



Snow Melt and Flooding

NOAA NATIONAL WEATHER SERVICE

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Main Contributors to Spring Flooding

1. Ice jams
2. High soil moisture in the fall
3. Significant frost (deep frozen layer) in the ground
4. Deep snow cover
5. High water content of existing snow cover
6. Rapid, continuous melting of snow
7. Moderate to heavy rain during melting

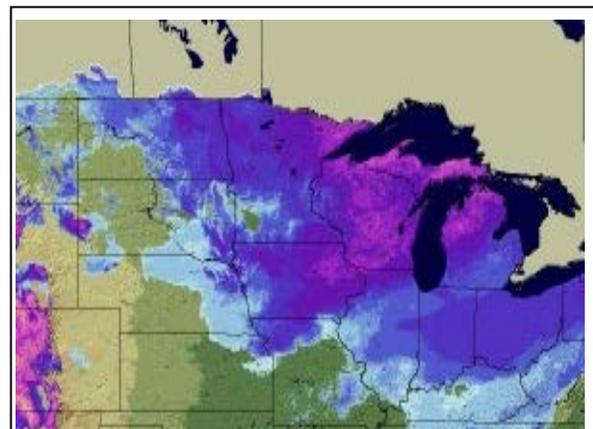
Effect of Snow on Flood Potential

When snow melts, it adds water to the ground in the same way as water from rainfall. On average in the Quad Cities region, one inch of fresh snow contains about 0.08 inches of water. This relationship can vary greatly from storm to storm and even during the same storm. As snow accumulates and compacts, the ratio of snow to water decreases. Thus, 10 inches of snow still on the ground in early spring may contain as much as 5 inches of water.

Water Equivalent of Snow

Cooperative weather observers across the U.S. measure the water equivalent of snow daily – that is, they melt an amount of snow and measure how much water it contained. Also, the National Operational Hydrologic Remote Sensing Center uses satellite imagery and gamma radiation measurements from aircraft surveys to monitor snow water equivalent.

The water equivalent of a particular snowfall depends on the time of year, air mass that is in place, and other factors. Generally, snowfall in the Quad Cities region averages 13:1 ratio of snow to liquid (13 inches of snow melts to one inch of liquid), although it can vary from 5:1 to over 20:1.



Upper Midwest snow water equivalent on Feb. 28, 2008. Provided by NOHRSC.

Melting Rate

Typically, three days with a high temperature of about 50 degrees melts about two to four inches of snow. That amount of warming would also create enough melting to cause ice breakup on small streams.

Effect of Rain Falling on Top of Snow

Air temperature is still the most important factor in melting snow. Rain will usually not add much heat to the process. At 40 degrees, one inch of rain will only produce a tenth of an inch of added water from snow melt. However, rainfall is often accompanied by windy and humid conditions which can greatly accelerate snow melt. At the same time, frozen ground will result in more of the available water running off directly to streams.

On the web:

- National Snow Analyses (NOHRSC) www.nohrsc.nws.gov
- COMET Snow Melt Online Training www.meted.ucar.edu/topics_hydro.php
- National Weather Service Quad Cities www.weather.gov/quadcities