MIAMI-SOUTH FLORIDA
National Weather Service
Forecast Office
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Dry Season Recap & 2016 Rainy Season Outlook

"Near to Slightly Above Normal" Rainy Season Anticipated

May 27, 2016: The 2016 rainy season is underway across South Florida, with a designated start date of **May 16th**. Information on the methodology used to determine the start of the rainy season is included below.

Before we get to the outlook for rainy season, here's a recap of the dry season:

It was a wet and stormy dry season across all of South Florida, with these conditions being most predominant from December through mid-February. A key contributor to the wet and stormy conditions was the presence of a strong El Niño pattern which set the stage for a series of storm systems to move across the Gulf of Mexico and Florida. Despite a dry period in March and April, dry season rainfall was above average at all South Florida observing sites. Rainfall totals ranged from as high as 39.25" at Miami Executive Airport in West Kendall to 14.93" at Naples Municipal Airport. East coast metro locations received the most rainfall, anywhere from 25 to 35 inches at most locations. The highest rainfall amounts recorded in Miami-Dade County in excess of 35 inches is close to the average for the **rainy** season (around 40 inches)! Interior and Gulf coast locations mostly ranged between 20 to 25 inches.

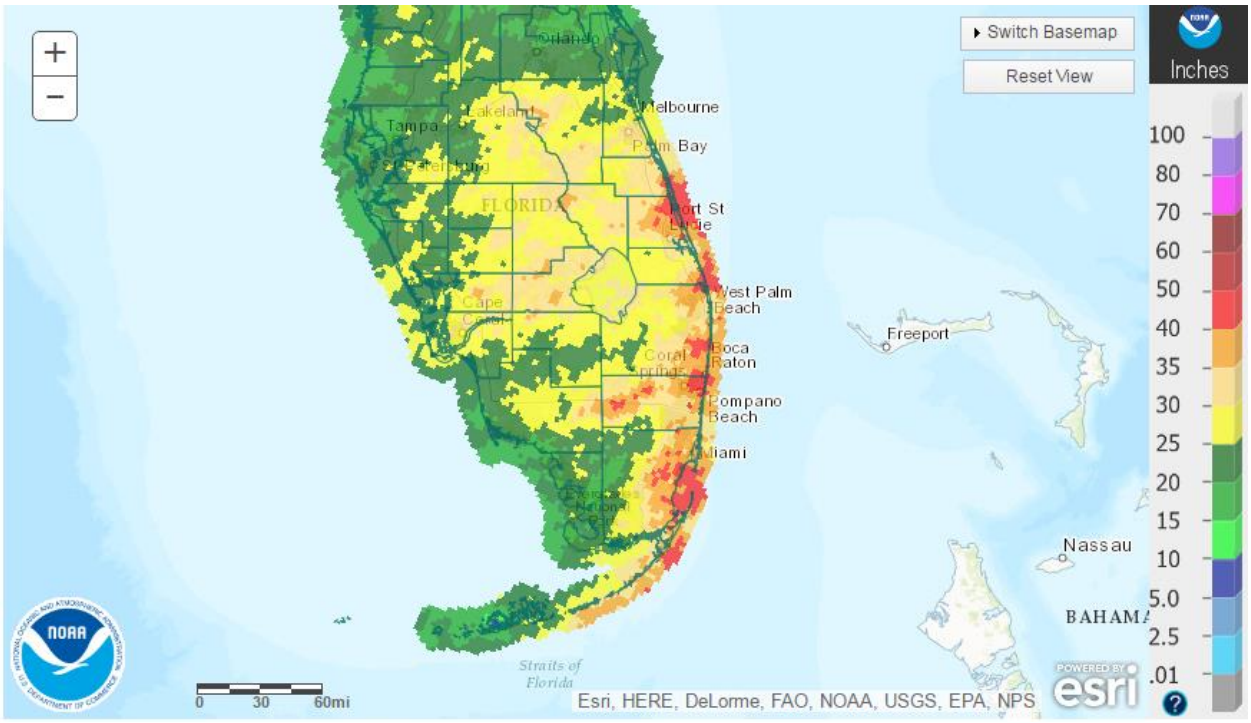


Figure 1: Rainfall Oct 1 – May 21

Below is a table with dry season rainfall totals and departure from normal:

Location (Beginning of Period of Record)	**Dry Season 2015-2016 Rainfall (inches)**	**Departure from Normal**
Big Cypress	**24.10**	
Brighton Reservation (Glades Co.)	**26.81**	
Canal Point (1941)	**22.76**	**+5.67**
Cape Florida	**34.80**	
Fort Lauderdale/Hollywood Int'l (1912)	**28.05**	**+8.00**
Fort Lauderdale Executive Airport	**29.91**	
Fort Lauderdale Dixie Water Plant	**29.85**	
Fort Lauderdale Beach	**32.83**	
Hialeah (1940)	**26.13**	**+6.00**
Hollywood (1963)	**31.14**	**+10.86**
Homestead General Airport (1990)	**23.76**	**+8.60**
Immokalee (1970)	**18.92**	**+3.79**
Juno Beach	**32.73**	

LaBelle (1929)	**21.12**	**+5.99**
Marco Island	**24.33**	
Miami Beach (1928)	**32.40**	**+15.25**
Miami International Airport (1895)	**33.60**	**+16.37**
Moore Haven (1918)	**25.04**	**+11.26**
Muse	**23.18**	
North Miami Beach	**35.34**	
Naples East/Golden Gate	**28.28**	
Naples Municipal Airport (1942)	**14.93**	**+1.55**
NWS Miami	**33.99**	
Oasis Ranger Station (1978)	**22.02**	**+8.84**
Opa-Locka Airport	**27.60**	
Ortona (1940)	**22.75**	**+7.30**
Palm Beach Gardens	**28.06**	
Palm Beach International Airport (1888)	**27.60**	**+3.76**
Pembroke Pines – North Perry Airport	**26.53**	
Pompano Beach Airpark	**31.40**	
Miami Executive Airport – W. Kendall	**39.25**	
The Redland (1942)	**37.33**	**+20.60**
South Bay (15S)	**23.47**	

Severe Weather

South Florida experienced a total of 7 “severe weather days” (days with multiple severe weather events) from December through February, including 7 tornadoes in January and February alone. The February 16th event can be classified as a tornado outbreak with a total of 4 tornadoes occurring in less than 4 hours.

- January 27th EF-1 tornado in northern Broward County affecting Coconut Creek and Pompano Beach

- January 28th EF-0 tornado in southern Palm Beach County affecting Delray Beach and Boynton Beach (summary of the two January tornadoes)

- February 16th EF-1 tornado in northern Broward County affecting Pompano Beach

- February 16th EF-1 tornado in northeastern Miami-Dade County

- February 16th EF-1 tornado in Glades County affecting Moore Haven

- February 16th EF-0 tornado in Broward County affecting the Davie area

- February 16th tornado in the Everglades of far eastern Collier County (no rating given)

In addition, on January 17th a line of strong to severe thunderstorms swept across south Florida and caused extensive tree damage in Naples, Golden Gate and Immokalee. Winds with this storm were measured at 84 mph at Naples Municipal Airport and estimated as high as 90 mph in other parts of Collier County.

In addition to the tornadoes and thunderstorms, there were several flood events of note. From December 3rd through the 5th, flooding occurred across much of Miami-Dade County as a result of a stalled front over far southern Florida and the Florida Keys. The most significant flooding was on the 5th when several rounds of very heavy rainfall affected the southern portion of Miami-Dade County. As much as 10 inches of rain fell in the West Kendall area in less than 12 hours, with 6 to 9 inches of rain during that same time period from Kendall to Homestead. Main impacts of the flooding were to streets and agricultural areas. Many streets were impassable into the next day and an estimated 70 to 80 percent of the winter vegetable crop was lost.

Rainy Season 2016 Outlook

The outlook for the 2016 rainy season calls for an increased likelihood of near to above normal rainfall and above normal temperatures (NOAA/CPC, Figures 2 and 3). This is based on a combination of several factors: analogs (past summers with similar atmospheric conditions to what is expected this summer), long-range models, and trends (observed conditions over the past 10 to 20 years).

The temperature outlook has a medium-high level of confidence due in large part to summer temperature trends over the past 10 to 20 years. Average temperatures are not expected to be much above normal, with the likely range being about 1 degree above the 30-year normal, and should largely be the result of warmer than normal night and morning temperatures.

The precipitation outlook has a low level of confidence due to weak and/or mixed signals from the different factors. For example, while trends and some long-range models suggest above-normal rainfall, the transition from El Niño to La Niña conditions has produced different precipitation patterns in past years with similar conditions.

The most likely range for this wet season's rainfall compared to normal is from 90% to 110% of normal, with a few areas likely to see higher or lower ratios. Average wet season rainfall ranges anywhere from 35 to 45 inches, highest along interior suburbs of east and west coasts and lowest over coastal areas along both the Atlantic and Gulf coasts. South Florida's daily summer rainfall tends to be highly variable in nature, with nearby areas potentially observing large differences in rainfall amounts. Normally it takes at least one or two organized, large-scale weather systems (such as tropical waves, disturbances or tropical storms/hurricanes) to provide high rainfall amounts over a large area.

The rainy season usually has three phases:

- Late May through early July ("stormiest" part of the season). Severe weather impacts, including strong and damaging winds, tornadoes, excessive lightning, hail, and flooding are most likely to occur during this period.

- Early July through mid-August (hotter with intermittent dry periods).

- Late August through mid-October (higher rainfall variability due to potential tropical systems and early-fall cold fronts).

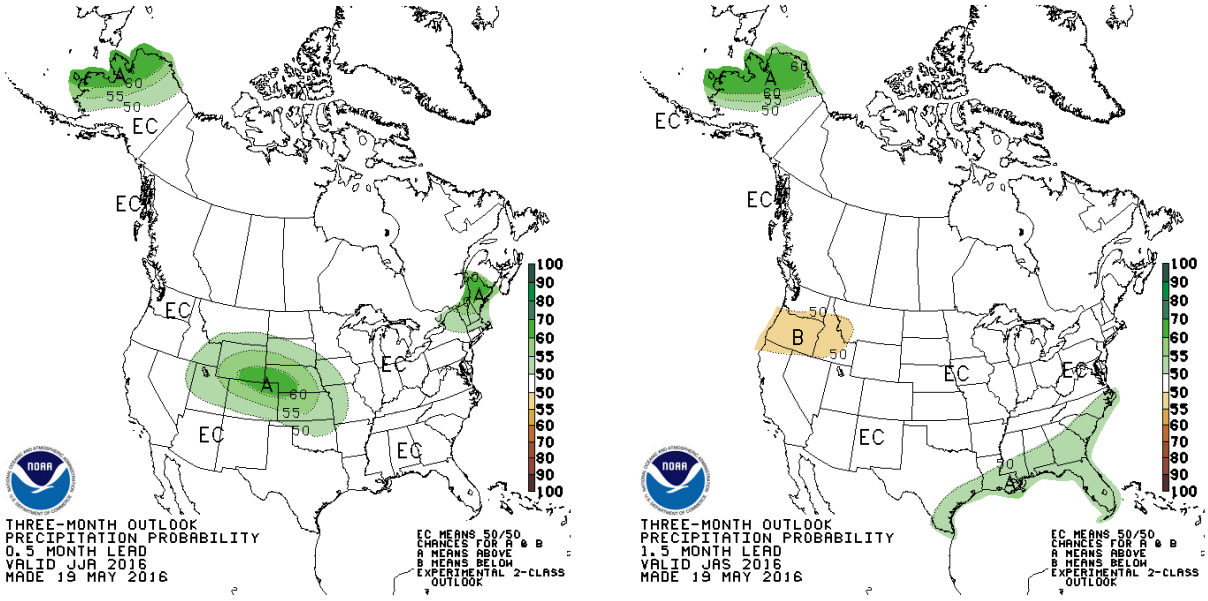


Figure 2: NOAA's Climate Prediction Center precipitation outlooks for 2016.

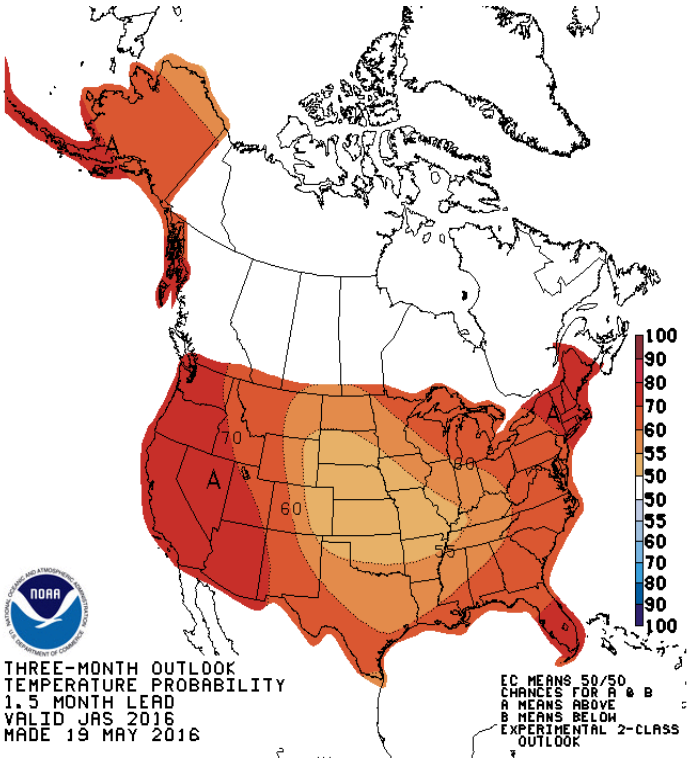
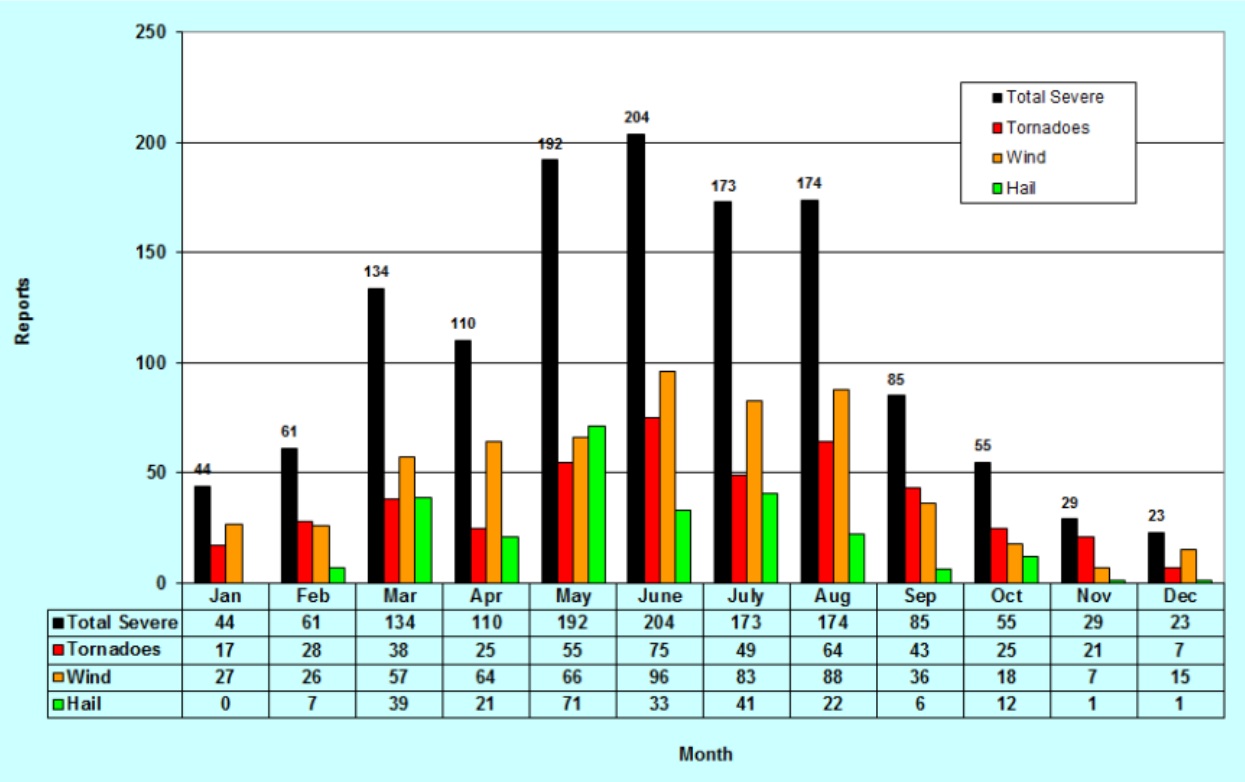


Figure 3: NOAA's Climate Prediction Center temperature outlook for July-September 2016 which is representative of the entire summer period

Weather Hazards and Potential Impacts

Weather hazards associated with the rainy season include lightning, damaging thunderstorm winds, flooding, hail, and even tornadoes. May to August is the period when most of South Florida's severe weather (flooding, large hail, tornadoes and strong winds) takes place (Figure 4). Also, rip currents are common due to the persistent onshore winds.

These hazards **do not include** impacts from any tropical systems that can affect South Florida, particularly during the peak months of August, September and October.



	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Total Severe	44	61	134	110	192	204	173	174	85	55	29	23
Tornadoes	17	28	38	25	55	75	49	64	43	25	21	7
Wind	27	26	57	64	66	96	83	88	36	18	7	15
Hail	0	7	39	21	71	33	41	22	6	12	1	1

Figure 4: Monthly Distribution of Severe Weather for southern Florida (1950-2012 Tornadoes & 1955-2012 Wind/Hail)

Please visit http://weather.gov/southflorida for daily forecasts and severe weather warnings and outlooks.

Definition and Significance of the South Florida Rainy Season

The South Florida rainy season is defined as the time of year when most of the yearly rainfall occurs. The median start date of the rainy season is May 20th and the median

end date is October 17th. During this nearly five-month period, South Florida receives about 70% of the rainfall for the entire year. Year-round groundwater conditions are largely determined by the amount of precipitation received during the rainy season. For example, a drier and/or late-arriving rainy season can lead to significant water shortages, while an early and/or particularly wet rainy season can result in concerns about too much groundwater.

The start date of the rainy season varies from year to year and is largely determined by the onset and almost daily persistence of daily showers and thunderstorms over the Florida peninsula, as well as night and morning showers and thunderstorms over the local Atlantic and Gulf waters. This is typically accompanied by an increase in humidity reflected by higher surface dew points (water-to-air saturation temperature associated with relative humidity); with persistent dew point values above 70F serving as a general indicator. Daily temperatures exhibit very little variation, with low temperatures in the 70s to around 80 and high temperatures from the upper 80s to the mid-90s.

Some years, the rainy season begins abruptly; triggered by a large-scale weather system such as low pressure systems near or over Florida. Other years, the onset can be quite subtle and dependent on gradual wind shifts and weather pattern changes which can take weeks to develop. Therefore, the beginning of the rainy season is usually a transition period rather than a sharp onset date.