

Geologists monitor landslide in Washington state for further movement

November 1 2009, By Sandi Doughton

It's hard to picture a bigger landslide than the one that buried a quarter-mile of Highway 410 in Yakima County, Wash., in mid-October.

But the state Department of Transportation is monitoring adjacent slopes around the clock and hoping the Oct. 11 slump doesn't reactivate part of a monster slide that smothered the Naches River Valley in [prehistoric times](#).

"We've not seen any movement up there," said DOT geotechnical engineer Tony Allen. "But it's certainly not out of the realm of possibility."

The agency is considering a warning system to alert drivers and residents if the larger slope begins to fail.

"They're wise to worry about it," said University of Washington geologist David Montgomery, a landslide expert. "I think it's a low probability thing ... but the consequences would be terrible."

Though massive on a human scale, the recent landslide is a small blip on the so-called Sanford Pasture Landslide Complex, a 6-mile-long slide that predates the ice age and may be more than a million years old. But even an ancient landslide can come back to life, Montgomery said. One potential trigger is a smaller landslide that removes a chunk from the toe of the slope.

The ancient landslide is so big it's hard to distinguish from the ground. On satellite photos, it's impossible to miss. Montgomery suspects it was triggered by an earthquake.

It's very unlikely the entire swath would give way now, Allen said. He's most concerned with keeping an eye on the section uphill from the recent slide.

"It could be in a pretty stable configuration, but due caution would dictate we check that," Allen said.

DOT's initial assessment of the slide 10 miles northwest of the town of Naches, Wash., cautioned that "involvement of the upper slopes could be a game-changer in terms of the current assumed risk to public safety and remediation options."

But there would almost certainly be some warning if the upper slope starts moving, Allen said.

The area that slid Oct. 11 rumbled and sloughed for a day or more before it collapsed. Seismic instruments detected pops and vibrations several hours in advance of the slide.

Other warning signs appeared as much as four years ago, when geologists noticed fissures and oddly leaning trees on a portion of the slope that eventually gave way.

That's why the Washington Department of Natural Resources ordered a gravel mine in the area to analyze slope stability and monitor for movement. The jury is still out on whether the mine's operations might have been a factor in triggering the landslide.

Soon after the slide, DNR geologists inspected the upper slopes and saw

no cracks or other signs of broader destabilization.

DOT installed a radar across the valley to continuously scan the slide itself and the slope above it to detect movement, Allen said. That will alert crews working in the area to possible hazards and provide an early warning if the larger slope becomes unstable. Allen hopes to soon have staffers monitor the radar 24/7.

Another tool aimed at detecting motion in the slide and the ridgeline above it is a long-range laser surveying system called LIDAR. The instrument provides highly detailed topographical "snapshots" that can be compared to detect as little as three inches of ground movement.

"We can map all the points on the slide and if there is movement, we can say how much and exactly where," said Kurt Iverson, survey manager for DOT's geographic services department.

Three seismometers installed by University of Washington scientists are also listening for vibrations that might signal another slide. The instruments recorded a loud pop on Oct. 20, said John Vidale, head of the UW seismic network. But that was probably the sound of the slide settling, he said, rather than a sign of potential trouble on the upper slopes.

The Oct. 11 slide destroyed at least two homes, forced the Naches River out of its banks and cut off Highway 410 as a link between the west and east sides of the state. Transportation officials have said the section of highway will remain closed all winter and will probably have to be rerouted.

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