

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.

In 1999, the preliminary estimated value¹ of nonfuel mineral production for Florida was about \$1.9 billion, according to the U.S. Geological Survey (USGS). This was a more than 6% increase from that of 1998,² and followed a 1.1% decrease in 1998 from 1997. The increase continued an overall upward trend that began in 1994, following 4 years of lower values. In 1999, for the third time in the past 4 years, Florida ranked fourth among the 50 States in total nonfuel mineral production value, of which the State accounted for almost 5% of the U.S. total.

Florida continued to be the Nation's leading phosphate rock-mining State in 1999, producing more than six times as much as the next-highest producing State. Phosphate rock is produced in only four States. In terms of value, phosphate rock, crushed stone, and portland cement continued to be the most important raw mineral commodities produced in Florida. (Listings of mineral commodities are in descending order of value, magnitude of change in value, or quantity produced.) In 1999, increases of \$80 million in phosphate rock, \$32 million in crushed stone, \$12 million in construction sand and gravel, and \$6 million in portland cement led the State's increase in value (table 1). Relatively smaller increases in masonry cement and several other mineral commodities contributed to the overall increase. The only significant decrease was a \$12 million drop in the value of zircon concentrates. In 1998, significant decreases occurred in the values of fuller's earth, crushed stone, portland cement, zircon concentrates, and ilmenite and rutile titanium concentrates. These decreases more than offset a substantial increase in the value of phosphate rock, moderate gain in construction sand and gravel, and smaller increases in masonry cement and peat, resulting in a net decrease for the year (table 1).

Based upon USGS preliminary estimates of production in the 50 States in 1999, Florida remained the only State to

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 1999 USGS mineral production data published in this chapter are preliminary estimates as of May 2000, 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. A telephone listing for the specialists may be retrieved over the Internet at URL <http://minerals.usgs.gov/minerals/contacts/comdir.html>, by using MINES FaxBack at (703) 648-4999 from a fax machine with a touch-tone handset (request Document #1000 for a telephone listing of all mineral commodity specialists), or by calling USGS information at (703) 648-4000 for the specialist's name and number. All Mineral Industry Surveys—mineral commodity, State, and country—also may be retrieved over the Internet at URL <http://minerals.usgs.gov/minerals>; facsimile copies may be obtained from MINES FaxBack.

²Values, percentage calculations, and rankings for 1998 may vary from the Minerals Yearbook, Area Reports: Domestic 1998, Volume II, owing to the revision of preliminary 1998 to final 1998 data. Data for 1999 are preliminary and are expected to change; related rankings may also be subject to change.

produce rutile concentrates and staurolite; it was first in peat and masonry cement, first of two States producing zircon concentrates, and first of three States producing ilmenite concentrates. Florida continued to be third in crushed stone production, fourth in fuller's earth, seventh in portland cement, and dropped from third to fourth in magnesium compounds. Additionally, Florida produced substantial quantities of construction and industrial sand and gravel.

The Florida Geological Survey³ (FGS) provided the following narrative information. Most employment in Florida's mining industry was associated with the mining and processing of minerals and materials used in the State's construction industry. Based upon information the FGS received from the U.S. Department of Labor's Mine Safety and Health Administration, 6,464 persons were employed at Florida mines and mills and another 1,037 persons were employed as office staff during 1999. The limestone sector was the largest employer with over 3,150 employees, and the phosphate industry was second with nearly 2,500 workers. Most of the remaining was employment at sand and gravel, cement, heavy mineral sand, and clay mine pit operations.

Most of the stone mined in Florida was used for road construction. Florida Rock Industries, Inc. acquired Harper Brothers, Inc.'s aggregate mining and highway and heavy construction business in Ft. Myers, FL (North American Quarry News, 1999a). Southdown, Inc. agreed to acquire Sunshine Materials, Inc.'s limestone quarry site in west-central Florida (North American Quarry News, 1999b). Martin-Marietta Materials, Inc. obtained an Environmental Resource Permit (ERP) from the Florida Department of Environmental Protection's Suwannee River Water Management District for an expansion of its Perry Quarry, which was formerly operated by Florida Rock Industries, Inc. Angelo's Aggregate Materials, Ltd. proceeded with an ERP application for its Jasper Pit in Madison County. Angelo's, currently producing sand from the Jasper Pit, was developing plans to excavate limestone from portions of the Jasper Pit, in addition to its sand production. The operators of several other limestone mines, although smaller than Martin-Marietta's Perry Quarry, filed ERP applications as part of their plans to reactivate their operations. Some of the limestone is from high-purity deposits, which can be calcined (heated) and, together with other ingredients, can be used to manufacture portland and masonry cement. During the past year, Florida Rock Industries, Inc. brought its Newberry cement plant on-line and began production.

The State's sand and gravel resources can be subdivided into construction and industrial, the bulk of which is construction grade. Florida ranks approximately 15th in the Nation in construction sand and gravel used or produced and 20th in industrial sand. Whereas sand is mined at many locations throughout the State, quartz gravel is mined only along

³Steven Spencer, Coastal/Economic Geologist, authored the text submitted by the Florida Geological Survey.

the Trail Ridge region of the peninsula and in the far northwestern regions of Florida. CSR America, Inc. (parent company of Rinker Materials Corp.) acquired Harper Brothers, Inc., Palmdale Sand Mine in Glades County, Florida. (Leu Newman, Florida Department of Environmental Protection, Bureau of Mine Reclamation, oral commun., 2000).

The Gypsum Division of Lafarge Corp. announced plans to open a new wallboard plant in Putnam County (North American Quarry News, 1999c).

Common, fuller's earth, and kaolin clays were mined in a few locations in Florida. Fuller's earth, typically used as an absorbent material, was mined in Gadsden and Marion Counties; kaolin, often used in the manufacture of paper and refractories, was mined in Putnam County; and common clay, often used in the manufacture of brick, cement, and lightweight aggregate, was mined in small quantities from various locations throughout the State.

Two of five companies that mine heavy minerals in the United States are located in Florida. E.I. du Pont de Nemours, Co., and RGC (USA) Mineral Sands, Inc. mined respectively in Bradford and Clay Counties, which are in northeastern Florida. Following a merger of RGC's Australian parent company with another Australian company, the heavy mineral mines of Green Cove Springs and Putnam East Extended Satellite operated under the name Iluka Resources, Inc. A variety of minerals are found in Florida's heavy mineral sand deposits, including ilmenite, leucoxene, rutile (titanium minerals), and zircon. Ilmenite and rutile are primary source materials used to manufacture titanium dioxide pigments. These pigments are often used in the manufacture of paint, varnish and lacquers, plastics, and paper.

According to the FGS, Florida producers supplied approximately 25% of the world's phosphate needs and 75% of U.S. domestic needs. Based upon FGS surveys and estimates, approximately 34 million metric tons of phosphate rock was mined in the State in 1999, nearly all of which was used to manufacture agricultural fertilizer. The remainder was used in products such as feed supplements, vitamins, soft drinks, and toothpaste. In 1998, \$1.8 billion worth of fertilizer was exported, making it one of Florida's leading export commodities.

Phosphate companies actively mining in the State included the IMC-Agrico Co., Cargill Fertilizer, Inc., CF Industries, Inc., Agrifos, L.L.C., Potash Corporation of Saskatchewan, and Nu-Gulf Industries, Inc. Farmland Hydro, L.P. planned to apply to open a new mine in Hardee County.

Mulberry Corp.'s Piney Point phosphate plant (formerly owned by Royster Phosphates, Inc.) in North Manatee County was reopened in August, employing about 170 people, but closed again in October because of challenges from environmental groups. All Mulberry plants were closed in December.

For IMC-Agrico, 1999 was a very busy year. It applied to open two new mines, Ona and Pine Level, but shut down several operations. IMC-Agrico permanently closed the Payne Creek and Noralyn-Clear Springs Mines. Near the end of 1999, the company also planned to close some plants in central Florida and Louisiana to cut output by more than 20% because of "a global fertilizer glut." IMC-Agrico announced that it planned to close its Nichols chemical plant east of Tampa (74 workers). The company planned to cease production of triple superphosphate, one of three major crop nutrients, at its New Wales chemical plant. Mine shutdowns also occurred at Cargill's Ft. Meade Mine (several weeks) and at Nu-Gulf's Wingate Creek Mine (News-Journal online, November 14, 1999, Nation's largest phosphate company to close mines, plants, accessed June 15, 2000, at URL <http://www.n-jcenter.com/1999/Nov/14/>). IMC-Agrico received conceptual approval for a 69-hectare (ha) expansion at its Four Corners Mine near Duette. The project was on hold because of problems with the county government and consultants' reports. Opposition from the State delayed the company's planned expansion of about 1,140 ha at its Ft. Green Mine near Duette (Herald Tribune News Coast, September 3, 1999, State opposes Manatee Mine expansion, accessed June 15, 2000, at URL <http://www.newscoast.com>).

In the peat sector, the Hyponex Co. announced plans to mine approximately 53 ha of South Lake County marshland (Orlando Sentinel, 1999). American Peat, Inc. was preparing an ERP application for the Loper Peat Mine in Madison County, formerly operated by W.C. Loper.

References Cited

- North American Quarry News, 1999a, Florida Rock Industries completes acquisition of Harper Bros., Inc.: North American Quarry News, July, v. 1, p. 6.
- 1999b, Southdown lands Florida ready-mix concrete and aggregates producer: North American Quarry News, August, v. 1, p. 8.
- 1999c, Lafarge to build new wallboard production facility in Florida: North American Quarry News, October, v. 1, p. 15-16.
- Orlando Sentinel, 1999, Mine may turn muck to bucks: Orlando Sentinel, September 8, p. 2.

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

(Thousand metric tons and thousand dollars)

Mineral	1997		1998		1999 p/	
	Quantity	Value	Quantity	Value	Quantit	Value
Cement:						
Masonry	406	36,200 e/	442	40,600 e/	454	42,000 e/
Portland	3,750	274,000 e/	3,470	259,000 e/	3,560	265,000 e/
Gemstones	NA	1	NA	1	NA	1
Peat	361	5,710	391	7,360	354	7,920
Sand and gravel:						
Construction	19,200	75,500	20,900	84,600	23,500	96,700
Industrial	507	5,800	525	6,150	516	6,410
Stone: Crushed 3/	73,600 r/	394,000 r/	81,000	377,000	85,800	409,000
Combined values of clays (common, fuller's earth, kaolin), magnesium compounds, phosphate rock, staurolite, stone (crushed marl), titanium concentrates, zirconium concentrates and values	XX	1,040,000	XX	1,030,000	XX	1,100,000
Total	XX	1,830,000	XX	1,810,000	XX	1,930,000

e/ Estimated. p/ Preliminary. r/ Revised. NA Not available. 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/ Excludes certain stones; kind and value included with "Combined values" data.

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

Kind	1997				1998			
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of Quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value
Limestone	70 r/	70,400 r/	\$376,000 r/	\$5.3 r/	91	76,600	\$351,000	\$4.15
Limestone-dolomite	2	W	W	5.74	2	W	W	7.62
Dolomite	4	W	W	6.42	4	W	W	5.78
Calcareous marl	1	(2/)	(2/)	(2/)	1	(2/)	(2/)	(2/)
Sandstone	--	--	--	--	1	W	W	4.00
Shell	4	W	W	4.61	6	1,950	7,940	3.70
Total or average	XX	73,600 r/	394,000 r/	5.36 r/	XX	81,000	377,000	4.65

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

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

2/ Excluded from total to avoid disclosing company proprietary data.

TABLE 3
FLORIDA: CRUSHED STONE SOLD OR USED BY PRODUCERS
IN 1998, BY USE 1/ 2/

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Coarse aggregate (+1 1/2 inch):			
Riprap and jetty stone	94	\$719	\$7.65
Filter stone	106	776	7.32
Other coarse aggregate	66	407	6.17
Coarse aggregate, graded:			
Concrete aggregate, coarse	6,590	43,700	6.63
Bituminous aggregate, coarse	3,000	17,100	5.69
Other graded coarse aggregate	1,740	10,200	5.90
Fine aggregate (-3/8 inch):			
Stone sand, concrete	2,200	12,000	5.45
Stone sand, bituminous mix or seal	1,660	8,730	5.27
Screening, undesignated	2,740	11,200	4.09
Other fine aggregate	2,320	12,000	5.16
Coarse and fine aggregates:			
Graded road base or subbase	13,600	50,200	3.69
Unpaved road surfacing	W	W	3.57
Crusher run or fill or waste	3,860	13,700	3.56
Other coarse and fine aggregates	1,600	6,140	3.80
Other construction materials	5,070	21,900	4.32
Agricultural:			
Agricultural limestone	438	2,680	6.11
Poultry grit and mineral food	W	W	19.94
Other agricultural uses	377	3,800	10.09
Chemical and metallurgical:			
Cement manufacture	3,440	13,200	3.83
Glass manufacture	W	W	9.89
Special:			
Asphalt fillers or extenders	W	W	12.97
Other fillers or extenders	77	426	5.54
Other miscellaneous uses: Other specified uses not listed	282	3,910	13.87
Unspecified: 3/			
Actual	23,500	105,000	4.46
Estimated	8,050	36,300	4.51
Total or average	81,000	377,000	4.65

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

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

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

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

TABLE 4
 FLORIDA: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 1998,
 BY USE AND DISTRICT 1/ 2/

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3		District 4	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Construction aggregates:								
Coarse aggregate (+1 1/2 inch) 3/	W	W	W	W	44	214	174	1,100
Coarse aggregate, graded 4/	W	W	W	W	5,010	37,600	5,780	28,100
Fine aggregate (-3/8 inch) 5/	W	W	W	W	4,040	19,100	4,650	23,400
Coarse and fine aggregate 6/	955	4,980	8,200	28,300	3,770	15,100	6,160	21,700
Other construction materials	381	3,540	449	3,800	--	--	5,070	21,900
Agricultural 7/	196	1,400	(8/)	(8/)	327	1,630	--	--
Chemical and metallurgical 9/	--	--	(8/)	(8/)	(8/)	(8/)	(8/)	(8/)
Special 10/	--	--	(8/)	(8/)	(8/)	(8/)	--	--
Other miscellaneous uses	--	--	(8/)	(8/)	--	--	(8/)	(8/)
Unspecified: 11/								
Actual	502	1,660	564	1,860	5,460	26,500	16,900	74,700
Estimated	677	3,090	1,080	5,230	1,500	7,260	4,800	20,700
Total	2,710	14,700	11,100	49,100	22,500	116,000	44,800	196,000

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

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

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

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

4/ Includes concrete aggregate (coarse), bituminous aggregate (coarse), and other graded coarse aggregate.

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

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

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

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

9/ Includes cement manufacture and glass manufacture.

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

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

TABLE 5
 FLORIDA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 1998,
 BY MAJOR USE CATEGORY 1/

Use	Quantity	Value	Unit
	(thousand metric tons)	(thousands)	value
Concrete aggregate and concrete products	8,380	\$38,200	\$4.56
Plaster and gunite sands	480	2,060	4.29
Asphaltic concrete aggregates and road base materials 2/	693	2,320	3.34
Fill	2,560	5,910	2.31
Other miscellaneous uses	W	W	4.09
Filtration	W	W	4.94
Unspecified: 3/			
Actual	4,880	20,800	4.28
Estimated	3,300	12,300	3.72
Total or average	20,900	84,600	4.04

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

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

2/ Includes road and other stabilization (lime).

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

TABLE 6
 FLORIDA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 1998,
 BY USE AND DISTRICT 1/

(Thousand metric tons and thousand dollars)

Use	District 1		District 2	
	Quantity	Value	Quantity	Value
Concrete aggregate and concrete products 2/	788	3,080	6,530	30,200
Asphaltic concrete aggregates and road base materials 3/	W	W	W	W
Fill	634	770	W	W
Other miscellaneous uses	W	W	W	W
Filtration	--	--	W	W
Unspecified: 4/				
Actual	W	W	258	1,010
Estimated	606	2,430	1,930	7,370
Total	2,370	9,060	9,470	41,500
	District 3		District 4	
	Quantity	Value	Quantity	Value
Concrete aggregate and concrete products 2/	1,540	7,040	2	5
Asphaltic concrete aggregates and road base materials 3/	139	463	286	1,040
Fill	956	2,350	W	W
Other miscellaneous uses	W	W	--	--
Filtration	W	W	--	--
Unspecified: 4/				
Actual	4,050	16,100	W	W
Estimated	760	2,480	--	--
Total	7,940	30,400	1,140	3,560

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 plaster and gunite sands.

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

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