2022 REPORT ON

OHIO MINERAL INDUSTRIES



compiled by Christopher E. Wright

OHIO GEOLOGICAL SURVEY
DEPARTMENT OF NATURAL RESOURCES



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2022 Report on Ohio mineral industries: An annual summary of the state's economic geology

compiled by
Christopher E. Wright

STATE OF OHIO
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF GEOLOGICAL SURVEY
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PREFACE

The supply chain difficulties brought about by the COVID-19 pandemic began to stabilize in 2022 as the negative effects on the supply chain began to wane. However, declines in at least one category of production, sales, value, or employment occurred for the majority of Ohio coal and industrial mineral producers in 2022.

The 2022 Report on Ohio Mineral Industries continues in the efforts of the ODNR Division of Geological Survey to present a clear and concise representation of mining production, sales, and employment for Ohio's mineral industry commodities. This report provides a brief discussion of each geologic commodity and a bulleted listing of commodity statistics for 2022. Percent change comparisons of 2022 production and sales values for each commodity with those of the previous year are notated, with the 2021 data coming from the 2021 edition of this report (Wright, 2022).

The Map of Active Mineral Industry Operations in Ohio is included at the end of the report and acts as a standalone product. The map includes a table with information about each labeled point, including the company name and total combined tonnage of material(s) mined at each operation location.

Detailed commodity information for all mineral industries, including sales, production, value, and company information for each of the operators who reported activity in 2022 is available on the ODNR Division of Geological Survey website at **ohiodnr.gov/industrialminerals**.

Chris Wright
Geology Program Supervisor

EDITOR'S NOTE

The original version of this report, published in 2023, erroneously reported the 2022 shale production total as 555,477 tons. This number has been corrected in several areas of this revised report (most notably in Table 1 and on p. 18) with the actual 2022 shale production total of 453,966 tons. Associated percentage changes for year-over-year shale production have also been updated.

Anthony Bresnen
Publications Editor

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2022 OHIO ECONOMIC GEOLOGY IN BRIEF

The total tonnage of coal and industrial minerals produced in Ohio during 2022 was 113,912,675 tons or approximately 9.7 tons per capita. In 2022, the total value[1] of coal was $130,625,344; the value of oil and gas was $14,581,394,684; and the value[1] of all nonfuel industrial minerals was $1,596,580,663 (figs. 1, 2, 3; table 1). The combined value of fuel and nonfuel minerals produced in Ohio during 2022 was $16,308,600,691 or approximately $1,387 per capita.

Reported and estimated total direct employment in the extractive industries of Ohio in 2022 was more than 10,000 people. Industrial mineral production increased for limestone and dolomite, salt, sandstone and conglomerate, shale, and peat, while production decreased for coal, clay, and sand and gravel. The total value of nonfuel industrial minerals exceeded $1 billion for the ninth straight year. In 2022, the production-leading commodity of limestone and dolomite was up 4.2%, with the second-leading commodity of sand and gravel down 3.2% from 2021; the third-leading commodity of salt was up 23.1% from 2021; the fourth-leading commodity of coal was down 6.0% from 2021 values.

[1]Includes reported and estimated values. Some operations reporting sales did not report a value for those sales. A statewide-average price per ton was calculated for each industrial mineral commodity based on sales for which the value was reported. A statewide-average price per ton was calculated for coal based on method of production for which sales or value was reported. These calculated averages were used to estimate the value of the sales for which the actual values were not reported.

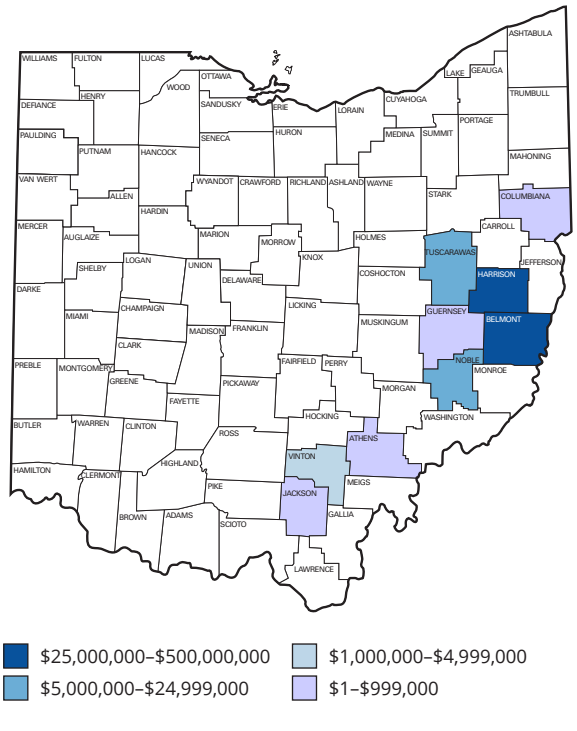


FIGURE 1. Total value of coal sold in Ohio in 2022, by county.

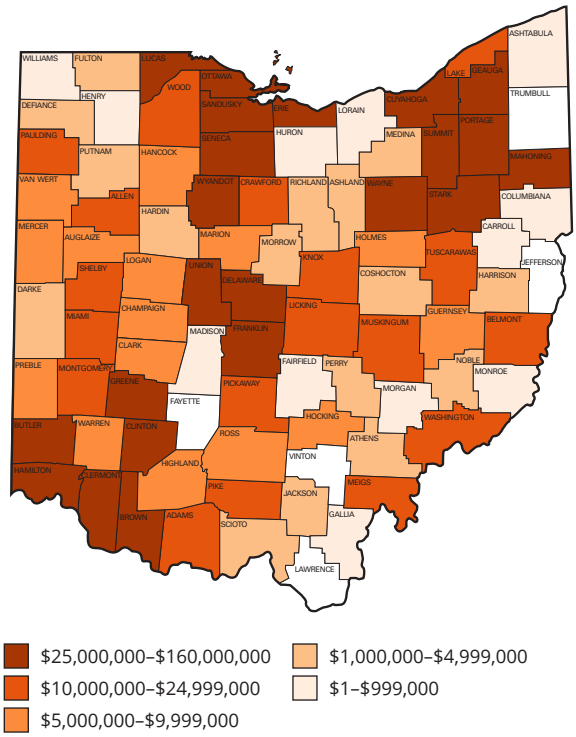


FIGURE 2. Total value of industrial minerals sold in Ohio in 2022, by county.

TABLE 1. ***Fuel and nonfuel mineral sales and production in Ohio in 2022***

Commodity	*Production*[1]	*Sales*[2]	*Value*[3]	*Change in value from 2021 (percent)*[4]
Limestone and dolomite	72,375,240 tons	71,312,833 tons	$984,216,077	+ 24.6
Coal	2,701,276 tons	2,731,562 tons	$130,625,344	+ 34.1
Sand and gravel	31,942,328 tons	32,591,360 tons	$306,414,324	+ 5.2
Salt	4,343,060 tons	4,392,024 tons	$239,963,638	– 2.9
Sandstone and conglomerate	1,374,101 tons	1,296,828 tons	$51,848,905	+ 15.5
Shale	453,966 tons	453,696 tons	$4,905,802	+ 3.7
Clay	722,204 tons	726,966 tons	$9,227,917	0.0
Peat	500 tons	200 tons	$4,000	– 66.1
Gas	2,215,565,214 thousand cubic feet	not available	$12,783,811,285	+ 68.4
Oil	19,886,972 barrels	not available	$1,797,583,399	+ 48.2

[1]The production figures for industrial minerals are estimates, as many operators do not know actual production. For those operators that do not report production, production is assumed equal to sales or estimated from ODNR Division of Mineral Resources Management records.
[2]Includes material for captive use.
[3]The FOB value (free on board; value of mined product excluding insurance or transportation costs) of industrial minerals sold was estimated for mines that failed to report this information and for those producing material for captive use. These estimates were calculated using a statewide-average price per ton calculated using reported FOB values.
[4]Percent change in value for peat is based on production in 2020, when peat was last mined in Ohio.

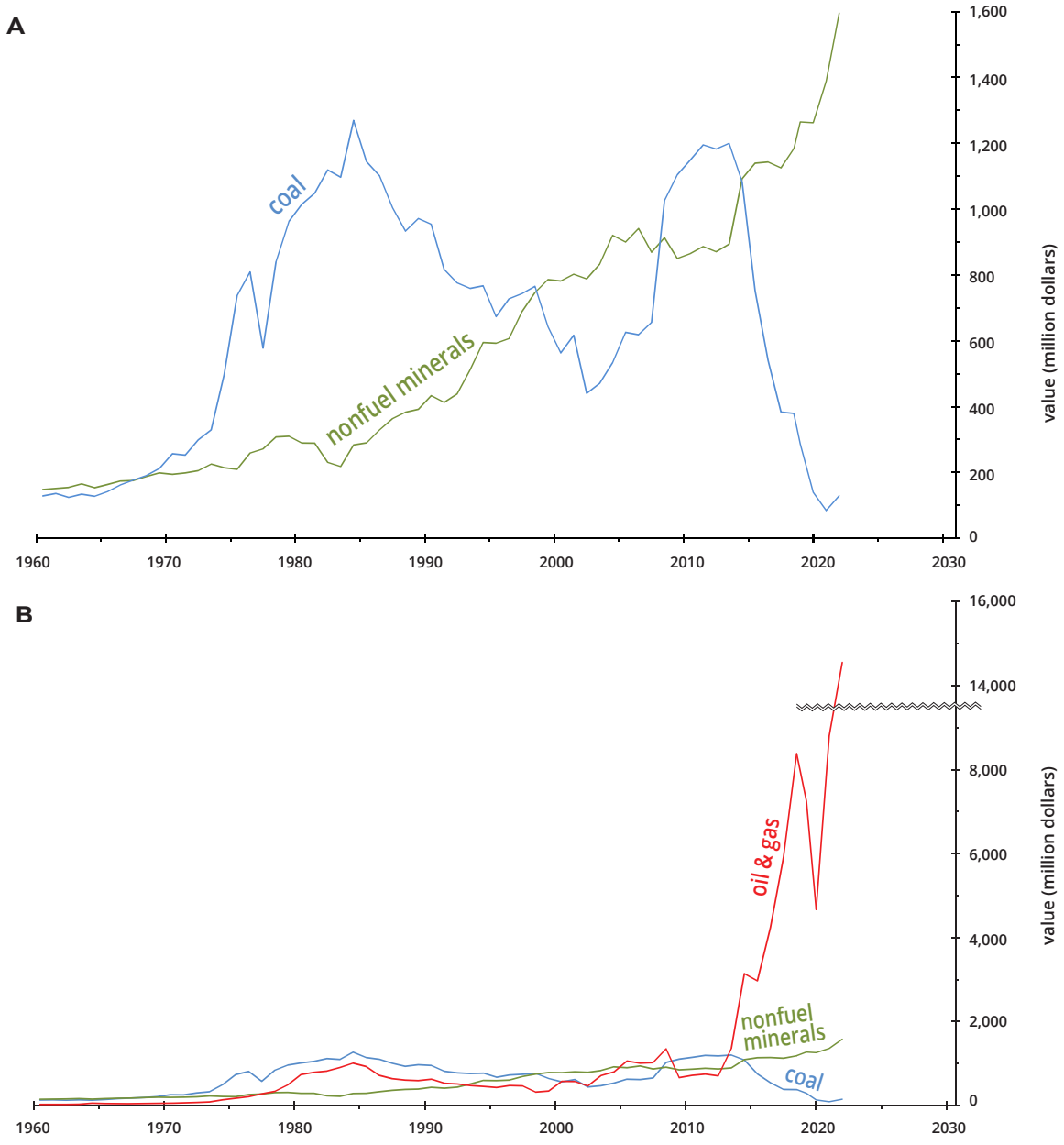


FIGURE 3. (A) Value of coal and nonfuel minerals in Ohio since 1960. (B) Value of coal, nonfuel minerals, and oil and gas in Ohio since 1960.

COAL

Commodity summaries and directories of operators are available at: ohiodnr.gov/industrialminerals.

Coal was first recognized in Ohio by pioneers during the 1740s, and the first map of Ohio coal deposits was made in 1752 (Crowell, 1995). Coal production first occurred in Jefferson County during 1800 and amounted to 100 tons. Columbiana County was the next to report coal production starting in 1803 (Crowell, 1995). Since that time, over 4 billion tons of coal have been mined from coal seams in the state (see fig. 4; Crowell, 1995); this represents a value of more than $200 billion in 2022 dollars.[2]

Throughout 2022, ODNR issued three surface-mine expansion permits and one underground-mine expansion permit. There was one new surface mine permit issued, and no new underground mines permitted. Several coal operations ceased or curtailed production in 2022 because of less-expensive, competing natural gas and decreased demand.

[2]The following link provides more information about the formation and uses of Ohio's coal resources: **ohiodnr.gov/coalgeology**.

Production

- Tons produced = 2,701,276 (–6.0% from 2021)
- U.S. ranking: 16th out of 22 producing states (**USDOE, 2023**)
- Leading counties (percentage of statewide production):
  - Harrison (49.9%)
  - Belmont (27.0%)
  - Noble (15.3%)
  - Tuscarawas (6.1%)
- Top producing seams (table 5):
  - Upper Freeport (No. 7)
  - Pittsburgh (No. 8)
  - Meigs Creek (No. 9)

Sales

(See figs. 5 and 6 and tables 2, 6, and 7)

- Tons sold = 2,731,562 (–5.3% from 2021)
- Value = $130,625,344

Employment

(See table 8)

- Production employees reported = 304
- Nonproduction employees reported = 134
- Average employee wages:
  - Surface-mine production = $56,265
  - Underground-mine production = $89,922
- Total wages earned = $32,371,139

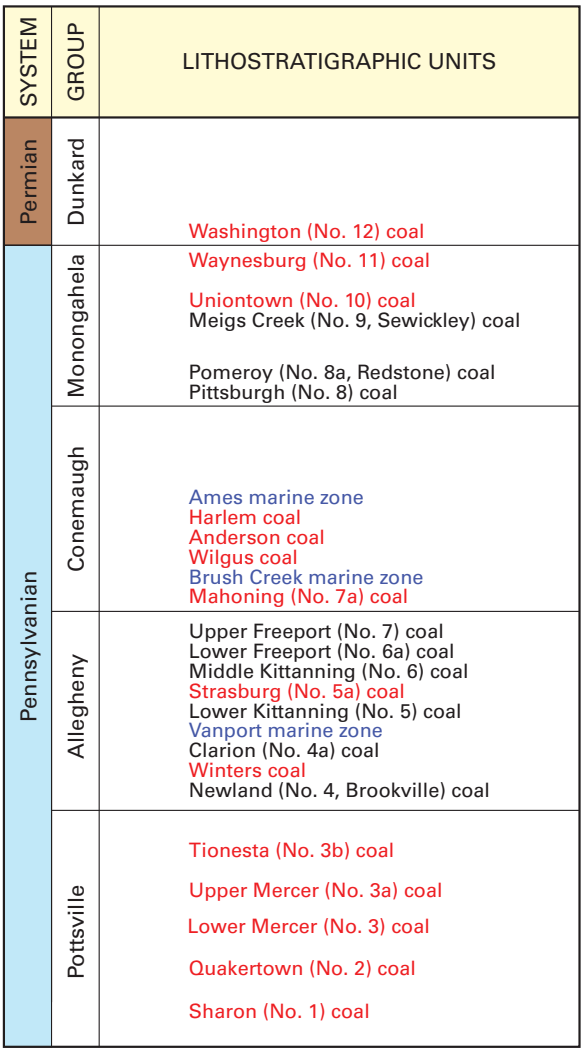


FIGURE 4. Stratigraphic column of coals mined in Ohio during 2022 (black), other significant coal beds (red), and associated key beds (blue) used for stratigraphic correlation. Modified from Brant and Delong (1960, table 9), Collins (1979, fig. 3), and Larsen (1991, fig. 2).

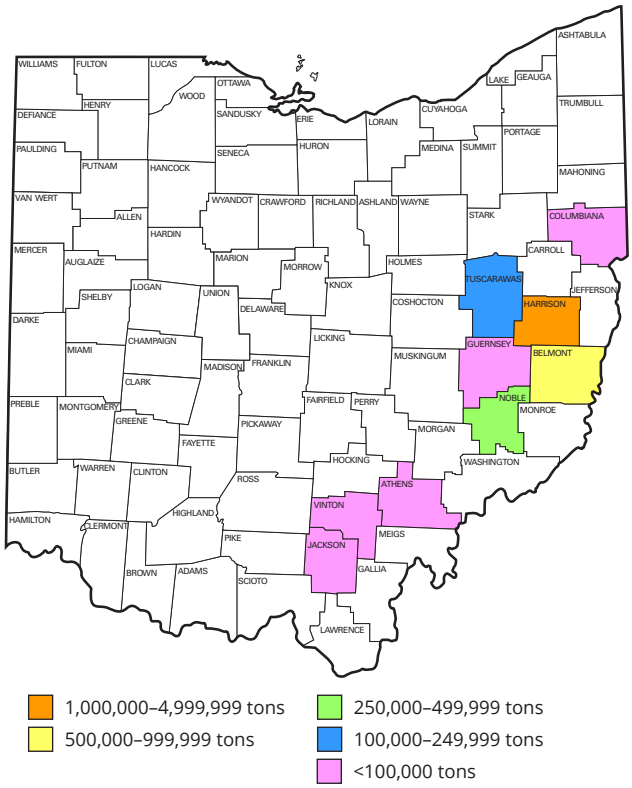


FIGURE 5. Coal sales in Ohio in 2022, by county and quantity.

TABLE 2. ***2022 Ohio coal production and sales by county, in descending order of production***

County	*Production (short tons)*	*Sales (short tons)*
Harrison	1,349,010	1,346,929
Belmont	728,668	764,580
Noble	413,577	413,577
Tuscarawas	164,918	162,464
Vinton	22,274	22,274
Athens	16,092	15,051
Jackson	6,517	6,517
Columbiana	217	167
Guernsey	3	3
TOTAL	2,701,276	2,731,562

TABLE 3. ***2022 Ohio coal production, by production size group and change from 2021***

Production size group	*2022*		*Change from 2021 (short tons)*
	Number of mines reporting	*Production (short tons)*	
1,000,000 tons and over	0	0	– 1,271,897
500,000 to 999,999 tons	1	653,753	653,753
250,000 to 499,999 tons	2	649,790	16,226
100,000 to 249,999 tons	6	979,226	497,536
50,000 to 99,999 tons	4	291,211	– 36,809
25,000 to 49,999 tons	2	70,512	– 10,637
Less than 25,000 tons	10	56,784	– 21,837
TOTAL	25	2,701,276	– 173,665

TABLE 4. ***2022 Ohio coal production, by county and mining method***

County	*All methods (short tons)*	*Total number of mines*	*Underground*				*Surface*				
			Number of mines reporting	*Production (short tons)*			*Number of mines reporting*	*Production (short tons)*			
				Total	*Longwall*	*Continuous miner*		*Total*	*Strip*	*Auger*	*Highwall*
Athens	16,092	1					1	16,092	9,127	0	6,965
Belmont	728,668	4	1	364,061	364,061	0	3	364,607	304,448	33,297	26,862
Columbiana	217	1					1	217	217	0	0
Guernsey	3	1					1	3	3	0	0
Harrison	1,349,010	5	2	939,482	0	939,482	3	409,528	404,765	4,763	0
Jackson	6,517	1					1	6,517	6,517	0	0
Noble	413,577	4					4	413,577	413,577	0	0
Tuscarawas	164,918	7					7	164,918	160,801	4,117	0
Vinton	22,274	1					1	22,274	22,274	0	0
TOTAL[1]	2,701,276	25	3	1,303,543	364,061	939,482	22	1,397,733	1,321,729	42,177	33,827

[1]Any tally inconsistencies are because of rounding of production tonnages.

TABLE 5. ***2022 Ohio coal production, by county and seam***

County[1]	Production (short tons)									
	Total	Newland (No. 4, Brookville)	Clarion (No. 4a)	Lower Kittanning (No. 5)	Middle Kittanning (No. 6)	Lower Freeport (No. 6a)	Upper Freeport (No. 7)	Pittsburgh (No. 8)	Pomeroy (No. 8a, Redstone)	Meigs Creek (No. 9, Sewickley)
Athens	16,092				16,092					
Belmont	728,668							521,715		206,953
Columbiana	217			217						
Guernsey	3									3
Harrison	1,349,010					35,616	973,871	251,039	85,258	3,226
Jackson	6,517			6,517						
Noble	413,577									413,577
Tuscarawas	164,918	31,320		58,350	75,248					
Vinton	22,274		3,858	12,421	5,995					
TOTAL[2]	2,701,276	31,320	3,858	77,505	97,335	35,616	973,871	772,754	85,258	623,759

[1]Production from mines operating in more than one county was evenly split between the counties involved unless a county-specific breakdown was provided by the operator.
[2]Any tally inconsistencies are because of rounding of production tonnages.

TABLE 6. ***2022 Disposition of Ohio coal, by county***

County[1]	Number of mines	Disposition[1] (short tons)					Stored
		Total[2]	Rail	Water	Truck	Conveyor	
Athens	1	15,051			15,051		1,041
Belmont	4	764,580			764,580		
Columbiana	1	167			167		50
Guernsey	1	3			3		
Harrison	5	1,346,929	283,991		1,062,938		3,506
Jackson	1	6,517			6,517		
Noble	4	413,577			413,577		
Tuscarawas	7	162,464			162,464		2,595
Vinton	1	22,274			22,274		
TOTAL[3]	25	2,731,562	283,991	0	2,447,571	0	7,192

[1]Tonnage of coal shipped from mines operating in more than one county was evenly split between the counties involved and type(s) of disposition reported unless county-specific information was provided by the operator.
[2]Does not reflect tonnage stored. Reflects tonnage sold and shipped from mine.
[3]Any tally inconsistencies are because of rounding.

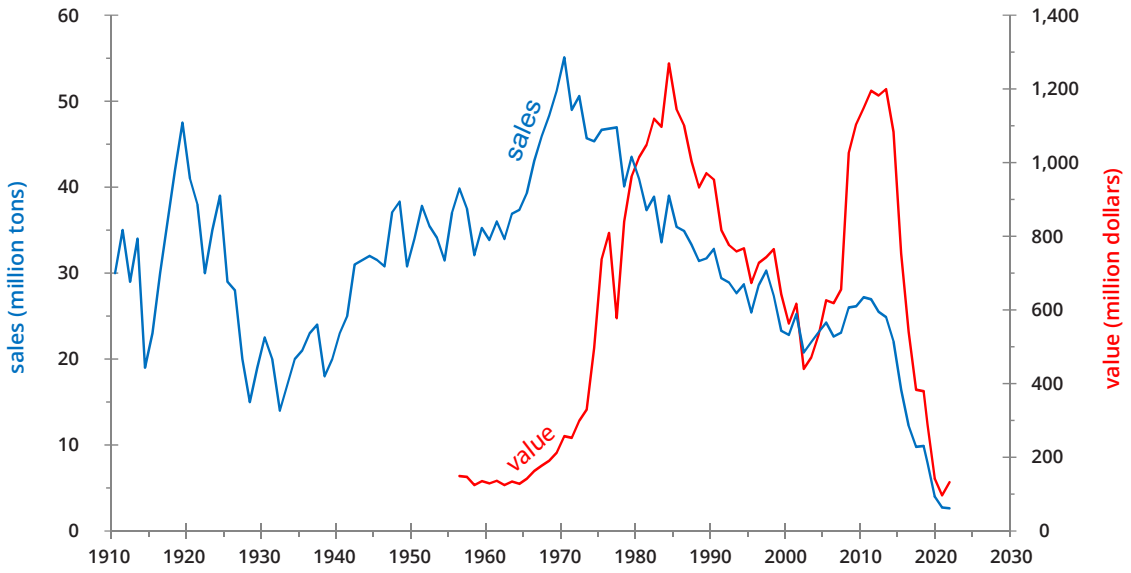


FIGURE 6. Sales and value of coal in Ohio since 1910.

TABLE 7. ***2022 Dollar value of coal at mine, by county and mining method***

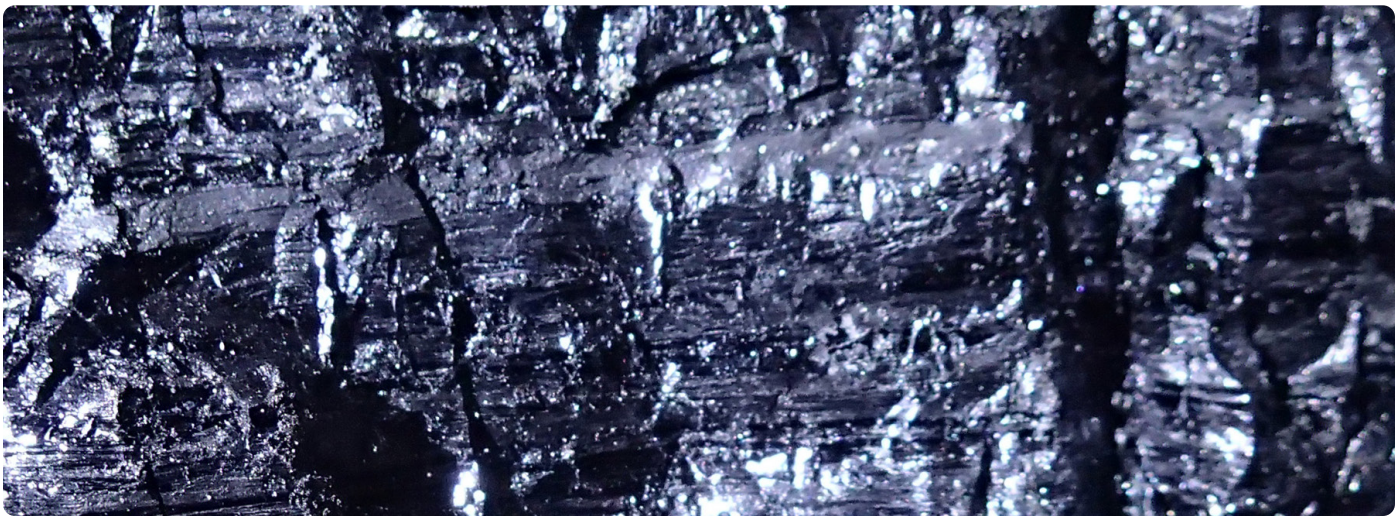
County[1]	Total				Underground				Surface			
	No. of mines	Tonnage sold (short tons)	Value at mine[2] (dollars)	Per ton average (dollars)	No. of mines	Tonnage sold (short tons)	Value at mine[2] (dollars)	Per ton average (dollars)	No. of mines	Tonnage sold (short tons)	Value at mine[2] (dollars)	Per ton average (dollars)
Athens	1	15,051	$495,075	$32.89					1	15,051	$495,075	$32.89
Belmont	4	764,580	$29,787,992	$38.96	1	399,318	$12,164,031	$30.46	3	365,262	$17,623,961	$48.25
Columbiana	1	167	$17,216	$103.09					1	167	$17,216	$103.09
Guernsey	1	3	$78	$26.00					1	3	$78	$26.00
Harrison	5	1,346,929	$77,360,553	$57.43	2	939,482	$54,790,949	$58.32	3	407,447	$22,569,604	$55.39
Jackson	1	6,517	$39,101	$6.00					1	6,517	$39,101	$6.00
Noble	4	413,577	$14,475,191	$35.00					4	413,577	$14,475,191	$35.00
Tuscarawas	7	162,464	$5,991,747	$52.60					7	162,464	$5,991,747	$36.88
Vinton	1	22,274	$2,458,391	$110.37					1	22,274	$2,458,391	$110.37
TOTAL	25	2,731,562	$130,625,344	$47.82	3	1,338,800	$66,954,980	$50.01	22	1,392,762	$63,670,364	$45.72

[1]Sales reported from mines operating in more than one county were evenly split between the counties involved unless county-specific information was provided by the operator.
[2]The FOB value (free on board; value of mined product excluding insurance or transportation costs) of coal sold was estimated for those mines that failed to report this information. These estimates were calculated using a statewide-average price per ton by mining method, based on reported FOB values deemed to be reliable.

TABLE 8. ***2022 Wage and salary payments to Ohio coal mine employees, by county and occupational group***

County[1]	Wage and salary payments (nearest whole dollar)[2]			
	All occupations	Underground production employees	Surface production employees	Other
Athens	$271,342		$186,413	$84,929
Belmont	$10,693,437	$3,310,629	$3,011,094	$4,371,714
Guernsey	$1,318,688		$456,514	$862,174
Harrison	$12,881,840	$7,749,809	$2,272,687	$2,859,344
Noble	$3,192,784		$2,921,227	$271,557
Tuscarawas	$1,054,399		$723,355	$331,044
Vinton	$612,756		$612,756	
TOTAL[3]	$30,025,246	$11,060,438	$10,184,046	$8,780,762

[1]For those operations reporting activity in more than one county, wage and salary payments were evenly split between the counties involved unless county-specific information was provided by the operator.
[2]For those operations reporting only a total wage and salary payment for all workers, an equal pay rate was assumed for all employees. In cases where quarterly employment was reported but wage and salary payments were not, wage and salary payments for that quarter were estimated from reported payments in the other quarters to arrive at the annual figure.
[3]Any tally inconsistencies are because of rounding.



INDUSTRIAL MINERALS

Commodity summaries and directories of operators are available at: ohiodnr.gov/industrialminerals.

Industrial minerals are nonmetallic, nonfuel rocks or minerals that have economic value and are essential to modern society. Industrial minerals have been mined or quarried in Ohio since the establishment of early settlements and include limestone, dolomite, sand, gravel, sandstone, conglomerate, clay, shale, salt, gypsum, and peat. Hundreds of construction projects and industrial products rely on the availability of industrial minerals.

The production of multiple commodities is important to the economic success of mine operations in many areas of Ohio. The production of sand and gravel along with clay is often located in glaciated portions of northern and western Ohio, where deposits of sand and gravel can occur with clay-rich glacial tills. The Pennsylvanian-age cyclic sedimentation in eastern Ohio includes coals, clays, shales, sandstones, and limestones in close proximity, allowing for economic recovery of multiple commodities.[3]

Industrial minerals were reported as produced or sold at 332 operations in 82 Ohio counties during 2022. The combined value of all industrial minerals sold in 2022 was $1,596,580,663 (table 9). This is the ninth consecutive year that the combined value of all nonfuel minerals has exceeded $1 billion. The statewide combined employment for all nonfuel industrial mineral extraction was 4,208 employees (table 10).

In 2022, peat sales were reported in Portage County by one company that also produces sand and gravel and clay. Peat production and sales have been very sporadic in Ohio since 2000. In recent years peat production and sales have been very marginal to small, generally having a negligible effect on the total value of all industrial minerals mined in Ohio (table 9).

[3]The following links will provide more information on the general bedrock and glacial geology of Ohio: **ohiodnr.gov/bedrockgeology** and **ohiodnr.gov/glacialgeology**.

TABLE 9. ***2022 Value of Ohio industrial minerals***

Commodity	*Sales (tons)*	*Change from 2021 (tons/percent)[1]*	*Value[2]*	*Percent of total value*
Limestone and dolomite	71,312,833	+926,259/+1.3	$984,216,077	61.6
Sand and gravel	32,591,360	–706,753/–2.1	$306,414,324	19.2
Salt	4,392,024	+29,055/+0.7	$239,963,638	15.0
Sandstone and conglomerate	1,296,828	+112,637/+9.5	$51,848,905	3.2
Shale	453,696	+127,967/+39.3	$4,905,802	0.3
Clay	726,966	–110,979/–13.2	$9,227,917	0.6
Peat	200	–528/–72.5	$4,000	0.0
TOTAL	110,773,907	+378,386/+0.3	$1,596,580,663	100.0

[1]Percent change in sales for peat is based on production in 2020, when peat was last mined in Ohio.
[2]The FOB value (free on board; value of mined product excluding insurance or transportation costs) of industrial minerals sold was estimated for those mines that failed to report this information and for those producing material for captive use. These estimates were calculated using a statewide-average price per ton based on reported FOB values.



TABLE 10. ***2022 Employment at Ohio industrial mineral operations, by county***

County	*Total Employees*[3]	*Production Employees*	*Nonproduction Employees*
Adams	24	11	13
Allen	27	11	16
Ashland	17	12	5
Ashtabula	2	1	1
Athens	10	7	3
Auglaize	13	9	4
Belmont	296	41	255
Brown	29	16	13
Butler	142	55	87
Carroll	1	1	0
Champaign	11	7	4
Clark	11	8	3
Clermont	59	53	6
Clinton[1]	0	0	0
Columbiana	7	4	3
Coshocton	32	23	9
Crawford	14	14	0
Cuyahoga	259	230	29
Darke	5	4	1
Defiance	17	10	7
Delaware	24	24	0
Erie	146	100	46
Fairfield	2	1	1
Franklin	147	95	52
Fulton	6	4	2
Gallia[1]	0	0	0
Geauga	74	67	7
Greene	53	43	10
Guernsey	32	14	18
Hamilton	115	55	60
Hancock	5	5	0
Hardin	29	7	22
Harrison	2	2	0
Henry[1]	0	0	0
Highland	32	22	10
Hocking	52	23	29
Holmes	45	24	21
Huron	2	1	1
Jackson	6	5	1
Knox	77	36	41
Lake	92	57	35
Licking	35	26	9
Logan	86	48	38
Lorain	4	3	1
Lucas	82	42	40
Madison	5	2	3
Mahoning	74	50	24
Marion	13	12	1
Medina	14	12	2
Meigs	21	15	6
Mercer	49	15	34
Miami	31	26	5
Monroe	4	3	1
Montgomery	42	31	11
Morrow	6	6	0
Muskingum	55	50	5
Noble	18	15	3
Ottawa	129	93	36
Paulding	65	31	34
Perry	15	12	3
Pickaway	21	11	10
Pike	15	12	3
Portage	152	109	43
Preble	36	26	10
Putnam	4	4	0
Richland	23	23	0
Ross	13	12	1
Sandusky	188	163	25
Scioto	5	4	1
Seneca	67	50	17
Shelby	16	12	4
Stark	99	83	16
Summit	100	1	99
Trumbull[2]	30	0	30
Tuscarawas	192	53	139
Union	79	46	33
Van Wert	46	24	22
Warren	28	18	10
Washington	132	88	44
Wayne	66	38	28
Williams[1]	0	0	0
Wood	82	46	36
Wyandot	149	100	49
TOTAL 83 counties	4,208	2,517	1,691

[1] Counties where commodities were extracted but no employment information was provided are represented with zeros in the employment fields.
[2] Trumbull County reported employment but no production or sales in 2022.
[3] Any tally inconsistencies are because of computer rounding produced by partial-year employment.



LIMESTONE AND DOLOMITE

Limestone and dolomite are Ohio's most versatile industrial minerals. Each is used as aggregate in the construction industry, as an essential ingredient in the cement industry, to produce lime, as a flux in the steel and glass industries, as filler in a multitude of products, as an agricultural supplement, in water purification, and as a building stone. Ohio has long been a national leader in the production of lime and construction aggregates.

Devonian- and Silurian-age carbonates located in the western half of Ohio are the primary geologic units producing crushed stone. Pennsylvanian- and Mississippian-age limestones are important sources of aggregate in local markets of eastern Ohio (Stout, 1941; Lamborn, 1951).

Production

- Tons produced = 72,375,240 (+4.2% from 2021)
- U.S. ranking:
  - 5th out of 50 producing states for crushed stone (**USGS, 2023a**)
  - In the top 4 of the 28 producing states for lime (**USGS, 2023b**)
- Top Producing Geologic Units (fig. 7):
  - Columbus/Delaware Limestones (Devonian)
  - Lockport Dolomite (Silurian)
  - Greenfield/Peebles/Tymochtee Dolomites (Silurian)
  - Brassfield Formation (Silurian)

Sales
(See figs. 8 and 9)

- Tons sold = 71,312,833 (+1.3% from 2021; tables 11 and 12)
- Value[4] = $984,216,077 (table 9)
- Leading counties (percentage of statewide sales):
  - Franklin (14.9%)
  - Wyandot (10.0%)
  - Ottawa (7.6%)
  - Erie (5.2%)

Employment
(See table 10)

- Production employees reported = 1,213
- Nonproduction employees reported = 860
- Average employee annual wage = $58,361
- Total wages earned = $90,867,299
- Average days worked per operation = 196

[4]Includes reported and estimated values. See footnote 1, p. 1.



TABLE 11. ***2022 Ohio limestone and dolomite sales, by county and use***

County	Tons sold														
	Total all types	Crushed and broken stone										Dimension stone	Stone for portland cement manufacture	Agricultural stone (aglime)	Raw stone for burning
		Total	Riprap	Flux stone	Stone for portland cement concrete	Stone for asphaltic concrete	Road construction/ resurfacing	Commercial building	Railroad ballast	Extenders/ fillers	Unspecified/ other				
Adams	1,126,207	1,126,207									1,126,207				
Allen	839,616	834,993	5,373		116,765	207,353	13,990	30,745			460,767			4,623	
Athens	52,000	52,000									52,000				
Auglaize	603,000	598,000	5,200		57,000	45,000	6,000	310,000			174,800			5,000	
Belmont	821,996	821,996	58,001				209,198	76,110			478,687				
Brown	1,977,235	1,977,235									1,977,235				
Butler	119,009	119,009									119,009				
Clermont	2,293,103	2,293,103			184,558	315,785	57,446	1,735,314							
Clinton	2,365,749	2,331,323	47,280		94,560	592,749	709,200	756,480	6,426		124,628			34,426	
Coshocton	40,927	40,927						7,247			33,680				
Crawford	1,417,000	1,275,000	10,000		264,000	335,000					666,000			142,000	
Darke	325,653	325,653	2,866			81,021	139,356	102,410							
Delaware	3,647,000	3,643,000	23,000		440,000	426,000					2,754,000			4,000	
Erie	3,708,218	3,703,027	13,051				164,670				3,525,306	2,695		2,496	
Franklin	10,611,961	10,588,144	27,964		645,064	555,830	396,130	2,708,726			6,254,430			23,817	
Greene	1,786,789	1,786,789			838,865	6,801	90,689	124,698			725,736				
Guernsey	340,560	340,560					340,560								
Hamilton	14,518	14,518									14,518				
Hancock	446,000	446,000	3,000		10,000	158,000			90,000		185,000				
Hardin	183,052	183,052									183,052				
Harrison	393,423	393,423					393,423								
Highland	474,021	457,810	4,576			44,238	215,553	171,843			21,600			16,211	
Hocking	43,160	43,160				21,000	22,160								
Holmes	21,890	209	209									21,681			
Jackson	128,500	128,500									128,500				
Knox	12,808	12,015					80	11,935						793	
Licking	11,327	11,327			253		151	10,923							
Logan	987,422	987,422	54,238		371,922		38,742	309,935			212,585				
Lucas	2,269,621	2,269,621									2,269,621				
Mahoning	2,054,849	2,054,849									2,054,849				
Marion	552,000	552,000	5,000		70,000	68,000					409,000				
Mercer	661,410	661,410									661,410				
Miami	1,329,109	1,199,730	5,249	8,797	89,693	55,080	299,564	378,789		146,307	216,251			129,379	
Montgomery	945,087	945,087			78,345			203,817			662,925				
Muskingum	917,034	917,034									917,034				
Noble	197,528	197,528	7,744				175,047				14,737				
Ottawa	5,387,109	5,156,249	8,688		952,547		2,291,325				1,903,689				230,860
Paulding	1,312,040	802,351									802,351		509,689		
Perry	247,693	247,693					247,693								
Pickaway	454,270	454,270	6,300		75,000	150,000	25,000	142,970	5,000		50,000				

TABLE 11. *2022 Ohio limestone and dolomite sales, by county and use (cont.)*

County	Tons sold														
	Total all types	Crushed and broken stone										Dimension stone	Stone for portland cement manufacture	Agricultural stone (aglime)	Raw stone for burning
		Total	Riprap	Flux stone	Stone for portland cement concrete	Stone for asphaltic concrete	Road construction/ resurfacing	Commercial building	Railroad ballast	Extenders/ fillers	Unspecified/ other				
Pike	1,323,805	1,314,805	93,075		300,000	500,000	300,000	100,000	5,000		16,730			9,000	
Preble	312,000	312,000									312,000				
Putnam	394,000	394,000	2,000		81,000	23,000					288,000				
Ross	304,089	304,089	1,200				150,000	120,000			32,889				
Sandusky	2,646,652	795,483	6,913		174,161	77,441	73,487	441,792			21,689			15,153	1,836,016
Seneca	1,412,828	583,411	6,695								576,716	593		42,102	786,722
Shelby	732,000	732,000									732,000				
Stark	6,199	6,199					6,199								
Tuscarawas	184,464	184,464	14,537				169,927								
Union	2,665,308	2,665,308									2,665,308				
Van Wert	620,914	620,914			26,000						594,914				
Wood	2,485,725	2,475,576	25,996		61,769	544,926	613,356	935,833		675	293,021			10,149	
Wyandot	7,104,955	7,063,955	91,000	54,000	346,208	1,158,345	19,532	311,734	138,000	266,000	4,679,136			41,000	
TOTAL	71,312,833	67,444,428	529,155	62,797	5,277,710	5,365,569	7,168,478	8,991,301	244,426	412,982	39,392,010	24,969	509,689	480,149	2,853,598

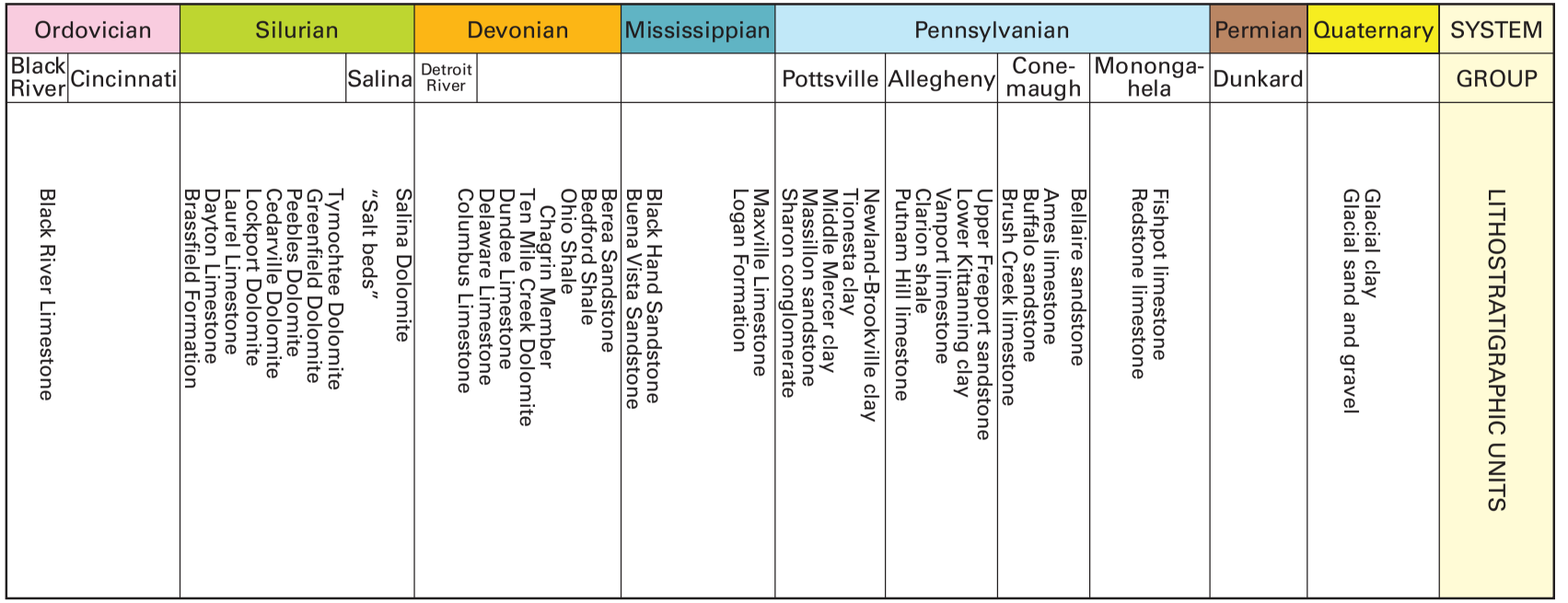


FIGURE 7. Stratigraphic column of nonfuel industrial minerals mined in Ohio during 2022. Modified from Brant and Delong (1960, table 9), ODNR Division of Geological Survey (1990), and Slucher and others (2006).

TABLE 12. *2022 Production of lime from Ohio, by county and use*

County	*Total tons*[1]	*Building (tons)*	*Chemical and industrial (tons)*	*Refractory (tons)*
Ottawa	104,937	53,403	51,534	
Sandusky	798,268		798,268	
Seneca	351,215		351,215	
TOTAL	1,254,420	53,403	1,201,017	0

[1]Burning produced a 44.0% weight loss.

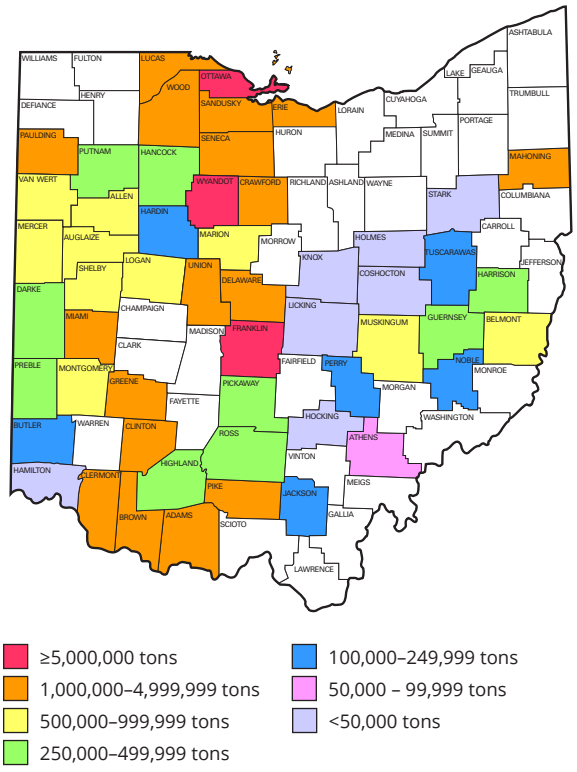


FIGURE 8. Sales of limestone and dolomite in Ohio in 2022, by county and quantity.

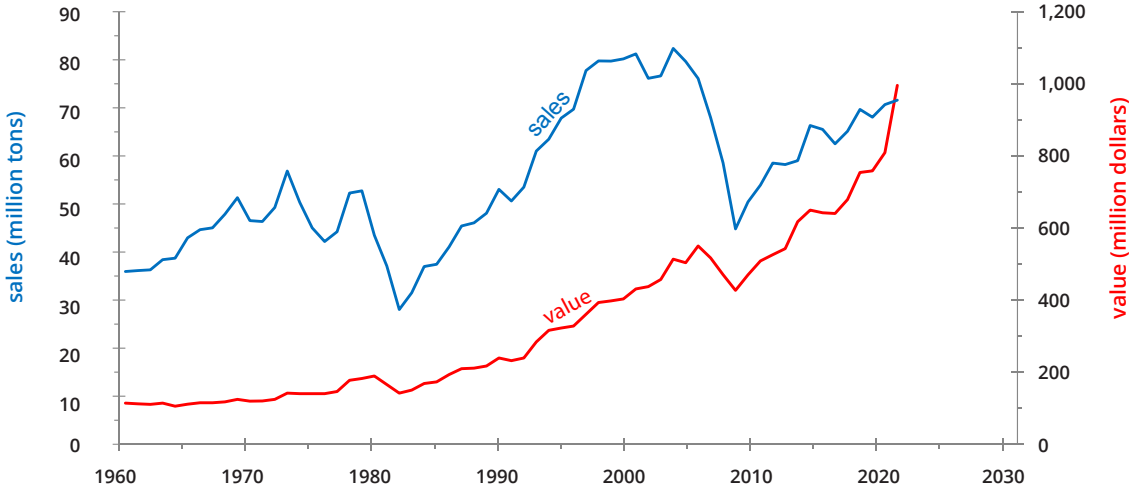


FIGURE 9. Sales and value of limestone and dolomite in Ohio since 1910.

SAND AND GRAVEL

Sand and gravel are common raw materials that are major constituents of asphalt, concrete, mortar, landscaping, roofing shingles, soil additives, and many other products. Sand-and-gravel production increased rapidly in Ohio beginning in the 1950s with the development of improved mining and processing machinery and increased demand from road building (ODNR Division of Geological Survey, 1959). Many depleted sand-and-gravel operations have been redeveloped as parks, residential spaces, or commercial facilities because of their proximity to urban areas.

Sand-and-gravel deposits in Ohio primarily are associated with Wisconsinan-age glacial outwash and kame terraces in the valleys and tributaries of the Great Miami, Scioto, and Muskingum Rivers located in the southwestern, central, and eastern portions of the state, respectively. Important sand-and-gravel deposits also are found in glacial kames in northeastern Ohio, beach ridges associated with ancestral Lake Erie, and alluvium of modern floodplains of the Ohio River and its tributaries.

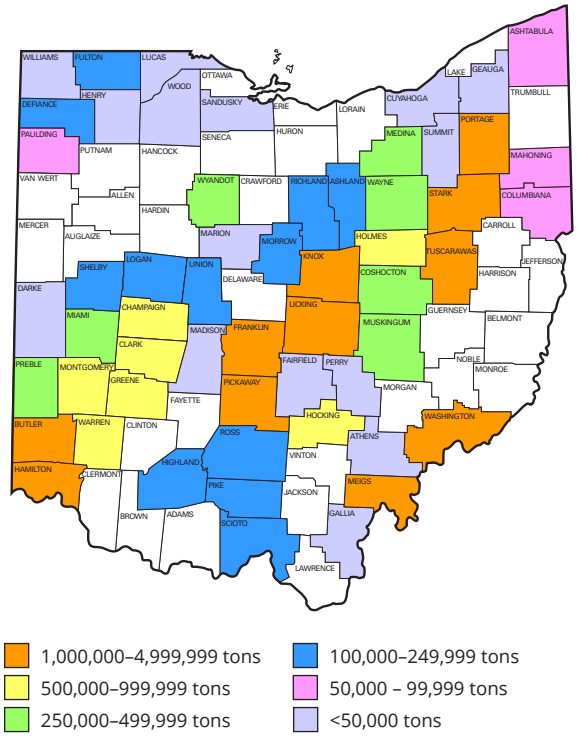


FIGURE 10. Sales of sand and gravel in Ohio in 2022, by county and quantity.

Production

- Tons produced = 31,942,328 (–3.2% from 2021)
- U.S. ranking:
  - 9th out of 50 producing states (**USGS, 2023c**)

Sales

(See figs. 10 and 11)

- Tons sold = 32,591,360 (–2.1% from 2021; table 13)
- Value[5] = $306,414,324 (table 9)
- Leading counties (percentage of statewide sales):
  - Stark (12.9%)
  - Portage (9.6%)
  - Hamilton (8.7%)
  - Butler (8.1%)
  - Franklin (5.3%)

Employment

(See table 10)

- Production employees reported = 1,054
- Nonproduction employees reported = 614
- Average employee annual wage = $59,097
- Total wages earned = $84,509,161
- Average days worked per operation = 168

[5]Includes reported and estimated values. See footnote 1, p. 1.

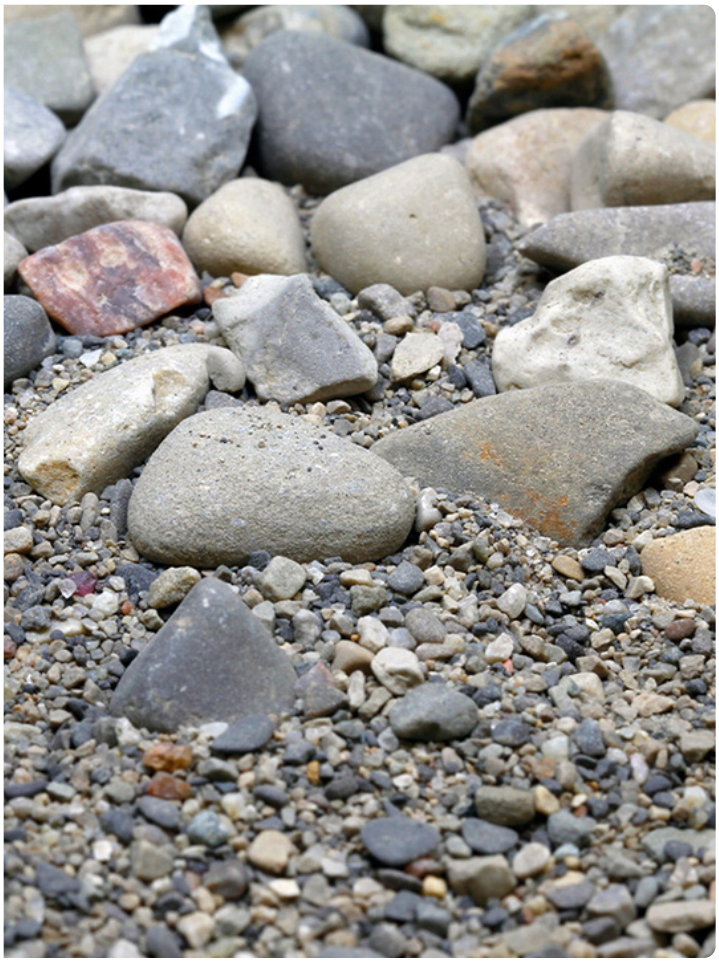


TABLE 13. ***2022 Ohio sand and gravel sales, by county and use***

County	Tons sold															
	Total sand and gravel	Total sand	Total gravel	Building		Portland cement concrete		Asphaltic concrete		Road construction/ resurfacing		Filtration		Foundry sand	Industrial sand	Other/unspecified	
				Sand	Gravel	Sand	Gravel	Sand	Gravel	Sand	Gravel	Sand	Gravel			Sand	Gravel
Ashland	218,472	68,002	150,470	20,400	45,141					40,802	90,282					6,800	15,047
Ashtabula	96,189	48,100	48,089	43,399	48,089	4,701											
Athens	46,689	37,275	9,414					37,275	9,414								
Butler	2,638,272	961,600	1,676,672	238,747	637,063	112,530	401,452				103,944					610,323	534,213
Champaign	576,204	229,492	346,712	11,582	19,526	148,896	251,040	4,963	8,368							64,051	67,778
Clark	831,915	369,612	462,303	2,901	62,100	54,000	94,842	54,900	60,673	20,811	7,688					237,000	237,000
Columbiana	63,880	31,940	31,940													31,940	31,940
Coshocton	475,776	226,029	249,747	8,943	4,517					800	22,916					216,286	222,314
Cuyahoga	24,782	12,391	12,391													12,391	12,391
Darke	12,737	6,369	6,368	6,369	6,368												
Defiance	203,246	176,949	26,297	19,773	22,118	157,176											4,179
Fairfield	2,054	1,432	622													1,432	622
Franklin	1,731,911	1,004,047	727,864	67,000	330,533	780,006	227,439	50,661	25,870		33,872					106,380	110,150
Fulton	224,546	224,546		6,980												217,566	
Gallia	1,623	811	812													811	812
Geauga	2,258	868	1,390													868	1,390
Greene	976,626	523,263	453,363	10,900	6,700	19,500	21,500	50,700	13,650	52,000	6,000					390,163	405,513
Hamilton	2,824,631	1,689,880	1,134,751	516,172	613,241	290,156	141,541		32,068		31,009					883,552	316,892
Henry	40,049	40,049		3,000								10,000				27,049	
Highland	160,321	90,981	69,340		23,110	74,003			20,265			16,978	3,478				22,487
Hocking	571,028	403,248	167,780	11,277	6,329	102,864	25,317	17,806	29,469	24,335	12,303					246,966	94,362
Holmes	766,763	478,900	287,863	27,813	93,474	224,569	31,817	154,438	43,321	55,199	76,954	2,273	41,145			14,608	1,152
Knox	1,205,699	562,229	643,470	16,026	218,675	286,373	63,576	63,684	52,232		110,437		63,715			196,146	134,835
Licking	1,258,762	620,848	637,914	32,503	339,877	263,168	9,154	24,177	28,189		4,879					301,000	255,815
Logan	235,543	126,710	108,833	533	532	2,003	2,004					120				124,054	106,297
Lucas	4,047	2,024	2,023												2,024		2,023
Madison	23,356	10,610	12,746	10,610	12,746												
Mahoning	55,085	23,747	31,338	1,843	8,146						6,435	12,500	14,000		9,187	217	2,757
Marion	14,251	5,518	8,733	420		2,075							136			3,023	8,597
Medina	265,017	122,280	142,737													122,280	142,737
Meigs	1,182,352	701,715	480,637			421,816	161,534									279,899	319,103
Miami	454,195	177,913	276,282		69,056	37,443										140,470	207,226
Montgomery	921,632	470,570	451,062	130,271	137,714	48,000	51,500			60	240		20,000		4,000	288,239	241,608
Morrow	212,000	65,000	147,000	1,000		32,000		32,000									147,000
Muskingum	298,512	245,326	53,186	467	467			90,840	18,567	18,082	427	1,251	1,251			134,686	32,474
Paulding	53,974		53,974				42,851		11,123								
Perry	627	313	314							313	314						
Pickaway	1,015,164	627,527	387,637		146	435,000	52,000	60,000	80,000	573	20,797					131,954	234,694
Pike	183,161	153,228	29,933													153,228	29,933
Portage	3,135,436	2,116,488	1,018,948	160,926	246,796	628,280	40,946	122,099	77,746	145,231	110,524	100	45,712			1,059,852	497,224

TABLE 13. ***2022 Ohio sand and gravel sales, by county and use (cont.)***

County	Tons sold															
	Total sand and gravel	Total sand	Total gravel	Building		Portland cement concrete		Asphaltic concrete		Road construction/ resurfacing		Filtration		Foundry sand	Industrial sand	Other/unspecified	
				Sand	Gravel	Sand	Gravel	Sand	Gravel	Sand	Gravel	Sand	Gravel			Sand	Gravel
Preble	429,806	231,508	198,298	43,811	97,230											187,697	101,068
Richland	218,697	179,874	38,823		8,900			353		302	5,932					179,219	23,991
Ross	243,878	157,389	86,489	5,345	12,811	12,163	302	28,506	11,683	1,364	1,914					110,011	59,779
Sandusky	29	14	15			14	15										
Scioto	107,644	71,733	35,911	24,993	16,469	27,498	200									19,242	19,242
Shelby	161,000	80,500	80,500													80,500	80,500
Stark	4,203,810	2,211,377	1,992,433	44,418	274,779	542,353	40,459	194,097	206,635	280,031	317,342		7,423			1,150,478	1,145,795
Summit	4,142	2,071	2,071													2,071	2,071
Tuscarawas	1,320,292	769,783	550,509	216,309	121,759	53,331	38,802	90,689	77,387	216,309	121,759					193,145	190,802
Union	167,394	83,697	83,697													83,697	83,697
Warren	737,376	348,835	388,541	337,093	376,799			3,891	3,892							7,851	7,850
Washington	1,264,728	1,003,058	261,670	23,061	4,605	158,645	9,209		28,047		28,887					821,352	190,922
Wayne	375,842	147,542	228,300	47,167	123,773	73,355	67,739	11,794	10,716	12,914	23,150	2,312	2,922				
Williams	1,163	581	582													581	582
Wood	20,544	10,272	10,272							10,272	10,272						
Wyandot	326,230	204,410	121,820	42,898	60,328	135,000		21,605				639	36,492			4,268	25,000
TOTAL[1]	32,591,360	18,160,474	14,430,886	2,134,950	4,049,917	5,126,918	1,775,239	1,114,478	849,315	879,398	1,148,277	46,173	236,274	0	15,211	8,843,346	6,371,864

[1]Any tally inconsistencies are because of rounding.

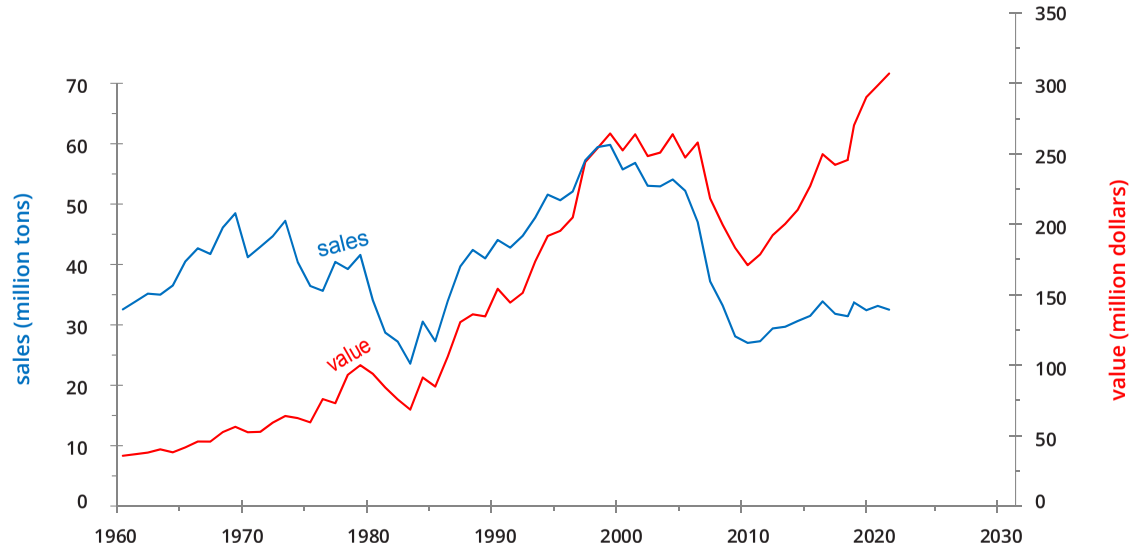


FIGURE 11. Sales and value of sand and gravel in Ohio since 1960.

SANDSTONE AND CONGLOMERATE

Extensive high-quality sandstone and conglomerate deposits are located in central and eastern Ohio, from near Lake Erie to the Ohio River. During the mid-1800s, these geologic resources were developed into large building stone and glass production industries, and to support the steel and associated industries. Many prominent buildings in the state were built using local building stones, including the Ohio Statehouse, Cleveland's Old Stone Church, The Ohio State University's Orton Hall, Cincinnati's City Hall, and numerous other churches, monuments, and historic structures.

Ohio led the nation in sandstone production for many decades; this natural resource continues to support the state's industries today. Historically, the Pennsylvanian-age Massillon sandstone and the Devonian-age Berea Sandstone of northern Ohio, as well as the Mississippian-age Buena Vista Sandstone in southern Ohio, have been the primary geologic units quarried for building stone (Bownocker, 1915; see also fig. 7).

Production

- Tons produced = 1,374,101 (+11.7% from 2021)
- U.S. ranking:
  - 5th out of 50 producing states for crushed stone (**USGS, 2023a**)
  - The 2022 U.S. state rankings for the 34 dimension-stone producing states were unavailable (**USGS, 2023d**).
- Top Producing Geologic Units (fig. 7):
  - Sharon conglomerate (Pennsylvanian)
  - Berea Sandstone (Devonian)
  - Unidentified Sandstone Pottsville Group (Pennsylvanian)
  - Logan Formation (Mississippian)

Sales

(See figs. 12 and 13)

- Tons sold = 1,296,828 (+9.5% from 2021; tables 14 and 15)
- Value[6] = $51,848,905 (table 9)
- Leading counties (percentage of statewide sales):
  - Geauga (53.0%)
  - Wayne (16.0%)
  - Pike (8.7%)
  - Lake (6.7%)
  - Knox (3.1%)

Employment

(See table 10)

- Production employees reported = 198
- Nonproduction employees reported = 51
- Average employee annual wage = $60,457
- Total wages earned = $13,905,016
- Average days worked per operation = 177

[6]Includes reported and estimated values. See footnote 1, p. 1.

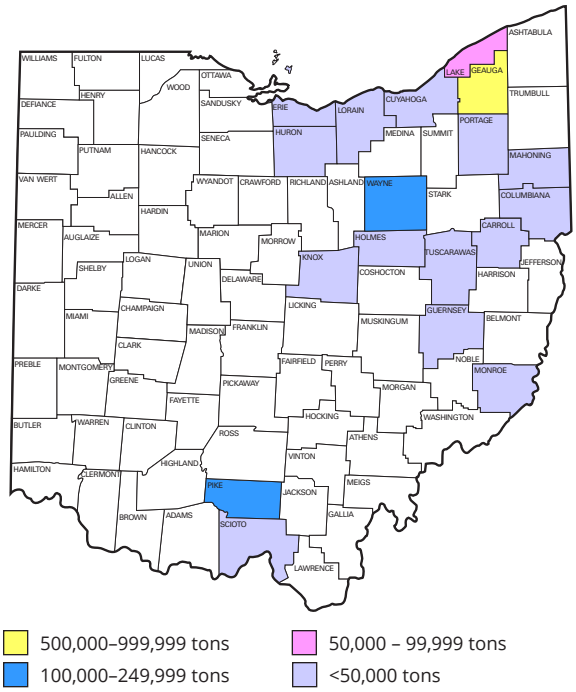


FIGURE 12. Sales of sandstone and conglomerate in Ohio in 2022, by county and quantity.



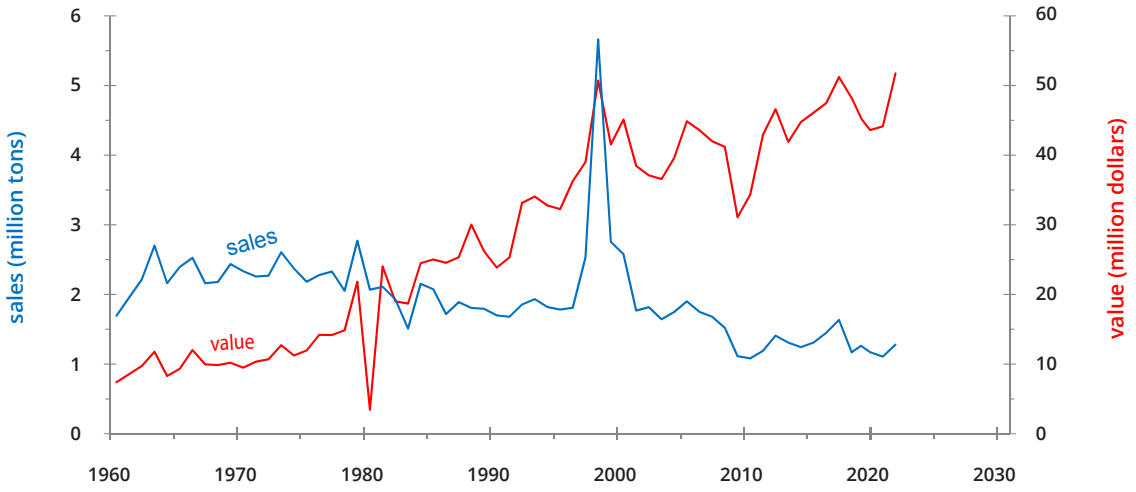


FIGURE 13. Sales and value of sandstone and conglomerate in Ohio since 1960.

TABLE 14. ***2022 Ohio sales of crushed sandstone and conglomerate, by county and use***

County	Tons sold														
	Total	Foundry sand	Glass sand	Metallurgical pebble	Refractory	Riprap	Aggregate	Silica flour	Polishing/ grinding sand	Fire and furnace sand	Engine sand	Frac sand	Construction	Industrial sand	Other/ unspecified
Carroll	1,150					1,150									
Columbiana	8,044												8,044		
Geauga	686,775	62,229	76,135	12,812	10,959		24,820		2,968				193,525	47,790	255,537
Guernsey	26,469						26,469								
Holmes	12,519						12,519								
Knox	40,400													40,400	
Lake	87,452						67,328						20,124		
Lorain	13,604						13,604								
Mahoning	18,314												18,314		
Monroe	11,733						11,733								
Pike	112,715	114											8,334		104,267
Portage	26,831														26,831
Tuscarawas	29,333	2,662											24,412		2,259
Wayne	207,155					83	121,674						85,398		
TOTAL	1,282,494	65,005	76,135	12,812	10,959	1,233	278,147	0	2,968	0	0	0	358,151	88,190	388,894

TABLE 15. ***2022 Ohio sales of dimension sandstone, by county and use***

County	Tons sold									
	Total	Refractory	Rough construction	Rubble	Grindstones	Rough architectural	Finished	Curbing	Flagging	Other/ unspecified
Columbiana	424									424
Cuyahoga	642									642
Erie	6,104		1,762	381		317	3,644			
Huron	3,214		3,214							
Lorain	3,546						3,546			
Scioto	404									404
TOTAL	14,334	0	4,976	381	0	317	7,190	0	0	1,470

CLAY AND SHALE

The ceramics industry in Ohio has a long and dynamic history. Potteries were established by the early 1800s to supply dinnerware, and by the early 1900s, Ohio was producing tremendous amounts of building bricks, sewer pipes, roof and floor tiles, paving bricks, art pottery, and refractory products. Edward Orton, Jr., established the first ceramics engineering program in the nation at Ohio State University in 1894. Ohio clay and shale still are being used to produce important ceramic products, though production tonnages are much less than 100 years ago. Ohio ceramic products are shipped throughout the eastern United States and Canada. Nearly all clay and shale produced in Ohio is used to produce value-added products (e.g., building bricks, industrial ceramics, pottery, expanded aggregate, quarry tile), thus the economic impact is much greater than the combined mined value.

Pennsylvanian-age shales and clays of eastern Ohio are the primary sources of raw materials for the ceramics industry; Mississippian- and Devonian-age shales of northern and central Ohio and Quaternary-age glacial clays of western Ohio are important secondary sources. General discussions of clay and shale geology in Ohio can be found in Lamborn and others (1938) and Stout and others (1923).

Production

- Tons produced (clay) = 722,204 (–9.8% from 2021)
- Tons produced (shale) = 453,966 (+34.3% from 2021)
  - The 2022 U.S. state rankings for the 38 clay and shale producing states were unavailable (**USGS, 2023e**).

Sales

(See figs. 14, 15, 16, and 17)

- Clay:
  - Tons sold = 726,966 (–13.2% from 2021; table 16)
  - Value[7] = $9,227,917 (table 9)
- Leading counties for clay (percentage of statewide sales):
  - Tuscarawas (41.7%)
  - Mahoning (15.9%)
  - Licking (14.1%)
  - Paulding (7.9%)
  - Jackson (4.3%)
- Shale:
  - Tons sold = 453,696 (+39.3% from 2021; table 17)
  - Value[8] = $4,905,802 (table 9)
- Leading counties for shale (percentage of statewide sales):
  - Tuscarawas (33.2%)
  - Marion (20.6%)
  - Holmes (10.0%)
  - Wayne (8.8%)
  - Perry (7.0%)

Employment

(See table 10)

- Production employees reported = 149
- Nonproduction employees reported = 114
- Average employee annual wage = $47,601
- Total wages earned = $10,710,334
- Average days worked per operation = 116

[7]Includes reported and estimated values. See footnote 1, p. 1.
[8]Includes reported and estimated values. See footnote 1, p. 1.



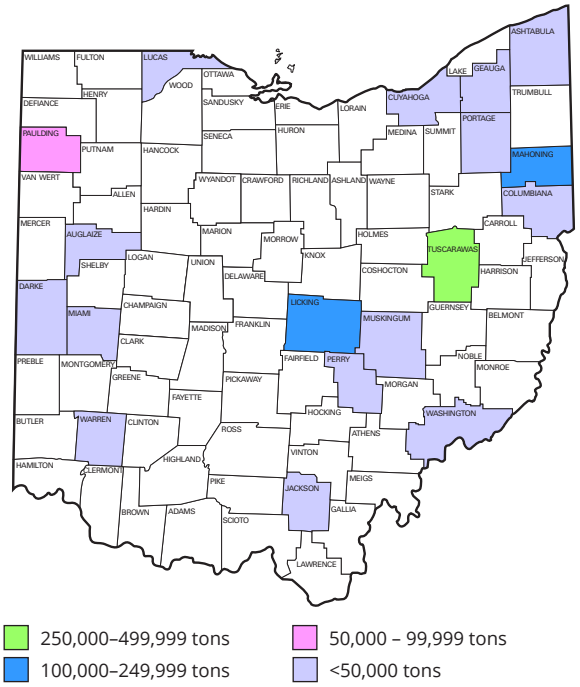


FIGURE 14. Clay sales in Ohio in 2022, by county and quantity.

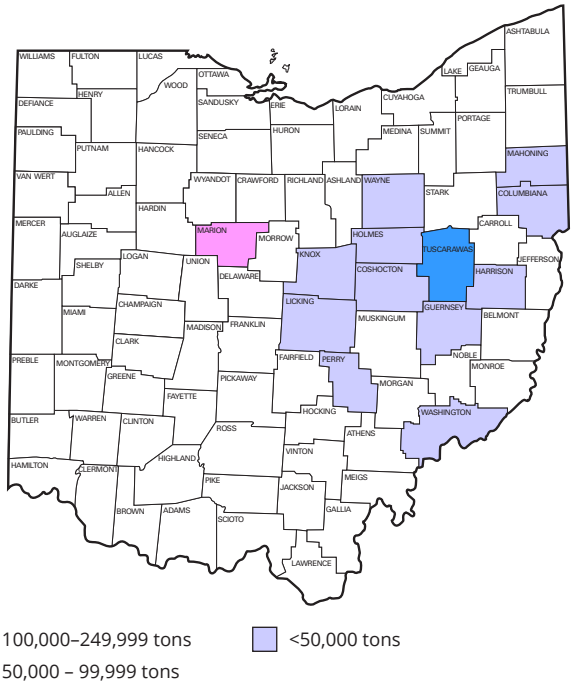


FIGURE 15. Shale sales in Ohio in 2022, by county and quantity.

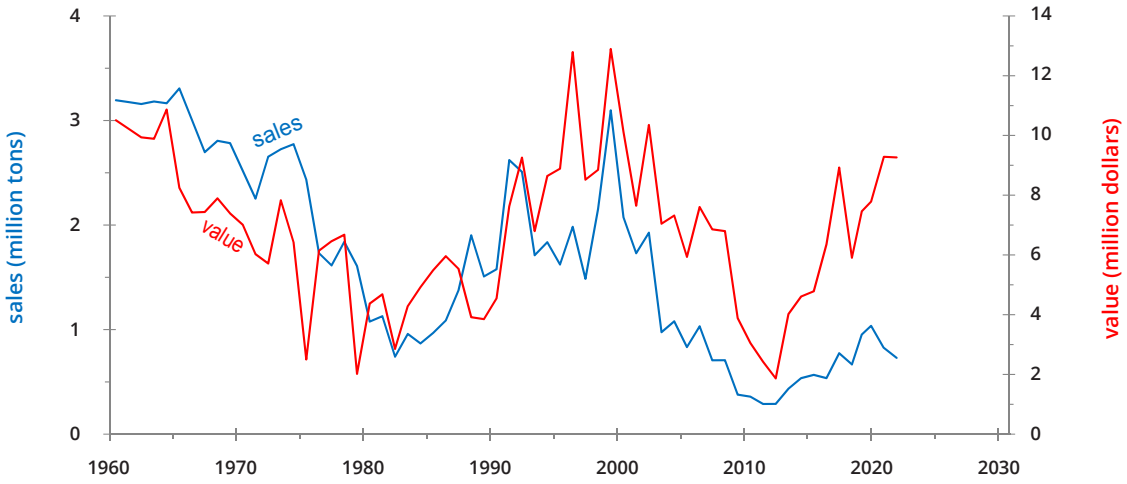


FIGURE 16. Sales and value of clay in Ohio since 1960.

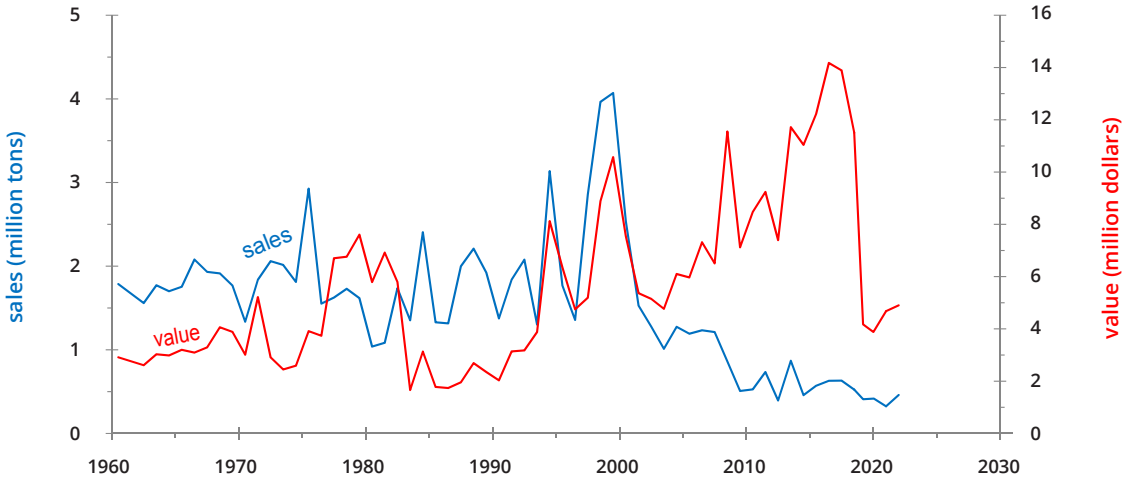


FIGURE 17. Sales and value of shale in Ohio since 1960.

TABLE 16. ***2022 Ohio clay sales, by county and use***

County	Tons sold								
	Total	Common clay products	Stoneware	Vitrified products	Cement manufacture	Refractories	Construction	Landfill use	Other/ unspecified
Ashtabula	29,783						29,700		83
Auglaize	1,116	1,116							
Columbiana	3,914	1,631					2,283		
Cuyahoga	1,990	281							1,709
Darke	570	570							
Geauga	23,692								23,692
Jackson	31,298	27,127				4,171			
Licking	102,515								102,515
Lucas	1,089						1,089		
Mahoning	115,563								115,563
Miami	30,213	30,213							
Muskingum	10,232	10,232							
Paulding	57,136				57,136				
Perry	3,800	3,186		614					
Portage	7,002	270					6,432		300
Tuscarawas	303,133	281,655					21,478		
Warren	500						500		
Washington	3,420						3,420		
TOTAL	726,966	356,281	0	614	57,136	4,171	64,902	0	243,862

TABLE 17. ***2022 Ohio shale sales, by county and use***

County	Tons sold							
	Total	Common clay products	Vitrified products	Cement manufacture	Lightweight aggregate	Construction	Landfill use	Other/ unspecified
Columbiana	14,917	14,917						
Coshocton	23,129						23,129	
Guernsey	8,830					8,830		
Harrison	25,911	25,911						
Holmes	45,516				37,557			7,959
Knox	1,518							1,518
Licking	5,836	5,836						
Mahoning	11,279							11,279
Marion	93,398	93,398						
Perry	31,851	5,850	11,836			14,165		
Tuscarawas	150,735	150,735						
Washington	846	846						
Wayne	39,930	30,304				9,626		
TOTAL	453,696	327,797	11,836	0	37,557	32,621	23,129	20,756

SALT

Salt was one of the first industrial minerals produced in Ohio and was a valuable commodity to early pioneers who obtained it from natural springs. The first State Legislature enacted laws concerning salt springs in 1803–1804, and wells were drilled in Jackson and Muskingum Counties, leading to the first commercial salt production in the state. The most important area for early salt production was in Meigs County, beginning in 1850. By 1903, Ohio was producing 14.7 percent of all salt in the United States (Bownocker, 1906).

The modern salt industry in Ohio began in 1956 with the construction of the underground salt mine at Fairport Harbor in Lake County. A second large underground operation was constructed in Cleveland, beginning in 1957. The primary use for Ohio salt in 2022 was ice control. Salt also was used as an additive in animal feed, for cattle blocks, and as a commercial and residential water-softening agent.

Salt production and sales in 2022 increased when compared to 2021 values. The recent stretch of warmer winters with lower-than-average precipitation have resulted in municipalities not needing to replenish salt supplies every year, resulting in fluctuating cycles of production, sales, and value.

Production

- Tons produced = 4,343,060 (+23.1% from 2021)
- U.S. ranking:
  - In the top 7 of 16 producing states (**USGS, 2023f**)
- Top producing geologic units (fig. 7):
  - Salina Group (Silurian)

Sales

(See figs. 18 and 19)

- Tons sold = 4,392,024 (+0.7% from 2021)
- Value[9] = $239,963,638 (table 9)

Employment

(See table 10)

- Production employees reported = 276
- Nonproduction employees reported = 160
- Average employee annual wage = $79,046
- Total wages earned = $34,384,992
- Average days worked per operation = 290

[9]Includes reported and estimated values. See footnote 1, p. 1.

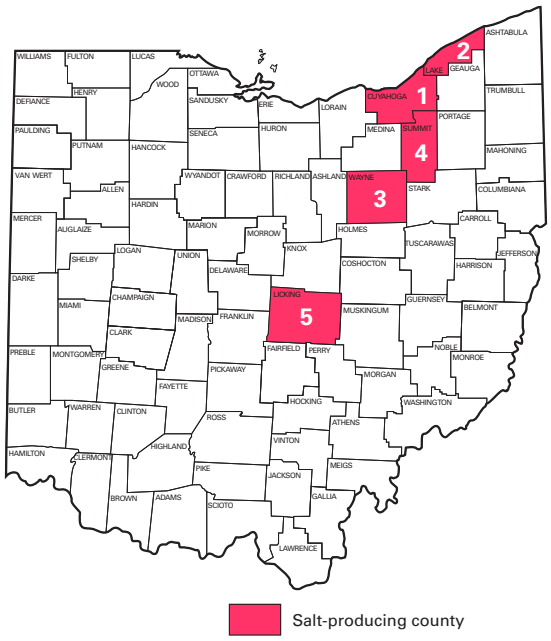


FIGURE 18. Counties producing salt in Ohio in 2022 and their rankings in sales.

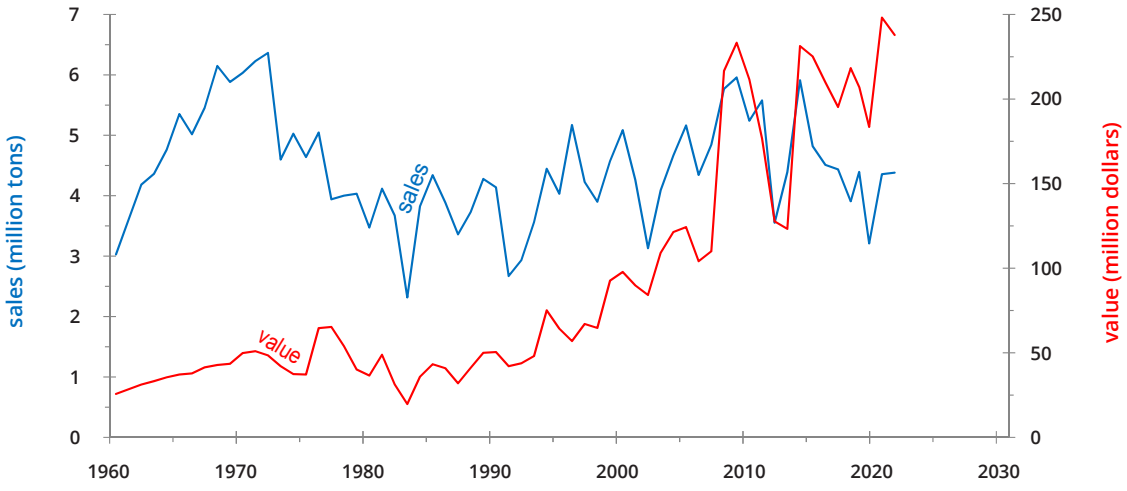


Figure 19. Sales and value of salt in Ohio since 1960.

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Map IM-1 2022 Edition
11/2023

MAP OF ACTIVE MINERAL INDUSTRY OPERATIONS IN OHIO 2022

By
Christopher E. Wright

GIS by Joseph G. Wells
Cartographic Design by Jason R. Piwarski

ABOUT THE MAP

This map is based on operators included in the supplementary appendices of the *2022 Report on Ohio Mineral Industries* (Wright, 2023) and is intended for general reference. Locations of mineral extraction operations are approximate and are based on permitting information on file at the Ohio Department of Natural Resources (ODNR), Division of Mineral Resources Management. The letters and numbers adjacent to the symbols are the state mine numbers assigned to operations listed in the downloadable directories of the *2022 Report on Ohio Mineral Industries*. More information about specific operations may be found using the state mine number to refer to the table included on this map or in the directories of operators reporting production, sales, and value in the report appendices. An interactive map of mineral industries and operator information can be viewed on the ODNR Division of Geological Survey's website at geology.ohiodnr.gov.

2022 OHIO ECONOMIC GEOLOGY IN BRIEF

The total tonnage of coal and industrial minerals produced in Ohio during 2022 was 113,912,675 tons or approximately 9.7 tons per capita. In 2022, the total value[1] of coal was $130,625,344; the value of oil and gas was $14,581,594,684; and the value[1] of all nonfuel industrial minerals was $1,596,580,683 (table 1; fig. 1). The combined value of fuel and nonfuel minerals produced in Ohio during 2022 was $16,308,600,691 or approximately $1,387 per capita.

Reported and estimated total direct employment in the extractive industries of Ohio in 2022 was more than 10,000 people. Industrial mineral production increased for limestone and dolomite, salt, sandstone, conglomerate, shale, and peat, while production decreased for coal, clay, and sand and gravel. The total value of nonfuel industrial minerals exceeded $1 billion for the ninth straight year. In 2022, the production-leading commodity of limestone and dolomite was up 4.2%, with the second-leading commodity of sand and gravel down 3.2% from 2021; the third-leading commodity of salt was up 23.1% from 2021; the fourth-leading commodity of coal was down 6.0% from 2021 values.

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[1]Includes reported and estimated values. Some operations reporting sales did not report a value for those sales. A statewide-average price per ton was calculated for each industrial-mineral commodity based on sales for which the value was reported. A statewide-average price per ton was calculated for coal based on method of production for which sales or value was reported. These calculated averages were used to estimate the value of the sales for which the actual values were not reported.

TABLE 1. *Fuel and nonfuel mineral sales and production in Ohio in 2022*

Commodity	Production[2]	Sales[2]	Value[2]	Change in value from previous[3]
Limestone and dolomite	72,375,240 tons	71,312,833 tons	$984,214,027	+ 24.6
Coal	2,705,278 tons	2,737,562 tons	$130,625,344	+ 34.1
Sand and gravel	31,942,328 tons	32,591,360 tons	$306,414,324	+ 5.2
Salt	4,343,060 tons	4,342,024 tons	$239,163,000	+ 23.1
Sandstone and conglomerate	1,374,151 tons	1,296,828 tons	$51,848,905	+ 15.5
Shale	453,946 tons	453,496 tons	$4,926,830	+ 3.1
Clay	722,204 tons	726,966 tons	$9,227,917	0.0
Peat	500 tons	200 tons	$4,000	- 66.1
Gas	2,215,565,214 thousand cubic feet	not available	$12,783,811,285	+ 68.4
Oil	19,886,972 barrels	not available	$1,797,783,399	+ 48.2

[2]The production figures for industrial minerals are estimates, as many operators do not know actual production. For those operators that do not report production, production is assumed equal to sales or estimated from ODNR Division of Mineral Resources Management records. Production includes material for internal use.
[3]The FOB value (free on board; value of mined product excluding insurance or transportation costs) of industrial minerals sold was estimated for mines that failed to report this information and for those producing material for captive use. These estimates were calculated using a statewide-average price per ton calculated using reported FOB values.
[4]Percent change in value for peat is based on production in 2020, when peat was last mined in Ohio.

FIGURE 1. (A) Value of coal and nonfuel minerals in Ohio since 1960. (B) Value of coal, nonfuel minerals, and oil and gas in Ohio since 1960.

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