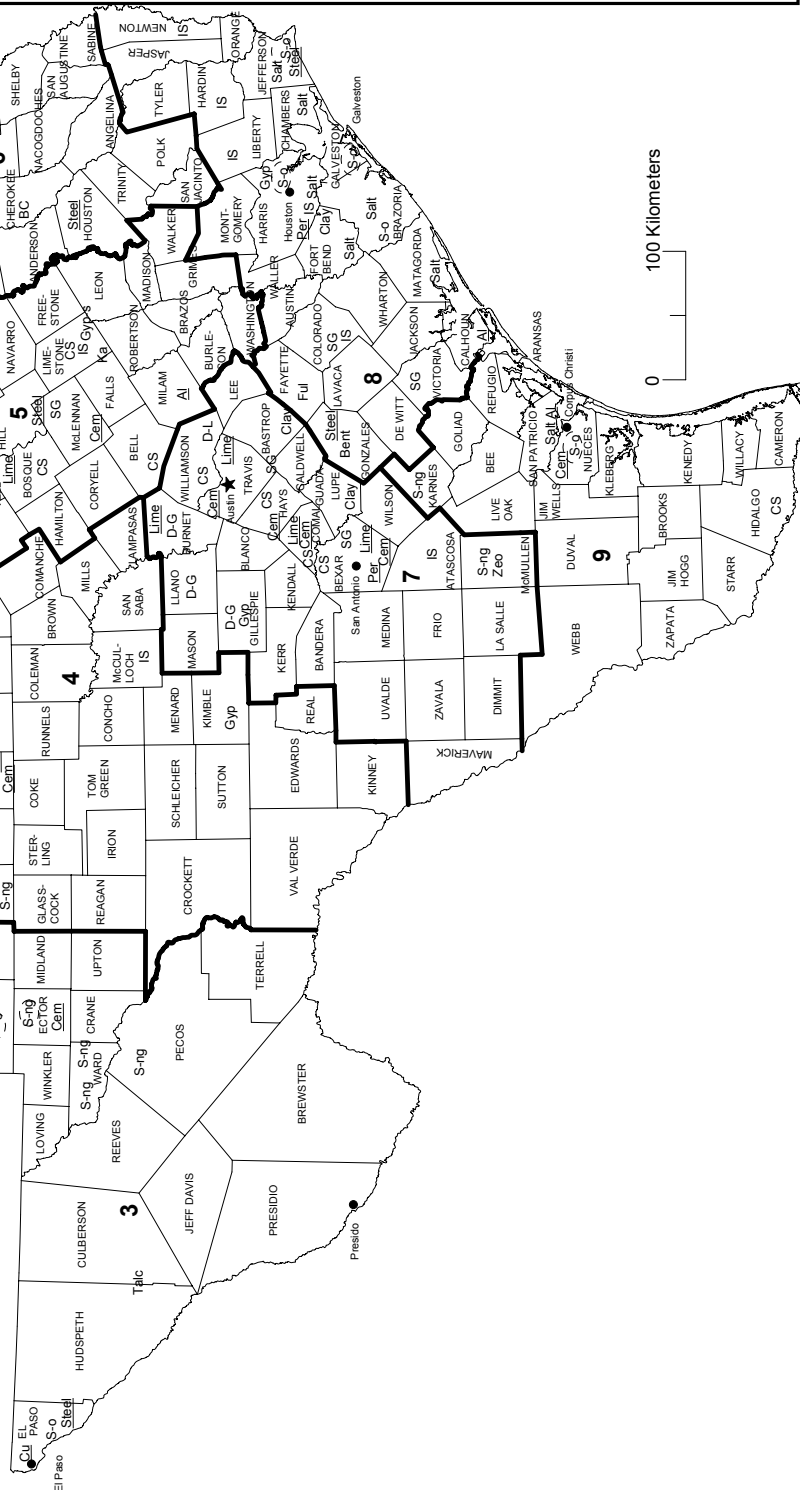


TEXAS

DALLAM	SHER-MAN	HANS-FORD	LIPS-COMB
HARTLEY	MOORE	HUTCH-INSON	HEMP-HILL
OLDHAM	POTTER	CARSON	GRAY
DEAF SMITH	ARM-STRONG	WHEELER	WHEELER
COLLINS-WORTH	ARM-STRONG	DONLEY	COLLINS-WORTH
1	BRISCOE	HALL	CHILD-RESS
PARMER	SWISHER	BRISCOE	HALL
BAILEY	HALE	FLOYD	MOTLEY
COCKRAN	LUBBOCK	CROSBY	DICKENS
YORKUM	TERRY	LYNN	GARZA
GAINES	DAWSON	BORDEN	GYP
ANDREWS	MARTIN	HOWARD	MITCHELL
LOVING	WINKLER	STERLING	COKE
EL PASO	MIDLAND	GLASS-COCK	TOM GREEN
EL PASO	CRANE	REAGAN	IRON
EL PASO	CRANE	REAGAN	IRON
EL PASO	CRANE	REAGAN	IRON

2	CLAY	MON-FABRE	COOKE	GRAYSON	FANNIN	HUNT	ROCKWELL	ROCKWELL	ROCKWELL
3	WICHITA	ARCHER	BAYLOR	KNOX	YOUNG	THROCKMORTON	HASKELL	STONEWALL	CHILD-RESS
4	WICHITA	ARCHER	BAYLOR	KNOX	YOUNG	THROCKMORTON	HASKELL	STONEWALL	CHILD-RESS
5	WICHITA	ARCHER	BAYLOR	KNOX	YOUNG	THROCKMORTON	HASKELL	STONEWALL	CHILD-RESS
6	WICHITA	ARCHER	BAYLOR	KNOX	YOUNG	THROCKMORTON	HASKELL	STONEWALL	CHILD-RESS
7	WICHITA	ARCHER	BAYLOR	KNOX	YOUNG	THROCKMORTON	HASKELL	STONEWALL	CHILD-RESS
8	WICHITA	ARCHER	BAYLOR	KNOX	YOUNG	THROCKMORTON	HASKELL	STONEWALL	CHILD-RESS
9	WICHITA	ARCHER	BAYLOR	KNOX	YOUNG	THROCKMORTON	HASKELL	STONEWALL	CHILD-RESS

10	WICHITA	ARCHER	BAYLOR	KNOX	YOUNG	THROCKMORTON	HASKELL	STONEWALL	CHILD-RESS
11	WICHITA	ARCHER	BAYLOR	KNOX	YOUNG	THROCKMORTON	HASKELL	STONEWALL	CHILD-RESS
12	WICHITA	ARCHER	BAYLOR	KNOX	YOUNG	THROCKMORTON	HASKELL	STONEWALL	CHILD-RESS
13	WICHITA	ARCHER	BAYLOR	KNOX	YOUNG	THROCKMORTON	HASKELL	STONEWALL	CHILD-RESS
14	WICHITA	ARCHER	BAYLOR	KNOX	YOUNG	THROCKMORTON	HASKELL	STONEWALL	CHILD-RESS
15	WICHITA	ARCHER	BAYLOR	KNOX	YOUNG	THROCKMORTON	HASKELL	STONEWALL	CHILD-RESS
16	WICHITA	ARCHER	BAYLOR	KNOX	YOUNG	THROCKMORTON	HASKELL	STONEWALL	CHILD-RESS
17	WICHITA	ARCHER	BAYLOR	KNOX	YOUNG	THROCKMORTON	HASKELL	STONEWALL	CHILD-RESS
18	WICHITA	ARCHER	BAYLOR	KNOX	YOUNG	THROCKMORTON	HASKELL	STONEWALL	CHILD-RESS
19	WICHITA	ARCHER	BAYLOR	KNOX	YOUNG	THROCKMORTON	HASKELL	STONEWALL	CHILD-RESS



0 100 Kilometers

Source: University of Texas at Austin, Bureau of Economic Geology/U.S. Geological Survey (2001)

LEGEND

- County boundary
- ★ Capital
- City

1

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
- Ee Iron ore and/or steel scrap plant
- Ful Fuller's earth
- Gyp Gypsum
- Gyp-s Synthetic gypsum
- He Helium
- IS Industrial sand
- Ka Kaolin
- Lime Lime plant
- Pet Petlite 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 Zeo
- (Dashed circle) Concentration of mineral operations

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 2001, the estimated value¹ of nonfuel raw mineral production for Texas was \$2.21 billion, based upon preliminary U.S. Geological Survey (USGS) data. This was about a 13% increase from that of 2000² and followed a 4.3% increase from 1999 to 2000. Texas rose in rank to third from fourth in the Nation in total nonfuel mineral production value, of which the State accounted for more than 5.5% of the U.S. total.

In 2001, about 94% 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, salt, and lime. The significantly increased values of the State's major construction aggregates (crushed stone and sand and gravel) and portland cement accounted for the largest increases in Texas' nonfuel mineral production value (table 1).

In 2000, crushed stone led the State's nonfuel mineral industry with an increase of \$49 million, followed by construction sand and gravel, up by \$35 million, portland cement, up by \$24 million, industrial sand and gravel, up by about \$8 million, salt, up by \$6.5 million, crude helium, up by more than \$5 million, and kaolin, up by more than \$2 million. The largest decreases were those of sulfur (owing to the closing of the State's only producing plant), dimension stone, gypsum, lime, and Grade-A helium (descending order of change) (table 1). All other changes in value were less than \$1 million.

Based upon USGS estimates of the quantities of minerals produced in the 50 States in 2001, Texas remained first in crushed stone, second in construction sand and gravel and salt, second of three crude helium-producing States, second in common clay, ball clay, talc, and zeolites, and second of two States that produce brucite. The State continued to be fifth in lime, as well as one of the top five States in the production of industrial sand and gravel and gypsum, and eighth in masonry cement. Texas rose to first from second in portland cement and

¹The terms "nonfuel mineral production" and related "values" encompass variations in meaning, depending upon the minerals or 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 2001 USGS mineral production data published in this chapter are preliminary estimates as of August 2002 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 Mineral Industry Surveys—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 2000 may differ from the Minerals Yearbook, Area Reports: Domestic 2000, Volume II, owing to the revision of preliminary 2000 to final 2000 data. Data for 2001 are preliminary and are expected to change; related rankings may also change.

dropped to fifth from fourth in the production of dimension stone.

The Texas metal industry produced copper, primary aluminum, raw steel, and smaller amounts of other metals. Sources of plant feed included ores and scrap metal acquired from other domestic or foreign sources. Texas produced 3.6 million metric tons of raw steel, as reported by the American Iron and Steel Institute. Based upon USGS data, the State increased in rank to fifth from seventh in primary aluminum production.

The following narrative information was provided by the Texas Bureau of Economic Geology³ (BEG). The nonfuel raw mineral industry of Texas continued to grow during 2001. The increase in population and growth in industry spurred activity in mineral production by creating a demand for materials used in developing infrastructure. Production of aggregate and other industrial minerals needed for manufacturing building products again responded to increased construction activity. Annual job growth in mining, reported by the Texas Labor Market Review, increased by 4.8% from December 2000 through December 2001; this was primarily because of an increase in oil and gas activity statewide (Griffis, 2000, 2001). Although the production and value of some nonfuel minerals (especially those of construction materials) was up during 2001, the overall job growth rate in the nonfuel mineral industry of Texas saw only a slight increase. Records of the Texas Workforce Commission showed that the construction job annual growth rate fell by 0.6%. Jobs related to clay, glass products, and stone fell by 0.2%, and those related to concrete, gypsum, and plaster products increased by 2.9%.

According to the BEG, some interest in previously mined metals properties existed during the past several years. The Shafter District, located in Presidio County, produced nearly 1.1 million kilograms (35 million troy ounces) of silver from 1883 to 1942; subsequent exploration has defined a comparable silver resource in a downdip extension of the original ore zone. Silver principally occurs there as oxidized mineralization controlled by tectonic and karst structures in Permian carbonates. Silver Standard Resources Inc. is permitting the Shafter project for silver production. Another property drawing interest was the Red Hills copper deposit about 10 kilometers (km) west of Shafter, which was recently documented as the easternmost porphyry copper-molybdenum system in southwestern North America. New zircon uranium/lead and molybdenite rhenium/osmium analyses for the Red Hills system revealed ages of 64.2 ± 0.2 million years and 60.2 ± 0.3 million years, respectively, indicating that the intrusion and mineralization are distinctly older than all other Tertiary magmatism (48 million to 17

³Sigrid Clift, Research Associate, Texas Bureau of Economic Geology, and J. Richard Kyle, Professor, Department of Geological Sciences, University of Texas at Austin, coauthored the text of mineral industry information submitted by the Texas Bureau of Economic Geology.

million years) in Trans-Pecos Texas. The Red Hills intrusion previously had been postulated to be genetically related to the 32-million-year-old Chinati Mountains caldera, located approximately 1 km to the north. The Laramide age for the Red Hills porphyry places it in the same age range as most of the porphyry copper systems (75 million to 54 million years) in Arizona, New Mexico, and northern Mexico (Silver Standard Resources Inc., 2002§⁴).

⁴A reference that includes a section twist (§) is found in the Internet Reference Cited section.

References Cited

- Griffis, Clayton, ed., 2000, Texas labor market review: Austin, Texas Workforce Commission, December, 10 p.
 Griffis, Clayton, ed., 2001, Texas labor market review: Austin, Texas Workforce Commission, December, 12 p.

Internet Reference Cited

- Silver Standard Resources Inc, 2002, Shafter silver project, Texas, USA, accessed September 15, 2002, via URL <http://www.silverstandard.com>.

TABLE 1
 NONFUEL RAW MINERAL PRODUCTION IN TEXAS 1/ 2/

(Thousand metric tons and thousand dollars unless otherwise specified)

Mineral	1999		2000		2001 p/	
	Quantity	Value	Quantity	Value	Quantity	Value
Cement:						
Masonry	261	29,400 e/	268	28,800 e/	250 e/	27,200 e/
Portland	8,680	659,000 e/	9,270	683,000 e/	10,700 e/	788,000 e/
Clays, common	2,100	9,890	2,210	9,460	2,210	9,460
Gemstones	NA	11	NA	11	NA	12
Gypsum, crude	2,230	15,700	1,760	8,980	1,560	8,100
Helium, crude	W	W	W	W	10	11,100
million cubic meters						
Lime	1,670 r/	111,000 r/	1,600	105,000	1,550	94,300
Salt	10,200	97,500	10,800	104,000	10,800	104,000
Sand and gravel:						
Construction	77,100	373,000	80,800	408,000	89,000	456,000
Industrial	1,620	37,100	1,750	45,200	1,750	45,200
Stone:						
Crushed	108,000 r/	447,000 r/	121,000	496,000	145,000	612,000
Dimension	metric tons					
82,500		24,200	84,700	11,500	84,700	11,500
Talc, crude	do.	220,000	5,000	212,000	3580	259,000
Zeolites	do.	(3/)	NA	(3/)	NA	(3/)
Combined values of brucite (2000-01), clays (ball, bentonite, fuller's earth, kaolin), helium (Grade-A), sulfur [Frash (1999)]	XX	58,400	XX	44,900	XX	35,900
Total	XX	1,870,000 r/	XX	1,950,000	XX	2,210,000

e/ Estimated. p/ Preliminary. r/ Revised. NA Not available. W Withheld to avoid disclosing company proprietary data; value included with "Combined values" data. XX Not applicable.

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

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

3/ Withheld to avoid disclosing company proprietary data.

TABLE 2
 TEXAS: CRUSHED STONE SOLD OR USED, BY KIND 1/

Kind	1999				2000			
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value
Limestone	131	103,000 r/	\$424,000 r/	\$4.12	124	115,000	\$468,000	\$4.07
Dolomite	2 r/	W	W	3.97 r/	2	W	W	4.23
Marble	14	W	W	14.93	7	W	W	3.94
Calcareous marl	2	W	W	3.87	2	W	W	3.45
Shell	1	W	W	3.55	1	W	W	23.08
Granite	10	21	296	14.10	9	W	W	4.21
Traprock	1	W	W	8.10	1	W	W	8.24
Sandstone and quartzite	6	942	3,480	3.69	5	1,080	6,110	5.65
Volcanic cinder and scoria	2	W	W	3.59	1	W	W	4.48
Miscellaneous stone	13	2,360	9,980	4.24	15	2,400	10,400	4.35
Total or average	XX	108,000 r/	447,000 r/	4.13	XX	121,000	496,000	4.10

r/ Revised. W Withheld to avoid disclosing company proprietary data; included in "Total." XX Not applicable.

1/ Data 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 2000, BY USE 1/ 2/

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Construction:			
Coarse aggregate (+1 1/2 inch):			
Macadam	W	W	\$2.00
Riprap and jetty stone	65	\$415	6.38
Filter stone	41	196	4.78
Other coarse aggregate	95	319	3.36
Total or average	201	930	4.63
Coarse aggregate, graded:			
Concrete aggregate, coarse	9,380	48,900	5.21
Bituminous aggregate, coarse	4,750	29,000	6.11
Bituminous surface-treatment aggregate	697	3,710	5.33
Railroad ballast	31	212	6.84
Other graded coarse aggregate	1,940	8,930	4.60
Total or average	16,800	90,800	5.40
Fine aggregate (-3/8 inch):			
Stone sand, concrete	3,990	20,300	5.10
Stone sand, bituminous mix or seal	704	2,900	4.12
Screening, undesignated	168	747	4.45
Other fine aggregate	979	3,430	3.50
Total or average	5,840	27,400	4.69
Coarse and fine aggregates:			
Graded road base or subbase	11,600	42,900	3.71
Unpaved road surfacing	729	2,530	3.47
Terrazzo and exposed aggregate	W	W	5.08
Crusher run or fill or waste	1,120	4,110	3.66
Other coarse and fine aggregates	3,950	14,000	3.55
Total or average	17,400	63,600	3.66
Other construction materials	82	426	5.20
Agricultural:			
Agricultural limestone	48	552	11.50
Poultry grit and mineral food	126	1,070	8.49
Other agricultural uses	28	335	11.96
Total or average	202	1,960	9.69
Chemical and metallurgical:			
Cement manufacture	13,200	47,800	3.62
Lime manufacture	(3/)	(3/)	4.16
Special:			
Asphalt fillers or extenders	(3/)	(3/)	10.19
Other fillers or extenders	574	3,920	6.83
Unspecified: 4/			
Reported	53,100	205,000	3.86
Estimated	12,000	46,000	3.74
Total or average	65,400	251,000	3.84
Grand total or average	121,000	496,000	4.10

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

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

2/ Includes calcareous marl, dolomite, granite, limestone, marble, miscellaneous stone, sandstone and quartzite, shell, traprock, and volcanic cinder and scoria.

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

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

TABLE 4
TEXAS: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2000, BY USE AND DISTRICT 1/

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3	
	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
Fine aggregate (-3/8 inch) 4/	W	W	W	W	W	W
Coarse and fine aggregate 5/	W	W	W	W	W	W
Other construction materials	--	--	1	3	--	--
Agricultural 6/	--	--	--	--	--	--
Chemical and metallurgical 7/	--	--	--	--	W	W
Special 8/	--	--	--	--	--	--
Unspecified: 9/						
Reported	W	W	--	--	3,330	12,800
Estimated	1,200	4,200	140	540	480	1,900
Total	1,840	6,780	819	3,110	5,080	19,800
	District 4		District 5		District 6	
	Quantity	Value	Quantity	Value	Quantity	Value
Construction:						
Coarse aggregate (+1 1/2 inch) 2/	W	W	W	W	W	W
Coarse aggregate, graded 3/	W	W	5,900	28,700	--	--
Fine aggregate (-3/8 inch) 4/	W	W	2,230	8,830	--	--
Coarse and fine aggregate 5/	W	W	4,160	16,800	W	W
Other construction materials	--	--	38	132	--	--
Agricultural 6/	--	--	W	W	--	--
Chemical and metallurgical 7/	W	W	7,190	27,400	--	--
Special 8/	--	--	W	W	--	--
Unspecified: 9/						
Reported	6,190	23,900	12,600	48,400	--	--
Estimated	560	2,100	4,200	15,000	300	1,200
Total	9,910	43,600	37,200	154,000	448	1,810
	District 7		District 8		District 9	
	Quantity	Value	Quantity	Value	Quantity	Value
Construction:						
Coarse aggregate (+1 1/2 inch) 2/	W	W	--	--	--	--
Coarse aggregate, graded 3/	8,970	49,000	W	W	--	--
Fine aggregate (-3/8 inch) 4/	3,180	16,200	--	--	--	--
Coarse and fine aggregate 5/	9,720	33,800	W	W	W	W
Other construction materials	43	291	--	--	--	--
Agricultural 6/	--	--	W	W	--	--
Chemical and metallurgical 7/	5,540	19,100	--	--	--	--
Special 8/	W	W	--	--	--	--
Unspecified: 9/						
Reported	23,600	91,000	W	W	W	W
Estimated	5,300	20,000	26	100	150	560
Total	56,700	232,000	5,590	22,500	3,390	12,600

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

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

2/ Includes filter stone, macadam, riprap and jetty stone, and other coarse aggregate.

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

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

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

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

7/ Includes cement manufacture and lime manufacture.

8/ Includes asphalt fillers or extenders and other fillers or extenders.

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

TABLE 5
TEXAS: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2000, BY MAJOR USE CATEGORY 1/

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate (including concrete sand)	27,700	\$160,000	\$5.80
Concrete products (blocks, bricks, pipe, decorative, etc.) 2/	1,870	10,400	5.57
Asphaltic concrete aggregates and other bituminous mixtures	1,230	11,300	9.14
Road base and coverings	2,630	9,800	3.72
Road stabilization (cement and lime)	489	2,230	4.55
Fill	8,580	19,300	2.25
Other miscellaneous uses 3/	118	1,040	8.80
Unspecified: 4/			
Reported	12,000	69,600	5.81
Estimated	26,000	120,000	4.71
Total or average	80,800	408,000	5.04

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

2/ Includes plaster and gunite sands.

3/ Includes filtration.

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

TABLE 6
TEXAS: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2000, 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
Concrete aggregate and concrete products 2/	1,310	12,500	W	W	197	1,090	W	W
Asphaltic concrete aggregates and other bituminous mixtures	644	8,160	--	--	--	--	--	--
Road base materials 3/	314	1,460	--	--	--	--	W	W
Fill	115	562	W	W	--	--	15	129
Other miscellaneous uses 4/	--	--	719	3,940	--	--	170	1,390
Unspecified: 5/								
Reported	166	1,100	--	--	1,440	6,970	179	886
Estimated	1,600	7,900	1,200	7,100	160	660	1,700	10,000
Total	4,170	31,700	1,900	11,000	1,800	8,720	2,050	12,500
Use	District 5		District 6		District 7		District 8	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregate and concrete products 2/	10,100	61,300	W	W	3,280	20,200	9,380	45,700
Asphaltic concrete aggregates and other bituminous mixtures	W	W	--	--	W	W	W	W
Road base materials 3/	649	2,530	W	W	W	W	1,570	4,480
Fill	W	W	--	--	1,600	2,720	4,840	12,400
Other miscellaneous uses 4/	2,100	4,010	514	2,440	507	3,270	210	1,230
Unspecified: 5/								
Reported	2,730	14,800	134	663	2,820	17,300	3,270	14,300
Estimated	4,200	16,000	1,400	7,800	4,500	19,000	8,800	39,000
Total	19,700	98,800	2,070	10,900	12,700	62,800	28,100	117,000
Use	District 9		Unspecified districts					
	Quantity	Value	Quantity	Value				
Concrete aggregate and concrete products 2/	3,900	21,700	47	773				
Asphaltic concrete aggregates and other bituminous mixtures	W	W	--	--				
Road base materials 3/	W	W	--	--				
Fill	5	15	--	--				
Other miscellaneous uses 4/	418	2,420	--	--				
Unspecified: 5/								
Reported	5	23	1,230	13,500				
Estimated	2,700	16,000	--	--				
Total	7,040	40,400	1,280	14,200				

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

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

2/ Includes plaster and gunite sands.

3/ Includes road and other stabilization (cement and lime).

4/ Includes filtration.

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