

**Calgary**



# Flood Readiness

Understand. Prepare. Stay Informed.

**A GUIDE TO PROTECTING YOUR FAMILY AND PROPERTY**



# Forward

The City of Calgary is pleased to provide this booklet to help Calgarians understand, prepare and stay informed before, during and after a flood event.



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# Flood words



When you are monitoring river conditions or weather, you may hear flood words or alerts related to the river. It's important to understand what they mean, so you can be prepared and take action.

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## Definitions

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<b>Flood</b>	A flood occurs when water flows beyond its normal confines over what would normally be dry land (i.e., a river overflowing its banks onto dry land).
<b>100-year flood</b>	A 100-year flood event describes a flood that has a one per cent chance of being equalled or exceeded in magnitude in any given year. It is not a flood that occurs once every 100 years. Often 100-year flooding is written as 1:100.
<b>Floodway</b>	The floodway includes the channel of a river and adjacent land areas. Floodways carry the bulk of floodwater downstream and are usually the area where flow velocity is the highest and flow depth is significant.
<b>Flood fringe</b>	The flood fringe refers to the land area outside the floodway but is subject to inundation by flooding.
<b>Floodplain</b>	A floodplain is the land area adjacent to the river that is subject to flooding. The floodplain is made up of two sections: the floodway and the flood fringe.
<b>Watershed</b>	The area of land where all of the water that is under it or drains off of it goes into the same place.
<b>Flow rate</b>	The flow rate tells us how much water is flowing in a certain amount of time. It's measured in cubic metres per second ( $m^3/s$ ), also referred to as cms. A cubic metre is 1,000 litres of water.

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## Types of flooding

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### Overland flooding

Overland flooding happens when water overflows the banks from creeks, streams, rivers and lakes. Depending on how severe the flooding is, the water can slowly creep up into backyards or it can rapidly spread throughout the streets with little warning. In winter, frozen catch basins, storm drains or piled snow – combined with quick thawing and/or rain – can cause overland flooding, which can enter basements or garages.

### Basement seepage

This happens when the ground absorbs water, much like a sponge. This water is absorbed by the soil and raises the level of the underground water table. Water seeps through the soil and eventually reaches the foundation of your home. The water works its way into your basement through cracks and holes or through joints in the home's foundation.

Basement seepage can also happen in homes near rivers, because of elevated river levels due to either spring–summer high water levels or winter ice jams.

### Sewage backup

Water on flooded streets or high groundwater may drain into the sanitary sewer system. This overloads the sanitary sewer pipes and can force sewage back through the sewer line and into your basement.

### Stormwater backup

The City's stormwater system empties into the Bow and Elbow rivers through large pipes. When the rivers rise, water can flow back into the stormwater pipe system. Water may spill back onto streets through stormwater drains.



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## Types of emergency alerts

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<b>Weather advisory</b>	An advisory is a type of alert issued by Environment Canada when a certain weather or environmental hazard is either occurring, imminent or expected to occur. Pay attention for further information on the potential weather event.
<b>Weather watch</b>	A watch is issued when conditions are favourable for the development of a weather or environmental hazard that may pose a significant threat to public safety and property. Continue to monitor weather conditions and take appropriate precautions.
<b>Weather warning</b>	A warning is an urgent message issued when a hazardous weather or environmental event that poses a significant threat to public safety and property is certain or imminent. Seek appropriate shelter and continue to monitor conditions. Visit <a href="http://weather.gc.ca/weather">weather.gc.ca/weather</a> for more information.
<b>High stream flow advisory</b>	This means that stream levels are rising or expected to rise rapidly. No major flooding is expected, but minor flooding in low-lying areas is possible. If you are using an affected river or are located close to an affected river (camping, fishing, boating, etc.), be cautious of the rising levels.
<b>Flood watch</b>	<p>A flood watch means that stream levels are rising and will approach or may exceed the tops of river banks.</p> <p>Flooding of areas next to rivers under a flood watch may occur, and you are advised to take appropriate precautionary measures as instructed by the authorities through <a href="http://calgary.ca/floodinfo">calgary.ca/floodinfo</a>, radio or TV. You can prepare by using steps outlined in this guide.</p>
<b>Flood warning</b>	A flood warning means that rising river levels will result in the flooding of some areas. If you are situated close to the river, take appropriate measures to avoid flood damage as instructed by the authorities through <a href="http://calgary.ca/floodinfo">calgary.ca/floodinfo</a> , radio or TV. You can prepare by using steps outlined in this guide.

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## State of local emergency

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If there is danger to life, great widespread risk to public and private property or if there is a need to consolidate resources, The City of Calgary officials can declare a State of Local Emergency. This gives the Director of Emergency Management special powers to take measures to protect life and property, including ordering mandatory evacuations. A State of Local Emergency has happened twice in Calgary – 2005 and 2013.

# Before Flooding Happens



Understanding, preparing and staying informed helps reduce the impact and lessen the damage caused by flooding.

# Understand flood risk



## Flood basics

### About flooding

Flooding in Calgary can occur in several ways:

- Rivers and streams cannot contain excessive rainfall within their banks.
- Rain and snowmelt cannot be absorbed into the ground.
- Waterways or storm drains are blocked with debris or ice.
- Water containment systems, such as stormwater or sewage pipes, are overloaded or break, causing backup.
- Severe thunderstorms cause localized flooding of streets and property.
- Ice jams on rivers may cause elevated water levels and overland flooding.

The speed with which flooding is experienced varies. Calgary sits at the confluence of two large rivers, the Bow River and the Elbow River, and several small creeks. The Bow River has a large watershed drainage area and drops from the mountains to the city at a steep slope. The Elbow River also drops in elevation at a steep slope and has a relatively short trip from the mountains to where it meets with the Bow River in the heart of Calgary.

The consequence of having two short and steep river systems is that any impacts, such as fast and high flow rates, can reach Calgary at a rapid speed with little warning.

### When

Flooding can occur at any time in Calgary with little or no warning. The period between May 15 and July 15 is when we are most likely to experience flooding. Historically, this is when we experience our largest rainfalls. However, flooding can occur any time of the year; for example, due to sanitary sewer back up, high ground water tables or ice jam.



**How** Calgary is located in the foothills of the Rocky Mountains, the home of the Bow River Basin, where the Bow and Elbow rivers begin. The mountains greatly influence our weather patterns, and a single day of heavy rainfall in the mountains can change river flow rates significantly enough to cause flooding in Calgary.

Rainfall in the mountains is the primary cause for flooding in Calgary. The rain flows off the mountains into the rivers rapidly and then travels a relatively short distance through steep river channels to arrive in Calgary. By the time the runoff arrives in the city, it is flowing rapidly and forcefully, which may lead to river flooding with little or no warning.

**Where** While flooding can impact all communities within Calgary, the risk for communities next to the Bow and Elbow rivers is the greatest.

To determine if you live in an affected community, visit [calgary.ca/floodinfo](http://calgary.ca/floodinfo) to review flood inundation maps.

**Impact** Calgary experienced significant flooding recently. In 2013, Calgary experienced the largest flood since 1932, resulting in widespread evacuations, a downtown that was inaccessible for days, and extensive damage to public and private property. With damages and economic impacts estimated at \$6 billion dollars, the southern Alberta flood was Canada's costliest natural disaster to date.

**Know** You should also be aware that weather conditions can change very rapidly. Calgary's proximity to the Rocky Mountains makes weather forecasting challenging. For example, satellite imagery may show approaching storm systems. However, weather forecasters often cannot predict how those weather systems will behave once they encounter the physical and climatic conditions surrounding the mountains.

Generally, winter storms follow a more predictable pattern, allowing more advance warning time so that you can take appropriate actions. Summer weather patterns can be much more volatile and difficult to predict. It is important to be vigilant about monitoring weather conditions from trusted sources.

When you are monitoring the weather, you may also hear alerts related to the river. If you live in the flood plain or in low-lying areas, it's important to understand what the alerts mean so you can be prepared and take action.

The first step towards protecting yourself is knowing your flood risk and the sources of information available to you. Check out the "Stay informed" section in this booklet.

Safety is everyone's responsibility. The City of Calgary's priorities are to protect citizens, critical infrastructure, civic property, the environment and the economy during emergency events, including flooding.

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## Know your risk

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The first step to understanding your risk is knowing how you may be impacted by flooding.

It is not possible to completely eliminate the risk of flooding, and people in low-lying areas may be impacted especially from river flooding.

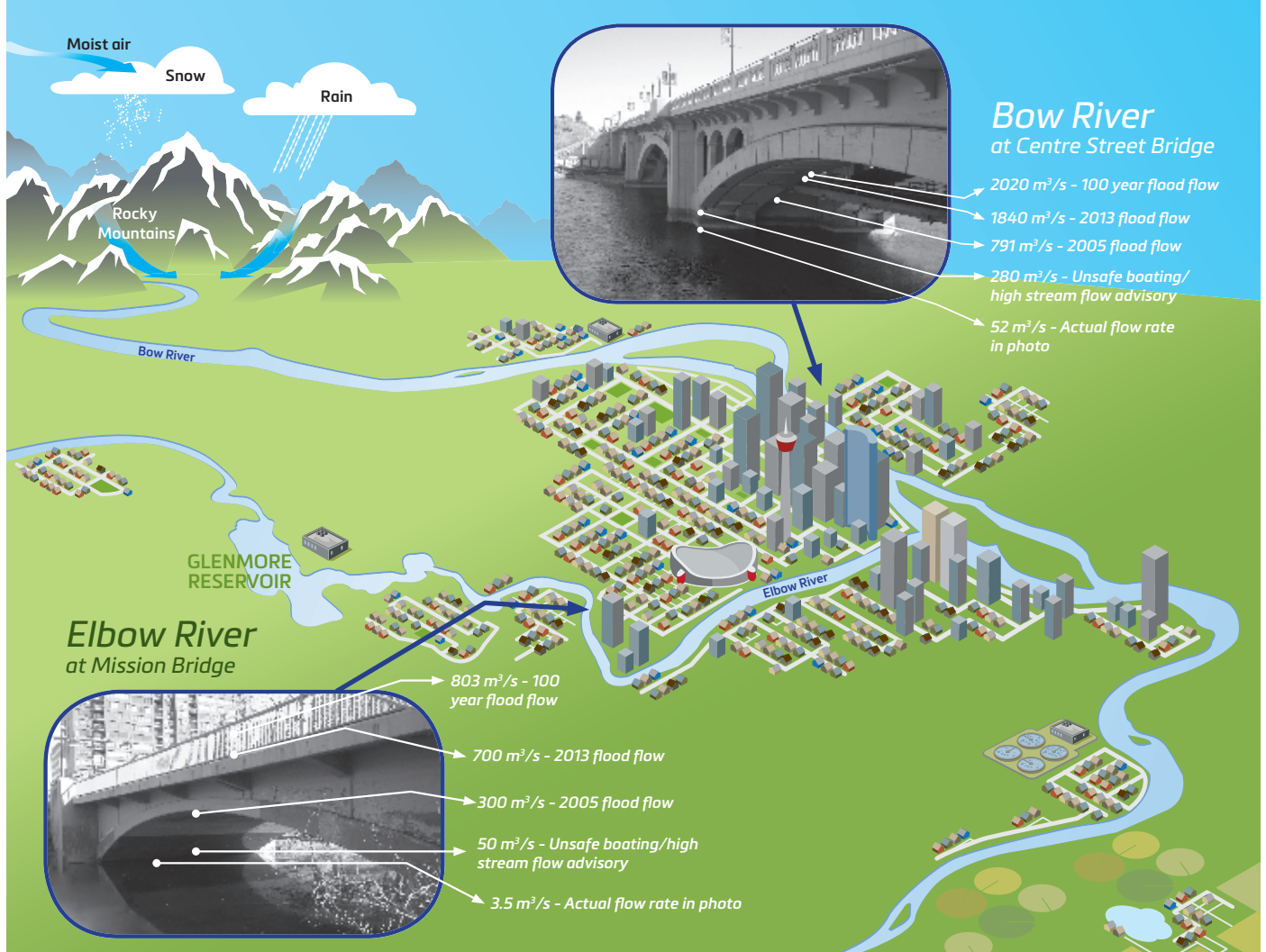
To determine if you live in a community that may potentially be impacted by river flooding, visit [calgary.ca/floodinfo](https://calgary.ca/floodinfo) for flood inundation maps.

The City also provides tools and resources, such as the following river flow triggers and their impacts to help Calgarians understand their risk. To stay informed on current river flow rates, visit Alberta's River Forecast Centre's website to get the latest flow rates, advisories and comments. A link to the River Forecast Centre's website can be found on [calgary.ca/floodinfo](https://calgary.ca/floodinfo).



# Flood Readiness: Understand. Prepare. Stay Informed.

## Bow and Elbow Rivers, Flows, Triggers and Related Effects



REFERENCE FLOW RATES	BOW RIVER (m <sup>3</sup> /s)	ELBOW RIVER (m <sup>3</sup> /s)
Normal Seasonal River Flows (Approximately May 15 to July 15)	70 to 400	30 to 90
Higher than Normal Seasonal River Flow	400 to 700	90 to 170
Flow in Excess of Channel Capacity	>700	>170

## BOW RIVER TRIGGERS

(Upstream of where the Bow River meets the Elbow River)

FLOW RATE (m <sup>3</sup> /s)	CHANCE OF OCCURRING IN ANY GIVEN YEAR	EFFECT
250	> 50 per cent	<ul style="list-style-type: none"> <li>Riverside pathways impacted</li> </ul>
280	> 50 per cent	<ul style="list-style-type: none"> <li>Boating and other activities on the river are potentially dangerous. Fire Department may issue a boating advisory</li> </ul>
550	50 per cent	<ul style="list-style-type: none"> <li>Heritage Dr/Glenmore Trail underpass inundated</li> </ul>
510	33 per cent	<ul style="list-style-type: none"> <li>Some basements may flood due to sewer backups and raised ground water levels</li> </ul>
700	13 per cent	<ul style="list-style-type: none"> <li>Widespread basement flooding</li> </ul>
927	12 per cent	<ul style="list-style-type: none"> <li>Overbank flooding may reach some residences</li> <li>Evacuation may begin (potentially Bowness, Sunnyside, Hillhurst)</li> <li>Temporary barrier construction is triggered</li> <li>Prince's Island inundated</li> </ul>
1230	5 per cent	<ul style="list-style-type: none"> <li>Evacuation widens (potentially Chinatown, Eau Claire, Montgomery)</li> <li>Construction of temporary barriers continues</li> </ul>
1500	3 per cent	<ul style="list-style-type: none"> <li>Widespread evacuation</li> <li>Widespread construction of temporary barriers</li> <li>Pedestrian bridges and approach roads for some vehicle bridges become impacted</li> </ul>
1840	1.4 per cent	<ul style="list-style-type: none"> <li>2013 Flood flow rate</li> </ul>
2020	1 per cent	<ul style="list-style-type: none"> <li>Hundred year flood flow rate</li> </ul>

## ELBOW RIVER TRIGGERS (Downstream of Glenmore Reservoir)

FLOW RATE (m <sup>3</sup> /s)	CHANCE OF OCCURRING IN ANY GIVEN YEAR	EFFECT
40	> 50 per cent	<ul style="list-style-type: none"> <li>Riverside pathways impacted</li> </ul>
50	> 50 per cent	<ul style="list-style-type: none"> <li>Boating and other activities on the river are potentially dangerous. Fire Department may issue a boating advisory</li> </ul>
120	29 per cent	<ul style="list-style-type: none"> <li>Modest overbank flooding occurs in mostly unpopulated areas</li> </ul>
140	20 per cent	<ul style="list-style-type: none"> <li>Some basements may flood due to sewer backups and raised ground water levels</li> <li>Limited temporary barrier construction may commence</li> </ul>
170	17 per cent	<ul style="list-style-type: none"> <li>Widespread basement flooding</li> <li>Temporary barrier construction and evacuation and may be considered</li> <li>Overbank flooding may reach some residences</li> </ul>
275	5 per cent	<ul style="list-style-type: none"> <li>Widespread evacuation</li> <li>Significant construction of temporary barriers</li> </ul>
500	2.6 per cent	<ul style="list-style-type: none"> <li>Widespread evacuation and construction of temporary barriers</li> <li>Pedestrian bridges and approach roads for some vehicle bridges become impacted</li> <li>Overland flooding in Mission, along Macleod Trail, at Erlton and in the Stampede C-Train tunnels</li> </ul>
700	1.3 per cent	<ul style="list-style-type: none"> <li>2013 Flood flow rate</li> </ul>
803	1 per cent	<ul style="list-style-type: none"> <li>Hundred year flood flow rate</li> </ul>

## ELBOW RIVER TRIGGERS (Upstream of Glenmore Reservoir)

FLOW RATE (m <sup>3</sup> /s)	CHANCE OF OCCURRING IN ANY GIVEN YEAR	EFFECT
100	10 per cent	<ul style="list-style-type: none"> <li>Overbank flooding may occur in Griffith's Woods Park and some basements may flood</li> </ul>
500	4 per cent	<ul style="list-style-type: none"> <li>Basements in Discovery Ridge may flood due to ground water levels and overbank flooding</li> </ul>

# Prepare



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## How The City prepares for flooding

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The City of Calgary's priority when planning for and responding to flooding is to protect its citizens, critical infrastructure, civic property, the environment and the economy.

The City prepares annually for flooding by:

- Working with the Government of Alberta to monitor snow pack, rainfall and temperatures, as well as river flow levels in the mountains and foothills.
- Developing and maintaining emergency response plans.
- Conducting training sessions and exercises for City personnel.
- Identifying those areas of the city and critical infrastructure that are most vulnerable to flooding.
- Ensuring adequate emergency resources are in place.
- Sharing information with Calgarians, businesses, stakeholders and other municipalities.
- Operating existing infrastructure, such as dams, reservoirs and outfall gates, to reduce flow rates and mitigate flood damage.

The City strives to maintain all critical business functions and services to Calgarians during any emergency or disaster (including flooding).

The City does not typically protect individual private properties from flood risk. Property owners remain responsible for protecting their property. Please visit [calgary.ca/floodinfo](https://calgary.ca/floodinfo) for information on permits, bylaws and land use policies regarding flood risk.

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## How you can prepare for flooding

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### Make a plan and practise it

One of the biggest sources of stress in an emergency is not knowing where your family members are. It's important to make a plan with your family members to ensure their safety and your own.

Emergencies and disasters, by their very nature, are unexpected events. They may occur when family members are not together. Your children may be in school, you may be at work or you may have an elderly parent who lives across the city. If phone lines are compromised or transportation is affected, what will you do?

As part of your family plan, you should plan a safe meeting spot outside your neighbourhood in case you are unable to return to your home or neighbourhood. Everyone must know the location of the meeting spot and the phone number of your emergency contact person.

Engage your family in preparing your plan and once it is complete, practise it.

Consider these factors when making your plan:

- **Transportation access and options:** What are all the ways you can get to and from your home, work or neighbourhood? What are your mobility options, such as taking public transit, driving, biking and walking.
- **A meeting place:** Where will your family members meet after an emergency or disaster? Having a few designated locations may be necessary, especially if a disaster occurs.
- **What other emergency plans may impact your plan:** What emergency plans are in place at your child's school or at your place of work? Will you be able to pick up your child in an emergency? Have you designated a family member or friend to pick your child up if you are unable to do so? Taking into account what other emergency may impact your own plan will help you to develop a better plan.
- **Communications inaccessibility:** During emergencies, communication services like telephone land lines, cellular and Internet services may be overwhelmed or impacted. Sometimes, local phone lines are overloaded or compromised by the disaster, but long distance calls, emails or texts may go through. To ensure you can locate one another, identify an out-of-town contact. Provide a few ways to get hold of your out-of-town contact, such as an email address, land line number, cell phone number and a link to his/her social media account. Your out-of-town contact can relay messages to other family members should you not be able to contact your family members directly.
- **Emergency kit:** Having the resources and tools to keep you safe and healthy during an emergency not only helps you, but also allows emergency responders time and resources to look after those less able to care for themselves. Have 72-hour emergency kit and keep it in an easy-to-access location. (See page 14 for more details). The City provides Important Documents bags to store copies of your important documents safely. The bags come with a checklist to help you know which documents to store. You can request a bag by calling [311](tel:311).





- **Your pet's needs:** If you are evacuated from your home or unable to return home during an emergency, how will your pet(s) be cared for? A care plan may save your pet's life.

Ensure you have a temporary, alternative place for your dog or cat to go for safekeeping in the event of an emergency.

The City also provides cat and dog owners with a door sticker and a window sticker to inform emergency services that pets are in the residence.

Call **311** or visit the Animal Services Centre at 2201 Portland Street S.E. during regular facility hours to get stickers and information leaflet.

Place your Protective Services Pet Sticker on your residence's door or window. Place the sticker on a main floor door or window, facing the street, as close to your front entrance as possible.

- **Utility shut-offs:** Knowing where the shut-offs for your utility services and appliances are and how to use them may reduce the damage to your property. If you have time to do so prior to evacuating, shut off your utilities and appliances.
- **Resources and services:** Do you know how to access help if you need it? Talk about any specific requirements your family may have and what you will do to take care of each need. This may involve mobility restrictions, important medication or a range of non-visible disabilities that could impair a loved one's ability to respond in an emergency.

Keep a paper copy of important phone numbers with you because if power is not available and electronic devices cannot be accessed, you may not recall contact information when you need it.

Get the Family Emergency Contact List at [calgary.ca/cema](http://calgary.ca/cema).

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## Make a kit

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Each disaster is unique and different actions may be required. You may have to leave your home – an evacuation or you may be instructed to stay in your home – sheltering-in-place. **If you are instructed by emergency personnel to evacuate, you must leave the area.** The decision to order an evacuation is based on safety and risks to residents remaining in their homes.

In a large emergency or a disaster, the first 72 hours are the busiest for first responders. Often, resources are stretched and emergency personnel may not be able to respond immediately.

It is important that you care for yourself and your family for a minimum of 72 hours.

Make a kit with supplies to help you be self-sufficient for 72 hours.

Your 72-hour kit should have basic supplies, be organized and easy to find.

Many items can be found in your home already, but if you're instructed to evacuate, you may not have time to gather supplies.

Keep your kit in a backpack or suitcase, preferably with wheels, in an accessible location like a front hallway closet.

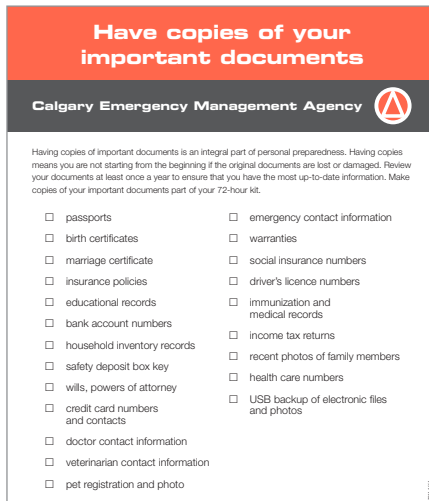
Supplies for a family can get heavy. Consider separating personal supplies into individual backpacks so they are more portable.





## Important documents

Make copies of your important documents and store them in your 72-hour kit. The City has Important Documents bags available that you can use to store copies of your documents. You may want to consider having two Important Documents bags: one in your 72-hour kit and another in a safe location (with a trusted friend or relative, or in locked storage at your workplace). Documents for which you should have copies include:



- passports
- birth certificates
- marriage certificate
- insurance policies
- educational records
- bank account numbers
- household inventory records
- safety deposit box key
- wills, powers of attorney
- credit card numbers and contacts
- doctor contact information
- veterinarian contact information
- pet registration and photo
- emergency contact information
- warranties
- social insurance numbers
- driver's licence numbers
- immunization and medical records
- income tax returns
- recent photos of family members
- health care numbers
- USB backup of electronic files and photos

For more information visit [calgary.ca/cema](http://calgary.ca/cema).

## 72-hour emergency kit checklist

- water (4L per person per day – 2L for drinking and 2L for hygiene. You will need more water if you have pets.)
- non-perishable food (canned or dried food, energy bars, etc.)
- manual can opener
- first aid kit
- prescription medication
- wind-up (crank) or battery-powered flashlight and radio
- external battery pack or charger, extra batteries
- warm clothing and blankets or sleeping bags
- important documents
- cash in small bills or coins
- personal hygiene items (soap, dry shampoo, etc.)

Depending on your needs, there are many more items that you can add to your kit. For more information and helpful tips, visit [calgary.ca/cema](http://calgary.ca/cema).

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## How you can protect your property

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### Contact your insurance agent

It is important to be aware if and how your insurance policy covers flooding. Most policies do not provide coverage for certain types of flooding or they have restrictions and place limits on flood risks. Talk to your insurance representative to know what your policy covers and what you can do to make a potential insurance claim easier, such as maintaining a good inventory of your belongings.

### Move valuable documents and personal items

Safely store important documents like insurance papers, wills, tax returns and passports in watertight bags and consider keeping a copy at another location. Store important personal items like photos, family videos or treasured mementos in water-tight bags and move them to a safe place away from areas that have the potential for water damage, such as on higher levels in your home and away from windows.

### Move electronic equipment

If possible, move televisions, computers, appliances, stereo and electronic equipment to higher levels in your home and away from windows.

### Move business records

Businesses should move business records and dangerous goods from basements or lower floors to upper floors. The City offers a publication called “Is your business prepared?” that provides tips and instructions about how to protect your business during emergencies and disasters. Additionally, we offer information on how businesses can develop strategies and plans to ensure continued operation during and after a disruption. For more information on how you can protect your business

from flooding, visit [calgary.ca/floodinfo](http://calgary.ca/floodinfo) and for more information on planning for business continuity in disasters, visit [calgary.ca/cema](http://calgary.ca/cema).

### Move waste

Both homeowners and businesses should also ensure any chemicals or waste are stored at ground level.

### Improve yard drainage

Prevent water from collecting beside your house and seeping into the basement. Your yard and garden areas should slope away from your house and onto a grassed area in the front or backyard – not toward a neighbour's yard.

Check around outside walls, under stairs and decks where soil settles, and fill in any hollow or sunken areas.

Cover window wells with a plastic protector to prevent rainfall from collecting. In winter, remove snow that is near the foundation of your home.

### Prevent sewage and stormwater backup

When water on flooded streets drains into sewer manholes, pipes may become overloaded and back up, which may cause basement flooding. To help mitigate against sewage entering your basement, install a back-flow prevention device on your sewer pipe. This can also be individually installed in basement showers, toilets and sinks. Contact a qualified plumber for more information.

Weeping tile is a perforated pipe surrounding basement foundations. It is used to drain high groundwater directly onto the ground above the 1:100 year flood level elevation. For weeping tile systems that are directly connected to the storm water system, a weeping tile backup prevention device may lessen the flow of water from entering basements when the storm sewer system overloads.

Although not guaranteed to work, the following steps, taken prior to evacuation and if safe to do so, may help prevent sewage from backing up into your basement:

- Install the cap in the basement sewer floor drain.
- If the cap cannot be found, stuff rags down the floor drain tightly enough to help prevent sewage backing up into the basement. Secure the rags by placing a heavy object on top.
- Plug basement toilets, shower drains, sinks and sewer standpipe openings in the same way. The standpipe may be located by following the discharge hose from a clothes washer or a water softener.

Know where your property's floor drain, clean-out sewer line and back-flow prevention device are located. (Not every home has a back-flow prevention device).

### Be smart about eavestroughs and downspouts

Eavestroughs and extensions should drain at least 1.5 metres (5 feet) away from your house. Water should drain onto a landscaped area so the water has the opportunity to soak into the ground.

For front or backyard eavestroughs, direct the downspout extensions away from your home's foundation onto your yard and away from your neighbours' homes. Don't connect eavestroughs extensions or downspouts to other pipes that drain directly onto a street, lane or sidewalk. Gravel and/or other debris can enter stormwater drains and/or water from eavestroughs or downspouts can cause gravel lanes to wash away, which may increase the chances of flooding in your community.

Don't connect extensions from your eavestroughs to the sanitary sewer line or weeping tile. Excess water could overload pipes and cause flooding in your basement.

To reduce excessive rainwater from running down the sides of your house, clear leaves and other debris from your eavestroughs so that rainwater will not accumulate and seep into your basement.

### Know how much to water

Over-watering your lawn and flowerbeds next to your house can cause seepage into the basement and also reduce the ability of your lawn to absorb heavy rainfall. A leak in an underground sprinkler system can do the same thing. If you have an underground system, check for leaks regularly and drain it every fall before the ground freezes.

Your lawn only needs 2.5 cm (1 inch) of water per week, including from sprinklers and natural rainfall. You can purchase gauges to connect to your automatic irrigation system to avoid overwatering. If you are watering your lawn with a sprinkler, put a frisbee upside down on your lawn. When it's full, that is all the water your lawn needs for the week. Remember to take into account natural rainfall when calculating the total.

### Maintain your property's lot grading

Lowering the grade of your property for a walk-out basement, garage or any other reason, creates a pathway for water to enter your home.

### Keep drainage gutters clear of debris

Some properties have a concrete drainage gutter in the backyard. It should be kept clear of debris, so that water can drain from your yard.

### Report plugged storm drains

Download The City's [311](#) app or visit [calgary.ca](#) and complete an online service request to report a plugged storm drain or call [311](#).

### Park vehicles on high ground

If you have low spots on the street where water collects, park your vehicles on higher ground.

### Check your sump pump

A sump pump removes water from your basement. If you have one, check it periodically to ensure it is in good working condition. It's important to know that your sump pump will not function without power. In case of power outages, have a back-up power source on hand, like a generator, but be sure not to put the generator inside your home.



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## Sandbagging and temporary flood measures

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The City of Calgary is unable to provide sandbags or temporary flood barriers to Calgarians for the protection of their individual properties. It is the responsibility of individual property owners to protect their property if required.

If you choose to sandbag your property, keep in mind that it takes two people one hour to fill and place 100 sandbags, to build a wall about 30 cm (1 foot) high and six metres (20 feet) long.

Make sure you have enough sand, burlap or plastic bags, shovels, strong helpers and time to place them properly. Remember that sandbags deteriorate over time and cannot be re-used once contaminated with floodwater or sewage.

Contact your local landscaping or home building supply company for sandbags.



# Stay informed



When Calgary is at its greatest risk of flooding (May 15 to July 15), stay up to date with conditions and ensure you are prepared to act as needed. All advisories and updates can be viewed at [calgary.ca/floodinfo](https://calgary.ca/floodinfo).

## The best ways to get information:

- Visit [calgary.ca/floodinfo](https://calgary.ca/floodinfo).
- Listen to local media stations.
- Monitor social media (Facebook, Twitter) from The City of Calgary.
- Download The City of Calgary alerts apps that are most applicable to you, including News, Road Conditions, Pathways and Bikeways, and more.
- Listen for and sign up for Alberta Emergency Alerts (AEA). Alberta Emergency Alerts interrupt local broadcasting. As well, you can download the AEA app to a smart device to receive notifications.

For more technical or background information:

- Visit Alberta Environment's website and download the river monitoring app by searching for "Alberta Rivers" on your device.
- Follow Environment Canada on social media.



It is important to follow the directions of emergency personnel.

# Stay safe during a flood



## Evacuation

You may have to evacuate your home or you may have to stay home (shelter-in-place), without basic services like electricity, gas, water, sewage treatment or telephone. Stay informed for media advisories letting you know when and if a mandatory evacuation is in effect. Following the media advisory, uniformed personnel go door to door to ensure everyone is safe and complying with the evacuation order.

### Evacuate for everyone's safety

**For your personal safety, you must evacuate when ordered to do so.** By not evacuating, you also put the lives of rescue workers in danger.

Flood water is dangerous:

- It carries bacteria and pollutants that can make the water a health risk.
- Electrical shorts caused by water can light fires in homes or garages, and flood water can become energized by power lines.
- Flood water also carries fast-moving debris, which can hurt you or damage your property or business.

Stay out of flood water, regardless of depth. It only takes 15 cm (six inches) or less of rushing water to pull down an average adult and less than 2.5 cm (one inch) to drown. Floodwater can rise quickly, and you may not be able to call for help if you initially refuse to leave. It may be too dangerous for responders to enter the area, or communication channels may be compromised.



Pack enough clothes, prescription medicine, identification and other essential items to last at least three days, including supplies for your pets. Please refer to the 72-Hour Emergency Kit Checklist (page 15).

Think about the 6 Ps of evacuation:

1. People
2. Pets
3. Prescriptions
4. Papers
5. Personal needs
6. Priceless items

If it's safe to do so and depending on evacuation orders, you may consider:

- Shutting off your electricity before leaving your home.
- Shutting off your gas appliances (i.e., water tank, stove, hot water furnace) at the appliance valve.
- Turning off all electrical appliances (i.e., computers, TVs, microwaves), and then shut off the main breaker panel. This prevents appliances from being accidentally turned on – and potentially causing a fire hazard – if the power is turned on before you return home.
- Securing and locking your home.

If you were able to turn your power and gas off prior to leaving, please leave a note on your front door to advise City crews that you have done so.

### Where can you stay if evacuated

City police will block off a perimeter around the evacuation area. For your safety and others, do not re-enter evacuation zones until permitted to do so.

You may choose to stay with others, family members or friends. The City of Calgary may set up reception centres where Emergency Social Services will help provide basic services, such as a safe place to stay, sleep and have meals. Information on emergency reception centres will be communicated through media advisories, when uniformed personnel come to your door, on [calgary.ca](http://calgary.ca) or by calling 311.

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## Don't drive on flooded roads

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You should avoid driving on flooded roadways:

- 30 cm (1 foot) of rushing water can carry away most vehicles, including sport utility vehicles (SUVs) and pick-ups.
- The depth of flood water is not always obvious. The road bed may be washed out under the water, there may be unseen hazards and you could become stranded or trapped.
- If evacuated, stick to designated evacuation routes.

Call **311** to report the flooded road.



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## Stay away from river banks and off the river

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Do not go on or near flooding rivers. Flowing water is unpredictable. The rivers may contain trees, chemicals and other hazards that cannot be seen, which may put your safety at risk. It's also important to stay away from river banks during a flood, as they may give way because of water saturation or weight on the banks.

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## Your electricity and natural gas

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Do not enter your basement if the water level has reached any plug, electrical outlet, extension cord or baseboard heater. This is a dangerous situation. You could be electrocuted. Call **911** for assistance.

Call The City of Calgary immediately at **311** if rainwater or sewage slowly enters your basement.

If water or sewage rises quickly on your floor, stay out of the basement and phone **911**.

Don't re-enter your basement until all authorities (Calgary Fire Department, ATCO Gas, ENMAX) say it's safe.



**During a flood, your electricity  
may be turned off**

Flood or sewer backups can damage electrical installations and appliances, creating a potential safety hazard. During an evacuation, ENMAX officials may turn off electricity on a house-to-house basis or in larger sections as required. They may be required to turn off the power to a zone beyond that which is being directly impacted by flooding.

The decision to turn off electricity is based on two main goals: protect the lives of residents and emergency personnel, and to keep the electrical system from being seriously damaged.

If your power is turned off, you'll need to have a qualified electrical contractor check your electrical installation and affected appliances. Once the work has been completed, phone ENMAX at **403-514-6100** to have the electricity turned on.

**During a flood, your natural gas  
may be turned off**

Flood or sewer backups can damage gas appliances by clogging burners and short circuiting control systems and monitors. ATCO Gas may turn off the natural gas supply to flood-damaged appliances, because damaged appliances can cause carbon monoxide or raw natural gas buildup in your home. During an evacuation, ATCO Gas officials may turn off natural gas on a house-to-house basis as required. If the situation is more serious, officials may turn off an entire block.

The decision to turn off natural gas is based on two main goals: protect the lives of residents and emergency personnel, and to keep the utility system from being seriously damaged. If your gas service was turned off, you need to have a licensed gas fitter inspect, dry and repair flood-damaged appliances (furnace, water heaters, natural gas dryers, etc.). Once the work is finished, phone ATCO Gas at **403-310-5678** to have your gas turned back on.



# After Flooding



Flood water is heavily polluted with viruses, bacteria and parasites. Stay safe and healthy when cleaning up after a flood.

# Returning home

Please do not return home until notified that it is safe to do so or until the evacuation order has been lifted.

An evacuation order will be lifted when it is safe for you to return home. City crews conduct a general assessment in the evacuation areas and determine which homes can be re-occupied and when.

The message that you can return to your home will be communicated by news media, The City website at [calgary.ca](http://calgary.ca), staff at the reception centres and 311.

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## What to do when you return home

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1. Look for notice(s) on your door, from ATCO Gas, ENMAX and/or The City of Calgary Inspection and Permit Services, depending on the current assessed status of your home.
2. If you have water in your basement, contact 311.
3. If your natural gas is not working, contact ATCO Gas at 403-310-5678. If you have a City of Calgary Inspection Notice (red), perform the actions indicated. Then, call 311 to book an inspection.
4. If you have no electricity, contact ENMAX at 403-514-6100. Or, if you have a City of Calgary Inspection Notice (red), perform the actions indicated and call 311 to book an inspection when complete.

### Steps when you return to your apartment or condominium

Contact your building manager or management company. They are responsible to ensure power and gas services and building inspections are made and that the building is safe. Please note that you may not be permitted to re-occupy the building if life safety features, such as sprinkler and alarm systems, are not operational. It is the responsibility of the building manager or company to ensure that the building complies with all building codes before residents are permitted to re-occupy their units.

### Insurance and claim information

Act quickly to protect property and minimize damage. Wastewater or sewage backup damage may be covered by insurance. If possible, record the details of damage with photos or video.

Prepare an insurance claim as soon as possible.

Follow these steps:

1. Phone your insurance agent and report the damage. Discuss how to proceed with your agent.
2. Ask your agent if you should take a sample of the flood water and if your insurance covers the cost of analyzing the sample.
3. Photograph the damage and make a record of the items damaged.

4. Even if you are covered by insurance, limit further damage by cleaning up and repairing the flooded property. Protect yourself from hazards in the water. Keep all receipts.
5. Keep a record of all belongings and property you dispose of for health or safety reasons.
6. To discuss a damage claim with The City of Calgary, call **311**. If you're calling from outside Calgary, dial **403-268-2489** and ask for Claims.
7. The Insurance Bureau of Canada answers general insurance claim questions Monday to Friday from 8 a.m. to 4 p.m. (MST). Call toll-free at **1-844-227-5422**.

Regardless of whether or not the damage will be covered by your insurance policy, it is important to begin the clean-up immediately. Make sure to keep a log of all the hours that you spend working on clean up, keep all receipts and, if possible, take pictures of all damage. If your carpet is damaged, keep a small sample of about 30 cm by 30 cm (12 inches by 12 inches).

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## Disaster recovery

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The Provincial Disaster Recovery Program (DRP) may cover damage to items deemed essential for day-to-day living, when insurance is not readily and reasonably available, and the event is widespread.

Depending on the size of the flood event, funding for disaster recovery programs may be available through the province. Provincial programs typically include funds for municipalities, homeowners, tenants, institutions, non-profit organizations and small businesses. Visit [aema.alberta.ca](http://aema.alberta.ca) for information.



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## Guidelines to help you clean up

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According to City Bylaws, raw sewage and/or other wastewater that can include soaps, detergents and hydrocarbons are considered prohibited materials and are not allowed to be discharged on any portion of a street or into the storm drainage system. Raw sewage and/or other wastewater may be disposed through floor drains, which are found in the lowest spot in basement floors. You may also want to contact a cleaning company that specializes in sewage backup restoration to come in and dispose of materials exposed to sewage or haul away residual sewage.

To dispose of prohibited materials, such as paint, motor oil and other chemicals, visit [calgary.ca](http://calgary.ca) for a drop-off location nearest you. The following are basic, suggested guidelines for cleaning up after a flood. For more comprehensive clean-up assistance, consider calling professional cleaners. Many cleaning companies offer free estimates.

If you decide to clean up on your own, proceed with caution. Wear coveralls, rubber boots, gloves and a protective face mask (a respirator) to prevent inhalation of fine water droplets and dust.

Always wash your hands with soap and properly treated water before preparing or eating food, and before and after using the toilet when participating in flood clean-up activities and after handling articles contaminated with flood water.

It is important to be aware of all the health risks and necessary precautions associated with flood clean up. For more about protecting yourself during clean-up, visit the Alberta Health Services website at [albertahealthservices.ca](http://albertahealthservices.ca).

### Steps to help you clean up

#### **STEP 1: Gather cleaning supplies**

- You will need brooms, mops, buckets, hoses, rubber gloves, rags, cleaning products, brushes, sponges, disinfectants and trash bags.

#### **STEP 2: Sort damaged items to be repaired or discarded**

- Always throw away food. The only safe flood-exposed foods are those sealed in metal cans, and they are safe only if the cans have not been dented. Thoroughly clean and disinfect all undamaged cans before opening.
- Always throw away these flood-exposed items: cosmetics, medicines, medical supplies, stuffed animals toys, rugs/carpets, carpet underlay, mattresses, box springs, pillows, bedding, cardboard, clothing, upholstered furniture, household chemicals. Place flood-damaged household chemicals in separate leak proof bottles, cans or plastic bags and dispose of household chemicals at a City drop-off location.
- For more information about how to dispose of any of the items above, call **311**.

#### **STEP 3: Clean up one room at a time**

- Suitable cleaners:
  - ❖ dishwashing liquid for lightly soiled items
  - ❖ laundry detergent for heavily soiled items



- Suitable disinfectants:
  - ❖ household chlorine liquid bleach (5.25%)
  - ❖ 250 ml (one cup) of bleach to 4.5 litres (one gallon) of water for disinfecting concrete
  - ❖ 15 ml (one tablespoon) of bleach to one litre (one quart) of water for disinfecting wood and other materials

**Important:** Do not mix bleach with other household chemical products, especially ammonia or toilet bowl cleaner. The chemical reaction can create a poisonous gas.

- A two-bucket approach is most efficient. Use one bucket for the cleaning solution and the other for the rinse water. After using the cleaning solution, rinse your mop, sponge or cleaning cloth in the rinse bucket.
- Wring it dry. Re-wet your mop in the cleaning solution.
- Using two buckets keeps most of the dirty rinse water out of your cleaning solution.
- Replace the rinse water frequently.
- After cleaning a room or item, go over it again with a disinfectant to kill the germs and smell left by flood water. You may also need to get rid of mildew. In case of heavy contamination, you should spray all surfaces with disinfectant.

#### **STEP 4: Dry out your home and remove mildew by lowering the humidity**

- Open doors and windows to air out your home.
- Open up closet doors and cabinet doors.
- Circulate the air with fans.
- Run a dehumidifier.



### **Your health may be at risk after flooding**

Flood water is heavily polluted with viruses, bacteria and parasites. When building materials and furniture become wet with flood water, extensive mold growth will likely occur.

Remove contaminated materials and reduce moisture and humidity, to prevent long-term health risks, including respiratory disease and allergic reactions. People with mold allergies or compromised immune systems are most at risk of potential illness.

Use protective waterproof clothing and footwear if you are in contact with flood water or sewage backup.

For more information, visit: [albertahealthservices.ca](http://albertahealthservices.ca)

If you are concerned about drinking water quality, visit [calgary.ca](http://calgary.ca). or call 311.

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## How to restore your belongings

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You may need the help of an expert to restore many of your belongings. Contact cleaners and water removal service providers for professional assistance. Many cleaning companies offer free estimates. If you decide to clean some of your belongings yourself, here are some guidelines.

### Disinfect flooded areas

Clean and disinfect flooded areas and your belongings by following the steps outlined in Steps 1 through 4 and using the cleaners and disinfectants recommended on pages 30 and 31, as flood water is often contaminated with sewage and other pollutants.

### Cleaning out mud

Remove mud with detergent. To dispose of the contaminated mud either bury it or take it to the Shepard Landfill. If you are burying the mud, bury it 30 to 60 cm (one to two feet) deep in the ground, spread lime on top and then cover it with clean soil. You can also take the mud to the Shepard Landfill, 114 Avenue and 52 Street S.E., Monday through Sunday from 7:30 a.m. to 5 p.m. Do not leave the mud where children or pets will come in contact it.

### Cleaning walls and floors

After all mud has been removed, concrete floors and walls can be scrubbed down with detergent. Then, disinfect with a solution of 250 ml (one cup) of bleach to 4.5 litres (one gallon) of water. Remove and throw out all insulation soaked by floodwater.

All drywall affected by accumulated rainwater or flood water should be cut out and replaced one to two feet above the highest water mark.

Allow plaster walls and ceilings to dry completely then brush off loose dirt and wash with cleaner. Re-paint walls only when they are completely dry. Discard and replace wallpaper unless it is washable.

Seek professional advice before cleaning wooden or laminate floors.

### Cleaning doors

Remove all doorknobs. Unhinge doors and lay them on a level surface. Use wooden strips to raise the doors away from level surface, to dry evenly and minimize warping.

Take locks and hinges apart and clean them with cleaner. Wipe working parts with kerosene to remove old oil, then re-oil lightly. If locks cannot be removed, squirt machine oil through a keyhole or bolt opening and turn the knob to distribute the oil.

### Cleaning furniture

Consult an expert in wood restoration and consider discarding any upholstered pieces.

### Cleaning rugs and carpets

You may be able to save some absorbent surfaces, such as wall-to-wall carpeting, rugs and carpet underlay, if they were affected only by clean water – such as water from a burst water pipe, failed supply lines on appliances or vertically falling rain water. Discard these items if drying is not complete within 48 hours, if evidence of mold develops, or there has been contact with sewage or floodwater.

If you are able to save your carpets, remove as much water as possible with a wet vac. Use a dehumidifier – they are available for rent – and large fans to blow air over the surface of the carpet.

Clean with commercial rug shampoo containing disinfectant. Spot clean first to ensure the colours don't run. Commercial rug shampoos are available at janitorial supply stores.

When cleaning carpets with an underpad, first remove as much water as possible with a wet vac. Pull back the carpet gently. You may have to loosen or remove the baseboards holding the carpet in place.

Remove the carpet and underlay and hang to dry. The underlay may have to be replaced. The sub-floor should be cleaned. Then, reinstall the clean and disinfected carpet.

### Cleaning bedding and clothing

Discard pillows, mattresses, box springs, comforters and plush toys soaked with flood water; they cannot be disinfected adequately.

Have wool, silk and rayon clothes drycleaned as soon as possible.

Remove mud from the remaining clothes and bedding by rinsing in cold water. Wash in warm soapy water – several times if necessary – adding disinfectant at the end of each washing cycle. Wash coloured clothing in separate loads to prevent colours from running.

Remove mildew or stains from linens and clothing by washing them with soap and water, and drying them in the sun.

### Cleaning leather

Before cleaning your leather furniture or clothing, ask an expert in leather restoration for advice.

### Cleaning books

Alternate between drying and pressing pages to prevent mildew. Dry by placing books on their end with the pages separated and press by stacking books on top of each other. Pressing prevents the pages from rippling.

### Cleaning dishes and utensils

Clean dishes and utensils with the cleaning solution and then disinfectant solution. Clean brass, copper and silver with recommended product cleaners.



# Frequently asked questions



## The most frequently asked questions

### Can floods be predicted?

The City of Calgary and Alberta Environment and Parks monitor snow pack, rainfall and temperatures year round. Stream-flow gauges in the mountains and foothills indicate when a large run-off of water is occurring.

If stream flows rise and it begins to rain, Alberta Environment and Parks issues notices that fall into three categories: high stream flow advisory, flood watch or flood warning.

While conditions may not seem right for flooding, weather patterns in Calgary and the surrounding areas can change rapidly. So, while we may assume that flooding will not happen, the risk of flooding is the greatest from May 15 to July 15. Stay informed about flood conditions.

### What does history tell us about flooding?

The City and Alberta Environment and Parks study flood plains and historical occurrences of flooding. This information is compiled into flood risk maps or flood inundation maps. These maps can be used to estimate areas at risk of flooding to a certain level. Flood maps often show various levels of predicted and worst-case scenario flooding. But estimating flooding beyond the “100-year flood” is a difficult task, especially when there is a lack of historical flood information by which to compare estimates.

### Why don't the dams stop flooding?

There are 11 dams located along the Bow River outside Calgary. The closest are the Bearspaw Dam (located on Calgary's western city limit) and the Glenmore Dam (on the Elbow River).

Many people assume these dams provide protection from flooding, but this isn't the case. These dams are built for two reasons: the first is for hydro-electric power generation or to provide safe drinking water supply and the second is to store water for the various water systems along the river.

When high water levels cause the rivers to rise, the dams release water almost as fast as it enters. Dams can provide a small amount of protection, because they can slow the release of water temporarily. The storage volumes of the dams on the lower Bow and Elbow rivers are relatively small, compared to the volume of a typical flood event, so their impact in mitigating floods is limited.

### Can The City build barriers along the riverbanks?

The City of Calgary has constructed barriers, berms, dykes and floodwalls in high-risk areas along the Bow and Elbow rivers. While these mitigation measures provide flood protection to certain levels, these structures cannot protect against all flooding, because they can collapse, erode, or water can flow right over them if the flood is large enough.

### How does the storm sewer system work?

Typically in Calgary, the storm sewer system is a network of underground pipes that drain water from the streets during low-intensity rainfalls. Water enters the pipes through storm drains in the streets and flows into the nearest river or stream.

In newer communities, a series of streets and ponds are built to collect water temporarily during heavy rainfall. Some excess water collects in low spots on streets. The rest flows through pipes into wet or dry storage ponds.

When the rain stops, water stored on the streets and ponds is released slowly at a rate that prevents pipes from overloading.

### How is a dry pond different from a wet pond?

A dry pond is dry 90 per cent of the time and can have playing fields on it. It fills with water quickly in heavy downpours and can take as long as 24 hours to drain, once the rain stops. You should avoid dry ponds during periods of rainfall, even if the pond doesn't appear to be filling.

A wet pond always has water in it, but the water gets much deeper during a storm. It can help to clean the water that comes off the roads, because it allows the water to slow down, at which point the heavy soil particles and debris will settle to the bottom.

### How deep are dry and wet ponds?

If you live near a dry pond or a wet pond, make sure your children stay away from them at all times due to water quality concerns. Although dry ponds drain slowly, most of them fill quickly and can reach a depth of 1.5 metres (five feet) and remain that deep for several hours.

Wet ponds can rise two metres (6.5 feet) above their normal levels.

### What is the purpose of the stormwater gates on outfalls along the river?

In winter months, ice can build up and force water from the river into the storm mains and into surrounding communities. Gates are in place to mitigate this from happening. As such, standard procedure is to keep the gates closed or slightly ajar.

The gates are monitored for stormwater buildup in the system and, if the level is significant, the gates are opened and the water is released. The gates are then immediately closed again.

During the summer months (May to October) the gates are fully opened. However, they are monitored throughout the summer and can be closed during high river flows to mitigate against backflow into the community.

**Does The City upgrade the storm sewer system in areas at risk?**

The City evaluates potential storm sewer system improvement projects in communities subject to flooding on an ongoing basis. Evaluations are based on safety considerations: potential amount of flood damage, number of floods in each area, and the design and cost-effectiveness of the project.

Projects are funded by the drainage charge on your monthly utility statement.

**Why doesn't The City provide sandbags to individual residents?**

City crews and staff identify key locations (which may include some residences) where The City installs mitigation measures like sandbags, to protect critical infrastructure and facilities that are needed for emergency operations and response to flooding.

The key locations identified are also those which, if not protected from flooding, could cause significant damage to the adjacent communities, drinking water distribution system, storm drainage system, other utilities and outlying communities, as well as those that will allow for maximum protection with limited resources.

It is not possible for The City to provide sandbags to hundreds or thousands of homes. It is your responsibility as a property owner to protect your property and sandbag, as or if required. Note that you may not have time to sandbag your property in an emergency or disaster.

**You asked me to evacuate; why can't I stay and clean water out of my basement?**

When you are ordered to evacuate, it is because there is a clear danger to your safety, even your life. We ask that you leave your home so that you or responders are not put in harm's way.

**Who pays to repair damage done to my property by flood, water seepage or sewer backup?**

It is all dependent on the event and your insurance coverage. You can call your agent or The Insurance Bureau of Canada. They answer general insurance claim questions Monday to Friday from 8 a.m. to 4 p.m. (MST). Call toll-free at [1-844-227-5422](tel:1-844-227-5422).

**I live in an apartment or condo; what steps should I take?**

Please contact your condominium board, property management company or landlord to inquire about preparation and actions you and they can take before, during and after flooding in addition to the information in this booklet.

**Why is there an outdoor water use restriction during some flooding situations?**

The City of Calgary sometimes restricts outdoor water use during flooding situations related to rainfall or snowmelt. As the turbidity (the level of silt and debris) of the water is very high during these times, the water treatment facilities must work at full capacity to treat the high levels of sediment in the water. To reduce the load on the treatment plants, Calgarians may be asked to refrain from outdoor water consumption or restrict use indoors.



# Important: safety precautions

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## Keep this guide where you can find it.

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Calls to 911 and 311 can be made 24 hours a day, seven days a week.

If flooding happens, here's what to do:

- Call 911 if you are in immediate danger.
- If you have minor sewage backup or storm sewer backup, call 311. If your basement is flooding quickly, call 911. Do not enter the basement. Do not flush toilets or turn on taps, as this will cause more flooding.
- If you smell gas in your home, leave immediately. On the way out, leave the doors open to air out your home. Don't touch any electrical appliances or switches; they can spark and ignite natural gas. When you are out of your home, call 911.
- If your natural gas appliances are affected by flooding, call ATCO Gas at 403-310-5678
- If your household electrical installation or appliances are affected by flooding, call ENMAX at 403-514-6100.
- If the streets are flooded, stay off them. Flood water can hide hazards like open manholes. It takes only 15 centimetres (six inches) or less of rushing water to knock down an average adult and less than 2.5 centimetres (one inch) to drown.

Learn more and stay informed: [calgary.ca/floodinfo](http://calgary.ca/floodinfo)