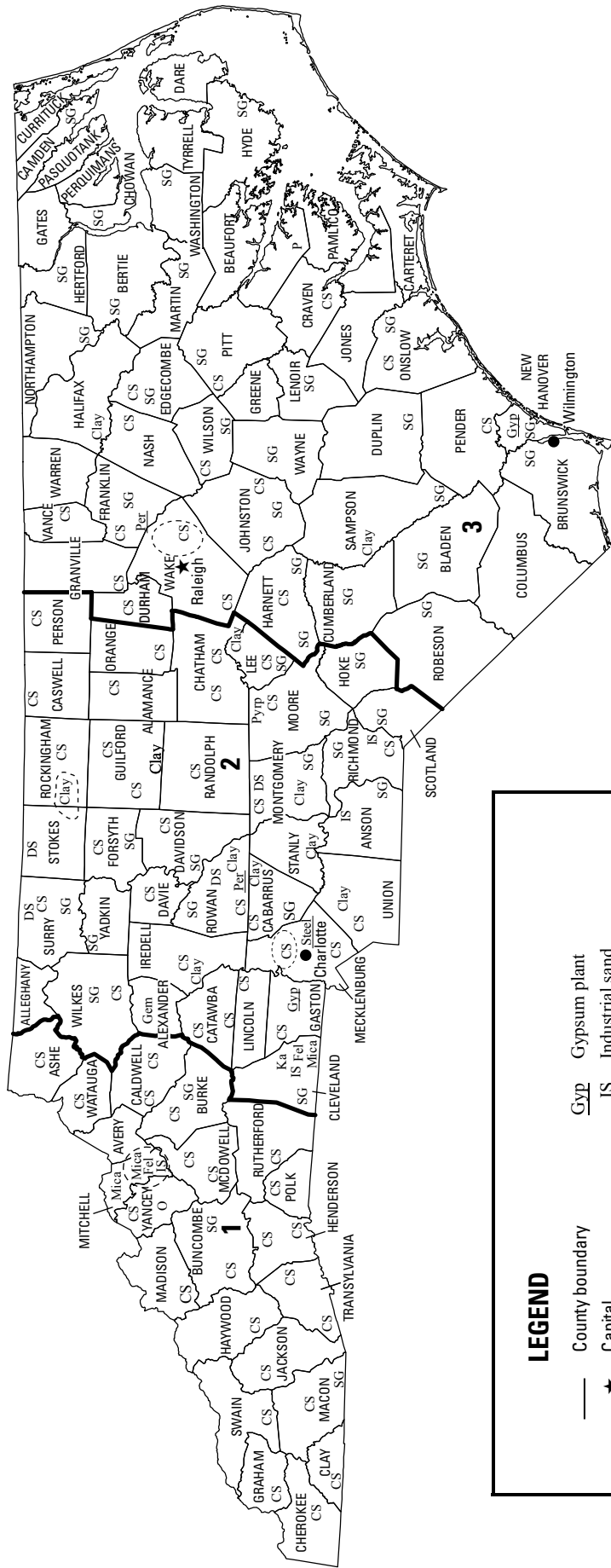




2009 Minerals Yearbook

NORTH CAROLINA

NORTH CAROLINA



LEGEND

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

MINERAL SYMBOLS (Principal producing areas)

Clay	CS	Common clay
Crushed stone	DS	Crushed stone
Dimension stone	Fel	Feldspar
Gemstones	Gem	Gemstones
Gypsum plant	Gyp	Gypsum plant
Industrial sand	IS	Industrial sand
Kaolin	Ka	Kaolin
Mica	Mica	Mica
Perlite plant	Per	Perlite plant
Phosphate rock	P	Phosphate rock
Olivine	O	Olivine
Pyrophyllite	Pyrp	Pyrophyllite
Construction sand and gravel	SG	Construction sand and gravel
Steel plant	Steel	Steel plant
Concentration of mineral operations	(Dashed circle)	Concentration of mineral operations

Source: North Carolina Geological Survey/U.S. Geological Survey (2009).

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 2009, North Carolina's nonfuel raw mineral production was valued at \$846 million, based upon annual U.S. Geological Survey (USGS) data. This was a \$244 million, or 22%, decrease from the State's total nonfuel mineral production value of \$1.09 billion in 2008, which was down by \$80 million, or almost 7%, from that of 2007. In 2009, North Carolina accounted for 1.4% of the U.S. total nonfuel mineral production value, and the State decreased in rank among the 50 States to 24th from 23d in 2008, which in turn was down from 21st in 2007.

North Carolina's leading nonfuel mineral commodity by value continued to be crushed stone, accounting for 69% of the State's total nonfuel mineral production value in 2009, down from almost 74% of the State's total production value in 2008. It was followed by (in descending order of value), phosphate rock, construction sand and gravel, industrial sand and gravel, dimension stone, and feldspar. Combined, these six commodities accounted for almost 98% of North Carolina's total nonfuel mineral production value.

The only mineral commodity to show an increase in production value in 2009 was phosphate rock, which increased significantly in value, slightly offsetting the overall decrease in North Carolina's mineral industry. The mineral commodity rose by more than 9.4% in value in 2009 (actual value withheld—company proprietary data). The largest increase in unit value took place with crude mica, increasing by about 33%, and the largest decrease in unit value took place with common clays, falling by 41%.

The largest decreases in value were in crushed stone, down from \$806 million in 2008 to \$584 million in 2009, or \$222 million; construction sand and gravel, down by almost \$16 million; common clay, down by \$7.9 million; and dimension stone, down by \$2.9 million. The decline in U.S. construction markets from 2007–08 was responsible for the significant declines in the production values of these four industrial mineral commodities. The largest decrease in total production took place in crushed stone, which was down by 19 million metric tons (Mt) to 38.5 Mt in 2009 from 57.5 Mt in 2008, or 33%, which in turn was down from 70.2 Mt in 2007, or 18%.

North Carolina continued to be the only andalusite producer in the United States and ranked first in the amount of feldspar produced among the seven feldspar-producing States—its rank since at least 1994. Since 2004, North Carolina had been the only pyrophyllite producer in the United States; however, in 2009, California resumed production of pyrophyllite. North Carolina continued to be the leading pyrophyllite producer in 2009. For the third consecutive year, the State continued to rank second of two olivine-producing States, behind Washington. The State continued to rank second of four phosphate rock-producing States since 2005, third in the production of

common clays since 2007, and eighth in kaolin production. North Carolina dropped in rank from 6th to 8th in industrial sand and gravel, from 7th to 8th in dimension stone, and from 7th to 13th in crushed stone production.

The following narrative information was provided by the North Carolina Geological Survey (NCGS), a State government agency within the Division of Land Resources (DLR) of the North Carolina Department of Environment and Natural Resources (NCDENR).

Commodity Review

Industrial Minerals

Gemstones, Emeralds.—No large emeralds were reported in 2009. However, low-quality emeralds continue to be found in the Hiddenite District, Alexander County.

Feldspar and Quartz.—Plans remained in place to rebuild Unimin Corporation's Spruce Pine quartz plant after it suffered substantial fire damage in late November 2008.

Phosphate Rock.—In June, 2009, after nearly 9 years of effort, Potash Corp. of Saskatchewan Inc. (Saskatoon, Saskatchewan, Canada) received a Clean Water Act (CWA) Section 404 permit from the U.S. Army Corps of Engineers (USACE), authorizing recovery of phosphate resources adjacent to its current mining operation in Aurora, Beaufort County. The permit provides continued mining operation for at least 35 years (U.S. Army Corps of Engineers, 2009, p. 52).

The official permit application was submitted to the USACE in November 2000. The CWA established requirements for activities that may affect water quality, wetlands, or streams. A majority of the land in eastern North Carolina was historically wetlands, including the area encompassed by the permit application. Federal and State agencies, led by USACE and NCDENR—Division of Water Quality (DWQ), as well as nongovernmental organizations, including the Pamlico-Tar River Foundation (PTRF) and Environmental Defense (ED), participated in the review team, meeting with Potash Corp. representatives on more than 20 occasions, beginning in 2001.

In addition to the Section 404 permit, other required Federal authorizations included a Section 401 Water Quality certification and National Pollutant Discharge Elimination System permit from the U.S. Environmental Protection Agency. Required North Carolina permits included a Coastal Zone Consistency Concurrence, as required by the Federal Coastal Zone Management Act (but granted by the North Carolina Division of Coastal Management), a Coastal Area Management Act permit, mining permit, Erosion and Sediment Control Plan approval, stream-buffer rule permit, storm-water permit, and a Capacity Use Area permit. A Special Use permit from the town of Aurora was also required.

Metals

Lithium.—North Arrow Minerals Inc. (Vancouver, British Columbia, Canada) drilled 12 holes, totaling approximately 1,240 meters (approximately 4,000 feet) of coring, at its Beaverdam project in North Carolina's tin-spodumene belt, a historically important lithium-producing area. The project was located north and along the strike of the Kings Mountain Mine, owned by Chemetall Foote Corp. (a subsidiary of Chemetall, which was owned by Rockwood Holdings Inc., Princeton, NJ), and the Hallman-Beam Mine, owned by FMC Lithium (a subsidiary of FMC Corp.). These two lithium mines began production in the 1950s. A summary of the 2009 drilling data was available on North Arrow Minerals' Web site and the company planned additional diamond drilling for the spring and summer of 2010 (North Arrow Minerals Inc., 2009).

Government Activities and Programs

State Government

Mine Permitting.—In support of the Land Quality Section (LQS) of DLR's Mining Program, the NCGS continued to review applications to open, modify, renew, or release mines and mining permits in 2009. The permitted active and inactive mine inventory is continually updated with the revised listings posted in June and December on the LQS Web site at portal.ncdenr.org/web/lr/land-quality.

Natural Gas Evaluation.—NCGS staff continued to study and to evaluate potential natural gas resources in the State's Mesozoic rift basins (Reid, 2009). Particular emphasis was placed on the Sanford subbasin of the Deep River Basin, which is primarily located in Lee and Chatham Counties, approximately 56 km southwest from Raleigh (Reid and Taylor, 2009a, b).

The North Carolina Geological Survey.—Geologic mapping continued in the Blue Ridge Mountains and in the northeast Piedmont physiographic provinces of North Carolina. Landslide mapping inventory continued in Henderson and Jackson Counties in the western portion of the State. Information regarding North Carolina's geology, mining, mineral resources, mineral production, and topographic and geological maps is available through the NCGS Web site at www.geology.enr.state.nc.us.

North Carolina State University Minerals Research Laboratory (MRL).—The MRL, located in Asheville, NC, is a unit of North Carolina State University. During 2009, the MRL continued to focus its efforts on work, sponsored by worldwide partners, for process development of various industrial minerals. In addition, the lab researched possible uses for in-State mine tailings, analyzing over 55 samples from within the State. This project was well received by the mining community, with the objective to have the variety of mineral suites and various industrial and aggregate mineral operations producing commercialized ideas. Various industrial specialists, academics, and regulators advise MRL personnel on technical, commercial, and environmental issues concerning the project.

MRL partnered with the University of North Carolina, Asheville, to establish a Mineral Science and Processing program to generate professionals trained in the aggregate, industrial minerals, or environmental service industries. The curriculum incorporates basic science, environmental science, and mineral-processing courses with pilot-plant-scale laboratories with an objective to supply the private and public sector with young, educated, and hands-on professionals.

Industry News, Community Involvement, and Awards

On March 31, 2009, Vulcan Materials Co. announced the division of its operations into two regional business units—East and West. North Carolina was placed in the East Region that will include all of the business and product lines of the Mideast, Southeast, Southern and Gulf Coast, Southwest, Florida Rock, and North Concrete Divisions (Vulcan Materials Co., 2009).

Vulcan's Stokesdale Quarry in Winston-Salem received the National Stone, Sand and Gravel Association's 2008 Excellence in Community Relations Gold Award. The award was presented at the Annual Convention on March 9, 2009, in Orlando, FL. The Director of Business Development and External Affairs at Vulcan received the Outstanding Alumni Award for 2009 from the Department of Geology within the College of Arts and Sciences at Appalachian State University.

Vulcan Materials Co. Foundation awarded Foothills Conservancy \$2,500 to support land and water conservation in the foothills of the Blue Ridge Mountains. A regional nonprofit land trust, Foothills Conservancy has protected more than 18,200 hectares (45,000 acres) since 1995 by working with landowners and community partners to preserve important natural areas and open spaces of this region, including watersheds, wildlife forests, and rural farm lands.

The Dillsboro Quarry of APAC—Harrison Division (division of Oldcastle Construction Products) became the seventh location to earn the Mining Star Award from the North Carolina Department of Labor (NCDOL). The Commissioner of Labor presented the certificate and flag during a luncheon on December 12, 2008. APAC—Harrison Division's Waynesville Quarry received the Mining Star Award in September 2007. These are the only two crushed stone operations to have received the Mining Star Award. The Mining Star Program of NCDOL began in 2003 and recognizes sites where management and employees are committed to safety and health (O'Briant, 2009).

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

(Thousand metric tons and thousand dollars)

Mineral	2007		2008		2009	
	Quantity	Value	Quantity	Value	Quantity	Value
Clays:						
Common	1,720	19,500	1,260	12,900	828	4,980
Kaolin	20	792	15	W	9	W
Gemstones, natural						
Mica, crude	43	10,300	22	4,580	16	4,430
Sand and gravel:						
Construction	11,500 ^r	62,900 ^r	9,770 ^r	58,800 ^r	7,570	43,000
Industrial	1,670	31,300	1,510 ^r	29,400	1,300	28,000
Stone:						
Crushed	70,200	898,000	57,500	806,000	38,500	584,000
Dimension	48	20,400	58	25,200	62	22,300
Combined values of andalusite, feldspar, olivine, phosphate rock, pyrophyllite (crude), and values indicated by symbol W	XX	131,000	XX	150,000 ^r	XX	160,000
Total	XX	1,170,000	XX	1,090,000	XX	846,000

^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
NORTH CAROLINA: CRUSHED STONE SOLD OR USED, BY TYPE¹

Type	2008			2009		
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Number of quarries	Quantity (thousand metric tons)	Value (thousands)
Limestone	14	6,310	\$86,600	15	4,110	\$59,400
Granite	85	41,500	585,000	84	28,300	432,000
Traprock	7	8,240	115,000	7	4,290	66,300
Slate	-- ^r	-- ^r	-- ^r	--	--	--
Miscellaneous stone	6 ^r	1,390 ^r	19,800 ^r	7	1,810	26,300
Total	XX	57,500	806,000	XX	38,500	584,000

^rRevised. 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 2009, BY USE¹

(Thousand metric tons and thousand dollars)

Use	Quantity	Value
Construction:		
Coarse aggregate (+1½ inch):		
Riprap and jetty stone	127	2,350
Filter stone	154	3,440
Other coarse aggregate	265	5,780
Coarse aggregate, graded:		
Concrete aggregate, coarse	923	14,400
Bituminous aggregate, coarse	W	W
Bituminous surface-treatment aggregate	340	9,000
Railroad ballast	711	8,990
Other graded coarse aggregate	3,160	59,300
Fine aggregate (-¾ inch):		
Stone sand, concrete	W	W
Stone sand, bituminous mix or seal	W	W
Screening, undesignated	574	8,510
Other fine aggregate	1,300	17,600
Coarse and fine aggregates:		
Graded road base or subbase	1,320	22,100
Unpaved road surfacing	W	W
Terrazzo and exposed aggregate	W	W
Crusher run or fill or waste	774	9,730
Other coarse and fine aggregates	3,000	43,600
Other construction materials	557	7,080
Agricultural:		
Limestone	W	W
Poultry grit and mineral food	W	W
Special, whiting or whiting substitute	W	W
Other miscellaneous uses and specified uses not listed	18	164
Unspecified:²		
Reported	20,300	299,000
Estimated	4,610	65,900
Total	38,500	584,000

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
NORTH CAROLINA: CRUSHED STONE SOLD OR USED BY PRODUCERS
IN 2009, 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	1,400	21,900	W	W	W	W
Other construction materials	--	--	557	7,080	--	--
Agricultural ⁶	W	W	4	326	W	W
Special ⁷	W	W	--	--	--	--
Unspecified: ⁸						
Reported	503	6,430	10,600	153,000	9,170	139,000
Estimated	2,820	41,900	1,110	14,800	669	9,220
Total	6,750	105,000	18,500	272,000	13,300	206,000

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, riprap and jetty stone, and other coarse aggregate.

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

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

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

⁶Includes limestone and poultry grit and mineral food.

⁷Includes whiting or whiting substitute.

⁸Reported and estimated production without a breakdown by end use.

TABLE 5
NORTH CAROLINA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2009,
BY MAJOR USE CATEGORY¹

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate (including concrete sand)	1,910	\$11,600	\$6.08
Concrete products (blocks, bricks, pipe, decorative, etc.) ²	282	1,900	6.74
Asphaltic concrete aggregates and road base materials ³	W	W	6.30
Fill	751	2,380	3.17
Other miscellaneous uses ⁴	170	1,190	6.99
Unspecified: ⁵			
Reported	702	4,760	6.78
Estimated	3,760	21,200	5.64
Total or average	7,570	43,000	5.68

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

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

²Includes plaster and gunite sands.

³Includes road and other stabilization (lime).

⁴Includes golf course, and snow and ice control.

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

TABLE 6
NORTH CAROLINA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2009,
BY USE AND DISTRICT¹

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3	
	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregates and concrete products ²	W	W	964	5,710	W	W
Asphaltic concrete aggregates and road base materials ³	W	W	96	587	W	W
Fill	--	--	125	403	626	1,980
Other miscellaneous uses ⁴	W	W	19	225	W	W
Unspecified: ⁵						
Reported	--	--	40	251	662	4,510
Estimated	W	W	373	2,190	W	W
Total	642	3,990	1,620	9,360	5,310	29,700

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 plaster and gunite sands.

³Includes road and other stabilization (lime).

⁴Includes golf course, and snow and ice control.

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