

PHOSPHATE ROCK

(Data in thousand metric tons unless otherwise noted)

Domestic Production and Use: Phosphate rock ore was mined by 6 firms at 12 mines in 4 States and upgraded to an estimated 27.2 million tons of marketable product valued at \$1.4 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:	2005	2006	2007	2008	2009^e
Production, marketable	36,100	30,100	29,700	30,200	27,200
Sold or used by producers	35,200	30,200	31,100	28,850	23,900
Imports for consumption	2,630	2,420	2,670	2,754	1,800
Consumption ¹	37,800	32,600	33,800	31,600	25,700
Price, average value, dollars per ton, f.o.b. mine ²	29.61	30.49	51.10	76.76	50.00
Stocks, producer, yearend	6,970	7,070	4,970	6,335	8,000
Employment, mine and beneficiation plant, number ^e	2,700	2,500	2,500	2,550	2,600
Net import reliance ³ as a percentage of apparent consumption	7	7	14	4	1

Recycling: None.

Import Sources (2005-08): Morocco, 100%.

Tariff: Item	Number	Normal Trade Relations 12-31-09
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: In 2009, U.S. phosphate rock production and reported usage were at their lowest point since the mid-1960s, and consumption was at its lowest level since the early 1970s. The weak market conditions were the result of the global economic crisis that started in late 2008 and carried into 2009. After phosphate rock and fertilizer prices reached highs in mid-2008, phosphate fertilizer producers were left with high inventories of both phosphate rock and fertilizer as farmers delayed purchases until the price dropped. This led to the temporary closure of many phosphate rock mines and fertilizer plants. The price for phosphate rock also fell rapidly during the same period. U.S. exports of phosphate fertilizers increased slightly on the strength of DAP sales to India.

The phosphate rock producer in North Carolina received a permit from the U.S. Army Corps of Engineers to expand its mining operation in the State. In Idaho, the leading phosphate rock producer in the Western States received a permit to expand its mining operation in the Caribou-Targhee National Forest in Eastern Idaho. The two other phosphate rock producers in Idaho announced plans for new mines, which will replace existing mines when the reserves are exhausted.

Worldwide, phosphate rock mine production capacity is expected to increase gradually through 2013 to about 30% more than that in 2008. New mines are scheduled to open in Australia and Peru in 2010 and Namibia and Saudi Arabia in 2011. Expansions to existing operations are planned in Brazil, China, Egypt, Finland, Morocco, Russia, and Tunisia. In Canada, a significant phosphate rock deposit in Northern Ontario was being evaluated for development, and another deposit in British Columbia was being investigated.

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A similar percentage increase was expected for phosphoric acid production capacity through 2013, with the bulk of the growth happening in China, Morocco, and Saudi Arabia. Most of the projected capacity growth for phosphoric acid and fertilizers will be captive production, as more countries attempt to limit reliance on imported fertilizers.

World Mine Production and Reserves: Reserves data for the United States, Canada, Jordan, Senegal, and Togo were revised based on new individual company data. Reserves data for China were revised using official government sources. Reserves data for Kazakhstan, Peru, and Saudi Arabia (in "Other countries") were revised based on new information from companies in those countries.

	Mine production		Reserves ⁴
	2008	2009 ^e	
United States	30,200	27,200	1,100,000
Australia	2,800	2,500	82,000
Brazil	6,200	6,000	260,000
Canada	950	900	15,000
China ⁵	50,700	55,000	3,700,000
Egypt	3,000	3,300	100,000
Israel	3,090	3,000	180,000
Jordan	6,270	6,000	1,500,000
Morocco and Western Sahara	25,000	24,000	5,700,000
Russia	10,400	9,000	200,000
Senegal	700	700	80,000
South Africa	2,290	2,300	1,500,000
Syria	3,220	3,000	100,000
Togo	800	800	60,000
Tunisia	8,000	7,000	100,000
Other countries	7,440	7,000	950,000
World total (rounded)	161,000	158,000	16,000,000

World Resources: Domestic reserves data were based on U.S. Geological Survey 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, 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.

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 definitions](#). Reserve base estimates were discontinued in 2009; see [Introduction](#).

⁵Production data for China do not include small "artisanal" mines.