

Testimony of the
Geological Society of America
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Regarding the
National Science Foundation
FY 2013 Budget Request

To the
U.S. House of Representatives
Committee on Appropriations
Subcommittee on Commerce, Science, Justice, and Related Agencies
March 22, 2012

Summary

The Geological Society of America urges Congress to appropriate at least \$7.373 billion for the National Science Foundation (NSF) in fiscal year 2013. This funding level would uphold the President's FY 2013 budget request for the NSF and is consistent with the vision to double the NSF budget as specified in the America COMPETES Reauthorization Act of 2010. The budget request would allow NSF to maintain a success rate of funding approximately 22 percent of the proposals received.

The Geological Society of America supports strong and growing investments in earth science research and education at NSF. Substantial increases in federal funding for earth science research and education are needed to ensure the health, vitality, and security of society; stewardship of Earth; and future economic growth. These investments are necessary to address such issues as energy 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. We encourage the committee to at least fully fund the Geosciences Directorate request of \$906.4 million.

The Geological Society of America, founded in 1888, is a scientific society with over 25,000 members from academia, government, and industry in all 50 states and more than 90 countries. Through its meetings, publications, and programs, GSA 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.

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As Congress recognized in the America COMPETES Act and its 2010 reauthorization, science and technology are engines of economic prosperity, environmental quality, and national security. In 2010, the National Academies issued a report, *Above the Gathering Storm, Revisited*, that speaks to the need to invest in research, even in a tight fiscal environment:

“It would be impossible not to recognize the great difficulty of carrying out the *Gathering Storm* recommendations, such as doubling the research budget, in today’s fiscal environment...with worthy demand after worthy demand confronting budgetary realities. However, it is emphasized that actions such as doubling the research budget are investments that will need to be made if the nation is to maintain the economic strength to provide for its citizens healthcare, social security, national security, and more.”

Likewise, the National Commission on Fiscal Responsibility and Reform, headed by Erskine Bowles and Alan Simpson, said:

“[W]e must invest in education, infrastructure, and high-value research and development to help our economy grow, keep us globally competitive, and make it easier for businesses to create jobs.”

The America COMPETES Act and the America COMPETES Reauthorization Act of 2010 set the stage to double the National Science Foundation (NSF) budget. Even with the fiscal pressures facing our Nation, Congress and the Administration have gradually moved NSF along the doubling path, and we greatly appreciate your support.

The Geological Society of America urges Congress to appropriate at least \$7.373 billion for the NSF in fiscal year 2013. We believe this growth in NSF is necessary for America’s future economic and science and technology leadership, both through discoveries that are made through this investment and through the talent developed through NSF programs. This funding level would uphold the President’s FY 2013 budget request for the NSF and is consistent with the vision to increase the NSF budget in the America COMPETES Act. This level would directly support an estimated 285,000 scientists, fellows, trainees, teachers, and students. The budget request will allow NSF to maintain a success rate of funding approximately 22 percent of the proposals received.

The earth sciences are critical components of the overall science and technology enterprise and NSF investment. Increases in federal funding for earth science research are needed 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, energy, and water resources at all levels of government.

The budget requests \$906.4 million, an increase of 2.4%, for the Geosciences Directorate. Within the directorate, the Division of Earth Sciences would receive \$189.2 million, a 3.1% increase; Atmospheric and Geospace Sciences would receive \$264.4, a 2.1 % increase; Integrative Computing Education and Research would stay flat at \$91.2 million, and Ocean Sciences would receive \$362 million, a 2.9% increase.

NSF's Earth Sciences Division regularly receives a large number of exciting research proposals that are highly rated for both their scientific merit and their broader impacts, but many meritorious projects have not been funded due to budget constraints. Additional investments in earth science research can have significant positive impacts on society.

It is critically important to increase NSF's investments in earth science research and education to meet challenges posed by human interactions with Earth's natural system and to help sustain these natural systems and the economy. Increased investments in NSF's earth science portfolio are necessary to address such issues as natural hazards, energy, water resources, climate change, and education. Specific needs include:

- Natural hazards - including earthquakes, tsunamis, volcanic eruptions, floods, droughts, wildfires, and hurricanes - remain a major cause of fatalities and economic losses worldwide. Recent natural disasters provide unmistakable evidence that the United States remains vulnerable to staggering losses. 2011 was a record year for natural disasters in the United States, with 12 separate billion dollar weather/climate disasters, breaking the previous record of nine billion-dollar weather/climate disasters in one year. An improved scientific understanding of geologic hazards will reduce future losses through better forecasts of their occurrence and magnitude, and allow for better planning and mitigation in these areas. We urge Congress to increase funding for the NSF investments in fundamental earth science research that stimulate basic understanding and innovations in natural hazards monitoring and warning systems. One new initiative to highlight in this arena is the "Creating a More Disaster Resilient America" in the Science Engineering and Education for Sustainability Initiative (SEES).
- Energy and mineral resources are critical to the functioning of society and to national security and have positive impacts on local, national, and international economies. Improved scientific understanding of these resources will allow for their better management and utilization while at the same time considering economic and environmental issues. The Division of Earth Sciences supports proposals for research geared toward improving the understanding of the structure, composition, and evolution of the Earth and the processes that govern the formation and behavior of the Earth's materials. This research contributes to a better understanding of the natural distribution of mineral and energy resources for future exploration. Research on critical materials needed for renewable energy sources are highlighted in the SEES Sustainable Energy Pathways Initiative and GSA encourages federal support for research on rare earth materials.
- The devastating droughts in 2011 reminded us of our dependence on water. 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 resources is necessary to ensure adequate and safe water resources for the future. NSF's program solicitation on water sustainability and climate is designed to address major gaps in our basic understanding of water availability, quality, and dynamics, and the impact of both a changing and variable climate, and human activity, on the water system.

- 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 deep-time history can increase confidence in the ability to predict future states and enhance the prospects for mitigating or reversing adverse impacts to the planet and its inhabitants.
- Research in earth science and education is fundamental to training and educating the next generation of earth science professionals. A recent study [*Status of the Geoscience Workforce 2011*](#) by the American Geosciences Institute found:

“The supply of newly trained geoscientists falls short of geoscience workforce demand and replacement needs. According to the U.S. Bureau of Labor Statistics there were a total of 262,627 U.S. geoscientist jobs in 2008, and in 2018, the projected number of U.S. geoscientist jobs will be 322,683, a 23 percent increase. These projections do not include replacements due to attrition. Given the age demographics of the geoscience discipline, we expect a 12 percent replacement rate for attrition. With this adjustment, aggregate job projections are expected to increase by 35 percent between 2008 and 2018....The majority of geoscientists in the workforce are within 15 years of retirement age. Even in oil and gas companies, which typically offer the highest salaries of all geoscience employing industries, the supply of new geoscientists is short of replacement needs. By 2030, the unmet demand for geoscientists in the petroleum industry will be approximately 13,000 workers for the conservative demand industry estimate.”

Increased NSF investments in earth science education at all levels are needed because knowledge of the earth sciences is essential to science literacy and to meeting the environmental and resource challenges of the twenty-first century. NSF’s Education and Human Resources Division researches and improves the way we teach science and provide research and fellowship opportunities for students to encourage them to continue in the sciences. Specifically, NSF’s Expeditions in Education Program (E2) would involve many Geoscience Programs on education and human resource development, with research to examine undergraduate STEM learning.

The Geological Society of America is grateful to the House Appropriations Subcommittee on Commerce, Science, Justice, and Related Activities for its leadership in increasing investments in the National Science Foundation and other science agencies. We thank the committee for their support of research at NSF and their recognition of the critical role it plays.

For additional information or to learn more about the Geological Society of America – including GSA Position Statements on water resources, energy and mineral resources, natural hazards, climate change, and public investment in earth science research – please visit www.geosociety.org or contact Kasey White at kwhite@geosociety.org.