

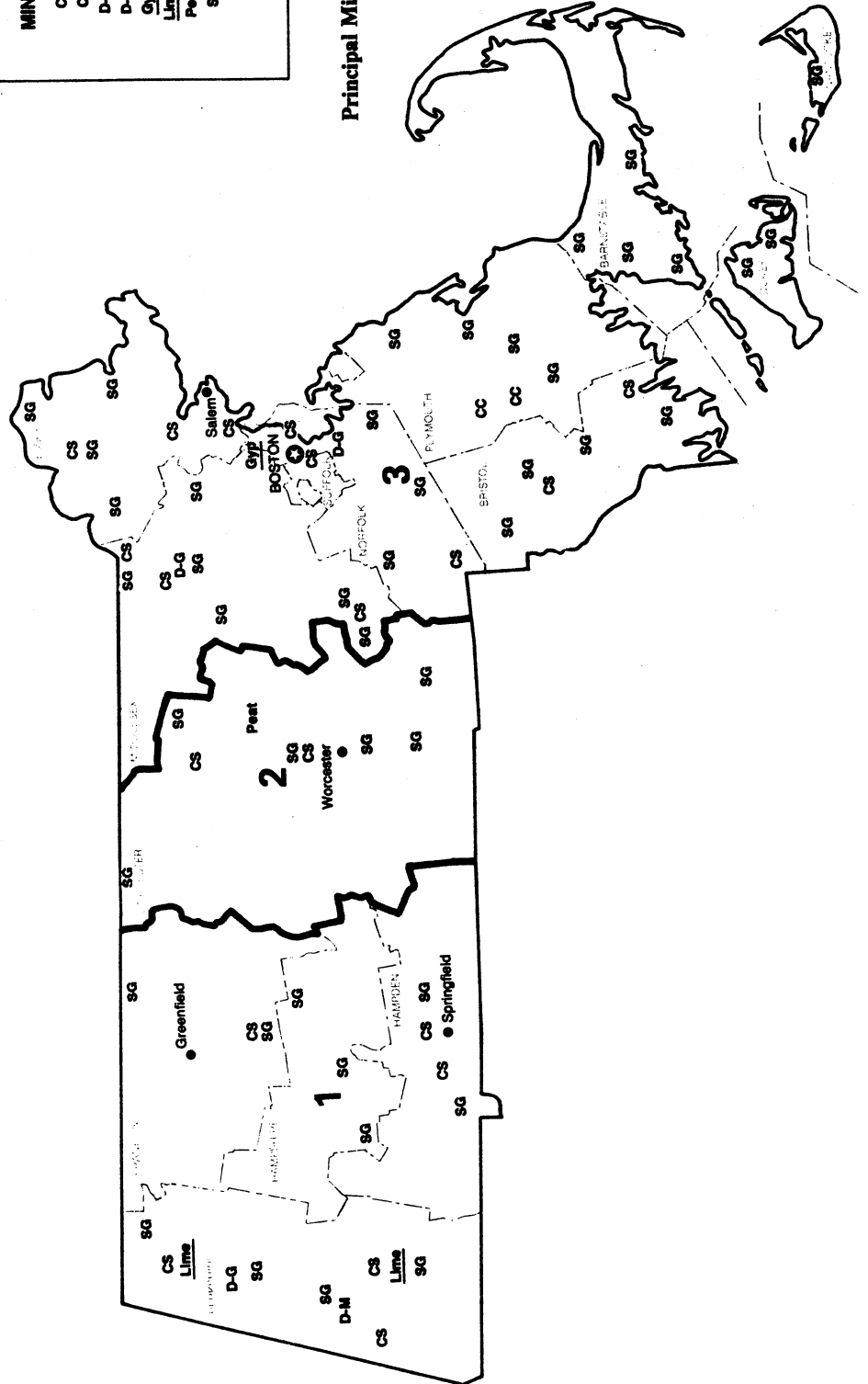
MASSACHUSETTS

LEGEND

- State boundary
- - - County boundary
- Capital
- City
- Crushed stone/sand & gravel districts

MINERAL SYMBOLS

- CC Common Clay
- CS Crushed Stone
- D-G Dimension Granite
- D-M Dimension Marble
- Gyp Gypsum plant
- Lime Lime plant
- Peat Peat
- SG Sand and Gravel



THE MINERAL INDUSTRY OF MASSACHUSETTS

This chapter has been prepared under a Memorandum of Understanding between the U.S. Bureau of Mines, U.S. Department of the Interior, and the Commonwealth of Massachusetts, Executive Office of Environmental Affairs, for collecting information on all nonfuel minerals.

By Donald K. Harrison¹ and Joseph A. Sinnott²

The value of nonfuel mineral production in 1990 was \$127.5 million, a decrease of \$16.6 million compared with the 1989 value. The combined value of crushed stone and construction sand and gravel, the State's two leading mineral commodities, accounted for 83% of the value. In 1990, the State ranked eighth among 34 States that produced dimension stone. Other commodities produced included common clay, industrial sand, lime, and peat. Industrial minerals processed or manufactured in the State included abrasives, graphite, gypsum, perlite, and vermiculite.

TRENDS AND DEVELOPMENTS

One leading indicator of the health of the State's aggregate industry was the number of construction contracts awarded. In 1990, the total value of

construction contracts was down 23% from 1989 after declining 15% from 1988 to 1989. Overbuilding in the mid-1980's had led to a collapse of the residential, commercial, and industrial construction markets. Although the value of nonbuilding construction contracts rose 14% in 1990, this was offset by declines in the value of nonresidential contracts (down 26%) and residential construction contracts (down 34%). Normally, highway construction was also a large consumer of aggregates. Because of State budgetary cuts, however, an estimated \$300 million worth of road and bridgework in the State was put on hold. As a result of fewer construction contracts and highway construction projects, output of the State's two leading mineral commodities (crushed stone and construction sand and gravel) were lower in 1990.

The long-term outlook for aggregate producers does appear brighter however,

once the combined \$10 billion Boston Harbor Cleanup and the Boston Central Artery Projects get into full swing. It was estimated that 3.8 million cubic yards of concrete would be required in the construction of the \$5 billion Central Artery-Tunnel Project. Structural steel needed would amount to 25,000 short tons, and almost 2 million square feet of ceramic tile would be needed to finish tunnel interiors.³ The State passed an additional 10-cent-per-gallon gasoline tax in the spring of 1990, which should provide additional funds for highway projects.

EMPLOYMENT

In 1990, the average number of workers⁴ employed in the mineral extractive industries in Massachusetts was 1,058. This included 449 workers in the sand and gravel industry, 300 in the stone industry, and 302 working in mills and preparation plants.

TABLE 1
NONFUEL MINERAL PRODUCTION IN MASSACHUSETTS¹

Mineral	1988		1989		1990		
	Quantity	Value (thousands)	Quantity	Value (thousands)	Quantity	Value (thousands)	
Gemstones	NA	\$1	NA	\$3	NA	\$1	
Sand and gravel:							
Construction	thousand short tons	22,168	79,364	*13,900	*57,000	12,774	51,466
Industrial	do.	W	W	34	601	30	401
Stone:							
Crushed	do.	*17,500	*91,900	11,880	67,768	*9,200	*54,500
Dimension	short tons	W	W	67,533	10,302	*56,254	*10,992
Combined value of clays (common), lime, peat, and values indicated by symbol W	XX	20,973	XX	8,452	XX	10,138	
Total	XX	192,238	XX	144,126	XX	127,498	

¹Estimated. NA Not available. W Withheld to avoid disclosing company proprietary data; value included with "Combined value" figure. XX Not applicable.

²Production as measured by mine shipments, sales, or marketable production (including consumption by producers).

LEGISLATION AND GOVERNMENT PROGRAMS

Under the State Mining and Mineral Resources Research Institute Program Act (Public Law 98-409), the U.S. Bureau of Mines awarded a basic allotment grant of \$145,000 to the Massachusetts Institute of Technology (MIT) to conduct research and training in the mineral-related disciplines. In addition to the allotment grant, \$125,745 was provided for studies of respirable dust for a total of \$270,745. Under stipulations of the act, the State of Massachusetts was required to match this grant on a 2:1 basis.

Engineers at the University of Massachusetts were planning to construct a large-scale solar energy system near the school's Amherst campus utilizing a large clay deposit as a heat storage medium. The technique, which could overcome the difficulty of storing solar energy, was explored by the U.S. Department of Energy in the 1970's as a way to heat homes, but heat leaked out of the relatively small system too fast. The Amherst system's much larger, 100,000-cubic-meter clay deposit is expected to retain and give back 85% of its stored heat. As planned, heat from the sun will be captured during the summer utilizing 6 acres of solar collectors. The heated water would then be pumped through underground pipes that interlace the clay. In the winter, the warm clay would heat water pumped into the system to 140° F. The heated water would then be pumped to a new convention center on the campus, providing 80% of the center's heating requirements. The estimated cost of the project is \$3.5 million.

Vitrifix of North America Inc., Alexandria, VA, sought approval to open a plant near Grafton to process waste asbestos by vitrifying asbestos into glass. If approved, the plant, which would be the first of its kind in the world, will convert asbestos and glass waste into a hard, reportedly nonhazardous glass product, using a 2,200° F furnace. Carcinogenic asbestos fibers are reportedly destroyed at 1,700° F. In addition to receiving local approval for

construction of the plant, the company must file an environmental notification form with the Massachusetts Environmental Policy Act (MEPA) unit.

REVIEW BY NONFUEL MINERAL COMMODITIES

Industrial Minerals

Abrasives (Manufactured).—Norton Co., the world's leading manufacturer of abrasives, produced nonmetallic abrasive products at its plant in Worcester. The company manufactured bonded and coated abrasives primarily used in the surface conditioning, cutting, shaping, and finishing of many types of materials. Primary end users included foundries and steel mills, metal fabricators, glass and ceramic grinders, stonecutters, and the construction industry.

Clays.—One company, in Plymouth County, mined common clay for the manufacture of common and face brick.

Graphite (Manufactured).—Two companies, both in Lowell, Middlesex County, produced high-modulus graphite fibers used primarily by the aerospace industry.

Gypsum (Calcined).—Crude gypsum, shipped into the State from company-owned mines in other States and Nova Scotia, was calcined by USG Corp. at Charlestown near Boston. The calcined gypsum was made into wallboard and shipped throughout New England primarily for use in residential construction.

Lime.—Two companies continued to produce lime in Berkshire County from locally quarried limestone. Primary markets for the lime included western New York and New England, with the majority shipped by truck.

In July, groundbreaking began on a \$13 million upgrading and expansion at Pfizer Inc.'s lime plant in Adams. Upgrading will include removing existing inadequate structures at the plant and

constructing a new office building and main quality control assurance laboratory, which will house a totally computerized control system. Obsolete equipment at the plant will be replaced, and a new carbonator will be built. The new equipment will enable the Adams plant to double its production of precipitated calcium carbonate, a high-grade synthetic product used primarily in the paper industry. Environmental concerns that will be addressed include increasing restoration of mined-out lands, adding muffling equipment, enclosing other machinery to reduce noise and dust emissions, and an asbestos abatement program at the plant.

Peat.—Reed-sedge peat was produced by Sterling Peat Inc., Worcester County, and was used primarily for agricultural purposes. All of the material was sold in packaged form.

Perlite (Expanded).—Crude perlite, mined in New Mexico, was expanded by Whittemore Perlite Co. Inc. at a plant in Suffolk County. The expanded perlite was used for insulation, plaster aggregate, and as a horticultural medium.

Sand and Gravel.—Construction.—Construction sand and gravel production is surveyed by the U.S. Bureau of Mines for even-numbered years only; data for odd-numbered years are based on annual company estimates. This chapter contains actual data for 1988 and 1990 and estimates for 1989.

Massachusetts construction sand and gravel statistics are compiled by geographical districts as depicted by the State map. Table 3 presents end-use data for the State's three districts.

The value of construction sand and gravel accounted for the second largest portion (40%) of the State's total mineral value. In 1990, production and value of construction sand and gravel decreased 8% and 10%, respectively, from 1989 levels. The 1990 output also represented a decrease of 42% from the alltime high output of 22.2 million tons produced in 1988. These decreases were largely

attributable to fewer construction starts and a decrease in highway construction projects.

In 1990, more than 100 companies mined construction sand and gravel in 13 counties. Leading counties, in order of output, were Middlesex, Worcester, and Norfolk. The material was used mainly for concrete aggregate, fill, and road base and coverings.

Boston Sand & Gravel Co. was awarded a 10-year contract by the Massachusetts Water Resources Authority to supply the concrete for the massive \$5 billion Boston Harbor Project. The provisions in the \$87.8 million contract state that Boston Sand & Gravel will transport by barge all raw materials to a Deer Island central mixing facility it will build. The contract also required that the company have access to, or own, an onshore location to load barges and store materials. The Boston Harbor Project includes building the second largest primary and secondary wastewater treatment facility in the Nation--an almost 6-mile-long, 11-foot-diameter, cross-harbor tunnel to transport sewage from Nut Island to Deer Island and a 9.5-mile, 24-foot-diameter ocean discharge tunnel to carry treated wastewater from Deer Island to deep-ocean waters.

Industrial.—Industrial sand was mined by one company in Plymouth County, primarily for use in molding and core and in sandblasting.

Stone.—Stone production is surveyed by the U.S. Bureau of Mines for odd-numbered years only; data for even-numbered years are based on annual company estimates. This chapter contains estimates for 1988 and 1990 and actual data for 1989.

Crushed.—Crushed stone was the State's leading mineral commodity, accounting for almost 43% of the State's total value. Estimated stone production in 1990 was 23% lower than that in 1989. The 1990 estimated output of 3.2 million tons was also 47% lower than the alltime high output of 17.5 million tons produced in 1988. Traprock (basalt)

accounted for the majority of the stone produced, followed by granite and limestone. Major uses included road base and concrete aggregates.

Dimension.—Massachusetts ranked eighth of the 34 States that reported dimension stone production. Dimension granite, used primarily for curbing, was quarried by six companies in Berkshire, Middlesex, and Plymouth Counties. Dimension marble was quarried by one company in Berkshire County and sold as rough blocks.

Vermiculite (Exfoliated).—W. R. Grace & Co. exfoliated imported vermiculite at its Easthampton plant in Hampshire County. Major uses were for insulation and fireproofing.

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²State geologist, Executive Office of Environmental Affairs, Boston, MA.

³Albee, R. The Big Dig, Boston's Central Artery Project. *ConnStruction*, Summer 1991, v. 30, No. 2, pp. 10-11.

⁴"Average number of workers" is a summary of the average number of workers at individual mining establishments during periods (not necessarily continuous) of active operations.

TABLE 2
MASSACHUSETTS: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 1990, BY MAJOR USE CATEGORY

Use	Quantity (thousand short tons)	Value (thousands)	Value per ton
Concrete aggregates (including concrete sand)	3,484	\$18,404	\$5.28
Plaster and gunite sands	72	633	8.79
Concrete products (blocks, bricks, pipe, decorative, etc.)	205	1,842	8.99
Asphaltic concrete aggregates and other bituminous mixtures	889	4,283	4.82
Road base and coverings ¹	1,345	3,814	2.84
Fill	1,164	3,308	2.84
Snow and ice control	322	1,483	4.61
Railroad ballast	W	W	5.83
Other ²	868	4,067	4.69
Unspecified: ³			
Actual	576	2,369	4.11
Estimated	3,848	11,262	2.93
Total ⁴ or average	12,774	51,466	4.03

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

¹Includes road and other stabilization (cement).

²Includes roofing granules and filtration.

³Includes production reported without a breakdown by end use and estimates for nonrespondents.

⁴Data may not add to totals shown because of independent rounding.

TABLE 3
MASSACHUSETTS: SAND AND GRAVEL SOLD OR USED BY PRODUCERS IN 1990, BY DISTRICT AND USE
(Thousand short tons and thousand dollars)

	District 1		District 2		District 3	
	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregates (including concrete sand)	764	\$3,708	552	\$2,863	2,168	\$11,833
Plaster and gunite sands	—	—	W	W	W	W
Concrete products (blocks, bricks, etc.)	W	W	—	—	W	W
Asphaltic concrete aggregates and other bituminous mixtures	W	W	W	W	657	3,423
Road base and coverings ¹	129	709	936	1,539	280	1,566
Fill	155	406	360	1,334	649	1,569
Snow and ice control	38	191	116	414	168	879
Railroad ballast	—	—	W	W	—	—
Other miscellaneous ²	396	954	122	896	859	5,552
Unspecified: ³						
Actual	270	539	25	150	281	1,680
Estimated	788	1,594	263	855	2,797	8,813
Total ⁴	2,540	8,100	2,374	8,051	7,859	35,315.00

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

¹Includes road and other stabilization (cement).

²Includes roofing granules and filtration.

³Includes production reported without a breakdown by end use and estimates for nonrespondents.

⁴Data may not add to totals shown because of independent rounding.

TABLE 4
PRINCIPAL PRODUCERS

Commodity and company	Address	Type of activity	County
Clays:			
Stiles & Hart Brick Co.	Box 367 Bridgewater, MA 02324	Pit	Plymouth.
Graphite (synthetic):			
The Stackpole Fibers Co., Inc.	Foundry Industrial Park Lowell, MA 01852	Pit	Middlesex.
Textron Corp., Avco Specialty Materials Div.	1275 King St. Box 9000 Greenwich, CT 06836	Plant	Do.
Lime:			
Lee Lime Corp. ¹	Marble St. Lee, MA 01238	Plant and quarry	Berkshire.
Pfizer Inc. ¹	260 Columbia St. Adams, MA 01220	do.	Do.
Peat:			
Sterling Peat Inc.	64 Greenland Rd. Sterling, MA 01564	Bog	Worcester.
Sand and gravel:			
Construction:			
Berkshire Concrete Co.	465 Chesire Rd. Pittsfield, MA 01201	Pits	Berkshire.
Emeral Corp.	Box 173 Millbury, MA 01527	Pit	Middlesex and Worcester.
Heffron Materials	Box 176, 68 Winter St. Reading, MA 08164	Pit	Middlesex.
P. A. Landers Inc.	Box FF Hanover, MA 02339	Pit	Plymouth.
S. M. Lorusso & Sons Inc.	230 West St. Walpole, MA 02081	Pit	Norfolk.
Industrial:			
Whitehead Bros. Co. Inc.	Box 259, River Rd. Leesburg, NJ 08327	Pit	Do.
Stone:			
Crushed (1989):			
Keating Materials Corp.	2140 Bridge St. Dracut, MA 01826	Pit	Middlesex and Worcester.
John S. Lane & Son Inc.	730 East Mountain Rd. Westfield, MA 01085	Quarries	Berkshire, Hampden, Hampshire.
S. M. Lorusso & Sons Inc.	331 West St. Walpole, MA 02081	do.	Middlesex, Norfolk, Suffolk.
Simeone Corp.	1185 Turnpike St. Stoughton, MA 02072	do.	Bristol and Norfolk.
Tilcon Inc.	Box 114 Acushnet, MA 02743	Quarry	Bristol.
Trimount Bituminous Products Co.	1935 Revere Beach Parkway Everett, MA 02149	Quarries	Essex.
Dimension:			
Fletcher Granite Co.	West Chelmsford, MA 01863	Quarry	Middlesex.
Williams Stone Co. Inc.	Box 278 East Otis, MA 01029	do.	Berkshire.

See footnotes at end of table.

TABLE 4-Continued
PRINCIPAL PRODUCERS

Commodity and company	Address	Type of activity	County
Vermiculite (exfoliated): W. R. Grace & Co.	62 Whittemore Ave. Cambridge, MA 02140	Plant	Hampshire.

¹Also stone.

