



# 2008 Minerals Yearbook

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## ARIZONA

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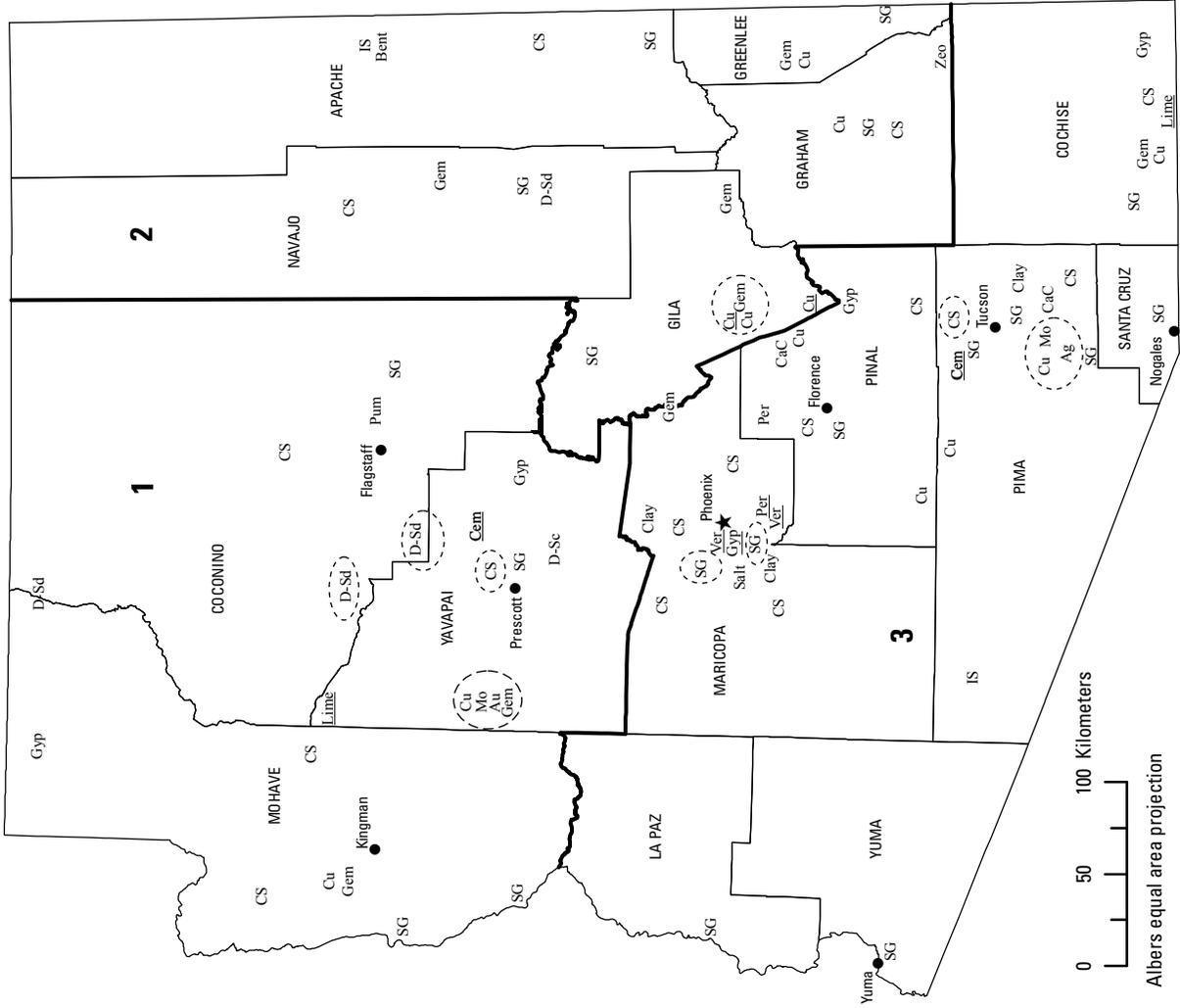
# ARIZONA

**LEGEND**

- County boundary
- ★ Capital
- City
- 1— Crushed stone/sand and gravel district boundary

**MINERAL SYMBOLS  
(Principal producing areas)**

- Ag Silver
- Au Gold
- Bent Bentonite
- CaC Calcium carbonate
- Cem Cement plant and quarry
- Clay Common clay
- CS Crushed stone
- Cu Copper
- Cu Copper plant
- D-Sd Dimension sandstone
- D-Sc Dimension schist/onyx
- Gem Gemstones
- Gyp Gypsum
- Gyp Gypsum plant
- IS Industrial sand
- Lime Lime plant and quarry
- Mo Molybdenum
- Per Perlite
- Per Perlite plant
- Pum Pumice and pumicite
- Salt Salt
- SG Construction sand and gravel
- Ver Vermiculite plant
- Zeo Zeolites
- Concentration of mineral operations



Source: Arizona Department of Mines and Mineral Resources/U.S. Geological Survey (2008).

# THE MINERAL INDUSTRY OF ARIZONA

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

In 2008, Arizona's nonfuel raw mineral production<sup>1</sup> was valued at \$7.84 billion, based upon annual U.S. Geological Survey (USGS) data. This was a \$561 million, or 7.7%, increase from the State's total nonfuel mineral value in 2007, which had increased by \$517 million, or 7.7%, from that of 2006. In 2008, for the fourth consecutive year, Arizona led the Nation in total nonfuel mineral production value, accounting for 11% of the U.S. total.

Arizona continued to be the leading copper-producing State in 2008, accounting for 64% of total U.S. copper production. Additionally, copper continued to be the State's leading mineral commodity by value, comprising 75% of Arizona's total nonfuel mineral production value. Following, in descending order of value, were molybdenum, construction sand and gravel, portland cement, crushed stone, and lime (table 1). The combined value of these six mineral commodities comprised 99% of the State's total production value.

The increase in Arizona's total production value was led by increases in the values of copper, molybdenum, silver, dimension stone (values withheld—company proprietary data), and lime (listed in descending order of change). Copper value increased by \$590 million, or 11%, with a greater than 14% increase in quantity produced. Despite significant increases

<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 2008 USGS mineral production data published in this chapter are those available as of July 2010. 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>.

in both value and quantity, the unit value of copper dropped nearly 3%. The production value of molybdenum increased by 15% and the value of silver increased by 46%, with a 32% increase in quantity produced. Lime value increased by nearly 6%. Smaller yet significant increases also took place in the values of gold, salt, pumice, and pumicite (listed in descending order of change). The largest decreases in value took place in the production values of construction sand and gravel, down \$96 million, or nearly 15%; portland cement, down 21%; and crushed stone, down \$14 million or nearly 9%. Smaller yet significant decreases took place in masonry cement, gypsum, and bentonite clay.

In 2008, Arizona rose to first from second in rank in the production of pumice and pumicite of seven producing States. The State also rose to second from third in the production of molybdenum and to fifth from sixth in the production of silver and dimension stone. Arizona remained ranked 3d in the production of crude perlite and construction sand and gravel, 5th in zeolites, 10th in gypsum, and 12th in lime. The State dropped in rank from 7th to 8th in the production of bentonite clay, 9th to 10th in gold production, and 13th to 14th in salt production. The State also decreased in rank in the production of masonry and portland cement. Arizona continued to be a significant producer of raw steel in 2008 (American Iron and Steel Institute, 2008, p. 74).

## Reference Cited

American Iron and Steel Institute, 2008, Table 24—Raw steel production by States, *in* American Iron and Steel Institute—AISI 2008 Annual Statistical Report: Washington, DC, American Iron and Steel Institute, 126 p.

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

(Thousand metric tons and thousand dollars)

Mineral	2006		2007		2008	
	Quantity	Value	Quantity	Value	Quantity	Value
Clays, bentonite	34	1,710	30	1,520	23	1,220
Copper <sup>3</sup>	712	4,950,000	731	5,290,000	836	5,880,000
Gemstones, natural	NA	1,560	NA	1,950	NA	1,960
Sand and gravel, construction	94,100 <sup>r</sup>	662,000	85,800	652,000	66,600	556,000
Stone:						
Crushed	15,000 <sup>r</sup>	123,000 <sup>r</sup>	17,100 <sup>r</sup>	157,000 <sup>r</sup>	14,400	143,000
Dimension	W	W	W	W	123	16,400
Combined values of cement, clays (common), gold, gypsum (crude), lime, molybdenum concentrates, perlite (crude), pumice and pumicite, salt, sand and gravel (industrial), silver, zeolites, and values indicated by symbol W	XX	1,030,000 <sup>r</sup>	XX	1,180,000 <sup>r</sup>	XX	1,240,000
Total	XX	6,760,000 <sup>r</sup>	XX	7,280,000 <sup>r</sup>	XX	7,840,000

<sup>r</sup>Revised. NA Not available. W Withheld to avoid disclosing company proprietary data. Withheld values included in "Combined values" data. 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 no more than three significant digits; may not add to totals shown.

<sup>3</sup>Recoverable content of ores, etc.

TABLE 2  
ARIZONA: CRUSHED STONE SOLD OR USED, BY TYPE<sup>1</sup>

Type	2007			2008		
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Number of quarries	Quantity (thousand metric tons)	Value (thousands)
Limestone <sup>2</sup>	8	6,520	\$69,700	11	6,730	\$86,400
Marble	2	430 <sup>r</sup>	4,040 <sup>r</sup>	--	50	492
Granite	25	5,030	48,500	29	3,390	27,700
Traprock	4	271	2,470	2	317	3,140
Sandstone and quartzite	5 <sup>r</sup>	760 <sup>r</sup>	7,010 <sup>r</sup>	4	536	5,310
Volcanic cinder and scoria	5	81	684	5	55	508
Miscellaneous stone	22 <sup>r</sup>	3,980 <sup>r</sup>	24,300 <sup>r</sup>	19	3,310	19,100
Total	XX	17,100 <sup>r</sup>	157,000 <sup>r</sup>	XX	14,400	143,000

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

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

<sup>2</sup>Includes limestone-dolomite reported with no distinction between the two.

TABLE 3  
ARIZONA: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2008, 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	44	511
Filter stone	W	W
Other coarse aggregate	1	4
Coarse aggregate, graded:		
Concrete aggregate, coarse	W	W
Bituminous aggregate, coarse	W	W
Other graded coarse aggregate	397	3,730
Fine aggregate (-¾ inch):		
Stone sand, concrete	W	W
Stone sand, bituminous mix or seal	W	W
Other fine aggregate	243	810
Coarse and fine aggregates:		
Graded road base or subbase	428	2,490
Terrazzo and exposed aggregate	W	W
Other coarse and fine aggregates	108	663
Other construction materials	492	1,370
<b>Agricultural:</b>		
Limestone	W	W
Poultry grit and mineral food	W	W
<b>Chemical and metallurgical:</b>		
Cement manufacture	W	W
Lime manufacture	W	W
Sulfur oxide removal	W	W
Other miscellaneous uses and specified uses not listed	6	46
<b>Unspecified:<sup>2</sup></b>		
Reported	2,530	12,300
Estimated	6,100	61,000
<b>Total</b>	<b>14,400</b>	<b>143,000</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.

TABLE 4  
ARIZONA: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2008, BY USE AND DISTRICT<sup>1</sup>

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3		Unspecified districts	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Construction:								
Coarse aggregate (+1½ inch) <sup>2</sup>	W	W	W	W	W	W	--	--
Coarse aggregate, graded <sup>3</sup>	--	--	--	--	511	4,990	--	--
Fine aggregate (-¾ inch) <sup>4</sup>	--	--	--	--	788	5,970	--	--
Coarse and fine aggregates <sup>5</sup>	W	W	W	W	W	W	--	--
Other construction materials	38	373	--	--	454	1,000	--	--
Agricultural <sup>6</sup>	--	--	--	--	W	W	--	--
Chemical and metallurgical <sup>7</sup>	W	W	--	--	W	W	--	--
Other miscellaneous uses	6	46	--	--	--	--	--	--
Unspecified: <sup>8</sup>								
Reported	55	507	33	304	931	9,230	1,510	2,260
Estimated	2,000	20,000	701	6,900	3,400	34,000	--	--
Total	3,650	36,300	782	7,510	8,440	96,600	1,510	2,260

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

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

<sup>2</sup>Includes riprap and jetty stone, filter stone, and other coarse aggregate.

<sup>3</sup>Includes concrete aggregate (coarse), bituminous aggregate (coarse), and other graded coarse aggregate.

<sup>4</sup>Includes stone sand (concrete), stone sand (bituminous mix or seal), and other fine aggregate.

<sup>5</sup>Includes graded road base or subbase, terrazzo and exposed aggregate, and other coarse and fine aggregates.

<sup>6</sup>Includes limestone and poultry grit and mineral food.

<sup>7</sup>Includes cement and lime manufacture and sulfur oxide removal.

<sup>8</sup>Reported and estimated production without a breakdown by end use.

TABLE 5  
ARIZONA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2008,  
BY MAJOR USE CATEGORY<sup>1</sup>

Use	Quantity	Value (thousands)	Unit value
	(thousand metric tons)		
Concrete aggregate (including concrete sand)	6,930	\$65,100	\$9.40
Concrete products (blocks, bricks, pipe, decorative, etc.) <sup>2</sup>	2,590	14,100	5.44
Asphaltic concrete aggregates and other bituminous mixtures	2,670	41,100	15.40
Road base and coverings <sup>3</sup>	7,090	49,200	6.94
Fill	928	7,460	8.04
Snow and ice control	2	42	21.00
Other miscellaneous uses <sup>4</sup>	129	2,230	17.31
Unspecified: <sup>5</sup>			
Reported	23,500	182,000	7.75
Estimated	23,000	200,000	8.56
Total or average	66,600	556,000	8.35

<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 sands.

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

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

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

TABLE 6  
ARIZONA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2008, BY USE AND DISTRICT<sup>1</sup>

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3	
	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregate (including concrete sand)	756	10,800	344	2,440	5,830	51,900
Concrete products (blocks, bricks, pipe, decorative, etc.) <sup>2</sup>	48	566	25	357	2,520	13,200
Asphaltic concrete aggregates and other bituminous mixtures	309	13,800	W	W	W	W
Road base and coverings <sup>3</sup>	690	4,640	279	2,390	4,920	33,900
Fill	167	1,020	22	148	739	6,300
Other miscellaneous uses <sup>4</sup>	64	497	141	2,750	1,830	21,600
Unspecified: <sup>5</sup>						
Reported	2,780	21,400	500	7,980	19,700	152,000
Estimated	2,400	21,000	2,200	19,000	18,000	160,000
Total	7,250	73,400	3,500	34,800	53,700	434,000
	Unspecified district					
	Quantity	Value				
Concrete aggregate (including concrete sand)	--	--				
Concrete products (blocks, bricks, pipe, decorative, etc.) <sup>2</sup>	--	--				
Asphaltic concrete aggregates and other bituminous mixtures	456	4,770				
Road base and coverings <sup>3</sup>	1,200	8,260				
Fill	--	--				
Other miscellaneous uses <sup>4</sup>	--	--				
Unspecified: <sup>5</sup>						
Reported	523	1,070				
Estimated	--	--				
Total	2,180	14,100				

W Withheld to avoid disclosing company proprietary data; included in "Other miscellaneous uses." -- Zero.

<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 and lime).

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

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