MIAMI-SOUTH FLORIDA
National Weather Service
Forecast Office
http://www.weather.gov/miami

SOUTH FLORIDA WINTER 2023-2024 SUMMARY

Near Normal Temperatures and Above Normal Rainfall

March 1, 2024: If you noticed a difference between this winter and the past several in South Florida, you are right! The 2023-2024 winter can be characterized as cooler than many we've recently experienced, as well as more cloudy/less sunny days than an average winter. **From an average temperature standpoint, it was the coolest winter at most locations since 2014-2015**. What led to these conditions?

The prevailing winter weather pattern was typical of El Niño winters in North America, characterized by a stronger-than-normal mid to upper-level high pressure over most of Canada and the northern third of the U.S., and a strip of slightly stronger than normal low pressure over the southern tier of the U.S., including Florida (Figure 1). The subtropical branch of the jet stream in the upper levels was mainly positioned over the northern Gulf of Mexico and SE U.S. (Figure 2). Central U.S. and mid-Atlantic states., reflecting a general storm track that was farther south than normal. This pattern led to an increase in winter cloudiness/storminess across South Florida, as well as more frequent cold fronts passing through the region. The active nature and more southerly location of the subtropical jet stream also contributed in keeping the polar or northern branch of the jet stream weaker and farther north across North America. This prevented air masses of arctic origin from penetrating too far south across the United States, therefore we ended up with fewer cool/cold days along with fewer warm days.

Following is a summary of Winter 2023-2024 temperature and precipitation, as well as significant weather events.

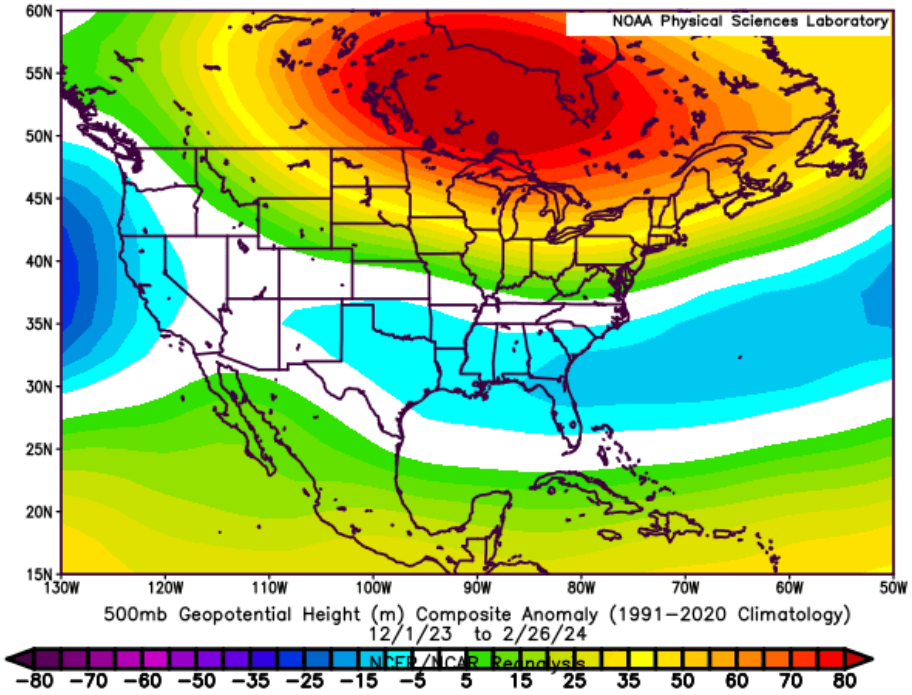


Figure 1: 500 mb height anomalies for December 2023-February 2024. Yellow colors reflect stronger high pressure at the 500 mb level, and blue colors reflect stronger low pressure

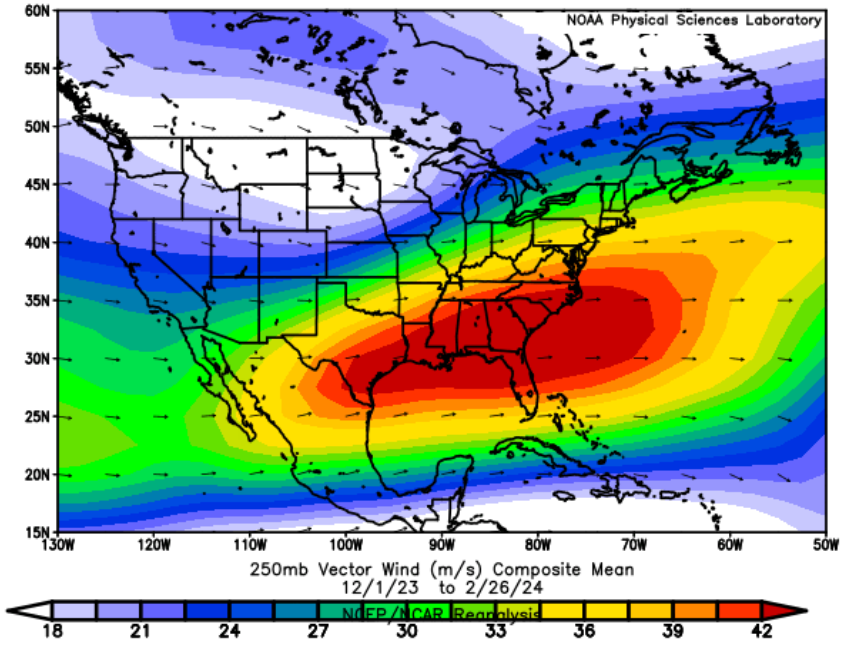


Figure 2: 250 mb mean wind for December 2023-February 2024. Red colors reflect the mean position of the upper-level jet stream and general winter storm track

Temperatures

Average winter temperatures were near normal across South Florida (Figures 3 and 4), generally within a half-degree of normal. The average daily maximum temperatures were near to slightly below normal, largely due to the higher number of cloudy days keeping daytime temperatures lower. On the other hand, more cloudiness tends to keep temperatures milder at night, and this along with a greater frequency of air masses of maritime origin than of continental/arctic origin contributed to average daily minimum temperatures being slightly above normal.

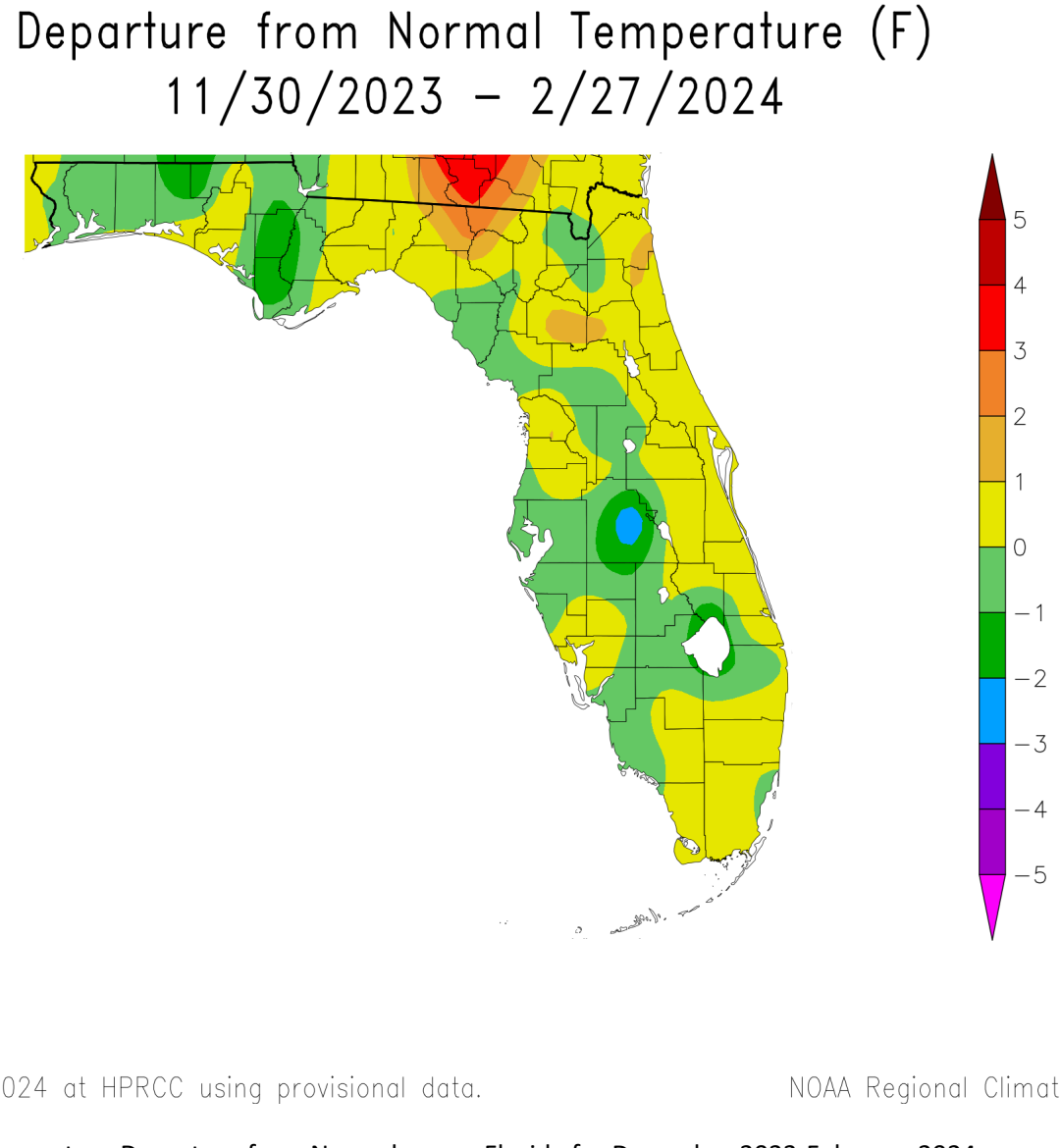


Figure 3: Temperature Departure from Normal across Florida for December 2023-February 2024

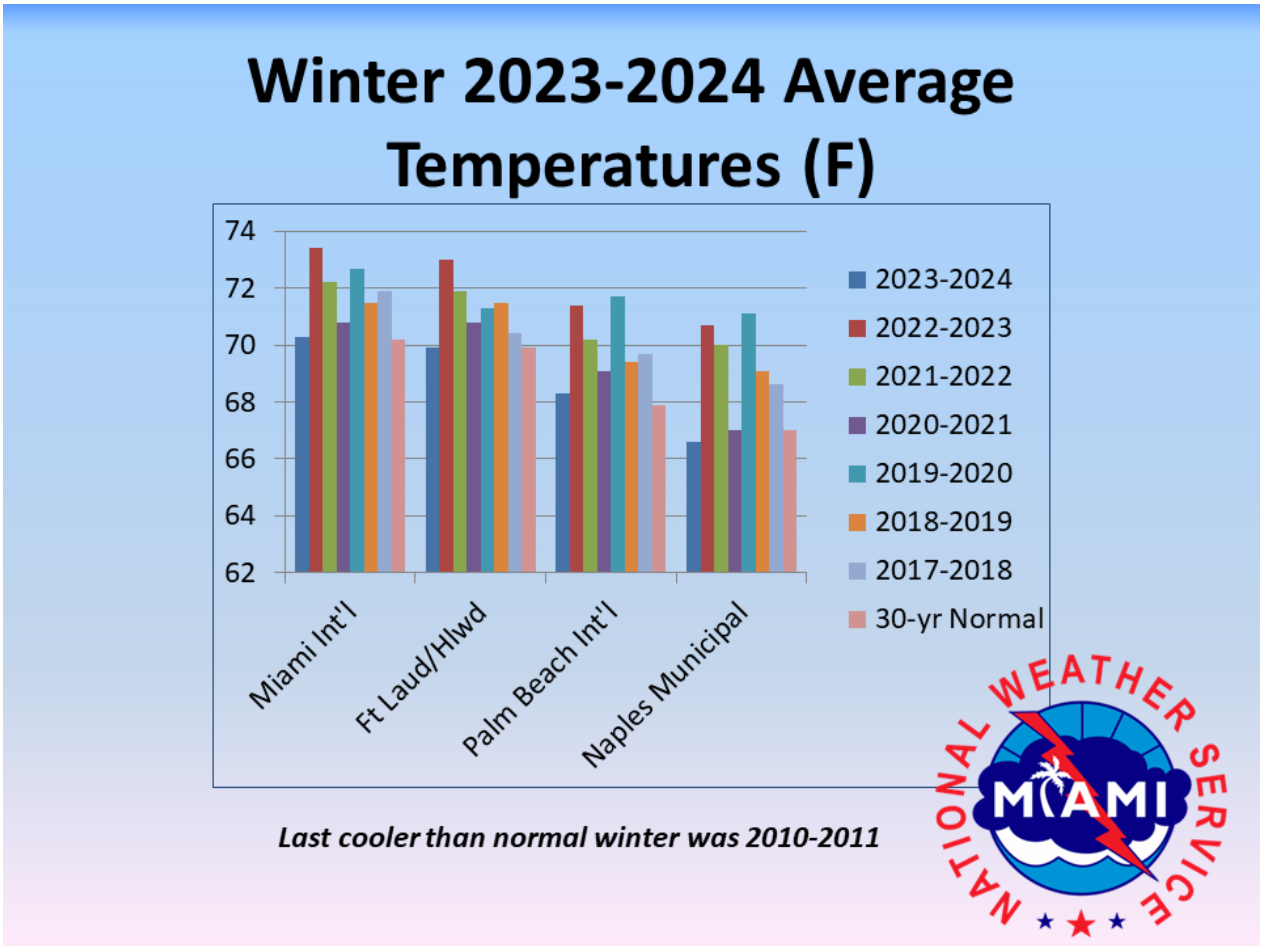


Figure 4: Average winter temperatures 2017-2024 for main South Florida climate sites

A closer look at the frequency of temperature extremes this winter clearly spells this out. The number of 80+ degree days (defined arbitrarily as “warm”) ranged from 22 days in Naples to 27 days in Miami, well below the 30-year normal and less than half of last year’s record warm winter. On the flip side, the lowest temperatures recorded this winter set records for the “warmest” seasonal minimums at Miami (52F), Fort Lauderdale (51F), and Naples (45F), and at West Palm Beach (47F) the warmest seasonal minimum since 1949-1950.

The lack of air masses of continental/arctic in origin across South Florida following cold fronts this winter is best exemplified in the lowest regional temperature at NWS sites of only 42F in Ortona Lock in Glades County on January 21st. No freezing temperatures were noted even when looking at unofficial readings which can often be lower than at official NWS sites.

Below are graphics with additional temperature data for the four main climate sites in South Florida:

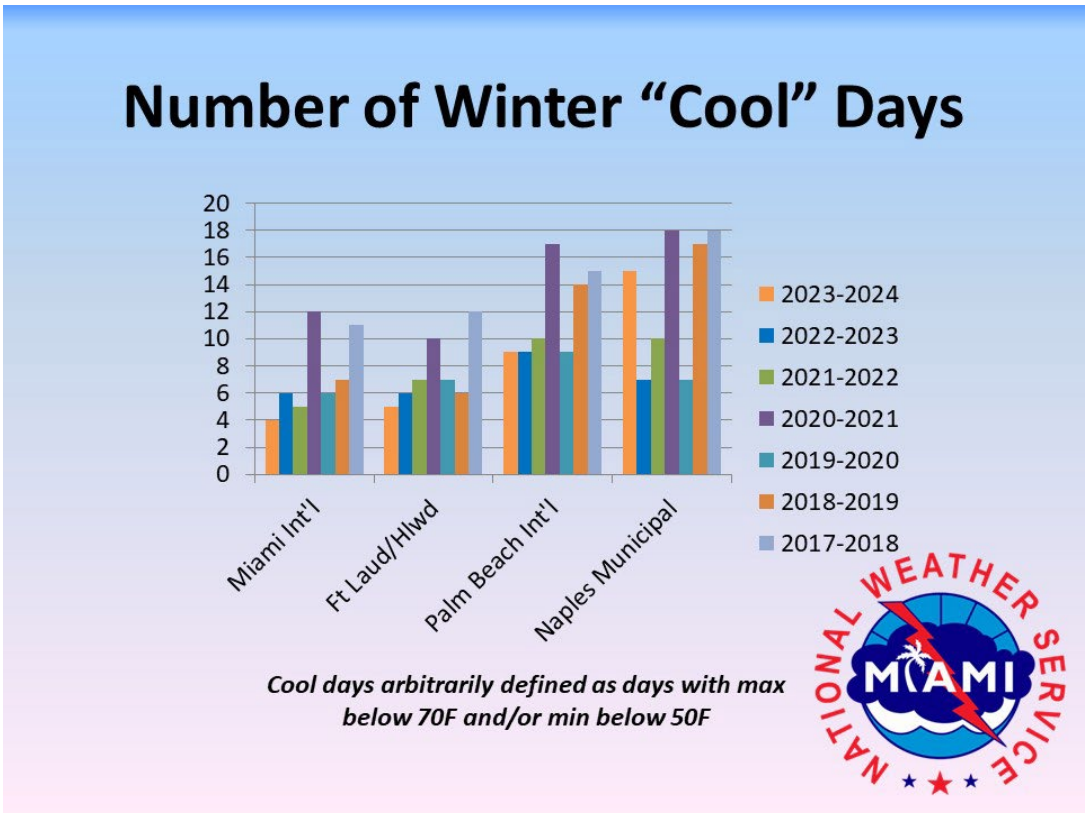


Figure 5: Number of days of sub-70F degree highs and/or sub-50F degree lows.

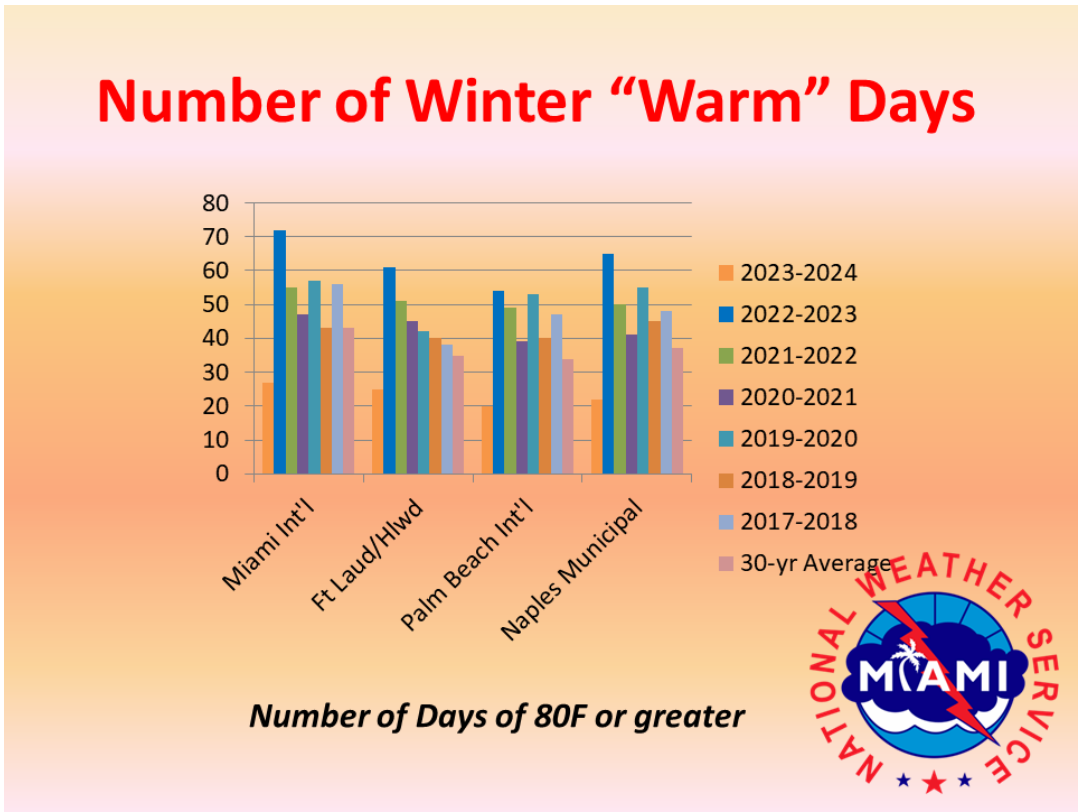


Figure 6: Number of days greater than or equal to 80 degrees F

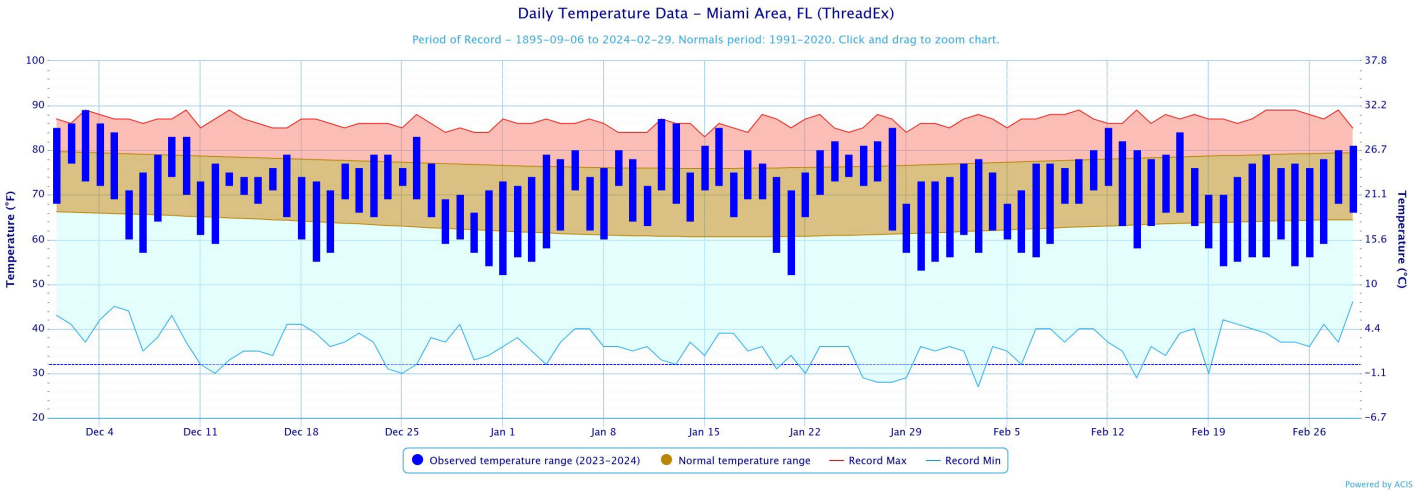


Figure 7: Daily temperature data for Miami International Airport for December 2023- February 2024. This is generally representative of winter temperature trends at all South Florida locations

Here are average December 2023-February 2024 temperatures, departure from normal in degrees F and ranking for the four main South Florida climate sites:

Location (beginning of period of historical record)	**Dec 2022-Feb 2023 Avg Temp**	**Departure from Normal (F)**
Miami (1895)	70.3	+0.1
Fort Lauderdale (1912)	69.9	0
West Palm Beach (1888)	68.3	+0.4
Naples (1942)	66.6	-0.4

Other noteworthy statistics and data:

- **Miami International Airport**: The highest temperature recorded was 89 degrees set on December 3rd, and the lowest temperature recorded was 52 degrees on January 1st and 21st. The temperature reached or exceeded 80 degrees on **27 days**, well below the 30-year average of 43 days. There were **no days** below 50 degrees (30-year average is 6).

- **Palm Beach International Airport**: The highest temperature recorded was 87 degrees on January 12th and February 12th, and the lowest temperature recorded was 47 degrees on December 31st. The temperature reached or exceeded 80 degrees on **20 days**, which is well below the 30-year average of 34 days. The number of days below 50 degrees was **6** which is well below the 30-year average of 14 days.

- **Fort Lauderdale/Hollywood International Airport**: The highest temperature recorded was 87 degrees on December 3rd, and the lowest temperature recorded was 51 degrees on January 21st. The temperature reached or exceeded 80 degrees on **25 days**, well below the 30-year average of 35 days. There were **no days** below 50 degrees (30-year average is 8).

- **Naples Municipal Airport**: The highest temperature recorded was 84 degrees on December 1st, December 9th, and January 25th, and the lowest temperature recorded was 45 degrees on January 21st. The temperature reached or exceeded 80 degrees on **22 days**, well below the 30-year average of 37 days. The number of days below 50 degrees was **4** which is well below the 30-year average of 17.

Precipitation

As indicated above, the more southern mean position of the upper-level jet stream favored more frequent storm systems to track across the Gulf of Mexico and Florida, causing this winter's precipitation to be mostly above normal.

Rainfall amounts were quite uniform across the region, mainly in the 7–10-inch range. Relative to normal, these values were about 1-3 inches above normal over most locations, and as much as 4 inches or more above normal over parts of SW Florida. The wetter than normal winter helped to alleviate and eventually end the drought over SW Florida which had persisted for most of 2023.

Despite the above normal rainfall, there were still fairly long stretches of dry weather which is typical of a South Florida winter.

Much of this winter's rainfall occurred in association with a few events. Two notable rainfall events include:

- 2-5 inches of rain fell mainly north of a Naples to Fort Lauderdale line on February 18th and 19th, in association with a strong low pressure area which tracked from the Gulf of Mexico across South Florida

- Another strong low pressure system tracking eastward from the Gulf across the Florida peninsula on December 16th and 17th led to a large area of 2-4 inches of rain across Broward and Palm Beach counties.

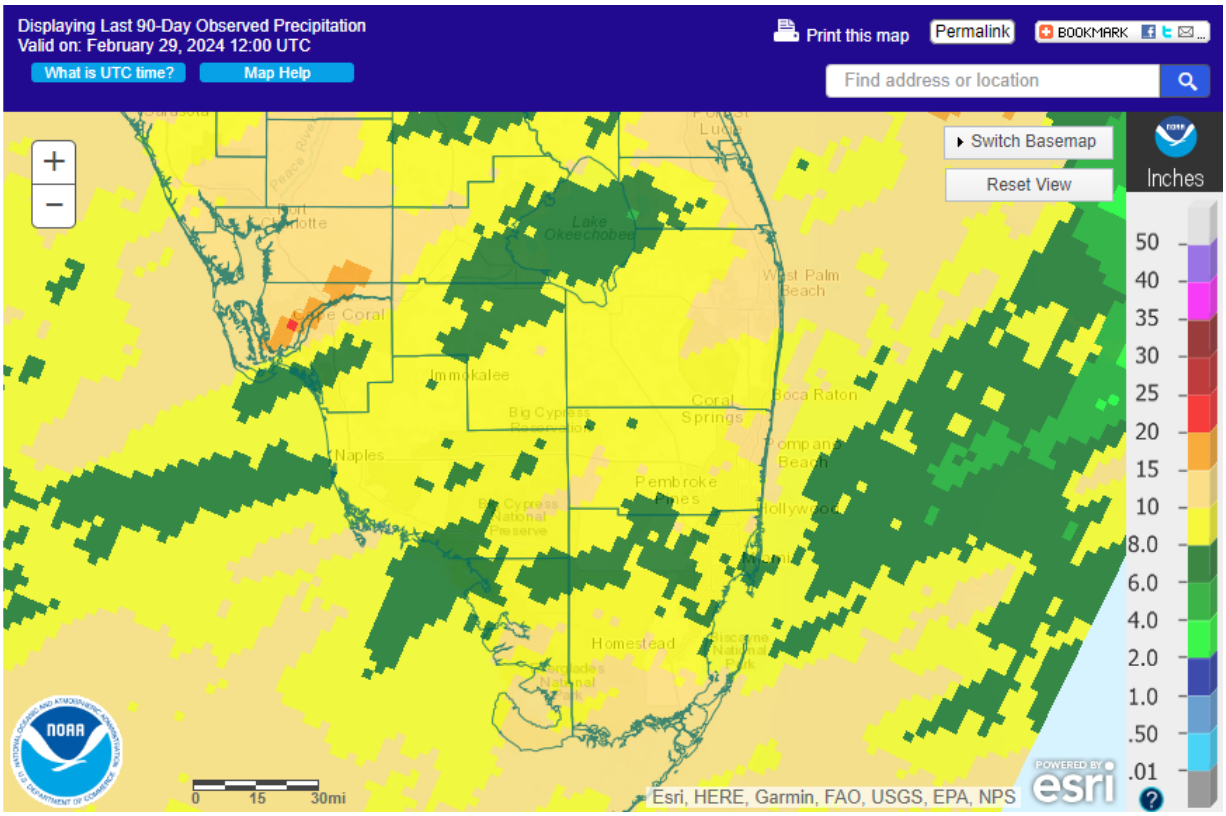


Figure 8: Observed Precipitation for Winter 2023-2024

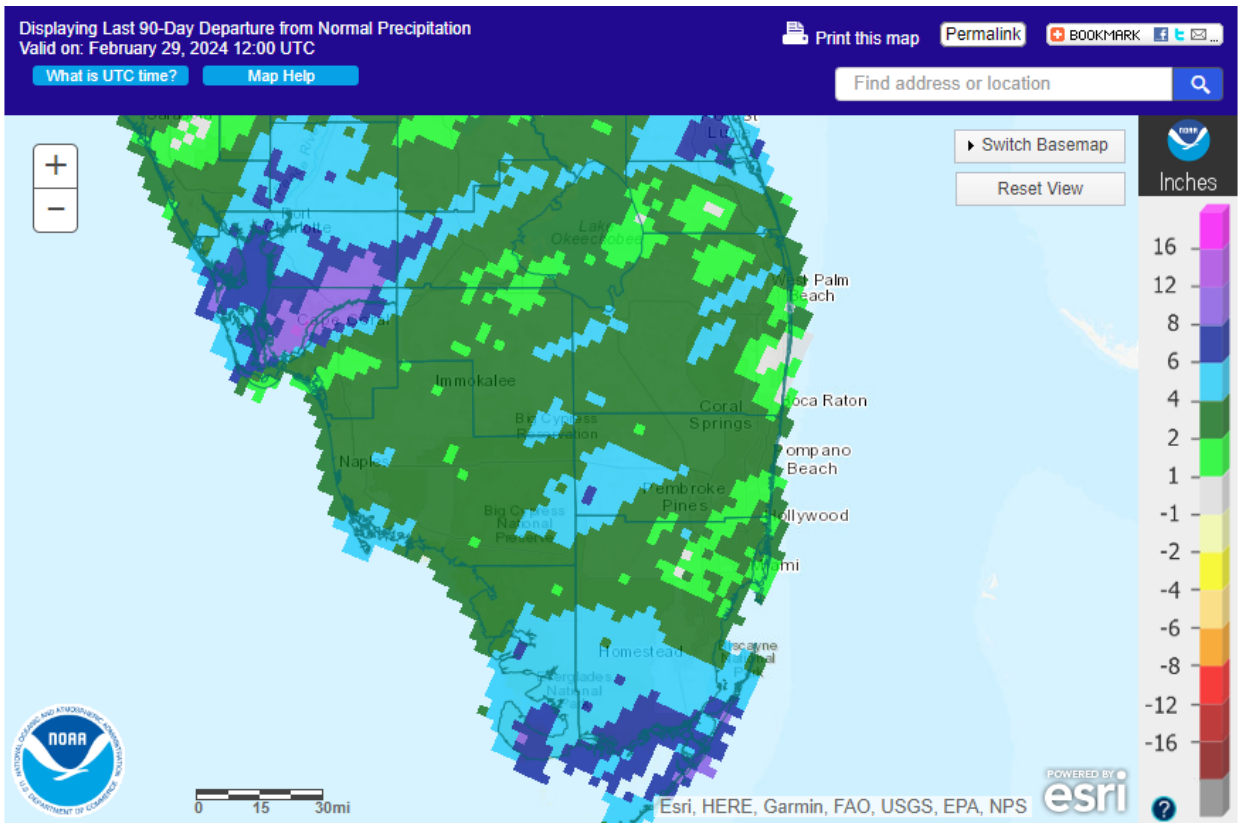


Figure 9: Departure from Normal Precipitation for Winter 2023-2024

Following are December 2023-February 2024 rainfall totals, departure from normal in inches and ranking for selected locations:

Location (Beginning of Period of Record)	Dec 2023-Feb 2024 Rainfall (inches)	Departure from Normal	Top 20 Rank
Cape Florida (1998)	**8.78**	**+2.10**	
Devils Garden (1956)	**7.64**	**+1.74**	**17th Wettest**
Fort Lauderdale/Hollywood Int'l (1912)	**8.31**	**+0.25**	
Fort Lauderdale Exec. Airport (1998)	**10.65**	**+3.53**	**4th Wettest**
Fort Lauderdale Dixie Water Plant	**8.90**	**+0.56**	
Hialeah (1942)	**7.23**	**+0.11**	
Hollywood Water Plant (2000)	**9.32**	**+1.29**	
Homestead General Airport (1990)	**9.23**	**+3.55**	**3rd Wettest**
Marco Island (2002)	**9.43**	**+3.31**	**3rd Wettest**
Miami International Airport (1895)	**7.77**	**+1.35**	
Moore Haven (1917)	**8.08**	**+2.15**	**14th Wettest**
Muse (2009)	**10.85**	**+4.45**	**2nd Wettest**
Naples Municipal Airport (1942)	**8.42**	**+4.02**	**12th Wettest**
NWS Miami (1999)	**8.15**	**+1.53**	
Opa-Locka Airport (1998)	**7.22**	**+0.58**	
Palm Beach Gardens (2002)	**7.61**	**-2.17**	
Palm Beach International Airport (1888)	**9.65**	**+0.07**	
Pembroke Pines North Perry Apt (1999)	**8.09**	**+0.37**	
Pompano Beach Airpark	**11.08**	**+4.69**	
The Redland (1942)	**9.53**	**+2.97**	**8th Wettest**
West Kendall/Miami Exec. Airport	**7.81**	**+1.83**	

Severe Thunderstorms/Tornadoes/Flooding

The active subtropical jet stream this winter set the stage for a few episodes of strong low pressure systems tracking eastward across the southern tier of the U.S., Gulf of Mexico, and Florida. These systems caused periods of strong winds, heavy rainfall, and severe weather. Three of the most notable events include:

- **December 13-17**: Strong high pressure over the eastern U.S. and low pressure over the NW Caribbean and SE Gulf of Mexico led to several days of strong and gusty winds. NE to E winds frequently reached 40 mph or higher in gusts, then turned SE and S on the 16th and 17th as low pressure formed over the southern Gulf and moved east across Florida. Bands of strong showers moved through the region, causing wind gusts of 50-60 mph. In addition, tides reached flooding levels in Flamingo where several vehicles were damaged by flood waters, as well as along portions of the east coast beaches

- **January 6th**: low pressure over North Florida dragged a cold front across the Florida peninsula. Ahead of the front, strong thunderstorms developed over South Florida and spawned an EF-0 tornado in Fort Lauderdale. Funnel clouds were also sighted near Moore Haven in Glades County

- **February 4th**: strong low pressure at the surface and aloft over the NE Gulf of Mexico swept a cold front through South Florida. A line of strong to severe thunderstorms moved rapidly through the area, with wind gusts of 40 mph common. An area of damaging winds of 60-70 mph affected central and eastern sections of Miami-Dade County, causing tree damage over locations from West Kendall to Coral Gables

- **February 18th**: A strong cold front coupled with an upper-level jet stream across South Florida caused strong showers to form over southern portions of South Florida. A series of EF-0 tornadoes affected Miami-Dade and Broward counties in association with some of the strong showers, causing damage primarily to trees

Outlook for March-May

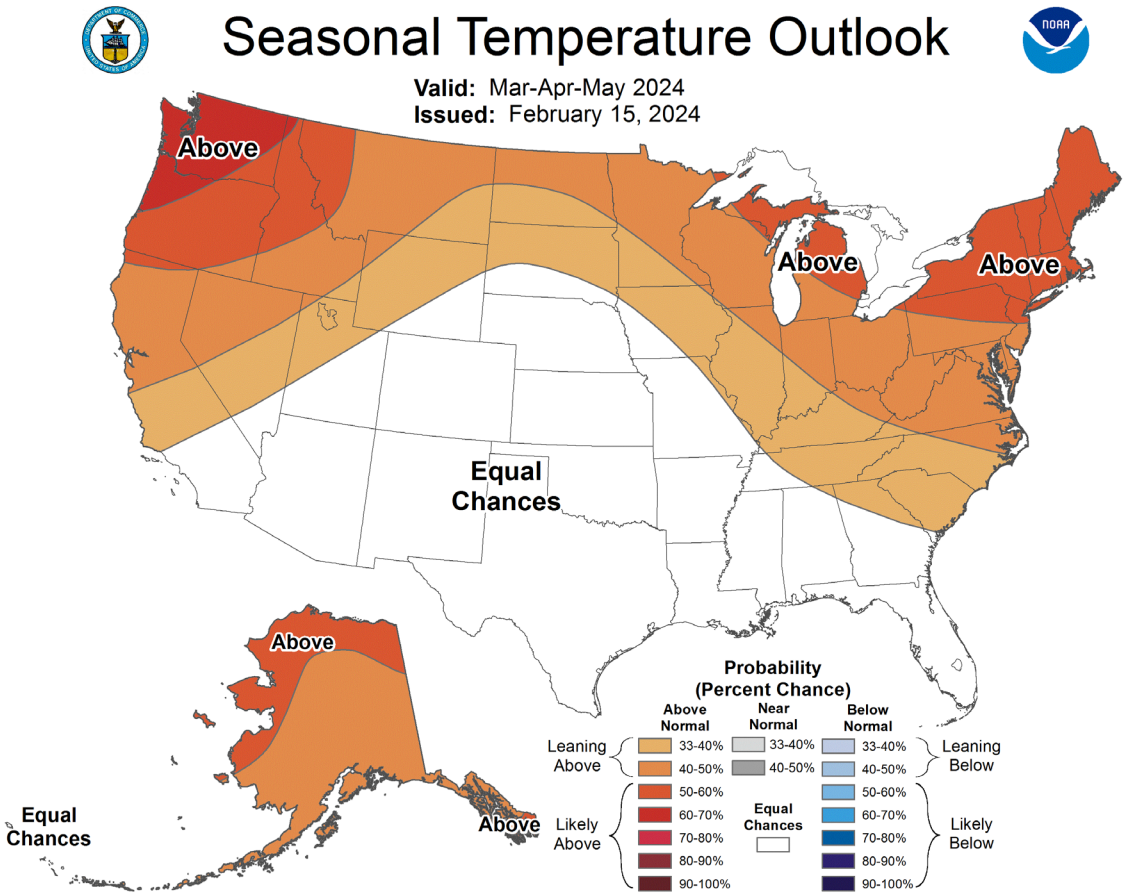
The outlook by the NOAA Climate Prediction Center for the period from March through May (Figures 10 and 11) leans towards above normal temperatures and precipitation across South Florida. Even though El Niño is expected to wane this spring, its lingering influence could lead to additional storm systems affecting Florida with increased rainfall and severe weather potential through May.

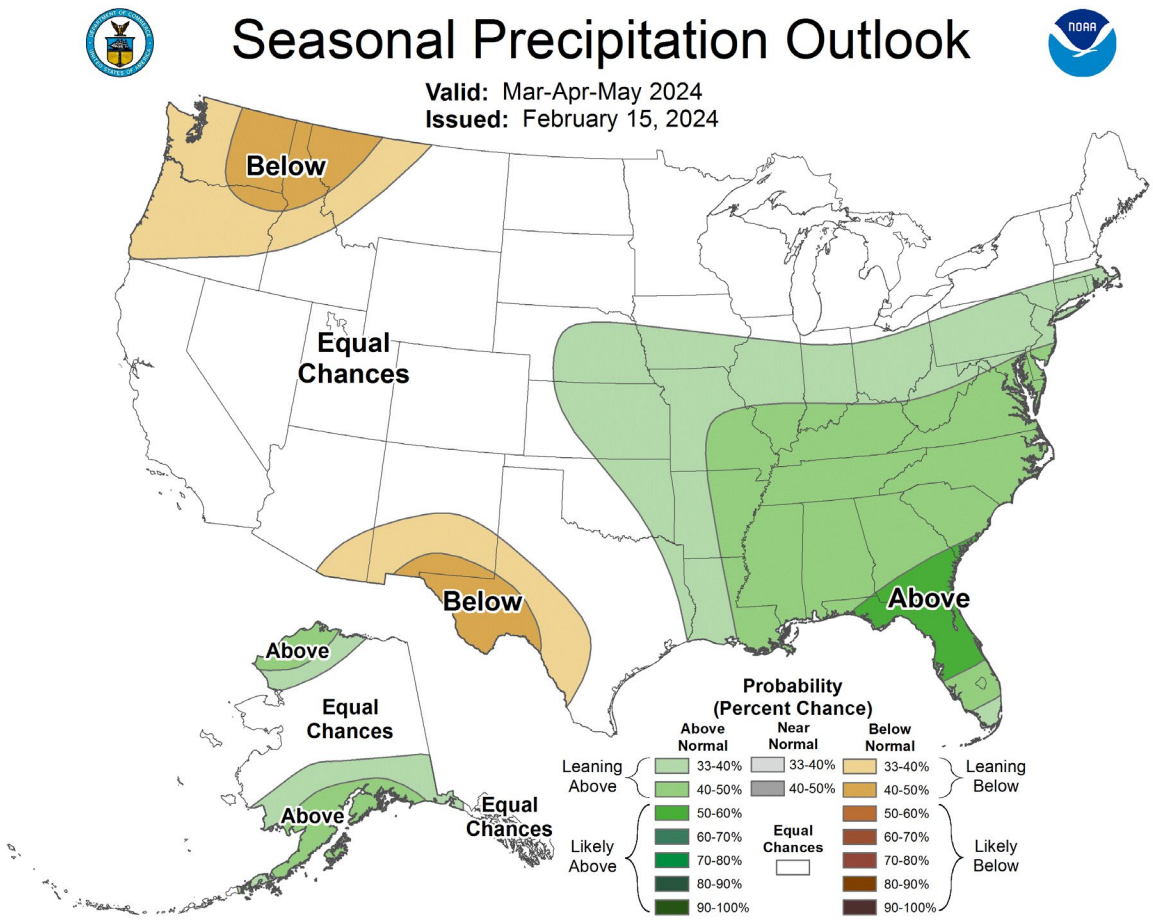
The near to above normal rainfall this winter has helped to keep groundwater levels at high levels, and thus deceasing the significant wildfire potential as we head into the first few weeks of spring. Thus, the significant wildland fire potential is below normal through May for all of South Florida. Nevertheless, even brief dry periods during the spring months can combine with gusty winds and increasing temperatures to cause conditions conducive for wildfires to form during what is considered the peak of wildfire

season. All persons are urged to take measures to reduce the chance of wildfires. Visit the Florida Forest Service web site for more information on how to help prevent wildfires.

Spring also brings periods of strong and gusty winds to the area along with an increase in beach-goers. This significantly increases the risk of rip currents at all South Florida beaches. A sharp increase in rip current-related drowning deaths and rescues occurs during the spring months due in part to this shift in the wind patterns and more people in the water. All residents and visitors visiting area beaches are strongly urged to heed the advice of Ocean Rescue lifeguards and swim near a lifeguard. Visit the National Weather Service Rip Current Awareness page for more information.

For the latest south Florida weather information, including the latest watches, advisories and warnings, please visit the National Weather Service Miami Forecast Office's web site at weather.gov/southflorida.





Figures 10 and 11: NOAA Climate Prediction Center outlook for March-May.