

TEXAS

LEGEND

County boundary

★ Capital

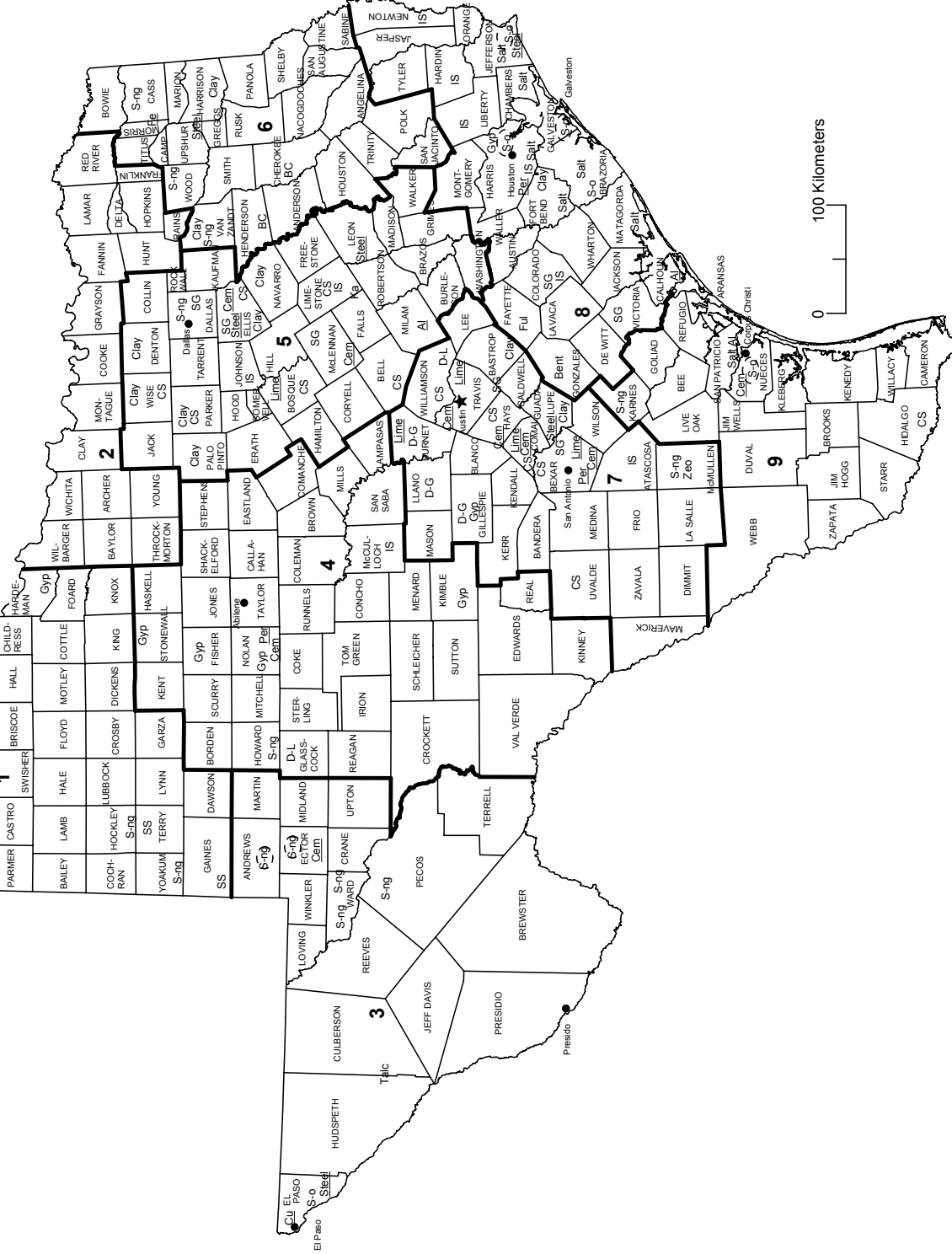
● City

1 — Crushed stone/sand and gravel districts

MINERAL SYMBOLS (Major producing areas)

- Al Aluminum plant
- BC Ball clay
- Bent Bentonite
- Cem Cement plant
- Clay Common clay
- CS Crushed stone
- Cu Copper plant
- D-G Dimension granite
- D-L Dimension limestone
- Ful Fuller's earth
- Gyp Gypsum
- He Helium
- IS Industrial sand
- Ka Kaolin
- Lim Lime plant
- Per Perlite plant
- S-ng Sulfur (natural gas)
- S-o Sulfur (oil)
- Salt Salt
- SG Construction sand and gravel
- SS Sodium sulfate
- Steel Steel plant
- Talc Talc
- Zeo Zeolites
- Concentration of mineral operations

DALLAM	SHER-MAN	HANS-FORD	COCHIL-FREE	LIPS-COMB
HARTLEY	MOORE	HUTCH-INSON	ROBERTS	HEMP-HILL
OLDHAM	POTTER	CARSON	GRAY	WHEELER
DEAF-SMITH	ARM-STRONG	STRONG	DONLEY	COLLINS-WORTH
1	BRISCOE	HALL	CHILD-RESS	
BAILEY	HALE	FLOYD	MOTLEY	COTTLE
COCH-RAN	LUBBOCK	CROSBY	DICKENS	KING
YOAKUM	TERRY	LYNN	GARZA	GYP
GAINES	DAWSON	BORDEN	JONES	FISHER
ANDREWS	MARTIN	HOWARD	MITCHELL	NOLAN
6	STER-LING	COCK	IRON	REAGAN
7	MIDLAND	CRANE	UPTON	TERRELL
8	WINKLER	REEVES	PECOS	BREWSTER
9	LOVING	WARD	JEFF DAVIS	PRESIDIO
10	CULBERSON	REEVES	JEFF DAVIS	PRESIDIO



0 100 Kilometers

THE MINERAL INDUSTRY OF TEXAS

This chapter has been prepared under a Memorandum of Understanding between the U.S. Geological Survey and the University of Texas at Austin, Bureau of Economic Geology, for collecting information on all nonfuel minerals.

In 2003, the estimated value¹ of nonfuel raw mineral production for Texas was about \$2 billion, based upon preliminary U.S. Geological Survey (USGS) data. This was about a 3% decrease from that of 2002² and followed a 2.3% decrease from 2001 to 2002. The State, for the third time in the past 4 years, was fourth in the Nation (third in 2002) in total nonfuel mineral production value, of which the State accounted for more than 5% of the U.S. total.

In 2003, about 93% of Texas' nonfuel mineral value came from the production of the State's top five industrial minerals, in descending order of value: cement (portland and masonry), crushed stone, construction sand and gravel, lime, and salt. Cement alone accounted for nearly 39% of the State's total nonfuel mineral value.

In 2002, increases in the production and values of common clays (up \$12.5 million), construction sand and gravel (up \$8 million with slightly lowered production), crude helium, Grade-A helium, and gypsum (descending order of change) were offset mostly by lowered production and values of crushed stone (down \$63 million), lime (down \$9.6 million), and industrial sand and gravel (down nearly \$8 million). Smaller decreases also took place in the overall value of cement (portland and masonry combined) and in the value of salt; all other changes in value in 2002 were \$1 million or less, having little effect on the net change in value (table 1).

Based upon USGS estimates of the quantities of minerals produced in the 50 States in 2003, Texas continued to be first in crushed stone and second in portland cement, construction sand and gravel, salt, common clays, gypsum, talc, and zeolites (listings in descending order of value). The State also continued to be second of two States that produce crude helium, second of four ball-clay-producing States, and second of two States that produce brucite. The State remained fifth in lime and industrial

sand and gravel, again was sixth in dimension stone, and increased to sixth from seventh in masonry cement.

The Texas metal industry produced copper, primary aluminum, raw steel, and smaller amounts of other metals. Sources of plant feed included ores, blister and anode copper, and scrap metal acquired from other domestic or foreign sources. In 2003, the State was fourth in rank (second in 2002) in primary aluminum production (based upon USGS annual data) and was the leading producer of electrolytically refined copper. Texas also was one of the leading steel-producing States (rank withheld owing to proprietary data); its steel mills produced 3.73 million metric tons of raw steel, as reported by the American Iron and Steel Institute (2004, p. 76).

The following narrative information was provided by the Texas Bureau of Economic Geology³ (BEG). In 2003, the mineral industry remained a significant component of the Texas economy. Annual job growth in mining, reported by the Texas Workforce Commission (2004§⁴), increased 2.4% from December 2002 through December 2003. This number includes mining and support services for nonfuel minerals as well as oil and gas extraction and coal mining. The Commission also reported that the construction job annual growth rate increased by less than 0.5%.

Exploration and Development

Silver Standard Resources, Inc. continued work on its property in the Shafter District in southwest Texas, in Presidio County, 32 kilometers north of the Mexican border and 64 kilometers south of the City of Marfa. The company held all permits required to commence production at Shafter and planned further evaluation of the Shafter site during the summer of 2004. The Shafter Silver Project is a measured and indicated resource of nearly 1.9 million metric tons of ore averaging about 360 grams per metric ton (nearly 10.6 troy ounces per short ton) silver (along with additional inferred resources) that has been outlined by the company (Silver Standard Resources, Inc., 2004§). The Shafter District area has been mined for silver since the 1880s and was host to the largest known silver deposit in Texas. A total of nearly 1.1 million kilograms (35 million ounces) of silver was mined from the Shafter deposit between 1883 and 1942. Most of the permitting for the current project was completed in 2001, and the project has been awaiting higher silver prices for a final feasibility study to be completed. A major road and powerlines traverse Silver Standard's project

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 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>.

²Values, 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.

³Sigrd Clift, Research Associate, Texas Bureau of Economic Geology, and J. Richard Kyle, Professor, both of the Department of Geological Sciences, John A. and Katherine G. Jackson School of Geosciences, University of Texas at Austin, coauthored the text of the State mineral industry information provided by the Texas Bureau of Economic Geology.

⁴References that include a section mark (§) are found in the Internet References Cited section.

area; the nearby town of Shafter has 30 to 40 inhabitants. Silver Standard purchased the components of the 16:1 mill, an 800-ton-per-day facility, from American Reclamation, Inc. The previous owner, Sunshine Mining and Refining Co., last operated the mill at its former producing silver mine in Silver Peak, NV. Silver Standard purchased the used mill components to help significantly reduce overall capital costs of the project and thereby lower the price of silver at which the company could economically put the mine into production; the company planned to move the mill components to Shafter in the latter part of 2003 in anticipation of production. The company received its mining permits for the project with this mill in mind (Silver Standard Resources, Inc. 2001§). In addition to the silver mineralization at Shafter, there are zinc and copper occurrences further to the west that are potential targets for exploration (Silver Standard Resources, Inc. 2003§).

Government Activities and Programs

A joint committee (created in 2002 by the Governor) composed of members of the State Senate, State House of Representatives, and citizen representatives from around the State continued its study of permitting issues for aggregate facilities. The findings of this committee could affect future aggregate reserve development if new permitting regulations result.

The U.S. Department of the Interior's National Park Service and the USGS, in cooperation with university researchers, continued its study of the Big Bend National Park in southwest Texas and related borderlands along the Rio Grande. Particular emphasis of the study was on human influences on geologic processes in park ecosystems. The comprehensive geologic

study of Big Bend National Park was published in 1967 (Maxwell, Hazzard, Lonsdale, and Wilson, 1967). One purpose of the current project is to make significant advances in updating the geologic framework of the region. Another purpose is to investigate drainages into the Park. Big Bend is downstream from the Terlingua mercury mining district that ceased production in the early 1970s. Additionally, the study will focus on an area in the National Park where lesser quantities of mercury and fluor spar mining at one time took place. Major fluor spar deposits occur south of the Park across the Rio Grande in the contiguous State of Coahuila, Mexico.

References Cited

- American Iron and Steel Institute, 2004, Pig iron and raw steel production—Final 2003, AIS-7, subsection of annual statistical report 2003: Washington, DC, American Iron and Steel Institute, 130 p.
- Maxwell, R.A., Hazzard, R.T., Lonsdale, J.T., and Wilson, J.A., 1967, Geology of Big Bend National Park, Brewster County, Texas: Austin, TX, The University of Texas at Austin, Bureau of Economic Geology, Publication 6711, 320 p.

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- Silver Standard Resources, Inc., 2001, Third quarter 2001, accessed September 22, 2004, at <http://www.silverstandard.com/i/pdf/2001-3rdQ.pdf>.
- Silver Standard Resources, Inc., 2003, Projects, Shafter Project, accessed December 3, 2003, at URL <http://www.silverstandard.com/s/Shafter.asp>.
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- Texas Workforce Commission, 2004 (January), Texas nonagricultural wage and salary employment (seasonally adjusted), Texas Labor Market Review, accessed June 29, 2004, at URL http://www.tracer2.com/admin/uploadedPublications/1095_tlmr0401.pdf.

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

(Thousand metric tons and thousand dollars unless otherwise specified)

Mineral	2001		2002		2003 ^P	
	Quantity	Value	Quantity	Value	Quantity	Value
Cement:						
Masonry	291	32,700 ^e	294	36,000 ^e	300	33,000 ^e
Portland	10,400	745,000 ^e	10,500	740,000 ^e	10,600	753,000 ^e
Clays:						
Common	2,120	8,750	2,160	21,200	2,160	21,200
Fuller's earth	29	2,270	W	W	W	W
Kaolin	W	W	39	8,420	39	8,420
Gemstones	NA	12	NA	12	NA	12
Gypsum, crude	W	W	2,060	13,400	2,090	13,300
Helium, crude	9	9,320	W	W	W	W
million cubic meters						
Lime	1,610	108,000	1,530	98,400	1,580	104,000
Salt	9,370	104,000	9,100	103,000	8,470	99,300
Sand and gravel:						
Construction	82,900	405,000	82,600	413,000	78,000	394,000
Industrial	1,850	70,000	1,670	62,200	1,750	45,700
Stone:						
Crushed	126,000 ^r	606,000 ^r	113,000	543,000	104,000	504,000
Dimension	86	12,600	65	12,200	79	13,300
Talc, crude	234	4,070	W	W	W	W
Zeolites	(3)	NA	(3)	NA	(3)	NA
metric tons						
Combined values of brucite, clays (ball, bentonite), helium (grade-A), and values indicated by symbol W						
	XX	35,100	XX	40,900 ^r	XX	37,900
Total	XX	2,140,000 ^r	XX	2,090,000 ^r	XX	2,030,000

^eEstimated. ^PPreliminary. ^rRevised. NA Not available. W Withheld to avoid disclosing company proprietary data; values included with "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.

³Withheld to avoid disclosing company proprietary data.

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

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	119 ^r	120,000 ^r	\$468,000 ^r	\$4.85 ^r	117	107,000	\$516,000	\$4.81
Dolomite	1	W	W	4.38	1	W	W	4.34
Sandstone	4 ^r	722	3,970	5.50	5	740	3,770	5.10
Marble	7	W	W	4.36	7	W	W	4.14
Calcareous marl	2	W	W	3.45	2	W	W	3.96
Shell	1	W	W	24.25	1	W	W	26.46
Granite	2	W	W	4.14	2	W	W	4.14
Traprock	1	W	W	9.26	1	W	W	8.61
Sandstone and quartzite	5	1,080 ^r	6,110 ^r	5.65 ^r	5	871	4,560	5.23
Volcanic cinder	1	W	W	4.41	2	W	W	4.36
Miscellaneous stone	10	2,080	8,260	3.97	9	1,850	7,370	4.00
Total or average	XX	126,000 ^r	606,000 ^r	4.83 ^r	XX	113,000	543,000	4.81

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

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

TABLE 3
TEXAS: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2002, BY USE¹

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Construction:			
Coarse aggregate (+1 1/2 inch):			
Riprap and jetty stone	165	\$1,130	\$6.86
Filter stone	32	224	7.08
Other coarse aggregate	16	143	8.94
Total or average	213	1,500	7.05
Coarse aggregate, graded:			
Concrete aggregate, coarse	3,130	23,800	7.60
Bituminous aggregate, coarse	1,520	9,250	6.07
Bituminous surface-treatment aggregate	952	9,070	9.53
Railroad ballast	W	W	5.29
Other graded coarse aggregate	7,150	49,700	6.95
Total or average	12,800	91,800	7.20
Fine aggregate (-3/8 inch):			
Stone sand, concrete	1,870	10,400	5.55
Stone sand, bituminous mix or seal	272	1,140	4.17
Screening, undesignated	201	1,000	4.97
Other fine aggregate	404	2,080	5.14
Total or average	2,750	14,600	5.32
Coarse and fine aggregate:			
Graded road base or subbase	6,870	30,500	4.44
Unpaved road surfacing	(2)	(2)	3.64
Terrazzo and exposed aggregate	(2)	(2)	5.50
Crusher run or fill or waste	569	2,360	4.15
Other coarse and fine aggregates	3,860	23,700	6.15
Total or average	11,300	56,600	5.01
Other construction materials	10	38	3.80
Agricultural:			
Agricultural limestone	(3)	(3)	5.09
Poultry grit and mineral food	(3)	(3)	10.40
Other agricultural uses	161	2,360	14.66
Chemical and metallurgical:			
Cement manufacture	4,380	17,700	4.05
Lime manufacture	2,270	8,750	3.85
Sulfur oxide removal	(3)	(3)	11.02
Special:			
Asphalt fillers or extenders	(3)	(3)	5.51
Whiting or whiting substitute	(3)	(3)	98.57
Other fillers or extenders	659	8,380	12.72
Other miscellaneous uses and other specified uses not listed	559	3,250	5.82
Unspecified:⁴			
Reported	61,500	272,000	4.43
Estimated	16,000	62,000	3.92
Total or average	77,300	334,000	4.32
Grand total or average	113,000	543,000	4.81

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

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 "total."

³Withheld to avoid disclosing company proprietary data; included in "Grand total."

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

TABLE 4
TEXAS: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2002, BY USE AND DISTRICT ¹

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3		District 4	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Construction:								
Coarse aggregate (+1 1/2 inch) ²	--	--	W	W	--	--	W	W
Coarse aggregate, graded ³	W	W	W	W	W	W	W	W
Fine aggregate (-3/8 inch) ⁴	62	331	W	W	W	W	W	W
Coarse and fine aggregates ⁵	W	W	W	W	W	W	W	W
Other construction materials	--	--	--	--	10	38	--	--
Agricultural ⁶	--	--	--	--	--	--	--	--
Chemical and metallurgical ⁷	--	--	--	--	--	--	W	W
Special ⁸	--	--	--	--	--	--	--	--
Other miscellaneous uses	--	--	--	--	--	--	--	--
Unspecified: ⁹	--	--	--	--	--	--	--	--
Reported	--	--	122	537	6,730	27,300	--	--
Estimated	1,000	3,700	390	1,500	500	2,000	450	1,800
Total	1,370	6,240	599	2,490	7,300	29,700	2,810	13,700
Use	District 5		District 6		District 7		District 8	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Construction:								
Coarse aggregate (+1 1/2 inch) ²	48	456	W	W	W	W	--	--
Coarse aggregate, graded ³	W	W	--	--	8,510	53,500	W	W
Fine aggregate (-3/8 inch) ⁴	68	451	--	--	2,450	12,500	W	W
Coarse and fine aggregates ⁵	2,360	11,100	W	W	5,550	24,500	W	W
Other construction materials	--	--	--	--	--	--	--	--
Agricultural ⁶	W	W	--	--	--	--	W	W
Chemical and metallurgical ⁷	3,580	13,300	--	--	2,380	9,680	W	W
Special ⁸	W	W	--	--	W	W	W	W
Other miscellaneous uses	8	94	--	--	551	3,160	--	--
Unspecified: ⁹	--	--	--	--	--	--	--	--
Reported	22,000	103,000	--	--	26,700	116,000	4,060	16,900
Estimated	7,500	30,000	180	790	5,600	22,000	--	--
Total	38,500	183,000	218	973	52,200	248,000	5,880	38,800
Use	District 9		Unspecified districts					
	Quantity	Value	Quantity	Value				
Construction:								
Coarse aggregate (+1 1/2 inch) ²	--	--	--	--				
Coarse aggregate, graded ³	W	W	20	267				
Fine aggregate (-3/8 inch) ⁴	W	W	--	--				
Coarse and fine aggregate ⁵	W	W	522	4,690				
Other construction materials	--	--	--	--				
Agricultural ⁶	--	--	--	--				
Chemical and metallurgical ⁷	--	--	--	--				
Special ⁸	--	--	--	--				
Other miscellaneous uses	--	--	--	--				
Unspecified: ⁹	--	--	--	--				
Reported	1,910	8,330	--	--				
Estimated	130	530	--	--				
Total	3,460	15,900	542	4,960				

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, riprap and jetty stone, and other coarse aggregate.

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

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

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

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

⁷Includes cement manufacture, lime manufacture, and sulfur oxide removal.

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 5
TEXAS: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2002, BY MAJOR USE CATEGORY ¹

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate (including concrete sand)	24,800	\$143,000	\$5.77
Plaster and gunite sands	274	2,140	7.81
Concrete products (blocks, bricks, pipe, decorative, etc.)	529	2,330	8.49
Asphaltic concrete aggregates and other bituminous mixtures	877	5,800	10.96
Road base and coverings	2,470	10,200	11.61
Road stabilization (cement and lime)	1,140	7,780	3.15
Fill	7,640	16,800	2.19
Other miscellaneous uses	67	476	7.10
Unspecified: ²			
Reported	18,400	99,900	5.44
Estimated	26,000	120,000	4.73
Total or average	82,600	413,000	5.01

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

²Reported and estimated production without a breakdown by end use.

TABLE 6
TEXAS: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2002, BY USE AND DISTRICT^{1,2}

(Thousand metric tons and thousand dollars)

Use	Districts 1 and 3		Districts 2 and 6		Districts 4 and 7	
	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregate and concrete products ³	725	6,360	1,170	7,690	3,730	21,600
Asphaltic concrete aggregates and road base materials ⁴	612	5,570	W	W	770	2,560
Fill	91	423	W	W	758	1,860
Other miscellaneous uses	--	--	210	500	3	17
Unspecified: ⁵						
Reported	3,230	24,500	1,090	5,520	2,510	12,600
Estimated	2,700	13,000	2,200	11,000	6,100	29,000
Total	7,310	49,900	4,670	24,800	13,900	67,600
	District 5		District 8		District 9	
	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregate and concrete products ³	8,210	53,300	9,390	43,200	2,370	15,300
Asphaltic concrete aggregates and road base materials ⁴	591	2,370	1,850	9,160	W	W
Fill	1,810	4,100	4,710	9,690	W	W
Other miscellaneous uses	--	--	57	436	736	4,330
Unspecified: ⁵						
Reported	3,760	18,900	6,150	30,300	1,650	8,050
Estimated	6,500	29,000	6,400	31,000	2,600	12,000
Total	20,800	108,000	28,500	124,000	7,370	39,800

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.

²Districts 1 and 3, 2 and 6, and 4 and 7 are combined to avoid disclosing company proprietary data.

³Includes plaster and gunite sands.

⁴Includes road and other stabilization (cement and lime).

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