

The U.S. Geological Survey—Recent Program Highlights



U.S. Department of the Interior

Whether it's the water we drink, the energy and mineral resources we consume, or the natural disasters that we try to prevent, the work of the U.S. Geological Survey (USGS) truly serves every citizen every day in every State. To serve the public better, the USGS is concentrating its programs under four major themes—Environment, Resources, Hazards, and Information Management. These cross-cutting themes help focus expertise on problems and solutions that directly affect public welfare. They also enable the USGS to build strong, multidisciplinary teams that can combine with other public and private organizations, by leveraging resources to produce results that are greater than the sum of individual efforts.

Hazards

The United States has been struck repeatedly by natural disasters in the past few years. These events have taken few lives, but the economic cost to the Nation has averaged \$55 billion annually. For much of the Nation, 1995 was the "Year of the Flood," and 1996 is continuing that pattern. Figure 1 shows areas afflicted by major floods from 1993 (the year of the floods in the Midwest)

control structures. For example, during the 1995-96 winter floods in the Pacific Northwest, real-time information on river levels, provided by the USGS, enabled accurate flood forecasting, which saved lives and billions of dollars in property damage. In the Willamette Valley of Oregon alone, better management of upstream reservoir levels prevented the flood peak in downtown Portland from rising above 6 feet, thus reducing potential losses by \$3 billion.

There were other disasters in 1995. Around the world more than 8,000 people died in earthquakes. The worst, the January 1995 earthquake that struck Kobe, Japan, caused the loss of more than 5,000 lives and \$100-\$200 billion of damage. The USGS is learning from that disaster, which occurred in a major urban area similar to Los Angeles or San Francisco, how better to protect vulnerable "lifeline" facilities such as power plants and hospitals. Applying recent advances in computers, telecommunications, and instrument design we are building the first seismic hazard real-time alert system in Los Angeles. This system will give warning of impending ground movement 20 seconds after initiation of the quake deep within the earth.

Hazards are unpreventable natural events that, by their nature, may expose our Nation's

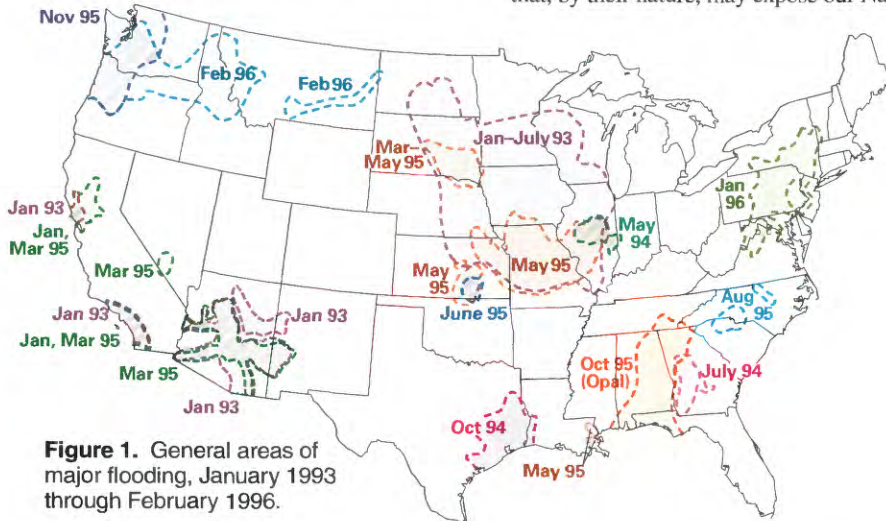


Figure 1. General areas of major flooding, January 1993 through February 1996.

to the present. The total area affected by this one type of disaster alone is enormous.

As the Nation's leading water resources information agency, the USGS provides other agencies (for example, the National Weather Service and the U.S. Army Corps of Engineers) with flood data needed to warn communities downstream of impending disasters. USGS information is also used to improve disaster response planning and in the construction and management of flood-

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 documents where and how natural hazards, such as floods, earthquakes, volcanic eruptions, hurricanes, droughts, wildfires, and landslides, have struck in the past, and works to understand ways to prevent or reduce future suffering and economic loss from these events.

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Environment

The Nation's citizens' safety and health are critically dependent on the environment in which they live. Today's decisions will affect future supplies of clean water and clean air.

For example, the Safe Drinking Water Act requires quarterly pesticide monitoring of Class A public water systems (15 or more connections). Monitoring costs would increase consumers' water bills by millions of dollars each year. States can provide waivers from quarterly monitoring if wells or intakes are not vulnerable to contamination by pesticides. The USGS working in partnership with the Washington State Department of Health (WDOH) and the New Jersey Department of Environmental Protection (NJDEP) designed and developed statewide assessments, which were based on pesticide use and hydrogeology, of the vulnerability of public water systems to pesticides. USGS results showed that 26 percent of the New Jersey wells have a low vulnerability to pesticides (fig. 2). In Washington, however, 75 percent of the sampled public supply wells have low vulnerability. As a result, the

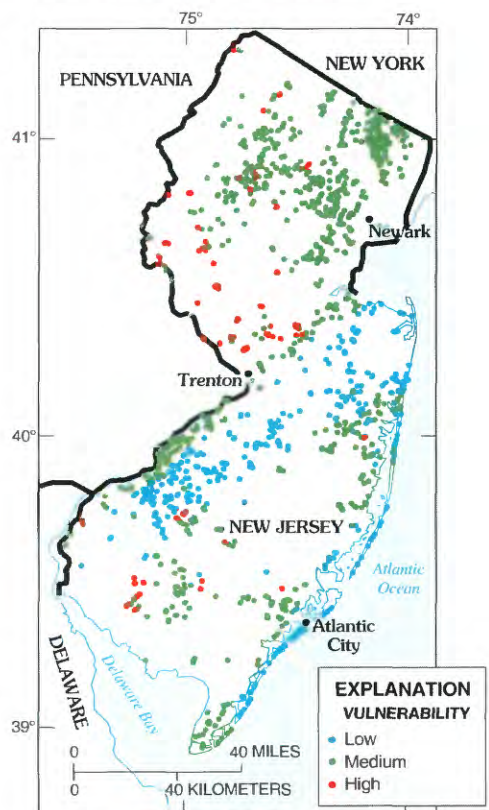


Figure 2. Vulnerability of public supply wells to pesticides.

NJDEP estimates savings to taxpayers of almost \$5 million annually, and the WDOH estimates savings of \$6 million annually.

In South Florida, USGS interdisciplinary science studies are contributing information that enhances the ability of water-resource planners and managers to predict the results of different management options. In the next few years decisions will be made regarding which path to follow to restore the Everglades and Florida Bay; the implementation of the selected path could cost between \$2 billion and \$3 billion.

The Nation's environment—the air, water, soil, and plant and animal life—is constantly changing as natural processes and human actions affect it. As a public service agency, the USGS works to produce accurate and impartial scientific interpretations and information needed by citizens, managers, and public officials to make informed decisions about the environment.

Natural Resources

A recent assessment by the USGS of the Nation's oil and gas resources is being used by State, Federal, and local agencies; environmental groups; and private industry to plan for and meet our future energy needs more effectively. Use of the USGS's 1995 National Assessment of Oil and Gas Resources of the United States (fig. 3) has reduced the economic risk associated with exploring for and developing of domestic oil and gas resources by many petroleum companies. Private industry and Federal and State agencies are using the assessment data to predict the supply and demand for natural gas across regional and national boundaries and to evaluate the economic impacts of resulting trade.

In the Pacific Northwest, USGS research into the migration of salmon may allow managers to design strategies that accommodate the hydropower needs of the region and the need to protect the salmon fishery. Biological and hydrological modeling in South Florida will help State and Federal managers meet the water needs of growing urban populations and the diverse wildlife in the Everglades.

Like many urban areas in the Southwest, Albuquerque, New Mexico, faces the need to develop long-term water-conservation plans with minimal disruption of current economic needs and planned growth. In a cooperative study, the USGS is using its hydrologic, geologic, and mapping expertise to refine knowledge of the complex ground-water flow system of the area, and to develop a computer model that can be used by Albuquerque and New Mexico to manage their water resources wisely.

The natural resources of our Nation are its land, water, biota, minerals, and energy. USGS activities in the natural resources theme area inventory the occurrence and assess the quantity and quality of natural resources. Activities also include monitoring changes to natural resources, understanding the processes that form and affect them, and forecasting the changes that may be expected in the future.

Information Management

Real-time data from stations in the USGS-operated national streamgaging network are being accessed online by thousands of monthly users, ranging from boaters to anglers who are planning trips, to Federal and State natural resource managers and public safety officials. USGS information management efforts provide real-time data during the drama of a major

flood, access to thousands of pages of earth science data with few key strokes, and standards to improve data sharing. USGS information is also provided in a host of publications and by FAX, telephone, or personal assistance from a national network of Federal and State USGS Earth Science Information Centers.

Use of the Internet to access USGS hydrologic, geologic, and cartographic information is rapidly increasing. In the past year, Internet access for water information has increased more than fourfold (fig. 4). A related biological information site has been queried by individuals from the 50 States and 53 countries.

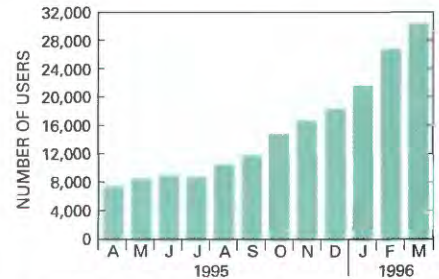


Figure 4. Public Internet access to the main USGS water information server.

In addition to providing information over the Internet, the USGS is a leader in developing a growing reference library of earth science information on CD-ROM's. The 1995 National Assessment of Oil and Gas Resources of the United States, and an oil recovery study (House Creek Oil Field, Powder River Basin, Wyoming), are two examples of an increasing body of geologic information available in CD-ROM formats. The USGS also is working in partnership with the private sector to produce the GeoMedia educational series of interactive CD-ROM's, which include multimedia journeys through rain forests or mountain streams.

The National Spatial Data Infrastructure (NSDI) is being developed by the Federal Geographic Data Committee to link high resolution mapping data and information through a national network that will be accessible to everyone via the Internet. As a key partner in NSDI development, the USGS coordinates with other Federal, State, and local agencies and the private sector to establish common standards to increase data availability and exchange.

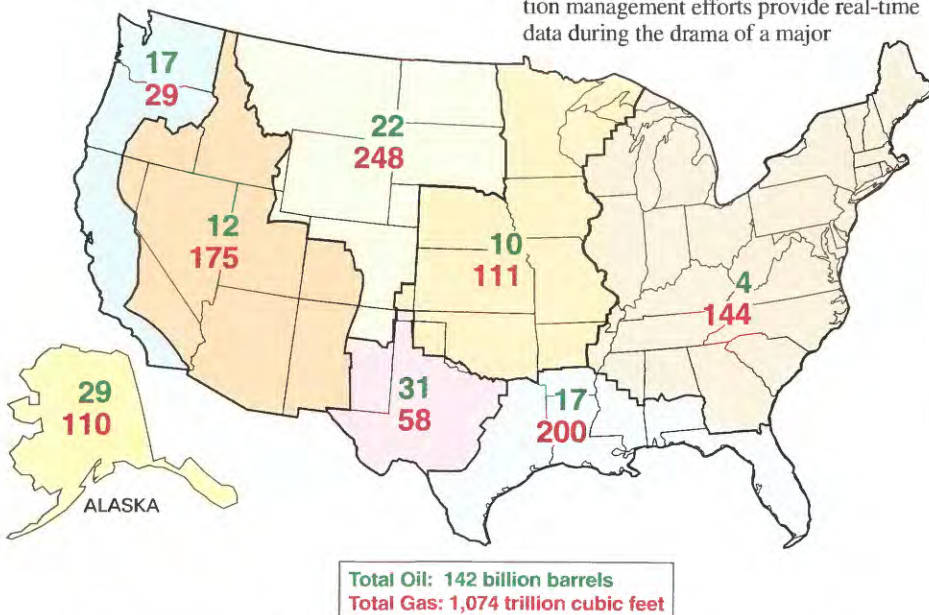


Figure 3. U.S. oil and gas resources (onshore and State waters), USGS 1995 Assessment of Oil and Gas Resources of the United States.

Getting the earth science information you need is easy—phone toll free at: 1-800-USA-MAPS, Internet at <http://www.usgs.gov>, and EARTHFAX at 703-648-4888.