

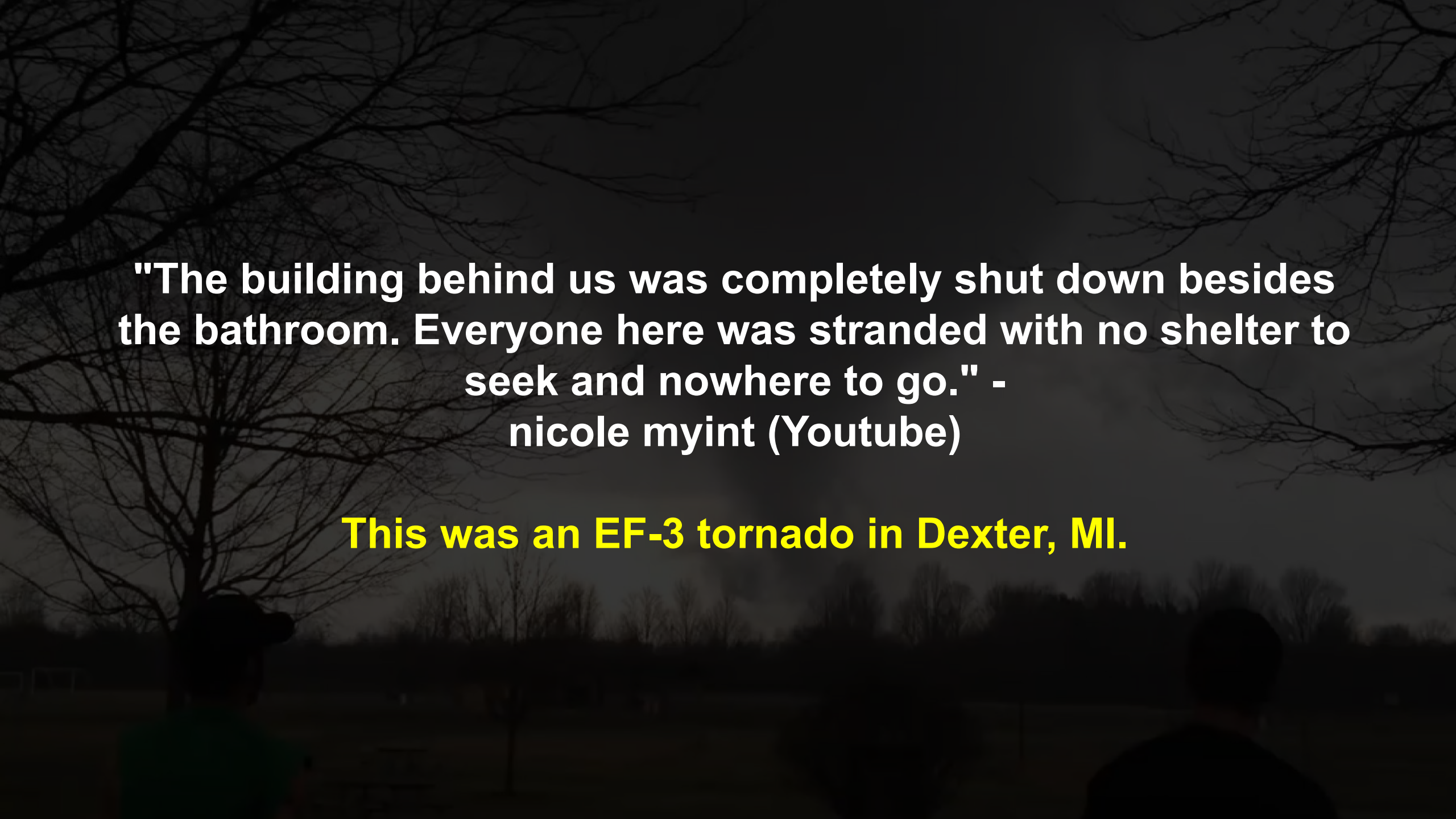
Vulnerable Outdoor Populations: A Local Study on How They Receive, Interpret, and Act Upon Weather Information

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NWS Detroit/Pontiac, MI

Special Thanks: Dick Wagenmaker, Rich Pollman & all staff at DTX



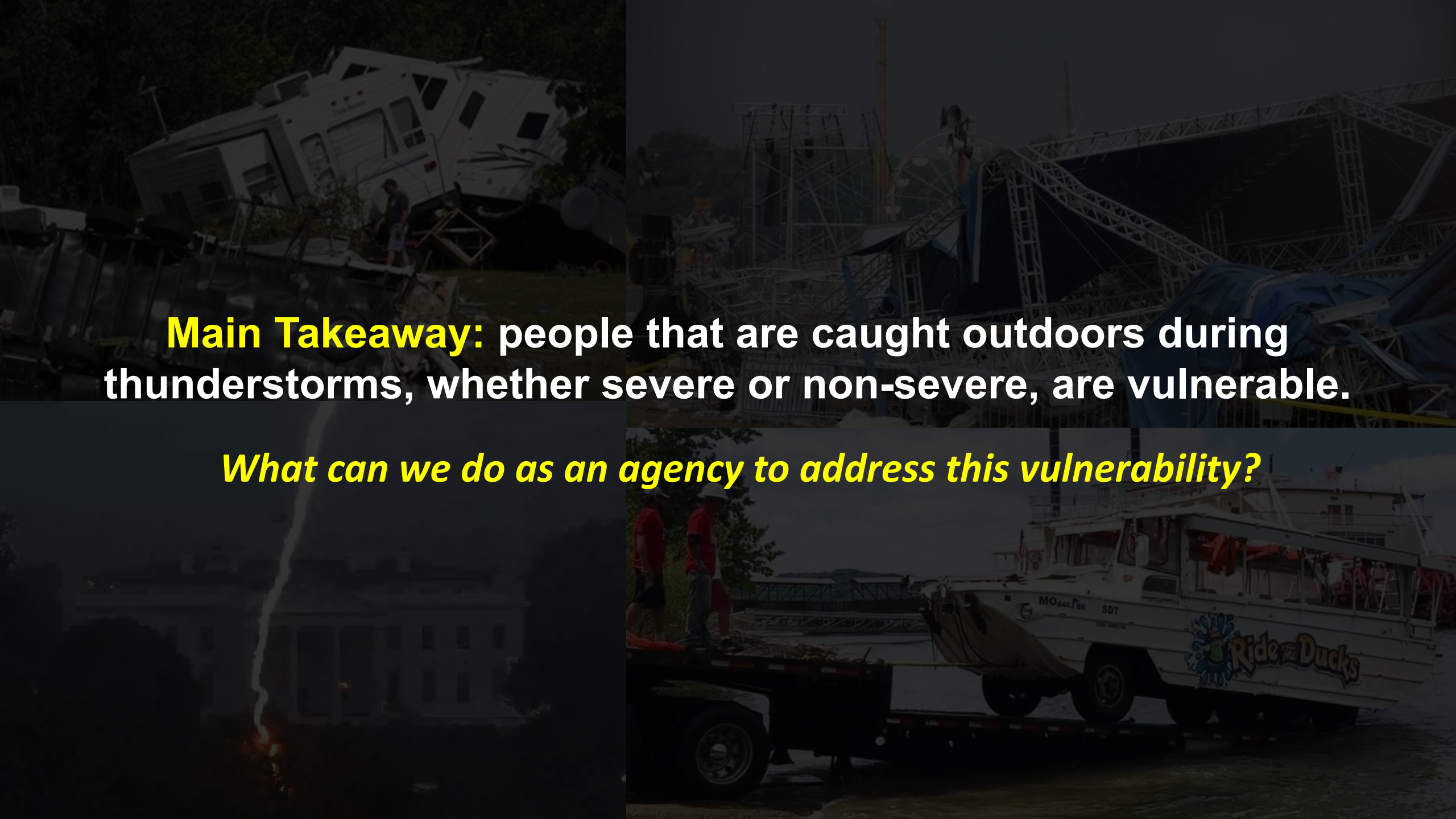
<https://www.youtube.com/watch?v=6iujiNpmzrk>



"The building behind us was completely shut down besides the bathroom. Everyone here was stranded with no shelter to seek and nowhere to go." - nicole myint (Youtube)

This was an EF-3 tornado in Dexter, MI.

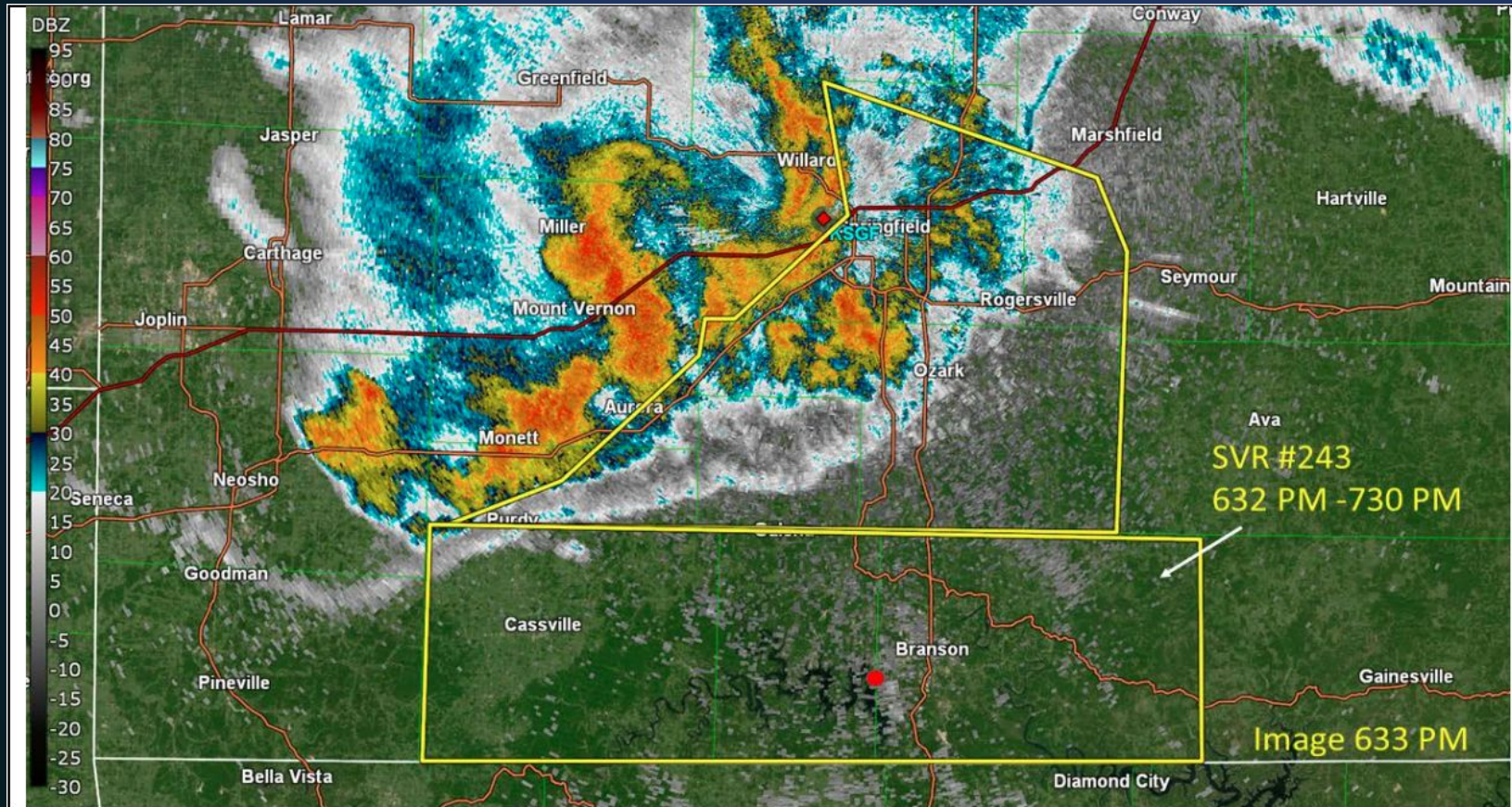




Main Takeaway: people that are caught outdoors during thunderstorms, whether severe or non-severe, are vulnerable.

What can we do as an agency to address this vulnerability?

This issue really came to light when a derecho hit Table Rock Lake in 2019, sinking a tour boat which resulted in 17 fatalities



A severe thunderstorm warning was in effect at the time of the accident, with 36 minutes between SVR issuance and the time of the accident...

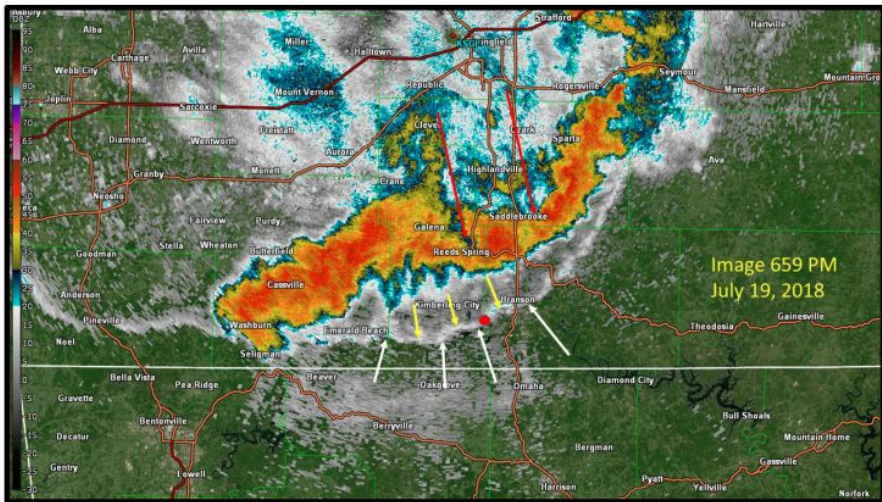
How does this happen?

Figure 13 – 0.5 degree reflectivity image from Springfield WSR-88D at 633 pm. Yellow polygons are NWS Severe Thunderstorm Warnings. Small red circle in the lower center part of the image marks location of Table Rock Lake State Park.



*National Weather Service Central Region
Service Assessment*

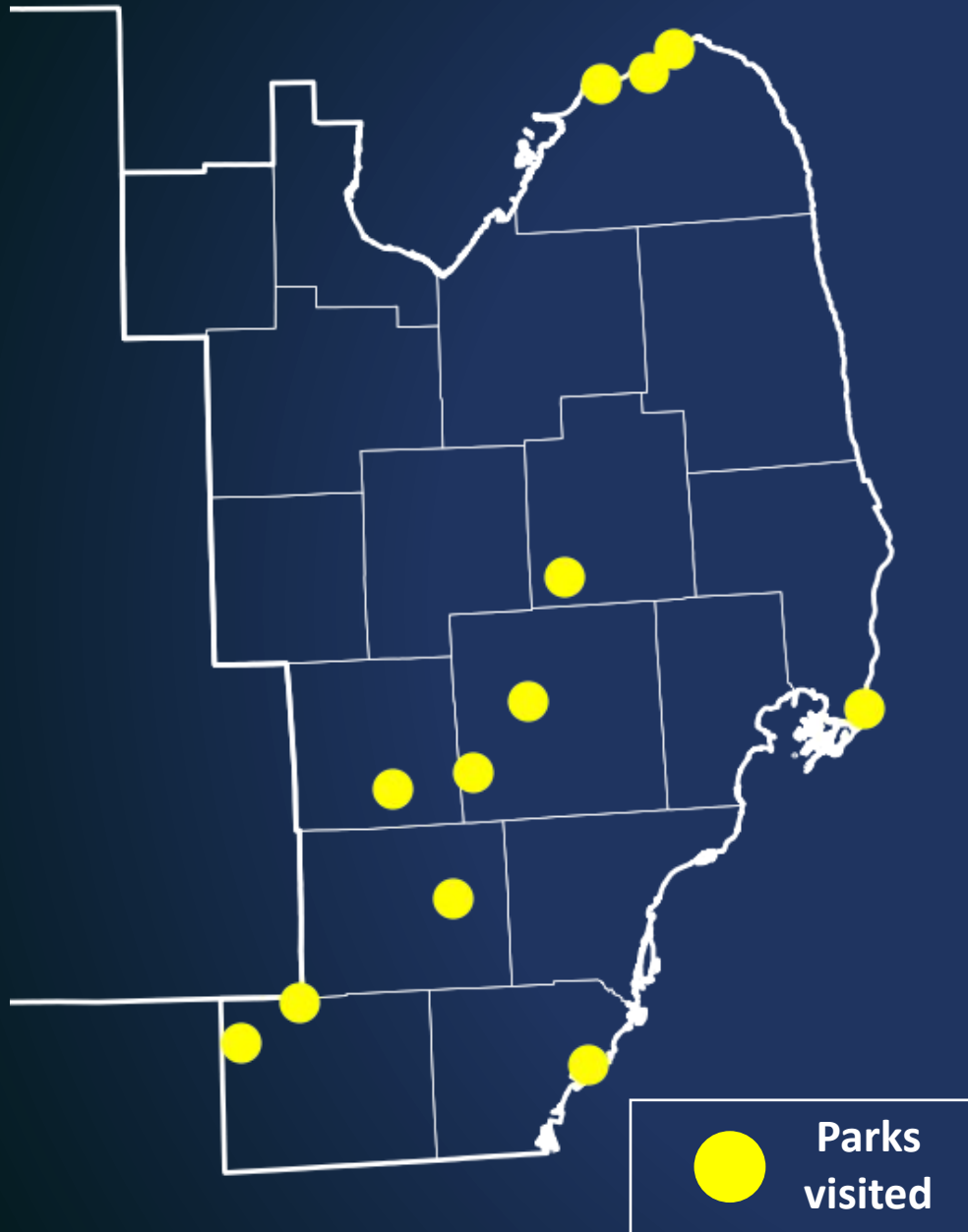
**July 19, 2018 Table Rock Lake, Missouri
Derecho**



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Weather Service Central Region Headquarters
Kansas City, Missouri

A portion of the Service Assessment was dedicated to gathering data on how vulnerable outdoor populations receive, interpret, and act on weather information:

- Done by conducting roughly two dozen interviews to gather feedback on NWS services for vulnerable outdoor populations
- Interviews were conducted with campground/marina managers and patrons
- But, because of the sample size, findings were considered **“specific to this case with potential for general applicability”**



Given local staff involvement in the SA & large outdoor recreation scene, NWS Detroit conducted additional interviews:

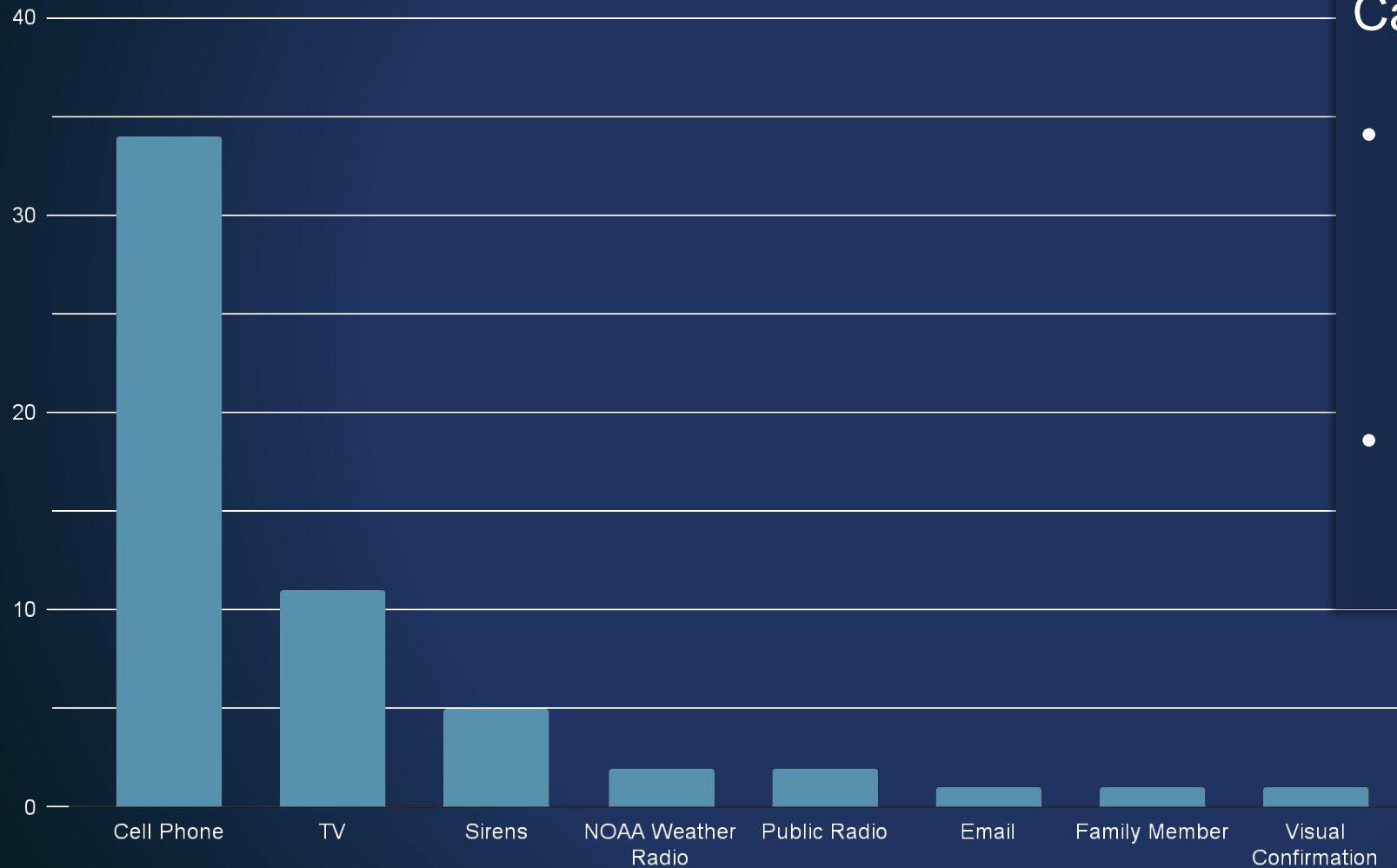
- **11 additional local and state park visits, 1 phone interview**
- **48 additional interviews with park management and patrons**
- **Local study followed similar methodology to SA**

How do vulnerable outdoor populations receive, interpret, and act on weather information?

Results

How do outdoor populations receive weather information?

Methods of Receiving Weather Information (Public)

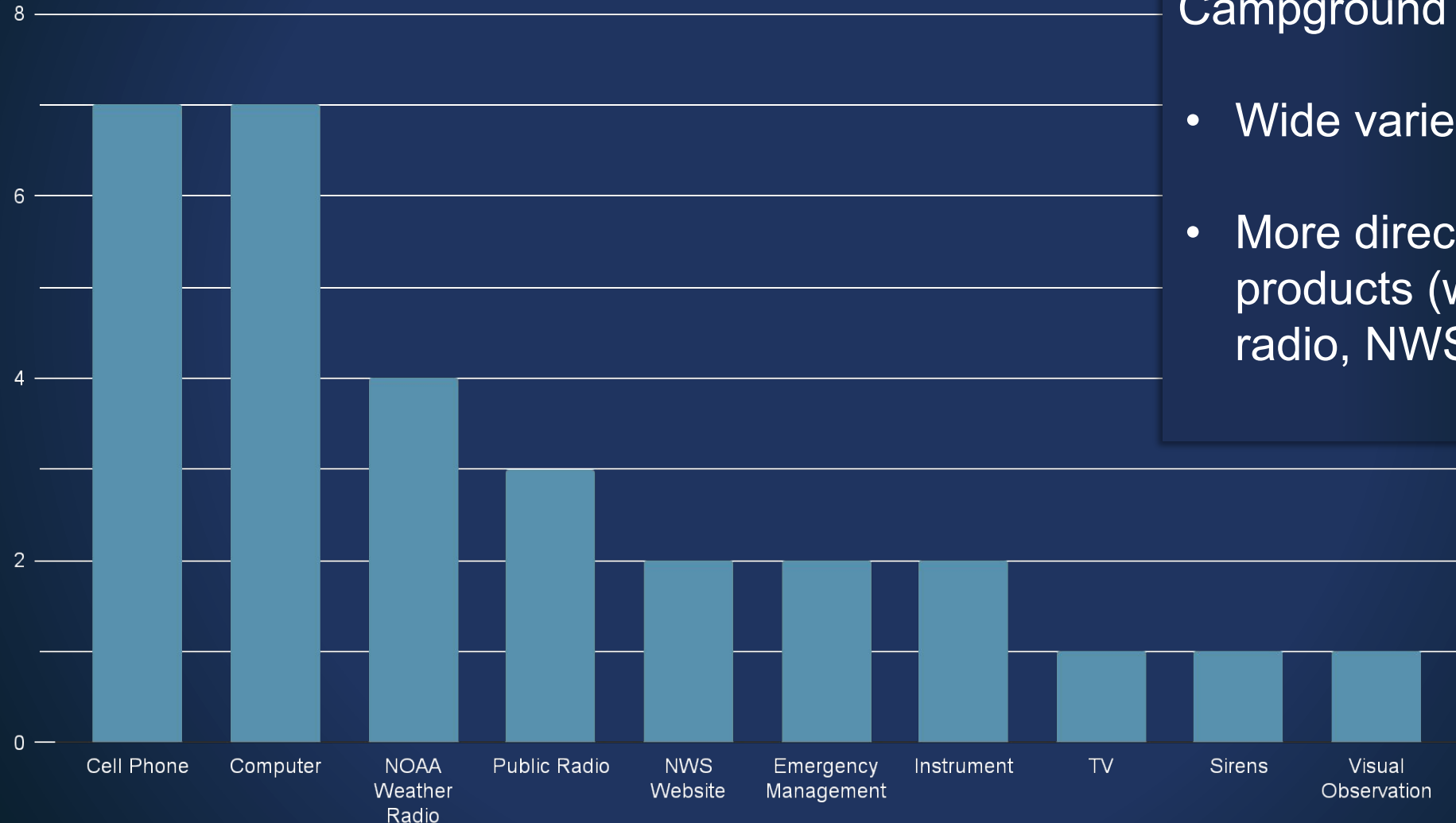


Campground Patrons:

- Cell phones were the primary method of receiving weather information
- Only 4 out of 37 interviewees reported using NOAA weather radio

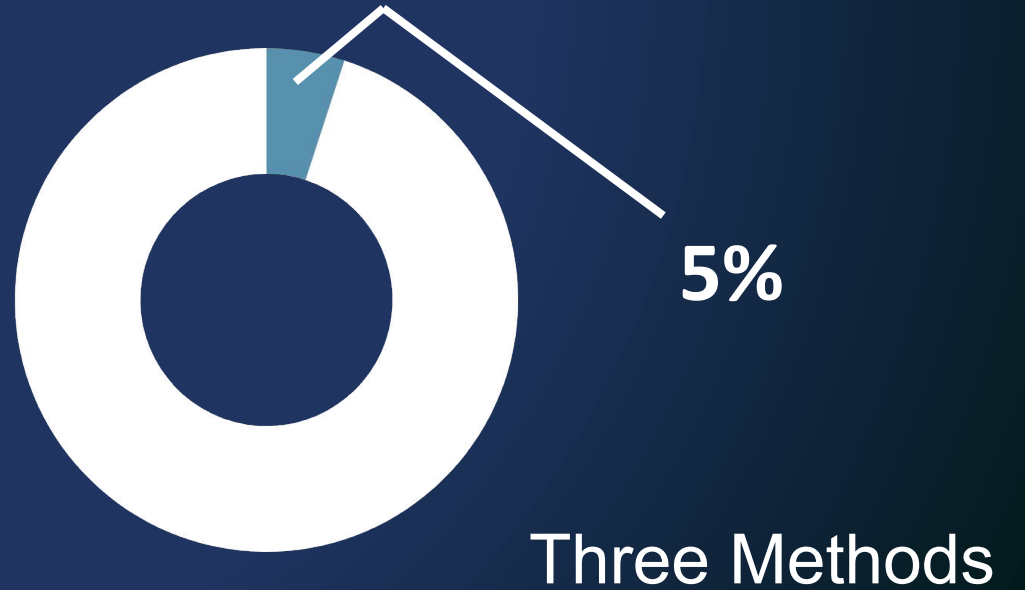
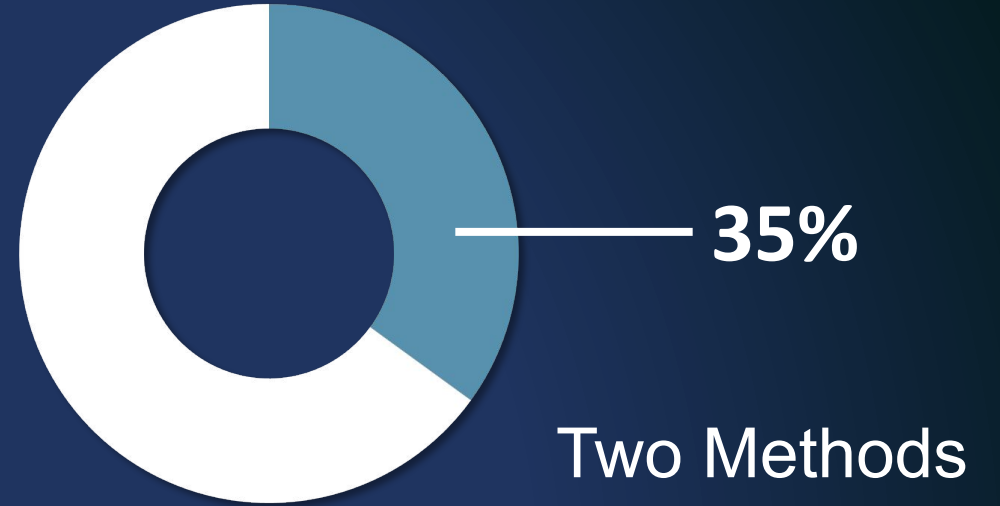
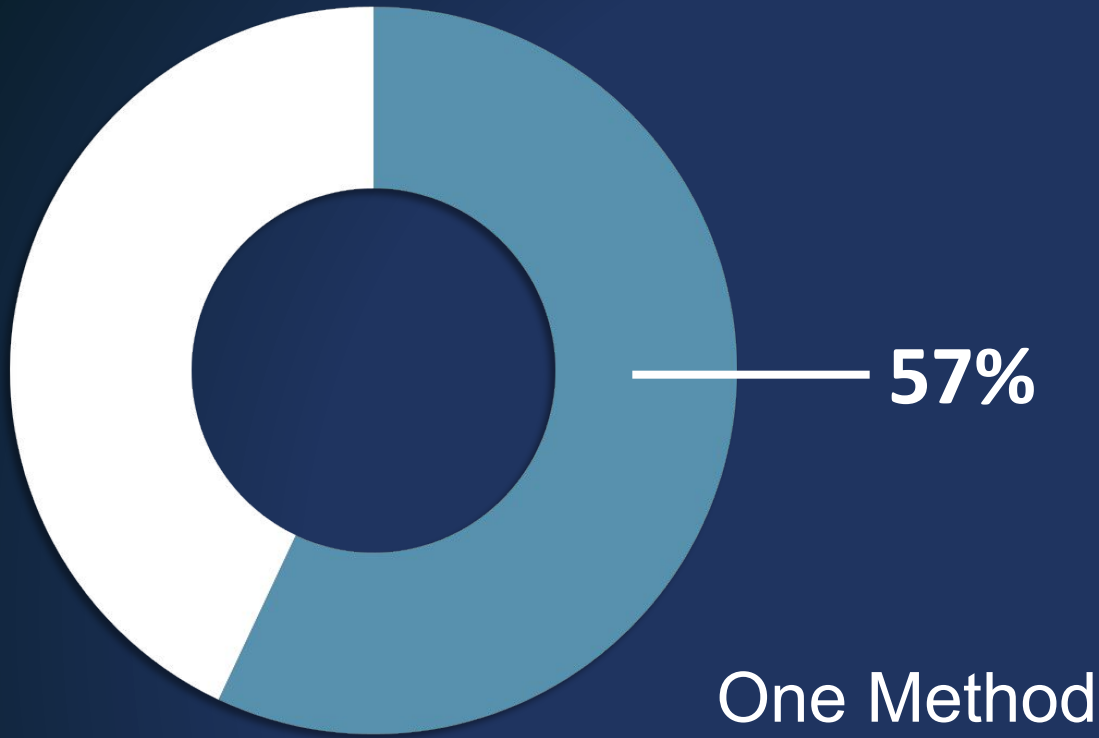
How do outdoor populations receive weather information?

Methods of Receiving Weather Information (Partners)



Campground Managers:

- Wide variety of methods
- More direct use of NWS products (weather radio, NWS website)



Over half of park patrons reported using only **one method** to receive weather information when outdoors

Gauging Utility of NWS Products

Special Weather Statement
National Weather Service Detroit/Pontiac MI
1257 PM EDT Fri Aug 27 2021

MIZ063-070-076-271800-
Macomb MI-St. Clair MI-Wayne MI-
1257 PM EDT Fri Aug 27 2021

...Strong thunderstorms will impact portions of northeastern Wayne, southern Macomb and southeastern St. Clair Counties through 200 PM EDT...

At 1257 PM EDT, Doppler radar was tracking strong thunderstorms along a line extending from Sterling Heights to Warren to near Detroit. Movement was east at 20 mph.

HAZARD...Winds in excess of 40 mph.

SOURCE...Radar indicated.

IMPACT...Gusty winds could knock down tree limbs and blow around unsecured objects.

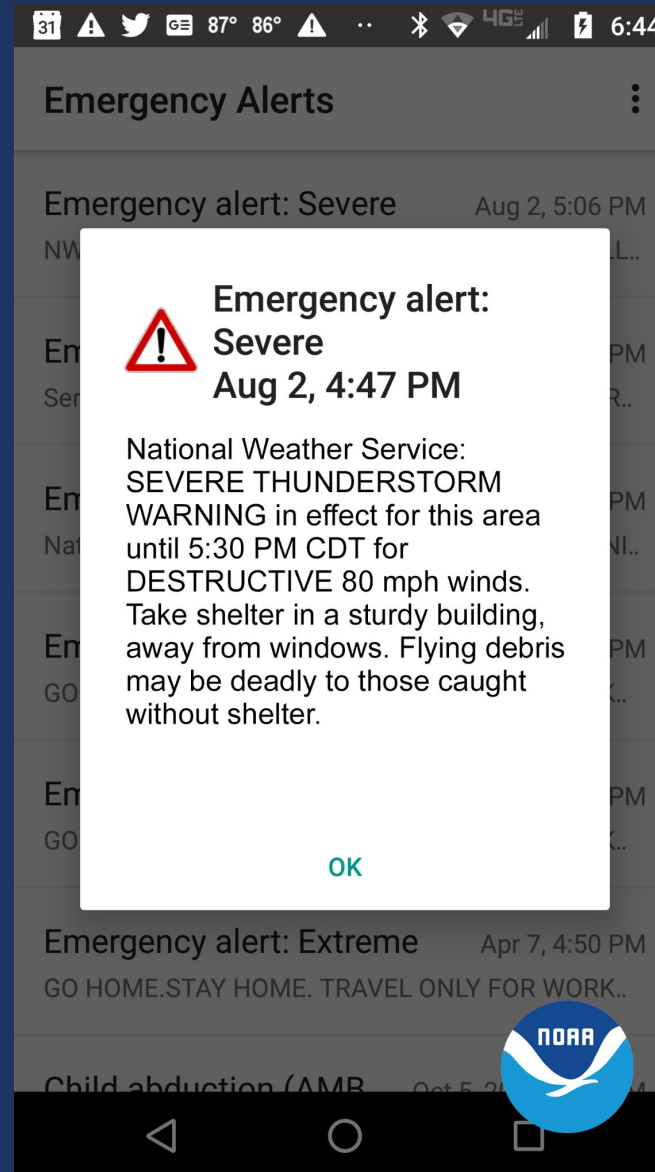
Strong thunderstorms will be near...
Sterling Heights around 100 PM EDT.
Mount Clemens, Grosse Pointe and Macomb Township around 115 PM EDT.
St. Clair Shores around 120 PM EDT.
New Baltimore around 145 PM EDT.
Algonac, Marine City and Harsens Island around 200 PM EDT.

Other locations impacted by these storms include Anchorville, Highland Park, Roseville, Fraser, Utica, Eastpointe, Fair Haven, Northeast Detroit, Harper Woods and Grosse Pointe Shores.

People attending Ford Field, Comerica Park, and Detroit Hydrofest should seek safe shelter immediately!

PRECAUTIONARY/PREPAREDNESS ACTIONS...

If outdoors, consider seeking shelter inside a building.



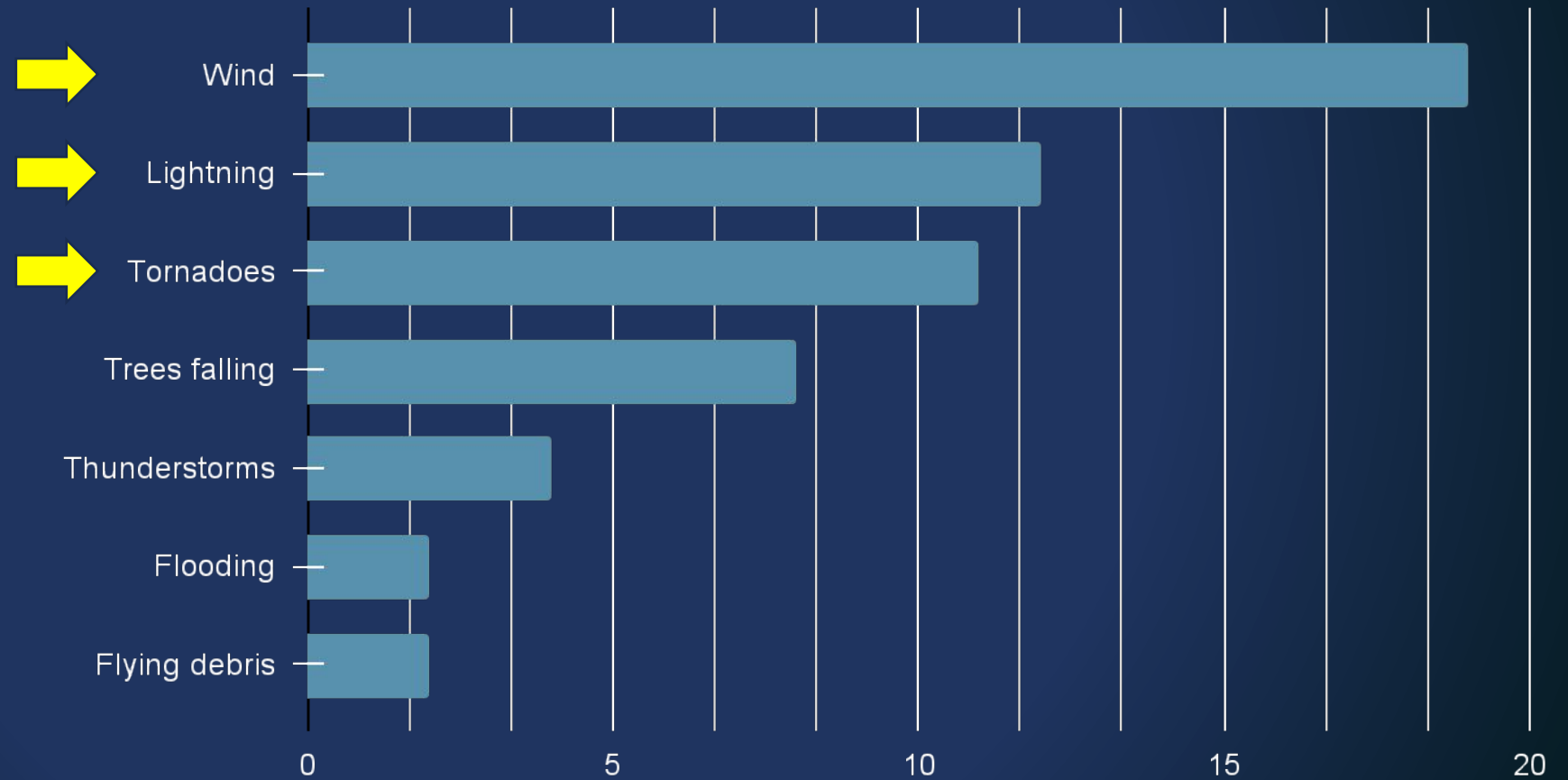
The general message from both public and partner interviews was that **the more information, the better.**

96% of public and 73% of partners said they would be interested in WEA for high-end SVR

84% of public and 82% of partners said they would find SPS information helpful (but not all currently use the product)

How do outdoor populations interpret weather information?

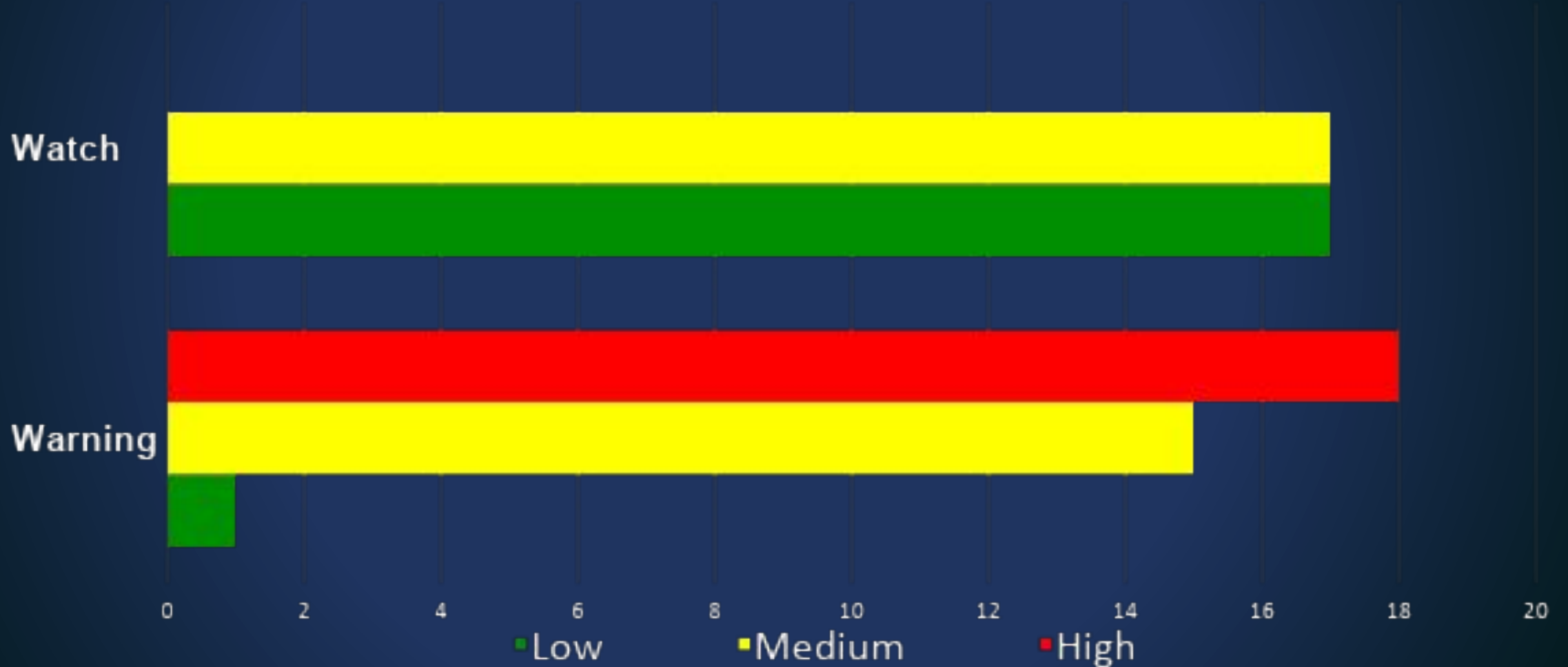
What weather hazards concern you most when outdoors?



Park patrons recognized both severe and sub-severe hazards as a threat when outdoors, with wind, lightning, and tornadoes as the top 3 concerns

Understanding & Interpreting NWS Products

Perception of Severe Thunderstorm Products



Timing information is important to both park management and patrons

89%

of park patrons said timing information is important in their decision making

100%

of park management said timing information is important in their decision making

Taking Action: When & Where?

If you learned severe weather was imminent, would you find shelter, confirm the threat, or do nothing?

- 38% would find shelter right away
- 57% would try to confirm the threat
- 5% would do nothing

If you learned severe weather was in the forecast, would you cancel or alter your plans?

- 46% would cancel
- 16% would alter
- 38% would keep plans the same

Do you know where to find shelter?

- 38% said bathrooms or showers
- 19% said they would leave the park
- 13% said no
- 30% did not state or other (e.g. car, camper, ditch)

Discussion

What can we do as an agency to address this vulnerability?

Address the Watch-to-Warning Gap

× Radar Update

As of 4:23 PM

Weather Forecast Office
Detroit, MI

Issued May 21, 2022 4:23 PM



This cell stays south of the MI-OH border as it moves northeast.

More intense thunderstorms stay well to our southeast in Ohio

Consider Time of Arrival / Pathcast Information

Radar Update

As of 6:40 AM



* Approximate timing of rainfall onset

Motion
SE at 30 mph

Weather Forecast
Detroit
Issued July 23, 2021 6

Radar Trends...

- Showers and embedded thunderstorms in the forecast area within the next hour and through late morning
- Rain generally stays southeast of I-75, with rain south of I-96
- Expect heavy rain and lightning within embedded thunderstorms to be the main hazards

Main Hazards



Impacts

- + Wet roadways & reduced visibility for commute
- + Slow down when driving through heavy rain

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PRECAUTIONARY/PREPAREDNESS ACTIONS...

If outdoors, consider seeking shelter inside a building.

Build relationships with core partners involved in the outdoor recreation sector



Questions & Discussion

Main Takeaway: People engaging in outdoor activities make up a significant vulnerable population to the hazards of severe and non-severe thunderstorms.



Lightning deaths
have decreased
from 44 deaths per
year (1998-2007) to
27 deaths per year
(2008-2017)



Wind fatalities
(thunderstorm and
non-thunderstorm winds)
have increased by 23%.