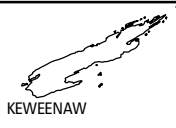




2010–2011 Minerals Yearbook

MICHIGAN



MICHIGAN



LEGEND

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

MINERAL SYMBOLS (Principal producing areas)

- Cem Cement plant
- Clay Common clay
- CS Crushed stone
- Cu Copper plant
- D-Sd Dimension sandstone
- FA Ferroalloys
- Fe Iron ore
- Gyp Gypsum
- IS Industrial sand
- K Potash
- Lime Lime plant
- Lime-c Lime plant (captive)
- MgCp Magnesium compounds
- Peat Peat
- Per Perlite plant
- S-ng Sulfur (natural gas)
- Salt Salt
- SG Construction sand and gravel
- Steel Steel plant
- TiMet Titanium metal plant
- Concentration of mineral operations

0 50 100 Kilometers

Albers equal area projection

THE MINERAL INDUSTRY OF MICHIGAN

This chapter has been prepared under a Memorandum of Understanding between the U.S. Geological Survey and the Michigan Department of Environmental Quality, Office of Oil, Gas, and Minerals for collecting information on all nonfuel minerals.

In 2011, Michigan's nonfuel mineral production¹ was valued at \$2.4 billion, based upon annual U.S. Geological Survey (USGS) data. This was a \$242 million (11%) increase from the State's total nonfuel mineral production value of \$2.17 billion in 2010, which had increased by \$407 million (23%) from \$1.76 billion in 2009. In 2011 and 2010, the State rose in rank to 9th, from 11th in 2009, among the 50 States in total nonfuel mineral production value, producing 3.3% of the U.S. total mineral value. On a per capita basis, Michigan was 15th in the Nation in nonfuel mineral production in 2011 with a value of \$244, slightly above the national average of \$240.

In 2011 and 2010, iron ore remained Michigan's leading nonfuel mineral commodity by value, followed by portland cement, salt, construction sand and gravel, magnesium compounds, and crushed stone, accounting for more than 94% of the State's production value. In 2011, industrial sand and gravel had the largest increase in production value, \$35.8 million (113%) from 2010, followed by an increase by 28% in the production value of gypsum. Salt, magnesium compounds, dimension stone, iron ore, and lime all increased in production value (data withheld—company proprietary data) from 2010 to 2011. In 2011, the production value and quantity of portland cement were nearly flat from 2010 to 2011. Between 2010 and 2011, significant decreases took place in masonry cement, down by \$1.9 million (18.6%), and construction sand

¹The terms "nonfuel mineral production" and related "values" encompass variations in meaning, depending upon the mineral products. Production may be measured by mine shipments, mineral commodity sales, or marketable production (including consumption by producers) as is applicable to the individual mineral commodity.

All USGS mineral production data published in this chapter are those available as of May 2013. Data in this report are rounded to three significant digits and percentages are calculated from unrounded data. All USGS Mineral Industry Surveys and USGS Minerals Yearbook chapters—mineral commodity, State, and country—can be retrieved over the Internet at <http://minerals.usgs.gov/minerals>.

and gravel, down by \$12 million (6%). The production value of potash and peat also decreased (data withheld—company proprietary data).

In 2010, the production of iron ore increased by almost 3 million metric tons (Mt) (34%) from 2009. Lime and magnesium compounds followed with significant increases to production quantity and value (data withheld—company proprietary data). In 2010, the production value of construction sand and gravel increased by \$16 million (9%) from 2009. Other than masonry cement, which increased, and portland cement and dimension stone, which were both flat, all other mineral commodities produced in the State decreased in production value, led by salt, down by 14.5%, and crushed stone decreasing by 13.8% despite both increasing in production.

In 2011 and 2010, Michigan continued to rank first in the Nation in the production of magnesium compounds among five producing States. The State continued to rank second in the production of iron ore among 4 producing States, third in the production of potash among 3 producing States, and seventh in the production of salt among 16 producing States. In 2011 and 2010, Michigan ranked fourth in the production of portland cement among 35 States, an increase from fifth in 2009. The State rose in rank to 12th from 14th in the production of lime among 33 States, from 2009 to 2011. The State ranked 16th in 2011 and 2010 in the production of common clays among 41 States, a rise from 17th in 2009. In 2011, Michigan fell in rank to fifth from fourth, in 2009 and 2010, in the production of construction sand and gravel among 50 States. In 2011, the State rose in rank to seventh from eighth after being ranked sixth in 2009, in the production of industrial sand and gravel among 33 States. Michigan dropped rank in gypsum production 2 consecutive years to 11th in 2011, and 10th in 2010, from 8th in 2009. In 2010, the State rose in rank to 9th from 10th before dropping rank back to 10th in 2011 in the production of masonry cement.

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

Mineral	2009		2010		2011	
	Quantity	Value	Quantity	Value	Quantity	Value
Cement:						
Masonry	80	9,800 ^e	83	10,200 ^e	61	8,300 ^e
Portland	3,550	350,000 ^e	3,480	350,000 ^e	3,480	353,000 ^e
Clays, common	318	1,310	312	1,280	312	1,280
Gemstones, natural	NA	2	NA	2	NA	2
Gypsum, crude	345 ^r	2,440 ^r	302	2,080	345	2,670
Iron ore, usable shipped	8,870	W	11,900	W	13,200	W
Peat	W	W	4	W	3	27
Sand and gravel:						
Construction	34,100 ^r	174,000 ^r	33,300	190,000	31,900	178,000
Industrial	1,410 ^r	32,000 ^r	1,350	31,700	1,830	67,500
Stone, crushed	20,400	116,000 ^r	21,500	100,000	20,700	99,000
Combined values of lime, magnesium compounds, potash, salt, stone (dimension dolomite sandstone), and values indicated by symbol W	XX	1,080,000	XX	1,490,000	XX	1,700,000
Total	XX	1,760,000	XX	2,170,000	XX	2,410,000

^eEstimated. ^rRevised. NA Not available. W Withheld to avoid disclosing company proprietary data. Withheld values included in "Combined values" data. XX Not applicable.

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

²Data are rounded to no more than three significant digits; may not add to totals shown.

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

Type	2009			2010			2011				
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Unit value
Limestone ²	21	15,700	\$94,100 ^r	27	15,800	\$72,700	26	15,300	\$4.59	\$70,100	\$4.58
Dolomite	4	3,860	19,900	4	4,670	25,000	4	4,570	5.35	24,800	5.43
Calcareous marl	--	--	--	--	--	--	1	2	--	17	7.51
Miscellaneous stone	16 ^r	762 ^r	1,810 ^r	5	986	2,780	5	859	2.81	4,040	4.70
Total or average	XX	20,400	116,000 ^r	XX	21,500	100,000	XX	20,700	4.67	99,000	4.78

^rRevised. XX Not applicable. -- Zero.

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

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

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

(Thousand metric tons and thousand dollars)

Use	Quantity	Value
Construction:		
Coarse aggregate (+1½ inch):		
Macadam	11	138
Riprap and jetty stone	79	1,150
Filter stone	W	W
Other coarse aggregate	W	W
Coarse aggregate, graded:		
Concrete aggregate, coarse	2,570	13,000
Bituminous aggregate, coarse	231	1,090
Railroad ballast	W	W
Other graded coarse aggregate	37	492
Fine aggregate (-¾ inch):		
Stone sand, concrete	W	W
Stone sand, bituminous mix or seal	203	1,040
Screening, undesignated	321	1,420
Other fine aggregate	W	W
Coarse and fine aggregates:		
Graded road base or subbase	1,650	8,770
Unpaved road surface	857	2,000
Crusher run or fill or waste	W	W
Other coarse and fine aggregates	W	W
Agricultural:		
Agricultural, limestone	231	1,840
Other agricultural uses	W	W
Chemical and metallurgical, flux stone	W	W
Special, other fillers or extenders	W	W
Unspecified:²		
Reported	6,120	35,400
Estimated	7,190	42,500
Total	21,500	100,000

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

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

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

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

(Thousand metric tons and thousand dollars)

Use	Quantity	Value
Construction:		
Coarse aggregate (+1½ inch):		
Macadam	W	W
Riprap and jetty stone	145	2,050
Filter stone	49	322
Coarse aggregate, graded:		
Concrete aggregate, coarse	2,110	11,000
Bituminous aggregate, coarse	164	695
Bituminous surface-treatment aggregate	W	W
Railroad ballast	W	W
Fine aggregate (-¾ inch):		
Stone sand, concrete	W	W
Stone sand, bituminous mix or seal	W	W
Screening, undesignated	256	1,310
Coarse and fine aggregates:		
Graded road base or subbase	2,020	8,560
Unpaved road surface	957	4,610
Terrazzo and exposed aggregate	W	W
Crusher run or fill or waste	W	W
Unspecified coarse and fine aggregates	274	2,120
Unspecified and other construction materials	2	17
Agricultural:		
Agricultural, limestone	159	736
Unspecified and other agricultural uses	W	W
Chemical and metallurgical:		
Cement manufacture	4,080	9,560
Flux stone	167	1,100
Glass manufacture	W	W
Special, other fillers or extenders	W	W
Unspecified:²		
Reported	54	414
Estimated	9,790	54,100
Total	20,700	99,000

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

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

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

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

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3	
	Quantity	Value	Quantity	Value	Quantity	Value
Construction:						
Coarse aggregate (+1½ inch) ²	W	W	W	W	87	1,310
Coarse aggregate, graded ³	W	W	W	W	1,240	5,880
Fine aggregate (-¾ inch) ⁴	W	W	W	W	535	2,470
Coarse and fine aggregates ⁵	W	W	W	W	1,440	7,550
Agricultural ⁶	W	W	W	W	256	1,860
Chemical and metallurgical ⁷	W	W	--	--	--	--
Special ⁸	--	--	W	W	--	--
Unspecified:⁹						
Reported	5	30	3,670	18,600	2,450	16,700
Estimated	3,160	17,900	2,490	14,100	1,540	10,600
Total¹⁰	W	W	6,560	35,100	7,540	46,400
	Unspecified districts					
Use	Quantity	Value				
Construction:						
Coarse aggregate (+1½ inch) ²	--	--				
Coarse aggregate, graded ³	--	--				
Fine aggregate (-¾ inch) ⁴	--	--				
Coarse and fine aggregates ⁵	W	W				
Agricultural ⁶	--	--				
Chemical and metallurgical ⁷	--	--				
Special ⁸	--	--				
Unspecified:⁹						
Reported	--	--				
Estimated	--	--				
Total¹⁰	W	W				

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

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

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

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

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

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

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

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

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

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

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

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

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3	
	Quantity	Value	Quantity	Value	Quantity	Value
Construction:						
Coarse aggregate (+1½ inch) ²	W	W	W	W	168	2,060
Coarse aggregate, graded ³	W	W	W	W	W	W
Fine aggregate (-¾ inch) ⁴	W	W	W	W	W	W
Coarse and fine aggregates ⁵	W	W	W	W	2,300	10,400
Other construction materials	--	--	--	--	2	17
Agricultural ⁶	3	76	W	W	W	W
Chemical and metallurgical ⁷	W	W	W	W	W	W
Special ⁸	--	--	W	W	--	--
Unspecified: ⁹						
Reported	1	7	--	--	53	407
Estimated	5,930	31,400	2,410	13,300	1,450	9,440
Total	7,600	41,100	6,910	25,700	6,210	32,200

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

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

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

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

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

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

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

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

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

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

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

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate (including concrete sand)	4,940	\$28,800	\$5.83
Plaster and gunite sands	25	240	9.60
Concrete products (blocks, bricks, pipe, decorative, etc.)	71	899	12.66
Asphaltic concrete aggregates and other bituminous mixtures	3,580	24,700	6.90
Road base and coverings	4,830	26,600	5.51
Road and other stabilization (cement)	164	1,190	7.26
Road and other stabilization (lime)	139	1,250	8.99
Fill	3,480	9,880	2.84
Snow and ice control	151	607	4.02
Railroad ballast	61	545	8.93
Filtration	109	1,090	10.00
Other miscellaneous uses ²	71	755	10.63
Unspecified: ³			
Reported	4,110	28,000	6.81
Estimated	11,900	67,000	5.63
Total or average	33,300	190,000	5.71

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

²Includes roofing granules and golf course.

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

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

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate (including concrete sand)	4,860	\$28,500	\$5.86
Plaster and gunite sands	74	348	4.70
Concrete products (blocks, bricks, pipe, decorative, etc.)	56	560	10.00
Asphaltic concrete aggregates and other bituminous mixtures	2,950	19,700	6.68
Road base and coverings	4,620	26,900	5.82
Road and other stabilization (cement)	87	644	7.40
Road and other stabilization (lime)	279	1,160	4.16
Fill	3,490	10,600	3.04
Snow and ice control	166	736	4.43
Railroad ballast	38	349	9.18
Filtration	134	1,340	10.00
Other miscellaneous uses ²	121	947	7.83
Unspecified: ³			
Reported	4,150	25,700	6.19
Estimated	10,900	60,200	5.52
Total or average	31,900	178,000	5.58

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

²Includes golf course and roofing granule.

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

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

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3	
	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregate (including concrete sand)	259	2,530	448	2,050	4,240	24,200
Concrete products (blocks, bricks, pipe, decorative, etc.) ²	W	W	2	12	W	W
Asphaltic concrete aggregates and other bituminous mixtures	W	W	932	6,880	W	W
Road base and coverings	1,420	10,200	1,100	4,740	2,550	12,500
Road and other stabilization (cement and lime)	--	--	869	3,840	298	2,420
Fill	180	274	406	714	2,890	8,890
Other miscellaneous uses ³	29	129	90	407	273	2,460
Unspecified: ⁴						
Reported	21	170	166	866	3,860	26,600
Estimated	1,410	9,590	2,700	16,900	9,420	54,700
Total ⁵	3,320	22,900	6,710	36,400	23,500	132,000
	Unspecified districts					
	Quantity	Value				
Concrete aggregate (including concrete sand)	--	--				
Concrete products (blocks, bricks, pipe, decorative, etc.) ²	--	--				
Asphaltic concrete aggregates and other bituminous mixtures	--	--				
Road base and coverings	--	--				
Road and other stabilization (cement and lime)	--	--				
Fill	--	--				
Other miscellaneous uses ³	--	--				
Unspecified: ⁴						
Reported	60	363				
Estimated	--	--				
Total ⁵	60	363				

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

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

²Includes plaster and gunite sands.

³Includes filtration, golf course, railroad ballast, roofing granules, and snow and ice control.

⁴Reported and estimated production without a breakdown by end use.

⁵District totals may not add up to the published State total, owing to revisions made after the production of the table and (or) proprietary data being withheld.

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

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3	
	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregate (including concrete sand)	344	2,950	408	1,920	4,110	23,600
Concrete products (blocks, bricks, pipe, decorative, etc.) ²	4	67	--	--	126	841
Asphaltic concrete aggregates and other bituminous mixtures	210	1,400	461	3,090	2,280	15,200
Road base and coverings	1,550	8,970	701	3,170	2,370	14,700
Road and other stabilization (cement and lime)	187	308	4	21	175	1,480
Fill	226	507	486	939	2,780	9,200
Other miscellaneous uses ³	10	47	105	575	344	2,750
Unspecified: ⁴						
Reported	17	139	115	629	3,900	24,200
Estimated	631	3,480	2,180	12,300	8,070	44,500
Total	3,180	17,900	4,460	22,600	24,200	136,000
	Unspecified districts					
Use	Quantity	Value				
Concrete aggregate (including concrete sand)	--	--				
Concrete products (blocks, bricks, pipe, decorative, etc.) ²	--	--				
Asphaltic concrete aggregates and other bituminous mixtures	--	--				
Road base and coverings	--	--				
Road and other stabilization (cement and lime)	--	--				
Fill	--	--				
Other miscellaneous uses ³	--	--				
Unspecified: ⁴						
Reported	119	756				
Estimated	--	--				
Total	119	756				

-- Zero.

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

²Includes plaster and gunite sands.

³Includes filtration, golf course, railroad ballast, roofing granules, and snow and ice control.

⁴Reported and estimated production without a breakdown by end use.