THE
ATMOSPHERICRESERVOIR
Examining the Atmosphere and Atmospheric Resource Management

"Verified Weather Warnings"

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Last month we learned how forecasters from the National Weather Service (NWS) assign chances of precipitation to their forecast products. Forecasters are also responsible for issuing weather warnings to protect lives and property. Last year, there were 18,550 severe thunderstorm and tornado warnings issued nationally by the NWS. (The NWS combines tornado and severe thunderstorm warnings for verification purposes because tornado warnings supersede severe thunderstorm warnings.) A total of 9,908 of those warnings verified, meaning a weather spotter actually witnessed severe weather conditions occurring and reported them. This equates to 46.6 percent of warned storms being unverified, which at first glance may seem high. But, after considering all the occurrences of severe weather that aren't reported each year, either because they were not observed, or they were observed and not reported, the reality is actually a much lower percentage.

Even though North Dakota's population is growing, it's still one of the most rural states, making storm verifications more difficult. With that in mind, it's impressive that the two NWS offices providing warnings for North Dakota counties scored higher than the national average for severe warnings. The Bismarck and Grand Forks NWS offices issued 396 severe thunderstorm and tornado warnings last year and 276 of those warnings were verified. This means that only 30.3 percent of warned storms were unverified. Again, imagine the many thousands of acres of our state that are unpopulated, where storm verification isn't possible. The NWS has a responsibility to warn for storms meeting warning criteria regardless of whether they will verify. In addition, North Dakota's NWS offices averaged an 87.2 percent probability of detection, meaning only 12.8 percent of reported severe thunderstorms or tornadic storms went unwarned.

With regard to flash flood warnings last year, the Bismarck and Grand Forks NWS offices scored a 95.8 percent probability of detection. There were warnings issued for every flash flood event reported in ND, but because events are divided into "fully warned" and "partially warned" categories, there were two partially warned events where the actual area flooded was partially outside of the warned area. The national probability of detection was 77.9 percent.

Warning lead-time is defined as the time between the warning being issued and the time the event occurs. The average national lead-time for severe thunderstorm and tornado warnings by the NWS in 2013 was 18.3 minutes while the average North Dakota lead-time was 22.4 minutes. For flash flood warnings, the national lead-time was 57.3 minutes, while North Dakota NWS offices averaged 64.7 minutes.

Forecasting weather and issuing warnings are both very complex, difficult tasks. Adding the verification process to warnings keeps forecasters on their toes, requiring them to consider the "before" (forecast), "during" (actual weather occurring), and "after" (verification) of storm events. In this context, it's easier to see why good meteorologists may only be right three-quarters of the time.

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