

P1.25 OK-WARN: OKLAHOMA WEATHER ALERT REMOTE NOTIFICATION

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1. INTRODUCTION

OKlahoma Weather Alert Remote Notification (OK-WARN) is a new, customized database that provides timely notification of weather hazards and emergencies to Oklahoma residents with hearing loss via alphanumeric pager, e-mail or cell phone. Following the tornado outbreak of 3 May 1999, this program was developed as a partnership between Oklahoma Department of Emergency Management, National Oceanic Atmospheric and Administration (NOAA) National Weather Service, NOAA National Severe Storms Laboratory, Oklahoma Department of Rehabilitation Services, Communication Services for the Deaf of Oklahoma, and Weather Affirmation, LLC. The OK-WARN program was made possible by a federal grant from the Federal Emergency Management Agency, now a division of the Department of Homeland Security. Since the inception of OK-WARN in 2001, the program has been expanded statewide to serve the deaf and hard-of-hearing community of Oklahoma.

Prior to the inauguration of OK-WARN in 2003, Wood and Weisman (2003) distributed more than a thousand questionnaires to Minnesota and Oklahoma deaf and hard-of-hearing residents via the state departments of rehabilitation services, regional agencies, workshops, and organizations serving deaf and hard-of-hearing people. The survey participants were asked about the accessibility of severe weather information during a 9-month period beginning in September 1999. Among the most important findings Wood and Weisman (2003) compiled was that about 80% of deaf and hard-of-hearing people experienced a fear of being unprepared for weather emergencies. This fear was attributed to several factors, but mainly to poor

information dissemination that included inadequate captioning of routine and emergency weather reports. Lack of weather education including safety tips, preparedness plans and assistive technologies further isolated deaf and hard-of-hearing citizens from weather alerts. These problems forced people to rely on looking at the sky or having hearing people alert them as their primary methods of receiving routine and emergency information. The author presented his survey findings to officials of the NOAA National Weather Service (NWS) Forecast Office in Norman. These officials suggested modifying the pager system to send weather alerts to the deaf and hard-of-hearing community in Oklahoma. Thus, "OK-WARN" was born.

Deaf and hard-of-hearing individuals who sign up for OK-WARN receive forecasts, watches, warnings and other hazardous weather information from local NWS forecast offices. Included are information about tornadoes, thunderstorms, winter storms, flash floods, river floods, fog, and high winds. OK-WARN is believed to be the only program in the U.S. that directly relays NWS alerts through pagers to people who are deaf and hard-of-hearing.

The objective of this study is to discuss information on what and how the OK-WARN system works.

2. THE OK-WARN SYSTEM

The OK-WARN system is similar to a customized database system exclusively used to alert local and state emergency managers to impending severe weather. The former system, however, is dedicated exclusively to the deaf and hard-of-hearing community of Oklahoma. The system adopted the Oklahoma Department of Emergency Management's Paging Alert System (EMPAS) which is used to send NWS alerts out to the local, regional and state emergency officials, meteorologists, and law enforcement officials. EMPAS developer Weather Affirmation, LLC,

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of Oklahoma City, agreed to adapt the system with the understanding that its use would be limited to qualified individuals who are deaf and hard of hearing. Furthermore, this paging service would be nearly equivalent to that provided for hearing people over public airwaves. The service is free for qualified deaf and hard-of-hearing clients in Oklahoma; however, an alphanumeric pager and service are not supplied. Only the paging companies that service Oklahoma have an interest in helping with this OK-WARN program.

Alerts originating from local NWS Forecast Offices that serves Oklahoma counties and the bordering counties are transmitted via satellite to EMPAS software. The software condenses and sends it to local paging companies for distribution to qualified deaf and hard-of-hearing pager users. Information is received within minutes of release by the NWS office. The customized system "reads" each product and prepares the message to a list of deaf and hard-of-hearing recipients. The system then sends the information to the recipient's pager, cell phone, personal digital assistant (PDA), other assistive device via phone line or e-mail per information on a sign-up sheet. The pager vibrates and displays the full message text in real time. All incoming weather products and outgoing messages are archived for recall as necessary. The entire system has 100% redundancy. In addition, the system provides multiple data sources and attempts to deliver the critical message so that the recipient would never miss a warning. The pager is an ideal notification method for deaf and hard-of-hearing individuals who cannot afford to be tied down to a personal computer or other weather data source.

A sample is presented following the REFERENCES section. A deaf or hard-of-hearing client can choose any of the customized weather products. A brief explanation of each product is provided on the back of the sample. Any changes in requests can be made easily. In addition to selected weather products, a civil emergency message may include information about terror attacks, Amber Alerts, wildfires, chemical spills, and other important emergency messages that may or may not be disseminated by state and local officials. If desired, the client may receive other non life-threatening weather

products during "normal" waking hours: (a) special and significant weather statements, (b) severe weather statements, (c) river flood statements and warnings, (d) forecasts and short-term forecasts, and (e) non-precipitation advisories (such as high winds and fog). Also, the client can specify a coverage area by selecting the following options: (a) all counties in Oklahoma, (b) home county only, (c) any number of counties (do not have to be contiguous or together) or (d) county group which includes a home county and all surrounding counties (including bordering counties outside Oklahoma). When a local NWS office disseminates the entire message, the message has to be condensed before distributing to pagers and cell phones. OK-WARN weather messages can be given in either a short or a long text. Examples of short and long texts are shown at the bottom of the back of the sample. The short text only contains the most critical part of the message.

3. WEATHER SAFETY EDUCATION

OK-WARN clients should be thinking about life-saving actions when they receive one of the paged alert messages. Severe weather education is vital for all people with hearing loss, including a basic understanding of severe weather terminology. In-person training has been provided to some users. There are many excellent weather education sources containing detailed information on safety tips, preparedness plans, and various types of weather hazards on the Internet. The weather safety education should help reduce the risk of injury or fatality and also prepare deaf and hard-of-hearing people to respond properly to weather threats.

4. OK-WARN RECOGNIZED BY OTHER STATES

Following the OK-WARN model, other states have instituted a program of disseminating hazardous weather warnings to the deaf and hard-of-hearing communities. In partnership with Telecommunications for the Deaf and Hard of Hearing, Inc. (TDI) and Communication Service for the Deaf (CSD) of Oklahoma, the Department of Homeland Security (DHS) has recognized the OK-WARN

program which is included in their new DHS approved-training course, called "Emergency Responders and the Deaf and Hard of Hearing Community: Taking the First Steps to Disaster Preparedness". The training program was offered by the Community Emergency Preparedness Information Network (CEPIN) Project, which was designed to encourage networking, preparation and communication between emergency responders and deaf and hard-of-hearing people prior to disaster situations. The training courses were offered in 16 cities across the country during 2006 (Cooper 2006, personal communication).

5. CONCLUSIONS

The OK-WARN system plays an increasingly important role in disseminating life-saving information to Oklahoma residents with hearing loss. When a local NWS forecast office issues a weather alert, the OK-WARN system automatically sends a text message to all participating pagers so that notification is nearly instant. By having an instant severe weather report at a client's fingertips, he/she can be (a) informed without having to rely entirely on television, radio, other forms of media or word of mouth, (b) prepared by knowing what to do when adverse weather approaches, (c) calm during dangerous

weather, and (d) be educated about the changing Oklahoma weather.

6. ACKNOWLEDGMENTS

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7. REFERENCES

Wood, V. T., and R. A. Weisman, 2003: A hole in the weather warning system: Improving access to hazardous weather information for deaf and hard of hearing people. *Bull. Amer. Meteor. Soc.*, **84**, 187-194.

OK-WARN for the Deaf and Hard of Hearing

Activation form

When complete, Fax to (XXX) XXX-XXXX or Mail to XXX, P.O. Box XXXX, OKC, OK XXXXX

Date: _____

CLIENT INFORMATION

Last Name: _____ First Name: _____ MI: _____

Address: _____ Deaf: () HoH: ()

Work Phone or Daytime Phone: _____ TTY () Voice ()

PAGER & E-MAIL INFORMATION

Pager Information

Paging Service Provider: _____ (NOT who you bought the pager from)

Paging Service Number: _____ (Paging terminal/modem number NOT the number to the paging company)

Pager ID Number: _____ (This is the pager number or PIN to identify your pager)

Paging Company Technical Contact: _____ **Phone Number:** _____

E-Mail Information

Would you like notification by E-Mail? () Yes () No - E-Mail Address: _____

Would you like () SHORT or () LONG E-Mail Messages? See examples on back.

A SHORT E-Mail message is a condensed message. A LONG E-Mail message is the entire text of the product.

WEATHER PRODUCTS

(CHECK DESIRED PRODUCTS BELOW – these products can not be delayed)

() TORNADO WARNING

() SEVERE THUNDERSTORM WARNING

Select **one** entry from one or both columns below.

() TORNADO WATCH AREA

() SEVERE T-STORM WATCH AREA

() TORNADO WATCH COVERAGE COUNTIES

() SEVERE T-STORM WATCH COVERAGE COUNTIES

() TORNADO WATCH ALL INCLUDED COUNTIES

() SEVERE T-STORM WATCH ALL INCLUDED COUNTIES

() TORNADO WATCH SINGLE COUNTY ONLY

() SEVERE T-STORM WATCH SINGLE COUNTY ONLY

Select any desired entry from the following columns.

() WINTER STORM WARNING

() FLASH FLOOD WARNING

() CIVIL EMERGENCY**

() WINTER STORM WATCH

() FLASH FLOOD WATCH

() WINTER WEATHER ADVISORY

“DELAYABLE” WEATHER PRODUCTS

(CHECK DESIRED PRODUCTS AND ANSWER THE “DELAYED” QUESTION AT THE BOTTOM OF THIS SECTION)

() SPECIAL/SIGNIFICANT WEATHER

() RIVER FLOOD WARNING

() SEVERE WEATHER STATEMENTS

() NON-PRECIPIATION ADVISORY

Should these Products be “Delayed”? () Yes () No if yes, **BEGIN Time:** _____ **END Time:** _____

(The **BEGIN** time is the time of the day when the “*delayed*” weather messages will start, and the **END** time is when the “*delayed*” weather messages will be stopped. For example, if you only want **SPECIAL/SIGNIFICANT WEATHER** statements between the hours of 8:00 AM and 7:00 PM, the 8:00 AM entry would be the **BEGIN** time and 7:00 PM would be the **END** time.)

COUNTY COVERAGE

() SINGLE COUNTY ONLY* _____

() COUNTY GROUP* _____

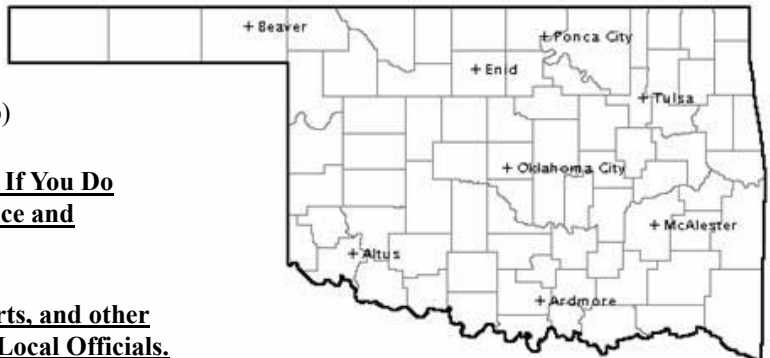
Home County: _____ + Surrounding)

() ALL COUNTIES IN OKLAHOMA

() SELECTED COUNTIES (Check or color in Counties on Map)

***In the Blank Spaces above, Please Write in the County Name. If You Do not know the County Name, Mark the Selection in the () Space and color in a SINGLE county on the Map.**

****May include information about Terrorist attacks, Amber Alerts, and other Important Emergency Messages that may be sent by State and Local Officials.**



Definitions of Weather Products

The following is a list of National Weather Service Products that are currently available for the OK-WARN for the Deaf and Hard of Hearing System. A brief explanation of each product is provided.

Product

Definition

PRODUCTS THAT CAN NOT BE DELAYED

TORNADO WARNING	A tornado has been sighted or NWS Doppler radar indicates a tornado may form at any time. Seek shelter immediately.
SEVERE THUNDERSTORM WARNING	A severe thunderstorm is indicated on radar or has been reported by storm spotters. Winds in excess of 58, MPH and/or hail dime size or larger can be expected.
TORNADO WATCH	Conditions are right for Severe Thunderstorms and Tornadoes to occur in the Watch Area. Product can be sent as an AREA (20 miles north of a line between Oklahoma City and Tulsa) or COVERAGE COUNTIES (One or more counties in your area) or INCLUDED COUNTIES (List of all OK Counties in Watch) or SINGLE COUNTY ONLY (Just your Home County)
SEVERE THUNDERSTORM WATCH	Conditions are right for Severe Thunderstorms to occur in the Watch Area. Product can be sent as an AREA (20 miles north of a line between Oklahoma City and Tulsa) or COVERAGE COUNTIES (One or more counties in your area) or INCLUDED COUNTIES (List of all OK Counties in Watch) or SINGLE COUNTY ONLY (Just your Home County)
WINTER STORM WARNING	Issued if there is a high probability that a dangerous winter storm will occur, such as heavy snow or sleet, significant accumulations of freezing rain or freezing drizzle, or any combination of these. This is normally issued 12 hours or less before the event.
WINTER STORM WATCH	Issued if there is a threat (but still some uncertainty) of heavy snow or sleet, significant accumulations of freezing rain or freezing drizzle, or a combination of these. Usually issued 12 to 48 hours before an event.
WINTER WEATHER ADVISORY	Winter weather advisories are used to ALERT the public of situations that may cause inconvenience or difficulty to travelers, or for people who must be outdoors, but conditions generally do not pose a threat to life or property.
FLASH FLOOD WARNING	Flash Flood Warning means flash flooding is occurring or is imminent in the specified area. Move to safe ground immediately.
FLASH FLOOD WATCH	Flash Flood Watch means it is possible that rains will cause flash flooding in the specified area. Be alert and prepared for a flood emergency.
CIVIL EMERGENCY MESSAGE	Messages from State and Local Officials relayed by the National Weather. May include information about Terrorist attacks, Amber Alerts, and other Emergency Messages.

DELAYABLE PRODUCTS

SPECIAL WEATHER and SIGNIFICANT WEATHER STATEMENTS	This product is used to describe significant weather events (like strong thunderstorms, lightning, etc) when no warning is in effect.
SEVERE WEATHER STATEMENT	This is a warning update, designed to provide updated information about Tornado and Severe Thunderstorm Warnings in effect.
RIVER FLOOD WARNING	This is designed to inform about river flooding.
NON-PRECIPITATION ADVISORY	Used to note periods of dense fog, high winds and other conditions that the public needs to be aware of.

Short Text Example:

NWS NORMAN OK** SEVERE T-STM WARNING FOR...BECKHAM CNTY * UNTIL 850 PM * AT 806 PM...RADAR DETECTED SEVERE T-STM 10M NW OF ERICK, .MOVING E AT 15 MPH.

Long Text Example:

THE NATIONAL WEATHER SERVICE IN NORMAN HAS ISSUED A

* SEVERE THUNDERSTORM WARNING FOR... BECKHAM COUNTY IN WESTERN OKLAHOMA UNTIL 850 PM CDT

* AT 806 PM CDT... DOPPLER RADAR DETECTED A SEVERE THUNDERSTORM 10 MILES NORTHWEST OF ERICK, MOVING EAST AT 15 MPH.

* LOCATIONS IN THE WARNING INCLUDE ERICK...SAYRE AND SWEETWATER HAIL UP TO THE SIZE OF QUARTERS AND WINDS TO 70 MPH ARE LIKELY.