BRITISH COLUMBIA | Emergency ManagementBC

# Earthquake and Tsunami Smart Manual

A guide for protecting your family

# A Narrative of Huu-ay-aht Seismic History

On January 26, 1700 at about 9 p.m., a powerful magnitude 9 earthquake struck off the coast of B.C. and, without warning, was followed by a catastrophic tsunami that devastated the village of Loht'a. With no time to respond, all 5,000 residents of Loht'a were lost to this devastating event.

This is the story of the Great Tsunami and Earthquake that was told to me by my grandparents, George and Louisa Johnson. For generations, Elders in our community as well as other First Nations along the coast have maintained this legend and others like it, as an oral history of our people.

Today, our people call Anacla (Pachena Bay) home and this oral history plays a central role in how we understand tsunami risks in our community. We are able to use our history to learn from the past and preparing for future tsunamis.

*by Robb Johnson from Huu-ay-aht First Nation*

# Earthquake and Tsunami Smart

Earthquakes are common in B.C., with more than 2,500 recorded each year in and around the province. Most are too small to be felt, but an earthquake capable of causing structural damage is expected to occur somewhere in the province about once every decade. There is a real risk that one of these could be "the big one."

Tsunamis can be associated with earthquakes. Sometimes a large earthquake beneath the ocean floor will produce a tsunami, which is a series of large waves. Damaging tsunamis are a rare, but serious event. If you live in or near a coastal region of our province, there is a possibility that you may have to respond to a tsunami threat one day.

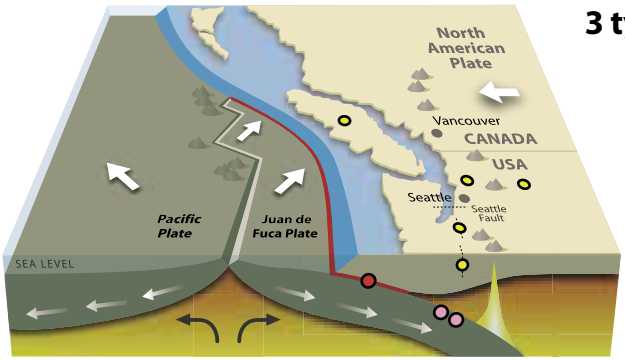
Preparation is the key to survival in the event of an earthquake or tsunami. However, for some of us, putting together an emergency supplies kit and creating a family disaster plan can seem overwhelming.

Following these Earthquake and Tsunami Smart guidelines is simple and takes little time. Sharing what you have learned with neighbours, family and friends may save lives. Take the time now to prepare.

***Unreinforced masonry structures may sustain significant damage from earthquakes.***

# Know the Risks – Earthquakes

The B.C. coast is considered a high risk earthquake zone. In this region, tectonic plates on the earth's surface (including those on the ocean floor) are moving apart, sliding past one another and colliding. It is the movement of these plates that causes small earthquakes (daily), potentially damaging earthquakes (decades apart), and some of the world's largest earthquakes (centuries apart).




**3 types of earthquakes**

- Crustal earthquakes
- Deep earthquakes
- Subduction zone earthquakes

The shaking motion of an earthquake is due to this sudden release of energy. The first sign of an earthquake may be a loud bang or a roar. The ground may start to pitch and roll like a ship for several seconds to several minutes. Over the following hours or days, aftershocks – smaller earthquakes – can follow.

***Earthquakes are an unavoidable natural hazard, but proper planning and a well-informed and well-prepared public can reduce their impact.***

# Know the Risks – Tsunamis

Like earthquakes, tsunamis can happen at any time of the day or night, under any kind of weather conditions, and in all seasons. Beaches open to the ocean or by bay entrances, as well as tidal flats and the shores of coastal rivers or inlets exposed to the open ocean are especially vulnerable to tsunamis.

The force of tsunami waves can cause great destruction. The first wave of a tsunami is often not the largest. Other waves may follow every few minutes, for a period of hours.

Tsunami waves can kill and injure people and cause great property damage where they come ashore. Understanding what a tsunami can do, and how to react during its approach, is vital to local communities and people along B.C.'s coast.

***The first wave of a tsunami may not be the largest. Other waves may follow every few minutes, for a period of hours.***

Following an earthquake far away in the Pacific Ocean, it may take hours for waves to reach coastal B.C. However, a closer earthquake could generate a tsunami capable of reaching the shore in a matter of minutes.

There is a Tsunami Notifications Process Plan in place to pass the warning to coastal communities as quickly as possible, but sometimes there is not enough time to reach everyone – especially in more remote communities.

***This logo has been adopted as the tsunami hazard symbol for British Columbia.***

It is important to remember that tsunamis are rare events and not all earthquakes will generate a tsunami. However, it is also critical to know what to do as a precaution if you live in a vulnerable area.

***The potential power of a tsunami is illustrated here. A fishing boat has been tossed on shore and a fire truck has been destroyed by debris.***

# Take the First Critical Step Toward Personal Preparedness

Imagine that a major earthquake has occurred, causing widespread damage, cutting power and gas lines. Or, you have just been warned that a tsunami is on its way towards your community.

If your home is no longer safe – you must leave immediately. You cannot gather food from the kitchen, fill bottles with water, grab a first-aid kit from the closet and snatch a flashlight and a portable radio from the bedroom quickly enough. You need to have these items packed and ready in one place before disaster strikes.

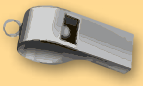

***It makes sense – and doesn't take much time – to be prepared. This checklist will get you started.***

## Basic Emergency Supply Kit


*First Aid kit and medications*

*Battery-powered or hand crank radio tuned to Environment Canada weather*

*Battery-powered or hand crank flashlight with extra batteries*



*Whistle to signal for help*

*Cell phone with chargers, inverter or solar charger*

*Local maps (have an evacuation plan) and some cash in small bills*

*Food, at least a three-day supply of non-perishable food. Manual can opener for cans*

*Garbage bags, moist towelettes and plastic ties for personal sanitation*


*Water, four litres per person per day for at least three days, for drinking and sanitation*

*Dust mask to help filter contaminated air*

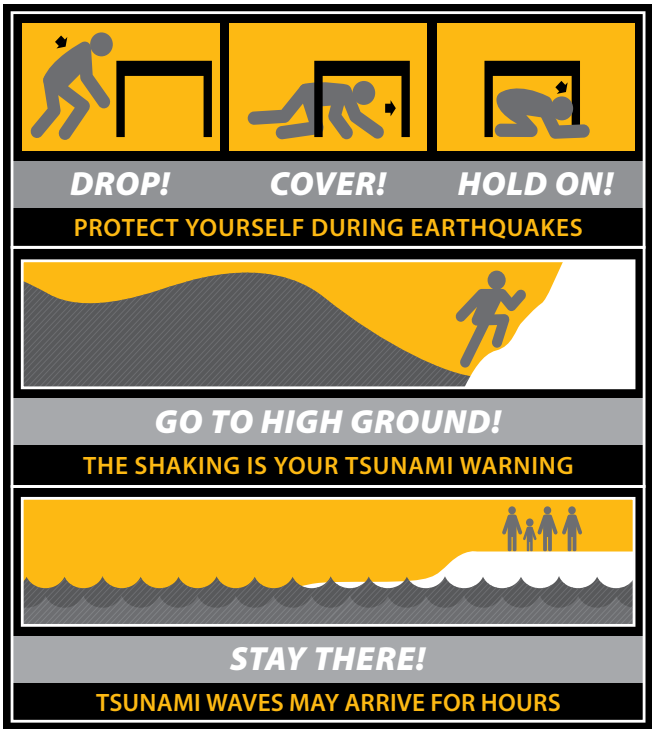
*Seasonal clothing and footware*

# When an Earthquake Happens – Remember to **Drop, Cover *and* Hold**

## During

It's 7:00 p.m. and an earthquake strikes. Each family member is in a different room – do you know how to protect yourselves?

By planning ahead, all members of a family will know what to do during an earthquake. Knowing what to expect can reduce panic and ensures you think clearly and act quickly. It's a good idea when forming an earthquake preparedness plan, for families to walk from room to room choosing the best places to be during a quake. Or discuss what to do if you are away from home.




***A tsunami is a series of waves – the first wave may not be the largest. Dangerous waves and currents can last for many hours.***

Indoors, the safest places are beneath sturdy furniture, beside a solid inside wall or in a corner or inside an inner hallway. Hold on tight to heavy furniture if you are using it as cover to keep it from moving around. Avoid windows.

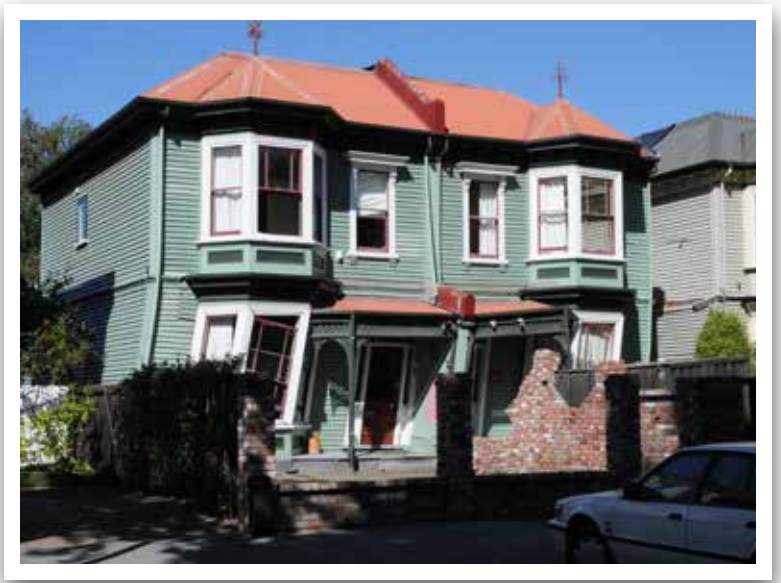
If you're outdoors, stay in the open, away from trees, buildings and power lines. You could be driving when a quake hits. Stop your car away from overpasses, bridges and power lines and stay inside your vehicle.

Once you're in a safe place, protect your head and hold on until all motion stops.

## After

When an earthquake is over, it's important to stay calm and move cautiously, checking for unstable objects and other hazards above and around you. You or others may be injured. Treat yourself first and then assist others.

Check gas, water and electrical lines. Also be aware that there may be other types of hazards caused by earthquakes including fire, landslides, highway damage, dike failures, liquefaction, cracks etc.



***This turn-of-the-century wooden residence sustained major damage when it moved off its foundation during an earthquake.***

Check around your residence. If you suspect a gas leak, turn off the gas valve and open the windows of your home. Caution! Once the gas is shut off at the meter, DON'T try to turn it back on. Only a registered gas contractor can turn the gas on safely.

Be aware of other possible hazards, such as broken glass, falling objects and weakened foundations or walls. If you and your family are okay, place a large OK sign in your window to let emergency workers know.

***Always anticipate aftershocks. Drop, Cover and Hold during aftershocks as well.***

If your house has suffered considerable damage and is unsafe, you may need to leave immediately. Gather your emergency supplies together and listen to a battery-operated radio or car radio for instructions by emergency officials through the news media. Evacuation reception centres may be opened to help with food and lodging and medical centres may be opened for those who have been injured.

# Tsunami Warning – Head for High Ground

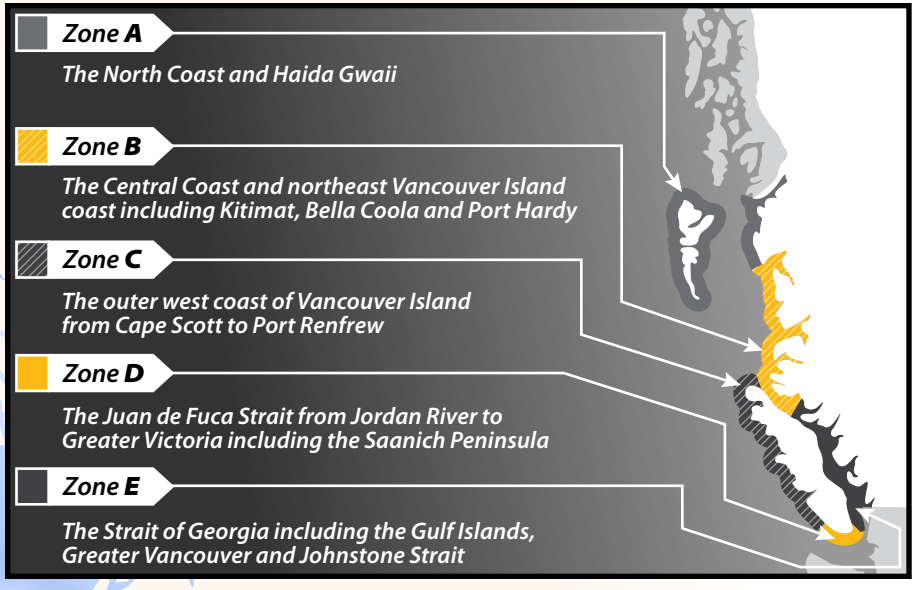
The Tsunami Warning System is an international program to detect tsunamis and provide notification and warnings to all countries bordering the Pacific Ocean, Indian Ocean and the Caribbean. B.C.'s Provincial Emergency Program receives alerts and advises:

- B.C. coastal communities in the risk areas (municipalities, regional districts and First Nations)
- RCMP
- Canada Coast Guard, the Canadian Forces, Nav Canada, Environment Canada, and other federal government agencies
- media networks and outlets, and other provincial and federal officials

***NEVER go to the coast to watch a tsunami. NEVER go down to the water if you see it start to recede as this could be an indication that a tsunami may follow. A tsunami moves faster than a person can run. MOVE to high ground immediately!***

If a large undersea earthquake takes place near the B.C. coast, the first tsunami waves may reach the shore minutes after the ground stops shaking. The best warning is the earthquake itself and residents in tsunami risk areas should be prepared to higher ground or inland immediately.

*Depending upon an earthquake's origin, a tsunami could reach the B.C. coast in as little as 15 minutes – or over 15 hours later. Little can be done to warn of local tsunamis because their travel time is so short.*




*A tsunami struck B.C.'s west coast in 1964, causing extensive damage to Port Alberni and other communities in the area.*

## During

**If you are near the ocean and you feel a large earthquake, you should go inland or to higher ground immediately – do not wait for an official warning.** Know your local community's suggested evacuation routes to safe areas, and proceed immediately. Be aware that damaged roads and bridges and debris caused by the earthquake may prevent driving.

If you are on a boat when a tsunami is coming, you should leave the harbour for the open water, but do not risk your life to move your boat into deeper water if it is too close to the wave arrival time. Tsunamis are scarcely noticed when they pass under a boat in deep water. If you are in a float plane in a harbour, take off for a safe landing area on a lake or on land, or away from areas at risk.

If you are camping on a beach or near the ocean, you may have to abandon your belongings in order to save your life.

***Remember: you cannot outrun a tsunami so don't go down to the water if you see it start to recede.***

Once a community is alerted that the arrival of a distant tsunami is (or may be) expected; residents will be warned in a number of different ways. In some locations, a siren is used, while others depend on a telephone fan-out or a door-to-door or loud hailer system. Once you have the initial warning, listen to your radio for updates.


***Be prepared to survive on your own for at least three days – this means when you leave, take your emergency supplies kit from your home, work or car with you.***

## After

Following a tsunami that reaches our shores do not return to the area after the first wave. Tsunamis generally involve several powerful waves. Wait for emergency management officials to give the "all clear" before you return to your home.

Stay tuned to your radio or marine radio during a disaster. Bulletins will be issued by emergency officials providing updates on the situation.

**Call 911 only for life-threatening emergencies.**

***Remember, taking the time to prepare now can save lives in the future.***

***The aftermath of a tsunami can be devastating. The debris at this location was about one metre deep.***

# For Additional Information

Preparedness and awareness information is available through Emergency Management BC ***www.embc.gov.bc.ca***

Information about current earthquake activity and past events can be found at Natural Resources Canada ***www.earthquakescanada.nrcan.gc.ca/index-eng.php***

Information about tsunamis can be found at Fisheries and Oceans Canada ***www.dfo-mpo.gc.ca/science/Publications/article/2005/24-04-2005-eng.htm***

The British Columbia Ministry of Justice and the Crown accept no responsibility for liability for any loss or damage that any person may sustain as a result of the information in, or anything done or omitted pursuant to this manual.

***Many highways and roads could be made impassable by cracks and landslides following an earthquake.***

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*This material has been prepared by the Province of British Columbia in cooperation with:*

Government of Canada
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