



Billings Tornado of June 20, 2010

Overview

June 30, 2010

Officials from NOAA's National Weather Service in Billings completed an assessment of the tornado that occurred in the city of Billings the afternoon of June 20th, 2010 (Fathers Day).

Based on the observed damage, the tornado is being classified as an EF-2 on the Enhanced Fujita Scale. Wind speeds within an EF-2 tornado range from 111-135 mph, and the associated damage observed at the Billings MetraPark and nearby businesses is consistent with this classification. The damage path was 120 yards wide with a length of about a half mile (Figure 5) and on the ground an estimated 12 minutes.



Figure 1: Photo Courtesy Les Stone



Figure 2: Photo Courtesy Darrell Buszmann

The damage assessment and eyewitness accounts indicate that the tornado developed near the intersection of Lake Elmo Drive and Main Street in the Billings Heights at approximately 4:24 pm, with significant EF-2 damage to several nearby businesses (Figure 3). Damage included rooftops being blown off of three structures, windows blown out, power poles downed, business signs and billboards blown down along with several trees uprooted. The tornado appeared to weaken slightly as it progressed southeast across Alkali Creek. Limbs were broken off numerous trees in the vicinity of the creek. The tornadic circulation then appears to have strengthened once again as it moved south over the Rimrock Auto Arena at Metrapark. EF-2 damage was again observed to the arena with much of the roof blown off along with other damage to the exterior of the building (Figure 4). Debris from the arena impacted other nearby businesses creating additional damage, mainly in the form of broken windows. Debris from the arena was reported landing as far away as a mile from the tornado touchdown. The tornado then dissipated over the arena around 4:36 pm.

The associated thunderstorm then moved northeast away from Billings. Numerous sightings of funnel clouds were reported as this storm moved east-northeast of Billings, however no additional tornado touchdowns were reported.



Figure 3: Main Street and Lake Elmo Drive

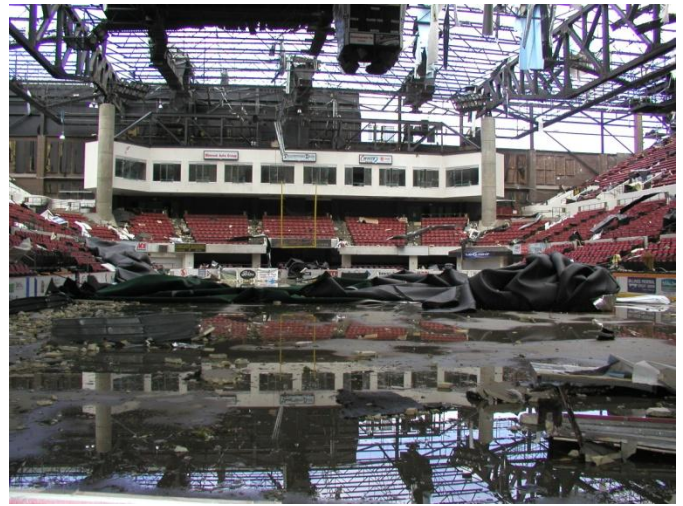


Figure 4: Rimrock Auto Arena

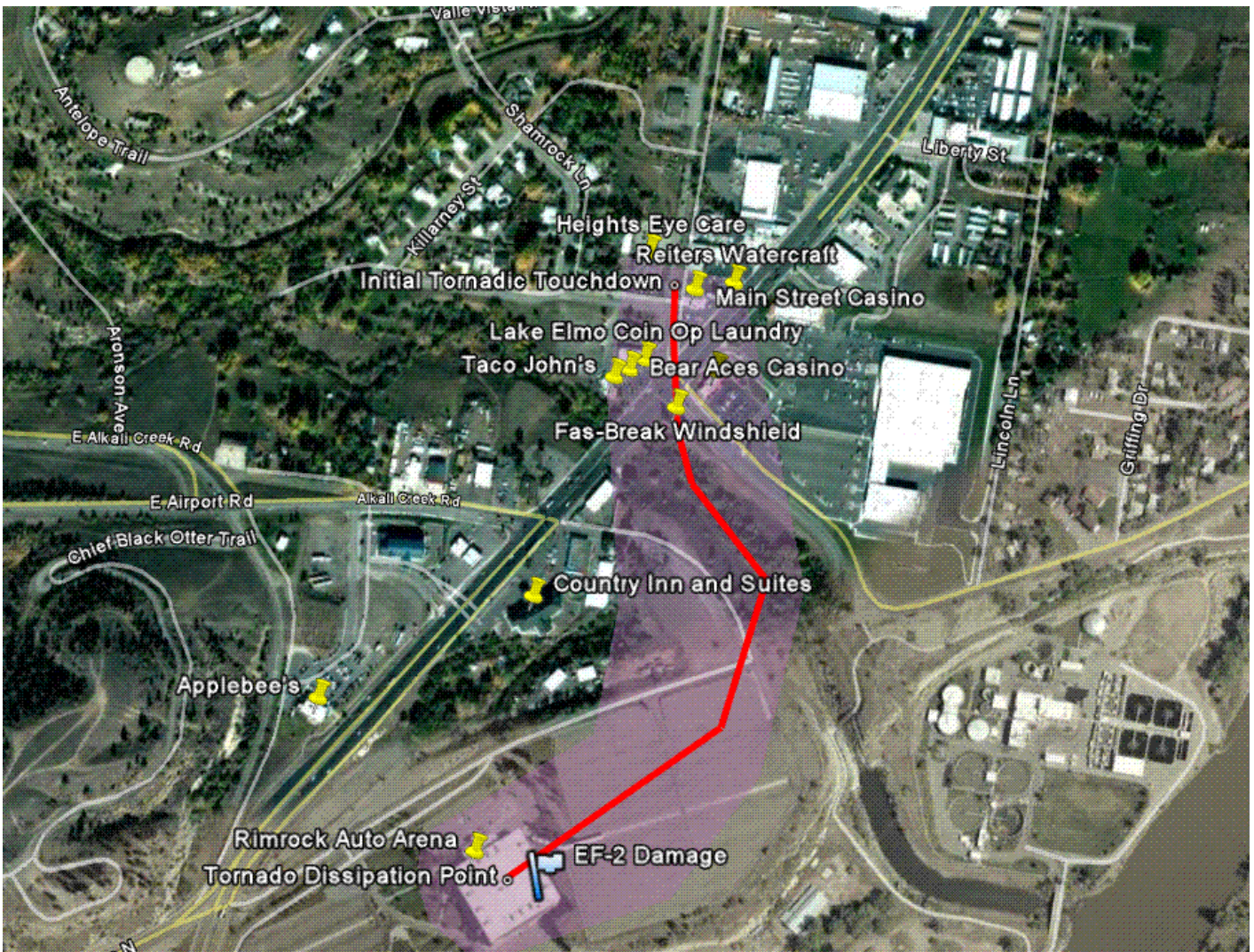


Figure 5: Damage Path

Meteorologically speaking, this was a very active severe weather day for south central Montana. The Storm Prediction Center in Norman, Oklahoma had issued a Severe Thunderstorm Watch for parts of Southern Montana, including Yellowstone County, at 1:55 pm on 6/20/10. Strong southwesterly flow aloft combined with a moderately unstable air mass created conditions favorable for producing severe thunderstorms, and potentially tornadoes.

The tornadic producing supercell thunderstorm is shown in Figure 6 at 4:29 pm on 6/20/10. This particular storm formed to the southeast of the Billings Doppler Radar (KBLX). The structure of this storm displayed a very distinct hook echo with very strong inflow. Figure 7 shows the storm-relative velocity profile from the same time. As a reference, green colors represent winds flowing toward the radar and red colors represent winds flowing away from the radar. The area of circulation at this particular time was quite impressive.

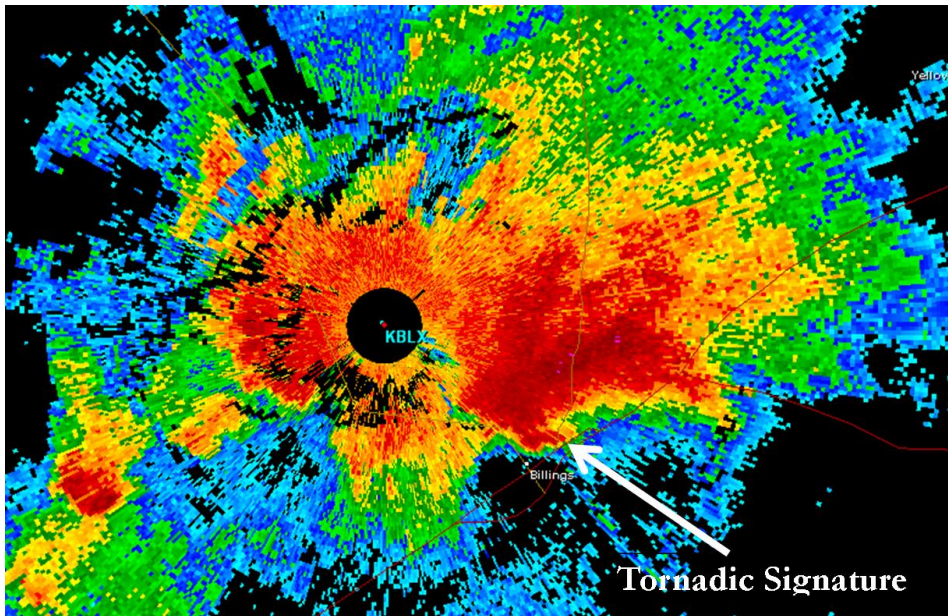


Figure 6: WSR-88D KBLX 0.5 ° Base Reflectivity Image valid Sunday June 20, 2010 at 4:29 pm

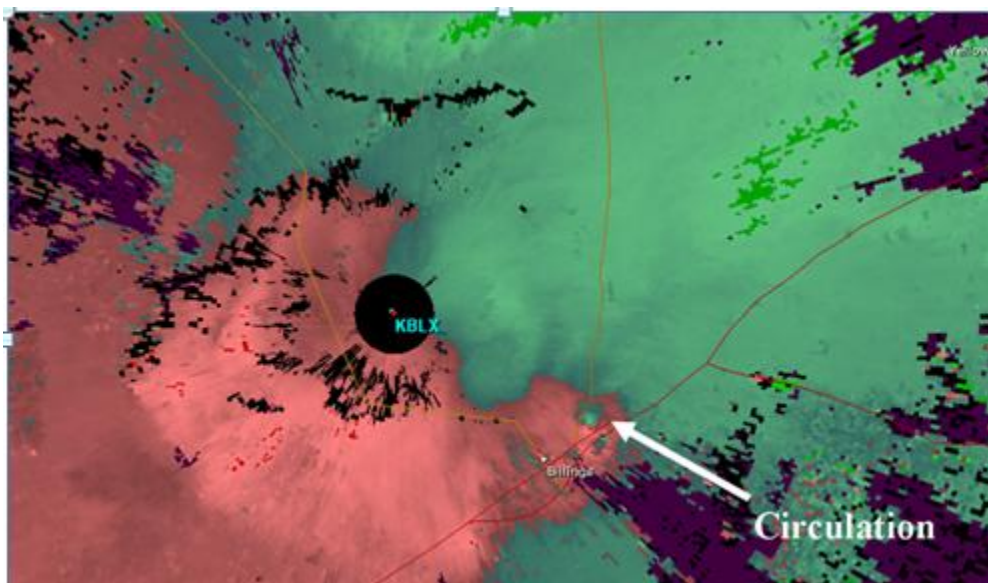


Figure 7: WSR-88D KBLX 0.5 ° Storm Relative Motion Image valid Sunday June 20, 2010 at 4:29 pm