



2010–2011 Minerals Yearbook

TENNESSEE

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 2011, nonfuel mineral production¹ in Tennessee was valued at \$878 million, based upon annual U.S. Geological Survey (USGS) data. This was a \$39 million (4.6%) increase from the State's total nonfuel mineral production value of \$839 million in 2010, which followed a \$144 million (21%) increase from \$695 million in 2009. Tennessee ranked 24th in total nonfuel mineral production value among the 50 States in 2011, up slightly from 25th in 2010 and 26th in 2009, and has ranked 24th to 26th in every year since 2004. It accounted for close to 1.2% of the total U.S. value in 2010 and in 2011, up from 1.0 percent in 2009. On a per capita basis, the State ranked 26th in the Nation in nonfuel mineral production in 2011 with a value of \$137; the national average was \$240.

Crushed stone, zinc, portland cement, and construction sand and gravel, in descending order of value, were the leading nonfuel mineral commodities produced in Tennessee in 2010 and in 2011. Crushed stone accounted for roughly 55% of the State's total nonfuel mineral production value in each year, while construction sand and gravel represented slightly more than 5% of the total (percentages for zinc and portland cement withheld—proprietary company data). Crushed stone has been the top nonfuel commodity in Tennessee since at least 1992, and its proportion of the nonfuel production value has gradually risen over the past three decades. It made up an average of roughly 40% of Tennessee's total nonfuel mineral production value from 1985 to 1989, an average of approximately 45% from 1990 to 1999, and an average of about 55% from 2000 to 2011. The production value of crushed stone increased in 2010 and 2011 from 2009, and along with zinc, was the cause of the increase in the State's mineral value. This was despite a 5% decrease of 2.1 million metric tons (Mt) in 2011 from 2010 (table 1).

In 2009, Nyrstar NV (Balen, Belgium) bought the East and Middle Tennessee Zinc Complexes, and in 2010 and 2011 reopened closed mines and increased output. Production values increased from negligible levels in 2009 to become the second leading mineral commodity of the State in 2010 and in 2011. Portland cement, with a decrease in production value of 21% in 2010, dropped to third from second in 2009, and remained third in 2011, despite an additional 11% decrease in production value in 2011. Construction sand and gravel increased by 10%

¹The 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 May 2013. 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 production quantity and value in 2010, but production value declined by 3% despite a 3.5% increase in production quantity. Among the remaining nonfuel minerals produced in Tennessee, production quantity and value generally increased during 2010 and 2011 compared to 2009, except for masonry cement, which decreased more than 25% in production value in 2011, and dimension stone, which had a very large decrease in production and value in 2010 from 2009. Lime increased by 16% in value in 2010 and by 26% in 2011, replacing industrial sand as the fifth-ranked commodity in the State.

Tennessee continued to be the leading producer (by quantity) of ball clay out of five States in 2010 and 2011, and remained sixth in the production of montmorillonite (fuller's earth) out of 10 States. Tennessee rose to second out of four States in production of zinc after falling to last place among six States in 2009. Other mineral commodities that were produced in significant quantities include lime, masonry cement, dimension stone, and common clay, in descending order of production value. Tennessee also produced aluminum, fused magnesia and fused silica, graphite, lithium, manganese, steel, and titanium pigments, but these were processed from materials obtained from other domestic and foreign sources.

The Tennessee Division of Geology² (TDG) provided the following narrative information. Data and information in the text are those reported by the TDG, based upon its own surveys and estimates.

Overview

Based on a review of the Tennessee Division of Water Pollution Control Mining Section permit files and accompanying National Pollutant Discharge Elimination System database, there were approximately 332 active permits for nonfuel mineral operations in 83 counties across the State during 2010. The active permits represent both quarry and plant sites, some of which may not have had any production.

Commodity Review

Industrial Minerals

Clays.—Ball clay and kaolin were mined from the Eocene Claiborne and Wilcox Formations in Carroll, Gibson, Henry, and Weakly Counties in northwest Tennessee. Companies operating in the State during 2010 were Boral Bricks Inc. (Sydney, Australia), H.C. Spinks Clay Company Inc. (Paris, TN; owned by Franklin Minerals Inc. of Brentwood, TN), Kentucky-

²Peter Lemiszki, Chief Geologist with the Tennessee Department of Environment and Conservation, Division of Geology, authored the text of the State mineral industry information provided by that agency.

Tennessee Clay Co. [Gleason, TN; a subsidiary of IMERYS Minerals Ltd. (Paris, France)], Old Hickory Clay Co. (Gleason, TN), and United Clays Inc. (owned by Unimin Corp. of New Canaan, CT). Fuller's earth (montmorillonite) was mined in Hardeman County by Moltan Co. (Memphis, TN) and in Henry County by American Colloid Co. (Hoffman Estates, IL).

General Shale Brick Inc. (Johnson City, TN; the U.S. subsidiary of Wienerberger AG of Vienna, Austria), the Nation's largest brick manufacturer, operated nine shale mines in Anderson, Knox, Rhea, Sullivan, and Washington Counties in eastern Tennessee to supply its brick production plants.

Gemstones.—Freshwater pearl was the only gemstone produced in the State. The American Pearl Co. (Nashville, TN) operated the only freshwater pearl farm in North America in Benton County. American Shell Co. (Camden, TN), Tennessee Shell Co. (Camden, TN), and The American Pearl Co. exported mollusk shells from the Tennessee River to pearl-producing countries.

Sand and Gravel, Construction.—There were 92 construction sand and gravel operations in 28 counties managed by 50 different companies and two county highway departments in Tennessee during 2010. Companies operating at least five sites were American Sand Co. LLC (Monterey, TN), Ford Construction Co. (Dyersburg, TN), Memphis Stone and Gravel Co. (Memphis, TN), and Standard Construction Co. (Germantown, TN).

Sand and Gravel, Industrial.—Industrial sand was mined in Hawkins County by Short Mountain Silica Co. (Mooresburg, TN), in Benton and Carroll Counties by Unimin Corp., and in Madison County by Teague Transports LLC (Jackson, TN).

Stone, Crushed.—There were 161 permitted crushed stone industry operations in 2010. Dolomite and limestone were produced at approximately 147 commercial quarries and underground mines located primarily in District 2 (middle Tennessee) and District 3 (eastern Tennessee), and by 14 county highway departments in these districts. A new site owned by East Tennessee Materials LLC (Calhoun, TN) in McMinn County was in the final permit phase in 2010 and planned to start quarrying operations in 2011. Three quarries in Johnson County produced either crushed granite or quartzite. The top three producers were Vulcan Materials Co. (Birmingham, AL; 47 quarry sites), Rogers Group Inc. (Nashville, TN; 38 quarry sites), and Aggregates USA LLC (Birmingham, AL; 12 quarry sites).

Stone, Dimension.—The Ordovician-age Holston Limestone was quarried for dimension marble at five sites in Blount, Knox, and Loudon Counties by the Tennessee Marble and Tennessee Marble Products companies (both located in Friendsville, TN). Four companies operated six dimension sandstone quarries in the Pennsylvanian Crab Orchard Sandstone in Bledsoe, Cumberland, Morgan, and Rhea Counties.

Other Industrial Minerals.—Synthetic gypsum was produced from Tennessee Valley Authority byproducts at the Allied Custom Gypsum (Norman, OK) plant in Stewart County. Lime plants operated by Abitibi Bowater Inc. (Montreal, Canada) in McMinn County produced high-calcium quicklime for captive consumption only. Carmeuse Lime & Stone (Pittsburgh, PA) also produced high-calcium quicklime and hydrated lime at its Tennessee-Luttrell plant in Union County.

Metals

Zinc.—Nyrstar N.V. (Balen, Belgium) owned all zinc mining operations in the State. The Middle Tennessee Mines (Gordonsville, Cumberland, and Elmwood Mines) in Smith County were operating at approximately 35% of capacity at the end of 2010 and produced approximately 13,000 metric tons (t) of zinc in concentrate (Nyrstar N.V., 2010). The East Tennessee Mines (the Coy and Young mines in Jefferson County and the Immel Mine in Knox County) produced 50,000 t of zinc in concentrate and were operating at full capacity by the end of the third quarter (Nyrstar N.V., 2010). In 2011, the Middle Tennessee Mines continued to ramp up to full production and produced about 32,000 metric tons of zinc in concentrate during 2011 while the East Tennessee Mines produced 49,000 t (Nyrstar N.V., 2011). Output from all of the zinc mines supplied Nyrstar's zinc smelting and alloying plant in Clarksville (Montgomery County), which is the sole producer of primary zinc in the United States (Nyrstar N.V., 2014).

References Cited

- Nyrstar N.V., 2010, Nyrstar annual report 2010: Balen, Belgium, Nyrstar N.V., 151 p. (Accessed October 10, 2014, at http://www.nyrstar.com/investors/en/Nyr_Documents/English/nyrstar_2010_uk.pdf.)
- Nyrstar N.V., 2011, Nyrstar annual report 2011: Balen, Belgium, Nyrstar N.V., 173 p. (Accessed October 10, 2014, at http://www.nyrstar.com/investors/en/Nyr_Documents/English/Nyrstar%20Annual%20Report%202011%20EN.pdf.)
- Nyrstar N.V., 2014, Clarksville fact sheet: Balen, Belgium, Nyrstar N.V., 2 p. (Accessed October 10, 2014, at <http://www.nyrstar.com/operations/Documents/Fact%20Sheet%20CLARKSVILLE%20EN%202015.pdf>.)

TABLE 1
NONFUEL RAW MINERAL PRODUCTION IN TENNESSEE^{1,2}
(Thousand metric tons and thousand dollars)

Mineral	2009		2010		2011	
	Quantity	Value	Quantity	Value	Quantity	Value
Clays:						
Ball	511	22,800	570	25,600	W	W
Common	113	816	113	817	113	817
Sand and gravel:						
Construction	5,360	42,800	5,900	47,000	6,100	45,600
Industrial	783	27,100	907	30,500	1,050	16,500
Stone, crushed	39,900 ^r	451,000 ^r	40,900	472,000 ^r	38,800	483,000
Combined values of cadmium (byproduct from zinc concentrates), cement, clays (Fuller's earth), gemstones (natural), lime, salt, stone (dimension marble), zinc, and value indicated by symbol W	XX	150,000	XX	263,000	XX	332,000
Total	XX	695,000 ^r	XX	839,000 ^r	XX	878,000

^rRevised. W Withheld to avoid disclosing company proprietary data. Withheld values included in "Combined values" data. XX Not applicable.
¹Production as measured by mine shipments, sales, or marketable production (including consumption by producers).
²Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 2
TENNESSEE: CRUSHED STONE SOLD OR USED IN THE UNITED STATES, BY TYPE¹

Type	2009			2010			2011		
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Number of quarries	Quantity (thousand metric tons)	Value (thousands)
Limestone ²	123	38,800 ^r	\$430,000 ^r	120	39,300	\$452,000 ^r	119	37,100	\$462,000
Dolomite	--	--	--	1	271	2,660	1	326	3,810
Sandstone and quartzite ³	6	1,070	18,100	4	811	10,900 ^r	4	845	10,100
Miscellaneous stone	1	454	4,920	1	499	5,720	2	515	6,890
Total or average	XX	39,900 ^r	451,000 ^r	XX	40,900	472,000 ^r	XX	38,800	483,000

^rRevised. XX Not applicable.

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

²Includes limestone-dolomite reported with no distinction between the two kinds of stone.

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

TABLE 3
 TENNESSEE: CRUSHED STONE SOLD OR USED BY PRODUCERS
 IN 2010, BY USE¹

(Thousand metric tons and thousand dollars)

Use	Quantity	Value
Construction:		
Coarse aggregate (+1½ inch):		
Riprap and jetty stone	583	5,100
Filter stone	86	840
Other coarse aggregate	1,870	21,300
Coarse aggregate, graded:		
Concrete aggregate, coarse	378	3,300
Bituminous aggregate, coarse	W	W
Bituminous surface-treatment aggregate	34	334
Railroad ballast	237	1,670
Other graded coarse aggregate	9,230	122,000
Fine aggregate (-¾ inch):		
Stone sand, concrete	154	770
Stone sand, bituminous mix or seal	1	10
Screening, undesignated	186	1,690
Other fine aggregate	1,700	23,800
Coarse and fine aggregates:		
Graded road base or subbase	1,390	8,640
Unpaved road surface	W	W
Terrazzo and exposed aggregate	W	W
Crusher run or fill or waste	512	3,660
Roofing granules	W	W
Other coarse and fine aggregates	7,220	69,800
Other construction materials	94	997
Agricultural, agricultural limestone	214	2,960
Chemical and metallurgical:		
Cement manufacture	W	W
Lime manufacture	W	W
Sulfur oxide removal	W	W
Special:		
Mining dusting or acid water treatment	W	W
Other fillers or extenders	W	W
Unspecified:²		
Reported	8,820	92,500
Estimated	5,520	61,100
Total	40,900	472,000

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

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

²Reported and estimated production without a breakdown by end use.

TABLE 4
 TENNESSEE: CRUSHED STONE SOLD OR USED BY PRODUCERS
 IN 2011, BY USE¹

(Thousand metric tons and thousand dollars)

Use	Quantity	Value
Construction:		
Coarse aggregate (+1½ inch):		
Macadam	14	159
Riprap and jetty stone	529	6,510
Filter stone	115	1,130
Unspecified coarse aggregate	1,500	16,000
Coarse aggregate, graded:		
Concrete aggregate, coarse	747	7,960
Bituminous aggregate, coarse	575	6,060
Bituminous surface-treatment aggregate	62	581
Railroad ballast	W	W
Unspecified graded coarse aggregate	8,620	119,000
Fine aggregate (-¾ inch):		
Stone sand, concrete	288	3,150
Stone sand, bituminous mix or seal	1	8
Screening, undesignated	184	1,960
Unspecified fine aggregate	2,000	28,200
Coarse and fine aggregates:		
Graded road base or subbase	1,220	9,340
Unpaved road surface	182	1,640
Crusher run or fill or waste	798	5,930
Roofing granules	W	W
Unspecified coarse and fine aggregates	7,870	80,500
Unspecified and other construction materials	91	1,030
Agricultural, agricultural limestone	147	2,170
Chemical and metallurgical:		
Cement manufacture	W	W
Lime manufacture	195	24,200
Sulfur oxide removal	639	9,060
Special:		
Mining dusting or acid water treatment	W	W
Other fillers or extenders	W	W
Unspecified:²		
Reported	4,760	55,400
Estimated	6,860	84,800
Total	38,800	483,000

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

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

²Reported and estimated production without a breakdown by end use.

TABLE 5
 TENNESSEE: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2010, BY USE AND DISTRICT¹

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3	
	Quantity	Value	Quantity	Value	Quantity	Value
Construction:						
Coarse aggregate (+1½ inch) ²	W	W	1,530	13,200	W	W
Coarse aggregate, graded ³	W	W	6,700	81,700	W	W
Fine aggregate (-¾ inch) ⁴	W	W	747	7,730	W	W
Coarse and fine aggregates ⁵	W	W	4,040	30,400	3,930	42,200
Other construction materials	--	--	W	W	--	--
Agricultural ⁶	W	W	126	1,640	W	W
Chemical and metallurgical ⁷	--	--	W	W	W	W
Special ⁸	--	--	--	--	W	W
Unspecified: ⁹						
Reported	229	2,250	4,470	43,900	4,120	46,300
Estimated	--	--	4,970	55,600	552	5,550
Total ¹⁰	3,080	37,600	23,800	244,000	14,000	182,000

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

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

²Includes macadam, riprap and jetty stone, filter stone, and other coarse aggregates.

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

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

⁵Includes graded road base or subbase, unpaved road surface, terrazzo and exposed aggregate, crusher run, roofing granules, and other coarse and fine aggregates.

⁶Includes agricultural limestone, poultry grit and mineral food, and other agricultural uses.

⁷Includes cement manufacture, lime manufacture, dead-burned dolomite manufacture, flux stone, chemical stone, glass manufacture, and sulfur oxide removal.

⁸Includes mine dusting or acid water treatment, whitening or whitening substance, and other fillers or extenders.

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

¹⁰District totals may not add up to the published State total, owing to revisions made after the production of the table and (or) proprietary data being withheld.

TABLE 6
TENNESSEE: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2011, BY USE AND DISTRICT¹

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3	
	Quantity	Value	Quantity	Value	Quantity	Value
Construction:						
Coarse aggregate (+1½ inch) ²	W	W	1,130	11,500	419	5,640
Coarse aggregate, graded ³	W	W	6,180	79,100	W	W
Fine aggregate (-¾ inch) ⁴	W	W	1,020	11,400	W	W
Coarse and fine aggregates ⁵	W	W	4,480	37,100	4,780	52,200
Other construction materials	--	--	W	W	W	W
Agricultural ⁶	W	W	W	W	W	W
Chemical and metallurgical ⁷	--	--	W	W	W	W
Special ⁸	--	--	W	W	W	W
Unspecified: ⁹						
Reported	225	2,320	3,300	38,500	1,240	14,600
Estimated	199	1,750	4,790	59,700	1,870	23,400
Total	2,960	36,800	22,100	257,000	13,800	189,000

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

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

²Includes macadam, riprap and jetty stone, filter stone, and other coarse aggregates.

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

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

⁵Includes graded road base or subbase, unpaved road surface, terrazzo and exposed aggregate, crusher run, roofing granules, and other coarse and fine aggregates.

⁶Includes agricultural limestone, poultry grit and mineral food, and other agricultural uses.

⁷Includes cement manufacture, lime manufacture, dead-burned dolomite manufacture, flux stone, chemical stone, glass manufacture, and sulfur oxide removal.

⁸Includes mine dusting or acid water treatment, whiting or whitening substance, and other fillers or extenders.

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

TABLE 7
TENNESSEE: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2010,
BY MAJOR USE CATEGORY¹

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate (including concrete sand) ²	1,660	\$14,100	\$8.49
Asphaltic concrete aggregates and road base materials ³	888	6,410	7.22
Other miscellaneous uses ⁴	98	525	5.36
Unspecified: ⁵			
Reported	174	1,400	8.05
Estimated	3,090	24,600	7.96
Total or average	5,900	47,000	7.97

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

²Includes plaster and gunite sands.

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

⁴Includes fill and golf course.

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

TABLE 8
TENNESSEE: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2011,
BY MAJOR USE CATEGORY¹

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate (including concrete sand) ²	1,660	\$10,600	\$6.39
Asphaltic concrete aggregates and road base materials ³	911	7,130	7.83
Other miscellaneous uses ⁴	252	2,890	11.47
Unspecified: ⁵			
Reported	175	1,370	7.83
Estimated	3,110	23,600	7.59
Total or average	6,100	45,600	7.48

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

²Includes plaster and gunite sands.

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

⁴Includes fill.

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

TABLE 9
TENNESSEE: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2010,
BY USE AND DISTRICT¹

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3	
	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregate (including concrete sand) ²	W	W	W	W	W	W
Asphaltic concrete aggregates and road base materials ³	W	W	--	--	121	1,710
Fill	86	340	--	--	--	--
Other miscellaneous uses ⁴	W	W	--	--	362	5,950
Unspecified: ⁵						
Reported	19	155	W	W	W	W
Estimated	1,760	12,900	2,080	15,400	1,470	10,600
Total or average ⁶	1,870	13,400	2,080	15,400	1,950	18,200

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

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

²Includes plaster and gunite sands.

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

⁴Includes golf course.

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

⁶District totals may not add up to the published State total, owing to revisions made after the production of the table and (or) proprietary data being withheld.

TABLE 10
 TENNESSEE: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2011,
 BY USE AND DISTRICT¹

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3	
	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregate (including concrete sand) ²	W	W	W	W	W	W
Asphaltic concrete aggregates and road base materials ³	W	W	W	W	W	W
Other miscellaneous uses ⁴	83	499	41	277	128	2,120
Unspecified: ⁵						
Reported	17	123	158	1,240	--	--
Estimated	1,390	10,600	909	6,920	806	6,130
Total or average	3,220	21,800	1,800	13,300	1,090	10,500

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

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

²Includes plaster and guniting sands.

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

⁴Includes fill.

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