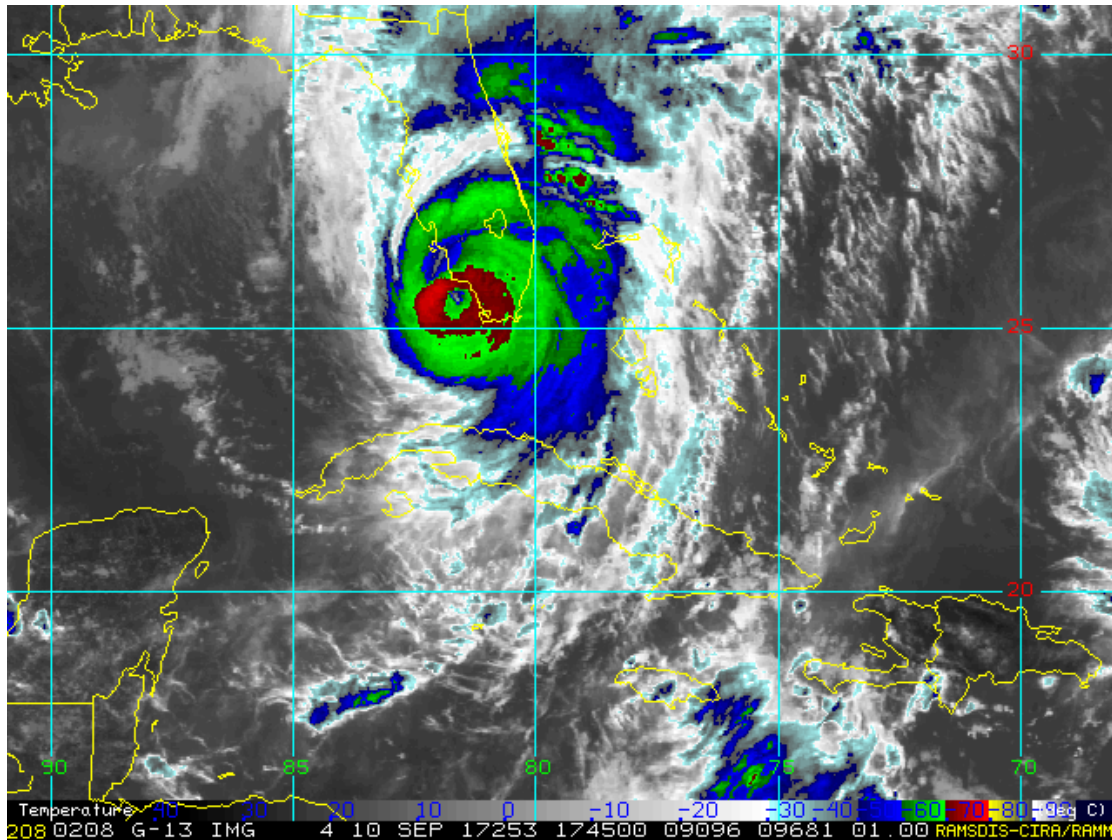




MIAMI-SOUTH FLORIDA National Weather Service Forecast Office <http://www.weather.gov/miami>



Hurricane Irma Makes Landfall in SW Florida on September 10th, 2017

2020 Florida Severe Weather Awareness Week

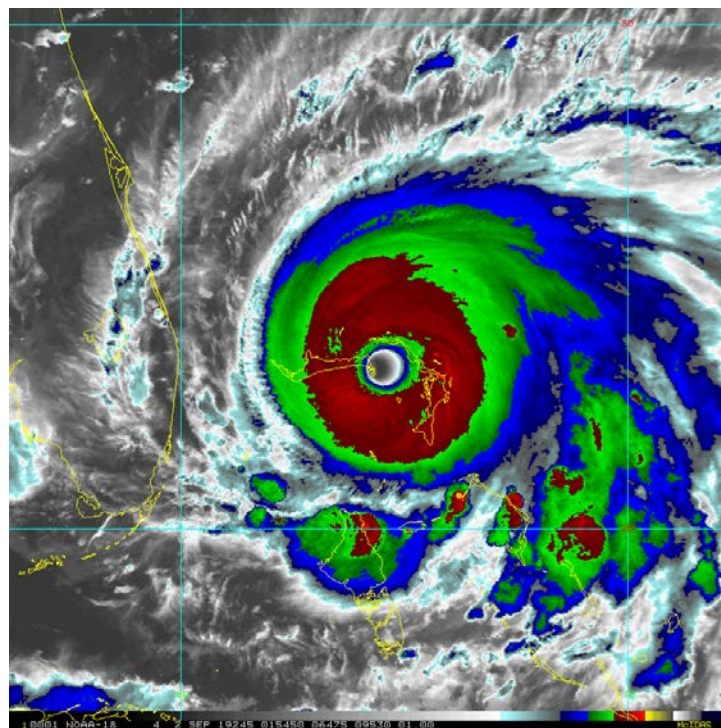
Thursday, January 30th is Hurricane and Flooding Awareness Day

The entire state of Florida was spared from a landfalling hurricane in 2019, however South Florida did have an unnervingly close call with catastrophic Major Category 5 Hurricane Dorian. Despite Dorian never making landfall in Florida, the effects were still felt across the region. Tropical Storm force wind gusts were recorded at multiple sites across South Florida. Some observations include Naples Municipal Airport, with a recorded wind gust of 41 mph (36 kt), Key Biscayne, with a recorded wind gust of 43

mph (37 kt), and Juno Beach Pier, with a recorded wind gust of 47 mph (41 kt). These are just three (3) examples from a large sample size of observations recorded over the span of two (2) days, September 2 through September 3. More meteorological information associated with Dorian in Figure 1 below.

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|----------------------|--|
| Wind | The highest wind gust recorded on land in South Florida was at 0359 AM EDT on September 3. A 61 mph (53 kt) gust was recorded at the mesonet XJUP located at the Juno Beach Pier. The east coast metro areas of Miami-Dade, Broward, and Palm Beach counties experienced tropical storm gusts throughout the course of September 2-3. Even Naples experienced tropical storm wind gusts. For the most part, maximum sustained winds were in the 25-40 mph (20-35 kt) range across the region, especially for coastal locations along the east coast. |
| Storm Surge | In Palm Beach County, inundation values of 3-5 feet were forecast whereas Broward County had forecast inundation values of 1-3 feet. Overall, little significant inundation occurred with only reports of minor street flooding stretching from coastal Miami-Dade County to Palm Beach County. |
| Flooding Rain | For the majority of locations where most of the population lives in South Florida, rainfall amounts averaged 2-3 inches in association with Dorian. Locations across the west coast received plentiful rain as well. In Collier County, a COCORAHS Spotter measured 2.80 inches of rain in a span of 21 minutes. |
| Tornadoes | There was one tornado warning issued on the evening of September 1 in southcentral Collier County associated with a strong storm and radar indicated rotation. However, no tornadoes were reported or confirmed. |

Figure 1: Information concerning wind, storm surge, flooding rain, and tornadoes associated with Hurricane Dorian across South Florida



Hurricane Dorian as a Category 5 in the Bahamas, Sep 2, 2019

Dorian was a reminder that tropical storms and hurricanes don't always have to make landfall in/near South Florida to give us any sort of impact. Furthermore, tropical storms and hurricanes don't always give us several days of advanced notice either and can rapidly develop nearby or right over South Florida. For example, back in 2018, Gordon formed just to the south of Homestead on Labor Day (September 3rd) as a tropical depression and made landfall a few hours later near Tavernier in the Florida Keys at 52 mph (45 kt).

The fairly quiet 2019 hurricane season for South Florida proceeded another relatively uneventful 2018 hurricane season. However, the 2017 hurricane season was a different story as it will be remembered for Hurricane Irma, the first major hurricane to strike South Florida since Wilma in 2005.

Despite the lack of impacts this past year, we can and should apply lessons learned from recent hurricane impacts to ensure that individuals, families, and communities remain well informed and prepared for hurricanes.



Damage to dock at Tin City in Naples caused by storm surge from Hurricane Irma (NWS Storm Survey picture)



Marooned boat in Coconut Grove after Hurricane Irma (NWS Storm Survey picture)

The active hurricane season of 2017 and its impacts felt across all of South Florida served as a reminder that we live in one of the most vulnerable and hurricane-prone places in the country. On average, the center of a hurricane will pass within 50 miles of any point in South Florida every 6 to 8 years. This means that while hurricane strikes are typically not a yearly occurrence, statistics indicate that South Florida will at least be significantly threatened a few times a decade, and impacted directly by a hurricane at least once a decade. Indirect hurricane impacts, as well as tropical storms passing over South Florida, occur with a much higher frequency; at least every 2 or 3 years on average.

Therefore, we can't afford to become complacent. Be prepared **every year** for the possibility of a tropical storm or hurricane impacting our region.

IT'S NOT JUST ABOUT THE WIND

As the storms of 2017 made clear, tropical cyclones are multi-hazard weather systems. While the wind speed is what determines the classification of a tropical cyclone, other hazards such as storm surge, flooding and tornadoes can cause significant impacts including loss of life, regardless of the storm's category. Hurricane Irma's storm tide reached close to 10 feet in the Everglades City/Chokoloskee area of Southwest Florida, and as high as 6 feet as far away as Coconut Grove south of Downtown Miami. Hurricane Irma and Tropical Storm Philippe in 2017 spawned a combined eight tornadoes across South Florida, and flooding from heavy rain occurred with all of the

2017 storms, as well as in the Homestead area from Tropical Storm Gordon on Labor Day 2018.

Remember: It doesn't take a major hurricane to produce significant impacts. Tropical storms directly impacting South Florida have been known to produce severe flooding, damaging winds and tornadoes. Take every tropical cyclone seriously, whether it's a tropical storm or a major hurricane. Also, pay close attention to the Tropical Weather Outlook issued 4 times a day during hurricane season to stay abreast of weather systems which have the potential of forming into tropical storms, especially those close to Florida such as Tropical Storm Gordon in 2018.

Important: Historically, it is the water that has caused most of the deaths in hurricanes. About 90 percent of all hurricane-related deaths nationwide occur from drowning from either the storm surge or freshwater flooding. Fortunately, no deaths were directly attributed to the storm surge from Hurricane Irma, but a slightly different track could have resulted in much higher storm surge and life-threatening flooding.

Residents of coastal and surge-prone areas are urged to heed advice from local officials and evacuate whenever storm surge flooding is expected. Become familiar with your county's storm surge evacuation zones and know whether you live in one or not. **Visit your county's emergency management web site for more information on evacuation zones.**

HURRICANE SAFETY TIPS: Regardless of the short or long term hurricane outlook, South Floridians need to be prepared every year. It only takes one big storm to affect our area long-lasting impacts to be felt. Now is the time to begin preparing for the 2020 hurricane season. Develop a plan and have it in place before a storm threatens. Know if you live in a hurricane evacuation zone. Gather supplies such as bottled water, canned foods and batteries. Remember to buy enough provisions to last a minimum of three to five days in the event of a tropical system affecting our area. Buy and install hurricane shutters. A minimum of preparation can save lives and property.

People are also urged to be extremely cautious during the storm's aftermath. Typically, more people die after the passage of a storm than during the storm itself. Most of the deaths associated with Hurricane Irma occurred after the storm's passage from a combination of factors including carbon monoxide poisoning, injuries while removing debris and storm shutters, lack of proper air conditioning, and vehicle accidents. Extreme care must be used when using generators, and make sure to run them in an outdoor location, not inside the house.

For a comprehensive list of hurricane preparedness information, visit [ready.gov](https://www.ready.gov) and [Ready South Florida](#).

Flooding

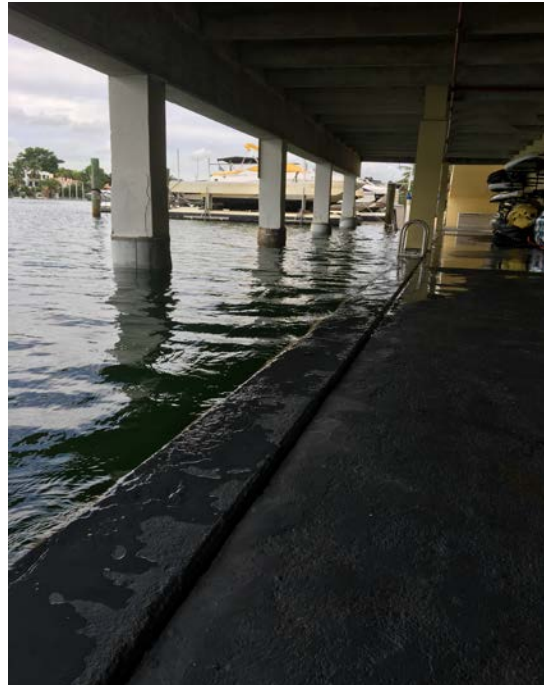
South Florida's occasional torrential rains and flat terrain can lead to major flooding. While tropical weather systems produce most of the significant and widespread rain events, flooding also occurs from non-tropical weather systems. On otherwise typical summer days, local thunderstorms frequently produce enough rainfall to flood streets and cause hazardous driving conditions. Major flooding events occur at least two or three times a year, and in some years even more. In August 2019, nearly two weeks of almost daily heavy rainfall led to localized flooding of several urban South Florida neighborhoods, especially along portions of the east coast metro area. On August 6, sections of West Palm Beach received 2-3 inches of rain in just thirty minutes and on August 15, surrounding areas near Kendall received approximately 7 inches of rain in under three hours. Stretching back to June 2017, a weather disturbance over the Gulf of Mexico caused three to four days of intense rainfall of up to 20 inches, and consequently severe flooding, from coastal Collier County to Broward and Palm Beach counties, was reported.

The most recent case of significant flooding across South Florida was during the overnight into early morning hours of December 23, 2019. A surface low in the Gulf of Mexico moved eastward across South Florida overnight. The atmosphere over South Florida featured a favorable combination of ingredients that could potentially support tornado development, warranting the issuance of a Tornado Watch from the Storm Prediction Center (SPC). Though no tornadoes were *reported*, a plethora of flooding reports and estimates swamped social media, rainfall databases, and KAMX radar estimates. Localized reports of 9 to 12+ inches occurred during this time frame with portions of Hallandale Beach receiving 12.75 inches of rain. In fact, the flooding was so severe that Fort Lauderdale/Hollywood International Airport (KFL) was shut down for several hours during the morning as runways were overrun with water and roadways leading to the airport were completely blocked. Why? That's because between 1253 AM EST and 0153 AM EST, 4.45 inches of rain fell. In one hour, the city of Fort Lauderdale experienced its wettest winter day on record, shattering the previous record for the period of 1.57 inches set in 1940.



Typical South Florida Urban/Street Flooding

Another type of flooding, tidal flooding due to astronomical high tide (a.k.a. King Tides), typically affects vulnerable areas along the Intracoastal Waterway during high tide cycles in September, October, and November, leading to flooding of streets, parks, and marinas.



Typical South Florida King Tide Flooding (courtesy of Liam Lynam)

PREPARE FOR FLOODING: The flat south Florida terrain lends itself to ponding of water in poorly drained or low lying areas during heavy rain events, rather than the flash flooding that occurs in other parts of the country. While this type of flooding is normally not as deadly or destructive, it can still lead to significant impacts as water can enter homes and other structures, as well as make driving extremely hazardous due to flooded roadways which can sometimes obscure canals. If water is covering a roadway, do not assume that you can drive through it. **Turn around, don't drown.**

All South Floridians need to be aware of their particular neighborhood's vulnerability to flooding. Fortunately, people can also plan well in advance for floods. The best advice is to have flood insurance, a separate policy from your homeowner's insurance. Know if you live in an area which floods frequently from heavy rains.

Good flood safety information can be found at the [NWS Flood Safety web site](#).

Monitor NOAA Weather Radio before, during and after a tropical cyclone or flood event to stay abreast of the latest information. You can also visit the National Weather Service Miami Forecast Office web site at weather.gov/southflorida where a description of potential storm impacts and latest hurricane and flood watches and warnings will be available, as well as the National Hurricane Center's five-day tropical cyclone track and intensity forecast.