The science behind slide season

Hunter Cresswell, Times Standard News, 1-25-16

Floods and landslides in areas impacted by the extreme drought and fire season have been exacerbated by rain dropped during this El Niño winter.

According to Caltrans and Humboldt County Public Works Department spokespersons, there are no official records kept of the total number of landslides in the county during winters. Based on their statements and a tally of the number of roads closed by slides in updates, eight roads closed in Humboldt County since last weekend.

This count includes the mud slide that closed part of Highway 101 last week but not the large slide near Big Bar that closed State Route 299, the slide that destabilized Highway 101 just south of Crescent City or any of the slides in Mendocino County.

“Since Saturday (the 16th) if we’re talking about Humboldt County the only one was near Loleta,” Caltrans spokesman Phil Frisbie said.

The ground of burned areas not only repels water, making flooding more of a problem, but also doesn’t have root systems from plants keeping it in place, making slopes more slide prone, Humboldt State geology professor Andre Lehre said.

“It’s really an absolute road map for having a lot of land slides,” he said.

Luckily most of the fires this summer took place in local state or national forest wilderness areas without a lot of infrastructure or homes to impact. Drought can have similar, though less severe, impacts on landslides and floods during the rainy season. Drought-stressed soil also repels water, but not as much as scorched earth, so it can also lead to floods. Drought also makes plants and their roots weaker, so certain slopes slide easier when they do get saturated, Lehre said.

He said when he moved to the area in 1981 this many landslides wouldn’t have been out of the ordinary.

“There were landslides like this every few years,” Lehre said. “This is fairly typical of what you’d expect.”

Lehre also explained how landslides happen on non-burnt or non-drought stressed slopes.

“There’s a variety of different things that cause it,” he said.

Water seeps into the ground and fills spaces between dirt, pushing outwards and increasing what he called, “pore pressure.” Water also adds weight to the slope, which makes it more likely to give way to gravity.

“That’s why you see most of out landslides occurring when we’ve had heavy rains,” Lehre said.

Aside from water, geology also plays a role in sliding slopes. If a steep piste is covered in shale, it's likely that slides can and will occur there.

"I suspect some of the things we see over 299 further east may be related to layering or jointing in the rocks that are parallel to the slope," Lehre said.

While it's the large slides dropping huge rocks onto roads that gets the most media attention, smaller slides can be equally destructive.

Weak plant materials holding a hill in place combined with heavy rain causes mud slides, debris slides or debris flow that can move anywhere from five to 20 miles per hour, he said.

"These can actually be very hazardous to individual houses," Lehre said. "It's like being buried in concrete."

These slides can be quiet and small, which can cause people witnessing them to drop their guard.

"They move so fast that basically you can't move out of the way," he said.

Since these slides can be small and quiet there's not much time for warning. People that find themselves in the path of a slide should make haste parallel to the slope and out of the way of the rocks and debris, Lehre said.