

Hazard Resilience Strategies

Atmospheric

- Blizzards
- Climate Change
- Drought
- Extreme Cold
- Fog
- Frost
- Hailstorms
- Heat Waves
- Hurricanes
- Ice Fogs, Ice Storms, and Freezing Rain
- Lake-Effect Storms
- Lightning and Thunderstorms
- Microbursts
- Sea Storms and Sea Surges
- Seiche
- Snowstorms
- Tornadoes and Waterspouts
- Windstorms

Regardless of the hazard, the development of citizen-based disaster preparedness and recovery groups can help improve your resilience to all hazards. The Canadian Red Cross Society and Public Safety Canada provide some excellent resources online on their websites. For example, the Red Cross has developed specific preparedness resources for [Indigenous Communities](#) that could be helpful to the development of strategies at the household level. The Government of Canada resources include the [Get Prepared](#) website which provides individuals and family households with emergency preparedness planning information

It is also good practice to ensure residents tell someone about their trip plans, routes and destinations for aid in any search efforts should the weather leave individuals stranded.

Blizzards

- Ensure building regulations require building designs that reduce and withstand snow accumulation on roofs.
- Ensure community-based blizzard exercises have taken place in schools and the community-at-large (e.g., table-top or full-scale exercises).
- Ensure critical power lines and sewer and water pipes are buried, where possible and protected where burying is not appropriate (e.g., in permafrost).
- Ensure hazardous trees are regularly trimmed and/or removed near residences.
- In case of an extended power failure due to a blizzard, ensure there are plans to allow residents to evacuate to a designated shelter with back-up power.
- Ensure most homes have well-insulated windows, walls, attics and pipes and roofs that are maintained in good condition.
- Ensure most residents check regularly with weather and storm forecasting agencies such as Environment Canada and take care to follow warnings and/or use Traditional Knowledge to assess weather prior to heading outside.
- Ensure most residents have heating sources that do not require power and/or have alternate power sources (e.g., generator) and are aware of the operation and ventilation needs.
- Ensure most residents have winter tires and winter emergency kits (including rock salt, shovels, blankets, food and water) in their vehicles.
- Ensure roads (gravel, ice and paved) and snowmobile trails are adequately maintained to allow Emergency Response Personnel to access residents during a blizzard.
- Ensure there is a warning system in place to notify Emergency Response Personnel of a potential blizzard.
- Ensure there is a warning system in place to notify residents of a potential blizzard.
- Ensure there is a warning system in place to notify transient, migrant homeless and other visiting people of a potential blizzard.
- To increase traffic safety, ensure there are visible fixed message signs, and raised reflective pavement markers on critical roads where possible.
- Ensure existing homeless shelters have made provisions for increased capacity and hazard specific conditions.
- Ensure the community has in place a means to discuss blizzards with subject matter experts and Traditional Knowledge holders about traditional warning systems and effective responses.

Climate Change

- To offset the growing climate change crisis, ensure residents, businesses and organizations adopt sustainable, environmentally friendly practices.
- Ensure carbon emission activities are reduced with an eye for eliminating emissions.

- Ensure community members have been educated about climate change hazards and residents have been encouraged to change actions that contribute to climate change, such as increasing the energy efficiency of homes and businesses.
- Ensure the community has in place a means to discuss climate change with subject matter experts and Traditional Knowledge holders about traditional warning systems and effective responses/adaptations.
- Ensure the community has a “no idling” in your vehicle for more than one minute policy.
- Ensure the community promotes the building of “green” buildings including installation of solar panels, collecting of rain water, insulated windows, and use of recycled building materials.
- Ensure the community promotes the use of public and school transportation systems and carpooling when possible as part of an emissions reduction strategy.

Drought — Natural and Human-Caused

- Ensure community officials check frequently with weather forecasting agencies such as Environment Canada and monitor the area’s drought dryness level.
- Ensure community-based drought exercises have taken place in the community-at-large (e.g., table-top or full-scale exercises).
- Ensure gardeners, gatherers of plants and farmers are educated about water conservation programs, plant where possible drought-resistant crops and make efficient use of irrigation (when necessary).
- Ensure the community actively promotes or requires water conservation practices to reduce the risk and severity of drought, including having businesses and households install water saving devices, repair leaking fixtures, and collect rain water.
- Ensure gardeners, gatherers of plants and farmers take advantage of incentives or subsidies to diversify business and harvesting activities.
- Ensure the community has fire restrictions in place during times of drought and has the personnel to enforce these restrictions.
- Ensure the community has plans to establish a drought crisis centre or hotline, during times of extended drought to educate the public about the health dangers of drought, and provide water to those in need if required.
- Ensure the community has policies in place to discourage or prohibit (depending upon the severity of the drought) community members from washing hard surfaces, vehicles, or buildings, filling swimming pools, or watering non-essential gardens.
- Ensure the community has policies in place to discourage or prohibit (depending upon the severity of the drought) businesses from non-essential commercial water use such as watering golf courses, operating car washes and watering plants in nurseries.
- Ensure the community provides education about water conservation to schools and community members.
- Ensure the community has in place a means to discuss droughts with subject matter experts and Traditional Knowledge holders who have knowledge about historical impacts, traditional warning systems and appropriate responses.

Extreme Cold

- Ensure building designs can withstand extreme cold and freezing temperatures.
- Ensure community-based cold-weather exercises have taken place in schools and the community-at-large (e.g., table-top or full-scale exercises).
- In case of an extended power failure, ensure there are plans to allow residents to evacuate to a designated shelter with back-up power.
- Ensure most homes have well insulated windows, walls, attics and pipes and roofs that are maintained in good condition.
- Ensure most residents check regularly with weather and storm forecasting agencies such as Environment Canada and take care to follow warnings and/or use Traditional Knowledge to assess weather prior to heading out onto the land.
- Ensure most residents have heating sources that do not require power and/or have alternate power sources (e.g., generator) and are aware of its safe operation and ventilation needs.
- Ensure most residents have winter tires and winter emergency kits (including rock salt, shovels, blankets, food and water) in their vehicles.
- Ensure there is a cold-weather shelter in the community that is accessible to transient, migrant and other visiting people.
- Ensure there is a warning system in place to notify emergency response personnel of extreme cold conditions.
- Ensure there is a warning system in place to notify residents of extreme cold conditions.
- Ensure there is a warning system in place to notify transient, migrant, homeless and other visiting people of extreme cold conditions.
- Ensure existing homeless shelters have made provisions for increased capacity and hazard specific conditions.
- Ensure the community has in place a means to discuss extreme cold with subject matter experts and Traditional Knowledge holders who have knowledge about traditional warning systems and effective responses.

Fog

- Ensure most residents check regularly with weather and storm forecasting agencies such as Environment Canada and take care to follow warnings and/or use Traditional Knowledge to assess weather prior to heading out onto the land.
- Ensure there are installed fixed message signs, raised reflective pavement markers, lighted pavement markers, and variable message signs where possible and appropriate.
- Ensure there is a warning system in place to notify emergency response personnel of potentially heavy fog.
- Ensure there is a warning system to notify residents of potentially heavy fog and to instruct people to limit travel, especially by pedestrians who are difficult to see when walking on roadsides.

Frost

- Ensure most farmers, hunters, gatherers, gardeners check regularly with weather and storm forecasting agencies such as Environment Canada and take care to follow warnings to protect livelihood.
- Ensure there is a warning system in place to notify emergency response personnel of potentially heavy frost.
- Ensure there is a warning system to notify residents of potentially heavy frost and the associated risks.

Hailstorms

- Ensure airport operators prepare for hailstorms by putting planes under cover.
- Ensure community-based hailstorm exercises have taken place in schools and the community-at-large (e.g., table-top or full-scale exercises).
- Ensure most farmers, hunters, gatherers and gardeners check regularly with weather and storm forecasting agencies such as Environment Canada and take care to follow warnings in order to protect plants, animals and property.
- Ensure most residents check regularly with weather and storm forecasting agencies such as Environment Canada and take care to follow warnings and/or use Traditional Knowledge to assess weather prior to heading outside.
- Ensure most residents know to prepare for hailstorms by putting vehicles and dogs/pets under cover and protecting any vulnerable structures.
- Ensure most businesses, industry and commercial operators prepare for hailstorms by putting vehicles under cover and protecting other vulnerable property.
- Ensure residents are educated about storm safety and know to keep family members and pets safe indoors and away from windows, skylights and glass doors during hail and avoid contact with plumbing, corded electrical equipment, concrete floors and walls if there is lightning along with the hail.
- Ensure there is a warning system in place to notify Emergency Response Personnel of potential heavy hailstorms.
- Ensure there is a warning system in place to notify residents of potentially heavy hailstorms.
- Ensure existing shelters have made provisions for increased capacity and hazard specific conditions.
- Ensure the community has in place a means to discuss hailstorms with subject matter experts and Traditional Knowledge holders who have knowledge about traditional warning systems and effective responses.

Heat Waves

- Ensure community-based heat wave exercises have taken place in schools and the community-at-large (e.g., table-top or full-scale exercises)
- Ensure plans are in place to install portable and widely available emergency drinking fountains for the public via portable water tanks or fire hydrant hook-up systems in the event of a heat wave.
- Ensure community plans are in place to check on vulnerable populations during a heat wave, especially the elderly.
- Ensure developers and property owners are encouraged to install air conditioning in new commercial buildings and community centres.
- If there is an extended heat wave, ensure plans are in place to allow residents to evacuate to a designated shelter with air-conditioned or cool temperatures.
- Ensure existing homeless shelters have made provisions for increased capacity and hazard specific conditions.
- Ensure most farmers, hunters, and gatherers check regularly with weather and storm forecasting agencies such as Environment Canada and take care to follow warnings and/or use Traditional Knowledge to assess weather prior to heading out onto the land.
- Ensure most residents check regularly with weather and storm forecasting agencies such as Environment Canada and take care to follow warnings and/or use Traditional Knowledge to assess weather prior to heading out onto the land.
- Ensure residents are educated about heat waves and know the warning symptoms of heat exhaustion and heat stroke and how best to keep cool; ensure reminders not to leave children or pets in cars during extreme heat are part of regular advertisements shared in summer.
- Ensure there are open green spaces, shade trees and light-coloured buildings in business areas.
- Ensure there is a warning system in place to notify Emergency Response Personnel of potential heat waves.
- Ensure there is a warning system in place to notify residents of potential heat waves and the appropriate action to take.

Hurricanes

- Ensure coastal wetlands are in place or are being re-established to protect against storm surge and coastal erosion.
- Ensure community-based hurricane exercises have taken place in schools and the community-at-large (e.g., table-top or full-scale exercises).
- Ensure critical power lines and sewer and water pipes are buried, where possible and protected where burying is not appropriate (e.g., in permafrost).
- Ensure critical roads are designed to drain well and are maintained to keep roads clear of pooled water during heavy rainfall.
- Ensure designated shelters are in place in areas which are not likely to be impacted by hurricanes or arrangements are in place with neighbouring communities who can provide shelters to evacuated residents

- Ensure development regulations in areas susceptible to hurricanes limit land use, prohibit development, or require wind and flood resilient building features including elevated buildings, concrete walls and roofs designed to withstand severe wind and rain.
- Ensure hazardous trees are regularly trimmed and/or removed near residences.
- Ensure most buildings have secure roofs attached to building frames with straps or clips.
- Ensure most residents check regularly with weather and storm forecasting agencies such as Environment Canada and take care to follow warnings and/or use Traditional Knowledge to assess weather prior to heading out onto the land.
- Ensure most residents have designated areas of refuge in their homes.
- Ensure protective dykes or levees are in place and well maintained in areas likely to experience hurricane damage.
- Ensure residents are aware of disaster evacuation routes for hurricanes and signs are clearly posted to guide them to safety.
- Ensure residents know to prepare for high winds and flooding by covering windows with storm shutters or plywood, reinforcing garage doors, clearing rain gutters and downspouts, protecting dogs/pets in a safe shelter, securing boats to land or storing them on land and removing potential windborne missiles such as barbecues and patio furniture.
- Ensure there is a warning system in place to notify Emergency Response Personnel of potential hurricanes.
- Ensure there is a warning system in place to notify residents of potential hurricanes.
- Ensure existing homeless shelters have made provisions for increased capacity and hazard specific conditions.
- Ensure the community has in place a means to discuss hurricanes with subject matter experts and Traditional Knowledge holders who have knowledge about traditional warning systems and effective responses.

Ice Fogs, Ice Storms and Freezing Rain

- Ensure community-based ice storm exercises have taken place in schools and the community-at-large (e.g., table-top or full-scale exercises).
- Ensure critical power lines and sewer and water pipes are buried, where possible and protected where burying is not appropriate (e.g., in permafrost).
- Ensure hazardous trees are regularly trimmed and/or removed near residences.
- In case of an extended power failure, ensure there are plans to allow residents to evacuate to a designated shelter with back-up power.
- Ensure most residents check regularly with weather and storm forecasting agencies such as Environment Canada and take care to follow warnings and/or use Traditional Knowledge to assess weather prior to heading out onto the land.
- Ensure most residents have heating sources that do not require power and/or have alternate power sources (e.g., generator) and are aware of its safe operation and ventilation needs.
- Ensure most residents have winter tires and winter emergency kits (including rock salt, shovels, blankets, food and water) in their vehicles.
- Ensure plans are in place to locate persons without power over extended time periods and to transport these persons to designated shelters. Plans and awareness campaigns

should also encourage persons to identify nearby family members who have heat or backup generators and to stay with them if feasible.

- Ensure there is a warning system in place to notify Emergency Response Personnel of potential ice storms and freezing rain.
- Ensure there is a warning system in place to notify residents of a potential ice storms and freezing rain.
- Ensure existing homeless shelters have made provisions for increased capacity and hazard specific conditions.
- Ensure the community has in place a means to discuss ice storms and freezing rain with subject matter experts and Traditional Knowledge holders who have knowledge about traditional warning systems and effective responses.

Lake-Effect Storms

- Ensure building regulations require building designs that reduce and withstand snow accumulation on roofs.
- Ensure community-based lake effect storm exercises have taken place in schools and the community-at-large (e.g., table-top or full-scale exercises).
- Ensure critical power lines and sewer and water pipes are buried, where possible and protected where burying is not appropriate (e.g., in permafrost).
- Ensure critical roads are designed to enable effective snow removal (e.g., with space for snowbanks) and also to drain well.
- Ensure hazardous trees are regularly trimmed and/or removed near residences.
- In case of an extended power failure due to a lake effect storm, ensure there are plans to allow residents to evacuate to a designated shelter with back-up power.
- Ensure most homes have well insulated windows, walls, attics and pipes and roofs that are maintained in good condition.
- Ensure most residents have heating sources that do not require power and/or have alternate power sources (e.g., generator) and are aware of its safe operation and ventilation needs.
- Ensure most residents have winter tires and winter emergency kits (including rock salt, shovels, blankets, food and water) in their vehicles.
- Ensure residents check regularly with weather and storm forecasting agencies such as Environment Canada and take care to follow warnings and/or use Traditional Knowledge to assess weather prior to heading out onto the land.
- Ensure roads are adequately maintained to allow Emergency Response Personnel to access residents during a lake effect storm.
- Ensure there is a warning system in place to notify Emergency Response Personnel of a potential lake effect storm.
- Ensure there is a warning system in place to notify residents of a potential lake effect storm.
- Ensure there is a warning system in place to notify transient, migrant, homeless and other visiting people of a potential lake effect storm.
- To increase traffic safety ensure there are visible fixed message signs, raised reflective pavement markers on critical roads and snowmobile trails where possible and appropriate

- Ensure existing homeless shelters have made provisions for increased capacity and hazard specific conditions.
- Ensure the community has in place a means to discuss lake effect storms with subject matter experts and Traditional Knowledge holders who have knowledge about traditional warning systems and land use options based on historic observations of impacts from these storms.

Lightning and Thunderstorms

- Ensure building regulations require wind, rain and lightning resilient building features including roofs designed to withstand severe wind and rain and regulations are enforced and monitored.
- Ensure community members have been educated about lightning safety, such as avoiding contact with plumbing, corded electrical equipment, concrete floors and walls and keeping family members and pets safe indoors and away from windows and doors during lightning events.
- Ensure critical power lines and sewer and water pipes are buried, where possible and protected where burying is not appropriate (e.g., in permafrost).
- Ensure critical roads are designed to drain well and are maintained to keep roads clear of pooled water during heavy rainfall.
- Ensure hazardous trees are regularly trimmed and/or removed near residences.
- Ensure most buildings are grounded.
- Ensure most residents check regularly with weather and storm forecasting agencies such as Environment Canada and take care to follow warnings and/or use Traditional Knowledge to assess weather prior to heading out onto the land.
- Ensure playgrounds, golf courses and other outdoor areas with large numbers public gathering places have warning systems to notify the public of potential lightning events and signage to show appropriate behaviour and designated locations where they can take cover.
- Ensure there is a warning system in place to notify Emergency Response Personnel of potential lightning and thunderstorms.
- Ensure there is a warning system in place to notify residents of potential lightning and thunderstorms.
- Ensure existing homeless shelters have made provisions for increased capacity and hazard specific conditions.
- Ensure the community has in place a means to discuss lightning and thunderstorms with subject matter experts and Traditional Knowledge holders who have knowledge about traditional warning systems and appropriate responses.

Microbursts

- Ensure community-based microburst exercises have taken place in schools and the community-at-large (e.g., table-top or full-scale exercises).
- Ensure designated shelters are in place in areas which are not impacted by microbursts.
- Ensure most businesses and community centres have emergency kits on hand and have business continuity plans in place.

- Ensure hazardous trees are regularly trimmed and/or removed near residences.
- Ensure most buildings have secure roofs attached to building frames with straps or clips.
- Ensure most residents check regularly with weather and storm forecasting agencies such as Environment Canada and take care to follow warnings and/or use Traditional Knowledge to assess weather prior to heading out onto the land.
- Ensure development regulations in areas susceptible to hurricanes limit land use, prohibit development or require building reinforcements and wind resilient infrastructure.
- Ensure residents are aware of disaster evacuation routes for microbursts due to the potential for damages similar or worse to what is experienced in a tornado.
- Ensure residents know to prepare for high winds and flooding by covering windows with storm shutters or plywood, reinforcing garage doors, clearing rain gutters and downspouts, protecting dogs/pets in a safe shelter, securing boats to land or storing them on land and removing potential windborne missiles such as barbecues and patio furniture.
- Ensure there is a warning system in place to notify Emergency Response Personnel of potential microbursts.
- Ensure there is a warning system in place to notify residents of a potential microburst and to instruct people to seek ground-level or underground shelter.
- Ensure existing homeless shelters have made provisions for increased capacity and hazard specific conditions.
- Ensure the community has in place a means to discuss microbursts with subject matter experts and Traditional Knowledge holders who have knowledge about historical impacts, traditional warning systems and appropriate responses.

Sea Storms and Storm Surges

- Ensure coastal wetlands are in place or are being re-established to protect shorelines and coastal infrastructure from erosion and damage.
- Ensure community-based sea storms and storm surges exercises have taken place in schools and the community-at-large (e.g., table-top or full-scale exercises).
- Ensure critical power lines and sewer and water pipes are buried, where possible and protected where burying is not appropriate (e.g., in permafrost).
- Ensure critical roads are designed to drain well and are maintained to keep roads clear of pooled water.
- Ensure designated shelters are in place in areas which are not impacted by sea storms and storm surges.
- Ensure development regulations in areas susceptible to sea storms and storm surges limit land use, prohibit development or require wind and flood resilient building features including elevated buildings, concrete walls and roofs designed to withstand severe wind and rain.
- Ensure hazardous trees are regularly trimmed and/or removed near residences.
- Ensure most buildings have secure roofs attached to building frames with straps or clips.
- Ensure most residents check regularly with weather and storm forecasting agencies such as Environment Canada and take care to follow warnings and/or use Traditional Knowledge to assess weather prior to heading out onto the land.
- Ensure most residents have designated areas of refuge in their homes.

- Ensure most residents know to prepare for high winds and flooding by covering windows with storm shutters or plywood, reinforcing garage doors, clearing rain gutters and downspouts, protecting dogs/pets in a safe shelter, securing boats to land or storing them on land and removing potential windborne missiles such as barbecues and patio furniture.
- Ensure protective dykes or levees are in place and well maintained in areas likely to experience sea storms and storm surges damage.
- Ensure plans are in place to develop and preserve coastal forests and wetlands which act as protection against storm surge.
- Ensure homes and buildings in low lying areas have effective water removal mechanisms (e.g., sump pump) or water barriers in place to prevent significant indoor flooding associated with storm surges.
- Ensure residents are aware of disaster evacuation routes for sea storms and storm surges.
- Ensure there is a warning system in place to notify Emergency Response Personnel of potential sea storms and storm surges.
- Ensure there is a warning system in place to notify residents, boaters and fishers of potential sea storms and storm surges.
- Ensure existing homeless shelters have made provisions for increased capacity and hazard specific conditions.
- Ensure the community has in place a means to discuss storm surge with subject matter experts and Traditional Knowledge holders who have knowledge about historical impacts, traditional warning systems and appropriate responses.

Seiche

- Ensure community-based seiche exercises have taken place in schools and the community-at-large (e.g., table-top or full-scale exercises).
- Ensure designated shelters are in place in areas which are not impacted by seiches.
- Ensure development regulations in areas susceptible to seiches limit land use, prohibit development or require wind and flood resilient building features including elevated buildings, concrete walls and roofs designed to withstand severe wind.
- Ensure evacuation routes for a potential seiche are marked with visible signage.
- Ensure flood protection structures such as dykes have been built and are well maintained.
- Ensure hazard zonation maps for seiches are prepared and used for development as well as being shared with the community.
- Ensure plans are in place to develop and preserve coastal forests which act as protection against seiches.
- Ensure residents are educated about seiches and know how and where to evacuate.
- Ensure there is a warning system in place to notify Emergency Response Personnel of potential seiches.
- Ensure there is a warning system in place to notify residents, boaters and fishers of potential seiches.
- Ensure existing homeless shelters have made provisions for increased capacity and hazard specific conditions.

- Ensure the community has in place a means to discuss seiches with subject matter experts and Traditional Knowledge holders who have knowledge about historical impacts, traditional warning systems and appropriate responses.

Snowstorms

- Ensure building regulations require building designs that reduce and withstand snow accumulation on roofs.
- Ensure community-based snowstorm exercises have taken place in schools and the community-at-large (e.g., table-top or full-scale exercises).
- Ensure critical power lines and sewer and water pipes are buried, where possible and protected where burying is not appropriate (e.g., in permafrost).
- Ensure critical roads are well-draining and have sufficient space (e.g., ditches) for snow accumulation related to road clearing following heavy snowfall.
- Ensure hazardous trees are regularly trimmed and/or removed near residences.
- In case of an extended power failure due to a snow storm, ensure there are plans to allow residents to evacuate to a designated shelter with back-up power.
- Ensure most homes have well insulated windows, walls, attics and pipes and roofs that are maintained in good condition.
- Ensure most residents check regularly with weather and storm forecasting agencies such as Environment Canada and take care to follow warnings and/or use Traditional Knowledge to assess weather prior to heading out onto the land.
- Ensure most residents have heating sources that do not require power and/or have alternate power sources (e.g., generator) and are aware of its safe operation and ventilation needs.
- Ensure most residents have winter tires and winter emergency kits (including rock salt, shovels, blankets, food and water) in their vehicles.
- Ensure roads are adequately maintained to allow Emergency Response Personnel to access residents during a snow storm.
- Ensure there is a warning system in place to notify Emergency Response Personnel of a potential snow storm.
- Ensure there is a warning system in place to notify residents of a potential snow storm.
- Ensure there is a warning system in place to notify transient, migrant, homeless and visiting people of a potential snow storm.
- To increase traffic safety there are visible fixed message signs, ensure raised reflective pavement markers are on critical roads and snowmobile trails where possible and appropriate.
- Ensure existing homeless shelters have made provisions for increased capacity and hazard specific conditions.
- Ensure the community has in place a means to discuss snowstorms with subject matter experts and Traditional Knowledge holders who have knowledge about historical impacts, traditional warning systems and appropriate responses.

Tornadoes and Waterspouts

- Ensure community-based tornado exercises have taken place in schools and the community-at-large (e.g., table-top or full-scale exercises).
- Ensure development regulations require building reinforcements and wind resilient infrastructure.
- Ensure hazardous trees are regularly trimmed and/or removed near residences.
- Ensure most residents check regularly with weather and storm forecasting agencies such as Environment Canada and take care to follow warnings and/or use Traditional Knowledge to assess weather prior to heading out onto the land.
- Ensure most residents have designated safe areas/tornado refuge areas in their home.
- Ensure residents know to prepare for high winds and flooding by covering windows with storm shutters or plywood, reinforcing garage doors, clearing rain gutters and downspouts, securing boats to land or storing them on land and removing potential windborne missiles such as barbecues and patio furniture.
- Ensure there is a warning system in place to notify police, fire and ambulance personnel of a potential tornado.
- Ensure there is a warning system in place to notify residents of a potential tornado.
- Ensure there is a warning system in place to notify transient, migrant, homeless and visiting people of a potential tornado.
- Ensure existing homeless shelters have made provisions for increased capacity and hazard specific conditions.
- Ensure the community has in place a means to discuss tornados with subject matter experts and Traditional Knowledge holders who have knowledge about historical impacts, traditional warning systems and appropriate responses.

Wind Storms

- Ensure community-based windstorm exercises have taken place in schools and the community-at-large (e.g., table-top or full-scale exercises).
- Ensure critical power lines, sewer and water pipes are buried, where possible and protected where burying is not appropriate (e.g., in permafrost).
- Ensure development regulations require building reinforcements and wind resilient infrastructure.
- Ensure hazardous trees are regularly trimmed and/or removed near residences.
- In case of an extended power failure due to a windstorm, ensure there are plans to allow residents to evacuate to a designated shelter with back-up power.
- Ensure most residents check regularly with weather and storm forecasting agencies such as Environment Canada and take care to follow warnings and/or use Traditional Knowledge to assess weather prior to heading out onto the land.
- Ensure residents know to prepare for high winds by covering windows with storm shutters or plywood, reinforcing garage doors, clearing rain gutters and downspouts, protecting dogs/pets in a safe shelter, securing boats to land or storing them on land and removing potential windborne missiles such as barbecues and patio furniture.

- Ensure there is a warning system in place to notify Emergency Response Personnel of a potential windstorm.
- Ensure there is a warning system in place to notify residents of a potential windstorm.
- Ensure there is a warning system in place to notify transient, migrant, homeless and visiting people of a potential windstorm.
- Ensure existing homeless shelters have made provisions for increased capacity and hazard specific conditions.
- Ensure the community has in place a means to discuss windstorms with subject matter experts and Traditional Knowledge holders who have knowledge about historical impacts, traditional warning systems and appropriate responses.

References

- Bush, E. & Flato, G. (2019). [*Canada's changing climate report*](#). Government of Canada.
- Centers for Disease Control and Prevention. (2019). [*Natural disasters and severe weather. Preparing for a winter storm.*](#)
- Climate Atlas of Canada. (n.d.). [*Health impacts of extreme heat.*](#)
- Cohen, C., Dorr, F., Funke, H., Waterer, K., & Jensen, L. (2005). [*How to protect your house and its contents from lightning: IEEE guide for surge protection of equipment to AC power and communication circuits.*](#) IEEE Press.
- Davenport, A. G. (1988). The reduction of windstorm hazard through the IDNDR. *Natural Hazards*, 1, 235-243.
- Delica, Z. G. (1993). Citizenry-based disaster preparedness in the Philippines. *Disasters*, 17(3), 239-247. <https://doi.org/10.1111/j.1467-7717.1993.tb00497.x>
- Environment Canada. (2009). [*Canadian drought alert and monitoring program.*](#)
- Federal Emergency Management Agency. (1999). [*Protecting building utilities from flood damage: Principles and practices for the design and construction of flood resistant building utility systems.*](#)
- Federal Emergency Management Agency. (2010). [*Natural hazards and sustainability for residential buildings.*](#) FEMA.
- Gilbert, D., Krauss, T. W., Boe, B. (2016). [*Twenty seasons of airborne hail suppression in Alberta Canada.*](#) *The Journal of Weather Modification*, 48(1), 68-92.
- Gopalakrishnan, C., & Okada, N. (2007). Designing new institutions for implementing integrated disaster risk management: Key elements and future directions. *Disasters*, 31(4), 353-372. [doi:10.1111/j.1467-7717.2007.01013.x](https://doi.org/10.1111/j.1467-7717.2007.01013.x)
- Gordon, J. A. (2001). [*Risk assessment and management in local government emergency planning.*](#) Institute for catastrophic loss reduction.
- Government of Canada. (2011). [*Severe storms: What to do?*](#)
- Government of Canada. (2018a). [*Before a hurricane.*](#)
- Government of Canada. (2018b). [*Be prepared for winter weather.*](#)
- Government of Canada. (2018c). [*Before a severe storm.*](#)
- Government of Canada. (2020). [*Canada's action on climate change.*](#)
- Grains Research & Development Corporation. (n.d.). [*Tips and tactics. Managing frost risk.*](#) National GRDC.
- Health Canada. (2011a). [*Adapting to extreme heat events: Guidelines for assessing health vulnerability.*](#) Government of Canada.

- Health Canada. (2011b). [*Extreme heat events guidelines: Technical advice for health care workers*](#). Government of Canada.
- Health Canada. (2018). [*Extreme cold*](#).
- Johnstone, W. M., & Lence, B. J. (2009). [*Assessing the value of mitigation strategies in reducing rapid-onset, catastrophic floods*](#). *Journal of Flood Risk Management*, 2, 209-221. <https://doi.org/10.1111/j.1753-318X.2009.01035.x>
- Knutson, C., Hayes, M., & Phillips, T. (1998). [*How to reduce drought risk*](#). Western Drought Coordination Council.
- Liu, Q., Ruan, X., & Shi, P. (2011). Selection of emergency shelter sites for seismic disasters in mountainous regions: Lessons from the 2008 Wenchuan ms 8.0 earthquake, China. *Journal of Asian Earth Sciences*, 40(3), 926-934. <https://doi.org/10.1016/j.jseaes.2010.07.014>
- McBean, G., & Henstra, D. (2003). [*Climate change, natural hazards and cities*](#). The Institute for Catastrophic Loss Reduction.
- Ministers Responsible for Emergency Management. (2017). [*An emergency management framework for Canada*](#) (3rd ed.). Public Safety Canada.
- National Science and Technology Council's Subcommittee on Disaster Reduction. (2006). [*Windstorm impact reduction implementation plan*](#). United States Army Corps of Engineers.
- Natural Resources Canada. (2020). [*Impacts and adaptation*](#).
- Office for Coastal Management, National Oceanic and Atmospheric Administration. (2021). [*General information. Reports on lessons learned from storms, hurricane and coastal flooding*](#). NOAA.
- Olick, D. (2019, May 21). [*Here's how to build a hurricane-resistant house – not as expensive as you may think*](#). CNBC.
- Ontario Ministry of Agriculture, Food and Rural Affairs. (2021a). [*Weather risks: Strategies to mitigate the risk of frost*](#).
- Ontario Ministry of Agriculture, Food and Rural Affairs. (2021b). [*Weather risks: Strategies to mitigate the risk of hail injury*](#).
- Osti, R., Tanaka, S., & Tokioka, T. (2009). [*The importance of mangrove forest in tsunami mitigation*](#). *Disasters*, 33(2), 203-213.
- Pendleton, L. D., (2000, September 20). [*Microbursts and other thunderstorm nastiness*](#). AVweb.
- Perks, G. (n.d.). [*Heat waves and hope*](#). [Video]. Climate Atlas of Canada.
- Philipsen, K. (2017). [*An overview of resilient construction for natural disaster mitigation*](#). Smart Cities Dive.
- Potash, C. B., & Brown, J. R. (1988). [*Fog mitigation update: Fog mitigation measures as applied to highway bridge structures*](#). *Transportation Research Record*, 1172, 74-77.

Public Safety Canada. (n.d.). [*Preparing your family for emergencies: A step-by-step guide.*](#)

Roth, A. P. & de Loë, R.C. (2015). [*Addressing drought: A survey of Canadian and international experiences.*](#) Water Policy and Governance Group.

Singh, K., Walters, B. B., & Ollerhead, J. (2007). Climate change, sea-level rise and the case for salt marsh restoration in the Bay of Fundy, Canada. *Environments Journal*, 35(2), 71-84.

Smoyer-Tomic, K. E., Kuhn, R., & Hudson, A. (2003). Heat wave hazards: An overview of heat wave impacts in Canada. *Natural Hazards*, 28, 463–485.