Baker, MT Tornado of June 11, 2016

Overview

Updated June 29, 2016

Officials from NOAA's National Weather Service in Billings completed an assessment of the tornado that occurred in the town of Baker, MT (and surrounding areas) the evening of June 11, 2016. The assessment included a survey of the damage, eyewitness reports, and an aerial survey.

The first indication of damage occurred approximately 3 miles south of Baker, with periodic damage along a northward path through Baker Municipal Airport to just northeast of Baker Lake (Figure 1). There was not a continuous path of damage and eyewitness reports indicate that the circulation on the ground likely lifted and reformed at times with multiple circulations occurring at the same time. Reports indicate that the tornado remained stationary in that region just northeast of Baker Lake for a short period before shifting west over the lake and dissipating shortly after 7 pm.

Based on the observed damage, a majority of the damage was EF-0 to EF-1 (winds upwards of 110 mph) on the Enhanced Fujita Scale. However, the strongest portion of the tornado is being classified as an EF-3. Wind speeds within an EF-3 tornado range from 136-165 mph. The most severe damage occurred in about a square block area in the town of Baker, in a subdivision just northeast of Baker Lake (Figure 2). Given that the tornado was reported as remaining stationary over that particular area for a short period of time likely led to the more significant damage.

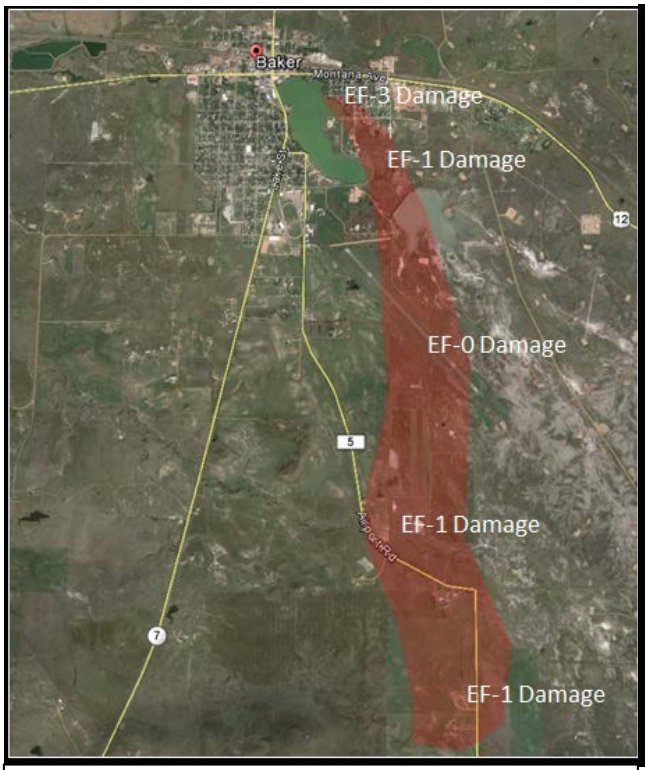


Figure 1: General Tornado Damage Path

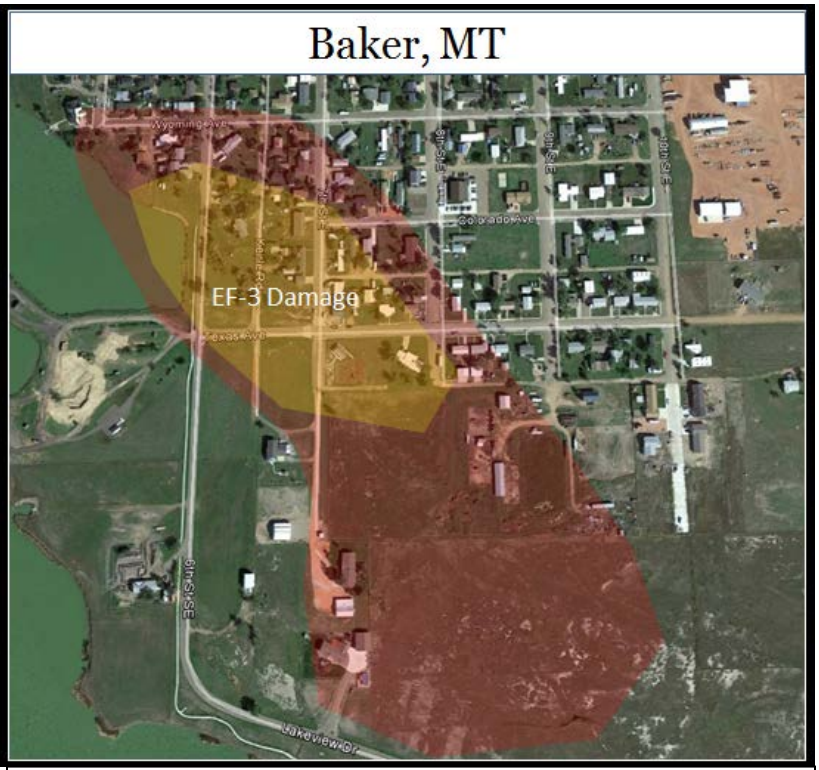


Figure 2: Baker, MT Damage Path

In an area approximately 3 miles south of Baker, where the first reports of damage occurred, a steel framed barn was destroyed, three RV's were destroyed, several homes sustained minor damage and several horses were killed.

Figure 3: Survey Photo – Steel Framed Barn Destroyed

Figure 4: Survey Photo – RV's damaged

In the most severe portion of the storm in the town of Baker, 10 homes were destroyed along with 4 other structures (garages, shops, outbuildings). An additional 30 homes sustained minor to moderate damage. A half dozen injuries were reported; all non-life threatening. The following pictures (Figures 5-8) were taken in the area around Texas Ave to 6th and 7th Street East.

Figure 5: Survey Photo - Baker

Figure 6: Survey photo - Baker

Figure 7: Survey photo - Baker

Figure 8: Survey photo - Baker

Thanks to aerial photography by Roger Meggers, Baker Municipal Airport Manager, we were able to obtain detailed imagery of the path of damage.

Figure 9: Aerial Photo of Steel Barn Destroyed. 3 Miles South of Baker, MT. Courtesy Roger Meggers

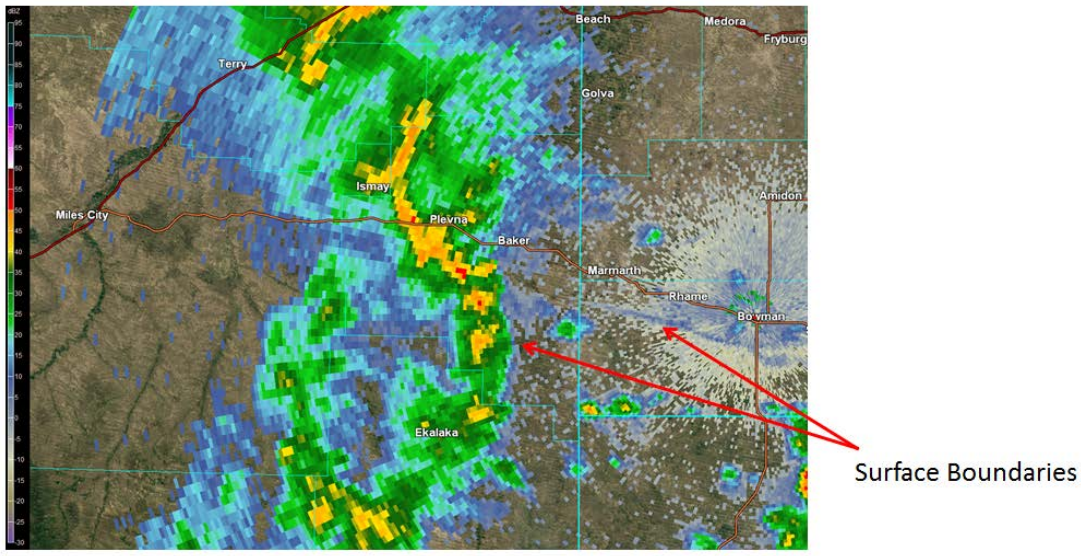
Figure 10: Aerial Photo of EF-3 Damage in Baker, MT Courtesy Roger Meggers

Scientific Explanation

The pre-storm environment for Eastern Montana was such that severe weather was likely. Surface dew point values in the Baker area were in the lower 60s (°F) with strong southeasterly flow converging in the vicinity of a stationary surface trough. This area of strong surface convergence, which also separated moisture rich air to the east and drier air to the west, played a critical role in the development of this particular short-lived tornado.

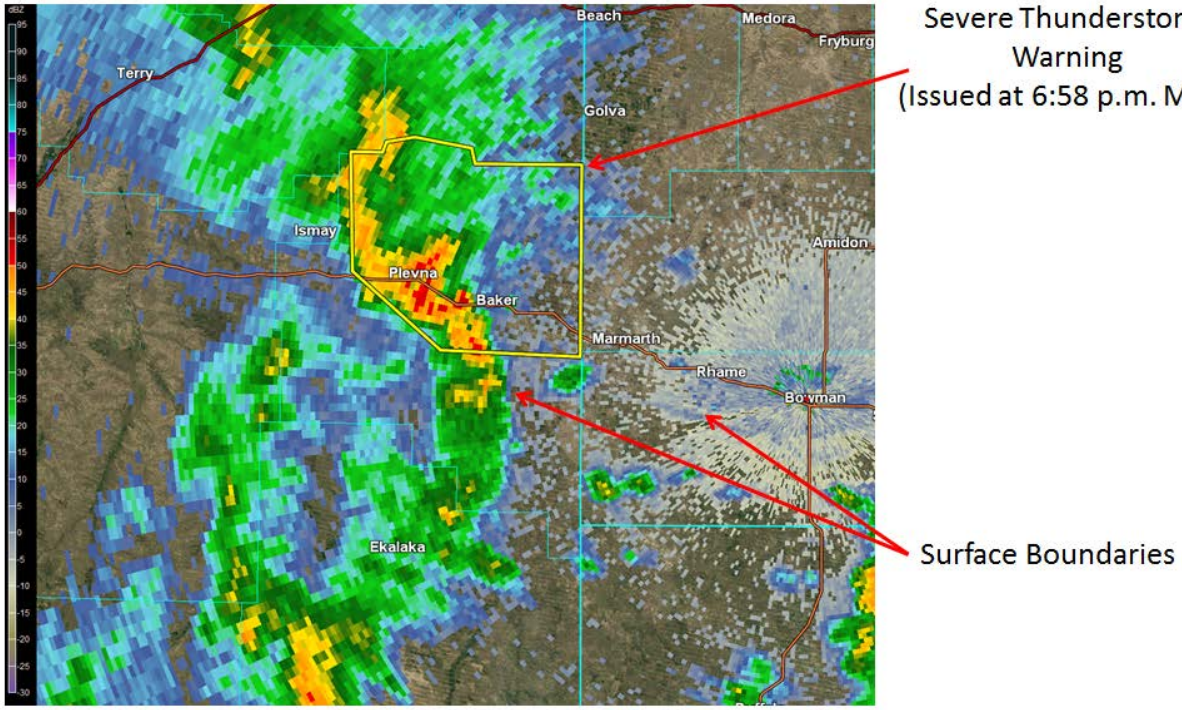
At the mesoscale (2 to 2000 km in space), the interaction of pre-existing convergence zones or boundaries can serve as areas of storm development or enhancement. In some cases, pre-existing thunderstorms interacting with a boundary of converging surface winds can rapidly develop short-lived tornadoes with very little precursor indication from weather radar. The time scale of these events typically is on the order of a few minutes (0-10 minutes).

In the case of the storms near Baker, MT on Saturday June 11th, 2016, evidence of these types of boundaries can be seen as early as 6:52 p.m. MDT on the KBPP Bowman, ND radar:



KBPP 0.5° Reflectivity Valid 6:52p.m. MDT

Thunderstorms began to intensify by 6:58 p.m. MDT, prompting the issuance of a Severe Thunderstorm Warning for portions of Fallon County, Montana (including the city of Baker):

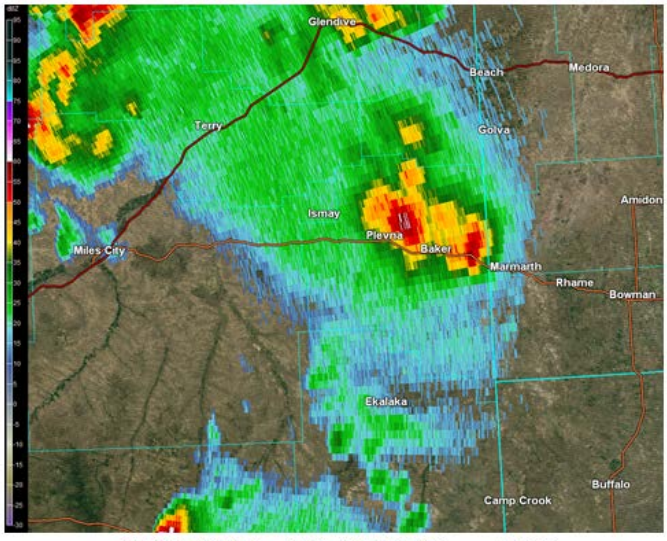


KBPP 0.5° Reflectivity Valid 6:58p.m. MDT

As previously mentioned thunderstorms interacting with pre-existing surface boundaries can lead to enhancement of the thunderstorm and in some cases generate transient tornadoes. These tornadoes, however, tend to be weaker and shorter-lived on average, than those associated with much stronger supercell thunderstorms.

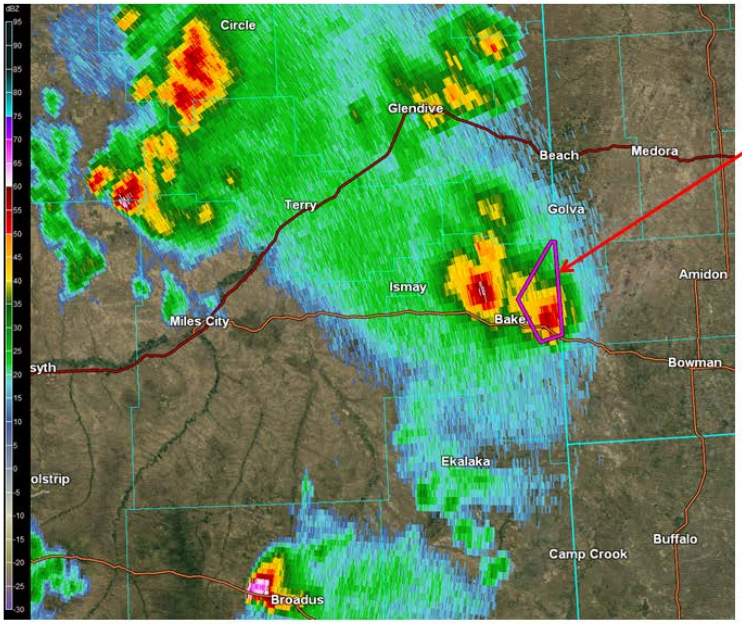
It can be very difficult to identify the indication of a tornado in rapidly intensifying, short-lived situations like this one. Quite often, meteorologists must rely on spotter reports for these type of short-lived events.

At 7:00 p.m. MDT storms were seen intensifying on the KBLX radar reflectivity:



KBLX 0.5° Reflectivity Valid 7:00p.m. MDT

The first spotter reports of a tornado on the ground near Baker came into the Billings NWS office at 7:00pm, triggering the issuance of a Tornado warning at 7:02 p.m. MDT:



KBLX 0.5° Reflectivity Valid 7:02p.m. MDT