

## UNISDR Scientific and Technical Advisory Group

### Case Studies – 2014

#### Assessing community earthquake risks; Planning for a disaster-resilient community in Western Canada.

##### The problem

This case study focuses on the District of North Vancouver, a municipality situated between the Pacific Ocean and the Coast Mountains on Canada's west coast, one of the most seismically active regions in the country. The District of North Vancouver is a dynamic piece of Canada's busiest port and forms part of Metro Vancouver's 2.3 million populous (1). It faces the challenge of trying to understand and assess the risks posed by a damaging earthquake in order to take proactive and effective action to mitigate those risks.



Image 1. North Vancouver - a city nestled between the mountains and ocean, in an area prone to earthquakes. Source: N. Hastings

In 2009, Canada's Department of Natural Resources partnered with the District of North Vancouver, the North Shore Emergency Management Office, the University of British Columbia and Defence Research and Development Canada, to adapt and validate Hazus - the United States Federal Emergency Management Agency's loss estimation tool - for use in Canada. The knowledge acquired from the use of Hazus is being used by the District of North Vancouver to develop an earthquake action plan.

##### The science

The approach to modelling earthquake risk was based on the four-step process of establishing the context and the built environment, assessing the seismic hazard, analyzing the risk and evaluating the risk.

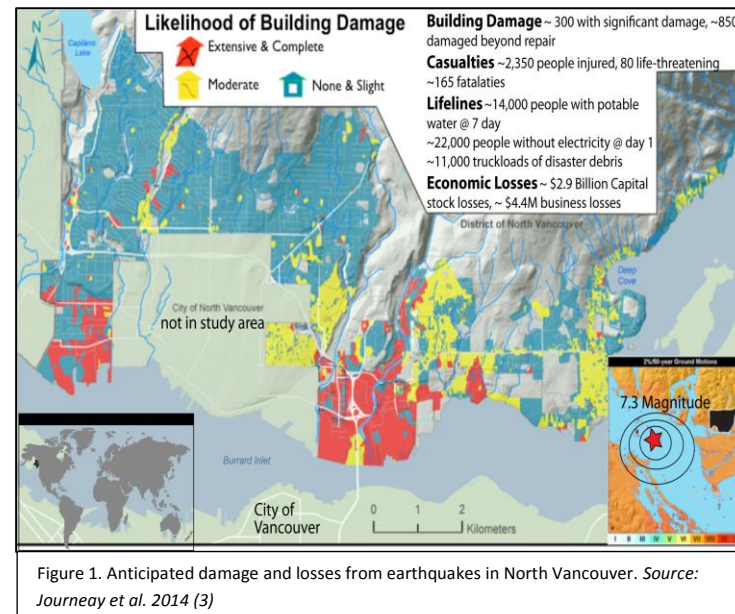
The District of North Vancouver is predominantly a residential community with businesses and industrial facilities lining its waterfront. A 7.3 magnitude earthquake was modelled for the study - based on a historically active fault lying about 30 kilometres from North Vancouver - that would cause significant ground shaking and would likely trigger aftershock events. The Canadian Hazus model (2) was used to estimate what might happen after this earthquake event: damage to buildings, numbers and severity of injuries, location of vulnerable populations, shelter needs, disruption to water, sewer and electrical services as well as economic impacts to businesses and the community as a whole (Figure 1). The results from the study were valuable and have helped the District of North Vancouver take action to reduce vulnerability and increase disaster resilience.

##### The application to policy and practice

The District of North Vancouver is addressing seismic risk by developing an earthquake action plan that outlines steps to prepare for, and reduce the impacts of, a major earthquake (4). The commercial and business waterfront sector was identified as the area exposed to the greatest seismic risk and the District is working to strengthen the resilience of this region by reaching out to this community to bolster their earthquake readiness.

##### Did it make a difference?

Prior to this study, the District of North Vancouver's focus was on outreach efforts to educate the public about preparedness. As a result of the study, the municipality is reaching out to the business community (5) to assist in preparing and planning for recovery after an earthquake. Experience gained from this case study will be shared with other Canadian communities to help them better assess, plan and prioritize for an earthquake event and help shape seismic resiliency for Canada.



##### References

1. Statistics Canada (2011): National Household Survey, [www.statcan.gc.ca](http://www.statcan.gc.ca)
2. Chow, W. et al., (2014): Hazus-MH 2.1 Canada application, databases and manual: earthquake module, Natural Resources Canada, Open File 7458.
3. Journeay, M., et al., (2014) A profile of Earthquake Risk for the District of North Vancouver, Natural Resources Canada in press.
4. District of North Vancouver (2014): DNV Earthquake Ready Action Plan; Corporation of the District of North Vancouver, in press.
5. North Shore Emergency Management Office: (2014): North Shore Business & Employer Emergency Preparedness Guide, <http://nsemo.org/preparedness/businesses>