Testimony of the

Geological Society of America

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Regarding the

U.S. Geological Survey

FY 2013 Budget Proposal

To the

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Committee on Natural Resources

Subcommittee on Energy and Minerals Resources

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My name is John W. Geissman. I am the President of the Geological Society of America, a Full Professor of Geosciences at the University of Texas at Dallas, and Full Professor Emeritus at the University of New Mexico. I am testifying today on behalf of the Geological Society of America (GSA). Founded in 1888, the Geological Society of America is the oldest professional geoscience scientific society in North America. It represents over 25,000 members from academia, government, and industry in all 50 states and more than 90 countries. Through its meetings, publications, and programs, the society 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.

I thank you for the opportunity to comment on the budget of the U.S. Geological Survey (USGS) and the value of the broad array of programs that the Survey supports.

The GSA urges Congress to fully fund the FY 2013 request for the USGS and restore cuts in the request to key programs. As one of our Nation's key science agencies, the USGS plays a vital role in understanding and documenting mineral and energy resources, researching and monitoring potential natural hazards, monitoring effects of climate change, and determining and assessing water availability and quality. These issues are truly some of society's greatest challenges. Despite the critical role played by the USGS, funding for the Survey has stagnated in real dollars for more than a decade.

The Geological Society of America supports strong and growing budgets for the U.S. Geological Survey and thanks the committee for its concerns for adequate funding of the USGS. The Society is concerned about the proposed cuts in several parts of the USGS' budget request, including a $5 million cut to the Mineral Resources Program, a $6.5 million cut to the Water Resources Research Act, and a $6 million cut to the National Water Quality Assessment

Methods Development and Monitoring program. Given the importance of the many activities of the Survey that protect lives and property for natural hazards, stimulate innovations that fuel the economy, provide national security, and enhance the quality of life, sustained, steady growth in federal funding for the Survey, as well as other organizations supporting Earth science research, is necessary for the well being of our Nation.

Broader Impacts of the U.S. Geological Survey

The USGS is one of the nation's premier science agencies. It was established in March, 1879, for the purpose of "classification of the public lands, and examination of the geological structure, mineral resources, and products of the national domain". Notably, one impetus for the establishment of the Survey was the deterioration of the US economy at that time, and understanding, including mapping, the geology of the American west may in the long run be an important means of improving the economy! At present, about 70 percent of the USGS budget is allocated for research and development. In addition to underpinning the science activities of the Department of the Interior, the Survey's research activities are used by communities across the nation. Through its offices and partnerships across the country, USGS data and resources are widely utilized by policymakers, emergency responders, natural resource managers, engineers, educators, and the public. USGS research addresses many of society's greatest challenges, including natural hazards, mineral and energy resources, climate change, and water availability and quality.

- Natural hazards – including earthquakes, tsunamis, volcanic eruptions, floods, droughts, wildfires, and hurricanes – are a major cause of fatalities and economic losses world-wide. 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 in 2011, with an aggregate damage total of about $52 billion. The 2011 record breaks the previous mark of nine billion-dollar weather/climate disasters in one year, which occurred in 2008. The combined historic and recent geologic records demonstrate that several areas in the United States will continue to experience major earthquake and/or volcanic activity in the earth's future. 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. The Geological Society of America urges Congress to increase funding for the USGS to modernize and upgrade its natural hazards monitoring and warning systems and support the proposed increases for funding of early warning systems in the budget request.

- Energy and mineral resources are critical to the sustainability of our 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 enhanced and environmentally sound management and utilization. The USGS is the sole federal information source on mineral (including base and precious metals) potential, production, and consumption. USGS assessments of mineral and energy resources – including those that have recently become of greater and greater importance (e.g., rare earth elements, unconventional natural gas resources, and geothermal resources) – are essential for making informed decisions about the nation's future. Many emerging renewable energy technologies – such as wind turbines and

solar cells – depend on rare earth elements and critical minerals that currently lack diversified sources of supply. China accounts for 95 percent of world production of rare earth elements although it has only 36 percent of identified world reserves (USGS, 2010). The increases proposed for Rare Earth Element Research by the USGS will help ease our dependence on these foreign sources.

- Improved understanding of geologic processes across Earth's history can increase our confidence in the ability to predict future climate states and long-term ecological changes and thus enhance the prospects for mitigating or reversing adverse impacts to the planet and all of its inhabitants. In addition, USGS research on climate impacts is used by the Department of the Interior and local partners to make informed decisions.

- The devastating droughts across much of the nation 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 our society and ecosystems. Further scientific understanding of these resources—and communication of new insights by geoscientists in formats useful to decision makers—is necessary to ensure adequate and safe water resources for the future. The establishment of a National Groundwater Monitoring Network will expand our understanding of this critical resource.

- The budget request proposes a $13 million increase at USGS for hydraulic fracturing research as part of a joint effort with the department of Energy and the Environmental Protection Agency. The USGS plays a critical role in this endeavor to better understand and minimize the environmental, health, and safety impacts of hydraulic fracturing. The USGS research will focus on better understanding potential relations among induced seismicity, water quality, and hydraulic fracturing and will be tasked with compiling an atlas of shale resources.

- Research in Earth science is also fundamental in the education and training of the next generation of Earth science professionals. The research and cooperative programs of the USGS play an important role in developing the future workforce. 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."

From a more personal perspective, having been entrenched in academia for over 32 years, I think that it is important to note that undergraduate student enrollments in the geosciences across the county have risen considerably over the past few years. This is in part a response to the understanding that there are a large number of very well-paying jobs available in the energy and mineral industries. In addition, it is a recognition by many students with whom I have spoken in my capacity as GSA President, and also as an educator, that the geosciences can and must play a leading role in addressing many of the sustainability issues that our global society is currently facing and will continue to face in the future. The USGS has and will continue to employ some of our best and brightest geoscientists with aspirations of meeting the current and future challenges our planet faces.

- Science and technology are engines of economic prosperity, environmental quality, and national security. Federal investments in research pay substantial dividends. According to the National Academies' report *Rising Above the Gathering Storm* (2007), "Economic studies conducted even before the information-technology revolution have shown that as much as 85% of measured growth in US income per capita was due to technological change." Likewise, the National Commission on Fiscal Responsibility and Reform, headed by Erskine Bowles and Alan Simpson, said: "We 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." Earth science is a critical component of the overall science and technology enterprise. Growing support for Earth science in general and the U.S. Geological Survey in particular is necessary to stimulate innovations that fuel the economy, provide security, and enhance the quality of life. Earth Science provides knowledge and data essential for developing policies, legislation, and regulations regarding land, mineral, energy, and water resources at all levels of government.

Budget Recommendations:

GSA supports the FY 2013 budget request for the U.S. Geological Survey and the increases provided for several key areas such as hydraulic fracturing research, early earthquake warning, establishing a National Groundwater Monitoring Network, and invasive species research. However, we are concerned about the proposed cuts in many programs and urge that full-funding for these areas be restored. Some proposed cuts of concern in the budget request include:

- $6.5 million for Water Resources Research Act Program. These programs provide for a federal-state partnership of State Water Resources Research Institutes that play an important role in gathering local and regional data, research, solutions, and technology transfer to aid in the resolution of State and regional water problems.

- $6.0 million for National Water Quality Assessment Methods Development and Monitoring. The NAWQA Program is a primary source for long-term, nationwide information

on the quality of streams, ground water, and aquatic ecosystems that supports water management policies at all levels of government.

- $5.0 million for Cooperative Water Program Interpretive Studies. For more than 100 years, this Program has been a highly successful cost-sharing partnership between the USGS and water-resource agencies at the State, local, and Tribal levels to collect data and conduct interpretive studies on water quality issues.

- $5.0 million for Mineral Resources Program. This program conducts research and assessment to provide scientific information for objective resource assessments and unbiased research results on mineral potential, production, consumption, and environmental effects. The MRP is the sole Federal source for this information.

- $3.3 million for Hydrologic Networks and Analysis Information Management and Delivery

- $2.0 million for Toxic Substances Hydrology Methods Development and Assessments

We urge Congress to support the FY 2013 budget request and restore these and other detrimental cuts to the USGS budget. We recognize the financial challenges facing the nation, but the loss of irreplaceable data, for example, will increase costs to society in the long term.

GSA supports the efforts of the USGS, NASA, NOAA and OSTP to examine a future path forward for multi-program support of Landsat satellites in order to maintain sufficient funding for other key programs within USGS. The Landsat satellites have amassed the largest archive of remotely sensed land data in the world, a tremendously important resource for natural resource exploration, land use planning, and assessing water resources, the impacts of natural disasters, and global agriculture production. GSA thanks the committee for its recognition that requiring the future Landsat mission to be maintained by the USGS would overwhelm the Survey's budget request; your support for studies of alternative means of supporting this important program is very appreciated.

Thank you for the opportunity to provide testimony about the U.S. Geological Survey. The Geological Society of America is grateful to the House Appropriations Subcommittee on Interior, Environment, and Related Agencies for its leadership in strengthening the U.S. Geological Survey over many years. For additional information or to learn more about the Geological Society of America – including GSA Position Statements on water resources, mineral and energy resources, climate change, natural hazards, and public investment in Earth science research – please visit www.geosociety.org or contact Kasey White at kwhite@geosociety.org.