

## **Leftovers from a landslide**

**By Jessica Bell**

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Faded pink, yellow and orange carnations, their stems stuffed into the soil by someone along a chain link fence, are the only signs of life that remain at 2440 Chapman Way. The Berkley escarpment behind where a North Vancouver house once stood is steep; no cedar trees grow here. It resembles an avalanche path, appearing to have been clear cut of its trees, except it wasn't an avalanche that swept down the bank five years ago: it was a landslide.

Today, in late October, a third-year geography class from Kwantlen Polytechnic University examines the slope. They gather around, pencils and notebooks in hand, in a half circle near where the flowers lie.

"The house sat right here," says John Martin, the students' Natural Hazards instructor. He points towards a hole in the ground where the cement foundation rooted 2440 prior to the early morning hours of Jan. 19, 2005. "The slide swept the house down there."

Eliza Kuttner, a Capilano College professor who taught Martin years before, was in her home at 2440 the morning a flood of rock, debris and snow came crashing down from 80 metres upslope. The landslide cut Kuttner's home in half, burying her and her husband in mud, before continuing down the slope and half-burying a house below. Mrs. Kuttner died.

The students pencil in answers on their field trip sheets, calculate the slope angle where the Berkley landslide occurred and discuss with Martin the visual evidence of it. They point out the young deciduous trees that grow on the slope side – they aren't yet five years old. Most notable is the 25-metre-wide run-out zone, a barren patch of land, bordered by tall cedar trees, although the run-out zone isn't all the landslide left behind.

Martin repeats the message he has been stressing to his students all day: the very definition of a "natural hazard" means that human life or property is at risk.

Martin, who has a Master's of Science from Simon Fraser University, wears a beige bucket hat, the kind one would imagine wearing as they venture into the jungle in an old black and white film. He sports Merrell hiking boots and there's a hop in his step, a

subtle sign of his excitement for the course he teaches. He seems to know all there is about landslides.

Although the District of North Vancouver (DNV) receives an annual 2,400 mm of rainfall, there are times during November to February when the area experiences a “pineapple express” storm. A pineapple express can produce more than 100 mm of rain per day with intensities that exceed 15 mm per hour. In comparison, normally the average amount of rain to fall during a typical storm is near 15 to 20 mm a day. Forty-eight hours prior to the 2005 Berkeley slide, the Mt. Seymour area received more than 320 mm of rain, according to the Geological Survey of Canada. That includes the area of the Berkley escarpment where the landslide occurred.

This amount of precipitation infiltrating and eventually saturating the soil, combined with the stress of a relatively steep slope and the ever-constant pressure by gravity, will often result in a landslide, says Martin.

“These hazards *can* occur here,” he says. “They aren’t just something that we watch on TV.” Martin notes that a total of six major slides have occurred along the Berkley escarpment east of the Seymour River since 1972. Three of them occurred in 1979, two of which rushed down from the subdivision at Carman Place above, just off Berkley Rd. The run-out zone for these landslides is still visible today from the road below. All of these landslides were triggered by heavy rain. By taking into account the six slides over the last 38 years, the probability that a landslide will occur in the area is every 6.3 years, says Martin. “We have been dealing with hazards throughout our history [Vesuvius, Krakatoa, the San Francisco earthquake in 1908]. Hazards are a part of our everyday life, even in our cozy corner of the world.”

Damian Dunne awoke in the middle of the night on Jan. 19, 2005 to the sounds of sirens roared through his house, the colours red and white lights flashing in the front windows. He’d been sleeping three property lots away from where the Berkley landslide came to a halt at around 3:15 a.m.

“I went out to have a look and there was chaos up the street,” he remembers. Dunne ran inside and minutes later reappeared, dressed warmly for the crisp weather. Amongst the flashing lights that circled the quiet neighbourhood were neighbours and emergency

personnel working to try and save someone buried beneath the debris. Some dug with their hands in the mud and emergency crews brought in excavating equipment to sift through the debris.

Down the street at 2243 Chapman Way, Lisa Winkelaar, her husband and their nine-year-old daughter were sound asleep that same night. Just as the ground gave away, she sat upright in bed when she heard what she thought was a metal blade from a snowplow grinding against the asphalt. She peered outside the window and saw only blackness, and fell back asleep.

Later that morning Winkelaar was surprised to see that two of her neighbours' homes were filled with mud. She and her family have moved from 2243 Chapman Way.

However, despite a landslide falling just metres from his front step, Dunne is no more concerned than many other area residents that another deadly slide will occur. He believes that the DNV is properly monitoring the area.

Following the slide that killed Kuttner – and with much support from the public – the DNV created a Natural Hazards Management Program in 2007. The district, tucked deep in the Coast Mountains and situated in part along a flood plain, is already located in a potentially risky area, never mind the very real problem of landslides. There are also concerns of wild fires, floods and earthquakes, all hazards that effect the Lower Mainland in general.

The DNV has since reassessed the Berkley escarpment and seven additional escarpments in the North Vancouver area. It demolished a few homes, including 2240 and 2290 Chapman Way, before implementing extensive measures to prevent another slide.

According to Fiona Dercole, manager of the DNV hazards program explains, the DNV positively altered the slope where the failure occurred. They installed a small debris basin along a creek that flows beneath the old Kuttner property. Made of cement and riprap (rubble and rock that acts as armour to streambeds), a debris basin is designed to protect soil along a slope from increased erosion. They also installed several piezometers along the slope – fluorescent-green tubes that measure changes in groundwater – and connected all of the homes along the Berkley escarpment to the municipal storm drainage system.

“Risk is so personal,” says Dercole. “If you perceive a benefit to living on a greenbelt and close to nature you may choose to accept slightly higher levels of risk.” Thus, residents like Dunne, who choose to live in a potentially hazardous zone, have accepted a higher level of risk.

Dercole says the district has strong communication with DNV residents at large: they inform them about how to better prepare for landslides, what steps to follow to prevent them, and what to do if they occur. The likelihood that another deadly landslide will occur is relatively small if residents work with the district and follow precautions, says Dercole. Something as simple as avoiding dumping old leaves and yard trimmings over the embankment, which suppresses natural vegetation from growing, or paying attention to any changes in nearby banks, will lower the chances of another preventable death.

“It was a tragic event that triggered this new approach,” says Dercole. “But I think we’ve tried to learn from our experiences and have tried to make sure that something similar doesn’t happen again.”

Back at 2440 Chapman Way, the university students walk cautiously down the steep asphalt driveway and to their yellow bus. Today they’ve witnessed a real natural hazard site, a half-hour’s drive away from campus.

Martin talks with a neighbour who has come to investigate what a posse of students are doing wandering around the site where a woman died. He explains that the class is examining the landslide and the man recalls the mound of mud and rock that people frantically tried to dig through on that January morning five years ago. The corner lot near where they stand is empty; the house that was half-filled with mud used to sit there. All that remains is a flat level of luscious grass and some young trees.

At 2440, the dead blades of grass, brown and yellow from the cool temperatures of fall, bend over one another blanketing the site. That, and a rusted clothesline wheel nailed to the side of a tree.