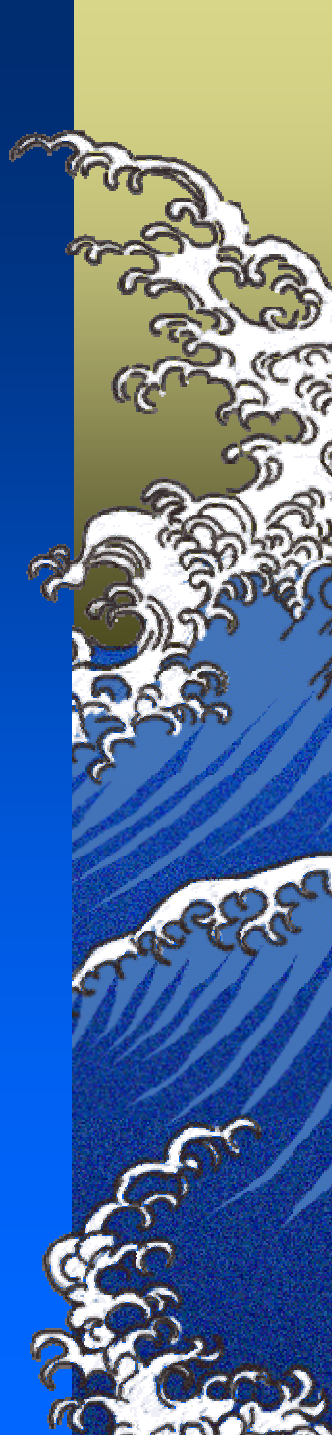
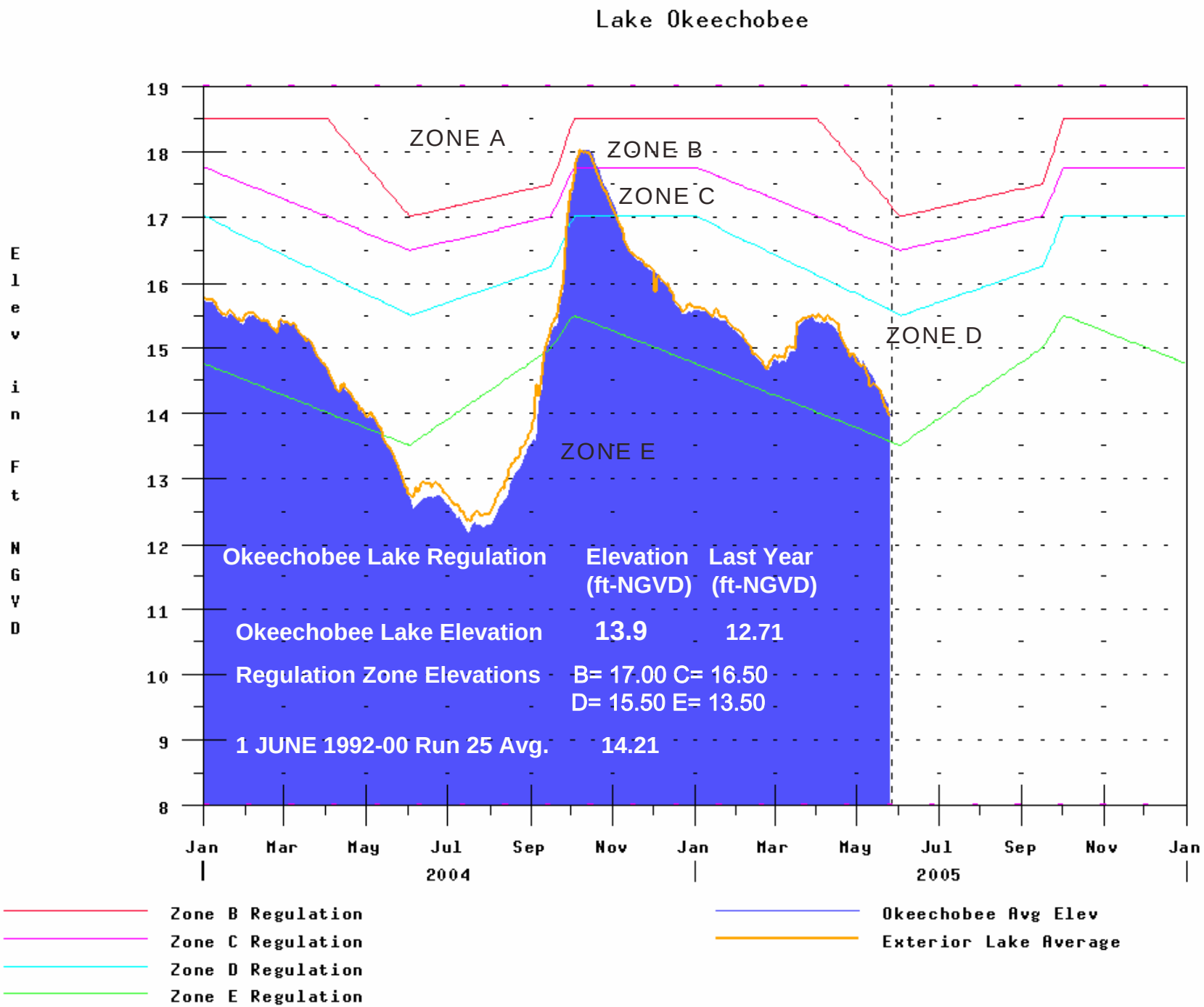
Lake Okeechobee Operations Public Workshop Semi-Annual Meeting June 1, 2005

- *Current Conditions*
- *Operations, Past 6 Months*
- *Climate Outlook*

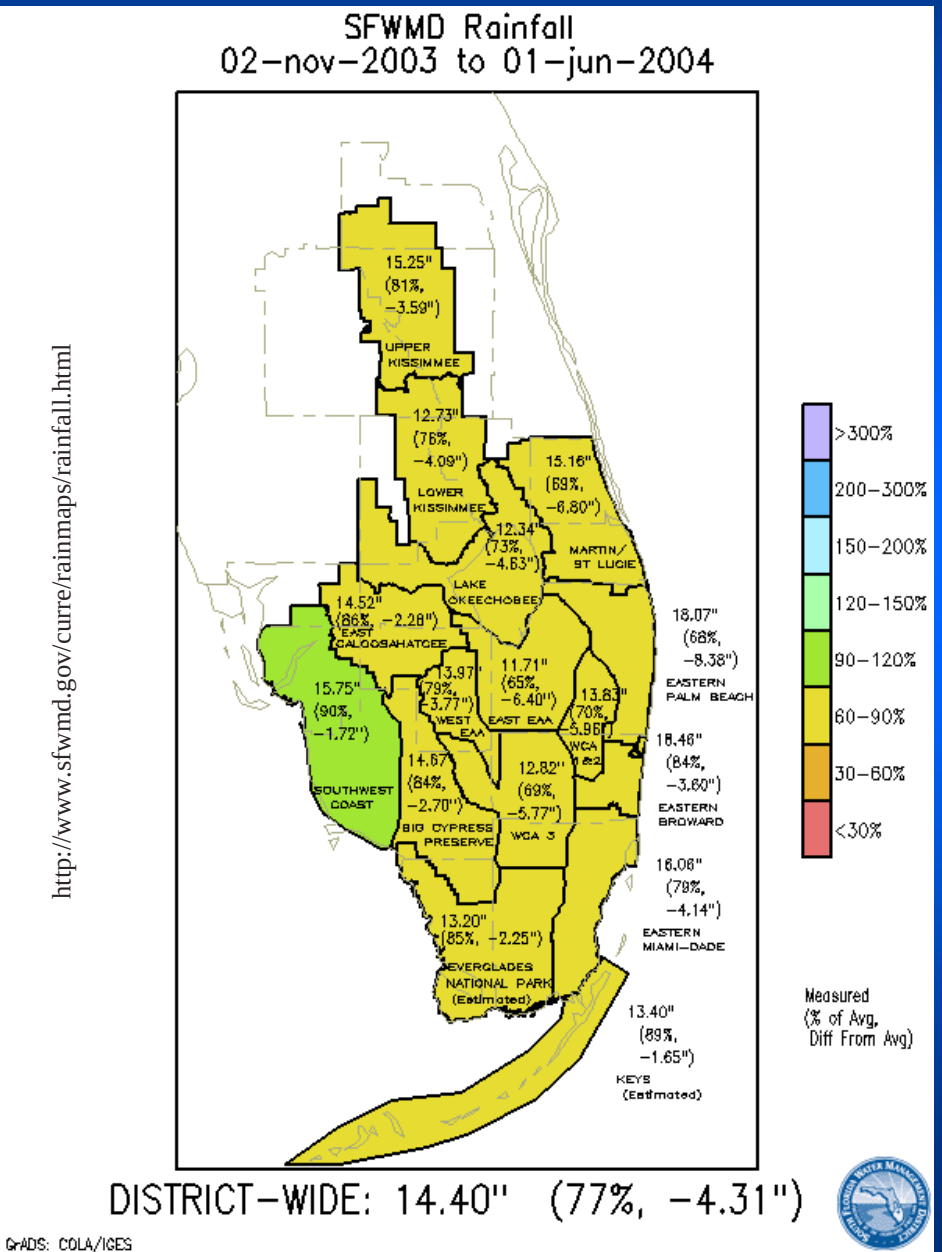
Susan Sylvester, USACE
Cal Neidrauer, SFWMD

- ***Current Conditions***
- ***Operations, Past 6 Months***
- ***Climate Outlook***



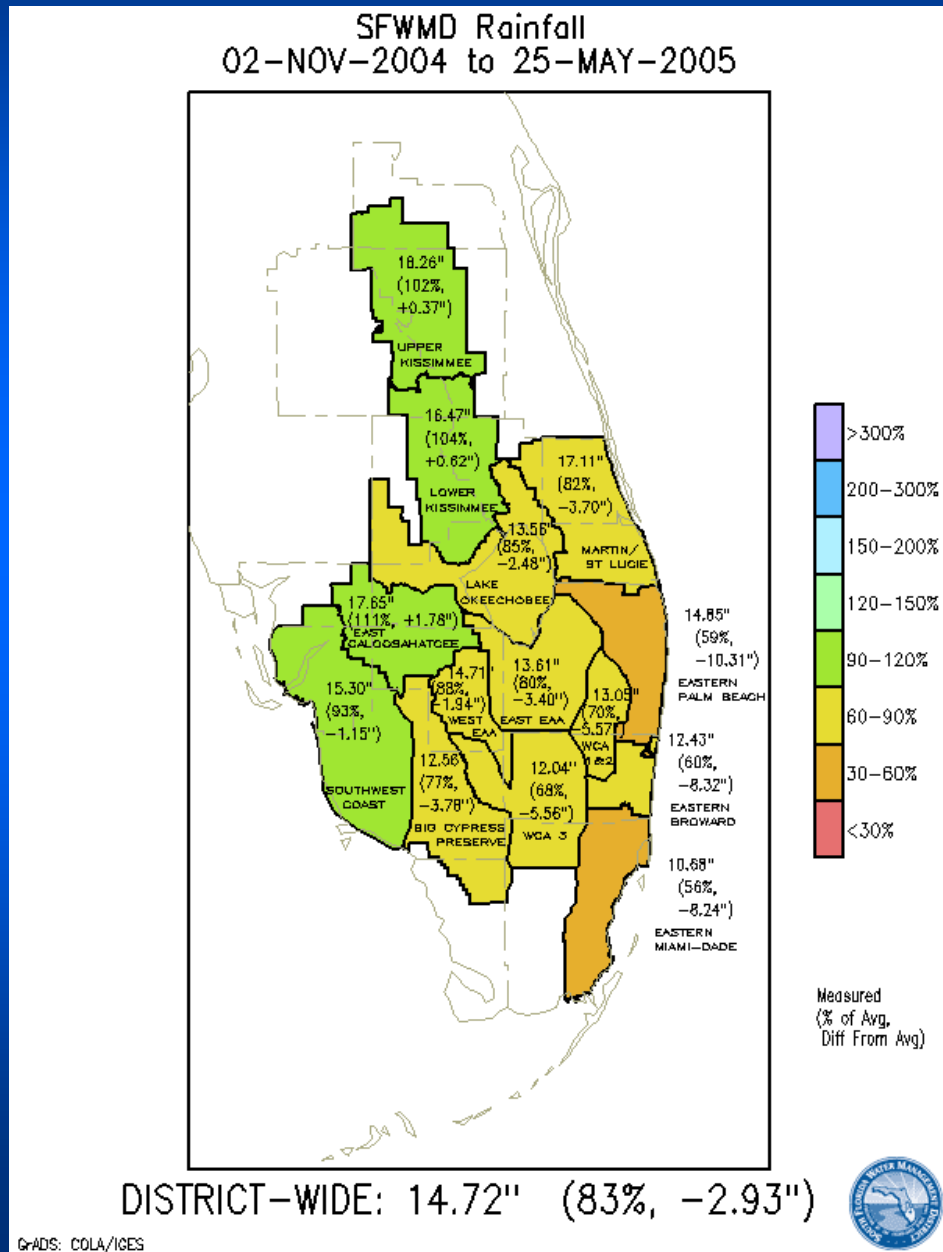

Lake Okeechobee
Elev in Ft NGVD
19
18
17
16
15
14
13
12
11
10
9
8
ZONE A
ZONE B
ZONE C
ZONE D
ZONE E
Okeechobee Lake Regulation
Elevation (ft-NGVD)
Last Year (ft-NGVD)
Okeechobee Lake Elevation
13.9
12.71
Regulation Zone Elevations
B= 17.00 C= 16.50
D= 15.50 E= 13.50
1 JUNE 1992-00 Run 25 Avg.
14.21
Jan
Mar
May
Jul
Sep
Nov
Jan
Mar
May
Jul
Sep
Nov
Jan
2004
2005
Zone B Regulation
Zone C Regulation
Zone D Regulation
Zone E Regulation
Okeechobee Avg Elev
Exterior Lake Average

Dry Season 2003 - 2004



http://www.sfwmd.gov/curre/rainmaps/rainfall.html

Dry Season 2004 - 2005



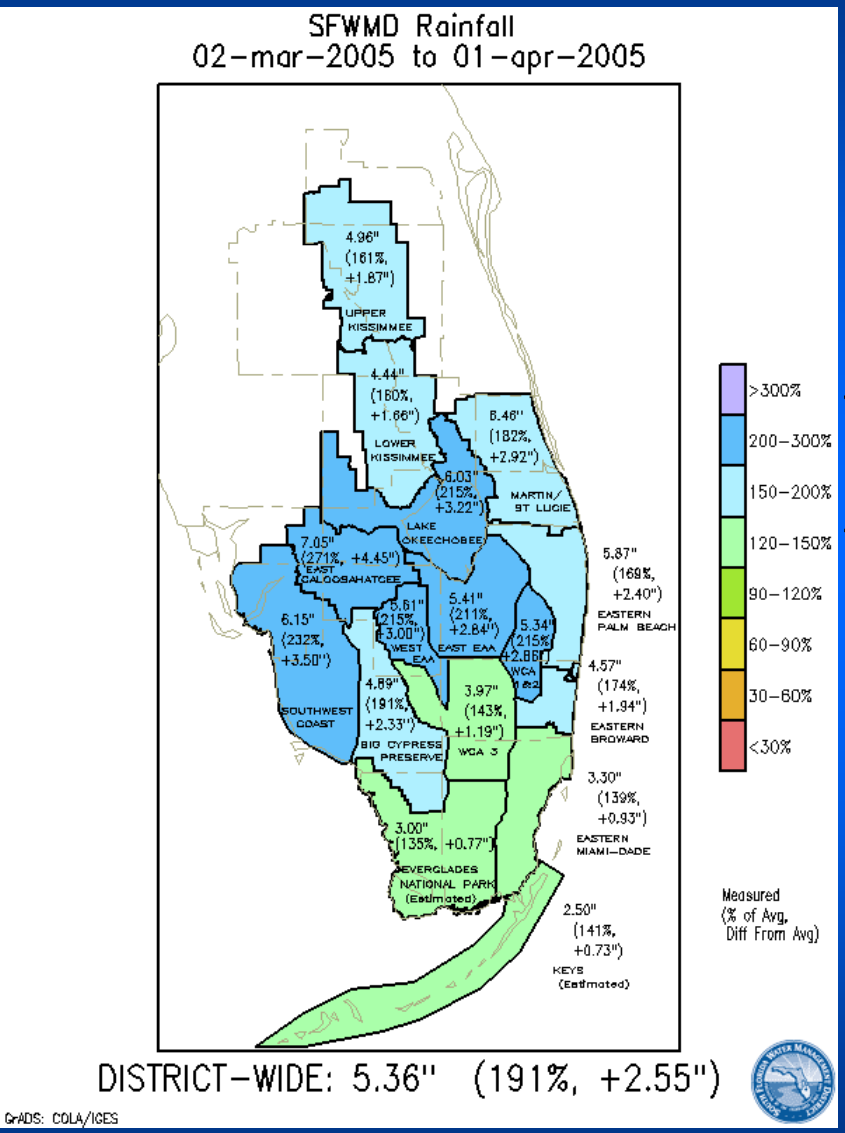
2004-05 Dry Season Rainfall

- *Overall, for the period Nov. 2004 – May 2005, Rainfall has been below-normal for Lake Okeechobee and slightly above normal for U & L Kissimmee.*

- *Rain has been concentrated into short period events.*
  - *Feb 2005 – Months worth of rain in last 3 days.*
  - *March 2005 – Double the average month of rain in 3 day period (15-17th). Lake Oke. Received 6.03 "(Avg=2.81") 215%*
  - *Upper and Lower Kissimmee also above normal rainfall.*

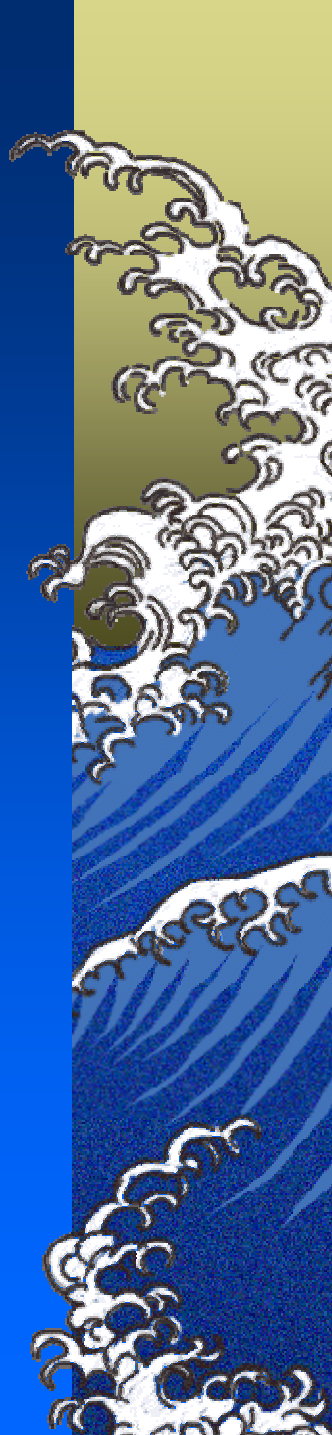
- *Lake trend reversed from 14.6' to 15.5' (between 23 Feb & 27 March)*
- *A water level of 14.6' was reached again on 8 May 2005.*

March 2005

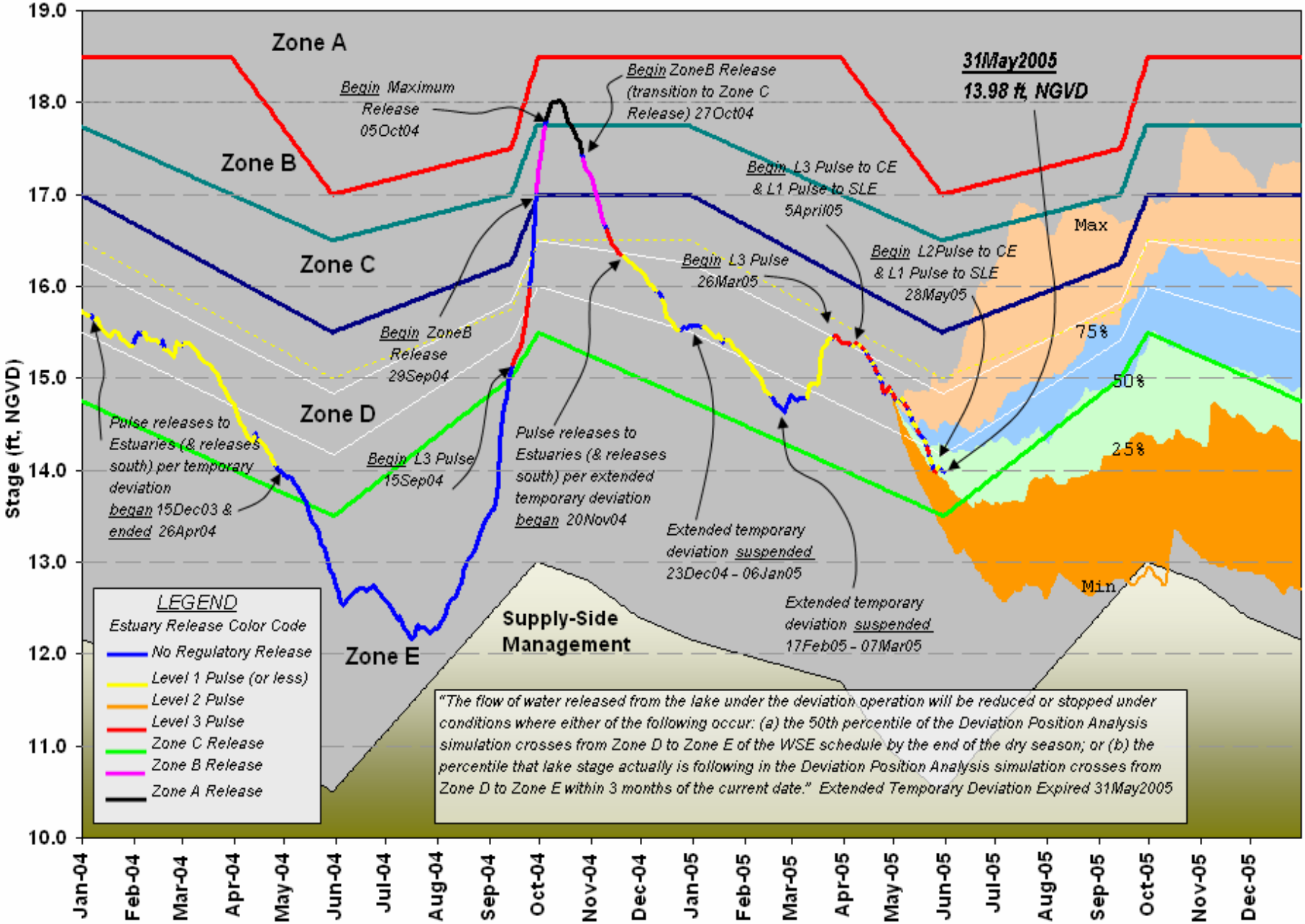


Lake Okeechobee (Nov-May)

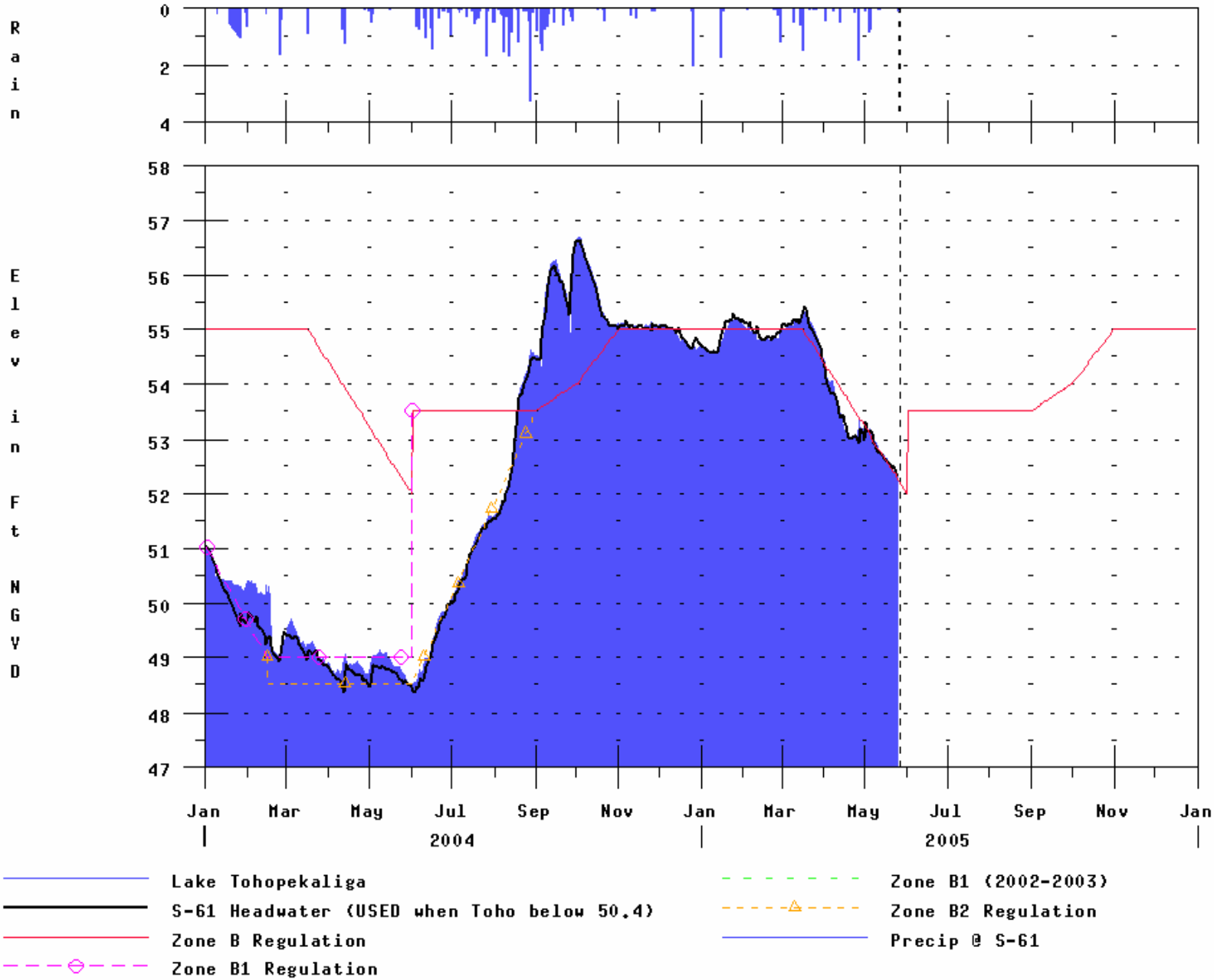
- *Current Conditions*
- ***Operations, Past 6 Months***
- *Climate Outlook*



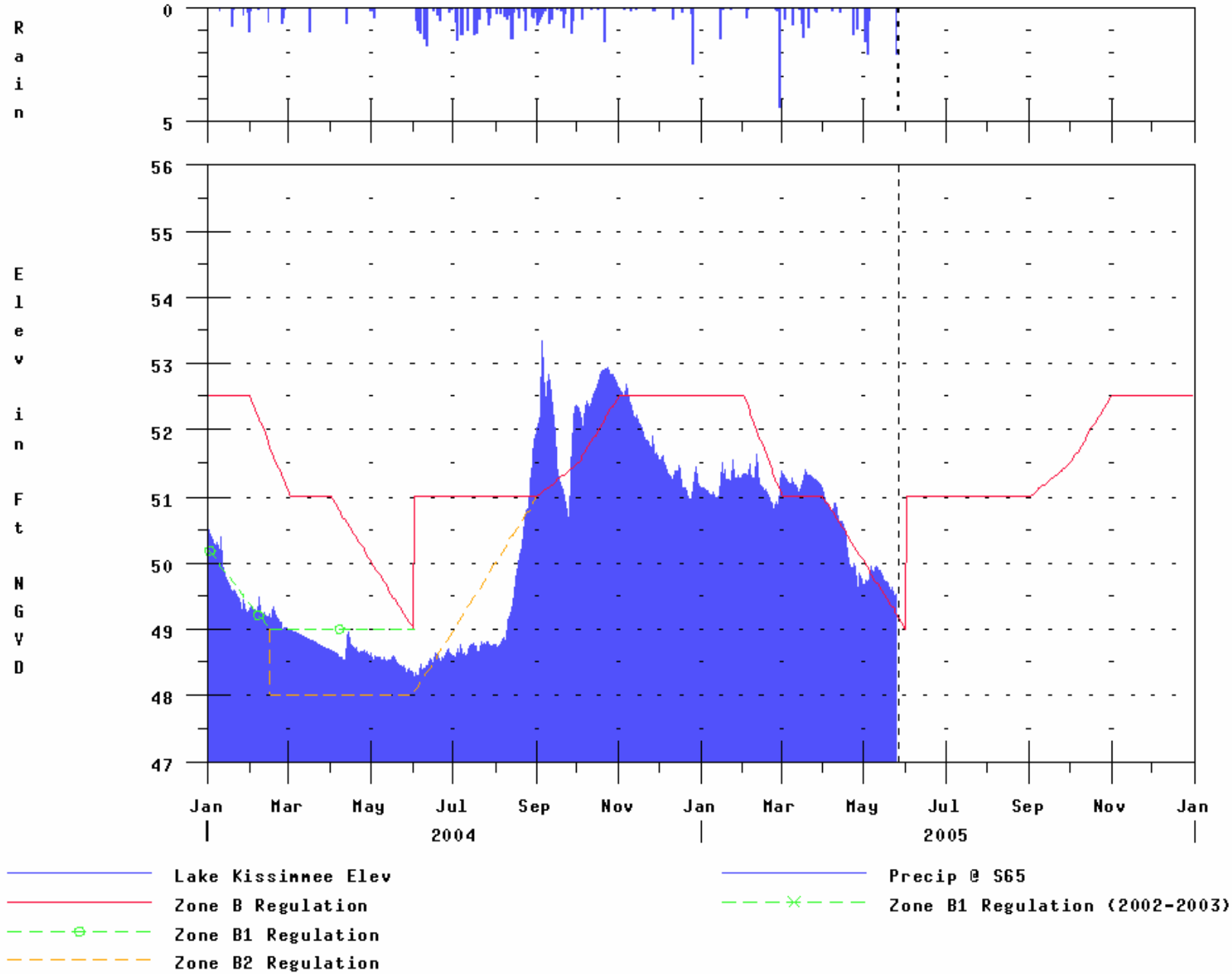
Lake Okeechobee Stage & Regulatory Discharge History & Projection

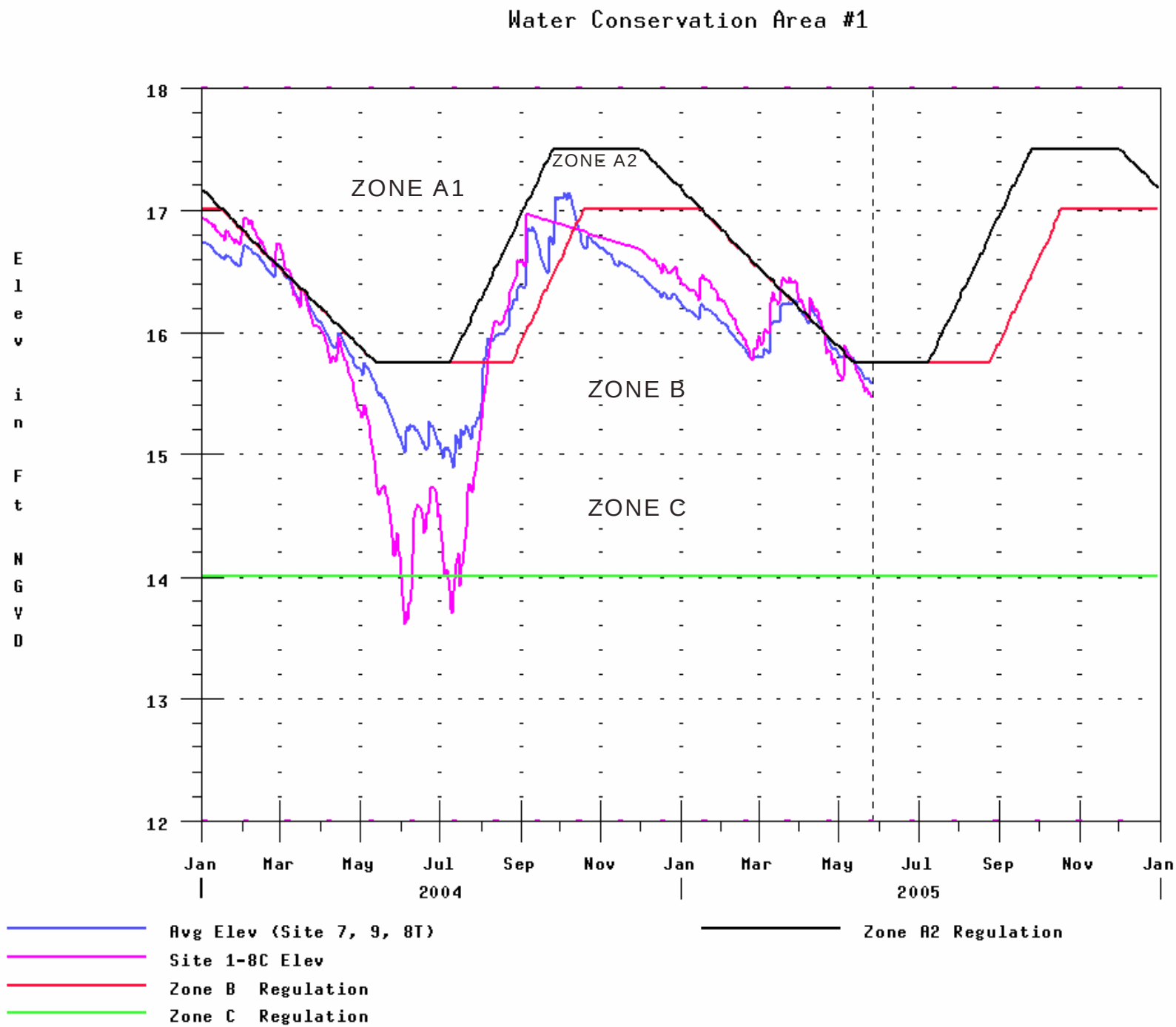


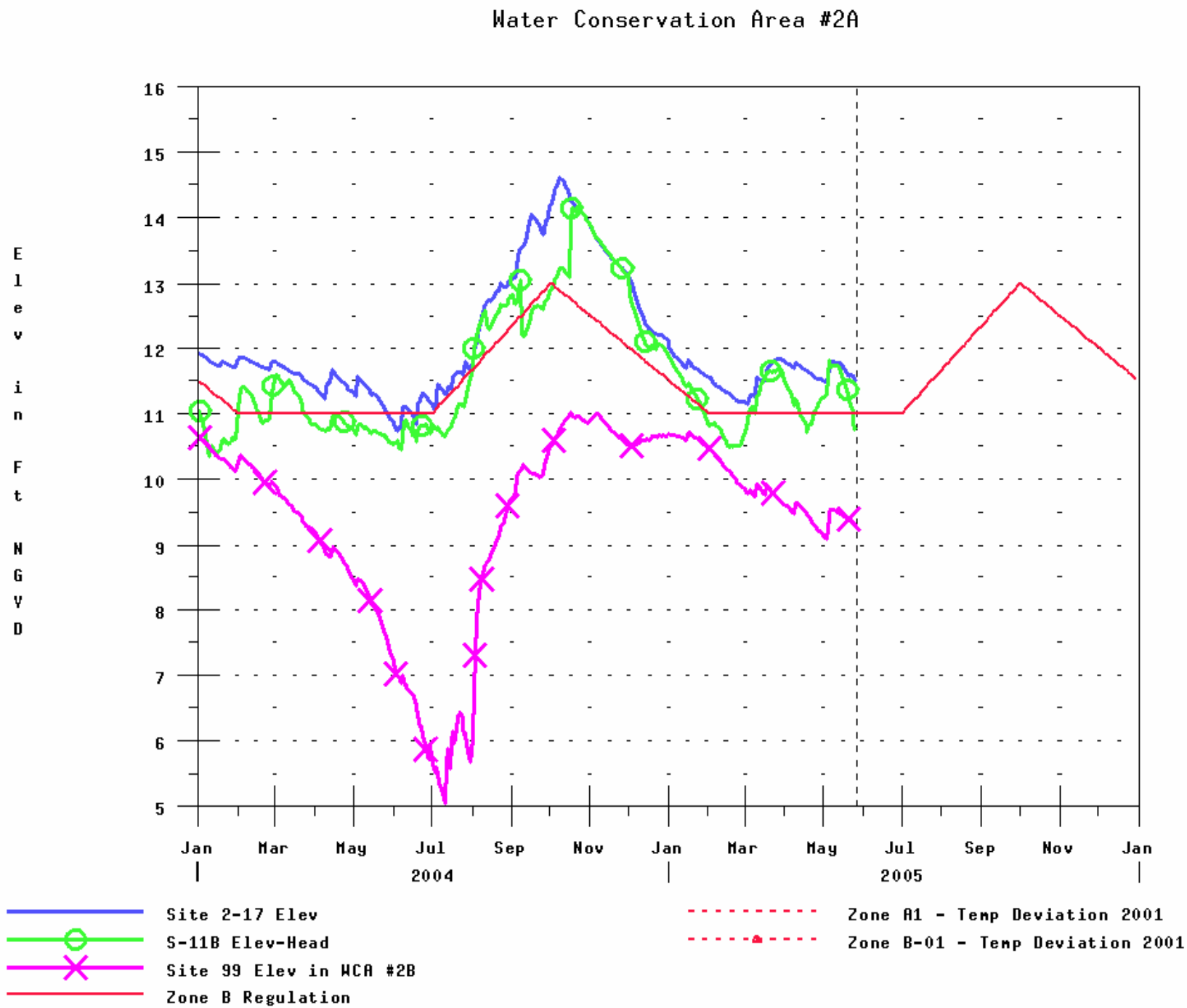
Kissimmee River Basin - Lake Tohopekaliga



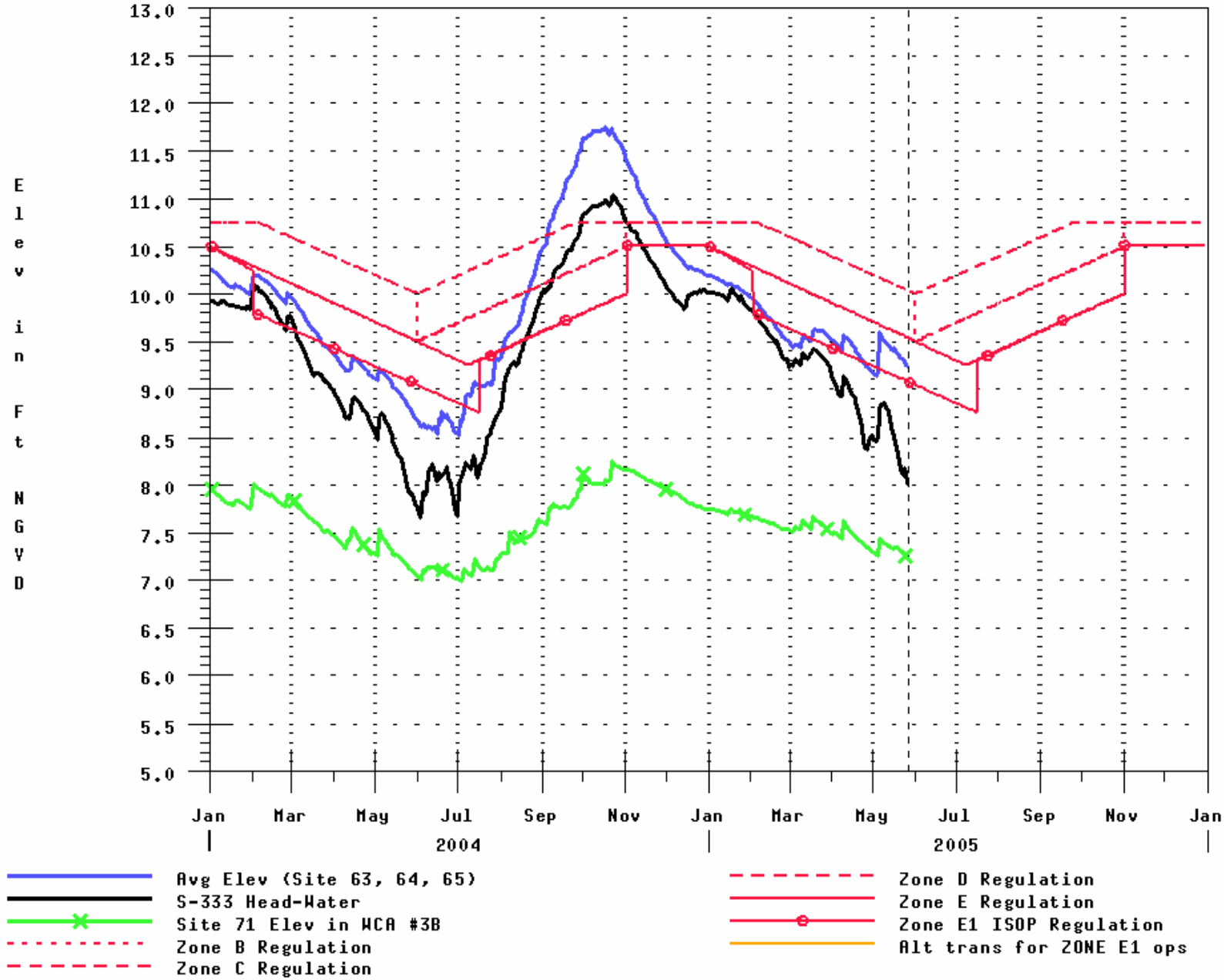
Kissimmee River Basin - Lake Kissimmee

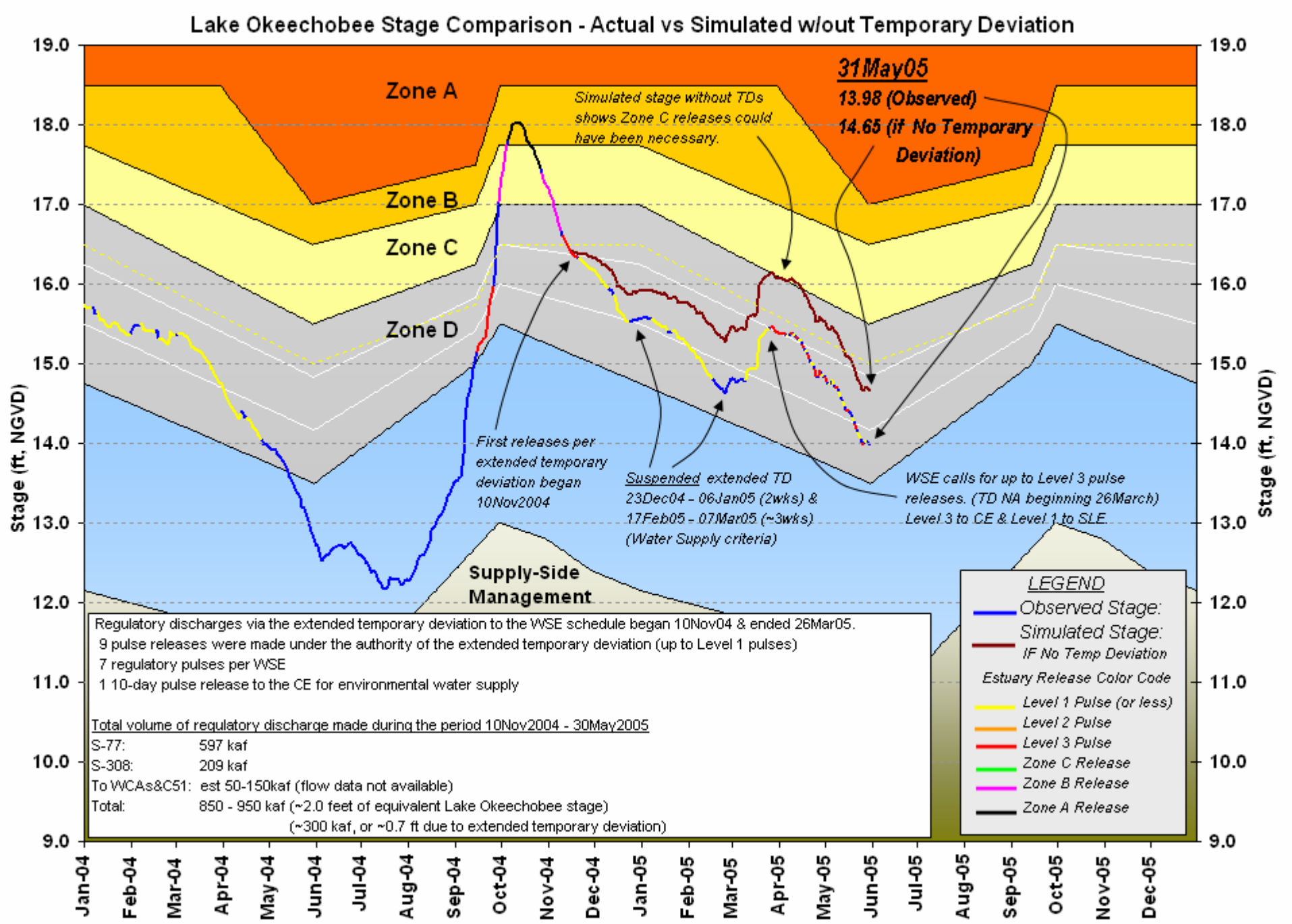



Water Conservation Area #1
Elev in Ft NGVD
18
17
16
15
14
13
12
ZONE A1
ZONE A2
ZONE B
ZONE C
Jan
Mar
May
Jul
Sep
Nov
Jan
Mar
May
Jul
Sep
Nov
Jan
2004
2005
Avg Elev (Site 7, 9, 8T)
Site 1-8C Elev
Zone B Regulation
Zone C Regulation
Zone A2 Regulation


Water Conservation Area #2A
Elev in Ft NGVD
16
15
14
13
12
11
10
9
8
7
6
5
Jan
Mar
May
Jul
Sep
Nov
Jan
Mar
May
Jul
Sep
Nov
Jan
2004
2005
Site 2-17 Elev
S-11B Elev-Head
Site 99 Elev in WCA #2B
Zone B Regulation
Zone A1 - Temp Deviation 2001
Zone B-01 - Temp Deviation 2001

Water Conservation Area #3A




Lake Okeechobee Stage Comparison - Actual vs Simulated w/out Temporary Deviation
Stage (ft, NGVD)
19.0
18.0
17.0
16.0
15.0
14.0
13.0
12.0
11.0
10.0
9.0
Zone A
Zone B
Zone C
Zone D
Supply-Side Management
31May05
13.98 (Observed)
14.65 (if No Temporary Deviation)
Simulated stage without TDs shows Zone C releases could have been necessary.
First releases per extended temporary deviation began 10Nov2004
Suspended extended TD 23Dec04 - 06Jan05 (2wks) & 17Feb05 - 07Mar05 (~3wks) (Water Supply criteria)
WSE calls for up to Level 3 pulse releases. (TD NA beginning 26March) Level 3 to CE & Level 1 to SLE.
Regulatory discharges via the extended temporary deviation to the WSE schedule began 10Nov04 & ended 26Mar05.
9 pulse releases were made under the authority of the extended temporary deviation (up to Level 1 pulses)
7 regulatory pulses per WSE
1 10-day pulse release to the CE for environmental water supply
Total volume of regulatory discharge made during the period 10Nov2004 - 30May2005
S-77: 597 kaf
S-308: 209 kaf
To WCAs&C51: est 50-150kaf (flow data not available)
Total: 850 - 950 kaf (~2.0 feet of equivalent Lake Okeechobee stage)
(~300 kaf, or ~0.7 ft due to extended temporary deviation)
LEGEND
Observed Stage:
Simulated Stage:
IF No Temp Deviation
Estuary Release Color Code
Level 1 Pulse (or less)
Level 2 Pulse
Level 3 Pulse
Zone C Release
Zone B Release
Zone A Release
Jan-04
Feb-04
Mar-04
Apr-04
May-04
Jun-04
Jul-04
Aug-04
Sep-04
Oct-04
Nov-04
Dec-04
Jan-05
Feb-05
Mar-05
Apr-05
May-05
Jun-05
Jul-05
Aug-05
Sep-05
Oct-05
Nov-05
Dec-05

Regulatory Discharge Summary

Regulatory discharges via the extended temporary deviation to the WSE schedule began 10Nov04 & ended 26Mar05

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- 7 regulatory pulses per WSE beginning 26 March '05
- 1 10-day pulse to the CE for environmental water supply

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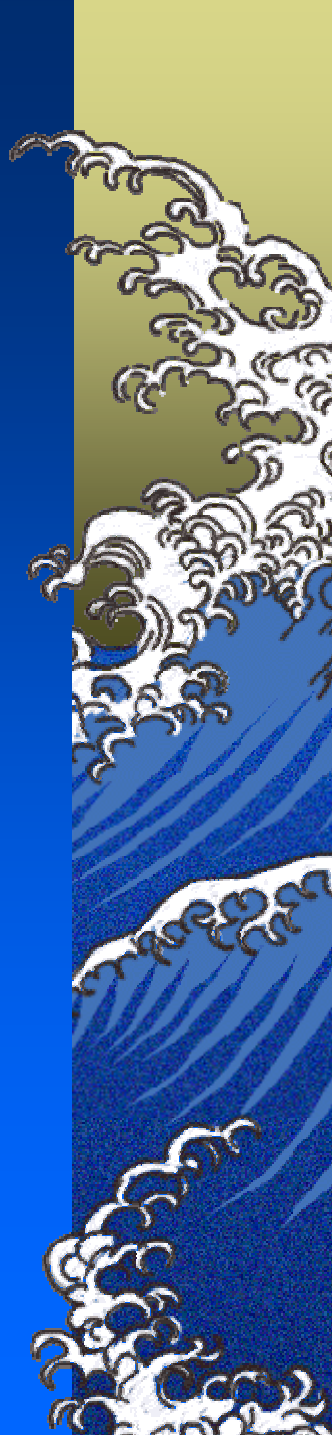
- *Current Conditions*
- *Operations, Past 6 Months*
- ***Climate Outlook***

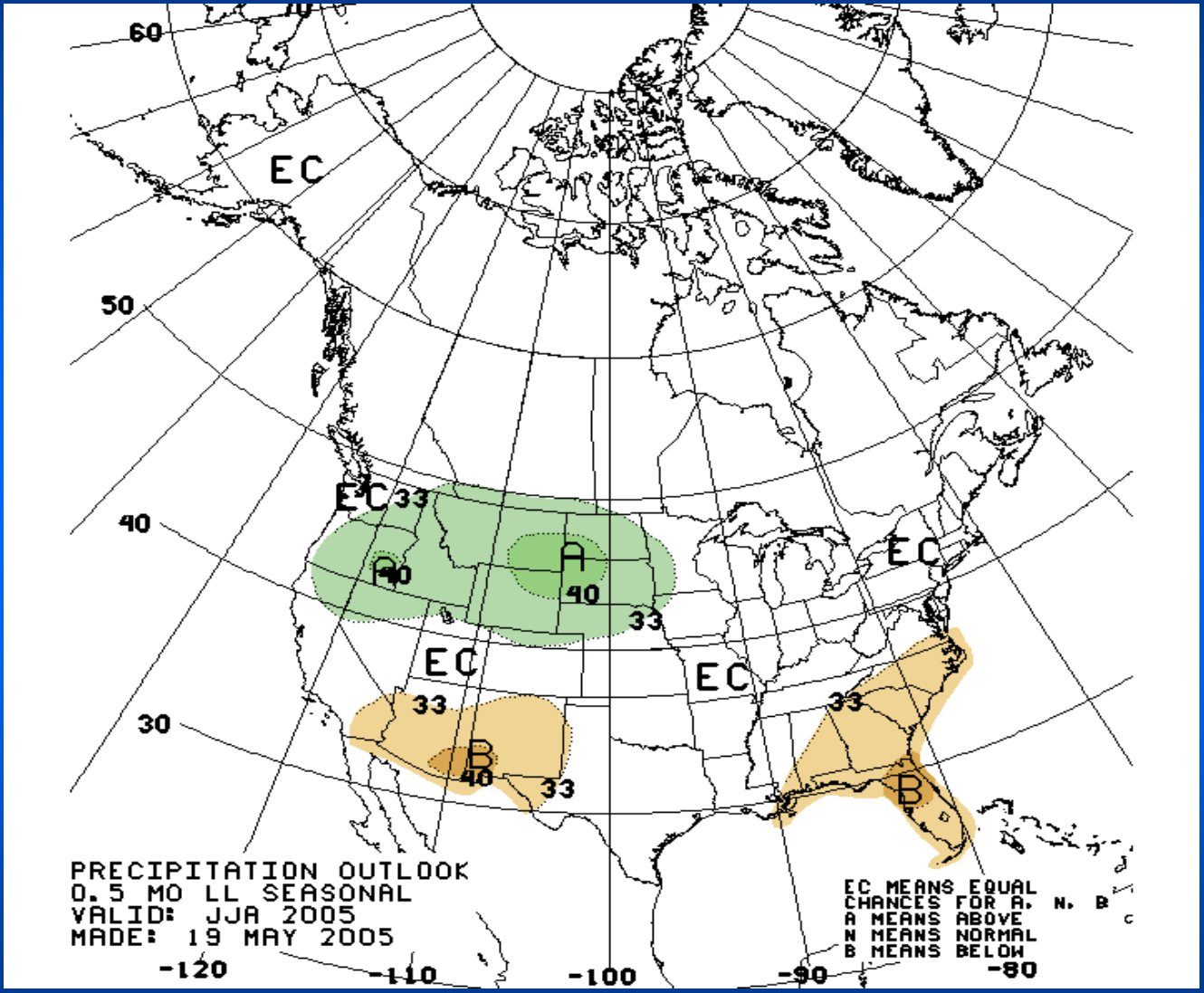


Climate Outlook

- ***The Official CPC outlook indicates increased chances of below-normal rainfall for the June-July-Aug window.***
- ***Future 3-month outlooks through wet season show increased chances of above-normal rainfall.***

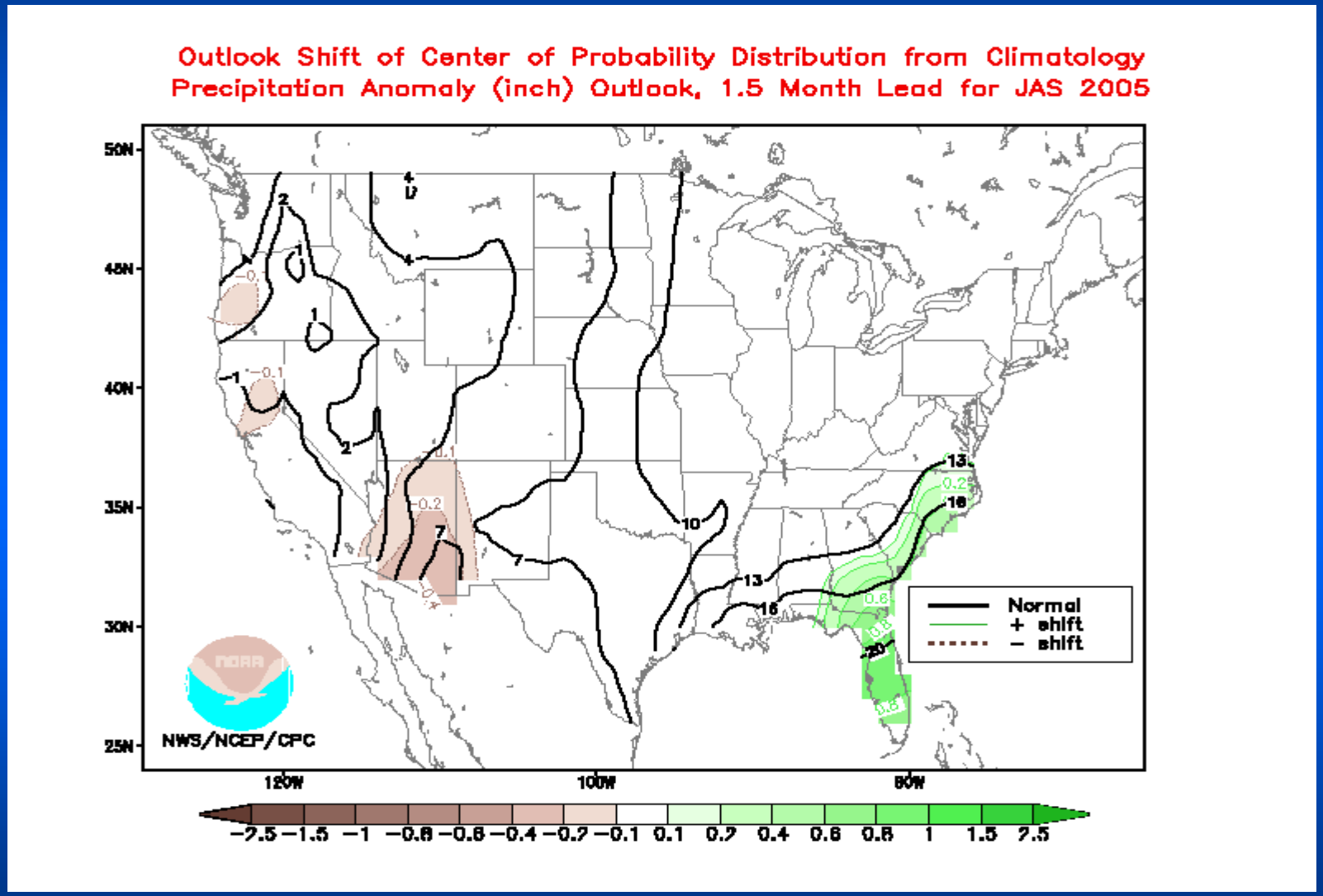
http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_advisory/index.html

June-July-August Outlook



http://www.cpc.ncep.noaa.gov/products/predictions/multi_season/13_seasonal_outlooks

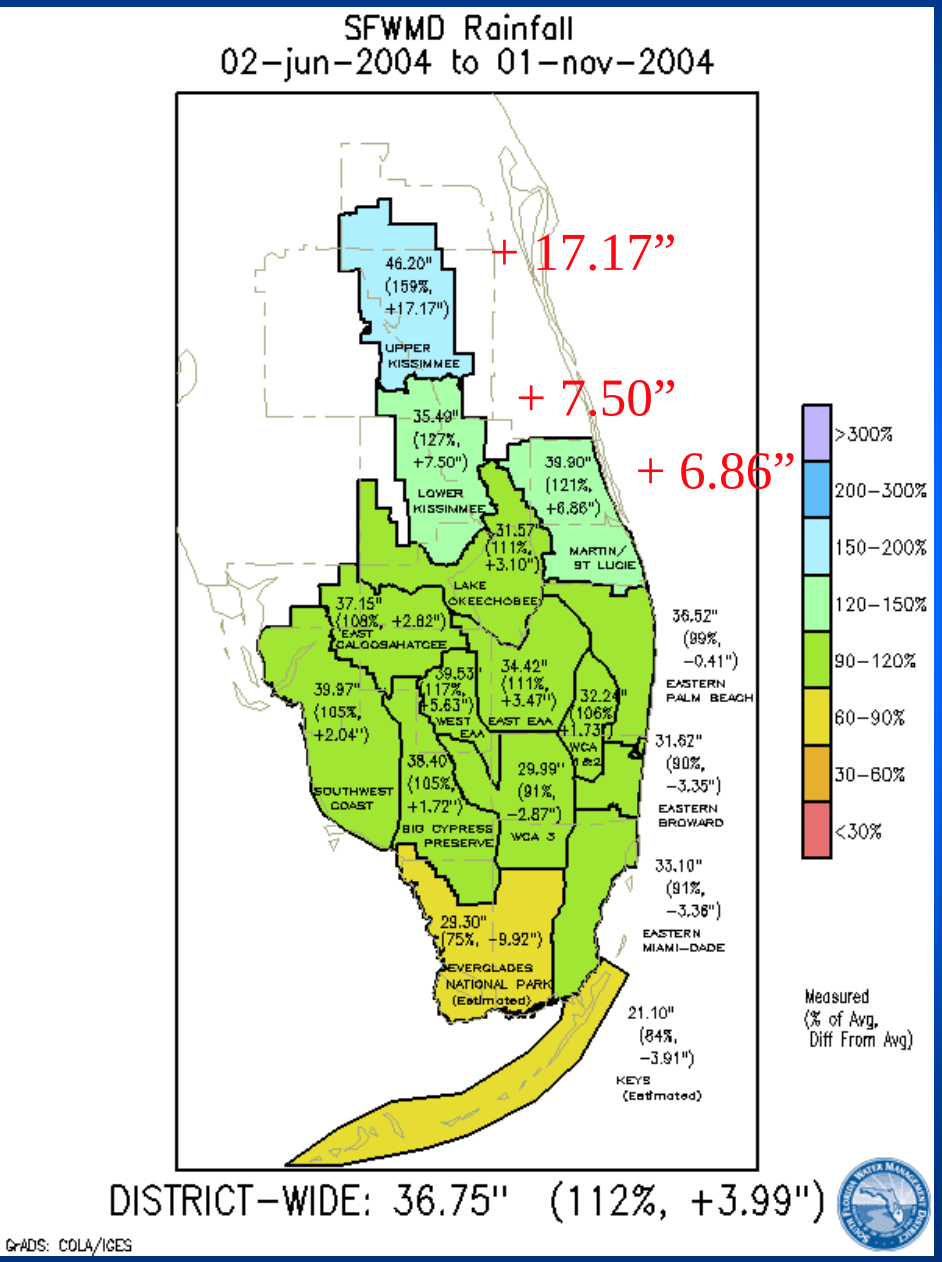
Probability of Exceedence (POE) Maps for Jul-Aug-Sep 2005



http://www.cpc.ncep.noaa.gov/products/predictions/long_range/lead02/poep_index.html

Wet Season 2004

Wet Season 2005



?

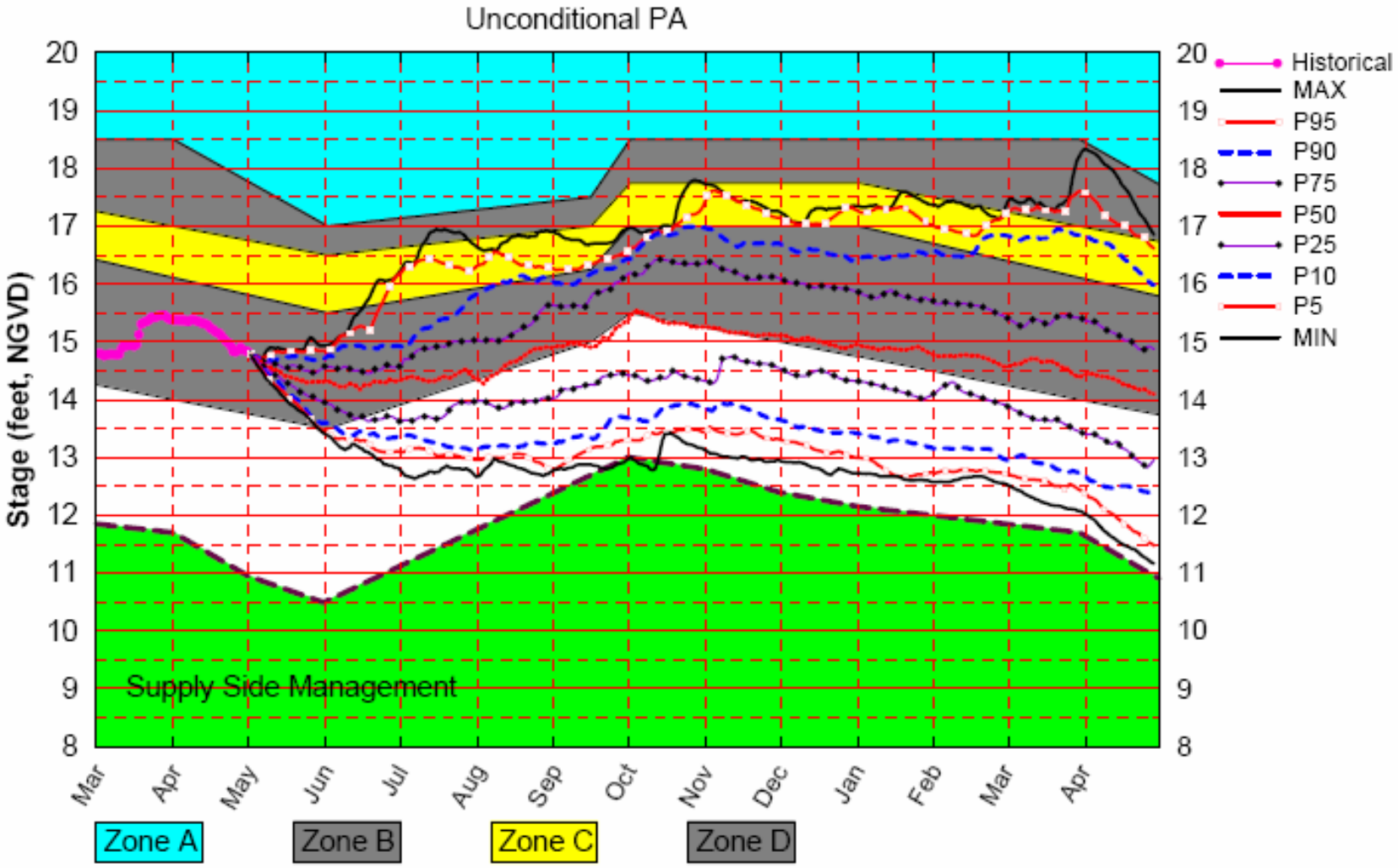
Atlantic Hurricane Season (Jun 1 – Nov 30)

	Average[1]	*NOAA 2004 Initial Forecast*	*2004 Actual*	*NOAA 2005 Initial Forecast*	*Dr. W.Gray Initial '05 & June'05 Forecast*[4]
Tropical Storms	***10***	***12-15***	***15***	***12-15***	***~~13~~ 15***
Hurricanes	***6***	***6-8***	***9***[2]	***7-9***	***~~7~~ 8***
Major Hurricanes (winds > 111 mph)	***2***	***2-4***	***6***[3]	***3-5***	***~~3~~ 4***

(1) 8 of past 10 seasons were above average
(2) 4 hit Florida within ~6 weeks, 3 were major hurricanes;
(117 lives lost, 1 in 5 homes damaged or destroyed, est. property damage ~$42B msnbc.msn.com/id/7872376)
(3) Alex, Charley, Frances, Ivan, Jeanne, Karl
(4) updated 31May – increased due to lack of strong El Nino
& warm northern Atlantic Ocean temperatures ~3°F > normal.

http://www.sfwmd.gov/org/pld/hsm/reg_app/opln/PA/01MAY2005/UPA/sfwmm_quan_1478.pdf

Lake Okeechobee SFWMM May 2005 Position Analysis



(See assumptions @ http://www.sfwmd.gov/org/pld/hsm/sfwmm_pa.html)

Wed May 11 11:54:52 2005

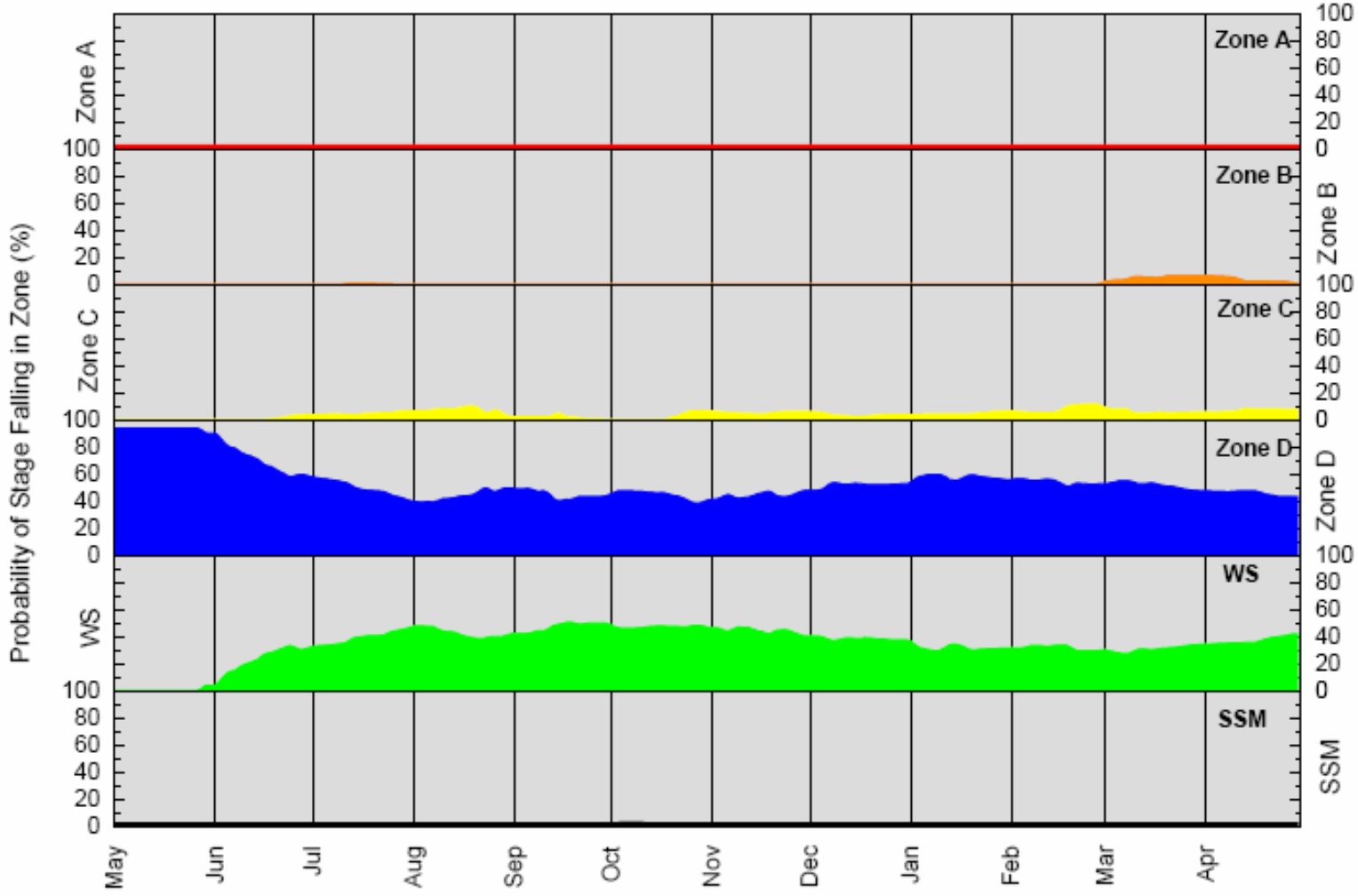
Questions?

http://fcit.usf.edu/florida/photos/envirmnt/sunset/sunset02.htm

- ***Backup Slides***

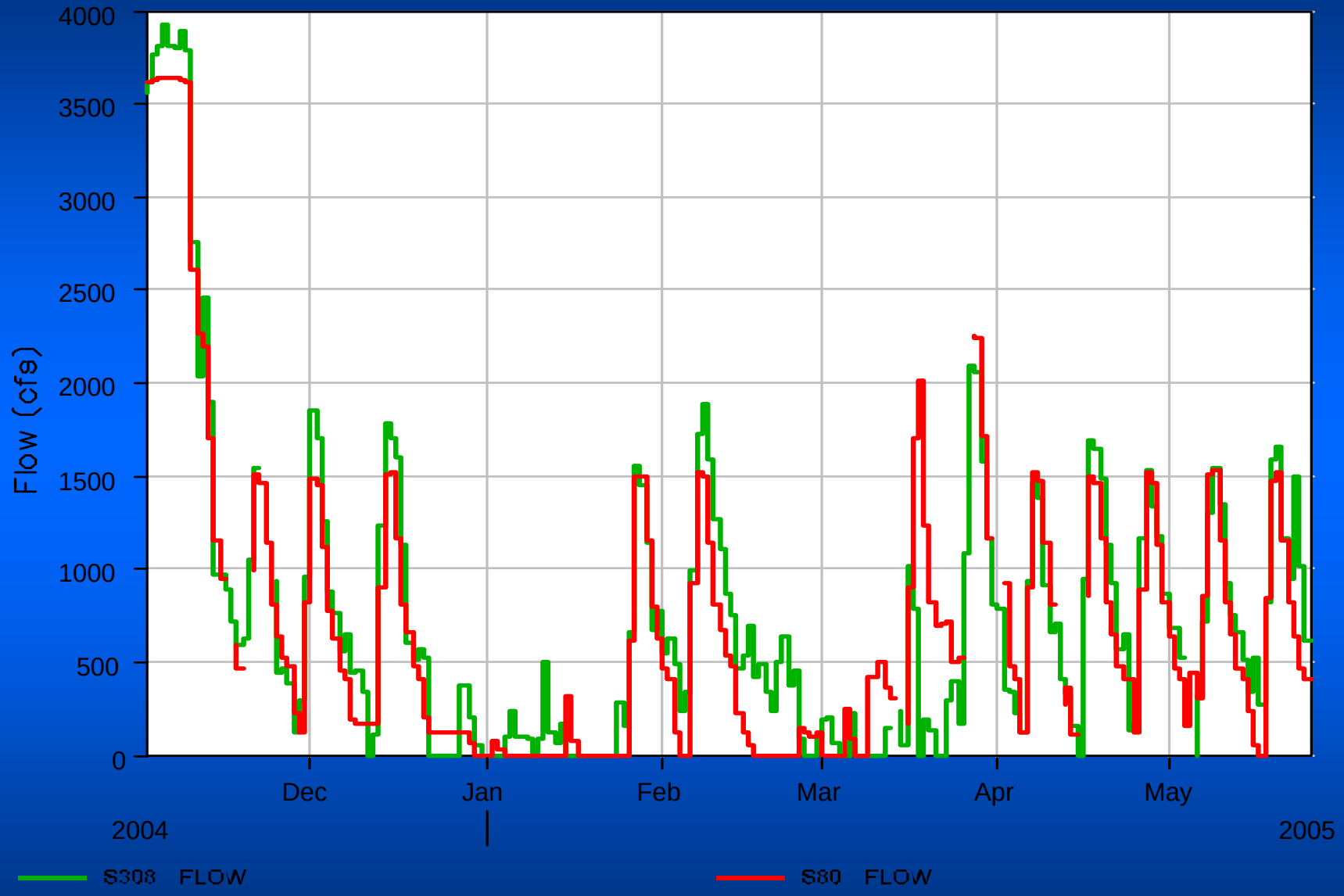
Lake Okeechobee – Zone Probabilities

(See assumptions @ http://www.sfwmd.gov/org/pld/hsm/sfwmm_pa.html)

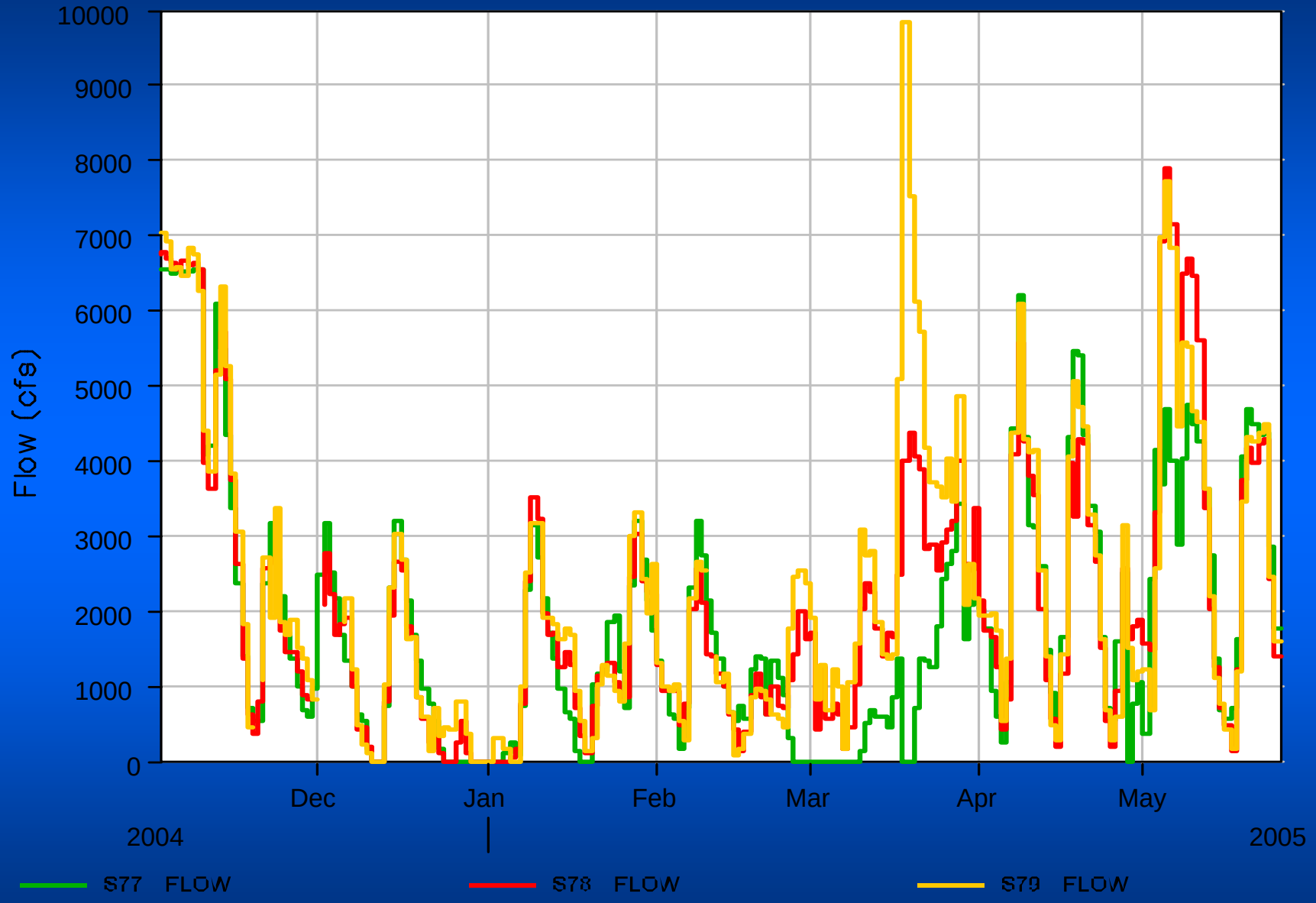


Wed May 11 14:14:29 2005

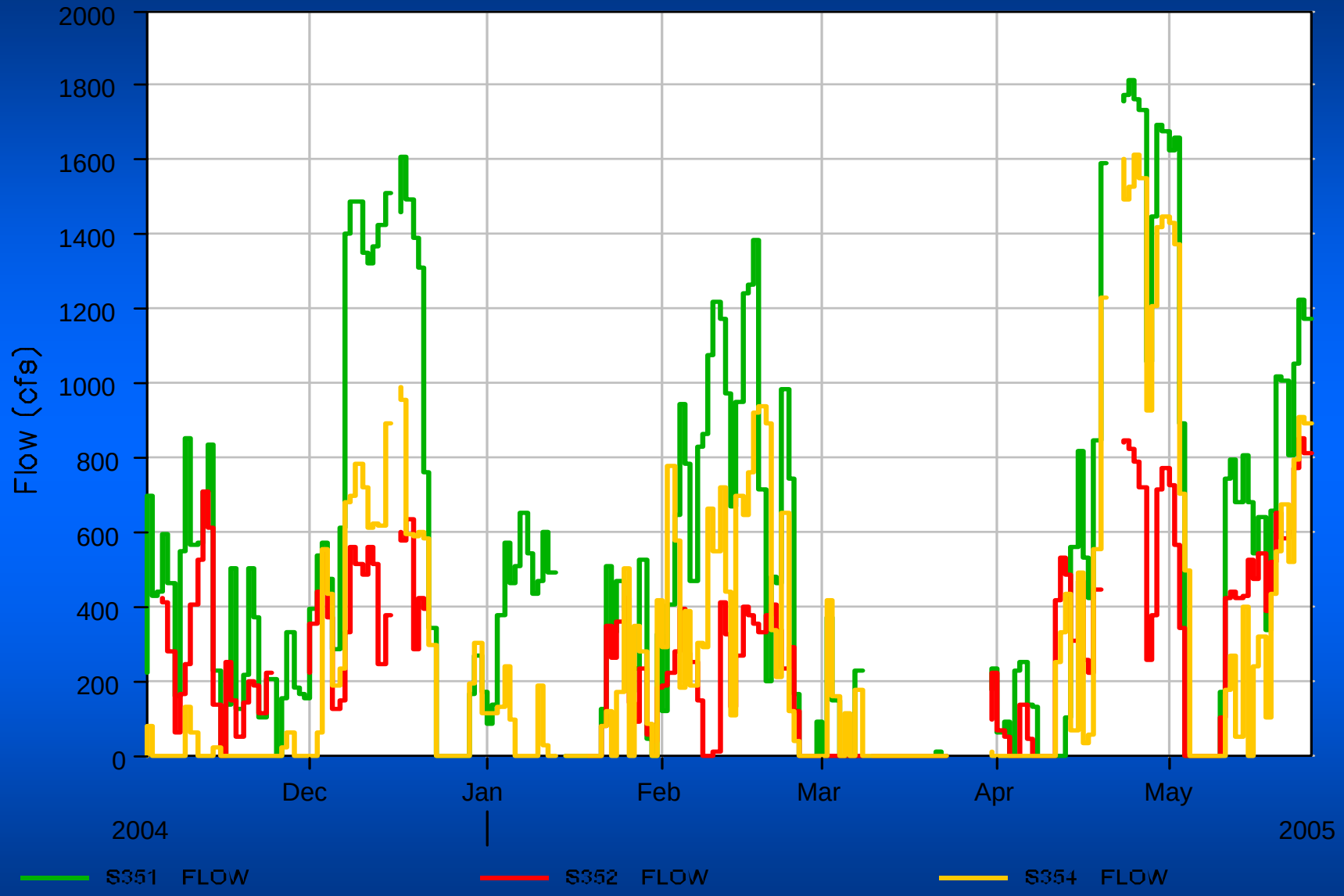
Outflow - East

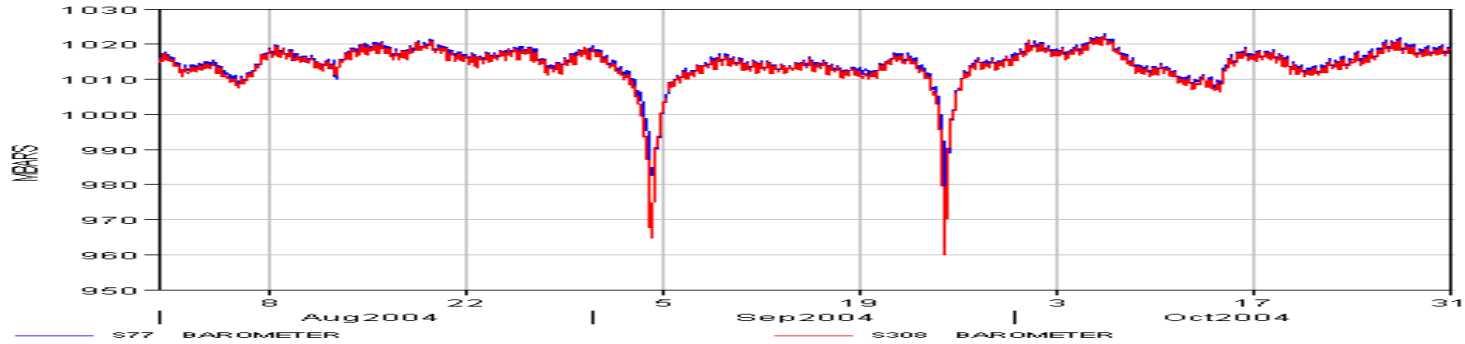


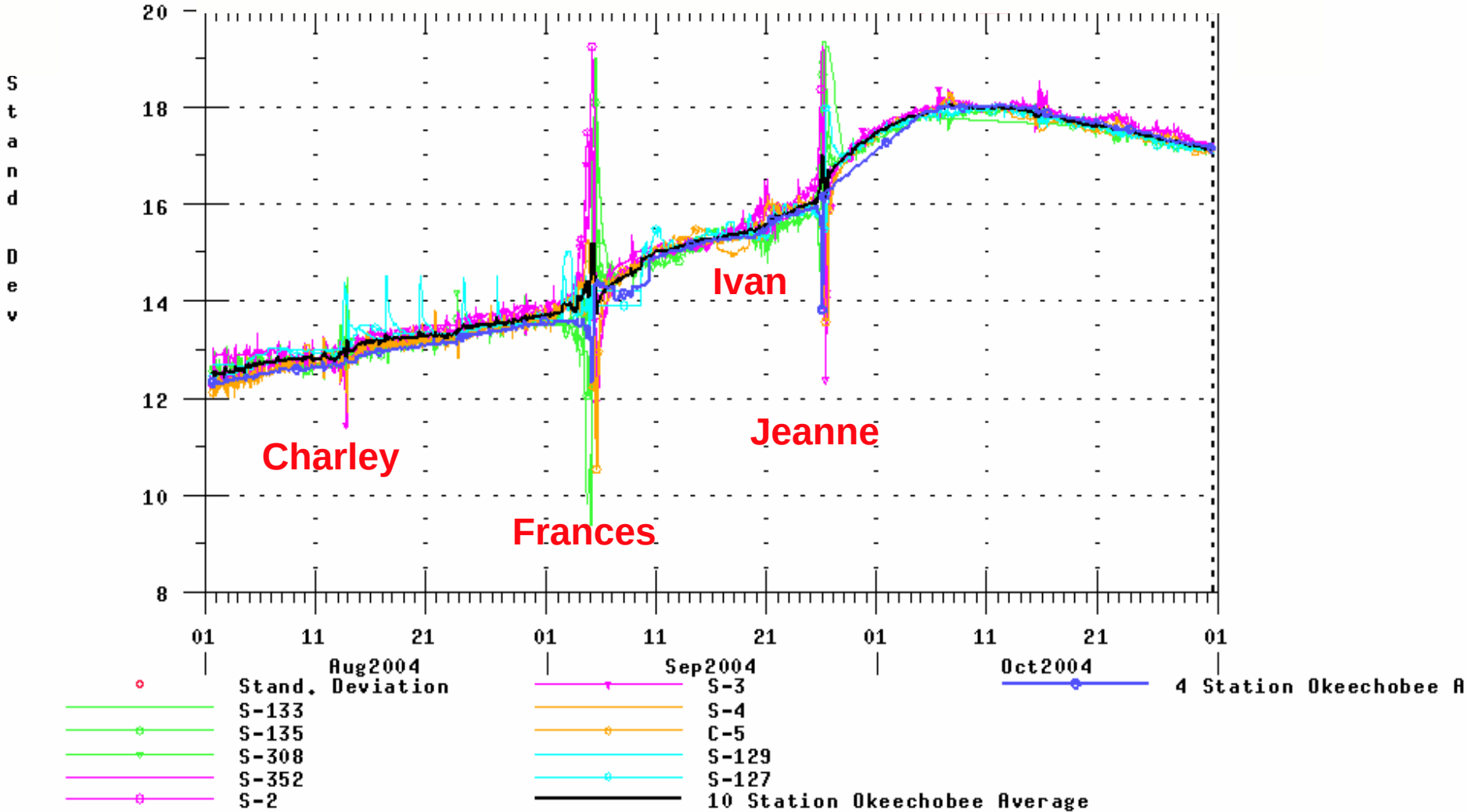
Outflow - West



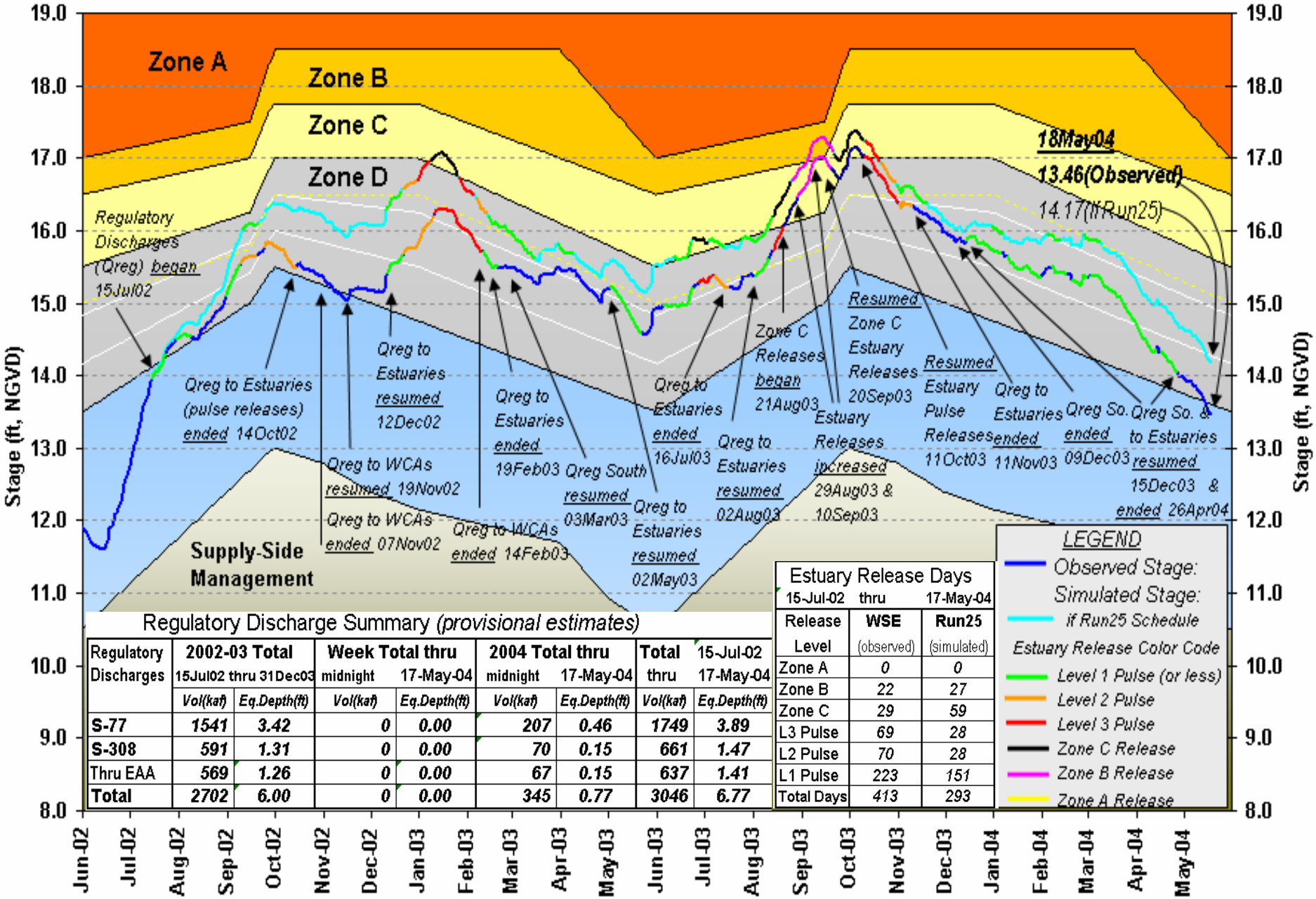
Outflow - South




MBARS
1030
1020
1010
1000
990
980
970
960
950
8
22
5
19
3
17
31
Aug2004
Sep2004
Oct2004
S77 BAROMETER
S308 BAROMETER


Stand Dev
20
18
16
14
12
10
8
Charley
Frances
Ivan
Jeanne
01
11
21
01
11
21
01
11
21
01
Aug2004
Sep2004
Oct2004
Stand. Deviation
S-133
S-135
S-308
S-352
S-2
S-3
S-4
C-5
S-129
S-127
10 Station Okeechobee Average
4 Station Okeechobee A

Lake Okeechobee Stage Comparison



Regulatory Discharge Summary *(provisional estimates)*

Regulatory Discharges	2002-03 Total 15Jul02 thru 31Dec03		Week Total thru midnight 17-May-04		2004 Total thru midnight 17-May-04		Total thru 17-May-04	15-Jul-02
	Vol(kaf)	Eq.Depth(ft)	Vol(kaf)	Eq.Depth(ft)	Vol(kaf)	Eq.Depth(ft)	Vol(kaf)	Eq.Depth(ft)
S-77	1541	3.42	0	0.00	207	0.46	1749	3.89
S-308	591	1.31	0	0.00	70	0.15	661	1.47
Thru EAA	569	1.26	0	0.00	67	0.15	637	1.41
Total	2702	6.00	0	0.00	345	0.77	3046	6.77

Estuary Release Days

15-Jul-02 thru 17-May-04

Release Level	WSE (observed)	Run25 (simulated)
Zone A	0	0
Zone B	22	27
Zone C	29	59
L3 Pulse	69	28
L2 Pulse	70	28
L1 Pulse	223	151
Total Days	413	293

LEGEND

Observed Stage:

Simulated Stage:

if Run25 Schedule

Estuary Release Color Code

- Level 1 Pulse (or less)
- Level 2 Pulse
- Level 3 Pulse
- Zone C Release
- Zone B Release
- Zone A Release

2005 Atlantic Hurricane Outlook

NOAA's 2005 Atlantic hurricane season outlook (16 May'05)

http://www.cpc.ncep.noaa.gov/products/outlooks/hurricane.html

- 70% probability of an above-normal # of hurricanes
- 20% probability of a near-normal # of hurricanes
- 10% chance of a below-normal # of hurricanes

The outlook calls for 12-15 tropical storms, with 7-9 becoming hurricanes, and 3-5 of these becoming major hurricanes.

Dr. William Gray & CSU Team 2004 Predictions (June '05)

http://hurricane.atmos.colostate.edu/Forecasts/2005/june2005

- 15 Named Storms (average is 10)
- 8 Hurricanes (average is 6)
- 4 Intense Hurricanes (average is 2)

Gray's team predicts that for "the East Coast, including the Florida Peninsula, the probability of an intense hurricane making landfall is 59 percent, compared with a long-term average of 31 percent."

09-Nov-2004, end Zone C discharges (stage receding after September ’04 hurricanes)
10-Nov-2004, begin L3 Pulses
20-Nov-2004, begin L1 Pulses (1st per extended TD)
30-Nov-2004, begin L1 Pulses (2nd per extended TD)
13-Dec-2004, begin L1 Pulses (3rd per extended TD)
23-Dec-2004, end 3rd L1 Pulses (water supply provision of TD suspended releases for 2wks)
07-Jan-2005, begin L1 Pulse to CE only (1st in ’05, 4th per extended TD)
20-Jan-2005, begin modified L1 Pulse (avg 600cfs) to CE only (5th per extended TD)
26-Jan-2005, terminate modified L1 Pulse (after 6days) & begin L1 Pulses to both estuaries (6th per extended TD)
06-Feb-2005, begin L1 Pulses (7th per extended TD)
16-Feb-2005, end 7th L1 Pulses (water supply provision of TD suspended regulatory releases for 3wks)
17-Feb-2005, start 10-day Env WS release to CE (avg 600 cfs) (1st per authority of Adaptive Protocols)
27-Feb-2005, end 10-day Env WS release to CE.
10-Mar-2005, begin ¼ pulse to SLE & CE (8th per extended TD)
16-Mar-2005, terminate ¼ pulse & begin L1 Pulses (9th per extended TD)
26-Mar-2005, end L1 pulse (9th & final pulse release per extended TD)
26-Mar-2005, begin L3 Pulses to SLE & CE (7th regulatory pulse since 01-Jan-2005)
05-Apr-2005, begin L3 to CE & L1 to SLE (8th regulatory pulse in 2005)
16-Apr-2005, begin L3 to CE & L1 to SLE (9th regulatory pulse in 2005)
26-Apr-2005, begin L3 to CE & L1 to SLE (10th regulatory pulse in 2005)
07-May-2005, begin L3 to CE & L1 to SLE (11th regulatory pulse in 2005)
18-May-2005, begin L3 to CE & L1 to SLE (12th regulatory pulse in 2005)
28-May-2005, tentatively begin L2 Pulses to CE & SLE (13th regulatory pulse in 2005)