

THE MINERAL INDUSTRY OF NORTH CAROLINA

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

In 2000, the estimated value¹ of nonfuel mineral production for North Carolina was \$779 million, based upon preliminary U.S. Geological Survey (USGS) data. This was about a 5% increase from that of 1999² and followed a 1.1% decrease from 1998 to 1999. For the fourth consecutive year, the State was 19th in rank among the 50 States in total nonfuel mineral production value, of which North Carolina accounted for about 2% of the U.S. total.

In 2000, the increased values of crushed stone and construction sand and gravel accounted for about 72% of the State's rise in value. The values of feldspar and industrial sand and gravel showed small increases (descending order of change), and there were decreases in the values of dimension stone, phosphate rock, pyrophyllite, olivine, and mica (table 1). In 1999, increases in the values of common clay, dimension stone, construction and industrial sand and gravel, and gemstones were more than offset by a \$21 million drop in the value of crushed stone and decreases of less than \$5 million each in phosphate rock and lithium minerals values. The significant drop in lithium minerals value was the result of the 1998 closure of FMC Corp., Lithium Division's, spodumene mine and lithium carbonate plant at Cherryville near Bessemer City, NC.

Based upon 2000 USGS estimates of the quantities of minerals produced in the 50 States, North Carolina continued as the leading State in common clay, feldspar, and mica; first of 2 pyrophyllite-producing States; second in gemstones and second of 2 States that produced olivine; third in phosphate rock; seventh in peat and industrial sand and gravel; and eighth in crushed stone. The State decreased to 7th from 6th in kaolin and to 10th from 7th in dimension stone. Metal production in the State, especially that of primary aluminum and raw steel, resulted from the processing of recycled materials or raw materials received from other domestic and foreign sources.

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

All 2000 USGS mineral production data published in this chapter are preliminary estimates as of July 2001 and are expected to change. For some mineral commodities, such as 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. A telephone listing of the specialists may be retrieved over the Internet at URL <http://minerals.usgs.gov/minerals/contacts/comdir.html>, by using MINES FaxBack at (703) 648-4999 from a fax machine with a touch-tone handset (request Document #1000 for a telephone listing of all mineral commodity specialists), or by calling USGS information at (703) 648-4000 for the specialist's name and number. All Mineral Industry Surveys—mineral commodity, State, and country—also may be retrieved over the Internet at URL <http://minerals.usgs.gov/minerals>; facsimile copies may be obtained from MINES FaxBack.

²Values, percentage calculations, and rankings for 1999 may vary from the Minerals Yearbook, Area Reports: Domestic 1999, Volume II, owing to the revision of preliminary 1999 to final 1999 data. Data for 2000 are preliminary and are expected to change; related rankings may also change.

The following narrative information was provided by the North Carolina Geological Survey³ (NCGS). In January 1998, Zemex Corp. acquired Aspect Minerals, Inc., a muscovite mica producer in Spruce Pine, NC, close to Zemex's (The Feldspar Corp.) feldspar plant where byproduct muscovite mica is produced. A capital expenditure program to retrofit and expand these facilities, under Zemex Corp.'s subsidiary, Zemex Industrial Minerals or ZIM, was completed at the end of 1999. Because of a shortage of appropriate feedstock, this plant was placed on care and maintenance effective December 31, 2000.

Zemex began grinding barite in 2000 at its old marble grinding plant in Murphy, NC. The barite is mined and milled by a contractor and trucked to Murphy. The barite comes from the Sweetwater district, TN.

The Kings Mountain Group mica operation, formerly a division of Franklin Industries Inc., was purchased by Oglebay Norton Specialty Minerals, Inc. on December 2, 1999. Oglebay Norton primarily produces dry-ground, wet-ground, micronized, and surface-modified muscovite mica at two operations located in Kings Mountain, NC, and Velarde, NM. The Kings Mountain facility also produces coproduct kaolin, potassium feldspar, feldspathic sand, and industrial sand.

3M Corp. announced plans for a quarry on a 73-hectare tract south of Pittsboro, NC. The company's mining division uses the dark-colored rock to manufacture roofing granules, which in turn are used in the production of shingles. Core drilling continued into late 1999, and some additional core drilling was completed in early 2000. Construction of a roofing plant was estimated to cost about \$50 million. The facility should be completed by 2002. 3M was eligible for job creation, worker training, and investment tax credits as part of State incentives to attract industries. The roofing granules will be colored in neutral shades including blacks, blues, browns, and greens.

General Shale Products Corp., U.S. subsidiary of the Wienerberger Group (Vienna, Austria), purchased the Cherokee Sanford Group LLC. Cherokee Sanford holds a share of 5% in the U.S. brick market and is the sixth largest brick producer in the United States. The company is a market leader in the growth markets of North Carolina and Maryland and operates five facing brick plants. The transaction was completed February 10, 2000, for a price of \$81 million.

Vulcan Materials Co. quarries were recognized for beautification efforts in 2000. Six of Vulcan's quarries in North Carolina and four in Virginia received awards for their beautification efforts from the National Stone, Sand, and Gravel Association (NSSGA). The Clear Creek and Morganton quarries in North Carolina were recognized as Showplace Award winners as part of the NSSGA's About Face awards program. The Boone, Cabarrus, Elkin, and Gold Hill quarries in North Carolina were recognized for maintaining their status as

³Jeffrey Reid, Senior Geologist for Minerals and Geographic Information Systems, authored the text of mineral industry information submitted by the North Carolina Geological Survey.

“showplace” quarries. The Showplace Award recognizes the highest level of achievement in quarry beautification.

A large emerald unearthed 2 years ago near Statesville failed to sell at a New York auction on December 7, 2000. The 18.8-carat “Carolina Queen” is considered by many gem experts to be a rare combination of size and quality for a gem produced in the United States. The stone drew a high bid of \$460,000, which auction officials said was below the minimum they had set for the stone. The stone was cut from a golf-ball-sized, 72-carat uncut crystal from an abandoned mine site near Hiddenite, in Alexander County, NC, in 1998. The same crystal had earlier produced another huge emerald called the “Carolina Prince,” a 7.85-carat stone that was sold to a private buyer in 1999 for \$500,000.

Subsidence (the sinking of land) in a residential area over abandoned underground workings at the Phoenix Gold Mine, Cabarrus County, occurred during February 2000. Subsidence was rapid in the case of the Phoenix Mine, where the ground collapsed over a period of less than 2 hours. The Phoenix Mine last produced gold about 1906.

Government Programs

The NCGS began assisting the Land Quality Section with mine permit reviews (new and renewed) in October 2000. The mine permit applications, other forms, and contact information are at the Land Quality Section’s Internet web site at URL <http://dlr.enr.state.nc.us/mining.html>. A list of permitted active and inactive mines is at the NCGS’ Internet web site at URL <http://www.geology.enr.state.nc.us> (link through the “What’s New!” page); updated information in the list is available from the Land Quality Section, Division of Land Resources, 919-733-4574.

Geologic mapping continued with Federal matching funding from the STATEMAP program, a component of the National Cooperative Geologic Mapping Program (NCGMP). The NCGMP distributes funding through three programs: (1) FEDMAP for the USGS, (2) STATEMAP for participating State geological surveys, and (3) EDMAP for training future geologic cartographers at universities and colleges. The NCGS has received STATEMAP funding through a competitive grant process since the program’s inception in 1992 and has ranked as 1 of the top 10 States for funding almost every year since then. To date, the NCGS has received more than \$985,000 during the past 9 years. Because the STATEMAP program requires that

every Federal dollar be matched by a State dollar, almost \$2 million has been allocated to the NCGS for geologic mapping in this program.

The NCGS has concentrated its 1:24,000-scale detailed mapping in three areas: the Asheville, Henderson, and Raleigh 30x60-minute quadrangles. These areas are some of the most populous and rapidly growing regions of the State. This rapid growth has accentuated many geologic-related problems including land-use and infrastructure planning; mineral resource identification—particularly construction aggregates; and environmental assessment and planning related to highway construction, waste-disposal siting, and ground water conservation and development. An adequate understanding of the geology and mineral resources of these regions is needed to help resolve these problems.

The National Geologic Map Database (NGMD) is a component of STATEMAP. Compilation of the North Carolina portion of this database has resumed. Additional information about the NGMD is at the Internet web site at URL <http://nccmp.usgs.gov>.

Digital geologic map data layers continue to be produced through STATEMAP. Digital aeromagnetic and airborne Bouguer gravity data layers are being developed. The 1985 Geologic Map of North Carolina was scanned and is on the NCGS’ Internet web site at URL <http://www.geology.enr.state.nc.us> (follow links at the “What’s New!” page). Digital data layers for the 1985 Geologic Map of North Carolina are in preparation.

A North Carolina aggregates database is in preparation. Data that are being compiled include the geologic map unit from the 1985 Geologic Map of North Carolina, as well as physical and chemical test results from the North Carolina Department of Transportation Materials Testing Laboratory. These data are to be compiled in a digital data layer.

New exhibits at the Museum of North Carolina Minerals will introduce visitors and students to regional geology and to the mineral resources of the region and State. The museum, at Milepost 331 on the Blue Ridge Parkway in Mitchell County, is slated to receive a new wing addition and multisensory interactive exhibits in 2002. In addition, the National Park Service, in cooperation with the Blue Ridge Parkway Foundation, plans to provide curriculum-based education outreach services as part of its “Parks As Classrooms” program. There is no admission to the museum, and the Ranger-led education programs are free.

TABLE 1
NONFUEL RAW MINERAL PRODUCTION IN NORTH CAROLINA 1/ 2/

(Thousand metric tons and thousand dollars unless otherwise specified)

Mineral	1998		1999		2000 p/	
	Quantity	Value	Quantity	Value	Quantity	Value
Clays, common	2,380	11,600	2,430	18,700	2,430	18,700
Feldspar metric tons	381,000	16,800	381,000	16,100	394,000	16,800
Gemstones	NA	968	NA	2,860	NA	W
Sand and gravel:						
Construction	10,900	58,000	11,600	62,900	12,300	69,000
Industrial	1,440	24,100	1,470	27,300	1,670	27,500
Stone:						
Crushed	69,700	480,000	67,000	459,000	70,000	491,000
Dimension metric tons	26,200	12,500	54,700	17,700	44,500	16,900
Combined values of clays (kaolin), lithium minerals (1998), mica (crude), olivine, peat, phosphate rock, pyrophyllite, and value indicated by symbol W	XX	146,000	XX	138,000	XX	139,000
Total	XX	750,000	XX	742,000	XX	779,000

p/ Preliminary. NA Not available. W Withheld to avoid disclosing company proprietary data; values 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 CAROLINA: CRUSHED STONE SOLD OR USED, BY KIND 1/

Kind	1998				1999			
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value
Limestone	11	6,310	\$41,700	\$6.60	10	6,070	\$40,700	\$6.70
Dolomite	1	279	1,870	6.69	1	354	2,360	6.65
Granite	76	52,800	365,000	6.91	77	50,000	343,000	6.86
Calcareous marl	1	W	W	4.37	1	W	W	4.37
Quartzite	2	W	W	7.93	2	W	W	8.05
Traprock	7	6,180	43,400	7.02	8	5,810	41,600	7.16
Slate	3	W	W	6.75	3	W	W	6.80
Volcanic cinder and scoria	1	W	W	6.62	1	W	W	6.61
Miscellaneous stone	2	W	W	6.62	3	1,050	5,540	5.27
Total or average	XX	69,700	480,000	6.89	XX	67,000	459,000	6.85

W Withheld to avoid disclosing company proprietary data; included in "Total." XX Not applicable.

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

TABLE 3
NORTH CAROLINA: CRUSHED STONE SOLD OR USED BY PRODUCERS
IN 1999, BY USE 1/ 2/

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Construction:			
Coarse aggregate (+1 1/2 inch):			
Macadam	W	W	\$3.99
Riprap and jetty stone	501	\$5,500	10.97
Filter stone	W	W	10.74
Other coarse aggregate	269	2,500	9.29
Coarse aggregate, graded:			
Concrete aggregate, coarse	1,780	17,100	9.59
Bituminous aggregate, coarse	1,690	16,000	9.45
Bituminous surface-treatment aggregate	W	W	9.05
Railroad ballast	1,230	6,650	5.40
Other graded coarse aggregate	4,270	35,900	8.40
Fine aggregate (-3/8 inch):			
Stone sand, concrete	227	1,590	7.00
Stone sand, bituminous mix or seal	W	W	7.56
Screening, undesignated	1,320	8,890	6.76
Other fine aggregate	1,120	8,410	7.55
Coarse and fine aggregates:			
Graded road base or subbase	6,070	41,100	6.77
Unpaved road surfacing	206	1,490	7.22
Terrazzo and exposed aggregate	W	W	21.95
Crusher run or fill or waste	567	3,390	5.98
Other coarse and fine aggregates	3,040	15,000	4.93
Other construction materials	(3/)	(3/)	6.79
Agricultural:			
Agricultural limestone	7	40	5.71
Poultry grit and mineral food	W	W	3.40
Other agricultural uses	9	31	3.44
Special, roofing granules	(3/)	(3/)	3.40
Other miscellaneous uses, lightweight aggregate (slate)	(3/)	(3/)	7.37
Unspecified: 4/			
Reported	41,700	276,000	6.61
Estimated	2,330	14,800	6.33
Total or average	67,000	459,000	6.85

W Withheld to avoid disclosing company proprietary data; included with "Other."

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

2/ Includes calcareous marl, dolomite, granite, limestone, miscellaneous stone, quartzite, slate, traprock, and volcanic cinder and scoria.

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

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

TABLE 4
NORTH CAROLINA: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 1999,
BY USE AND DISTRICT 1/

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3	
	Quantity	Value	Quantity	Value	Quantity	Value
Construction:						
Coarse aggregate (+1 1/2 inch) 2/	W	W	453	4,720	W	W
Coarse aggregate, graded 3/	W	W	5,370	48,200	W	W
Fine aggregate (-3/8 inch) 4/	W	W	1,570	10,600	W	W
Coarse and fine aggregate 5/	2,400	15,200	6,240	39,900	1,880	10,600
Other construction materials	--	--	W	W	--	--
Agricultural 6/	W	W	W	W	--	--
Unspecified: 7/						
Reported	3,290	22,100	20,100	133,000	18,100	120,000
Estimated	1,300	7,900	110	720	910	6,200
Total	10,200	70,400	33,900	237,000	22,900 8/	151,000 8/

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

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

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

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

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

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

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

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

8/ Includes production from unspecified districts to avoid disclosing company proprietary data.

TABLE 5
NORTH CAROLINA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 1999,
BY MAJOR USE CATEGORY 1/

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate (including concrete sand)	2,570	\$10,600	\$4.14
Plaster and gunite sands	870	3,700	4.25
Concrete products (blocks, bricks, pipe, decorative, etc.)	576	2,730	4.74
Asphaltic concrete aggregates and other bituminous mixtures	1,050	4,600	4.37
Road base and coverings 2/	501	2,820	5.63
Fill	1,070	4,200	3.93
Railroad ballast	88	576	6.55
Other miscellaneous uses 3/	32	178	5.56
Unspecified: 4/			
Reported	3,020	24,900	8.24
Estimated	1,800	8,600	4.76
Total or average	11,600	62,900	5.43

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

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

3/ Includes ice and snow control.

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

TABLE 6
NORTH CAROLINA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 1999,
BY USE AND DISTRICT 1/

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3	
	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregate and concrete products 2/	W	W	W	W	3,710	15,900
Asphaltic concrete aggregate and road base materials 3/	W	W	W	W	554	2,150
Fill	21	117	289	797	759	3,280
Railroad ballast	88	576	--	--	--	--
Other miscellaneous uses 4/	670	4,020	660	2,540	2	7
Unspecified: 5/						
Reported	49	80	2,870	24,200	96	523
Estimated	170	950	560	2,400	1,100	5,200
Total	993	5,740	4,380	30,000	6,200	27,100

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

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

2/ Includes gunite and plaster sands.

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

4/ Includes ice and snow control.

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