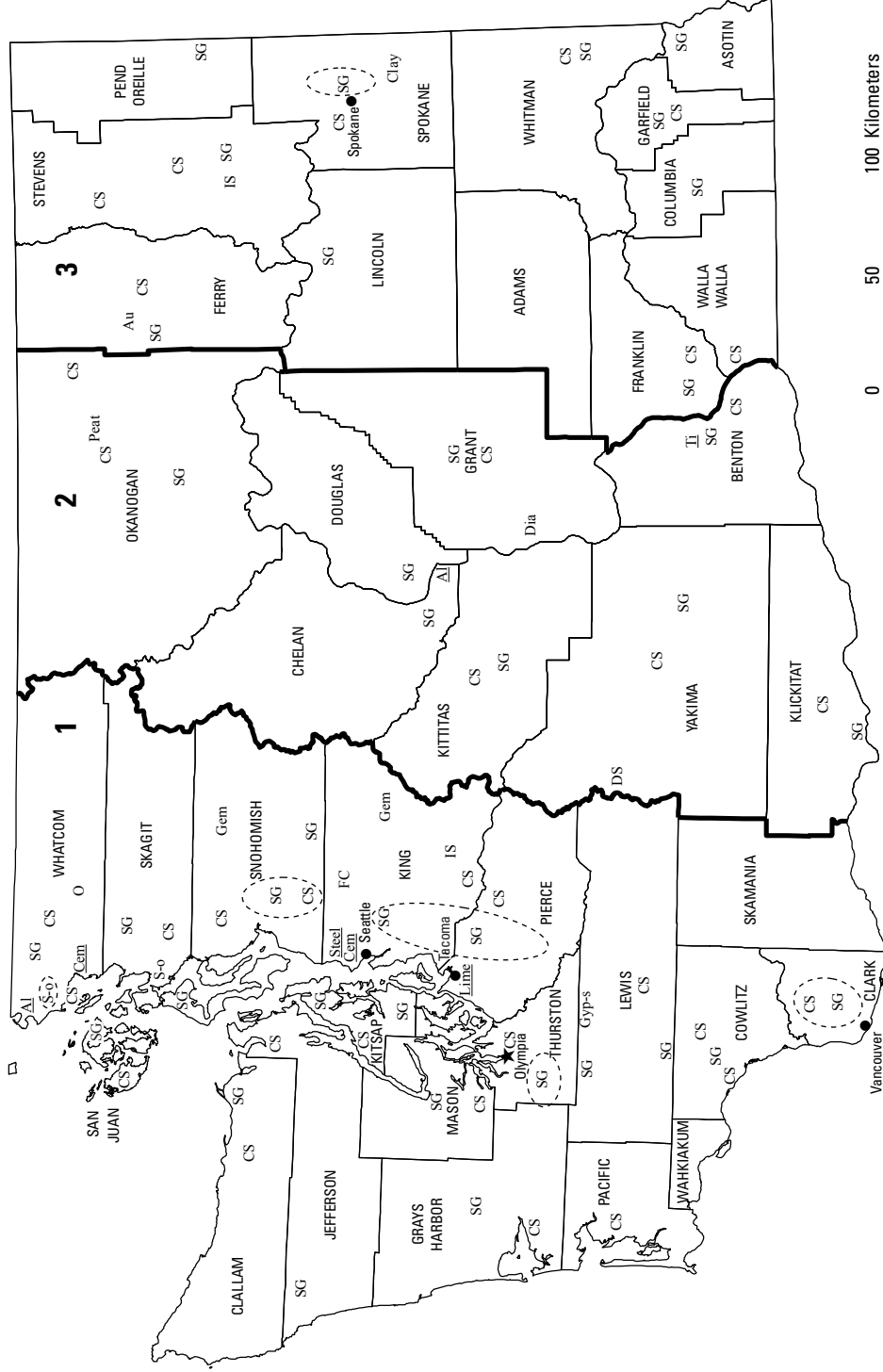




2010–2011 Minerals Yearbook

WASHINGTON

WASHINGTON



LEGEND

- County boundary
- ★ Capital
- City
- Crushed stone/sand and gravel district boundary

MINERAL SYMBOLS (Principal producing areas)

- Al Aluminum plant
- Au Gold
- Cem Cement plant
- Clay Common clay
- CS Crushed stone
- Dia Diatomite
- DS Dimension stone
- FC Fire clay
- Gem Gemstones
- Gyp-s Synthetic gypsum
- IS Industrial sand
- Lime Lime plant
- O Olivine
- Peat Peat
- SG Construction sand and gravel
- S-o Sulfur (oil)
- Steel Steel plant
- Ti Titanium metal 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 Department of Natural Resources, Division of Geology and Earth Resources, for collecting information on all nonfuel minerals.

In 2011, nonfuel mineral production¹ in Washington was valued at \$742 million, based upon annual U.S. Geological Survey (USGS) data. This was a \$19 million (2.6%) increase from the State's total nonfuel mineral production value of \$723 million in 2010, which followed a \$60 million (9.1%) increase from 2009. In terms of total nonfuel mineral production value, Washington ranked 29th in 2009, 28th in 2010, and 29th in 2011 among the 50 States. It accounted for approximately 1% of the total U.S. value in each year. On a per capita basis, Washington ranked 32d in the Nation in nonfuel mineral production in 2011 with a value of \$109 per capita, below the national average of \$240.

In descending order of production value, gold, construction sand and gravel, crushed stone, portland cement, and diatomite were the leading nonfuel mineral commodities in Washington in 2010 and in 2011. Construction sand and gravel and crushed stone combined accounted for approximately 46% of the State's total nonfuel mineral production value in 2010 and also in 2011, down from 56% in 2009, and an average of roughly 65% from 2000 to 2008. This decline in the combined percentage of these two commodities was driven by decreases in their production value and a surge in gold production and value from 2009 to 2011 from Kettle River-Buckhorn Mine. It had been idle from 2005 to 2007 but started production again in 2008 after development of the Buckhorn underground operation. Construction sand and gravel decreased by \$39.8 million (17%) in 2010 from the previous year, though production had only decreased by 8%. In 2011, production quantity and production value increased by 5% and 9%, respectively, to levels still below those of 2009. Crushed stone was more stable; production values decreased slightly more than 1% each year while production quantity increased by less than 1% in 2010 and

2011. Portland cement, though remaining among the leading four mineral commodities, continued a trend of decreasing production quantity and production value that began after a high in 2007.

Among the other mineral commodities produced in 2011, common clay, diatomite, and industrial sand and gravel increased in production value. Common clay had the largest percentage increase in production value for the year, but was still significantly below the 2009 level after a very large decrease in 2010. Diatomite production value increased only moderately in 2011 after a very large increase in 2010. This increase was brought about by a significant increase in production quantity in 2010 that landed it a spot as the fifth leading commodity by production value in both 2010 and 2011. Industrial sand and gravel saw a steadier increase of about 15% in 2011 and 8% in 2010 (production amounts withheld to protect company proprietary data).

The production value of dimension stone, lime, olivine, and peat decreased in 2011. Olivine had significant decreases in production value and production quantity in 2010 as well. Peat remained relatively level between 2009 and 2010 but production quantity and production value decreased significantly in 2011. Fire clay, produced in 2010, was not produced in 2011. Dimension stone, though not a significant component of the State's mineral industry, had large decreases in production quantity and even larger decreases in production value in 2011. Lead, zinc, and byproduct cadmium were not produced in either 2010 or 2011, as the Pend Oreille Mine was placed on care and maintenance in 2009 and did not return to production.

Washington ranked second out of two producing States in the quantity of olivine in 2010 and 2011, down from first in 2009. The State also fell slightly in rank from fifth in 2009 and 2010 to sixth in 2011 for gold (out of 10 States) despite the surge in production. It remained last out of four States in the production of diatomite. Washington rose in rank to seventh for construction sand and gravel in 2011 from eighth in 2009, and went from fifth in 2009 to second in 2010 out of four States for fire clay production (there was no production in the State during 2011). It remained a significant producer of common clay, gemstones, lime, and peat (by sales). Aluminum, steel, and titanium were also produced in the State, from other domestic sources and imported raw materials.

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 USGS mineral production data published in this chapter are those available as of May 2013. Data in this report are rounded to three significant digits and percentages are calculated from unrounded data. All USGS Mineral Industry Surveys and USGS Minerals Yearbook chapters—mineral commodity, State, and country—can be retrieved over the Internet at <http://minerals.usgs.gov/minerals>.

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

Mineral	2009		2010		2011	
	Quantity	Value	Quantity	Value	Quantity	Value
Gemstones, natural	NA	65	NA	64	NA	57
Sand and gravel, construction	30,000 ^r	231,000 ^r	27,700	191,000	29,100	208,000
Stone, crushed	14,700	143,000 ^r	14,800	141,000	14,800	140,000
Combined values of cadmium [byproduct from zinc concentrates (2009)], cement (portland), clays [common, fire (2009–10)], diatomite, gold, lead (2009), lime, olivine, peat, sand and gravel (industrial), stone (dimension miscellaneous), and zinc (2009)	XX	289,000	XX	391,000	XX	394,000
Total	XX	663,000 ^r	XX	723,000	XX	742,000

^rRevised. NA Not available. W Withheld to avoid disclosing company proprietary data. Withheld values included in "Combined values" data. XX not applicable.

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.

TABLE 2
WASHINGTON: CRUSHED STONE SOLD OR USED IN THE UNITED STATES, BY TYPE¹

Type	2009			2010			2011					
	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	988	\$9,150	\$9.25	8	967	\$12,400	\$12.86	8	1,100	\$13,000	\$11.91
Dolomite	15 ^r	102	454	4.44	18	198	3,220	16.31	20	224	3,550	15.86
Granite	11 ^r	885	8,630	9.74	8	682	6,730	9.87	5	572	5,940	10.38
Traprock	74 ^r	5,710 ^r	48,300 ^r	8.46	62	6,100	54,800	8.98	69	6,900	57,900	8.39
Sandstone and quartzite ³	4 ^r	720 ^r	13,000	18.11	8	721	12,900	17.92	7	585	13,100	22.41
Volcanic cinder and scoria	--	--	--	--	1	50	454	9.12	1	71	664	9.37
Miscellaneous stone	33 ^r	6,240 ^r	63,200 ^r	8.21	30	6,040	50,800	8.41	25	5,360	45,300	8.45
Total or average	XX	14,700	143,000 ^r	8.93	XX	14,800	141,000	9.58	XX	14,800	140,000	9.42

^rRevised. XX Not applicable.

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

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

³Includes sandstone-quartzite reported with no distinction between the two kinds of stone.

TABLE 3
WASHINGTON: CRUSHED STONE SOLD OR USED BY PRODUCERS
IN 2010, BY USE¹

(Thousand metric tons and thousand dollars)

Use	Quantity	Value
Construction:		
Coarse aggregate (+1½ inch):		
Macadam	105	832
Riprap and jetty stone	178	2,990
Filter stone	63	718
Other coarse aggregate	309	2,050
Coarse aggregate, graded:		
Concrete aggregate, coarse	561	4,740
Bituminous aggregate, coarse	1,440	8,450
Bituminous surface-treatment aggregate	92	1,040
Railroad ballast	63	763
Fine aggregate (-¾ inch):		
Stone sand, concrete	286	1,920
Stone sand, bituminous mix or seal	138	664
Screening, undesignated	30	324
Other fine aggregate	W	W
Coarse and fine aggregates:		
Graded road base or subbase	2,220	11,800
Unpaved road surface	887	5,020
Terrazzo and exposed aggregate	W	W
Crusher run or fill or waste	324	3,220
Roofing granules	W	W
Other coarse and fine aggregates	W	W
Other construction materials	93	1,800
Chemical and metallurgical:		
Cement manufacture	2	20
Lime manufacture	W	W
Flux stone	W	W
Chemical Stone	W	W
Special:		
Mining dusting or acid water treatment	W	W
Asphalt fillers or extenders	3	31
Whiting or whiting substitute	W	W
Other fillers or extenders	W	W
Other miscellaneous uses and specified uses not listed	W	W
Unspecified:²		
Reported	1,190	13,400
Estimated	5,950	58,500
Total	14,800	141,000

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
WASHINGTON: CRUSHED STONE SOLD OR USED BY PRODUCERS
IN 2011, BY USE¹

(Thousand metric tons and thousand dollars)

Use	Quantity	Value
Construction:		
Coarse aggregate (+1½ inch):		
Macadam	W	W
Riprap and jetty stone	101	1,760
Filter stone	65	747
Unspecified coarse aggregate	192	1,540
Coarse aggregate, graded:		
Concrete aggregate, coarse	W	W
Bituminous aggregate, coarse	342	1,500
Bituminous surface-treatment aggregate	93	679
Railroad ballast	W	W
Unspecified graded coarse aggregate	118	815
Fine aggregate (-¾ inch):		
Stone sand, concrete	53	561
Unspecified fine aggregate	19	572
Coarse and fine aggregates:		
Graded road base or subbase	1,080	6,220
Unpaved road surface	226	1,130
Terrazzo and exposed aggregate	W	W
Crusher run or fill or waste	138	894
Roofing granules	W	W
Unspecified coarse and fine aggregates	663	2,980
Unspecified and other construction materials	14	272
Agricultural:		
Agricultural, limestone	W	W
Poultry grit and mineral food	W	W
Unspecified and other agricultural uses	W	W
Chemical and metallurgical:		
Cement manufacture	1	10
Flux stone	W	W
Chemical Stone	W	W
Special:		
Mining dusting or acid water treatment	W	W
Asphalt fillers or extenders	4	53
Whiting or whiting substitute	W	W
Other fillers or extenders	W	W
Other miscellaneous uses and specified uses not listed	405	12,300
Unspecified:²		
Reported	4,640	31,900
Estimated	6,010	56,600
Total	14,800	140,000

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 5
WASHINGTON: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2010, BY USE AND DISTRICT¹

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3	
	Quantity	Value	Quantity	Value	Quantity	Value
Construction:						
Coarse aggregate (+1½ inch) ²	438	4,900	--	--	W	W
Coarse aggregate, graded ³	189	2,060	16	109	229	2,780
Fine aggregate (-¾ inch) ⁴	102	1,000	10	81	W	W
Coarse and fine aggregates ⁵	1,300	10,200	99	553	137	2,690
Other construction materials	W	W	--	--	W	W
Chemical and metallurgical ⁶	W	W	--	--	W	W
Special ⁷	W	W	123	684	W	W
Other miscellaneous uses and specified uses not listed ⁸	--	--	--	--	W	W
Unspecified:⁹						
Reported	657	7,330	333	3,850	181	2,020
Estimated	4,580	42,900	788	9,370	590	6,310
Total¹⁰	7,430	69,900	1,370	14,600	1,650	25,500
Unspecified districts						
Use	Quantity	Value				
Construction:						
Coarse aggregate (+1½ inch) ²	216	1,690				
Coarse aggregate, graded ³	1,730	10,000				
Fine aggregate (-¾ inch) ⁴	216	1,260				
Coarse and fine aggregates ⁵	2,160	10,100				
Other construction materials	--	--				
Chemical and metallurgical ⁶	--	--				
Special ⁷	--	--				
Other miscellaneous uses and specified uses not listed ⁸	--	--				
Unspecified:⁹						
Reported	18	206				
Estimated	--	--				
Total¹⁰	4,330	23,300				

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

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

⁴Includes stone sand (concrete), stone sand (bituminous mix or seal), screening (undesignated), and other fine aggregates.

⁵Includes graded road base or subbase, unpaved road surface, terrazzo and exposed aggregate, crusher run, roofing granules, and other coarse and fine aggregates.

⁶Includes cement manufacture, lime manufacture, dead-burned dolomite manufacture, flux stone, chemical stone, glass manufacture, and sulfur oxide removal.

⁷Includes mine dusting or acid water treatment, whitening or whitening substance, and other fillers or extenders.

⁸Includes drain fields, waste material, lightweight aggregate (slate), pipe bedding, refractory stone (including ganister), and other miscellaneous uses.

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

¹⁰District totals may not add up to the published State total, owing to revisions made after the production of the table and (or) proprietary data being withheld.

TABLE 6
WASHINGTON: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2011, BY USE AND DISTRICT¹

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3	
	Quantity	Value	Quantity	Value	Quantity	Value
Construction:						
Coarse aggregate (+1½ inch) ²	426	4,350	W	W	84	623
Coarse aggregate, graded ³	W	W	18	113	646	3,640
Fine aggregate (-¾ inch) ⁴	W	W	--	--	W	W
Coarse and fine aggregates ⁵	1,250	7,790	152	827	503	3,010
Other construction materials	14	272	6	42	W	W
Agricultural ⁶	--	--	W	W	W	W
Chemical and metallurgical ⁷	1	10	--	--	W	W
Special ⁸	--	--	W	W	W	W
Other miscellaneous uses and specified uses not listed ⁹	--	--	--	--	W	W
Unspecified: ¹⁰						
Reported	293	3,370	W	W	301	3,220
Estimated	4,920	46,400	891	8,350	169	1,500
Total	7,160	64,500	1,650	27,100	2,150	26,200
Unspecified districts						
Use	Quantity	Value				
Construction:						
Coarse aggregate (+1½ inch) ²	8	126				
Coarse aggregate, graded ³	--	--				
Fine aggregate (-¾ inch) ⁴	--	--				
Coarse and fine aggregates ⁵	213	708				
Other construction materials	--	--				
Agricultural ⁶	--	--				
Chemical and metallurgical ⁷	--	--				
Special ⁸	--	--				
Other miscellaneous uses and specified uses not listed ⁹	--	--				
Unspecified: ¹⁰						
Reported	3,600	20,600				
Estimated	--	--				
Total	3,820	21,500				

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

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

⁴Includes stone sand (concrete), stone sand (bituminous mix or seal), screening (undesigned), and other fine aggregates.

⁵Includes graded road base or subbase, unpaved road surface, terrazzo and exposed aggregate, crusher run, roofing granules, and other coarse and fine aggregates.

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

⁷Includes cement manufacture, lime manufacture, dead-burned dolomite manufacture, flux stone, chemical stone, glass manufacture, and sulfur oxide removal.

⁸Includes mine dusting or acid water treatment, whitening or whitening substance, and other fillers or extenders.

⁹Includes drain fields, waste material, lightweight aggregate (slate), pipe bedding, refractory stone (including ganister), and other miscellaneous uses.

¹⁰Reported and estimated production without a breakdown by end use.

TABLE 7
WASHINGTON: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2010,
BY MAJOR USE CATEGORY¹

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate (including concrete sand)	5,780	\$40,800	\$7.06
Plaster and gunitite sands	46	319	6.93
Concrete products (blocks, bricks, pipe, decorative, etc.)	9	142	15.78
Asphaltic concrete aggregates and other bituminous mixtures	649	5,200	8.01
Road base and coverings ²	3,820	25,500	6.68
Fill	2,140	11,100	5.19
Snow and ice control	48	217	4.52
Railroad ballast	81	717	8.85
Other miscellaneous uses ³	45	359	7.98
Unspecified: ⁴			
Reported	4,470	33,400	7.47
Estimated	10,200	70,000	6.86
Total or average	27,700	191,000	6.90

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

²Includes road and other stabilization (cement and lime).

³Includes filtration.

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

TABLE 8
WASHINGTON: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2011,
BY MAJOR USE CATEGORY¹

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate (including concrete sand)	6,170	\$46,300	\$7.50
Plaster and gunitite sands	58	461	7.95
Concrete products (blocks, bricks, pipe, decorative, etc.)	2	25	12.50
Asphaltic concrete aggregates and other bituminous mixtures	554	4,230	7.64
Road base and coverings ²	4,420	28,100	6.36
Fill	2,230	10,600	4.75
Snow and ice control	68	573	8.43
Railroad ballast	160	1,330	8.31
Other miscellaneous uses ³	69	568	8.23
Unspecified: ⁴			
Reported	5,130	41,800	8.15
Estimated	10,300	74,400	7.22
Total or average	29,100	208,000	7.15

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).

³Includes filtration and golf course.

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

TABLE 9
WASHINGTON: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2010, 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 and concrete products ²	5,030	35,200	640	4,800	168	1,240
Asphaltic concrete aggregates and road base materials ³	2,810	20,500	1,320	7,560	336	2,610
Fill	2,000	10,300	113	591	26	143
Snow and ice control	18	113	W	W	W	W
Railroad ballast	69	672	W	W	W	W
Other miscellaneous uses ⁴	12	219	4	39	29	102
Unspecified: ⁵						
Reported	1,160	9,050	1,680	12,300	1,630	12,100
Estimated	9,100	62,500	431	2,970	625	4,310
Total ⁶	20,200	139,000	4,190	28,200	2,810	20,500
	Unspecified districts					
Use	Quantity	Value				
Concrete aggregates and concrete products ²	--	--				
Asphaltic concrete aggregates and road base materials ³	--	--				
Fill	--	--				
Snow and ice control	--	--				
Railroad ballast	--	--				
Other miscellaneous uses ⁴	--	--				
Unspecified: ⁵						
Reported	--	--				
Estimated	45	313				
Total ⁶	45	313				

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 (cement and lime).

⁴Includes filtration.

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

⁶District totals may not add up to the published State total, owing to revisions made after the production of the table and (or) proprietary data being withheld.

TABLE 10
WASHINGTON: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2011, 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 and concrete products ²	5,480	41,100	674	5,020	82	676
Asphaltic concrete aggregates and road base materials ³	3,390	21,900	1,360	8,870	236	1,550
Fill	1,980	9,470	122	558	124	586
Snow and ice control	27	189	W	W	W	W
Railroad ballast	106	924	W	W	W	W
Other miscellaneous uses ⁴	17	231	17	207	35	130
Unspecified: ⁵						
Reported	1,440	12,200	1,590	12,500	1,850	15,300
Estimated	8,850	64,200	605	4,330	782	5,670
Total	21,300	150,000	4,410	31,800	3,150	24,300
	Unspecified districts					
Use	Quantity	Value				
Concrete aggregates and concrete products ²	--	--				
Asphaltic concrete aggregates and road base materials ³	--	--				
Fill	--	--				
Snow and ice control	--	--				
Railroad ballast	--	--				
Other miscellaneous uses ⁴	--	--				
Unspecified: ⁵						
Reported	254	1,830				
Estimated	23	165				
Total	277	2,000				

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 plaster and gunite sands.

³Includes road and other stabilization (lime).

⁴Includes filtration and golf course.

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