

Testimony of
Kasey White
Director for Geoscience Policy
for the
Geological Society of America
Regarding the
National Science Foundation
and
National Aeronautics and Space Administration
FY 2023 Appropriation
to the
U.S. House of Representatives
Committee on Appropriations
Subcommittee on Commerce, Justice, Science, and Related Agencies
May 13, 2022

The Geological Society of America (GSA) supports increased investments in geoscience research and education at the National Science Foundation (NSF) and National Aeronautics and Space Administration (NASA). GSA encourages Congress to appropriate at least \$11 billion for NSF in Fiscal Year 2023 and provide increases to NASA's Science Mission Directorate and its Earth Science and Planetary Science Divisions. Investment in NSF and NASA is necessary to secure America's future economic leadership, both through the discoveries made and the talent developed through their programs. For the United States to remain a global leader, the nation must provide greater investment in its people, particularly women and individuals from other groups traditionally underrepresented in STEM fields. Earth and space science at these two agencies play a vital role in American prosperity and security through understanding and documenting mineral and energy resources that underpin economic growth; researching and monitoring potential natural hazards that threaten U.S. and international security; informing communities about the impacts of a changing climate; and determining and assessing water quality and availability.

GSA is a scientific society with members from academia, government, and industry in more than 100 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.

SCIENCE ■ STEWARDSHIP ■ SERVICE

National Science Foundation

The Geological Society of America (GSA) appreciates the increase to the National Science Foundation (NSF) budget in FY 2022 and thanks the Committee for recognizing the important role that the agency plays in our country's global competitiveness. We urge Congress to provide NSF at least \$11 billion in FY 2023. Increases in funding will allow NSF to continue to support its core basic research in addition to growing investments in its [Ten Big Ideas](#) and other transformational research, such as that funded by the new Directorate for Technology, Innovation and Partnerships (TIP).

Sustained increases beyond inflation are necessary to regain America's science and technology leadership and to enable the discoveries that lead to future innovations and industries. Data from the [Merit Review Process Fiscal Year 2020 Digest](#) show that NSF receives many more high-quality proposals than it can fund. In FY 2020, NSF was only able to fund 28% of the proposals received. The report noted, "Approximately \$3.9 billion was requested for declined proposals that were rated Very Good or higher in the merit review process— proposals that, if funded, may have produced substantial research and education benefits."

Geoscience research is a critical component of the overall science and technology enterprise and a key contributor to groundbreaking research across disciplines at NSF. Increased investments in NSF's geoscience portfolio are necessary to address pressing issues including natural hazards, energy and minerals, water resources, and education.

- There is a vital need to understand the abundance and distribution of critical mineral resources, as well as the geologic processes that form them, as articulated in the Energy Policy Act of 2020. NSF's Division of Earth Sciences supports research on 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.
- The quality and quantity of surface water and groundwater have a direct impact on the wellbeing of societies and ecosystems, as evidenced by flooding and drought impacts experienced across the U.S. during the past year. NSF's research addresses major gaps in our understanding of water availability, quality, and dynamics, including the impact of both a changing climate and human activity on the water system.
- The Division of Atmospheric and Geospace Sciences provides critical infrastructure and research funding for understanding our planet, including weather and precipitation variability, atmospheric conditions, and space weather hazards. NSF is a key partner in obtaining data necessary to predict severe space weather events, which affect the electric power grid, satellite communications, and navigation systems, as noted in The Promoting Research and Observations of Space Weather to Improve the Forecasting of Tomorrow Act (PROSWIFT Act), which was signed into law in October of 2020.
- Understanding the oceans is key to a sustainable future. The National Research Council report [Sea Change, 2015-2025 Decadal Survey of Ocean Sciences](#) highlights areas of research that are need to make informed decisions. These include better characterizing

risk and the ability forecast geohazards such as earthquakes, tsunamis, undersea landslides, and volcanic eruptions; rates, mechanisms, impacts, and geographic variability of sea level change; and changes in the marine food.

- Natural hazards are a major cause of fatalities and economic losses. NOAA found in 2021 alone, 20 weather/climate disaster events with losses greater than \$1 billion. An improved scientific understanding of hazards will reduce future losses by informing effective planning and mitigation. We urge Congress to support NSF investments in fundamental Earth science research and facilities that underpin innovations in natural hazards monitoring and warning systems. For example, the Coastlines and People Hubs for Research and Broadening Participation initiative aims to understand the impacts of coastal environmental variability and natural hazards on populated coastal regions.

National Aeronautics and Space Administration

GSA appreciates past committee support of NASA Science and requests increases to NASA's Science Mission Directorate and its Earth Science and Planetary Science Divisions in FY 2023 as proposed in the President's budget request. Increased funding will be critical to implement the recommendations of the National Academy of Sciences report, [*Thriving on Our Changing Planet: A Decadal Strategy for Earth Observation from Space*](#). The report notes:

“Earth science and derived Earth information have become an integral component of our daily lives, our business successes, and society’s capacity to thrive. Extending this societal progress requires that we focus on understanding and reliably predicting the many ways our planet is changing.”

The data and observations from Earth observing missions and research are a tremendously important resource for natural resource exploration and land use planning, as well as assessing water resources, natural disaster impacts, global agriculture production. The Landsat satellites have amassed the largest archive of remotely sensed land data in the world. On September 27, 2021, the NASA/USGS Landsat program launched its ninth satellite in its 50 year program that will operate in tandem with Landsat 8 and replace Landsat 7. GSA supports interagency efforts to ensure the future viability of Landsat satellites as well as funding to increase the capabilities and uses of multi-spacecraft constellations of small scientific satellites.

By looking at our planet as an integrated system, NASA's Earth and climate science efforts are among the nation's most effective tools to understand and tackle climate change. For example, NASA's new Earth System Observatory consists of a series of Earth-focused missions that will create a holistic view of the Earth to provide key information related to climate change, natural hazards and agricultural processes. In addition, NASA's proposal to create an Earth Information Center will make data more accessible to communities most affected by climate change.

Planetary research is directly linked to Earth science research and cuts in either program will hinder the other. In order to support missions to better understand the workings of the entire solar system, planetary scientists engage in both terrestrial field studies and Earth observation to examine geologic features and processes that are common on other planets, such as impact

structures, volcanic constructs, tectonic structures, and glacial and fluvial deposits and landforms. In addition, geochemical planetary research studies include investigations of extraterrestrial materials now on Earth, including lunar samples, meteorites, cosmic dust particles, and, most recently, particles returned from comets and asteroids. We appreciate past congressional support for Planetary Science and urge you to continue to investment to allow NASA to move forward with priority missions as identified in the recent decadal survey, [*Origins, Worlds, and Life: A Decadal Strategy for Planetary Science and Astrobiology 2023-2032*](#).

Support Needed to Educate Future Innovators

For the United States to remain a global leader, the nation must provide greater investment in its people, including women and individuals from other groups traditionally underrepresented in STEM fields. NSF's Education and Human Resources Directorate researches and improves the way we teach science and provides research and fellowship opportunities for students that encourage them to continue in the sciences. Similarly, NASA's educational programs, led by NASA's Office of STEM Engagement and directorates, have inspired and led many into science careers. GSA fully supports these efforts, as well as additional programs to make the geoscience workforce more diverse, such as NSF INCLUDES- Inclusion across the Nation of Communities of Learners of Underrepresented Discoverers in Engineering and Science.

Please contact GSA Director for Geoscience Policy Kasey White to learn more about the Geological Society of America – including GSA Position Statements on water resources, planetary research, energy and mineral resources, natural hazards, climate change, and public investment in Earth science research.