

Earthquakes

Earthquakes are identified in the top 13 hazards that can occur in Vancouver.

What are earthquakes?

The earth's surface is divided into large sections, called tectonic plates. Earthquakes occur as these plates slip past or underneath one another, releasing stress. This stress causes the ground above to move and shake in an earthquake.

When can you expect a damaging earthquake in Vancouver?

Vancouver is at a daily risk of a damaging earthquake. The Geological Survey of Canada estimates a one in five chance a damaging earthquake in the next fifty years. It's not a matter of if, but when the next damaging earthquake will occur.

What can happen during an earthquake?

Earthquakes have a wide range of impacts, including:

- Ground shaking resulting in building and infrastructure damage.
- Heavy damage to buildings, potentially leading to collapse, fires, injury, loss of life, and long-term residential and commercial displacement.
- Buildings most at risk include concrete mid-rise and high-rise concrete residential buildings, older brick buildings, and older wood apartment buildings.
- Debris on sidewalks and streets making it difficult to travel around.
- Disruptions to power, telecommunications, water, and sewer utilities.
- Prolonged and challenging building repair due to heavy demand for building assessment and trade services, even for buildings that only have minor damage.
- Extended inaccessibility of large sections of neighbourhoods. For example, in Christchurch, cordoning lasted well over a year for many sections of downtown.
- Significant damage to infrastructure, which further disrupts life and delays response and recovery efforts.

Prepare your home

Strong shaking can cause furniture and items around your home to move, fall, or break. Even if you rent, there are steps you can take today to reduce damage in your home:

- Place large or heavy objects on lower shelves
- Move framed pictures and mirrors away from beds, couches, and chairs
- Use double-sided tape or velcro to secure smaller appliances such as stereos, televisions, or microwaves
- Locate beds away from windows

- Put a spare pair of sturdy shoes underneath your bed to stay safe from possible broken glass and debris
- Know where your gas, electric, and water shut-offs are located and know how to turn them off

Gather supplies

If your home is safe following an earthquake, the best thing you can do is to stay home. Gather enough non-perishable food, water, and other supplies to support yourself and loved ones for a minimum of three days, although your target should be a week to two weeks. If you have camping supplies, this is a great start to your emergency kit! Don't forget special items according to your needs (for example prescription medication, infant formula, extra pair of glasses and contacts, pet food and supplies, extra cane and other medical equipment, and so on).

Earthquake response

When you feel the ground shake or receive an alert, immediately DROP, COVER, and HOLD ON:

- Drop to the ground, or if unable, drop your head to your knees while seated
- Cover your head and neck with your arms and take cover under a sturdy surface, if you can
- Hold on and hold your position until the shaking stops

When the shaking stops:

- Stay where you are and count to 60 seconds before getting up, giving objects a chance to settle
- Stay calm and move cautiously, checking for unstable objects and other hazards above and around you
- Look out for hazards including: broken glass and debris, downed power lines, fire, and gas leaks
- Be aware of the potential for aftershocks. Drop, cover and hold on every time you feel shaking.
- If your home is severely damaged and unsafe to stay in, take your grab-and-go bag and evacuate to somewhere safer
- If your home is damaged but safe to stay in, stay at home, and use your emergency kit
- Only call 9-1-1 for life-threatening emergencies, and do not call to ask for information

Extreme heat

Extreme heat is identified in the top 13 hazards that can occur in Vancouver.

What is extreme heat?

Extreme heat occurs when temperatures reach dangerous levels. Extreme heat events are commonly referred to as heat waves. Described as a “silent killer”, extreme heat is responsible for more weather-related deaths in Canada in an average year than any other weather event.

When can you expect extreme heat?

In Vancouver, the hottest temperatures of the year are most likely to occur from **May to September**. Heat in May and June can lead to an increased risk of heat-related illness because our bodies are not used to heat yet.

Environment and Climate Change Canada will declare a **Heat Warning** when daytime and overnight temperatures are higher than seasonal norms and holding steady. We can expect 1 to 3 of these every summer. An **Extreme Heat Emergency** is when daytime and overnight temperatures are higher than seasonal norms and getting hotter every day. These events are more rare and we do not expect them as often, but continue to become more frequent with climate change.

What can happen in extreme heat?

Hot weather, especially prolonged heat or extreme heat, can cause heat illness or death. Symptoms of heat illness can range from mild to severe and occur when your body is unable to cool itself.

Indoor temperatures can be higher and more dangerous than outdoor temperatures. For people susceptible to heat, the risk increases at indoor temperatures higher than 26°C. Temperatures higher than 31°C can be dangerous for everyone.

Who is most affected by extreme heat?

Heat can harm anyone, especially those without mechanical cooling. Some people are at higher risk:

- Older adults, aged 60 years or older
- People who are socially isolated or live alone
- People with pre-existing health conditions such as diabetes, heart disease or respiratory disease
- People with mental illness such as schizophrenia, depression or anxiety
- People who use certain drugs, including alcohol
- People with limited mobility, spinal cord injuries, or other disabilities
- People who are experiencing homelessness or marginal housing

- Residents of buildings without adequate cooling
- Workers in hot environments
- People who are pregnant
- Infants and young children

Plan for extreme heat

- For those who are more vulnerable to heat, have a plan to go to a cool location if it is 26°C or higher in your home.
- Everyone should have a plan to go to a cool location if it is 31°C or higher in your home.
- It's important to spend time in air-conditioned spaces such as a friend's house, shopping mall or neighbourhood organization. Identify places you can go if you do not have air conditioning at home.
- Plan to sleep in the coolest room in your home, even if it's not a bedroom.
- Identify friends, family, and neighbours who may need extra help during extreme heat and have a plan to check on them.
- If you live alone, find an extreme heat buddy to check in on you when it gets hot, and who you can also reach out to for help.
- If you are outside during periods of hot weather, plan to take breaks in air-conditioned spaces or in shaded areas.
- Visit vancouver.ca/heatinfo to find your nearest cool space and tips to stay cool.

Prepare your home

- Install a window air conditioner in at least one room or a heat pump if you are able to do so. Mechanical cooling is currently the best protection from heat.
- Use thermometers to accurately measure and monitor for dangerous indoor temperatures.
- Fans can be used to help move cooler outdoor air into your home during the late evening and early morning. Fans cannot effectively reduce body temperatures or prevent heat-related illness in people at-risk. Do not rely on fans as your primary cooling method.
- Install thermal curtains or window coverings to prevent sunlight from entering your home during the hottest part of the day.
- Install exterior covers or reflective films that block the sun from hitting the windows. This can be as simple as applying cardboard to the outside of the window.
- Create a kit so you're ready to cool yourself down when it starts to get too hot. Visit vancouver.ca/heatinfo to find instructions on how to build your own cool kit.

Wildfire smoke and poor air quality

Wildfire smoke and poor air quality are identified in the top 13 hazards that can occur in Vancouver.

What is poor air quality?

A major cause of poor air quality and air pollution in Vancouver is wildfire smoke, which is a mix of gases and small particles from burning trees, buildings, and other material. These small particles, known as PM2.5, can cause mild to severe health effects when inhaled. Depending on weather and wind patterns, Vancouver can be affected by smoke from wildfires across Canada and the United States, with smoke possibly reaching hundreds or thousands of kilometres away from the fire.

When does wildfire smoke occur?

Wildfires that lead to wildfire smoke and poor air quality are most likely to occur from **June to September**. The number of air quality advisories due to wildfire smoke have increased since 2010. With climate change resulting in increased temperatures and longer drier periods, particularly in the summer, it is expected there will be an increase in wildfire frequency and intensity.

What can happen during poor air quality?

There is currently no research identifying safe levels of exposure for wildfire smoke. This means that even at low levels of particulate matter (PM2.5) concentrations, wildfire smoke can be harmful to everyone's health. There are more asthma-related physician visits at lower concentrations of wildfire smoke, which happen more frequently, than there are at high concentrations. You may experience symptoms if you are exposed for a long time or if you breathe in a lot of smoky air. Chronic wildfire smoke can produce long-term health impacts and has been shown to impact mental health.

Who is most affected by poor air quality?

Many people will experience common symptoms, but some people may be more affected by wildfire smoke:

- People with asthma
- People with chronic obstructive pulmonary disease (COPD)
- People with heart disease
- People with diabetes
- People who are pregnant
- Infants and small children
- Older adults
- People who have been diagnosed with a respiratory infection
- People who are experiencing homelessness or are under-housed

- People who live in spaces without mechanical ventilation, air filtration systems, or portable air cleaners
- People who work or are active outdoors

Prepare for poor air quality

- During smoky days, have a plan to spend time in places that have cleaner air or at a minimum, air-conditioned spaces.
- Spaces with air filtration or air conditioning can be a friend's house, shopping mall or neighbourhood organization. Identify places you can go if you do not have clean air at home.
- Find a cleaner air space near you and instructions on creating your own air cleaner at vancouver.ca/smokeinfo.
- Have a plan to minimize your smoke exposure by taking it easy outdoors and wearing fitted masks, particularly if you are more sensitive, or part of a vulnerable group, such as pregnant people.
- If you or members of your family have a chronic disease, work with your doctor to create a management plan for smoky periods.
- If you care for groups of children or plan outdoor events, ensure you have a smoke contingency plan.
- Identify friends, family, and neighbours who may be more at-risk during wildfire smoke and have a plan to check on them.
- Plan to monitor your mental health. If you are feeling stressed or overwhelmed, reach out for support. Contact your health care provider or phone HealthLink BC at 8-1-1 (7-1-1 for deaf or hard of hearing) to find resources.

Gather supplies

- Use a portable air cleaner to filter the air in your home if you can buy one. Or make a homemade box fan air filter with instructions on vancouver.ca/smokeinfo.
- Well-fitted respirators, such as a properly fitted N95 mask, offer effective protection from the fine particulate matter in wildfire smoke.
- A 3-layer cloth or disposable mask provides moderate protection but is less effective than a respirator. Simple 1-layer cloth masks, bandanas, gaiter scarves, or t-shirts offer no protection against wildfire smoke, whether wet or dry.
- Regardless of the type of mask you use, fit can make the biggest difference. You want air to travel through the mask and not along the sides.
- If you use rescue medications such as an inhaler, make sure you have a supply at home and always carry them with you during wildfire season. Have a clear plan to follow if your rescue medications cannot bring your condition under control.

Coastal flooding and sea level rise

Coastal flooding and sea level rise are identified in the top 13 hazards that can occur in Vancouver.

What is coastal flooding?

Coastal flooding occurs when low-lying land is submerged by seawater. In Vancouver, this is usually caused by a combination of storms and high tide.

What is sea level rise?

Sea level rise is caused by the ocean expanding as it heats up due to climate change and as major stores of ice from glaciers and ice sheets melt. After 2050, we don't know exactly how much the sea level will rise in Vancouver. By 2100, sea level could increase by 60 centimetres to more than 6 metres. The Province of BC currently recommends planning for 1 metre of sea level rise by 2100, which the City has adopted.

When does coastal flooding occur?

Higher tides and severe storms that can lead to coastal flooding are most likely to occur from **October to February**. We can predict the dates of king tides, the highest tides of the year, well in advance. We often only have a few days of warning ahead of storms.

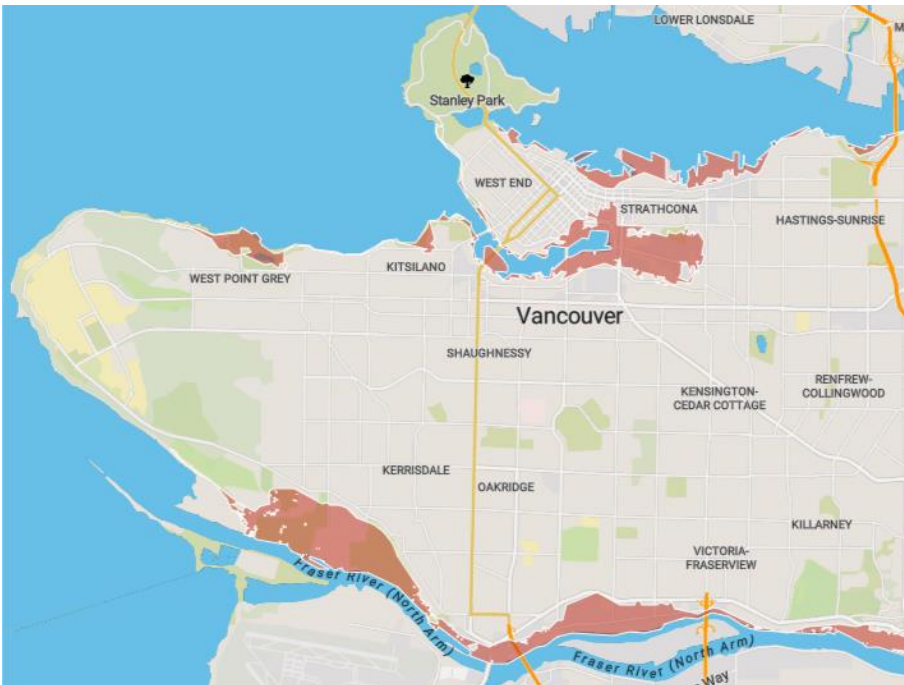
What can happen during coastal flooding?

Flooding can damage buildings and critical infrastructure, cause power outages, disrupt transportation, and displace people and businesses in the flooded area. When the event includes strong winds, waves can impact shoreline structures, including crashing floating debris such as logs against piers and other structures. Recent flooding events in Vancouver have caused extensive damage to the Stanley Park seawall, Jericho Pier, and Kitsilano Pool, costing millions of dollars to repair.

Sea level rise increases the risk of coastal flooding and can result in the loss and damage of habitats and species along the shore. This may have longer-term impact to the health and wellbeing of Indigenous communities, culture and economies, particularly if traditional food sources decline.

Who is most affected by coastal flooding?

Not everyone will be impacted by coastal flooding. Low-lying areas in the floodplain are at an elevated flood risk and may experience coastal flooding. These include Southlands, Fraser River floodplain, and Locarno/Spanish Banks.



With sea level rise, there is an increased risk of flooding on Granville Island and in the False Creek flats by 2100 with no flood protections in place.

This map shows the floodplain in red, which are areas that are at risk now and in the future of flooding. This is used for planning purposes for how we regulate land use and set standards for flood construction level requirements.

Plan for coastal flooding

- If you live or work in an area at risk for coastal flooding, plan an exit route out of the neighbourhood that does not take you into low-lying areas.
- Be prepared to either evacuate in advance or stay indoors on an upper floor until floodwaters recede.
- Make grab-and-go bags for everyone in the household in case you need to evacuate.
- Download Alertable to get emergency information, including when to evacuate, directly to your smartphone. Visit vancouver.ca/get-alerts or download from your phone's app store.
- If you live in the floodplain, look into what your insurance covers.
- If you have a business in the floodplain, ensure you have adequate business continuity plans. Consider how it will impact operations if workers cannot get to work due to flooding.
- When we experience coastal flooding events, stay off the seawall and away from the shoreline, docks, and piers for safety reasons.

Prepare your home or business

- Depending on the elevation of your home, consider moving valuables and important personal items from ground-level floors to upper floors to avoid damage from flooding.
- Similarly, depending on the elevation of your business, place servers and important files on upper floors to avoid damage from flooding.
- More preventative actions you can take:
 - Clean your gutters regularly
 - Keep nearby storm drains clear of debris
 - Install a sump pump to remove water
 - Raise appliances and electrical sockets
 - Install tiled floors, flood-resistant doors and drywall