



**DRAFT – DO NOT DISTRIBUTE**

# Landslides and Debris Flow

## Vision

A disaster resilient America that mitigates against natural hazards such as landslides through better land-use planning, and which emphasizes near real-time warning systems for fast moving types of landslides, such as debris flows.

## Background

Landslides, debris flows, and other forms of ground failure affect communities all across the Nation. Despite advances in science and technology, these events continue to result in human suffering, billions of dollars in property losses, and environmental degradation. As our population increases

and our societal lifelines become ever more complex, the economic and societal costs of landslides will continue to rise. Annual direct losses from landslides in the United States cost between 25-50 lives and over \$3 billion in property damage. There are no accurate estimates of indirect costs, which are also large. The USGS derives its leadership role in landslide-hazards-related work from the Disaster Relief Act of 1974 (Stafford Act), and the Director of the USGS has been designated the responsibility to issue disaster landslide warnings.

Landslides can be triggered by a number of mechanisms, mainly intense rainstorms and earthquakes. They can be slow moving and cause extensive property damage, or fast moving and be a direct threat to life. In order to protect our society from landslides, it is critical to expand the basic research into the earth processes that cause landslides, and well as developing better, near real-time warning systems.

USGS

Map showing potential landslide susceptibility

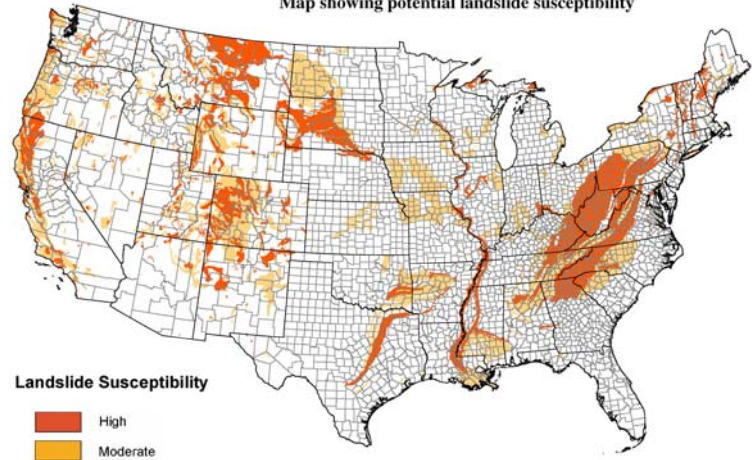


Figure 1. Map showing potential landslide susceptibility for the conterminous United States (modified from Radbruch-Hall and others, 1982).



A companion document to the Subcommittee on Disaster Reduction's report, *Grand Challenges for Disaster Reduction*

## **Expected Benefits**

- Improved monitoring of landslides through remote sensing techniques and on-the-ground instrumentation.
  - Improved rainfall thresholds for most local areas within the United States.
  - Improved weather forecasting and rainfall prediction.
  - Improved assessments of societal, economic and environmental impacts of landslides—both direct and indirect.
  - Improved partnerships and coordination among federal, state and local agencies that conduct research into landslide processes and who are responsible for landslide alerts and warnings.
  - Improved understanding of the links between wildland fire and landslides.
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When addressed, the Grand Challenges in science and technology outlined here will enhance community resilience and thus create a disaster resilient America. These Grand Challenges require sustained Federal investment in research, education, communication and the effective application of technology. They demand our focused Federal attention.

### **Grand Challenges for Landslides and Debris Flow: Scope of Work and Products**

**Grand Challenge #1:** Provide landslide and debris flow information where and when it's needed.

Scope of Work.

Product.

**Grand Challenge #2:** Understand the natural processes that produce landslides and debris flow.

Scope of Work.

Product.

**Grand Challenge #3:** Develop landslide and debris flow mitigation strategies and technologies.

Scope of Work.

Product.

**Grand Challenge #4:** Recognize and reduce the vulnerability of critical infrastructure.

Scope of Work.

Product.

**Grand Challenge #5:** Assess landside and debris flow resilience using standard methods.

Scope of Work.

Product.

**Grand Challenge #6:** Promote risk-wise behavior.

Scope of Work.

Product.

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## Implementation Actions

Collaborations with federal, state, and local governments; professional societies and trade associations; the design and construction community; and academia will be vital to the successful development and transfer of disaster reduction technologies and practices into common use.

## Short Term (1 – 2 years)

## Medium Term (2 – 5 years)

## Long Term (5+ years)

The National Science and Technology Council (NSTC), a cabinet-level council, is the principal means for the President to coordinate science and technology policies across the Federal Government. NSTC acts as a virtual agency for science and technology to coordinate the diverse parts of the Federal research and development enterprise.

An important objective of the NSTC is the establishment of clear national goals for Federal science and technology investments in areas ranging from information technologies and health research to improving transportation systems and strengthening fundamental research. This council prepares research and development strategies that are coordinated across Federal agencies to form an investment package that is aimed at accomplishing multiple national goals. To obtain additional information regarding the NSTC, contact the NSTC Executive Secretariat at (202) 456-6101.

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**About the Subcommittee on Disaster Reduction.** The SDR is a subcommittee of the Committee on Environment and Natural Resources (CENR) under the National Science and Technology Council. Chartered in 1988, the SDR is charged with facilitating and promoting disaster mitigation, preparedness, response, and recovery. The SDR addresses all types of natural and technological hazards, whether domestic or foreign in origin. To accomplish this mission, the SDR provides a forum for government leaders to leverage expertise, inform policy makers, promote technology applications, coordinate various activities, and promote excellence in research.



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