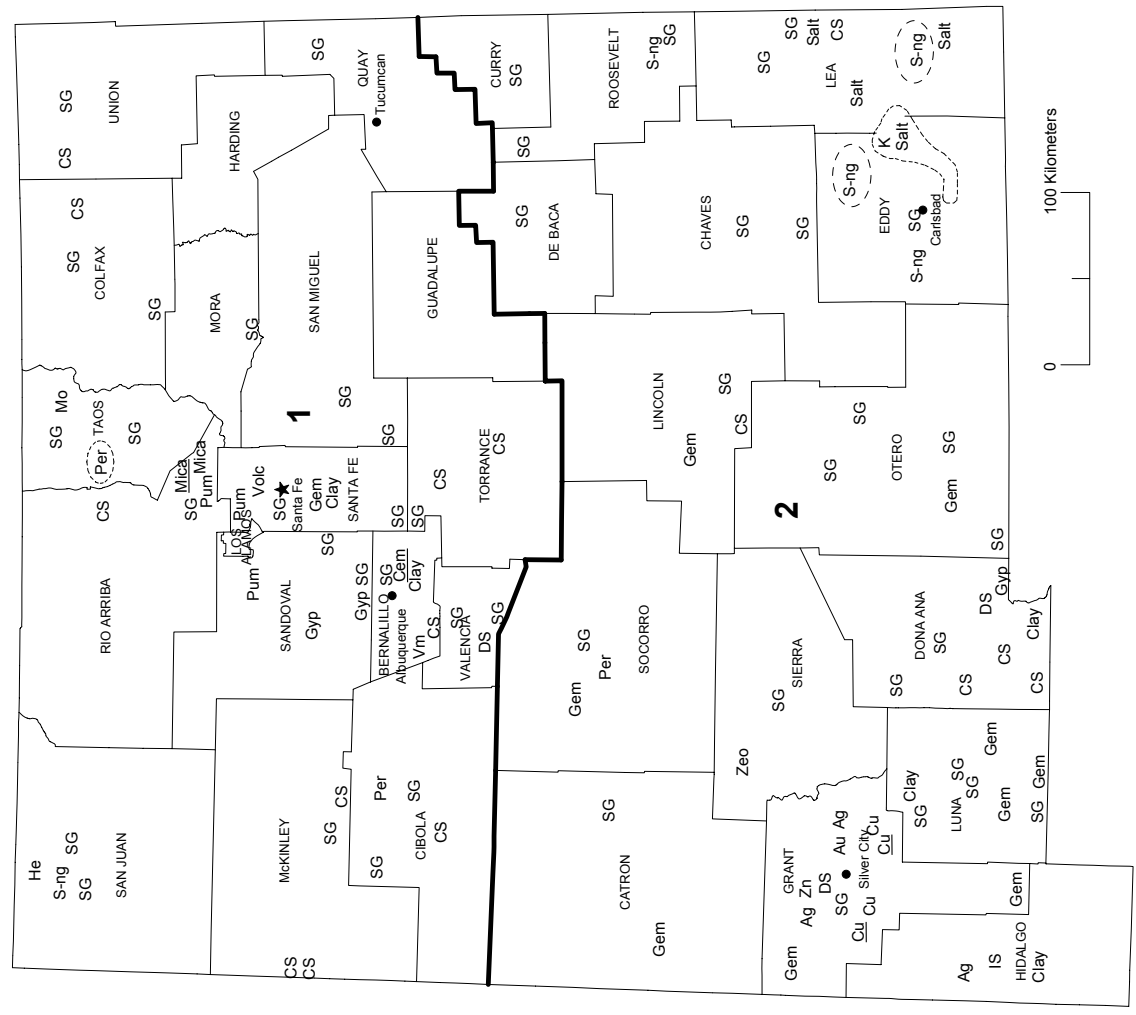


NEW MEXICO

- LEGEND**
- County boundary
 - ★ Capital
 - City
 - 1 — Crushed stone/sand and gravel districts

**MINERAL SYMBOLS
(Major producing areas)**

- Ag Silver
- Au Gold
- Cem Cement plant
- Clay Common clay
- CS Crushed stone
- Cu Copper
- Cu Copper plant
- DS Dimension stone
- Gem Gemstones
- Gyp Gypsum
- He Helium
- IS Industrial sand
- K Potash
- Mica Mica
- Mica Mica plant
- Mo Molybdenum
- Per Perlite
- Pum Pumice
- S-ng Sulfur (natural gas)
- Salt Salt
- SG Construction sand and gravel
- Vm Vermiculite
- Volc Volcanic cinder
- Zeo Zeolites
- Zn Zinc
- Concentration of mineral operations



Source: New Mexico Bureau of Mines and Mineral Resources/U.S. Geological Survey (2001)

THE MINERAL INDUSTRY OF NEW MEXICO

This chapter has been prepared under a Memorandum of Understanding between the U.S. Geological Survey and the New Mexico Bureau of Mines and Mineral Resources for collecting information on all nonfuel minerals.

In 2001, the estimated value¹ of nonfuel mineral production for New Mexico was \$614 million, based upon preliminary U.S. Geological Survey (USGS) data. This was a 22% decrease from that of 2000² and followed a 9.3% increase from 1999 to 2000. The State was 24th in rank (18th in 2000) among the 50 States in total nonfuel mineral production value and accounted for about 1.5% of the U.S. total.

The top nonfuel minerals in New Mexico were, by value, copper and potash, followed by construction sand and gravel and cement (portland and masonry). These four accounted for about 88% of the State's total nonfuel raw mineral production value. In 2001, decreases in copper, down about \$145 million, and potash, down about \$25 million, accounted for the largest portion of the State's decrease in value. Smaller yet significant decreases also existed in construction sand and gravel, mica, gold (down more than \$3.5 million), portland cement, molybdenum concentrates, perlite (down about \$2.5 million), and gypsum (descending order of change) (table 1). Relatively small increases surfaced in the values of crushed stone, salt, pumice and pumicite, and lime. In 2000, increases in the values of copper (up \$50 million), construction sand and gravel and potash (up about \$14 million each), and lime led the State's increase in value for the year. The most significant decreases were those of molybdenum, portland cement, gold, and perlite, in a range from about \$7 million down to about \$1.5 million (table 1).

Based upon USGS estimates of the quantities of minerals produced in the 50 States during 2001, New Mexico was first in the Nation in potash, perlite, and zeolites, third in copper, and fifth in molybdenum. The State rose to second from third in pumice and pumicite, decreased to third from second in mica, and was a significant producer of construction sand and gravel and dimension stone (production listings by descending order of value).

¹The 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>.

²Values, 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 New Mexico Bureau of Mines and Mineral Resources (BMMR).³ Production data in the text that follows are those reported by the BMMR and are based on the agency's own surveys and estimates. They may differ from some production figures reported to the USGS.

Copper prices continued to drop in 2001 after layoffs, cutbacks, and mine closures. Commodity exchange (COMEX) spot prices averaged \$0.76 per pound in 1999, \$0.89 per pound in 2000, and \$0.73 per pound in 2001.

The largest porphyry copper deposit in New Mexico was Phelps Dodge Corp.'s Chino Mine at Santa Rita. In 2001, Chino produced 16,600 metric tons (t) of copper in concentrates and precipitates and 54,300 t of copper by solvent extraction-electrowinning (SX-EW) process (Phelps Dodge Corp., 2002§⁴, p. 7). Estimated milling reserves in 2001 were 275 million metric tons (Mt) of 0.59% copper, and estimated leaching reserves were 407 Mt of 0.28% copper (Phelps Dodge Corp., 2002§, p. 12). The company developed a first-of-its-kind control system to guide the processing of the wide variety of ore found in the Chino deposit. The system saves costs by analyzing the ore as it comes into the concentrator and continually adjusts ore processing conditions.

Phelps Dodge's Tyrone porphyry copper mine in the Burro Mountains produced 69,300 t of electrowon copper (Phelps Dodge Corp., 2002§, p. 7). The concentrator processed approximately 272 Mt of ore grading 0.81% copper from 1969 to 1992. The mill closed and the mine began mining for leach. In 2001, leaching reserves were estimated to be 394 Mt of ore grading 0.3% copper (Phelps Dodge Corp., 2002§, p. 12). In addition, the Niagara deposit contains 450 Mt of mineralized material grading 0.29% copper as of December 2001. According to Phelps Dodge, this mineralized material could be brought into production should market conditions warrant.

In 1998, Phelps Dodge acquired Cobre Mining Co., Inc.'s operations, which include an open pit mine, two underground mines, two mills, and surrounding 4,450 hectares (ha) of land. By March 1999, all operations were suspended; the operation remained on care-and-maintenance status in 2001. Estimated milling reserves in 2001 were 120 Mt of ore grading 0.73% copper, and leaching reserves were 89 Mt of ore grading 0.35% copper (Phelps Dodge Corp., 2002§, p. 12).

Molybdenum was produced from Molycorp Inc.'s Questa Mine in Taos County. Molycorp (a subsidiary of Unocal Corp.) processed 649,000 t of crude ore in 2001 that resulted in 1,240 t molybdenum disulfide (MoS₂) of concentrate recovered. In 2001, proven reserves at Questa were 16.3 Mt of ore grading

³Virginia T. McLemore, Senior Economic Geologist, authored the information submitted by the New Mexico Bureau of Mines and Mineral Resources.

⁴References that include a section twist (§) are found in the Internet References Cited section.

0.343% MoS₂ at a cutoff grade of 0.25% MoS₂; probable reserves were 47.2 Mt of ore grading 0.315% MoS₂; and possible reserves were 3.22 Mt of ore grading 0.369% MoS₂. When proven and probable reserves are considered, the mine life is 25 to 35 years, and when resources are included, the mine life is 50 to 80 years.

Molycorp also continued with a reclamation and revegetation program to cover overburden dumps at the inactive open pit site. In 2000, Molycorp posted a \$129 million cleanup bond in response to concerns expressed by the New Mexico Environment Department about reclamation of the mine site (Paydirt, 2000). In May 2000, the U.S. Environmental Protection Agency proposed the Questa Mine for the National Priorities List; as a result, the USGS and the State of New Mexico were conducting additional hydrologic studies.

The Carlsbad potash district is the largest potash-producing area in the United States. Mississippi Potash, Inc. (a subsidiary of Mississippi Chemical Corp.) and IMC Kalium Potash Mines (a subsidiary of IMC Global Inc.) operate mines in the district. Total production for IMC Kalium in 2001 was almost 2 Mt of finished product (IMC Global Inc., 2002§, p. 6). IMC Kalium's reserves were estimated to be 169 Mt of potash ore that are estimated to yield 11.3 Mt of concentrate from sylvinitic with an average grade of 60% potassium oxide (K₂O) and 31.3 Mt of langbeinite concentrate with an average grade of 22% K₂O.

Mississippi Potash production capacity was estimated to be 1.1 million metric tons per year from its two facilities at Carlsbad. In 2001, the company sold 928,000 t (Mississippi Chemical Corp., 2002§, p. 8-10). In 2001, total reserves were estimated to be 576 Mt with an average grade of 15.2% K₂O; recoverable reserves were estimated to be 510 Mt at a grade of 14.7% K₂O.

St. Cloud Mining Co. (a subsidiary of The Goldfield Corp.) operates the largest zeolite mine in the United States at the Stone House Mine in Sierra County. The mining property consists of approximately 607 ha and contains 18.3 Mt of reserves. Clinoptilolite was mined, crushed, dried, and sized without beneficiation and was shipped packaged to meet customers' specifications. In 2001, St. Cloud produced 16,000 t of natural zeolite. The company has made several modifications to its zeolite operation, including the addition of cation exchange capacity for added value products and additional classification capabilities to expand markets for their products. The updated facility has crushing and sizing capacity of 500 metric tons per day.

Pumice is found in the Jemez Mountains and the Mogollon-Datil volcanic field. Six operations were active in New Mexico in 2001. The expansion of the El Cajete pumice mine in the Jemez Mountains in Copar Pumice County was delayed until an Environmental Impact Statement could be completed.

Only one mine, the U.S. Hill Mine (owned by Oglebay Norton Co.) in Taos County, produces mica in New Mexico. Oglebay had acquired the mine in December 1999 from Franklin Industries; in 2001, the company was the largest

producer of muscovite mica in the United States. The mine was the fourth largest scrap-mica mine in the United States and covered approximately 6 ha in 2001. The planned expansion would increase the size to 36 ha within 20 years. The nearby Picuris Pueblo (native Americans) opposed any expansion of the mine.

Two types of clay were mined in New Mexico—common and fire clay. New Mexico ranked sixth in production of fire clay in 1999; production, which comes from Luna and Grant Counties, amounted to 1,000 t.

Gemstones and semiprecious stones produced in New Mexico include agate, azurite, geodes, fluorite, moonstone, onyx, peridot, smithsonite, and turquoise. Production statistics for 1998 to 2001 are withheld. Depletion of known deposits and difficulty in and expense of adhering to Federal, State, and local environmental regulations have closed most of the commercial mines. Although garnet has not been produced in New Mexico from 1998 to 2001, at least one company was examining areas in the State having a potential to contain these resources that could be produced for use as an abrasive. Garnet typically is found in skarn deposits in southern and central New Mexico, and in some areas, it is a major constituent of waste rock piles remaining after recovery of metals (Lueth, 1996).

Other minerals produced in New Mexico in smaller amounts are helium, perlite, silica, and sulfuric acid. Helium is produced from the Shiprock and the Ute Dome fields in the San Juan Basin. Perlite is produced from three mines in New Mexico. Iron ore consisting primarily of magnetite was shipped from the magnetite tailings at Phelps Dodge's Cobre Mine in Grant County. Silica flux was mined from two quarries near the copper smelter at Hurley. Sulfuric acid was produced as a byproduct of copper smelters in Grant County.

Only one company, Quivira Mining Co. (owned by Bulletin BHP), produced uranium from 1998 to 2001 in New Mexico from waters recovered from inactive underground operations at Ambrosia Lake. Homestake Mining Co. completed reclamation drilling in January 2002 and planned to complete reclamation of the Homestake mill at Milan in 2004.

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- Phelps Dodge Corp., 2002, Form 10K, accessed April 24, 2002, at URL <http://www.sec.gov/Archives/edgar/data/78066/000095015302000502/p66069e10-k405.htm>.

TABLE 1
NONFUEL RAW MINERAL PRODUCTION IN NEW MEXICO 1/ 2/

(Thousand metric tons and thousand dollars unless otherwise specified)

Mineral	1999		2000		2001 p/	
	Quantity	Value	Quantity	Value	Quantity	Value
Clays:						
Common	W	W	34	256	34	256
Fire	1	W	--	--	--	--
Copper 3/	197	330,000	195	380,000 r/	140	235,000
Gemstones	NA	13	NA	27	NA	33
Sand and gravel, construction	10,600	53,000	13,400	66,800	12,000	60,600
Stone:						
Crushed	3,710 r/	22,200	3,690	22,400	3,700	23,100
Dimension metric tons	17,900	2,320	W	W	W	W
Zeolites do.	(4/)	NA	(4/)	NA	(4/)	NA
Combined values of cement, gold, gypsum (crude), iron ore (usable), lime (2000-01), mica (crude), molybdenum concentrates, perlite (crude), potash, pumice and pumicite, salt, sand and gravel (industrial), silver, and values indicated by symbol W	XX	311,000 r/	XX	317,000 r/	XX	295,000
Total	XX	719,000 r/	XX	786,000 r/	XX	295,000

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

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.

3/ Recoverable content of ores, etc.

4/ Withheld to avoid disclosing company proprietary data.

TABLE 2
NEW MEXICO: 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	17 r/	2,000	\$7,750	\$3.87	17	2,200	\$9,320	\$4.25
Granite	2	W	W	8.64	2	W	W	10.08
Sandstone	--	--	--	--	1	W	W	9.72
Volcanic cinder and scoria	7 r/	W	W	11.80 r/	7	W	W	12.12
Miscellaneous stone	15	364	2,060	5.66	15	637	3,830	6.01
Total or average	XX	3,710 r/	22,200	5.98	XX	3,690	22,400	6.07

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

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

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

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Construction:			
Coarse aggregate (+1 1/2 inch):			
Riprap and jetty stone	93	\$658	\$7.08
Filter stone	1	5	5.00
Other coarse aggregate	1	5	5.00
Total or average	95	668	7.03
Coarse aggregate, graded:			
Concrete aggregate, coarse	237	1,560	6.58
Bituminous aggregate, coarse	W	W	10.40
Bituminous surface-treatment aggregate	114	1,230	10.80
Railroad ballast	W	W	10.50
Other graded coarse aggregate	696	4,600	6.60
Total or average	1,050	7,390	7.06
Fine aggregate (-3/8 inch):			
Stone sand, concrete	110	577	5.25
Screening, undesignated	W	W	7.73
Other fine aggregate	42	288	6.86
Total or average	152	865	5.69
Coarse and fine aggregates:			
Graded road base or subbase	160	789	4.93
Terrazzo and exposed aggregate	W	W	27.81
Crusher run or fill or waste	89	348	3.91
Roofing granules	W	W	15.50
Other coarse and fine aggregates	104	2,700	25.91
Total or average	353	3,830	10.86
Other construction materials	151	932	6.17
Agricultural, poultry grit and mineral food	(3/)	(3/)	(3/)
Unspecified: 4/			
Reported	877	4,430	5.05
Estimated	1,000	4,300	4.23
Total or average	1,890	8,710	4.61
Grand total or average	3,690	22,400	6.07

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 granite, limestone, miscellaneous stone, sandstone, and volcanic cinder and scoria.

3/ Less than 1/2 unit.

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

TABLE 4
NEW MEXICO: 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		Unspecified districts	
	Quantity	Value	Quantity	Value	Quantity	Value
Construction:						
Coarse aggregate (+1 1/2 inch) 3/	W	W	W	W	--	--
Coarse aggregate, graded 4/	W	W	W	W	--	--
Fine aggregate (-3/8 inch) 5/	W	W	W	W	--	--
Coarse and fine aggregate 6/	213	3,210	140	621	--	--
Other construction materials	17	106	134	826	--	--
Agricultural 7/	(8/)	(8/)	--	--	--	--
Unspecified: 9/						
Reported	84	489	422	1,770	371	2,170
Estimated	780	3,330	230	1,000	--	--
Total	2,060	14,000	1,260	6,230	371	2,170

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/ Includes granite, limestone, miscellaneous stone, sandstone, and volcanic cinder and scoria.

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

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

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

6/ Includes crusher run (select material or fill), graded road base or subbase, roofing granules, terrazzo and exposed aggregate, and other coarse and fine aggregates.

7/ Includes poultry grit and mineral food.

8/ Less than 1/2 unit.

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

TABLE 5
NEW MEXICO: 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)	2,310	\$16,800	\$7.28
Plaster and gunite sands	202	1,110	5.49
Concrete products (blocks, bricks, pipe, decorative, etc.)	26	400	15.38
Asphaltic concrete aggregates and other bituminous mixtures	1,150	6,990	6.07
Road base and coverings	1,670	7,930	4.74
Fill	301	926	3.08
Snow and ice control	18	98	5.44
Other miscellaneous uses 2/	41	285	6.95
Unspecified: 3/			
Reported	5,270	18,800	3.56
Estimated	2,400	14,000	5.55
Total or average	13,400	66,800	4.97

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

2/ Includes railroad ballast, and snow and ice control.

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

TABLE 6
 NEW MEXICO: 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		Unspecified districts	
	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregate (including concrete sand)	1,700	13,500	609	3,270	--	--
Concrete products (blocks, bricks, pipe, decorative, etc.) 2/	126	1,030	103	481	--	--
Asphaltic concrete aggregates and road base materials	2,190	12,000	638	2,940	--	--
Other miscellaneous uses 3/	159	591	202	718	--	--
Unspecified: 4/						
Reported	2,590	11,700	828	3,990	1,860	3,080
Estimated	1,200	7,500	1,200	6,000	--	--
Total	7,940	46,300	3,620	17,400	1,860	3,080

-- Zero.

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 fill, railroad ballast, and snow and ice control.

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