



## FLOODS

Please note that the foundation messages are included in the previous section: *Key messages for all-hazards household and family disaster planning*. Separate messages are also available for other specific hazards.

Floods are described as the overflowing of the normal confines of a stream or other body of water, or the accumulation of water over areas that are not normally submerged. This includes: river/fluviat floods. They can be very high-impact events. Annual flooding is a natural phenomenon long associated with increased soil fertility, but human habitation and land-use practices lead to many adverse impacts. Less frequent but unexpected flooding, caused by the interplay of natural and human factors, occur worldwide.

Natural causes include: high-intensity or prolonged rains, storms and storm surges, sudden melting of snow or ice, sudden release of water held or diverted by ice or debris jams and drought. Man-made causes include: the failure of water containment and drainage system, human-generated refuse in riverbeds and run-off channels, deforestation, unsustainable land management, urban cement and asphalt cover.

The two main types of floods are inundation floods (slow, developing over hours or days) and flash floods (occur without warning, in places where there are no streams, generally within six hours of a rain event, or after dam or levee failure). Within these two types, the major kinds of flooding are:

- **Run-off** from higher ground occurs when water flowing from mountains towards the sea can collect in low or flattened areas, creating sheet-flooding run-off.
- **Coastal flooding** is inundation caused by sea-water above normal tides. Causes can include prolonged or strong onshore flow of wind, storm surges and astronomical tides or tsunamis generated by earthquakes.
- **Estuary flooding** can be caused by sea tidal surges or storm-force winds from a cyclone.
- **Outburst flooding** takes place due to an unexpected dam or glacial breakage.
- **Urban flooding** can be caused by impermeable ground cover (such as concrete and asphalt) that increases run-off two-to-six times more than natural terrain. Urban streets can become swiftly moving rivers, while basements and viaducts can collect water.
- **River flooding** is a natural event for any river, creek or stream when the catchment receives more water than usual. Development on the flood plain and alteration of the flood plain terrain can cause flooding or make it worse. It may be slow or fast.



Depending on their size and severity, floods can roll boulders and vehicles, tear out trees, destroy buildings and bridges, bring down power lines, cover roads and fill basements. Floodwater may rise to several storeys, reaching heights of 3 to 6 meters or 10 to 20 feet, and can trigger deadly debris slides. Debris in floodwater can accumulate in tight passages, creating flooding above the blockage and flash flooding below when the jam breaks. In coastal outlet areas, floodwater can move at 10 to 15

kilometres per hour or 6 to 10 miles per hour, spreading as widely as the terrain permits.

Floods can cause death, injury, damage to property and infrastructure, severe erosion, ground instability, food shortage, contamination of drinking water and deposits of mud, sand and gravel. Floods can lead to loss of shelter and livelihoods, and can disrupt life-line infrastructure and destroy communities.







## Assess and plan

Key messages	Context-specific details
Know your area's flood risks	<ul style="list-style-type: none"> <li>• Know the local terrain, water sources and catchment area and weather patterns, to better understand the risks.</li> <li>• If flood plains have been mapped, find out whether you are located on a flood plain, and learn about the measures required to elevate your property and buildings relative to predictable flood levels.</li> <li>• Consider risk factors such as proximity to rivers, dykes and coastlines, blockage of channels or gullies, and urban infrastructure.</li> <li>• Investigate historical experience and the potential impact of climate change on the area.</li> <li>• Speak with local authorities and neighbours to find out whether your area is prone to flooding and how flood risk is being addressed.</li> <li>• Maintain communication with neighbours located above and below you in a building.</li> <li>• Identify industrial activity that may create hazardous materials release and contamination risks during flooding.</li> </ul>
Store valuables and dangerous materials above likely water levels	<ul style="list-style-type: none"> <li>• Keep important papers, equipment, feedstock and other valuables above potential flood levels, using waterproof containers where possible.</li> <li>• Keep hazardous chemicals above anticipated flood levels.</li> </ul>
Consider relocating or mitigating and adapting	<ul style="list-style-type: none"> <li>• If you live in a place prone to frequent or serious flooding, consider relocating, building elevated storage buildings or using floating shelters.</li> </ul>
Plan to protect your animals	<ul style="list-style-type: none"> <li>• Consider precautionary evacuation of your livestock and pets.</li> </ul>
Know your areas expected flood evacuation routes	<ul style="list-style-type: none"> <li>• Identify your safe evacuation routes, using any forms of transportation available to you, as well as routes that can be used on foot.</li> </ul>



## Mitigate risks: physical or environmental

Key messages	Context-specific details
Select a safe site for your building	<ul style="list-style-type: none"> <li>• Avoid building or living within 200 meters, i.e. 650 feet of a high-tide coast-line.</li> <li>• Avoid building or living on riverbanks, gullies or flood plains, unless you elevate and reinforce your home (with the exception of delta areas, where riverbanks are on high ground).</li> </ul>
Build and maintain your home with floods in mind	<ul style="list-style-type: none"> <li>• If you live on a flood plain, build an appropriate foundation and elevate your home.</li> <li>• Construct wells and latrines in safe places, above expected flood levels.</li> <li>• If you are advised to, for your specific conditions, install back-flow valves in plumbing to prevent floodwater from backing up into drains.</li> <li>• When you make renovations or alterations, wet-flood proof the construction. Choose flood damage-resistant materials for areas that usually get wet, raise electrical circuits 1.2 meters or 4 feet above the floor, put appliances on pedestals, and design walls so that cavities drain.</li> </ul>
Maintain water channels	<ul style="list-style-type: none"> <li>• If you change the natural course of a river or stream, make sure its water-carrying capacity is not reduced.</li> <li>• Keep water channels, drainpipes and gutters clear of debris.</li> </ul>
Provide a raised plinth for animals	<ul style="list-style-type: none"> <li>• If you have livestock or large animals that cannot be transported, create a raised plinth, with access, so that the animals can move to higher ground in the event of flooding.</li> </ul>
Construct barriers to prevent floodwater from entering buildings	<ul style="list-style-type: none"> <li>• Construct levees, berms or floodwalls in accordance with local building regulations, to prevent floodwater from entering your building.</li> <li>• Identify the best methods to prevent water from entering your home, depending on your construction type and location. If possible, create a barrier in front of your doors and vents to keep water out.</li> <li>• Make sure you have the supplies and time available to implement your solution. Examples of temporary barrier solutions include washboards; sand-bags and anchored heavy plastic sheeting that can be used to channel water away from your building.</li> <li>• If you plan to fight floods with barriers, decide in advance when to abandon the fight and save your life. Know how to get out of the flooded area.</li> </ul>





## Prepare to respond: develop skills and store provisions

Key messages	Context-specific details
Practise evacuation routes	<ul style="list-style-type: none"> <li>Make sure household members know where to evacuate to, what route to take, and where to meet if they have to leave.</li> </ul>
Stay informed: monitor weather, listen to the radio and follow instructions	<ul style="list-style-type: none"> <li>Monitor the weather closely. If there is a <b>flood watch</b>, this means a flood is possible in your area. If there is a <b>flood warning</b>, this means a flood is already occurring in your area, or will do soon.</li> <li>If you are advised to evacuate, or if you think you are in danger, evacuate immediately.</li> <li>If you are instructed, or if you have time before evacuating, disconnect heating and cooking or gas tanks and unplug electrical appliances.</li> </ul>
Keep supplies to protect your home	<ul style="list-style-type: none"> <li>If you live in an area prone to flooding, keep supplies (such as plywood, plastic sheeting, nails, hammer, a saw, a crow bar, sand, shovels and sand-bags), to protect your home.</li> </ul>
Keep supplies to protect people from drowning and as floating transportation	<ul style="list-style-type: none"> <li>Buy or make personal float devices for each household member.</li> <li>Keep a ladder and rope for escaping to the roof.</li> <li>Keep an inflatable boat or make an improvised group-floating platform for example, with capped water bottles.</li> </ul>
Bring your pets and service animal indoors	<ul style="list-style-type: none"> <li>Maintain direct control of your animals and take them with you if you evacuate.</li> </ul>
When you hear a flood warning, store extra water	<ul style="list-style-type: none"> <li>Fill plastic bottles with clean water for drinking.</li> <li>Fill bathtubs and sinks with water for all other cleaning and sanitation needs.</li> </ul>

During rainy season and flood conditions, keep your vehicle fuel tank filled	<ul style="list-style-type: none"> <li>• If you have a vehicle, keep its fuel tank filled in case you need to evacuate.</li> </ul>
During a flood 'Turn around, don't drown.' Stay out of floodwater and evacuate vertically	<ul style="list-style-type: none"> <li>• Never try to walk, swim or drive through swift water. If you come across flowing water above your ankles, stop, turn around and go the other way. Fast moving water only 15 centimetres or 6 inches deep can sweep a person off their feet.</li> <li>• Do not expect to outrun floodwater, as it may flow at 10 to 20 kilometres per hour, i.e. 6 to 12 miles per hour.</li> <li>• If you have not been able to evacuate out of the area move to higher ground or the uppermost floors of buildings.</li> </ul>
During a flood, if you are in a vehicle, avoid unsafe conditions	<ul style="list-style-type: none"> <li>• Never attempt to cross any flowing water or water-covered roads or bridges.</li> <li>• Do not drive around barricades: they are there for your safety. Turn around and find another route.</li> <li>• Stay away from underpasses, as the depth of water there is not obvious. Underpasses can fill with 1.5 to 2 meters or 5 to 6 feet of water.</li> <li>• Standing water may be electrically charged from underground or downed power lines.</li> <li>• Avoid travelling at night.</li> <li>• Move to higher ground, away from rivers, streams, creeks and storm drains.</li> <li>• As little as 20 centimetres or 6 inches of water can cause you to lose control of your vehicle. As little as 50 centimetres, i.e. 2 feet of rushing water can carry away most vehicles, including trucks.</li> <li>• If they become wet, test your brakes on a clear patch of road at low speed. If brakes are not working, as they should, dry them by pressing gently on the brake pedal while maintaining speed.</li> <li>• If your vehicle stalls in water, abandon it and climb to higher ground. Restarting your engine may cause irreparable damage.</li> <li>• If your vehicle is being submerged, open the windows to escape.</li> </ul>
After a flood, take care around floodwaters	<ul style="list-style-type: none"> <li>• Stay away from low-lying areas.</li> <li>• Do not drink from, play or swim in floodwater.</li> <li>• Watch out for poisonous snakes – especially around trees and bushes. Use a stick to poke through debris.</li> <li>• Avoid touching electrical item that is wet or any water that is in contact with electrical wires.</li> </ul>
After a flood, pump out floodwater from basements gradually	<ul style="list-style-type: none"> <li>• Pump out flooded basements gradually (about one-third of the water per day) to avoid the basement walls collapsing due to pressure from water-saturated soil outside.</li> </ul>
After a flood, start clearing out and drying your home when rain stops and water recedes	<ul style="list-style-type: none"> <li>• Drying may take weeks, and complete restoration can take months. Sewage and toxic contamination is difficult to clean.</li> <li>• Move everything that is wet outside (weather permitting).</li> <li>• Drain away water under the house.</li> <li>• Keep doors and windows open on dry days. On wet days, leave windows ajar.</li> <li>• Turn on heaters when possible.</li> <li>• Wash and then disinfect every part of your home that has been flooded. Start from the bottom and work your way up. Work in a well-ventilated area with two buckets – one for the cleaning agent and one for rinse water. Replace rinse water frequently. Repeat after 8–24 hours to kill germs and reduce the odour.</li> <li>• Remove mildew.</li> </ul>

### After a flood, take sanitation precautions

- Service sanitation systems as soon as possible.
- Check drinking wells for contamination before using the water.
- Use protective equipment for all tasks (including tall boots, long pants, long sleeves, eye protection and gloves).
- Wash hands before eating, drinking or smoking.
- Use disinfectant when cleaning.
- Disinfect any cuts and protect them with a waterproof dressing.
- Keep children away during the clean-up.
- Bury human waste matter quickly.

### After a flood, clean up carefully

Follow the instructions below for cleaning specific items.

- Paper and photographs:
  - To protect paper, rinse and freeze it or place it in a sealed container with moth crystals or stacked individually between sheets of wax paper and sealed in a plastic bag. Freezing slows the damage, and the paper can then be defrosted and dried later.
  - Place wet or frozen photos in cold clear water and separate them. Do not hold them under running water or wipe them. Dislodge dirt by moving gently in a tub.
  - Photocopy the items as soon as possible.
  - As soon as the pages are thawed or unsealed, dry them with a blow dryer or blotting paper.
  - Do not force pages apart – dry them until they come apart easily.
  - Seek professional help for rare and heritage books, photographs and stamp collections.
- Computer disks:
  - Rinse disks, place them in a plastic bag and refrigerate them until you can get professional help.
- Clothing and linens:
  - Shake out mud, hose off dirt and wash items in a washing machine with hot water and disinfectant.
- Furniture and appliances:
  - If appliances are wet, turn off the electricity at main fuse box or circuit breaker. Unplug appliances and let them dry out. Ensure that a professional checks the electrical system and appliances before turning power on and using them.
  - Clean appliances with clean drinkable water.
  - Check that sewer line is working before using toilet or the latrine.
  - Discard all food that has been in contact with floodwater.
  - Discard plastic or porous kitchen items.
  - Clean and disinfect refrigerators and other appliances with drinkable water and disinfectant. (However, refrigerators and freezers may not be salvageable.)
  - Use hot water to wash pots, pans, dishes and utensils. Disinfect and air-dry these.
  - Remove the backs of furniture to allow air to circulate.
  - Do not force open wooden drawers and doors: let them dry first.