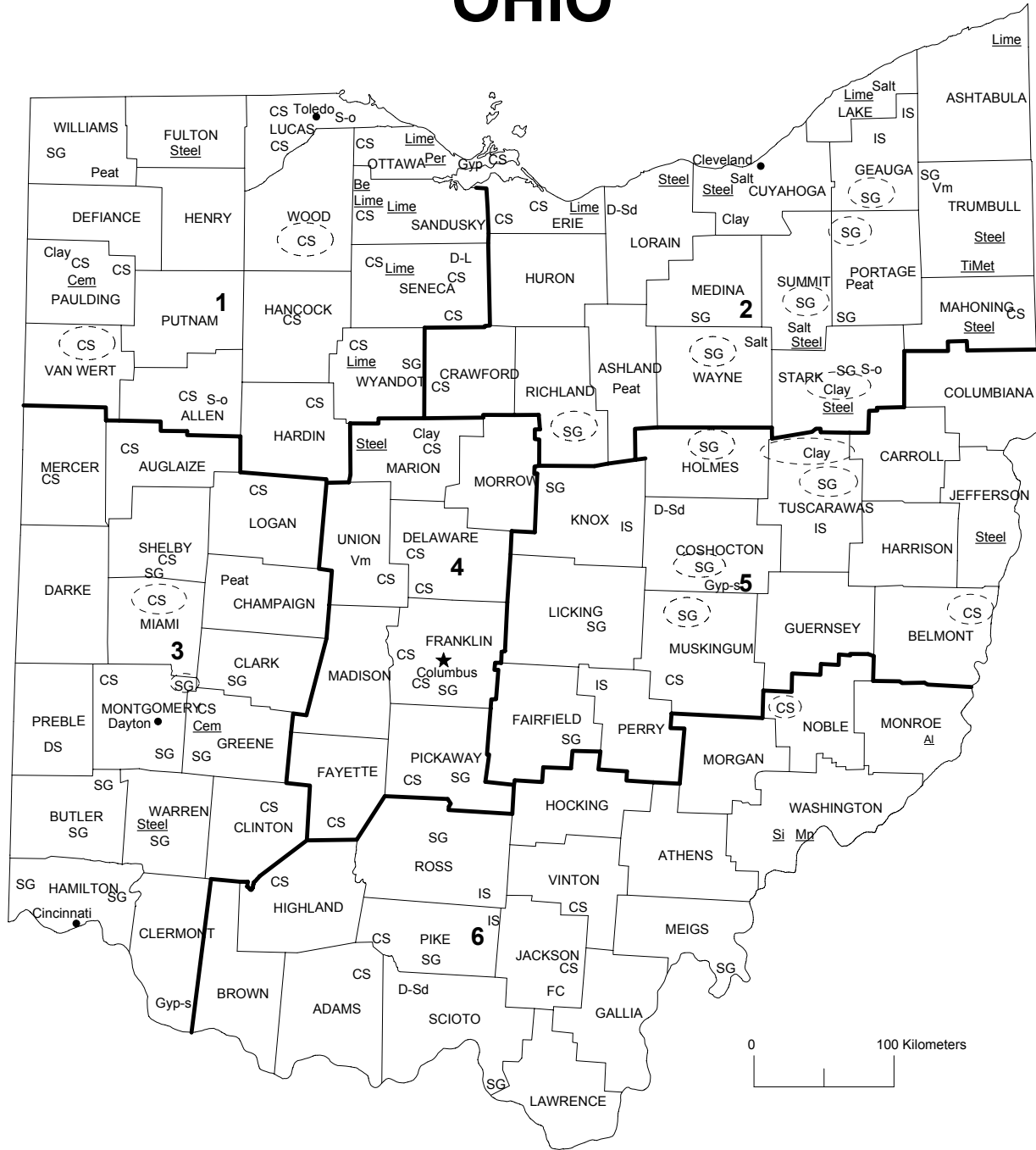


OHIO



LEGEND		MINERAL SYMBOLS		(Major Producing areas)	
	County boundary	Al	Aluminum plant	FC	Fire clay
	Capital	Be	Beryllium plant	Gyp	Gypsum
	City	Cem	Cement plant	Gyp-s	Synthetic gypsum
	Crushed stone/sand and gravel districts	Clay	Common clay	IS	Industrial sand
		CS	Crushed stone	Lime	Lime plant
		D-L	Dimension limestone	Mn	Manganese dioxide plant
		D-Sd	Dimension sandstone	Peat	Peat
		DS	Dimension stone	Per	Perlite plant
				S-o	Sulfur (oil)
				Salt	Salt
				SG	Construction sand and gravel
				Si	Silicon metal plant
				Steel	Steel plant
				TiMet	Titanium metal plant
				Vm	Vermiculite
					Concentration of mineral operations

Source: Ohio Division of Geological Survey/U.S. Geological Survey (2001)

THE MINERAL INDUSTRY OF OHIO

This chapter has been prepared under a Memorandum of Understanding between the U.S. Geological Survey and the Ohio Department of Natural Resources, Division of Geological Survey, for collecting information on all nonfuel minerals.

In 2001, the estimated value¹ of nonfuel mineral production for Ohio was \$1.07 billion, based upon preliminary U.S. Geological Survey (USGS) data. This was about a 7% increase from that of 2000² and followed a 3.9% decrease from 1999 to 2000. The State increased in rank to 12th in the Nation (14th in 2000) in total nonfuel mineral production value, of which Ohio accounted for more than 2.5% of the U.S. total.

In 2001, crushed stone by value remained Ohio's leading nonfuel mineral, followed by construction sand and gravel, salt, lime, portland cement, and industrial sand and gravel (descending order of value). Crushed stone and construction sand and gravel alone accounted for about 60% of the State's total nonfuel raw mineral production value. In 2000, the most significant changes were decreases in the values of salt (down more than \$30 million), portland cement (down \$7.5 million), and gypsum. Except for industrial sand and gravel (up \$2 million), all other changes in value were about \$1 million or less and had limited effect on the overall total change in value (table 1).

Compared with USGS estimates of the quantities produced in the other 49 States during 2001, Ohio remained second in fire clay, fourth in salt, fifth in construction sand and gravel and common clays, seventh in crushed stone, and ninth in industrial sand and gravel. While the State rose to third from fourth in lime, Ohio was a significant producer of portland and masonry cements and dimension stone. The State's mines exclusively produced industrial minerals and coal; any metals, especially aluminum and steel, produced in the State were processed from materials received from other domestic and foreign sources. In 2001, Ohio continued to be the Nation's second leading raw-steel-manufacturing State with an estimated output of about 14.3 million metric tons (Mt) of raw steel, as reported by the American Iron and Steel Institute. Based upon USGS annual data, the State rose to second from fifth in the production of

¹The 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>.

²Values, 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.

primary aluminum in 2001.

The Ohio Department of Natural Resources, Division of Geological Survey (DGS), provided the following narrative information.³ Aggregate production (crushed limestone and dolomite, crushed sandstone and conglomerate, and sand and gravel) continued to be strong in 2001, reaching 128 Mt. Demand for aggregate should remain relatively strong in the short term; long-term forecasts are problematic. The Ohio Department of Transportation (ODOT) proposed budgets for fiscal years 2003 through 2005 indicate a decline from approximately \$320 million to \$75 million annually for new construction. The Ohio Transportation Review Advisory Council did not allocate any new construction money for 2006. Higher maintenance costs and flat revenues mean that ODOT has less money for new construction and that the Federal transportation law expires in 2003, making it difficult to predict Federal expenditures.

BPB-Celotex (BPB America Inc.) discontinued its gypsum mining and wallboard production in Ottawa County during August 2001 because of increased competition from new facilities in the Midwest that use gypsum produced as a byproduct of flue gas desulfurization. Miller Brothers Construction, Inc., purchased 266 hectares (ha), including mining equipment and the gypsum quarry, from BPB-Celotex in May 2002. Miller Brothers planned to mine the gypsum and byproduct aggregates for the cement, agricultural, and construction industries.

The first comprehensive overhaul of Ohio's industrial minerals regulations since 1974 was signed into law on December 14, 2001. Key provisions of the new law include (1) requiring ground water modeling before a mining permit can be issued, (2) regulation of in-stream and near-stream mining, (3) increasing the term of the mining permit from 10 to 15 years, (4) increasing reclamation bond amounts, and (5) updating blasting requirements.

The Geologic Mapping Group of the Ohio Division of Geological Survey has produced reconnaissance three-dimensional glacial-geology maps at a scale of 1:100,000 for seven 30 x 60 minute quadrangles. The maps depict the type, thickness, lateral extent, and vertical sequence of the glacial deposits and the bedrock lithology immediately beneath. The maps were partially funded by a severance tax on Ohio mineral industries, the USGS National Cooperative Geologic Mapping Program STATEMAP component, and the U.S. Environmental Protection Agency Nonpoint Source Pollution Program. The maps serve many practical purposes including (1) identification of areas underlain by sand and gravel resources, (2) identification of glacial and alluvial clay resources, (3)

³Mark Wolfe, Geologist, authored the text of the Ohio mineral industry information submitted by the Ohio's Division of Geological Survey.

identification of areas of shallow bedrock (potential limestone, dolomite, and sandstone resources), (4) identification of peat resources, (5) foundation-stability characterization, (6) delineation of areas susceptible to ground water contamination, (7) highway and other land-use planning, and (8) seismic-risk potential mapping.

Public outreach and education continued to be an important component of the mineral industry in Ohio. Several companies hosted open houses that attracted thousands of attendees, participated in the regional meeting of the National Science Teachers Association in Columbus, and cooperated with and partially funded the Ohio's Mineral Industries & the

Environment teacher workshops conducted each summer by the Ohio Division of Geological Survey and the University of Akron. Almost 400 teachers have taken these workshops in the past 15 years, and it is estimated that 157,000 students have received information about Ohio's mineral industries provided by the participants. In another significant public relations endeavor, Hanson Aggregates Midwest cooperated with the city of Sylvania to open the 4-ha Fossil Preserve Park adjacent to its quarry in Lucas County during 2001. This fossil locality in the Devonian age Silica Shale could attract as many as 250,000 visitors per year.

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

(Thousand metric tons and thousand dollars unless otherwise specified)

Mineral	1999		2000		2001 p/	
	Quantity	Value	Quantity	Value	Quantity	Value
Cement:						
Masonry	W	W	92	11,000 e/	80 e/	9,800 e/
Portland	1,130	90,800 e/	1,030	83,300 e/	1,170 e/	94,200 e/
Clays, common	1,710	8,170	1,370	7,380	1,370	7,380
Gemstones	NA	3	NA	3	NA	3
Lime	1,820	105,000	1,850	106,000	1,720	103,000
Sand and gravel:						
Construction	52,000	257,000	51,200	256,000	55,000	280,000
Industrial	1,150	30,700	1,200	32,800	1,210	32,800
Stone:						
Crushed	73,200	328,000	73,600	327,000	80,000	366,000
Dimension metric tons	25,600	2,390	34,500	3,050	34,000	3,000
Combined values of clays (fire), gypsum (crude), peat, salt, and value indicated by symbol W	XX	220,000	XX	172,000	XX	171,000
Total	XX	1,040,000	XX	999,000	XX	1,070,000

e/ Estimated. p/ Preliminary. NA Not available. W Withheld to avoid disclosing company proprietary data; value included with "Combined values" data. 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
OHIO: CRUSHED STONE SOLD OR USED, BY KIND 1/

Kind	1999 r/				2000			
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value
Limestone 2/	96	63,600	\$283,000	\$4.45	92	64,000	\$284,000	\$4.44
Dolomite	13	9,100	42,300	4.65	13	9,130	40,300	4.42
Sandstone	7	506	2,420	4.78	7	459	2,210	4.82
Total or average	XX	73,200	328,000	4.47	XX	73,600	327,000	4.44

XX Not applicable.

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

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

TABLE 3
OHIO: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2000, BY USE 1/ 2/

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Construction:			
Coarse aggregate (+1 1/2 inch):			
Macadam	W	W	\$4.38
Riprap and jetty stone	2,560	\$13,700	5.36
Filter stone	135	599	4.44
Other coarse aggregate	708	2,550	3.60
Total or average	3,410	16,900	4.96
Coarse aggregate, graded:			
Concrete aggregate, coarse	3,670	17,800	4.84
Bituminous aggregate, coarse	2,160	11,000	5.08
Bituminous surface-treatment aggregate	570	2,820	4.95
Railroad ballast	203	835	4.11
Other graded coarse aggregate	1,980	11,100	5.62
Total or average	8,580	43,500	5.07
Fine aggregate (-3/8 inch):			
Stone sand, concrete	388	1,700	4.39
Stone sand, bituminous mix or seal	620	2,760	4.45
Screening, undesignated	407	1,580	3.89
Other fine aggregate	279	1,390	4.97
Total or average	1,690	7,430	4.39
Coarse and fine aggregates:			
Graded road base or subbase	12,000	51,800	4.32
Unpaved road surfacing	2,320	9,910	4.27
Crusher run or fill or waste	1,330	5,250	3.95
Other coarse and fine aggregates	11,500	46,500	4.06
Total or average	27,100	113,000	4.19
Other construction materials	1,160	4,870	4.18
Agricultural, agricultural limestone	(3/)	(3/)	4.44
Chemical and metallurgical:			
Cement manufacture	1,460	6,150	4.20
Lime manufacture	(3/)	(3/)	4.39
Dead-burned dolomite manufacture	(3/)	(3/)	4.40
Flux stone	(3/)	(3/)	5.08
Special:			
Asphalt fillers or extenders	(3/)	(3/)	5.26
Whiting or whiting substitute	(3/)	(3/)	12.09
Other fillers or extenders	(3/)	(3/)	5.78
Other miscellaneous uses, refractory stone (including ganister)	(3/)	(3/)	4.06
Unspecified: 4/			
Reported	19,800	88,800	4.48
Estimated	8,700	37,000	4.31
Total or average	28,500	126,000	4.43
Grand total or average	73,600	327,000	4.44

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, limestone, limestone-dolomite, 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
OHIO: 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		District 4	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Construction:								
Coarse aggregate (+1 1/2 inch) 2/	2,340	11,600	150	916	179	1,060	558	2,290
Coarse aggregate, graded 3/	3,080	15,500	2,200	11,000	977	4,720	1,900	10,300
Fine aggregate (-3/8 inch) 4/	690	3,190	W	W	163	684	211	831
Coarse and fine aggregate 5/	10,900	44,800	7,550	30,500	3,130	14,000	3,040	12,400
Other construction materials	311	1,310	162	678	512	2,080	47	254
Agricultural 6/	253	1,150	W	W	78	304	17	76
Chemical and metallurgical 7/	W	W	W	W	W	W	--	--
Special 8/	W	W	W	W	W	W	--	--
Other miscellaneous uses 9/	--	--	--	--	--	--	--	--
Unspecified: 10/								
Reported	4,900	23,000	820	3,620	1,920	8,450	7,240	31,900
Estimated	4,900	21,000	920	4,000	840	3,600	1,300	5,600
Total	28,600	127,000	12,500	53,800	8,690	39,400	14,300	63,700
	District 5		District 6					
	Quantity	Value	Quantity	Value				
Construction:								
Coarse aggregate (+1 1/2 inch) 2/	158	870	16	87				
Coarse aggregate, graded 3/	208	1,020	218	1,050				
Fine aggregate (-3/8 inch) 4/	173	773	W	W				
Coarse and fine aggregate 5/	1,500	6,510	1,020	5,380				
Other construction materials	95	340	37	205				
Agricultural 6/	W	W	W	W				
Chemical and metallurgical 7/	--	--	--	--				
Special 8/	--	--	--	--				
Other miscellaneous uses 9/	W	W	--	--				
Unspecified: 10/								
Reported	114	503	4,850	21,400				
Estimated	41	180	660	2,800				
Total	2,430	10,700	7,020	32,100				

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 aggregate.

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

6/ Includes agricultural limestone.

7/ Includes cement manufacture, dead-burned dolomite manufacture, flux stone, and lime manufacture.

8/ Includes asphalt fillers or extenders, whiting or whiting substitute, and other fillers or extenders.

9/ Includes refractory stone (including ganister).

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

TABLE 5
OHIO: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2000,
BY MAJOR USE CATEGORY 1/

Use	Quantity		Unit value
	(thousand metric tons)	Value (thousands)	
Concrete aggregate (including concrete sand)	9,350	\$43,300	\$4.64
Concrete products (blocks, bricks, pipe, decorative, etc.) 2/	788	5,040	6.39
Asphaltic concrete aggregates and other bituminous mixtures	4,220	21,700	5.14
Road base and coverings 3/	2,790	15,100	5.43
Fill	3,610	15,700	4.36
Snow and ice control	76	338	4.45
Filtration	74	449	6.07
Other miscellaneous uses 4/	1,520	9,140	6.03
Unspecified: 5/			
Reported	23,300	117,000	5.03
Estimated	5,400	28,000	5.21
Total or average	51,200	256,000	5.01

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

2/ Includes plaster and gunite sands.

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

4/ Includes roofing granules.

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

TABLE 6
OHIO: CONSTRUCTION SAND AND GRAVEL SOLD OR USED 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
Concrete aggregate (including concrete sand)	298	1,150	3,110	16,500	2,370	9,250
Concrete products (blocks, bricks, pipe, decorative, etc.) 2/	--	--	263	1,510	365	2,450
Asphaltic concrete aggregate and other bituminous mixtures	W	W	1,370	7,860	877	4,210
Roadbase and coverings 3/	W	W	685	4,140	539	3,180
Fill	82	456	938	4,900	1,680	5,620
Snow and ice control	--	--	W	W	15	70
Other miscellaneous uses 4/	265	1,140	205	1,280	175	1,210
Unspecified: 5/						
Reported	258	951	2,340	12,600	11,200	54,700
Estimated	270	1,200	2,100	12,000	1,700	8,300
Total	1,170	4,940	11,000	60,800	18,900	89,000
Use	District 4		District 5		District 6	
	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregate (including concrete sand)	1,310	6,790	1,470	5,750	797	3,870
Concrete products (blocks, bricks, pipe, decorative, etc.) 2/	W	W	43	190	W	W
Asphaltic concrete aggregate and other bituminous mixtures	W	W	537	2,250	476	2,400
Roadbase and coverings 3/	574	2,670	841	4,460	W	W
Fill	650	3,490	110	516	150	764
Snow and ice control	W	W	37	147	W	W
Other miscellaneous uses 4/	1,620	9,610	387	1,940	188	1,070
Unspecified: 5/						
Reported	2,240	12,000	4,750	24,200	2,540	12,900
Estimated	--	--	1,300	6,500	17	78
Total	6,400	34,500	9,490	46,000	4,170	21,100

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

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

2/ Includes plaster and gunite sands.

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

4/ Includes filtration and roofing granules.

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