

THE MINERAL INDUSTRY OF FLORIDA

This chapter has been prepared under a Memorandum of Understanding between the U.S. Geological Survey and the Florida Geological Survey for collecting information on all nonfuel minerals.

Florida ranked sixth among the 50 States in total nonfuel mineral production value¹ in 1997, according to the U.S. Geological Survey (USGS). The State was fourth in 1996. The estimated value for 1997 was more than \$1.7 billion, a 1% decrease from that of 1996. This followed a 14% increase from 1995 to 1996 (based on final 1996 data). The State accounted for almost 4.5% of the U.S. total nonfuel mineral production value.

Florida continued to be the Nation's leading phosphate rock-mining State in 1997, producing more than five times the quantity of material as that of the next-highest State. Phosphate rock is only produced in four States. In terms of value, phosphate rock, crushed stone, and portland cement continued to be the most important minerals produced in Florida. In 1997, significant increases in the values of portland cement, construction sand and gravel, and phosphate rock moderated but did not overcome decreases in fuller's earth and crushed stone (*see table 1*), resulting in the State's small drop in nonfuel mineral value from that of 1996. In 1996, most of the State's nonfuel mineral commodities increased in value, led by phosphate rock, which increased nearly 18% (more than \$100 million), compared with that of 1995. The other leading nonfuel mineral commodities in 1996, in descending order of net increase, were crushed stone, zircon concentrates, portland cement, ilmenite, fuller's earth, and rutile. Only construction sand and gravel showed a small decrease.

Based on USGS estimates of quantities produced in the 50 States during 1997, Florida remained the only State to produce zircon concentrates, rutile, and staurolite; first in peat and masonry cement, first of 2 ilmenite-producing States (as well as the major U.S. producer), and seventh in portland cement. The State rose to second from third in fuller's earth, to third from fourth in magnesium compounds, and dropped from third to fourth in crushed stone. Additionally, Florida produced significant quantities of construction sand and gravel.

The following narrative information was provided by the

¹The terms "nonfuel mineral production" and related "values" encompass variations in meaning, depending on 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 1997 USGS mineral production data published in this chapter are estimates as of January 1998. For some commodities (for example, 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. Call MINES FaxBack at (703) 648-4999 from a fax machine with a touch-tone handset and request Document # 1000 for a telephone listing of all mineral commodity specialists, or call USGS information at (703) 648-4000 for the specialist's name and number. This telephone listing may also be retrieved over the Internet at: <http://minerals.er.usgs.gov/minerals/contacts/comdir.html/>. All Mineral Industry Surveys—mineral commodity, State, and country—also may be retrieved by way of MINES FaxBack or over the Internet at <http://minerals.er.usgs.gov/minerals/>.

Florida Geological Survey² (FGS). Common clay is extracted in small quantities from many localities in Florida. Kaolin is mined in Putnam County at the Feldspar Corp. Mine. Fuller's earth, in the form of attapulgite (palygorskite), is extracted in the Gadsden County area of northwest Florida and montmorillonite-type fuller's earth in north-central Florida in Marion County. The attapulgite-type fuller's earth is most often recognized as Florida's primary clay commodity. During the past year the Engelhard Corp. purchased the Floridin Co. and is operating the Quincy Mine, which was formerly operated by Floridin.

Heavy minerals produced in Florida are used in the manufacture of titanium dioxide pigments. RGC (USA) Mineral Sands, Inc. (RGC), and E.I. du Pont de Nemours & Co. Inc., are the only heavy mineral producers in the State. This past year, RGC received an Environmental Resource Permit (ERP) for a satellite mine. RGC will conduct operations without the use of a suction dredge and a floating wet-mill concentrator, and instead will use traditional earth-moving equipment. The sand will be concentrated at a land-based concentrator at the mine site.

Florida's phosphate operations supply approximately 25% of the world's and 75% of the Nation's phosphate needs. Phosphate rock is the State's largest industrial mineral commodity in terms of quantity mined and value. Companies presently mining in Florida include IMC-Agrico Co., Cargill Fertilizer, Inc., CF Industries, Inc., Potash Corp. of Saskatchewan (PSC), and Agrifos L.L.C. Neither Farmland Industries, Inc. nor Nu-Gulf Industries were actively mined in 1997; however, Farmland is just about to enter into the permitting phase for a new mine. IMC-Agrico also is working on permits for two new mines, permits must be obtained before any mining is allowed.

Limestone, the primary source of stone, is mined in many localities in the State. During the past year, Florida Rock Industries, Inc. (FRI) acquired permission to mine at the Florida Aggregates Inter-Group Mine in St. Lucie County. FRI is now in the process of getting the proper permits. Construction has begun on FRI's new cement mill in western Alachua County. It is anticipated that the mill will be brought on-line in 18 months.

Florida Limerock and Aggregates Institute (FLAI), which acts as the voice of the Florida aggregate industry, continues to work closely with the Florida Department of Transportation as they implement both "Superpave," a new asphalt mix design concept, and Quality Control 2000, a quality control/quality assurance program to improve the quality of construction for the State and federal highway system. Many of the aggregate producers are members of the FLAI.

The Department of Environmental Protection's (DEP) Bureau of Mine Regulation (BOMR) administers the State's reclamation

²Steven Spencer, Coastal/Economic Geologist, authored the text submitted by the Florida Geological Survey.

rules. The rules, which are spelled out in the Florida Administrative Code, give the BOMR authority to regulate individual operators in their reclamation efforts. There is no statewide mining law covering all commodities.

The BOMR transferred the ERP and reclamation programs for mines within the Southwest district to the DEP Southwest District

Office. These programs cover clay, limestone, peat, sand and gravel, and shell and dolomite operations. The only mines in the district that are still under the jurisdiction of BOMR are those mines where operators have other mines in other DEP districts or, where their mines cross into neighboring districts.

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

(Thousand metric tons and thousand dollars unless otherwise specified)

Mineral	1995		1996		1997 p/	
	Quantity	Value	Quantity	Value	Quantity	Value
Cement:						
Masonry	383	35,200	422	35,200 e/	431	36,600 e/
Portland	3,170	233,000	3,450	245,000 e/	3,510	255,000 e/
Clays:						
Fuller's earth	388	50,800	377	58,900	430	41,900
Kaolin	33	3,510	35	3,760	35	3,770
Gemstones	NA	W	NA	1	NA	1
Peat	294	5,390	298	5,550	244	4,690
Sand and gravel:						
Construction	19,300	69,300	18,500	68,800	19,300	73,500
Industrial	547	6,340	515	6,340	515	6,330
Stone, crushed	68,000	350,000	73,600 3/	394,000 3/	70,200 3/	380,000 3/
Combined value of clays (common), magnesium compounds, phosphate rock, staurolite, stone [crushed marl (1996-97)], titanium concentrates, zirconium concentrates, and value indicated by symbol W	XX	783,000	XX	947,000	XX	943,000
Total	XX	1,540,000	XX	1,760,000	XX	1,740,000

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

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

2/ Data are rounded to three significant digits; may not add to totals shown.

3/ Excludes certain stones; kind and value included with "Combined value" data.

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

Kind	1995				1996			
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value
Limestone	75 r/	64,200 r/	\$329,000 r/	\$5.12 r/	76 2/	71,000 2/	\$379,000 2/	\$5.34 2/
Limestone-dolomite	2	W	W	7.06	--	--	--	--
Dolomite	4	1,120	7,010	6.28	4	W	W	6.55
Shell	5	1,090	4,100	3.78	4	W	W	4.46
Calcareous marl	2	W	W	4.53	(3/)	(3/)	(3/)	(3/)
Total	XX	68,000	350,000	5.14	XX	73,600	394,000	5.35

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

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Includes "Limestone-dolomite," reported with no distinction between the two.

3/ Excludes calcareous marl from State total to avoid disclosing company proprietary data.

TABLE 3
FLORIDA: CRUSHED STONE SOLD OR USED BY PRODUCERS
IN 1996, BY USE 1/ 2/

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Coarse aggregate (+1 1/2 inch):			
Riprap and jetty stone	274	\$1,620	\$5.89
Filter stone	361	1,900	5.26
Coarse aggregate, graded:			
Concrete aggregate, coarse	12,400	86,800	7.02
Bituminous aggregate, coarse	5,580	36,500	6.54
Bituminous surface-treatment aggregate	309	2,650	8.59
Other graded coarse aggregate 3/	994	6,530	6.57
Fine aggregate (-3/8 inch):			
Stone sand, concrete	6,080	42,900	7.04
Stone sand, bituminous mix or seal	3,120	19,300	6.18
Screening, undesignated	2,600	9,630	3.70
Other fine aggregates	1,330	7,480	5.64
Coarse and fine aggregates:			
Graded road base or subbase	17,100	67,500	3.94
Unpaved road surfacing	420	1,860	4.43
Crusher run or fill or waste	4,300	15,700	3.67
Other coarse and fine aggregates	2,040	6,080	2.98
Other construction materials 4/	284	1,320	4.64
Agricultural limestone 5/	816	4,600	5.63
Chemical and metallurgical, cement manufacture	3,220	9,160	2.84
Special:			
Other fillers or extenders	W	W	5.51
Other specified uses not listed	W	W	9.06
Unspecified: 6/			
Actual	8,050	48,100	5.98
Estimated	4,360	24,000	5.51
Total	73,600	394,000	5.35

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

1/ Includes dolomite, limestone, limestone-dolomite, and shell; excludes calcareous marl from State to avoid disclosing company proprietary data.

2/ Data are rounded to three significant digits; may not add to totals shown.

3/ Includes railroad ballast.

4/ Includes pipe bedding.

5/ Includes poultry grit and mineral food and other agricultural uses.

6/ Includes production reported without a breakdown by end use and estimates for nonrespondents.

TABLE 4
FLORIDA: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 1996,
BY USE AND DISTRICT 1/ 2/ 3/

(Thousand metric tons and thousand dollars)

Use	District 3		District 4	
	Quantity	Value	Quantity	Value
Construction aggregates:				
Coarse aggregate (+1 1/2 inch) 4/	99	727	536	2,790
Coarse aggregate, graded 5/	5,570	40,400	13,700	92,100
Fine aggregate (-3/8 inch) 6/	3,930	19,400	9,200	59,800
Coarse and fine aggregate 7/	10,700	36,100	13,200	55,000
Other construction materials 8/	75	738	209	579
Agricultural 9/	816	4,600	--	--
Chemical and metallurgical 10/	W	W	W	W
Special 11/	W	W	--	--
Other miscellaneous uses 12/	W	W	--	--
Unspecified: 13/				
Actual	W	W	W	W
Estimated	2,260	12,900	2,090	11,200
Total	31,800	159,000	41,800	235,000

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

1/ Excludes calcareous marl from State total to avoid disclosing company proprietary data.

2/ Production reported in District 1 and District 2 was included with "District 3" to avoid disclosing company proprietary data.

3/ Data are rounded to three significant digits; may not add to totals shown.

4/ Includes filter stone and riprap and jetty stone.

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

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

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

8/ Includes pipe bedding.

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

10/ Includes cement manufacture.

11/ Includes other fillers or extenders.

12/ Includes other specified uses not listed.

13/ Includes production reported without a breakdown by end use and estimates for nonrespondents.

TABLE 5
FLORIDA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 1996,
BY MAJOR USE CATEGORY 1/

Use	Quantity	Value (thousands)	Value per ton
	(thousand metric tons)		
Concrete aggregate (including concrete sand)	7,410	\$30,900	\$4.17
Plaster and gunite sands	694	2,480	3.57
Concrete products (blocks, bricks, pipe, decorative, etc.)	529	2,630	4.97
Asphaltic concrete aggregates and other bituminous mixtures	405	1,400	3.46
Road base and coverings 2/	793	4,740	5.97
Fill	1,930	3,390	1.76
Other miscellaneous uses 3/	520	2,160	4.15
Unspecified: 4/			
Actual	2,150	9,260	4.30
Estimated	4,050	11,800	2.91
Total or average	18,500	68,800	3.72

1/ Data are rounded to three significant digits; may not add to totals shown.

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

3/ Includes filtration.

4/ Includes production reported without a breakdown by end use and estimates for nonrespondents.

TABLE 6
 FLORIDA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 1996,
 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/	952	3,340	W	W	W	W	254	560
Asphaltic concrete aggregates and road base materials 3/	871	1,360	W	W	W	W	373	551
Other miscellaneous uses 4/	4	8	7,220	32,400	2,600	9,570	--	--
Unspecified: 5/								
Actual	246	2,290	--	--	1,910	6,970	--	--
Estimated	807	2,400	1,520	4,620	1,020	3,300	711	1,460
Total	2,880	9,400	8,740	37,000	5,520	19,800	1,340	2,570

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

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Includes plaster and gunite sands.

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

4/ Includes filtration.

5/ Includes production reported without a breakdown by end use and estimates for nonrespondents.