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MEMORANDUM

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

FROM: SFWMD Staff Environmental Advisory Team

DATE: May 30, 2017

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Weather Conditions and Forecast

Some showers/storms interior south this afternoon before activity shifts focus north of the Lake by evening. Morning balloon data and satellite imagery support a higher coverage of showers/storms today. On the negative side, temperature lapse rates are not very impressive for late May; but, good heating should eventually overcome this deficiency. Similar story tomorrow before rains probably decrease Thursday/Friday as high pressure cinches in more strongly. Longer term...it looks wet next week.

Kissimmee

On Sunday, stage was 0.1 feet below regulation schedule in East Lake Toho and Lake Toho, and 0.9 feet below regulation schedule in Kissimmee-Cypress-Hatchineha. Over the past week, discharge at S65, S65A, and S65E averaged 190, 121, and 159 cfs, respectively. Tuesday morning discharges were ~191 cfs, 129 cfs, and 104 cfs, respectively at S65, S65A, and S65E. Dissolved oxygen data in the Kissimmee River averaged 7.9 mg/L for the week (manual sondes at PC33 and PC62). Kissimmee River mean floodplain depth on Sunday was 0.05 feet. No new recommendations.

Lake Okeechobee

As of midnight May 28, 2017, Lake stage was 11.05 feet NGVD, in the Beneficial Use sub-band and 0.54 feet above the Water Shortage Management Sub-band. Most of the Lake Okeechobee marsh is now dry and much of Moonshine Bay is approaching dryness as well. There are currently approximately 23,508 acres of suitable foraging habitat for long-legged birds and 9,412 acres for long and short-legged birds on the Lake. The most recent imagery from the OLCI sensor suggests the potential for bloom conditions may be intensifying in the north and western regions of Lake Okeechobee but the monthly chlorophyll concentrations from the May water quality sampling are not yet available for validation. For the remainder of the dry season, efforts should be made to limit the amount of water discharged from the Lake to keep the dwindling wading bird foraging and nesting locations hydrated. However, snail kites have started to migrate away from the Lake presumably due to lack of suitable foraging habitat.

Estuaries

Total discharge to the St. Lucie estuary averaged 252 cfs over the past week with 0 cfs (0%) coming from Lake Okeechobee as the USACE has stopped flow through the S-80 structure for the foreseeable future. Salinities were about the same compared to last week. The seven-day average salinity at the US1 Bridge remains in the fair range for adult oysters. Total inflow to the Caloosahatchee estuary averaged 609 cfs over the past week with 96 cfs (16%) coming from the Lake. The 30-day average surface salinity at the Ft. Myers monitoring station is 15.2 and has been above 10 for 63 consecutive days. The 30-day average surface salinity at Val I-75 is 6.9. Salinity conditions between Val I-75 and

Ft. Myers are deteriorating for tape grass. Salinity conditions are in the good range for adult oysters at the Cape Coral Bridge, in the fair range at Shellpoint, and in the poor range at the Sanibel Causeway. The 30-day moving average salinity at the I-75 Bridge is forecast to be 7.4 in the next two weeks if no flow comes through the S-79 structure, and the daily salinity is forecast to reach 8.5.

Stormwater Treatment Areas

Over the past week, the STAs/FEBs received approximately 2,800 acre-feet of Lake releases. The total amount of Lake releases sent to the STAs/FEBs in WY2018 (since May 1, 2017) is approximately 9,900 acre-feet. Most STA cells are at target depths, except STA-5/6 emergent aquatic vegetation cells which are drying out. Operational restrictions are in place for vegetation rehabilitation in STA-1E. Operational restrictions are in place for the STA-1W Expansion project construction in STA-1W. In addition, nests of MBTA-protected species have been observed in STA-1E and STA-5/6, and the nest of an Endangered Species Act protected species has been observed in STA-1E. This week, if Lake releases are sent to the WCAs and the conditions allow, releases will be sent to STA-2 and STA-3/4.

Everglades

Wildfires were active in Rotenberger, WCA-3N (+20,000 acres), WCA-3B and the Everglades National Park last week. While stage reversals had some negative regional effects on later nesting wading birds, overall nesting success is looking promising. In Florida Bay mangrove zone, daily average salinity increased to 36 psu. The 30-day moving average increased +1 to end the week at 30.4 psu. An exceedance of the Florida Bay MFL is denoted as >30 psu.

Supporting Information

KISSIMMEE BASIN

Kissimmee Basin Rainfall

The Upper Kissimmee Basin received 0.94 inches of rainfall in the past week and the Lower Basin received 1.07 inches (SFWMD Daily Rainfall Report 05/29/2017).

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: 5/30/2017

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)	Daily Departure (feet)						
							5/28/17	5/21/17	5/14/17	5/7/17	4/30/17	4/23/17	4/16/17
Lakes Hart and Mary Jane	S62	0	LKMJ	59.5	R	59.6	-0.1	-0.2	-0.3	-0.3	-0.3	-0.4	-0.4
Lakes Myrtle, Preston, and Joel	S57	0	S57	59.6	R	60.0	-0.4	-0.4	-0.3	-0.3	-0.3	-0.1	-0.1
Alligator Chain	S60	0	ALLI	61.8	R	62.1	-0.3	-0.4	-0.4	-0.5	-0.5	-0.5	-0.6
Lake Gentry	S63	16	LKGT	59.6	R	59.6	0.0	0.0	-0.1	-0.1	0.0	0.0	-0.1
East Lake Toho	S59	80	TOHOE	55.1	R	55.2	-0.1	-0.2	-0.3	-0.5	-0.7	-0.7	-0.9
Lake Toho	S61	0	TOHOW, S61	52.1	R	52.2	-0.1	-0.2	-0.3	-0.5	-0.6	-0.7	-0.8
Lakes Kissimmee, Cypress, and Hatchineha	S65	190	LKISSP, KUB011, LKIS5B	48.2	R	49.1	-0.9	-1.2	-1.2	-1.2	-1.3	-1.3	-1.3

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

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

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

DATA ARE PROVISIONAL

Lower Kissimmee Basin

Discharges and stages at Lower Basin structures are shown in Table 2. SFWDAT depth maps for the Phase I restoration area are shown in Figure 12. Kissimmee River floodplain stages at selected stations are shown in Figure 13.

Table 2. Mean weekly discharge at S-65x structures, and mean weekly Phase I area river channel dissolved oxygen and floodplain mean water depth. Discharge and stage data are provisional real-time data from SFWMD OASyS DualTrend; reported values are averages through midnight of the Sunday prior to the report date unless otherwise specified.

Report Date: 5/30/2017

Metric	Location	Sunday's 1-day average	Weekly Average**									
			5/28/17	5/21/17	5/14/17	5/7/17	4/30/17	4/23/17	4/16/17	4/9/17	4/2/17	3/26/17
Discharge (cfs)	S-65	200	190	237	234	258	283	330	344	292	361	626
Discharge (cfs)	S-65A	123	121	160	167	184	205	248	262	270	277	461
Discharge (cfs)	S-65D****	139	157	182	198	252	253	286	297	288	359	679
Discharge (cfs)	S-65E****	135	159	182	173	260	225	267	282	297	372	723
DO concentration (mg/L)***	Phase I river channel	8.6	7.9	7.7	8.0	7.4	7.9	7.8	8.1	7.7	7.8	8.9
Mean depth (feet)*	Phase I floodplain	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.06	0.07	0.11

* 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 manual sondes at PC62 and PC33; telemetry sondes have been taken offline.

**** S-65D discharge combines discharge at S-65D, S-65DX1, and S-65DX2; S65E discharge combines S65E and S65EX1.

DATA ARE PROVISIONAL; N/A indicates that data were not available.

Water Management Recommendations

Kissimmee Basin Adaptive Recommendations and Operational Actions

Date	Recommendation	Purpose	Outcome	Source
5/30/2017	No new recommendations.			
5/22/2017	No new recommendations.			
5/15/2017	Reduce discharge at S65/S65A by 40-50 cfs	Reduce rate of stage decline in KCH while maintaining discharge to the Kissimmee River.	Implemented	KB Ops
5/9/2017	No new recommendations.			
5/3/2017	Reduce discharge at S65/S65A by 50 cfs	Reduce rate of stage decline in KCH		SFWMD Water Management/KB Ops
4/25/2017	Reduce discharge at S65/S65A by 50 cfs	Reduce rate of stage decline in KCH	Implemented	SFWMD Water Management/KB Ops
4/17/2017	No new recommendations.			
4/11/2017	No new recommendations.			
3/30/2017	Reduce discharge at S-59 and S-61 so that stage in these lakes declines to respective low pools on May 31; reduce discharge at S-65 to 300 cfs	Reduce rate of stage decline in East Toho, Toho, and KCH.	Implemented	SFWMD Water Management/KB Ops
3/23/2017	Reduce S-65 discharge by 75 cfs per day through 3/25 for a target discharge of ~500 cfs.	Reduce rate of stage decline in KCH.	Implemented	SFWMD Water Management/KB Ops
3/16/2017	Reduce S-65 and S-65A discharge by 150 cfs.	Reduce rate of stage decline in KCH.	Implemented	SFWMD Water Management/KB Ops
3/14/2017	No new recommendations.		N/A	
3/7/2017	No new recommendations.		N/A	
2/22/2017	Increase discharge at S65 to establish and maintain a stage recession on KCH to reach low pool (49 ft) by May 1, as possible subject to rainfall and construction needs. Maintain 49 ft or lower for the month of May as possible.	Wet season storage, aquatic plant management.		KB Operations
2/21/2017	No new recommendations.		N/A	
2/14/2017	Increase S65 and S65A discharge by 200 cfs.	Allow stage to decline in KCH.	Implemented	SFWMD Water Management/KB Ops
2/7/2017	No new recommendations.		N/A	
1/25/2017	Make releases from East Lake Tohopekaliga and Lake Tohopekaliga to achieve a recession rate of 0.2 feet per week. Releases will not be made to compensate for direct rain on the lakes, but adjustments may be made for changes in inflow to maintain the 0.2 feet per week recession rate to the extent available capacity in Lake Kissimmee allows.	To prepare for the 2017 wet season, facilitate the ongoing Kissimmee River Restoration Construction (backfilling of the C-38), and provide more desirable recession rates for East Lake Tohopekaliga and Lake Tohopekaliga, the SFWMD will follow the below guiding criteria to the extent it does not conflict with other water related needs (e.g. Kissimmee River Flows, Kissimmee River Restoration Construction, and flood control).	Implemented	SFWMD Water Management Section/KB Ops
1/24/2017	No new recommendations.		N/A	
1/17/2017	No new recommendations.		N/A	
1/10/2017	No new recommendations.		N/A	

KCOL Hydrographs (through Sunday midnight)

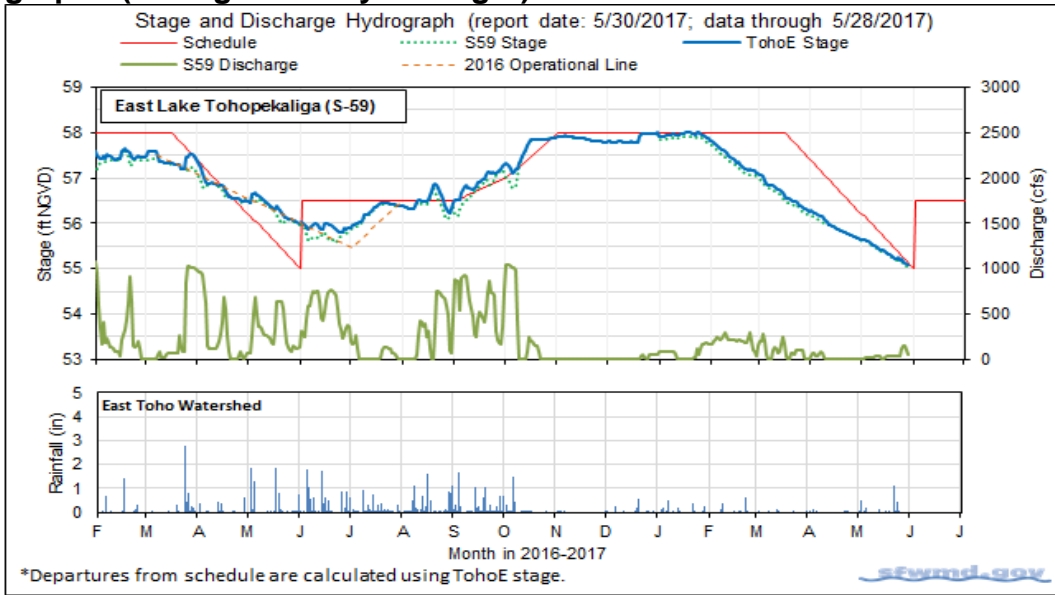


Figure 1.

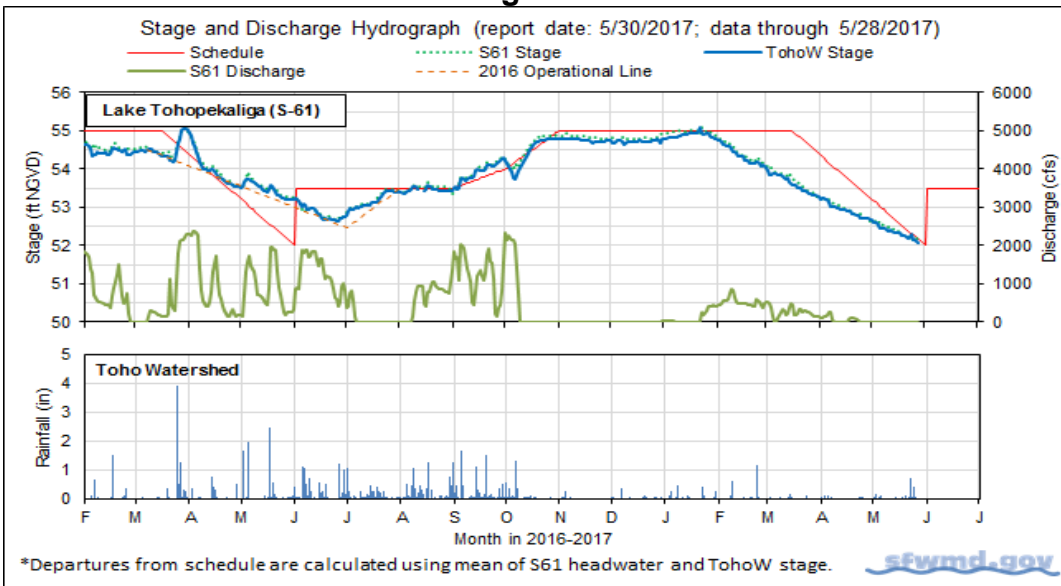


Figure 2.

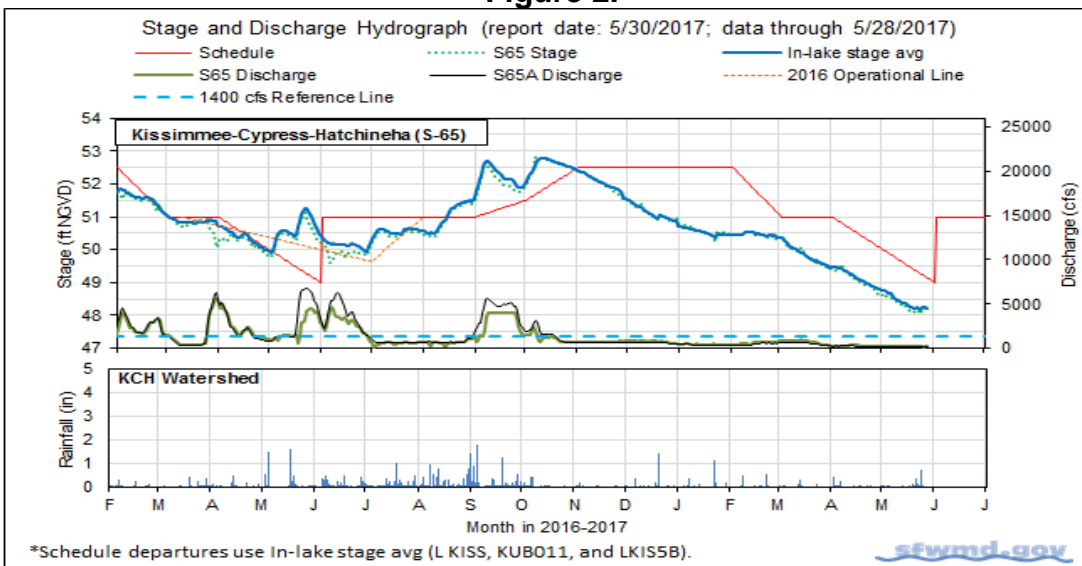


Figure 3.

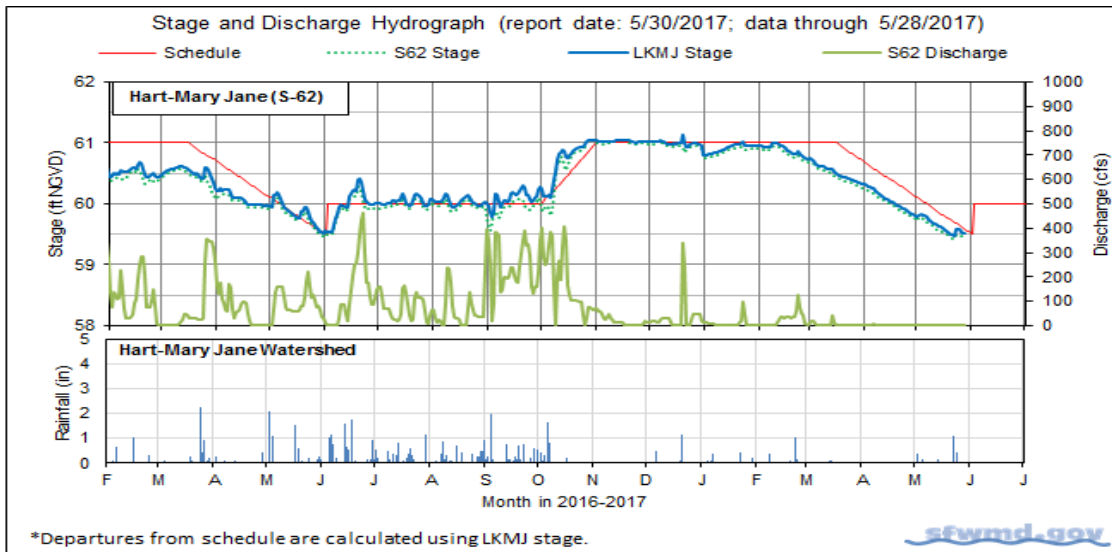


Figure 4.

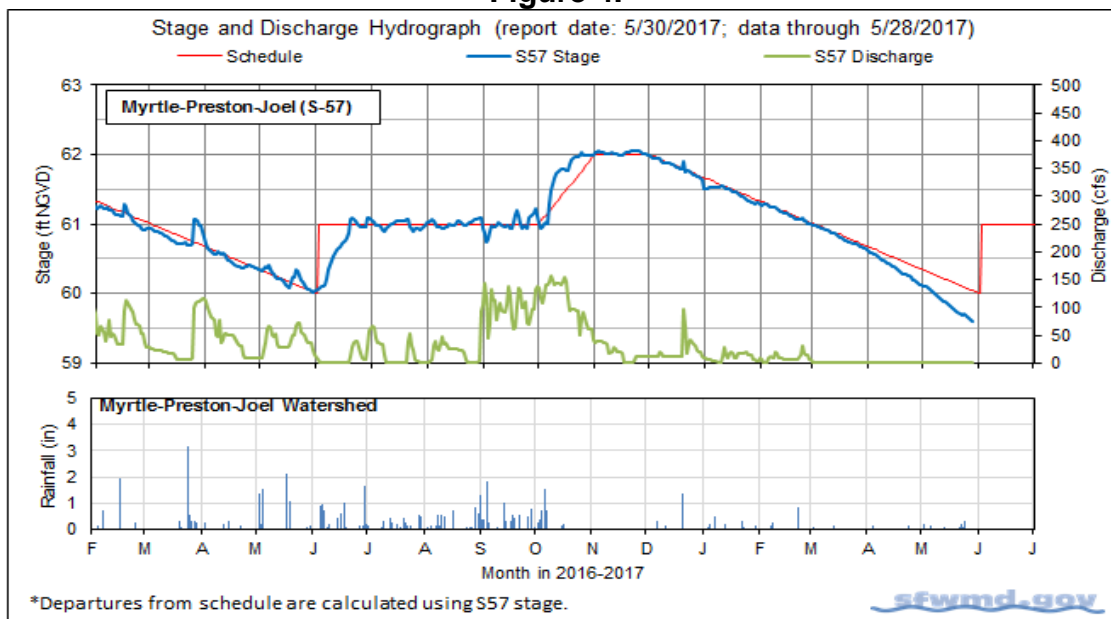


Figure 5.

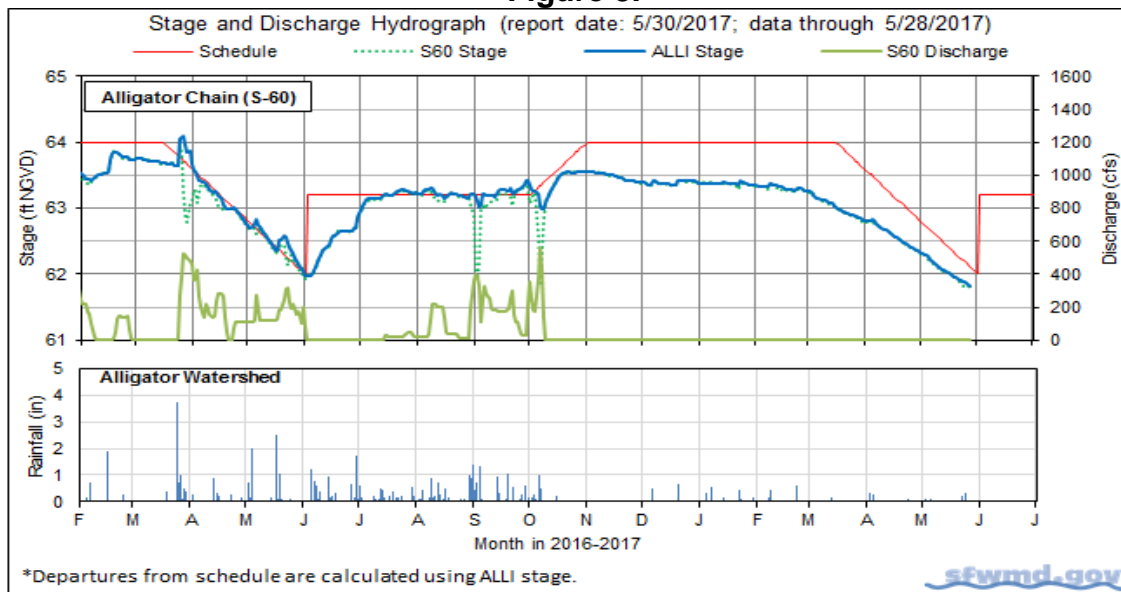


Figure 6.

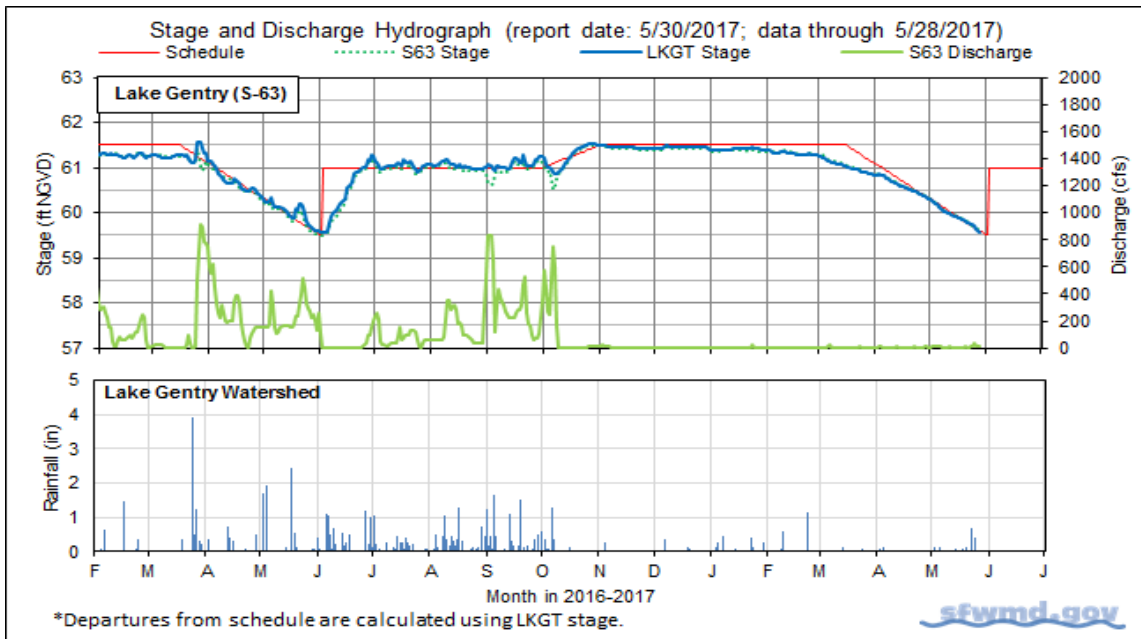


Figure 7.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

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

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

15

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

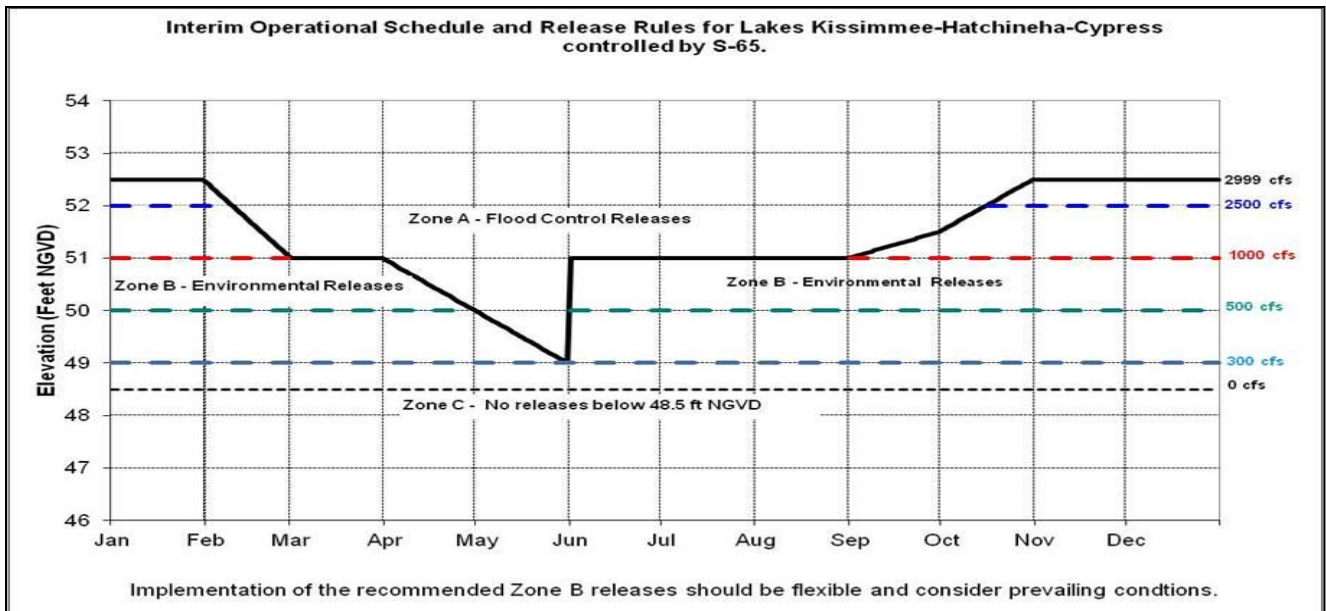


Figure 9. Interim operations schedule for S-65. The discharge schedule shown to the right has not been used in recent years or in Wet Season 2015.

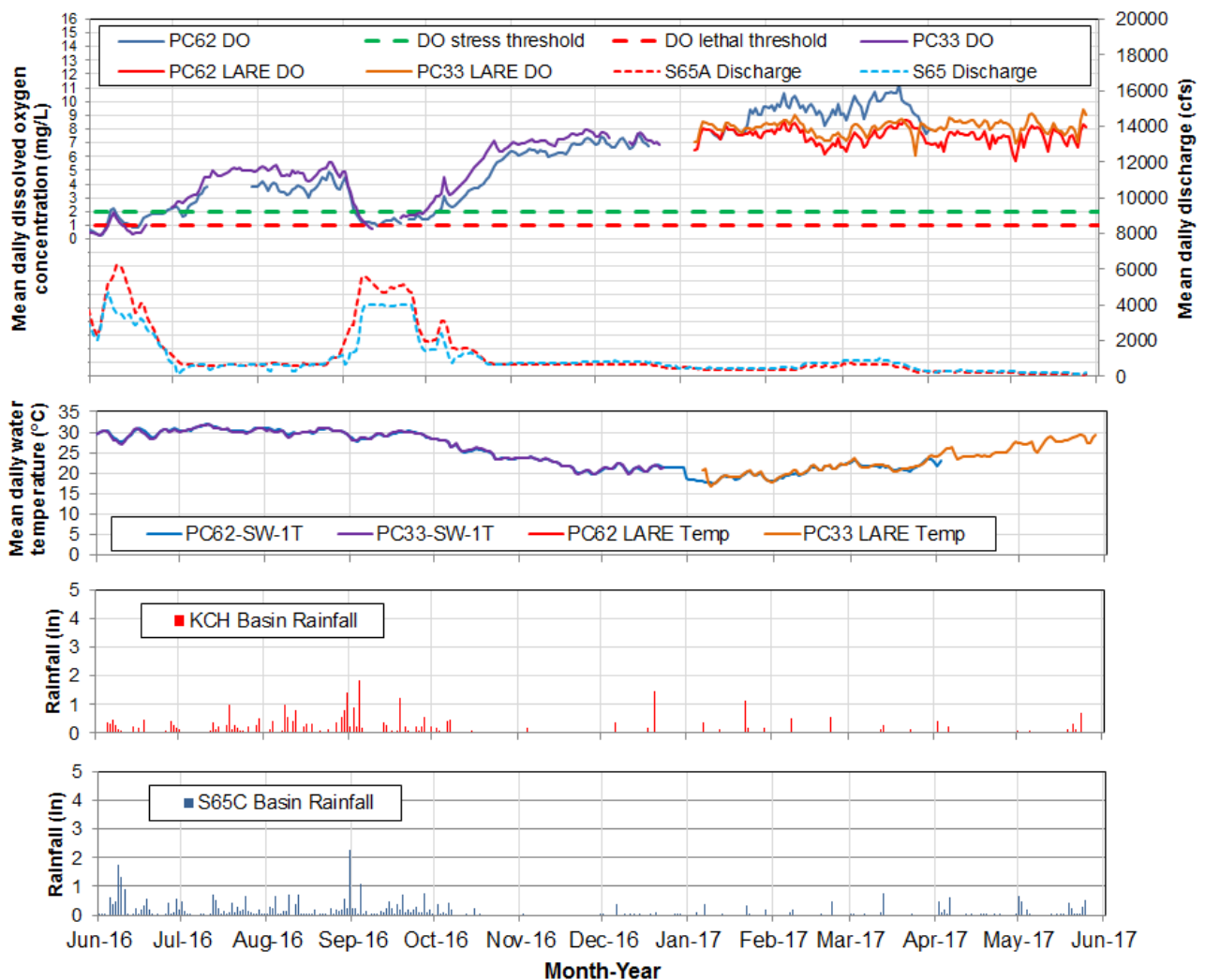


Figure 10. Mean daily Dissolved Oxygen, discharge, temperature and rainfall in the Phase I river channel.

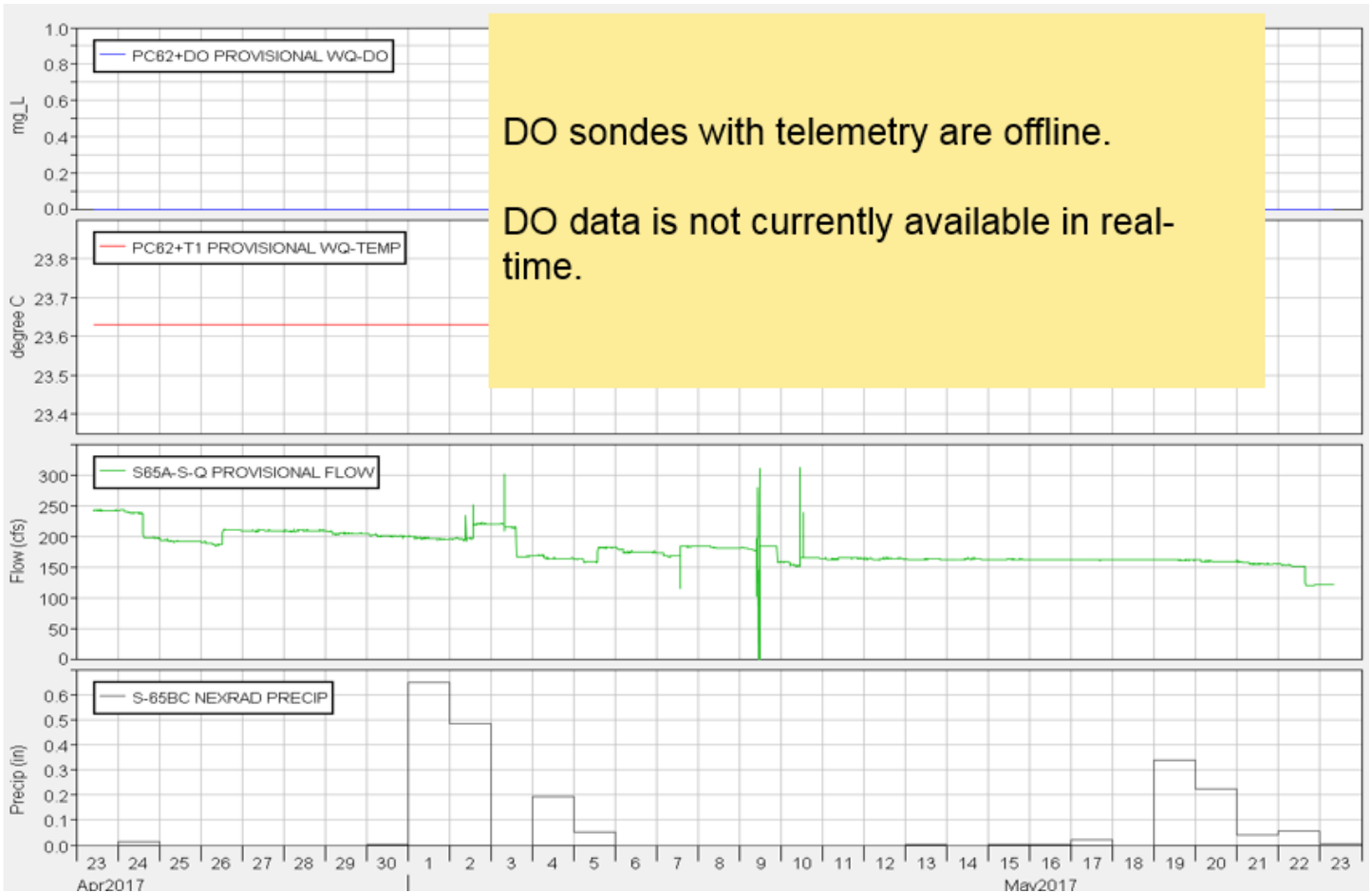


Figure 11. Phase I river channel dissolved oxygen and water temperature (measured at 15 minute intervals) and Pool BC daily rainfall.

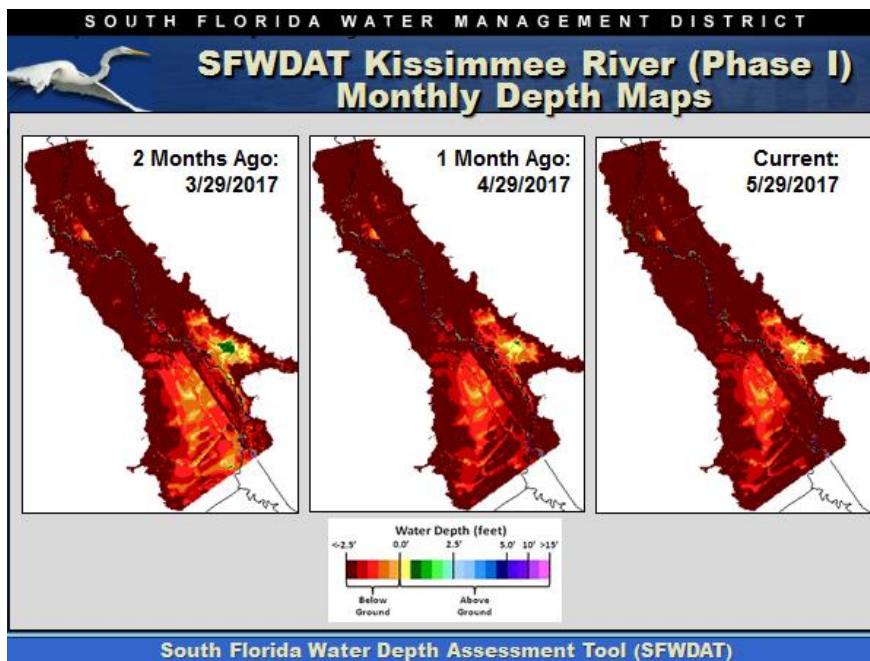
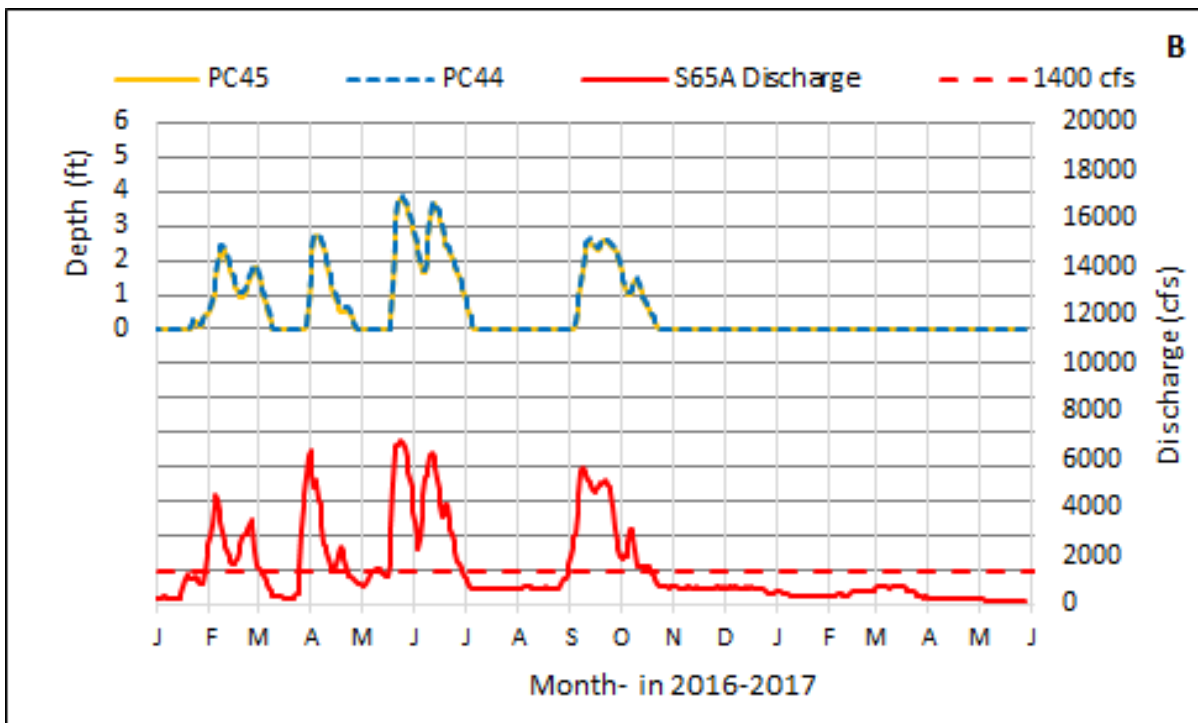
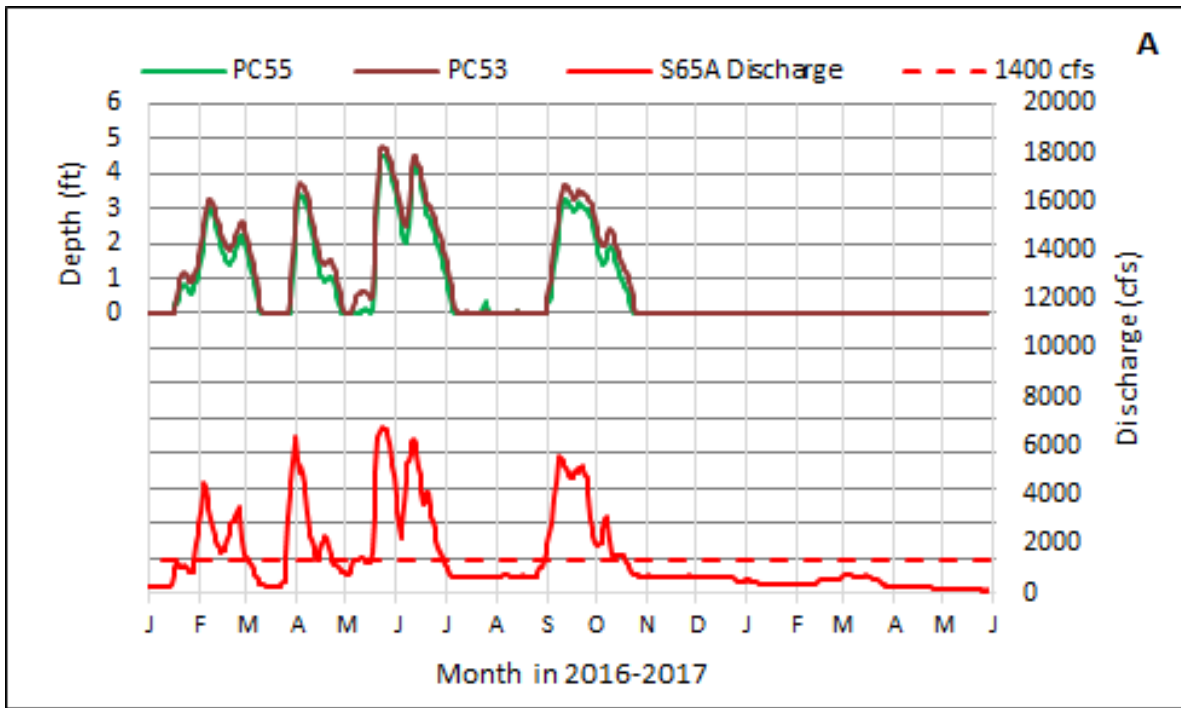


Figure 12. Phase I area floodplain water depths for this week, one month ago, and two months ago. Note that the WDAT color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to Jan. 16, 2012.



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

Kissimmee River Hydrographs

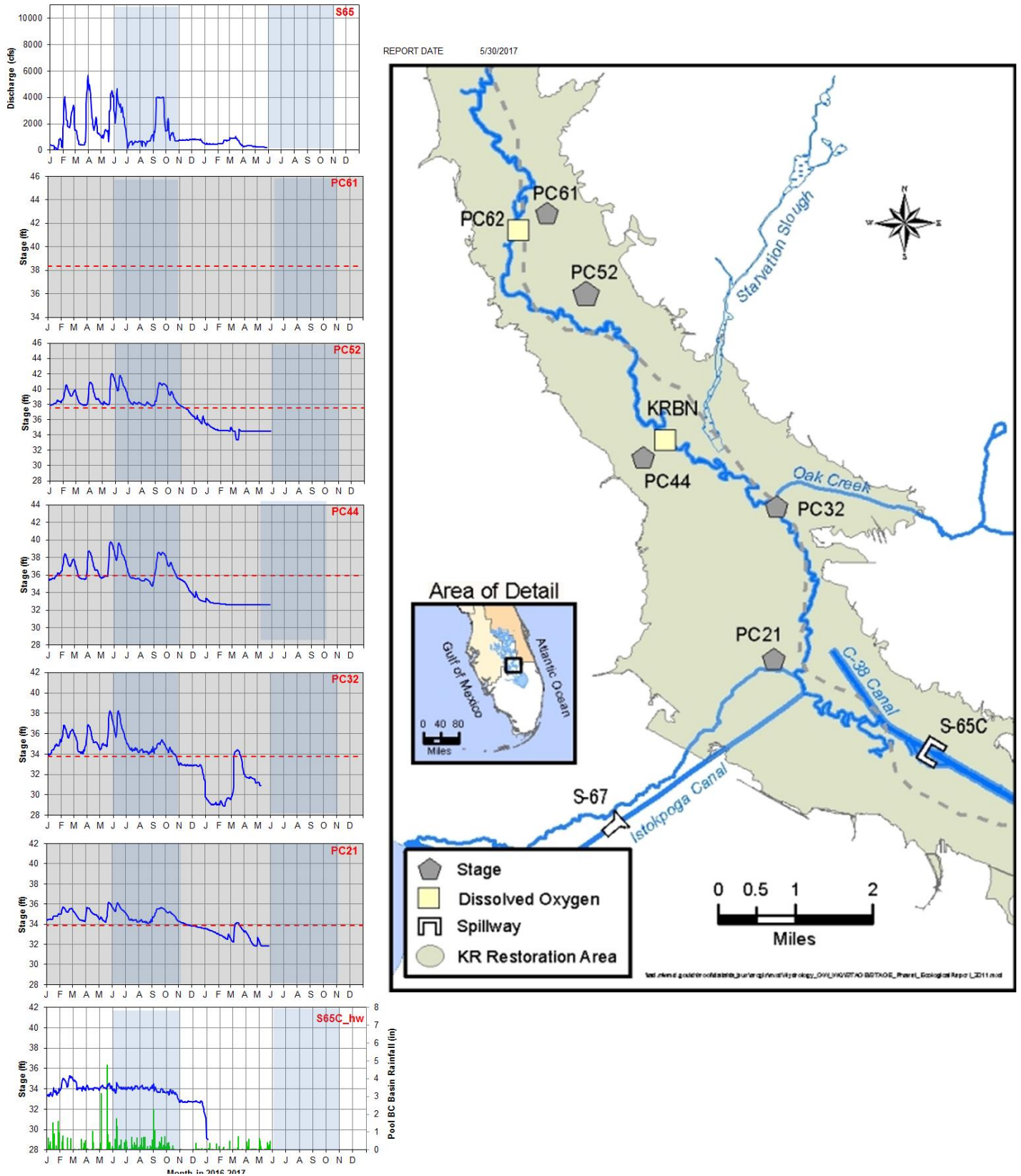


Figure 13. Discharge at S65, stages at five monitoring stations in the Phase I area of the Kissimmee River floodplain, and headwater stage at S65-C since January 1, 2015. The most recent data (~2 weeks) are provisional real-time data from SFWMD DualTrend; previous data are from SFWMD DB-HYDRO (validated).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

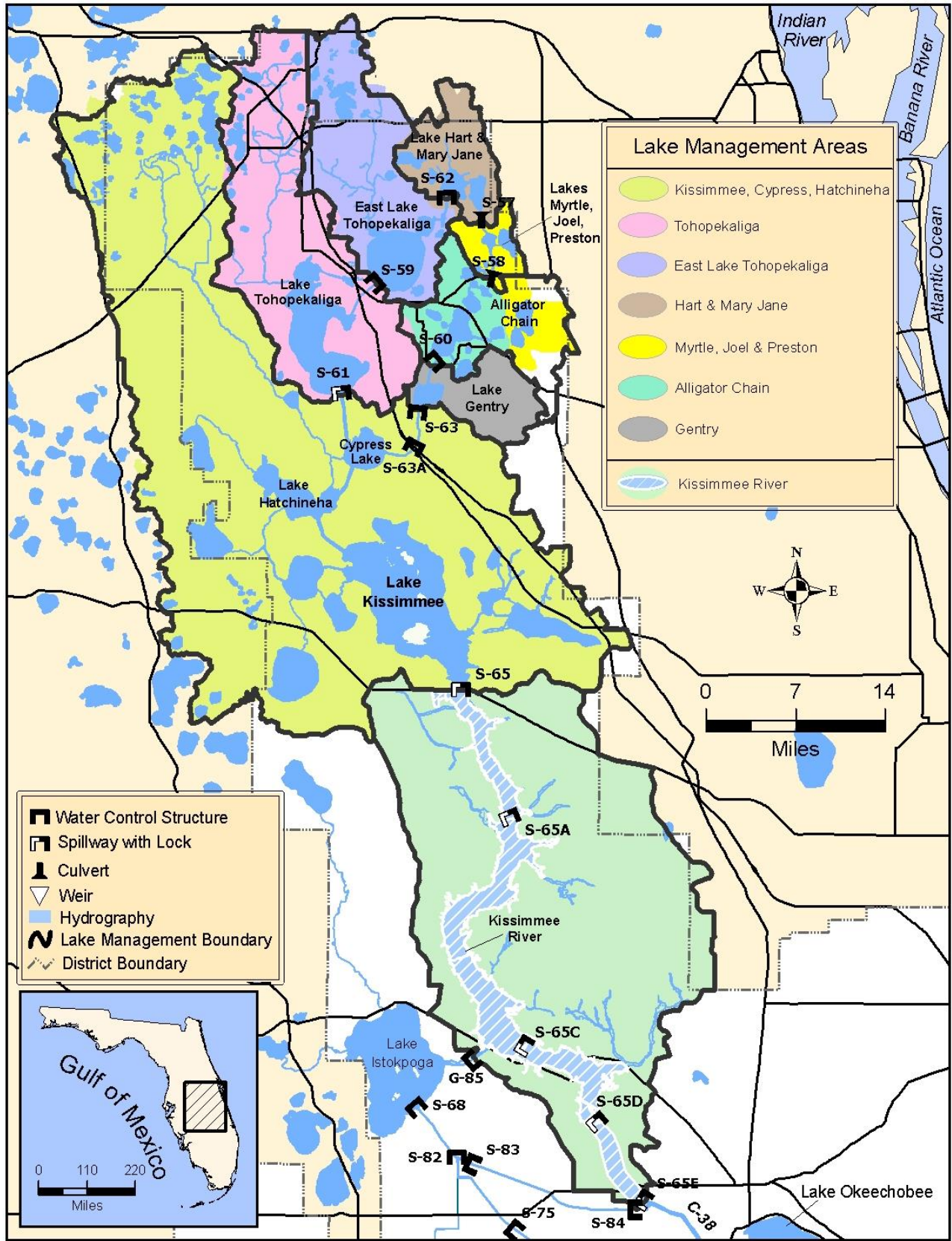


Figure 14. The Kissimmee Basin.

LAKE OKEECHOBEE

According to the USACE web site, Lake Okeechobee stage is at 11.05 feet NGVD for the period ending at midnight on May 28, 2017. This value is based on the use of four interior Lake stations (L001, L005, L006, and LZ40) and four perimeter stations (S308, S352, S4 and S133). Lake stage decreased by 0.11 feet over the past week and is 0.65 feet lower than it was a month ago and 3.35 feet lower than it was a year ago (Figure 1). The Lake is currently in the Beneficial Use sub-band and is 0.54 feet above the Water Shortage Management Sub-band (Figure 2). According to RAINDAR, 1.26 inches of rain fell directly over the Lake during the past seven days (Figure 3). Similar or greater amounts of rain fell in most of the remaining watershed although the lower east coast and parts of the Kissimmee Valley received less amounts of rainfall.

Based on USACE reported values, current Lake inflow is approximately 135 cfs as detailed below.

Structure	Flow cfs
S65E	0
S65EX1	135
S154	0
S84 & 84X	0
S71	0
S72	0
C5 (Nicodemus slough dispersed storage)	0
S191	0
S133 PUMPS	0
S127 PUMPS	0
S129 PUMPS	0
S131 PUMPS	0
S135 PUMPS	0
Fisheating Creek	0
S2 Pumps	0
S3 Pumps	0
S4 Pumps	0

Current Lake outflow is approximately 349 cfs with 152 cfs exiting at S77 and 303 cfs directed south through S351, S352 and S354. Approximately 106 cfs is entering the Lake from the L8 canal through Culvert 10A. Flow from S308 is not available. Corrected evapotranspiration value based on the L006 weather platform solar radiation data for this past week decreased from 3,993 cfs last week to 3,858 cfs.

Change in elevation equivalents and average weekly flows (midnight May 22, 2017 to midnight May 28, 2017) for major structures are presented in Figure 4. Flow for S308 is not available.

Based on the Lake Okeechobee wading bird habitat suitability index, there are currently approximately 23,508 acres of suitable foraging habitat for long-legged birds and 9,412 acres for long and short-legged birds on the Lake (Figure 5).

The most recent imagery from the OLCI sensor (May 20 and 27, 2017) suggests the potential for bloom conditions may be intensifying in the north and western regions of the Lake (Figure 6) but chlorophyll

concentrations from the monthly Lake Okeechobee water quality sampling (conducted on May 23 and 24, 2017) are not yet available for validation.

Water Management Recommendations

Lake stage is 11.05 feet NGVD having decreased by 0.11 feet over the past week. The current weekly recession rate equates to a monthly recession rate of 0.44 feet which is within the optimal 0.50 feet per month or less guideline. For the remainder of the dry season, efforts should be made to limit the amount of water discharged from the Lake to keep wading bird foraging and nesting locations hydrated. However, wading birds have started abandoning nests and snail kites have already started to migrate away from the Lake presumably due to lack of suitable foraging habitat.

The goal should be to slow the monthly recession rate to less than 0.50 feet per month. Actions which contribute to a slower recession are essential to protect critical components of the Lake's floral (bulrush and submerged aquatic vegetation) and faunal (wading birds, snail kites, apple snails and fish) communities.

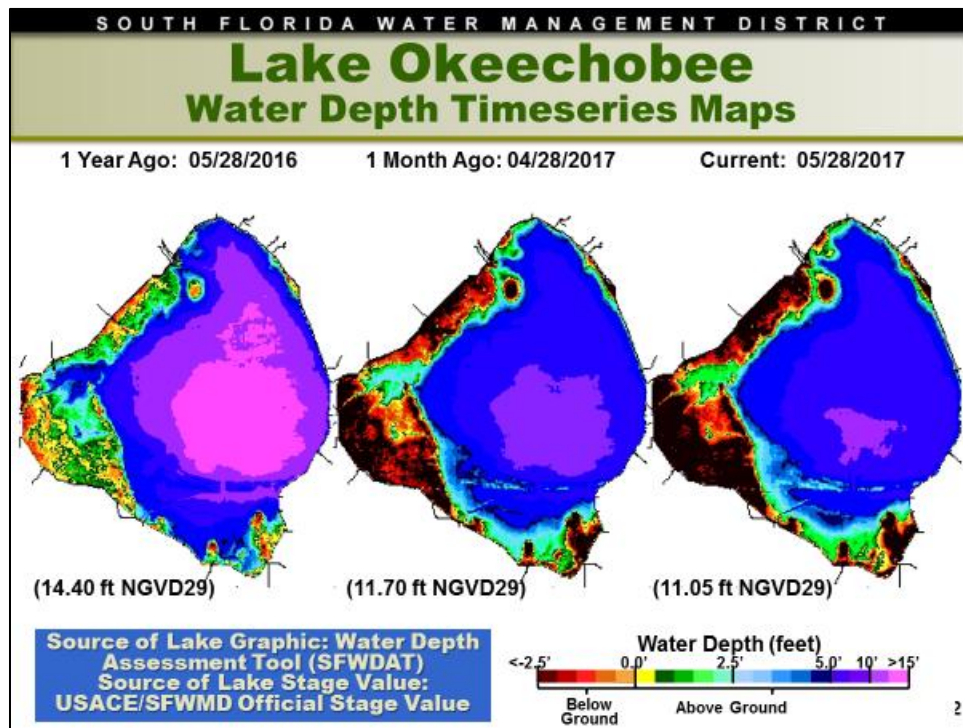


Figure 1

Weekly Stage Hydrograph

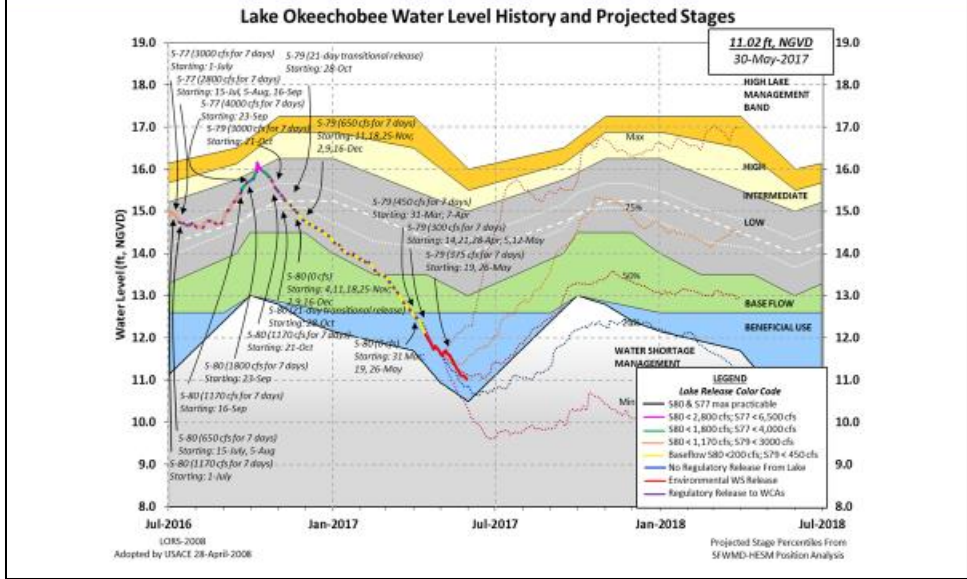
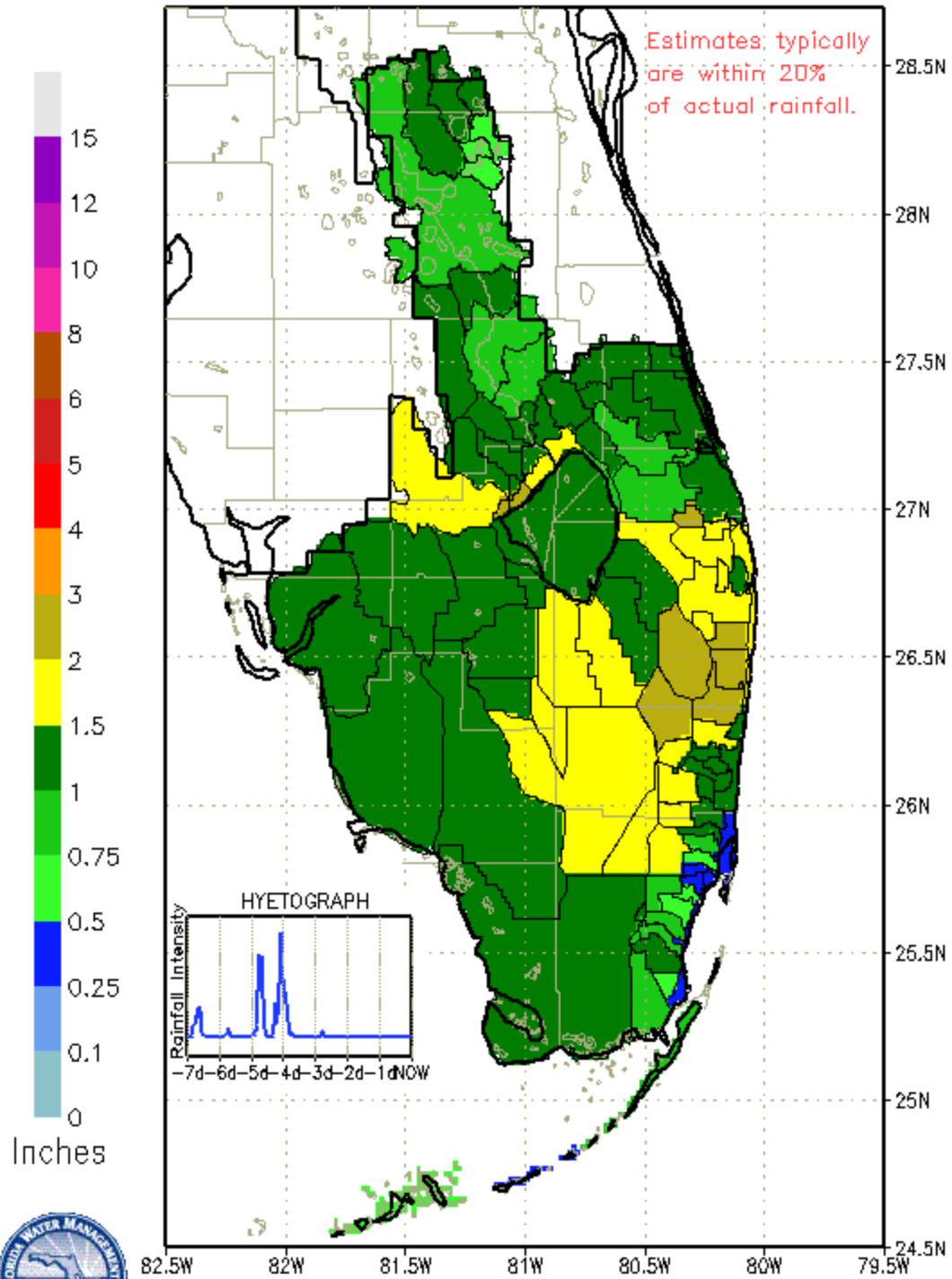


Figure 2

SFWMD PROVISIONAL RAINFAR 7-DAY BASIN RAINFALL ESTIMATES

FROM: 1115 EST, 05/22/2017 THROUGH: 1115 EST, 05/29/2017



DISTRICT-WIDE RAINFALL ESTIMATE: 1.349"



Figure 3

INFLOWS	Average Daily Flow Past Week cfs	Feet of Change Past Week
S65E & S65EX1	165	0.007
S71 & 72	25	0.001
S84 & 84X	0	0.000
Fisheating Creek	6	0.000
Rainfall	N.A.	0.105
OUTFLOWS	Average Daily Flow Past Week cfs	Feet of Change Past Week
S77	605	0.025
S308	N.R.	N.R.
S351	396	0.016
S352	197	0.008
S354	408	0.017
L8	-108	-0.004
ET	3858	0.158

Figure 4

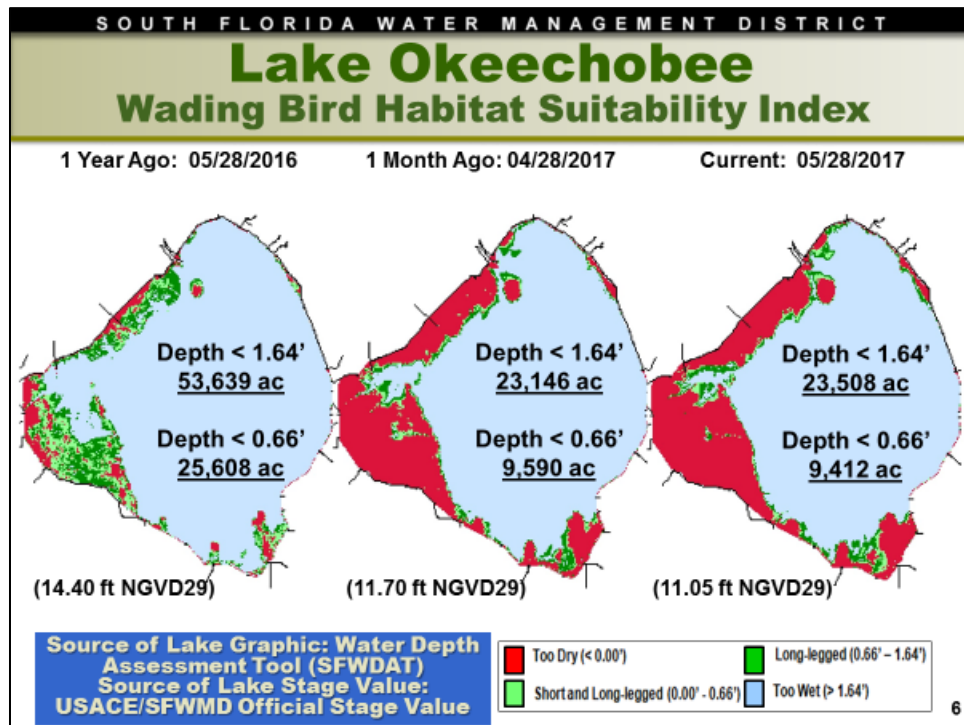


Figure 5

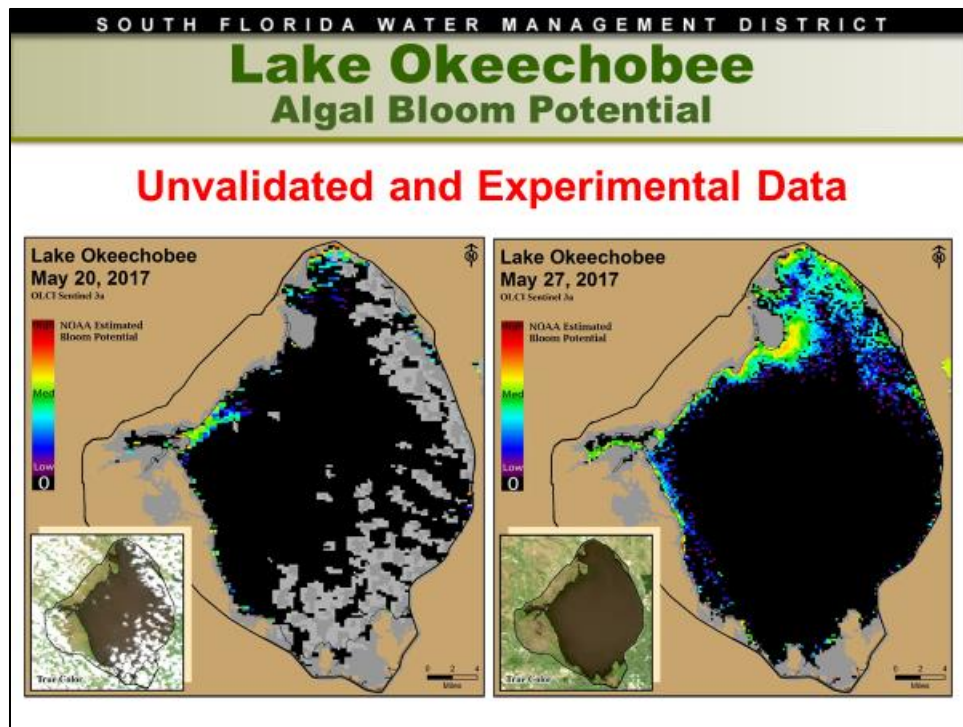


Figure 6

Lake Istokpoga

The annual recession from high pool to low pool stage on Lake Istokpoga continues. Stage is 37.49 feet NGVD as of midnight May 28, 2017 and is currently 0.84 feet below its regulation schedule of 38.33 feet NGVD (Figure 7). Average flows into the Lake from Arbuckle and Josephine creeks were -26 cfs and 4 cfs, respectively. Average discharge from S68 and S68X this past week was 41 cfs, a decrease from the previous week's flow of 82 cfs. According to RAINДАР, 1.11 inches of rain fell in the Lake Istokpoga watershed during the past seven days.

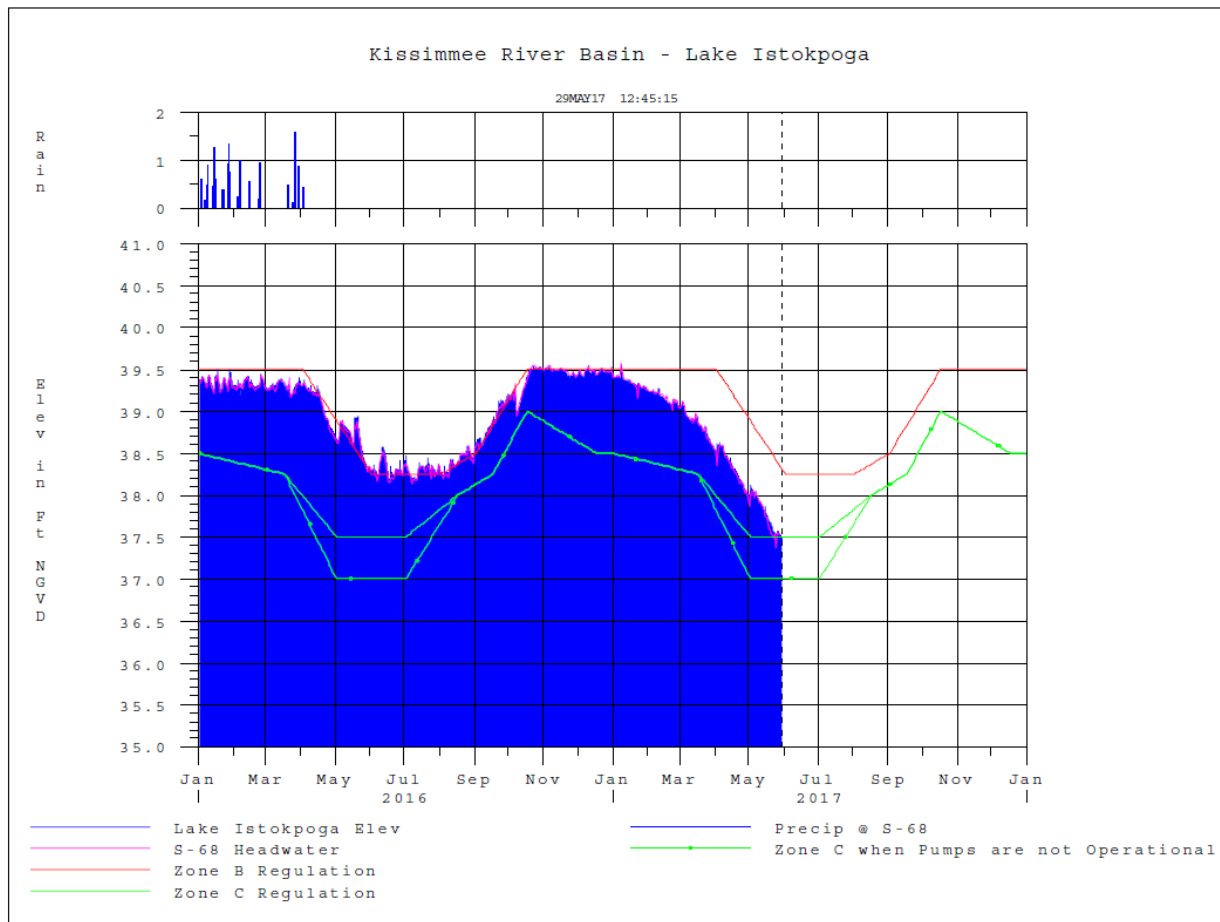


Figure 7

ESTUARIES

St. Lucie Estuary

Over the past week, provisional flows averaged about 0 cfs at S-80, 8 cfs downstream of S-308 flowing into Lake Okeechobee (gates closed, lock open during the day and closed at night), 0 cfs at S-49 on C-24, 0 cfs at S-97 on C-23, and 54 cfs from Ten Mile Creek at the Gordy Road Structure. Average inflow from tidal basin tributaries is estimated to be 198 cfs (Figures 1 and 2). Total inflow averaged about 252 cfs last week and 203 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 27.9. 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)	25.3 (25.6)	26.7 (25.9)	NA ¹
US1 Bridge	27.8 (27.4)	28.1 (27.8)	10.0-26.0
A1A Bridge	32.4 (32.6)	33.1 (33.4)	NA

¹Envelope not applicable

Caloosahatchee Estuary

During the past week, provisional flows averaged approximately 163 cfs at S-77, 278 cfs at S-78, and 418 cfs at S-79. Average inflow from tidal basin tributaries is estimated to be 191 cfs (Figures 5 & 6). Total inflow averaged 609 cfs last week and 515 cfs over last month.

Over the past week, surface salinity decreased throughout the estuary (Table 2, Figures 7 and 8). The seven-day average salinity values are within the good range for adult oysters at Cape Coral, within the fair range at Shell Point, and within the poor range at Sanibel (Figure 9). The 30-day moving average surface salinity is 6.9 at Val I-75 and 15.2 at Ft. Myers. The 30-day moving average salinity at Ft. Myers has been above 10 for 63 consecutive days. Salinity conditions between Val I-75 and Ft. Myers are likely to result in tape grass deterioration. Without discharges at S-79, the 30-day moving average salinity at Val I-75 is forecast to be 7.4 within two weeks (Figure 10).

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

Sampling Site	Surface	Bottom	Envelope
S-79 (Franklin Lock)	5.3 (7.8)	5.4 (7.8)	NA ¹
*Val I75	6.8 (8.3)	9.3 (11.0)	0.0-5.0 ²
Ft. Myers Yacht Basin	14.5 (15.6)	15.3 (17.2)	NA
Cape Coral	23.4 (23.8)	24.5 (25.3)	10.0-30.0
Shell Point	32.9 (33.7)	32.7 (32.3)	10.0-30.0
Sanibel	35.6 (36.0)	36.7 (EM ³)	10.0-30.0

¹Envelope not applicable, ²Envelope is based on a 30-day average, ³Equipment Malfunction.

*Val I75 is temporarily offline due to site construction,

Salinity values are estimated using models developed for this site.

Monitoring data collected by the River, Estuary and Coastal Observing Network of Sanibel-Captiva Conservation Foundation using continuous sensors are summarized in Table 3 as concentration ranges of Chlorophyll *a* and dissolved oxygen at Beautiful Island, Ft. Myers, and Shell Point in the Caloosahatchee Estuary.

Table 3. Weekly ranges of Chlorophyll *a* (a measure of algal biomass) and dissolved oxygen concentrations at three monitoring stations maintained by the Sanibel-Captiva Conservation Foundation.

	RECON Monitoring Stations		
	Beautiful Island	Ft. Myers	Shell Point
Chlorophyll <i>a</i> (µg/l)	4.02 – 11.37	3.06 – 9.92	1.40 – 11.25
Dissolved Oxygen (mg/l)	3.23 – 6.41	3.85 – 5.68	No Data

The Florida Fish and Wildlife Research Institute reported on May 26, 2017, that *Karenia brevis*, the Florida red tide organism, was not present in samples collected from Lee County.

Water Management Recommendations

The 30-day average salinity at the I-75 Bridge is 6.9 and is forecast to continue to exceed 5 with no inflow at S-79. Lake stage is in the Beneficial Use sub-band of 2008 LORS. The 2008 LORS/Adaptive Protocols recommend up to 300 cfs at S-79 with flow from Lake Okeechobee supplementing as needed. However, a release greater than 650 cfs is forecast to be required to achieve a 30-day average salinity below 5 at the I-75 Bridge.

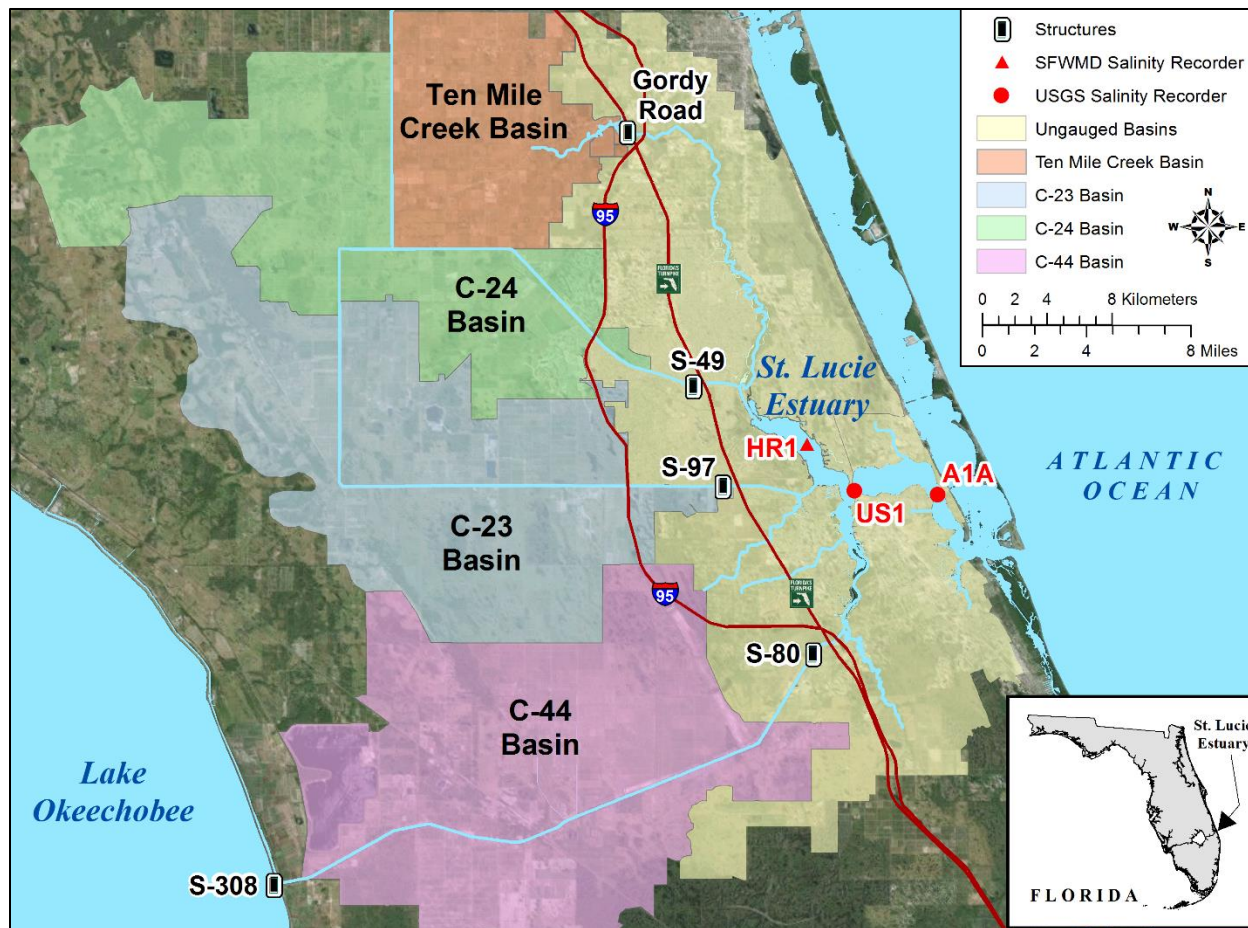


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

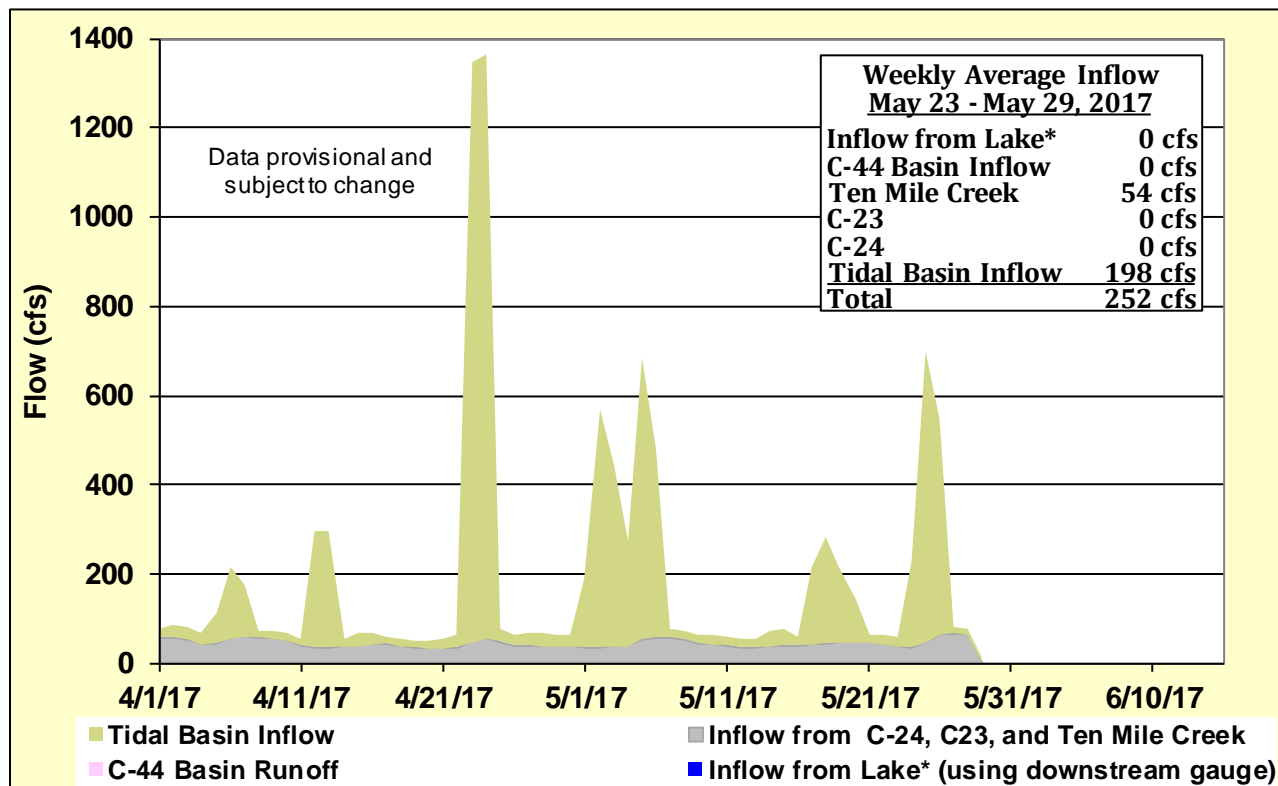


Figure 2. Estimated surface freshwater inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basins into the St. Lucie Estuary.

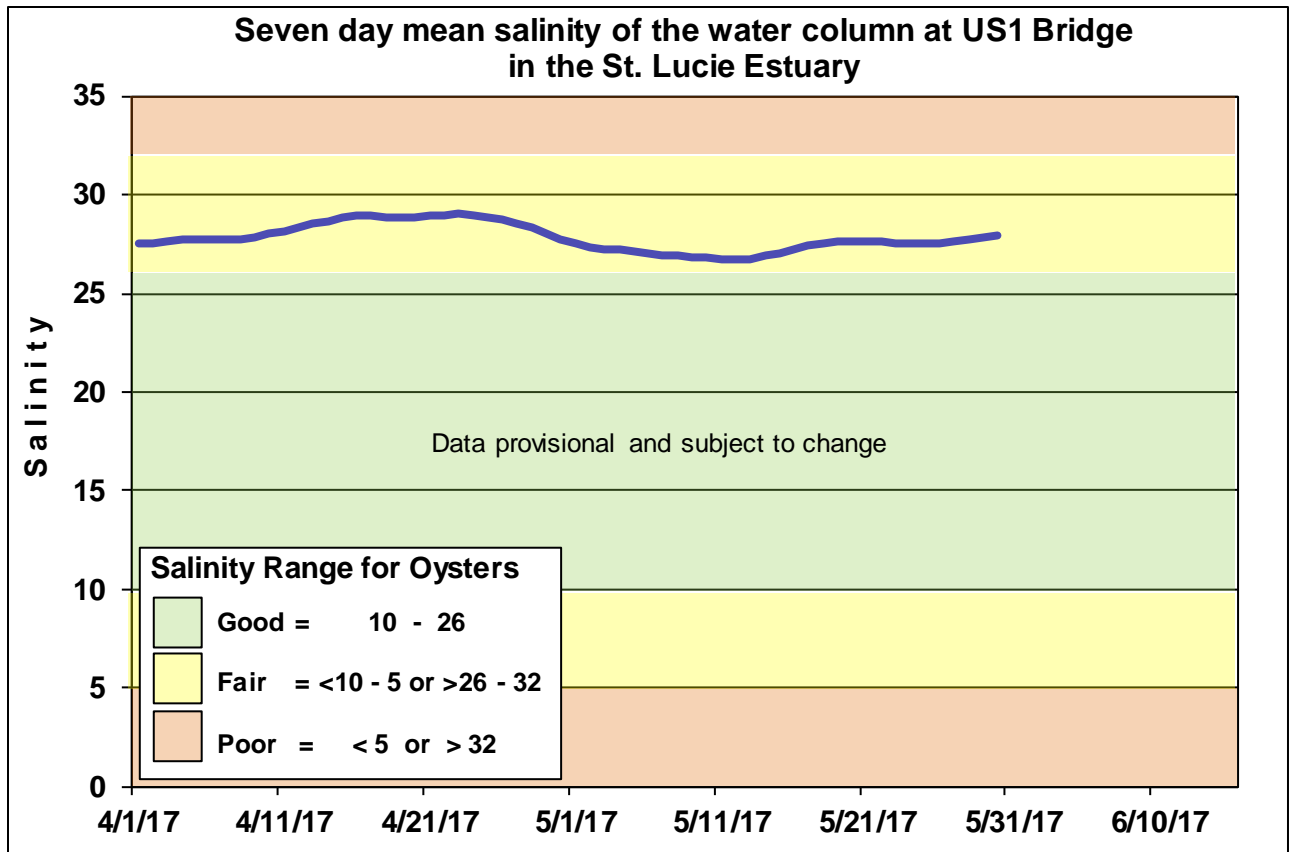


Figure 3. Seven-day mean salinity of the water column at the U.S. Highway 1 Bridge.

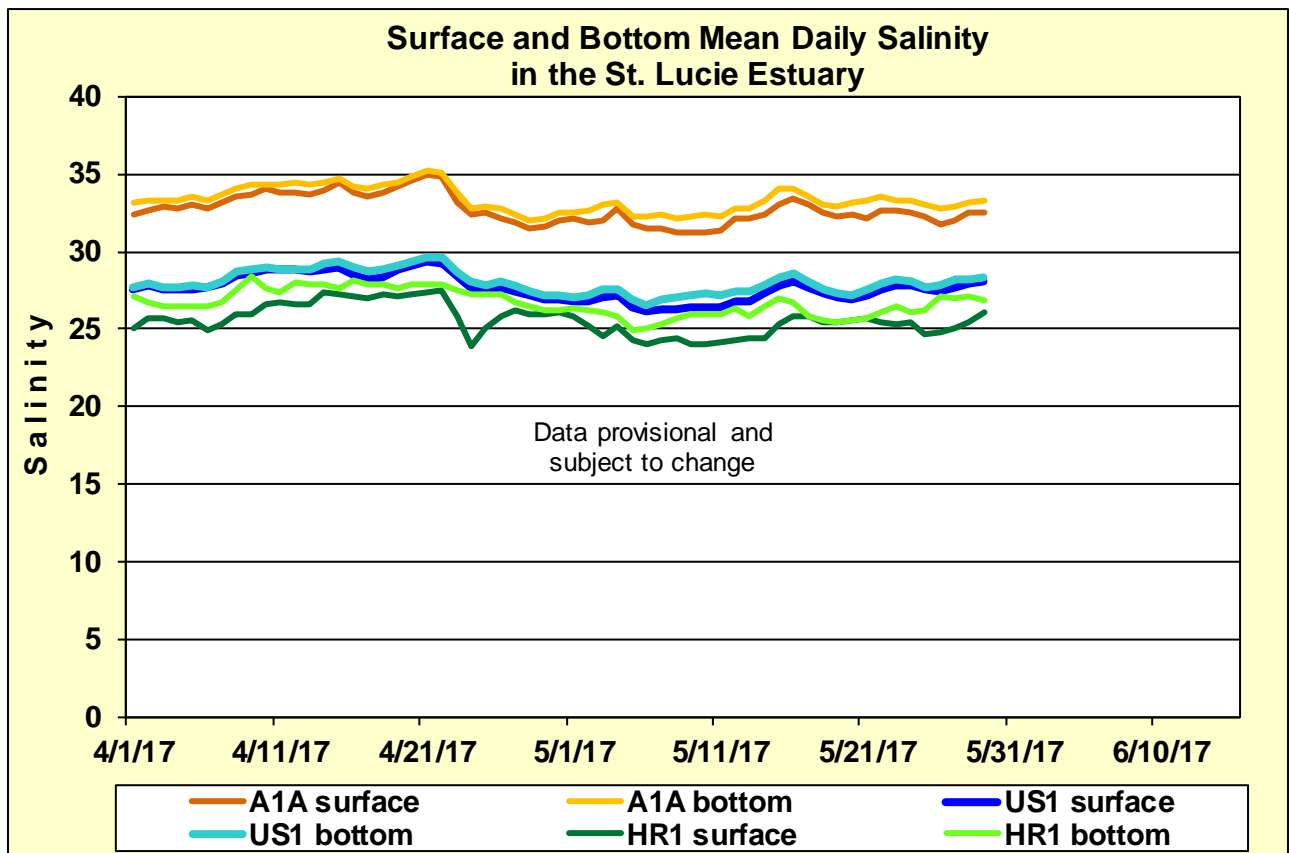


Figure 4. Daily mean salinity at the A1A, US1 and estimated HR1 stations.

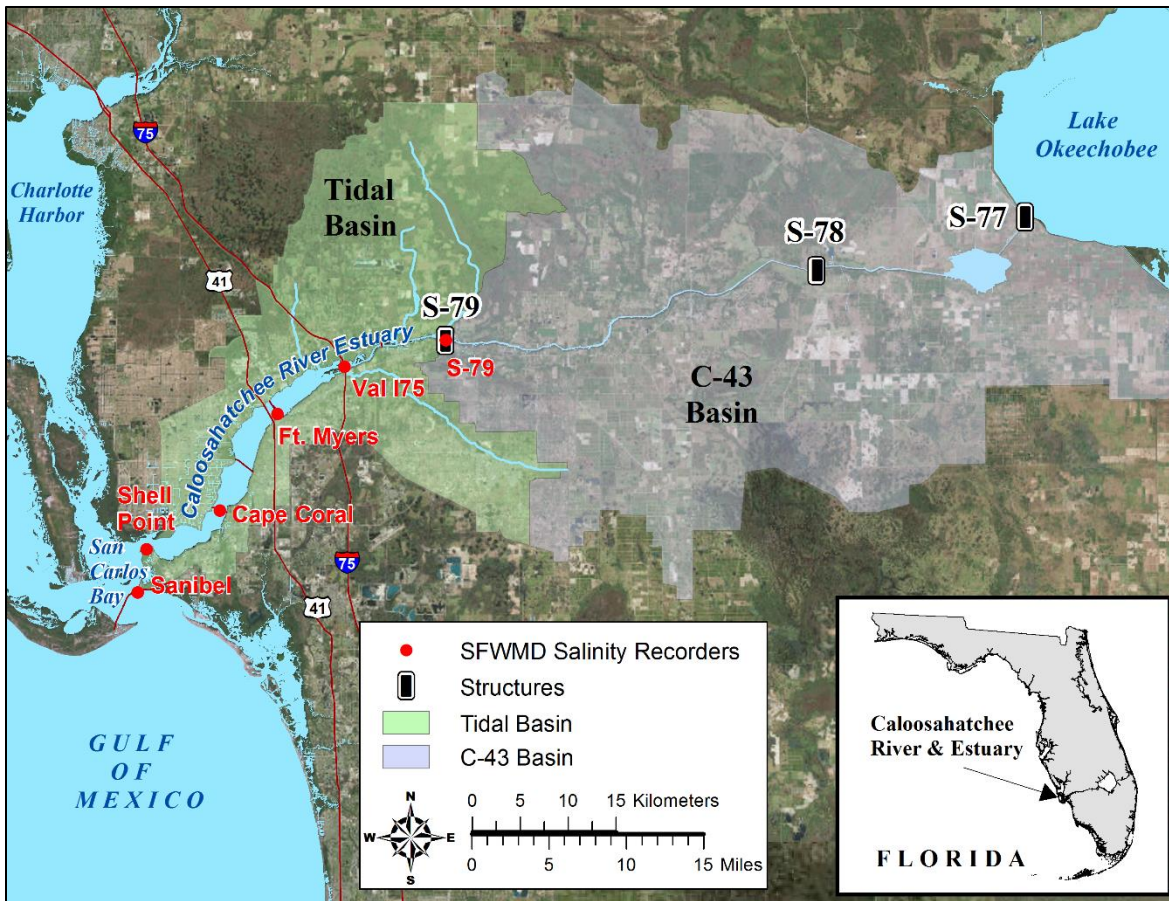


Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

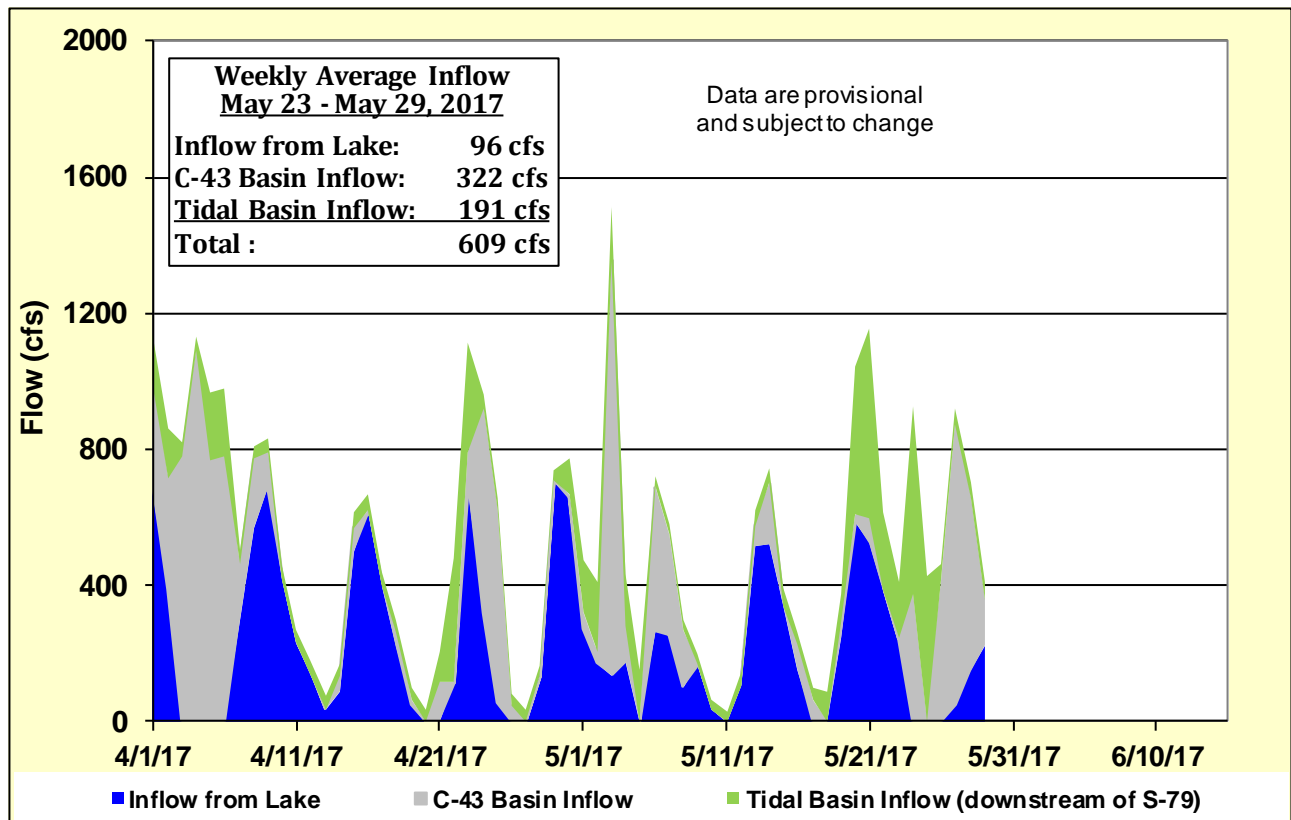


Figure 6. Freshwater inflows from Lake Okeechobee, runoff from the C-43 basin, and tributaries in the tidal basin into the Caloosahatchee River Estuary.

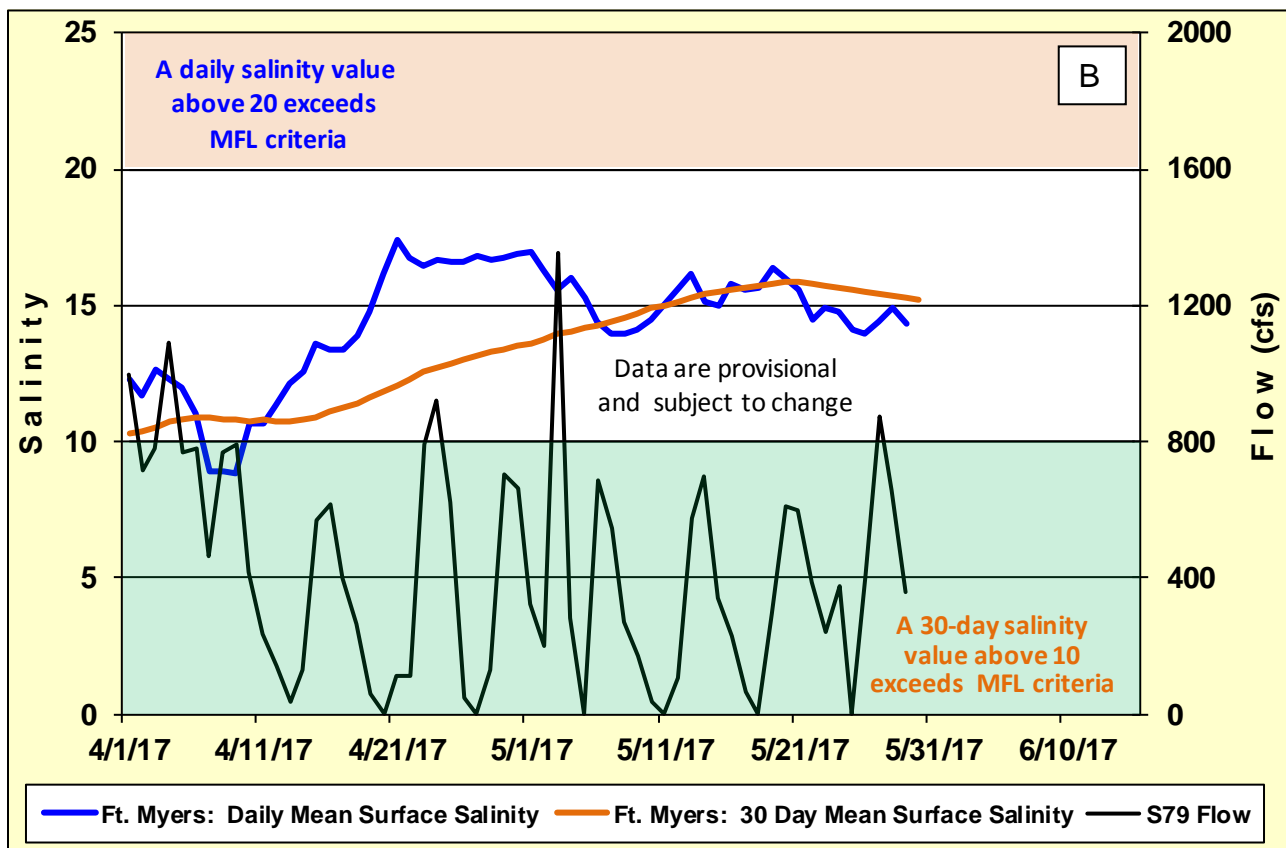
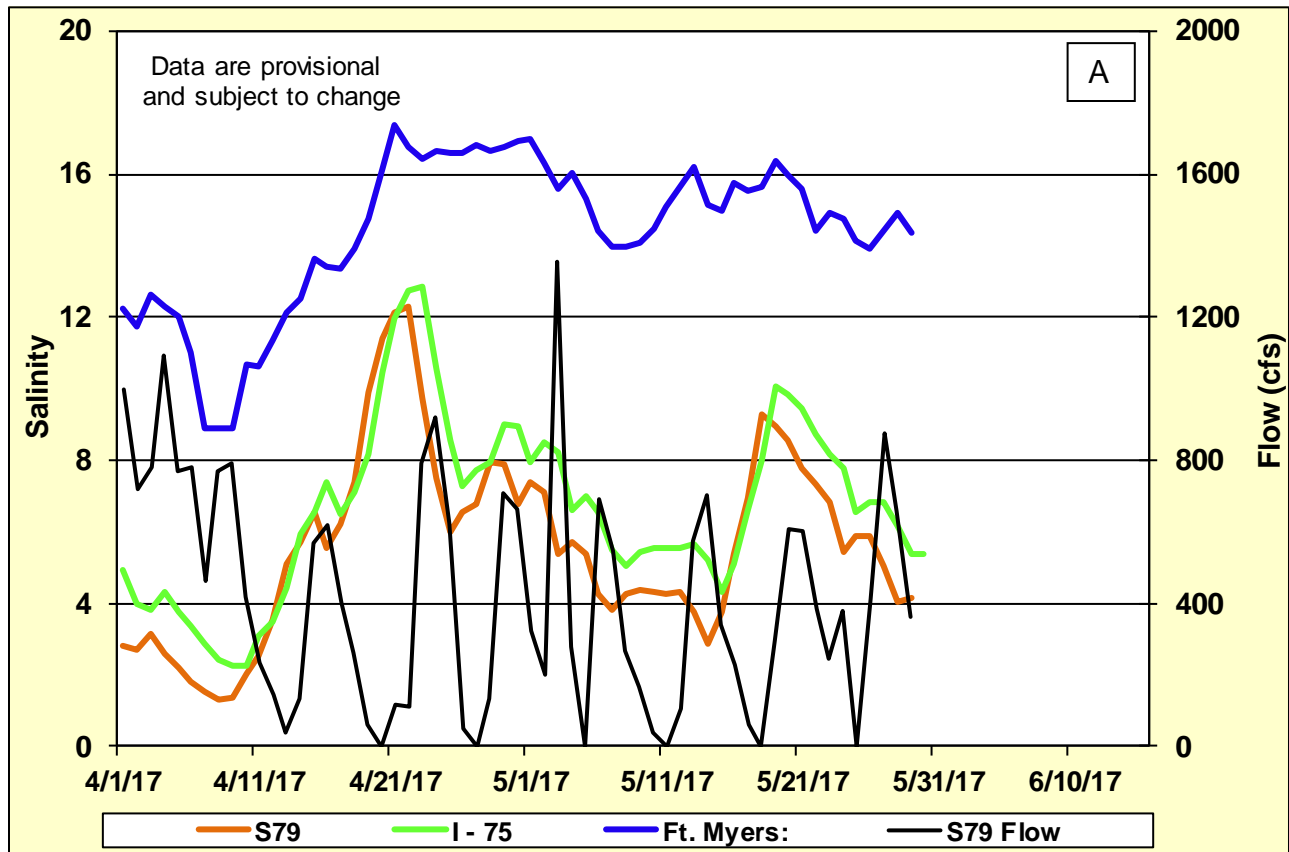


Figure 7. Daily mean flows at S-79 and salinity at upper estuary monitoring stations (A) and 30-day moving average salinity at Ft. Myers (B).

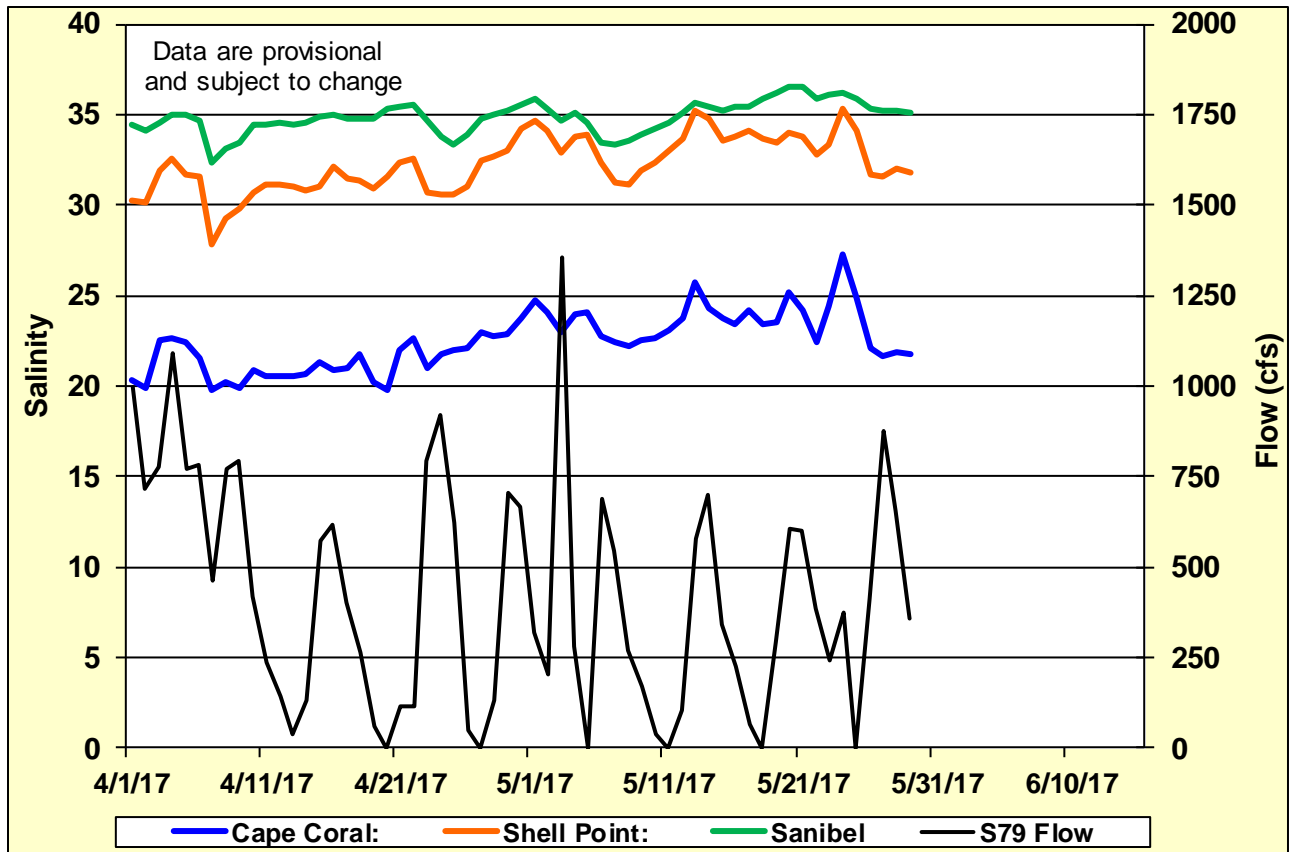


Figure 8. Daily mean flows at S-79 and salinity at lower estuary stations.

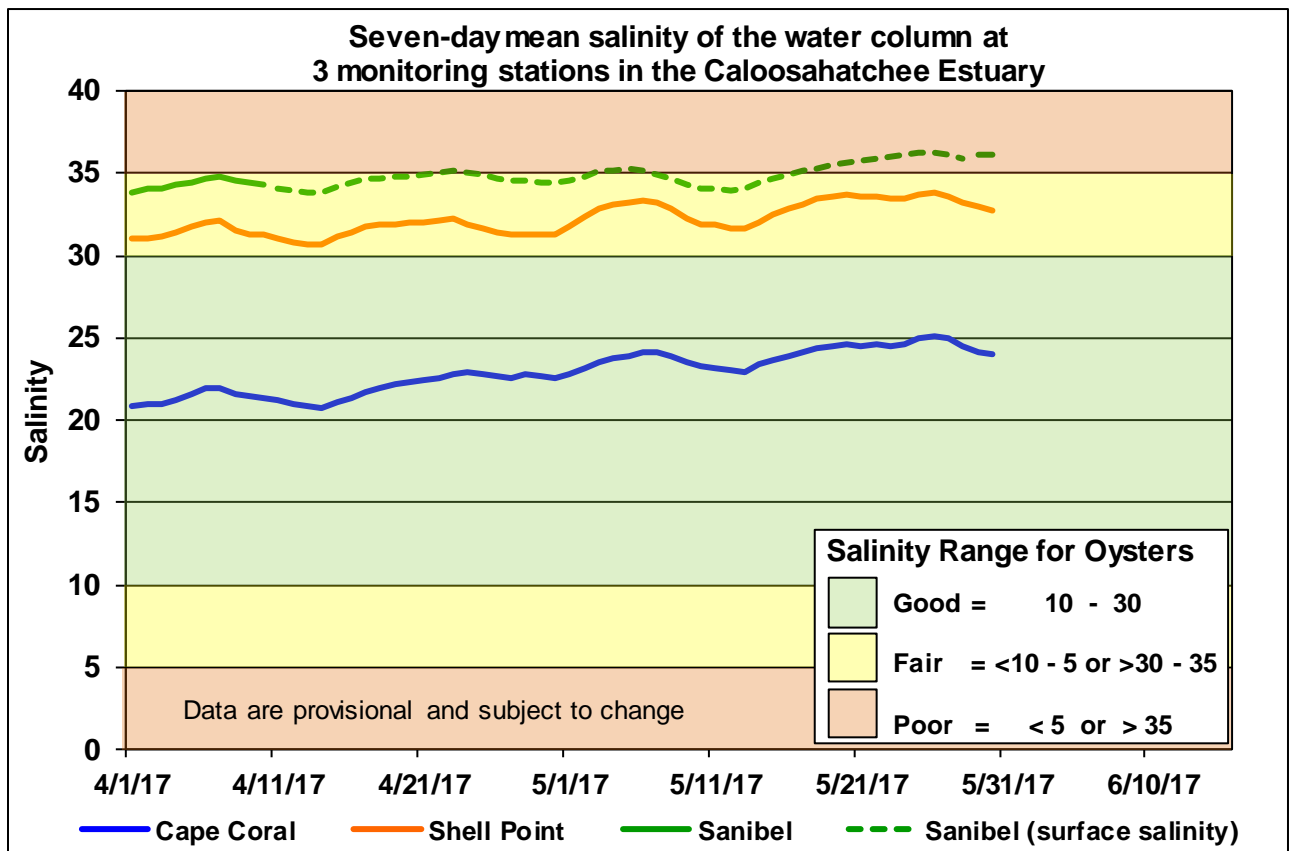


Figure 9. Seven-day mean salinity at Cape Coral Bridge, Shell Point and Sanibel Bridge monitoring stations.

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

Forecast 1: S-79 = 0 cfs & TBR = 220 cfs

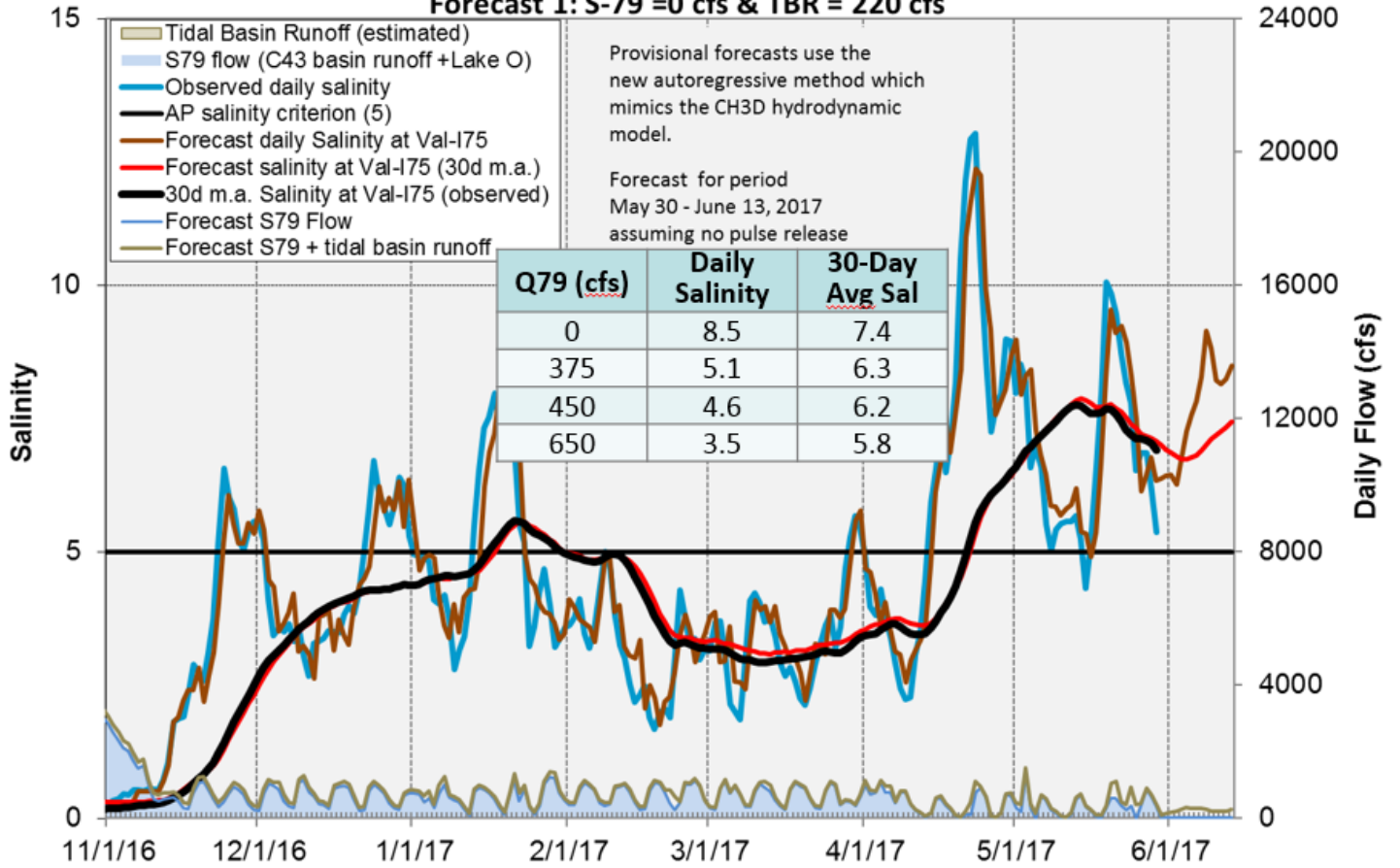


Figure 10. 14-day salinity forecast at Val I-75 assuming no releases at S-79.

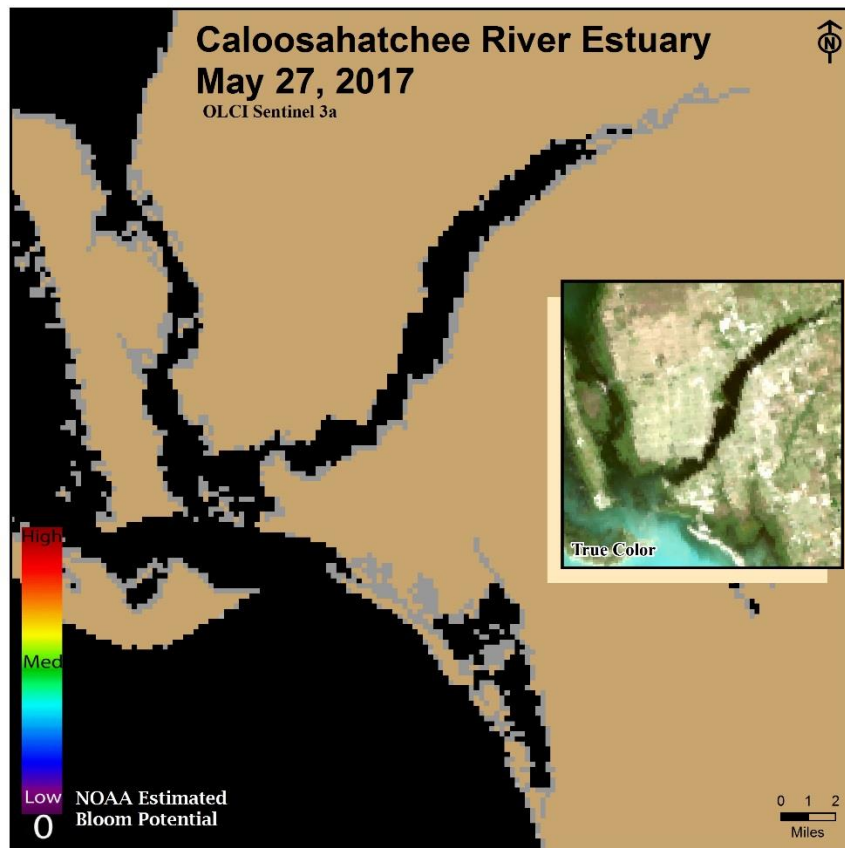
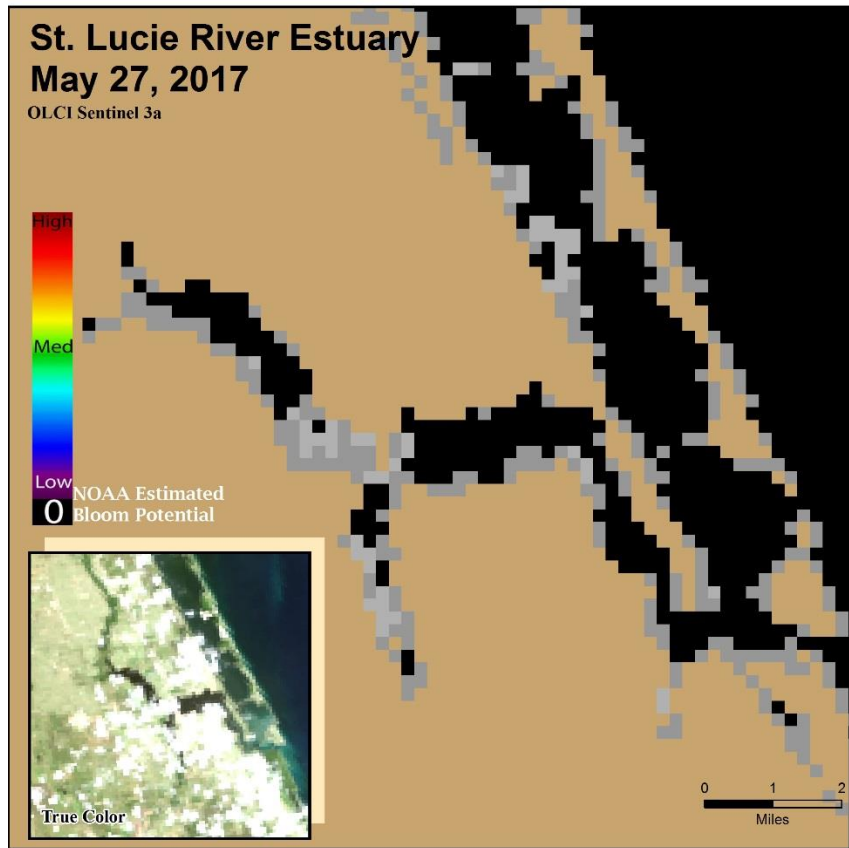



Figure 11. Sentinel 3a Satellite imagery provided by NOAA uses Ocean and Land Color Instrument (OLCI) to estimate cyanobacteria bloom potential in Caloosahatchee Estuary.

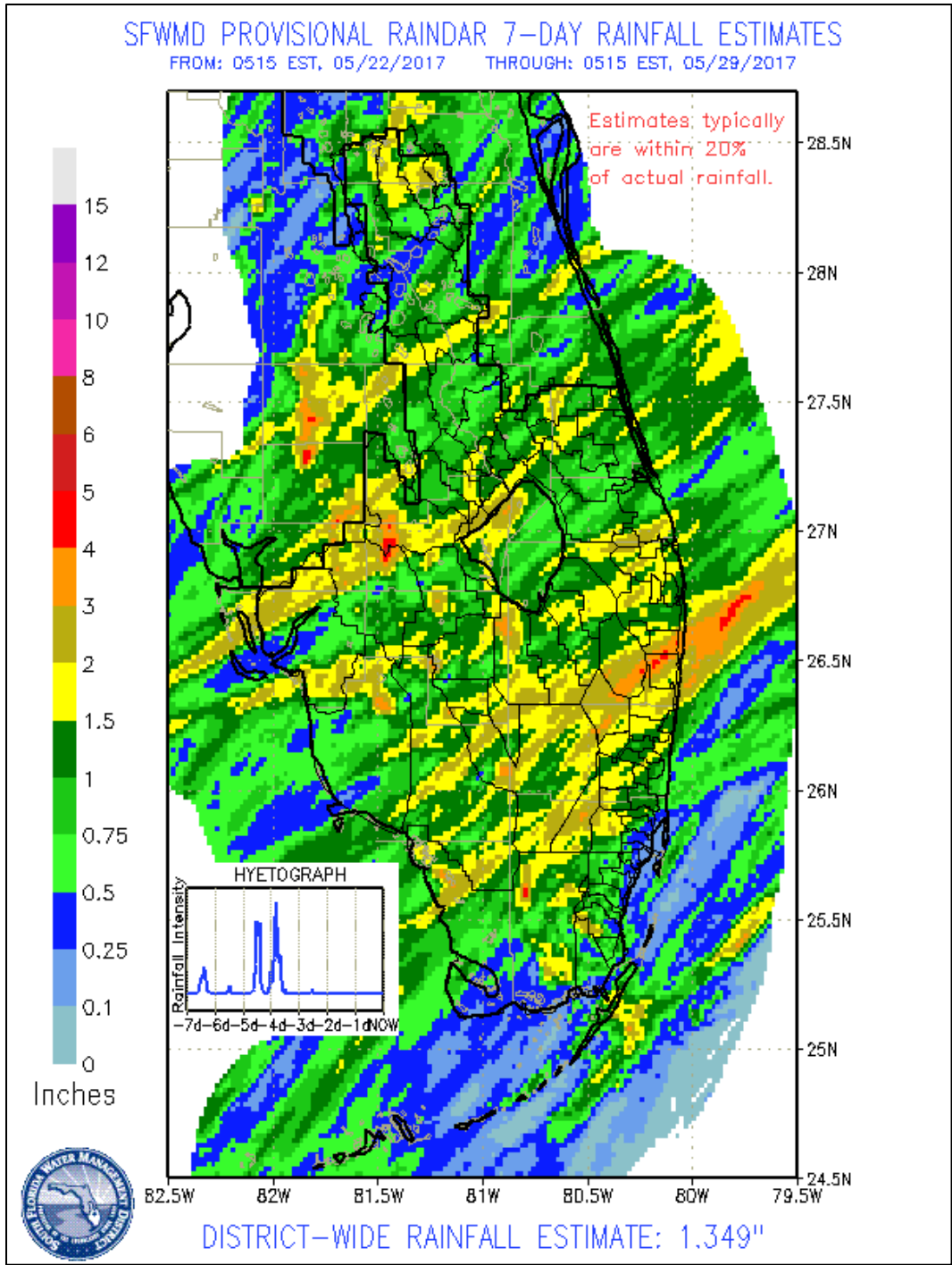
EVERGLADES

Widespread rain resulted in increases in stage across the Everglades. Instrument issues limited stage data in WCA-3B this week.

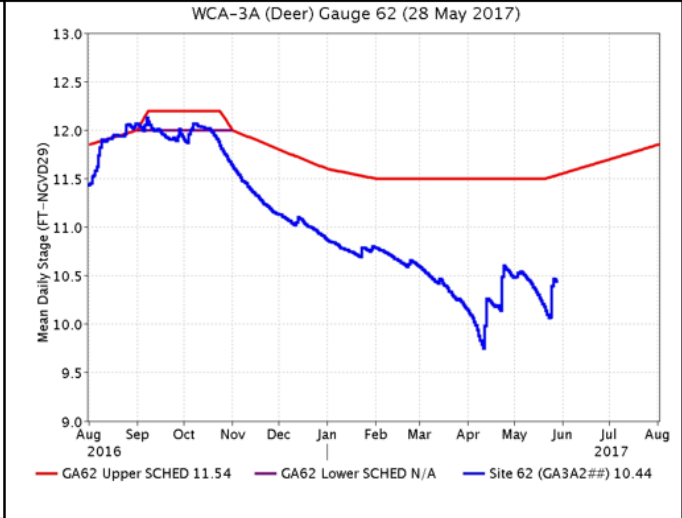
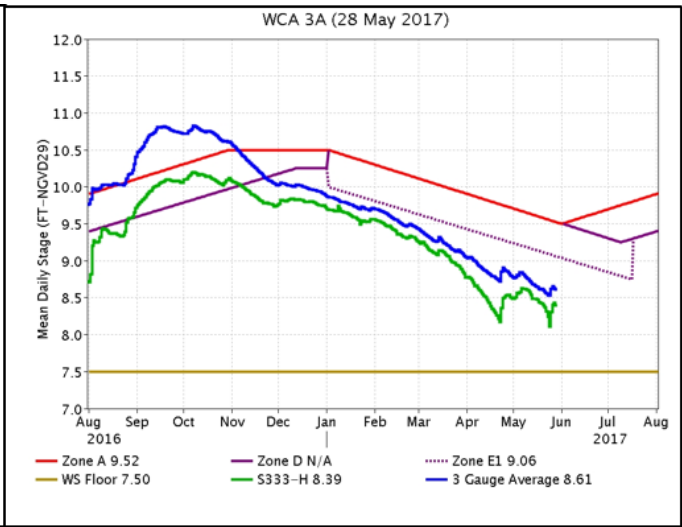
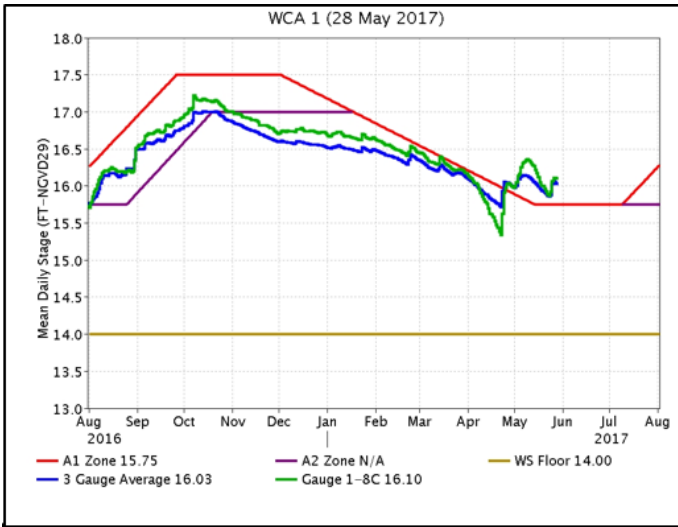
Everglades Region	Rainfall (Inches)	Stage Change (feet)	
WCA-1	2.20	0.14	
WCA-2A	2.46	0.13	
WCA-2B	1.12	0.01	
WCA-3A	1.73	0.10	
WCA-3B	1.99	N/A	
ENP	1.03	0.11	

SFWM District-wide Rainfall 7-Day Rainfall Estimates

FROM: 0515 EST, 05/22/2017 THROUGH: 0515 EST, 05/29/2017



Regulation Schedules: WCA-1 stage is .28 feet above Zone A. WCA-2A the marsh stage at gauge GA2A17 is currently above zone A (+0.81 feet) and above canal stage. WCA-3A three-gauge average is 0.45 feet below zone E1, but generally tracking that line. WCA-3A at gauge 62 (Northwest corner) is 1.1 feet below schedule.

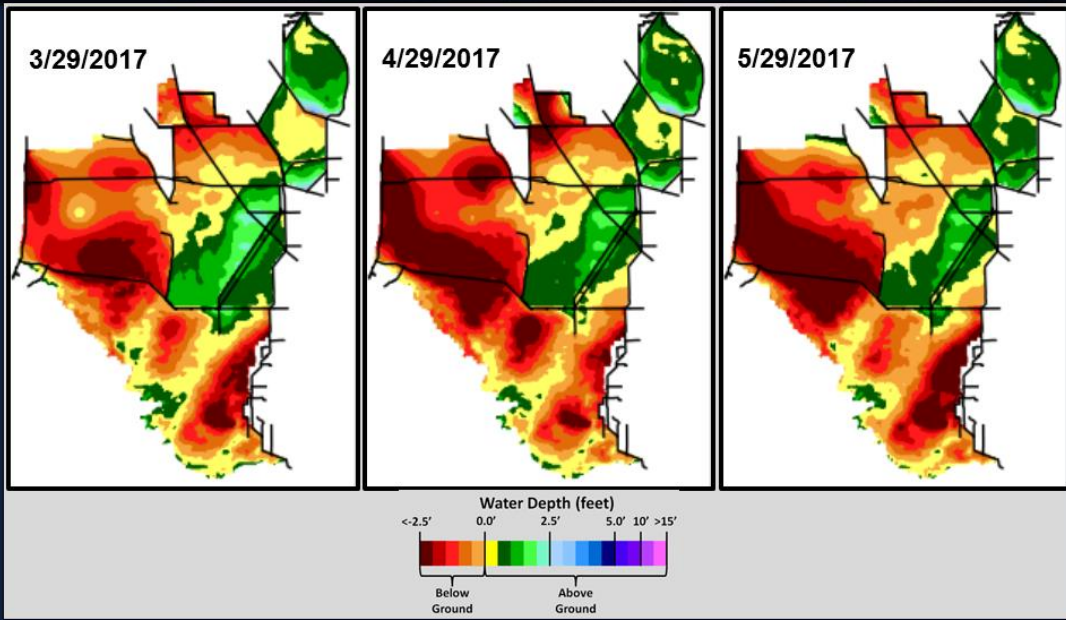


Blue – wetlands
Green – canals

Water Depths and Changes: This week's water depths at functioning monitored gauges other than in WCA-2B range from -0.30 feet (northeast WCA-3A) to 1.33 feet (WCA-1). Over the last week individual gauge changes ranged from -0.07 feet (WCA-2B & 1) to +.31 feet (WCA-3A NW).



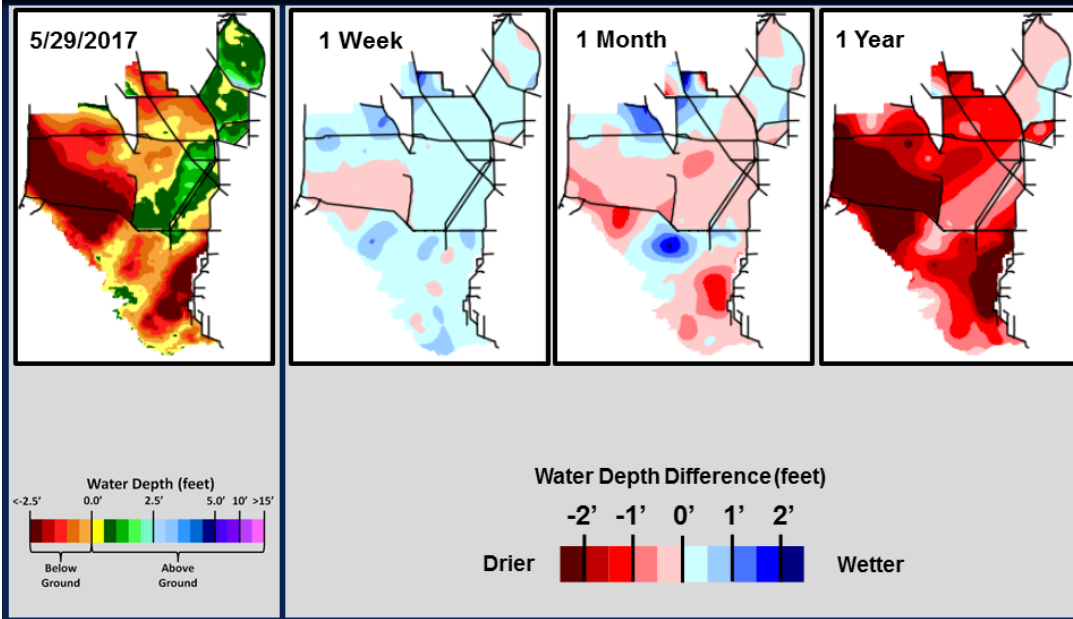
SFWDAT Water Depth Monthly Snapshots



South Florida Water Depth Assessment Tool (SFWDAT)

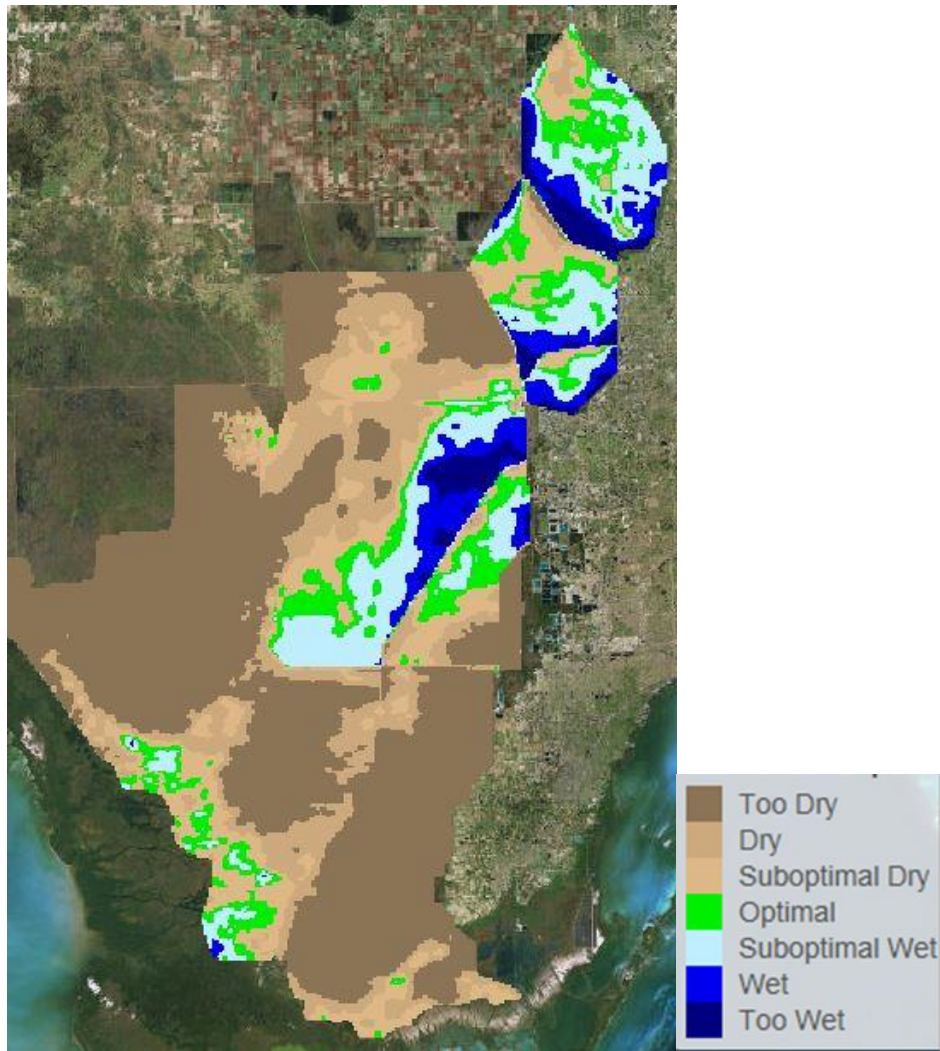


SFWDAT Everglades Difference Maps (Present - Past)



South Florida Water Depth Assessment Tool (SFWDAT)

Wading Birds: A wading bird survey was not able to be conducted this week. It is expected that birds are continuing to forage in central and southern WCA-3A, just south of the drying front where depths are currently optimal for wading bird foraging (see green and pale blue areas on the depth Habitat Suitability Index below).



The following is a summary from the District's wading bird ecologist on wading bird nesting up to this point in the nesting cycle. This summary is based on weekly flights and field work in the WCAs and Everglades National Park (ENP), and from discussions with University of Florida ENP staff.

White Ibis

Although initially about half of all White Ibis nests were lost in WCA-1 after the reversals in April the remaining nests seem to have held on and are doing well. Ibis feed on Asian lawn cockroaches from urban and agricultural areas when foraging conditions in the wetlands are unsuitable and this seems to have tied them over for the past month or so. On May 24 Ibis were feeding in WCA-1 and WCA2A.

The large (8-10,000 nest) 6th Bridge colony in northern WCA-3A (just south of I-75) appears to have been relatively successful and has fledged most of its nestlings (many thousands).

There are a few White Ibis colonies starting up in central and southern WCA-3A. About 3,000 ibis nested at the Tamiami trail colony (on Tamiami trail) and many of the chicks from these nests have fledged. Overall, it was probably an average year for ibis in terms of both nesting effort and nest success. However, there was considerable variation among colonies in nest success based on location and timing on nesting; southern and early nesting colonies were very successful (e.g. 6th Bridge, Tamiami W) while later, northern nesting colonies almost completely failed (e.g. Lox 99 in the Refuge).

Wood Storks

Storks started nesting very early (important because of their extensive nesting period), nested in relatively high numbers, and have been very successful in terms of numbers of chicks fledged. Fledgling survival is also likely to be relatively high given the great foraging conditions these young birds are experiencing. As of May 24, the colonies near Jetport were still active and healthy, and adult and fledgling birds continue to forage in large numbers in WCA-3A.

ENP staff is still in the process of counting nests from photos but as of May 29 there were 1,100 stork nests. Most of these nests successfully fledged many chicks.

Great Egret

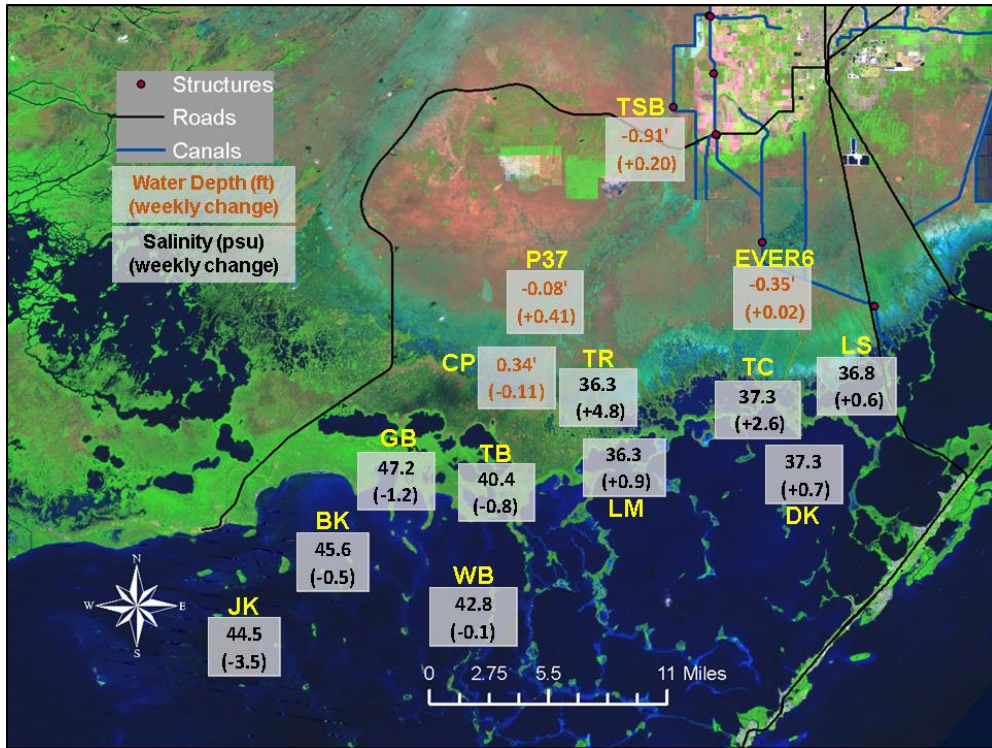
These birds have been nesting in good numbers and producing many fledglings since November and have not stopped yet. The final number of nests for this species from UF are coming, but it is clear that it has been a great year for them.

Small herons and egrets (little blue, tricolored, snowy)

It is hard to monitor nesting for these species from the air because they are small and/or cryptic and tend to nest under the canopy. Annual ground surveys by University of Florida have shown that all three species have declined precipitously in the interior Everglades over the past decade and are cause for concern. This year numbers appear to be up a little. Many more of these birds are foraging in the marsh, especially snowy egrets; and, currently there are relatively more fledglings in the colonies than usual, particularly little blue herons in WCA-1. The colonies in ENP have good numbers of tricolored heron nests.

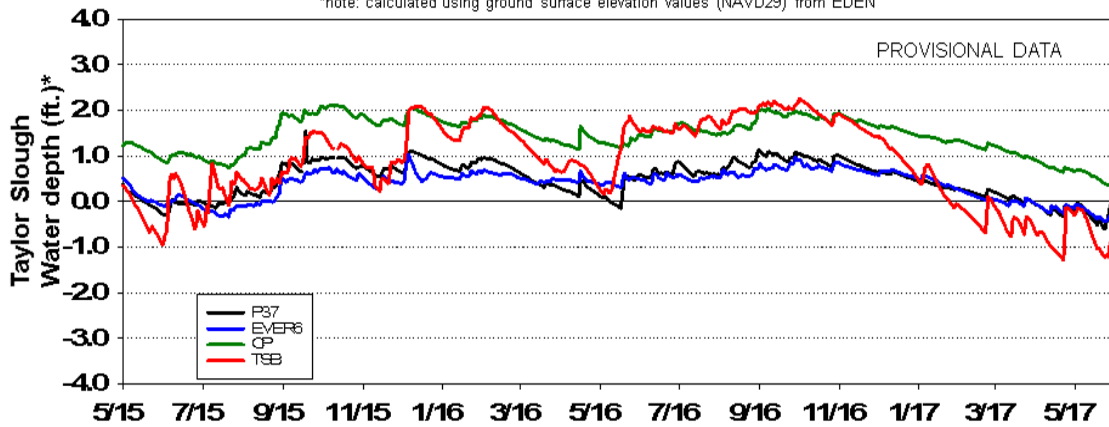
Roseate Spoonbills in the freshwater Everglades

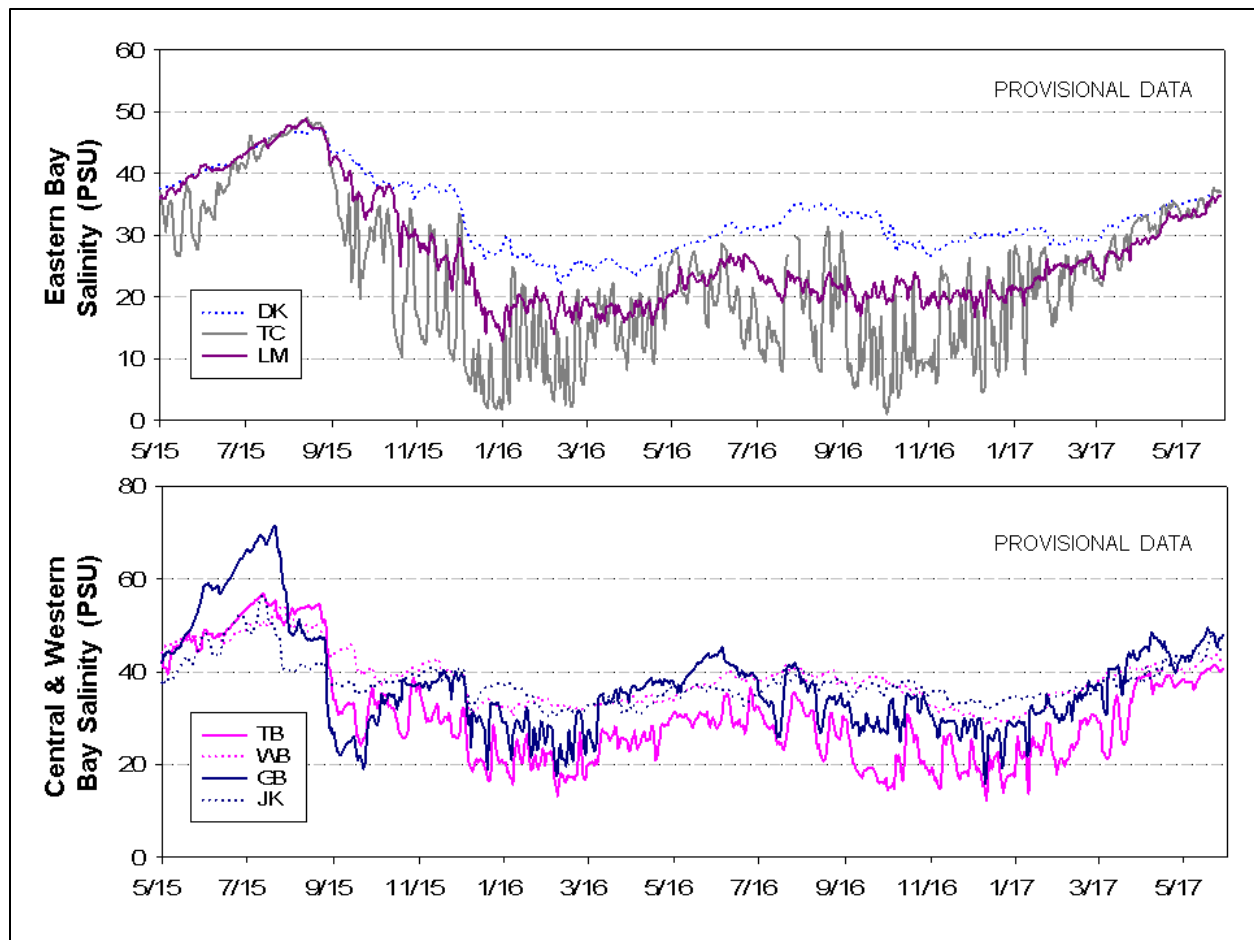
Final counts are pending from UF but observations suggest that spoonbills in the WCAs nested early (December) and in greater numbers than last year and seem to be spread over more colonies than usual. Nesting success appeared to be high given the large numbers of young birds in the colonies and foraging in the marsh. There is a similar pattern in the coastal colonies of ENP, such as Otter, Cabbage and Broad River colonies.



Taylor Slough Water Depths

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



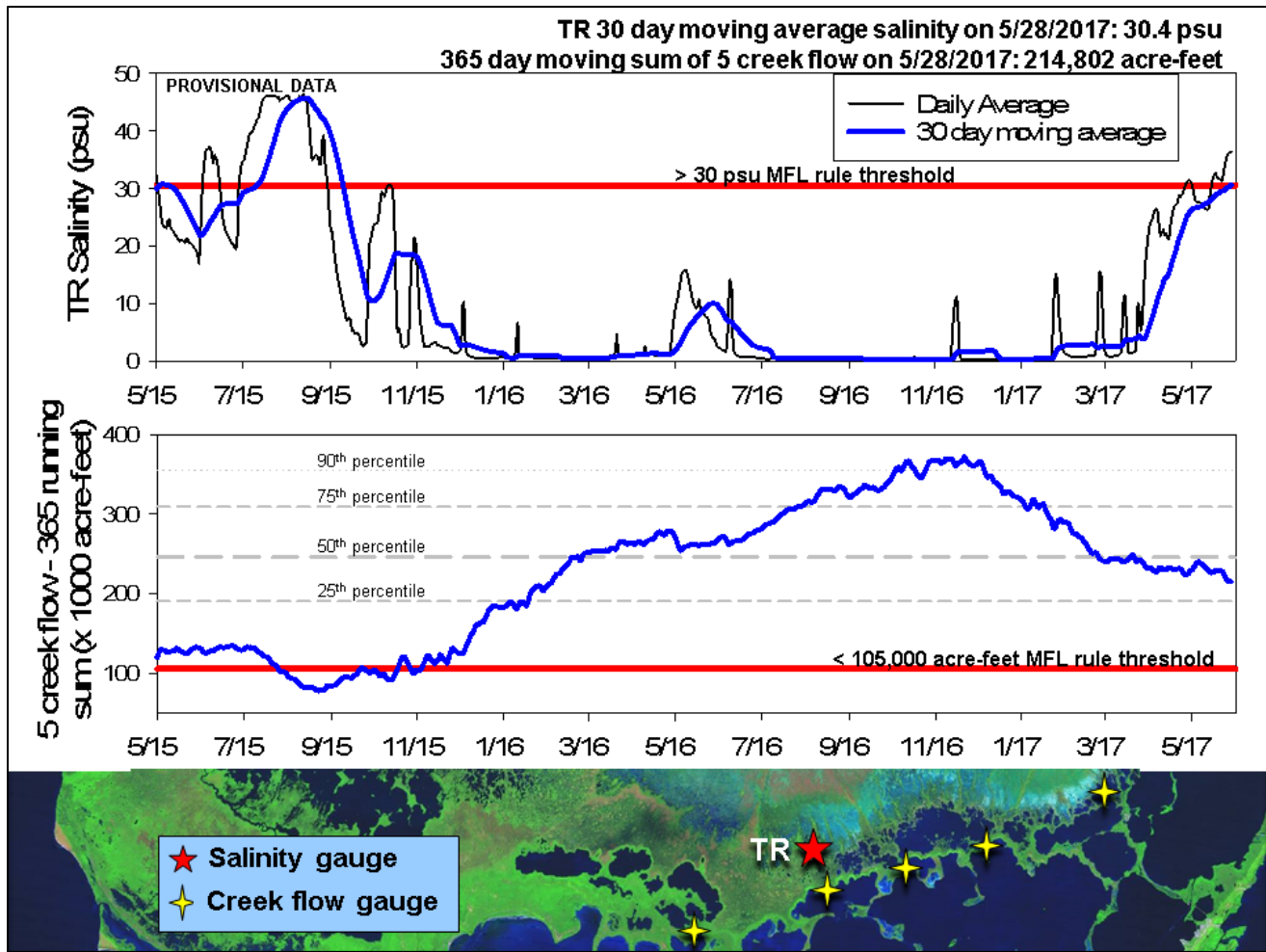


Taylor Slough stages: Water levels continued to decrease in Taylor Slough last week with changes raging from -0.09 to -0.37 feet. Only southwestern Taylor Slough (which is below sea-level) is still above ground. Northern Taylor Slough is still the only area that is currently wetter than a month ago. Compared to historic averages, water levels are average to six inches below average.

Florida Bay salinities and MFL: Salinities in the Bay are currently $+3$ to $+8$ psu above average and range from 35 psu in the eastern nearshore to 48 psu in the western nearshore. Weekly changes ranged from -1 psu to $+5$ psu. Mangrove zone salinities have hovered just above 30 psu for the daily average all week. The 30-day moving average increased $+1.5$ to end the week at 29.4 psu.

The eastern most creek of the five, tracked for the MFL, has not had any data for the last week.

The 365-day moving sum of flow from the five creeks identified by stars on the map was 226,081 acre-feet on May 14 (below the long-term average of 257,628 acre-feet). Creek flow is provisional data from the USGS and is highly variable.



Water Management Recommendations

- Maintaining the foraging conditions in WCA-1, WCA-2A, Central and Southern WCA-3A by returning to a natural recession rate (-.05 to -.09 feet per week) is recommended.

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

Everglades Ecological Recommendations, May 30th, 2017 (red is new)

Area	Current Condition	Cause(s)	Recommendation	Reasons
WCA-1	Stages increased 0.08' to 0.21'	Rainfall, ET, management	Operate for dry season conditions and allow natural recession to resume (up to 0.15 ft/wk). Diversion of STA flows to 2A or northern 3A would be beneficial. Releasing inflows through S-10s to moderate ascension is recommended.	Retain water for the upcoming dry season while protecting habitat for apple snail, snail kite and wading birds.
WCA-2A	Stages increased 0.13'	Rainfall, ET, management	Allow to return to natural recession rates (up to 0.15 ft/wk). Releasing water through S-11s to moderate inflows from the STAs is recommended.	Protect habitat and wildlife. Support apple snails and nesting wading birds. Retain water to provide foraging habitat.
WCA-2B	Stages changes -0.07' to 0.09'	Rainfall, ET, management	Resume natural recession rates (up to 0.15 ft/wk).	Protect habitat and wildlife. Support apple snails and wading birds.
WCA-3A NE	Stages increased 0.31'	Rainfall, ET, management	Restrict recession rates to -0.05' to -0.07' per week to prevent the area from drying out too early for wading bird nesting. Water for northern 3A is desired with the priority being northeastern WCA-3A.	Protect habitat and wildlife. Support apple snails and wading birds and snail kites. Reduce fire risk as water depths are now below ground.
WCA-3A NW	Stages increased 0.04'	Rainfall, ET, management		
Central WCA-3A S	Stages decreased -0.02'	Rainfall, ET, management	Restrict recession rates to -0.05' to -0.09' per week. When flows are changed a gradual reduction is recommended (stepping down over several days). Allow to return to natural recession rates.	Keeping depths below 2.5' at gauge 65 is important to allow tree island vegetation to recover from stress of the recent extended inundation duration. Protect habitat, wildlife and support wading bird and snail kite breeding.
Southern WCA-3A S	Stages increased 0.07'	Rainfall, ET, management		
WCA-3B	Stages increased 0.07'	Rainfall, ET, management	Restrict recession rates to -0.05' to 0.09' per week.	Protect habitat and wildlife including wading bird and snail kite foraging. Provide conditions to support apple snails.
ENP-SRS	Stages at or below minimum for gauge	ET, rainfall, topography, management	Make discharges to the Park according to the 2012 WCP rainfall plan.	Keep peat wet to promote native habitat and maintain wetland plant and animal communities. Protect habitat and wildlife, including wading birds and snail kites.
ENP-CSSS habitats	S-12A, S-12B, S-344, S-343A, S-343B are closed. S-333 closed	Rainfall, ET, management	Follow rainfall plan for releases and current ERTTP guidelines. Follow guidance in C-111 Western Spreader Canal Project operations manual. Care should be taken to avoid overdrying eastern subpopulations C and F.	Future operations need to continue to provide appropriate hydrological and habitat conditions for CSSS. Current and forecasted conditions are conducive for a successful sparrow breeding season. Dry conditions are expected for much of the sparrow breeding season.
Taylor Slough	Stage decreases ranged -0.11' to +0.41'	Rain, ET, inflows	Move water southward as possible	Provide freshwater buffer for ecosystems, maintain low salinity conditions downstream, and maintain slow recession rates.
FB- Salinity	Salinity changes ranged -3 to +3 psu	Rain, ET, inflows, wind	Move water southward as possible	Maintain low salinity conditions and prevent early salinity increases.