

Annual Report of the Idaho Geological Survey

Fiscal Year
2011

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INTRODUCTION

The funding and collegial support provided through cooperative projects have long been integral components of the agency's operation. The activities highlighted for the 2011 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

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

Arizona Geological Survey ~ Idaho Bureau of Homeland Security ~ Idaho Department of Environmental Quality ~ Idaho Department of Lands ~ Idaho Department of Water Resources ~ Idaho State University ~ Idaho Transportation Department ~ Incorporated Research Institutions for Seismology ~ J.R. Simplot Co. ~ Midas Gold, Inc. ~ National Park Service ~ National Science Foundation ~ Rocky Mountain Section, American Association of Petroleum Geologists ~ Snake River Section, Society for Mining Metallurgy and Exploration ~ U.S. Bureau of Land Management ~ U.S. Department of Energy ~ U.S. Forest Service ~ U.S. Geological Survey ~ U.S. Mine Safety and Health Training Program ~ Thunder Mountain Gold ~ University of Idaho Research Office ~ Washington State University

Collaborators

Ada County Highway District ~ American Geological Institute ~ Association of American State Geologists ~ Belt Association ~ Brigham Young University-Idaho ~ Boise State University ~

Bonner County Museum ~ City of Boise ~ Cooperative Ecosystem Studies Units ~ Greater Portneuf Water Resource Partnership ~ Ice Age Floods Institute ~ Idaho Concrete and Aggregate Producers Association ~ Idaho Conservation League ~ Idaho Historical Society ~ Idaho Geospatial Council ~ Idaho Mining Association ~ Idaho National Laboratory ~ Idaho Office of Energy Resources ~ Idaho Science Teachers Association ~ Idaho State University ~ Idaho Strategic Energy Alliance ~ Idaho Transportation Department ~ Idaho Water Resources Research Institute ~ Inside Idaho ~ Intermountain Forest Tree Nutrition Cooperative ~ Intermountain Regional Advisory Council, Advanced National Seismic System ~ Latah County Historical Society ~ Latah County Library ~ Lewis-Clark State College ~ Montana Bureau of Mines and Geology ~ National Earthquake Program Managers ~ National Science Foundation, Earthscope Program ~ Natural Resources Conservation Service ~ North Idaho College ~ Northwest Mining Association ~ Oregon Department of Geology and Mineral Industries ~ Pacific Northwest National Laboratory ~ Pocatello Ground Water Task Force ~ Tobacco Root Geological Society ~ U.S. Forest Service ~ U.S. Geological Survey Minerals Program ~ University of Idaho ~ University of Montana ~ University of Utah ~ Utah State University ~ Washington Division of Geology and Earth Resources ~ Washington State University ~ Western States Seismic Policy Council ~ Yellowstone National Park ~ Yellowstone Volcano Observatory

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 he 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

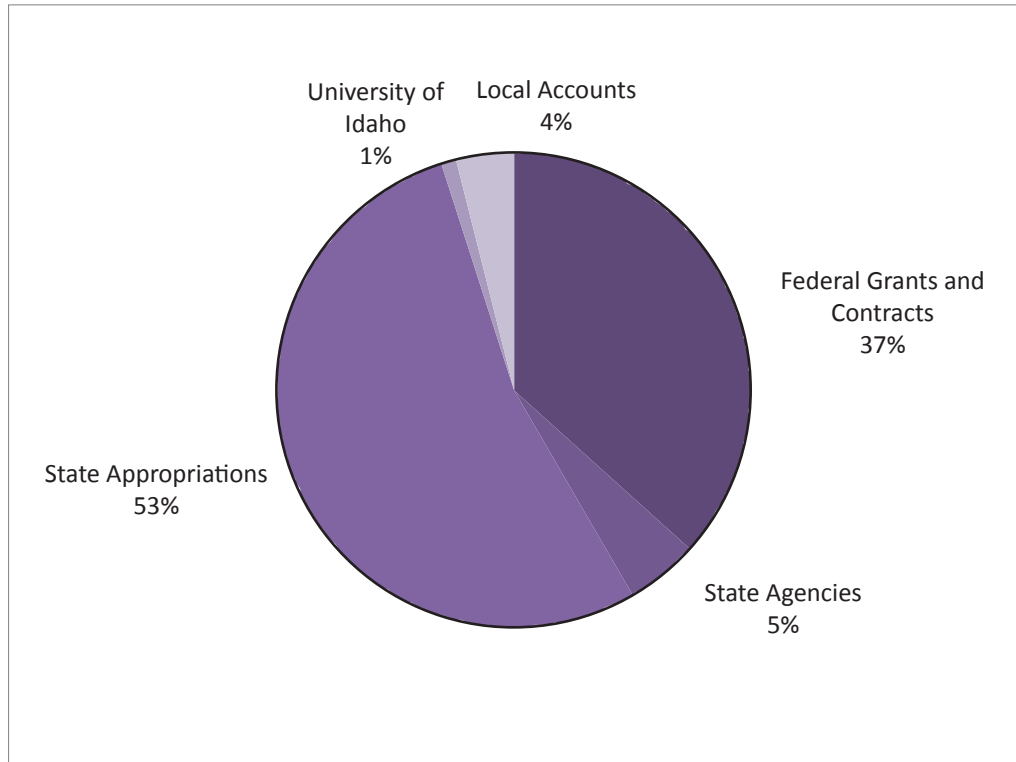
the U.S. Geological Survey's National Cooperative Geologic Mapping Program (NCGMP) as well as research programs for data preservation, minerals, energy resources, and geologic hazards. AASG was successful in receiving an award for a nationwide geothermal database from the U.S. Department of Energy. The 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 FY2011 state appropriation to \$701,100 from the final FY2010 budget of \$710,940. The FY 2012 appropriation has been set at \$671,800. These cuts to the budget base adversely affect the agency's mission in research, public service, and education.

Budget Fiscal Year 2011				
Category	Beginning Balance	Income	Expense	Ending Balance
Personnel		\$ 685,900.00	\$ 685,900.00	\$ 0.00
Operarating Expense		15,200.00	15,200.00	0.00
Capital Outlay		0.00	0.00	0.00
Total Appropriation		701,100.00	701,100.00	0.00
U/I Personnel Funds		13,032.82	13,032.82	0.00
Local Accounts	\$ 83,782.53	65,096.18	51,742.64	\$ 97,136.07
Grants and Contracts		544,803.02	544,803.02	-
Grand Total	\$ 83,782.53	\$1,324,032.02	\$1,310,678.48	\$ 97,136.07

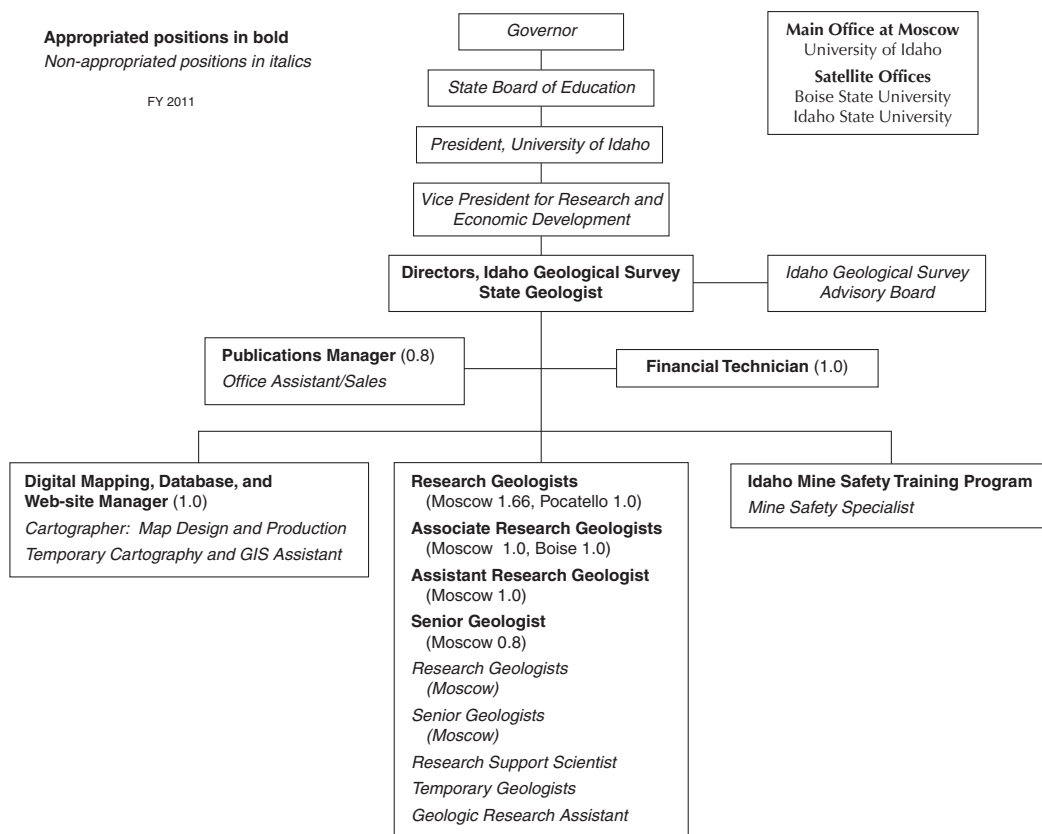
Sources of Funding



ORGANIZATION AND PERSONNEL

Organization Chart

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
Michelle Hughes Office Specialist II, Pocatello
Melissa M. Neiers Financial Technician, Pocatello

Research, Full Time

Roy M. Breckenridge Full Research Geologist
Jane S. Freed Cartographer
Scott R. Furman Mine Safety Training Specialist
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 Associate Research Geologist
Victoria E. Mitchell Research Support Scientist
Kurt L. Othberg Full Research Geologist
William M. Phillips Assistant Research Geologist
Loudon R. Stanford Manager, Digital Map and GIS Lab
Michael J. Weaver Mine Safety Specialist, C.M.S.P.
John A. Welhan Full Research Geologist, Pocatello

Research and Support, Part-Time

Chris A. Blankenship Work Study
Russell F. Burmester Geologist
James R. Cash Earth Science Instructor
Skye W. Cooley Research Support
Rachel G. Daley Research Support
Glenn F. Embree Geologist
Vincent H. Isakson Research Support
Becky A. Kolb Work Study
Mark D. McFadden Geologist
Madison L. Myers Research Support
Sherry E. Pixley Non-lab Research
Keegan L. Schmidt Geologist
Darin M. Schwartz Research Support
Malcolm L. Spannagel Work Study
Cody J. Steven Work Study
David E. Stewart Geologist
Kerrie N. Weppner Research Support

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

Glenn Thackray

Chair, Department of Geological Sciences,
Idaho State University

David Jackson

Idaho Bureau of Homeland Security

Karl Languirand

Idaho Association of Professional Geologists

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

Idaho Geological Mapping Advisory Committee

David P. Jackson – Chairman
Idaho Bureau of Homeland Security

Ted Doughty
PRISEM Geoscience Consulting LLC

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

Seth Grigg
Idaho Association of Counties

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 Russell
Russell Surveying

John Tracy
Idaho Water Resources Research Institute

Scott Van Hoff
U. S. Geological Survey Geospatial Liaison

Sylvie White
TerraPen Geographics
Maps and More

IGS Data Preservation Advisory Committee

Chris Dail
Exploration Geologist
Midas Gold Inc., Spokane, WA

Dave Frank
Outreach Coordinator
U.S. Geological Survey, Spokane Office

Bruce Godfrey
GIS Specialist, Inside Idaho
University of Idaho, Post Falls, ID

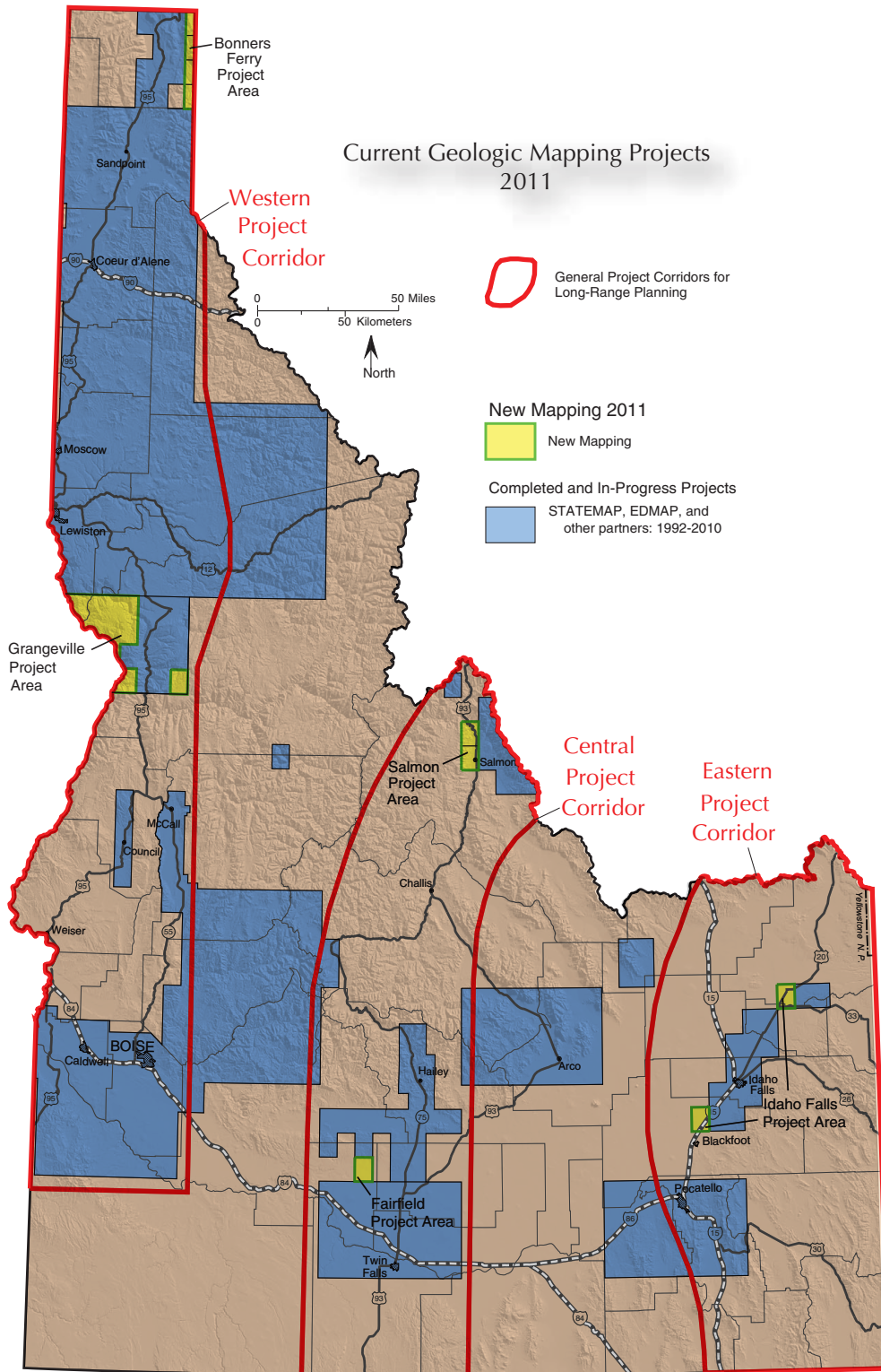
Garth Reese
Head of Special Collections
University of Idaho Library

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 2011, the Idaho Survey was again in the top several in the nation among all STATEMAP proposals. During the year, Survey geologists worked in project areas throughout the state and mapped ten 7.5' quadrangles under the STATEMAP Program. An additional 7.5' quadrangle was mapped



with U.S. Forest Service funding and parts of six 7.5' quadrangles were mapped with Idaho Department of Water Resources funding.

Hydrogeology

Cooperation and collaboration have been a hallmark of the Survey's interaction with other groundwater interests in Idaho, including state and federal water resource and environmental groups, university researchers, and water users throughout Idaho. Research activities include analysis and modeling of aquifer hydrogeology, groundwater levels, and groundwater contamination; activities related to resource management include assessing the impact of surface-derived contaminants on groundwater, evaluating the water-bearing potential of proposed developments and the hydrogeology of water supplies, and activities related to education and outreach. One of the Survey's key roles in this regard is communicating its research and monitoring results to state and local governments, regulatory authorities, city and county planners, and to private and public interests seeking information about groundwater issues, as well as actively participating in graduate teaching and research.

Contamination of groundwater by nitrate and other compounds derived from septic leachate is one of the most pervasive water-quality management problems in the state. The Survey cooperated 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 groundwater quality; the use of spatial statistical techniques to delineate Nitrate Priority Areas in a statistically defensible manner; and providing technical input to IDEQ via the state's Groundwater Monitoring Technical Committee. At a local level, the Survey played a major role in a technical advisory committee established by Bannock County to identify areas that are vulnerable to septic-

derived contamination of groundwater and to assist the County's citizens' advisory committee to propose protective overlays for various districts based on hydrogeology, septic density, and existing septic-derived contamination.

The Survey worked with the Idaho Department of Water Resources to integrate hydrogeologic information contained in IDWR's Well Construction Database with new geologic mapping to better understand the subsurface geologic and hydrologic characteristics of the western Snake River Plain. This information, together with hydrologic monitoring data, was used to develop a conceptual model of the aquifer and its suitability as a water supply for future development. Staff work continued on the East Ada project, funded by IDWR to map the geology and characterize the hydrogeology of the Mayfield area in east Ada County.

The results of state-funded basic research that the Survey performed six years ago were put to practical use in FY2011. The Survey's work on spatial statistical analysis of water quality data enabled IDWR, IDEQ, and the U.S. Geological Survey to modify the Statewide Groundwater Monitoring Network sampling plan and thereby reduce costs and increase monitoring efficiency in the Boise-Meridian area. The modified sampling plan was justified on the basis of the Survey's previous work that identified redundancies in the state's annual and rotating 4-year sampling campaigns that could be eliminated at a substantial cost savings without sacrificing critical information about spatial or temporal trends of groundwater contamination.

Geologic Hazards

Idaho is prone to earthquakes, flooding, landslides, and volcanic eruptions. The Survey works to support mitigation of these hazards in several ways. Public awareness is addressed through website information and direct contact by e-mail, telephone, and

occasional public lectures or field trips. Geological mapping conducted through the STATEMAP program provides baseline information on the location, magnitude, and frequency of hazards. This information is incorporated into planning documents and also serves as the basis for more detailed studies, such as mapping of liquefaction susceptibility and earthquake site classes. The Survey collaborates with volcanic and seismic monitoring of Idaho performed by the U.S. Geological Survey, Montana Bureau of Mines and Geology, University of Utah, University of Idaho, and BYU-Idaho. Finally, the Survey provides expert opinion and advice to state and federal agencies involved with Idaho hazard mitigation. In FY11, the Survey performed the following hazard mitigation activities at the request of the Idaho Bureau of Homeland Security:

- Participation in meetings of the Idaho Seismic Advisory Committee. This committee provides expert advice on issues related to earthquake hazards and risk reduction strategies.
- Participation in review and revision of the Idaho State Hazard Mitigation Plan. Updating the State Hazard Mitigation Plan 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.
- Participation in update of the Idaho Emergency Operation Plan, Earthquake Annex. This portion of the plan documents response of first responders to an Idaho earthquake emergency.
- Conducted field trip on Seismic Hazards of the Boise Area for the joint meeting of the National Earthquake Managers and the Western States Seismic Policy Council.

Mines and Mining

Active Mining

It was a very good year for many companies as precious and base metal prices were high, fueling an increase in exploration activity. However, construction-related commodities were still in a slump. A record Idaho production value of \$ 1.066 billion for non-fuel mineral production was achieved in 2008 and reported in the Minerals Yearbook by the Survey in cooperation with the U.S. Geological Survey. Major mining-related developments in 2010 include the very high silver and gold prices, which favored operations and new developments at silver mines in the Coeur d'Alene District and several large exploration projects for gold. Positive developments from 2009 extended into 2010. Developments included resource increases and probable future expansions at Hecla's Lucky Friday mine and the Thompson Creek mine, mining on the 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 the Draft EIS for the Blackfoot Bridge phosphate mine. While financing difficulties stymied projects of some junior mining companies, there were still several large exploration projects underway and spending money. Major projects included Azteca Gold's deep drilling at Two Mile Gulch near Osburn, New Jersey Mining's Toboggan joint venture at Murray, the Crescent mine development by United Mining Group, Premium Exploration's project at Orogrande, Midas Gold's Golden Meadows project at Stibnite, Otis Gold's work at Kilgore, the Atlanta Gold project, and Mosquito Consolidated's drilling of the very large Cumo molybdenum-copper deposit in Boise County. Many smaller projects were also underway. During the year, requests for minerals information and mine files and reports dramatically increased as a result of the boom in exploration activity, particularly with critical minerals and rare earth elements.

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 Clayton Mine and Smelter in Custer County was published during the year. The Survey completed an Abandoned Mine Lands project for the Idaho Department of Lands to investigate the Florida Mountain and Blue Gulch area in Owyhee County.

Energy

Geothermal

The Survey successfully completed the first year of a major three-year Department of Energy-funded subcontract administered by the Arizona Geological Survey (AZGS) to identify, compile, and digitally format relevant geotechnical information within the state that can help stimulate geothermal energy exploration. These data will be cataloged in the new National Geothermal Data System and will be nationally accessible via an on-line browser interface. Work is nearing completion on the digitization of the State's permitted geothermal wells and oil and gas exploration wells, as well as the formatting of IGS's active fault database. Work is also continuing on a statewide map and database of thermal wells and features, a bibliography of Idaho geothermal literature, and a compilation of radioactive (heat-generating) elemental concentrations in volcanic and igneous rocks in the state.

In addition, Idaho is one of a handful of states to have received supplementary funding under the Geothermal Data Program to collect new geothermal data. In this part of the program, the Survey is preparing to drill three or four wells to collect heat flow information in areas of southeast Idaho that have geothermal power generation potential. The Survey, working closely with the Bureau of

Land Management and IDWR, has submitted a Notice of Intent and documentation for NEPA permitting and expects to begin drilling in mid-FY12.

Oil and Gas

The Survey maintains files on more than one hundred fifty oil and gas wells in the state. These files include the reports and logs provided by companies to the Oil and Gas Commission from 1903-1988. Some files contain drilling service reports, geophysical logs, geologic logs, and lease maps. Most are one-of-a-kind documents, and many are in fragile condition.

Information on historical oil and gas exploration wells in Idaho was transferred to the Survey in 2009 from the Idaho Department of Lands. In FY2011, the emphasis was on scanning the historical statewide oil and gas well log collection. Recent geothermal and oil and gas exploration in Idaho has greatly increased the number of requests for these logs and the Survey goal is to make them available on the website.

Carbon Sequestration

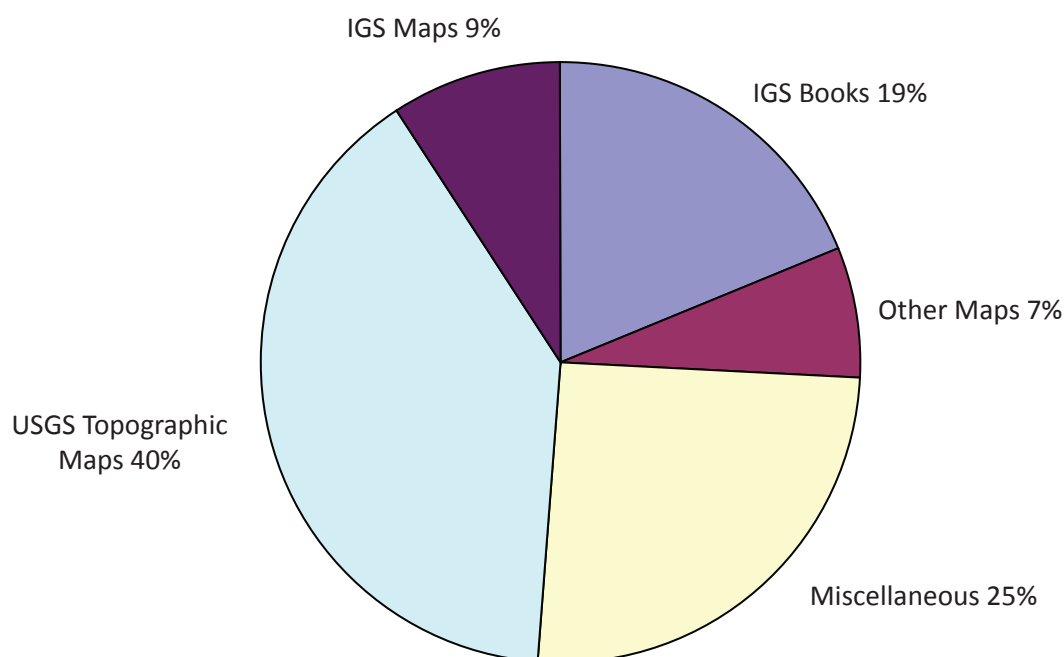
In FY2011, the Survey was awarded a grant to compile geologic data relevant to the U.S. Geological Survey's Carbon Sequestration Assessment Program. Much of the funding was used to supplement other funding sources to help organize, check, and scan oil and gas well files, to compile a list of selected geologic references, and to post the data on the Survey's website. The project was extended several months into FY2012.

OUTREACH

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

Publications

Publication Sales



Website—www.idahogeology.org

The website provides customers electronic access to its publications and data. Over 97 percent of IGS publications are now available free for download in PDF format. Finding information on the website 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. This year IGS added a new Google Maps-driven search tool for finding

and retrieving information about Idaho mines and prospects. In FY 2011, there were 452,000 users that visited the Survey website for information and downloaded 220,000 products. Twenty-seven new publications were posted on the site this year.

The Digital Mapping and GIS Laboratory

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 website support. The lab continues to compile geology from around the state in a geologic map database in addition to producing geologic maps. Fifteen geologic maps were published this year. All are available as print-on-demand maps and can be viewed free on the website.

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 website include sets of information on earthquake epicenters, mines and prospects, oil and gas wells, and geologic faults. The mines and prospects database is available for download. The Survey's archives were inventoried for the National Geological and Geophysical Data Preservation Program in FY 2008. In FY 2011, scans of historic photographs of the Borah Peak earthquake area were completed and records obtained from the Sunshine Mining Company were indexed. A new version of the Mines and Prospects database was also released.

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 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. 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, miner's 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, and knowledge and control of hazardous materials (HAZMAT). All training includes first aid. During FY 2011, the position was vacated and a new mine safety trainer was hired.

Earth Science Education

On October 7-8, 2010, the Survey exhibited a display on Idaho natural hazards and geology at the annual Idaho Science Teachers Association meeting in Lewiston. The meeting was at-

tended by teachers from across the state. The Survey distributed Earth Science Education Week packets to teachers at the meeting. The American Geological Institute hosts Earth Science Education 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 Education Week offers opportunities to discover the earth sciences and engage in responsible stewardship of the earth. The program is supported by the U.S. Geological Survey, National Aeronautics and Space Administration, the National Park Service, the American Association of Petroleum Geologists Foundation, U.S. Department of Energy, ExxonMobil, Environmental Systems Research Institute, and other geoscience groups.

Due to funding cuts, the Survey's field workshop for teachers was not offered in FY 2011.

PUBLICATIONS AND ACTIVITIES

Publications

Annual Report of the Idaho Geological Survey, Fiscal Year 2010,
Idaho Geological Survey Website, 2010.

*Detrital Zircon Analysis of Mesoproterozoic and Neoproterozoic
Metasedimentary Rocks of North-Central Idaho: Implications
for Development of the Belt-Purcell Basin,* by Reed S. Lewis,
Jeffrey D. Vervoort, Russell F. Burmester, and Peter J. Oswald:
Canadian Journal of Earth Sciences, v. 47, p. 1383-1404, 2010.

*Geodatabase of NEHRP Site Class and Liquefaction Susceptibility
Maps for the Idaho Falls - Rexburg Area, Southeast Idaho,*
by William M. Phillips, John A. Welhan, and Roy M. Breckenridge:
Idaho Geological Survey Digital Database 2, 2010.

Geologic Map of the East of Salmon Quadrangle, Lemhi County, Idaho,
by Kurt L. Othberg, Loudon R. Stanford, and Reed S. Lewis: Idaho
Geological Survey Digital Web Map 125, scale 1:24,000, 2010.

Geologic Map of the Fairfield Quadrangle, Camas County, Idaho, by
Kurt L. Othberg and John D. Kauffman: Idaho Geological Survey
Digital Web Map 115, scale 1:24,000, 2010.

Geologic Map of the Firth Quadrangle, Bingham County, Idaho, by
William M. Phillips and John A. Welhan: Idaho Geological Survey
Digital Web Map 123, scale 1:24,000, 2011.

Geologic Map of the Gannett Quadrangle, Blaine County, Idaho, by
Dean L. Garwood, Kurt L. Othberg, and John D. Kauffman: Idaho
Geological Survey Digital Web Map 117, scale 1:24,000, 2010.

*Geologic Map of the Idaho Falls North Quadrangle, Bonneville
County, Idaho,* by William M. Phillips and John A. Welhan: Idaho
Geological Survey Digital Web Map 77, scale 1:24,000, 2011.

Geologic Map of the Indian Valley Quadrangle, Adams County, Idaho, by Dean L. Garwood, Kurt L. Othberg, and John D. Kauffman: Idaho Geological Survey Digital Web Map 121, scale 1:24,000, 2010.

Geologic Map of the McHan Quadrangle, Camas and Gooding Counties, Idaho, by John D. Kauffman, Kurt L. Othberg, and Dean L. Garwood: Idaho Geological Survey Digital Web Map 116, scale 1:24,000, 2010.

Geologic Map of the Meadow Creek Quadrangle, Boundary County, Idaho, by Russell F. Burmester, Roy M. Breckenridge, Mark D. McFaddan, and Reed S. Lewis: Idaho Geological Survey Digital Web Map 120, scale 1:24,000, 2010.

Geologic Map of the Moyie Springs Quadrangle, Boundary County, Idaho, by Russell F. Burmester, Roy M. Breckenridge, Mark D. McFaddan, and Reed S. Lewis: Idaho Geological Survey Digital Web Map 118, scale 1:24,000, 2010.

Geologic Map of the Newdale Quadrangle, Fremont and Madison Counties, Idaho, by Glen F. Embree, William M. Phillips, and John A. Welhan: Idaho Geological Survey Digital Web Map 122, scale 1:24,000, 2011.

Geologic Map of the Ritz Quadrangle, Boundary County, Idaho, by Roy M. Breckenridge, Russell F. Burmester, and Reed S. Lewis: Idaho Geological Survey Digital Web Map 119, scale 1:24,000, 2010.

Historical Oil and Gas Data for Idaho: 1903-1988, by Dean L. Garwood, Reed S. Lewis, Rachel G. Daly, James R. Cash, Sherry E. Pixley, and Roy M. Breckenridge: Idaho Geological Survey Digital Database 3.

History of the Clayton Mine and Smelter, Custer County, Idaho, by Victoria E. Mitchell: Idaho Geological Survey Staff Report 10-8, 48 p., 2010.

History of the Florida Mountain Mines, Owyhee County, Idaho, by Victoria E. Mitchell: Idaho Geological Survey Staff Report 10-7, 60 p., 2010.

Idaho, by Roy M. Breckenridge: FY 2010 report in Association of American State Geologists Journal, 2011.

Near Infrared Spectra of White Mica in the Belt Supergroup and Implications for Metamorphism, by Edward F. Duke and Reed S. Lewis: *American Mineralogist*, v. 95, p. 908-920, 2010.

New Mine Developments in Idaho: A Tale of Reserves and Environmental Issues, by Virginia S. Gillerman, in R. Steininger and B. Pennell, eds., *Great Basin Evolution and Metallogeny: Geological Society of Nevada 2010 Symposium Proceedings*, p. 489-510, 2011.

Protocols for Geologic Hazards Response by the Yellowstone Volcano Observatory, 2010, by the Yellowstone Volcano Observatory (Roy M. Breckenridge, contributor): U.S. Geological Survey Circular 1351, 18 p.

Road Guide to the Columbia River Basalt Group of the Lewiston, Kendrick, Deary, Moscow Area, Idaho, by James R. Cash and Dean L. Garwood: Idaho Geological Survey Staff Report 10-6, 24 p., 2010.

Rare Earth Elements and Other Critical Metals in Idaho, by Virginia S. Gillerman: Idaho Geological Survey GeoNote 44, 4 p., 2011.

The Dating and Interpretation of a Mode 1 Site in the Luangwa Valley, Zambia, by Lawrence Barham, William M. Phillips, Barbara A. Maher, Vassil Karloukovski, Geoff A.T. Duller, Mayank Jain, and Ann G. Wintle: *Journal of Human Evolution*, v. 60, no. 5, p. 523-672, 2011.

The Mineral Industry of Idaho, 2007, by Virginia S. Gillerman and USGS: U.S. Geological Survey Minerals Yearbook, v. 2, p. 14.0-14.6, 2010.

Weiser Basin Evaluation, by John G. Bond, John D. Kauffman, Bill C. Rember, and Donna J. Shiveler: Idaho Geological Survey Technical Report 11-1, 36 p., 3 plates, appendices, 2011.

Well Logs for the Union Oil UNST-7 and UNST-8 Geothermal Test Wells, Newdale 7.5-Minute Quadrangle, Idaho, by William M. Phillips: Idaho Geological Survey Staff Report 10-9, 10 p., 2010.

Abstracts

A New Geologic Map of Idaho, by Reed S. Lewis, Paul K. Link, Loudon R. Stanford, and Sean P. Long: Geological Society of America Abstracts with Programs, v. 43, no. 4, p. 84, 2010.

Cambrian and Mississippian Magmatism Associated with Neodymium-enriched Rare Earth and Thorium Mineralization, Lemhi Pass District, Idaho, by Virginia S. Gillerman, M.D. Schmitz, M.J. Jercinovic, and R. Reed: Geological Society of America Abstracts with Program, v. 42:5, p. 334, 2010.

Large-scale Rheomorphic Structures and Basalt Stratigraphy of the Newdale and Linderman Dam 7.5-Minute Quadrangles, Eastern Snake River Plain, Idaho, by Glenn F. Embree, William M. Phillips, Dan K. Moore, Benjamin R. Jordan, and J. W. Geissman: Geological Society of America Abstracts with Programs, v. 43, no. 4, p. 64, 2011.

NEHRP Site Class and Liquefaction Susceptibility Maps Derived from STATEMAP Geologic Mapping, Idaho Falls-Rexburg Area, Eastern Snake River Plain, Idaho, by William M. Phillips and John A. Welhan: Geological Society of America Abstracts with Programs, v. 42, no. 5, p. 280, 2010.

New Cosmogenic ^{10}Be Surface Exposure Ages for the Purcell Trench Lobe of the Cordilleran Ice Sheet in Idaho, by Roy M. Breckenridge and William M. Phillips: Geological Society of America Abstracts with Programs, v. 42, no. 5, p. 309, 2010.

The Beaverhead Divide Fault on the Idaho-Montana Border—Cretaceous Contraction, Eocene Extension, But Not a Terrane Boundary, by Russ Burmester, Jeffrey D. Lonn, Reed S. Lewis, and Mark D. McFadden: Geological Society of America Abstracts with Programs, v. 43, no. 4, p. 50, 2011.

Reports

Abandoned Mine Land (AML) Reports on Florida Mountain and Blue Gulch areas, Owyhee County, Idaho, by Virginia S. Gillerman: Idaho

Geological Survey project report to Idaho Department of Lands, AML contract, 14 p., January.

Archiving 1933 Aerial Photographs of Idaho, Washington, and Montana from the 116th Observation Squadron of the Washington Air National Guard, by Rachel G. Daly, Dean L. Garwood, and Roy M. Breckenridge: Idaho Geological Survey report to U.S. Forest Service, electronic files, July.

Final Technical Report, U.S. Geological Survey FY 2009 Data Preservation Program, by Reed S. Lewis: Idaho Geological Survey report to the U.S. Geological Survey for Data Preservation Program, 3 p. and 2 electronic files, September.

Geologic Map of the Badger Spring Gulch Quadrangle, Lemhi County, Idaho, by Russell F. Burmester, Reed S. Lewis, Kurt L. Othberg, Jeffrey D. Lonn, Loudon R. Stanford, and Mark D. McFadden: Idaho Geological Survey report to the U.S. Geological Survey for STATEMAP, scale 1:24,000, April.

Geologic Map of the Baker Quadrangle, Lemhi County, Idaho, and Beaverhead County, Montana, by Kurt L. Othberg, Reed S. Lewis, Loudon R. Stanford, Russell F. Burmester, and Mark D. McFadden: Idaho Geological Survey report to the U.S. Geological Survey for STATEMAP, scale 1:24,000, April.

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

Geologic Map of the Corral Quadrangle, Camas County, Idaho, by John D. Kauffman and Kurt L. Othberg: Idaho Geological Survey report to the U.S. Geological Survey for STATEMAP, scale 1:24,000, April.

Geologic Map of the Dairy Mountain Quadrangle, Idaho County, Idaho, by John D. Kauffman, Reed S. Lewis, Keegan L. Schmidt, David E. Stewart, Dean L. Garwood, and Kurt L. Othberg: Idaho Geological Survey report to the U.S. Geological Survey for STATEMAP, scale 1:24,000, April.

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

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

Geologic Map of the John Day Mountain Quadrangle, Idaho County, Idaho, by Reed S. Lewis, Keegan L. Schmidt, David E. Stewart, Kurt L. Othberg, John D. Kauffman, and Eric D. Stewart: Idaho Geological Survey report to the U.S. Geological Survey for STATEMAP, scale 1:24,000, April.

Geologic Map of the Linderman Dam Quadrangle, Fremont, Madison, and Teton Counties, Idaho, by Glenn F. Embree and William M. Phillips: Idaho Geological Survey report to the U.S. Geological Survey for STATEMAP, scale 1:24,000, April.

Geologic Map of the Picabo Quadrangle, Blaine County, Idaho, by Dean L. Garwood, John D. Kauffman, and Kurt L. Othberg: Idaho Geological Survey report to the U.S. Geological Survey for STATEMAP, scale 1:24,000, April.

Geothermal Systems As A Renewable Energy Resource: Project Partnerships as a Development, Financing and Operating Strategy, by T. MacDonald, John A. Welhan, and M. McCurry: LotusPS white paper, 70 p., August.

Idaho Geological Survey, Performance Indicators, FY 2010, by Roy M. Breckenridge and Kurt L. Othberg: Idaho Geological Survey report to Idaho State Board of Education and Idaho Division of Financial Management, August.

Idaho Geological Survey, Strategic Plan 2012-2016, by Roy M. Breckenridge: Idaho Geological Survey report to Idaho State Board of Education and Idaho Division of Financial Management, March.

Inventory of Idaho Department of Lands AML Information, by Virginia S. Gillerman: Idaho Geological Survey spreadsheet, deliverable for Idaho Department of Lands Abandoned Mine Lands (AML) contract, March.

Presentations

An Objective Methodology for Assessing Relative Septic Contamination Risk: A case study, by John A. Welhan: Ground Water Monitoring Technical Committee, Pocatello, November.

Applicability Of S-T Structure to Network Sampling Design, by John A. Welhan: presentation to Ground Water Monitoring Technical Committee working group, Boise, December.

Cambrian and Mississippian Magmatism Associated with Neodymium-Enriched Rare Earth and Thorium Mineralization, Lemhi Pass District, Idaho, by Virginia S. Gillerman: Geological Society of America Annual Meeting, Denver, Colorado, November.

Emerging Standards for Database Design and Data Exchange - What is Appropriate for Your Agency and the Public?: A Discussion Session, led by Loudon R. Stanford: Digital Mapping Techniques 2011, Williamsburg, Virginia, May.

Geologic Setting and Development Strategies for a Fault-Bounded Geothermal Reservoir, by John A. Welhan: technical presentation to industry representatives, Pocatello, September 17.

Geology Along U.S. 95- Coeur d'Alene to Sandpoint, by Roy M. Breckenridge: North Idaho Legislative Tour, Coeur d'Alene, November.

Geology and Geologic Hazards Framework Layers: an Update, by Loudon R. Stanford: Idaho Geospatial Forum, Boise, October.

Geology Iphone App: a Case Study in "Great Idea—Bad Use of Data", by Loudon R. Stanford: Idaho Geospatial Council Executive Committee meeting, Boise, June.

Geology of the Coeur d'Alene Area, by Roy M. Breckenridge, Coeur d'Alene Chamber of Commerce Leadership Coeur d'Alene, September.

Geothermal Setting and Development Possibilities for the Stanley Area, by John A. Welhan: Mayor and council representatives, Stanley, June.

GIS-based Screening for Septic-based Development: An Objective Methodology for Assessing Relative Risk of Ground water Contamination, by John A. Welhan: presentation at GIS-Day Discovering the World Through GIS, Pocatello, November.

Idaho Mining and Exploration 2010, by Virginia S. Gillerman: Snake River Section Society of Mining Engineers (SME), Pocatello, April.

In Search of the Megashear: Proterozoic Structure and Stratigraphy of the Beaverhead Range, Idaho and Montana, by Reed S. Lewis: University of Montana Geology Department Seminar, Missoula, Montana, April.

Molybdenum Deposits and Idaho: a Condensed Overview, by Virginia S. Gillerman: Idaho Environmental Forum Panel, Boise, August.

New Cosmogenic ^{10}Be Surface Exposure Ages for the Purcell Trench Lobe of the Cordilleran Ice Sheet in Idaho, by Roy M. Breckenridge and William M. Phillips: Geological Society of America Annual Meeting, Denver, Colorado, November.

The 1917 Enigma: Why Was It Such A Good Year For The Coeur d'Alene District?, by Victoria E. Mitchell: Northwest Mining Association Annual Meeting, Spokane, Washington, December.

Update on Mapping Projects in the Belt Supergroup, by Reed S. Lewis: Belt Association Annual Meeting, Spokane, Washington, December.

Web Products

Idaho Geological Survey Mines and Prospects Search Tool, by Loudon R. Stanford and Dustin Thomas: Idaho Geological Survey web page, Google Maps-based search engine.

Idaho Oil and Gas, by Dean L. Garwood: Idaho Geological Survey web page, update.

Operational Improvements

Geologic map-publication tracking database: an in-house productivity application (Loudon R. Stanford).

Updates to Mines and Prospects Database and online search capability (Digital Mapping and GIS Lab staff, Victoria E. Mitchell, Reed S. Lewis, Virginia S. Gillerman).

Professional Activities

Adjunct Graduate Faculty, Boise State University (V.S. Gillerman).

Administration and technical lead on ARRA geothermal data project (J.A. Welhan).

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, April (R.M. Breckenridge, K.L. Othberg).

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

Affiliate Faculty and Graduate Faculty representative, Idaho State University (J.A. Welhan).

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

Association of American State Geologists, mid-year meeting, Denver, Colorado, November (R.M. Breckenridge).

Association of American State Geologists, Annual meeting, Dubuque, Iowa, June (R.M. Breckenridge).

Chair and Member, Search committee, Research Support 3, IGS, April, May (V.S. Gillerman).

Co-developer and co-teacher, Geol 5599 geothermal exploration course, Idaho State University (J.A. Welhan).

Co-supervisor, introduction of 3-D visualization and modeling software, Idaho State University Geol 210 course, November (J.A. Welhan).

Committee Member and Reviewer, Review of Geology and Geography Academic Programs for North Idaho Community College, Coeur d'Alene, March (W.M. Phillips).

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

Digital Mapping Techniques 2011 Workshop, AASG, USGS, hosted by USGS, Williamsburg Virginia., May (L.R. Stanford).

Earthscope/NSF seismic line field trip with University of Wisconsin and Washington State University professors and graduate students, central Idaho, August (R.S. Lewis).

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

Field Trip Leader, Geology along U.S. 95- Coeur d'Alene to Sandpoint: North Idaho Legislative Tour, Coeur d'Alene, November (R.M. Breckenridge).

Field Trip Leader, Seismic Hazards of the Boise Area, National Earthquake Program Managers Annual Meeting, Boise, April (W.M. Phillips).

Geological Society of America Annual Meeting, Denver, Colorado, November (R.M. Breckenridge, V.S. Gillerman, W.M. Phillips).

Idaho Geologic Mapping Advisory Committee, teleconference, October (R.M. Breckenridge, R.S. Lewis, K.L. Othberg, W.M. Phillips).

Idaho Geospatial Forum meeting, Boise, October (L.R. Stanford).

Idaho Geospatial Council Executive Committee meeting, Boise, April and June (L.R. Stanford).

Idaho Geological Survey representative, Department of Geosciences, Boise State University (V.S. Gillerman).

Idaho Geological Survey representative, Governor's Carbon Sequestration Advisory Committee (J.A. Welhan).

Idaho Geological Survey representative, Idaho State University Department of Geosciences (J.A. Welhan).

Lecturer, Boise State University/Colorado School of Mines Geophysical Field Camp, Neal Hot Springs, Oregon, May (V.S. Gillerman).

Member, Association of American State Geologists/U.S. Geological Survey Data Capture Working Group (L.R. Stanford).

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

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

Member, Department of Grant Administrator's Roundtable, Office of Sponsored Programs, University of Idaho (T. Kanikkeberg).

Member, Financial Information Group, Office of Business Systems and Accounting Services, University of Idaho (T. Kanikkeberg).

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

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

Member, Geology and Geologic Hazards Idaho Framework Layers, Technical Working Group (L.R. Stanford).

Member, Geothermal Resources Council (J.A. Welhan).

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

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

Member, Minerals and Policy Committee, Association of American State Geologists (R.M. Breckenridge).

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

Member, Quaternary Geology and Geomorphology Division, Geological Society of America (R.M. Breckenridge).

Member, search committee for Mine Safety Trainer position (R.M. Breckenridge, Chair, V.S. Gillerman, T. Kannikeberg, K.L. Othberg, M.J. Weaver).

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

Member, Spokane Coeur d'Alene Corridor, Water Sustainability, and Climate Research Initiative, Biophysical Work Group (R.M. Breckenridge).

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

National Aeronautics Space Administration (NASA) Jet Propulsion Lab site visit and meetings with NASA scientists to establish research collaboration in remote sensing (J.A. Welhan).

Northwest Mining Association Annual Meeting, Spokane, Washington, December (V.S. Gillerman, R.S. Lewis, V.E. Mitchell).

Participant, Basement rocks field trip with University of Montana professor and graduate students, upper North Fork Clearwater River, Idaho, October (R.S. Lewis).

Participant, CAES Geothermal Workshop, presentations and discussions with colleagues from INL, BSU, UI, and ISU on the future of geothermal research activities in the state, Idaho Falls, April (J.A. Welhan, V.S. Gillerman).

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 Board Meeting, Idaho State Hazard Mitigation Plan, September (W.M. Phillips).

Participant, Executive Committee, Update of Idaho Emergency Operation Plan, Earthquake Annex, September (W.M. Phillips).

Participant, Field Trip, Reinterpreted history of latest Pleistocene Lake Bonneville – geologic setting of threshold failure, Bonneville flood, deltas of the Bear River, and outlets for two Provo shorelines, southeastern Idaho, May (W.M. Phillips)

Participant, Idaho Environmental Forum Panel Discussion, Boise, August (V.S. Gillerman).

Participant, Joint Annual Meeting of the Cordilleran and Rocky Mountain Sections, Geological Society of America, Logan, Utah, May (R.S. Lewis, W.M. Phillips).

- Participant, Joint Annual Meeting of the Cordilleran and Rocky Mountain Sections, Geological Society of America, Logan, Utah, Hells Canyon field trip, May (R.S. Lewis).
- Participant, Joint Annual Meeting of the Western States Seismic Policy Council and National Earthquake Program Managers, Boise, April (W.M. Phillips).
- Participant, Mine tours of Silver City area, Stibnite, Thunder Mountain, Lemhi County rare earth deposits, Brundage placer, and Gold Hill mine (V.S. Gillerman).
- Participant, Mine Safety Health Administration (MSHA) Refresher Training, Boise, November (V.S. Gillerman).
- Participant, NASA HySpiri satellite platform technical workshop, August 23-26 (J.A. Welhan).
- Participant, President's Leadership Meetings: government outreach, public policy, marketing and branding, University of Idaho (R.M. Breckenridge).
- Participant, Shaping Sustainable Communities along the Spokane-Coeur d'Alene Corridor - Nonpoint Pollution Control and Human Dynamics, Stakeholders meeting, University of Idaho Research Park, Post Falls, June (R.M. Breckenridge).
- 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).
- Reviewer, Geoarchaeology (W.M. Phillips).
- Reviewer, Geological Society of America Bulletin (W.M. Phillips).
- Reviewer, Geology (W.M. Phillips).
- Reviewer, U.S. Geological Survey article manuscript, April (K.L. Othberg).
- Secretary, Belt Association Board of Directors (R.S. Lewis).
- Supervisor, Chris Blankenship, Work Study student, University of Idaho (W.M. Phillips).

Supervisor, James Cash, Temporary employee, University of Idaho,
January-June (D.L. Garwood).

Teaching, Geol 599 Independent Study course in geostatistics, Idaho State
University (J.A. Welhan).

Teaching, Geol 599 Independent Study course in geothermal exploration,
Idaho State University (J.A. Welhan).

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

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

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

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

Technical and planning advisor for Idaho State University's Indigenous
Nations Institute (J.A. Welhan).

Training, E-mail and Business Writing Essentials, Rockhurst University
Continuing Education Center, October (T. Kanikkeberg).

Training, Gatekeeper Orientation, Human Resources, University of Idaho,
December (T. Kanikkeberg).

Training, Personnel Functions, Department of Human Resources,
University of Idaho (T. Kanikkeberg).

Training, Space Survey, Phases I, II, III, Office of Sponsored Programs,
University of Idaho, March, April, May (T. Kanikkeberg).

Media Interviews

A Challenge for Rare Earth Metal Miners, by Anne Wallace Allen:
Idaho Business Review (and Coeur d'Alene Press), January 16,
2011 (V.S. Gillerman).

Digging it: Phosphate Plants Have Long-term Expansion Plans, by
Anne Wallace Allen: Idaho Business Review, February 18, 2011
(V.S. Gillerman).

Geologist: Earthquake Could Hit Idaho Within Next 50 Years, by KTVB, Boise, March 12, 2011 (W.M. Phillips).

Idaho Mining Activity Increased During 2010, by Anne Wallace Allen (AP excerpt from IBR): Idaho Statesman, December 25, 2010 (V.S. Gillerman).

Idaho Mining Expert Comments on Chilean Mine Rescue, by KTVB News (Ch. 7, Boise), KTRV (Fox 12 News, Nampa), KIVI (Ch. 6, Nampa), and KIFI-TV (Ch. 8, Idaho Falls): Television interviews, October 13, 2010 (V.S. Gillerman).

Mining Expert: Rescue Effort in Idaho Mine Is a Slow Process, by Ty Brennan: KTVB.com and televised KTVB News (Ch. 7, Boise), April 19, 2011 (V.S. Gillerman).

Mining in Idaho, by Staff: Marples NW Business Letter, March 9, 2011 (V.S. Gillerman).

Mining Likely Worth \$ 1 Billion to Idaho in 2010, by Anne Wallace Allen: Idaho Business Review, December 23, 2010 (V.S. Gillerman).

Molybdenum Exploration Sparks Debate over Idaho Watershed, by Phil Taylor: E&E News, The Natural Resources Weekly Report, September 16, 2010 (V.S. Gillerman).

Molybdenum Exploration Sparks Debate over Idaho Watershed, by Phil Taylor: The New York Times, September 17, 2010 (V.S. Gillerman).

U of I Researcher Weighs in on Eastern Idaho Earthquake Risk, by KIFI-TV, Idaho Falls, March 11, 2011 (W.M. Phillips).

Thesis Committees

Andrew Jansen, M.S., Geology, Washington State University (R.S. Lewis).

Chris Tennant, M.S., Geological Sciences, Idaho State University (J.A. Welhan).

Dinesh Gover, M.S., Geological Sciences, Idaho State University (J.A. Welhan).

Keith Gray, Ph.D., Geology, Washington State University (R.S. Lewis).

Kelly Whitehead, M.S., Geological Sciences, Idaho State University (J.A. Welhan).

Liane Stevens, Ph.D., Geology, University of Montana (R.S. Lewis).

Rachel Brewer, M.S., Geology, Washington State University (R.S. Lewis).

Susan Norman, M.S., Geological Sciences, Idaho State University (J.A. Welhan).

Will Smith, M.S., Geological Sciences, Idaho State University (J.A. Welhan).

Vincent Isakson, M.S., Geology, Washington State University (R.S. Lewis).

Grants and Contracts

ARRA Geothermal Data Compilation Project: J.A. Welhan (DOE-AASG, May, 2010-May, 2013, \$412,389).

ARRA Geothermal New Data Supplement Project: J.A. Welhan (DOE-AASG, June, 2011-May, 2013, \$457,663).

CO2 Sequestration Assessment: J.D. Kauffman, PI (U.S. Geological Survey CO2 Sequestration Assessment Program, July 2010-June 2011; no-cost extension to September, 2011, \$50,000).

Geologic Mapping in the Idaho Falls, Fairfield, Grangeville, Salmon, and Bonners Ferry Areas: K.L. Othberg, W.M. Phillips, J.D. Kauffman, R.S. Lewis, and R.M. Breckenridge (U.S. Geological Survey STATEMAP Program, May 2010-April 2011, \$232,509).

Geologic Mapping in the Idaho Falls, Fairfield, Grangeville, Salmon, and Bonners Ferry Areas: R.S. Lewis, W.M. Phillips, J.D. Kauffman, and R.M. Breckenridge (U.S. Geological Survey STATEMAP Program, June 2011-May 2012, \$220,985).

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 26, 2009–September 30, 2011, \$94,000).

Idaho Department of Lands AML (Abandoned Mine Lands)

Assistance: V.S. Gillerman and R.S. Lewis (Idaho Department of Lands, September 1, 2009–January 31, 2011, \$ 96,567.90).

Idaho Mine Safety Training Program: M.J. Weaver and R.M. Breckenridge (Mine Safety and Health Administration, October 2009-December 2010, \$92,578).

Idaho Mine Safety Training Program: S. Furman (Mine Safety Health Administration, September 2010- March 2012 \$95,000).

Lithologic Characterization of Active ITD Aggregate Sources and Implications for Aggregate Quality: V.S. Gillerman and W.M. Phillips (Idaho Department of Transportation, March 1, 2011-September 30, 2013, \$119,999).

Idaho Earthquake Mitigation Projects: Boise Area NEHRP Soil Class and Liquefaction Suceptibility Maps: W.M. Phillips, K.L. Othberg, and J.A. Welhan (Idaho Bureau of Homeland Security, July 2010-May 2011, \$35,111).

Idaho Earthquake Mitigation Projects: Geological Maps and USGS Seismic Acceleration Data for Idaho Counties: W.M. Phillips, R.S. Lewis, and L.R. Stanford (Idaho Bureau of Homeland Security, July 2010-May 2011, \$14,889).

NEHRP Soil Class and Liquefaction Susceptibility Maps – Teton County: W.M. Phillips and L.R. Stanford (Idaho Bureau of Homeland Security, May 2011-December 2011, \$30,000).

Data Preservation Program: R.S. Lewis (U.S. Geological Survey FY 2010 Program, August 1, 2010-July 31, 2011, \$37,792).

Geologic Map of the Big Creek Quadrangle: R.S. Lewis (U.S. Department of Agriculture, U.S. Forest Service, Region 4, June 8, 2010-August 1, 2011, \$19,221).

Remote Sensing Exploration of Hidden Geothermal Resources in Eastern Idaho: T. Sankey, M. McCurry, and J.A. Welhan (NASA-Idaho Space Grant Consortium, April, 2010-December, 2010, \$3,972).