Northern Rockies to Upper Great Lakes Winter Storm
4/11 - 4/13 2020
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Meteorological Overview:

The synoptic setup for this event involved an upper-level trough over the Great Lakes/Northeast U.S. and a closed low/trough over the California/Southwest U.S. This placed much of the Northern and Central Plains in northwest flow aloft. Shortwave energy within this flow sent a cold front south and east through the Canadian Prairies into the northern-tier states while a nearly stationary front banked against the Rockies began to move eastward as a warm front on Friday 10 April. Snow began across parts of the Rockies and High Plains during this time. As the upper low tracked from southern California to southern Arizona during the early morning on Saturday 11 April, the surface cold front plunged south into Colorado, the Dakotas and the Upper Mississippi Valley--spreading the snow farther south while continuing across the northern-tier. The front's progression slowed somewhat as it approached Nebraska; meanwhile a warm front lifted north over the Midwest while a warm front began lifting across southern Texas and along the Gulf Coast Saturday night.

As the upper-level low exited the Southwest Sunday 12 April it transitioned to a negatively-tilted trough and continued to traverse over the Southern/Central Plains into the Southeast U.S. A surface low and cold front formed over New Mexico late Saturday night and became better organized over southeastern Colorado and western Texas by early Sunday morning, then proceeded to move east while lifting the warm front through the Gulf States toward the Southeast. The northern cold front reached the Southern Rockies/High Plains and was draped over this southern low-pressure system. The leading low with the northern system deepened over the Great Lakes as it lifted through southern Michigan into Ontario Sunday night into Monday (12-13 April). In the cold sector, scattered to widespread snow continued near the front. Within the warm sector, scattered thunderstorm activity was observed from Texas to Illinois on Saturday 11 April but quickly became widespread in the strongly sheared environment. An outbreak of severe thunderstorms occurred across the South, Southeast and Mid-Atlantic regions on Sunday 12 April and lingered into Monday 13 April along the East Coast. Numerous tornadoes, large hail and heavy rain were reported from eastern Texas and Oklahoma to Virginia. Training of cells lead to flash flooding over portions of the Gulf states.

Impacts:

The effects of this particular winter storm seem paltry when compared to similar events. Normally, millions of people would be traveling any given day. Being a holiday weekend, there would have been an additional surge of people flocking to airports, train or bus stations or driving cross-country to spend time with family and friends. Due to the Covid-19 outbreak, many states had stay-at-home orders and travel restrictions in place, limiting it to mainly essential travel only. Major disruptions to the transportation industry had already occurred.

For those that were travelling, road conditions became hazardous as snow and ice began to accumulate. Across central Montana snow values varied quite a bit, with up to 8 inches in the lower elevations and 12 to 24 inches in the highest terrain. Great Falls set a new daily snowfall record with 5.4 inches for 11 April, surpassing the previous record of 4 inches that was set in 1991. In addition, the season total spanning from 1 July 2019 to 11 April was 99 inches; making it 35 inches above average with 2.5 months to go for the year (seasonal record runs July to June). Other daily records for 11 April include 6.2 inches in Stanford, passing the previous record of 3 inches from 2007, 5 inches at Holter Dam, passing 3 inches from 1996, and 3.3 inches in Havre, breaking the prior record of 1 inch from 1996.

Similar snowfall totals of 12 to 24 inches were recorded in the higher terrain across Wyoming and Colorado. Boulder set a 12 April daily record with 8.8 inches of snow. Rain initially fell across the Dakotas but then switched over to snow, falling at rates of 1+ inch/hour for several hours. The highest observed total of 15 inches occurred near Deadwood, South Dakota; however, several locations near Rapid City and the central parts of the state south of I-90 had 5 to 10+ inches. Sioux Falls, South Dakota received 5.2 inches on 12 April; breaking the previous daily record set back in 1983. Across eastern South Dakota snow amounts averaged 2 to 6 inches, however, embedded heavier snow bands dumped 7 to 10 inches in isolated locations.

According to local news stations in Minnesota, WCCO and KARE, there were more than 250 accidents and spinouts on Easter Sunday across the state; which was fatal for 1 individual and injured 14 others. Per the Minnesota Department of Transportation, the majority of the incidents occurred along stretches of I-90 between Albert Lea and Rochester, I-35 south of Minneapolis and St. Paul, and along Highway 52 from the Twin Cities to Rochester. Minneapolis-St. Paul airport observed 5.1 inches of snow through 7pm 12 April, 2020 which makes this event the snowiest Easter Sunday on record. Rochester had its 2nd snowiest Easter with 7.5 inches and its 4th snowiest April day on record. Parts of Iowa had 3 to 12 inches of snow. A new daily record of 3.7 inches at the Sioux Gateway Airport in Sioux City, Iowa was established for 12 April, making it the second snowiest Easter snowfall since 1929. Other daily records across eastern Iowa include 8.3 inches in Rock Rapids, 7 inches in Rock Valley, and 6.5 inches in Hull. Moderate to heavy snow, with occasional lightning, was observed across parts of eastern Iowa, southeastern Minnesota and western/central Wisconsin on Sunday 12 April. Given that some areas had rain longer than others, snow accumulations ranged from 1 to 10 inches over this region.

Two waves of snow impacted Michigan; the first occurred Sunday night into the early hours of Monday. Snow was widespread, especially for the eastern side of the Upper Peninsula where strong warm air advection and broad large-scale lift were aligned. The highest swath was observed across the central portion of the Upper Peninsula. In contrast, locations near Lake Michigan and along the coast had much lower amounts thanks to warming above freezing and transitioning to mainly rain for hours. The second wave of winter precipitation came in the form of lake-enhanced snowfall as cold air wrapped back into the region as the low exited. This activity persisted through afternoon, then mostly tapered off by Monday night.

In addition to the widespread snow impacts, frigid air surged south into the Northern and Central Rockies region causing a vast area to have much below normal temperatures. Several locations tied or established new daily records. The new temperature records for 12 April, 2020 include Great Falls, Montana at -3 degrees F (previously 7 from 1997), Cut Bank, Montana at 1 degrees F (previously 3 from 1997) and Billings, Montana at 15 degrees (tied from 1986). The 13 April, 2020 temperature records are Denver, Colorado at 16 degrees F morning for the low (previously 17 from 1933) and new all-time coldest high temperature of 25 degrees F (also from 1933), Gillette, Wyoming 4 degrees F as the new all-time daily low (prior record of 9 was set in 1997).