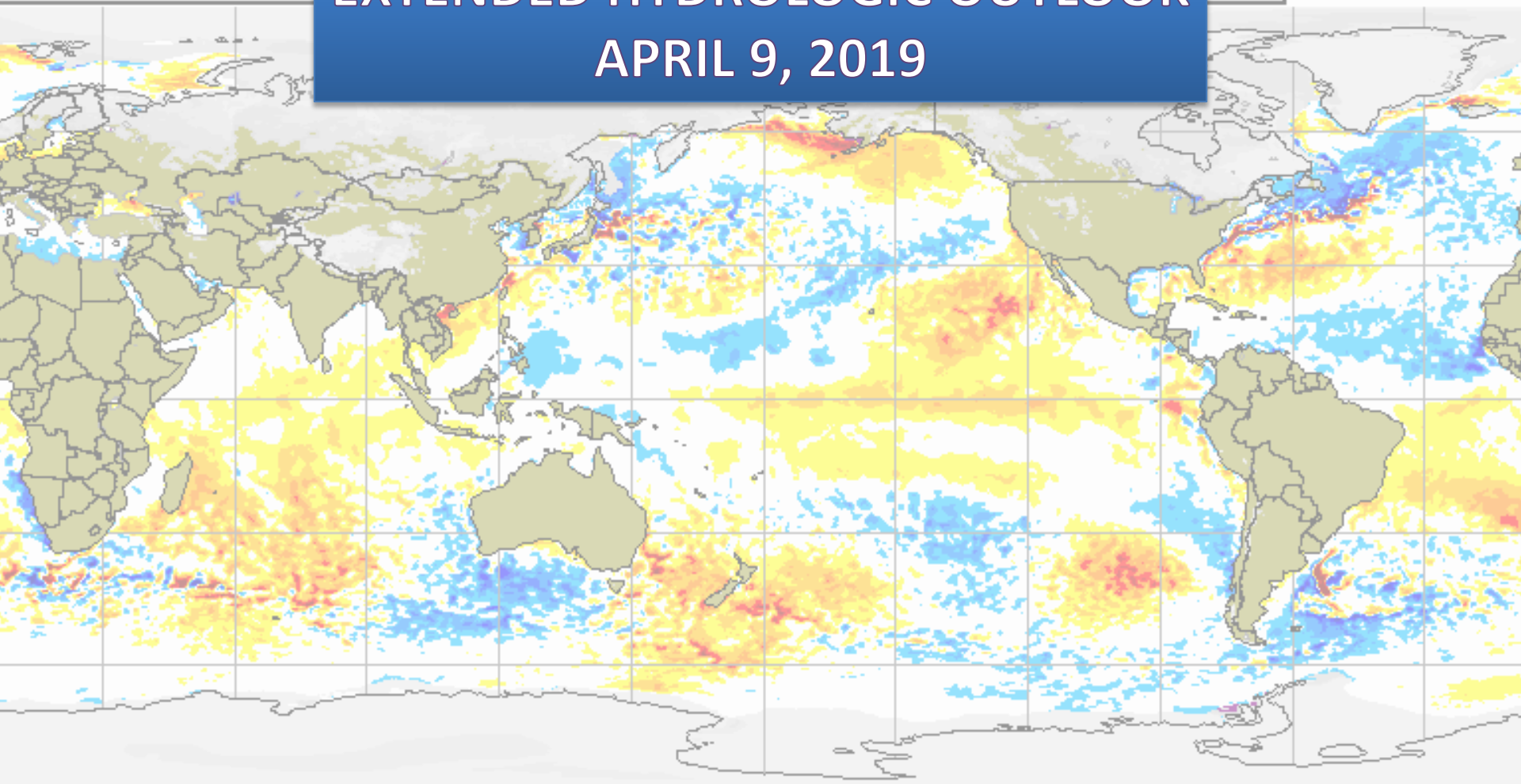
EXTENDED HYDROLOGIC OUTLOOK
APRIL 9, 2019



Summary

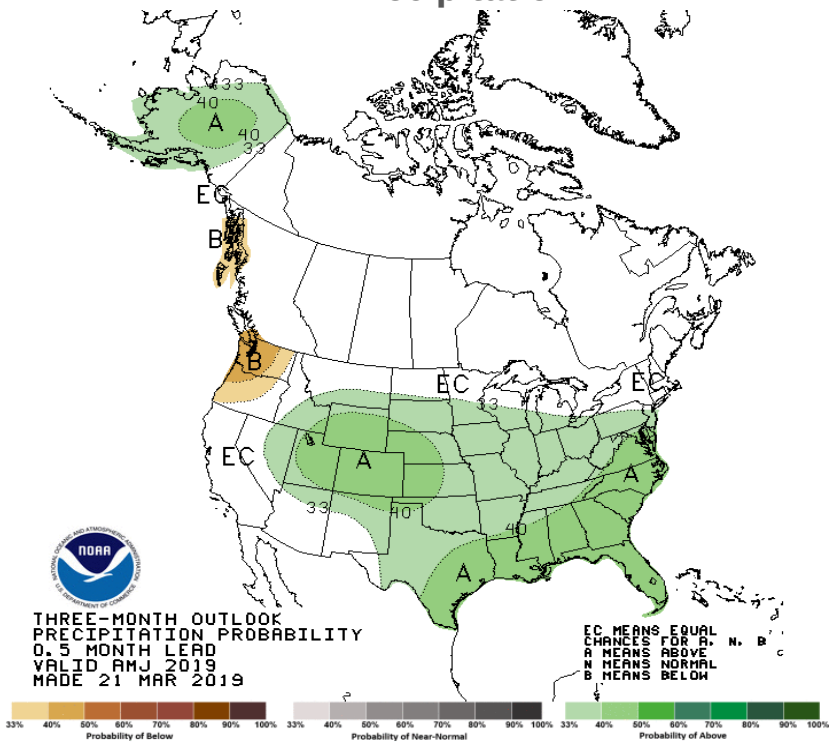
- The Climate Prediction Center (CPC) is forecasting above normal rainfall for April through June.
- Weak El Niño conditions are likely to continue through the spring 2019 (~80% chance) and summer (~60% chance). El Niño increases the chances of a wetter-than-normal dry season and decreases the potential for tropical storm activity from the Main Development Region in the Atlantic Ocean.
- 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. Seasonal Outlooks

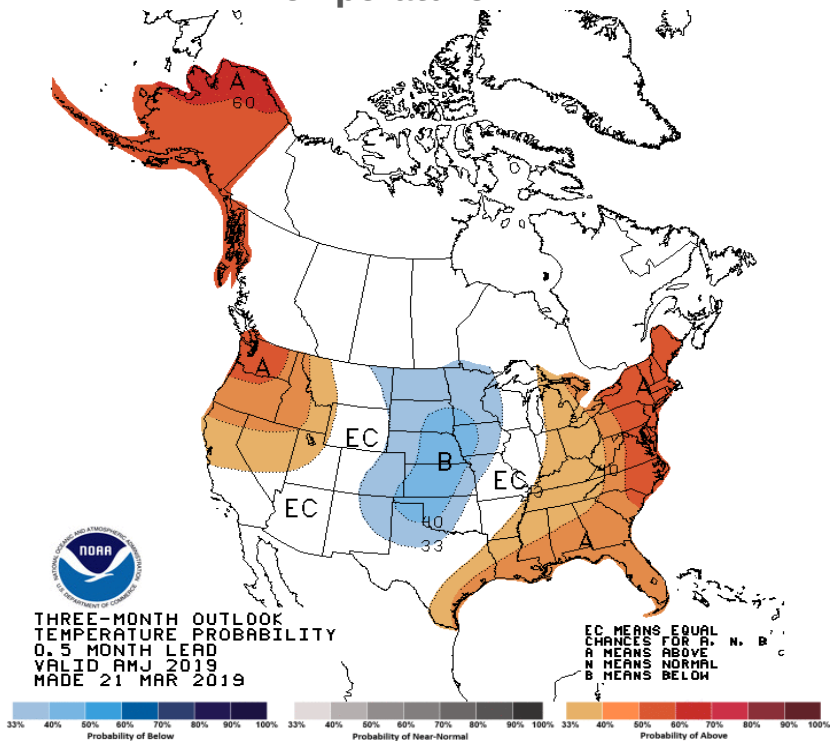
April-June 2019

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

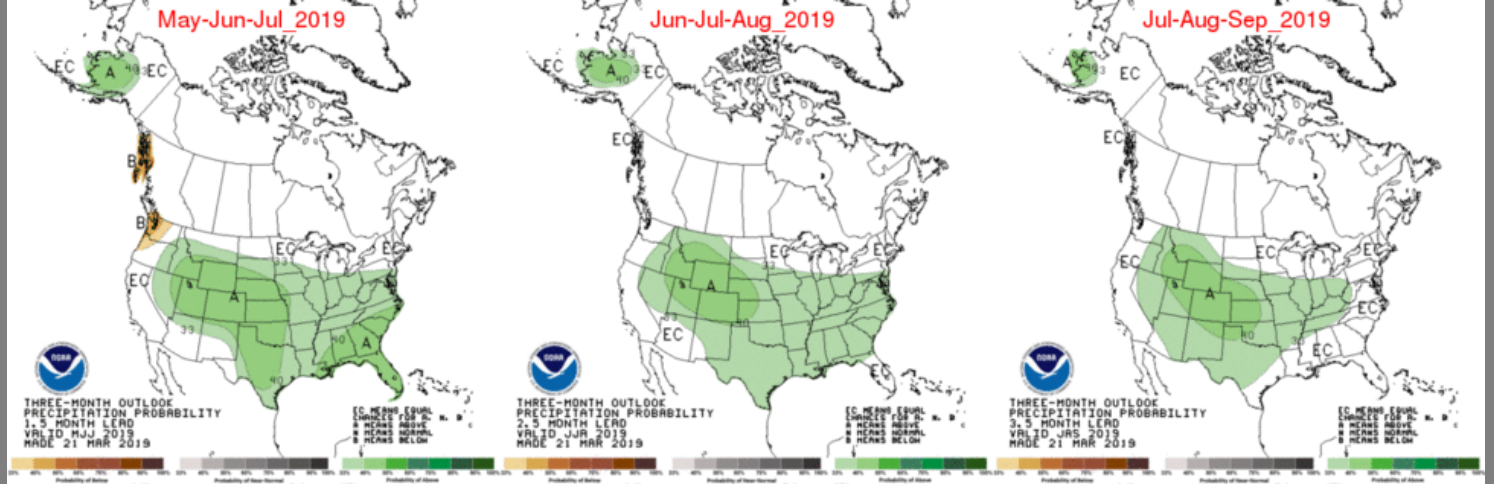
Precipitation

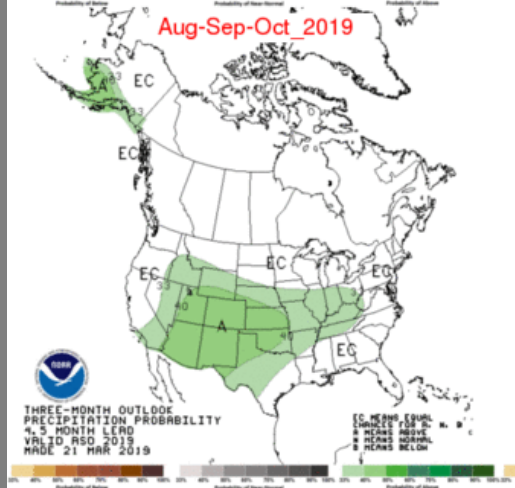


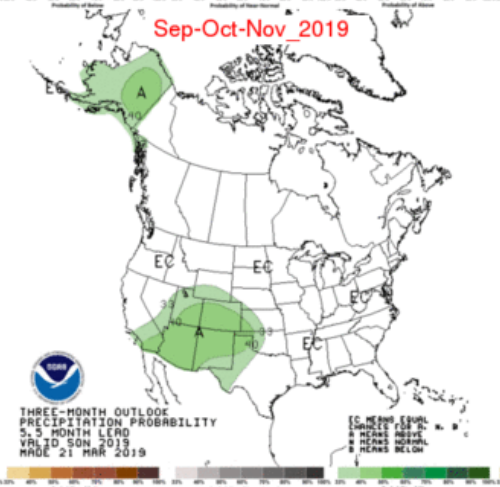
Temperature

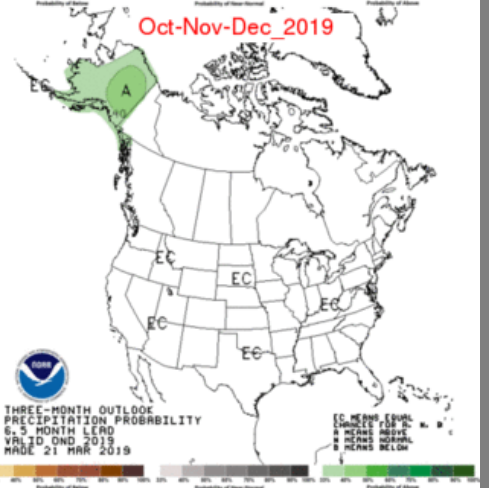


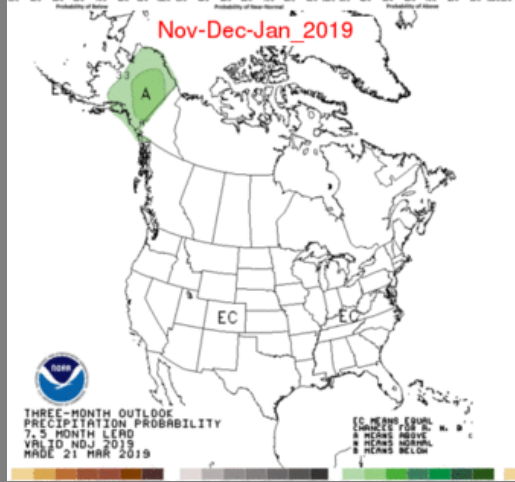
Prepared by: Climate Prediction Center/NCEP

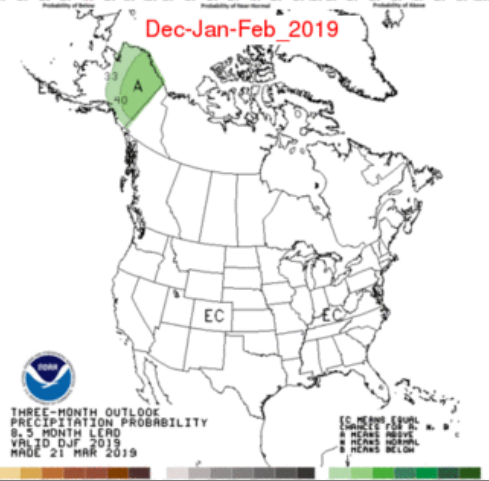


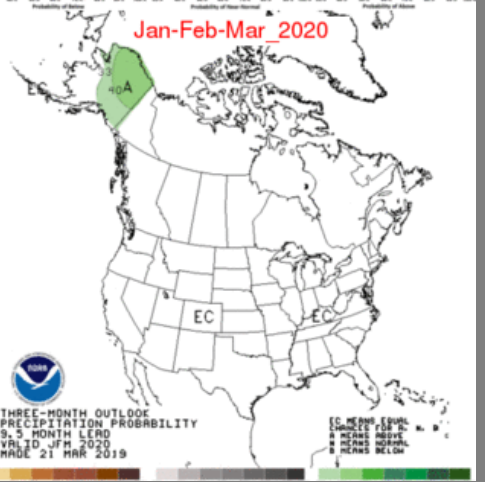












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Teleconnections to South Florida

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

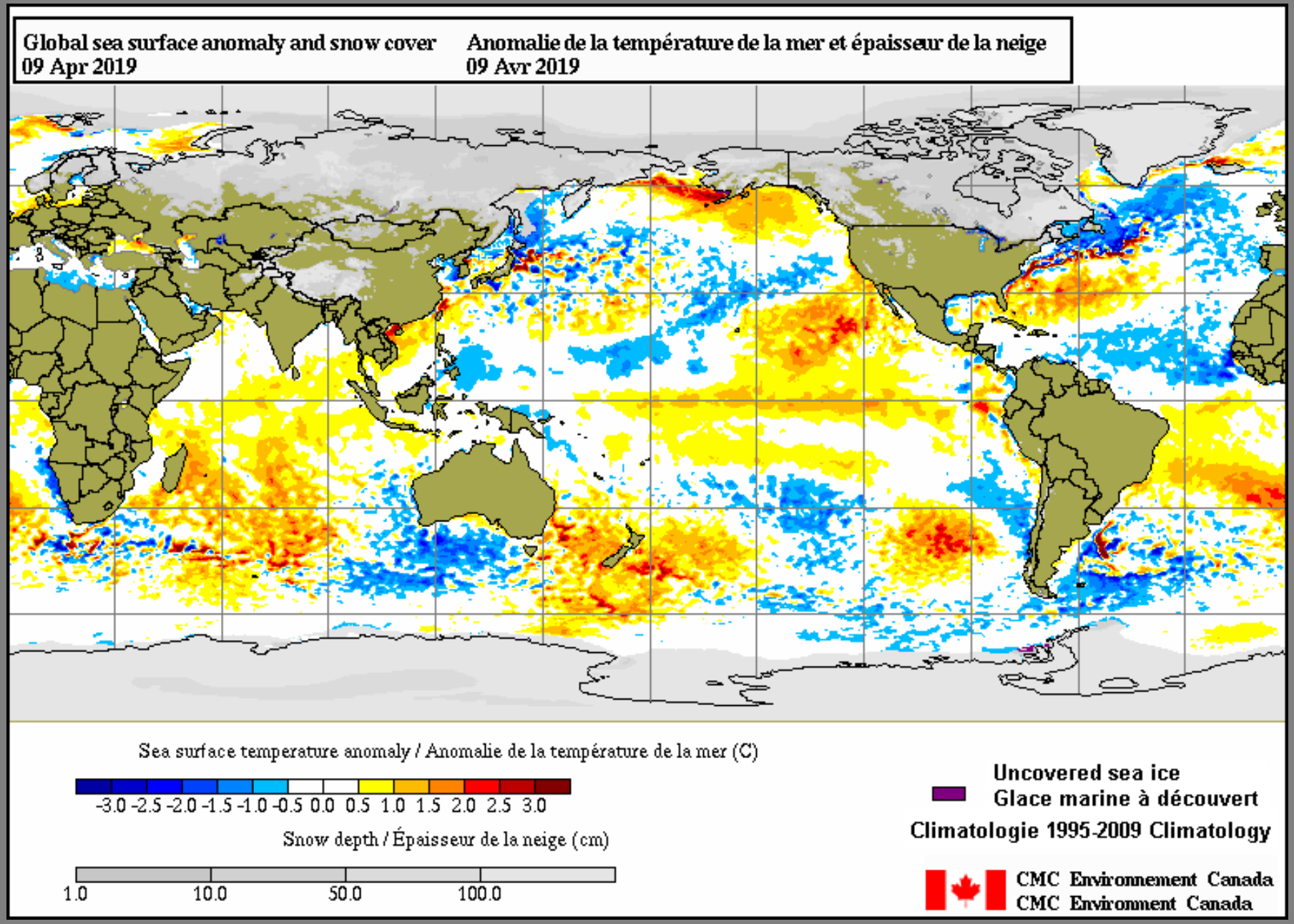
Atlantic Multidecadal Oscillation (AMO)

- 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

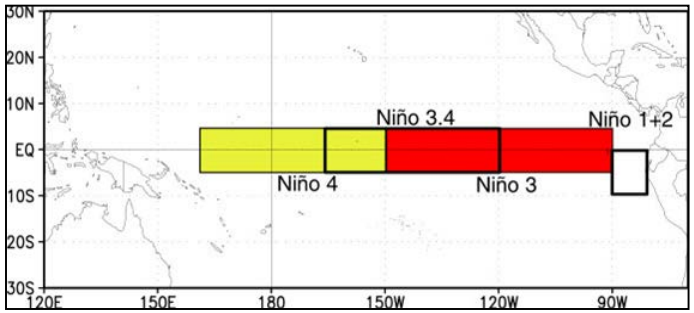
Current Global Sea Surface Temperature Anomalies

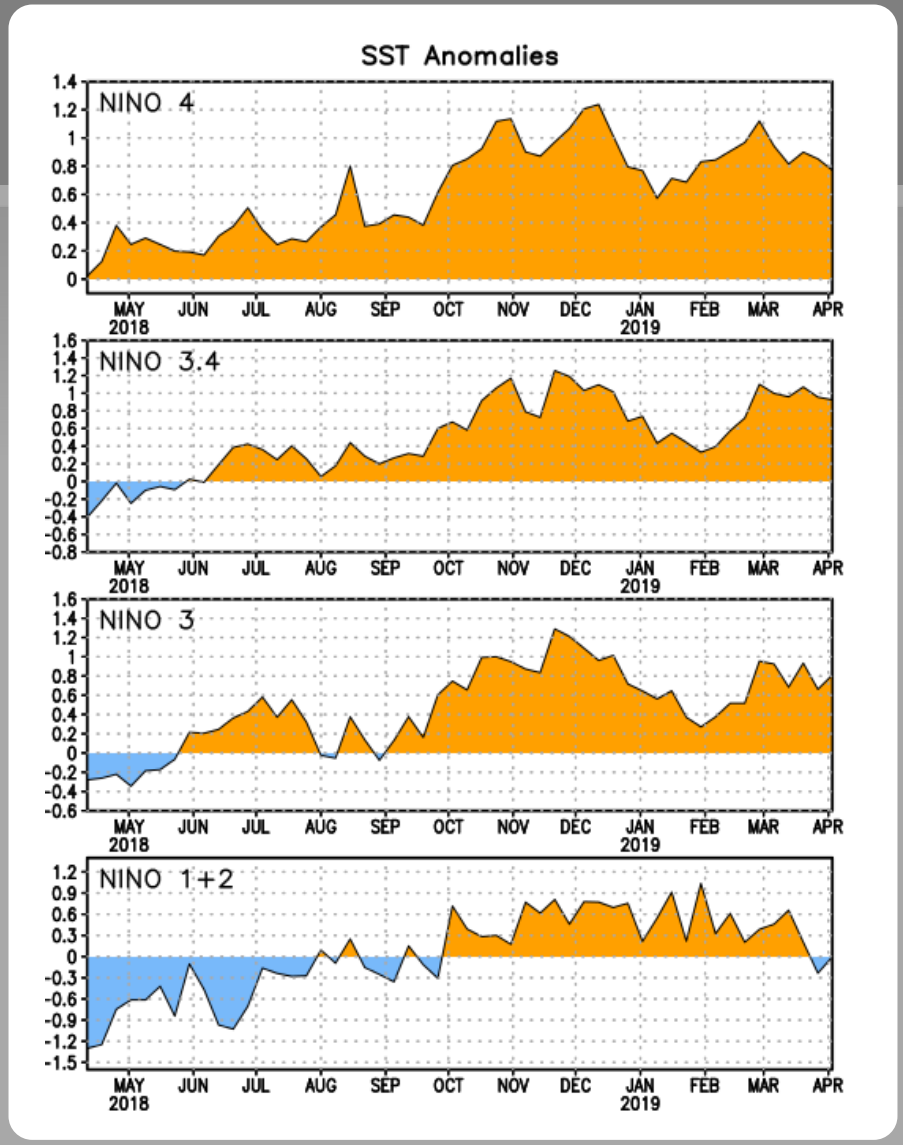


Niño Region SST Departures (ºC) Recent Evolution

The latest weekly SST departures are:

Niño 4	0.8ºC
Niño 3.4	0.9ºC
Niño 3	0.8ºC
Niño 1+2	0.0ºC





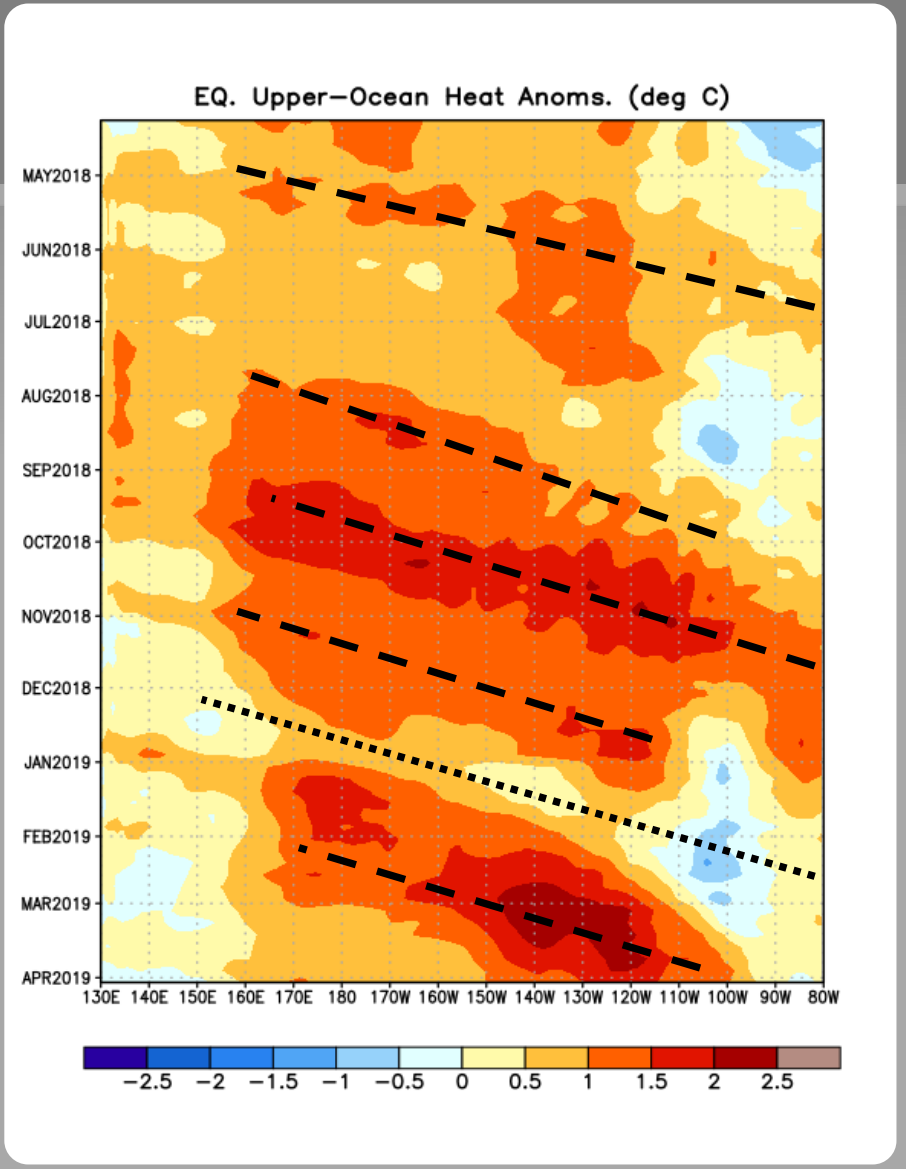
Prepared by: Climate Prediction Center/NCEP

Weekly Heat Content Evolution in the Equatorial Pacific

In early August, October, and November 2018, positive subsurface temperature anomalies increased, partly due to downwelling Kelvin waves.

Since early January 2019, a downwelling Kelvin wave increased the positive subsurface temperature anomalies across the Pacific.

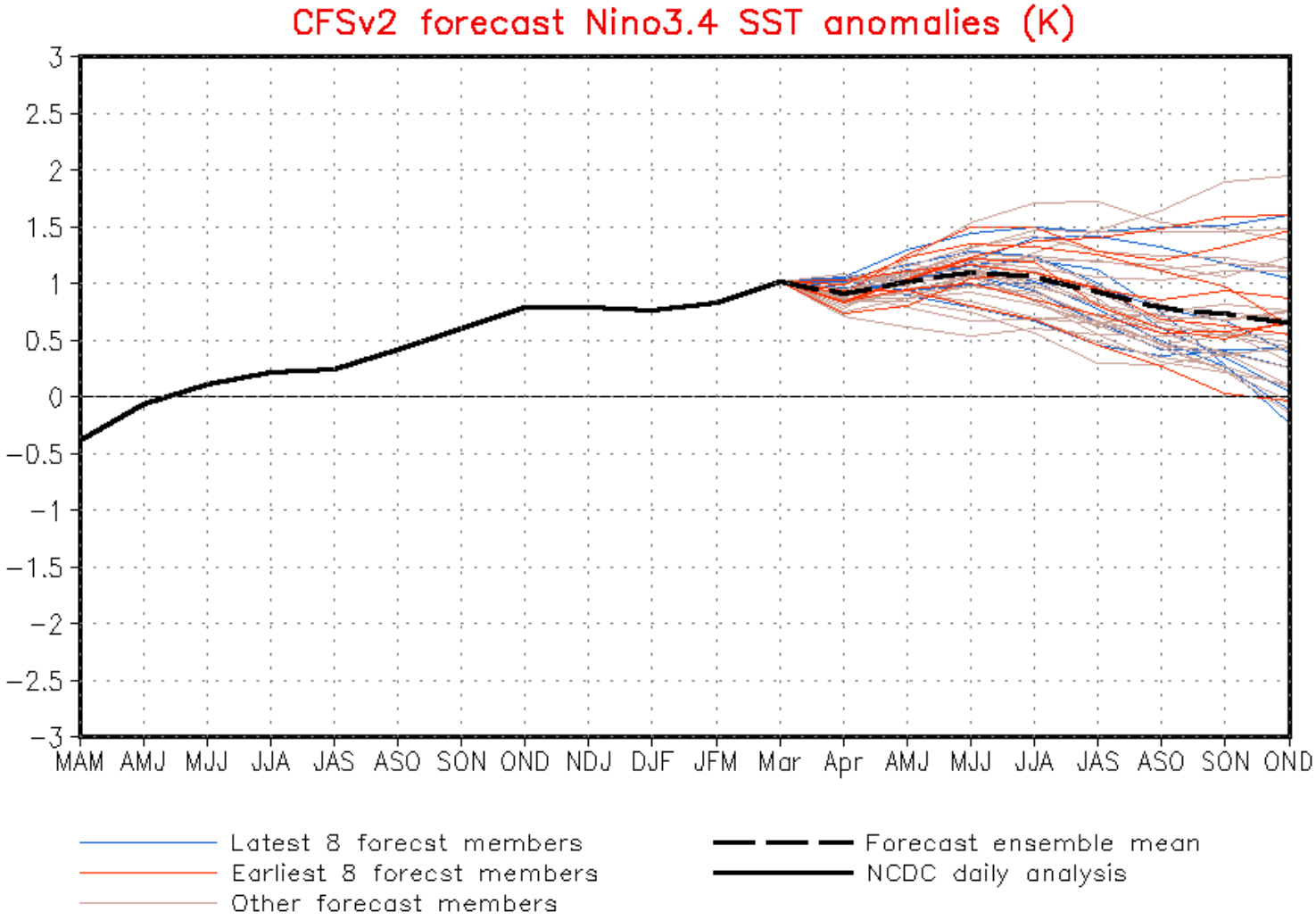
In the last couple of weeks, positive subsurface temperature anomalies have increased in the eastern Pacific.



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 Apr 9 2019
Initial conditions: 29Mar2019–7Apr2019



IRI/CPC Pacific Niño 3.4 SST Model Outlook

The majority of models predict a weak El Niño to continue into the Northern Hemisphere fall 2019.

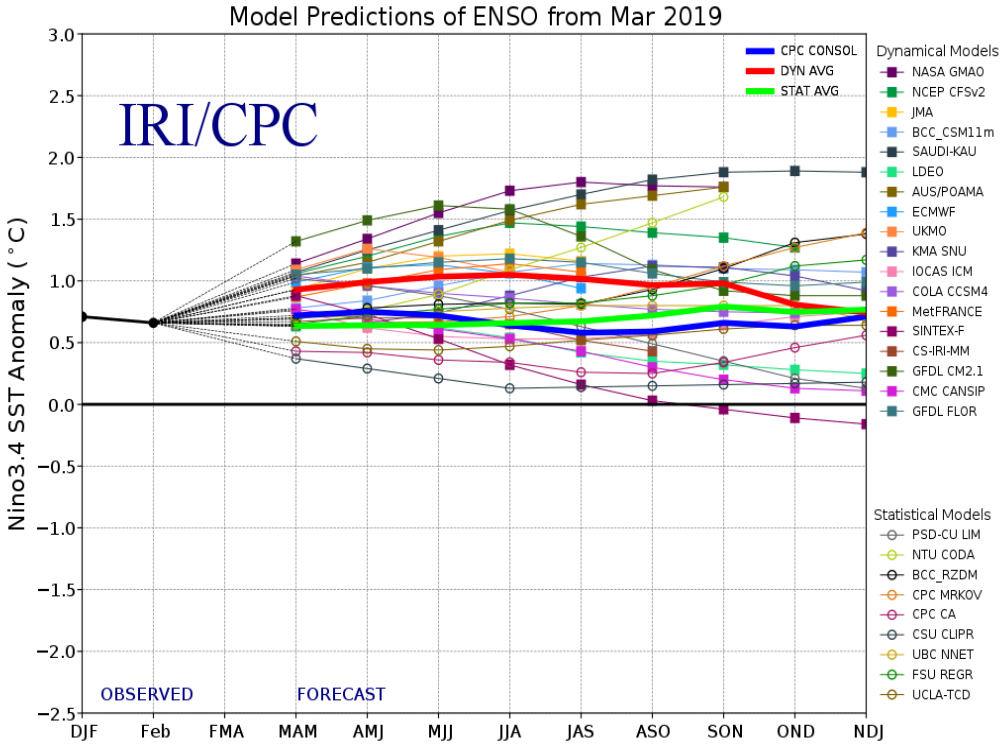


Figure provided by the International Research Institute (IRI) for Climate and Society (updated 19 March 2019).

Prepared by: Climate Prediction Center/NCEP

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

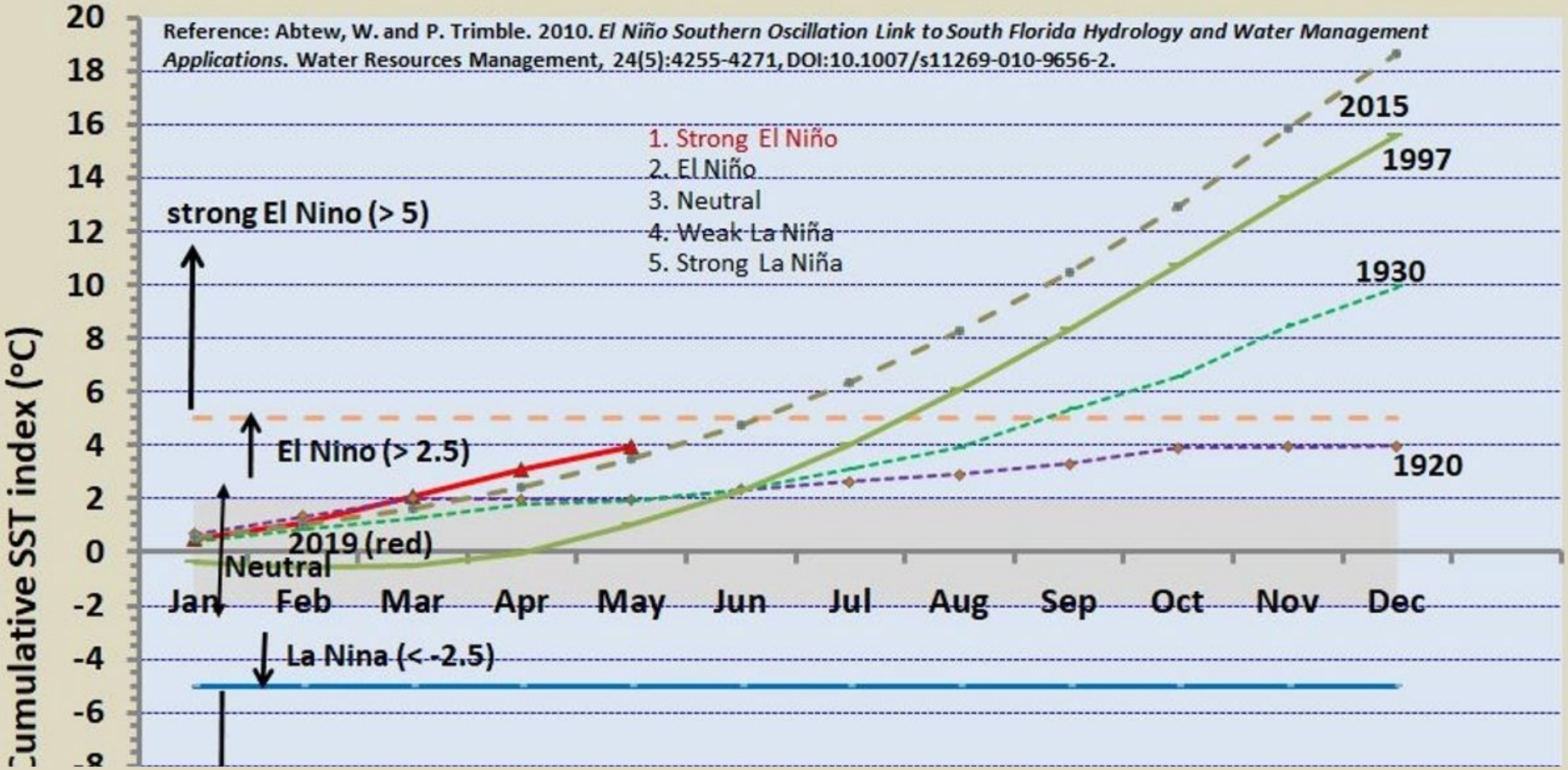
Recent Pacific warm (red) and cold (blue) periods based on a threshold of +/- 0.5 ºC for the Oceanic Nino Index (ONI) [3 month running mean of ERSST.v5 SST anomalies in the Nino 3.4 region (5N-5S, 120-170W)]. For historical purposes, periods of below and above normal SSTs are colored in blue and red 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
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	0.2	-0.1	-0.4	-0.7	-0.9	-1.0
2018	-0.9	-0.8	-0.6	-0.4	-0.1	0.1	0.1	0.2	0.4	0.7	0.9	0.8
2019	0.8	0.8										

Prepared by: Climate Prediction Center/IRI

El Niño Southern Oscillation Weekly Tracking

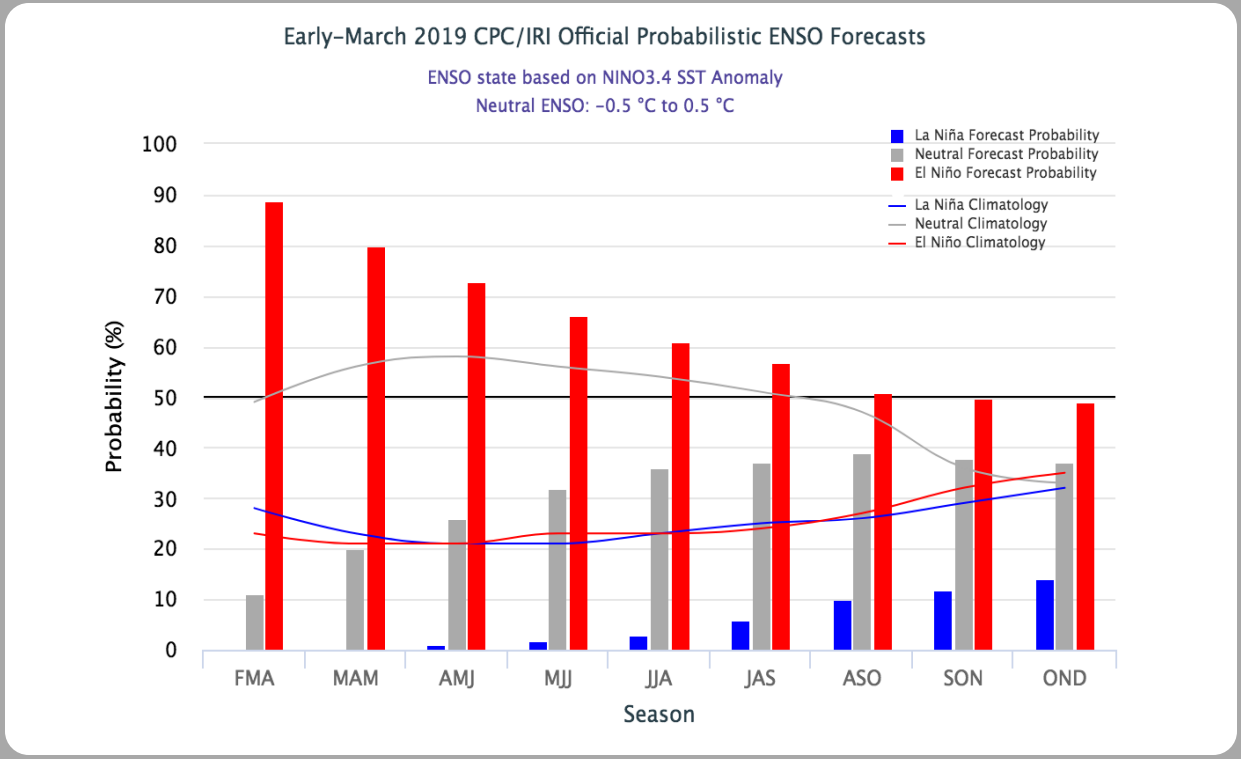


Prepared by: Wossenu Abtew

CPC/IRI Probabilistic ENSO Outlook

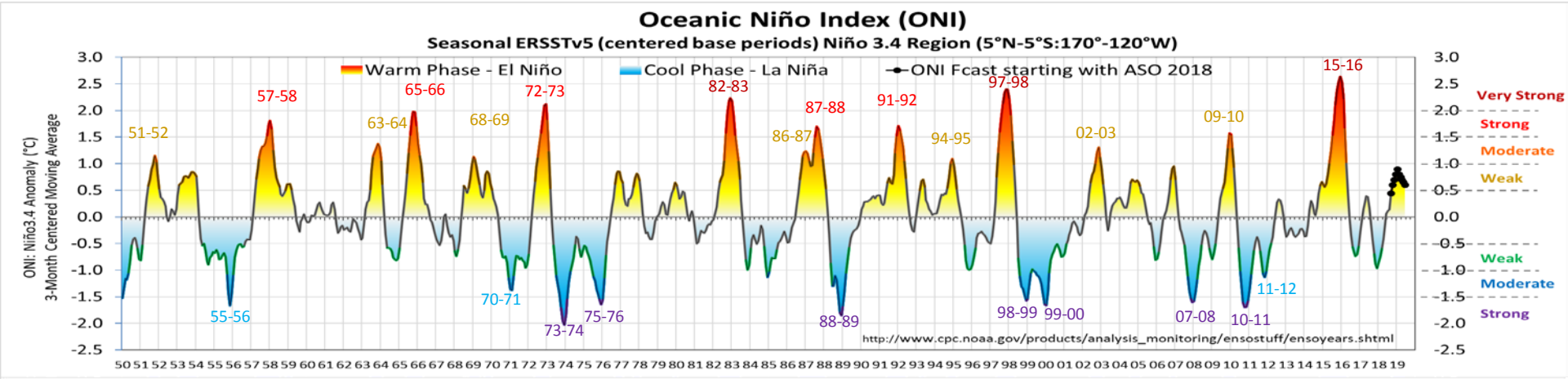
Updated: 14 March 2019

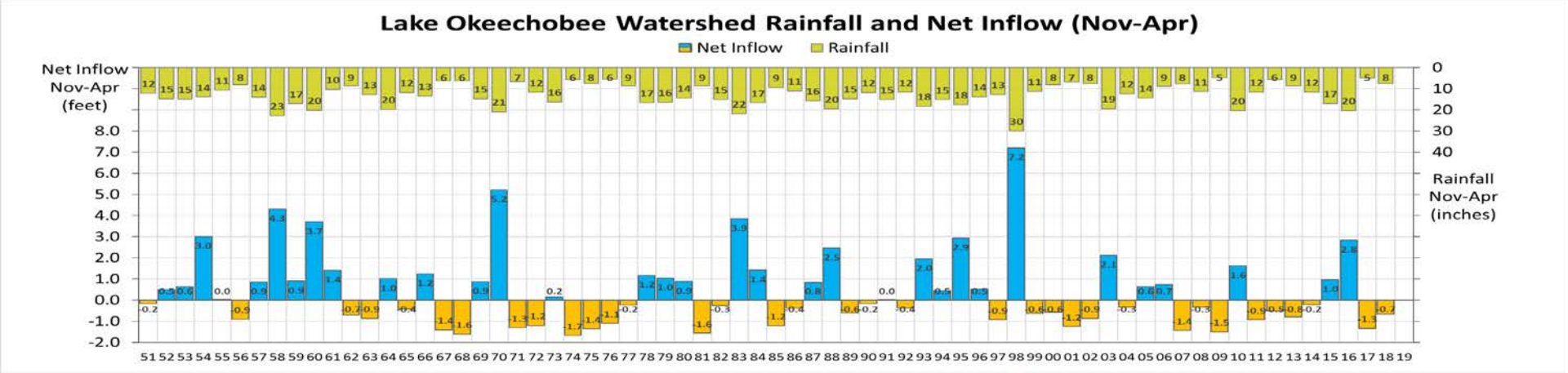
El Niño conditions are favored to continue through fall 2019 with diminishing chances (~50% in October-November-December).



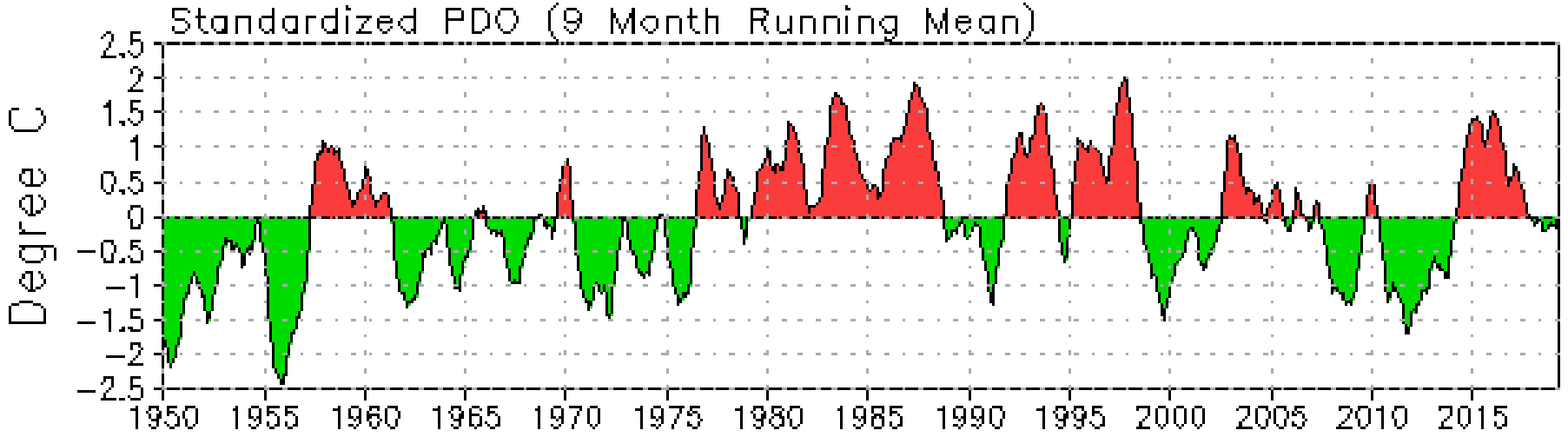
Prepared by: Climate Prediction Center/IRI

El Niño & La Niña Events (1950-2018), and Lake Okeechobee Watershed Rainfall & Net Inflow





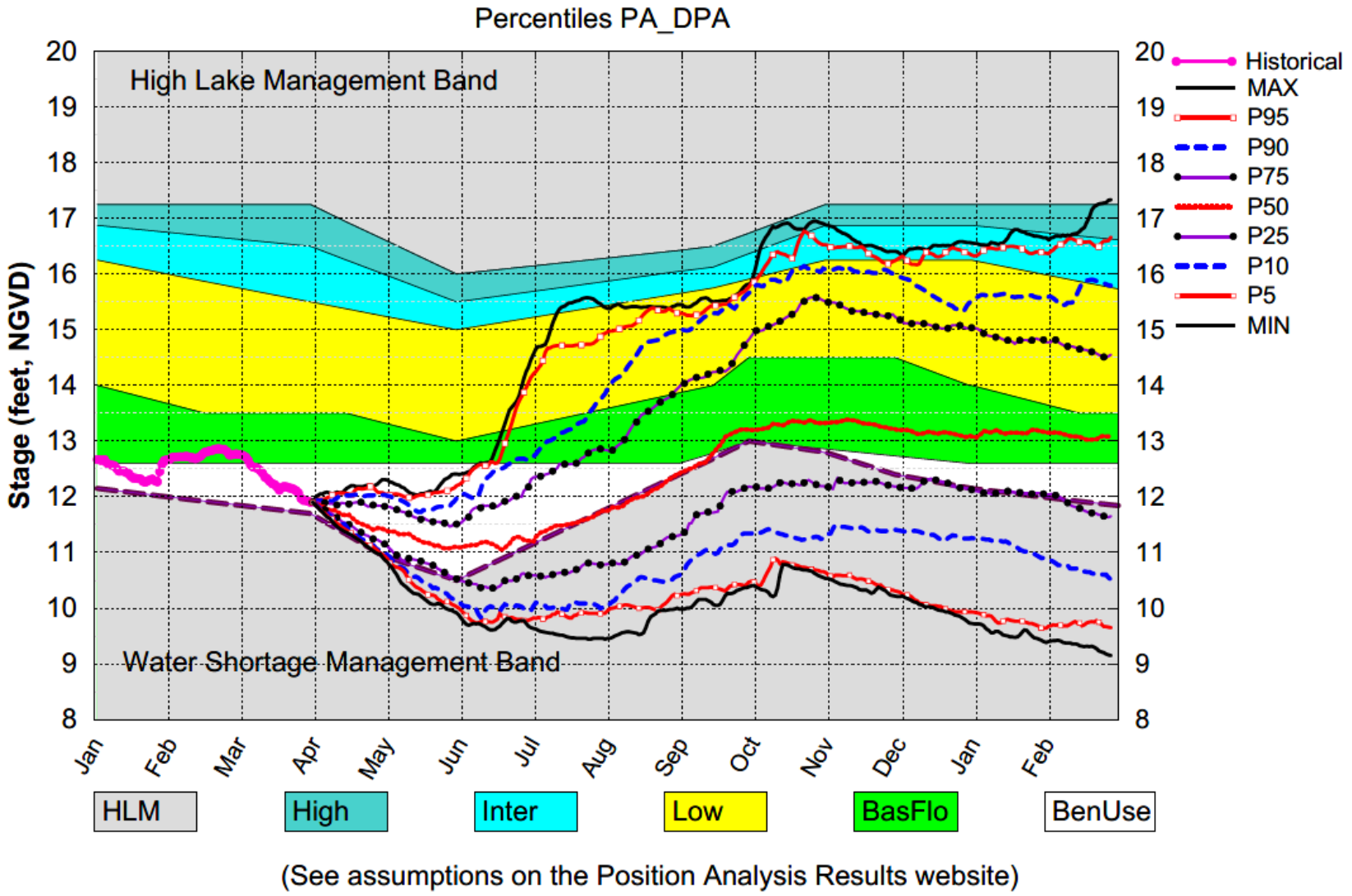
Source: Cal Neidrauer (SFWMD)


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

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 the 1st of the current month for both Lake Okeechobee and the Water Conservation Areas
- Dynamic Position Analysis
  - Each 1-year simulation starts with current hydrologic conditions (e.g., 1-Apr-2019)
  - 41 1-year simulations of system response to historical rainfall conditions
  - Statistical summaries used to display projections

Lake Okeechobee SFWMM Apr 2019 Position Analysis

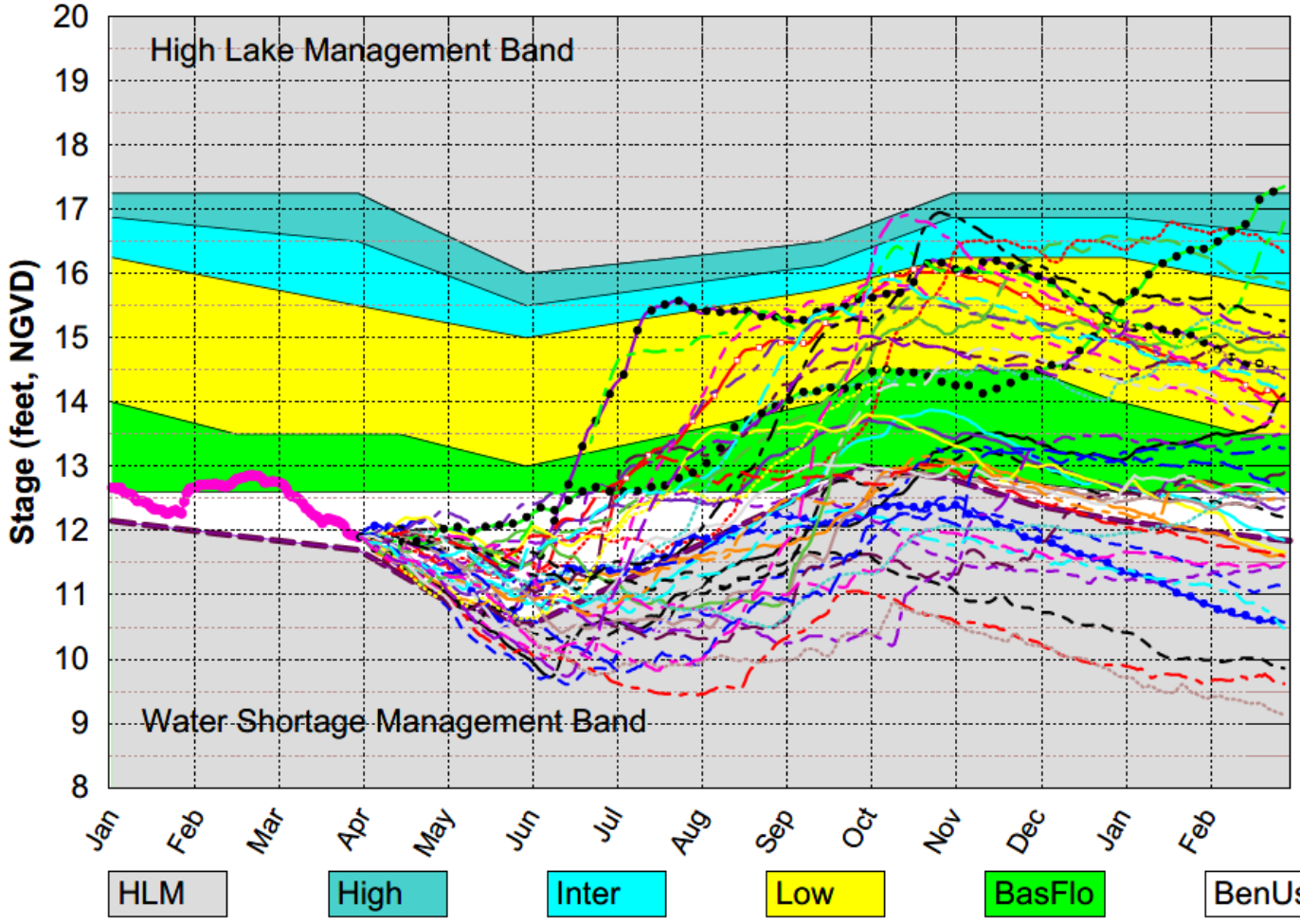


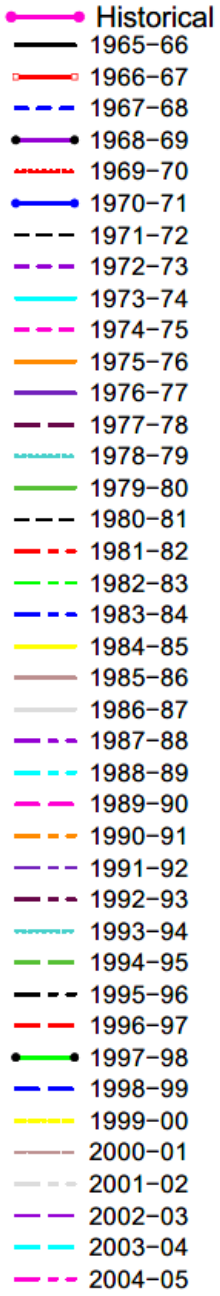
(See assumptions on the Position Analysis Results website)

Thu Apr 4 10:04:06 2019

Lake Okeechobee SFWMM Apr 2019 Position Analysis

All Simulated Years Plot PA_DPA

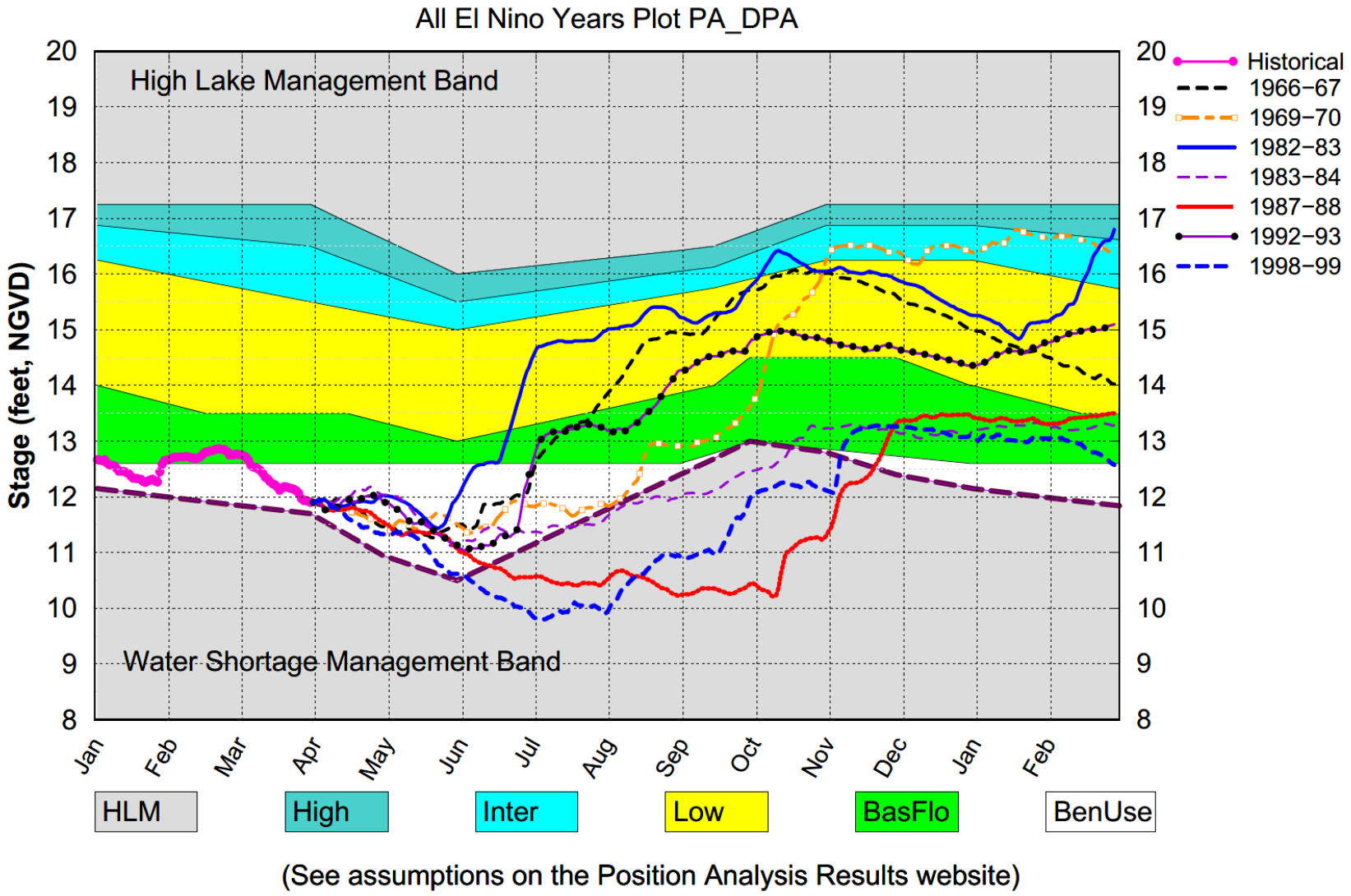




(See assumptions on the Position Analysis Results website)

Thu Apr 4 10:06:53 2019

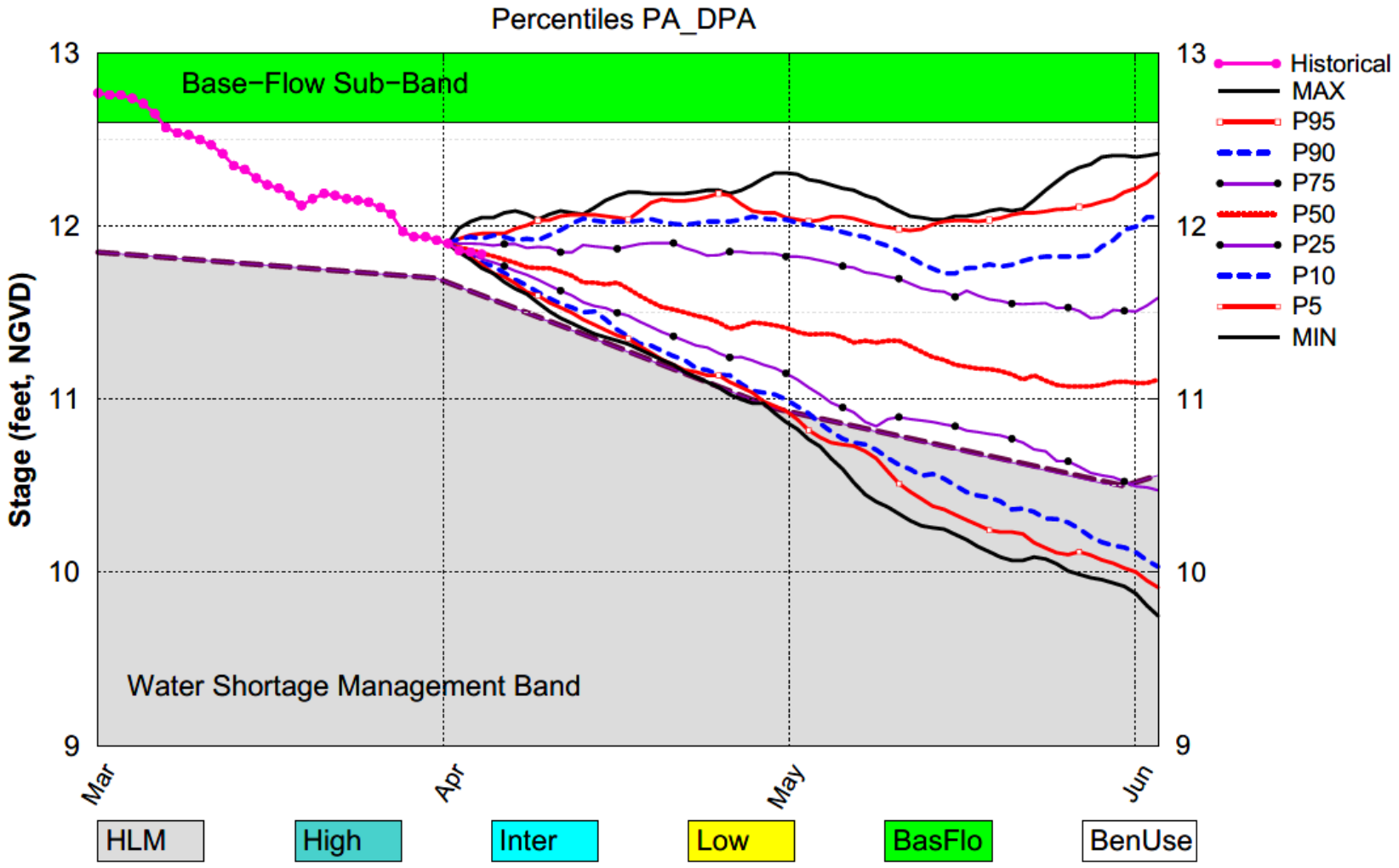
Lake Okeechobee SFWMM Apr 2019 Position Analysis



(See assumptions on the Position Analysis Results website)

Thu Apr 4 10:04:37 2019

Lake Okeechobee SFWMM Apr 2019 Position Analysis



(See assumptions on the Position Analysis Results website)

Thu Apr 4 10:47:07 2019