

Role of the Warning Coordination Meteorologist (WCM)

Robert Molleda

U.S. National Weather Service

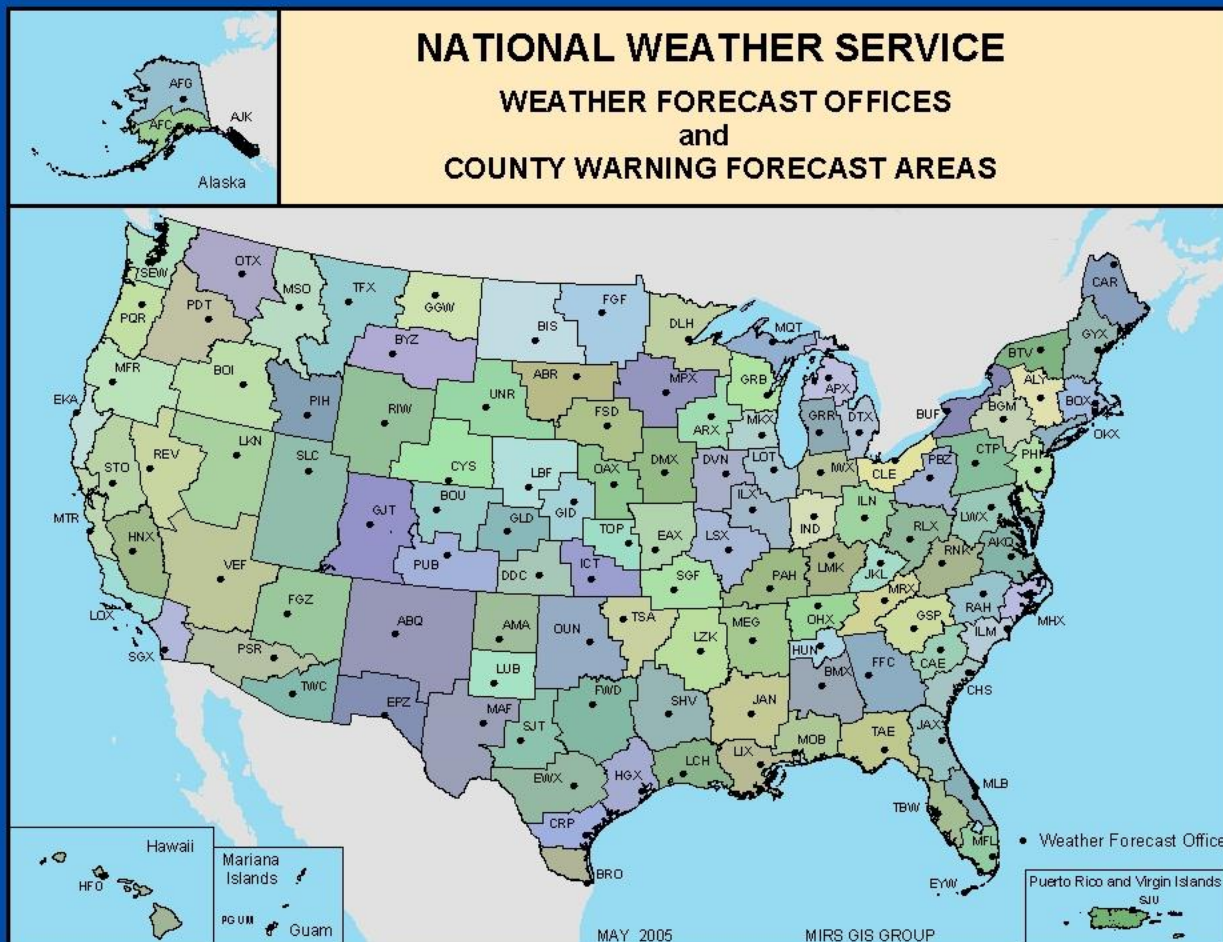
Miami/South Florida Forecast Office



U.S. National Weather Service

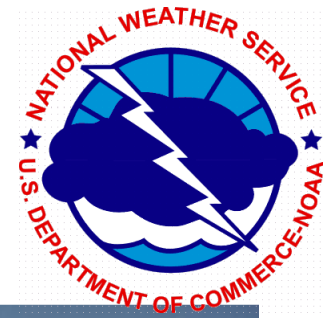
122 local weather forecast offices

9 National Centers- 3 with WCMs





U.S. National Weather Service Weather Forecast Offices (WFOs)



- Issue all Local Forecasts and Warnings
- Build and Maintain Relationships with key partners
- Coordinate and Provide **Expert Decision Support** to Emergency Operations Centers and other key partners
- Solicit Customer Feedback on Products and Services
- Conduct Community Awareness and Education Programs
- Train Volunteer Observers and Storm Spotters

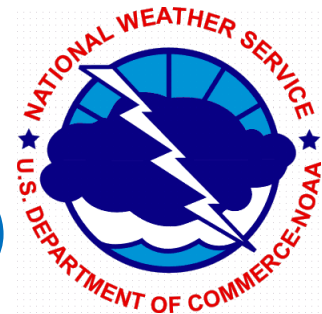


Warning Coordination Meteorologist serves as the primary interface between WFO and Customers



WCM Job Description/Duties

Local Weather Forecast Office (WFO)



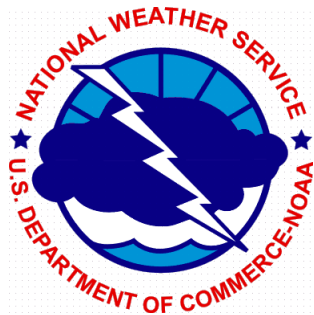
It is said that the WCM wears several hats



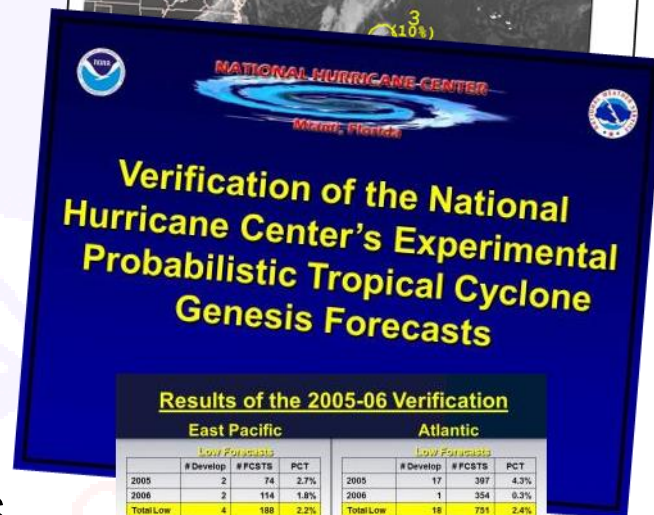
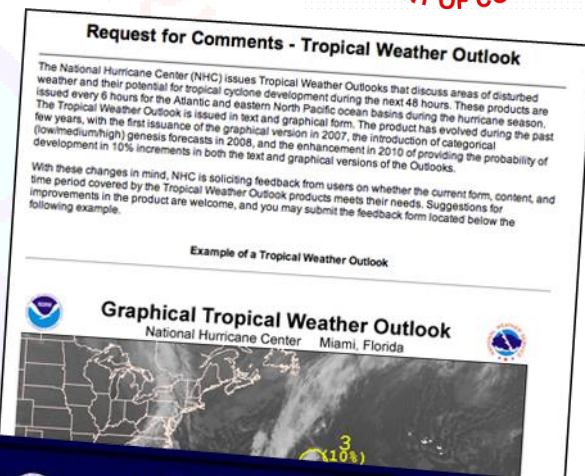


WCM Job Description/Duties

Local Weather Forecast Office (WFO)



- **Primary interface** between WFO and core community partners (emergency managers/public safety officials and media)
- **Product Evaluation:** seeks and implements partner feedback on improvements and additions to products and services



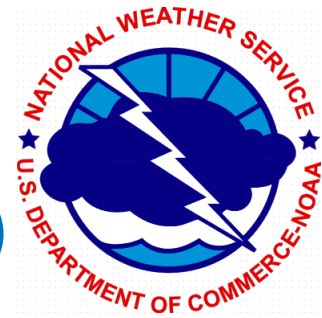
Results of the 2005-06 Verification			
East Pacific			
Low Forecasts			
	# Develop	# FCSTs	PCT
2005	2	74	2.7%
2006	2	114	1.8%
Total Low	4	188	2.2%
Medium Forecasts			
	# Develop	# FCSTs	PCT
2005	40	161	24.8%
2006	68	218	31.2%
Total Med.	108	379	28.0%
High Forecasts			
	# Develop	# FCSTs	PCT
2005	66	116	56.9%
2006	83	119	69.7%
Total High	149	235	63.3%

Atlantic			
Low Forecasts			
	# Develop	# FCSTs	PCT
2005	17	387	4.3%
2006	1	354	0.3%
Total Low	18	731	2.4%
Medium Forecasts			
	# Develop	# FCSTs	PCT
2005	86	301	28.6%
2006	25	243	10.6%
Total Med.	111	544	20.4%
High Forecasts			
	# Develop	# FCSTs	PCT
2005	97	167	58.1%
2006	32	76	42.1%
Total High	129	243	53.1%



WCM Job Description/Duties

Local Weather Forecast Office (WFO)



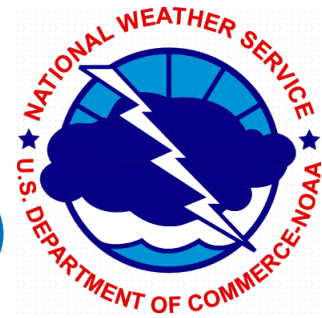
- Organizes and conducts yearly partner training/meetings such as **Integrated Warning Team workshops** and takes part in local and state exercises
- Attends and represents NWS at partner-organized meetings to **better understand partner and community needs**, and apply those to NWS products and services





WCM Job Description/Duties

Local Weather Forecast Office (WFO)



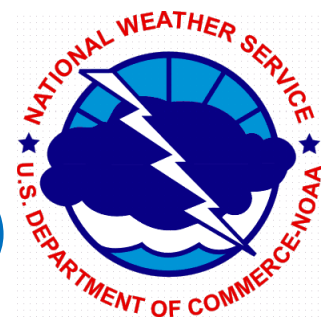
- Conducts and arranges media interviews on high-impact weather events
- Press conferences for seasonal outlooks





WCM Job Description/Duties

Local Weather Forecast Office (WFO)



- Responsible for planning, coordinating, and carrying out the public weather awareness and preparedness program
 - Educate the public to ensure the mitigation of death, injury and property damage or loss caused by meteorological events



Community Outreach

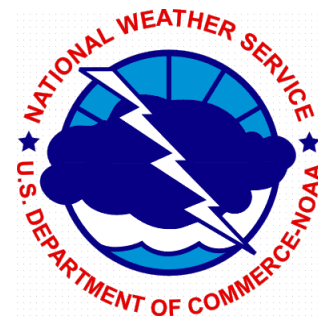


- Yearly hurricane/severe weather expos
- Being accessible to community-at-large
- Office tours/open house
- Speaking to business and civic groups, and schools

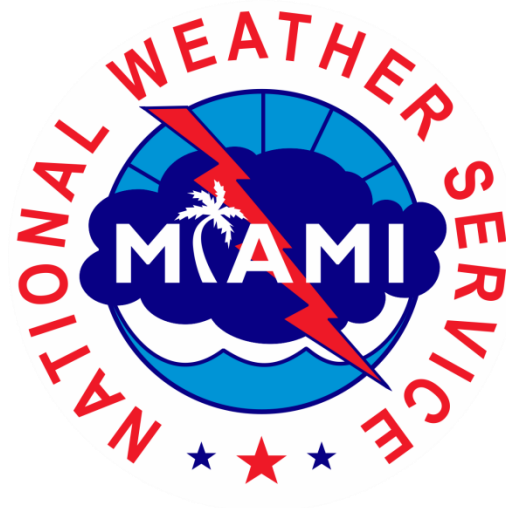




WRN Ambassador



AMBASSADOR
WRN
WEATHER-READY NATION™





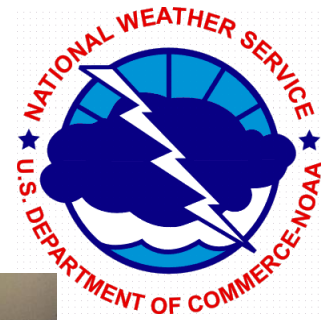
It's All About Partnerships



Weather-Ready Nation



WRN Ambassador

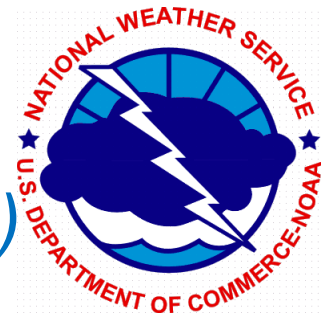


Over 7,000 WRN Ambassadors in the U.S., almost 90 in South Florida alone



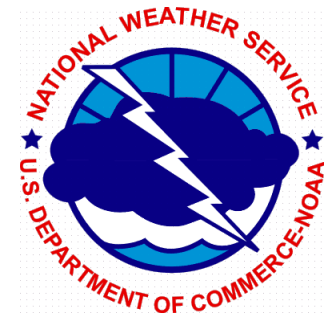
WCM Job Description/Duties

Local Weather Forecast Office (WFO)

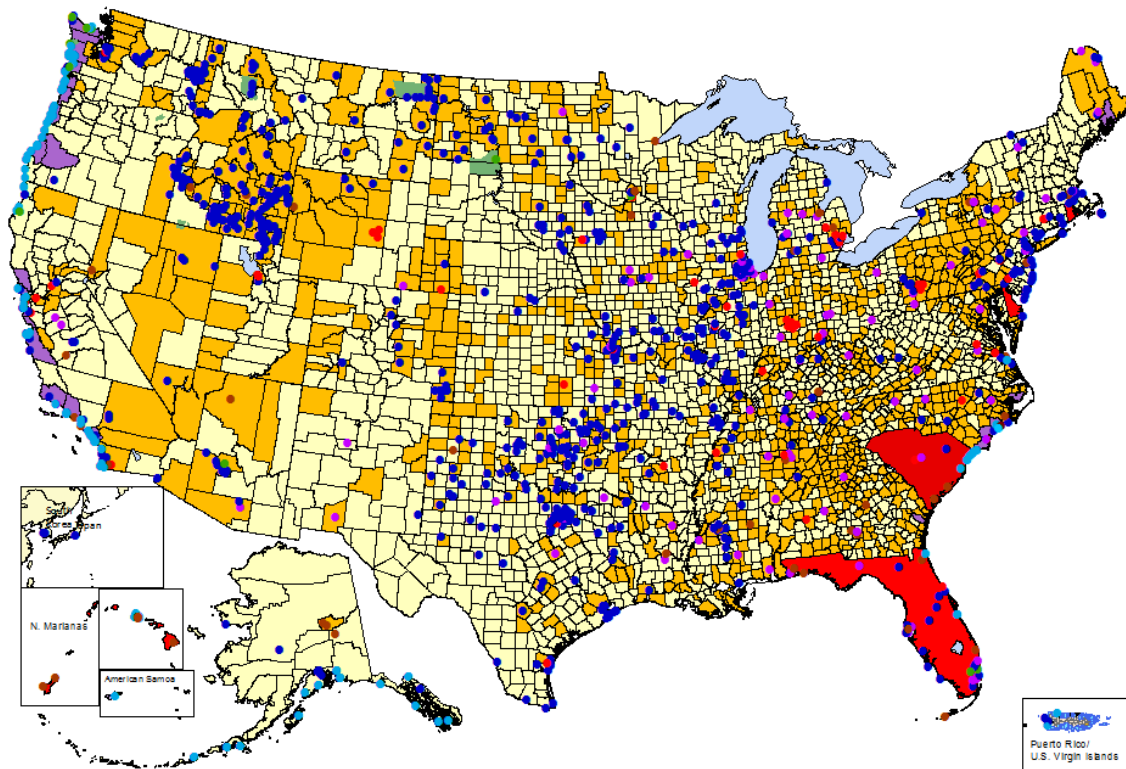


- Coordinates preparedness program with government officials and media
 - Works with media and emergency managers to ensure that preparedness message is consistent and plans are in place ***well before a weather threat***





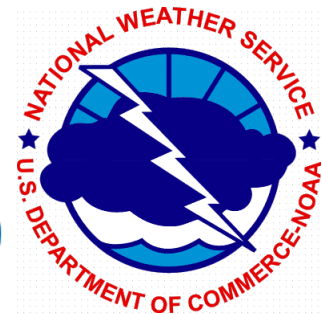
- Communities must meet basic guidelines for receiving and disseminating alerts as well as 24-hour monitoring
- Perform at least 4 safety talks per year
- Maintain hazardous weather operations plan, record of storm spotters and participate yearly in weather-related exercises
- Must Be Renewed Every 3 Years





WCM Job Description/Duties

Local Weather Forecast Office (WFO)



- Works with government agencies and other key partners to develop plans for promoting more effective use of NWS products and services

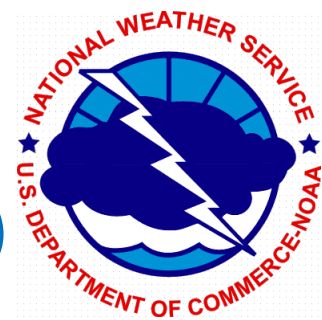


Local Mitigation Strategy



WCM Job Description/Duties

Local Weather Forecast Office (WFO)



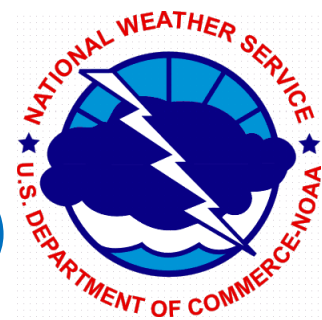
- Conduct storm spotter training classes year-round
- Several hundred new spotters trained every year in South Florida alone





WCM Job Description/Duties

Local Weather Forecast Office (WFO)



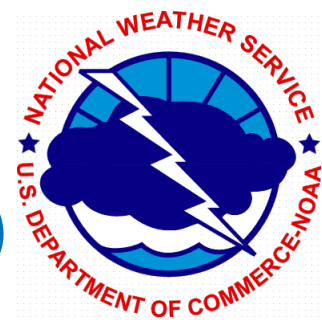
- **Serves as Senior Forecaster**
 - Performs full range of responsibilities of that position
 - Serves in this role about 25% of the time
- **Act as acting branch/office chief**
 - full range of administrative duties





WCM Job Description/Duties

Local Weather Forecast Office (WFO)

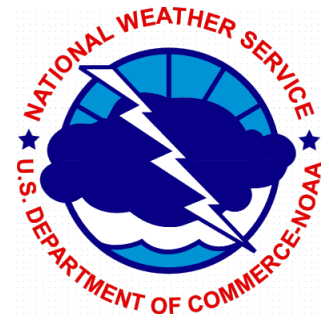


Coordinates with partners on the provision of **impact decision support**





Impact Decision Support Services

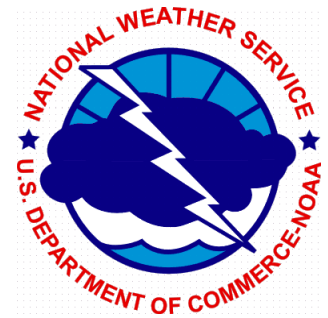


- **Provide direct and specific weather-based and/or event-based weather support** to government officials either on-site at a command post or remotely from NWS office
- Focus on providing an expectation of impacts that could affect a large public event or a community's preparation in advance of severe weather
- Examples: severe weather/tropical cyclone events, festivals, sporting events







Impact Decision Support Services



- **What IS Impact Decision Support Services?**

- A. Provision of forecast advice and interpretative services to help core partners, such as emergency personnel and public safety officials, make decisions when weather, water and climate impacts lives and livelihood
- B. Providing specific temperature and wind information to a private event organizer

**National Weather Service**
Miami – South Florida
weather.gov/miami

Issue Date: July 10, 2017 **Time:** 9:00 am

OVERVIEW
Today, there is enhanced coverage of morning showers and storms compared to the last couple days. Expect scattered showers and storms through early afternoon with lower rain chances beyond mid-afternoon. An isolated passing shower or storm can't be completely ruled out for late afternoon and evening today. For tomorrow, rain chances will be lower as there will be a slightly drier airmass in place. Any showers that do occur would happen in the morning to early afternoon hours.

July 10, 2017	July 11, 2017	July 12, 2017
Temperatures High: U 80's; Low: U 70's Heat Index: 96-100 (Daytime) Precipitation Thru 2PM: 50% Beyond 2PM: 30% Thunderstorms Thru 2PM: 40% Beyond 2PM: 30% Wind East southeast: 9-14 mph Gusts: 14-18 mph	Temperatures High: Near 90; Low: lower 80's Heat Index: 97-101 (Daytime) Precipitation AM: 20% PM: 20% Thunderstorms AM: 20% PM: 20% Wind East: 8-12 mph Gusts: 12-15 mph	Temperatures High: Near 90; Low: lower 80's Heat Index: 97-101 (Daytime) Precipitation AM: 30% PM: 30% Thunderstorms AM: 20% PM: 30% Wind East northeast: 8-14 mph Gusts: 14-18 mph
POTENTIAL HAZARDS <div>Moderate</div> Lightning <div>Slight</div> Wind Gusts <div>Slight</div> Heat Index	POTENTIAL HAZARDS <div>Slight</div> Lightning <div>None</div> Wind gusts <div>Slight</div> Heat Index	POTENTIAL HAZARDS <div>Slight</div> Lightning <div>None</div> Wind gusts <div>Slight</div> Heat Index

Green
No Current threat

Yellow
Slight Threat

Orange
Moderate Threat

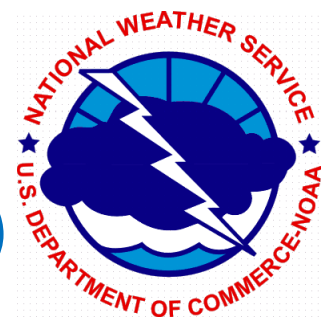
Red
High Threat

For More Detailed Forecast: [Hourly Weather Forecast for Bayfront Park](#)



WCM Job Description/Duties

Local Weather Forecast Office (WFO)



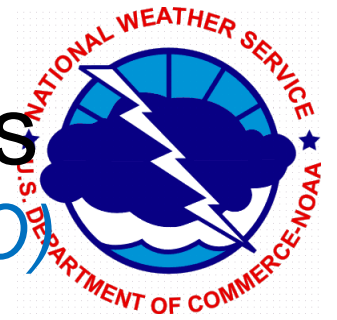
Coordinates with partners on the provision of **impact decision support**

	Miami-Dade County EMERGENCY OPERATIONS CENTER FLASH REPORT # 2 8/01/2017 Severe Weather	PHONE: 305-468-5800 FAX: 305-468-5401 ecoc@miamidade.gov
REPORT DATE August 3, 2017	EOC ACTIVATION LEVEL Level 3 - Monitoring	REPORT TIME 1230
<p>SUMMARY OF CURRENT SITUATION AND ACTIONS</p> <ol style="list-style-type: none"> The National Weather Service (NWS) Miami issued a Flash Flood Warning for Miami-Dade County on August 1st at 1547 hours until 1745 hours. It was extended until 2145 for east-central Miami-Dade. The Miami-Dade Office of Emergency Management (OEM) deployed personnel to assist Miami Beach with conducting a damage assessment. <p>Damages from Miami Beach</p> <p>Residential</p> <p>16 – no damages – no flooding inside of the structures 6 – affected – minimal flooding inside of structure</p> <p>Commercial</p> <p>8 – no damages – water did not go inside of structure 12 – affected – minimal flooding inside of the structure</p> <ul style="list-style-type: none"> One business had up to 3" of water Two apt buildings reported up to 6" of water in the lobby with water in the elevator pit One business reported damage to wood floor but had insurance and previous claims Miami Beach Convention Center reported damages <p>3. The Florida Department of Economic Opportunity activated the Business Damage Assessment Survey to document damages to the business community. The survey is available at: http://flvbecoc.org/index.php?action=bda</p> <p>Florida Department of Economic Opportunity Damage Survey</p> <p>4 businesses from the City of Miami have filed Business Damage Assessment Surveys with the State. Reporting they would need up to \$100,000 in assistance. (the lowest option is a range from \$1,000 to \$100,000)</p> <p>4. A heat advisory is in effect until 1900 hours for all areas of Miami-Dade. Heat indices may reach temperatures near 110 degrees and up to 105 degrees into the weekend and early next week. The OEM Duty Officer is monitoring.</p> <p>5. OEM will continue to monitor the weather forecasts and provide additional notifications as conditions warrant. For forecast information, specific to your area please visit: http://www.weather.gov/mfl</p>		
<div style="display: flex; justify-content: space-around;"> <div data-bbox="1166 1005 1483 1272"> <p>SFWMD 24-HOUR RAINFALL</p> <p>DISTRICT-WIDE RAINFALL ESTIMATE: 0.403"</p> </div> <div data-bbox="1489 1005 1825 1272"> <p>HEAT INDEX FORECAST 8/3/2017</p> <p>24-Hour Maximum Heat Index Temperature</p> </div> </div>		

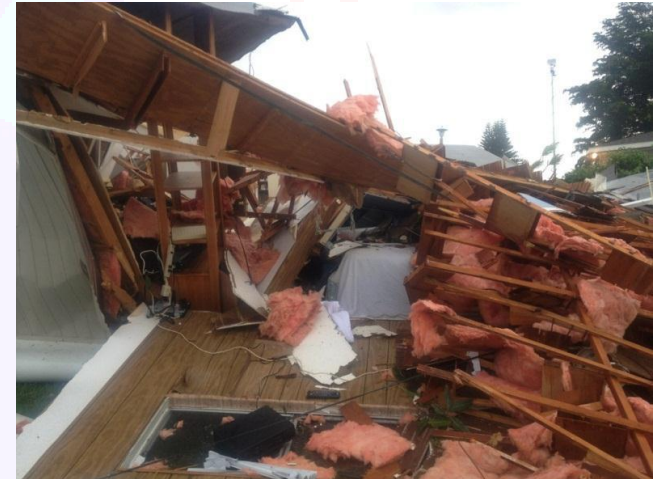


WCM Job Description/Duties

Local Weather Forecast Office (WFO)

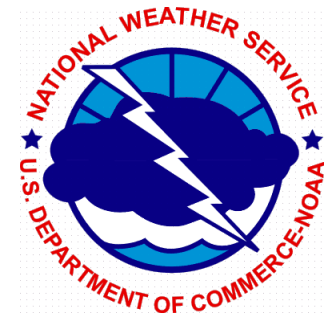


- Coordinates and performs NWS post-storm surveys to assess damage and rate the intensity and effects of a storm
- Normally done for tornado events but can also be done for flooding and hurricanes





NHC WCM



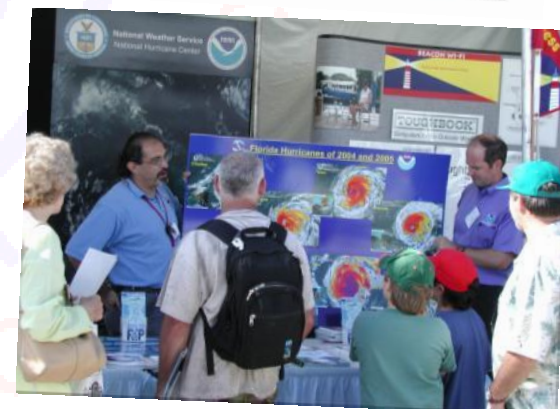
- **Conducts a tropical cyclone preparedness program**
 - Identifies preparedness objectives and projects to meet them
 - Reviews NHC warning efforts and determines adequacy of NHC preparedness activities
 - Coordinates with NWS WCMs to ensure uniformity of effort, collaboration, and compatibility
 - Interacts with NCEP, and regional and NWS headquarters on TC preparedness activities
- **Conducts a marine preparedness program**
 - Coordinates NHC interactions with marine customers
 - Serves as a liaison between NHC TAFB and the marine user community

Tropical Cyclones



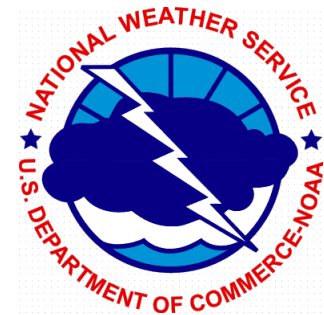
Hurricane Earl, September 1, 2006/NOAA

A PREPAREDNESS GUIDE
U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Weather Service
Revised March 2011





Key Tasks of NHC WCM



- Works with FEMA Emergency Management Institute (EMI) to conduct 3-one week EM training courses on hurricane preparedness and evacuation decision making
- Develops NHC outreach and training agenda for National Hurricane Conference
- Coordinates NHC participation at state EM or hurricane conferences



DAY AT A GLANCE FOR THURSDAY, APRIL 21, 2011

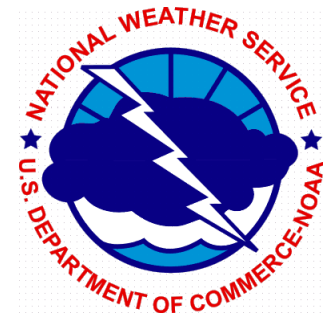
	1 8:30 am to 10:00 am	2 10:30 am to 12:00 pm	3 1:30 pm to 3:00 pm	4 3:30 pm to 5:00 pm
A	Mitigation WS Get More for Your Money: Make the Newly- Revised 406 Hazard Mitigation Policy Work for You	Mitigation WS Integrating Hazard Mitigation and Comprehensive Planning for a Resilient Community	Mitigation/Recovery WS Encouraging Personal Hazard Mitigation Actions Through Risk Communication	Mitigation WS Building Resiliency: Hurricanes Katrina and the Mitigation Measure Best Practices
B	Recovery WS The FEMA Arbitration Process for Hurricane Katrina	Recovery WS Implementation of the New National Disaster Recovery Framework (NDRF)	Recovery WS Disaster Human Services: A Keystone in Hurricane Recovery	Recovery WS FEMA and AD: Federally Funded Disaster Case Management Program
C	Public Education/Media TS ESP-15 External Affairs: It is More Than Public Information	Public Education/Media TS Social Media 101: What is Social Media: What Types are Available and how Do You Sign Up?	Public Education/Media TS Social Media 101: What is Social Media: What Types are Available and how Do You Sign Up?	Public Education/Media TS Social Media 101: What is Social Media: What Types are Available and how Do You Sign Up?
D	Meteorology/Hydrology WS The State of Hurricane Forecasting	Meteorology/Hydrology WS National Hurricane Center Products: What's New?	Meteorology/Hydrology WS Coastal Hurricane Hazards	Meteorology/Hydrology WS Inland Hurricane Hazards and Decision Support
E	Response WS In the Path of the Hurricane	Response WS Public-Private Partnership in Tourism	Response WS HC or Miss: Hurricane Earl, A Category 4 Storm	Response WS The Vital Role of Communication in Public Safety Response
F	Evacuation Planning WS Recent Behavioral Research on Evacuation Planning Issues	Evacuation Planning WS Real-Time and Near Real-Time Evacuation Transportation Modeling	Evacuation Planning WS Evacuation Decision Making Assistance Tools: The Hurricane Risk Profile	Evacuation Planning WS Use of Social Networks and Websites in Evacuations
G	Fire/EMS WS The Haiti US&F Experience: Operating with International Disaster Teams	Fire/EMS WS MABAS Tornado Mutual Aid Validation Exercise	Fire/EMS/Recovery WS Transitioning Damage Assessment from Emergency to Non-Emergency	Fire/EMS WS Gauging a Community's Infrastructure Vulnerability
H	Hurricane History WS Learning from the Past to Mitigate Hurricane Impacts in the Future	Hurricane History WS Back to the Future: Impacts of the Northern Gulf of Mexico's Hurricane Coast Have Been Lost in Time	Insurance WS Dangers of Complacency: Dealing with Insurance Amnesia After Storm-Free Years	Insurance WS Insurance Incentives for Mitigation or Show Me the Money
I	Utilities WS Department of Homeland Security, Protective Security Advisors and Infrastructure Liaison Roles During a Disaster	Utilities WS A Comparison of Hurricane Induced Power Outage Models: Component vs Statistical Models	Healthcare/Accessibility & Functional Needs WS Emergency Planning for the Whole Community - Integrating the Access and Functional Needs of Children and Adults with Disabilities	Recovery/Response/Public Education/Media/Mitigation WS Mississippi Alternative Housing Program: Challenges, Successes and Lessons Learned
J	Mass Care WS Sudden Sheltering/Community Mobilization	Mass Care WS Planning for the Real World	Mass Care WS Planning for the Real World	Mass Care WS Planning for the Real World

2011 Governor's Hurricane Conference®
May 15-20, 2011

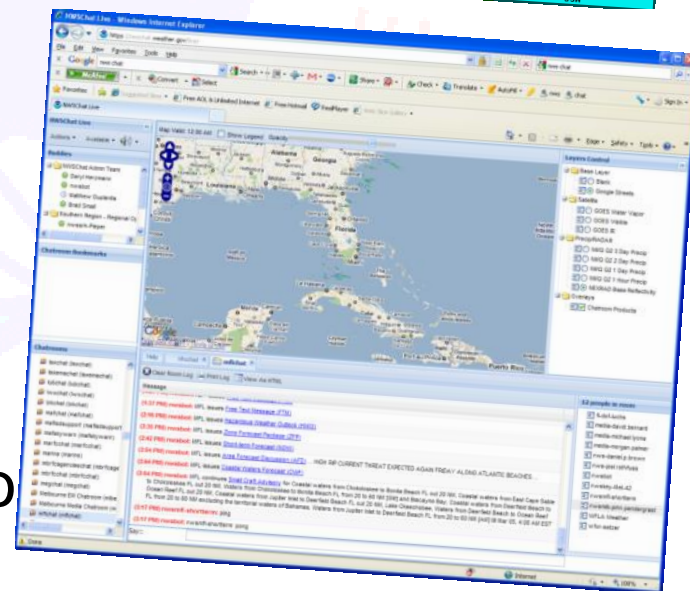
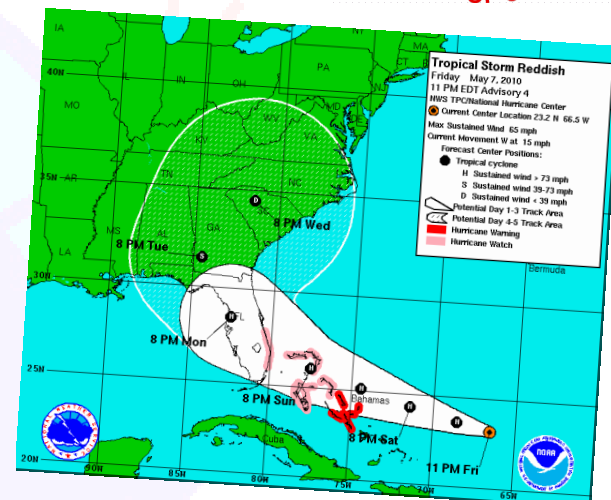




Key Tasks of NHC WCM

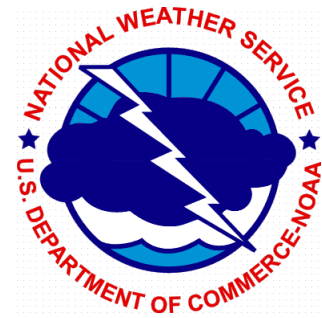


- Develop training plan and course for media
- Coordinates and develops table top hurricane exercise material for state and federal agencies
- Works with NWS WCMs and regions to improve NHC/WFO Watch/Warning coordination
- Works with international met services to improve forecast coordination

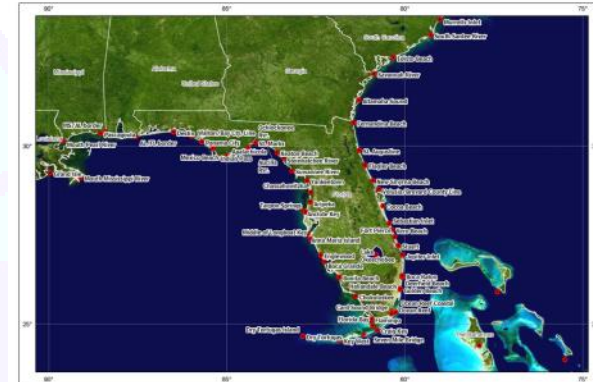




Other Tasks of NHC WCM

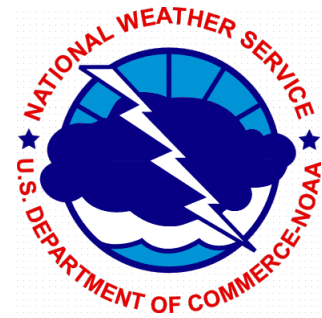


- Serves on team to improve NWS watch and warning collaboration
- Serves on NWS Assessment Teams
- Works with COMET on on-line hurricane preparedness module
- Participates in U.S. Hurricane Awareness Tour
- **WORKS OPERATIONAL FORECAST SHIFTS FROM MAY 15 - NOVEMBER 30!**

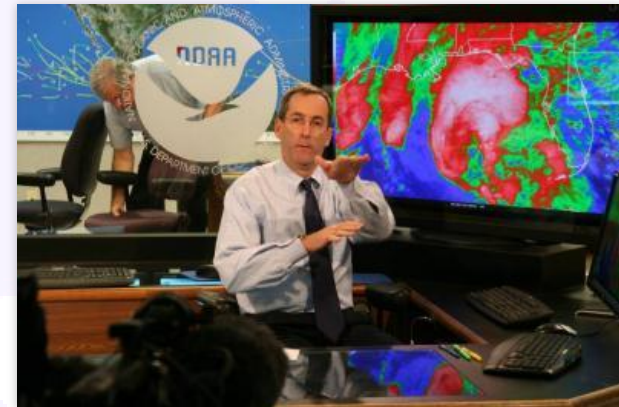




Difference Between WFO and NHC WCMs



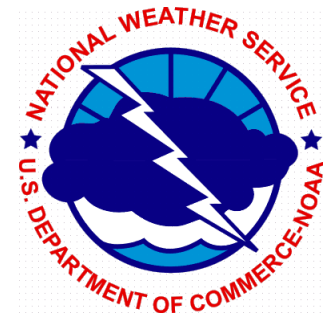
- NHC Director and Deputy Director are the primary spokespersons for the center
 - At a WFO, the WCM and Meteorologist-In-Charge serve that role
- NHC WCM role is more of an Outreach Coordinator and Planner
- Coordinates with Federal and State partners more than local officials



FEMA



“Battle is won (or lost) during the off-season...”

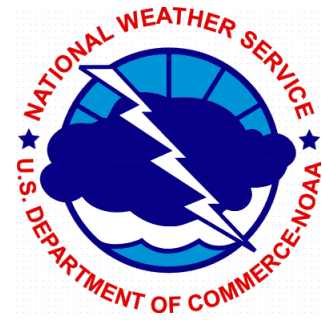


Highlights of annual NHC involvement:

- FEMA/NWS week-long Introduction to Hurricane Preparedness course for emergency managers (three courses), January-February
- U.S. Interdepartmental Hurricane Conference, March
- National Hurricane Conference, April
- World Meteorological Organization workshop for international meteorologists (2-week course at NHC), March
- Hurricane Awareness Tour (one week, alternating each year between U.S. Gulf and East Coasts), April or May
- Caribbean Hurricane Awareness Tour, April
- National Hurricane Preparedness Week, May
- State conferences
- Scientific conferences
 - Transition of new science from research into operations



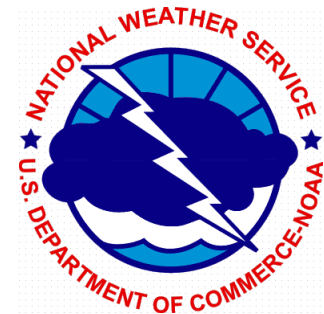
Question



- **When is the BEST time to get to know your core partners?**
- A. Right at the beginning of hurricane season
- B. Well before hurricane season
- C. 5 days before a high-impact weather event
- D. When you show up at Emergency Operations Center two days before a hurricane landfall



“Battle is won (or lost) during the off-season...”



- **Main message:** don't wait until a disaster to get to know the people your serve and work with
- This involves a continuous, year-long effort and engagement with key partners
- Battle is won (or lost) during the “off-season” (Max Mayfield)





The U.S. National Weather Service Outreach and Education Program



The Basic NWS Goal: Building A Weather-Ready Nation

- Protect Life And Property Through The Issuance Of Warnings And Advisories For Hazardous Weather
- Promote Commerce And The Economy Through Collection Of Weather Data And Preparation Of Forecasts And Statements



Is There Really A Need For More Outreach and Education?

Timeliness and Accuracy Of Forecasts and Warnings
Are Steadily Improving...But Deaths and Injuries
From Weather Related Events Still Occur... Are We
Missing Something???

A Basic Problem:

Even The Most Accurate Forecasts And Warnings
Are Ineffective If Users Either Do Not Understand
Them Or Do Not Know What Actions To Take!

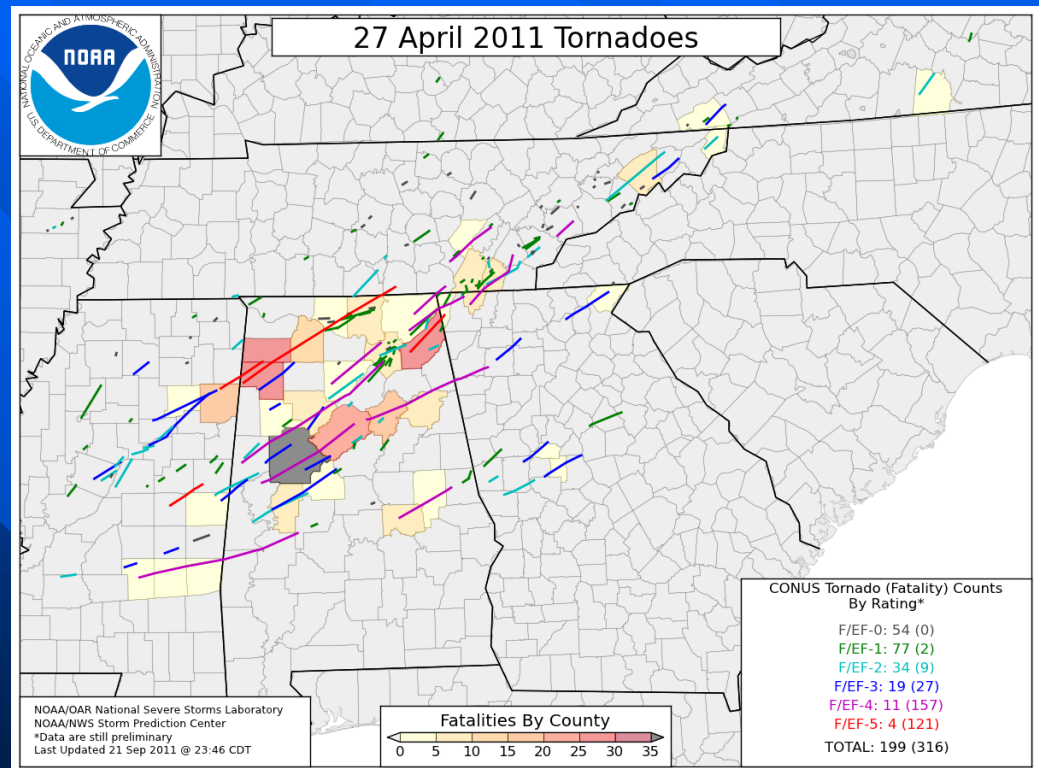
January 24, 2012: A massive outbreak of strong/violent tornadoes affects the southern United States



Sequence of radar images during Sunday/Monday's tornado outbreak along with paths of strong rotation aloft (colored in red) as indicated by radar. Note these "rotation paths" did not necessarily continuously produce tornadoes on the ground but did in many instances. (Greg Carbin, NOAA Storm Prediction Center)

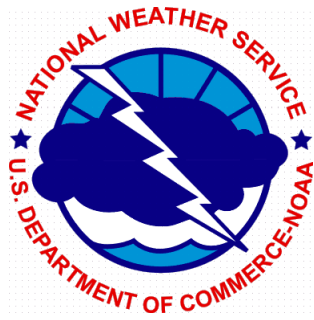
The Previous Spring, another tornado outbreak affected the same area...

- 122 Tornadoes
- 31 Rated EF3 or Higher
- 4 EF5 Tornadoes
- Average Path Length 66 Miles
- \$4.2 Billion In Damage





Question



- **What impressions did the news report give?**
- A. People didn't have enough time to protect themselves
- B. Event was poorly forecasted
- C. No warning was given
- D. Some inconsistency in information provided by anchor and reporter versus what actually happened

How Was This Event Handled?

- It Was Anticipated And Forecast Several Days In Advance.
- Tornado Watch Lead Times Ranged From 3 To 6 Hours For The Significant Tornadoes
- Tornado Warning Mean Lead Time Was 22.1 Minutes.
- 89% Of The Tornadoes Were Detected And Warned For.
- Conclusion: From A Forecast And Warning Perspective, The Event Was Very Well Handled.

However...

***If The Event Was Indeed So Well
Handled...***

Why Were There 316 Deaths????



Service Assessment Findings

Despite A Robust Outreach & Education Program,
There Were Still Numerous Response Issues...

- Myths – “Tornadoes Can’t Cross Rivers” etc.

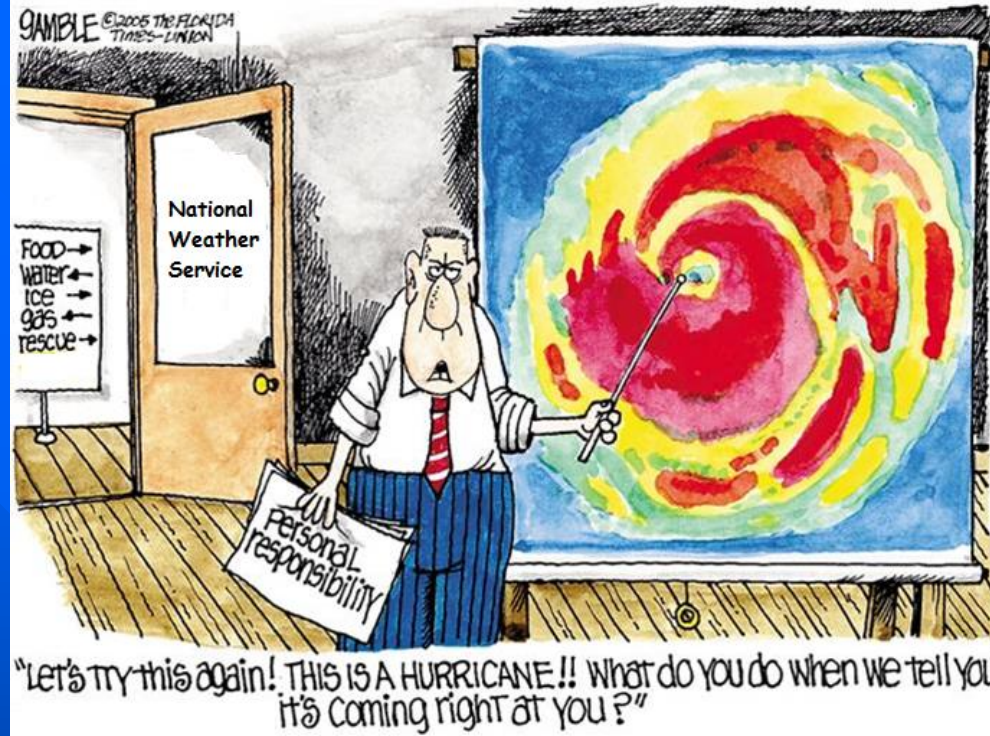
- “False Alarm” or “Cry Wolf” Syndrome

- Waiting For Confirmation

- Multiple Sources Saying The Same Thing
- Actual Visual Confirmation

- Many Who Waited For Confirmation Did Not Have Time To Find Safe Shelter.





What We Do Well:

- Accurate & Timely Watches & Warnings

What Needs Improvement:

- Ensuring That The Public Knows What They Should Actually Do to Protect Themselves When They Hear Those Warnings!

Where Do We Start?

- **Multi-agency public outreach and education campaigns**
- **Participation in exercises and drills with Emergency Managers and other local officials**
- **Community Outreach**

Public Awareness/Education

- Hazardous weather awareness weeks
- Media campaigns
- Partnership with EMs
- Tours of Office
- Talks to student, business, civic groups



Media Outreach and Coordination



- Primary disseminators to the public
- Awareness of NWS products and services
- Ensure timely receipt of products
- Ensure all entities speak with one voice

Social Media... The New Communications Model?

Social Media Users

As of January 2014



Facebook
1.15 billion + users



Twitter
230 million + users



LinkedIn
238 million + users



Google+
500 million + users



YouTube
1 billion unique
monthly users



Pinterest
70 million + total users



Instagram
130 million + users



Pinterest was the fastest growing social network of 2013

Over 2.6 million companies have pages on LinkedIn

Google+ adds 25,000 new users every day



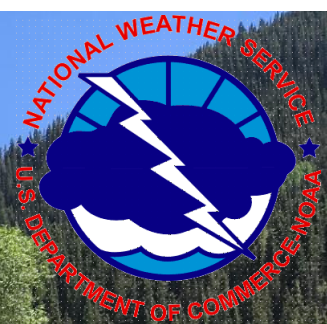
Social Media... The New Communications Model?

- Despite inherent problems, social media has to be acknowledged as a key communications platform]
- Use social media to provide accurate, official information as well as to dispel false information
- Build strong, reliable, trusted social media presence well BEFORE a disaster



Conclusions

- Despite An Ongoing Outreach/Education Effort, More Work Needs To Be Done!
- Forecasts And Warnings Are Improving...The Social Aspect Of Weather Preparedness Must Also Improve
- Technology Provides New Opportunities To Enhance Our Communication And Outreach Efforts.
- Building A Weather-Ready Nation Is A Partnership That Includes Everyone!



Questions?

*Thank you for your time,
and safe trip home!*

