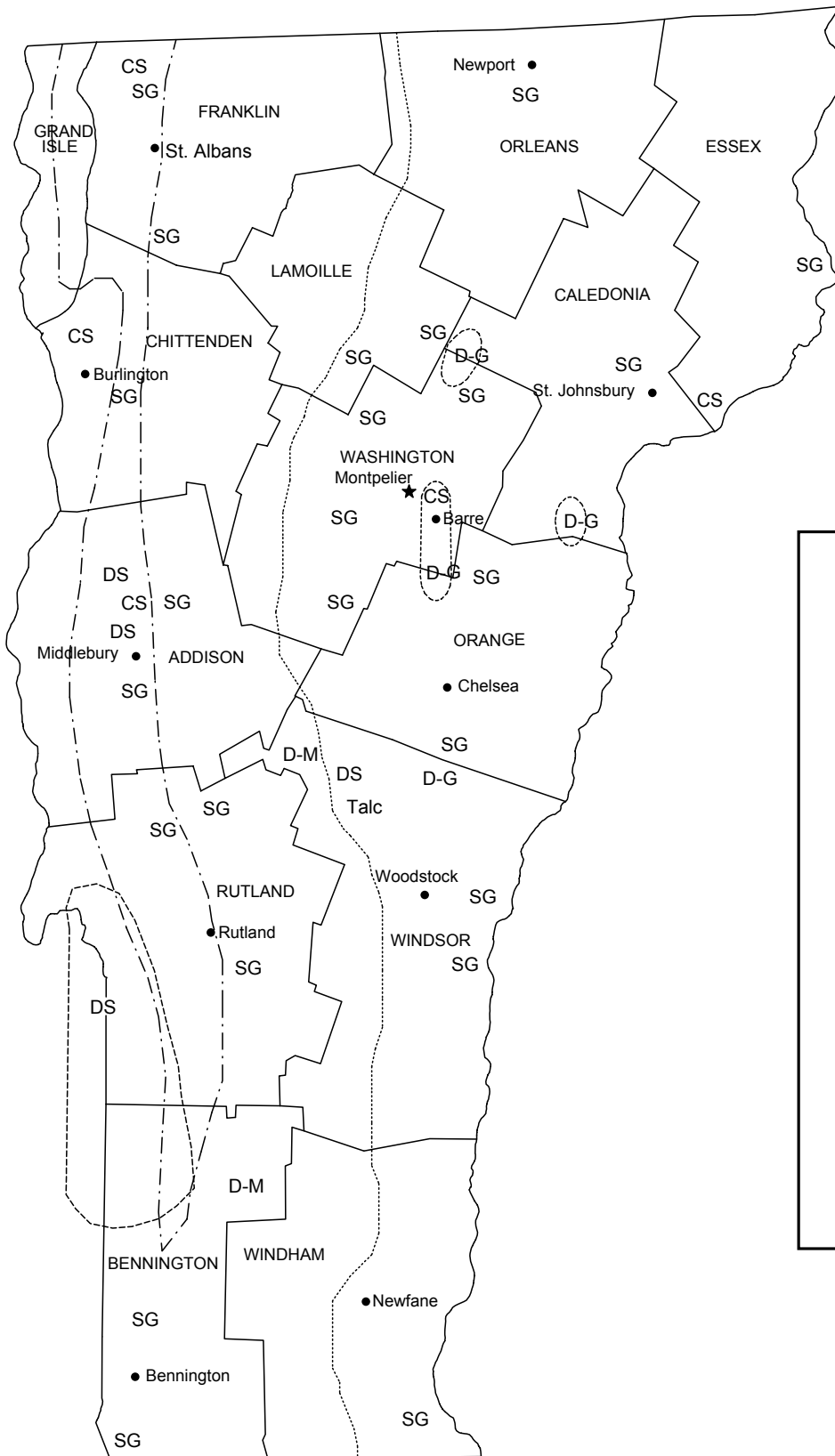


# VERMONT

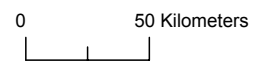


## LEGEND

- County boundary
- ★ Capital
- City

## MINERAL SYMBOLS (Major producing areas)

- CS Crushed stone
- D-G Dimension granite
- D-M Dimension marble
- DS Dimension stone
- SG Construction sand and gravel
- Talc Talc
- Concentration of mineral operations
- ⊖ VT limestone-marble belt
- ⋯ Ultramafic trend, includes asbestos, talc, and verde antique operations



# 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 2003, the estimated value<sup>1</sup> of nonfuel mineral production for Vermont was \$73 million, based upon preliminary U.S. Geological Survey (USGS) data. This was a more than 3% increase compared with that of 2002<sup>2</sup> and followed a marginal decrease from 2001 to 2002. Because data for talc have been withheld to avoid disclosing company proprietary data, the actual total values for 2001-03 are higher than those reported in table 1.

In 2003, dimension stone remained Vermont's leading nonfuel mineral commodity, accounting for about 40% of the State's publishable nonfuel mineral production value. The values of dimension stone and crushed stone increased in 2003, while that of construction sand and gravel decreased.

In 2002, increases in the production and values of construction sand and gravel and dimension stone, the values of which were up \$2.2 million and \$0.5 million, respectively, slightly less than offset decreases in the production and value of crushed stone, down \$3 million, resulting in the small net decrease for the year (table 1). Based upon USGS estimates of the quantities of minerals produced in the 50 States during 2003, Vermont continued to be third in talc and was fourth (third in 2002) among the States that produced dimension stone.

The Vermont Geological Survey (VGS) provided the following narrative information.<sup>3</sup>

## Exploration and Development

### *Mine Permitting*

Act 250 (Vermont's Land Use and Development Law) permits were issued for seven new construction sand and

gravel operations and one new crushed stone operation in 2003. A total of 14 amended permits were issued to existing sand and gravel and crushed stone operations to continue extraction, expand operations, or increase annual production. Additionally, one new permit was issued to McLean Enterprises for a dimension stone operation. The company received an Act 250 permit in February for its dimension stone quarry in Cavendish. The stone being quarried is a mica schist referred to as "glimmerstone." As part of the permitting process, McLean Enterprises claimed that a significant market for the stone existed both within Vermont as well as outside of the State. In addition to uses as dimension stone, approximately 30% of the stone quarried will be processed as crushed stone.

## Commodity Review

### *Industrial Minerals*

**Calcium Carbonate.**—OMYA, Inc., North America, with a plant in Florence, VT, hosted the 3d annual Open House at the company's white marble quarry in Middlebury during Earth Science Week 2003. Visitors were able to view and experience firsthand the rocks, quarry equipment, and products. OMYA's calcium carbonate plant in Florence, VT, which began production in 1979, was the company's first North American plant. Ground calcium carbonate, also used in the manufacture of food and pharmaceuticals, was produced in the Florence plant mainly for the paper, paint, and plastics industries. This plant also was capable of producing dry and slurry products.

## Government Programs and Activities

The VGS, also known as the Division of Geology and Mineral Resources in Vermont's Department of Environmental Conservation, continued to conduct surveys and research of the geology, mineral resources, and topography of the State. The VGS continued its focus on completion of the bedrock map of Vermont, surficial mapping by quadrangle and watershed, and a natural hazard map program. Mapping projects address societal issues in Vermont: landslide hazard, riverine erosion, and nitrate and naturally occurring radionuclides in bedrock and ground water. Prototype aquifer and aquifer recharge area mapping was underway for town planning. Digital surficial and bedrock data continued to be used in customizing HAZUS, an earthquake hazard computer program, to make it realistically simulate local Vermont conditions.

The State Geologist manages interdisciplinary studies with strong geologic components, especially those focused on surface waters, ground water resources, and geologic hazards. Review of projects as they relate to Criteria 9D and 9E of Act 250, Vermont's Land Use and Development Law, is a VGS activity

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<sup>1</sup>The 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 2003 USGS mineral production data published in this chapter are preliminary estimates as of July 2004 and are expected to change. 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. Specialist contact information may be retrieved over the Internet at URL <http://minerals.usgs.gov/minerals/contacts/comdir.html>; alternatively, specialists' names and telephone numbers may be obtained by calling USGS information at (703) 648-4000 or by calling the USGS Earth Science Information Center at 1-888-ASK-USGS (275-8747). All USGS Mineral Industry Surveys and USGS Minerals Yearbook chapters—mineral commodity, State, and country—also may be retrieved over the Internet at URL <http://minerals.usgs.gov/minerals>.

<sup>2</sup>Values, percentage calculations, and rankings for 2002 may differ from the Minerals Yearbook, Area Reports: Domestic 2002, Volume II, owing to the revision of preliminary 2002 to final 2002 data. Data for 2003 are preliminary and are expected to change; related rankings also may change.

<sup>3</sup>Marjorie Gale, Environmental Scientist III-Geologist with the Vermont Geological Survey, authored the text of the State mineral industry information provided by that agency.

that recognizes the importance of lands with high potential for extraction of mineral and earth resources. The VGS also reviews and makes recommendations regarding mine and quarry reclamation plans in response to current environmental concerns. Published reports are prepared and made available to the public, consultants, industry, and government, providing geologic aid and advice to the public as required by State statute.

The VGS also provides advice concerning the development

and working of rock and mineral deposits suitable for building, roadmaking, and economic purposes. The VGS maintains 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 provides geologic services for Vermont's Natural Gas and Oil Resources Board. Additional information about the VGS is available on the Internet at URL <http://www.anr.state.vt.us/dec/geo/vgs.htm>.

TABLE 1  
NONFUEL RAW MINERAL PRODUCTION IN VERMONT<sup>1,2</sup>

(Thousand metric tons and thousand dollars unless otherwise specified)

Mineral	2001		2002		2003 <sup>P</sup>	
	Quantity	Value	Quantity	Value	Quantity	Value
Gemstones	NA	1	NA	1	NA	1
Sand and gravel, construction	4,570	20,000	4,990	22,200	4,700	21,200
Stone:						
Crushed	4,950	24,300	4,360	21,300	4,600	22,800
Dimension	98	26,500	101	27,000	98	29,000
Talc, crude	W	(3)	W	(3)	W	(3)
Total	XX	70,800	XX	70,600	XX	73,000

<sup>P</sup>Preliminary. NA Not available. W Withheld to avoid disclosing company proprietary data. XX Not applicable.

<sup>1</sup>Production as measured by mine shipments, sales, or marketable production (including consumption by producers).

<sup>2</sup>Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>3</sup>Value excluded to avoid disclosing company proprietary data.

TABLE 2  
VERMONT: CRUSHED STONE SOLD OR USED, BY KIND<sup>1</sup>

Kind	2001				2002			
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value
Limestone <sup>2</sup>	6	1,990	\$8,050	\$4.05	6	1,680	\$7,160	\$4.26
Dolomite	3	W	W	8.01	3	W	W	8.00
Granite	3	307	1,960	6.37	3	192	1,250	6.51
Marble	1	W	W	4.08	1	W	W	4.08
Quartzite	1	W	W	3.58	1	W	W	4.74
Slate	1	W	W	3.58	1	W	W	4.85
Total or average	XX	4,950	24,300	4.92	XX	4,360	21,300	4.88

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

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

<sup>2</sup>Includes limestone-dolomite reported with no distinction between the two.

TABLE 3  
VERMONT: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2002, BY USE<sup>1</sup>

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Construction:			
Coarse aggregate (+1 1/2 inch):			
Macadam	W	W	\$5.29
Riprap and jetty stone	24	\$211	8.79
Filter stone	W	W	7.15
Total or average	55	430	7.82
Coarse aggregate, graded:			
Concrete aggregate, coarse	W	W	10.36
Bituminous aggregate, coarse	W	W	10.47
Bituminous surface treatment aggregate	W	W	11.19
Railroad ballast	W	W	11.19
Other graded coarse aggregate	5	17	3.40
Total or average	188	2,040	10.84
Fine aggregate (-3/8 inch):			
Stone sand, bituminous mix or seal	W	W	9.26
Screening, undesignated	W	W	4.41
Total or average	87	650	7.47
Coarse and fine aggregates:			
Graded road base or subbase	267	1,790	6.69
Unpaved road surfacing	W	W	5.85
Crusher run or fill or waste	W	W	5.66
Total or average	573	3,550	6.19
Unspecified: <sup>2</sup>			
Reported	750	3,580	4.77
Estimated	2,700	11,000	4.07
Total or average	3,460	14,600	4.22
Grand total or average	4,360	21,300	4.88

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

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

<sup>2</sup>Reported and estimated production without a breakdown by end use.

TABLE 4  
VERMONT: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2002,  
BY MAJOR USE CATEGORY<sup>1</sup>

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate and concrete products <sup>2</sup>	143	\$986	\$6.90
Asphaltic concrete aggregates and road base materials <sup>3</sup>	653	3,260	4.98
Fill	138	375	2.72
Snow and ice control	144	606	4.21
Other miscellaneous uses	35	181	5.17
Unspecified: <sup>4</sup>			
Reported	978	5,140	5.26
Estimated	2,900	12,000	4.02
Total or average	4,990	22,200	4.45

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

<sup>2</sup>Includes plaster and gunite sands.

<sup>3</sup>Includes road and other stabilization, cement.

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