Fiscal Year 2010
Annual Report
of the
Idaho Geological Survey

Fiscal Year
2010

Cover photo taken by Jim Cash, Idaho Geological Survey:
Bonneville Flood boulder near Bliss.
# Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highlights</td>
<td>1</td>
</tr>
<tr>
<td>Mission Statement</td>
<td>2</td>
</tr>
<tr>
<td>Administration</td>
<td>3</td>
</tr>
<tr>
<td>Fiscal Overview</td>
<td>5</td>
</tr>
<tr>
<td>Research</td>
<td>6</td>
</tr>
<tr>
<td>Idaho Geological Mapping Advisory Committee</td>
<td>8</td>
</tr>
<tr>
<td>Outreach</td>
<td>14</td>
</tr>
<tr>
<td>Organization and Personnel</td>
<td>18</td>
</tr>
<tr>
<td>Organization Chart</td>
<td>18</td>
</tr>
<tr>
<td>Directory</td>
<td>19</td>
</tr>
<tr>
<td>Idaho Geological Survey Advisory Board</td>
<td>20</td>
</tr>
<tr>
<td>Publications and Activities</td>
<td>21</td>
</tr>
<tr>
<td>Publications</td>
<td>21</td>
</tr>
<tr>
<td>Abstracts</td>
<td>24</td>
</tr>
<tr>
<td>Reports</td>
<td>26</td>
</tr>
<tr>
<td>Presentations</td>
<td>32</td>
</tr>
<tr>
<td>Web Products</td>
<td>35</td>
</tr>
<tr>
<td>Operational Improvements</td>
<td>36</td>
</tr>
<tr>
<td>Professional Activities</td>
<td>37</td>
</tr>
<tr>
<td>Media Interviews</td>
<td>45</td>
</tr>
<tr>
<td>Thesis Committees</td>
<td>45</td>
</tr>
<tr>
<td>Grants and Contracts</td>
<td>46</td>
</tr>
</tbody>
</table>
HIGHLIGHTS

The funding and collegial support provided through cooperative projects have long been integral components of the agency’s operation. The activities highlighted for the 2010 Annual Report represent long-term research, service, and education programs by the Survey. Over time, the staff has developed wide-ranging interdisciplinary networks in support of its mission. For a one-year snapshot of what has been a very productive synergy, look at the Partners and Collaborators section for the many organizations currently involved in Survey projects. This is a tribute to the staff’s interest, initiative, and ingenuity in building these relationships. Details of the staff’s professional engagement in the agency’s agenda are in the staff Publications and Activities section at the end of this report.
Mission Statement

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 satellite offices in Pocatello at Idaho State University and in Boise at the Idaho Water Center and also Boise State University. Staff geologists conduct applied research with a strong emphasis on producing maps and information on Idaho's geologic setting, earth resources, and geologic hazards. Externally funded projects enhance this research.
Administration

Partners and Collaborators

The Survey’s statewide mission encourages interdisciplinary partnerships and collaboration with many other agencies, organizations, and universities. This broad cooperation ranges from direct grants for individual projects to the collegial sharing of expertise and information. On the national level, the Survey is also directly involved in the initiatives of the Association of American State Geologists. These alliances offer many opportunities to engage in projects that enhance the agency’s applied research and outreach.

Funding Partners


Collaborators

American Geological Institute ~ Association of American State Geologists ~ Belt Association ~ Boise State University ~ Bonner County Museum ~ Cooperative Ecosystem Studies Units ~ Earthquake Engineering Research Institute ~ Greater Portneuf Water Resource Partnership ~ Ice Age Floods Institute ~ Idaho Concrete and Aggregate Producers Association ~ Idaho Conservation League ~ Idaho Geospatial Council ~ Idaho Earth Science Teachers Association ~ Idaho Mining Association ~ Idaho Histori-

Association of American State Geologists

The Survey is an active participant in the Association of American State Geologists (AASG). As Idaho State Geologist, Roy Breckenridge represented Idaho AASG at the midyear meeting in Denver and the AASG Spring Liaison in Washington, D.C. During the year Roy served as a member of the minerals and policy committee and also served on the geologic hazards committee. The AASG is a strong advocate for the funding and reauthorization of the U.S. Geological Survey’s National Cooperative Geologic Mapping Program (NCGMP) as well as research programs for data preservation, minerals, energy resources, and geologic hazards. AASG was successful in receiving an award for a nationwide geothermal database from the U.S. Department of Energy. The three year project includes all state geological surveys and is being led by the Arizona Geological Survey.
Fiscal Overview

During the year, mandated reductions in state funding reduced the Survey’s FY2010 initial appropriated budget from $768,600 to $710,940. The Survey and the University initiated a graduated furlough program to address the salary shortfall. During the legislative session, the Survey’s budget was further reduced to $701,100 for FY2011. The reduction is mostly in personnel funds. These cuts to the budget base adversely change the agency’s mission in research, public service, and education.

<table>
<thead>
<tr>
<th>Appropriation</th>
<th>Beginning Balance</th>
<th>Income</th>
<th>Expense</th>
<th>Ending Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personnel</td>
<td>$693,600.00</td>
<td>$693,600.00</td>
<td>$0.00</td>
<td></td>
</tr>
<tr>
<td>Operating Expense</td>
<td>14,748.80</td>
<td>14,748.80</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>Capital Outlay</td>
<td>2,591.20</td>
<td>2,591.20</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>710,940.00</td>
<td>710,940.00</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>U/I Personnel Funds</td>
<td>37,240.31</td>
<td>37,240.31</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>Local Accounts</td>
<td>$117,653.57</td>
<td>76,914.48</td>
<td>110,785.52</td>
<td>$83,782.53</td>
</tr>
<tr>
<td>Grants and Contracts</td>
<td>NA</td>
<td>598,421.40</td>
<td>544,631.10</td>
<td>NA</td>
</tr>
<tr>
<td>Total</td>
<td>$117,653.57</td>
<td>$1,423,516.19</td>
<td>$1,403,596.93</td>
<td>$137,572.83</td>
</tr>
</tbody>
</table>

NA = not applicable

Sources of Funding
Research

Geological Mapping and Related Studies

The Survey’s primary research activity is mapping and publishing the geology of Idaho’s 7.5’ and 30’ x 60’ quadrangles. Before 1990, geologic mapping in Idaho was primarily conducted in localized rural areas to facilitate extraction of earth resources. In the last two decades, the Survey has been mapping in areas selected specifically because of development impacts in urban settings, for earth-resource needs, and to advance the science. The Idaho Geologic Mapping Advisory Committee (IGMAC) assists the Survey by assessing Idaho’s mapping needs and addressing long-term plans for geologic mapping. The committee guides the medium- and short-term mapping plans to take advantage of state partnerships. Idaho’s geologic map products have been used, for example, to designate landslide hazards; to define mineralization potential; to delineate rock units that form boundaries of aquifers; to show geologic materials for engineering needs; to better predict groundwater resources; to aid in highway design and construction; and to define geologic resources of public lands which include Idaho’s parks, recreation areas, and endowment lands.

Funding of Idaho’s geologic mapping program is shared by the STATEMAP component of the National Cooperative Geologic Mapping Program. Since 1993 Idaho has received nearly $3 million in federal funds and matched an equal amount of state money to complete geologic mapping in Idaho. In 2010 the Idaho Survey again ranked highest in the nation with the largest funding award of all STATEMAP proposals. During the year Survey geologists worked in project areas throughout the state and mapped eleven 7.5’ quadrangles.
Highlights

Current Geologic Mapping Projects 2010

General Project Corridors for Long-Range Planning

New Mapping 2010

Completed and In-Progress Projects

STATEMAP, EDMAP, and other partners: 1992-2009

Western Project Corridor

Central Project Corridor

Eastern Project Corridor
Idaho Geological Mapping Advisory Committee
2010

David P. Jackson – Chairman
Idaho Bureau of Homeland Security

Gail Ewart
Geospatial Information Officer
Idaho Department of Administration Geospatial Office

Tom Frost
U.S. Geological Survey Minerals Program

Paul Gessler
Geospatial Laboratory for Environmental Research, University of Idaho
IdahoView / America View Program

Nancy Glenn
Boise Center Aerospace Laboratory
Idaho State University

Jerome Mapp
Idaho Planning Association

Keith Nottingham
Idaho Transportation Department

Paul Pedone
Natural Resource Conservation
NRCS State Geologist, Oregon and Idaho

Kenneth C. Reid, PhD.
State Archaeologist and Deputy SHPO Preservation Office
Idaho State Historic Office

John Tracy
Idaho Water Resources Research Institute

Scott Van Hoff
U. S. Geological Survey Geospatial Liaison

Sylvie White
TerraPen Geographics
Maps and More
Hydrogeology

The Survey cooperates with state and federal agencies, other university programs, and water-users throughout Idaho in research, monitoring and management activities relating to the state’s ground-water resources. Research and monitoring activities include analysis and modeling of aquifer hydrogeology, ground-water levels, and ground-water contamination. Management-related activities include assessing the impact of septic sewage disposal on ground water, the water-bearing potential of areas slated for development, the geologic aspects of water supply problems, and communicating research and monitoring results to state and local governments, regulatory authorities, city and county planners, and to private and public interests seeking information about ground water management issues.

Researchers are utilizing hydrogeologic information contained in the Idaho Department of Water Resources’ (IDWR) Well Construction Database to better understand the subsurface geologic and hydrologic characteristics of the eastern and western Snake River Plain and other areas. This information, together with surface geologic mapping and historical hydrologic data, is used to develop subsurface models of an aquifer and its response to short- and long-term stresses that affect water supply. Geographic Information Systems (GIS) technology and spatial statistical analysis are being used to integrate information on water levels derived from IDWR’s network of water-level monitoring wells and the water levels recorded in drillers logs to extract information about aquifer characteristics beyond what is possible using only data from the monitoring network.

Contamination of Idaho’s ground water by nitrate and other compounds derived from septic leachate is one of the most pervasive water-quality management problems in the state. The Survey cooperates with Idaho’s Department of Environmental Quality (IDEQ) on a number of fronts related to water quality, including: a
GIS screening tool to assess the risk that septic sewage disposal poses to ground-water quality; the use of spatial statistical techniques to map changes in water quality and delineate Nitrate Priority Areas (NPAs) in a statistically defensible manner; developing spatio-temporal models of changing nitrate levels in NPAs; and providing technical input to IDEQ via the state’s Ground-Water Monitoring Technical Committee. The Survey is currently involved in a special working subgroup to reassess the design of the state’s water-quality monitoring network, possibly using spatio-temporal optimization of existing water-quality data to maximize the cost/benefit return on the state’s future network expenditures.

Digital Geologic Maps

The Survey’s digital mapping and GIS laboratory provides services that include digital cartography, spatial data management, database management and design, network system administration, graphic design and desk-top publishing, and Web-site support. The lab continues to compile geology from around the state in a geologic map database in addition to producing geologic maps. Thirty-five geologic maps were published this year. All are available as print-on-demand color maps and can be viewed free on the Web site.

The statewide geologic map database is now available for download on the State Clearing House for Geospatial Data as an ESRI Geodatabase. This GIS database supplies map analysts with the best available geologic map data while helping the Survey to manage the data better and implement software updates and migration. The ESRI Geodatabase format lends itself to future interactive online delivery.

Databases and Archives

The Survey stores and maintains several databases. Many of these data portray spatial information and include additional data tables all stored in relational databases. Interactive data available
on the Survey’s Web site include sets of information on earthquake epicenters, mines and prospects, and geologic faults. Mines and prospects data are available for download. The IGS archives were inventoried for the National Geological and Geophysical Data Preservation Program in FY08 and in FY09 precise location information was obtained for over 2,600 mines and prospects within the IGS Mineral Property File collection. In FY10 the emphasis was on archiving mine maps and creating a digital index of the statewide oil and gas well log collection that was obtained in June, 2009. Recent geothermal and oil and gas exploration in Idaho has increased the number of requests for these logs.

**Geologic Hazards**

Idaho is susceptible to significant hazards from earthquakes. The Survey works to support hazard mitigation in several ways. Public awareness is addressed through website information and direct contact by e-mail, telephone, and occasional public lectures. Landslide hazards are documented in geological mapping conducted through the STATEMAP program. The IGS collaborates with the Yellowstone Volcano Observatory in monitoring volcanism and preparing hazard response in the Yellowstone Plateau area. In 2009, the IGS also collaborated with the U.S. Geological Survey by assisting with the installation of a new seismic monitoring station near McCall. This station will improve monitoring in a region of Idaho notable for earthquake swarms.

In FY10, the Survey conducted earthquake hazard mitigation activities with funding from the Idaho Bureau of Homeland Security (IBHS). These activities consisted of the following:

- Preparation of digital National Earthquake Hazard Reduction Program soil class and liquefaction susceptibility maps at scale 1:24,000 of the Idaho Falls-Rexburg area. These maps will assist engineers and planners design shaking-resistant communities.
• Preparation of *Putting Down Roots in Earthquake Country: Your Handbook to Idaho Earthquakes*. Over 170,000 copies of this handbook were released as a supplement in weekend newspapers in Boise, Twin Falls, Idaho Falls, and Pocatello. Additional copies have been distributed to teachers and emergency management officials in northern Idaho.

• Participation in meetings of the Idaho Seismic Advisory Committee. This committee advises IBHS on issues related to earthquake hazards and risk reduction strategies.

• Participation in revision of the earthquake chapter of the Idaho State Hazard Mitigation Plan (SHMP). Updating the SHMP qualifies Idaho for all available federal assistance in the event of disasters. It provides a framework to save lives and reduce vulnerability to natural and man-made hazards.

• Presentation of public lectures on earthquake scenarios and research activities for the Idaho Seismic Advisory Committee Earthquake Hazard Listening Sessions in Meridian and Idaho Falls. The sessions were designed to raise public awareness of regional earthquake hazards.

**Mines and Mining**

**Active Mining**

While Idaho’s mining industry did suffer in the recession that started in late 2008, many commodity prices, especially precious and base metal prices, were recovering nicely by mid-2009. Consequently, employment and profits were looking up by late 2009 for metal miners. Construction-related materials and industrial mineral operations were still suffering however.
Production data collected by the U.S. Geological Survey show that in 2008, Idaho’s non-fuel mineral production value topped $1 billion. This is the first time the value has reached the billion dollar mark for Idaho, though final precise figures are not out yet. Molybdenum was the leading contributor to the value.

Major mining-related developments in 2009 include the rebound in silver and base metal prices which favored operations at silver mines in the Coeur d’Alene District, resource increases and potential future expansions at the Lucky Friday and Thompson Creek mines, start of mining on new panels at Smoky Canyon phosphate mine, approval of the Environmental Impact Statement (EIS) and other permits needed for the Idaho Cobalt mine in Lemhi County, and release of the Draft EIS for the Blackfoot Bridge phosphate mine. While financing difficulties stymied projects of some junior mining companies, there were still several large projects underway and spending money. Major ones included Azteca Gold’s Two Mile deep drilling near Osburn, New Jersey Mining’s Toboggan joint venture at Murray, the Crescent mine re-opening announced by SNS, the Golden Meadows project near Stibnite, and Mosquito Consolidated’s drilling on the Cumo prospect in Boise County.

During the year requests for minerals information and mine files and reports dramatically increased as a result of the boom in exploration activity. Requests for geologic information related to energy exploration including uranium, geothermal, and oil and gas resources also increased.

**Mining Histories**

The Survey continues with its popular — and award-winning — series of mine history reports, which combine published references with unpublished materials from its mineral property files. *A History of the Viola Mine in Lemhi County* was published during the year.
Outreach

The Survey disseminates geologic and mineral data on Idaho primarily through its publications, Web site, in-house collections, and efforts by the staff in educating the public in the earth sciences.

Publications

### Publication Sales

- **IGS Maps**: 8%
- **IGS Books**: 21%
- **USGS Topographic Maps**: 46%
- **Other Maps**: 6%
- **Miscellaneous**: 18%

The Web Site—www.idahogeology.org

The Web site provides customers electronic access to its publications and data. Over 97% of IGS publications are now available free for download in PDF format. Finding information on the Web site has been simplified. Publications can be located via search engines on the site. Geologic data are available there as well, including GIS geologic map data sets and geochemical analyses. Information about Idaho mines and prospects can be found quickly and data downloaded easily using another search tool. In FY 2010, 493,582 users visited the Survey website for information and downloaded 205,519 products.
Mine Safety Training

The U.S. Department of Labor’s Mine Safety and Health Administration distributes federal grants to 49 states and the Navajo Nation. Grant funds are used to support health and safety training courses and programs designed to reduce mining accidents, injuries, and illnesses.

The University of Idaho, Idaho Geological Survey remains committed to providing expert health and safety training and retraining that meets the requirements for 30 CFR parts 46 and 48 New Miner Training and Annual Refresher Training, and part 49 Mine Rescue Training. In addition, the Survey offers MSHA approved classes on such varied subjects as fall protections, powered haulage, accident prevention, electrical hazards, silicosis prevention, respiratory protection, prevention of hearing loss, substance abuse, hand and forearm safety, Miners rights and responsibilities, water hazards, job safety analysis, mine gases, and hazard communications. Training is conducted on-site whenever feasible and is designed to be as site specific as possible. Before training begins the instructor conducts an inspection of the property with the mine manager or safety supervisor. The program is then adapted to address their findings. Mine Rescue Training consists of actual mock rescues underground, the use of hands-on training, classroom instruction and mine rescue competitions. Surface mine rescue training includes rope rescue training, confined space rescue training, knowledge and control of hazardous materials (HAZMAT). All training includes first aid. During FY 2010 this program trained and certified 1715 miners and industry supervisors in the state and region.

Earth Science Education

In FY2010, the Survey advanced its commitment to earth science education through a summer field workshop for Idaho’s educators, an exhibit at the annual Idaho Science Teachers Asso-
ciation (ISTA) meeting, and a two-day field trip for the Annual Meeting of the Pacific Northwest Section of the National Association of Geoscience Teachers.

The Idaho Earth Science Educator Summer Field Workshop was held July 13-18, 2009 in the Hagerman/Glenns Ferry Area, Idaho. Major funding for the workshop was provided by the Idaho Geological Survey. The focus was on volcanism of the Snake River Plain, Lake Idaho, and the Bonneville Flood. Eight K-12 educators from around the state attended the workshop, which was instructed by IGS staff. The educators examined lava flows of various ages, landslides, lava dammed lake deposits, and flood deposits. Participants spent a day with the U.S. National Park Service at Hagerman Fossil Beds National Monument. The workshop concluded with individual teacher projects designed to transform workshop material into activities suitable for use in real classrooms.

On October 1-2, 2009, the Survey exhibited a display on Idaho natural hazards and geology at the annual ISTA meeting in Boise. The meeting was attended by teachers from across the state. The Survey distributed Earth Science Education Week packets to teachers at the meeting. American Geological Institute hosts Earth Science Week in cooperation with sponsors as a service to the public and the geoscience community. Each year, local groups, educators, and interested individuals organize celebratory events. Earth Science Week offers opportunities to discover the earth sciences and engage in responsible stewardship of the earth. The program is supported by the United States Geological Survey, National Aeronautics and Space Administration, the National Park Service, the American Association of Petroleum Geologists Foundation, United States Department of Energy, ExxonMobil, Environmental Systems Research Institute, and other geoscience groups.

Due to funding cuts the Idaho Geological Survey’s 2010 field workshop for teachers was incorporated into a two-day field trip at
the National Association of Geoscience Teachers conference at College of Southern Idaho in Twin Falls. The National Association of Geoscience Teachers is an organization interested in promoting excellence in geoscience education at the K-12 and higher education levels. The two-day trip was entitled: Effects of Volcanism and the Bonneville Flood in the Central Snake River Plain.
Organization and Personnel

Organization Chart

Appropriated positions in bold
Non-appropriated positions in italics

FY10 - June

Governor
State Board of Education
President, University of Idaho
Vice President for Research and Economic Development
Directors, Idaho Geological Survey
State Geologist
Research Geologists
Moscow 1.66, Pocatello 0.92
Associate Research Geologists
Moscow 0.92, Boise 0.92
Assistant Research Geologist
Moscow 0.92
Senior Geologist
Moscow 0.58
Research Geologists
Moscow
Senior Geologists
Moscow
Research Support Scientist
Temporary Geologists
Geologic Research Assistant

Publications Manager (0.92)
Office Assistant/Sales

Research Geologists
(Moscow 1.66, Pocatello 0.92)
Associate Research Geologists
(Moscow 0.92, Boise 0.92)
Assistant Research Geologist
(Moscow 0.92)
Senior Geologist
(Moscow 0.58)
Research Geologists
(Moscow)
Senior Geologists
(Moscow)
Research Support Scientist
Temporary Geologists
Geologic Research Assistant

Idaho Mine Safety Training Program
Mine Safety Specialist

Financial Technician (1.0)

Idaho Geological Survey Advisory Board

Digital Mapping, Database, and Web-site Manager (0.92)
Cartographer: Map Design and Production
Temporary Cartography and GIS Assistant

Idaho Geological Survey
Directory

Moscow office
Morrill Hall, Third Floor
University of Idaho
PO Box 443014
Moscow, ID 83844-3014
208-885-7991   Fax 208-885-5826

Boise satellite
Idaho Water Center, Suite 201
322 E. Front Street
Boise, ID 83702-7359
208-332-4420   Fax 208-332-4400

Pocatello satellite
Physical Science, Room 201B
Idaho State University
MS 8071
Pocatello, ID 83209-8071
208-282-4254   Fax 208-282-4414

Administrative and Support Staff
Roy M. Breckenridge ……………………………………………………………………………………… Director and State Geologist
Kurt L. Othberg .......................................................... Director
Roger C. Stewart ........................................................... Manager, Publications and Communications
Tracy Kanikkeberg ......................................................... Financial Technician
Sherry E. Pixley .............................................................. Office Assistant/Sales

Research, Full Time
Roy M. Breckenridge ........................................................... Full Research Geologist
Jane S. Freed ........................................................... Cartographer
Collette Gantenbein ......................................................... Cartographer/GIS Assistant
Dean L. Garwood ........................................................... Senior Geologist
Virginia S. Gillerman ....................................................... Associate Research Geologist, Boise
John D. Kauffman ........................................................... Senior Geologist
Reed S. Lewis ........................................................... Research Support Scientist
Victoria E. Mitchell ....................................................... Full Research Geologist
Kurt L. Othberg ........................................................... Assistant Research Geologist
William M. Phillips ....................................................... Manager, Digital Map and GIS Lab
Loudon R. Stanford ....................................................... Mine Safety Specialist, C.M.S.P.
Michael J. Weaver ........................................................... Full Research Geologist, Pocatello
John A. Welhan ........................................................... Full Research Geologist, Pocatello

Research and Support, Part-Time
Russell F. Burmester ....................................................... Geologist
James R. Cash ........................................................... Earth Science Instructor
Don J. Derrick ........................................................... Work Study
Glenn F. Embree ........................................................... Geologist
Richard M. Gaschnig ........................................................... Geologist
Kelly A. Hugo ........................................................... Work Study
Becky Kolb ........................................................... Work Study
Teresa A. Kusic ........................................................... Work Study, Non-lab Research
Mark D. McFadden ....................................................... Work Study
Sherry E. Pixley ........................................................... Non-lab Research
Keegan L. Schmidt ........................................................... Geologist
David E. Stewart ........................................................... Geologist
Christopher Tate ........................................................... Work Study
Idaho Geological Survey
Advisory Board

George Bacon
Director, Idaho Department of Lands

Mickey Gunter
Chair, Department of Geological Sciences, University of Idaho

David Hawk
Representing Office of the Governor

David Rodgers
Chair, Department of Geological Sciences, Idaho State University

David Jackson
Idaho Bureau of Homeland Security

Jack Lyman
Executive Director, Idaho Mining Association

David Wilkins
Chair, Department of Geosciences, Boise State University

Ex Officio Members
Roy Breckenridge
Director and State Geologist, Idaho Geological Survey

Kurt Othberg
Director, Idaho Geological Survey

Karl Languirand
Idaho Association of Professional Geologists
PUBLICATIONS AND ACTIVITIES

Publications


Major Oxide and Trace Element Analyses for Igneous Rock Samples From South-Central Idaho, by Reed S. Lewis and Thor H. Kiilsgaard: Idaho Geological Survey Digital Analytical Data 6, 2009.


Abstracts


Crustal Growth and Recycling and Links to Tectonism in the Idaho Batholith and Challis Intrusive Province, by Richard Gaschnig,


Reports


Geologic Map of the Meadow Creek Quadrangle, Boundary County, Idaho, by Russell F. Burmester, Roy M. Breckenridge, Mark D. McFadden, and Reed S. Lewis: Idaho Geological Survey report to the U.S. Geological Survey for STATEMAP, scale 1:24,000, April.

Geologic Map of the Moyie Springs Quadrangle, Boundary County, Idaho, by Russell F. Burmester, Roy M. Breckenridge, Mark D.
McFadden, and Reed S. Lewis: Idaho Geological Survey report to the U.S. Geological Survey for STATEMAP, scale 1:24,000, April.


Geologic Map of the Twentymile Creek Quadrangle, Boundary County, Idaho, by Russell F. Burmeister, Roy M. Breckenridge, Reed S. Lewis, and Mark D. McFadden: Idaho Geological Survey report to the Idaho Department of Lands, scale 1:24,000, August.


Ice Age Floods Field Trip—Lake Pend Oreille and the Hoodoo Valley to Priest River, Idaho, by Roy M. Breckenridge: Coeur du Luge Chapter—Heart of the Floods, Ice Age Floods Institute, 10 p., July.


Liquefaction Susceptibility Map for the Goshen Quadrangle, Bingham and Bonneville Counties, Idaho, by William M. Phillips, John A.


Presentations


Blackfoot Volcanic Field Neotectonic Features and Sampling Strategies, by John A. Welhan: ISU field trip, April.

Denudation Rate Chronologies and the Topographic Development of the San Bernardino Mountains, California, by Steve Binnie and William M. Phillips: Key Concepts in Geomorphology Vignette Workshop, Portland, Oregon, October.

Effects of Volcanism and the Bonneville Flood in the central Snake River Plain near Twin Falls and Hagerman, Idaho, by Kurt L. Othberg and Dean L. Garwood: Annual Meeting of the Pacific Northwest Section of the National Association of Geoscience Teachers, Twin Falls, Idaho, June.


Geologic and Mining History of Latah County, by Reed S. Lewis: Potlatch Public Library, Potlatch, April.


Geologic Setting of Coeur d’Alene, by Roy M. Breckenridge: Chamber of Commerce Leadership Project, Coeur d’Alene, September.


Ice Age Floods Research and Mapping in Idaho: Results from STATEMAP, by Roy M. Breckenridge and Dean L. Garwood: Geological Society of America annual meeting, Portland, Oregon, October.

Ice Age Floods Field Trip—Lake Pend Oreille and the Hoodoo Valley to Priest River, Idaho, by Roy M. Breckenridge: Coeur du Luge Chapter—Heart of the Floods, Ice Age Floods Institute, Sandpoint, July.


Idaho Mining, by Virginia S. Gillerman: Idaho Department of Commerce, China trade representative, Boise, August.


Indigenous Nations Institute Strategic Plan and 5-year Budget, by B. Goodwin, D. Anderson, L. Murillo, J.A. Welhan, M. McCurry, and K. Trimmer: presentation to BIA Assistant Secretary Larry EchoHawk, April.

Integration of Water Well Records with Geologic Mapping Along the Snake River, Eastern Idaho, by William M. Phillips and John A. Welhan: Geological Society of America annual meeting, Portland, Oregon, October.

Lake Indian Road—History and Geology Field Trip, by Tom Sandberg, Roy Breckenridge, and Jack Nisbet: Bonner County Historical Society and Idaho Historical Society, David Thompson Bicentennial Commemoration, Sandpoint, September.


New Mine Developments in Idaho: A Tale of Reserves and Environmental Issues, by Virginia S. Gillerman: Geological


Regional Stratigraphic Implications From New Mapping of the Northern Beaverhead Range, Montana and Idaho, by Reed S. Lewis: Geological Society of America annual meeting, Portland, Oregon, October.


Sources of Nitrate Contamination in Ground Water of the American Falls Reservoir Area, by John A. Welhan: Idaho Department of Environmental Quality, Regional Office and Bannock/Power County officials, February.

Sources of Nitrate Contamination in Ground Water of the American Falls Reservoir Area, by John A. Welhan: Idaho State University, Geosciences Colloquium, February.

Tribal Economic Diversification: Developing Geothermal Energy Resources in Southeast Idaho by John A. Welhan: Department of the Interior, Bureau of Indian Affairs Assistant Secretary Larry EchoHawk, February.

What IGS Can Do for Preston-Area Groundwater Protection Efforts, by John A. Welhan and Shannon L. Ansley: Franklin County commissioners and Preston water resources committee, March.

Web Products


**Operational Improvements**

Documentation of mapping lab processes and techniques (L.R. Stanford, J.S. Freed, C. Gantenbein).

Facilitate software multi-seat site license for ISU Geosciences from Mpatek Corp., Denver CO (J.A. Welhan).

Improved IGS on-line source map database (L.R. Stanford, D. Thomas).

New and improved IGS online help: an in-house documentation application (L.R. Stanford, D. Thomas).

Purchased and rehabilitated large-format scanner for geologic mapping capture purposes (L.R. Stanford).
Professional Activities

Advisory board, Advanced National Seismic System, Intermountain West Regional Advisory Council (R.M. Breckenridge).


Advisory board meeting, Idaho Geological Survey, teleconference, Moscow, Boise, and Pocatello, July and November (R.M. Breckenridge).

Affiliate, Center for Advanced Energy Studies (CAES), Idaho National Laboratory (V.S. Gillerman).


Association of American State Geologists, midyear meeting, Portland, Oregon, October (R.M. Breckenridge).

Chair, hiring committee, GIS-specialist position, Idaho Geological Survey, July-September (W.M. Phillips).

Co-developer, Vulcan laboratory exercises to introduce the software into the Idaho State University curriculum, Geol 210, Spring semester, (J.A. Welhan).


Co-leader, field trip, Lake Indian Road history and geology, David Thompson Bicentennial, Bonner County Historical Society, September (R.M. Breckenridge).

Coordinator, Belt Association annual meeting, Spokane, Washington, February (R.S. Lewis).

Coordinator, garnet geochronology field trip with Washington State University professor and graduate student, South Fork Clearwater River, April (R.S. Lewis).


Expert witness, Idaho Department of Water Resources request to participate in public water right hearing (J.A. Welhan).

Field assistant, installation of new U.S. Geological Survey seismic monitoring station, McCall, August (W.M. Phillips).

Field trip, Salmon River suture zone, Geological Society of America, October (R.S. Lewis).

Field trip co-coordinator and co-leader, Blackfoot – Willow Creek volcanic field, SE Idaho, April (J.A. Welhan).

Field trip co-coordinators and co-leaders, National Association of Geoscience Teachers Pacific Northwest Section meeting, Twin Falls, June (D.L. Garwood, K.L. Othberg).

Field trip leader, geology of Lake Pend Oreille and Hoodoo channel, Ice Age Floods Institute, Priest River, July (R.M. Breckenridge).

Field trip leader, mine tours: Cumo, Thompson Creek, Grouse Creek, and Idaho Almaden mines in Idaho; Leeville mine in Nevada, September-November (V.S. Gillerman).

Field trips, basement rocks of the upper North Fork Clearwater River, Washington State University professor graduate students, August and September (R.S. Lewis).

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


Instructor, Geology 405/505, field workshop on natural hazards of Idaho, Department of Geological Sciences, University of Idaho summer session, Glenns Ferry, July (D.L. Garwood).
Instructor, Geoscience 497-002, ore deposits and mining, Department of Geosciences, Boise State University, Fall semester (V.S. Gillerman).

Intermountain Forest Tree Nutrition, cooperative technical assistance committee meeting, Spokane, Washington, July (R.S. Lewis).


Judge, Twenty fifth annual Mine Rescue Contest, Kellogg, May (M. J. Weaver).

Manager, rock-sample crushing facility, Department of Geological Sciences, University of Idaho (W.M. Phillips).

Members, American Geophysical Union (W.M. Phillips, J.A. Welhan).

Member, American Institute of Professional Geologists (R.M. Breckenridge).

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

Member, data capture working group, Association of American State Geologists and U.S. Geological Survey (L.R. Stanford).

Member, financial information group, Office of Business Systems and Accounting Services, University of Idaho (T. Kanikkeberg).

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

Member, geology and geologic hazards Idaho framework layers, Technical Working Group, (L.R. Stanford).

Member, Governor’s Carbon Sequestration Advisory Committee (J.A. Welhan).

Member, Governor’s Geothermal Task Force, Idaho Strategic Energy Alliance, Boise (V.S. Gillerman).

Member, hiring committee, GIS-specialist position, Idaho Geological Survey, September (V.S. Gillerman).
Member, Ice Age Floods Institute (R.M. Breckenridge).

Member, Idaho Ground Water Monitoring Technical Committee (J.A. Welhan).

Member, Idaho State Agencies GIS Stakeholders (L.R. Stanford).

Member, Idaho GIS framework layers, technical working group, geology and geologic hazards (L.R. Stanford).

Member, minerals and policy committee, Association of American State Geologists (R.M. Breckenridge).

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

Member, Society for Mining, Metallurgy, and Exploration, Inc. (V.S. Gillerman).

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

Member, technical committee, Idaho Ground-Water Monitoring (J.A. Welhan).


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, Western States Seismic Policy Council (W.M. Phillips, R.M. Breckenridge).


Organizer, Idaho Earth Science Teachers summer field workshop, Glenns Ferry, July (D.L. Garwood).
Participant, 4-day workshop on Vulcan software basics, Denver, CO.,
August (J.A. Welhan).

Participant, Advanced Banner Training, Department of Human
Resources, University of Idaho (T. Kanikkeberg).

Participant, Association of American State Geologists, Spring Liaison,

Participant, Cayuse Training, Office of Sponsored Programs, University
of Idaho (T. Kanikkeberg).

Participant, Department of Energy Project kickoff meeting on National
Geothermal Data Systems project and peer review sessions on
ARRA-funded geothermal projects, Washington, D.C., May (J.A.
Welhan).

Participant, Earth Science Education Week, hosted by American
Geological Institute, supported by U.S. Geological Survey, NASA,
the National Park Service, the AAPG Foundation, U.S. Department
of Energy, ExxonMobil, ESRI, and other geoscience groups,
October (IGS Staff).

Participant, executive committee, 2010 Idaho State Hazard Mitigation
Plan Revision, Boise, November (W.M. Phillips).

Participant, field trip, IOCG and Porphyry-related Deposits of Western
Nevada, Yerington Area Deposits, Geological Society of Nevada
Fieldtrip, Yerington, Nevada, May (V.S. Gillerman).

Participant, Geological Society of Nevada 2010 Symposium, Great Basin
Evolution and Metallogeny, Reno, Nevada, May (V.S. Gillerman).

Participant, Human Resources: Summer Session EPAF training,
Department of Human Resources, University of Idaho (T.
Kanikkeberg).

Participant, Idaho Environmental Forum meetings, Boise, January and
April (V.S. Gillerman).

Participant, Idaho Science Teachers Association annual meeting,
Boise, Idaho, October (J.R. Cash).

Participant, Intermountain Forest Tree Nutrition Cooperative annual meeting, Moscow, April (R.S. Lewis).

Participant, President’s Leadership Meetings: government outreach, public policy, marketing and branding, University of Idaho (R.M. Breckenridge).

Participant, Rare Earth Sessions, Society for Mining, Metallurgy, and Exploration, Inc. Annual Meeting, Phoenix, Arizona, March (V.S. Gillerman).

Participant, Shaping Sustainable Communities along the Spokane-Coeur d’Alene Corridor - Non point Pollution Control and Human Dynamics, Stakeholders meeting, UI Research Park Post Falls, June, (R.M. Breckenridge).


Participant, short course: Introduction to the Acquisition, Visualization, and Interpretation of Airborne LiDAR-derived Digital Elevation Models, Geological Society of America annual meeting, Portland, Oregon, October. (W.M. Phillips).

Participant, short course: Real Colors of Your Personality, Staff Affairs Professional Development Week, University of Idaho, October (T. Kanikkeberg).


Participant, University of Idaho-Washington State University Spokane-Coeur d’Alene Corridor Signature Research Workshop for stakeholders, Post Falls, March (W.M. Phillips).

Participant, workshop: Vulcan 3-D software basics, Department of Geosciences, Idaho State University (J.A. Welhan).
Registered geologist, Oregon Board of Geologist Examiners (R.M. Breckenridge).

Representative and Disaster Coordinator, Bureau of Homeland Security (BHS) State Agency Emergency Coordinator’s Working Group (V.S. Gillerman).

Representative, Idaho Geological Survey: Governor’s Zero Based Budget bi-weekly agency meetings, UI Moscow, (R.M. Breckenridge).

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

Representative, affiliate faculty and graduate faculty, Department of Geosciences, Idaho State University (J.A. Welhan).

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

Representative, Governor’s carbon sequestration advisory committee (J.A. Welhan).


Reviewer, grant proposals, National Geologic and Geophysical Data Preservation Program, Denver, Colorado, March (R.S. Lewis).

Reviewer, Geology, November (W.M. Phillips).


Reviewer, manuscript for Journal of Contaminant Hydrology (J.A. Welhan).


Senior Personnel, Biophysical Sciences and Modeling group, Spokane-Coeur d’Alene Urban Corridor, Water for Sustainability and Climate
(WSC) Signature Research Area, University of Idaho and Washington State University (R.M. Breckenridge, W.M. Phillips, R.S. Lewis).

Secretary, board of directors, Belt Association (R.S. Lewis).

Supervisor, Becky Kolb, work study student, University of Idaho, January-May (W.M. Phillips).

Supervisor, Rachel Daly, intern (D.L. Garwood).

Supervisor, Ramzi Azzabi, intern (R.S. Lewis).

Technical advisor and planning assistance for the Indigenous Nations Institute’s geothermal research and economic development planning and fund-raising initiatives (J.A. Welhan).

Technical advisor and proposal assistance for geothermal development, Shoshone-Bannock Tribes Energy Development Office (J.A. Welhan).

Technical advisor to Aberdeen-Springfield Canal Company operations manager (J.A. Welhan).

Technical advisor to Bannock County Groundwater Protection Technical Advisory Committee (J.A. Welhan).

Technical advisor to Bannock County Planning and Zoning Department (J.A. Welhan).

Technical advisor to City of Lava Hot Springs (J.A. Welhan).

Technical advisor to Department of Environmental Quality on statistical analysis of ground-water monitoring data (J.A. Welhan).

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

Tobacco Root Geological Society meeting and field trips, Philipsburg, Montana, August (R.S. Lewis).


Training refresher course, Mine Safety and Health Administration, Boise, October (V.S. Gillerman).
Media Interviews


Is There Oil and Gas in the Valley? by Rocky Barker: Idaho Statesman, September 13, 2009 (V.S. Gillerman).


Thesis Committees

Rachel Brewer, M.S., Geology, Washington State University (R.S. Lewis).
Rich Gaschnig, Ph.D., Geology, Washington State University (R.S. Lewis).
Keith Gray, Ph.D., Geology, Washington State University (R.S. Lewis).
Cephas Holder, M.S., Geological Sciences, Idaho State University (J.A. Welhan).
Andrew Jansen, M.S., Geology, Washington State University (R.S. Lewis).
Nick Semenza, M.S., Geological Sciences, Idaho State University (J.A. Welhan).
Will Smith, M.S., Geology, Idaho State University (J.A. Welhan).
Ashley Tefft, M.S., Geology, Washington State University (R.S. Lewis).
Chris Tennant, M.S., Geology, Idaho State University (J.A. Welhan).
Kelly Whitehead, M.S., Geology, Idaho State University (J.A. Welhan).
Grants and Contracts


**Geologic Database**: R.S. Lewis (Idaho Department of Lands, July 2009-June 2010, $6,000).


**Geologic Mapping in the Twentymile Creek 7.5-Minute Quadrangle**: R.S. Lewis (Idaho Department of Lands, August 2008-July 2009, $6,000).

**Geologic Setting and Mapping of East Ada Project Area**: V.S. Gillerman, R.S. Lewis, and J.A. Welhan (Idaho Department of Water Resources, October 2009 – September 2011, $94,000).

**Idaho Department of Lands AML (Abandoned Mine Lands) Assistance**: V.S. Gillerman and R.S. Lewis (Idaho Department of Lands, September 2009-September 2010, $96,567.90).

**Idaho Mine Safety Training Program**: M.J. Weaver (Mine Safety and Health Administration, October 2008-September 2009, $91,146).

**Idaho Mine Safety Training Program**: M.J. Weaver (Mine Safety and Health Administration, October 2009-September 2010, $92,578).

**Mine Site Database**: R.S. Lewis (U.S. Department of Agriculture, U.S. Forest Service, Region 4, June 2003-October 2009, $390,000).


