Landslides

Landslides affect all 50 states and U.S. territories, where they cause 25 to 50 deaths and more than $1 billion in damages each year. Geoscientists study and monitor landslides to identify at-risk areas, prepare populations, and improve our understanding of why, when, and where landslides happen.

Basics

Landslides are masses of earth, rock, or debris that move down slopes. Landslides are triggered by one event, but many causes can weaken slopes over time and make them more likely to fail when there is a triggering event. These causes can be both natural and artificial. Landslides often occur in areas with oversteepened slopes, weak soils/bedrock, or de-vegetated slopes (whether by human deforestation or natural events such as wildfires).[1] Some of the most damaging landslides are triggered by water, typically from intense short-term rainfall or long-term saturation of the slope. Both natural and human activities (such as irrigation or seepage) can saturate hillsides. Earthquakes and volcanic eruptions also cause damaging landslides.[1] Read more

Frequently Asked Questions

What is Lidar and what is it used for?
National Oceanic and Atmospheric Administration

Can major landslides and debris flows happen in all areas of the U.S.?
U.S. Geological Survey

How much do landslides cost the U.S. in terms of monetary losses?
American Geosciences Institute

What are the different types of landslide hazard maps? What do they mean?
Earthquakes
Since 1900, earthquakes in the United States have resulted in over 1300 deaths and direct damages totaling more than $51 billion. While the West Coast and Alaska have the highest risk, history shows that major earthquakes can also affect the Central and Eastern United States.

Floods
Flooding is the most common and costliest natural hazard facing the United States. Each year, flooding causes billions of dollars in damages and dozens of deaths nationwide.

Hazards
Natural hazards such as earthquakes, landslides, hurricanes, floods, and wildfires endanger public health and safety, threaten critical infrastructure, and cost our economy billions of dollars each year. Geoscientists study these hazards to provide information and warnings to populations at risk.

Sinkholes
Sinkholes have both natural and artificial causes. They tend to occur most often in places where water can dissolve the bedrock (especially limestone) below the surface, causing overlying rocks to collapse. Florida, Texas, Alabama, Missouri, Kentucky, Tennessee, and Pennsylvania are most sinkhole-prone.

Tsunamis
Tsunamis are destructive waves caused by sudden displacement of ocean water. Tsunamis most often appear on shore as a rapidly receding tide or rapidly rising flood. In the United States, the Pacific coastal states – Oregon, Washington, California, Alaska, and Hawaii – are at greatest risk for destructive tsunamis.

Volcanoes
Volcanoes pose many hazards to their surroundings, from ashfall, mudflows, lava flows, landslides, and associated earthquakes. At least 54 of the United States’ 169 active volcanoes pose major threats to public health and safety and to major industries such as agriculture, aviation, and transportation.

Wildfires
Wildfires are causing more frequent and wider-ranging societal impacts, especially as residential communities continue to expand into wildland areas. Since 2000, there have been twelve wildfires in the United States that have each caused damages exceeding $1 billion; cumulatively, these twelve wildfires have caused a total of $44 billion in damages.

Maps & Visualizations

Interactive map of post-fire debris-flow hazards in the Western United States
U.S. Geological Survey

The U.S. Geological Survey conducts post-fire debris-flow hazard assessments for many major fires across the Western United States. The information from these assessments is provided in an interactive map, allowing users to view fires by location or name and access detailed maps of debris-flow...

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Case Studies & Factsheets

Geologic map guides transportation planning in North Dakota

Geologic maps can help to show which areas may be more prone to landslides and therefore directly assist in making optimum engineering design choices. Defining the Problem U.S Highway 85 and ND Highway 22, along with numerous county roads,
buildings, pipelines, and power lines, have been...

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Webinars & Forums

Identifying and Reducing Landslide Risk
This webinar provides an overview of landslide risk assessment and landslide impacts in the United States, discusses various policy approaches and funding for landslide risk mapping, and features case studies of work done with communities to reduce landslide risk.

Search all Webinars & Forums

GOLI Online Courses

An Introduction to Landslides and Mass Wasting
Course Type: GOLI Online Course
View course
This course is designed to be an introduction to the subject of landslides or mass wasting. Landslides or mass wasting occur in both solid bedrock and in poorly-consolidated sediments. Concerning the latter, loose sands, clays and soft shales can prove to be quite problematic. These type of...

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Geological Surveys Database Publications

Landslides
1976, West Virginia Geological & Economic Survey

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