Emergency Manager Interpretation of Probabilistic Snowfall Graphics

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The Extreme Weather and Emergency Management Survey

The Extreme Weather and Emergency Management Survey (WxEM) is a panel study of Emergency Managers (EMs) from across the U.S. Participating EMs are sent surveys 3-4 times a year to gauge how they utilize NWS weather forecast information. Wave 6 of this survey asked how EMs use probabilistic forecast information from the NWS, and their preferences about receiving this information. A portion of this larger survey was dedicated to winter weather probabilistic graphics.

Research Questions:

- What ranges of probabilistic information do EMs prefer for snowfall forecasts?
- What types of probabilistic graphics do EMs understand and find useful to communicate snowfall information?

Preference for Forecast Wording

EMs were asked to evaluate different probabilistic snowfall forecast wordings and select the one they thought was best. One scenario involved the possibility of zero inches of snowfall, while the other did not, assigned randomly

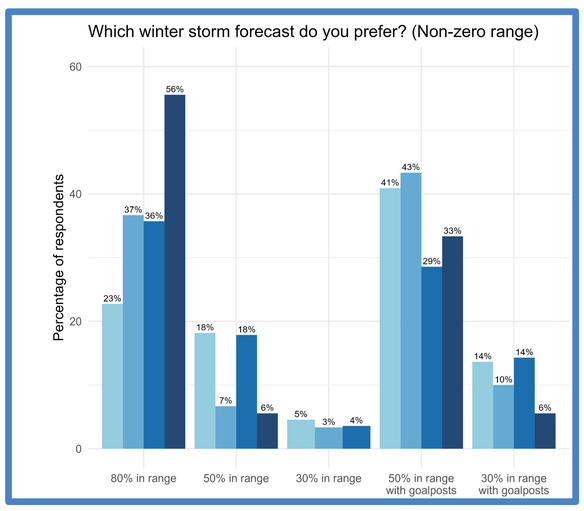
Imagine there's a winter storm forecast for tomorrow and that you see all the snowfall forecasts below, which are different ways of presenting snowfall ranges and the likelihood that the actual amount will fall in that range. Which of these options do you prefer?

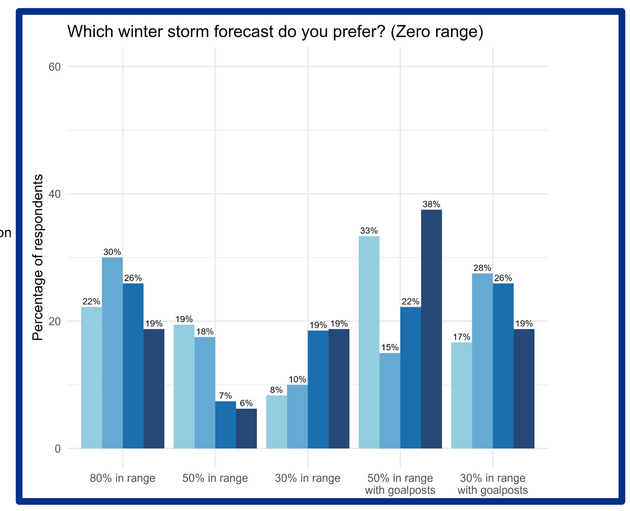
Non-zero range:

1 - The forecast is for 2-8 inches of snow, and there's an 80% chance that it will fall within that range.
2 - The forecast is for 3-7 inches of snow, and there's a 50% chance that it will fall within that range.
3 - The forecast is for 4-6 inches of snow, and there's a 30% chance that it will fall within that range.
4 - The forecast is for 3-7 inches of snow, and there's a 50% chance that it will fall within that range. But, there could be as little as 2 inches or as much as 8 inches.
5 - The forecast is for 4-6 inches of snow, and there's a 30% chance that it will fall within that range. But, there could be as little as 2 inches or as much as 8 inches.

Zero range:

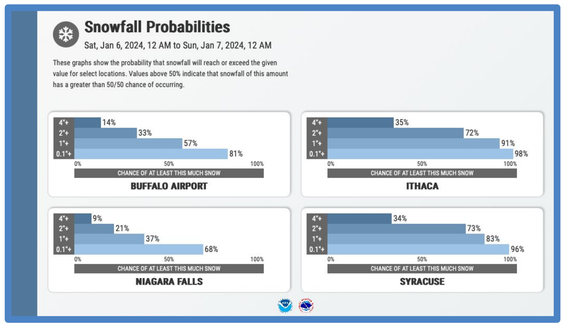
1 - The forecast is for 0-6 inches of snow, and there's an 80% chance that it will fall within that range.
2 - The forecast is for 1-5 inches of snow, and there's a 50% chance that it will fall within that range.
3 - The forecast is for 2-4 inches of snow, and there's a 30% chance that it will fall within that range.
4 - The forecast is for 1-5 inches of snow, and there's a 50% chance that it will fall within that range. But, there could be as little as 2 inches or as much as 6 inches.
5 - The forecast is for 2-4 inches of snow, and there's a 30% chance that it will fall within that range. But, there could be as little as 0 inches or as much as 6 inches.

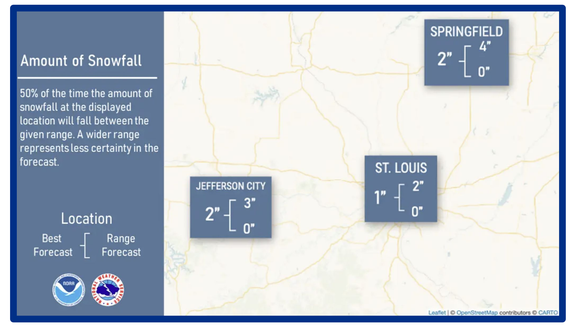




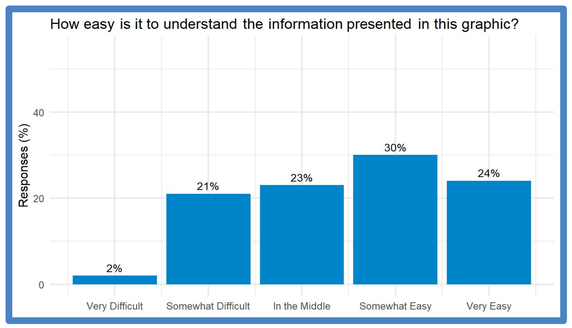
Preference for Probabilistic Graphic Type

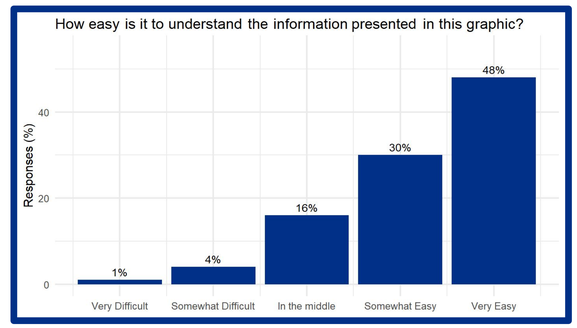
- Tests two different kinds of NWS probabilistic forecast graphics.
- The left is a probability of exceedance graph for various locations around Syracuse, NY.
- The right is a snowfall map containing, from bottom to top, the 25th percentile, median, and 75th percentile snowfall forecast for various locations around Springfield, IL.

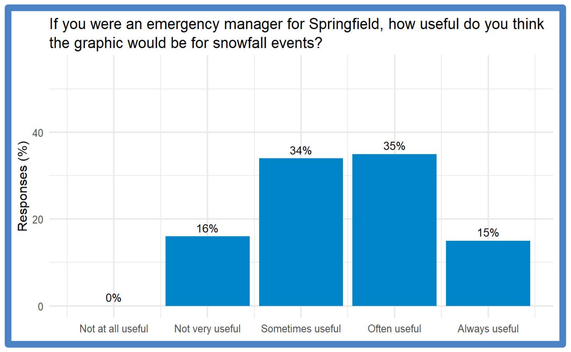


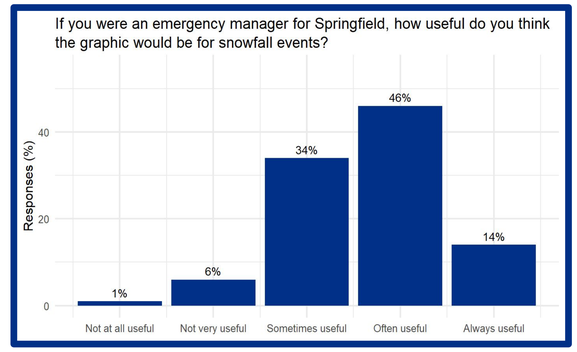


EMs were asked how easy it was to understand the information contained within each graphic, and how useful the graphic would be for snowfall events.









Analysis

- **EMs** tend to **prefer wider ranges of outcomes** for probabilistic forecasts. However, this preference is less strong when 0 inches of snowfall is possible, particularly among western region EMs
- EMs find **the snowfall map easier to interpret than the snowfall bar graph**. The distributions for graphic usefulness are more similar, with **the snowfall map rated slightly higher**