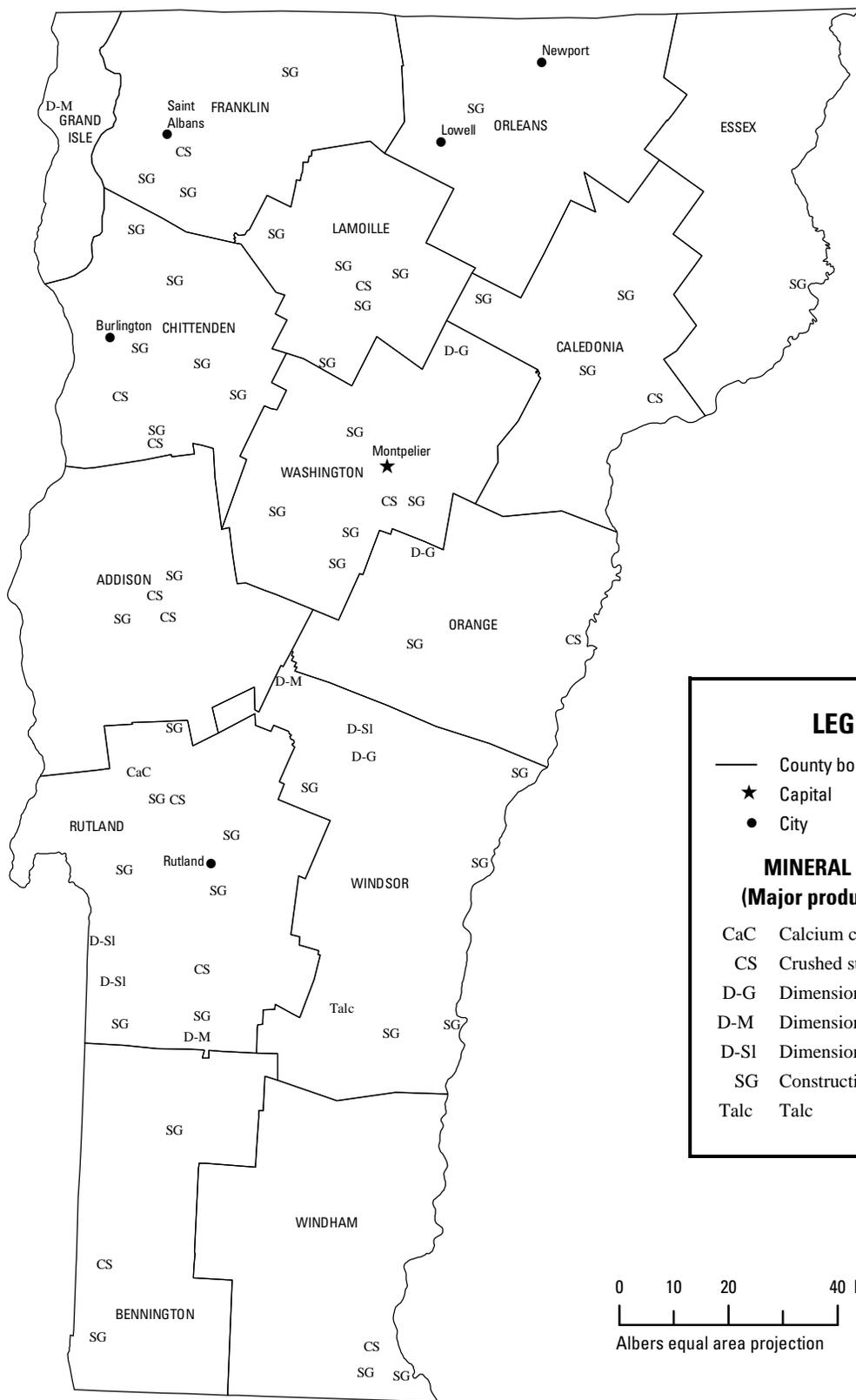




2007 Minerals Yearbook

VERMONT [ADVANCE RELEASE]

VERMONT

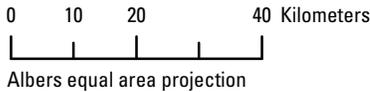


LEGEND

- County boundary
- ★ Capital
- City

**MINERAL SYMBOLS
(Major producing areas)**

- CaC Calcium carbonate
- CS Crushed stone
- D-G Dimension granite
- D-M Dimension marble
- D-SI Dimension slate
- SG Construction sand and gravel
- Talc Talc



Source: Vermont Geological Survey/U.S. Geological Survey (2007).

THE MINERAL INDUSTRY OF VERMONT

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

In 2007, Vermont's nonfuel raw mineral production¹ was valued at \$102 million, based upon annual U.S. Geological Survey (USGS) data. This was a \$13 million, or 11.3%, decrease from the State's total nonfuel mineral value in 2006, which then had increased by more than \$17 million, or up by nearly 18%, from that of 2005. (Because data for crushed slate (2005) and talc have been withheld (company proprietary data), the actual total values for 2005–07 are somewhat higher than those reported in table 1.) Vermont was 47th in rank among the 50 States in total nonfuel mineral production value, yet, per capita, the State ranked 23d in the Nation in its minerals industry's value of nonfuel mineral production; with a population of about 621,000, the value of production was about \$164 per capita.

In 2007, crushed stone, construction sand and gravel, and dimension stone, in descending order of value, were Vermont's leading nonfuel mineral commodities. Most of the State's mineral commodities decreased in production value partly was a reflection of an overall decrease in the construction industry activity. A 3% drop in crushed stone production led to a \$9.8 million, or nearly 20% decrease in the commodity's value, and a nearly 12% decrease in construction sand and gravel production resulted in a \$3.2 million, or 8.5%, decrease in its value. A 2% decrease in the production of dimension stone led to a negligible decrease in its value. The production and the value of talc increased, value up by nearly \$1 million (table 1).

In 2007, Vermont continued to rank third as compared with other States in the quantity of dimension stone produced and third in talc among five producing States.

The Vermont Geological Survey² (VGS), a State agency within Vermont's Agency of Natural Resources, Department of Environmental Conservation, was also known as the Division of Geology and Mineral Resources. The VGS provided the following narrative information.

Exploration and Development

Mine Permitting

Seven of the permit applications submitted for sand and gravel extraction under Act 250 for review in 2006 were continued on

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 2007 USGS mineral production data published in this chapter are those available as of June 2009. 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>.

²Marjorie Gale, Environmental Scientist V, a geologist with the Vermont Geological Survey, authored the text of the State mineral industry information provided by that agency. The Vermont Geological Survey is designated in Vermont State government as the Division of Geology and Mineral Resources within the Vermont Department of Environmental Conservation.

into 2007; Act 250 is Vermont's Land Use and Development Law. In 2007, altogether Vermont issued six sand gravel extraction permits and amendments under the Act 250 process. All permits issued during the year were for expansion of existing operations. No new sand and gravel extraction permits were issued. Extraction rates for these operations varied up to a maximum of about 95,600 cubic meters (125,000 cubic yards) per year. Additionally, six permit applications for new sand and gravel extraction projects or expansion of existing projects were submitted under Act 250 for review in 2007.

Commodity Review

Industrial Minerals

Calcium Carbonate.—OMYA, Inc., North America, continued to produce calcium carbonate at its plant in Florence, VT. The plant produced ultrafine calcium carbonate, also used in the manufacture of food and pharmaceuticals, mainly as dry and slurry products for the paper, paint, and plastics industries. The plant, purchased by OMYA in 1976, was the company's first North American plant; since that time, the plant has been expanded several times to become one of the most modern of the company's plants. The company continued to be a very active participant in Earth Science Week.

Talc.—Luzenac America, Inc. (a wholly owned subsidiary of Rio Tinto Minerals, Inc.) produced talc from the company's Ludlow (Windsor County) area mines in southern Vermont. Luzenac marketed talc globally for use in many products including ceramics, paint, paper, personal care and foodstuffs, plastics, roofing, and in a myriad of other products and processes.

Stone, Dimension.—The second leading producer of dimension stone in the Nation was Rock of Ages Corp., with quarries in North Carolina, Pennsylvania, and Vermont. The company was based in Graniteville, Washington County, southwest of Montpelier in central Vermont where the company continued production of its signature Vermont product, Barre Gray granite. Rock of Ages also quarried Bethel White granite to the south in Windsor County in Bethel, VT. The Bethel White granite was a high standard granite to which other white granites commonly have been compared.

Government Programs and Activities

Environmental Issues

Vermont Asbestos Group Mine.—The following site description and history was taken from Vermont's Agency of Natural Resources, Department of Environmental Conservation, Waste Management Division: "The Vermont Asbestos Group Mine (VAG) site is an inactive asbestos mine and mill which

operated in the early 1900s and closed in 1993. It was the largest asbestos mine in the United States. The mine site comprises 623 hectares (1540 acres) on private lands on Belvidere Mountain within the towns of Eden and Lowell, Vermont. The mine site consists of a network of eleven mine and mill buildings and structures and two significant mill tailings piles estimated at 26–27 million metric tons (29–30 million short tons). The asbestos ore was mined from open pits producing chrysotile “white” asbestos. 90 to 96% of the chrysotile mined in the United States came from the VAG mine. General Aniline & Film Corporation (GAF), along with its predecessor corporation Ruberoid, operated the mine from 1936–1975. In 1975, the current owner, VAG, purchased the property from General Aniline & Film Corporation (GAF). In the late 80s and early 90s, the production rate at the mine was significantly less than in the past. The mine closed in 1993” (Vermont Agency of Natural Resources, undated, p. 1).

In late 2004, the Vermont Agency of Natural Resources, Department of Environmental Conservation, Wetlands Program (VWP), received a complaint from a down-gradient property owner of tailings material eroding onto his wetland. The VWP, which had been investigating the site since that time, began a 2-year study in 2005 of the biological and chemical assessments within the Lamoille River and Missisquoi River watersheds. Data indicated that the aquatic biota, water quality, and streambed quality were degraded in both watersheds. In 2007, the VAG installed a diversion channel directing flow away from a large ravine created by erosion of the old mine pile. The USGS collected samples from tailings, mine rock and water for environmental analyses, and mineral identification. Additionally, in 2007, the Secretary of the Agency of Natural Resources formally requested assistance from the U.S. Environmental Protection Agency (EPA) to address VAG mine-related issues, and the EPA began the process of determining if the site would meet criteria for inclusion in the EPA’s National Priorities List.

Earth Science Week 2007.—Earth Science Week was a national project jointly sponsored in the State by the VGS (at the Agency of Natural Resources) and the American Geological Institute. During Earth Science Week 2007, OMYA, Inc. hosted its 7th annual Open House at the company’s white marble quarry in Middlebury with more than 1,000 visitors and 90 volunteers. Visitors were able to view and experience first-hand the rocks, quarry equipment, and products. OMYA and the Vermont Marble Exhibit cosponsored the Earth Science Week annual poster contest; posters for 2007 and the previous 6 years were made available to the public on the Internet at <http://www.anr.state.vt.us/dec/geo/esweekinx07.htm>. In addition, the North Branch Nature Center sponsored mineral identification workshops and field trips.

The Vermont Geological Survey

The State Geologist managed interdisciplinary studies with strong geologic components, especially those focused on surface waters, groundwater resources, and geologic hazards. Review of projects as they related to Criteria 9D and 9E of Act 250, was a VGS activity that recognized the importance of lands with high potential for extraction of mineral and earth resources. The VGS

also reviewed and made recommendations regarding mine and quarry reclamation plans in response to current environmental concerns. Reports were prepared, published, and made available to the public, such as to include Federal and State agencies, consultants, and industry, providing geologic aid and advice to the public as required by State statute.

The VGS continued geologic operations conducting surveys and research of the geology, mineral resources, and topography of the State and to be an active participant in the STATEMAP program. STATEMAP is a component of the congressionally mandated National Cooperative Geologic Mapping Program (NCGMP), through which the USGS distributes Federal funds to support geologic mapping efforts through a competitive funding process. The NCGMP has three primary components: (1) FEDMAP, which funds Federal geologic mapping projects, (2) STATEMAP, which is a matching-funds grant program with State geological surveys, and (3) EDMAP, a matching-funds grant program for universities that has a goal to train the next generation of geologic mappers.

Emphasis was placed upon completion of the bedrock map of Vermont, surficial mapping by quadrangle and watershed, and a natural hazard map program. Mapping projects addressed societal issues in Vermont: landslide hazards, riverine erosion, and nitrate and naturally occurring radionuclides in bedrock and groundwater. Prototype aquifer and aquifer recharge area mapping was underway for town planning. Digital surficial and bedrock data were also used to customize HAZUS, an earthquake hazard computer program, to make it realistically simulate local Vermont conditions.

In 2007, bedrock and surficial geologic maps were digitally produced as one color plate each at a scale of 1:24,000. The maps were published on the Internet, viewable in pdf format; the digital data for most of the maps were either available online or available upon request to the VGS. One VGS bedrock geologic map produced in 2007 covered Hazens Notch and parts of the Eden and Lowell 7.5-minute quadrangles in central northern Vermont. The VGS digitally compiled the map (a 2.9-megabyte file) from previously published maps; it included Belvidere Mountain, Tillotson Peak, and the Hazens Notch area. Another bedrock geologic map (2.2-megabyte file) was prepared of the town of Williston, VT, east of Burlington. A higher resolution image or the digital data for Williston was available from the VGS upon request.

Digital surficial geologic maps were produced of the central Vermont Mad River Watershed, (northern sheet), the Mad River Watershed (southern sheet), and the town of Williston, VT. The digital surficial materials data for the Mad River Watershed maps (1.8-megabyte map files) and the Williston map (2.2-megabyte file) could be accessed by way of the VGS Web page from the Vermont Center for Geographic Information, Inc., a nonprofit public corporation. These and all other available geologic maps and data for areas in the State were available over the Internet at <http://www.anr.state.vt.us/dec/geo/mapsonlineinx.htm>.

The VGS continued to provide advice concerning the development and production from rock and mineral deposits suitable for building, road making, and economic purposes. The VGS maintained an archive of old and new information

as per State statute. In the event of any significant discovery of hydrocarbons in the State, the VGS was responsible for providing geologic services to Vermont's Natural Gas and Oil Resources Board. Further information about the VGS and the agency's Earth Resources pages were available on the Internet at <http://www.anr.state.vt.us/dec/geo/vgs.htm>.

Reference Cited

Vermont Agency of Natural Resources, [undated], Sites management—Vermont asbestos group mine site: Waterbury, VT, Vermont Agency of Natural Resources, 3 p. (Accessed April 20, 2010, at <http://www.anr.state.vt.us/dec/wastediv/SMS/VAG.htm>.)

TABLE 1
NONFUEL RAW MINERAL PRODUCTION IN VERMONT^{1,2}
(Thousand metric tons and thousand dollars unless otherwise specified)

| Mineral | 2005 | | 2006 | | 2007 | |
|-------------------------------|--------------------|---------------------|--------------------|----------------------|----------|---------|
| | Quantity | Value | Quantity | Value | Quantity | Value |
| Gemstones, natural | NA | 1 | NA | 1 | NA | 1 |
| Sand and gravel, construction | 5,240 | 32,000 | 5,810 | 37,300 | 5,140 | 34,100 |
| Stone: | | | | | | |
| Crushed | 4,960 ³ | 37,900 ³ | 5,840 ^r | 49,900 ^r | 5,660 | 40,100 |
| Dimension | 98 | 27,800 | 100 | 27,600 | 98 | 27,500 |
| Talc, crude metric tons | W | W | W | W | W | W |
| Total | XX | 97,700 | XX | 115,000 ^r | XX | 102,000 |

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

³ Excludes certain stones; quantity and value withheld to avoid disclosing company proprietary data.

TABLE 2
VERMONT: CRUSHED STONE SOLD OR USED, BY TYPE¹

| Type | 2006 | | | 2007 | | |
|-------------------------|--------------------|---------------------------------|-----------------------|--------------------|---------------------------------|-------------------|
| | Number of quarries | Quantity (thousand metric tons) | Value (thousands) | Number of quarries | Quantity (thousand metric tons) | Value (thousands) |
| Limestone ² | 8 ^r | 1,630 ^r | \$15,100 ^r | 8 | 1,510 | \$11,000 |
| Dolomite | 2 | 205 | 1,610 | 1 | 15 | 110 |
| Traprock | 1 | 106 | 738 | 1 | 108 | 768 |
| Marble | 1 | 2,030 | 13,700 | 1 | 2,130 | 15,100 |
| Sandstone and quartzite | 3 ^r | 1,150 | 12,500 | 3 | 1,030 | 7,270 |
| Miscellaneous stone | 10 ^r | 712 ^r | 6,200 ^r | 12 | 867 | 5,930 |
| Total | XX | 5,840 ^r | 49,900 ^r | XX | 5,660 | 40,100 |

^r Revised. XX Not applicable.

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

² Includes limestone-dolomite reported with no distinction between the two.

TABLE 3
VERMONT: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2007, BY USE¹

(Thousand metric tons and thousand dollars)

| Use | Quantity | Value |
|-------------------------------------|--------------|---------------|
| Construction: | | |
| Coarse aggregate (+1½ inch): | | |
| Riprap and jetty stone | 27 | 233 |
| Filter stone | 50 | 405 |
| Other coarse aggregate | 5 | 33 |
| Coarse aggregate, graded: | | |
| Concrete aggregate, coarse | W | W |
| Bituminous aggregate, coarse | W | W |
| Other graded coarse aggregate | 16 | 111 |
| Fine aggregate (-¾ inch): | | |
| Stone sand, bituminous mix or seal | W | W |
| Screening, undesignated | W | W |
| Other fine aggregate | 3 | 18 |
| Coarse and fine aggregates: | | |
| Graded road base or subbase | 142 | 895 |
| Unpaved road surfacing | W | W |
| Crusher run or fill or waste | W | W |
| Other coarse and fine aggregates | 262 | 1,800 |
| Agricultural, limestone | W | W |
| Unspecified:² | | |
| Reported | 541 | 3,750 |
| Estimated | 4,300 | 31,000 |
| Total | 5,660 | 40,100 |

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
VERMONT: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2007,
BY MAJOR USE CATEGORY¹

| Use | Quantity (thousand metric tons) | Value (thousands) | Unit value |
|---|---------------------------------------|----------------------|---------------|
| Concrete aggregate and concrete products ² | 323 | \$2,340 | \$7.25 |
| Asphaltic concrete aggregates and other bituminous mixtures | 21 | 187 | 8.90 |
| Road base and coverings ³ | 499 | 2,660 | 5.32 |
| Fill | 118 | 378 | 3.20 |
| Other miscellaneous uses ⁴ | 207 | 1,220 | 5.90 |
| Unspecified:⁵ | | | |
| Reported | 633 | 5,430 | 8.58 |
| Estimated | 3,340 | 21,900 | 6.57 |
| Total or average | 5,140 | 34,100 | 6.65 |

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 (cement and lime).

⁴Includes snow and ice control and filtration.

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