



When the Snow Melts: Preparing for Localized Flooding

After the chill of winter, many people look forward to the arrival of spring. But snowmelt and spring rain can cause troublesome flooding in some communities. In some areas, climate change may worsen localized flooding in winter and spring.

What is localized flooding?

Localized flooding refers to flooding in a particular area that happens because of a specific event, like snow melt or heavy rain. Often, this sort of flooding occurs because the infrastructure that is supposed to move water away from the community (like ditches) gets overwhelmed and water stays in the community, pooling in low-lying areas. Localized flooding can cause damage to buildings (through flooded basements or sewer backups), roads (causing washouts), and other infrastructure. Any low-lying area in a community is at risk of localized flooding.



The runoff from spring snow melt pools around homes in Fort Hope.

Why does localized flooding happen in spring?

As temperatures warm, melting snow can mean a lot of water on the landscape. If the ground or local waterways are still frozen, this can mean that there is nowhere for that water to go and, instead of draining away, it pools, causing flooding. This can be a bigger problem if snow melts very quickly. Spring rains can also cause localized flooding because the rain can't seep into the frozen ground and stays on the surface. The same problem can happen when rain events happen in the winter.



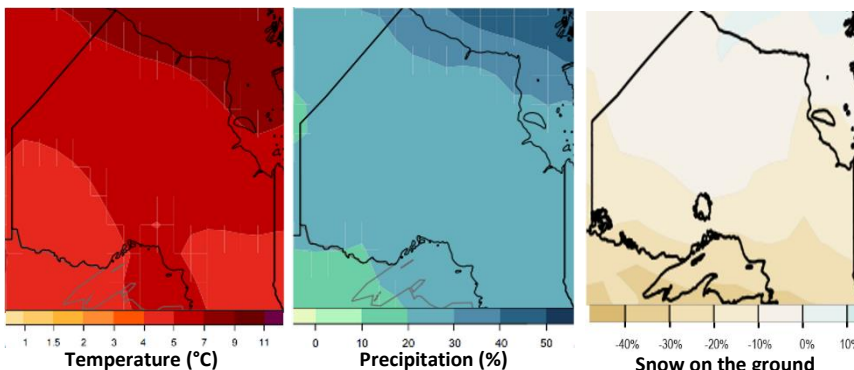
This road in Northern Ontario floods every spring, leading to closure. Photo from <https://www.cbc.ca/news/canada/sudbury/hwy-537-mto-rehabilitation-1.4573211>

What have people noticed?

Already, many people feel that spring is warmer than it used to be, and that rain arrives earlier. The weather station in Kitchenuhmaykoosib Inninuwug (Big Trout Lake) has also recorded warmer spring and winter temperatures. People in the north also speak of experiencing more rain in the winter than they used to.

Will localized flooding change because of climate change?

Climate change is expected to bring warmer winter temperatures and more snowfall meaning that there will be thinner layer of dense snow on the ground (that holds more water). This can lead to faster surge of melt in spring. More rain is also expected in winter and spring which can increase the chance of localized flooding.



Northern Ontario will see an increase in winter temperature (°C) and precipitation (%) as well as a decrease in snow on the ground (%) by the 2050s compared to the average from 1986-2015 (CMIP5, RCP8.5, 75th percentile). <http://climate-scenarios.canada.ca/?page=download-cmip5>



How can we prepare?

Improve community drainage

Flooded buildings and roads, as well as pools of standing water are all indications that a community drainage system isn't working as well as it should. Make sure ditches and culverts are clear from blockages and are big enough to handle the amount of water that comes with spring melt. Drainage systems should follow the natural slope of the land, so gravity can help take the water away from buildings and roads. A good drainage plan should also include water storage areas, like wetlands.

Drain water away from buildings

Keep water from making its way into homes and buildings by sloping the ground around a foundation so water flows away. If the ground around a home or building is level, consider trenching or grading the property to manage melt water and rain. Homes and community buildings can also have their own drainage systems which can include weeping tile, a sump pump, and eavestrough with drain pipes, all to promote drainage away from the house.

Manage snow

When clearing snow from driveways and parking lots, keep snow melt in mind. Make sure snow is piled away from buildings, preferably in an area where melt water can drain away safely. In some cases, this may mean moving the snow to another location. Snow can also be removed from roadside ditches before the spring melt begins. This allows the ditches to more effectively carry water away from the community, promoting drainage and, hopefully, reducing flooding.

Wetlands and greenspace

Natural areas in communities can help absorb the water from spring rain and snowmelt. Surfaces like packed gravel, pavement, and concrete don't allow water to absorb; water that hits those surfaces either pools on top or runs off following the slope of the land. Natural areas on the other hand, like lawns, parks, or forest, absorb water and keep it from causing flooding. Wetlands can be especially good at this and can provide natural flood mitigation by storing the water from rain and melt events and releasing it slowly.

Climate change will likely continue to bring warmer springs with fast snowmelt and more rain on frozen ground. Communities need to prepare by sloping the ground away from buildings, making sure drainage systems work well, managing snow and preserving natural areas like wetlands.

Want to know more?

The Northern Infrastructure Standardization Initiative can be a good resource www.scc.ca/en/nisi



Damaged or blocked culverts and ditches can't carry water away like they should.



Sloping the ground around houses helps water drains away from the foundation into the ditch.



Taking snow out of ditches allows water to flow away in spring Photo from www.plowsite.com



Wetlands act as natural sponges that trap and slowly release water, helping prevent flooding.