

Annual Report
of the
Idaho Geological Survey

Fiscal Year 2001

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Program Highlights—Fiscal Year 2001

Introduction. 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.

Publications. 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.

The Web site—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.

Geological 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.

Geologic 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.

Hydrogeology. 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.

Databases, 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.

Geologic 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.

Mines 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.

Earth 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.

Staff Publications and Activities

Fiscal Year 2001

Publications

- Agency Activities—Fiscal Year 2000:* Idaho Geological Survey Web site on Web page, “Agency Activities,” 2001.
- Alteration and Mineralization in the Eastern Part of the Soldier Mountains, Camas County, Idaho,* by R.S. Lewis: U.S. Geological Survey Bulletin 2064-V, 2001, 17 p.
- Bedrock Geologic Map of the Lapwai Quadrangle, Nez Perce County, Idaho,* by J.H. Bush and D.L. Garwood: Idaho Geological Survey Technical Report 01-1, 2001, scale 1:24,000.
- Bedrock Geologic Map of the Lewiston Orchards North Quadrangle, Nez Perce County, Idaho,* by D.L. Garwood and J.H. Bush: Idaho Geological Survey Technical Report 01-2, 2001, scale 1:24,000.
- Bedrock Geologic Map of the Moscow East Quadrangle, Latah County, Idaho,* by J.H. Bush, J.L. Pierce, and G.N. Potter: Idaho Geological Survey Geologic Map 27, 2000, scale 1:24,000.
- Geologic Map of the Bonneville Peak Quadrangle, Bannock and Caribou Counties, Idaho,* by J.W. Riesterer, P.K. Link, D.W. Rodgers: Idaho Geological Survey Technical Report 00-3, 2000, scale 1:24,000.
- Geologic Map of the Fernan Lake Quadrangle, Kootenai County, Idaho,* by J.L. Browne: Idaho Geological Survey Technical Report 00-2, 2000, scale 1:24,000.
- Geologic Map of the Hayden Lake Quadrangle, Kootenai County, Idaho,* by J.L. Browne: Idaho Geological Survey Technical Report 00-1, 2000, scale 1:24,000.
- Geologic Map of the Idaho City 30' x 60' Quadrangle, Idaho,* by T.H. Kiilsgaard, L.R. Stanford, and R.S. Lewis: Idaho Geological Survey Geologic Map 29, 2000, scale 1:100,000.
- Geologic Map of the St. Maries 30' x 60' Quadrangle, Idaho,* by R.S. Lewis, R.F. Burmester, J.D. Kauffman, and T.P. Frost: Idaho Geological Survey Geologic Map 28, 2000, scale 1:100,000.
- Ground-water Interactions Near the Highway Pond Gravel Pit, Pocatello, Idaho,* by J.A. Welhan: Idaho Geological Survey Staff Report 01-3, 2001, 18 p.
- Hydrogeological Assessment of Well Yield Problems at Yankee Fork State Park Interpretive Center,* by J.A. Welhan: Idaho Geological Survey Staff Report 00-17, 2000, 11 p., appendices.
- Idaho Agency Report,* by R.M. Breckenridge and S. Weiser, in *Earthquake Quarterly: Western States Seismic Policy Council*, summer/fall, p. 16-17.
- Idaho Mining and Geology,* by V.S. Gillerman: Idaho Geological Survey GeoNote 40, February, 2001.
- Idaho Report,* by R.M. Breckenridge and S. Weiser, in *Proceedings of the National Earthquake Risk Management Conference Guide*, 2000, p. SI 14-15.
- Idaho: Selenium Not a Prescription for Growth,* by V.S. Gillerman: *North American Minerals News*, no. 62, July, 2000, p. 10-12.
- Land-Use Map Emphasizing Sand and Gravel Resources of the Eagle Quadrangle, Ada County, Idaho,* by J.A. Walling: Idaho Geological Survey Technical Report 00-4, 2000, scale 1:24,000.
- List of Publications, 2001,* produced by R.C. Stewart: Idaho Geological Survey booklet; with B.B.E. Studer: Idaho Geological Survey Web site.
- Mineral Industry of Idaho (1999),* by A. Tanner and S.D. Smith with V.S. Gillerman: U.S. Geological Survey Mineral Industry Surveys and Minerals Yearbook Chapter, v. II, p. 14.1-14.5, December, 2000.
- Mining and Exploration in Idaho, 2000,* by V.S. Gillerman: *Mining Engineering*, May, 2001, v. 53, no. 5, p. 73-76.
- National Natural Landmarks in Idaho,* by S.T. Gibbons: Idaho Geological Survey GeoNote 41, April, 2001.
- Plutonic and Hypabyssal Rocks of the Hailey 1° x 2° Quadrangle, Idaho,* by T.H. Kiilsgaard, R.S.

- Lewis, and E.H. Bennett: U.S. Geological Survey Bulletin 2064-U, 2001, 18 p.
- Recommendations for Siting a Second Ground-Water Production Well at Black Pine Mine, Cassia County, Idaho*, by J.A. Welhan: Idaho Geological Survey Staff Report 00-16, 2000, 18 p.
- Sand and Gravel Resource Potential Map of the Eagle Quadrangle, Ada County, Idaho*, by J.A. Walling: Idaho Geological Survey Technical Report 00-5, 2000, scale 1:24,000.
- Simulating Basalt Lava Flows Using a Structure Imitation Approach*, by T. Clemo and J. Welhan, in L.R. Bentley, J.F. Sykes, and C.A. Brebbia, eds., *Computational Methods in Water Resources: Proceedings, XIII International Conference on Computational Methods in Water Resources*, Balkema, Rotterdam, 2000, p. 841-848.
- Surficial Geologic Map of the Hayden Lake Quadrangle, Kootenai County, Idaho*, by R.M. Breckenridge and K.L. Othberg: Idaho Geological Survey Surficial Geology Map 9, 2000, scale 1:24,000.
- Use of Chlorine-36 to Determine Regional-Scale Aquifer Dispersivity, Eastern Snake River Plain Aquifer, Idaho*, by L.D. Cecil, J.A. Welhan, J.R. Green, S.K. Frape, and E.R. Sudicky: *Nuclear Instruments and Methods in Physics Research*, B 172, 2000, p. 679-687.
- by V.S. Gillerman, B.R. Otto, and F.S. Griggs: *Geological Society of America Abstracts with Programs*, 2000, v. 32, no. 7, p. A-83.
- Miocene to Pleistocene Volcanism and Rifting, Western Snake River Plain, Southwestern Idaho*, by B. Bonnicksen and M.M. Godchaux: *Geological Society of America Abstracts with Programs*, 2000, v. 33, no. 5, p. A-61.
- Paleomagnetic Evidence for Multiple Flood Releases from Glacial Lake Missoula*, by R.M. Breckenridge, K.L. Othberg, D.W. Weisz, and T.C. Walker: *Geological Society of America Abstracts with Programs*, 2000, v. 32, no. 7, p. A-117.
- Stochastic Simulation of Heterogeneity in a Layered Basalt-Sedimentary Aquifer, Idaho*, by J.A. Welhan: *Geological Society of America Abstracts with Programs*, 2000, v. 32, no. 7, p. A 410.
- Water Quality in the Portneuf Aquifer, Pocatello-Chubbuck Area, Idaho: The Case for Protection*, by J.A. Welhan: *Proceedings, 43rd Idaho Academy of Science Meeting*, Caldwell, 2001, p. 52-55.

Abstracts

- Comparison of Laboratory Cooling Experiments to the Crystallization of the 1998 Basalt Flow, Cerro Azul, Galapagos Islands*, by R. Teasdale, D. Geist, T. Williams, and K. Cashman: *Geological Society of America Abstracts with Programs*, 2000, v. 32, no. 7, p. A-323.
- Idaho Geologic Hazards Curriculum Project*, by T.C. Walker and K.L. Othberg: *Geological Society of America Abstracts with Programs*, 2000, v. 32, no. 7, A-266.
- Lemhi Pass Thorium District: A Variant of Proterozoic Iron Oxide (Cu-U-Au-REE) Deposits?*
- An Account of Three Hotspots: Hawaii, Gran Canaria, and Idaho's Snake River Plain*, by M.M. Godchaux: *Geology research faculty seminar, Universidad Nacional Autonoma de Mexico, Juriquilla campus, Queretaro, Mexico, March.*
- Annual Report of the Idaho Geological Survey to the Advisory Board, Fiscal Year—2000*: Idaho Geological Survey report, December, 2000.
- Aquifer Protection in the Lower Portneuf River Valley—A Management Perspective*, by J.A. Welhan: *Geology colloquium, Idaho State University, Pocatello, October*; *Hydrology seminar, University of Idaho, Idaho Falls, October.*
- Basalt-Water Interactions in the Western Snake River Plain: A World-Class Example of Phreatomagmatism*, by M.M. Godchaux and B. Bonnicksen: *Owyhee-Bruneau Canyonlands*

Reports and Presentations

- Symposium, American Land Alliance, Boise State University, November, 2000.
- Boise Ground Shaking-Hazard Analysis, Progress Report*, by R.M. Breckenridge, B.K. Peterson, and G. Adema: Idaho Geological Survey unpublished report, 3 p., October.
- The Case for Aquifer Protection in the Lower Portneuf River Valley*, by J.A. Welhan: Portneuf Watershed Council, Pocatello, October.
- Characteristics of High-Grade Ignimbrites*, by B. Bonnicksen: Geology research faculty seminar, Universidad Nacional Autonoma de Mexico, Juriquilla campus, Queretaro, Mexico, March.
- Demonstration of the IGS Digital Mapping and GIS Laboratory*, by J.S. Freed: Moscow Girl Scout Troop, emphasizing careers in cartography, September.
- Demonstration of the IGS Digital Mapping and GIS Laboratory*, by J.S. Freed and L.R. Stanford: Computer geology class, University of Idaho, February.
- Earthquake History of Idaho*, by J. Perry, T. Walker, R.M. Breckenridge, and S. Weiser: Idaho Geological Survey and Idaho Bureau of Disaster Services portable exhibit.
- Earthquake History of Idaho*, by R.M. Breckenridge: National Earthquake Risk Management Conference poster session, Seattle, Washington, October.
- Earthquake Map of Idaho*, by R.M. Breckenridge and G.W. Adema: Idaho Geological Survey unpublished map, scale 1:1,000,000, October, 2000.
- Enhancement of GIS Systems Using Component Technology*, by V.T. MacKubbin: Intermountain GIS User's Conference 2001, Boise, May.
- An Estimation of the Ground-Shaking Hazard Due to Seismically Induced Bedrock Motion in the Vicinity of Idaho Falls, Idaho*, by B.K. Peterson, G.W. Adema, and R.M. Breckenridge: Idaho Geological Survey unpublished report, 2000, 43 p.
- Geologic Features in Bruneau and Jarbidge Canyons, Owyhee County, Idaho*, by B. Bonnicksen and M.M. Godchaux: Owyhee-Bruneau Canyonlands Symposium, American Land Alliance, Boise State University, November, 2000.
- Geologic Map of the Melba Quadrangle, Ada and Canyon Counties, Idaho*, by B. Bonnicksen and M.M. Godchaux: Idaho Geological Survey unpublished map, scale 1:24,000, April.
- Geologic Map of the Potlatch 30' x 60' Quadrangle*, by R.S. Lewis, J.H. Bush, R.E. Burmester, J.D. Kauffman, D.L. Garwood, P.E. Meyers, K.L. Othberg, and W. McClelland: Idaho Geological Survey unpublished map, scale 1:100,000, April.
- GIS Applications in Hydrogeology*, by J.A. Welhan: American Society for Photogrammetry and Remote Sensing, Intermountain Spring Technical Meeting, Pocatello, April.
- Idaho Epicenter Update for Seismic/Eruption*, by G.W. Adema and R.M. Breckenridge: Idaho Geological Survey digital data report to the Idaho Bureau of Disaster Services, October.
- Idaho Geological Survey Geologic Map Database*, by D.W. Weisz, L.R. Stanford, and R.S. Lewis: Idaho Geological Survey database, June.
- Idaho Geologic Hazards Curriculum Project*, by T.C. Walker and K.L. Othberg: Geological Society of America Annual Meeting, Reno, Nevada, November.
- Idaho Mining and Geology*, by V.S. Gillerman: National Science Teachers Association Convention, Minerals Education Exhibit, Boise, October.
- Idaho Report for National Earthquake Hazards Reduction Program*, by S. Weiser with a contribution by R.M. Breckenridge: Idaho Bureau of Disaster Services report to the Federal Emergency Management Agency, 2001, 3 p.
- Idaho Report on the Advanced National Seismic System*, by R.M. Breckenridge: Idaho Geological Survey report, 2000, 3 p.
- The Interconnection Between American Falls Reservoir Water Levels and Aquifer Water Levels in the Lower Portneuf River Valley*, by J.A. Welhan: Alliance for Wise Water Use, Pocatello, March.
- Landslide Database Pilot Study: Little Salmon*

- River Valley, Idaho*, by R.M. Breckenridge, G.W. Adema, and L.R. Stanford: Idaho Geological Survey report, October, 2000, 4 p.; by G.W. Adema, L.R. Stanford, and R.M. Breckenridge: Idaho Geological Survey digital data report, October.
- Landslide Locations in the Coeur d'Alene Area*, by R.M. Breckenridge and D.W. Weisz: Idaho Geological Survey unpublished map, October.
- Lemhi Pass Thorium District: A Variant of Proterozoic Iron Oxide (Cu-U-Au-REE) Deposits?* by V.S. Gillerman, B.R. Otto, and F.S. Griggs: Geological Society of America Annual Meeting, Reno, Nevada, November.
- Mining and Exploration in Idaho, 2000*, by V.S. Gillerman: Northwest Mining Association 106th Annual Meeting, Spokane, Washington, December.
- Miocene and Younger Faults in Idaho*, by R.M. Breckenridge, R.S. Lewis, G.W. Adema, and D.W. Weisz: Idaho Geological Survey unpublished map, scale 1:1,000,000, October.
- Miocene to Pleistocene Volcanism and Rifting, Western Snake River Plain, Southwestern Idaho*, by B. Bonnicksen and M.M. Godchaux: Geological Society of America Rocky Mountain and South-Central Sections Meeting, May.
- Modeling Ground-Water Flow With Isotopic Tracers*, by J.A. Welhan: Isotope hydrology class, University of Idaho, Idaho Falls, December.
- Nisqually Earthquake*, by K.S. Sprenke and R.M. Breckenridge: McClure Hall foyer exhibit, University of Idaho, March.
- Paleomagnetic Evidence for Multiple Flood Releases From Glacial Lake Missoula*, by R.M. Breckenridge, K.L. Othberg, D.W. Weisz, and T.C. Walker: Geological Society of America Annual Meeting, Reno, Nevada, November.
- Progress Report on Geologic Mapping and Belt Stratigraphy of the Coeur d'Alene Quadrangle, Idaho*, by R.S. Lewis: Belt Association session, Northwest Mining Association 106th Annual Meeting, Spokane, Washington, December.
- Regional Geographic Initiatives Project Summary and Overview*, by J.A. Welhan: Environmental Protection Agency's regional meeting of administrators and program officers, Pocatello, November.
- Report on Eastern Snake River Plain Mapping Project—Summer 2000*, by B. Bonnicksen and M.M. Godchaux: Final contract report submitted to Bechtel Corp., May-September, 2000.
- Seismic-Shaking Hazard in Idaho Falls, Idaho*, by B.K. Peterson, G.W. Adema, and R.M. Breckenridge: Idaho Geological Survey report, 2000, 2 p.
- Sensitive Resources Recategorization—What, Why, How*, by J.A. Welhan: Portneuf Watershed Council, Pocatello, December.
- Site Inspection Report for the Abandoned and Inactive Mines in Idaho on U.S. Bureau of Land Management Property in the Challis Area: Challis Area Group, Custer County, Idaho*, by V.S. Gillerman and F.S. Griggs: Idaho Geological Survey unpublished report, 2001, 75 p.
- Site Inspection Report for the Abandoned and Inactive Mines in Idaho on U.S. Bureau of Land Management Property in the Hailey-Bellevue Area: Minnie Moore Group, Hailey-Bellevue Area, Blaine County, Idaho*, by V.S. Gillerman and F.S. Griggs: Idaho Geological Survey unpublished report, 2001, 79 p.
- Site Inspection Report for the Abandoned and Inactive Mines in Idaho on U.S. Bureau of Land Management Property in the Hailey-Bellevue Area: Miscellaneous Sites, Hailey-Bellevue Area, Blaine County, Idaho*, by V.S. Gillerman and F.S. Griggs: Idaho Geological Survey unpublished report, 2000, 59 p.
- Site Inspection Report for the Abandoned and Inactive Mines in Idaho on U.S. Bureau of Land Management Property in the Lemhi Pass Area: Lemhi Pass Area, Lemhi County, Idaho*, by V.S. Gillerman, B.R. Otto, and F.S. Griggs: Idaho Geological Survey unpublished report, 2001, 168 p.
- Site Inspection Report for the Abandoned and Inactive Mines in Idaho on U.S. Forest Service Lands (Region 1), Clearwater National Forest: Volume I, Section A: Palouse Ranger District*,

- Latah and Clearwater Counties, Idaho*, by J.D. Kauffman, E.H. Bennett, and V.E. Mitchell: Idaho Geological Survey unpublished report, 2000, 270 p., videotapes of properties.
- Site Inspection Report for the Abandoned and Inactive Mines in Idaho on U.S. Forest Service Lands (Region 1), Clearwater National Forest: Volume I, Section B: Palouse Ranger District, Latah and Clearwater Counties, Idaho*, by J.D. Kauffman, E.H. Bennett, and V.E. Mitchell: Idaho Geological Survey unpublished report, 2000, 215 p., videotapes of properties.
- Site Inspection Report for the Abandoned and Inactive Mines in Idaho on U.S. Forest Service Lands (Region 1), Clearwater National Forest: Volume II: Pierce, North Fork, Powell, and Lochsa Ranger Districts, Clearwater, Idaho, and Shoshone Counties, Idaho*, by J.D. Kauffman, E.H. Bennett, and V.E. Mitchell: Idaho Geological Survey unpublished report, 2000, 231 p., videotapes of properties.
- Site Inspection Report for the Abandoned and Inactive Mines in Idaho on U.S. Forest Service Lands (Region 1), Idaho Panhandle National Forest: Volume IX, Section A: Sandpoint Ranger District, Bonner and Boundary Counties, Idaho*, by J.D. Kauffman, E.H. Bennett, and V.E. Mitchell: Idaho Geological Survey unpublished report, 2000, 179 p., videotape of properties.
- Site Inspection Report for the Abandoned and Inactive Mines in Idaho on U.S. Forest Service Lands (Region 1), Idaho Panhandle National Forest: Volume IX, Section B: Sandpoint Ranger District, Bonner and Boundary Counties, Idaho*, by J.D. Kauffman, E.H. Bennett, and V.E. Mitchell: Idaho Geological Survey unpublished report, 2000, 237 p., videotape of properties.
- Site Inspection Report for the Abandoned and Inactive Mines in Idaho on U.S. Forest Service Lands (Region 1), Idaho Panhandle National Forest: Volume IX, Section C: Sandpoint Ranger District, Bonner and Boundary Counties, Idaho*, by J.D. Kauffman, E.H. Bennett, and V.E. Mitchell: Idaho Geological Survey unpublished report, 2000, 142 p., videotape of properties.
- Site Inspection Report for the Abandoned and Inactive Mines in Idaho on U.S. Forest Service Lands (Region 1), Idaho Panhandle National Forest: Volume IX, Section D: Sandpoint Ranger District, Bonner and Boundary Counties, Idaho*, by J.D. Kauffman, E.H. Bennett, and V.E. Mitchell: Idaho Geological Survey unpublished report, 2000, 197 p., videotape of properties.
- Site Inspection Report for the Abandoned and Inactive Mines in Idaho on U.S. Forest Service Lands (Region 1), Nez Perce National Forest: Volume I: Florence and Rapid River Areas, Idaho County, Idaho*, by J.D. Kauffman, E.H. Bennett, and V.E. Mitchell: Idaho Geological Survey unpublished report, 2001, 308 p., videotapes of properties.
- Site Inspection Report for the Abandoned and Inactive Mines in Idaho on U.S. Forest Service Lands (Region 1), Nez Perce National Forest: Volume II: Dixie Area, Idaho County, Idaho*, by E.H. Bennett, J.D. Kauffman, and V.E. Mitchell: Idaho Geological Survey unpublished report, 2001, 349 p., videotapes of properties.
- Site Inspection Report for the Abandoned and Inactive Mines in Southern Idaho, Owyhee County: Volume II: Flint Creek-South Mountain Area, Owyhee County, Idaho*, by E.H. Bennett, J.D. Kauffman, and V.E. Mitchell: Idaho Geological Survey unpublished report, 2000, 154 p., videotapes of properties.
- Site Inspection Report for the Abandoned and Inactive Mines in Southern Idaho, Owyhee County: Volume III: Miscellaneous Properties, Owyhee County, Idaho*, by E.H. Bennett, J.D. Kauffman, and V.E. Mitchell: Idaho Geological Survey unpublished report, 2001, 325 p., videotapes of properties.
- Stochastic Simulation of Heterogeneity in a Layered Basalt-Sedimentary Aquifer, Idaho*, by J.A. Welhan: Geological Society of America Annual Meeting, Reno, Nevada, November.
- Surficial Geologic Map of the Asotin Quadrangle, Nez Perce County, Idaho*, by K.L. Othberg,

- R.M. Breckenridge, T.C. Walker, and D.W. Weisz: Idaho Geological Survey unpublished map, scale 1:24,000, April.
- Surficial Geologic Map of the Culdesac North Quadrangle, Nez Perce County, Idaho*, by K.L. Othberg, R.M. Breckenridge, and D.W. Weisz: Idaho Geological Survey unpublished map, scale 1:24,000, April.
- Surficial Geologic Map of the Juliaetta Quadrangle, Nez Perce County, Idaho*, by K.L. Othberg, R.M. Breckenridge, and D.W. Weisz: Idaho Geological Survey unpublished map, scale 1:24,000, April.
- Surficial Geologic Map of the Lenore Quadrangle, Nez Perce County, Idaho*, by K.L. Othberg, R.M. Breckenridge, and D.W. Weisz: Idaho Geological Survey unpublished map, scale 1:24,000, April.
- Surficial Geologic Map of the Lewiston Orchards South Quadrangle, Nez Perce County, Idaho*, by K.L. Othberg, R.M. Breckenridge, T.C. Walker, and D.W. Weisz: Idaho Geological Survey unpublished map, scale 1:24,000, April.
- Surficial Geologic Map of the Sun Valley Quadrangle, Blaine County, Idaho*, by R.M. Breckenridge and K.L. Othberg: Idaho Geological Survey unpublished map, scale 1:24,000, April.
- Surficial Geologic Map of the Sweetwater Quadrangle, Nez Perce County, Idaho*, by K.L. Othberg, R.M. Breckenridge, and D.W. Weisz: Idaho Geological Survey unpublished map, scale 1:24,000, April.
- Tour of the Clark Fork Ice Dam and Flood Outbursts of Glacial Lake Missoula*, by R.M. Breckenridge: National Park Service Ice Age Floods Alternative Study and Ice Age Floods Institute, field trip guidebook, 14 p.
- An Update of Digital Geologic Mapping Projects in Idaho*, by R.S. Lewis: Intermountain Forest Tree Nutrition Cooperative Annual Meeting, Moscow, April.
- Update on Active Fault Mapping in Idaho*, by R.M. Breckenridge: U.S. Geological Survey fault mapping workshop, Salt Lake City, Utah, March.
- Water Balance and Total Pumping Capacity of the Lower Portneuf River Valley Aquifer*, by J.A. Welhan: Idaho Geological Survey unpublished report for the city of Pocatello Water Department, June.
- Water Quality in the Portneuf Aquifer, Pocatello-Chubbuck Area, Idaho: The Case for Protection*, by J.A. Welhan: 43rd Idaho Academy of Science Meeting, Idaho Water Symposium, Caldwell, March.

Professional Activities

- 37th Forum on the Geology of Industrial Minerals, Victoria, British Columbia, Canada, May (V.S. Gillerman).
- Advanced National Seismic System meeting, Seattle, Washington, September (R.M. Breckenridge).
- Advisory board meeting, Idaho Geological Survey, Boise, December (E.H. Bennett, R.M. Breckenridge, C.D. Fullerton, V.S. Gillerman, K.L. Othberg, J.A. Welhan).
- Association of American State Geologists and U.S. Geological Survey cluster meeting, Seattle, Washington, September (E.H. Bennett, R.M. Breckenridge).
- Association of American State Geologists Annual Meeting, Fairmont Hot Springs, Montana, June (E.H. Bennett).
- Association of American State Geologists meeting, Reno, Nevada, November (E.H. Bennett, R.M. Breckenridge, K.L. Othberg).
- Basin and Range Earthquake Clearinghouse Workshop, Western States Seismic Policy Council, Salt Lake City, Utah, March (R.M. Breckenridge).
- Business meetings, Idaho Earth Science Teachers Association, Sawtooth Valley, July; Boise, October (R.M. Breckenridge, K.L. Othberg, T.C. Walker); Boise, March (T.C. Walker).
- Certifications, First aid and cardiopulmonary resuscitation, February (T.C. Walker, G.A. Wells).
- Chair, Organizing Committee for Minerals Education Exhibit, National Science Teachers

- Association Convention, Boise, October (V.S. Gillerman).
- Chair, Portneuf Ground Water Forum, City of Pocatello (J.A. Welhan).
- Co-chair, Basin and Range Clearinghouse Committee, Western States Seismic Policy Council (R.M. Breckenridge).
- Co-chair and convener, Portneuf Aquifer Protection Working Group, Pocatello (J.A. Welhan).
- Co-instructor, Characterization of mineral fibers vs. fragments by TEM, University of Idaho student project, August-December (T.J. Williams).
- Contributor, Digital Atlas of Idaho 2000 (R.M. Breckenridge).
- Coordinator, Idaho Geological Survey contribution, eastern Snake River Plain geologic mapping project, Idaho State University (J.A. Welhan).
- Co-supervisor, Digital Geologic Mapping Laboratory, Idaho State University Geology Department and Idaho Geological Survey (J.A. Welhan).
- Councilor, Society of Economic Geologists (V.S. Gillerman).
- Councilor-at-Large, Pacific Northwest Section, National Association of Geoscience Teachers (T.C. Walker).
- Director, Paleomagnetism laboratory, Idaho Geological Survey-College of Mines and Earth Resources (K.L. Othberg).
- Earth Science Week Proclamation ceremony, Office of Gov. Dirk Kempthorne, October (V.S. Gillerman, K.L. Othberg, T.C. Walker).
- Exhibitor, Boise Gem, Mineral, and Fossil Show, Boise, February (V.S. Gillerman).
- Exhibitor, National Science Teachers Association Convention, Boise, October (V.S. Gillerman).
- Expert witness, Court case on mining, Boise, May (V.S. Gillerman).
- Fault mapping workshop, U.S. Geological Survey, Salt Lake City, Utah, March (R.M. Breckenridge).
- Fellow, Geological Society of America (B. Bonnichsen).
- Fellow, Society of Economic Geologists (B. Bonnichsen, V.S. Gillerman).
- Field trip, Belt Supergroup correlations from Glacier Park, Montana, to Wallace, July (R.S. Lewis).
- Field trip, Riggins-Seven Devils suture zone, University of Idaho/Washington State University/Boise State University students and faculty (T.J. Williams).
- Field trip, Pend Oreille and Sullivan mines, Washington and British Columbia, March (V.S. Gillerman).
- Field trip, Porphyry, skarn, and gold deposits of northern Mexico, Society of Economic Geologists (T.J. Williams).
- Field trip, Teacher workshop preview, Bear Lake Valley, June (R.M. Breckenridge, K.L. Othberg, T.C. Walker).
- Geological Society of America Annual Meeting, Reno, Nevada, November (E.H. Bennett, R.M. Breckenridge, V.S. Gillerman, K.L. Othberg, L.R. Stanford, T.C. Walker, D.W. Weisz, J.A. Welhan, T.J. Williams).
- Grant proposal writing workshop, University of Idaho, December and February (T.C. Walker).
- Grant proposal writing workshop, Washington State University, November (T.C. Walker).
- Guest lecturer, Courses in isotope geochemistry, hydrogeology, water systems engineering, Idaho State University (J.A. Welhan).
- HAZUS Forum, Western States Seismic Policy Council, Seattle, Washington, October (R.M. Breckenridge).
- Idaho Association of Professional Geologists meetings, Boise (V.S. Gillerman).
- Idaho Earthquake Education Field Workshop, Stanley Basin, July (R.M. Breckenridge).
- Idaho Environmental Forum meetings, Boise (V.S. Gillerman).
- Idaho Geographic Information Advisory Committee meeting, Boise, November (L.R. Stanford).
- Idaho Science Teachers Association and Idaho Earth Science Teachers Association annual conference in conjunction with the National Science Teachers Association regional meeting, Boise, October (R.M. Breckenridge, K.L. Othberg, T.C. Walker).

- Idaho State Mapping Advisory Committee meeting, October, Boise (R.M. Breckenridge, K.L. Othberg).
- Instructor, Earth materials for geological engineers, University of Idaho, January-May (T.J. Williams).
- Instructor, Geology 405, May-June, (T.C. Walker).
- Instructor, Geology 408, Summer session, June, (T.C. Walker).
- Instructor, Geology 606, Geostatistics and spatial modeling, Idaho State University, January-May (J.A. Welhan).
- Instructor, Instrumental analysis in materials science, University of Idaho, January-May (T.J. Williams).
- Instructor, Short course, JEOL: Techniques in Transmission Electron Microscopy, June (T.J. Williams).
- Instructors, Geology 504, Geology and geologic hazards, Sawtooth Valley, Idaho, July (R.M. Breckenridge, K.L. Othberg, T.C. Walker).
- Leader, Field trip, Clark Fork Ice Dam and Flood Outbursts of Glacial Lake Missoula, National Park Service Ice Age Floods Alternative Study and Ice Age Floods Institute, Sandpoint, September (R.M. Breckenridge).
- Leader, Field trip, Hells Canyon, Lewiston High School environmental science class, May (R.S. Lewis).
- Leader, Field trip, Lower Salmon River Canyon, Bureau of Land Management, April (R.S. Lewis).
- Leader, Field trip, Ross Elementary School, Kuna, Boise, May (V.S. Gillerman).
- Leader, Field trip, Impact of Glacial Lake Missoula Floods and Lake Bonneville Flood in the Lewiston-Clarkston Valley, Walla Walla Community College, Clarkston, Washington, November (T.C. Walker).
- Liaison, Idaho, National Earth Science Teachers Association, 1988-2000 (K.L. Othberg).
- Member, Alpine Club of Canada (R.M. Breckenridge).
- Member, Blackfoot storm water technical advisory committee (J.A. Welhan).
- Member, Commission of Explosive Volcanism Working Group of the International Association of Volcanology and Chemistry of the Earth's Interior (B. Bonnicksen).
- Member, Earthquake Engineering Research Institute (R.M. Breckenridge).
- Member, Earth Science Editors Association (R.C. Stewart).
- Member, Geological Society of Nevada (V.S. Gillerman).
- Member, Ground Water Monitoring technical committee, Idaho Department of Environmental Quality (J.A. Welhan).
- Member, Ice Age Floods Institute (R.M. Breckenridge).
- Member, Ice Age Floods Task Force (R.M. Breckenridge).
- Member, International Association of Volcanology and Chemistry of the Earth's Interior (B. Bonnicksen).
- Member, National Science Teachers Association (T.C. Walker).
- Member, North American Digital Geologic Map Data Model steering committee (L.R. Stanford).
- Member, Northwest Scientific Association (K.L. Othberg).
- Member, Science language technical team, North American Geologic Map Data Model Project (R.S. Lewis).
- Member, Seismological Society of America (R.M. Breckenridge).
- Member, Sigma Xi (V.S. Gillerman).
- Member, Society of Economic Geologists (T.J. Williams).
- Member, Society for Mining, Metallurgy, and Exploration, Inc. (V.S. Gillerman).
- Member, Technical advisory committee, Pocatello storm water master plan (J.A. Welhan).
- Member, Technical committee, Treasure Valley Hydrologic Modeling Project (K.L. Othberg).
- Member, Western States Seismic Policy Council (R.M. Breckenridge).
- Member and occasional chair, Ground Water Guardian, Portneuf Chapter (J.A. Welhan).
- Members, American Geophysical Union (T.C.

- Walker, J.A. Welhan).
Members, American Quaternary Association (R.M. Breckenridge, K.L. Othberg).
Members, EDMAP review board, Idaho Geological Survey (R.M. Breckenridge, K.L. Othberg).
Members, Geological Society of America (E.H. Bennett, V.S. Gillerman, R.S. Lewis, V.E. Mitchell, K.L. Othberg, T.C. Walker, T.J. Williams).
Members, Idaho Earth Science Teachers Association (R.M. Breckenridge, K.L. Othberg, T.C. Walker).
Members, National Association of Geology Teachers (K.L. Othberg, T.C. Walker).
Members, National Earth Science Teachers Association (K.L. Othberg, T.C. Walker).
Members, Northwest Mining Association (E.H. Bennett, V.S. Gillerman, R.S. Lewis).
Mentors, Field Experience Program, Association of American State Geologists, July-October (R.S. Lewis); May-June (K.L. Othberg).
Microscopy and Microanalysis National Meeting, Philadelphia, Pennsylvania, October (T.J. Williams).
National Association of Geoscience Teachers, Pacific Northwest Section Meeting, Bellevue, Washington, June (T.C. Walker).
National Earthquake Risk Management Conference, Seattle, Washington, September (R.M. Breckenridge).
National Science Teachers Association and Idaho Science Teachers Association annual conference, Boise, October (T.C. Walker).
North American Digital Geologic Map Data Model Steering Committee meetings, Reno, Nevada, November; Tuscaloosa, Alabama, May (L.R. Stanford).
Northwest Anthropological Conference 54th Annual Meeting, Moscow, March (R.M. Breckenridge).
Northwest Clay Symposium, Lewiston, March (V.S. Gillerman).
Northwest Mining Association 106th Annual Meeting, Spokane, Washington, December (Earl H. Bennett, J.D. Kauffman, R.S. Lewis, V.S. Gillerman, G.A. Wells).
Past-President, Boise Section Society for Mining, Metallurgy, and Exploration, Inc. (V.S. Gillerman).
President's leadership retreat, University of Idaho, January (R.M. Breckenridge).
President-Elect, Idaho Earth Science Teachers Association (T.C. Walker).
Principal author, Request for proposals on the economic impacts of aquifer protection in the Lower Portneuf River Valley, Idaho Department of Environmental Quality (J.A. Welhan).
Public meetings, Ice Age Floods comments, National Park Service alternative study, Sandpoint, September (R.M. Breckenridge).
Representative, Department of Geological Sciences, University of Idaho (T.J. Williams).
Representative, Department of Geology, Idaho State University (J.A. Welhan).
Representative, Department of Geosciences, Boise State University (V.S. Gillerman).
Representative, Graduate faculty, Idaho State University (J.A. Welhan).
Representative, Idaho State University Day, Idaho State Legislature, Boise, January (J.A. Welhan).
Representative, Mining Advisory Committee, Idaho Department of Lands (V.S. Gillerman).
Representative, Technical Advisory Committee, Treasure Valley Hydrologic Project, Boise (V.S. Gillerman).
Representative, Water Planning Coordination Committee, Idaho Department of Water Resources (V.S. Gillerman).
Representative and Disaster Coordinator, Idaho Bureau of Disaster Services (V.S. Gillerman).
Secretary, Board of Directors, Belt Association (R.S. Lewis).
Society for Mining, Metallurgy, and Exploration (SME) Boise Section meetings (V.S. Gillerman).
Water Quality Workshop, Boise, January (V.S. Gillerman).
Western States Seismic Policy Council Annual Conference, Seattle, Washington, September (R.M. Breckenridge).
Workshop, Digital Mapping Techniques 2001,

Tuscaloosa, Alabama, May (J.S. Freed, L.R. Stanford).

Workshop for teachers, Geology and geologic hazards of Sawtooth Valley, Idaho, July (R.M. Breckenridge, K.L. Othberg, T.C. Walker).

Award

Governor's Certificate of Recognition, Joint Idaho Governor's Safety and Health Conference and the Intermountain Conference on the Environment, November (J.A. Welhan).

Media Interviews, Appearances, and Articles

Appearances in *Volcanoes*, Idaho Public Television's *Dialogue for Kids* series, May 8 (B. Bonnichsen, M. M. Godchaux).

Aquifer Protection in the Lower Portneuf River Valley, Panel discussion, Pocatello Public Access, cable channel 12, June (J.A. Welhan).

Earthquake, Argonaut, University of Idaho student newspaper, March (R.M. Breckenridge).

Large Quake Unlikely to Hit Near Spokane, Spokesman Review, Idaho Edition, March 1, p. A5 (R.M. Breckenridge).

Live talk show, Radio coverage of Idaho earthquake threat, Pacific Empire Communications, Idaho Falls, March (R.M. Breckenridge).

Nisqually Earthquake, Acknowledgments, University of Idaho Register, v. 13, no. 11, March (R.M. Breckenridge).

Sculpted by Floods, narrated and produced by Allison Kordival, one-hour video, KSPS Spokane Public Television, February (R.M. Breckenridge).

Spoke 'N' Word, Boise's Bicycling Publication, "Q & A" with Mark Rooney, v. 2, no. 3, p. 2-3 (V.S. Gillerman).

Graduate Thesis Committees

Dean Garwood, M.S., Geology, University of

Idaho (R.S. Lewis).

Gwen Gerber, M.S., Geology, Idaho State University (J.A. Welhan).

John Glover, M.S., Geology, Idaho State University (J.A. Welhan).

Jason Hurlless, M.S., Environmental Engineering, Idaho State University (J.A. Welhan).

R.C. Lovell, M.S., Geography, University of Idaho (R.M. Breckenridge).

Joel Murray, M.S., Environmental Science, University of Idaho (K.L. Othberg).

Gerald N. Potter, M.S., Geology, University of Idaho (B. Bonnichsen).

Andy Smith, M.S., Geology, Idaho State University (J.A. Welhan).

Adele Williams, Ph.D., Geology, University of Idaho (R.M. Breckenridge).

Susan Wilson, M.S., Geology, University of Idaho (R.S. Lewis).

Grants and Contracts

Basalt Mapping in Northern Idaho: R.S. Lewis (Idaho Department of Lands, April 2001-March 2002, \$5,000).

Basalt Mapping in the Potlatch 30' x 60' Quadrangle: R.S. Lewis (Potlatch Corporation, January 2000-March 2001, \$5,000).

Basalt Mapping in the Potlatch 30' x 60' Quadrangle: R.S. Lewis (Idaho Department of Lands, April 2000-March 2001, \$5,000).

Continued Investigation of Abandoned/Inactive Mine Sites: V.S. Gillerman (Bureau of Land Management, October 2000-December 2001, \$30,000).

Digital Atlas of Idaho: R.S. Lewis (Idaho State Board of Education, July 2000-June 2001, \$22,778).

Eastern Snake River Plain Geological Mapping Initiative, Evaluation of the Status of Geological Mapping of Silicic Volcanic Rocks in the Ashton and Dubois 30' x 60' Quadrangles, Eastern Idaho: Bill Bonnichsen (Bechtel Corporation, June-September, 2000, \$35,000).

Geologic Hazards Curriculum Project: T.C.

- Walker (Idaho EPSCoR grant, January 2001-May 2002, \$8,000).
- Headwaters Project Involving Geologic Mapping and Digital Compilation of the Potlatch and Deadwood River 30' x 60' Quadrangles, Idaho:* R.S. Lewis (U.S. Geological Survey, July 2000-June 2001, \$18,500).
- Idaho Landslide Inventory Database:* R.M. Breckenridge (Idaho Bureau of Disaster Services, April 1, 2000-September 30, 2000, \$9,999).
- Investigation of Abandoned/Inactive Mine Sites:* E.H. Bennett (U.S. Environmental Protection Agency, May 1999-September 2000, \$17,719).
- Investigation of Abandoned/Inactive Mine Sites:* E.H. Bennett (Idaho Department of Lands, May 1999-January 2001, \$20,000).
- Investigation of Abandoned/Inactive Mine Sites:* E.H. Bennett (Bureau of Land Management, October 2000-December 2001, \$20,000).
- Mentored Field Experience Program:* R.S. Lewis (Association of American State Geologists, National Science Foundation, U.S. Geological Survey, June 2000-October 2000, \$2,500).
- Mentored Field Experience Program:* K.L. Othberg (Association of American State Geologists, National Science Foundation, U.S. Geological Survey, June 2001-October 2001, \$3,300).
- Mitigation of Idaho Geologic Hazards, Earthquake Education Workshop:* R.M. Breckenridge and K.L. Othberg (Idaho Bureau of Disaster Services, March 2001-September 2001, \$50,000).
- Mitigation of Idaho Geologic Hazards, Earthquake Education Workshop:* R.M. Breckenridge and K.L. Othberg (Idaho Bureau of Disaster Services, March 2000-December 2000, \$40,000).
- STATEMAP Project, Geologic Mapping in the Lewiston Area, the Sun Valley Urban Corridor, the Melba Area, and in the Potlatch 30' x 60' Quadrangle:* K.L. Othberg, R.M. Breckenridge, B. Bonnicksen, and R.S. Lewis (U.S. Geological Survey, May 2001-April 2002, \$122,869).
- STATEMAP Project, Geologic Mapping in the Sun Valley Urban Corridor, the Clearwater River valley, and in the Murphy, Headquarters and Deadwood River 30' x 60' Quadrangles:* K.L. Othberg, R.M. Breckenridge, B. Bonnicksen, and R.S. Lewis (U.S. Geological Survey, May 2000-April 2001, \$208,450).