
US1 Bridge	0.5 (0.3)	0.7 (0.3)	10.0-26.0
A1A Bridge	3.3 (3.3)	11.5 (12.7)	NA

¹Envelope not applicable

Caloosahatchee Estuary

During the past week, provisional flows averaged approximately 5,844 cfs downstream of S-77, 5,682 cfs at S-78, and 7,486 cfs at S-79. Average inflow from tidal basin tributaries is estimated to be 468 cfs (Figures 5 and 6). Total inflow averaged 7,954 cfs last week and 9,838 cfs over last month.

Over the past week, salinity remained about fresh just downstream of Cape Coral and about the same further downstream (Table 2, Figures 7 & 8). The seven-day average salinity values are within the poor range for adult oysters at Cape Coral, the fair range at Shell Point, and the good range at 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 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)	0.2 (0.2)	0.2 (0.2)	NA ¹
*Val I75	0.2 *(0.2*)	0.2 *(0.2*)	0.0-5.0 ²
Ft. Myers Yacht Basin	0.2 (0.2)	0.2 (0.2)	NA
Cape Coral	0.2 (0.3)	0.3 (0.3)	10.0-30.0
Shell Point	8.4 (8.3)	11.5 (12.8)	10.0-30.0
Sanibel	20.5 (21.8)	23.1 (24.2)	10.0-30.0

¹Envelope not applicable, ²Envelope 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)	5.05 – 6.02	4.05 – 5.6	5.4 – 14.5
Dissolved Oxygen (mg/l)	5.97 – 6.95	6.75 – 8.1	6.7 – 9.2

The Florida Fish and Wildlife Research Institute reported on February 26, 2016, that there were background concentrations of *Karenia brevis* in one sample collected from inshore waters of Lee County.

Water Management Recommendations

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

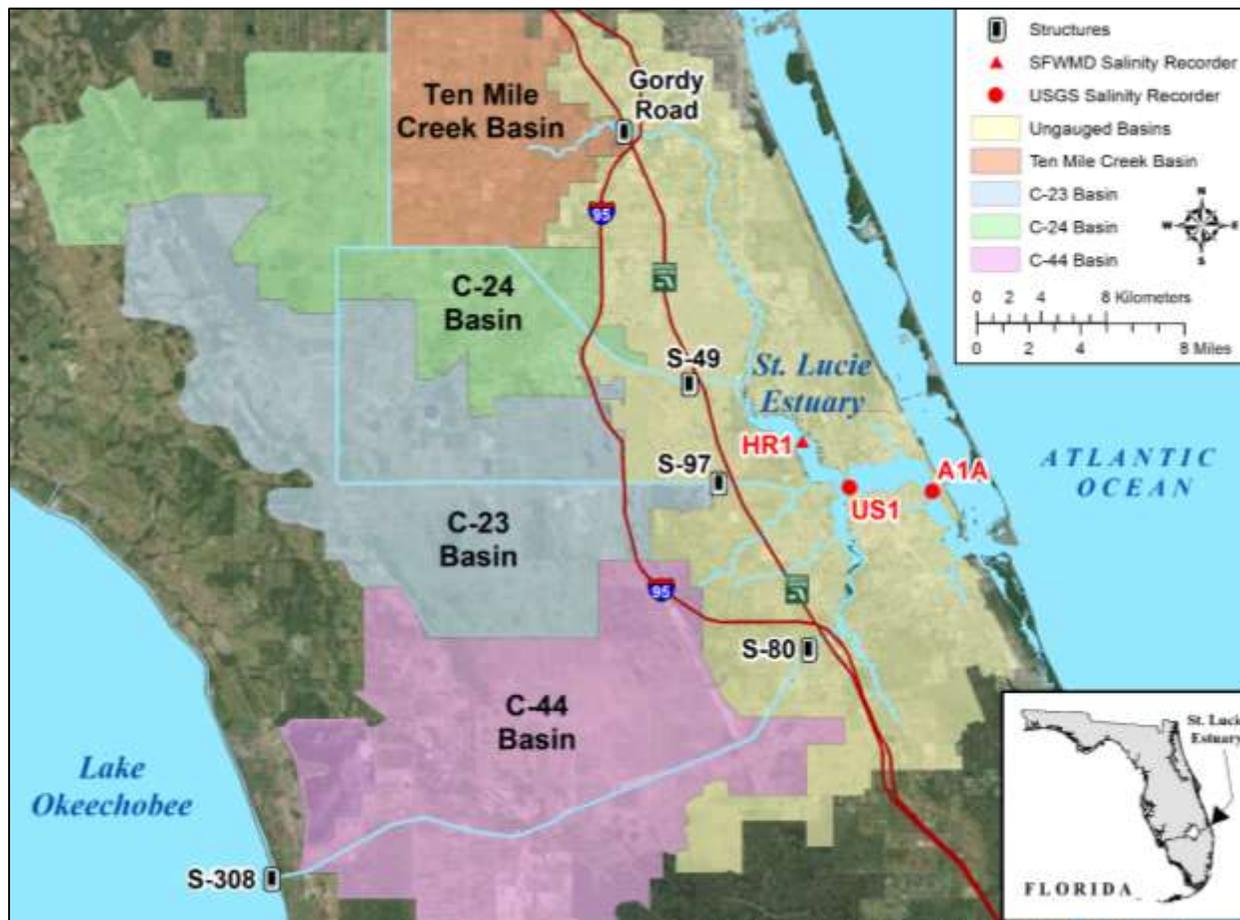


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

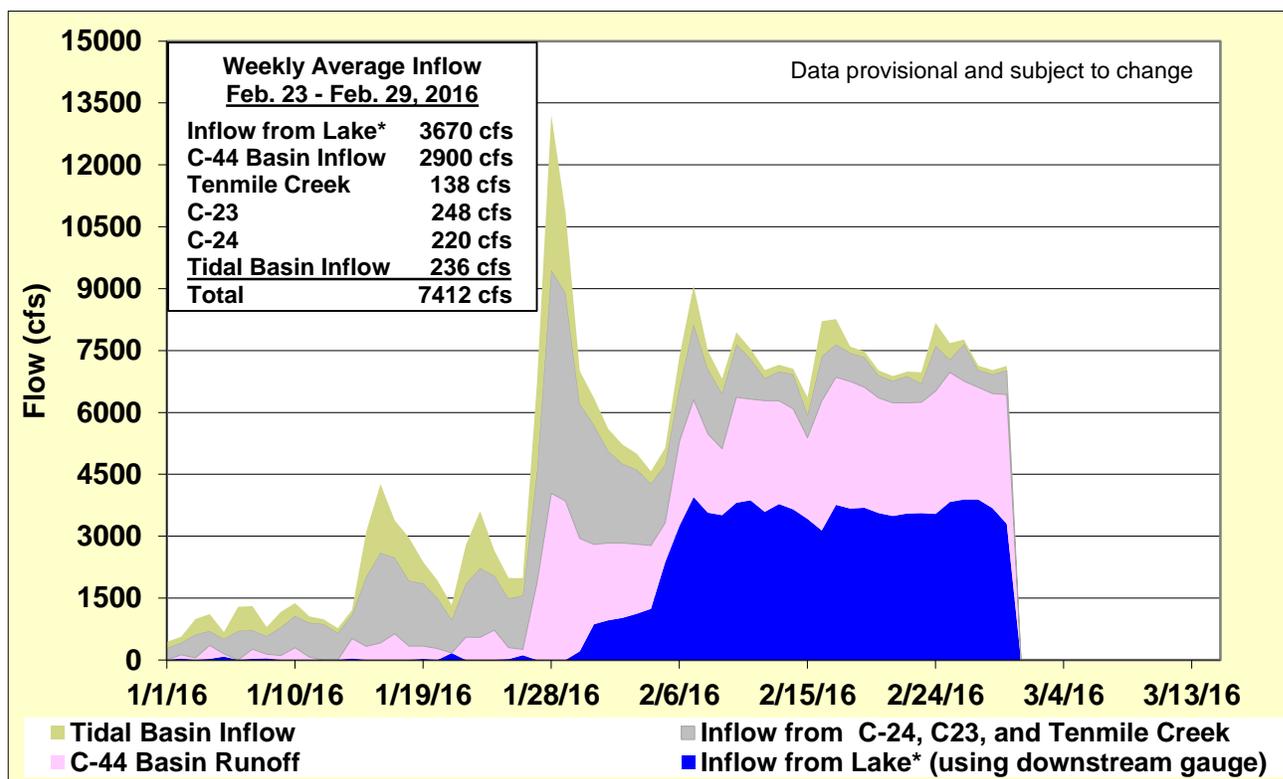


Figure 2. Estimated surface freshwater inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basins into the St. Lucie Estuary.

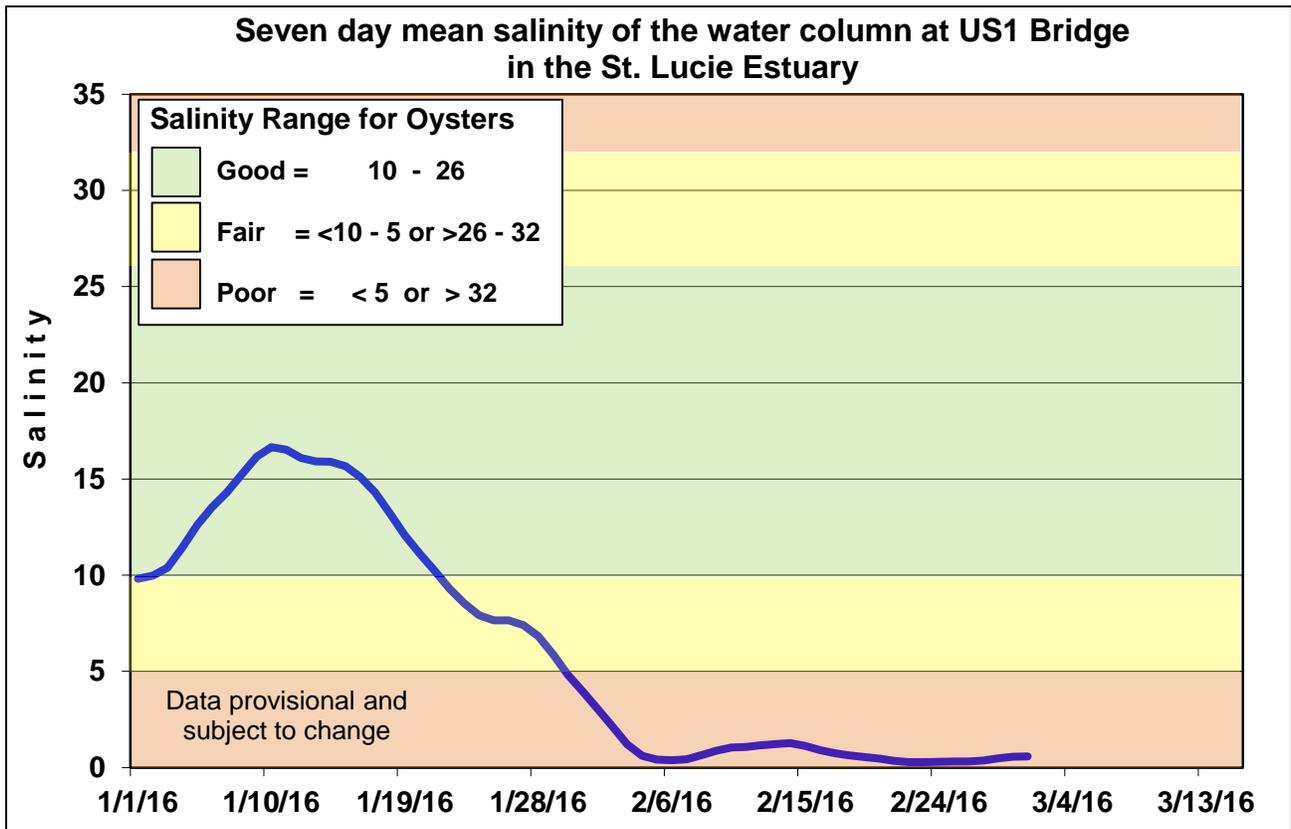


Figure 3. Seven-day mean salinity of the water column at the U.S. Highway 1 Bridge.

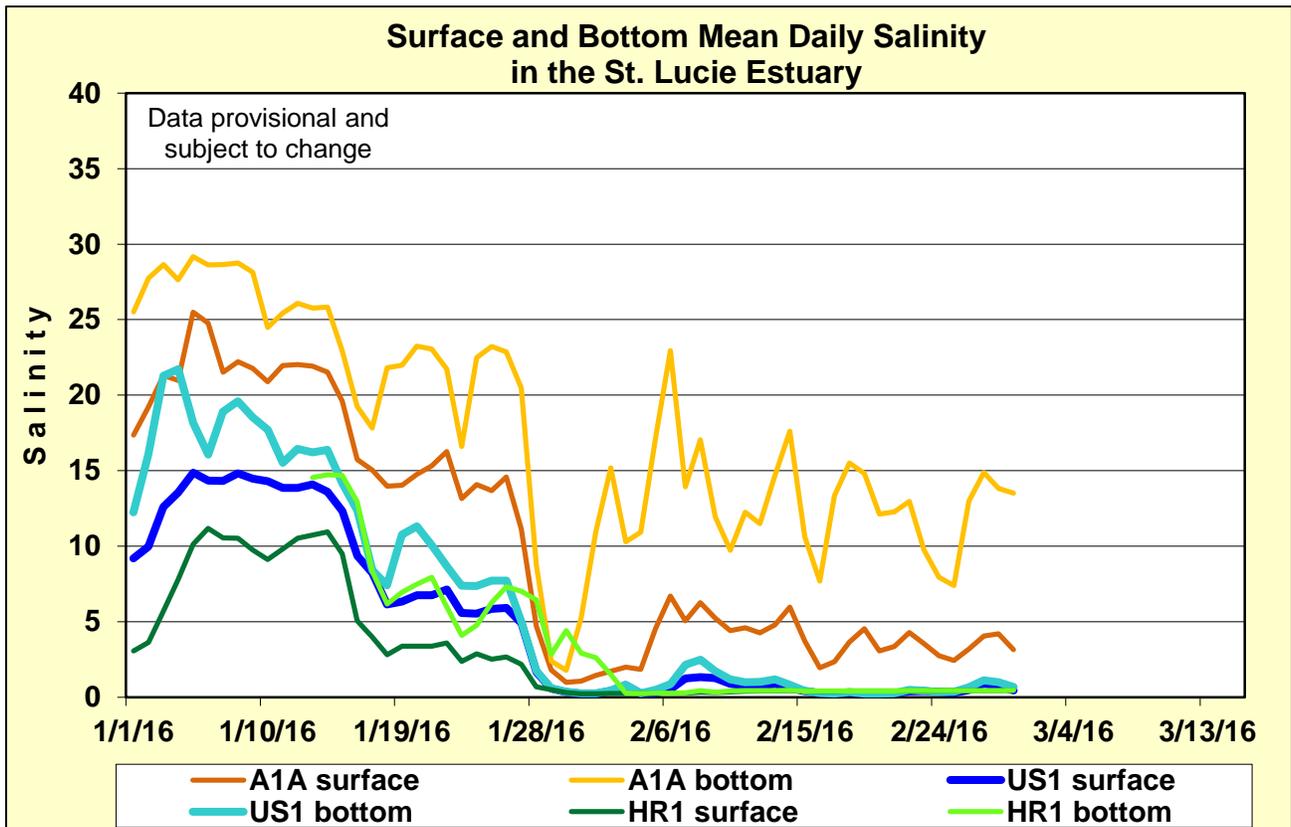


Figure 4. Daily mean salinity at the A1A, US1 and estimated HR1 stations.

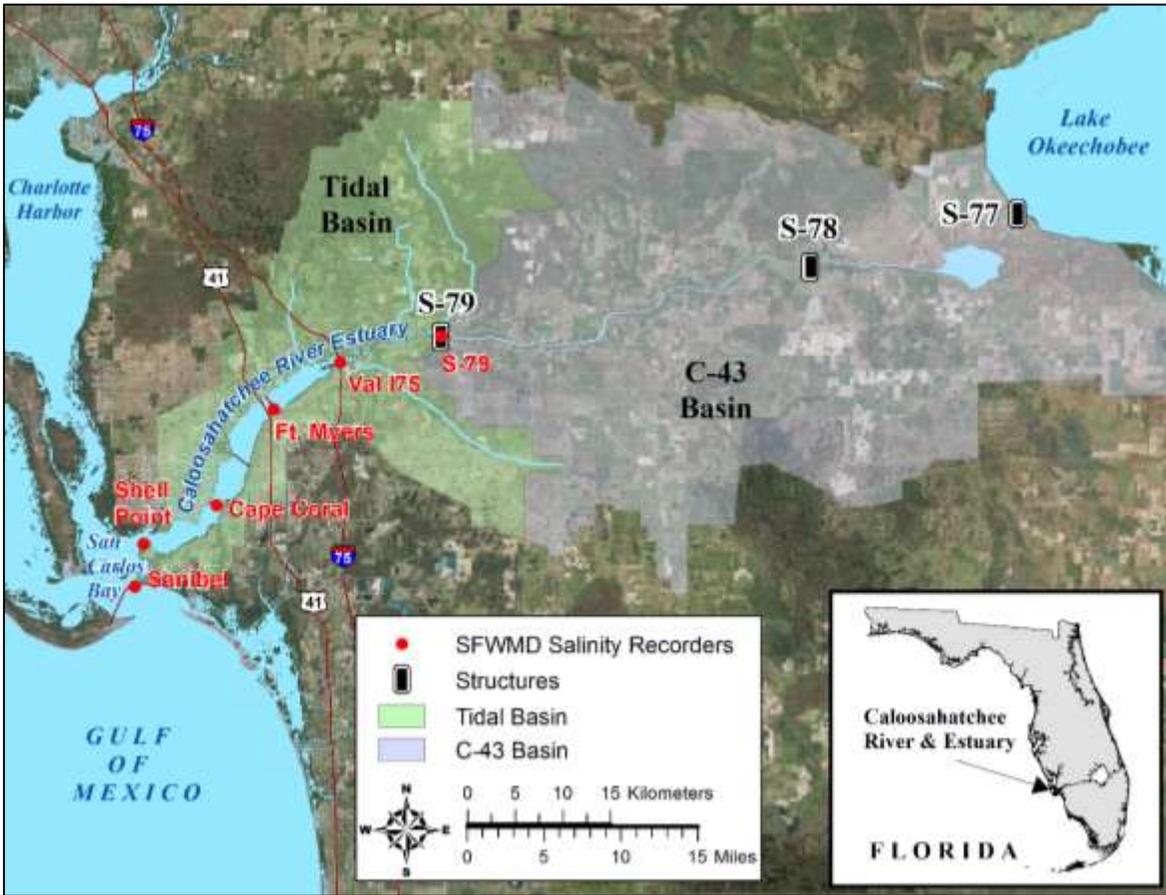


Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

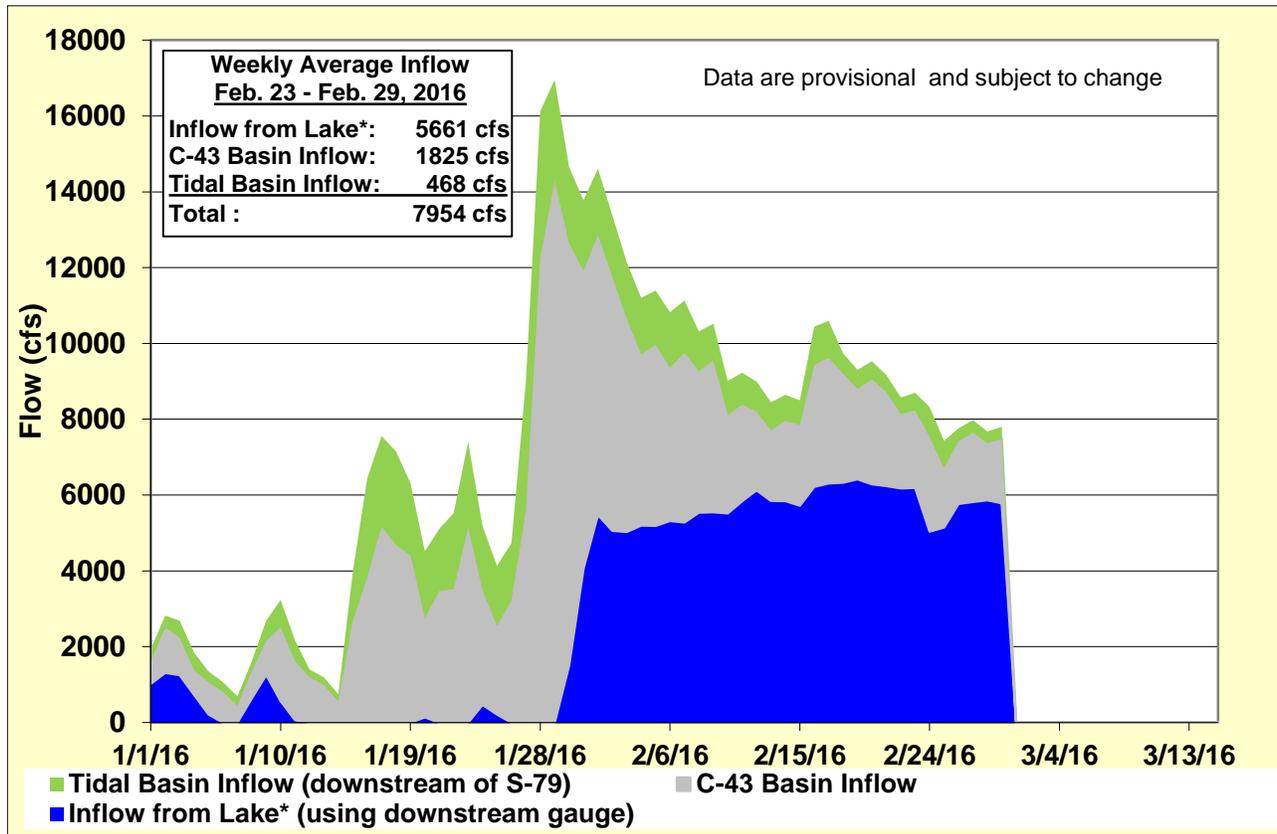


Figure 6. Freshwater inflows from Lake Okeechobee, runoff from the C-43 basin, and tributaries in the tidal basin into the Caloosahatchee River Estuary.

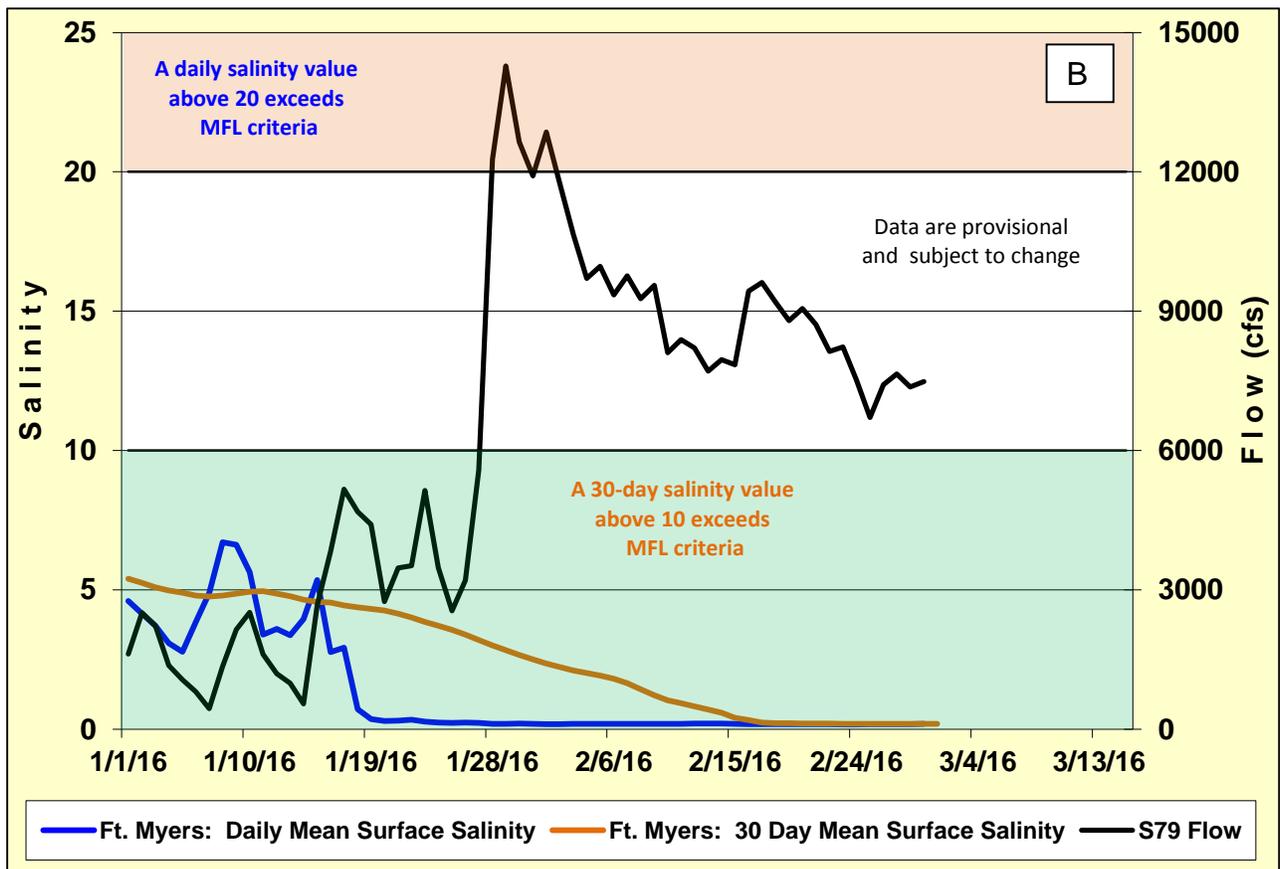
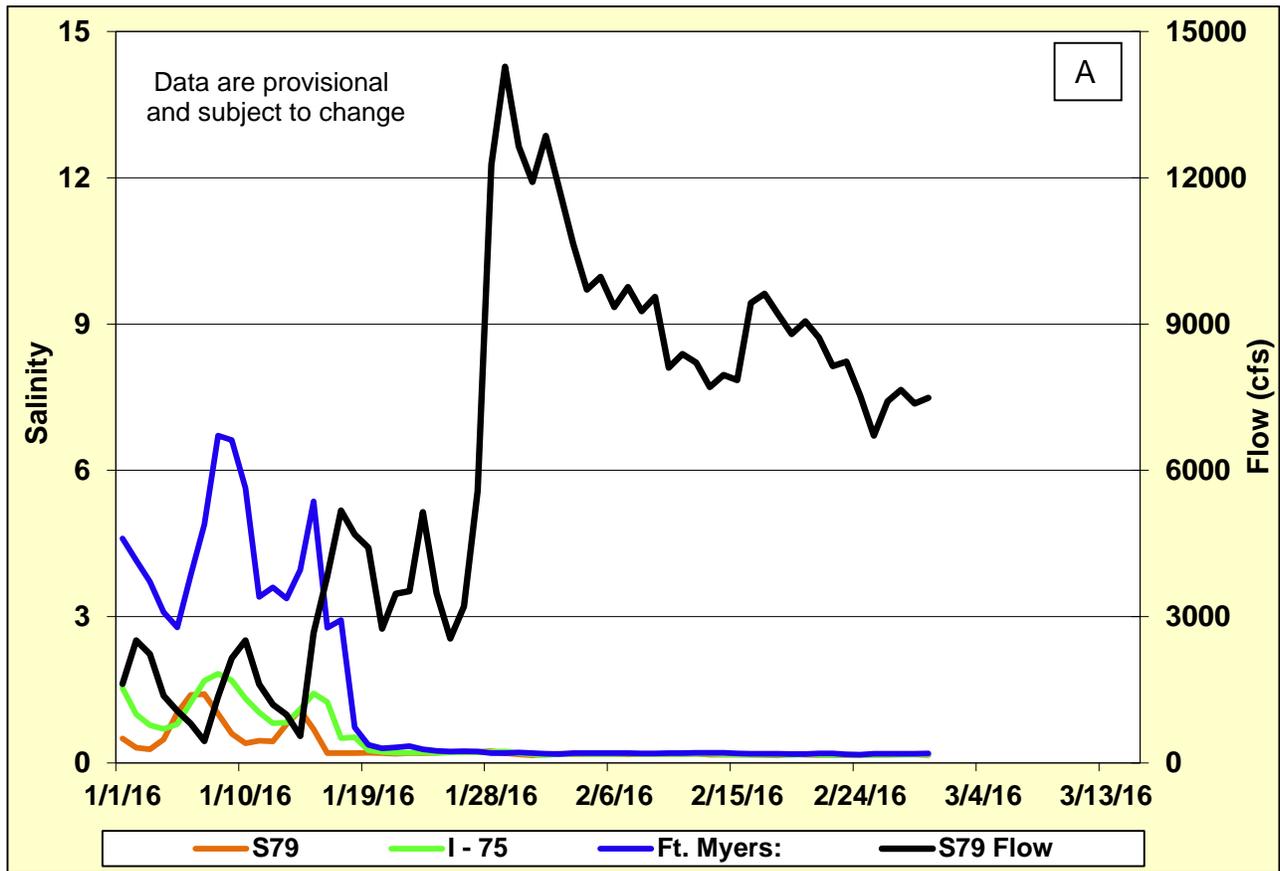


Figure 7. Daily mean flows at S-79 and salinity at upper estuary monitoring stations (A) and 30-day moving average salinity at Ft. Myers (B).

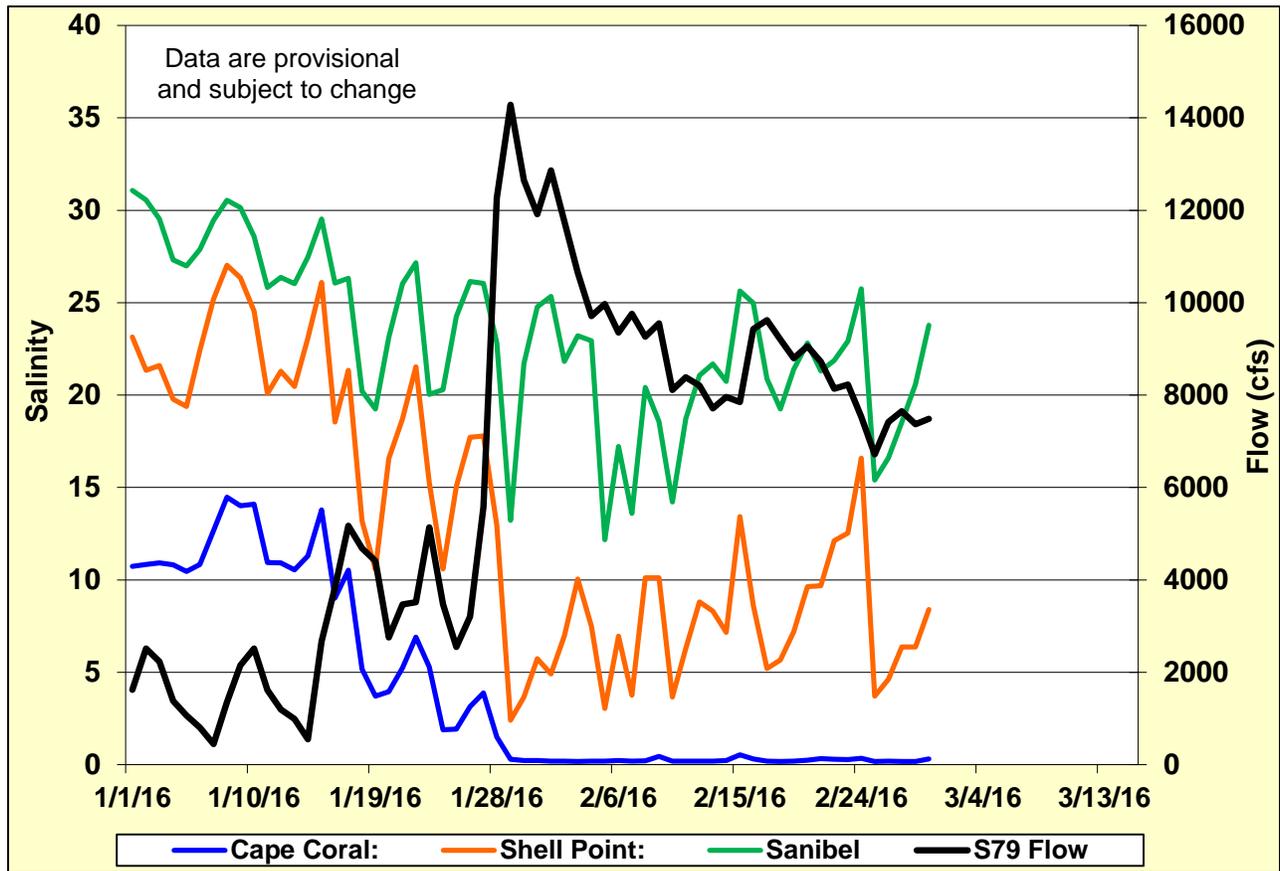


Figure 8. Daily mean flows at S-79 and salinity at lower estuary stations.

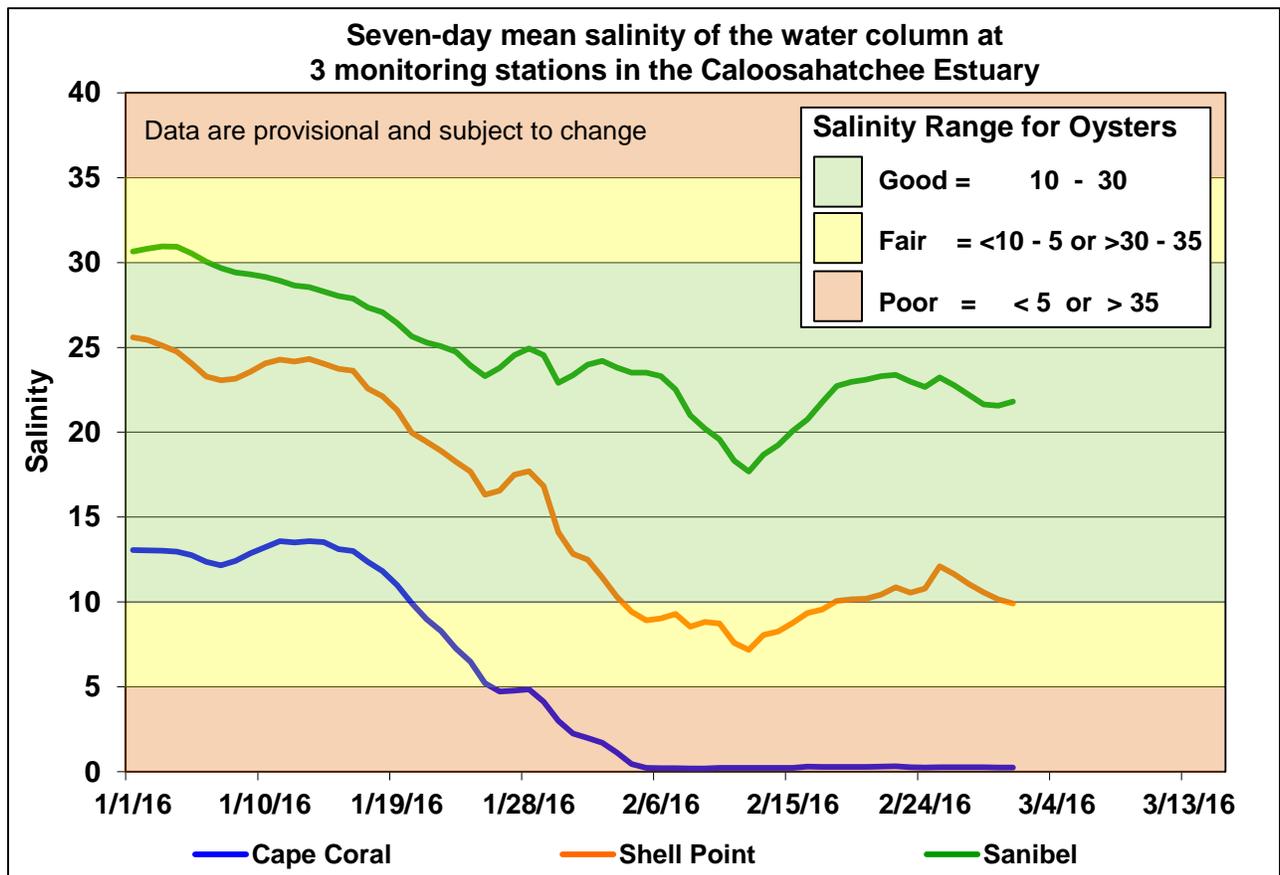
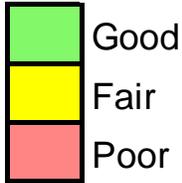


Figure 9. Seven-day mean salinity at Cape Coral Bridge, Shell Point and Sanibel Bridge monitoring stations.

GREATER EVERGLADES

Rainfall was under 0.55 inches in the Everglades with the local maximum of 1.22 inches in WCA-3A. Over the week, stages declined in the WCAs (-0.40 feet to -0.01 feet) but increased in northeastern ENP by 0.14 feet with water releases from WCA-3A. Pan evaporation was close to the pre-project average of 1.15 inches.

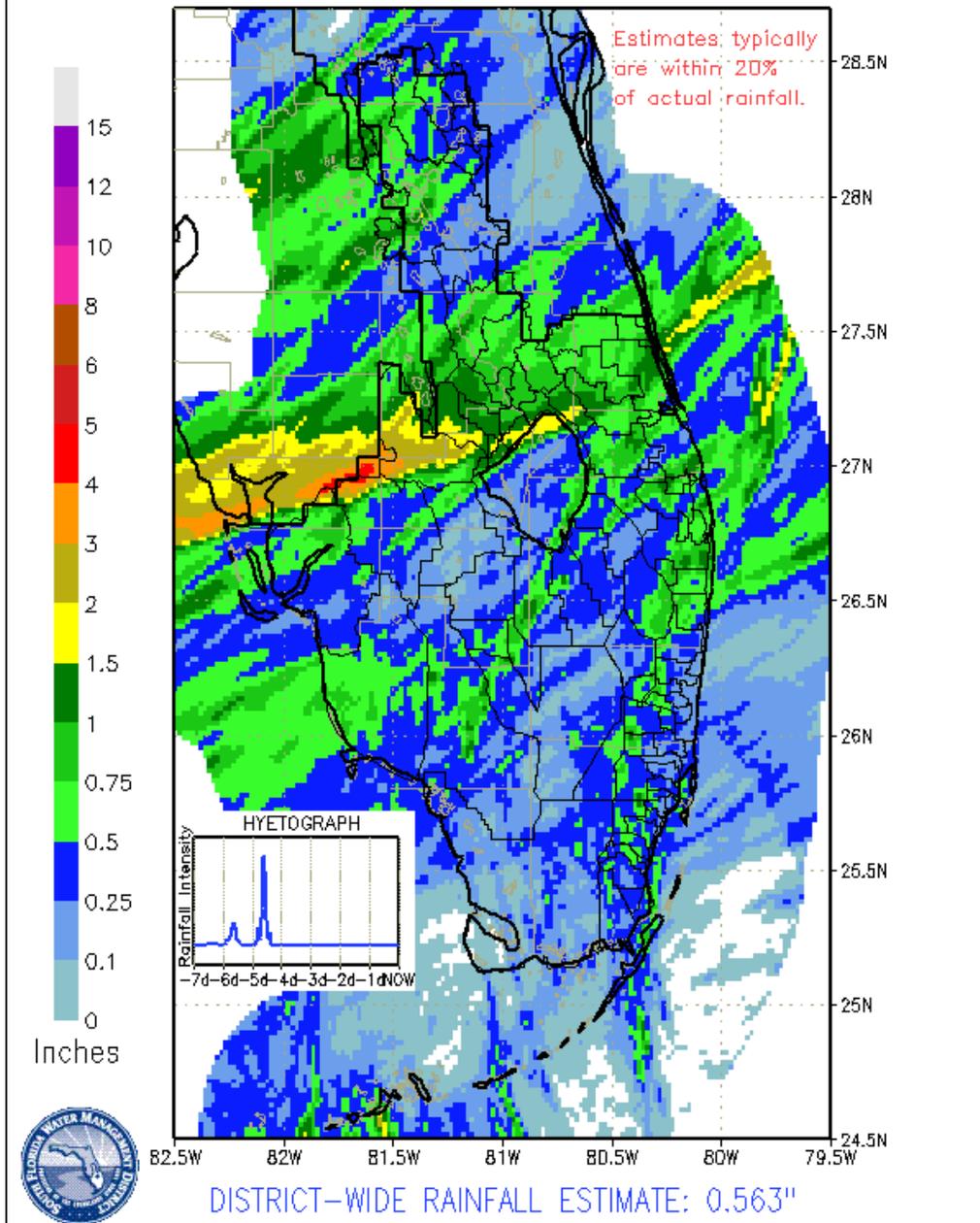
Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	0.54	-0.08
WCA-2A	0.28	-0.40
WCA-2B	0.53	-0.09
WCA-3A	0.26	-0.06
WCA-3B	0.43	-0.01
ENP	0.20	0.14



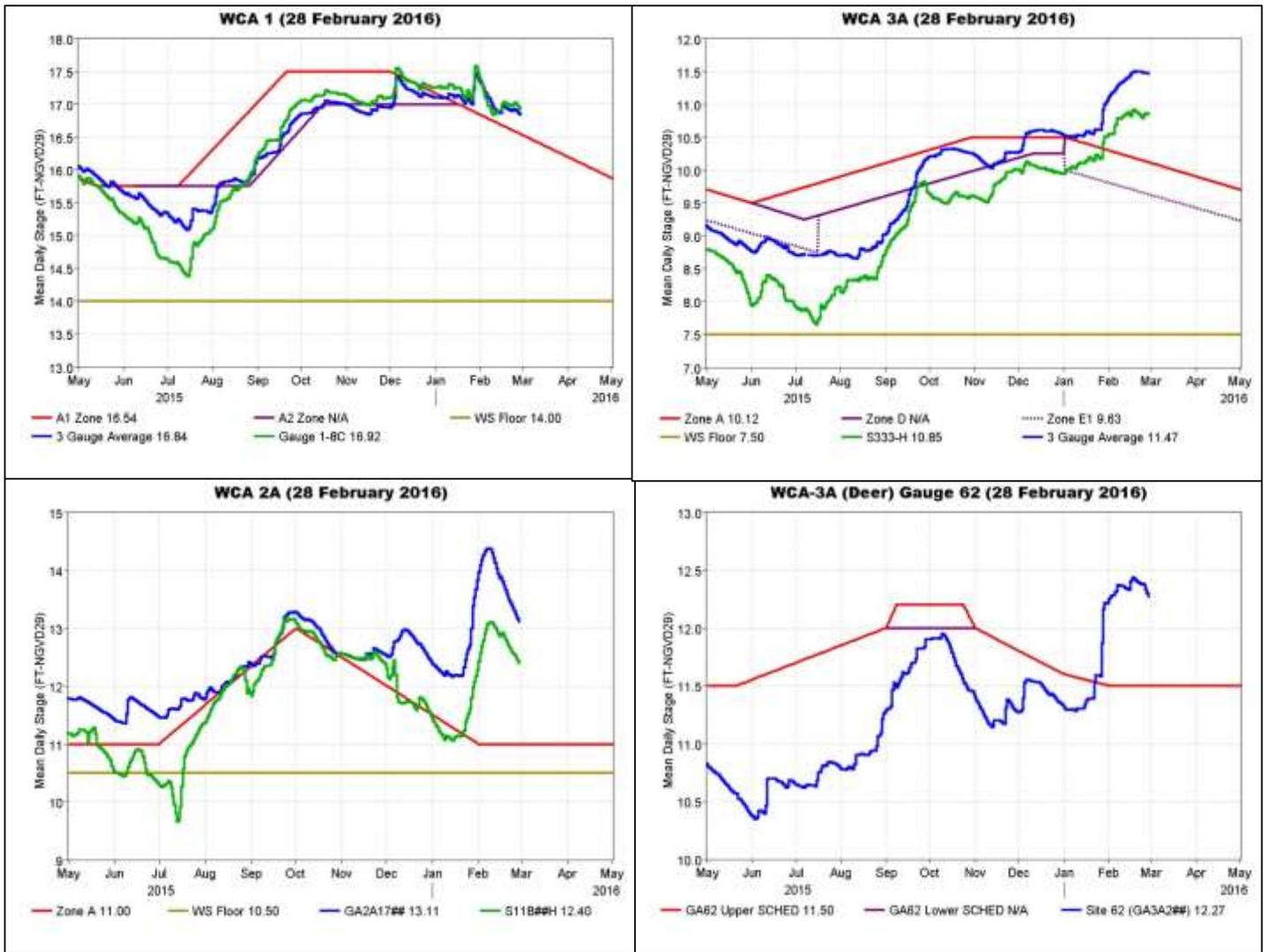
Good
Fair
Poor

SFWM DISTRICT-WIDE RAINFALL ESTIMATES

FROM: 0615 EST, 02/22/2016 THROUGH: 0615 EST, 02/29/2016



Regulation Schedules: Stages decreased in the WCAs this week but remain well above regulation. The WCA-1 stage remains 0.30 feet above regulation, the WCA-2A stage has dropped to 2.11 feet above regulation, and the three-gauge average stage in WCA-3A is 1.35 feet above regulation. The northwestern WCA-3A gauge stage (gauge 62) has decreased to 0.77 feet above regulation.

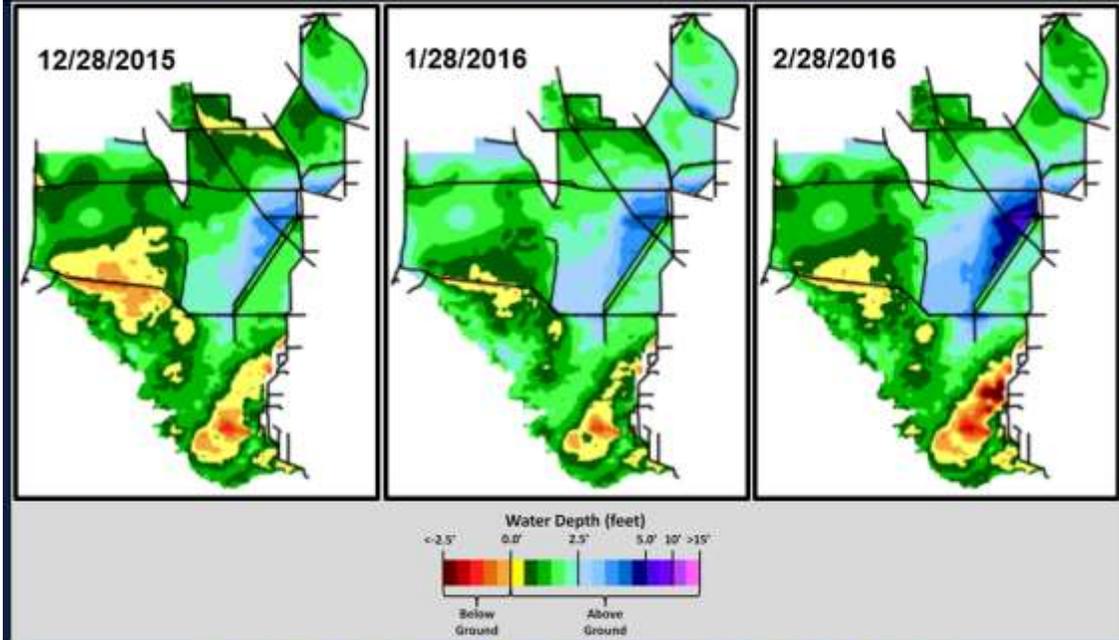


Water Depths and Changes: Water levels remain much higher than those two months ago but have decreased in WCAs 1, 2A, and ENP since January. WCA-3A is deeper than a month ago and depths exceed five feet in eastern WCA-3A. Water depths at the monitored gauges (except WCA-2B) range from 1.48 feet to 3.72 feet. Depths in southern WCA-3A have exceeded 2.5 feet, the depth of note for tree island inundation-duration, for 14 weeks (it is now 3.72 feet). At gauges 63 and 64, depths have exceeded 2.5 feet for five weeks.

Stages are generally lower than a week ago and show evidence of water flow into ENP. From a month ago, stages have decreased one to 1.5 feet in WCAs 1 and 2 as WCA-3A stages increased by up to one foot in depth. Relative to the last year, stages are up to 2.5 feet or more higher in WCA-3A and ENP. Individual stage gauges decreased -0.40 feet to -0.01 feet in the WCAs and increased 0.14 in northern Shark Slough last week.



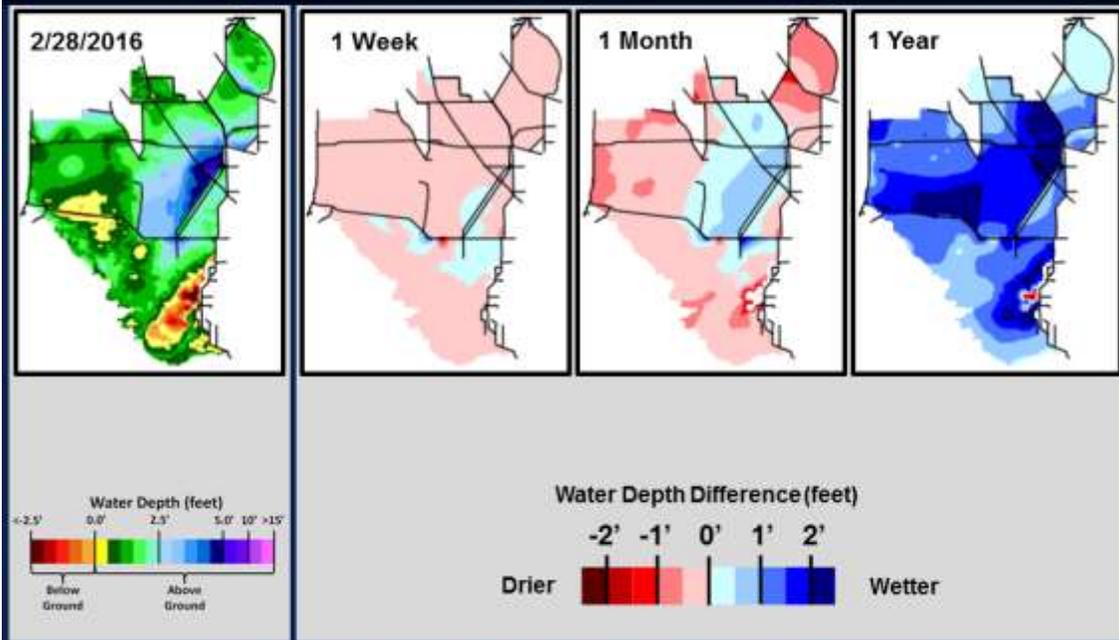
SFWDAT Water Depth Monthly Snapshots



South Florida Water Depth Assessment Tool (SFWDAT)



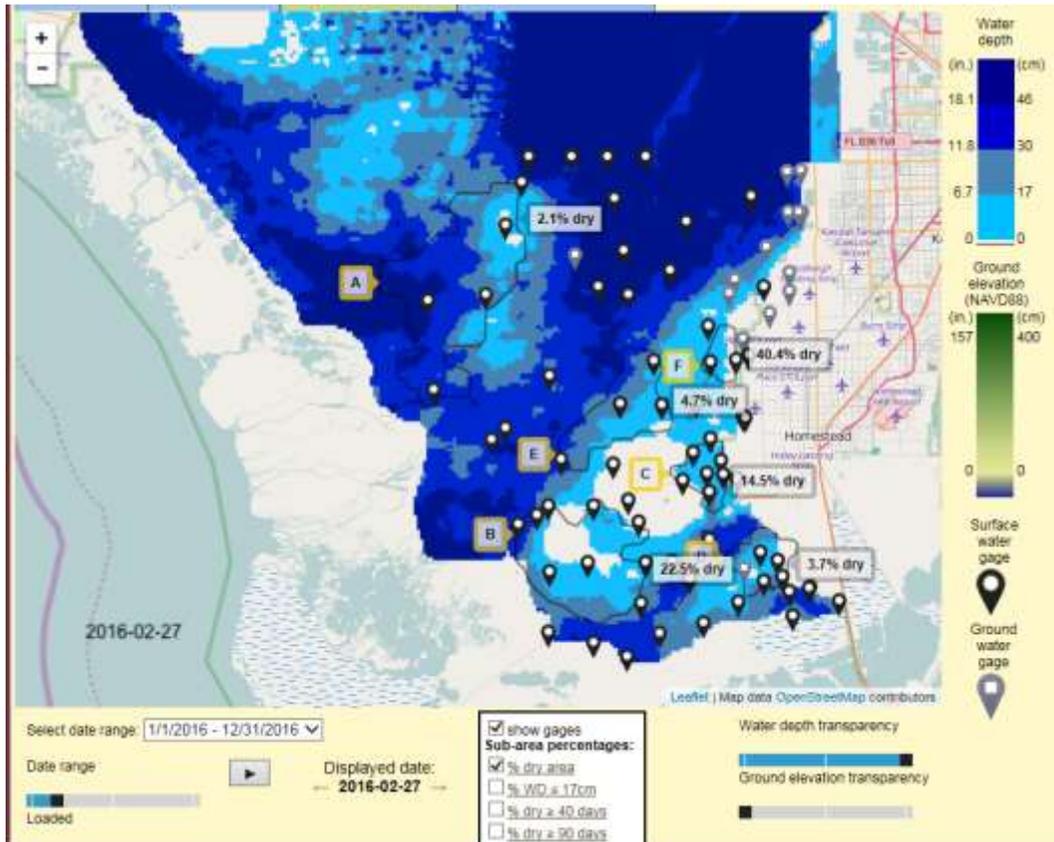
SFWDAT Everglades Difference Maps (Present - Past)



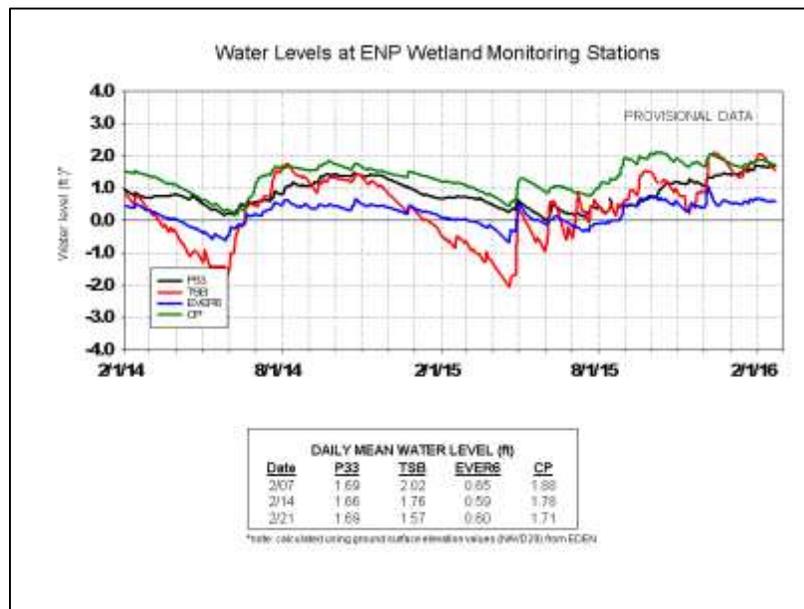
South Florida Water Depth Assessment Tool (SFWDAT)

Wading Bird Status: Current conditions are poor for nesting.

Cape Sable Seaside Sparrow: Most areas show a slight increase in percent dry area, but subpopulation B is slightly wetter. Since conditions are not good for early season breeding, maximizing late season breeding opportunities would be beneficial if conditions improve by May to June.



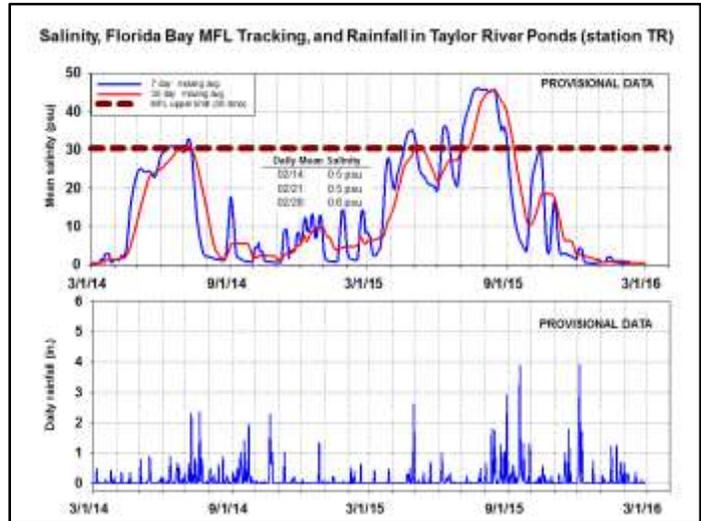
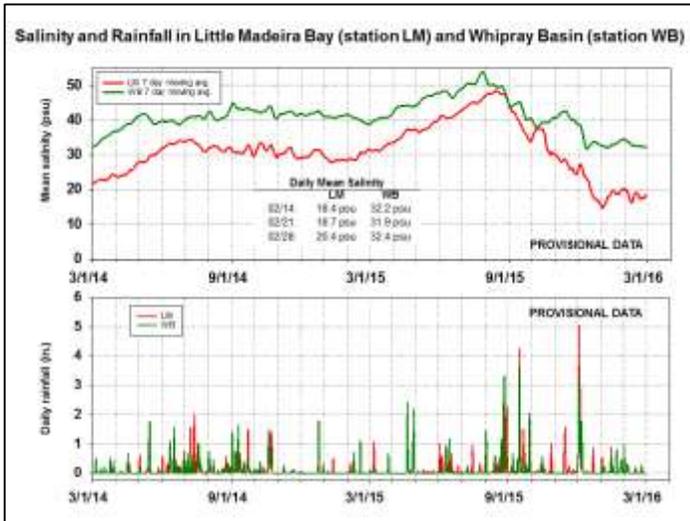
Everglades National Park (ENP) and Florida Bay: Water levels decreased this past week in Taylor Slough. Water levels remain 18 inches above average in northern Taylor Slough and six to seven inches above average in the southern areas. This is slightly closer to average than last week.



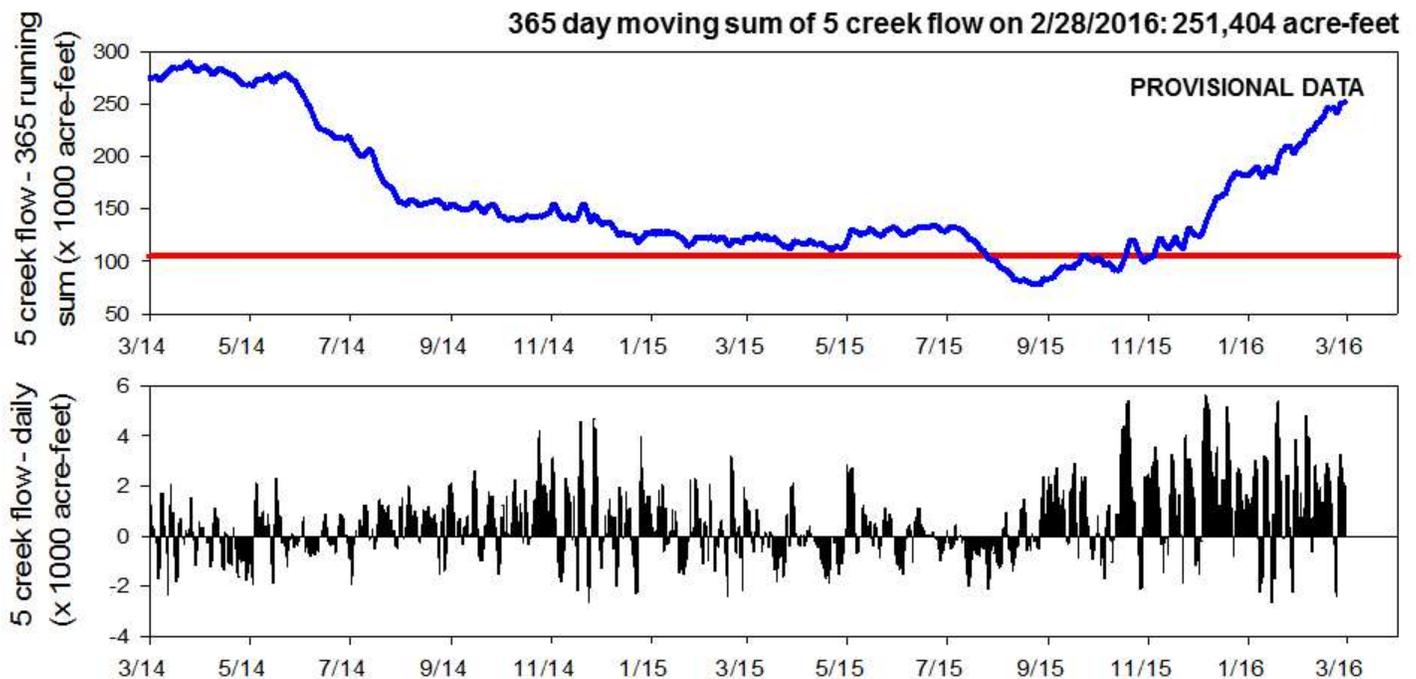
Salinity changes this past week were mixed, but mostly slight increases of less than 2 psu. Salinities in the bay still range from 15 to 32 psu (similar to last week), and compared to historic averages range from average (Whipray Basin in central Florida Bay and Little Madeira in northeastern nearshore embayments) to -10 psu below average (Terrapin Bay in the western nearshore embayments). The

daily average salinity at the MFL sentinel site of TR rose 0.1 to 0.6 psu on February 28, which is below the 4 psu seasonal average. The seasonal averages of all stations will be rising from now through June. The 30-day moving average salinity at TR remained at 0.5 psu 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 251,404 acre-feet this week (98 percent of the average 365-day running sum of 257,628 acre-feet). Last week's cumulative flow from the five creeks was 5,527-acre-feet, about 5,000 acre-feet higher than the average for this time of year, and was less than half of the previous week's total of 13,237-acre-feet, about 11,500 acre-feet above average. Creek flow is provisional data from the USGS and is highly variable.



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 in the WCAs need to be lowered. Water levels at gauge 65 have exceeded 2.5 feet, the depth monitored for tree island inundation and duration, for 14 weeks (now 3.72 feet deep). Gauges 64 and 63 have exceeded 2.5 feet depth for five 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.

Interagency biologists' recommendations appear in the summary table below. The red text represents their new or modified information or recommendations.

Summary of Everglades Recommendations, March 1, 2016 (SFWMD) (red is new text)

Area	Current Condition	Cause(s)	Recommendation	Reasons
WCA-1	Stages changed - 0.09' to -0.06'	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.
WCA-2A	Stage decreased - 0.40'	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.
WCA-2B	Stages changed - 0.09' to -0.08'	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.
WCA-3A NE	Stage changed - 0.09' to -0.08'	Rainfall, ET, management	WCA-2A and northern WCA-3A inflow are not recommended at this time because of high water and ecological concerns. Lower stages throughout the WCAs would be ecologically beneficial.	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. Additional inputs into these areas are not recommended until stages decline below 11.60' average of gauges 62 and 63.
WCA-3A NW	Stage changed - 0.13'	Rainfall, ET, management		
Central WCA-3A S	Stage changed - 0.05'	Rainfall, ET, management	Prevent repeated or ongoing reversals. Lower the stages. Stages at gauge 65 have exceeded 2.5' since Nov. 23 (14 weeks, now 3.72') and gauges 63 and 64 have now exceeded 2.5' for 5 weeks.	Provide moderate recession rates to support avian foraging, necessary for successful nesting.
Southern WCA-3A S	Stage changed - 0.04'	Rainfall, ET, management		
WCA-3B	Stages changed - 0.07' to 0.03'	Rainfall, ET, management	Follow normal seasonal practices. Prevent repeated or ongoing reversals as much as possible.	Provide moderate recession rates to support avian foraging, necessary for successful nesting.
ENP-SRS	Stage changed 0.14'	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.
ENP-CSSS habitats	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. Maximizing flows through S333, as possible, is recommended.	Provide habitat and appropriate nesting conditions for CSSS.
Taylor Slough	6-18 inches above average	Rain, ET, inflows	Move water southward as needed	Provide freshwater buffer for ecosystems and maintain low salinity conditions downstream
FB- Salinity	Average to -10 psu of average	Rain, ET, inflows, wind	Move water southward as needed	Maintain lower salinity levels.