

## Program Highlights—Fiscal Year 2001

**I**ntroduction. The Idaho Geological Survey has a statewide mission as the lead agency for collecting and disseminating geologic information and mineral data in the state. In addition to its main office in Moscow at the University of Idaho, the Survey has branch offices in Boise at Boise State University and in Pocatello at Idaho State University. Staff geologists conduct applied research with a strong emphasis on producing geologic maps and providing technical and general information about Idaho's geology. Externally funded projects enhance this research.

**P**ublications. In the last 10 years, the Survey has released 167 publications in a variety of formats that include books, maps, reports, posters, and fact sheets. The output represents a substantial gain in knowledge on the state's geology. Remarkably, it also accounts for nearly 30 percent of all the published research in the Survey's 82 year history. This solid productivity can be attributed to three factors: experienced staff, success in obtaining external research funds to bolster state appropriations, and prudent investment in computer technology.

For the past several years, the Survey has devoted much of its resources to geologic mapping, particularly at 1:24,000 and 1:100,000 scales. Cooperative federal grants and contracts have provided much-needed funding for this research. At the same time, the publishing of maps has changed dramatically. Extraordinary advances in cartography through computer hardware and software make it possible to generate better maps today than ever before.

**T**he Web site—[www.idahogeology.org](http://www.idahogeology.org). Viewable on the Internet, interest in the Web site has been strong, and our offerings continue to expand through updates and additions and an ever-widening network of links. The Web site offers multiple opportunities to get information before the public. The searchable *List of Publications* is always on line, and a searchable Index to Geologic Maps will be accessible in October 2001. The Web site provides electronic access to selected geologic maps, GIS databases, and wide-ranging information such as geologic hazards, mining, earth science education, and digital geologic maps.

**G**eological mapping and related research. Central to the Survey's applied research is geologic mapping and related topical studies that together form the technical content of digital geologic maps, databases, reports, and publications. Since 1985 the Survey has been conducting detailed geologic mapping in selected development-impact areas. The Survey participates in the U.S. Geological Survey's STATEMAP program, which since 1990 has augmented geologic mapping in urban areas and development-impact corridors, and is now a major supporter of the Survey's long-term goal of completing new geologic maps of the state's fifty-seven 30' x 60' quadrangles. The State Mapping Advisory Committee was reorganized to better assess Idaho's mapping needs and address long-term plans for geologic mapping. During the year, STATEMAP project geologists mapped twenty-eight 7.5-minute quadrangles and delivered for review and publication eight 7.5-minute quadrangles and one 30' x 60' quadrangle. The U.S.

Geological Survey's Headwaters project provided additional support for mapping the Potlatch 30' x 60' quadrangle. All of the new mapping data will be entered into the statewide digital database. Following review and corrections, the new geologic maps will be published as on-demand color maps.

The Survey cooperates with several universities by endorsing EDMAP proposals for student geologic mapping in the state and has participated for a third year in the Association of American State Geologists's Mentored Field Experience Program that is funded by the National Science Foundation and the U.S. Geological Survey.

**G**eologic map production and publishing. The Survey's digital mapping and GIS laboratory performs services ranging from digital cartography to spatial data management. The lab uses computer-aided design and GIS software to produce maps for publication and to fashion existing geologic maps into digital-map compilations. Most new geologic maps published by the Survey are available in full color as print-on-demand maps. Seven maps were released in FY 2001.

The Survey participates in the North American Data Model Steering Committee, which is preparing guidelines for the digital-legend design of geologic maps. The Survey is developing a new publication category, called the Digital Data series, to handle the release of electronic information and should have the format completed early next year.

**H**ydrogeology. In several counties, the Survey works with other agencies, university programs, and groups to better understand the geologic controls on the recharge, flow, and transport of ground water. The Survey also provides technical information for ground-water protection, including artificial wetlands designed for managing storm-water runoff. The hydrogeologic research has developed predictive models of ground-water recharge and transport, simulation techniques for understanding complex aquifers, and novel modeling techniques for monitoring and managing statewide ground-water quality. In addition, aquifer water-balance studies have provided planners and domestic water suppliers with information on current and future ground-water resource potential.

The scientific characterization of the lower Portneuf River valley aquifer and ongoing cooperation with various area jurisdictions and citizen groups have led to a prototype effort to protect and manage the ground-water resources in this part of Bannock County. The work developed an environmental GIS database for aquifer vulnerability assessment, coordinated the use of the database to improve water management by municipal water suppliers, and developed a Web-site to foster public awareness of ground-water issues in cooperation with the Portneuf Groundwater Guardian and the Groundwater Foundation.

**D**atabases, bibliographies, and collections. Many of the digital geologic maps are also available as GIS databases. Other databases include information on the state's mines and prospects, earthquakes, faults, and landslides. Digital geologic databases and earthquake information are available on the Survey's Web site. Several technical bibliographies have been published, and an electronic bibliography with over 11,000

references has been compiled on the state's geology. Many of these references, such as the collection of theses and dissertations on the state's geology, are available at the Moscow Office. The Survey has prepared a digital database, Index to Geologic Maps, on a project funded by the Idaho Board of Education and is currently compiling an index of the geologic maps in theses. These products will complement the existing U.S. Geological Survey's index available on the Internet.

**G**eologic hazards. As the state's population grows and disaster losses increase, the Survey devotes more time to geologic-hazard mitigation. The agency cooperates closely with the Idaho Bureau of Disaster Services, both formally and informally, to provide technical analysis when needed and to mitigate, respond to, and recover from the impacts of floods, fires, landslides, and earthquakes.

The Survey's digital mapping laboratory designed a statewide landslide database for use by state and federal agencies, local planners, and emergency response personnel. A landslide mapping protocol has been established for GIS compatibility and consistency in the field. New STATEMAP projects in Blaine County and along the Clearwater River corridor are using the new protocol for surficial geologic mapping. Landslides are also being mapped this year in seven quadrangles bordering Coeur d'Alene Lake.

The Survey is completing a two-year study of the earthquake-shaking hazard in the greater Boise area. Similar studies have been completed for the Idaho Falls and Pocatello areas. Maps of the state's faults and earthquakes have been completed and will be updated annually. The mapped faults are linked to an extensive database as well as a seismic reference collection at the main office.

As an active participant in the Western States Seismic Policy Council (WSSPC) and in regional planning groups of the Advanced National Seismic System, the Survey is involved in organizing and planning several hazard mitigation projects throughout the state. The Survey is organizing a technical clearinghouse response capability in cooperation with the Idaho Bureau of Disaster Services and participates at clearinghouse coordinating functions with the other basin-and-range states in WSSPC.

The mitigation of natural hazards is a major component of the Survey's annual summer workshop for teachers. Training activities provide knowledge of Idaho's tectonic setting and classroom safety and response. The success by master teachers last year in developing and testing classroom activities for geologic-hazard education has led to a follow-up project for next year to complete an additional set of activities.

**M**ines and the geology of mines. The Survey maintains a working knowledge of the geology of all active and many inactive mines in Idaho. This includes current research on the geologic setting of the Lemhi Pass thorium district. Information and statistics on Idaho's mines are collected and published annually. The Survey cooperates with the U.S. Geological Survey in collecting and interpreting mineral statistics and mining data, and presents an overview of Idaho's exploration and mining at the

Northwest Mining Association's annual meeting. The Survey's summaries of mining and exploration activity are published annually in the May issue of *Mining Engineering*, the U.S. Geological Survey's *Minerals Yearbook*, and the Idaho Department of Commerce's *Idaho Facts*.

Abandoned and inactive mines in the state are being evaluated and field-inventoried by the Survey. The projects are conducted in cooperation with the U.S. Forest Service's Regions 1 and 4, the U.S. Bureau of Land Management, and the Idaho Department of Lands. The results identify physical as well as environmental hazards at each site. Selected mine histories are compiled for possible future analysis and remediation work. Interest and concern over the physical hazards and potential environmental risks associated with abandoned mines have increased due to local development and the expected influx of visitors, especially during the upcoming bicentennial of the Lewis and Clark Expedition.

**E**arth science education. The Survey supports formal and informal geologic education activities throughout the state, the region, and the nation. Staff members make their expertise available to geology departments at the three state universities by participating in seminars, field trips, and workshops, by teaching selected upper-division courses, and by directing graduate student research. The Survey contributed to an exhibit on geology, minerals, and mining at the regional National Science Teachers Association meeting in Boise. The exhibit was cosponsored by the Survey and the Society of Mining Engineers, the Minerals Education Coalition, the Idaho Museum of Mining and Geology. Staff also designed and implemented displays, handouts, and field trips highlighting the ice-dam story of Glacial Lake Missoula for the Ice Age Floods Institute.

With funding enhancement, the Survey participated in the American Geological Institutes's new elementary- and middle-school curriculum programs, presented a paper at a geoscience education symposium at the Geological Society of America National Meeting, and submitted a proposal to the National Science Foundation for coordinating all supplemental geoscience education in the state's K-12 schools. The Survey promotes earth science education with the support of the Idaho Earth Science Teachers Association, through information posted on the Web site, and with field workshops around the state where teachers can observe the methods and science of geology. Idaho is one of a handful of states in which the state geological survey and earth science teachers work together to enhance the teaching of earth science. This includes cooperating with selected master teachers to classroom-test student activities for geologic-hazard education, a project funded by EPSCoR (Experimental Program to Stimulate Competitive Research). The Survey's partnership with teachers also involves Earth Science Week activities in early October and the summer field workshop. In the workshop, the Survey cosponsors an educational program on hazards mitigation in cooperation with the Idaho Bureau of Disaster Services. The summer of 2000 marked the twenty-first teacher workshop the Survey has conducted since 1986.