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 1998, the preliminary estimated value[1] of nonfuel mineral production for Florida was about $1.96 billion, according to the U.S. Geological Survey (USGS). This value, the highest nonfuel mineral value reported in the State's history, was a 7% increase from that of 1997,[2] and followed a 4% increase in 1997 from 1996. The increase continued an upward trend that began in 1994, following 5 years of lowering values. For the third consecutive year, 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 1998, producing nearly seven 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 1998, increases of $53 million in the value of crushed stone, $44 million in phosphate rock, and $16 million in portland cement led the State's increase in value (table 1). This was further supported by smaller increases in construction sand and gravel, zircon concentrates, rutile, masonry cement, and peat, in descending order of net increase. Values of production for all other mineral commodities also increased except for staurolite and kaolin, which showed small decreases, and gemstones, which remained unchanged.

Likewise, in 1997, most of Florida's nonfuel mineral commodities increased in value, led by portland cement up $29 million (up nearly 12%), zircon concentrates up $15.5 million, phosphate rock almost $10 million, and construction sand and gravel up $6.7 million (almost 10%).

Based on USGS preliminary estimates of the quantities produced in the 50 States in 1998, Florida remained the only[2] State to produce rutile and staurolite. It ranked first in peat and tied for first in masonry cement; third in fuller's earth and crushed stone; fourth in magnesium compounds; and seventh in portland cement. Florida ranked the first of three titanium-producing States and the first of two States in zirconium concentrates. Additionally, Florida produced substantial quantities of construction and industrial sand and gravel.

The Florida Geological Survey[3] provided the following narrative information. Common clay is extracted from many localities in Florida. Fuller's earth is Florida's number one clay commodity because it surpasses both of Florida's other two clay types, common clay and kaolin, in total quantity produced and total mineral production value. Fuller's earth, in the form of palygorskite (attapulgite), is mined by the Engelhard Corp. and the Milwhite Co. in Gadsden County, and, in the form of montmorillonite, is mined by MFM Industries, Inc. in Marion County. Kaolin is mined by the Feldspar Corp. in Putnam County.

The principal use of the heavy minerals in Florida remains the manufacture of titanium dioxide pigments. RGC (USA) Mineral Sands, Inc. (RGC) and E.I. du Pont de Nemours and Co., Inc. remain the only heavy mineral producers in the State. In 1997, RGC began mining operations in Putnam County.

Florida's phosphate producers supply approximately 25% of the world's and 75% of the Nation's phosphate needs. As such, it is Florida's largest industrial mineral commodity in terms of quantity produced and production value. Companies that actively mined phosphate during 1998 include IMC-Agrico Co., Cargill Fertilizer, Inc., CF Industries, Inc., Potash Corp. of Saskatchewan and Agrifos L.L.C. NuGulf Industries reopened its mine in late November. IMC-Agrico announced the temporary shut down of the Kingsford and Payne Creek Mines and the Clear Springs and Noralyn Mines will be closed permanently in mid-1999.

IMC-Agrico Co. and Farmland Hydro LP are currently trying to get approval to mine on about 25,000 hectares in DeSoto, Hardee, and Manatee Counties. This region falls into the Peace River Basin.

Florida Rock Industries (FRI) has received permits that will allow them to complete construction of its cement plant at Newberry, FL. Nearby, in the Branford area, the Suwannee American Cement Co., a subsidiary of Anderson-Columbia Co., has applied for air permits for a new cement plant. If both companies begin production it would bring the total number of cement plants in Florida to six (Matus, 1998).

E.R. Jahna Industries is now in the permitting phase on a proposed sand mine in northern Polk County.

Limestone ($CaCO_3$), the primary source of stone in Florida and one with large reserves, is mined in many localities. Much of the limestone is crushed and used as base course material or as small aggregate in road building. The larger size limestone aggregates are becoming a limited resource in the State.

---

[1]The 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 1998 USGS mineral production data published in this chapter are preliminary estimates as of February 1999 and are expected to change. For some mineral 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. A telephone listing for the specialists may be retrieved over the Internet at 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 http://minerals.usgs.gov/minerals; facsimile copies may be obtained from MINES FaxBack.

[2]Values, percentage calculations, and rankings for 1997 may vary from the *Minerals Yearbook, Area Reports: Domestic 1997, Volume II*, owing to the revision of preliminary 1997 to final 1997 data. Data for 1998 are preliminary and expected to change, while related rankings may also be subject to change.

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

FRI's request for a 10-year extension to its mining lease in the Withlachoochee State Forest was turned down in 1998 by the U.S. Forest Service (USFS). FRI was first issued a mining lease by the USFS in 1965. The action by the USFS brings limestone mining in the Withlachoochee State Forest to an end (Hollingsworth, 1998).

The Quality Control 2000 program for qualifying laboratories and training technicians who sample and test aggregates, asphalt, concrete, and earthwork is moving forward on schedule. This program is a result of the Federal Highway Administration's mandate that all State's Departments of Transportation have Quality Assurance Procedures for Construction in place by June 30, 2000. The University of Florida is acting as coordinator for the Florida Department of Transportation in developing and administering the program.

The Florida Minerals Association (FMA) was established by several Florida mining companies in 1997 to provide leadership and to advance and encourage responsible development of the mineral industry in the State. The FMA generally focuses on legislation and regulation, the environment, public safety and health, and land use issues. The association is in the process of selecting a director and building an internet web page.

The Department of Environmental Protection's (DEP) Bureau of Mine Regulation (BOMR) administers the State's reclamation rules, which are found in the Florida Administrative Code and which are authorized by Chapter 373 of the Florida Statutes. The BOMR regulates the permitting of mines that are located on lands over which the DEP has jurisdiction through DEP's dredge and fill and environmental resource permitting rules. The BOMR also regulates the design, construction, and maintenance of phosphogypsum recovery stack systems.

In 1998, the BOMR coordinated the National Association of State Land Reclamationists conference, where several mines were recognized with awards for their reclamation efforts. The BOMR published a document recently that outlines an integrated habitat network for the Florida phosphate district (Jim Price, FDEP-BOMR, written commun., 1999).

Miami-Dade Lake Belt Plan legislation was vetoed in the 1998 legislature. The veto took place not because of the plan itself, but rather because of another provision that was attached to the bill. The bill will be reintroduced into the 1999 legislature. The plan integrates mining operations with other land uses. The plan calls for operators to contribute to a trust fund that will, in turn, handle all wetlands mitigation. Federal, State, and local permitting and reclamation will be consolidated at the county level.

References Cited

Hollingsworth, Jan, 1998, Mistake allowed mining in state forest: Tampa Tribune, November 24.

Matus, Ron, 1998, Cement plant is approved: Gainesville Sun, December 17, p. 1B and 3B.

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

(Thousand metric tons and thousand dollars unless otherwise specified)

Mineral	1996		1997		1998 p/	
	Quantity	Value	Quantity	Value	Quantity	Value
Cement:						
Masonry	422	35,200 e/	406	36,200 e/	413	38,100
Portland	3,450	245,000 e/	3,750	274,000 e/	3,880	290,000
Clays:						
Fuller's earth	377	58,900	W	W	W	W
Kaolin	35	3,760	W	W	W	W
Gemstones	NA	1	NA	1	NA	1
Peat	298	5,550	361	5,710	263	7,160
Sand and gravel:						
Construction	18,500	68,800	19,200	75,500	20,100	81,200
Industrial	515	6,340	507	5,800	536	6,220
Stone: Crushed 3/	73,600	394,000	73,800	396,000	81,700	449,000
Combined values of clays (common), magnesium compounds, phosphate rock, staurolite, stone [crushed marl (1996-97)], titanium concentrates, zirconium concentrates, and values indicated by symbol W	XX	947,000	XX	1,040,000	XX	1,090,000
Total	XX	1,760,000	XX	1,830,000	XX	1,960,000

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 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	1996 Number of quarries	1996 Quantity (thousand metric tons)	1996 Value (thousands)	1996 Unit value	1997 Number of Quarries	1997 Quantity (thousand metric tons)	1997 Value (thousands)	1997 Unit value
Limestone	76 2/	71,000 2/	$379,000 2/	$5.34 2/	73 2/	71,600 2/	$384,000 2/	$5.37 2/
Dolomite	4	W	W	6.55	4	W	W	6.42
Shell	4	W	W	4.46	4	W	W	4.61
Calcareous marl	2	(3/)	(3/)	(3/)	1	(3/)	(3/)	(3/)
Total	XX	73,600	394,000	5.35	XX	73,800	396,000	5.37

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 1997, BY USE 1/ 2/

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Coarse aggregate (+1 1/2 inch):			
Riprap and jetty stone	3,530	$4,560	$1.29
Other coarse aggregate 3/	30	240	8.00
Coarse aggregate, graded:			
Concrete aggregate, coarse	5,750	36,100	6.27
Bituminous aggregate, coarse	2,860	15,700	5.49
Other graded coarse aggregate 4/	1,710	12,900	7.55
Fine aggregate (-3/8 inch):			
Stone sand, concrete	1,690	9,530	5.64
Stone sand, bituminous mix or seal	2,120	9,980	4.71
Screening, undesignated	2,380	8,020	3.36
Other fine aggregates	1,560	9,220	5.92
Coarse and fine aggregates:			
Graded road base or subbase	13,900	44,000	3.16
Unpaved road surfacing	307	1,430	4.64
Crusher run or fill or waste	3,550	10,200	2.88
Other coarse and fine aggregates	430	3,260	7.58
Other construction materials	2	10	5.00
Agricultural:			
Agricultural limestone	485	3,070	6.33
Other agricultural uses	200	885	4.43
Chemical and metallurgical, cement manufacture	W	W	1.45
Special, other specified uses not listed	W	W	2.24
Unspecified: 5/			
Actual	27,500	204,000	7.39
Estimated	3,670	20,800	5.66
Total	73,800	396,000	5.37

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 filter stone.
4/ Includes railroad ballast.
5/ Includes reported and estimated production without a breakdown by end use.

TABLE 4
FLORIDA: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 1997,
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	W	W	W	W
Coarse aggregate, graded 4/	W	W	W	W	4,950	34,400	4,660	22,500
Fine aggregate (-3/8 inch) 5/	W	W	W	W	4,120	18,700	3,370	16,100
Coarse and fine aggregate 6/	W	W	6,790	21,800	2,990	11,300	7,530	19,600
Other construction materials	--	--	W	W	--	--	--	--
Agricultural 7/	221	1,520	W	W	347	2,120	--	--
Chemical and metallurgical 8/	--	--	--	--	W	W	--	--
Other miscellaneous uses 9/	--	--	W	W	--	--	--	--
Unspecified: 10/								
Actual	W	W	W	W	W	W	W	W
Estimated	--	--	1,150	6,870	848	4,820	W	W
Total	2,340	16,500	9,130	36,600	22,000	129,000	40,400	214,000

W Withheld to avoid disclosing company proprietary data; included in "Total."
1/ 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 filter stone and riprap and jetty stone, and other coarse aggregate.
4/ Includes concrete aggregate (coarse), bituminous aggregate (coarse), railroad ballast, 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, and other agricultural uses.
8/ Includes cement manufacture.
9/ Includes other specified uses not listed.
10/ Includes reported and estimated production without a breakdown by end use.

TABLE 5
FLORIDA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 1997,
BY MAJOR USE CATEGORY 1/

Use	Quantity (thousand metric tons)	Value (thousands)	Value per ton
Concrete aggregate (including concrete sand)	5,720	$24,500	$4.28
Plaster and gunite sands	774	3,000	3.87
Concrete products (blocks, bricks, pipe, decorative, etc.)	533	2,980	5.59
Asphaltic concrete aggregates and other bituminous mixtures	365	1,370	3.75
Road base and coverings 2/	710	3,500	4.93
Fill	2,350	5,560	2.37
Other miscellaneous uses 3/	1,020	4,810	4.72
Unspecified: 4/			
Actual	3,910	17,400	4.44
Estimated	3,840	12,400	3.22
Total or average	19,200	75,500	3.93

1/ Data are rounded to 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 1997,
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/	695	2,770	W	W
Asphaltic concrete aggregates and road base materials 3/	W	W	608	3,040
Other miscellaneous uses 4/	835	2,920	6,500	29,000
Unspecified: 5/				
Actual	W	W	W	W
Estimated	1,100	3,970	1,640	4,990
Total	2,630	9,650	8,750	37,100
	District 3		District 4	
	Quantity	Value	Quantity	Value
Concrete aggregate and concrete products 2/	1,330	5,900	(6/)	(6/)
Asphaltic concrete aggregates and road base materials 3/	1,440	4,600	(6/)	(6/)
Other miscellaneous uses 4/	2,280	8,610	--	--
Unspecified: 5/				
Actual	2,090	8,120	--	--
Estimated	1,100	3,430	--	--
Total	6,800	26,100	1,050	2,690

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 (lime).
4/ Includes filtration.
5/ Includes reported and estimated production without a breakdown by end use.
6/ Withheld to avoid disclosing company proprietary data; included in "Total."