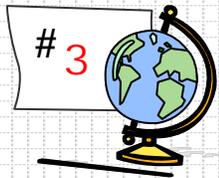


PRODUCTS OF NEW YORK MINES

New York State law does not require mine operators to report how much their facilities produce. However, every year the U.S. Geological Survey (USGS) collects information on a voluntary basis for over 100 mined commodities nationwide. Selected USGS information on state rank, production quantity and production value figures for New York are included on pages 57 to 66. These figures should be regarded as minimums since the surveys are incomplete and USGS regularly revises their statistics as more information becomes available. However, the figures are still useful for showing rough levels of production and year-to-year trends.

In 2004 New York remained the only wollastonite-producing state in the country and also retained its recently achieved first place rank in production of industrial garnet. New York likewise remained third in production of salt and fourth in talc. New York usually ranks around tenth nationwide in cement (2004 USGS figures not yet available).

As far as economic importance within the State, crushed stone is usually New York's leading non-fuel mineral, followed by cement (portland and masonry), salt, construction sand and gravel, and wollastonite. These five commodities typically account for 98% of the State's nonfuel mineral value which generally runs around \$1 billion.



In world production*, the State of New York ranks 3rd in wollastonite, behind countries China and India.



In U.S. production*, New York ranks:

- 1st in wollastonite and garnet,
- 3rd in salt, and
- 4th in talc.



New Yorkers use 50 pounds of minerals per person per day.

* Production rank based on volume

Sand and Gravel

Sand and gravel mines are New York’s most common type of mine with 1,948 active mines spread across the State. Suffolk, Dutchess and Rensselaer Counties are New York’s leading producers of sand and gravel due to their proximity to large markets and the occurrence of high quality glacial deposits. Sand and gravel is New York’s fourth most economically important nonfuel mineral

In 2003 New York’s production of construction grade sand and gravel declined by over 6% to 30,200,000 metric tons, but the value rose slightly to \$172 million. The vast majority of this material was used for road and building construction and maintenance. 2004 figures are not yet available from USGS.

Table 26 - Sand and Gravel Mines Over 125 Permitted Acres, 2004			
<u>Company</u>	<u>County</u>	<u>Town</u>	<u>Acres</u>
Callanan Industries	Rensselaer	North Greenbush	412
Hanson Aggregates NY, Inc.	Oswego	Sandy Creek	273
Valley Sand & Gravel, Inc.	Livingston	Caledonia	213
Hanson Aggregates NY, Inc.	Livingston	Caledonia	200
Frey Concrete, Inc.	Genesee	Alexander	188
Hanson Aggregates NY, Inc.	Herkimer	Warren	186
Barney & Dickenson, Inc.	Broome	Vestal	184
Champion Sand & Gravel, Inc.	Jefferson	Champion	170
Hanson Aggregates NY, Inc.	Herkimer	Russia	160
F S Lopke Contracting, Inc.	Tioga	Tioga	158
Knight Settlement S&G LLC	Steuben	Bath	156
Lafarge North America, Inc.	Cattaraugus	Freedom	149
Gernatt Asphalt Products, Inc.	Erie	Sardinia	148
Hanson Aggregates NY, Inc.	Ontario	Phelps	147
Buffalo Crushed Stone, Inc.	Cattaraugus	Farmersville	146
Fletcher Gravel Co, Inc.	Onondaga	Marcellus/ Camillus	137
Graymont Materials NY, Inc.	Clinton	Schuyler Falls	135
Hanson Aggregates NY, Inc.	Steuben	Bath	134
Troy Sand & Gravel Co. Inc.	Rensselaer	Sand Lake	128
Hanson Aggregates NY, Inc.	Ontario	Victor	127

Table 27 - Largest Sand and Gravel Mine Operators, Total Permitted Acres, 2004

<u>Company</u>	<u>Counties</u>	<u>Acres</u>
Hanson Aggregates NY, Inc.	Oswego, Livingston, Herkimer, Ontario, Steuben, Schuyler, Oneida, Wayne, Monroe, Montgomery, Chemung, Cattaraugus	2,130
Lafarge North America, Inc.	Cattaraugus, Erie, Genesee, Wyoming	588
Buffalo Crushed Stone, Inc.	Cattaraugus, Allegany, Genesee, Erie	586
Callanan Industries, Inc.	Rensselaer, Albany	546
Gernatt Asphalt Products, Inc.	Erie, Cattaraugus, Chautauqua	487
Graymont Materials NY, Inc.	Clinton, St. Lawrence, Essex, Franklin	466
F S Lopke Contracting, Inc.	Tioga, Broome	465
Cranesville Aggregate Co., Inc.	Schenectady, Columbia, Saratoga, Jefferson Fulton	404
Dalrymple Gravel & Contracting	Steuben, Chemung	330
Elam Sand & Gravel Corp.	Wayne, Ontario, Steuben, Livingston	309



Mines that produce sand, gravel and other aggregates can only be sited where these resources occur naturally.

Limestone, Dolostone, Crushed Stone and Cement

Limestone and dolostone make up the second biggest category of New York mines with 98 scattered across the State. These mines produce roughly 90% of the stone sold in New York State. They collectively encompass 11,378 permitted acres with nearly half of that acreage in DEC Regions 4 and 8 (see map on page 8).

New York’s most important products from these mines are crushed stone and cement which are used predominantly in building and road construction and maintenance. Based on value, crushed stone is usually New York’s leading nonfuel mineral, followed by cement.

The most recently available USGS figures show New York typically produces over 50 million metric tons of stone worth over \$350 million. While limestone and dolostone represent the vast majority of the State’s crushed stone production, New York also produces crushed granite, marble, traprock, sandstone and quartzite.

Previous USGS figures show that New York typically produces around 3 million metric tons of cement worth over \$225 million. Cement production is concentrated in the upper Hudson Valley area where a relatively pure limestone is quarried from the Coeymans formation.

Table 28 - Limestone and Dolostone Mines Over 250 Permitted Acres, 2004			
<u>Company</u>	<u>County</u>	<u>Town</u>	<u>Acres</u>
Hanson Aggregates NY, Inc.	Onondaga	Dewitt	790
Lafarge N. American Cement	Albany	Coeymans	759
Tilcon NY, Inc.	Dutchess	Poughkeepsie	682
St. Lawrence Cement Co.	Greene	Catskill	318
Hanson Aggregates NY, Inc.	Livingston	Lima	285
St. Lawrence Cement Co.	Columbia	Greenport	281
Hanson Aggregates NY, Inc.	Onondaga	Skaneateles	270
Glens Falls Lehigh Cement Co.	Greene	Catskill	267
Buffalo Crushed Stone, Inc.	Genesee	Alabama	264
Hanson Aggregates NY, Inc.	Oneida	Marshall	264
Hanson Aggregates NY, Inc.	Jefferson	Pamelia	263

Table 29 - Largest Limestone & Dolostone Mine Operators, Total Permitted Acres, 2004

<u>Company</u>	<u>Counties</u>	<u>Acres</u>
Hanson Aggregates NY, Inc.	Genesee, Herkimer, Jefferson, Livingston, Oneida, Onondaga, Ontario, St. Lawrence, Orleans, Cayuga, Montgomery, Wayne	3,076
Tilcon NY, Inc.	Dutchess, Rockland, Ulster	838
Callanan Industries, Inc.*	Monroe, Montgomery, Madison, Ulster	774
Lafarge N. American Cement	Albany	759
Dolomite Products Co., Inc.	Genesee, Monroe, Ontario, Wayne	669
St. Lawrence Cement**	Columbia, Greene	599
Barrett Paving Materials, Inc.	Herkimer, Jefferson, Onedia, St. Lawrence	546
Redland Quarries NY, Inc.	Niagara	489
Buffalo Crushed Stone, Inc.	Erie, Genesee	460
Glens Falls Lehigh Cement Co.	Greene, Saratoga	343
Cobleskill Stone Products, Inc.	Schoharie	284

* Includes Callanan dba Iroquois Rock Products

** Includes St Lawrence, LLC and Co.



Old steam shovel at the Jamesville Quarry.

The Jamesville Quarry is a connected group of mine sites forming an 1,811-acre quarry property in the Town of Dewitt, Onondaga County. When the Jamesville Quarry opened in 1878, it was mined by hand for slake lime that was loaded onto horse-drawn wagons. By 1909 Allied Chemical had taken over the mine to extract raw materials for soda ash. Steam or electric shovels excavated the stone and it was loaded onto railroad hopper cars.

Today, Hanson's large modern mining equipment can produce stone at a maximum rate of 1,700 tons per hour.

Garnet

Since 2003 New York State has ranked first in industrial garnet-production in the United States. Since there are just a few companies that account for all U.S. industrial garnet production, USGS does not publish detailed production statistics for New York State. However, generally speaking, Barton Mines in Warren County is the largest U.S. garnet producer. NYCO Minerals probably ranks third in the country; the company produces accessory garnet with their main product, wollastonite.

Table 30 - New York Garnet Mine, Permitted Acres, 2004			
<u>Company</u>	<u>County</u>	<u>Town</u>	<u>Acres</u>
Barton Mines Co., LLC	Warren	Johnsburg	107

Barton currently extracts garnet from its Ruby Mountain mine in the Town of Johnsburg. However the company’s nearby Gore Mountain mine, which opened in 1878 and ran until 1983, was the largest garnet mine in the world during its operation. Garnets from the company’s current Ruby Mountain site make especially high-quality abrasives. Most New York garnet is used for sandpaper. Garnet is also used in grinding and polishing glass and metal, sandblasting, water filtration and waterjet stone cutting. Garnet is a well-known gemstone, but most New York garnets have too many internal imperfections to be used in jewelry.



Garnet boulder on display at the New York State Fairgrounds in Syracuse. The boulder was donated by the Barton Garnet Mines.

Wollastonite

New York is the only commercial producer of wollastonite in the country and the State's four mines, located in the Adirondacks, account for all U.S. production. New York is the third largest producer of wollastonite in the world providing about 25% of global production. Wollastonite has been mined in New York for over 50 years.

To protect proprietary data, the USGS does not publish detailed quantity and value statistics for NY wollastonite. However, the federal agency did note that domestic production, which was solely from New York, increased between 2003 and 2004. An industry consultant routinely cited by USGS gives annual production estimates in the range of 115,000 tons per year. Within the State, wollastonite usually ranks as New York's fifth most valuable nonfuel mineral.



DEC Inspector on left and a mine employee surveying NYCO's Lewis wollastonite mine.

One of wollastonite's most unusual characteristics is its ability to cleave into needle-like (acicular) crystals. These fibrous particles make it useful both as an asbestos replacement and as reinforcement material in products ranging from plastics, ceramics and brake pads to paint, coatings and sealants.

China, the world's largest producer, is the main source of the lower-grade wollastonite imported into the U.S. New York's mines now generally focus on higher-grade wollastonite and a portion of each mine's output is specially milled and/or surface treated to achieve specific industrial properties.

Table 31 - New York Wollastonite Mines, Permitted Acres, 2004			
<u>Company & Mine</u>	<u>County</u>	<u>Town</u>	<u>Acres</u>
NYCO/ Oak Hill Mine	Essex	Lewis	127
NYCO/ Lewis Mine	Essex	Lewis	90
Gouverneur Talc/ No. 4 Mine	Lewis	Diana	49
NYCO/ Willsboro Mine	Essex	Willsboro	4

Salt

More than 10,000 square miles of central and western New York are underlain by the Salina formation which contains roughly 3.9 trillion metric tons of rock salt. This large salt resource has been very important throughout the State's history. Once again in 2004 New York was the third largest salt producer in the country. There are currently two active rock salt mines in New York State, Cargill's Cayuga Mine centered around Cayuga Lake in Tompkins and Seneca Counties and American Rock Salt's Hampton Corners Mine in Livingston County. Salt is also produced from five solution mining facilities in Schuyler and Wyoming Counties (see page 39).

For 2004 the U.S. Geological Survey estimated New York's combined salt output from underground mines and solution salt mining wells at roughly 6.4 million metric tons worth \$301 million. New York's estimated brine production figures for 2004 subtracted from the total leave an estimated rock salt production of roughly 3.75 million metric tons. New York ranked third nationally in salt production from 2000 to 2004. Within the State, salt typically ranks third in the value of New York's non-fuel mineral commodities.

The Cargill Lansing mine, near Ithaca, is the larger of the State's two salt mines. It is also the deepest underground salt mine in the western hemisphere. The much smaller American Rock Salt mine in Livingston County began production in December 2000 to replace the abandoned AKZO Retsof mine near Geneseo. When the Retsof mine was in operation, it was one of the largest underground salt mine in the world.



Salt has been mined in the area of Cayuga Lake since at least 1915, but Cargill did not take over the mine until the 1970s. The company extracts salt from a depth of roughly 2,000 feet under portions of the lake and surrounding lands. Cargill leases the underwater land from the NY State Office of General Services and pays a basic royalty of 2% per ton of the market unit-value of the marketable rock salt with adjustments for production in excess of 1,500,000 tons. Virtually all the salt from this particular mine is sold as road deicing salt. However, salt also has a broad array of uses in food and chemical products.



Worker installing roof bolts at Cargill's Lansing Mine. Photograph by Simon A. Wheeler, Elmira Star Gazette 2002, copyright 2004.

Table 32 - New York Underground Salt Mines, Permitted Acres, 2004

<u>Company</u>	<u>Counties</u>	<u>Acres</u>
American Rock Salt, Inc.	Livingston	672
Cargill, Inc.	Seneca, Tompkins	9,260

Talc

In 2004 New York ranked fourth in the country in talc production. Since there are so few talc producing companies in the country, the USGS does not publish detailed production information, but they did indicate that New York's talc production increased in 2004.

Gouverneur Talc is New York's only talc producing company, and their overall land holdings cover roughly 2,000 acres in the northwest Adirondacks. While the company has more than one mine with a current permit, most of their production is from their #1 Mine, an open pit facility also known as the Arnold Mine. Since most talc in the U.S. is sold only after crushing and grinding, Gouverneur Talc has an active milling operation at Balmat.

Industrial talc is a mixture of talc, tremolite, anthophyllite, serpentine and dolomite. Because of the presence of these minerals, New York's industrial talc is fibrous with long, thin white needle-like crystals.

Talc is used as a paint extender, a carrier for insecticide dust and in many other products where a white powdery mineral is needed. It is also used in ceramics, filler in asphalt roofing, putty and linoleum.

Table 33 - New York Talc Mines. Permitted Acres, 2004

<u>Company</u>	<u>County</u>	<u>Town</u>	<u>Acres</u>
Gouverneur Talc No. 1 & 2 Mine	St. Lawrence	Fowler	185
Gouverneur Talc No. 3 Mine	St. Lawrence	Edwards	5

Zinc

While New York has historically been a major zinc producer, there was no 2004 production from the single remaining zinc mine in the northwestern Adirondacks. The Pierrepont mine was permanently closed in 2001 and the mine site reclaimed. Work at the Balmat mine was also suspended at the same time while the company awaited a buyer. When the 2 mines were operating they ranked in the top 10 zinc mines in the country and New York ranked third or fourth in total production.

During 2000, which was the last full year of operation, the Balmat mine was the third most productive zinc mine in the United States. This mine has a new owner and is expected to eventually resume production when the price of zinc improves.

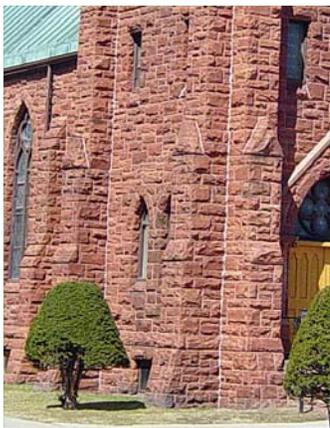
Sandstone

In 2004 there were 24 mines in New York producing sandstone which is widely found across the State in the form of sedimentary sandstones, graywacke, metamorphic quartzite and conglomerate. There are no quantity or value statistics available for New York sandstone production. Mines produce sandstone blocks for building, flagstone and curbing. However, most of the sandstone is crushed for aggregate and some larger blocks are sold for riprap to stabilize waterways and embankments. Pure quartz sandstone can be used to make high-quality glass, but sandstone in New York contains too much iron and alumina for this purpose.

Callanan Industries is the company with the most sandstone mines (6 in eastern New York). The highest concentrations of permitted acreage for sandstone mining is in two areas. The first is a roughly 40-mile long trend in Sullivan and Delaware Counties (total 551 permitted acres) and the second is in Orleans County (176 permitted acres).

Table 34 - Sandstone Mines Over 50 Permitted Acres, 2004

<u>Company</u>	<u>County</u>	<u>Town</u>	<u>Acres</u>
Callanan Industries, Inc.	Sullivan	Thompson	375
Cobleskill Stone Products, Inc.	Delaware	Hancock	123
E. Tetz & Sons, Inc.	Sullivan	Thompson	103
Shelby Crushed Stone, Inc.	Orleans	Shelby	88
Callanan Industries, Inc.	Rensselaer	Brunswick	76
Hanson Aggregates NY, Inc.	Orleans	Murray	68
Blades Construction Products, Corp.	Steuben	Bath	55
Callanan Industries, Inc.	Sullivan	Cochecton	53



Potsdam sandstone is a well-known type of sandstone found on many public buildings in New York State and elsewhere. In the 1800s it was lauded for its ability to withstand the effects of fire, such as cracking and spalling, much better than granite. In fact its fire resistant properties were so well known it was a preferred material for lining furnaces.

Bluestone

New York and Pennsylvania are the only sources of bluestone, a specific type of commercial sandstone. The New York State Bluestone Association estimates that the market value of bluestone is approximately \$40 million a year.

In 2004 there were 54 permitted bluestone mines in an area extending from Tompkins County on the west to Albany County on the east. However the majority of the bluestone activity is in Delaware and Broome Counties. In Broome County roughly 90% of the bluestone mines are in the Pennsylvania border towns of Windsor and Sanford. In Delaware the majority of mines are in the western end of the county with the highest number in Hancock, a long-time stronghold of the bluestone industry.

Bluestone mining is by nature a relatively small-scale operation. Roughly 60% of the bluestone mines are between 1 and 5 acres in size. The operators with the largest mines are shown in Table 35. In 2004 the companies with the highest number of mines were Johnston & Rhodes Bluestone (16), Tompkins Bluestone (5), and Indian Country (5).

While bluestone is a strongly cemented rock, it splits easily into smooth thin slabs that are ideal for outdoor patios, building exteriors and indoor floors. Bluestone’s current popularity has led to exploration for new deposits and reopening of old mines. In addition, bluestone’s recent high prices are enabling mine operators to switch from old-fashioned hand mining to more modern techniques and equipment.

As an aid to exploration, bluestone miners have the option of applying for a simplified one-year Exploration Authorization (EA) instead the full mining permit. When the EA expires, the operator must apply for a regular mining permit if the site is commercially viable or reclaim the land. In 2004 DEC issued 8 regular bluestone mining permits, renewed 2 EAs and issued 2 new ones.

Table 35 - Bluestone Mines Over 15 Permitted Acres, 2004			
<u>Company</u>	<u>County</u>	<u>Town</u>	<u>Acres</u>
Heldeberg Bluestone & Marble	Albany	Berne	30
Damascus 535 Quarry & Stone	Broome	Windsor	24
Larry Schaefer	Delaware	Deposit	22
RCS, LLC	Delaware	Multiple Towns	18
Johnston & Rhodes Bluestone, Co.	Delaware	Masonville	16
Johnston & Rhodes Bluestone, Co.	Delaware	Hancock	15
Indian Country, Inc.	Broome	Sanford	15
Kenneth Decker	Broome	Conklin	15

Granite

In 2004 there were 17 granite mines operating mostly in the Adirondack and Taconic regions. Washington County, with 6 mines, has the highest concentration of this type of mine in New York State. New York granite mines include anorthosite and granitic gneiss.

While granite had long been used for building exteriors, statues and gravestone monuments, it has recently become very popular for kitchen countertops and other interior decorative uses. New York granite ranges in color from gray and green to black. The larger granite mines produce crushed stone.

Table 36 - Granite Mines Over 20 Permitted Acres, 2004

<u>Company</u>	<u>County</u>	<u>Town</u>	<u>Acres</u>
Hanson Aggregates NY, Inc.	Oneida	Forestport	100
Peckham Materials Corp.	Saratoga	Greenfield	91
Graymont Materials NY, Inc.	Franklin	Brandon	67
Wingdale Materials, LLC	Dutchess	Dover	60
Thalle Industries, Inc.	Dutchess	Fishkill	46
Graymont Materials NY, Inc.	Essex	St. Armand	36
Lake Placid Granite Co.	Essex	Jay	29
Lake Placid Granite Co.	Essex	Jay	20



Wingdale Materials' underground granite mine, Dutchess County.

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