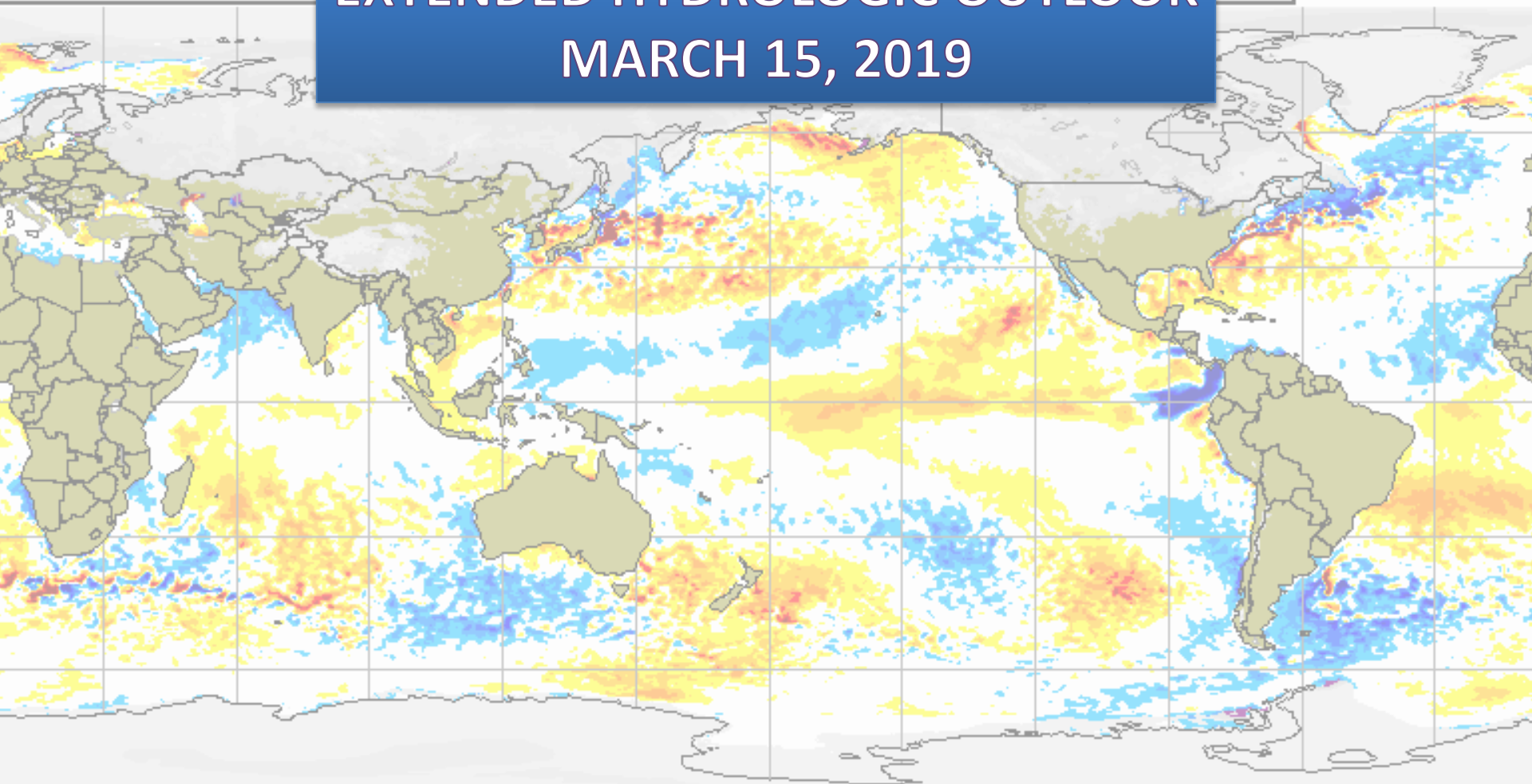


EXTENDED HYDROLOGIC OUTLOOK MARCH 15, 2019



Sea surface temperature anomaly / Anomalie de la température de la mer (C)



Snow depth / Épaisseur de la neige (cm)



Uncovered sea ice
Glace marine à découvert
Climatologie 1995-2009 Climatologie



CMC Environnement Canada
CMC Environment Canada

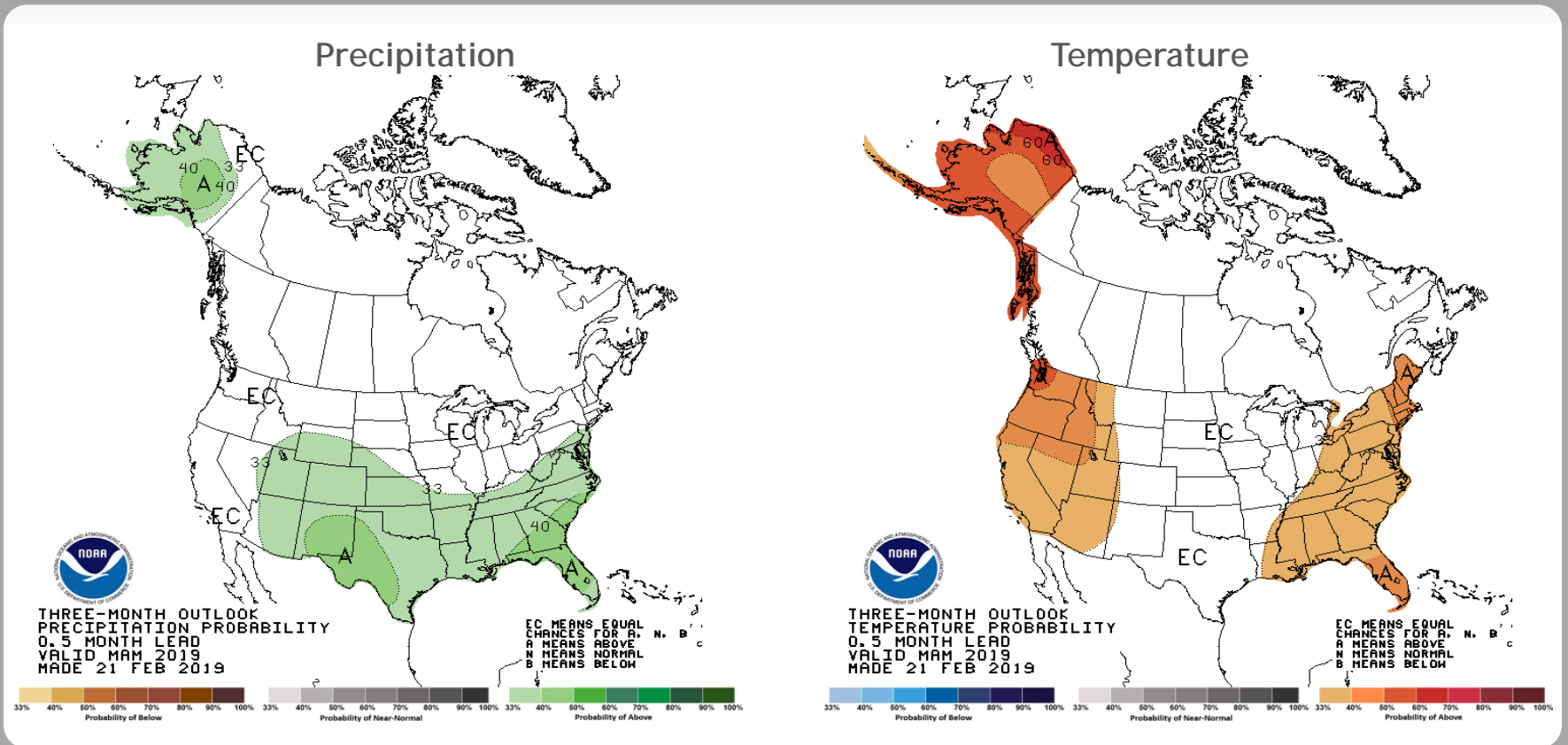
Summary

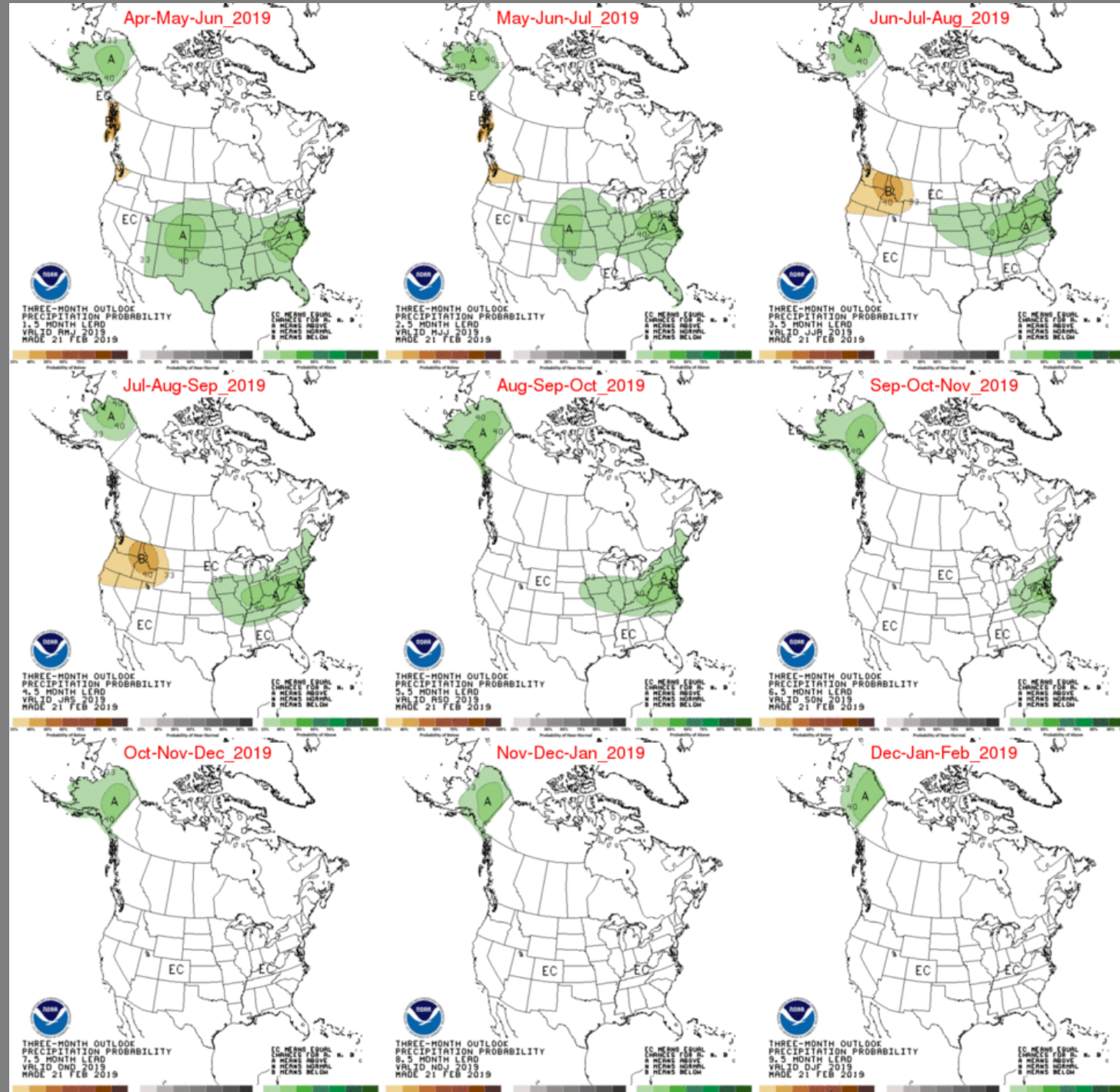
- The Climate Prediction Center (CPC) is forecasting above normal rainfall for March through May.
- Weak El Niño conditions are likely to continue through the spring 2019 (~80% chance) and summer (~60% chance). El Niño increases the chances of a wetter-than-normal dry season and decreases the potential 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

March- May 2019

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





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

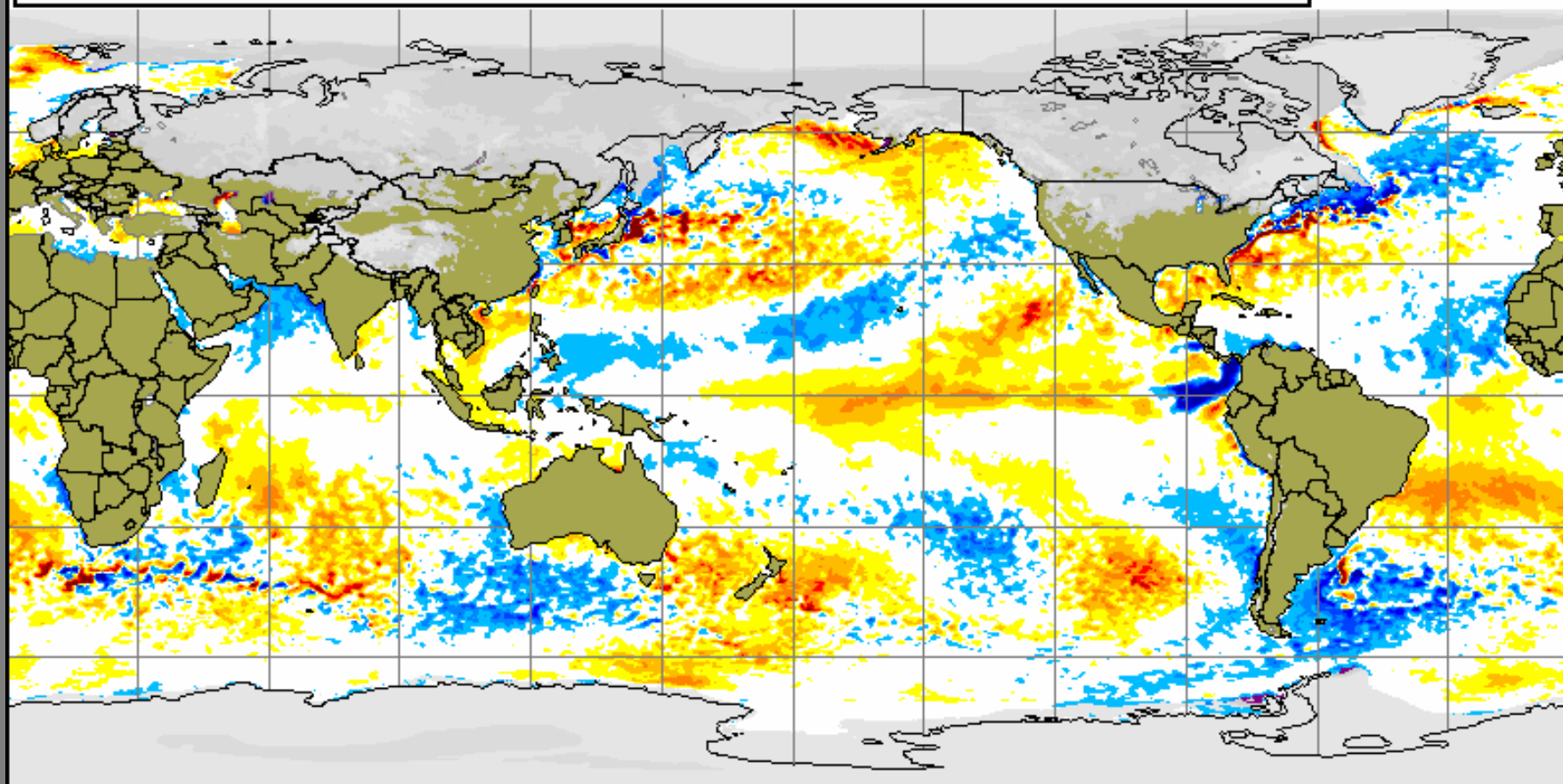
Pacific Decadal Oscillation (PDO)

Increases variations of south Florida dry season rainfall

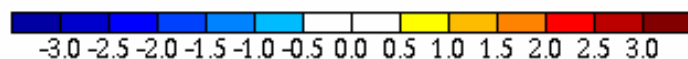
Current Global Sea Surface Temperature Anomalies

Global sea surface anomaly and snow cover
15 Mar 2019

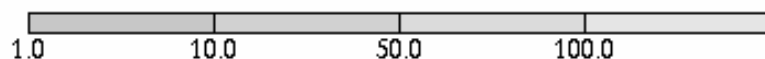
Anomalie de la température de la mer et épaisseur de la neige
15 Mar 2019



Sea surface temperature anomaly / Anomalie de la température de la mer (°C)



Snow depth / Épaisseur de la neige (cm)



Uncovered sea ice

Glace marine à découvrir

Climatologie 1995-2009 Climatologie

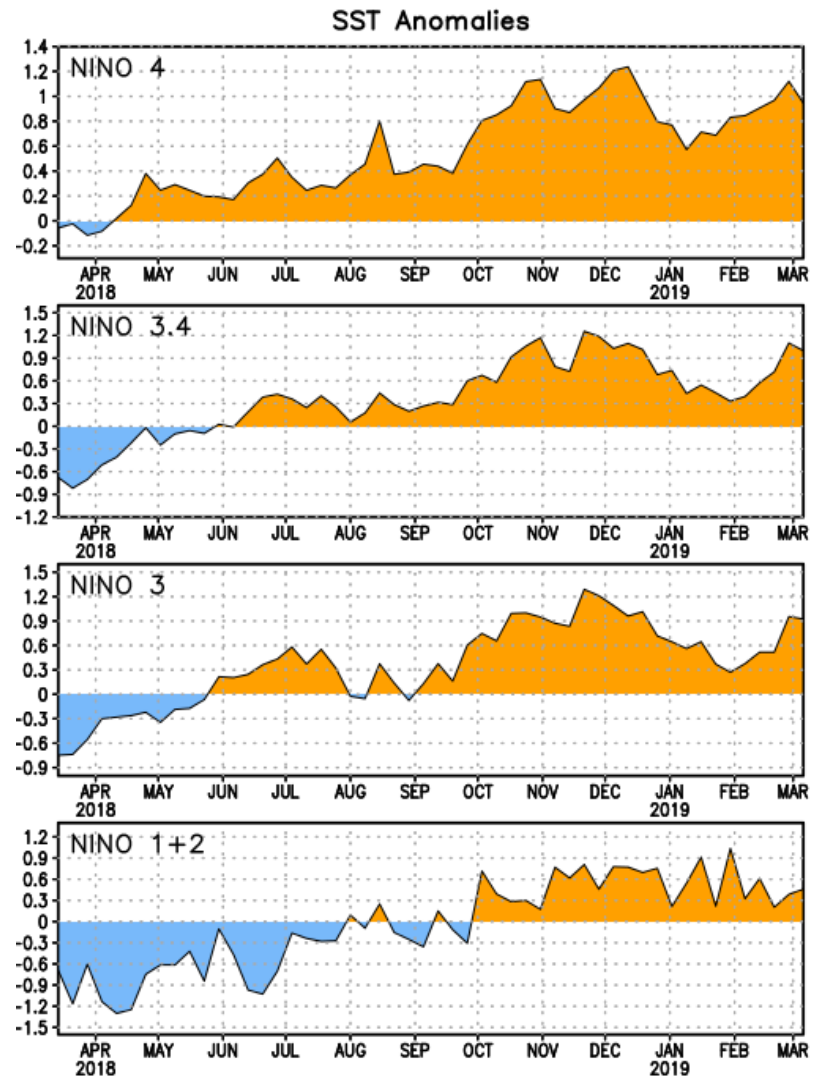
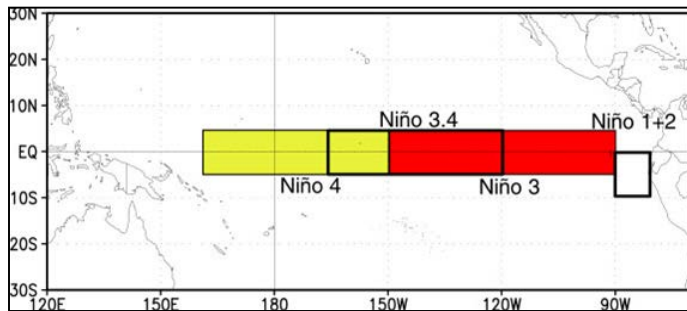


CMC Environnement Canada
CMC Environnement Canada

Niño Region SST Departures (°C) Recent Evolution

The latest weekly SST departures are:

Niño 4	0.9°C
Niño 3.4	1.0°C
Niño 3	0.9°C
Niño 1+2	0.5°C



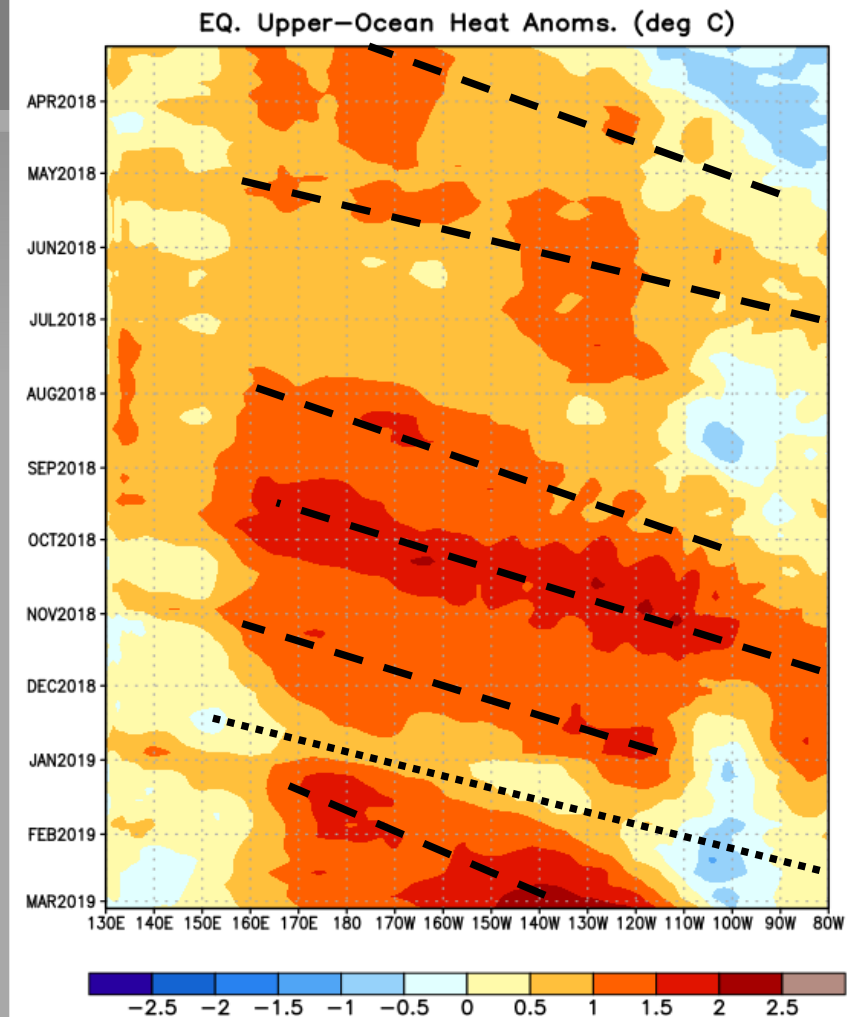
Weekly Heat Content Evolution in the Equatorial Pacific

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 central and east-central Pacific.

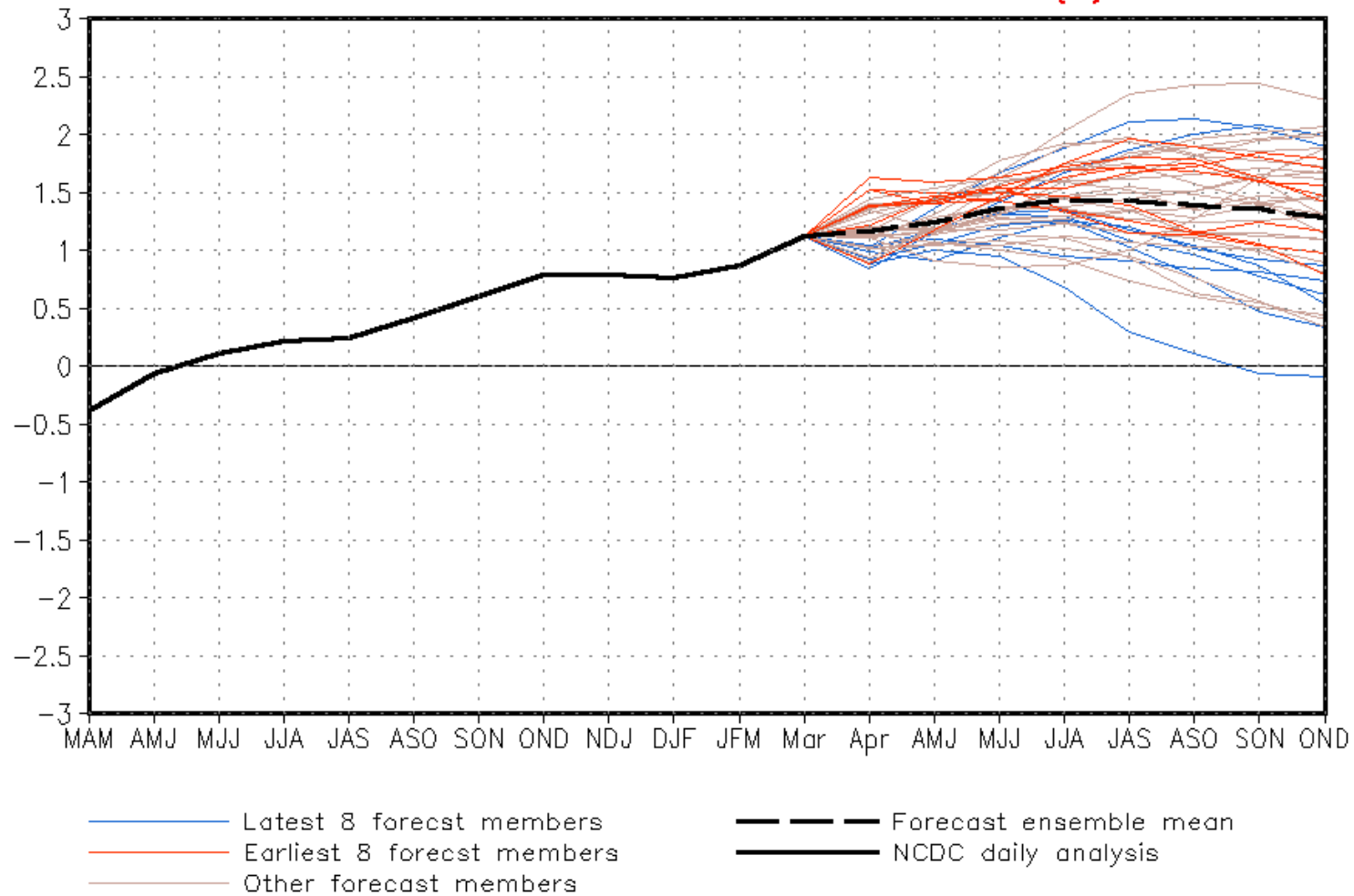
Also since early January 2019, negative subsurface temperature anomalies have been present between 110°W and 90°W.

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





CFSv2 forecast Nino3.4 SST anomalies (K)



IRI/CPC Pacific Niño

3.4 SST Model Outlook

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

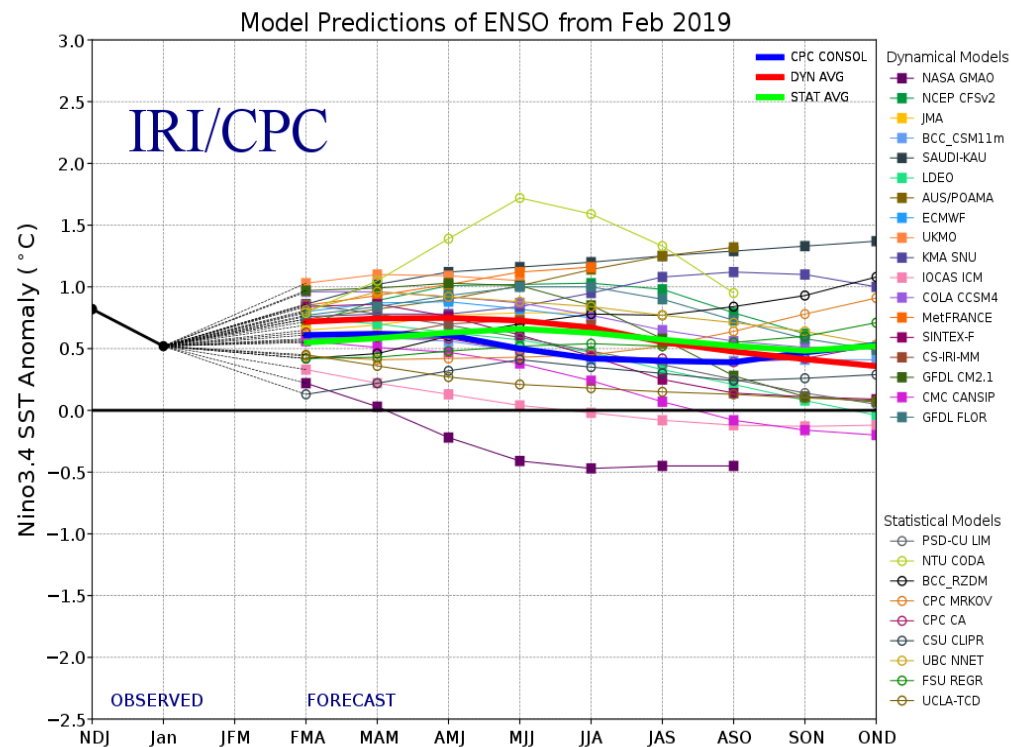


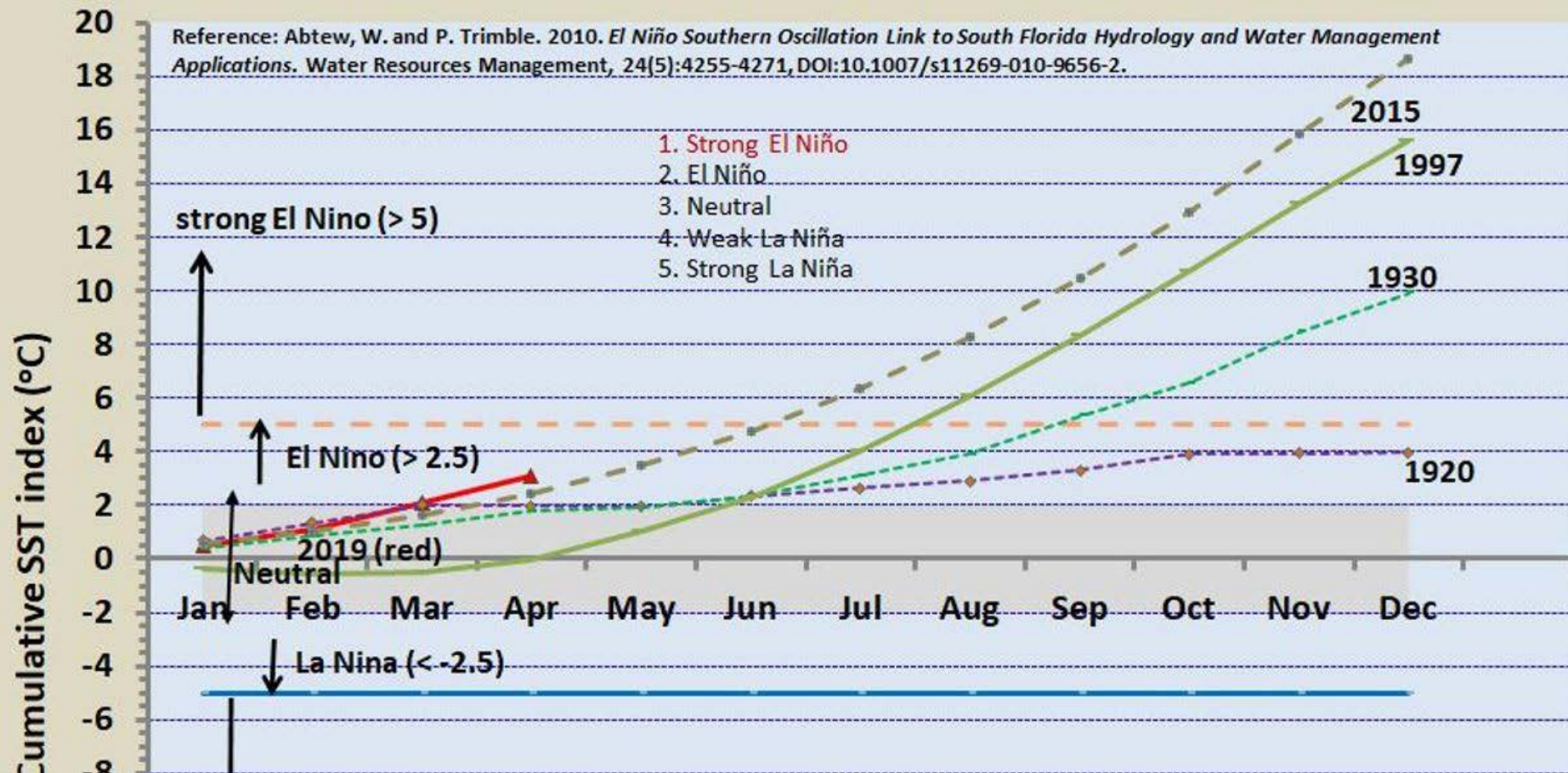
Figure provided by the International Research Institute (IRI) for Climate and Society (updated 19 February 2019).

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 °C 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](#).

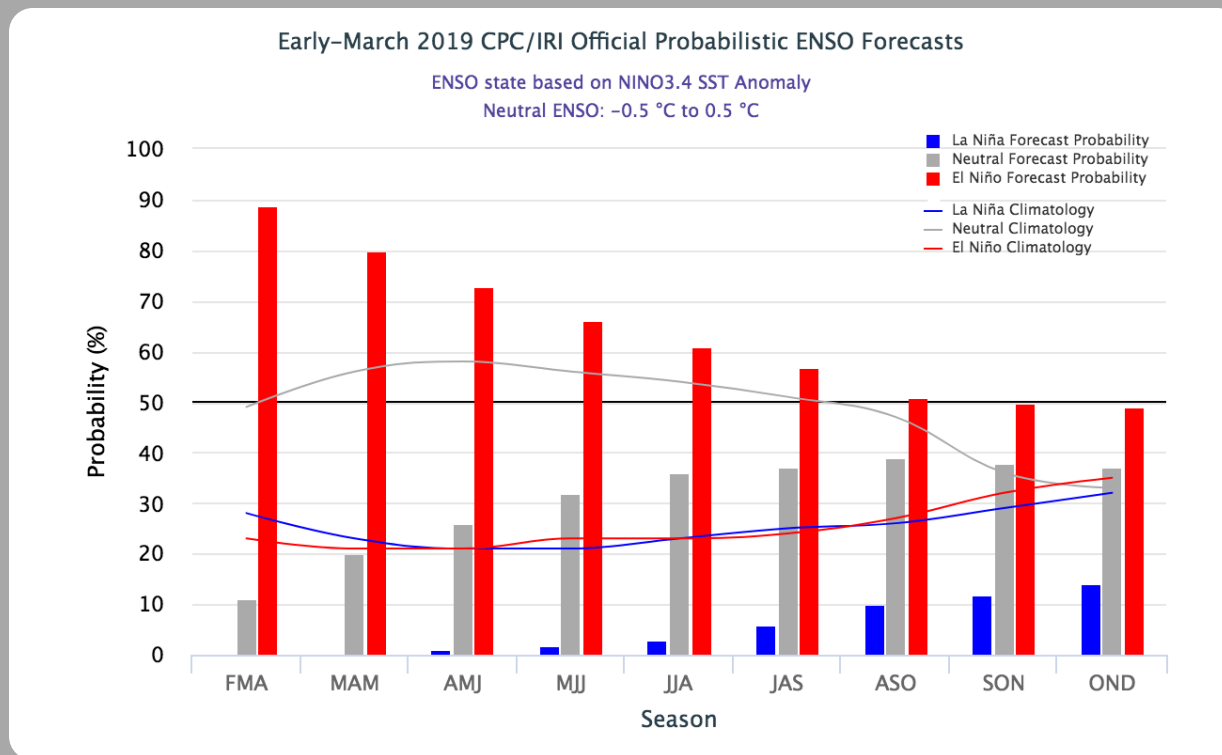
Year	DJF	JFM	FMA	MAM	AMJ	MJJ	JJA	JAS	ASO	SON	OND	NDJ
2007	0.7	0.3	0.0	-0.2	-0.3	-0.4	-0.5	-0.8	-1.1	-1.4	-1.5	-1.6
2008	-1.6	-1.4	-1.2	-0.9	-0.8	-0.5	-0.4	-0.3	-0.3	-0.4	-0.6	-0.7
2009	-0.8	-0.7	-0.5	-0.2	0.1	0.4	0.5	0.5	0.7	1.0	1.3	1.6
2010	1.5	1.3	0.9	0.4	-0.1	-0.6	-1.0	-1.4	-1.6	-1.7	-1.7	-1.6
2011	-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											



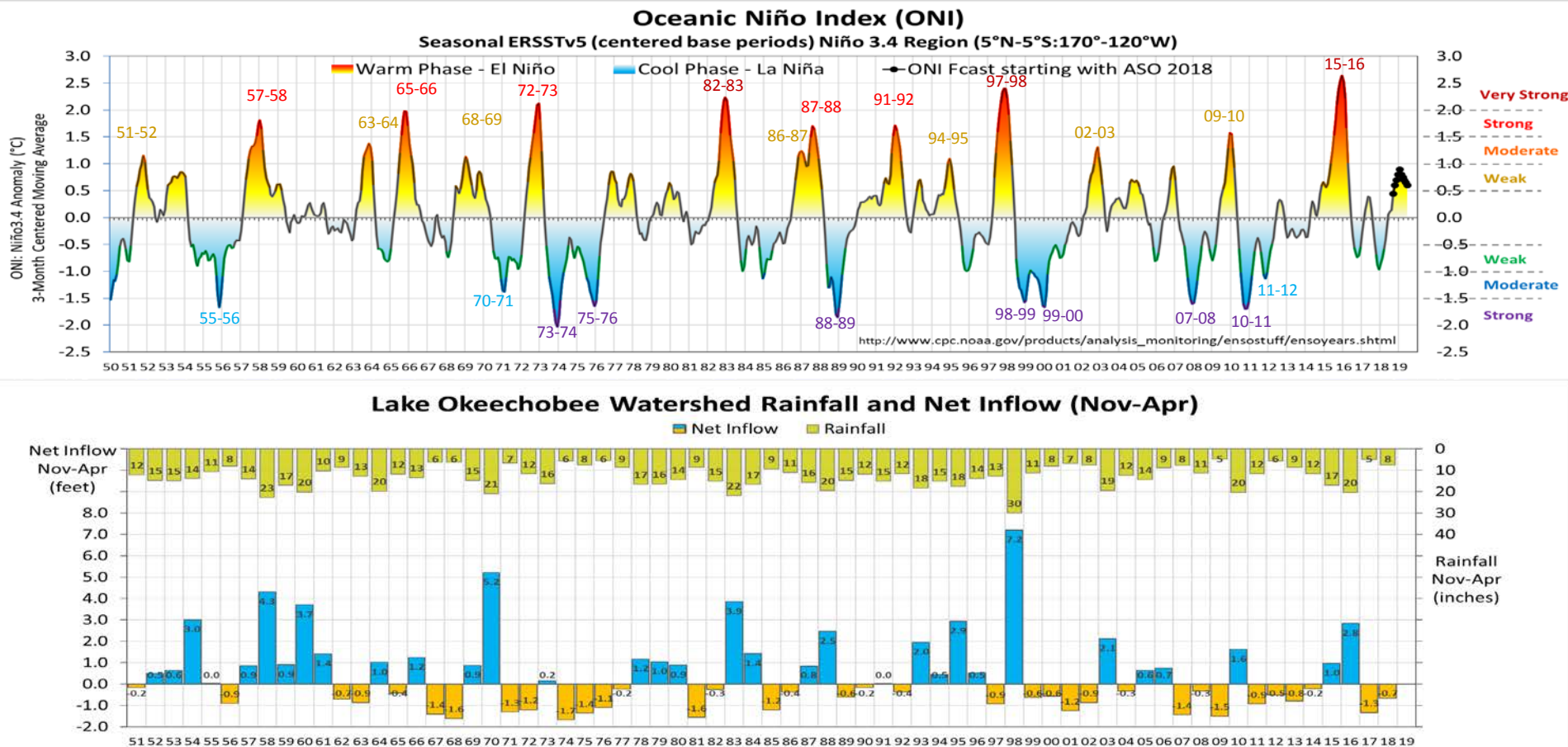
CPC/IRI Probabilistic ENSO Outlook

Updated: 15 March 2019

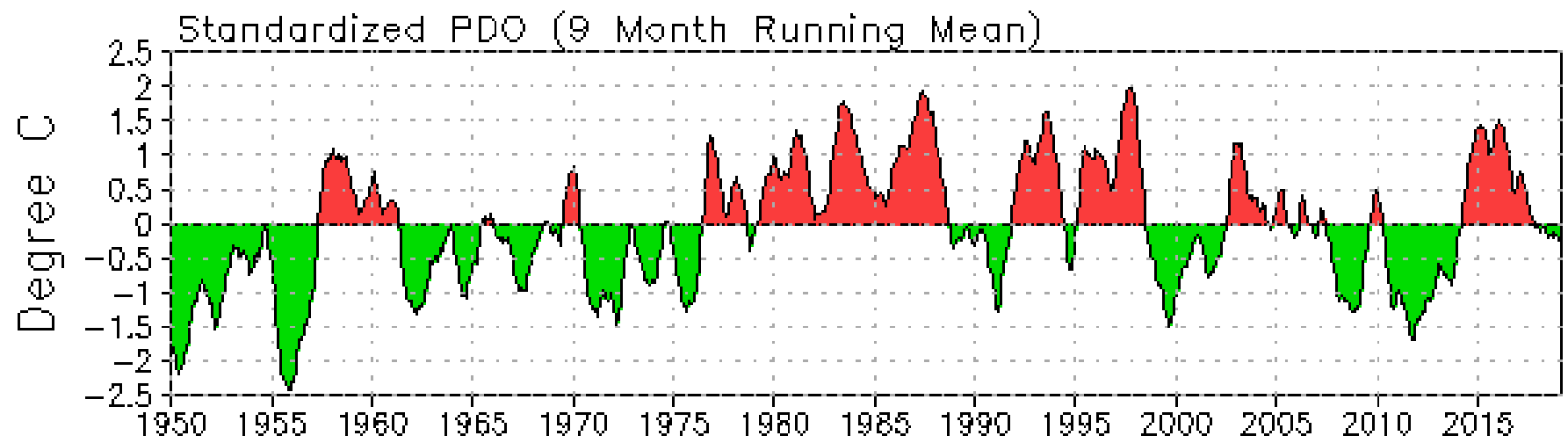
El Niño conditions have formed and are favored to continue through the Northern Hemisphere spring 2019 (~80% chance) and summer 20019 (~60% chance).



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



Source: Cal Neidrauer (SFWMD)

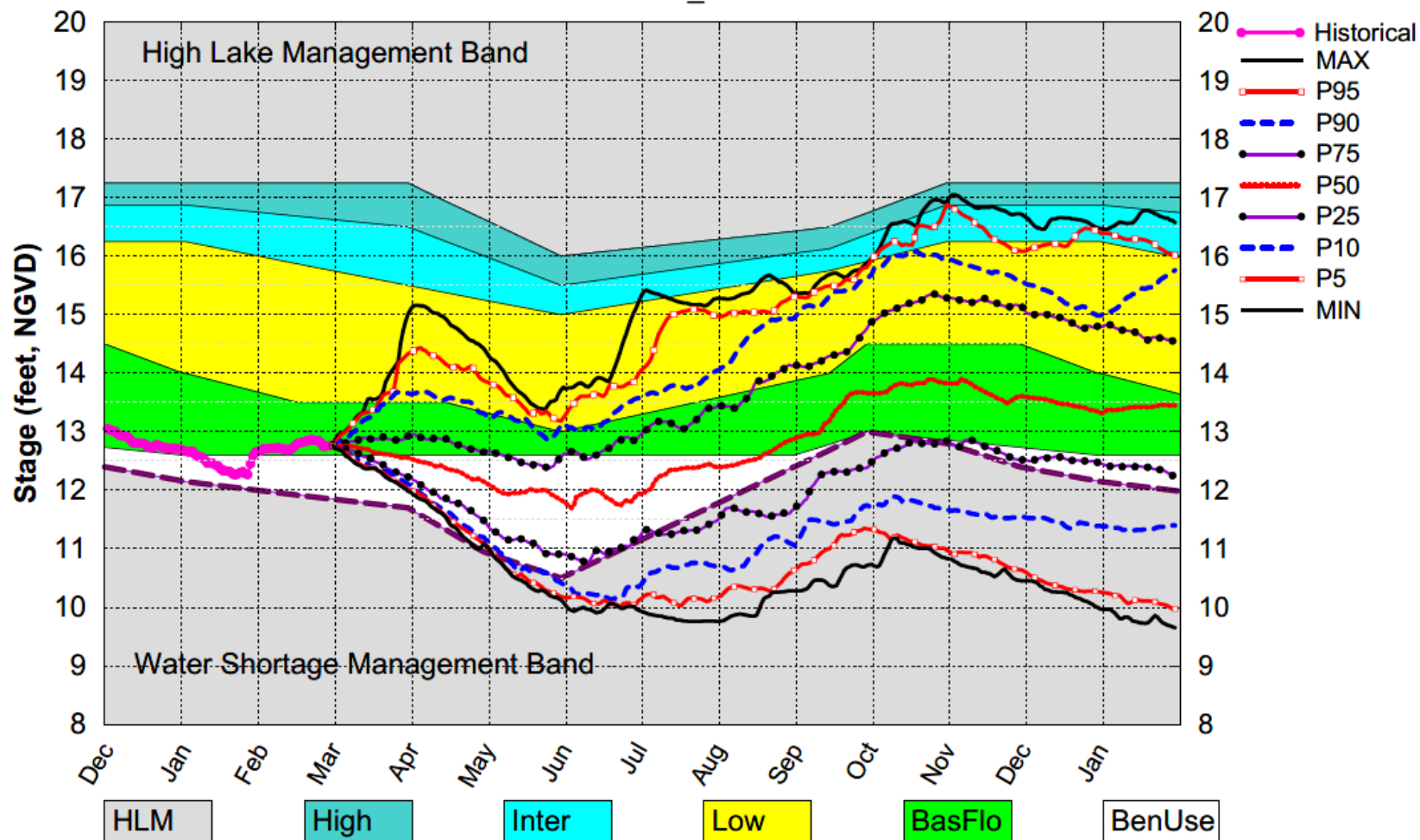


Dynamic Position Analysis

- 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-Mar-2019)
 - 41 1-year simulations of system response to historical rainfall conditions
 - Statistical summaries used to display projections

Lake Okeechobee SFWMM Mar 2019 Position Analysis

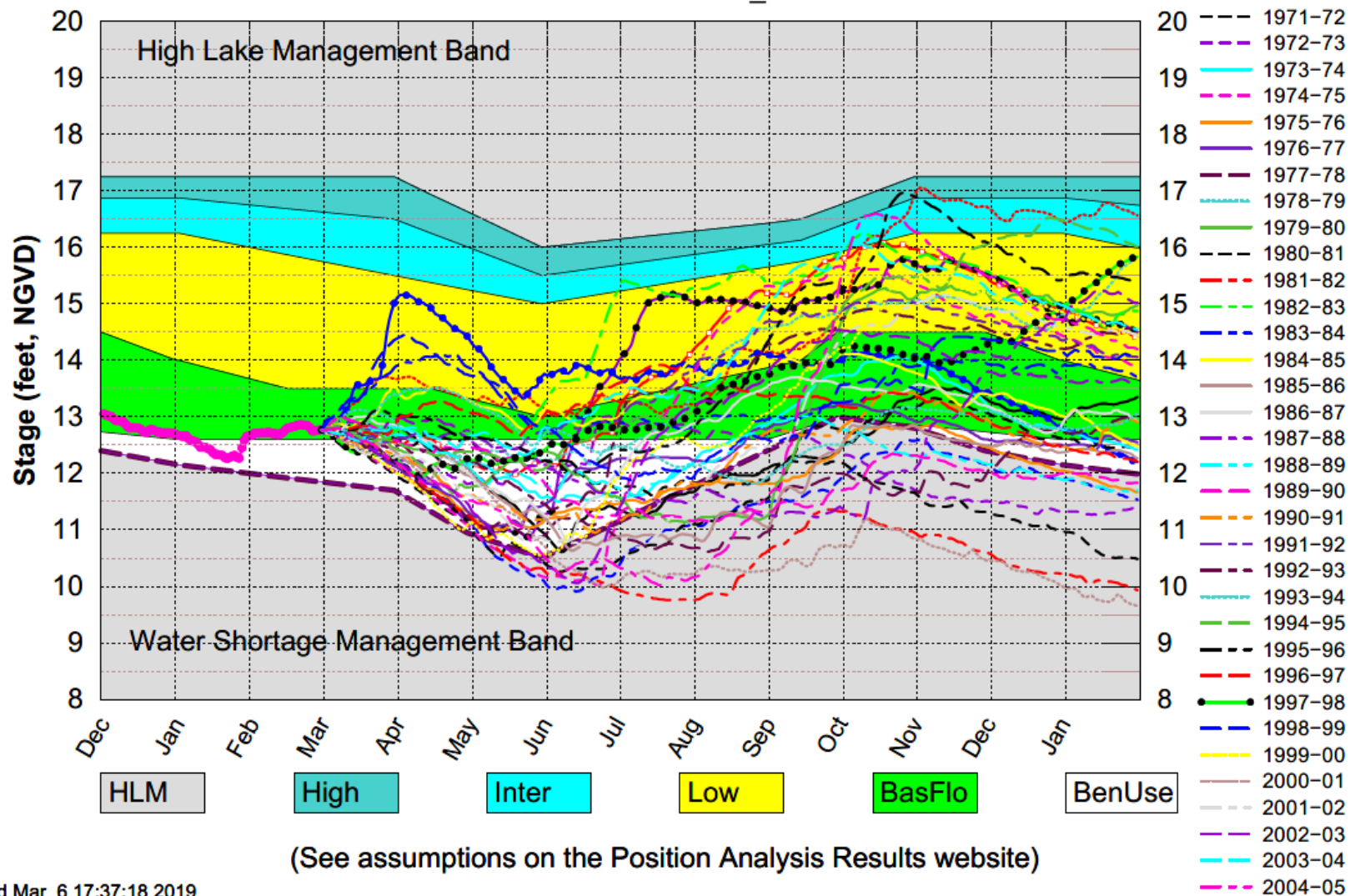
Percentiles PA_DPA1



(See assumptions on the Position Analysis Results website)

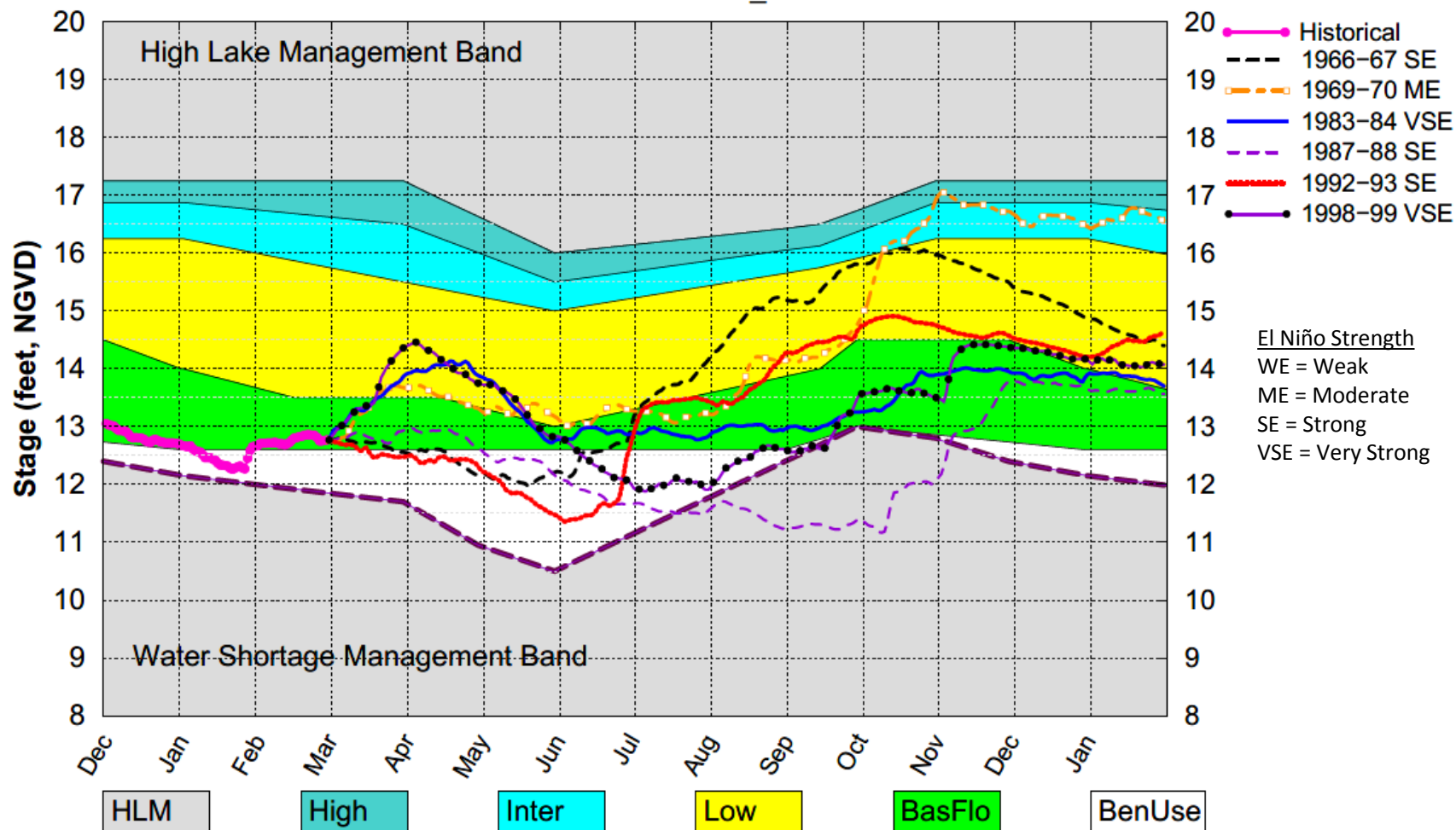
Lake Okeechobee SFWMM Mar 2019 Position Analysis

All Simulated Years Plot PA_DPA1



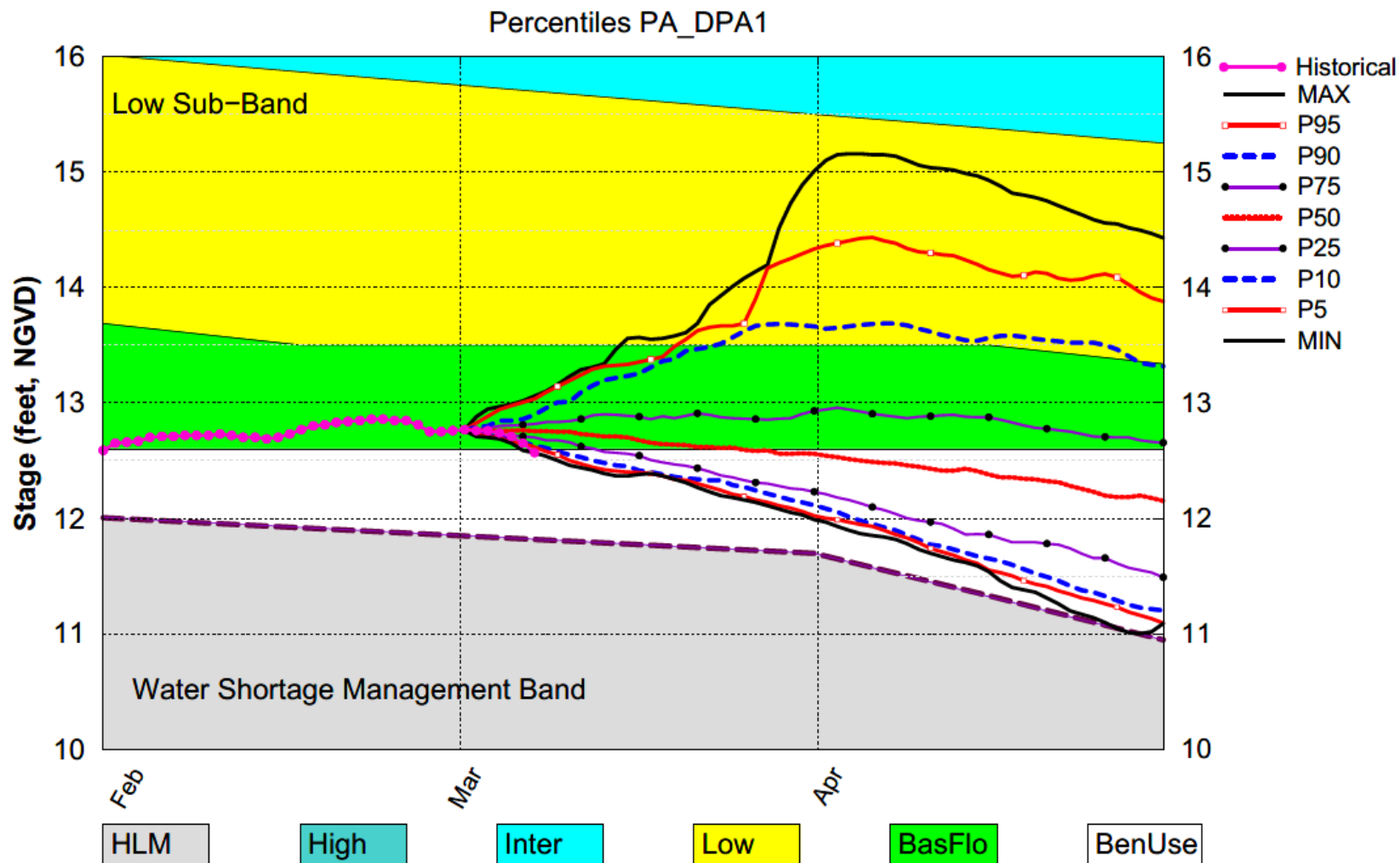
Lake Okeechobee SFWMM Mar 2019 Position Analysis

All El Nino Years Plot PA_DPA1



(See assumptions on the Position Analysis Results website)

Lake Okeechobee SFWMM Mar 2019 Position Analysis



(See assumptions on the Position Analysis Results website)