

THE MINERAL INDUSTRY OF FLORIDA

This chapter has been prepared under a Memorandum of Understanding between the U.S. Bureau of Mines, U.S. Department of the Interior, and the Florida Department of Mines and Mineral Resources for collecting information on all nonfuel minerals.

Florida ranked ninth among the 50 States in total nonfuel mineral production value² in 1995, according to the U.S. Geological Survey (USGS). This is a decline from eighth place in 1994. The estimated value for 1995 was \$1.4 billion, an increase of about 1% from that of 1994. This followed a 4.5% increase in 1994 from that of 1993 (based on final 1994 data). The State accounted for about 4% of the U.S. total nonfuel mineral production value.

Florida continued to be the Nation's leading phosphate rock-mining State in 1995, producing more than four times the quantity as the next-highest State. Phosphate rock is only produced in four States. The phosphate rock industry usually has the most impact on the State's raw nonfuel mineral economy. Other minerals that commonly have a significant effect on the State's overall nonfuel mineral production value are crushed stone, construction sand and gravel, and portland cement. In 1995, the increase in the State's mineral production value mainly resulted from a substantial increase in the value of phosphate rock. This increase was mitigated by decreases in portland cement, zircon concentrates, and titanium concentrates. The overall increase extended the rebound in Florida's mineral production value begun in 1994. Since reaching the State's second all-time high of \$1.61 billion in 1989, the State's

mineral value had been on a downward trend. This culminated in the 9% drop to \$1.31 billion from 1992 to 1993; declining phosphate rock value was the principal contributor. Most other mineral commodities in 1993 increased. In 1994, the increased values of crushed stone, phosphate rock, and portland and masonry cements were principally responsible for the turnaround in mineral value.

Compared with 1994, the values of fuller's earth clays, staurolite, and peat increased in 1995. In addition to the more significant decreases mentioned above, other mineral commodities had small to only slight decreases in 1995. These were: crushed stone, construction sand and gravel, masonry cement, magnesium compounds, industrial sand and gravel, and common and kaolin clays.

Florida, almost exclusively an industrial-mineral-producing State, remained first in phosphate rock and first of two States with ilmenite (a titanium ore) production, fourth in crushed stone, and seventh in portland cement. (All rankings are based on 1995 USGS-estimated data).² Additionally, Florida was the only State to produce zircon concentrates, staurolite, and rutile concentrates (a titanium ore). While climbing from second to first in the production of masonry cement, the State dropped from first to second in peat production; second to third in magnesium

TABLE 1
NONFUEL RAW MINERAL PRODUCTION IN FLORIDA^{1 2}

Mineral	1993		1994		1995 ^p		
	Quantity	Value (thousands)	Quantity	Value (thousands)	Quantity	Value (thousands)	
Cement:							
Masonry	metric tons	351,000	\$27,300	400,000	\$34,600	393,000	\$34,000
Portland	do.	4,190,000	211,000	3,370,000	228,000	2,970,000	200,000
Clays ³	thousand metric tons	407	52,700	430	55,000	363	55,100
Peat	metric tons	219,000	3,780	206,000	3,230	W	W
Sand and gravel:							
Construction	thousand metric tons	°22,800	°73,100	16,600	60,700	15,800	59,300
Industrial	metric tons	504,000	5,910	540,000	6,120	591,000	6,050
Stone (crushed)	thousand metric tons	64,900	313,000	°67,000	343,000	66,500	343,000
Combined value of clays (common), gemstones, magnesium compounds, phosphate rock, rare-earth metal concentrates (1993-94), staurolite, stone [crushed dolomite and limestone (1993)], titanium concentrates (ilmenite and rutile), zircon concentrates, and value indicated by symbol W							
		XX	624,000	XX	639,000	XX	689,000
Total		XX	1,310,000	XX	1,370,000	XX	1,390,000

¹Estimated. ^pPreliminary. W Withheld to avoid disclosing company proprietary data; value included with "Combine value" data. XX Not applicable.

²Production as measured by mine shipments, sales, or marketable production (including consumption by producers).

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

⁴Excludes certain clays; kind and value included with "Combined value" data.

⁵Excludes certain stones; kind and value included with "Combined value" data.

compounds; and third to fourth in fuller's earth. Although not placing among the top 10 producing States, Florida mines produced significant quantities of construction and industrial sand and gravel.

The remainder of this narrative was derived from information provided by the Florida Geological Survey. In 1995 Florida State Legislature, passed a new law entitled the "Life-of-the-Mine Permit." This bill, which designates the Florida Bureau of Mine Reclamation (BOMR) as the regulatory authority, was intended to ease the overall permitting process for operators producing fuller's earth and heavy minerals. The new law allows the operator to combine several different permits and plans into one environmental permit. Included in the Life-of-the-Mine Permit are dredge and fill permits, the mine's reclamation plan, and management and storage of surface water permits. BOMR was made responsible for initiating and coordinating a concurrent review of two portions of the Life-of-the-Mine Permit: the industrial waste water and the national pollution discharge elimination system permits. Previously, these permits were handled by various agencies, including the former Florida Department of Environmental Regulation, the Florida Department of Natural Resources, and the State's Water Management District Offices. The U.S. Army Corps of Engineers will continue processing Federal dredge and fill permits.

Rising phosphate rock production led to increased employment and profitability for companies. Although most of the phosphate rock produced during the year was sold domestically, exports of phosphate fertilizers continued to play an important role in the industry's vitality. The largest consuming nations of Florida phosphate were China, India, and the countries of eastern Europe and the former Soviet Union. The companies that were engaged in phosphate mining in the State in 1995 included: Cargill Fertilizer Inc., CF Industries Inc., IMC-Agrico Co., Mobil Mining and Minerals Co., and White Springs Agricultural Chemicals, Inc. (formerly Occidental Chemical Corp.). Of these, IMC-Agrico brought the Clear Springs Mine back on line in 1994. CF Industries opened its South Pasture Mine during the 4th quarter. Mobil Mining recently sold its South Fort Meade Mine to Cargill Fertilizer.

The new voice of the Florida aggregate industry is the

Florida Limerock and Aggregate Institute (FLAI). The institute is an autonomous division of the Florida Concrete Products Association, with which it recently merged. The primary focus of the FLAI is the pursuit of promotional, technical, and regulatory matters of concern to the aggregate industry. The Florida aggregate industry is working closely with the Florida Department of Transportation to improve the effectiveness of the quality assurance program used to control aggregate quality. In other activities within the Florida aggregate industry, Martin Marietta Aggregates purchased the Florida production and redistribution terminal operations formerly owned by Dravo Basic Materials Co.

RGC (USA) Mineral Sands, Inc., ceased extraction of monazite from the heavy mineral sands concentrate at its Clay County facility. However, heavy mineral mining continued from dredging operations on leased lands in Clay and Putnam Counties, while extraction of ilmenite, rutile, and zircon concentrate was done in Clay County. E. I. du Pont de Nemours & Co. Inc. continued mining the entire Trail Ridge area in Clay and Baker Counties, especially for rutile and ilmenite. These titanium-bearing heavy minerals are a primary ingredient in the manufacture of titanium dioxide pigments.

Although production of specialty grades of clay were increasing, the overall clay business continued to decline during 1995. The majority of this decline was in the absorbent products market sector and appeared to be a result of environmental pressures being placed on petroleum cleanup operations regarding the disposal of contaminated clay.

¹An additional contact is Steven Spencer, coastal/economic geologist, same address and fax number as Dr. Schmidt, telephone: (904) 488-9380, internet: spencer_s@dep.state.fl.us

²The terminologies "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 1995 USGS mineral production data published in this chapter are estimated as of Dec. 1995. Estimates for some commodities, e.g., construction sand and gravel, crushed stone, and portland cement, are periodically updated. To obtain the most recent information please contact the appropriate USGS mineral commodity specialist. Call MINES FaxBack at (703) 648-4999 from your fax machine and request Document No. 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.

TABLE 2
FLORIDA: CRUSHED STONE¹ SOLD OR USED BY PRODUCERS IN 1994, BY USE²

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Coarse aggregate (+1 1/2 inch):			
Riprap and jetty stone	50	\$296	\$5.92
Filter stone	220	1,610	7.30
Other coarse aggregate	W	W	16.50
Coarse aggregate, graded:			
Concrete aggregate, coarse	12,300	85,100	6.92
Bituminous aggregate, coarse	4,410	26,800	6.09
Bituminous surface-treatment aggregate	760	4,220	5.56
Railroad ballast	137	226	1.65
Other graded coarse aggregate	W	W	5.63
Fine aggregate (-3/8 inch):			
Stone sand, concrete	3,930	24,200	6.15
Stone sand, bituminous mix or seal	1,990	10,700	5.40
Screening, undesignated	3,770	20,900	5.55
Other fine aggregates	W	W	4.65
Coarse and fine aggregates:			
Graded road base or subbase	15,800	61,000	3.85
Unpaved road surfacing	355	1,470	4.15
Crusher run or fill or waste	3,490	8,420	2.41
Other coarse and fine aggregates	2,640	12,900	4.88
Other construction materials	1,340	7,280	5.42
Agricultural:			
Agricultural limestone	563	6,330	11.20
Other agricultural uses ³	392	2,220	5.67
Special:			
Asphalt fillers or extenders	86	648	7.53
Other fillers or extenders	1	4	4.00
Other specified uses not listed ⁴	1,920	2,890	1.51
Unspecified:⁵			
Actual	8,160	39,500	4.84
Estimated	4,600	26,700	5.80
Total	67,000	343,000	5.13

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

¹Includes calcareous marl, dolomite, limestone, limestone-dolomite, and shell.

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

³Includes poultry grit and mineral food.

⁴Includes cement manufacture.

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

TABLE 3
FLORIDA: CRUSHED STONE SOLD OR USED, BY KIND¹

Kind	1993				1994			
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value
Limestone ²	85	62,500	³ \$301,000	³ \$4.81	82	64,200	\$330,000	\$5.14
Shell	8	1,130	4,240	3.76	6	1,160	4,530	3.92
Dolomite	3	W	5,020	W	3	W	W	5.84
Calcareous marl	1	W	¹ 3,190	W	1	W	W	5.09
Total	XX	64,900	313,000	4.83	XX	67,000	343,000	5.13

¹Revised. W Withheld to avoid disclosing company proprietary data; included in "Total." XX Not applicable.

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

³Includes "Limestone-dolomite," reported with no distinction between the two.

⁴Excludes limestone-dolomite value from State total to avoid disclosing company proprietary data.

TABLE 4
FLORIDA: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 1994, BY USE AND DISTRICT¹

(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) ²	—	—	(³)	(³)	17	76	(³)	(³)
Coarse aggregate, graded ⁴	(³)	(³)	(³)	(³)	6,810	50,900	10,600	63,000
Fine aggregate (-3/8 inch) ⁵	(³)	(³)	(³)	(³)	3,520	19,400	6,770	39,200
Coarse and fine aggregate ⁶	(³)	(³)	(³)	(³)	3,860	12,900	11,700	47,400
Other construction materials	—	—	—	—	—	—	(³)	(³)
Agricultural ⁷	(³)	(³)	(³)	(³)	781	7,500	—	—
Chemical and metallurgical ⁸	—	—	—	—	W	W	—	—
Special ⁹	—	—	—	—	W	W	—	—
Other miscellaneous uses	—	—	—	—	2,000	3,540	—	—
Unspecified: ¹⁰								
Actual	513	1,440	830	5,230	85	694	6,740	32,200
Estimated	658	4,030	1,520	11,400	620	3,150	1,810	8,130
Total	2,420	11,600	8,920	42,300	17,700	98,100	37,900	191,000

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

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

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

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

⁴Includes concrete aggregate (coarse), bituminous aggregate (coarse), bituminous surface-treatment aggregate, railroad ballast, and other graded coarse aggregate.

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

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

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

⁸Includes cement manufacture.

⁹Includes other specified uses not listed.

¹⁰Includes production reported without a breakdown by end use and estimates for nonrespondents.

TABLE 5
FLORIDA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 1994, BY MAJOR USE CATEGORY¹

Use	Quantity (thousand metric tons)	Value (thousands)	Value per ton
Concrete aggregate (including concrete sand)	6,790	\$28,800	\$4.25
Plaster and gunite sands	367	1,380	3.75
Concrete products (blocks, bricks, pipe, decorative, etc.)	515	2,320	4.50
Asphaltic concrete aggregates and other bituminous mixtures	547	3,560	6.50
Road base and coverings ²	546	1,550	2.85
Fill	2,470	4,200	1.70
Other ³	948	4,870	5.14
Unspecified: ⁴			
Actual	883	3,170	3.59
Estimated	3,560	10,800	3.04
Total or average	16,600	60,700	3.65

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

²Includes road and other stabilization (lime).

³Includes filtration.

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

TABLE 6
FLORIDA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 1994, BY USE AND DISTRICT¹

(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	1,250	5,660	4,950	20,900	1,480	6,000	—	—
Asphaltic concrete aggregates and road base materials ³	505	2,850	498	1,240	1,530	3,080	1,030	2,140
Other miscellaneous uses ⁴	16	42	148	994	664	3,300	121	531
Unspecified: ⁵								
Actual	54	476	385	1,700	249	671	195	323
Estimated	1,130	3,630	1,450	4,190	848	2,620	136	400
Total	2,950	12,700	7,430	29,000	4,770	15,700	1,480	3,390

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

²Includes plaster and gunite sands.

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

⁴Includes filtration.

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