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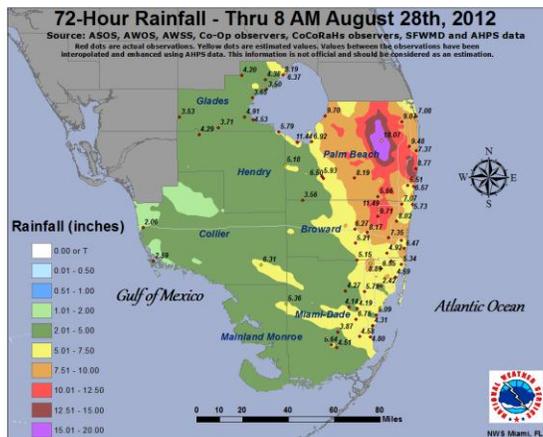
# 2012 South Florida Weather Year in Review

## Wet and Stormy Summer with Tropical Impacts

**December 29<sup>th</sup>, 2012:** The main weather story of 2012 in south Florida was the extremely wet summer, particularly over parts of metro southeast Florida, as well as impacts from a total of three tropical systems. Although no hurricanes struck South Florida in 2012 (the seventh consecutive year with no hurricane strikes), our region felt significant effects from Tropical Storm Debby in June, Tropical Storm Isaac in August and Hurricane Sandy in October. Following are the “top 5” south Florida weather stories of 2012.

Due to impacts from three tropical systems (of the 19 which formed over the Atlantic basin in 2012), it’s no surprise that these make up the top three weather stories:

### 1. Tropical Storm Isaac Brings Flooding Rains and Coastal Flooding – August 26<sup>th</sup> and 27<sup>th</sup>.



Tropical Storm Isaac impacted all of southern Florida with tropical storm force winds, heavy rains and high storm tides. Winds and rains increased on Saturday, August 25<sup>th</sup> as the center of the storm passed over eastern Cuba. On Sunday, August 26<sup>th</sup>, the center of

the storm moved west-northwest across the Straits of Florida, with rain bands increasing in frequency and intensity across the southern Florida peninsula due to the large size of the storm. After a brief lull as the center of Isaac passed near Key West late in the afternoon on the 26<sup>th</sup>, heavy squalls and rain bands began to affect southeast Florida on Sunday evening and continued into Monday the 27<sup>th</sup>. These squalls and rain bands produced long periods of torrential downpours resulting in severe flooding in the western communities of Palm Beach County (Wellington, Loxahatchee, The Acreage, Royal Palm Beach) as well as portions of northwest metro Broward County (Lauderhill, Tamarac and Coral Springs). As much as 10-18 inches of rain fell in these areas in about a 12-hour period. Although little structural flooding was noted, standing water a few feet deep lingered in many of these areas for several days, causing severe damage to roads and other infrastructure.



*Severe Flooding in Wellington (Courtesy WPTV)*

On the southwest Florida coast, Isaac's impacts were from high storm tides which affected the Collier County coast from Naples to Everglades City on Monday the 27<sup>th</sup> on the back side of the storm's circulation. Flooding as much as three feet deep impacted areas along and near the Gulf of Mexico, resulting in significant beach erosion and damage to infrastructure.



*Tidal Flooding in Goodland (Courtesy Naples News)*

No injuries or deaths were reported from Isaac in southern Florida, however total estimated storm damage was \$16.55 million.

For a more detailed report on Isaac, visit the following page:

<http://www.srh.noaa.gov/mfl/?n=isaac>

## **2. Hurricane Sandy Brushes Southeast Florida, Large Swells Batter Beaches – October 26<sup>th</sup>- 28<sup>th</sup>.**

While Hurricane Sandy will be long-remembered for the devastation it caused in the northeast U.S., south Florida did not escape its impacts. Sandy was a large and powerful hurricane affecting a large area due to the unusually large size of the storm. At its closest approach, the center of Sandy passed 160 miles east of the southeast Florida coast. However, this was close enough for tropical storm force winds (40-50 mph) to brush the coastline of Miami-Dade, Broward and Palm Beach counties. Rainfall was limited as the rain bands remained offshore.

The big story, though, was the severe beach erosion and coastal flooding caused by Sandy's large swells. As Sandy moved north past the Bahamas and toward the mid-Atlantic and northeast United States coasts, the wind trajectory around Sandy produced an optimal fetch which led to the development of large, long period swells which pounded the southeast Florida coast. The swells peaked Saturday, October 27<sup>th</sup> and Sunday, October 28<sup>th</sup>. Breaking waves, estimated to have been as high as 10 feet at the Miami-Dade County beaches to around 20 feet, perhaps even higher, at the Palm Beaches, led to severe beach erosion and tidal flooding. The tidal flooding was greatest in Fort Lauderdale Beach where a section of A1A was closed for several days due to ocean over-wash during the daily high tide cycles.



*Flooding on A1A in Fort Lauderdale Beach from swells generated by Hurricane Sandy (photo by Dan Gregoria/NWS Miami)*

As with Isaac in August, no local deaths or injuries were noted but coastal/beach damage was significant and estimated at about \$14 million in Palm Beach County alone, with similar if not higher values likely for Broward County.

More details on Sandy's effects in south Florida can be found here:

<http://www.srh.noaa.gov/mfl/?n=sandy>

### **3. Tropical Storm Debby Lashes South Florida with Tornadoes – June 23<sup>rd</sup>-24<sup>th</sup>.**

The tropical season kicked off in south Florida not with rain or flooding, but with a two-day tornado outbreak caused by outer rain bands associated with Tropical Storm Debby centered over the eastern Gulf of Mexico in late June. A total of 10 tornadoes were observed over southern Florida on June 23<sup>rd</sup> and 24<sup>th</sup>. Eight of these tornadoes occurred in a four-hour period during the late morning and early afternoon of June 24<sup>th</sup>, making it the highest number of observed tornadoes in a single day in southern Florida since Hurricane Isbell in October 1964.

As is typical of tornadoes associated with tropical systems, most of these were brief and relatively small EF0-intensity tornadoes (of those which were rated based on observed damage). Of the 10 tornadoes, two in Collier County stood out; one during the late

afternoon of June 23<sup>rd</sup> which cut a path of 1.7 miles across East Naples, producing minor structural damage and knocking down trees and power lines, and another on June 24<sup>th</sup> which was a long-track tornado originating from a waterspout which moved onshore just east of Goodland and tracked north-northeast, passing just east of Collier-Seminole State Park as it crossed Tamiami Trail. The total path length of this waterspout/tornado was approximately 16 miles.



*Tornado just south of Tamiami Trail about 1 mile east of Collier-Seminole State Park (Courtesy Dan Floyd)*

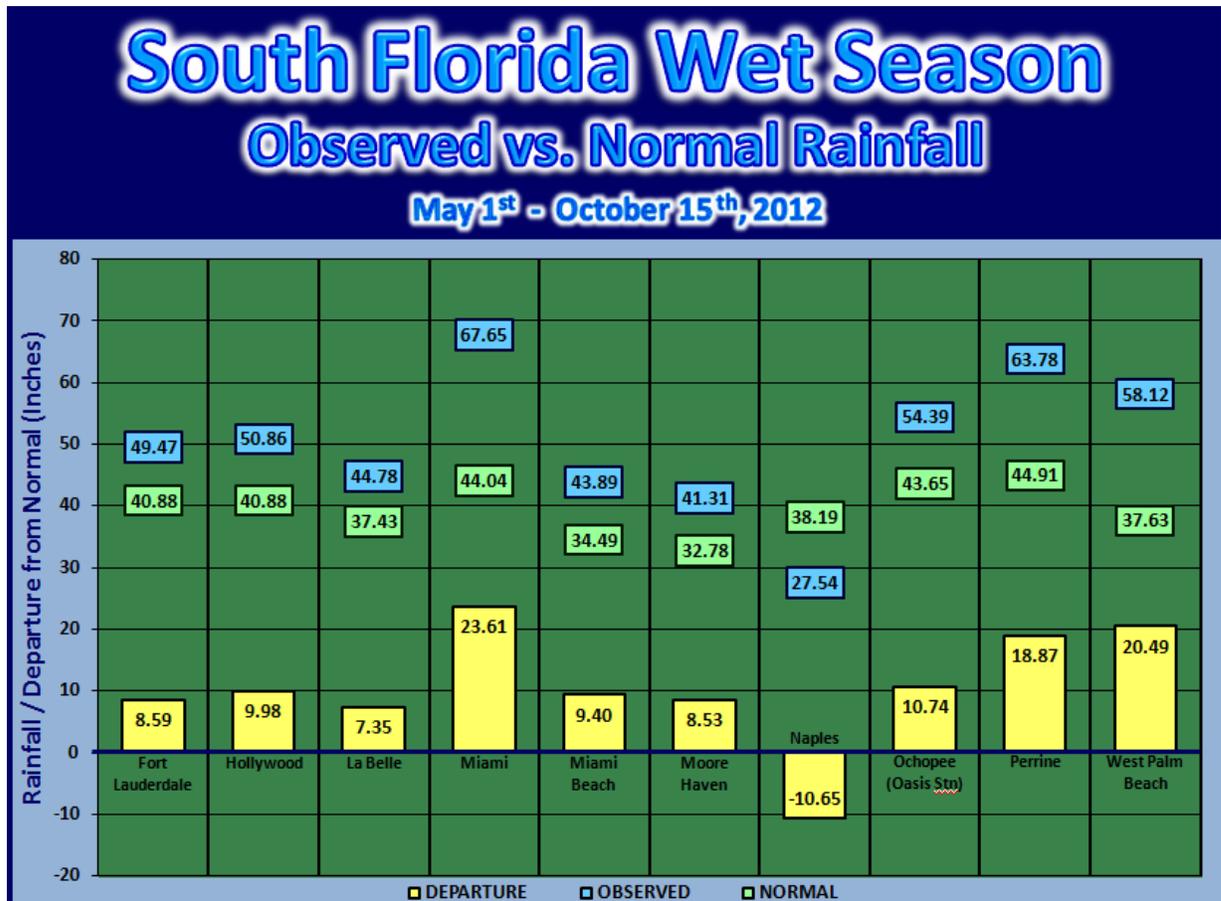
In addition to the tornadoes, beach erosion and minor coastal flooding was observed along the southern Collier County coast due to persistent onshore winds.

A detailed report on the tornadoes spawned by Tropical Storm Debby can be found here: <http://www.srh.noaa.gov/images/mfl/news/TornadoOutbreakJune23-24.pdf>

#### **4. Rainy Season Lived up to its Name**

2012 started out on a very dry note across all of South Florida, but from May through most of October near-record rainfall was observed, especially across eastern sections.

From May 1 through October 15 (encompassing almost the entire rainy season) Miami and The Redland recorded their second wettest such period (see chart below). West Palm Beach recorded its third wettest May 1 to October 15 period, with Fort Lauderdale's Dixie Water plant ranking 9<sup>th</sup> wettest. At the National Weather Service on the Florida International University campus in West Miami-Dade County, a remarkable 81.04 inches was measured. West Palm Beach established a record-wettest August with 22.66 inches of rain (records at West Palm Beach go back to 1888).



These values can be put in further perspective when considering that the average rainfall for an entire year is anywhere from 45 to 60 inches area-wide. Many locations received near or over a year's worth of rain in less than 6 months!

Several localized flooding episodes comprised part of these high rainfall totals. Most notably, Doral and Sweetwater on May 22<sup>nd</sup> when 8-10 inches of rain fell in about 6 hours and the rainfall associated with Tropical Storms Debby and Isaac. Even after the rainy season ended, severe flooding from up to 10 inches of rain in only 6 hours occurred in Jupiter from a stationary line of heavy showers on December 11<sup>th</sup>.

These copious rains didn't fall everywhere, however. Portions of southwest Florida, especially the Naples area and northern Collier County, received significantly less rain than normal during the wet season. Naples Municipal Airport only received 27.54 inches

from May 1 to October 15, about 40 inches less than locations on the other side of the peninsula.

As of 7 AM December 29<sup>th</sup>, one south Florida location (Juno Beach) surpassed the 100-inch mark with a total of 101.79 inches, a rare feat. The NWS office in West Miami-Dade came very close to recording 100 inches of rain (99.42 inches).

Here is a listing of total 2012 rainfall (**through 7 AM December 29th**), departure from normal and rank:

<b>Station – Beginning of Records</b>	<b>2012 Total</b>	<b>Dep. from Normal (Rank)</b>
MIAMI - 1911	86.94	+25.04 (2nd wettest)
WEST PALM BEACH – 1888	78.74	+16.41 (12 <sup>th</sup> wettest)
FORT LAUDERDALE – 1912	60.87	-1.31
NAPLES - 1942	37.93	-13.96 (7 <sup>th</sup> driest)
JUNO BEACH	101.79	
NWS MFL – SWEETWATER	99.42	
THE REDLAND - 1942	79.96	+17.36 (5 <sup>th</sup> wettest)
HIALEAH - 1940	77.60	+7.22 (12 <sup>th</sup> wettest)
NORTH MIAMI BEACH	76.80	
FT. LAUD DIXIE WTR PLANT	76.30	+10.55
HOMESTEAD GEN APT - 1990	74.52	+15.00
FORT LAUDERDALE BEACH	71.05	
PALM BEACH GARDENS	70.41	
HOLLYWOOD WTR PLANT	69.07	+4.72
MIAMI BEACH - 1927	65.17	+13.44 (7 <sup>th</sup> wettest)
SOUTH BAY/OKEELANTA	65.13	
CAPE FLORIDA	64.45	
OASIS RANGER STN - 1978	63.01	+4.94
MUSE	61.93	
BIG CYPRESS RES (HENDRY)	56.86	
BRIGHTON RES (GLADES)	56.17	
MOORE HAVEN - 1918	53.89	+6.94
LABELLE - 1929	53.74	+0.80

NAPLES (GOLDEN GATE)	53.37	-1.34
MARCO ISLAND	50.88	
ORTONA	41.46	-13.99
IMMOKALEE - 1970	37.23	-12.59 (5 <sup>th</sup> driest)

*NOTE: Normals are for period 1981-2010*

## 5. Hail the size of Baseballs!

On June 15<sup>th</sup>, intense afternoon thunderstorms produced hail the size of baseballs in the Coral Gables area and in rural Hendry County. This was only the 5<sup>th</sup> time since 1955 that hail of baseball-size or larger were reported in south Florida. Fortunately, there were no reports of significant damage. While this particular event rarely occurs in south Florida, it was emblematic of the wet and stormy summer experienced by many South Floridians. A total of 24 individual reports of large hail (one inch in diameter or greater) were received by the NWS Miami office covering southern Florida, along with 50 reports of thunderstorm winds of 58 mph or greater.



*Hailstone recovered in Coral Gables from thunderstorm on June 15<sup>th</sup>  
(courtesy Becca Fronczak via Facebook)*

## Other Weather Highlights

### 2012 Temperatures: Not as Warm as 2011

After a cold snap brought freezing temperatures to interior South Florida on January 4<sup>th</sup>, the first three months of 2012 were warmer than normal. This was followed by near to below normal temperatures all the way through November from a combination of increased cloud cover and rain in the summer and early-season cool snaps in November. Overall, December 2012 will finish off the year on a warm note.

Below are 2012 average temperatures for select sites, departure from normal and the 2011 average temperature for the same location:

Location (beginning of historical record)	2012 Avg Temp (F)	Departure From Normal (F)	2011 Avg Temp (F)
Miami Int'l (1895)	77.3	+0.4	78.3
Fort Lauderdale Int'l (1912)	77.1	-0.5	77.8
Palm Beach Int'l (1888)	76.0	+0.5	77.6
Naples Municipal (1942)	75.6	+0.5	76.0

*NOTE: Normals are for period 1981-2010*

Some other noteworthy 2012 temperature statistics:

- **Miami International Airport (MIA)** observed 76 days of temperatures at or above 90 degrees. The average number of 90+ degree days per year is 51.

Miami's hottest temperature reading in 2012 was 94 degrees registered on June 14<sup>th</sup>; with the coldest being a rather mild 43 degrees on January 4<sup>th</sup>.

- **Palm Beach International Airport (PBI)** observed 47 days of temperatures at or above 90 degrees which is below the average of 56 days.

West Palm Beach's hottest temperature reading in 2012 was 93 degrees registered on August 17<sup>th</sup> and 18<sup>th</sup>; with the coldest being 39 degrees on January 3<sup>rd</sup> and 4<sup>th</sup>.

- **Naples Municipal Airport (APF)** observed 78 days of temperatures at or above 90 degrees which is below the average of 109 days.

Naples' hottest temperature reading in 2012 was 95 degrees registered on August 8<sup>th</sup>. The coldest reading was 36 degrees on January 4<sup>th</sup>.

- **Fort Lauderdale/Hollywood International Airport (FLL)** observed 55 days of temperatures at or above 90 degrees which is below the average of 66 days.

Fort Lauderdale's hottest temperature reading in 2012 was 94 degrees registered on June 14<sup>th</sup> and September 9<sup>th</sup>. The coldest was a rather mild 42 degrees set on January 4<sup>th</sup>.

### **Weather-Related Deaths/Injuries:**

A total of four people died in south Florida from weather-related incidents in 2012 and an additional 19 were injured. Rip currents accounted for two deaths and 12 injuries, lightning incidents accounted for one death and four injuries and marine hazards totaled one death and three injuries (all from a capsized boat near Hillsboro Inlet on Thanksgiving Day).