

2021 REPORT ON OHIO MINERAL INDUSTRIES



compiled by Christopher E. Wright



**OHIO
GEOLOGICAL
SURVEY**
DEPARTMENT OF NATURAL RESOURCES



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2021 Report on Ohio mineral industries: An annual summary of the state's economic geology

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STATE OF OHIO
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF GEOLOGICAL SURVEY
D. Mark Jones, Chief

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PREFACE

The supply chain difficulties brought about by the COVID-19 pandemic continued in 2021 as the global economy struggled to deal with the transportation of commodity goods in the face of the pandemic. Coal and industrial mineral producers in Ohio were also affected, and decreases in production, sales, value, and employment were much more common among a number of commodities in 2021 than they had been prior to the pandemic.

The 2021 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 2021. Percent change comparisons of 2021 production and sales values for each commodity with those of the previous year are notated, with the 2020 data coming from the 2020 edition of this report (Wright, 2021).

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.

The appendices are not included within the report and are instead available as downloadable files on the ODNR Division of Geological Survey website at ohiodnr.gov/industrialminerals. These appendices include data for all commodities categorized by company, commodity, and county. Digital versions of these appendices allow users to view and organize data in a way that is convenient to them.

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2021 OHIO ECONOMIC GEOLOGY IN BRIEF

The total tonnage of coal and industrial minerals produced in Ohio during 2021 was 111,225,176 tons or approximately 9.4 tons per capita. In 2021, the total value¹ of coal was \$97,436,156; the value of oil and gas was \$8,803,677,768; and the value¹ of all nonfuel industrial minerals was \$1,387,142,002 (figs. 1, 2, 3; table 1). The combined value of fuel and nonfuel minerals produced in Ohio during 2021 was \$10,288,255,926 or approximately \$873 per capita.

Reported and estimated total direct employment in the extractive industries of Ohio in 2021 was more than 10,000 people. Industrial-mineral production increased for limestone and dolomite, while production decreased for coal, salt, clay, shale, sandstone and conglomerate, sand and gravel, and peat. The total value of nonfuel industrial minerals exceeded \$1 billion for the eighth straight year. In 2021, the production-leading commodity of limestone and dolomite was up 3.3%, with the second leading commodity of sand and gravel down 0.7% from 2020; the third leading commodity of salt was down 21.4% from 2020; the fourth leading commodity of coal was down 24.1% from 2020 values.

¹Includes 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.

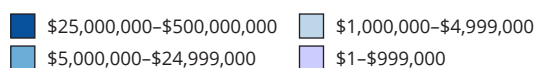
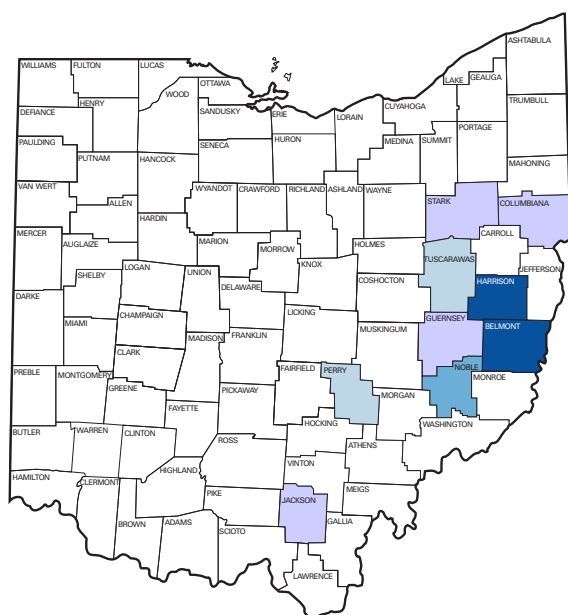


FIGURE 1. Total value of coal sold in Ohio in 2021, by county.

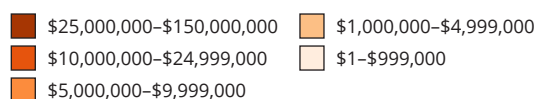
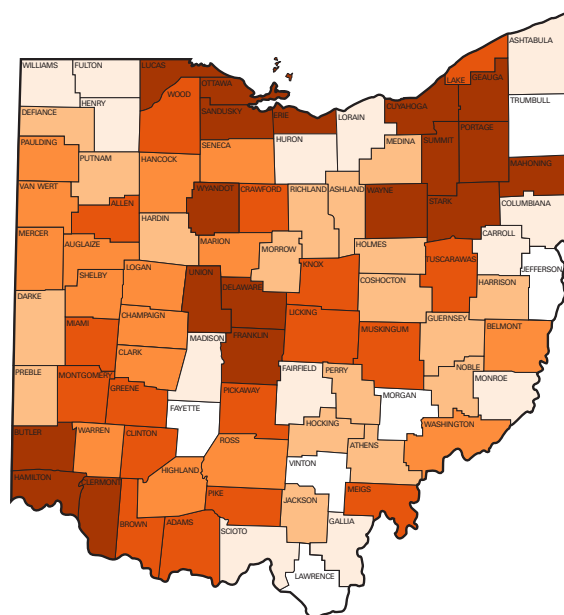


FIGURE 2. Total value of industrial minerals sold in Ohio in 2021, by county.

TABLE 1. Fuel and nonfuel mineral sales and production in Ohio in 2021

Commodity	Production ¹	Sales ²	Value ³	Change in value from 2020 (percent) ⁴
Limestone and dolomite	69,438,919 tons	70,386,574 tons	\$789,940,373	+ 7.2
Coal	2,874,941 tons	2,884,155 tons	\$97,436,156	- 31.0
Sand and gravel	33,013,486 tons	33,298,113 tons	\$291,212,355	+ 1.7
Salt	3,528,841 tons	4,362,969 tons	\$247,137,710	+ 34.8
Sandstone and conglomerate	1,230,072 tons	1,184,191 tons	\$44,892,977	+ 2.6
Shale	338,101 tons	325,729 tons	\$4,730,306	+ 21.3
Clay	800,816 tons	837,945 tons	\$9,228,281	+ 17.4
Peat	0 tons	0 tons	\$0	- 100.0
Gas	2,259,048,712 thousand cubic feet	not available	\$7,590,403,672	+ 99.3
Oil	18,998,968 barrels	not available	\$1,213,274,096	+ 41.8

¹The 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.

²Includes material for captive use.

³The 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.

⁴Percent change in value for peat is based on production in 2020, when peat was last mined in Ohio.

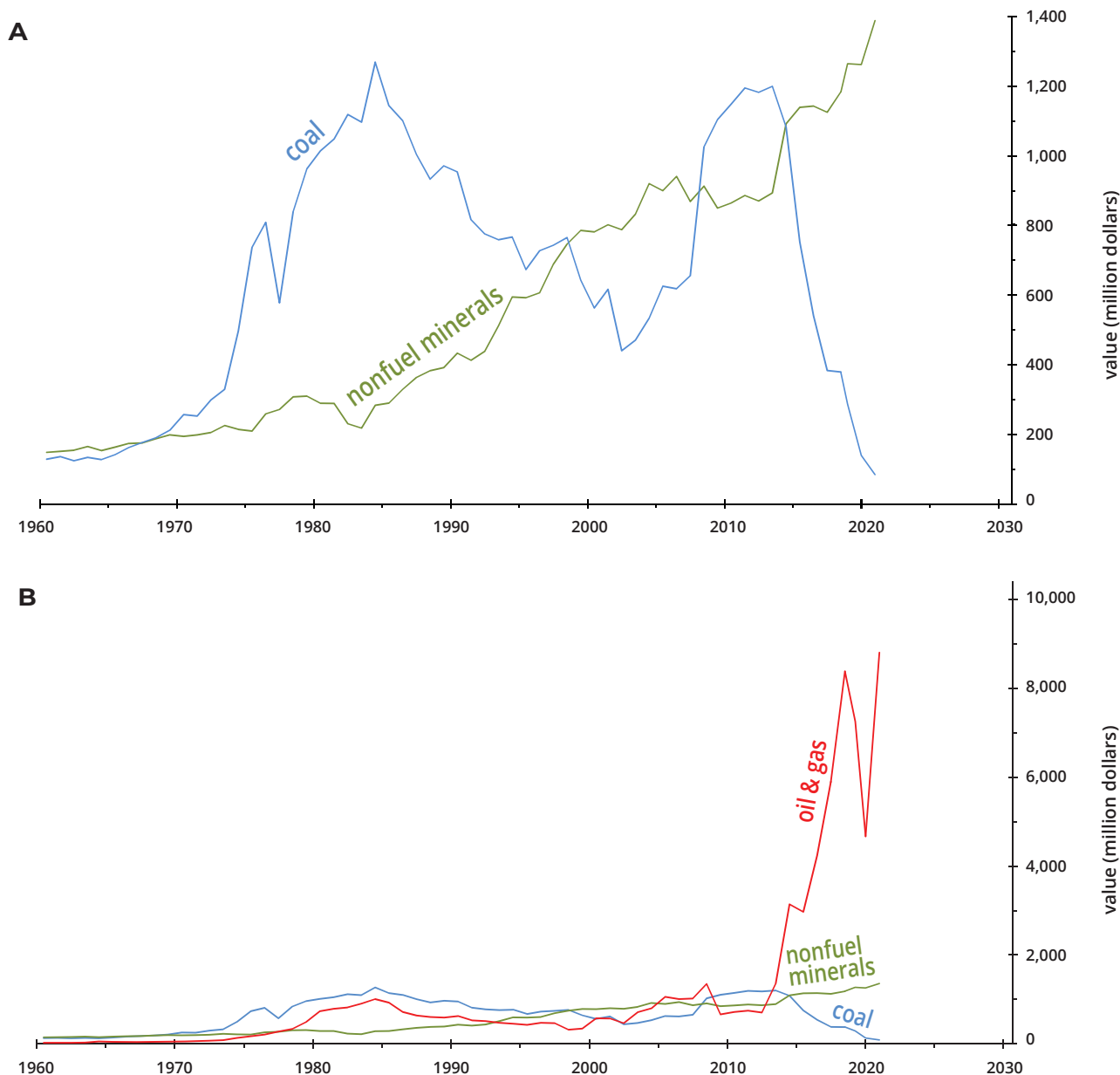


FIGURE 3. (A) Value of coal and nonfuel minerals in Ohio since 1960. (B) Value of coal, nonfuel minerals, and oil and gas in Ohio since 1960.

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, nearly 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 2021 dollars.²

Throughout 2021, ODNR issued one surface-mine expansion permit and no underground-mine expansion permits. There was one new surface mine permit issued, and no new underground mines permitted. Several coal operations ceased or curtailed production in 2021 because of less-expensive, competing natural gas and decreased demand, in large part due to the continuing effects of the global COVID-19 pandemic.

²The following link will provide more information about the formation and uses of Ohio's coal resources: ohiodnr.gov/coalgeology.

Production

- Tons produced = 2,874,941 (~24.1% from 2020)
- U.S. ranking: 16th out of 21 producing states ([USDOE, 2022](#))
- Leading counties (percentage of statewide production):
 - Belmont (54.9%)
 - Harrison (25.0%)
 - Noble (15.7%)
 - Tuscarawas (3.2%)
- Top producing seams (table 5):
 - Pittsburgh (No. 8)
 - Meigs Creek (No. 9)
 - Upper Freeport (No. 7)

Sales

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

- Tons sold = 2,884,155 (~27.9% from 2020)
- Value = \$97,436,156

Employment

(See table 8)

- Production employees reported = 263
- Nonproduction employees reported = 80
- Average employee wages:
 - Surface-mine production = \$53,527
 - Underground-mine production = \$81,681
- Total wages earned = \$28,665,552

SYSTEM	GROUP	LITHOSTRATIGRAPHIC UNITS
Permian	Dunkard	Washington (No. 12) coal
Pennsylvanian	Monongahela	Waynesburg (No. 11) coal Uniontown (No. 10) coal Meigs Creek (No. 9, Sewickley) coal Pomeroy (No. 8a, Redstone) coal Pittsburgh (No. 8) coal
	Conemaugh	Ames marine zone Harlem coal Anderson coal Wilgus coal Brush Creek marine zone Mahoning (No. 7a) coal
	Allegheny	Upper Freeport (No. 7) coal Lower Freeport (No. 6a) coal Middle Kittanning (No. 6) coal Strasburg (No. 5a) coal Lower Kittanning (No. 5) coal Vanport marine zone Clarion (No. 4a) coal Winters coal Newland (No. 4, Brookville) coal
	Pottsville	Tionesta (No. 3b) coal Upper Mercer (No. 3a) coal Lower Mercer (No. 3) coal Quakertown (No. 2) coal Sharon (No. 1) coal

FIGURE 4. Stratigraphic column of coals mined in Ohio during 2021 (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).

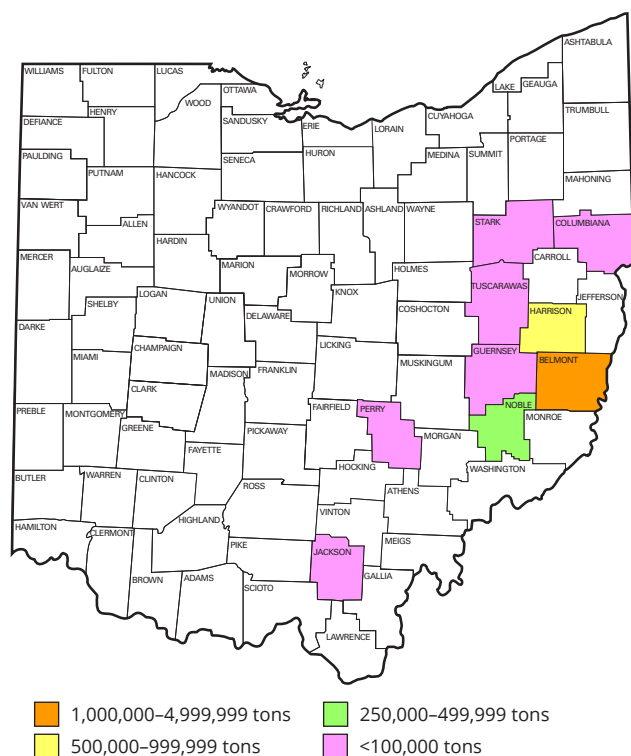


FIGURE 5. Coal sales in Ohio in 2021, by county and quantity.

TABLE 2. 2021 Ohio coal production and sales by county, in descending order of production

County	Production (short tons)	Sales (short tons)
Belmont	1,579,465	1,600,247
Harrison	719,518	703,918
Noble	450,815	450,815
Tuscarawas	93,307	93,818
Perry	24,638	28,346
Jackson	4,277	4,277
Stark	2,579	2,579
Columbiana	337	150
Guernsey	5	5
TOTAL	2,874,941	2,884,155

TABLE 3. 2021 Ohio coal production, by production size group and change from 2020

Production size group	2021		Change from 2020 (short tons)
	Number of mines reporting	Production (short tons)	
1,000,000 tons and over	1	1,271,897	- 417,400
500,000 to 999,999 tons	0	0	0
250,000 to 499,999 tons	2	633,564	- 8,185
100,000 to 249,999 tons	3	481,690	- 594,031
50,000 to 99,999 tons	4	328,020	102,950
25,000 to 49,999 tons	2	81,149	10,189
Less than 25,000 tons	11	78,621	- 5,556
TOTAL	23	2,874,941	- 912,033

TABLE 4. 2021 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
Belmont	1,579,465	4	1	1,271,897	1,271,897	0	3	307,568	203,210	8,247	96,111
Columbiana	337	1					1	337	337	0	0
Guernsey	5	1					1	5	5	0	0
Harrison	719,518	4	2	480,640	0	480,640	2	238,878	214,942	23,936	0
Jackson	4,277	2					2	4,277	4,277	0	0
Noble	450,815	4					4	450,815	450,815	0	0
Perry	24,638	1	1	24,638	0	24,638					
Stark	2,579	1					1	2,579	2,579	0	0
Tuscarawas	93,307	5					5	93,307	93,307	0	0
TOTAL¹	2,874,941	23	4	1,777,175	1,271,897	505,278	19	1,097,766	969,472	32,183	96,111

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

TABLE 5. 2021 Ohio coal production, by county and seam

County ¹	Production (short tons)								
	Total	Newland (No. 4, Brookville)	Lower Kittanning (No. 5)	Middle Kittanning (No. 6)	Upper Freeport (No. 7)	Pittsburgh (No. 8)	Pomeroy (No. 8a, Redstone)	Meigs Creek (No. 9, Sewickley)	Waynesburg (No. 11)
Belmont	1,579,465					1,483,411		66,686	29,368
Columbiana	337		337						
Guernsey	5							5	
Harrison	719,518				480,640	197,006	37,865	4,007	
Jackson	4,277	950	3,327						
Mahoning	0								
Noble	450,815							450,815	
Perry	24,638			24,638					
Stark	2,579	2,579							
Tuscarawas	93,307	46,430	17,177	29,700					
TOTAL ²	2,874,941	49,959	20,841	54,338	480,640	1,680,417	37,865	521,513	29,368

¹Production 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.

²Any tally inconsistencies are because of rounding of production tonnages.

TABLE 6. 2021 Disposition of Ohio coal, by county

County ¹	Number of mines	Disposition ¹ (short tons)					Stored
		Total ²	Rail	Water	Truck	Conveyor	
Belmont	4	1,600,247			1,600,247		35,257
Columbiana	1	150			150		187
Guernsey	1	5			5		
Harrison	4	703,918	96,799		607,119		12,352
Jackson	2	4,277			4,277		
Noble	4	450,815			450,815		
Perry	1	24,638			24,638		
Stark	1	2,579			2,579		
Tuscarawas	5	93,818			93,818		
TOTAL ³	23	2,880,447	96,799	0	2,783,648	0	47,796

¹Tonnage 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.

²Does not reflect tonnage stored. Reflects tonnage sold and shipped from mine.

³Any tally inconsistencies are because of rounding.

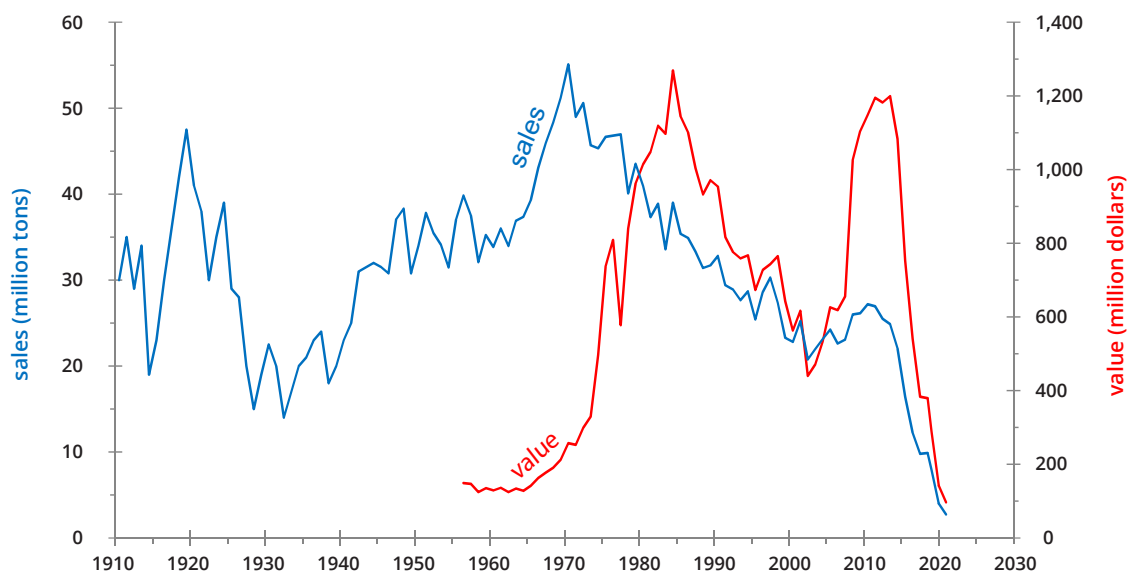
**FIGURE 6. Sales and value of coal in Ohio since 1910.**

TABLE 7. 2021 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)
Belmont	4	1,600,247	\$49,166,660	\$30.72	1	1,287,163	\$40,263,778	\$31.28	3	313,084	\$8,902,882	\$28.44
Columbiana	1	150	\$14,250	\$95.00					1	150	\$14,250	\$95.00
Guernsey	1	5	\$150	\$30.00					1	5	\$150	\$30.00
Harrison	4	703,918	\$32,570,042	\$46.27	2	468,285	\$23,598,842	\$50.39	2	235,633	\$8,971,200	\$38.07
Jackson	2	4,277	\$110,260	\$25.78					2	4,277	\$110,260	\$25.78
Noble	4	450,815	\$12,166,429	\$26.99					4	450,815	\$12,166,429	\$26.99
Perry	1	28,346	\$1,311,675	\$46.27	1	28,346	\$1,311,675	\$46.27				
Stark	1	2,579	\$47,664	\$18.48					1	2,579	\$47,664	\$18.48
Tuscarawas	5	93,818	\$2,049,026	\$21.84					5	93,818	\$2,049,026	\$21.84
TOTAL	23	2,884,155	\$97,436,156	\$33.78	4	1,783,794	\$65,174,295	\$36.54	19	1,100,361	\$32,261,861	\$29.32

¹Sales 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.

²The 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.

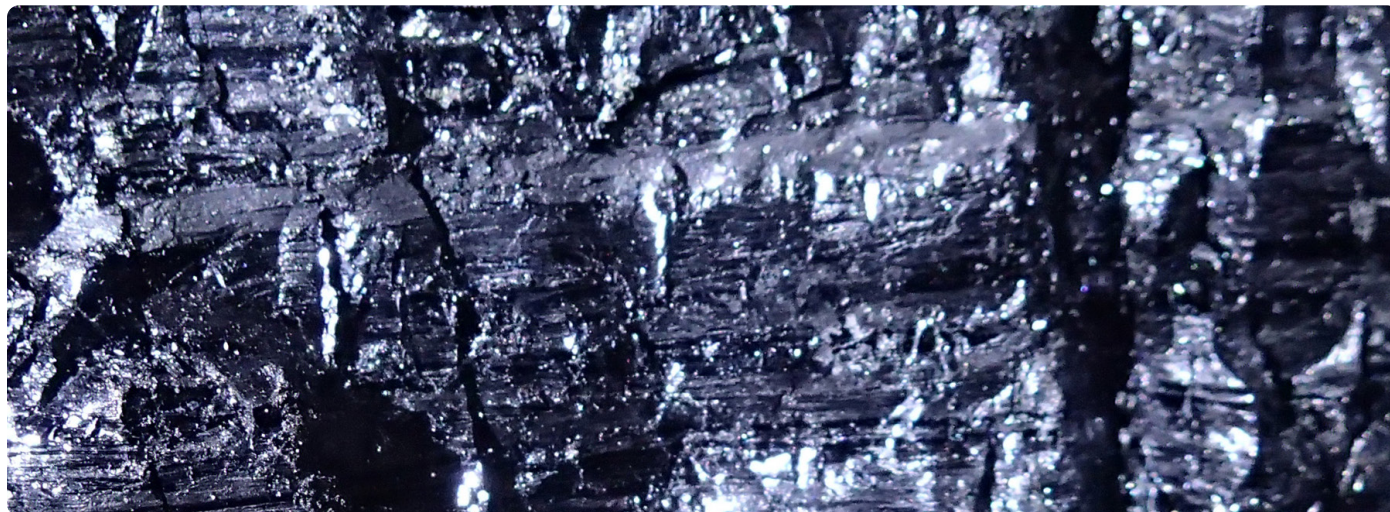
TABLE 8. 2021 Wage and salary payments to Ohio coal mine employees, by county and occupational group

County ¹	Wage and salary payments (nearest whole dollar) ²			
	All occupations	Underground production employees	Surface production employees	Other
Belmont	\$13,666,283	\$5,541,203	\$1,769,277	\$6,355,803
Harrison	\$6,363,297	\$3,368,591	\$1,330,955	\$1,663,751
Jefferson	\$76,800		\$76,800	
Mahoning	\$6,501			\$6,501
Noble	\$13,671			\$13,671
Perry	\$3,023,892		\$3,023,892	
Stark	\$1,176,478	\$316,902		\$859,576
Tuscarawas	\$18,785		\$11,312	\$7,473
Vinton	\$768,705		\$585,644	\$183,061
TOTAL³	\$25,114,412	\$9,226,696	\$6,797,880	\$9,089,836

¹For 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.

²For 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.

³Any 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 335 operations in 82 Ohio counties during 2021. The combined value of all industrial minerals sold in 2021 was \$1,387,142,002 (table 9). This is the eighth 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 4,209 employees (table 10).

Peat production and sales were not reported in 2021. In 2020, 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).

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

TABLE 9. 2021 Value of Ohio industrial minerals

Commodity	Sales (tons)	Change from 2020 (tons/percent) ¹	Value ²	Percent of total value
Limestone and dolomite	70,386,574	+2,593,752/+3.8	\$789,940,373	56.9
Sand and gravel	33,298,113	+741,127/+2.3	\$291,212,355	21.0
Salt	4,362,969	+1,162,125/+36.3	\$247,137,710	17.8
Sandstone and conglomerate	1,184,191	-19,465/-1.6	\$44,892,977	3.2
Shale	325,729	-78,331/-19.4	\$4,730,306	0.3
Clay	837,945	-258,159/-23.6	\$9,228,281	0.6
Peat	0	-728/-100	\$0	0.0
TOTAL	110,395,521	+4,139,856/+3.9	\$1,387,142,002	100.0

¹Percent change in sales for peat is based on production in 2020, when peat was last mined in Ohio.

²The 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. 2021 Employment at Ohio industrial-mineral operations, by county

County	Total Employees ²	Production Employees	Nonproduction Employees
Adams	21	10	11
Allen	27	11	16
Ashland	15	11	4
Ashtabula	27	2	25
Athens	16	13	3
Auglaize	9	9	0
Belmont	303	45	258
Brown	29	16	13
Butler	147	54	93
Carroll	1	1	0
Champaign	11	6	5
Clark	10	7	3
Clinton ¹	0	0	0
Clermont	45	40	5
Columbiana	11	7	4
Coshocton	33	23	10
Crawford	15	15	0
Cuyahoga	265	231	34
Darke	8	6	2
Defiance	22	9	13
Delaware	23	23	0
Erie	134	103	31
Fairfield	1	1	0
Franklin	181	129	52
Fulton	6	2	4
Gallia ¹	0	0	0
Geauga	71	62	9
Greene	53	41	12
Guernsey	3	2	1
Hamilton	122	56	66
Hancock	5	5	0
Hardin	28	12	16
Harrison	2	2	0
Henry ¹	0	0	0
Highland	30	22	8
Hocking	67	38	29
Holmes	52	31	21
Huron	2	1	1
Jackson	10	9	1
Knox	74	37	37
Lake	108	67	41
Licking	38	24	14
Logan	79	43	36
Lorain	4	3	1
Lucas	87	54	33
Madison	5	3	2
Mahoning	95	67	28
Marion	12	11	1
Medina ¹	0	0	0
Meigs	21	15	6
Mercer	41	15	26
Miami	35	24	11
Monroe	9	8	1
Montgomery	46	34	12
Morrow	5	5	0

County	Total Employees ²	Production Employees	Nonproduction Employees
Muskingum	67	59	8
Noble	19	16	3
Ottawa	118	86	32
Paulding	64	36	28
Perry	13	9	4
Pickaway	21	9	12
Pike	18	15	3
Portage	140	104	36
Preble	19	16	3
Putnam	3	3	0
Richland	16	16	0
Ross	26	17	9
Sandusky	201	176	25
Scioto	5	4	1
Seneca	63	49	14
Shelby	17	13	4
Stark	96	75	21
Summit	100	1	99
Trumbull	40	0	40
Tuscarawas	205	62	143
Union	68	37	31
Van Wert	40	20	20
Warren	26	17	9
Washington	66	28	38
Wayne	63	35	28
Williams ¹	0	0	0
Wood	75	50	25
Wyandot	156	108	48
TOTAL 83 counties	4,209	2,526	1,683

¹ Counties where commodities were extracted but no employment information was provided are represented with zeros in the employment fields.

² 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 = 69,438,919 (+3.3% from 2020)
- U.S. ranking:
 - 5th out of 50 producing states for crushed stone ([USGS, 2022a](#))
 - In the top 5 of the 28 producing states for lime ([USGS, 2022b](#))
- 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, 9)

- Tons sold = 70,386,574 (+3.8% from 2020; table 11, 12)
- Value⁴ = \$789,940,373 (table 9)
- Leading counties (percentage of statewide sales):
 - Franklin (13.7%)
 - Wyandot (11.4%)
 - Ottawa (8.0%)
 - Erie (5.8%)

Employment

(See table 10)

- Production employees reported = 1,275
- Nonproduction employees reported = 787
- Average employee annual wage = \$54,250
- Total wages earned = \$84,304,165
- Average days worked per operation = 196

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



TABLE 11. 2021 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	1,083,078	1,083,078													
Allen	841,182	837,605	7,719		135,950	213,294	27,536	43,887						3,577	
Athens	65,000														
Auglaize	609,599	603,890	3,770		59,000	28,220	87,000	222,900						5,709	
Belmont	766,001	766,001	37,215				193,250	148,347							
Brown	1,893,326	1,893,326													
Butler	273,435	273,435													
Clermont	2,434,361	2,434,361	3,727												
Clinton	2,106,762	2,085,753	42,019		84,039	546,254	630,293	699,106	2,100					21,009	
Coshocton	23,570	23,570						1,034							
Crawford	1,109,000	1,011,000	14,000		312,000	300,000								98,000	
Darke	361,385	361,385	1,385			145,000	15,000	200,000							
Delaware	3,127,000	3,113,000	14,000	476,000	480,000									14,000	
Erie	4,087,551	4,070,221	15,765				291,232							379	
Franklin	9,663,541	9,611,081	26,156		287,939	896,955	64,575	3,015,787						52,460	
Greene	1,528,414	683,042				224								845,372	
Guernsey	227,042	227,042													
Hamilton	20,972	20,972													
Hancock	561,000	561,000	1,000		11,000	81,000			174,000						
Hardin	225,189	225,189													
Harrison	375,331	375,331					375,331								
Highland	532,347	525,903	7,085			46,336	303,811	151,905						6,444	
Hocking	43,570	43,570				20,560	23,010								
Holmes	25,257	25,257					25,257								
Jackson	92,813	92,813					8,813								
Knox	11,941	10,924			502	292	554	9,576						1,017	
Licking	4,623	4,623						4,623							
Logan	856,506	856,506	41,691		285,885		29,780	238,238							
Lucas	2,318,406	2,318,406													
Mahoning	2,274,259	2,274,259													
Marion	471,000	471,000	5,000		68,000	116,000									
Mercer	535,583	535,583													
Miami	1,637,184	1,563,095	4,864	13,200	157,550	23,000	408,158	268,323		150,000	538,000			74,089	
Monroe	26,663	26,663					26,663								
Montgomery	988,995	877,312						167,542					111,683		
Muskingum	1,030,440	1,030,440	1,868												
Noble	201,643	201,643	6,521				179,507								
Ottawa	5,644,281	5,381,324	86,124	614,410			3,179,586	119,000		3,045	1,379,159			262,957	
Paulding	1,217,984	700,932											517,052		
Perry	299,747	299,747					299,747								

TABLE 11. 2021 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				
Pickaway	342,448	342,448	8,300		75,000	125,000	20,000	75,000	5,000		34,148				
Pike	1,318,807	1,313,507	69,390		300,000	450,000	300,000	150,000	5,000		39,117		5,300		
Putnam	378,000	378,000	2,000		78,000	28,000					270,000				
Ross	276,232	276,232	1,365				100,000	150,000			24,867				
Sandusky	3,141,090	1,109,630	3,123		125,173	133,283	287,983	486,027			74,041		23,631	2,007,829	
Seneca	1,296,580	487,190	1,278								485,912	1,211	25,894	782,285	
Shelby	667,000	667,000									667,000				
Stark	16,190	16,190					16,190								
Tuscarawas	163,626	163,626	5,651				137,731				20,244				
Union	2,806,189	2,806,189									2,806,189				
Van Wert	642,887	642,887			30,000						612,887				
Warren	1,960	1,960									1,960				
Wayne	5,309	4,996						4,996					313		
Wood	1,737,085	1,729,555	15,341		46,222	437,773	605,283	512,617		1,417	110,902		7,530		
Wyandot	7,997,190	7,957,190	102,000	23,000	1,586,208	858,593	13,203	393,412	149,000	56,000	4,775,774		40,000		
TOTAL	70,386,574	65,461,882	528,357	512,200	4,736,878	4,449,784	7,672,029	7,062,320	335,100	210,462	39,954,752	18,162	1,474,107	3,053,071	

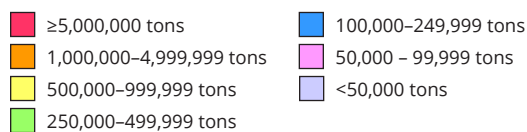
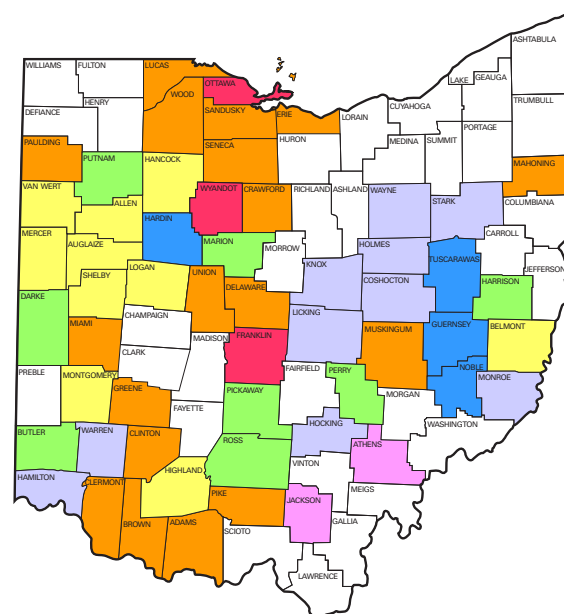
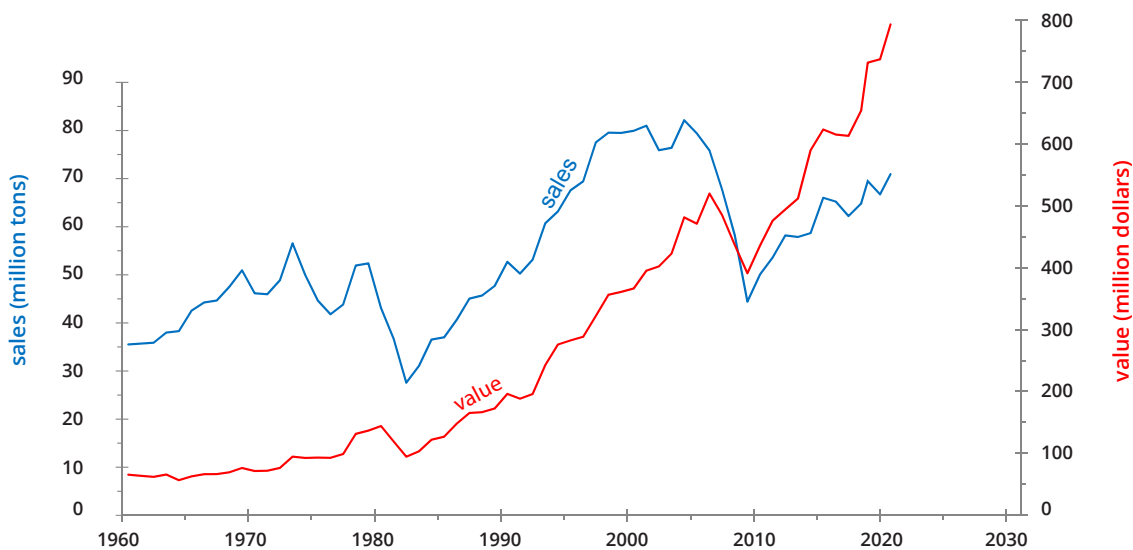
SYSTEM		GROUP		LITHOSTRATIGRAPHIC UNITS	
Quaternary				Glacial clay Glacial sand and gravel	
Permian	Dunkard				
Pennsylvanian	Monongahela			Fishpot limestone Redstone limestone	
	Conemaugh			Bellaire sandstone Ames limestone Buffalo sandstone Brush Creek limestone	
	Allegheny			Upper Freeport sandstone Lower Kittanning clay Vanport limestone Clarion shale Putnam Hill limestone	
	Pottsville			Newland-Brookville clay Tionesta clay Middle Mercer clay Massillon sandstone Sharon conglomerate	
Mississippian				Maxville Limestone Logan Formation	
Devonian				Black Hand Sandstone Buena Vista Sandstone	
	Detroit River			Berea Sandstone Bedford Shale Ohio Shale Chagrin Member Ten Mile Creek Dolomite Dundee Limestone Delaware Limestone Columbus Limestone	
Silurian	Salina			Salina Dolomite "Salt beds"	
				Tymochtee Dolomite Greenfield Dolomite Peebles Dolomite Cedarville Dolomite Lockport Dolomite Laurel Limestone Dayton Limestone Brassfield Formation	
Ordovician	Cincinnati				
	Black River			Black River Limestone	

FIGURE 7. Stratigraphic column of nonfuel industrial minerals mined in Ohio during 2021. Modified from Brant and Delong (1960, table 9), ODNR Division of Geological Survey (1990), and Slucher and others (2006).

TABLE 12. 2021 Production of lime from Ohio, by county and use

County	Total tons ¹	Building (tons)	Chemical and industrial (tons)	Refractory (tons)
Ottawa	119,526	63,235	56,291	
Sandusky	872,969		872,969	
Seneca	348,777		348,777	
TOTAL	1,341,272	63,235	1,278,037	0

¹Burning produced a 43.9% weight loss.

**FIGURE 8. Sales of limestone and dolomite in Ohio in 2021, 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 Wisconsin-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.

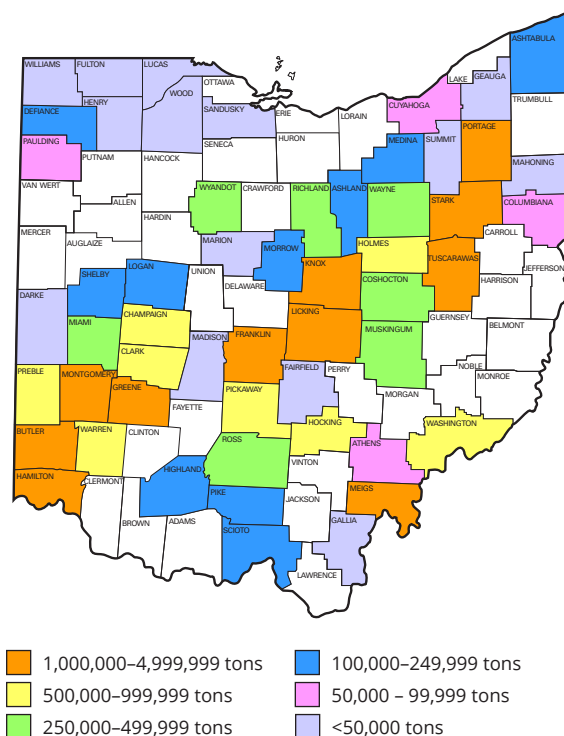


FIGURE 10. Sales of sand and gravel in Ohio in 2021, by county and quantity.

Production

- Tons produced = 33,013,486 (–0.7% from 2020)
- U.S. ranking:
 - 8th out of 50 producing states (USGS, 2022c)

Sales

(See figs. 10, 11)

- Tons sold = 33,298,113 (+2.3% from 2020; table 13)
- Value⁵ = \$291,212,355 (table 9)
- Leading counties (percentage of statewide sales):
 - Stark (11.2%)
 - Portage (11.2%)
 - Hamilton (9.4%)
 - Butler (8.7%)
 - Franklin (7.2%)

Employment

(See table 10)

- Production employees reported = 982
- Nonproduction employees reported = 640
- Average employee annual wage = \$51,740
- Total wages earned = \$70,469,524
- Average days worked per operation = 167

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



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	248,187	98,841	149,346	29,653	44,804							59,305	89,608				9,883	14,934
Ashtabula	124,029	77,819	46,210	6,000	46,210	66,856											4,963	
Athens	93,322	71,290	22,032															
Butler	2,884,784	1,464,079	1,420,705	305,435	387,430	465,168	256,197						147,816				693,476	629,262
Champaign	578,964	227,630	351,334	6,500	11,609	66,200	153,800	98,300	98,300	12,000	9,300	12,000					58,330	75,625
Clark	845,850	341,500	504,350	4,500	24,500	24,500	129,850	103,000	103,000	35,500	31,000	35,500					211,500	211,500
Columbiana	56,253	28,127	28,126								157	156					27,970	27,970
Coshocton	442,498	227,278	215,220	10,651	5,997	2,078						25,430		145			214,549	183,648
Cuyahoga	78,661	39,331	39,330														39,331	39,330
Darke	36,000	16,000	20,000	16,000	20,000													
Defiance	233,694	196,743	36,951	9,464	29,066	187,279												7,885
Fairfield	6,905	3,295	3,610														3,295	3,610
Franklin	2,391,121	1,141,835	1,249,286	57,413	757,663	790,985	185,964	3,085	3,085	24,207							275,714	278,367
Fulton	23,268	23,268		7,840													15,428	
Gallia	1,763	1,763															1,763	
Geauga	1,516	758	758														758	758
Greene	1,020,817	506,745	514,072	11,100	8,500	20,000	25,000	20,000	20,000	10,000	55,000	10,000					368,645	450,572
Hamilton	3,143,337	1,803,081	1,340,256	488,241	647,866	317,481	134,543	100	100	104,949	245,712					6,500	892,310	312,035
Henry	31,323	31,323											5,000				19,823	
Highland	164,593	92,577	72,016		20,094	80,914				25,383			11,663	4,511				22,028
Hocking	516,738	372,278	144,460	500		81,811	22,713	21,861	24,170	20,100	12,150						248,006	85,427
Holmes	645,866	356,543	289,323	20,167	100,622	156,385	27,066	124,668	55,568	15,386	72,257		33,810	25,777			14,160	
Knox	1,269,092	595,642	673,450	41,269	232,483	293,821	38,483	56,598	73,272		104,262		80,272				203,954	144,678
Licking	1,186,616	696,090	490,526	46,171	221,336	348,310	6,253	20,647	28,667		2,386						280,962	231,884
Logan	183,340	91,713	91,627	1,102		4,144											86,467	91,627
Lucas	750	375	375														375	375
Madison	18,959	4,445	14,514	4,445	14,514													
Mahoning	46,472	18,219	28,253	3,092	9,350							2,830		12,300	12,700	2,501	326	3,373
Marion	10,852	4,557	6,295	1,420		1,662									1,715		1,475	4,580
Medina	227,100	113,550	113,550														113,550	113,550
Meigs	1,324,336	685,634	638,702			465,775	231,515										219,859	407,187
Miami	489,254	216,875	272,379		73,401	27,913											188,962	198,978
Montgomery	1,089,118	496,822	592,296	172,000	223,474	68,000	87,000							40,000		15,000	241,822	241,822
Morrow	212,000	53,000	159,000	1,000		26,000		13,000									13,000	159,000
Muskingum	293,371	243,246	50,125	11,758	2,847			85,792	16,224	2,116	452						143,580	30,602
Paulding	75,648		75,648				59,247		16,401									
Pickaway	798,477	485,616	312,861		496	323,000	66,000	100,000	60,000	1,052	15,385						61,564	170,980
Pike	189,900	169,009	20,891														169,009	20,891
Portage	3,735,873	2,575,921	1,159,952	136,696	289,380	711,484	65,919	305,444	75,418	235,989	176,633			44,681			1,186,308	507,921
Preble	680,150	223,125	457,025	66,656	272,772												156,469	84,252

TABLE 13. 2021 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	Sand
Richland	302,659	255,897	46,762		8,049											Sand	Gravel	
Ross	267,513	164,578	102,935	3,312	21,479		22,805	305	22,943	18,819						252,193	23,345	
Sandusky	365	350	15						350	15						115,518	62,332	
Scioto	103,037	80,061	22,976	22,586	16,469		51,838	871										
Shelby	169,000	84,500	84,500													5,637	5,636	
Stark	3,741,748	1,963,519	1,778,229	56,232	158,194		472,047	42,973	147,358	254,120	295,762	266,289				992,120	1,056,653	
Summit	13,580	13,580														13,580		
Tuscarawas	1,242,605	735,410	507,195	226,717	113,785		46,597	42,805	63,738	67,799	235,092	122,160				163,266	160,646	
Warren	526,077	246,092	279,985	243,081	277,773				3,011								2,212	
Washington	832,440	496,090	336,350	28,853	6,928		252,748	13,857		42,201		25,638				214,489	247,726	
Wayne	384,841	202,342	182,499	25,031	144,802		101,910	4,668	57,967	10,134	14,876	20,131	2,558	2,764				
Williams	1,656	828	828													828	828	
Wood	11,109	11,109					23		11,086									
Wyandot	300,686	181,823	118,863	43,700	42,956		53,626		74,000				7,169	37,907		3,328	38,000	
TOTAL¹	33,298,113	18,232,122	15,065,991	2,108,585	4,334,849		5,531,360	1,595,029	1,409,716	1,026,567	1,080,948	1,414,511	64,467	258,505	0	24,001	8,013,045	6,436,530

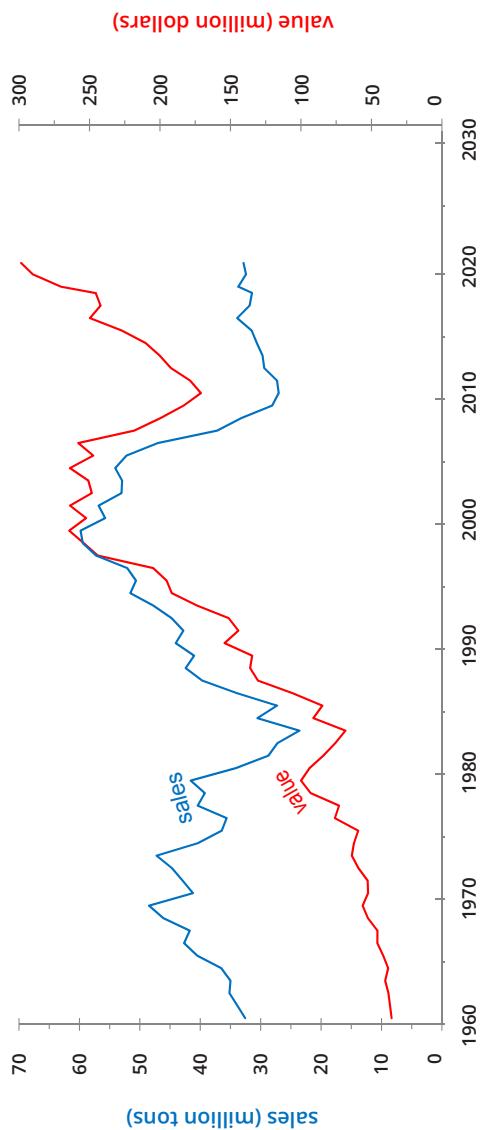
¹Any tally inconsistencies are because of rounding.

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 use 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 = 1,230,072 (–7.8% from 2020)
- U.S. ranking:
 - 5th out of 50 producing states for crushed stone ([USGS, 2022a](#))
 - The 2021 U.S. state rankings for the 34 dimension-stone producing states were unavailable ([USGS, 2022d](#)).
- Top Producing Geologic Units (fig. 7):
 - Sharon conglomerate (Pennsylvanian)
 - Berea Sandstone (Devonian)
 - Logan Formation (Mississippian)
 - Unidentified Sandstone Pottsville Group (Pennsylvanian)

Sales

(See figs. 12, 13)

- Tons sold = 1,184,191 (–1.6% from 2020; table 14, 15)
- Value⁶ = \$44,892,977 (table 9)
- Leading counties (percentage of statewide sales):
 - Geauga (57.8%)
 - Lake (9.8%)
 - Wayne (8.9%)
 - Pike (5.9%)
 - Knox (3.5%)

Employment

(See table 10)

- Production employees reported = 190
- Nonproduction employees reported = 56
- Average employee annual wage = \$61,992
- Total wages earned = \$15,002,071
- Average days worked per operation = 157

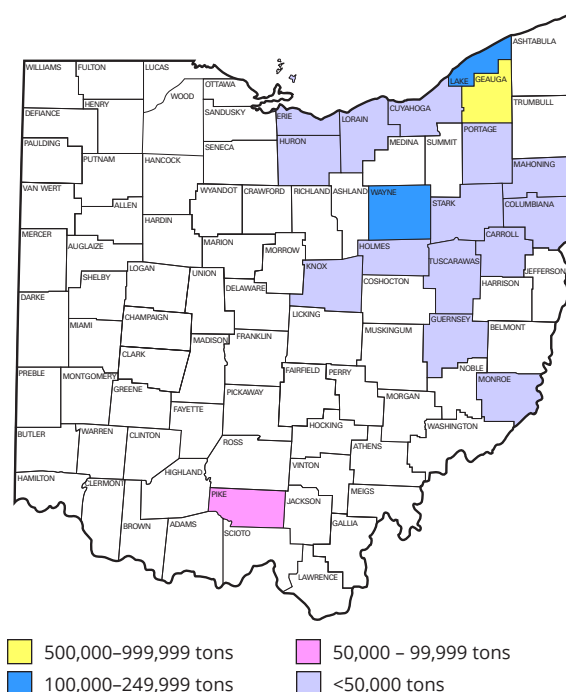


FIGURE 12. Sales of sandstone and conglomerate in Ohio in 2021, by county and quantity.



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

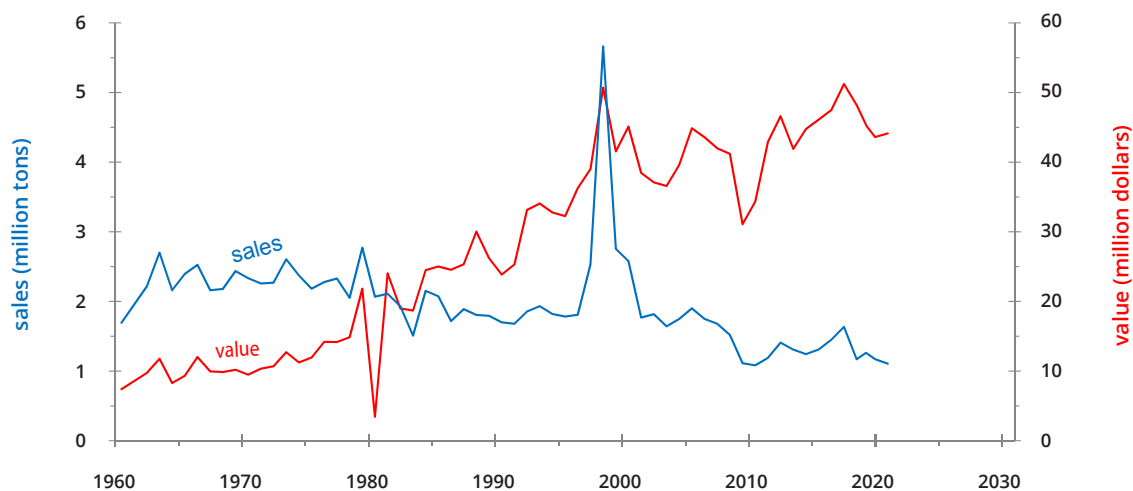


FIGURE 13. Sales and value of sandstone and conglomerate in Ohio since 1960.

TABLE 14. 2021 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	4,123					4,123									
Columbiana	20,756												15,374	5,129	253
Geauga	683,921	62,960	77,227	1,699	11,211		21,105		3,100				266,246	48,666	191,707
Guernsey	33,291						33,291								
Holmes	4,606						4,606								
Knox	41,157		20,578						10,895		4,130		4,693		861
Lake	115,950						69,300						46,650		
Mahoning	39,195												39,195		
Monroe	5,226						5,226								
Pike	69,892												23,352		46,540
Portage	17,548														17,548
Stark	12,848												12,848		
Tuscarawas	8,229												8,159		70
Wayne	105,809						46,542						21		59,246
TOTAL	1,162,551	62,960	97,805	1,699	11,211	4,123	180,070	0	13,995	0	4,130	0	416,538	53,795	316,225

TABLE 15. 2021 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
Cuyahoga	665									665
Erie	6,188		1,831	68		1,195	3,094			
Huron	3,717		3,717							
Lorain	11,070			7,728			3,342			
TOTAL	21,640	0	5,548	7,796	0	1,195	6,436	0	0	665

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) = 800,816 (–26.9% from 2020)
- Tons produced (shale) = 338,101 (–16.3% from 2020)
 - The 2021 U.S. state rankings for the 38 clay and shale producing states were unavailable ([USGS, 2022e](#)).

Sales

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

- Clay:
 - Tons sold = 837,945 (–23.6% from 2020; table 16)
 - Value⁷ = \$9,228,281 (table 9)
- Leading counties for clay (percentage of statewide sales):
 - Tuscarawas (38.6%)
 - Greene (17.5%)
 - Mahoning (8.4%)
 - Paulding (7.1%)
 - Defiance (6.0%)
- Shale:
 - Tons sold = 325,729 (–19.4% from 2020; table 17)
 - Value⁸ = \$4,730,306 (table 9)
- Leading counties for shale (percentage of statewide sales):
 - Tuscarawas (44.2%)
 - Wayne (13.9%)
 - Holmes (9.8%)
 - Harrison (8.2%)
 - Coshocton (6.8%)

Employment

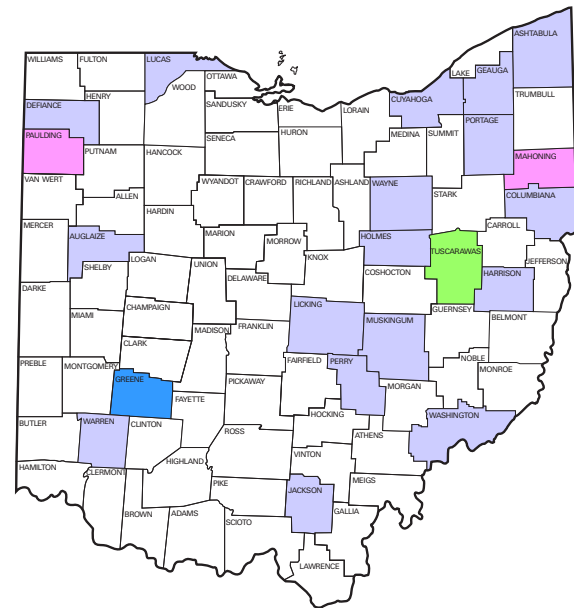
(See table 10)

- Production employees reported = 126
- Nonproduction employees reported = 128
- Average employee annual wage = \$50,531
- Total wages earned = \$12,177,949
- Average days worked per operation = 91

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

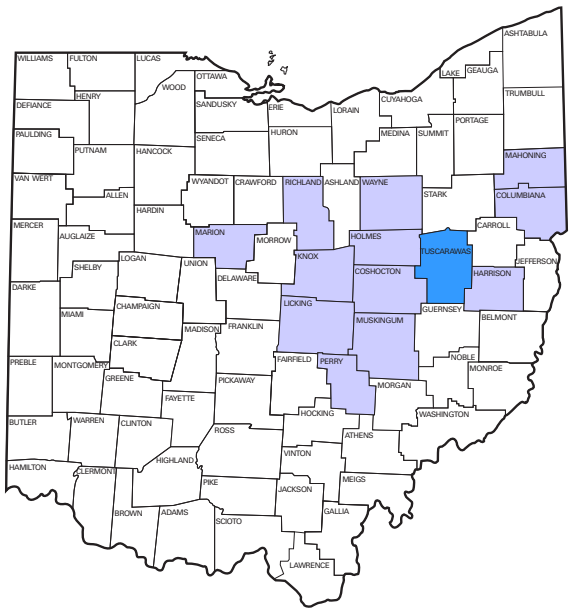
⁸Includes reported and estimated values. See footnote 1, p. 1.





250,000-499,999 tons 50,000 - 99,999 tons
100,000-249,999 tons <50,000 tons

FIGURE 14. Clay sales in Ohio in 2021, by county and quantity.



100,000-249,999 tons <50,000 tons

FIGURE 15. Shale sales in Ohio in 2021, by county and quantity.

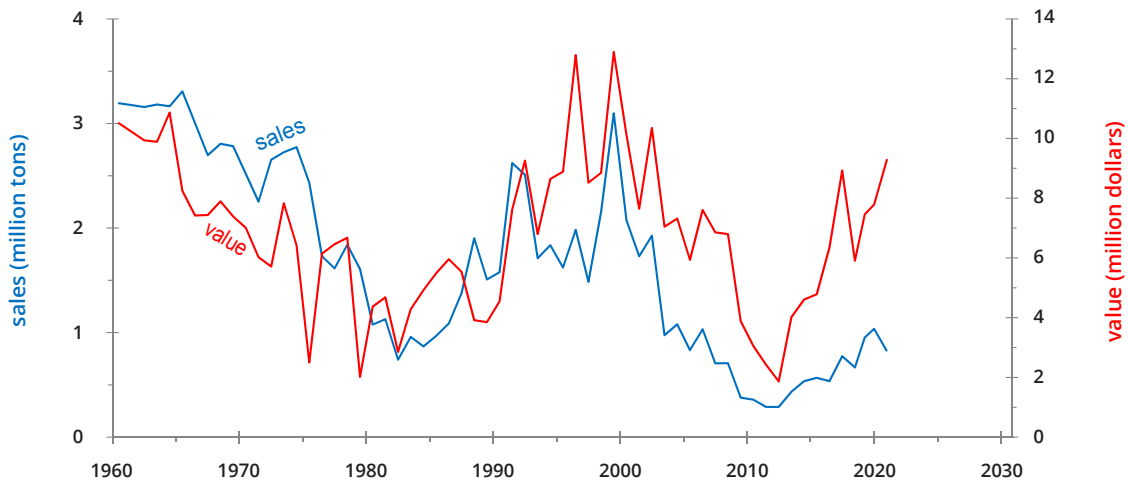


FIGURE 16. Sales and value of clay in Ohio since 1960.

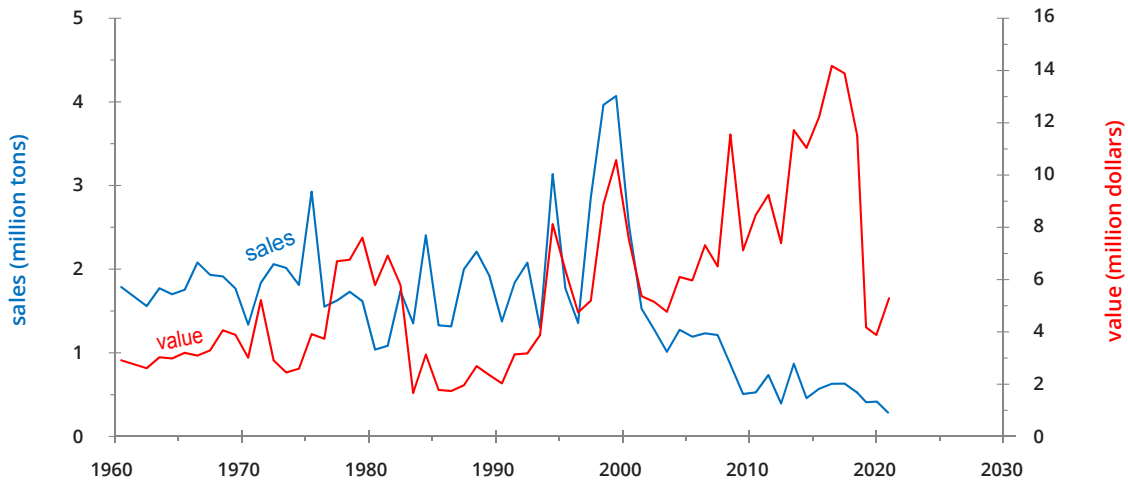


FIGURE 17. Sales and value of shale in Ohio since 1960.

TABLE 16. 2021 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	12,664						9,430		3,234
Auglaize	841	841							
Columbiana	465			465					
Cuyahoga	2,279	173							2,106
Defiance	50,000							50,000	
Geauga	1,306								1,306
Greene	146,640				146,640				
Harrison	39,350						39,350		
Holmes	11								11
Jackson	26,753	26,753							
Licking	17,870								17,870
Lucas	40,300							40,300	
Mahoning	70,090								70,090
Muskingum	14,789	12,769	2,020						
Paulding	59,751				59,751				
Perry	6,073	5,637		436					
Portage	7,591	519					7,072		
Tuscarawas	323,658	303,983					19,675		
Warren	100						100		
Washington	16,579						13,329		3,250
Wayne	835						835		
TOTAL	837,945	350,675	2,020	901	206,391	0	89,791	90,300	97,867

TABLE 17. 2021 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	8,638	7,938				700		
Coshocton	22,096						22,096	
Harrison	26,852	26,852						
Holmes	32,014	340			13,819			17,855
Knox	1,276							1,276
Licking	18,912	18,912						
Mahoning	4,816							4,816
Marion	9,237							9,237
Muskingum	8	8						
Perry	12,608		12,608					
Richland	80							80
Tuscarawas	143,903	143,903						
Wayne	45,289	36,623				8,664		2
TOTAL	325,729	234,576	12,608	0	13,819	9,364	22,096	33,266

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 2021 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 in 2021 decreased when compared to 2020 values, while sales increased. The recent stretch of unusually warm winters with lower-than-average precipitation have resulted in municipalities not needing to replenish salt supplies every year, resulting in lower sales and value.

Production

- Tons produced = 3,528,841 (–21.4% from 2020)
- U.S. ranking:
 - In the top 7 of 16 producing states (USGS, 2022f)
- Top producing geologic units (fig. 7):
 - Salina Group (Silurian)

Sales

(See figs. 18, 19)

- Tons sold = 4,362,969 (+36.3% from 2020)
- Value⁹ = \$247,137,710 (table 9)

Employment

(See table 10)

- Production employees reported = 295
- Nonproduction employees reported = 170
- Average employee annual wage = \$68,853
- Total wages earned = \$32,016,820
- Average days worked per operation = 284

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

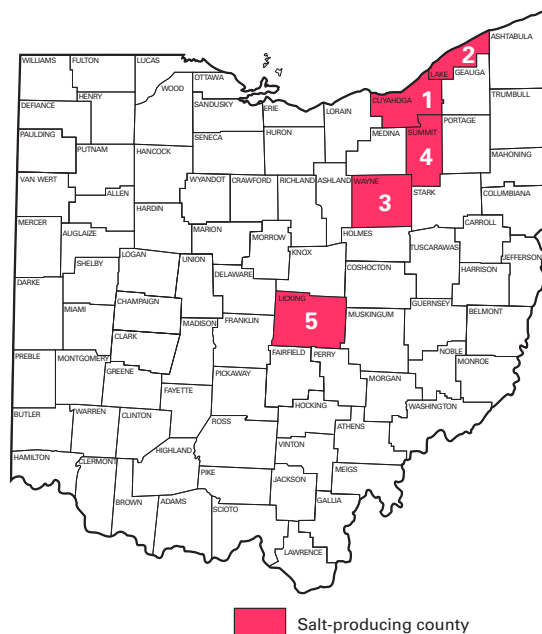


FIGURE 18. Counties producing salt in Ohio in 2021 and their rankings in sales.

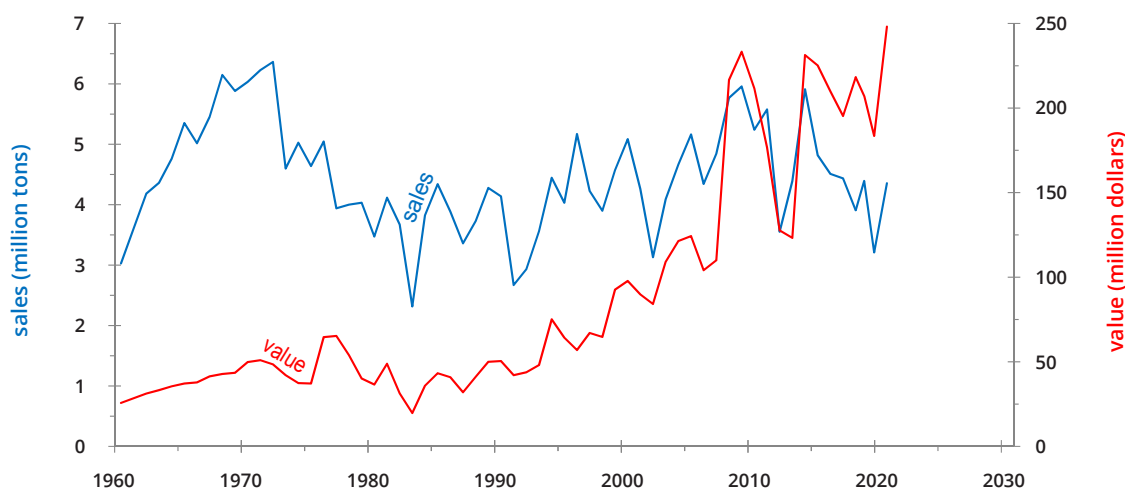


Figure 19. Sales and value of salt in Ohio since 1960.

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ABOUT THE MAP

Reported and estimated total direct employment in the extractive industries of Ohio in 2021 was more than 10,000 people. Industrial-mineral production increased for limestone and dolomite, while production decreased for coal, salt, clay, shale, sandstone and conglomerate, sand and gravel, and peat. The total value of nonfuel industrial minerals exceeded \$1 billion for the eighth straight year. In 2021, the production-leading commodity of limestone and dolomite was up 3.3%, with the second leading commodity of sand and gravel coming down 0.7% from 2020; the third leading commodity of salt was down 21.4% from 2020; the fourth leading commodity of coal was down 24.1% from 2020 values.

^aIncludes 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.

Commodity	Production ¹	Sales ²	Value ³	Change in value from 2020 prices ⁴
Limestone and dolomite	69,618,579 tons	70,184,574 tons	\$789,940,373	+ 7.2
Coal	2,874,941 tons	2,884,115 tons	\$97,636,116	- 31.0
Sand and gravel	331,101,486 tons	328,081,106 tons	\$291,212,355	+ 1.7
Crushed stone	3,323,841 tons	4,261,964 tons	\$247,131,313	+ 34.8
Sandstone and conglomerates	12,302,072 tons	11,849,145 tons	\$448,992,977	+ 2.6
Shale	338,101 tons	325,729 tons	\$148,730,306	+ 21.3
Clay	800,676 tons	875,945 tons	\$5,226,281	+ 17.4
Gas	0 tons	0 tons	\$0	- 100.0
Oil	2,259,648,712 thousand cubic feet	not available	\$7,590,401,872	+ 99.3

Oil	18,998,968 barrels	not available	\$1,213,274,096	+41.8
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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 DODIR Division of Mineral Resources Management records.

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.

Percent change in value is based on production in 2020, when net sales was last mined in Ohio.

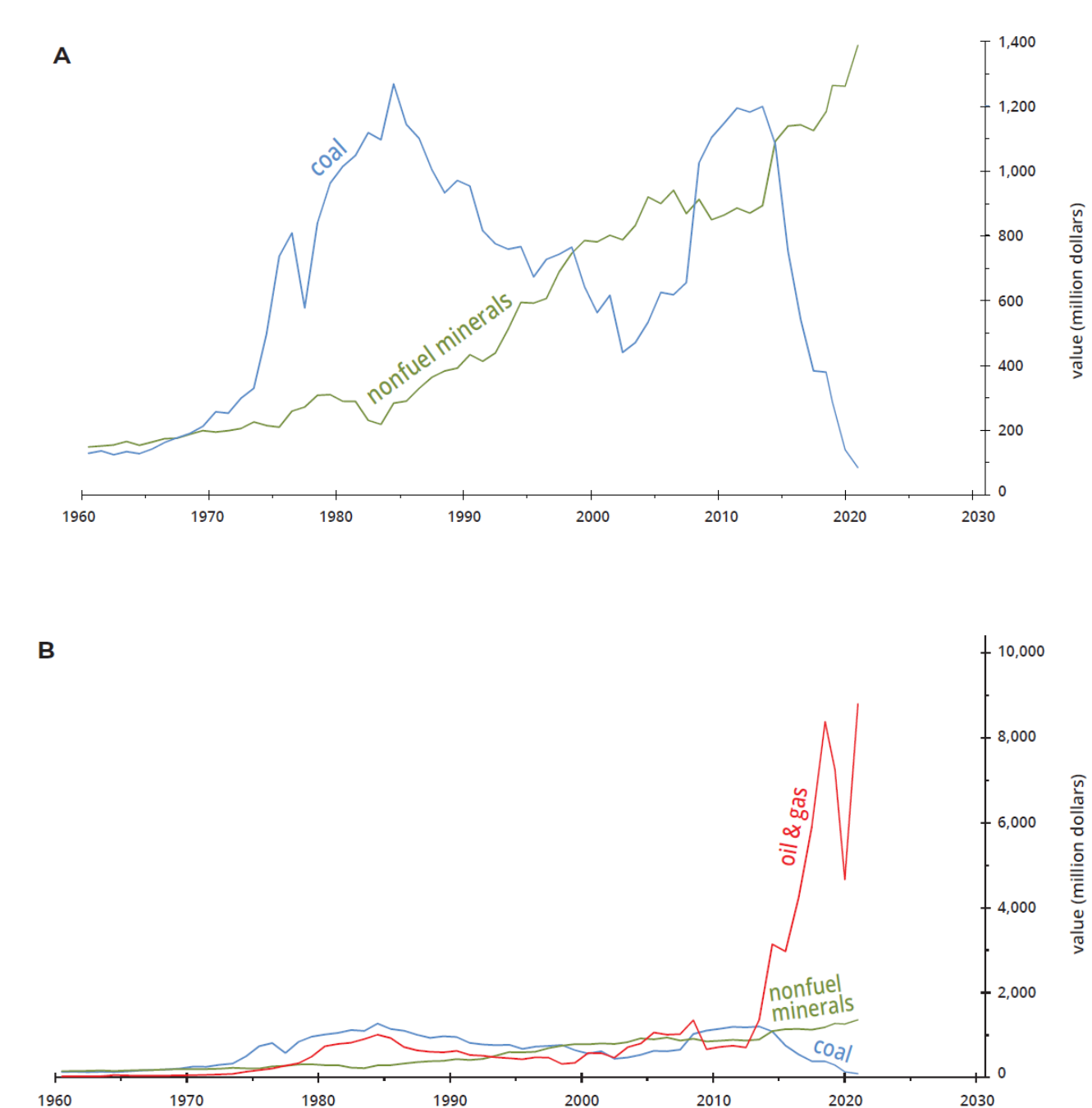


FIGURE 1. (A) Value of coal and nonfuel minerals in Ohio since 1960. (B) Value of coal, nonfuel minerals and oil and gas in Ohio since 1960.

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INDIANA

PENNsylvania

NEW NUMBER	COMPANY NAME	MINE NAME	TOTAL PRODUCTION (TONS)	STATE MINE NUMBER	COMPANY NAME	MINE NAME	TOTAL PRODUCTION (TONS)	TOTAL SALES (\$ MIL.)
AA-1	Henry Aggregates Mktg. Inc.	Pum Run Quarry	84,013	HW-19	Fluor Corporation, Co. Inc.	Seaton Sand & Gravel	1,032	92.2
AA-2	Dee Coal Co., LLC	Dee	48,032	HW-20	Henry Aggregates, Inc.	Hampton	471.7	11.3
AA-3	Butler Stone Co., Inc.	Butler Stone	384,394	HW-21	Gray-Clary Corp.	Isle Quarry	8,327	9.2
AA-4	National Limestone & Stone Co.	Bluff Run	103,000	HW-22	Fremontville Sand LP	Fremontville Sand	199,000	19.0
AA-5	Yung's Sand & Gravel, Inc.	Spring & Yung	11,466	HW-23	Frederick Stone Co.	Frederick Stone	1,000	1.1
AA-6	Yung's Sand & Gravel, Inc.	Spring & Yung	287,271	HW-24	Martin's Materials, Inc.	Asheboro Sand	127,293	24.4
AA-7	W. B. Wells, Inc.	Belo-Aggregates	9	HW-25	Revelsby Inc.	Revelsby	691,290	98.7
AA-8	Joe Smith & Sons Trucking, Inc.	North Hager Hill	111,393	HW-26	Revelsby Inc.	Revelsby	691,290	98.7
AA-9	Madiba Road Quarry	Madiba Road	3,360	HW-27	Revelsby Inc.	Revelsby	691,290	98.7
AA-10	Nelson & Sons, Inc.	Nelson Sand & Gravel, Inc.	10,000	HW-28	Revelsby Inc.	Revelsby	691,290	98.7
AA-11	Nelson & Sons, Inc.	Jefferson	10,000	HW-29	Revelsby Inc.	Revelsby	691,290	98.7
AA-12	National Limestone & Stone Co.	Mineral Materials	65,352	HW-30	Revelsby Inc.	Revelsby	691,290	98.7
AA-13	Aggregates, LLC	Atlanta-Putnam Quarry	65,000	HW-31	Revelsby Inc.	Revelsby	691,290	98.7
AA-14	National Limestone & Stone Co.	Buckland Park	276,000	HW-32	Revelsby Inc.	Revelsby	691,290	98.7
AA-15	Clarks, Inc.	Clarks	1,000	HW-33	Revelsby Inc.	Revelsby	691,290	98.7
AA-16	Sandwich City Works, Inc.	Sandwich City Works, Inc.	841	HW-34	Revelsby Inc.	Revelsby	691,290	98.7
AA-17	CCI Co. and Construction, LLC	Shaper Nuts	202,078	HW-35	Revelsby Inc.	Revelsby	691,290	98.7
AA-18	CCI Co. and Construction, LLC	Shaper Nuts	13,000	HW-36	Revelsby Inc.	Revelsby	691,290	98.7
AA-19	CCI Co. and Construction, LLC	Shaper Nuts	13,000	HW-37	Revelsby Inc.	Revelsby	691,290	98.7
AA-20	CCI Co. and Construction, LLC	Shaper Nuts	13,000	HW-38	Revelsby Inc.	Revelsby	691,290	98.7
AA-21	CCI Co. and Construction, LLC	Shaper Nuts	13,000	HW-39	Revelsby Inc.	Revelsby	691,290	98.7
AA-22	CCI Co. and Construction, LLC	Shaper Nuts	13,000	HW-40	Revelsby Inc.	Revelsby	691,290	98.7
AA-23	CCI Co. and Construction, LLC	Shaper Nuts	13,000	HW-41	Revelsby Inc.	Revelsby	691,290	98.7
AA-24	CCI Co. and Construction, LLC	Shaper Nuts	13,000	HW-42	Revelsby Inc.	Revelsby	691,290	98.7
AA-25	CCI Co. and Construction, LLC	Shaper Nuts	13,000	HW-43	Revelsby Inc.	Revelsby	691,290	98.7
AA-26	CCI Co. and Construction, LLC	Shaper Nuts	13,000	HW-44	Revelsby Inc.	Revelsby	691,290	98.7
AA-27	CCI Co. and Construction, LLC	Shaper Nuts	13,000	HW-45	Revelsby Inc.	Revelsby	691,290	98.7
AA-28	CCI Co. and Construction, LLC	Shaper Nuts	13,000	HW-46	Revelsby Inc.	Revelsby	691,290	98.7
AA-29	CCI Co. and Construction, LLC	Shaper Nuts	13,000	HW-47	Revelsby Inc.	Revelsby	691,290	98.7
AA-30	CCI Co. and Construction, LLC	Shaper Nuts	13,000	HW-48	Revelsby Inc.	Revelsby	691,290	98.7
AA-31	CCI Co. and Construction, LLC	Shaper Nuts	13,000	HW-49	Revelsby Inc.	Revelsby	691,290	98.7
AA-32	CCI Co. and Construction, LLC	Shaper Nuts	13,000	HW-50	Revelsby Inc.	Revelsby	691,290	98.7
AA-33	CCI Co. and Construction, LLC	Shaper Nuts	13,000	HW-51	Revelsby Inc.	Revelsby	691,290	98.7
AA-34	CCI Co. and Construction, LLC	Shaper Nuts	13,000	HW-52	Revelsby Inc.	Revelsby	691,290	98.7
AA-35	CCI Co. and Construction, LLC	Shaper Nuts	13,000	HW-53	Revelsby Inc.	Revelsby	691,290	98.7
AA-36	CCI Co. and Construction, LLC	Shaper Nuts	13,000	HW-54	Revelsby Inc.	Revelsby	691,290	98.7
AA-37	CCI Co. and Construction, LLC	Shaper Nuts	13,000	HW-55	Revelsby Inc.	Revelsby	691,290	98.7
AA-38	CCI Co. and Construction, LLC	Shaper Nuts	13,000	HW-56	Revelsby Inc.	Revelsby	691,290	98.7
AA-39	CCI Co. and Construction, LLC	Shaper Nuts	13,000	HW-57	Revelsby Inc.	Revelsby	691,290	98.7
AA-40	CCI Co. and Construction, LLC	Shaper Nuts	13,000	HW-58	Revelsby Inc.	Revelsby	691,290	98.7
AA-41	CCI Co. and Construction, LLC	Shaper Nuts	13,000	HW-59	Revelsby Inc.	Revelsby	691,290	98.7
AA-42	CCI Co. and Construction, LLC	Shaper Nuts	13,000	HW-60	Revelsby Inc.	Revelsby	691,290	98.7
AA-43	CCI Co. and Construction, LLC	Shaper Nuts	13,000	HW-61	Revelsby Inc.	Revelsby	69	