

# Area of Washington mudslide long known and documented as unstable

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As recovery efforts from Saturday's landslide in Oso, Washington continue under rainy conditions, the death toll has reached 25, with 90 people still missing. Chances of finding further survivors are near zero. Soil, rock and debris moved with such force in the slide that houses and cars were ripped apart, and it is possible that the bodies of some victims were utterly destroyed and will never be found, according to officials on the scene.

As in many outlying areas of Washington State, the transportation infrastructure (which received a D+ in the 2013 American Society of Civil Engineers Report Card) is not only in bad repair, but alternate routes through rural areas are practically nonexistent, hampering rescue and recovery efforts.

On Wednesday, the Washington State Department of Transportation finally opened an alternate route for residents of the nearby town of Darrington who had been cut off from Interstate 5 when the landslide swept away a section of State Route 530. The alternate route, the Mountain Loop Highway, is a 25-mph pothole-ridden one-way dirt and gravel road that takes close to two hours to travel, has no gas stations and is not suitable for freight or heavy trucks.

WSDOT's web site states that they are as yet unable to assess the damage to the roads and highway as the area is still "volatile." They have no estimate as to when they will be able to enter the area, let alone begin reconstruction.

Though initial newscasts and articles listed the heavy rain as a likely culprit in the slide, several geologists and Army Corps of Engineers personnel as well as many locals have noted that the area was not only the site of repeated slides, but that the Stillaguamish River has on several occasions changed course and eroded the "toe," or leading edge, of prior slides, thus setting the

scene for future catastrophe.

A 2010 report by Snohomish County stated that Oso neighborhoods around Steelhead Drive along the Stillaguamish River ranked as being at high risk for landslide danger. The federally funded report, the "Natural Hazard Mitigation Plan Update" included a map highlighting areas most likely to experience landslides. The hillside along the North Fork of the Stillaguamish River, just outside of Oso, was among those highlighted as most dangerous due to the steep slope of the hill and the type of soil involved, which has been linked to landslides.

One of the report's authors, Rob Flaner of Tetra Tech, said to the *Seattle Times*, "For someone to say that this plan did not warn that this was a risk is a falsity."

Speaking to the *Seattle Times*, geomorphologist Daniel Miller said that after the 2006 slide, he was surprised to find people rebuilding, rather than vacating the area. "Frankly, I was shocked that the county permitted any building across from the river," he said "We've known that [the hill has] been failing." He noted that, "It's not unknown that this hazard exists." Miller also authored a 1999 Army Corps report that warned a "large catastrophic failure" was likely for the area.

This is in stark contrast to the head of Snohomish County's Department of Emergency Management John Pennington, who said Monday that the collapsed hillside had been considered "very safe" and that Saturday's slide "came out of nowhere."

The area above the slide had also been the site of repeated clear-cutting over the years, with logging being one of the main industries of the region. Known as the Hazel formation, the site of the slide had been repeatedly logged, removing large trees that can soak

up water and help stabilize the soil.

Geomorphologist Paul Kennard, speaking to KUOW radio, said, “There was cutting in the 1940s; it failed in the ‘50s. There was cutting in 1960, then it failed in the mid-‘60s. There was cutting in ‘88; it failed in ‘91. There was cutting in 2005, and it failed in 2006 and in 2014.”

Though the 2005 clear-cut was smaller in scale than previous cuts, it is not known whether the cut sat in the groundwater recharge zone, where water funnels into underground aquifers and destabilizes the soil. Kennard notes that it would take a geotechnical study to determine with any certainty whether the 2005 logging had a part in Saturday’s slide, although it is almost directly under the site of the cutting.



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