Michael and Harvey
Communications Successes and Challenges

Tom Johnstone, MIC Tallahassee/NOAA Gulf Collaboration Team Member
What We Will Cover Today

- Brief review of Hurricanes Michael and Harvey
- NWS IDSS review for both storms
- Shared challenges and lessons learned
- A look to the future
Harvey Facts

- 1st category 4 hurricane to strike Texas since Carla 1961
- 1st major hurricane to hit U.S. since Wilma 2005 (12 years).
- Tropical depression to major hurricane in 36 hours!
- 16th deepest U.S. land-fall
- Zero direct landfall fatalities!

- Peak wind gust 145 mph measured near Rockport.
  - 151 mph at 15 meters
- Peak storm surge 12.5 feet Aransas Wildlife Refuge
Beyond the 5-day forecast, there remains considerable uncertainty on where the system may track. Continue to monitor the latest advisories from the National Hurricane Center.
There remains considerable uncertainty on where the system may track. Continue to monitor the latest forecasts or advisories from the National Hurricane Center.
BULLETIN
Tropical Depression Harvey Advisory Number 12
NWS National Hurricane Center Miami FL  AL002017
1000 AM CDT Wed Aug 23 2017

...HARVEY REGENERATES INTO A TROPICAL DEPRESSION...
...HURRICANE AND STORM SURGE WATCHES ISSUED FOR PORTIONS OF THE TEXAS COAST...

BULLETIN
Tropical Storm Harvey Advisory Number 15
NWS National Hurricane Center Miami FL  AL002017
400 AM CDT Thu Aug 24 2017

...HARVEY FORECAST TO STRENGTHEN IN THE GULF OF MEXICO...
...HURRICANE WARNING ISSUED FROM PORT MANSFIELD TO MATAGORDA...

BULLETIN
Tropical Storm Harvey Advisory Number 16
NWS National Hurricane Center Miami FL  AL002017
1000 AM CDT Thu Aug 24 2017

...HARVEY QUICKLY STRENGTHENING AND FORECAST TO BE A MAJOR HURRICANE WHEN IT APPROACHES THE MIDDLE TEXAS COAST...
...LIFE-THREATENING STORM SURGE AND FRESHWATER FLOODING EXPECTED...

...6 PM CDT POSITION AND INTENSITY UPDATE...
...HARVEY BECOMES A CATEGORY FOUR HURRICANE...
...SUSTAINED HURRICANE-FORCE WINDS SPREADING ACROSS THE MIDDLE TEXAS COAST...

Air Force Reserve Reconnaissance aircraft data indicate that Harvey has become a category 4 hurricane with maximum sustained winds of 130 mph (215 km/h).
NWS Corpus IDSS for Harvey

- Meteorologists deployed to Corpus and Victoria EOCs for the duration
- 40 email briefing packages sent
- Led 25 Webinars
- Participated in dozens of other calls
- 55 personal Core Partner briefings
- Over 500 text messages to core partners
- Nine individual EM briefings...
  - In the eye!!!
Michael - One for the Record Books*

- 1\textsuperscript{st} category 4 or 5 hurricane on record to make landfall in the Florida Panhandle
- Latest in season to make landfall as Cat-5
- First GA Major Hurricane since 1898
- 3\textsuperscript{rd} strongest hurricane at U.S. landfall based on pressure (behind 1935 unnamed FL Keys hurricane and Camille 1969)
- 4\textsuperscript{th} strongest hurricane at U.S. landfall based on wind (160 mph) behind the 1935 Keys, Camille (1969) and Andrew (1992)
- 46 mb drop in 24 hours before landfall - 9 mb drop in final three hours

* Based on NHC Advisories and preliminary best track data.
Peak Measured Gusts*

- Port St. Joe, WeatherSTEM: 98 knots
- KPAM (Tyndall AFB): 121 knots
- FSU/Panama City WeatherSTEM: 101 knots
- Marianna ASOS: 89 knots
- Donalsonville, Georgia Mesonet: 100 knots

*No known site with complete wind data for storm core.
## Surge

<table>
<thead>
<tr>
<th>Location</th>
<th>Preliminary Peak Storm Surge Inundation (AGL)</th>
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<tbody>
<tr>
<td>Mexico Beach to Indian Pass</td>
<td>9 to 14 feet</td>
</tr>
<tr>
<td>Indian Pass to Lanark Village</td>
<td>6 to 9 feet</td>
</tr>
<tr>
<td>Lanark Village to Ecofina State Park</td>
<td>9 to 11 feet</td>
</tr>
<tr>
<td>Ecofina State Park to Steinhatchee</td>
<td>6 to 8 feet</td>
</tr>
<tr>
<td>Steinhatchee to Suwanee River</td>
<td>4 to 6 feet</td>
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</tbody>
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Impacts
Estimated Maximum Power Outages

Percent of customers within the county without power

[Map showing percentage of power outages across different counties, with percentages ranging from 0% to 100% in various counties.]
Georgia - 2,368,226 acres of forestland was impacted by Hurricane Michael; estimated value of $762,683,909

Florida - almost 3 million acres of forested land was damaged; costs estimate of $1.29 billion

Sources: Georgia Forestry Commission/Florida Department of Agriculture
Other Agriculture

- Florida
  - Cotton: $50 million
  - Cattle: $43 million
  - Peanuts: $23 million
  - Poultry and eggs: $10 million
  - Pecans: $4 million
  - Other ag: $33 million

- Georgia
  - Cotton: $550-600 million
  - Pecans: $560 million
  - Vegetables: $480 million
  - Poultry: $28 million
  - Peanuts: $10-20 million
  - Other ag: $28 million

Sources: Georgia Department of Agriculture/Florida Department of Agriculture
Mexico Beach, Florida

Source: NOAA/National Geodetic Survey
Lynn Haven, Florida (Panama City Area)
Marianna, Florida

- 56 miles inland from landfall point

Source: National Weather Service
• 8 Direct Fatalities Locally
  • 16 nationwide
• 3 Wind Related
• 5 Surge Related
• 5 Male
• 3 Female
Agnes Vicari, 79 – Bay County

Found in Mexico Beach, moved by storm surge
TALLAHASSEE — In the final hours before Hurricane Michael crumbled her Mexico Beach home around her, Agnes Vicari was on the phone with her niece with a promise.

“I made a mistake. I won’t make a mistake again,” she told Joanne Garone Behnke the morning the storm hit. Vicari, 79, who lived in a small one-story home just yards from the Gulf of Mexico, promised she’d evacuate the next time a storm came, that she’d see them soon to celebrate Behnke’s husband retiring.

“Aunt Aggie, you can still go to a shelter,” Behnke begged.

“There are no shelters in Mexico Beach,” Vicari said, before the call ended.

When Hurricane Michael began to churn into the Gulf two weeks ago, her family begged her to leave. Her pilot nephew called the day before the storm. Her granddaughter, who evacuated north to Wewahitchka, asked her to do the same. Even a police officer stopped by. She chuckled at them, Behnke remembered.

“She was still struggling with the concept of getting in her car and going somewhere,” she said. “She’s an old-time Italian, kept her money in her house, very stubborn.”

Her somewhat reclusive aunt might also have not wanted to go to a shelter, she added, “probably afraid of leaving her home where she had her sense of security.”

The Wednesday the storm hit, Behnke called Vicari around 11 a.m. Vicari worried about the storm, which had strengthened to a Category 4 overnight. But as it approached, she sounded hopeful she would see her family soon.

“My aunt didn’t want to die,” Behnke added. “She didn’t think she was going to die.”
Donald Vonderhaar, 87 - Bay County

Swept away by house during the storm
Sandra Lucas Detrick, 60 – Bay County

Found in Mexico Beach rubble, moved by storm surge
William McConnell, 70 – Gulf County

Found in Cape San Blas debris - was fleeing in truck

MATIAS J. OCNER/Miami Herald
John Gombos, 67 – Jackson County

Tree collapsed on mobile home, roof collapsed onto decedent
Steve Sweet, 44 – Gadsden County

Due to trauma following a tree falling on a home
Local WFO Response and Communication
Had to ramp up messaging quickly!
October 2, 2018 2AM EDT
First mention of potential for Michael in 5 day TWO

October 5, 2018 2:51PM EDT
First email to partners

October 6, 2018 4PM EDT
Potential Tropical Cyclone Fourteen

Staffing Availability and First Guess
Sunday October 7, 2018 11:30AM EDT
Pow-Wow with MIC

October 7, 2018 2PM EDT
Becomes TS Michael

October 7, 2018 2:30PM EDT
First webinar for partners

- Michael has maximum sustained winds of 40 mph.
- No watches or warnings
October 8, 2018 5:16 AM EDT
Watches issued for CWA

October 8, 2018 11AM EDT
Hurricane becomes Hurricane Michael

October 8, 2018 Afternoon
Decision made to deploy forecasters to three EOCs

October 8, 2018 5:42 PM EDT
Warnings issued for CWA
October 9, 2018 Morning
Forecasters arrive at respective EOCs

October 9, 2018 4PM EDT
Hurricane Michael becomes a major hurricane

October 9, 2018 7PM EDT
Midnight shift arrives for the duration of the event

October 9, 2018 Evening
~250 people left in Mexico Beach

October 9, 2018 12:55PM EDT
First Facebook Live

October 9, 2018
10:15PM EDT
“Pull out all the stops”
Messaging Avenues and Severity

Pre-Event

Unprecedented Event Unfolding

Social Media

Facebook Live

Wireless Emergency Alerts

Unprecedented Event Unfolding

This is your last chance to get to a safe place and the time for that is coming. This storm will bring deadly surge to the Florida Keys; anything we have seen before. If you don’t act now, you risk your life or that of your family.

Emergency Alert

LIFE THREATENING STORM EVACUATE ZONES A B C AND LOW LYING AREAS AND MOBILE HOMES NOW

Social Media

5AM EDT update: This is as serious as it gets. Major HurricaneMichael has continued to intensify over the Gulf of Mexico. We want everyone to know this is an EXTREMELY dangerous storm and unfortunately the time for preparation is ending!

5:16 AM - Oct 10, 2018

919 people are talking about this

Facebook Live

Skype Interviews
Deployed Meteorologists

Pre-Event

Leon County
Bay County
Florida State University
Helped to craft hard hitting messages

Provided briefings to partners that centered around logistical decisions

Communicator between Bay County and Leon County due to loss of comms

Bay County Deployment

EMERGENCY ALERTS
Emergency Alert
Dangerous winds are beginning to occur in Bay County shelter in place now

Helped to craft hard hitting messages
October 10, 2018 1:30PM EDT
Hurricane Michael makes landfall - winds of 155 mph

October 10, 2018 11:11AM EDT
First Extreme Wind Warning issued

October 10, 2018 Morning
50 people left in Mexico Beach

October 10, 2018 1:30PM EDT
NWS Tallahassee comms fail and operations are passed to NWS Jacksonville

TO: All Southern Region Offices
FROM: WFO Jacksonville
SUBJECT: Service Backup

WFO Jacksonville has initiated full service backup for WFO Tallahassee.
Lessons Learned – Looking Ahead
Michael/Harvey - Similar Challenges

- Accelerated timeline associated with rapid intensification
- Staff lockdown
- Communications
  - No Hurricane Hotline for either storm
  - Lost Internet/Awips in Michael
  - No HAMS for either event
- Post hurricane surveys
  - 2000+ data points surveyed in Michael
  - Lack of coastal survey experience
  - EF Scale does not work for hurricanes
- Lack of reliable real time wind information
Lessons Learned/Applied

- Prepare for one category stronger
- All hands on deck/12 hour shifts
- “Survive the aftermath” Mike Brennan
- IT expertise and Management on duty 24/7
- ET and facility personnel here throughout
- Backup internet critical – FSU and hot spots
- 10 hotel rooms reserved
- Internal coordination document and DSS schedule
More Lessons Learned/Applied

- One person dedicated to supporting deployees
- Use DAT to coordinate internal and partner surveys
- Coastal survey support from NOAA and HCFCD
- Late season tropical training
- COOP and service backup???
Next Time?

- Redundant operational internet
- Time of departure graphics
- Robust/reliable observing equipment
- Tropical messaging training for inland WFOs
- Two person deployments to EOCs for tropical ops
- Apply Dr. Myers’ post-Michael social science findings
Team Effort

Southern Region HQ

Forecasters and surveys

Facilities and surveys

NOAA Co-ops

Backup and surveys

Surveys

Forecaster

HELP
Thank You!
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