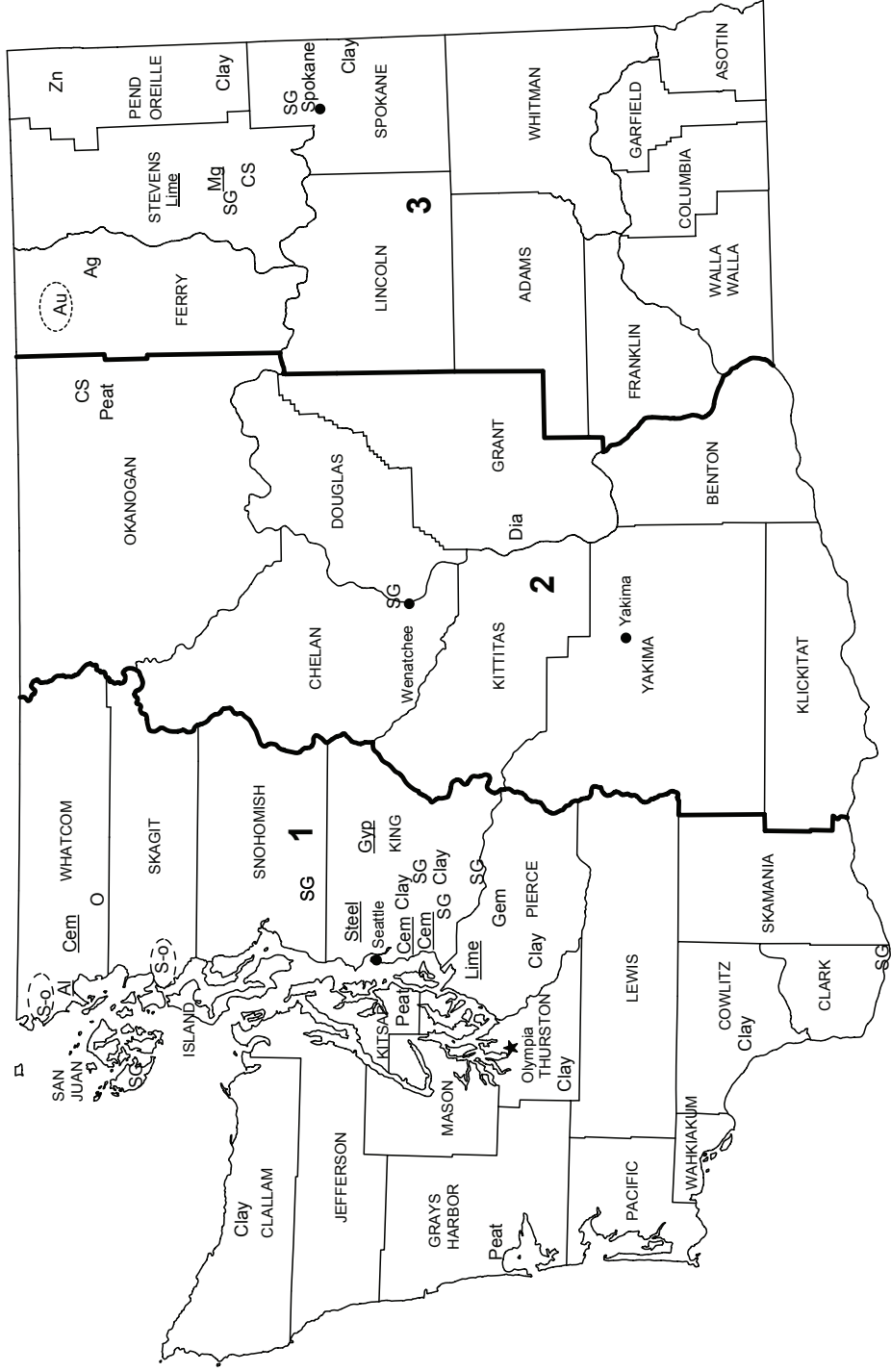


WASHINGTON



LEGEND

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

MINERAL SYMBOLS (Major producing areas)

- Ag Silver
- Al Aluminum plant
- Au Gold
- Cem Cement plant
- Clay Common clay
- CS Crushed stone
- Dia Diatomite
- Gem Gemstones
- Gyp Gypsum plant
- Lime Lime plant
- Mg Magnesium metal plant
- O Olivine
- Peat Peat
- S-o Sulfur (oil)
- SG Construction sand and gravel
- Steel Steel plant
- Zn Zinc
- Concentration of mineral operations

THE MINERAL INDUSTRY OF WASHINGTON

This chapter has been prepared under a Memorandum of Understanding between the U.S. Geological Survey and the Washington State Department of Natural Resources, Division of Geology and Earth Resources, for collecting information on all nonfuel minerals.

In 2004, Washington's nonfuel raw mineral production was valued¹ at \$507 million, based upon annual U.S. Geological Survey (USGS) data. This was a 28% increase from the State's total nonfuel mineral value for 2003,² which was down about 9% from 2002. The State rose to 30th from 33d in rank among the 50 States in total nonfuel mineral production value, of which Washington accounted for more than 1% of the U.S. total value.

In 2004, based upon value, Washington's leading nonfuel mineral commodities were construction sand and gravel, portland cement, crushed stone, gold, and zinc; the two aggregate commodities accounted for nearly 60% of the State's total nonfuel mineral value. Primary metal mine production resumed in the State in 2004 with the reopening of Teck Cominco Limited's Pend Oreille Mine in northeastern Washington and the resumption of mine production at Kinross Gold Corporation's Kettle River Mine. Teck Cominco began commercial zinc and lead production in August, and Kinross Gold produced gold and silver in 2004 following the recommencing of operations at Kettle River in late 2003.

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 2004 USGS mineral production data published in this chapter are those available as of December 2005. All USGS Mineral Industry Surveys and USGS Minerals Yearbook chapters—mineral commodity, State, and country—also can be retrieved over the Internet at URL <http://minerals.usgs.gov/minerals>.

²Values, percentage calculations, and rankings for 2003 may differ from the Minerals Yearbook, Area Reports: Domestic 2003, Volume II, owing to the revision of preliminary 2003 to final 2003 data. Data and rankings for 2004 are considered to be final and are not likely to change significantly.

In 2004, nearly every nonfuel mineral commodity showed increases in production and value. Increases in the values of gold, zinc, portland cement, and construction sand and gravel (up \$11 million), in descending order of change, led in the State's increase in total value for the year (table 1). Smaller yet significant increases also took place in the values of lead, lime, and crushed stone (up \$2.4 million). The only decrease in production and commodity value was in industrial sand and gravel; the value of gemstones was unchanged.

In 2003, small increases took place in the values of industrial sand and gravel, olivine, and common clays; the value of gemstones rose by 52%. But all other mineral commodities showed decreases in value, the largest decreases of which were in the values of portland cement, gold (down \$9.8 million), construction sand and gravel (down \$7 million), crushed stone (down \$6.2 million), lime, and diatomite (descending order of change) (table 1).

In 2004, Washington continued to be first of 2 olivine-producing States, fourth in the quantities of diatomite produced, fourth in lead, sixth of 10 gold-producing States, and ninth in the production of silver. The State rose to third in the production of zinc in 2004 from no reported production in 2003, and although production of construction sand and gravel increased by 2%, the State decreased in rank to ninth from seventh. Additionally, Washington continued to be a significant producer of portland cement, crushed stone, and industrial sand and gravel. Primary aluminum and raw steel were produced in the State, but both metals were processed from materials acquired from foreign and other domestic sources. In 2004, the State continued to rank 10th in the production of primary aluminum.

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

(Thousand metric tons and thousand dollars unless otherwise specified)

Mineral	2002		2003		2004	
	Quantity	Value	Quantity	Value	Quantity	Value
Clays, common	89	169	83	204	W	W
Gemstones	NA	29	NA	44	NA	44
Gold ³ kilograms	980	9,810	--	--	W	W
Sand and gravel, construction	43,200	223,000	40,700	216,000	41,500	227,000
Silver ³ kilograms	729	108	--	--	W	W
Stone, crushed	13,700	79,900	12,000	73,700	12,300	76,100
Combined values of cement (portland), diatomite, lead (2004), lime, olivine, peat, sand and gravel (industrial), stone [dimension miscellaneous (2004)], zinc (2004), and values indicated by symbol W	XX	124,000	XX	107,000	XX	205,000
Total	XX	437,000	XX	396,000	XX	507,000

NA Not available. W Withheld to avoid disclosing company proprietary data. Withheld values included in "Combined values" data. XX Not applicable. -- Zero.

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.

³Recoverable content of ores, etc.

TABLE 2
WASHINGTON: CRUSHED STONE SOLD OR USED, BY KIND¹

Kind	2002				2003				2004			
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value
Limestone ²	10	1,920	\$11,200	\$5.82	9	1,690	\$10,000	\$5.94	18	2,000	\$12,700	\$6.34
Dolomite	24 ^r	535 ^r	2,520 ^r	4.72	21	205	1,020	4.96	23	201	916	4.56
Marble	2 ^r	W	W	7.87 ^r	2	W	W	7.43	2	W	W	7.25
Granite	6	1,040	5,860	5.66	8	925	5,250	5.67	7	862	4,860	5.63
Sandstone	6	296	1,840	6.20	3	344	1,820	5.29	3	303	1,560	5.13
Traprock	81 ^r	8,970 ^r	53,200 ^r	5.93	80	8,050	51,200	6.36	56	8,260	52,600	6.38
Volcanic cinder and scoria	1	W	W	8.22	1	W	W	5.51	1	W	W	5.51
Slate	1	W	W	3.69	1	W	W	6.54	1	W	W	5.79
Miscellaneous stone	11 ^r	613 ^r	2,590 ^r	4.22 ^r	8	302	1,090	3.61	6	311	1,080	3.49
Total or average	XX	13,700	79,900	5.82	XX	12,000	73,700	6.14	XX	12,300	76,100	6.19

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

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

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

TABLE 3a
 WASHINGTON: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2003, BY USE¹

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Construction:			
Coarse aggregate (+1½ inch):			
Macadam	W	W	\$5.14
Riprap and jetty stone	284	\$1,920	6.75
Filter stone	5	55	11.00
Other coarse aggregates	29	153	5.28
Total or average	318	2,120	6.68
Coarse aggregate, graded:			
Concrete aggregate, coarse	(2)	(2)	8.82
Bituminous aggregate, coarse	184	1,050	5.70
Bituminous surface-treatment aggregate	227	978	4.31
Railroad ballast	115	586	5.10
Other graded coarse aggregates	179	1,230	6.89
Total or average	705	3,850	5.46
Fine aggregate (-¾ inch):			
Stone sand, concrete	(3)	(3)	5.50
Screening, undesignated	82	312	3.80
Other fine aggregates	40	229	5.73
Total or average	122	541	4.43
Coarse and fine aggregate:			
Graded road base or subbase	792	3,660	4.61
Unpaved road surfacing	383	2,710	7.06
Crusher run or fill or waste	49	240	4.90
Other coarse and fine aggregates	494	2,160	4.38
Total or average	1,720	8,760	5.10
Agricultural:			
Agricultural limestone	(4)	(4)	5.16
Poultry grit and mineral food	(4)	(4)	4.96
Other agricultural uses	(4)	(4)	5.74
Total or average	6	32	5.33
Chemical and metallurgical:			
Flux stone	(5)	(5)	6.92
Glass manufacture	(5)	(5)	4.41
Special:			
Asphalt fillers or extenders	(4)	(4)	9.64
Whiting or whiting substitute	(4)	(4)	5.02
Other fillers or extenders	(4)	(4)	9.02
Total or average	374	3,160	8.44
Unspecified:⁶			
Reported	4,630	32,100	6.93
Estimated	3,800	22,000	5.66
Total or average	8,470	53,800	6.36
Grand total or average	12,000	73,700	6.14

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

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

²Withheld to avoid disclosing company proprietary data; included with "Other graded coarse aggregates."

³Withheld to avoid disclosing company proprietary data; included with "Other fine aggregates."

⁴Withheld to avoid disclosing company proprietary data; included in "Total or average."

⁵Withheld to avoid disclosing company proprietary data; included in "Grand total or average."

⁶Reported and estimated production without a breakdown by end use.

TABLE 3b
WASHINGTON: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2004, BY USE¹

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Construction:			
Coarse aggregate (+1½ inch):			
Macadam	W	W	\$5.14
Riprap and jetty stone	250	\$1,810	7.24
Filter stone	W	W	12.13
Total or average	285	2,030	7.13
Coarse aggregate, graded:			
Concrete aggregate, coarse	W	W	8.29
Bituminous aggregate, coarse	W	W	5.38
Bituminous surface-treatment aggregate	59	437	7.41
Railroad ballast	81	536	6.62
Other graded coarse aggregates	2	20	10.00
Total or average	289	1,930	6.69
Fine aggregate (-¾ inch):			
Stone sand, concrete	W	W	7.28
Screening, undesignated	W	W	4.93
Other fine aggregates	7	55	7.86
Total or average	32	222	6.94
Coarse and fine aggregate:			
Graded road base or subbase	408	2,110	5.16
Unpaved road surfacing	704	3,320	4.72
Crusher run or fill or waste	W	W	6.62
Roofing granules	W	W	4.43
Other coarse and fine aggregates	328	1,230	3.74
Total or average	1,480	6,940	4.68
Other construction materials	29	129	4.45
Agricultural, limestone	(2)	(2)	5.14
Chemical and metallurgical:			
Cement manufacture	W	W	3.86
Lime manufacture	W	W	13.78
Flux stone	W	W	8.72
Chemical stone	W	W	16.54
Glass manufacture	W	W	4.41
Total or average	365	2,680	7.34
Special, asphalt fillers or extenders	(2)	(2)	8.82
Unspecified:³			
Reported	5,290	36,000	6.80
Estimated	4,500	26,000	5.81
Total or average	9,790	62,100	6.34
Grand total or average	12,300	76,100	6.19

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

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

²Withheld to avoid disclosing company proprietary data; included in "Grand total or average."

³Reported and estimated production without a breakdown by end use.

TABLE 4a
WASHINGTON: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2003, BY USE AND DISTRICT¹

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3		Unspecified districts	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Construction:								
Coarse aggregate (+1½ inch) ²	307	2,040	3	33	8	50	--	--
Coarse aggregate, graded ³	272	1,720	W	W	W	W	231	866
Fine aggregate (-¾ inch) ⁴	W	W	--	--	W	W	--	--
Coarse and fine aggregate ⁵	1,370	6,920	102	553	245	1,290	--	--
Agricultural ⁶	W	W	W	W	W	W	--	--
Chemical and metallurgical ⁷	--	--	--	--	W	W	--	--
Special ⁸	W	W	W	W	W	W	--	--
Unspecified: ⁹								
Reported	1,710	9,990	1,600	12,300	1,150	8,900	163	864
Estimated	3,400	19,000	360	2,100	100	510	--	--
Total	7,250	41,500	2,390	17,200	1,960	13,300	394	1,730

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, macadam, riprap and jetty stone, and other coarse aggregates.

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

⁴Includes screening (undesignated), stone sand (concrete), and other fine aggregates.

⁵Includes crusher run (select material or fill), graded road base or subbase, unpaved road surfacing, and other coarse and fine aggregates.

⁶Includes agricultural limestone, poultry grit and mineral food, and other agricultural uses.

⁷Includes flux stone and glass manufacture.

⁸Includes asphalt fillers or extenders, whitening or whitening substitute, and other fillers or extenders.

⁹Reported and estimated production without a breakdown by end use.

TABLE 4b
WASHINGTON: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2004, BY USE AND DISTRICT¹

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3		Unspecified districts	
	Quantity	Value	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	--	--
Coarse and fine aggregate ⁵	W	W	W	W	W	W	--	--
Other construction materials	28	125	1	4	--	--	--	--
Agricultural ⁶	--	--	--	--	W	W	--	--
Chemical and metallurgical ⁷	W	W	--	--	W	W	--	--
Special ⁸	--	--	--	--	W	W	--	--
Unspecified: ⁹								
Reported	1,890	11,000	1,740	13,200	1,240	9,530	432	2,290
Estimated	3,900	22,000	530	3,400	100	400	--	--
Total	7,530	43,400	2,320	16,800	2,010	13,600	432	2,290

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, macadam, and riprap and jetty stone.

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

⁴Includes screening (undesignated), stone sand (concrete), and other fine aggregates.

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

⁶Includes agricultural limestone.

⁷Includes cement and lime manufacture, chemical stone, flux stone, and glass manufacture.

⁸Includes asphalt fillers or extenders.

⁹Reported and estimated production without a breakdown by end use.

TABLE 5a
 WASHINGTON: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2003,
 BY MAJOR USE CATEGORY¹

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate (including concrete sand)	9,610	\$65,100	\$6.77
Plaster and gunite sands	262	1,830	6.97
Concrete products (blocks, bricks, pipe, decorative, etc.)	93	1,220	13.14
Asphaltic concrete aggregates and other bituminous mixtures	1,870	11,300	6.07
Road base and coverings ²	7,590	39,600	5.22
Fill	5,880	24,900	4.24
Snow and ice control	86	314	3.65
Railroad ballast	166	918	5.53
Other miscellaneous uses	170	1,060	6.22
Unspecified: ³			
Reported	7,810	35,700	4.57
Estimated	7,200	34,000	4.68
Total or average	40,700	216,000	5.29

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

²Includes road and other stabilization (lime).

³Reported and estimated production without a breakdown by end use.

TABLE 5b
 WASHINGTON: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2004,
 BY MAJOR USE CATEGORY¹

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate (including concrete sand)	9,670	\$63,100	\$6.52
Plaster and gunite sands	29	252	8.68
Concrete products (blocks, bricks, pipe, decorative, etc.)	2	15	8.82
Asphaltic concrete aggregates and other bituminous mixtures	1,530	10,300	6.70
Road base and coverings	6,720	35,500	5.29
Fill	5,990	25,300	4.22
Snow and ice control	78	307	3.94
Railroad ballast	209	1,230	5.88
Other miscellaneous uses ²	313	2,520	8.06
Unspecified: ³			
Reported	7,990	39,400	4.94
Estimated	9,000	49,000	5.42
Total or average	41,500	227,000	5.46

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

²Includes filtration and roofing granules.

³Reported and estimated production without a breakdown by end use.

TABLE 6a
WASHINGTON: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2003, BY USE AND DISTRICT¹

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3	
	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregate (including concrete sand)	8,870	60,800	537	3,080	206	1,190
Concrete products (blocks, bricks, pipe, decorative, etc.) ²	353	3,030	1	5	1	10
Asphaltic concrete aggregates and other bituminous mixtures	1,310	7,310	347	1,460	111	2,180
Road base and coverings ³	5,600	31,300	1,120	5,020	777	2,970
Fill	5,650	24,200	W	W	W	W
Other miscellaneous uses ⁴	302	1,860	162	580	186	577
Unspecified: ⁵						
Reported	2,150	10,400	934	4,680	4,710	20,600
Estimated	6,200	28,000	700	3,700	300	1,600
Total	30,400	167,000	3,810	18,500	6,340	29,100
	Unspecified districts					
	Quantity	Value				
Concrete aggregate (including concrete sand)	--	--				
Concrete products (blocks, bricks, pipe, decorative, etc.) ²	--	--				
Asphaltic concrete aggregates and other bituminous mixtures	98	380				
Road base and coverings ³	84	279				
Fill	--	--				
Other miscellaneous uses ⁴	--	--				
Unspecified: ⁵						
Reported	5	8				
Estimated	--	--				
Total	186	666				

W Withheld to avoid disclosing company proprietary data; included in "Other miscellaneous uses." -- 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 railroad ballast and snow and ice control.

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

TABLE 6b
 WASHINGTON: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2004, 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 (including concrete sand)	9,110	59,400	519	3,360	42	300
Concrete products (blocks, bricks, pipe, decorative, etc.) ²	29	254	--	--	2	13
Asphaltic concrete aggregates and other bituminous mixtures	1,190	8,920	W	W	W	W
Road base and coverings	4,730	26,200	1,100	5,320	721	3,040
Fill	5,690	24,100	192	638	39	171
Snow and ice control	W	W	W	W	48	122
Other miscellaneous uses ³	488	3,560	292	1,130	81	381
Unspecified: ⁴						
Reported	1,840	10,100	1,740	8,460	4,380	20,700
Estimated	8,000	44,000	460	2,500	560	2,600
Total	31,100	176,000	4,300	21,400	5,880	27,400
	Unspecified districts					
	Quantity	Value				
Concrete aggregates (including concrete sand)	--	--				
Concrete products (blocks, bricks, pipe, decorative, etc.) ²	--	--				
Asphaltic concrete aggregates and other bituminous mixtures	--	--				
Road base and coverings	169	1,030				
Fill	67	382				
Snow and ice control	--	--				
Other miscellaneous uses ³	32	195				
Unspecified: ⁴						
Reported	36	194				
Estimated	5	8				
Total	309	1,810				

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

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

²Includes plaster and gunite sands.

³Includes filtration, railroad ballast, and roofing granules.

⁴Reported and estimated production without a breakdown by end use.