

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 is also the federal government's principal domestic map-making agency. 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.

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 1999, the Department employed the following 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*.

“Interior provides the Nation with reliable, impartial information to describe and understand the Earth.”

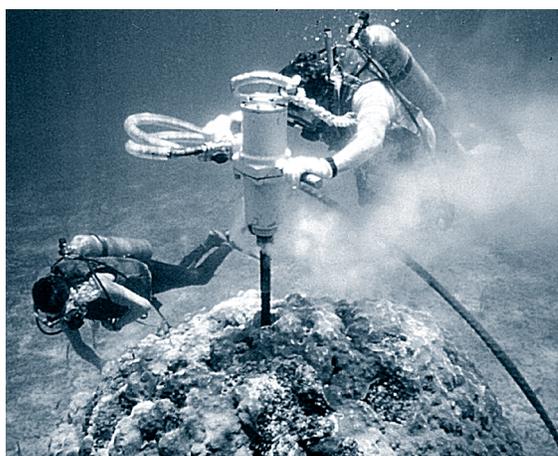
Figure 8

Goal 4 – Provide Science for a Changing World	
GPRA Program Activity	1999 Expenses (\$ in millions)
1. Environment and Natural Resources	\$1,062
2. Hazards	131
3. Improve Land, Resource, and Title Information	64
Total – Goal 4	\$1,257

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.

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.

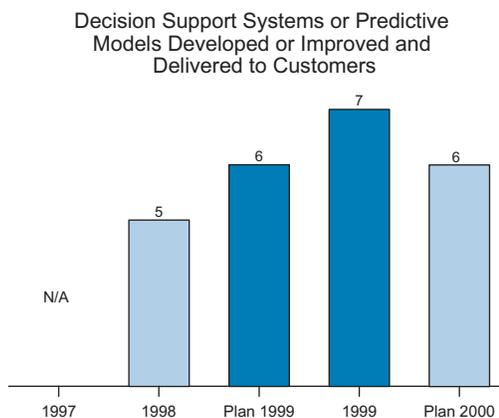


USGS divers take a coral core sample with an underwater coring device developed by USGS. Coral have growth rings like trees. Information on the thickness and geochemical composition of the coral rings can give clues to past climatic conditions (photo by USGS).

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 seeks to build partnerships among federal, state, local, private, and industrial entities to leverage resources

and expertise. The USGS works 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.

1999 Performance Indicator



In 1999, the USGS exceeded its target for this performance measure. An additional water resource predictive model was completed and in use by stakeholders at the end of 1999.

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.

The USGS has the primary federal responsibility for monitoring and issuing warnings for earthquakes, volcanoes, landslides, and geomagnetic (solar) 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 Interagency Fire Center supporting wildland fire management activities. The USGS has unique capabilities for the integration of hazards information with a wealth of other geospatial data and imagery to rapidly assess the impact of natural hazards events.

1999 Performance Indicators

	1997	1998	Plan 1999	1999	Plan 2000
Real-time streamgages (cumulative)	4,467	4,571	4,671	5,132	N/A
Real-time earthquake sensors (cumulative)	70	100	120	120	200

In 1999, the USGS met or exceeded the performance measure targets for the Hazards program activity. USGS added telemetry to 461 streamgages against a target of 100. Although exceeding the target, USGS is revising this measure for 2000. Because USGS is responsible for delivering hazards information to the National Weather Service and others, the reliability of the systems which deliver streamflow data is a crucial component of USGS's performance. In addition, USGS encountered problems with collecting reliable performance data on a quarterly basis to provide timely information for management purposes. USGS is proposing to change the real-time streamgages measure not only to reflect the number of real-time streamgages that USGS puts in place each year, but also to capture its ability to deliver hazards data to those who need it, and to automate the performance tracking process as well.

The USGS has developed a "robot" program to query each Web site every day to ask: "How many sites are delivering real-time data on the Web right now?" The new performance measure will be "quarterly average number of gages reporting real-time data on the Internet."

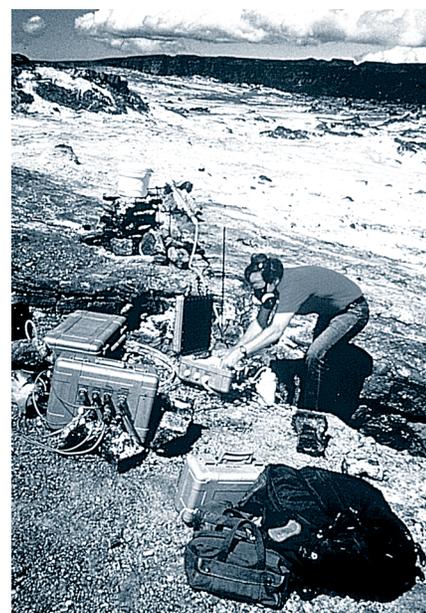
The USGS is also exploring alternatives for modification of the earthquake sensor performance measure to better capture its ability to deliver hazards data to those who need it, and to automate its performance tracking process as well.

Improve Land, Resources, and Title Information

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

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.

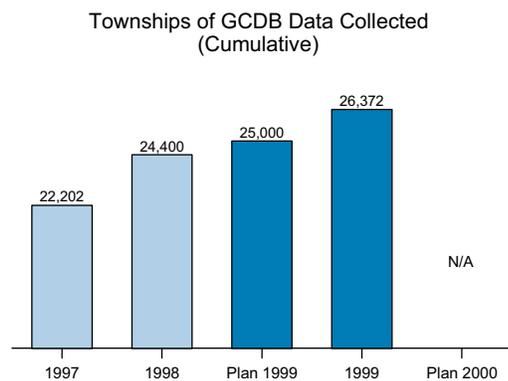
With the release of Executive Order 12906, "Building a National Spatial Data Infrastructure," the BLM has strived to make survey information more readily accessible by other disciplines and the public. The BLM's national responsibilities include providing cadastral information for land title records to other agencies and the public. This information is fundamental to effective land management and, with the ever-growing access to technologies such as Geographic Informa-



USGS earth scientists describe the features of the earth and what created them by mapping the geology at the surface and beneath the ground. At the Kilauea volcano summit on Hawaii, this scientist is setting up a device to sample volcanic gases (photo by USGS).

tion Systems, the demand for this information has increased dramatically. The BLM's Geographic Coordinate Database (GCDB) initiative provides cadastral information in a form that is more readily accessible and easily used with advanced technologies.

1999 Performance Indicator



In 1999, the collection of GCDB data continued in the areas of mineralization and the more complex land tenure areas of urban interface between federal and tribal lands. The total townships collected through the end of 1999 was 26,372, which slightly exceeded the performance target; data will be used for management of high priority areas.

The GCDB collection effort was augmented by leveraging resources through partnerships with other federal, tribal, state, and county agencies. This provided additional resources to collect more accurate and up-to-date GCDB data. Plan 2000 data is not available since revisions are anticipated for this performance measure.



BLM employees use global positioning system equipment to map abandoned mine sites on Winnemucca Mountain, Winnemucca, Nevada (photo by BLM).