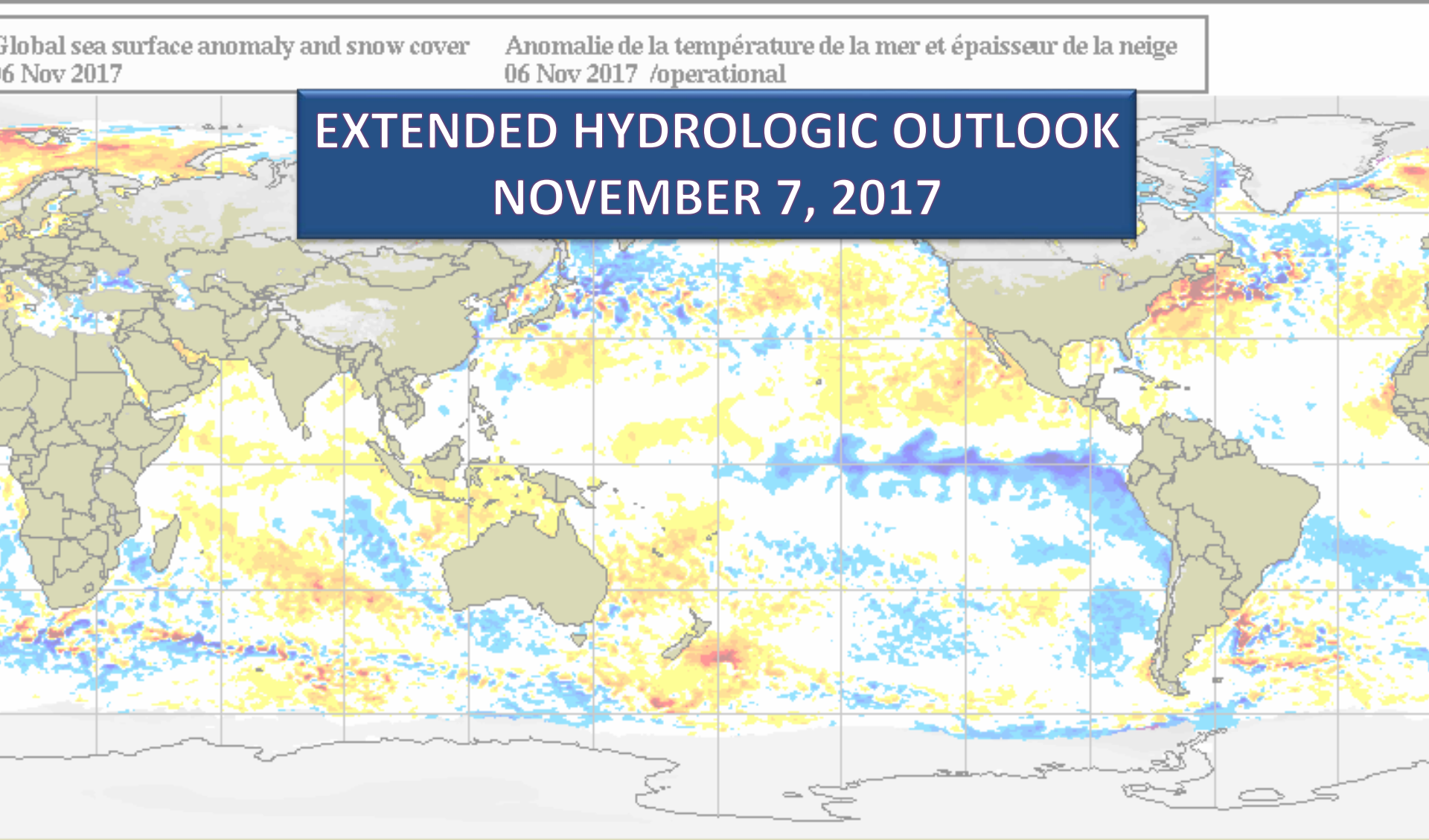
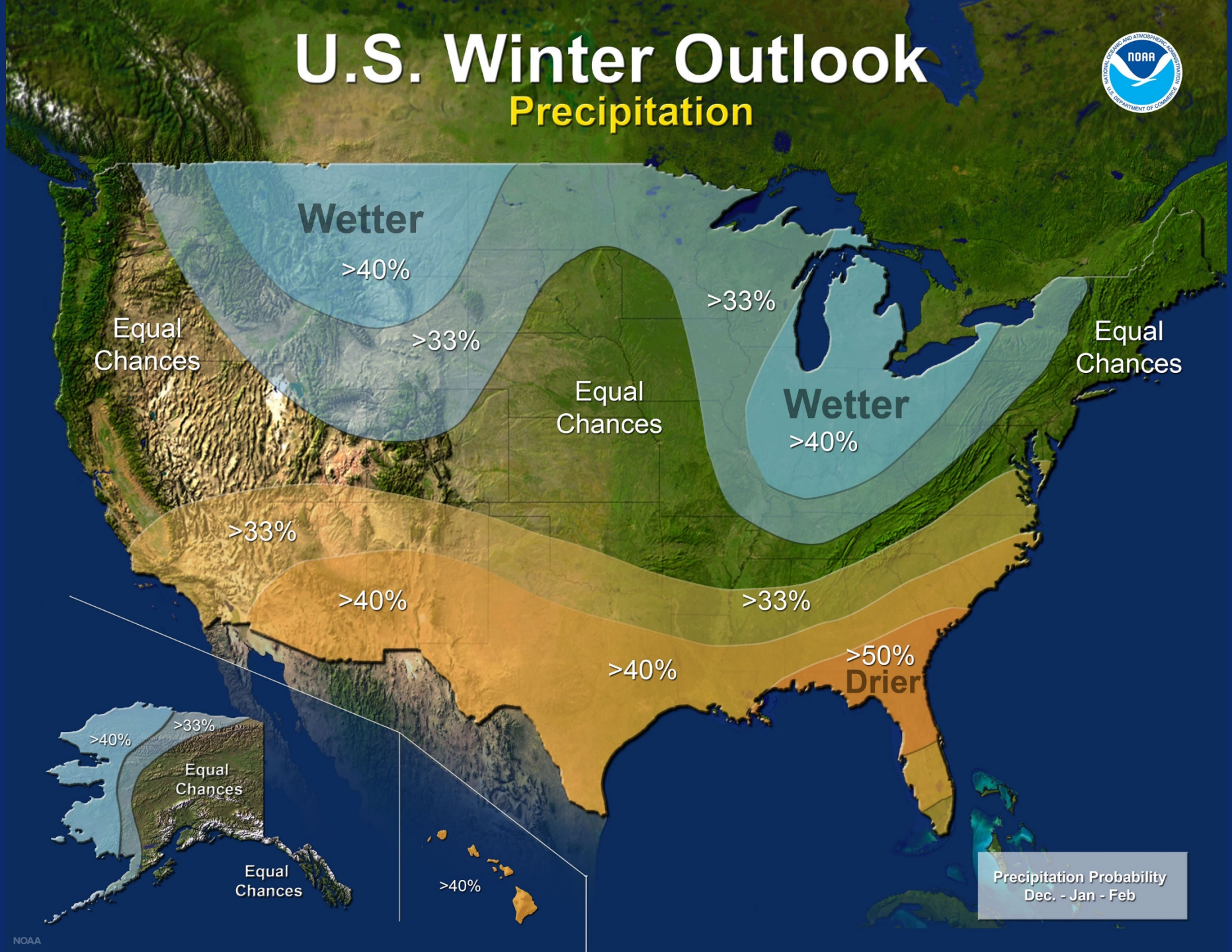
EXTENDED HYDROLOGIC OUTLOOK
NOVEMBER 7, 2017



Summary

- The Climate Prediction Center (CPC) is forecasting 40-50% chance of below normal rainfall for areas including and north of Lake Okeechobee and 33-40% chances of below normal rainfall for areas south of Lake Okeechobee for November through January.
- ENSO-neutral conditions are present. La Niña conditions are favored (~55%-65%) during fall and winter 2017-18.
- Monitoring Atlantic Multidecadal Oscillation (AMO) index for switch to negative (cold) phase, this has the potential to contribute to drier-than-normal wet seasons.

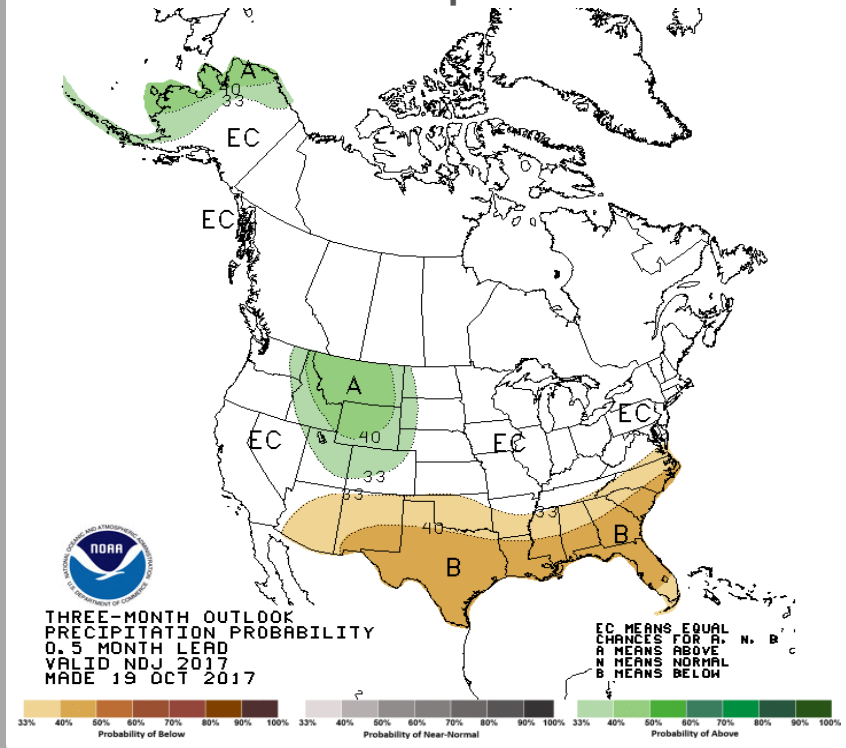

U.S. Winter Outlook
Precipitation
Wetter
>40%
>33%
Equal Chances
>33%
Equal Chances
Wetter
>40%
Equal Chances
>33%
>40%
>33%
>40%
>50%
Drier
>40%
>33%
Equal Chances
Equal Chances
>40%
Precipitation Probability
Dec. - Jan - Feb
NOAA

U. S. Seasonal Outlooks

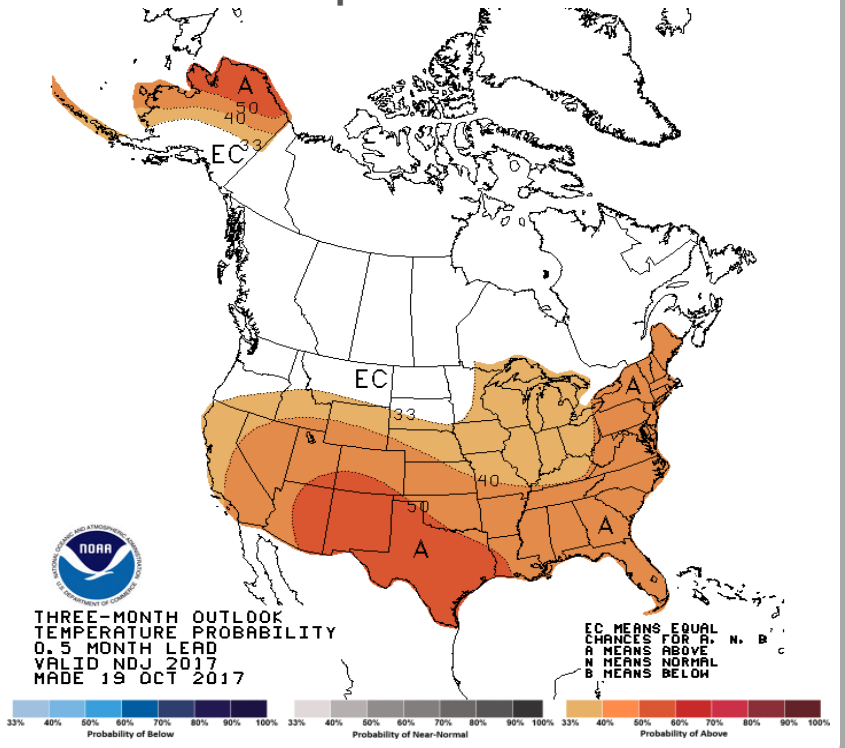
November 2017 - January 2018

The seasonal outlooks combine the effects of long-term trends, soil moisture, and, when appropriate, ENSO.

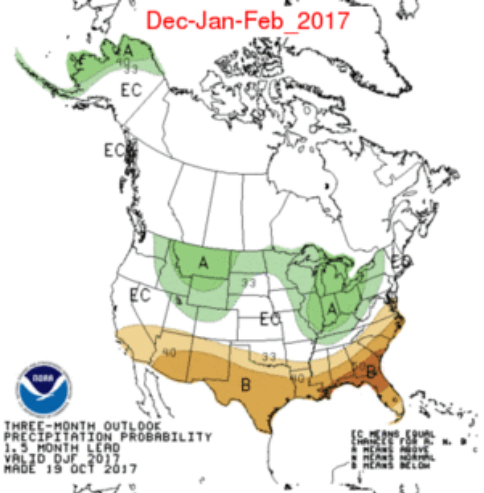
Precipitation

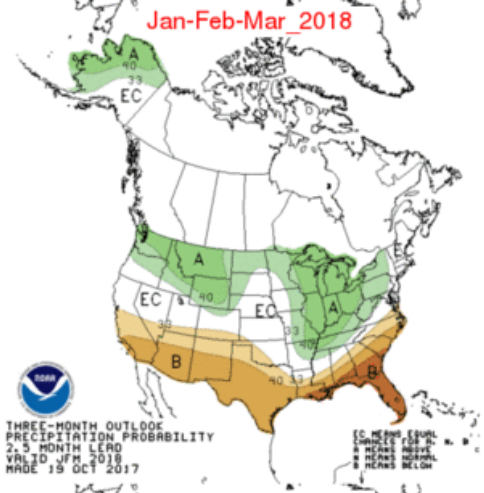


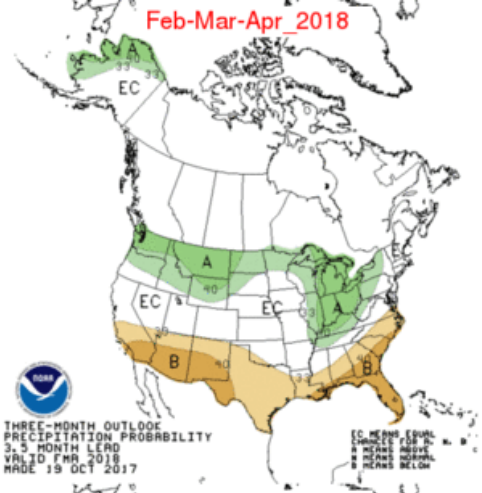
Temperature

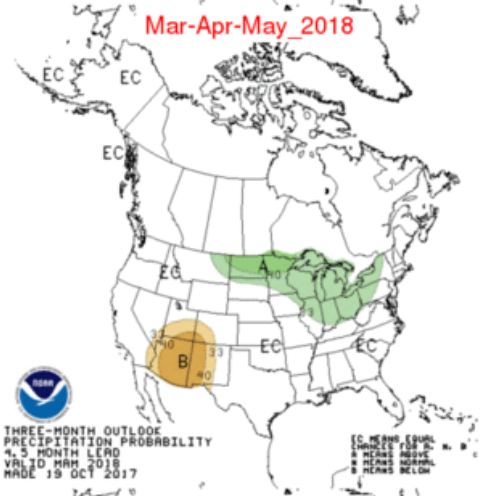


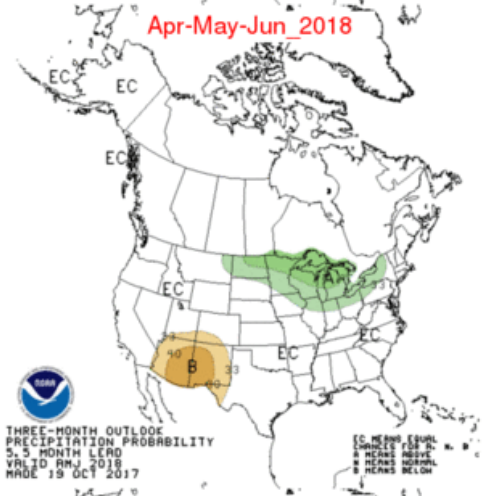
Prepared by: Climate Prediction Center / NCEP

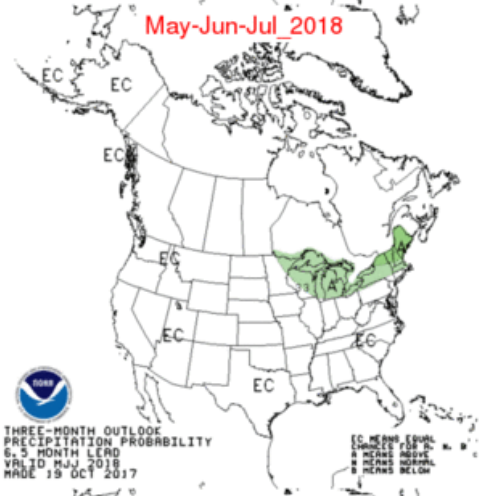


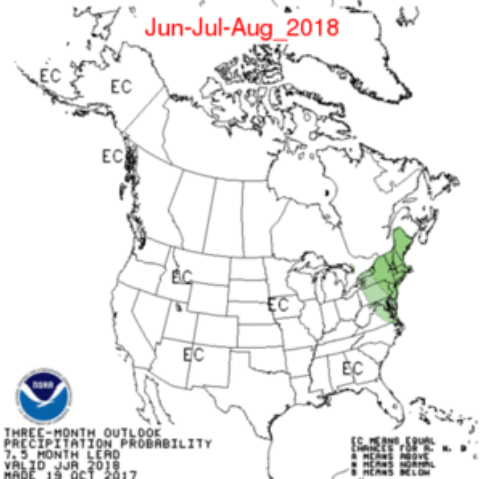


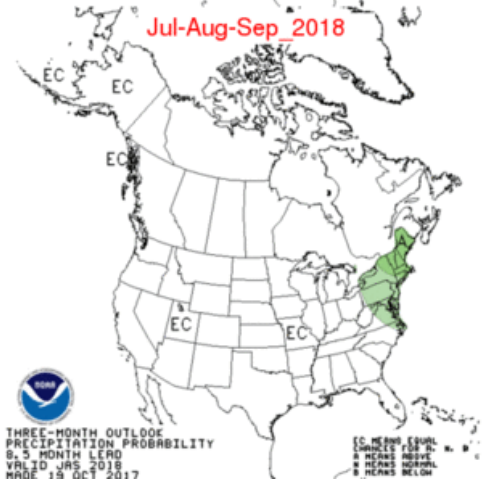


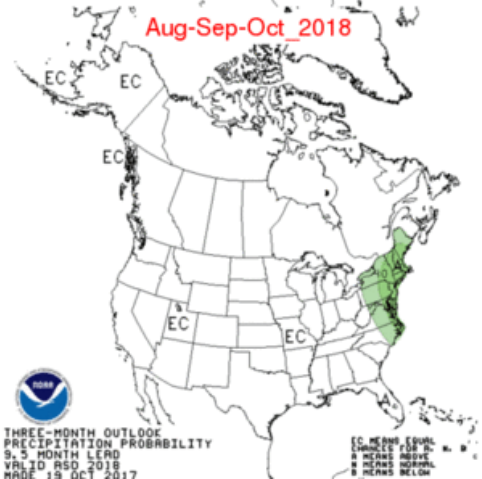












Prepared by: Climate Prediction Center / NCEP

Teleconnections to South Florida

Climate anomalies being related to each other at large distances:

El Niño Southern Oscillation (ENSO)

- **South Florida dry season (November through May) rainfall is positively correlated with El Niño which has a frequency that ranges between 3 to 7 years while rainfall is negatively correlated with La Niña November through March with a potential increase in tropical rainfall during La Niña**

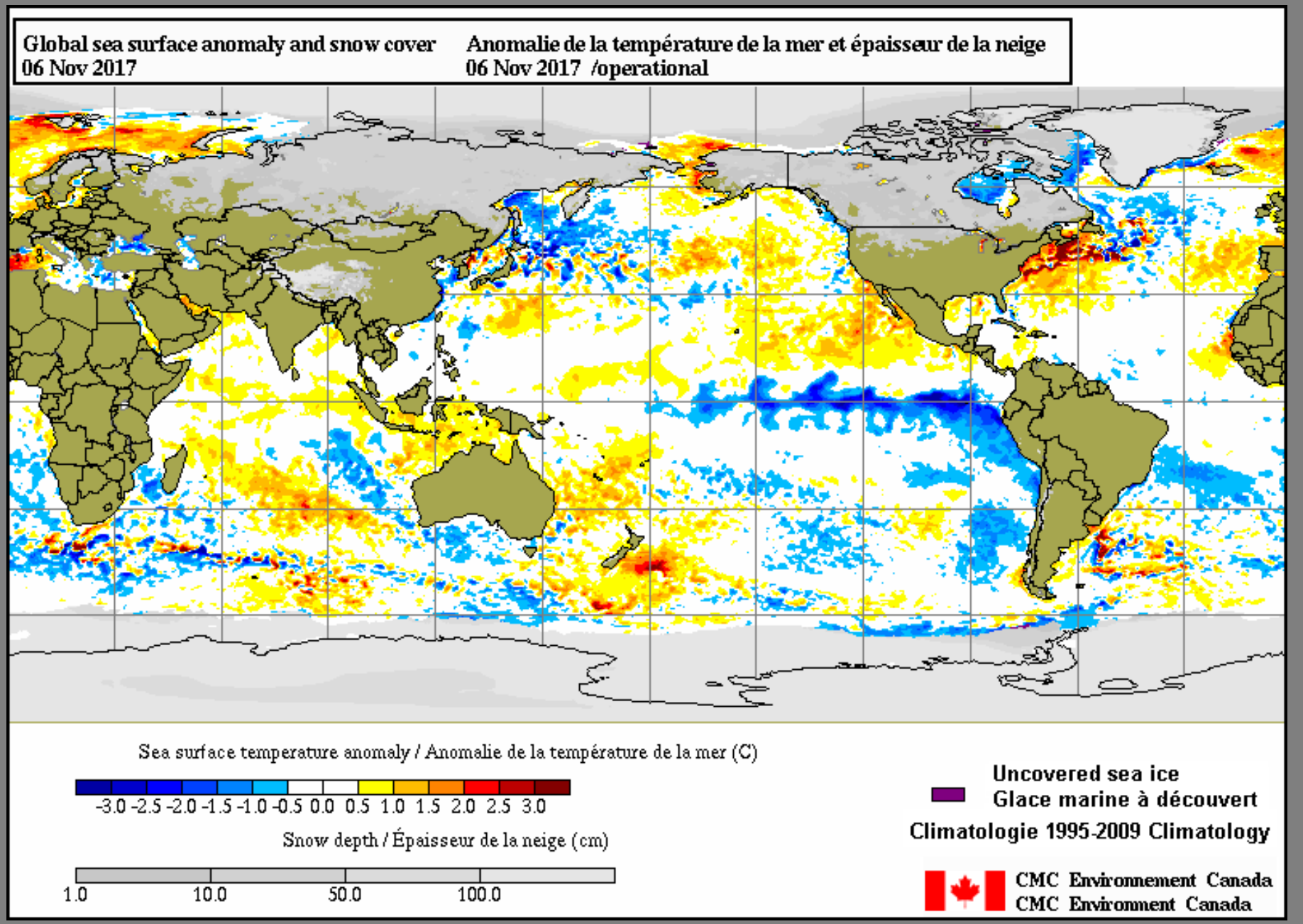
Atlantic Multidecadal Oscillation (AMO)

- **Average annual inflow to Lake Okeechobee is nearly 50% greater during the warm phase compared to the cold phase of the AMO, easterly flow toward south Florida affected by phase**

Pacific Decadal Oscillation (PDO)

- **Increases variations of south Florida dry season rainfall**

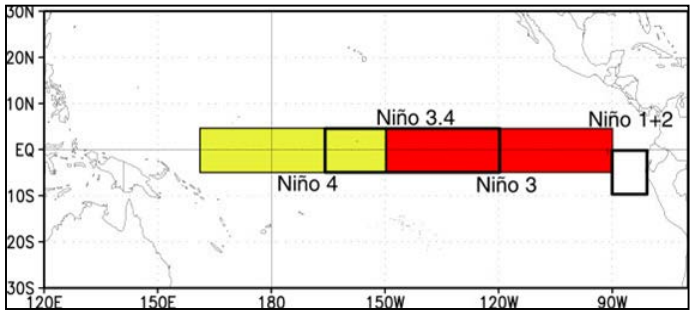
Current Global Sea Surface Temperature Anomalies

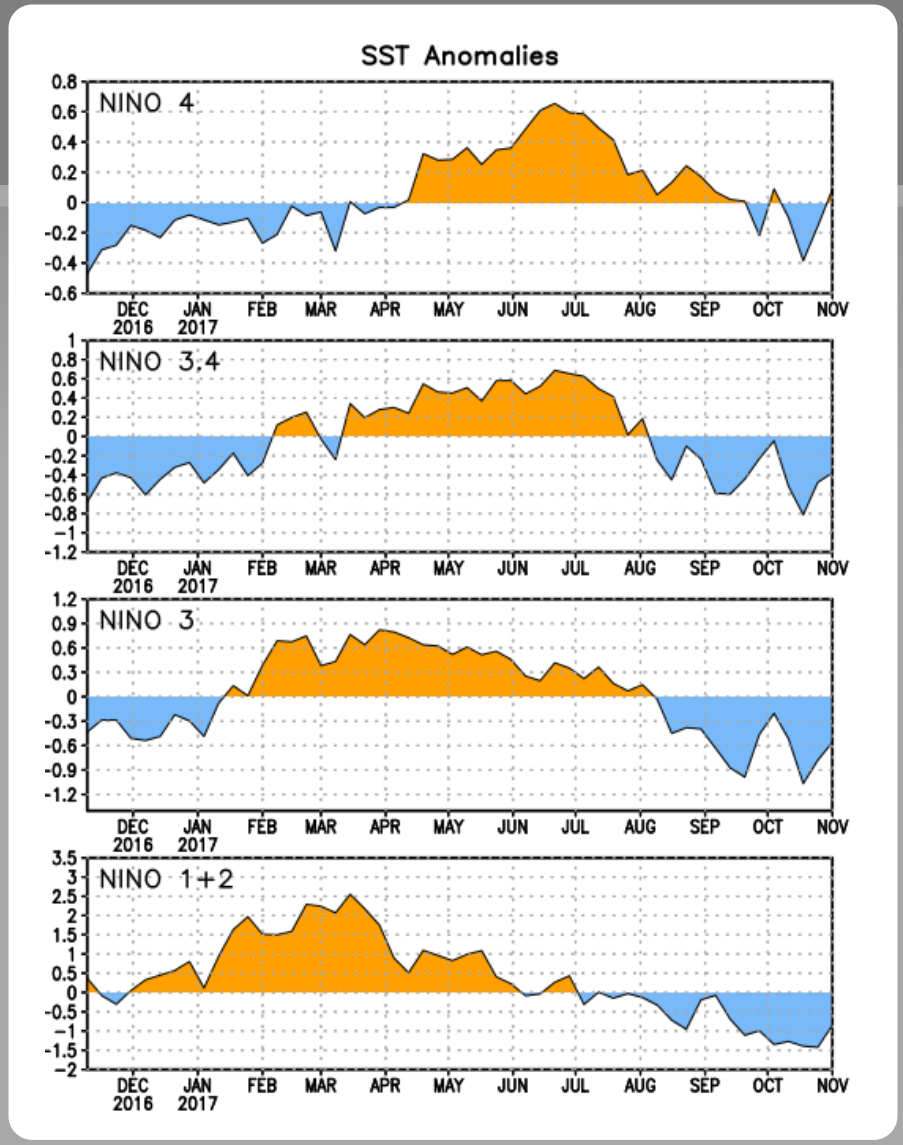


Niño Region SST Departures (ºC) Recent Evolution

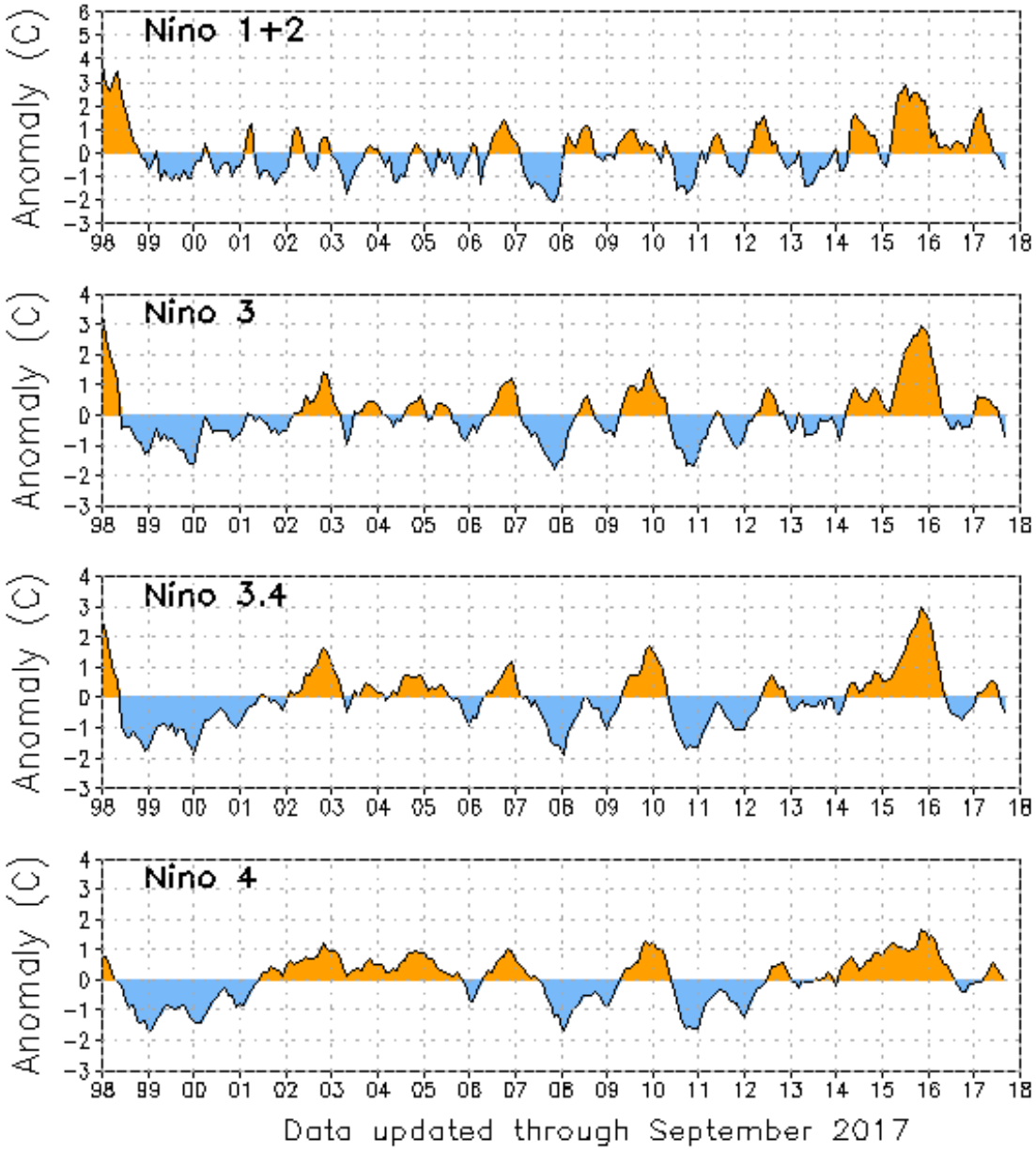
The latest weekly SST departures are:

Niño 4	0.1ºC
Niño 3.4	-0.4ºC
Niño 3	-0.6ºC
Niño 1+2	-0.8ºC





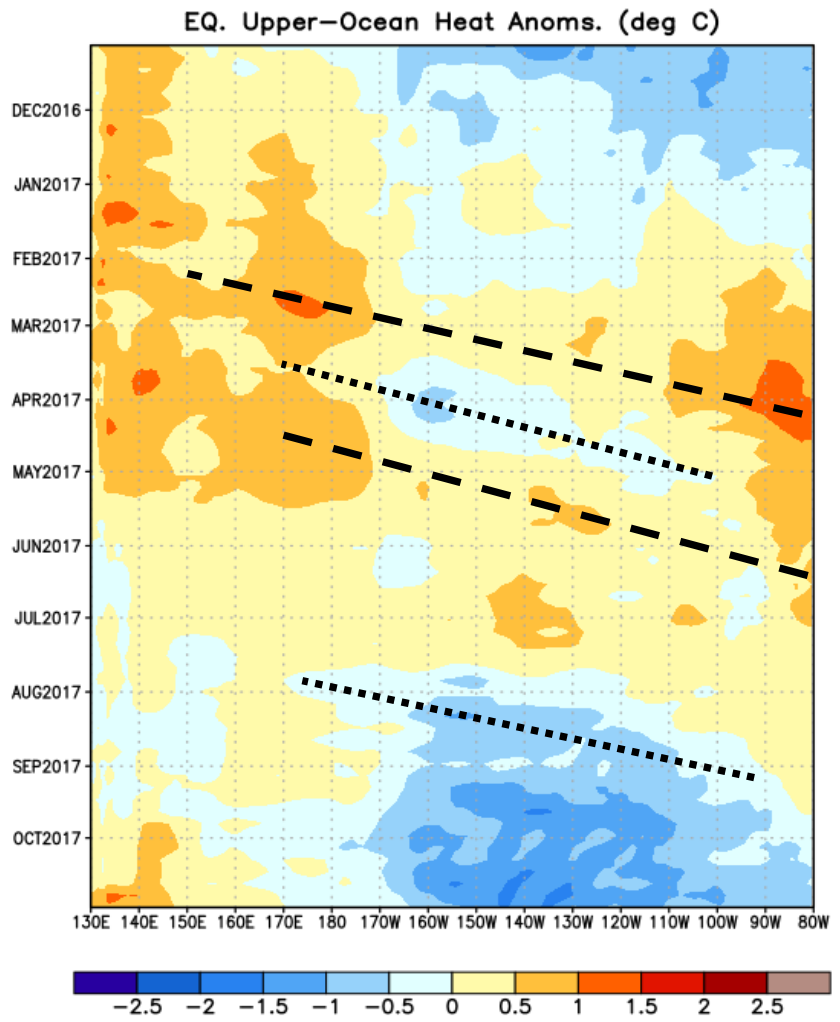
Prepared by: Climate Prediction Center / NCEP


Nino 1+2
Nino 3
Nino 3.4
Nino 4
Anomaly (C)
98 99 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18
Data updated through September 2017

Weekly Heat Content Evolution in the Equatorial Pacific

From February 2017 through May 2017, positive subsurface temperature anomalies persisted in the western and eastern Pacific Ocean, with oceanic Kelvin waves resulting in anomalous temperature variability in the central Pacific.

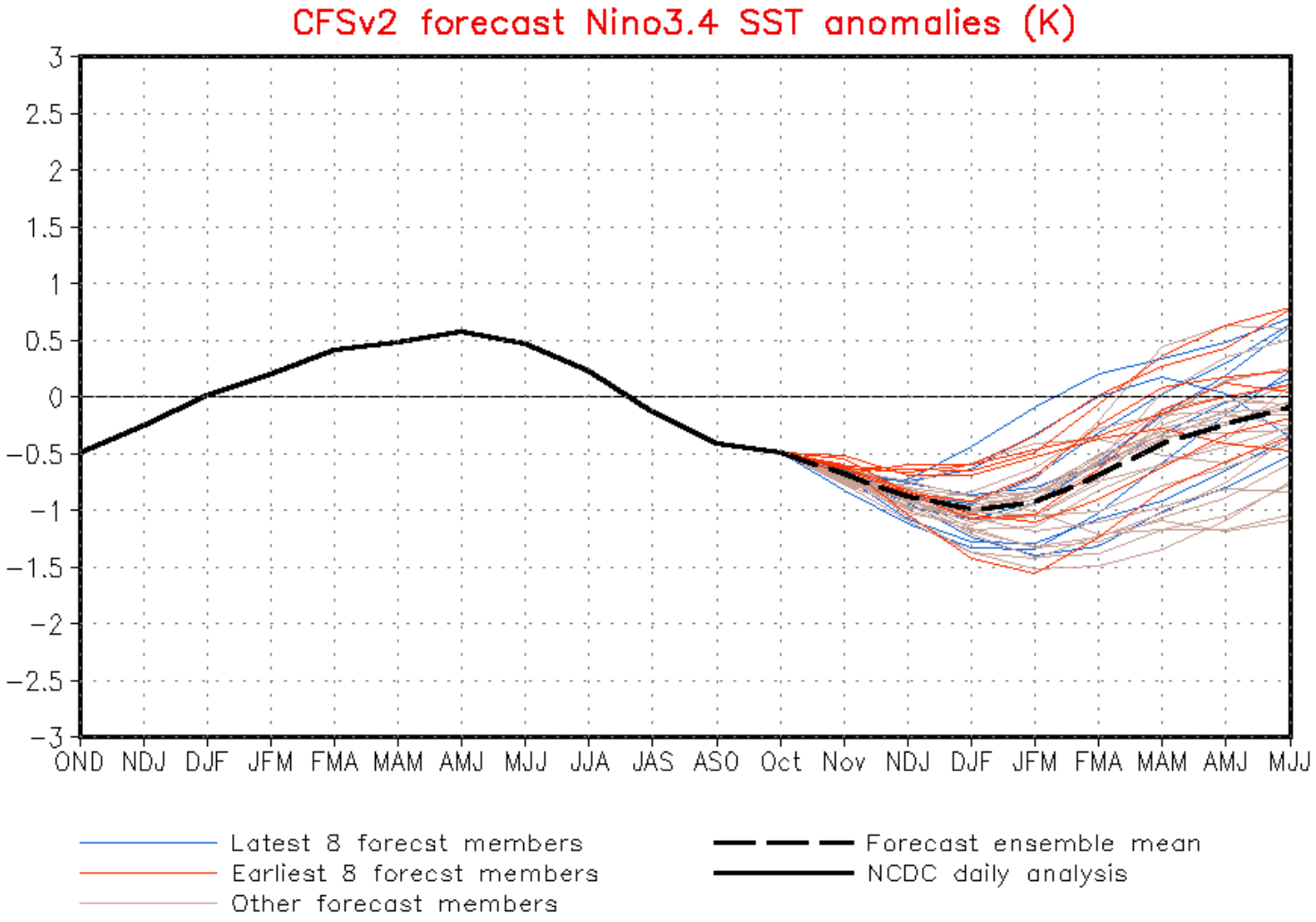
During August 2017, an upwelling Kelvin wave resulted in below-average sub-surface temperatures across the east-central and eastern equatorial Pacific. Since September 2017, negative sub-surface anomalies have persisted in those regions.



Equatorial oceanic Kelvin waves have alternating warm and cold phases. The warm phase is indicated by dashed lines. Down-welling and warming occur in the leading portion of a Kelvin wave, and up-welling and cooling occur in the trailing portion.

NWS/NCEP/CPC

Last update: Tue Nov 7 2017
Initial conditions: 27Oct2017-5Nov2017



IRI/CPC Pacific Niño 3.4 SST Model Outlook

The multi-model averages predict La Niña to develop and persist through the remainder of the year and into early 2018.

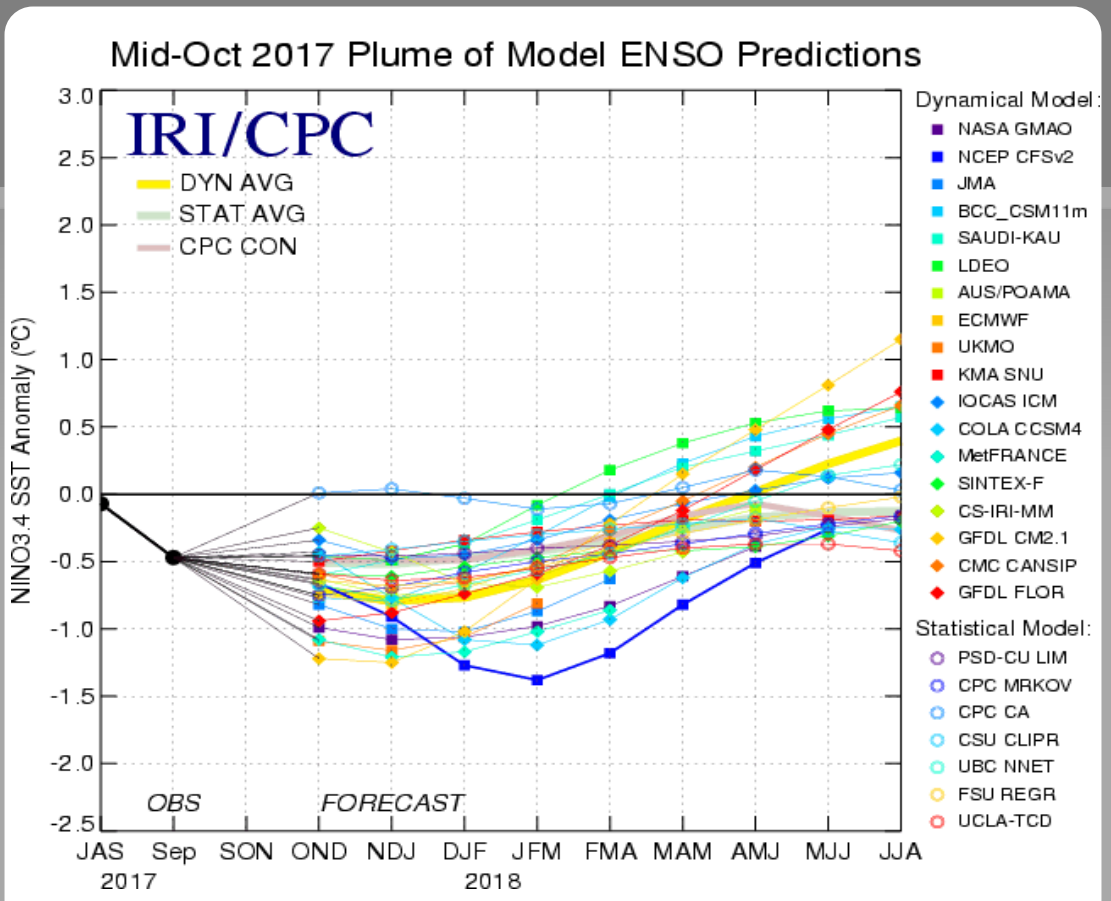


Figure provided by the International Research Institute (IRI) for Climate and Society (updated 17 October 2017).

Historical El Niño and La Niña Episodes Based on the ONI computed using ERSST.v5

Recent Pacific warm (red) and cold (blue) periods based on a threshold of +/- 0.5 ºC for the Oceanic Nino Index (ONI) [3 month running mean of ERSST.v5 SST anomalies in the Nino 3.4 region (5N-5S, 120-170W)]. For historical purposes, periods of below and above normal SSTs are colored in blue and red when the threshold is met for a minimum of 5 consecutive over-lapping seasons.

The ONI is one measure of the El Niño-Southern Oscillation, and other indices can confirm whether features consistent with a coupled ocean-atmosphere phenomenon accompanied these periods. The complete table going back to DJF 1950 can be found here.

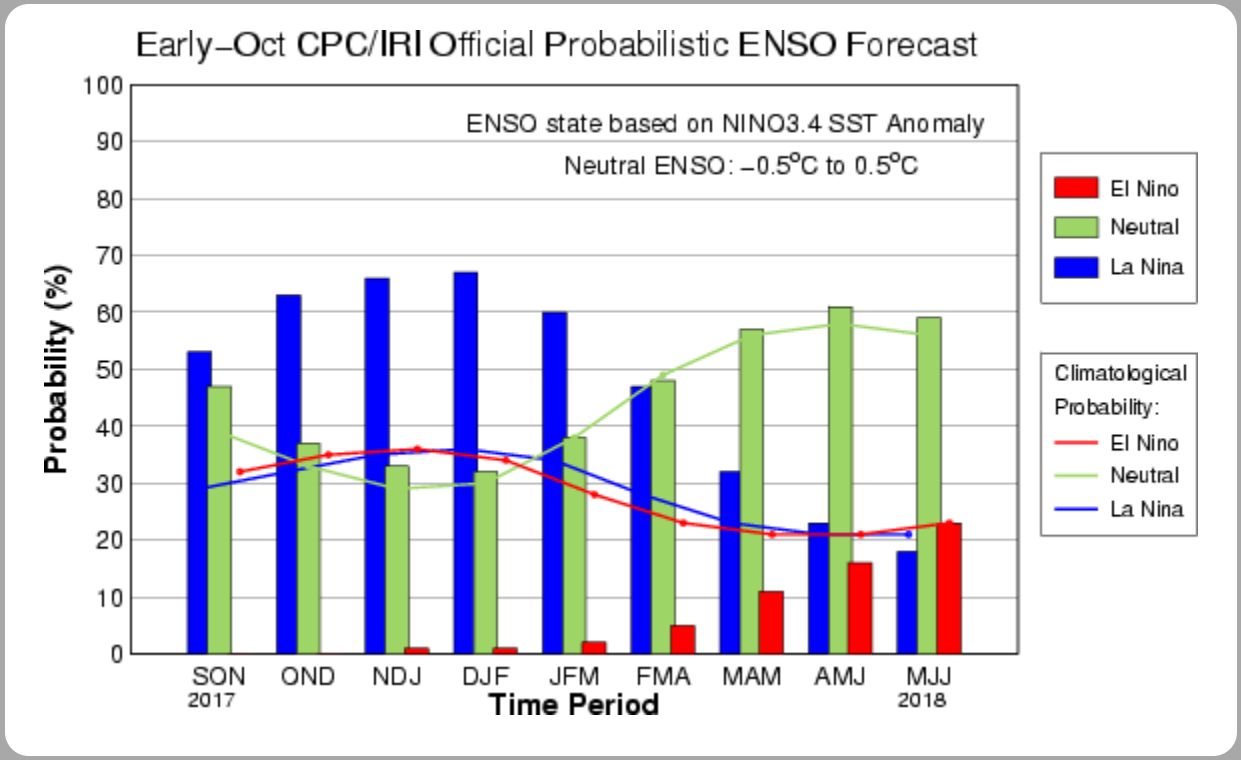
Year	DJF	JFM	FMA	MAM	AMJ	MJJ	JJA	JAS	ASO	SON	OND	NDJ
2005	0.6	0.6	0.4	0.4	0.3	0.1	-0.1	-0.1	-0.1	-0.3	-0.6	-0.8
2006	-0.8	-0.7	-0.5	-0.3	0.0	0.0	0.1	0.3	0.5	0.7	0.9	0.9
2007	0.7	0.3	0.0	-0.2	-0.3	-0.4	-0.5	-0.8	-1.1	-1.4	-1.5	-1.6
2008	-1.6	-1.4	-1.2	-0.9	-0.8	-0.5	-0.4	-0.3	-0.3	-0.4	-0.6	-0.7
2009	-0.8	-0.7	-0.5	-0.2	0.1	0.4	0.5	0.5	0.7	1.0	1.3	1.6
2010	1.5	1.3	0.9	0.4	-0.1	-0.6	-1.0	-1.4	-1.6	-1.7	-1.7	-1.6
2011	-1.4	-1.1	-0.8	-0.6	-0.5	-0.4	-0.5	-0.7	-0.9	-1.1	-1.1	-1.0
2012	-0.8	-0.6	-0.5	-0.4	-0.2	0.1	0.3	0.3	0.3	0.2	0.0	-0.2
2013	-0.4	-0.3	-0.2	-0.2	-0.3	-0.3	-0.4	-0.4	-0.3	-0.2	-0.2	-0.3
2014	-0.4	-0.4	-0.2	0.1	0.3	0.2	0.1	0.0	0.2	0.4	0.6	0.7
2015	0.6	0.6	0.6	0.8	1.0	1.2	1.5	1.8	2.1	2.4	2.5	2.6
2016	2.5	2.2	1.7	1.0	0.5	0.0	-0.3	-0.6	-0.7	-0.7	-0.7	-0.6
2017	-0.3	-0.1	0.1	0.3	0.4	0.4	0.1	-0.2	-0.4			

Prepared by: Climate Prediction Center / IRI

CPC/IRI Probabilistic ENSO Outlook

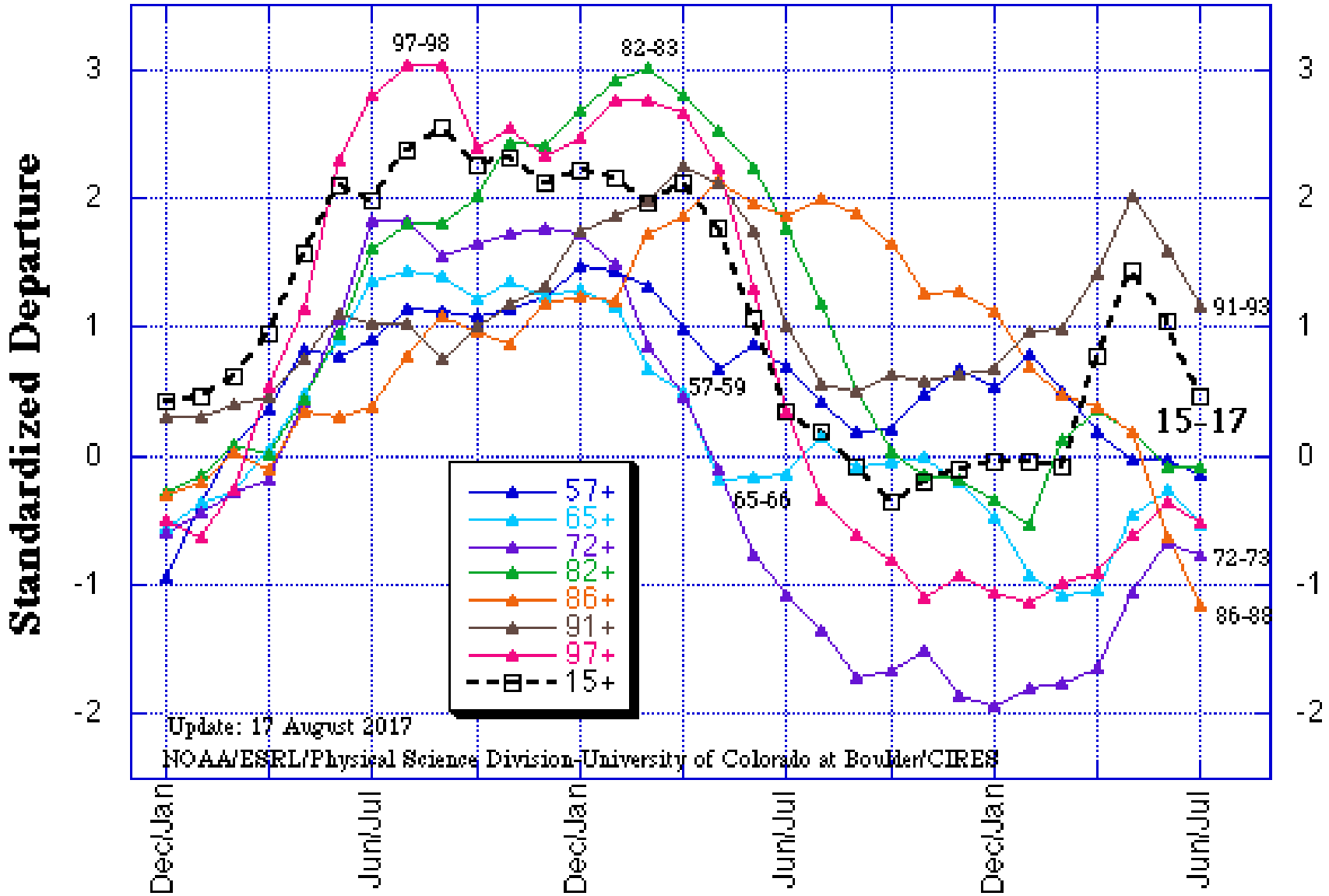
Updated: 12 October 2017

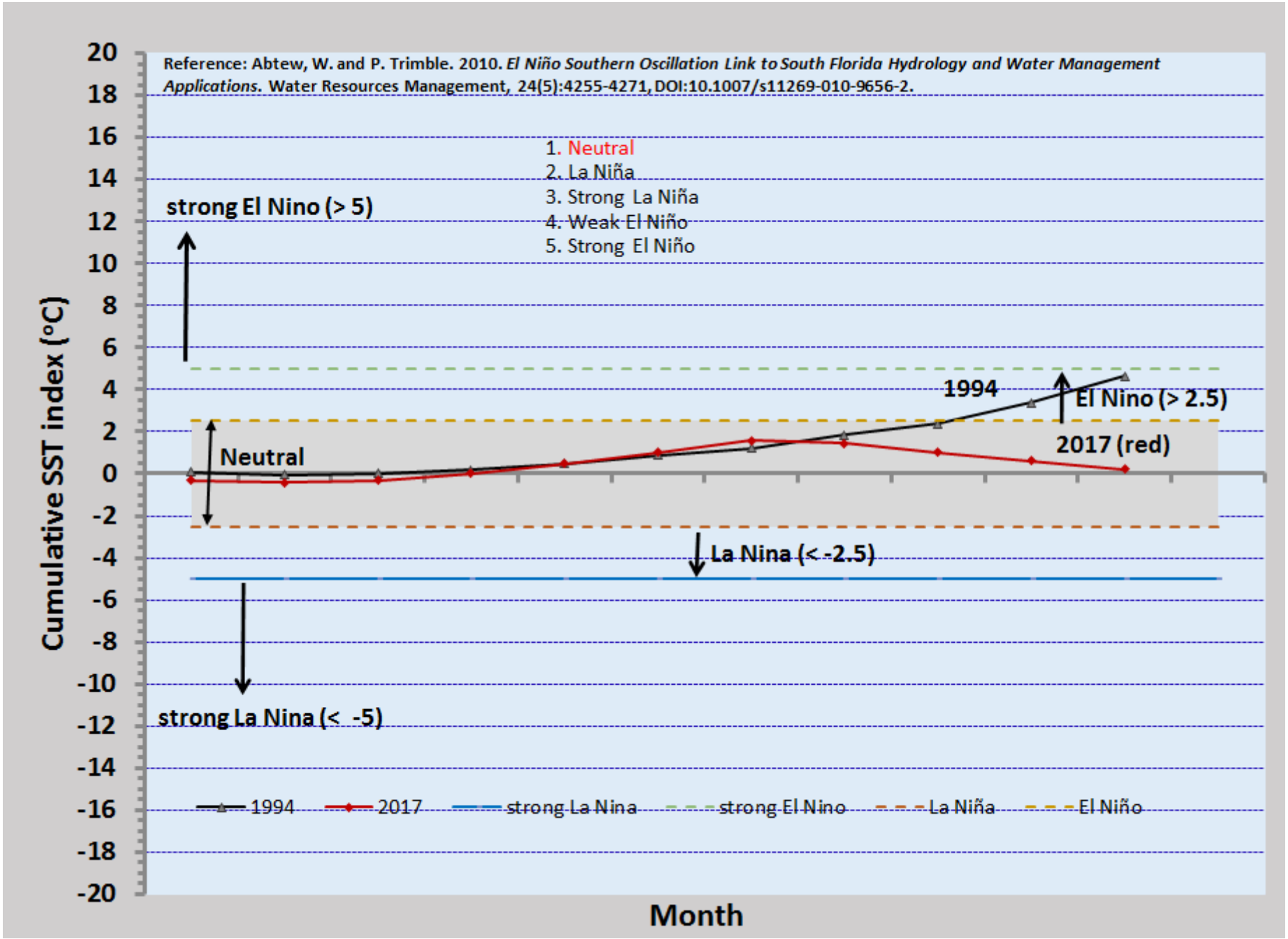
La Niña is favored (~55%-65%) during the Northern Hemisphere fall and winter 2017-18.



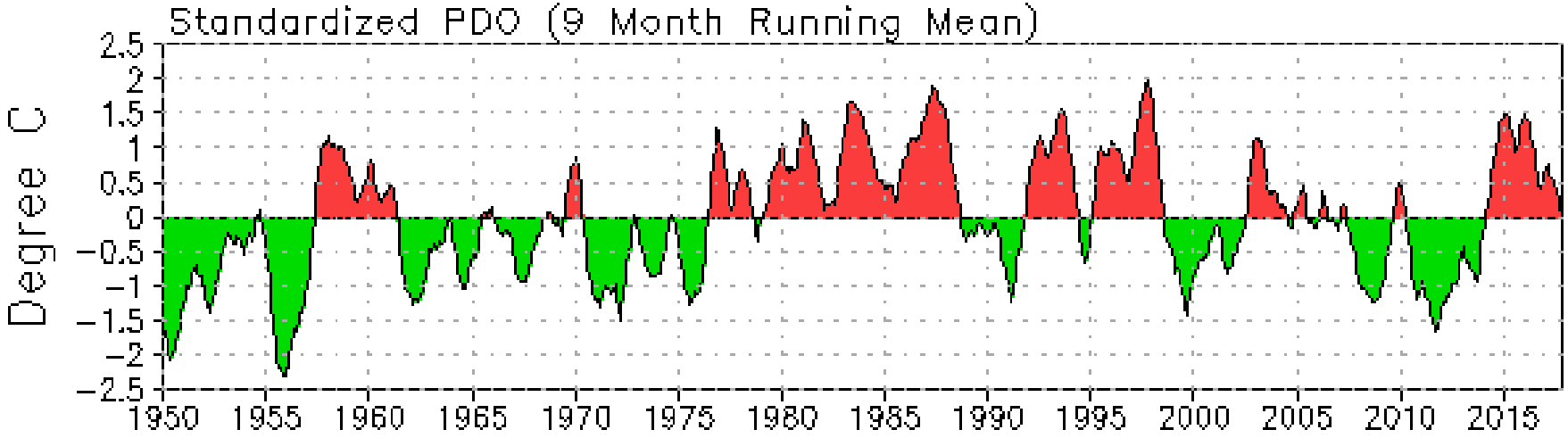
Prepared by: Climate Prediction Center / IRI

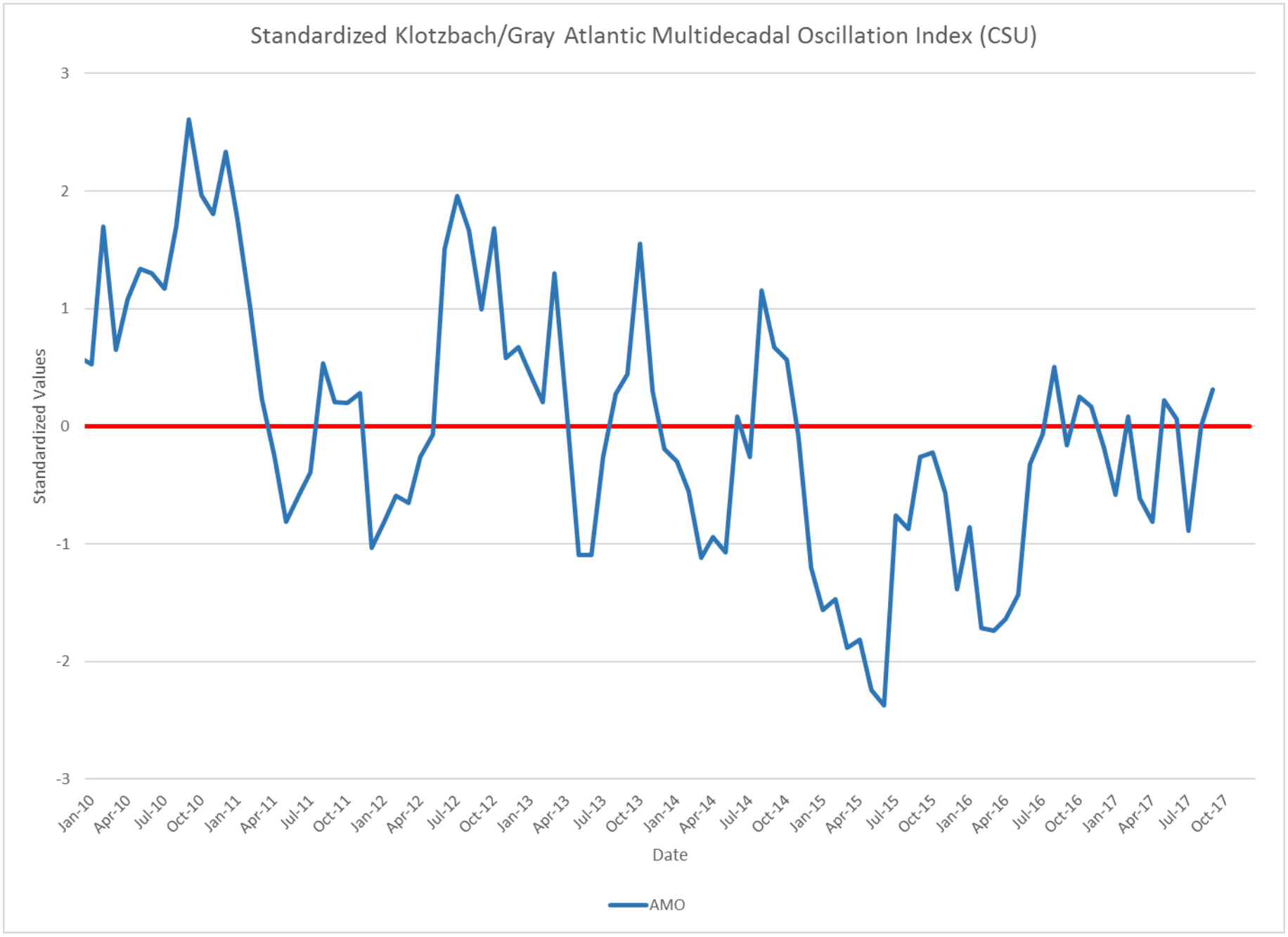
Multivariate ENSO Index (MEI) for the seven strongest El Niño events since 1950 vs. 2015-17





Source: Wossenu Abtew (SFWMD)

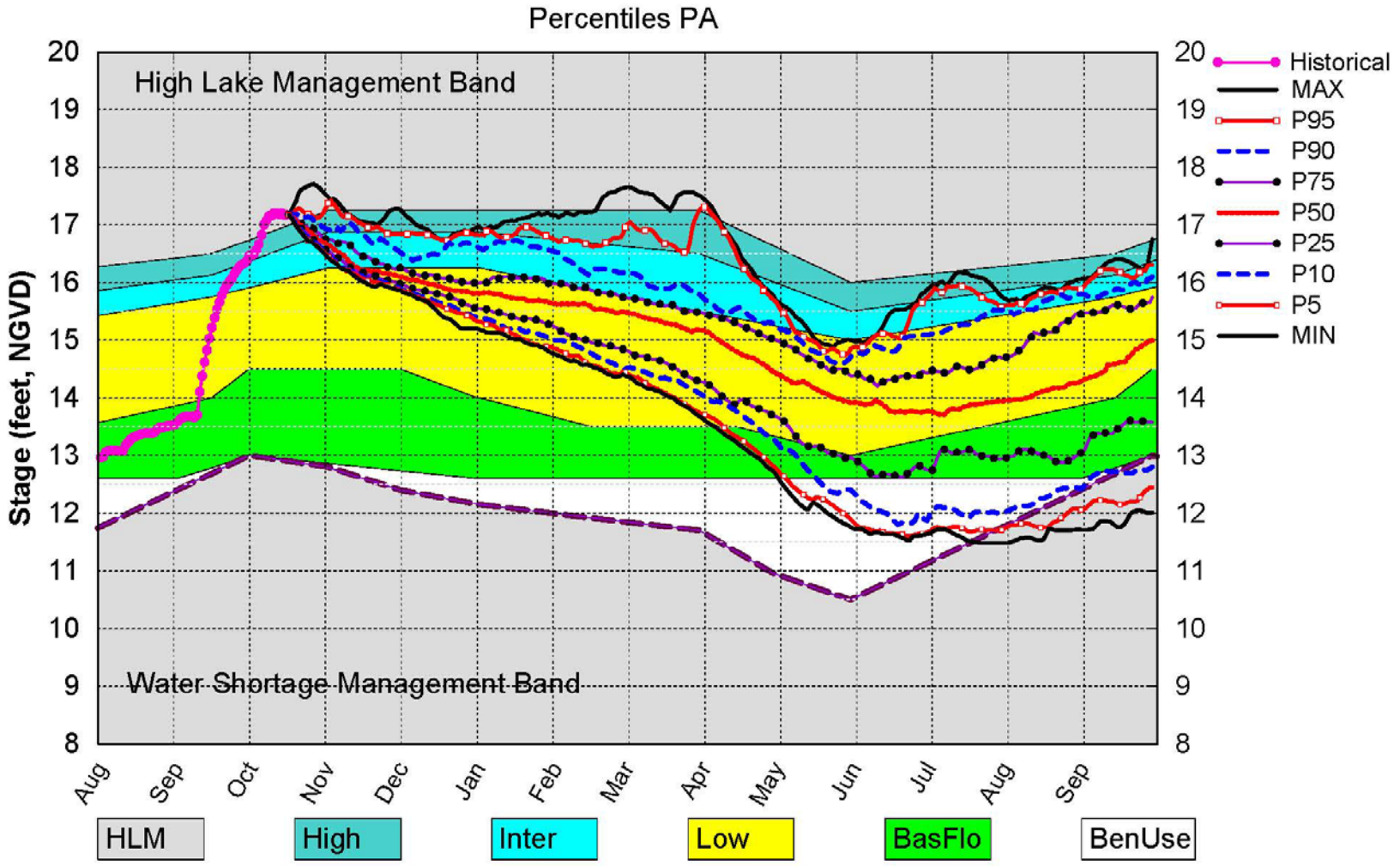

Standardized PDO (9 Month Running Mean)
Degree C
2.5
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2
−2.5
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015


Standardized Klotzbach/Gray Atlantic Multidecadal Oscillation Index (CSU)
3
2
1
0
-1
-2
-3
Standardized Values
Jan-10
Apr-10
Jul-10
Oct-10
Jan-11
Apr-11
Jul-11
Oct-11
Jan-12
Apr-12
Jul-12
Oct-12
Jan-13
Apr-13
Jul-13
Oct-13
Jan-14
Apr-14
Jul-14
Oct-14
Jan-15
Apr-15
Jul-15
Oct-15
Jan-16
Apr-16
Jul-16
Oct-16
Jan-17
Apr-17
Jul-17
Oct-17
Date
AMO

Dynamic Position Analysis

- Based on historical climatic conditions spanning the period 1965-2005
- Each year the model resets the initial stages for Lake Okeechobee (LOK) and the Water Conservation Areas (WCAs) to value on the 1st of the previous month and conditions the simulation using real time data during the previous month to achieve real time stage on current month's 1st for both Lake Okeechobee and the Water Conservation Areas
- Dynamic Position Analysis
  - Each 1-year simulation starts with current hydrologic conditions (e.g., 1-Jun-2017)
  - 41 1-year simulations of system response to historical rainfall conditions
  - Statistical summaries used to display projections

Lake Okeechobee SFWMM Oct 2017 Mid-Mon Dynamic Position Analysis

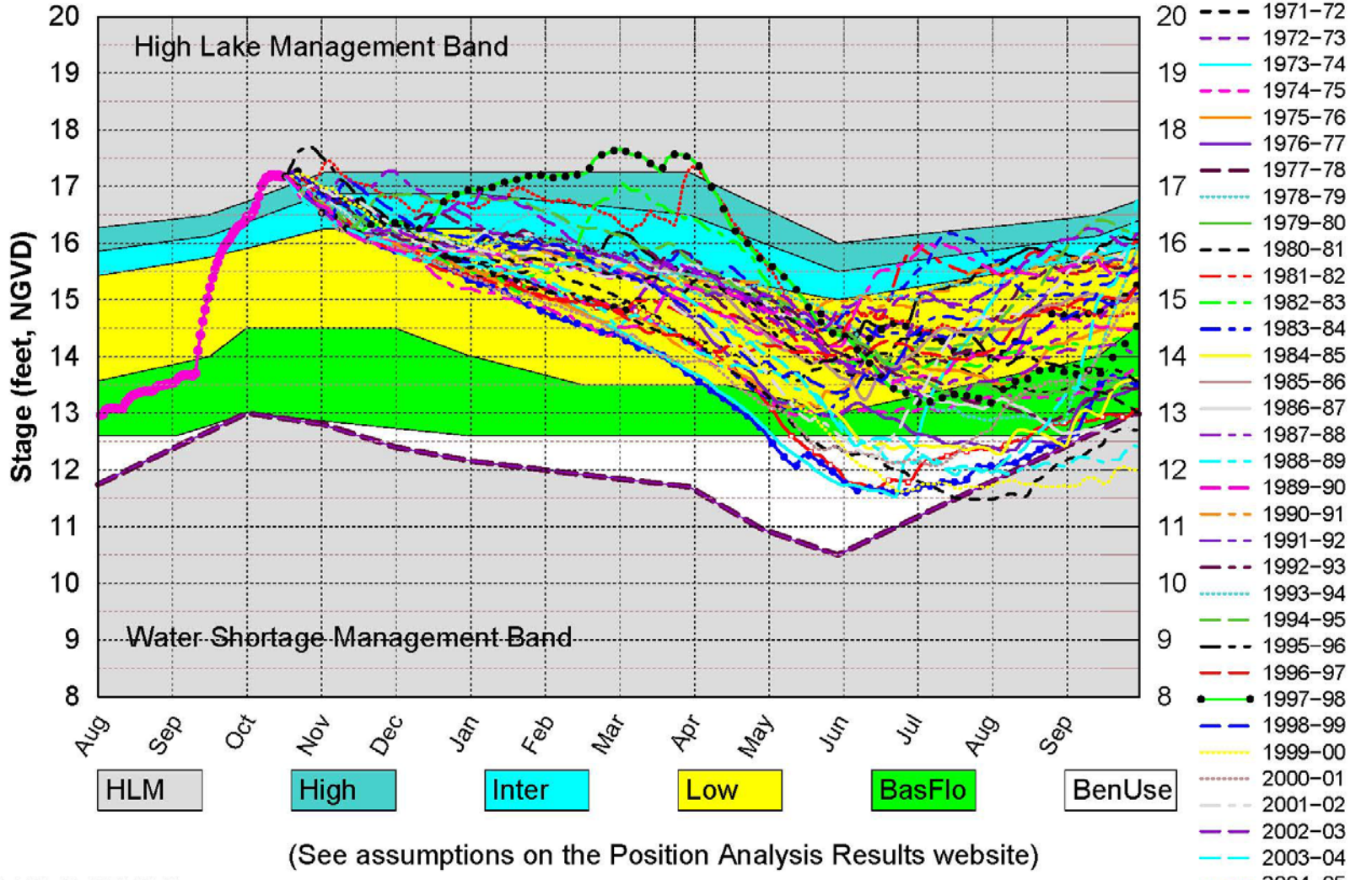


(See assumptions on the Position Analysis Results website)

Fri Oct 20 15:42:08 2017

Lake Okeechobee SFWMM Oct 2017 Mid-Mon Dynamic Position Analysis

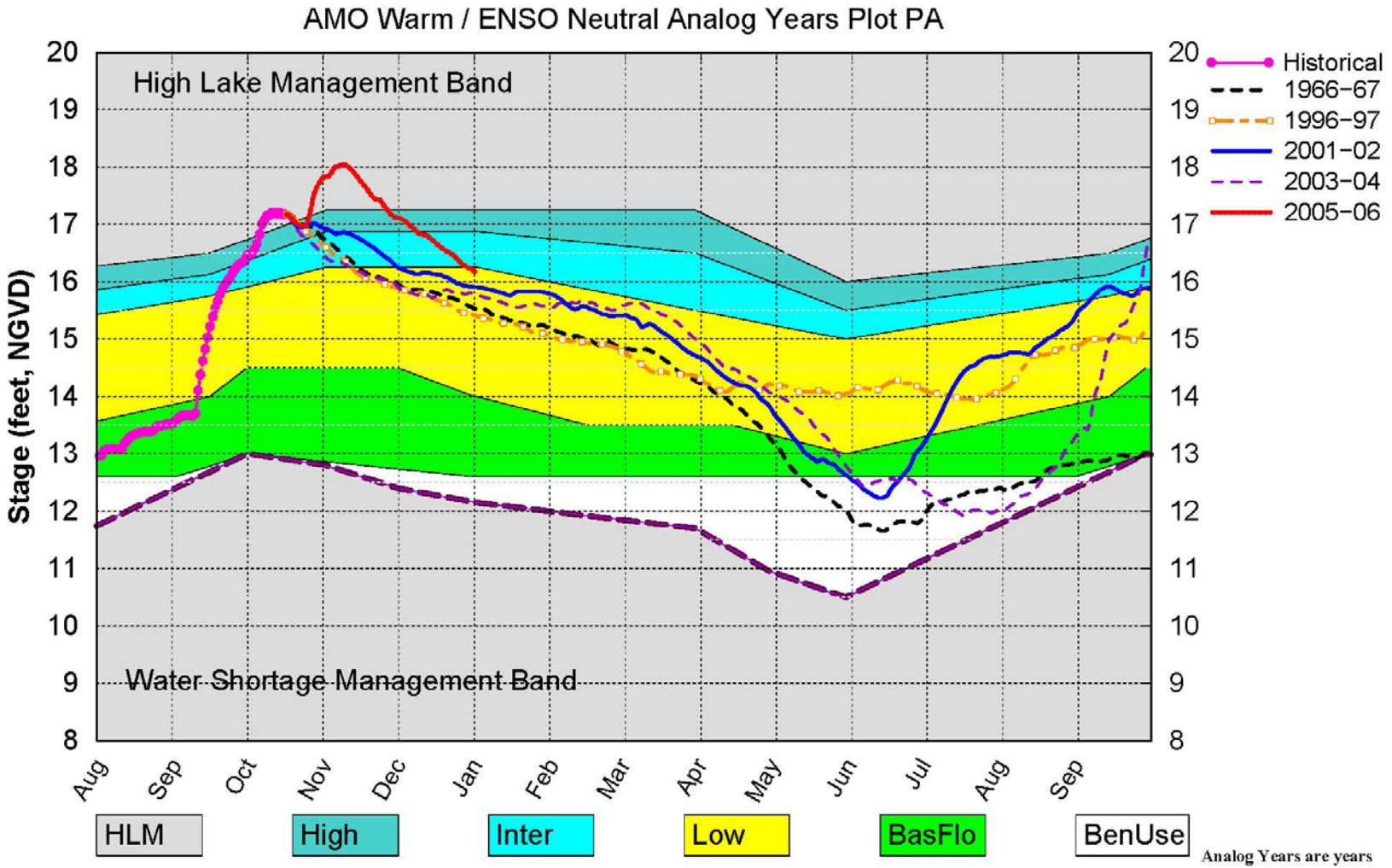
All Simulated Years Plot PA



(See assumptions on the Position Analysis Results website)

Fri Oct 20 15:44:53 2017

Lake Okeechobee SFWMM Oct 2017 Mid-Mon Dynamic Position Analysis

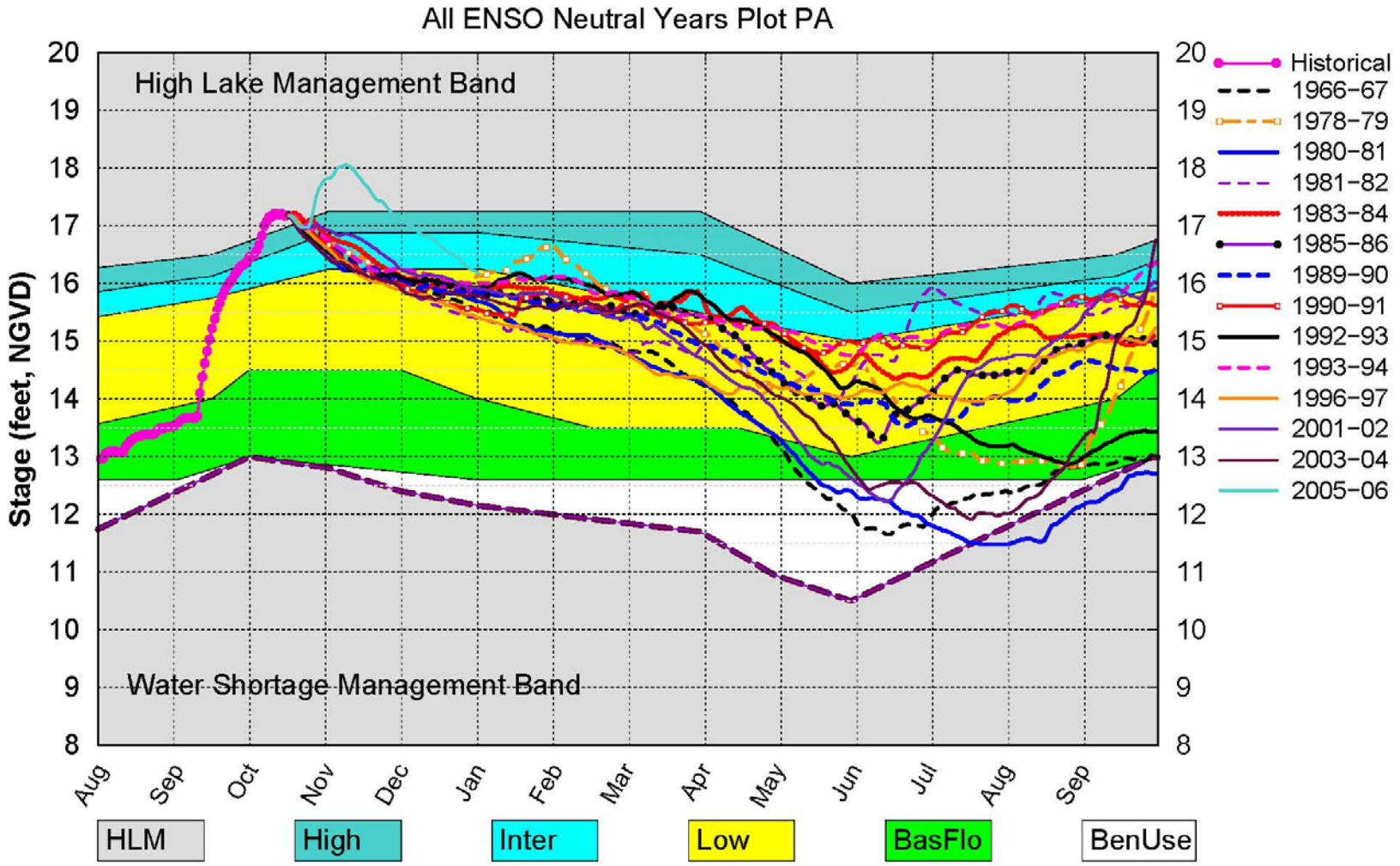


(See assumptions on the Position Analysis Results website)

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

Fri Oct 20 15:42:45 2017

Lake Okeechobee SFWMM Oct 2017 Mid-Mon Dynamic Position Analysis



(See assumptions on the Position Analysis Results website)

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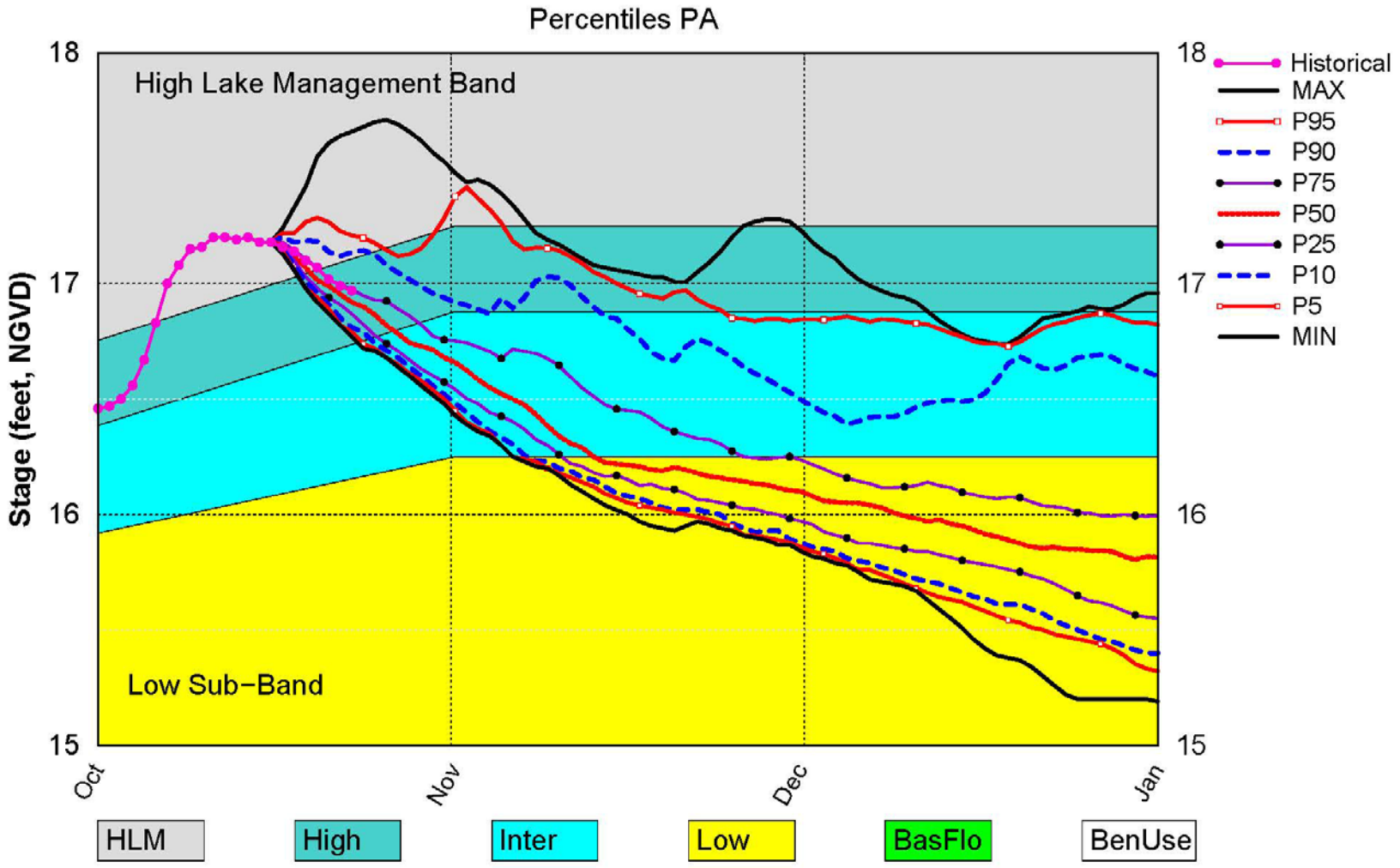
Lake Okeechobee SFWMM Oct 2017 Mid-Mon Dynamic Position Analysis



(See assumptions on the Position Analysis Results website)

Mon Oct 23 16:52:59 2017