Societal Impacts and Public Perception

Advanced Warning Operations Course

IC Core 5

Lesson 2: Effective Warnings

Warning Decision Training Branch

Welcome to the Lesson 2 – Effective Warnings of the AWOC IC Core 5 Societal Impacts and Public Perception. This is the second lesson of a total of three lessons. This lesson focuses on how to issue effective warnings.

Overview of Societal Impacts and Public Perception

- Lesson 1: The Warning Response Process
- **Lesson 2: Effective Warnings**
- Lesson 3: Social Science Lessons: What We Have Learned From Recent Floods and Warnings
  - Presenter – Eve Gruntfest

There are only three lessons in IC Core 5 Societal Impacts and Public Perception. Each lesson is an online “recorded” session of about 20 to 45 minutes in length. After listening to the three modules, you should take the short 10 question exam to receive credit for this instructional component.

Overview

- Review of WFO Severe Weather Products Specifications
  - NWS Instruction 10-511
  - NWS Instruction 10-922
- What are the elements of an effective warning?

In this lesson we will first review the NWS “official” product specifications. Many of the elements of an effective warning are built into the product specifications. We will then discuss the elements of an effective warning, and discover ways to deliver effective warnings.

Performance Objectives

1. Demonstrate the ability to apply the five characteristics of an effective warning.
   - Specificity,
   - Consistency,
   - Certainty,
   - Clarity, and
   - Accuracy.

There is one performance objective for this lesson. This performance objectives is a statement of the behaviors that participants will be able to demonstrate both in the simulations and on the job.

Learning Objectives

1. According to NWS Instruction 10-511, be able to identify specifications of WFO Severe Weather Products.

2. Be able to name five characteristics of an effective warning.

3. Be able to identify effectively worded warning phrases.

There are only three objectives to this lesson.

NWS Instruction 10-511 Highlights

http://www.weather.gov/directives/010/pd01005011b.pdf

- Areal Outline Statement (SLS)
- **Severe Thunderstorm Warning (SVR)**
- **Tornado Warning (TOR)**
- **Severe Weather Statement (SVS)**
- Watch County Notification Message (WCN)

Department of Commerce • National Oceanic & Atmospheric Administration • National Weather Service

NATIONAL WEATHER SERVICE INSTRUCTION 10-511
OCTOBER 1, 2003

Operations and Services
Public Weather Services, NWSPD 10-5

WFO SEVERE WEATHER PRODUCTS SPECIFICATION

NOTICE: This publication is available at: http://www.nws.noaa.gov/directives/

OPR: OS22 (R. Okulski) **Certified by:** OS22 (J. Lee)
Type of Issuance: Routine

SUMMARY OF REVISIONS: This directive supersedes NWSI 10-511, dated October 1, 2002 and OMI 99-05 filed with WSOM Chapter C-40, dated November 10, 1999. This directive adds the Valid Time Event Code to Severe Thunderstorm Warnings, Tornado Warnings, and Severe Weather Statements (Sections 3, 4, and 5). It also adds a new Watch By County Notification product specification (Section 6) and requires mandatory Latitude/Longitude Points for Severe Weather Statements (Section 5).

signed 04/04/03
Gregory A. Mandt Date
Director, Office of Climate,
Water, and Weather Services

A quick review of NWS Instruction 10-511 will be our starting point for a discussion of effective warnings. The focus here is on Severe Thunderstorm Warnings, Tornado Warnings, and Severe Weather Statements. Information on the Areal Outline Statement and Watch County Notification Message is available in other training sessions (not in AWOC).

NWS Instruction 10-511 Highlights

http://www.weather.gov/directives/010/pd01005011b.pdf

- Severe Thunderstorm Warning (SVR)
  - Gust of 50 kts (58 mph) and/or
  - Hail size of ¾ inch (penny) diameter or larger
  - Valid times should be **30 to 60** minutes
  - If Tornado Watch, include possibility of tornadoes
  - Should **not** combine with Flash Flood Warnings

Some of the highlights from the instruction on Severe Thunderstorm Warnings.

NWS Instruction 10-511 Highlights

http://www.weather.gov/directives/010/pd01005011b.pdf

- Tornado Warning (TOR)
  - Tornado
  - Valid times should be **15 to 45** minutes

Highlights from the instruction on Tornado Warnings.

NWS Instruction 10-511 Highlights

http://www.weather.gov/directives/010/pd01005011b.pdf

- SVR and TOR
  - Should use nine part divisions (I.e. northeast, east central, etc.) to identify portions of counties
  - Moves over coastal water -> Special Marine Warning
  - Keep bullets brief
  - Include call to action statements
    - May discontinue during widespread severe weather outbreaks
  - May use mileage markers of major highways as reference points

Instructions common to both Severe Thunderstorm Warnings and Tornado Warnings.

NWS Instruction 10-511 Highlights

http://www.weather.gov/directives/010/pd01005011b.pdf

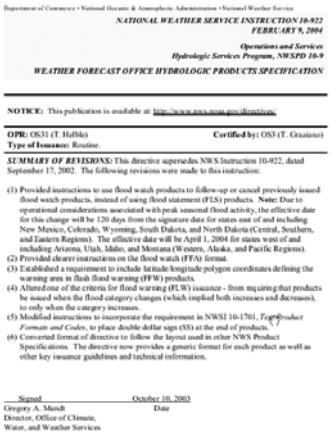
- Severe Weather Statement (SVS)
  - Include updated location
  - Include reports
  - Portions canceled or expired
  - **At least once** during valid time
  - Notify of expiration or erroneous counties
  - Include call to action statements if suspended in warnings

Highlights from the instruction on Severe Weather Statements.

NWS Instruction 10-922 Highlights

http://www.weather.gov/directives/010/pd01009022b.pdf

- Hydrologic Outlook (ESF)
- Flood Watch (FFA)
- **Flash Flood Warning (FFW)**
- **Flash Flood Statement (FFS)**
- Flood Warning (FLW)
- Flood Statement (FLS)
- RVS, RVA, RVD, RRx, Hyx, AHPS



Department of Commerce • National Oceanic & Atmospheric Administration • National Weather Service

NATIONAL WEATHER SERVICE INSTRUCTION 10-922
FEBRUARY 9, 2004

Operations and Services
Hydrologic Services Program, NWSPD 10-9

WEATHER FORECAST OFFICE HYDROLOGIC PRODUCTS SPECIFICATION

NOTICE: This publication is available at: http://www.nws.noaa.gov/directives/

OPR: OS31 (T. Hebble) **Certified by:** OS3 (T. Graziano)
Type of Issuance: Routine.

SUMMARY OF REVISIONS: This directive supersedes NWS Instruction 10-922, dated September 17, 2002. The following revisions were made to this instruction:

(1) Provided instructions to use flood watch products to follow-up or cancel previously issued flood watch products, instead of using flood statement (FLS) products. **Note:** Due to operational considerations associated with peak seasonal flood activity, the effective date for this change will be 120 days from the signature date for states east of and including New Mexico, Colorado, Wyoming, South Dakota, and North Dakota (Central, Southern, and Eastern Regions). The effective date will be April 1, 2004 for states west of and including Arizona, Utah, Idaho, and Montana (Western, Alaska, and Pacific Regions).
(2) Provided clearer instructions on the flood watch (FFA) format.
(3) Established a requirement to include latitude/longitude polygon coordinates defining the warning area in flash flood warning (FFW) products.
(4) Altered one of the criteria for flood warning (FLW) issuance - from requiring that products be issued when the flood category changes (which implied both increases and decreases), to only when the category increases.
(5) Modified instructions to incorporate the requirement in NWSI 10-1701, *Text Product Formats and Codes*, to place double dollar sign ($$) at the end of products.
(6) Converted format of directive to follow the layout used in other NWS Product Specifications. The directive now provides a generic format for each product as well as other key issuance guidelines and technical information.

Signed October 10, 2003
Gregory A. Mandt Date
Director, Office of Climate,
Water, and Weather Services

Flash Flood Warning product specification is in NWS Instruction 10-922. The focus here is on Flash Flood Warnings and Statements. Refer to the instruction (link is in the subtitle) for information on the other WFO Hydrologic Products.

NWS Instruction 10-922 Highlights

http://www.weather.gov/directives/010/pd01009022b.pdf

- Flash Flood Warning (FFW)
  - *"Short-term events which require immediate action to protect lives and property"*
    - Dangerous small stream or urban flooding
    - Dam or levee failures
  - Valid Time. *"… until flooding (requiring immediate actions to protect lives and property) is expected to end"*

A flash flood warning will be issued when:

a. Flash flooding is reported;
b. Precipitation capable of causing flash flooding is indicated by radar, rain gages, and/or satellite;
c. Local flash flood monitoring and prediction tools indicate flash flooding is likely;
d. The effective time of a pre-existing warning changes;
e. The geographical area covered by a pre-existing flash flood warning increases;
f. A dam or levee fails;
g. A sudden failure of a naturally-caused stream obstruction (including debris slide, avalanche, or ice jam) is imminent or occurring; or
h. Small basin hydrologic models indicate flash flooding for specific locations along small streams.

NWS Instruction 10-922 Highlights

http://www.weather.gov/directives/010/pd01009022b.pdf

- Flash Flood Statement (FFS)
  - Supplemental information on current flash flood warning products
    - Updated observations
    - Impact information
  - Announce cancellation or expiration of a flash flood warning
    - Expires within 15 minutes of warning expiration

Flash Flood Statements should include the latest information on the current flash flood warning products. Focus on useful information that will help customers and partners direct mitigation activities where waters continue to present a danger to lives and property.

Response Item

According to NWS Instruction 10-511, a Tornado Warning should not be valid for more than __ minutes.

A. 15 minutes
B. 30 minutes
C. 45 minutes
D. 60 minutes
E. None of the above

What is an effective warning?

- Effective = Having an effect; producing a result
- Effective warnings…
  - Are accurate and timely
  - Are composed to highlight the threat and expected impacts
  - Are aimed at those most at risk

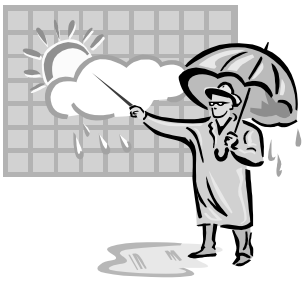
First we learned that you as the sender of information can impact public response. We then quickly reviewed the “requirements” for a thunderstorm warning. Now we will look at how you can issue effective warnings.

Use Technology to Help…

- AWIPS/Warngen
  - Issue warnings faster
  - Be sure technology does not mean good quality information is lost
  - It's still the forecaster's job to
    - Interpret radar/other information
    - Make the warning decision
    - Relay useful information via warnings and statements

Technology, such as AWIPS and Warngen, can help in the warning process, but the forecaster still has to make the warning decision and issue warnings and statements that meet the needs of the users.

Characteristics of Effective Warnings



- Specificity
  - What, when, where
- Consistency
  - Internal/external
- Certainty
  - The tone of the message
- Clarity
  - Simple words with precise meaning
- Accuracy
  - Timely, accurate and complete information

Recall that the behavioral outcomes of the public in a warning situation are impacted by both the sender (issuing the warning) and receiver (those hearing the warning) factors. Severe weather warnings that include these five characteristics will have the best chance for a positive outcome.

Specificity

- Provide as much specific, detailed information as possible about
  - The risk
  - Where it is
  - What those in the path can expect
- Be as specific as possible; provide as much information as possible

Although the what, when, and where is a requirement in a severe weather warning, the warning forecaster has latitude in the specificity of the warning. There are many occasions when specificity cannot be high. Include what you know in the warning message, be as specific as possible without exceeding the capabilities of the science and technology.

Specificity
Highlight the Threat

- Damaging Winds
  - **RADAR INDICATED DANGEROUS THUNDERSTORMS CAPABLE OF PRODUCING WINDS IN EXCESS OF 80 MPH…**
  - **RADAR INDICATED SEVERE THUNDERSTORMS WITH HURRICANE FORCE WINDS**
- Large Hail
  - **RADAR INDICATED A SEVERE THUNDERSTORM CAPABLE OF PRODUCING HAIL UP TO GOLFBALL SIZE**
  - **SPOTTERS 5 MILES WEST OF MAYBERRY REPORTED QUARTER SIZE HAIL**

Be as specific as possible about the threat.

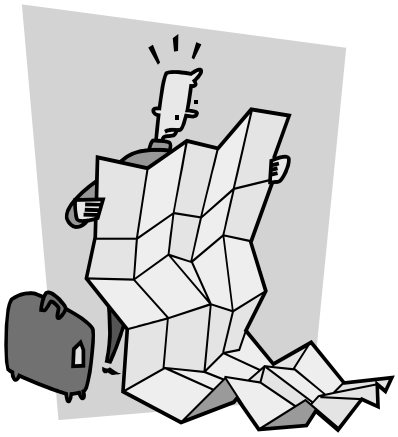
Specificity
Location, Location, Location

- Where is the storm?
- Where is it headed?

- Do people understand the storm positions and forecasts we provide?

Specificity
Location, Location, Location

- Use well-known locations
  - Larger cities, county seats
  - Interstate/other major highways
    - Mile markers/exits
  - Landmarks
    - Lakes, parks, etc



Specificity
Location, Location, Location

- What can we do to help travelers and others who are geographically challenged?

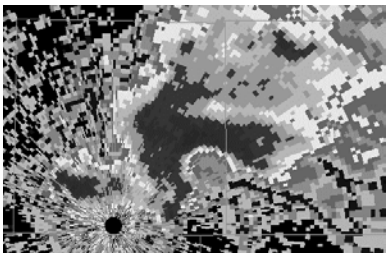
Specificity

- **"… THE MAIN THREAT WITH THIS STORM IS DIME TO NICKLE SIZE HAIL. THE HAIL MAY CAUSE SOME VEHICLE OR ROOF DAMAGE. STRONG AND GUSTY WINDS UP TO 50 MPH CAN ALSO BE EXPECTED."**
- **"…THIS TORNADO WILL CROSS INTERSTATE 135 NEAR THE MEADOWS MALL…"**
- **"PEOPLE TRAVELING EAST ON INTERSTATE 40 BETWEEN EXITS 270 AND 275 SHOULD EXIT AND FIND SUBSTANTIAL SHELTER …IF POSSIBLE. GOLFBALL SIZE HAIL IS LIKELY WITH THIS STORM."**

Here are three example of actual statements in warnings. With each statement, what are potential outcomes? Are these the desired outcomes?

Pathcasts

- WarnGen makes it easy
  - BUT!!
    - Are we that good???
    - Are we exceeding our abilities???

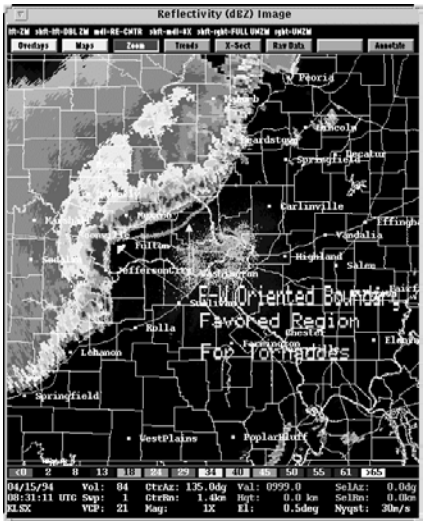


Pathcasting Cautions

- Too much detail?
  - *** THE TORNADO WILL BE NEAR**
    HUTCHENS ELEMENTARY SCHOOL BY 715 AM
    MAGNOLIA GROVE GOLF COURSE BY 725 AM
    LOTT AND COLEMAN DAIRY ROADS BY 730 AM
  - *** SEVERE THUNDERSTORM WILL BE NEAR**
    GREEN HILLS MALL AT 1220 PM
    VILLAGE MALL AT 1220 PM
    ONE HUNDRED OAKS MALL AT 1225 PM
    HARDING MALL AT 1225 PM
    HICKORY HOLLOW MALL AT 1225 PM

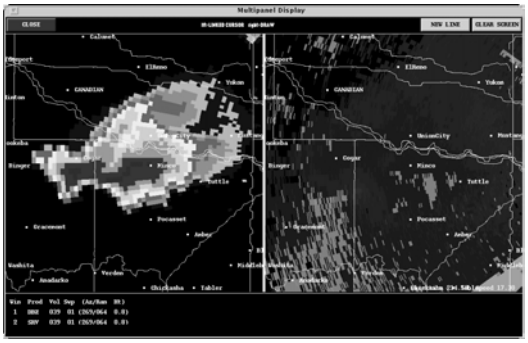
Pathcasting Cautions

- WHAT are you tracking?
  - Gust front
  - Leading edge of precipitation
  - High reflectivity gradient
  - High reflectivity cores



Pathcasting Cautions

- WHAT are you tracking?
  - Tornado location
  - Mesocyclone
  - Leading edge of precipitation
  - Large hail core
  - Gust front



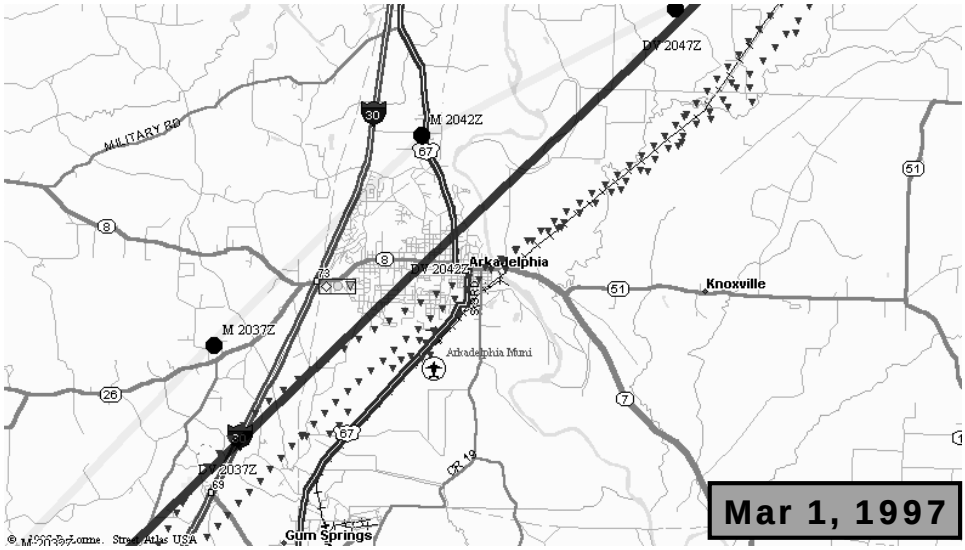
Pathcasting Cautions

- Technological Limitations
  - Radar resolution and range
  - Background map inaccuracies
  - Large and/or irregularly shaped cities
  - Radar algorithm time differential

Pathcasting Cautions

- Meteorological Concerns
  - Erratic storm motion – speed/direction
  - Storm interactions – splits, mergers
  - Mesocyclone uncertainties
  - Multiple threats from a single storm
    - Tracking tornado arrival time may expose people in the path to large hail, damaging winds, flooding rains

The Dangers of False Precision



Here is a comparison of tracks from the Mesocyclone algorithm (yellow), TVS algorithm (red), actual tornado (red triangles). The radar circulation signature may be some distance from where the tornado is occurring. This becomes an even greater problem using a linear extrapolation pathcast since the track will usually be non-linear.

Reference: **Correlation Between Tornado Damage Paths and WSR-88D Signatures, and Resulting Implications for the use of Pathcasts in Tornado Warnings**

Steven Piltz and Richard Smith: NWS, Tulsa OK

Making Pathcasts more effective (realistic)

- Only forecast short distance ahead in initial warning with frequent updates
- Use range of arrival times based on storm type/threat/motion
- Simply mention towns in path for the valid period of the warning – more precise updates via the SVS

Some suggestions on pathcasts.

Response Item

A. “AT 217PM...SPOTTERS REPORTED SEVERE WEATHER 5 MILES NORTH OF SPRINGFIELD ... MOVING SOUTH AT 20 MPH.”

B. “AT 625 PM…SPOTTERS REPORTED BASEBALL SIZE HAIL WITH A SEVERE THUNDERSTORM LOCATED 5 MILES SOUTH OF MANSFIELD

C. “AT 1230 AM…DAMAGING WINDS ALONG THE LEADING EDGE OF A LINE OF SEVERE THUNDERSTORMS EXTENDED FROM NEAR…

Which one of these statements suffers from lack of specificity? What are potential behavioral outcomes by the public from this lack of specificity?

Consistency

- Improves credibility
- Increases likelihood of appropriate action
- Important within the warning message
  - Proofread for consistent message
- Important across messages
  - Reference or repeat:
    - What was just said
    - What has changed
    - Why it has changed

A consistent message is important in establishing the credibility of the message. Often different warning forecasters are writing warnings and statements, and sometimes neighboring offices will be writing statements about the same storm. Frequent communication within the office and between neighboring offices is necessary to ensure a consistent message.

Use of the “Call-To-Action” statements in Warngen can sometime result in an inconsistent message within an individual warning or statement. A quick proofread of the warning prior to issuance can help keep the message consistent.

Keep the flow from message to message consistent by referencing or repeating previous statements.

Consistency

TORNADO WARNING
NATIONAL WEATHER SERVICE ~~~
448 PM ~~~
___

*** AT 443 PM EDT NATIONAL WEATHER SERVICE DOPPLER RADAR INDICATED A DEVELOPING TORNADO 9 MILES NORTH OF ~~~ AIRPORT. MOVING SOUTH AT 10 MPH.**

*** SOME LOCATIONS NEAR THE PATH OF THE STORM THROUGH 515 PM EDT...**
~~~ AIRPORT AND ~~~...

VERY LARGE HAIL IS POSSIBLE WITH THE PARENT THUNDERSTORM. IF YOU ARE IN THE PATH OF THE STORM...PUT YOUR CAR IN A GARAGE.

The intent might have been to indicate that the hail is in a different location than the tornado. This problem is the confused public may go outside to put the car in the garage as a tornado hits.

Call to action statements that are not consistent with the body of the warning happens more than we would like. Proofreading your warning for consistency of message before issuing may help.

Consistency

AT 903 AM CDT…AMATEUR RADIO WEATHER SPOTTERS REPORTED A BRIEF TORNADO TOUCHDOWN 8 MILES NORTH OF AKINS.

THIS IS AN EXTREMELY DANGEROUS AND LIFE THREATENING SITUATION. IF YOU ARE IN THE PATH OF THIS LARGE AND DESTRUCTIVE TORNADO…TAKE COVER IMMEDIATELY.

And another example of where call-to-action statements in Warngen can cause problems in consistency of the message.

Consistency

AT 1234 PM EST...SEVERE THUNDERSTORM WITH STRONG ROTATION OVER SOUTH CENTRAL TAYLOR COUNTY...MOVING NORTHEAST AT 35 MPH...THIS DANGEROUS STORM COULD PRODUCE A TORNADO AT ANY TIME.

*** OTHER LOCATIONS IN THE PATH OF THIS STORM INCLUDE …SPRINGFIELD**

CONFIRMED REPORT FROM SPOTTER OF TORNADO 10 MILES SOUTHWEST OF ANYTOWN AT 1239 PM EST.

Another example of where call-to-action statements in Warngen can cause problems in consistency of the message.

Certainty

> *"When faced with uncertainty we frequently base our commitments to particular action on factors other than the facts."*
>
> - Dr. Roger Pielke Jr.
> Director CIRES Center for Science and Technology Policy Research

- State with certainty, even when there is ambiguity associated with the hazard's impact
- Avoid hedging terms (possibly, may, could…)

A warning message should be stated with certainty even in circumstances in which there is ambiguity associated with the hazard's impact. "Hedging" terms tend to spur the listener into "inaction" rather than action. Using terms which indicate action or development can fill the gap in listener's minds between "nothing's happening" to "it's too late now".

Certainty

- **…DOPPLER RADAR INDICATED A SEVERE THUNDERSTORM CAPABLE OF PRODUCING A TORNADO. THE MOST DANGEROUS PORTION OF THE STORM WAS LOCATED 4 MILES EAST OF…**
- **…AT 812 PM CDT…DOPPLER RADAR INDICATED A RAPIDLY INTENSIFYING SEVERE THUNDERSTORM CAPABLE OF PRODUCING A TORNADO. THE MOST DANGEROUS PORTION OF THE STORM WAS LOCATED…**
- **…A BRIEF TOUCHDOWN OF A TORNADO WAS REPORTED 5 MILES NORTH OF BEETOWN. THE TORNADO HAS LIFTED BUT IS EXPECTED TO REDEVELOP AT ANY TIME…**

Even though the impacts in all of these situations are uncertain, these statements have included a degree of certainty that would tend to spur the listener to action.

Clarity

- Warnings MUST be worded in simple language that can be understood
  - Tailored to your area
  - Avoid technical jargon
- Focus Call-To-Action statements
  - Impacts expected with THIS storm
  - Quick, targeted safety information
  - General statements about complicated subject
  - Focus on the MAIN threat
    - Can’t give every possible safety rule

Call to Action Statements

- **THIS TORNADO IS WRAPPED IN RAIN – IF YOU WAIT UNTIL YOU SEE OR HEAR IT COMING IT MAY BE TOO LATE TO GET TO A SAFE PLACE. TAKE COVER NOW!**
- **THIS STORM SHOWS STRONG ROTATION AND MAY PRODUCE A TORNADO AT ANY TIME. DO NOT WAIT...GO TO A SAFE PLACE NOW! PUT AS MANY WALLS BETWEEN YOU AND THE OUTSIDE AS POSSIBLE.**
- **GET TO A SAFE PLACE NOW! STAY AWAY FROM WINDOWS AND OUTSIDE WALLS. PUT AS MANY WALLS BETWEEN YOU AND THE OUTSIDE AS POSSIBLE**

Clarity is especially important in “Call To Action” statements. Keep it simple!

Call to Action Statements

- **DESTRUCTIVE WINDS CAN BE EXPECTED. IF YOU CANNOT GET UNDERGROUND... GO TO AN INTERIOR ROOM ON THE LOWEST FLOOR OF A STURDY BUILDING. AVOID WINDOWS!**
- **DAMAGING WINDS MAY OCCUR UP TO !** **! MILES AHEAD OF THE RAIN. GO TO A SAFE PLACE UNTIL THE STORMS HAVE PASSED.**
- **A TORNADO WATCH IS ALSO IN EFFECT. TORNADOES CAN DEVELOP SUDDENLY FROM SEVERE THUNDERSTORMS.**

More examples of simply worded “Call-To-Action” statements.

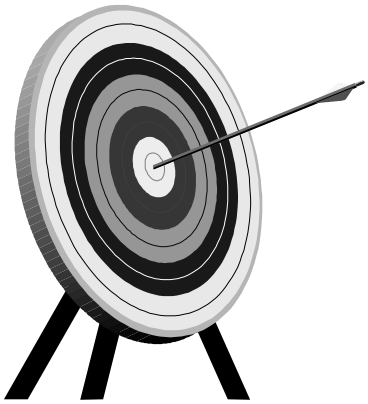
Clarity?

- SPOTTERS REPORT AN INCIPIENT TORNADO
- REPORTS HAVE BEEN RECEIVED THAT THE PARENT THUNDERSTORM PRODUCED TWO TORNADO FUNNELS
- THIS STORM HAS HAD A HISTORY OF PRODUCING A BRIEF TORNADO TOUCHDOWN
- A THUNDERSTORM NEAR THE TOWN OF OROVILLE REPORTED LARGE HAIL
- NUMEROUS REPORTS OF TORNADOES WERE REPORTED

What is wrong with each of these statements?

Accuracy

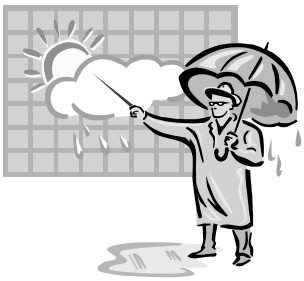
- Timely, accurate and complete information
- Simple typos, spelling, incorrect locations
- Header errors
  - e.g., SVR under SVS header



Accuracy

- AT 301 PM CST...DOPPLER WEATHER RADAR INDICATED A SEVERE THUNDERSTORM 162 MILES NORTH OF SALEM OR 155 MILES NORTH OF MOKO... MOVING NORTHEAST AT 40 MPH.
- HAIL UP TO 10 INCHES IN DIAMETER HAS BEEN REPORTED WITH THIS STORM
- THIS IS A VIOLENT THUNDERSTORM PRODUCING HUGH HAIL!

Characteristics of Effective Warnings



- Specificity
  - Where, when, what
- Consistency
  - Internal/external
- Certainty
  - The tone of the message
- Clarity
  - Simple words with precise meaning
- Accuracy
  - Timely, accurate and complete information

Response Item

Which characteristic(s) of an effective warning are missed in the example wording?

RADAR CURRENTLY SHOWS STRONG WEST WINDS JUST TO THE SOUTHWEST OF MAYBERRY AND NOW EAST OF STORMYVILLE. THESE WINDS ARE ACCOMPANIED BY VERY HEAVY RAIN AND EXPECTED THUNDER AND LIGHTNING AND ARE CONTINUING TO MOVE TOWARD THE EAST AT ABOUT 15 KT. WINDS TO THE NORTH OF THIS AREA ARE FROM THE SOUTHEAST …THIS HAS CAUSED THE RADAR TO ISSUE A MESOCYCLONE ALERT TO THE WEST OF VORT CITY.

A. Specificity
B. Consistency
C. Certainty
D. Clarity
E. Accuracy
F. There is nothing wrong with this wording.

This was taken from a warning with the names changed. If you answered F, start this presentation over from the beginning.

References

- The Role of Effective Communications in the Warning Process
  - Richard Smith, WDM III Workshop Presentation
- Communication of Emergency Public Warnings: A Social Science Perspective and State of the Art Assessment
  - Mileti and Sorensen, Aug 1990
- Correlation Between Tornado Damage Paths and WSR-88D Signatures, and Resulting Implications for the use of Pathcasts in Tornado Warnings
  - Steven Piltz and Richard Smith: NWS, Tulsa OK

References

- Toward Improved Understanding of Warnings for Short Fuse Weather Events
  - Eve Gruntfest, March 2002
- Factors Related to Flood Warning Response
  - Denis S. Mileti, Nov 1996
- NWS Instruction 10-511 WFO Severe Weather Products Specification, October 2003
- NWS Instruction 10-922 WFO Hydrologic Products Specification, February 2004

End of Lesson 2

Questions about
Lesson 2: Effective Warnings
iccore5@wdtb.noaa.gov

Congratulations. You have completed Lesson 2 of AWOC IC Core 5

Remember…there is one more lesson in IC Core 5.

If you have any questions about this lesson: 1) first ask your SOO 2) if you need additional help send an e-mail to ***iccore5@wdtb.noaa.gov*** – answers will be cc:'d to the SOO and considered for the FAQ page.

The exam should be taken as soon as possible after completing IC Core 5 Lesson 3.

Remember…the exam covers Lessons 1, 2, and 3.