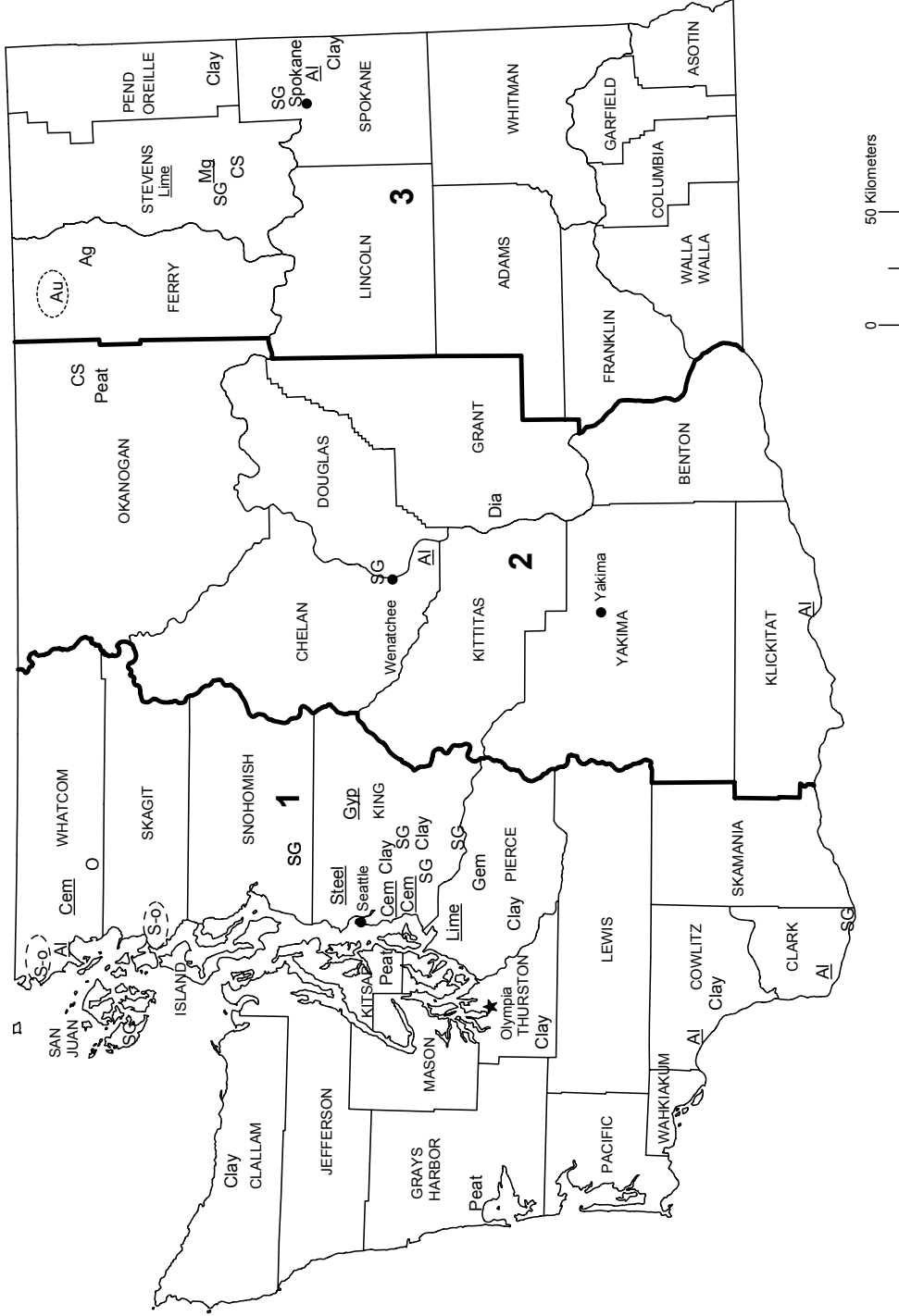


# WASHINGTON



## 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
- 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 2003, the estimated value<sup>1</sup> of nonfuel mineral production for Washington was \$430 million, based upon preliminary U.S. Geological Survey (USGS) data. This was about a 1.5% decrease from that of 2002<sup>2</sup> and followed a 12.2% decrease from 2001 to 2002. The State remained 31st in rank among the 50 States in total nonfuel raw mineral production value, of which Washington accounted for more than 1% of the U.S. total.

In 2003, based on value, Washington's leading nonfuel mineral commodities were construction sand and gravel, portland cement, and crushed stone; the two aggregate commodities accounted for about 69% of the State's total nonfuel mineral value. Diatomite was next, the total value for these four mineral commodities being about 95% of the State's

total nonfuel mineral value, followed by lime, and industrial sand and gravel (table 1).

In 2002, the decrease in value mostly resulted from the cessation of magnesium metal and gold production and drops in the production and values of lime, olivine, and crushed stone. Increases took place in the production of portland cement and construction sand and gravel, the values of which were up about \$6 million and \$3 million, respectively. All other changes were significantly smaller and inconsequential to the net result (table 1).

Based upon USGS estimates of the quantities produced in the 50 States in 2003, Washington continued to be second of 2 olivine-producing States, fourth of 4 States that produce diatomite, and seventh in construction sand and gravel. Additionally, the State was a significant producer of portland cement and crushed stone.

In 2003, the State increased in rank to 10th from 11th in the production of primary aluminum. (The primary aluminum and raw steel that were produced in Washington were processed from materials obtained from other domestic and foreign sources.) Following a 25% decrease in production from 2001 to 2002, primary aluminum production significantly increased in 2003, up by more than 50%, mostly owing to increases in aluminum prices. Owing to highly escalated energy costs, the production of primary aluminum in Washington had precipitously dropped in 2001; the significant decrease resulted from the closing of most of the State's primary aluminum plants. For many years prior to 2001, Washington had been (by far) first in the Nation in the production of primary aluminum; in 2000, the State accounted for about 1.05 million metric tons, or nearly 30% of the U.S. total primary production of the metal.

<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. For some mineral commodities, such as construction sand and gravel, crushed stone, and portland cement, 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.

TABLE 1  
NONFUEL RAW MINERAL PRODUCTION IN WASHINGTON<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   |
| Clays, common   | 89       | 258     | 89       | 169     | 89                | 169     |
| Gemstones   | NA       | 25      | NA       | 29      | NA                | 29      |
| Gold <sup>3</sup> kilograms   | 1,700    | 14,900  | 980      | 9,810   | --                | --      |
| Sand and gravel, construction   | 41,400   | 220,000 | 43,200   | 223,000 | 42,000            | 218,000 |
| Silver <sup>3</sup> kilograms   | --       | --      | 729      | 108     | --                | --      |
| Stone, crushed  | 14,100   | 84,300  | 13,700   | 79,900  | 13,400            | 79,100  |
| Combined values of cement (portland), diatomite, lime, magnesium metal (2001), olivine, peat, sand and gravel (industrial), and stone (dimension miscellaneous) | XX       | 178,000 | XX       | 124,000 | XX                | 133,000 |
| Total   | XX       | 498,000 | XX       | 437,000 | XX                | 430,000 |

<sup>p</sup>Preliminary. NA Not available. XX Not applicable. -- Zero.

<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>Recoverable content of ores, etc.

TABLE 2  
WASHINGTON: 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>     | 10 <sup>r</sup>    | 1,900 <sup>r</sup>              | \$10,400 <sup>r</sup> | \$5.48 <sup>r</sup> | 10                 | 1,920                           | \$11,200          | \$5.82     |
| Dolomite                   | 17                 | 561                             | 2,620                 | 4.67                | 25                 | 537                             | 2,530             | 4.72       |
| Marble                     | 1                  | W                               | W                     | 8.82                | 1                  | W                               | W                 | 9.46       |
| Granite                    | 10 <sup>r</sup>    | 1,270 <sup>r</sup>              | 6,900 <sup>r</sup>    | 5.42 <sup>r</sup>   | 6                  | 1,040                           | 5,860             | 5.66       |
| Sandstone                  | 6 <sup>r</sup>     | W                               | W                     | 14.41 <sup>r</sup>  | 6                  | W                               | W                 | 6.20       |
| Traprock                   | 71 <sup>r</sup>    | 9,120 <sup>r</sup>              | 55,200 <sup>r</sup>   | 6.05 <sup>r</sup>   | 83                 | 8,990                           | 53,300            | 5.93       |
| Volcanic cinder and scoria | 1                  | W                               | W                     | 6.47                | 1                  | W                               | W                 | 8.22       |
| Miscellaneous stone        | 9                  | 580                             | 2,470                 | 4.26                | 12                 | 697                             | 3,030             | 4.34       |
| Total or average           | XX                 | 14,100                          | 84,300                | 6.00                | XX                 | 13,700                          | 79,900            | 5.82       |

<sup>r</sup>Revised. 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  
WASHINGTON: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2002, BY USE<sup>1</sup>

| Use                                    | Quantity<br>(thousand<br>metric tons) | Value<br>(thousands) | Unit<br>value |
|--|---------------------------------------|----------------------|---------------|
| <b>Construction:</b>                   |                                       |                      |               |
| <b>Coarse aggregate (+1 1/2 inch):</b> |                                       |                      |               |
| Macadam                                | W                                     | W                    | \$8.59        |
| Riprap and jetty stone                 | 64                                    | \$511                | 7.98          |
| Filter stone                           | 12                                    | 93                   | 7.75          |
| Other coarse aggregates                | 122                                   | 774                  | 6.34          |
| Total or average                       | 198                                   | 1,380                | 6.96          |
| <b>Coarse aggregate, graded:</b>       |                                       |                      |               |
| Concrete aggregate, coarse             | (2)                                   | (2)                  | 4.19          |
| Bituminous aggregate, coarse           | (2)                                   | (2)                  | 8.27          |
| Bituminous surface treatment aggregate | (2)                                   | (2)                  | 4.24          |
| Railroad ballast                       | 48                                    | 276                  | 5.75          |
| Other graded coarse aggregates         | 25                                    | 126                  | 5.04          |
| Total or average                       | 104                                   | 609                  | 5.86          |
| <b>Fine aggregate (-3/8 inch):</b>     |                                       |                      |               |
| Stone sand, concrete                   | (2)                                   | (2)                  | 3.69          |
| Screening, undesignated                | (2)                                   | (2)                  | 5.15          |
| Other fine aggregates                  | 9                                     | 53                   | 5.89          |
| Total or average                       | 82                                    | 413                  | 5.04          |
| <b>Coarse and fine aggregate:</b>      |                                       |                      |               |
| Graded road base or subbase            | 641                                   | 2,780                | 4.33          |
| Unpaved road surfacing                 | 331                                   | 1,820                | 5.49          |
| Terrazzo and exposed aggregate         | W                                     | W                    | 9.92          |
| Crusher run or fill or waste           | 102                                   | 444                  | 4.37          |
| Other coarse and fine aggregates       | 764                                   | 3,240                | 4.23          |
| Total or average                       | 1,840                                 | 8,270                | 4.50          |
| Other construction materials           | 91                                    | 840                  | 9.23          |
| <b>Agricultural:</b>                   |                                       |                      |               |
| Agricultural limestone                 | (2)                                   | (2)                  | 3.86          |
| Other agricultural uses                | (2)                                   | (2)                  | 5.95          |
| Total or average                       | 5                                     | 21                   | 4.20          |
| <b>Chemical and metallurgical:</b>     |                                       |                      |               |
| Cement manufacture                     | (2)                                   | (2)                  | 3.53          |
| Flux stone                             | (2)                                   | (2)                  | 13.17         |
| Chemical stone for alkali works        | (2)                                   | (2)                  | 3.53          |
| Total or average                       | 69                                    | 847                  | 12.28         |
| <b>Special:</b>                        |                                       |                      |               |
| Asphalt fillers or extenders           | (2)                                   | (2)                  | 9.43          |
| Other fillers or extenders             | (2)                                   | (2)                  | 10.53         |
| Total or average                       | 135                                   | 1,420                | 10.53         |
| <b>Other miscellaneous uses:</b>       |                                       |                      |               |
| Glass manufacture                      | (3)                                   | (3)                  | 4.74          |
| Other uses not listed                  | (4)                                   | (4)                  | 8.27          |
| <b>Unspecified:<sup>5</sup></b>        |                                       |                      |               |
| Reported                               | 5,010                                 | 34,400               | 6.86          |
| Estimated                              | 6,100                                 | 31,000               | 5.13          |
| Total or average                       | 11,100                                | 65,700               | 5.91          |
| Grand total or average                 | 13,700                                | 79,900               | 5.82          |

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

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

<sup>3</sup>Withheld to avoid disclosing company proprietary data; included in "Grand total."

<sup>4</sup>Less than 1/2 unit.

<sup>5</sup>Reported and estimated production without a breakdown by end use.

TABLE 4  
WASHINGTON: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2002, BY USE AND DISTRICT<sup>1</sup>

(Thousand metric tons and thousand dollars)

| Use   | District 1 |        | District 2 |        | District 3 |        | Unspecified districts |       |
|---|------------|--------|------------|--------|------------|--------|-----------------------|-------|
|   | Quantity   | Value  | Quantity   | Value  | Quantity   | Value  | Quantity              | Value |
| <b>Construction:</b>                        |            |        |            |        |            |        |                       |       |
| Coarse aggregate (+1 1/2 inch) <sup>2</sup> | 91         | 661    | W          | W      | W          | W      | 103                   | 681   |
| Coarse aggregate, graded <sup>3</sup>       | 82         | 489    | W          | W      | W          | W      | --                    | --    |
| Fine aggregate (-3/8 inch) <sup>4</sup>     | 36         | 163    | W          | W      | W          | W      | --                    | --    |
| Coarse and fine aggregate <sup>5</sup>      | 1,470      | 6,190  | 289        | 1,720  | 75         | 361    | --                    | --    |
| Other construction materials                | 48         | 284    | 18         | 179    | 25         | 377    | --                    | --    |
| Agricultural <sup>6</sup>                   | --         | --     | W          | W      | W          | W      | --                    | --    |
| Chemical and metallurgical <sup>7</sup>     | W          | W      | --         | --     | W          | W      | --                    | --    |
| Special <sup>8</sup>                        | --         | --     | W          | W      | W          | W      | --                    | --    |
| Other miscellaneous uses <sup>9</sup>       | --         | --     | W          | W      | --         | --     | --                    | --    |
| <b>Unspecified:<sup>10</sup></b>            |            |        |            |        |            |        |                       |       |
| Reported                                    | 1,960      | 12,200 | 1,580      | 11,800 | 1,120      | 8,470  | 347                   | 1,830 |
| Estimated                                   | 4,100      | 22,000 | 390        | 2,200  | 1,200      | 5,500  | 460                   | 1,700 |
| Total                                       | 7,760      | 41,900 | 2,470      | 17,500 | 2,590      | 16,300 | 912                   | 4,230 |

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

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

<sup>2</sup>Includes filter stone, macadam, riprap and jetty stone, and other coarse aggregates.

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

<sup>4</sup>Includes screening (undesignated), stone sand (concrete), and other fine aggregates.

<sup>5</sup>Includes crusher run (select material or fill), graded road base or subbase, terrazzo and exposed aggregate, unpaved road surfacing, and other coarse and fine aggregates.

<sup>6</sup>Includes agricultural limestone and other agricultural uses.

<sup>7</sup>Includes cement manufacture, chemical stone for alkali works, and flux stone.

<sup>8</sup>Includes asphalt fillers or extenders and other fillers or extenders.

<sup>9</sup>Includes glass manufacture and other specified uses not listed.

<sup>10</sup>Reported and estimated production without a breakdown by end use.

TABLE 5  
WASHINGTON: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2002,  
BY MAJOR USE CATEGORY<sup>1</sup>

| Use   | Quantity                  | Value<br>(thousands) | Unit<br>value |
|---|---------------------------|----------------------|---------------|
|   | (thousand<br>metric tons) |                      |               |
| Concrete aggregate (including concrete sand)                            | 7,810                     | \$53,000             | \$6.78        |
| Concrete products (blocks, bricks, pipe, decorative, etc.) <sup>2</sup> | 152                       | 1,710                | 11.24         |
| Asphaltic concrete aggregates and other bituminous mixtures             | 1,840                     | 10,100               | 5.49          |
| Road base and coverings   | 7,700                     | 36,100               | 4.68          |
| Fill  | 6,740                     | 23,000               | 3.41          |
| Snow and ice control  | 105                       | 449                  | 4.28          |
| Railroad ballast  | 139                       | 774                  | 5.57          |
| Other miscellaneous uses  | 220                       | 1,340                | 6.09          |
| <b>Unspecified:<sup>3</sup></b>   |                           |                      |               |
| Reported  | 8,220                     | 40,400               | 4.92          |
| Estimated   | 10,000                    | 56,000               | 5.47          |
| Total or average  | 43,200                    | 223,000              | 5.16          |

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

TABLE 6  
 WASHINGTON: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2002, BY USE AND DISTRICT<sup>1</sup>

(Thousand metric tons and thousand dollars)

| Use   | District 1            |         | District 2 |        | District 3 |        |
|---|-----------------------|---------|------------|--------|------------|--------|
|   | Quantity              | Value   | Quantity   | Value  | Quantity   | Value  |
| Concrete aggregate (including concrete sand)                            | 6,390                 | 45,400  | 907        | 4,950  | 520        | 2,640  |
| Concrete products (blocks, bricks, pipe, decorative, etc.) <sup>2</sup> | 124                   | 1,550   | W          | W      | W          | W      |
| Asphaltic concrete aggregates and other bituminous mixtures             | 1,190                 | 7,130   | 414        | 1,960  | 245        | 1,020  |
| Road base and coverings   | 4,720                 | 23,200  | 1,520      | 6,910  | 1,450      | 6,000  |
| Fill  | 6,520                 | 22,100  | 72         | 316    | 147        | 558    |
| Snow and ice control  | W                     | W       | W          | W      | 73         | 234    |
| Other miscellaneous uses <sup>3</sup>                                   | 324                   | 1,940   | 76         | 410    | 19         | 136    |
| Unspecified: <sup>4</sup>   |                       |         |            |        |            |        |
| Reported  | 3,910                 | 23,000  | 15         | 25     | 4,030      | 15,900 |
| Estimated   | 8,900                 | 50,000  | 790        | 3,800  | 610        | 2,100  |
| Total   | 32,100                | 175,000 | 3,790      | 18,400 | 7,090      | 28,600 |
|   | Unspecified districts |         |            |        |            |        |
|   | Quantity              | Value   |            |        |            |        |
| Concrete aggregate (including concrete sand)                            | --                    | --      |            |        |            |        |
| Concrete products (blocks, bricks, pipe, decorative, etc.) <sup>2</sup> | --                    | --      |            |        |            |        |
| Asphaltic concrete aggregates and other bituminous mixtures             | --                    | --      |            |        |            |        |
| Road base and coverings   | --                    | --      |            |        |            |        |
| Fill  | --                    | --      |            |        |            |        |
| Snow and ice control  | --                    | --      |            |        |            |        |
| Other miscellaneous uses <sup>3</sup>                                   | --                    | --      |            |        |            |        |
| Unspecified: <sup>4</sup>   |                       |         |            |        |            |        |
| Reported  | 261                   | 1,500   |            |        |            |        |
| Estimated   | --                    | --      |            |        |            |        |
| Total   | 261                   | 1,500   |            |        |            |        |

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

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

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

<sup>3</sup>Includes railroad ballast.

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