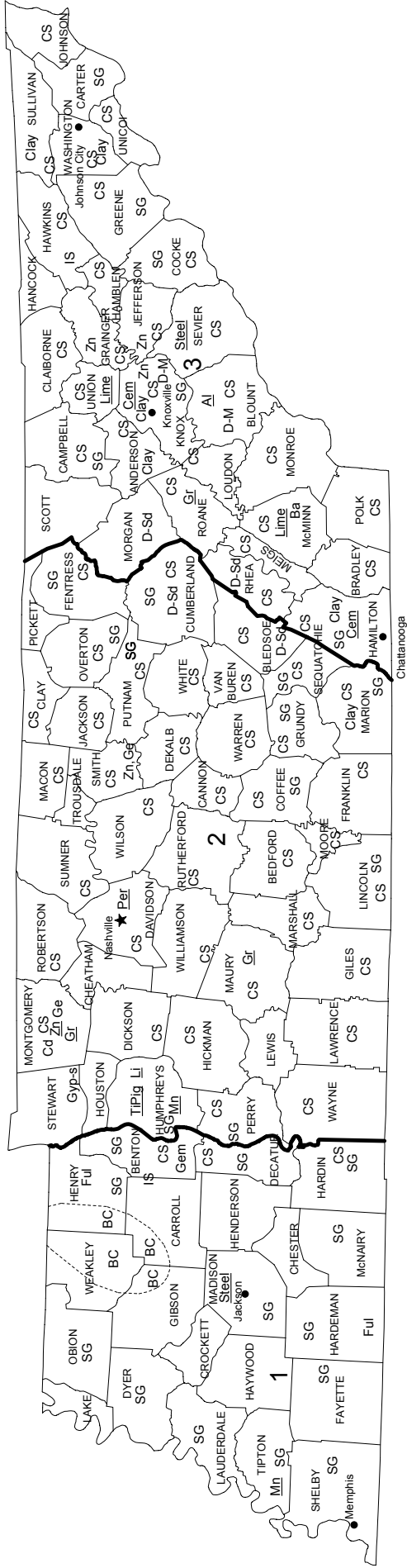


# TENNESSEE



## LEGEND

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

## MINERAL SYMBOLS (Major producing areas)

Al	Aluminum plant	Gyp-s	Synthetic gypsum
Ba	Barite	IS	Industrial sand
BC	Ball clay	Li	Lithium plant
Cd	Cadmium (See Zn)	Lime	Lime plant
Cem	Cement plant	Mn	Manganese dioxide plant
Clay	Common clay	Per	Perlite plant
CS	Crushed stone	SG	Construction sand and gravel
D-M	Dimension marble	Steel	Steel plant
D-Sd	Dimension sandstone	TiPlg	Titanium dioxide pigment plant
Ful	Fuller's earth	Zn	Zinc
Ge	Germanium	Zn	Zinc plant (Cd byproduct cadmium) (Ge byproduct germanium)
Gem	Gemstones		
Gr	Graphite plant		



# THE MINERAL INDUSTRY OF TENNESSEE

**This chapter has been prepared under a Memorandum of Understanding between the U.S. Geological Survey and the Tennessee Department of Environment and Conservation, Division of Geology, for collecting information on all nonfuel minerals.**

In 2001, the estimated value<sup>1</sup> of nonfuel raw mineral production for Tennessee was \$708 million, based upon preliminary U.S. Geological Survey (USGS) data. This was about a 5% decrease from that of 2000<sup>2</sup> and followed a 2.6% increase from 1999 to 2000. Tennessee was 21st in rank (20th in 2000) among the 50 States in total nonfuel mineral production value, of which the State accounted for nearly 2% of the U.S. total.

Crushed stone has been Tennessee's leading mineral commodity, by value, for more than 25 years, except for 1981 when zinc was first. In 2001, crushed stone accounted for about one-half of the State's total nonfuel mineral production value. Zinc was the second leading nonfuel mineral, followed by portland cement, construction sand and gravel, and ball clay. In 2000, these rankings were the same, but zinc, with an increase of more than \$35 million compared with that of 1999, had the greatest affect on the State's nonfuel mineral economy. Portland cement and industrial sand and gravel were up about \$2 million each and lime was up \$1 million. The largest decreases in value occurred for crushed stone, down \$11 million; construction sand and gravel, down \$6.1 million; and fuller's earth, down slightly more than \$3 million (table 1). All other changes were small relative to these.

Compared with USGS estimates of the quantities produced in the 50 States in 2001, Tennessee remained the leading gemstone and ball-clay-producing State, 2d in zinc, 3d of 3 barite-producing States, 8th in fuller's earth, 10th in industrial sand and gravel, and a significant producer of crushed stone, portland cement, and lime (descending order of value). Primary aluminum and raw steel were produced in Tennessee but were processed from materials obtained from other domestic and foreign sources. The State rose in rank to eighth from ninth in the production of primary aluminum.

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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 Tennessee Division of Geology provided the following narrative information.<sup>3</sup> By the end of 2001, a total of 326 nonfuel mineral operations had permits to mine in 82 counties across the State. Ball clay was mined in Carroll, Weakly, Henry, and Gibson Counties in northwest Tennessee by Old Hickory Clay Co., H. C. Spinks Co., Unimin Corp. (United Clays Inc.), Gleason Brick Co., and Kentucky-Tennessee Clay Co. Unimin's Carroll County mine also produced kaolinite.

General Shale Products Corp. operated eight shale mines in Washington, Sullivan, Knox, and Anderson Counties in northeast Tennessee to supply its brick production plants. Additional shale mining occurred in Hamilton and Marion Counties in southeast Tennessee. Fuller's earth was mined in Hardeman County by Moltan Co. and in Henry County by American Colloid Co.

Construction sand and gravel was produced at 91 sites located in 30 counties and operated by 63 different companies. Companies operating five or more sites included Ford Construction Co., Memphis Stone and Gravel Co., and Standard Construction Co. in District 1 (west Tennessee) and Bradley Stone and Sand Inc. in the eastern part of District 2 (middle Tennessee).

The crushed stone industry produces limestone and dolomite at 151 active quarries and underground mines located primarily in District 2 (middle Tennessee) and District 3 (east Tennessee). Crushed limestone and dolomite was produced in 66 counties by 48 different companies and 18 county highway departments. The top three producers were Vulcan Materials Co., which operated 39 quarries in 29 counties; Rogers Group Inc., which operated 31 quarries in 27 counties; and Asarco Inc. (American Limestone Co.), which operated 9 quarries in 5 counties. Crushed granite and quartzite were produced in three quarries in Johnson County.

Holston Limestone was quarried for dimension stone in Blount County by Tennessee Marble Co. and Tennessee Valley Marble Inc. Quartzitic sandstone was quarried on the Cumberland Plateau for dimension sandstone, flagstone, and ashlar. Six companies operated seven quarries in Cumberland, Bledsoe, Rhea, and Morgan Counties.

Tennessee's gem industry is located in Benton County. American Shell Co. and Tennessee Shell Co. harvested mollusk shells from the Tennessee River for seeds in the cultured pearl industry. American Pearl Co. runs the only freshwater pearl farm in the United States, which cultivates approximately 250,000 mussels each season.

In other industrial minerals, Yates Construction Co. operated two industrial-grade open pit barite mines in McMinn County. Gypsum was produced from Tennessee Valley Authority

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<sup>3</sup>Peter Lemiszki, Chief Geologist with the Tennessee Division of Geology in Knoxville, authored the text of the State mineral industry information submitted by that agency.

byproducts at the Allied Custom Gypsum plant in Stewart County. Industrial sand was mined in Hawkins County by Short Mountain Silica Co. and in Benton County by Unimin Corp. Bowater Southern Paper Corp. in McMinn County produced high-calcium quicklime, and Global Stone Tenn-Luttrell Inc. in Union County produced high-calcium quicklime and hydrated lime.

In the metals sectors, ASARCO Incorporated operated the Coy, Immel, and Young Mines in Jefferson and Knox Counties. Because of sluggish market conditions, zinc mining and processing operations were suspended in mid-November 2001. A total of 360 workers were laid off, but a small staff remained to continue processing agricultural lime from existing production byproducts and for care and maintenance. The Coy and Young Mines also produced a small amount of lead.

Pasminco Ltd. operated mines at Clinch Valley (mine and mill) (Grainger County) and Gordonsville (Smith County) and an electrolytic zinc plant in Clarksville (Montgomery County). The Clarksville zinc plant produced primary cadmium as a byproduct during roasting and leaching of the zinc concentrate. The mines at and near Gordonsville, the Cumberland, Elmwood, and Gordonsville Mines, are all connected underground and hoist ore through one shaft. The first two are close together and are the oldest; the newer Cumberland Mine is 11 kilometers away and mills ore from the other two mines. These mines have produced some of the highest grade zinc concentrate in the world and are among the largest sources of germanium. The mines also produced agricultural limestone, crushed stone, and masonry sand.

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

(Thousand metric tons and thousand dollars)

Mineral	1999		2000 r/		2001 p/	
	Quantity	Value	Quantity	Value	Quantity	Value
Clays, ball	725	30,100	685	29,300	715	30,000
Sand and gravel, construction	9,640	53,100	8,760	47,000	7,910	43,100
Stone, crushed	63,100	382,000	62,100	371,000	60,500	372,000
Combined values of barite, cement, clays (common, fuller's earth, kaolin) copper (1999), gemstones, lead (1999), lime, salt, sand and gravel (industrial), silver (1999), stone (dimension marble), zinc, and values indicated by symbol W	XX	261,000 r/	XX	298,000 r/	XX	263,000
Total	XX	726,000 r/	XX	745,000 r/	XX	708,000

p/ Preliminary. r/ Revised. 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  
TENNESSEE: 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	109 r/	56,800 r/	\$347,000 r/	\$6.11 r/	114	57,300	\$341,000	\$5.95
Dolomite	8 r/	W	W	5.58 r/	8	W	W	6.63
Granite	1	W	W	5.79	1	W	W	4.41
Sandstone	1	W	W	3.39	1	W	W	3.59
Total or average	XX	63,100	382,000	6.05	XX	62,100	371,000	5.97

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

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

TABLE 3  
TENNESSEE: 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>			
<b>Coarse aggregate (+1 1/2 inch):</b>			
Macadam	27	\$90	\$3.33
Riprap and jetty stone	1,000	6,480	6.48
Filter stone	592	3,520	5.95
Other coarse aggregate	279	1,480	5.32
Total or average	1,900	11,600	6.10
<b>Coarse aggregate, graded:</b>			
Concrete aggregate, coarse	2,640	16,800	6.37
Bituminous aggregate, coarse	10,900	74,300	6.81
Bituminous surface-treatment aggregate	1,340	8,740	6.54
Railroad ballast	349	1,890	5.43
Other graded coarse aggregate	2,250	13,900	6.17
Total or average	17,500	116,000	6.61
<b>Fine aggregate (-3/8 inch):</b>			
Stone sand, concrete	1,220	8,570	7.01
Stone sand, bituminous mix or seal	270	1,610	5.95
Screening, undesignated	2,800	18,800	6.72
Other fine aggregate	999	5,040	5.05
Total or average	5,290	34,000	6.43
<b>Coarse and fine aggregates:</b>			
Graded road base or subbase	12,200	69,400	5.67
Unpaved road surfacing	264	913	3.46
Terrazzo and exposed aggregate	W	W	4.63
Crusher run or fill or waste	988	3,620	3.66
Roofing granules	W	W	6.00
Other coarse and fine aggregates	2,320	12,300	5.30
Total or average	15,800	86,200	5.45
Other construction materials	145	764	5.27
Agricultural, agricultural limestone	1,590	6,330	3.99
<b>Chemical and metallurgical:</b>			
Cement manufacture	(3/)	(3/)	3.59
Lime manufacture	524	8,660	16.53
Chemical stone for alkali works	78	309	3.96
Sulfur oxide removal	(3/)	(3/)	5.64
<b>Special:</b>			
Mine dusting or acid water treatment	12	94	7.83
Other fillers or extenders	162	1,600	9.90
<b>Unspecified: 4/</b>			
Reported	7,140	38,400	5.38
Estimated	11,000	62,000	5.83
Total or average	17,700	100,000	5.65
Grand total or average	62,100	371,000	5.97

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, and sandstone.

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

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

TABLE 4  
 TENNESSEE: CRUSHED STONE SOLD OR USED BY PRODUCERS 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
<b>Construction:</b>						
Coarse aggregate (+1 1/2 inch) 2/	W	W	W	W	832	5,230
Coarse aggregate, graded 3/	W	W	7,740	47,800	W	W
Fine aggregate (-3/8 inch) 4/	W	W	W	W	2,750	18,800
Coarse and fine aggregate 5/	W	W	6,770	32,500	W	W
Other construction materials	--	--	122	688	22	76
Agricultural 6/	W	W	W	W	W	W
Chemical and metallurgical 7/	--	--	W	W	W	W
Special 8/	--	--	--	--	174	1,700
Unspecified: 9/						
Reported	93	541	4,960	27,100	2,080	10,800
Estimated	--	--	6,600	38,000	4,000	23,000
<b>Total</b>	<b>6,260</b>	<b>44,700</b>	<b>29,800</b>	<b>165,000</b>	<b>26,000</b>	<b>161,000</b>

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 filter stone, macadam, riprap and jetty stone, and other coarse aggregate.

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

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

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

6/ Includes agricultural limestone.

7/ Includes cement manufacture, chemical stone for alkali works, lime manufacture, and sulfur oxide removal.

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

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

TABLE 5  
 TENNESSEE: 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/	3,750	\$22,700	\$6.05
Concrete products (blocks, bricks, pipe, decorative, etc.)	232	1,090	4.71
Asphaltic concrete aggregates and other bituminous mixtures	726	3,400	4.69
Road base and coverings 3/	1,470	6,830	4.65
Fill	148	1,300	8.75
Other miscellaneous uses 4/	71	826	11.63
Unspecified: 5/			
Reported	919	4,420	4.81
Estimated	1,500	6,400	4.45
<b>Total or average</b>	<b>8,760</b>	<b>47,000</b>	<b>5.37</b>

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

2/ Includes plaster and gunite sands.

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

4/ Includes filtration.

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

TABLE 6  
 TENNESSEE: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2000,  
 BY USE AND DISTRICT 1/ 2/

(Thousand metric tons and thousand dollars)

Use	District 1		Districts 2 and 3	
	Quantity	Value	Quantity	Value
Concrete aggregate (including concrete sand) 3/	2,240	12,100	1,510	10,600
Concrete products (blocks, bricks, pipe, decorative, etc.)	--	--	232	1,090
Asphaltic concrete aggregates and road base materials 4/	1,740	7,180	458	3,060
Other miscellaneous uses 5/	168	1,450	51	669
Unspecified: 6/				
Reported	919	4,420	--	--
Estimated	980	3,700	470	2,800
Total	6,050	28,900	2,710	18,100

-- Zero.

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

2/ Districts 2 and 3 are combined to avoid disclosing company proprietary data.

3/ Includes plaster and gunite sands.

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

5/ Includes fill and filtration.

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