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Looking Back at 2010 Severe Weather Season

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Storm reports from North Dakota's 2010 severe weather season were still being compiled by the National Weather Service (NWS) in early September when this article was written, but early indications are that it was one of the most active seasons on record. According to John Paul Martin, Warning Coordination Meteorologist (WCM) for the Bismarck NWS Office, forecasters issued 529 warning products, encompassing 1,276 counties in 2010 (through August 31), making it the most warned severe weather season on record for western and central North Dakota. The NWS has used storm-based warnings instead of county-based warnings since October 2007. Storm-based warnings allow forecasters the ability to warn for a more specific area, instead of referencing an entire county in their warnings. For accurate comparison of the two different warning methods, the data were adjusted for all the counties that were covered under the storm-based warnings.

Another change to severe thunderstorm warnings occurred in 2009, when the NWS increased its warning criterion for hail from three-quarters of an inch to one-inch in diameter. This change likely reduced the number of severe thunderstorm warnings for the 2009 and 2010 seasons, making the comparison all the more impressive! Had the three-quarter inch criterion still been in place, one could argue that the total number of warnings would have been even higher in 2009 and this year.

The main reason for this season's prolonged severe weather was an upper-level wind pattern called zonal flow where the jet stream sets up in a direct west to east flow across the Northern Plains. This pattern allows for frequent, fast moving low-pressure systems that are able to tap into lower-level moisture and wind shear over North Dakota. This instability and shear oftentimes results in large hail and tornadoes.

There were at least 43 confirmed tornadoes reported statewide through the end of August, and that number could increase once the final numbers are determined. An average season experiences 22 tornadoes and the all-time record is 61 tornadoes back in 1999. According to Gregory Gust, WCM for the Grand Forks NWS Office, there were at least 30 confirmed tornadoes in eastern North Dakota in 2010 (as of August 31). That makes 2010 the second most active tornado season in eastern North Dakota next to 2005, when 37 tornadoes were reported. Gregory Gust added that, "The nation's most dramatic tornado outbreak of the 2010 season had deep North Dakota roots, beginning near Hettinger in the southwest corner of the state, and stretching eastward. Through the afternoon of June 17, at least 21 tornadoes were spawned across North Dakota, the strongest beginning near Mayville and producing EF4 damage along its 17-mile track. Over 70 tornadoes were produced that day across the Northern Plains states, ranking it as one of the biggest single day outbreaks in U.S. history."

Probably the most notable hail event during the 2010 season occurred during the overnight hours of July 13-14 when numerous reports of baseball and softball-sized hail were received in southwestern and south central North Dakota. These hailstorms caused extensive damage to agriculture and property. Windows were completely blown out by 4 1/4-inch diameter hail in Elgin and Cannonball and several mammoth 5-inch hailstones were recovered at Prairie Knights Resort, tying the North Dakota state record hailstone that fell in Mercer County back on August 3, 1969. Damage assessments in Sioux County by the Bismarck NWS indicated that there were about 100 buildings damaged from Solen to Cannonball, hail actually breaking completely through roofs, and leaving large divots in the ground where the hailstones hit.

"It just seemed like we could not get a 'garden variety' or 'every day type' thunderstorm this season," stated John Paul Martin. "They were unusually violent storms. If it wasn't a tornado, it was monster hail. If it wasn't thunderstorm winds causing extensive damage, it was flash flooding. We just couldn't catch a break. And almost no part of the state was spared."

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