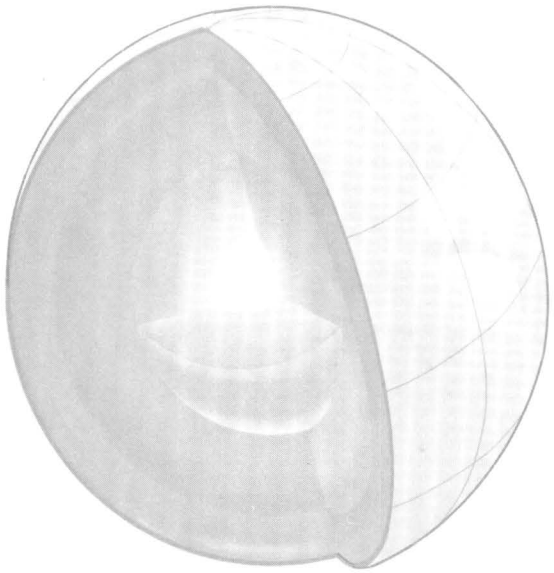
GOALS
of the
U.S. Geological Survey



Earth Science in the Public Service

Circular 1010

The mission of the U.S. Geological Survey is to provide geologic, topographic, and hydrologic information that contributes to the wise management of the Nation's natural resources and that promotes the health, safety, and well-being of the people. This information consists of maps, data bases, and descriptions and analyses of the water, energy, and mineral resources, land surface, underlying geologic structure, and the dynamic processes of the Earth.

GOALS
of the
U.S. Geological Survey

Circular 1010

DEPARTMENT OF THE INTERIOR
MANUEL LUJAN, Jr., Secretary

U.S. GEOLOGICAL SURVEY
Dallas L. Peck, Director

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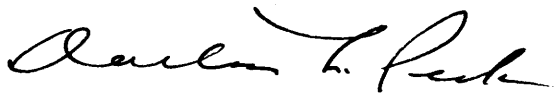
Foreword

The material needs of society are ultimately met by the resources of the Earth—its land, water, and mineral endowment. In using these resources, we may affect our environment and alter our options for land and other resource uses. How can we ensure an adequate supply of this natural wealth for future generations? In what ways are we irreversibly altering our natural environment? How can we avoid undesirable or unacceptable side effects of man's use of the land and prevent or mitigate potential hazards from active earth processes? To respond to these and similar questions, continued research in basic earth science is needed to develop knowledge about the Earth, its structure, and its resources; to place this knowledge in a coherent scientific and global context; and to apply it to meet society's current and future needs.

Over a century ago, the Congress of the United States determined that the Nation needed a Federal agency "under the Interior Department" to examine the geologic structure, mineral resources, and other products of the "national domain" and to provide information about the Earth for use by the Congress, Federal agencies, and the public in reaching informed decisions concerning the development, use, and protection of our natural resources. As a result, the Congress established the Geological Survey in 1879. Since that time, the mission of the Survey has evolved in response to changing national needs and priorities, advancements in science and technology, and additional legislation.

The Survey has been, from its very inception, an integral part of the larger national and international earth-science community. It cooperates with other Federal, State, and local agencies, as well as with academic and industrial groups, both in the United States and elsewhere, to ensure a continuous and mutually beneficial collection and exchange of information, ideas, and results.

This document describes the current goals of the Survey in response to its mission and authorizations. It also describes the national needs for earth-science information to which these goals are responsive. A preliminary edition was circulated for comment to members of the Geological Survey and various officials of Federal, State, and local earth-science-related organizations. All suggestions received were considered in the preparation of this final document. Both the preliminary and final editions were compiled by a Geological Survey team consisting of W. A. Radlinski, Peter F. Bermel, Timothy E. Calkins, Russell H. Campbell, Robert M. Hirsch, David W. Moody, Benjamin A. Morgan III, Norman E. Schmidt, Jr., Ethan T. Smith, Frederick B. Sower, Lowell E. Starr, Richard E. Witmer, and E-an Zen. As the needs of the Nation and the state of the science change, the document will be reviewed and revised. Comments are invited.



Dallas L. Peck,
Director, U.S. Geological Survey

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INTRODUCTION

The purpose of this document is to inform the general public, including potential users of services and products of the U.S. Geological Survey, members of Congress and other public officials, Survey employees, and other interested individuals, about the role of the Survey in satisfying the earth-science needs of our Nation. Understanding this role can lead to better legislation, increased cooperation, better informed management decisions, and greater public awareness of available products and services. Another purpose of the document, of equal importance, is for internal use in setting program objectives, in establishing priorities, and in preparing program proposals and budget requests. Together, these items form the basis for a strategic plan for the future of the Survey.

This document is organized into four sections: (1) *Mission*—functions that the Survey is authorized and funded to perform; (2) *National Needs*—examples of problems that require earth-science information for effective and intelligent decisionmaking; (3) *Goals*—a desired state, process, or product that the Survey plans to achieve in order to fulfill its mission and address future needs for earth-science knowledge; and (4) *Authorizations*—legislative and executive documents that have authorized and funded Survey activities, including a chronological list of pertinent legislation.

Relationships among national needs, goals, and other activities that lead to satisfaction of these national needs are shown in a figure preceding the Goals section. Objectives for each of the goals, which in turn determine program priorities, levels of effort, and estimates of work completion, are not included in this document. Objectives are being set forth in a follow-on report available from the Director, U.S. Geological Survey.

The Survey provides services to all segments of society. Its clients include individuals in Federal, State, and local governments, the U.S. Congress, universities, private enterprise, and the general public, as well as foreign governments and other organizations. It distributes annually over 80,000 book publications and 7 1/2 million maps, mostly in small-quantity individual orders. The fact that over two dozen Federal agencies contribute funds to the Survey for products and services and over 900 State and local agencies cooperate with the Survey on a cost-sharing basis indicates the broad diversity of the Survey's work in satisfying national needs.[1]

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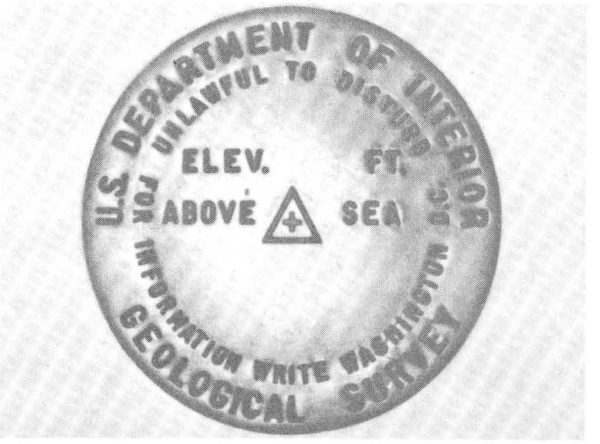
[1]The *United States Geological Survey Yearbook* includes lists of these Federal agencies and cooperators and is available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. The *Yearbook* contains a summary of annual accomplishments and a list of the principal offices and officials of the Survey with addresses and telephone numbers. The *Yearbook* also provides guidance on how to obtain information and publications, as does Circular 900, *Guide to Obtaining USGS Information*, which is available free upon request from the Books and Open-File Reports Section, U.S. Geological Survey, Federal Center, Box 25425, Denver, CO 80225.

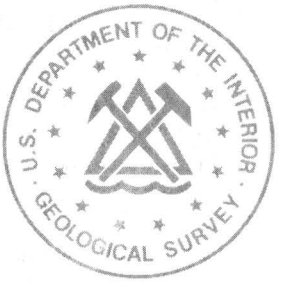


MISSION

The mission of the U.S. Geological Survey is to provide geologic, topographic, and hydrologic information that contributes to the wise management of the Nation's natural resources and that promotes the health, safety, and well-being of the people. This information consists of maps, data bases, and descriptions and analyses of the water, energy, and mineral resources, land surface, underlying geologic structure, and dynamic processes of the Earth.

To accomplish its mission, the Survey:

- Conducts and sponsors research in geology, hydrology, mapping, and related sciences.
- Produces and updates geographic, cartographic, and remotely sensed information in graphic and digital forms.
- Describes the onshore and offshore geologic framework and develops an understanding of its formation and evolution.
- Assesses energy and mineral resources, determines their origin and manner of occurrence, and develops techniques for their discovery.
- Collects and analyzes data on the quantity and quality of surface water and ground water, on water use, and on quality of precipitation.
- Assesses water resources and develops an understanding of the impact of human activities and natural phenomena on hydrologic systems.
- Evaluates hazards associated with earthquakes, volcanoes, floods, droughts, toxic materials, landslides, subsidence, and other ground failures, and develops methods for hazards prediction.
- Participates in the exploration of space and prepares geologic and other maps of the planets and their satellites.
- Publishes reports and maps, establishes and maintains earth-science data bases, and disseminates earth-science data and information.
- Provides scientific and technical assistance for the effective use of earth-science techniques, products, and information.
- Coordinates topographic, geologic, and land-use mapping, digital cartography, and water-data activities.
- Develops new technologies for the collection, coordination, and interpretation of earth-science data.
- Provides scientific support and technical advice for legislative, regulatory, and management decisions.
- Cooperates with other Federal, State, and local agencies, and with academia and industry.



NATIONAL NEEDS

Sustained economic growth in the United States during the 20th century has been accompanied by rapid growth in population and per capita consumption of agricultural and industrial products. Improving, even simply maintaining, this high standard of living for a growing population places ever-increasing demands on the Nation's land, water, energy, and mineral resources. As a result, there is growing competition for land use among, for example, food and forest production, shelter and living space, transportation, and recreation. The management of the Nation's resources, including selections for conservation and development with a minimum of adverse impact on the environment, places increasing demands on earth science to provide detailed and comprehensive information to assure the wisest choices. Some of the national needs and ways in which earth sciences can address them are listed below.

ENERGY

- Nearly all components of the American economy depend on energy. Use of nonrenewable energy resources, such as oil, gas, coal, and uranium, requires continuing efforts by earth scientists to locate and understand the genesis of these resources and to maintain current knowledge of the worldwide energy supply, demand, and potential.

- Development of such energy resources as hydroelectric, geothermal, solar, or fusion power requires informed decisions about alternative uses of land, water, and materials.

- Extraction of some energy-producing materials from the Earth carries with it the risk of serious environmental damage, as well as threats to human health and safety. Examples are wastes from the mining and processing of energy-producing materials, increased output of atmospheric pollutants that affect the quality of precipitation, destruction of habitats because of mining activity, land subsidence from subsurface withdrawals of water, oil, and coal, and pollution of water from the disposal of energy-related wastes. Solutions to these problems require understandings of the geology and of the chemical, physical, and biological processes occurring in the air, on the land surface, and in the water and ground.

MINERALS

- Our society consumes large quantities of mineral resources. At the same time, urban growth, recreational development, and withdrawal of public lands prevent many areas from being developed for mineral extraction. Accurate descriptions of mineral resources of public and private lands, both onshore and offshore, are needed to achieve informed policy decisions about the use of the Nation's lands and offshore areas, to assure the long-term availability of minerals, and to select the most appropriate alternative land uses.

- Several major mineral districts in the United States are nearly depleted. Important mineral deposits either may be undetected or are not currently being exploited because of low grade or difficult accessibility. New techniques are needed to detect undiscovered deposits and to use lower grade mineral deposits.

- Many strategic and critical minerals needed to sustain our society are not found in abundance within the United States and have to be imported. Study of the origins of these minerals and their world distribution may lead to the development of methods to identify new domestic deposits and lessen our reliance on uncertain foreign sources.

WATER

- Water is needed to sustain life and to ensure the future growth of the economy, particularly for the production of food and energy. Hydrologic information contributes to descriptions of the location, quantity, quality, and use of water resources and prediction of the effects of droughts and water development on the adequacy of water supplies. Planners and managers use this information to locate, design, and operate water-supply facilities such as reservoirs, well fields, and water-treatment plants and to plan for regional and local economic development.

- Protection of water resources from contaminants and from wastes discharged into streams, injected into aquifers, or placed on the land or underground is essential to public health and the quality of life. An understanding of the chemical, physical, and biological mechanisms that affect the transport and fate of contaminants is necessary to detect their presence and predict their behavior. This kind of knowledge is essential to planning effective management strategies for protecting the quality of water resources and for locating, designing, and operating waste storage and disposal facilities.

- Allocation of water resources is based on court decrees, interstate compacts, international treaties, and water law. Accurate information about our water resources is needed to apportion available resources, monitor fulfillment of legal obligations, and resolve disputes.

LAND

- Proper management of the land and offshore areas requires accurate and comprehensive information about its location, characteristics, configuration, and current and potential uses. Topographic, geologic, and land-use maps, digital cartographic data bases, and remotely sensed data contribute to an understanding of the land as a resource. As changes in the natural and man-made features of the land occur, the need for current and more detailed geographic information increases.

- The capacity of the land to support human enterprise is finite. Multiple and conflicting demands for land are often unavoidable, and difficult choices among uses must be made. Examples of possible conflicting uses include those of wilderness, agriculture, urban growth, mineral, energy, and water resources development, and waste disposal. In deciding how to use the land, the benefits to society must be evaluated and the effects on the land and its animal and plant life determined.

FOOD AND FIBER

- A better understanding of the relationships among geology, topography, weathering, and erosion is needed to identify soils that can best support agricultural production. This understanding can contribute to more effective land-use decisions.

- Irrigation frequently necessitates artificial drainage to prevent water saturation of the soil and the accumulation of naturally occurring salts and minerals at concentrations toxic to plants or animals. However, the drainage process itself can lead to contamination of surface and ground water. Understanding of soil physics and the geochemistry of surface- and ground-water flow systems is necessary to design drainage systems that minimize these problems and protect water supplies and downstream water quality.

- Geologic resource investigations are needed to assure the continued availability of mineral fertilizers. Research is needed to predict the impact of fertilizers and pesticides on soil, ground water, surface water, and sediments to assure the continued production of food without irreparable environmental damage.

HOUSING AND TRANSPORTATION

- The suitability of any site developed to accommodate our growing population depends in part on the engineering properties of rocks and soils, the slope of the land, and the potential for natural hazards. Topographic, geologic, and hydrologic maps are among the kinds of information that are used to evaluate site suitability.

- The design and construction of transportation facilities, such as pipelines, powerlines, tunnels, bridges, waterways, roads, railroads, and airports, are more efficient if information on topographic, geologic, and hydrologic characteristics of the area is known before final site selection. Better knowledge of these characteristics can lead to more efficient, more reliable, and safer transportation systems.

- The availability of nearby sources of construction materials, such as sand, gravel, and limestone, is a significant cost factor in the development of housing and transportation. Knowledge of the location, quantity, and quality of these resources is obtained by geologic investigations and is disseminated in geologic maps and reports.

HEALTH AND SAFETY

- Human contact with certain earth materials in their native state or in the course of extraction, processing, use, and subsequent disposal can pose threats to health. Earth-science knowledge can contribute to better decisions to protect society from adverse consequences of or miscomprehensions associated with the use of these materials by identifying those that pose potential health hazards and by contributing to an understanding of how such problems may be avoided or mitigated.

- Geologic and hydrologic hazards such as earthquakes, volcanic eruptions, floods, droughts, tsunamis, subsidence, and landslides threaten public safety and can cause great economic losses. Earth-science information is used to define flood plains and other hazard zones and to evaluate risk. The ability to predict these hazards is essential for land-use planning, engineering design, and emergency-preparedness decisions to reduce the loss of life, property, and natural resources.

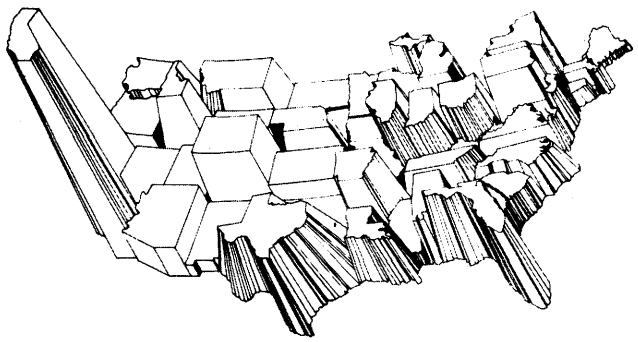
- Human activities create vast quantities of waste material, some of which is toxic or radioactive. Some of this waste must be isolated from the biosphere for a long time and be disposed of in underground repositories, in sanitary landfills, and offshore. Earth-science knowledge is vital for the safe and lasting disposition of the society's waste materials, as well as for the possible reclamation of the waste material and of the disturbed sites.

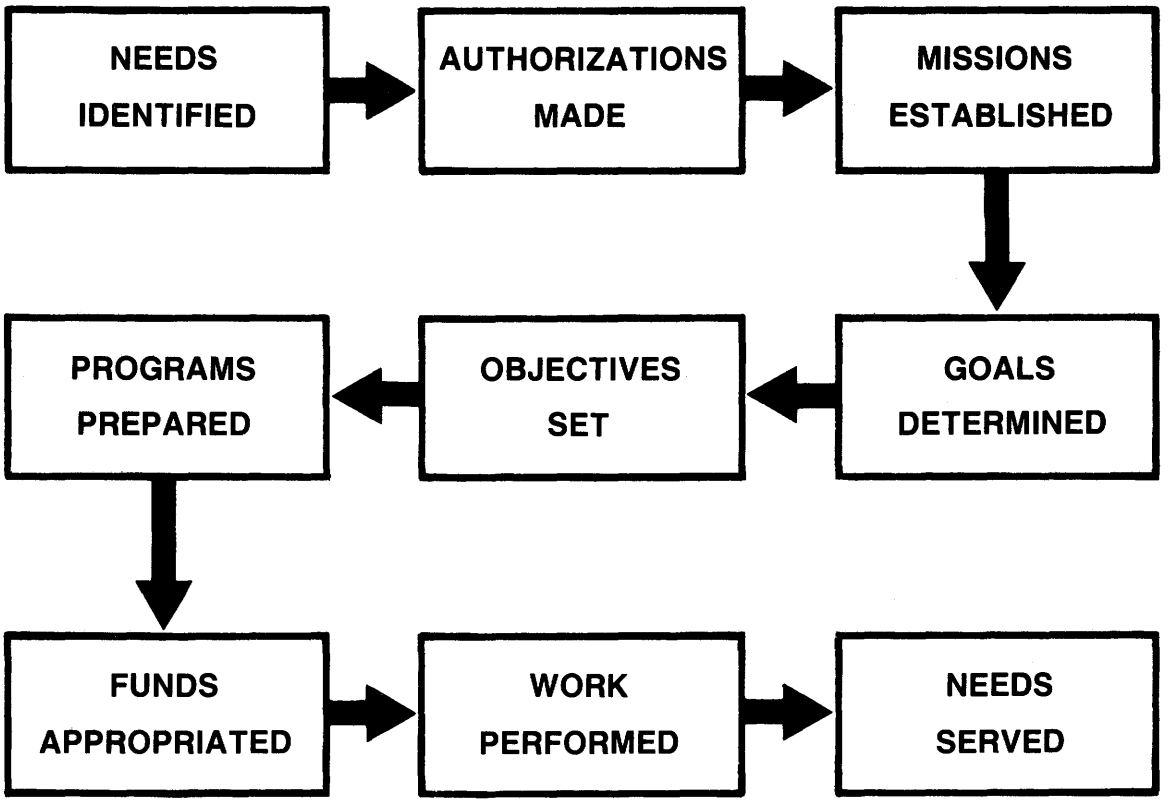
NATIONAL SECURITY

- Up-to-date maps and earth-science data are needed for an understanding of the configuration and characteristics of the land surface and the distribution of water supplies and earth materials for possible military operations in defense of our country. Knowledge of the availability of strategic and critical minerals on a global scale is also necessary in planning for the Nation's security.

- Remote detection and identification of underground nuclear tests require knowledge of the Earth's internal structure and of the physical properties of rocks, and the ability to discriminate such tests from earthquakes. Planning for the containment of underground tests of nuclear weapons and storage of weapons and associated radioactive wastes require geologic and hydrologic information.

- National defense and security depend upon the capability to quickly and accurately locate features on the Earth's surface. Modern navigational methods for transportation systems require extensive knowledge about the geodetic and geophysical characteristics and the topographic and oceanographic features of the Earth.





Schematic diagram showing how the U.S. Geological Survey responds to national needs.

GOALS

Goals identify a desired state, process, or product and serve to guide an organization toward the future. The following goals indicate where the U.S. Geological Survey contributes to the national welfare within the context of its mission. Fulfillment of the goals requires constant improvement of our knowledge about the Earth and its natural processes, including its deep structure, its history, and its place in the evolution of the solar system. Many of the goals are responsive to more than one of our national needs and several respond to most of them in some degree. In a document to follow, the Survey will identify the objectives it has set to meet each of the goals. Although national needs for earth-science information are met principally by the Survey, other Federal, State, and local agencies, industry, and academia make major contributions to meeting these needs through their separate programs. Additionally, the Survey works with other Federal agencies, State, local, and foreign governments, academic institutions, and other members of the earth-science community in the furtherance of its own mission, in helping to meet their needs for earth-science data, and in the interest of improving coordination in earth-science research. The Survey enters into this work under a wide variety of formal relationships. They include Memoranda of Understanding, Interagency Agreements, Joint Funding Agreements, Cooperative Agreements, and Protocols, as well as grants and contractual arrangements.

TOPOGRAPHIC MAPPING

Expand knowledge about the location and configuration of natural and manmade features of the Nation's land and water areas to satisfy the needs of government, industry, and the public for accurate and up-to-date topographic information.

This information is required by a wide variety of users, such as those who manage the land, develop its resources, have responsibility for environmental protection or national security, or seek recreational opportunities. Map information is the basic foundation necessary for the efficient conduct of land-resource and other earth-science studies. Basic data are acquired from field surveys, use of aerial photographs and other remotely sensed data, and from other cartographic and geographic sources. This information is published as topographic and other maps at various scales and the data are maintained in digital data bases.

GEOLOGIC FRAMEWORK

Increase knowledge of the geologic structure of the Nation, including the continental shelf and the Exclusive Economic Zone, to provide the scientific framework for energy, mineral, and hazards investigations and to meet future responsibilities.

Such knowledge includes an understanding of the deep structure and composition of the Earth, its history of formation and evolution, and its relation to other planets and moons in the solar system. The knowledge is acquired by geological and geophysical mapping; testing conceptual models and measuring physical and chemical properties of rocks and minerals; determining the absolute and relative ages of rocks and minerals; documenting the time and character of evolutionary changes in organisms and of past changes in the Earth's climate and magnetic field; and participating in the exploration of the solar system.

ENERGY AND MINERAL RESOURCE ASSESSMENT

Increase knowledge of the distribution and quality of national and global mineral and energy resources for use in the formulation of policies that involve the long-term availability of these resources and the wise use of the Nation's land, mineral, and energy resources.

Resource evaluation techniques include geologic mapping, resource-distribution modeling, geophysical and geochemical investigations, international cooperation, open exchange of scientific information, and basic research in these specialties. An important aspect of this work is the need to provide estimates of the statistical uncertainties involved and the development of methods to reduce these uncertainties.

WATER RESOURCES ASSESSMENT

Increase knowledge of the distribution and quality of the Nation's ground water and surface water resources for use in the formulation and evaluation of policies and programs that assure the most efficient use of the Nation's water resources.

This entails knowing aquifer properties, the general configuration of water levels, and patterns of ground-water recharge, circulation, and discharge; average runoff, its seasonal variation, and low flow and flood characteristics of the Nation's rivers; the chemical, physical, and biological quality of these resources; and the quality of precipitation, including geographic variations and time trends. This knowledge is developed by analyzing data collected over many years, mapping the resources, interpreting these observations in light of the relevant natural and human factors, and providing estimates of statistical uncertainties.

WATER USE

Improve knowledge of the way society uses water so as to support water management and to increase the accuracy of water-use forecasts.

Such information assists water resource managers to plan, design, and operate dams, well fields, water distribution systems, water treatment plants, and other water-related facilities. The development of a full range of water management options depends, in part, upon the knowledge of existing water-use processes, ways in which they may be altered, and the impact the processes have on water quality and the environment. This knowledge is acquired by collecting and analyzing data about the location, amount, and purposes of withdrawals from ground water and surface water systems; the location, amounts, and quality of water returned to hydrologic systems; and the amount of water used.

ENERGY AND MINERAL RESOURCE PROCESSES

Enhance the ability to discover hidden or as yet unrecognized types of energy and mineral deposits that may be economically important energy and mineral resources by developing information on the natural processes by which materials in the Earth are formed, transported, and concentrated.

Such information will improve our understanding of the origins and occurrence of this wealth and contribute to predictions of the nature and locations of new deposits. This knowledge is obtained by field investigations, deep drilling, laboratory experiments and analyses, and construction and field testing of conceptual models.

HYDROLOGIC PROCESSES

Increase understanding of the processes that affect the properties and movement of water and its dissolved and suspended constituents through hydrologic systems.

This understanding provides water resource managers with the capability to predict the effects of natural phenomena and human actions on the hydrologic system. Increased understanding is achieved by fundamental research on and simulation of physical, chemical, and biological processes. This leads to improved methods for prediction of water availability, water-related hazards such as floods or subsidence, and the fate and transport of heat, chemical contaminants, and sediments carried by water.

GEOGRAPHIC PROCESSES

Increase knowledge of the processes that affect the location, distribution, and changes in land use and land cover and improve predictions of the effects of natural stresses and those caused by man on land-resource systems.

This is accomplished by integrating and analyzing, in a geographic framework, information on physical, biological, and human processes. Methods are developed that relate the interactions of man in his physical environment to changes in land use and land cover. Such relationships can then be used in planning and decisionmaking to predict the impact of events on the environment.

GLOBAL AND INTERNATIONAL GEOSCIENCE

Develop initiatives that increase knowledge of global earth science, including: the dynamics of plate tectonics; the record of past and present ocean basins and their circulation; the geologic record of ancient climates; and active solid-earth processes.

These initiatives include study of the Earth's mantle and core, global occurrence of earthquakes and volcanoes, comparative study of the Earth and other planets, and long lead-time research in unconventional, strategic, and critical mineral and energy resources. The investigations are carried out by use of advanced drilling technology, by geophysical techniques that provide a subsurface view of the Earth's crust, by the use of advanced space systems, and by sensors or orbiting satellites to monitor changes in the physical, chemical, and biological properties and processes of the Earth such as earthquakes, climate patterns, pollution, and acid rain. International cooperation includes the provision of technical assistance for nations to design their own research efforts and participation in joint ventures of international scope and is carried out through international agreements and efforts conducted with other Federal agencies on global geoscience projects.

GEOGRAPHIC INFORMATION SYSTEMS

Develop and maintain geographic information systems to satisfy national needs for the analysis and display of earth-science data from various sources.

Data about the location, use, ownership, and physical characteristics of the land, integrated into a standardized spatial reference system, are needed for wise management of the Nation's resources. Such data are acquired from various sources, identified with coordinate values, digitized, and stored in a computerized system that provides for ready manipulation, analysis, and output.

HAZARDS PREDICTION

Improve the ability to predict the location, time, and severity of natural and manmade hazards in order to minimize loss of life and property.

Losses from earthquakes, volcanic eruptions, flooding, landslides, and glaciers can be reduced by developing predictive methods and by a more complete understanding of the nature and rates of the dynamic interactions of these earth processes. An important aspect of predicting such events is the need to provide statistical estimates of their uncertainty.

HAZARDS ASSESSMENT

Improve the ability to identify and delineate areas subject to natural and manmade hazards and to provide the means to select the most efficient approach to prevent or reduce the risks of loss of life and economic disruption.

Earthquakes, volcanic eruptions, floods, subsidence, droughts, and landslides are potentially hazardous natural processes. Soil erosion, ground water depletion, and toxic and nuclear waste contamination are problems that man created whose resolution involves active earth processes. Geological and hydrological investigations locate potential hazards, determine their causes and character, and provide the basic information for technological approaches to diminish their effects on public health and safety, property, and environment.

TIMELY REPORTING OF EVENTS AND CONDITIONS

Provide timely reporting, and forecasts when possible, of important hydrologic and geologic events and conditions of immediate concern to the public and to governmental bodies.

The timely reporting of hydrologic conditions is needed for the efficient operation of water supply and navigation facilities, for efficient water quality and flood control, and for implementation of court decrees, treaties, and compacts. Certain geologic events, such as earthquakes, volcanic activity, landslides, or magnetic field changes, require the rapid

determination of the location, magnitude, or nature of the event for immediate and effective responses. The timely documentation of these conditions and events is accomplished by the continued operation of networks of sensors, including stream gages and seismometers, and by the rapid processing, analysis, and dissemination of relevant information and warnings.

COORDINATION

Improve the coordination of earth-science data collection, research, and mapping so as to minimize duplication of effort, increase data accessibility, and reduce costs.

Coordination is carried out by sharing plans, results of investigations, technologies, and data bases and by standardizing information formats. Extensive coordination is accomplished through cooperative programs with State and local agencies and formal agreements and joint committees with other Federal agencies and governments.

EARTH-SCIENCE STANDARDS

Establish standards for definition, accuracy, and format of earth-science information to improve communication and facilitate the exchange of information among users.

Standards are developed in operational programs and are reviewed by professional colleagues and users. Standards also are revised as the result of improved technology, evolving scientific thought, and as a result of changing user requirements. Some standards are developed in concert with other Federal agencies, professional organizations, or international councils. Selected earth-science standards are submitted for review and promulgation as Federal standards.

INFORMATION DISSEMINATION

Improve dissemination of the knowledge developed by Survey programs so as to enhance timely public and private sector access to an understanding of earth-science information and technologies.

This is achieved by publishing maps, scientific and technical reports, popular publications, films, and data bases in ways that are responsive to changing needs. It is also achieved by issuing news releases and by operating public information centers and clearinghouses that enable potential users to readily identify and obtain existing information. In addition, the Survey participates in and sponsors conferences, symposia, workshops, and public forums.

TRAINING AND ASSISTANCE

Assist organizations outside the Survey, especially academic institutions and State agencies, to increase their capability to conduct earth-science research, to develop and disseminate technologies that can help solve resource-related problems, and to train an adequate supply of earth-science professionals.

This is accomplished by: cooperative programs with State and local agencies; grants to academic institutions (e.g., the Water Resources Research Institutes); grants to a variety of research organizations; cosponsoring symposia with professional associations; making available to others the various Geological Survey training activities; and providing advice and assistance to resource-management agencies.

MISSION SUPPORT

Provide competent personnel, adequate facilities, and modern equipment and instrumentation in order to improve the Survey's productivity and its ability to carry out its mission effectively.

Improvements in efficiency and effectiveness are pursued by developing and maintaining a competent and innovative work force; by ensuring an adequate technological base for earth-science research through development or acquisition of state-of-the-art instrumentation, facilities, computer hardware and software, and other equipment; by developing and sharing new methodologies for research; by making maximum use of available capabilities within the private sector, other Federal agencies, and State and local governments; by encouraging scientific interaction and providing access to the scientific community at large; and by maintaining an ongoing program of productivity improvement through automation, training, and review of management procedures.

AUTHORIZATIONS

The U.S. Geological Survey derives authority for its activities from specific pieces of legislation, including its annual appropriation acts and various executive orders. The Survey was established by an Act of Congress on March 3, 1879, that authorized "appropriations for sundry civil expenses of the Government for the fiscal year ending June 30, 1880, and for other purposes." This Act is commonly referred to as the Survey's Organic Act, codified in 43 U.S.C. 31 as follows:

Organic Act

"The Director of the Geological Survey, which office is established, under the Interior Department, shall be appointed by the President by and with the advice and consent of the Senate. This officer shall have the direction of the Geological Survey and the classification of the public lands and examination of the geological structure, mineral resources, and products of the national domain. The Director and members of the Geological Survey shall have no personal or private interests in the lands or mineral wealth of the region under survey, and shall execute no surveys or examinations for private parties or corporations."

Geographic Scope

The Survey's authorizations were made more specific over the years by additional legislation (listed in the following section) that clarifies its role and authority. For example, the geographic scope of the Survey's activities was expanded beyond the national domain when on August 23, 1958, the Secretary of the Interior was authorized by P.L. 85–743 (43 U.S.C. 1457) "to perform surveys, investigations, and research in geology, biology, minerals and water resources, and mapping . . . in Antarctica and the Trust Territory of the Pacific Islands"; and on September 5, 1962, when the Survey was authorized by P.L. 87–626 (43 U.S.C. 31b) to conduct "such examinations outside the national domain where determined by the Secretary to be in the national interest."

Geologic Surveys

Authority for conducting geologic surveys is expressly contained in the 1879 Organic Act. Chemical and physical research was recognized and undertaken as an essential part of geologic investigations. Specific appropriation for work was initially made by Congress in an act of October 2, 1888 (25 Stat. 505, 526). The Wilderness Act of 1964 (16 U.S.C. 1131) authorized the Survey to assess the mineral resources of areas proposed or established as wilderness. The Disaster Relief Act of 1974 (42 U.S.C. 5132) authorized the issuance of disaster warnings. Specific authority for an earthquake hazards reduction program was given to the Survey in an act of October 7, 1977 (42 U.S.C. 7701 et seq.). Authority for the Survey's astrogeology programs comes from the National Aeronautics and Space Act of 1958 (42 U.S.C. 2473).

Topographic Surveys

Authority for making topographic surveys is inherent in the language of the 1879 Organic Act. In appropriating funds for the fiscal year 1889 (25 Stat. 505, 526), Congress made specific provision for topographic surveys. Further recognition was given in an act of June 11, 1896 (43 U.S.C. 38), requiring that, in making topographic surveys, elevations "shall be determined and marked by iron or stone posts or permanent bench marks"; and by the joint resolution of February 18, 1897 (43 U.S.C. 42), authorizing and directing the dispersal of topographic and geologic maps and atlases of the United States, made and published by the Geological Survey. Cooperative (joint) funding with State and local government agencies was first referenced in the appropriations act of March 7, 1928 (45 Stat. 231), which provided that the share of the Geological Survey in any topographic investigation carried out in cooperation with any State or municipality shall not exceed 50 percent of the cost.

Water Resources Investigations

Authority for conducting water resources investigations is inherent in the language of the 1879 Organic Act. It was further recognized in an act of October 2, 1888 (25 Stat. 505, 526), which authorized the survey of irrigable lands in arid regions, reservoir sites, gaging of streams, etc., for irrigation. In an August 18, 1894, statute (28 Stat. 372, 398), Congress made funds available to the Geological Survey for "gaging the streams and determining the water supply of the United States, including the investigations of underground current and artesian wells in arid and semi-arid sections." Authority to exercise these functions by the Geological Survey is also indicated in an act of June 11, 1896 (29 Stat. 413, 453), providing that "hereafter the reports of the Geological Survey in relation to the gaging of streams and to the methods of utilizing the water resources may be printed in octavo form . . . ."; and the joint resolution of May 16, 1902 (44 U.S.C. 260), providing that "hereafter the publications of the Geological Survey shall consist of . . . water-supply and irrigation papers . . . ." Cooperative (joint) funding of water resources investigations was first referenced in the appropriations act of March 7, 1928 (45 Stat. 231), which provided that the share of the Geological Survey in any water resource investigation carried out in cooperation with any State or municipality shall not exceed 50 percent of the cost.

The Survey's legislation authorities were supplemented in later years by authorizations from the Office of Management and Budget (OMB) and the Executive Office as follows:

National Mapping Coordination

OMB Circular A–16, issued by the Bureau of the Budget on January 16, 1953, and revised May 6, 1967, names the Department of the Interior (delegated to the Geological Survey) as "responsible for the National Topographic Map Series of the United States and outlying areas of sovereignty and jurisdiction and for the National Atlas of the United States of America." It also calls for the Department to operate a "Map Information Office" and to exercise "governmentwide leadership in assuring coordinated planning and execution" of these and the "cartographic activities of other Federal agencies related thereto. . . ." The Map Information Office has evolved into the National Cartographic Information Center (NCIC).

Water Data Coordination

OMB Circular A–67, issued by the Bureau of the Budget on August 28, 1964, gives the Department of the Interior (delegated to the Geological Survey) responsibility "for the design and operation of the national network for acquiring data on the quantity and quality of surface and ground waters, including sediment load of streams," and responsibility "for exercising leadership in achieving effective coordination of national network and specialized water data acquisition activities."

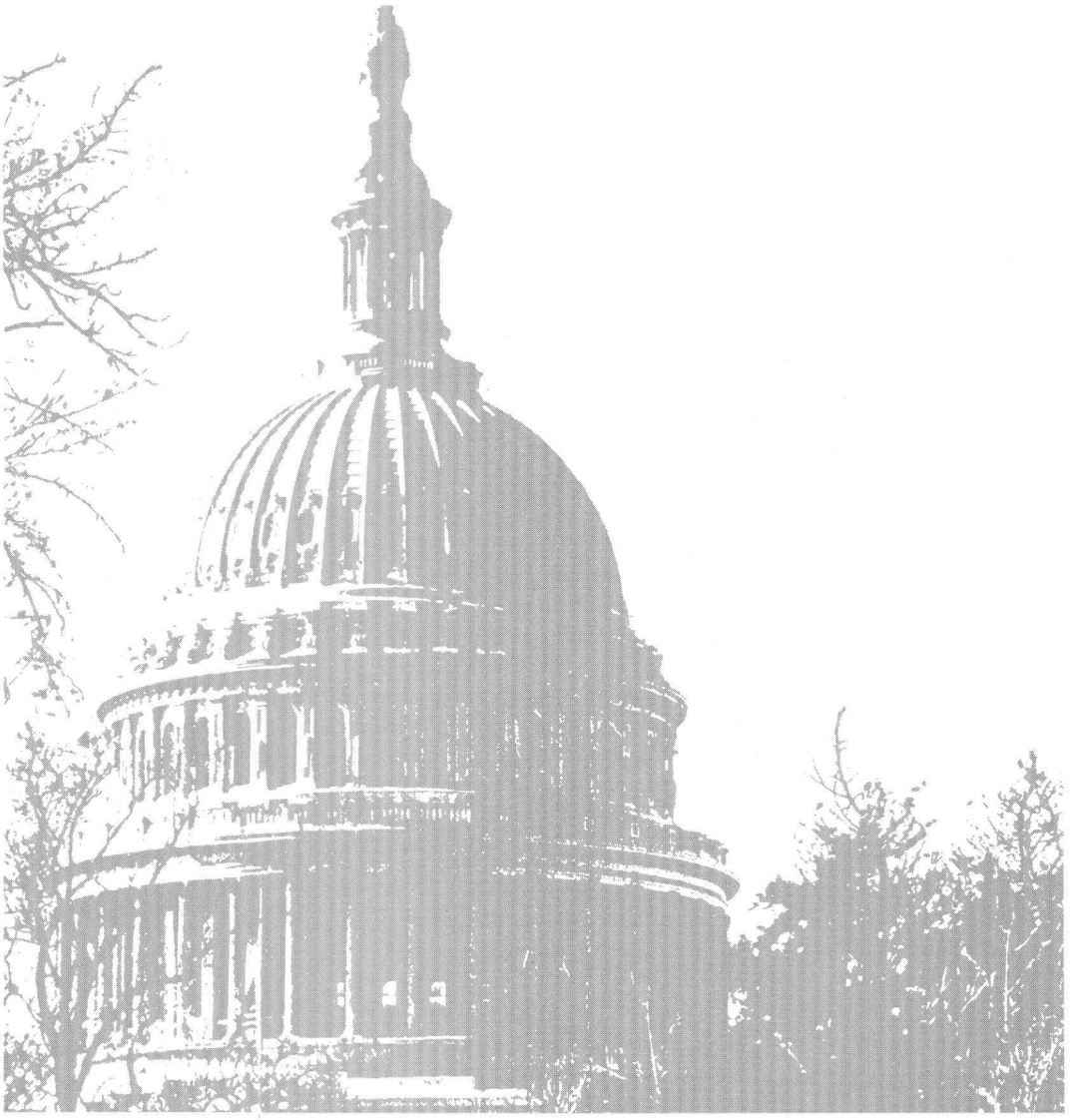
Digital Cartographic Data

A memorandum to heads of departments from the Director, OMB, on April 4, 1983, assigns the Department of the Interior (delegated to the Geological Survey) the chair of a Federal Interagency Coordinating Committee on Digital Cartography "to improve the use of digital cartographic base data within the Federal Government and to provide a framework for its proper management. . . ." This memorandum was renewed on March 18, 1986, and is in effect until March 15, 1989.

Exclusive Economic Zone

Presidential Proclamation No. 5030, dated March 10, 1983, established the Exclusive Economic Zone (EEZ) of the United States. The EEZ extends to a distance of 200 nautical miles offshore the United States and its territories and possessions. Within the EEZ, the United States has the sovereign rights for the purpose of exploring, exploiting, conserving, and managing natural resources, both living and nonliving, of the seabed and subsoil and the superjacent waters and, with regard to other activities, for the economic exploitation and exploration of the zone. The Geological Survey conducts programs for the geologic assessment of the EEZ in response to the President's challenge to the Department of the Interior "to map and explore this new frontier."

A chronological list of legislation that authorizes the programs and activities of the Geological Survey follows. Appropriation acts are listed only in those cases where some significantly new activity is authorized. Wherever the language of a law gives the authority to the Secretary of the Interior, he, in turn, has delegated the authority to the Director, U.S. Geological Survey.



AUTHORIZING LEGISLATION OF THE U.S. GEOLOGICAL SURVEY

Popular Title or Subject	Public Law Number	Date	Purpose
Appropriations Act of 1879	None	Mar. 3, 1879	Establishes the Geological Survey for the classification of the public lands and examination of the geological structure, mineral resources, and products of the national domain. (43 U.S.C. 31(a)) Authorizes the publication, exchange, and sale of geological and economic maps, and reports on general and economic geology and paleontology. (43 U.S.C. 41)
Appropriations Act of 1889	None	Oct. 2, 1888	Provides for chemical and physical research as part of geologic investigations, and for topographic surveys.
Appropriations Act of 1894	None	Aug. 18, 1894	Provides for gaging streams and determining the water supply.
Appropriations Act of 1896	None	June 11, 1896	Authorizes the establishment and location of permanent benchmarks used in making topographic surveys. (43 U.S.C. 38) Authorizes the publication of Geological Survey reports on gaging of streams and methods of utilizing water resources. (44 U.S.C. 1318)
Distribution of Maps and Atlases, etc.	Pub. Res. 13 54th Congress	Feb. 18, 1897	Authorizes the Director to distribute the topographic and geologic maps and atlases of the United States, and provides also that a copy of each map and atlas shall be sent to each member of Congress. (43 U.S.C. 42 and 43)
Joint Resolution of May 16, 1902	Pub. Res. 22 57th Congress	May 16, 1902	Authorizes publication by the Geological Survey of water supply and irrigation papers. (44 U.S.C. 1318)
Sale of Data	Pub. Law 383 59th Congress	June 30, 1906	Authorizes the Geological Survey to furnish copies of maps to any person, concern, institution, State, or foreign government, with receipts to be deposited in the general fund of the Treasury. (43 U.S.C. 44)
Production and Sale of Photographs and Records	Pub. Law 328 60th Congress	Mar. 4, 1909	Authorizes the Director to produce and sell copies of photographs, mosaics, and other official records. (43 U.S.C. 45)
USGS Share of Cost for Work in Cooperation with State and Local Governments	Pub. Law 100 70th Congress	Mar. 7, 1928	Directs that the Geological Survey's share in any topographic mapping or water resources investigations carried out in cooperation with any State or municipality shall not exceed 50 percent of that cost. (43 U.S.C. 50)
Extension of Cooperative Work to Puerto Rico	Pub. Law 29 74th Congress	June 17, 1935	Authorizes the Geological Survey to make topographic and geologic surveys and to conduct investigations relating to mineral and water resources in Puerto Rico. (43 U.S.C. 49)

AUTHORIZING LEGISLATION OF THE U.S. GEOLOGICAL SURVEY—Continued

Popular Title or Subject	Public Law Number	Date	Purpose
Production and Sale of Photographs and Records	Pub. Law 206 80th Congress	July 21, 1947	Authorizes the Director to produce and sell copies of aerial photographs and provides for receipts to be deposited in the Treasury to the credit of the current appropriations. (43 U.S.C. 45)
Standardization of Geographic Names	Pub. Law 242 80th Congress	July 25, 1947	Directs the Secretary to assume responsibility for all functions relating to domestic geographic names, including staff support to the interdepartmental U.S. Board of Geographic Names. (43 U.S.C. 364)
Appropriations Act of Fiscal Year 1953	Pub. Law 470 82nd Congress	July 9, 1952	Authorizes payment of compensation and expenses of persons on the rolls of the Geological Survey appointed to represent the United States in the negotiation and administration of interstate compacts. (Same administrative provision appears in current appropriations acts.)
National Aeronautics and Space Act of 1958	P.L. 85–568	July 29, 1958	Authorizes the National Aeronautics and Space Administration to cooperate or contract with Federal departments and agencies in the performance of its functions. (42 U.S.C. 2473)
Mineral Discovery Loan Program Act of 1958	P.L. 85–701	Aug. 21, 1958	Authorizes the Secretary to provide a program for exploration by private industry within the United States, its territories and possessions, for minerals, excluding organic fuels, and to provide Federal financial assistance. (30 U.S.C. 641) (Activities under the Act not funded since 1974.)
Appropriations Act of Fiscal Year 1959	P.L. 85–743	Aug. 23, 1958	Authorizes the Secretary to perform surveys, investigations, and research in geology, biology, minerals and water resources, and mapping in Antarctica and the Trust Territory of the Pacific Islands. (43 U.S.C. 1457 note)
Acquisition of Lands for Use in Gaging Streams and Underground Resources	P.L. 86–406	Apr. 4, 1960	Authorizes the Secretary to acquire lands on behalf of the Geological Survey for use in gaging streams and underground resources. (43 U.S.C. 36b)
Examination of the Geological Structure Outside the National Domain	P.L. 87–626	Sept. 5, 1962	Authorizes the examination of the geological structure, mineral resources, and products outside the national domain. (43 U.S.C. 31(b))
Wilderness Act of 1964	P.L. 88–577	Sept. 3, 1964	Authorizes the Geological Survey and Bureau of Mines to assess the mineral resources of each area proposed or established as wilderness if no prior mineral survey was done. (16 U.S.C. 1131)
Delmarva Peninsula Hydrologic Study	P.L. 89–618	Oct. 4, 1966	Authorizes the Secretary to make a comprehensive 5-year study and investigation of the water resources of the Delmarva Peninsula. (42 U.S.C. 1962d–7)

AUTHORIZING LEGISLATION OF THE U.S. GEOLOGICAL SURVEY—Continued

Popular Title or Subject	Public Law Number	Date	Purpose
Classes and Sizes of Publications	P.L. 90–620	Oct. 22, 1968	Requires that publications of the Geological Survey shall include maps, folios, and atlases required by law. Further provides for printing and reprinting of Geological Survey reports and distribution to Congress and the Library of Congress. (44 U.S.C. 1318) Also authorizes the Geological Survey to send publications to public libraries. (44 U.S.C. 1320)
Federal Water Pollution Control Act Amendments of 1972	P.L. 92–500	Oct. 18, 1972	Directs EPA to have a water quality surveillance system that will use the resources of the Geological Survey. (33 U.S.C. 1254(a))
Flood Disaster Protection Act of 1973	P.L. 93–234	Dec. 31, 1973	Directs the Secretary of the Interior (through the U.S. Geological Survey) and heads of other Federal departments and agencies to give high-priority assistance to the Secretary of HUD in the mapping of flood-hazard areas and flood-risk zones. (42 U.S.C. 4101c)
Disaster Relief Act of 1974	P.L. 93–288	May 22, 1974	Directs the President to insure that all appropriate Federal agencies are prepared to issue warnings of disaster to State and local officials and that appropriate Federal agencies provide technical assistance to State and local governments to insure that timely and effective disaster warning is provided. (42 U.S.C. 5132)
Geothermal Energy Research, Development, and Demonstration Act of 1974	P.L. 93–410	Sept. 3, 1974	Directs the Geological Survey to provide a schedule and objectives for inventorying geothermal resources, and names the Survey as the action agency in support of the Geothermal Energy Coordination and Management Project, for developing a plan for a resource inventory, conducting regional surveys, and publishing maps. (30 U.S.C. 1121 et seq.)
Federal Land Policy and Management Act of 1976	P.L. 94–579	Oct. 21, 1976	Directs the Secretary by 1991 to have the Geological Survey and the Bureau of Mines conduct minerals surveys of areas proposed to be recommended as wilderness prior to such recommendations being finalized. (43 U.S.C. 1782)
Surface Mining Control and Reclamation Act of 1977	P.L. 95–87	Aug. 3, 1977	Establishes an Advisory Committee on Mining and Mineral Research under the State mining and mineral resources and research institutes program, with the Director of the Geological Survey as a member. (30 U.S.C. 1229(a))
Earthquake Hazards Reduction Act of 1977	P.L. 95–124	Oct. 7, 1977	Directs the Geological Survey to be part of an earthquake hazards reduction program, which encompasses prediction, hazards reduction, and research. (42 U.S.C. 7701 et seq.)
Earthquake Hazards Reduction Act Amendments of 1980	P.L. 96–472	Oct. 19, 1980	Authorizes the Director to issue earthquake predictions or advisories after notifying FEMA. (42 U.S.C. 7704(f))

AUTHORIZING LEGISLATION OF THE U.S. GEOLOGICAL SURVEY—Continued

Popular Title or Subject	Public Law Number	Date	Purpose
Alaska National Interest Lands Conservation Act	P.L. 96–487	Dec. 2, 1980	Authorizes the Secretary to assess oil and gas and other mineral resources on Federal lands in Alaska. (16 U.S.C. 3150)
Appropriations Act of Fiscal Year 1983	P.L. 97–394	Dec. 30, 1982	Authorizes the Geological Survey to accept contributions from public and private sources.
Nuclear Waste Policy Act of 1982	P.L. 97–425	Jan. 7, 1983	Authorizes the Geological Survey to act in a consultative and review role to the DOE for siting, building, and operating high-level radioactive waste repositories. (42 U.S.C. 10101 et seq.)
Appropriations Act of Fiscal Year 1984	P.L. 98–146	Nov. 4, 1983	Authorizes the Geological Survey to retain receipts from the sale of all published maps. Also transfers responsibility for issuing grants to State water resources research institutes from the Office of Water Policy to the Geological Survey.
Water Resources Research Act of 1984	P.L. 98–242	Mar. 22, 1984	Authorizes the Secretary to make cost-sharing grants to designated State water resources research and technology institutes for research and training and to make matching grants to those State institutes, as well as other academic institutions, State or local governments, or the private sector for water research and technology development. (42 U.S.C. 10301)
Land Remote Sensing Commercialization Act of 1984	P.L. 98–365	July 17, 1984	Encourages continued research in remote sensing in the Department of the Interior; the legislative report recommends utilization of the EROS Data Center as a remote sensing data archive. (15 U.S.C. 4201)
Barrow Gas Field Transfer Act of 1984	P.L. 98–366	July 17, 1984	Authorizes the Secretary to transfer the Barrow gas fields to the North Slope Borough of Alaska, and requires the Geological Survey to provide follow-up assistance to the North Slope Borough.
High Plains States Ground-Water Demonstration Program Act of 1983	P.L. 98–434	Sept. 28, 1984	Authorizes the Bureau of Reclamation to establish demonstration projects for ground water recharge of aquifers in the High Plains States and directs the Bureau to consult with the Geological Survey and other agencies in the two-phase program. (43 U.S.C. 390g)
Hazardous and Solid Waste Amendments of 1984	P.L. 98–616	Nov. 8, 1984	Provides for establishment of a National Ground Water Commission (NGWC); the Director of the Geological Survey is to provide, if requested by NGWC, personnel on a reimbursable basis.

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