SOUTH FLORIDA WATER MANAGEMENT DISTRICT

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Lake Okeechobee Operations and Adaptive Protocols

Semi-annual Update: Water Conditions and Operations

Water Resources Advisory Commission

December 1, 2016

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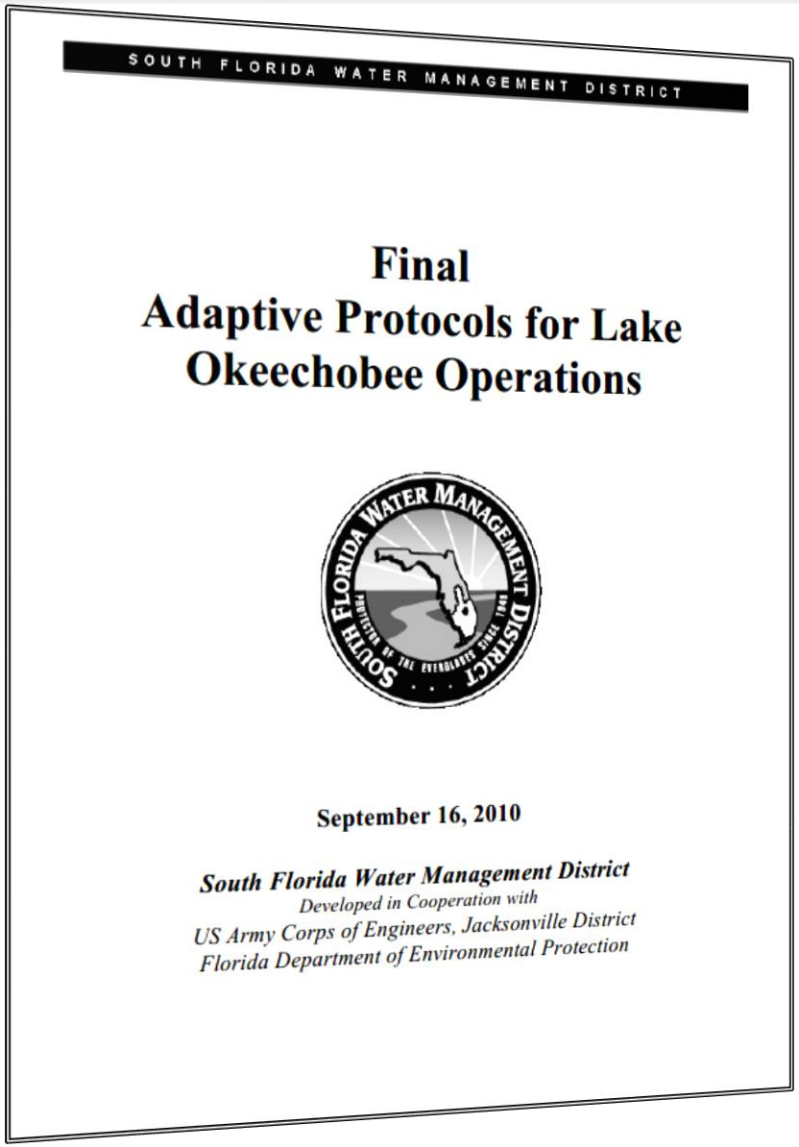
Purpose


SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Final
Adaptive Protocols for Lake Okeechobee Operations

September 16, 2010

South Florida Water Management District
Developed in Cooperation with
US Army Corps of Engineers, Jacksonville District
Florida Department of Environmental Protection

The Adaptive Protocols for Lake Okeechobee Operations:

- Identifies opportunities for water resource improvements in the operations of the 2008 LORS.
- Provides scientifically-based recommendations on releases in the Low, Baseflow, and Beneficial Use subbands of 2008 LORS through weekly operations discussions with the USACE.
- Conducts semi-annual public workshops at the start of the wet and dry seasons to receive public comments, review regional operations, gather and present recent information, and discuss operations, issues and opportunities for the next six months.

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Topics

1. **Brief Background**
2. **Summary of 2016 Wet Season Water Conditions & Operations**
3. **2016-17 Dry Season Outlook & Tentatively Planned Operations**
4. **Ecological Conditions Summary – Dr. Susan Gray**

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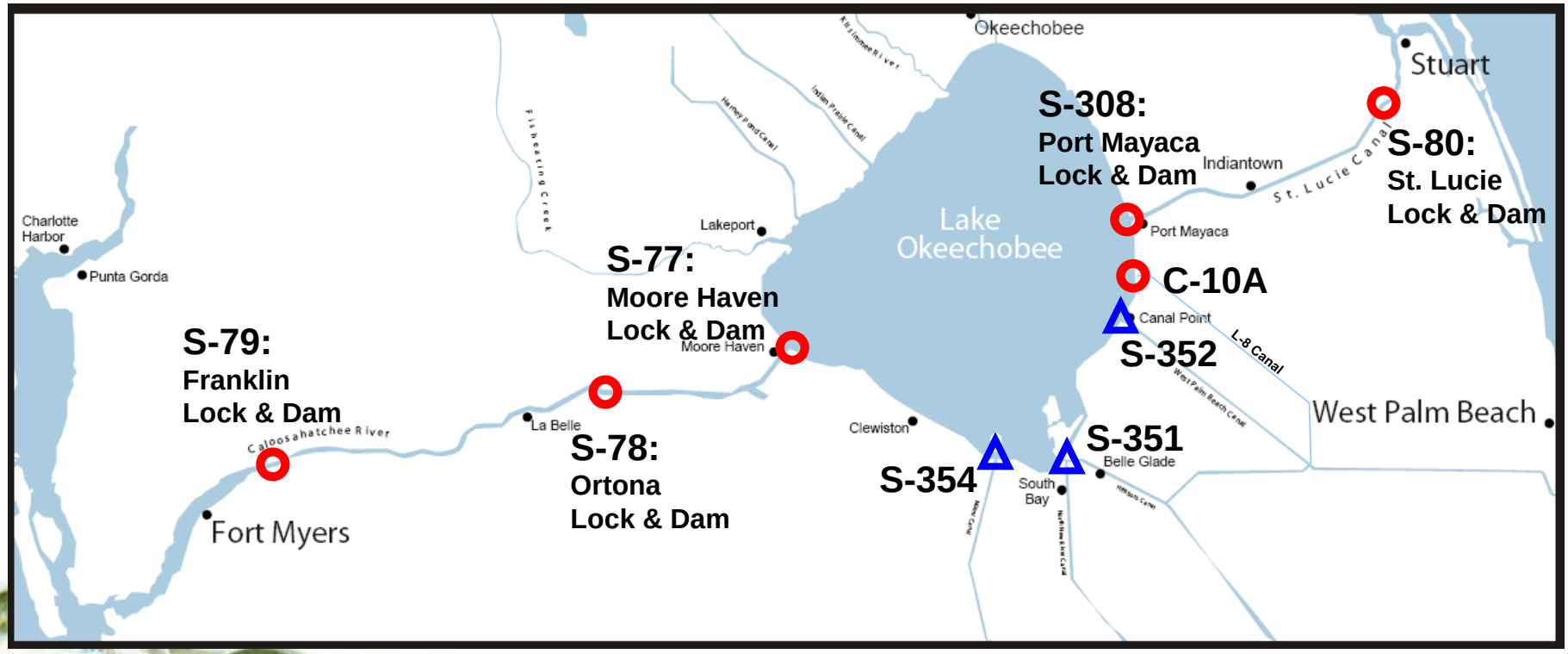
Lake Okeechobee Outlet Structures

Lake Okeechobee outlet structures managed by the USACE (red ○) and the SFWMD (blue Δ)



2008 Lake Okeechobee Interim Regulation Schedule *(2008 LORS)*

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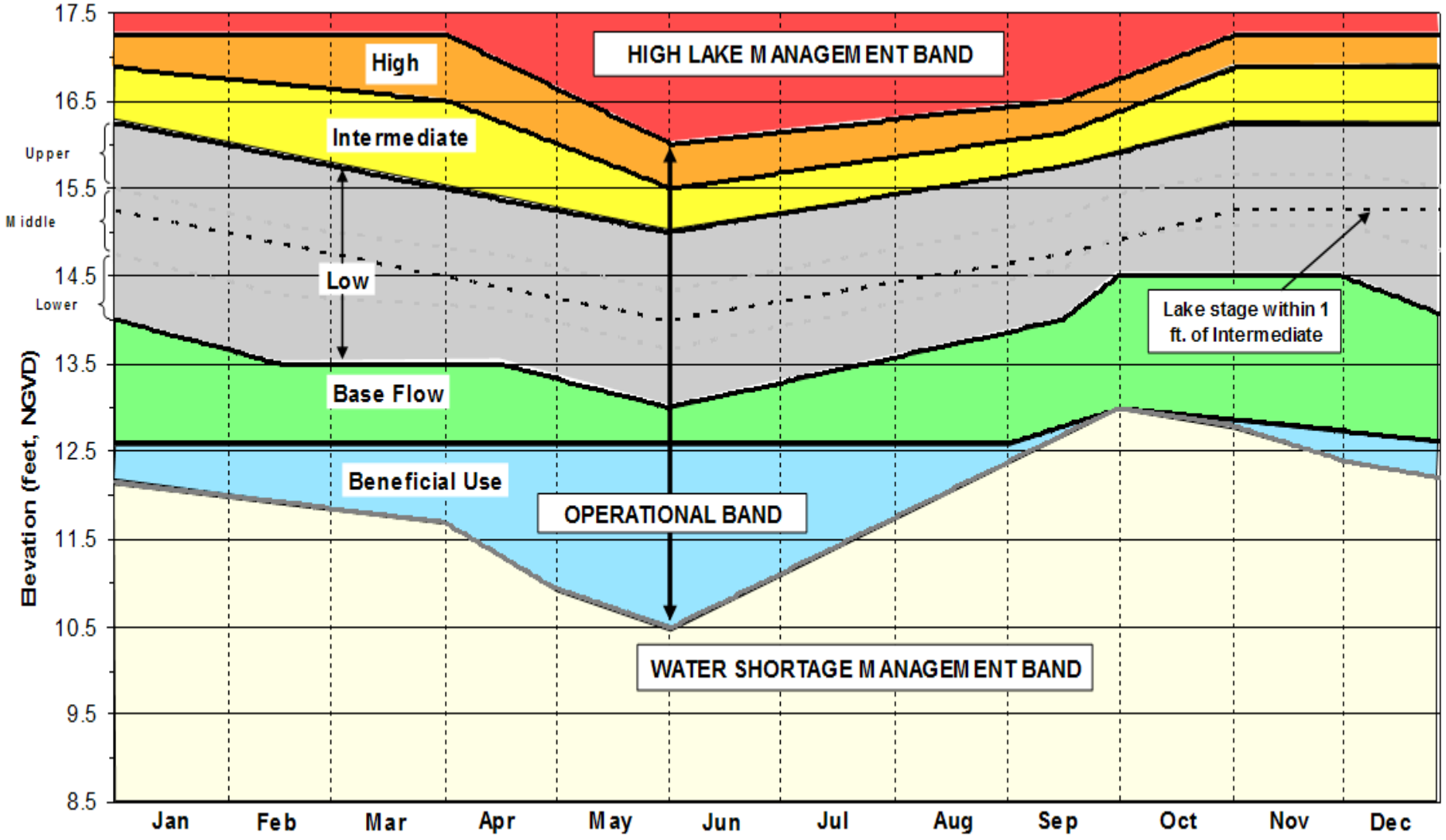

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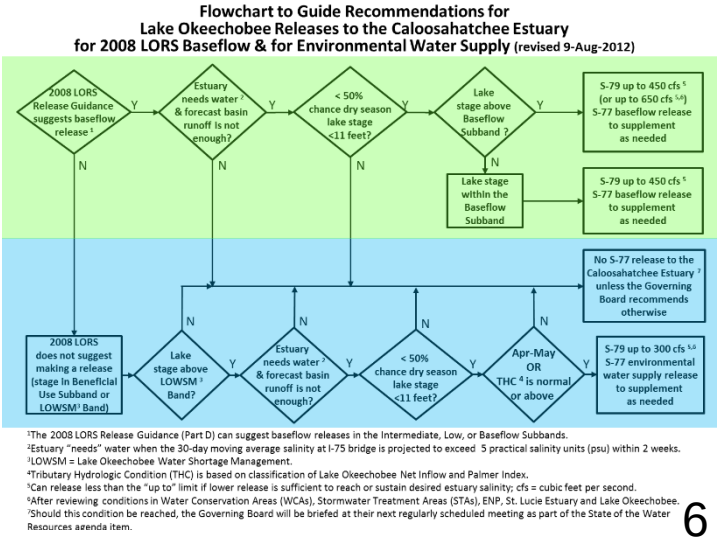
What are the Lake O Adaptive Protocols (AP)?

- AP document (16-Sep-2010) provides operational guidance to SFWMD and a framework for making Lake O release recommendations to the USACE
- Recommends the USACE make "conservative" regulatory releases in the Low Subband at the beginning of the dry season (if no impact to HHD safety)
- Flowchart used to guide SFWMD recommendations for Lake O Releases to the Caloosahatchee Estuary
  - **for 2008 LORS Baseflow**
  - **for Environmental Water Supply**
- Flowchart designed primarily to achieve SFWMD Governing Board-approved water supply balance between permitted water users, Caloosahatchee Estuary, and the Lake O MFL



Flowchart to Guide Recommendations for Lake Okeechobee Releases to the Caloosahatchee Estuary for 2008 LORS Baseflow & for Environmental Water Supply (revised 9-Aug-2012)

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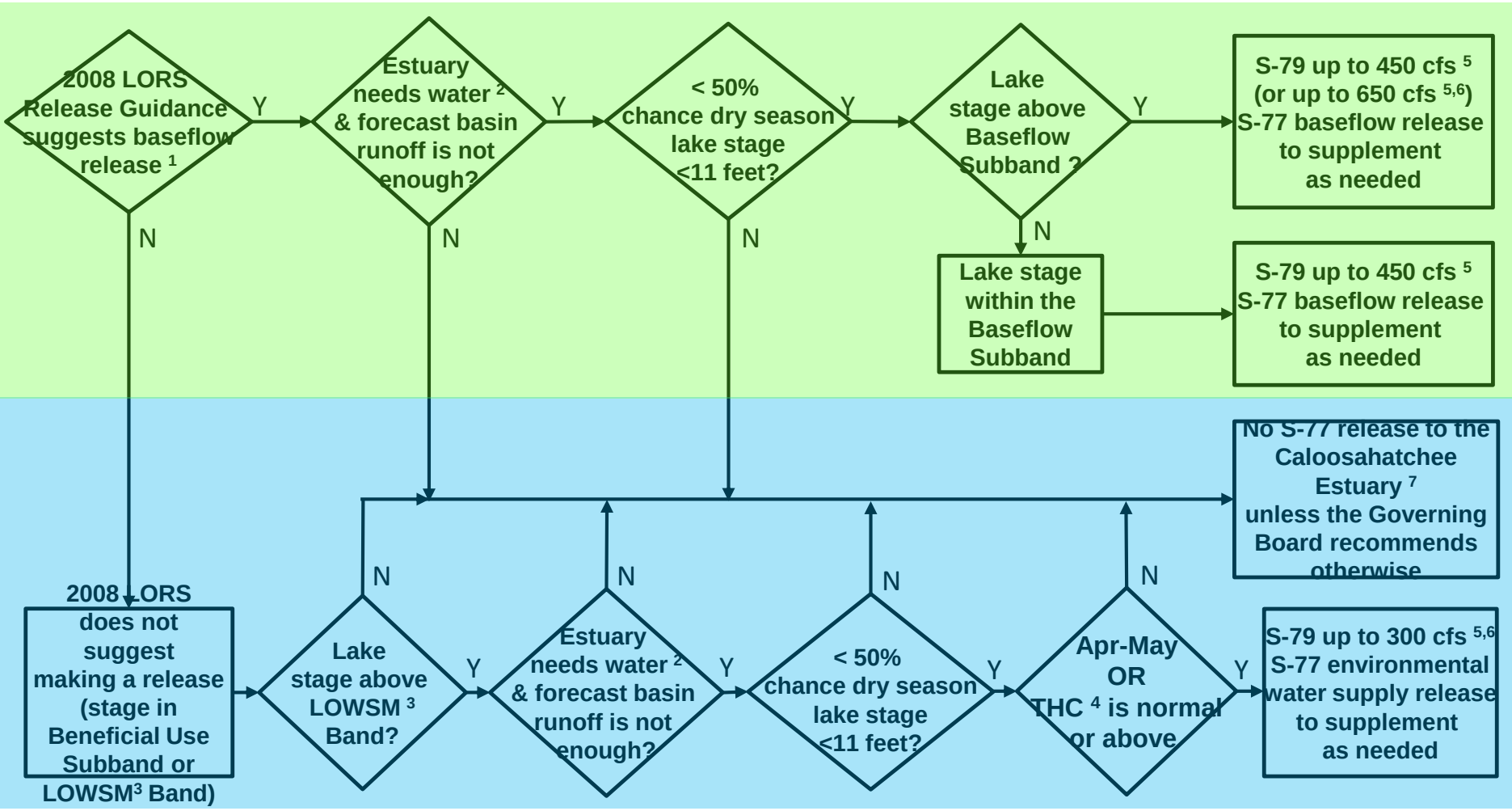

[1]The 2008 LORS Release Guidance (Part D) can suggest baseflow releases in the Intermediate, Low, or Baseflow Subbands.

[2]Estuary "needs" water when the 30-day moving average salinity at I-75 bridge is projected to exceed 5 practical salinity units (psu) within 2 weeks.

[3]LOWSM = Lake Okeechobee Water Shortage Management.

[4]Tributary Hydrologic Condition (THC) is based on classification of Lake Okeechobee Net Inflow and Palmer Index.

[5]Can release less than the "up to" limit if lower release is sufficient to reach or sustain desired estuary salinity; cfs = cubic feet per second.

[6]After reviewing conditions in Water Conservation Areas (WCAs), Stormwater Treatment Areas (STAs), ENP, St. Lucie Estuary and Lake Okeechobee.

[7]Should this condition be reached, the Governing Board will be briefed at their next regularly scheduled meeting as part of the State of the Water Resources agenda item.

2016 Wet Season SFWMD Rainfall November 2016

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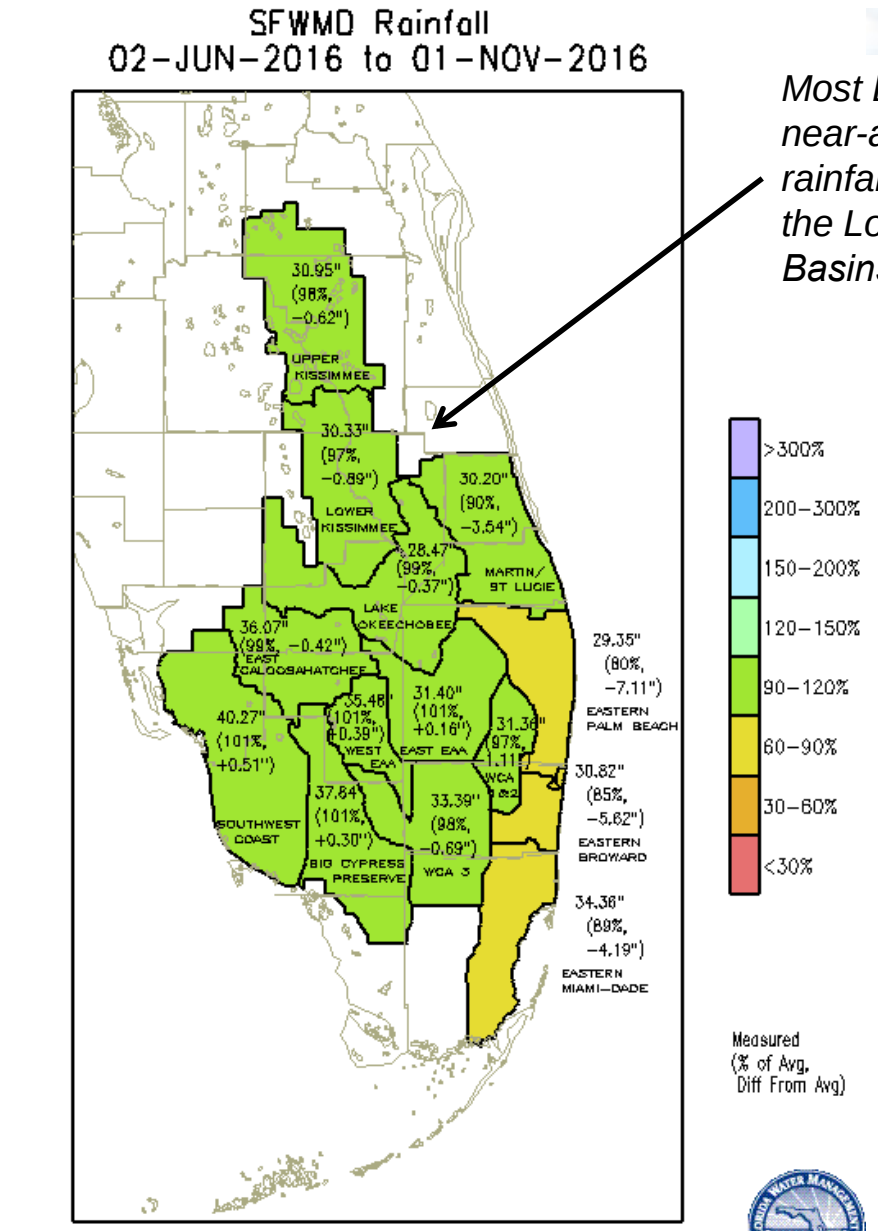
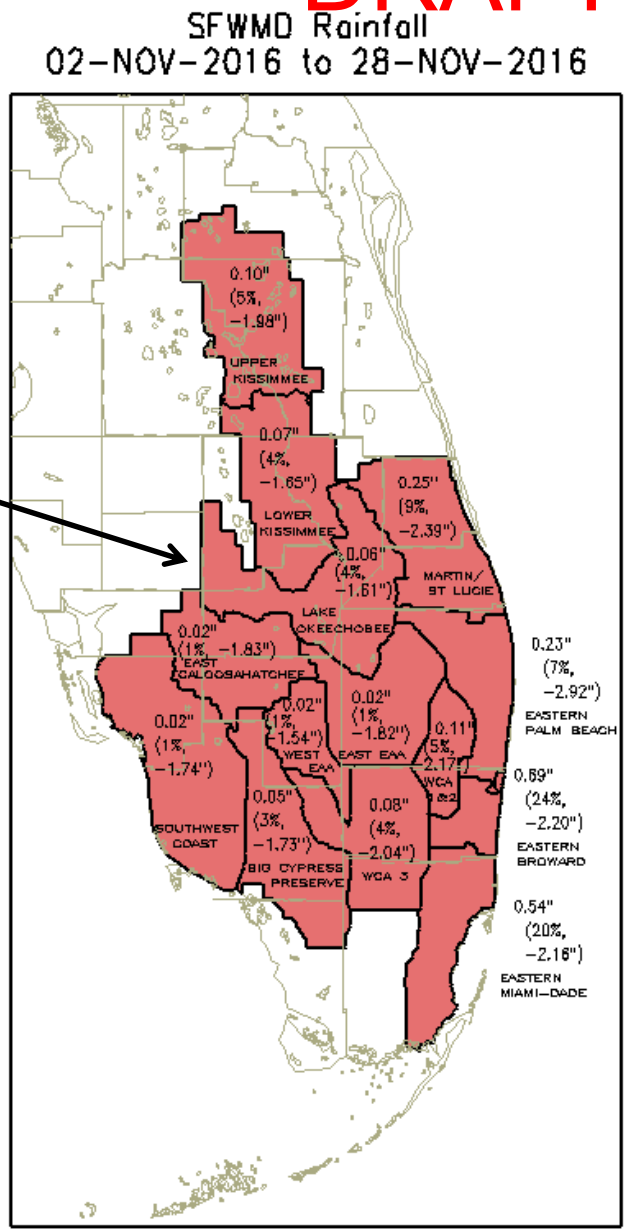


Most Basins received near-average Jun-Oct rainfall; exceptions were the Lower East Coast Basins (4"-7" deficits)

All Basins received well below-average November rainfall (wet season ended in early October after H. Matthew)

Projected to be the Driest November in the 85-yr record (1932-2016)



2016 Lake Okeechobee Water Level and Releases

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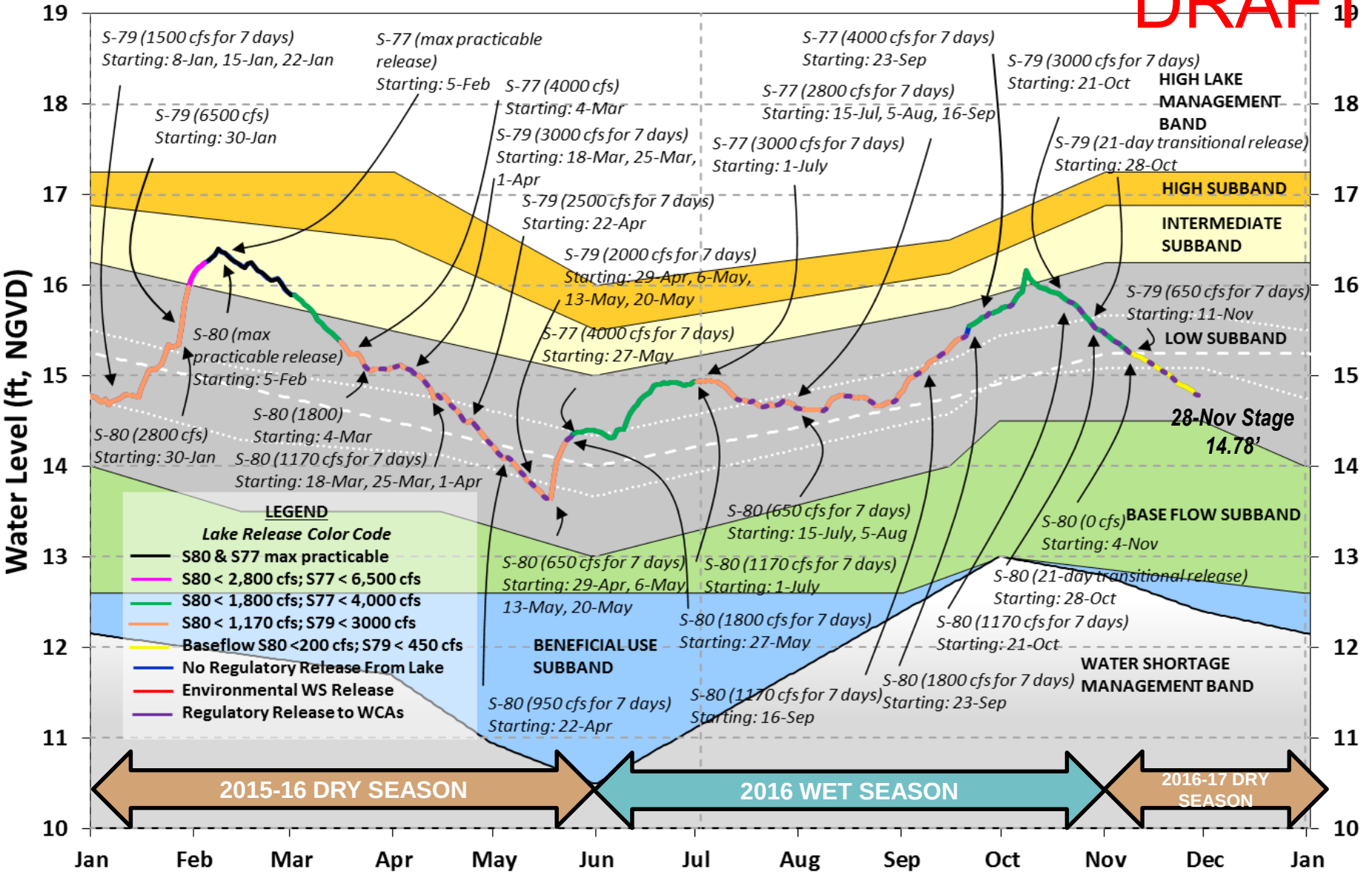

Lake O Release Summary
May-Oct 2016

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(provisional flow data)

- 90 kaf Lake O regulatory releases south to FEBs & STAs
  - About 0.21 feet of Lake O water (430 kac average lake area)
  - Less than for same periods in 2015 (150 kaf) & 2014 (207 kaf)
  - WCAs above regulation schedules during most of the wet season
- Lake O regulatory releases from S-308 to the St. Lucie Estuary totaled about 332 kaf, about 37% of the total inflow to the estuary (908 kaf)
- Lake O regulatory releases from S-77 to the Caloosahatchee Estuary totaled about 833 kaf, about 42% of the total inflow to the estuary (1,965 kaf)
- Relatively high basin runoff to the coastal estuaries
- Lake O Adaptive Protocols Guidance not applicable due to relatively high Lake O stage (above Baseflow Sub-band)

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Lake Okeechobee: Current Operations

- **USACE's Lake O Regulation Schedule (2008 LORS)**
  - Stage (~14.8 feet, NGVD) 0.3' above bottom of Low Subband & receding
  - Current LORS release guidance outcome:
    S-79: up to 450 cfs
    S-80: up to 200 cfs
    WCAs: up to maximum practicable to the WCAs if desirable or with minimum Everglades impacts
  - USACE current operations: S-79: 650 cfs; S-80: 0 cfs
  - SFWMD has been releasing 1,800 – 2,500 cfs south during the past 4 weeks

- **SFWMD's Lake O Adaptive Protocols Guidance (2010)**
  - Lake stage projected to recede into the Baseflow Subband
  - AP release guidance will suggest baseflow releases to the Caloosahatchee Estuary depending on current and forecast salinity

U. S. Seasonal Precipitation Outlook

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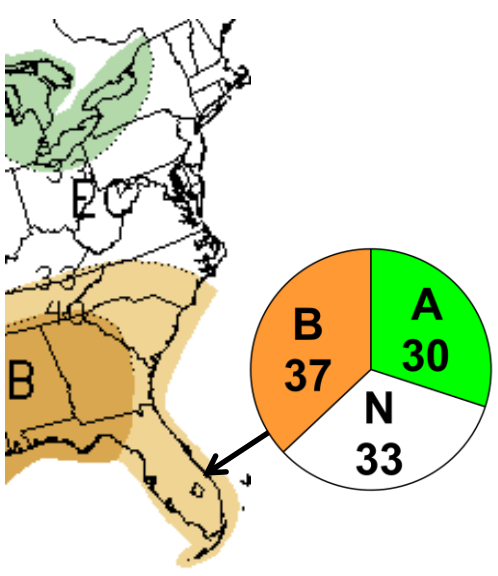
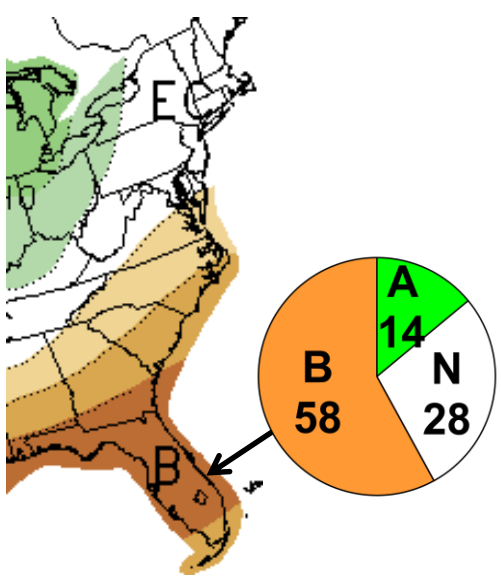
National Climate Prediction Center (CPC)

Dec 2016



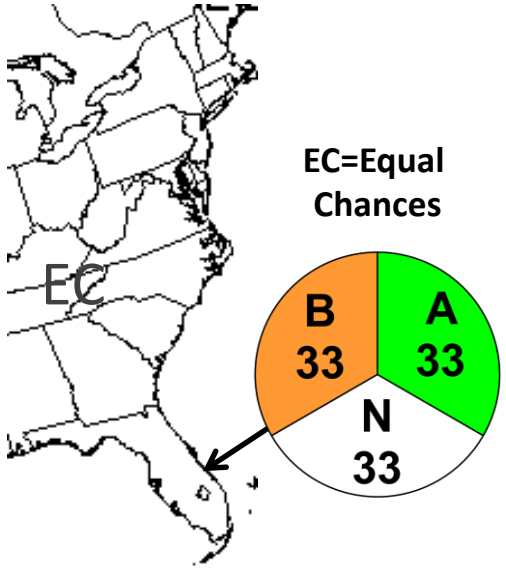
Posted 17-Nov-2016

Dec-Feb 2017



Posted 17-Nov-2016

Mar-May 2017



EC=Equal Chances

Posted 17-Nov-2016

The most-recent CPC precipitation outlooks for central & southern Florida indicate:

- **>33% chance of Below-Normal rainfall for December 2016**
- **58% chance of Below-Normal rainfall for Dec 2016 - Feb 2017**
- **Equal chances of Above-Normal Normal & Below-Normal rainfall for Mar-May 2017**
- **As of 10-Nov CPC update, La Niña conditions are present and slightly favored to persist (~55% chance) through winter 2016-17**

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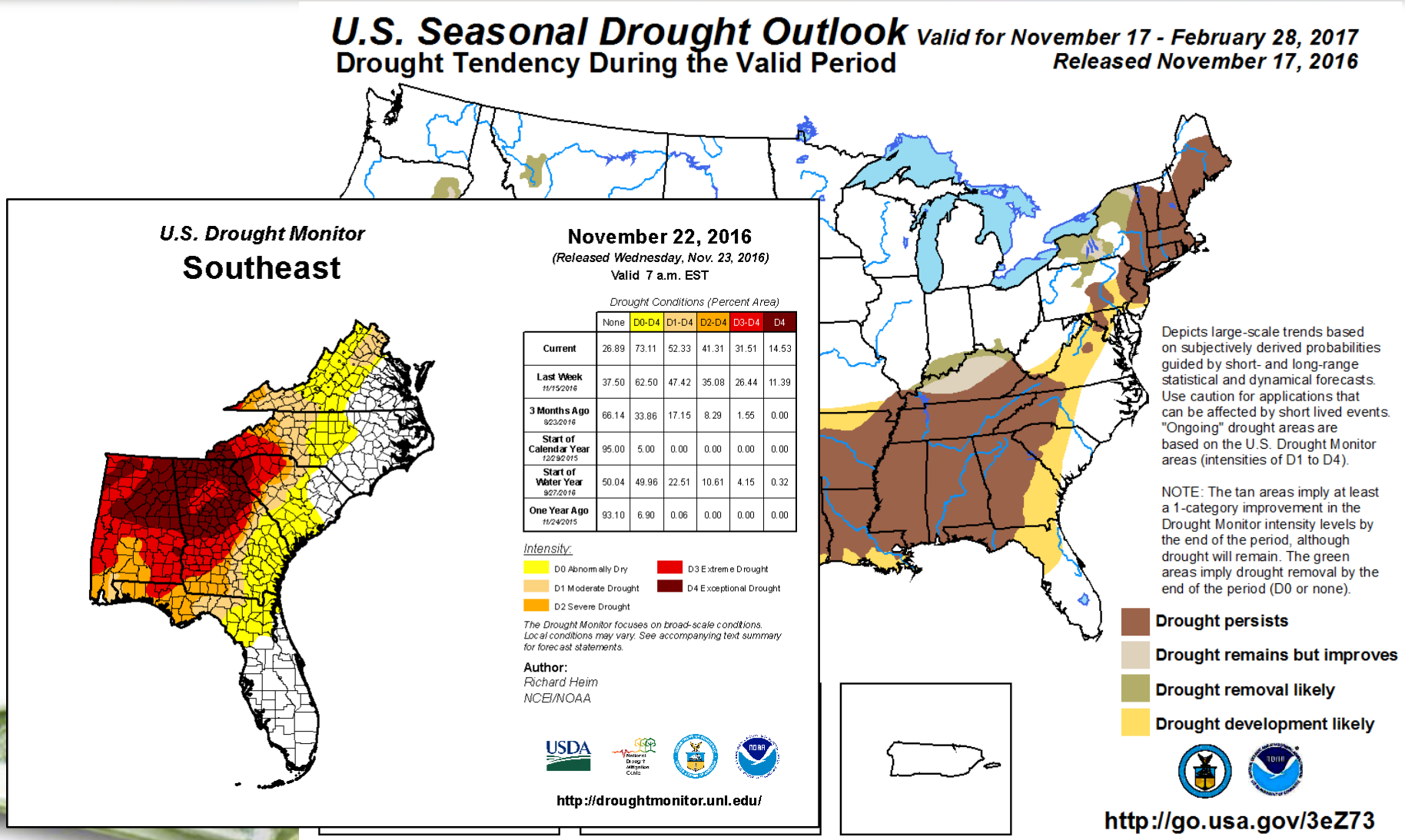
U. S. Drought Monitor and Seasonal Drought Outlook

currently show no issues for central and southern Florida



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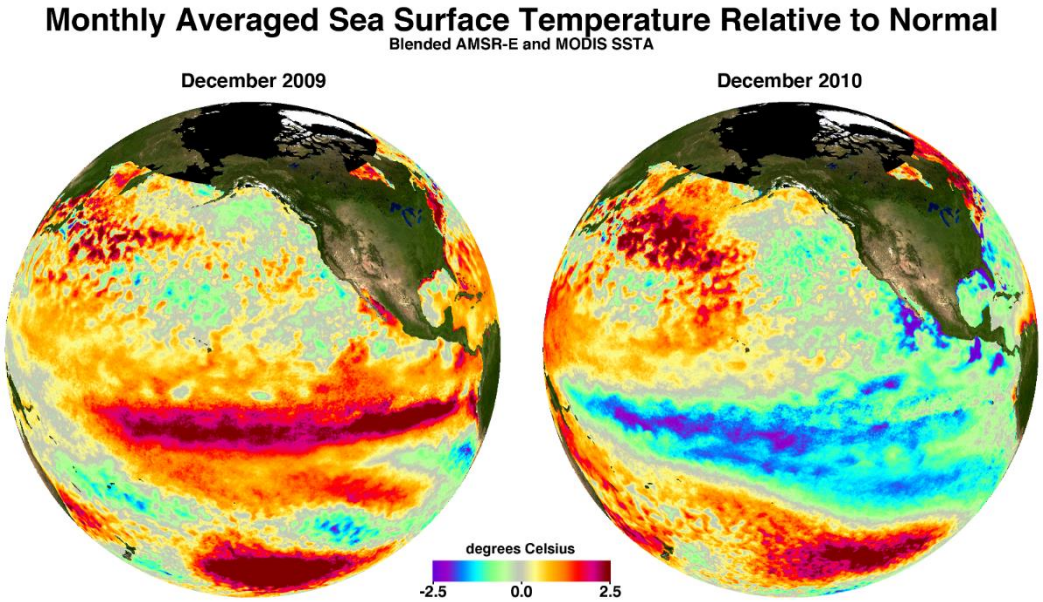
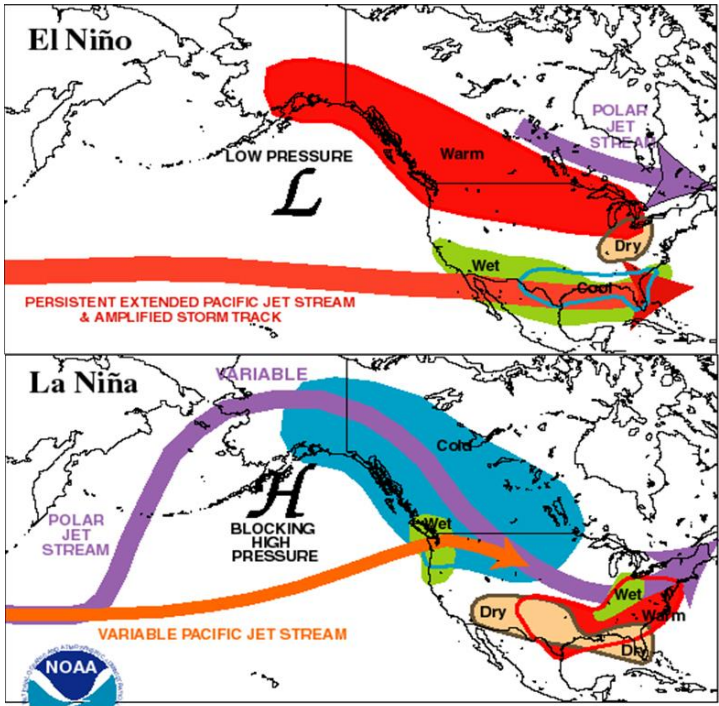
What are El Niño & La Niña?

"El Niño and La Niña are complex weather patterns resulting from variations in ocean temperatures in the Equatorial Pacific" (NOAA)



Warm Phase
El Niño

Cool Phase
La Niña



Climate Prediction Center/NCEP/NWS

https://podaac.jpl.nasa.gov/OceanEvents/GRACE_2010-11_GMSL_ENSO_Oct2012

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Summary of SFWMD Analysis

- 1951-2015 data analyzed to determine the distribution of Lake Okeechobee watershed rainfall (LOWRF) and net inflow (LONIN) conditioned on equatorial Pacific Ocean sea-surface temperature anomalies (ONI)
- Confirmation of tendency for higher Nov-Apr rainfall and Lake O net inflows during El Niño years, and lower rainfall and net inflow during La Niña years
- For El Niño dry seasons, the chance of above-normal rainfall is 61% and the chance of above-normal Lake O net inflow is 70%
- For La Niña dry seasons, the chance of below-normal rainfall is 55% and the chance of below-normal Lake O net inflow is 75%

Lake Okeechobee SFWMM Nov 2016 Dynamic Position Analysis

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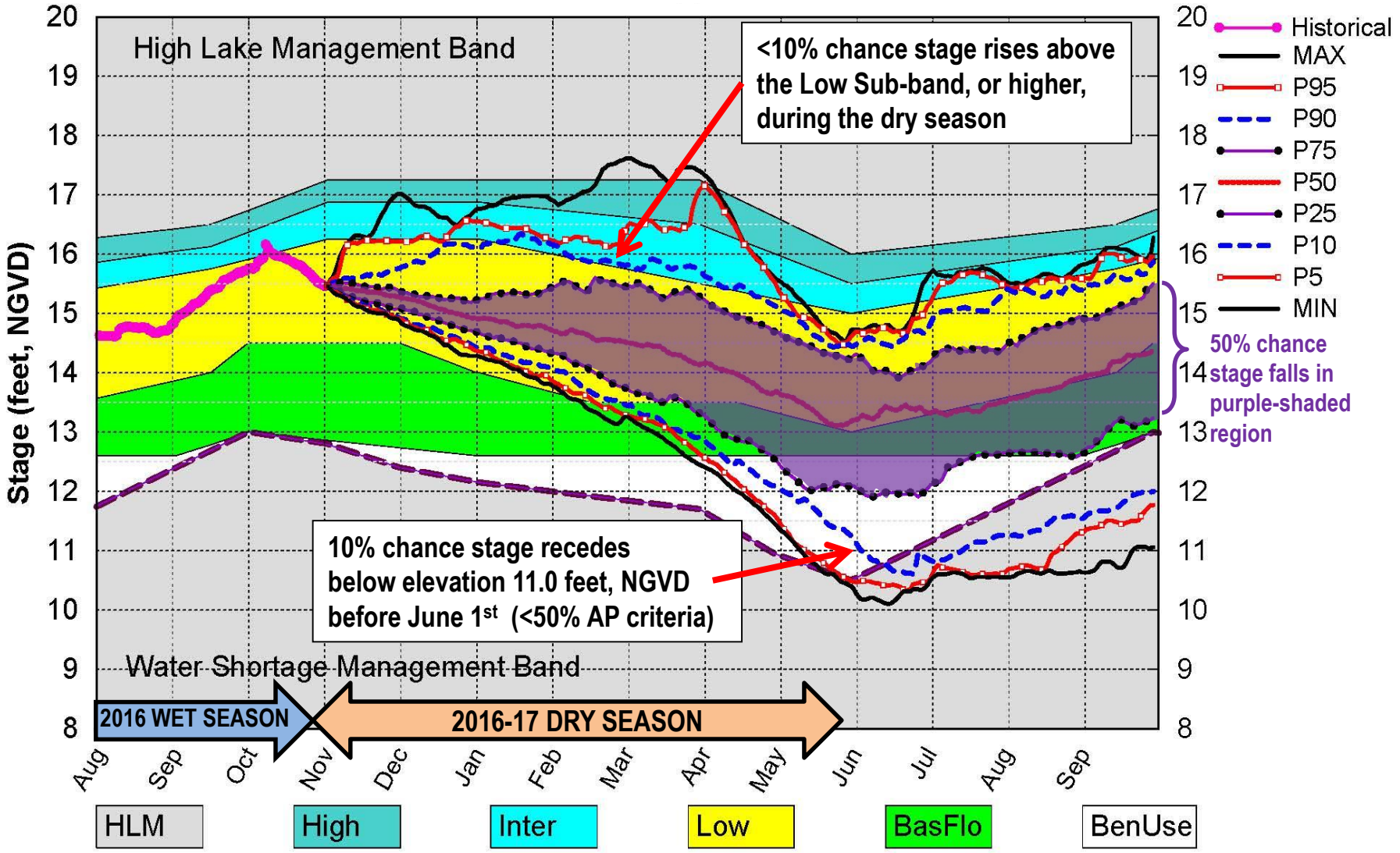
Percentiles based on 41 equally-likely outcomes starting with Nov 1st initialization



(See assumptions on the Position Analysis Results website)

Fri Nov 4 13:05:34 2016

Lake Okeechobee SFWMM Nov 2016 Dynamic Position Analysis

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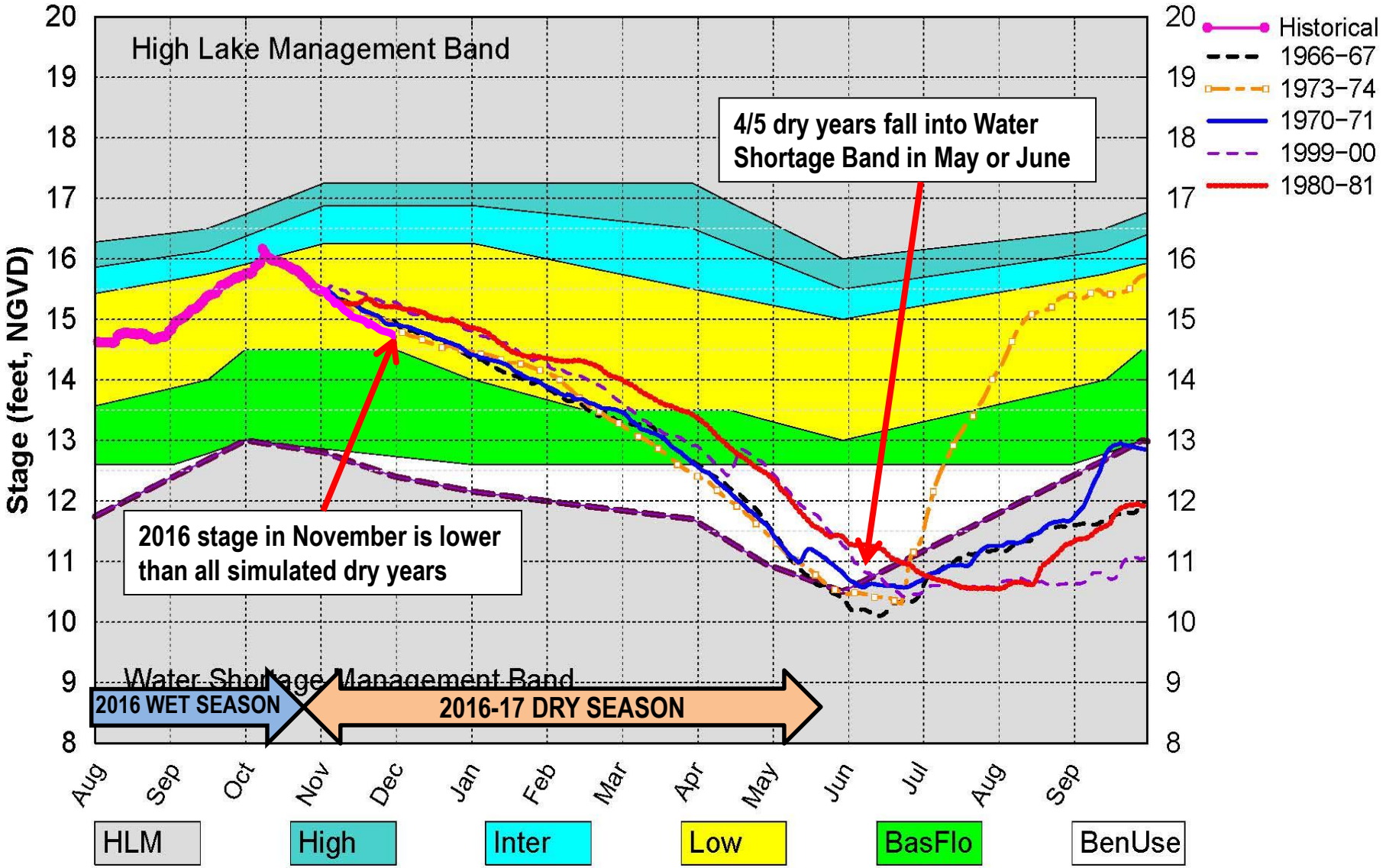
Percentiles based on 41 equally-likely outcomes starting with Oct 1st initialization



(See assumptions on the Position Analysis Results website)

Tentatively Planned Lake O Operations 2016-17 Dry Season

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- **SFWMD to continue weekly Lake O release recommendations to the USACE based on**
  - **Recommendations from SFWMD scientists**
  - **Adaptive Protocols Release Guidance (if applicable)**
  - **Findings from model projections and operations analyses**
- **USACE plans to continue releases per the 2008 LORS guidance within the allowable operating flexibility**
  - **USACE decisions based on best available information and input from various government agencies and the public**
  - **Operations to be consistent with design and intent of LORS per 2007 EIS & the associated balance of multiple project purposes**

Questions??

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http://florida-georgiacamping.blogspot.com/2011/12/wp-franklin-locks-campground.html