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Your Member of Parliament in Saanich-Gulf Islands

## April 2017 Newsletter

### Introduction

On June 23, 2010, I was in my Ottawa office when things started shaking. As ever in such moments, one thinks of logical explanations. I turned to my Chief of Staff and said, "Boy that construction is getting seriously out of hand." And when pictures on the wall started to wobble off their nails, we looked at each other and said, more or less simultaneously, "or could it be an earthquake?"

We got down the stairwell and out to the street where hundreds of other office workers were doing the same. I now know more about quakes. I should have stayed put and gotten under my desk.

Media reported it was a 5.0 quake, but the information the media relied upon came from the U.S. Geological Survey's National Earthquake Information Centre. The Canadian equivalent, an earthquake information centre within the Booth Street office of Natural Resources Canada, lost all communications - due to the earthquake.

It made me wonder how ready we all are for earthquakes.

This issue of the MP newsletter focuses on this question and reports to you on the work I am doing to make sure we are as well prepared as possible. It's not an event we want to think about, but British Columbians are more aware and more prepared than those who live in Canada's other major seismic zone, in the Ottawa River Valley. The message from this newsletter is "let's not panic, but let's do more." The precautionary steps we take now can save lives.


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## That *New Yorker* article

The July 20, 2015 New Yorker contained an article, *The Really Big One,* to make all of us lose sleep. In an extremely well-written and well-researched piece, Pulitzer Prize-winning journalist Kathryn Schulz relayed the fascinating science linking Pacific Northwest First Nations oral history with a 400 year old written record from Japan.

An island off the coast of Washington State was known for its "ghost forest" assumed to have been created slowly as sea levels changed. Instead, recent science revealed the trees had died suddenly, when the ground beneath them dropped. The Huu-ay-aht First Nation, a Vancouver Island Nation within the Nuu-chah-nulth, have an oral history that includes the story of the sudden disappearance of an entire people – everyone then living on Pachena Bay. But no one had bothered to follow up on this and many other similar First Nations' stories from both sides of the border until scientists tested the tree rings of the "ghost forest." The timing of the creation of the "ghost forest" matched up with a mystery tsunami that hit Japan.

The Japanese had called it the "orphan tsunami" because it hit without an earthquake preceding it. But what if the earthquake that preceded it had been on the other side of the Pacific?

Schulz wrote "...the reconstruction of the Cascadia earthquake of 1700 is one of those rare natural puzzles whose pieces fit together as tectonic plates do not: perfectly."

Not until the publication of research conducted by seismologist Kenji Satake in a 1996 article in Nature did the event become known. We now know that on January 26, 1700 a huge 9.0 magnitude earthquake struck the Pacific Northwest.

It was a subduction event – one in which tectonic plates shift suddenly. Off-shore pressure is building once again for another subduction event. Once the science of the July 1700 event was known, further research revealed that our area has experienced 41 subduction zone earthquakes over the last 10,000 years. That means, on average, the event occurs every 243 years. And we are now 315 years past the last time the plates shifted.

## Saanich-Gulf Islands – a Centre for Seismic Science

As well as having expert seismic engineers in our community, we also have western Canada's primary facility for earthquake monitoring at the Institute for Ocean Sciences (IOS), right on the shores of Patricia Bay. The Pacific Geoscience Centre is part of IOS and monitors quakes.

As well the scientists from Natural Resources Canada at IOS conduct modeling for tsunamis. Nearby, at University of Victoria, we have Oceans Network Canada. Oceans Network places sensors on the ocean floor and has recently deployed sensors in the region of the Cascadia fault. The underwater sensors were installed in June 2016. Oceans Network monitors are part of the earthquake early monitoring system in partnership with Emergency Management British Columbia. Every moment's additional warning will save lives.

We do need more science. Particularly, when one examines the network of GPS sensors on land along the US earthquake zones, compared to BC, we have less than a quarter of the terrestrial capacity to detect earthquakes.

## Definitions

**Subduction** is the force that drives plate tectonics.

A **subduction zone** is a place where two tectonic plates border each other, with one over-riding the other. They can be under water or under land.

Between earthquakes, the plates 'lock.' But pressure builds up and inevitably the lower plates will be forced up, or be driven down quite suddenly.

The **Cascadia subduction zone** runs 700 miles off the coast of the Pacific Northwest. It begins just north of California's San Andreas fault and runs all the way to Vancouver Island.

## Being Prepared—Earthquake Kits

I think most of my constituents know what is supposed to be in our earthquake emergency kit. But I have a feeling that many of us do not actually have it ready! Think of what it would be like to have a major earthquake at 2am in the middle of January, while it is cold and rainy. You've safely gotten outside, but cannot go back in. Would you be prepared to handle this?

Go down this list and place a check mark next to the items you actually have ready:

- First-aid kit
- Battery-powered or hand-crank radio
- Flashlight and extra batteries
- Whistle to signal for help
- Cellphone with charger
- Cash in small bills – because your debit and credit cards are not likely to work
- A local map with your family meeting place identified
- Three-day supply of food
- Garbage bags
- Dust mask
- Seasonal clothing and footwear
- Emergency blanket
- Pocket knife/multi-tool
- Candle with matches or lighters
- Duct tape
- Work gloves
- Head lamp
- Small pot
- Special medications
- Items for babies or other vulnerable people
- Feminine hygiene products
- Toilet paper
- Car keys
- Pet food/supplies
- And LOTS of water: 4 litres/person/day also factoring in water for your pets

Be sure to have emergency supplies in your car as well as at home. You may be on the road when a quake hits.

I think it is important to find the balance of a useful kit, and one that does not make you feel overwhelmed or discouraged to make. It seems to be difficult for a lot of people to take emergency preparation seriously, or sometimes even when there is a real concern, people just don't get around to making a kit. The main concerns after a major earthquake will be injuries, shelter, water, and food. A very basic kit should be able to meet these needs.

Being self-sufficient for 72 hours is the minimum that the provincial government recommends. If we have a large scale event such as a 9.0 earthquake, both Vancouver Island as well as Vancouver will be seriously damaged. We are on an island, and this creates an extra obstacle for getting help. It is wise to be prepared for a longer period of self-sufficiency.

The City of Victoria has a great guide to earthquake kits: *www.victoria.ca/EN/main/residents/public-safety/emergency-preparedness/everyday-readiness.html*.

## Being Prepared—What to do during an Earthquake

From *www2.gov.bc.ca/gov/content/safety/emergency-preparedness-response-recovery/preparedbc/know-the-risks/earthquakes* :

**During an earthquake... drop, cover and hold on**

**If you are inside, stay inside.** DO NOT run outside or to other rooms during shaking.

- DROP down onto your hands and knees (before the earthquake knocks you down). This position protects you from falling, but allows you to still move if necessary.
- COVER your head and neck (and your entire body if possible) under a sturdy table or desk. If there is no shelter nearby, only then should you get down near an interior wall (or next to low-lying furniture that won't fall on you), and cover your head and neck with your arms and hands.
- HOLD ON to your shelter (or to your head and neck) until the shaking stops. Be prepared to move with your shelter if the shaking shifts it around.

**What do I do if...**

I'm in a wheelchair?

- Lock your wheels and remain seated until the shaking stops. Always protect your head and neck with your arms, a pillow, a book, or whatever is available.

I'm in bed?

- Hold on and stay there, protecting your head with a pillow or blanket. You are less likely to be injured staying where you are. Broken glass on the floor has caused injury to those who have rolled to the floor or tried to get to doorways.

I'm in a high-rise?

- Immediately drop, cover and hold on. Avoid windows and other hazards. Do not use elevators. Do not be surprised if sprinkler systems or fire alarms activate.

I'm in a stadium or theatre?

- Stay at your seat or drop to the floor between rows and protect your head and neck with your arms. Don't try to leave until the shaking is over. Then walk out slowly, watching for anything that could fall in the aftershocks.

I'm in a store?

- Immediately drop cover and hold on. If you must move to get away from heavy items on high shelves, drop to the ground first and crawl only the shortest distance necessary.

I'm outside?

- Move to a clear area if you can safely do so; avoid buildings, power lines, trees, signs, vehicles and other hazards.

I'm driving?

- Pull over to the side of the road, stop and set the handbrake. Avoid overpasses, bridges, power lines, signs and other hazards. Stay inside the vehicle until the shaking is over. If a power line falls on the car, stay inside until a trained person removes the wire.

I'm near the shore or on the beach?

- Drop, cover, and hold on until the shaking stops. If the shaking is severe and you are in a tsunami risk area, immediately evacuate to high ground. Don't wait for officials to issue a warning. Walk quickly, rather than drive, to avoid traffic, debris and other hazards.

Information provided by Earthquake Country Alliance.

**After the Shaking Stops**

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. If you are injured, treat yourself first and then assist others. Also, be aware of the potential for aftershocks - and continue to drop, cover and hold on if you feel them.

Do not call 9-1-1 unless a life is at stake.

**Some other tips:**
In case the quake happens when you are in bed, follow the advice above. It's a good idea to keep a pair of sturdy shoes under your bed, with a flashlight. You don't want to be walking barefoot and in the dark with the risk of broken glass around. Remember never have heavy items above your bed, such as large framed pictures or a bookshelf.

In your family plan, think about choosing a relative who lives out of province to be the main point of contact. Local phones lines are likely to be harder to access than areas outside the quake zone. Have a plan that is shared so you will have one point of contact to check in with children, parents and extended family to know everyone is safe and accounted for.

## How ready is our infrastructure for the (really) big one?

As an island, it really matters how well our infrastructure survives a major earthquake. Relief supplies, construction material for rebuilding, will all depend on being able to access the mainland of Canada. The good news is that the engineers who designed the Swartz Bay ferry terminal took into account earthquake and tsunami risk. The Swartz Bay ferry terminal is built to be resilient to seismic events. You may not have noticed but the main dock is on a large pillar structure and the dock floats and can adjust to rising seas.

The less good news is that the ferry structures on the mainland are unlikely to survive. Tsawwassen is on very unstable ground, likely to be subject to liquefaction. The Vancouver airport will meet the same fate. It will not survive a major subduction event. The Duke Point ferry terminal is on sturdy ground, but it is an old structure and engineers with whom I have met do not think it will survive. I have met with Public Safety Minister Ralph Goodale on the need for an investment in another ferry terminal such as the one at Swartz Bay to be ready for quick installation on a pillar at Duke Point.

I also met with Minister of Infrastructure Amarjeet Sohi to try to access some of the federal infrastructure funds for seismic work. Unfortunately, the federal government does not accept that fortifying infrastructure to prepare for seismic events is an appropriate use for planned infrastructure dollars.

## How large is the tsunami risk for Saanich-Gulf Islands?

Finally, some good news! We are not in a zone expected to experience a devastating tsunami. There could well be some sea level surges from tsunami action elsewhere, so it makes sense to seek higher ground if you are right on the shoreline, but Victoria to Sidney and the Gulf Islands are tucked protectively out of most of harm's way when it comes to tsunamis.

If you are visiting Tofino or other places on our west coast, be vigilant to know your tsunami escape routes. And, never walk toward the sea if there is a tsunami risk. Incredible as it seems, people are attracted to see the water as it surges away from shore. Be prepared to click into gear and move fast, on foot, to higher ground.

## Unnatural earthquakes - how fracking is increasing BC earthquakes

While most of this newsletter focuses on the risks posed by earthquakes due to natural forces, it is now true that many earthquakes in BC are caused by human activity. Scientists refer to it as "induced seismicity" and it is caused by fracking for natural gas. There are two ways that fracking causes earthquakes. One is due to the storage of large volumes of wastewater injected below the earth's surface. The other is from the fracking itself. In order to create the hydraulic fractures that release natural gas, water, sand and chemicals are injected at high pressure. This opens up cracks and can cause earthquakes.

In Oklahoma, the volume of wastewater stored has made a previously inactive area quite vulnerable to frequent earthquakes. The US Geological Survey has been tracking likelihood of frequency of earthquakes and now rates Oklahoma as having a similar risk to California – all due to fracking. The Canadian government does not track induced seismicity, but a number of universities are working on the risk. While most of the earthquakes experienced from fracking in northern BC and Alberta have been quite small, they are not insignificant. The largest was 4.5 on the Richter scale, or enough to cause damage.

Those working in this area believe the government should place some common sense no-fracking zones around critical infrastructure. We currently have no government policies on the earthquake risk caused by fracking. An exclusion zone to prevent any fracking activities within five kilometres should be placed around dams and other critical infrastructure.

## Does Earthquake insurance cover everything?

In May of last year, I attended a luncheon address by Don Forgeron, the President and CEO of the Insurance Bureau of Canada. The main focus of his talk was the coming risks of climate change in increasing fires and floods, so I think the audience at the Economic Club of Canada was surprised when my question was about earthquake insurance. It turns out that British Columbians are much more likely to take out earthquake insurance than people in the southern Ontario and Quebec earthquake zones.

The insurance industry is very concerned about earthquake preparedness. The Insurance Bureau of Canada commissioned a study on earthquakes, focusing on the two major seismic zones in Canada – the Quebec City-Montreal-Ottawa corridor and British Columbia's lower mainland and Vancouver Island. The industry accepts the risk of a major subduction event in BC at a one in three chance over the next fifty years. Their cost estimate for a 9.0 magnitude quake in BC as almost $75 billion.

Many homeowners with earthquake insurance assume that the damage from the quake can be repaired, but fail to take into account that following the quake surveys for physical stability will be conducted by provincial officials. Any home "red-tagged" will be ruled uninhabitable and not repairable. In a post-disaster triage, inspectors will move quickly deciding if buildings are habitable or not. A "red tag" means your home is gone, even if it is still standing.

## Your opinion matters!

What matters to you is important to me, and I want to know your priorities!

Please take a moment to answer the questions on the right, cut along the dotted line, and mail your opinion back to me postage free. You can also go to my MP website www.elizabethmaymp.ca and complete the survey online.

If you have more than one person in your home, feel free to contact my constituency office in Sidney at 250-657-2000 to get additional copies of the survey mailed to you.

Thank you!

Are you concerned about a major earthquake happening within the next 30 years?

☐ Yes ☐ No ☐ Not Sure

Do you feel that the federal government has done enough to prepare this region for a major earthquake?

☐ Yes ☐ No ☐ Not Sure

Do you support increased efforts to prepare for a future major earthquake?

☐ Yes ☐ No ☐ Not Sure

What other steps not mentioned in this newsletter do you think I should pursue?

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_____

## How BC schools got one of the world's most extensive seismic upgrades

We take for granted in BC that we have a commitment to seismic reinforcement of our schools. And we are woefully unaware of how rare it is. In fact, that New Yorker article (see above: *The Really Big One*) ends with the unbearably tragic story of the failed efforts of Doug Dougherty, school superintendent of Seaside, Oregon. Four out of five schools in the region will be wiped out by the predictable tsunami, but residents voted down a bond measure to move the schools to a safe zone. It would have added less than three dollars to every thousand dollars of property assessment.

Meanwhile, in BC, we (quite rightly) push for the remaining schools to be upgraded.

It was in 2004 that former Premier Gordon Campbell committed $1.5 billion to the Seismic Mitigation Program with the goal of ensuring 700 schools receive seismic reinforcement. Since then, it has become clear that $1.5 billion was not nearly enough. So far $1.2 billion has been spent on 155 schools. Of particular concern are the 118 schools deemed high-risk.

But why did Gordon Campbell make the commitment in the first place? The credit goes to one determined parent. No one accomplishes anything like this alone, and I am sure Tracy Monk would insist that credit goes to the vast coalition with whom she continues to work. But it is an inspiring story of the power of one.

Dr. Tracy Monk, a Vancouver mother and family physician, started looking for answers about whether her children's school was safe. Her worries were prompted by reading about the deaths of 23 children in a school collapse caused by the 2002 earthquake in Molise, Italy. She realized that schools seemed to be, worldwide, much less resilient to seismic events than other buildings. Tracy Monk found a 1989 seismic evaluation report of BC schools, written by one of my constituents, seismic engineer Dr. Graham Taylor.

Monk told interviewer Jean Sorensen (*BC Schools; Making them Safe*, Canadian Consulting Engineer magazine): "To me, as a physician, it was like finding out the Walkerton lab test report showing E. Coli in the water supply was still sitting ignored on the fax machine. There was a failure to act."

Tracy and several other parents created "Families for School Seismic Safety". Tracy and the parents group were relentless. They met with the media, with MLAs, with the premier and with then MP Stephen Owen (Vancouver-Quadra) who found the project's first funding - $300,000 in federal funds through Western Diversification in 2004.

The job is not done. Dr. Monk and a coalition of groups calling for our schools to be upgraded to better withstand earthquakes continue to press both the federal and provincial governments to get the job done.

## What more can we do to make sure our buildings survive the quake?

For the last year I have been working with an amazing (and growing) team of seismic engineers and experts developing a programme to engage building owners and various levels of government to retrofit our buildings to better withstand earthquakes.

It is estimated that in the Cascadia Subduction event, Victoria could have 2,000 fatalities, but 90% of those deaths could be avoided if our buildings were more able to withstand earthquakes. And in the post-quake period, survival will depend on giving people shelter. For every building that remains habitable, the reconstruction and recovery process will be easier.

Dr. Graham Taylor, mentioned above as the author of the 1989 assessment of the vulnerability to earthquakes of BC schools, is a key driver of our efforts. So too is Dr. Carlos Ventura, Professor of Civil Engineering at University of British Columbia and a leading expert researcher in seismic structural stability. Chris Willmore teaches economics at University of Victoria and has buttressed our work with studies that show building seismic resilience pays for itself in the short term, even if the earthquake doesn't hit for a generation. Peter Mitchell, Director of Professional Practice at the Association of Professionals and Geoscientists of British Columbia (APEGBC), will play a lead role in establishing professional practice standards for a seismic retrofit program for building owners.

We now have a pilot project approved by the Mayors and Councils of Victoria and North Vancouver. Catherine Umland of Victoria Civic Heritage Trust is very engaged. She relays how much Victoria learned from the devastating quake in Christchurch, New Zealand. We need to assess the ornate cornices and decorative flourishes that adorn the Victoria downtown. But for every building there is a solution. We are blessed to have so many smart and proactive people prepared to pay attention to making us safer.

What we need now is financial commitment to start a building seismic resilience program. We need senior government to partner with British Columbians and Quebecers who wish to seismically upgrade their buildings for improved safety, economic security and quality of community life.

Here is the basic concept. A national seismic upgrade quality assurance program would be put in place and monitored by experienced construction professionals. This program would be readily accessible to any building owner who has a seismically vulnerable building (residential, commercial or First Nations building owner). When the seismic upgrade is completed in accordance with the certified program, the building owner receives a 50% rebate from the federal government. More modest targeted rebates may also be offered by the provincial government. Municipal government would be an active supporter of this program.

We call our programme Building Resilience in Canada (BRIC).

While I work on getting the federal government to support this project, I do urge building owners to consider contacting a professional engineer to look at your property. In some cases, a home can avoid being "red-tagged" with some very simple, relatively inexpensive steps. For example, if a house wobbles off its foundations in a quake, it will be red-tagged. But if the owner gets the basement redone, with floor to ceiling sheet-rock, that alone can be enough to keep the house where you want it – on its foundation.

## Current Federal Opportunities

**Canada 150 Speakers' Speech Writing Contest** - Young Canadians from across the country are encouraged to participate in the Speakers' Speech Writing Contest. The contest closes on April 21, 2017. For more details see www.facebook.com/PARLyouth/app/941345315938094/.

**Teachers Institute on Canadian Parliamentary Democracy** - The Teachers Institute brings together 85 educators from across Canada for an engaging and informative week in early November to learn about Parliament, governance, and citizenship. Apply by April 15, 2017. For more details see www.parl.gc.ca/teachers.

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