EXTENDED HYDROLOGIC OUTLOOK
SEPTEMBER 20, 2017
Summary

• The Climate Prediction Center (CPC) is forecasting 33-40% chance of above normal rainfall for September through November.

• ENSO-neutral conditions are present. There is an increasing chance (~55%-60%) of La Niña during the 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.

• National Hurricane Center favors an above-normal hurricane season (5-9 hurricanes), with 60% probability (30% probability of a near-normal season). Colorado State University’s Tropical Meteorology Project anticipates an above-average hurricane season (8 hurricanes).
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
20 Sep 2017

Anomalie de la température de la mer et épaisseur de la neige
20 Sep 2017 /operational
Niño Region SST Departures (°C) Recent Evolution

The latest weekly SST departures are:

- Niño 4: 0.0°C
- Niño 3.4: -0.6°C
- Niño 3: -0.9°C
- Niño 1+2: -0.7°C
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 subsurface temperatures across the east-central and eastern equatorial Pacific.

Negative subsurface anomalies have persisted in the east-central Pacific Ocean.

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 upwelling and cooling occur in the trailing portion.
Most models and the multi-model averages predict ENSO-Neutral through the remainder of the year and into early 2018.
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.v4 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 Southern phenomenon accompanied these periods. The complete
table going back to DJF 1950 can be found [here](#).

<table>
<thead>
<tr>
<th>Year</th>
<th>DJF</th>
<th>JFM</th>
<th>FMA</th>
<th>MAM</th>
<th>AMJ</th>
<th>MJJ</th>
<th>JJA</th>
<th>JAS</th>
<th>ASO</th>
<th>SON</th>
<th>OND</th>
<th>NDJ</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>0.7</td>
<td>0.6</td>
<td>0.5</td>
<td>0.5</td>
<td>0.3</td>
<td>0.2</td>
<td>0.0</td>
<td>-0.1</td>
<td>0.0</td>
<td>-0.2</td>
<td>-0.5</td>
<td>-0.7</td>
</tr>
<tr>
<td>2006</td>
<td>-0.7</td>
<td>-0.6</td>
<td>-0.4</td>
<td>-0.2</td>
<td>0.0</td>
<td>0.0</td>
<td>0.1</td>
<td>0.3</td>
<td>0.5</td>
<td>0.7</td>
<td>0.9</td>
<td>0.9</td>
</tr>
<tr>
<td>2007</td>
<td>0.7</td>
<td>0.4</td>
<td>0.1</td>
<td>-0.1</td>
<td>-0.2</td>
<td>-0.3</td>
<td>-0.4</td>
<td>-0.6</td>
<td>-0.9</td>
<td>-1.1</td>
<td>-1.3</td>
<td>-1.3</td>
</tr>
<tr>
<td>2008</td>
<td>-1.4</td>
<td>-1.3</td>
<td>-1.1</td>
<td>-0.9</td>
<td>-0.7</td>
<td>-0.5</td>
<td>-0.4</td>
<td>-0.3</td>
<td>-0.3</td>
<td>-0.4</td>
<td>-0.6</td>
<td>-0.7</td>
</tr>
<tr>
<td>2009</td>
<td>-0.7</td>
<td>-0.6</td>
<td>-0.4</td>
<td>-0.1</td>
<td>0.2</td>
<td>0.4</td>
<td>0.5</td>
<td>0.5</td>
<td>0.6</td>
<td>0.9</td>
<td>1.1</td>
<td>1.3</td>
</tr>
<tr>
<td>2010</td>
<td>1.3</td>
<td>1.2</td>
<td>0.9</td>
<td>0.5</td>
<td>0.0</td>
<td>-0.4</td>
<td>-0.9</td>
<td>-1.2</td>
<td>-1.4</td>
<td>-1.5</td>
<td>-1.4</td>
<td>-1.4</td>
</tr>
<tr>
<td>2011</td>
<td>-1.3</td>
<td>-1.0</td>
<td>-0.7</td>
<td>-0.5</td>
<td>-0.4</td>
<td>-0.3</td>
<td>-0.3</td>
<td>-0.6</td>
<td>-0.8</td>
<td>-0.9</td>
<td>-1.0</td>
<td>-0.9</td>
</tr>
<tr>
<td>2012</td>
<td>-0.7</td>
<td>-0.5</td>
<td>-0.4</td>
<td>-0.4</td>
<td>-0.3</td>
<td>-0.1</td>
<td>0.1</td>
<td>0.3</td>
<td>0.3</td>
<td>0.3</td>
<td>0.1</td>
<td>-0.2</td>
</tr>
<tr>
<td>2013</td>
<td>-0.4</td>
<td>-0.4</td>
<td>-0.3</td>
<td>-0.2</td>
<td>-0.2</td>
<td>-0.2</td>
<td>-0.3</td>
<td>-0.3</td>
<td>-0.2</td>
<td>-0.3</td>
<td>-0.3</td>
<td>-0.3</td>
</tr>
<tr>
<td>2014</td>
<td>-0.5</td>
<td>-0.5</td>
<td>-0.4</td>
<td>-0.2</td>
<td>-0.1</td>
<td>0.0</td>
<td>-0.1</td>
<td>0.0</td>
<td>0.1</td>
<td>0.4</td>
<td>0.5</td>
<td>0.6</td>
</tr>
<tr>
<td>2015</td>
<td>0.6</td>
<td>0.5</td>
<td>0.6</td>
<td>0.7</td>
<td>0.8</td>
<td>1.0</td>
<td>1.2</td>
<td>1.4</td>
<td>1.7</td>
<td>2.0</td>
<td>2.2</td>
<td>2.3</td>
</tr>
<tr>
<td>2016</td>
<td>2.2</td>
<td>2.0</td>
<td>1.6</td>
<td>1.1</td>
<td>0.6</td>
<td>0.1</td>
<td>-0.3</td>
<td>-0.6</td>
<td>-0.8</td>
<td>-0.8</td>
<td>-0.8</td>
<td>-0.7</td>
</tr>
<tr>
<td>2017</td>
<td>-0.4</td>
<td>-0.1</td>
<td>0.2</td>
<td>0.4</td>
<td>0.4</td>
<td>0.2</td>
<td>-0.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
La Niña is favored (~55%-60%) during the Northern Hemisphere fall and winter 2017-18.
Multivariate ENSO Index (MEI) for the seven strongest El Niño events since 1950 vs. 2015-17

Update: 17 August 2017
NOAA/ESRL/Physical Science Division-University of Colorado at Boulder/CIRES
1. Neutral
2. Weak El Niño
3. La Niña
4. Strong La Niña
5. Strong El Niño

Cumulative SST index (°C)

Month


Source: Wossenu Abtew (SFWMD)
2017 Atlantic Hurricane Season Outlook
AUGUST 9 UPDATE

- **Named storms**: 14-19
- **Hurricanes**: 5-9
- **Major Hurricanes**: 2-5

Season probability:
- Above-normal: 60%
- Near-normal: 30%
- Below-normal season: 10%

Be prepared: Visit hurricanes.gov and follow @NWS and @NHC_Atlantic on Twitter.

August 9, 2017
## Atlantic Basin Seasonal Hurricane Forecast for 2017

<table>
<thead>
<tr>
<th>Forecast Parameter and 1981-2010 Median (in parentheses)</th>
<th>Issue Date 6 April 2017</th>
<th>Issue Date 1 June 2017</th>
<th>Issue Date 5 July 2017</th>
<th>Observed Activity Thru July 2017</th>
<th>Forecast Activity After 31 July</th>
<th>Total Seasonal Forecast</th>
</tr>
</thead>
<tbody>
<tr>
<td>Named Storms (NS) (12.0)</td>
<td>11</td>
<td>14</td>
<td>15</td>
<td>5</td>
<td>11</td>
<td>16</td>
</tr>
<tr>
<td>Named Storm Days (NSD) (60.1)</td>
<td>50</td>
<td>60</td>
<td>70</td>
<td>6</td>
<td>64</td>
<td>70</td>
</tr>
<tr>
<td>Hurricanes (H) (6.5)</td>
<td>4</td>
<td>6</td>
<td>8</td>
<td>0</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Hurricane Days (HD) (21.3)</td>
<td>16</td>
<td>25</td>
<td>35</td>
<td>0</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>Major Hurricanes (MH) (2.0)</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Major Hurricane Days (MHD) (3.9)</td>
<td>4</td>
<td>5</td>
<td>7</td>
<td>0</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Accumulated Cyclone Energy (ACE) (92)</td>
<td>75</td>
<td>100</td>
<td>135</td>
<td>4</td>
<td>131</td>
<td>135</td>
</tr>
<tr>
<td>Net Tropical Cyclone Activity (NTC) (103%)</td>
<td>85</td>
<td>110</td>
<td>140</td>
<td>11</td>
<td>129</td>
<td>140</td>
</tr>
</tbody>
</table>

From the Tropical Meteorology Project at Colorado State University (8/4/2017): http://webcms.colostate.edu/tropical/media/sites/111/2017/08/2017-08.pdf
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 Sep 2017 Mid-Mon Dynamic Position Analysis

Percentiles PA_SIM2

High Lake Management Band

Stage (feet, NGVD)

HLM | High | Inter | Low | BasFlo | BenUse

Water Shortage Management Band

(See assumptions on the Position Analysis Results website)
Lake Okeechobee SFWMM Sep 2017 Mid-Mon Dynamic Position Analysis

AMO Warm / ENSO Neutral Analog Years Plot PA_SIM2

High Lake Management Band

Stage (feet, NGVD)

HLM
High
Inter
Low
BasFlo
BenUse

Water-Shortage Management Band

(See assumptions on the Position Analysis Results website)
Lake Okeechobee SFWMM Sep 2017 Mid-Mon Dynamic Position Analysis

All ENSO Neutral Years Plot PA_SIM2

High Lake Management Band

Stage (feet, NGVD)

Water-Shortage Management Band

Mon Sep 18 18:52:56 2017

(See assumptions on the Position Analysis Results website)