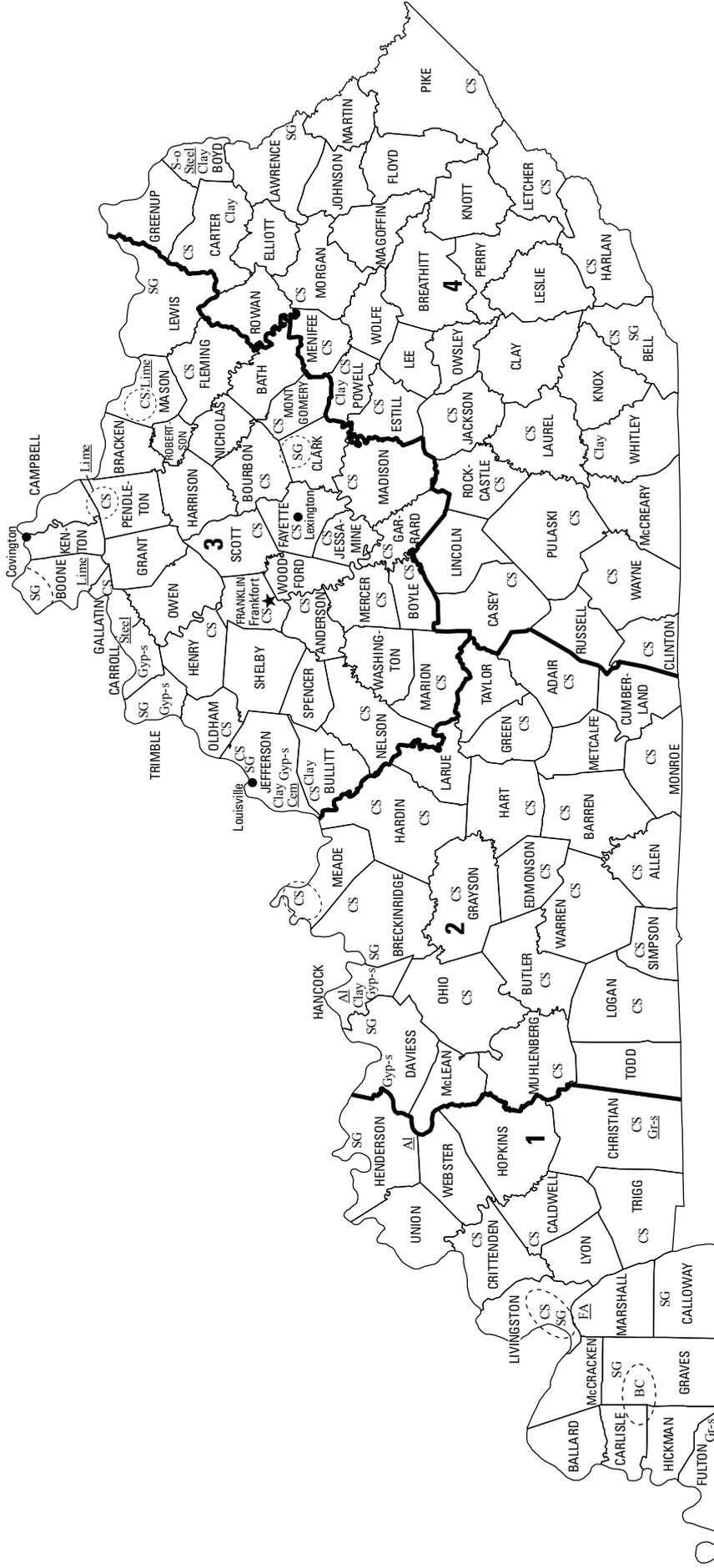




2010–2011 Minerals Yearbook

KENTUCKY [ADVANCE RELEASE]

KENTUCKY



LEGEND

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

MINERAL SYMBOLS (Principal producing areas)

- Al Aluminum plant
- BC Ball clay
- Cem Cement plant and quarry
- Clay Common clay
- CS Crushed stone
- FA Ferroalloys plant
- Gr-s Synthetic graphite plant
- Gyp-s Synthetic gypsum
- Lime Lime plant
- S-o Sulfur (oil)
- SG Construction sand and gravel
- Steel Steel plant
- Concentration of mineral operations

0 50 100 Kilometers
Albers equal area projection

Source: Kentucky Geological Survey/U.S. Geological Survey (2010–11).

THE MINERAL INDUSTRY OF KENTUCKY

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

In 2011, Kentucky's nonfuel mineral production¹ was valued at \$791 million, based upon annual U.S. Geological Survey (USGS) data. This was a \$38 million (5%) increase from the State's total nonfuel mineral production value of \$753 million in 2010, which followed a \$52 million (7.4%) increase from \$702 million in 2009. Kentucky ranked 26th in total nonfuel mineral production value among the 50 States in 2011, up slightly from 27th in 2010 and 2009, and accounted for approximately 1.1% of the total U.S. value in each year. On a per capita basis, the State ranked 20th in the Nation in nonfuel mineral production in 2011 with a value of \$181, about three-fourths of the national average of \$240.

Crushed stone continued to be the leading nonfuel mineral in Kentucky, as it has been since at least the 1950s. In 2010 and 2011 combined, it alone accounted for 57% of the State's nonfuel mineral production value. Crushed stone was followed by lime, portland cement, and construction sand and gravel, in order of descending production value. Together, these commodities constituted close to 99% of Kentucky's total nonfuel mineral production value in 2011 and 2010. The remainder of the total consisted of common clay, ball clay, masonry cement, and gemstones.

The production value of crushed stone had declined for four consecutive years prior to 2010 while that of construction sand and gravel had dropped for five consecutive years before 2011. Overall, the quantities and production values of crushed stone, lime, and portland cement ended 2011 higher than in 2009. The crushed stone and lime industries experienced the most substantial growth in production value. An increase in production of 968,000 metric tons (t) (2.1%) led to an upswing of \$47 million (11.4%) in the value of crushed stone produced during the period 2009 to 2011. During the same period the quantity and production value of lime climbed by 19.3% and 24.1%, respectively (actual values withheld—proprietary company data). On the other hand, the production quantity of construction sand and gravel decreased by 1.1 million metric tons (Mt) (15.5%) and the production value dropped by \$3.6 million (9.9%) from 2009 to 2011. Increases in the

¹The terms "nonfuel mineral production" and related "values" comprise 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>.

production value of crushed stone during 2010 and 2011 reversed the losses that had taken place in recent years—crushed stone production in 2011 was roughly \$16 million higher than in 2005—but the production value of construction sand and gravel was still approximately \$22 million lower in 2011 than in 2005.

In 2011, Kentucky continued to rank fourth in the quantity of ball clay produced out of five States and seventh in the production of crushed stone, accounting for 4% of the nearly 1.2 billion metric tons (Gt) generated in the United States. The State also climbed to second in lime production from third in 2009 and 2010 and to 15th in common clay from 19th in 2009.

The following narrative information was provided by the Kentucky Geological Survey² (KGS).

Overview

Mineral industry development activity in 2010 remained steady in all residential, industrial, and transportation markets. Demand for clay, crushed stone, lime, sand and gravel, and steel, increased. After many years of decreasing demand for crushed stone, the data in 2010 suggested a modest increase in demand for crushed stone as the economy began to improve.

Kentucky continued to be a leader in production of primary and secondary aluminum, which was produced from material obtained from outside the State. Synthetic gypsum and wallboard were produced as a byproduct at several coal-fired powerplants, and synthetic graphite and natural gemstones (freshwater pearls) were also produced in Kentucky. Employment in the mineral industry remained at low levels, but with the increase in economic activity, many mines began to rehire employees that were formerly laid off.

Mineral Exploration

Fluorspar.—In 2009, Hastie Mining and Trucking Co. (Cave-In-Rock, IL) and Moodie Mineral Co. (Smithland, KY) acquired the final mine permit necessary to begin development of the Klondike II Mine in Livingston County in the western Kentucky Fluorspar District (Miller, 2011, p. 56). The companies commenced mine excavation and anticipated that mining of the ore would begin by the end of 2012. Core drilling operations continued along the Klondike Mine area. The company states that reserves for the area indicated over a million tons of economic quantities of fluorspar.

²Warren H. Anderson, Geologist and Principal Investigator with the Kentucky Geological Survey (KGS), submitted the text of the State mineral industry information provided by the KGS.

Commodity Review

Industrial Minerals

Aggregates.—Bluegrass Materials Company (Bowling Green, KY) announced the acquisition of seven aggregate quarries, three resale distribution centers, and a concrete block manufacturing facility in Kentucky from CEMEX SAB de CV for \$90 million (Bluegrass Materials Company, 2010).

Stone, Crushed.—Hilltop-Ingleside Mine LLC (Cincinnati, OH) received final approval from the State for a new limestone mine in western Mason County. Mine development was set to begin in 2009 but was delayed until 2010 due to permitting issues. The operation was to supply desulphurization stone to the East Kentucky Power Cooperative coal-fired electric generating powerplants at the Spurlock Station in Mason County, but did not start operation. (Toncray—personal communication).

North American Limestone Corporation (Louisville, KY) acquired final mining permits in 2009 and opened the Cherry Grove quarry north of Trenton in Todd County, near the Fort Campbell Military Base. The property, which contains an estimated 35 Mt of limestone reserves, was subsequently acquired by VantaCore Partners LP (Philadelphia, PA) in 2011 (VantaCore Partners LP, 2011).

Metals

Aluminum.—Owl's Head Alloys added space for the installation of an additional smelting furnace at its secondary aluminum recycling plant in Bowling Green, KY. Metalworks Recycle-Reload also established a new processing center in Bowling Green (Kentucky Cabinet for Economic Development, 2010).

Copper.—Kentucky Copper Inc. (a subsidiary of India-based Chandra Proteco Inc.) announced the opening of a new plant and technology center in Morgantown to manufacture copper cables for power transformers, energy transmission, high-speed trains, and other applications (Mink, 2012).

Government Programs and Activities

The government of Kentucky is promoting a lithium-ion battery research facility. The Kentucky-Argonne Battery Research Center in Lexington is a collaboration between the University of Kentucky, University of Louisville, and the Kentucky Energy and Environment Cabinet. The center will develop an open access lab that will investigate lithium-ion technologies in order to produce more efficient batteries. This lab will collaborate with nGimat LLC, a lithium titanate nanobattery developer to employ new advanced lithium battery nanostorage capability.

The KGS continues to participate in the STATEMAP program by mapping Quaternary and surficial deposits in eastern and western Kentucky. Eastern Kentucky University, Morehead State University, and the University of Kentucky Department of Earth and Environmental Sciences continue to support the EDMAP program by having students participate in mapping exercises throughout the State. In October of 2009, the KGS celebrated the conclusion of a 10-year STATEMAP cooperative project by releasing a new 1:350,000-scale digital geologic map of Kentucky at a press conference. This map was created from 707 1:24,000-scale bedrock geologic maps and is available at <http://kgs.uky.edu/kgsweb/findpubsmain.asp>, publication #17283.

The KGS continues to scan mineral and mine data for the development of a GIS-based minerals database of mineral data and site specific information. Once complete, these databases can be searched on a site specific location to provide detailed mining information, such as mine maps, cross sections, plan maps, chemical analysis and ore grades, and other data. As a companion project, the KGS has begun compilation of a mines-and-minerals map of the fluorspar district to identify most of the historic mines, prospects, faults, and igneous dikes in the district. The KGS is also compiling a new map of limestone mines, quarries, and operations in the State and show surface outcrops of limestone suitable for use in construction, mining, agricultural, and sulfur-sorbent applications.

The KGS began a geological research program in 2010 to investigate igneous rocks in the western Kentucky Fluorspar District for their potential for rare-earth elements. Ultramafic rocks, such as alnoite, lamprophyre, and peridotite, occur in the district and contain rare-earth minerals.

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TABLE 1
NONFUEL MINERAL PRODUCTION IN KENTUCKY^{1,2}

(Thousand metric tons and thousand dollars)

Mineral	2009		2010		2011	
	Quantity	Value	Quantity	Value	Quantity	Value
Clays, common	288	5,980	284	5,780	328	6,430
Gemstones, natural	NA	37	NA	12	NA	11
Sand and gravel, construction	6,810 ^r	36,100 ^r	5,760	30,100	5,750	32,600
Stone, crushed	47,000 ^r	415,000 ^r	47,900	417,000	47,900	462,000
Combined values of cement, clays (ball), gypsum [crude (2009–10)], lime	XX	244,000 ^r	XX	301,000	XX	290,000
Total	XX	702,000 ^r	XX	753,000	XX	791,000

^rRevised. NA Not available. XX Not applicable.

¹Production as measured by mine shipments, sales, or marketable production (including consumption by producers).

²Data are rounded to three significant digits; may not add to totals shown.

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

Type	2009				2010				2011			
	Number of quarries	Quantity (thousand metric tons)	Value (thousands) ^r	Unit value	Number of quarries	Quantity (thousand metric tons)	Value ^r (thousands)	Unit value	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value
Limestone ²	90 ^r	47,000 ^r	\$415,000 ^r	\$8.83	88	47,800	\$416,000	\$8.69	82	47,900	\$462,000	\$9.64
Miscellaneous stone	--	--	--	--	2	89	848	9.48	2	44	426	9.76
Total or average	XX	47,000 ^r	415,000 ^r	8.83	XX	47,900	417,000	8.70	XX	47,900	462,000	9.64

^rRevised. XX Not applicable. -- Zero

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.

TABLE 3
KENTUCKY: 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	503	5,470
Filter stone	319	2,910
Other coarse aggregate	2,120	15,300
Coarse aggregate, graded:		
Concrete aggregate, coarse	928	7,470
Bituminous aggregate, coarse	2,930	27,400
Bituminous surface-treatment aggregate	W	W
Railroad ballast	208	1,550
Other graded coarse aggregate	4,760	44,000
Fine aggregate (-¾ inch):		
Stone sand, concrete	W	W
Stone sand, bituminous mix or seal	519	5,140
Screening, undesignated	1,320	8,370
Other fine aggregate	1,530	15,300
Coarse and fine aggregates:		
Graded road base or subbase	3,650	28,800
Unpaved road surface	246	2,260
Crusher run or fill or waste	35	256
Other coarse and fine aggregates	3,160	28,800
Other construction materials	W	W
Agricultural:		
Agricultural, limestone	427	2,360
Lime manufacture	W	W
Flux stone	W	W
Sulfur oxide removal	2,060	18,200
Special, mining dusting or acid water treatment	W	W
Unspecified:²		
Reported	4,830	42,600
Estimated	14,700	126,000
Total	47,900	417,000

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
 KENTUCKY: 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	8	85
Riprap and jetty stone	395	4,150
Filter stone	176	1,270
Unspecified coarse aggregate	1,010	10,200
Coarse aggregate, graded:		
Concrete aggregate, coarse	852	8,390
Bituminous aggregate, coarse	839	8,550
Bituminous surface-treatment aggregate	123	1,390
Railroad ballast	143	1,290
Unspecified graded coarse aggregate	4,730	49,300
Fine aggregate (-¾ inch):		
Stone sand, concrete	73	809
Stone sand, bituminous mix or seal	414	4,620
Screening, undesignated	79	511
Unspecified fine aggregate	1,090	10,300
Coarse and fine aggregates:		
Graded road base or subbase	2,160	18,900
Unpaved road surface	638	6,720
Crusher run or fill or waste	178	1,440
Unspecified coarse and fine aggregates	2,650	24,300
Agricultural:		
Agricultural, limestone	390	2,700
Unspecified and other agricultural uses	W	W
Chemical and metallurgical:		
Lime manufacture	W	W
Flux stone	W	W
Sulfur oxide removal	W	W
Special:		
Mining dusting or acid water treatment	W	W
Other fillers or extenders	(³)	1
Unspecified:²		
Reported	8,190	81,000
Estimated	22,900	219,000
Total	47,900	462,000

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

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

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

³Less than ½ unit.

TABLE 5
KENTUCKY: 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	1,060	9,540	94	780	315	2,830
Coarse aggregate, graded ³	2,650	23,300	653	6,550	3,880	37,500
Fine aggregate (-¾ inch) ⁴	1,100	9,270	W	W	1,550	11,300
Coarse and fine aggregates ⁵	2,400	18,800	566	4,420	2,580	23,400
Other construction materials	--	--	--	--	W	W
Agricultural ⁶	W	W	68	254	165	854
Chemical and metallurgical ⁷	W	W	W	W	W	W
Special ⁸	--	--	--	--	W	W
Unspecified: ⁹						
Reported	892	7,860	993	8,750	576	5,080
Estimated	1,910	17,800	5,550	49,100	4,690	37,300
Total ¹⁰	10,700	92,300	9,170	81,300	19,000	163,000
Unspecified districts						
Use	Quantity	Value				
Construction:						
Coarse aggregate (+1½ inch) ²	1,480	10,600				
Coarse aggregate, graded ³	1,720	13,900				
Fine aggregate (-¾ inch) ⁴	590	7,250				
Coarse and fine aggregates ⁵	1,540	13,500				
Other construction materials	--	--				
Agricultural ⁶	47	304				
Chemical and metallurgical ⁷	--	--				
Special ⁸	--	--				
Unspecified: ⁹						
Reported	2,370	20,900				
Estimated	2,530	22,000				
Total ¹⁰	10,300	88,400				

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 (undesigned), 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
KENTUCKY: 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	109	1,170	381	3,730
Coarse aggregate, graded ³	W	W	1,070	11,300	3,090	32,800
Fine aggregate (-¾ inch) ⁴	W	W	422	4,160	204	2,110
Coarse and fine aggregates ⁵	W	W	1,480	13,400	2,350	21,500
Agricultural ⁶	W	W	W	W	92	493
Chemical and metallurgical ⁷	--	--	W	W	W	W
Special ⁸	--	--	--	--	W	W
Unspecified: ⁹						
Reported	W	W	W	W	650	6,300
Estimated	3,610	31,300	6,520	63,700	11,400	111,000
Total	9,850	92,000	11,200	109,000	18,800	183,000
District 4						
Use	Quantity	Value				
Construction:						
Coarse aggregate (+1½ inch) ²	813	7,970				
Coarse aggregate, graded ³	1,780	17,500				
Fine aggregate (-¾ inch) ⁴	607	6,190				
Coarse and fine aggregates ⁵	1,200	11,400				
Agricultural ⁶	75	535				
Chemical and metallurgical ⁷	--	--				
Special ⁸	--	--				
Unspecified: ⁹						
Reported	2,290	22,400				
Estimated	1,320	12,900				
Total	8,090	78,900				

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

¹Data are rounded to no more than three significant digits.

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
 KENTUCKY: 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)	1,020	\$5,240	\$5.15
Asphaltic concrete aggregates and road base materials	150	752	5.01
Fill	79	302	3.82
Other miscellaneous uses	6	66	11.00
Unspecified: ²			
Reported	70	562	8.03
Estimated	4,420	23,100	5.24
Total or average	5,760	30,100	5.24

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

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

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

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate and concrete products ²	1,150	\$6,360	\$5.53
Asphaltic concrete aggregates and other bituminous mixtures	127	520	4.09
Fill	84	310	3.69
Other miscellaneous uses	9	112	12.44
Unspecified: ³			
Reported	192	1,550	8.07
Estimated	4,190	23,700	5.66
Total or average	5,750	32,600	5.67

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

²Includes plaster and gunitite sands.

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

TABLE 9
KENTUCKY: 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)	W	W	--	--	W	W
Asphaltic concrete aggregates and road base materials	--	--	W	W	W	W
Fill	--	--	--	--	W	W
Other miscellaneous uses	--	--	--	--	6	\$66
Unspecified: ²						
Reported	--	--	--	--	W	W
Estimated	W	W	W	W	3,060	16,000
Total ³	1,740	9,060	420	2,240	3,520	18,400
	District 4					
	Quantity	Value				
Concrete aggregate (including concrete sand)	--	--				
Asphaltic concrete aggregates and road base materials	--	--				
Fill	--	--				
Other miscellaneous uses	--	--				
Unspecified: ²						
Reported	--	--				
Estimated	60	315				
Total ³	60	315				

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.

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

³District 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
KENTUCKY: 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 and concrete products ²	W	W	W	W	W	W
Asphaltic concrete aggregates and other bituminous mixtures	--	--	W	W	W	W
Fill	--	--	3	12	63	231
Other miscellaneous uses	--	--	4	44	5	68
Unspecified: ³						
Reported	--	--	--	--	192	1,550
Estimated	W	W	327	1,850	3,020	17,100
Total	1,870	10,300	351	2,020	3,510	20,200
	District 4					
	Quantity	Value				
Concrete aggregate and concrete products ²	--	--				
Asphaltic concrete aggregates and other bituminous mixtures	--	--				
Fill	18	67				
Other miscellaneous uses	--	--				
Unspecified: ³						
Reported	--	--				
Estimated	--	--				
Total	18	67				

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

¹Data are rounded to no more than three significant digits.

²Includes plaster and gunite sands.

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