

Station Fire provides opportunity to understand the science of mudslides

Emma Gallegos, Los Angeles Newspaper Group, 4-24-10

For decades, Tom Farr jogged along the banks of the Arroyo Seco for fun - but now the Jet Propulsion Laboratory researcher jogs on the clock, trying to understand how mudslides work.

Farr is just one of a fleet of scientists using August's Station Fire as an opportunity to understand what causes mudslides.

Soon after the massive fire, the U.S. Geological Survey released a study warning residents downhill about killer debris flows when the winter rains came - but the basic question of how mudslides work is still an open one.

"The big questions are pretty fundamental at this point," said Mike Lamb, a scientist at Caltech who has been studying the debris flows. "I don't think we have a good handle on any of those questions."

That's in large part because mudslides rarely have witnesses, he explained.

So far, Farr, Lamb and other scientists - from the USGS, Arizona State University, Caltech and JPL - haven't found the smoking gun that explains this season's mudslides.

Researchers can't get too close to where mudslides might happen. It's hard for helicopters to fly in storms and airplanes can't see through the rain clouds below.

"It's not that there's a lack of interest or motivation," Lamb said. "It's hard to figure out what to do that's really going to teach you something."

The science of mudslides is particularly important for Southern California, where residents live in the hills that burn in the summer and tumble in the rain.

"It's one of the few places in the world where the difference between developed and undeveloped land is so strong and there's no buffer zone," said Jonathan Stock, who has been studying the San Gabriel Mountains with the USGS.

The USGS has installed cameras throughout the Angeles National Forest in the hopes of witnessing something that might provide clues.

But most of what scientists know about mudslides is by examining what happens after the fact, Lamb explained.

On his jogs in the Station Fire burn area, Farr hasn't seen many areas where large chunks of hillsides fell into the river. He has seen tiny grooves in the hillsides where rain picked up dirt and carried it downhill.

Scientists don't know if these tiny grooves can trigger a large mudslide that moves swiftly and can pick up car-sized boulders.

Field work is difficult too since many areas are inaccessible in the days after a large slide. Often county crews clean up the evidence before scientists can get there, Lamb said.

But, researchers can also take to the skies to understand what has happened. For the last decade, geologists at Arizona State University have been mapping the San Gabriel Mountains with airborne radar, according to Kelin Whipple at ASU.

Now scientists want to scan the mountains again to determine which parts were worn down by the rains and lost the most dirt and rock.

Ultimately, Lamb hopes to understand mudslides by starting one in the laboratory.

Lamb is building a flume - a chute that can pump water up an incline 30 feet long - to recreate conditions that might trigger a mudslide.

He can create recipes of dirt and water and tilt the flume at different angles to predict what kinds of conditions make mudslides more likely.

In the end what Lamb and other scientists learn remains to be seen.

"Humans are still struggling to understand how those landscapes work," Stock said.