

# 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 1998, the preliminary estimated value<sup>1</sup> of nonfuel mineral production for Idaho was \$444 million, according to the U.S. Geological Survey (USGS). This was a 5% decrease from that of 1997,<sup>2</sup> following a 6% decrease from 1996 to 1997. The State remained at 31st among the 50 States in total nonfuel mineral production value, of which Idaho accounted for more than 1% of the U.S. total.

Phosphate rock, molybdenum, silver, gold, and construction sand and gravel were, by value, Idaho's leading nonfuel minerals in 1998. Continuing a trend, gold production and value declined, contributing to the total drop in value (table 1). Silver value was nearly unchanged, while the value for construction sand and gravel increased.

Based on USGS estimates of the quantities produced in the United States during 1998, Idaho remained the only State to produce antimony ore, first of three industrial garnet-producing States, third in silver and lead (descending order of value), and sixth in feldspar. While the State rose to third from fourth in the production of both molybdenum and pumice and pumicite, it dropped to third from second in phosphate rock and to eighth from seventh of 12 gold-producing States. Additionally, the State was a significant producer of construction and industrial sand and gravel.

The Idaho Geological Survey<sup>3</sup> (IGS) provided the narrative information that follows. Production data in the following text are those reported by the IGS, based on its own survey and estimates. They differ from some production figures reported to the USGS.

Mining and mineral exploration in Idaho was affected by the Asian recession and the global downturn in metal prices during 1998. The number of exploration projects in the State decreased. In addition, closure of the Stibnite gold mine because of exhaustion of reserves and the surprise yearend

<sup>1</sup>The terms "nonfuel mineral production" and related "values" encompass variations in meaning, depending on the minerals or 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 1998 USGS mineral production data published in this chapter are preliminary estimates as of February 1999 and are expected to change. For some mineral commodities (for example, construction sand and gravel, crushed stone, and portland cement), estimates are updated periodically. To obtain the most current information, please contact the appropriate USGS mineral commodity specialist. A telephone listing for the specialists may be retrieved over the Internet at <http://minerals.usgs.gov/minerals/contacts/comdir.html>; by using MINES FaxBack at (703) 648-4999 from a fax machine with a touch-tone handset (request Document #1000 for a telephone listing of all mineral commodity specialists); or by calling USGS information at (703) 648-4000 for the specialist's name and number. All Mineral Industry Surveys—mineral commodity, State, and country—also may be retrieved over the Internet at <http://minerals.usgs.gov/minerals>; fascimile copies may be obtained from MINES FaxBack.

<sup>2</sup>Values, percentage calculations, and rankings for 1997 may vary from the *Minerals Yearbook, Area Reports: Domestic 1997, Volume II*, owing to the revision of preliminary 1997 to final 1997 data. Data for 1998 are preliminary and expected to change, while related rankings may also be subject to change.

<sup>3</sup>Virginia Gillerman, Research Economic Geologist, authored the text of the Idaho mineral industry information submitted by the Idaho Geological Survey. IDAHO—1998

announcement that Kinross Gold Corp.'s DeLamar Mine would close were shocks to the State's precious metals industry. The silver mines, phosphate operations, and sand and gravel industry enjoyed some successes. The southeast Idaho Phosphate Reserve, with its mines and processing plants combining for an approximately one-half-billion-dollar industry, was in full production for the year. Silver production in the famous Coeur d'Alene District of north Idaho increased significantly at both Hecla Mining Co.'s Lucky Friday unit, which completed the Gold Hunter expansion project on-time and on-budget, and Sunshine Mining and Refining Co.'s Sunshine Mine. Silver prices averaged more than \$5 per ounce but remained quite volatile and not up to expectations for the year.

Gold and molybdenum production showed decreases because of closures and price-induced cutbacks. The State's largest gold mine, Meridian Gold Co.'s Beartrack Mine in Lemhi County produced more than 3,421 kilograms (kg) of gold, slightly more than in 1997. Kinross Gold Corp.'s DeLamar and Stone Cabin Mines in Owyhee County poured 1,221 kg of gold and 39,871 kg of silver in 1998 from 1.16 million metric tons (Mt) of ore mined. Gold prices less than \$300 per ounce prompted the premature closure at DeLamar, kept several small operations shut down, and severely cut back interest in gold exploration. The price drop also forced reevaluation of reserves and shortened the mine life for Meridian's Beartrack Mine to just another 2 years. Beartrack is a heap leach, open pit gold mine near the old placer mining ghost town of Leesburg. Meridian expanded the leach pad, focused production on the South Pit, and commenced backfilling of the North Pit. Low prices also kept the mill mothballed at CSC Mining Co.'s small, underground Rescue gold mine near Warren, although crews continued development work during the winter. A similar situation existed at U.S. Antimony Corp.'s Yellowjacket Mine in Lemhi County.

Kinross Gold Corp.'s DeLamar Mine has been a major employer and taxpayer amongst the ranchers of sparsely populated Owyhee County. Lower gold prices and reevaluation of the reserve at the nearby Stone Cabin Mine prompted the decision to put the project on a care-and-maintenance status in early 1999. Mining was to be completed at the DeLamar Mine, and final reclamation was to be started on the five open pits, which had been active since the mid-1980's. Production at the Stone Cabin Mine was stopped in November to preserve the resource remaining in the Stone Cabin and Blackjack pits. The closure cost 150 jobs.

The 1997 closure of three precious-metal mines resulted in major reclamation work in 1998. Bankruptcy proceedings not withstanding, work continued at the Black Pine Mine in Cassia County of south-central Idaho. The Pegasus Gold Corp. property went through a planned closure at the end of 1997 because of exhaustion of ore reserves. In central Idaho, Hecla Mining Co. continued recontouring and reclamation of

the waste dumps and worked to dewater the tailings pond at its Grouse Creek Mine in Custer County.

At the closed Stibnite Mine in Valley County, cleanup of the processing plants was taken over by the State in 1998 after Dakota Mining Co. forfeited its \$800,000 reclamation bond on the heap-leach gold mine. In addition, Mobil Oil Corp. stepped in to finance and direct work on remediation of the historic Meadow Creek tailings area on behalf of Superior Oil Corp., which operated Stibnite from 1982-85. Woodward Clyde Corp. of Denver is the prime contractor, and Nelson Construction Co. of Boise has been doing the work.

A steady decline in molybdenum prices throughout the year affected Thompson Creek Mining Co.'s large, open pit Thompson Creek Mine in Custer County. Mining for a Phase 4 pushback started in April, but by October the price drop forced a 25% production cut and layoffs of 75 workers at the mine. A Supplemental Environmental Impact Statement on handling of the pyritic mill tails was completed in late summer, but the U.S. Forest Service decision was not scheduled until 1999. Subaqueous deposition is the preferred alternative. The company hosted the annual meeting of the International Molybdenum Association in Sun Valley in August.

Mines in the Coeur d'Alene District of north Idaho have produced more than 31,000 metric tons (t) of silver since 1884, along with appreciable base metals. Silver production in the Silver Valley increased to more than 342 t in 1998, versus 299 t in 1997. The increase resulted from past exploration success by geologists at the three currently operating deep underground mines: Sunshine Mining Co.'s Sunshine Mine, Hecla's Lucky Friday Mine, and Silver Valley Resources' Galena Mine. The Coeur Mine, another Silver Valley Resources property, was placed on standby in July, but exploration continued. Silver Valley Resources is a joint venture of ASARCO Incorporated and Coeur d'Alene Mines Corp.

Sunshine Mining and Refining Co. had mixed news from their famous Sunshine Mine, which has more than 11,000 t of historic production. Total output increased to more than 180 t of silver in 1998, up from 131 t in 1997 and the highest since 1971. Production was primarily from the galena and tetrahedrite of the West Chance vein. An aggressive exploration drilling program delineated the apparent edge of the ore body and failed to expand the reserve base by yearend. The company took a \$50-million writeoff on the mine in the third quarter of 1998, though drilling continued. Another exploration project, driving a ramp over to the ConSil Mine, was terminated in October when silver prices fell below \$5 per ounce.

Hecla Mining Co. successfully completed the \$16 million development of the Gold Hunter ore body and expansion of the Lucky Friday Mine at Mullan. The higher grade ore contributed to a doubling of silver production from the Lucky Friday unit to 128 t in 1998 versus 59 t in 1997. Total cash costs also decreased as a result of the higher grade ore, which is mined by both overhand and underhand cut-and-fill methods using diesel equipment on an innovative ramp system.

The New Bunker Hill Mining Co. continued mining for pyromorphite crystals at the Bunker Hill Mine. It completed rebuilding the hoist on the Kellogg tunnel level and stockpiled

zinc ore. The New Jersey Mining Company (Mine Systems Design) evaluated a large gold-quartz vein at the old New Jersey Mine.

Formation Capital Corporation continued work on the Sunshine project in the Idaho Cobalt Belt of Lemhi County. Through unpatented claims staked in 1994, Formation Capital owns 100% of the Sunshine project in the Blackbird Mining District, the only known domestic resource of high-grade cobalt.

Phosphate mining and processing is the largest mineral industry in Idaho. The Phosphoria Formation supplies ore to four major mines in Caribou County in southeastern Idaho. According to the IGS, production levels increased slightly to approximately 6.1 Mt of ore mined. Market demand for phosphate fertilizer and other products remained high, though prices were starting to drop because of the slump in Asian markets. As reported by the IGS, Boise-based J.R. Simplot Co.'s Smoky Canyon Mine near the Idaho-Wyoming border is the largest producer with nearly 2.3 Mt extracted. The mine increased output to accommodate a planned expansion of Simplot's phosphoric acid fertilizer plant in Pocatello. Smoky Canyon ore is sent to the plant through a 140-km-long slurry line. Simplot also did exploration drilling on its Deer Creek lease and won a State reclamation award for past exploration projects.

Agrium Inc., a Canadian agribusiness, operates a fertilizer plant at Conda, just north of Soda Springs. The plant employs 285 people and had another record year. In January, Agrium finalized acquisition of Rhone-Poulenc's Rasmussen Ridge Mine. In March, Agrium hired MK Mining as contract miners. Main production is from the Central Pit. Stripping and production also began from the North Pit with all of the ore going to the plant at Conda.

Solutia Inc., formerly part of Monsanto, operates the Enoch Valley Mine and an elemental phosphorus plant at Soda Springs. Their plant also had a record year. A \$2 million safety project was started to relocate the ore unloading station to the east side of the highway and install a 600-km-long conveyor belt in a culvert under the road. This will eliminate the need for large ore trucks to cross the highway next to the plant. Slag from the phosphorus plant is used by Kerr-McGee's vanadium plant across the road to produce vanadium pentoxide, used by the steel industry. In June, the company started up a single phosphate fertilizer plant to help use up the vanadium tailings, which contain about 14% phosphate. Vanadium is naturally enriched in the Phosphoria Formation, as is selenium. Work by the industry-lead Selenium Working Group's third party contractor, Montgomery Watson, included extensive sampling for metals in soil, water, and vegetation in the region. Research is ongoing to find ways to reduce the hazard.

FMC Corp. was mining from the B Pit at the Dry Valley Mine and permitting the C and D pits. The company won Idaho Land Board reclamation awards for both its quartzite quarry and the Dry Valley mine A Pit reclamation work. FMC operates the world's largest elemental phosphorus plant at Pocatello. The company reached a consent agreement with the Environmental Protection Agency in October for a \$190 million program to reduce air and other pollution at the plant. Projects include pond remediation, waste treatment, air quality improvements and health studies for the Shoshone-Bannock

tribe, as the plant is on the Fort Hall Reservation. FMC also plans to rebuild one of the four electric furnaces.

Strong demand for construction sand and gravel continued, particularly in urban areas. Idaho and other Western States are experiencing rising population growth and development. There has been a steady demand for and production of dimension stone and landscaping rock. Hecla's Mountain West Bark merged with Colorado Aggregate Inc. to form MWCA, based in Rexburg. MWCA produces red and gold pumice for landscaping. Sales of the unusual gold-colored pumice were up tremendously.

However, some industrial mineral commodities were affected by the economic slowdown overseas. In north Idaho,

Emerald Creek Garnet saw sales of its industrial garnets, used for abrasives and water jets, slow slightly. The company has plans to expand operations to a 168-hectare parcel near the St. Maries River, adjacent to current leases. The project will require an Environmental Impact Statement and a 404 permit. Hess Pumice Products in southeastern Idaho sells fine, ultrapure pumice for polishing television screens. Sales to the Pacific Rim countries were down. Hess is collaborating on a new product, a special microgrout cement, which is more stable chemically and can penetrate finer cracks. Also in southeastern Idaho at Inkom, Ash Grove Cement Co. had another record year, shipping 245,000 t of clinker. Ash Grove is Idaho's only cement operation.

TABLE 1  
NONFUEL RAW MINERAL PRODUCTION IN IDAHO 1/ 2/

(Thousand metric tons and thousand dollars unless otherwise specified)

Mineral	1996		1997		1998 p/		
	Quantity	Value	Quantity	Value	Quantity	Value	
Antimony	metric tons	242	W	356	W	W	
Gemstones		NA	347	NA	687	NA	
Gold 3/	kilograms	10,800	136,000	7,490	80,100	4,990	47,500
Pumice and pumicite	metric tons	159,000	1,340	83,100	758	114,000	1,010
Sand and gravel:							
Construction		14,700	46,100	14,800	42,700	15,500	46,000
Industrial		646	8,510	630	7,950	698	8,930
Silver 3/	metric tons	234	39,000	341	53,800	335	54,900
Stone: Crushed 4/		3,960	20,200	3,910	18,700	3,000	13,500
Combined values of cement, copper, feldspar, garnet (industrial), lead, lime, molybdenum, phosphate rock, stone [crushed quartzite (1997-98), crushed miscellaneous (1996), dimension quartzite and miscellaneous], vanadium, zinc, and values indicated by symbol W		XX	249,000	XX	264,000	XX	272,000
Total		XX	500,000	XX	469,000	XX	444,000

p/ Preliminary. NA Not available. W Withheld to avoid disclosing company proprietary data; value included with "Combined values" data. XX Not applicable.

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

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

3/ Recoverable content of ores, etc.

4/ Excludes certain stones; value included with "Combined values" data.

TABLE 2  
IDAHO: CRUSHED STONE SOLD OR USED, BY KIND 1/

Kind	1996				1997			
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value
Limestone	7	1,370	\$7,920	\$5.80	7	1,150	\$5,860	\$5.09
Granite	7	549	3,060	5.57	3	140	243	1.74
Traprock	27	1,680	6,150	3.66	22	1,460	6,420	4.39
Quartzite	10	371	3,110	8.40	4	(2/)	(2/)	(2/)
Miscellaneous stone	3	(2/)	(2/)	(2/)	4	1,160	6,190	5.35
Total	XX	3,960	20,200	5.11	XX	3,910	18,700	4.78

XX Not applicable.

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

2/ Excludes miscellaneous stone and quartzite from State total to avoid disclosing company proprietary data.

TABLE 3  
IDAHO: CRUSHED STONE SOLD OR USED BY PRODUCERS  
IN 1997, BY USE 1/ 2/

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Coarse aggregate (+1 1/2 inch): Riprap and jetty stone	38	\$56	\$1.47
Coarse aggregate, graded:			
Bituminous surface-treatment aggregate	4	16	4.00
Other graded coarse aggregate 3/	231	478	2.07
Fine aggregate (-3/8 inch); Screening (undesignated)	14	45	3.21
Coarse and fine aggregates:			
Graded road base or subbase	467	1,910	4.09
Unpaved road surfacing	86	451	5.24
Other construction materials 4/	30	158	5.27
Agricultural:			
Poultry grit and mineral food	W	W	3.29
Other agricultural uses	W	W	3.36
Chemical and metallurgical:			
Cement manufacture	W	W	2.76
Lime manufacture	W	W	5.97
Flux stone	(5/)	(5/)	3.33
Sulfur oxide removal	W	W	2.00
Special:			
Mine dusting or acid water treatment	(5/)	(5/)	3.31
Other fillers or extenders	20	287	14.35
Unspecified: 6/			
Actual	1,890	9,740	5.15
Estimated	10	58	5.80
Total	3,910	18,700	4.78

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

1/ Includes granite, limestone, miscellaneous stone, and traprock; excludes quartzite from State total to avoid disclosing company proprietary data.

2/ Data are rounded to three significant digits, except unit value; may not add to totals shown.

3/ Includes concrete aggregate (coarse), bituminous aggregate (coarse), and railroad ballast.

4/ Includes crusher run or fill or waste.

5/ Less than 1/2 unit.

6/ Includes reported and estimated production without a breakdown by end use.

TABLE 4  
IDAHO: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 1997,  
BY USE AND DISTRICT 1/ 2/

(Thousand metric tons and thousand dollars)

Use	District 1		Unspecified districts	
	Quantity	Value	Quantity	Value
<b>Construction aggregates:</b>				
Coarse aggregate (+1 1/2 inch) 3/	38	56	--	--
Coarse aggregate, graded 4/	W	W	--	--
Fine aggregate (-3/8 inch) 5/	14	45	--	--
Coarse and fine aggregate 6/	770	3,310	--	--
Other construction materials	253	597	--	--
Agricultural 7/	(8/)	(8/)	--	--
Chemical and metallurgical 9/	1,080	5,360	--	--
Special 10/	(8/)	(8/)	--	--
Unspecified: 11/				
Actual	(8/)	(8/)	1,120	5,890
Estimated	(8/)	(8/)	--	--
Total	2,790	12,800	1,120	5,890

W Withheld to avoid disclosing company proprietary data; included with "Other construction materials."

1/ Excludes quartzite from State total to avoid disclosing company proprietary data.

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

3/ Includes, riprap and jetty stone.

4/ Includes concrete aggregate (coarse), bituminous aggregate (coarse), bituminous surface-treatment aggregate, railroad ballast, and other graded coarse aggregate.

5/ Includes screening (undesignated).

6/ Includes graded road base or subbase, unpaved road surfacing, crusher run (select material or fill), and other coarse and fine aggregate.

7/ Includes poultry grit and mineral food, and other agricultural uses.

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

9/ Includes cement and lime manufacture, flux stone, and sulfur oxide removal.

10/ Includes mine dusting or acid water treatment and other fillers or extenders.

11/ Includes reported and estimated production without a breakdown by end use.

TABLE 5  
IDAHO: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 1997,  
BY MAJOR USE CATEGORY 1/ 2/

Use	Quantity (thousand metric tons)	Value (thousands)	Value per ton
Concrete aggregate (including concrete sand)	2,660	\$8,840	\$3.32
Plaster and gunite sands	13	72	5.54
Concrete products (blocks, bricks, pipe, decorative, etc.)	32	262	8.19
Asphaltic concrete aggregates and other bituminous mixtures	1,400	4,220	3.02
Road base and coverings 3/	6,140	17,800	2.90
Fill	572	1,140	1.99
Snow and ice control	90	528	5.87
Railroad ballast	53	165	3.11
Other miscellaneous uses 4/	182	709	3.90
Unspecified: 5/			
Actual	2,980	6,970	2.34
Estimated	696	1,980	2.85
Total or average	14,800	42,700	2.88

1/ To avoid disclosing company proprietary data, no district tables were produced for 1997.

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

3/ Includes road and other stabilization (cement).

4/ Includes filtration.

5/ Includes reported and estimated production without a breakdown by end use.