**Forecast Overview | October 2023**

- **An El Niño Advisory** is in effect, with ongoing El Niño conditions forecast to strengthen and persist over the equatorial Pacific Ocean through the winter (Dec-Feb), and likely continue through the spring (Mar-May).
- This will likely be a strong El Niño event, leading to a higher probability of overall wetter than normal conditions across Central Florida this dry season (Nov-Apr). While this will lower the potential for drought development and wildfire activity this winter and spring, it will increase the threat of heavy rain and river flooding.
- ENSO state typically has a weaker influence on temperature patterns across Florida, and therefore the temperature forecast is lower confidence. However, El Niño conditions can lead to overall cooler than normal conditions during the dry season (Nov-Apr), mainly due to increased cloud cover and rainfall.
- Seasonal storminess is forecast to be above to well above normal through the dry season, increasing the risk of hazardous weather, including severe thunderstorms, as well as strong to violent tornadoes.
- Make sure to have an all-hazards plan in place due to the increased potential for severe weather this dry season, including having multiple ways to receive warnings, especially when severe weather threatens at night!

### About this Product

This forecast product is a result of research from the National Weather Service (NWS) in Melbourne, Florida on the El Niño - Southern Oscillation (ENSO) and its impact on Central Florida’s dry season (November – April). This research, conducted since early 1997, was produced in recognition of the fact that climatic fluctuations on regional and global scales have been shown to have a profound impact on Florida’s weather from season to season. The importance of seasonal forecasting continues to increase as extreme weather events affect more of Florida’s growing population. These forecasts are meant to supplement, not replace, the official NWS Climate Prediction Center’s (CPC) seasonal and winter outlooks by providing more detail and adaptive meteorological interpretation of the impact of predicted climatic events on Central Florida.
The seasonal forecast is produced by a team of National Weather Service Melbourne meteorologists that employ the use of linear and logistic regression equations as well as analog-based techniques. These methods are based on the official observed and forecast Niño 3.4 and 3.0 values from the Climate Prediction Center and historical weather data for the Central Florida region. The accuracy of these indices will have a bearing on the accuracy of the seasonal forecast.

The Florida dry season forecast is issued for the period between November 1, 2023 and April 30, 2024 and is intended to serve as an early warning of significant impacts from climatic variability for planners and decision makers. Seasonal temperature and precipitation for Central Florida (climate divisions 3 and 4 as shown in figure 1), as well as the number of extratropical storms expected to impact the state are forecast into two separate periods: November-December-January (NDJ) and February-March-April (FMA).

The ENSO state and forecasts for storminess, rainfall, and temperature are divided into five categories, or quintiles: well below normal, below normal, normal, above normal, and well above normal. Discussions for each individual forecast parameter are included on the next several pages to help address uncertainty and should be used to supplement the forecast charts.

**Fig 1.** Temperature and precipitation forecasts are provided for Division 3 and 4 (Central Florida) while storminess forecasts are for the entire state of Florida.
Latest Discussion | The latest El Niño/Southern Oscillation (ENSO) diagnostic discussion from the Climate Prediction Center states that El Niño conditions continue, with warmer than normal SSTs over the equatorial Pacific Ocean resulting in a typical atmospheric response consistent with an El Niño pattern. El Niño conditions are anticipated to persist through the Northern Hemisphere winter 2023-2024 and spring 2024, with an 80% chance of El Niño conditions continuing during March-May 2024 (fig. 1b). This will most likely be a strong El Niño event (peak ONI value greater than 1.5°C), with currently only a 3 in 10 chance of this event being historically strong, rivaling the El Niño events of 1997-1998 and 2015-2016.

The latest 3-month (July through September 2023) running mean of sea surface temperature (SST) departures in the Niño 3.4 region, or ONI, was 1.3°C. As of October 16th, the latest weekly SST departure in the Niño 3.4 region was 1.5°C. The most recent forecasts of statistical and dynamical models (fig. 1a) collectively show SSTs departures in the Niño 3.4 region remaining warmer than normal through the spring, and peaking in strength during the winter months.

Additional Information | The El Niño Southern Oscillation or ENSO is a complex meteorological phenomenon that relates to changes in sea surface temperature and sea level pressure over the equatorial regions of the Pacific Ocean. ENSO has a warm phase (El Niño) and a cool phase (La Niña) and has profound influences on the atmospheric circulations over the Pacific Ocean, and consequently, the circulations over North America and other parts of the globe. Locally, research shows that there is a physical relationship between the state of ENSO and the mean position of the jet stream over North America during the winter and spring seasons. These shifts in the jet stream often influence central Florida in the form of increased/decreased rainfall, storminess, and seasonal temperatures depending on the state of ENSO.

The relationship between Florida weather and ENSO is not just a simple “one-to-one” relationship, however, as other weather patterns (teleconnections) including the North Atlantic Oscillation (NAO), Arctic Oscillation (AO), Pacific-North American teleconnection pattern (PNA) and Madden-Julian Oscillation (MJO) can also play a major role in Florida dry season weather. Even when El Niño/La Niña conditions are occurring over the equatorial pacific, these other teleconnections can act to enhance or suppress the impact of ENSO, or cause extreme variability on their own. Considerable uncertainty remains in longer range outlooks since these other oscillations are generally not predictable beyond 10 – 14 days.

Fig 1. ENSO guidance from the International Research Institute (IRI) for Climate and Society and the Climate Prediction Center (CPC). (a) Dynamical and statistical model plume of ENSO predictions. (b) Official ENSO forecast probabilities based off of a consensus between CPC and IRI forecasters.
**Temperature**

*Discussion* | The temperature forecast for the 2023-2024 dry season (November-April) across Central Florida leans toward average temperatures for the 3-month period from November-January that are closer to normal, and that are below normal for the February-April period.

It is important to note that confidence in this temperature forecast, especially for the first half of the dry season is lower than normal, especially when compared to the other seasonal forecast parameters (rainfall and storminess). Local research and past analogs of strong to very strong El Niño events, do tend to favor overall below normal temperatures for the second half of the dry season across Central Florida. The latest CPC temperature outlooks for both November-January and February-April (fig. 3) currently show equal chances for either above, near, or below normal temperatures occurring across the area, which highlights the uncertainty in the temperature outlook this upcoming dry season.

Freezes across Central Florida are most common in the months of December and January. Freezing conditions can occur during all ENSO states (table 1, page 8), and examination of analog years with stronger El Niño conditions indicate the majority experienced freezes at some point during the winter months, especially across northern portions of east central Florida.

*Additional Information* | When trying to correlate the state of ENSO and seasonal temperature over Central Florida, one finds much less skill compared to precipitation and storminess. Other large-scale phenomena, including the North Atlantic Oscillation (NAO) and Arctic Oscillation (AO), play a significant role in the week-to-week weather patterns over the state. For instance, strongly negative (positive) phases of the AO often lead to colder (warmer) than normal weather across the eastern half of the United States, including Florida. The AO is not predictable beyond a few weeks, and there are no long-range outlooks available at this time.

**Fig 3.** Three-month temperature probability outlooks issued by the Climate Prediction Center (CPC). Temperature probabilities for (a) Nov-Dec-Jan and (b) Feb-Mar-Apr.
Precipitation

Discussion | The overall forecast for the 2023-2024 dry season (November-April) favors above normal rainfall across Central Florida, due to ongoing El Niño conditions that will strengthen through the winter and are anticipated to continue through the spring. The latest 3-month outlooks from CPC (fig. 4) show around a 50 to 60 percent chance for above normal rainfall for the November through January period, and near a 70 percent chance for above normal rainfall during February through April.

This will likely be a strong El Niño event, and local research shows that ENSO state has a greater correlation with precipitation patterns across the area, especially the stronger an El Niño or La Niña event becomes. Therefore, this leads to increasing confidence of wetter than normal conditions throughout the entire dry season, which will decrease the threat of developing drought conditions and wildfire activity across the area this dry season, but will increase the potential for heavy rain and river flooding.

Additional Information | The relationship between ENSO and rainfall is perhaps the most straightforward and statistically significant of all weather parameters. In general, during the Florida dry season, substantial rainfall is only provided by passing extratropical disturbances in the westerlies or by stalled frontal boundaries. During an El Niño event, the number of extratropical systems is often increased over Florida and the Gulf of Mexico leading to above average rainfall. Likewise, during a La Niña event, rainfall is often lower than normal due to a limited number of extratropical systems impacting the state.

Fig 4. Precipitation probability outlooks issued by the Climate Prediction Center (CPC). Precipitation probabilities for (a) Nov-Dec-Jan and (b) Feb-Mar-Apr.
Storminess

Discussion | The forecast for the 2023-2024 dry season (November-April) is for above to well above normal storminess across the state, due to stronger El Niño conditions that will be in place and persist through this winter and spring.

There is a direct relationship between the presence of a strong El Niño and increased storminess in Florida, due to the extension of the subtropical jet stream across the southern United States. This narrow band of stronger winds several miles above the earth's surface increases the passage of storm systems across the region, leading to an increased threat for severe weather, especially the potential of strong to violent tornadoes across the region. Past El Niño events, especially strong events, have been highly correlated with well above normal storminess and strong tornadoes (EF2+) across the Florida Peninsula between November and April (fig. 5). Keep in mind, El Niño doesn’t cause violent tornadoes in Florida, but they can set the stage!

Additional Information | This forecast attempts to estimate the number of extratropical low pressure systems that will impact the state during a given dry season. There is a very strong relationship between ENSO and winter storminess and severe weather in Florida. Extratropical cyclones can produce excessive rainfall, damaging straight-line winds, tornadoes, dangerous marine conditions, coastal flooding, and beach erosion. The number of extratropical low pressure systems passing near or over the state often increases during El Niño episodes due an extension of the subtropical jet stream over the southern United States.

**Fig 5.** Location and tracks (line) of tornadoes over the Florida Peninsula during seven strong El Nino events. Track and location information gathered from National Weather Service StormData.
Preparedness Advice

With seasonal storminess forecast to be above normal this dry season, it is important to be prepared whenever the threat for severe weather, especially tornadoes emerge through this winter and spring. Here is some safety information for you and your family to help prepare for when the next storm strikes!

✓ Monitor local television, radio, and the internet for severe weather situations
  o Severe weather threats are typically identified a few days in advance, with more specific information about the most likely time(s) and location(s) of impact provided one day in advance

✓ Have an all-hazards plan in place
  o Every person and/or family should have an all-hazards plan that includes multiple ways to receive severe weather warnings and knowing what to do when one is issued

✓ Have multiple dependable ways to receive timely weather warning alerts
  o Ensure that you have a NOAA Weather Radio (programmed, with fresh batteries) and/or the Wireless Emergency Alert feature on your cell phone (or NWS warnings relayed by text message from Emergency Management, Media, or another reliable app)
  o Can save lives, especially with dangerous, nighttime tornadoes

✓ If living in a mobile home, RV, or boat:
  o Make plans to stay with family or friends and leave before the threat for severe weather arrives
  o If you can’t leave, identify the closest sturdy shelter such as a clubhouse or laundry room and go there immediately if a warning is issued for your location

✓ Identify your shelter location and “safe place” in advance of a threat
  o Small interior room on the lowest floor of your home or business, far from windows
  o Ensure everyone in your family or business is aware of the location

✓ Words of advice from those who have survived tornadoes
  o “Putting on your shoes, placing your charged cell phone in your pocket, making good use of any kind of helmet and/or pillow to protect your head, and holding tightly to one another” (these actions must be done quickly and prior to the arrival of a tornado)

✓ If a tornado warning is issued for your location:
  o Take immediate action and move to your shelter, remain in place until the threat passes
### Additional Information and Links

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*Table 1.* Average number of days during the dry season when the minimum temperature reaches at or below freezing based on ENSO state using data from 1950 to 2022. A hard freeze is when minimum temperatures reached 28°F or lower.

### Helpful Links

- Teleconnection Guidance & Forecasts from the Climate Prediction Center (CPC)
  - [ENSO](#) | [AO](#) | [NAO](#) | [PNA](#) | [MJO](#)

- CPC Guidance (Temperature, Precipitation, Drought, Hazards)
  - [1-Month Outlook](#) | [3-Month Outlook (~90 Days)](#)
  - [U.S. Drought Information](#) | [U.S. Hazards Assessment](#) (out to 2 weeks)

- National Weather Service Melbourne, FL Research
  - [ENSO and Climate](#) | [Storminess](#) | [Severe Weather](#) | [Rainfall](#) | [Temperature](#)

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