



# THE MINERAL INDUSTRY OF COLORADO

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

In 2001, the estimated value<sup>1</sup> of nonfuel mineral production for Colorado was \$577 million, based upon preliminary U.S. Geological Survey (USGS) data. This was a 2% decrease from that of 2000<sup>2</sup> and followed about a 1% increase from 1999 to 2000. The State increased to 22d (from 26th in 2000) in rank among the 50 States in total nonfuel mineral production value, of which Colorado accounted for about 1.5% of the U.S. total.

Approximately 82% of Colorado's nonfuel mineral production value in 2001 was from the production of industrial minerals, especially construction sand and gravel, portland cement, and crushed stone (in descending order of value), the State's three leading nonfuel mineral commodities. Metals mined in the State included gold, molybdenum, and silver, all of which showed small decreases in mine production and value. In 2001, increases in the values of soda ash (new mining operation) and crushed stone were offset by more substantial decreases that occurred in the values of portland cement, construction sand and gravel, and gold, resulting overall in a decrease for the year.

In 2000, increases of more than \$6 million each in crushed stone and portland cement (descending order of change) plus a nearly \$5 million increase in the value of gold more than balanced out decreases in the values of molybdenum and Grade-A helium, resulting in a small gain for the year. Relative to these, all other nonfuel minerals showed significantly smaller changes in value that were inconsequential to the net result for the year (table 1).

Compared with USGS estimates of the quantities produced in the other 49 States during 2001, Colorado rose in rank to second from third in molybdenum concentrates, was third in soda ash, increased to sixth from seventh of 11 gold-producing States, and remained fourth in Grade-A helium and sixth in construction sand and gravel. Additionally, the State produced significant quantities of portland cement, crushed stone, gypsum, and gemstones (gemstones based on value).

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<sup>1</sup>The terms "nonfuel mineral production" and related "values" encompass variations in meaning, depending upon 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 2001 USGS mineral production data published in this chapter are preliminary estimates as of August 2002 and are expected to change. For some mineral commodities, such as 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. Specialist contact information may be retrieved over the Internet at URL <http://minerals.usgs.gov/minerals/contacts/comdir.html>; alternatively, specialists' names and telephone numbers may be obtained by calling USGS information at (703) 648-4000 or by calling the USGS Earth Science Information Center at 1-888-ASK-USGS (275-8747). All Mineral Industry Surveys—mineral commodity, State, and country—also may be retrieved over the Internet at URL <http://minerals.usgs.gov/minerals>.

<sup>2</sup>Values, percentage calculations, and rankings for 2000 may differ from the Minerals Yearbook, Area Reports: Domestic 2000, Volume II, owing to the revision of preliminary 2000 to final 2000 data. Data for 2001 are preliminary and are expected to change; related rankings may also change.

The following narrative information was provided by the Colorado Geological Survey.<sup>3</sup> The Cripple Creek and Victor Gold Mining Co. (CC&V), a joint venture between AngloGold Ltd. and Golden Cycle Gold Corp., continued to operate the only major precious-metals mine in Colorado. The Cresson Mine in Teller County produced 6,660 kilograms (kg) of gold in 2001, down from the 7,530 kg in 2000. The decrease in metal production was attributable to a lower average ore grade. The mine employed approximately 300 people. The companies planned a major expansion at the mine that will enable gold production to increase to 16,000 kg per year.

The Henderson Mine in Clear Creek County continued to be North America's largest primary producer of molybdenum. The underground mine was owned by Climax Molybdenum Co., a subsidiary of Phelps Dodge Corp. In 2001, the mine and mill produced 5.1 million metric tons of ore containing 8,530 metric tons (t) of molybdenum oxide, down 6% from the 9,070 t produced in 2000. According to the USGS, the 2001 average price for contained molybdenum was \$5.20 per kilogram, down from \$5.64 per kilogram in 2000 (Blossom, 2002). The operation continued to employ about 320 workers at the mine and mill.

The largest segment of the nonfuel mineral industry in the State was sand, gravel, and crushed stone. Other important industrial minerals and construction materials currently produced in Colorado included cement, clay, decorative stone, dimension stone, gypsum, silica sand, soda ash, and sodium bicarbonate.

In October 2000, American Soda, LLP began production of soda ash and sodium bicarbonate from nahcolite in western Colorado. The company built a state-of-the-art solution mine, 71-kilometer dual pipeline, processing plant, and railroad spur to produce and ship its sodium products. The mine and plant have a nameplate designed production capacity of 730,000 metric tons per year (t/yr) of soda ash and 140,000 t/yr of sodium bicarbonate. In 2001, the first full production year, the company shipped slightly less than one-half of the nameplate capacity of soda ash and sodium bicarbonate.

In 2001, the Yule Quarry in Gunnison County produced 4,479 t of marble valued at approximately \$1.2 million. The stone was used by the Veterans Administration for national cemeteries, by other monument fabricators, and by sculptors. A 53-t marble block was cut for a renowned sculptor of Parker, CO. This massive block surpassed the previous record 50-t stone produced in 1931 for the Tomb of the Unknowns in Washington, DC. The owner of the quarry was Sierra Minerals Corp. of Centennial, CO. The quarry employed 13 people. The stone was marketed under the name Colorado Yule Marble.

Holcim (US) Inc., formerly Holnam, Inc., operated two portland cement manufacturing plants in the State, one near La

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<sup>3</sup>John W. Keller, a Geologist at the Colorado Geological Survey, authored the text of mineral industry information submitted by that agency.

Porte in Larimer County and one east of Florence in Fremont County. The La Porte plant produced about 430,000 t/yr of cement using the dry process. The Portland plant near Florence completed a \$225 million expansion in 2001 that nearly doubled its capacity from 900,000 t/yr to 1,700,000 t/yr.

Radar Acquisitions Corp. of Calgary, Alberta, Canada, considered developing its “Limon Integrated Coal and Heavy Mineral” project on the plains of eastern Colorado near the town of Limon. Garnet, some rare-earth minerals, titanium minerals (ilmenite and rutile), and zircon were present within paleo/beach placer deposits in the Fox Hills Sandstone. In addition, deposits of lignite coal overlie the heavy-mineral deposits. The coal was also being considered for its economic potential.

The Kelsey Lake Mine, in Larimer County near the Wyoming border, produced diamonds for all of the fourth quarter of 2001. In 2001, the mine implemented a new crusher system and other upgrades to its processing plant and began mining on the Kelsey Lake No. 1 kimberlite pipe. A partnership that included Roberts Construction Co., WY, and BJ&J Ltd., Boulder, CO, owned an option to purchase the Great Western Diamond Co., which owned and operated the mine.

In early 2001, Consolidated Pacific Bay Minerals Ltd. of Vancouver, British Columbia, Canada, announced its intentions to acquire three diamond prospects in the State Line district

of Larimer County from Diamond-X LLC. Diamond-X was a Denver-based company that staked the prospects in 1992. The three prospects are the George Creek, Pearl Creek, and Sand Creek properties. These properties were previously prospected and tested in the late 1970s and early 1980s by a joint venture between Superior Oil Corp. and Lac Minerals Ltd. The Superior-Lac joint venture also constructed a 45-metric-ton-per-day pilot plant near the Sloan kimberlites in the same district.

The Pride of the West Mill (formerly called the Howardsville Mill), northeast of Silverton in San Juan County, was renovated to process ore from mine waste piles in the Animas River watershed. The mill eventually will also process new ore from the nearby Silver Wing and Gold King mines. The mill was expected to start up later in 2002. A 14,000-t stockpile of ore from mine waste piles was already at the site awaiting processing, delivered by the Animas River Stakeholder’s Group.

Rhodochrosite was designated the official State Mineral in April. Some of the finest rhodochrosite crystals in the world were mined at the Sweet Home Mine near Alma, CO.

### Reference Cited

Blossom, J.W., 2002, Molybdenum: U.S. Geological Survey Mineral Commodity Summaries 2002, p. 112-113.

TABLE 1  
NONFUEL RAW MINERAL PRODUCTION IN COLORADO 1/ 2/  
(Thousand metric tons and thousand dollars unless otherwise specified)

Mineral	1999		2000		2001 p/	
	Quantity	Value	Quantity	Value	Quantity	Value
<b>Clays:</b>						
Bentonite	1	W	W	W	W	W
Common	373	2,530	296	2,000	296	2,000
Gemstones	NA	261	NA	277	NA	269
Lime	40	2,380	37	2,170	35	2,100
<b>Sand and gravel:</b>						
Construction	45,200	217,000	43,900	216,000	39,500	197,000
Industrial	W	W	65	W	65	W
<b>Stone:</b>						
Crushed	13,200	75,500	13,000	81,900	13,500	87,700
Dimension metric tons	14,700	3,430	W	W	W	W
Combined values of cement, clays [fire (2000-01)], gold, gypsum (crude), helium (Grade-A), lead (1999), molybdenum concentrates, peat (1998), soda ash, silver, stone [dimension marble and sandstone (2000-01)], zinc (1999), and values indicated by symbol W						
Total	XX	282,000	XX	285,000 r/	XX	288,000
	XX	584,000	XX	588,000 r/	XX	577,000

r/ Revised. 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 no more than three significant digits; may not add to totals shown.

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

Kind	1999				2000			
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value
Limestone	8 r/	2,960 r/	\$17,300 r/	\$5.86 r/	10	3,050	\$17,600	\$5.76
Dolomite	1	W	W	4.39	1	W	W	4.53
Granite	7 r/	4,970 r/	27,700 r/	5.57 r/	9	4,450	33,100	7.43
Sandstone and quartzite	5 r/	2,710 r/	13,400 r/	4.94 r/	10	2,910	16,300	5.60
Traprock	1	W	W	10.42	1	W	W	3.69
Volcanic cinder and scoria	3 r/	W	W	3.75 r/	2	W	W	9.05
Miscellaneous stone	6 r/	1,810 r/	9,940	5.49 r/	17	2,080	12,800	6.16
Total or average	XX	13,200	75,500	5.71	XX	13,000	81,900	6.31

r/ Revised. W Withheld to avoid disclosing company proprietary data; included in "Total." XX Not applicable.

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

TABLE 3  
 COLORADO: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2000, BY USE 1/ 2/

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
<b>Construction:</b>			
Coarse aggregate (+1 1/2 inch):			
Macadam	W	W	\$3.31
Riprap and jetty stone	517	\$4,650	9.00
Filter stone	27	450	16.67
Other coarse aggregate	358	1,200	3.35
Total or average	902	6,300	6.99
Coarse aggregate, graded:			
Concrete aggregate, coarse	1,490	15,300	10.26
Bituminous aggregate, coarse	1,320	11,500	8.68
Bituminous surface-treatment aggregate	136	1,500	11.03
Railroad ballast	38	270	7.11
Total or average	2,990	28,500	9.56
Fine aggregate (-3/8 inch):			
Stone sand, concrete	W	W	6.57
Stone sand, bituminous mix or seal	769	2,790	3.63
Screening, undesignated	496	2,400	4.84
Other fine aggregate	139	911	6.55
Total or average	1,400	6,100	4.35
Coarse and fine aggregates:			
Graded road base or subbase	661	2,940	4.45
Unpaved road surfacing	300	1,450	4.83
Terrazzo and exposed aggregate	104	891	8.57
Crusher run or fill or waste	326	1,150	3.53
Total or average	1,390	6,430	4.62
Other construction materials	62	300	4.84
<b>Agricultural:</b>			
Agricultural limestone	(3/)	(3/)	40.00
Poultry grit and mineral food	(3/)	(3/)	23.98
Other agricultural uses	(3/)	(3/)	9.60
Chemical and metallurgical, cement manufacture	(3/)	(3/)	3.91
<b>Special:</b>			
Mine dusting or acid water treatment	(3/)	(3/)	26.60
Asphalt fillers or extenders	(3/)	(3/)	21.00
Other fillers or extenders	(4/)	(3/)	(3/)
Other miscellaneous uses and specified uses not listed	106	489	4.61
Unspecified: 5/			
Reported	3,920	20,200	5.15
Estimated	410	2,300	5.51
Total or average	4,340	22,500	5.19
Grand total or average	13,000	81,900	6.31

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

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

2/ Includes dolomite, granite, limestone, miscellaneous stone, sandstone and quartzite, traprock, and volcanic cinder and scoria.

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

4/ Less than 1/2 unit.

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

TABLE 4  
 COLORADO: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2000, BY USE AND DISTRICT 1/ 2/

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 4	
	Quantity	Value	Quantity	Value	Quantity	Value
Construction:						
Coarse aggregate (+1 1/2 inch) 3/	W	W	W	W	W	W
Coarse aggregate, graded 4/	--	--	--	--	W	W
Fine aggregate (-3/8 inch) 5/	W	W	--	--	1,320	5,820
Coarse and fine aggregate 6/	W	W	W	W	1,040	4,470
Other construction materials	--	--	11	121	--	--
Agricultural 7/	--	--	W	W	--	--
Chemical and metallurgical 8/	--	--	W	W	W	W
Special 9/	--	--	W	W	--	--
Other miscellaneous use 10/	36	164	--	--	--	--
Unspecified: 11/						
Reported	168	879	--	--	2,520	13,200
Estimated	40	220	--	--	370	2,100
Total	366	1,860	1,070	9,000	8,960	56,900
	District 5		District 6		Unspecified districts	
	Quantity	Value	Quantity	Value	Quantity	Value
Construction:						
Coarse aggregate (+1 1/2 inch) 3/	557	2,900	--	--	--	--
Coarse aggregate, graded 4/	W	W	--	--	--	--
Fine aggregate (-3/8 inch) 5/	W	W	--	--	--	--
Coarse and fine aggregate 6/	W	W	W	W	--	--
Other construction materials	42	148	9	31	--	--
Agricultural 7/	W	W	--	--	--	--
Chemical and metallurgical 8/	--	--	--	--	--	--
Special 9/	W	W	W	W	--	--
Other miscellaneous use 10/	30	136	40	189	--	--
Unspecified: 11/						
Reported	1,220	6,030	(12/)	2	24	127
Estimated	--	--	--	--	--	--
Total	2,420	13,100	139	924	24	127

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

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

2/ No production for District 3.

3/ Includes filter stone, macadam, riprap and jetty stone, and other coarse aggregate.

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

5/ Includes stone sand (bituminous mix or seal), stone sand (concrete), screening (undesignated), and other fine aggregate.

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

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

8/ Includes cement manufacture.

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

10/ Includes other specified uses not listed.

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

12/ Less than 1/2 unit.

TABLE 5  
 COLORADO: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2000,  
 BY MAJOR USE CATEGORY 1/

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate (including concrete sand)	9,070	\$52,300	\$5.77
Plaster and gunite sands	94	843	8.97
Concrete products (blocks, bricks, pipe, decorative, etc.)	265	2,320	8.75
Asphaltic concrete aggregates and other bituminous mixtures	2,600	15,300	5.89
Road base and coverings	6,530	31,400	4.81
Road and other stabilization (cement and lime)	49	349	7.12
Fill	2,740	10,400	3.79
Snow and ice control	122	864	7.08
Other miscellaneous uses 2/	320	2,150	6.73
Unspecified: 3/			
Reported	14,100	64,300	4.56
Estimated	8,000	36,000	4.48
Total or average	43,900	216,000	4.92

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

2/ Includes filtration and railroad ballast.

3/ Reported and estimated production without a breakdown by end use.

TABLE 6  
 COLORADO: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2000,  
 BY USE AND DISTRICT 1/

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3	
	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregate and concrete products 2/	1,220	8,420	2,070	10,800	26	152
Asphaltic concrete aggregates and other bituminous mixtures	358	2,210	W	W	W	W
Road base and coverings 3/	2,080	9,880	1,490	9,560	700	2,460
Fill	781	3,520	364	1,330	W	W
Other miscellaneous uses 4/	142	975	614	2,890	206	2,210
Unspecified: 5/						
Reported	4,420	19,700	4,720	21,900	328	1,610
Estimated	1,500	6,300	2,500	11,000	99	380
Total	10,500	50,900	11,700	57,800	1,360	6,810
Use	District 4		District 5		District 6	
	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregate and concrete products 2/	3,670	24,000	2,150	10,200	285	1,810
Asphaltic concrete aggregates and other bituminous mixtures	777	4,890	409	1,990	W	W
Road base and coverings 3/	471	1,970	1,120	4,230	727	3,650
Fill	1,040	3,090	514	2,320	W	W
Other miscellaneous uses 4/	145	828	130	1,000	301	1,480
Unspecified: 5/						
Reported	4,190	19,400	309	1,420	142	274
Estimated	1,900	8,900	190	860	1,800	8,100
Total	12,200	63,100	4,820	22,000	3,220	15,300

W Withheld to avoid disclosing company proprietary data; included with "Other miscellaneous uses."

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

2/ Includes plaster and gunite sands.

3/ Includes road and other stabilization (cement and lime).

4/ Includes filtration, railroad ballast, and snow and ice control.

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