

Water WoRDs

Updates from the Water Resources Division



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Winter Weather and Flooding

As Michigan endures another bout of very cold temperatures, it seems like an opportune time to share the work of the Michigan Committee for Severe Weather Awareness. The Water Resources Division (WRD) participates in this Committee, which was formed in 1991 to promote safety awareness and coordinate public information efforts regarding tornadoes, lightning, flooding, and winter weather. In November 2013, the Committee produced a booklet providing many helpful winter hazard tips for Michiganders as the season bore down upon us. With two more months of what has already been a tough winter ahead of us, the WRD wants to both share the booklet with its readers and talk a bit of the WRD's involvement in a concern at the forefront of many homeowner's minds during severe weather: flooding.

A river, stream, lake, or drain may on occasion overflow its banks and inundate adjacent land areas. Land areas that are normally dry, but have the susceptibility of being inundated by water from such waterbodies, or other sources, are considered to be floodplains or flood-prone areas. In Michigan (and nationally), development regulations apply to flood-prone areas where water rises to an elevation from a storm event where there is 1 percent chance of the event being equaled or exceeded in any given year. This is often colloquially referred to as the 100-year flood event. The flood water elevation realized by the 1 percent annual chance flood is known as the base flood elevation (BFE). Other factors used in calculating a BFE include land use factors, soils, drainage area, and stream characteristics. It is estimated that about 6 percent of Michigan's land is flood-prone, including about 200,000 buildings.

In 1968, Congress instituted the National Flood Insurance Program (NFIP) to reduce the economic and social costs of flood losses and to provide a source for homeowners to obtain affordable flood insurance. Michigan's floodplain management program has an NFIP Coordinator within the WRD with the role of working with local units of government (villages, cities, townships) to assist them in enrolling into, participating in, and meeting the NFIP requirements. Community participation in the NFIP supports and promotes proper floodplain development, minimizes flood event impacts, and provides the opportunity for homeowners to acquire flood insurance protection for mitigation against future flood losses. The NFIP Coordinator is available to provide assistance to lenders, realtors, insurance agents, and citizens who have questions about flood insurance or floodplain management. In addition, the WRD employs floodplain staff around the state to provide additional, local points of contact for community officials and concerned individuals.

The following is an excerpt from the Michigan Committee for Severe Weather Awareness' 2013 2014 Winter Hazards Awareness booklet; specific to ice jams and associated flooding that may be of particular interest to readers as we prepare for another cycle of freezing and thawing:

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 developing an ice jam. These ice jams can accumulate 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 occur downstream.



2. When was the last time ice jam flooding occurred in Michigan?

Ice jams occur every year in Michigan. In January 2013, significant ice jams formed on the Muskegon River near Rogers Heights, Michigan. Flooding from the ice jams on the Muskegon River near Rogers Heights impacted over 60 homes and was reported to have caused approximately 2.6 million dollars in damages. Over the past several years, ice jams have occurred on the Flat River near Smyrna, Looking Glass River near Eagle, Maple River near Maple Rapids, Chippewa River near Mt. Pleasant, Grand River near Portland, Grand River at Comstock Park, Grand River between Grand Haven and Robinson Township, Muskegon River near Evart, and the St. Joseph River near Burlington. Historically, ice jams have also caused flooding on the River Raisin, Thornapple, and Kalamazoo rivers.

3. What time of year is an ice jam likely to occur?

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



4. What effect does snow have on flooding potential?

When 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, 10 inches of snow remaining on the ground into early spring

may contain as much as five inches of water. A deep snowpack in late spring increases the flood potential.

5. How fast does snow and ice melt?

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

6. What happens when rain falls on top of snow?

Air temperature is still the most important factor in melting snow. Rain does not usually 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.

7. What are the main factors that contribute to snowmelt flooding?

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

Also keep an eye out for the 2014 Hydrologic Outlooks for spring snowmelt flood potential. This information is generally issued in February and March and can be found at www.weather.gov.

What do you do in the WRD? Meet Les Thomas

Les Thomas has worked in environmental resources programs for 35 years and currently serves as the NFIP Coordinator, functioning as a liaison and resource person between the Federal Emergency Management Agency's NFIP and Michigan's local communities and citizens. Prior to his NFIP Coordinator role, Les worked within the state's Great Lakes Submerged log recovery permitting program, marina permitting, land/water interface construction permitting, and the wastewater discharge permitting program (both National Pollutant Discharge Elimination System and groundwater).
