Northern U.S. Winter Storm
April 12 - 16, 2018
By: Allison Santorelli, WPC meteorologist

Meteorological Overview:

A large and prolonged late season winter storm impacted much of the northern United States from the northern Rockies to the Great Lakes from 12 April to 16 April, 2018. Snow across the northern Rockies fell in response to an area of upper level low pressure shifting eastward across the western states and upper level forcing along the favored terrain (figure 1). As the upper level low strengthened over the northern and central Rockies on 13 April, heavy snowfall also fell in portions of northern to eastern Montana along a mid-level frontal boundary.

As the upper level low ejected into the central Rockies and High Plains on 13 April, a surface low pressure system also began to take shape over the central Plains. By 00 UTC 14 April, a closed upper level low was located near the border of Kansas and Nebraska, while the surface low was moving into the Midwest (figure 1). Heavy snow began falling to the north and west of the surface low during the afternoon hours of Friday, 13 April across portions of Nebraska, South Dakota, and into central Minnesota as significant moisture streamed northward ahead of the upper level low and cold air was sinking southward from Canada. Heavy snowfall across the central and northern Plains came to an end by the evening hours of Saturday, 14 April as the upper level low shifted eastward into the Midwest and the main feed of moisture was cut off.

Farther east into the Upper Mississippi Valley and the Great Lakes, an initial round of moderate to locally heavy snow also fell late Friday into early Saturday in response to warm air advection north of a surface warm front draped across the Ohio Valley. Another round of much more widespread and heavy snowfall arrived by Saturday night and lasted through Sunday, 15 April as the main surface low and upper level low moved through the Upper Midwest and into the Ohio Valley (figure 1). Just to the south of the heavy snowfall area, warm air moving in aloft resulted in widespread sleet and freezing rain with significant ice accumulations observed across parts of the upper Ohio Valley, Great Lakes, and upstate New York. The heaviest of the precipitation across the Great Lakes came to an end by late Sunday night, into early Monday morning, 16 April as the main upper level system lifted into eastern Canada.

Impacts:

Snowfall accumulations from this storm ranged from generally 4 to 12 inches across the northern Rockies and into portions of northern and eastern Montana, with as much as 2 feet of snow in the highest terrain (figure 2). From the northern/central Plains to the Great Lakes, a large swath of 6 to 18 inches of snow was observed, with embedded higher amounts of 2 to 3 feet, especially for locations near and west of Green Bay, Wisconsin (figure 3). The highest recorded total from this storm was 33 inches in Amherst, Wisconsin. Particularly across the Plains into the upper Midwest, this was a historical to record breaking storm. For many

locations, including Minneapolis/St. Paul, Green Bay & Wautau, WI, Sioux Falls, SD, and Negaunee Township, MI, this storm broke records for the heaviest or second heaviest snowfall in April. For Menominee, MI this was the biggest snowstorm on record and in Green Bay, WI, this was the 2nd heaviest snowstorm on record, respectively. As much as a quarter to half an inch of ice, and several inches of sleet were observed across portions of the Upper Ohio Valley/Great Lakes to upstate New York as well.

In addition to the heavy snowfall and ice, high winds in excess of 50 to 60 miles per hour led to blizzard or near blizzard conditions for many locations across the northern Rockies, into the Plains and the upper Midwest/Great Lakes. Combined with the heavy snows and icing, this resulted in 5 to 6 foot snow drifts, downed trees and powerlines, widespread power outages, collapsed roofs, and numerous closed roads, businesses, and airports. Strong winds over the Great Lakes also brought 10 to 16 foot waves on Lake Michigan, Lake Superior, and western portions of Lake Erie, causing lakeshore flooding and erosion issues. This storm can also be blamed for the death of 3 people: 2 deaths from traffic accidents in Idaho and Wisconsin, and one in Milwaukee, WI after a man suffered a heart attack while shoveling snow.

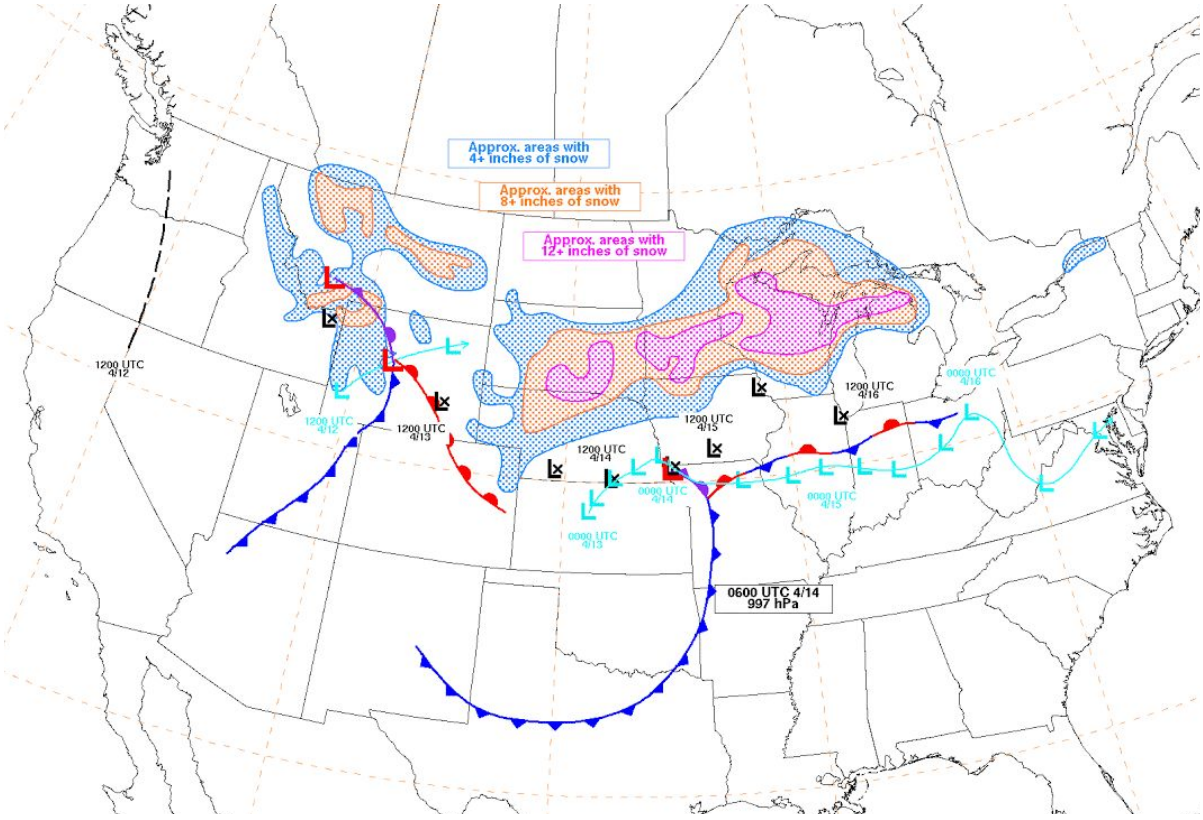

Figure 1: 500 hPa low track (black), surface low tracks (cyan), approximate areas of greater than 4 inches (blue), 8 inches (orange), and 12 inches (pink) of snow, and selected frontal positions valid at 1800 UTC 12 April, and 0600 UTC 14 April.

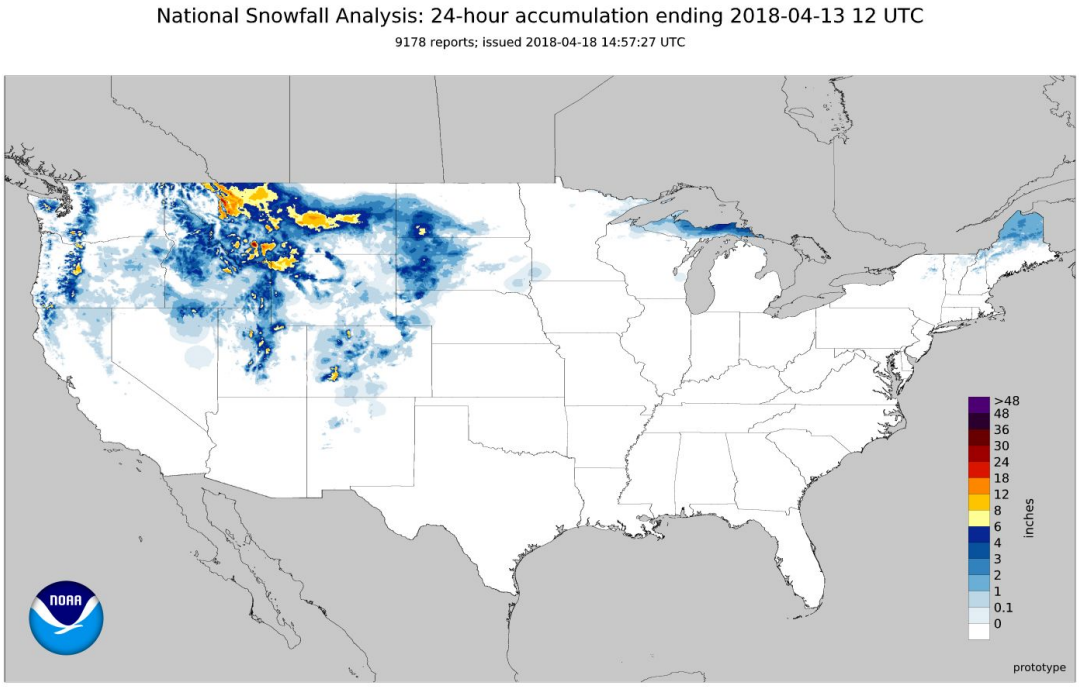

Figure 2: 24-hour accumulated snowfall analysis valid from 1200 UTC 12 April to 1200 UTC 13 April (courtesy of NOHRSC)

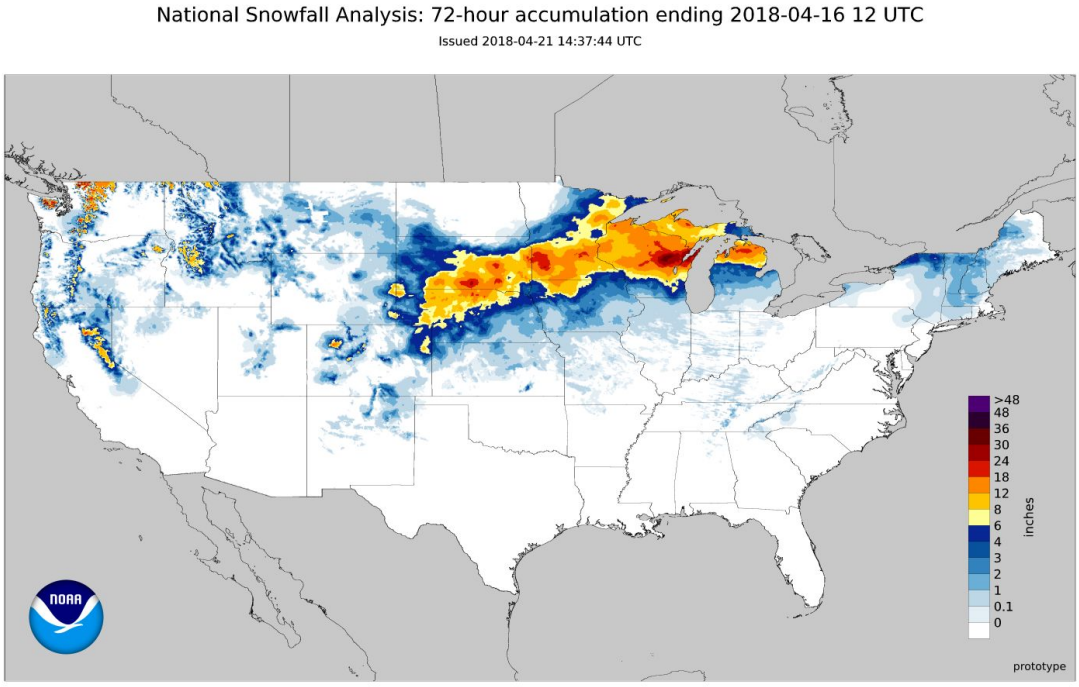

Figure 3: 72-hour accumulated snowfall analysis valid from 12 UTC 13 April to 1200 UTC 16 April (courtesy of NOHRSC)