

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 2000, the estimated value¹ of nonfuel mineral production for Florida was about \$1.92 billion, based upon preliminary U.S. Geological Survey (USGS) data. This was a 5% decrease from that of 1999² and followed an 11.6% increase in 1999 from 1998. In 2000, for the second time in the past 3 years, Florida ranked fifth 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 2000, producing almost 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, portland cement, and construction sand and gravel 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 2000, increases of an estimated \$56 million in cement (portland and masonry combined), \$42 million in crushed stone, \$6 million in construction sand and gravel, plus smaller yet significant increases in zirconium concentrates and fuller's earth bolstered the State's nonfuel mineral economy. Staurolite and industrial sand and gravel also showed small increases for the year. These increases were more than offset by a very substantial drop in the value of phosphate rock, along with much smaller decreases in the values of rutile, magnesium compounds, peat, kaolin, and common clays, resulting in a net drop for the year (table 1). Producers of fertilizer in Florida and North Carolina were affected by lower export sales and prices, which resulted from the opening of new phosphoric acid and diammonium phosphate plants in Asia. One mine in Florida closed permanently in August owing to market conditions; the company began using phosphate rock imported from Morocco at its fertilizer plant. Since mid-1999, four mines have closed in Florida as part of corporate

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 2000 USGS mineral production data published in this chapter are preliminary estimates as of July 2001 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 1999 may vary from the Minerals Yearbook, Area Reports: Domestic 1999, Volume II, owing to the revision of preliminary 1999 to final 1999 data. Data for 2000 are preliminary and are expected to change; related rankings may also be subject to change.

restructuring programs and depletion of reserves. Overall, production in the Florida-North Carolina region during 2000 was below 90% of rated annual capacity (Jasinski, 2001).

In 1999, increases in the values of crushed stone (up \$92 million), phosphate rock, construction sand and gravel (up almost \$30 million), cement (up \$11 million), and smaller yet significant increases in fuller's earth and both titanium concentrates, ilmenite and rutile, led to the State's increase in value. The only significant decrease for the year was a more than \$10 million drop in the value of zirconium concentrates and a much smaller drop in that of magnesium compounds.

Based upon USGS preliminary estimates of production in the 50 States in 2000, Florida continued to be the only State to produce rutile concentrates and staurolite; it was first in masonry cement and peat and first of two States producing ilmenite concentrates and zirconium concentrates; third in magnesium compounds; and seventh in portland cement. While the State rose to second from third in crushed stone and to third from fourth in fuller's earth, it dropped to eighth from seventh in kaolin. Additionally, Florida produced substantial quantities of construction and industrial sand and gravel.

The Florida Geological Survey³ provided the following narrative information. The Mine Safety and Health Administration reported that there were 3,808 persons employed in Florida's surface mining operations and another 2,334 persons employed in associated mills and preparation plants during 2000. The limestone industry employed over 3,000, and the phosphate industry was second with nearly 2,300 workers. The remainder of the work force was from sand and gravel companies, cement operations, the heavy-mineral sands industry, and clay mines operations.

Most of the stone that is mined in Florida is used for road base material. Other uses include asphalt aggregate and concrete, cement manufacturing, fertilizer, rip rap, and soil conditioning. Youngquist Brothers, Inc. submitted an application for a new limestone mine in Lee County. They sold their Corkscrew Limerock Mine to RMC South Florida Inc.

Limestone can be used to manufacture portland and masonry cement. Florida was a major producer and consumer of these two types of cement during year 2000. In North Florida, Anderson Mining Co. sold its Columbia City pit to the State. The pit was used to mine limestone used for the production of cement. Suwannee American Inc. began construction of a new integrated cement plant in Branford, FL. Tarmac-America, Inc. was purchased by a Greece's Titan Cement Co. (CNNfn, August 28, 2000, Titan to buy Tarmac, accessed July 16, 2001, at URL <http://cnnfn.cnn.com/2000/08/28/deals/titan>). CSR America Inc. purchased the aggregates and cement company FCS Holdings Inc. and its subsidiary Florida Crushed Stone Co.

Florida produced both construction and industrial grade quartz sand. Sand is mined at many localities throughout the

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

State. Quartz gravel only comes from certain areas along the Trail Ridge region of the peninsula or from northwest Florida.

Common clay, fuller's earth, and kaolin were mined in 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 ceramics, was mined in Putnam County. Common clay was mined in small quantities from various locations throughout the State and was often used in the manufacture of brick, cement, and lightweight aggregate.

E.I. du Pont de Nemours and Co., Inc. and Iluka Resources, Inc. mined heavy minerals in northeast Florida in Baker, Clay, and Putnam Counties. A variety of minerals were in the Florida heavy-mineral sand deposits including ilmenite, leucoxene, rutile, and zircon. Ilmenite and rutile were primary ingredients in the manufacture of titanium dioxide pigments. These pigments were often used in the manufacture of lacquers, paint, paper, plastics, and varnish.

Florida producers supplied approximately one-quarter of the world's phosphate needs and three-quarters of U.S. domestic needs. About 90% of the rock that is mined in Florida, which equates to approximately 29 million metric tons (Mt) in 2000 (down slightly from 30 Mt in 1999), was used to manufacture fertilizer. The remaining 10% was used in applications such as

animal feed supplements, soft drinks, toothpaste, and vitamins. In 2000, \$1,128 billion worth of fertilizer was exported from Florida making it one of Florida's leading export commodities (Florida Phosphate Council, Spring 2001, 2000 Florida phosphate facts, accessed July 17, 2001, at URL <http://www.flaphos.org/facts01.html>).

Phosphate companies actively mining in the State included Cargill Fertilizer, Inc., CF Industries, Inc., IMC-Phosphate Co., and PCS-Phosphate. IMC was in the process of obtaining permits to open its Ona and Pine Level Mines and Farmland Hydro, L.P. was still in the process of obtaining permits to open its Hardee County Mine. Currently, there is an individual prospecting for hard-rock phosphate in Lafayette County.

During the 2000 legislative session, the State Fire Marshall was given the exclusive authority to regulate blasting at construction aggregate mines. Until State rules are finalized and adopted, existing county rules will continue to apply (H. Hayes, Florida Department of Environmental Protection, Bureau of Mine Reclamation, oral commun., 2001).

Reference Cited

Jasinski, S.M., 2001, Phosphate rock: U.S. Geological Survey Mineral Commodity Summaries 2001, p. 120-121.

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

(Thousand metric tons and thousand dollars)

Mineral	1998		1999		2000 p/	
	Quantity	Value	Quantity	Value	Quantity	Value
Cement:						
Masonry	442	40,600 e/	494	50,900 e/	550	56,700 e/
Portland	3,470	259,000 e/	3,500	260,000 e/	4,200	310,000 e/
Clays, kaolin	W	W	35	3,830	34	3,500
Gemstones	NA	1	NA	1	NA	1
Peat	391	7,360	408	8,180	368	7,090
Sand and gravel:						
Construction	20,900	84,600	27,200	114,000	27,300	120,000
Industrial	525	6,150	509	6,370	528	6,710
Stone, crushed 3/	81,000 3/	377,000 3/	92,300	469,000	98,000	511,000
Combined values of clays (common, fuller's earth), magnesium compounds, phosphate rock, staurolite, stone [crushed marl (1998)], titanium concentrates, zirconium concentrates, and value indicated by symbol W	XX	1,030,000	XX	1,110,000	XX	904,000
Total	XX	1,810,000	XX	2,020,000	XX	1,920,000

e/ Estimated. p/ Preliminary. 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/ Excludes certain stones; kind and value included with "Combined values" data.

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

Kind	1998				1999			
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of Quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value
Limestone 2/	93 r/	76,800 r/	\$351,000	\$4.57 r/	97	87,500	\$440,000	\$5.03
Dolomite	5 r/	2,430	17,700	7.31 r/	5	W	W	W
Granite	--	--	--	--	1	W	W	W
Shell	7 r/	2,110 r/	8,750 r/	4.15 r/	8	2,390	10,500	4.38
Total or average	XX	81,000	377,000	4.64 r/	XX	92,300	469,000	5.08

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

TABLE 3
FLORIDA: CRUSHED STONE SOLD OR USED BY PRODUCERS
IN 1999, BY USE 1/ 2/

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Construction:			
Coarse aggregate (+1 1/2 inch):			
Macadam	W	W	\$5.00
Riprap and jetty stone	158	\$1,040	6.59
Filter stone	122	674	5.52
Other coarse aggregate	1,160	3,980	3.42
Total or average	1,440	5,690	3.94
Coarse aggregate, graded:			
Concrete aggregate, coarse	16,200	116,000	7.13
Bituminous aggregate, coarse	4,420	24,600	5.56
Bituminous surface-treatment aggregate	1,340	5,410	4.05
Other graded coarse aggregate	5,680	33,400	5.87
Total or average	27,700	179,000	6.47
Fine aggregate (-3/8 inch):			
Stone sand, concrete	7,180	37,900	5.28
Stone sand, bituminous mix or seal	3,040	16,300	5.35
Screening, undesignated	4,210	20,900	4.98
Other fine aggregate	2,170	13,700	6.31
Total or average	16,600	88,800	5.35
Coarse and fine aggregates:			
Graded road base or subbase	17,800	67,800	3.81
Unpaved road surfacing	W	W	6.73
Crusher run or fill or waste	5,140	19,100	3.72
Other coarse and fine aggregates	975	6,610	6.78
Total or average	23,900	93,600	3.91
Other construction materials	270	1,120	4.14
Agricultural:			
Agricultural limestone	(3/)	(3/)	7.66
Other agricultural uses	(3/)	(3/)	3.43
Chemical and metallurgical:			
Cement manufacture	(3/)	(3/)	4.27
Sulfur oxide removal	(3/)	(3/)	3.60
Special, other fillers or extenders	(3/)	(3/)	5.80
Other miscellaneous uses and specified uses not listed	113	643	5.69
Unspecified: 4/			
Reported	9,230	42,300	4.58
Estimated	8,000	34,000	4.34
Total or average	17,200	76,700	4.47
Grand total or average	92,300	469,000	5.08

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

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

2/ Includes dolomite, granite, limestone, limestone-dolomite, and shell.

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
FLORIDA: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 1999,
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	150	685	W	W
Coarse aggregate, graded 3/	W	W	W	W	9,000	84,100	W	W
Fine aggregate (-3/8 inch) 4/	W	W	W	W	4,430	25,500	11,900	60,900
Coarse and fine aggregate 5/	1,110	7,110	10,000	37,500	2,920	11,300	9,850	37,700
Other construction materials	--	--	--	--	266	1,100	4	19
Agricultural 6/	W	W	W	W	W	W	--	--
Chemical and metallurgical 7/	--	--	W	W	W	W	W	W
Special 8/	--	--	--	--	W	W	--	--
Other miscellaneous use	--	--	84	404	--	--	29	239
Unspecified: 9/								
Reported	699	3,280	1,330	6,000	2,540	11,600	4,670	21,400
Estimated	480	2,100	1,300	5,600	2,200	9,900	3,900	17,000
Total	2,890	19,000	13,800	56,400	24,000	156,000	51,500	238,000

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), and other graded coarse aggregate.

4/ Includes screening (undesignated), 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, unpaved road surfacing, and other coarse and fine aggregates.

6/ Includes agricultural limestone and other agricultural uses.

7/ Includes cement manufacture and sulfur oxide removal.

8/ Includes other fillers or extenders.

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

TABLE 5
FLORIDA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 1999,
BY MAJOR USE CATEGORY 1/

Use	Quantity	Value	Unit
	(thousand metric tons)	(thousands)	value
Concrete aggregate (including concrete sand)	9,040	\$43,900	\$4.86
Plaster and gunite sands	862	4,560	5.29
Concrete products (blocks, bricks, pipe, decorative, etc.)	400	2,030	5.08
Asphaltic concrete aggregates and road base materials 2/	790	3,070	3.89
Fill	2,360	6,470	2.74
Other miscellaneous uses 3/	3,350	15,000	4.48
Unspecified: 4/			
Reported	5,080	22,000	4.33
Estimated	5,300	17,000	3.21
Total or average	27,200	114,000	4.19

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/ Includes filtration.

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

TABLE 6
 FLORIDA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 1999,
 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/	567	2,180	W	W
Asphaltic concrete aggregates and road base materials 3/	--	--	W	W
Fill	240	593	238	917
Other miscellaneous uses 4/	3	7	221	1,350
Unspecified: 5/				
Reported	294	2,630	356	1,430
Estimated	1,800	5,900	1,800	6,200
Total	2,860	11,300	9,510	43,800
	District 3		District 4	
	Quantity	Value	Quantity	Value
Concrete aggregate and concrete products 2/	2,800	12,900	W	W
Asphaltic concrete aggregates and road base materials 3/	--	--	W	W
Fill	1,500	3,850	387	1,110
Other miscellaneous uses 4/	3,120	13,600	--	--
Unspecified: 5/				
Reported	4,430	18,000	--	--
Estimated	960	3,400	800	1,600
Total	12,800	51,800	2,030	7,200

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 (lime).

4/ Includes filtration.

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