



# 2010–2011 Minerals Yearbook

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IDAHO [ADVANCE RELEASE]

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# THE MINERAL INDUSTRY OF IDAHO

**This chapter has been prepared under a Memorandum of Understanding between the U.S. Geological Survey and the Idaho Geological Survey for collecting information on all nonfuel minerals .**

Idaho's nonfuel mineral production<sup>1</sup> in 2011 was valued at \$1.32 billion, based upon annual U.S. Geological Survey (USGS) data. This was a \$141 million (12%) increase from the State's total nonfuel mineral production value of \$1.18 billion in 2010, which followed a \$252 million (27%) increase from \$931 million in 2009. In terms of total nonfuel mineral production value, Idaho ranked 17th in 2011, after having risen to 16th among the 50 States in 2010 from 21st in 2009. Idaho accounted for nearly 1.8% of the total U.S. value in both 2011 and 2010. On a per capita basis, it ranked eighth in the Nation in nonfuel mineral production in 2011 with a value of \$835, nearly 350% greater than the national average of \$240.

In descending order of production value, molybdenum concentrates, phosphate rock, silver, construction sand and gravel, and lead were the top nonfuel minerals produced in Idaho during 2011 and 2010. These five commodities combined constituted close to 95% of the total in each year, down from 98% in 2009 (percentages for molybdenum concentrates, phosphate rock, silver, and lead withheld—company proprietary data). Construction sand and gravel accounted for 5% of the total nonfuel mineral production value in 2011 and about 7% in 2010 in the State. In total, there were 19 nonfuel minerals produced in Idaho during 2011 and 20 during 2010. Metals constituted 72% of the nonfuel value in 2011 and 75% in 2010, up from nearly 70% in 2009.

In 2011, the production value of molybdenum concentrates remained unchanged while increases in the production values of phosphate rock and silver outpaced declines in lead and construction sand and gravel by a combined \$139 million. Production values for each of Idaho's top five nonfuel mineral commodities increased in 2010. The production value of silver rose 113% in 2011 and 2010 relative to 2009, phosphate rock increased 62%, molybdenum concentrates increased by 40%, and the value for lead rose 17%. After 2 consecutive years of decreases, the quantity and value of construction sand and gravel increased in 2010 before falling again in 2011. Approximately \$67.7 million worth of construction sand and gravel was mined in 2011, \$7 million (9.4%) lower than in 2009, and the production quantity fell by 488,000 metric tons (t), from 12.9 million metric tons (Mt) in 2009 to 12.4 Mt in 2011 (a drop of 3.8%). Among other nonfuel mineral commodities, the production values of dimension stone, copper, garnet, perlite,

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<sup>1</sup>The terms "nonfuel mineral production" and related "values" encompass variations in meaning, depending upon the mineral products. Production may be measured by mine shipments, mineral commodity sales, or marketable production (including consumption by producers) as is applicable to the individual mineral commodity.

All USGS mineral production data published in this chapter are those available as of May 2013. Data in this report are rounded to three significant digits and percentages are calculated from unrounded data. All USGS Mineral Industry Surveys and USGS Minerals Yearbook chapters—mineral commodity, State, and country—can be retrieved over the Internet at <http://minerals.usgs.gov/minerals>.

pumice, and pumicite rose in both 2011 and 2010 while those of gemstones, crushed stone, and portland cement declined each year. Significant increases took place from 2009 to 2011 in the quantity of feldspar (153%) produced and the production value of feldspar (174%), and the quantity and value of perlite (398% and 470%, respectively).

In 2011, three Idaho commodities rose in rank (based on quantity produced) in comparison with other producing States. Perlite production rose to third (out of six States) from fourth in 2009 and 2010, pumice and pumicite rose from fourth in 2009 to third (out of seven States) in 2011 and 2010, and dimension stone rose to 15th (out of 36 States) from 17th in 2009. Six commodities fell in rank: zeolites—to third (out of five States) from second in 2009, molybdenum concentrates—to fourth (out of seven States) in both 2011 and 2010 from third in 2009, zinc and cadmium byproduct of zinc concentrates—to fourth (out of four States) in 2011 and 2010 from third in 2009, gemstones (based upon value)—to tenth (all States produce gemstones) from ninth in 2010 and fifth in 2009, and construction sand and gravel—to 23d (out of 50 States) in 2011, from 19th in 2010 and 22d in 2009. The rank of the following commodities did not change from 2009 to 2011: silver—third (out of 11 producing States), phosphate rock—third (out of four States), garnet and lead—third out of three producing States (five produced lead in 2009), feldspar—fourth (out of seven States), copper—seventh (out of eight States), and crushed stone—43d (out of all 50 States).

The following narrative information was provided by the Idaho Geological Survey<sup>2</sup> (IGS). IGS production data and information, except where otherwise noted, were based upon the agency's own surveys and mine inquiries, company annual reports, and data and information derived from other State government agency sources. These data may differ from USGS annual production figures, which were based upon company responses to USGS surveys and upon USGS estimates.

## Overview and Employment

Many mineral operations in Idaho rebounded in 2010, along with much of the global economy, due to record gold and silver prices and strong demand, particularly from developing nations overseas. Mining employment in Idaho increased 6% in 2010 to nearly 2,300 jobs and 12.5% in 2011 to about 2,580 jobs, not including mineral-related chemical plants. New mines and expansions are anticipated to add additional jobs through 2017 (Idaho Division of Financial Management, 2014).

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<sup>2</sup>Virginia S. Gillerman, Research Geologist/Economic Geologist, and Earl H. Bennett authored the text of the State mineral industry information submitted by the Idaho Geological Survey.

## Exploration and Mine Development Activities

### Industrial Minerals

**Clay Minerals, Quartz, and Feldspar.**—In the Bovill area, in Latah County, I-Minerals Inc. (Vancouver, Canada) continued work on their kaolin-halloysite-quartz-feldspar project. A drilling program identified an inferred mineral resource of 34.8 Mt of clay at a cutoff grade of 20%. Potentially economic concentrations of quartz and potassium feldspar are also present (I-Minerals Inc., 2010).

**Phosphate Rock.**—In 2010, Stonegate Agricom Ltd. (Toronto, Canada) acquired the Paris Hills phosphate project in Bear Lake County from Rocky Mountain Resources Corporation (Vancouver, Canada). Stonegate drilled at least 60 holes for a combined length of approximately 16,000 meters (m) from late 2010 to late 2011, targeting the Phosphoria Formation, previously mined further north. The lower phosphate zone on the Paris Hills property has a company-estimated measured and indicated resource of 19 Mt with an average grade of 30.6% phosphorus pentoxide ( $P_2O_5$ ), as well as an additional inferred resource of 12 Mt with an average grade of 30.1%  $P_2O_5$  (Gilbride and Santos, 2011).

In June of 2011, the Bureau of Land Management issued a Record of Decision approving the proposed mine plan for the Blackfoot Bridge Mine near Soda Springs to be operated by Monsanto (St. Louis, MO). This new operation was expected to replace Monsanto's South Rasmussen Mine, which is nearing the end of its life. Construction began in late summer. An innovative feature of the mine design will be the first use of highly impermeable, geosynthetic clay liner laminated with HDPE (high-density polyethylene) covers for the waste rock piles to avoid infiltration of water into the overburden piles. Construction was expected to continue in 2012 with initial production expected in 2013. Long-term monitoring of the site and cover systems was included in the plan.

### Metals

**Cobalt.**—Formation Capital Corporation, U.S. (Salmon, ID) and its parent company, Formation Metals Inc. (Vancouver, Canada) began building the Idaho Cobalt Project, which consists of a newly permitted underground cobalt-copper-gold mine located in the Blackbird mining district of Lemhi County and a hydrometallurgical plant at Kellogg in Shoshone County. In 2010, Formation Capital drilled six holes totaling nearly 1,750 m to the south of the Ram deposit. Drilling extended the economic mineralization for 120 m along strike and 60 m down dip. One hole intersected a 2-m zone of ore with grades of 1.27% cobalt, 3.57% copper, and 9.0 grams of gold per metric ton (g/t) (Formation Metals Inc., 2011). Cuttings from the drilling were being used to evaluate rare-earth element concentrations and metallurgy in the ore zones. Announced reserves for the underground mine are claimed to be sufficient for a 10-year life, with considerable potential to block out additional resources in the district (Formation Metals Inc., 2007). Three geotechnical holes were drilled at the portal location near Kellogg; the former Sunshine Mine refinery, used

as a precious metals refinery, now owned by Formation Capital, was undergoing expansion and modification to process the cobalt concentrates.

**Gold.**—Atlanta Gold Inc. (Toronto, Canada) met public opposition to its plans for development of a gold-silver resource at the historic Atlanta site in Elmore County. In response, the company shifted its focus from a large open pit to more selective extraction of higher grade material from underground mining and small open pits. Ore would be processed conventionally by gravity and flotation to produce gold and a precious metal-bearing sulfide concentrate, thus avoiding the use of cyanide. During the 2010 field season, the company drilled 48 core holes totaling approximately 11,900 m. Results from several deep drill holes suggested that the shear zone splits but continues at depth. Two intermediate depth holes intersected intervals of 8.2 to 38 g/t gold over true widths of 0.8 to 4.6 m (Atlanta Gold Inc., 2010). Gold Hill Mining and Reclamation (Boise, ID) leases the historic Gold Hill Mine at Quartzburg in Boise County. Before mining stopped in 1938, this underground mine was the largest lode producer in the Boise Basin, Idaho's most prolific historic gold district. Gold Hill Mining has been looking at exploration options since 2009, as well as evaluating the large waste dumps at the property. Testing indicated that the dumps contained significant gold left over from the old milling. The company was constructing a custom-built placer-type processing plant utilizing essentially a large sluice to recover gold and sulfides.

Midas Gold Inc. (Vancouver, Canada) completed 44 diamond drill holes totaling nearly 12,900 m at the Golden Meadows project in Valley County during 2010. The program focused on resource definition and exploration for gold in the Hangar Flats and West End areas at the historic Stibnite-Yellow Pine mining district, which also supplied tungsten and antimony during World War II. One hole reported 177 m assaying 2.43 g/t gold, including a 7.6-m section of 7.1 g/t gold (Midas Gold Corp., 2011a). Midas also conducted an induced polarization survey and surface trenching and sampling, as well as compilation and interpretation of the historic mine data. The company has identified at least three major deposits in the district: Hangar Flats, Yellow Pine, and West End, plus several satellite deposits. In early 2011, the updated NI 43-101-compliant resource study for the Hangar Flats and West End deposits concluded the existence of 54.4 t (1.75 million troy ounces) of indicated gold and 51.0 t (1.64 million troy ounces) of inferred gold resources (Midas Gold Corp., 2011b).

In the Murray area of Shoshone County, Newmont Mining Corp. (Greenwood Village, CO) and New Jersey Mining Company (Coeur d'Alene, ID) had been exploring for gold at the Toboggan project as joint-venture partners. Newmont spent nearly \$2 million over three field seasons on geologic mapping, soil and rock sampling, geophysics, and drilling at the property. In 2010, the joint venture completed eight core holes totaling 914 m and seven reverse circulation (RC) holes totaling 941 m, with drilling targeted principally at the Gold Butte and Mineral Ridge prospects. A 2009 core hole at Gold Butte intersected 2.52 g/t gold over 4 meters in a mineralized structure, including 1 meter of 7.15 g/t. Several targets remained untested, in part because the necessary permits were not received until the end of the field season. In early 2011, Newmont Mining decided not to

renew the joint venture and transferred the entire land package, as well as all surface and drill data, to the New Jersey Mining Company (New Jersey Mining Company, 2011).

In a 50/50 joint venture with Marathon Gold Corporation (Toronto, Canada), New Jersey Mining conducted a 10-km diamond drill program at the Golden Chest underground mine near Murray in 2011. Highlights included intercepts from a hole, which intercepted 4.59 g/t of gold over 18.1 m, and another hole that encountered 23.7 m with an average grade of 1.83 g/t. The companies planned release of a resource estimate in early 2012 and additional drilling on the property (Marathon Gold Corporation, 2011). In addition to gold, scheelite (a calcium tungstate mineral) was intersected in some of the quartz veins (Marathon Gold Corporation, 2012).

In 2010, Otis Gold Corp. (Vancouver, Canada) negotiated a purchase agreement with Bayswater Uranium Corp. (Vancouver, Canada) to acquire 100% interest in the Kilgore gold-silver deposit in Clark County. Results from Otis Gold's 2010 drilling program, which consisted of 35 core holes totaling approximately 6,660 m, showed gold mineralization. For example, one hole intersected 30.5 m of 2.81 g/t gold, including 9.1 m of 8.65 g/t gold (Otis Gold Corp., 2011). Otis also drilled 41 core holes totaling about 9,200 m in 2011, including two metallurgical holes. Most of the holes (28 of 41) encountered gold mineralization, and the core from the Mine Ridge deposit increased the depth of mineralization from 460 m to about 800 m. The Mine Ridge deposit remains open to the north, northwest, and southwest, and is claimed to have significant potential for expansion (Otis Gold Corp., 2012).

Premium Exploration Inc. (Vancouver, Canada) acquired the Orogrande/Petsite property west of Elk City in Idaho County in 2008–2009, after reviewing historical data and prior drill data from Kinross Gold Corp. (Toronto, Canada) and other companies. Exploration during 2010 focused on the Friday-Petsite deposit and included 20 core holes totaling approximately 8,440 m, 60 km of ground magnetic lines, and a 3,700-km grid of airborne magnetics and electromagnetic measurements. Premium Exploration reported numerous intercepts of gold in the range of 0.5 g/t to 3.0 g/t, particularly in the Friday-Petsite deposit (Gillerman and Bennett, 2011). In 2011, Premium Exploration drilled nearly 10,900 m of a 25-km four-phase program in addition to conducting surface geochemical sampling. Using a combination of detailed geophysics, surface geochemistry, and geology for targeting, they encountered significant gold mineralization at multiple zones and reported eight mineralized locations at their Idaho gold project (Gillerman and Bennett, 2012). An NI 43-101-compliant resource of about 37.3 t (1.2 million troy ounces) of gold (indicated and inferred) was reported, and drilling was continuing (Premium Exploration Inc., 2011).

Terraco Gold Corp. (Vancouver, Canada) drilled 16 holes in 2011 for a total of nearly 5,500 m on their 100%-owned Almaden project on Nutmeg Mountain east of Weiser in Washington County. The project is located at the historic Almaden mercury mine, which also hosts hot springs gold mineralization. Results from core drilling generally showed better mineralization than the most recent resource estimate (either revealed by higher grade or grade times thickness)

and confirmed significant gold grades from the surface to a depth of 91 m. The company claims that the existing gold resource estimate (measured, indicated, and inferred) totals 29.5 t (948,000 troy ounces) at an average grade of 0.69 g/t (Terraco Gold Corp., 2012). Terraco was updating the resource calculation and planning for additional drilling in 2012.

In 2010, Thunder Mountain Gold Inc. (Boise, ID) drilled seven RC holes totaling about 1,550 m on two targets at their South Mountain property in Owyhee County. Five of the holes drilled the newly discovered intrusive breccia zone, and 97% of the samples contained anomalous gold, with the highest value intercept being 2 m of 1.3 g/t. The other two holes tested the massive replacement and skarn-related base-metal mineralization found in the historic mine workings on the Laxey and Sonneman levels. Both holes intersected 8 to 9 m of high grade zinc- and silver-rich polymetallic ores (Thunder Mountain Gold Inc., 2010).

Western Pacific Resources Corp. (Vancouver, Canada) conducted a drilling program and tested soil anomalies at their Mineral Gulch project in Cassia County during 2011. Mineral Gulch is the site of the former Black Pine Mine, which produced more than 15.6 t (500,000 troy ounces) of gold from several open pits. A number of holes encountered anomalous gold, such as one which intersected 24.4 m of 1.59 g/t gold, including 7.6 m of 3.59 g/t (Western Pacific Resources Corp., 2011). The company applied for a permit to do additional drilling.

**Molybdenum.**—In 2009, American CuMo Mining Corp. (Vancouver, Canada; formerly Mosquito Consolidated Gold Mines Ltd.) released a preliminary economic assessment study for the American CuMo molybdenum-copper deposit in Boise County that identified 598 Mt of indicated mineral resources with grades of 0.11% molybdenum disulfide and 0.06% copper (Ausenco Canada Inc., 2009). Work at the site was delayed in 2011 by an appeal from environmental groups against the U.S. Forest Service's Environmental Assessment allowing additional exploratory drilling. The company was also seeking financing to assist with development of the deposit. In December, a protesting group, which included the former exploration manager, started a complicated shareholder battle with company management. The legal conflict continued into 2012.

**Silver.**—Hecla Mining Company (Coeur d'Alene, ID), has been digitally compiling in 3D the historical mine data available for their 6,500-hectare (ha) land position within the Coeur d'Alene District in Shoshone County. Surface drilling and field work started in 2010 to test the targets delineated from this assessment. Three diamond core drills drilled almost 10,400 m, and more than 2,000 soil samples were collected in a grid over parts of the property. One portal was reopened to access upper workings of the Noonday vein near the Star Mine, where drilling and underground sampling delineated a modest (470 Mt) inferred resource of zinc- and lead-rich (approximately 10% zinc and 3.6% lead) ore with more than 31.1 t (1 million troy ounces) of contained silver (Hecla Mining Company, 2011a). During 2011, Hecla rehabilitated the 2000 level of the Star Mine and drilled approximately 3,050 m of core from underground to test several veins. Multiple intercepts on the Noonday vein (and others) ran up to 3 m of silver, lead, and (or) zinc mineralization (Hecla Mining Company, 2011b). The company also reported

an indicated resource of 99 t (3.15 million troy ounces) of silver, plus 61,000 t of zinc and 69,000 t of lead for the entire Star Mine complex (Hecla Mining Company, 2012a).

At the Lucky Friday Mine in Shoshone County, development work and construction in 2010 advanced Hecla's #4 shaft project, which will access deep, higher grade ore on the Gold Hunter vein system; the entire #4 shaft expansion project was approved in August of 2011. Total capital expenditures were estimated at \$200 million, and the project had a target completion date of mid-to late 2014 (Hecla Mining Company, 2011c). Drilling continued in 2011, which defined new silver resources with grades ranging from approximately 70 g/t to 2,500 g/t in the vein system (Hecla Mining Company, 2011c).

The famous Sunshine Mine in the Coeur d'Alene District remained closed in 2010 and 2011 following the 2008 closure and subsequent bankruptcy proceedings of Sterling Mining Company (Wallace, ID). In May of 2010, Silver Opportunity Partners LLC (Denver, CO) announced the acquisition of all Sterling assets after their bid of \$24 million was approved by the U.S. Bankruptcy Court. Silver Opportunity Partners formed a new company, Sunshine Silver Mining and Refining Corporation (Denver, CO), to explore and redevelop the mine and property of 2,400 ha. During 2011, the company repaired the hoists and Jewell shaft, dewatered the mine to below the 1,130 meter level, and reestablished utilities. An independent technical report has estimated that the mine contains approximately 1.8 Mt of mineralized material with an average grade about 730 g/t of silver (Gillerman and Bennett, 2011, 2012).

At the Crescent Mine, located just across Big Creek from the Sunshine Mine, United Silver Corporation (Kellogg, ID; formerly United Mining Group) started driving the Countess decline in 2010 to access a silver resource on the Alhambra and South veins. United Silver obtained an 80% buy-in interest from Gold Finder Explorations Ltd. (Kelowna, British Columbia, Canada; formerly SNS Silver Corp.) to conduct the exploration and development. They also signed an agreement with the New Jersey Mining Company to use and expand the Kellogg mill to treat the Crescent ore. United Silver added an additional 225 ha of claims to the Crescent property in October of 2010 (Gillerman and Bennett, 2011). The company announced a temporary halt to predevelopment activities in 2011 for further financial evaluation and analysis. In addition, an NI 43-101 technical report identified an indicated resource of 189.7 t (6.1 million troy ounces) of silver, grading 640 g/t, and an inferred resource of 127.5 t (4.1 million troy ounces), grading 670 g/t (United Mining Group Inc., 2010).

U.S. Silver & Gold Inc. (Toronto, Canada) drilled more than 15,000 m of exploration cores in 2010 and nearly 20,000 m in 2011 at the Galena Mine near Osburn in Shoshone County. Fifteen cores (out of 34) intercepted silver mineralization with a grade of 685 g/t or higher during 2010, and resource additions from exploration exceeded depletion from mining (U.S. Silver & Gold Inc., 2011). In 2011, the company estimated that exploration drilling increased proven and probable silver reserves at Galena by about 39.19 t (1.26 million troy ounces) (U.S. Silver & Gold Inc., 2012). The U.S. Silver and Gold Board also approved redevelopment of the Coeur Mine, which is connected underground to the Galena Mine. Exploration drilling

and repair and development work took place at the Coeur Mine in the second half of 2011.

## Commodity Review

### *Industrial Minerals*

**Garnet.**—Emerald Creek Garnet Ltd. (Fernwood, ID), a subsidiary of WGI Heavy Minerals Inc. (Waterdown, Ontario, Canada), mined alluvial garnets from mines with two washing plants on Emerald and Carpenter Creeks in Benewah County. The almandine garnets are hard and durable, ideal for uses in abrasives, water jets, and filtration. The company has been mining in the area since the 1930s. Tourist garnet diggings in the Panhandle National Forests, operated seasonally by the U.S. Forest Service, were crowded during the summer with about 5,000 visitors (<http://www.fs.usda.gov/recarea/ipnf/recarea/?recid=6927>).

**Perlite and Pumice.**—Hess Pumice Products (Malad City, ID) operated the Wrights Creek pit and a processing plant at Malad City in Oneida County. The pumice produced was used in a variety of industrial applications, including in the preparation of computer boards, as paint fillers, as abrasives for polishing and stonewashing, for filtration, and as lightweight construction aggregate. Hess also owns U.S. Grout (Malad City, ID), which makes a special ultrafine cement grout, and Idaho Minerals LLC (Malad City, ID), which produces expanded and processed perlite for a variety of uses, including horticulture and insulation.

**Phosphate Rock.**—Agricultural markets were positive in 2010 and 2011, and Idaho's phosphate mines and plants operated at full capacity as they transformed phosphate rock into intermediate and retail chemical products. Three open pit mines produced feedstock for southeast Idaho's two phosphoric acid fertilizer plants [the J.R. Simplot Company (Boise, ID) plant at Pocatello and the Agrium Inc. (Calgary, Canada) plant at Conda] and the Monsanto elemental phosphorus plant at Soda Springs, the only one in the western hemisphere. Monsanto's elemental phosphorus was used primarily to manufacture its trademark Roundup herbicide. Idaho's three phosphate pits were all located in Caribou County and mine the apatite-rich Meade Peak member of the Permian Phosphoria Formation—an organic black shale with local concentrations of carbon, molybdenum, phosphorous, selenium, uranium, and vanadium. Selenium has been a particularly troublesome contaminant in the phosphate ore because it is concentrated in the center waste shale unit and can be leached by oxidizing groundwater or surface water, then bioaccumulated by certain plants to toxic amounts. All three of the major phosphate companies were involved in researching and implementing better ways to minimize the adverse effects of natural selenium in the water (<https://www.deq.idaho.gov/regional-offices-issues/pocatello/southeast-idaho-phosphate-mining/southeast-idaho-selenium-investigations.aspx>).

J.R. Simplot Company's Smoky Canyon Mine pumped more than 1.6 Mt, a new company record, of phosphate slurry to the fertilizer plant in Pocatello during 2010, and moved 22 Mt of material (another yearly record), largely in preparation for a proposed mine expansion. In December, the U.S. 9th Circuit Court of Appeals upheld a prior ruling that permitting for the

Smoky Canyon expansion had properly followed the National Environmental Policy Act (NEPA) process and mining could continue. The mine increased employment by 20% and the company's fertilizer plant was sold out of production due to market demand. A mine plan for Agrium's new Rasmussen Valley Mine was submitted in March of 2010 to start the NEPA process. Agrium completed mining at the Dry Valley Mine in August of 2011 and began backfilling pits and conducting closure reclamation at the site. The company moved operations to the North Rasmussen Ridge Mine, which was permitted in 2003. Agrium also conducted exploration, collected baseline data, and scoped for a new mine plan at Rasmussen Valley during 2011. Reported 2011 gross margins from phosphate sales were triple those of 2010, due in part to higher sales prices from strong agricultural demand (Agrium Inc., 2012).

**Stone, Dimension.**—Production was reportedly down at most of the State's dimension stone quarries in 2011 and 2010. Idaho Travertine Corporation (Idaho Falls, ID) was reacquired by Ted Orchard and his family when the owners released their option. Several producers in Cassia County supplied so-called Oakley Stone, a durable micaceous quartzite, for flagstone and ledgerstone. Other parts of the State produced tan travertine and Table Rock Sandstone.

**Zeolites.**—Bear River Zeolite Co., Inc. (Preston, ID), a subsidiary of U.S. Antimony Corp .

(Thompson Falls, MT), operated a large open pit of high-quality clinoptilolite. The zeolite was processed to specifications for numerous markets using a variety of crushers, dryers, screens, and a Raymond mill. Major uses include animal feed, filtration, soil amendments, and chemical spill remediation. Bear River reported a 30% increase in mine production during 2010. The company added a vertical-shaft impact crusher to its facility and was seeking new markets. One shipment was sent to the U.S. Department of Energy for use in a demonstration project in New York State, on recovering radioactive strontium 90.

## Metals

**Molybdenum.**—In late 2009, Thompson Creek Metals Company (Littleton, CO) announced new proven and probable ore reserves of 150 Mt, with an average grade of 0.084% molybdenum, for extending the life of the open pit Thompson Creek Mine in Custer County to 2025 (Thompson Creek Metals Company, 2009).

**Silver and Other Metals.**—Within the Coeur d'Alene District in northern Idaho, mining of high grade quartz-siderite-sulfide veins hosted in Precambrian metasedimentary rocks has produced more than 37,300 t (1.2 billion troy ounces) of silver since 1884. Two underground operations, Hecla Mining's Lucky Friday Mine and U.S. Silver's Galena Mine, operated during 2010 and 2011 .

## Government Programs and Activities

The IGS Web site, [www.idahogeology.org](http://www.idahogeology.org), is the Survey's primary portal to the public and offers almost all publications as digital documents. Areas of past and current geologic mapping can be viewed online, and the Mines and Minerals

page now provides access to an enhanced, map-based search routine for the Mines and Prospects database, which includes over 8,000 properties in Idaho. Searches can be conducted by geographic area or commodity. An indexing of the over 2,600 mineral property files in the Survey's archive is also indicated online, and those records can be scanned, if needed. Likewise, a new online, digital index of the historic oil and gas wells (to 1988) is available. A new summary publication, GeoNote 44, "Rare Earth Elements and Other Critical Minerals in Idaho," is available for download as well.

STATEMAP, a joint Federal/State program, continued to be the primary funding source in 2011, but a contract with the Idaho Department of Water Resources funded mapping and a hydrogeologic study of the Mayfield area east of Boise. A contract with the Idaho Department of Transportation to study aggregate and its susceptibility to alkali-silica reactivity was also underway. Multiple types of information on Idaho's geothermal resources were being put into a large database under the auspices of a Department of Energy funded project, with drilling of a few thermal gradient wells planned. Other activities included developing a searchable digital database of oil and gas wells, data preservation of minerals and energy records, mapping and mitigation of natural hazards, and reporting on Idaho's active mining and exploration industry.

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TABLE 1  
NONFUEL MINERAL PRODUCTION IN IDAHO<sup>1,2</sup>

(Thousand metric tons and thousand dollars)

Mineral	2009		2010		2011	
	Quantity	Value	Quantity	Value	Quantity	Value
Gemstones, natural	NA	492 <sup>r</sup>	NA	430	NA	379
Sand and gravel, construction	12,900	74,800 <sup>r</sup>	13,800	78,500	12,400	67,700
Stone,						
Crushed	3,880 <sup>r</sup>	26,800 <sup>r</sup>	3,960	23,600	3,910	21,500
Dimension, quartzite, sandstone	25	3,370	25	3,520	28	4,200
Combined values of cadmium (byproduct from zinc concentrates), cement (portland), copper, feldspar, garnet (industrial), gold (2009-10), lead, lime, molybdenum concentrates, perlite (crude), phosphate rock, pumice and pumicite, sand and gravel (industrial), silver, zeolites, zinc	XX	825,000 <sup>r</sup>	XX	1,080,000	XX	1,230,000
Total	XX	931,000 <sup>r</sup>	XX	1,180,000	XX	1,320,000

<sup>r</sup>Revised. NA Not available. XX Not applicable.

<sup>1</sup>Production as measured by mine shipments, sales, or marketable production (including consumption by producers).

<sup>2</sup>Data are rounded to three significant digits; may not add to totals shown.

TABLE 2  
IDAHO: CRUSHED STONE SOLD OR USED IN THE UNITED STATES, BY TYPE<sup>1</sup>

Type	2009				2010				2011			
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value
Limestone <sup>2</sup>	6	237	\$3,430	\$14.46	6	250	\$3,660	\$14.66	6	257	\$4,230	\$16.45
Granite	7	283 <sup>r</sup>	1,390	4.91	7	251	1,180	4.69	6	259	1,030	3.98
Traprock	38	1,710	8,660	5.07	36	1,720	8,190	4.77	33	1,130	4,830	4.28
Sandstone and quartzite <sup>3</sup>	--	--	--	--	2	95	673	7.07	2	93	642	6.90
Volcanic cinder and scoria	--	--	--	--	1	19	631	33.12	1	25	74	2.91
Miscellaneous stone	24 <sup>r</sup>	1,660 <sup>r</sup>	13,100 <sup>r</sup>	7.90	25	1,620	9,320	5.74	24	2,150	10,700	4.98
Total or average	XX	3,880 <sup>r</sup>	26,600 <sup>r</sup>	6.86	XX	3,960	23,600	5.98	XX	3,910	21,500	5.50

<sup>1</sup>Revised. XX Not applicable. -- Zero

<sup>2</sup>Data are rounded to no more than three significant digits, except unit value; may not add to totals shown.

<sup>3</sup>Includes limestone-dolomite reported with no distinction between the two kinds of stone.

<sup>4</sup>Includes sandstone-quartzite reported with no distinction between the two kinds of stone.

TABLE 3  
IDAHO: CRUSHED STONE SOLD OR USED BY PRODUCERS  
IN 2010, BY USE<sup>1</sup>

(Thousand metric tons and thousand dollars)

Use	Quantity	Value
<b>Construction:</b>		
Coarse aggregate (+1½ inch):		
Riprap and jetty stone	4	29
Filter stone	W	W
Other coarse aggregate	W	W
Coarse aggregate, graded:		
Concrete aggregate, coarse	W	W
Bituminous aggregate, coarse	W	W
Bituminous surface-treatment aggregate	W	W
Fine aggregate (-¾ inch):		
Stone sand, concrete	W	W
Stone sand, bituminous mix or seal	W	W
Screening, undesignated	W	W
Coarse and fine aggregates:		
Graded road base or subbase	1,410	5,780
Unpaved road surface	297	1,740
Crusher run or fill or waste	15	48
Other coarse and fine aggregates	W	W
Agricultural, poultry grit and mineral food	W	W
Special, mining dusting or acid water treatment	W	W
Other miscellaneous uses and specified uses not listed	W	W
Unspecified: <sup>2</sup>		
Reported	248	1,390
Estimated	724	5,030
<b>Total<sup>3</sup></b>	<b>3,960</b>	<b>23,600</b>

W Withheld to avoid disclosing company proprietary data; included in "Total."

<sup>1</sup>Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Reported and estimated production without a breakdown by end use.

<sup>3</sup>2010 data for this table may not match those presented in table 1 or discussed in the text, owing to revisions that occurred after the production of this table.

TABLE 4  
IDAHO: CRUSHED STONE SOLD OR USED BY PRODUCERS  
IN 2011, BY USE<sup>1</sup>

(Thousand metric tons and thousand dollars)

Use	Quantity	Value
Construction:		
Coarse aggregate (+1½ inch):		
Riprap and jetty stone	7	50
Filter stone	3	31
Unspecified coarse aggregate	W	W
Coarse aggregate, graded:		
Bituminous aggregate, coarse	W	W
Bituminous surface-treatment aggregate	W	W
Coarse and fine aggregates:		
Graded road base or subbase	862	3,230
Unpaved road surface	108	458
Terrazzo and exposed aggregate	(3)	2
Crusher run or fill or waste	74	213
Unspecified coarse and fine aggregates	W	W
Unspecified and other construction materials	6	33
Agricultural:		
Agricultural, limestone	W	W
Poultry grit and mineral food	W	W
Chemical and metallurgical, cement manufacture	2	2
Special:		
Mining dusting or acid water treatment	W	W
Asphalt fillers or extenders	W	W
Other miscellaneous uses and specified uses not listed	42	1,500
Unspecified: <sup>2</sup>		
Reported	1,400	7,060
Estimated	796	4,370
Total	3,910	21,500

W Withheld to avoid disclosing company proprietary data; included in "Total."

<sup>1</sup>Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Reported and estimated production without a breakdown by end use.

<sup>3</sup>Less than ½ unit.

TABLE 5  
IDAHO: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2010,  
BY MAJOR USE CATEGORY<sup>1</sup>

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate and concrete products <sup>2</sup>	958	\$7,160	\$7.48
Asphaltic concrete aggregates and other bituminous mixtures	282	2,430	8.60
Road base and coverings	2,070	13,100	6.35
Fill	204	656	3.22
Snow and ice control	52	388	7.46
Other miscellaneous uses <sup>3</sup>	195	1,670	8.55
Unspecified: <sup>4</sup>			
Reported	5,180	26,100	5.03
Estimated	4,740	26,700	5.63
Total or average	13,800	78,500	5.71

<sup>1</sup>Data are rounded to no more than three significant digits, except unit value; may not add to totals shown.

<sup>2</sup>Includes plaster and gunite sand.

<sup>3</sup>Includes railroad ballast and filtration.

<sup>4</sup>Reported and estimated production without a breakdown by end use.

TABLE 6  
IDAHO: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2011,  
BY MAJOR USE CATEGORY<sup>1</sup>

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate and concrete products <sup>2</sup>	821	\$6,050	\$7.37
Asphaltic concrete aggregates and other bituminous mixtures	151	1,280	8.48
Road base and coverings <sup>3</sup>	2,010	12,300	6.12
Fill	237	737	3.11
Snow and ice control	26	209	8.04
Other miscellaneous uses <sup>4</sup>	114	829	7.27
Unspecified: <sup>5</sup>			
Reported	5,010	24,800	4.95
Estimated	4,040	21,600	5.35
Total or average	12,400	67,700	5.46

<sup>1</sup>Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Includes plaster and gunite sands.

<sup>3</sup>Includes road and other stabilization (cement).

<sup>4</sup>Includes filtration, and railroad ballast.

<sup>5</sup>Reported and estimated production without a breakdown by end use.