

AASG

The Association of American State Geologists (AASG) represents the State Geologists of the 50 United States and Puerto Rico. Founded in 1908, AASG seeks to advance the science and practical application of geology and related earth sciences in the United States and its territories, commonwealths, and possessions.

Position Statement

The Association of American State Geologists urges Federal, State, and local governments and the private sector to reduce risks from geologic and seismic hazards in vulnerable areas by assessing the hazards and taking constructive actions to minimize the consequences of future damaging events.

Background



Top, Fire in San Francisco, California, after 1989 Loma Prieta (World Series) earthquake. **Bottom**, Damage to unreinforced masonry building from 1994 Northridge, California, earthquake. Photos courtesy Karl V. Steinbrugge Collection, University of California, Berkeley, Earthquake Engineering Research Center.

Most natural hazards either are geologic in character or have a significant geologic component, and many anthropogenic hazards have geologic aspects. Landslides (including debris flows, mudslides, and rock falls), earthquakes, tsunamis, volcanoes, swelling and collapsing soils, floods, erosion, sinkholes, and avalanches are examples of hazards that can have both local and regional effects. Dams that fail, abandoned mines that collapse, and ground that subsides because of excessive pumping of water from aquifers are examples of anthropogenic hazards for which geologic information is vital in risk reduction.

Geologic investigations assist in our understanding of natural processes that create hazards and can extend our knowledge of past events beyond the brief time for which direct human observations are available. This work is critical in assessing the extent,

severity, and likelihood of future events. Wildfires can create conditions that intensify the potential for damage from debris flows and excessive erosion in burned-over areas. Hurricanes, floods, and tsunamis leave traces of their destruction in the geologic record (through both erosion and sediment deposition), thereby allowing assessment of long-term risk. These insights can facilitate risk reduction through opportunities to limit damage and loss of life through the design and placement of future

structures. State Geological Surveys and the U.S. Geological Survey (USGS) play vital advisory roles in such loss-reduction activities. They also aid others in identifying the vulnerability associated with existing structures, which is necessary to facilitate cost-effective mitigation. Maps depicting site response to ground shaking provide essential background information for establishing building codes and defining mitigation strategies. The stakes are high because these hazards collectively cause tens of billions of dollars of physical damage and economic loss each year in the United States. Fortunately much can be done to lower the risks and reduce future damage. Preparing for inevitable natural hazards can also provide insight into mitigating acts of terrorism through understanding the structural vulnerabilities of buildings, bridges, and other manufactured structures.

AASG supports several Federal initiatives to acquire the geologic insights necessary to effectively reduce risks from natural hazards. The National Earthquake Hazards Reduction Program (NEHRP) includes work by the Federal Emergency Management Agency (FEMA), National Institute of Standards and Technology (NIST), National Science Foundation (NSF),



Debris flow in Olokele Canyon, Kauai, 1980. Photo courtesy U.S. Geological Survey Water Resources Discipline.

Implementation at the Federal Level



Landslide in Jeffersonville, Vermont, 1999. Photo courtesy Jonathan Kim, Vermont Geological Survey.

and USGS, all of which have major roles in reducing risks from earthquakes. AASG supports FEMA's role in earthquake-risk mitigation and encourages FEMA to recognize that hazard assessment through mapping and earthquake investigation is a *necessary* component of mitigation.

AASG maintains that the top priority for USGS's Earthquake Hazards Program should be growth of the **external grants program**, which encourages participation by experts throughout the country. AASG also supports full implementation of the **Advanced National Seismic System**, a key component of NEHRP. AASG supports the role of NSF-supported research in making breakthroughs in fundamental understanding of the science of earthquakes and other natural hazards. The NSF **EarthScope** Program shows great promise in improving our knowledge of the dynamics of the Earth, particularly across the United States. AASG urges the National Aeronautics and Space Administration (NASA) to complement the EarthScope Program with missions designed to acquire ground-change data with interferometric synthetic aperture radar (**InSAR**) and to support the application of the global positioning system (GPS) to hazards identification.

AASG supports creation of a major program within USGS to evaluate and reduce losses from **landslides**. As indicated in recent USGS and National Academy of Sciences studies, landslides cause billions of dollars of damage per year, yet not enough has been done to map and understand the hazards, a key step to risk reduction. AASG strongly supports increased funding of USGS hazards programs, including earthquakes, volcanoes, and landslides and related land-surface movements (including liquefaction, shrink-swell soils, sinkholes, and subsidence).

AASG supports the integration of geological information, particularly as deduced from geologic maps and investigations, in reducing losses caused by **floods** and levee failures.

As recommended by the National Academy of Sciences, such information should be integrated into FEMA's modernization of flood insurance rate maps.

AASG also supports the National Tsunami Hazards Mitigation Program of the National Oceanic and Atmospheric Administration (NOAA), which has been instrumental in building necessary early warning systems at sea, and the efforts of USGS and the Federal Aviation Administration (FAA) in funding the Alaska, Cascade, and Hawaii Volcano Observatories, which play a key role in reducing loss of life and property from volcanoes.

In the arena of subsidence and other adverse effects of abandoned mines (fouled groundwater, acid drainage, death traps), AASG supports programs to address these hazards by the Office of Surface Mining, Bureau of Land Management, U.S. Forest Service, Army Corps of Engineers, and other agencies.

Geologic hazards are State and local phenomena, and Federal agencies should coordinate their programs and activities with State Geological Surveys. These surveys have a responsibility to assist local governments and to serve as implementers of scientific information from universities and Federal agencies. State Geological Surveys work closely with other State agencies involved in hazard issues, including emergency management, law enforcement, natural resources, and environmental protection.

The National Cooperative Geologic Mapping Program is an excellent example of a partnership between Federal and State governments, wherein complementary priorities are met and costs are shared. Geologic maps are our first and perhaps most important assessment tool for many hazards. Collaboration between USGS, State Geological Surveys, and universities has led to the production of thousands of new maps and training of the next generation of qualified professionals. This program and funding at the fully authorized level are vital to a national goal to reduce risks from natural hazards.



House on Washington coast destroyed by 1964 tsunami generated by Anchorage, Alaska, earthquake. From U.S. Army Corps of Engineers unpublished file report by D. W. Hogan and others (1964).

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