

Provide Science for a Changing World

As a Nation, we face serious questions concerning the environment. How can we ensure an adequate supply of critical water, energy, and mineral and biological resources in the future? Are we irreversibly altering our natural environment when we use these resources? How has the global environment changed over geologic time, and what can the past tell us about the future? How can we predict, prevent, and mitigate the effects of natural hazards? Collecting, analyzing, and disseminating the scientific information needed to answer these questions, as well as providing the other critical scientific support for resource management decisions, are major responsibilities of the Department.

The U.S. Geological Survey (USGS) is the Nation's primary provider of natural science information related to natural hazards, certain aspects of the environment, and mineral, energy, water, and biological resources. USGS scientific research contributes to improving the health and welfare of the American people, as well as helping to resolve the Nation's environmental issues and formulate sound federal land management and natural resource policies. USGS is also the federal government's principal domestic map-making agency.

Since 1879, the USGS has been responsible for classifying the public lands and examining the geological structure, mineral resources, and products of the national domain. With the incorporation of the former National Biological Service in 1996, the USGS has also become a major partner in enhancing the Nation's understanding of the conditions and trends of biological resources and the ecological factors affecting them.

In 2000, the Department employed the following cross-cutting strategies to achieve the goal of providing science for a changing world:

- Participated in interagency and intergovernmental programs to assess, document, and monitor ecological and socioeconomic conditions and trends, including development and implementation of information-needs assessment procedures.
- Developed technology to increase efficiency and expand collection and management of natural science data, as well as establishing and maintaining national earth and biological science databases for use by federal, state, and local land management and regulatory agencies, as well as the public.

The major departmental activities to achieve the goal of providing science for a changing world are summarized in *Figure 8*.

Figure 8

Goal 4 – Provide Science for a Changing World	
GPRA Program Activity	2000 Expenses (\$ in millions)
1. Environment and Natural Resources	\$1,069
2. Hazards	159
3. Improve Land, Resource, and Title Information	119
Total – Goal 4	\$1,347

“The USGS conducts a significant water resources national program, with more than 45,000 monitoring stations, to describe the status and trends in the quantity and quality of surface and ground water resources.”

Environment and Natural Resources

Desired Result: Provide science for a changing world in response to present and anticipated needs to expand our understanding of environmental and natural resource issues on regional, national, and global scales and enhance predictive/forecast modeling capabilities.



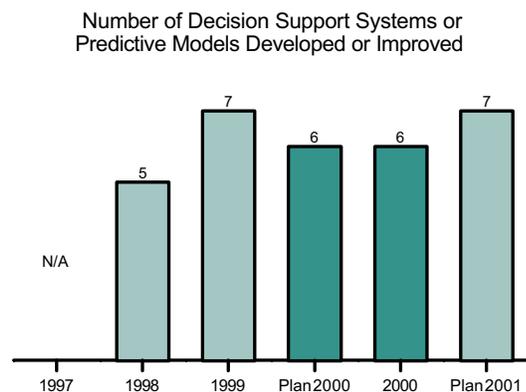
Environmental research begins with data collection and monitoring (photo by USGS).

Our environment—the air, water, soil, and plant and animal life—is constantly changing as natural processes and human actions affect it. Changes in demographics also affect the competition for and use of the renewable and nonrenewable natural resources—land, water, minerals, and energy—needed to sustain life and to maintain and enhance our Nation’s economic strength. The traditional boundaries between environment and natural resources science are increasingly blurring as land and resource management decisions deal with increasingly complex issues affecting both. The need for cross-disciplinary integrated science has never been more apparent. USGS environment and natural resource activities deal with studies of natural, physical, chemical, and biological processes, and the results of human actions. These studies encompass collecting data, making long-term assessments, conducting ecosystem analyses, monitoring change, and forecasting the changes that may be expected in the future.

The USGS cannot, and does not seek to, collect all of the environmental and natural resources data required for managers, regulators, and the general public to make informed decisions. The USGS is increasingly building partnerships among federal, state, local, private, and industrial entities to leverage resources and expertise. The USGS is working with customers to identify their long-term environmental and natural resource issues, current trends, and available information to improve its data collection and data management efforts; to deliver systematic analyses needed by its customers; and to develop and improve decision support systems. The USGS is also seeking new applications and increased use of its classified assets.

Performance Measure: USGS’s environment and natural resource programs focus on understanding, modeling, and predicting how multiple forces affect natural systems. This knowledge enables land managers, decisionmakers, and citizens to make sound decisions about how to live on and manage the land. The USGS provides these customers with a better understanding of natural systems at all scales, with more and better predictive tools and decision support systems, and with easier access to natural science data. The long-term goal is to ensure the continued availability of long-term environmental and natural resource information and systematic analysis and investigations needed by customers, and by 2005, to develop 20 new decision support systems and predictive tools for informed decisionmaking about natural systems.

2000 Results: In 2000, the USGS met its performance target by developing or improving six decision support systems.



Hazards

Desired Result: Provide science for a changing world in response to present and anticipated needs, focusing efforts to predict and monitor hazardous events in near-real and real-time and to conduct risk assessments to mitigate loss.

Hazards are unpreventable natural events that, by their nature, may expose our Nation's population to the risk of death or injury and may damage or destroy private property, societal infrastructure, and agricultural or other developed land. The USGS is responsible for describing, documenting, and understanding natural hazards and their risks. These activities include long-term monitoring and forecasting, short-term prediction, real-time monitoring, and communication with civil authorities and others during a crisis. Other significant activities are post-crisis analysis to develop strategies to mitigate the impact of future events and preparation of coordinated risk assessments for regions vulnerable to natural hazards.



A streamflow gaging station equipped with satellite transmission capability (photo by USGS).

The USGS has the primary federal responsibility for monitoring and issuing warnings for earthquakes, volcanoes, landslides, and geomagnetic storms. The USGS works closely with the National Weather Service in providing hydrologic information that is used to forecast floods; the National Oceanic and Atmospheric Administration in monitoring coastal erosion and tsunamis; and the National Interagency Fire Center in supporting wildland fire management activities. The USGS has unique capabilities for integrating hazards information with a wealth of other geospatial data and imagery to rapidly assess the impact of natural hazards events.

Performance Measure: The USGS enhances its ability to characterize and monitor hazardous events in near-real and real time by using telemetered streamgages and earthquake sensors that are capable of delivering information almost instantaneously. The long-term goal is to ensure the continued transfer of hazards-related data, risk assessments, and disaster scenarios needed by USGS customers before, during, and after natural disasters, and by 2005, to increase the delivery of real-time hazards information by increasing the quarterly average number of gages reporting data on the Internet to 5,500 (thus reducing the time it takes to provide flood information at that site from 6 to 8 weeks to 4 hours) and by installing 500 improved earthquake sensors (thus reducing delivery time of information on potentially damaging earthquakes from 40 to 20 minutes) to minimize the loss of life and property.

2000 Results: In 2000, the USGS met its performance goals by increasing the quarterly average number of streamgages on the Internet (cumulative) to 4,872 (target was 4,700) and the number of real-time earthquake sensors (cumulative) to 201 (target was 200).

	1997	1998	1999	Plan 2000	2000	Plan 2001
Real-time streamgages on the Internet (quarterly average)	Replacement		4,500	4,700	4,872	5,374
Real-time earthquake sensors (cumulative)	70	100	120	200	201	329

Land, Resources, and Title Information

Desired Result: Provide the public with improved information about the land, its resources, and land records.



A BLM cadastral survey crew hiking through dense vegetation to establish survey points near the Mississippi River in Missouri (photo by BLM).

The Bureau of Land Management (BLM) has extensive historical and current information on land ownership, use, and condition in the United States. The agency maintains cadastral survey and historical data on patented lands, along with information on the mineral estate, resource conditions, and permits or leases on federal lands. Historical records are critical to resolving many ownership disputes and are increasingly recognized as an important source of both genealogical information and data about historic resource conditions in the United States.

As the complexities of managing ecosystems increase, data collection and analysis become even more vital to managing the land. The BLM's information about land ownership, status, and condition is of interest to a wide variety of parties, including public land users; other federal, state, tribal, and local agencies; and the scientific community.

Performance Measure: On May 1, 1998, two million General Land Office (GLO) land title records were web-enabled at www.gloreCORDS.blm.gov, allowing customer access to data and images. The response has been astounding: as of October 31, 2000, almost 2.4 million website visitors have accessed 84.2 million pages, generating 36.5 million data and image requests. Automation of serial patents, representing all BLM patents issued from 1908 to the 1960s, will be completed in 2002, expanding the website to include images of western U.S. records. The long-term goal by 2005 is to post 4,260,000 GLO conveyance records and survey plats for portions of 30 states on the Internet to assist title, survey, historical, and genealogical research.

2000 Results: The BLM posted 335,248 conveyance records and survey plats to the Internet in 2000, exceeding its performance target of 335,000.

