Ice Jams/Flooding

1. What is an ice jam?

Pieces of floating ice carried with a stream's current can accumulate at any obstruction to the stream flow. These ice jams can develop near river bends, mouths of tributaries, points where the river slope decreases, downstream of dams and upstream of bridges or obstructions. The water held back can cause flooding upstream, and if the obstruction suddenly breaks, flash flooding can then occur downstream as well.

2. When is an ice jam likely to occur?

An ice jam can occur anytime from early winter to late spring in Michigan, depending upon changes in temperatures that cause alternate freezing and melting of water surfaces. The most likely times are early winter before the surfaces are completely frozen and early spring when the ice cover begins to break up due to melting.

3. What effect does snow have on flooding potential?

When the snow melts, it adds water to the ground that drains away in the same way as water from rainfall. On average, one inch of fresh snowfall contains about a tenth of an inch of water. However, as snow accumulates and becomes compacted during the winter, the ratio of snow to water decreases. Thus, ten inches of snow remaining on the ground into early spring may contain as much as five inches of water.

4. How fast do the snow and ice melt?

Three days with the maximum temperature of about 50 degrees would create enough melting to cause ice breakup on small streams. That amount of warming would also melt two inches of snow.

5. What happens when rain falls 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. At the same time, frozen ground will result in more of the available water running off directly to streams.

6. What is a Hydrologic Outlook?

A Hydrologic Outlook provides information on hydrometeorological conditions that could cause flooding or impact water supply. This product will typically be issued if precipitation forecasts and/or snowmelt potential indicate the possibility of flooding beyond 36 hours. The Hydrologic Outlook for the spring snowmelt flood potential defines the flood potential from snowmelt based on normal precipitation and rate of melt projected through the normal snowmelt period. If the actual conditions bring more rapid melt or heavier rains than normal, or if ice jams occur, the flood threat would increase substantially. On the other hand, a gradual or intermittent melt, with minimal additional precipitation, would decrease the flood threat.

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Outlooks are based on calculation of existing conditions (snow cover, soil conditions, and stream flow) together with predicted future weather conditions. Normal precipitation and snowmelt rates for the future period are presumed in making these projections. An earlier melt than expected may reduce flood potential. Alternatively, if snow persists into late March, the flood potential increases.

The river crest stage values given in the outlooks are only an indication of potential stream crests rather than specific forecasts. An increase in the potential can be expected if above normal precipitation and/or rapid melting develops. Likewise, the potential will decrease if below normal precipitation and/or more gradual melting occurs.

The main factors contributing to spring snowmelt flooding are:

- High soil moisture in the fall
- Significant frost in the ground
- High water content of existing snow cover
- Rapid, continuous melting
- Moderate to heavy rain during melting
- Ice jams

Flood Potential Categories (assume normal precipitation and melt rates):

Low snowmelt flood potential - A general term indicating minimal or no property damage but possibly some public inconvenience.

Moderate snowmelt flood potential - The inundation of secondary roads; transfer to higher elevation necessary to save property, some evacuation may be required.

Major snowmelt flood potential - A general term including extensive inundation and property damage (usually characterized by the evacuation of people and livestock and the closure of both primary and secondary roads).

Severe snowmelt flood potential - Large-scale inundation, requiring substantial resources from outside the local communities; record or near record flooding.

7. When are these outlooks issued?

The 2002 Hydrologic Outlooks for the Spring snowmelt flood potential are tentatively scheduled to be issued February 22 and March 22.