

PHOSPHATE ROCK

(Data in thousand metric tons unless otherwise noted)

Domestic Production and Use: Phosphate rock ore was mined by 6 firms at 11 mines in 4 States and upgraded to an estimated 29.2 million tons of marketable product valued at \$2.9 billion, f.o.b. mine. Florida and North Carolina accounted for more than 85% of total domestic output; the remainder was produced in Idaho and Utah. Marketable product refers to beneficiated phosphate rock with phosphorus pentoxide (P₂O₅) content suitable for phosphoric acid or elemental phosphorus production. More than 95% of the U.S. phosphate rock mined 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 45% of the wet-process phosphoric acid produced was exported in the form of upgraded granular diammonium and monoammonium phosphate (DAP and MAP, respectively) 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 a variety of food-additive and industrial applications.

Salient Statistics—United States:	2008	2009	2010	2011	2012^e
Production, marketable	30,200	26,400	25,800	28,100	29,200
Sold or used by producers	28,900	25,500	28,100	28,600	26,600
Imports for consumption	2,750	2,000	2,400	3,350	2,850
Consumption ¹	31,600	27,500	30,500	32,000	29,500
Price, average value, dollars per ton, f.o.b. mine ²	76.76	127.19	76.69	96.64	96.90
Stocks, producer, yearend	6,340	8,120	5,620	4,580	5,800
Employment, mine and beneficiation plant, number ^e	2,550	2,500	2,300	2,270	2,260
Net import reliance ³ as a percentage of apparent consumption	4	1	16	13	5

Recycling: None.

Import Sources (2008–11): Morocco, 88%; and Peru, 12%.

Tariff: Item	Number	Normal Trade Relations 12–31–12
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: Domestic consumption and imports of phosphate rock were estimated to have been lower in 2012 compared with 2011, owing to the lower seasonal demand in the first quarter of the year, which resulted in the temporary closure of some fertilizer plants. World production of phosphate rock was estimated to have increased in 2012 primarily because of higher production in China and a new mine in Saudi Arabia, which opened late in 2010.

A Canadian company continued with development of a new underground phosphate rock mine in southeastern Idaho. The mine encompasses the site of three abandoned mines that operated intermittently from 1917 to 1975. The company planned to begin production in 2014 and produce 10 million metric tons of phosphate concentrate over the life of the mine. The company planned to sell the phosphate rock for domestic use and export.

The sole North American producer of elemental phosphorus was expected to open a new phosphate rock mine in 2013 to replace its current mine in Idaho that was nearing depletion. The company's phosphate and phosphorus production capacity will remain the same after the new mine is operational. U.S. mine production capacity at the end of 2012 was 34.7 million tons per year.

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World phosphate rock production capacity was projected to increase from 220 million tons per year in 2012 to 256 million tons per year, with more than 50% of the growth in North Africa. The largest expansion project was in progress in Morocco, where phosphate rock production capacity was being increased from 30 million tons per year to 50 million tons per year by 2018. Elsewhere in Africa, phosphate rock mines and expansions were under development in Angola, Congo (Brazzaville), Egypt, Ethiopia, Guinea-Bissau, Namibia, Mali, Mauritania, Mozambique, Senegal, South Africa, Togo, Tunisia, Uganda, and Zambia. Outside of Africa, phosphate rock mines were in various stages of development in Australia, Brazil, Canada, China, Kazakhstan, and New Zealand.

The projected increases in annual production capacity for phosphate rock will supply the associated projected increase in phosphoric acid and fertilizer production. World population growth ensures the need for phosphate fertilizer to grow crops for food and biofuels. World consumption of P₂O₅ in fertilizer was projected to increase from 41.9 million tons in 2012 to 45.3 million tons in 2016.

World Mine Production and Reserves: Reserves for Brazil and Peru were updated with information from Government agencies in each country. Reserve data for Iraq were updated based on a report prepared jointly by the U.S. Geological Survey (USGS) and the Iraqi Ministry of Industry and Minerals in 2012.

	Mine production		Reserves ⁴
	2011	2012 ^e	
United States	28,100	29,200	1,400,000
Algeria	1,500	1,500	2,200,000
Australia	2,650	2,600	490,000
Brazil	6,200	6,300	270,000
Canada	900	900	2,000
China ⁵	81,000	89,000	3,700,000
Egypt	3,500	3,000	100,000
India	1,250	1,260	6,100
Iraq	30	150	460,000
Israel	3,100	3,000	180,000
Jordan	6,500	6,500	1,500,000
Mexico	1,510	1,700	30,000
Morocco and Western Sahara	28,000	28,000	50,000,000
Peru	2,540	2,560	820,000
Russia	11,200	11,300	1,300,000
Saudi Arabia	1,000	1,700	750,000
Senegal	980	980	180,000
South Africa	2,500	2,500	1,500,000
Syria	3,100	2,500	1,800,000
Togo	730	865	60,000
Tunisia	5,000	6,000	100,000
Other countries	6,790	6,000	390,000
World total (rounded)	198,000	210,000	67,000,000

World Resources: Domestic reserve data were based on USGS and individual company information. 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.

Substitutes: There are no substitutes for phosphorus in agriculture.

^eEstimated.

¹Defined as phosphate rock sold or used + imports.

²Marketable phosphate rock, weighted value, all grades.

³Defined as imports – exports + adjustments for Government and industry stock changes.

⁴See Appendix C for resource/reserve definitions and information concerning data sources.

⁵Production data for large mines only.