Musings from the Editor

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The Connection Between Melting Ice, Earthquakes, and Bats - Strange Meanderings by a Wondering Scientist

At first, the evening of October 27th was just the end of another typical day in the life of a self-employed consultant. I sat diligently typing on my computer, working at some project or other. Then, at 8 pm, things got a little peculiar. There was a strange rumbling, like a distant train. Then the office started to feel most uncomfortably like I was out at sea with no ship in sight. For about 30 seconds, the ground rolled in a most unsolid-like manner. Earthquake! Once my slow-witted brain got wrapped around the concept, and it was clear that the house wasn't going to come crashing down around my ears, I guessed that it had likely been a sudden lurch in the Queen Charlotte fault, over on Haida Gwaii. As it turns out, the quake was a 7.7 magnitude shaker, the second largest Canadian earthquake ever recorded. Luckily, the movement along the fault was strike-slip, rather than vertical, thus no tsunami was generated and damage to the region was very minor.

This earthquake, although very close to home for me, was just one in a string of recent earthquakes that have occurred around the Pacific "Ring of Fire" - even Vancouver Island got a bit of a shaking on Boxing Day by a 6.3 magnitude quake. Are we seeing an increase in the frequency of earthquakes? Scientific opinion on this is split. On the one hand, an increasing number of deployed sensors means that we are detecting more earthquakes than before, thus making it seem like earthquake frequency is increasing. However, on the other hand, some scientists studying the crustal movements which cause earthquakes have seen some disturbing trends. Global warming has been causing increasingly rapid rates of glacial melting. Glaciers are heavy, and press down on the land, forcing the continental crust to sink into the mantle. When the glaciers melt, this weight is removed, and the land is buoyed upwards in a process called "isostatic rebound". Rapid isostatic rebound increases the stresses on the lithospheric plates, and can increase the frequency of earthquakes and volcanoes.[1,2,3] Is this seeming increase in earthquake activity yet another unforeseen outcome of global warming?

So what's this got to do with bats? Well, the earthquake in Haida Gwaii on October 27th caused the famed hot springs of Haida Gwaii to go dry. The exact cause of this misfortune is unclear, but a number of subterranean changes could have resulted from the earthquake that might have made the hot springs go dry, including changing the groundwater level, completely closing the cracks the water used to reach the surface, causing a sudden surge in water that depleted the underground reservoir for a short time, or even diverting the hot water elsewhere.[4] Sadly, the hot springs are one of only two known maternal colonies in the entire range of the Keen's long-eared bat. It's uncertain whether the bats will return to Gwaii Hanaas now that the hot springs are gone.[5,6]

As a kid with a budding interest in biology, I always thought bats were neat. We used to have bats roosting in the attic of our old farmhouse. At dusk, they would come out and cruise around the Ponderosa pines, catching insects on the wing and emitting barely audible squeaks. Not being enamoured with mosquitos, I used to cheer them on in their bug-consuming frenzy. Unfortunately, whenever humans and bats come into conflict, the bats always seem to end up as the losers. I still remember when one of our resident bats had the misfortune of mistaking a window for the attic entrance. To my parents' horror, it ended up in the living room, completely terrified. Thereupon ensued yelps of dismay and ominous warnings regarding rabid bats. The bat was persued violently through the house by my parents, and probably didn't survive to tell about its misfortune. Shortly thereafter, the attic was sealed and the bat roost was permantly "closed" for bat occupants.

Even when we don't intend harm, it often seems that bats are the losers from the outcomes of our actions. White Nose Syndrome (WNS) is a fungal disease which has caused the death of over 5.7 million bats in the United States within the last decade. In Canada, it has spread through Ontario, Quebec, New Brunswick, and Nova Scotia. The fungus responsible, *Geomyces destructans*, has had its origins traced back to Europe[7], and it appears likely that an unsuspecting tourist tracked fungal spoors on their boots or clothing into the popular Howes Cave in New York, where the first North American case of WNS was observed.

While I'm not suggesting that anthropogenically-caused global warming is going to be directly responsible for the local extinction of Keen's long-eared bats on Haida Gwaii, what I do believe is that the connections between the different components of our ecosystems can be very complex, and are frequently poorly understood. As a result, even with good intentions, our actions can often have unexpected negative outcomes.

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