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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 22, 2016

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Kissimmee

On Sunday, stage in East Lake Toho was 0.5 feet below schedule and Toho was 0.4 feet below schedule; Kissimmee-Cypress-Hatchineha (KCH) was 0.1 feet below schedule. Over the past week, discharge at S65 averaged 402 cfs and at S65A 280 cfs; discharge at S65E averaged 487 cfs. Tuesday morning discharges: S65 ~388 cfs; S65A ~277 cfs; S65C ~397 cfs; S65E ~356 cfs. Dissolved oxygen in the Kissimmee River averaged 5.98 mg/L over the past week and 5.53 mg/L on Sunday. Kissimmee River mean floodplain depth is currently 0.48 feet.

Lake Okeechobee

The recession in Lake stage continued this past week, dropping the Lake an additional 0.21 feet. The Lake is at 15.20 feet NGVD and is in the Low Flow Sub-band. Ecological conditions for wading birds, snail kites, and species in the nearshore region remain poor but may improve if the recession continues.

Estuaries

Total inflow to both the Caloosahatchee and St. Lucie Estuaries declined over the past week. For the St. Lucie, total inflow averaged 1,688 cfs with 65% coming from Lake Okeechobee. Salinity was in the fair range for oysters at the Roosevelt Bridge. Total inflows to the Caloosahatchee averaged 3,560 cfs with 72% coming from Lake Okeechobee. Salinity conditions in the upper estuary were favorable for tape grass. Salinity was in the poor range for oysters at the Cape Coral Bridge but in the good range at Shell Point and the Sanibel Causeway.

Stormwater Treatment Areas

Over the past week, the STAs/FEBs received approximately 18,500 acre-feet of Lake regulatory releases. The total amount of Lake regulatory releases sent to the STAs/FEBs in WY2016 (since May 1) is approximately 202,000 acre-feet. All STA cells are at or above target depths and restrictions are in place for structure repairs and Snail Kite nesting in STA-1E, vegetation rehabilitation in STA-1W, a Restoration Strategies Science Plan Study in STA-2 and vegetation rehabilitation in STA-3/4. This week, if LORS 2008 recommends Lake Releases to the WCAs and the conditions allow, releases will be sent to STA-1E and A-1 FEB. A-1 FEB releases will be sent to STA-2.

Everglades

Water levels have continued to decline in most areas as is expected for this time of year and are about one to four feet deep in most of the wetlands. WCA-3A water levels have exceeded 2.5 feet, the depth monitored for tree island inundation and duration, from eight to 17 weeks. Deep water is affecting terrestrial wildlife, preventing wading bird foraging and nesting, and may be affecting vegetation on tree islands. The 30-day moving average salinity at the Florida Bay MFL site is 0.8 psu and the cumulative

inflow from the five creeks into Florida Bay has risen to 255,603 acre-feet. Florida Bay salinities are close to average for this time of year.

Weather Conditions and Forecast

Cool and dry today. Dry air behind a reinforcing trough has moved over the District so no rain is expected today. Some spotty light showers will return southeast Wednesday as winds switch back to the southeast. Scattered afternoon thunderstorm activity should pop up with daytime heating Thursday, Friday, and Saturday.

KISSIMMEE BASIN

Kissimmee Basin Rainfall

The Upper Kissimmee Basin received 0.53 inches of rainfall in the past week and the Lower Basin received 0.74 inches (SFWMD Daily Rainfall Report 3/21/2016).

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: 3/22/2016		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)	3/20/16	3/13/16	3/6/16	2/28/16	2/21/16	2/14/16	2/7/16
Lakes Hart and Mary Jane	S62	35	LKMJ	60.5	R	60.9	-0.4	-0.4	-0.4	-0.6	-0.6	-0.4	-0.5
Lakes Myrtle, Preston, and Joel	S57	8	S57	60.7	R	60.8	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	0.0
Alligator Chain	S60	0	ALLI	63.7	R	63.9	-0.2	-0.3	-0.3	-0.3	-0.2	-0.5	-0.5
Lake Gentry	S63	18	LKGT	61.2	R	61.4	-0.2	-0.2	-0.3	-0.2	-0.2	-0.3	-0.2
East Lake Toho	S59	64	TOHOE	57.3	R	57.8	-0.5	-0.7	-0.4	-0.6	-0.5	-0.6	-0.5
Lake Toho	S61	169	TOHOW	54.4	R	54.8	-0.4	-0.6	-0.5	-0.6	-0.5	-0.6	-0.6
Lakes Kissimmee, Cypress, and Hatchineha	S65	402	LKISSP, KUB011, LKISSB	50.9	R	51.0	-0.1	-0.2	-0.1	-0.1	0.0	-0.2	-0.5

* T = temporary schedule, R = USACE flood control schedule, S = temporary snail kite schedule, A = projected ascension line, N/A = not applicable or data not available.

** Seven-day average of weighted daily means through Sunday midnight.

*** Names of in-lake monitoring sites and structures used to determine lake stage; if more than one site is listed, an average is reported.

DATA ARE PROVISIONAL

Lower Kissimmee Basin

Discharges and stages at Lower Basin structures are shown in Table 2. SFWDAT depth maps for the Phase I restoration area are shown in Figure 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: 3/22/2016

Metric	Location	Sunday's 1-day average	Weekly Average**									
			3/20/16	3/13/16	3/6/16	2/28/16	2/21/16	2/14/16	2/7/16	1/31/16	1/24/16	1/17/16
Discharge (cfs)	S-65	394	402	505	1313	2770	2257	1997	3248	802	477	130
Discharge (cfs)	S-65A	279	280	408	1214	2817	2261	2223	3772	1355	1115	463
Discharge (cfs)	S-65C	567	492	1237	2629	2850	2515	3805	2987	2261	2017	877
Headwater stage (feet NGVD)		34.0	34.1	34.2	34.9	35.2	34.5	34.8	34.5	33.7	33.7	33.5
Discharge (cfs)	S-65D****	672	534	1375	2713	3112	2810	4355	3811	3336	2716	1318
Discharge (cfs)	S-65E	549	487	1360	2696	3101	2880	4513	3975	3703	2779	1369
DO concentration (mg/L)***	Phase I river channel	5.53	5.98	5.98	5.36	5.37	6.82	7.39	5.85	7.36	6.56	7.12
Mean depth (feet)*	Phase I floodplain	0.48	N/A	0.52	1.12	1.81	1.44	1.64	2.19	1.10	0.92	0.79

* 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
3/22/2016	No new recommendations.			
3/15/2016	No new recommendations.			
3/8/2016	No new recommendations.			
3/1/2016	No new recommendations.			
2/23/2016	No new recommendations.			
2/16/2016	No new recommendations.			
2/9/2016	No new recommendations.			
2/1/2016	Begin F&W recessions in East Toho, Toho, and KCH per the requested recession lines shown in the 2015-16 Dry Season Standing Recommendation (SR). Use Table 2 for guidance on rates of change in discharge to control departures from the line in KCH, and the reversal guidelines shown in the SR for Toho and East.	Initiate and manage lake stage recessions in East Toho, Toho, and KCH for the benefit of fish and wildlife, while avoiding harm to the Kissimmee River	TBD	KB Tech Team
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, 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

KCOL Hydrographs (through Sunday midnight)

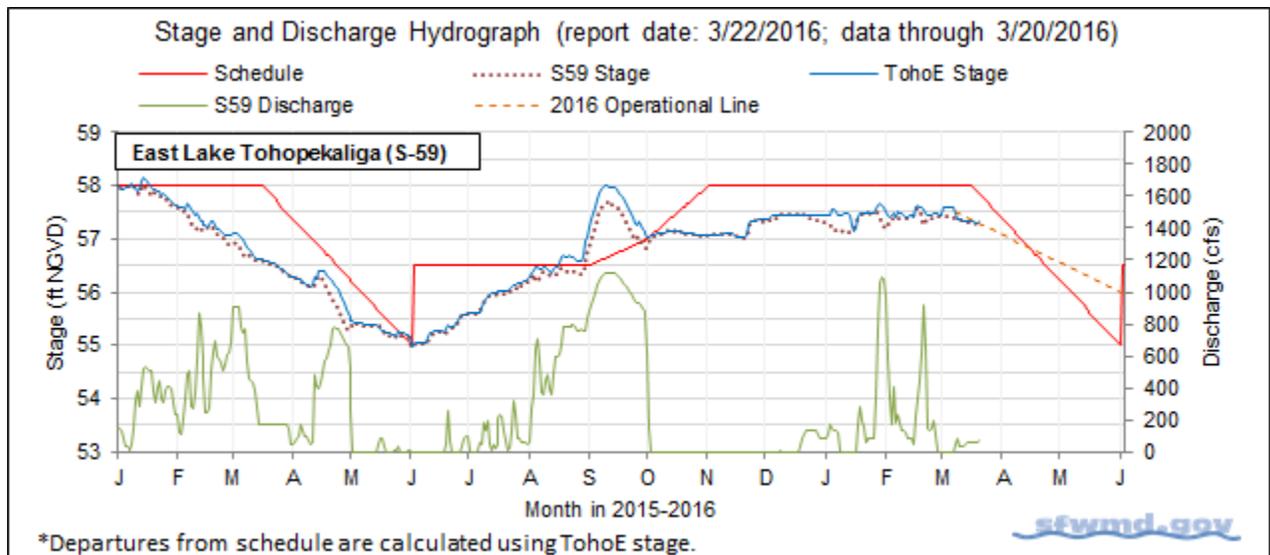


Figure 1.

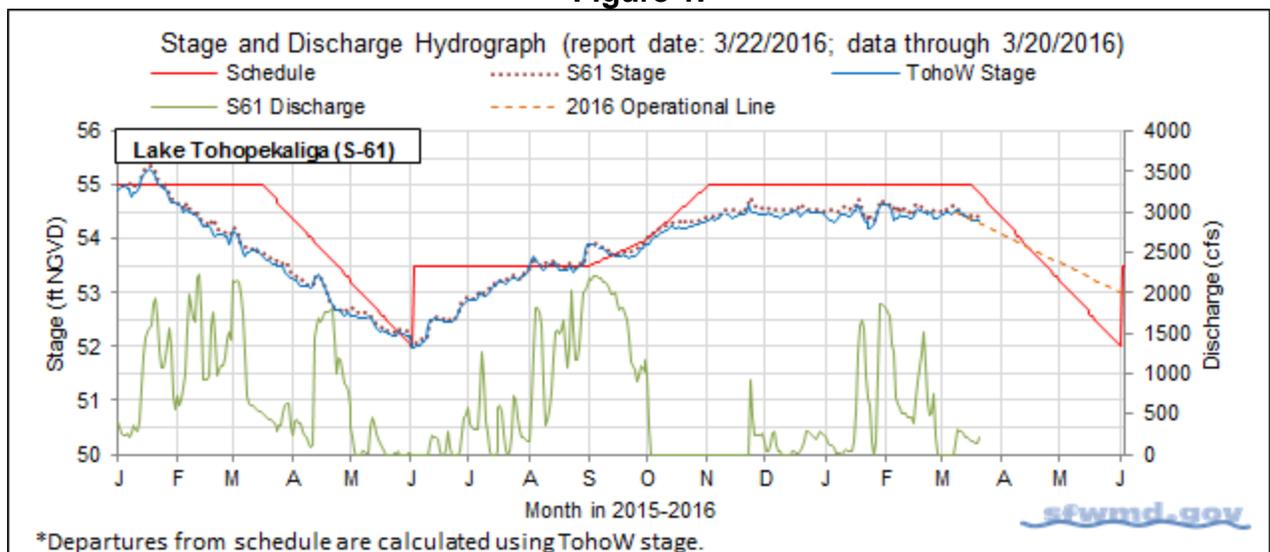


Figure 2.

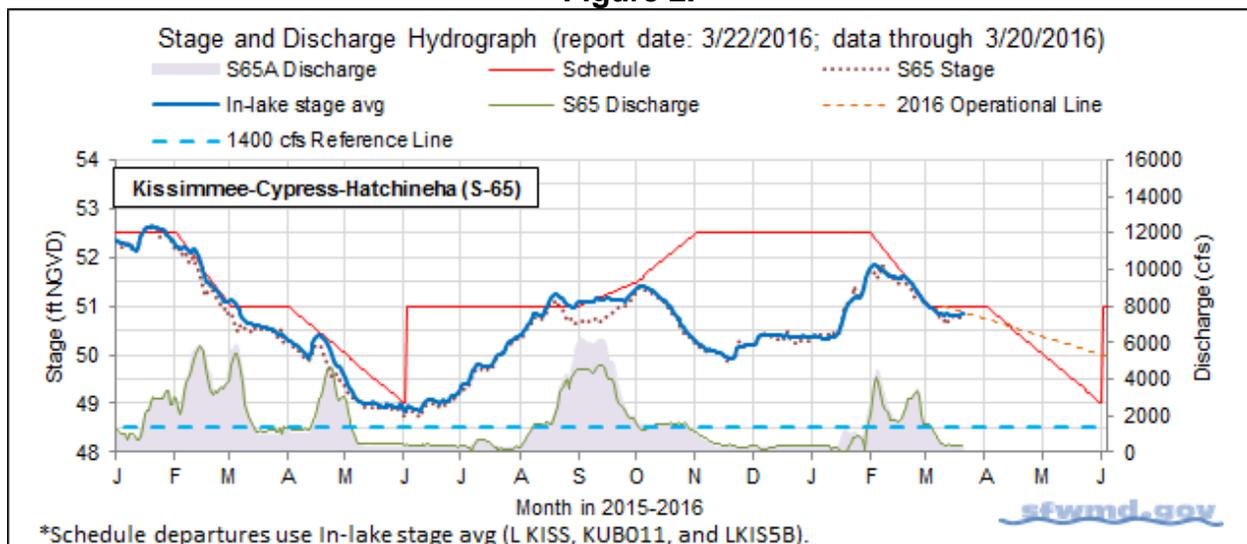


Figure 3.

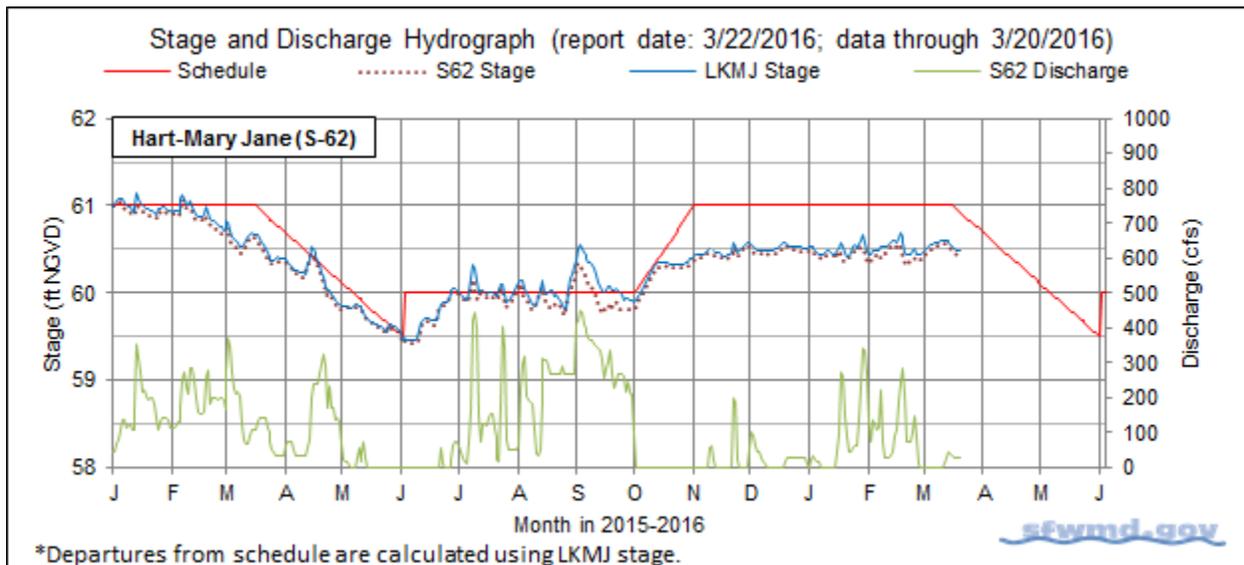


Figure 4.

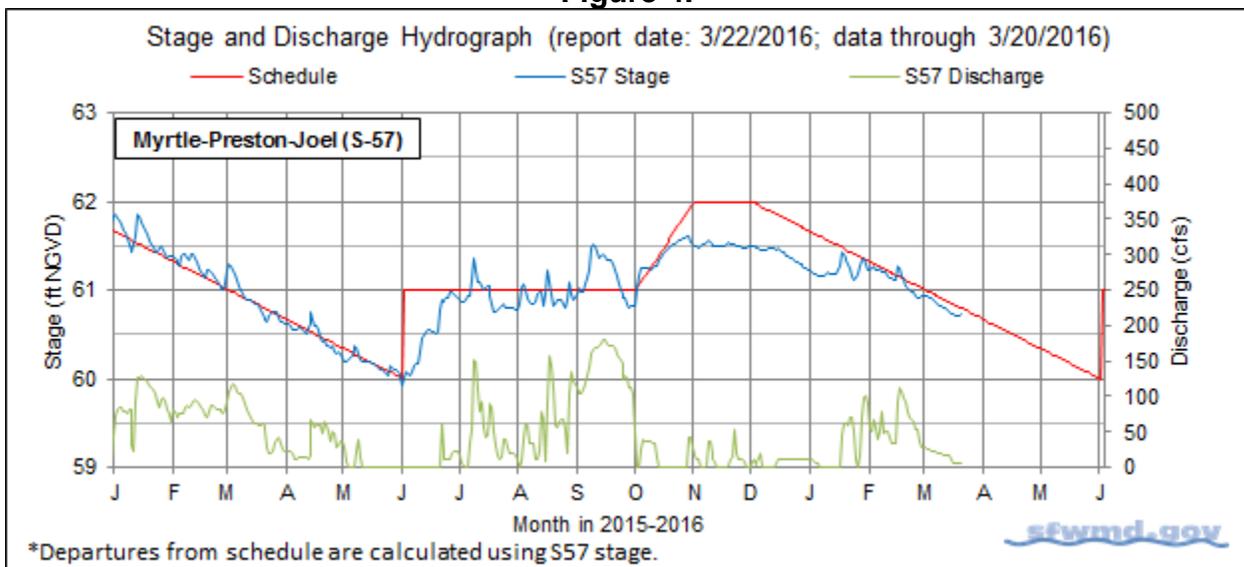


Figure 5.

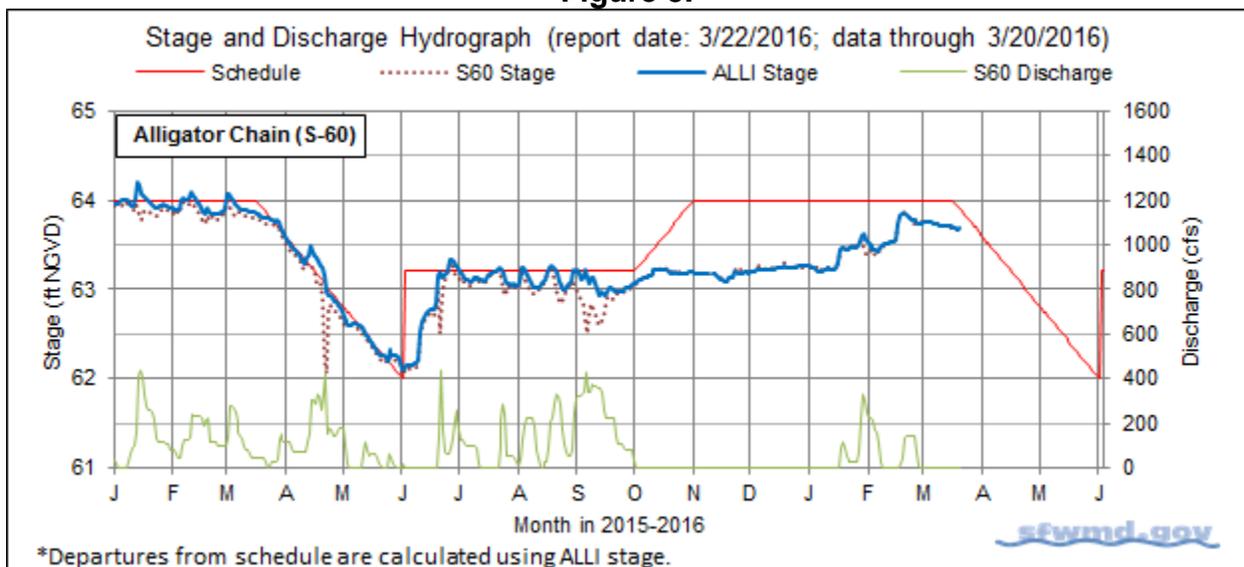


Figure 6.

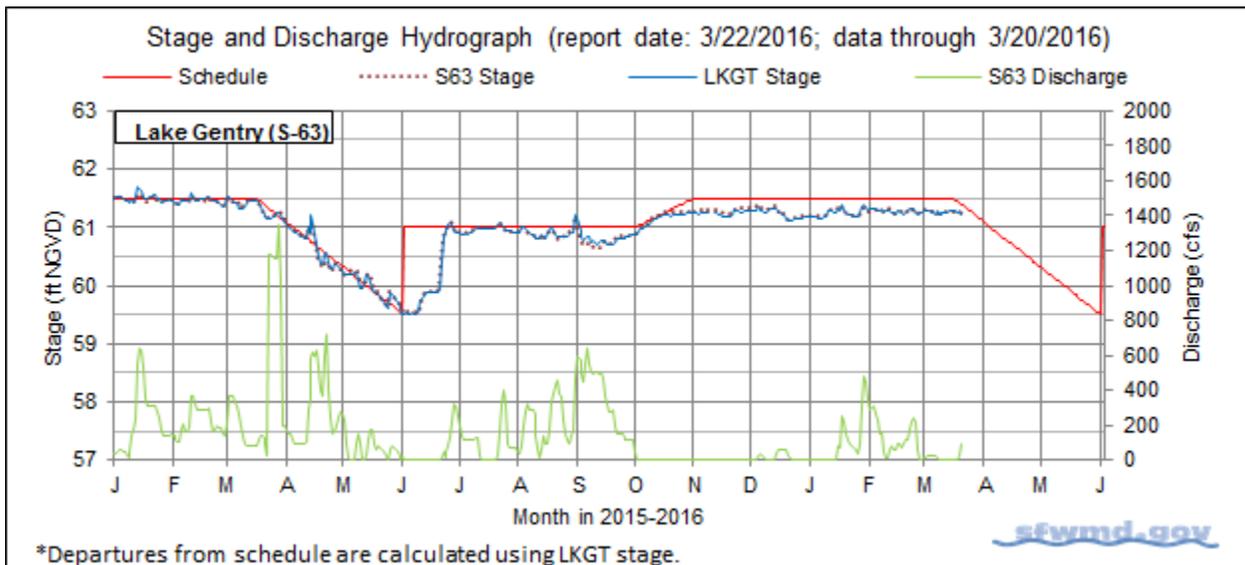
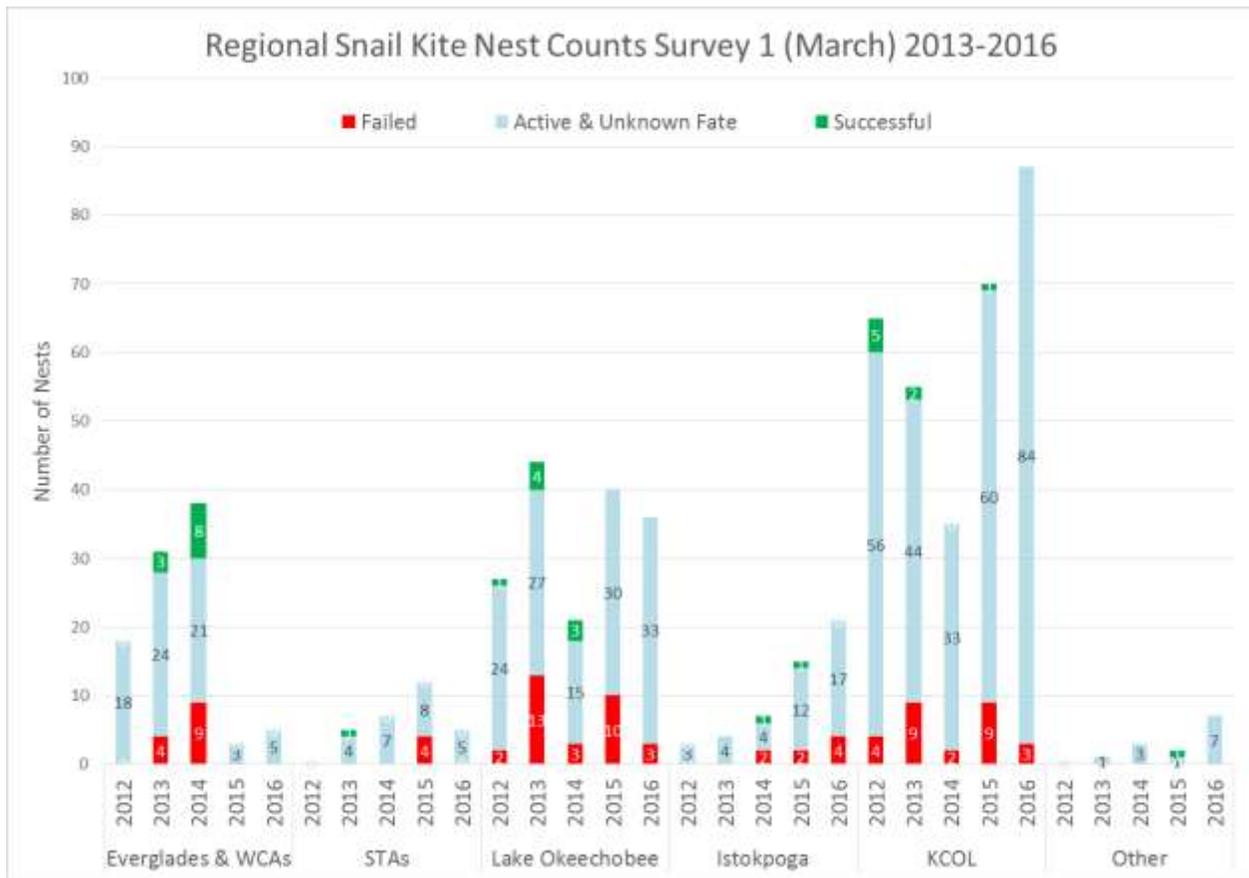
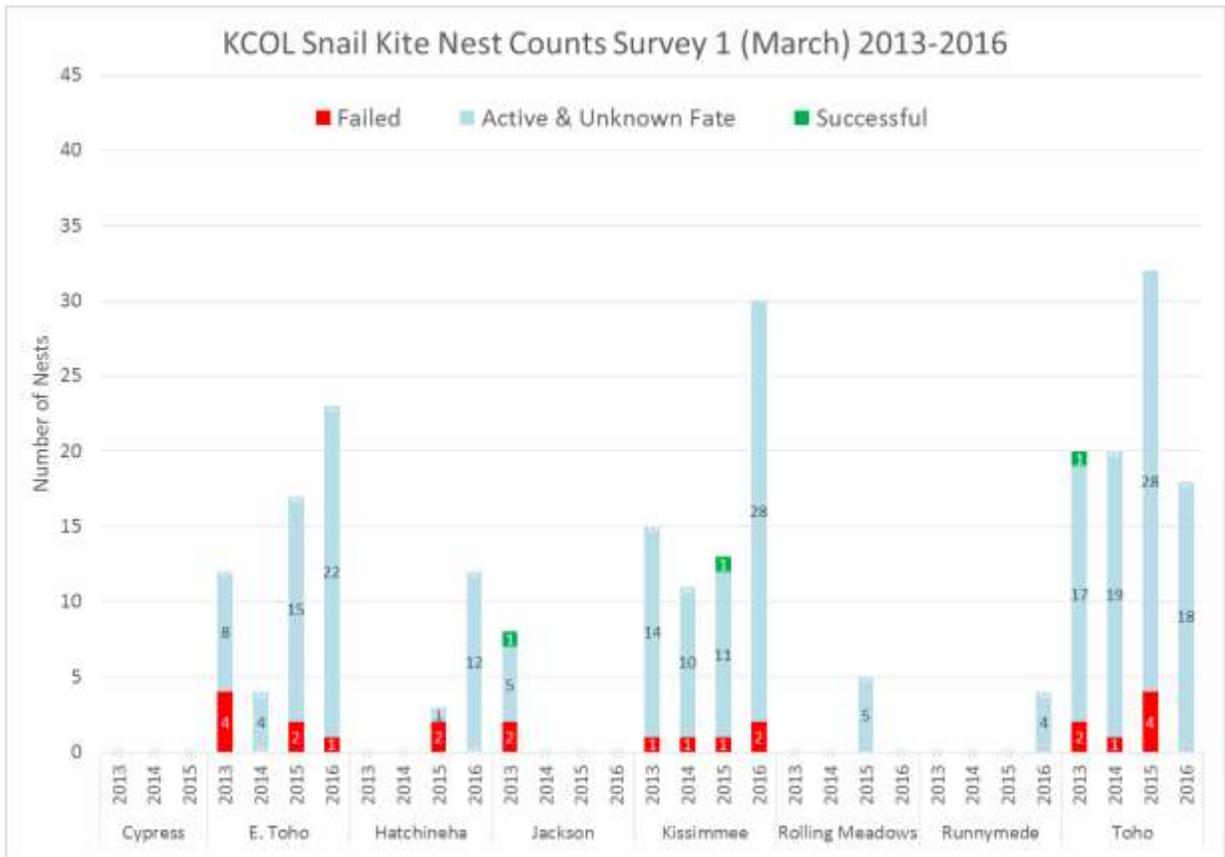


Figure 7.



Insert A. Regional Snail Kite nest counts for Survey 1 (March) in 2013-2016.



Insert B. Snail Kite nest counts in the KCOL for Survey 1 (March) in 2013-2016.

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****

		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
Q (cfs)		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.

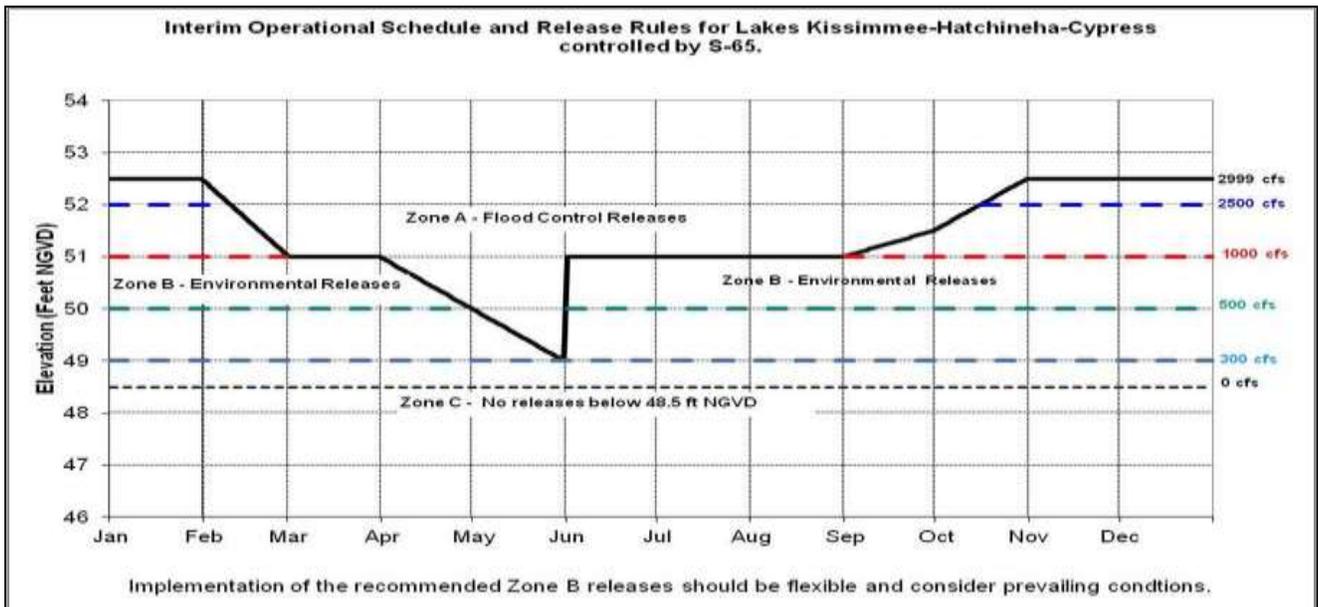


Figure 8b. Interim operations schedule for S-65. The discharge schedule shown to the right has not been used in recent years or in Wet Season 2015.

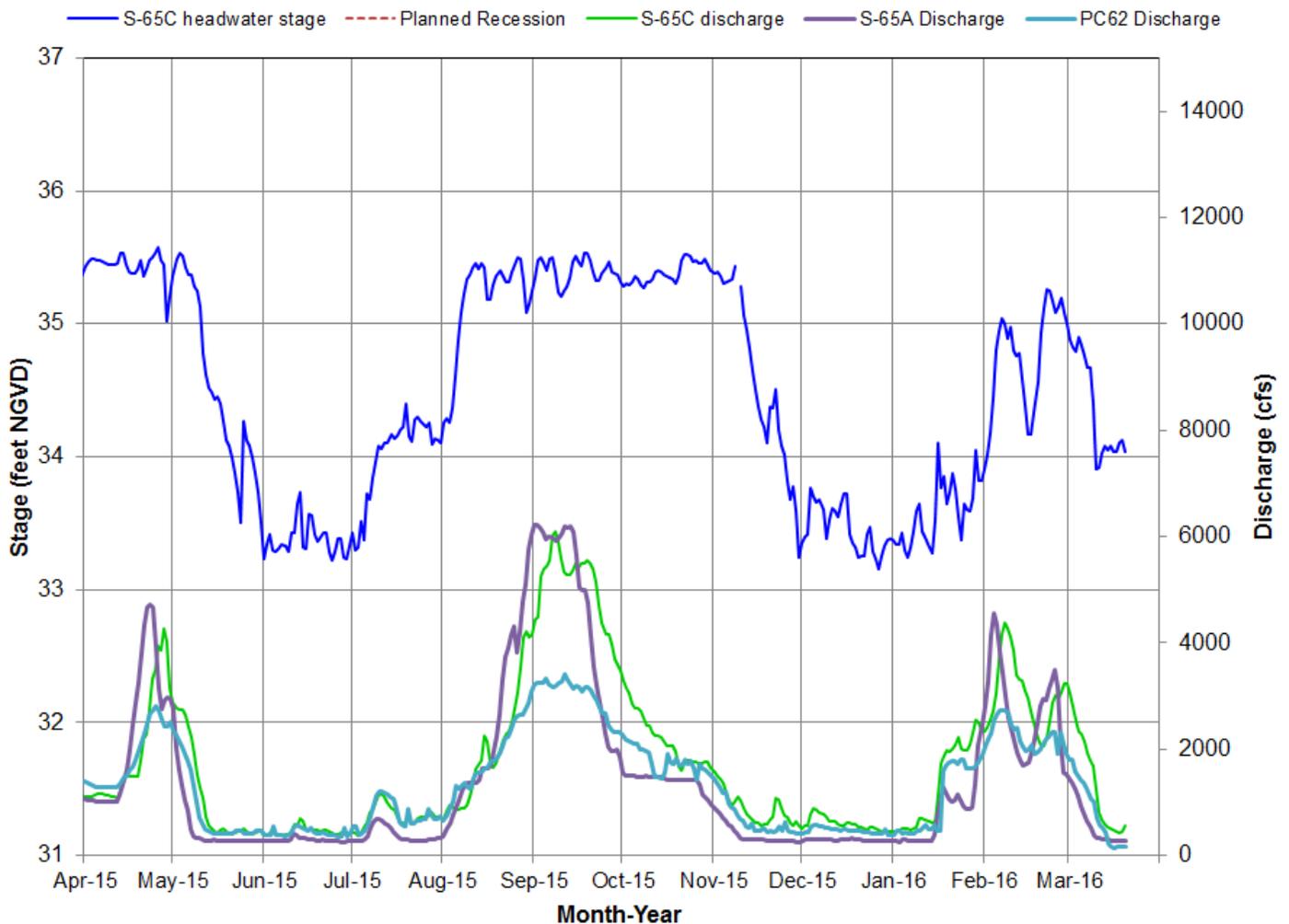


Figure 9. S-65C headwater stage in relation to discharge at S-65C, S-65A, and PC62.

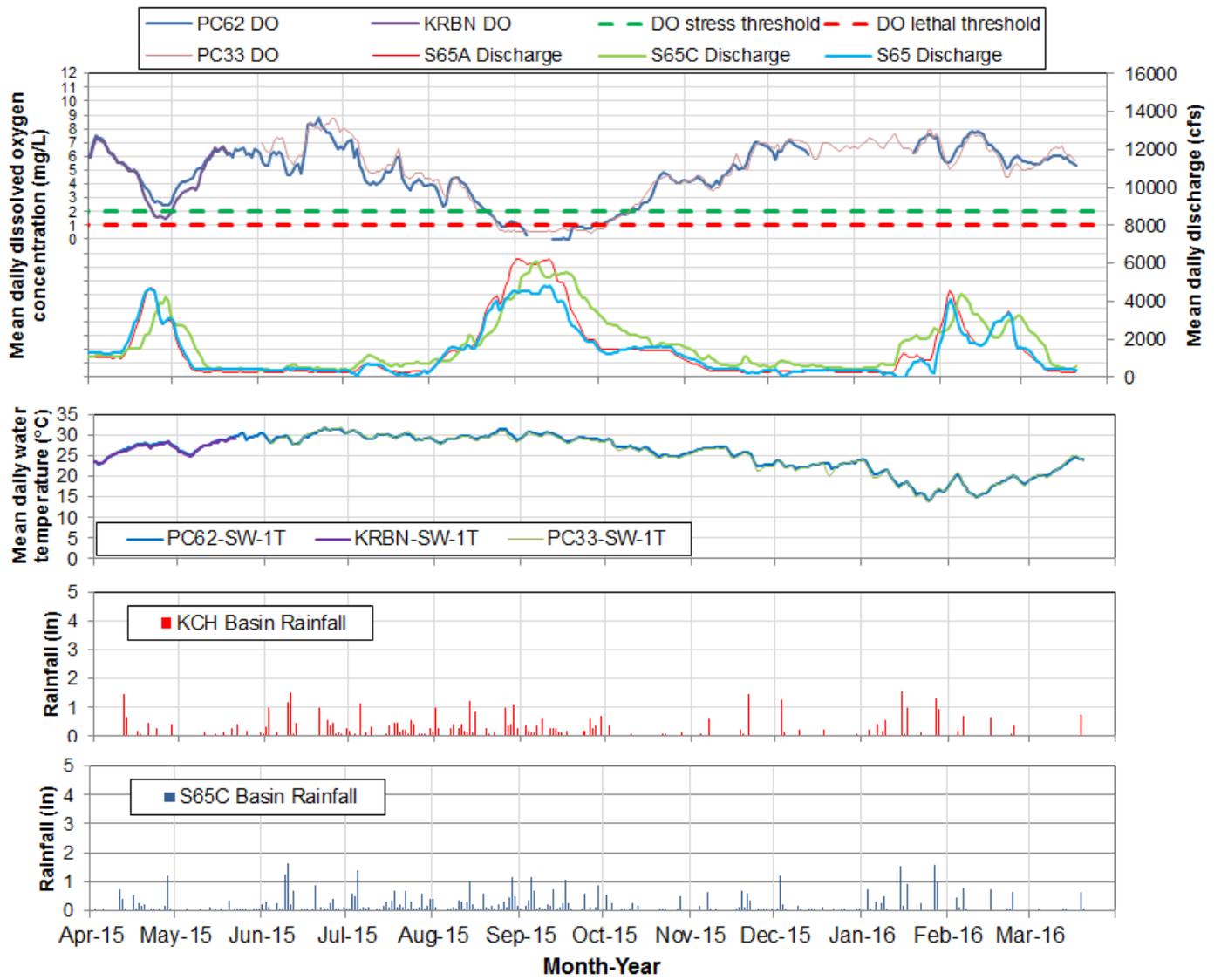


Figure 10. Mean daily Dissolved Oxygen, discharge, temperature and rainfall in the Phase I river channel.

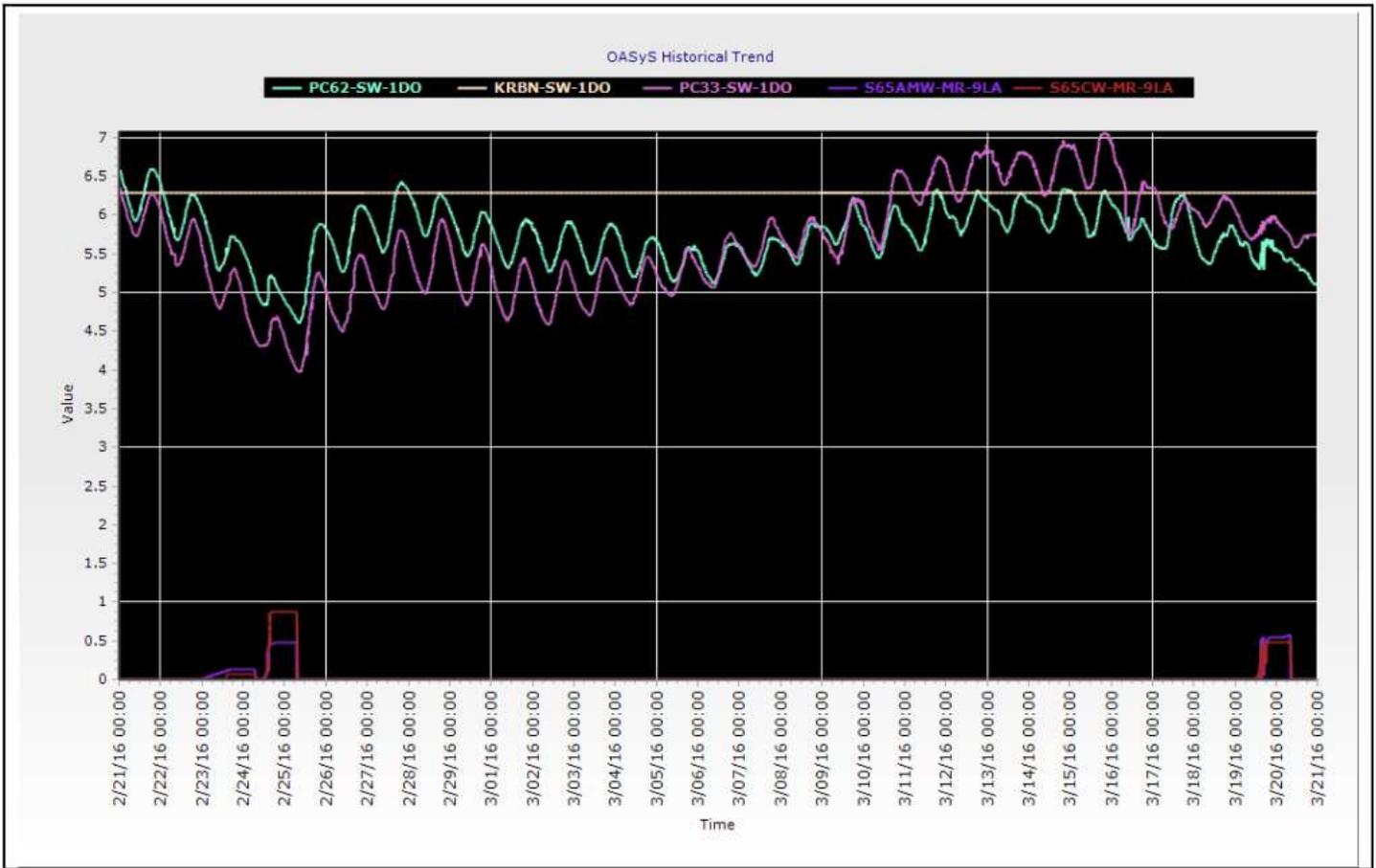


Figure 11. Phase I river channel Dissolved Oxygen (measured at 15 minute intervals) and rainfall at S65A and S65C.

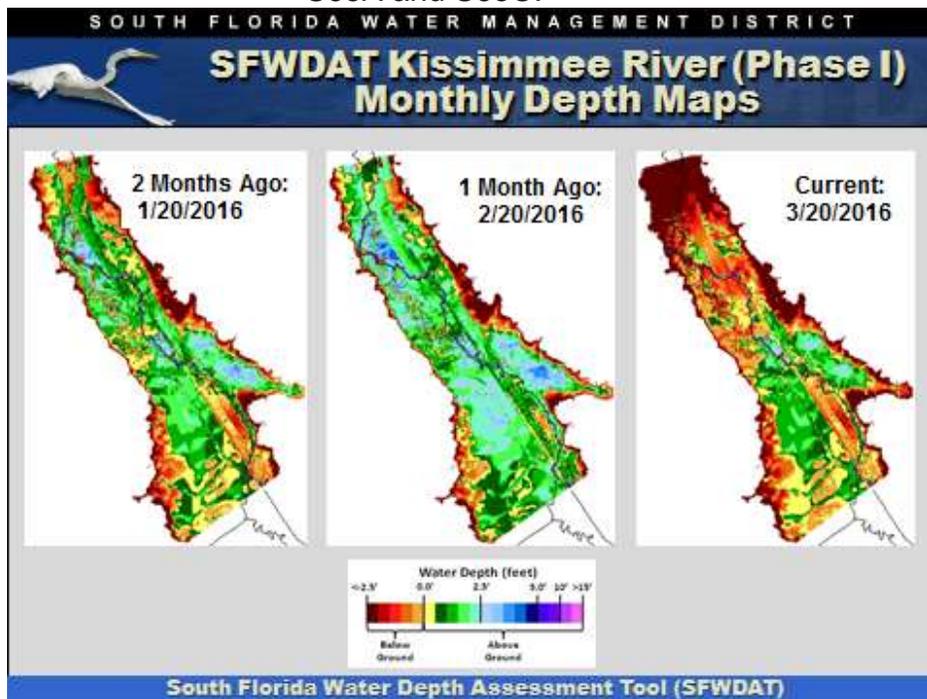


Figure 12. Phase I area floodplain water depths for this week, one month ago, and two months ago. Note that the WDAT color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to Jan. 16, 2012.

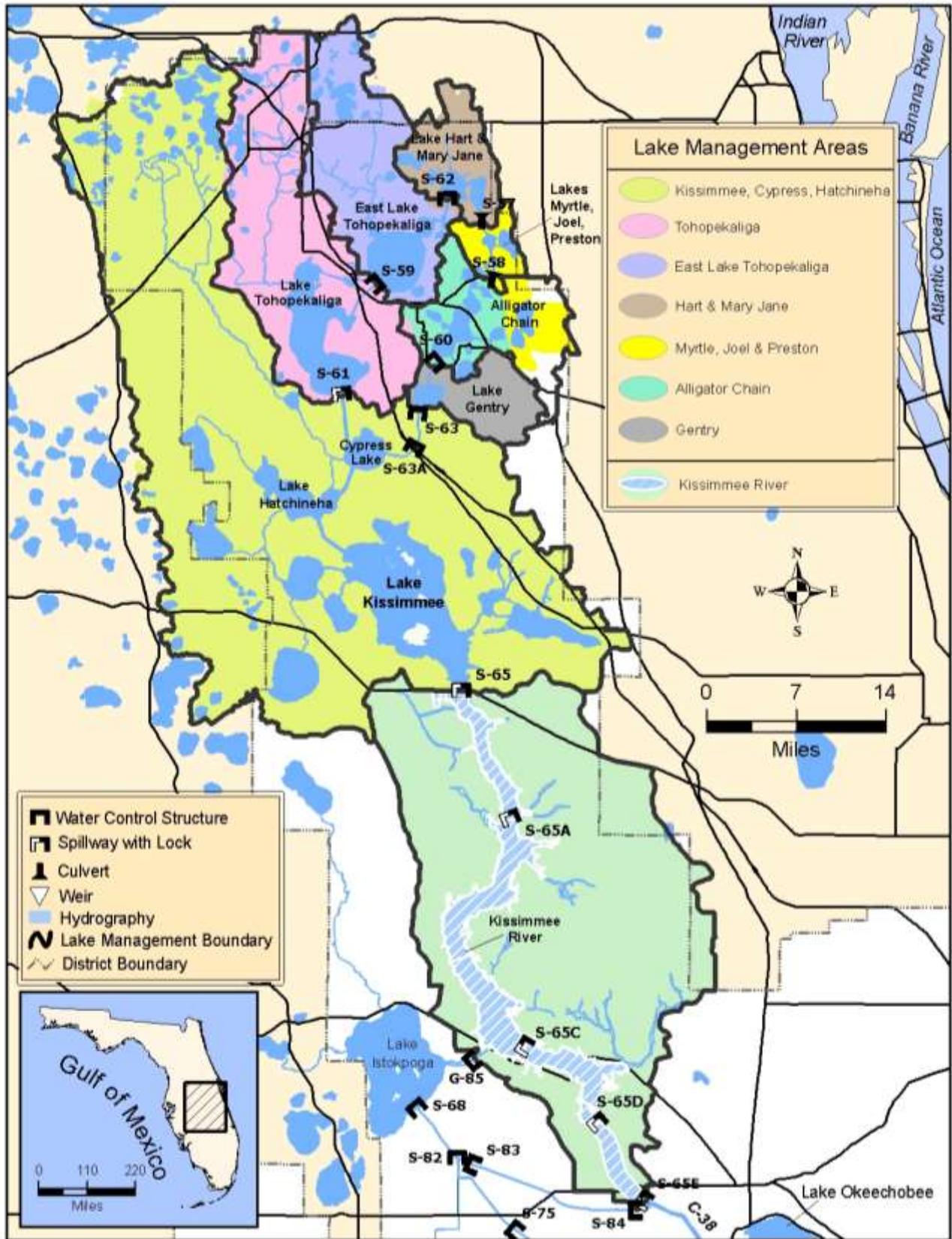


Figure 14. The Kissimmee Basin

LAKE OKEECHOBEE

According to the USACE web site, Lake Okeechobee stage is at 15.20 feet NGVD for the period ending at midnight on March 21, 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 0.21 feet over the past week. The Lake is 0.94 feet lower than it was a month ago and 0.86 feet higher than it was a year ago (Figure 1). The Lake is in the Low Flow Sub-band (Figure 2). According to RAINДАР, 0.65 inches of rain fell directly over the Lake during the past seven days. Similar or greater amounts fell in much of the surrounding watershed except to the south and southwest of the Lake where amounts were generally lower (Figure 3).

Based on USACE reported values, current Lake inflow is approximately 1,249 cfs, consisting of flows as indicated below.

Structure	Flow cfs
S65E	632
S154	0
S84 & 84X	580
S71	0
S72	176
C5(Nicodemus slough dispersed storage)	-202
S191	0
S133 PUMPS	6
S127 PUMPS	0
S129 PUMPS	0
S131 PUMPS	0
S135 PUMPS	0
Fisheating Creek	57
S2 Pumps	0
S3 Pumps	0
S4 Pumps	0

Current Lake outflow is approximately 5,988 cfs exiting at S77 (2,275 cfs), S308 (1,212 cfs), S351 (1,163 cfs), S354 (916 cfs), S352 (295 cfs) and to the L8 canal through Culvert C10A (127 cfs). Water supply demands remain high in the EAA resulting in continued higher flows through S351, 352, and 354. Corrected evapotranspiration value based on the L006 weather platform solar radiation data for this past week was 1,300 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 47,544 acres of potentially suitable foraging habitat on the Lake for long-legged wading birds, and 11,301 acres of potentially suitable foraging habitat for short-legged wading birds (Figure 5). Despite improving foraging conditions, only six wading bird flocks totaling 1,026 birds were observed during the March 17 wading bird survey (Figure 6).

The most recent MODIS satellite images (March 10 and 16) indicate the absence of potential algal bloom conditions on the Lake. Colored pixels noted on the March 16 image reflect edge effects associated with cloud cover (Figure 7).

Water Management Recommendations

The winter/spring dry season recession has continued now for six weeks with a decrease of 0.21 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 1.1 feet per month (0.27 feet/week) to achieve a Lake stage of approximately 12.5 feet NGVD by the end of the dry season and to avoid additional reversals in Lake stage.

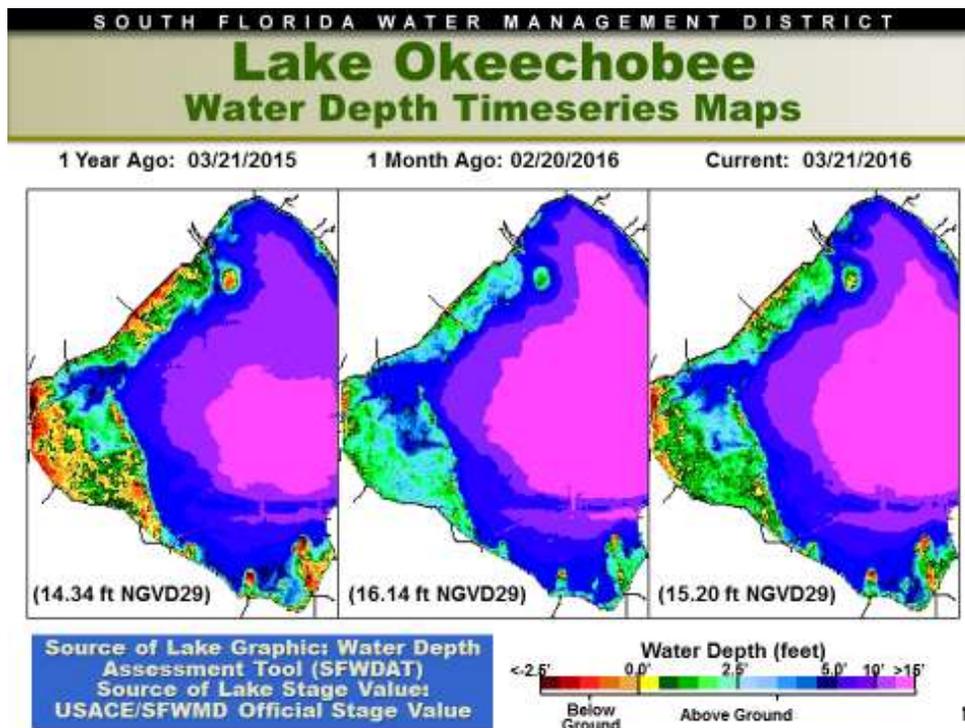


Figure 1

Lake Okeechobee Water Level History and Projected Stages

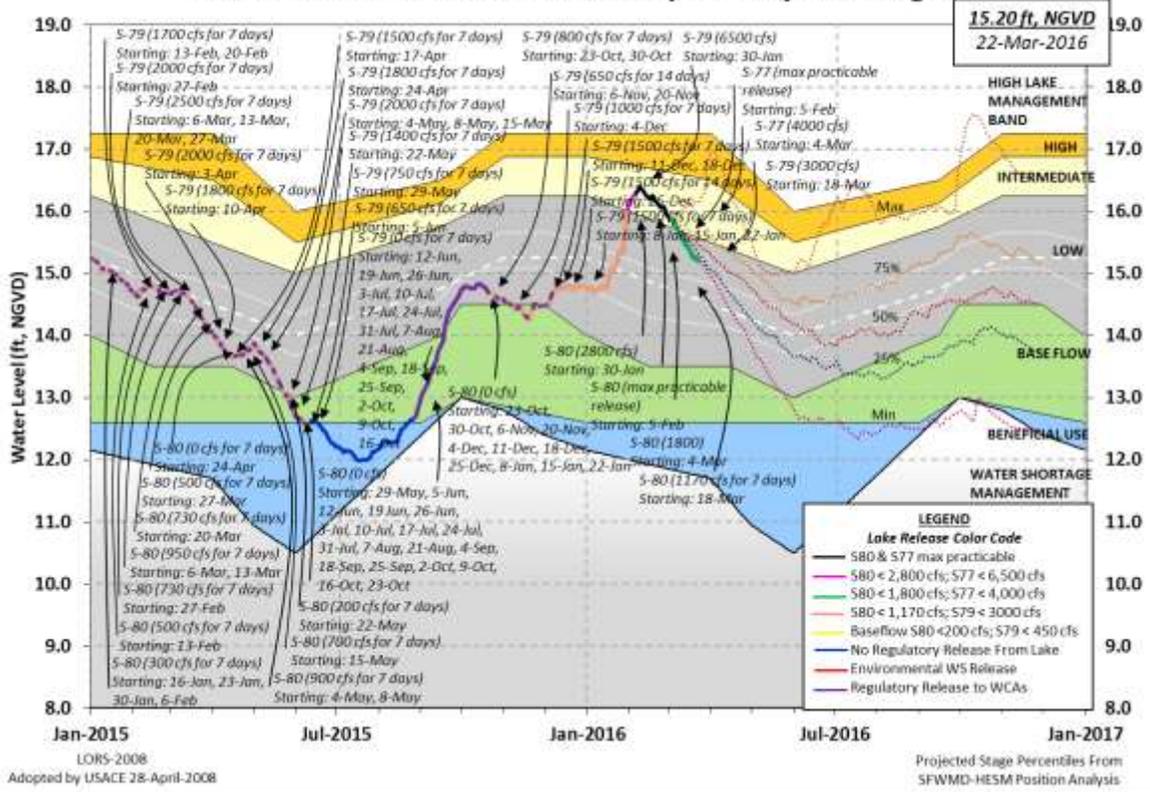
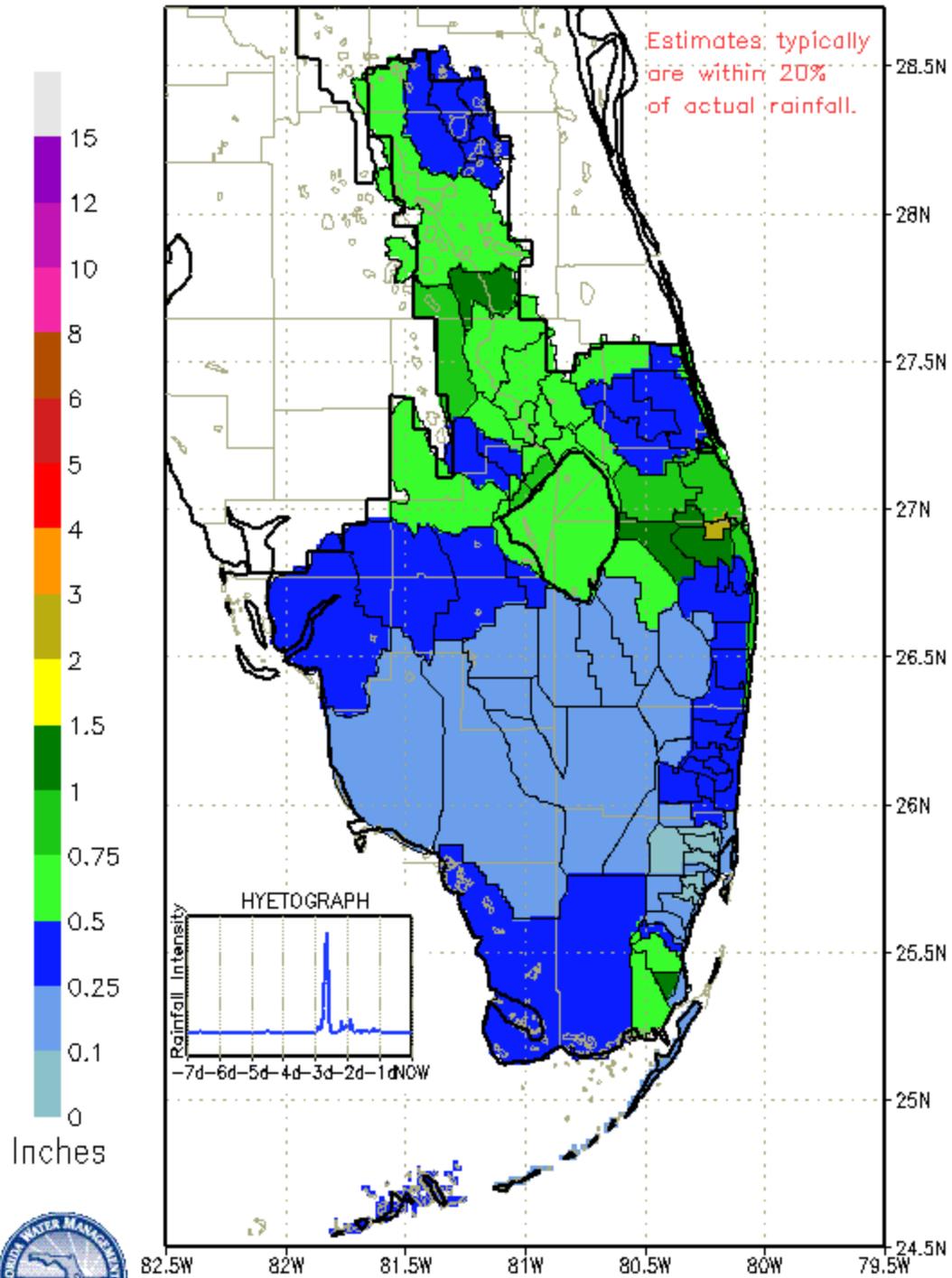


Figure 2

SFWMD PROVISIONAL RAINDAR 7-DAY BASIN RAINFALL ESTIMATES

FROM: 0515 EST, 03/15/2016 THROUGH: 0515 EST, 03/22/2016



DISTRICT-WIDE RAINFALL ESTIMATE: 0.416"



Figure 3

INFLOWS	Average Daily Flow Past Week cfs	Feet of Change Past Week
S65E	491	0.016
S71 & 72	58	0.002
S84 & 84X	648	0.021
Fisheating Creek	233	0.008
Rainfall	N.A.	0.054
OUTFLOWS	Average Daily Flow Past Week cfs	Feet of Change Past Week
S77	3011	0.098
S308	1107	0.036
S351	945	0.031
S352	174	0.006
S354	507	0.017
L8	135	0.004
ET	1300	0.039

Figure 4

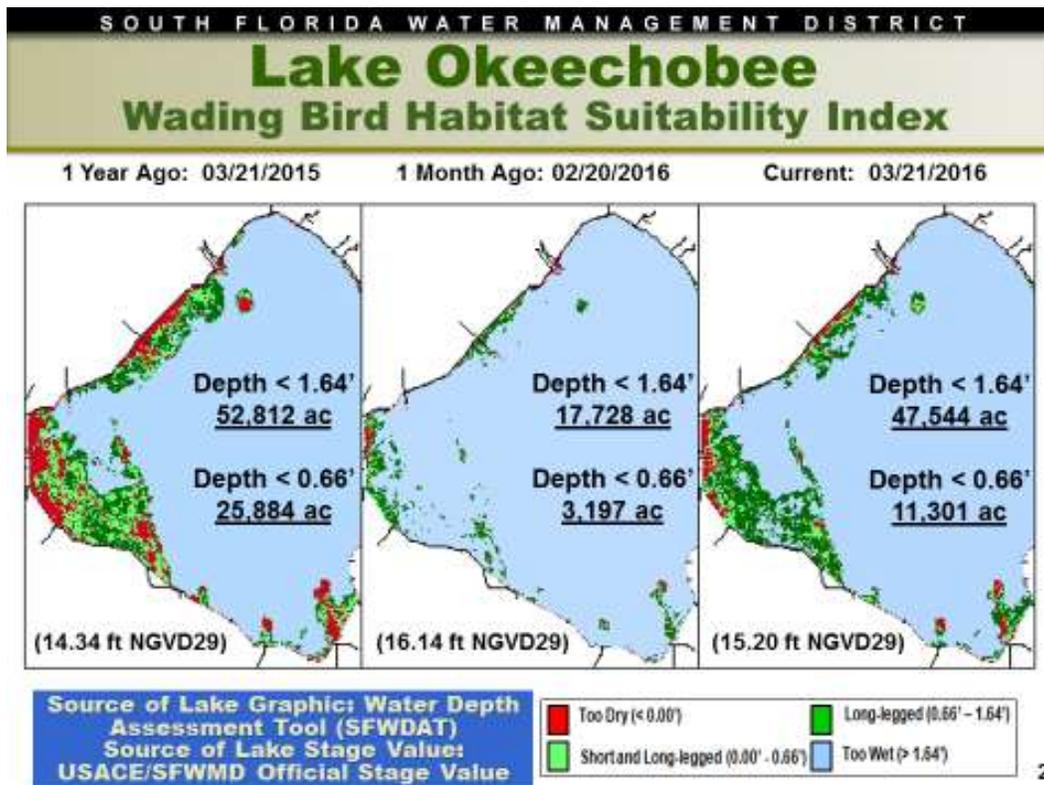


Figure 5

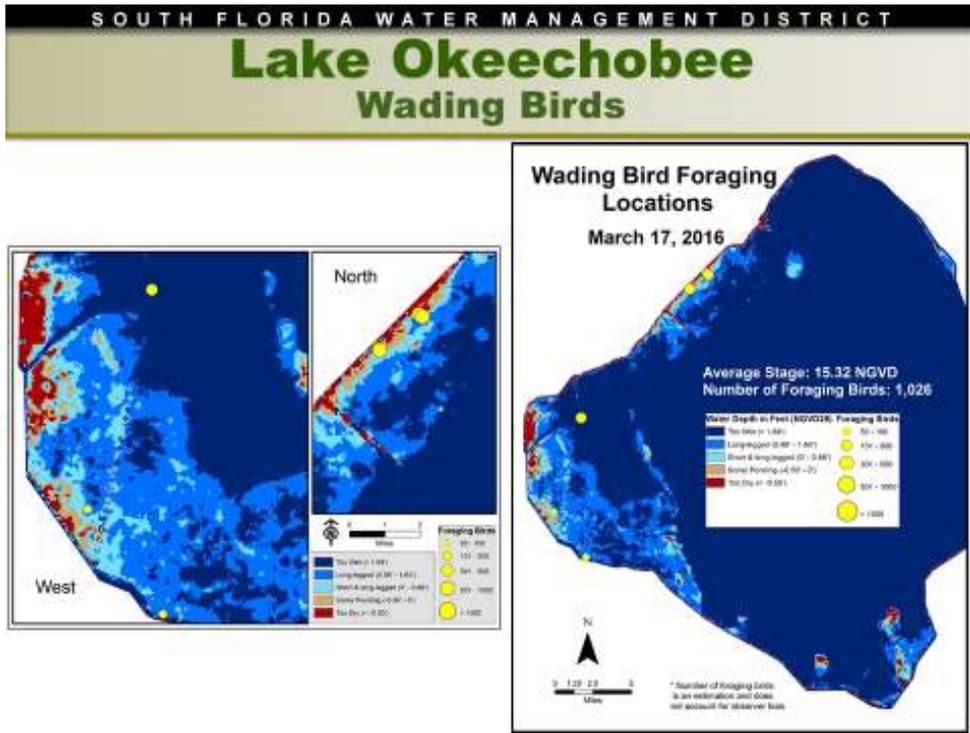


Figure 6

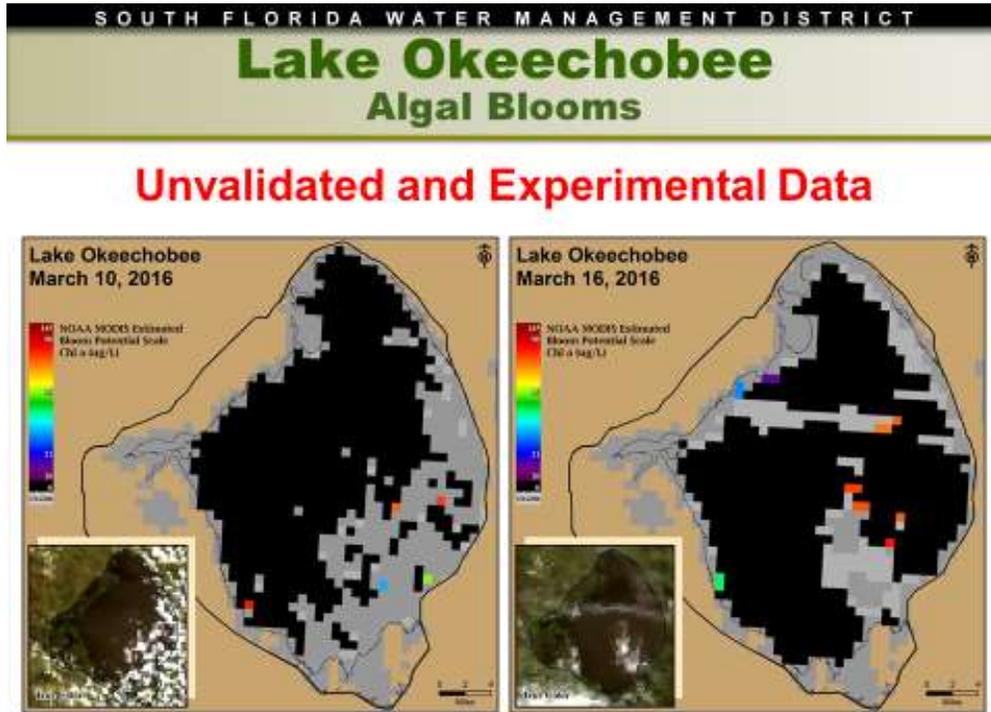


Figure 7

Lake Istokpoga

Lake Istokpoga stage is 39.21 feet NGVD today and is currently 0.29 feet below its regulation schedule of 39.50 feet NGVD, which remains at peak high pool (Figure 8). Average flows into the Lake from Arbuckle and Josephine creeks were 275 and 82 cfs respectively, a small decrease from the preceding week. Average discharge from S68 and S68X this past week was 736 cfs, a significant increase compared to the preceding week. According to RAINDAR, 0.87 inches of rain fell in the Lake Istokpoga watershed during the past seven days.

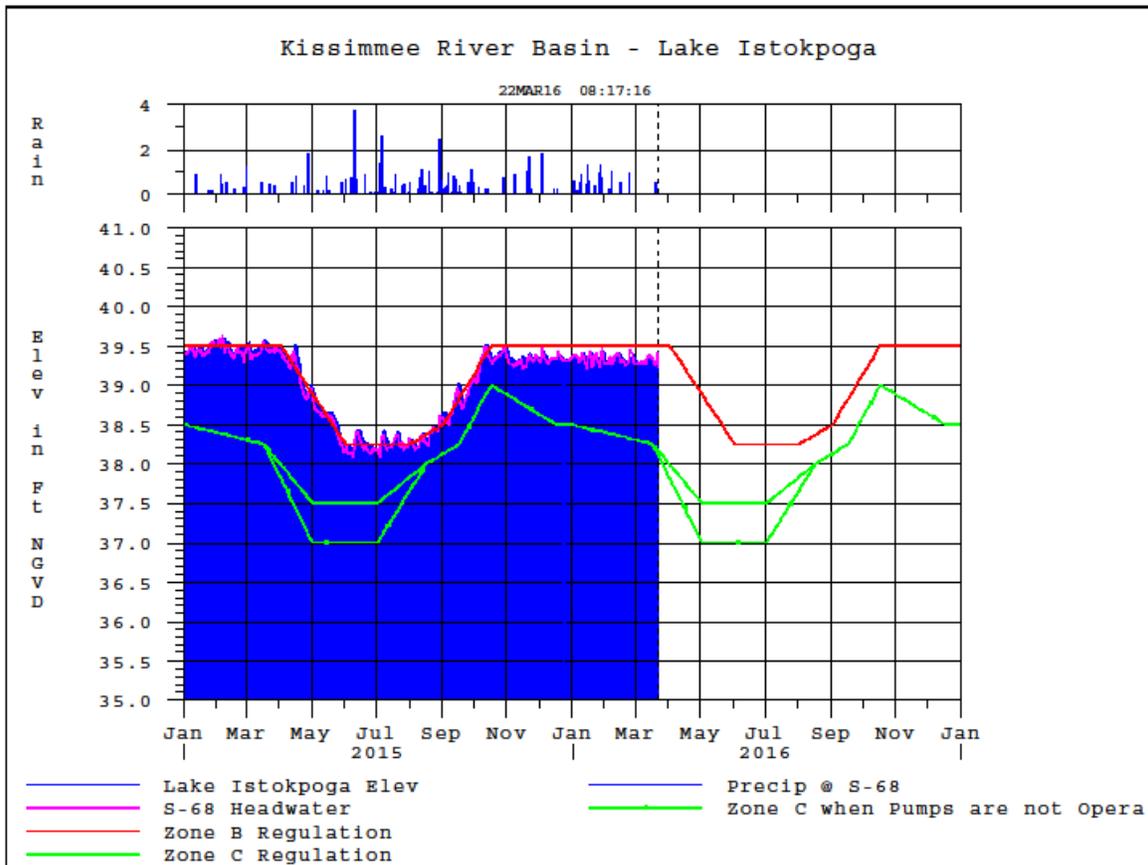


Figure 8

ESTUARIES

St. Lucie Estuary

Over the past week, provisional flows averaged 1,352 cfs at S-80, 1,107 cfs downstream of S-308, 20 cfs at S-49 on C-24, 38 cfs at S-97 on C-23, and 90 cfs from Ten Mile Creek at the Gordy Road Structure. Average inflow from tidal basin tributaries is estimated to be 188 cfs (Figures 1 and 2). Total inflow averaged about 1,688 cfs last week and 3,253 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 8.5. Salinity conditions in the middle estuary are in the fair range for the adult eastern oyster.

Table 1. Seven-day average salinity at three monitoring stations in the St. Lucie Estuary. Current average is in bold face type, previous average in parentheses. The envelope reflects the preferred salinity range for adult eastern oysters (*Crassostrea virginica*) in the middle estuary.

Sampling Site	Surface	Bottom	Envelope
HR1 (N. Fork)	2.7 (1.2)	6.7 (1.3)	NA ¹
US1 Bridge	6.1 (1.9)	10.9 (2.2)	10.0-26.0
A1A Bridge	13.6 (10.1)	24.1 (18.4)	NA

¹Envelope not applicable

Caloosahatchee Estuary

During the past week, provisional flows averaged approximately 2,869 cfs downstream of S-77, 2,578 cfs at S-78, and 3,355 cfs at S-79. Average inflow from tidal basin tributaries is estimated to be 205 cfs (Figures 5 and 6). Total inflow averaged 3,560 cfs last week and 5,468 cfs over last month.

Over the past week, salinity remained about fresh in the upper estuary from S-79 to Ft. Myers Yacht Basin, and decreased in the lower estuary from Cape Coral to Sanibel (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 at Sanibel (Figure 9). 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	1.9 (3.1)	3.1 (4.3)	10.0-30.0
Shell Point	15.0 (19.6)	18.3 (20.5)	10.0-30.0
Sanibel	25.7 (NR ³)	27.4 (NR)	10.0-30.0

¹Envelope not applicable, ²Envelope is based on a 30-day average, ³Not Reporting

*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)	4.4 – 5.25	1.9 – 6.5	2.8 – 9.0
Dissolved Oxygen (mg/l)	4.9 – 6.13	6.7 – 8.38	4.6 – 7.5

The Florida Fish and Wildlife Research Institute reported on March 18, 2016, that *Karenia brevis*, the Florida red tide organism, was not present in samples collected this week in Lee County.

Water Management Recommendations

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

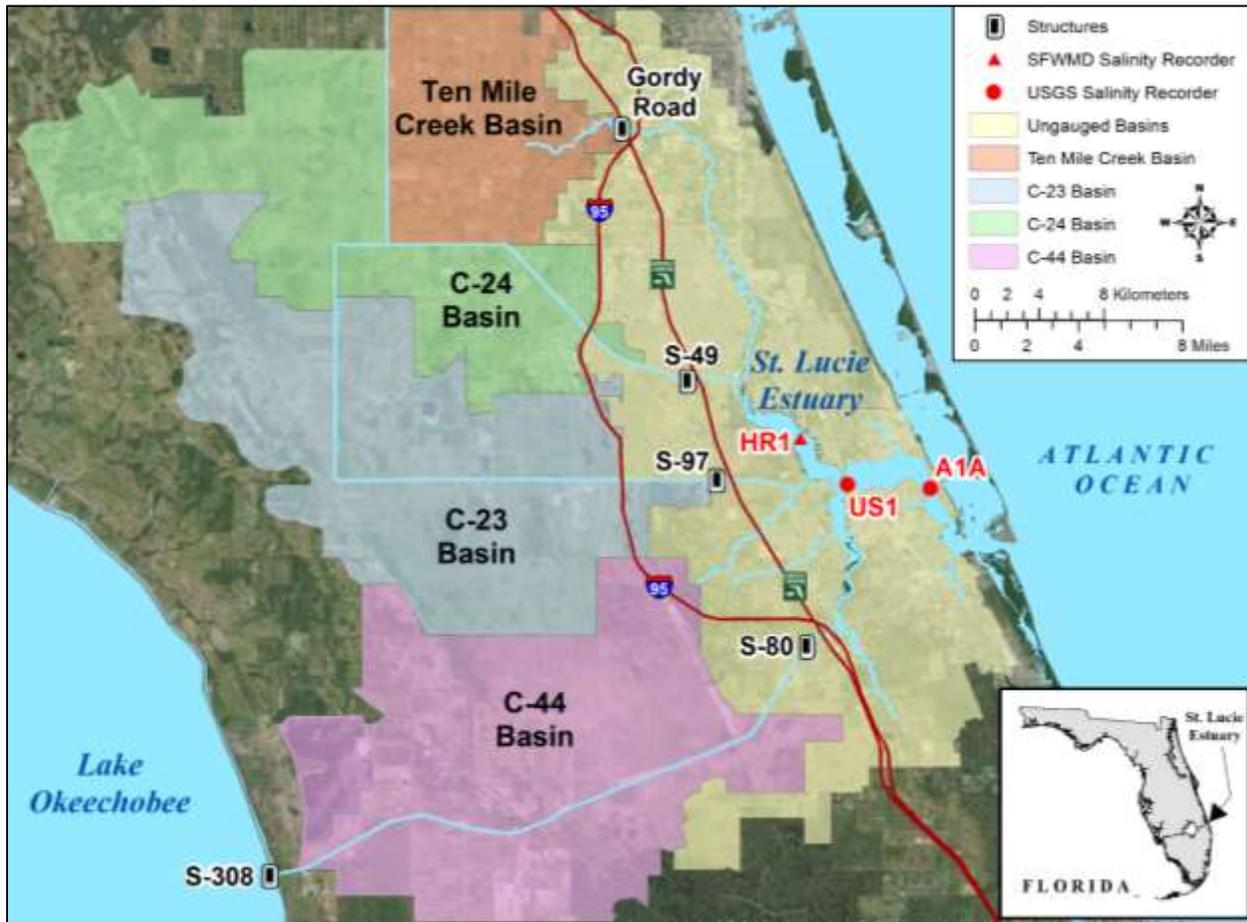


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

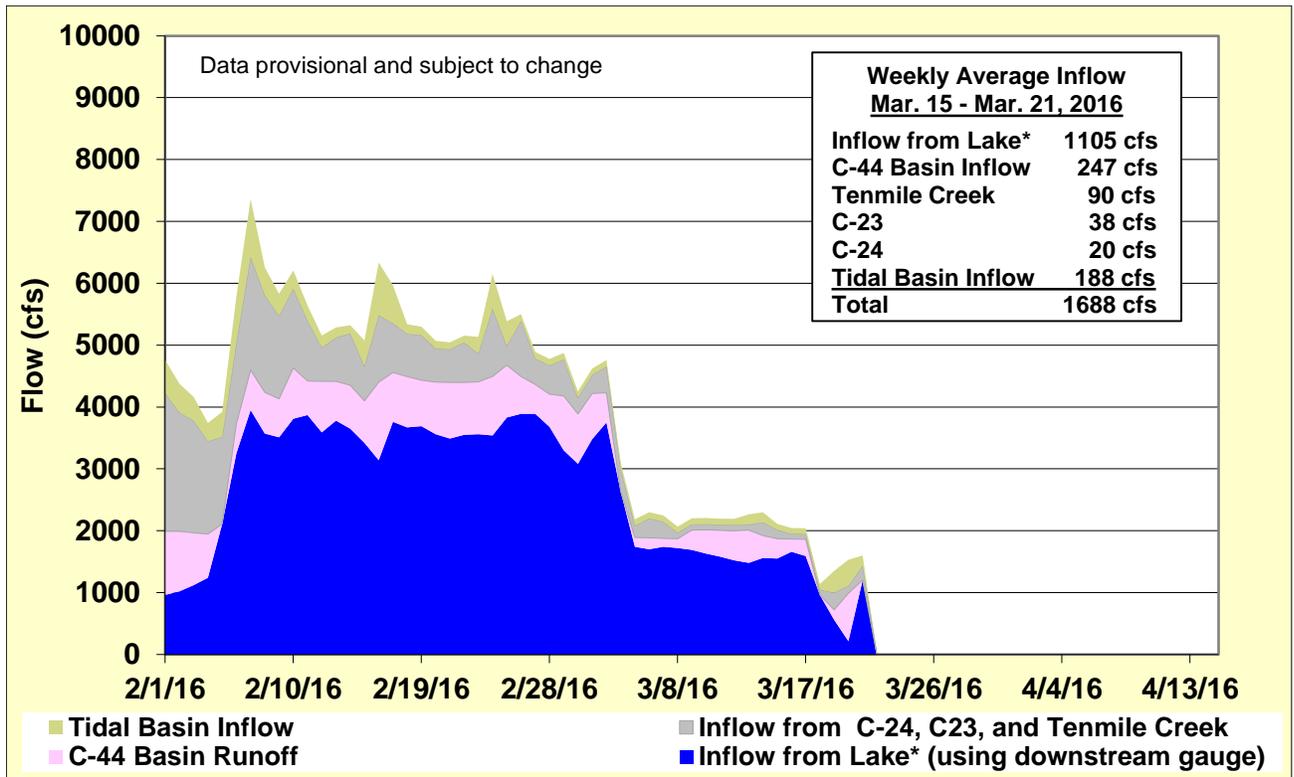


Figure 2. Estimated surface freshwater inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basins into the St. Lucie Estuary.

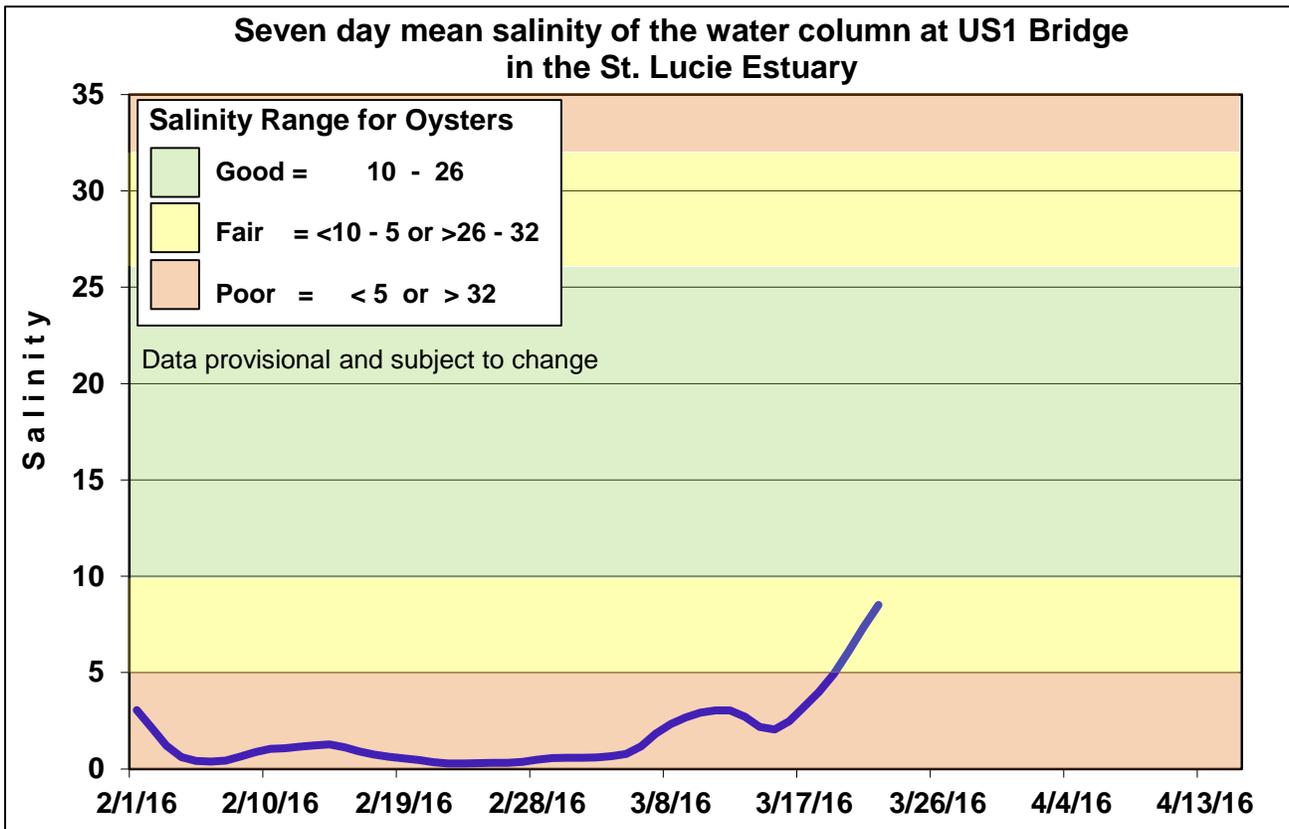


Figure 3. Seven-day mean salinity of the water column at the U.S. Highway 1 Bridge.

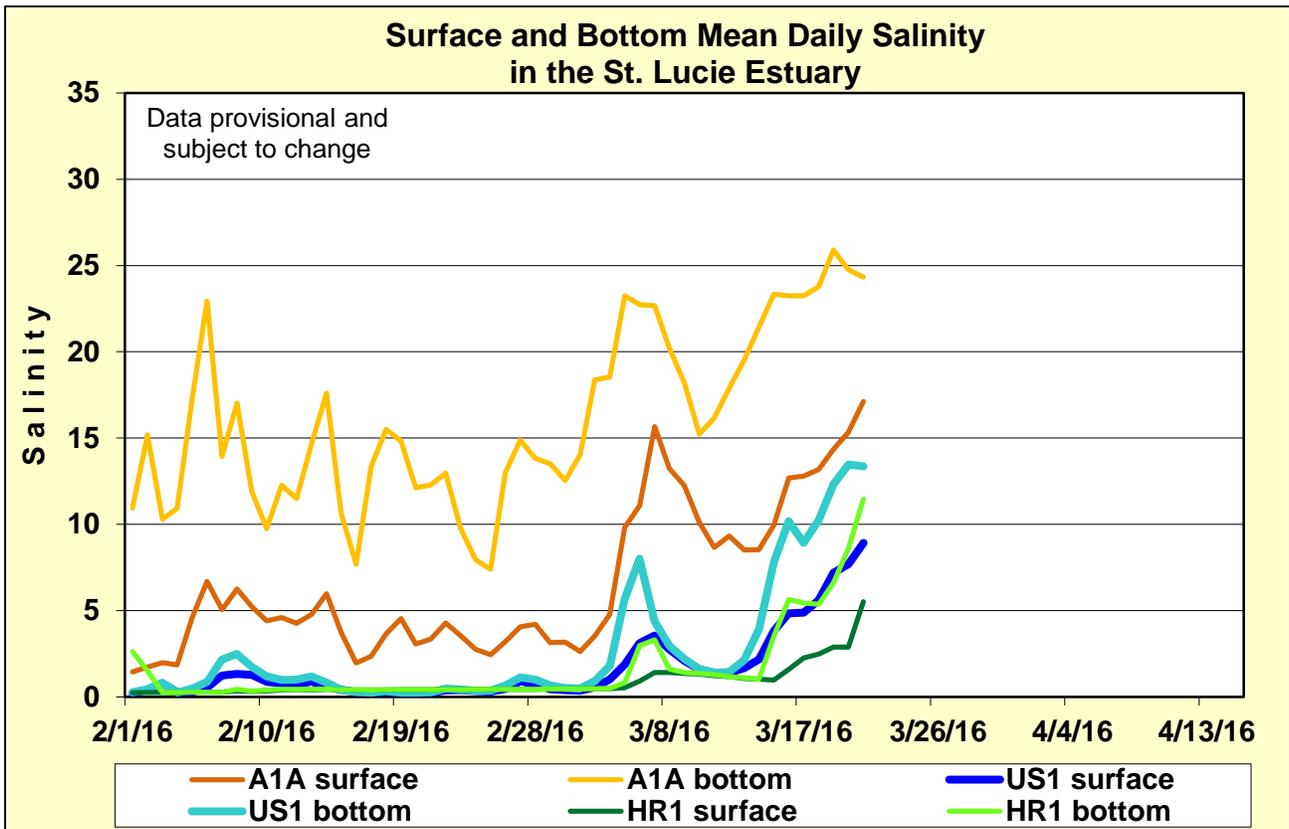


Figure 4. Daily mean salinity at the A1A, US1 and estimated HR1 stations.

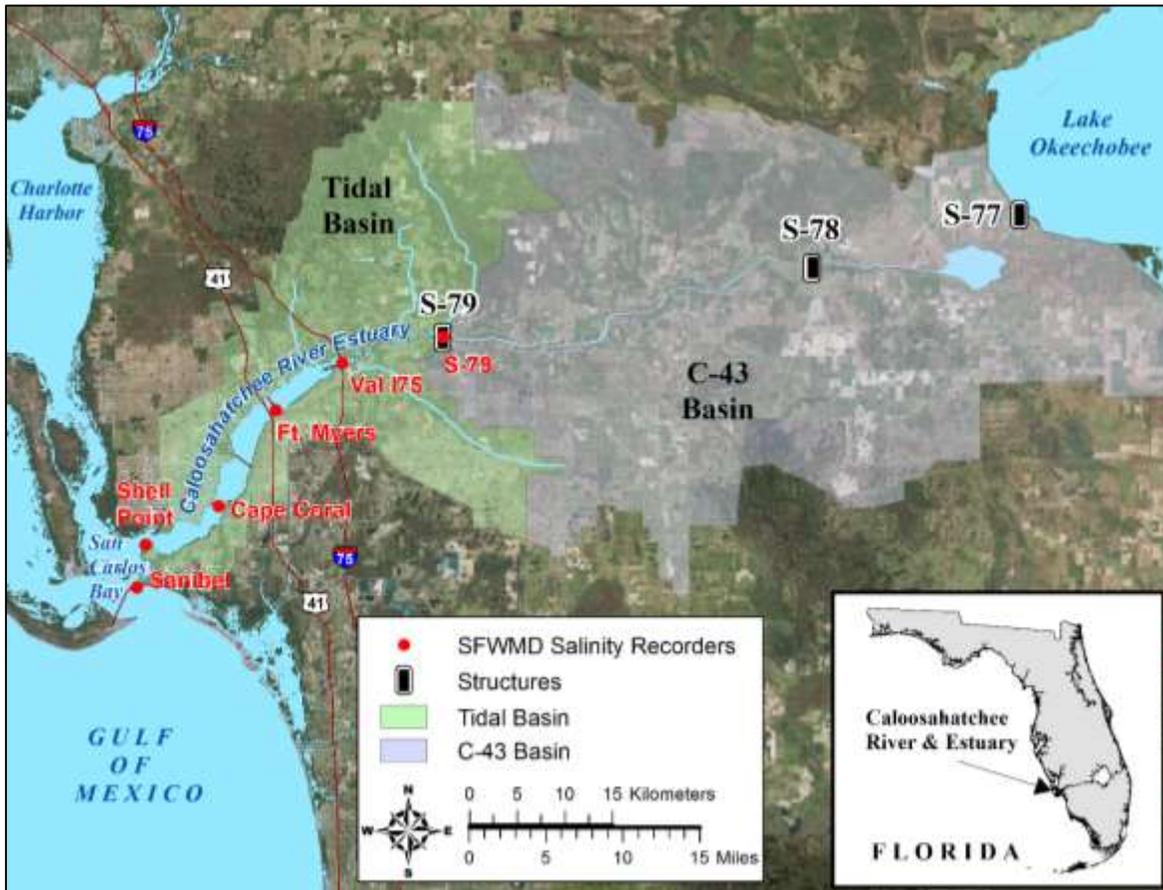


Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

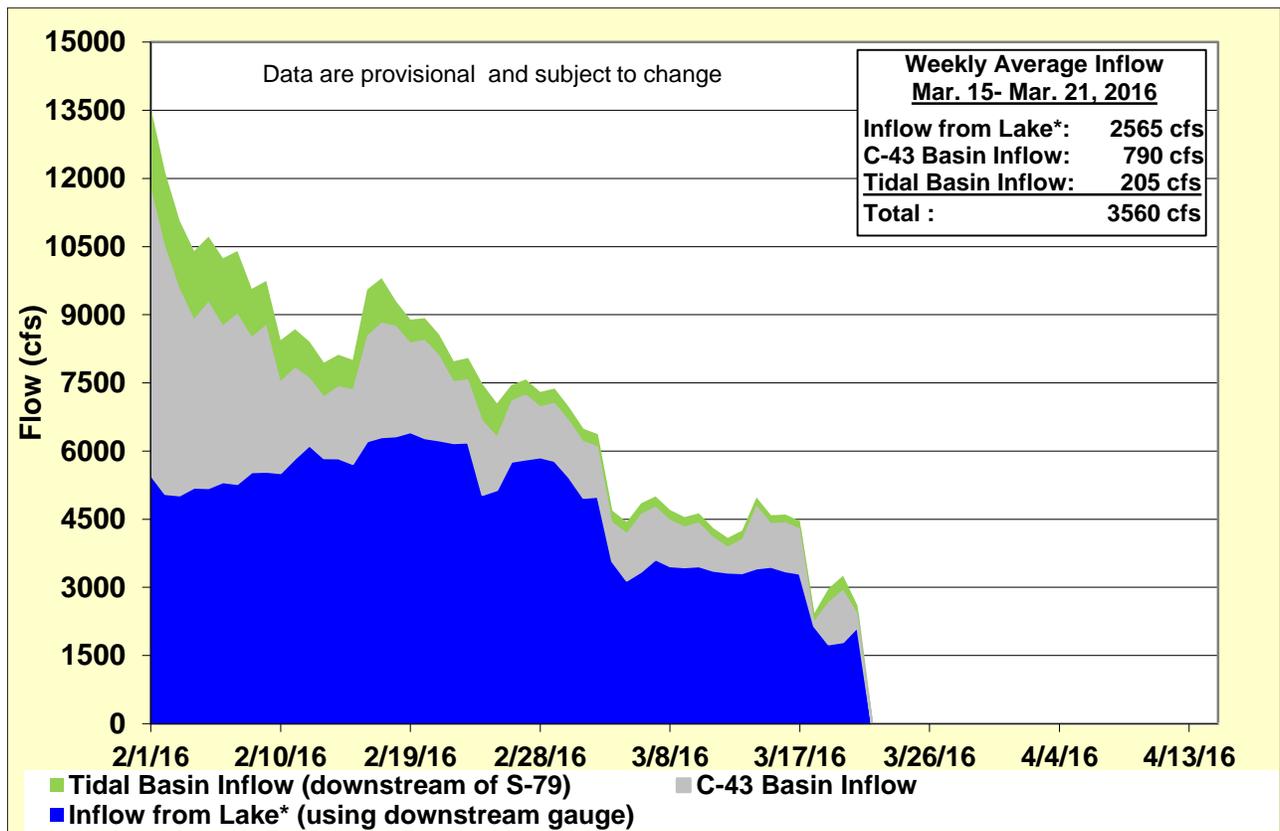
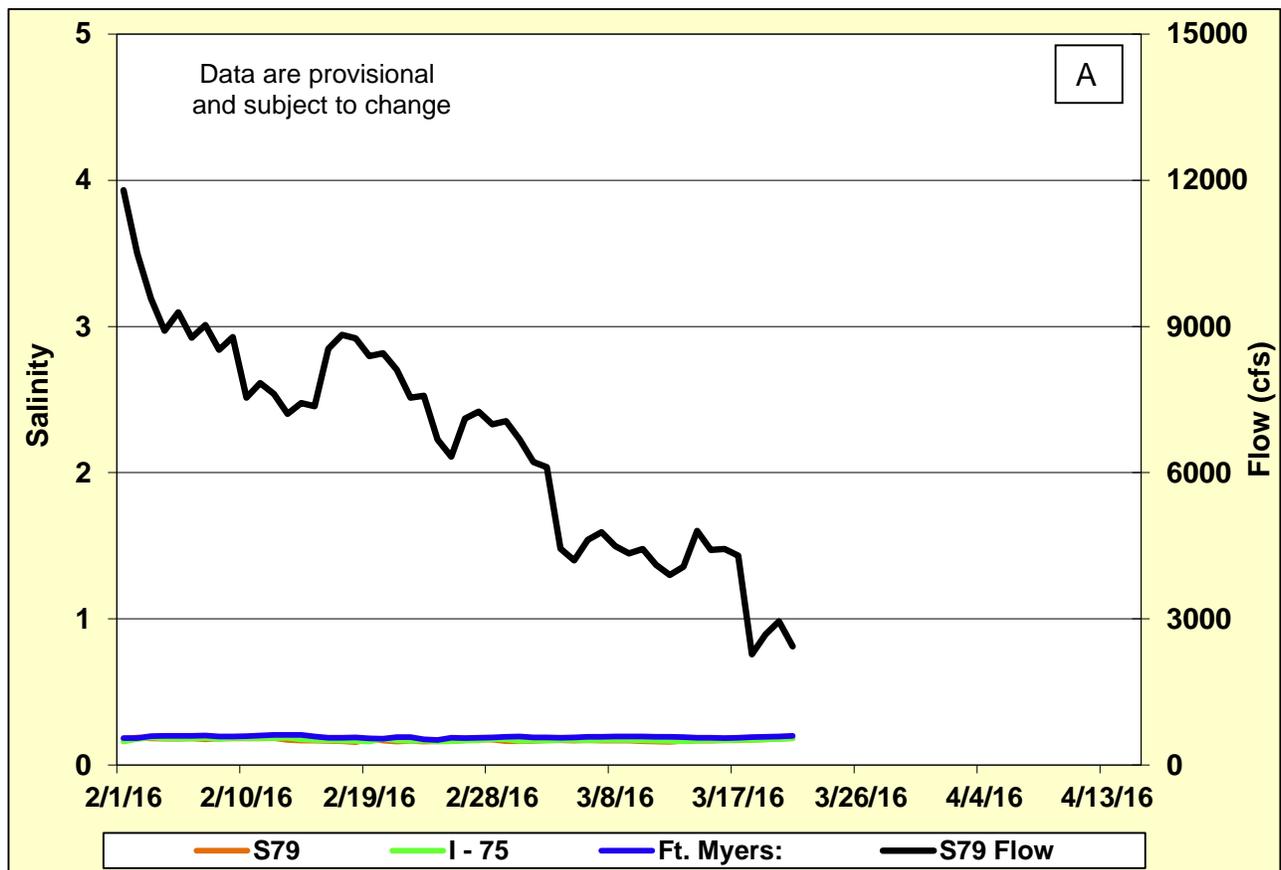


Figure 6. Freshwater inflows from Lake Okeechobee, runoff from the C-43 basin, and tributaries in the tidal basin into the Caloosahatchee River Estuary.



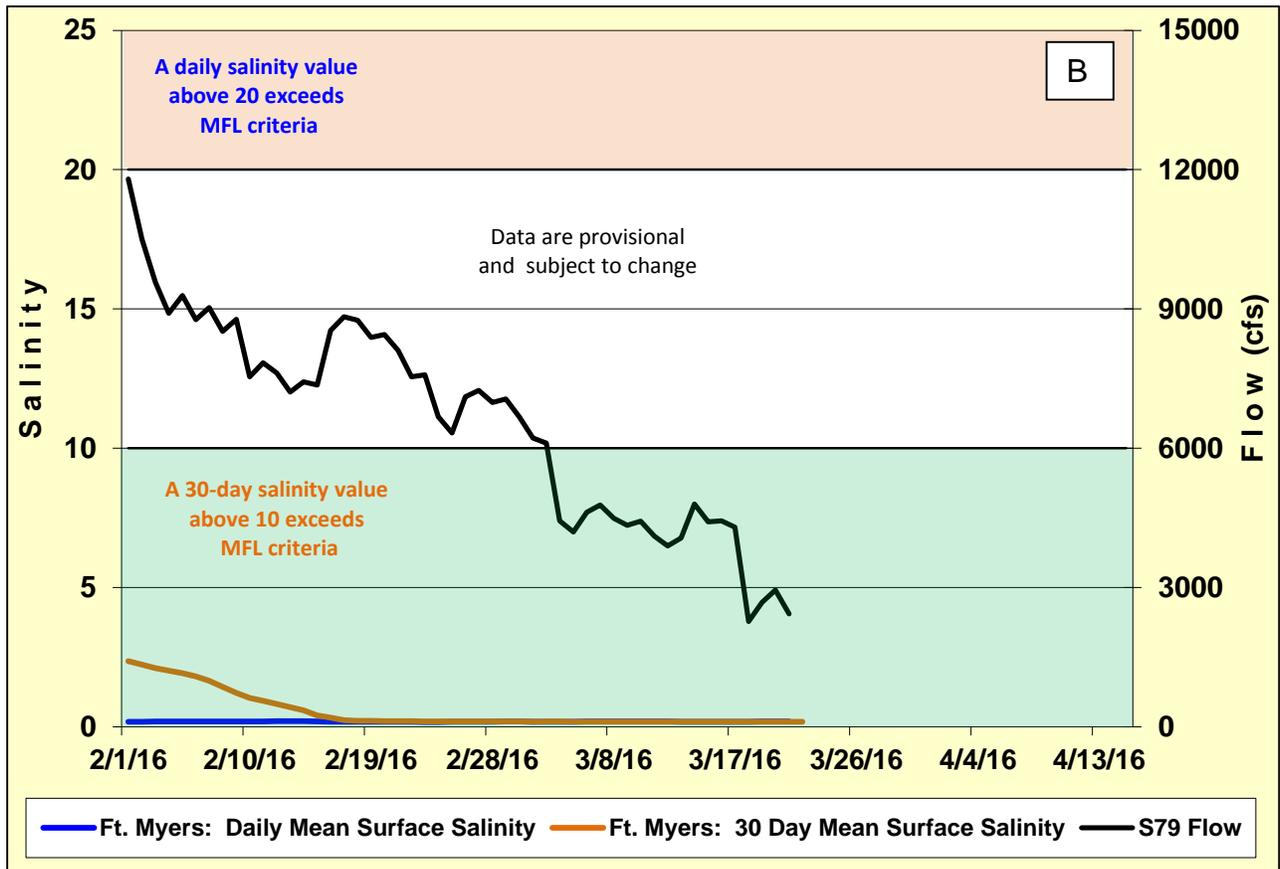


Figure 7. Daily mean flows at S-79 and salinity at upper estuary monitoring stations (A) and 30-day moving average salinity at Ft. Myers (B).

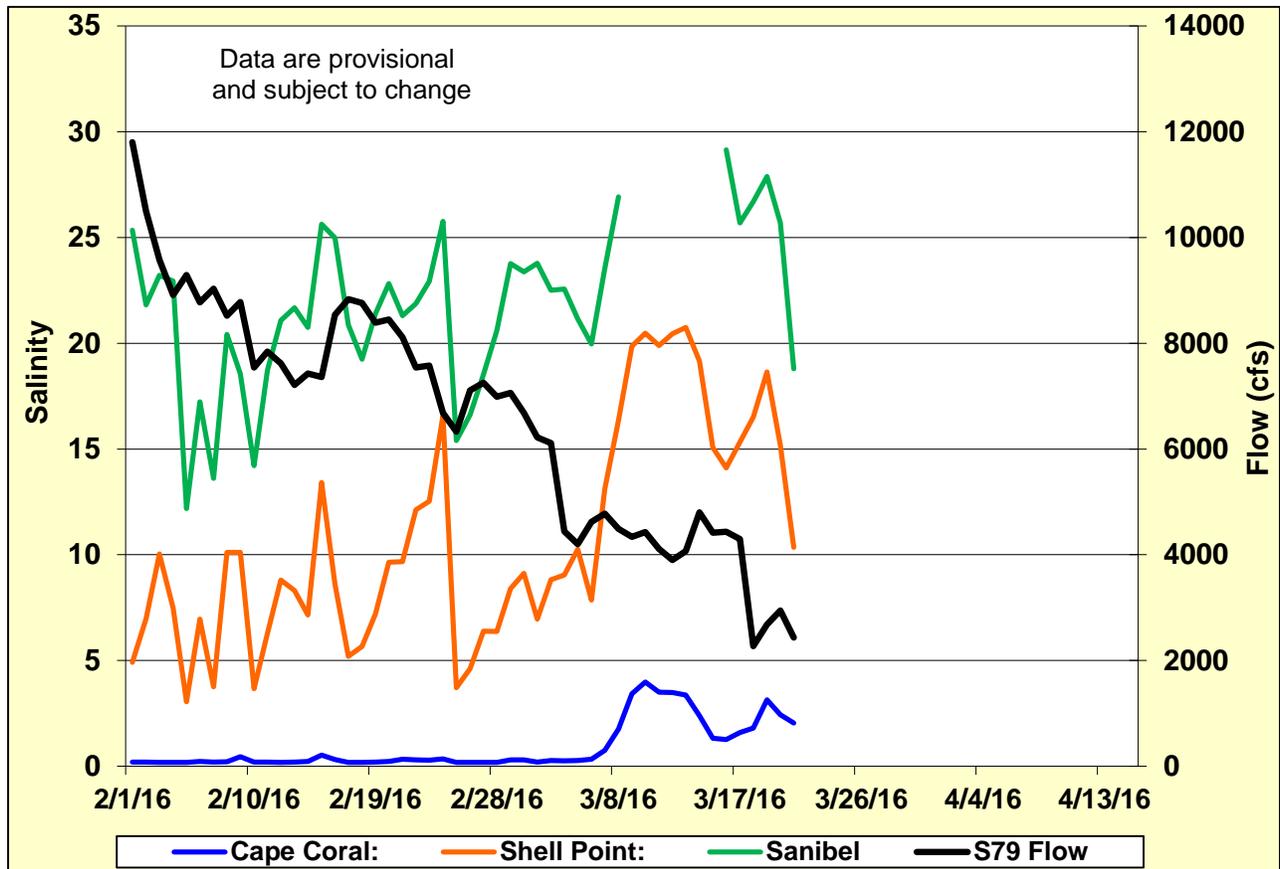


Figure 8. Daily mean flows at S-79 and salinity at lower estuary stations.

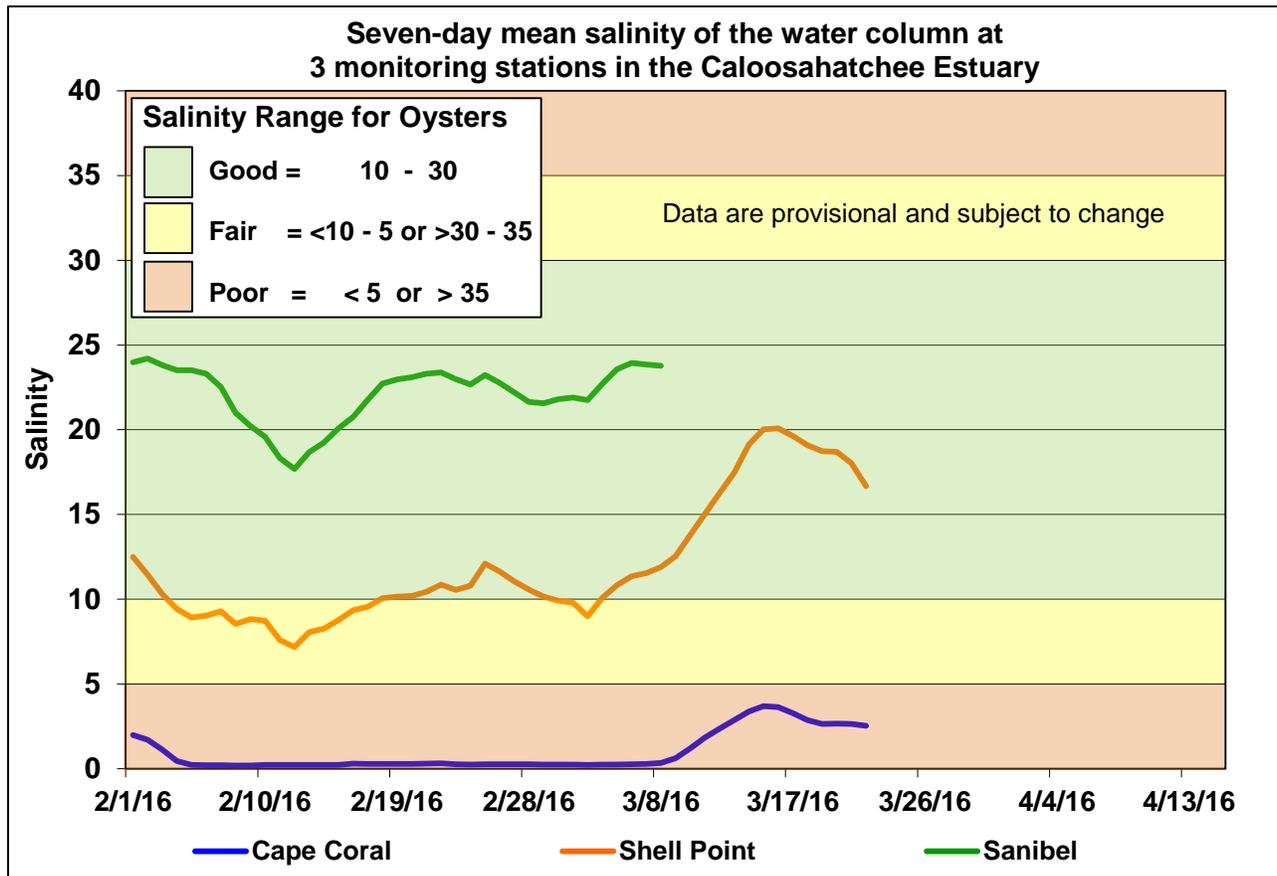


Figure 9. Seven-day mean salinity at Cape Coral Bridge, Shell Point and Sanibel Bridge monitoring stations.

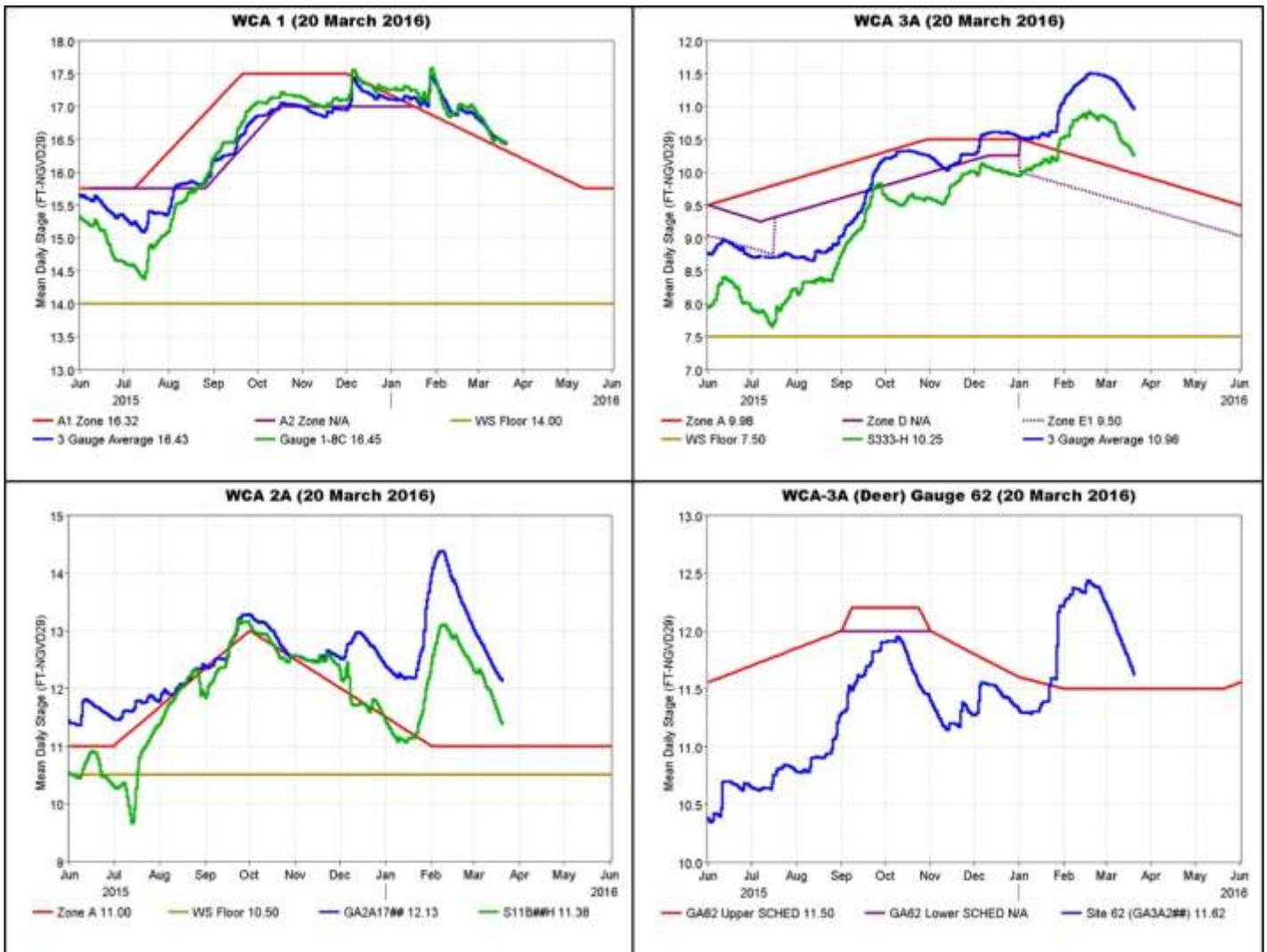
GREATER EVERGLADES

Last week's rainfall was higher than the previous week in the Everglades with a local maximum of 0.35 inches falling in Northeastern Everglades National Park (ENP). Over the week, stages declined in the WCAs -0.26 feet to -0.02 feet but stayed steady in northern ENP. Good recession rates occurred only in WCAs -1 and -3B. At 1.46 inches, pan evaporation was 7% above the pre-project average of 1.36 inches.

Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	0.17	-0.09
WCA-2A	0.12	-0.26
WCA-2B	0.18	-0.03
WCA-3A	0.11	-0.23
WCA-3B	0.10	-0.09
ENP	0.35	0.00

	Good
	Fair
	Poor

Regulation Schedules: Stages continued to decrease rapidly in the WCAs this week but most remain well above regulation. The WCA-1 stage decreased to only 0.11 feet above regulation, the WCA-2A stage is 1.13 feet above regulation, and the three-gauge average stage in WCA-3A is 0.98 feet above regulation. The northwestern WCA-3A gauge stage (gauge 62) has decreased to 0.12 feet above regulation.

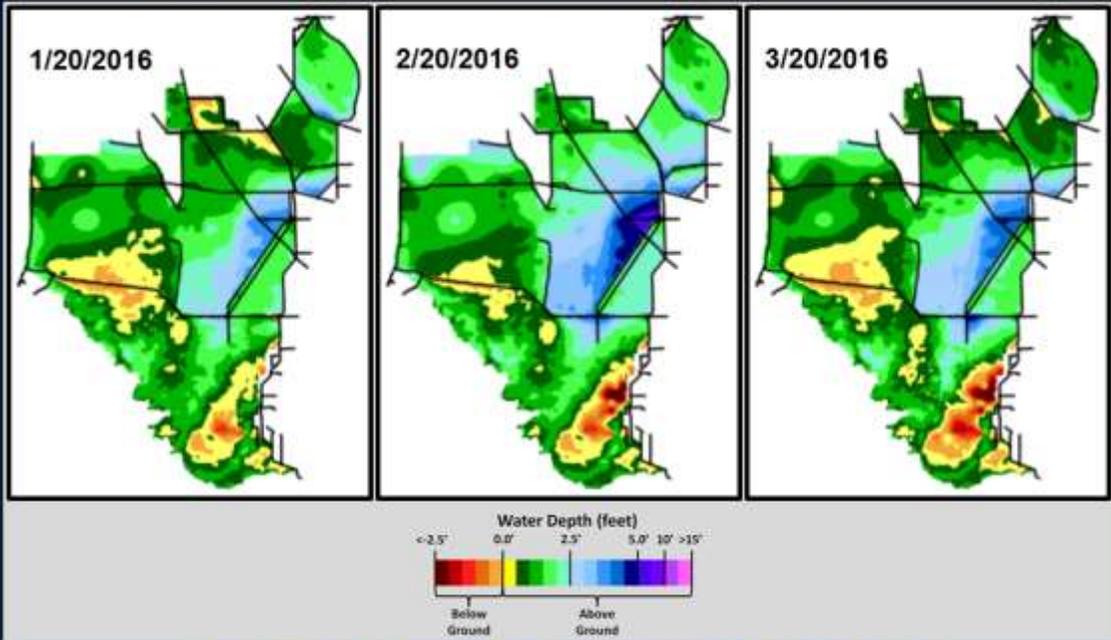


Water Depths and Changes: Water levels have decreased since February and are generally higher than in January with the exception of WCA-1. Water depths at the monitored gauges (except WCA-2B) range from 1.01 feet to 3.16 feet. Depths in southern WCA-3A have exceeded 2.5 feet, the depth of note for tree island inundation-duration, for 17 weeks (it is now 3.16 feet). At gauge 63, the depth has remained below 2.5 feet, but at gauge 64, water depth has exceeded 2.5 feet for eight weeks.

Stages are lower than a week ago in most areas. Stages at individual gauges decreased with a range of -0.26 feet to -0.02 feet in the WCAs and stayed the same in northern Shark Slough last week. Over the last month, stages have mostly dropped by 0.5 feet to 2.0 feet in the WCAs, and changes in ENP are mixed. Relative to a year ago, stages are much higher just about everywhere.



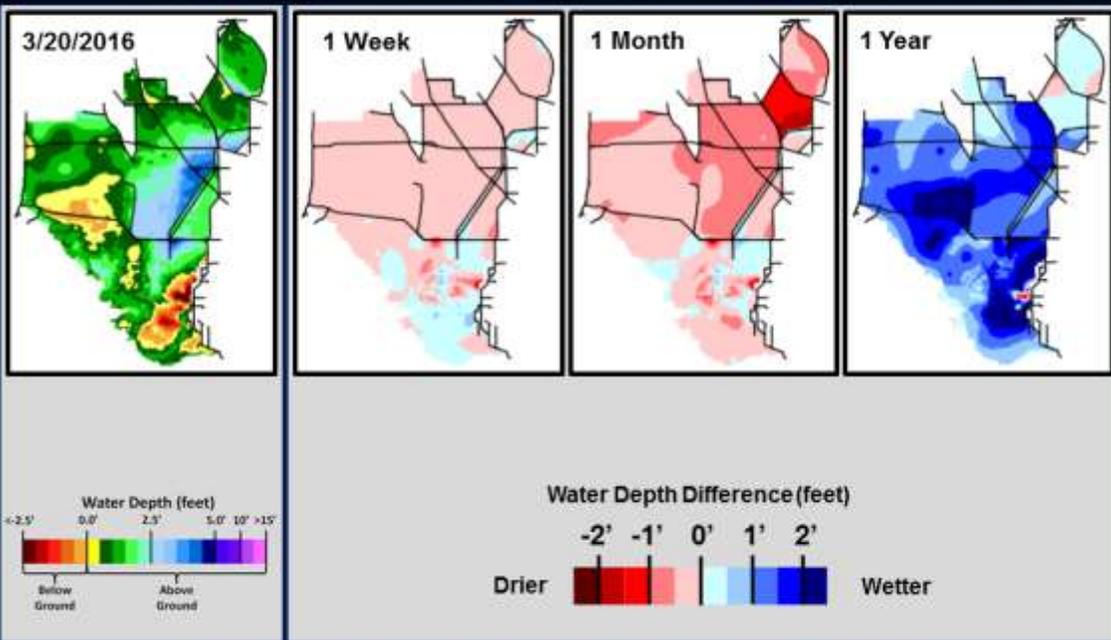
SFWDAT Water Depth Monthly Snapshots



South Florida Water Depth Assessment Tool (SFWDAT)

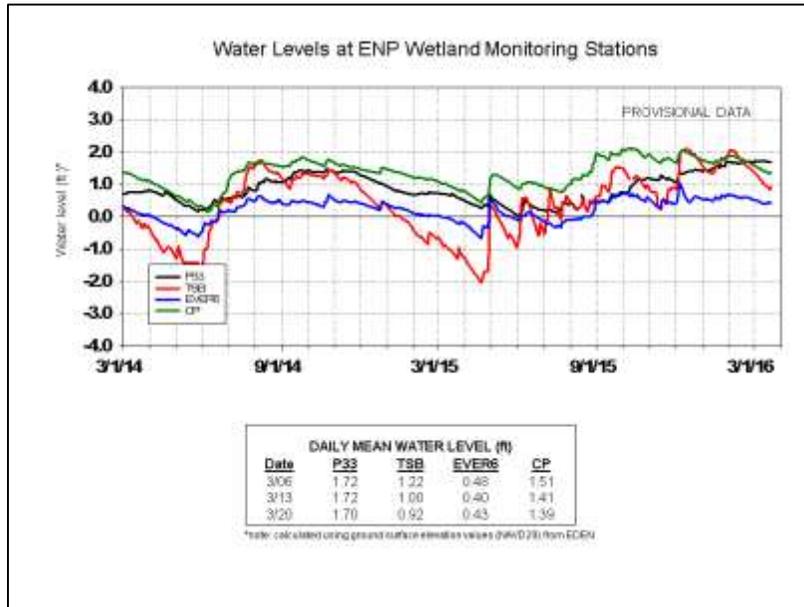


SFWDAT Everglades Difference Maps (Present - Past)



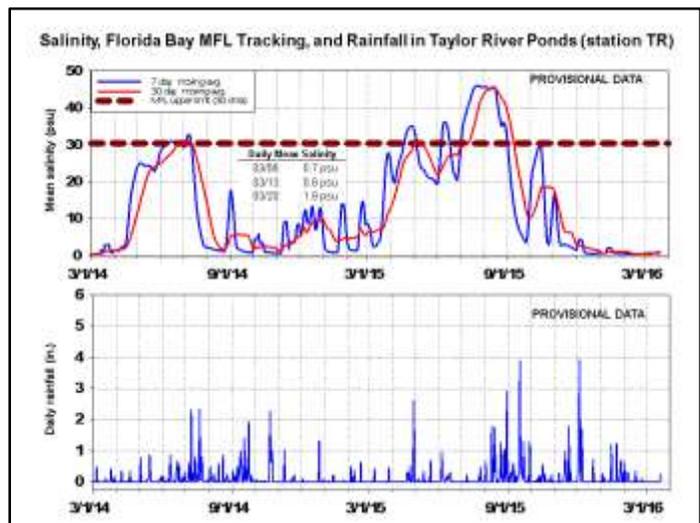
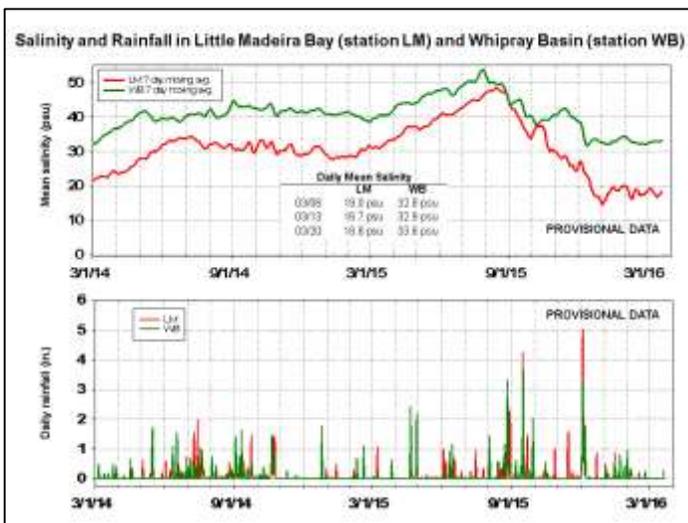
South Florida Water Depth Assessment Tool (SFWDAT)

Wading birds and wildlife: No new wildlife or wading bird information was available for this week. Water levels continue to be too high for wading bird foraging.



Salinities in Florida Bay remain average to -6 psu below average. Changes this past week were mixed but within 3 psu. The central and western areas of the bay are within 2 psu of their long-term averages with salinities that range from 28 to 36 psu. The eastern bay areas are 3 to 6 psu below their long-term averages with salinities that range from 18 to 26 psu. Upstream in the mangrove ecotone, the daily average salinity at the MFL sentinel site of TR rose 1.1 to 1.9 psu, which is still below the seasonal average of 9 psu. The 30-day moving average salinity at TR rose to 0.8 while the typical 30-day moving average salinity for this time of year is about 6 psu.

The 365-day running sum of the cumulative flow from the five creeks feeding Florida Bay rose to 255,603 acre-feet this week, which is about 1,000 acre-feet higher than last week. This is still 99% of the average 365-day running sum for the five-creek flow over the period of WY1997-2014, which is 257,628 acre-feet (this number is not seasonal). The weekly (March 14 – March 20) cumulative flow from the five creeks was -4,952 acre-feet which is fairly typical for this time of year when flow is often negative. Creek flow is provisional data from the USGS and is highly variable.



Water Management Recommendations

- The average stage at gauges 62 and 63 in WCA-3A has fallen below 11.60 feet (currently 11.42 feet), but reversals should still be avoided.
- Water levels at gauge 65 have exceeded 2.5 feet, the depth monitored for tree island inundation and duration, for 17 weeks (now 3.16 feet deep). At gauge 63, the depth remains below 2.5 feet, but at gauge 64, water depth has exceeded 2.5 feet for eight weeks.
- Conditions are too wet, too deep, and too variable for wading birds. As conditions improve, recession rates through the end of May should be managed to support foraging.
- Additional water should not be released into WCA-3A, where most of the remaining tree islands are located, because of harm to tree islands, terrestrial wildlife, and wading bird foraging and nesting.

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

Everglades Ecological Recommendations, March 22, 2016 (red is new)				
Area	Current Condition	Cause(s)	Recommendation	Reasons
WCA-1	Stages changed -0.06' to -0.11'	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 changed - 0.26'	Rainfall, ET, management	Lower stages. Prevent repeated or ongoing reversals as much as possible.	Provide moderately fast recession rates to provide suitable depths for avian foraging and nesting.
WCA-2B	Stages changed -0.02' to -0.05'	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 -0.26'	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 moderately fast recession rates to provide suitable depths for avian 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 -0.22'	Rainfall, ET, management		
Central WCA-3A S	Stage changed -0.22'	Rainfall, ET, management	Prevent repeated or ongoing reversals. Lower the stages. Stages at gauge 65 have exceeded 2.5' since Nov. 23 (17 weeks, now 3.16'), and gauge 64 has now exceeded 2.5' for 8 weeks.	Provide moderately fast recession rates to provide suitable depths for avian foraging and nesting.
Southern WCA-3A S	Stage changed -0.21'	Rainfall, ET, management		
WCA-3B	Stages changed -0.03' to -0.18'	Rainfall, ET, management	Follow normal seasonal practices. Prevent repeated or ongoing reversals as much as possible.	Provide moderately fast recession rates to provide suitable depths for avian foraging and nesting.
ENP-SRS	Stage same as last week.	ET, rainfall, topography, management	Make discharges to the Park according to the ERTF 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 dry-down.	Rainfall, ET, management	Follow rainfall plan for releases. Adhere to ERTF closures for S12-A and B. Maximizing flows through S333, as possible, is recommended. Follow guidance in C-111 western spreader canal project operations manual.	Provide appropriate hydrological and habitat conditions for CSSS.
Taylor Slough	6-15 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 -6 psu below average	Rain, ET, inflows, wind	Move water southward as needed	Maintain lower salinity levels.