IDAHO
GEOLOGICAL SURVEY

Annual Report
Fiscal Year 2005

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IDAHO
GEOLOGICAL SURVEY

SINCE 1919, SERVING THE STATE THROUGH GEOLOGIC RESEARCH

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Board of Regents
University of Idaho (SBOE)

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Tim White

Provost & Executive Vice President
Doug Baker

- Athletic Department - Rob Spear
- Diversity and Community - tbd
- General Counsel - Sharyl Kammerzell [Interim]
- Governmental Relations-Marty Peterson
- Human Rights Compliance Officer-Andy Neukranz-Butler
- Internal Audit-Dolores Salesky
- NCAA Faculty Athletic Representative - Kathe Gabel
- Omsbud - tbd

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- Administrative Affairs-tbd
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- Budget-Mark Brainard
- Controller-Joy Fisher [Interim]
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- Facilities-Brian Johnson
- Human Resources-David Chichester [Interim]
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- Trust & Investments-Bob Steele

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and Executive Director of UI Foundation

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- Development-Carolyn Nilsson Troy
- Foundation-Mike Wilson [Interim]
- Marketing & Strategic Communications - Vacant

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Charles Hatch

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- Aquaculture Research Institute-Ronald Hardy
- Environmental Biotechnology Institute-Ron Crawford
- Experimental Program to Stimulate Competitive Research-Jean'ne Shreeve
- **IdahoGeological Survey--RoyBreckenridge, Kurt Othberg**
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- Idaho Water Resources Research Institute-John Tracy
- Microelectronic Research & Communications Institute-Touraj Assefi
- National Institute for Advanced Transportation Technology-Michael Kyte
- Office of Sponsored Programs
- Secure & Dependable Software Center-James Alves Foss
- UI Business and Technology Incubator, Moscow - Chuck Hatch

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- Career and Professional Planning-Suzie Billington
- Center for Academic Advising-Cindy Faircloth
- College Assistance Migrant Program - Yolanda Bisbee
- Core - General Education-Wes Chun
- Honors Program-Stephan Flores
- Independent Study-Barry WIllis
- International Programs-Mike Whiteman
- New Student Services-Lloyd Scott
- Officer Education/ROTC
- Program and Student Assessment Coordinator-vacant
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- Summer Programs/Concurrent Enrollment-Cynthia Leonhart
- Tutoring & Academic Assistance Center-Meredyth Goodwin

Vice Provost Student Affairs & Dean of Students
Bruce Pitman

- Child Care-Jan Reed
- Counseling Center-Joan Pulakos
- Dean of Students-Bruce Pitman
- Housing/Residence Life-Michael Griffel
- Multicultural Affairs-Francisco Salinas
- Student Benefits, Health & Wellness-Hal Godwin
- Student Recreation/Idaho Commons/Student Activities/ Student Union-Greg Tatham
- Women's Center-Jeanne Harvey

Agricultural & Life Sciences
Dean John Hammel

Business & Economics
Dean Byron Dangerfield

Education
Dean Jeanne Christiansen

Engineering
Dean Charles Peterson [Interim]

Law
Dean Don Burnett

Letters, Arts & Social Sciences
Dean Joe Zeller

Natural Resources
Dean Steven Daley Laursen

Science
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Northern Idaho-Associate Vice President Larry Branen
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- UI Research Park at Post Falls

WWAMI Medical Education Program
Andrew Turner

Institutional Research & Assessment
Archie George

Library
Dean Ron Force

Shared governance is enabled as the following groups interact with offices through the fabric of the University

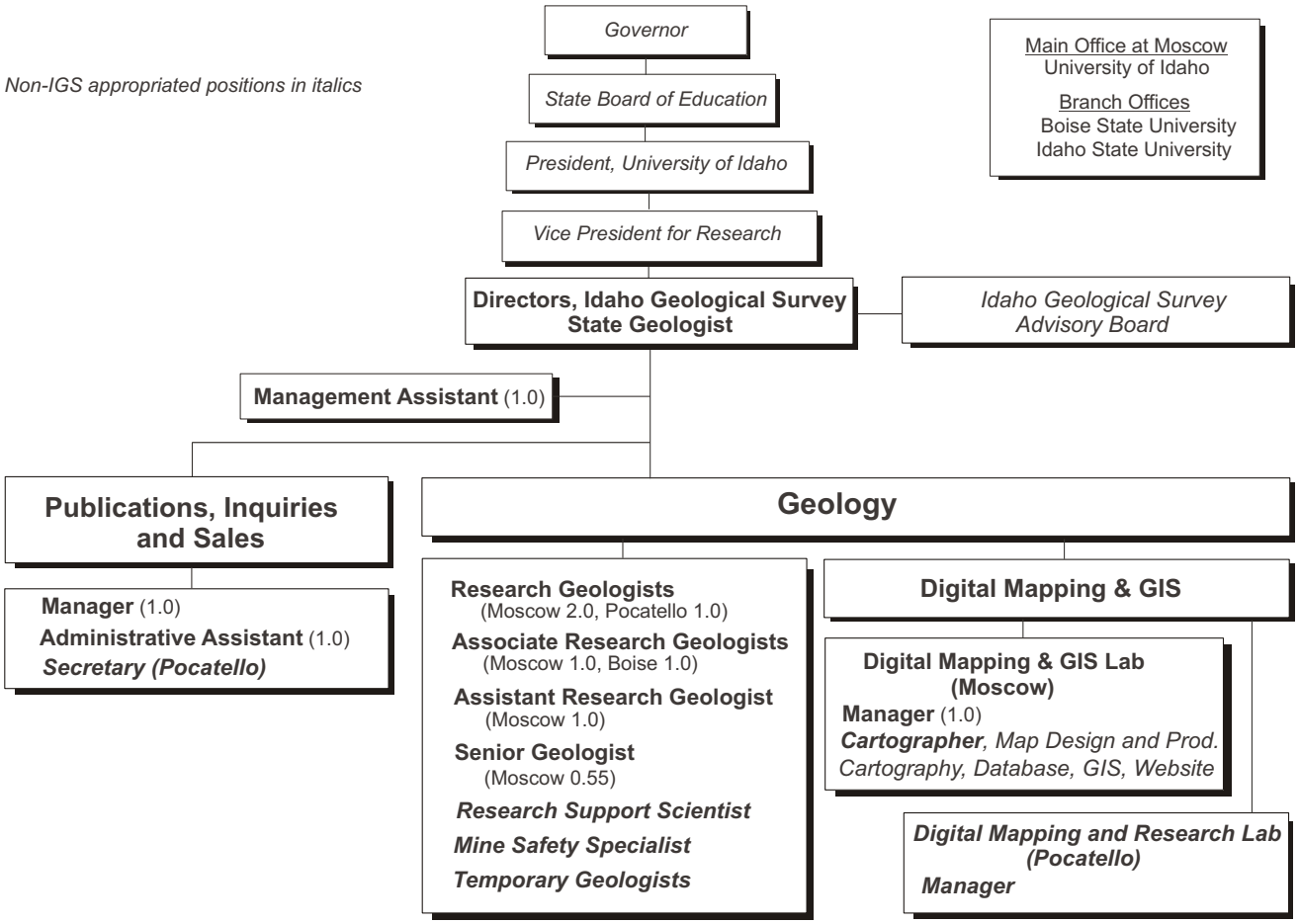
- Associated Students University of Idaho-Autumn Hansen
- Faculty Council-Bob Zemetra
- Graduate & Professional Students Association-Claudia Hemphill
- Staff Affairs-Brant Madson
- Student Bar Association-Taylor Mossman

October 27, 2005
Office of the Provost and Executive Vice President

June, 2005

Idaho Geological Survey

Non-IGS appropriated positions in italics



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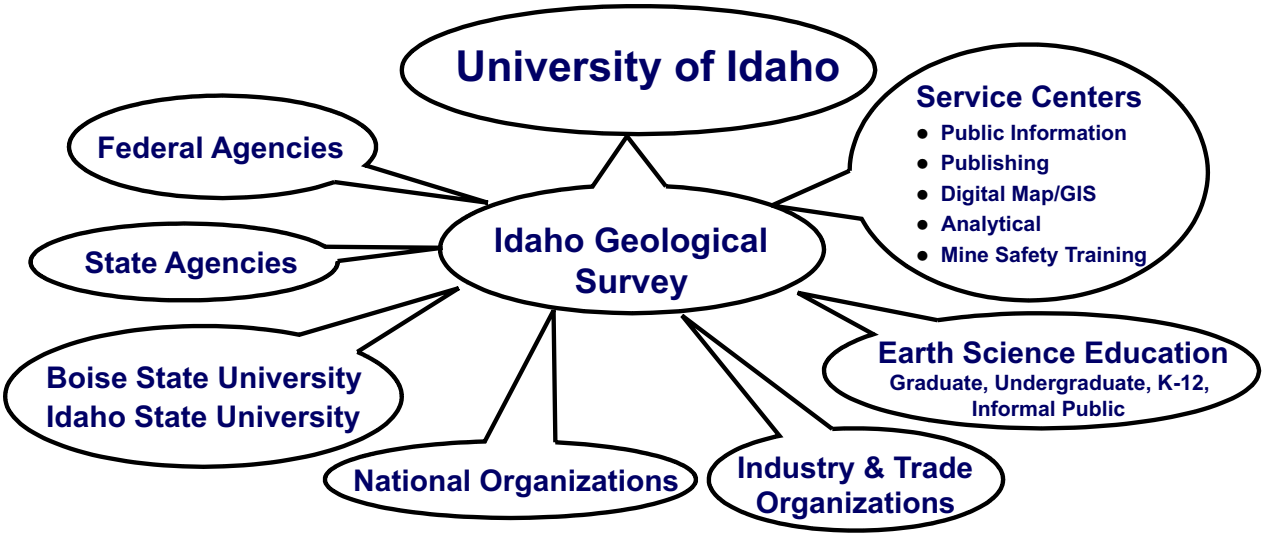
Idaho Geological Survey
Research and Education Alliances



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SINCE 1919, SERVING THE STATE THROUGH GEOLOGIC RESEARCH

December 13, 2005

Dr. Charles R. Hatch, Vice President for Research
University Research Office
University of Idaho
Moscow, ID 83844-3010

Dear Dr. Hatch:

We are pleased to submit the *Annual Report of the Idaho Geological Survey* for Fiscal Year 2005, as directed by Idaho Code, Section 47-201 through 47-204. The document shows the productive and diverse activities of the Survey staff. It contains details of the agency organization, employees, budget sources, and performance indicators. Our research and service role continues to expand through outreach of our publications, website products, presentations, and individual requests. The Idaho Geological Survey Advisory Board met in June and emphasized their support of our mission and accomplishments.

Roy M. Breckenridge
Director and State Geologist

Kurt L. Othberg
Director

Program Highlights

The Idaho Geological Survey is 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 geologic setting, earth resources, and geologic hazards. Externally funded projects enhance this research.

Annual Budget and Personnel. The State and University again experienced budget difficulties during the past year (FY 2005) but the University administration supported the Survey in replacing a faculty research geologist and reclaiming the part of a geologist position previously moved to an academic unit. The budget cuts and hold-backs of the last several years have reduced the budget base and continue to impact the operation of the Idaho Geological Survey in research, public service, and education. This year marked the second since a new enabling act placed the Survey with the University Research Office under the Vice President for Research. This reorganization has improved access to the administration and communication between the Survey and other research units, institutes, and cooperative programs.

Geologic 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 urban-impact areas of Idaho. 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 throughout Idaho. The Idaho Geologic Mapping Advisory Committee assists the Survey by assessing Idaho's mapping needs and addressing long-term plans for geologic mapping. During the year STATEMAP project geologists mapped seventeen 7.5-minute quadrangles. The Survey cooperated with Utah State University in EDMAP student geologic mapping of three quadrangles in south-central Idaho.

Geologic Map Production. The Survey's digital mapping and GIS laboratory performs services ranging from digital cartography to spatial data management. The lab continues to compile geology around the state in a geologic map database in addition to the ongoing work of producing new geologic maps. Eighteen new geologic maps were published this year. Most of these are available as print-on-demand color maps. All are available for free online.

The Survey participates in the North American Data Model Steering Committee to help make guidelines for digital-legend design for geologic maps. A Digital Geologic Map series is a new publication category for Idaho in which four new data sets were published during the fiscal year.

Geologic Hazards. As the state's population has grown and disaster losses have increased, the Survey devotes increasing amounts of time with geologic hazard mitigation. The agency works in close cooperation with the Idaho Bureau of Homeland Security both formally and informally to mitigate, respond to, and recover from the impacts of floods, fires, landslides, and earthquakes, and to provide technical analysis when needed. New surficial geologic maps are

being applied in a project interpreting geologic hazards in Clearwater, Kootenai, and Nez Perce counties.

As an active participant in the Western States Seismic Policy Council (WSSPC) and Pacific Northwest and Intermountain regional planning groups of the Advanced National Seismic System (ANSS), the Survey is involved in organizing seismic network operators and planning several hazard mitigation projects. The Survey is leading a state seismic network clearinghouse effort based on the EARTHWORM system in cooperation with the Idaho Bureau of Homeland Security, and participates at regional clearinghouse planning functions with the other basin-and-range states in WSSPC. Idaho was chosen as the host state for the upcoming 2005 annual meeting of WSSPC.

Mitigation of natural hazards is a major component of the Survey's annual summer workshop for teachers. This year the workshop was held at Cascade in the seismically active Long Valley area. Training activities provided knowledge of Idaho's tectonic setting, school safety, and disaster response. Workshop participants developed classroom activities for geologic-hazard education and for interpretive campfire programs for Cascade State Park.

Hydrogeology. The Survey continues to work to better understand the geologic controls on ground-water flow and recharge and the distribution and transport of ground-water contaminants. Results of the 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 modeling of aquifer stratigraphy, data analysis and mapping of ground-water quality, and assessing groundwater vulnerability to septic sewage disposal through mapping of surface geological and soils data and subsurface hydrogeologic information.

In collaboration with the USGS-Idaho National Laboratory Project Office, the Survey is conducting statistical analysis and three-dimensional stratigraphic modeling of sedimentary interbeds based on USGS well databases. This effort is in support of the USGS's development of a subregional-scale ground-water flow model and is also helping to advance basic geologic knowledge of the sedimentary and volcanic depositional setting of the Eastern Snake River Plain.

The Survey has developed and applied a new group of spatial-temporal geostatistical tools for analyzing patterns of change in both water quality and ground water storage. These practical approaches improve the effectiveness of monitoring network sampling designs and are being successfully applied in the analysis of other state ground water monitoring databases.

A ten-year evaluation of ground-water quality in the lower Portneuf River valley, has provided the first hard evidence of the magnitude of ground-water quality impairment due to septic sewage disposal. A novel modeling approach was applied to quantify the cumulative effects of individual septic systems on the city of Pocatello's municipal water supply and predict impacts of future development.

Mining Activity. The Survey maintains a working knowledge of the geology of all active mines in Idaho. 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 exploration and mining at the Northwest Mining Association's annual meeting. The Survey's summaries of Idaho's mining and exploration activity are published annually in the May issue of Mining Engineering, the U.S. Geological Survey's Mineral Yearbook, and the Idaho Department of Commerce's Idaho Facts. These new data update the previous gold occurrences map and bring Idaho's historic gold production to approximately 12.4 million troy ounces (about 386 metric tons).

Abandoned and Inactive Mines. Abandoned and inactive mines in Idaho continue to be evaluated and inventoried by the Survey (AML program). To date the Survey has visited over 1100 properties, yet records reflect approximately 9700 properties in Idaho. Current projects are conducted in cooperation 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. New petrologic and geochronological research on the Lemhi Pass Thorium District show mineralization from Proterozoic through Mesozoic ages rather than the Tertiary ages in published literature.

The U.S. Department of Labor Mine Safety and Health Training Program is administered by the Idaho Geological Survey. The Mine Safety Trainer conducted fifty training sessions in Idaho and the region. A mine safety module and associated classroom materials was popular at the Survey's annual summer field workshop for teachers.

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Outreach. The Survey disseminates geologic and mineral data on Idaho primarily through its publications, Web site, in-house library collections, and various efforts in educating the public in the earth sciences. In addition to handling public inquiries, the staff makes numerous presentations and reports throughout the year.

Publications. The Survey publishes a variety of maps, books, and articles catalogued in the annual List of Publications that includes over 700 titles produced since 1919. Since 2000, the Survey has released more than 100 publications that include books, maps, reports, databases, posters, and fact sheets (see Publication charts for sales and revenue results). This rate of output is over twice that of the previous decade, and now averages about 25 publications a year. Geologic maps and Staff Reports represent most of the increase (see Staff Publications and Activities). Access to publications is 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. Internet access to the research and services of the Survey continues to expand through added information, search engines, viewable PDF documents, and downloadable maps and documents.

The Web site offers multiple opportunities to get information before the public, including the

searchable List of Publications and the searchable Index to Geologic Maps. Most new geologic maps are viewable on the Web site and can be downloaded in PDF format free of charge. There are now over 70 downloadable maps online. This year's additions to the Web site include searchable versions of the Survey's Mines and Prospects dtabase, a map of Miocene and Younger Faults in Idaho, and Idaho Earthquake Information.

Databases and Archives. Many of the digital geologic maps are also available as GIS databases. Other databases include Mines and Prospects, with data on Idaho mines, and the state's earthquake, fault, and landslide database. Digital geologic databases and earthquake information are available on the Survey's Web site. Several technical bibliographies are published. A collection of over 1200 theses and dissertations on Idaho's geology are available at the Moscow Office. The Survey recently completed a new digital database and index to geologic maps. To date the areal coverages of 614 thesis maps have been digitized for inclusion in the searchable database. These products complement the existing U.S. Geological Survey's index available on the Internet.

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 working relationships with the geology departments at the three state universities, Survey 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. Survey geologists also designed and implemented displays, handouts, and field trips for the Ice Age Floods Institute, highlighting the ice-dam story of Glacial Lake Missoula in north Idaho. A bill authorizing a National Ice Age Floods Geologic Trail in Montana, Idaho, Washington, and Oregon is now moving through Congress.

The Survey is primarily engaged in promoting earth science education with the state's teachers through the Idaho Earth Science Teachers Association, through its Web site (www.idahogeology.org), and through field workshops conducted around the state so that teachers can observe the methods and science of geology in Idaho's own outdoor laboratory. The summer of 2004 marked the twenty-fifth teacher workshop the Survey has conducted since 1986.

Association of American State Geologists (AASG). The Idaho Geological Survey is an active participant in the AASG. During FY 2005, Roy Breckenridge attended the Annual and Midyear meetings as well as the Spring Liaison in Washington D.C. Roy served the first year of a three-year term as the Western Regional Representative on the U.S. Geological Survey's Peer-Review Panel for the STATEMAP Component of the National Cooperative Geologic Mapping Act. He also provided information requested by the Idaho Congressional delegation regarding re-authorization of the Mapping Act and its important benefits to Idaho. AASG was instrumental in the successful effort to restore planned cuts to the U.S. Geological Survey minerals and energy programs, as well as authorization of an external geologic hazards initiative and a data preservation program.

Staff Publications and Activities

Publications

Agency Activities—Fiscal Year 2004: Idaho Geological Survey Web site on Web page, "Agency Activities," 2005.

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Geologic Map of the Hope Quadrangle, Bonner County, Idaho, by Russell F. Burmester, Roy M. Breckenridge, Reed S. Lewis, and Mark D. McFaddan: Idaho Geological Survey Digital Web Map 26, 2004, scale 1:24,000.

Geologic Map of the Keuterville Quadrangle, Lewis and Idaho Counties, Idaho, by Keegan L. Schmidt, Dean L. Garwood, and John D. Kauffman: Idaho Geological Survey Digital Web Map 38, 2005, scale 1:24,000.

Geologic Map of the Nez Perce Quadrangle, Lewis and Idaho Counties, Idaho, by John D. Kauffman, Keegan L. Schmidt, and John H. Bush: Idaho Geological Survey Digital Web Map 28, 2004, scale 1:24,000.

Geologic Map of the Orofino East Quadrangle, Clearwater and Lewis Counties, Idaho, by Reed S. Lewis, John D. Kauffman, Gary F. Davidson, and Russell F. Burmester: Idaho Geological Survey Geologic Map 39, 2005, scale 1:24,000.

Geologic Map of the Orofino West Quadrangle, Clearwater, Lewis, and Nez Perce Counties, Idaho, by John D. Kauffman, Gary F. Davidson, Reed S. Lewis, and Russell F. Burmester: Idaho Geological Survey Geologic Map 40, 2005, scale 1:24,000.

Geologic Map of the Peck Quadrangle, Clearwater, Lewis, and Nez Perce Counties, Idaho, by John D. Kauffman, Gary F. Davidson, Reed S. Lewis, and Russell F. Burmester: Idaho Geological Survey Geologic Map 38, 2005, scale 1:24,000.

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Lewis, and Mark D. McFaddan: Idaho Geological Survey Digital Web Map 24, 2004, scale 1:24,000.

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Hydrogeologic Analysis of the Water Supply for Bloomington and Paris, Bear Lake County, Idaho, by Allan H. Wylie, Bruce R. Otto, and Michael J. Martin: Idaho Geological Survey Information Circular 58, 2005, 10 p., 1 plate.

Hydrogeologic Analysis of the Water Supply for Challis, Custer County, Idaho, by Bruce R. Otto, Allan H. Wylie, and Michael J. Martin: Idaho Geological Survey Information Circular 60, 2005, 14 p., 1 plate.

Hydrogeologic Analysis of the Water Supply for Franklin, Franklin County, Idaho, by Bruce R. Otto, Allan H. Wylie, and Michael J. Martin: Idaho Geological Survey Information Circular 57, 2005, 9 p., 2 plates.

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Idaho Mining and Exploration, 2004, by Virginia S. Gillerman, Earl H. Bennett, and Michael J. Weaver: Mining Engineering, May, 2005, v. 57, no. 5, p. 78-83.

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Idaho Report, by R.M. Breckenridge, *in* Karl Muessig, ed., The State Geologists Journal, 2004: Association of American State Geologists, v. LVI, p. 31-35.

List of Publications, 2005, by Roger C. Stewart: Idaho Geological Survey booklet, 53 p.

Mineral Industry of Idaho (2003), by V.S. Gillerman and U.S. Geological Survey staff: U.S. Geological Survey Minerals Yearbook Area Reports: Domestic 2003, 2005, v. II, p. 14-14.5.

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County, Idaho, by Victoria E. Mitchell and Virginia S. Gillerman: Idaho Geological Survey Staff Report 05-2, 2005, 46 p.

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Surficial Geologic Map of the Lake Fork Quadrangle, Valley County, Idaho, 2005, by R.M. Breckenridge and K.L. Othberg: Idaho Geological Survey Digital Web Map 34, scale 1:24,000.

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Abstracts

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Dating Alluvial Sediments With Cosmogenic Nuclides, by W.M. Phillips, L.S. Barham, and P.W. Kubik: Geochimica et Cosmochimica Acta, Abstracts of the 15th Annual V.M. Goldschmidt Conference, University of Idaho, May, 2005, p. A166.

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Geostatistical Modeling of the Eastern Snake River Plain Aquifer, by R. Farabaugh, J.A. Welhan, and M. Merrick: Geological Society of America Annual Meeting, Abstracts with Program, Denver, Colorado, November, 2004, v. 36, no. 7, paper 49-18.

Preliminary Results of Geostatistical Modeling of the ESRP Aquifer, by R. Farabaugh and J.A. Welhan: Inland Northwest Research Alliance, Subsurface Science Symposium, Spokane, Washington, September; www.inra.org/.

Probability Mapping As a Tool to Portray and Prioritize Water Quality Trends, by J.A. Welhan: Agriculture and Water Quality in the Pacific Northwest and Idaho Ground Water Connections Conference Proceedings, Boise, October, p. 62; www.agwaterqualitynw.org/.

Sodic and Potassic Suites of the Cretaceous Idaho Batholith, by Reed S. Lewis: 15th Annual V.M. Goldschmidt Conference, University of Idaho, May, 2005, p. 249.

Spatial-Temporal Geostatistics for Ground Water Quality Networks, by J.A. Welhan and T. Masiane: Inland Northwest Research Alliance, Subsurface Science Symposium, Spokane, Washington, September; www.inra.org/.

Surficial Geologic Maps Help Counties Understand Geologic Hazards in Idaho, by Kurt L. Othberg, Loudon R. Stanford, and Roy M. Breckenridge: Geologic Society of America Abstracts with Programs, 2004, v. 36, no. 7, paper 249-35.

Reports and Presentations

Age, Chemical, and Isotopic Complexity in Magmatic Belts Along the Orofino Segment of the Western Idaho Suture Zone (WISZ), by Keegan L. Schmidt and Reed S. Lewis: 15th Annual V.M. Goldschmidt Conference, University of Idaho, May.

Annual Report of the Idaho Geological Survey, Fiscal Year 2004: December.

Clark Fork Ice Dam and Missoula Flood Outburst Areas, Idaho, by Roy M. Breckenridge and R.S. Lewis: Ice Age Floods Institute field trip, May.

Comparison Between Remote Sensing Classification and Stochastic Simulation Techniques for Predicting Areas of Weed Invasion, by N. Singh, J.A. Welhan, and N. Glenn: Geological Society of America Annual Meeting, Denver, Colorado, November.

Dating Alluvial Sediments With Cosmogenic Nuclides, by W.M. Phillips, L.S. Barham,

and P.W. Kubik: 15th Annual V.M. Goldschmidt Conference, University of Idaho, May.

Dating Sediments and Geomorphic Surfaces with Terrestrial Cosmogenic Nuclides, by W.M. Phillips: Seminar, Department of Earth and Environmental Sciences, Tulane University, New Orleans, Louisiana, February.

Dating Sediments with Cosmogenic Nuclides, by W.M. Phillips: Joint Seminar, Department of Geological Sciences, University of Idaho, and Department of Geology, Washington State University, February.

Deeply Weathered Rock and Ancient Soils in North Idaho, by K.L. Othberg: Intermountain Forest Tree Nutrition Cooperative Annual Meeting, Moscow, April.

Earthquakes and the December, 2004, Tsunami, by V.S. Gillerman: Idaho Water Resources Research Institute, Project WET class, Boise, January.

Eocene Plutonic Rocks of North-Central Idaho, by Thomas P. Frost and Reed S. Lewis: 15th Annual V.M. Goldschmidt Conference, University of Idaho, May.

Geohydrologic Data Needs for Septic Management, by J.A. Welhan: Greater Portneuf Water Resource Partnership steering committee, Pocatello, August.

Geologic Field Trip Guide to the Clark Fork Ice Dam and Missoula Flood Outburst Areas, Idaho, by Roy M. Breckenridge and R.S. Lewis: Ice Age Floods Institute, 17 p.

Geologic Map of the Cabinet Quadrangle, Idaho, by Mark D. McFaddan, Roy M. Breckenridge, Russell F. Burmester, and Reed S. Lewis: Idaho Geological Survey unpublished map, scale 1:24,000, April.

Geologic Map of the Culdesac North Quadrangle, Nez Perce County, Idaho, by John D. Kauffman: Idaho Geological Survey unpublished map, scale 1:24,000, April.

Geologic Map of the Culdesac South Quadrangle, Nez Perce County, Idaho, by John D. Kauffman: Idaho Geological Survey unpublished map, scale 1:24,000, April.

Geologic Map of the Derr Point Quadrangle, Idaho, by Russell F. Burmester, Roy M. Breckenridge, Mark D. McFaddan, and Reed S. Lewis: Idaho Geological Survey unpublished map, scale 1:24,000, April.

Geologic Map of the Lewiston Orchards North Quadrangle and Part of the Clarkston Quadrangle, Nez Perce County, Idaho, by Dean L. Garwood and John H. Bush: Idaho Geological Survey unpublished map, scale 1:24,000, April.

Geologic Map of the Trout Peak Quadrangle, Idaho, by Reed S. Lewis, Roy M. Breckenridge, Mark D. McFaddan, and Russell F. Burmester: Idaho Geological Survey unpublished map, scale 1:24,000, April.

Geologic Map of the Twin Falls 30 x 60 Minute Quadrangle, Idaho, by John D. Kauffman, Kurt L. Othberg, Virginia S. Gillerman, and Dean L. Garwood: Idaho Geological Survey unpublished map, 1:100,000 scale, April.

Geology and Geologic Hazards of Long Valley, by R.M. Breckenridge and K.L. Othberg: Field Workshop for Teachers, Cascade, July.

Geology of Canyon County's Wine Grape Growing Regions, by V.S. Gillerman: Annual Meeting of Idaho Grape Growers and Wine Producers Commission, Caldwell, March.

Geostatistical Analysis and Modeling of Spatial Data, by J.A. Welhan: Technical workshop, 2005 Intermountain GIS Users Conference, Pocatello, April.

Geostatistical Analysis of Water Quality Databases: Finding the Kernels Among the Chaff, by J.A. Welhan: Guest lecture, Engineering

Seminar 651, Idaho State University, January.

Glacial Geology and History of the Sawtooth Mountains and White Cloud Peaks Area, by L.R. Stanford: Wild Idaho Conservation Conference field trip, Sawtooth Valley, May.

Ground-Water Management Needs in the Portneuf River Basin, by J.A. Welhan: Greater Portneuf Watershed Resource Partnership, Pocatello, February.

Ground-Water Recharge, Residential Septic Systems, and Drinking Water Quality in the Lower Portneuf River Valley, by J.A. Welhan: Idaho Society of Professional Engineers Annual Meeting, Pocatello, April.

Idaho Mining and Exploration, 2004, by V.S. Gillerman: Northwest Mining Association 110th Annual Meeting, Spokane, Washington, December.

Information Needs in Septic Planning, by J.A. Welhan: Twin Falls Public Health District environmental health training session, Twin Falls, March.

Information Needs in Septic Planning and Design, by J.A. Welhan: Idaho Environmental Health Association, Area C Meeting, Pocatello, October.

Information Needs in Septic Planning and Design for Ground-Water Protection, by J.A. Welhan: Pocatello City Council study session, Pocatello, July.

Map Production and Data Distribution the Idaho Way: An Update, by J.S. Freed and L.R. Stanford: Digital Mapping Techniques Workshop, 2005, Baton Rouge, Louisiana, April.

New Developments in a New Century for Idaho's Precious Metal Districts, 2005, by Virginia S. Gillerman and Victoria E. Mitchell: Geological Society of Nevada Symposium 2005, May, Reno, Nevada.

Ore Deposits of the Mt. Isa Region, Australia: Proterozoic Connections to Idaho? by V.S. Gillerman: Seminar, Department of Geosciences, Boise State University, February.

Overview of Geostatistical Modeling of the ESRP Subsurface, by J.A. Welhan: Idaho National Laboratory Water Resources Committee, Idaho Falls, October.

Probability Mapping as a Tool to Portray and Prioritize Water Quality Trends, by J.A. Welhan: Agriculture and Water Quality in the Pacific Northwest and Idaho Ground Water Connections Conference, Boise, October.

Proposed Guidelines for a Tiered System of Water Supply Planning Requirements for New Developments, by J.A. Welhan: Bannock County water planning officials, Pocatello, November.

Site Inspection Report for Abandoned and Inactive Mines on Lands Administered by the U.S. Bureau of Land Management in the Boise Resource Area, Idaho: Boise Foothills, Ada County, and Osborne Mine, Gem County, by Dave E. Leppert and Virginia S. Gillerman: U.S. Bureau of Land Management, April, 184-page report and CD.

Site Inspection Report for Abandoned and Inactive Mines on Lands Administered by the U.S. Bureau of Land Management in the Challis Resource Area, Idaho: Lemhi and Custer County, by Dave E. Leppert and Virginia S. Gillerman: U.S. Bureau of Land Management, April, 130-page report and CD.

Sodic and Potassic Suites of the Cretaceous Idaho Batholith, by Reed S. Lewis: 15th Annual V.M. Goldschmidt Conference, University of Idaho, May.

Spatial-Temporal Geostatistics for Ground-Water Quality Networks, by J.A. Welhan: Subsurface Science Symposium, Inland Northwest Research Alliance, Spokane,

September.

Spring Thaw: Regional Industry Awareness, by M.J. Weaver: Mine Safety and Health Administration, Twin Falls, February; Salem, Oregon, April.

Status of Geologic Mapping in North Idaho, by K.L. Othberg: Intermountain Forest Tree Nutrition Cooperative Annual Meeting, Moscow, April.

Surficial Geologic Map of the Cascade Quadrangle, Valley County Idaho, by Roy M. Breckenridge and Kurt L. Othberg: Idaho Geological Survey unpublished map, scale 1:24,000, April.

Surficial Geologic Map of the Donnelly Quadrangle, Valley County Idaho, by Roy M. Breckenridge and Kurt L. Othberg: Idaho Geological Survey unpublished map, scale 1:24,000, April.

Surficial Geologic Map of the Meadows Quadrangle, Valley County Idaho, by Roy M. Breckenridge and Kurt L. Othberg: Idaho Geological Survey unpublished map, scale 1:24,000, April.

Surficial Geologic Map of the No Business Mountain Quadrangle, Valley County Idaho, by Roy M. Breckenridge and Kurt L. Othberg: Idaho Geological Survey unpublished map, scale 1:24,000, April.

Surficial Geologic Maps Help Counties Understand Geologic Hazards in Idaho, by Kurt L. Othberg, Loudon R. Stanford, and Roy M. Breckenridge: Geologic Society of America Annual Meeting, Denver, Colorado, November.

What is Geostatistics? by J.A. Welhan: Geology 599 Seminar, Department of Geosciences, Idaho State University, November.

Professional Activities

Advisory board meeting, Idaho Geological Survey, Boise, June (R.M. Breckenridge, C.D. Fullerton V.S. Gillerman, K.L. Othberg, W.M. Phillips, L.R. Stanford, J.A. Welhan).

Association of American State Geologists, annual meeting, St. Charles, Illinois, June (R.M. Breckenridge).

Association of American State Geologists, liaison meeting, Washington, D.C., March (R.M. Breckenridge).

Association of American State Geologists, midyear meeting, Denver, Colorado, November (R.M. Breckenridge, L.R. Stanford).

Association of American State Geologists, western cluster meeting, St. Charles, Illinois, June (R.M. Breckenridge).

Chair, Special Symposium S-17, "Cosmogenic Nuclides and Surface Process Research: New Developments and Applications," 15th Annual V.M. Goldschmidt Conference, University of Idaho, May (W.M. Phillips).

Co-chair, "Evolution of the Mesozoic continental margin," 15th Annual V.M. Goldschmidt Conference, University of Idaho, May (R.S. Lewis).

Committee member, Association of American State Geologists, 2005 auditing committee (R.M. Breckenridge).

Co-supervisor, Digital Geologic Mapping Lab, Idaho Geological Survey-Department of Geosciences, Idaho State University (J.A. Welhan).

Delegate, Geoscience, Western States Seismic Policy Council (W.M. Phillips).

Discussion leader, Inland Northwest Research Alliance graduate seminar, September (J.A. Welhan).

EARTHSCOPE meeting, Idaho-U.S. Array, Idaho Geological Survey and Idaho Bureau of Disaster Services, February (R.M. Breckenridge).

Field trip, Geological Society of Nevada Symposium, Reno, Nevada, May (V.S. Gillerman).

Field trip and State Geologists' briefing, National Park Service, Yellowstone National Park, September (R.M. Breckenridge).

Field trip co-coordinator, Inland Northwest Research Alliance Subsurface Science graduate program (J.A. Welhan).

Field trip leader, "Plutonic History of the Northwest Border Zone and Main Bitterroot Lobe of the Idaho Batholith," 15th Annual V.M. Goldschmidt Conference, University of Idaho, May (R.S. Lewis).

Field trip leaders, Ice Age Floods Institute Field trip, Sandpoint, May (R.M. Breckenridge, R.S. Lewis).

Field trip preview, 2005 Field Workshop for Teachers, Borah Peak area, April (W.M. Phillips, D.L. Garwood).

Field Workshop for Teachers, Cascade, July (R.M. Breckenridge, K.L. Othberg, M.J. Weaver, G.A. Worthington).

Geological Society of America Annual Meeting, Denver, Colorado, November (R.M. Breckenridge, L.R. Stanford).

Geological Society of Nevada Symposium, Reno, Nevada, May (V.S. Gillerman).

Guest lecturer, Geology Seminar 599, November; Engineering Seminar 651, January; Idaho State University (J.A. Welhan).

Idaho Association of Professional Geologists meetings, Boise (V.S. Gillerman).

Idaho Bureau of Homeland Security, State Agency Emergency Coordination working group meetings, Boise, monthly (V.S. Gillerman).

Idaho Earth Science Teachers Association and Idaho Science Teachers Association annual conference, Lewiston, October (W.M. Phillips, G.A. Worthington).

Idaho Earth Science Teachers Association, business meetings, Cascade, July (R.M. Breckenridge, K.L. Othberg, G.A. Worthington); Lewiston, October (W.M. Phillips, G.A. Worthington).

Idaho Earth Science Teachers Association, steering committee, Moscow, November (R.M. Breckenridge, K.L. Othberg, G.A. Worthington).

Idaho Environmental Forum meetings, Boise (V.S. Gillerman).

Idaho Geologic Mapping advisory committee (IGMAC) meeting, Boise, June (R.M. Breckenridge, V.S. Gillerman, W.M. Phillips, K.L. Othberg, L.R. Stanford).

Idaho Geologic Mapping advisory committee (IGMAC) teleconference, Boise and Moscow, September and October (R.M. Breckenridge, K.L. Othberg).

Idaho Geospacial Committee, Boise, May and March (L.R. Stanford).

Idaho Geothermal Working Group, Boise, January and April (V.S. Gillerman).

Instructor, Mine Safety Training sessions, Mine Safety and Health Administration (M.J. Weaver).

Instructor, one-day technical workshop, 2005 Intermountain GIS Users Conference, Pocatello, April (J.A. Welhan).

Instructors, Geology 404 and 504, Geology and geologic hazards of Long Valley, Department of Geological Sciences, University of Idaho, July (R.M. Breckenridge, K.L. Othberg).

Intermountain Forest Tree Nutrition Cooperative, annual meeting, Moscow, April (K.L. Othberg).

Intermountain Forest Tree Nutrition Cooperative, northern Idaho field trip, Moscow, June (R.S. Lewis, K.L. Othberg, W.M. Phillips).

Intermountain GIS User's Conference, Northern Rockies Chapter of Urban Regional Information Systems Association (URISA), Pocatello, April (D.L. Garwood).

Judge, 17th Annual Coeur d'Alene District Mining Competition, Jean Day Park, Os-

burn, August (M.J. Weaver).

Judge, 18th Central Mine Rescue Competition. Osburn, May (M.J. Weaver).

Member, Alpine Club of Canada (R.M. Breckenridge).

Member, American Geophysical Union (J.A. Welhan).

Member, American Quaternary Association (R.M. Breckenridge).

Member, Association of American State Geologists (R.M. Breckenridge).

Member, Association of Earth Science Editors (R.C. Stewart).

Member, Basin and Range Committee, Western States Seismic Policy Council (R.M. Breckenridge).

Member (ex officio), board of directors, Western States Seismic Policy Council (R.M. Breckenridge).

Member (lifetime), Certified Mine Safety Professional (M.J. Weaver).

Member, Geological Society of Nevada (V.S. Gillerman).

Member, Ground-Water Monitoring Technical Committee, Idaho Department of Environmental Quality (J.A. Welhan).

Member, Idaho Geospacial Committee (L.R. Stanford).

Member, Prospectors and Developers Association of Canada (V.S. Gillerman).

Member, Science language technical team, North American geologic map data model project (R.S. Lewis).

Member, Seismological Society of America (R.M. Breckenridge).

Member, Society of Economic Geologists (V.S. Gillerman).

Member, steering committee, North American Digital Geologic Map Data Model (L.R. Stanford).

Member, Storm Water Technical Advisory Committee, Pocatello (J.A. Welhan).

Member, U.S. Mine Rescue Association (M.J. Weaver).

Member and co-chair, Ground Water Guardian, Portneuf Chapter (J.A. Welhan).

Member and co-facilitator, steering committee, Greater Portneuf Water Resources Partnership (J.A. Welhan).

Members, EDMAP review board, Idaho Geological Survey (R.M. Breckenridge, K.L. Othberg).

Members, Geological Society of America (R.M. Breckenridge, V.S. Gillerman, R.S. Lewis, V.E. Mitchell, K.L. Othberg).

Members, Idaho Earth Science Teachers Association (R.M. Breckenridge, K.L. Othberg, W.M. Phillips, G.A. Worthington).

Members, Northwest Mining Association (V.S. Gillerman, R.S. Lewis).

Members, Society for Mining, Metallurgy, and Exploration, Inc. (V.S. Gillerman, M.J. Weaver).

Members, steering committee, Idaho Earth Science Teachers Association (R.M. Breckenridge, K.L. Othberg, W.M. Phillips, G.A. Worthington).

Members, Tobacco Root Geological Society (V.S. Gillerman, R.S. Lewis).

Mine Safety and Health Administration, State grants business meeting, Beckley, West Virginia, May (M.J. Weaver).

National Earthquake Consortia meeting, Washington, D.C., March (R.M. Breckenridge).

Northwest Mining Association 110th Annual Meeting, Spokane, Washington, December (V.S. Gillerman, R.S. Lewis, M.J. Weaver).

Organizer, Western Cluster meeting, Association of American State Geologists, St. Charles, Illinois, June (R.M. Breckenridge).

Organizers, 2004 Field Workshop for Teachers, "Geology and Geologic Hazards of Long Valley," Cascade, July (R.M. Breckenridge, K.L. Othberg).

Organizers, 2005 Field Workshop for Teachers, "Geology and Geologic Hazards of the Lost River Area," Cascade, July (W.M. Phillips, R.M. Breckenridge, K.L. Othberg).

Post-conference field trip, "The Columbia River Basalt Group in Southeastern Washington and Northeastern Oregon," 15th Annual V.M. Goldschmidt Conference, University of Idaho, May (D.L. Garwood, J.D. Kauffman).

Pre-conference field trip, "Plutonic History of the Northwest Border Zone and Main Bitterroot Lobe of the Idaho Batholith," 15th Annual V.M. Goldschmidt Conference, University of Idaho, May (D.L. Garwood).

Prospectors and Developers Association of Canada Convention, Toronto, Canada, March (V.S. Gillerman).

Recertification, Abandoned Mine Rescue Specialist, Central Mine Rescue (M.J. Weaver).

Representative, Department of Geological Sciences, University of Idaho (R.M. Breckenridge).

Representative, Department of Geosciences, Boise State University (V.S. Gillerman).

Representative, Department of Geosciences, Idaho State University (J.A. Welhan).

Representative, Eastern Idaho Geologic Mapping Scoping meeting, Idaho Falls, January (J.A. Welhan).

Representative, School of Graduate Studies, Idaho State University Graduate Faculty (J.A. Welhan).

Representative, Western Region (2004-2007), STATEMAP peer review panel, National Cooperative Geologic Mapping Program, U.S. Geological Survey-Association of American State Geologists (R.M. Breckenridge).

Reviewer, Geology/Geography Program Review, North Idaho College, Coeur d'Alene, April (W.M. Phillips).

Secretary, Belt Association Board of Directors (R.S. Lewis).

Society of Economic Geologists, Fellow, Past Vice-President, and Program Committee Chair (V.S. Gillerman).

Society of Economic Geologists council and program committee meetings, Toronto, Canada, March (V.S. Gillerman).

STATEMAP review panel meeting, U.S. Geological Survey, Reston, Virginia, December (R.M. Breckenridge).

Steering committee meetings, North American Digital Geologic Map Data Model, Denver, Colorado, November; Baton Rouge, Louisiana, April (L.R. Stanford).

Technical advisor, Bannock County water planning officials (J.A. Welhan).

Technical advisor, land acquisition to protect ground-water resources, city of Pocatello (J.A. Welhan).

Technical advisor, Shoshone-Bannock Tribes' Water Resources Department (J.A. Welhan).

Technical advisor, Union Pacific Railroad subsurface site characterization, Idaho Department of Environmental Quality (J.A. Welhan).

Technical advisor, siting of replacement water supply well, city of Pocatello (J.A. Welhan).

Technical representative, Pocatello's Intergovernmental Water Advisory Group (J.A. Welhan).

Tobacco Root Geological Society annual meeting, August (R.S. Lewis).

Western Phosphate Mining and Processing Conference, Pocatello, June (V.S. Gillerman).

Western States Seismic Policy Council, Board of Directors meetings, Washington, D.C.,

March; Salt Lake City, June (R.M. Breckenridge).

Workshop, Digital Mapping Techniques, Baton Rouge, Louisiana, April (J.S. Freed, L.R. Stanford).

Workshop, Sampling Protocols and Calibration Sites, Cosmic-Ray Produced Nuclide Systematics on Earth Project (CRONUS-Earth), Coeur d'Alene, May (W.M. Phillips).

Media Interview

Flooded With History: National Ice Age Floods Geologic Trail, by Eric Barker: Lewiston Tribune, February 10, 2005 (R.M. Breckenridge).

Graduate Thesis Committees

Renee Farabaugh, Ph.D., Geosciences, Idaho State University (J.A. Welhan).

Chris Jenkins, Ph.D., Geosciences, Idaho State University (J.A. Welhan).

Tiisetso Masiane, M.S., Environmental Engineering, Idaho State University (J.A. Welhan).

John Mazurek, M.S., Geosciences, Idaho State University (J.A. Welhan).

Chris Meehan, M.S., Geosciences, Idaho State University (J.A. Welhan).

Tom Rackow, M.S., Environmental Engineering, Idaho State University (J.A. Welhan).

Matthew Hoffer, M.S., Geology, University of Idaho (R.S. Lewis).

Grants and Contracts

Abandoned and Inactive Mine Inventory: R.S. Lewis (U.S. Forest Service, Region 1, September 2001-September 2006, $82,593).

Belt-Purcell Basement Domains: R.S. Lewis (U.S. Geological Survey, Mineral Resources External Research Program, September 2004-September 2005, $15,000).

Compilation of GIS Coverage of Oil and Gas Wells and Areas of Potential Interest, Coeur d'Alene and Cottonwood BLM Offices: V.S. Gillerman (U.S. Bureau of Land Management, August 2004-September 2005, $5,000).

Digital Geology of Idaho: R.S. Lewis (National Science Foundation, subcontract with Idaho State University, June 2004-May 2006, $20,000).

G*eologic Mapping in the Coolin 7.5' Quadrangle*: R.S. Lewis (Idaho Department of Lands, May 2004-April 2005, $5,000).

Geostatistical Analysis of Sediment Architecture in the Big Lost River Volcanic Trough: J.A. Welhan (U.S. Geological Survey, September 2003-August 2004, $70,000).

Idaho Geological Survey Support of Idaho Bureau of Land Management's Abandoned Mine Lands Program: V.S. Gillerman (U.S. Bureau of Land Management, July 2003-December 2005, $40,000).

Idaho Mine Safety Training Program: M.J. Weaver (Mine Safety and Health Administration, October 2003-September 2004, $89,007; supplemental grant for vehicle, $21,500).

Idaho Mine Safety Training Program: M.J. Weaver (Mine Safety and Health Administration, October 2004-September 2005, $89,007).

Minesite Database: R.S. Lewis (U.S. Forest Service, Region 4, June 2003-December 2005, $205,000).

Mitigation of Idaho Geologic Hazards, Earthquake Education Workshop: R.M. Breckenridge and K.L. Othberg (Idaho Bureau of Disaster Services, May-September 2004, $45,000).

Mitigation of Idaho Geologic Hazards, Earthquake Education Workshop: R.M. Breck-

enridge, K.L. Othberg, and W.M. Phillips (Idaho Bureau of Disaster Services, March-October 2005, $45,000).

STATEMAP Project, Geologic Mapping in the Orofino, Long Valley, Sandpoint, and Idaho Falls Project Areas: K.L. Othberg, R.M. Breckenridge, R.S. Lewis, J.D. Kauffman, and W.M. Phillips (U.S. Geological Survey, May 2005-April 2006, $191,188).

STATEMAP Project, Geologic Mapping in the Twin Falls, Orofino, McCall-Cascade, and Sandpoint Project Areas: K.L. Othberg, R.M. Breckenridge, R.S. Lewis, and V.S. Gillerman (U.S. Geological Survey, May 2004-April 2005, $220,375).

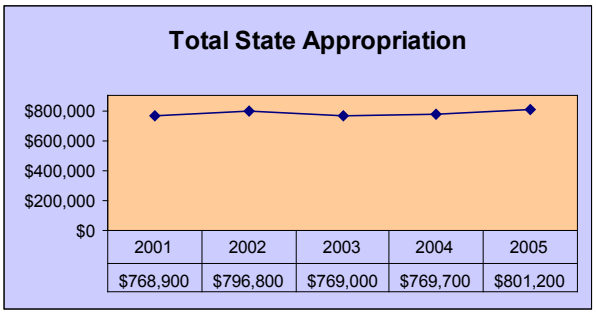
Water Quality Monitoring Analyses: J.A. Welhan (Three Rivers Resource, Conservation and Development District, July 2004-October 2004, $3,000).

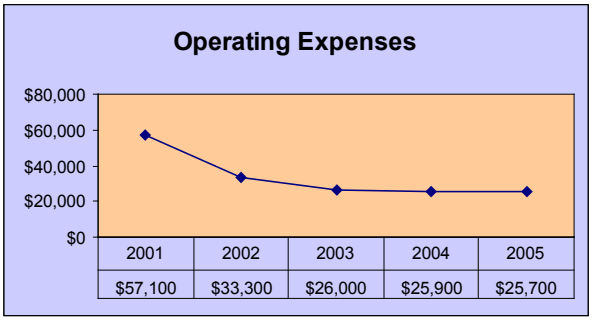
Fiscal Year 2005 Budget

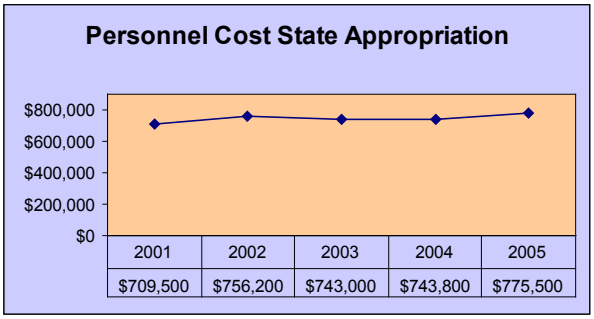
		FISCAL YEAR 2005		
	04 Carryover	Income	Expenses	06 Carryover
Appropriation				
Personnel	0	769,200	769,200	0
1% Bonus	0	6,300	6,300	0
Operating Expenses	0	25,700	25,700	0
Capital Outlay	0	0	0	0
Total	0	801,200	801,200	0
Rotary Accounts*	125,472	133,396	145,182	113,686
Grants and Contracts	na	534,302	534,302	na
Total	125,472	1,468,898	1,480,684	113,686

*Analyses, Boise branch office, digital mapping lab, earth-science education, earned overhead, literature collections, motor pool, MSHA, publications.

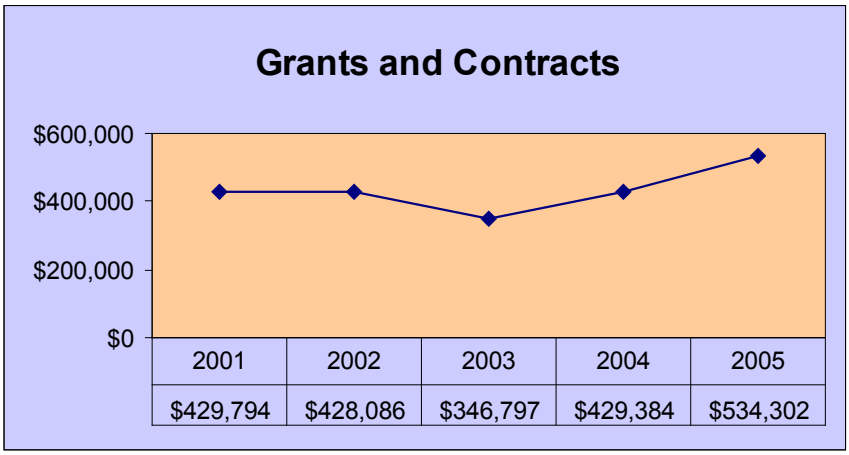
Budget Appropriation History

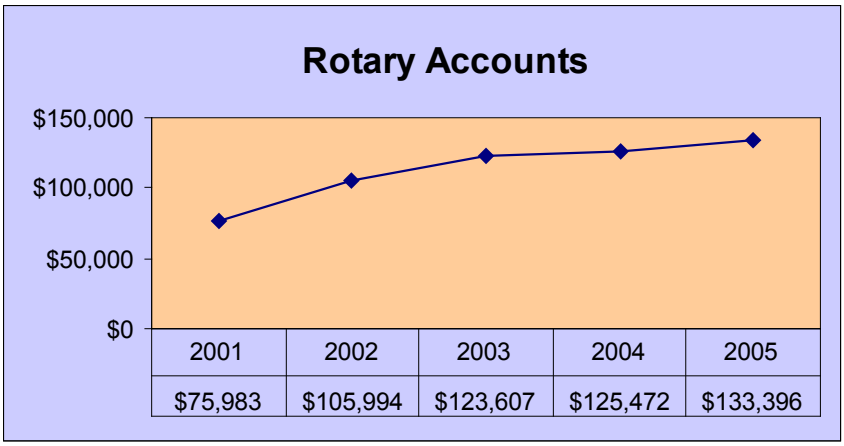




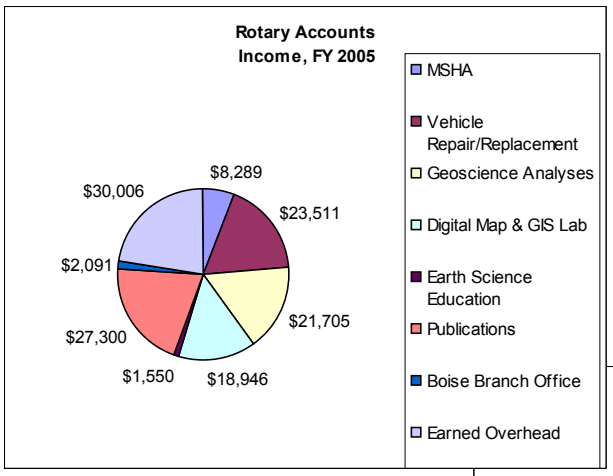


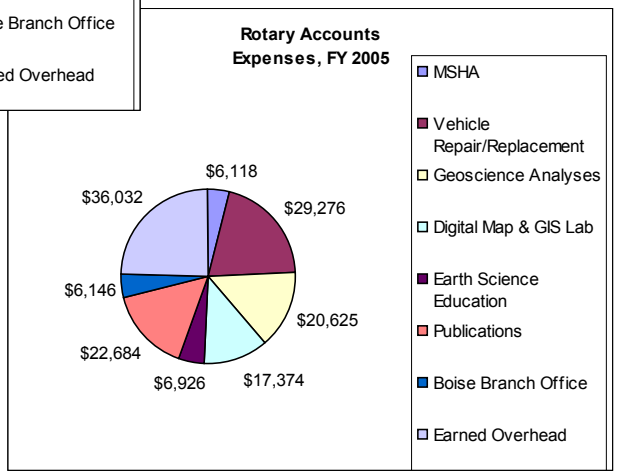
Sponsored Programs

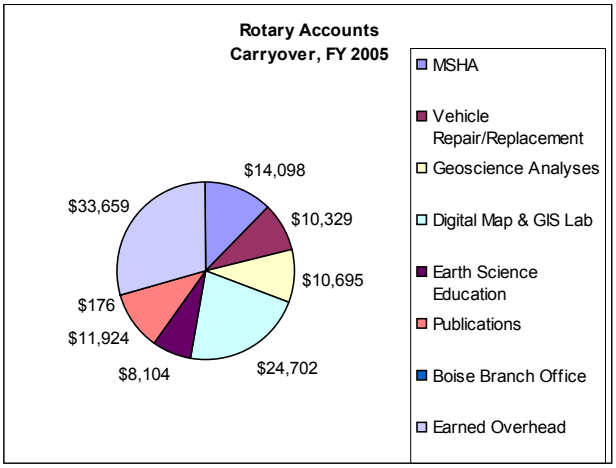




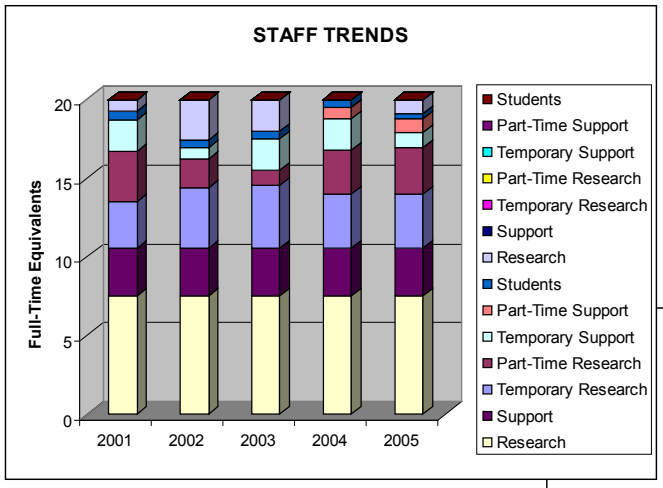
Rotary Accounts Breakdown

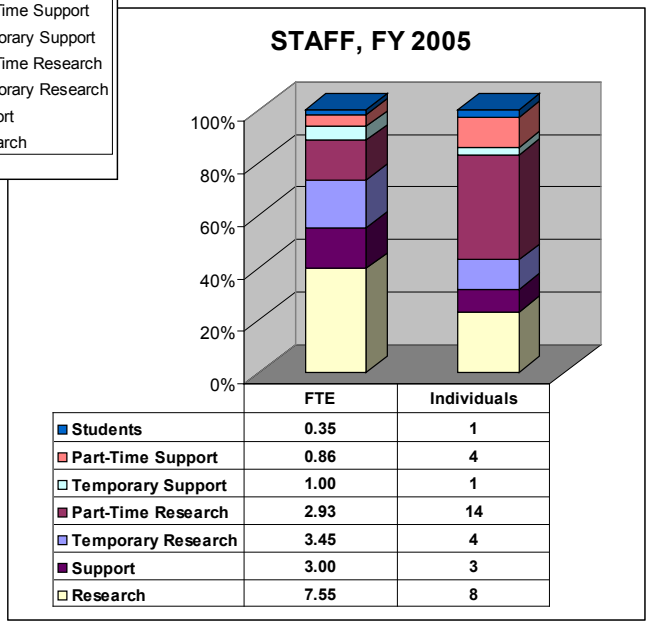




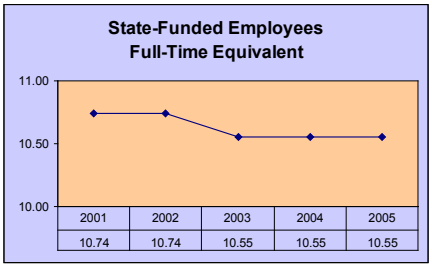


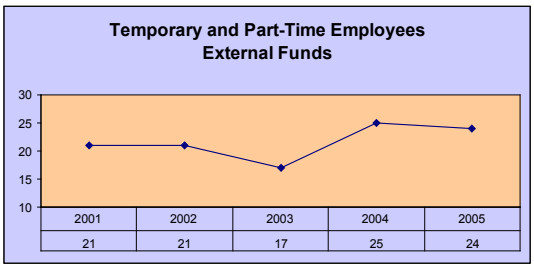
Personnel Trends





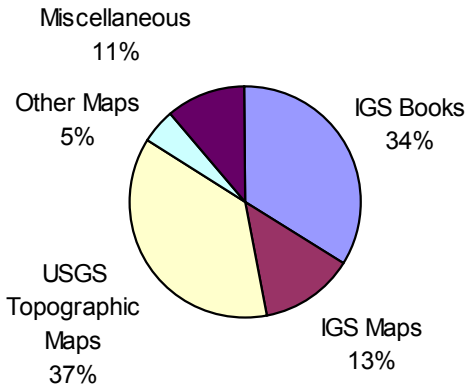
	FTE	Individuals
Students	0.35	1
Part-Time Support	0.86	4
Temporary Support	1.00	1
Part-Time Research	2.93	14
Temporary Research	3.45	4
Support	3.00	3
Research	7.55	8

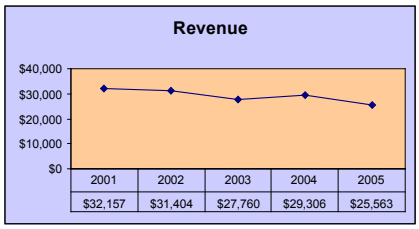


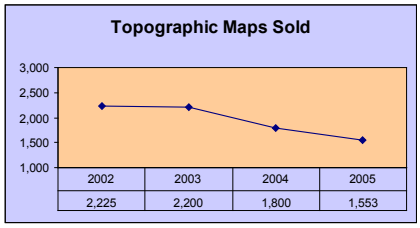


Publications

FY 2005 Sales

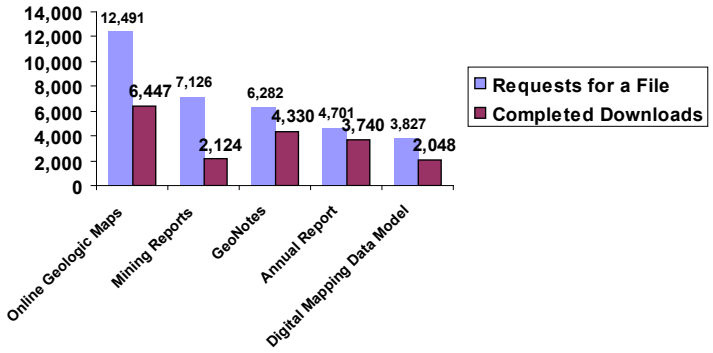




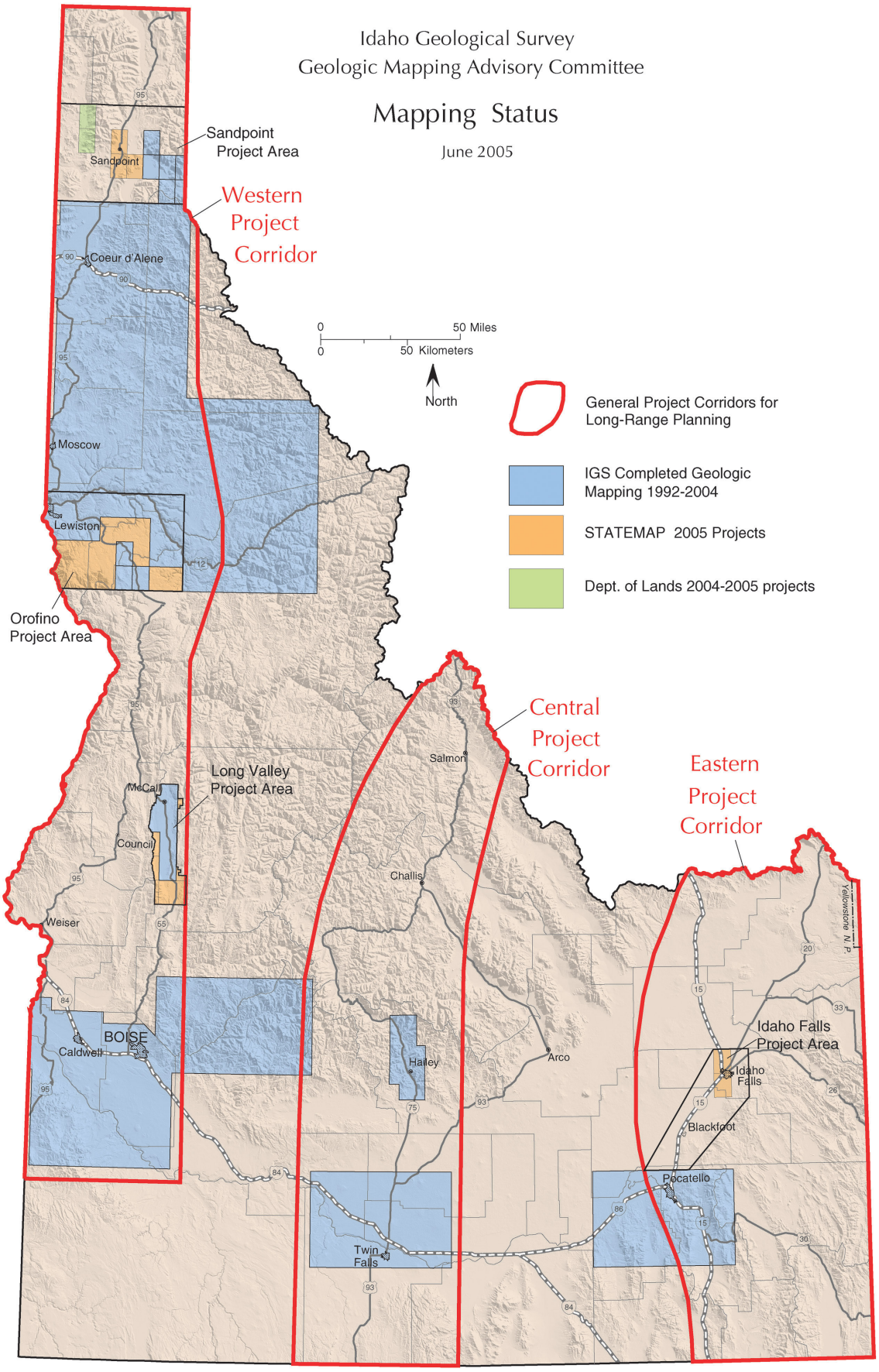


Idaho Geological Survey Web Site
www.idahogeology.org

Web-site performance FY 2005



Top Performers
Total = 34,427


Idaho Geological Survey
Geologic Mapping Advisory Committee
Mapping Status
June 2005
Sandpoint Project Area
Western Project Corridor
Sandpoint
Coeur d'Alene
Moscow
Lewiston
Orofino Project Area
0 50 Miles
0 50 Kilometers
North
General Project Corridors for Long-Range Planning
IGS Completed Geologic Mapping 1992-2004
STATEMAP 2005 Projects
Dept. of Lands 2004-2005 projects
Central Project Corridor
Salmon
Long Valley Project Area
McCall
Council
Weiser
Challis
Eastern Project Corridor
Yellowstone N. P.
BOISE
Caldwell
Hailey
Arco
Idaho Falls Project Area
Idaho Falls
Blackfoot
Pocatello
Twin Falls

Overview of Grants and Contracts—FY05

Project Title	Funding Agency	Dates	Amount
Abandoned/Inactive Mine Inventory	U.S. Department of Agriculture, Forest Service, Region 1	September 2001–September 2006	$87,593
Belt-Purcell Basement Domains	U.S. Geological Survey	September 2004–September 2005	$15,000
Compilation of GIS Coverage of Oil and Gas Wells and Areas of Potential Interest, Coeur d'Alene and Cottonwood BLM Offices	USDI-Bureau of Land Management	August 2004–September 2005	$5,000
Digital Geology of Idaho; Subcontract with Idaho State University	National Science Foundation	June 2004–May 2006	$20,000
Geologic Mapping in the Coolin 7.5' Quadrangle	Idaho Department of Lands	May 2004–April 2005	$5,000
Geostatistical Analyses of Sediment Architecture in the Big Lost River Volcanic Trough	U.S. Geological Survey	September 2003–August 2004	$70,000
Investigation of Abandoned/Inactive Mine Sites	U.S. Department of Agriculture, Forest Service Region 1	September 2001–September 2006	$82,593
Idaho Geological Survey Support of Idaho Bureau of Land Management's Abandoned Mine Lands Program	USDI-Bureau of Land Management	July 2003–December 2005	$40,000
Idaho Mine Safety Training Program	Mine Safety and Health Administration	October 2003–September 2004	$110,507
Idaho Mine Safety Training Program	Mine Safety and Health Administration	October 2002–September 2003	$89,007
Mine Site Database	U.S. Department of Agriculture, Forest Service Region 4	June 2003–December 2005	$350,000
Mitigation of Idaho Geologic Hazards, Earthquake Education Workshop	Idaho Bureau of Homeland Security	May 2004–September 2004	$45,000
Mitigation of Idaho Geologic Hazards, Earthquake Education Workshop	Idaho Bureau of Homeland Security	March 2005–October 2005	$45,000
STATEMAP Project, Geologic Mapping in the Twin Falls, Orofino, McCall-Cascade, and Sandpoint, Areas	U.S. Geological Survey	May 2004–April 2005	$220,375
STATEMAP Project, Geologic Mapping in the Orofino, Long Valley, Sandpoint, and Idaho Falls Areas	U.S. Geological Survey	May 2005–April 2006	$191,188
Water Quality Monitoring Analysis (Three Rivers Resource, Conservation and Development District)	Idaho Department of Water Resources	July 2004–October 2004	$3,000

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The Idaho Geological Survey's Twentieth Annual Advisory Board Meeting June 7, 2005

Introduction

The twentieth annual Advisory Board meeting of the Idaho Geological Survey was held on June 7, 2005, at the new Idaho Water Center in Boise. Following a continental breakfast, the meeting was called to order at 8:30 a.m. Kurt Othberg and Roy Breckenridge offered their welcome and appreciation to board members, guests, and staff.

The following Advisory Board members, or their representatives, were present: **David Hawk** (representing the Office of the Governor), **Scott Hughes** (Chair, Department of Geosciences, Idaho State University), **Starr Johnson** (Idaho Association of Professional Geologists), **M. Jerome Mapp** (Western Planner Resources, Boise City and County Planning), **Denise Mills** (representing Winston Wiggins, Director, Idaho Department of Lands), **David Wilkins** (representing C.J. Northrup, Chair, Department of Geosciences, Boise State University), **Stephen Weiser** (Assistant Deputy Director of Mitigation, Idaho Bureau of Homeland Security), and **Tom Williams** (via phone, representing Dennis Geist, Chair, Department of Geological Sciences, University of Idaho).

Guests included: **Mary Donato** (U.S. Geological Survey), **Phillip Bandy** and **Mark Jeffers** (Idaho Department of Environmental Quality), **Gene Merrell** (representing Charles Hatch,Vice President of Research, University of Idaho), **Ken Neely** (Idaho Department of Water Resources), **Keith Nottingham** (Idaho Department of Transportation), and **A. Wesley Ward, Jr**. (U.S. Geological Survey, Western Regional Geologist).

The following staff were present: **Roy Breckenridge** (Director/State Geologist/Full Research Geologist), **Charlotte Fullerton** (Management Assistant), **Virginia Gillerman** (Associate Research Geologist, Branch Office at Boise), **Kurt Othberg** (Director /Full Research Geologist),**William Phillips** (Assistant Research Geologist), **Loudon R. Standford** (Manager, Digital Map and GIS Lab), and **John Welhan** (Full Research Geologist, Branch Office at Pocatello).

University of Idaho Renewal Includes Partnering

Gene Merrell of the University of Idaho's Research Office summarized President Tim White's plans for reorganization and financial and strategic renewal of people, places, and programs based on five thematic areas. The following strategic themes were developed to focus U of I programs towards multidisciplinary proposals and concepts to better attain investment dollars.

- Promoting science and technology to advance core competencies in these areas by focusing on those programs identified by the Governor's Office of Science and Technology.
- Advancing liberal arts and sciences to strengthen those liberal arts and science programs across campus for positive education and professional opportunities and experiences.
- Catalyzing entrepreneurial innovation to inspire enterprise and technological change.
- Stewarding environments to sustain natural resources and natural resource based industries.

- Understanding sustainable design and lifestyle, integrative architecture, and creative arts in frontiers and rural environments of Idaho.

Gene noted that the U of I expects to invest $1 million next year in this type of multidisciplinary research. He was confident the Survey would lend itself well to positive opportunities for partnering in seeking investment funds.

David Hawk questioned Gene about U of I cutbacks that have already occurred and those expected in FY06. Gene replied that due to the $4.7 million U of I deficit, the Research Office had to return $200,000 to help balance the budget. IGS was able to avoid this cut. Gene added there are two additional holdbacks which include decreasing the overhead earned by departmental grants from 50% to 40%. That 10% difference then becomes part of the new U of I investment fund. Also, an additional 1% tax will be levied on revenue earned by departments.

Scott Hughes asked if either the Survey or the U of I Department of Geosciences programs had been impacted. Roy noted that while the Survey had avoided such cuts, the Department of Geosciences under the College of Science was scheduled to terminate its MS graduate geophysics program.

Stephen Weiser asked if there would be an opportunity for additional FTEs such as a seismologist. Roy indicated that FTEs are still constrained by the legislature, but there may be a new opportunity for sharing positions and alliances with other programs and agencies. Kurt noted that the IGS/U of I budget status under the Board of Education has not changed.

Roy noted that IGS's alignment with U of I institutes as well as other state surveys and state geologists through the Association of American State Geologists provides great support for the agency in improving its outreach role in the state and nation. Roy noted that as a result of these alliances, IGS is well-positioned to partner in all five theme areas addressed by Gene.

Program Update

- ***Personnel Information.*** Kurt reviewed the Survey's organizational chart and personnel directory. Several positive comments ensued regarding the productivity of the IGS staff with just 10.5 FTEs.

- ***Organizational Chart.*** David Hawk suggested that the IGS Advisory Board be included in the organizational chart and that ISU be added to the box for "Digital Mapping/Research Lab" to help emphasize the broad and comprehensive nature of IGS's programs and operations.

- ***New Research Geologist.*** IGS's newest employee gave a presentation to the Advisory Board on his research interests and background. Bill Phillips joined the agency in August 2004. A native of Pocatello, Bill was educated at Tufts University, Washington State University, and University of Arizona, where he received a Ph.D. in Geosciences in 1997. His research focuses on cosmogenic nuclide surface exposure dating, a relatively new technique used to date Quaternary deposits and young lava flows. Bill plans to apply cosmogenic nuclides to Idaho problems including the dating of Snake River Plain lavas and central Idaho glacial deposits. He recently received a $9,000 grant from the University of Idaho to equip a cosmogenic nuclide sample preparation laboratory in Moscow. Bill is also active in the STATEMAP program with current projects in the Idaho Falls and Orofino areas and will serve as Idaho's geosciences representative for WSSPC, as well as organize and instruct the Survey's 2005 summer workshop for teachers.

- ***Status of Sponsored Programs.*** Even though FTEs (10.5) have remained constant since 2003, projects are accomplished with the assistance of 23 temporary employees (four working full-time). The dollar value of sponsored programs remains fairly constant.

- ***Budget Appropriations.*** Kurt emphasized that the IGS state-appropriated budget (covering salary, fringe benefits, and operating expenses) has basically been flatlined without any substantial salary increases since 2003 and no capital outlay appropriation since FY02. Over the past few years, the $25,900 received each year for operating expenses has barely covered half of the fiscal year's necessary operating expenses. Sponsored programs, returned overhead, and other rotary accounts enable the Survey to function as effectively as it does.

David Hawk remarked how impressed he was that the Survey has been able to grow nearly the same number of sponsored dollars as previously with fewer full-time people. Scott Hughes suggested that IGS's "environmental impact" include supporting more students and increased outreach. Jerome Mapp asked whether any of these part-time people are contracted. Kurt noted that most are geologists who work for IGS during the summer. Jerome advised that the Survey specifically demonstrate how it partners with other agency institutions (including the locations of institutions assisting IGS research) to get the job done. It was suggested that the full-time temporary people be listed separately from the part-time people.

2005-2006 Map Production and Publication Sales Highlights

Publications and reports for staff authors include: one Digital Database, four Digital Web Maps, four Geo-logic Maps, twelve Staff Reports, eleven professional meeting abstracts, and four journal articles. In addition, five Informational Circulars were released. USGS topographic maps make up nearly one-third of publication sales, but sales have declined over the last several years, which may be due to topographic software sales. With increased technology, more people may be printing their own maps.

David Hawk indicated that he was pleased to see the speed at which information is being made available to the public. Mary Donato inquired about what impact online maps have had on the Survey's sales. Loudon responded that although the quality of the map is less than those printed by the Survey, the data from Web maps are more readily available, which is a plus for many people. The Survey's long-term goal is to have a statewide database on a geobase data model. When data are stored in a centralized location, it is easier to update.

U.S. Geological Survey Update

Wesley Ward, the USGS Regional Geologist based in Tucson, compared the current structure of the USGS with changes expected to occur this October. The purpose of this change is to bring the USGS to a more integrated level of science. He noted that Ann Kinzer, based in Seattle, will be the initial contact person for issues concerning Idaho, Oregon, and Washington. She will then refer people to the appropriate specialist.

David Hawk asked about the future of the STATEMAP program. Wesley responded that he did not expect problems in that area.

David Hawk recommended that IGS consider the possibility of displaying IGS mapping products during the legislative term (preferably at the Capitol Rotunda) and invite science teachers to attend with their students. David felt it would be useful politically as well as a method of advertisement.

Scott Hughes suggested that ISU/BSU days would be a good venue to display the Survey's products and provide examples as to how the agency partners with other institutions. Mark Jeffers added that partnering with other agencies would broaden the impact. Gene Merrill recommended we implement it through Marty Peterson, who handles the U of I contact with the legislature.

Association of American State Geologists Update

Roy Breckenridge, in his role as State Geologist remarked on the value of membership in the AASG. He added that AASG played a very important role at the AASG Liaison meeting this March where representatives met with congressional staffers and agency executives to show their support for reinstating the mineral program and energy bills in the USGS budget.

In 2007, with the support of AASG, the USGS is planning a hazards initiative. AASG has proposed that awards be based on competitive proposals similar to the STATEMAP process.

Current Idaho Science

Ginna Gillerman reported on a new gold production compilation and poster that she and Vicki Mitchell presented at the May meeting of the Geological Society of Nevada's Symposium. In addition to summarizing the renewed activity in Idaho's precious metal mining industry, it featured an update to Map 1, Gold Occurrences in Idaho, published in1978. Since then, according to records from the former U.S. Bureau of Mines and the U.S. Geological Survey, Idaho has produced an additional 2,435,180 troy ounces of gold, mostly from new discoveries in the 1980s and 1990s. This brings Idaho's historic gold production (through 2004) to approximately 12.4 million troy ounces (about 386 metric tons).

In another project, Ginna described efforts to date thorium-bearing minerals from the Lemhi Pass district in the Beaverhead Mountains south of Salmon. With colleagues from the University of Massachusetts and Colorado State University, they have obtained a Proterozoic age (1.055 Ma) on the copper-molybdenum mineralization at the Copper Queen mine and Proterozoic through Mesozoic ages on zoned monazite grains at the Lucky Horseshoe prospect, as reported in abstracts from the Geologic Society of America meetings. Published literature suggests that the mineralization is far younger (Tertiary), but the new dates, using cutting-edge analytical techniques, make more sense with the field observations. The project is ongoing as the scientists at the University of Massachusetts are trying to confirm the U-Pb microprobe data with a newer, higher powered instrument because the U and Pb values are unusually low in the monazites, since the district is primarily thorium rich. Ginna and her colleagues are preparing the results for publication. As a sidelight, new Ar-Ar dates on metamorphic biotite from the Blackbird district indicate a Cretaceous age for the metamorphism there and at Lemhi Pass (which also has older events indicated).

As Reed Lewis was unable to attend, Kurt reported on the research he is doing with Jeff Vervoort (Washington State University) to obtain detrital zircon ages from metasedimentary rocks in northern Idaho. The dating method uses laser ablation to obtain U-Pb ages from cores of individual zircon grains. The youngest ages provide a maximum age of sedimentation. Rocks east of Harpster, once thought to be Mesoproterozoic or older, are now known to be 680 million or younger (Neoproterozoic or younger) and cannot be part of the Mesoproterozoic Belt Supergroup. This work confirms similar results obtained by Karen Lund of the USGS.

John Welhan summarized research progress in two areas pertaining to Idaho's ground-water quality. He has developed and applied a new group of statistical tools for analyzing patterns of change in both water quality and ground-water storage, practical applications which are potentially important for monitoring and managing the state's ground-water resources.

A second study, a ten-year evaluation of ground-water quality in the lower Portneuf River valley, has provided the first hard evidence of the magnitude of ground-water quality impairment due to septic sewage disposal. A novel modeling approach was applied to quantify the cumulative effects of individual septic systems on Pocatello's municipal ground-water supply, an approach that will allow planners to predict the water quality impacts of future septic-based development.

Dave Wilkins commented that he also is seeing a rapid increase of multidisciplinary research projects. He wondered if the state geologists might look into promoting science fellowships on congressional committees.

Kurt and Roy thanked the advisory board members and guests for attending this year's meeting. Roy announced that Idaho Bureau of Homeland Security and the IGS will be co-hosts of the annual Western States Policy Council Meeting, and WSPC brochures were distributed. The meeting was followed in the afternoon with a session devoted to current STATEMAP programs and plans for next year.