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

M E M O R A N D U M

TO: Susan Sylvester, Director, Operations and Hydrologic Data Management Department

FROM: SFWMD Staff Environmental Advisory Team

DATE: March 30, 2010

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Discharge from Lake Kissimmee averaged 4024 cubic per second (cfs) at S65 over the week. Lake Okeechobee stage is 14.52 feet NGVD, which is 0.29 feet higher than a week ago, 0.96 feet higher than a month ago, 2.32 feet higher than it was a year ago, and 1.46 feet higher than the simulated average using the current regulation schedule. In the St. Lucie estuary, salinity is poor for the survival of oysters in the mid estuary while salinity in the Caloosahatchee are tolerable for seagrass and oysters just east of Shell Point in the mid estuary. Since the estimated 30-day average salinity at Ft. Myers is 4.4 psu conditions are good in the upper estuary. Conditions in the lower estuary are also good. This week's recession rates were poor because of the stage increases except in WCA-1. Depths considered good for wading bird feeding (green) have grown sparse in most of the Conservation Areas, though they remain along Shark River Slough in ENP (see Bird depths map below). Good recession rates occurred in southern WCA-3A and in ENP last week although parts of these areas are too deep to be useful for wading birds (see Birds-recession diagram below). Salinity was generally stable in Florida Bay over the past week.

Weather Conditions and Forecast

Dry for the next week. High pressure over the area will bring persistent dry conditions for a while. The next cold front will stall over the southeastern US over the weekend. A second cold front will then push into the District with some limited rainfall the later part of next week. Cool nighttime temperatures tonight but then warmer temperatures with highs in the 80s are expected through the early part next week. The next ten days precipitation outlook is below average with moderately high confidence.

KISSIMMEE WATERSHED

Over the past week the Upper Kissimmee Basin received 3.4 inches of rainfall, and the Lower Basin 2.9 inches. Rainfall in the last 30 days totaled 8.8 inches in the Upper Basin (274% of normal) and 7.0 inches in the Lower Basin (243% of normal) (SFWMD Daily Rainfall Report 3/30/2010).

Upper Kissimmee Basin

- Stages in the Kissimmee Chain of Lakes (KCOL) are within 1.1 ft above regulation schedule. **Water bodies marked (C) or (SK) in Table 1 are currently being operated under temporary deviations; the departures shown are from the temporary schedules (SFWMD Operations Control Division). See also Figures 2-7**.
- **Discharge at S65** averaged 4024 cfs over the past week (3509 cfs last week) and averaged 5332 cfs yesterday (Figure 8).

Table 1. Departures from flood regulation or temporary deviation schedules, 3/30/2010.

DATE: 3/30/2010

Water Body	Structure	Deviation Schedule	Today's Regulation Stage (SFWMD Operations Control)	Today's Stage (SFWMD Operations Control)	Departure (calculated field)
Lake Hart and Mary Jane	S62	C	60.19	60.72	**0.53**
Lakes Myrtle, Preston, and Joel	S57	C	60.17	61.08	**0.91**
Alligator Chain	S60	C	63.08	64.00	**0.92**
Lake Gentry	S63		60.58	61.20	**0.62**
East Lake Toho	S59	SK	56.69	57.44	**0.75**
Lake Toho	S61	SK	53.75	54.85	**1.10**
Lakes Kissimmee, Cypress, and Hatchineha	S65	SK	50.63	51.18	**0.55**

C = temporary deviation for construction
SK = temporary deviation for snail kite habitat

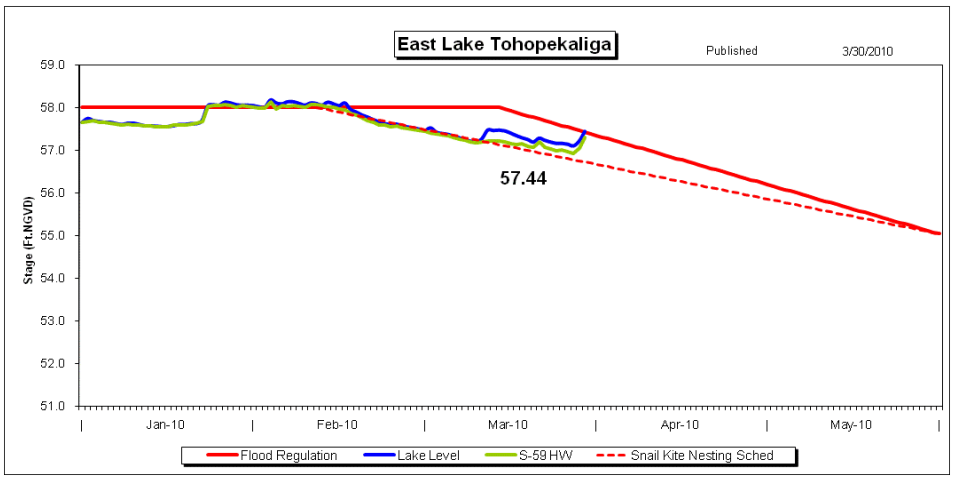


Figure 1

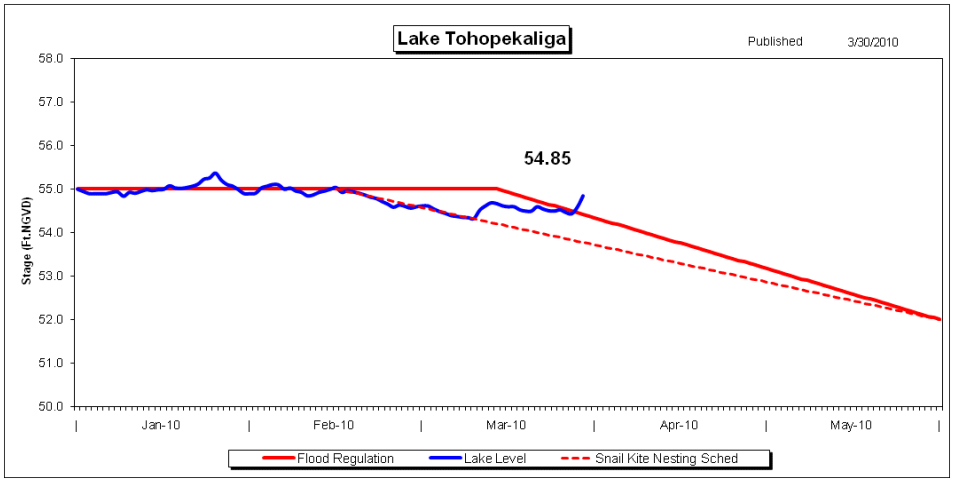


Figure 2

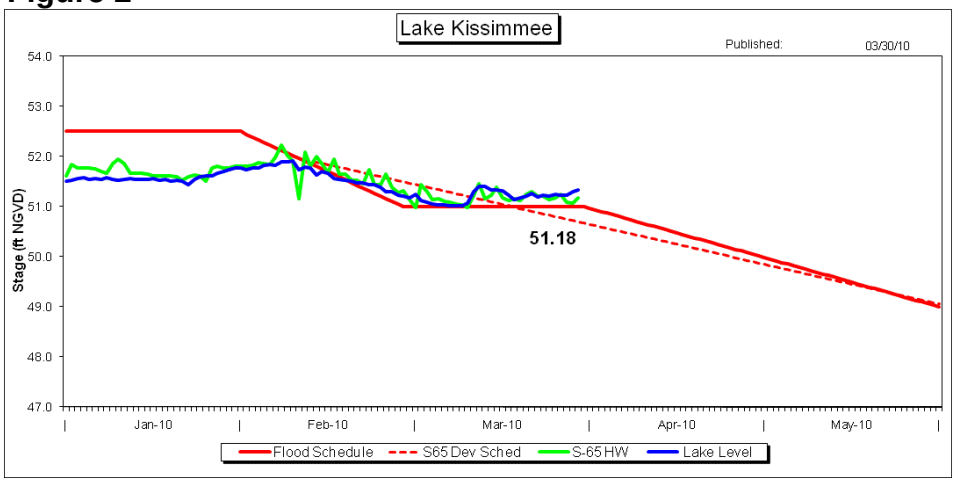


Figure 3

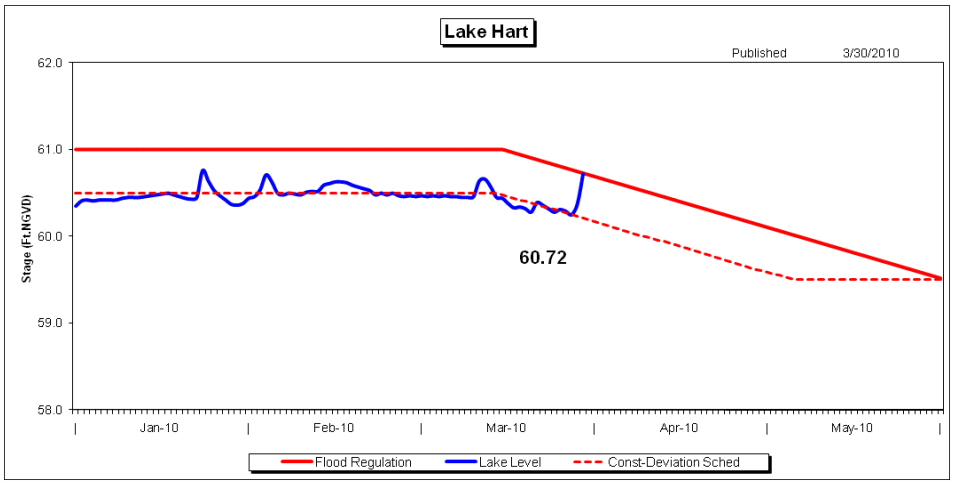


Figure 4

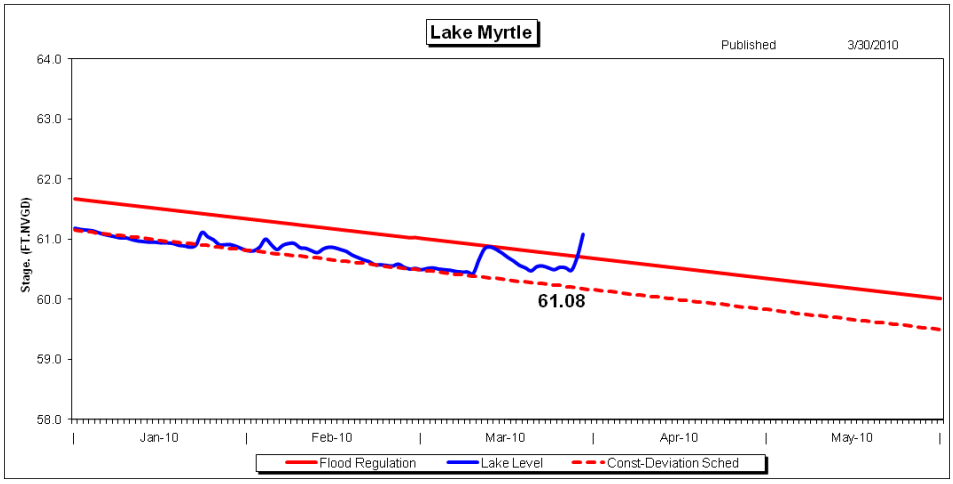


Figure 5

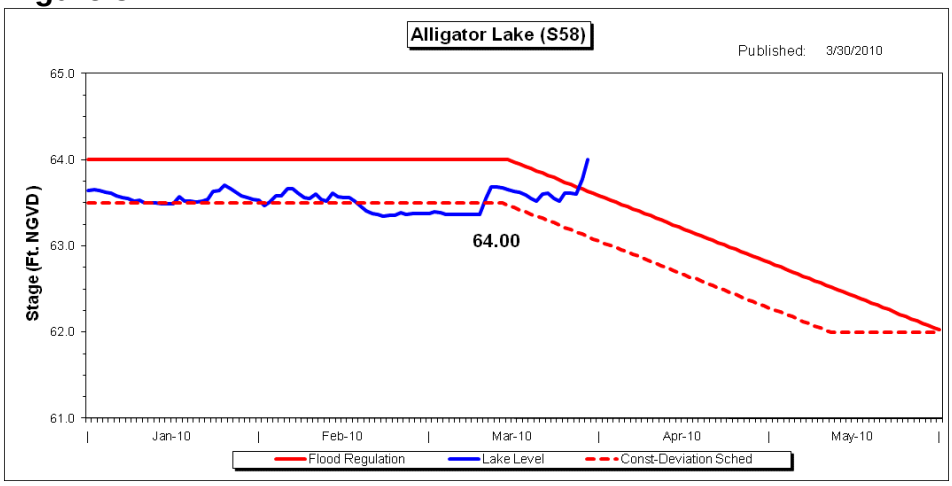


Figure 6

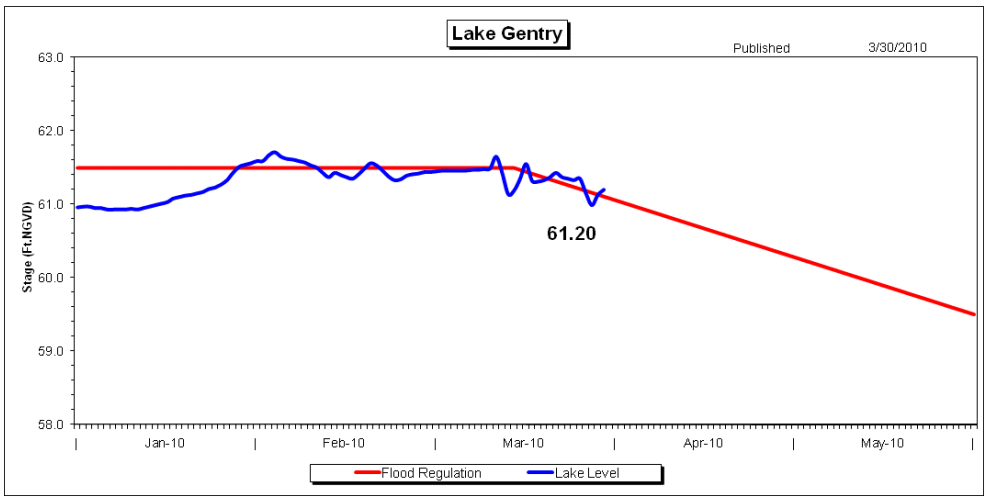


Figure 7

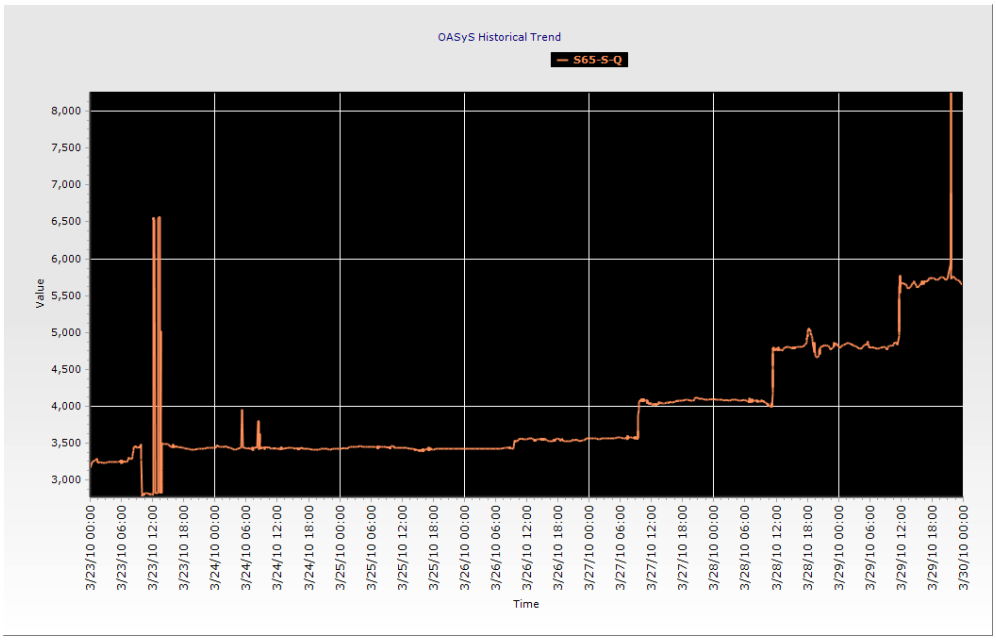


Figure 8

Table 2. Snail kite survey results in KCOL lakes.

Date	Water Body	Total Birds	Active Nests
03/11/10	Cypress	0	0
03/17/10	E. Lake Toho	18	2
03/11/10	Hatchineha	15	2
03/11/10	Jackson	8	0
03/10/10	Kissimmee	34	0
03/11/10	Marian	3	0
03/10/10	Tiger	0	0
03/16/10	Toho	58	5

Lower Kissimmee Basin (discharges, stages, and dissolved oxygen concentrations are **weekly averages** from SFWMD **DualTrend).**

- Discharge at S65-A averaged 3994 cfs over the past week (2996 cfs last week).
- Discharge at S65-C averaged 3586 cfs over the past week (5022 cfs last week), with headwater stage averaging 34.5 ft (34.3 feett last week).
- Discharge at S65-D averaged 3845 cfs over the past week (5136 cfs last week).
- **Discharge at S65-E to Lake Okeechobee** averaged 4204 cfs over the past week (4970 cfs last week) and averaged 5676 cfs yesterday.
- Water depths on the Kissimmee River floodplain averaged 1.7 ft in the Phase I restoration area (SFWDAT 3/28/2010) (1.9 feett last week). SFWDAT depth and difference maps are shown below in Figures 9 and 10.
- River channel dissolved oxygen (DO) concentrations in the Phase I area averaged 5.1 mg/L over the past week, above the level of concern of ≤2.0 mg/L.

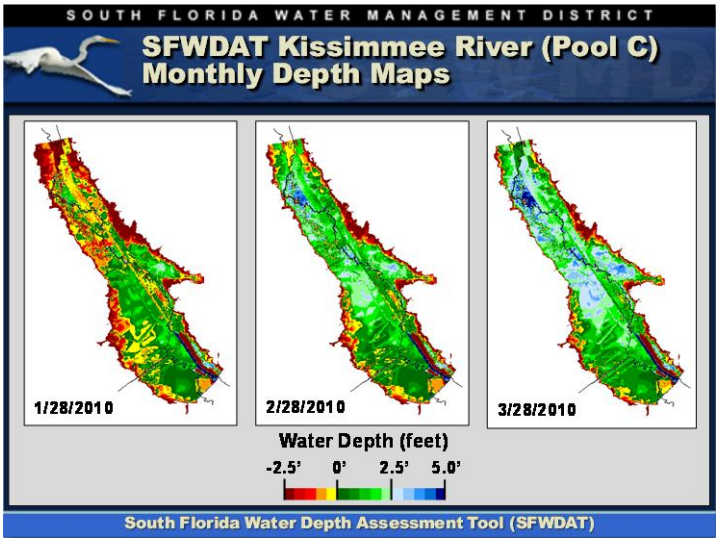


Figure 9

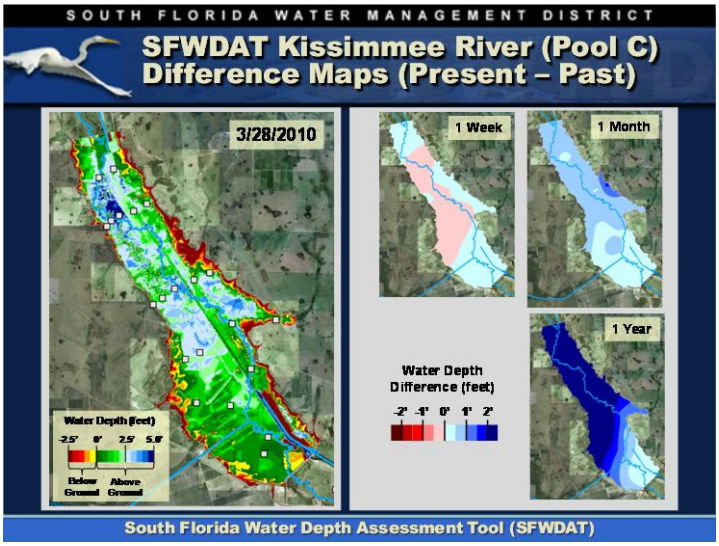


Figure 10

Water Management Recommendation

Due to recent rainfall and resulting stage reversals in the headwater lakes, Operations Control and Kissimmee Divisions will meet next week with USFWS and FFWCC to address how best to manage lake recessions through spring. No changes are being requested at this time - operations in the Upper Basin is currently constrained by conveyance and discharge capacities.

LAKE OKEECHOBEE

According to the USACE web site, Lake Okeechobee stage is 14.52 feet NGVD for the period ending at midnight March 29, 2010; which is 0.29 feet higher than a week ago, 0.96 feet higher than a month ago, and 2.32 feet higher than a year ago. The current stage is 0.20 feet above the historical average for this date and 1.46 feet higher than the simulated average using the current regulation schedule (LORS2008). Total reported inflows are approximately 15227 cfs and include flows as listed in the following table:

Structure	Flow cfs
S65E	5974
S154	333
S84	2122
S71	3354
S72	1500
S191	872
S129 pumps	170
S131 pumps	124
S135 pumps	193
S4 pumps	402
Fish Eating Creek	183

Lake net outflows were reported as approximately 984 cfs consisting of 613 cfs through S77, 252 cfs through S308 and 119 cfs through the L8 at Canal Point.

According to Raindar 2.16 inches of rain fell directly over the lake this past week and lake levels continue to rise. In response to the increasing lake levels, the USACE's began a series of three 13-day pulse releases to the Caloosahatchee Estuary and St. Lucie Estuary on Saturday, March 27th at 7am. The target flow to the Caloosahatchee Estuary is an average flow of 2,200 cfs over the 13-day period, measured at S-79 (W.P. Franklin Lock and Dam). The target flow to the St. Lucie Estuary is an average flow of 950 cfs over the 13-day period, measured at S-80.

In the last month lake stage has increased almost a foot and this increase continues to threaten submerged and emergent vegetation and wading birds. Both FWC and SFWMD scientists observed snail kites foraging in the shallower waters around

Observation Island on the west side of the lake and in the Okeetantie region on the north side of the lake. FWC scientists also reported a burrowing owl nest near Observation Island.

Monthly phytoplankton bloom monitoring was conducted on Wednesday March 24th. All 9 sites had sufficient water to access for sampling and no blooms were observed. Water clarity was reduced to a mean light penetration depth of 1.0 m (down from 1.24 m in February) on the day of sampling due to windy conditions. Microcystin levels for this month are not yet available but in February all sites sampled had levels at or below the 0.2 ppb detection limit.

Water Management Recommendation

No changes are being requested from Operations Control at this time.

ESTUARIES

St. Lucie Estuary

Over the past week, flow averaged 284 cfs at S308 and 580 cfs at S-80. Provisional data indicate that discharge averaged 362 cfs at S-49 on C-24 and 386 cfs at S-97 on C-23. The current weekly average salinities (in bold) at the three monitoring sites in the St. Lucie Estuary are given below in practical salinity units (psu), along with the previous week's (in parenthesis) as listed in the following table.

	Weekly Average Salinity (psu)		
Sampling Site	**Surface**	**Bottom**	**Envelope**
HR1 (N. Fork)	**5.4** (5.4)	**7.8** (8.4)	
US1 Bridge	**7.9** (7.8)	**9.1** (10.1)	8.0 – 25.0
A1A Bridge	**16.5** (15.3)	**21.3** (20.4)	20.0 – 31.0

Salinity remained about the same over the past week throughout the estuary. Weekly average surface salinity at both the Roosevelt and A1A Bridges is below the preferred range and bottom salinities are at just within the envelope. Salinity conditions in the estuary are poor considering the time of year, the location in the estuary, and salinity preference of the oyster, *Crassostrea virginica*.

Caloosahatchee Estuary

During the past week, flow averaged 424 cfs at S-77, 646 cfs at S-78. Flow and chloride values at S-79 were unavailable. The current weekly average salinities (in bold) at the six monitoring sites in the Caloosahatchee Estuary are given below in practical salinity units (psu), along with the previous week's (in parenthesis) as listed in the following table.

Weekly Average Salinity (psu)		
Sampling Site	**Surface**	**Bottom**
S-79 (Franklin Locks)	**0.3** (0.3)	**0.3** (0.3)
BR31	**0.3** (0.3)	**0.3** (0.3)
Val I75	**0.3** (0.3)	**0.3** (0.3)
Ft. Myers Yacht Basin	**0.5** (0.4)	**0.5** (0.8)
Marker 52	**0.5** (0.4)	**1.2** (0.8)
Cape Coral	**5.7** (4.6)	**8.0** (5.7)
Shell Point	**20.0** (17.6)	**21.3** (19.4)
Sanibel	**27.3** (25.2)	**28.7** (27.6)

Average salinity remained the same upstream of Ft. Myers Yacht Basin and slightly increased downstream of Ft. Myers over the past week. Since the estimated 30-day average salinity at Ft. Myers is 4.4 psu conditions are good in the upper estuary. Salinities at the Cape Coral Bridge are not within the preferred range for the oyster, *Crassostrea virginica or shoal grass (Halodule wrightii). However, salinity just east of Shell Point are sufficient to keep these Valued Ecosystem Components alive.* Salinities at Shell Point and the Sanibel Causeway indicate that conditions are good for seagrass in San Carlos Bay.

Monitoring data collected by the River, Estuary and Coastal Observing Network (RECON) of Sanibel-Captiva Conservation Foundation (SCCF) indicated that dissolved oxygen concentrations at Ft. Myers ranged between 7.3 and 10.7 mg/l and at Shell Point between 5.8 and 8.3 mg/l. Chlorophyll *a* at Ft Myers ranged between 1.7 and 4.0 ug/l. At Shell Point Chlorophyll *a* concentration generally ranged between 1.7 and 15 ug/l with a several spikes between 40 – 65 ug/l.

Fish and Wildlife Research Institute (FWRI) reports that *Karenia brevis*, the Florida red tide organism, was not detected in water samples collected this week alongshore between Pinellas and Collier counties. Samples collected late last week offshore of Sarasota County also contained no *K.* brevis. One sample collected late last week offshore of the Dry Tortugas (Florida Keys, Monroe County) contained background concentrations of *K. brevis*.

Bloom Boundary (alongshore): A localized bloom of *K. brevis* was detected last week offshore of Monroe County, on the northern side of the lower Florida Keys. No samples were taken in the area this week.

Water Management Recommendation

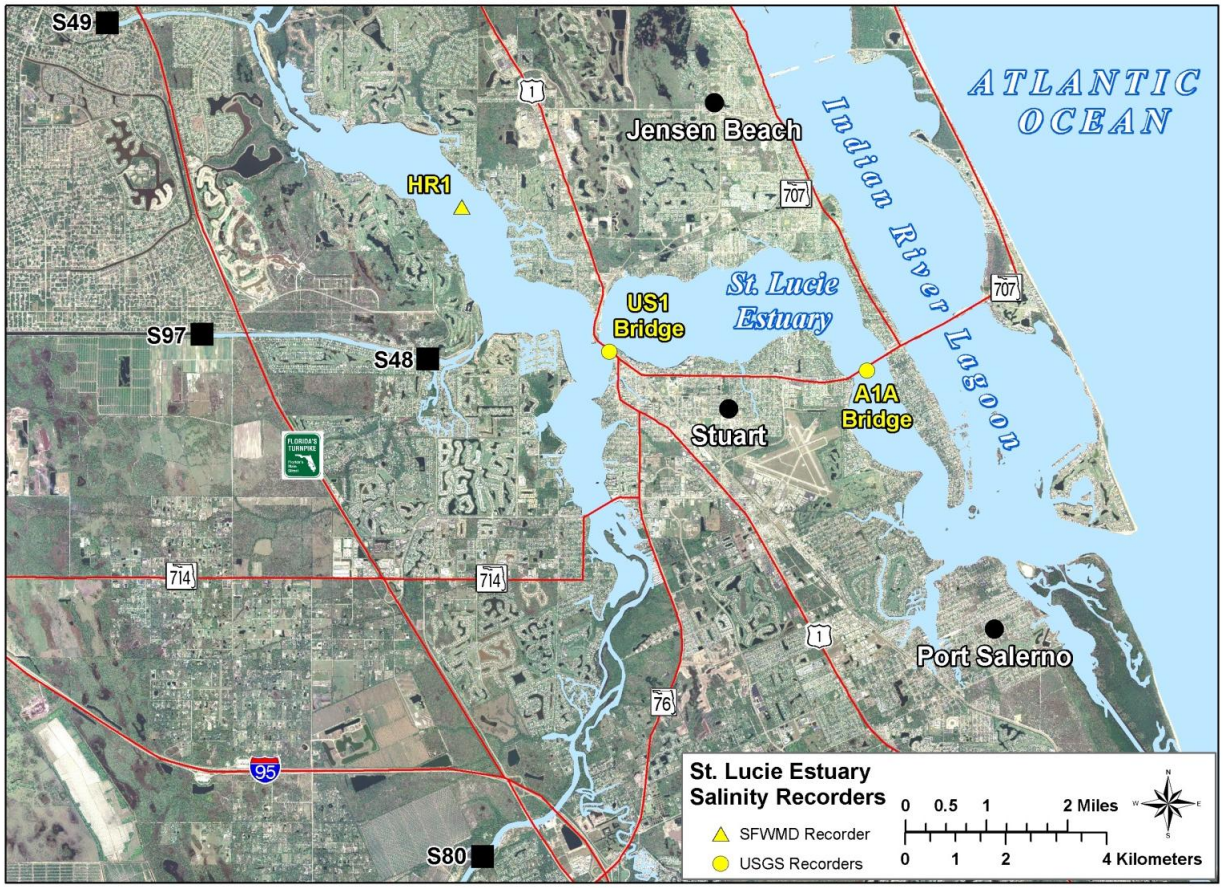
The Lake Okeechobee Regulation Schedule calls for releases to the St. Lucie and Caloosahatchee estuaries up to a monthly average of 1170 cfs and 3000 cfs respectively. The Army Corps of Engineers started three, 13 day, modified level two

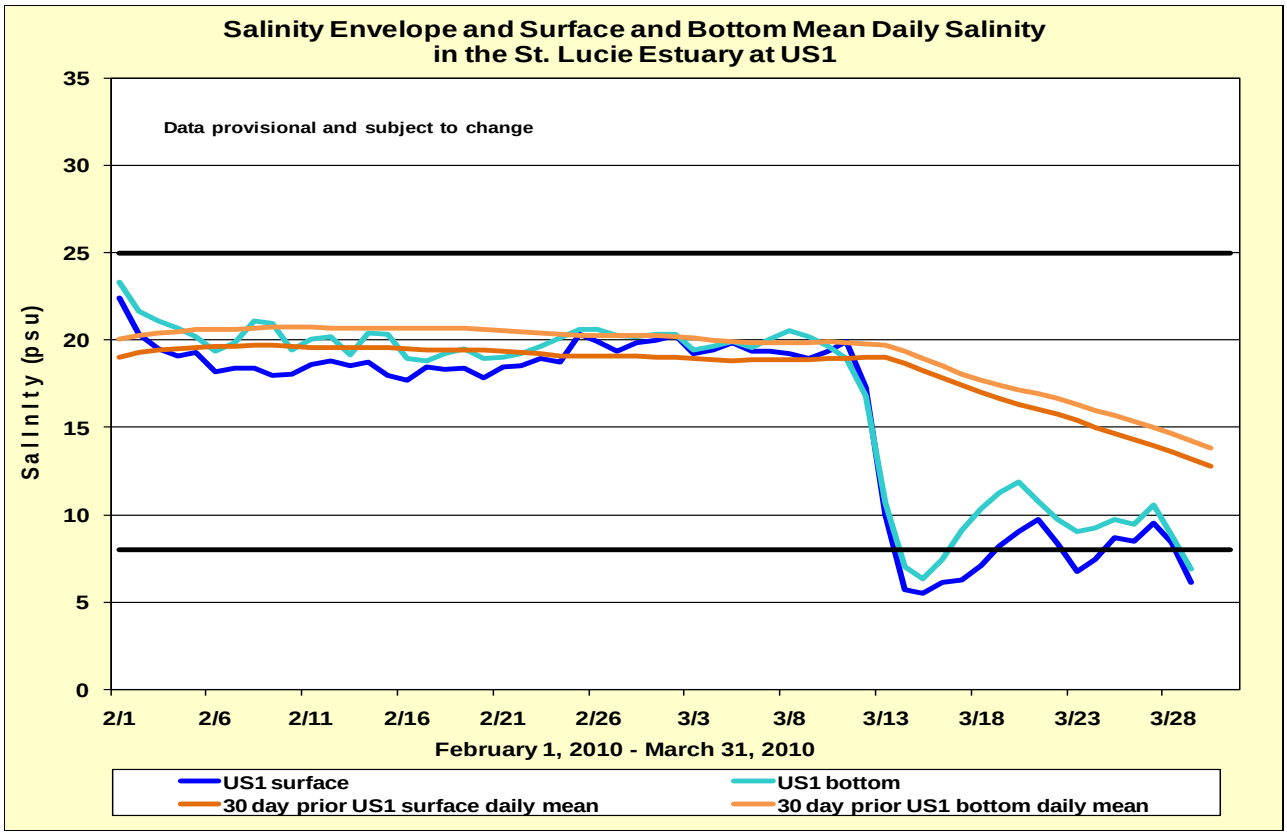
pulses (used in the WSE Lake schedule) on March 27, 2010 of 950 cfs and 2200 cfs measured at S-80 and S-79.

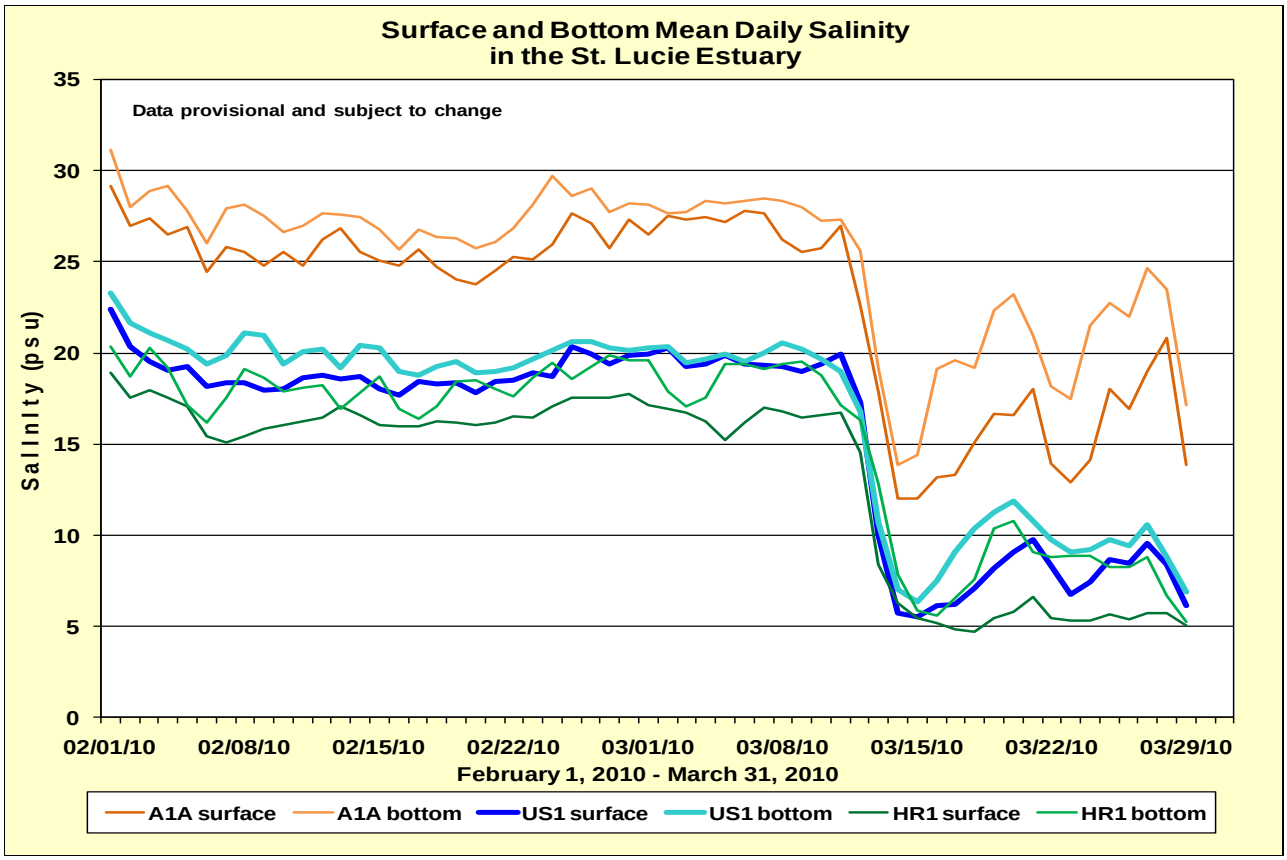
Performance Measures (PM) update:

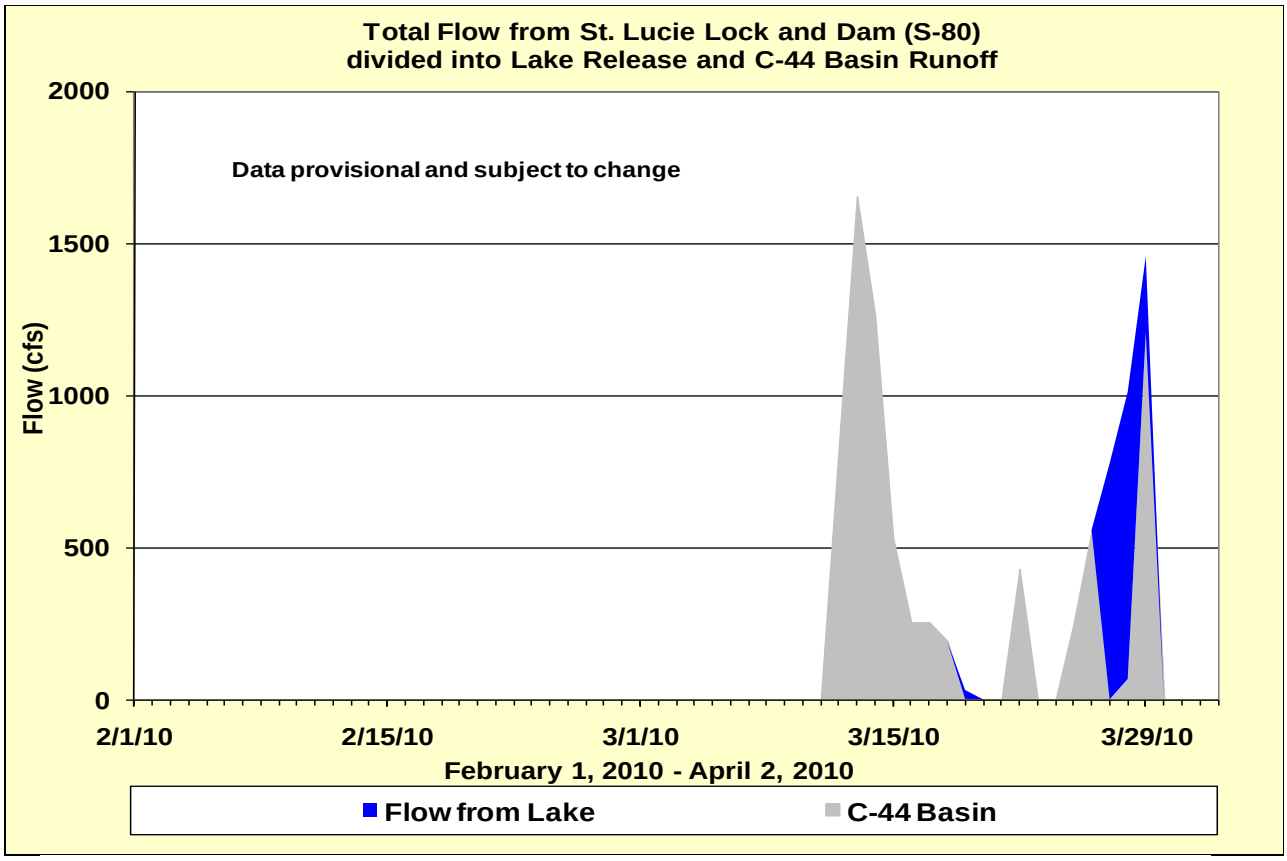
The salinity PM for the St. Lucie estuary is to keep the average daily salinity above 8 psu at US 1 Bridge in Stuart, Florida. Oyster's short term exposure to salinities lower than 8 psu can be tolerated by the oysters for limited time periods. Real time monitoring of salinity will be conducted by the District and adaptive management to reduce the probability of oyster mortality should be considered if the PM is being violated. The average salinity is presently below the PM at 6.5 psu and is decreasing as of this morning. If salinity does not start to rebound after Friday, April 2, 2010; it is recommended that flows from S-80 be reduced to meet the PM.

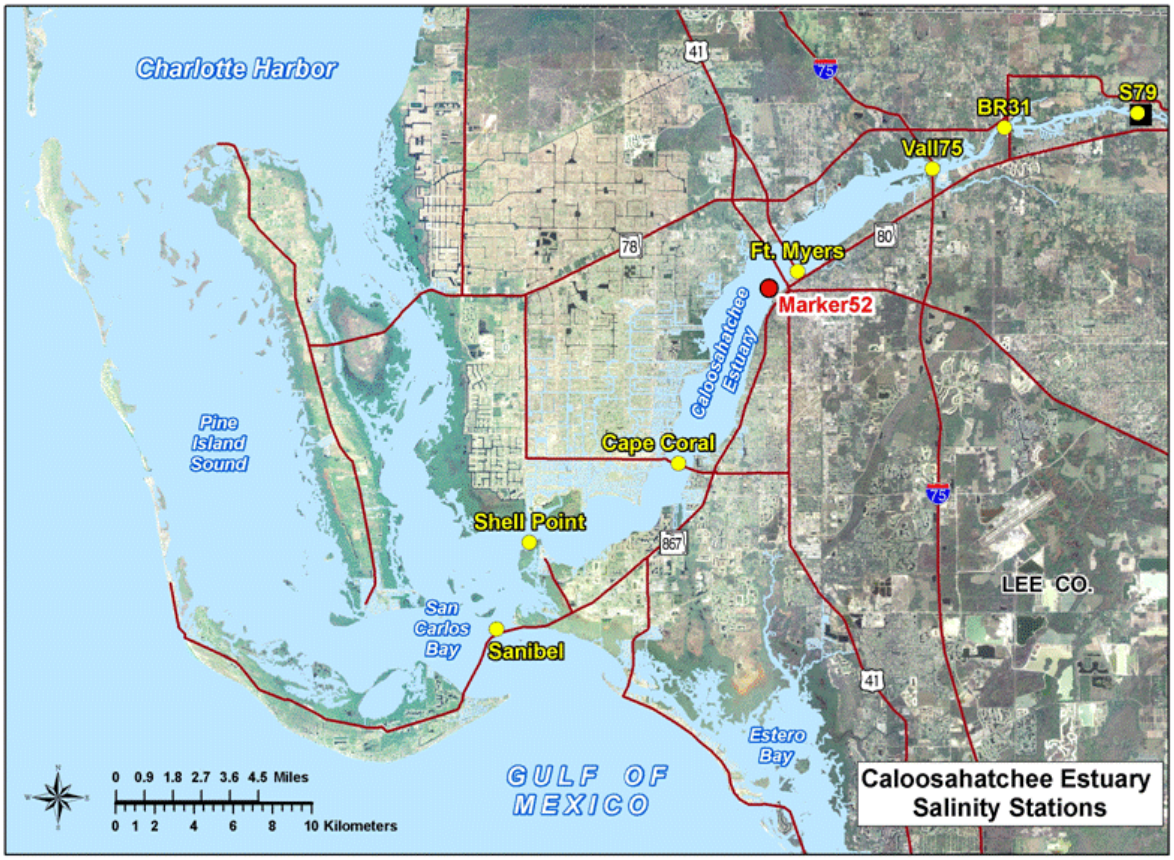
The Caloosahatchee estuary salinity PM at the Cape Coral salinity station is to not decrease average daily salinity below 5 psu to avoid the loss of seagrasses and oysters in the Iona Cove area, east of Shell Point. The PM is being met with a daily average of 7.5 psu. It is recommended that the planned 13 days pulses continue.

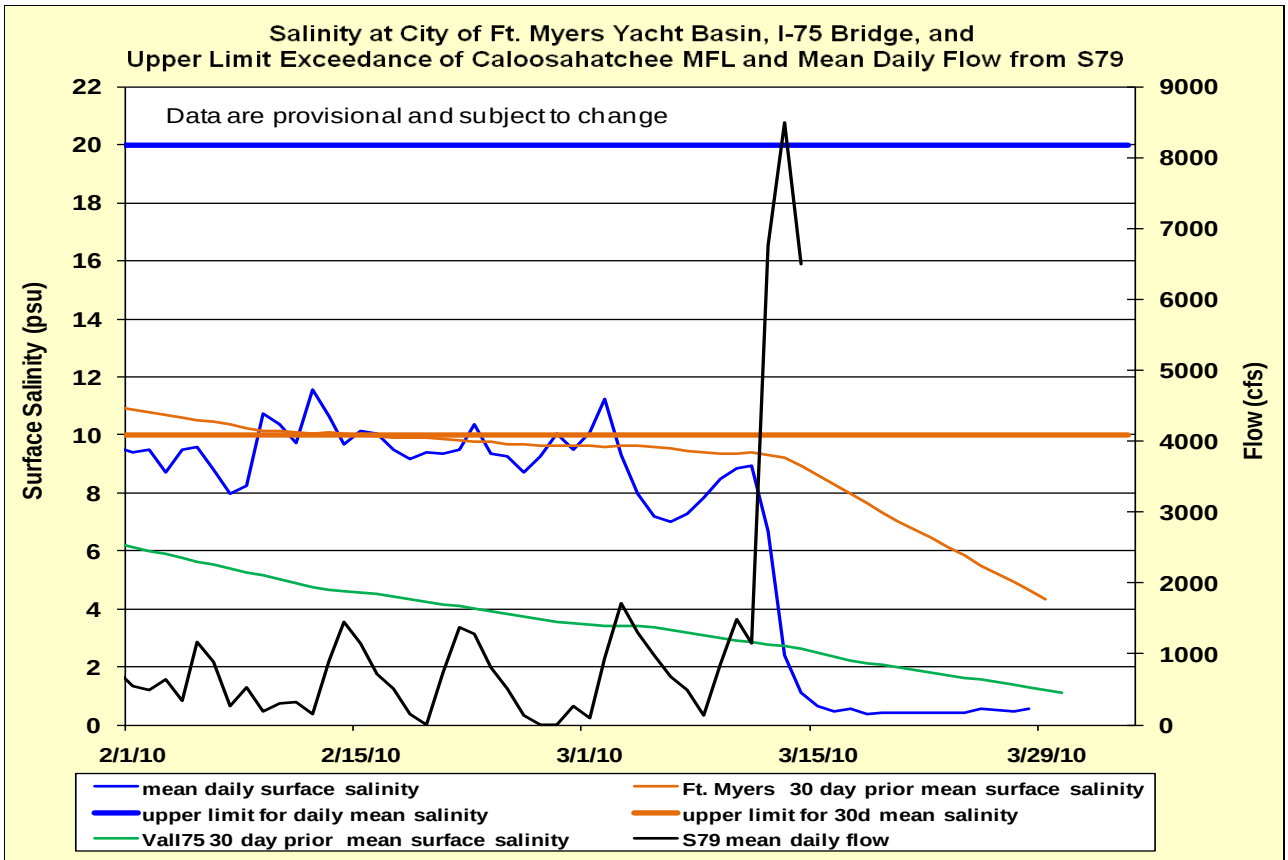


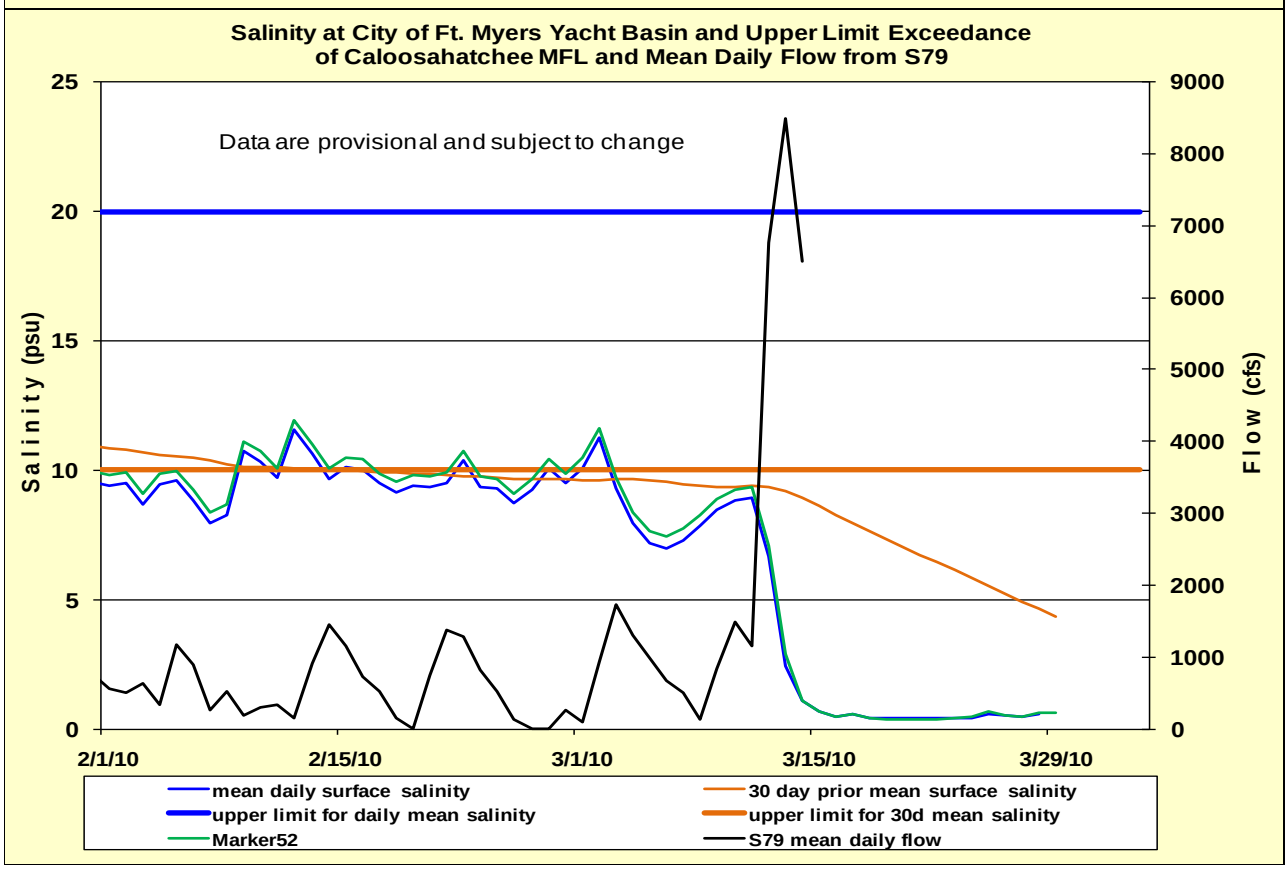

Salinity Envelope and Surface and Bottom Mean Daily Salinity
in the St. Lucie Estuary at US1
Data provisional and subject to change
Salinity (psu)
35
30
25
20
15
10
5
0
2/1
2/6
2/11
2/16
2/21
2/26
3/3
3/8
3/13
3/18
3/23
3/28
February 1, 2010 - March 31, 2010
US1 surface
US1 bottom
30 day prior US1 surface daily mean
30 day prior US1 bottom daily mean

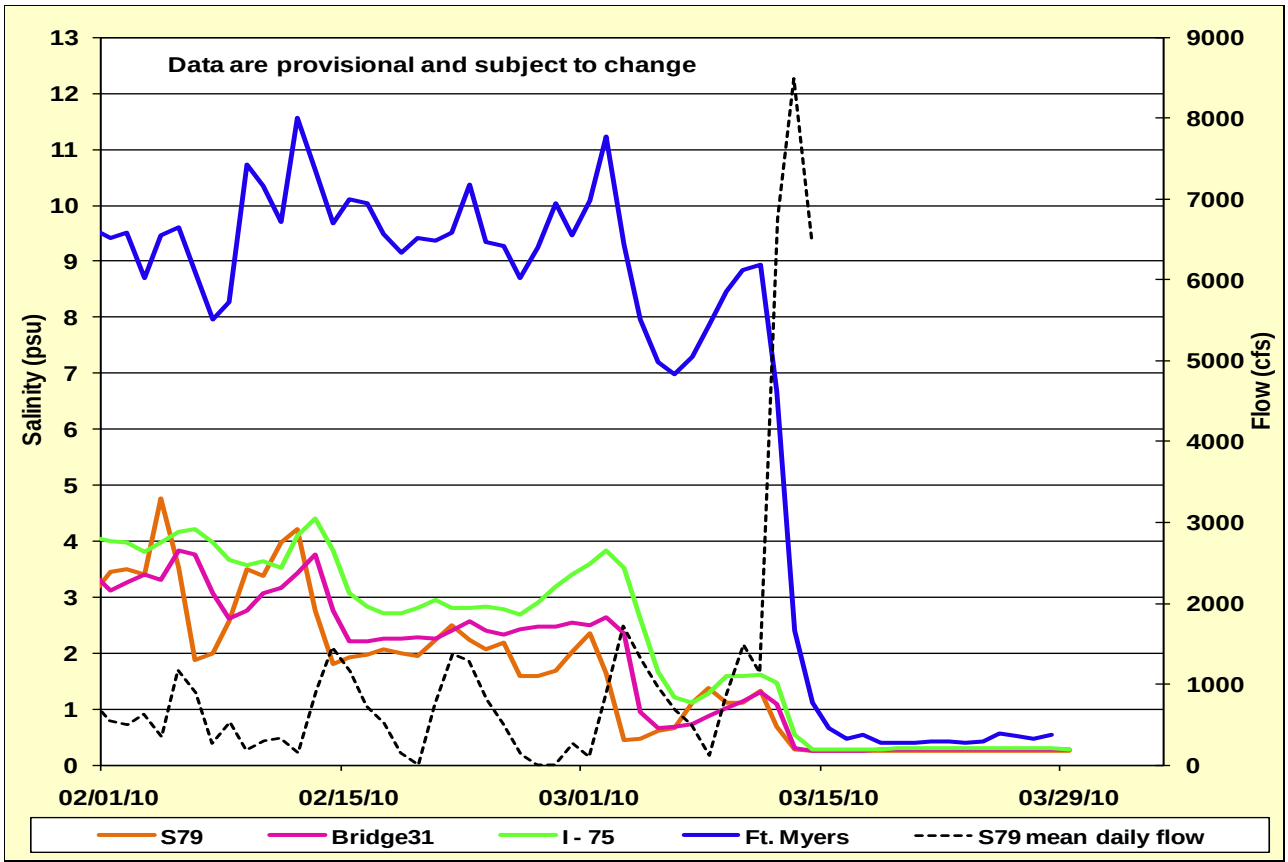

Surface and Bottom Mean Daily Salinity
in the St. Lucie Estuary
Data provisional and subject to change
Salinity (psu)
35
30
25
20
15
10
5
0
02/01/10
02/08/10
02/15/10
02/22/10
03/01/10
03/08/10
03/15/10
03/22/10
03/29/10
February 1, 2010 - March 31, 2010
A1A surface
A1A bottom
US1 surface
US1 bottom
HR1 surface
HR1 bottom

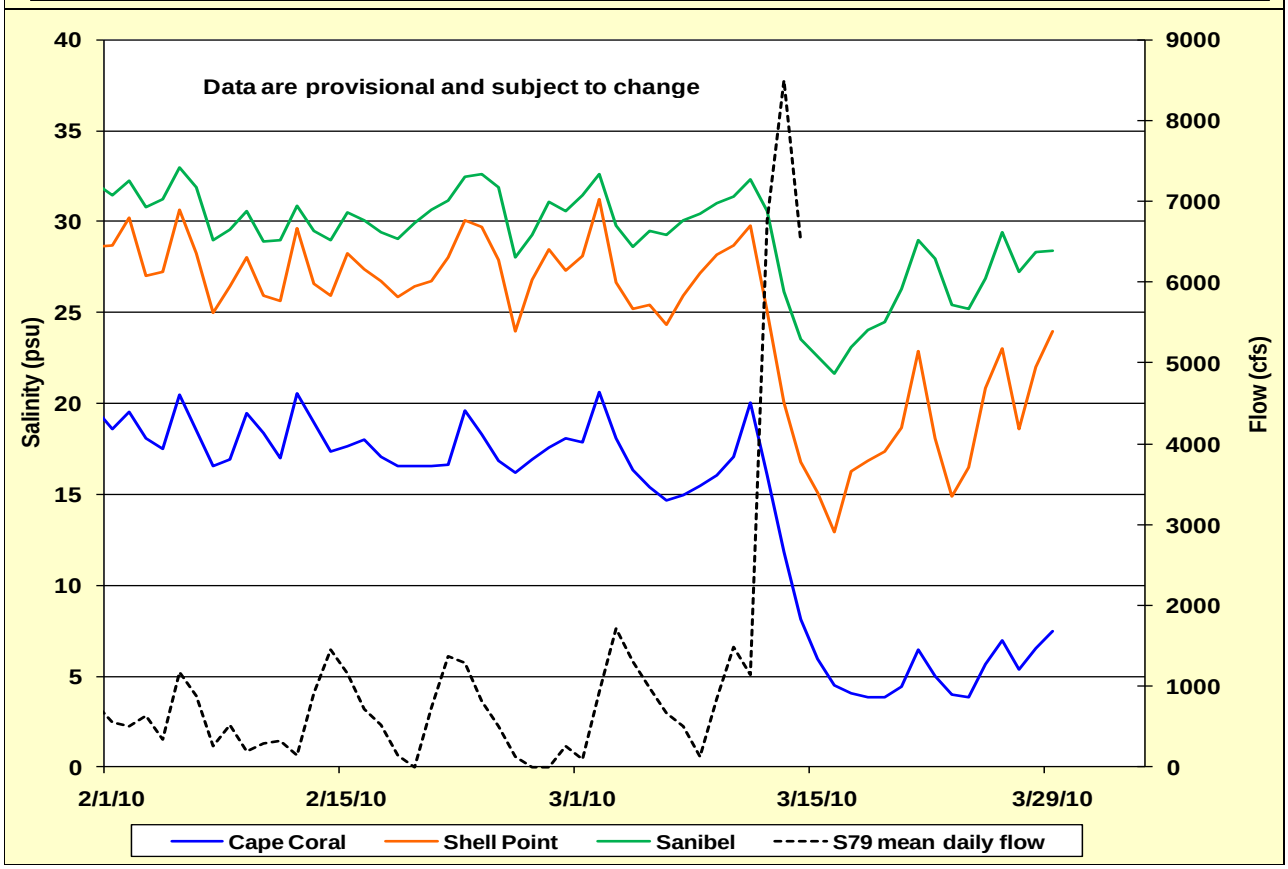

Total Flow from St. Lucie Lock and Dam (S-80)
divided into Lake Release and C-44 Basin Runoff
Data provisional and subject to change
Flow (cfs)
2000
1500
1000
500
0
2/1/10
2/15/10
3/1/10
3/15/10
3/29/10
February 1, 2010 - April 2, 2010
Flow from Lake
C-44 Basin

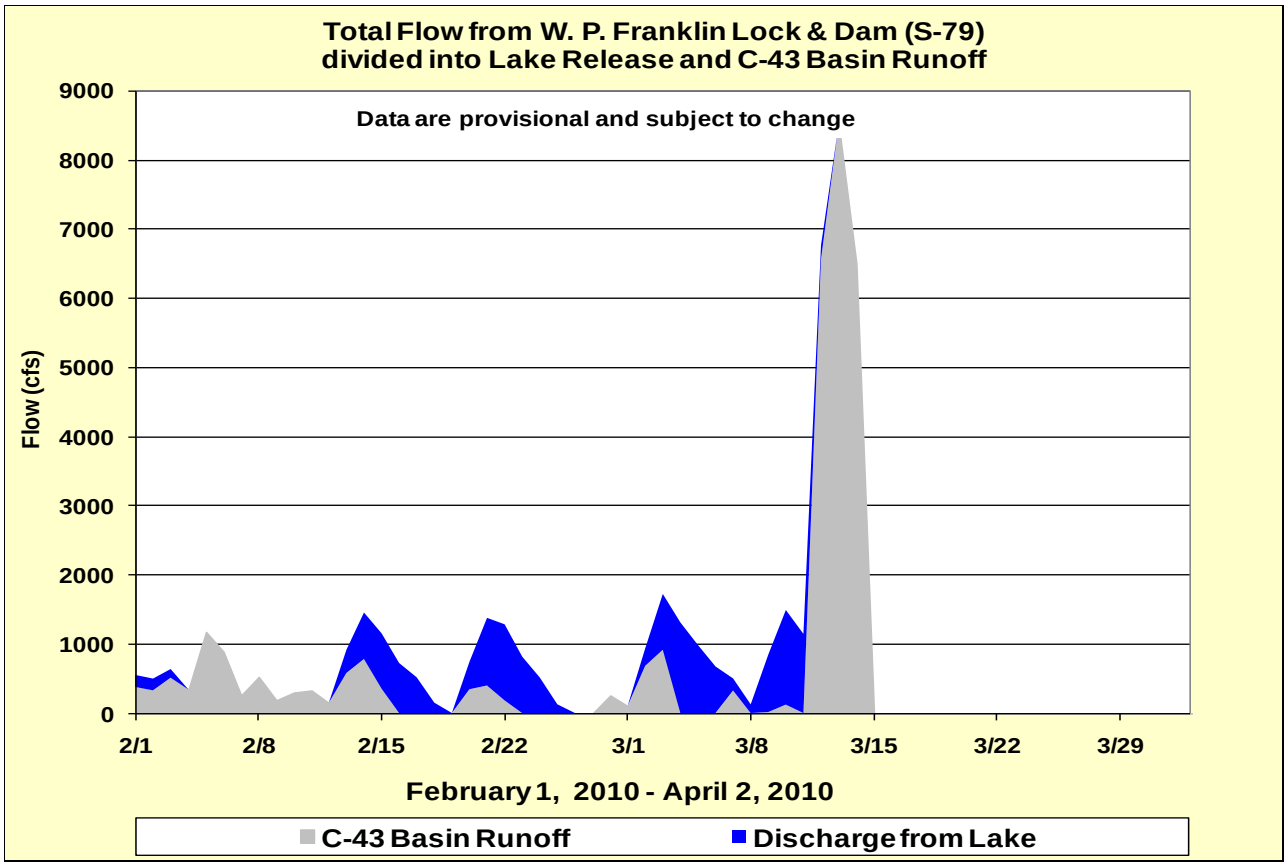

Charlotte Harbor
Pine Island Sound
San Carlos Bay
GULF OF MEXICO
Estero Bay
Caloosahatchee Estuary
Cape Coral
Shell Point
Sanibel
Ft. Myers
Marker52
Vall75
BR31
S79
LEE CO.
41
75
78
80
867
0 0.9 1.8 2.7 3.6 4.5 Miles
0 1 2 4 6 8 10 Kilometers
Caloosahatchee Estuary
Salinity Stations


Salinity at City of Ft. Myers Yacht Basin, I-75 Bridge, and
Upper Limit Exceedance of Caloosahatchee MFL and Mean Daily Flow from S79
Data are provisional and subject to change
Surface Salinity (psu)
Flow (cfs)
22
20
18
16
14
12
10
8
6
4
2
0
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
2/1/10
2/15/10
3/1/10
3/15/10
3/29/10
mean daily surface salinity
Ft. Myers 30 day prior mean surface salinity
upper limit for daily mean salinity
upper limit for 30d mean salinity
Vall75 30 day prior mean surface salinity
S79 mean daily flow


Salinity at City of Ft. Myers Yacht Basin and Upper Limit Exceedance
of Caloosahatchee MFL and Mean Daily Flow from S79
Data are provisional and subject to change
Salinity (psu)
Flow (cfs)
25
20
15
10
5
0
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
2/1/10
2/15/10
3/1/10
3/15/10
3/29/10
mean daily surface salinity
30 day prior mean surface salinity
upper limit for daily mean salinity
upper limit for 30d mean salinity
Marker52
S79 mean daily flow


Data are provisional and subject to change
Salinity (psu)
Flow (cfs)
13
12
11
10
9
8
7
6
5
4
3
2
1
0
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
02/01/10
02/15/10
03/01/10
03/15/10
03/29/10
S79
Bridge31
I - 75
Ft. Myers
S79 mean daily flow


Data are provisional and subject to change
Salinity (psu)
Flow (cfs)
40
35
30
25
20
15
10
5
0
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
2/1/10
2/15/10
3/1/10
3/15/10
3/29/10
Cape Coral
Shell Point
Sanibel
S79 mean daily flow



GREATER EVERGLADES

Water Conservation Areas (WCA):

Last week's rainfall in the Greater Everglades was higher in the central areas (see Raindar image and below) and lower to the north and south. The local high of 5.4 inches fell in WCA-3A.

Rain:	WCA-1:	1.07 inches	WCA-3A:	2.90 inches
	WCA-2A:	2.26 inches	WCA-3B:	2.66 inches
	WCA-2B:	4.00 inches	ENP:	0.96 inches

Rainfall exceeded the week's pan evaporation of 1.32 inches, and produced significant reversals everywhere except for WCA-1 (the Refuge) (see WCA Stages below). Stages rose by almost a half foot in WCA-2A and -3A (gauges 2-17 and 63), and by 0.29 foot in WCA-2B. This week's recession rates were Poor because of the stage increases except in WCA-1.

Stage Change:	WCA-1:	-0.07 feet	WCA-3A:	0.23 feet
	WCA-2A:	0.46 feet	WCA-3B:	0.15 feet
	WCA-2B:	0.29 feet	NESRS:	0.08 feet

Water depths are similar to those a month ago, though slightly shallower (see Water Depths map below). The differences show up particularly in the Park, where water depths have dropped to -2 feet below the ground surface. Greater Everglades water depths (see Depth differences map below) reflect the rainfall patterns and are a bit deeper in the central areas than week ago, are similar to those a month ago except in the Park (shallower) and in eastern WCA-2A (deeper). Water levels are much higher than a year ago, particularly in Big Cypress, ENP, and the northern conservation areas.

Regulation stages (see Regulation schedules) reflect the reversals this week, visible in the sharp upturns in marsh and canal stages. Stages in WCA-2A have continued to rise over the last month; marsh stages are almost 1.5 feet above regulation stages and the canal stage is at regulation. The marsh stage in WCA-3A rose to just above regulation. In contrast, even with the rainfall, canal and marsh stages declined over the last week in WCA-1 (the Refuge).

Depths considered good for wading bird feeding (green) have grown sparse in most of the Conservation Areas, though they remain along Shark River Slough in ENP (see Birds-depths map below). Good recession rates (see Birds-recession jpg below) occurred in southern WCA-3A and in ENP last week although parts of these areas are too deep to be useful for wading birds.

The only fire in the Greater Everglades was a prescribed burn Thursday in WCA-2B by Florida Fish and Wildlife Conservation Commission.

Everglades National Park (ENP) and Florida Bay:

Moderate rain fell across northeast to southwest (including Cape Sable) Everglades National Park (ENP) while light rain fell across southeast ENP and Florida Bay last week. ENP stations measured 0.03 inches – 1.3 inches of rainfall, and the basin-wide, spatially-averaged weekly RAINDAR totals were 0.9 inches and 0.3 inches for the ENP and C-111 basins, respectively (see Raindar below).

Stages generally declined across ENP wetland stations. Water levels in Shark River Slough rose +0.5 inches, but dropped -1.4 inches at the Taylor Slough Bridge. To the south, water levels in the ENP panhandle and in Craighead Basin dropped -0.5 inches and -0.6 inches, respectively.

Salinity was generally stable across Florida Bay. In the near shore eastern Bay, salinity was steady in the low 20s and middle-lower 20s in Long Sound and at the Little Madeira Bay platform, respectively. Further into the Bay in Duck Key Basin, salinity was steady in the middle-upper 20s. The 30 day moving average salinity at the Taylor River platform (used for tracking the Florida Bay Minimum Flows and Levels Rule) was unchanged at 0.9 practical salinity units (psu), and the daily average salinity increased slightly from 1.0 psu up to 1.1 psu. In the north central Bay, salinity was variable but increased from the middle teens up to the middle 20s in McCormick Creek. In Terrapin

Bay, salinity dropped from the middle 20s down to the lower 20s mid-week before increasing back up to the middle 20s by week's end. At the central Bay platform in Whipray Basin, salinity increased slightly from the middle-lower 30s up to the middle 30s. To the west, in the upstream reaches of Shark River Slough, salinity increased from 5.3 psu up to 6.5 psu.

Birds and Wildlife

Wading Birds: Survey flights were not conducted last week but a recent flight over WCAs 1 and 2A suggested very little foraging in those areas. Stages increased over the past week in WCAs 1, 2 and 3A and stages are now generally too deep for foraging/breeding throughout the northern system. However, suitable foraging depths and recession rates remain available along the full length of the margins of Shark Slough in ENP. The District will survey colonies on April 5.

Snail Kites: There are currently four kite nests in 3A: one incubating in the southwest and three are building nests in northern-central 3A (south of I-75). Four pairs are building nests in WCA-3B, one is incubating eggs in WCA-1; and nesting activity is occurring in STA ¾, STA 5, and ENP.

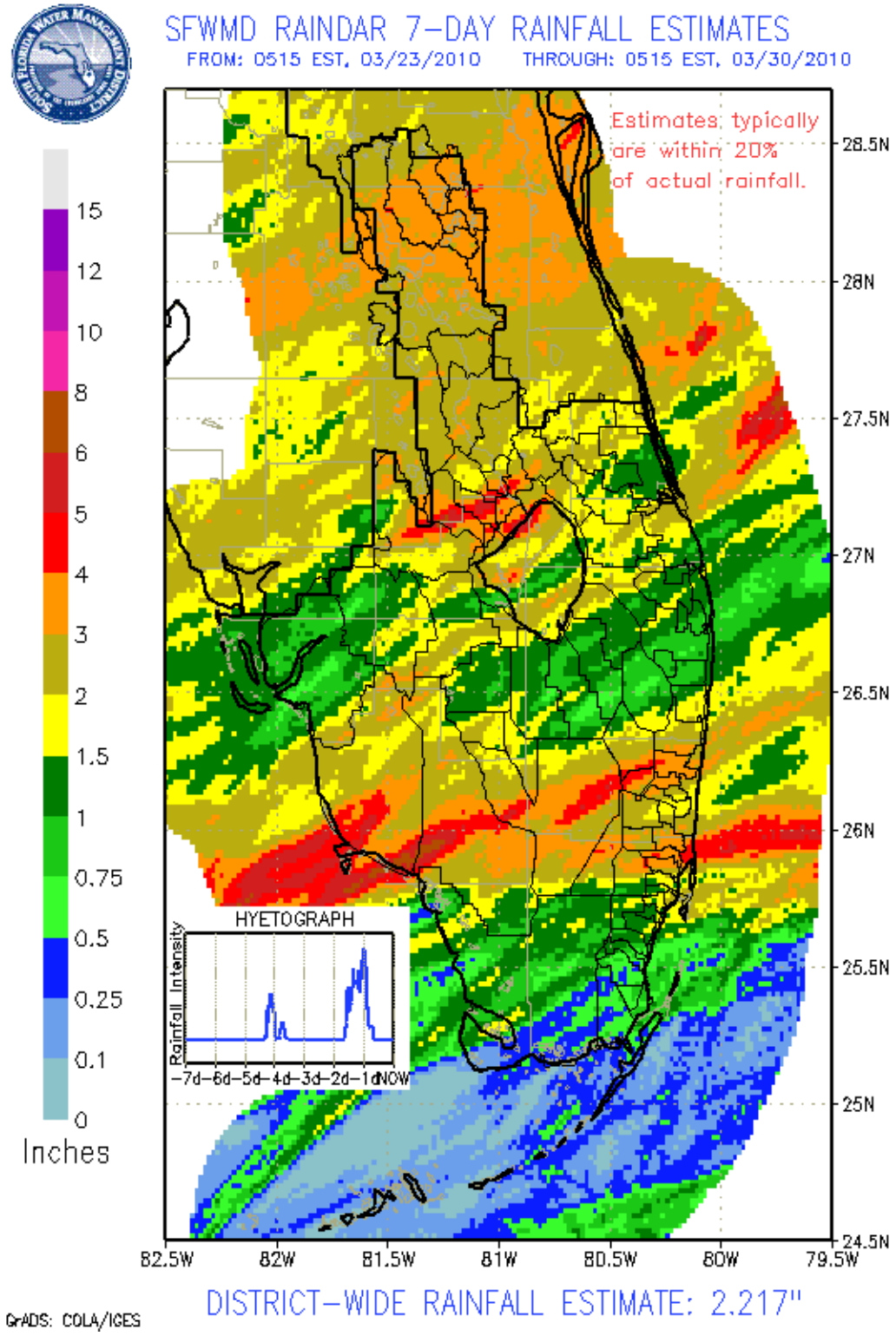
Cape Sable Seaside Sparrows: Water levels at NP-205 have risen and are very close to the 6.0 ft threshold. Nest survey data should be available in the next week or two.

Water Management Recommendation

Further reversals could be very detrimental to kite nesting so the ecological priority is to minimize further reversals in 3A and 3B and aim for a recession rate of approximately 0.05 foot/week for the immediate future, although rates up to 0.1 ft/week are acceptable in the short term (next 7 days) if rain-related water releases are necessary. Water levels are too deep for wading bird foraging in WCAs 1, 2 and 3 so a return to water level recession would benefit foraging wading birds in any of these regions (optimum: -0.04 to -0.15 feet/week). Note, however, that any recessions in WCAs 1 and 2 should not be to the detriment of recession rates in 3A and 3B. Any movement of water into ENP should not increase water levels at NP205, which is now very close to 6.0 ft.

Attachments

Raindar:



WCA Stages spreadsheet:

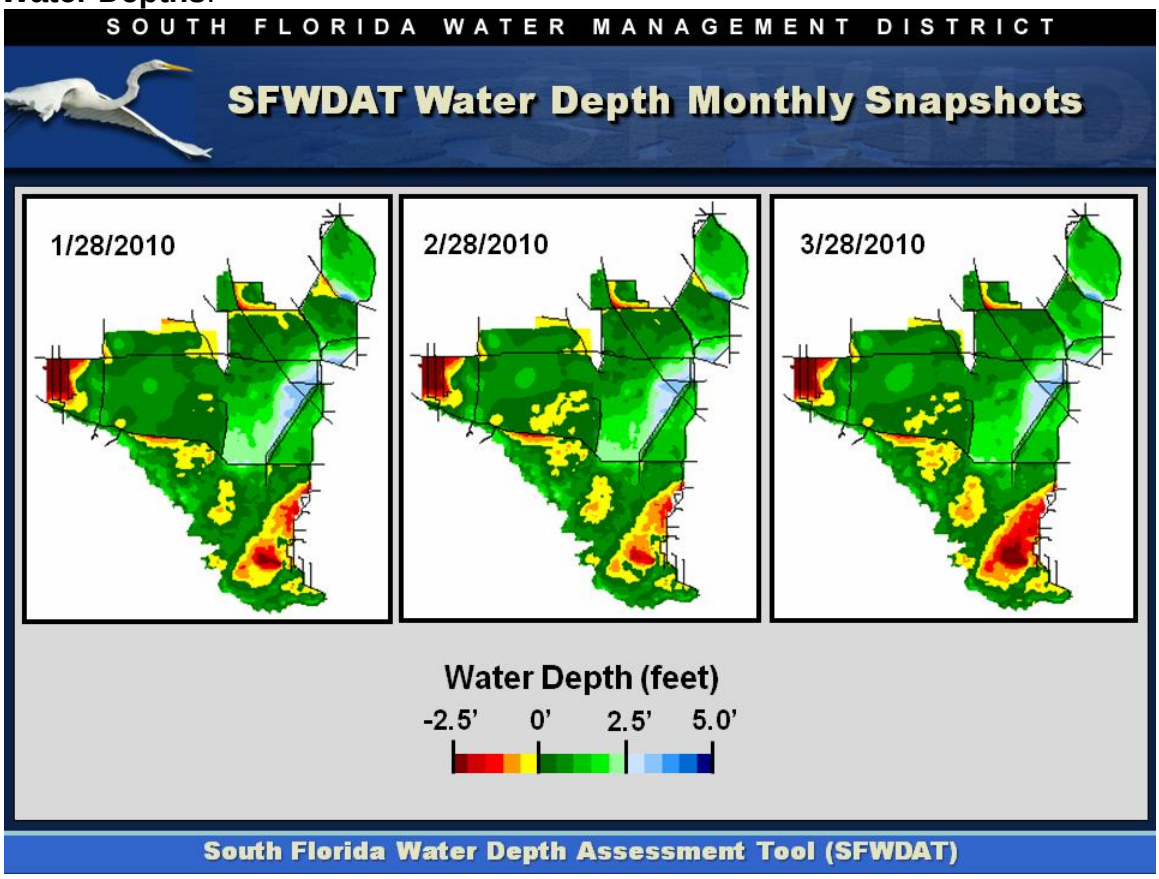
WCA and ENP Hydrology Data with Environmental Ratings

Area	Gage	Ground Eleva-tion	Stage 12/22/09	Stage 12/29/09	Stage 1/5/10	Stage 1/12/10	Stage 1/19/10	Stage 1/26/10	Stage 2/2/10	Stage 2/9/10	Stage 2/16/10	Stage 2/23/10	Stage 3/2/10	Stage 3/9/10	Stage 3/16/10	Stage 3/23/10	**Stage 3/30/10**	**Stage Change**
WCA-1	1-7	15.4	16.72	16.66	16.62	16.57	16.61	16.58	16.57	16.55	16.57	16.52	16.59	16.53	16.68	16.77	**16.77**	**0.00**
	1-9	14.7	16.74	16.68	16.64	16.60	16.60	16.56	16.56	16.55	16.56	16.51	16.61	16.53	16.60	16.75	**16.71**	**-0.04**
	1-8T		16.77	16.72	16.67	16.63	16.62	16.58	16.58	16.58	16.60	16.51	16.60	16.47	16.86	16.76	**16.60**	**-0.16**
WCA-2A	2-17	11.1	12.48	12.25	12.01	11.88	11.82	11.75	11.71	11.67	11.65	11.60	11.74	11.77	11.85	11.96	**12.42**	**0.46**
WCA-2B	99	6.8	10.65	10.56	10.44	10.37	10.37	10.31	10.34	10.24	10.20	10.11	10.13	10.05	10.06	9.97	**10.25**	**0.28**
	EDEN-13	6.7	9.10	9.00	8.89	8.85	8.85	8.83	8.79	8.69	8.66	8.60	8.60	8.52	8.52	8.43	**8.73**	**0.30**
WCA-3A	62	10.1	10.88	10.82	10.79	10.75	10.75	10.75	10.80	10.78	10.77	10.79	10.85	10.85	11.01	11.10	**11.31**	**0.21**
	63	9.08	10.19	10.28	10.29	10.20	10.15	10.13	10.18	10.17	10.07	9.97	9.97	9.91	9.96	10.01	**10.47**	**0.46**
	64	8.49	10.26	10.24	10.23	10.22	10.30	10.26	10.25	10.23	10.15	10.09	10.05	9.94	9.92	9.85	**10.01**	**0.16**
	65	7.3	9.91	9.88	9.88	9.91	9.92	9.87	9.90	9.85	9.77	9.67	9.65	9.51	9.43	9.33	**9.42**	**0.09**
WCA-3B	76	6.32	7.64	7.59	7.56	7.56	7.62	7.57	7.78	7.71	7.66	7.60	7.61	7.56	7.53	7.54	**7.72**	**0.18**
	71	6.52	7.95	7.90	7.88	7.89	7.90	7.90	7.91	7.94	7.91	7.88	7.89	7.83	7.82	7.79	**7.94**	**0.15**
	SRS1	6.23	7.56	7.49	7.42	7.41	7.41	7.40	7.41	7.41	7.41	7.40	7.40	7.36	7.37	7.34	**7.45**	**0.11**
ENP	NESRS2	5.62	6.77	6.67	6.60	6.57	6.55	6.50	6.54	6.61	6.72	6.74	6.77	6.74	6.78	6.78	**6.86**	**0.08**

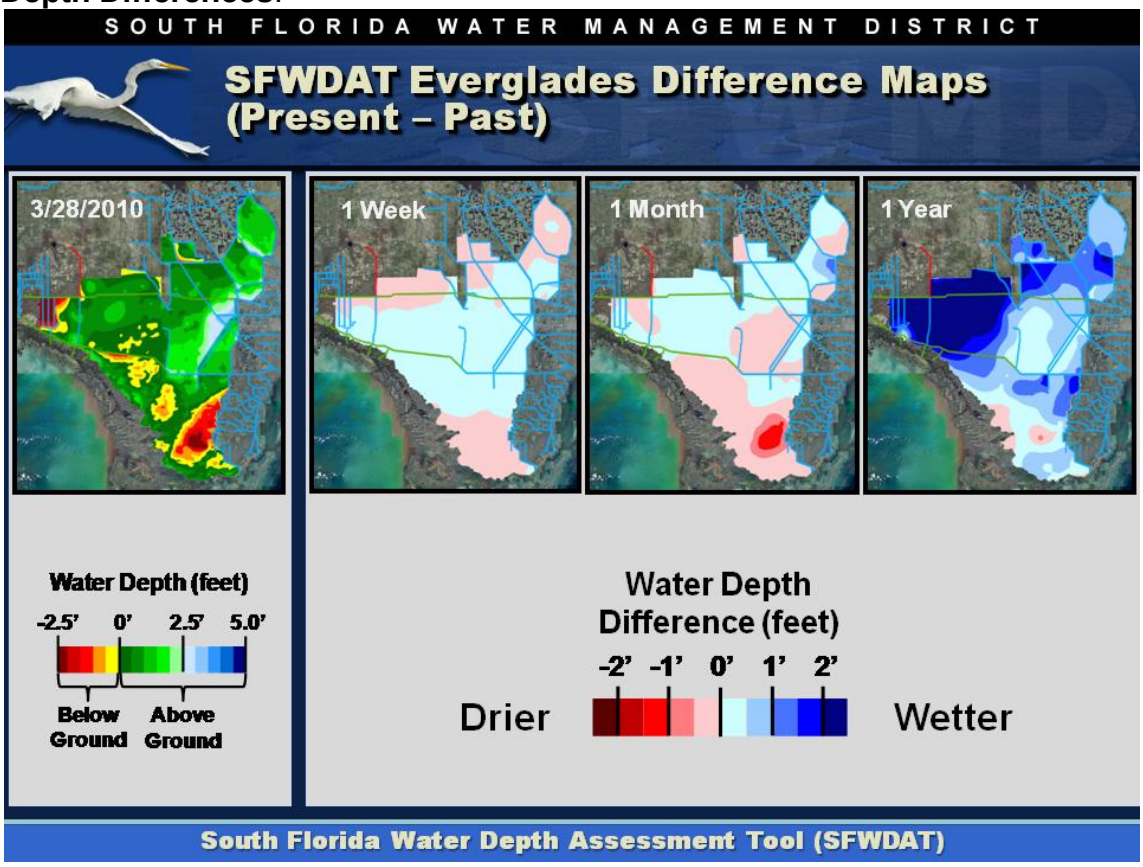
		1 week stage change 12/22/09	1 week stage change 12/29/09	1 week stage change 1/5/10	1 week stage change 1/12/10	1 week stage change 1/19/10	1 week stage change 1/26/10	1 week stage change 2/2/10	1 week stage change 2/9/10	1 week stage change 2/16/10	1 week stage change 2/23/10	1 week stage change 3/2/10	1 week stage change 3/9/10	1 week stage change 3/16/10	1 week stage change 3/23/10	**1 week stage change 3/30/10**	**Reces-sion rate**
WCA-1	1-7	1.32	-0.06	-0.04	-0.05	0.04	-0.03	-0.01	-0.02	0.02	-0.05	0.07	-0.06	0.15	0.09	**0.00**	Poor
	1-9	2.04	-0.06	-0.04	-0.04	0.00	-0.04	0.00	-0.01	0.01	-0.05	0.10	-0.08	0.07	0.15	**-0.04**	Good
	1-8T	16.77	-0.05	-0.05	-0.04	-0.01	-0.04	0.00	0.00	0.02	-0.09	0.09	-0.13	0.39	-0.10	**-0.16**	Good
WCA-2A	2-17	1.38	-0.23	-0.24	-0.13	-0.06	-0.07	-0.04	-0.04	-0.02	-0.05	0.14	0.03	0.08	0.11	**0.46**	Poor
WCA-2B	99	3.85	-0.09	-0.12	-0.07	0.00	-0.06	0.03	-0.10	-0.04	-0.09	0.02	-0.08	0.01	-0.09	**0.28**	Poor
	EDEN-13	2.40	-0.10	-0.11	-0.04	0.00	-0.02	-0.04	-0.10	-0.03	-0.06	0.00	-0.08	0.00	-0.09	**0.30**	Poor
WCA-3A	62	0.78	-0.06	-0.03	-0.04	0.00	0.00	0.05	-0.02	-0.01	0.02	0.06	0.00	0.16	0.09	**0.21**	Poor
	63	1.11	0.09	0.01	-0.09	-0.05	-0.02	0.05	-0.01	-0.10	-0.10	0.00	-0.06	0.05	0.05	**0.46**	Poor
	64	1.77	-0.02	-0.01	-0.01	0.08	-0.04	-0.01	-0.02	-0.08	-0.06	-0.04	-0.11	-0.02	-0.07	**0.16**	Poor
	65	2.61	-0.03	0.00	0.03	0.01	-0.05	0.03	-0.05	-0.08	-0.10	-0.02	-0.14	-0.08	-0.10	**0.09**	Poor
WCA-3B	76	1.32	-0.05	-0.03	0.00	0.06	-0.05	0.21	-0.07	-0.05	-0.06	0.01	-0.05	-0.03	0.01	**0.18**	Poor
	71	1.43	-0.05	-0.02	0.01	0.01	0.00	0.01	0.03	-0.03	-0.03	0.01	-0.06	-0.01	-0.03	**0.15**	Poor
	SRS1	1.33	-0.07	-0.07	-0.01	0.00	-0.01	0.01	0.00	0.00	-0.01	0.00	-0.04	0.01	-0.03	**0.11**	Poor
ENP	NESRS2	1.15	-0.10	-0.07	-0.03	-0.02	-0.05	0.04	0.07	0.11	0.02	0.03	-0.03	0.04	0.00	**0.08**	Poor

		Depth 12/22/09	Depth 12/29/09	Depth 1/5/10	Depth 1/12/10	Depth 1/19/10	Depth 1/26/10	Depth 2/2/10	Depth 2/9/10	Depth 2/16/10	Depth 2/23/10	Depth 3/2/10	Depth 3/9/10	Depth 3/16/10	Depth 3/23/10	**Depth 3/30/10**	**Foraging water depths**
WCA-1	1-7	1.32	1.26	1.22	1.17	1.21	1.18	1.17	1.15	1.17	1.12	1.19	1.13	1.28	1.37	**1.37**	Poor
	1-9	2.04	1.98	1.94	1.90	1.90	1.86	1.86	1.85	1.86	1.81	1.91	1.83	1.90	2.05	**2.01**	Poor
	1-8T																
WCA-2A	2-17	1.38	1.15	0.91	0.78	0.72	0.65	0.61	0.57	0.55	0.50	0.64	0.67	0.75	0.86	**1.32**	Poor
WCA-2B	99	3.85	3.76	3.64	3.57	3.57	3.51	3.54	3.44	3.40	3.31	3.33	3.25	3.26	3.17	**3.45**	Poor
	EDEN-13	2.40	2.30	2.19	2.15	2.15	2.13	2.09	1.99	1.96	1.90	1.90	1.82	1.82	1.73	**2.03**	Poor
WCA-3A	62	0.78	0.72	0.69	0.65	0.65	0.65	0.70	0.68	0.67	0.69	0.75	0.75	0.91	1.00	**1.21**	Poor
	63	1.11	1.20	1.21	1.12	1.07	1.05	1.10	1.09	0.99	0.89	0.89	0.83	0.88	0.93	**1.39**	Poor
	64	1.77	1.75	1.74	1.73	1.81	1.77	1.76	1.74	1.66	1.60	1.56	1.45	1.43	1.36	**1.52**	Poor
	65	2.61	2.58	2.58	2.61	2.62	2.57	2.60	2.55	2.47	2.37	2.35	2.21	2.13	2.03	**2.12**	Poor
WCA-3B	76	1.32	1.27	1.24	1.24	1.30	1.25	1.46	1.39	1.34	1.28	1.29	1.24	1.21	1.22	**1.40**	Poor
	71	1.43	1.38	1.36	1.37	1.38	1.38	1.39	1.42	1.39	1.36	1.37	1.31	1.30	1.27	**1.42**	Poor
	SRS1	1.33	1.26	1.19	1.18	1.18	1.17	1.18	1.18	1.18	1.17	1.17	1.13	1.14	1.11	**1.22**	Poor
ENP	NESRS2	1.15	1.05	0.98	0.95	0.93	0.88	0.92	0.99	1.10	1.12	1.15	1.12	1.16	1.16	**1.24**	Poor

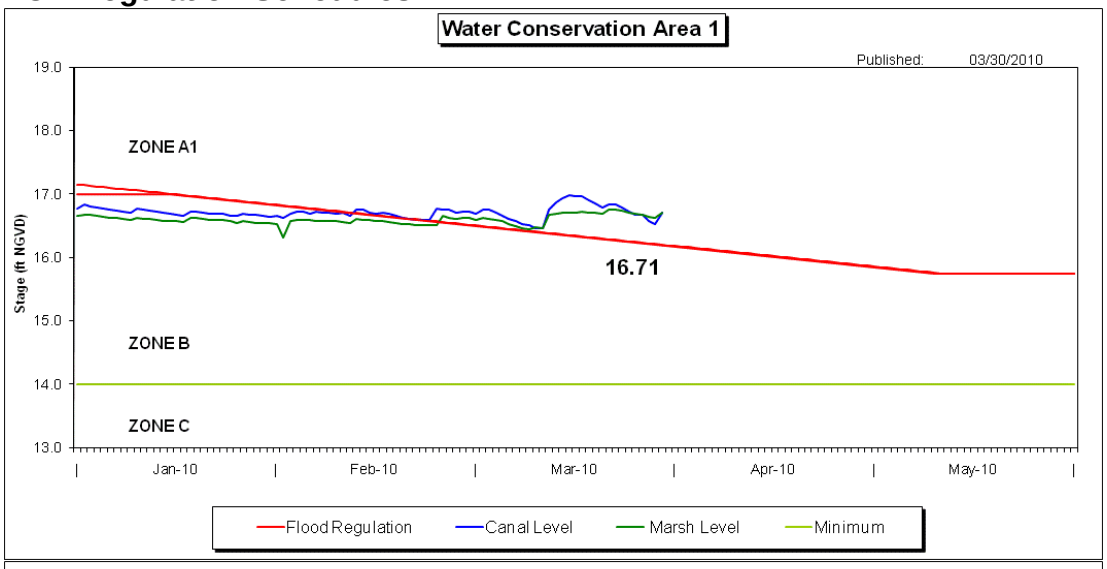
Water Depths:

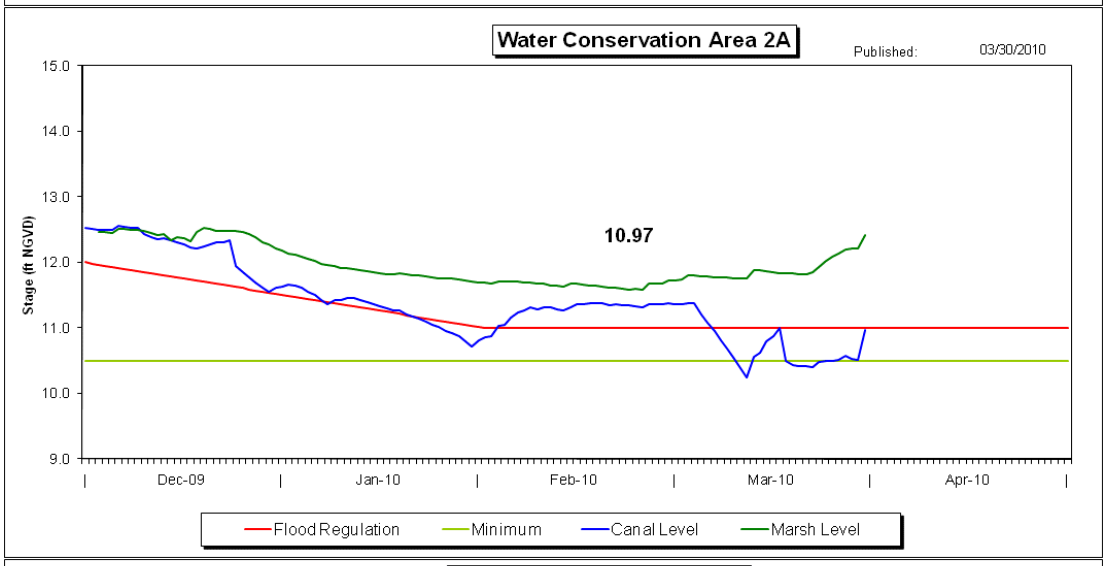


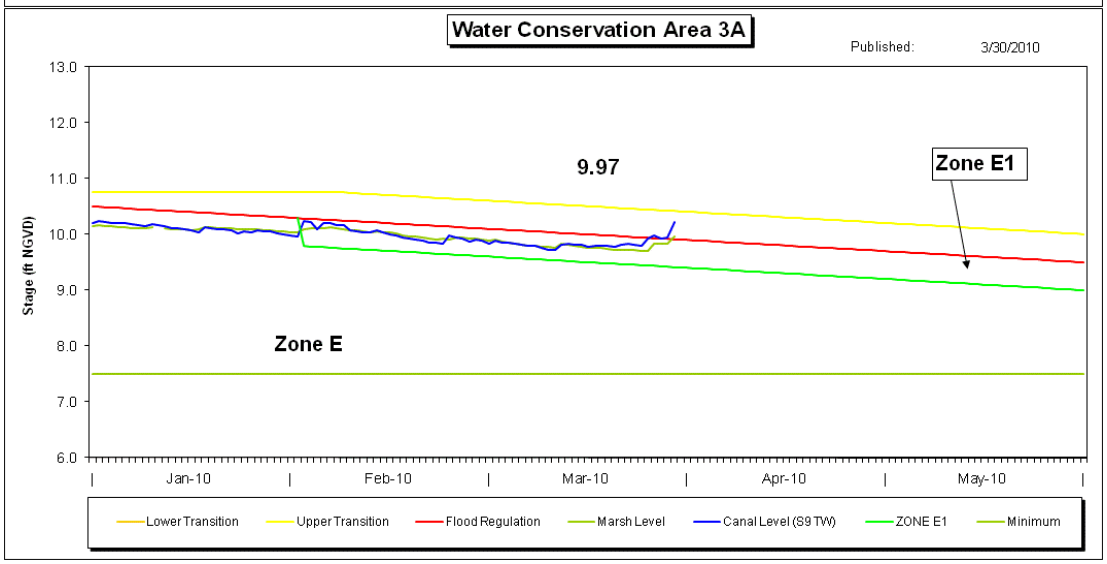
Depth Differences:



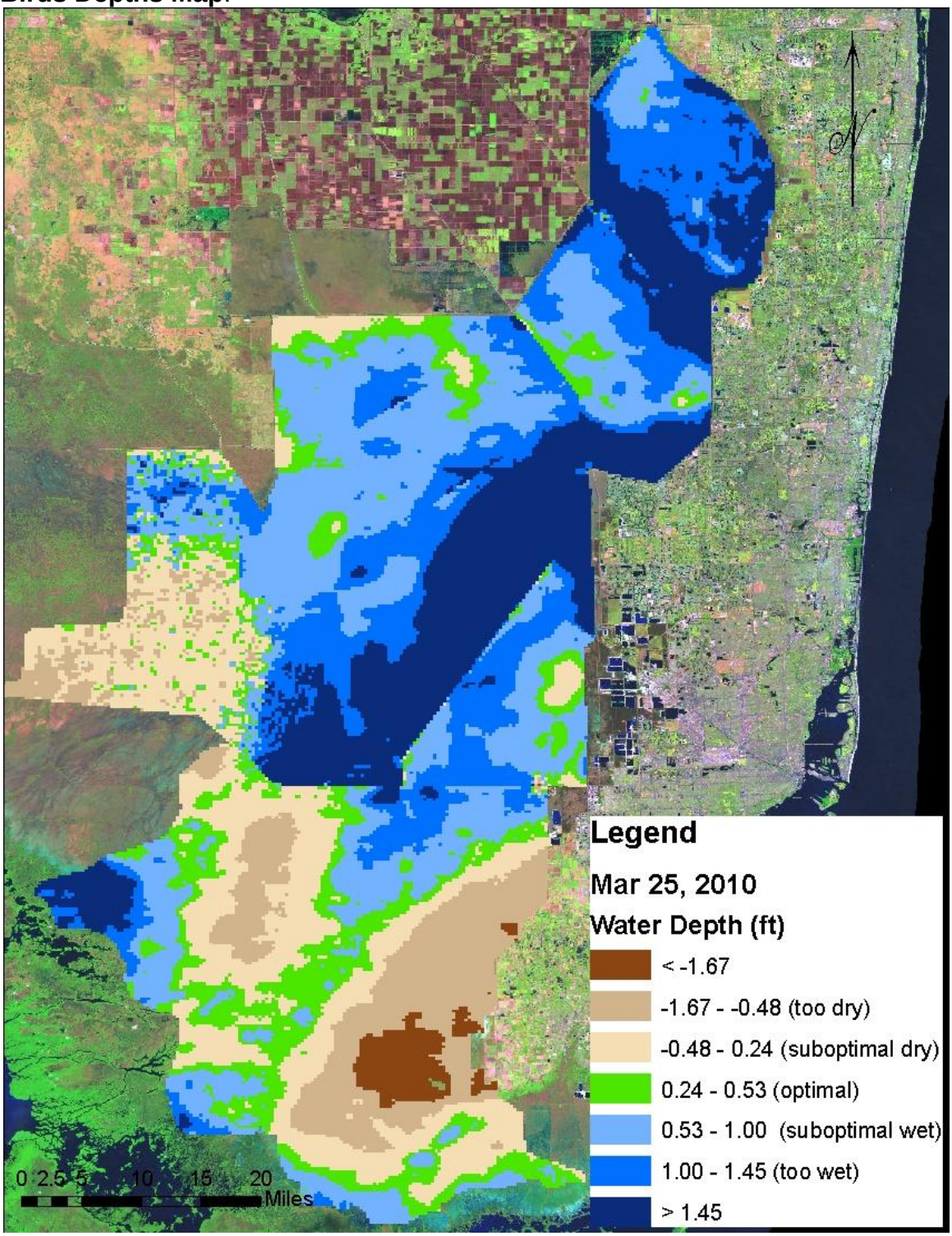
WCA Regulation Schedules:



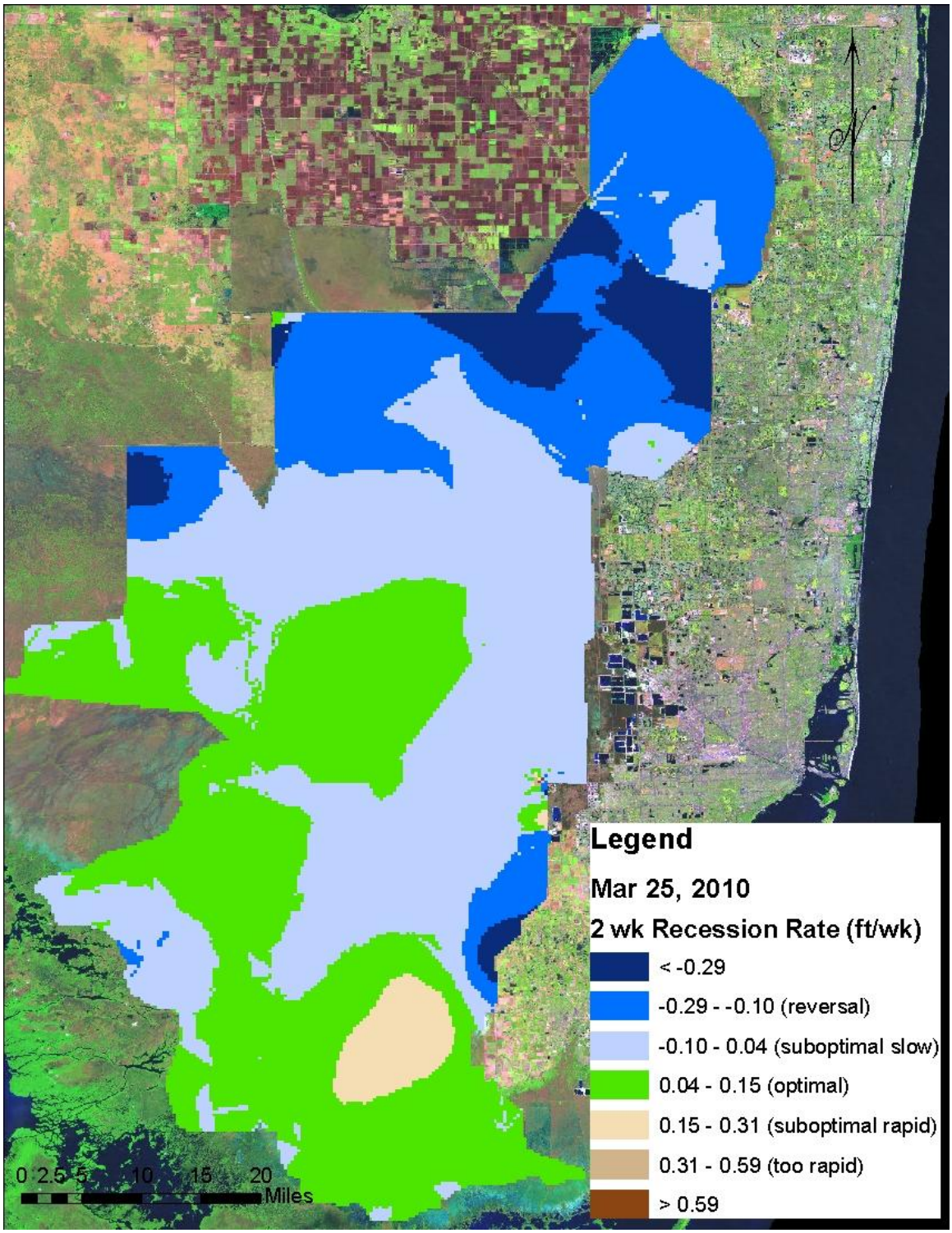




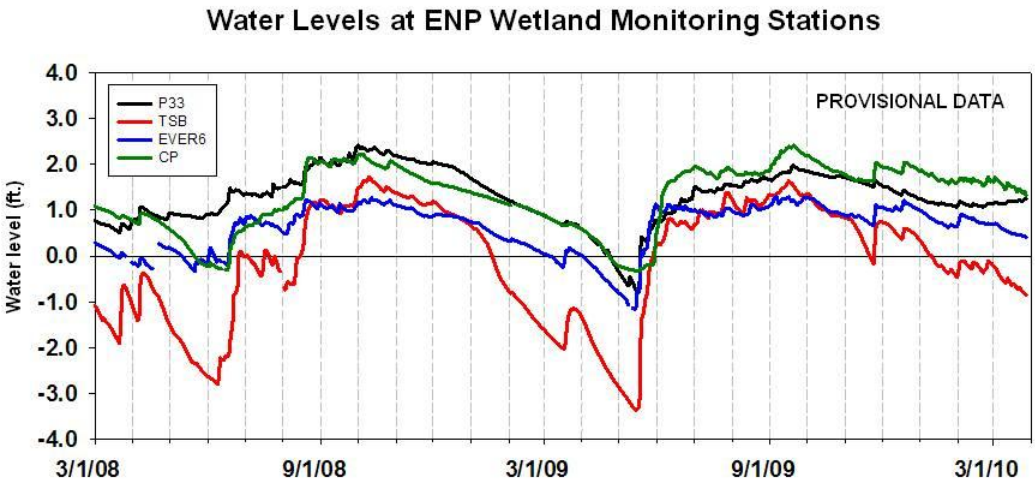
Birds Depths Map:



Birds Recession Rates:

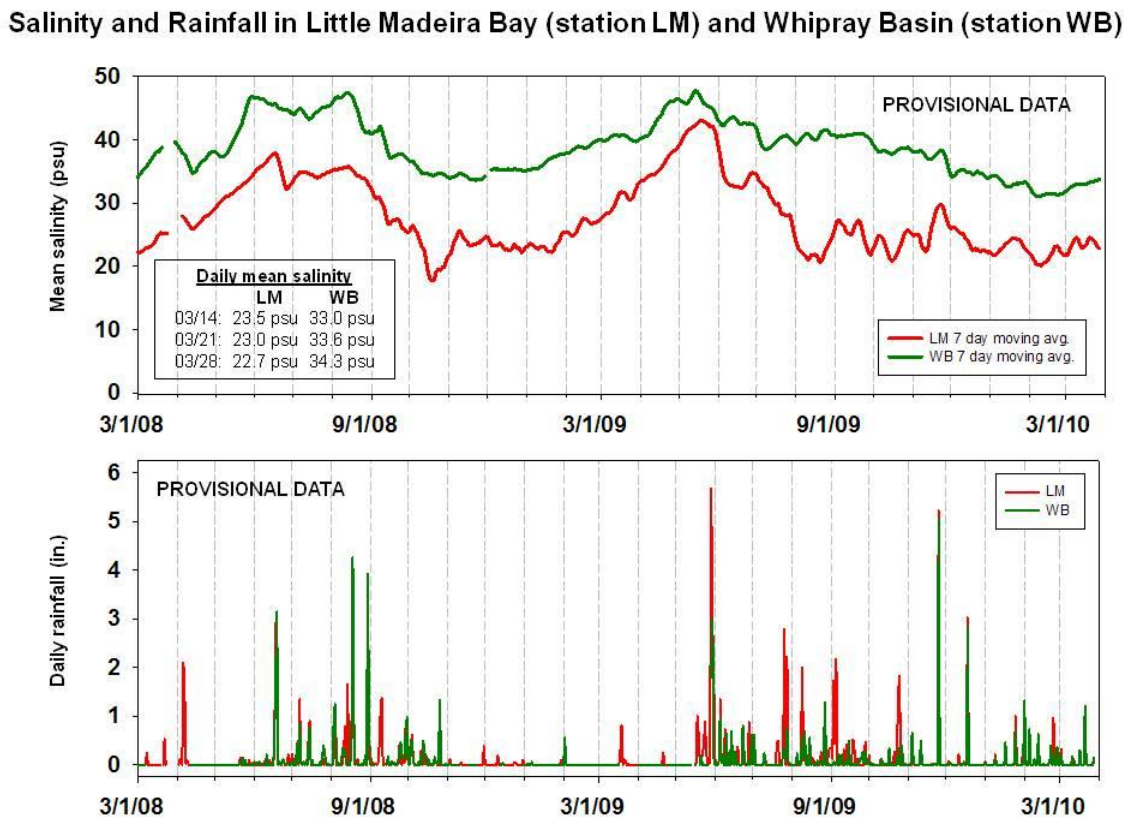
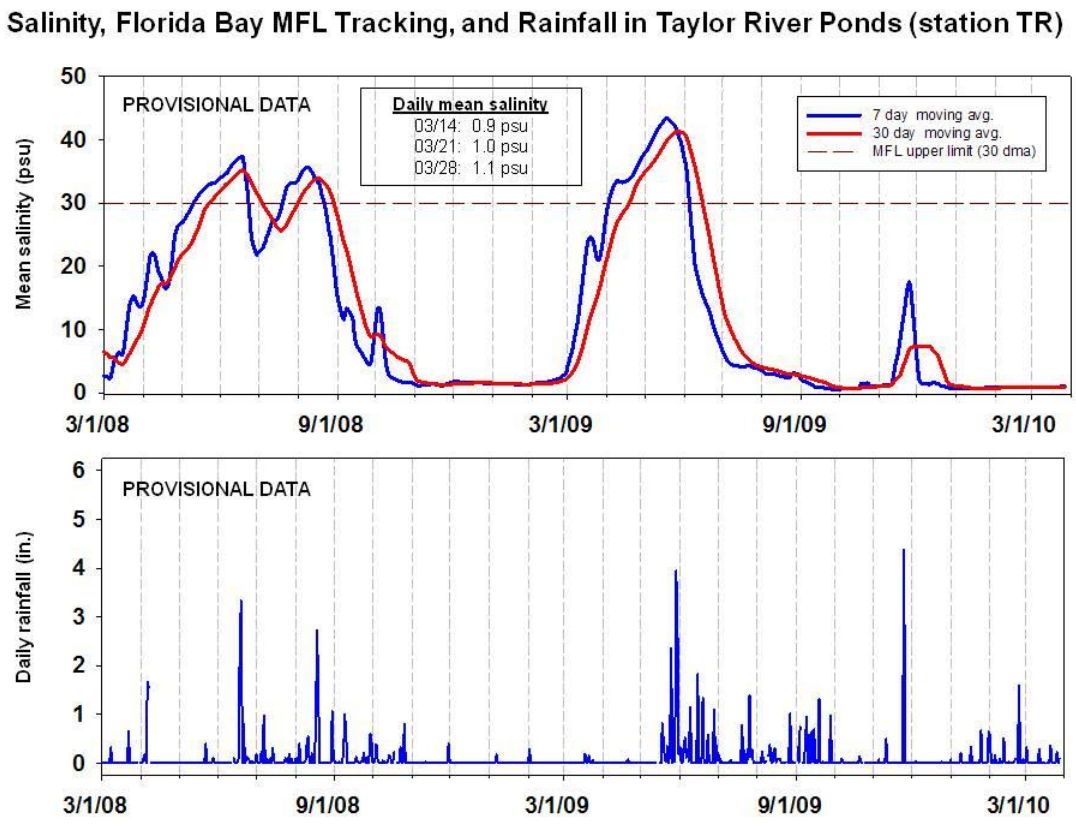


ENP Stages:



DAILY MEAN WATER LEVEL				
Date	P33	TSB	EVER6	CP
3/14	1.20	-0.53	0.53	1.55
3/21	1.20	-0.72	0.46	1.39
3/28	1.24	-0.84	0.42	1.34

ENP LM/WB Salinity:



ENP MFL/TR Salinity: