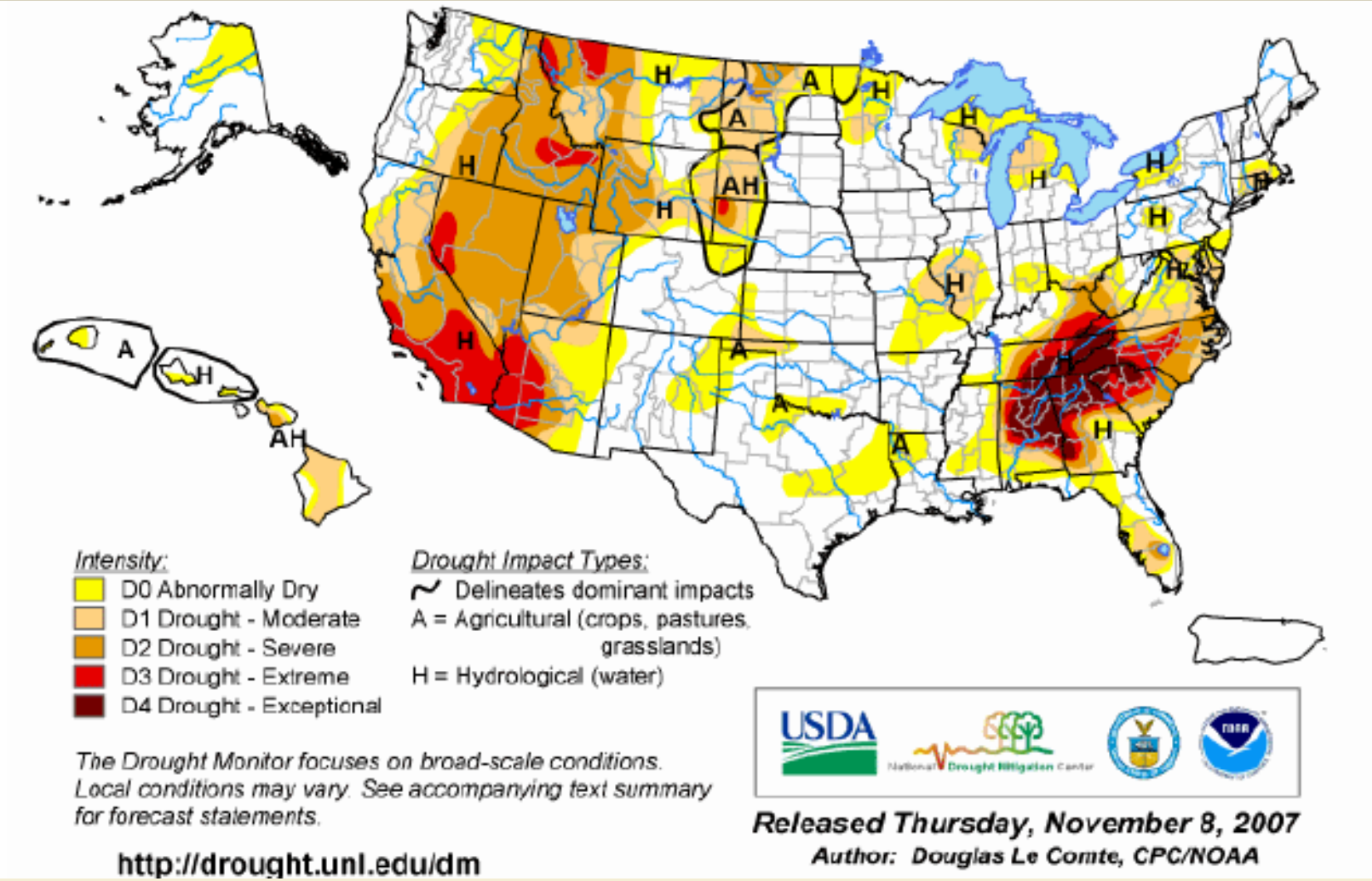
2006-07 Water Shortage

Governing Board
November 14, 2007

Carol Ann Wehle
Executive Director

Nationwide Drought Conditions

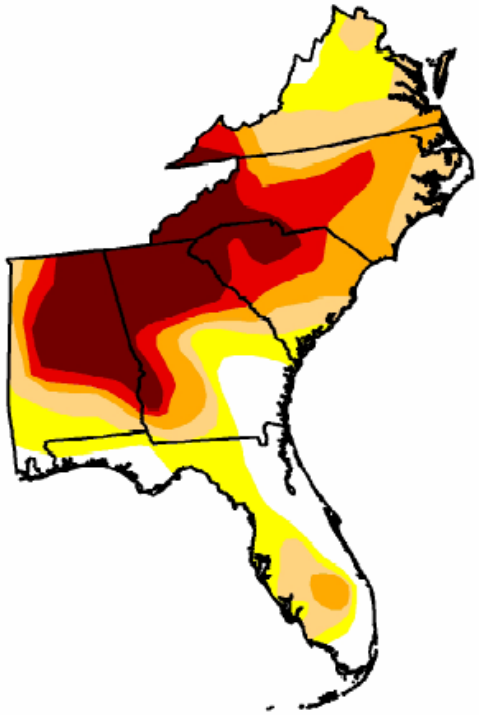


California Drought Conditions

Southeast Drought Conditions

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	13.8	86.2	67.7	48.6	32.7	20.4
Last Week (10/30/2007 map)	14.8	85.2	66.7	46.3	31.3	18.5
3 Months Ago (08/14/2007 map)	2.4	97.6	84.7	55.2	31.3	18.8
Start of Calendar Year (01/02/2007 map)	52.2	47.8	10.2	1.5	0.0	0.0
Start of Water Year (10/02/2007 map)	10.1	89.9	77.9	63.8	45.2	24.0
One Year Ago (11/07/2006 map)	53.6	46.4	20.0	0.0	0.0	0.0



Intensity:

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

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

http://drought.unl.edu/dm

Released Thursday, November 8, 2007

Author: Douglas Le Comte, CPC/NOAA

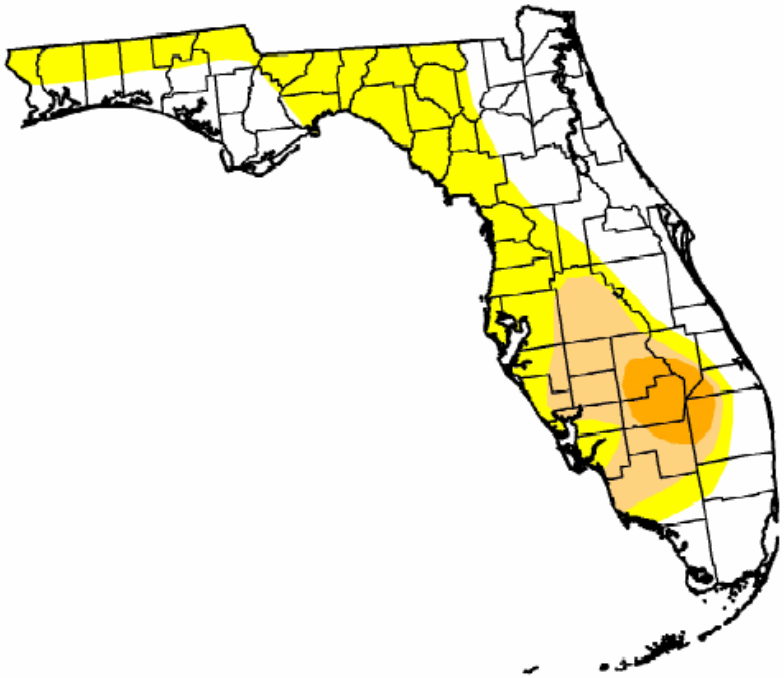
Tennessee Drought Conditions

Georgia Drought Conditions

Florida Drought Conditions

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	45.3	54.7	17.4	4.6	0.0	0.0
Last Week (10/30/2007 map)	45.3	54.7	17.4	4.6	0.0	0.0
3 Months Ago (08/14/2007 map)	12.2	87.8	72.2	27.6	10.2	0.8
Start of Calendar Year (01/02/2007 map)	1.2	98.8	47.8	7.4	0.0	0.0
Start of Water Year (10/02/2007 map)	20.8	79.2	44.2	22.0	9.1	0.0
One Year Ago (11/07/2006 map)	22.0	78.0	49.1	0.0	0.0	0.0



Intensity:

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

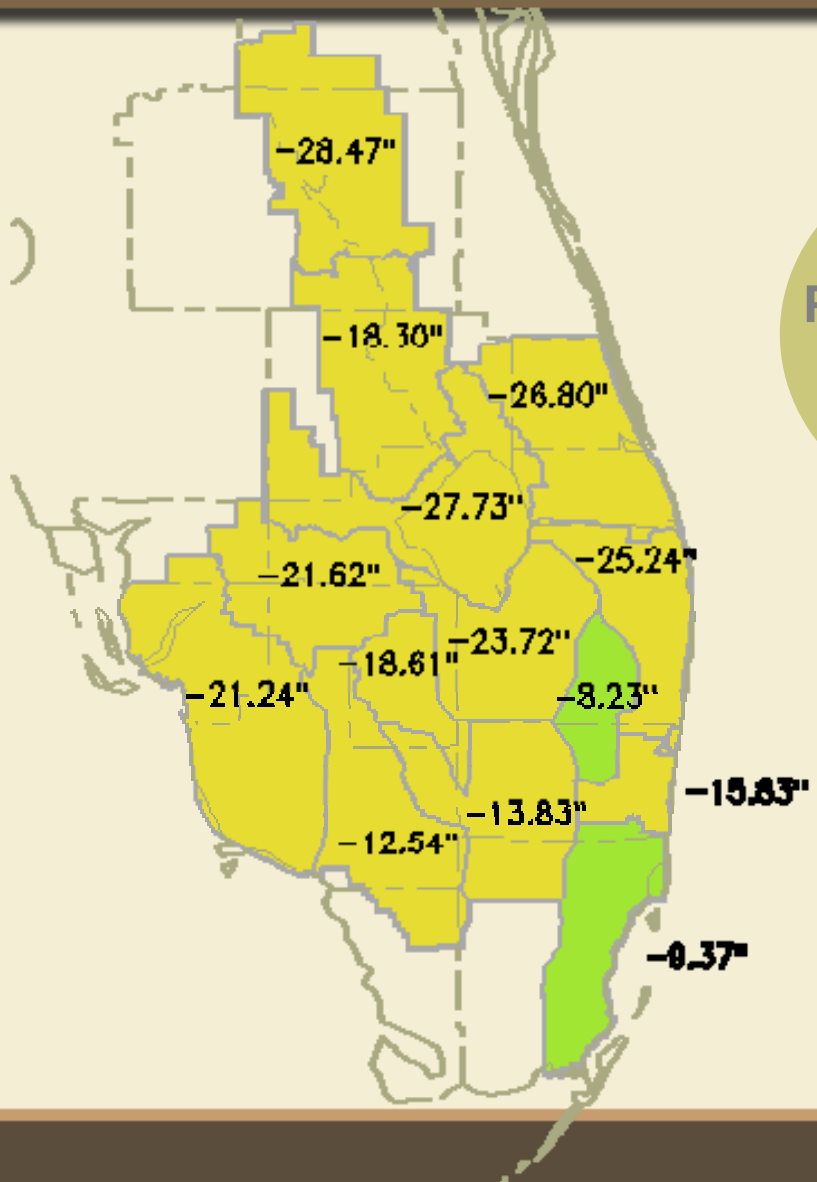
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

http://drought.unl.edu/dm

Released Thursday, November 8, 2007

Author: Douglas Le Comte, CPC/NOAA

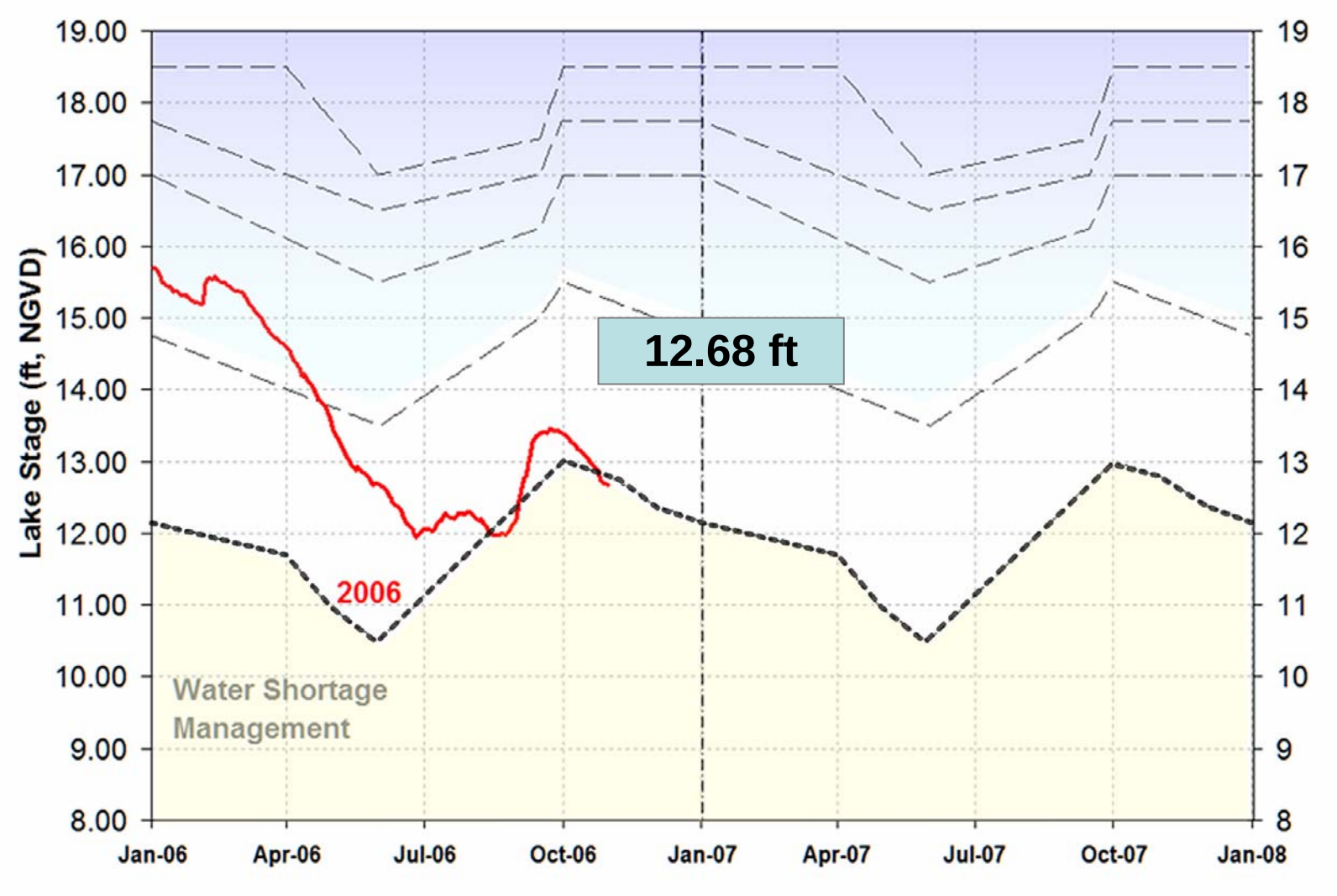
SFWMD: Two-Year Rainfall Deficit



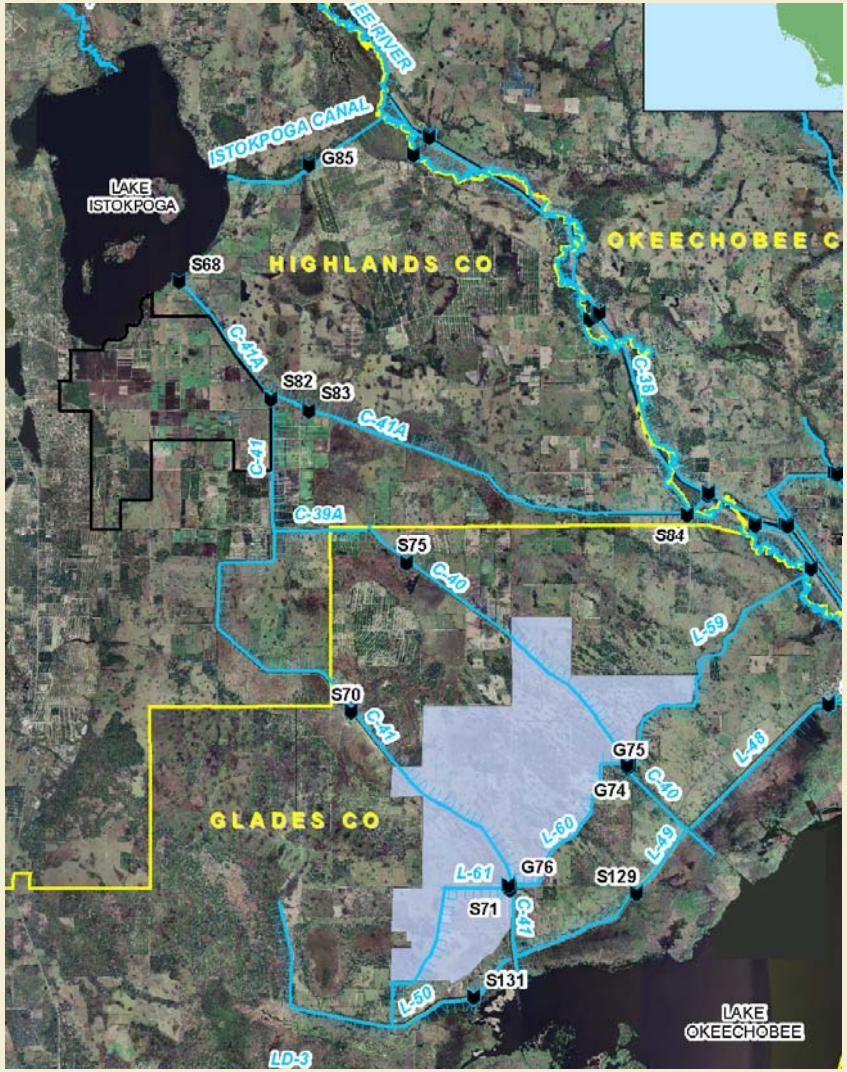
Rainfall Deficit
11/05 - 10/07

Water Shortage Emergency Actions

Lake Okeechobee Levels – October 2006

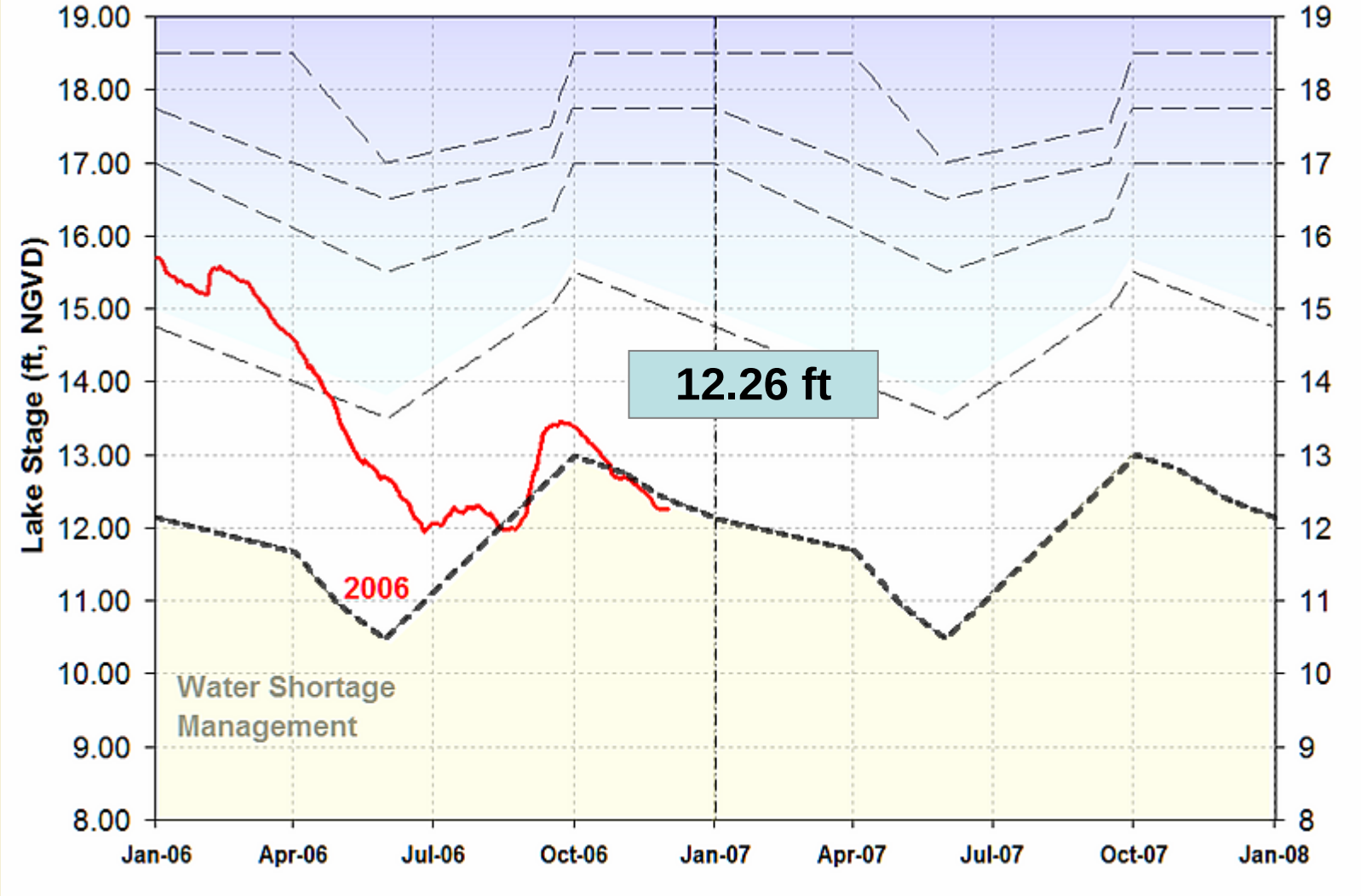


October 2006 Water Shortage Actions



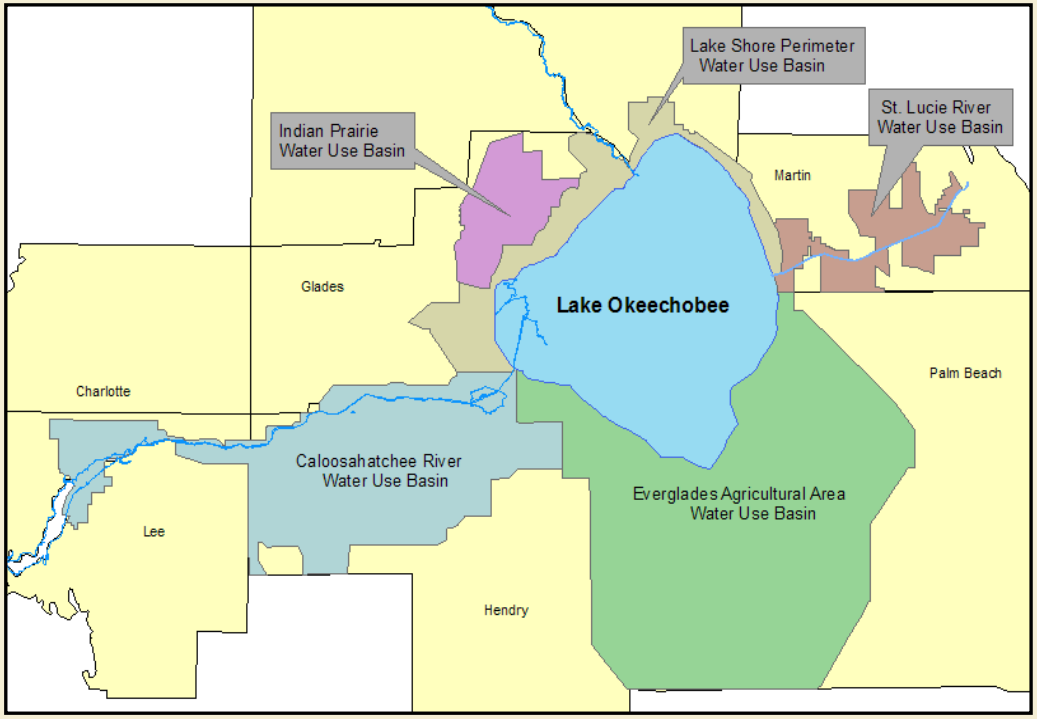
- Water Shortage Emergency Order issued for Lake Istokpoga and Indian Prairie
- Terminates water use if levels fall below canal minimums

Lake Okeechobee Levels – November 2006



November 2006 Water Shortage Actions

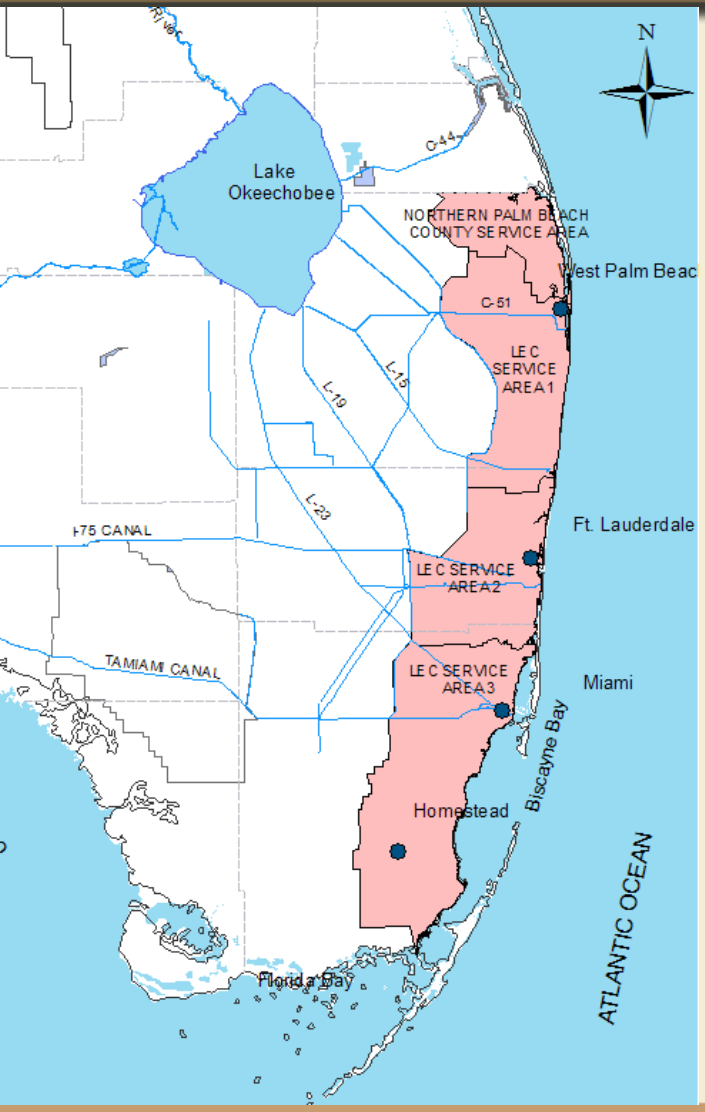
- Water Shortage Order mandates cutbacks within the Lake Okeechobee Service Area
- 15% cutback of 1-in-10 year irrigation demands



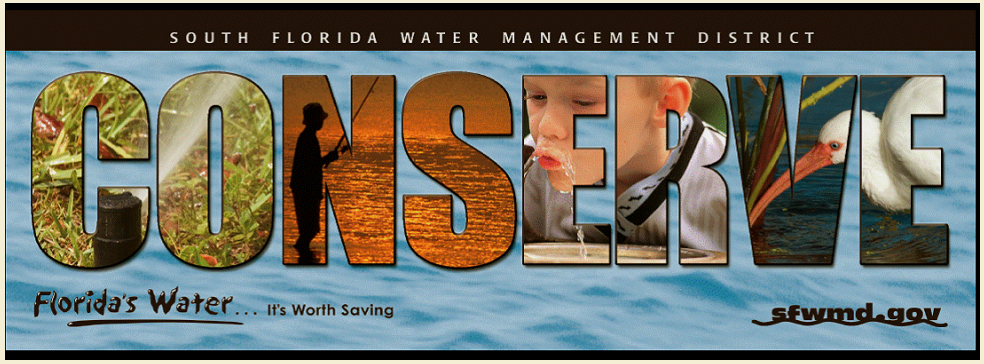
2001 Lessons Learned:

- Revised water allocation method coordinated with agricultural water users
- Larger, more predictable weekly allocations of irrigation water

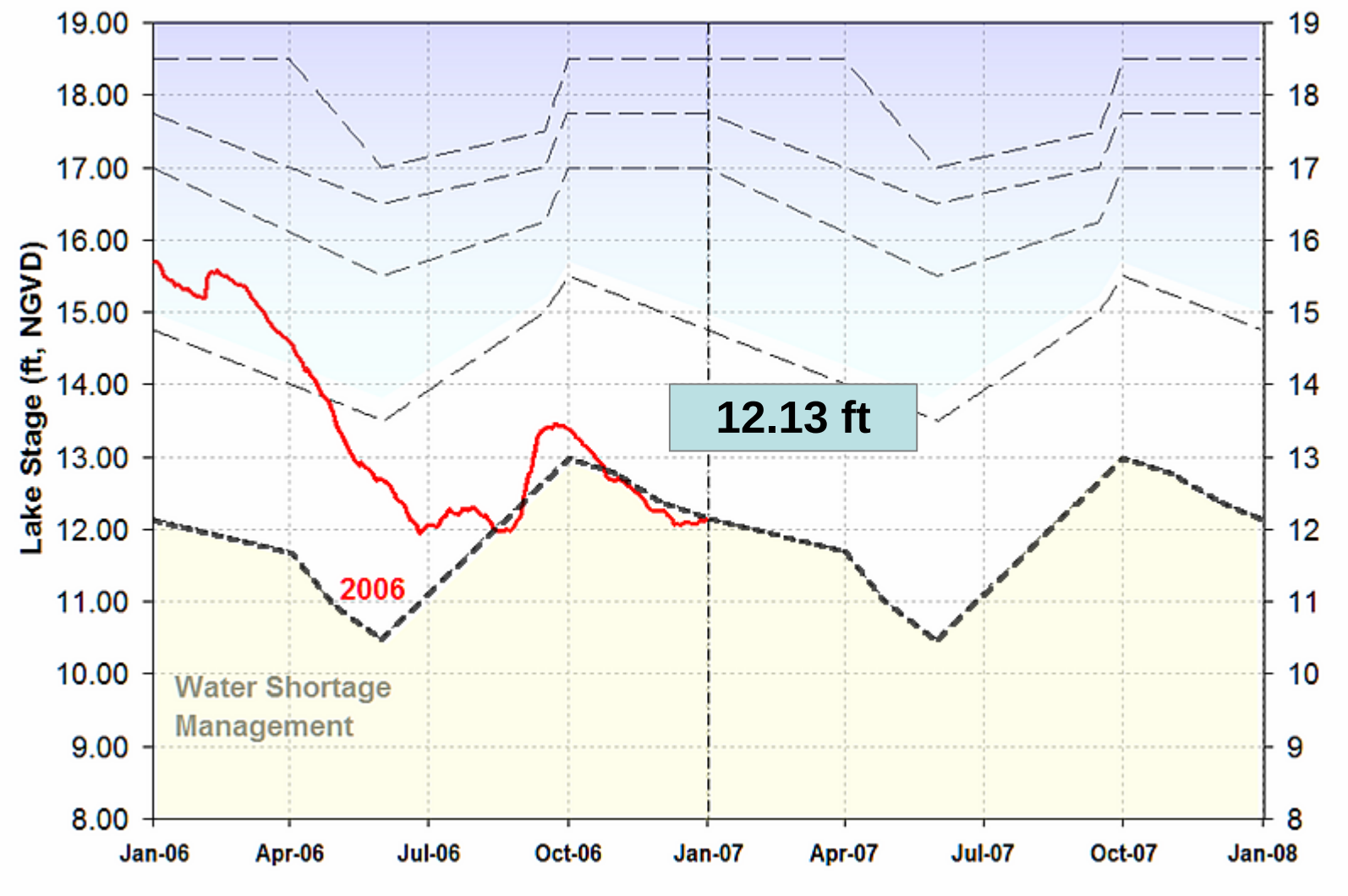
November 2006 Water Shortage Actions



- Water Shortage Warning issued for Lower East Coast
- Public messaging for voluntary reductions in water use
- Stepped up water conservation efforts



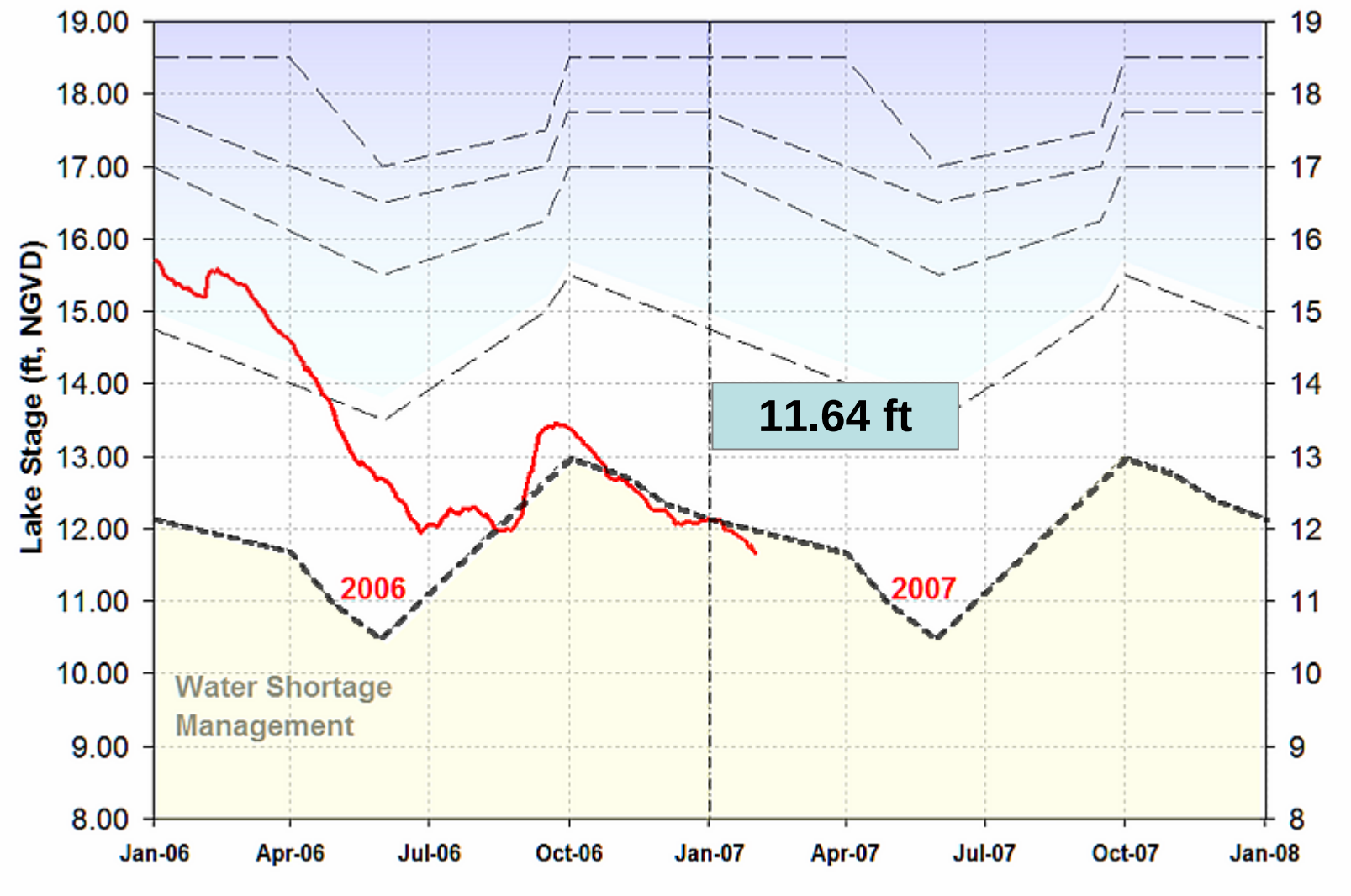
Lake Okeechobee Levels – December 2006



December 2006 Water Shortage Actions

- 14 temporary forward pumps procured for future emergency use at Lake Okeechobee
- Water Shortage Order to coordinate water deliveries for agricultural users & Seminole Tribe in Southern Indian Prairie Basin
- Continued small environmental deliveries to Caloosahatchee Estuary

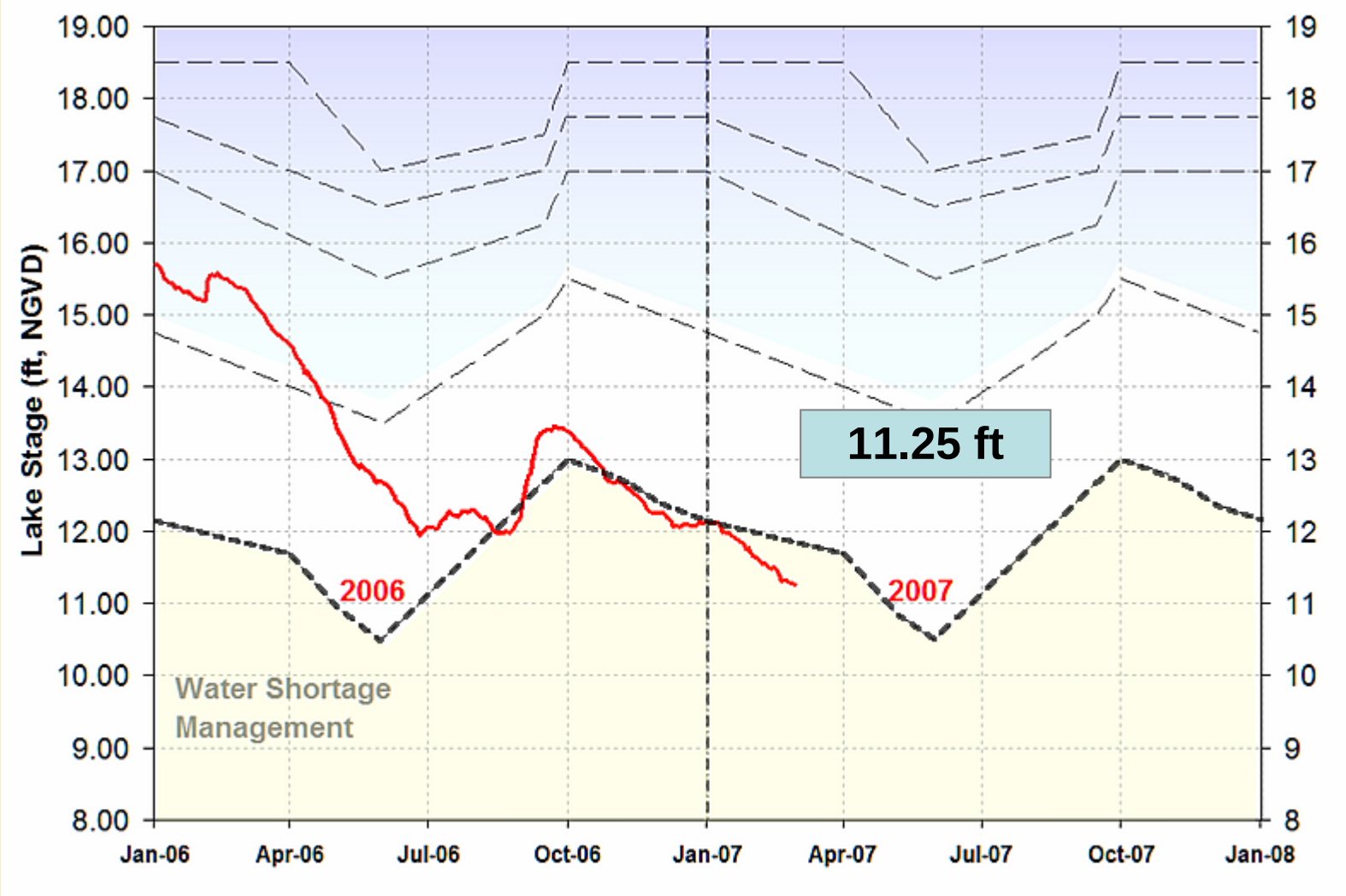
Lake Okeechobee Levels – January 2007



January 2007
Water Shortage Actions

- Extensive public communications
- Ongoing coordination with agricultural representatives
- Weekly water allocations posted on web for Ag water users
- Outreach campaigns with water utilities and the Florida Nursery Growers & Landscape Assoc.
- Continuing news releases

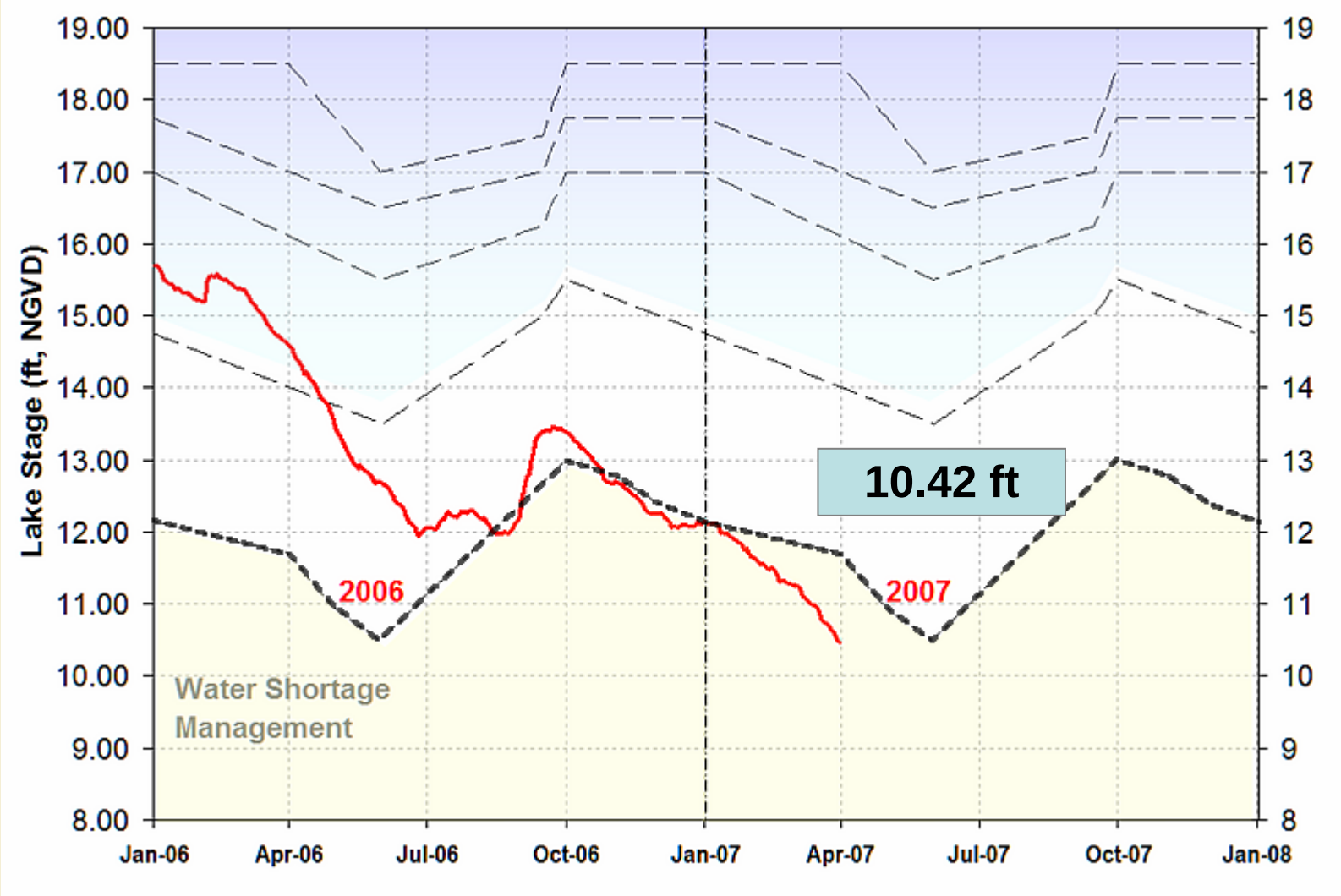
Lake Okeechobee Levels – February 2007



February 2007 Water Shortage Actions

- Public workshops for marina and business owners in Okeechobee & Clewiston
- Coordinated navigation lock restrictions with the Army Corps of Engineers
- Low lake environmental enhancements planned
- Continued coordination with water user groups and extensive public messaging

Lake Okeechobee Levels – March 2007



March 2007
Water Shortage Actions

- District Emergency Operations Center fully activated
- Over the next four months, more than 300 staff members assigned water shortage emergency duties

March 2007
Water Shortage Actions

- **Instituted 20+ specialized drought management teams**

- District Enforcement
- Local Government Enforcement
- Utility Issues
- 298 Special District Issues
- Fish Kills/Canals
- Navigation & Shoaling
- Lake Istokpoga/Tribe
- Variances
- Upper East Coast Canals
- L-8 Water Potential/DEP Variances
- Media/Outreach
- Agriculture Allocation Team
- State EOC & County Coordination
- WCA Deviations
- Lake Istokpoga Deviation
- Reuse/Canal Recharge
- Lake Okeechobee Environmental Enhancement
- Economic Impact
- Water Conditions Analysis
- Modeling
- Citizen Information Line
- Research/History
- Stormwater Treatment Areas (STAs)

March 2007
Water Shortage Actions

- Water Shortage Order for the St. Lucie Agricultural Area and C-23, C-24 & C-25 Basins
- 30% cutbacks in irrigation ordered for Lake Okeechobee Service Area
- Three day a week watering and other restrictions ordered for Lower East Coast

March 2007
Water Shortage Actions

- Temporary pumps installed to assist Everglades Agricultural Area growers
  - 14 pumps at three sites

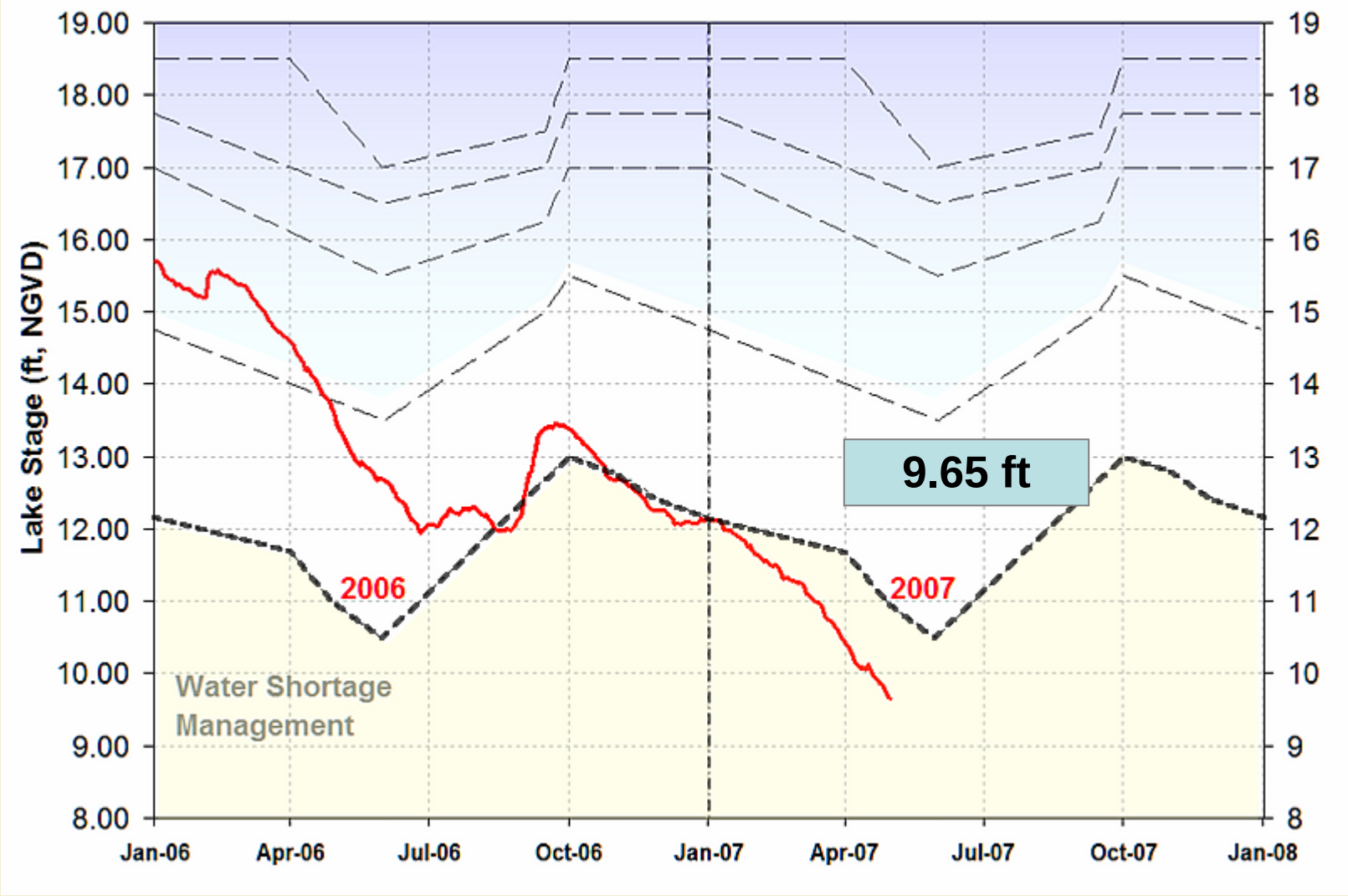
March 2007
Water Shortage Actions

- Deviation requests sent to the U.S. Army Corps for temporary changes to regulation schedules for:
  - Lake Istokpoga
  - Water Conservation Area 1
  - Water Conservation Area 2
- Requests granted June 2007

March 2007
Environmental Enhancement Projects

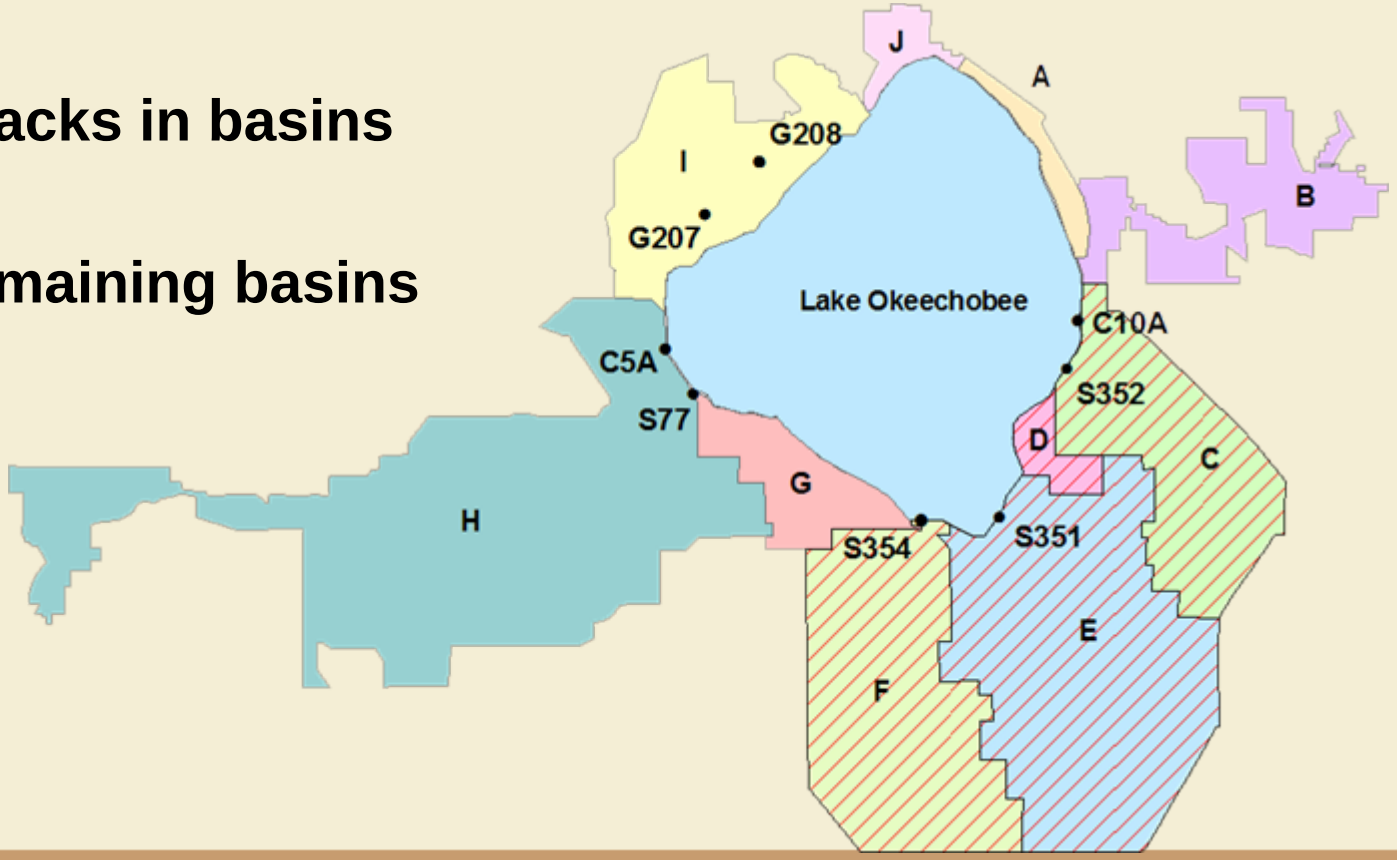
- Lake Okeechobee control burn projects initiated
- 70,000 acres of marsh burned to reduce cattail and torpedo grass
- Planning for additional projects at lower lake stages

Lake Okeechobee Levels – April 2007

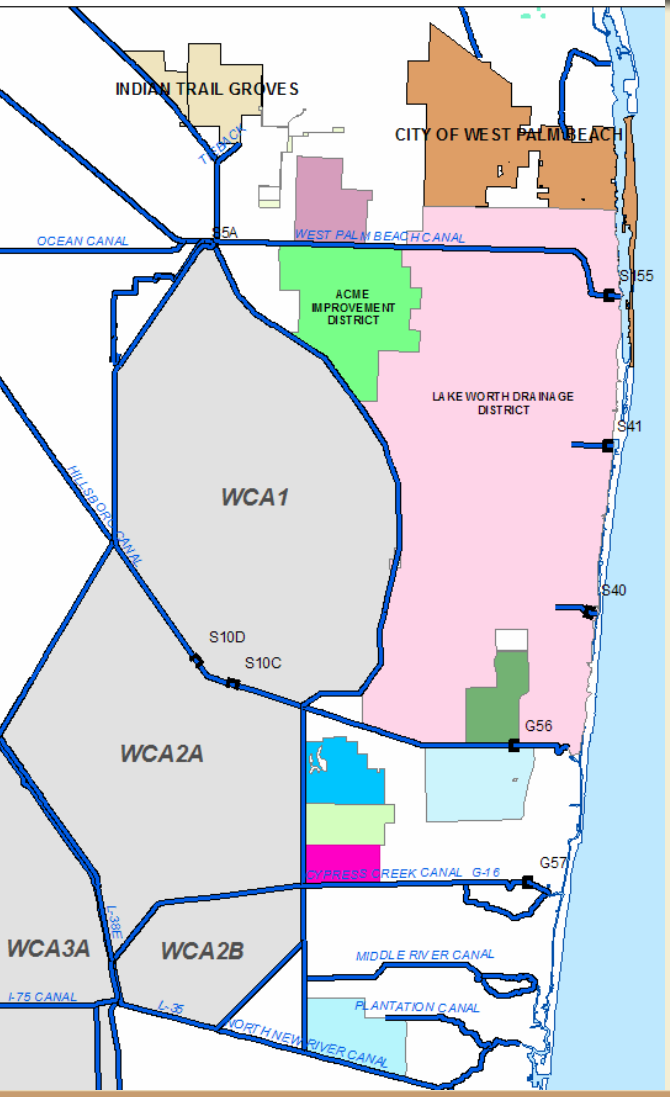


April 2007
Water Shortage Actions

- **Coordinated with agricultural users in Lake Okeechobee Service Area on increased cutbacks**
  - **45% cutbacks in basins C, D, E, F**
  - **30% in remaining basins**



April 2007
Water Shortage Actions



- All water withdrawals from WCAs & regional canals by 298 Districts and other diversion & impoundment permittees are terminated
- Identification of “Utilities at Risk” & “Utilities of Concern”
- Initiated weekly monitoring of pumpage, water levels & chlorides at coastal utilities

April 2007
Water Shortage Actions

Additional Emergency Orders Issued:

- Lower East Coast and Lower West Coast
  - Two day per week lawn watering and other restrictions
- Upper East Coast
  - Three day per week lawn watering and other restrictions
- Istokpoga & Indian Prairie Basins Operational Water Delivery Plan

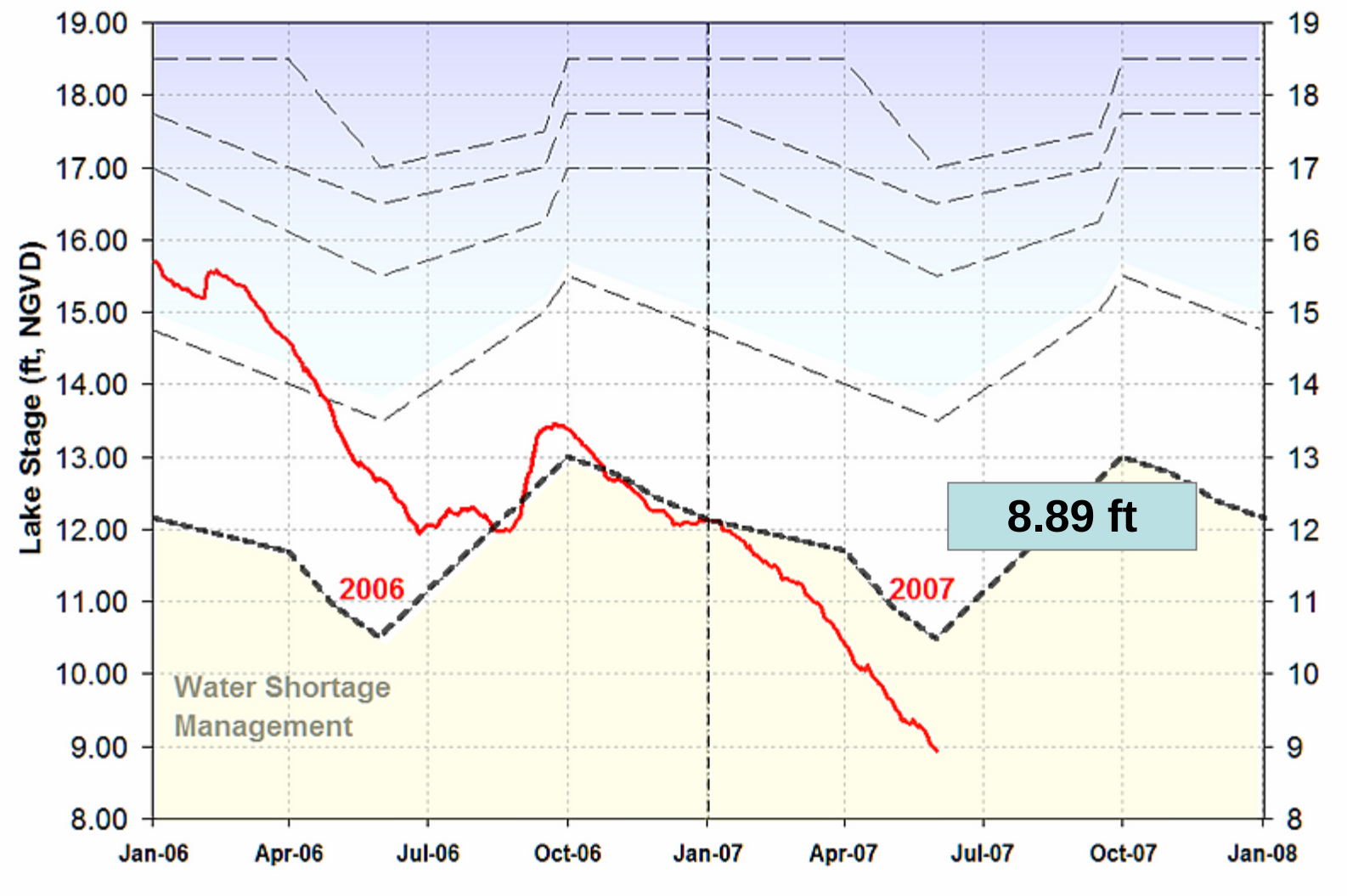
April 2007
Water Shortage Actions

- Emergency authorization provided for agricultural facilities
  - Excavation or deepening of livestock watering holes
  - Deepening of water wells & changes in withdrawal facilities

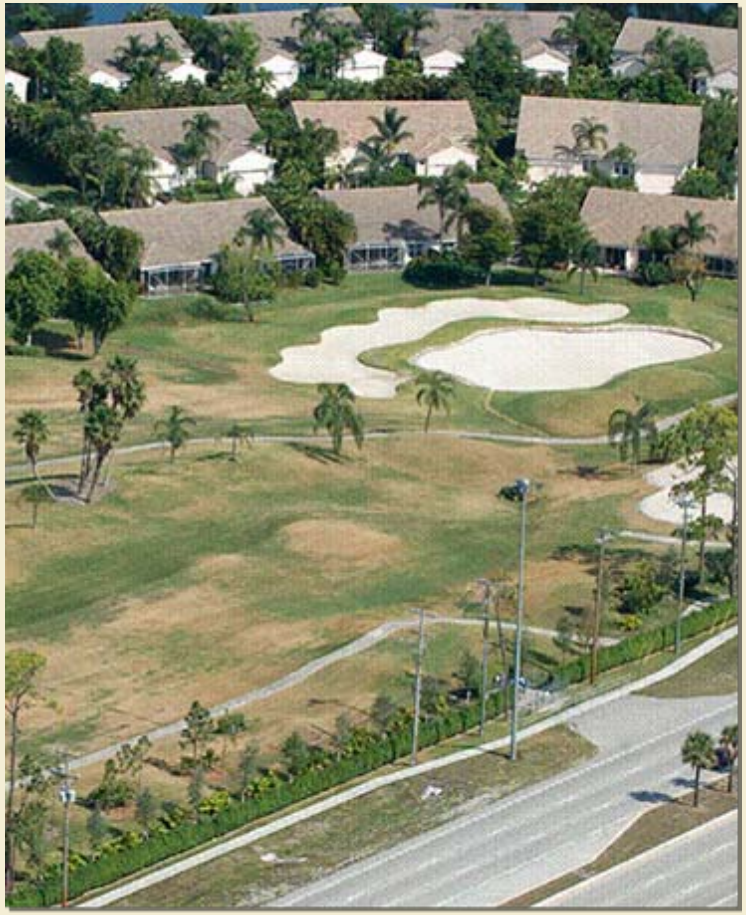
April 2007
Water Shortage Actions

- Citizen Information Line activated – over 23,000 calls
- Aggressive enforcement initiated
- Coordination with local government on water restrictions in urban areas
- "Cop Shops" - training sessions for local law enforcement, utility and code enforcement officers

Lake Okeechobee Levels – May 2007



May 2007
Water Shortage Actions

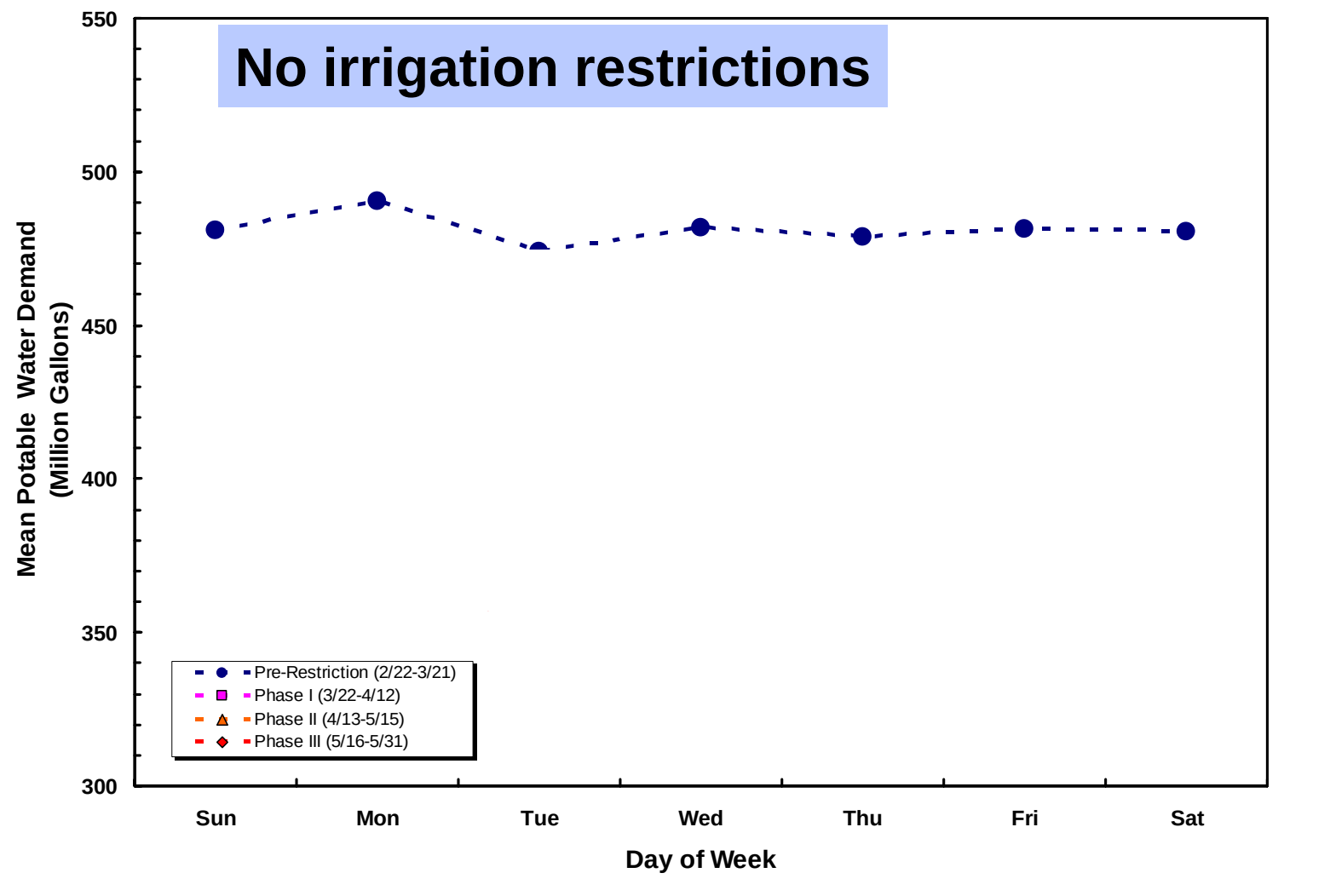


Additional Emergency Orders:

- Increased restrictions in Palm Beach & Broward Counties to one day per week lawn watering
- Continued two days per week water restrictions in Miami-Dade & Florida Keys
- Increased water restrictions to two days per week in St. Lucie and Martin Counties

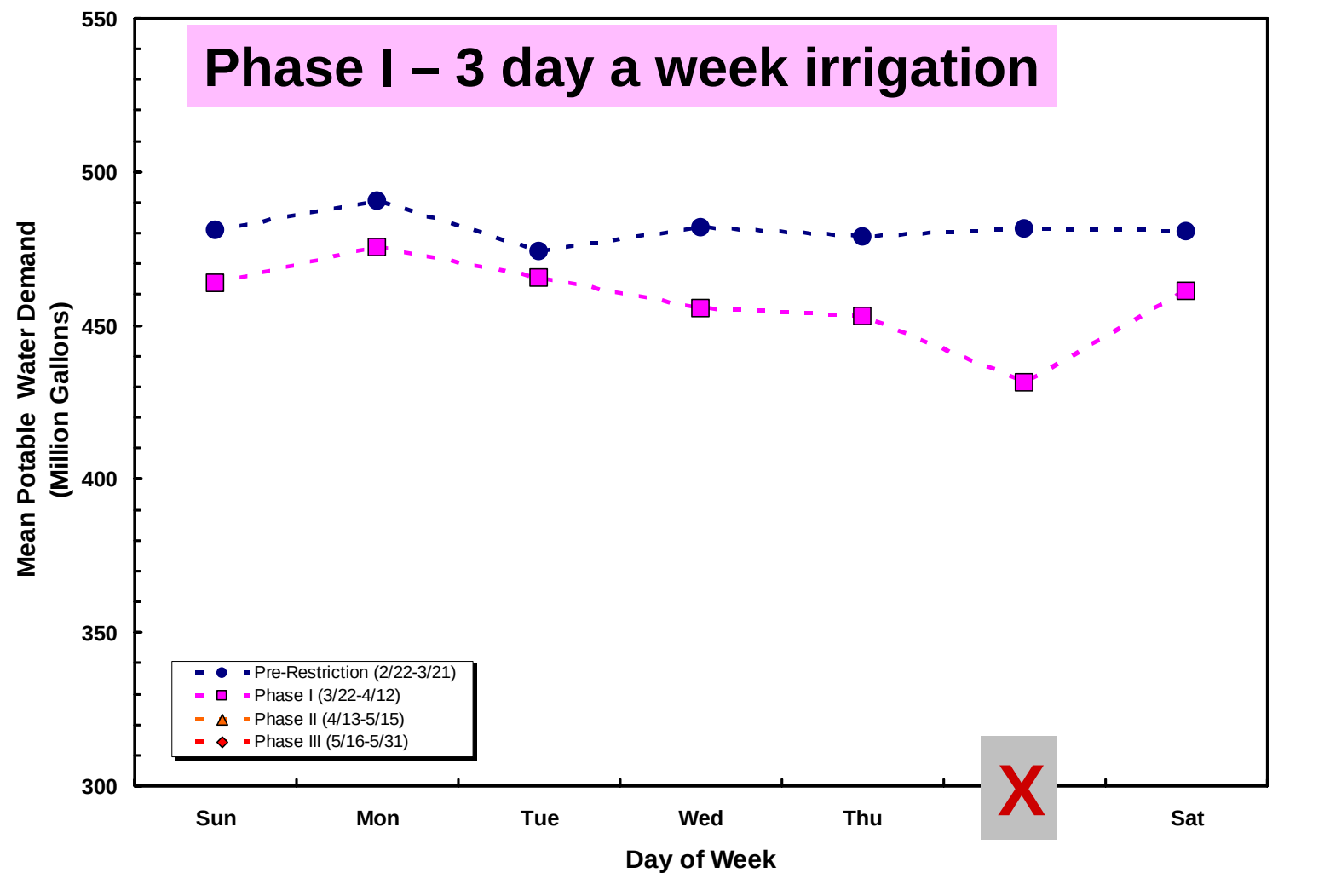
Restriction Effectiveness / Demand Reductions

Potable Water Demand by Day in Palm Beach and Broward Counties (February through May 2007)



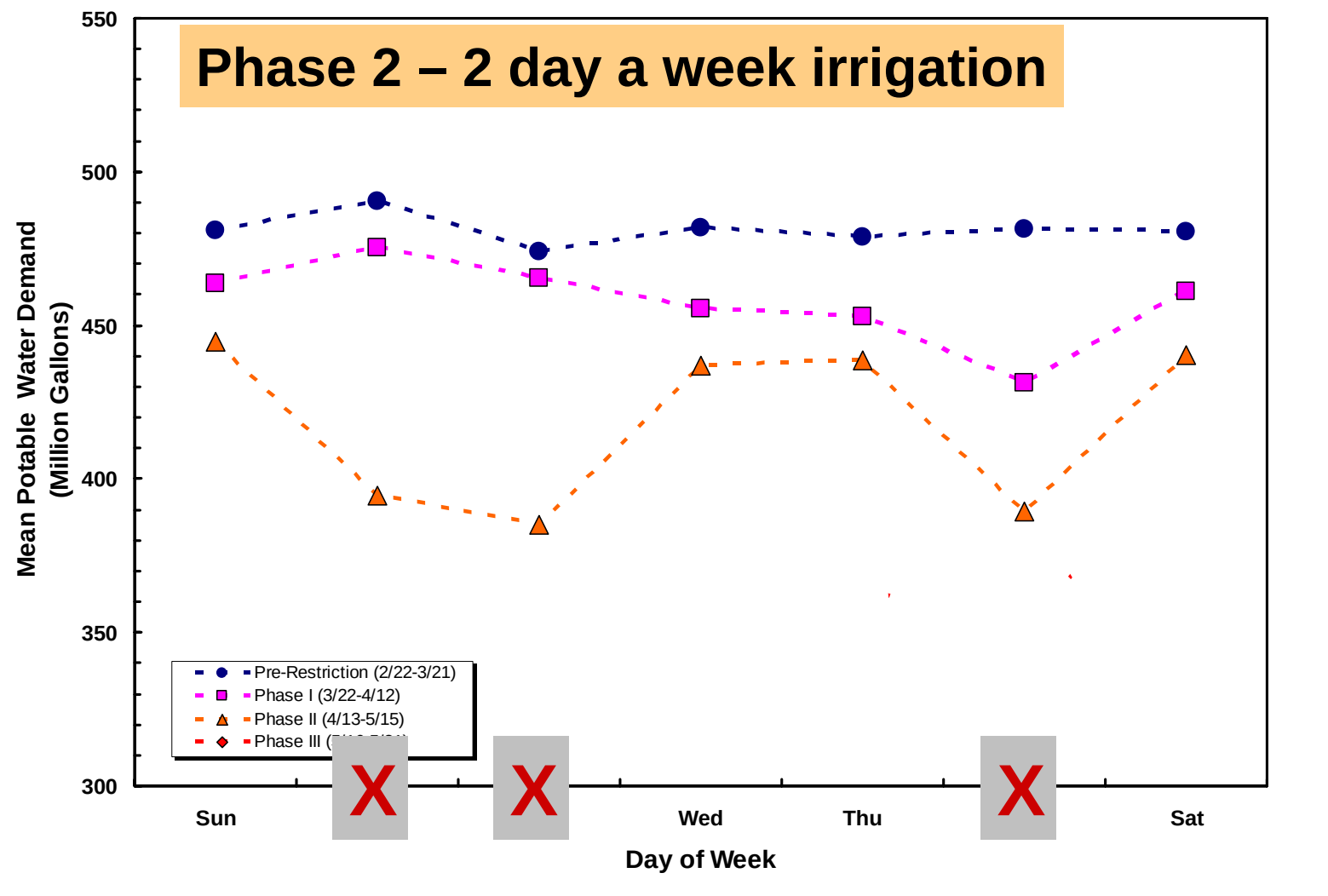
Restriction Effectiveness / Demand Reductions

Potable Water Demand by Day in Palm Beach and Broward Counties (February through May 2007)



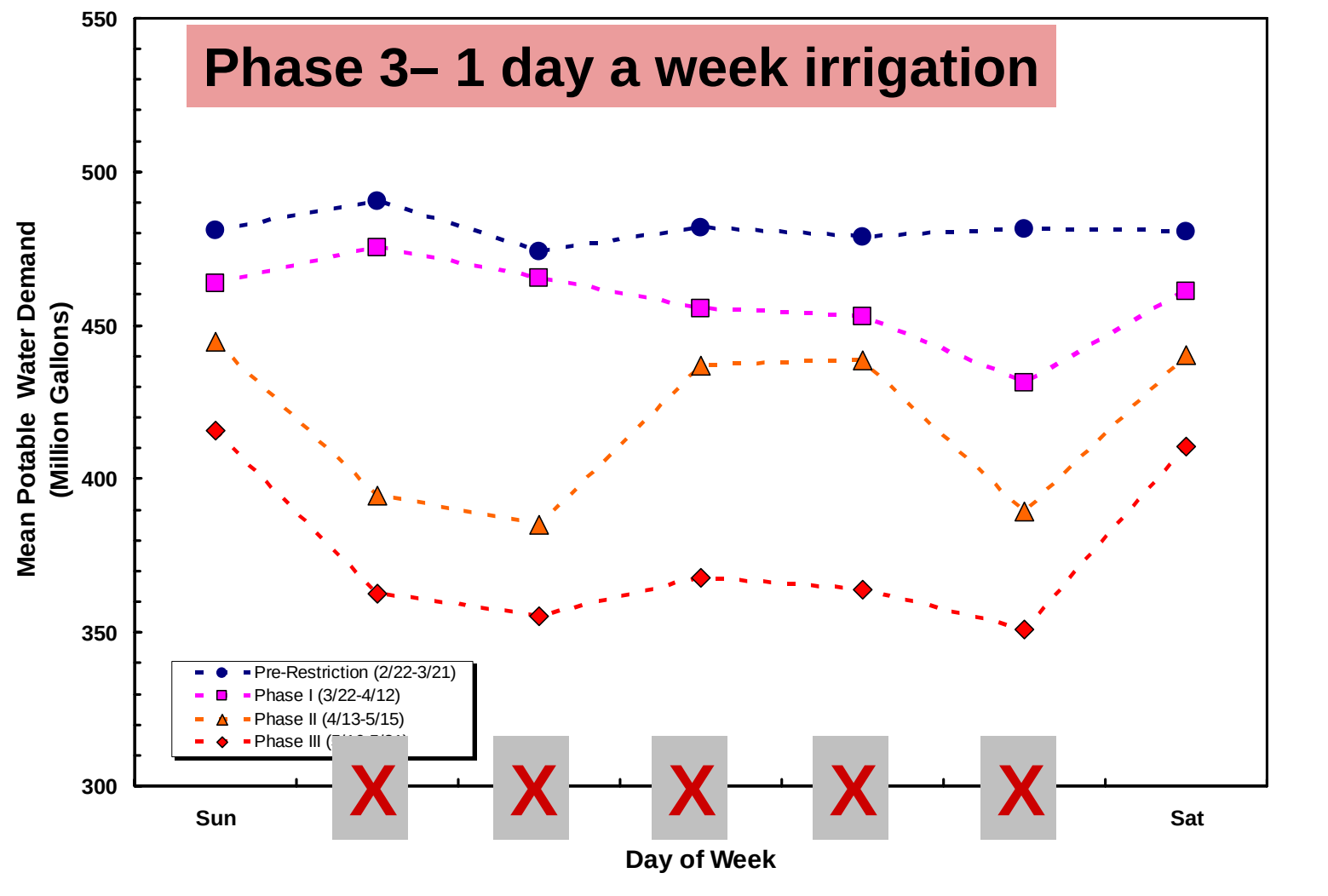
Restriction Effectiveness / Demand Reductions

Potable Water Demand by Day in Palm Beach and Broward Counties (February through May 2007)



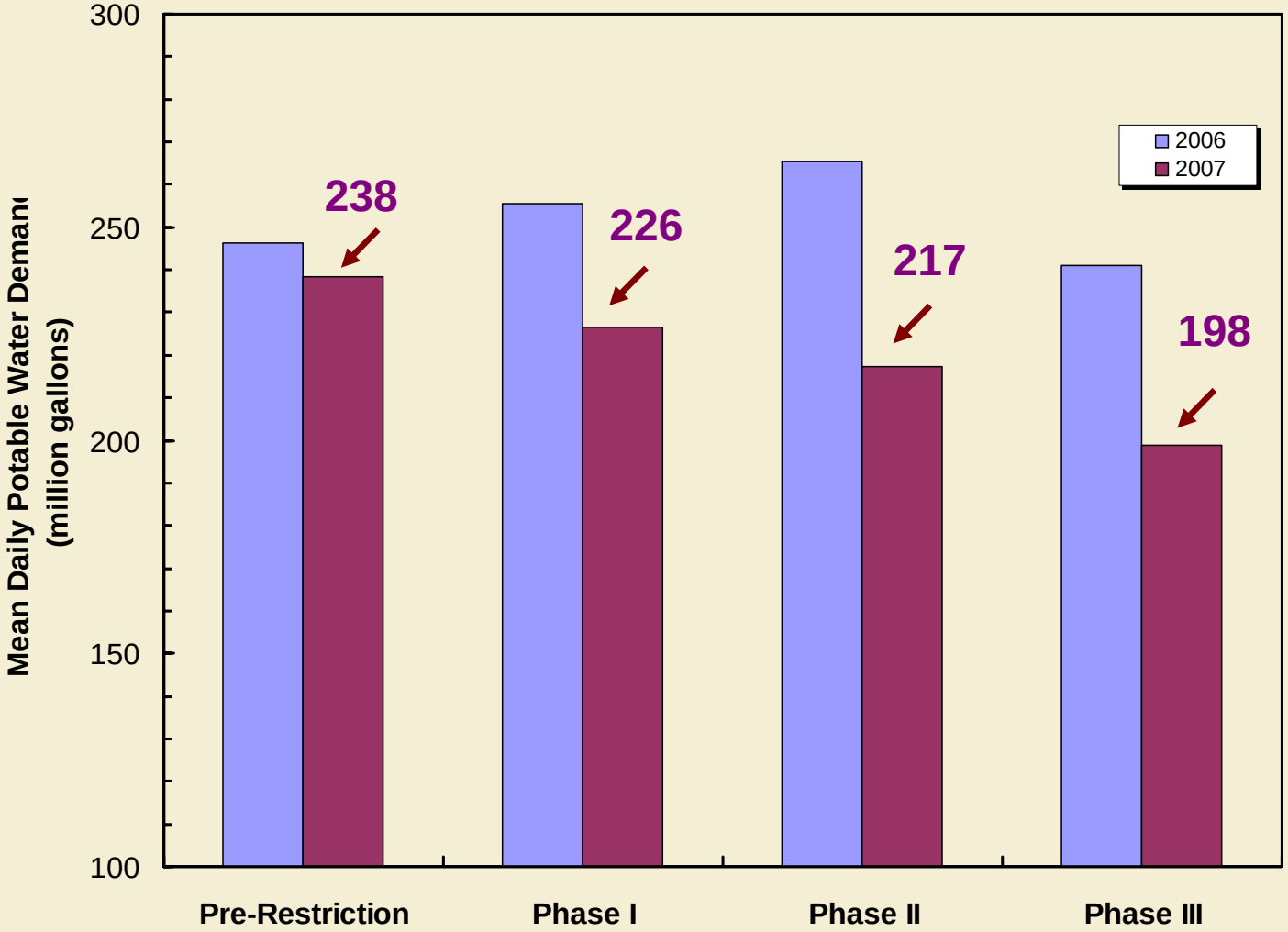
Restriction Effectiveness / Demand Reductions

Potable Water Demand by Day in Palm Beach and Broward Counties (February through May 2007)



Restriction Effectiveness / Demand Reductions
Palm Beach County Water Demand Comparison 2006 and 2007

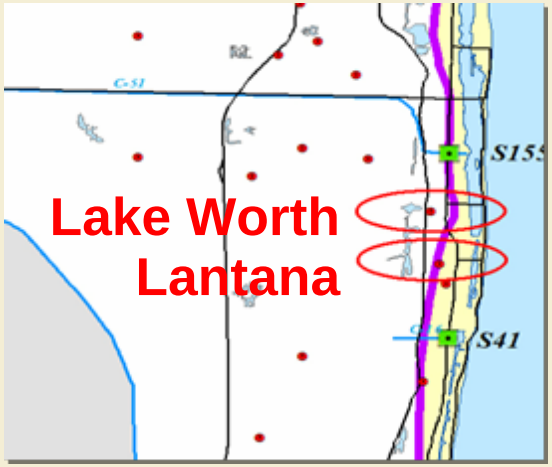
Restriction Effectiveness / Demand Reductions
Broward County Water Demand Comparison 2006 and 2007



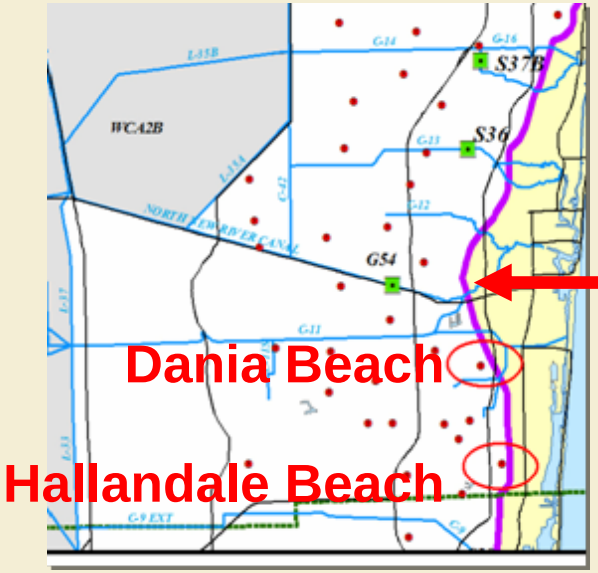
May 2007
Water Shortage Actions

- Emergency Order to deliver water 20 miles to the City of West Palm Beach from the L-8 Reservoir Project
- One day per week water restrictions ordered by West Palm Beach

May 2007
Water Shortage Actions



- Utilities at Risk for saltwater intrusion required to:
  - Reduce or shift pumpage
  - Monitor water levels and chlorides weekly

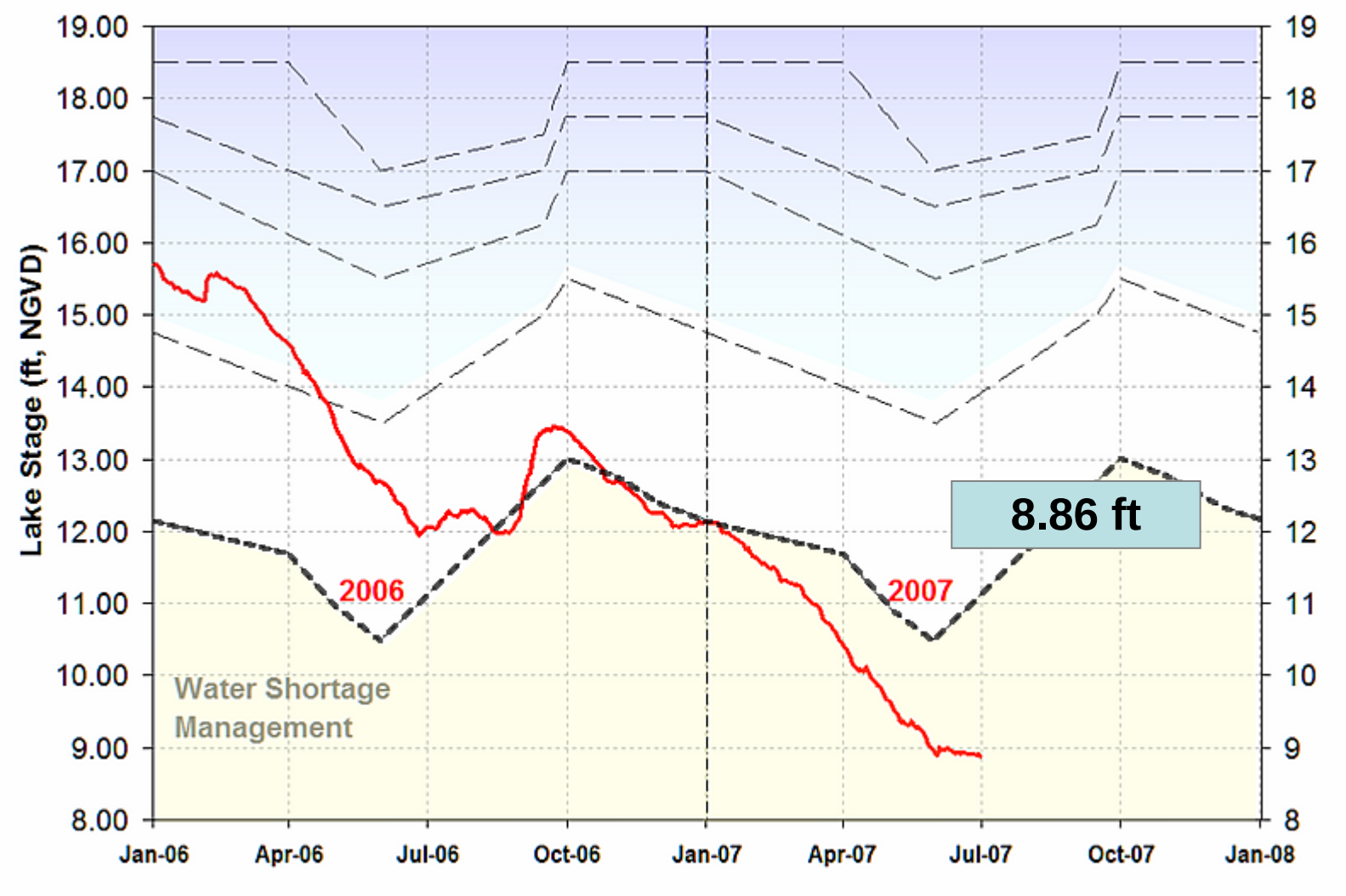


Saltwater intrusion line

May 2007
Water Shortage Actions

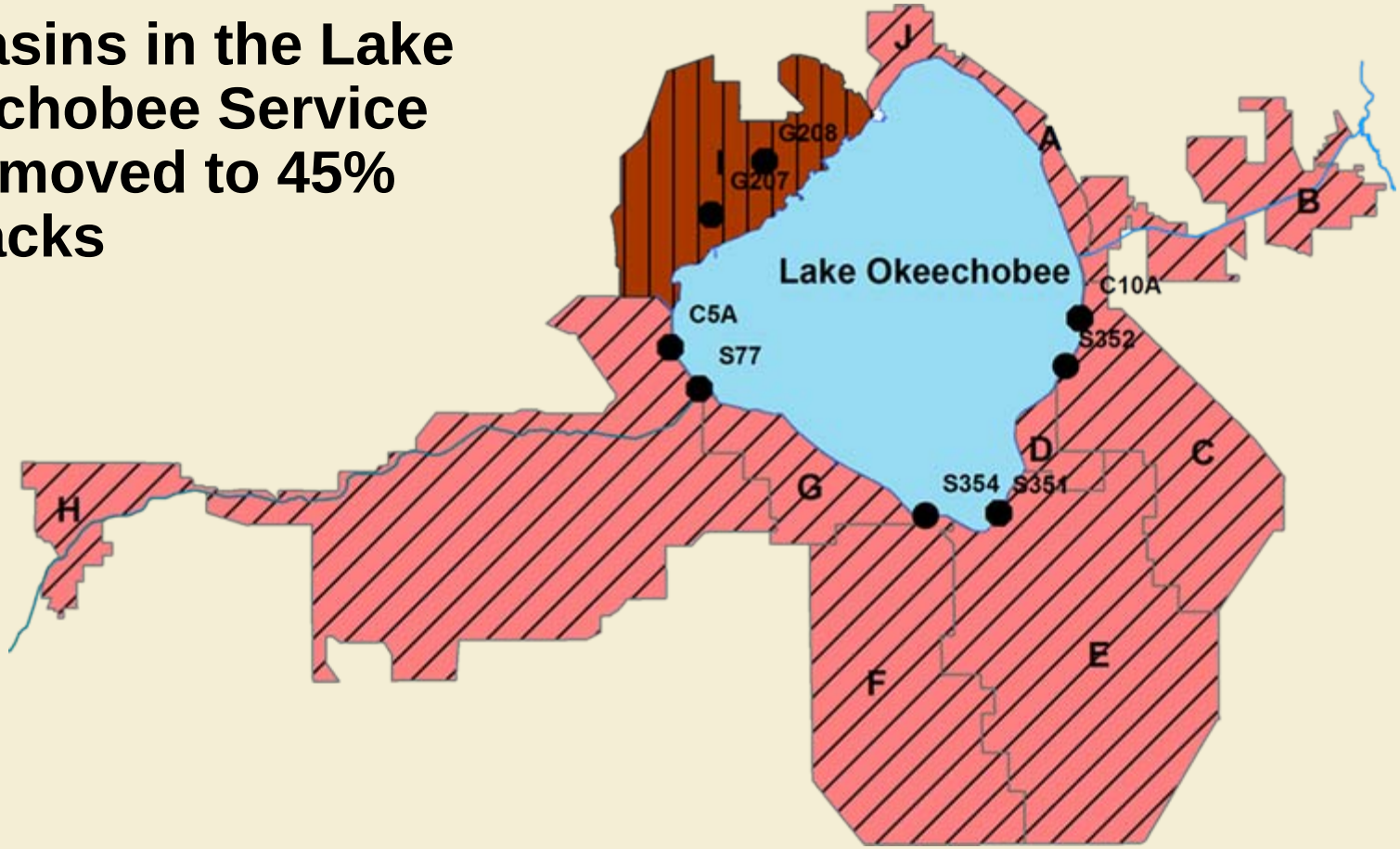
- Assistance to lakeside communities:
  - Inspected, repaired & retrofitted public water supply intakes for operation at low lake stages
    - South Bay – 4 feet
    - Pahokee – 4 feet
    - Belle Glade – 4 feet
    - Clewiston – 3.8 feet
    - Okeechobee – 3.5 feet

Lake Okeechobee Levels – June 2007



June 2007
Water Shortage Actions

- All basins in the Lake Okeechobee Service Area moved to 45% cutbacks



June 2007
Environmental Enhancement Projects

- 2 million cubic yards of muck removed for improved habitat when lake rises
  - 100,000 loaded dump trucks
  - 3,000 acres
  - 140 tons of phosphorus

June 2007
Environmental Enhancements Projects

- 10,000 acres of torpedo grass treated

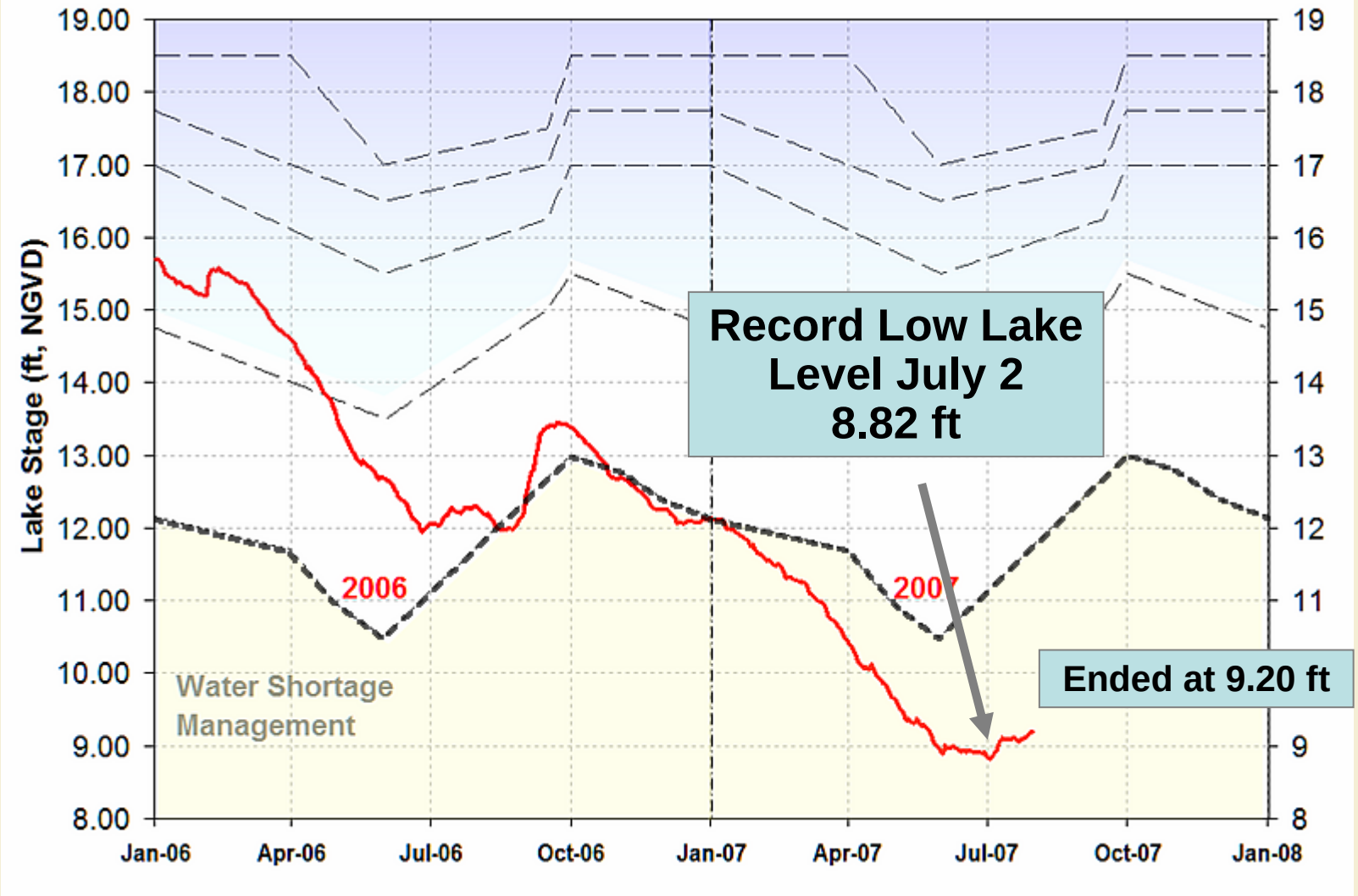
June 2007
Environmental Enhancements Projects

- 2,000 pond apples planted on Torrey Island

June 2007
Environmental Enhancements Projects

- **Removal of navigation hazards**

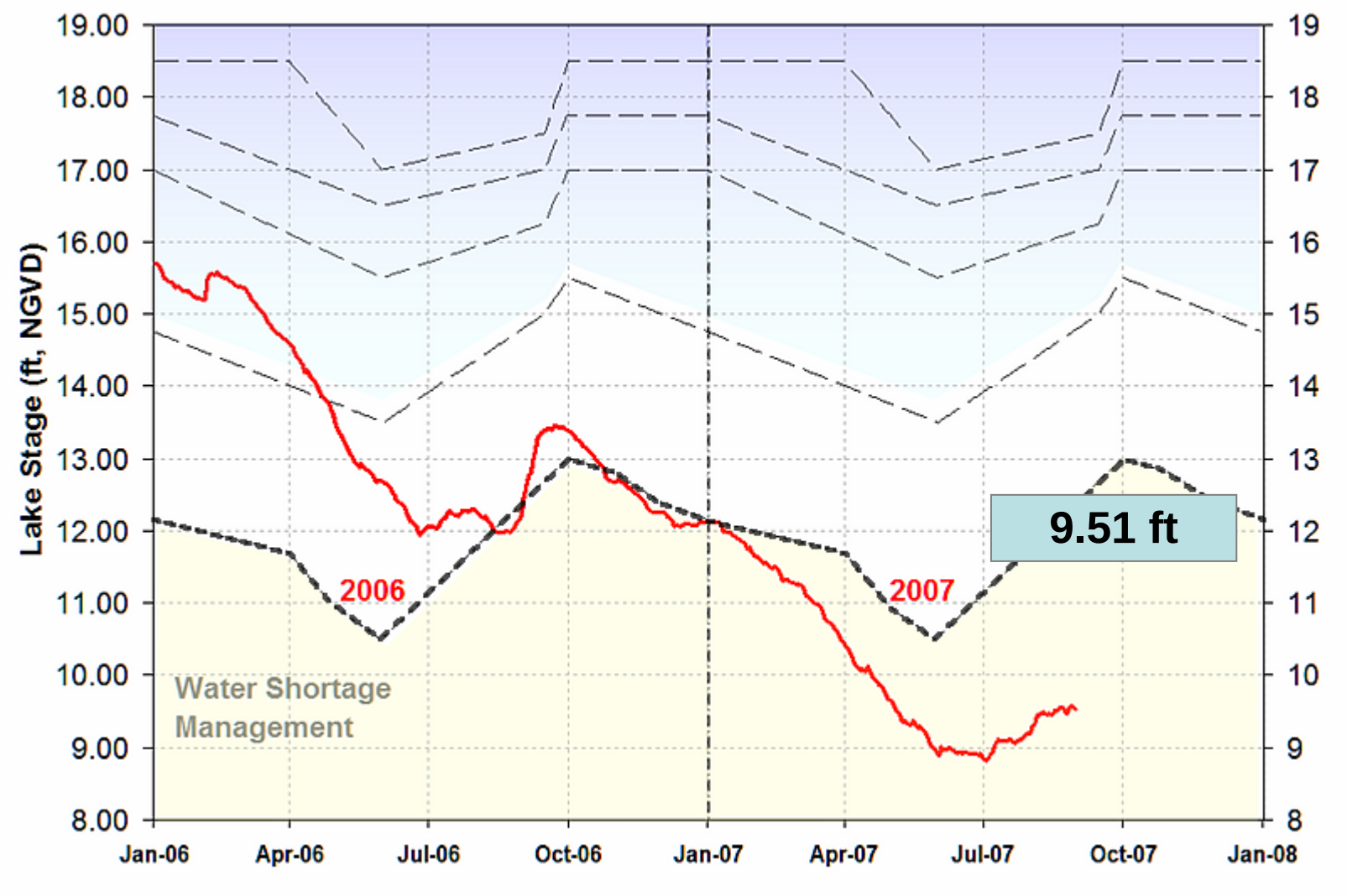
Lake Okeechobee Levels – July 2007



July 2007
Water Shortage Actions

- Two months of above average rainfall in coastal areas
- Discharges to tide to avoid flooding in coastal areas
- Water restrictions temporarily moved back to two days per week lawn watering in Lower & Upper East Coast

Lake Okeechobee Levels – August 2007



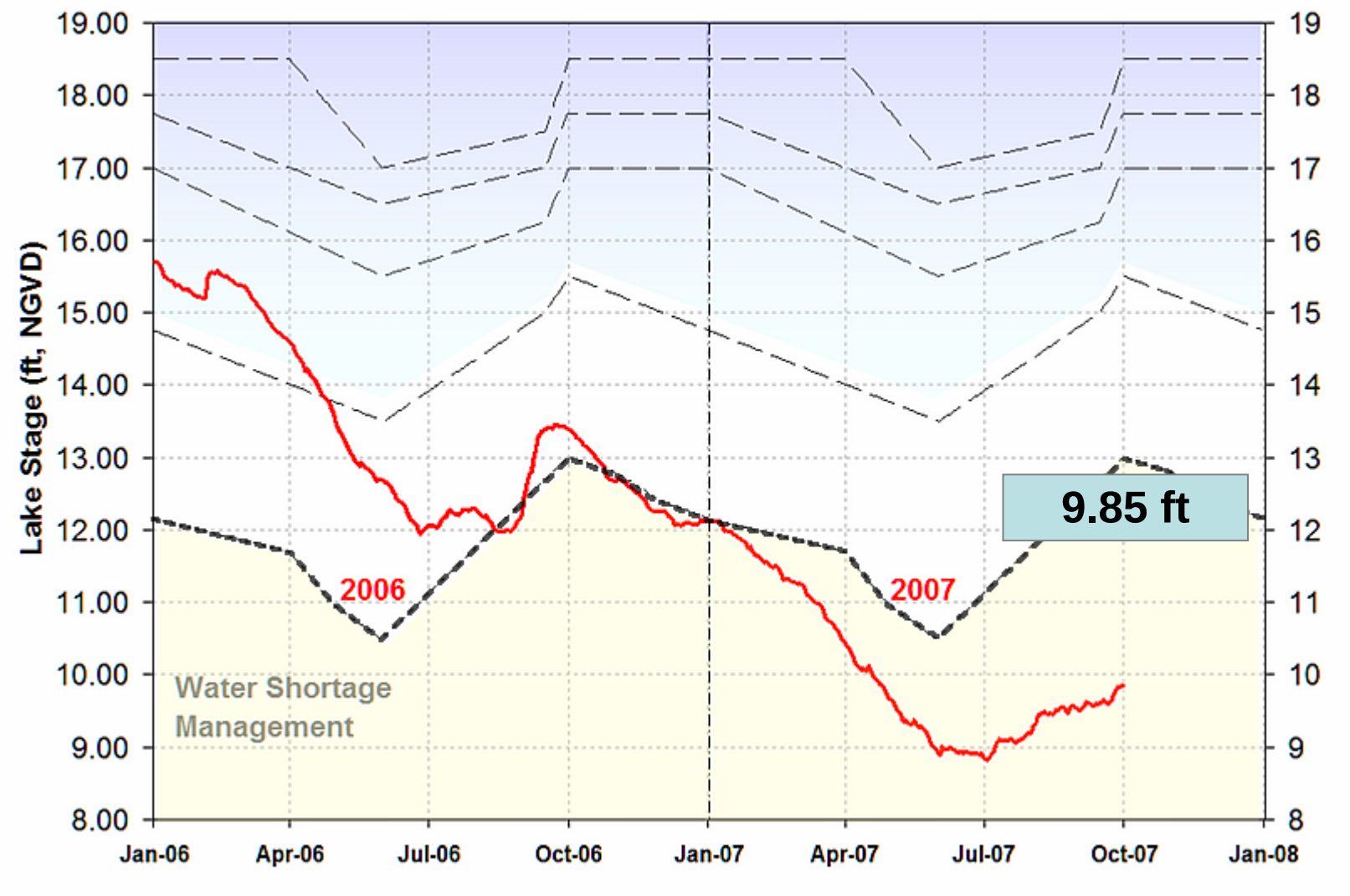
August 2007
Water Shortage Actions

- **Began removal of temporary forward pumps for maintenance & readiness check for next dry season**

August 2007
Water Shortage Actions

- **Strong cooperation by local government in enforcing residential water restrictions**
  - **+11,000 warning notices**
  - **+12,000 citations**
- **District enforcement of permitted water users**
  - **+700 Notices of Violation**
  - **+$400,000 in civil penalties**

Lake Okeechobee Levels – September 2007



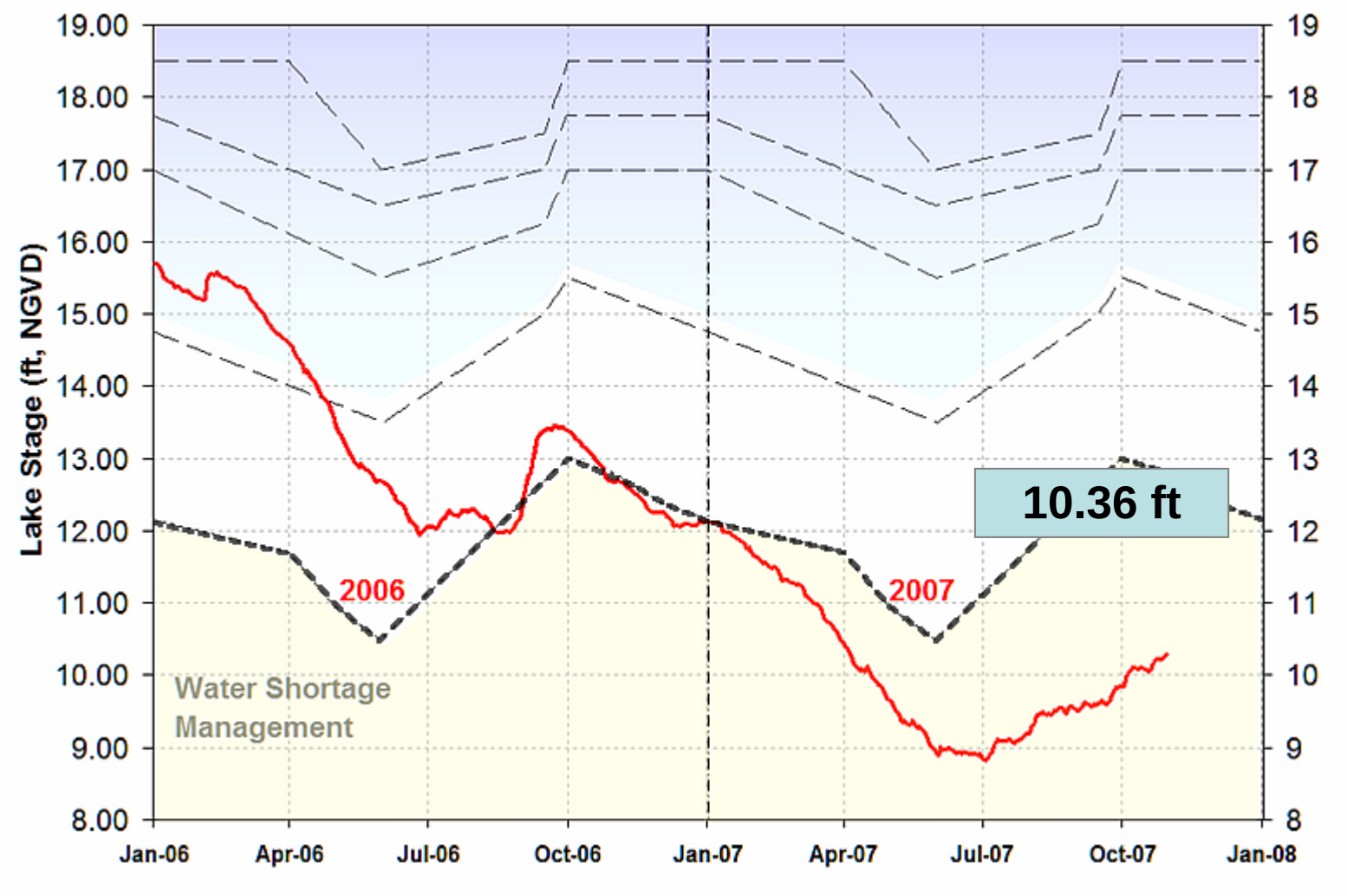
September 2007
Water Shortage Actions

- **Gravity flows to Lake Okeechobee**

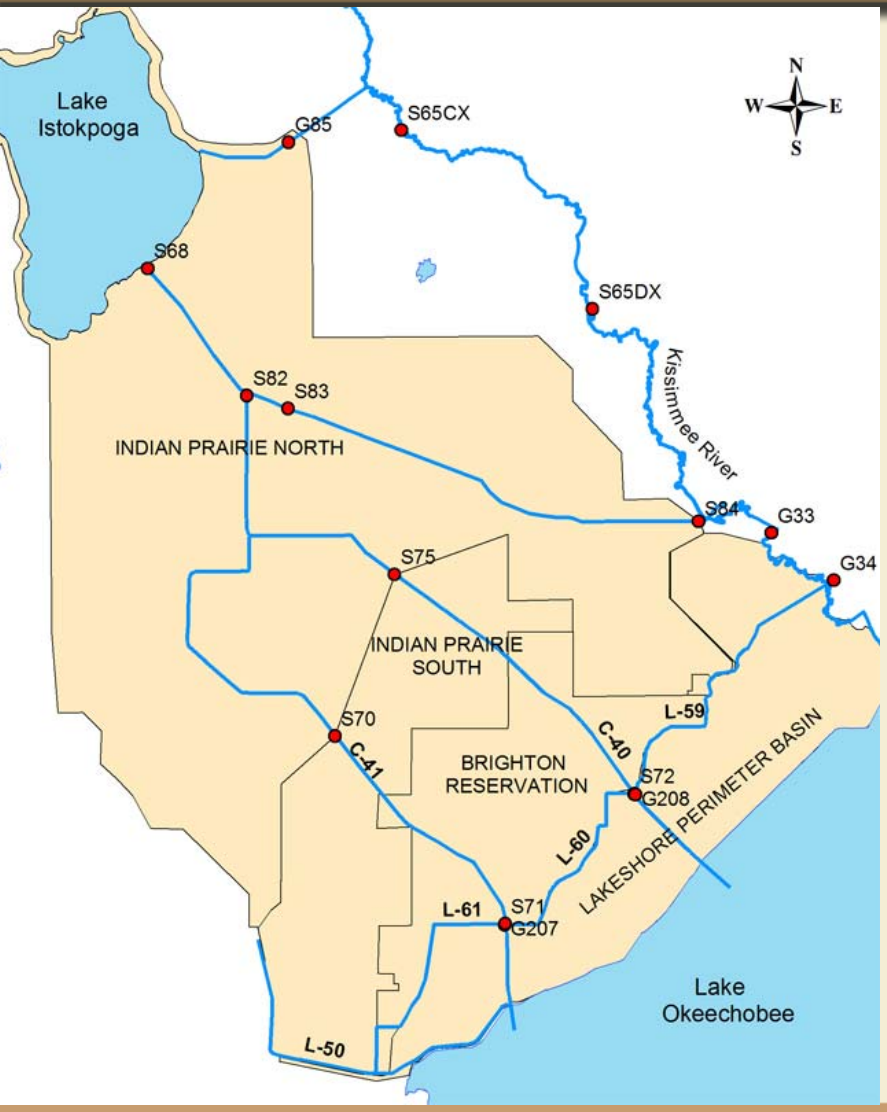
September 2007 Water Shortage Actions

- Capturing local stormwater
  - More than 5 billion gallons moved into local storage by 298 Districts & local govt.
  - Additional temporary pumps installed at S-155A

Lake Okeechobee Levels – October 2007

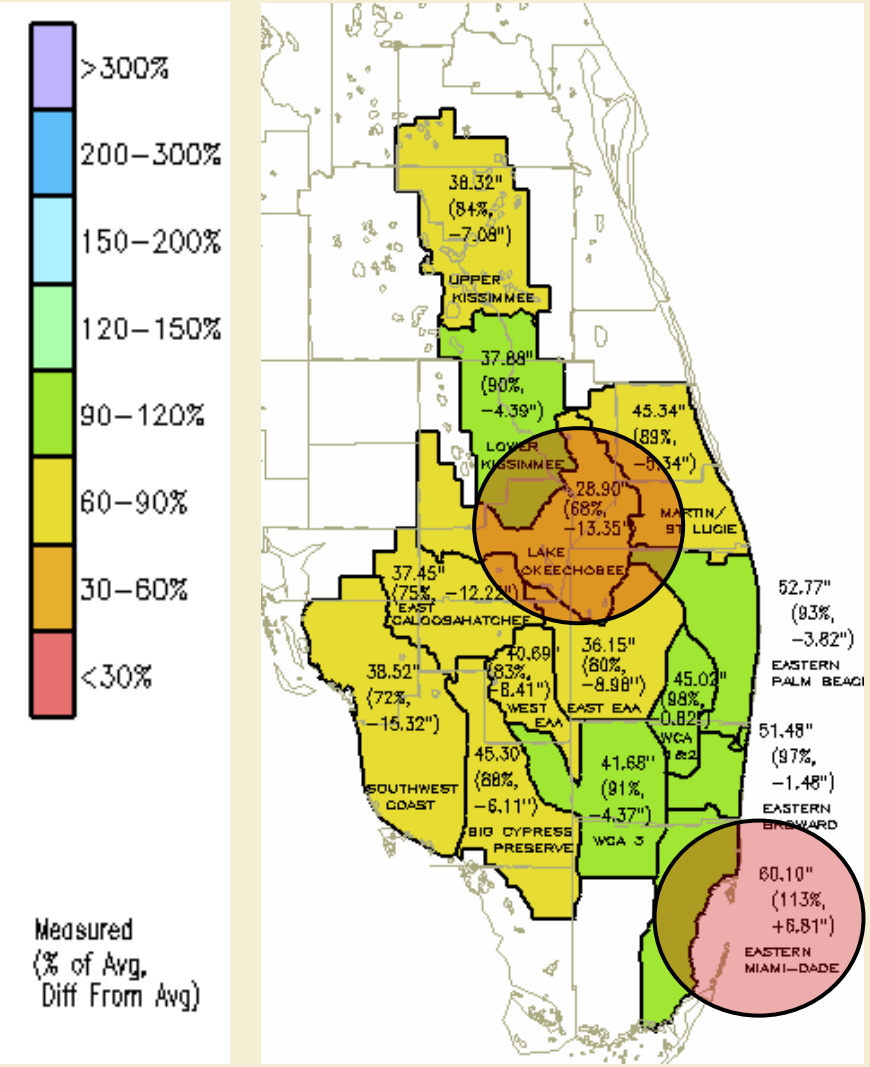


October 2007 Water Shortage Actions



- Lake Istokpoga below regulation schedule, withdrawals terminated
- Neither Lake Okeechobee or Lake Istokpoga available to supply water to basin or Seminole Tribe
- Only water sources are rainfall, canals & seepage
- Deviation requested from Army Corps of Engineers

Current Water Conditions

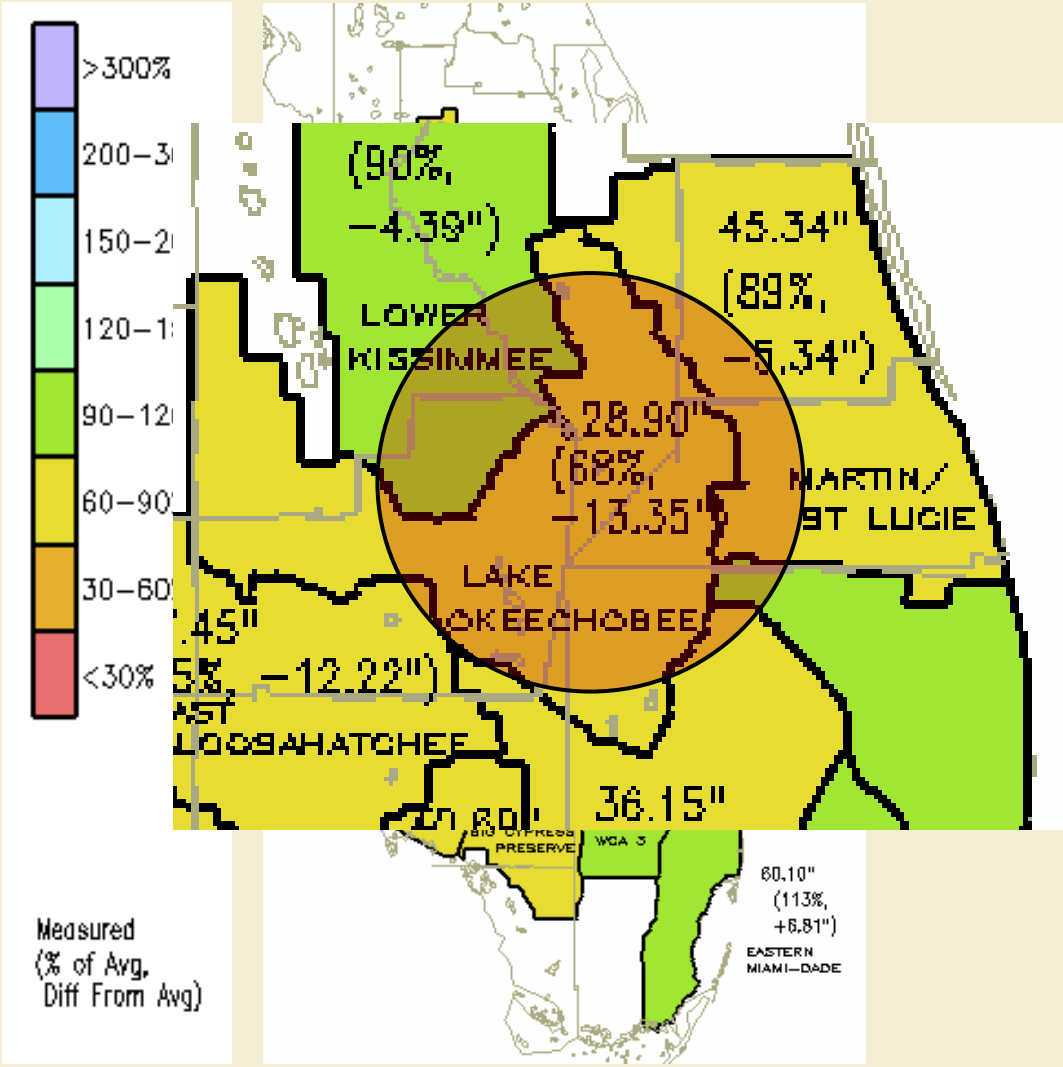


SFWMD Annual Rainfall
January – November 2007

DISTRICT-WIDE:
41.30” (86%, -6.83”)

Average Year
52.0”

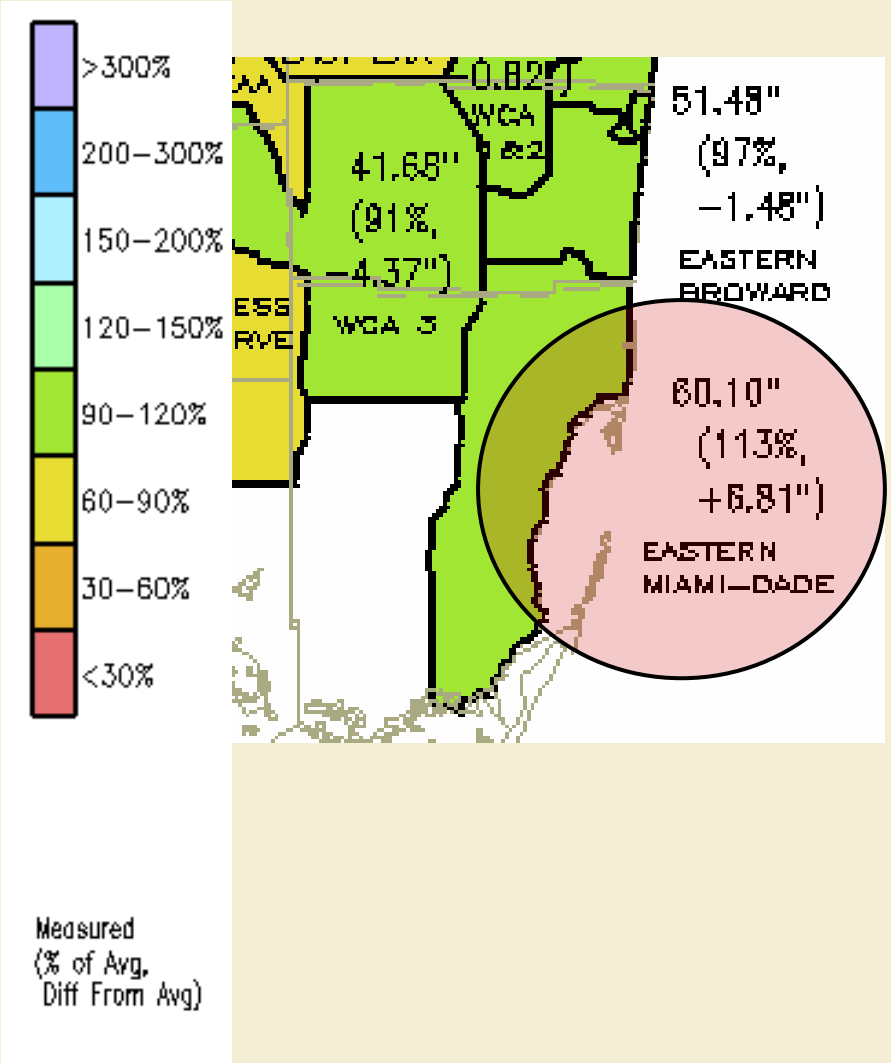
Current Water Conditions



DISTRICT-WIDE:
41.30” (86%, -6.83”)

Lake Okeechobee
28.90” (68%, -13.35”)

Current Water Conditions



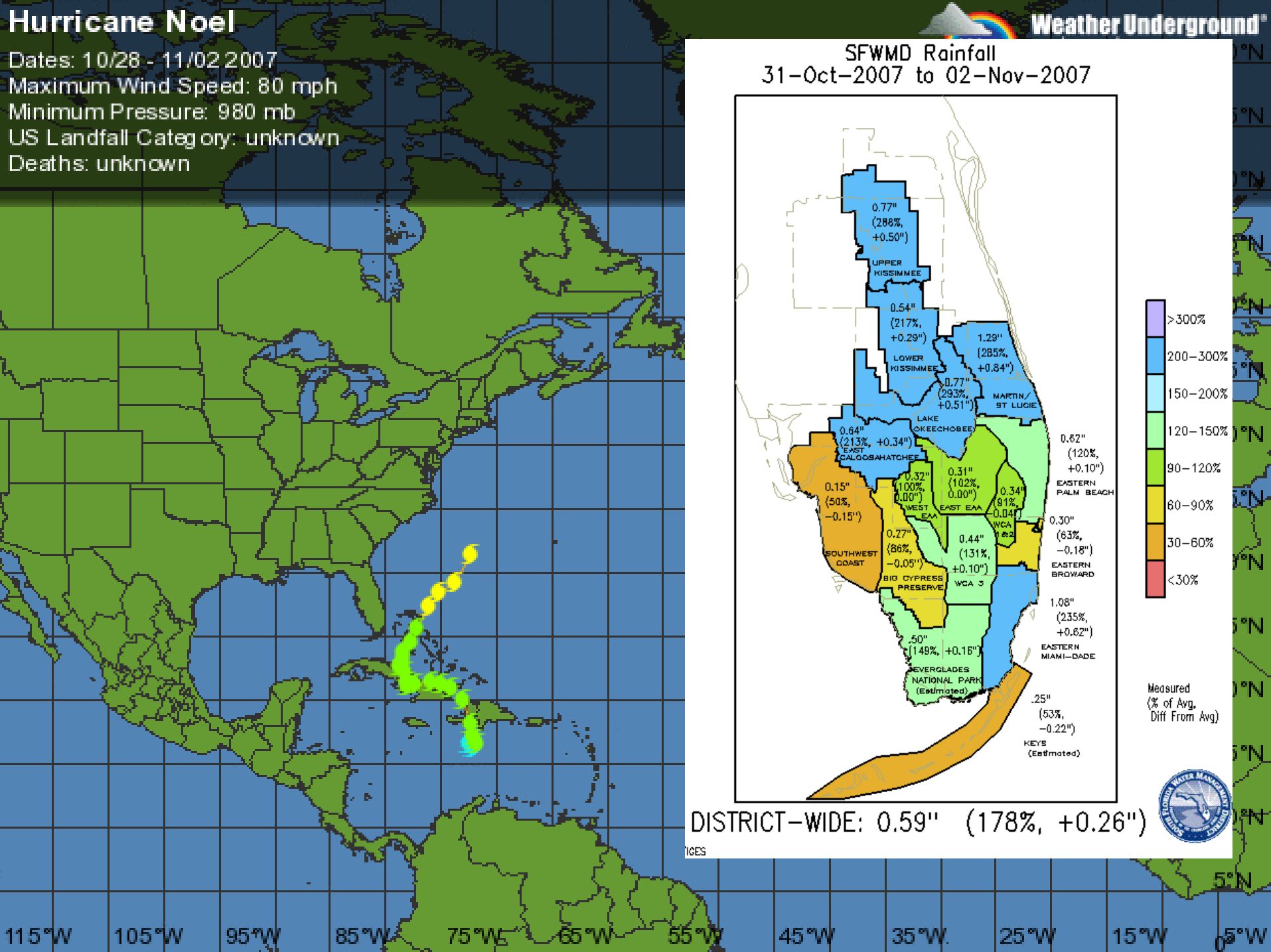
DISTRICT-WIDE:
41.30” (86%, -6.83”)

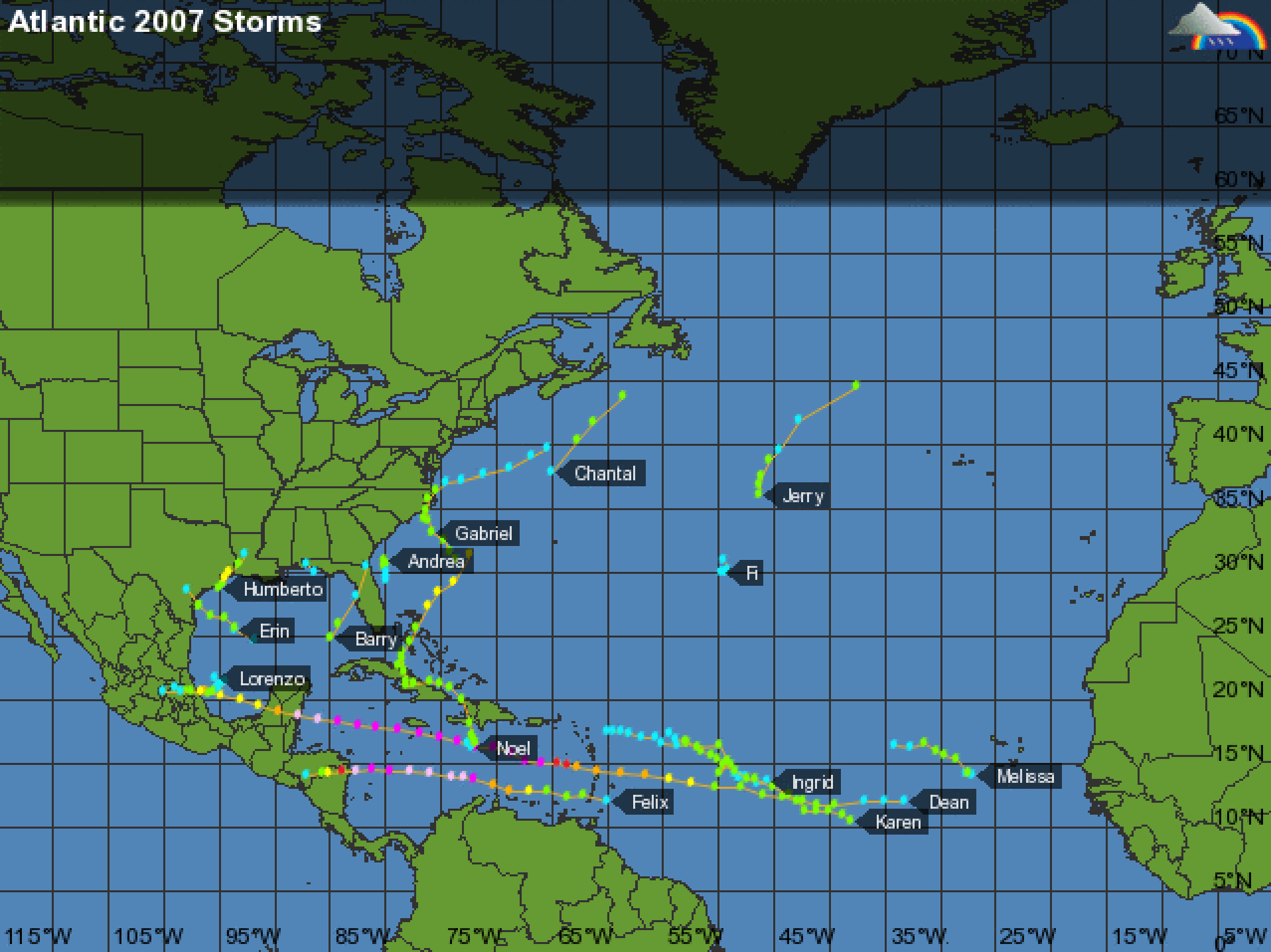
Lake Okeechobee
28.90” (68%, -13.35”)

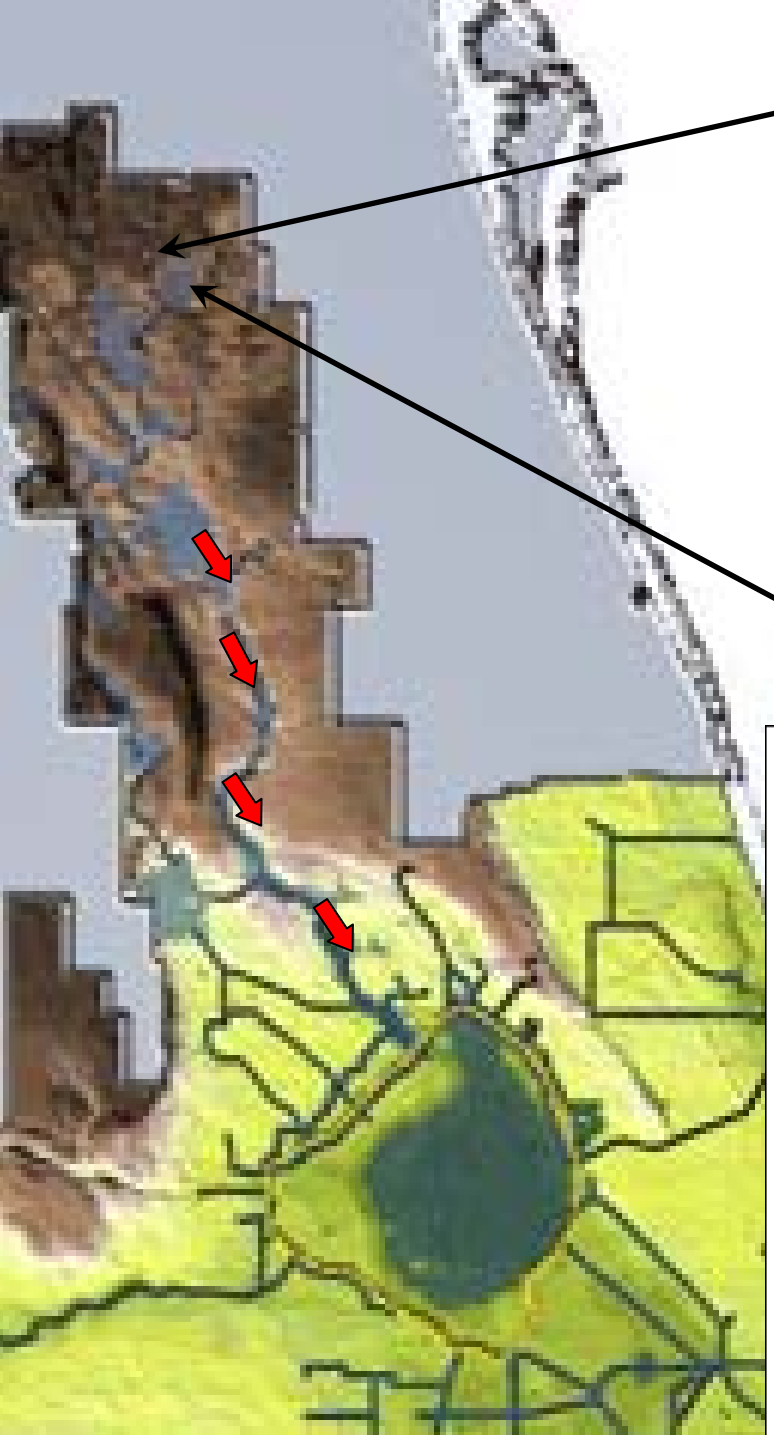
Eastern Miami-Dade
60.10” (113%, +6.81”)

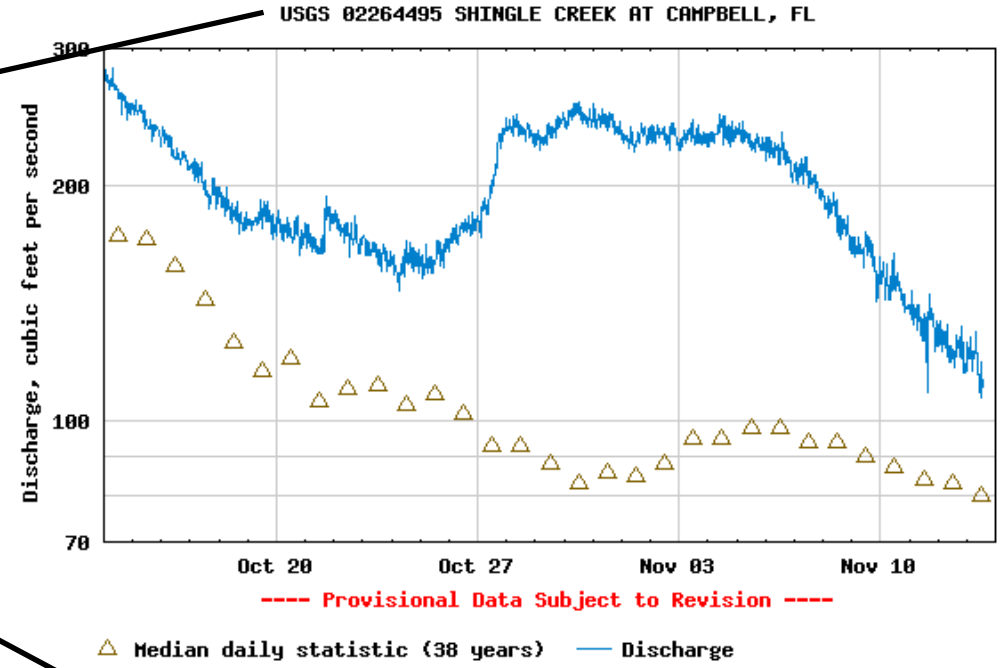
Hurricane Noel

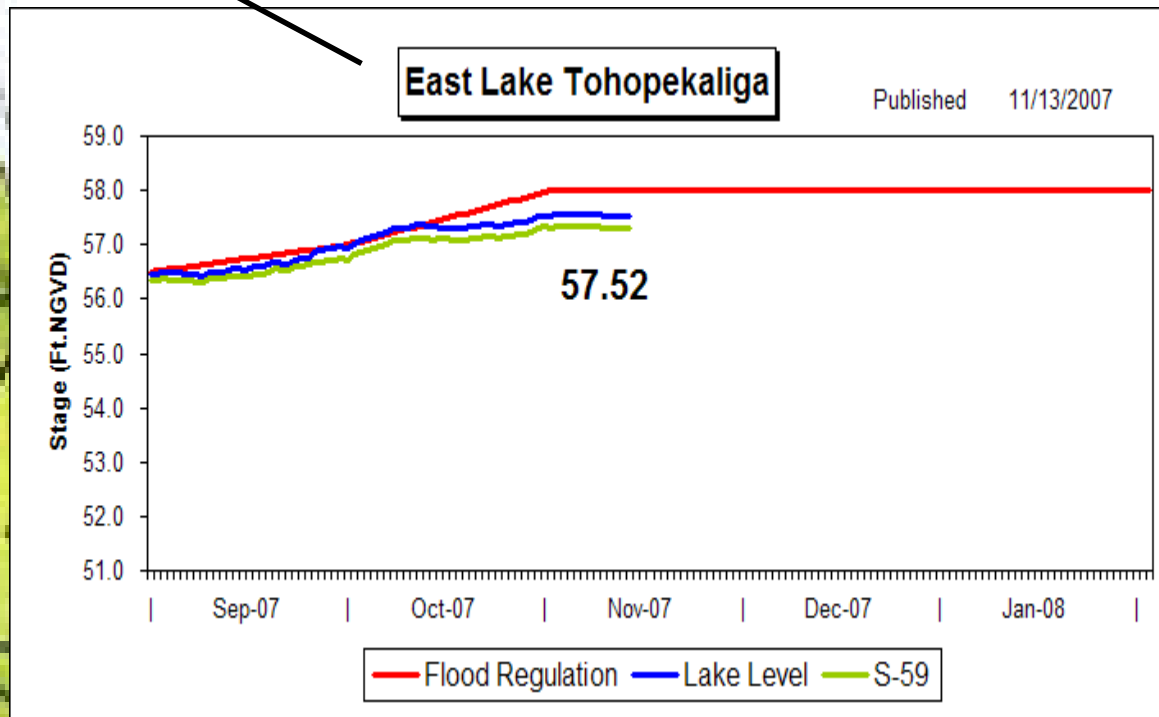
Dates: 10/28 - 11/02 2007
Maximum Wind Speed: 80 mph
Minimum Pressure: 980 mb
US Landfall Category: unknown
Deaths: unknown

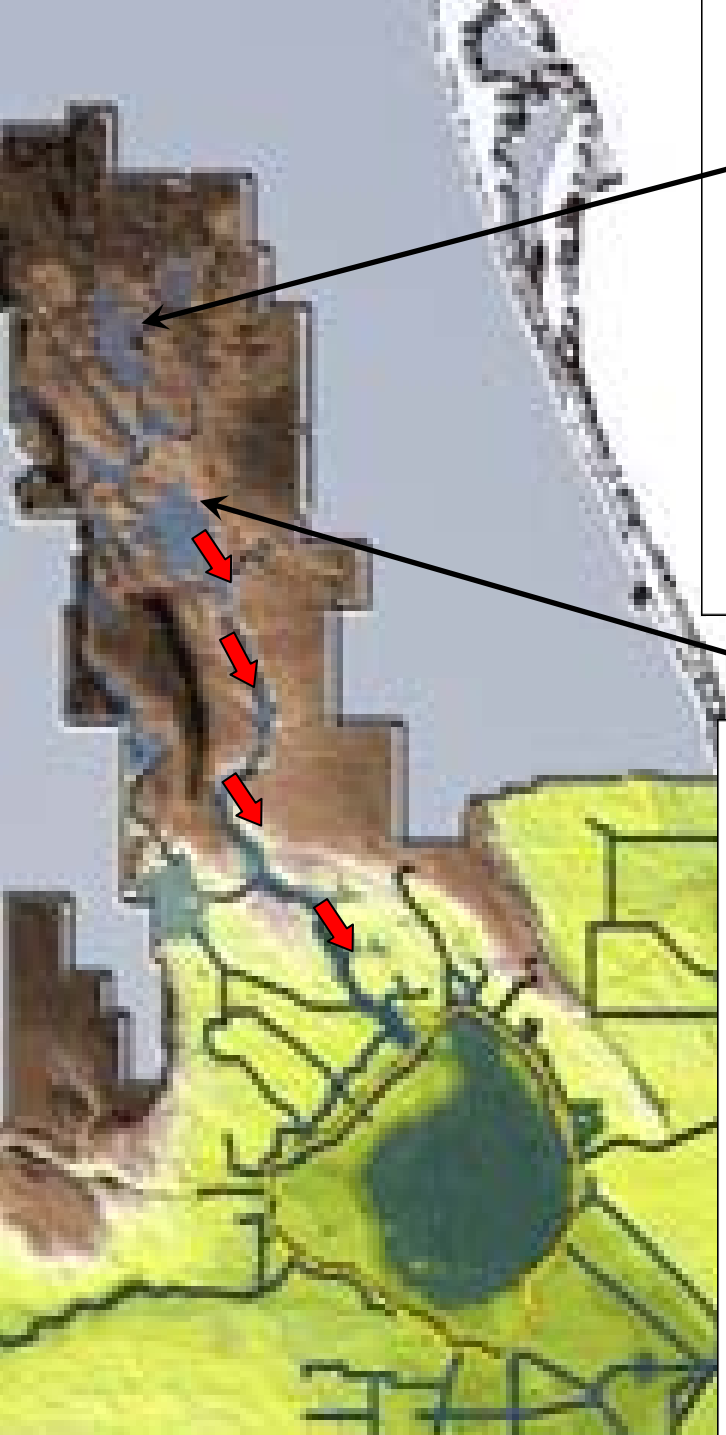


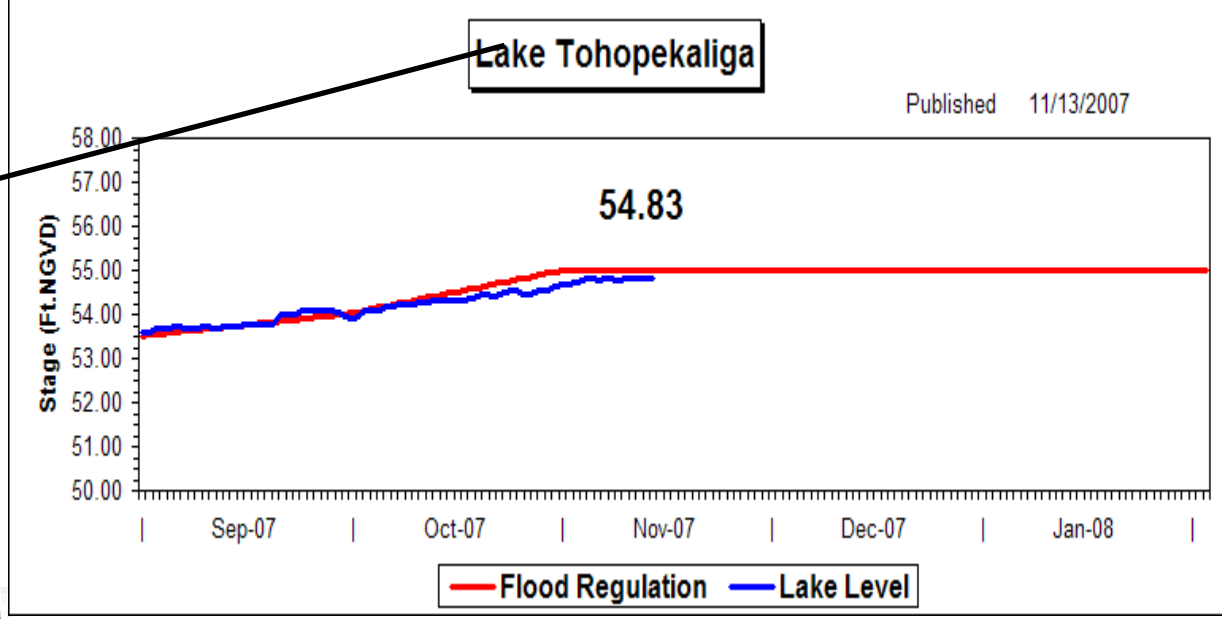

Atlantic 2007 Storms
Chantal
Jerry
Gabriel
Andrea
Humberto
Fi
Erin
Barry
Lorenzo
Noel
Ingrid
Melissa
Felix
Dean
Karen
70°N
65°N
60°N
55°N
50°N
45°N
40°N
35°N
30°N
25°N
20°N
15°N
10°N
5°N
115°W
105°W
95°W
85°W
75°W
65°W
55°W
45°W
35°W
25°W
15°W
5°W
0°

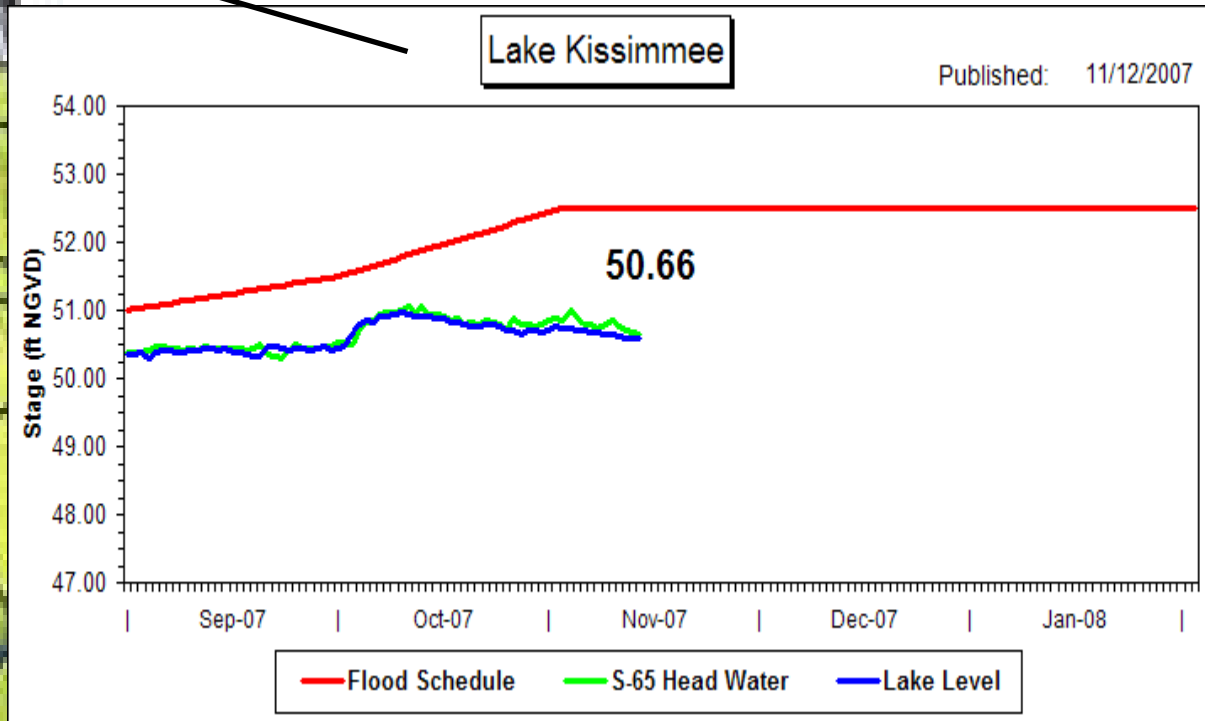


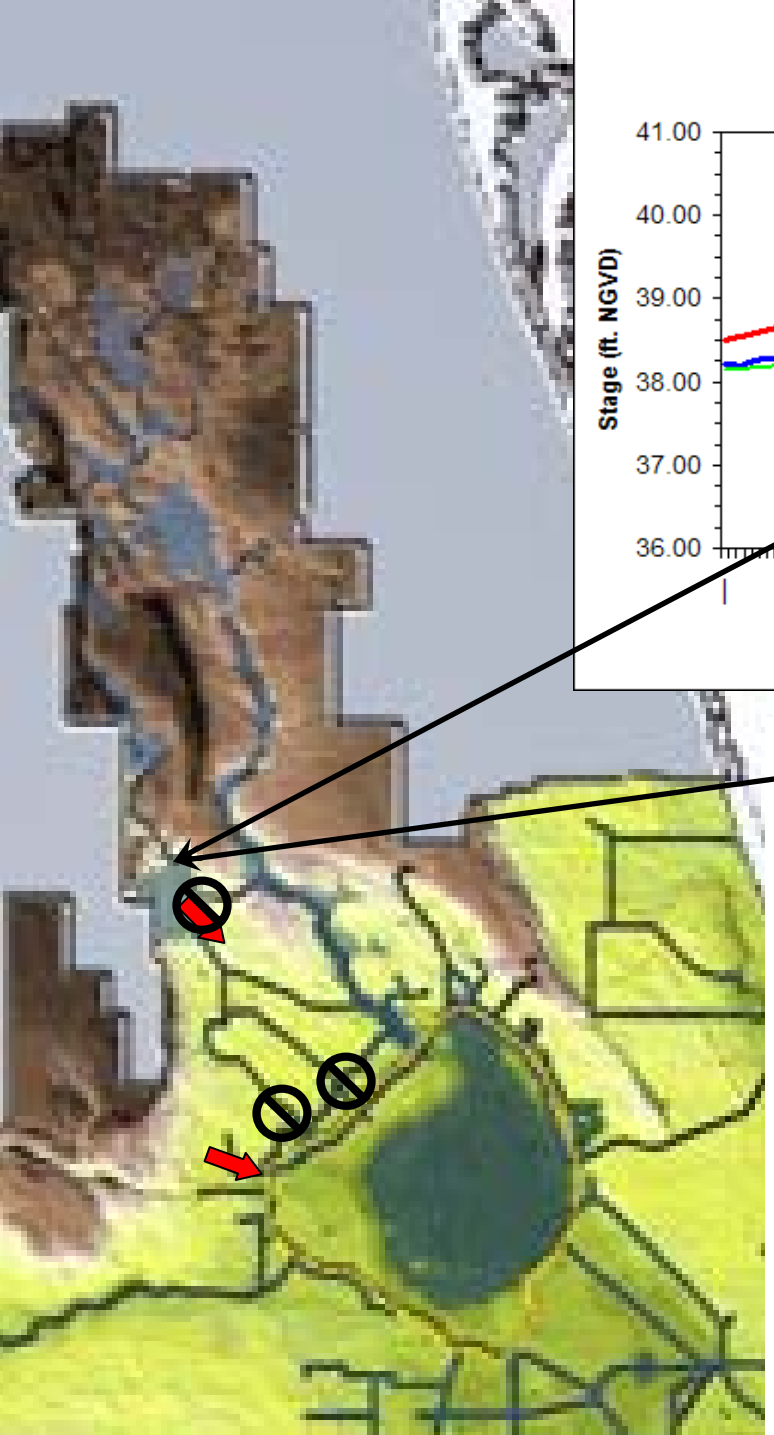

USGS 02264495 SHINGLE CREEK AT CAMPBELL, FL
Discharge, cubic feet per second
300
200
100
70
Oct 20
Oct 27
Nov 03
Nov 10
---- Provisional Data Subject to Revision ----
Median daily statistic (38 years)
Discharge

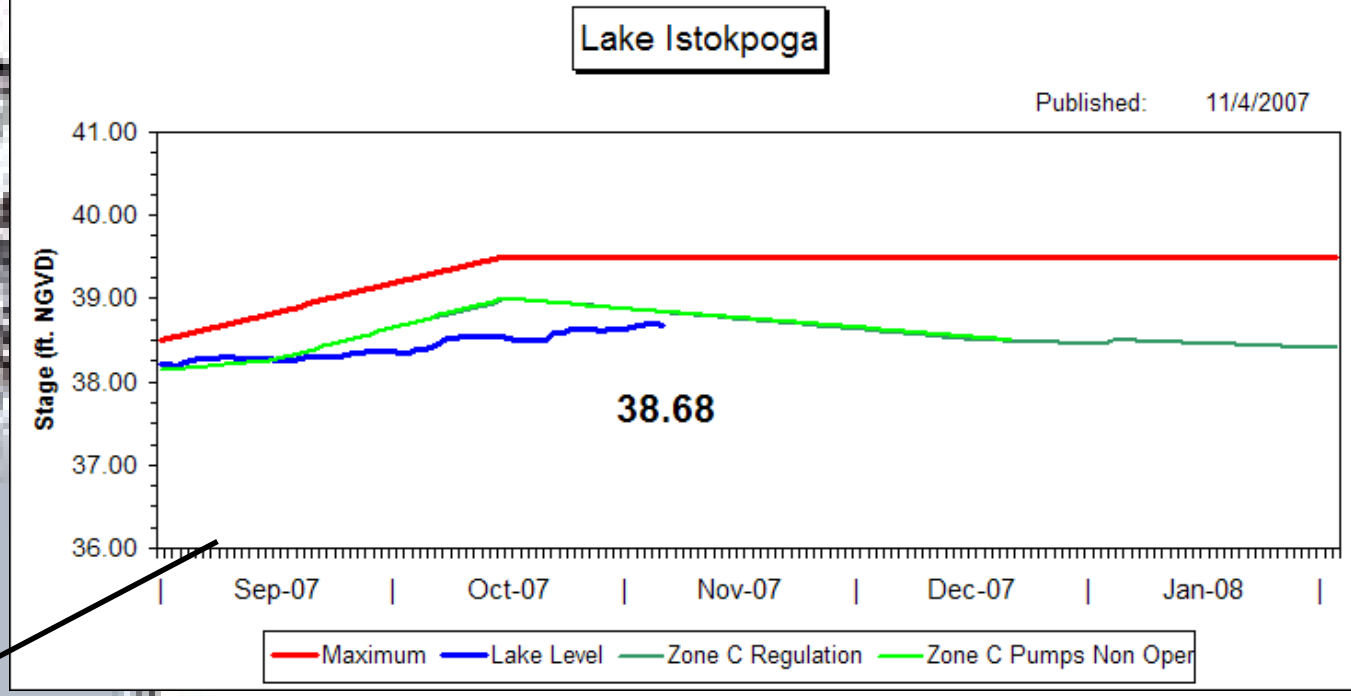

East Lake Tohopekaliga
Published 11/13/2007
Stage (Ft.NGVD)
59.0
58.0
57.0
56.0
55.0
54.0
53.0
52.0
51.0
57.52
Sep-07
Oct-07
Nov-07
Dec-07
Jan-08
Flood Regulation
Lake Level
S-59

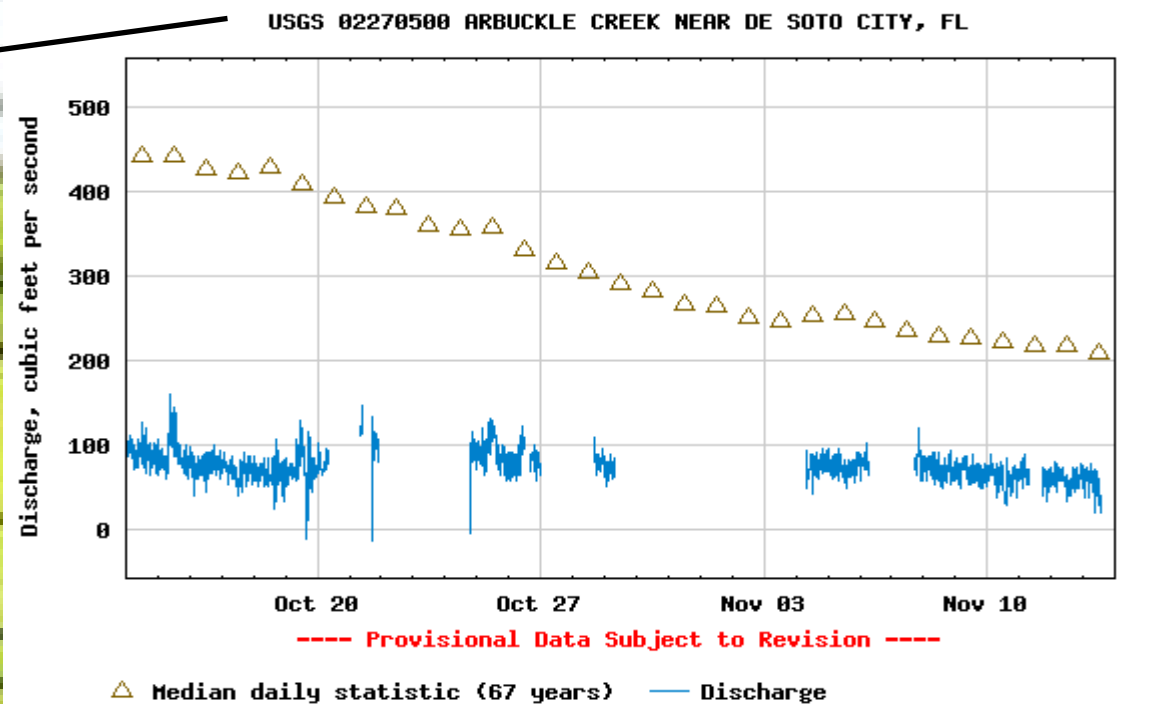


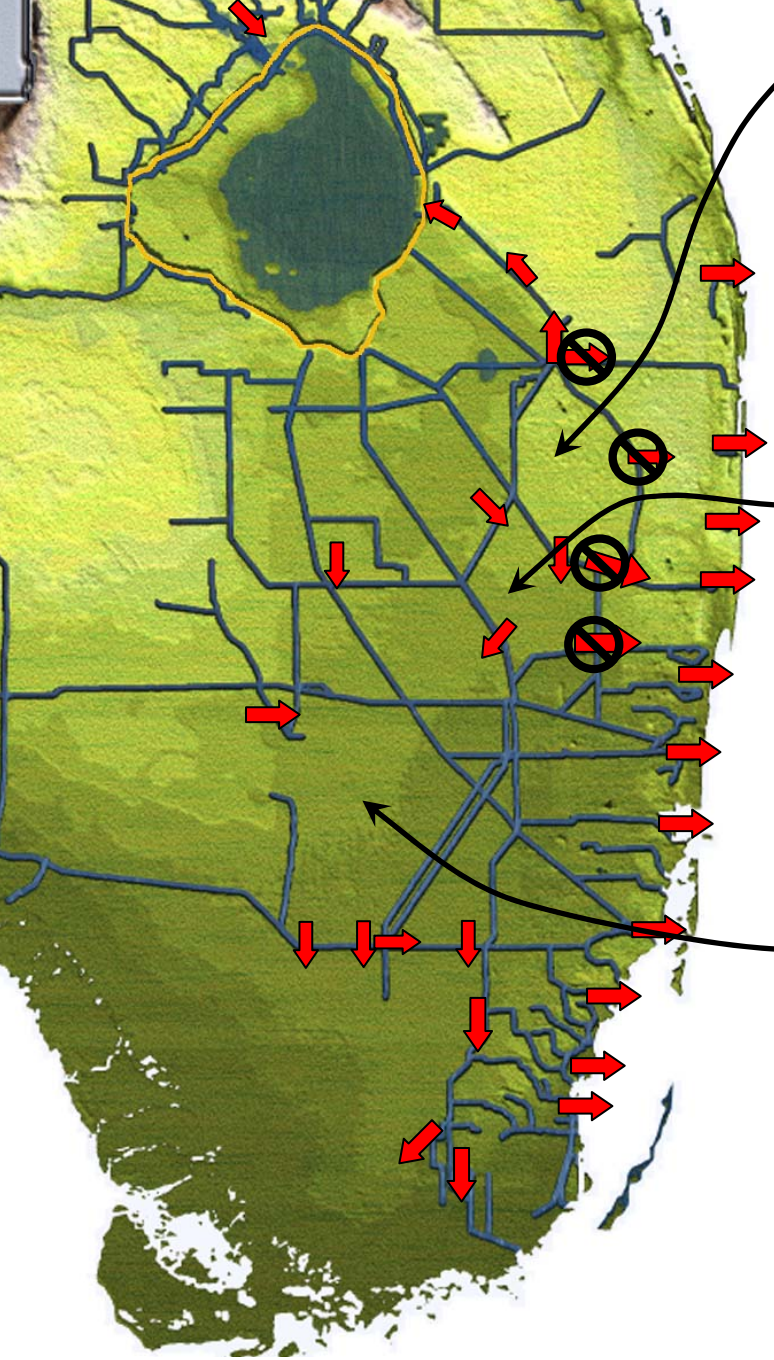

Lake Tohopekaliga
Published 11/13/2007
54.83
Stage (Ft.NGVD)
58.00
57.00
56.00
55.00
54.00
53.00
52.00
51.00
50.00
Sep-07
Oct-07
Nov-07
Dec-07
Jan-08
Flood Regulation
Lake Level

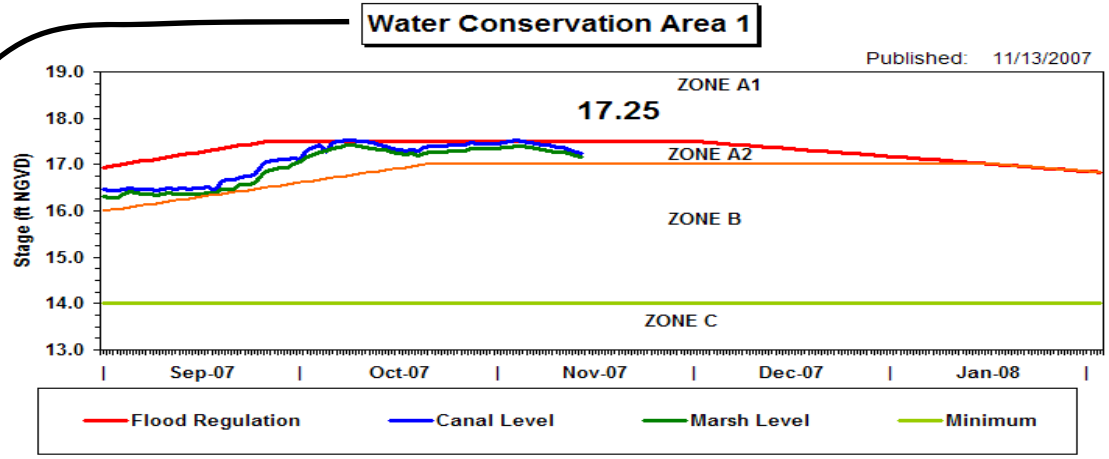

Lake Kissimmee
Published: 11/12/2007
50.66
Stage (ft NGVD)
54.00
53.00
52.00
51.00
50.00
49.00
48.00
47.00
Sep-07
Oct-07
Nov-07
Dec-07
Jan-08
Flood Schedule
S-65 Head Water
Lake Level

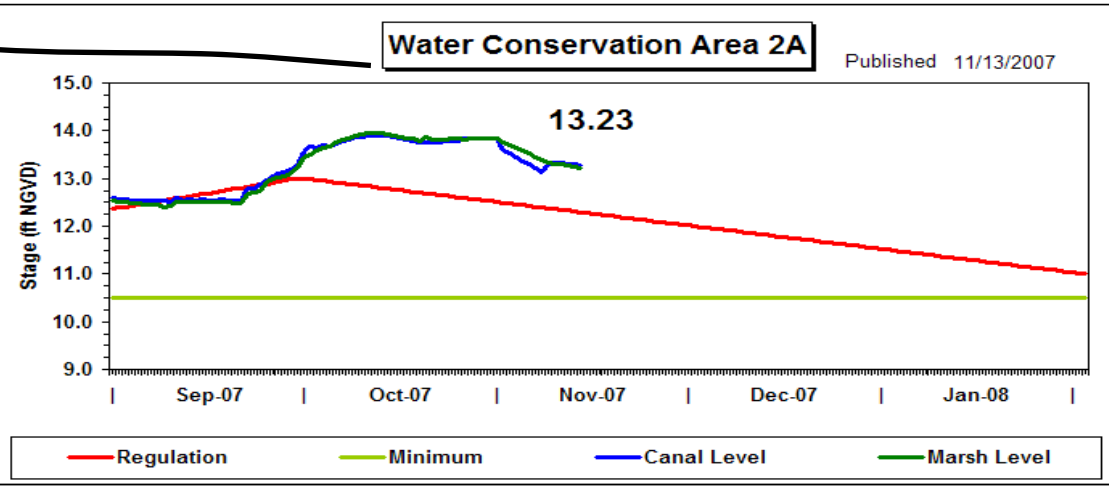


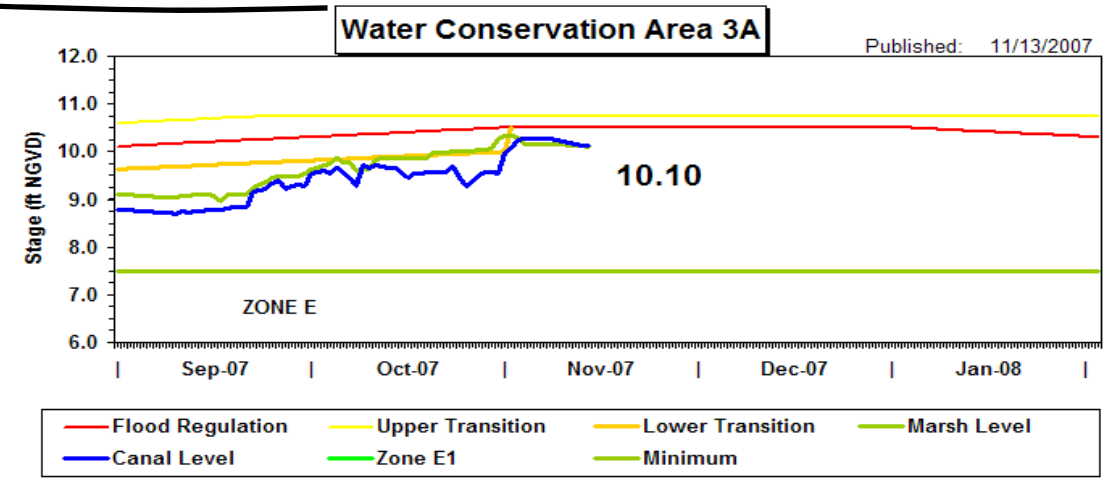

Lake Istokpoga
Published: 11/4/2007
Stage (ft. NGVD)
41.00
40.00
39.00
38.00
37.00
36.00
38.68
Sep-07
Oct-07
Nov-07
Dec-07
Jan-08
Maximum
Lake Level
Zone C Regulation
Zone C Pumps Non Oper


USGS 02270500 ARBUCKLE CREEK NEAR DE SOTO CITY, FL
Discharge, cubic feet per second
500
400
300
200
100
0
Oct 20
Oct 27
Nov 03
Nov 10
---- Provisional Data Subject to Revision ----
Median daily statistic (67 years)
Discharge



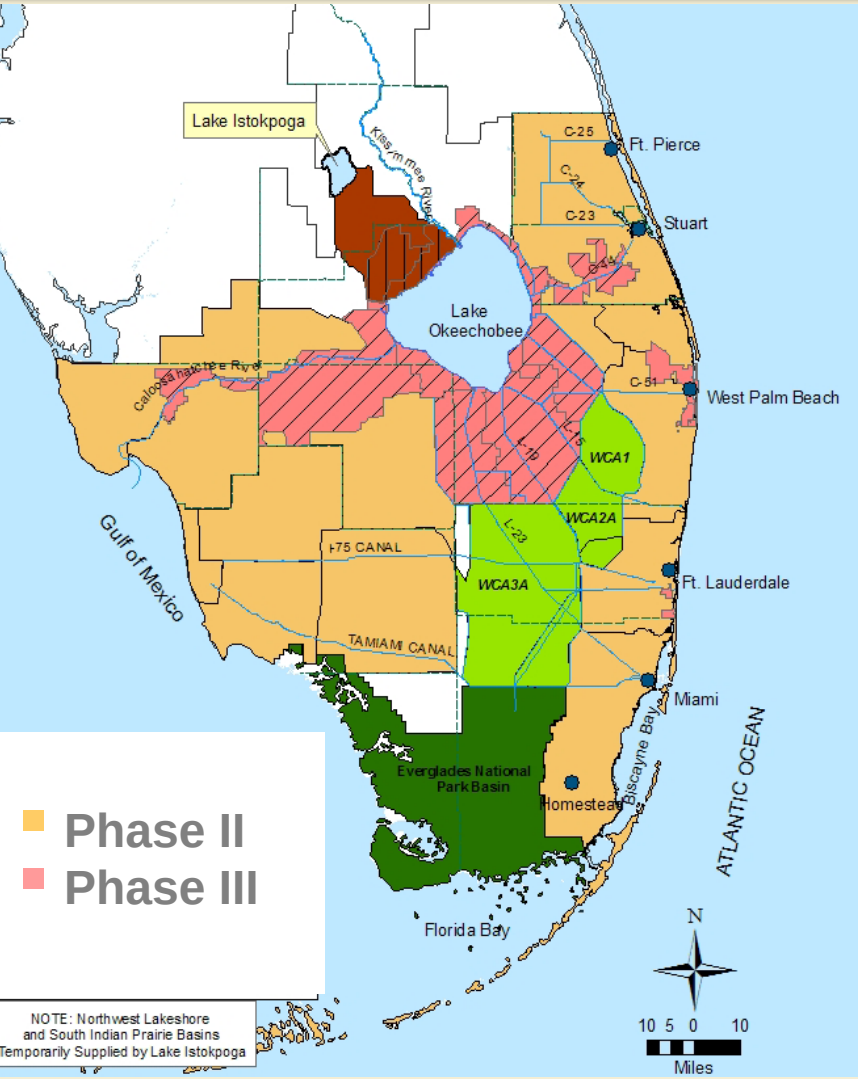






https://my.sfwmd.gov/sfwmd/weatherdata/hydrographs/daily3.htm

Current Water Restrictions



Phase III – 45% cutbacks and one day per week lawn watering

- Lake Okeechobee Service Area
- Lake Istokpoga & Indian Prairie Basin
- Utilities at Risk

Phase II – 2 day per week lawn watering and other restrictions

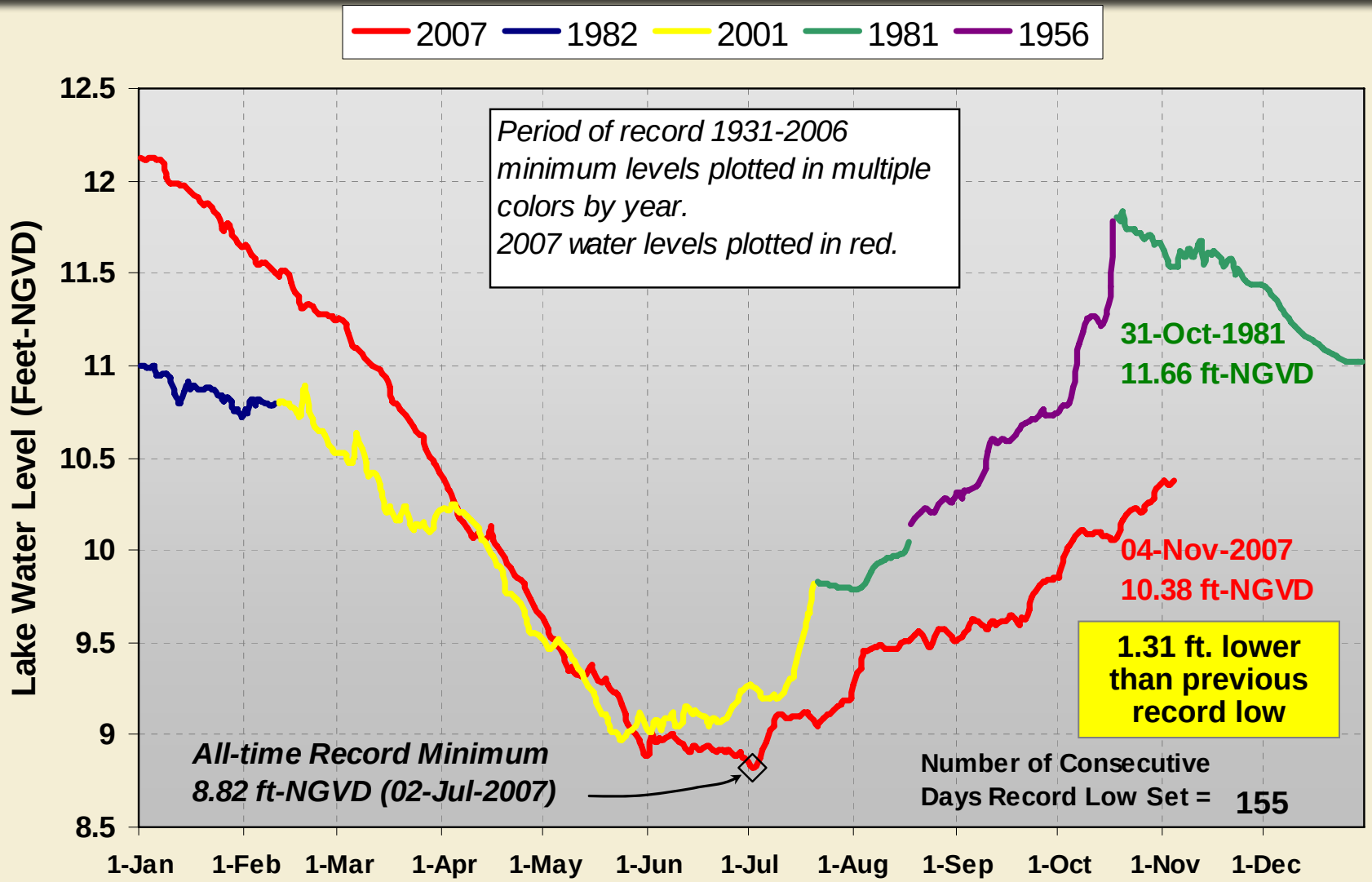
- Lower West Coast

Modified Phase II – 2 day per week lawn watering

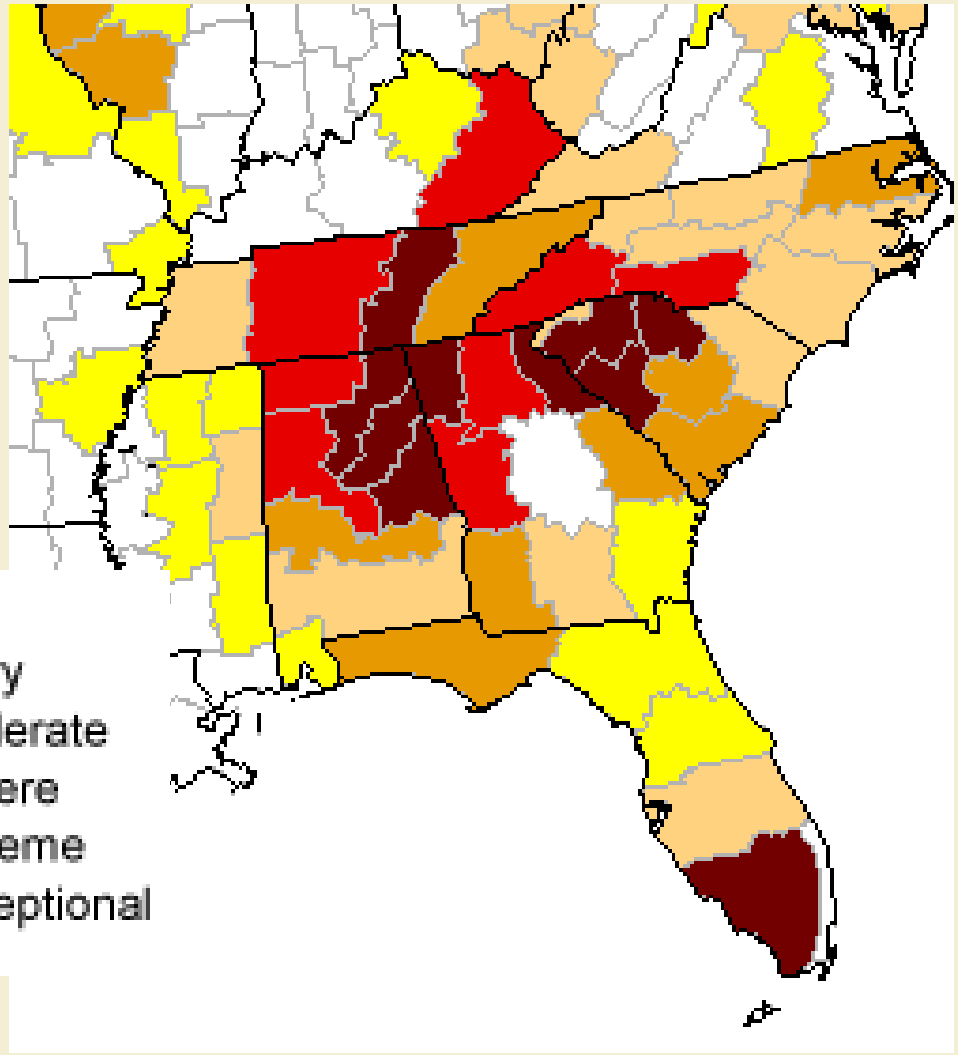
- Lower East Coast
- Upper East Coast

Lake Okeechobee Minimum Water Levels

Period of Record 1931-2006



Long Term Drought Outlook



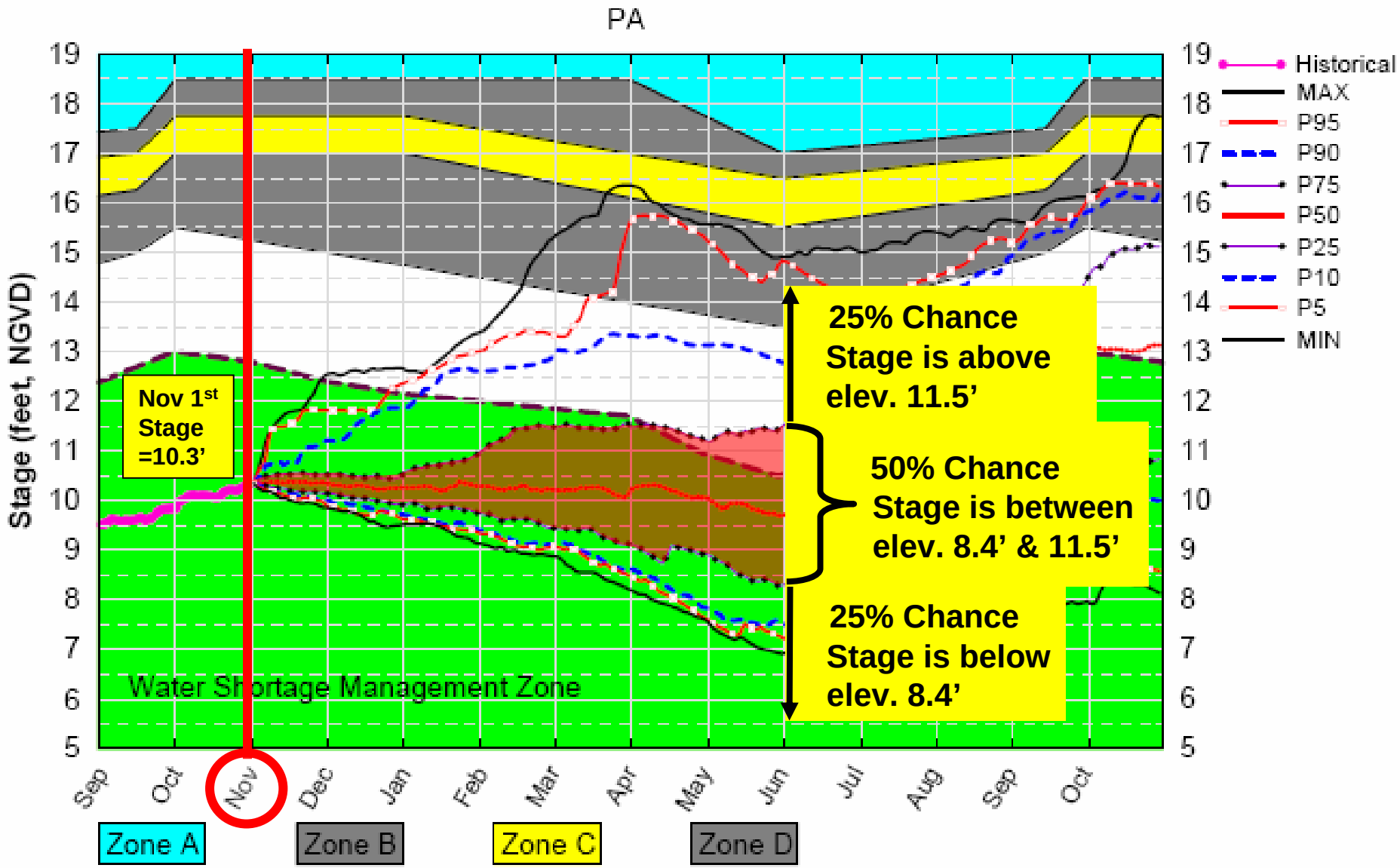
Intensity:

- 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

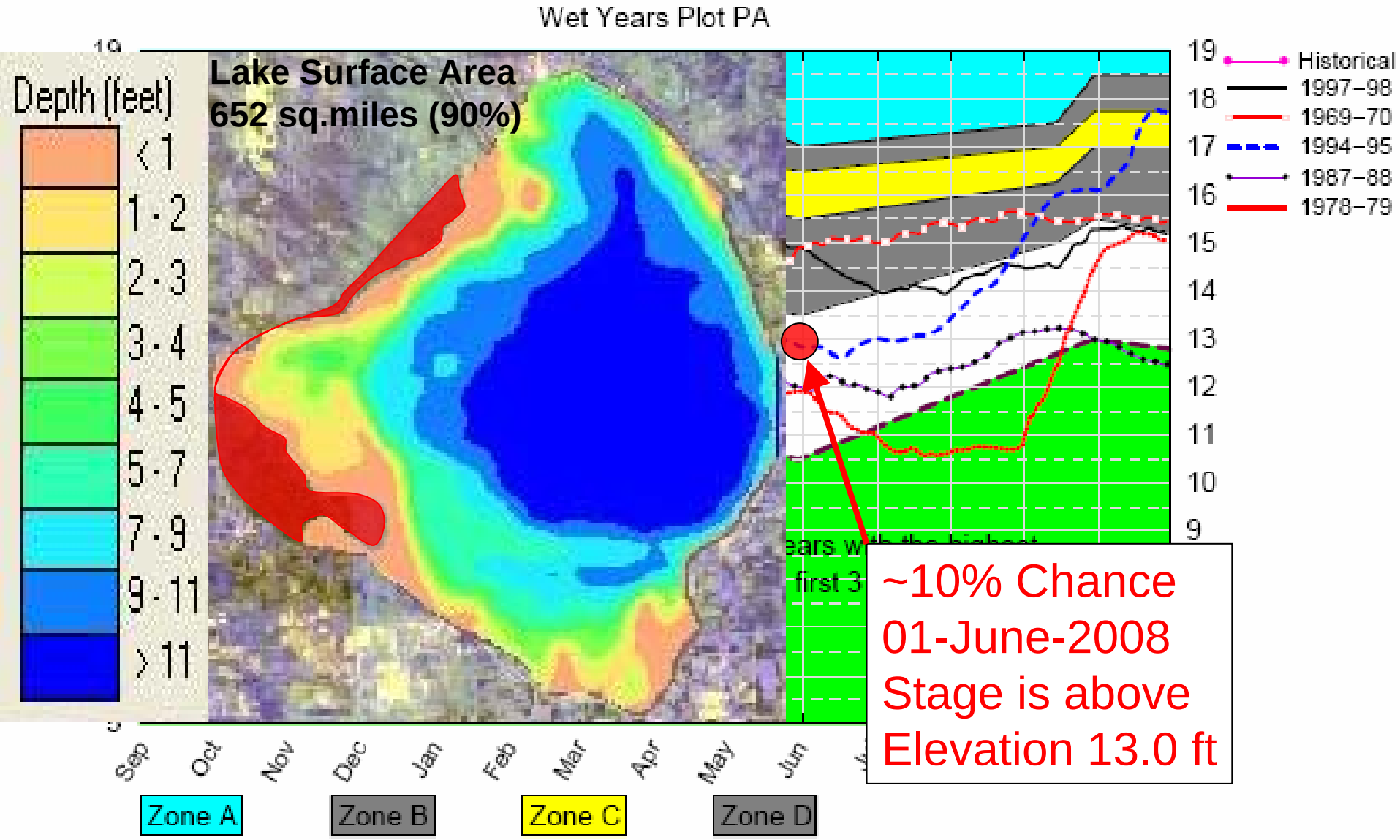
Lake Okeechobee SFWMM November 2007 Position Analysis



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

Fri Nov 2 13:07:23 2007

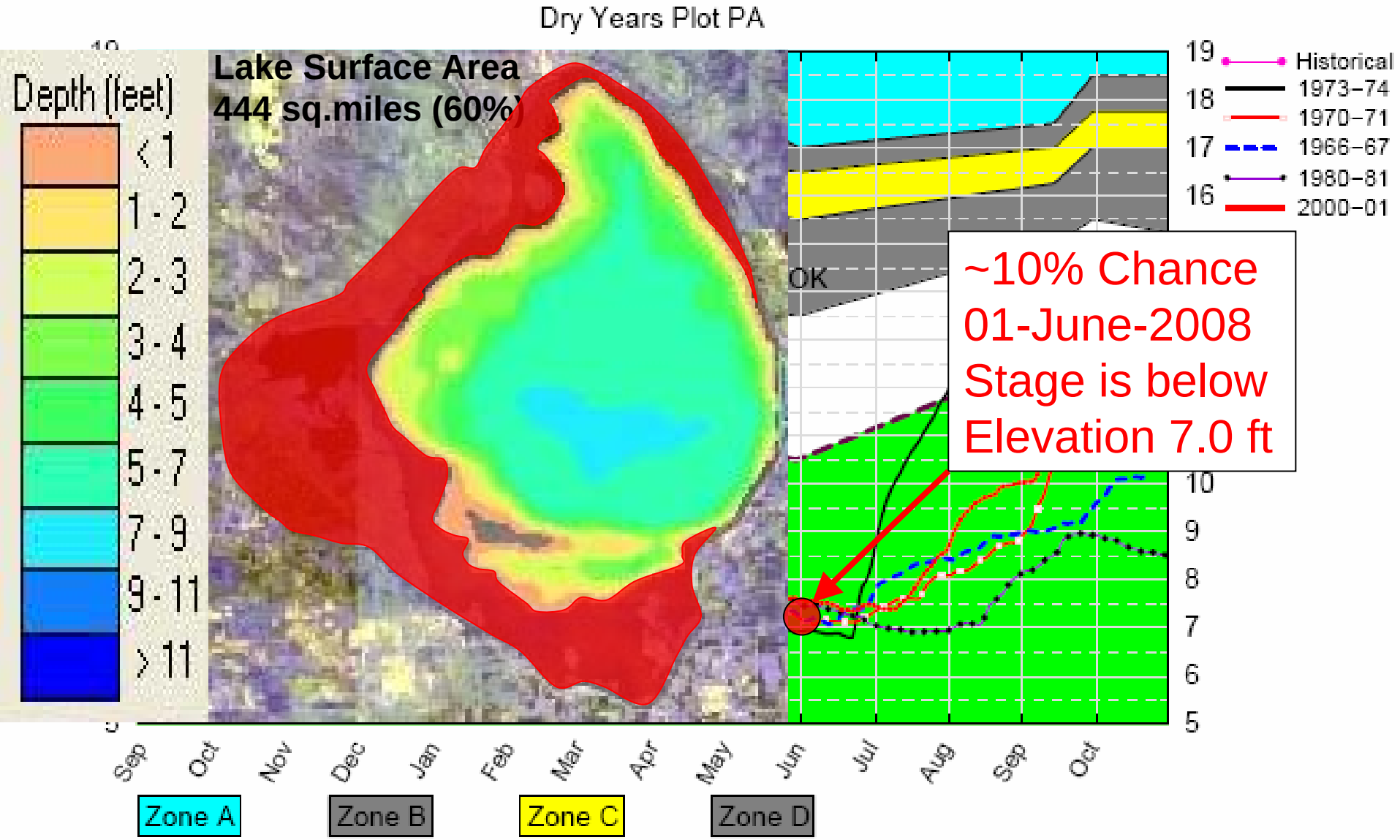
Lake Okeechobee SFWMM November 2007 Position Analysis



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

Fri Nov 2 13:07:36 2007

Lake Okeechobee SFWMM November 2007 Position Analysis



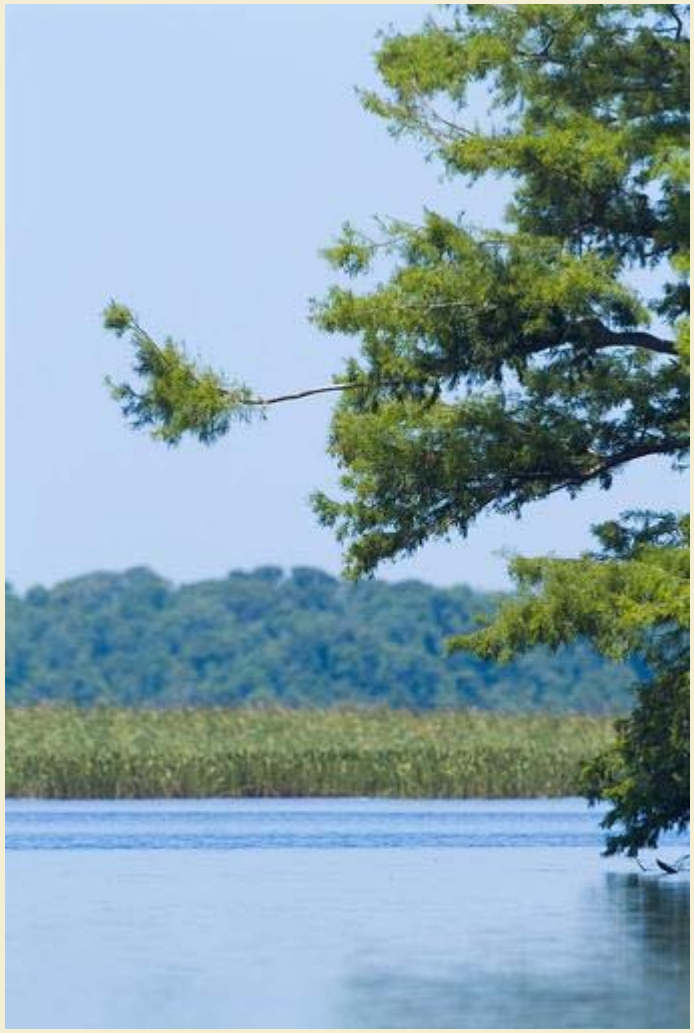
(See assumptions @ http://www.sfwmd.gov/org/pld/hsm/sfwmm_pa.html)

Fri Nov 2 13:07:35 2007

November-December 2007 Water Shortage Actions

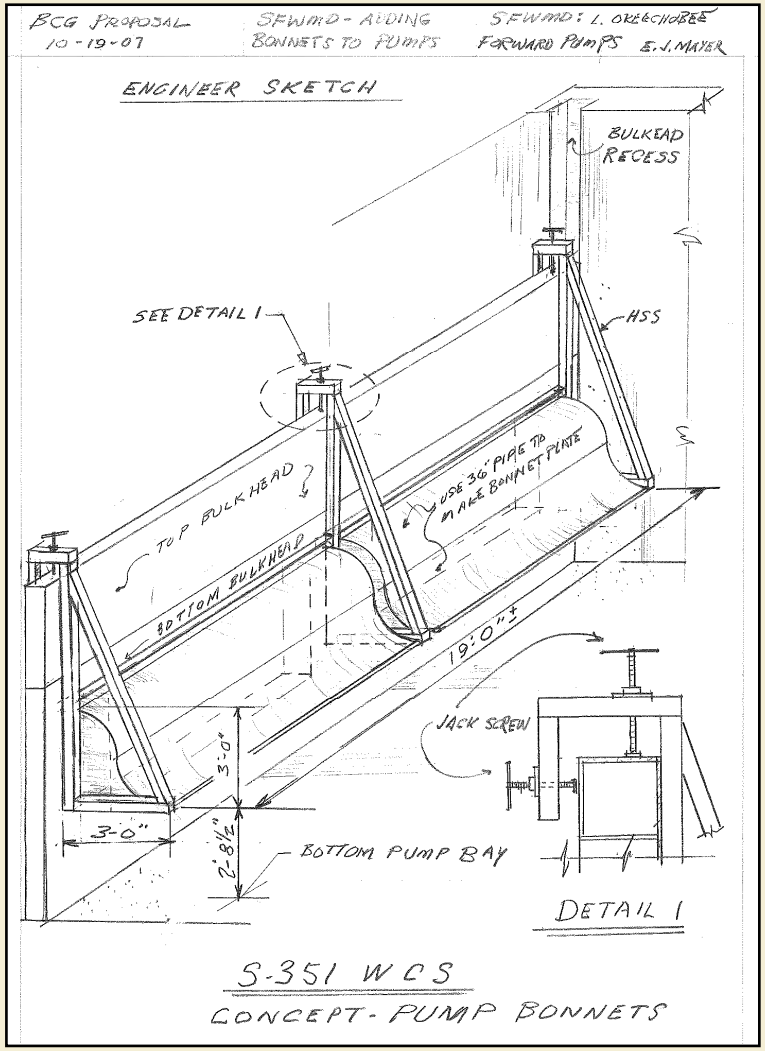
- Transition to dry season operations
  - Close coastal structures
  - Strategic operations to conserve water in regional system

November-December 2007 Water Shortage Actions



- Finalize extension of deviation from regulation schedules with Corps
  - Water Conservation Areas 1 & 2
  - Lake Istokpoga

November-December 2007 Water Shortage Actions



- **Temporary Pump Retrofits**
  - **Ensure pump operation down to lake stage of 7 feet**
  - **Design and fabrication underway**
  - **Pump test planned for December**

November-December 2007 Water Shortage Actions

- Evaluating Floating Pumps
  - Engineering feasibility study underway to consider floating pumps
  - May allow pumps to continue operating below lake stages of 7 feet

November-December 2007 Water Shortage Actions

- Planning for additional environmental enhancement projects
  - Expanded muck removal
  - Expanded treatment of exotic vegetation
  - Replanting of native vegetation
  - Restocking of native apple snails

November-December 2007 Water Shortage Actions

- Water Conservation Summit
- Comprehensive Water Conservation Program
- Coordinated public information and education initiative

Future Policy Actions for Governing Board

- Increased water restrictions
  - District-wide implementation
  - Landscape irrigation
  - Agriculture and Nurseries
  - Golf Courses

Questions?