PHOSPHATE ROCK

(Data in thousand metric tons unless otherwise noted)

Domestic Production and Use: Phosphate rock ore was mined by five firms at 11 mines in four States and processed into an estimated 27.7 million tons of marketable product, valued at $2.1 billion, f.o.b. mine. Florida and North Carolina accounted for more than 75% of total domestic output; the remainder was produced in Idaho and Utah. Marketable product refers to beneficiated phosphate rock with phosphorus pentoxide (P_2O_5) content suitable for phosphoric acid or elemental phosphorus production. More than 95% of the phosphate rock mined in the United States was used to manufacture wet-process phosphoric acid and superphosphoric acid, which were used as intermediate feedstocks in the manufacture of granular and liquid ammonium phosphate fertilizers and animal feed supplements. Approximately 50% of the wet-process phosphoric acid produced was exported in the form of upgraded granular diammonium (DAP) and monoammonium phosphate (MAP) fertilizer, and merchant-grade phosphoric acid. The balance of the phosphate rock mined was for the manufacture of elemental phosphorus, which was used to produce phosphorus compounds for industrial applications.

Salient Statistics—United States:	2013	2014	2015	2016	2017[e]
Production, marketable	31,200	25,300	27,400	27,100	27,700
Used by producers	28,800	26,700	26,200	26,700	26,700
Imports for consumption	3,170	2,380	1,960	1,590	2,100
Exports	—	—	—	—	—
Consumption, apparent[1]	31,900	29,100	28,100	28,200	28,800
Price, average value, dollars per ton, f.o.b. mine[2]	91.11	78.59	72.41	76.90	75.00
Stocks, producer, yearend	9,000	5,880	6,730	7,180	7,500
Employment, mine and beneficiation plant, number[e]	2,170	2,100	2,000	2,000	2,000
Net import reliance[3] as a percentage of apparent consumption	3	18	4	4	6

Recycling: None.

Import Sources (2013–16): Peru, 67%; Morocco, 32%; and other, 1%.

Tariff: Item	Number	Normal Trade Relations 12–31–17
Natural calcium phosphates:		
Unground	2510.10.0000	Free.
Ground	2510.20.0000	Free.

Depletion Allowance: 14% (Domestic and foreign).

Government Stockpile: None.

Events, Trends, and Issues: U.S. phosphate rock production and consumption was estimated to have increased in 2017. Hurricane Irma affected production of phosphate rock and fertilizers in Florida in September. Most mines and plants were closed temporarily because of power outages and flooding.

The leading United States phosphate rock producer agreed to purchase the phosphate and potash assets of the leading fertilizer producer in Brazil. The acquisition included five phosphate rock mines, one potash mine, and four phosphate fertilizer plants in Brazil and a potash mine project in Canada. The acquiring company also would get the other company's 40% stake in their joint venture mine in Peru, which would increase its stake to 75%.

A new phosphate rock mine, which was being developed in southeastern Idaho, was sold in 2017 to a multinational corporation that also has phosphate projects under development in Brazil, Guinea-Bissau, and Peru. A feasibility study for the project was completed in 2013, but lower phosphate rock prices and financial issues have delayed construction of the mine facility. The new owner has not stated when the mine would be completed. The multinational firm also purchased an existing phosphate rock mine and phosphate plant in Idaho. The phosphate facility was owned by the United States. subsidiary of a company in Canada that was merging with another fertilizer company in Canada. Sale of the facility was one of the requirements for the merger, which was expected to be completed by early 2018, pending approval by the U.S. Federal Trade Commission.

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PHOSPHATE ROCK

U.S. mine production annual capacity was expected to remain at 32.6 million tons for the next several years, because any new mines that are planned to open in Florida and Idaho would be replacements for existing mines. World mine production capacity, excluding China, was projected to increase to 168 million tons in 2021 from 147 million tons in 2017, according to industry analysts. The bulk of capacity increases will take place in Egypt, Jordan, Morocco, Senegal, and Turkey. Phosphate rock production in China was estimated by industry analysts to be around 85 million tons, which is considerably lower than the official data published by the Government of China.

In 2017, a new phosphate rock mine and fertilizer facility began operation in Saudi Arabia, which increased production capacity in the country to 10.5 million tons per year from 5.0 million tons per year. The leading United States integrated phosphate producer has a 25% stake in the associated DAP facility with two companies from Saudi Arabia.World consumption of P_2O_5, contained in fertilizers and other uses, was projected to increase to 48.8 million tons in 2021 from 45.7 million tons in 2017. Asia and South America would account for about 70% of the projected growth.

World Mine Production and Reserves: Reserves for Brazil, Egypt, Finland, Israel, Jordan, Peru, Saudi Arabia, and the United States were revised based on information from individual company reports. Data for China and Russia were revised based on information from Government sources.

	Mine production		Reserves[4]
	2016	2017[e]	
United States	27,100	27,700	1,000,000
Algeria	1,270	1,300	2,200,000
Australia	3,000	3,000	[5]1,100,000
Brazil	5,200	5,500	1,700,000
China[6]	135,000	140,000	3,300,000
Egypt	5,000	5,000	1,300,000
Finland	940	950	1,000,000
India	2,000	1,800	65,000
Israel	3,950	4,000	74,000
Jordan	7,990	8,200	1,300,000
Kazakhstan	1,500	1,600	260,000
Mexico	1,700	2,000	30,000
Morocco and Western Sahara	26,900	27,000	50,000,000
Peru	3,850	3,900	400,000
Russia	12,400	12,500	700,000
Saudi Arabia	4,200	4,500	1,400,000
Senegal	2,200	2,200	50,000
South Africa	1,700	1,800	1,500,000
Syria	—	100	1,800,000
Togo	850	1,000	30,000
Tunisia	3,660	3,700	100,000
Vietnam	2,800	3,000	30,000
Other countries	1,950	1,940	900,000
World total (rounded)	255,000	263,000	70,000,000

World Resources: Some world reserves were reported only in terms of ore tonnage and grade. Phosphate rock resources occur principally as sedimentary marine phosphorites. The largest sedimentary deposits are found in northern Africa, China, the Middle East, and the United States. Significant igneous occurrences are found in Brazil, Canada, Finland, Russia, and South Africa. Large phosphate resources have been identified on the continental shelves and on seamounts in the Atlantic Ocean and the Pacific Ocean. World resources of phosphate rock are more than 300 billion tons. There are no imminent shortages of phosphate rock.

Substitutes: There are no substitutes for phosphorus in agriculture.

[e]Estimated. — Zero.
[1]Defined as phosphate rock used by producers + imports – exports.
[2]Marketable phosphate rock, weighted value, all grades.
[3]Defined as imports – exports + adjustments for industry stock changes.
[4]See Appendix C for resource and reserve definitions and information concerning data sources.
[5]For Australia, Joint Ore Reserves Committee-compliant reserves were about 290 million tons.
[6]Production data for large mines only, as reported by National Bureau of Statistics of China.