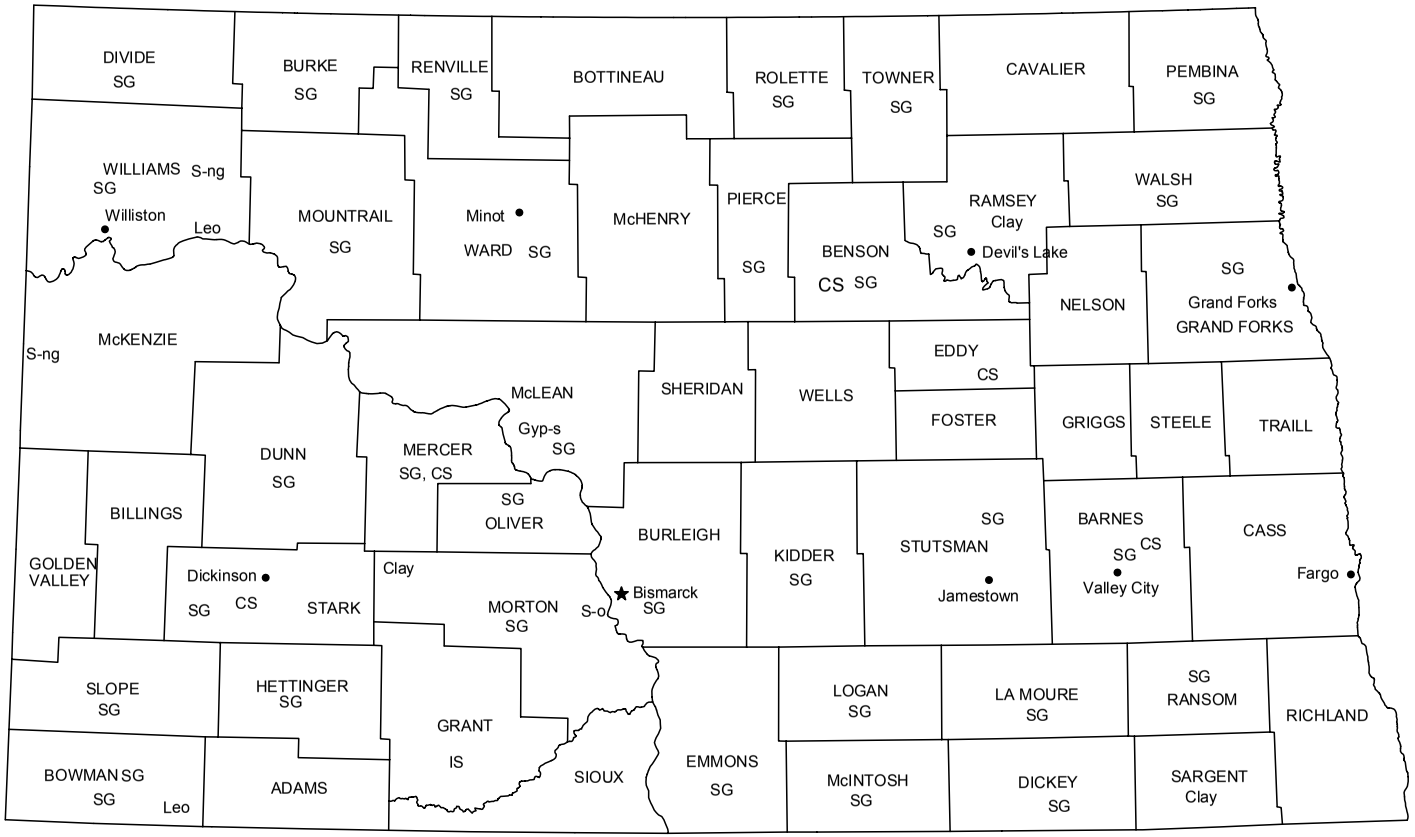
NORTH DAKOTA



LEGEND

- County boundary
- ★ Capital
- • City

MINERAL SYMBOLS

(Major producing areas)

Clay	Common clay
CS	Crushed stone
Gyp-s	Synthetic gypsum
IS	Industrial sand
Leo	Leonardite
S-ng	Sulfur (natural gas)
S-o	Sulfur (oil)
SG	Construction sand and gravel

0 50 Kilometers

Source: North Dakota Geological Survey/U.S. Geological Survey (2003)

The Mineral Industry of North Dakota

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

In 2003, the estimated value[1] of nonfuel mineral production for North Dakota was $37.7 million, based upon preliminary U.S. Geological Survey (USGS) data. This was about a 3% increase from that of 2002[2] and followed a 9.6% increase in 2002 from 2001.

North Dakota's leading nonfuel mineral by value in 2003 continued to be construction sand and gravel. This high-volume low-value commodity accounted for about three-fourths of the State's nonfuel raw mineral production value. Lime was second by value, and crushed stone was third. In 2003, lime, with an increase in production, led the State's increase in value, the commodity's value up more than $2 million. The State's rise in value in 2002 resulted from increases in the production and value of construction sand and gravel, up $1.6 million, an increase in the value of lime, and increases in the production and values of crushed stone as a group (granite, limestone, volcanic cinder, and miscellaneous) (descending order of change). The value of gemstones was up slightly, while the production and values of common clays and industrial sand and gravel were down slightly (table 1).

The following narrative information was provided by the North Dakota Geological Survey[3] (NDGS).

Commodity Review

Industrial Minerals

During 2003, 15 surface mining operators in North Dakota reported information to the State Soil Conservation Committee (SSCC). (The SSCC collects production data by volume, unlike the USGS, which collects data by mass or metric tons produced.) Based on these reports, 92 hectares (ha) was affected. The quantity of minerals mined included about 1.5 million cubic meters (m^3) of sand and gravel, 60,300 m^3 of clay, 14,000 m^3 of scoria, and 28,400 m^3 of crushed stone, totaling slightly more than 1.6 million m^3 of mineral material. From 43 pits ranging in size from more than 0.2 ha to 8.1 ha, a total of 288,000 m^3 of overburden was disturbed.

Common Clays.—Most of the clay mined in North Dakota during 2003 (about 86%, or 52,000 m^3) was mined by the Hebron Brick Co. to produce brick. One-third to one-half of the clay mined for the manufacture of brick was kaolinite. In 2002, more than half of the clay produced in North Dakota was used to construct dikes and raise roads in the flooded area of Devils Lake. In 2003, only 8,370 m^3 of clay was mined for this purpose.

Leonardite.—Leonardite is an oxidized lignite. Currently, Georesources, Inc. of Williston and American Colloid Co. of Scranton were the only leonardite mining operations in North Dakota. The two companies produced a combined total of approximately 72,000 metric tons (t) of leonardite in 2003, about a 60% increase over that of 2002. Leonardite is processed and used as a dispersant and for viscosity control in oil well drilling muds, as a stabilizer for ion-exchange resins in water treatment, and as a soil conditioner.

Other Industrial Minerals.—The coal gasification plant located near Beulah continued to operate an anhydrous ammonia plant. The anhydrous portion of the plant, in operation since spring 1997, has the capacity to produce 1,200 metric tons per day (t/d) of anhydrous ammonia. The plant averaged 448 t/d during 2003. Total production of anhydrous ammonia in 2003 was 161,000 t. In 2003, the gasification plant also produced more than 3.3 million liters (ML) of krypton and xenon; approximately 12.3 ML of phenol; 13.1 ML of cresylic acid; 35.6 ML of naptha; and about 184,000 liters of nitrogen. Additionally, ammonium sulfate production from the stack gas scrubber was 98,500 t, and the plant shipped more than 29.9 billion standard cubic feet of carbon dioxide for use in enhanced oilfield recovery.

Legislation and Government Programs

The SSCC, as designated by the State legislature, continued to administer the Surface Mining Report Law, which required any person conducting surface mining operations for minerals other than coal to comply with the reporting requirements of North Dakota Century Code chapter 38-16. Minerals included under the law remain cement rock, clay, gravel, limestone, manganese, molybdenum, peat, potash, pumicite, salt, sand, scoria, stone, sodium sulfate, zeolite, or other minerals except coal. The

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[1]The 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 2003 USGS mineral production data published in this chapter are preliminary estimates as of July 2004 and are expected to change. Construction sand and gravel and crushed stone estimates are updated periodically. To obtain the most current information, please contact the appropriate USGS mineral commodity specialist. Specialist contact information may be retrieved over the Internet at URL http://minerals.usgs.gov/minerals/contacts/comdir.html; alternatively, specialists' names and telephone numbers may be obtained by calling USGS information at (703) 648-4000 or by calling the USGS Earth Science Information Center at 1-888-ASK-USGS (275-8747). All USGS Mineral Industry Surveys and USGS Minerals Yearbook chapters—mineral commodity, State, and country—also may be retrieved over the Internet at URL http://minerals.usgs.gov/minerals.

[2]Values, percentage calculations, and rankings for 2002 may differ from the Minerals Yearbook, Area Reports: Domestic 2002, Volume II, owing to the revision of preliminary 2002 to final 2002 data. Data for 2003 are preliminary and are expected to change; related rankings also may change.

[3]Edward C. Murphy, Geologist, authored the text of State mineral industry information provided by the North Dakota Geological Survey.

SSCC has the regulatory authority to administer the reporting requirement, while the actual regulatory authority for most of these mining activities rests with the North Dakota Geological Survey. The law requires that any person or company that within 1 calendar year removes 7,650 m^3 (10,000 cubic yards) or more of earthen materials or products (including overburden) affecting 0.2 ha (0.5 acre) or more in combined mining operations must report the particulars of its surface mining activities. Some operators of smaller operations cooperate by voluntarily submitting summary reports to the SSCC, although this is not required to by law. Nevertheless, because not all operations report, the summary of surface mining statistics presented above is a conservative estimate of the amount of nonfuel minerals mined in North Dakota in 2003.

The NDGS maintains a minerals page on its Web site at URL http://www.state.nd.us/ndgs/minerals/minerals.htm, in particular for the nonfuel raw mineral commodities of cement, clay, rock salt, sand and gravel, volcanic ash, and the fuel minerals coal, petroleum, and uranium.

TABLE 1
NONFUEL RAW MINERAL PRODUCTION IN NORTH DAKOTA[1, 2]

(Thousand metric tons and thousand dollars)

Mineral	2001		2002		2003[p]	
	Quantity	Value	Quantity	Value	Quantity	Value
Clays, common	68	W	57	W	57	W
Gemstones	NA	3	NA	4	NA	4
Lime	184	6,360	W	W	W	W
Sand and gravel, construction	10,300	26,300	10,700	27,900	10,600	28,100
Combined values of sand and gravel (industrial), stone [crushed granite, limestone, volcanic cinder, miscellaneous (2002), crushed limestone, volcanic cinder, and miscellaneous (2001, 2003)], and values indicated by symbol W	XX	623	XX	8,540	XX	9,620
Total	XX	33,300	XX	36,500	XX	37,700

[p]Preliminary. NA Not available. W Withheld to avoid disclosing company proprietary data; value included with "Combined values" data. XX Not applicable.
[1]Production as measured by mine shipments, sales, or marketable production (including consumption by producers).
[2]Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 2
NORTH DAKOTA: CRUSHED STONE SOLD OR USED, BY KIND

Kind	2001				2002			
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value
Limestone	1	W	W	$4.11	1	W	W	$4.11
Granite	--	--	--	--	1	W	W	8.82
Volcanic cinder and scoria	2	W	W	3.53	2	W	W	3.55
Miscellaneous stone	3	W	W	7.14	5	W	W	4.34
Total or average	XX	W	W	4.71	XX	W	W	5.29

W Withheld to avoid disclosing company proprietary data. XX Not applicable. --Zero.

TABLE 3
NORTH DAKOTA: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2002, BY USE[1]

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Construction:			
Coarse aggregate (+1 1/2 inch), riprap and jetty stone	W	W	$8.78
Coarse aggregate, graded:			
Bituminous aggregate (coarse)	W	W	5.51
Railroad ballast	W	W	4.03
Fine aggregate (-3/8 inch), stone sand (bituminous mix or seal)	W	W	3.75
Coarse and fine aggregates, graded road base or subbase	W	W	3.79
Other miscellaneous uses and specified uses not listed	4	$16	4.00
Unspecified, reported[2]	119	519	4.37
Total or average	W	W	5.29

W Withheld to avoid disclosing company proprietary data.
[1]Data are rounded to no more than three significant digits, except unit value.
[2]Reported production without a breakdown by end use.

TABLE 4
NORTH DAKOTA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2002,
BY MAJOR USE CATEGORY[1]

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate and concrete products[2]	217	$1,580	$7.27
Asphaltic concrete aggregates and other bituminous mixtures	192	803	4.18
Road base and coverings	2,830	6,170	2.18
Road stabilization (cement)	13	22	1.69
Fill	198	314	1.59
Other miscellaneous uses[3]	37	130	3.51
Unspecified:[4]			
Reported	1	2	2.00
Estimated	7,200	19,000	2.64
Total or average	10,700	27,900	2.62

[1]Data are rounded to no more than three significant digits, except unit value; may not add to totals shown.
[2]Includes plaster and gunite sands.
[3]Includes road and other stabilization (lime).
[4]Reported and estimated production without a breakdown by end use.