

# National Weather Service Melbourne

# DRY SEASON FORECAST

# Jan 2024

The Forecast

## November – December - January

<p><b>STRONG EL NINO</b></p> <p>WEAK EL NINO</p> <p>NEUTRAL</p> <p>WEAK LA NINA</p> <p>STRONG LA NINA</p> <p><b>ENSO State</b></p>	<p>WELL ABOVE NORMAL</p> <p>ABOVE NORMAL</p> <p><b>NEAR NORMAL</b></p> <p>BELOW NORMAL</p> <p>WELL BELOW NORMAL</p> <p><b>Temperature</b></p>	<p>WELL ABOVE NORMAL</p> <p><b>ABOVE NORMAL</b></p> <p>NEAR NORMAL</p> <p>BELOW NORMAL</p> <p>WELL BELOW NORMAL</p> <p><b>Precipitation</b></p>	<p>WELL ABOVE NORMAL</p> <p><b>ABOVE NORMAL</b></p> <p>NEAR NORMAL</p> <p>BELOW NORMAL</p> <p>WELL BELOW NORMAL</p> <p><b>Storminess</b></p>
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## February – March - April

<p><b>STRONG EL NINO</b></p> <p>WEAK EL NINO</p> <p>NEUTRAL</p> <p>WEAK LA NINA</p> <p>STRONG LA NINA</p> <p><b>ENSO State</b></p>	<p>WELL ABOVE NORMAL</p> <p>ABOVE NORMAL</p> <p><b>NEAR NORMAL</b></p> <p>BELOW NORMAL</p> <p>WELL BELOW NORMAL</p> <p><b>Temperature</b></p>	<p>WELL ABOVE NORMAL</p> <p><b>ABOVE NORMAL</b></p> <p>NEAR NORMAL</p> <p>BELOW NORMAL</p> <p>WELL BELOW NORMAL</p> <p><b>Precipitation</b></p>	<p>WELL ABOVE NORMAL</p> <p><b>ABOVE NORMAL</b></p> <p>NEAR NORMAL</p> <p>BELOW NORMAL</p> <p>WELL BELOW NORMAL</p> <p><b>Storminess</b></p>
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## Forecast Overview | January 2024

- A strong El Niño pattern persists, but will gradually weaken over the next few months, with a transition to ENSO neutral likely into Apr-Jun 2024.
- Even as this El Niño event weakens, its influence on central Florida weather is forecast to continue through the remainder of the dry season (Feb-Apr), especially in regards to rainfall. Wetter than normal conditions are favored to continue through this period, lowering the potential for drought and wildfire activity, but increasing the threat of heavy rain and river flooding.
- The temperature forecast favors an average temperature for Feb-Apr that is near normal, but confidence in this outlook remains low, as ENSO state typically has a weaker influence on temperature patterns across Florida.
- Seasonal storminess is forecast to continue to be above normal through April, 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, 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.

## Forecast Basis & Interpretation

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.

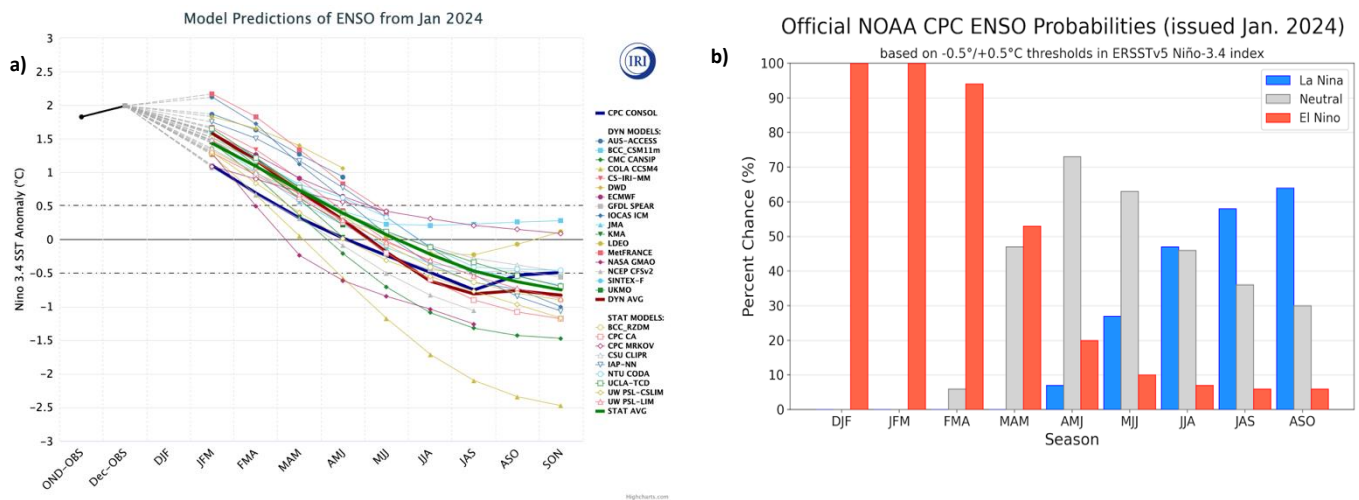
# ENSO

**Latest Discussion** | The latest El Niño/Southern Oscillation (ENSO) diagnostic discussion issued on January 11, 2024 from the Climate Prediction Center states that a strong and mature El Niño is in place, and that El Niño conditions are expected to continue over the next few months as they gradually weaken. A transition to ENSO neutral conditions is then favored to occur during the April to June 2024 time frame (fig. 1b).

The latest 3-month (October through December 2023) running mean of sea surface temperature (SST) departures in the Niño 3.4 region, or ONI, was 1.9°C. As of January 29th, the latest weekly SST departure in the Niño 3.4 region was 1.7°C. The most recent forecasts of statistical and dynamical models (fig. 1a) collectively show SSTs departures in the Niño 3.4 region weakening through the spring season, with a transition to ENSO neutral conditions (SST departures in the Niño 3.4 region falling below 0.5°C) into the spring and early summer.

**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.



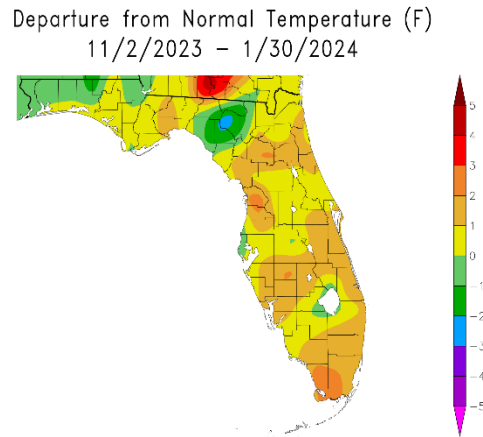
**Fig 1.** ENSO guidance from the International Research Institute (IRI) for Climate and Society and the Climate Prediction Center (CPC). (a) Dynamical and statistical model plume of ENSO predictions. (b) Official ENSO forecast probabilities based off of a consensus between CPC and IRI forecasters.

# Temperature

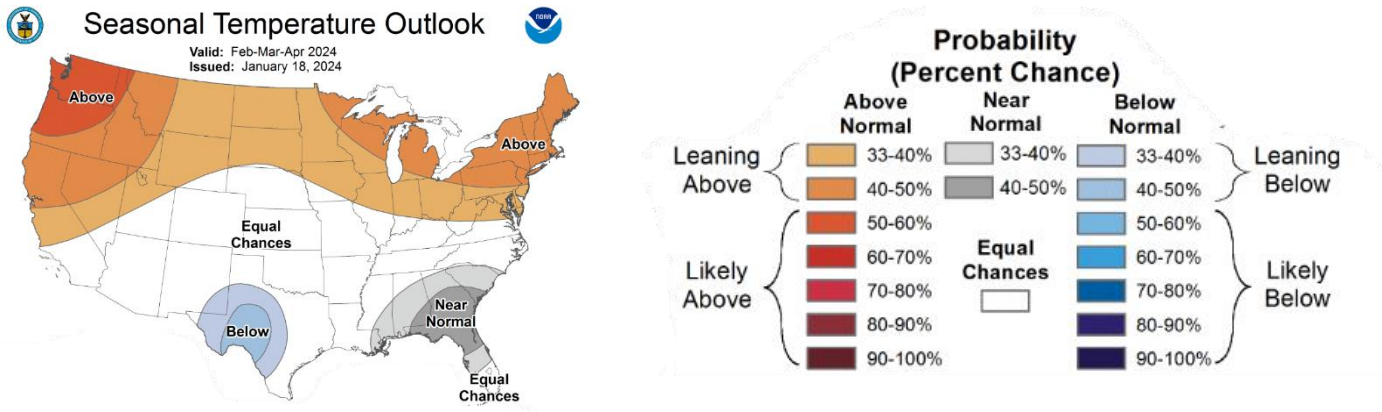
*Discussion* | Seasonal average temperature values for the first half of the dry season (Nov 2023-Jan 2024) ended up near to slightly warmer than normal by 1-2°F across Central Florida (fig. 3). However, the slight tilt toward warmer than normal conditions was primarily due to warmer overnight lows that averaged around 2-3°F above normal for the three-month period, as average maximum temperatures were generally near or within a degree of normal values for this time frame. The updated temperature forecast for the second half of the dry season (Feb-Apr 2024) across Central Florida leans toward average temperatures for this 3-month period that are closer to normal, based on guidance from CPC (fig. 4). It is important to note that confidence in this temperature forecast is lower than normal, especially when compared to the other seasonal forecast parameters (rainfall and storminess).

While freezes across Central Florida are most common in the months of December and January, they can still occur into the late winter and early spring. Additionally, 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 average temperature anomaly (°F) across Florida for Nov 2023-Jan 2024 from the NOAA Regional Climate Centers.



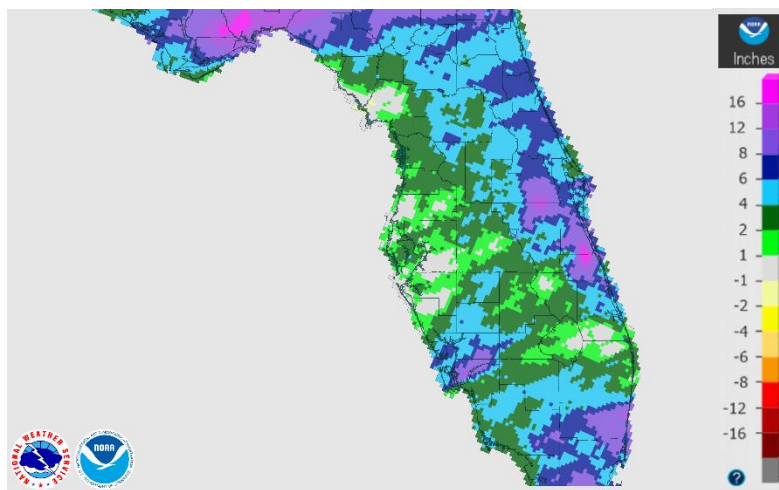
**Fig 4.** Three-month temperature probability outlook for Feb-Mar-Apr 2024 issued by the Climate Prediction Center (CPC).

# Precipitation

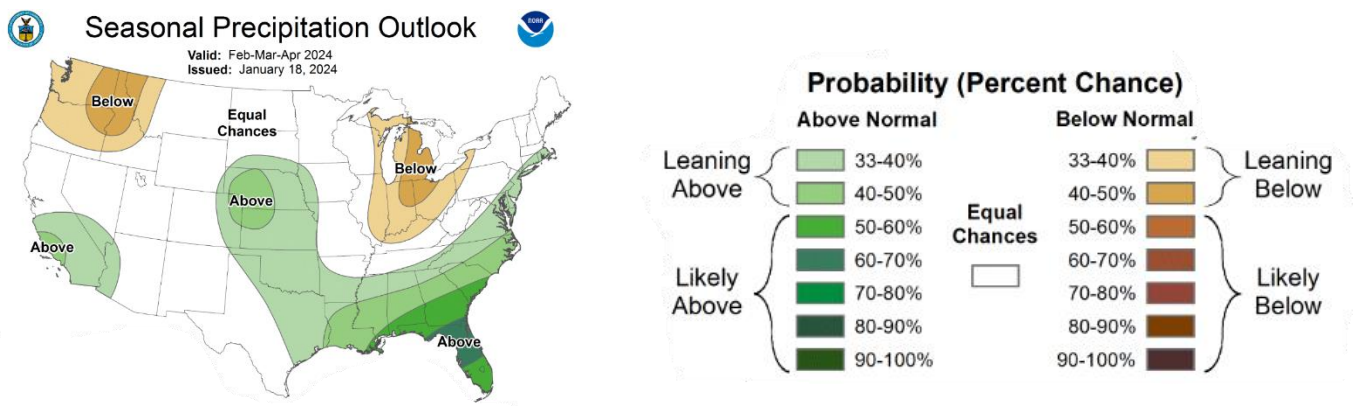
*Discussion* | Rainfall totals for the first half of the dry season (Nov 2023-Jan 2024) have been above to well above normal across the area, up to 4-9 inches higher than normal for portions of east central Florida (fig. 5). The forecast for the second half of the dry season (Feb-Apr 2024) favors wetter than normal conditions continuing across Central Florida, due to the continued influence of El Niño conditions that will persist over the next few months. The latest 3-month outlook from CPC (fig. 6) show up to a 60 to 70 percent chance for above normal rainfall for the February through April time frame.

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, with a strong El Niño currently in place this leads to increasing confidence of wetter than normal conditions through the rest of the dry season, even as this pattern gradually weakens over the next few months. This will decrease the threat of developing drought conditions and wildfire activity across the area through April, 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 5.** Total rainfall anomaly (dep. from normal) across Florida for Nov 2023-Jan 2024 from the Advanced Hydrologic Prediction Service.



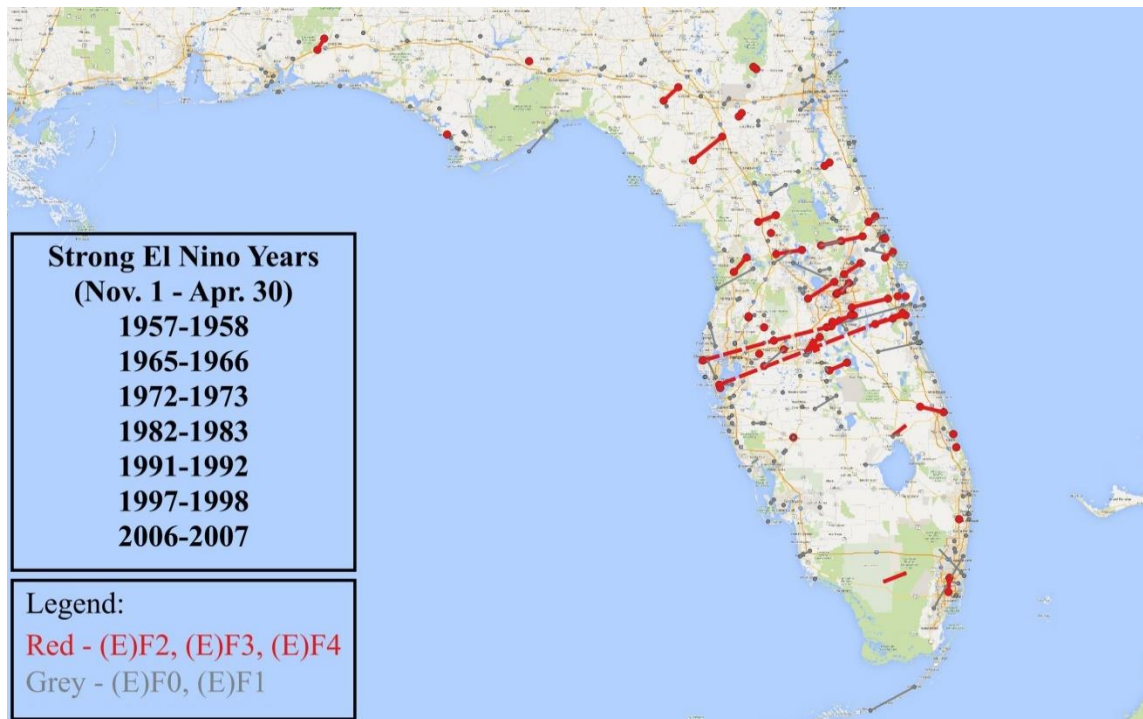
**Fig 6.** Three-month precipitation probability outlook for Feb-Mar-Apr 2024 issued by the Climate Prediction Center (CPC).

# Storminess

*Discussion* | The forecast for the remainder of the dry season (February-April 2024) is for above normal storminess to continue across the state, due the lingering influence of El Niño through this time frame.

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. 7). 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 7.** Location and tracks (line) of tornadoes over the Florida Peninsula during seven strong El Niño 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!

### BE AWARE: PREPARE!

- ✓ Monitor local television, radio, and the internet for severe weather situations
  - 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
  - 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
  - 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)
  - Can save lives, especially with dangerous, nighttime tornadoes

### BEFORE / DURING THREAT

- ✓ If living in a mobile home, RV, or boat:
  - Make plans to stay with family or friends and leave before the threat for severe weather arrives
  - 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
  - Small interior room on the lowest floor of your home or business, far from windows
  - Ensure everyone in your family or business is aware of the location
- ✓ Words of advice from those who have survived tornadoes
  - "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:
  - Take immediate action and move to your shelter, remain in place until the threat passes

## Additional Information and Links

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ENSO State	Daytona Beach		Orlando		Melbourne		Vero Beach		ENSO State
	≤ 32°F	≤ 28°F	≤ 32°F	≤ 28°F	≤ 32°F	≤ 28°F	≤ 32°F	≤ 28°F	
El Niño	4.5	1.3	2.2	0.7	1.9	0.5	1.6	0.4	El Niño
Neutral	5.0	1.6	2.5	0.8	2.0	0.7	1.8	0.5	Neutral
La Niña	4.8	1.4	2.6	0.5	2.2	0.5	2.0	0.4	La Niña

**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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