

Water Resources Advisory Commission

May 8, 2014

Adaptive Protocols for Lake Okeechobee Operations

Water Conditions and Operations: Past, Present and 2014 Wet Season Outlook

Calvin J. Neidrauer, P.E., Chief Engineer
Water Control Operations Bureau

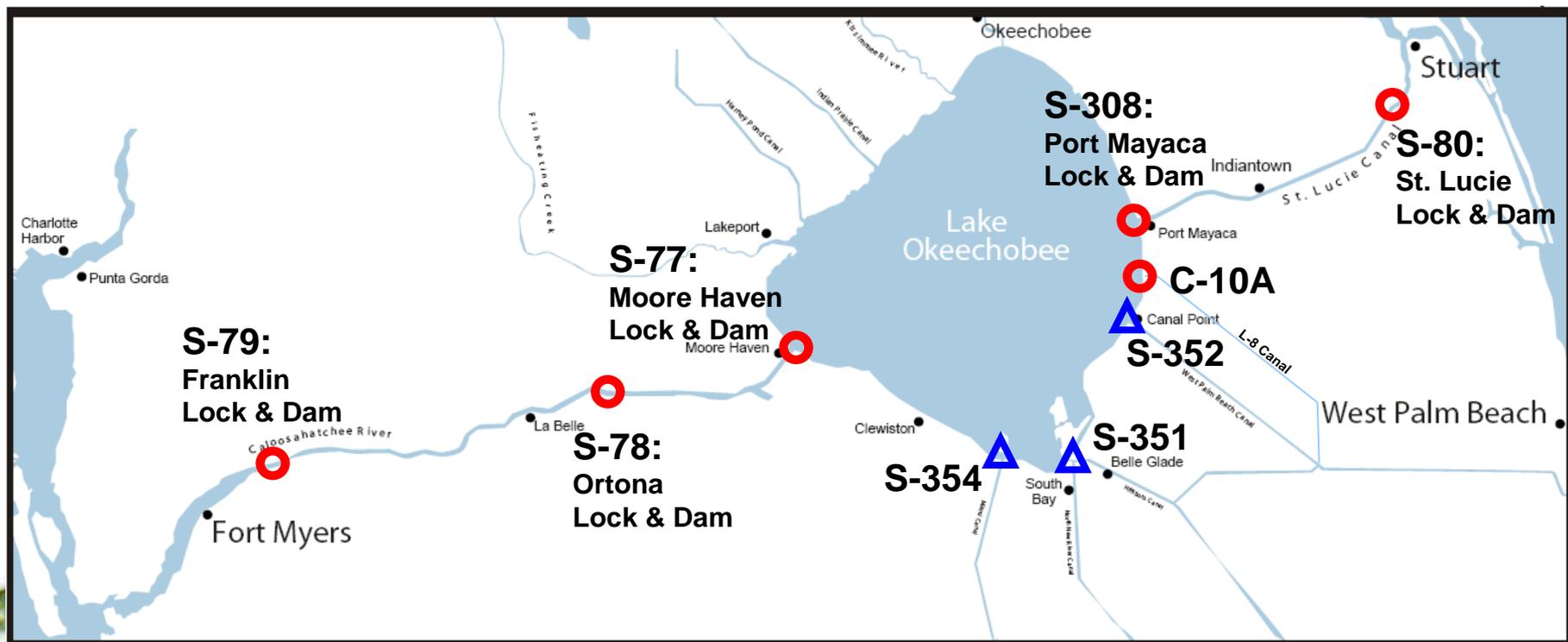
Topics

- 1. Brief Background**
- 2. Summary of 2013-14 Dry Season Water Conditions & Operations**
- 3. Current Water Conditions & Operations**
- 4. 2014 Wet Season Outlook and Tentatively Planned Operations**

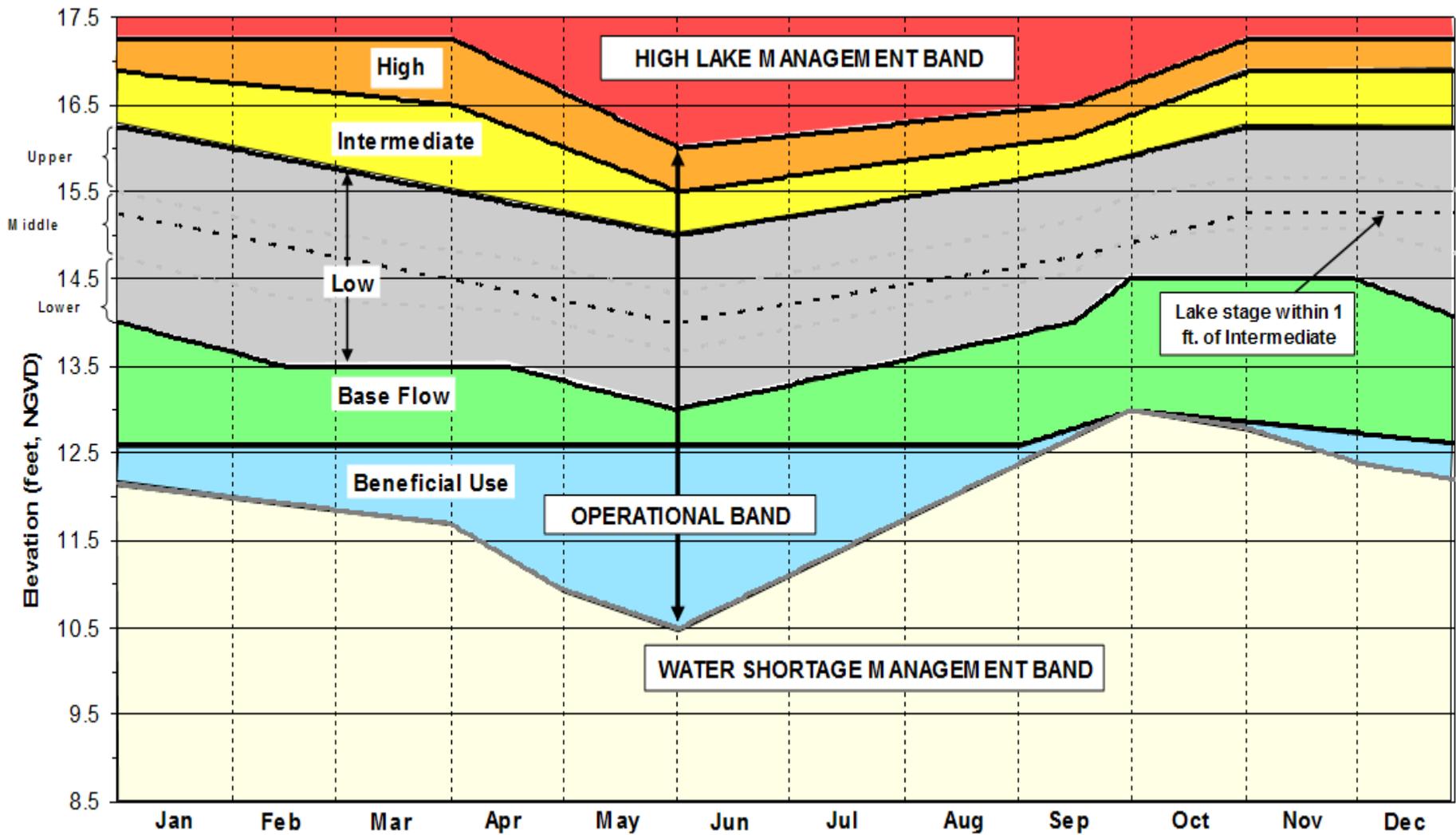
Part 1. Brief Background on Lake O Operations

Lake Okeechobee Outlet Structures

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



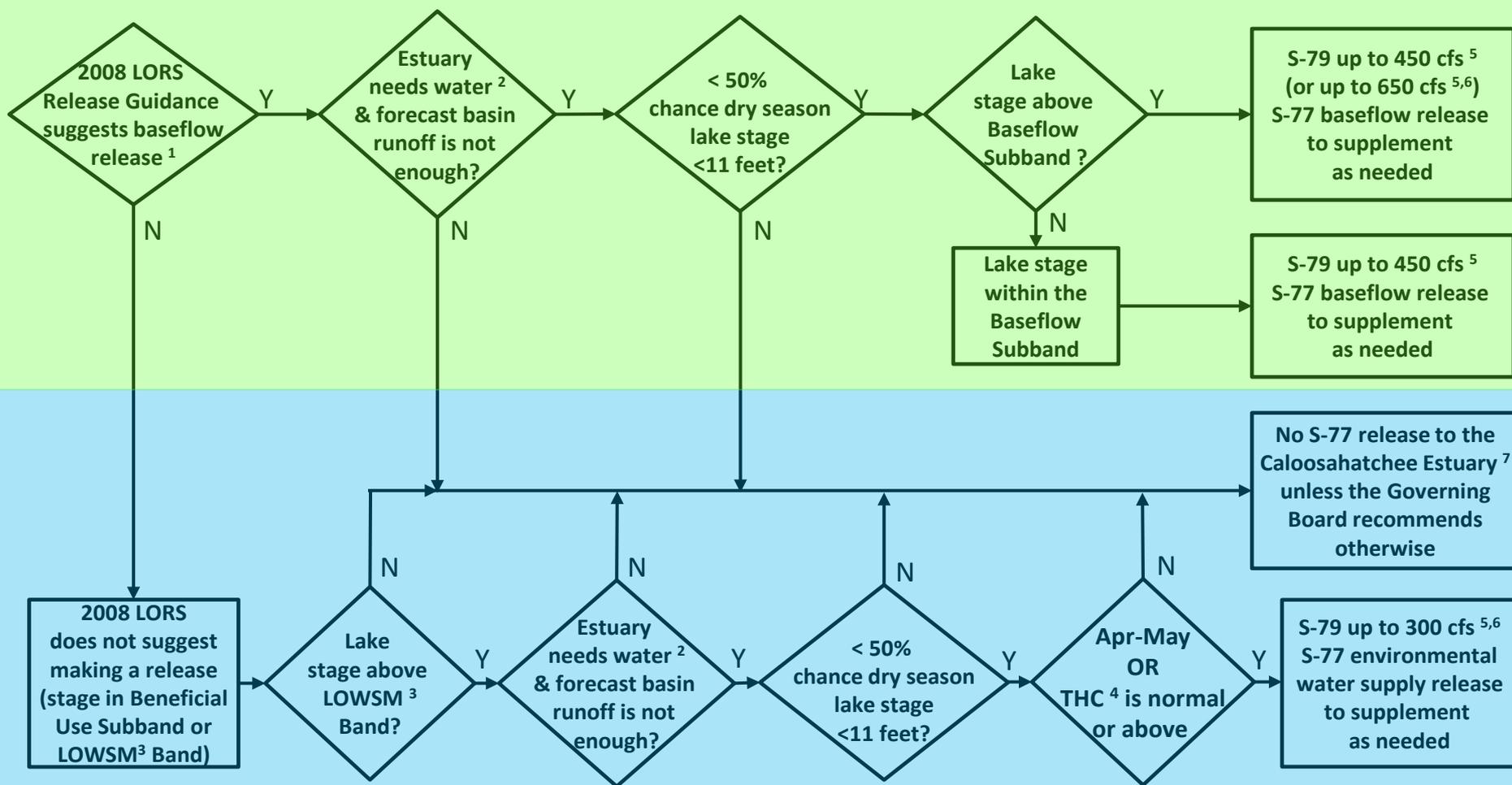
2008 Lake Okeechobee Interim Regulation Schedule (2008 LORS)



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” 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)



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

²Estuary “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.

³LOWSM = Lake Okeechobee Water Shortage Management.

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

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

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

⁷Should 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.

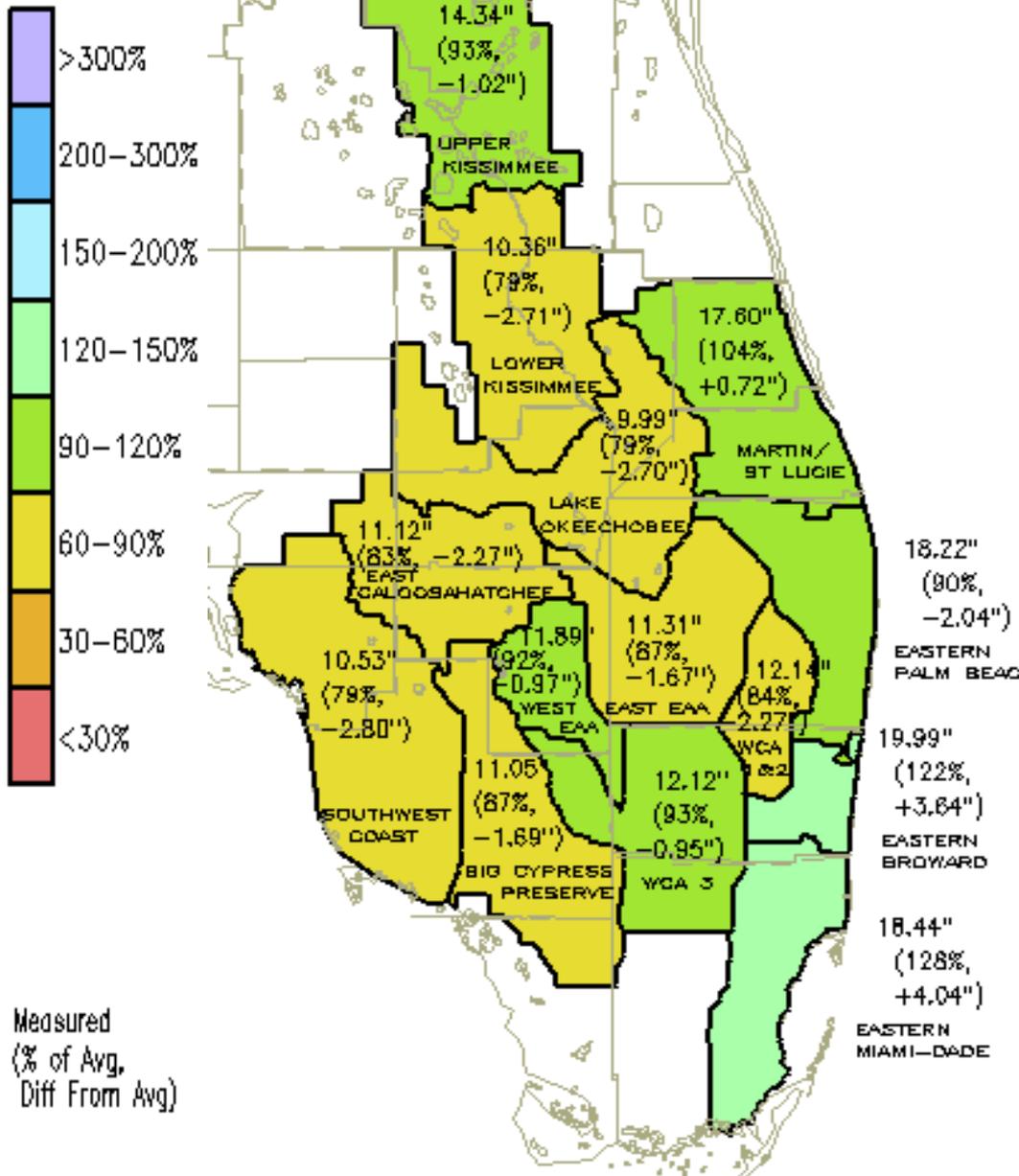
Part 2. 2013-14 Dry Season Water Conditions & Operations

SFWMD

Dry Season Rainfall

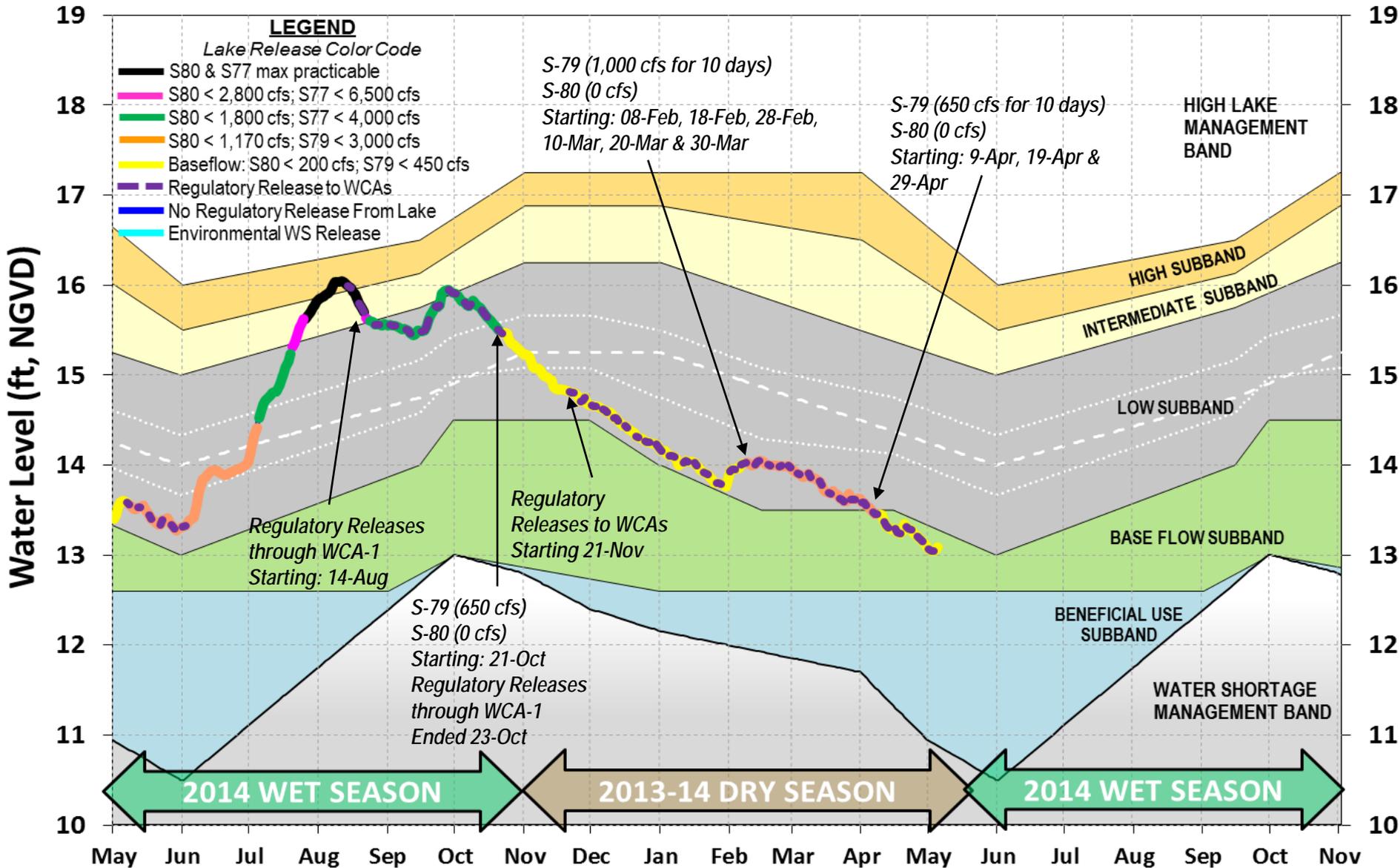
Nov 2, 2013 – May 1, 2014

**DISTRICT-WIDE: 12.9"
(91% of Avg, or -1.2")**



- **Average Rainfall in:**
 - Upper Kissimmee Basin
 - Upper East Coast
 - Eastern Palm Beach County
 - C-139 Basin
 - WCA-3
- **Above-Average Rainfall in:**
 - Eastern Broward and Miami-Dade Counties
- **Below-Average Rainfall in the rest of the SFWMD basins**
 - Lake O & Kissimee Basins about 3" (~20%) below-avg

2013-14 Lake Okeechobee Water Level and Releases



LORS-2008

Adopted by USACE 28-April-2008

2013 | 2014

Lake Okeechobee and Estuary Flows

2013-14 Dry Season (Nov-Apr)
flows in 1000 acre-feet

Lake O Rainfall = 342 kaf (9.7")
 Lake Inflows = 254 kaf (7.2")
 Estimated ET = 646 kaf (18.4")
 LOSA Water Supply = 544 (15.5")
 Total Lake O Reg Release = 317 (9.0")
 Storage Change = -912 kaf (-25.9")

Lake Inflows
254
79% from Kiss.R

**Other Basin
Runoff to SLE: 163**

**S-80 Flow
to SLE: 5**

**C-44 Basin
Runoff
(5 to SLE)
(22 to LOK)**

**Lake
Release
at S-308: 23
(0 to SLE)**

**Lake
Release
at S-77: 241
(179 to CRE)**

**Lake Release
South: 509
(103 to WCAs)
(407 to EAA)**

**Lake Release: 89
36 to tide**

**C-43 Basin
Runoff 131**

**Tidal Basin
Runoff 81**

**S-79 Flow to
CRE: 311**

**EAA
Runoff
151**

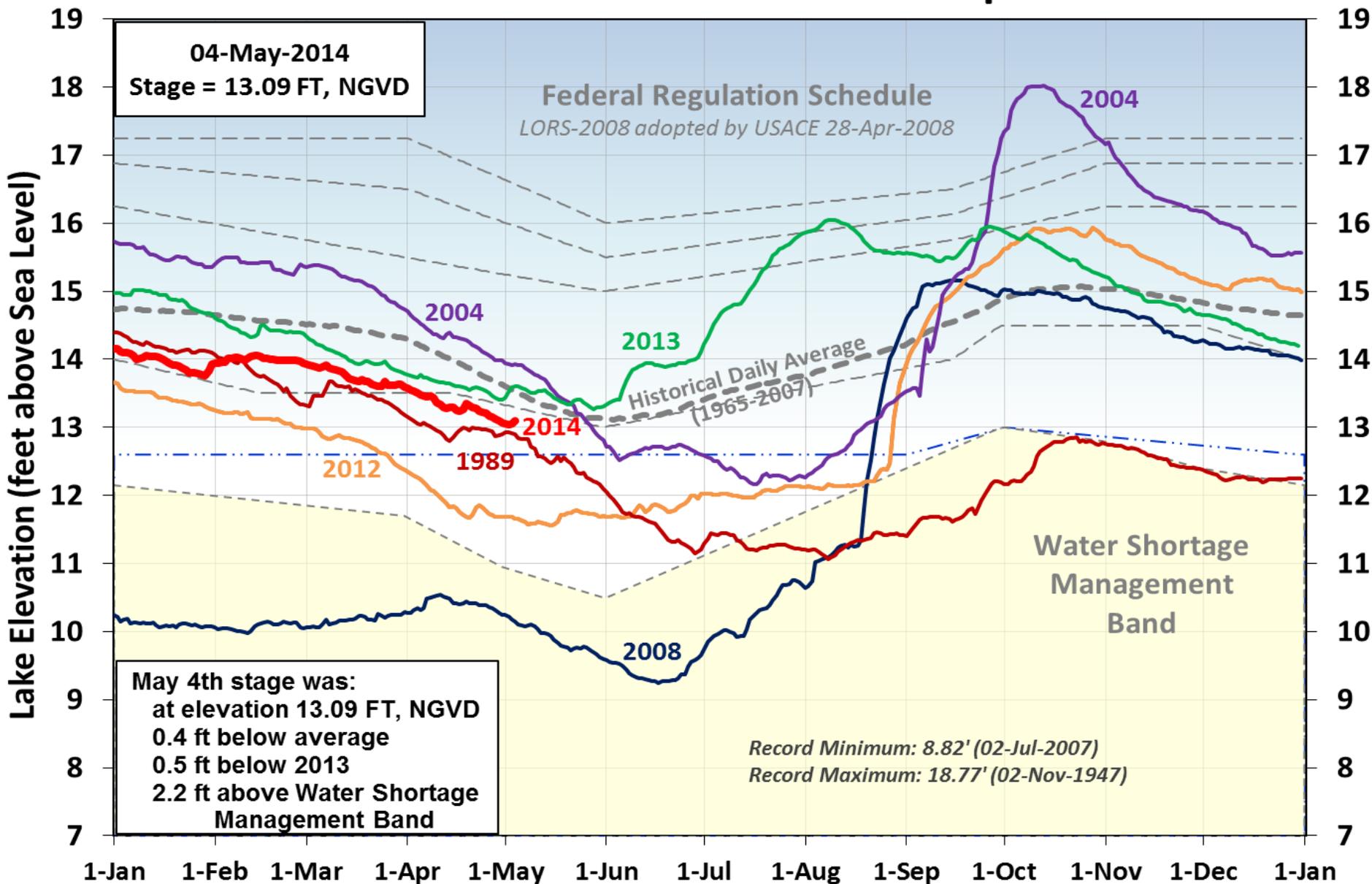
**Constraints Limiting Lake Okeechobee
Regulatory Releases to the WCAs:**

- Flow through conveyance capacity
- STA treatment capability
- WCAs water levels

This map does not represent a complete water budget.
Flow volumes are approximate based on provisional discharge data.

Part 3. Current System Water Conditions & Operations

Lake Okeechobee Water Level Comparison



Lake Okeechobee: Current Operations

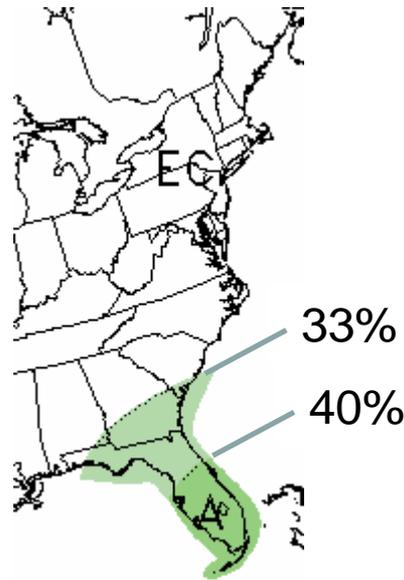
- **USACE's Lake O Regulation Schedule (2008 LORS)**
 - Stage (~13.1 feet, NGVD) within the Baseflow Subband
 - Current release guidance outcome:
 - S-79: up to 450 cfs
 - S-80: up to 200 cfs
 - Up to maximum practicable to the WCAs if desirable or with minimum Everglades impacts
 - USACE current operations: S-79: 650 cfs; S-80: 0 cfs
 - Maximum practicable Lake O regulatory releases to the WCAs
- **SFWMD's Lake O Adaptive Protocol (2010)**
 - Has been the basis for SFWMD recommendations since the Lake stage receded into the Baseflow Subband in early April
 - Recommended no Lake O releases to the Caloosahatchee Estuary because current and forecast salinity are below the threshold defined by the AP guidance

Part 4.
2014 Wet Season Outlook &
Tentatively Planned Operations

U. S. Seasonal Precipitation Outlook

National Climate Prediction Center (CPC)

May 2014



Posted 17-Apr-2014

May-Jul 2014



Posted 17-Apr-2014

Aug-Oct 2014



Posted 17-Apr-2014

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

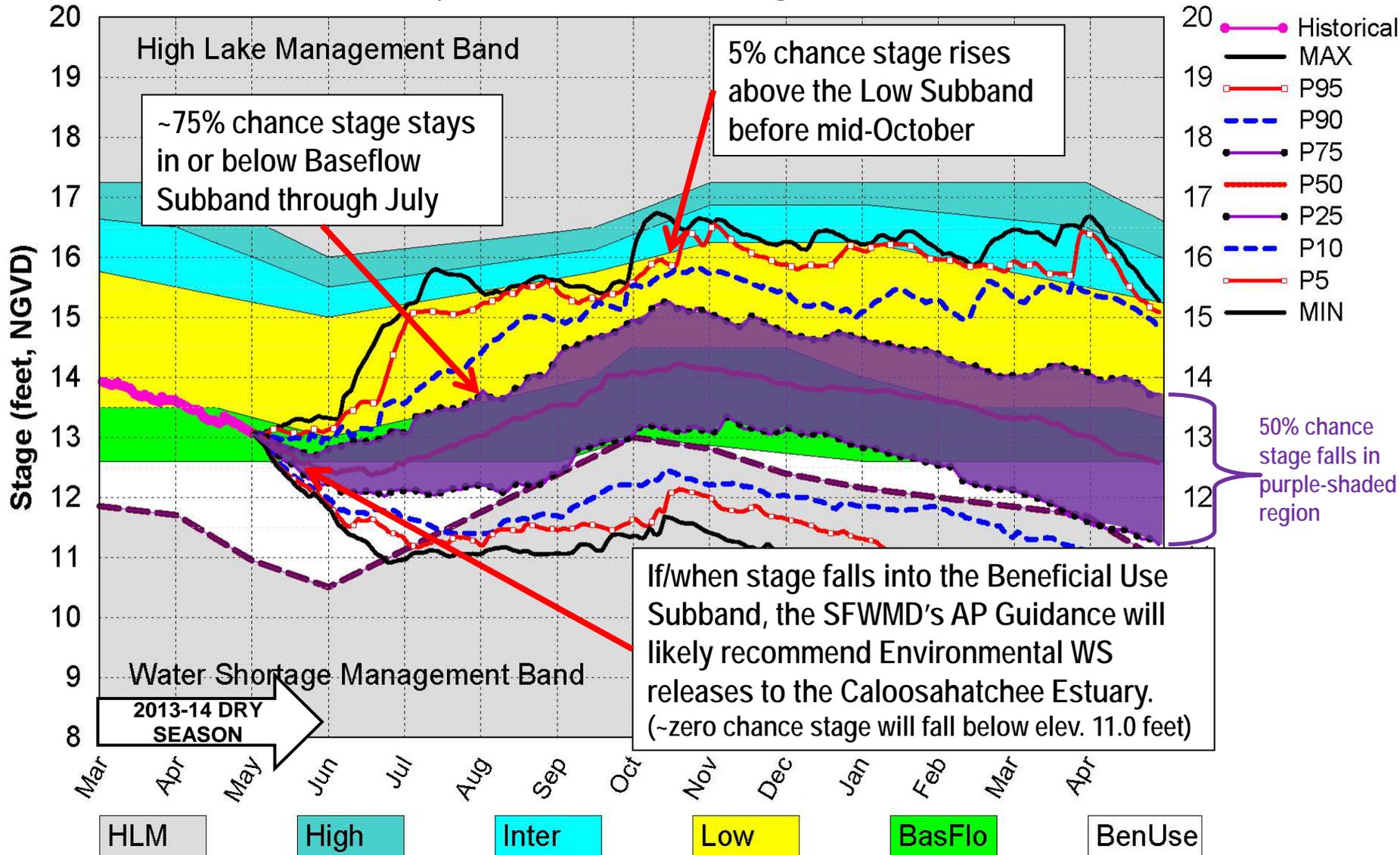
- Increased chances of Above-Normal (A) rainfall for May
- Equal Chances (EC) of Above-Normal (A), Normal, and Below-Normal (B) rainfall for all 3-month windows starting with May and ending with October

Lake Okeechobee Stage Forecast

- **Future Lake stage depends on future rainfall**
- **Projections provided monthly by SFWMD Hydrologic and Environmental Systems Modeling (HESM) Section**
- **Position Analysis**
 - **Each 1-year simulation starts with current hydrologic conditions (e.g, 1-May-2014)**
 - **41 1-yr simulations of system response to historical rainfall conditions**
 - **Statistical summaries used to display projections**

Lake Okeechobee SFWMM May 2014 Position Analysis

Percentiles based on 41 possible outcomes starting with March 1st initialization



(See assumptions on the Position Analysis Results website)

Tentatively Planned Operations (May-Oct 2014)

- **The USACE plans to continue releases per the 2008 LORS.**
- **Climate Prediction Center forecast is above normal rainfall in May.**
- **SFWMD's multi-seasonal forecast (currently 12-months) is 6.00 ft of Net Inflow into Lake Okeechobee.**
- **Lake Okeechobee levels are projected to be above Base Flow Sub-Band from June to October and releases will be adjusted in accordance with 2008 LORS.**



Questions??

