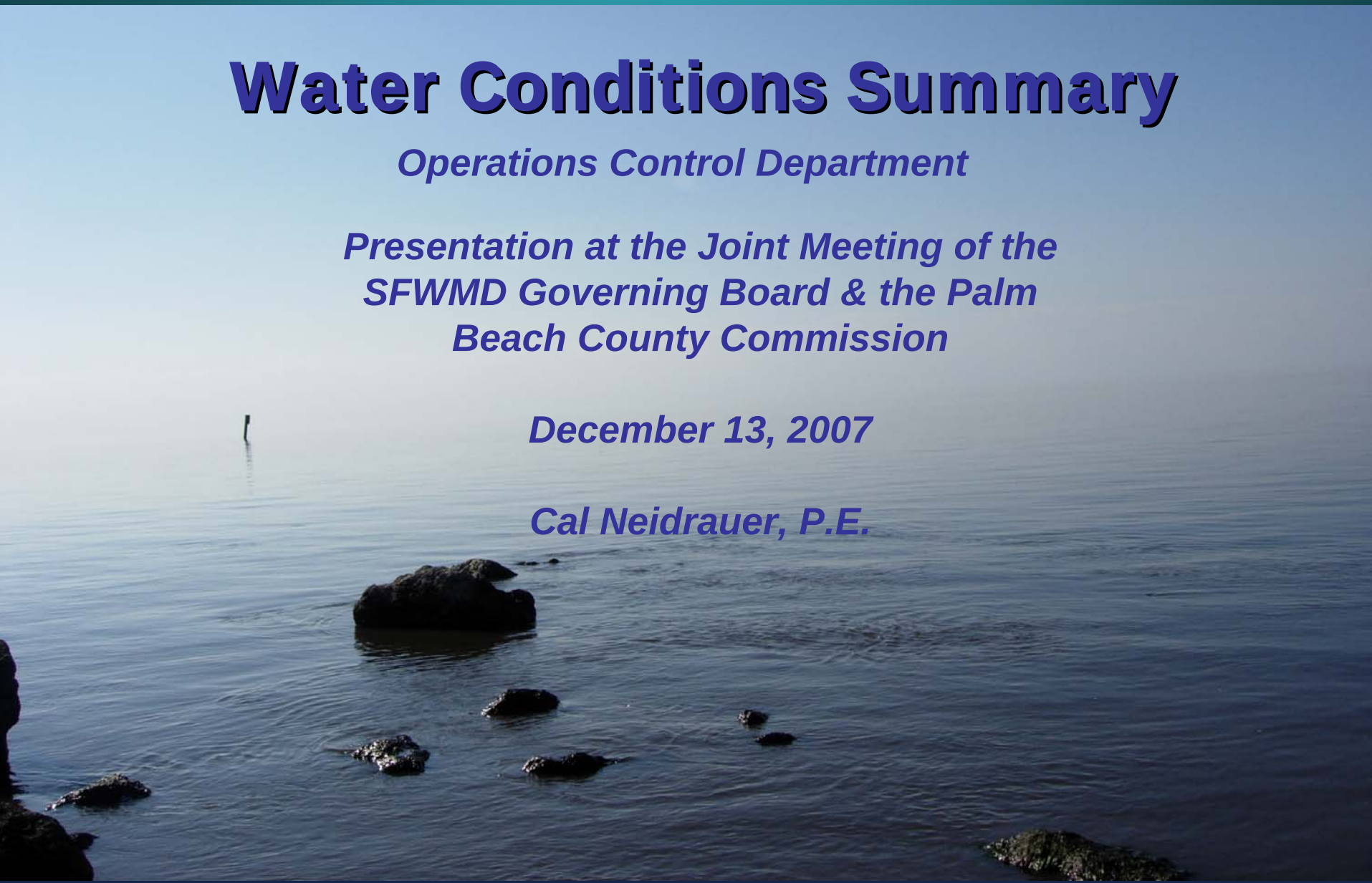
Water Conditions Summary

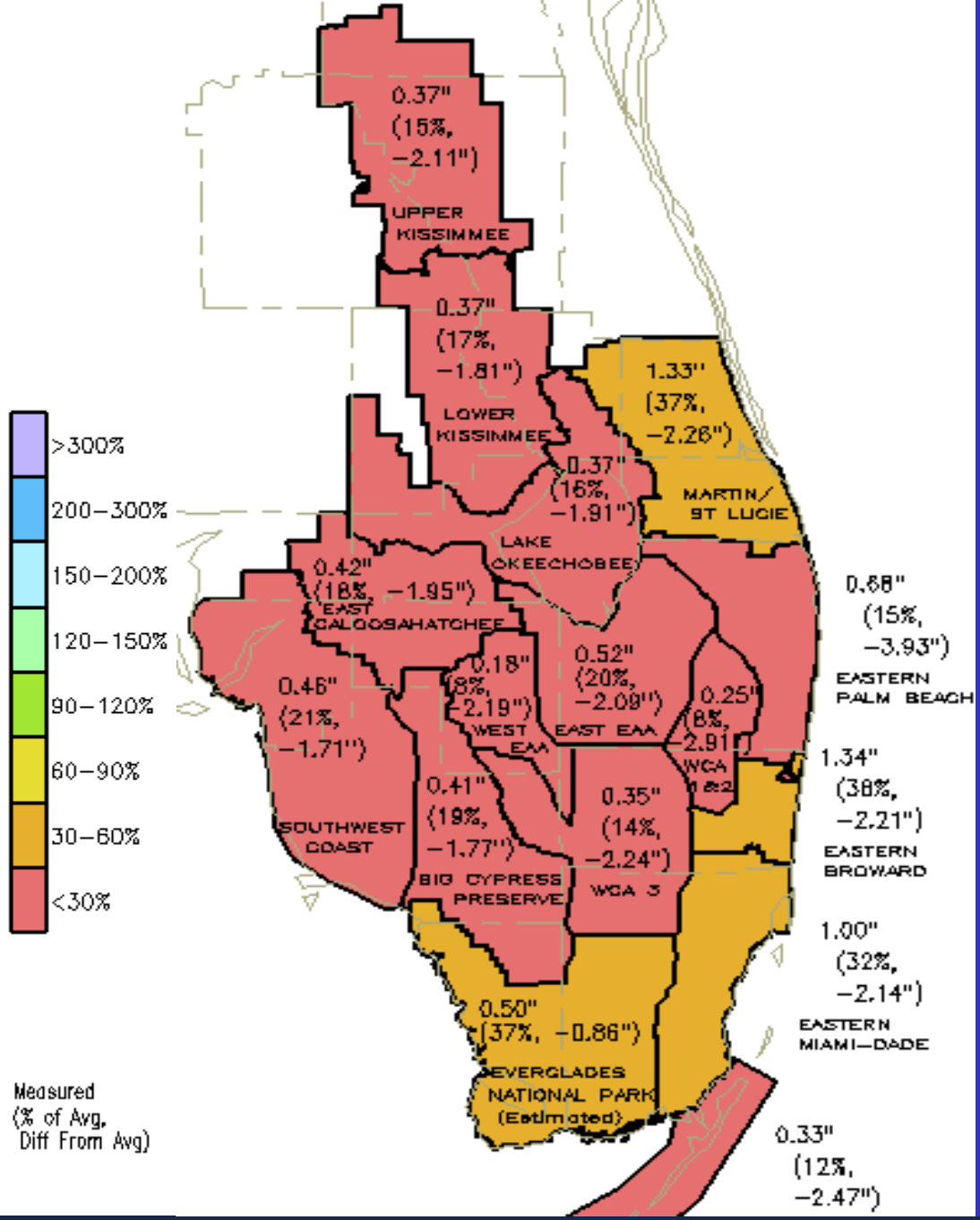
Operations Control Department

Presentation at the Joint Meeting of the SFWMD Governing Board & the Palm Beach County Commission

December 13, 2007

Cal Neidrauer, P.E.





SFWMD 2007
November Rainfall
Nov 2nd – Dec 1st

DISTRICT-WIDE:
0.54” (20%, -2.12”)

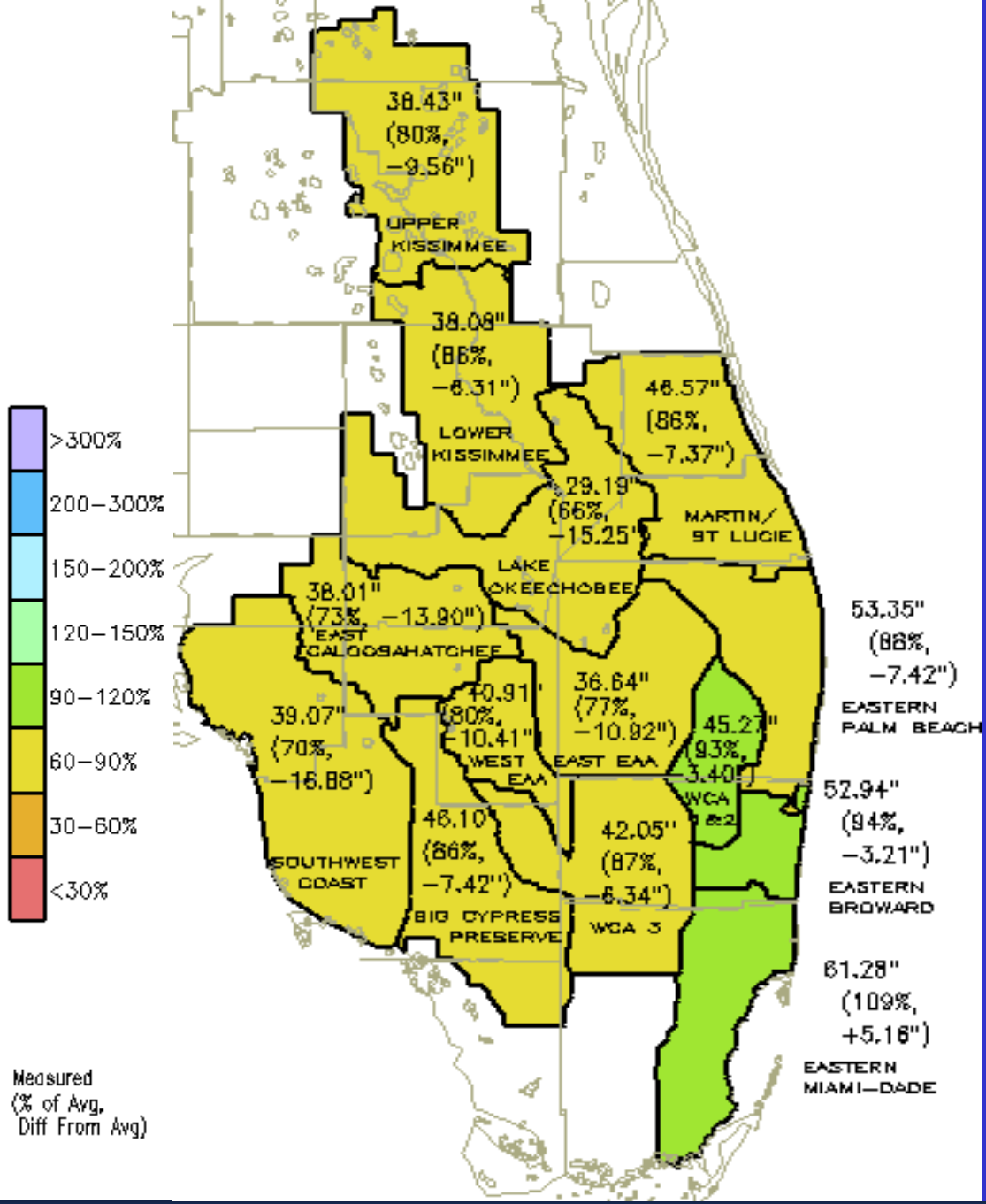
Average November
= 2.66”

- *Below-average November rainfall in all basins*
- *November 2007 was the 5th driest November on record*
- *Poor start for the 2007-2008 Dry Season*

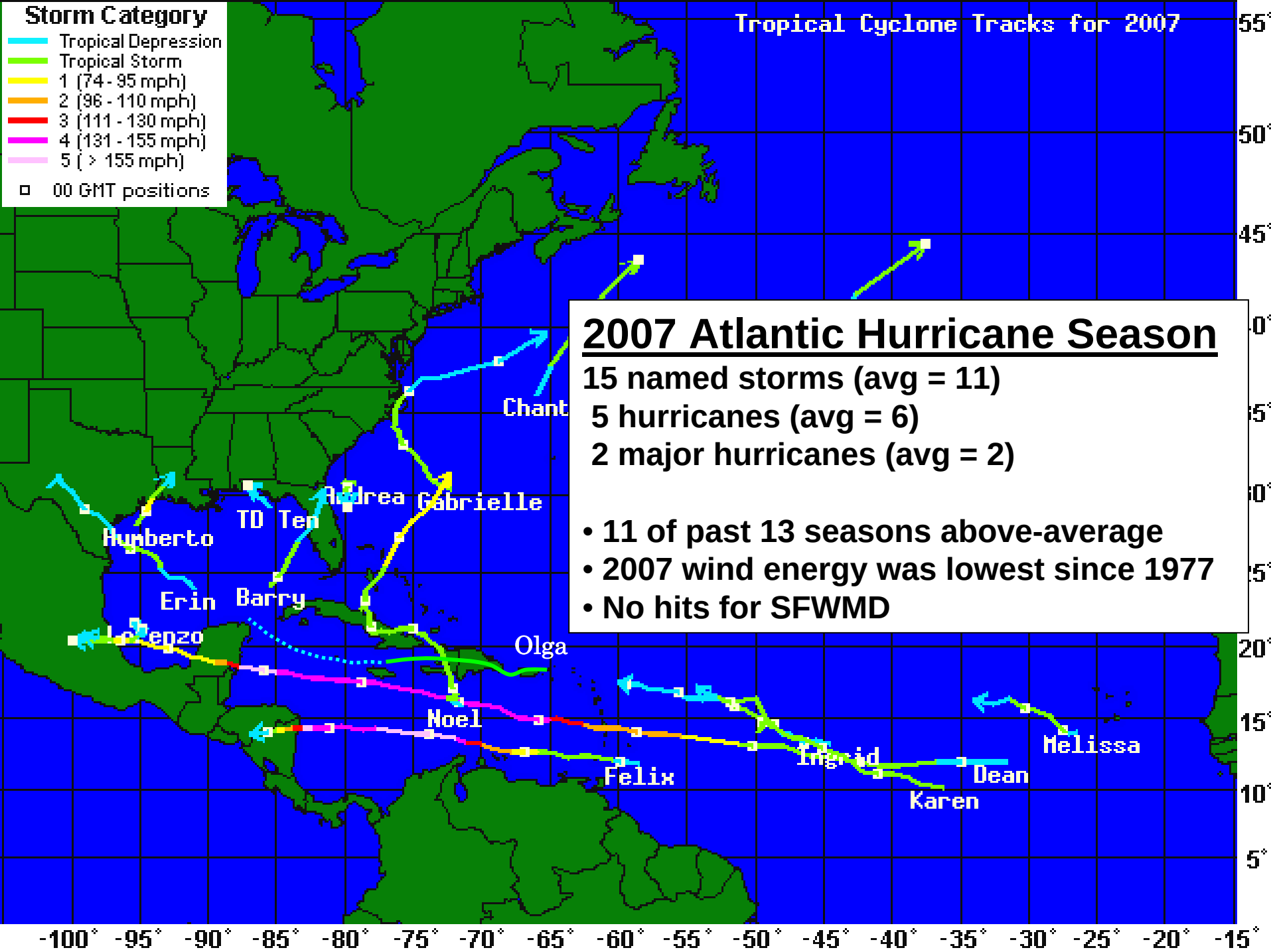
SFWMD 2007
Annual Rainfall
02-Jan to 11-Dec

DISTRICT-WIDE:
41.8” (83%, -8.8”)

Average Annual
= 52.0”

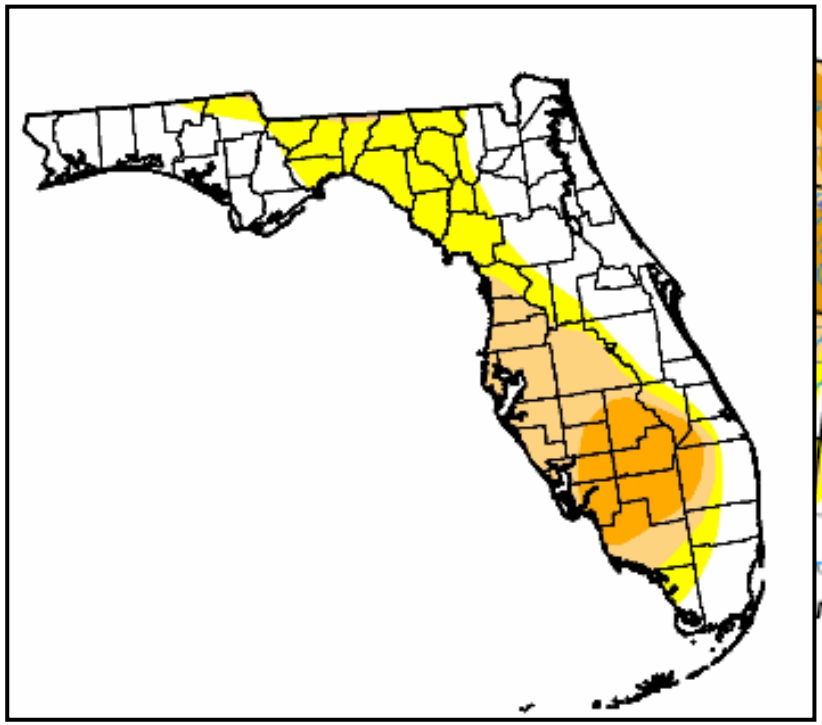


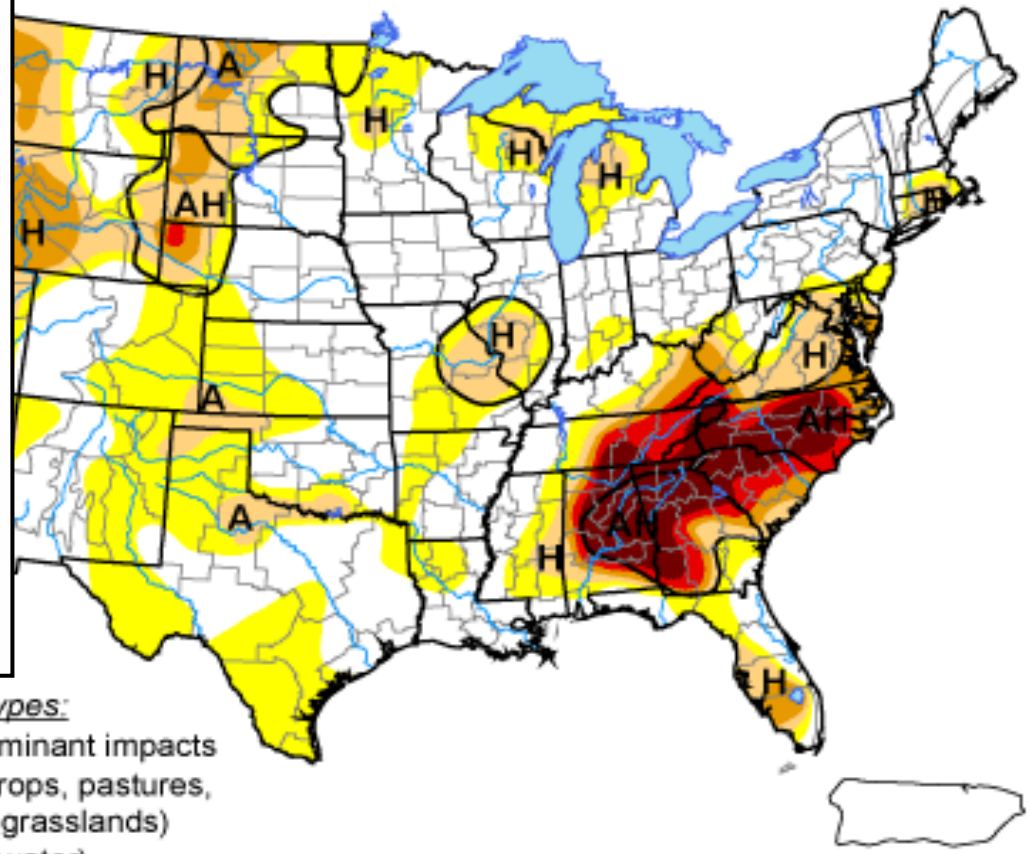
- *Kissimmee Basins ~6”-9” < average*
- *Lake O. & Southwest Coast 14”-16” < average*
- *EAA ~11” < average*
- *Eastern Miami-Dade Co. 5” > average*
- *Biennial Total (so far) = 82.5” Need >2” in next 3-wks to avoid breaking record-low 2-yr rainfall (1955-56: 84.6”)*


Storm Category
Tropical Depression
Tropical Storm
1 (74 - 95 mph)
2 (96 - 110 mph)
3 (111 - 130 mph)
4 (131 - 155 mph)
5 (> 155 mph)
00 GMT positions
Tropical Cyclone Tracks for 2007
2007 Atlantic Hurricane Season
15 named storms (avg = 11)
5 hurricanes (avg = 6)
2 major hurricanes (avg = 2)
• 11 of past 13 seasons above-average
• 2007 wind energy was lowest since 1977
• No hits for SFWMD
Chantal
Andrea
Gabrielle
TD Ten
Humberto
Erin
Barry
Lorenzo
Olga
Noel
Felix
Ingrid
Karen
Dean
Melissa
55°
50°
45°
40°
35°
30°
25°
20°
15°
10°
5°
-100° -95° -90° -85° -80° -75° -70° -65° -60° -55° -50° -45° -40° -35° -30° -25° -20° -15°

U.S. Drought Monitor

December 4, 2007
Valid 7 a.m. EST





Intensity:
- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

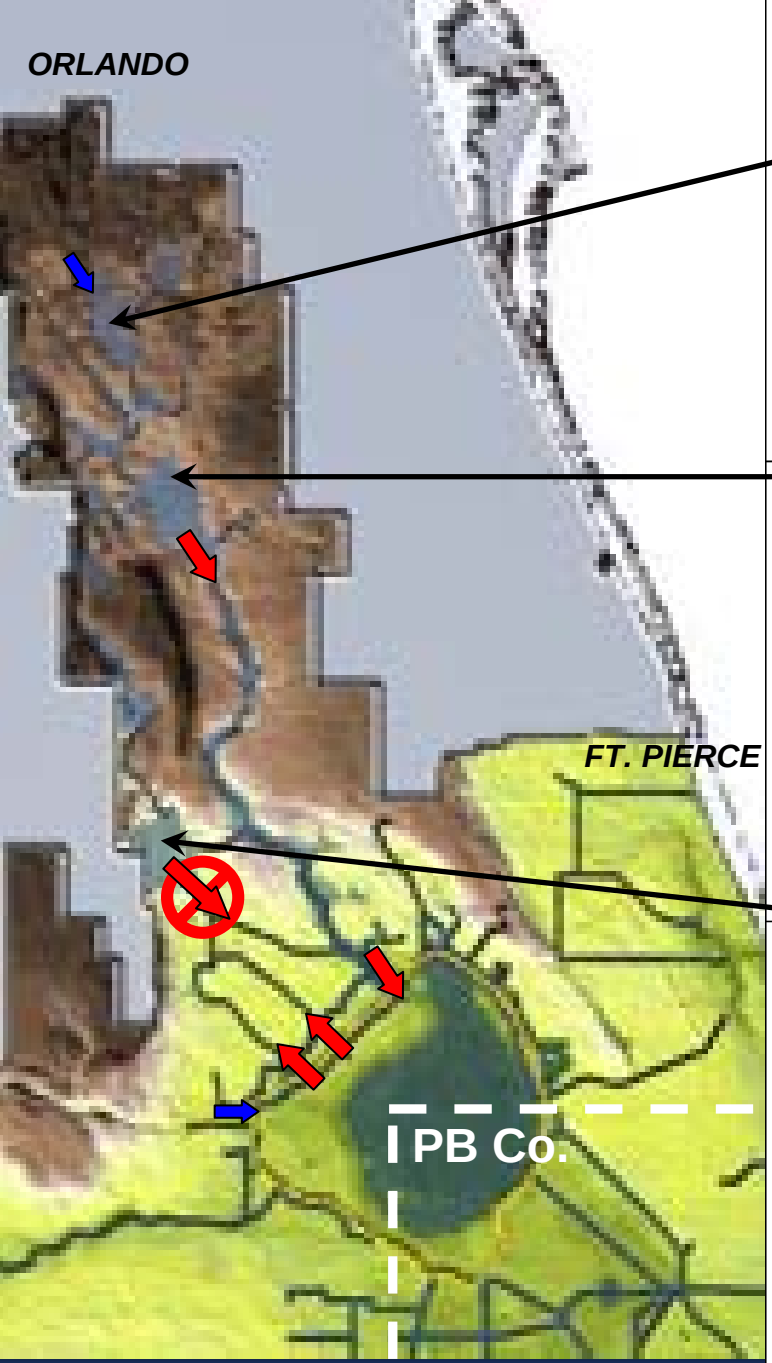
Drought Impact Types:
- ~ Delineates dominant impacts
- A = Agricultural (crops, pastures, grasslands)
- H = Hydrological (water)

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

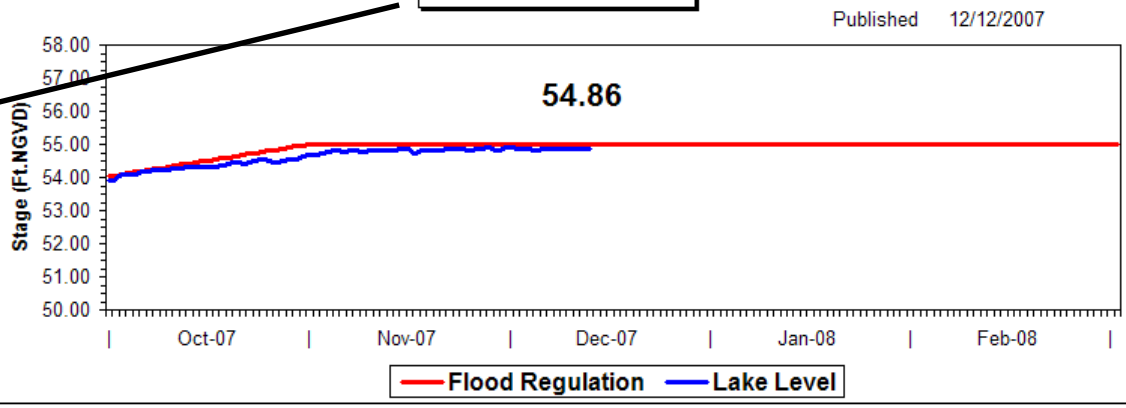
http://drought.unl.edu/dm

USDA National Drought Mitigation Center

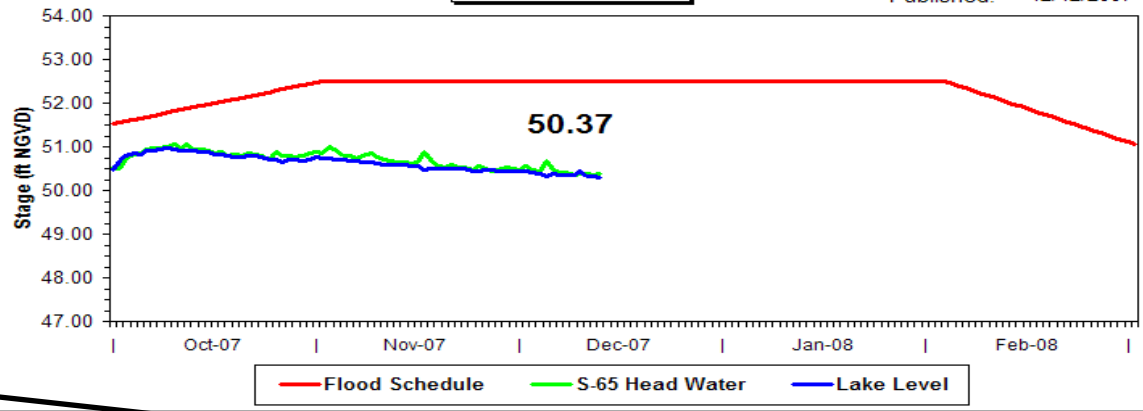
Released Thursday, December 6, 2007
Author: Brad Rippey, U.S. Department of Agriculture



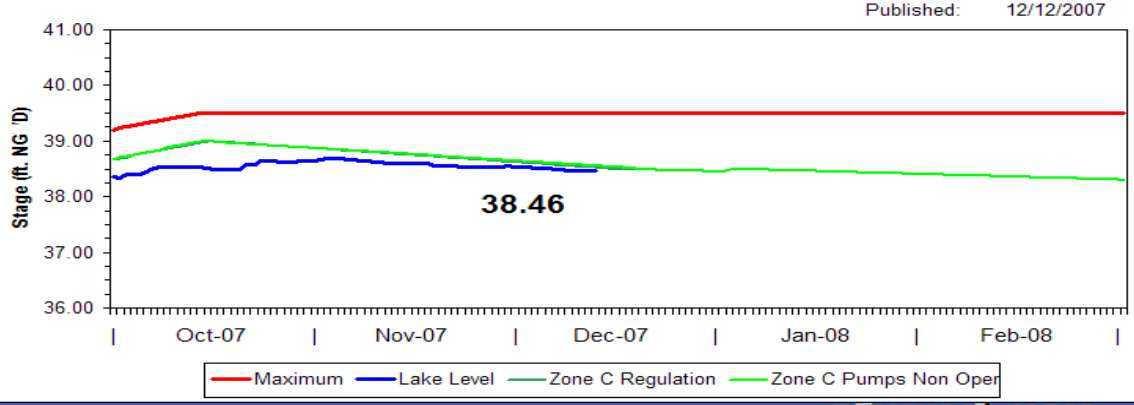
Lake Tohopekaliga

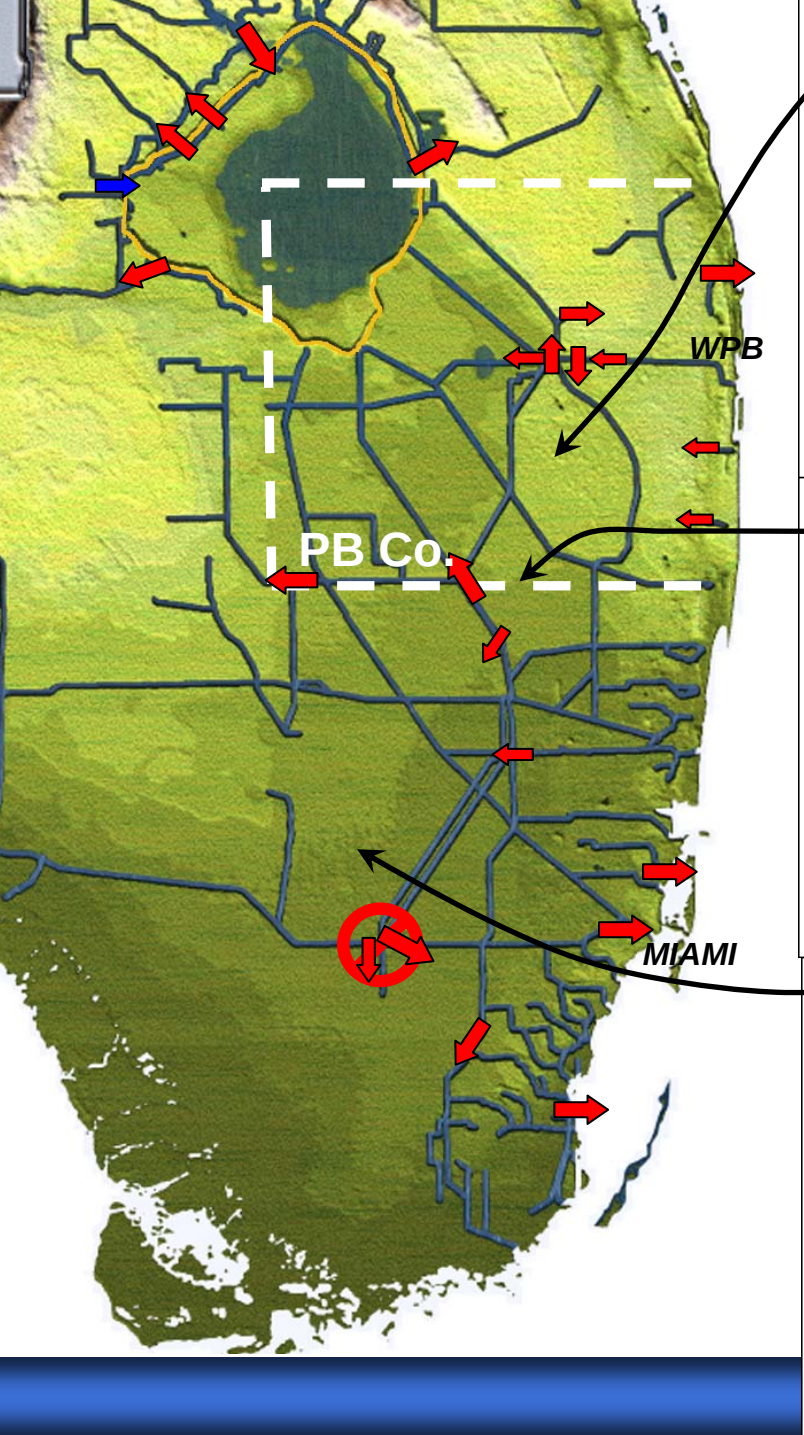


Lake Kissimmee



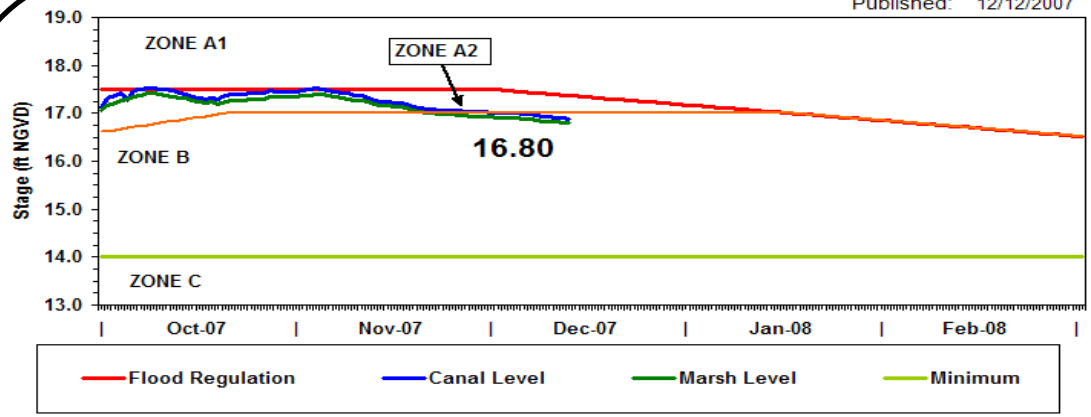
Lake Istokpoga





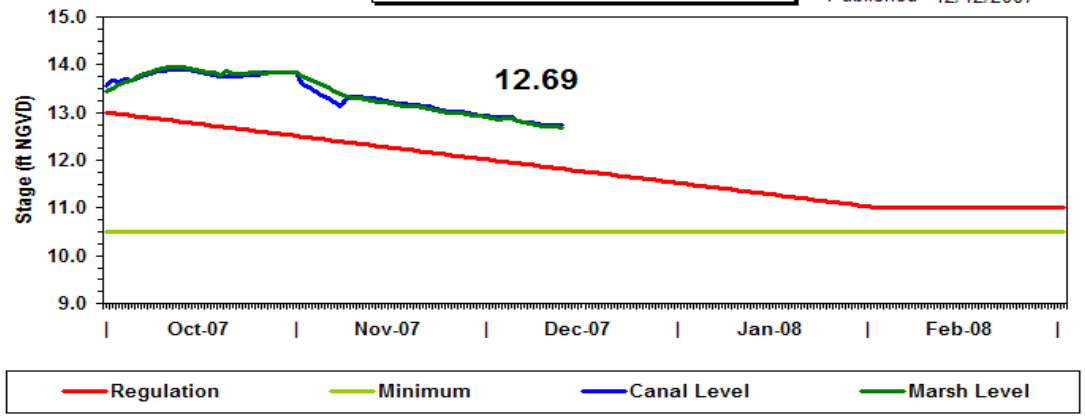
Water Conservation Area 1

Published: 12/12/2007



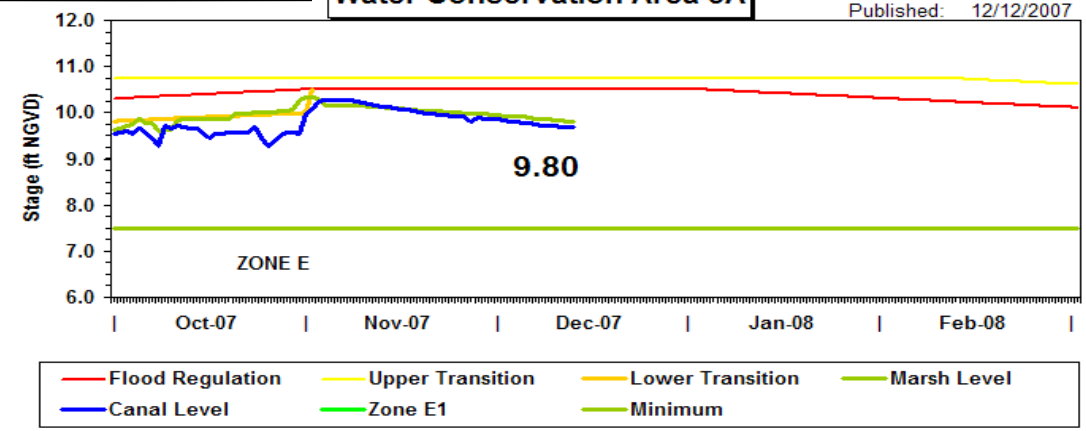
Water Conservation Area 2A

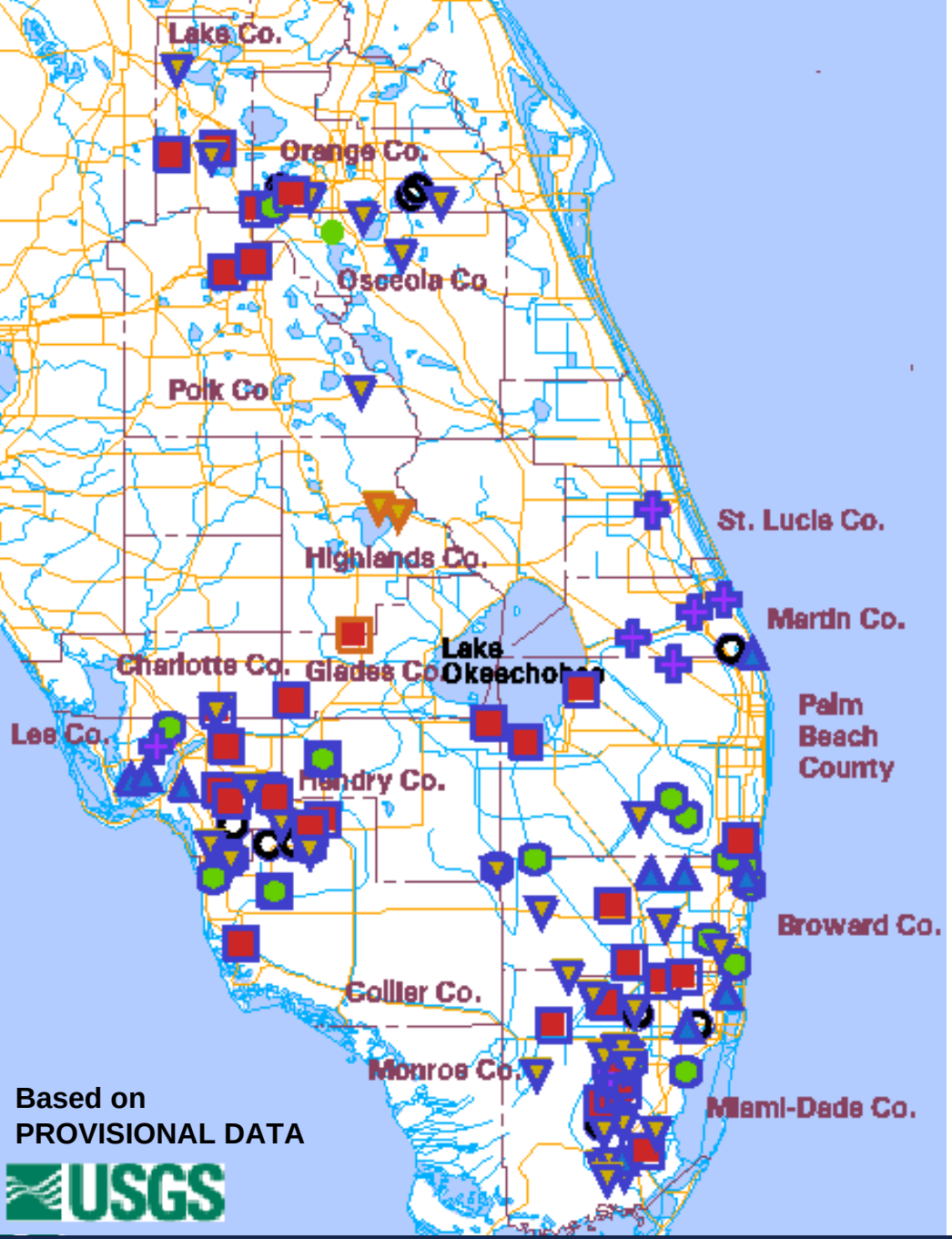
Published 12/12/2007



Water Conservation Area 3A

Published: 12/12/2007





WATER LEVELS AT SELECTED MONITORING SITES

as of December 11, 2007

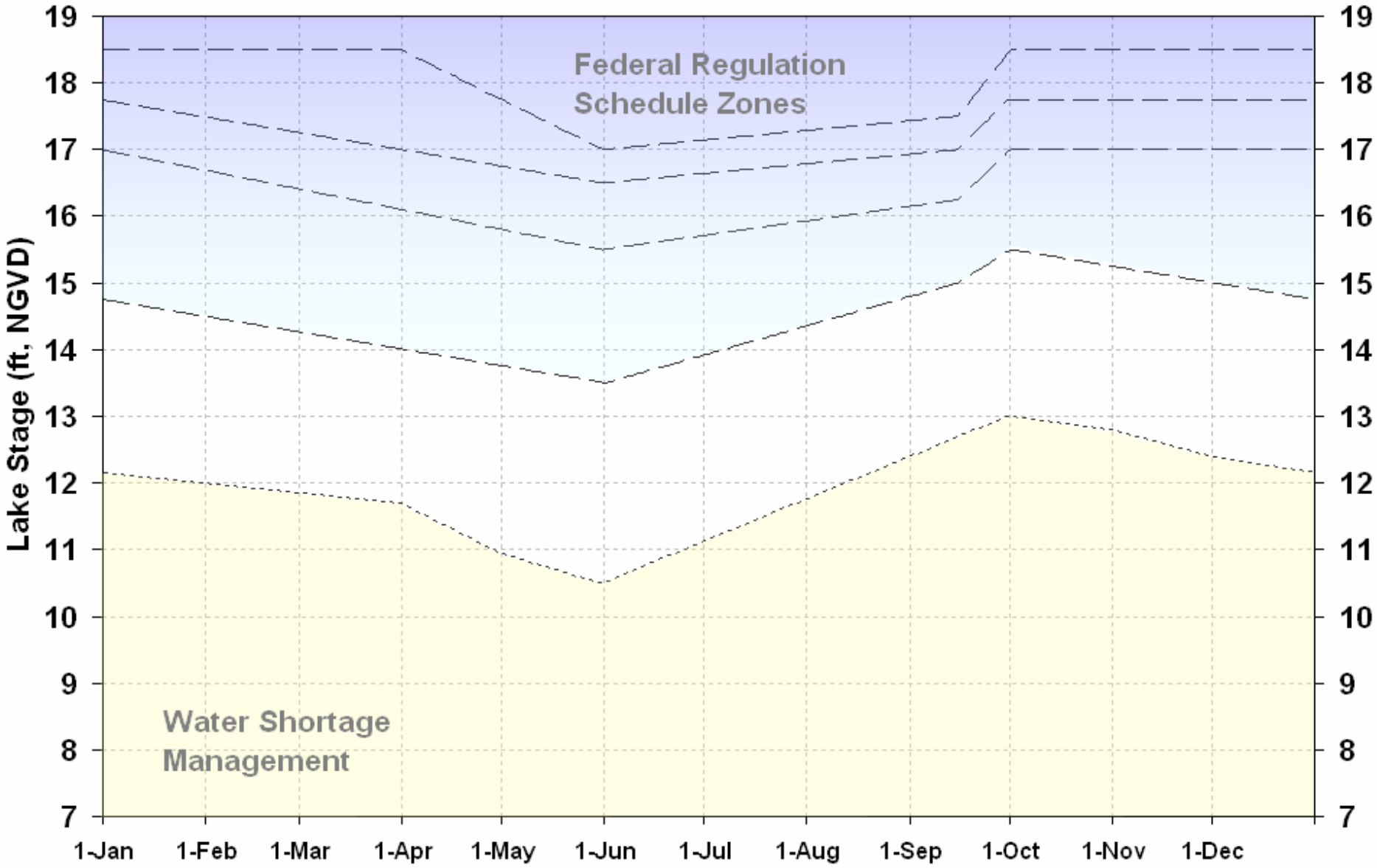
Based on PROVISIONAL DATA

USGS

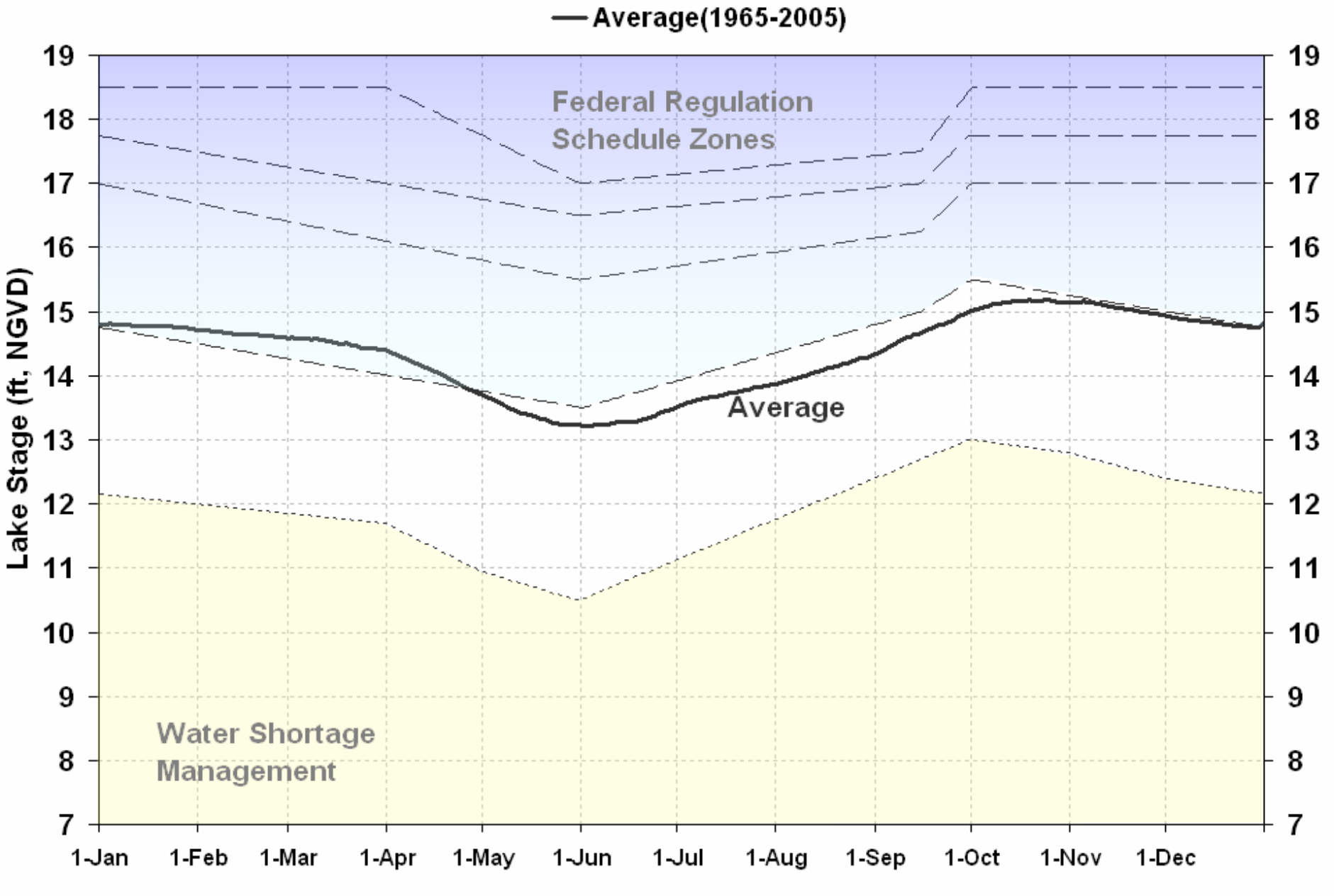
CLASS BASED ON PAST WATER ELEVATIONS FOR THIS TIME OF YR

- In highest 10%
- Within highest 10-30%
- Within 20% of the median
- Within lowest 10-30%
- In lowest 10%
- Insufficient information

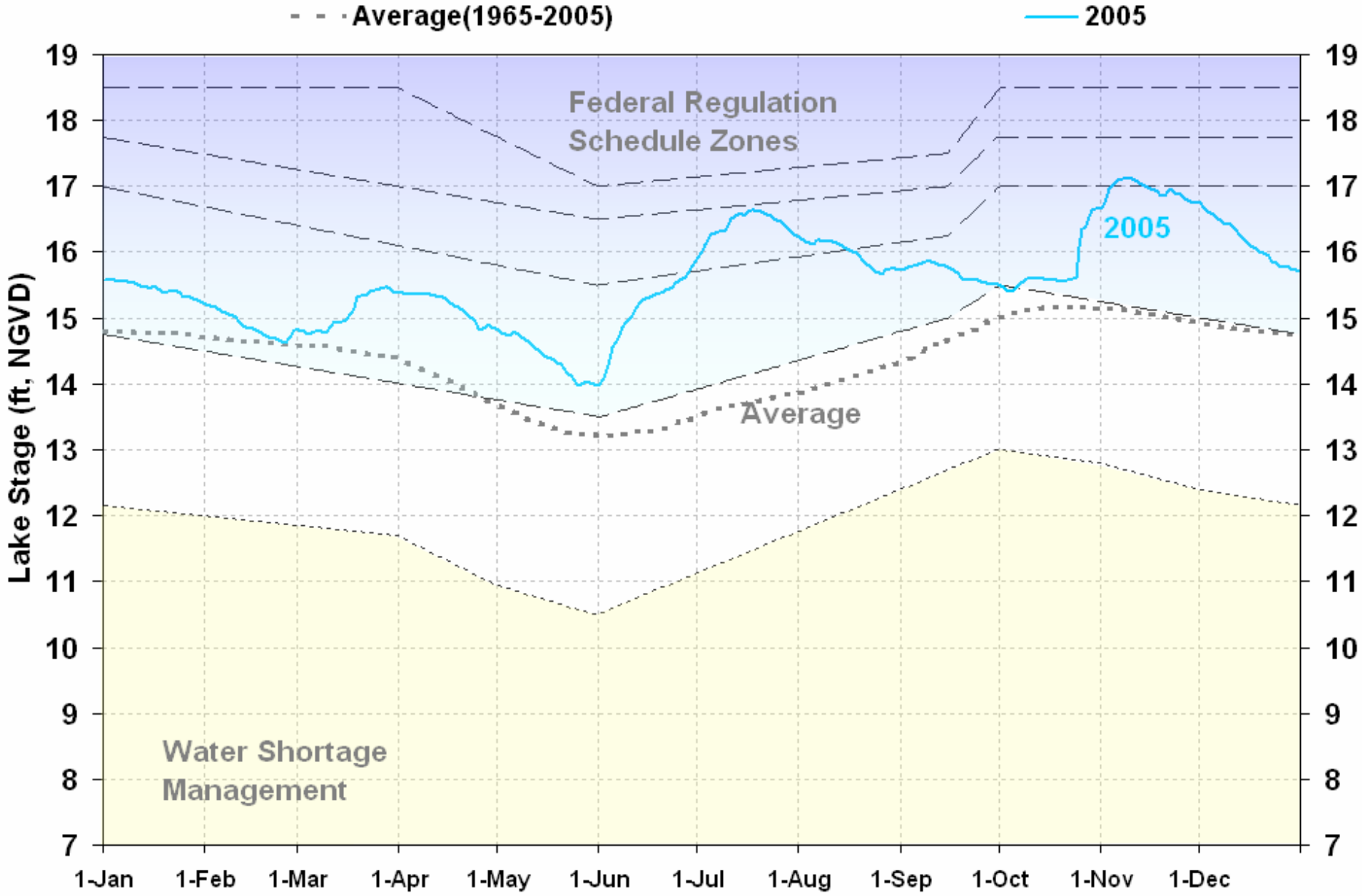
Lake Okeechobee Historical Stage Hydrograph Comparison



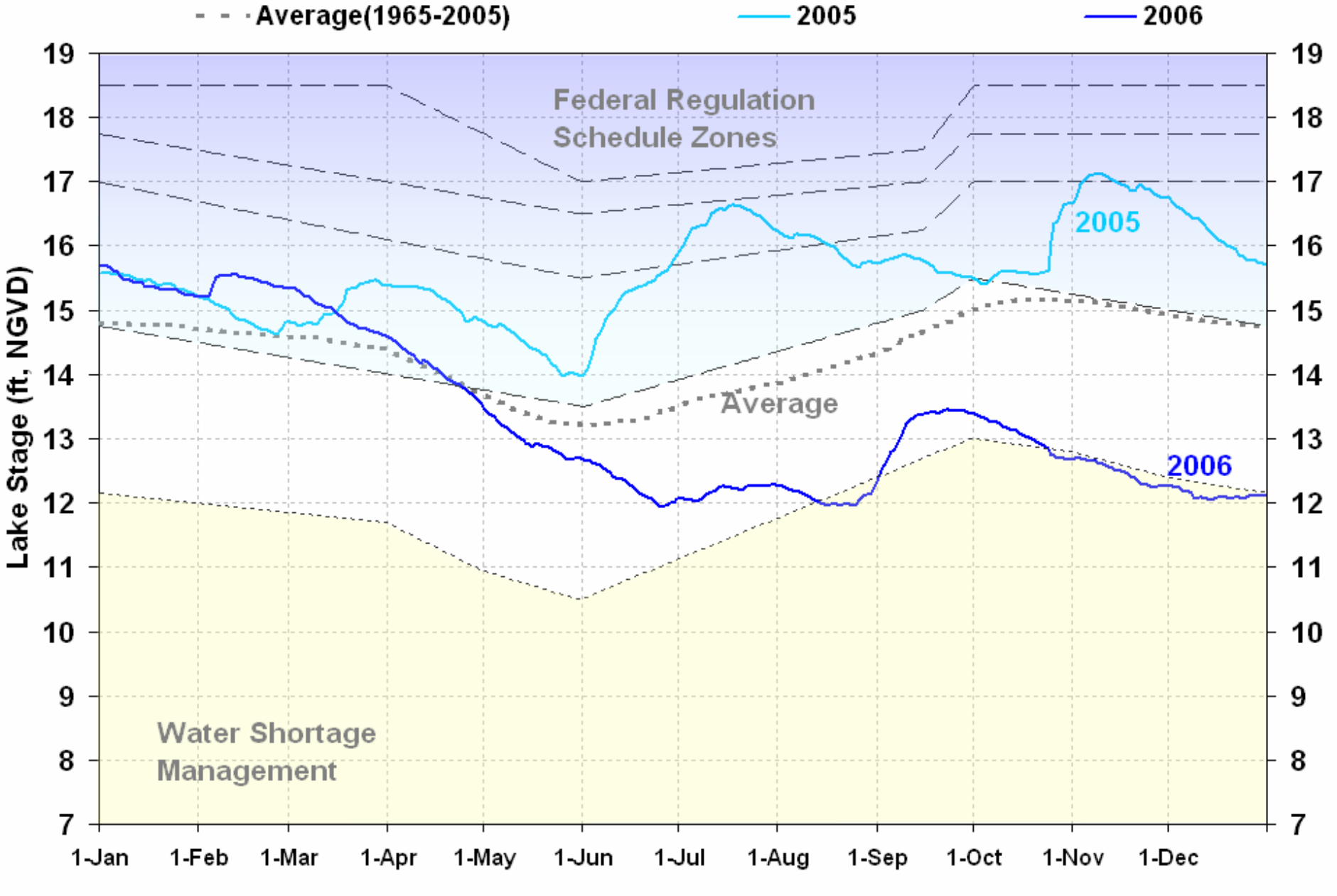
Lake Okeechobee Historical Stage Hydrograph Comparison

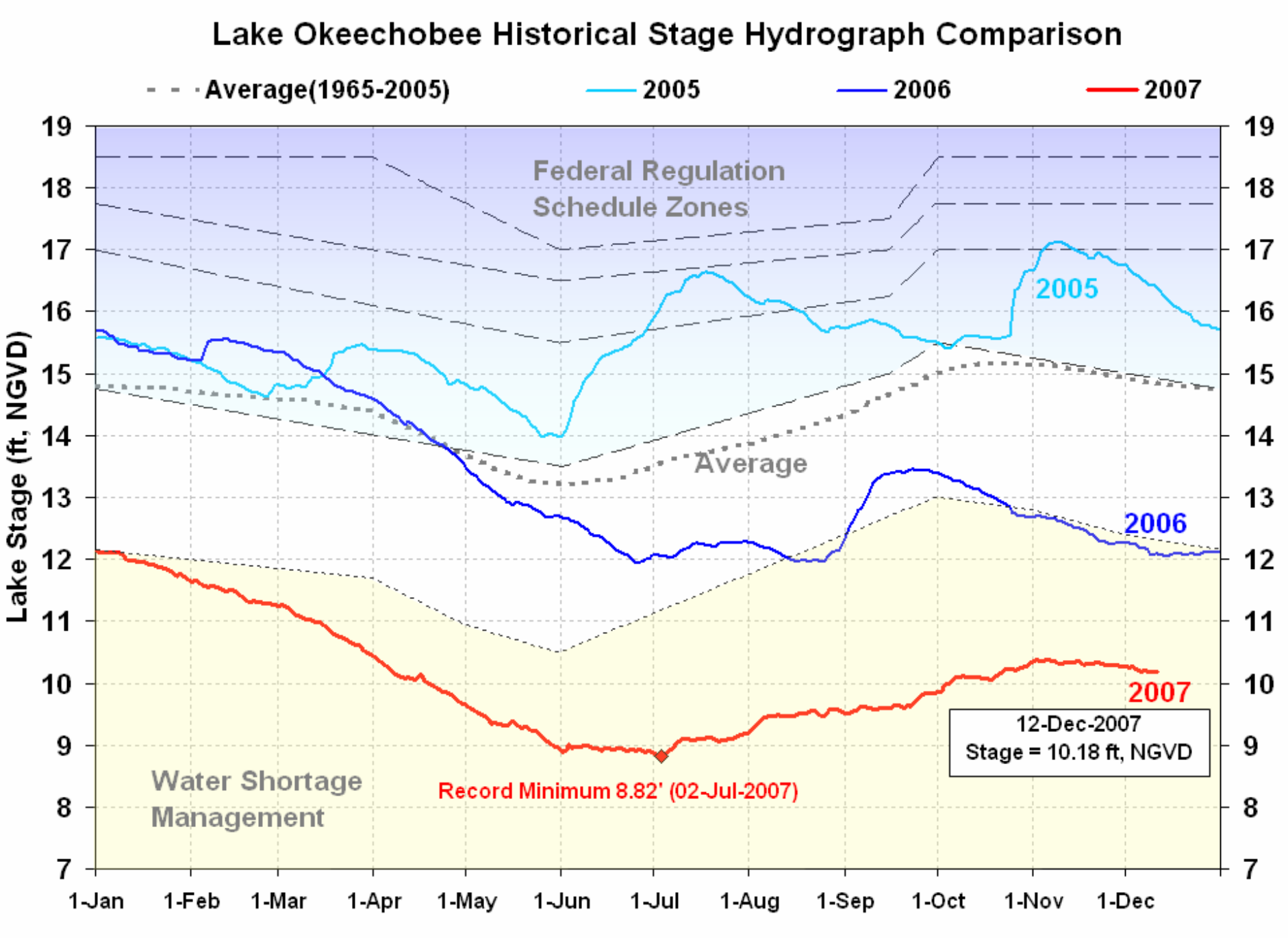


Lake Okeechobee Historical Stage Hydrograph Comparison

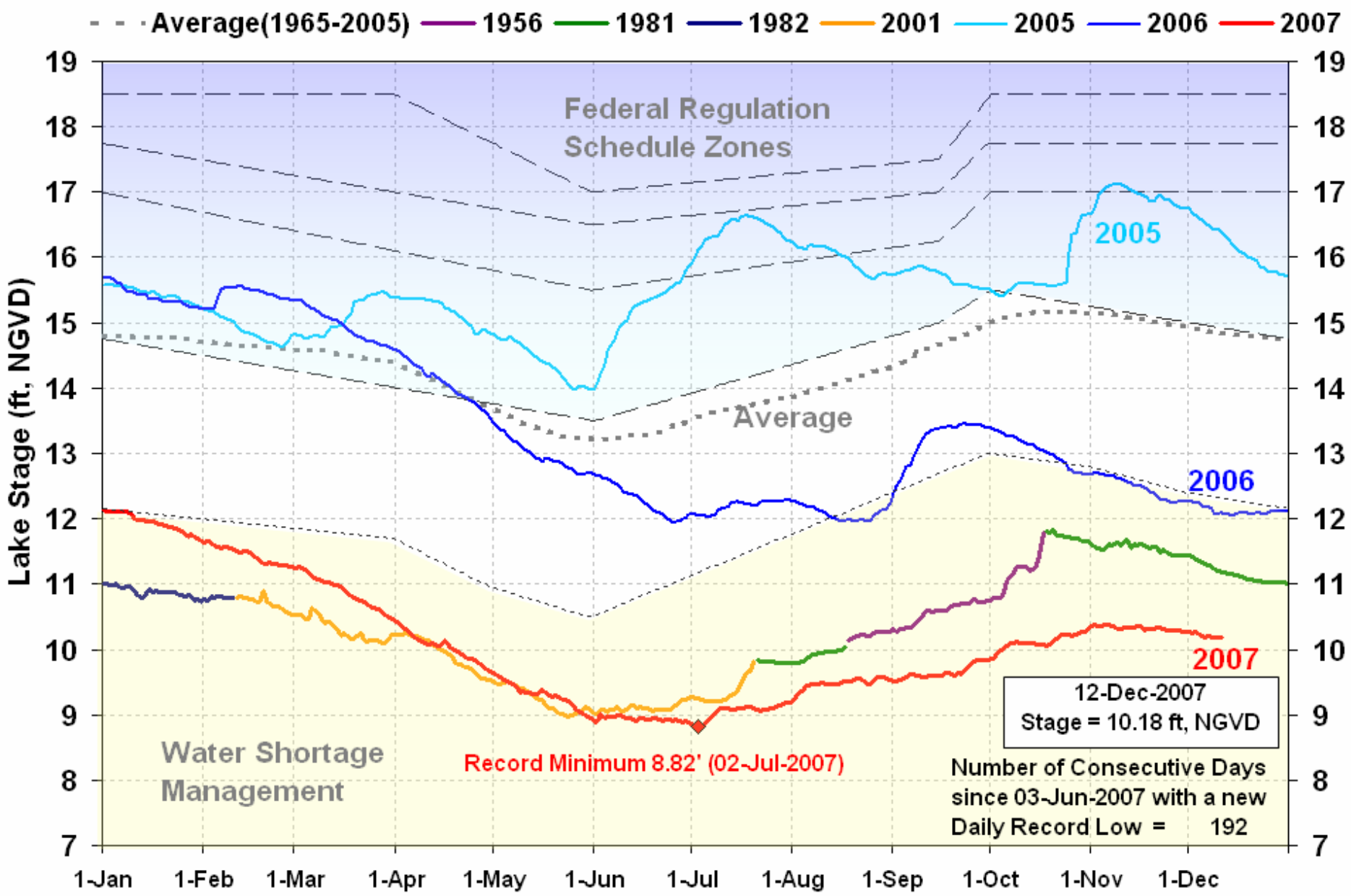


Lake Okeechobee Historical Stage Hydrograph Comparison



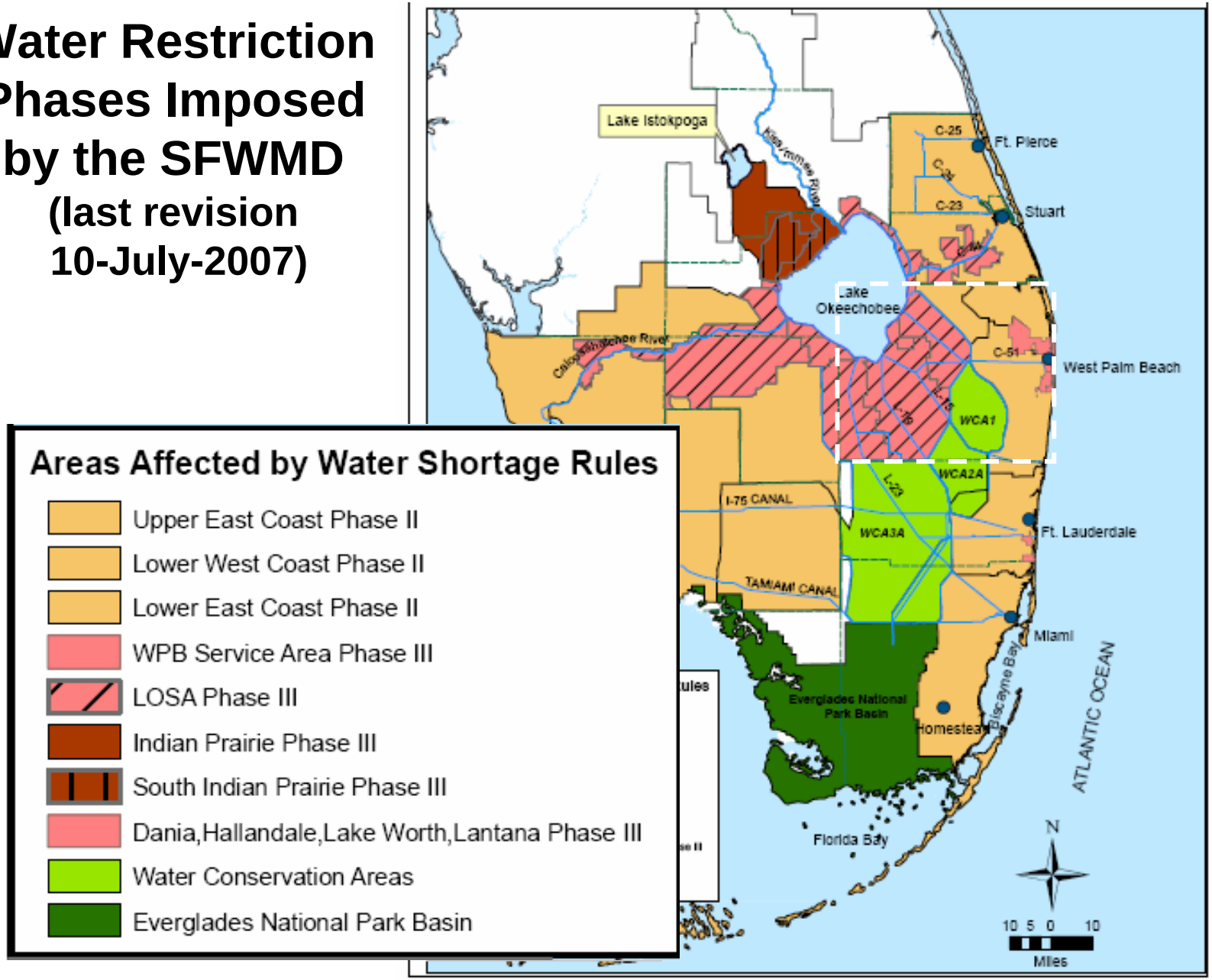

Lake Okeechobee Historical Stage Hydrograph Comparison
Average(1965-2005)
2005
2006
2007
Federal Regulation Schedule Zones
Average
2005
2006
2007
Water Shortage Management
Record Minimum 8.82' (02-Jul-2007)
12-Dec-2007
Stage = 10.18 ft, NGVD
Lake Stage (ft, NGVD)
19
18
17
16
15
14
13
12
11
10
9
8
7
1-Jan
1-Feb
1-Mar
1-Apr
1-May
1-Jun
1-Jul
1-Aug
1-Sep
1-Oct
1-Nov
1-Dec

Lake Okeechobee Historical Stage Hydrograph Comparison



Water Restriction Phases Imposed by the SFWMD

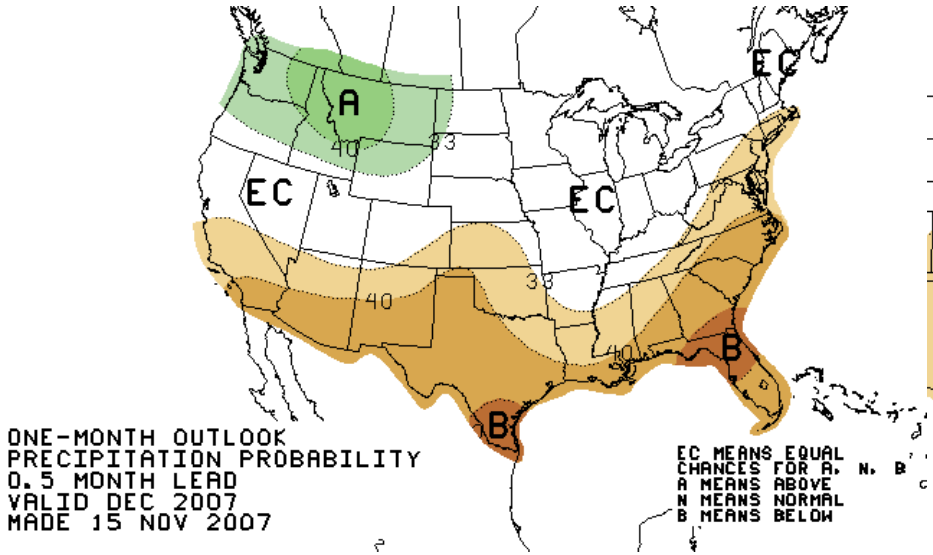
(last revision 10-July-2007)



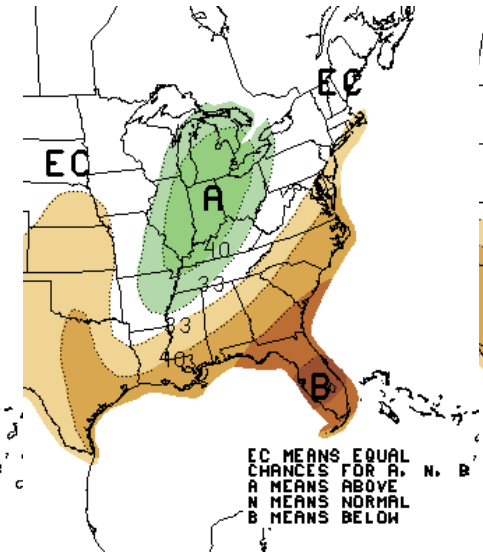
U. S. Seasonal Precipitation Outlook

National Climate Prediction Center (CPC)

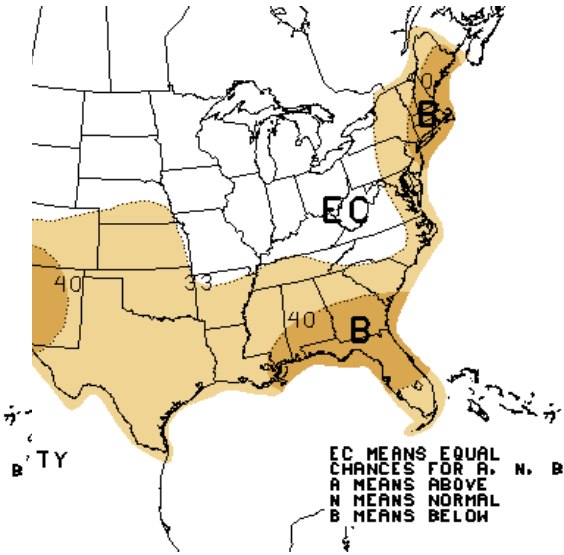
December



Jan-Mar



Apr-May

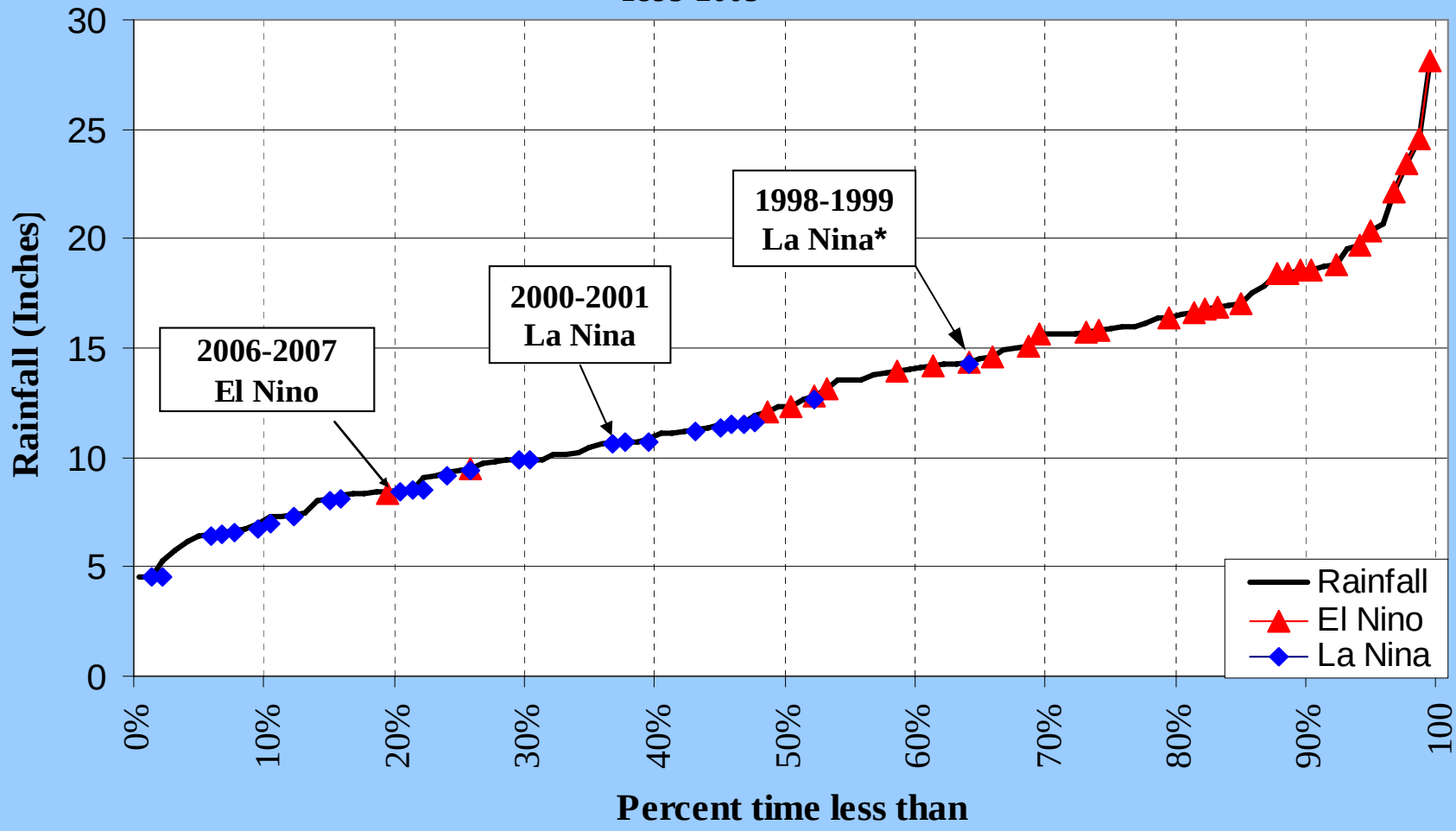


The CPC December outlook for an increased chance of below-normal rainfall. The 2007-2008 dry season has an increased chance of below-normal rainfall due to La Niña conditions which are predicted by many climate models to persist.

Historical SFWMD Dry Season Rainfall

(November - April)

1895-2005

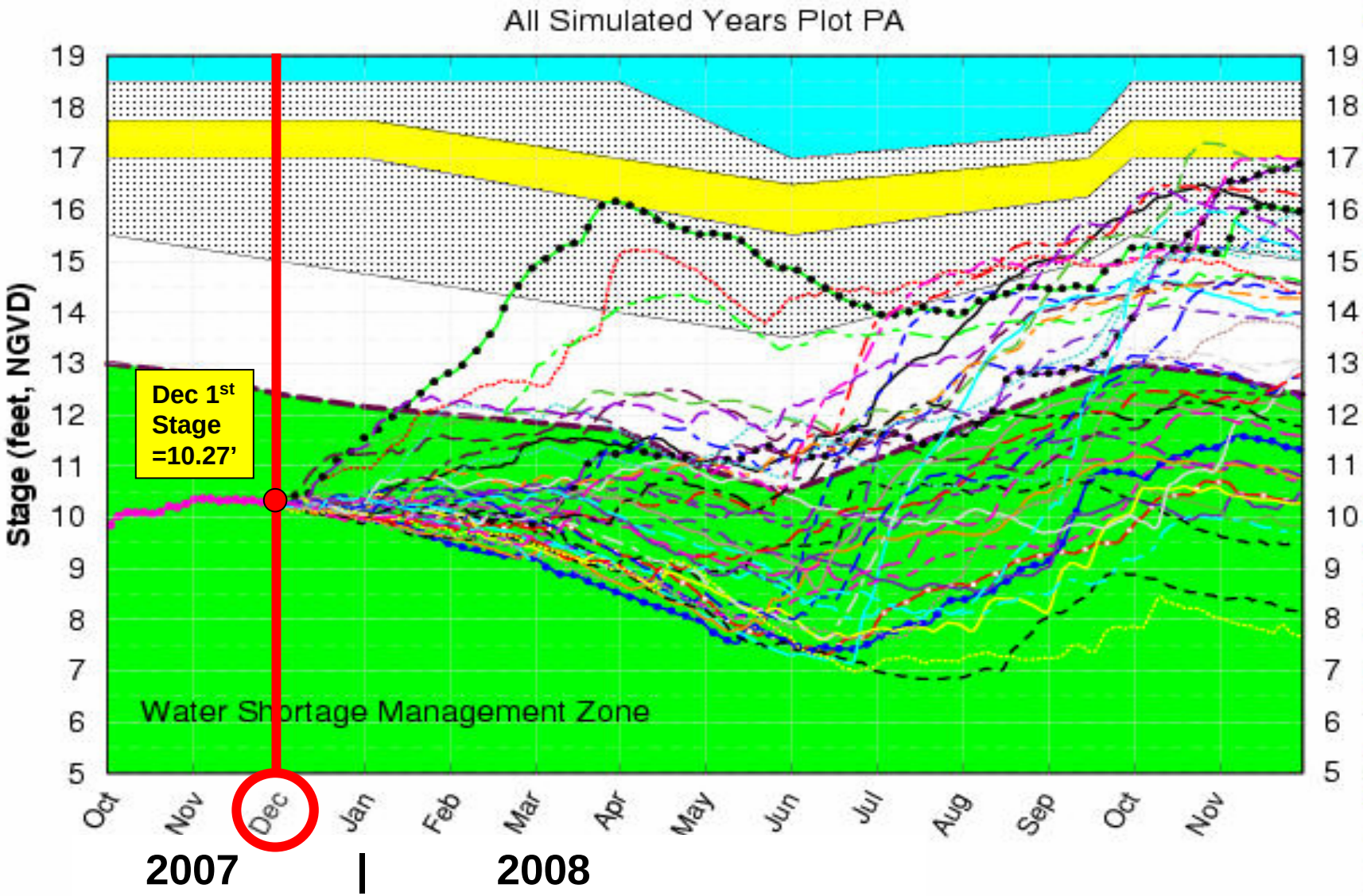


* 25 of the 27 La Niña years experienced rainfall less than the median

How will Lake Okeechobee stages behave during 2007-08?

- **Depends on rainfall**
- **Projections provided monthly by SFWMD Hydrologic and Environmental Systems Modeling (HESM) Department**
  http://www.sfwmd.gov/org/pld/hsm/reg_app/opln/PA/wmm_upa_05012007.html
- **Position Analysis**
  - **Each year starts with current hydrologic conditions**
  - **41 1-yr simulations of system response to historical rainfall conditions**
  - **Statistical summaries used to provide projections**

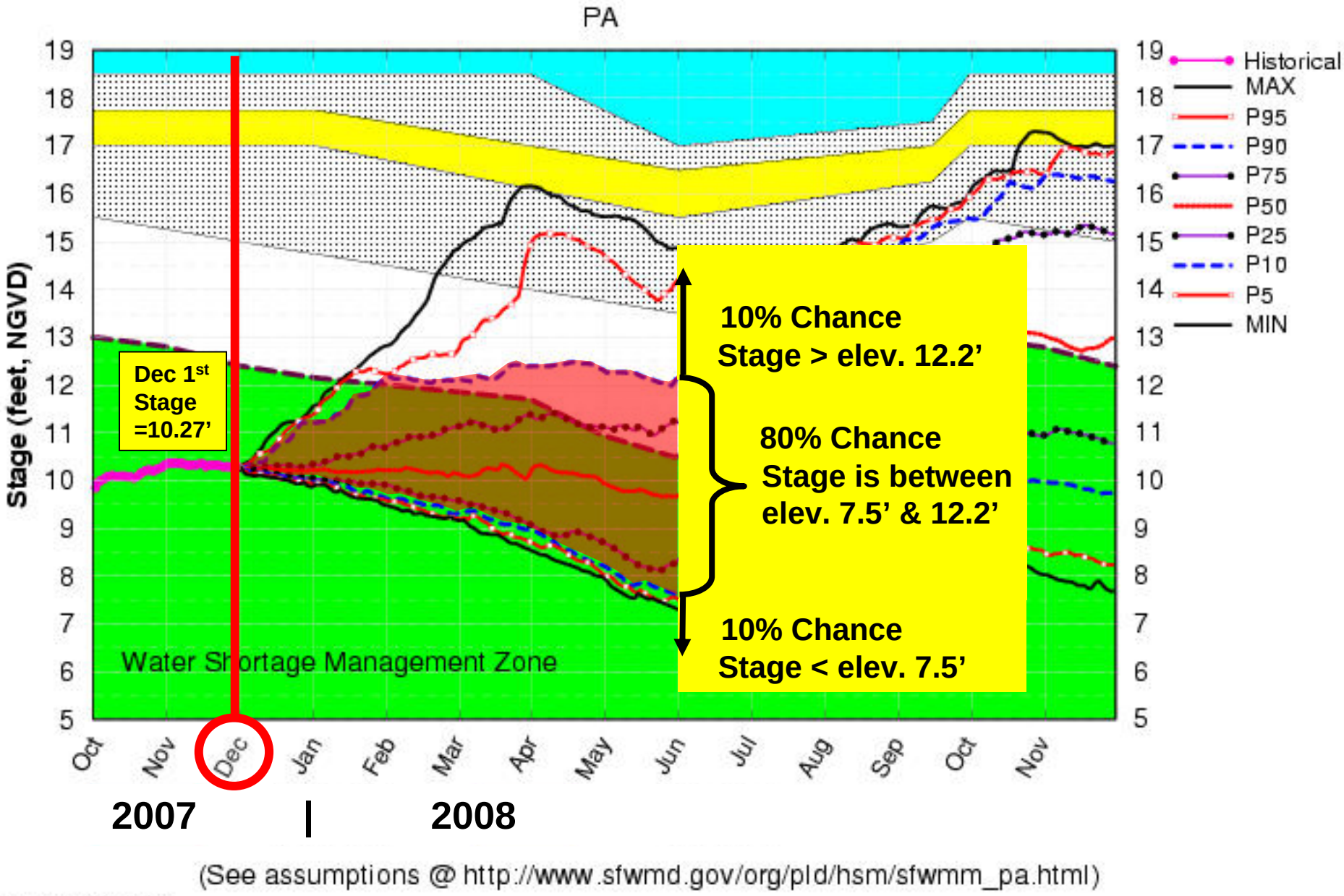
Lake Okeechobee SFWMM December 2007 Position Analysis



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

Fri Dec 7 08:28:18 2007

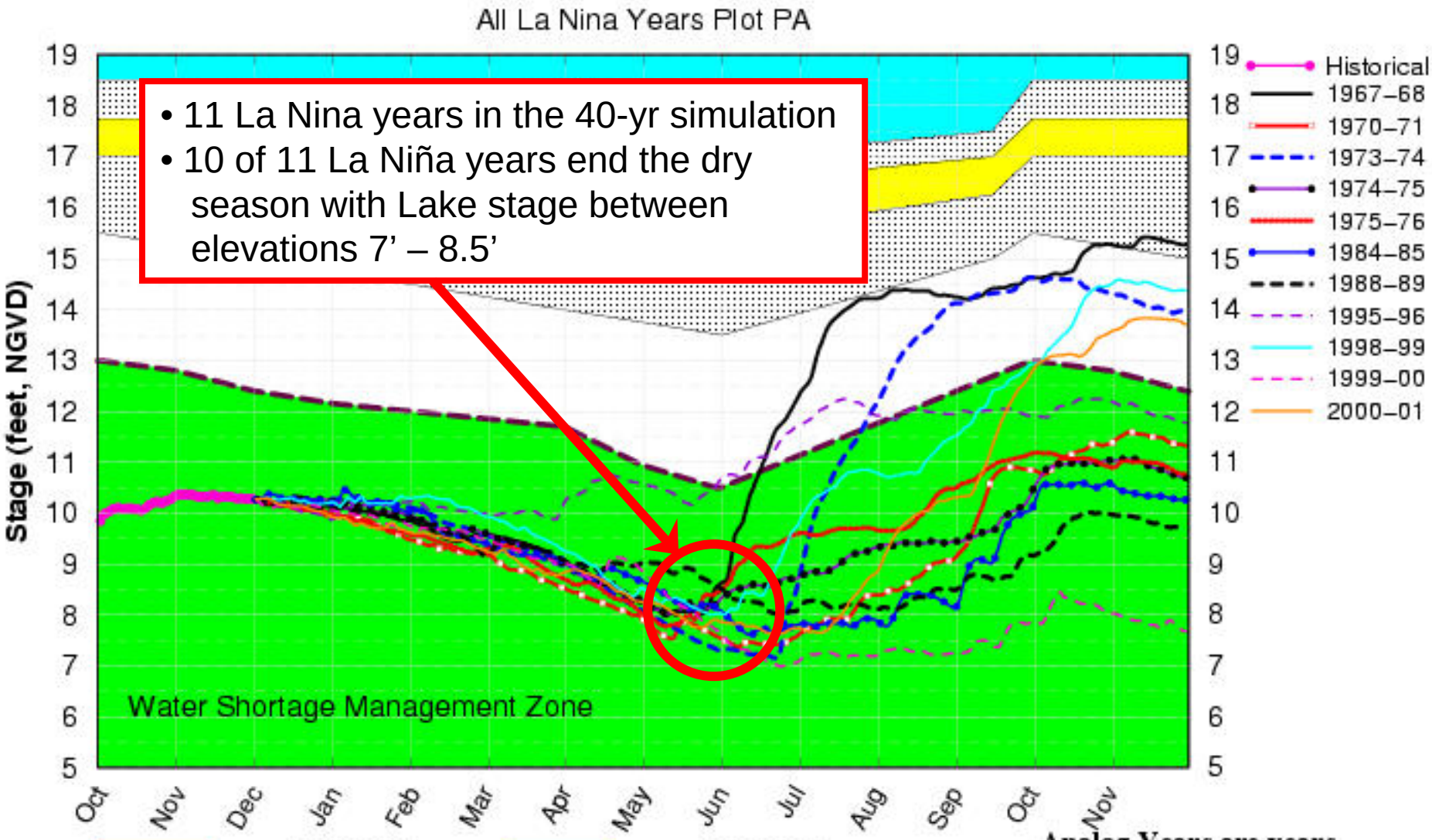
Lake Okeechobee SFWMM December 2007 Position Analysis



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

Fri Dec 7 08:15:58 2007

Lake Okeechobee SFWMM December 2007 Position Analysis



Analog Years are years with similar climatological conditions to the current year.

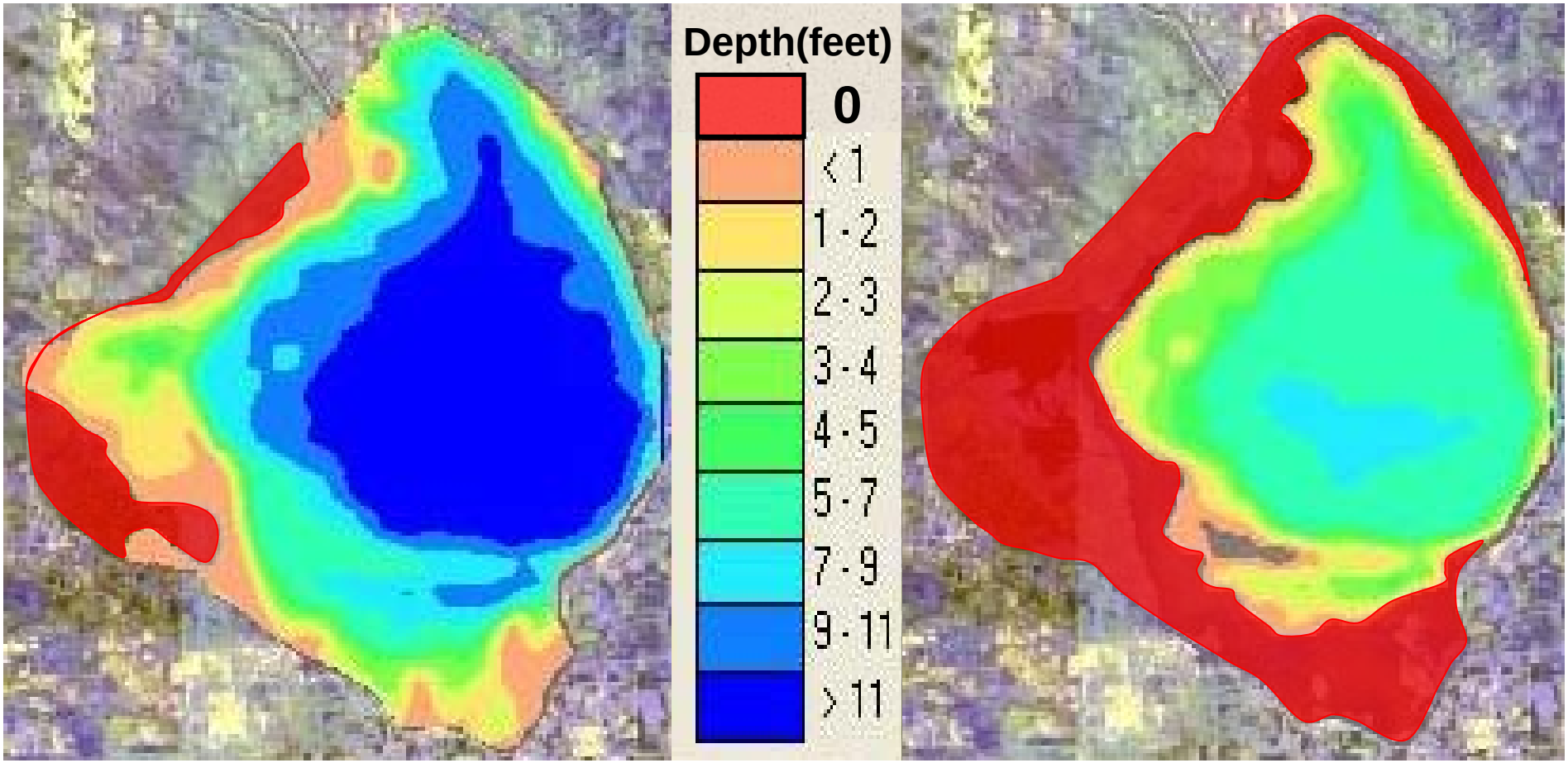
(See assumptions @ http://www.sfwmd.gov/org/pld/hsm/sfwmm_pa.html)

Fri Dec 7 08:16:20 2007

Lake Okeechobee Water Surface Area & Depths

Average end of dry season (May)
Lake Stage = 13.0 ft, NGVD

Possible end of 2008 dry season
Lake Stage = 7.0 ft, NGVD

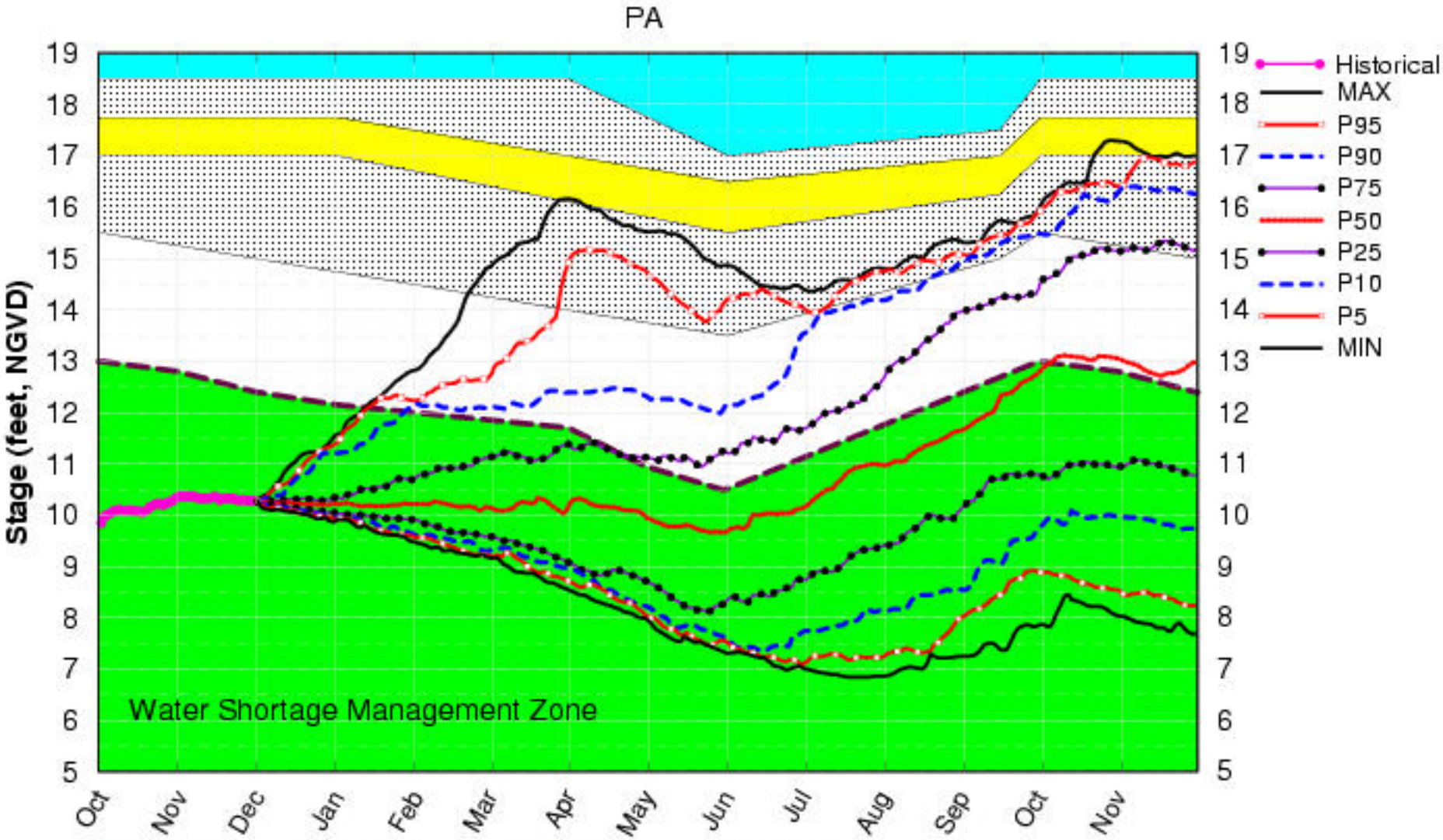


Lake Surface Area
652 sq.miles (90%)

Lake Surface Area
444 sq.miles (60%)

Questions?

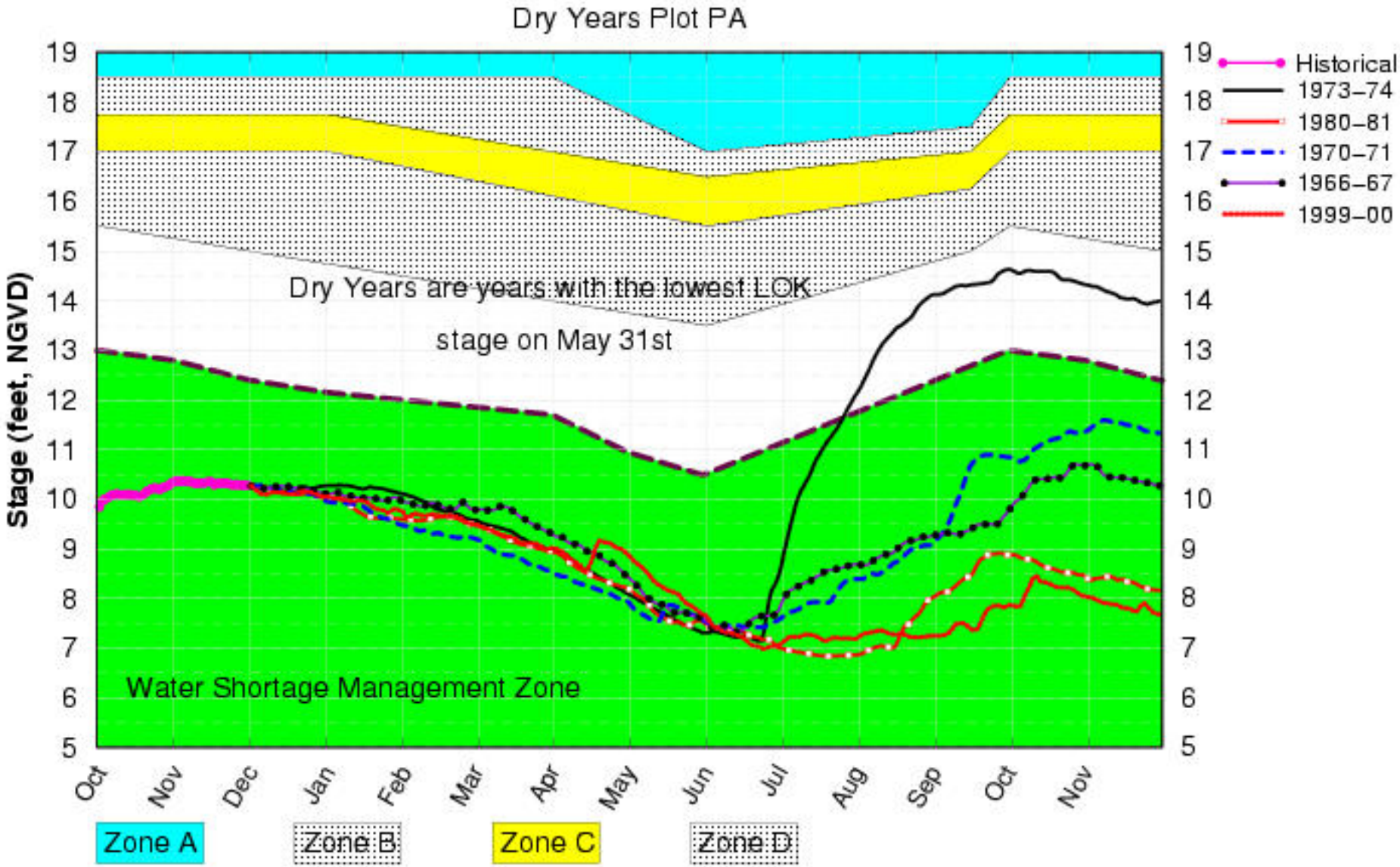
Lake Okeechobee SFWMM December 2007 Position Analysis



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

Fri Dec 7 08:15:58 2007

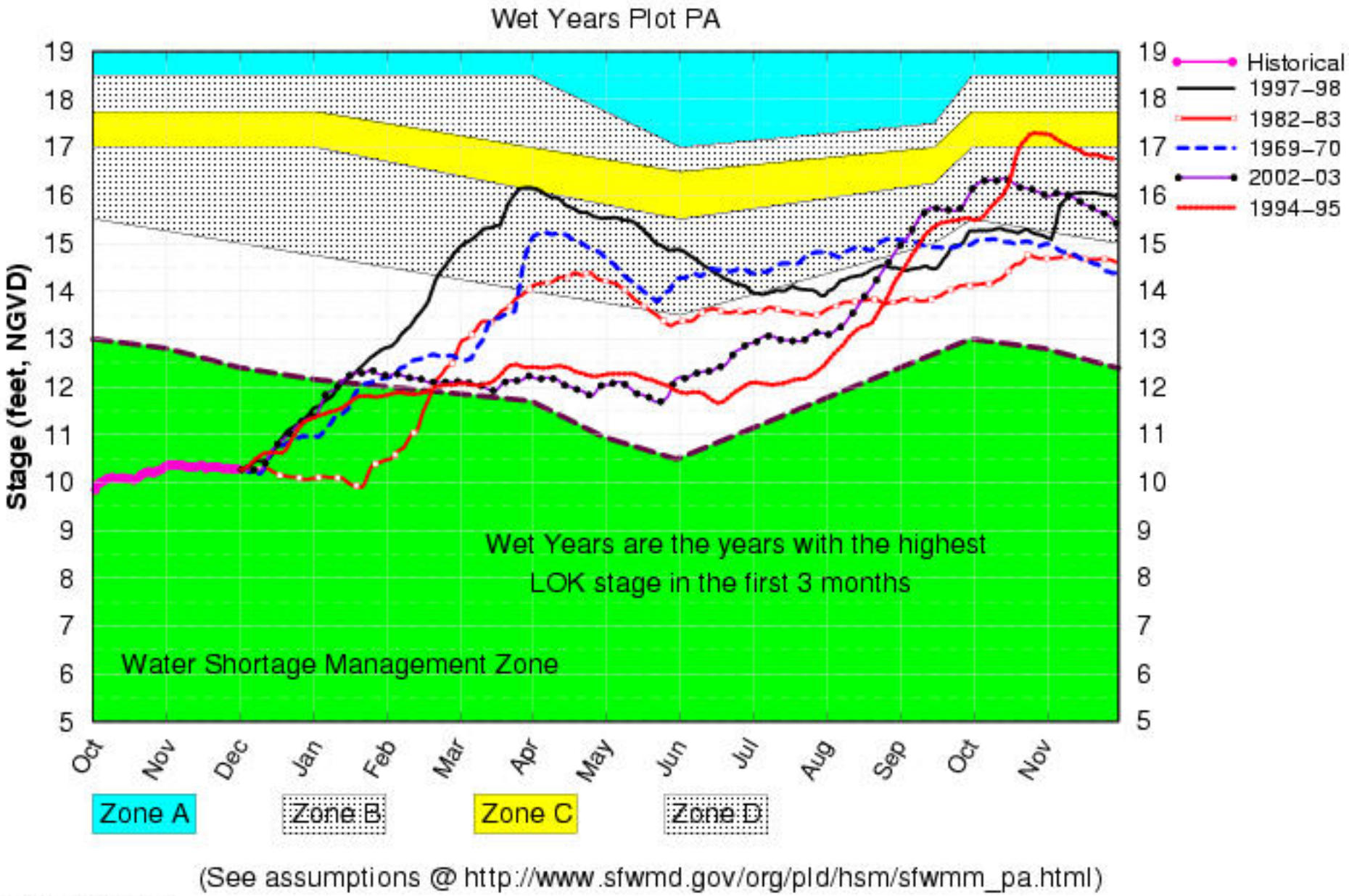
Lake Okeechobee SFWMM December 2007 Position Analysis



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

Fri Dec 7 08:16:19 2007

Lake Okeechobee SFWMM December 2007 Position Analysis

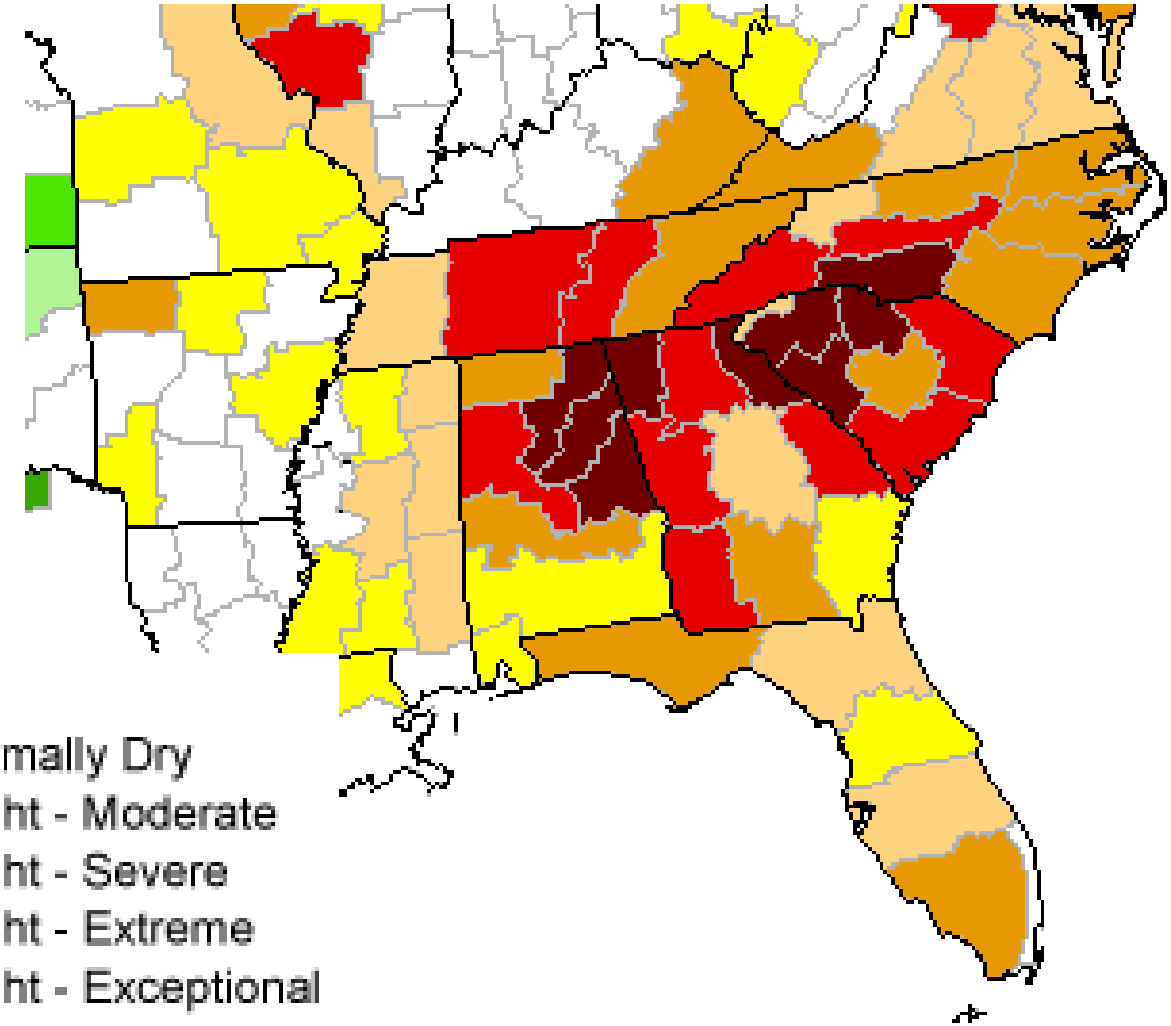


(See assumptions @ http://www.sfwmd.gov/org/pld/hsm/sfwmm_pa.html)

Fri Dec 7 08:16:20 2007

Long-Term Drought Outlook

December 1, 2007



Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

NWS / NCEP
Climate
Prediction
Center

NESDIS
National
Climatic
Data Center

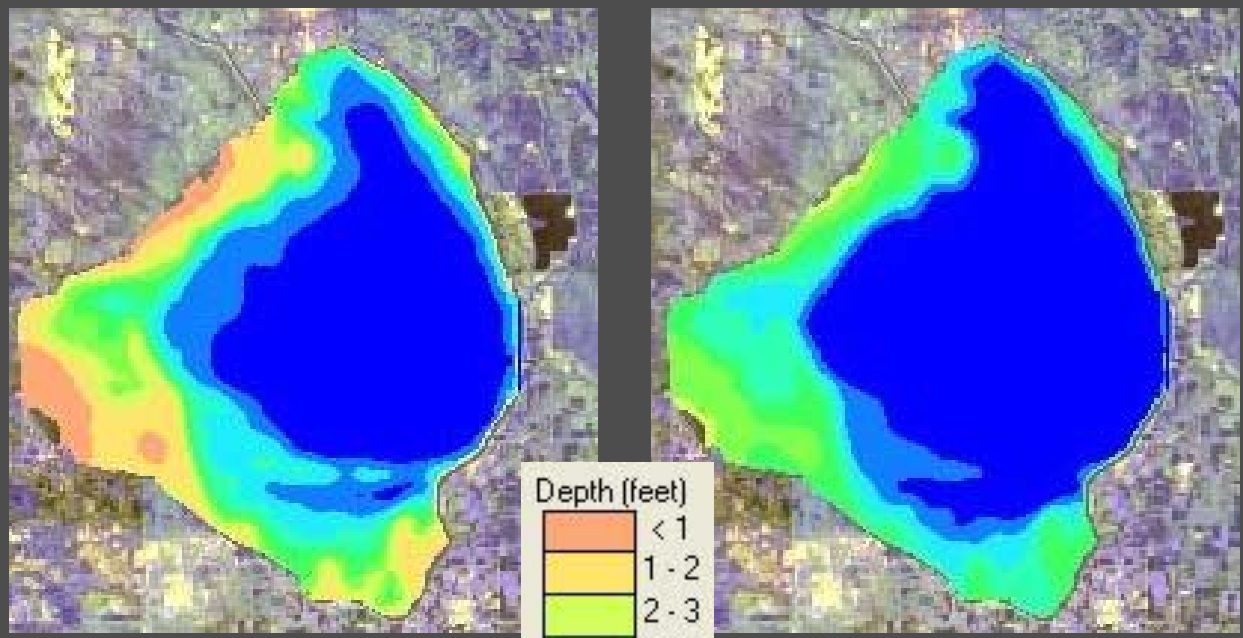
http://www.cpc.ncep.noaa.gov/products/predictions/tools/edb/lbfinal.gif

Lake Okeechobee Water Depth Comparison

http://spatial1.sfwmd.gov/losac/sfwmd.asp

Elevation 14.3 ft, NGVD Long-term Average (1965-2005)

689 sq.mi. (95%)



Elevation 17.0 ft, NGVD H. Wilma Nov-2005

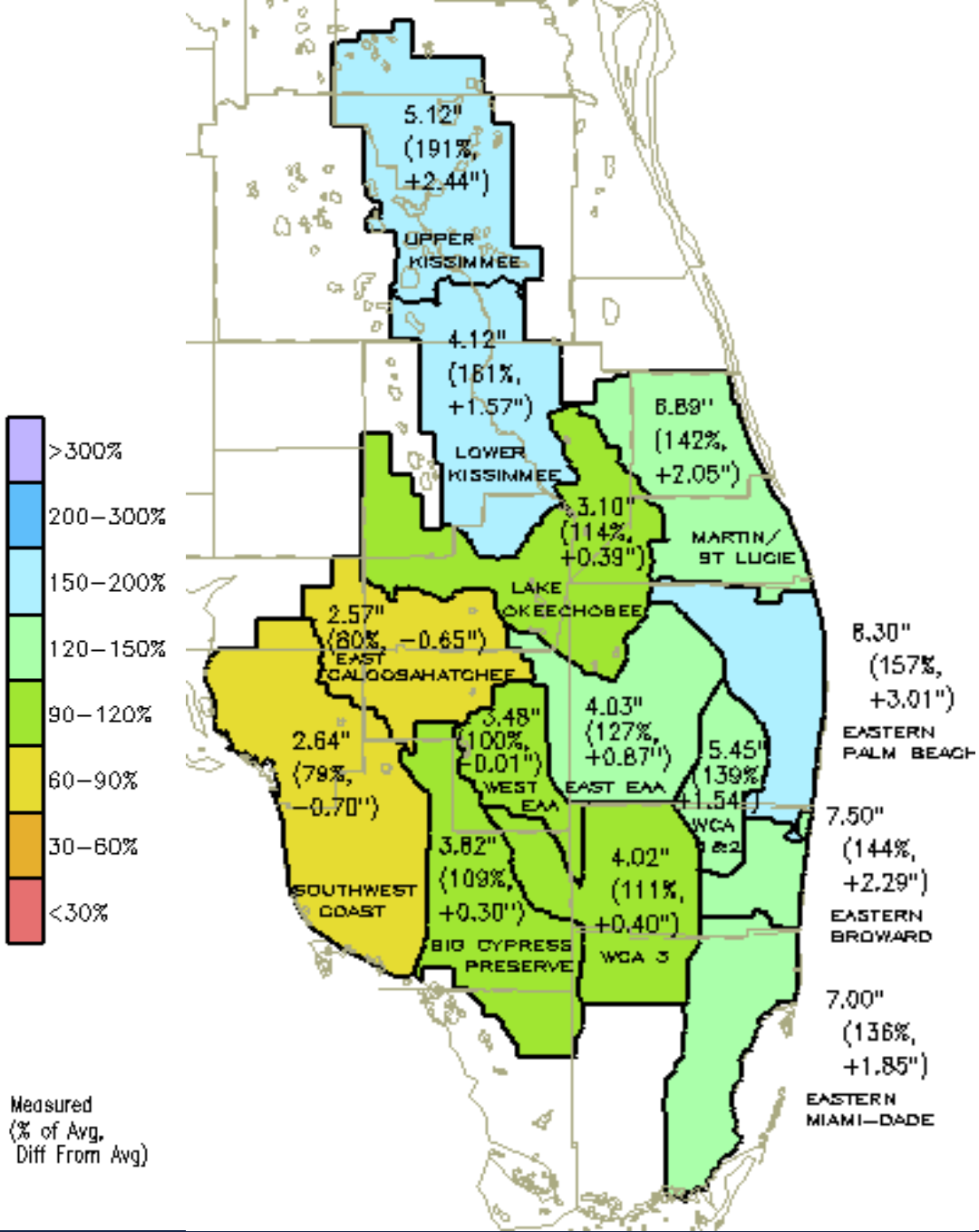
712 sq.mi. (98%)

Elevation 8.82 ft, NGVD Record Low 02-July-2007

463 sq.mi. (64%)

Elevation 10.1 ft, NGVD 08-Oct-2007

497 sq.mi. (68%)



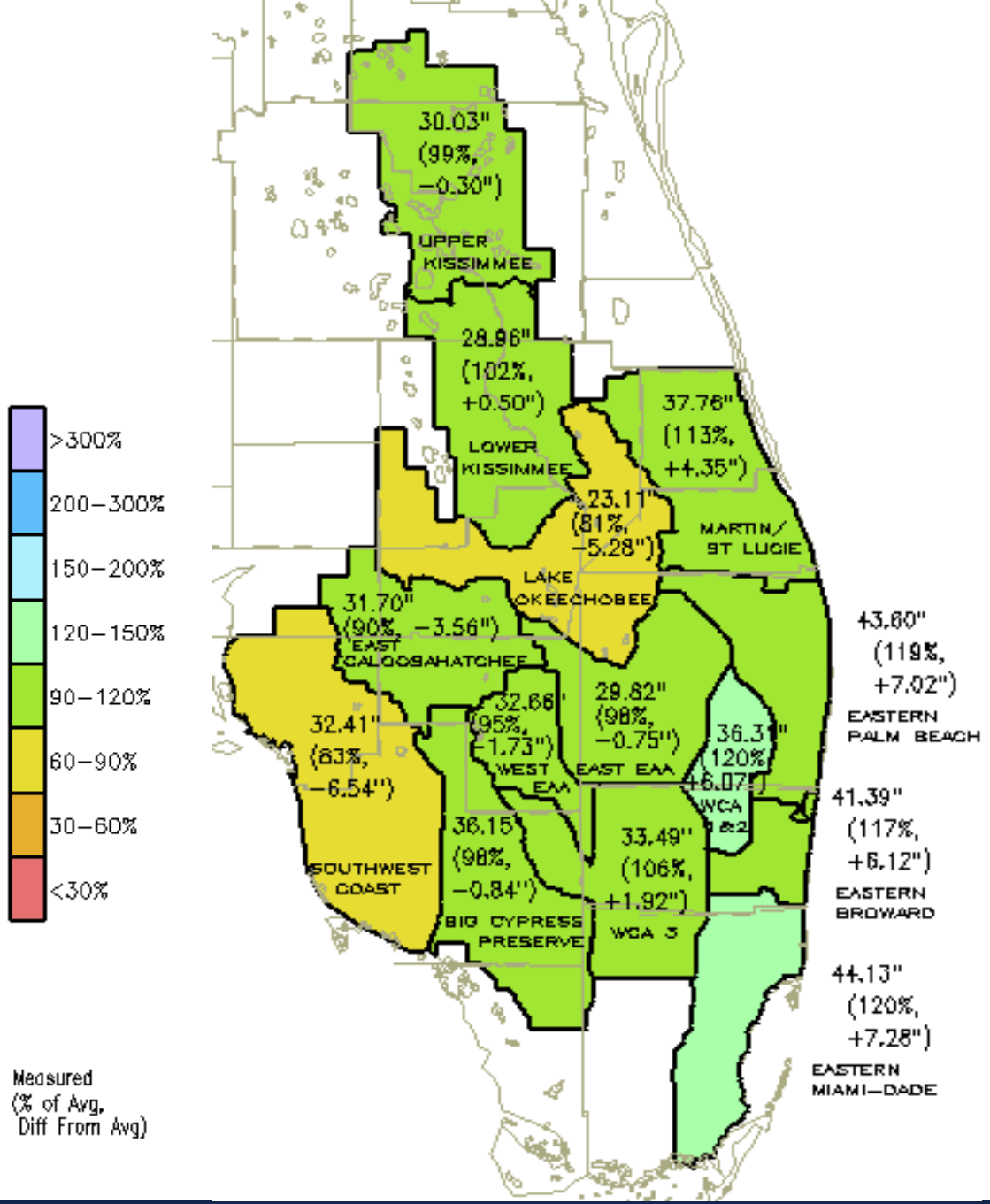
SFWMD 2007
October Rainfall
Oct 2nd – Oct 30th

DISTRICT-WIDE:
4.52” (129%, +1.0”)

Average October
= 3.76”

Above-Average October Rain in all basins except:

- *Caloosahatchee*
- *Southwest Coast*



SFWMD 2007

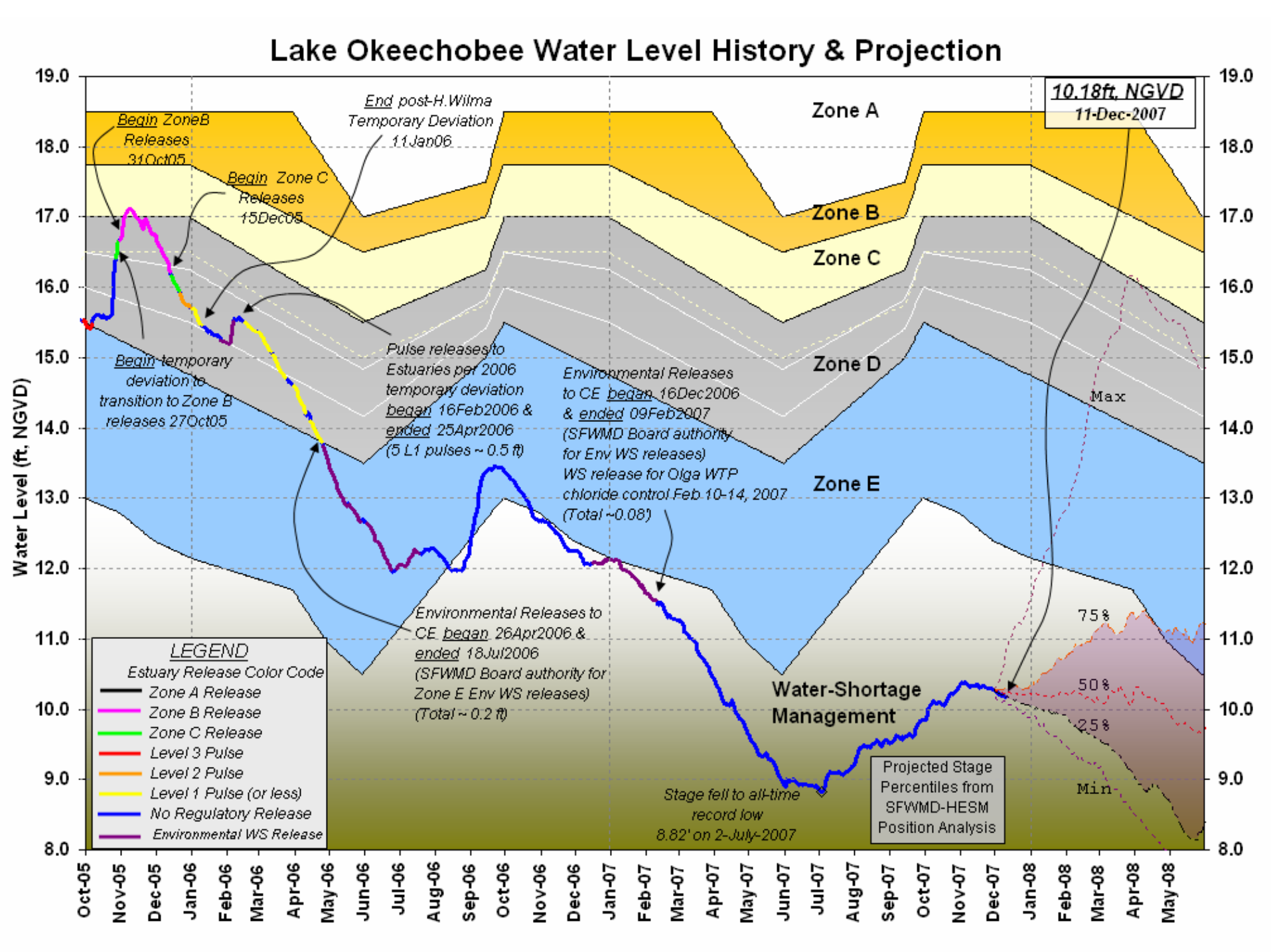
Wet Season Rainfall

02-Jun to 30-Oct

DISTRICT-WIDE:
33.23” (101%, +0.26”)

Average Wet Season
= 33.2”

- *Lake O. & Southwest Coast 5”-7” below-average*
- *Year-to-date 6.4” deficit District-wide*
- *Need ~50% of avg rain for Nov-Dec (4.7”) to avoid breaking all-time record low 2-yr rainfall (1955-56: 84”)*


Lake Okeechobee Water Level History & Projection
Water Level (ft, NGVD)
10.18ft, NGVD
11-Dec-2007
Zone A
Zone B
Zone C
Zone D
Zone E
Begin ZoneB Releases 31Oct05
End post-H.Wilma Temporary Deviation 11Jan06
Begin Zone C Releases 15Dec05
Begin temporary deviation to transition to Zone B releases 27Oct05
Pulse releases to Estuaries per 2006 temporary deviation began 16Feb2006 & ended 25Apr2006 (5 L1 pulses ~ 0.5 ft)
Environmental Releases to CE began 16Dec2006 & ended 09Feb2007 (SFWMD Board authority for Env WS releases) WS release for Olga WTP chloride control Feb 10-14, 2007 (Total ~0.08')
Environmental Releases to CE began 26Apr2006 & ended 18Jul2006 (SFWMD Board authority for Zone E Env WS releases) (Total ~ 0.2 ft)
Water-Shortage Management
Stage fell to all-time record low 8.82' on 2-July-2007
Max
75%
50%
25%
Min
Projected Stage Percentiles from SFWMD-HESM Position Analysis
LEGEND
Estuary Release Color Code
Zone A Release
Zone B Release
Zone C Release
Level 3 Pulse
Level 2 Pulse
Level 1 Pulse (or less)
No Regulatory Release
Environmental WS Release
19.0
18.0
17.0
16.0
15.0
14.0
13.0
12.0
11.0
10.0
9.0
8.0
Oct-05
Nov-05
Dec-05
Jan-06
Feb-06
Mar-06
Apr-06
May-06
Jun-06
Jul-06
Aug-06
Sep-06
Oct-06
Nov-06
Dec-06
Jan-07
Feb-07
Mar-07
Apr-07
May-07
Jun-07
Jul-07
Aug-07
Sep-07
Oct-07
Nov-07
Dec-07
Jan-08
Feb-08
Mar-08
Apr-08
May-08

SFWMD AVERAGE RAINFALL (30 YEAR: 1976-2005)

http://www.sfwmd.gov/org/omd/ops/weather/30yr_rain.html

NORMAL	Upper Kiss	Lower Kiss	Lake O	East EAA	West EAA	Conserv _1_2	Conserv Area_3	Martin/ St. Lucie	Palm Beach	Broward	Dade	East Caloos	BCP	SW Coast	District
JAN	2.38	1.86	2.12	2.19	2.17	2.20	1.91	2.48	3.29	2.34	1.97	2.20	2.21	2.43	2.23
FEB	2.44	2.18	2.06	1.92	1.97	2.34	1.98	2.51	2.82	2.47	2.04	2.04	2.04	2.28	2.19
MAR	3.35	2.98	2.93	2.80	2.85	2.68	2.56	3.80	3.79	2.78	2.66	2.97	2.68	2.86	3.01
APR	2.33	2.18	2.22	2.35	2.42	2.56	2.58	2.84	3.24	3.32	3.18	2.39	2.39	2.40	2.50
MAY	3.55	3.78	3.66	4.30	4.35	4.60	4.42	4.23	5.12	5.35	5.30	3.88	4.21	4.04	4.19
JUN	7.41	7.07	6.77	7.21	8.44	7.28	8.22	6.69	8.10	8.91	8.94	8.85	9.49	9.72	8.03
JUL	6.88	6.35	5.96	6.38	7.34	6.08	6.48	6.50	6.38	6.04	6.13	7.58	8.09	8.76	6.83
AUG	7.21	6.48	6.66	7.09	8.10	6.60	7.12	7.58	7.74	7.41	8.29	8.30	8.35	8.90	7.54
SEP	6.15	6.01	6.29	6.73	7.02	6.37	6.13	7.80	9.07	7.70	8.34	7.31	7.54	8.23	7.05
OCT	2.86	2.73	2.90	3.38	3.73	4.18	3.87	5.17	5.66	5.57	5.50	3.44	3.76	3.57	3.76
NOV	2.48	2.18	2.28	2.61	2.37	3.16	2.59	3.59	4.61	3.55	3.14	2.37	2.18	2.17	2.66
DEC	2.65	1.83	1.82	1.86	1.73	1.92	1.65	2.32	2.96	2.21	1.96	1.81	1.81	1.84	2.01
YEAR	49.69	45.63	45.67	48.82	52.49	49.97	49.51	55.51	62.78	57.65	57.45	53.14	54.75	57.20	52.00