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.

FWC
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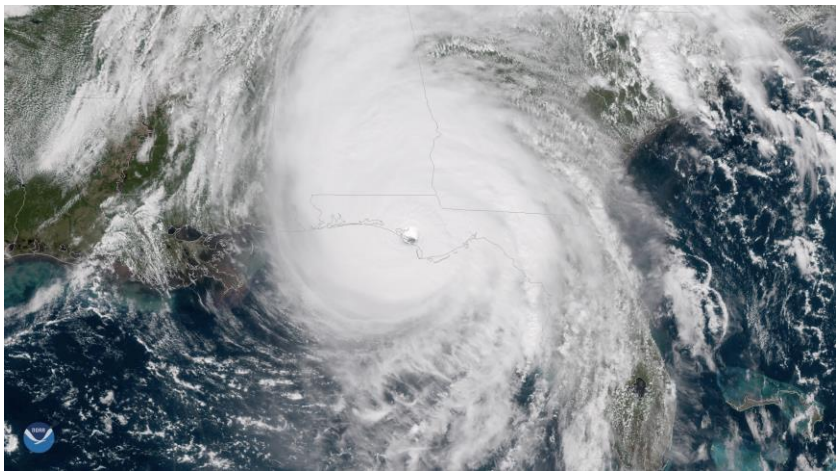
HURRICANE "MICHAEL" METEOROLOGICAL EXPERT REPORT

FORENSIC WEATHER INVESTIGATION OF THE WEATHER CONDITIONS, WIND DIRECTIONS, SUSTAINED WINDS, PEAK WINDS (INCLUDING GUSTS), AND STORM SURGE HEIGHTS ON OCTOBER 10, 2018 AT 3422 GULF WAY IN MEXICO BEACH, FLORIDA

December 29, 2020



CASE NAME: "Levon Tamalian v. Coastal Residential Insurance Company"
PREPARED FOR: Ms. Stephanie Tailsman, Esq.
COMPANY: Greco, O'Malley, & Sherif

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ASSIGNMENT:

This case was assigned to me by Greco, O'Malley, & Sherif. I was asked to perform an in-depth weather analysis and forensic weather investigation at 3422 Gulf Way in Mexico Beach, Florida in order to determine the weather conditions, sustained winds, peak winds (including gusts) and storm surge heights as a result of Hurricane "Michael" on October 10th, 2018.

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.

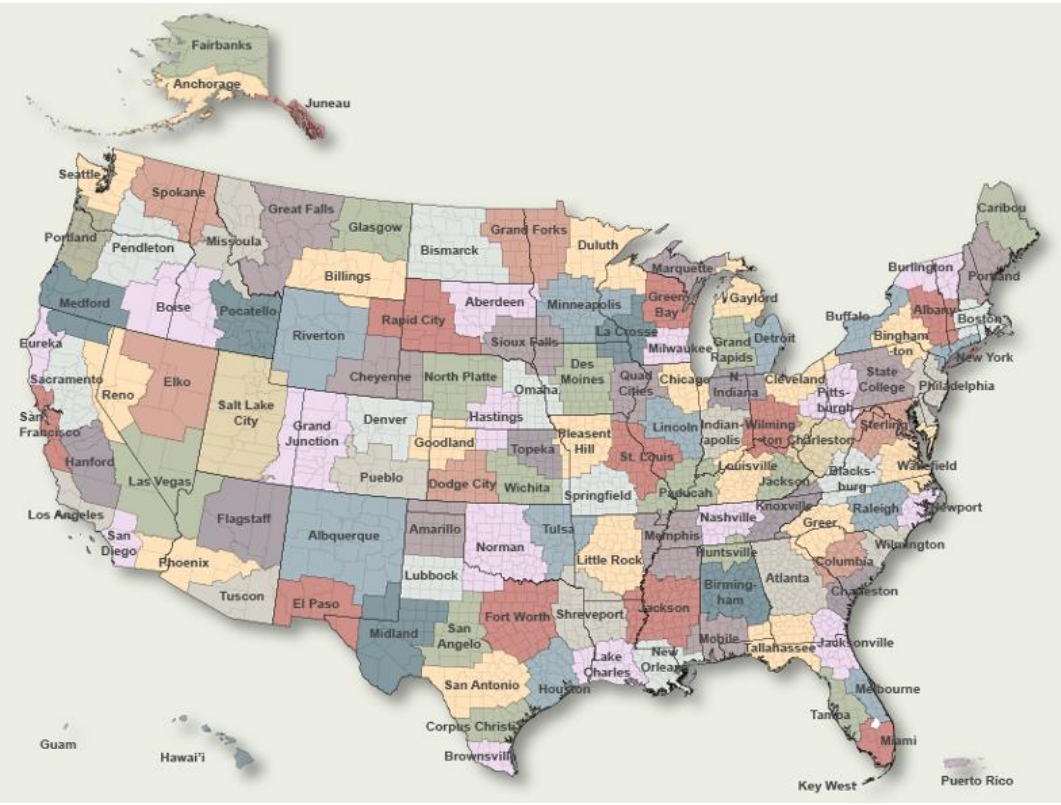
The National Ocean Service (**NOS**) provides data, tools, and services that support coastal economies and their contribution to the national economy. NOS maintains the nation's network of coastal tide and water level sensors to provide real-time data. Among many things, this data supports accurate weather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

To augment the fixed location real-time gaging networks and temporary rapid deployment gages, a temporary network of hurricane storm surge sensors can be deployed prior to a hurricane. As part of this monitoring approach by the United States Geological Survey (**USGS**), water-level and barometric-pressure sensors are deployed to areas of projected hurricane landfall. The addition of these sensors creates a concentrated network of storm-tide monitors which provide more spatially dense monitoring of hurricane storm tide. For example, temporary deployment of sensors in the projected hurricane path can be placed to monitor the escalation and attenuation of the hurricane tide along coastal rivers and across barrier islands, low-lying areas, and wetlands. Hydrologists often visit streams after a large storm to check for high-water marks (**HWMs**). This kind of information is valuable in developing maps and information concerning the impact of floods on the adjacent landscape, structures, and people.

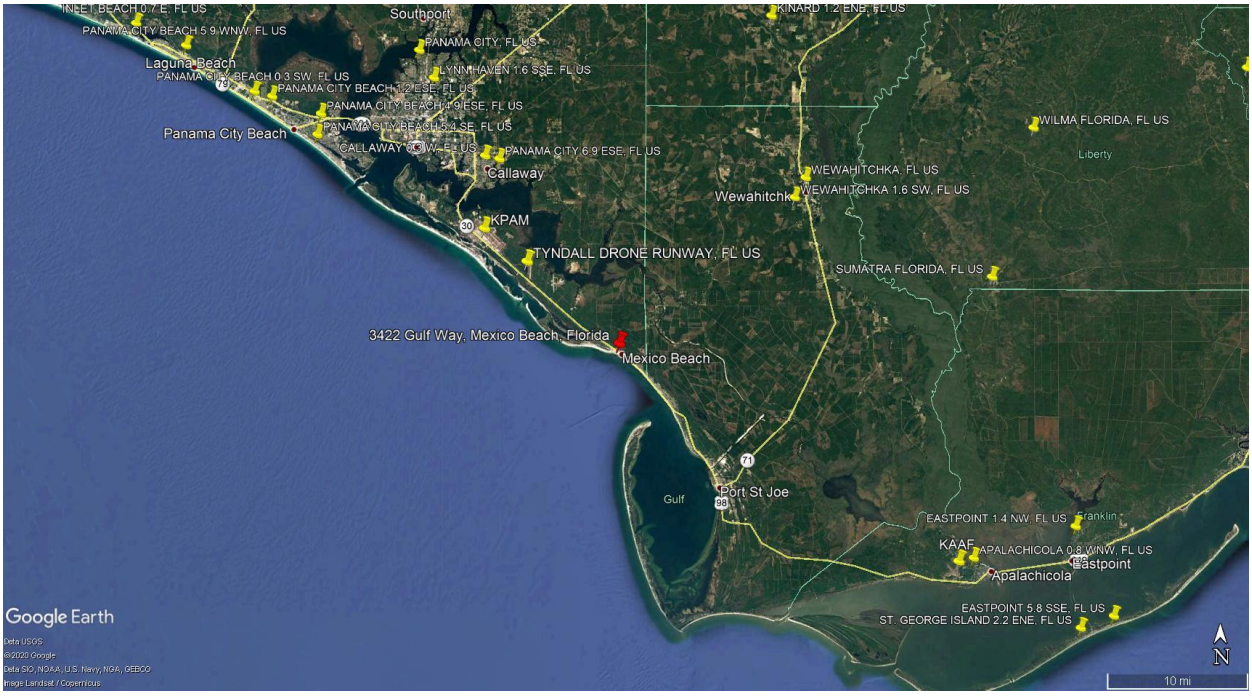
One of the most effective tools to detect precipitation is radar. Radar, which stands for RAdio Detection And Ranging, has been utilized to detect precipitation, and especially thunderstorms, since the 1940's. The radar used by the National Weather Service is called the WSR-88D, which stands for Weather 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 approximately 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. Doppler radar images and several other types of weather records were used in this study. Doppler radar images are useful for locating precipitation. 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 these radar echoes helps indicate where precipitation may be falling, and the various colors on the color code key on the right side of the radar image indicates intensity. Doppler radar images are processed approximately every 1 to 5 minutes and can determine if precipitation was falling at the incident location and if so, when it started and stopped.

The National Weather Service (NWS) offices around the country issue numerous weather alerts, advisories, warnings, statements, bulletins, and storm reports and these are also utilized in our investigations. A map depicting the locations of these NWS offices can be found below.



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 weather stations we used in this study and their proximity to the incident location.



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):

a. National Weather Service Hourly Surface Weather Observations/Local Climatological Data (LCD) from the Tyndall Drone Runway in Panama City, Florida (approximately xxx miles xxxxx of the incident location).

b. National Weather Service Hourly Surface Weather Observations/Local Climatological Data (LCD) from the Tyndall Air Force Base in Panama City, Florida (approximately xxx miles xxxxx of the incident location).

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

d. Cooperative Observer Program (COOP) weather station reports from Wewahitchka, Florida (approximately xxx miles xxxxx of the incident location).

e. Cooperative Observer Program (COOP) weather station reports from Panama City, Florida (approximately xxx miles xxxxx of the incident location).

f. Remote Automated Weather Station (RAWS) reports from Sumatra Florida, Florida (approximately xxx miles xxxxx of the incident location).

g. Remote Automated Weather Station (RAWS) reports from Wilma Florida, Florida (approximately xxx miles xxxxx of the incident location).

h. Community Collaborative Rain, Hail and Snow Network (CoCoRaHS) reports from Panama City 6.9 ESE, Florida (approximately xxx miles xxxxx of the incident location).

i. Community Collaborative Rain, Hail and Snow Network (CoCoRaHS) reports from Lynn Haven 1.6 SSE, Florida (approximately xxx miles xxxxx of the incident location).

j. Community Collaborative Rain, Hail and Snow Network (CoCoRaHS) reports from Apalachicola 0.8 WNW, Florida (approximately xxx miles xxxxx of the incident location).

k. Community Collaborative Rain, Hail and Snow Network (CoCoRaHS) reports from Eastpoint 1.4 NW, Florida (approximately xxx miles xxxxx of the incident location).

l. Online Community Collaborative Rain, Hail and Snow Network (CoCoRaHS) reports from Bay County in Florida and Gulf County in Florida.

m. United States Geological Survey (USGS) Storm Tide Sensor reports from Mexico Beach – FLBAY03283 (approximately xxx miles xxxxx of the incident location).

n. United States Geological Survey (USGS) High Water Mark data from Mexico Beach – FLBAY27706 (approximately xxx miles xxxxx of the incident location).

o. United States Geological Survey (USGS) High Water Mark data from Mexico Beach – FLBAY27701 (approximately xxx miles xxxxx of the incident location).

p. United States Geological Survey (USGS) High Water Mark data from Mexico Beach – FLBAY27709 (approximately xxx miles xxxxx of the incident location).

q. Super-resolution Reflectivity Doppler Radar images from the Elgin Air Force Base, Florida radar site that were zoomed in over the incident location.

r. Gibson Ridge Analyst Edition (GRAE) data from the Elgin Air Force Base, Florida radar site.

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

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

u. Hurricane Michael “Best Track” map data from the National Hurricane Center in Miami, Florida.

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

w. Post Tropical Cyclone Report and Summary for Hurricane Michael issued by the National Weather Service (NWS) office in Tallahassee, Florida.

x. National Hurricane Center Tropical Cyclone Report for Hurricane Michael.

y. "Automated Hurricane Report" for Hurricane Michael downloaded from Www.WeatherConsultants.Com

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

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

bb. Storm Events Database from the National Centers for Environmental Information (NCEI) for Bay County in Florida and Gulf County in Florida.

The weather data and Climatological records used for this analysis include official records that Meteorologists rely upon every day during the normal course of business. 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.

In addition to the weather records and climatological data listed above, I also reviewed the following information that was provided to me:

- Elevation Certificate for the Incident Location from the U.S. Department of Homeland Security Federal Emergency Management Agency

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. A color key on the Doppler radar images can be used to indicate intensity, among other things.

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 Central Daylight Time (CDT), a subtraction of 5 hours is necessary. 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 in the ASOS records are given in GMT. The findings in this report have incorporated and converted all of these times correctly.

It should be noted that the Local Climatological Data (LCD) from the Tyndall Air Force Base, the Tyndall Drone Runway, and the Apalachicola Regional Airport are incomplete at times on October 10th, 2018.

Due to expected power outages, deteriorating conditions and a concern for the safety of the staff of the National Weather Service in Tallahassee, Florida, the National Weather Service in Jacksonville, Florida issued various bulletins and statements at times during Hurricane Michael and after the storm had passed.

HURRICANE MICHAEL OVERVIEW

Michael was a category 5 hurricane (on the Saffir-Simpson Hurricane Wind Scale) that made a catastrophic landfall near Mexico Beach and Tyndall Air Force Base, Florida, producing devastating winds and storm surge near the coast, and rain and wind inland. It was directly responsible for 16 deaths and about $25 billion in damage in the United States. Before hitting the United States, the cyclone brought hurricane-force winds to the western tip of Cuba when it was a category 2 hurricane.

After some gradual strengthening and weakening, Michael reached hurricane strength at around 7:00 a.m. CDT on October 8th, 2018. After some fluctuations in organization and intensity near Cuba, Michael moved toward the Florida Gulf coast and made landfall near Tyndall Air Force Base just southeast of Panama City, Florida at approximately 12:30 p.m. CDT on October 10th, 2018.

Michael rapidly weakened after landfall as it accelerated northeastward across the central Florida Panhandle before the eye moved into southwestern. The center passed just west of Albany, Georgia and then tracked just southeast of Macon, Macon, Georgia shortly after the cyclone weakened to a tropical storm. Continuing northeastward, the center passed just west of Augusta before crossing into South Carolina. By this time, the winds had decreased below tropical-storm force, however, tropical-storm-force winds continued over the coastal areas and coastal waters of Georgia and South Carolina.

NATIONAL HURRICANE CENTER DEFINITIONS

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

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

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

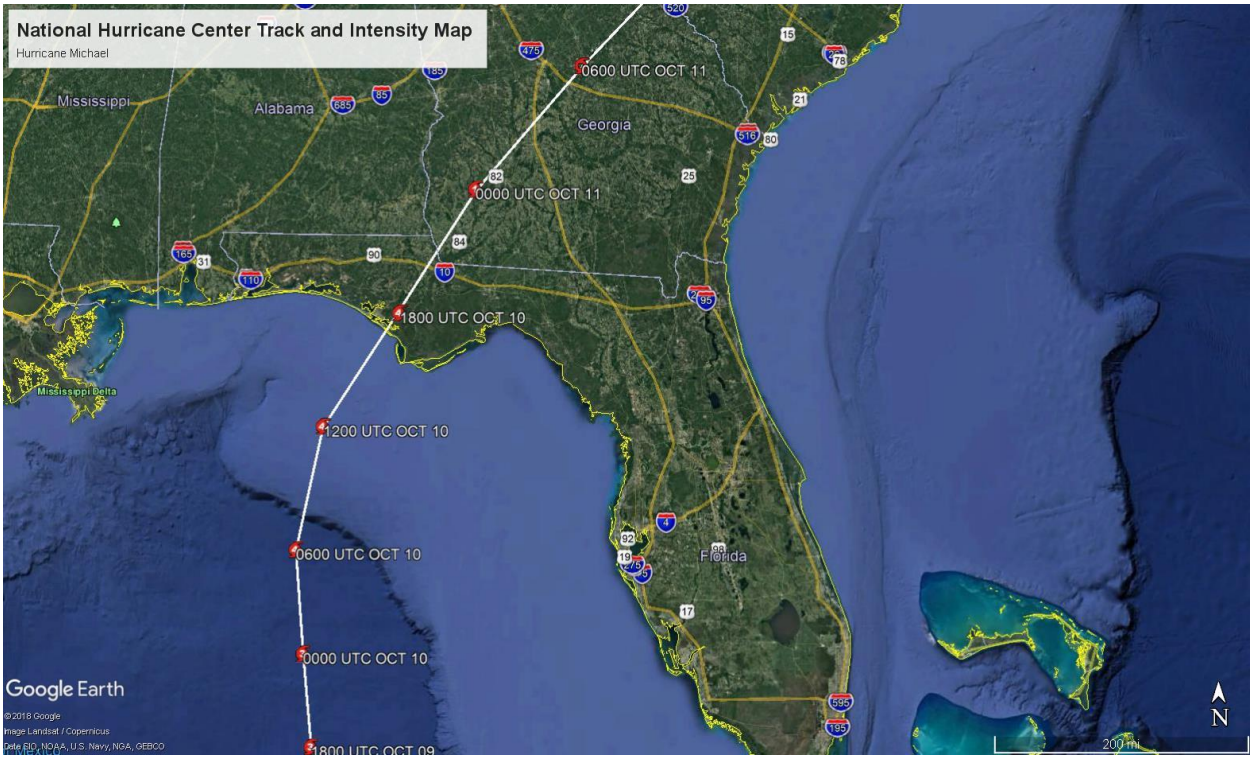
Category	Sustained Winds (MPH)	Types of Damage Due to Hurricane Winds
1	**74-95**	**Very dangerous winds will produce some damage:** Well-constructed frame homes could have damage to roof, shingles, vinyl siding and gutters. Large branches of trees will snap and shallowly rooted trees may be toppled. Extensive damage

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

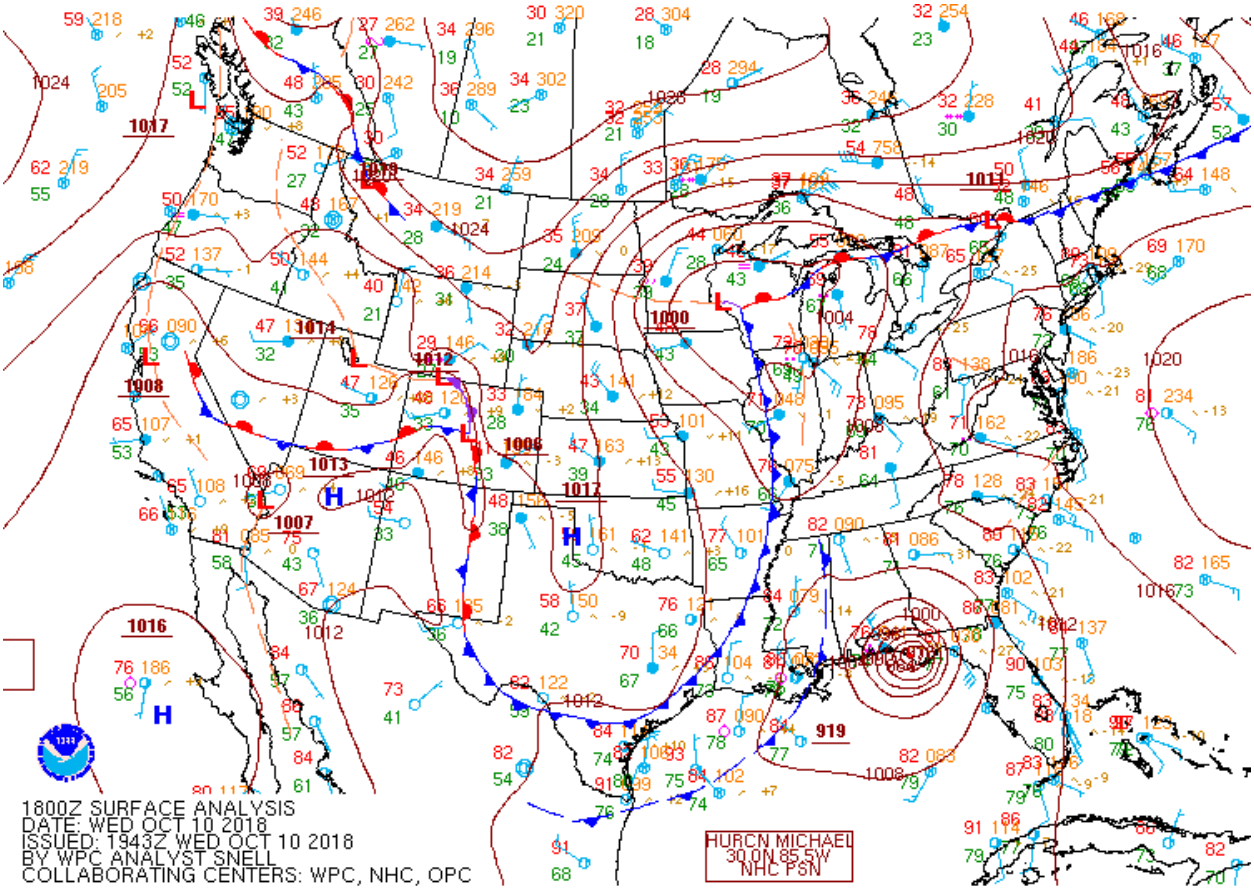
		to power lines and poles likely will result in power outages that could last a few to several days.
2	**96-110**	**Extremely dangerous winds will cause extensive damage:** Well-constructed frame homes could sustained major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted 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 MICHAEL TRACK AND INTENSITY MAP

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



The following is a surface analysis map of the contiguous United States at 1:00 p.m. CDT on October 10th, 2018 that was prepared by the Weather Prediction Center (WPC), a division of the National Weather Service. This surface map indicated that Hurricane Michael had just made landfall near Tyndall Air Force Base in Panama City, Florida.



METEOROLOGICAL ANALYSIS FOR OCTOBER 10, 2018

Doppler radar images that were zoomed in over the incident location and area weather observations indicated that as Hurricane Michael moved northward across the Gulf of Mexico and toward the Florida Panhandle, on and off light rain began to fall at approximately 12:10 a.m. CDT on October 10th, 2018. As the outer bands became increasingly more common, the rain quickly became steadier, and light to occasionally moderate and heavy rain, torrential downpours, squalls, and strong, gusty winds occurred at times. At approximately 8:01 a.m. CDT on October 10th, 2018, very intense rain was falling with squalls and strong, gusty winds. The outer eyewall and the northern and western portions of the inner eyewall itself moved over the incident location producing extreme winds, squalls, and steady torrential rain. The eyewall affected the incident location from approximately 11:33 a.m. to 1:28 p.m. CDT on October 10th, 2018.

As the center of "Michael" continued to move inland across the interior Florida Panhandle, the intense rainfall, and very strong winds slowly subsided. The heavier rain had tapered off to occasional light rain or rain showers at approximately 3:31 p.m. CDT. Thereafter, a few showers fell at times through 4:10 p.m. CDT on October 10th, 2018.

Doppler radar Base Reflectivity and Base Velocity images in conjunction with Local Storm Reports (LSR's), Storm Data and other information did not indicate the presence of tornadoes at

the incident location.

DOPPLER RADAR IMAGES

The following Doppler radar images (**Figures 1-6**) were obtained from the Elgin Air Force Base radar facility in Florida. The images below depict super-resolution base reflectivity. These are only a sampling of the radar images that were available as Hurricane Michael affected the area. The radar images show the progression of the outer bands, the eyewall, the eye, and other features of Hurricane Michael relative to the location of the incident. Heavy rain, torrential downpours, strong squalls, and intense winds were present, especially when the eyewall affected the incident location.

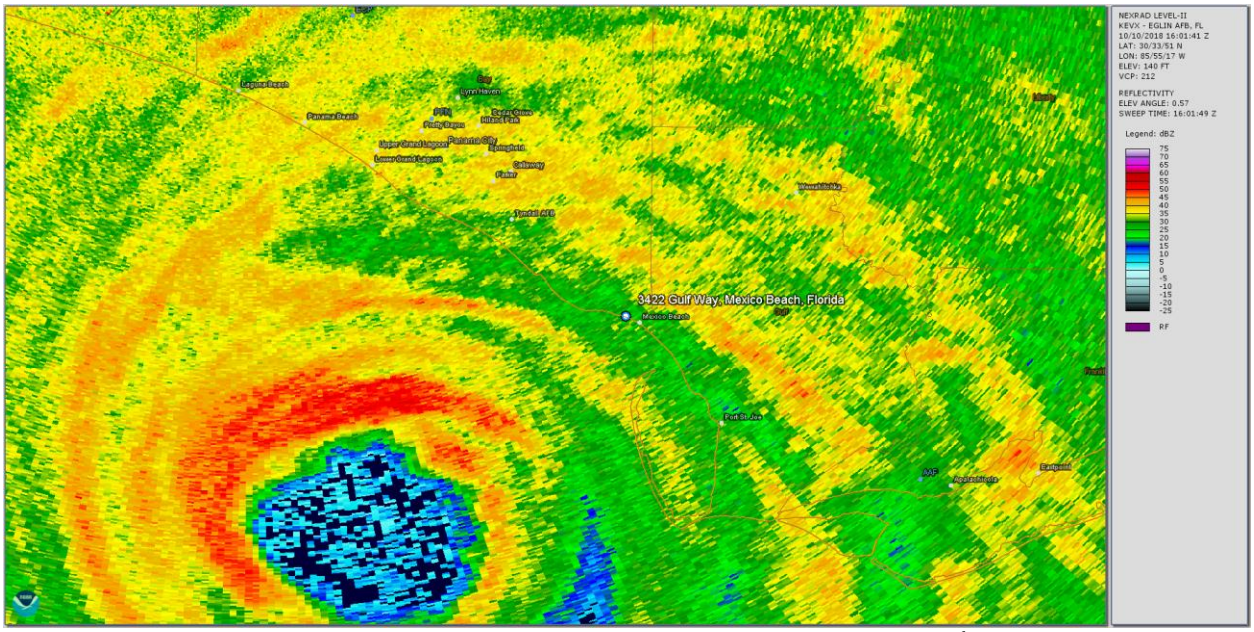


Figure 1. This Doppler radar image processed at 11:01 a.m. CDT on October 10th, 2018 depicts base reflectivity when heavy rain, torrential downpours, squalls, and intense winds were affecting the incident location.

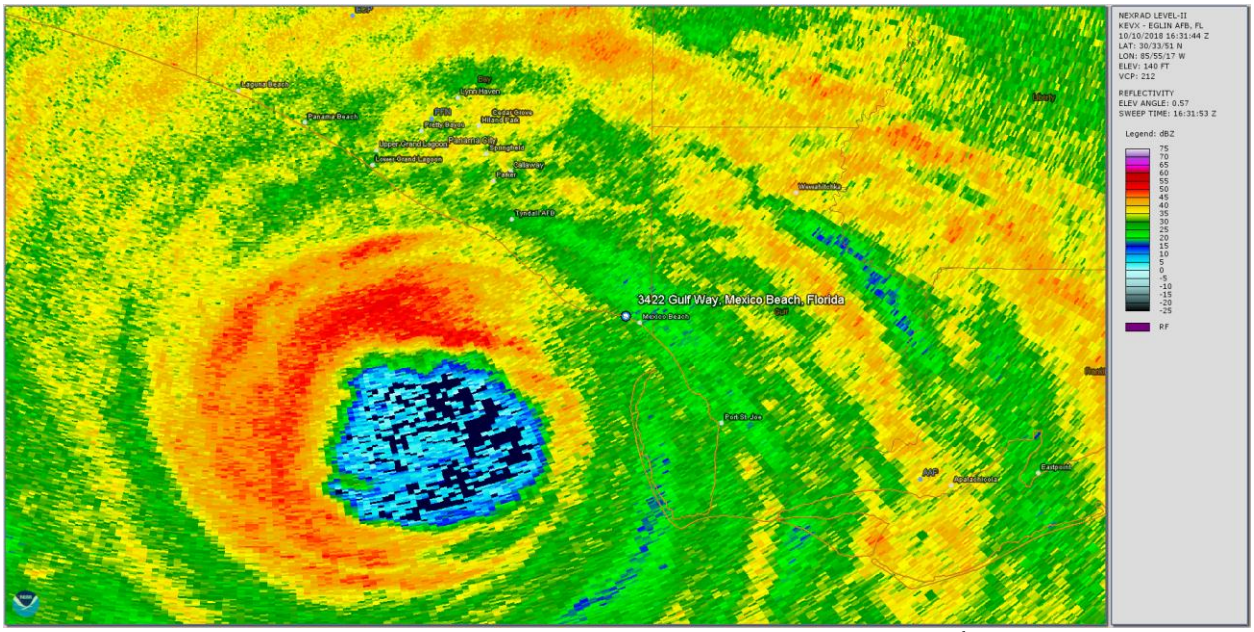


Figure 2. This Doppler radar image processed at 11:31 a.m. CDT on October 10th, 2018 depicts base reflectivity when heavy rain, torrential downpours, squalls, and intense winds were affecting the incident location.

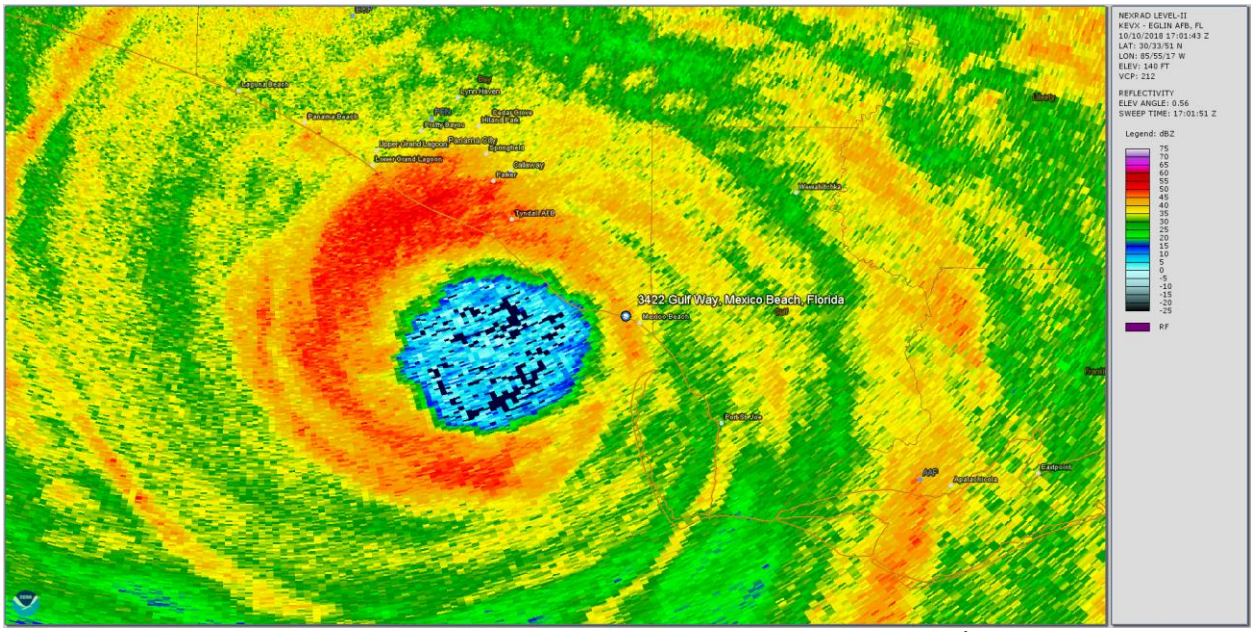


Figure 3. This Doppler radar image processed at 12:01 p.m. CDT on October 10th, 2018 depicts base reflectivity when heavy rain, torrential downpours, squalls, and intense winds were affecting the incident location.

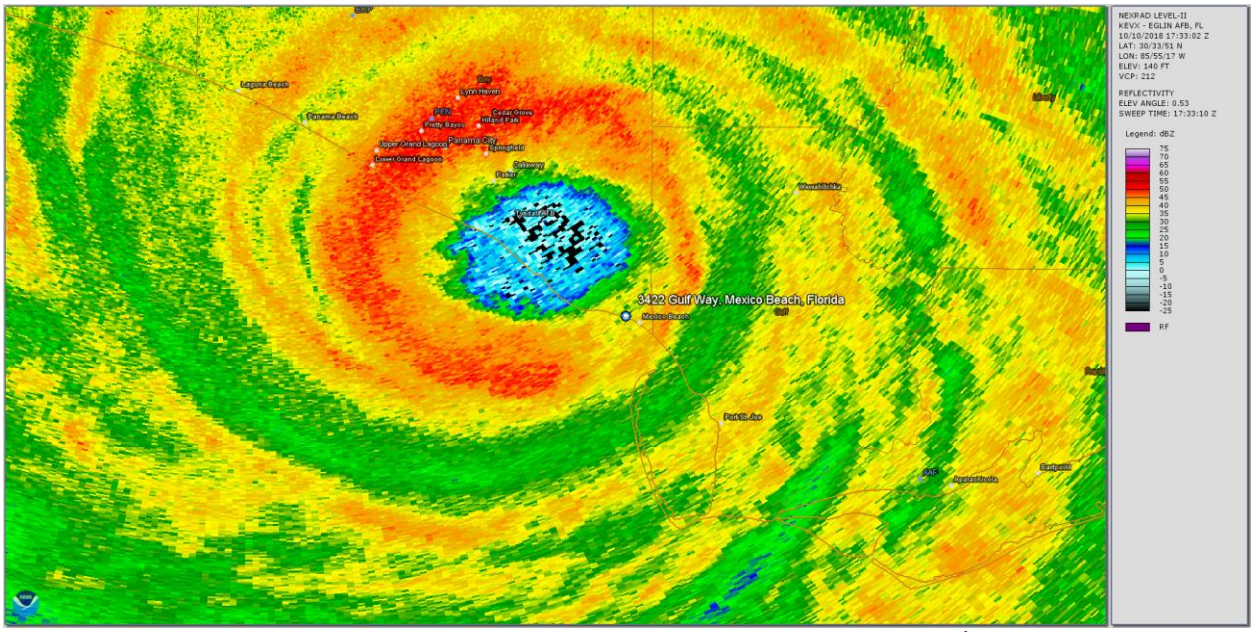


Figure 4. This Doppler radar image processed at 12:33 p.m. CDT on October 10th, 2018 depicts base reflectivity when heavy rain, torrential downpours, squalls, and intense winds were affecting the incident location.

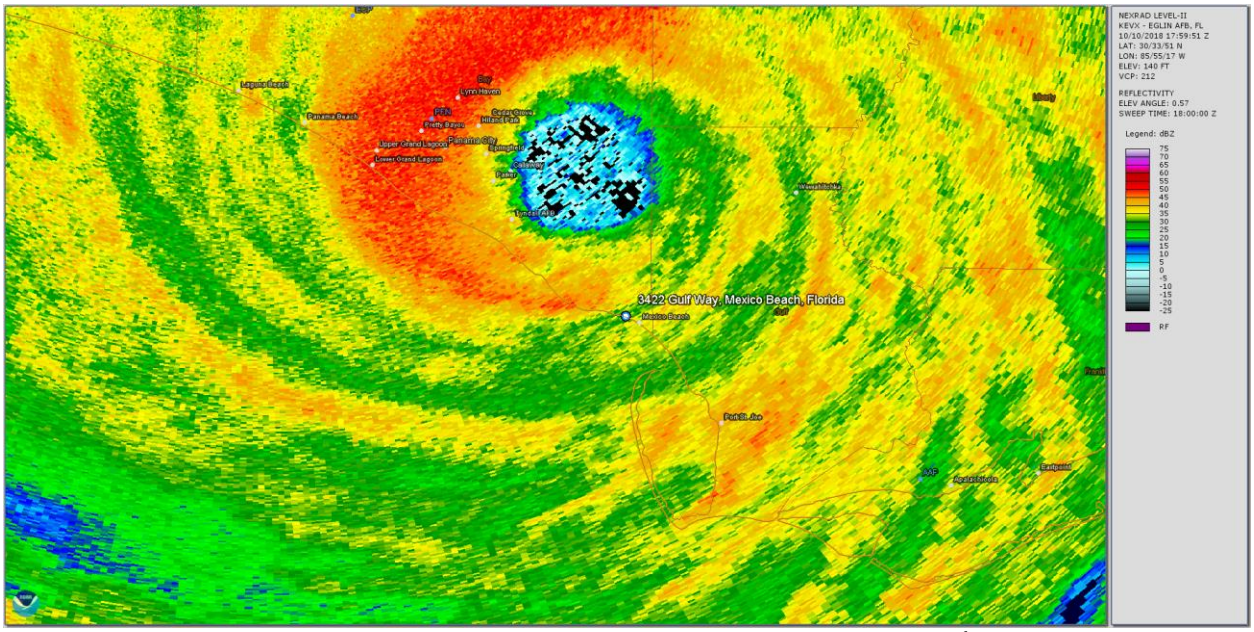


Figure 5. This Doppler radar image processed at 12:59 p.m. CDT on October 10th, 2018 depicts base reflectivity when heavy rain, torrential downpours, squalls, and intense winds were affecting the incident location.

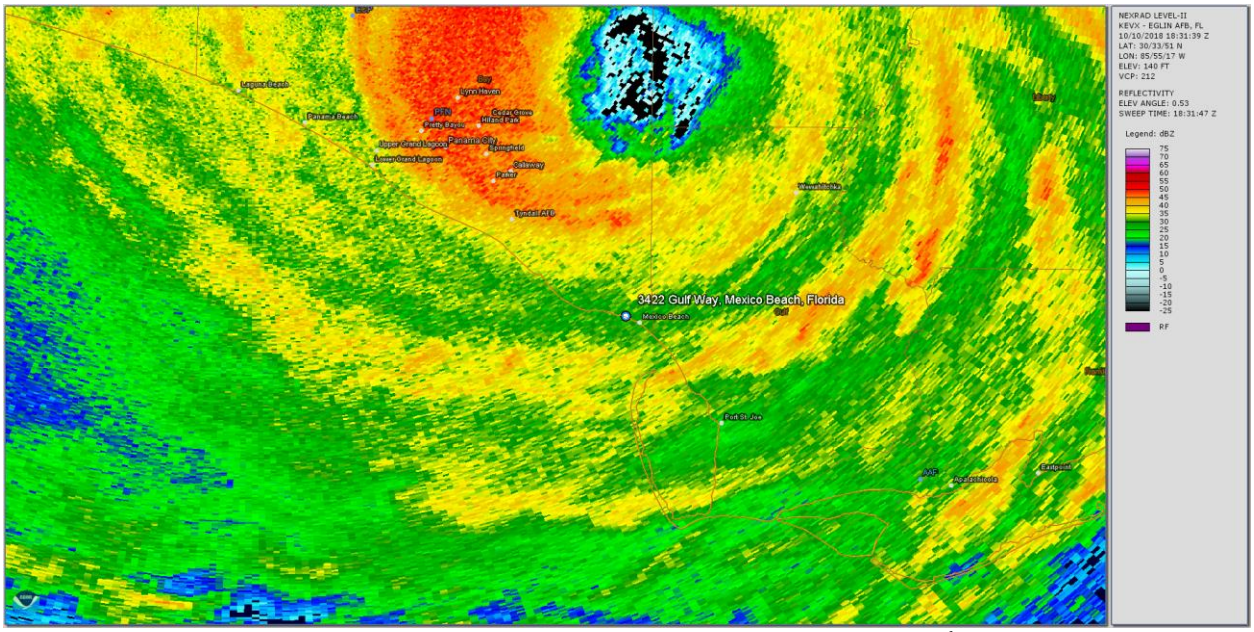


Figure 6. This Doppler radar image processed at 1:31 p.m. CDT on October 10th, 2018 depicts base reflectivity when heavy rain, torrential downpours, squalls, and intense winds were affecting the incident location.

TROPICAL CYCLONE WIND REPORTS

The National Weather Service listed many wind reports that occurred on October 10th, 2018 as a result of Hurricane Michael. 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.

- **FCMP T2 Beacon Hill (Approximately xxx miles xxxxx of the incident location):** Reported peak wind gust of 127 Miles Per Hour (MPH) at 12:51 p.m. CDT on October 10th, 2018. It should be noted that the anemometer at this station is located 15 meters above the ground.

- **FCMP T3 Tyndall Air Force Base (Approximately xxx miles xxxxx of the incident location):** Reported peak wind gust of 130 Miles Per Hour (MPH) from 078° (*east-northeast*) at 11:53 a.m. CDT on October 10th, 2018. It should be noted that the anemometer at this station is located 15 meters above the ground.

- **Tyndall Air Force Base (KPAM) (Approximately xxx miles xxxxx of the incident location):** Reported peak wind gust of 139 Miles Per Hour (MPH) from 060° (*east-northeast*) at 12:15 p.m. CDT on October 10th, 2018. It should be noted that the anemometer at this station is located 10 meters above the ground. The peak wind observations from this station are incomplete.

- **Gulf County EOC WeatherStem (Approximately xxx miles xxxxx of the incident location):** Reported peak wind gust of 76 Miles Per Hour (MPH) at 11:41 a.m. CDT on October 10th, 2018. It should be noted that the peak wind observations from this station are incomplete.

- **Port St. Joe Elementary School WeatherStem (Approximately xxx miles xxxxx of the incident location):** Reported peak wind gust of 113 Miles Per Hour (MPH) at 11:37 a.m. CDT on October 10th, 2018. It should be noted that the peak wind observations from this station are incomplete.

NATIONAL WEATHER SERVICE LOCAL STORM REPORTS (LSRs)

After determining if Local Storm Reports were received by the National Weather Service and the National Centers for Environmental Information on October 10th, 2018, I quality-controlled and plotted these reports using the program Google Earth.

At 4:27 p.m. EDT (3:27 p.m. CDT) on October 10th, 2018, the National Weather Service in Tallahassee, Florida issued the following "Preliminary Local Storm Report" which included Bay County in Florida:

```
PRELIMINARY LOCAL STORM REPORT
NATIONAL WEATHER SERVICE TALLAHASSEE FL
427 PM EDT WED OCT 10 2018
..TIME...   ...EVENT...      ...CITY LOCATION...     ...LAT.LON...
..DATE...   ....MAG....      ..COUNTY LOCATION..ST.. ...SOURCE....
            ..REMARKS..
0200 PM     HURRICANE        1 E MEXICO BEACH        29.95N 85.41W
10/10/2018                   BAY                FL   PUBLIC
            SIGNIFICANT DAMAGE AND INUNDATION REPORTED
            THROUGHOUT MEXICO BEACH.
```

NATIONAL WEATHER SERVICE BULLETINS, WARNINGS AND ADVISORIES

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

At 11:11 a.m. EDT (10:11 a.m. CDT) on October 10th, 2018, the National Weather Service in Tallahassee, Florida issued an "Extreme Wind Warning" that was in effect through 2:15 p.m. EDT (1:15 p.m. CDT) on October 10th, 2018:

```
Extreme Wind Warning
National Weather Service Tallahassee FL
1111 AM EDT WED OCT 10 2018
The National Weather Service in Tallahassee has issued a
* Extreme Wind Warning for...
  Gulf County in the Panhandle of Florida...
  Southern Bay County in the Panhandle of Florida...
  Southwestern Franklin County in Big Bend of Florida...
```

*** Until 215 PM EDT/115 PM CDT/.**
*** At 1109 AM EDT/1009 AM CDT/, National Weather Service Doppler radar indicated extreme winds in excess of 130 mph, associated with the eyewall of Hurricane Michael, were moving onshore. THIS IS AN EXTREMELY DANGEROUS AND LIFE-THREATENING SITUATION!**
PRECAUTIONARY/PREPAREDNESS ACTIONS...
TAKE COVER NOW! Treat these imminent extreme winds as if a tornado was approaching and move immediately to the safe room in your shelter. Take action now to protect your life!

At 1:15 p.m. EDT (12:15 p.m. CDT) on October 10th, 2018, the National Weather Service in Tallahassee, Florida issued an "Extreme Wind Warning" that was in effect through 4:15 p.m. EDT (3:15 p.m. CDT) on October 10th, 2018:

Extreme Wind Warning
National Weather Service Tallahassee FL
115 PM EDT WED OCT 10 2018
The National Weather Service in Tallahassee has issued a
*** Extreme Wind Warning for...**
Southern Jackson County in the Panhandle of Florida...
Gulf County in the Panhandle of Florida...
Bay County in the Panhandle of Florida...
Calhoun County in the Panhandle of Florida...
Liberty County in Big Bend of Florida...
Southeastern Washington County in the Panhandle of Florida...
*** Until 415 PM EDT/315 PM CDT/.**
*** At 113 PM EDT/1213 PM CDT/, National Weather Service Doppler radar indicated extreme winds in excess of 130 mph, associated with the eyewall of Hurricane Michael, were continuing to move inland. THIS IS AN EXTREMELY DANGEROUS AND LIFE-THREATENING SITUATION!**
PRECAUTIONARY/PREPAREDNESS ACTIONS...
TAKE COVER NOW! Treat these imminent extreme winds as if a tornado was approaching and move immediately to the safe room in your shelter. Take action now to protect your life!

At 3:02 p.m. EDT (2:02 p.m. CDT) on October 10th, 2018, the National Weather Service in Jacksonville, Florida issued a "Severe Weather Statement" for the "Extreme Wind Warning" that was in effect through 4:15 p.m. EDT (3:15 p.m. CDT) on October 10th, 2018:

Severe Weather Statement
National Weather Service Tallahassee FL
Issued by National Weather Service Jacksonville FL
302 PM EDT WED OCT 10 2018
FLC005-013-045-063-077-133-102015-
/O.CON.KTAE.EW.W.0002.000000T0000Z-181010T2015Z/
Jackson FL-Gulf FL-Bay FL-Calhoun FL-Liberty FL-Washington FL-
302 PM EDT WED OCT 10 2018
...AN EXTREME WIND WARNING REMAINS IN EFFECT UNTIL 415 PM EDT/315 PM CDT/ FOR SOUTHERN JACKSON...NORTHWESTERN GULF...**BAY**...CALHOUN...
NORTHWESTERN LIBERTY AND SOUTHEASTERN WASHINGTON COUNTIES...
At 300 PM EDT/200 PM CDT/, National Weather Service Doppler radar indicated extreme winds, associated with the eyewall of Hurricane Michael, were continuing to move inland. THIS IS AN EXTREMELY DANGEROUS AND LIFE-THREATENING SITUATION!
PRECAUTIONARY/PREPAREDNESS ACTIONS...
TAKE COVER NOW! Treat these imminent extreme winds as if a tornado was approaching and move immediately to the safe room in your shelter. Take action now to protect your life!

HOURLY ANALYSIS OF PEAK WINDS AND STORM TIDE:

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. Storm surge data utilizing NOAA/National Hurricane Center information was also obtained from the incident location point information. 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 analysis of the automated hurricane report, other official weather data, records, observations, and reports, I was able to determine with a reasonable degree of certainty what the weather conditions were at this incident location. The results of my analysis based on all of this data can be found below. This information is based on sound, scientific principles, and accepted methodologies in the field of meteorology.

On March 7th, 2019, a conversation was had with Mr. Ronald Knapp from the USGS regarding Storm Tide Sensors utilized during Hurricane Michael, as well as information about High Water Marks. According to Mr. Knapp, the unfiltered data is the raw data that the sensor was detecting at the time of the observation. The unfiltered data does include wave action. The filtered data is the output of when the raw data was placed through a "low pass filter" in order to eliminate wave action. The filtered data results in "storm tide." Mr. Knapp stated that the unfiltered data values are more representative of the actual water levels due to the fact that waves are taken into account.

The following map indicates the locations of the United States Geological Survey (USGS) Storm Tide Sensors and High Water Marks (HWM) that we utilized for this investigation.

According to official data from USGS High Water Mark FLBAY27706 (located only approximately xxx miles xxxxx of the incident location), the peak height of the water was 17.91 feet above NAVD88, or 7.8 feet above the ground. On November 5th, 2019, we conducted a follow-up conversation with Mr. Ronald Knapp from the USGS. Mr. Knapp stated that when the elevation above NAVD88 is not provided for the surface below the documented High Water Mark (HWM), the elevation of the ground below the HWM could be "ascertained by simple subtraction." In this case, for HWM FLBAY27706, the elevation of the ground beneath the HWM can be obtained by completing the following calculation: 17.91 feet-7.8 feet = 10.11 feet above NAVD88.

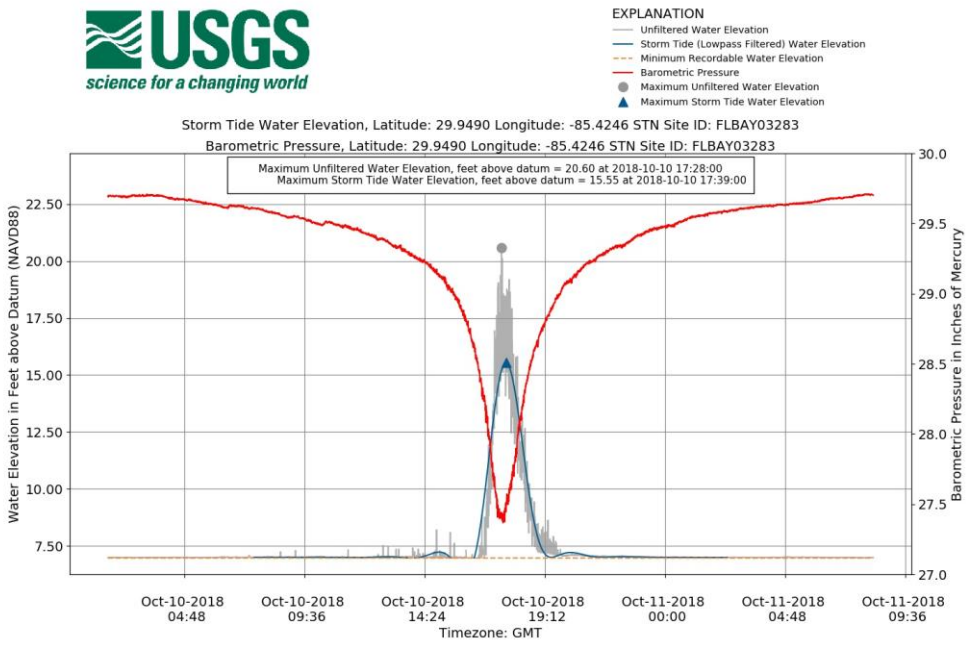
Therefore, this implies the change in value of water height above NAVD88 is equal to the change in value in water height above the ground. For a generic example, if the height of the water at a given location rises 1 foot above NAVD88 within an hour, it is also true that the height of the water at a given location rises 1 foot above the ground within an hour.

According to the Elevation Certificate for the Incident Location from the U.S. Department of Homeland Security Federal Emergency Management Agency, the lowest adjacent grade at the lowest elevation of the property was 8.6 feet above NAVD88.

According to the Elevation Certificate for the incident location, the incident location is located approximately 1.5 feet lower in elevation than HWM FLBAY27706. Therefore, the height of the water above the ground at the incident location was approximately 1.5 feet higher than it was at HWM FLBAY27706. This means that while the water reached a peak level of 7.8 feet above

the ground at HWM FLBAY27706, **the water reached a peak level of approximately 9.3 feet above the ground at the incident location.**

According to official data from USGS Storm Tide Sensor FLBAY03283 (located only approximately xxx miles xxxxx of the incident location), the peak unfiltered storm tide height, including waves, occurred at 17:28:00 GMT, or 12:28 p.m. CDT on October 10th, 2018.



Therefore, it is my opinion that the water reached a peak level of 9.3 feet above the ground at the incident location between the times of 12:15 p.m. and 12:30 p.m. CDT on October 10th, 2018.

The following table of information was prepared for the incident location utilizing numerous weather records, water gauge, water level, and wave data in addition to other official information. These values were adjusted and are given for this specific incident location. For this specific incident location, storm tide heights (including wave heights) were calculated in addition to maximum wind speed information.

OCTOBER 10, 2018

Time (CDT)	Peak Winds Gusts (MPH)	Storm Tide Heights, Including Waves (Feet Above the Ground)
6:15 AM	41	0.0
6:30 AM	40	0.0
6:45 AM	43	0.0
7:00 AM	35	0.0
7:15 AM	38	0.0

7:30 AM	31	0.0
7:45 AM	37	0.0
8:00 AM	39	0.0
8:15 AM	43	0.0
8:30 AM	49	0.0
8:45 AM	54	0.0
9:00 AM	46	0.0
9:15 AM	46	0.0
9:30 AM	46	0.0
9:45 AM	52	0.0
10:00 AM	57	0.0
10:15 AM	61	0.0
10:30 AM	65	0.0
10:45 AM	69	0.0
11:00 AM	73	0.0
11:15 AM	72	0.0
11:30 AM	88	0.0
11:45 AM	88	0.0
12:00 PM	108	0.1
12:15 PM	123	5.1
12:30 PM	123	9.3
12:45 PM	128	4.0
1:00 PM	128	1.2
1:15 PM	117	0.4
1:30 PM	111	0.0
1:45 PM	103	0.0
2:00 PM	88	0.0
2:15 PM	84	0.0
2:30 PM	87	0.0
2:45 PM	83	0.0
3:00 PM	71	0.0
3:15 PM	67	0.0
3:30 PM	69	0.0
3:45 PM	63	0.0
4:00 PM	69	0.0
4:15 PM	63	0.0
4:30 PM	56	0.0
4:45 PM	58	0.0
5:00 PM	58	0.0
5:15 PM	57	0.0
5:30 PM	55	0.0
5:45 PM	55	0.0
6:00 PM	53	0.0
6:15 PM	53	0.0

6:30 PM	50	0.0
6:45 PM	48	0.0
7:00 PM	47	0.0
7:15 PM	45	0.0
7:30 PM	45	0.0
7:45 PM	44	0.0
8:00 PM	46	0.0
8:15 PM	43	0.0
8:30 PM	40	0.0
8:45 PM	41	0.0
9:00 PM	40	0.0

CONCLUSIONS

In conclusion, it is my opinion that:

- Hurricane Michael produced maximum wind gusts of approximately 128 Miles Per Hour (MPH) at the incident location.
- Peak wind speeds/gusts exceeded hurricane force well before the storm tide/ocean water including waves reached the property.
- In fact, peak wind speeds with gusts reached approximately 88 Miles Per Hour (MPH) before any storm tide/ocean water reached this property.
- Frequent wind gusts between 88 MPH and as high as 108 MPH affected the incident location as the storm tide/ocean water began to affect the property between 11:45 a.m. and 12:00 p.m. CDT on October 20th, 2018.
- The National Weather Service in Tallahassee, Florida issued an "Extreme Wind Warning" at 10:11 a.m. CDT on October 10th, 2018 which stated, *"At 1109 AM EDT/1009 AM CDT/, National Weather Service Doppler radar indicated extreme winds in excess of 130 mph, associated with the eyewall of Hurricane Michael, were moving onshore. THIS IS AN EXTREMELY DANGEROUS AND LIFE-THREATENING SITUATION!"* **This "Extreme Wind Warning" was issued and in effect approximately 2 hours before any storm tide/ocean water reached the property.**

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.