NOTE: THIS SAMPLE REPORT IS MEANT TO SHOW YOU WHAT OUR REPORTS GENERALLY LOOK LIKE. EACH REPORT WILL BE CATERED SPECIFICALLY TO YOUR CASE. NAMES AND LOCATIONS HAVE BEEN CHANGED TO PRESERVE CONFIDENTIALITY.

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FORENSIC WEATHER CONSULTANTS

AMERICAN METEOROLOGICAL SOCIETY
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HURRICANE "IRMA" METEOROLOGICAL EXPERT REPORT

FORENSIC WEATHER INVESTIGATION OF THE WEATHER CONDITIONS, WIND DIRECTIONS, SUSTAINED WINDS, AND PEAK WINDS (INCLUDING GUSTS) ON SEPTEMBER 9-11, 2017 AT 51862 BEACH BOULEVARD IN DEERFIELD BEACH, FLORIDA

December 29, 2020

CASE NAME: "Ana Faulkner v. Residential Insurance Company"
PREPARED FOR: Ms. Liliana Somero, Esq.
COMPANY: Somero Law Group

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ASSIGNMENT:

This case was assigned to me by the Somero Law Group. I was asked to perform an in-depth weather analysis and forensic weather investigation at 51862 Beach Boulevard in Deerfield Beach, Florida in order to determine the weather conditions, wind directions, sustained winds, and peak winds (including gusts) as a result of Hurricane "Irma" on September 9th-11th, 2017.

METHODOLOGY:

Forensic Weather Consultants, LLC uses various reliable sources of weather information in order to conduct a reliable weather analysis. In order to accurately determine the weather conditions that existed leading up to and including the time of the incident, a detailed search was performed to find the closest, official weather stations to the incident location. Using the computer program "Google Earth", weather station locations provided by the National Centers for Environmental Information (NCEI) and MesoWest were plotted and are indicated by a yellow pushpin. MesoWest is a cooperative project that was started at the University of Utah in 1996 with a goal of providing access to current and archived weather observations from across the United States through internet-based resources. While not all of the weather data can be certified by the NCEI, it is all housed and maintained on National Weather Service websites including ncei.noaa.gov and raws.wrh.noaa.gov and are the records that meteorologists rely upon during the normal course of business to conduct these investigations.

GENERAL REVIEW OF WEATHER DATA SOURCES

Many different types of weather data are gathered and analyzed as part of our investigations. While some, but not necessarily all, of these weather data sources were utilized for this case, we are providing a list of the different types of stations for general information purposes.

The Automated Surface Observing Systems (ASOS) program is a joint effort of the National Weather Service (NWS), the Federal Aviation Administration (FAA), and the Department of Defense (DOD). The ASOS systems serve as the nation's primary surface weather observing network. The ASOS systems compile various weather observations, often more than once per hour, called Local Climatological Data (**LCD**) that are reviewed, maintained, and stored by NOAA. ASOS computed wind speeds are the 2-minute average wind speed prior to the time of the observation. ASOS computed wind gusts are the greatest 5-second average wind speed that was measured in the 10 minutes prior to the time of the observation. Wind gusts are reported if the greatest gust exceeds 14 knots (16 MPH). ASOS also computes peak wind gusts which are

the greatest 5-second average wind speed that occurred since the last generated Meteorological Aerodrome Report (METAR). Peak wind gusts are reported if the greatest peak wind gust exceeds 25 knots (29 MPH).

Through the National Weather Service (NWS) Cooperative Observer Program (**COOP**), more than 10,000 volunteers take daily weather observations at National Parks, seashores, mountaintops, and farms as well as in urban and suburban areas. COOP data usually consists of daily maximum and minimum temperatures, snowfall, and 24-hour precipitation totals ending at a specific time, such as 7:00 a.m. in many locations.

The Community Collaborative Rain, Hail and Snow Network (**CoCoRaHS**) is a network consisting of volunteer weather observers across the United States, Canada, and the Bahamas. These volunteers take daily precipitation measurements and report them to a centralized data store online, where this data is heavily utilized by the NWS, meteorologists, emergency managers and city utilities. CoCoRaHS data is particularly useful in situations where storm systems produce sharp precipitation gradients.

The Citizen Weather Observer Program (**CWOP**) is a network of privately-owned electronic weather stations in the United States and in over 150 countries. These stations are part of a network that allows volunteers with computerized weather stations to send automated surface weather observations to the National Weather Service by way of the Meteorological Data Ingest System (MADIS). The CWOP reported wind speed is the 2-minute average of the wind speed prior to the observation. The CWOP reported wind gust is the maximum instantaneous wind speed (at least a 5-second average) observed in the 10 minutes prior to the observation.

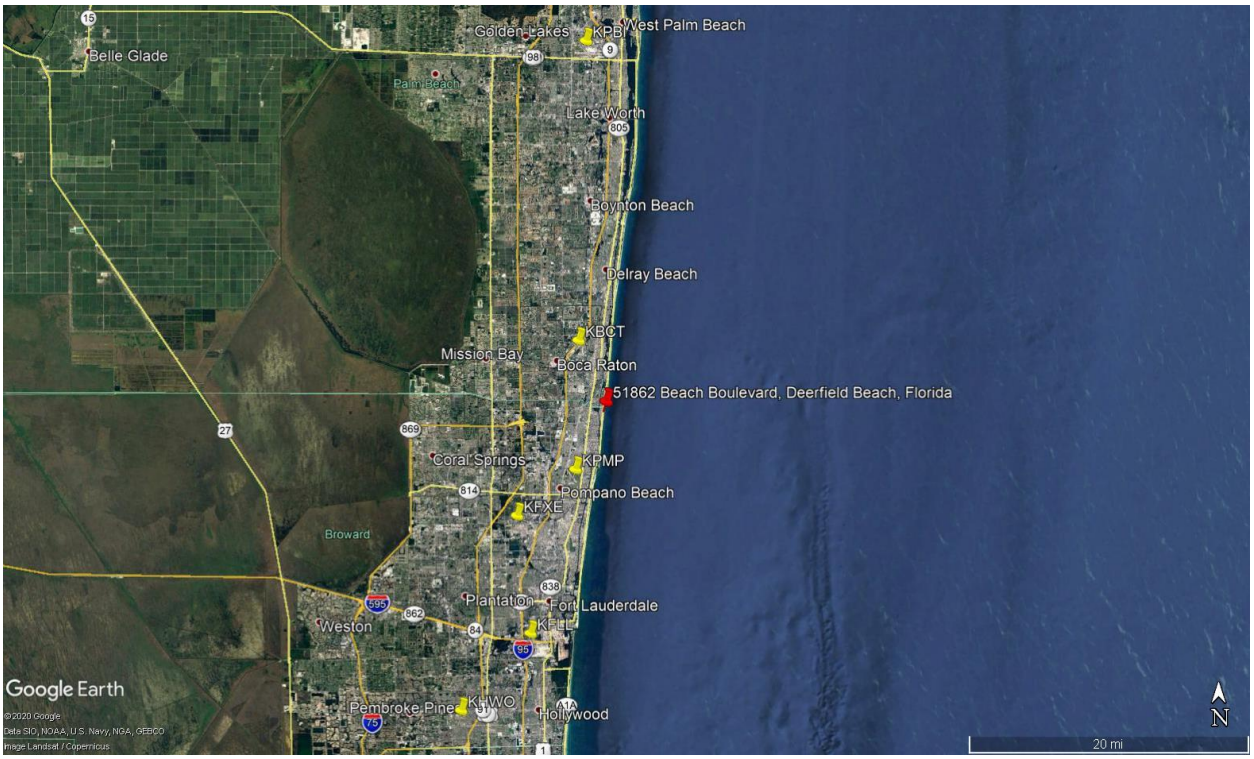
The National Ocean Service (**NOS**) provides data, tools, and services that support coastal economies and their contribution to the national economy. NOS maintains the nation's network of coastal tide and water level sensors to provide real-time data. Among many things, this data supports accurate weather forecasts, coastal storm and flood predictions, and tsunami warnings.

The Coastal-Marine Automated Network (**C-MAN**) is a meteorological observation network located along the coastal United States, and this network is maintained by the National Data Buoy Center (NDBC). The stations within this network record wind direction, wind speed, wind gusts, atmospheric pressure, and air temperature. Some C-MAN stations also measure sea surface temperatures, water levels, waves, precipitation, visibility, and relative humidity.

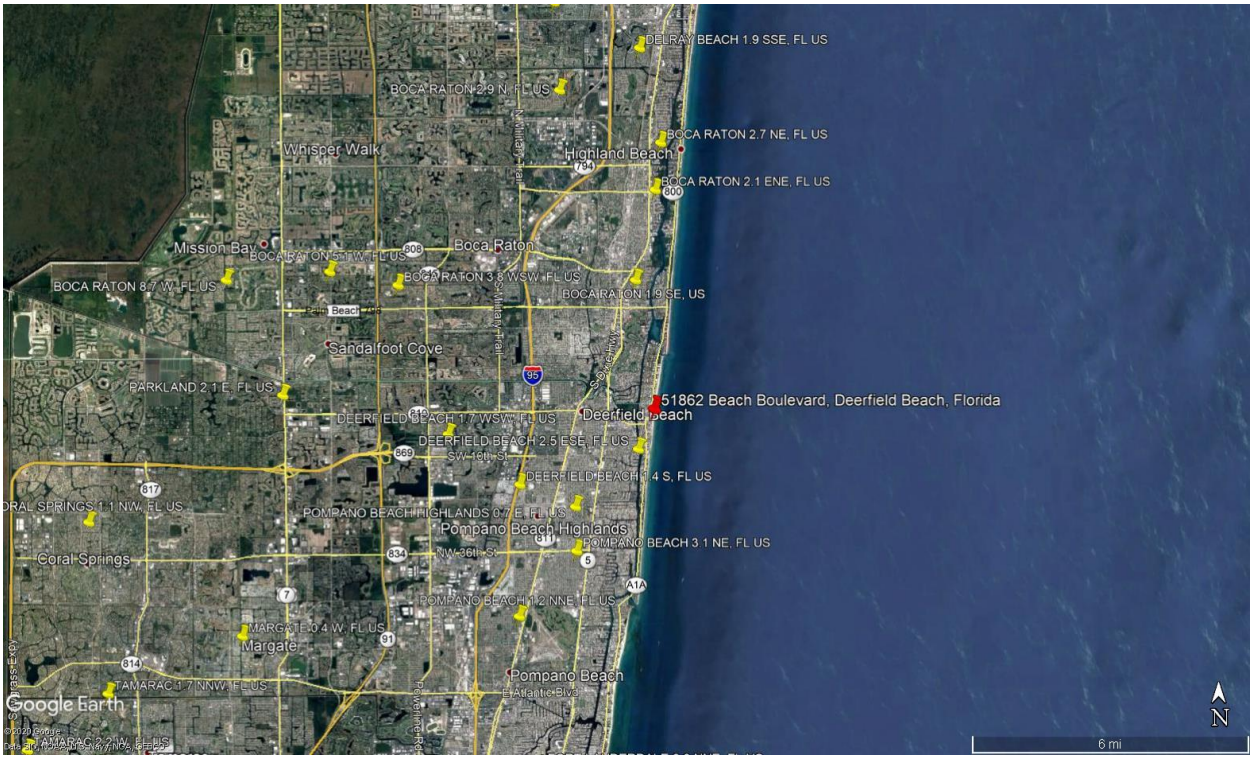
One of the most effective tools to detect precipitation is radar. Radar, which stands for RAdio Detection And Ranging, has been utilized to detect precipitation, and especially thunderstorms, since the 1940's. The radar used by the National Weather Service is called the WSR-88D, which stands for Weather Surveillance Radar - 1988 Doppler (the prototype radar was built in 1988). As its name suggests, the WSR-88D is a **Doppler radar**, meaning it can detect motions toward or away from the radar as well as the location of precipitation areas. There are around 155 WSR-88D Doppler radar in the nation, including the U.S. Territory of Guam and the Commonwealth of Puerto Rico, operated by the National Weather Service and the Department of Defense.

The National Weather Service offices around the country issue a multitude of weather alerts, advisories, warnings and bulletins every day and these are also utilized in our investigations.

The incident location was plotted by our office and is indicated by a red pushpin. The map will help give you an approximate location of the National Weather Service Hourly Surface Weather Observations stations and the National Ocean Service (NOS) station we used in this study and their proximity to the incident location.



The following map will help give you an approximate location of the Community Collaborative Rain, Hail and Snow Network (CoCoRaHS) stations we used in this study and their proximity to the incident location.



<u>In order to perform my analysis of the weather conditions that existed, I obtained and reviewed official copies of the following weather records (the distance from the incident location and each weather station is also provided)</u>:

a. National Weather Service Hourly Surface Weather Observations/ Local Climatological Data (LCD) from the Boca Raton Airport in Boca Raton, Florida (approximately xxx miles xxxxx of the incident location).

b. National Weather Service Hourly Surface Weather Observations/ Local Climatological Data (LCD) from the Pompano Beach Airpark in Pompano Beach, Florida (approximately xxx miles xxxxx of the incident location).

c. National Weather Service Hourly Surface Weather Observations/ Local Climatological Data (LCD) from the Fort Lauderdale Executive Airport in Fort Lauderdale, Florida (approximately xxx miles xxxxx of the incident location).

d. National Weather Service Hourly Surface Weather Observations/ Local Climatological Data (LCD) from the Palm Beach International Airport in West Palm Beach, Florida (approximately xxx miles xxxxx of the incident location).

e. Surface Weather Observations from the National Ocean Service (NOS) station LKWF1 – 8722670 – Lake Worth Pier, Florida (approximately xxx miles xxxxx of the incident location).

f. Community Collaborative Rain, Hail and Snow Network (CoCoRaHS) reports from Boca Raton 2.1 ENE, Florida (approximately xxx miles xxxxx of the incident location).

g. Community Collaborative Rain, Hail and Snow Network (CoCoRaHS) reports from Deerfield Beach 2.5 ESE, Florida (approximately xxx miles xxxxx of the incident location).

h. Community Collaborative Rain, Hail and Snow Network (CoCoRaHS) reports from Boca Raton 2.7 NE, Florida (approximately xxx miles xxxxx of the incident location).

i. Community Collaborative Rain, Hail and Snow Network (CoCoRaHS) reports from Pompano Beach Highlands 0.7 E, Florida (approximately xxx miles xxxxx of the incident location).

j. Community Collaborative Rain, Hail and Snow Network (CoCoRaHS) reports from Delray Beach 1.9 SSE, Florida (approximately xxx miles xxxxx of the incident location).

k. Community Collaborative Rain, Hail and Snow Network (CoCoRaHS) reports from Boca Raton 3.8 WSW, Florida (approximately xxx miles xxxxx of the incident location).

l. Online Community Collaborative Rain, Hail and Snow Network (CoCoRaHS) reports from Palm Beach County in Florida and Broward County in Florida.

m. The publication entitled, "Storm Data" for Florida in September 2017.

n. Super-resolution Reflectivity Doppler Radar images from the Miami, Florida radar site that were zoomed in over the incident location.

o. Super-resolution Velocity Doppler Radar images from the Miami, Florida radar site that were zoomed in over the incident location.

p. Differential Reflectivity Doppler Radar images from the Miami, Florida radar site that were zoomed in over the incident location.

q. Correlation Coefficient Doppler Radar images from the Miami, Florida radar site that were zoomed in over the incident location.

r. Gibson Ridge Analyst Edition (GRAE) data from the Miami, Florida radar site.

s. Various weather bulletins, advisories and statements that were issued by the National Weather Service in Miami, Florida.

t. Hurricane Irma "Best Track" map from the National Hurricane Center in Miami, Florida.

u. Various advisories and discussions that were issued by the National Hurricane Center in Miami, Florida.

v. Post Tropical Cyclone Report & Summary for Hurricane Irma issued by the National Weather Service (NWS) office in Miami, Florida.

w. National Hurricane Center Tropical Cyclone Report for Hurricane Irma.

x. Hurricane Irma Reconnaissance Mission Data from the National Oceanic and Atmospheric Administration and the United States Air Force.

y. "Forensic Hurricane Report" for Hurricane Irma downloaded from Www.WeatherConsultants.Com

z. Crowd-sourced Damage Reports from the National Weather Service.

aa. Iowa Environmental Mesonet (IEM) Archived Warnings issued by the NWS in Miami, Florida.

bb. United States Surface Analysis Images from the Weather Prediction Center (WPC).

cc. Storm Events Database from the National Centers for Environmental Information (NCEI) for Palm Beach County in Florida and Broward County in Florida.

The weather data and Climatological records used for this analysis are the official records that Meteorologists rely upon every day during the normal course of business and are either kept in our office or at the National Centers for Environmental Information (NCEI). The findings in this report utilize the weather records that were available at the time of data retrieval for this case. Any additional weather records, data or information that become available at a later date may be incorporated into my findings and this report in the future.

Super-resolution Doppler radar images and several other types of weather records were used in this study. Doppler radar images are useful for locating precipitation, wind speeds and mesoscale weather features such as microbursts and tornadoes. As the radar unit sends a pulse of energy into the atmosphere and if any precipitation is intercepted by the energy, part of the energy is scattered back to the radar. These return signals, called "radar echoes", are assembled to produce radar images. The location of the colored radar echoes indicates where precipitation is falling and the various colors indicate the intensity of the precipitation through the color code key on the right side of the radar image itself.

It should be noted that the radar image date and time stamps that are given on the Doppler radar images are given in "GMT", which is Greenwich Mean Time. In order to convert "GMT" to Eastern Daylight Time (EDT), a subtraction of 4 hours is necessary. Additionally, the hourly surface weather observations / Local Climatological Data are given in "Local Standard Time" which requires a one-hour forward time adjustment to obtain "Local Daylight Time." The only exception to this is that some of the remarks themselves are given in GMT. The findings in this report have incorporated and converted all of these times correctly.

It should also be noted that the surface weather observations from LKWF1, the Local Climatological Data (LCD) from the Pompano Beach Airpark, the Boca Raton Airport, and the Fort Lauderdale Executive Airport are incomplete at times for the period of September 9th-11th, 2017.

HURRICANE IRMA SYNOPSIS

Hurricane Irma was a classic Cape Verde hurricane that formed in the Eastern Atlantic Ocean during the peak of hurricane season. Irma emerged off of the African coast as a strong tropical wave during the evening of August 27th, 2017. As Irma moved to the west and northwest, the wave became better organized and was classified as a Tropical Storm on August 30th, 2017 just west of the Cape Verde Islands. Irma strengthened into a Hurricane as the storm moved westward. Between September 1st and 5th, 2017, very warm ocean water temperatures and low wind shear allowed Irma to grow and strengthen into a major hurricane. By September 5th, 2017, Irma had become a Category 5 Hurricane as it approached the northern U.S. and British Virgin Islands. The eye of Hurricane Irma passed directly over the islands of Barbuda and Saint Martin before heading toward Tortola, St. John, and St. Thomas. The center of Hurricane Irma, still intact as a Category 5 storm, passed just to the north of Puerto Rico, the Dominican Republic and Haiti. The hurricane then continued to move northwestward with the center of the hurricane passing just south of Providenciales and the other Turks and Caicos Islands. Hurricane Irma then encountered slightly less favorable environmental conditions which caused the hurricane to fluctuate between Category 4-5 strength as it tracked along the northern part of Cuba. Interaction with the northern part of Cuba caused Irma to weaken to Category 3 strength by 2:00 p.m. on September 9th, 2017. As Hurricane Irma moved over the very warm waters of the Florida Straits, the storm intensified and regained Category 4 strength. During the morning of September 10th, 2017, Hurricane Irma made landfall over the Cudjoe Key, Florida area as a Category 4 Hurricane with maximum sustained winds near 130 Miles Per Hour (MPH). The interaction with the Florida Keys caused Irma to weaken slightly to Category 3 strength, and Irma remained a Category 3 Hurricane over the eastern Gulf of Mexico before making a secondary landfall over Marco Island, Florida during the afternoon of September 10th, 2017.

After making a secondary landfall over Marco Island, Florida, Irma moved northward and passed just east of Fort Myers, Florida as a Category 2 Hurricane. Irma then continued to move northward before taking a slight turn to the North-Northwest bringing the center of Category 1 Hurricane Irma just to the east of Tampa, Florida. By 8:00 a.m. on September 11th, 2017, Irma had been downgraded to a Tropical Storm and was located just west of Gainesville, Florida. What was left of Irma continued to move North-Northwestward into Southwestern Georgia and Southeastern Alabama while weakening from a Tropical Storm into a Tropical Depression.

Tropical Depression Irma then moved over Alabama and Western Tennessee before dissipating into a remnant low pressure system.

NATIONAL HURRICANE CENTER DEFINITIONS

The following are several definitions that are provided by the National Hurricane Center's "Glossary of NHC Terms"[1]:

Potential Tropical Cyclone	"A term used in NWS advisory products to describe a disturbance that is not yet a tropical cyclone, but which poses the threat of bringing tropical storm or hurricane conditions to land areas within 48 hours."
Tropical Cyclone	"A warm-core non-frontal synoptic-scale cyclone, originating over tropical or subtropical waters, with organized deep convection and a closed surface wind circulation about a well-defined center. Once formed, a tropical cyclone is maintained by the extraction of heat energy from the ocean at high temperature and heat export at the lower temperatures of the upper troposphere. In this they differ from extratropical cyclones, which derive their energy from horizontal temperature contrasts in the atmosphere (baroclinic effects)."
Tropical Depression	"A tropical cyclone in which the maximum sustained surface wind speed (using the U.S. 1-minute average) is 33 kt (38 mph or 62 km/hr) or less."
Tropical Storm	"A tropical cyclone in which the maximum sustained surface wind speed (using the U.S. 1-minute average) ranges from 34 kt (39 mph or 63 km/hr) to 63 kt (73 mph or 118 km/hr)."
Hurricane/Typhoon	"A tropical cyclone in which the maximum sustained surface wind (using the U.S. 1-minute average) is 64 kt (74 mph or 119 km/hr) or more. The term hurricane is used for Northern Hemisphere tropical cyclones east of the International Dateline to the Greenwich Meridian. The term typhoon is used for Pacific tropical cyclones north of the Equator west of the International Dateline."

SAFFIR-SIMPSON HURRICANE WIND SCALE

According to the National Hurricane Center, "The Saffir-Simpson Hurricane Wind Scale is a 1 to 5 rating based on a hurricane's sustained wind speed. This scale estimates potential property damage. Hurricanes reaching Category 3 and higher are considered major hurricanes because of their potential for significant loss of life and damage. Category 1 and 2 storms are still dangerous, however, and require preventative measures. In the western North Pacific, the term 'super typhoon' is used for tropical cyclones with sustained winds exceeding 150 mph."[2] The

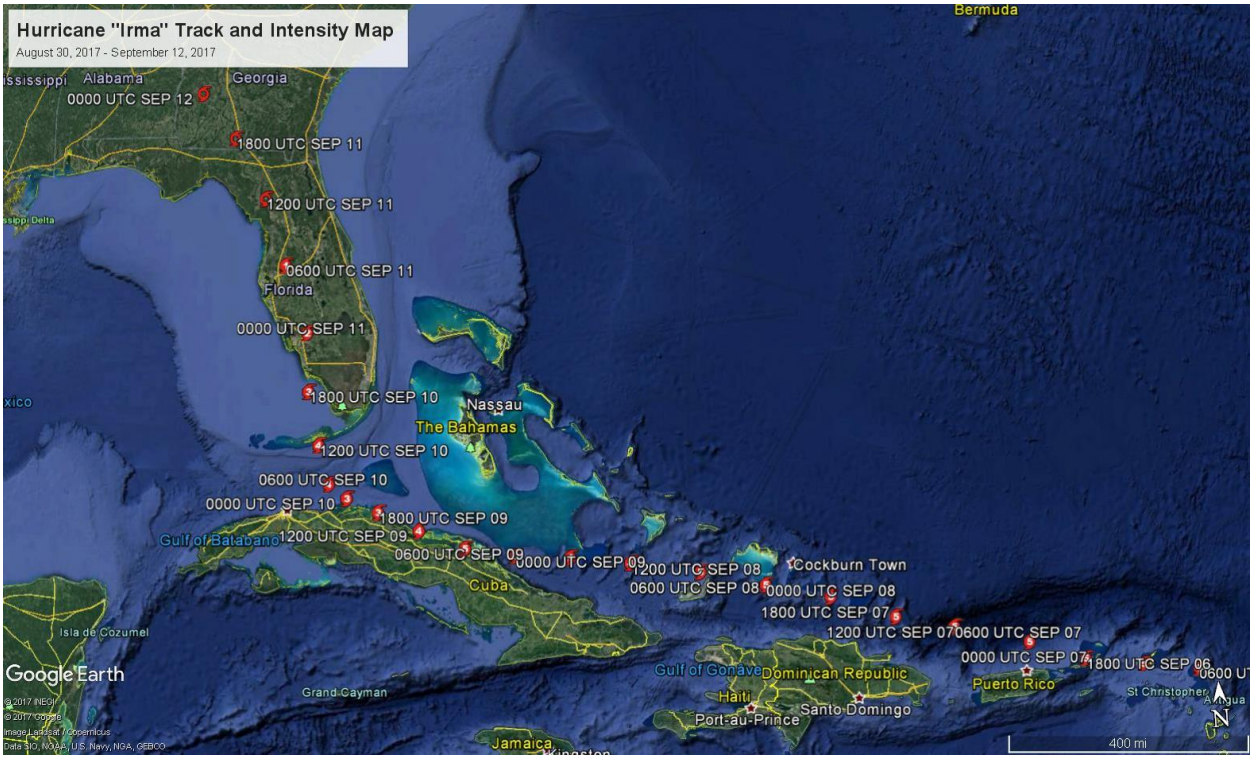
[1] https://www.nhc.noaa.gov/aboutgloss.shtml
[2] https://www.nhc.noaa.gov/aboutsshws.php

Saffir-Simpson Hurricane Wind Scale from the National Hurricane Center can be found below.

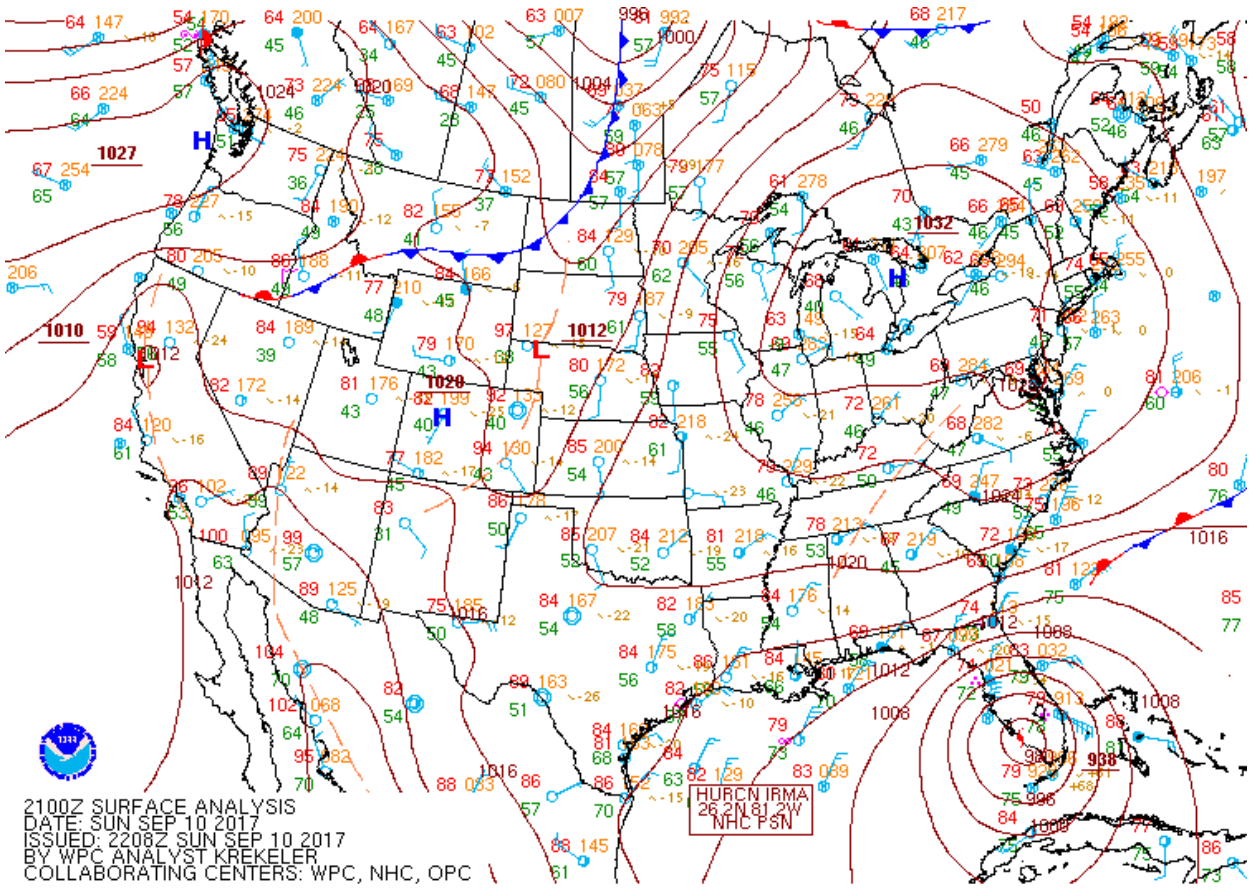
Category	Sustained Winds (MPH)	Types of Damage Due to Hurricane Winds
1	**74-95**	**Very dangerous winds will produce some damage:** Well-constructed frame homes could have damage to roof, shingles, vinyl siding and gutters. Large branches of trees will snap and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.
2	**96-110**	**Extremely dangerous winds will cause extensive damage:** Well-constructed frame homes could sustained major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
3	**111-129**	**Devastating damage will occur:** Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electivity and water will be unavailable for several days to weeks after the storm passes.
4	**130-156**	**Catastrophic damage will occur:** Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
5	**157 or Higher**	**Catastrophic damage will occur:** A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

HURRICANE IRMA TRACK AND INTENSITY MAP

The following map indicates the track and intensity map of Hurricane Irma according to data from the National Hurricane Center.



The following is a surface analysis map of the contiguous United States at 5:00 p.m. EDT on September 10th, 2017 that was prepared by the Weather Prediction Center (WPC), a division of the National Weather Service. This surface map indicated that Hurricane Irma was centered over southwestern Florida.



METEOROLOGICAL ANALYSIS

Doppler radar images that were zoomed in over the incident location and area weather observations indicated that occasional showers in advance of Hurricane Irma moved over the incident location from the early to mid-morning through approximately 4:43 p.m. on September 9th, 2017. More frequent showers and thunderstorms with moderate, heavy, and torrential downpours at times occurred from approximately 5:12 p.m. through 7:50 p.m. on September 9th, 2017.

As Irma moved closer to the area, the rain became steadier and gradually more intense. Nearly continuous light to occasionally moderate and frequently heavy rain with torrential downpours, squalls, and strong gusty winds occurred from approximately 8:37 p.m. on September 9th, 2017 to 7:12 p.m. on September 10th, 2017.

As Hurricane Irma moved northward through the Florida Peninsula, the steady rain transitioned to on and off showers after 7:12 p.m. which continued through Midnight.

The following Doppler radar images (**Figures 1-6**) were obtained from the Miami, Florida radar facility and depict super-resolution base reflectivity. The images below were plotted approximately once per hour and show the light, moderate, heavy, and torrential rains, and

squalls that fell with Hurricane Irma. These radar images are only a sampling of the radar images that were available as Hurricane Irma affected the area.

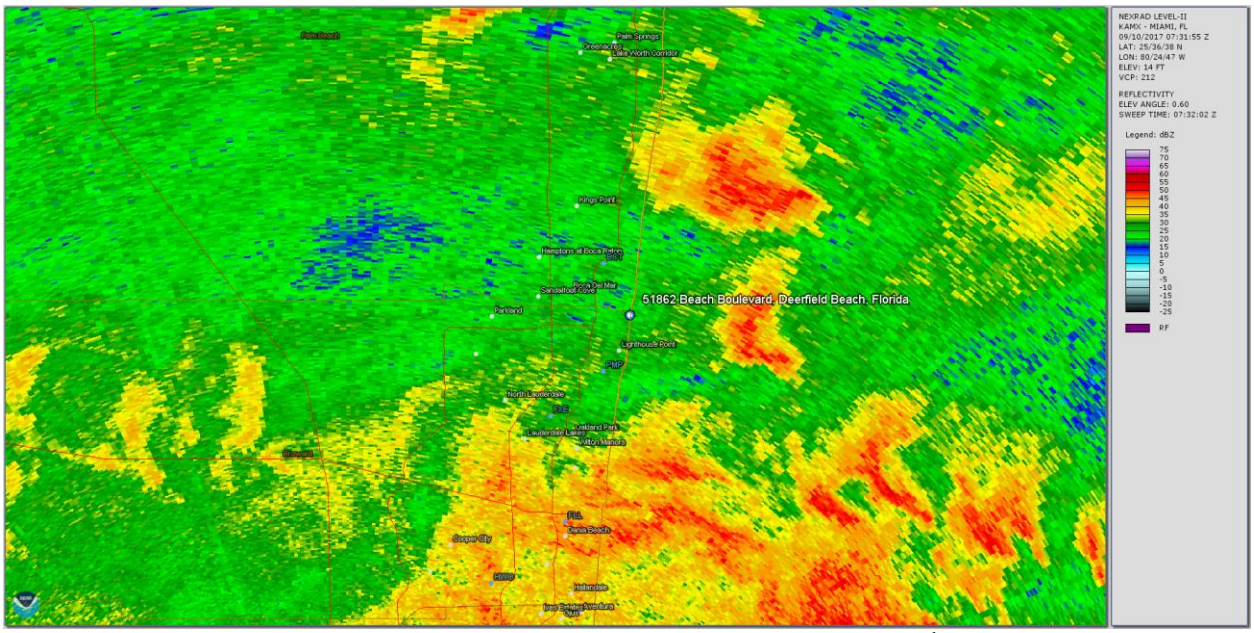


Figure 1: This Doppler radar image was processed at 3:31 a.m. EDT on September 10th, 2017 and depicts super-resolution base reflectivity.

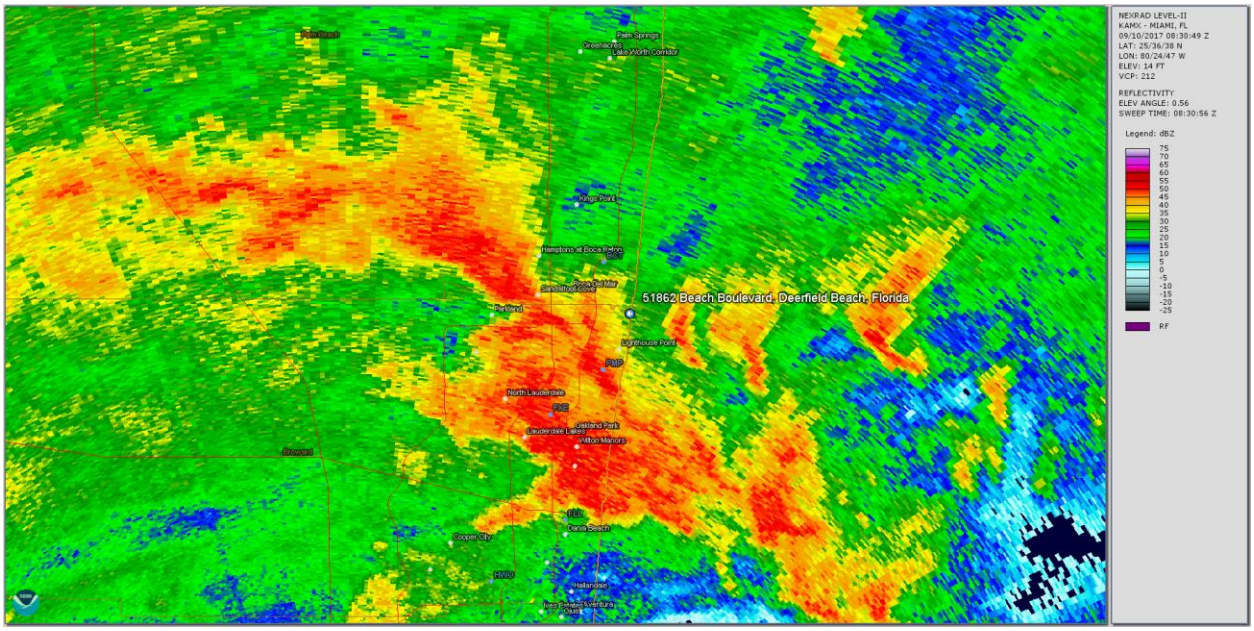


Figure 2: This Doppler radar image was processed at 4:30 a.m. EDT on September 10th, 2017 and depicts super-resolution base reflectivity.

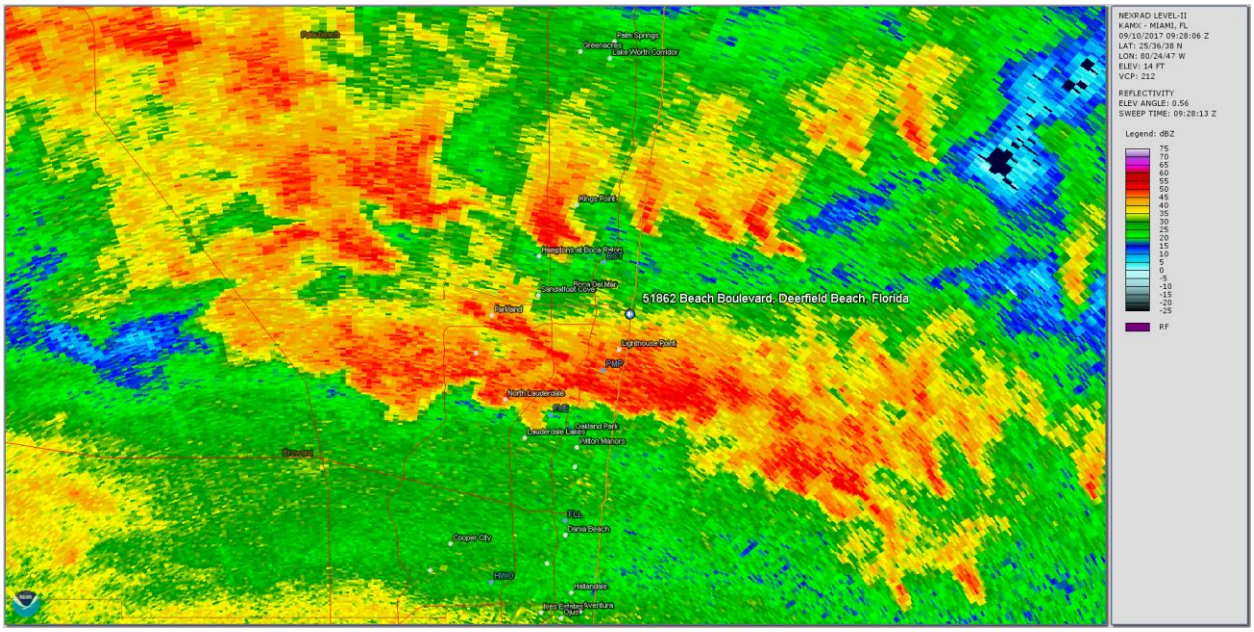


Figure 3: This Doppler radar image was processed at 5:28 a.m. EDT on September 10th, 2017 and depicts super-resolution base reflectivity.

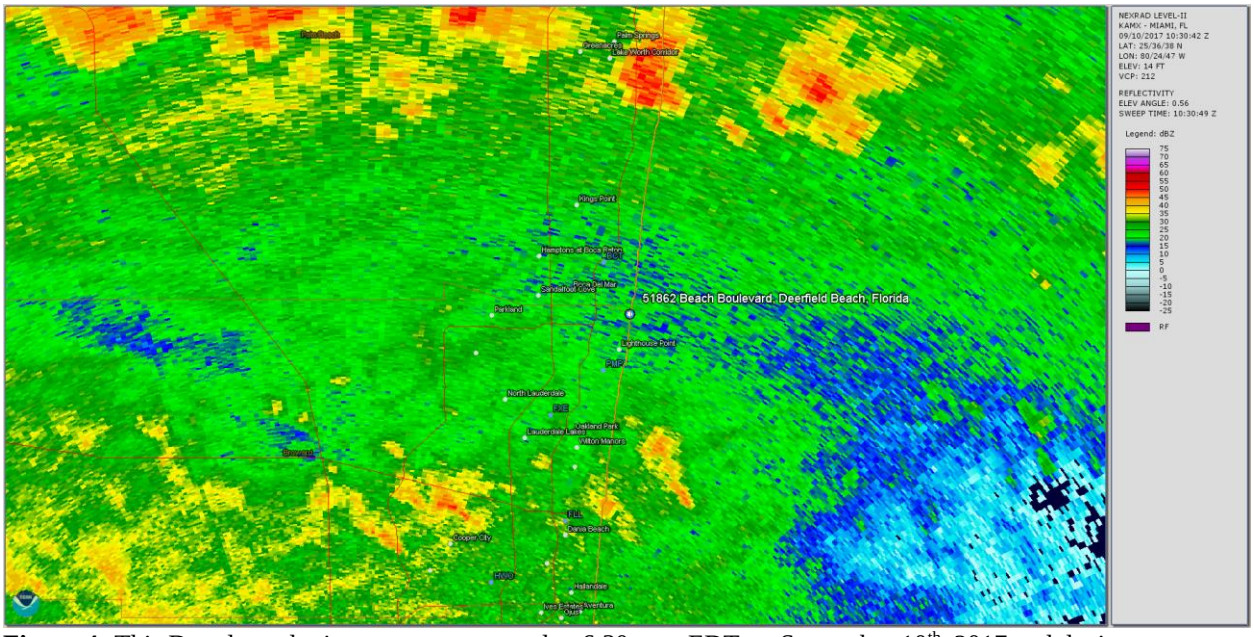


Figure 4: This Doppler radar image was processed at 6:30 a.m. EDT on September 10th, 2017 and depicts super-resolution base reflectivity.

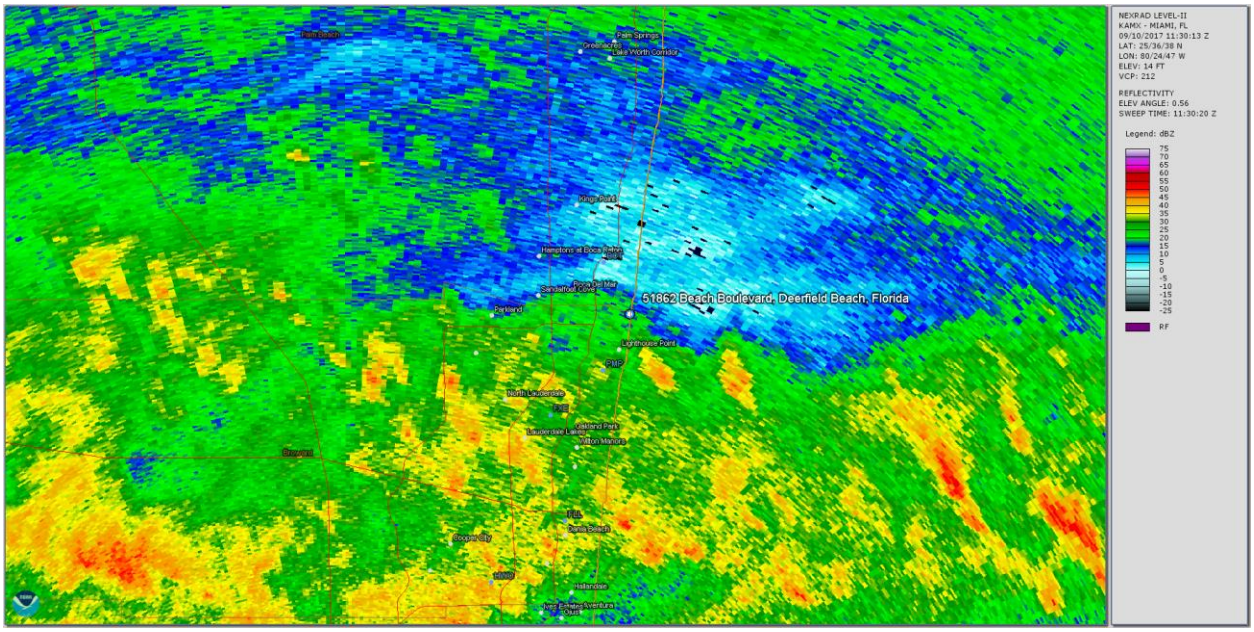


Figure 5: This Doppler radar image was processed at 7:30 a.m. EDT on September 10th, 2017 and depicts super-resolution base reflectivity.

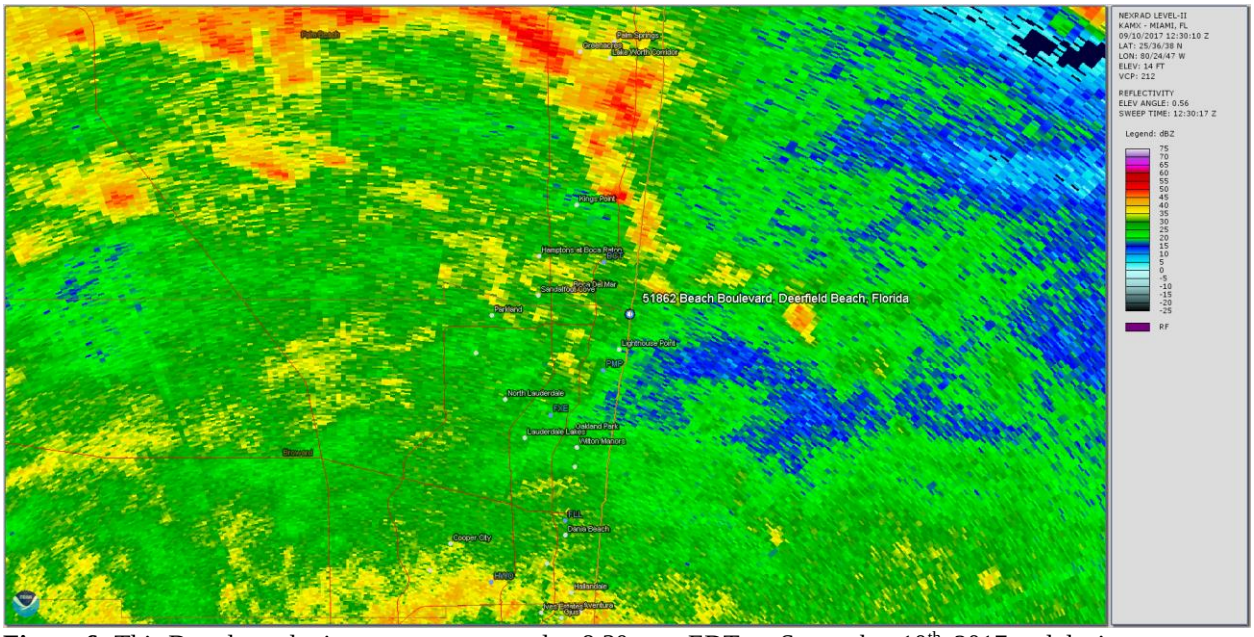


Figure 6: This Doppler radar image was processed at 8:30 a.m. EDT on September 10th, 2017 and depicts super-resolution base reflectivity.

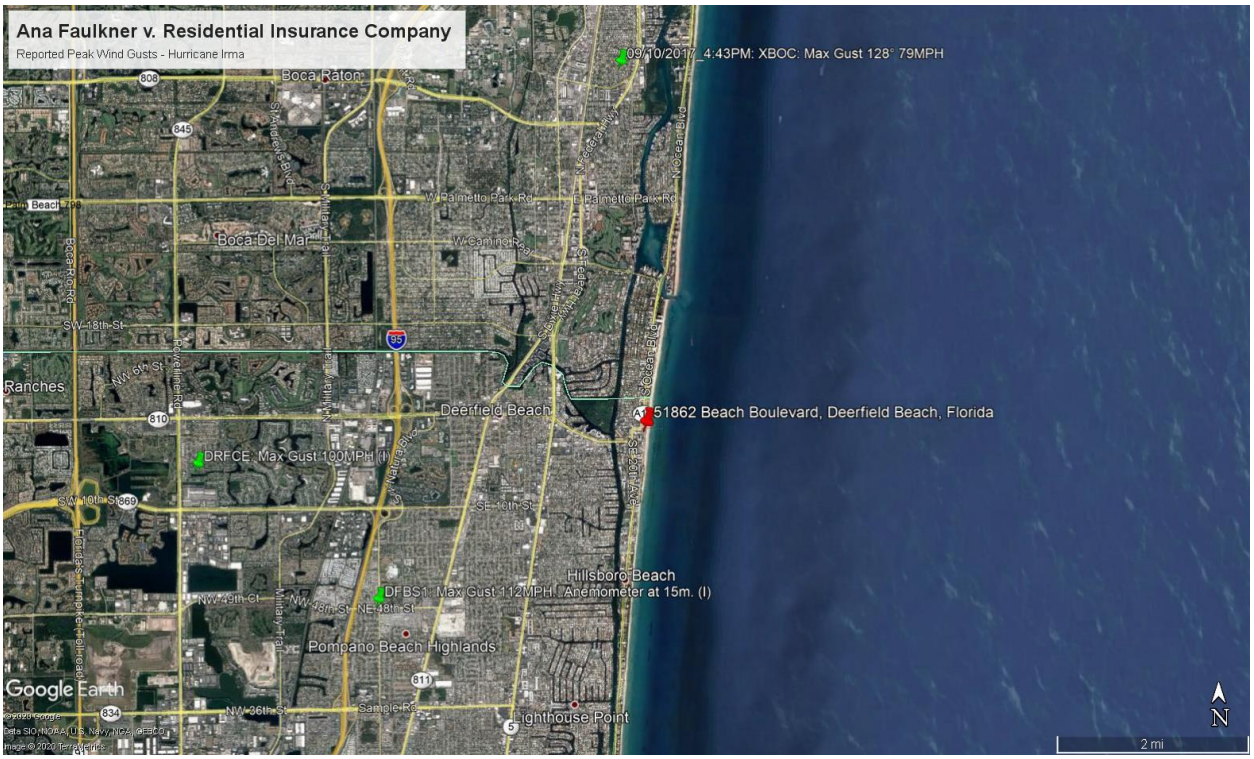
TROPICAL CYCLONE WIND REPORTS

The National Weather Service listed many wind reports that occurred on September 9th-11th, 2017 during Hurricane Irma. The wind speed reports that occurred in the general vicinity of the incident location are listed below, including the time and date that they occurred as well as the direction the winds came from. These reports were also plotted on a Google Earth map that can be found below the text wind reports. It should be noted that some of these wind reports were recorded before the weather station went offline and before the strongest winds of Hurricane Irma arrived. As a result, they do not necessarily reflect the true intensity of how strong the winds were.

- **XBOC (Approximately xxx miles xxxxx of the incident location):** Reported peak wind gust of 79 Miles Per Hour (MPH) from 128° (*southeast*) at 4:43 p.m. on September 10th, 2017.

- **DRFCE (Approximately xxx miles xxxxx of the incident location):** Reported peak wind gust of 100 Miles Per Hour (MPH). It should be noted that the peak wind observations from this station are incomplete.

- **DFBS1 (Approximately xxx miles xxxxx of the incident location):** Reported peak wind gust of 112 Miles Per Hour (MPH). It should be noted that the peak wind observations from this station are incomplete, and the anemometer is located at a height of 15 meters above the ground.



NATIONAL WEATHER SERVICE LOCAL STORM REPORTS (LSR's)

After determining if Local Storm Reports (LSR's) were received by the National Weather Service and the National Centers for Environmental Information on September 9th-11th, 2017, I quality-controlled and plotted these reports using the program Google Earth. The LSR map can be found below the text bulletins.

At 3:58 a.m. on September 10th, 2017, the National Weather Service in Miami, Florida issued the following "Preliminary Local Storm Report" which included Broward County, Florida:

```
PRELIMINARY LOCAL STORM REPORT
NATIONAL WEATHER SERVICE MIAMI FL
358 AM EDT SUN SEP 10 2017
..TIME...   ...EVENT...      ...CITY LOCATION...     ...LAT.LON...
..DATE...   ....MAG....      ..COUNTY LOCATION..ST.. ...SOURCE....
            ..REMARKS..
0343 AM     TROPICAL STORM   3 W DEERFIELD BEACH     26.31N  80.15W
09/10/2017                   BROWARD            FL   MESONET
            A TROPICAL STORM WIND GUST OF 61 MPH 53 KTS WAS
            RECORDED BY THE WEATHER BUG MESONET SITE DRFCE LOCATED
            AT CODE ENFORCEMENT AT 343 AM EDT
```

At 4:01 a.m. on September 10th, 2017, the National Weather Service in Miami, Florida issued the following "Preliminary Local Storm Report" which included Broward County, Florida:

```
PRELIMINARY LOCAL STORM REPORT
NATIONAL WEATHER SERVICE MIAMI FL
401 AM EDT SUN SEP 10 2017
..TIME...   ...EVENT...      ...CITY LOCATION...     ...LAT.LON...
..DATE...   ....MAG....      ..COUNTY LOCATION..ST.. ...SOURCE....
            ..REMARKS..
0355 AM     TROPICAL STORM   POMPANO BEACH           26.23N  80.13W
09/10/2017                   BROWARD            FL   MESONET
            A TROPICAL STORM WIND GUST OF 61 MPH 53 KTS WAS
            RECORDED BY THE WEATHERBUG MESONET SITE PMPBC LOCATED AT
            THE BSO POMPANO BEACH.
```

At 5:47 a.m. on September 10th, 2017, the National Weather Service in Miami, Florida issued the following "Preliminary Local Storm Report" which included Broward County, Florida:

```
PRELIMINARY LOCAL STORM REPORT
NATIONAL WEATHER SERVICE MIAMI FL
547 AM EDT SUN SEP 10 2017
..TIME...   ...EVENT...      ...CITY LOCATION...     ...LAT.LON...
..DATE...   ....MAG....      ..COUNTY LOCATION..ST.. ...SOURCE....
            ..REMARKS..
0541 AM     TROPICAL STORM   1 ESE POMPANO BEACH AIR 26.25N  80.11W
09/10/2017                   BROWARD            FL   ASOS
            A TROPICAL STORM WIND GUST OF 62 KTS 71 MPH WAS
            RECORDED BY THE ASOS LOCATED AT POMPANO BEACH AIRPORT
```

At 5:56 a.m. on September 10th, 2017, the National Weather Service in Miami, Florida issued the following "Preliminary Local Storm Report" which included Broward County, Florida:

```
PRELIMINARY LOCAL STORM REPORT
NATIONAL WEATHER SERVICE MIAMI FL
556 AM EDT SUN SEP 10 2017
..TIME...   ...EVENT...      ...CITY LOCATION...     ...LAT.LON...
..DATE...   ....MAG....      ..COUNTY LOCATION..ST.. ...SOURCE....
            ..REMARKS..
```

```
0549 AM     HURRICANE        3 W DEERFIELD BEACH     26.31N  80.15W
09/10/2017                   BROWARD            FL   MESONET
            A HURRICANE WIND GUST OF 75 MPH 65 KTS WAS RECORDED BY
            THE WEATHERBUG MESONET SITE DRFCE LOCATED AT CODE
            ENFORCEMENT
```

At 7:51 a.m. on September 10th, 2017, the National Weather Service in Miami, Florida issued the following "Preliminary Local Storm Report" which included Broward County, Florida:

```
PRELIMINARY LOCAL STORM REPORT
NATIONAL WEATHER SERVICE MIAMI FL
751 AM EDT SUN SEP 10 2017
..TIME...   ...EVENT...      ...CITY LOCATION...     ...LAT.LON...
..DATE...   ....MAG....      ..COUNTY LOCATION..ST.. ...SOURCE....
            ..REMARKS..
0557 AM     TROPICAL STORM   3 W DEERFIELD BEACH     26.31N  80.15W
09/10/2017                   BROWARD            FL   MESONET
            WIND GUST OF 77 MPH AT MESONET SITE DRFCE - CODE
            ENFORCEMENT IN DEERFIELD BEACH AT 557AM
```

At 8:57 a.m. on September 10th, 2017, the National Weather Service in Miami, Florida issued the following "Preliminary Local Storm Report" which included Broward County, Florida:

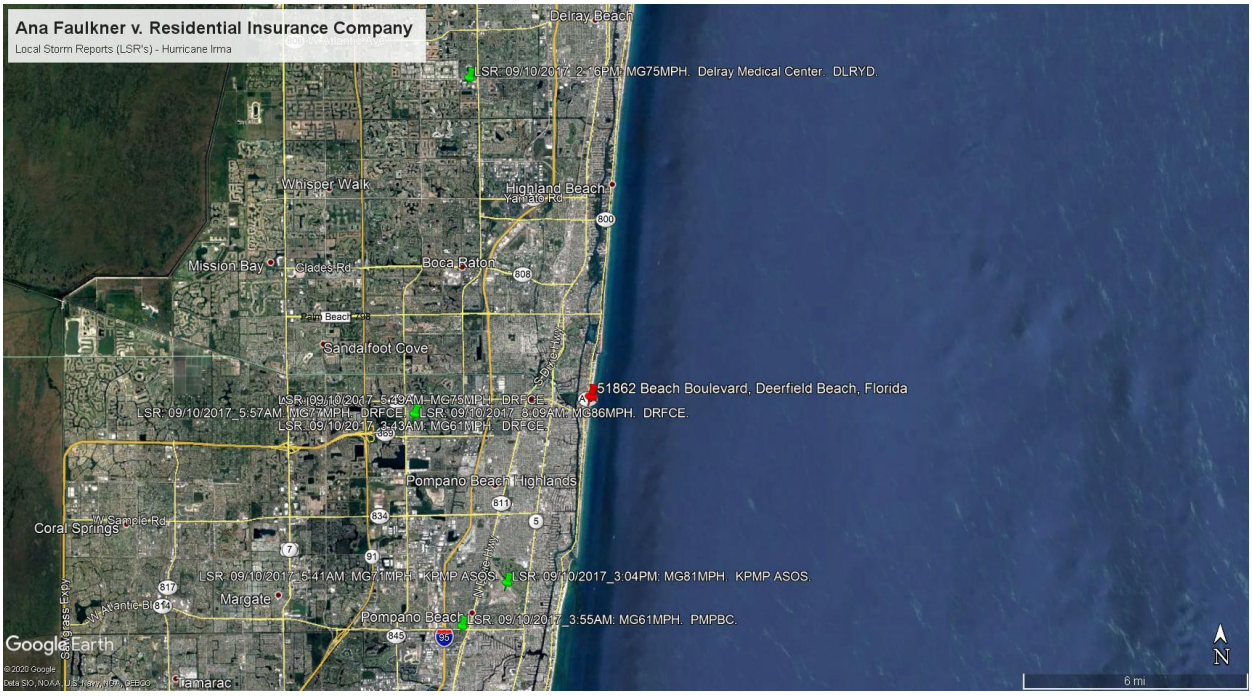
```
PRELIMINARY LOCAL STORM REPORT
NATIONAL WEATHER SERVICE MIAMI FL
857 AM EDT SUN SEP 10 2017
..TIME...   ...EVENT...      ...CITY LOCATION...     ...LAT.LON...
..DATE...   ....MAG....      ..COUNTY LOCATION..ST.. ...SOURCE....
            ..REMARKS..
0809 AM     TROPICAL STORM   3 W DEERFIELD BEACH     26.31N  80.15W
09/10/2017                   BROWARD            FL   MESONET
            A WIND GUST OF 86 MPH WAS RECORDED AT 809AM AT CODE
            ENFORCEMENT IN DEERFIELD BEACH... SITE DRFCE
```

At 2:56 p.m. on September 10th, 2017, the National Weather Service in Miami, Florida issued the following "Preliminary Local Storm Report" which included Palm Beach County, Florida:

```
PRELIMINARY LOCAL STORM REPORT
NATIONAL WEATHER SERVICE MIAMI FL
256 PM EDT SUN SEP 10 2017
..TIME...   ...EVENT...      ...CITY LOCATION...     ...LAT.LON...
..DATE...   ....MAG....      ..COUNTY LOCATION..ST.. ...SOURCE....
            ..REMARKS..
0216 PM     TROPICAL STORM   3 WSW DELRAY BEACH      26.44N  80.13W
09/10/2017                   PALM BEACH         FL   MESONET
            GUST OF 75MPH AT DELRAY MEDICAL CENTER IN DELRAY BEACH
            AT 216PM. MESONET SITE DLRYD
```

At 3:25 p.m. on September 10th, 2017, the National Weather Service in Miami, Florida issued the following "Preliminary Local Storm Report" which included Broward County, Florida:

```
PRELIMINARY LOCAL STORM REPORT
NATIONAL WEATHER SERVICE MIAMI FL
325 PM EDT SUN SEP 10 2017
..TIME...   ...EVENT...      ...CITY LOCATION...     ...LAT.LON...
..DATE...   ....MAG....      ..COUNTY LOCATION..ST.. ...SOURCE....
            ..REMARKS..
0304 PM     TROPICAL STORM   1 ESE POMPANO BEACH AIR 26.25N  80.11W
09/10/2017                   BROWARD            FL   ASOS
            WIND GUST OF 70 KNOTS...81MPH...AT ASOS KPMP - POMPANO
            BEACH AIRPARK AT 304PM
```



"STORM DATA" PUBLICATION

The publication "Storm Data" from September 2017 contained the following entries for Palm Beach County, Florida (including the incident location and surrounding areas) for Hurricane Irma:

Storm Data and Unusual Weather Phenomena

September 2017

Location	Date	Time Local/ Standard	Path Length (Miles)	Path Width (Yards)	Number of Persons Killed	Number of Persons Injured	Estimated Damage Property	Estimated Damage Crops	Character of Storm
FLORIDA, Southern									
FLZ068-168	**Coastal Palm Beach - Palm Beach**								
	09	1700EST							
	11	0200EST			0	0	300.0M		Tropical Storm
FLZ069-168-172-173	**Coastal Broward - Coastal Collier - Miami-Dade - Palm Beach**								
	10	0930EST							
		2300EST			0	0	0.00K		Storm Surge/Tide

Major Hurricane Irma made landfall in Southwest Florida on Marco Island as a Category 3 hurricane around 330 PM EDT on September 10th. The storm traveled north through southwest Florida through the evening. Effects from Irma were felt across South Florida from September 9th through September 11th. Irma had reached Category 5 strength and a minimum central pressure of 914 MB east of the Bahamas, maintaining Category 5 intensity until landfall along the north coast of Cuba on September 9th. Irma made its first Florida landfall in the Lower Florida Keys early on September 10th as a Category 4 hurricane.

The strength and size of Hurricane Irma allowed for impacts to be felt across all of South Florida. Irma brought widespread wind damage, heavy rainfall and storm surge to all areas. Hurricane-force sustained wind were measured in much of Collier County, as well as far southern and inland Miami-Dade County, with the possibility of additional hurricane-force sustained wind in more isolated areas over the remainder of South Florida where widespread tropical storm force sustained wind occurred. Gusts to hurricane force were felt over all of South Florida, with the maximum measured wind gust of 142 mph in Naples in Collier County. Widespread tree damage and some structural damage occurred across all of South Florida, with most structural damage on the minor side.

Irma brought a significant storm surge on both coasts of South Florida. Storm surge of 6 to 8 feet was observed in the Everglades City and Goodland areas of Collier County, with 3 to 5 feet from Marco Island to Naples. Along the east coast, observed storm surge values of 4 to 6 feet were noted along Biscayne Bay from south of Miami to Homestead, and 2 to 4 feet elsewhere along the east coast from Key Biscayne to Palm Beach.

Hurricane Irma brought widespread rainfall and some flooding across the region. From the period between 8 AM EDT September 9th and 8 AM EDT September 11th, 8 to 15 inches of rain were measured over interior portions of Southwest Florida, with estimated amounts of 16 to 20 inches in southwestern Hendry County. This rainfall near the end of a wet summer led to significant flooding over these areas. 5 to 10 inches of rain were noted elsewhere across South Florida, with areas of minor to moderate flooding.

32 deaths were attributed to Irma in southern Florida, all but one indirect. The only direct death was an 86-year-old man who was knocked down by a gust of wind while opening the front door of his home in Broward County. Most of the deaths occurred during cleanup after the storm, as well as several as a result of carbon monoxide poisoning from misuse of generators. Initial and incomplete damage estimate across the area is estimated to be around $800 million, but in all likelihood will be much higher once damage assessments are completed. $222.5 million in damage came in from Collier County, and about $300 million from Palm Beach County. About $255 million came from the agricultural community in Miami-Dade County.

Total number of people who were at county evacuation shelters were as follows: Miami-Dade County - 31,092, Palm Beach County - 17,263, Collier County - 17,040, Broward County - 17,000, Hendry County - 3,000

Total number of customers without power were as follows: Miami-Dade County - 888,530, Broward County - 689,000, Palm Beach County- 566,240, Collier County - 197,630, Hendry County - 9,700, Glades County - 1,670.

STORM EVENTS DATABASE

The following entries are from the Storm Events Database for Coastal Palm Beach County, Florida (including the incident location and surrounding areas) from the National Centers for Environmental Information for Hurricane Irma.

Storm Events Database

Event Details:

Event	Tropical Storm
State	FLORIDA
County/Area	COASTAL PALM BEACH COUNTY
WFO	MFL
Report Source	NWS Storm Survey
NCEI Data Source	CSV
Begin Date	2017-09-09 17:00 EST-5
End Date	2017-09-11 02:00 EST-5
Deaths Direct/Indirect	0/0 (fatality details below, when available...)
Injuries Direct/Indirect	0/0
Property Damage	
Crop Damage	
Episode Narrative	Major Hurricane Irma made landfall in Southwest Florida on Marco Island as a Category 3 hurricane around 330 PM EDT on September 10th. The storm traveled north through southwest Florida through the evening. Effects from Irma were felt across South Florida from September 9th through September 11th. Irma had reached Category 5 strength and a minimum central pressure of 914 MB east of the Bahamas, maintaining Category 5 intensity until landfall along the north coast of Cuba on September 9th. Irma made its first Florida landfall in the Lower Florida Keys early on September 10th as a Category 4 hurricane. The strength and size of Hurricane Irma allowed for impacts to be felt across all of South Florida. Irma brought widespread wind damage, heavy rainfall and storm surge to all areas. Hurricane-force sustained wind were measured in much of Collier County, as well as far southern and inland Miami-Dade County, with the possibility of additional hurricane-force sustained wind in more isolated areas over the remainder of South Florida where widespread tropical storm force sustained wind occurred. Gusts to hurricane force were felt over all of South Florida, with the maximum measured wind gust of 142 mph in Naples in Collier County. Widespread tree damage and some structural damage occurred across all of South Florida, with most structural damage on the minor side. Irma brought a significant storm surge on both coasts of South Florida. Storm surge of 6 to 8 feet was observed in the Everglades City and Goodland areas of Collier County, with 3 to 5 feet from Marco Island to Naples. Along the east coast, observed storm surge values of 4 to 6 feet were noted along Biscayne Bay from south of Miami to Homestead, and 2 to 4 feet elsewhere along the east coast from Key Biscayne to Palm Beach. Hurricane Irma brought widespread rainfall and some flooding across the region. From the period between 8 AM EDT September 9th and 8 AM EDT September 11th, 8 to 15 inches of rain were measured over interior portions of Southwest Florida, with estimated amounts of 16 to 20 inches in southwestern Hendry County. This rainfall near the end of a wet summer led to significant flooding over these areas. 5 to 10 inches of rain were noted elsewhere across South Florida, with areas of minor to moderate flooding. 32 deaths were attributed to Irma in southern Florida, all but one indirect. The only direct death was an 86-year-old man who was knocked down by a gust of wind while opening the front door of his home in Broward County. Most of the deaths occurred during

	cleanup after the storm, as well as several as a result of carbon monoxide poisoning from misuse of generators. Initial and incomplete damage estimate across the area is estimated to be around $800 million, but in all likelihood will be much higher once damage assessments are completed. $222.5 million in damage came in from Collier County, and about $300 million from Palm Beach County. About $255 million came from the agricultural community in Miami-Dade County. Total number of people who were at county evacuation shelters were as follows: Miami-Dade County - 31,092, Palm Beach County - 17,263, Collier County - 17,040, Broward County - 17,000, Hendry County - 3,000 Total number of customers without power were as follows: Miami-Dade County - 888,530, Broward County - 689,000, Palm Beach County- 566,240, Collier County - 197,630, Hendry County - 9,700, Glades County - 1,670.
Event Narrative	Hurricane Irma produced maximum sustained winds generally between 50 and 70 mph with stronger gusts across metro Palm Beach County. Highest measured wind gust in the county was 91 mph at Palm Beach International Airport at 455 PM EDT and at Lake Worth Pier at 500 PM EDT. Widespread tree and fence damage occurred county-wide, with only minor structural damage. 566,240 customers lost power, about 75% of total customers. Around 17,300 people evacuated to county shelters. Information on damage estimates and death toll is contained in the event summary for Metro Palm Beach County.

Storm Events Database

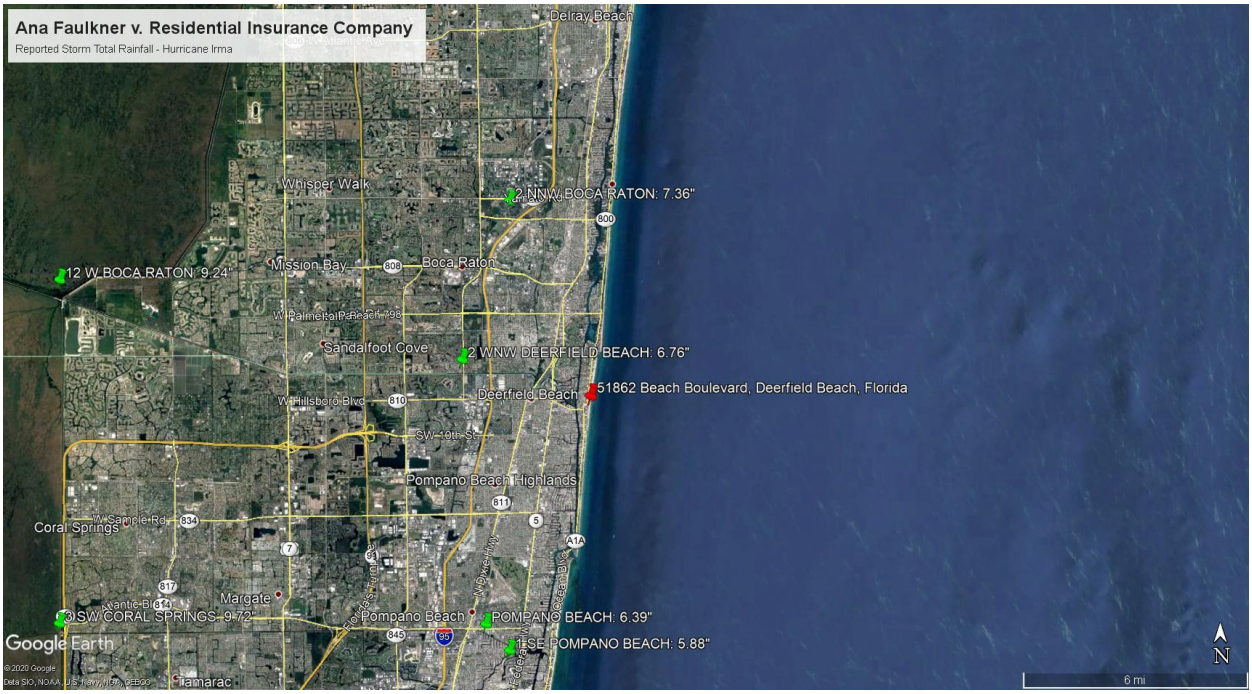
Event Details:

Event	Storm Surge/Tide
State	FLORIDA
County/Area	COASTAL PALM BEACH COUNTY
WFO	MFL
Report Source	NWS Storm Survey
NCEI Data Source	CSV
Begin Date	2017-09-10 09:30 EST-5
End Date	2017-09-10 16:00 EST-5
Deaths Direct/Indirect	0/0 (fatality details below, when available...)
Injuries Direct/Indirect	0/0
Property Damage	
Crop Damage	0.00K
Episode Narrative	Major Hurricane Irma made landfall in Southwest Florida on Marco Island as a Category 3 hurricane around 330 PM EDT on September 10th. The storm traveled north through southwest Florida through the evening. Effects from Irma were felt across South Florida from September 9th through September 11th. Irma had reached Category 5 strength and a minimum central pressure of 914 MB east of the Bahamas, maintaining Category 5 intensity until landfall along the north coast of Cuba on September 9th. Irma made its first Florida landfall in the Lower Florida Keys early on September 10th as a Category 4 hurricane. The strength and size of Hurricane Irma allowed for impacts to be felt across all of South Florida. Irma brought widespread wind damage, heavy rainfall and storm surge to all areas. Hurricane-force sustained wind were measured in much of Collier County, as well as far southern and inland Miami-Dade County, with the possibility of additional hurricane-force sustained wind in more isolated areas over the remainder of South Florida where widespread tropical storm force sustained wind occurred. Gusts to hurricane force were felt over all of South Florida, with the maximum measured wind gust of 142 mph in Naples in Collier County. Widespread tree damage and some structural damage occurred across all of South Florida, with most structural damage on the minor side. Irma brought a significant storm surge on both coasts of South Florida. Storm surge of 6 to 8 feet was observed in the Everglades City and Goodland areas of Collier County, with 3 to 5 feet from Marco Island to Naples. Along the east coast, observed storm surge values of 4 to 6 feet were noted along Biscayne Bay from south of Miami to Homestead, and 2 to 4 feet elsewhere along the east coast from Key Biscayne to Palm Beach. Hurricane Irma brought widespread rainfall and some flooding across the region. From the period between 8 AM EDT September 9th and 8 AM EDT September 11th, 8 to 15 inches of rain were measured over interior portions of Southwest Florida, with estimated amounts of 16 to 20 inches in southwestern Hendry County. This rainfall near the end of a wet summer led to significant flooding over these areas. 5 to 10 inches of rain were noted elsewhere across South Florida, with areas of minor to moderate flooding. 32 deaths were attributed to Irma in southern Florida, all but one indirect. The only direct death was an 86-year-old man who was knocked down by a gust of wind while opening the front door of his home in Broward County. Most of the deaths occurred during

	cleanup after the storm, as well as several as a result of carbon monoxide poisoning from misuse of generators. Initial and incomplete damage estimate across the area is estimated to be around $800 million, but in all likelihood will be much higher once damage assessments are completed. $222.5 million in damage came in from Collier County, and about $300 million from Palm Beach County. About $255 million came from the agricultural community in Miami-Dade County. Total number of people who were at county evacuation shelters were as follows: Miami-Dade County - 31,092, Palm Beach County - 17,263, Collier County - 17,040, Broward County - 17,000, Hendry County - 3,000 Total number of customers without power were as follows: Miami-Dade County - 888,530, Broward County - 689,000, Palm Beach County- 566,240, Collier County - 197,630, Hendry County - 9,700, Glades County - 1,670.
Event Narrative	Maximum storm tide in Palm Beach County was in the 2-3 ft range, with a measured maximum storm tide of 1.97 feet above Mean Higher High Water (MHHW) at Lake Worth Pier. Little significant inundation was noted.

STORM TOTAL RAINFALL REPORTS

The following storm total rainfall reports were received by the National Weather Service and the National Centers for Environmental Information during Hurricane Irma. I quality-controlled and plotted these reports using the program Google Earth. I also obtained estimated rainfall amounts for the incident location from multi-radar multi-sensor data. Following my analysis and extrapolation of this information, I determined that between 6.00-7.00 inches of rain accumulated at the incident location as a result of Hurricane Irma.



NATIONAL WEATHER SERVICE BULLETINS, WARNINGS AND ADVISORIES

The following are publicly issued warnings and severe weather statements from the National Weather Service in Miami, Florida which included the incident location and surrounding areas.

At 3:46 a.m. on September 10th, 2017, the National Weather Service in Miami, Florida issued a "Tornado Warning" for Northeastern Broward County, Florida that was in effect through 4:15 a.m. on September 10th, 2017:

```
BULLETIN - EAS ACTIVATION REQUESTED
Tornado Warning
National Weather Service Miami FL
346 AM EDT SUN SEP 10 2017
The National Weather Service in Miami has issued a
* Tornado Warning for...
  Northeastern Broward County in southeastern Florida...
  Southeastern Palm Beach County in southeastern Florida...
* Until 415 AM EDT
* At 346 AM EDT, severe thunderstorms capable of producing tornadoes
  were located along a line extending from Ocean Ridge to Port
  Everglades, moving northwest at 30 mph.
  HAZARD...Tornado.
  SOURCE...Radar indicated rotation.
  IMPACT...Flying debris will be dangerous to those caught without
           shelter. Mobile homes will be damaged or destroyed.
           Damage to roofs, windows, and vehicles will occur.  Tree
           damage is likely.
* These dangerous storms will be near...
  Boynton Beach, Delray Beach, Ocean Ridge, Village Of Golf and
  Dunes Road around 350 AM EDT.
  Palm Beach and Lantana around 355 AM EDT.
  Lake Worth, Greenacres and Atlantis around 400 AM EDT.
  Pompano Beach, Sunrise, Palm Springs and Hillsboro Beach around
  405 AM EDT.
  Tamarac, Wellington, Margate, Lighthouse Point and North
  Lauderdale around 410 AM EDT.
  Coral Springs, Deerfield Beach, Coconut Creek, Parkland, Godfrey
  Road, Boca Pointe, Boca Del Mar, Mission Bay, Hamptons At Boca
  Raton and Whisper Walk around 415 AM EDT.
Other locations impacted by these tornadic storms include Fau South
Campus, Fort Lauderdale Beach, Aberdeen, Boca West, Hillsboro Pines,
North Andrews Gardens, Aberdeen Golf Course, Terra Mar, Boulevard
Gardens and Seminole Manor.
PRECAUTIONARY/PREPAREDNESS ACTIONS...
TAKE COVER NOW! Move to an interior room on the lowest floor of a
sturdy building. Avoid windows. If you are outdoors, in a mobile
home, or in a vehicle, move to the closest substantial shelter and
protect yourself from flying debris.
&&
LAT...LON 2660 8003 2651 8003 2605 8009 2611 8027
      2666 8018
TIME...MOT...LOC 0746Z 153DEG 26KT 2654 8003 2611 8009
TORNADO...RADAR INDICATED
HAIL...0.00IN
```

At 4:13 a.m. on September 10th, 2017, the National Weather Service in Miami, Florida issued a "Severe Weather Statement" for the expiration of the "Tornado Warning" for Northeastern Broward County, Florida that was in effect through 4:15 a.m. on September 10th, 2017:

```
Severe Weather Statement
National Weather Service Miami FL
413 AM EDT SUN SEP 10 2017
FLC011-099-100822-
/O.EXP.KMFL.TO.W.0032.000000T0000Z-170910T0815Z/
Broward FL-Palm Beach FL-
413 AM EDT SUN SEP 10 2017
...THE TORNADO WARNING FOR NORTHEASTERN BROWARD AND SOUTHEASTERN PALM
BEACH COUNTIES WILL EXPIRE AT 415 AM EDT...
The storms which prompted the warning have weakened below severe
limits, and no longer appear capable of producing a tornado.
Therefore the warning will be allowed to expire.
```

A tornado watch remains in effect until noon EDT for southeastern
Florida.

At 2:24 p.m. on September 10th, 2017, the National Weather Service in Miami, Florida issued a "Tornado Warning" for Northeastern Broward County, Florida that was in effect through 2:45 p.m. on September 10th, 2017:

BULLETIN - EAS ACTIVATION REQUESTED
Tornado Warning
National Weather Service Miami FL
224 PM EDT SUN SEP 10 2017
The National Weather Service in Miami has issued a
*** Tornado Warning for...**
Northeastern Broward County in southeastern Florida...
Southeastern Palm Beach County in southeastern Florida...
*** Until 245 PM EDT**
*** At 224 PM EDT, a severe thunderstorm capable of producing a tornado was located 7 miles east of Pompano Beach, moving northwest at 90 mph.**
HAZARD...Tornado.
SOURCE...Radar indicated rotation.
IMPACT...Flying debris will be dangerous to those caught without shelter. Mobile homes will be damaged or destroyed. Damage to roofs, windows, and vehicles will occur. Tree damage is likely.
*** This dangerous storm will be near...**
Deerfield Beach and Boca Del Mar **around 230 PM EDT.**
Boca Raton, Delray Beach, Highland Beach, Kings Point, Whisper Walk, Hamptons At Boca Raton, Boca Pointe and Mission Bay around 235 PM EDT.
Boynton Beach, Ocean Ridge, Lantana, Atlantis, Village Of Golf and Dunes Road around 240 PM EDT.
Greenacres around 245 PM EDT.
Other locations impacted by this tornadic thunderstorm include Fau South Campus, Hypoluxo, Hillsboro Ranches, Aberdeen, Boca West, Hillsboro Pines, Lake Worth Corridor, Aberdeen Golf Course, South County Regional Park and Gulf Stream.
PRECAUTIONARY/PREPAREDNESS ACTIONS...
TAKE COVER NOW! Move to an interior room on the lowest floor of a sturdy building. Avoid windows. If you are outdoors, in a mobile home, or in a vehicle, move to the closest substantial shelter and protect yourself from flying debris.
Heavy rainfall may hide this tornado. Do not wait to see or hear the tornado. TAKE COVER NOW!
To report severe weather contact your nearest law enforcement agency. They will send your report to the National Weather Service office in Miami.
&&
LAT...LON 2654 8003 2618 8003 2642 8033 2670 8012
TIME...MOT...LOC 1824Z 148DEG 77KT 2624 7997
TORNADO...RADAR INDICATED
HAIL...0.00IN

At 2:31 p.m. on September 10th, 2017, the National Weather Service in Miami, Florida issued a "Severe Weather Statement" for the "Tornado Warning" for Northeastern Broward County, Florida that was in effect through 2:45 p.m. on September 10th, 2017:

Severe Weather Statement
National Weather Service Miami FL
231 PM EDT SUN SEP 10 2017
FLC011-099-101845-
/O.CON.KMFL.TO.W.0038.000000T0000Z-170910T1845Z/
Broward FL-Palm Beach FL-
231 PM EDT SUN SEP 10 2017
...A TORNADO WARNING REMAINS IN EFFECT UNTIL 245 PM EDT FOR NORTHEASTERN BROWARD AND SOUTHEASTERN PALM BEACH **COUNTIES...**

```
At 231 PM EDT, a severe thunderstorm capable of producing a tornado
was located over Boca Raton, moving northwest at 85 mph.
HAZARD...Tornado.
SOURCE...Radar indicated rotation.
IMPACT...Flying debris will be dangerous to those caught without
         shelter. Mobile homes will be damaged or destroyed. Damage
         to roofs, windows, and vehicles will occur.  Tree damage is
         likely.
This dangerous storm will be near...
  Delray Beach, Whisper Walk, Hamptons At Boca Raton and Mission Bay
  around 235 PM EDT.
  Boynton Beach, Village Of Golf, Kings Point and Dunes Road around
  240 PM EDT.
  Greenacres and Atlantis around 245 PM EDT.
Other locations impacted by this tornadic thunderstorm include Fau
South Campus, Hypoluxo, Hillsboro Ranches, Aberdeen, Boca West,
Hillsboro Pines, Lake Worth Corridor, Aberdeen Golf Course, South
County Regional Park and Gulf Stream.
PRECAUTIONARY/PREPAREDNESS ACTIONS...
TAKE COVER NOW! Move to a basement or an interior room on the lowest
floor of a sturdy building. Avoid windows. If you are outdoors, in a
mobile home, or in a vehicle, move to the closest substantial shelter
and protect yourself from flying debris.
Heavy rainfall may hide this tornado. Do not wait to see or hear the
tornado. TAKE COVER NOW!
If a tornado or other severe weather is spotted, report it to the
National Weather Service or your local nearest law enforcement agency
who will send your report. This act may save lives of others in the
path of dangerous weather.
&&
LAT...LON 2654 8003 2618 8003 2642 8033 2670 8012
TIME...MOT...LOC 1831Z 145DEG 72KT 2635 8006
TORNADO...RADAR INDICATED
HAIL...0.00IN
```

HOURLY TABLE OF WIND DIRECTIONS, SUSTAINED WINDS AND PEAK WINDS:

In order to help determine what the weather conditions were at the incident location, I obtained and downloaded an "Automated Hurricane Report" from Www.WeatherConsultants.Com, a product of Forensic Weather Consultants. The automated report is based on the assimilation and initialization of high-resolution NOAA computer model data using creations of initial conditions each hour. These model initializations are based on recorded data each hour and are not forward-looking forecasts. These methodologies are utilized by NOAA entities, the National Weather Service, and the National Hurricane Center.

Following my review of the automated hurricane report data and analysis of the other official weather records, Doppler radar reflectivity and velocity images, surface observations, local storm data wind reports and tropical cyclone reports, I was able to conduct an analysis to determine with a reasonable degree of certainty what the wind conditions were at this incident location. My findings are based on my analysis and extrapolation of the weather data and observations using sound, scientific principles and accepted methodologies that are customarily relied upon by meteorologists in these kinds of investigations. Extrapolation from Pompano Beach Airpark, the Lake Worth Pier, and the other local storm reports and wind gust reports were very useful in determining the wind at the incident location since similar wind conditions occurred at each location as Irma moved up the coast over time.

The table below contains the following information for the incident location on September 9th-11th, 2017:

1) The direction that the maximum sustained winds were coming from (in Degrees from True North)
2) The maximum sustained winds for the preceding hour ending at the given time (in Miles Per Hour)
3) The peak winds (including gusts) for the preceding hour ending at the given time (in Miles Per Hour)

Please note that the time is given in Eastern Daylight Time (EDT).

Date	Time (EDT)	Wind Direction (Degrees from True North)	Sustained Winds (MPH)	Peak Winds (MPH)
9/9/2017	12:00 AM	040	26	34
9/9/2017	1:00 AM	050	24	32
9/9/2017	2:00 AM	070	23	31
9/9/2017	3:00 AM	060	19	29
9/9/2017	4:00 AM	050	21	32
9/9/2017	5:00 AM	060	20	29
9/9/2017	6:00 AM	060	21	29
9/9/2017	7:00 AM	060	23	28
9/9/2017	8:00 AM	060	21	28
9/9/2017	9:00 AM	080	26	39
9/9/2017	10:00 AM	070	21	33
9/9/2017	11:00 AM	080	25	36
9/9/2017	12:00 PM	080	25	34
9/9/2017	1:00 PM	070	25	36
9/9/2017	2:00 PM	070	25	36
9/9/2017	3:00 PM	060	26	36
9/9/2017	4:00 PM	070	28	38
9/9/2017	5:00 PM	070	29	44
9/9/2017	6:00 PM	070	31	42
9/9/2017	7:00 PM	070	32	39
9/9/2017	8:00 PM	070	29	39
9/9/2017	9:00 PM	070	28	46
9/9/2017	10:00 PM	080	31	52
9/9/2017	11:00 PM	090	35	56
9/10/2017	12:00 AM	090	27	36
9/10/2017	1:00 AM	100	33	45
9/10/2017	2:00 AM	100	30	46
9/10/2017	3:00 AM	090	29	46
9/10/2017	4:00 AM	100	34	49
9/10/2017	5:00 AM	120	34	52
9/10/2017	6:00 AM	110	50	68

9/10/2017	7:00 AM	110	40	59
9/10/2017	8:00 AM	120	45	57
9/10/2017	9:00 AM	100	49	68
9/10/2017	10:00 AM	110	48	67
9/10/2017	11:00 AM	110	49	65
9/10/2017	12:00 PM	110	48	66
9/10/2017	1:00 PM	120	52	73
9/10/2017	2:00 PM	120	52	73
9/10/2017	3:00 PM	120	59	**92**
9/10/2017	4:00 PM	140	57	84
9/10/2017	5:00 PM	130	**68**	89
9/10/2017	6:00 PM	140	50	81
9/10/2017	7:00 PM	140	62	75
9/10/2017	8:00 PM	160	59	84
9/10/2017	9:00 PM	160	62	72
9/10/2017	10:00 PM	170	62	72
9/10/2017	11:00 PM	170	60	68
9/11/2017	12:00 AM	170	53	65
9/11/2017	1:00 AM	180	54	67
9/11/2017	2:00 AM	180	47	57
9/11/2017	3:00 AM	180	43	53
9/11/2017	4:00 AM	180	34	42
9/11/2017	5:00 AM	190	27	39
9/11/2017	6:00 AM	190	25	32
9/11/2017	7:00 AM	190	23	29
9/11/2017	8:00 AM	190	25	31
9/11/2017	9:00 AM	190	27	38
9/11/2017	10:00 AM	200	21	30
9/11/2017	11:00 AM	210	24	34
9/11/2017	12:00 PM	210	25	31
9/11/2017	1:00 PM	230	22	29
9/11/2017	2:00 PM	220	23	32
9/11/2017	3:00 PM	220	19	29
9/11/2017	4:00 PM	240	17	25
9/11/2017	5:00 PM	210	16	24
9/11/2017	6:00 PM	210	15	24
9/11/2017	7:00 PM	230	16	24
9/11/2017	8:00 PM	220	11	20
9/11/2017	9:00 PM	220	9	15
9/11/2017	10:00 PM	210	9	14
9/11/2017	11:00 PM	220	9	13

CONCLUSIONS

In conclusion, it is my opinion with a reasonable degree of meteorological certainty based on sound, scientific principles, practices, and accepted methodologies that:

- Hurricane Irma produced maximum wind gusts of approximately 92 Miles Per Hour (MPH) at the incident location.
- Frequent strong wind gusts between 42-44 MPH occurred at the incident location between approximately 4:00 p.m. and 6:00 p.m. on September 9th, 2017.
- Frequent strong wind gusts between 46-56 MPH occurred at the incident location between approximately 8:00 p.m. and 11:00 p.m. on September 9th, 2017.
- Frequent strong wind gusts between 45-52 MPH occurred at the incident location between approximately 12:00 a.m. and 5:00 a.m. on September 10th, 2017.
- Frequent strong to severe wind gusts between 57-73 MPH occurred at the incident location between approximately 5:00 a.m. and 2:00 p.m. on September 10th, 2017.
- Maximum wind gusts of approximately 92 MPH occurred at the incident location between approximately 2:00 p.m. and 3:00 p.m. on September 10th, 2017.
- Frequent severe wind gusts between 65-89 MPH occurred at the incident location between approximately 3:00 p.m. on September 10th, 2017 and 1:00 a.m. on September 11th, 2017.
- Frequent strong wind gusts between 42-57 MPH occurred at the incident location between approximately 1:00 a.m. and 4:00 a.m. on September 11th, 2017.
- Very severe wind gusts as high as 92 MPH occurred at the incident location along with approximately 37 hours of at least tropical storm-force wind gusts often well in excess of 39 MPH.
- Approximately 6.00-7.00” of rain accumulated at the incident location as a result of “Irma.”

CERTIFICATION

I certify that the above information contained in this report is true and accurate to the best of my ability and that all of my opinions, findings, estimations, and interpolations expressed in this report were made with accuracy as a professional meteorologist within a reasonable degree of meteorological certainty.

By: _____

Certified Consulting Meteorologist

Certified Consulting Meteorologist
Awarded by the American Meteorological Society.