



## SCIENCE FOR COMMUNITIES

*Interior's USGS, the Nation's premier earth sciences agency, generates scientific information that helps inform decisions about land and water management. Its hazards monitoring helps reduce risks to communities associated with earthquakes, tsunamis, floods, mudslides, and volcanoes.*

*Secretary Gale A. Norton, March 2, 2005*

Science forms the foundation of Interior's land management decisions, supporting work to protect and use resources, enjoy recreation opportunities on our Nation's lands, and serve our communities. Research provides information critical to better understand many of Interior's complex issues. The ability of land managers to address a range of issues depends on the knowledge garnered from reliable information, accessible earth science data, and associated tools and technologies. Interior is improving the response to these science needs by developing a process to prioritize the research, monitoring, and assessment capabilities of all the bureaus within the Department.

The U. S. Geological Survey serves as the Department's primary source of scientific research, earth and biological sciences data, and geospatial information. The USGS provides science that addresses the Nation's complex land and resource management problems and protects lives and property. The ultimate outcome is scientific information that enables decisionmakers to make informed decisions, set priorities, reduce risks from material and natural hazards, and monitor land conditions.

The 2007 budget proposes \$944.8 million for USGS science-related initiatives to protect lives and resources and provide scientific leadership through improved hazards detection and warning; improved energy research; streamgaging; and USGS participation in the Landsat Data Continuity Mission known as Landsat 8.

The Department continues to improve its science programs. During 2005, Interior established a Research and Development Council to coordinate

scientific research and development activities across the Department. The Council is comprised of senior R&D managers and budget representatives from across the Department and meets quarterly to plan, coordinate, and assess R&D activities. During its first year, the Council defined "research and development" for the Department and used this definition to inventory and assess research and development programs; established guidelines for peer review consistent with Office of Management and Budget criteria and guidelines; coordinated the Department's report on technology transfer; and coordinated a multi-bureau gas hydrates work plan. In 2006, the Council began to review current research and development practices and will make recommendations to improve consistency and collaboration and avoid duplication.

The Office of Science and Technology Policy has established a set of R&D investment criteria that address the planning, management, and assessment of research programs by rating their relevance, performance, and quality. Both the Department and bureaus used these investment criteria in the 2007 budget formulation process.

Interior bureaus have undergone 11 PART reviews using R&D investment criteria. All 11 have rated the programs under review as moderately effective or better.

**Multi-Hazards Pilot Initiative** – More Americans are at risk of experiencing severe impacts of natural hazards now than at any time in the Nation's history. Hurricanes Katrina and Rita underscore the scale of damage such hazards can present. Each

decade, property damage from natural hazards doubles or triples in constant dollars as more people live on coasts and other hazardous areas. An estimated 75 million Americans in 39 States face significant risk from earthquakes. Coastal population growth and associated infrastructure have quadrupled in the last 30 years, with more than 45 million people now living in hurricane-prone areas. Landslides cause billions of dollars in property damage each year. Average annual losses from floods and earthquakes exceed \$12 billion per year.

Addressing these risks is a high priority for USGS. Ensuring community and public access to critical scientific information regarding natural hazards can improve decisionmaking and the ability of jurisdictions to manage public risks. In analyzing how best to enhance Interior's ability to assess, monitor, and report on natural hazards, USGS



listened to the needs of customers and partners. The USGS also participated actively in the Program Assessment Rating Tool evaluation of the bureau's geologic hazards programs. The PART action plan that resulted from this process calls for USGS to identify opportunities to coordinate hazards investments across landslide, earthquake, and volcano activities.

In April 2005, *Time Magazine* released a special issue with the cover title "The TIME 100: The Lives and Ideas of the World's Most Influential People." Brian Atwater, a USGS scientist, is featured in the category of scientists and thinkers. Brian earned his place on the list from a seemingly humble place, a well-used aluminum canoe.

The *Time* article describes how Brian paddled around the salt marshes and tidal flats of Washington State, discovering evidence of past tsunamis. Brian was studying the 600-mile-long Cascadia Subduction Zone that was once thought by some to be relatively harmless, but his finding helped demonstrate that the fault line is capable of producing powerful earthquakes and tsunamis that can infiltrate and change the landscape of Washington and travel across the ocean, inflicting widespread damage to distant shorelines.

The USGS geologic hazards program received a moderately effective PART rating, based on evidence that the program could demonstrate progress toward some long-term goals. The review also pointed to opportunities for improvement, clearly requiring both a change in program direction and increased leveraging of resources through partnerships. The USGS addresses these opportunities in its 2007 proposal for a multi-hazards pilot initiative in Southern California that will create synergies across USGS's various hazards programs. The initiative includes a \$2.2 million increase that will be leveraged with \$3.5 million redirected from workforce restructuring in the geology program and lower priority activities within other hazards-related and geospatial programs.

The pilot will concentrate on hazards reduction in Southern California by enhancing research and assessment into the causes and consequences of natural hazards and improving responses to hazard events. The initiative will merge information about disparate hazards into integrated products to support land-use planning, hazards mitigation, and emergency response. The initiative will also focus on information sharing with the local community to help prepare for and recover from natural disasters.

Southern California was chosen for this project as it has one of the Nation's highest potentials for



extreme, catastrophic losses from several natural hazards, including earthquakes, tsunamis, fires, landslides, and floods. The pilot stage of the initiative is expected to last five years, with successfully demonstrated capabilities ready for expansion to



additional regions after the first year. Examples of these capabilities include a warning system prototype for debris flows being developed in partnership with the National Weather Service, improved seismic and streamgage network capabilities, and a suite of integrated hazard-assessment tools.

The hazards initiative builds on advances in science and technology that position USGS as a leader with potential to reduce the Nation's future risks. By working with local land-use and emergency managers, USGS will adapt its scientific information into useful assessment and warning products to be made available through geospatial systems already in use. Delivering these products when and where they are needed can help prevent hazard events from becoming catastrophic disasters.

The initiative also highlights the importance of strong partnerships. Dozens of partners, representing user communities, will assist in leveraging work and collaborate in the development of USGS information products needed to upgrade building codes and strengthen local emergency planning efforts. These partners will assist in improving the data delivery systems for early warning of natural disasters. Approximately 25 percent of the funding for the initiative will be leveraged with external resources and expertise to provide services and products in the most efficient and cost-effective manner.

**Streamgages** – Information on the quantity and timing of stream flow in the Nation's rivers helps safeguard lives and property and ensure adequate water resources for a healthy environment and

economy. Knowledge of the flow of water in the Nation's streams and rivers plays a critical role in flood protection, water supply, pollution control, environmental management, and recreational enjoyment. Since 1887, USGS has operated a streamgaging program to collect stream flow information needed by Federal, State, and local agencies, as well as individual citizens.

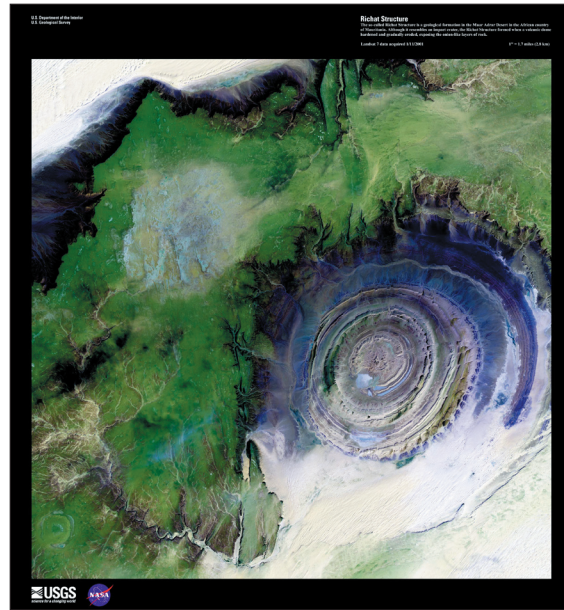
Today, USGS operates and maintains approximately 7,000 streamgages that provide long-term, accurate information for diverse users. These streamgages are part of the National Streamgage Network which consists of a core of USGS funded and operated streamgages; streamgages operated by the USGS but funded in cooperation with other agencies; and streamgages funded and operated by other agencies that provide data appropriate to meet national goals. Altogether, 800 agencies at the Federal, State, tribal, and local levels participate in funding the National Streamgage Network.



The 2007 budget requests an increase of \$2.3 million for the streamgaging program, which will enable USGS to increase the number of streamgages providing real-time data on the internet by 30, and maintain the operation of the current network. The USGS anticipates that the funding requested for 2007 will help to maintain or increase streamgage coverage in Mississippi and Louisiana, where the importance of timely streamgage data was made apparent during and after Hurricanes Katrina and Rita. In addition, the funds would provide resources for technological investments that will make the entire network more cost-efficient in the long-term. These include procurement or development of improved software for data collection and data processing and new instruments that are more reliable or make the data collection process more efficient.

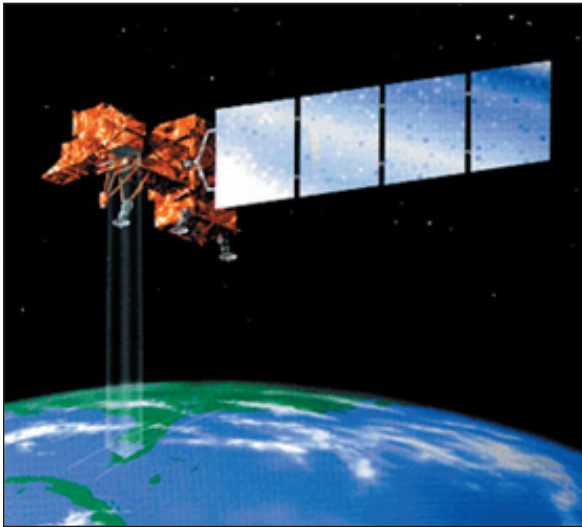
**Landsat 8: Landsat Data Continuity Mission**—For over 30 years, Landsat satellites have collected data about the Earth’s land surfaces. These data constitute the longest continuous record of the Earth’s surface as seen from space. By imaging the Earth’s land environment at a resolution sufficient to record the impacts of human activities, Landsat provides an important complement to U.S. global imagers, such as those run by the National Aeronautics and Space Administration and the National Oceanic and Atmospheric Administration.

The first satellite in the Landsat family, Landsat 1, was launched in 1972. The most recent, Landsat 7 launched in April of 1999, continues to collect data though data utility has declined due to the failure of the satellite’s scan line corrector. Landsat 5, which has performed since launch in 1984 and is well past its three-year projected life span, is now experiencing its own set of problems that could limit its utility.



changes in the Earth’s land surfaces and associated environment. The USGS role will be to operate Landsat 8 after its launch and implement and operate ground systems to collect, archive, process, and distribute land surface data to the Federal government and other users.

In 2006, USGS received \$8.1 million to start the design of the ground system components needed to acquire, archive, produce, and distribute Landsat 8 data. The USGS estimates that it will take four years, 2006 through 2009, to design, build, and test the proposed system, at a total cost of \$73.8 million. In 2006, USGS will work with NASA to develop, evaluate, and award a request for proposals for Landsat 8. The satellite is currently scheduled to launch in early 2010.



The Landsat Data Continuity Mission, a partnership between NASA and USGS to build, launch, and operate a new satellite (Landsat 8) is the next phase of the Landsat program. Landsat 8 will acquire and deliver highly calibrated, medium-spatial resolution, remotely sensed data that will provide for the continuous collection of Landsat data, including the Earth’s landmasses, coastal boundaries, and coral reefs. Landsat 8 will also ensure that the data collected and distributed to users meet the scientific objectives of monitoring

The 2007 budget requests an additional \$16.0 million to complete all of the design and 27 percent of the development activities needed for the ground system. The USGS plans to conduct the following activities in 2007 to reach this goal: design reviews and development of the Landsat 8 ground system elements, determination of the suite of Landsat 8 products to be offered to customers, and initial development of the Landsat 8 ground system test plan. Throughout this process, USGS will work closely with NASA.