THE GEOLOGICAL SOCIETY OF AMERICA®

GSA Position Statement

Adopted October 2005; Revised November 2008; Revised April 2012

Geoscience and Natural Hazards Policy

Position Statement. The Geological Society of America (GSA) urges scientists, policy makers, and the public to work together to reduce our vulnerability to natural hazards. GSA strongly supports government investment in research, monitoring, and outreach programs to better characterize the nature and distribution of natural hazards and their impacts on modern society, to increase hazards awareness, and to enlist the resources of the private sector. Geoscientists must effectively communicate and integrate their research and monitoring results into functional public policy, reach out to the private sector for mutual benefit, and work to integrate geoscience into scientifically sound educational programs at all levels.

Purpose. This position statement (1) encourages increased public and private investments to reduce natural hazards vulnerability through better understanding of geologic processes; (2) emphasizes the crucial role of geoscience education and outreach in broadening the public's understanding of their risk from natural hazards and the available options to reduce risk; and (3) promotes active participation of geoscientists in implementing public policy that will improve society's resilience to natural hazards.

RATIONALE

We inhabit a dynamic planet. Human society is increasingly vulnerable to the results of earth processes, because of growing populations in hazard-prone locations and the interconnection of modern economies, with the risks increasing every year. For example:

- More people than ever before live on lands subject to earthquakes, floods, hurricanes, landslides, tsunamis, volcanoes, wildfires, and other hazards.
- We now transport and stockpile large quantities of hazardous materials and wastes at temporary sites and in structures whose integrity can be compromised by extreme events.
- Modern economies depend on large-scale critical infrastructure, such as interdependent networks of roads, pipelines, utilities, telecommunications, and computer systems, that is both fragile and costly to repair when damaged by natural hazards. Damage to any one of these networks can create cascading impacts that could be felt for weeks, months, or even years; damage to multiple systems can generate exponentially greater effects in terms of life safety, public and economic health, and overall community viability.
- Natural disasters cause not only physical damage, but social and economic damage as well. In the aftermath of many disasters, businesses shut down and either never reopen or fail within a short period of time. Emergency responders and critical care facilities are overwhelmed by sudden, immense, and sometimes long-term demand for their services. The costs of repairing buildings and infrastructure are often exceeded by the indirect socioeconomic costs associated with loss of jobs and business interruption. The impact of disaster experiences on mental health can also adversely affect the long-term functional recovery of communities in post-disaster environments.
- Globalization of the world economy makes all of us vulnerable to disasters wherever they occur. Modern business practices, in particular just-in-time inventory management, have created new vulnerabilities. Local supply-chain interruption due to an event in one area may result in worldwide economic impact.

RECOMMENDATIONS

Although geoscientists cannot eliminate natural hazards, they can help to reduce their consequences. In particular, there is considerable value to society when science results in practical mitigation strategies that improve overall resilience to disasters. Therefore, GSA makes the following recommendations:

- Geoscientists have a professional responsibility to inform the public about natural hazards and the need to build a more resilient society, thereby enabling more responsible actions and decisions. This includes clearly explaining research results, particularly with respect to uncertainty, and promoting individual and collective behaviors that may minimize disaster impact, increase individual and community capability function during and after a disaster, and to understand and adapt to a changed environment.
- Increased public investment is critical to improving our understanding of natural hazards and to characterize them and their impact over space and time. GSA supports funding to modernize and enhance monitoring networks so as to improve mitigation and emergency response by better characterizing the location, magnitude, and frequency of natural hazards. GSA also supports funding for programs related to the mechanisms and timing of natural hazard events, including the National Science Foundation's EarthScope initiative, the U.S. Geological Survey hazards programs, the multi-agency National Earthquake Hazards Reduction Program, NOAA's National Tsunami Hazards Mitigation Program, FEMA's Flood Map Modernization Program, and NASA's earth science mission. GSA also supports proactive outreach programs to both the public and private sectors, the latter of which owns or operates approximately 80% of the nation's critical infrastructure and can apply considerable resources toward greater resilience.
- Government agencies at local, state, national, and international levels have a special responsibility to integrate geoscience information and recommendations on natural hazards into land-use planning and sustainable development policies, as well as location, development, and long-term resilience of critical infrastructure. There must be a strong effort to coordinate hazard identification and risk reduction activities across agencies and levels of government. The private sector and the general public should have access to reliable geoscience information to reduce vulnerability in areas of known natural or human-induced hazards, and to maintain critical operations in event of disaster. Increased public investment in geoscience education and outreach is needed in order to promote informed land-use decisions.
- No single discipline can address all the integrated aspects of natural hazard characterization and mitigation. To enhance society's resilience and reduce the devastating effects of natural hazards, geoscientists must coordinate their efforts with engineers, architects, building code and standards developers, business leaders, public utilities, emergency managers, policy makers, design professionals, investors, insurers, news media, educators, relief organizations, and the public, as well as with other scientists.

ABOUT THE GEOLOGICAL SOCIETY OF AMERICA

The Geological Society of America (GSA), founded in 1888, is a scientific society with over 25,000 members from academia, government, and industry in more than 100 countries. Through its meetings, publications, and programs, GSA advances the geosciences, enhances the professional growth of its members, and promotes the geosciences in the service of humankind. GSA encourages cooperative research among earth, life, planetary, and social scientists, fosters public dialogue on geologic issues, and supports all levels of earth-science education. Inquiries about GSA or this position statement should be directed to GSA's Director for Geoscience Policy, Kasey S. White, at +1-202-669-0466 or kwhite@geosociety.org.

OPPORTUNITIES FOR GSA AND GSA MEMBERS TO HELP IMPLEMENT RECOMMENDATIONS

To facilitate implementation of the goals of this Position Statement and to increase the involvement of geoscientists in developing hazard policy, GSA recommends the following actions:

- Directly engage with land-use planners, emergency managers, response and relief agencies, and providers of critical infrastructure on every level, in order to best inform ongoing activities such as: hazard identification and modeling; hazard vulnerability development and maintenance; pre-disaster mitigation; situational awareness for responders during disaster response; and post-disaster decision-making during recovery and redevelopment. Direct engagement also allows us to provide the scientific basis for accurate and effective risk communication, understanding natural systems' effects on the build environment and the potential cascading impacts of natural hazards, and to clearly delineate the limits of our ability to model and forecast natural events.

- Seek opportunities to effectively communicate the value of integrating geoscience with natural hazards policy to (1) international, national, state, and local legislative bodies and government agencies; (2) private-sector leadership, especially in the finance, insurance, energy, utilities, equity, communications, manufacturing, and investment industries; and (3) private developers, economic development corporations, professional land-use planners, chambers of commerce, and other local decision makers. GSA members are encouraged to work with print, electronic, and broadcast media in promoting the value of science-based approaches for addressing natural hazards; ideally, this could be done in concert with end-users of geoscience information (e.g., local planners or emergency managers), in order to demonstrate the value of the aforementioned direct engagement (including how geoscientific information can lessen the effects of a major natural disaster).

- Seek opportunities to communicate effectively with community and industry-specific groups the value of integrating geoscience with natural hazard policy. Now more than ever, the value of geoscientific information to the development of hazard policy must be made clear to the general public. Public communication may be achieved by identifying the broadest range of diverse audiences and engaging them through appropriate media, including: (1) presenting short courses or customized presentations to industry groups via their professional organizations (e.g., International Association of Emergency Managers or state-based organizations, National Environmental Health Association, American Public Health Association, Risk and Insurance Management Society, American Banking Association, American Water Works Association, Chartered Property-Casualty Underwriters) or in regional forums that include multiple providers exposed to similar hazards; (2) approaching these end-user organizations as partners by conducting short-courses or other educational activities that involve direct input and participation from them, for the mutual benefit of their membership and GSA's (3) writing letters to the editor and op-ed pieces in newspapers; (4) establishing local media contacts and providing updates on hazard related information; (5) conducting field trips and/or presenting short courses for the public and/or the media; (6) publishing easily understood pamphlets, booklets, and white papers; (7) presenting public lectures at museums, schools, environmental groups, and civic clubs; and (8) understanding and engaging in social media forums. As mentioned, it is beneficial to provide local examples of how geoscientific information has either contributed to community, state, and national disaster resilience.

- Participate in professional forums and community interactions to encourage open discussion on the role that geoscience plays in effective hazard mitigation and policy development. Our interaction should emphasize the value of geoscientific information for planning and policy development and enable GSA members to be better-informed advocates for requesting funding for geoscientific information in support of hazard mitigation. GSA's Executive Director, Director for Geoscience Policy in Washington, D.C., and Geology and Public Policy Committee share primary responsibility for identifying opportunities for GSA to encourage the funding of natural hazards research and monitoring systems, and the dissemination of factual information about such hazards in support of

its ongoing communication and outreach efforts. GSA members are encouraged to bring relevant opportunities to the attention of these individuals, and members are also encouraged to use this Position Statement as a resource in their participation in public discussions related to the study and mitigation of natural hazards.

- GSA members who are employed in academia are encouraged to promote a dialog on the role that geoscience plays in effective planning and policy development with their peers in science and engineering, as well as other relevant fields, such as planning, community development, and emergency services, and to offer courses, seminars, and other efforts that will help prepare the next generation of participants in the public discourse. Material progress is limited if geoscientists only talk to one another. The ongoing dissemination of relevant and factual information by skilled geoscientists and their colleagues in related professions will help to create an informed public better able to act responsibly in reducing our vulnerability to natural hazards, but only if these scientists are able to identify both their audiences and the best way to communicate the desired information. All GSA members are encouraged to engage in this important process.
- GSA should provide members with readily accessible print, electronic, and personnel resources that support communication with decision makers regarding the value of integrating geoscience with natural hazards policy. Considerable expertise and resources are available to members through GSA's Geology and Public Policy Committee, GSA's Geology and Society Division, and GSA's Director for Geoscience Policy.
- GSA can raise awareness of the value of integrating geoscience with natural hazards policy by publishing articles and providing other content in its various outlets, as well as in external media.