
Public Investment in Earth Science Research

Position Statement. The Geological Society of America (GSA) supports strong and growing public investments in earth-science research. Earth-science research requires substantial increases in public funding from all levels of government to promote the general welfare of all citizens; to ensure the health, vitality, and security of society; and to provide sound stewardship of Earth. These investments address such issues as energy and mineral resources, water resources, climate change, and natural hazards. Earth-science research forms the basis for training and educating the next generation of earth-science professionals.

Purpose. The purpose of this position statement is to (1) summarize consensus views of The Geological Society of America regarding public investment in earth-science research; (2) improve public and political awareness and understanding of how investment in earth-science research benefits society and leads to greater health and prosperity; and (3) provide recommendations for implementation of a strategy that strengthens the commitment to public investment in earth-science research by GSA and its members.

RATIONALE

Science and technology are engines of economic prosperity, environmental quality, and national security. Public investment in research pays substantial dividends. According to a report by the National Academies of Sciences, Engineering, and Medicine, "...the economic value of investing in science and technology has been thoroughly investigated. Published estimates of return on investment (ROI) ... for publicly funded R&D range from 20 to 67%" (*Rising Above the Gathering Storm*).

The earth sciences are critical components of the overall science and technology enterprise and require substantial increases in public funding to ensure the health, vitality, and security of society and for Earth stewardship. Earth-science research provides knowledge and data essential for developing policies, legislation, and regulations regarding land, mineral, and water resources at all levels of government. Growing investments in earth-science research will stimulate innovations that fuel the economy, provide security, and enhance the quality of life.

SCIENTIFIC AND PUBLIC POLICY ASPECTS OF EARTH SCIENCE RESEARCH

Additional public investments in earth science research are necessary to address such issues as natural hazards, energy, water resources, rising sea level, and climate change, especially as they relate to the responsible development and maintenance of human infrastructures and the stewardship of the environment.

- Natural hazards, such as earthquakes, tsunamis, volcanic eruptions, hurricanes, wild fires, and floods remain a major cause of fatalities and economic losses worldwide. An improved scientific understanding of geologic hazards will reduce future losses through better forecasts of their occurrence and magnitude.
- Energy and mineral resources are critical to society and to national security and have positive impacts on local, national, and international economies and quality of life. These resources are often costly and difficult to find, and new generations of geoscientists need the tools and expertise to discover them. Management of their extraction, use, and residue requires a scientific approach that will maximize the derived benefits and minimize the negative effects.
- The availability and quality of surface water and groundwater are vital to the well-being of both society and ecosystems. Greater scientific understanding of these critical resources—and communication of new insights by

geoscientists in formats useful to decision makers—is necessary to ensure adequate water resources for the future.

- Forecasting the outcomes of human interactions with Earth’s natural systems, including climate change, is limited by an incomplete understanding of geologic and environmental processes. Improved understanding of these processes in Earth’s history increases confidence in the ability to predict future states and enhance the prospects for mitigating or reversing adverse impacts to the planet and its inhabitants.
- The increasing global population requires a sustainable infrastructure and environment in which to thrive. The design and engineering of future civil construction, such as roads, bridges, power plants, utilities, and waste management facilities, to name a few, necessitates a greater scientific understanding of geologic processes. This is especially relevant in regions prone to natural hazards. An improved understanding of the dynamics of terrestrial forces will enhance the security, reliability, and effectiveness of critical infrastructure as well as mitigate potential environmental liabilities.

Research in earth science is also fundamental to training and educating the next generation of earth-science professionals. The Geological Society of America recognizes the need to actively support policies and investments that strengthen earth-science research and research capabilities; foster research partnerships among universities, government agencies, and industry; and provide support for the education of the next generation of geoscientists.

Significant increases in earth-science research investments will help us meet challenges posed by the human impact on Earth’s natural systems. Public investment in earth-science research and education should come from national, state, and local government sources and support mission-driven government agencies as well as academic research. Policy makers must be made aware of the importance of earth-science research to the future of our nation, states, municipalities, and industry. Ironically, the need for this information comes at a time of reduced funding for earth-science research by many private companies and government agencies, and many state and federal programs supporting earth-science endeavors have been reduced or eliminated.

RECOMMENDATIONS

- *The Geological Society of America supports strong and growing public investments in earth-science research and education at all levels of government.* Current public investments in earth-science research are not sufficient. Increased funding is needed to meet the significant challenges posed by human interactions with Earth’s natural systems, to ensure economic vitality, and to sustain an overall high quality of life for Earth’s inhabitants.
- *Earth-science research and education should be a component of broader initiatives to increase overall public investments in science and technology.* For example, earth-science research should be included in a recommendation by the National Academies to “increase the federal investment in long-term basic research by 10% each year over the next 7 years ...” (*Rising Above the Gathering Storm*). Likewise, implementation of the America COMPETES Act, which authorizes a doubling of the budgets of key science agencies in seven years, should encompass earth-science research and education.

ABOUT THE GEOLOGICAL SOCIETY OF AMERICA

The Geological Society of America, founded in 1888, is a scientific society with over 26,000 members from academia, government, and industry in 115 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 geoscience issues, and supports all levels of earth-science education. Inquiries about the 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 ITS MEMBERS TO HELP IMPLEMENT RECOMMENDATIONS

To facilitate implementation of the goals of this position statement, the Geological Society of America recommends the following actions:

- *GSA members should seek opportunities to effectively communicate the value of earth-science research to society.* More than ever, the value of earth-science research should be made clear to national, state, and local governments, community groups, local decision makers, and the general public. We should also seek opportunities to link earth-science research funding with compatible public funding initiatives at various levels of government. Local examples of how earth science has contributed vital information to water, energy, environmental, or engineering projects are essential to this effort. We should make clear the ways additional earth-science information might prevent or lessen the effect of a costly, adverse land-use activity or reduce the otherwise devastating consequences of a natural disaster.
- *GSA members should participate in professional forums and town hall meetings and speak at gatherings, such as community service organizations, library lecture series, and at local nature centers on the range of issues associated with increasing public investment in earth-science research.* Our discussions should emphasize the societal returns on public investments in earth-science research and enable GSA members to be better-informed advocates for public funding of this research. GSA members who have experience with policy makers and policy decision making at various levels of government should lead discussions, encourage participation, and offer advice on best-practice communication skills.
- *GSA should provide members with readily accessible print, Web, and personnel resources that support geoscientists' communications with decision makers regarding the value of public investment in earth-science research.* 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 in Washington, D.C.
- *GSA and its members should encourage the academic community to work more closely with the private sector to increase the role of private enterprise in earth-science education.* With the paucity of well-trained geoscientists available to meet certain industry needs, GSA and its members should actively seek opportunities for partnerships between universities and industry to train earth scientists, especially in the form of joint workshops, industry grants and contracts, donations, and on-site training programs, among other efforts.