

## **Long-Lived Supercell Thunderstorm Pummels Northeast Montana**

### **Overview**

On the afternoon and evening of June 16, 2007, a lone severe thunderstorm tracked across northeastern Montana producing damaging straight line winds in excess of 80 miles per hour at times, large hail up to three inches in diameter and localized flooding. Damage from this storm was noted almost entirely along its estimated 320 mile long path resulting in approximately \$300,000 in property damage alone. What made this thunderstorm different from other storms commonly observed in this region was its unusual longevity thanks to a persistent rotating updraft. This type of storm, referred to by meteorologists as a supercell, is the most common source for tornadoes, large hail and damaging winds and frequently occurs in the Central and Southern Great Plains of the United States.

### **Meteorological Setup**

Conditions across northeast Montana this day were not unusually warm or humid as highs reached into the 80s while dewpoints resided in the low 50s. Despite these seasonable conditions, the air aloft was substantially cooler resulting in an unstable atmosphere. Winds at the surface had been blowing from the east-southeast much of the morning and afternoon with frequent gusts to 30 miles per hour well before the storm developed. Meanwhile, a strong 105 mile per hour jet stream located 30,000 feet above the ground was flowing from the southwest directly across northern Montana. It was this favorable change in wind speed and direction from the ground on up that allowed this thunderstorm to acquire rotation. The final ingredient was a warm front that was situated south of the area. Unlike cold fronts that typically produce storms very close to the front itself, warm fronts can generate storms well ahead of them. This process is caused by moist, unstable air ascending and traveling over a more stable air mass near the ground. This particular supercell thunderstorm trekked east-southeastward almost completely parallel to the warm front resulting in an uninterrupted feed of unstable air for just over ten hours!

### **Storm Track and Damage Reports**

Along the storm's track extending from near Whitlash to just west of Sidney, MT, the most extensive damage reports were received in southern Valley and northern McCone Counties where the cities of Glasgow and Nashua suffered direct hits. At 5:30 pm, the storm's leading edge was 12 miles west of Glasgow when strong inflow winds out of the east began gusting to 65 miles per hour downing several small tree limbs. The storm hit Glasgow around 5:50 pm with large hailstones ranging from golfball to baseball size, winds gusts between 70 to 80 miles per hour from the west and heavy rains. The large hail quickly diminished to pea and penny size, but lasted for almost ten minutes while accumulating into drifts from the strong winds. Many homes in Glasgow sustained damage to roofs, siding and windows from the wind-driven hail. Damage to crops was so extensive that following the event weather satellites clearly revealed a damage swath in the terrain coinciding with thousands of acres of destroyed vegetation along the storm's path. In addition to the wind and hail, street flooding was common

in Glasgow with standing water noted in several nearby farmlands and low lying areas. More storms later in the evening traversed over areas still recovering from the heavy rains resulting in additional flooding of lowlands and small streams. There was so much rain that Glasgow ended up setting a precipitation record for the date with 2.55 inches having fallen.

### Storm and Damage Photos



Storm approaching Glasgow at 5:45 pm - photo courtesy Matt Ziebell



One of several areas affected by flooding in Glasgow - photo courtesy Holly Burleson



Satellite image six days before the storm centered near Fort Peck Lake - image courtesy CIMMS/SSEC



Satellite image four days after the storm showing the easternmost portion of a 285 mile long and 12 mile wide damage swath - image courtesy CIMMS/SSEC

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