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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: July 26, 2016

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Kissimmee

On Sunday, stage in East Lake Toho, Lake Toho, and Kissimmee-Cypress-Hatchineha were below schedule by 0.1, 0.1, and 0.4 feet, respectively. Over the past week, discharge at S65, S65A, and S65E averaged 642, 660, and 1,181 cfs, respectively. Tuesday morning discharges were ~647 cfs, ~635 cfs, ~1,328 cfs, and ~907 cfs, respectively at S65, S65A, S65C, and S65E. Dissolved oxygen in the Kissimmee River averaged 4.91 mg/L over the past week and 5.14 mg/L on Sunday. Kissimmee River mean floodplain depth on Sunday was 0.44 feet. There are no new recommendations for this week.

Lake Okeechobee

Lake Okeechobee is at 14.69 feet NGVD having remained static over the past week. The Lake remains in the Low Flow Sub-band. Lake levels are approximately a foot too high for this time of year and there is a potential for negative impacts to submerged aquatic vegetation (SAV). Various data sources indicate the presence of large dense cyanobacterial blooms on the Lake.

Estuaries

The USACE implemented a seven-day pulse schedule of 650 cfs to the St. Lucie Estuary last week. Total freshwater inflow to the St. Lucie Estuary averaged 1,166 cfs. Flow from the Lake was 594 cfs (51% of total flow). Salinity increased throughout the estuary. The seven-day average salinity at the US1 Bridge is at the top of the fair range for adult oysters. In the Caloosahatchee Estuary, the USACE implemented a seven-day pulse schedule at S-79 of 2,800 cfs. Total freshwater inflow averaged 4,786 cfs. Flow from the Lake was 487 cfs (10% of total flow). High rainfall in the area resulted in high C-43 watershed contribution (2,709 cfs) to total flow. In order to meet S-79 target flows, the contribution from the Lake was reduced. Salinity conditions in the upper estuary are suitable for tape grass. Salinity remained in the poor range for adult oysters at the Cape Coral Bridge and in the good range at Shell Point and Sanibel. The 30-day average salinity at the I-75 Bridge is below 5.

Stormwater Treatment Areas

Over the past week, the STAs/FEBs received approximately 11,500 acre-feet of Lake regulatory releases. The total amount of Lake regulatory releases sent to the STAs/FEBs in WY2017 (since May 1, 2016) is approximately 38,400 acre-feet. All STA cells are at or above target depths. Operational restrictions are in place for vegetation rehabilitation in STA-1E, STA-1W, and STA-5/6 and structure repairs are underway in STA-1E. In addition, nests of ESA-protected species have been observed in STA-1E and STA-5/6. This week, as conditions allow, releases will be sent to STA-1E, STA-1W and the A-1 FEB, and A-1 FEB releases will be sent to STA-2 and STA-3/4.

Everglades

Rainfall was moderate again in the Everglades, but stages changed little, ranging from -0.01 feet to 0.07 feet. Water levels remain shallow in northern WCA-3A and in WCA-1, where the northern half of the area has been closed to airboat access. Additional water is requested for WCA-1, central WCA-2A, and northern WCA-3A. The 30-day moving average salinity at the Florida Bay MFL site is at a seasonally typical 0.5 psu and the cumulative 365-day inflow from the five creeks into Florida Bay increased to 304,391 acre-feet on July 18, the last day total flow data were available.

Weather Conditions and Forecast

Below average rains likely into the weekend. Instability is weak as warmer mid to upper level temperatures moved in behind the upper level low that moved across south Florida on Sunday. Look for easterly steering winds to focus a below average crop of seabreeze storms west of the Lake this afternoon. Moisture decreases further on Tuesday (except over the Keys) as mid-level high pressure dominates, so expect well below average rains tomorrow afternoon and again on Wednesday. The large-scale pattern will need to change before above average rains can return...probably in early August.

KISSIMMEE BASIN

Kissimmee Basin Rainfall

The Upper Kissimmee Basin received 1.86 inches of rainfall in the past week and the Lower Basin received 1.92 inches (SFWMD Daily Rainfall Report 07/25/2016).

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: 7/26/2016		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)	7/24/16	7/17/16	7/10/16	7/3/16	6/26/16	6/19/16	6/12/16
Lakes Hart and Mary Jane	S62	81	LKMJ	60.1	R	60.0	0.1	0.0	0.1	0.0	0.0	0.4	0.0
Lakes Myrtle, Preston, and Joel	S57	21	S57	60.9	R	61.0	-0.1	0.1	0.0	0.0	0.0	0.1	-0.4
Alligator Chain	S60	22	ALLI	63.3	R	63.2	0.1	0.0	0.0	-0.1	-0.5	-0.6	-0.8
Lake Gentry	S63	112	LKGT	60.9	R	61.0	-0.1	0.2	0.0	0.0	0.1	-0.1	-0.8
East Lake Toho	S59	88	TOHOE	56.4	R	56.5	-0.1	-0.1	-0.3	-0.5	-0.7	-0.5	-0.6
Lake Toho	S61	0	TOHOW, S61	53.4	R	53.5	-0.1	-0.3	-0.4	-0.5	-0.8	-0.8	-0.5
Lakes Kissimmee, Cypress, and Hatchineha	S65	642	LKISSP, KUB011, LKISSB	50.6	R	51.0	-0.4	-0.5	-0.4	-0.5	-1.0	-0.8	-0.8

* 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.

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: 7/26/2016												
Metric	Location	Sunday's 1-day average	Weekly Average**									
			7/24/16	7/17/16	7/10/16	7/3/16	6/26/16	6/19/16	6/12/16	6/5/16	5/29/16	5/22/16
Discharge (cfs)	S-65	625	642	545	552	857	2431	3194	3940	2899	4304	2029
Discharge (cfs)	S-65A	664	660	633	660	1211	2890	4455	5649	3348	6187	4379
Discharge (cfs)	S-65C	1126	1091	1119	1489	2741	4168	6224	5091	4792	6914	3320
Headwater stage (feet NGVD)		34.2	34.0	34.1	34.2	34.0	34.1	34.1	34.1	34.1	33.9	34.2
Discharge (cfs)	S-65D****	1178	1263	1272	1835	3108	4552	7361	5471	5186	7868	2979
Discharge (cfs)	S-65E	1089	1181	1147	1755	2991	4458	7216	5255	5005	7470	2873
DO concentration (mg/L)***	Phase I river channel	5.14	4.91	4.40	2.74	2.21	1.66	0.77	1.44	0.48	0.72	3.62
Mean depth (feet)*	Phase I floodplain	0.44	N/A	0.63	0.62	1.18	1.93	2.33	3.12	1.75	2.81	3.09

* 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
7/26/2016	No new recommendations.			
7/19/2016	No new recommendations.			
7/12/2016	No new recommendations.			
6/30/2016	Ramp down S65/S65A discharge by 150 cfs per day to 650 cfs and hold at 650 cfs until lake stage rises to Zone A of the schedule. When stage enters Zone A, ramp up S65 discharge to 1,400 cfs as stage rises from 0.0 to 0.6 feet above the regulation line unless there is a large rainfall event. This ramp up schedule will be reevaluated when the regulation schedule reaches 52.0 feet NGVD.	The ramp down in S65/S65A discharge is intended to lessen the impact of Lake Okeechobee releases on naturally occurring algal blooms. Holding discharge at 650 cfs reflects consideration for the Snail Kites nesting in the Kissimmee River floodplain.	Implemented	SFWMD Operations Control
6/28/2016	No new recommendations.			
6/21/2016	No new recommendations.			
6/14/2016	No new recommendations.			
6/7/2016	No new recommendations.			
5/31/2016	No new recommendations.			
5/24/2016	No new recommendations.			
5/17/2016	No new recommendations.			
5/10/2016	No new recommendations.			
5/3/2016	No new recommendations.			
4/26/2016	No new recommendations.			
4/19/2016	No new recommendations.			
4/12/2016	No new recommendations.			
4/5/2016	No new recommendations.			
3/29/2016	No new recommendations.			
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

KCOL Hydrographs (through Sunday midnight)

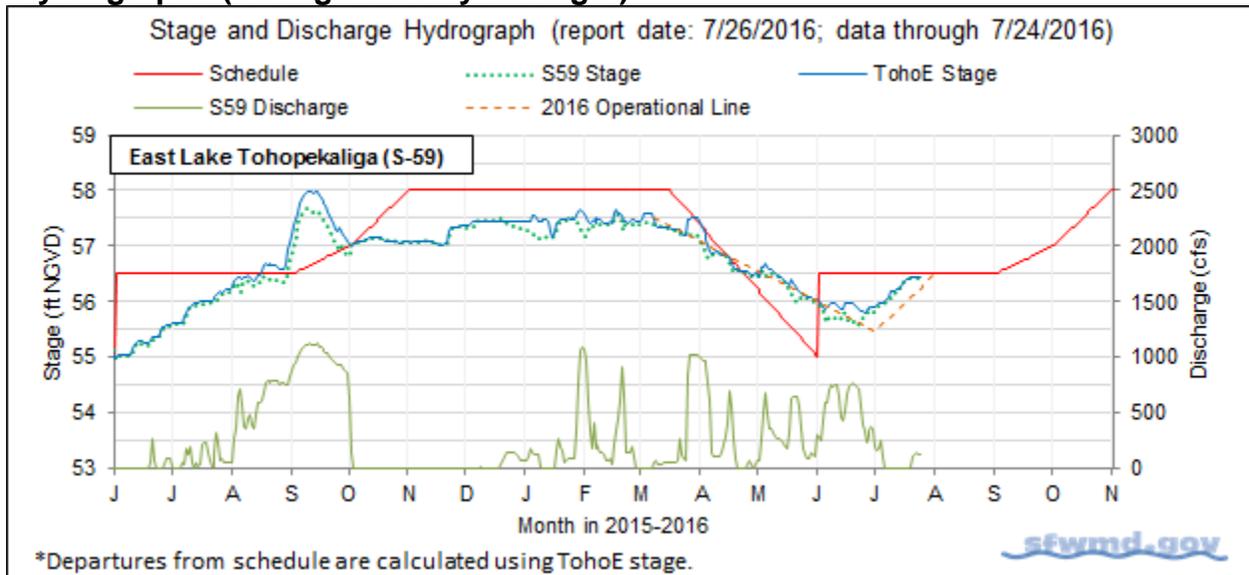


Figure 1.

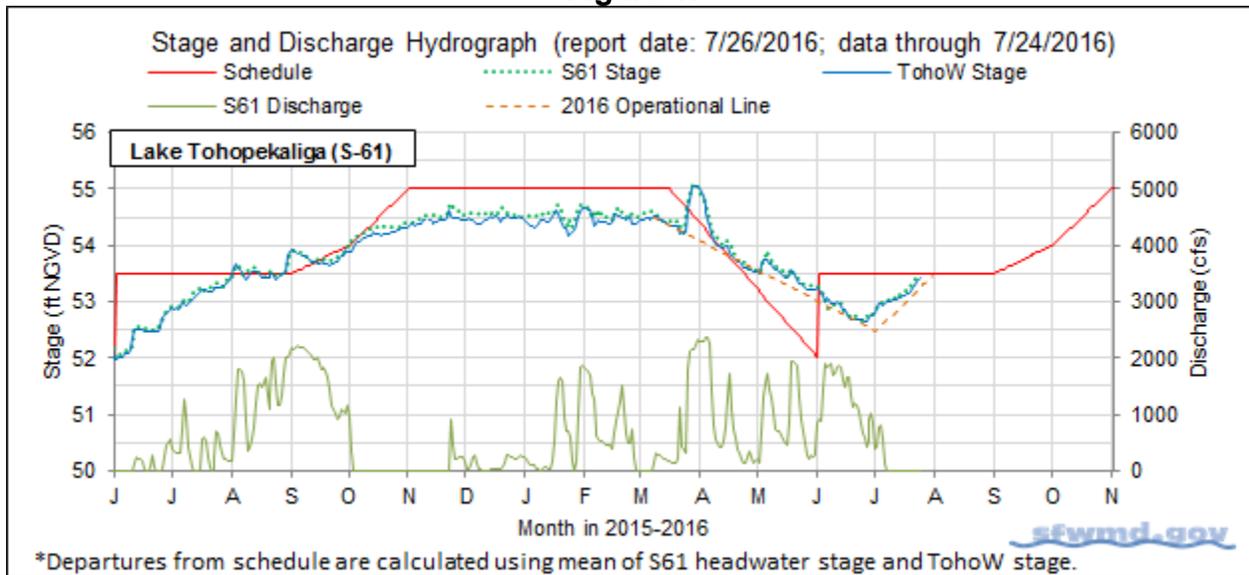


Figure 2.

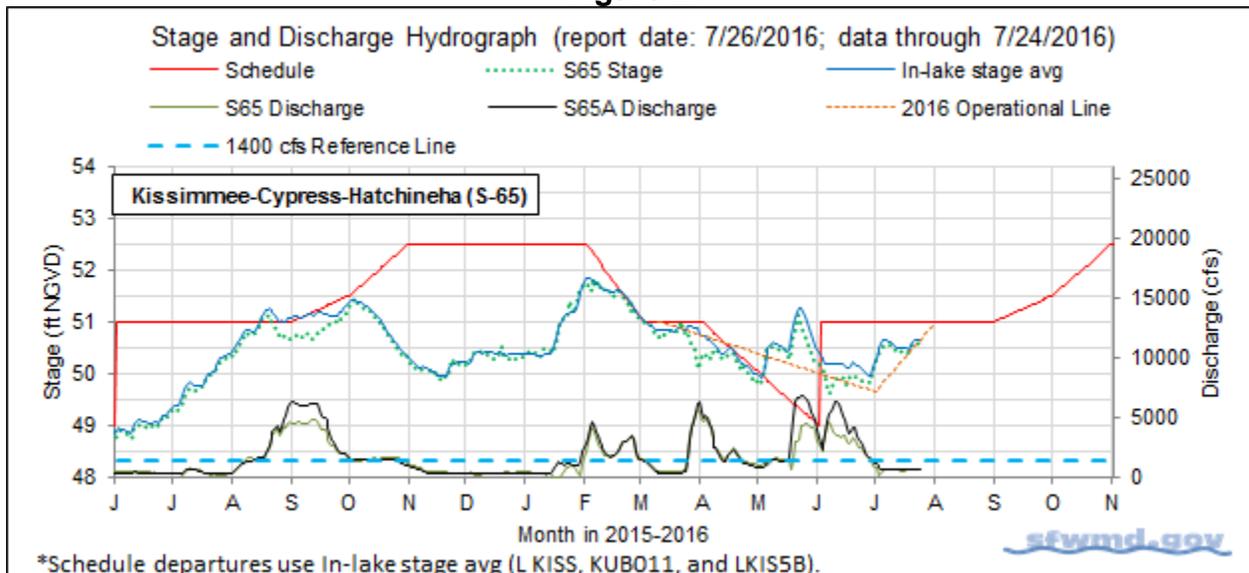


Figure 3.

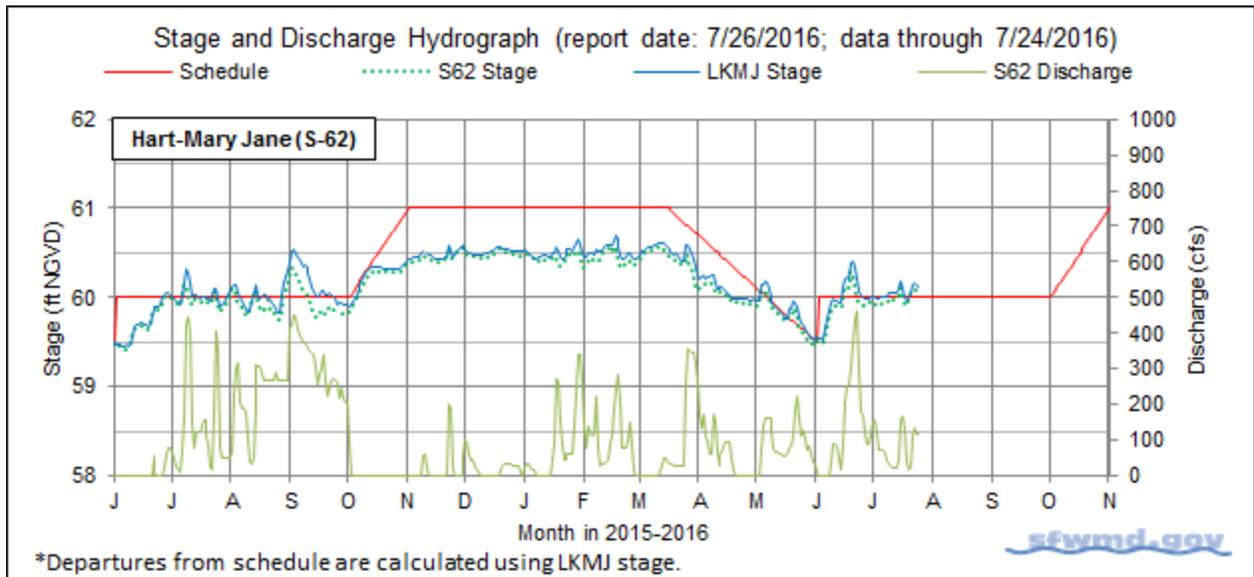


Figure 4.

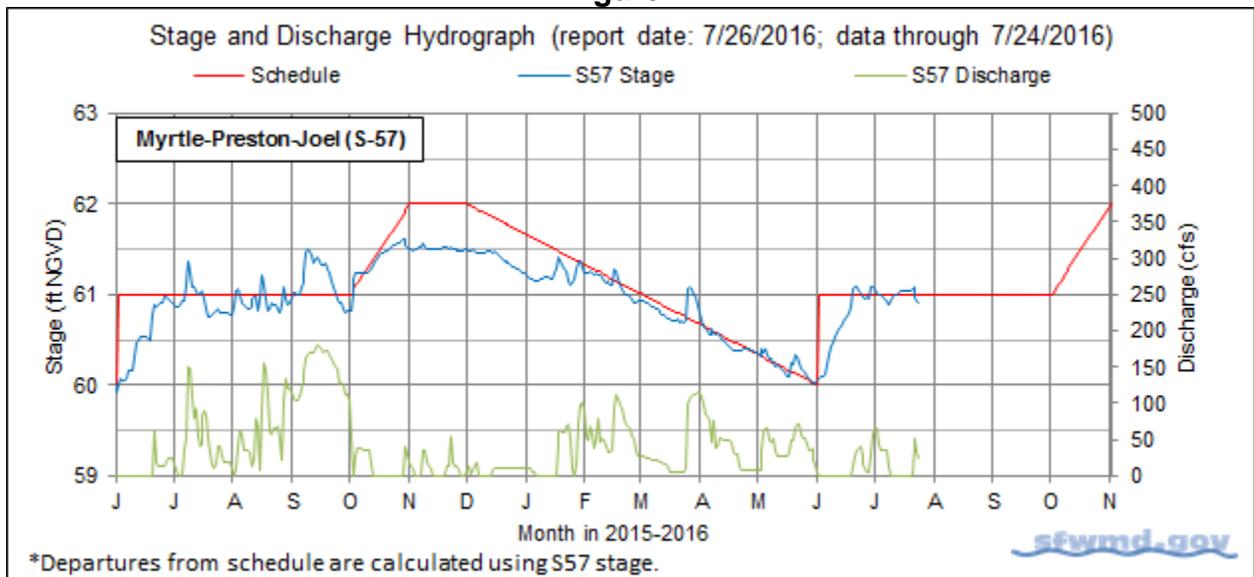


Figure 5.

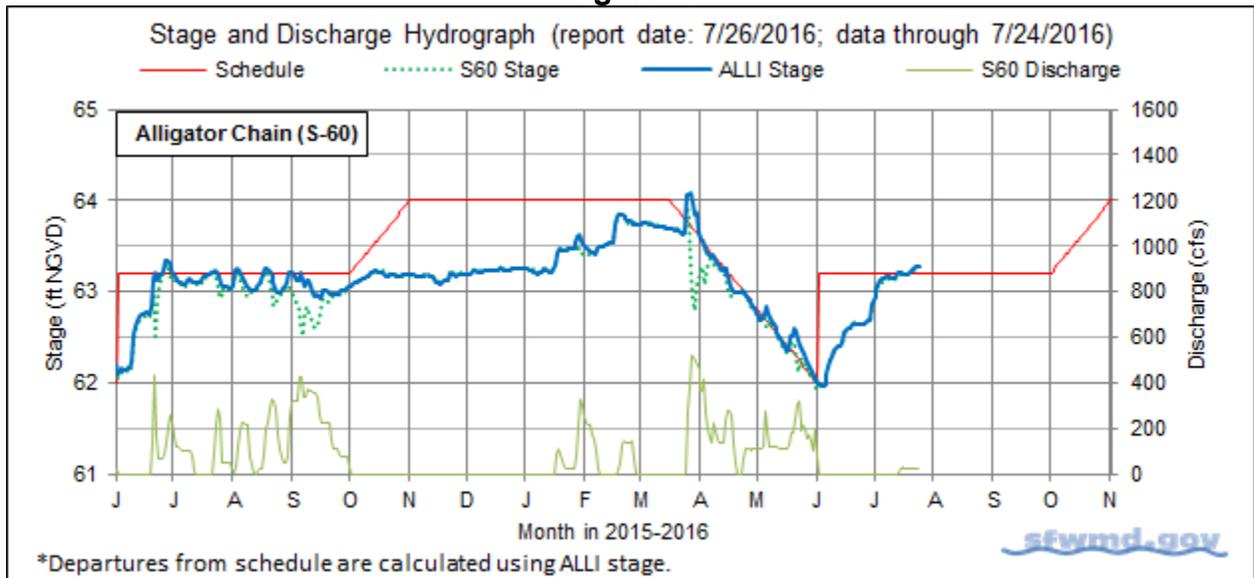


Figure 6.

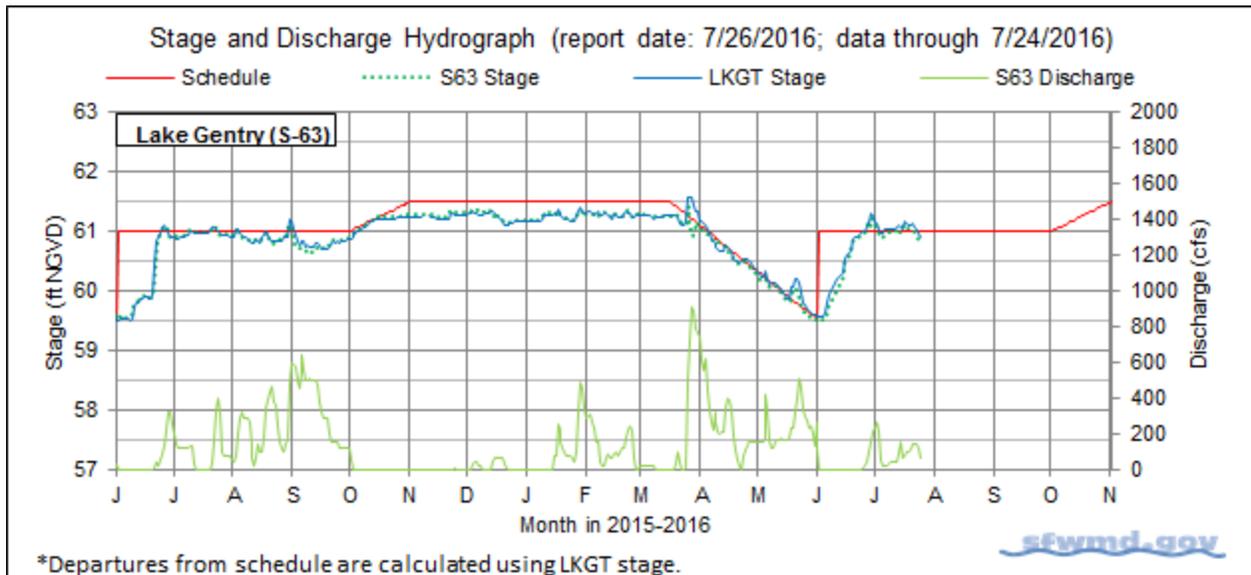


Figure 7.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Limits on Rate of Discharge Change at S65/S65A During Wet Season 2016

Discharge Rate of Change Limits for S65/S65A (revised 6/30/16). **Rate limits apply only in Zone B**			
	Q (cfs)	Maximum rate of increase (cfs/day)	Maximum rate of decrease (cfs/day)
Zone B	650-1450	150	-150
	1450-1700	250	-250
	1700-2600	300	-300
	2600-3000	400	-400
	>3000	1000	-1000
Zone A	No limits		

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

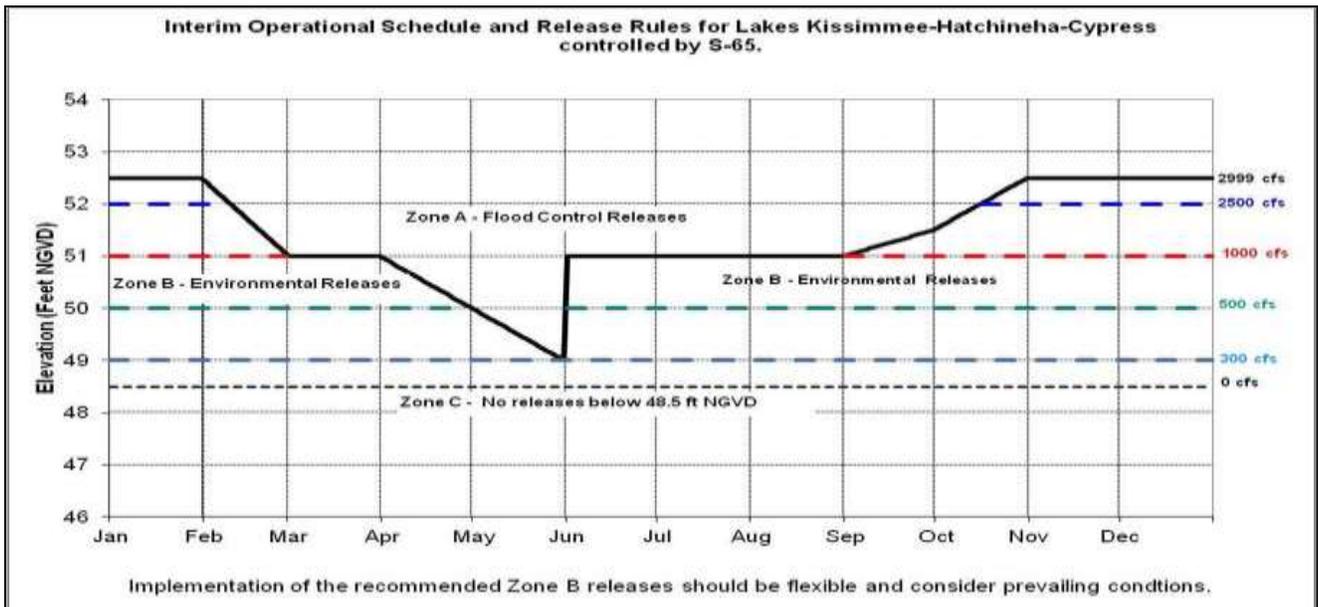


Figure 8b. Interim operations schedule for S-65. The discharge schedule shown to the right has not been used in recent years or in Wet Season 2015.

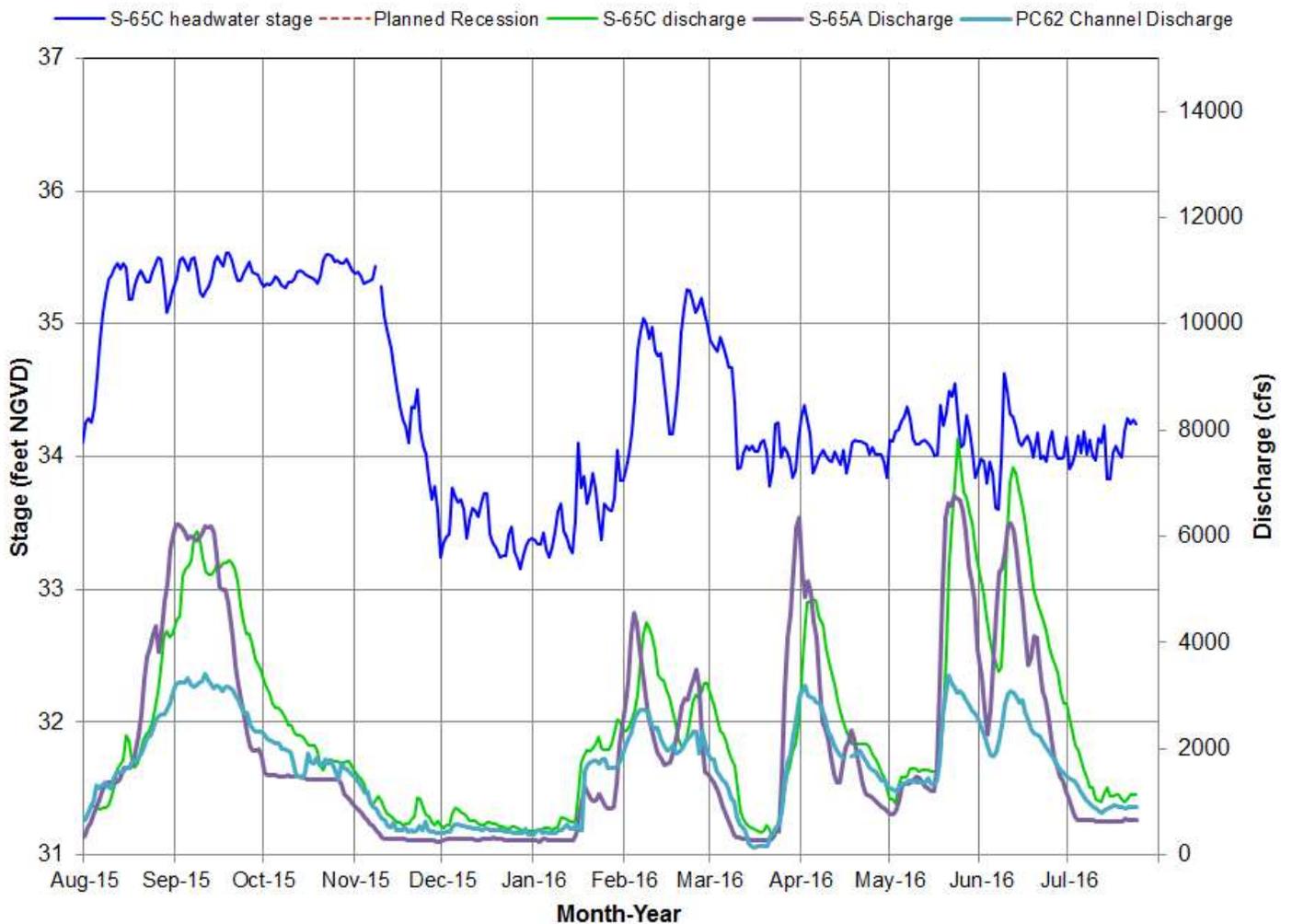


Figure 9. S-65C headwater stage in relation to discharge at S-65C, S-65A, and PC62.

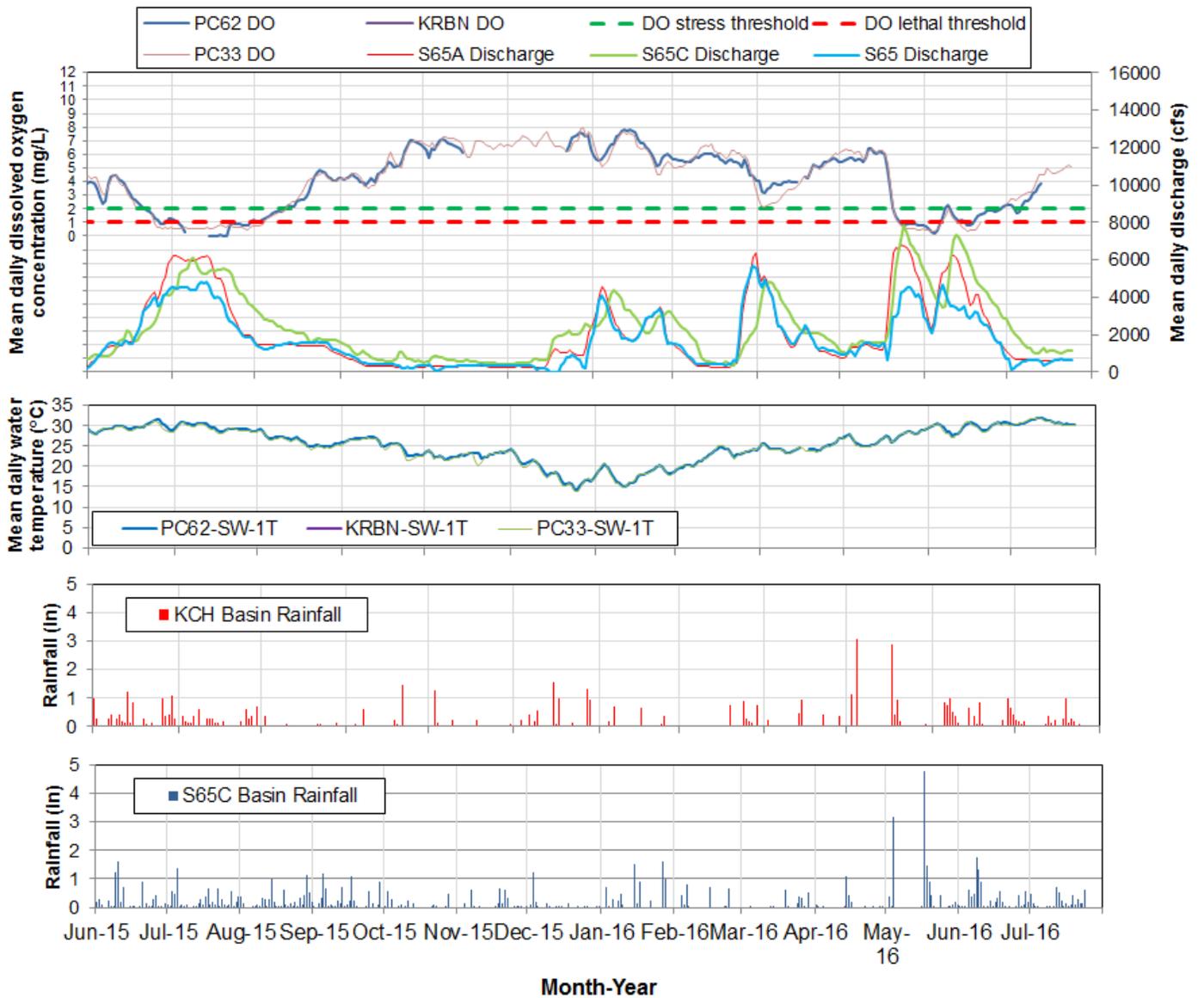


Figure 10. Mean daily Dissolved Oxygen, discharge, temperature and rainfall in the Phase I river channel.

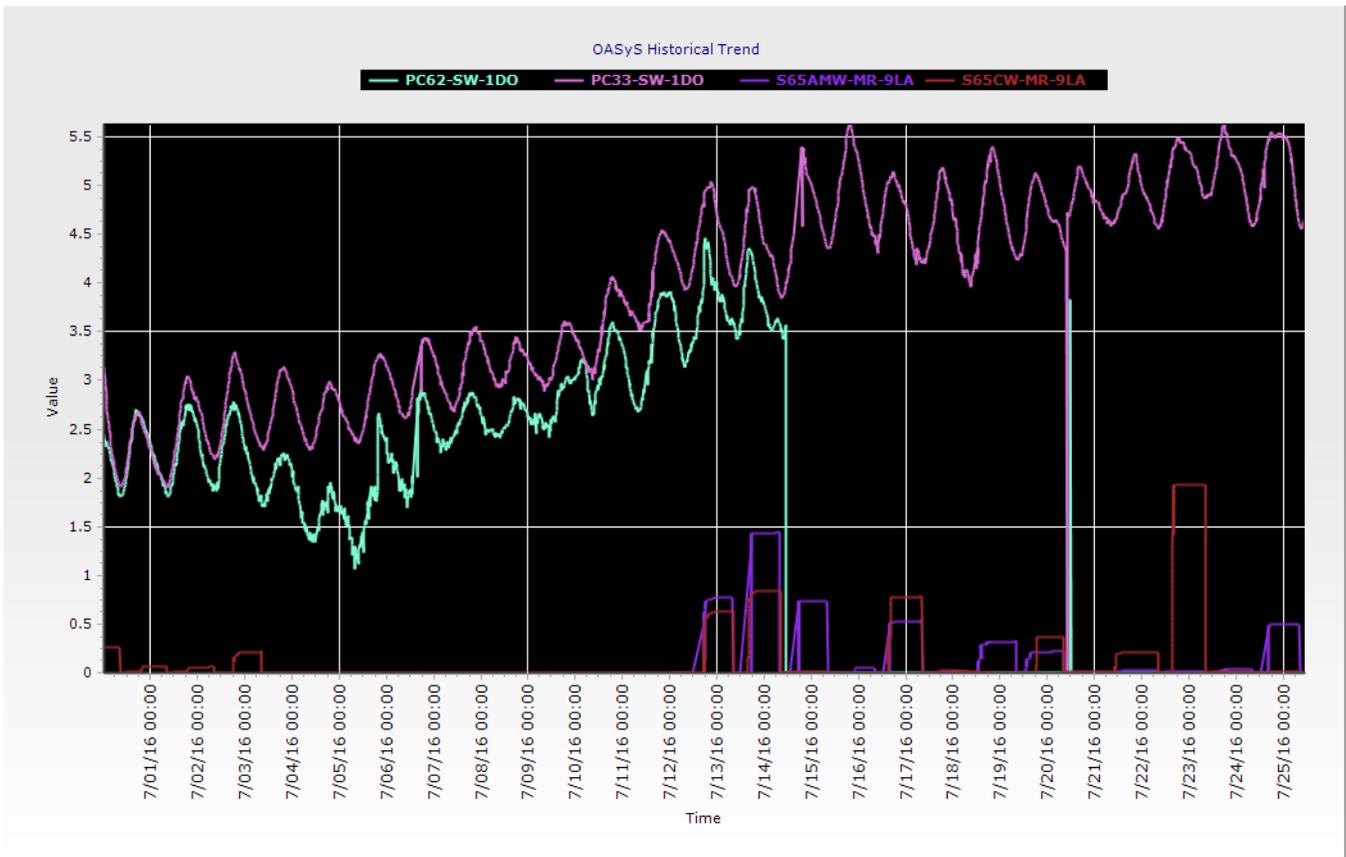


Figure 11. Phase I river channel dissolved oxygen (measured at 15 minute intervals) and rainfall at S65A and S65C.

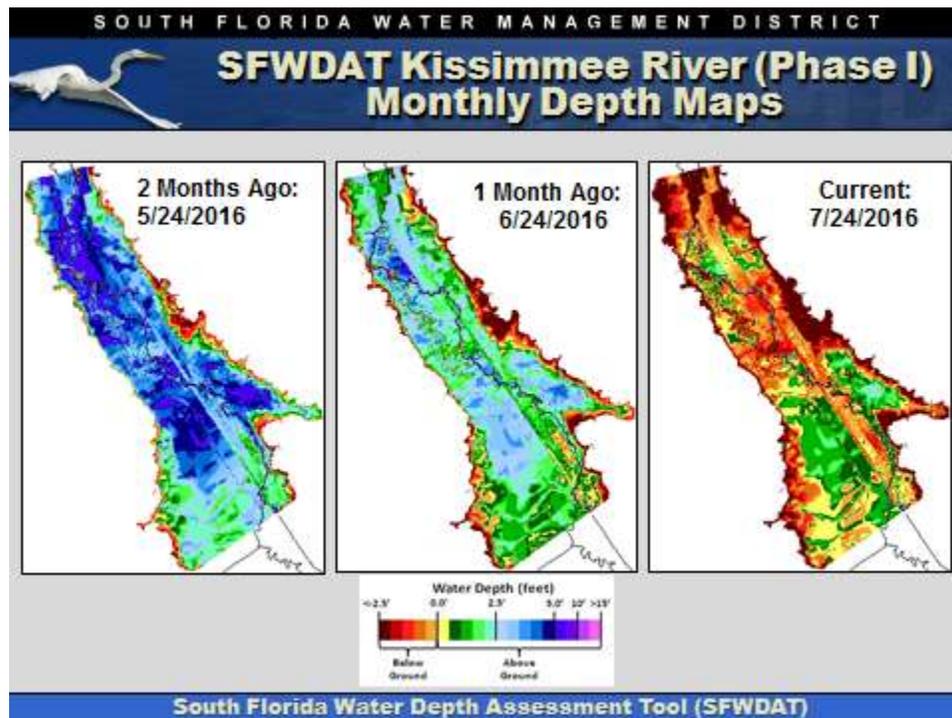
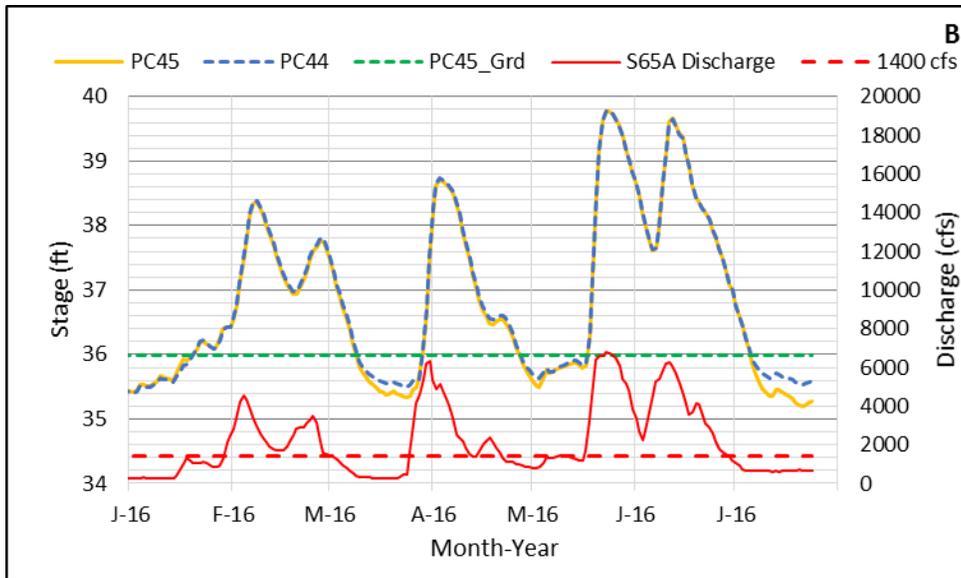
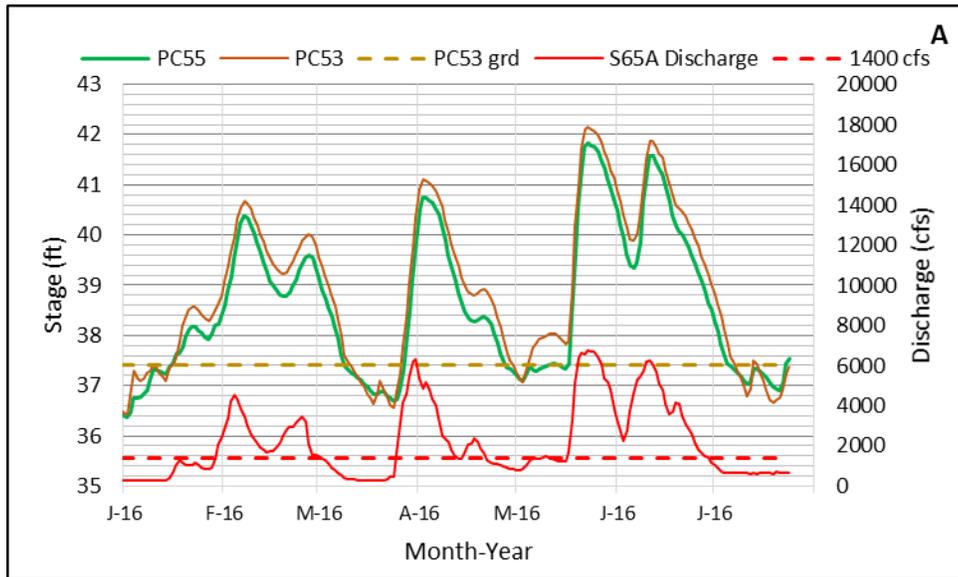


Figure 12. Phase I area floodplain water depths for this week, one month ago, and two months ago. Note that the WDAT color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to Jan. 16, 2012.



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

Kissimmee River Hydrographs

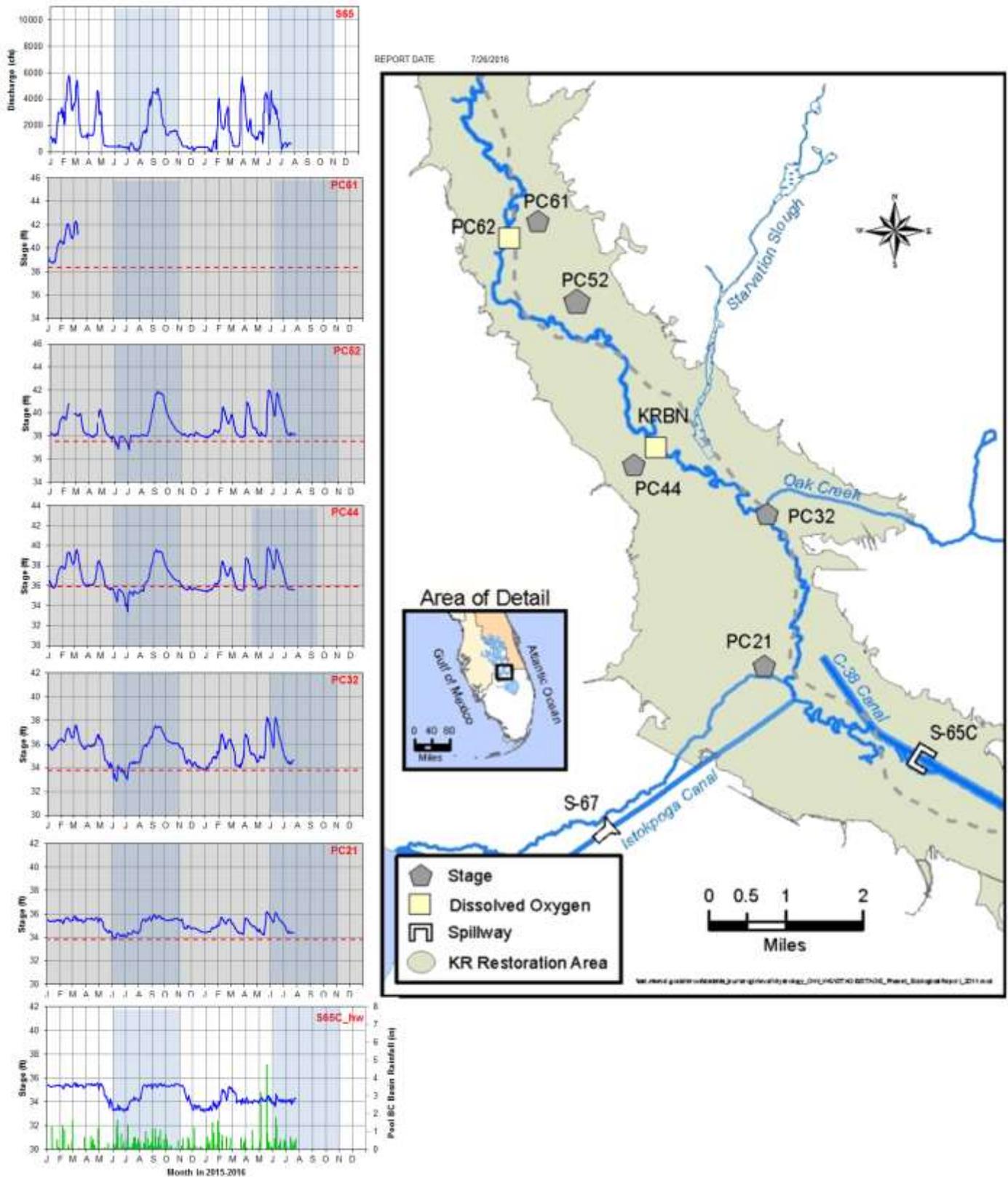


Figure 13. Discharge at S65, stages at five monitoring stations in the Phase I area of the Kissimmee River floodplain, and headwater stage at S65-C since January 1, 2015. The most recent data (~2 weeks) are provisional real-time data from SFWMD DualTrend; previous data are from SFWMD DB-HYDRO (validated).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

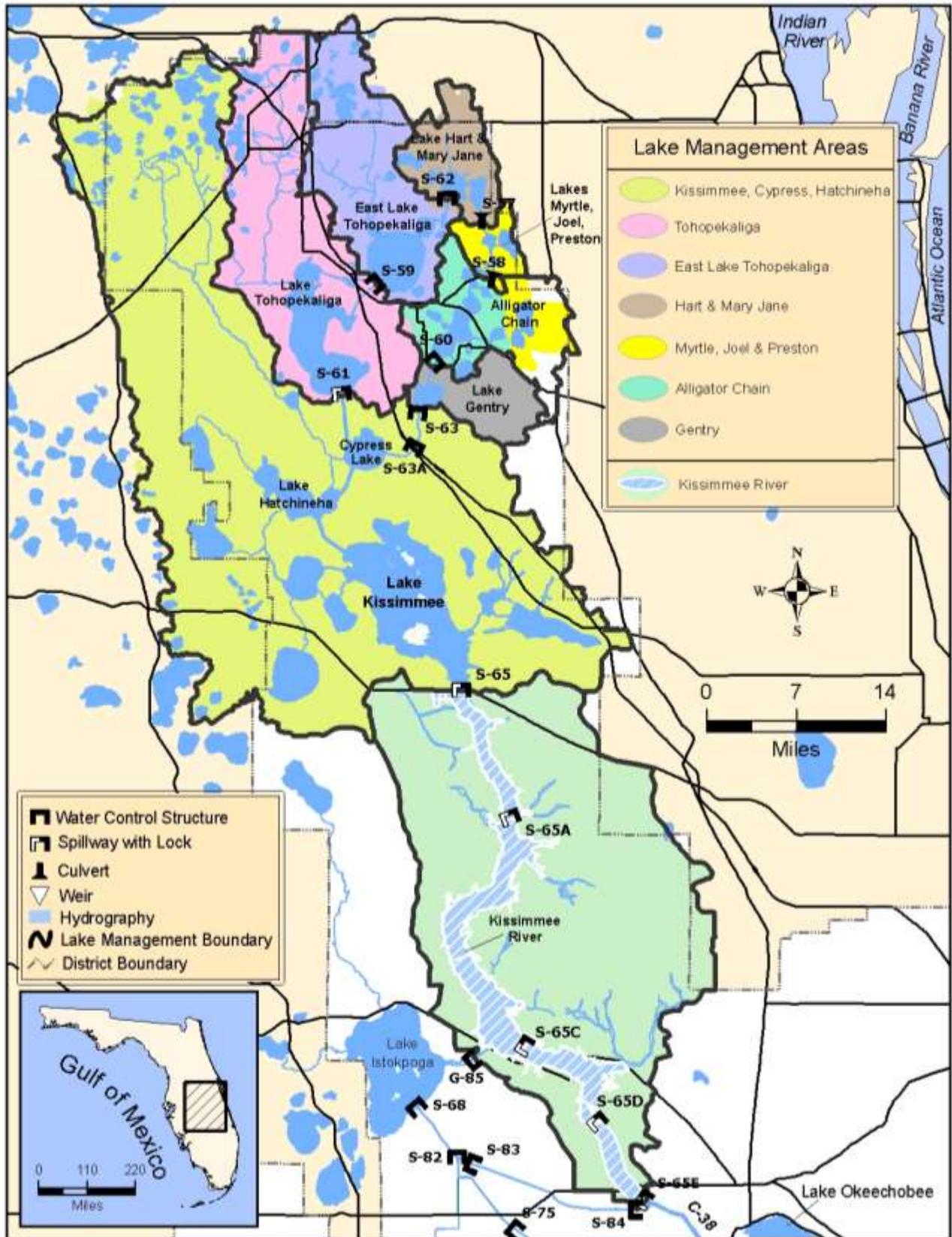


Figure 14. The Kissimmee Basin

LAKE OKEECHOBEE

According to the USACE web site, Lake Okeechobee stage is at 14.69 feet NGVD for the period ending at midnight on July 25, 2016. This value is based on the use of four interior Lake stations (L001, L005, L006, and LZ40) and four perimeter stations (S352, S308, S4 and S133). Lake stage showed no net change over the past week and is 0.22 feet lower than it was a month ago and 2.61 feet higher than it was a year ago (Figure 1). The Lake is in the Low Flow Sub-band (Figure 2). According to RAINDAR, 1.48 inches of rain fell directly over the Lake during the past seven days. The surrounding watershed experienced similar or higher rainfall amounts (Figure 3).

Based on USACE reported values, current Lake inflow is approximately 3,510 cfs as detailed below.

Structure	Flow cfs
S65E	1316
S154	0
S84 & 84X	1691
S71	0
S72	23
C5 (Nicodemus slough dispersed storage)	-48
S191	8
S133 PUMPS	0
S127 PUMPS	0
S129 PUMPS	0
S131 PUMPS	0
S135 PUMPS	4
Fisheating Creek	515
S2 Pumps	0
S3 Pumps	0
S4 Pumps	0

Current Lake outflow is approximately 2,070 cfs exiting at S77 (32 cfs), S308 (623 cfs) and to the L8 canal through Culvert 10A (252 cfs). Water supply demands decreased somewhat in the EAA, compared to the previous week, with a total of 1,162 cfs exiting through S351, S352, and S354. Corrected evapotranspiration value based on the L006 weather platform solar radiation data for this past week was 2,600 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.

July water quality data are presented in Figure 5. Total phosphorus (TP) and total suspended solids values have remained relatively low and unchanged for the past three months, except for pelagic zone TP values, which showed a marked decrease over the past two months.

July chlorophyll and microcystin data collected on July 11 and 12 indicated the presence of blooms at seven sampling sites, mostly along the western shoreline and in the southern bays (Figure 6). All of the routine microcystin sampling sites had values above the analytical limit of detection.

The most recent satellite images (MODIS for July 16 and 23) (Figure 7) indicate a possible resurgence of bloom conditions with approximately 200+ square miles of surface area affected.

The Fish and Wildlife Commission snail kite coordinator reported that during the July Lake Okeechobee survey 30 new nests were identified, most of them in the moonshine bay area (Figure 8). There are currently 32 active nest on the Lake. Twenty-four successful kite nests have been recorded for Lake Okeechobee this season out of a total of 127 nesting attempts (19%).

Water Management Recommendations

Lake stage has been decreasing slowly over the past month but showed no net change over the past week. The current Lake stage is about one foot too high for this time of year, which may result in an increased loss of submerged aquatic vegetation (SAV). There also appears to be an increase in the occurrence of cyanobacterial blooms and the potential for elevated toxin levels. Future short-term recommendations are highly dependent on near-term rainfall patterns and amounts. The goal should be to limit the rate of Lake stage increase or continue the current unseasonable recession in Lake stage to avoid exceeding the top of the preferred stage envelope (15.5 feet NGVD) during the wet season.

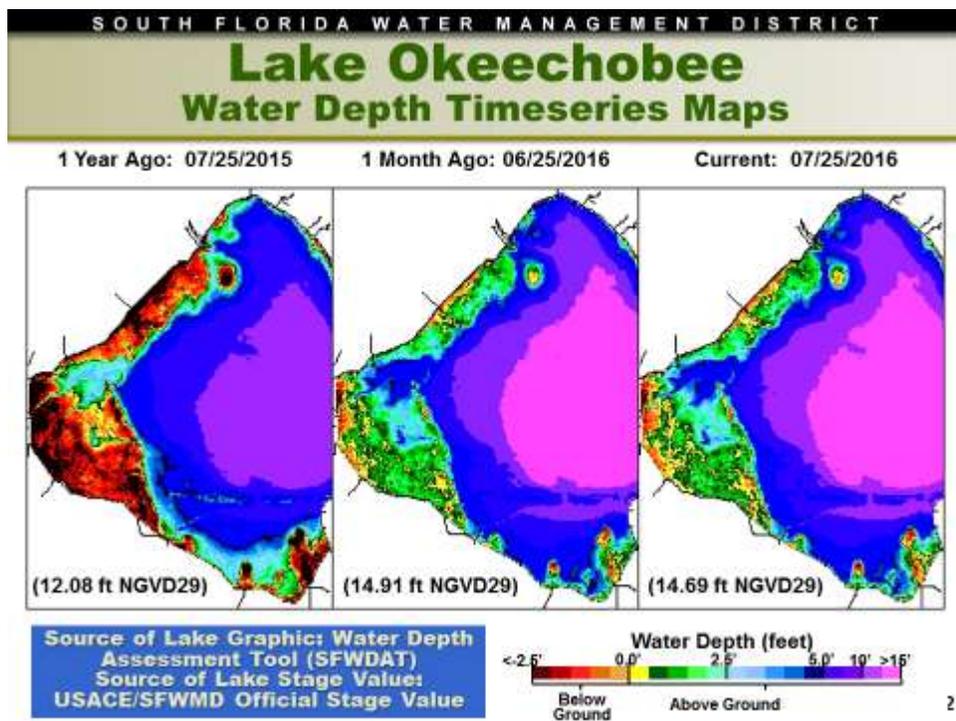


Figure 1

Lake Okeechobee Water Level History and Projected Stages

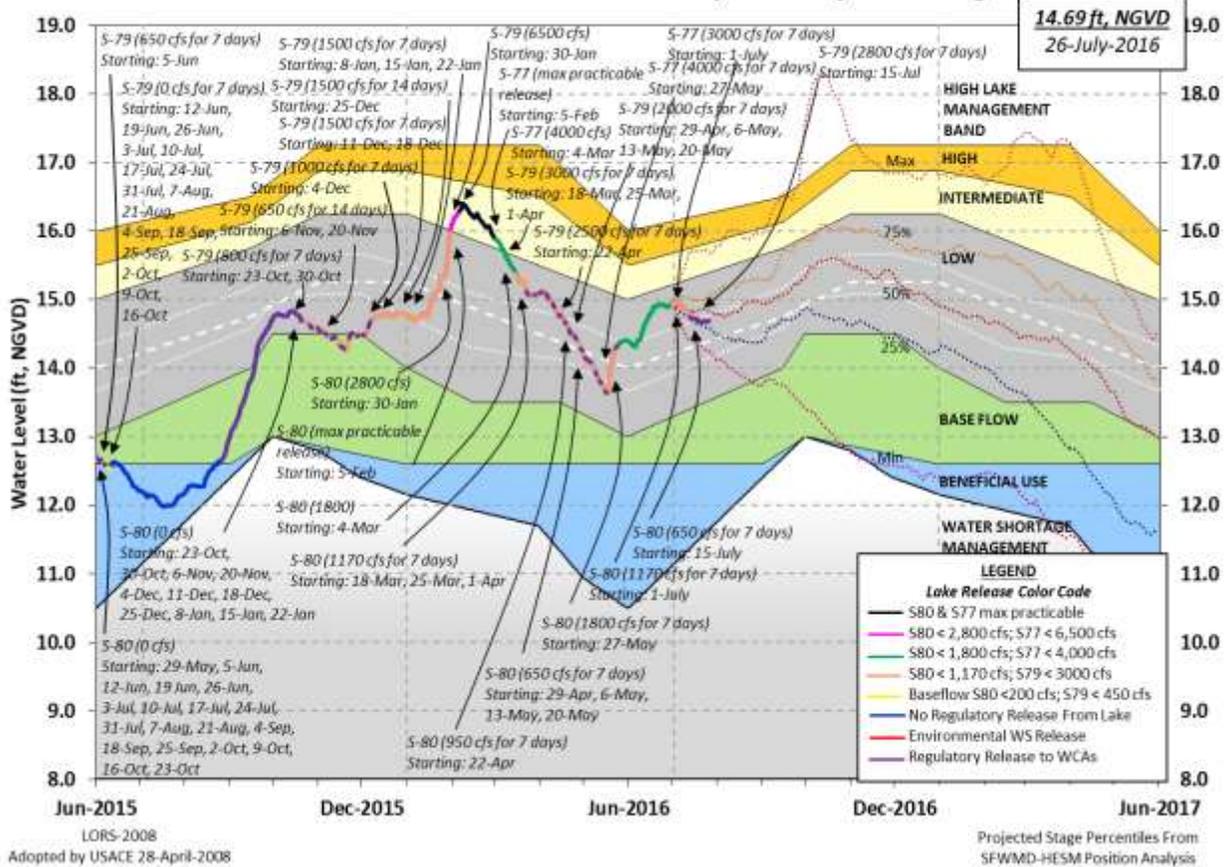


Figure 2

SFWMD PROVISIONAL RAINDAR 7-DAY BASIN RAINFALL ESTIMATES

FROM: 0230 EST, 07/19/2016 THROUGH: 0230 EST, 07/26/2016

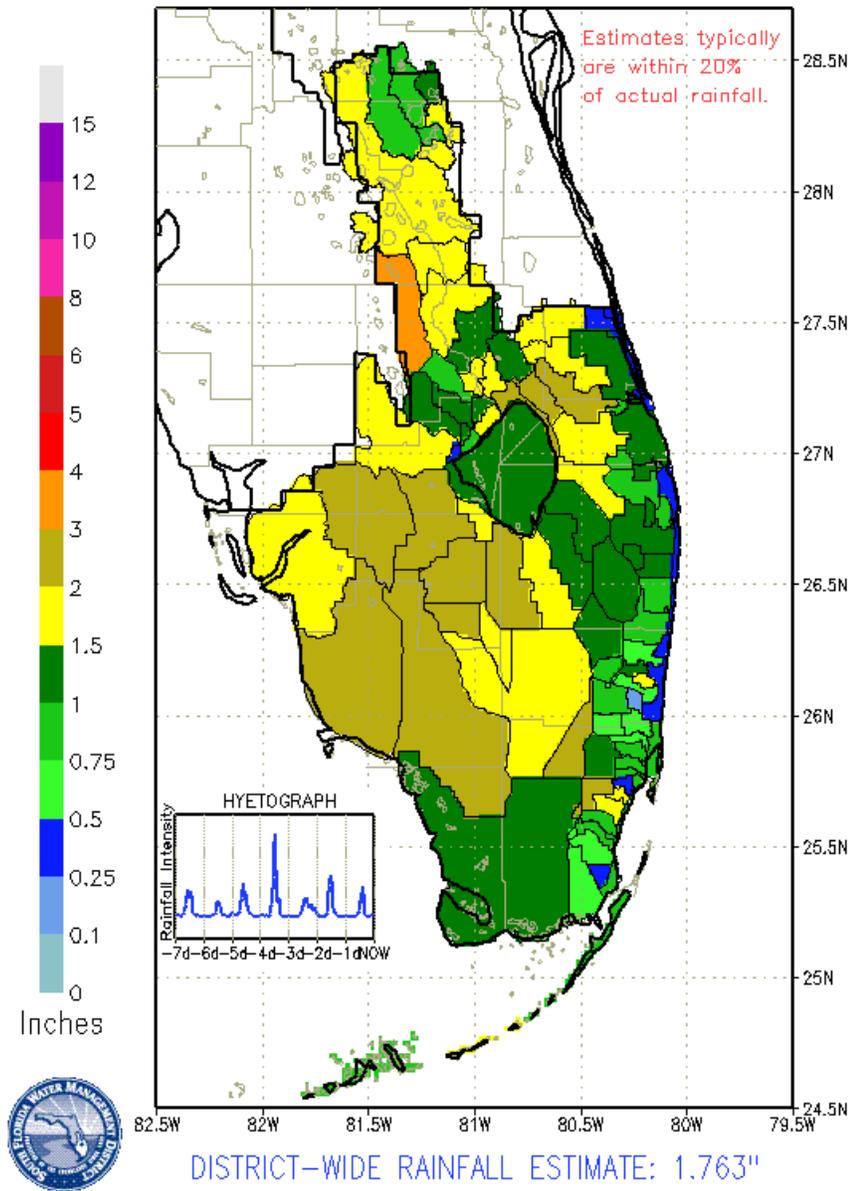


Figure 3

INFLOWS	Average Daily Flow Past Week cfs	Feet of Change Past Week
S65E	1316	0.044
S71 & 72	110	0.004
S84 & 84X	1607	0.054
Fisheating Creek	472	0.016
Rainfall	N.A.	0.123
OUTFLOWS	Average Daily Flow Past Week cfs	Feet of Change Past Week
S77	487	0.016
S308	590	0.020
S351	310	0.010
S352	351	0.012
S354	984	0.033
L8	361	0.012
ET	2600	0.087

Figure 4

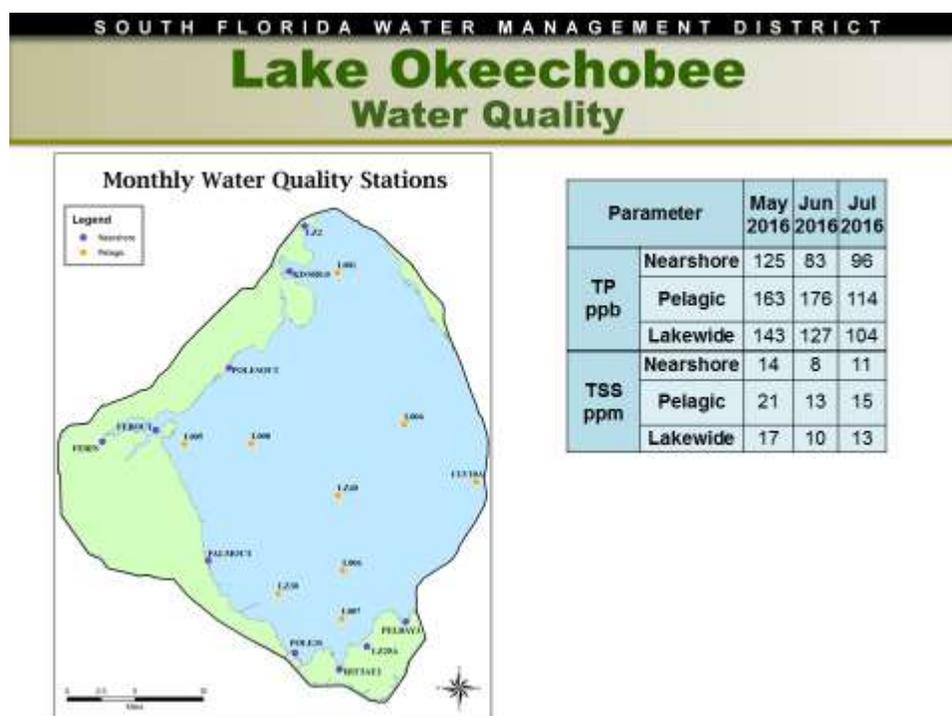


Figure 5

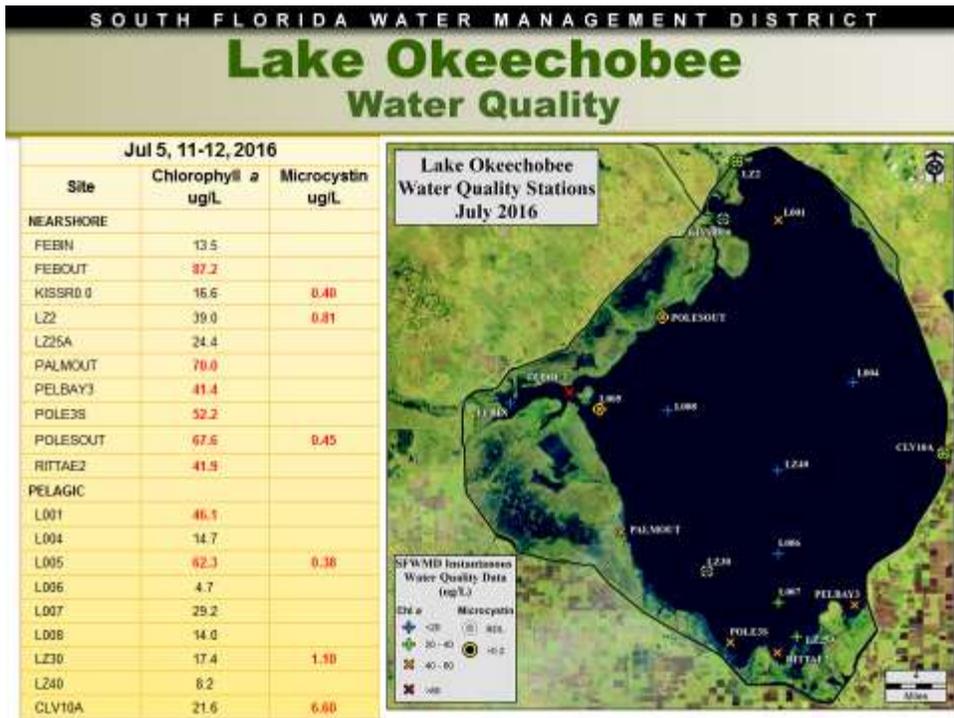


Figure 6

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Lake Okeechobee Algal Blooms

Unvalidated and Experimental Data

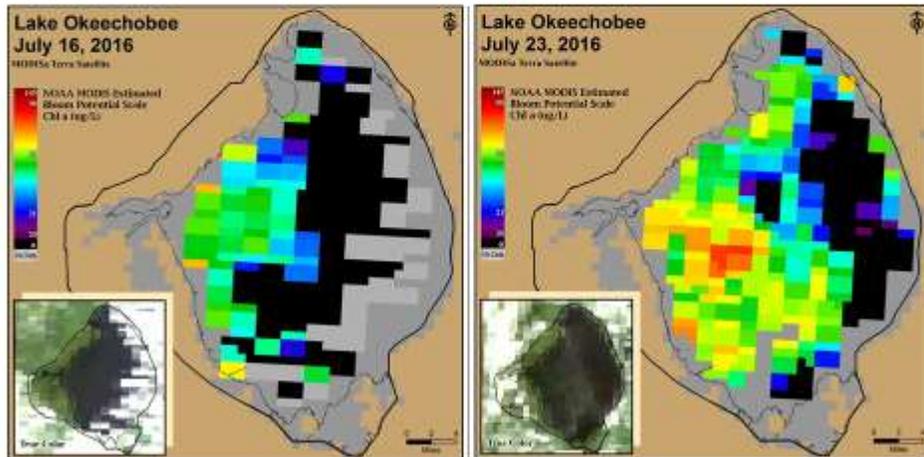


Figure 7

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Lake Okeechobee

Snail Kites

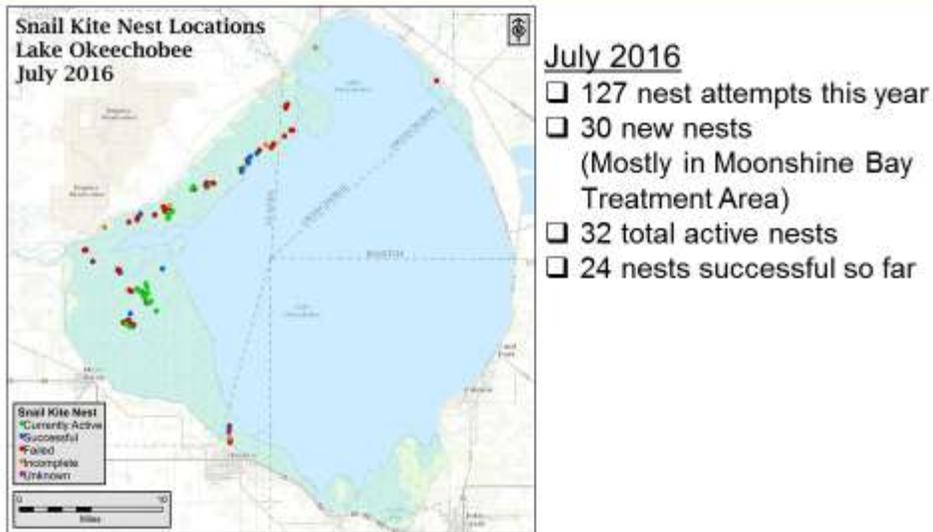


Figure 8

Lake Istokpoga

The Lake Istokpoga regulation schedule has returned to its annual low pool stage of 38.25 feet NGVD. Lake stage is 38.34 feet NGVD and is currently 0.09 feet above regulation (Figure 9). Average flows into the Lake from Arbuckle and Josephine creeks were 979 and 287 cfs respectively, a large increase over the preceding month's flows. Average discharge from S68 and S68X this past week was 1,677 cfs, a nearly threefold increase from the preceding week. According to RAINDAR, 3.68 inches of rain fell in the Lake Istokpoga watershed during the past seven days.

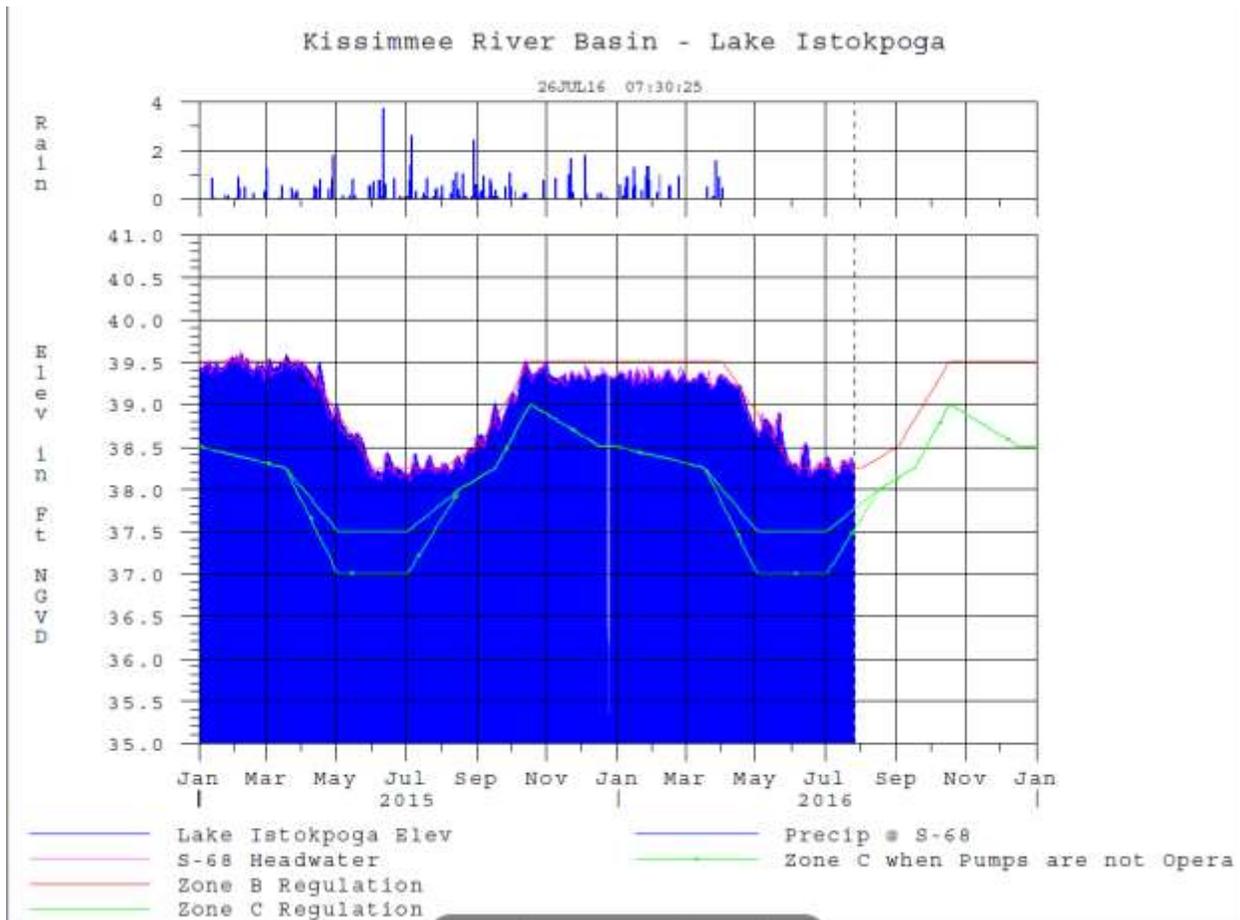


Figure 9

ESTUARIES

St. Lucie Estuary

Over the past week, provisional flows averaged about 666 cfs at S-80, 689 cfs downstream of S-308, 25 cfs at S-49 on C-24, 76 cfs at S-97 on C-23, and 87 cfs from Ten Mile Creek at the Gordy Road Structure. Average inflow from tidal basin tributaries is estimated to be 312 cfs (Figures 1 and 2). Total inflow averaged about 1,166 cfs last week and 1,661 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 9.5. Salinity conditions in the middle estuary are at the top of 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)	3.6 (2.5)	7.1 (5.2)	NA ¹
US1 Bridge	7.9 (6.5)	11.1 (10.1)	10.0-26.0
A1A Bridge	23.5 (20.6)	25.4 (24.8)	NA

¹Envelope not applicable

Caloosahatchee Estuary

During the past week, provisional flows averaged approximately 487 cfs downstream of S-77, 823 cfs at S-78, and 3,196 cfs at S-79. Average inflow from tidal basin tributaries is estimated to be 1,590 cfs (Figures 5 and 6). Total inflow averaged 4,786 cfs last week and 5,704 cfs over last month.

Over the past week in the estuary, salinity remained about fresh to Cape Coral Bridge and about the same downstream (Table 2, Figures 7 and 8). The seven-day average salinity values are within the good range for adult oysters at Shell Point and at Sanibel and has been in the poor range at Cape Coral for 63 consecutive days (Figure 9). The 30-day moving average surface salinity is 0.2 at Val I-75 and 0.2 at Ft. Myers. Salinity conditions at Val I-75 are in the good range for tape grass.

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

Sampling Site	Surface	Bottom	Envelope
S-79 (Franklin Lock)	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	2.4 (1.2)	3.9 (2.4)	10.0-30.0
Shell Point	12.7 (11.2)	17.0 (16.3)	10.0-30.0
Sanibel	24.5 (25.1)	26.4 (27.2)	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
Chlorophyll <i>a</i> (µg/l)	5.2 – 5.66 one spike to 10.7	4.27 – 4.54	2.0 – 5.0 one spike to 8.3
Dissolved Oxygen (mg/l)	3.1 – 4.5	5.35 – 6.2	4.4 – 7.1

The Florida Fish and Wildlife Research Institute reported on July 22, 2016, that *Karenia brevis*, the Florida red tide organism, was not detected in samples collected from Lee County.

Water Management Recommendations

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

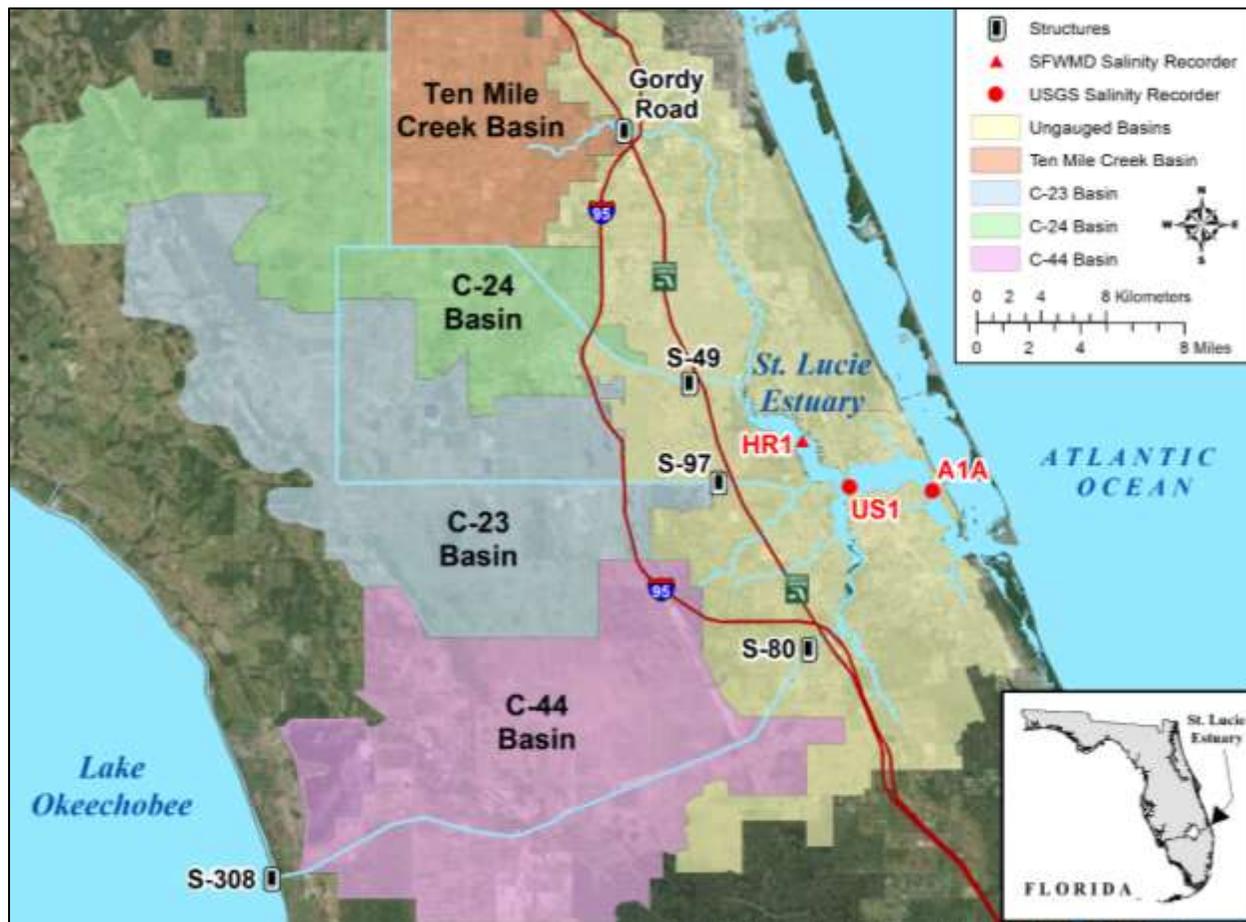


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

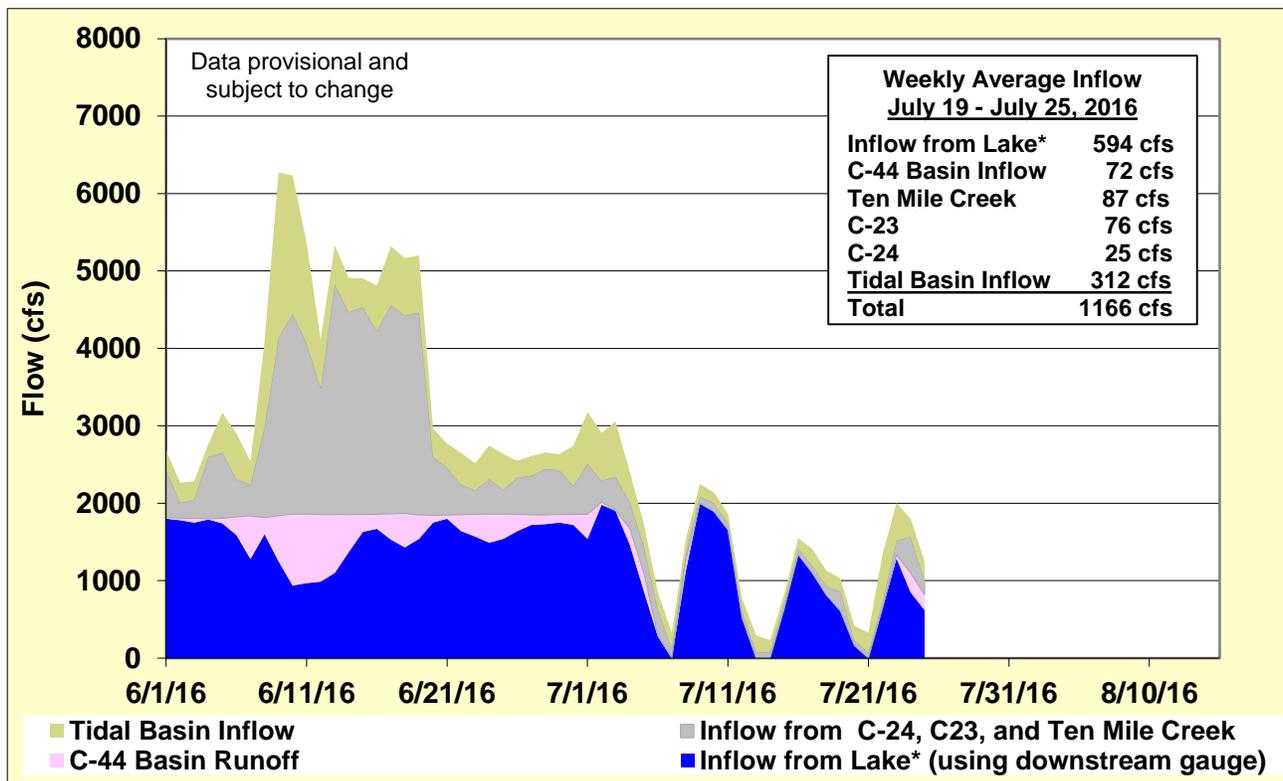


Figure 2. Estimated surface freshwater inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basins into the St. Lucie Estuary.

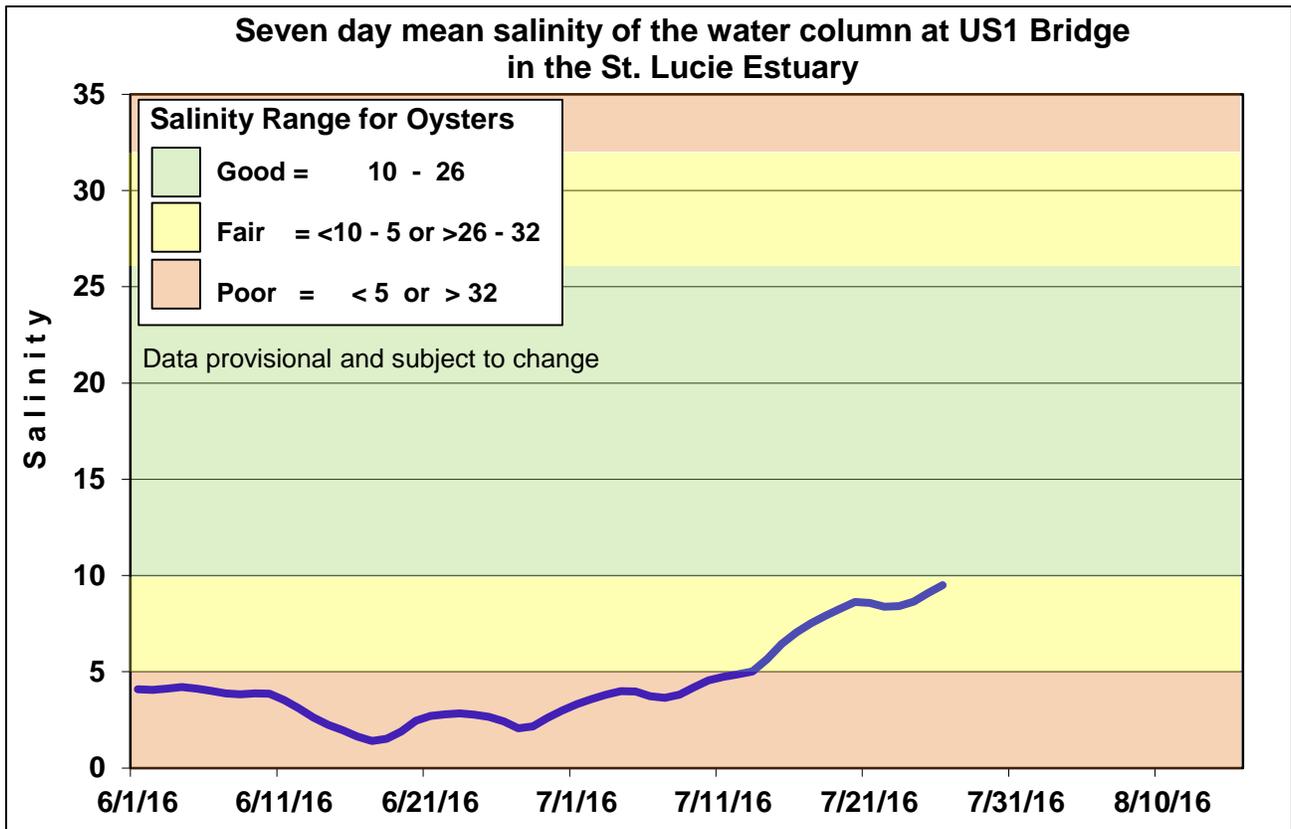


Figure 3. Seven-day mean salinity of the water column at the U.S. Highway 1 Bridge.

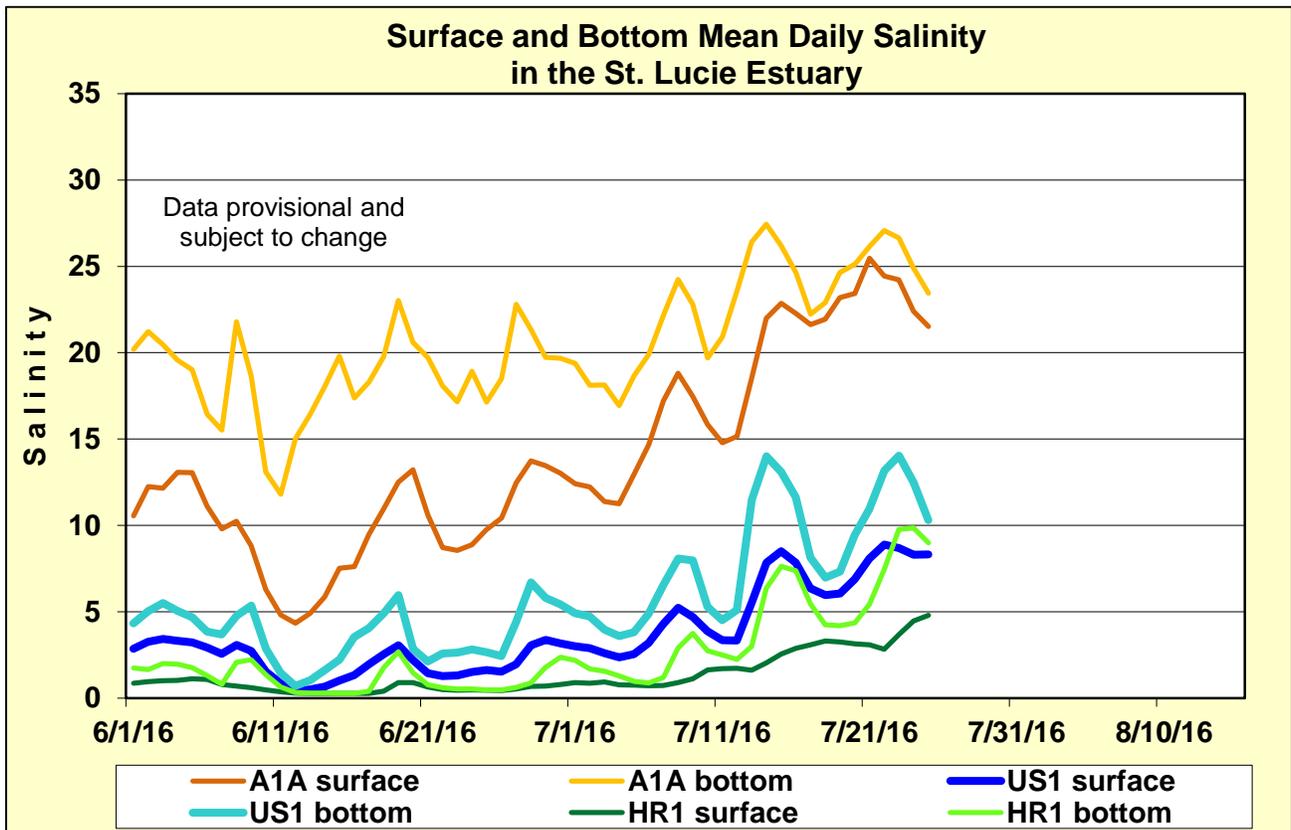


Figure 4. Daily mean salinity at the A1A, US1 and estimated HR1 stations.

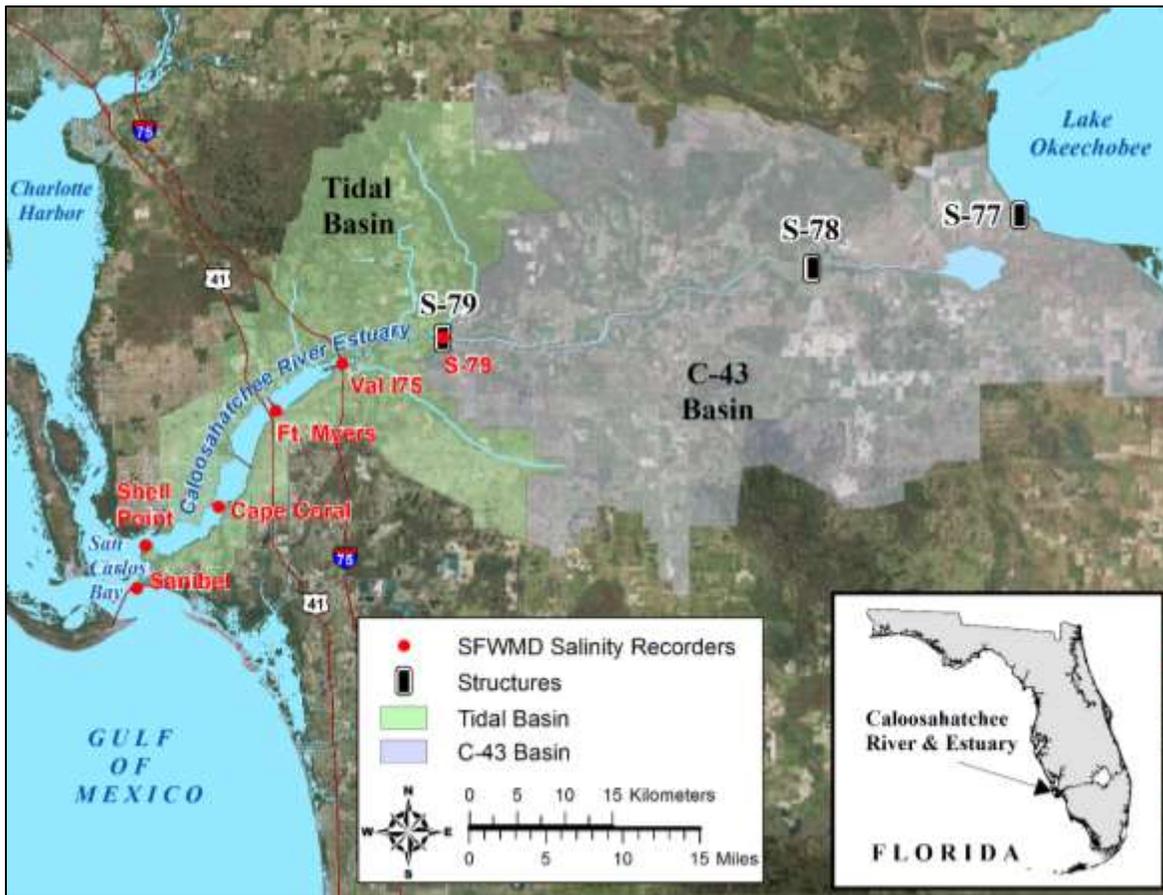


Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

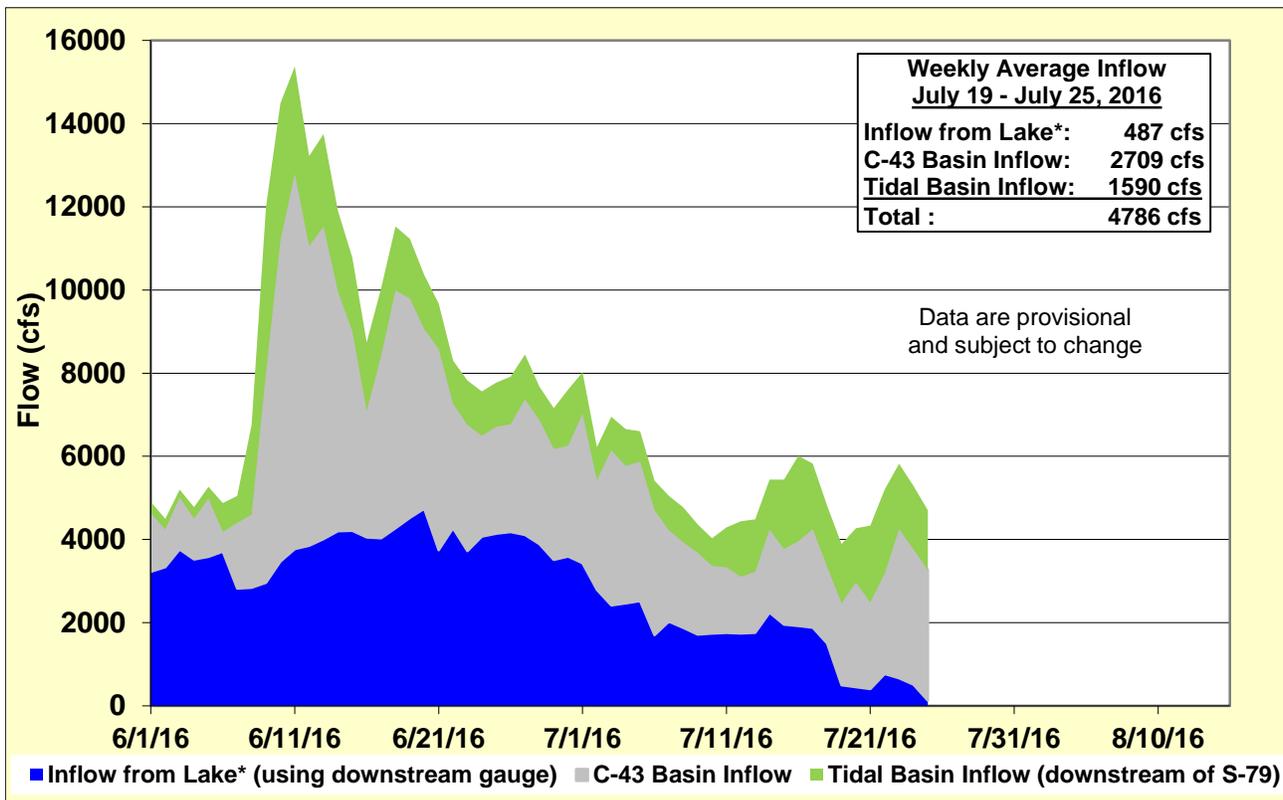


Figure 6. Freshwater inflows from Lake Okeechobee, runoff from the C-43 basin, and tributaries in the tidal basin into the Caloosahatchee River Estuary.

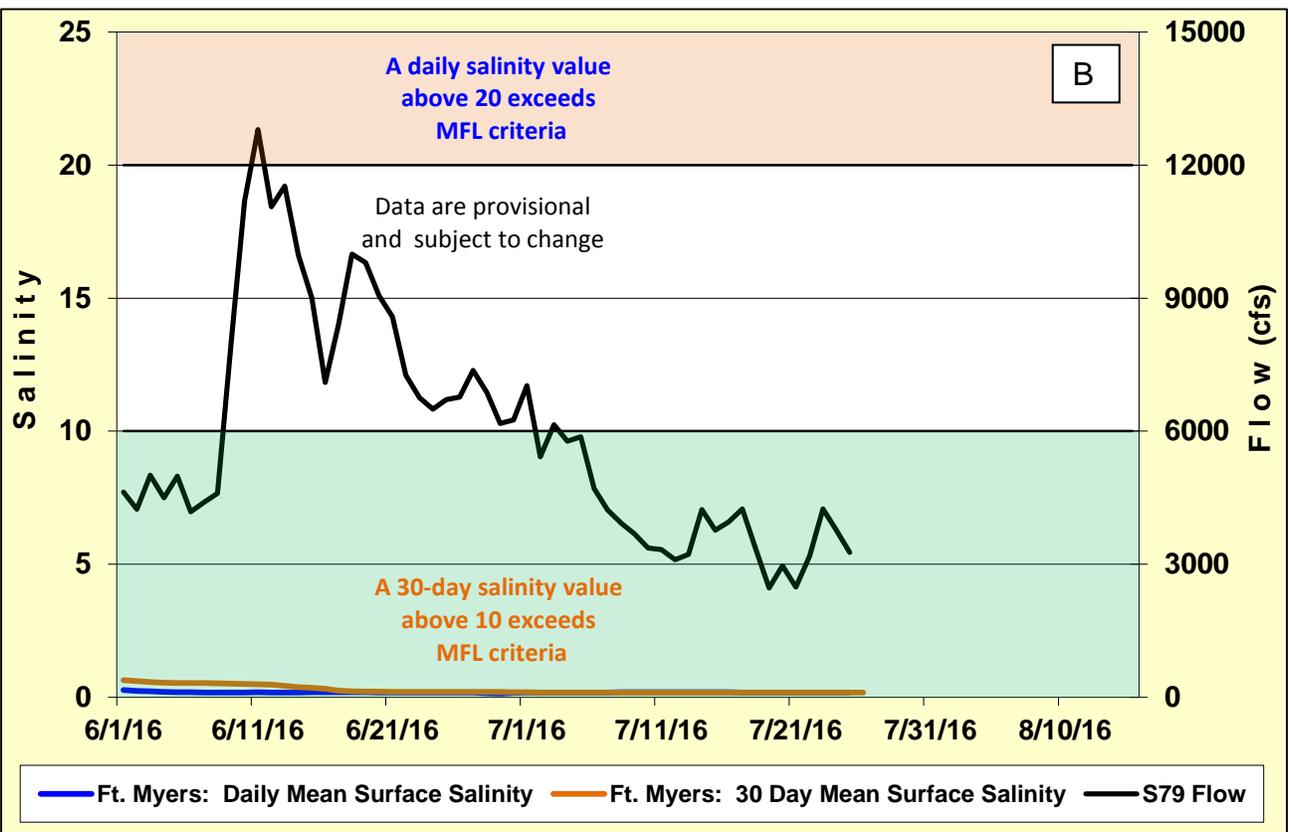
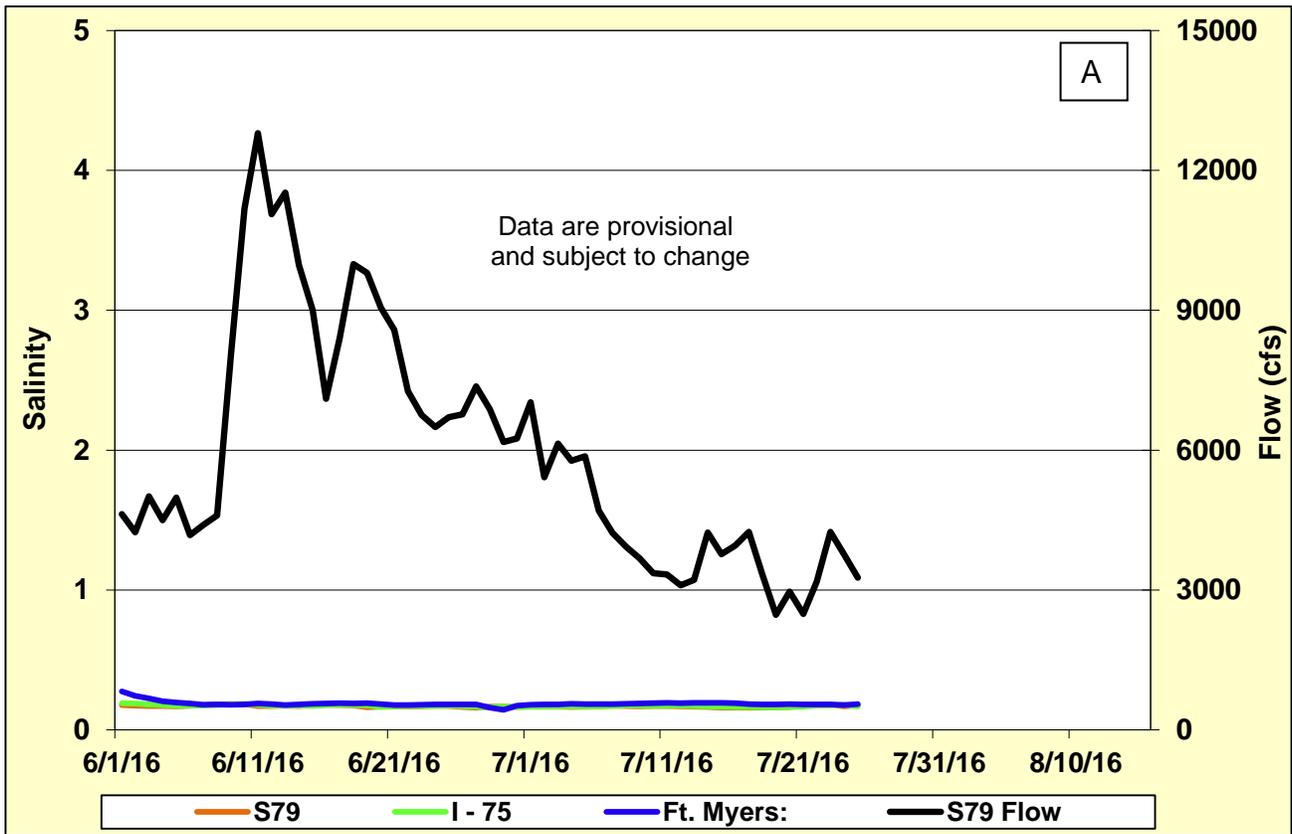


Figure 7. Daily mean flows at S-79 and salinity at upper estuary monitoring stations (A) and 30-day moving average salinity at Ft. Myers (B).

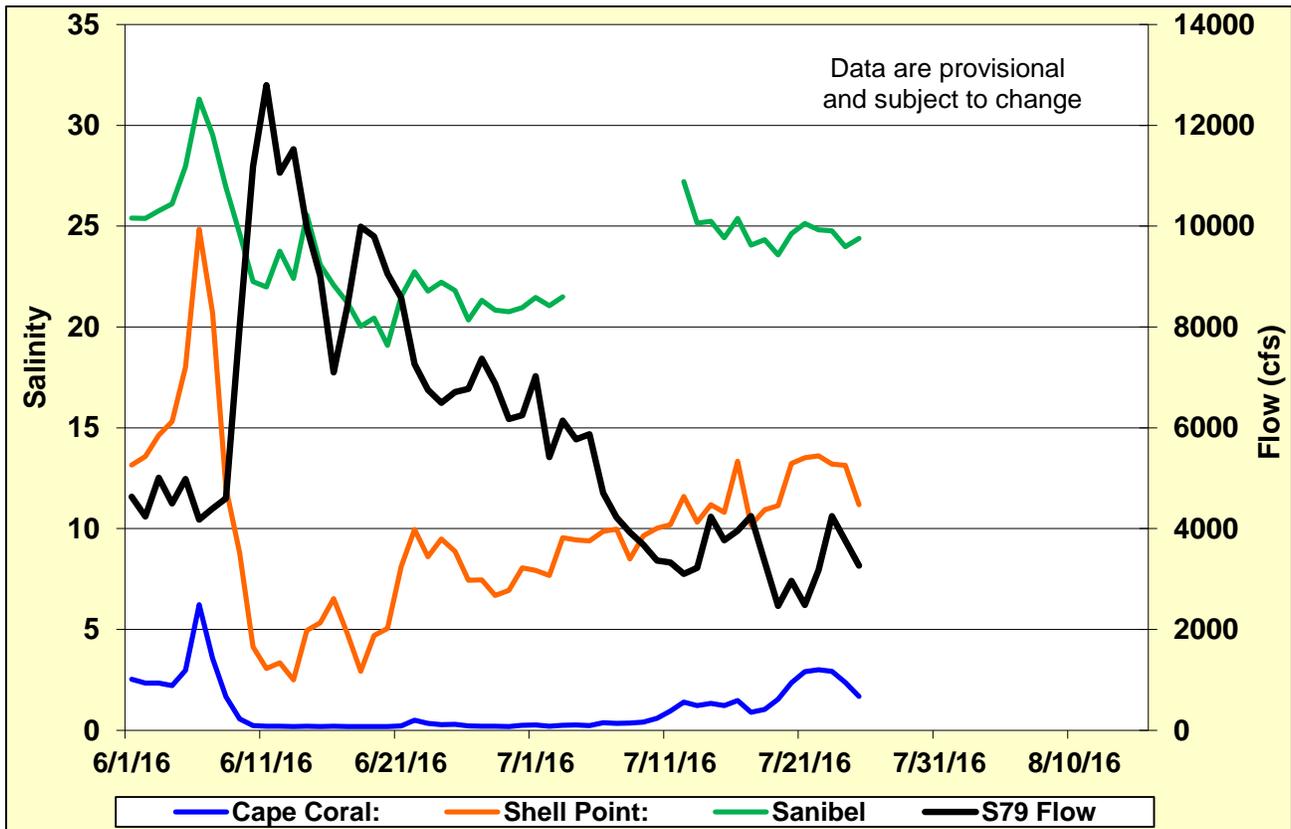


Figure 8. Daily mean flows at S-79 and salinity at lower estuary stations.

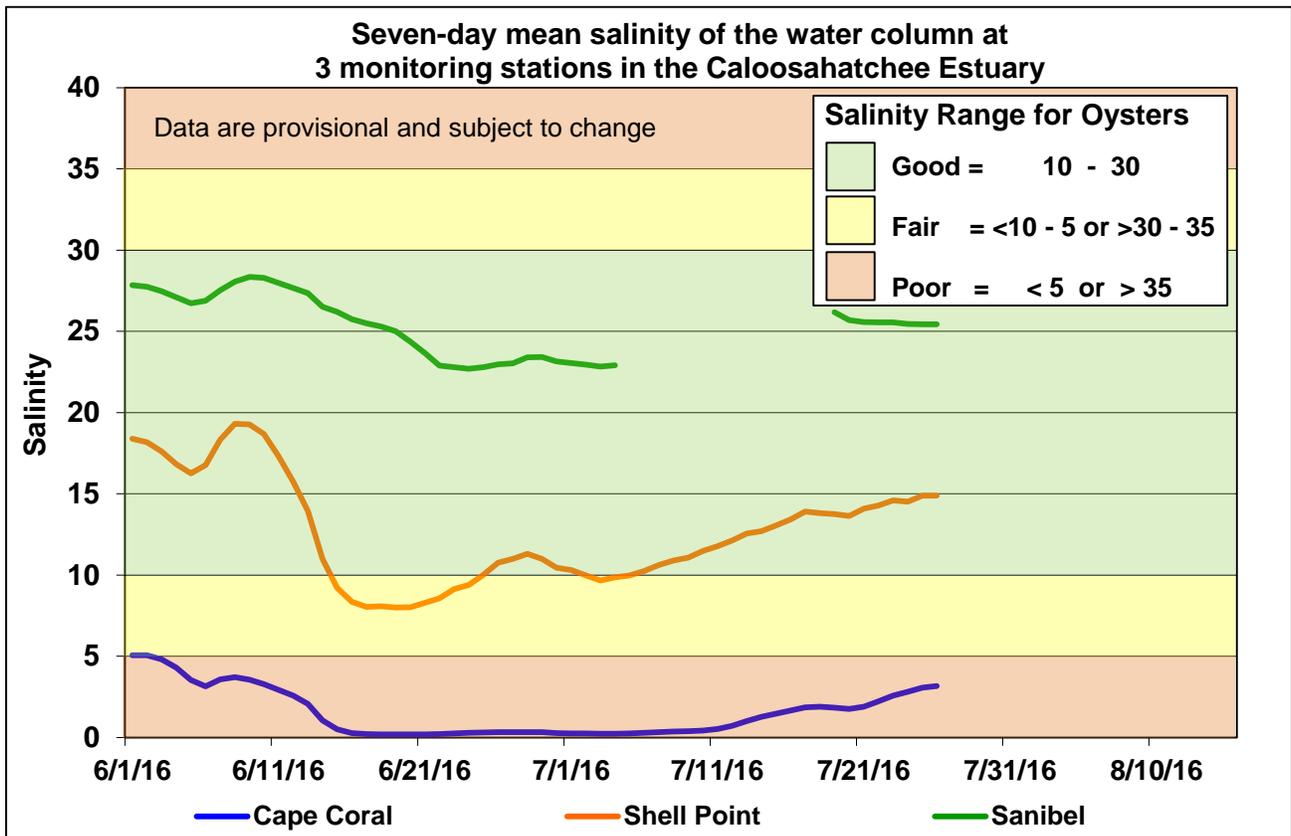
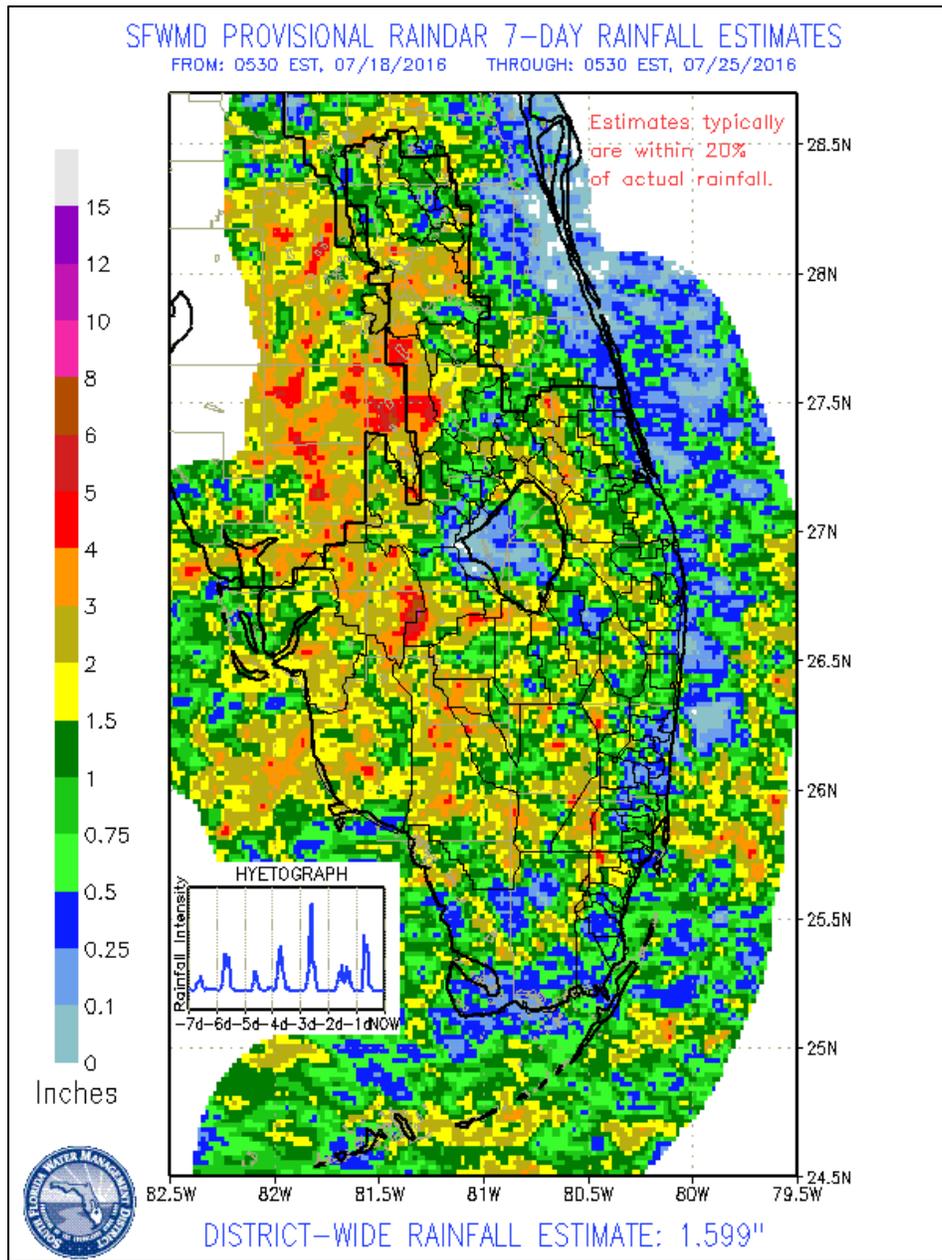


Figure 9. Seven-day mean salinity at Cape Coral Bridge, Shell Point and Sanibel Bridge monitoring stations.

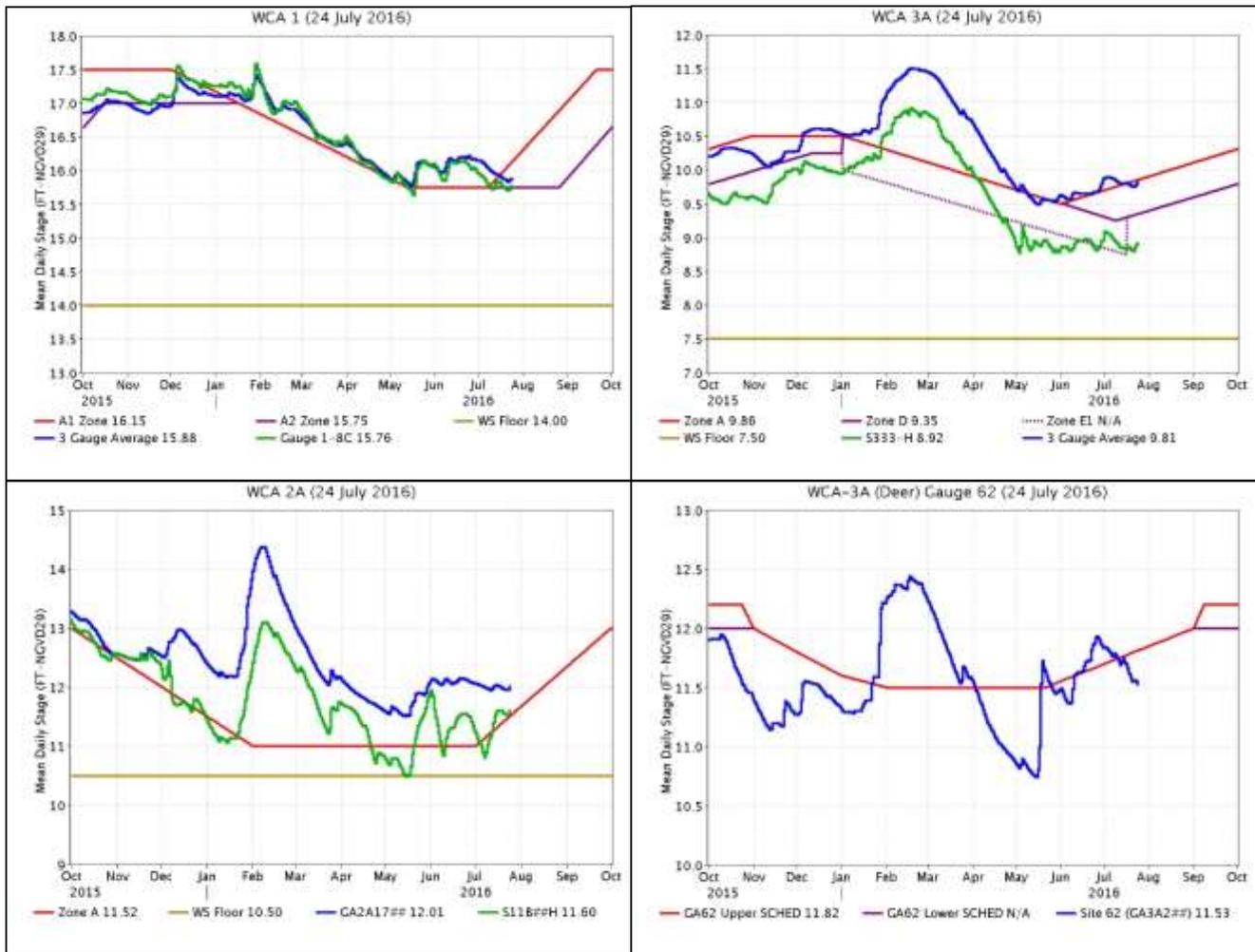
GREATER EVERGLADES

Rainfall was moderate last week, with basin-wide averages ranging from 0.98 inches to 2.05 inches. The local maximum was 4.85 inches in WCA-3A. In spite of the rainfall, water levels changed little last week except in WCA-3B, which rose 0.07 feet. Pan evaporation was 1.63 inches, 15 percent above the pre-project average of 1.42 inches.

Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	1.28	-0.01
WCA-2A	1.63	0.01
WCA-2B	1.01	0.00
WCA-3A	1.68	0.00
WCA-3B	2.05	0.07
ENP	0.98	0.00



Regulation Schedules: Water levels have changed little from last week. Regulation schedules are increasing, which changes the relative difference from regulation. Three of the four areas remain below regulation. The WCA-1 three-gauge average is 0.27 feet below regulation. The WCA-2A stage is 0.49 feet above regulation. The WCA-3A three-gauge average stage remains 0.05 feet below regulation and the northwestern WCA-3A gauge stage (gauge 62) is 0.29 feet below regulation.

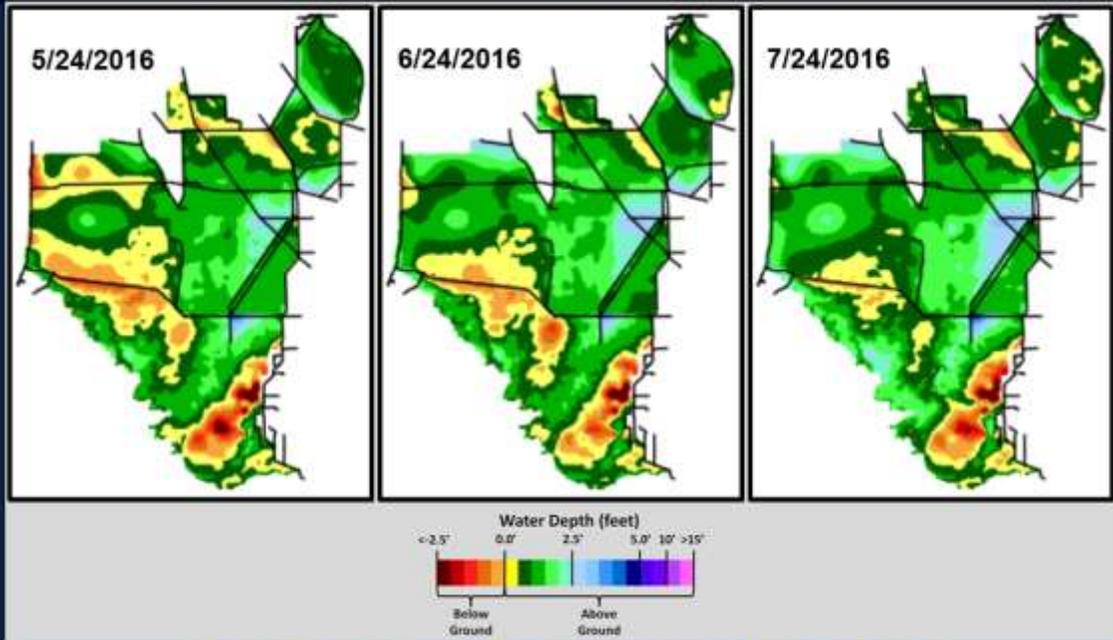


Water Depths and Changes: Water levels are lower than a month ago and slightly higher than two months ago. The WCA stages are all at the lowest or below the lowest stages of the Dynamic Position Analyses for an ENSO neutral climate, suggesting that stages are lower than anticipated for July.

Stage changes were mixed last week, increasing in parts of Everglades National Park (ENP), WCA-1 and southern WCA-3A and -3B. Gauge changes ranged from -0.12 feet to 0.10 feet. Compared to a month ago, stages are lower in WCAs 1, 2, and northern 3A, while higher in the central and southern portions of the Everglades. However, stages are higher to much higher than a year ago.



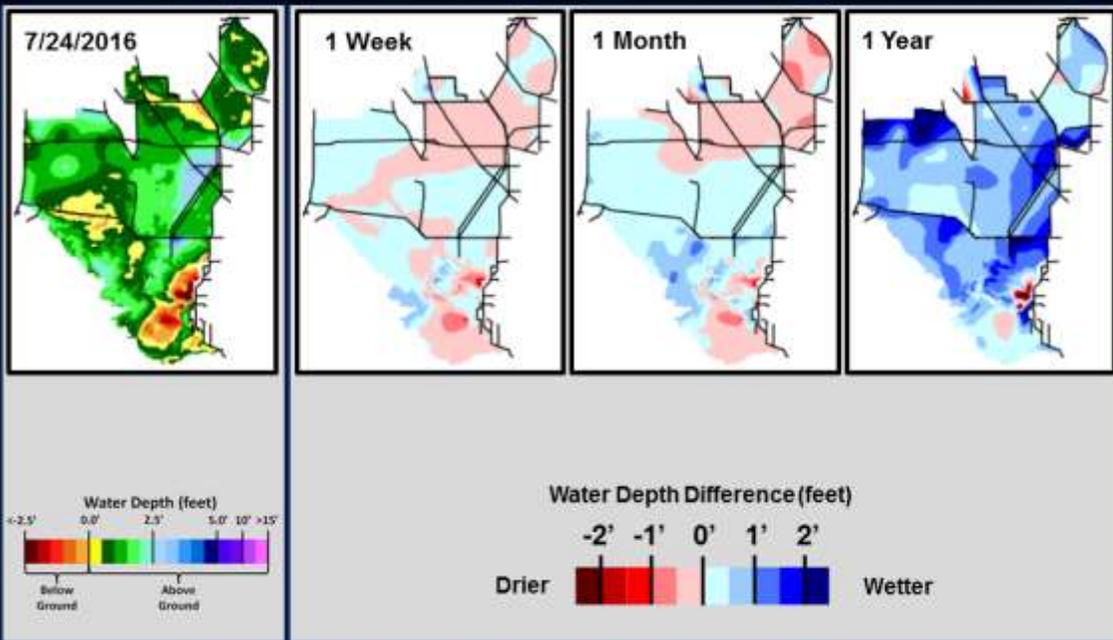
SFWDAT Water Depth Monthly Snapshots



South Florida Water Depth Assessment Tool (SFWDAT)



SFWDAT Everglades Difference Maps (Present - Past)



South Florida Water Depth Assessment Tool (SFWDAT)

Cape Sable Seaside Sparrows: Late breeding is underway and birds are fledging chicks in subpopulations A and B. Subpopulations C and D are not being surveyed.

Subpopulation surveys in early July:

A: Breeding activities increased. In the area surveyed, nine territories were observed with four active nests. Two nests fledged a total of seven young, while two other nests were lost to predators. Water levels were rising.

B: Five to six territories were identified with one active nest (the third nest for this pair) with three nestlings. Juvenile sparrows were seen being fed by adults, and breeding was continuing despite deep water.

Subpopulation surveys in mid-July:

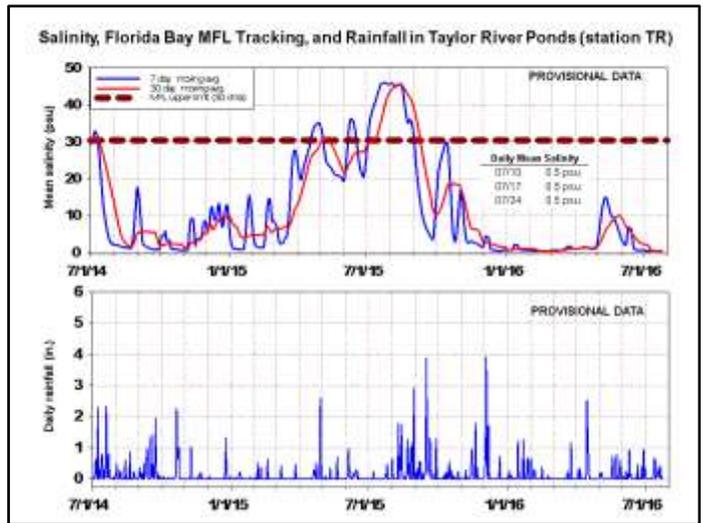
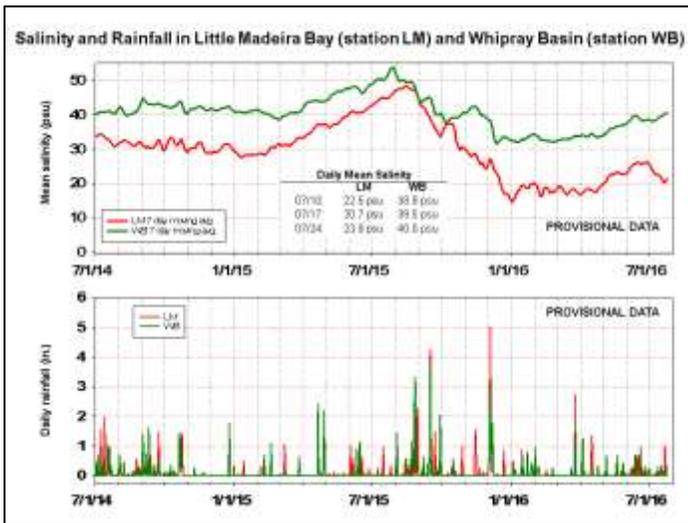
A: Breeding continued with eight territories observed. There were two active nests, one with chicks and one with four eggs. The area of subpopulation A that was surveyed produced 13 fledged chicks this season. Stages were declining.

B: Five to six territories were identified with multiple pairs exhibiting breeding behavior. The prior active nest fledged chicks and a second undiscovered nest fledged chicks as well. A possible additional nest is suspected but unconfirmed. Singing rates are decreasing and water levels remain high (95 percent of the area has surface water).

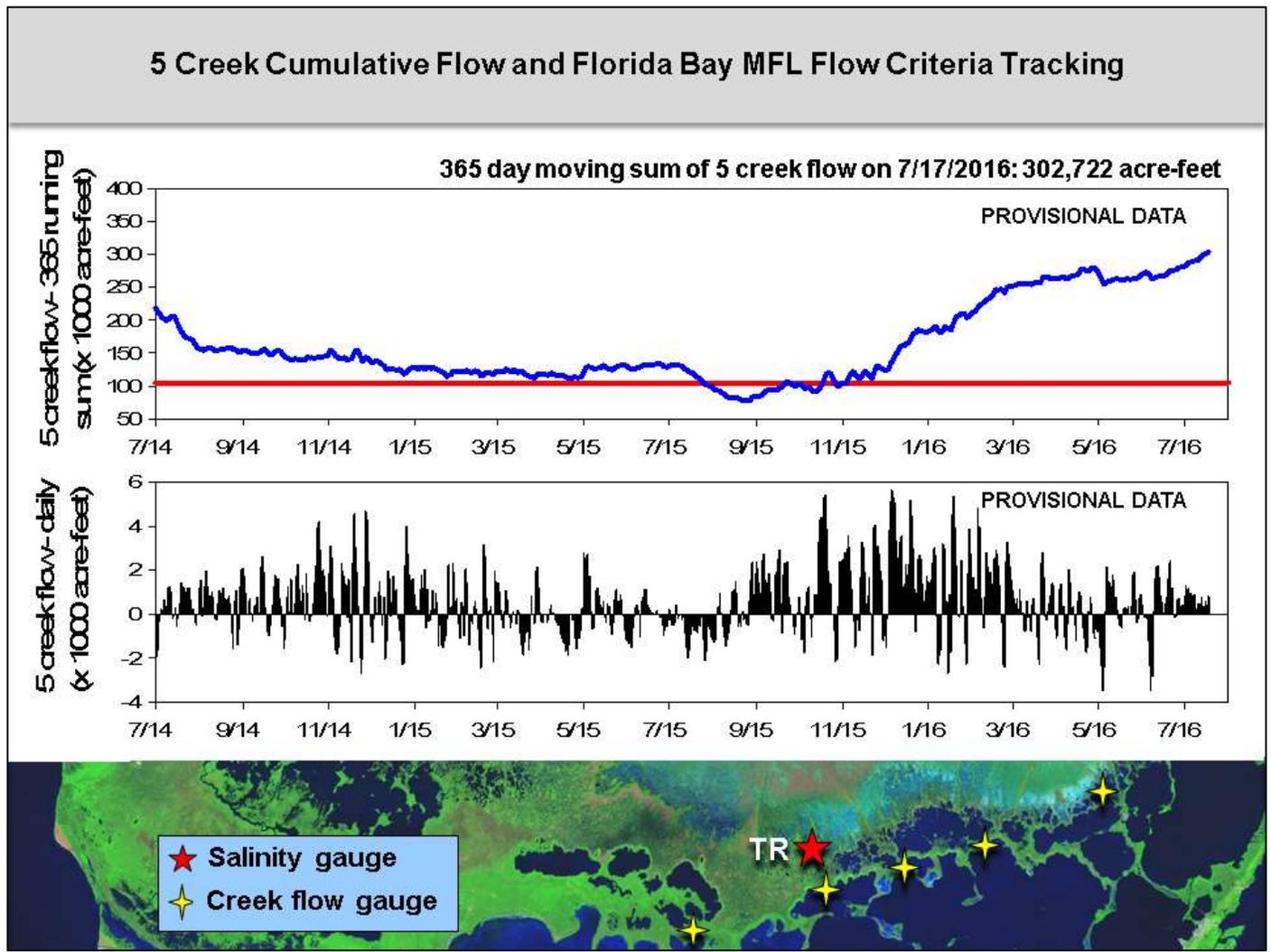
Everglades National Park (ENP) and Florida Bay: Water level changes were mixed again last week. The largest change was 0.13 feet in northern Taylor Slough. Water levels in northern Taylor Slough are higher than they were a month ago closer to shore, but generally slightly lower than a month ago. Compared to historic averages, water levels are still two to nine inches above average.

Salinities across Florida Bay range from average to 11 psu above average. Daily average salinities range from 18 to 40 psu (highest in central Florida Bay). The largest weekly change of +12.5 psu occurred in the western nearshore embayments which is also the area that is now 11 psu above average. Creek flow data suggest that the large salinity increase is due to saltwater moving upstream. The MFL sentinel site TR in the mangrove zone remains near fresh at 0.5 psu, and the 30-day moving average salinity at TR is also at a seasonally typical 0.5 psu.





The easternmost creek of the five creeks used in the cumulative flow calculation has been offline for the last week so the cumulative flow calculation was not possible. The 365-day running sum of the cumulative flow from the five creeks feeding Florida Bay was 304,391 acre-feet on July 18 (above the average of 257,628-acre feet). Creek flow data are provisional from the USGS and are highly variable.



Water Management Recommendations

- Water levels need to increase in northern WCA-3A and in WCA-1. The northern half of WCA-1 has been closed to airboats because of low water and stages are declining throughout northern 3A.
- We recommend keeping water depths in southern WCA-3A below 2.5 feet throughout the wet season to protect tree island forests. The depth at gauge 65 is 2.00 feet.
- We recommend limiting ascension rates to a maximum of 0.25 feet per week to protect habitat and wildlife, including the apple snail, prey of the endangered snail kite.
- The Active Marsh Improvement Project (AMI) in WCA-2A needs water levels to be over six inches for a planned burn next week, remaining at that depth for several weeks. Depths are still below six inches.

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

Everglades Ecological Recommendations, July 26, 2016 (red is new)				
Area	Current Condition	Cause(s)	Recommendation	Reasons
WCA-1	Stages changed -0.05' to +0.04'	Rainfall, ET, management	Increase inflows to WCA-1. Limit ascension rates to extent possible with a maximum of 0.25 ft/week.	Stages are too low in northern WCA-1, leading to recent closures of northern WCA-1 to airboats. Ascension rates of <0.25'/week will protect habitat and wildlife including reproducing apple snails.
WCA-2A	Stage rose 0.01'	Rainfall, ET, management	Begin wet season operations for this area, including maintaining ascension rates <0.25 ft/week. Raise water levels to at least 6" depth at experimental sites and maintain depths of 6"-12" for a controlled burn within one to two weeks.	A burn at an experimental site is necessary as part of an ongoing effort to determine how best to achieve restoration goals. Ascension rates of <0.25'/week will protect habitat and wildlife including reproducing apple snails.
WCA-2B	Stages: no change	Rainfall, ET, management	Follow normal seasonal practices. Limit ascension rates to extent possible with a maximum of 0.25 ft/week.	Ascension rates of <0.25'/week will protect habitat and wildlife including reproducing apple snails.
WCA-3A NE	Stage fell -0.03'	Rainfall, ET, management	Increase inflow into northeastern WCA-3A. Increase ascension rates to extent possible with a maximum of 0.25 ft/week.	Stages are low in northeastern WCA-3A and are declining over northern WCA-3A. Increasing ascension rates while not exceeding 0.25'/week will protect habitat and wildlife including reproducing apple snails.
WCA-3A NW	Stage fell -0.12'	Rainfall, ET, management		
Central WCA-3A S	Stage rose +0.07'	Rainfall, ET, management	Limit ascension rates to extent possible with a maximum of 0.25 ft/week. Water depths should remain below 2.5 feet over this upcoming wet season. When flows are changed a gradual reduction is recommended (stepping down over several days).	Moderate recession rates would benefit habitat and wildlife. Keeping depths below 2.5' is important to allow tree island vegetation to recover from stress of the recent extended inundation duration. Ascension rates of <0.25'/week will protect habitat and wildlife including reproducing apple snails.
Southern WCA-3A S	Stage rose 0.10'	Rainfall, ET, management		
WCA-3B	Stages rose 0.01' to 0.12'	Rainfall, ET, management	Follow normal seasonal practices. Limit ascension rates to extent possible with a maximum of 0.25 ft/week.	Ascension rates of <0.25'/week will protect habitat and wildlife including reproducing apple snails.
ENP-SRS	Stage: no change	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 remain closed to enhance dry-down.	Rainfall, ET, management	Follow rainfall plan for releases. Extend ERTTP closures for S12-A and B through mid-August. Gradual reduction in flows through S333, S12C and D, as possible, is recommended (stepping down over several days). Follow guidance in C-111 western spreader canal project operations manual.	Sparrows are continuing to breed throughout July into August, so it is important to provide appropriate hydrological and habitat conditions for breeding in subpopulation A.
Taylor Slough	2 to 9 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 11 psu above average	Rain, ET, inflows, wind	Move water southward as needed	Maintain lower salinity levels.