“You’ve Been Warned?”
Public Perceptions of Outdoor Sirens and Their Alternatives for Tornadoes

Linda Plotnick, MCIS Department, Jacksonville State University, Jacksonville, AL, USA
Starr Roxanne Hiltz, New Jersey Institute of Technology, Newark, NJ, USA
Matthew Burns, MCIS Department, Jacksonville State University, Jacksonville, AL, USA

ABSTRACT

Outdoor emergency sirens are used as a major component of the Emergency Management Agency’s Emergency Alert and Notification System in tornado-prone Alabama and many other areas of the U.S. This study examines public perceptions and reactions to the sirens for notification of tornadoes as well as perceptions of the usefulness of alternative means of notification. In April 2011 a major tornado swept through northeast Alabama leaving in its wake over 300 fatalities and massive destruction. Faculty and students of a mid-sized university in Calhoun County, Alabama were surveyed before and after the devastating 2011 tornado. Although the respondents find the sirens helpful, they have difficulty understanding the tones and spoken messages emitted by the sirens. In general, concerns about tornadoes did not increase after the 2011 tornado. However, those who did experience an increase in concern were likely to change their behavior in preparations and response to tornadoes.

Keywords: Emergency Alert Radios (EARs), Emergency Sirens, Public Perceptions, Tone Alert Radios (TARs), Tornadoes

INTRODUCTION

Stormchasers have become movie heroes and images of “twisters” scooping up everything in their path dominate the videos on the Weather Channel each spring. From The Wizard of Oz to today’s mass media, images of the widespread devastation and deaths and injuries that a single tornado can cause never cease to amaze the viewers. Thus the public is very aware of how important it is to take shelter in a safe place when a tornado is in the vicinity, often with only a few minutes warning. But, what are the most effective ways to warn the public that a severe storm and possible tornado is headed their way? Is it the traditional siren, and/or some other technology? And, will the public heed these warnings even if they are received?

Calhoun County in Alabama is in an area that is highly vulnerable to tornadoes and has at least several warnings and/or incidents a year. Yet, it was the observation of one of the

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researchers who recently moved to the area from an area not subject to tornadoes, that despite the severity of damage and high risk of death from tornadoes, locals tended to take the threats rather in stride, often not even heeding warnings. This was curious to the researchers and was the genesis of the development of this research project. Although there has been much research on warning systems of various kinds, there is little that addresses public perceptions and reactions to the warnings. Warning the public is futile if people do not heed the warnings or do not know what to do. We see this study as a launching point for further research that may improve understanding the complexities of public reactions and can then lead to programs and research to improve not only the technology for public warning, but also the effectiveness of public warning. Ultimately, this research and its follow-ups can save many lives.

Emergency alert sirens were initially developed during World War II to sound air raid alerts and are still in use to warn of tornadoes, other weather events, hazardous spills, and are often placed within a 10-mile radius of nuclear power plants (Keneson, 2011). The wails of sirens have become a common sound in Northeast Alabama, especially since 1986, when Congress mandated that the chemical munitions stored at the Anniston Army Depot and seven other stockpile sites around the country be destroyed. In Alabama these outdoor sirens are administered by the Alabama Emergency Management Agency (EMA). The sirens were installed to be used as a part of the Chemical Stockpile Emergency Preparedness Program (CSEPP) to warn those living around the Anniston Army Depot in the event of a chemical incident as part of the Emergency Alert System (EAS) to alert the public of other civil emergencies and warn of weather related emergencies as determined by the National Weather Service. Although the last of the chemical weapons were removed from the Depot in 2011 and therefore the sirens are no longer used to warn of chemical spills, the outdoor sirens are still a primary source of public notification of tornadoes. Additionally, in 2012 other weather-related events, such as severe thunderstorms, were removed from the list of events that would trigger a siren alert and Calhoun County moved to a polygon based alerting system (Bain, 2012). Prior to this, including during the time of Study 1, sirens were used for severe thunderstorm alerts and chemical disasters at the Anniston Depot. They were also configured so that sirens throughout the county would all be activated at once, even if the area affected was only part of the county. With the polygon system, the county is divided into sections and sirens are sounded only in the affected sections.

The focus of this paper is on the use of outdoor emergency sirens as an emergency information system to alert the public about weather related threats, particularly tornadoes. The participants in this study are from the Calhoun County region of Northeast Alabama which has an area of 608.46 square miles and a population, in 2010, of 118,572 (United States Census Bureau, 2011). Two surveys, one before and one after the devastating tornadoes of 2011, examine opinions about sirens and other widely used sources of warnings for tornadoes and other emergencies in the Calhoun County area.

Outdoor sirens are part of a comprehensive alert system in Alabama. To warn residents in their homes and cars, the Alabama EMA uses Tone Alert Radios (TARs) and National Oceanic and Atmospheric Administration (NOAA) Emergency Alert Radios (EARs) in conjunction with local television and radio Emergency Alert Stations, as well as sirens. TARs were installed as part of CSEPP in hospitals, schools, nursing homes, day care centers, and other special facilities within the area covered by the program, as well as in homes closest to the Anniston Army Depot. TARs are limited in function to emitting a loud tone followed by spoken information and are used for a limited range of alerts. The newer NOAA EARs display text information in addition to the tone and spoken instructions, and are capable of receiving more than 80 different types of alerts including AMBER alerts for missing children and evacuations, as well as weather information from the National Weather Service Through a $3.25 million grant
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