Severe Weather Awareness

English 314

MICROSOFT

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Authored by: Samantha Santeiu, Elizabeth Suess, Ryan Alliss

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Introduction

Severe weather awareness plays a major role in the weather-related deaths. Most people do not consider severe weather something that can happen outside of the typical areas: tornadoes in "Tornado Alley", and hurricanes on the east coast and the Gulf coast. However, severe weather occurs everywhere. For example, in the United States the highest number of tornadoes occurs in Florida and Colorado, where the most thunderstorms form (see Figure 1). (NOAA's National Severe Storms Laboratory) As a group, we strive to increase severe weather awareness, educate the public in safety, and hopefully save the lives of people across the United States.

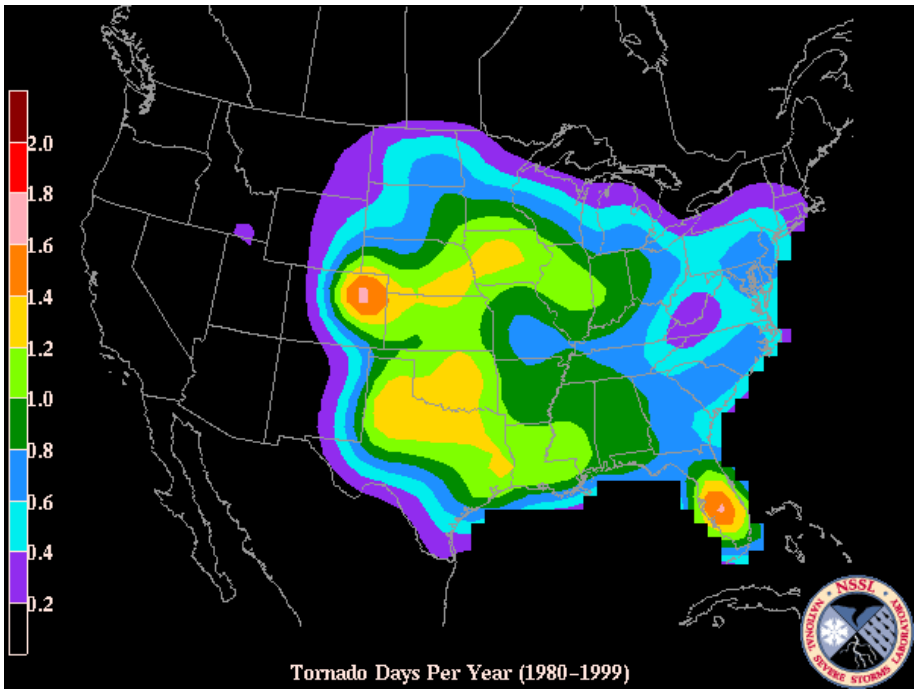

Figure 1: Number of days on which a tornado occurred per year from 1980-1999

Background

On the afternoon of May 25, 2008, an EF5-rated tornado devastated the Iowa towns of Parkersburg and New Hartford. This tornado was the first EF5 in Iowa since 1976. (Des Moines, IA, Weather Forecast Office) The storm brought with it 205 mile per hour winds, a path a mile wide, and longevity that carried it 43 miles. Unfortunately, 9 people in Parkersburg and New Hartford lost their lives that day or in the ensuing weeks and months after the tornado. The majority of victims heard that the storms were coming, but did not have enough time to prepare. One victim did not know at all, but was asleep when the tornado hit her town. ("Remembering the Victims")

Sadly, severe weather claims the lives of 629 people every year, with tornadoes contributing to 57 of those deaths per year ("NWS Weather Fatality…"). This may be due to insufficient preparation, not enough time to reach shelter, or not knowing the severe weather is approaching. Better communication might be the answer to these problems, but we first need to understand what goes into detecting severe weather (particularly thunderstorms and tornadoes) and informing the public of the threat of severe weather.

The National Weather Service (NWS), part of the National Oceanographic and Atmospheric Administration (NOAA), dedicates themselves to providing forecasts and warnings related to weather, hydrology, and climate in order to preserve the life and property of the American public. ("Mission Statement") In addition, the Storm

Prediction Center (SPC) provides more in-depth watches, warnings, discussions, outlooks, and analyses of severe weather, both past and present. Stations can warn their viewers that they believe that severe weather is present, but they do not actually produce the warnings. They provide information and insight to the NWS, who then issues the warnings.

Many people misunderstand the meanings of "watch" and "warning," and therefore may not take the proper safety measures for the weather situation they experience. Below are explanations of each term, and a short description on how meteorologists issue watches and warnings.

Watch: Meteorologists issue weather watches if a significant risk of severe or hazardous weather exists, but the timing and location of the event is uncertain. Watches provide people with the time they need to formulate a plan if severe weather actually occurs, and head to a safe place if they are in an area vulnerable to severe weather. See the large, red polygon below in *Figure 2* labeled "Watch".

Warning: A severe weather warning, on the other hand, indicates that some hazardous or severe weather event is occurring at that time or is imminent. Warnings advise people in the path of severe weather to take evasive action immediately. See the small, red polygon below in *Figure 2* labeled "Warning". (Boise Weather Forecast Office)

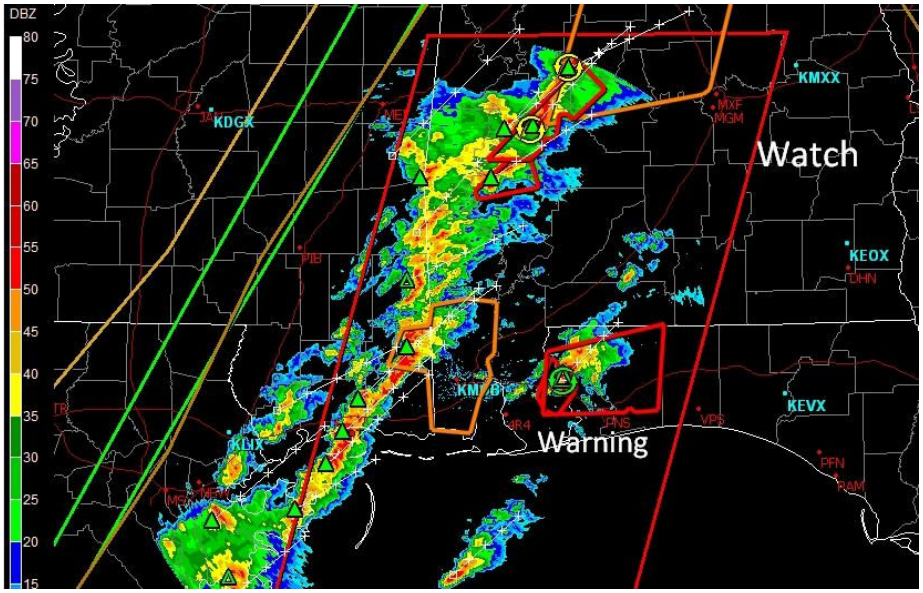

Figure 2: Watches and warnings on a radar map

How does the public know when watches or warnings have been issued? The following are common means of communication during severe and hazardous weather.

Television is a major mode of communication regarding severe weather. Local news stations or weather stations keep the public informed on watches and warnings. News stations may even make the weather story their top priority, over other news stories. In addition to news and weather stations displaying weather news, many television channels now show small maps in the corner of the screen, outlining areas targeted for watches and warnings. Viewers do not have to tune in to the news or weather to know about potential severe weather.

Weather radios are one of the best ways to stay up to date and informed about severe weather watches and warnings. Weather radio broadcasts come from the National Weather Service offices. In general, the radios inform listeners of forecasts for farming, travel, fishing, etc. However, in the event of severe weather, they immediately broadcast the watch or warning for the area. Most radios are programmable, so the listener can choose only to hear news about severe weather. This is incredibly helpful, and is more reliable than television or internet information. A weather radio can stay with the listener throughout a severe weather event because they are operated by batteries as well as electrical power. Weather radios also broadcast information of environmental hazards such as oil or hazardous material spills, and public safety announcements such as AMBER alerts. ("What watches and…")

Civil defense sirens, easily recognized, are mounted on buildings or tall poles and emit extremely loud tones that warn everyone in the area of some crisis. Sirens may be used to indicate air raids, fallout, an attack of some sort, fire, or (in tune with this proposal) tsunamis or tornadoes. While sirens are useful during the daytime, they are especially useful at night when tornadoes are unexpected and people are sleeping.

Currently, the National Weather Service and local weather organizations make efforts to education the public and train weather spotters to be severe weather informants. The NWA's StormReady program, formed in 1999, aids America's communities in preparing for severe weather by teaching them communication and safety skills needed to preserve lives and property. StormReady encourages advanced planning and awareness and strengthens local safety programs. ("NWS StormReady Program")

SKYWARN is another part of the NWS's goal to monitor severe weather and preserve life and property during such weather. SKYWARN trains locals to spot severe weather and inform their Weather Forecast Offices. Overall, this helps the NWS to issue more accurate and precise warnings for severe weather. Anyone who has an interest in public safety is welcome to train as a spotter and provide eyewitness information to the NWS in times of severe weather, especially thunderstorms and tornadoes. ("NWS SKYWARN")

Problem Statement

When it comes to severe weather, many people are not well-informed. This may be caused by both a lack of communication from the government agencies as well as lack of education of the general public. If the public were better informed as to what weather-related terms mean and how they work, they would be more likely to listen to things the NWS, SPC, and NOAA announce, as well as follow instructions for staying safe in severe weather.

Summary of Findings

Typically when dealing with statistics, one wants a large sample size to get a better idea of results. Because this was not full-scale due to time constraints, we only had 84 people take our survey the first time and only 29 the second time. Even with the small sample size, we saw dramatic improvement from the initial survey to the post survey. This shows us that the website and brochure did a good job of informing people of the dangers of severe weather.

Literature of Research

Our research depended heavily on the best weather information sources we could find, to properly understand the difficulties people have with severe weather awareness and accurately provide safety and educational material dealing with severe weather. We first looked to the National Oceanographic and Atmospheric Administration (NOAA) for statistics and reliable information on such topics as watches v. warnings and what to do should severe weather strike.

The National Weather Service (NWS) provided an excellent mission statement that inspired us to choose severe weather awareness communication as a problem. NWS also had valuable information about their educational programs, such as SKYWARN and the StormReady programs across the country. Much of our severe weather statistics came from the NWS website as well. Individual cities have specific pages on the NWS website. We used the Des Moines, IA, page to learn about the deadly Parkersburg tornado.

While the NOAA and NWS pages have fantastic technical information, we also wanted news stories concerning severe weather, as well as different perspectives on weather issues from non-meteorological sources. USAToday and KCRG-TV9, Cedar Rapids, are two valuable sources of information that greatly helped us.

Throughout our research we realized that the issue of severe weather awareness and communication about awareness was greatly lacking. A few of our sources mentioned that people are not often warned quickly enough, or did not even have a television or weather radio working to warn them of impending severe weather. For such a serious matter as severe weather, a communication device is critical. The lack of a communication device and severe weather awareness startles and disturbs us, since we are well-educated in severe weather awareness and communication. This is why we want to solve the problem of the lack of communication about and knowledge of severe weather in today's society.

Approach

Our problem-solving plan begins with an initial survey discussing watches, warnings, safety information, and means of communicating that severe weather is afoot, such as tornado sirens and weather radios. We will then proceed to create flyers and a webpage containing the information that everyone should know about severe weather preparedness and awareness. The flyers and webpage will include all the information a reader would need to answer the questions in the survey, plus other interesting information and safety tips. As part of the American Meteorological Society, ISU Chapter, there is a possibility that we can add our webpage to the AMS online site, to make it easily located, accessible, and credible. We will post the flyers around campus in well-travelled areas, and publicize the webpage link so that people can read the severe weather information. Finally, we will conduct a post-survey to gauge if our information had any effect on students around campus. Using the information from the surveys, we can calculate how effective our project was and plan better programs in the future.

Timeline

We plan on splitting this project fairly evenly between the three of us. There is just enough to do so that the workload can be spread out between multiple people. Setting date deadlines will help us keep the project moving. (This is our original timeline. The final date has now moved to May 4, 2010.)

April 13th, 2010

- Sam finishes preparing the survey questions with the help of Liz and Ryan
- The survey is put on SurveyMonkey and e-mails are sent out to students so that they can take it until April 16th

April 17st, 2010

- Survey results are evaluated to see what information is important for the flier and website
- Liz finishes the outline for the flier
- Ryan finishes the general web layout and design

April 20th, 2010

- The final draft of the flier is finished and ready for printing
- A version of the website is available online to the general public
- The post-flier survey questions are finalized

April 21st, 2010

- The post-flier/website survey are sent out

April 27th, 2010

- Post survey results are evaluated

April 30th, 2010

- Changes to the website are finished based on results from the survey
- Final project is due for class

Budget

In addition to a schedule, we have a proposed budget for the project based on prior experience and company websites. We have included possible quotes for a printing service for the fliers, webspace expenses, and other possible expenses.

ITEM	PRICE (APPROX)
Website	
Webspace	$90.00
Hit Counter	-
Time and Effort	-
Flier	
Paper	$10.00
Printing	$150.00
Time and Effort	-
Surveys	
SurveyMonkey Account	$100.00
Time and Effort	-
TOTAL	**$350.00**

Results

The results for this survey were somewhat surprising. While we did use a relatively small sample size, we had extremely good results for both surveys. In each survey we asked some basic demographic questions. We also asked some of the same questions in the post survey and the initial survey so that we could see exactly how much we improved. Overall we did see an improvement, but there are still some questions that people had difficulty answering.

Observations

Many of the questions had positive answers in that they answered it correctly. There were a few wrong answers, but these for the most part decreased in number from the initial to the post survey.

As you can tell by looking at Chart 1, the results from just one survey to the other increased dramatically. Due to the discrepency of the amount of data, we analyzed all of the charts by percentages of the total number of people who answered the question. This question exibits exceptional improvement, in that we went from having most of the people getting it right to every single person answering the question correctly. There were two correct answers for this question in that they had to know what a watch was and what a warning was.

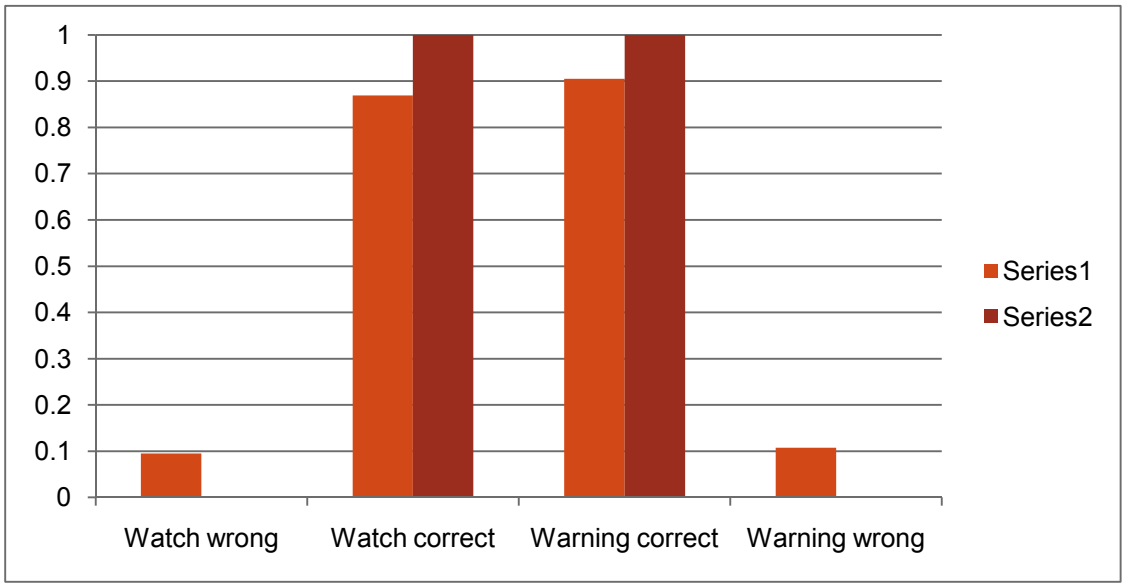

Chart 1. Percentage of answers for the question about watches vs. warnings. Series 1 is the initial survey; series 2 is the post survey.

Another set of questions that showed great improvement were the "What to do" style questions. Both the tornado question and the wind question showed minor improvements, as seen in Chart 2 below. The wind question did not see as many improvements as we would have liked (See Chart 3 below), but this is partially due to the fact that the website was not entirely completed when we distributed the survey. If we had been doing this project full scale, we would have had it all completed first. Due to time constraints, however, we were unable to finish it before we had to put out the post survey.

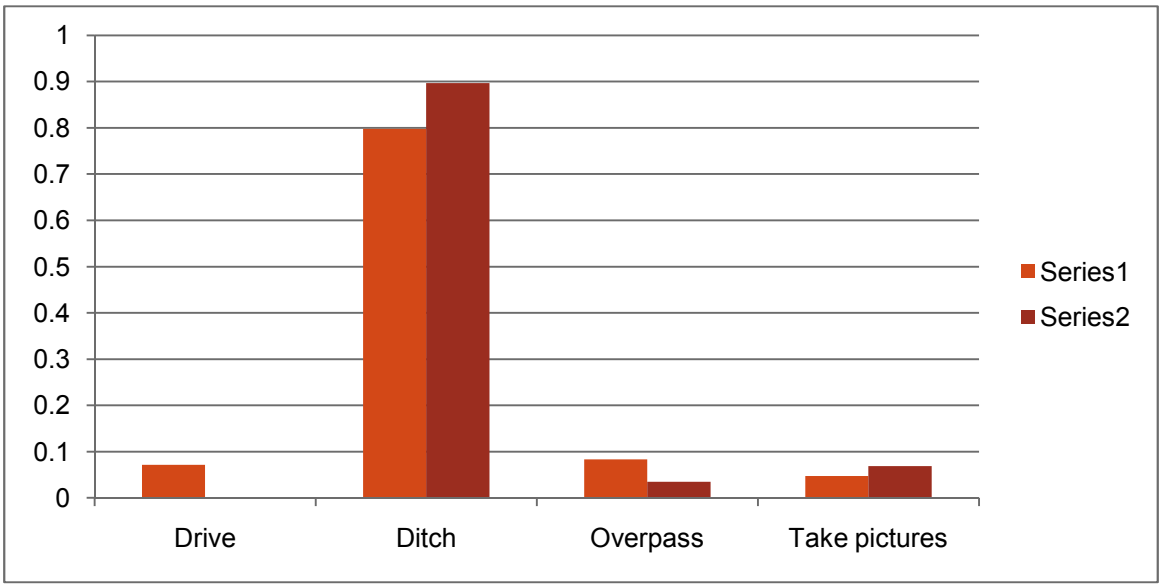

Chart 2. Percentage of answers for the "What to do-tornado" question.

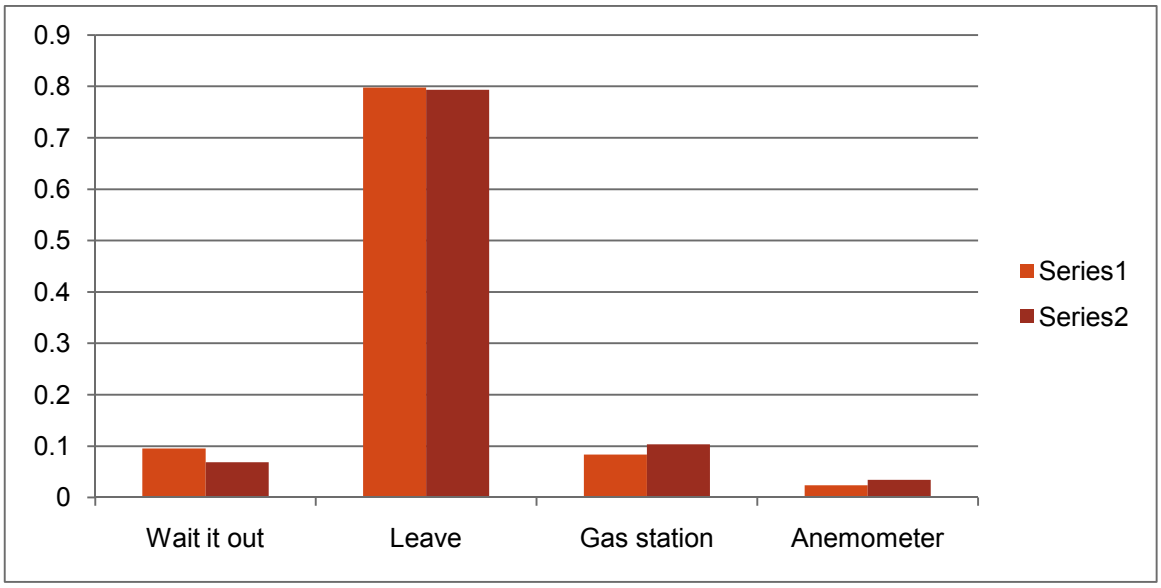

Chart 3. Percentage of answers for the "What to do-high wind" question.

According to the post survey, a lot of people found both the website and the brochure helpful. A lot of people stated that the website was not working, but this was due to the fact that we hadn't quite completed it before we had to send out the post-survey. Also, people didn't quite realize that our brochure was not meant to cover all of the material in the website. Another thing that was interesting was that there wasn't any area of study that had a lot of people take the survey. The participants had widely spread majors,

which helped us to know that our audience wasn't biased in that they already had a meteorological background.

Discussion

Initial Survey

One of the most interesting results of our initial survey was that exactly half of the participants were female and half were male. Overall there were 84 participants in the original survey. For the most part, many people got the answers right, but there were still a decent number who were not sure about a few of the questions. Some of the questions we made tricky on purpose, and we were pleased with how many understood the correct answer. For example, in the question on what to do in a wind storm if you live in a mobile home, the correct answer was "Go to a friend's house." Some people could argue that the correct answer would be "Go to a gas station," but wind storms can last several days. Gas stations do not have anywhere to sleep and also have large glass windows, which makes that answer incorrect.

Post Survey

The post survey did not get as many results, but this may have to do with the timing. The post survey was sent a few days before Iowa State's Dead Week started. Because it was sent mostly to college students, they probably had a lot of homework and studying to do. We believe that this is what caused the lower turnout. Of the people that did fill out the survey, the results were greatly improved from the initial survey. Every single participant answered the watch v. warning question correctly, which is excellent. This showed that people read either the pamphlet or the website. For the "What to do" questions, we still had people answering the two wrong answers that were mostly joke answers. This is more than likely just people playing games due to the extremely low amount of people who answered that way.

Conclusion

We found that from our sample that most people already knew basic severe weather awareness. From our initial survey, we saw that some confusion existed with the definitions of watches and warnings and where to go if a wind storm was present. As evident in the post survey, these confusions, for the most part, cleared up. This pleases us as increasing knowledge of what we feel is necessary to know in order to stay safe is a victory. If we were to take this to a larger scale most people would learn more and thus be more likely to stay safe if that certain situation is brought upon them.

Recommendations

We have provided two media as reference for learning more about severe weather awareness: a brochure and a website. The best way to stay safe is by staying up-to-date with the latest safety information for each risk. We have this information posted on the webpage and brochure. The webpage goes into greater detail than the basic overview information in the brochure. Our recommendation is to know the information in the brochure by memory. As an additional resource for more detailed information such as

spotter training, the website should be used. Simply knowing the facts we provide will keep the public safe.

Benefits

There are many benefits to improving communication between government agencies and the general public. The biggest benefit of this project would be saving the lives of innocent bystanders. If the general public has a better understanding of the watches and warnings issued by the National Weather Service, they can be better prepared and protect themselves and others. In this project we also made known some of the programs that the National Weather Service and NOAA have available for the public that aid in preparing them for severe weather. Fliers better inform the public and help them protect others around them. Also, fliers are useful pieces of paper to keep handy during severe weather so that people have easy access to specific details relating to things broadcast by the National Weather Service or a weather radio. A website is an excellent reference for information. Websites are easily editable as information evolves and changes. Websites are easily accessible to anyone with Internet, and since we are in a very technological age, that is easy to come by. A website can also demonstrate things that a flier possibly would not, such as videos on programming a weather radio. Finally, our surveys assess what people know and what they have learned. As seen in the improved post-survey answers, our subjects learned much about severe weather through the website and pamphlet. We had great success in this project. The survey-takers directly involved will benefit from their increased severe weather awareness and knowledge, and they will in turn benefit the people around them by acting quickly and correctly in the event of severe weather.

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