

Program Highlights—Fiscal Year 2003

During Fiscal Year 2003, an internal reorganization by the University of Idaho modified the administration of the Idaho Geological Survey. The College of Mines and Earth Resources was eliminated, and its departments placed in the new College of Science. This reorganization, however, necessitated an administrative realignment for the Survey within the University because of the loss of the previous Dean/Director position. As a consequence, the Survey was placed with the University Research Office.

New Enabling Legislation. A new enabling act for the Survey was passed by the Idaho Legislature and signed into law by Governor Dirk Kempthorne. Effective July 1, 2003, the act internalizes the director within the Survey. Previously, the director was also the dean of the College of Mines and Earth Resources, a University position external to the Survey. Now, the Survey is administratively aligned with the University Research Office under the Vice President for Research. Advisory Board members will include the chairs of geological science departments at all three state universities. Further changes in the act involve the addition of hydrogeology and geologic hazards to the agency's statewide research responsibility and a new time for the annual Advisory Board meeting. This administrative transition within the University has been smooth.

Personnel. Director Earl H. Bennett, the interim dean of the College of Science, retired effective June 2003. He was honored for his long service with the Idaho Geological Survey, University of Idaho, and the Association of American State Geologists. Also in June, Dr. Bill Bonnicksen retired after twenty-seven years of service with the Survey. A national search to fill the research geologist position is ending this month. Under the University's reorganization,

the position of Mine Safety Specialist in charge of the U.S. Department of Labor's Mine Safety and Health Training Program in the state was transferred to the Survey.

New Administrators for the Survey. Before July 1, 2003, the Associate Directors managed the daily operation of the Survey. With the reorganization, the old Dean/Director position is no more. Now, the position of Director has been internalized, and the position of Associate Director eliminated. Two Directors now manage the Survey (compare the June and July 2003 organizational charts). In addition, Roy Breckenridge has been designated State Geologist, whose duties include membership in the Association of American State Geologists.

Annual Budget. Idaho again experienced a revenue shortfall this past year, forcing the Governor to impose budget hold-backs throughout state government. The cuts reduced the Survey's operating funds to a nineteen-year low, severely impacting state-supported research and public service and eliminating most of the earth science education program.

Geological Mapping and Related Research. Central to the Survey's applied research are geologic mapping and topical studies produced in databases, reports, and publications. The Digital Mapping/GIS Lab uses state-of-the-art techniques to provide the public with readily accessible and readable maps and digital data. The Survey participates in the U.S. Geological Survey's STATEMAP and EDMAP programs, which augment geologic mapping throughout the state. The Survey's long-range planning for geologic mapping identifies societal and scientific requirements for the state. The Idaho Geologic Mapping Advisory Committee (IGMAC) assists the Survey in choosing project

areas and designates these for the annual STATEMAP proposal.

The Survey's long-term geologic mapping database is organized into 30' x 60' quadrangles. Interaction with IGMAC identifies 30' x 60' tiles for multiyear project areas. Specific project quadrangles within a 30' x 60' tile are chosen according to need for updated geology and essential information about, for example, earthquakes, landslides, floods, subsidence, construction aggregate, phosphate mining, and surface- and ground-water quantity and contamination. Since 1990, three-quarters of Idaho's counties have experienced population growth ranging from 10% to more than 40%. The growth is occurring primarily within the major urban centers and along transportation zones that form three north-south corridors (Figure 1). Scientifically, Idaho's geologic framework is vast and complex, and much of the older geologic mapping needs revision. The Survey's new mapping is intended to update geologic understanding with modern concepts and techniques. Equally important, the new mapping is produced with digital technology and thereby becomes much more accessible and usable by the public.

I **Idaho Geologic Mapping Advisory Committee.** The Idaho Geologic Mapping Advisory Committee (IGMAC) represents the following sectors: cities and counties, land-use management, emergency management and geologic-hazards mitigation, water resources, transportation, geographic information systems, and economic geology and mineral resources. The IGMAC reviews the performance of past and current projects, appraises long-range planning needs and priorities, evaluates both the state and STATEMAP funding for projects, assesses the Survey's capabilities and resources, determines project areas, and establishes the quadrangles for the annual STATEMAP proposal.

S **STATEMAP.** The National Cooperative Geologic Mapping Program (NCGMP) coordinates geologic mapping between the U.S. Geological Survey and the state geological surveys to set geologic mapping requirements for the nation and to increase the production of geologic maps. STATEMAP is the state geologic mapping component of the NCGMP. The agency competes annually for a STATEMAP contract award from the U.S. Geological Survey to finance specific geologic mapping in the state. Since 1992, the Survey has received funds and completed multiple geologic maps each year. These awards total nearly \$1.5 million for about ninety maps. Figure 1 shows the locations of STATEMAP-supported geologic mapping.

E **EDMAP.** The primary objective of the EDMAP component of the NCGMP is to train the next generation of geologic mappers. Participating academic faculty annually compete for federal funds to support graduate and undergraduate students on geologic mapping projects. Important goals of this program for Idaho are to inform the geologic mappers at universities and colleges of the societal needs that drive research projects at the Survey and to provide an outlet through the agency to make this mapping available to the public. The Survey's role in EDMAP is to review each proposal, provide letters of support for the best mapping proposals, and establish regular contact with participating faculty members to insure statewide coordination and greater public access to the completed geologic maps.

G **Geologic Map Production.** 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. Thirty maps were released during FY-2003.

Through the lab, the Survey participates in the North American Data Model Steering Committee to help develop and implement guidelines for digital legend design for geologic maps. The Digital Web Map series is a new publication category in which eighteen maps were released on the Survey's Web site during FY-2003.

Geologic Hazards. This year the Survey and the Idaho Bureau of Disaster Services (IBDS) met with seismic network operators and end-users in the eastern and northern parts of the state to review a plan to implement the Advanced National Seismic System (ANSS). One outcome of the meeting was that the Survey would serve as a distribution site for seismic information shared by the network operators. These data would also be accessible on the Survey's Web site. Work began to install Earthworm, a near real-time seismogram display, at Moscow and to develop a notification and reporting protocol for seismic events.

A map of Miocene age and younger faults in the state was released and is available on the Web site. A series of reports describing studies of seismic-shaking hazards for Pocatello, Idaho Falls, and Boise are being prepared for the Web site. New digital surficial geologic maps of the Survey's STATEMAP projects are the basis for geologic hazard vulnerability maps in the Clearwater valley, an area of landslide concern. These maps are being produced by a geotechnical consultant in partnership with the Survey and are funded by Nez Perce and Clearwater counties under initiatives resulting from FEMA's project Impact. The maps translate the geologic maps into geotechnical units that can be readily

applied in planning decisions by the local jurisdictions. A similar pilot program is progressing in Kootenai County.

The annual field workshop for earth science educators focused on the geology and geologic hazards of the Salmon region in central Idaho. Participants studied the tectonic setting of the region, historical floods and ice jams, and regional mineralization and mining. The class project was a geotechnical assessment of expanded facilities at the University of Idaho farm near Salmon. The Survey again partnered with IBDS and the Idaho Earth Science Teachers Association in sponsoring Earth Science Education Week in Idaho.

Hydrogeology. The Survey works steadily to better understand the geologic controls on ground-water flow and recharge and the distribution and transport of ground-water contaminants. Results of research are provided to end-users for ground-water resource development and protection. To accomplish this, the Survey cooperates with other state and federal agencies, university programs, and water-user groups throughout Idaho. Research applications include quantifying ground-water resources, data analysis and mapping of ground-water quality, and integration of surface geological and subsurface hydrogeological information to assess ground-water vulnerability.

The Survey has developed a statistical approach to analyzing the state's ground-water quality database that is successfully assisting the Idaho Department of Water Resources in managing the state's ground-water resources. Statistically based GIS tools are used to identify areas of water quality concern, to define trends and spatial boundaries, and to determine problem areas.

In the greater Pocatello area, the Survey assists local jurisdictions in creating effective

ways to protect and manage the lower Portneuf Valley ground-water resources. Methods developed include a GIS database for aquifer vulnerability assessment and an educational component that includes a Web site devoted to this program.

The Survey is currently involved in three, funded research projects: mapping water quality in the Treasure Valley and Twin Falls areas and other areas of the state, mapping surficial geology and aquifer characteristics in the Big Wood River Valley, and developing technical criteria for assessing septic drain field performance in the lower Portneuf Valley. The agency also assisted the Idaho Water Resources Research Institute in concluding an EPA-funded project to provide geologically based ground-water information to rural communities with critical water issues.

Mining Activity. The Survey maintains geologic information on all active mines in Idaho. The agency cooperates with the U.S. Geological Survey in collecting and interpreting mineral and mining data, and presents an overview of Idaho exploration and mining at the Northwest Mining Association's annual meeting. Production data on mines are also collected and published. Annual summaries of Idaho's mining and exploration activity are published 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. Since 1994, the Survey has been evaluating and inventorying abandoned and inactive mines in the state in cooperation with federal agencies. In FY-2003, work continued with the U.S. Forest Service Region 4 and the U.S. Bureau of Land Management. The results identify physical as well as environmental hazards, and selected mine histories are recorded for possible future

analysis and remediation. The primary motivation for the projects is concern over the physical hazards and potential environmental risks associated with abandoned mines.

Mine Safety Training Program. Starting in MFY-2003, the University of Idaho's Mine Safety Training Program has been transferred to the Survey as a new component of the agency's service responsibility. The program provides courses approved by the U.S. Department of Labor's, Mine Safety Health Administration (MSHA). Courses include new miner training, annual refreshers on safety, and mine rescue training. The instructor, now a Survey employee, conducts the training throughout Idaho at numerous underground and surface mines. The program is funded by the MSHA.

Databases and Archives. The Survey's databases include digital geologic maps, mines and prospects, and information on the state's earthquakes, faults, and landslides. Digital geologic databases and earthquake information are also available on the Survey's Web site. Several technical bibliographies are published. At the Moscow office, the agency maintains collections of reports on Idaho's mines and of graduate theses and dissertations on Idaho's geology. Geologic maps in the theses and dissertations are included in the Web site's *Index to Geologic Maps*, which complements the existing U.S. Geological Survey's index available on the Internet.

Outreach. The enabling act of the Idaho Geological Survey charges the agency with disseminating the geologic and mineral data it collects. This outreach is accomplished primarily through the Survey's publications, Web site, and various efforts in educating the public in the earth sciences.

Publications. In the past decade, the Survey has released over 200 publications in a variety of formats that include books, maps, reports, posters, and fact sheets. The output represents a substantial addition to modern geologic knowledge of Idaho and accounts for about 30 percent of all the published research in the Survey's 84-year history. This solid productivity can be attributed to three factors: experienced staff, prudent investment in computer technology, and success in obtaining external research funds to augment state appropriations. Access to publications is greatly broadened through the agency's Web site.

The Web site—www.idahogeology.org. The Survey's Web site provides electronic access to geologic maps, GIS databases, and wide-ranging information such as geologic hazards and earth science education. The Web site includes a searchable *List of Publications* and a searchable *Index to Geologic Maps*. Digital Web maps in PDF format can be downloaded free of charge.

Earth Science Education. The Survey staff supports a variety of formal and informal geologic education efforts throughout the state, the region, and the nation. Through close professional relationships with the geology departments at the state's universities and colleges, staff geologists make their expertise available by participating in seminars, field trips, and workshops, by teaching selected upper-division courses, and by directing graduate student research. Further reductions in the state's appropriation again this year eliminated the position of Earth Science Education Coordinator early in the fiscal year and greatly curtailed efforts to enhance earth science education in Idaho. Nonetheless, the twenty-third summer field workshop for teachers was conducted in Salmon with crucial funding assistance provided by the Idaho Bureau of Disaster Services (IBDS). The continuing cooperation with IBDS in hazards mitigation education enabled the Survey to go ahead with plans for the summer 2003 workshop in the Clearwater Mountains.