

# Mudslides and associated issues research paper sample

[Economics](#), [Insurance](#)



## **Introduction**

A mudslide is a specific variant of a landslide, a term which describes “ a wide variety of processes that result in the downward and outward movement of slope-forming materials including rock, soil, artificial fill, or a combination of these.”(Highland & Johnson, 2004). Of the different types of landslides described, the type known as “ earthflow” includes the sub-category “ mudflow” - the subject of this research paper. The following paragraphs will describe mudflows (or mudslides) and a number of the issues surrounding them.

## **The Research**

Definition of Landslides and Mudslides. In the USGS factsheet originally produced by Highland & Johnson, it was stated that in a landslide, the movement of the displaced materials downwards (and outwards) may be described as “ falling, toppling, sliding, spreading, or flowing.” The Figure below, extracted and reproduced from that factsheet, illustrates the features of a typical landslide using accepted terms for its various features.

Figure 1: Features of a Typical Slump Earthflow Landslide

### **(Extracted from Highland & Johnson USGS Factsheet, 2004)**

Although landslides generally occur in mountainous terrain, the above-referenced factsheet reports they can also occur in comparatively flat areas. That is especially the case in association with man-made topographical features such as waste heaps from mines and cut-and-fill areas, where (e. g.) road building has altered the natural landscape features.

The mudflow or mudslide type that is the subject of this research typically occurs as a result of saturation of sloping terrain due to prolonged and heavy rainfall. The mudflow is a variant of the landslide type categorized as an earthflow. Those can occur when the saturated ground comprises a high percentage of small-grained material such as sand or silt or clay. The following Figure shows a representation of a mudflow. As noted by Highland & Johnson (2004) the flow forms a characteristic “hourglass” shape, spreading out as it reaches flatter terrain.

Figure 2: Hourglass Shape of a Typical Earthflow

### **(Extracted from Highland & Johnson USGS Factsheet, 2004)**

Other Causes of Earthflow Landslides. Apart from, or in addition to, the cause previously mentioned (prolonged and heavy rainfall), these mudflows can be triggered by other influencing factors such as seismic activity (earthquakes). An earthquake or nearby volcanic eruption may either cause an earthflow to begin moving simply due to the shaking of the sloping terrain, or cause it by effectively opening the structure of the soil material, so that water enters more rapidly, thereby provoking the slide once the saturation reaches the critical level.

Melina (2010) pointed out that mudslides can also be caused – paradoxically – by fires. Quoting Lynn Highland, a USGS geographer, Melina explained that a wildfire can, by killing the roots of plants that hold the soil together, allow the soil to slip away. A similar effect can be the result of over-grazing of sloping terrain, when the animals have caused the death of all the grass and other plants that were retaining the soil in place. In some instances, the

mudslide can occur days after the rainfall has ended.

Precautions and Prediction. Fatalities most often occur as the result of people buried while sleeping in bedrooms on the lower level of houses below mudslide-prone slopes, particularly in rooms on the house side facing up the slope. Therefore an obvious precaution if living in a location that could be in the path of a mudslide, is to at the very least sleep in a room on the opposite side of an upper floor of the house. Because mudslides usually happen without warning (apart from the preceding rainfall patterns), it is not practicable to plan on out-running one. Ideally, do not build or live in a house located at or close to the foot of any steep slopes in hilly areas.

As far as predicting mudslides is concerned, because each likely location differs in topography, geology, and precise weather / rainfall conditions, prediction is extremely difficult. As Sullivan reported in the New York Times in 1987, efforts were made to re-create mudslide conditions on artificial slopes in Japan's " National Center for Disaster Prevention." The article reported that at the time of publication, Japan was a long way ahead of other countries in landslide research, perhaps because its heavy population densities in risk-prone mountainous areas of a country with a wet climate, make mudslides more likely to cause losses of life. Measures tried in Japan included building retaining walls on slopes and laying drainage pipes within slopes to drain off the water before instability occurs.

Fountain (2006) published another article about mudslides in the New York Times, this one entitled " In Mudslides, Safety Seems Out of Reach." His theme was that although there are ways to protect people against them, there is insufficient political will and funding to act upon the accurate

weather forecasting and climate modelling that is available to do so. The article suggested that with climate change causing an increasing number of storms and protracted periods of rainfall, these landslide events are showing signs of increasing in frequency - a situation that the article reported as "really frightening."

**Home Insurance Aspects.** Most people may be under the mistaken impression that because they have an All Perils home insurance policy, their home is insured against possible damages or loss due to mudslides.

However, that is not the case. A standard home insurance policy does not include mudslide or mudflow cover, though flood insurance does cover mudflows. From an insurance company's perspective, the terms mudflow and mudslide mean different things. According to their definitions, a mudflow is a particular variant of a flood - water and mud flowing across land that is normally dry. In contrast, they define a mudslide as earth (mud) and rock that travels downhill, maybe due to a collapsed hill or other steep slope. And those are NOT covered by either home or flood insurance. They are included in a whole list of exclusions that many believe might have been covered by an All Perils policy. Homeowners are strongly advised to read the small print before a disaster comes along.

**Mudslide Prone Areas.** Mudslides can and do occur in many countries of the world, though naturally tend to be more prevalent in the hillier or mountainous areas, especially regions where underlying earth movements, such as those caused by the sudden shifting of tectonic plates, can trigger a mudslide on water-saturated steep slopes already in a weakened state. And the results can be devastating and of catastrophic proportions. A piece

entitled “ Social and Economic Impact of Mass Movements” (n. d.) published by the Florida International University (FIU) described how such a flow “ can strike with little or no warning at avalanche speeds. It can travel several miles from its source, growing in size as it picks up trees, cars, and other materials along the way.” The same article reported that a volcanic eruption in Colombia triggered a mud slurry that eradicated the nearby town of Almero, killing 22, 000 of its 25, 000 inhabitants.

The Consequences of Mudslides. Apart from the most obvious consequence, the loss of human lives, there are numerous other after effects. The “ Mass Movements” article mentioned above lists the following:

- Damage to properties and other structures
- Lost tax revenues on properties devalued as a consequence
- Lower real estate valuations in areas prone to landslides
- Lost productivity on affected agricultural land
- Industrial losses due to damaged property and transport systems / facilities.

## **Conclusions**

The research has shown that not only are mudslides a serious hazard for the populations living in areas close to likely mudslide occurrences, their frequency is increasing, due to the effects of climate change bringing more storms and higher rainfall amounts. Not only does house insurance not cover them, even flood insurance does not protect vulnerable properties from this natural hazard. Apart from the loss of human lives that has occurred virtually worldwide due to mudslides, they also cause much damage to property and land, as well as causing costs and loss of revenue to those affected,

sometimes for a long time after the events themselves (for many years in the case of devaluations of real estate). Utilizing the data from climate modeling and accurate short-term weather forecasts could predict at least the probability of mudslides, so perhaps saving lives, but it seems that there is insufficient political will / funding to allow that to happen.

## **References:**

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