

April 27, 2011

2011



Huntsville-Madison County Emergency Management Agency

April 27, 2011 Madison County Tornado Response

After-Action Report

Madison County, Alabama



Huntsville-Madison County Emergency Management Agency

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Preface

This After-Action Report (AAR) was produced with the help, advice, and assistance of the participants from state, county, local departments, agencies and volunteer organizations. The purpose of publishing this AAR is to document the overall disaster response. As such, this report documents Madison County's efforts to respond to the disastrous tornado events that occurred on April 27, 2011. It serves as a compendium of observations, outlines recommended corrective actions, and provides the basis for future planning efforts.

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EXECUTIVE SUMMARY

On April 27, 2011, The National Weather Service (NWS) Weather Forecast Office in Huntsville issued 92 Tornado Warnings beginning in the predawn hours; 26 of those Tornado Warnings were in Madison County. What followed those warnings were paths of destruction across North Alabama. Madison County was not spared.

Disaster preparedness involves a cycle of outreach, planning, capability development, training, exercising, evaluation, and improvement. Madison County has conducted many successful exercises over the years which led to an ongoing program of process improvements. This report is intended to assist agencies striving for preparedness and response excellence through the following:

- Analyzing the response
- Identifying strengths to be maintained and built upon
- Identifying potential areas for further improvement
- Recommending follow-up actions
- Providing a framework for developing *Corrective Action Plans* at the local level

The Huntsville-Madison County Emergency Management Agency (EMA) and the Madison County Emergency Planning Committee have worked together, along with the emergency response community, to develop disaster response plans and procedures. This event affected all the emergency response agencies within the county and the entire population present on April 27, 2011.

As most readers of this document are aware, Madison County is no stranger to effects of large dangerous tornadoes. Following each of those events there were “lessons learned” that came out of the response and recovery which have subsequently been incorporated into our plans and procedures. However, no set of plans or procedures can cover all contingencies, especially in a major disaster, as all disasters are different even if resulting from similar events. This report aims to present the observations, issues and “lessons learned” by emergency response community and numerous government and non-government organizations that responded to the tornado events in Madison County of April 27, 2011 and the days that followed.

What resulted from the events of April 27, 2011 can be looked at from a “steel rod/steel spring methodology” point of view. Certain necessary elements are critical to a disaster response such as the Emergency Operations Center, 911 Center, communications, emergency responders - those things that you must have and are likened to the “steel rod”. Certain elements, while critical, we can live without temporarily, such as power and fuel, which are likened to the “steel spring”, as they bounce back. The reader should take this into consideration while reviewing this report.

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The primary goal of the response to the tornado disaster of April 27, 2011 was to protect lives and property. Regrettably, nine lives were lost in Madison County as a result of the tornadic events of that day. While no organization has the resources or the infrastructure to mass a response to such an event alone, the existing network of agencies, institutions and organizations within Madison County collectively possessed an enormous amount of resources.

Following the tornado events of April 27, 2011, the Huntsville-Madison County Emergency Management Agency drafted a questionnaire to glean information for this after-action-report. While the number of questions following such a major disaster is almost inexhaustible, the design of the questions was such that both general and specific issues/concerns of the response and immediate recovery could be captured and used to develop improvements to Madison County's disaster response. The EMA solicited a wide range of organizations (both government and non-government organizations (NGOs)) that participated in the response and recovery efforts. Most organizations participated in the AAR questionnaire, either by replying via email or through direct interviews by the EMA staff.

The suggested actions in this report should be viewed as recommendations only. In some cases, organizations may determine the costs of implementing suggested actions outweigh their benefits. In other cases, agencies may identify alternative solutions that are more effective or efficient. Each organization should review the recommendations and determine the most appropriate action and the time needed for implementation. In order to prepare for an emergency situation, personnel should be encouraged to make maximum use of existing emergency response resources and plans and to adopt an approach that is consistent with the principles on which the management of any other type of natural or man-made emergency is based. A community's existing capability to respond to an incident is therefore an essential component of preparedness for future events.

The ultimate goal of the response to the events of April 27, 2011, was the protection of life and property. While nine lives were lost, scores injured and hundreds of homes businesses damaged or destroyed Madison County's resolve to be better prepared for the next disaster remains unshaken, even as recovery efforts continue. Additionally, this event has enabled communities and organizations to identify areas they can use to improve their ability to respond in the future. The cycle of planning, training, exercising and making improvements is the key to success in the response to future disasters. Follow-up exercises should test specific improvements instituted as identified by this report.

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INTRODUCTION

On April 27, 2011, The National Weather Service (NWS) Weather Forecast Office in Huntsville issued 92 Tornado Warnings beginning in the predawn hours; 26 of those Tornado Warnings were in Madison County. What followed those warnings were paths of destruction across North Alabama. Madison County was not spared. The NWS began announcing the possibility of a major severe weather outbreak days in advance. Pre-event briefings were conducted by the NWS and EMA beginning two days in advance for the local emergency response community and other officials which led to a well-prepared response capability.

The primary goal of the response to the tornado disaster of April 27, 2011 was to protect lives and property. Regrettably, nine lives were lost in Madison County as a result of the tornadic events of that day. While no organization has the resources or the infrastructure to mass a response to such an event alone, the existing network of agencies, institutions and organizations within Madison County collectively possessed an enormous amount of resources.

During an emergency, the key roles of the emergency management community are: 1) to protect life and property and 2) to request and coordinate assistance from local, regional and national resources. In emergency response, the main goal is to determine the magnitude and possible outcomes of the situation and to mitigate the effects on the public as much as possible. Recovery involves a transition from the basic levels of service and the support roles an entity assumes during an emergency back to “business as usual”—the way things were before the incident occurred.

This event demonstrated the importance of a coordinated multi-jurisdictional and multi-agency response. The event required responding organizations to utilize the County’s procedures supporting the Incident Command/Unified Command (IC/UC) at various locations when faced with multiple victims and tremendous amounts of debris. The County’s Emergency Operations Center (EOC) remained the focal point for coordination of resources and public information. A region-wide complete power outage lasting several days hampered the response and recovery efforts. This event challenged participants to do the following:

- Ensure safety of responders and public.
- Exercise the integration of resources involving multi-discipline and multi-jurisdictional local, state and federal agency response.
- Utilize command, control, and coordination of response elements and resources using the National Incident Management System (NIMS).
- Function with limited resources.
- Function with no electrical power and limited communications capability for several days.

EVENT OVERVIEW

Exercise Name

April 27, 2011 Madison County Tornado Event (actual event)

Duration

1. Pre-event announcements and briefings began approximately 5 days before the event
2. Emergency Response – Approximately 5 days
3. Recovery - Ongoing

Exercise Date

Wednesday, April 27, 2011

Type of Exercise

Real event – Tornado
Presidentially Declared Disaster – FEMA 1971-DR

Sponsor

Huntsville-Madison County Emergency Management Agency

Focus

Response and recovery operation to multiple tornado events within Madison County

Locations

1. Harvest, Toney and Moores Mill, Alabama
2. Various other locations in Madison County, including Huntsville and Madison

Number of Participants

- Agencies: 50+
- Victims: 9 fatalities 80+ injured

Participating Organizations (Not an all-inclusive list, many fall under umbrella organizations)

Local Agencies

- Huntsville-Madison County Emergency Management Agency (EMA)
- Huntsville Fire and Rescue (HFR)
- Madison Fire and Rescue/Alabama Heavy Rescue 1 Team (MFR)
- Huntsville Police Department (HPD)

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- Madison County Sheriff's Offices (MCSO)
- City of Madison Police Department (MPD)
- Madison County Volunteer Fire
- Huntsville-Madison County 911
- Huntsville Emergency Medical System, Inc. (HEMSI)
- Huntsville Hospital Main (HH)
- Women's and Children's Hospital (WCH)
- Crestwood Medical Center (CMC)
- Monrovia Light Rescue Team
- Madison County Medical Society
- North Alabama Medical Reserve Corps
- City of Huntsville Department of Transportation
- Madison-Marshall Chapter of the American Red Cross
- Madison County Volunteer Organizations Active in Disaster (VOAD)
- Madison County RACES/ARES (Amateur Radio)
- Seventh Day Adventists
- Southern Baptist Association
- Salvation Army
- Madison County Department of Human Resources (DHR)
- Madison County Community Emergency Response Team (CERT)
- Crisis Services of North Alabama, Inc.

Federal Agencies

- Redstone Arsenal (RSA)
- Federal Emergency Management Agency (FEMA)
- Marshall Spaceflight Center/NASA

EXERCISE FUNCTIONAL DESIGN

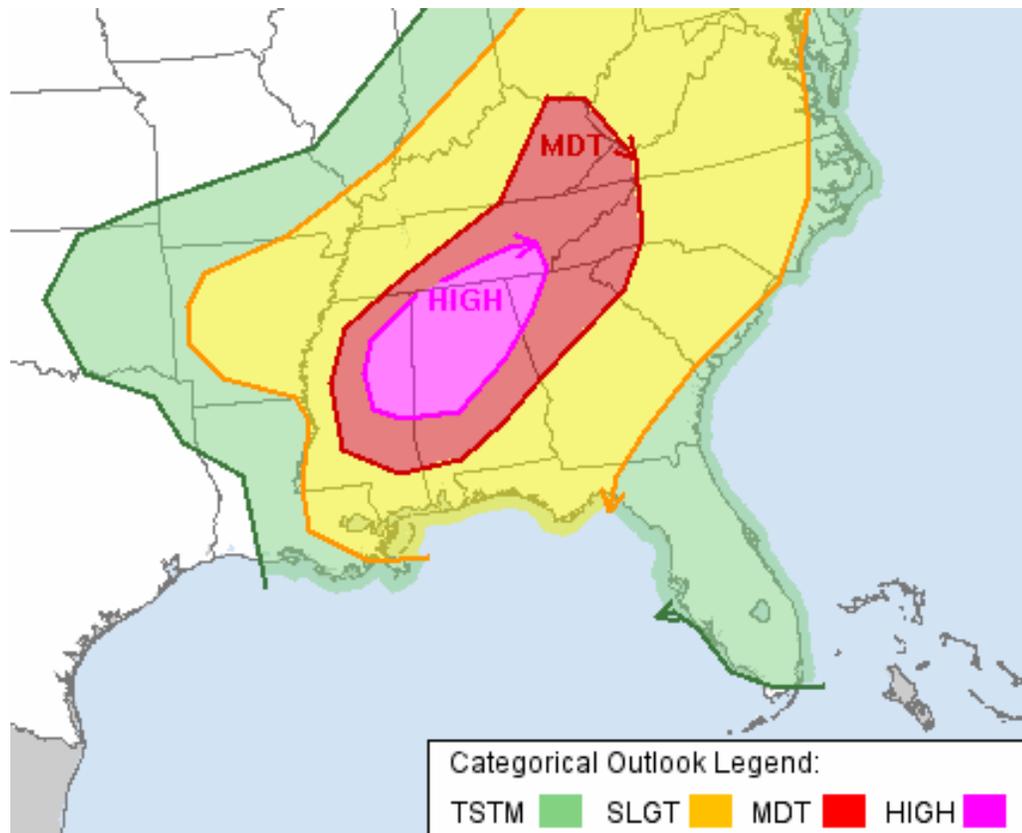
Purpose

The purpose of the response to this event was for the safety of life and protection of property. Regrettably, few structures are capable of providing complete protection from the ravages of large tornadoes unless such design elements are incorporated in their construction. Nine lives were lost in Madison County due to the tornado events of April 27, 2011 and scores were injured. Hundreds of homes and other structures were damaged or destroyed, as well creating over 500,000 cubic yards of debris.

Scenario

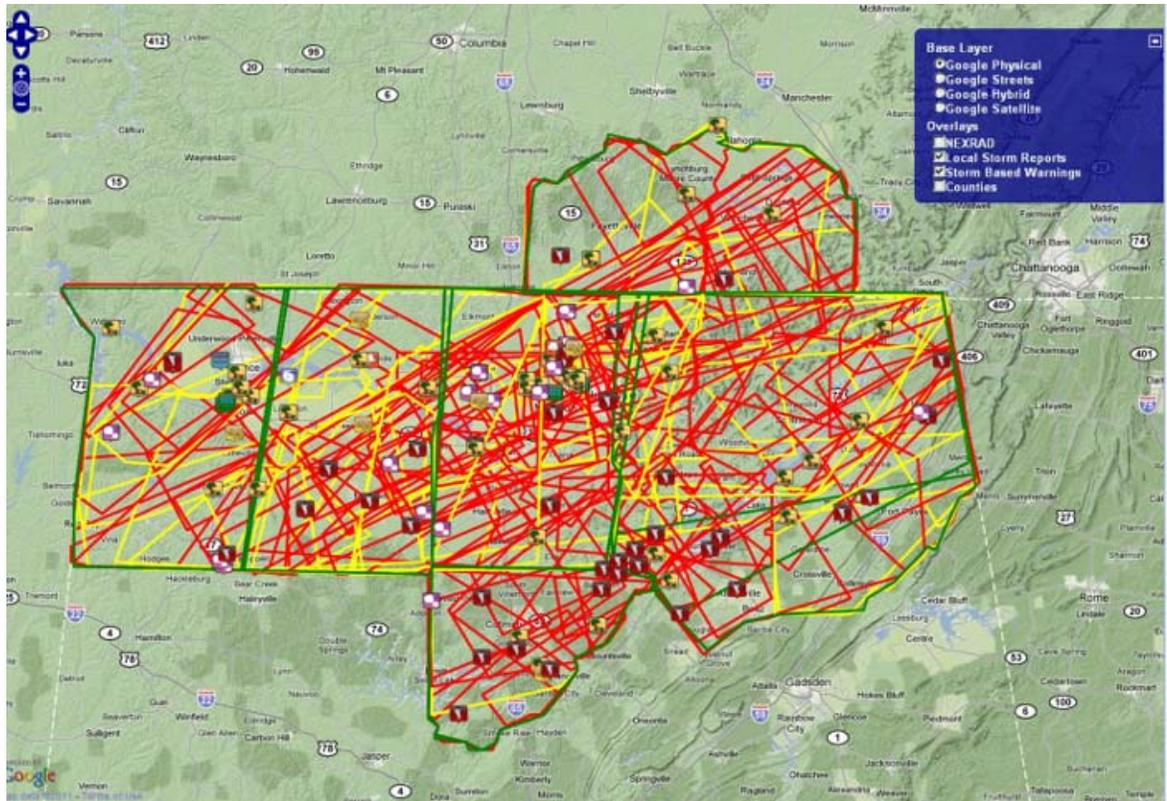
Preceding the events of Wednesday, April 27, 2011 were several briefings by the National Weather Service Office in Huntsville indicating that a major severe weather outbreak was likely, starting in the early morning hours and going through most of the day. This ominous forecast proved very accurate. The Storm Prediction Center placed the northern half of Alabama under a High Risk for severe weather.

Reports of severe thunderstorm and tornado damage in North Alabama began coming in at 4:06 a.m. on April 27 with the last storm report coming in at 1:48 a.m. on April 28. Hail, up to 1.75 inches in diameter was reported, as well as numerous areas of flooding.



The National Weather Service Forecast Office in Huntsville issued 92 tornado warnings across North Alabama with 26 of those warnings in Madison County, along with 31 severe thunderstorm warnings and 7 flash flood warnings across the area.

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EVENT OBJECTIVES

Fundamental disaster response objectives were demonstrated during the course of the event. Through demonstration of these objectives, the responding organizations successfully responded to the various disaster situations that occurred in Madison County on April 27, 2011. At the same time, the actual response revealed ways that future efforts could be made more effective. The EMA considers the following objectives were the major goals for this event:

Goals

- Ensure safety of responders and public.
- Exercise the integration of resources involving multi-discipline and multi-jurisdictional local, state and federal agency response.
- Utilize command, control and coordination of response elements and resources using the National Incident Management System (NIMS).
- Function with limited resources.
- Function with no electrical power and limited communications capability for several days.
- Emergency Public Information and Warning

PERFORMANCE ANALYSIS

The findings mentioned in this section are reflective of those collected from many of the organizations that participated in the response and recovery. The following issues have been brought to light in order to aid the participating organizations in determining which steps to take to ensure Madison County's emergency response community continued success in managing a complex response. These issues will be explored in more depth under each functional area section.

Results

Goal 1: Ensure safety of responders and public.

Observation 1.1: Strength. An overwhelming majority of respondents indicated that adequate warning for the potential and actual events was made.

Discussion: The NWS office in Huntsville provided briefings to Madison County EMA. Representatives from the emergency response community and other outside organizations were present in the Madison County Emergency Operations Center (EOC) during those briefings.

Recommendation: None

Observation 1.2: Strength. Most respondents indicated that the morning meetings with the EOC Executive Group was beneficial.

Discussion: Those organizations that maintained a presence in the EOC indicated the meetings provided them with a good overview of the response. Several organizations were not present for those meetings, nor had a regular presence in the EOC during the event. The conference room utilized for those meetings was too small for the number of people present and because of the number of people the room environment was very hot and humid. Also, it was very difficult to hear the situation reports because of ambient noises.

Recommendations:

1. Conduct an Operational Planning Chiefs' briefing prior to the EOC Executive Group meeting to review the previous day's accomplishments.
2. Utilize a larger room in the building, which may require providing additional generator power.
3. Develop agendas or checklists to more efficiently conduct the meetings and help ensure critical reports are not overlooked.
4. Improve temperature and humidity controls within the EOC by causing existing air handling equipment or additional auxiliary air handling equipment to be put on generator power.
5. Incorporate a scribe or note-taker to capture the comments during the morning Executive Group meetings.

Observation 1.3: Weakness. Formal Emergency Action Plans were not developed for each operational period.

Discussion: The EOC did not develop Emergency Action Plans during the event. Doing so could have improved the response by prioritizing and structuring the response for the various agencies. Many agencies responded without having prioritized missions and this caused confusion.

Recommendation: At the onset of a major disaster a Planning Team should be formed in the EOC to develop Emergency Action Plans.

Observation 1.4: Strength. Most respondents indicated that the dusk-to-dawn curfew improved safety.

Discussion: After the curfew went into effect, law enforcement indicated reports of burglary and mischief substantially decreased. Very few indicated any sort of impact the curfew had on completing their mission. Employees going to and from work were not impacted much if they had work identification.

Recommendation: None

Goal 2: Exercise the integration of resources involving multi-discipline and multi-jurisdictional local, state and federal agency response.

Observation 2.1: Strength Mutual aid assets were effectively integrated and functioned well.

Discussion: Several outside organizations responded to provide assistance, some requested and some not, although in time all assets were successfully integrated.

Recommendation: Continue to request mutual aid through proper channels in order to ensure the assistance is properly coordinated.

Observation 2.2: Area for improvement. Some organizations had difficulty in accessing the affected areas due to lack of credentials. Some organizations such as City of Huntsville Public Works received assignments at the Incident Command Post, but were not allowed into the area by law enforcement.

Recommendation: Ensure organizations have proper identification for their employees and if not work with the EOC to coordinate with the Incident Commander on-scene. Additionally, Incident Command/Unified Command should communicate with units in the field, so that recovery operations are not impeded unnecessarily.

Goal 3: Utilize command, control, and coordination of response elements and resources using the National Incident Management System (NIMS).

Observation 3.1: Area for Improvement. Several respondents indicated that Unified Command was not effectively exercised on-scene.

Discussion: Based on information received by various response elements, it appears that multiple command posts were operated in the field with different

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agencies coordinating those efforts. The lack of a true Unified Command resulted in loss of situational awareness, independent operations in the field, uncoordinated centrally and resulted in a disorganized initial response. When proper representation in the EOC and coordination with the agencies operation in the field was established, the overall response improved dramatically.

Recommendations:

1. Response agencies should review and validate or re-write Emergency Support Function (ESF) # 9 (Search and Rescue) of the Madison County Emergency Operations Plan (EOP).
2. The Madison County Emergency Planning Committee should conduct a formal meeting with representatives of the emergency response community and local elected officials to discuss how to prevent future issues from arising.
3. Develop and present an “Executive Level” National Incident Management System Presentation to local elected officials and emergency response command level personnel.
4. Ensure each emergency response agency provides a liaison to the EOC.

Observation 3.2: Area for Improvement. Most respondents indicated that command operations in the EOC went well. However, not all emergency response organizations had a presence in the EOC and there was difficulty in knowing who was from what organization. Also, it was indicated that a morning briefing and periodic updates to the EOC staff would have kept agencies better informed of priorities and response/recovery progress.

Discussion: Coordination of resources, response operations and information went well at the EOC, considering the chaos. The lack of liaisons in the EOC from some organizations may have exacerbated problems with command and control in the field, the gathering of critical information and the coordination of resource requests.

Recommendations:

1. Ensure that all emergency response organizations participating in a large scale disaster response have a representative present at the EOC during the event.
2. The Emergency Management Agency should develop a “staffing” Standard Operating Procedure (SOP) and distribute to all emergency response agencies, identifying liaison positions.
3. Designate agency representatives and/or locations more clearly in the EOC.
4. Conduct a periodic briefing to EOC staff to establish priorities and provide an update on current progress. This would allow agencies to voice concerns and point out possible improvements/adjustments to the current response plan.

5. Conduct a review of Chapters 4 and 5 of the basic plan of the EOP.

Goal 4: Function with limited resources.

Observation 4.1: Strength. Respondents indicated that initially they had adequate resources to respond to the event.

Discussion: Most of the emergency response organizations had adequate supplies to handle the initial emergency response.

Recommendation: Emergency response organizations should continue to maintain disaster response supplies.

Observation 4.2: Area for Improvement. Many organizations that do not normally have an emergency response role (such as, but not limited to, higher education, some volunteer organizations and businesses) did not have adequate resources to continue to function normally.

Recommendation: Acquire disaster supplies to provide some ability to be self-sufficient for at least 72 hours.

Goal 5: Function with no electrical power and limited communications capability for several days.

Observation 5.1: Strength. Some government facilities had generators and functioned during the disaster.

Discussion: The need for emergency back-up power was evident during this disaster. Facilities that had generator power served as coordination, resource and information hubs. Lack of power at the City of Huntsville Public Works facility inhibited their ability to load equipment and charge batteries needed for recovery operations.

Recommendation: Advocate the purchase of, as funding becomes available, generators for more critical facilities.

Observation 5.2: Area for Improvement. The loss of Voice over Internet Protocol (VOIP) phone functionality impeded the ability to communicate with City of Huntsville departments and some other organizations that have phone systems requiring power or internet connectivity.

Discussion: Many respondents indicated that the loss of the VOIP capability impeded their ability to contact staff and communicate with the public. The lack of VOIP phone service necessitated the use of cellular phones and, due to the already increased volume of calls, made service sporadic. Additionally, as the days went on, cell sites began to fail due to generators running out of fuel or batteries being depleted. Cellular coverage began to decrease, as a result.

Recommendation: Implement redundancy for VOIP phone services, especially for local government agencies.

Observation 5.3: Strength. Texting through cell phones appeared to be not as impeded by increased cellular usage, although coverage ability decreased due to the failure of some cell sites.

Discussion: Many agencies utilized texting when they found it difficult to make direct contact.

Recommendation: Promote the use of texting when direct communications cannot be established, which may require some practice on part of “texting novices”.

Observation 5.4: Strength. The EOC maintains 21 Plain Old Telephone System (POTS) lines for use in the event of VOIP failure (two lines are for fax machines).

Discussion: The POTS lines in the EOC provided the only telephone capability for many organizations. The fact that these numbers were not the normal EOC lines inhibited the ability of the public to contact the EOC, as well as other organizations (such as the State EMA) having a need to coordinate with the EOC until a phone number was provided to them. Due to the nature of a non-centralized phone system, the ability to transfer calls from one phone to another was not possible.

Recommendations:

1. Continue to maintain POTS lines in the EOC.
2. Produce and circulate a phone list at the onset of an EOC activation for a major disaster (both VOIP and POTS numbers).
3. Develop an EOC telephone communications plan.

Observation 5.5: Area for Improvement. The loss of the City of Huntsville’s internet connectivity made it difficult to communicate electronically within the EOC or use the WebEOC crisis management software outside of the EOC.

Discussion: Lack of internet connectivity within the EOC was due to the City of Huntsville’s Internet Provider losing its connectivity. Outside organizations that did have internet capability were unable to connect to WebEOC, as it is hosted on City of Huntsville servers. Additionally, the EOC was unable to use the State EMA’s tracking system, EMITS, due to lack of internet connectivity.

Recommendation: The City of Huntsville should contract with another Internet Service Provider to provide a back up capability. [**Note:** The City of Huntsville is currently in the process of implementing this recommendation.]

Observation 5.6: Area for Improvement. Lack of internet connectivity affected emergency response agencies access via Mobile Data Terminals and also affected Computer Aided Dispatch at the 911 Center.

Discussion: The dependency on connectivity to the internet is critical to many emergency response organizations. Without connectivity response capability is slowed and the margin for error is increased.

Recommendations:

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1. Redundant internet connectivity.
2. Training response personnel in methods to relay information when a loss of internet connectivity occurs.

Observation: 5.7: Area for Improvement. The loss of the City of Huntsville 800MHz radio system impeded response capabilities until it was restored.

Discussion: Several organizations utilize the City of Huntsville's 800MHz radio system to serve their communications needs and during a failure response is drastically impeded.

Recommendation: Develop redundancy within the radio system. [**Note:** This is a situation that is known and efforts are underway for improvements.]

Observation 5.8: Area for Improvement. Huntsville Police Department (HPD) and the Madison County Sheriff's Office (MCSO) utilize two different radio systems and were not immediately able to communicate directly together.

Discussion: HPD utilizes the City of Huntsville 800MHz radio system and the MCSO utilizes a VHF system. The agencies' radios are not directly compatible with each other and require some special patching of the two systems by outside methods.

Recommendation: Utilize radio system patching capability at the 911 Center until on-scene mutual aid communications resources arrive.

Observation 5.8: Strength. The Madison County Radio Amateur Civil Emergency Service/Amateur Radio Emergency Service (RACES/ARES) groups provided severe storm spotter information during the Tornado Watches and Warnings as well as provided communications linkages to various locations while the power was out.

Discussion: Amateur radio operators staffed their position in the EOC continuously while the EOC was activated and provided storm and damage reports during the tornado events. RACES/ARES worked with other groups as well to provide communications support: the Huntsville Amateur Radio Club (HARC) and the Military Affiliate Radio System (MARS). The amateur radio groups provided communications from the EOC to the American Red Cross, Madison Baptist Association, South Carolina Baptist Disaster Relief, Salvation Army Disaster Canteen, National Weather Service, Monrovia Community Center, Seventh Day Adventist Church, North Alabama Medical Reserve Corps Clinic at Sparkman Academy, Madison County VOAD chainsaw and cleanup teams, North Alabama Food Bank and the Food Service Center setup at Joe Davis Stadium.

Recommendation: Continued incorporation of amateur radio in the County's disaster planning efforts.

CONCLUSION

Following the events and major recovery operations, EMA began to conduct after-action interviews with many of the responding agencies and organizations. Some of these interviews were conducted in-person or on the phone and some were conducted through the return of a questionnaire. Most, but not all, organizations involved in the response and recovery operations were included in these interviews.

This after-action report (AAR) is not taken from the perspective of an evaluator, as in a preplanned exercise, but from the actual response organizations in order to provide insight on what worked and did not work, so that responses to future disasters will be improved. This is the key post-event document developed in partnership with the local community, sponsoring agencies and key participants. It is used as reference for continued improvement of response plans and program attributes for coordinated response capabilities. The AAR is not used as a grading system or as a report card. This document provides historical reference and recommendations for future response planning, training and exercise development.

POINTS OF CONTACT

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