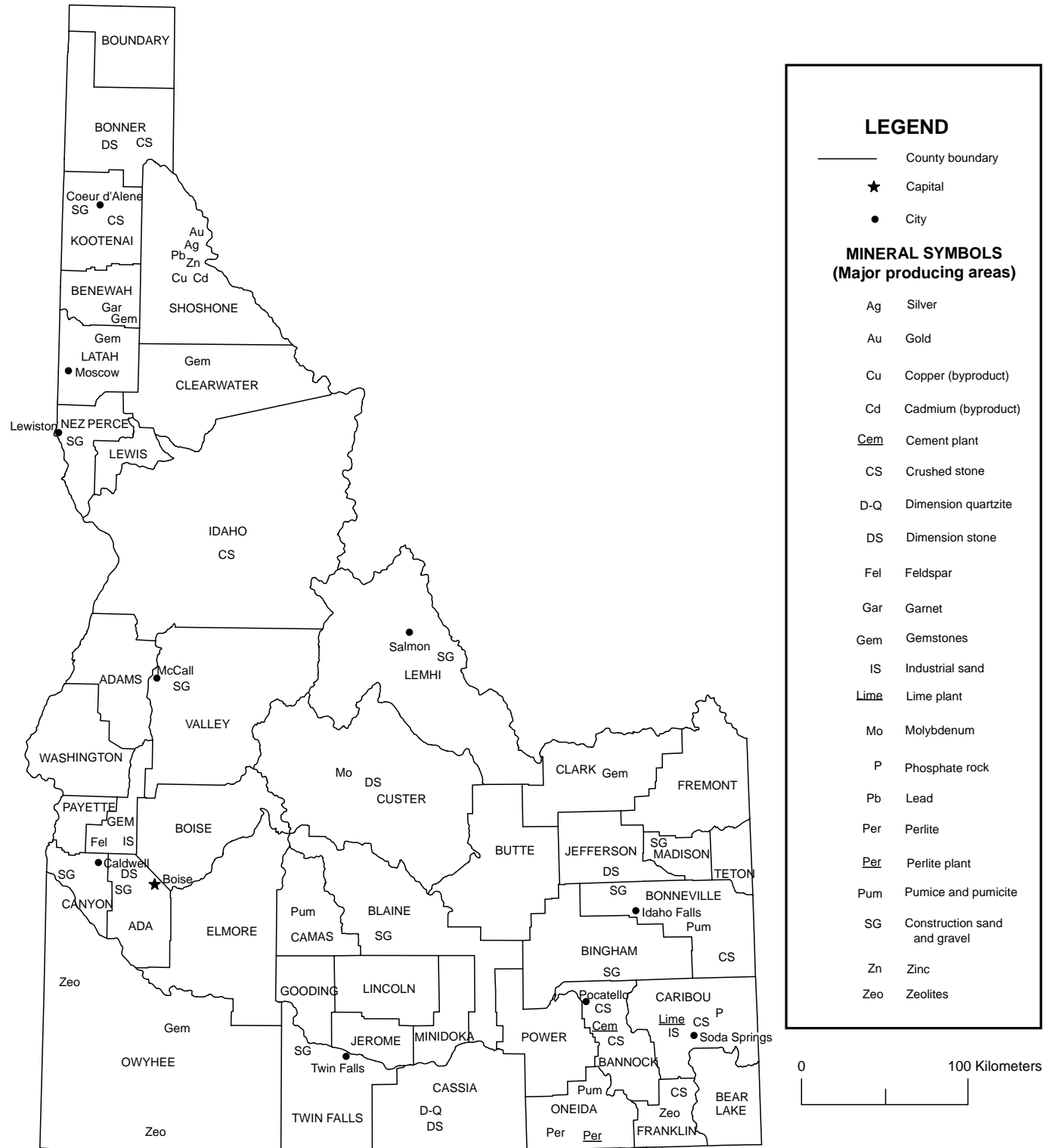




2006 Minerals Yearbook

IDAHO

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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.

In 2006, Idaho's nonfuel mineral production was valued¹ at \$797 million based upon annual U.S. Geological Survey (USGS) data. This was a 12% decrease from the State's total nonfuel mineral value for 2005. Idaho was 27th in rank among the 50 States in total nonfuel mineral production value and accounted for 12% of the U.S. total. Yet, per capita, the State ranked eighth in the Nation in its minerals industry's value of nonfuel mineral production; with a population of about 1,470,000, the value of production was about \$543 per capita.

Molybdenum concentrates, construction sand and gravel, phosphate rock, silver, crushed stone, lead, and portland cement were, in descending order of value, Idaho's leading nonfuel minerals and accounted for more than 96% of the State's total nonfuel mineral production value in 2006. Industrial minerals accounted for about 41% of the State's total nonfuel mineral value; molybdenum concentrates, silver, lead, copper, zinc, and gold (descending order of value) accounted for the remainder. In 2006, the largest increases in value took place in the values of construction sand and gravel (up \$39 million), silver, and lead (descending order of change in value). Significant, though more moderate increases took place in phosphate rock, crushed stone (up \$7.6 million), portland cement, lime, and zinc. But these increases were more than offset, in particular, by a substantial decrease in the value of molybdenum concentrates, and less so by decreases in the values of industrial sand and gravel, copper, and gold, leading to the State's decrease in nonfuel mineral production value for the year (table 1).

In 2006, Idaho continued to rank second of three producing States in the quantities of industrial garnet produced; third of four phosphate rock-producing States and third in silver production and lead production (descending order of value); and fourth in the production of molybdenum concentrates. The State rose to fourth from fifth in the production of pumice and pumicite and to seventh from eighth in gemstones (gemstones based upon value), but decreased to third from second in zeolite production. Idaho continued to be a significant producer of construction sand and gravel.

¹The 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 2006 USGS mineral production data published in this chapter are those available as of March 2008. All USGS Mineral Industry Surveys and USGS Minerals Yearbook chapters—mineral commodity, State, and country—can be retrieved over the Internet at URL <http://minerals.usgs.gov/minerals>.

The Idaho Geological Survey² (IGS) provided the narrative information that follows. Production data in the text that follows are those reported by the IGS and are based on the agency's own surveys and estimates or information gathered from company annual reports. They may differ from production figures published by the USGS.

Higher base and precious metal prices lead to increased development and mining employment, which peaked at 2,416 in the second quarter of 2006, reflecting a 10% increase from that of 2005. The phosphate processing industry employed an additional 1,000 workers in the chemical plants in southeastern Idaho. A strong housing and commercial construction market fueled increases in value and production of sand and gravel and crushed stone. Exploration interest increased significantly in 2006.

Exploration and Development Activities

Metals

Cobalt.—Formation Capital Corporation, Vancouver, British Columbia, Canada, continued the process for development of its Idaho Cobalt Project (ICP), a new underground cobalt-copper-gold mine in the Blackbird Mining District southwest of Salmon within the Salmon-Challis National Forest. The primary activity in 2006 was preparation of the draft environmental impact statement (DEIS) by the U.S. Department of Agriculture, Forest Service. The DEIS was expected to be released in 2007. The proposed ICP project consists of a 725-metric-ton-per-day mine and mill complex, along with ancillary facilities, many of which were to be located on a high plateau to simplify construction and environmental management. Annual metal production from the mine was estimated to be about 1.3 million kilograms (kg) of cobalt, 0.9 million kg of copper, and 106 kg (3,400 troy ounces) of gold. Concentrate from the mill was to be transported by truck to Formation's hydrometallurgical plant in Kellogg for metal recovery.

Reserves at the ICP site have been estimated to be sufficient for 10 to 12 years of mine life with the potential for additional reserves upon further exploration. These reserves are located in the Ram and Sunshine deposits on 145 unpatented claims immediately surrounding an original patented district. The ICP operation was expected to disturb less than 51 hectares of new

²Virginia S. Gillerman, Associate Research Geologist/Economic Geologist, authored the text of the State mineral industry information provided by the Idaho Geological Survey.

mining land.

Gold.—Valencia Ventures, Inc., Toronto, Ontario, Canada, through Golder Associates Inc., an International consulting company, completed a preliminary assessment of the Buffalo Gulch deposit, a component of the Idaho Gold Project near Elk City. Toronto's Beartooth Platinum Corporation retained a 49% interest in Buffalo Gulch, an open pit deposit with an oxide resource of 4.4 million metric tons (Mt), grading 0.69 grams per metric ton (g/t) gold. The remaining components of the Idaho Gold Project consisted of three prospective gold resources in the Orogrande Shear zone. These included the Friday/Petsite, the Deadwood, and the Dixie zones. Late in 2006, the Idaho Gold Project was sold to Clearwater Mining Corporation, a privately owned company.

In Lemhi County, Journey Resources Corp., Vancouver, British Columbia, Canada, completed an additional 3,000 meters (m) of reverse circulation drilling at the Musgrove Creek gold project, southwest of Salmon. Journey's decision to conduct further drilling was based upon earlier reports that had indicated a mineral resource at the site of about 8 Mt, grading 1.22 g/t gold. The gold was hosted in epithermal veins in the Precambrian metasediments. Results of the latest drilling indicated numerous intervals of anomalous gold with some high grade gold intercepts.

In eastern Idaho, Kilgore Minerals Ltd., Vancouver, British Columbia, Canada, drilled 10 holes, totaling 3,320 m, at the Kilgore epithermal gold system in Clark County. Previous work by Kilgore and several major mining companies outlined a 14,000-kg (450,000-troy ounce) gold resource and additional soil anomalies. The drilling in 2006 intersected anomalous alteration and low-grade gold mineralization over wide areas.

In southern Idaho, Vancouver-based Freegold Ventures Ltd. conducted a 10,000-m drill program at the Almaden gold project east of Weiser in Washington County. Prior drilling results at Almaden had identified a Canadian National Instrument (NI) 43-101-compliant indicated resource of about 17,100 kg (551,000 troy ounces) of gold. Freegold held a 100% lease on the property.

Toronto-based Atlanta Gold Inc., continued efforts to develop its open pit gold mine at Atlanta, as the company sought public input on its revised plan of operations for the mine. The Atlanta mining project had raised significant concern in Boise regarding the proposed mine's possible impacts on water quality in the Middle Fork section of the Boise River. Some delay in completing the permitting process for the mine also was encountered during the year as a result of corporate restructuring.

Molybdenum.—Vancouver-based Kobex Resources Ltd. began a drilling program at its Cumo molybdenum property in Boise County. Molybdenum mineralization was intersected over a significant portion of two drill holes totaling 1,070 m. One 500-m drill hole averaged 0.096% molybdenum sulfide (MoS_2). The Cumo deposit includes multiple intrusive porphyries and some copper mineralization. The property had been acquired by Kobex from Vancouver-based Mosquito Consolidated Gold Mines Ltd. in 2005. Cumo was discovered and explored by Amax Exploration Inc. during the 1970s and 1980s. The indicated block model resource was 1.3 billion metric tons,

grading 0.093% MoS_2 in 1982.

Silver.—As the price of silver continued to rise, the Coeur d'Alene District in Shoshone County experienced a resurgence of exploration interest in the rich quartz-siderite-sulfide veins that define the Silver Valley. The Galena, Lucky Friday, and Sunshine Mines in the Coeur d'Alene District each had development projects underway during the year. At Hecla Mining Company's Lucky Friday Mine, a new access drift was completed on the 1,800-m [5,900-foot (ft)] level from the Silver Shaft to the tetrahedrite-rich Gold Hunter veins. The new drift allowed mining on both the 1,400-m (4,900-ft) and 1,800-m levels. Improvements were made to the Lucky Friday mill that included construction of a third-stage crushing circuit and an increase in flotation capacity. Diamond drilling below the 1,800-m level intersected mineralized veins near the 2,400-m (7,900-ft) level, effectively increasing the silver resource by 34% to 3.64 million kilograms (117 million troy ounces).

The Galena Mine continued to be operated after U.S. Silver purchased the mine and adjoining property from Coeur Silver Valley in June. The new company increased exploration and development, improved the mine plan, and started needed infrastructure maintenance. U.S. Silver conducted a major drilling program with nearly 18,000 m of core drilling completed during the year. Two types of high-grade mineralization zones were discovered on the 730-m (2,400-ft) level that included silver-copper and silver-lead veins. Some high-grade mineralization containing about 1,400 g/t of silver also was intersected on the 1,040-m (3,400-ft) level. Improvements were made at the nearby Coeur mill to allow for two separate metallurgical circuits.

Sterling Mining Company pursued an aggressive development program at the Sunshine Mine near Kellogg during the year. In January, the company detonated the first blast for the new Sterling Tunnel, designed to connect with the Polaris Drift-Silver Summit Tunnel and to reopen the upper workings of the Sunshine vein for mining and exploration. By yearend, an 850-m length of the 3.6-m-wide tunnel had been completed. Sterling also began refurbishing the Sunshine mill and Jewell Shaft and stations, including the power supply, pumps, and secondary mine escape shaft. In October, Sterling Mining purchased exclusive right to the Sunshine tailings facility from Essential Metals Corp., a subsidiary of Formation Capital Corporation.

New Jersey Mining Company, based in Kellogg, operated the Golden Chest Mine at Murray in Shoshone County and reported the core drilling of nine exploration holes on the Idaho vein. The company also began development of its newly permitted Silver Strand underground mine northeast of Coeur d'Alene in Kootenai County. Efforts included driving a new adit and constructing an office and water management facility. New Jersey also constructed a concentrate leach tank circuit and introduced improvements at its Kellogg mill that would enable the company to produce dore from the Silver Strand's high-grade silver-gold ore.

In other company activities, New Jersey acquired the Niagara copper-silver property near Murray in December. Prior work by Earth Resources Company in the 1970s at the Niagara deposit delineated a resource of approximately 14 Mt of ore hosted in

the Revett Quartzite. New Jersey also developed the Coleman vein and staked new discoveries, including the Gold Butte and CA-Toboggan prospects near Murray.

Other Metal Projects.—Journey Resources Corp. and Calgary-based Trio Gold Corp. began an exploration program at the Empire Mine near Mackay in Custer County. Initial drill results from the AP pit area revealed an intercept of 9 m, grading 0.26% copper and 5.5 g/t gold. The Empire deposit is a polymetallic skarn containing copper, gold, silver, and zinc mineralization. A feasibility study was planned to determine the potential for use of a solvent extraction/electrowinning process to recover copper and zinc from the deposit.

Salmon River Resources, a Vancouver-based company, conducted preliminary diamond drilling at the CAS property near Iron Creek. Cobalt-bearing pyrite and arsenopyrite with appreciable gold content were discovered there in the 1970s.

Commodity Review

Industrial Minerals

Garnet, industrial.—Gem-quality garnets and industrial garnets were produced in the State during the year. Emerald Creek Garnet (a subsidiary of WGI Heavy Minerals) mined and processed industrial grade garnets in Benewah County from areas along Carpenter and Emerald Creeks and the St. Maries River flood plain. The Idaho Panhandle National Forest received many public comments on its environmental impact statement to revamp the regulations for the recreational star garnet digging near St. Maries. New procedures included eliminating public access to the creek and constructing sluice boxes for visitors to use containing premined alluvial ore.

Phosphate Rock.—Three companies, Agrium Inc., J.R. Simplot Co., and Monsanto Co. extracted and processed about 3.6 Mt of ore from the Permian Phosphoria Formation in Caribou County in southeastern Idaho. The ore was processed locally into phosphoric acid by Agrium and Simplot for use in the agricultural chemical industry or into elemental phosphorus by Monsanto to produce other phosphorus compounds.

Monsanto continued its mining at South Rasmussen Ridge while concurrently reclaiming and backfilling the mined area. The company also conducted further studies on geology and water issues in preparation for permitting of its proposed Blackfoot Bridge Mine. Exploratory drilling also was continued at the Blackfoot Bridge site. J.R. Simplot continued mining of two pits at the Smoky Canyon Mine near the Idaho-Wyoming border while reclaiming three other pits at the mine site. Production at Smoky Canyon in 2006 was near the record level of 1.8 Mt reached in 2005. J.R. Simplot also awaited public comments on the DEIS pertaining to the expansion of the company's mining activities into two new areas located on its Manning and Deer Creek leased properties. Some issues remained to be resolved on the planned expansion regarding road access to the proposed mining areas. Agrium operated the Dry Valley Mine, which was purchased in 2004 from Astaris/FMC. Mining was primarily from one pit, while delineation drilling was carried out at a second pit area.

Stone, dimension.—L and W Stone Corp. operated its Three

Rivers quarry west of Challis in Custer County extracting approximately 23,000 to 27,000 metric tons (t) of multicolored argillaceous sandstone during the year. Oakley stone was produced from several quarries on Middle Mountain in Cassia County. Companies active in the recovery of oakley stone included American Stone, Northern Stone Supply, Oakley Valley Stone, and Scrivanich Natural Stone. At Boise, Gerhard Borbonus Landscaping and Table Rock Sandstone quarried silicified sandstone for high-end landscaping and building stone. Idaho Travertine operated a stone-cutting facility in Idaho Falls.

Other Industrial Minerals.—Ash Grove Cement operated at capacity at its Inkom cement plant in southeastern Idaho. Hess Pumice Products, Inc. produced pumice from its Wrights Creek Mine north of Malad. Most of the pumice was transported to the nearby Owens Corning plant for use in the manufacture of cultured stone for construction. Hess also produced finely ground pumice for a variety of other uses in domestic and international markets. Idaho Minerals, LLC, owned by Hess, mined perlite and expanded it for use in potting soils. Bear River Zeolite continued to produce zeolite at or above the 2005 level at its expanded zeolite mine and plant near Preston. Unimin Corporation, New Canaan, CT, produced industrial silica-feldspar sand at its operation near Emmett. Sand and gravel and crushed stone production increased compared with that of 2005, and the production level for other construction commodities remained high during the year.

Metals

Gold.—New Jersey Mining began the first full year of production at its Golden Chest Mine at Murray in Shoshone County, mining ore at the rate of about 400 metric tons per month and processing it at the company's mill in Kellogg. The Katie-Dora vein at Golden Chest contains an estimated resource of about 9,300 kg (300,000 troy ounces) of gold. One other small gold mine, the Bond Mine, located at Pierce, reported extracting an undisclosed quantity of gold during the year.

Molybdenum.—Thompson Creek Mining Co. produced approximately 7,300 t of molybdenum (contained in molybdenite concentrate) in 2006 at its Thompson Creek Mine in Custer County. Expansion of the large open pit molybdenum mine continued during the year as an additional quantity of overburden was removed as part of the sixth phase of the expansion process. In October, the privately held Thompson Creek was purchased by Blue Pearl Mining, a Canadian junior company with a molybdenum deposit in British Columbia. The sale included the Custer County open pit mine and mill, a 75% interest in the Endako Mine in British Columbia, and the metallurgical roasting plant in Langeloth, PA. Blue Pearl changed its name to Thompson Creek Metals Company, Inc. to reflect the new acquisition.

Silver.—About 130,000 kg (reported as 4.188 million troy ounces) of silver was produced at the two operating mines in the Coeur d'Alene District. Hecla's Lucky Friday unit at Mullan reported a 19% increase in silver production to more than 89,000 kg (reported as 2.87 million troy ounces) from its Gold Hunter expansion area. Byproduct lead and zinc also were produced from the Gold Hunter deposit. Silver production from

the Galena Mine was about 41,000 kg (reported as 1.31 million troy ounces) in 2006. Byproduct lead and copper were also produced at Galena.

Environmental Issues and Mine Reclamation Awards

Meridian Gold's Beartrack Mine in Lemhi County won the U.S. Bureau of Land Management's National 2006 Hard Rock Mine Reclamation Award. The open pit, heap-leach gold mine west of Salmon operated from 1994 to 2000, producing approximately 22,000 kg (700,000 troy ounces) of gold. The mine was strongly supported by the local community and maintained the highest standards of environmental performance throughout its lifetime and postclosure. Reclamation work at the site was nearly complete.

Selenium contamination in mine waste remained a difficult issue for companies and agencies in the phosphate rock mining region. Samples recovered from historic mine waste dumps further emphasized the challenging problems to be faced in remediating these mine sites. As a result, new mine regulations have required the backfilling and capping of seleniferous overburden to prevent environmental releases of selenium.

Government Programs

The Idaho Geological Survey (IGS) continued its active participation in the STATEMAP program. STATEMAP is a component of the congressionally mandated National Cooperative Geologic Mapping Program (NCGMP), through which the USGS distributes Federal funds to support geologic mapping efforts through a competitive funding process. The NCGMP has three primary components: (1) FEDMAP, which funds Federal geologic mapping projects, (2) STATEMAP, which is a matching-funds grant program with State geological surveys, and (3) EDMAP, a matching-funds grant program with universities that has a goal to train the next generation of geologic mappers.

New digital web maps (DWMs) can be downloaded in pdf format from the IGS Web site (www.idahogeology.org). Maps released included the Deadwood, Murphy, and Orofino 100 K quadrangle geologic maps, Long Valley surficial geology, and an oil and gas drilling map. A research project of the IGS Boise Office on the Lemhi Pass Thorium-Rare Earth District was underway. More information on these and other items can be accessed on the IGS Web site.

TABLE 1
NONFUEL RAW MINERAL PRODUCTION IN IDAHO^{1,2}

(Thousand metric tons and thousand dollars)

Mineral	2004		2005		2006	
	Quantity	Value	Quantity	Value	Quantity	Value
Gemstones, natural	NA	836	NA	469	NA	388
Sand and gravel, construction	19,600	74,300	20,800	93,800	26,900	133,000
Stone, crushed	3,420	18,100	4,890 ^r	26,300 ^r	5,960	33,900
Combined values of cadmium (byproduct of zinc concentrates), ³ cement (portland), copper, feldspar, garnet (industrial), gold (2005-06), lead, lime, molybdenum concentrates, perlite (crude), phosphate rock, pumice and pumicite, sand and gravel (industrial), silver, stone (dimension quartzite and sandstone), zeolites, zinc	XX	354,000	XX	788,000	XX	630,000
Total	XX	447,000	XX	908,000 ^r	XX	797,000

^rRevised. NA Not available. XX Not applicable.

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

²Data are rounded to three significant digits; may not add to totals shown.

³Data not available for 2006.

TABLE 2
IDAHO: CRUSHED STONE SOLD OR USED, BY KIND¹

Kind	2005			2006		
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Number of quarries	Quantity (thousand metric tons)	Value (thousands)
Limestone	6	504	\$3,560	9	982	\$6,480
Shell	1	W	W	1	W	W
Granite	10	692	3,280	15	806	3,710
Traprock	13 ^r	1,500 ^r	7,900 ^r	29	1,470	6,680
Quartzite	2	W	W	4	W	W
Miscellaneous stone	8 ^r	1,720 ^r	9,000 ^r	12	2,220	14,300
Total	XX	4,890 ^r	26,300 ^r	XX	5,960	33,900

^rRevised. W Withheld to avoid disclosing company proprietary data; included in "Total." XX Not applicable.

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

TABLE 3
IDAHO: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2006, BY USE¹

(Thousand metric tons and thousand dollars)

Use	Quantity	Value
Construction:		
Coarse aggregate (+1½ inch):		
Riprap and jetty stone	8	30
Filter stone	18	114
Other coarse aggregate	14	31
Total	40	175
Coarse aggregate, graded:		
Concrete aggregate, coarse	W	W
Bituminous aggregate, coarse	221	1,370
Bituminous surface-treatment aggregate	92	459
Railroad ballast	W	W
Total	322	1,880
Fine aggregate (-¾ inch):		
Stone sand, bituminous mix or seal	W	W
Screening, undesignated	W	W
Other fine aggregate	11	57
Total	47	241
Coarse and fine aggregates:		
Graded road base or subbase	1,450	5,980
Unpaved road surfacing	78	268
Crusher run or fill or waste	(2)	(2)
Other coarse and fine aggregates	96	517
Total	1,620	6,770
Agricultural:		
Limestone	(3)	(3)
Poultry grit and mineral food	(3)	(3)
Chemical and metallurgical:		
Cement manufacture	W	W
Lime manufacture	W	W
Flux stone	W	W
Total	812	3,610
Special:		
Asphalt fillers or extenders	W	W
Whiting or whiting substitute	W	W
Other fillers or extenders	W	W
Total	47	1,500
Unspecified: ⁴		
Reported	2,240	14,400
Estimated	790	4,300
Total	3,030	18,700
Grand total	5,960	33,900

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

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

²Withheld to avoid disclosing company proprietary data; included with "Other coarse and fine aggregates."

³Withheld to avoid disclosing company proprietary data; included in "Grand total."

⁴Reported and estimated production without a breakdown by end use.

TABLE 4
IDAHO: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2006,
BY MAJOR USE CATEGORY¹

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate and concrete products ²	2,410	\$15,700	\$6.49
Asphaltic concrete aggregates and other bituminous mixtures	1,010	6,380	6.30
Road base and coverings	6,250	30,000	4.80
Road and other stabilization (cement and lime)	76	427	5.63
Fill	1,330	4,550	3.41
Snow and ice control ³	82	596	7.28
Other miscellaneous uses	215	922	4.29
Unspecified: ⁴			
Reported	6,510	29,300	4.51
Estimated	9,040	44,800	4.96
Total or average	26,900	133,000	4.93

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

²Includes plaster and gunite sand.

³Includes railroad ballast.

⁴Reported and estimated production without a breakdown by end use.