



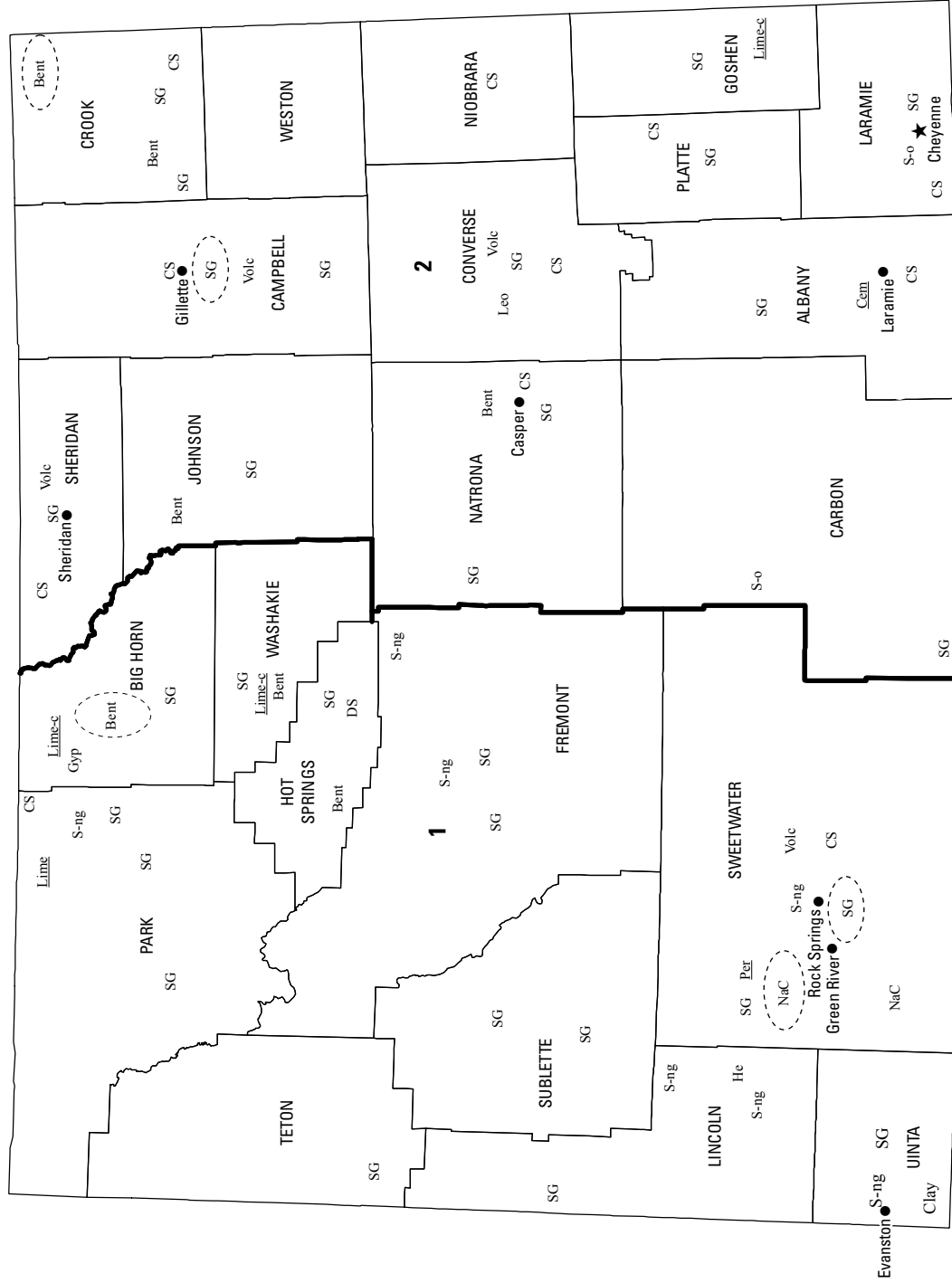
# 2012–2013 Minerals Yearbook

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## WYOMING

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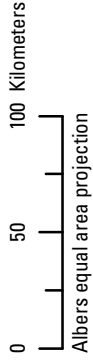


**LEGEND**

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

**MINERAL SYMBOLS (Principal producing areas)**

- Bent Bentonite
- Cem Cement plant
- Clay Common clay
- CS Crushed stone
- DS Dimension stone
- Gyp Gypsum
- He Helium
- Leo Leonardite
- Lime Lime plant
- Lime-c Lime plant (captive)
- NaC Sodium carbonate
- Per Perlite plant
- SG Construction sand and gravel
- S-ng Sulfur (natural gas)
- S-o Sulfur (oil)
- Volc Volcanic cinder
- Concentration of mineral operations



# THE MINERAL INDUSTRY OF WYOMING

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

In 2013, the value of the nonfuel mineral production<sup>1</sup> in the State of Wyoming decreased to \$2.26 billion, 3.0% of the total U.S. nonfuel mineral production, ranking it 11th in the Nation. In 2012, the corresponding value was \$2.33 billion, 3.1% of the U.S. total nonfuel mineral production, ranking it 9th among the 50 States. In 2013, on a per capita basis, nonfuel mineral production in Wyoming had a value of \$3,880 compared with the national average of \$238. In 2012, the per capita value was \$4,040 compared with the national average of \$241.

The value of nonfuel mineral production in Wyoming for the years 2006 through 2013 was as follows (in billions of dollars): \$1.59 (2006), \$1.76 (2007), \$2.03 (2008), \$1.80 (2009), \$1.87 (2010), \$2.12 (2011), \$2.33 (2012), and \$2.26 (2013).

In 2013, there were 1,574 employees in nonfuel mineral mines in Wyoming and 1,893 in mills and preparation plants. In 2012, the corresponding numbers were 1,653 in nonfuel mineral mines and 1,900 in mills and preparation plants (U.S. Mine Safety and Health Administration, 2013, p. 17; 2014, p. 17). In 2013, the average annual wage in Wyoming for all mining was \$82,416 compared with \$44,699 for all industries. In 2012, the corresponding figures were \$80,774 and \$44,309, respectively (National Mining Association, unpub. data, February 4, 2016).

## Commodity Review

### *Industrial Minerals*

In 2012–13, Wyoming produced a variety of industrial minerals and was the leading producer of bentonite. Bentonite in Wyoming consisted primarily of the sodium-containing swelling bentonite rather than the nonswelling calcium-containing bentonite. Wyoming produced 97% of the U.S. output of swelling bentonite in 2013, up from 90% in 2012 (Virta, 2014, 2015), and was produced by several companies operating in Big Horn, Crook, Johnson, Natrona, and Washakie Counties. The swelling-bentonite industry continued to experience increased demand, especially for use in oil and gas well drilling, and there were an increasing number of bentonite mining permits being requested from the Bureau of Land Management to ensure that future demand could be met (Kidston, 2012).

Wyoming had five of the six active U.S. soda ash operations, and underground mines extracted trona in the Green River Basin

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<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 USGS mineral production data published in this chapter are those available as of February 2016. Data in this report are rounded to three significant digits and percentages are calculated from unrounded data. All USGS Mineral Industry Surveys and USGS Minerals Yearbook chapters—mineral commodity, State, and country—can be retrieved over the Internet at <http://minerals.usgs.gov/minerals>.

in Sweetwater County, one of the world’s largest deposits. The Bureau of Land Management leased about 30,000 hectares (74,130 acres) to operators in this area (Bureau of Land Management, undated). The United States was a significant exporter of soda ash, producing about 22% of the world’s total in 2012 and in 2013 and exporting more than half of the annual U.S. production. Wyoming’s soda ash plants accounted for 85% of nameplate capacity for soda ash in the United States (Bolen, 2015).

Wyoming is a major producer of coal, and also produces natural gas and crude petroleum. Helium was one important byproduct commodity of the energy industry in Wyoming. One plant continued operating in Lincoln County, producing crude and Grade-A helium as a byproduct of natural gas. Another helium plant was still under construction, with production expected in early 2014. Like the existing plant, it would also draw from one of the largest natural gas fields in the United States—the LaBarge Field—for its helium. The plant was originally scheduled to be operational in 2011 (Cockerill, 2014). Sulfur was another byproduct of the petroleum industry, extracted at one petroleum refinery and at two natural gas plants.

A variety of types of crushed stone was produced in Wyoming, including a significant amount of limestone, scoria, and volcanic cinder. In 2012, there were more volcanic cinder operations than limestone operations active in the State before activity at these operations decreased in 2013 (table 2). Mountain Cement Company produced cement at one cement plant near Laramie, and operated two associated limestone quarries, two shale quarries, and a gypsum quarry (Mountain Cement Company, 2015). Gypsum was also mined for wallboard manufacture, and clay for brick manufacture. Lime, in the form of high-calcium quicklime, was produced for internal consumption at three plants for sugar beet processing, and at one commercial plant from purchased raw materials.

### *Metals*

No metals were produced in Wyoming in 2012–2013; however, the permitting process continued for the Bear Lodge Project for rare earths, with a formal Environmental Impact Statement to be undertaken as the next step (Rare Element Resources Ltd., 2013). Exploration for gold continued at the Rattlesnake Hills Project and an NI 43–101 technical report was completed in 2012 (Evolving Gold Corp., 2012).

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

(Thousand metric tons and thousand dollars)

Mineral	2011		2012		2013	
	Quantity	Value	Quantity	Value	Quantity	Value
Clays, bentonite	4,510 <sup>r</sup>	263,000 <sup>r</sup>	1,500	267,000	4,000	253,000
Gemstones, natural	NA	15	NA	19	NA	18
Sand and gravel, construction	12,500 <sup>r</sup>	89,800 <sup>r</sup>	11,800	100,000	12,600	95,100
Stone, crushed	11,500	51,300 <sup>r</sup>	11,400	50,500	9,380	39,300
Combined values of cement (portland), clays (common), gypsum (crude), helium (Grade-A), lime, soda ash, stone [dimension (2012)]	XX	1,710,000	XX	1,910,000	XX	1,880,000
Total	XX	2,120,000 <sup>r</sup>	XX	2,330,000	XX	2,260,000

<sup>r</sup>Revised. NA Not available. 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.

TABLE 2  
WYOMING: CRUSHED STONE SOLD OR USED IN THE UNITED STATES, BY TYPE<sup>1</sup>

Type	2012				2013			
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value
Limestone <sup>2</sup>	14	3,680	\$20,800	\$5.66	11	3,110	\$15,000	\$4.83
Granite	1	1,970	12,500	6.34	1	1,600	10,400	6.52
Sandstone and quartzite <sup>3</sup>	1	385	1,700	4.41	1	318	1,560	4.92
Volcanic cinder and scoria	15	1,760	8,680	4.93	5	865	4,400	5.08
Miscellaneous stone	10	3,650	6,820	1.87	9	3,490	7,940	2.27
Total or average	XX	11,400	50,500	4.41	XX	9,380	39,300	4.19

XX Not applicable.

<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 limestone-dolomite reported with no distinction between the two kinds of stone.

<sup>3</sup>Includes sandstone-quartzite reported with no distinction between the two kinds of stone.

TABLE 3  
WYOMING: CRUSHED STONE SOLD OR USED BY PRODUCERS, BY USE<sup>1</sup>

Use	2012			2013		
	Quantity (thousand metric tons)	Value (thousands)	Unit value	Quantity (thousand metric tons)	Value (thousands)	Unit value
<b>Construction:</b>						
Coarse aggregate (+1½ inch):						
Riprap and jetty stone	W	W	W	3	\$16	\$ 5.37
Unspecified coarse aggregate	--	--	--	3	19	6.91
Coarse aggregate, graded:						
Concrete aggregate, coarse	99	\$993	\$10.03	88	720	8.21
Bituminous aggregate, coarse	--	--	--	6	49	8.26
Bituminous surface-treatment aggregate	1	9	8.68	--	--	--
Unspecified graded coarse aggregate	--	--	--	3	10	3.19
Fine aggregate (-¾ inch):						
Stone sand, concrete	128	629	4.91	--	--	--
Stone sand, bituminous mix or seal	--	--	--	29	181	6.25
Coarse and fine aggregates:						
Graded road base or subbase	204	2,610	12.78	117	1,190	10.16
Unpaved road surface	9	111	12.34	W	W	W
Terrazzo and exposed aggregate	W	W	W	--	--	--
Crusher run or fill or waste	1	4	3.51	9	47	5.41
Unspecified and other construction materials	--	--	--	28	171	6.22
<b>Chemical and metallurgical:</b>						
Cement manufacture	1,030	4,660	4.51	1,130	2,330	2.06
Other miscellaneous uses and specified uses not listed						
Unspecified: <sup>2</sup>						
Reported	9,950	41,400	4.16	7,960	34,400	4.32
Estimated	--	--	--	--	--	--
Total or average	11,400	50,500	4.41	9,380	39,300	4.19

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, except unit value; may not add to totals shown.

<sup>2</sup>Reported and estimated production without a breakdown by end use.

TABLE 4  
WYOMING: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2012, BY USE AND DISTRICT<sup>1</sup>

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		Unspecified districts	
	Quantity	Value	Quantity	Value	Quantity	Value
<b>Construction:</b>						
Coarse aggregate (+1½ inch) <sup>2</sup>	W	W	W	W	--	--
Coarse aggregate, graded <sup>3</sup>	W	W	W	W	--	--
Fine aggregate (-¾ inch) <sup>4</sup>	--	--	128	629	--	--
Coarse and fine aggregates <sup>5</sup>	W	W	W	W	--	--
Other construction materials	--	--	--	--	--	--
Agricultural	--	--	--	--	--	--
Chemical and metallurgical <sup>6</sup>	--	--	1,030	4,660	--	--
Special	--	--	--	--	--	--
Other miscellaneous uses and specified uses not listed	--	--	--	--	--	--
<b>Unspecified:<sup>7</sup></b>						
Reported	514	2,330	6,770	37,800	2,670	1,240
Estimated	--	--	--	--	--	--
<b>Total</b>	<b>576</b>	<b>3,090</b>	<b>8,190</b>	<b>46,200</b>	<b>2,670</b>	<b>1,240</b>

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.

<sup>3</sup>Includes concrete aggregate (coarse) and bituminous surface-treatment aggregate.

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

<sup>5</sup>Includes graded road base or subbase, unpaved road surface, terrazzo and exposed aggregate, and crusher run.

<sup>6</sup>Includes cement manufacture.

<sup>7</sup>Reported and estimated production without a breakdown by end use.

TABLE 5  
WYOMING: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2013, BY USE AND DISTRICT<sup>1</sup>

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		Unspecified districts	
	Quantity	Value	Quantity	Value	Quantity	Value
<b>Construction:</b>						
Coarse aggregate (+1½ inch) <sup>2</sup>	--	--	6	35	--	--
Coarse aggregate, graded <sup>3</sup>	--	--	97	799	--	--
Fine aggregate (-¾ inch) <sup>4</sup>	W	W	W	W	--	--
Coarse and fine aggregates <sup>5</sup>	W	W	W	W	--	--
Other construction materials	--	--	28	171	--	--
Agricultural	--	--	--	--	--	--
Chemical and metallurgical <sup>6</sup>	--	--	1,130	2,330	--	--
Special	--	--	--	--	--	--
Other miscellaneous uses and specified uses not listed	--	--	--	--	--	--
<b>Unspecified:<sup>7</sup></b>						
Reported	449	2,210	5,490	31,200	2,020	1,030
Estimated	--	--	--	--	--	--
<b>Total</b>	<b>496</b>	<b>2,990</b>	<b>6,870</b>	<b>35,300</b>	<b>2,020</b>	<b>1,030</b>

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.

<sup>3</sup>Includes concrete aggregate (coarse) and bituminous surface-treatment aggregate.

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

<sup>5</sup>Includes graded road base or subbase, unpaved road surface, terrazzo and exposed aggregate, and crusher run.

<sup>6</sup>Includes cement manufacture.

<sup>7</sup>Reported and estimated production without a breakdown by end use.

TABLE 6  
WYOMING: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2012,  
BY MAJOR USE CATEGORY<sup>1</sup>

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate (including concrete sand)	782	\$9,690	\$12.39
Plaster and gunitite sands	16	\$122	7.63
Asphaltic concrete aggregates and other bituminous mixtures	431	5,850	13.57
Road base and coverings <sup>2</sup>	2,380	24,200	10.19
Fill	147	817	5.56
Other miscellaneous uses <sup>3</sup>	45	534	11.87
Unspecified: <sup>4</sup>			
Reported	6,190	43,900	7.09
Estimated	1,790	15,000	8.42
Total or average	11,800	100,000	8.51

<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 road and other stabilization (cement and lime).

<sup>3</sup>Includes railroad ballast, and snow and ice control.

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

TABLE 7  
WYOMING: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2013,  
BY MAJOR USE CATEGORY<sup>1</sup>

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate and concrete products <sup>2</sup>	349	\$4,910	\$14.06
Asphaltic concrete aggregates and other bituminous mixtures	334	3,520	10.54
Road base and coverings	1,410	13,000	9.21
Fill	120	509	4.24
Other miscellaneous uses <sup>3</sup>	50	881	17.62
Unspecified: <sup>4</sup>			
Reported	7,530	49,100	6.52
Estimated	2,830	23,200	8.18
Total or average	12,600	95,100	7.53

<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 gunitite sands.

<sup>3</sup>Includes railroad ballast, and snow and ice control.

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

TABLE 8  
WYOMING: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2012,  
BY USE AND DISTRICT<sup>1</sup>

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		Unspecified districts	
	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregate (including concrete sand) <sup>2</sup>	W	W	W	W	45	444
Asphaltic concrete aggregates and road base materials <sup>3</sup>	W	W	W	W	61	435
Fill	95	520	52	297	--	--
Other miscellaneous uses <sup>4</sup>	32	385	14	149	--	--
Unspecified: <sup>5</sup>						
Reported	1,420	10,300	2,460	20,900	2,310	12,700
Estimated	762	6,390	966	8,160	56	479
Total	3,960	37,400	5,340	48,700	2,470	14,000

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 plaster and gunitite sands.

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

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

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

TABLE 9  
WYOMING: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2013,  
BY USE AND DISTRICT<sup>1</sup>

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		Unspecified districts	
	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregate and concrete products <sup>2</sup>	W	W	W	W	W	W
Asphaltic concrete aggregates and road base materials	W	W	W	W	W	W
Fill	97	382	23	127	--	--
Other miscellaneous uses <sup>3</sup>	27	519	22	362	--	--
Unspecified: <sup>4</sup>						
Reported	1,340	9,630	4,010	30,200	2,180	9,290
Estimated	681	5,940	2,090	16,800	61	451
Total	3,330	29,700	6,840	54,000	2,460	11,300

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 plaster and gunitite sands.

<sup>3</sup>Includes railroad ballast, and snow and ice control.

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