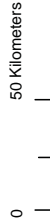
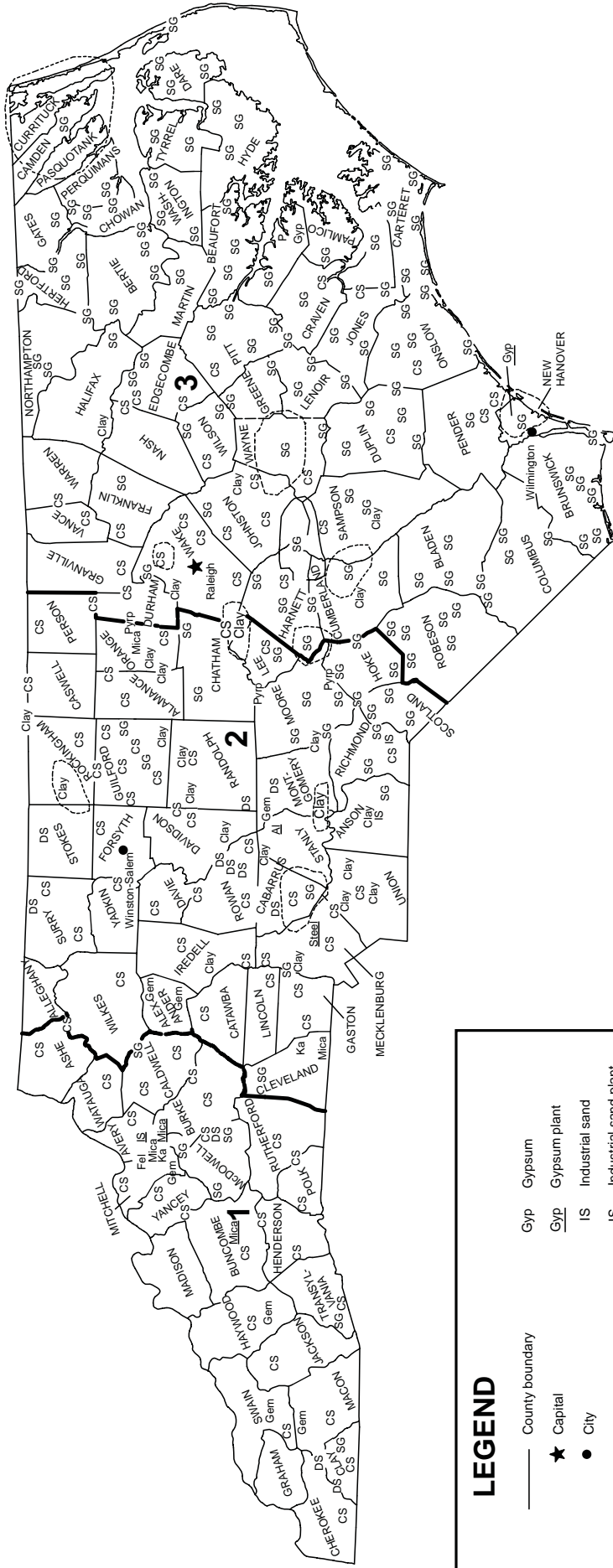




2005 Minerals Yearbook

NORTH CAROLINA

NORTH CAROLINA



LEGEND

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

MINERAL SYMBOLS (Major producing areas)

- Al Aluminum plant
- Clay Common clay
- CS Crushed stone
- DS Dimension stone
- Fel Feldspar
- Gem Gemstones
- Gyp Gypsum
- Gyp Gypsum plant
- IS Industrial sand
- IS Industrial sand plant
- Ka Kaolin
- Mica Mica
- Mica Mica plant
- P Phosphate rock
- Pyp Pyrophyllite
- SG Construction sand and gravel
- Steel Steel plant
- Concentration of mineral operations

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 2005, North Carolina's nonfuel raw mineral production was valued¹ at \$792 million,² based upon annual U.S. Geological Survey (USGS) data. This was a 1.6% decrease from that of 2004³ and followed a 9.7% increase from 2003 to 2004. The State was 25th in rank³ (21st in 2004) among the 50 States in total nonfuel mineral production value, of which North Carolina accounted for nearly 1.5% of the U.S. total.

Crushed stone remained North Carolina's leading nonfuel raw mineral in 2005, accounting for about 81% of the State's total value of nonfuel raw mineral production (excluding that of phosphate rock). It was followed by phosphate rock, construction sand and gravel, industrial sand and gravel, feldspar, dimension stone, common clays, and mica. The largest increases in value for the year were in crushed stone, up \$89 million, and in phosphate rock. Smaller yet significant increases in value also took place in common clays, construction sand and gravel, mica, and pyrophyllite. Although industrial sand and gravel production was down about 29%, its value of production was up slightly. The largest decreases in value were those of feldspar and dimension stone, down \$1.5 million and \$1.2 million, respectively (table 1).

In 2005, North Carolina continued to be the only State that produced pyrophyllite, to lead the Nation in the quantities of feldspar and mica produced, to be 9th in crushed stone production and 10th in dimension stone, and to be 11th in gemstones (based upon value). While the State rose to 2d from 3d of four phosphate rock-producing States, it decreased to 3d from 1st in common clays, and to 10th from 7th in industrial sand and gravel. Additionally, significant quantities of construction sand and gravel were produced in North Carolina. 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 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 2005 USGS mineral production data published in this chapter are those available as of December 2006. All USGS Mineral Industry Surveys and USGS Minerals Yearbook chapters—mineral commodity, State, and country—can be retrieved over the Internet at URL <http://minerals.usgs.gov/minerals>.

²The State's actual annual total value for 2005 is significantly higher than \$792 million, also listed as such in table 1 from which specific data for phosphate rock and pyrophyllite (2005) were withheld (company proprietary data).

³If computed while also withholding "Combined values" from 2004 as well, instead of a decrease, the State would have a more than 10% increase in value in 2005 from 2004; this better represents the true change in value for the State's nonfuel mineral industry from 2004 to 2005. Inclusion of the withheld 2005 combined value data would also change the State's overall ranking for 2005 to 22d or 21st.

The following narrative information was provided by the North Carolina Geological Survey⁴ (NCGS).

Commodity Review

Industrial Minerals

Clays.—Resco Products Inc. announced the successful installation and startup of a roller hearth kiln in the company's Greensboro, NC, facility. Resco manufactures brick of several types and classes for a variety of applications including high-alumina brick containing greater than 45% alumina (Resco Products Inc., 2005§⁵).

Crushed Stone.—Martin Marietta Materials, Inc., based in Raleigh, continued with its multiyear investment project of installing new state-of-the-art technology to run its rock-crushing facilities for its quarries. The Sunrock Group's Butner quarry in Granville County switched from a wet to a dry fines-recovery process resulting in a significant decrease in handling fines and in the production (from crushed stone) of manufactured sand for the company's asphalt plant and high fines density sand for its concrete plant (Kuhar, 2005§).

Mica.—Oglebay Norton Co. announced on April 6, 2005, that its Oglebay North Specialty Minerals, Inc. subsidiary completed the sale of its Kings Mountain mica operation to King's Mountain Mining LLC, an affiliate of Zemex Corp., for \$15,000,000 (Oglebay Norton Company, 2005§).

Environmental Issues, Mine Safety, and Technology Achievements

The Federal Clean Air Act of 2002 required utility companies burning high-sulfur coal and releasing sulfur dioxide into the atmosphere to reduce their sulfur dioxide emissions. As a result, utility companies have formed partnerships with wallboard companies to convert sulfur dioxide through the flue-gas desulfurization process into synthetic gypsum, which then in turn can be used in the manufacture of wallboard. In the past, that synthetic gypsum would have been sent to landfills as a combustion byproduct from the burning of coal. North Carolina's two major electric utilities, Progress Energy, Inc. and Duke Energy Corp., planned to sell byproduct gypsum rather than sending the materials to a landfill.

In early December, Progress Energy officials and State and local leaders joined in a celebration of the State's first new scrubber (flue-gas desulfurization unit) to begin operation

⁴Jeffrey C. Reid, Senior Geologist, Minerals and Geographic Information Systems, authored the text for the State mineral industry information provided by the North Carolina Geological Survey.

⁵References that include a section mark (§) are included in the Internet References Cited section.

under North Carolina's Clean Smokestacks Act (passed by the North Carolina General Assembly in 2002); the Asheville plant scrubber began operating on November 17 (Progress Energy Inc., 2005§).

National Gypsum Co. announced on August 3, 2005, plans to invest up to \$125 million to construct a new high-speed wallboard plant west of Charlotte in Mount Holly. The plant will create 100 direct jobs and 100 indirect jobs for Gaston County (National Gypsum Company, 2005§).

PCS Phosphate Co.'s Aurora operations reached a milestone of 'One Million Safe Hours' worked on July 27, 2005. Also, PCS employees actively participated in the Science Olympiad by beginning an educational outreach program, "I Dig Aurora," in collaboration with the Aurora Fossil Museum, in Aurora. [The Science Olympiad is an international nonprofit organization devoted to improving the quality of science education, increasing student interest in science, and providing recognition for outstanding achievement in science education by both students and teachers (Science Olympiad, 2007§).] Additional information regarding the Aurora Fossil Museum may be found on the Internet at URL <http://www.aurorafossilmuseum.com>.

Legislation and Government Programs

A listing of permitted active and inactive mines in North Carolina (as of December 31, 2005) was prepared by the NCGS and was made available on the Internet (North Carolina Geological Survey, 2006§).

The NCGS in collaboration with the minerals industry and the Minerals Research Laboratory of North Carolina convened the 42nd Forum on the Geology of Industrial Minerals in Asheville on May 7-13, 2006. The Forum proceedings were electronically published by the NCGS as Information Circular 34 in a compact disk and was available for purchase by way of the Internet (Reid, 2006).

The Minerals Research Laboratory (MRL), which is in Asheville, is a part of the North Carolina State University's Industrial Extension Service. The main research focus of the MRL is the beneficiation of industrial minerals; it is fairly unique in that it partners with academia, government, and industry in conducting effective research. Although most of its research efforts are conducted for corporate sponsors, public service projects also are undertaken. The MRL's facility is equipped with mineral processing equipment and an analytical support facility for mineral characterization. As part of a Land Grant Institution, technical assistance and service to the public is also part of the MRL mission. The MRL continued efforts to communicate to the general public its purpose and information about its activities by establishing an educational outreach program known as "Down to Earth." Also, at its facilities in Asheville, the MRL sponsors professional seminars, which count toward continuing professional competency requirements for professional engineers. The MRL library contains some of the most extensive reference sources for mineral processing information in the southeastern United States, which also is available for public use. Additional information regarding the

MRL may be found at the lab's Web site, URL <http://www.engr.ncsu.edu/mrl/>.

Recent MRL work includes projects on lightweight aggregate and providing assistance to the NCGS studies regarding garnet, high purity quartz, glass sand, and frac sand products. Results of these studies are included in the aforementioned NCGS Information Circular 34. The MRL has conducted diverse beneficiation studies for companies located in North Carolina, as well as similar studies for new mines worldwide, including studies to improve the quality and efficiency of existing products. The MRL director traveled to various States to assist mining companies at their sites and to advise them of potential opportunities learned of as a result of the lab's collaborative research studies.

The North Carolina General Assembly funded a 3-year Landslide Hazard Mapping Program with \$1.3 million from the State's Hurricane Recovery Act of 2005. The NCGS is implementing this program. The Act provided disaster assistance to people, businesses, and public agencies that suffered damage from one or more of the six hurricanes that struck North Carolina in 2004. On September 16, 2004, heavy rains from Hurricane Ivan triggered a landslide that carried massive amounts of debris more than 3 kilometers, killing five people and destroying 16 homes in the Peeks Creek community of Macon County, NC. A week earlier, Hurricane Ivan and Hurricane Francis started more than 140 other landslides throughout western North Carolina (Office of the Governor, 2006§).

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TABLE 1
NONFUEL RAW MINERAL PRODUCTION IN NORTH CAROLINA^{1,2}

(Thousand metric tons and thousand dollars)

Mineral	2003		2004		2005	
	Quantity	Value	Quantity	Value	Quantity	Value
Clays:						
Common	2,190	10,900	2,260	12,900	2,180	13,900
Kaolin	W	4,500	34	764	27	593
Feldspar	362	18,900	351	20,500	351	19,000
Gemstones	NA	279	NA	280	NA	280
Mica, crude	39	9,580	40	9,600	39	10,200
Sand and gravel:						
Construction	10,500	55,600	11,500	59,700	12,000	63,900
Industrial	1,530	26,700	1,630	29,000	1,150	29,200
Stone:						
Crushed	67,100	505,000	72,300	549,000 ^r	74,300	638,000
Dimension	47	18,700	43	18,200	39	17,000
Combined values of olivine (2003-04), phosphate rock, pyrophyllite (crude)	XX	84,500	XX	105,000	XX	(3)
Total	XX	734,000	XX	805,000	XX	792,000

^rRevised. NA Not available. W Withheld to avoid disclosing company proprietary 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.

³Value excluded to avoid disclosing company proprietary data.

TABLE 2
NORTH CAROLINA: CRUSHED STONE SOLD OR USED, BY KIND¹

Kind	2004			2005		
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Number of quarries	Quantity (thousand metric tons)	Value (thousands)
Limestone	11	6,670	\$48,800	11	6,790	\$49,700
Dolomite	1	W	W	1	W	W
Calcareous marl	1	W	W	--	--	--
Granite	76 ^r	52,500 ^r	400,000 ^r	74	53,900	472,000
Traprock	7	7,280	53,500	7	7,690	62,400
Quartzite	2	W	W	2	W	W
Slate	2	1,320	9,460	2	1,350	9,700
Miscellaneous stone	4 ^r	3,270 ^r	25,600 ^r	4	3,460	33,500
Total	XX	72,300	549,000 ^r	XX	74,300	638,000

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

¹Data 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 2005, BY USE¹

(Thousand metric tons and thousand dollars)

Use	Quantity	Value
Construction:		
Coarse aggregate (+1½ inch):		
Macadam	W	W
Riprap and jetty stone	770	10,900
Filter stone	173	2,420
Other coarse aggregates	353	1,760
Total	1,300	15,100
Coarse aggregate, graded:		
Concrete aggregate, coarse	3,590	45,200
Bituminous aggregate, coarse	(2)	(2)
Bituminous surface-treatment aggregate	(2)	(2)
Railroad ballast	1,300	9,080
Other graded coarse aggregates	3,220	36,600
Total	11,100	125,000
Fine aggregate (-¾ inch):		
Stone sand, concrete	588	5,600
Stone sand, bituminous mix or seal	(3)	(3)
Screening, undesignated	2,210	18,000
Other fine aggregates	1,020	9,200
Total	3,820	32,900
Coarse and fine aggregates:		
Graded road base or subbase	7,050	63,300
Unpaved road surfacing	150	2,020
Terrazzo and exposed aggregate	(2)	(2)
Crusher run or fill or waste	924	7,770
Roofing granules	(2)	(2)
Other coarse and fine aggregates	2,210	16,700
Total	10,400	90,100
Other construction materials	(4)	(4)
Agricultural, poultry grit and mineral food	(4)	(4)
Unspecified: ⁵		
Reported	42,700	327,000
Estimated	4,200	42,000
Total	46,900	369,000
Grand total	74,300	638,000

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

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

²Withheld to avoid disclosing company proprietary data; included in "Total."

³Withheld to avoid disclosing company proprietary data; included with "Other fine aggregates."

⁴Withheld to avoid disclosing company proprietary data; included in "Grand total."

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

TABLE 4
NORTH CAROLINA: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2005, 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	W	W
Coarse aggregate, graded ³	W	W	W	W	W	W
Fine aggregate (-¾ inch) ⁴	W	W	W	W	W	W
Coarse and fine aggregate ⁵	2,370	21,700	W	W	W	W
Other construction materials	--	--	W	W	--	--
Agricultural ⁶	--	--	W	W	W	W
Unspecified: ⁷						
Reported	4,120	36,700	21,600	148,000	17,000	142,000
Estimated	2,600	26,000	174	1,700	1,400	14,000
Total	13,200	127,000	37,200	296,000	23,900	215,000

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

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

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

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

⁶Includes poultry grit and mineral food.

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

TABLE 5
NORTH CAROLINA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2005,
BY MAJOR USE CATEGORY¹

Use	Quantity	Value (thousands)	Unit value
	(thousand metric tons)		
Concrete aggregate (including concrete sand)	4,810	\$24,100	\$5.01
Plaster and gunite sands	108	842	7.80
Concrete products (blocks, bricks, pipe, decorative, etc.)	358	2,750	7.69
Asphaltic concrete aggregates and other bituminous mixtures	474	2,590	5.47
Road base and coverings ²	460	3,330	7.24
Fill	2,610	9,360	3.59
Snow and ice control	18	120	6.67
Other miscellaneous uses	216	3,630	16.81
Unspecified: ³			
Reported	1,180	7,620	6.45
Estimated	1,700	9,600	5.51
Total or average	12,000	63,900	5.34

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

²Includes road and other stabilization (lime).

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

TABLE 6
 NORTH CAROLINA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2005,
 BY USE AND DISTRICT^{1,2}

(Thousand metric tons and thousand dollars)

Use	Districts 1 and 2		District 3		Unspecified districts	
	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregates and concrete products ³	2,330	12,900	2,930	14,600	22	255
Asphaltic concrete aggregates and road base materials ⁴	719	5,240	215	688	--	--
Fill	230	676	2,320	8,360	61	325
Other miscellaneous uses ⁵	204	3,520	30	234	--	--
Unspecified: ⁶						
Reported	973	6,020	208	1,610	--	--
Estimated	100	600	1,600	9,000	--	--
Total	4,570	29,000	7,320	34,400	83	580

-- Zero.

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

²Districts 1 and 2 are combined to avoid disclosing company proprietary data.

³Includes plaster and gunite sands.

⁴Includes road and other stabilization (lime).

⁵Includes snow and ice control.

⁶Reported and estimated production without a breakdown by end use.