Nature Wise January 2016 Earthquakes and the Okanagan

It has been about five years since I last wrote about earthquakes so the great amount of publicity associated with the recent small earthquake near Sidney BC (Dec 29) is a good excuse to remind readers about the nature of earthquakes and what we might expect here in the Okanagan in the way of future earthquakes.

First note that I called the Sidney quake a "small" quake – it was measured as magnitude 4.7. Generally any quake above magnitude 2 can be felt by at least some people and quakes less than magnitude 5 seldom cause any significant damage. For perspective, the great Alaskan earthquake of 1964 was magnitude 9.2 and the Indonesian earthquake of December 2004 which killed more than 200,000 people was about magnitude 9.1. The largest known earthquake occurred in Chile in May of 1960 with a magnitude of 9.5. The scale used to measure earthquakes is a logarithmic scale which means that each whole number is 10 times the preceding whole number so a quake of magnitude 5 is ten times greater than a quake of magnitude 4 – breaking this down more means a 4.2 quake is twice as strong as a 4.0 quake. Since 1946 there have been five earthquakes in BC with a magnitude of 7 or greater, fortunately all either well offshore or in one case in 1946, in a remote area of Vancouver Island so British Columbians' experience with really damaging earthquakes is minimal. Historic earthquakes in the Okanagan Valley region have all been less than magnitude 5 and there is no good reason to suppose this will change in the next hundred years.

The coast of BC is an entirely different story – most of the earth's really large quakes occur where two or more tectonic plates collide. In the case of the BC coast, the North American continental plate is moving west –southwest at just over 2 cm per year while the Pacific plate is moving north-northwest at more than triple this speed and in between the two is the small Juan de Fuca plate getting over-ridden by the North American plate. It is the occasional "sticky" movement along plate boundaries that cause the really big earthquakes such as the Indonesian and Alaskan quakes.

The United States Geological Survey has analyzed the data from many thousands of earthquakes over the past hundred or more years and come up with some interesting estimates of frequency of quakes. For instance they estimate the earth has more than 10,000 earthquakes per year in the range of 4.0 to 4.9 magnitude but only about 1000 per year in the range 5.0 to 5.9 and less than 20 per year greater than magnitude 7. Really large earthquakes (magnitude 9 or greater) occur over the earth on average less than once every ten years. Studies in the Oregon, Washington, BC area suggest really large quakes occur in this region about every 300-500 years. Evidence suggests a quake of magnitude 9 occurred in January, 1700 so we may well be due for the next big one any time. While a magnitude 9 earthquake in coastal BC would cause a huge amount of damage there and would most likely be easily felt in the Okanagan, it is unlikely it would cause significant damage here in the valley. Waves on Okanagan and Skaha Lakes would likely be the most probable adverse effects, if any.

A strong earthquake in 1872 near Lake Chelan in Washington State (estimated magnitude about 7) reminds us that we are not one hundred percent safe from earthquake damage but given what we know about the geologic history of the Okanagan Valley over the past 10,000 years, it's a reasonable bet that you needn't worry about that particular type of natural disaster effecting your life.

The next meeting of the South Okanagan Naturalists' Club will be January 28. The public is always welcome. Check out our website (southokanagannature.com) for details about our monthly speaker.

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