

PEAT

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Peat is a renewable, natural, organic material of botanical origin and commercial significance. Peatlands are situated predominately in shallow wetland areas of the Northern Hemisphere, where large deposits developed from the gradual decomposition of plant matter under anaerobic (lack of oxygen) conditions.

Peat has widespread use as a plant-growth medium in a variety of horticultural and agricultural applications because its fibrous structure and porosity promote a combination of water-retention and drainage. Commercial applications include potting soils, lawn and garden soil amendments, and turf maintenance on golf courses. In industry, peat is used primarily as a filtration medium to remove toxic materials from process waste streams, pathogens from sewage effluents, and deleterious materials suspended in municipal storm-drain water. In its dehydrated form, peat is a highly effective absorbent for fuel and oil spills on land and water.

The United States was a significant producer and consumer of peat for horticultural, agricultural, and industrial purposes. A variety of peat types were extracted and processed from 60 identified operations in 18 of the conterminous United States and by several companies in Alaska; varieties included, in order of importance, reed-sedge, sphagnum moss, hypnum moss, and humus. About 80% of U.S. production was from Florida, Michigan, and Minnesota. The United States imported more than one-half of its total domestic requirements, principally from Canada, where deposits of sphagnum moss are extensive.

U.S. production, sales, and consumption of peat increased for the second consecutive year (table 1). Imports of sphagnum peat from Canada reached another record high, but accounted for a smaller percentage of domestic consumption. This reverses the trend of the past decade of decreasing sales, production, consumption, and imports accounting for a greater percentage of domestic demand. The U.S. peat industry continued to be affected by Federal and State wetland regulations, which have hampered the development and expansion of peat bogs.

Production

Domestic production data for peat were developed from a voluntary survey of operations in the conterminous United States by the U.S. Geological Survey (USGS). Of the 77 operations to which a survey request was sent, 60 responded, representing approximately 85% of the total production. Peat production in 1998 was 676,000 metric tons (t), a 2% increase over that of 1997 (table 2).

Domestic production was dominated by operations in Florida, Michigan, and Minnesota (table 3). Reed-sedge peat accounted for 61.2% of production by weight, followed by sphagnum moss, 23.2%; hypnum moss, 7.9%; and humus, 7.7% (table 4). Peat production in Alaska was estimated to be 29,000 cubic

meters in 1998, according to the Alaska Department of Natural Resources (Szumigala and Swainbank, 1999), which conducts its own survey of mineral production in the State. Production was reported by volume only.

Scotts Company of Marysville, OH, acquired the Shamrock® line of peat products from Bord na Móna of Ireland. Shamrock® peat was one the largest selling brands of peat in Ireland and the United Kingdom. As part of the agreement, Scotts has preferential access to Bord na Móna's extensive peat reserves and an option to supply the Shamrock® brand to continental Europe. Bord na Móna also will mix and package peat for Scotts in Ireland (Scotts Company, 1998).

Environment

On July 8, the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Justice filed suit against Bay-Houston Towing Co., parent company of Michigan Peat Co., for violations of the Clean Water Act. The EPA alleged that Michigan Peat has discharged wastewater into a tributary of the Black River Drain, which flows into Lake Huron, without a permit since 1972. The wastewater was discharged through a series of ditches located in the Minden Bog in Sanilac County, MI. The suit also alleged that the company discharged soil, mud, clay, peat, gravel, tree stumps, and vegetation into 345 hectares of the bog without a permit (U.S. Environmental Protection Agency, 1998).

Consumption

Domestic peat sales increased by 4%, to 785,000 t, compared with that of 1997. Packaged materials composed 50% of the total domestic sales tonnage and commanded premium prices for sphagnum and hypnum moss. Apparent consumption increased by 8% compared with that of 1997. Imports of sphagnum moss from Canada accounted for 54% of domestic consumption. Nearly 50% of domestic peat was sold for use in general soil improvement, followed by potting soils and nursery applications (table 5). The remainder was used in a variety of applications, including seed inoculants, vegetable cultivation, mixed fertilizers, and packing for flowers and plants, and in the industrial sector.

Stocks

U.S. yearend peat stocks as shown in table 4, decreased by 3%, to 408,000 t. Reed-sedge peat accounted for 83% of total stocks; sphagnum, 11%; hypnum moss and humus, 6% (table 4).

Prices

The total reported f.o.b. value of domestic peat sold in the

United States was \$18.9 million, according to the annual survey of peat producers. The average unit value increased to \$24.07 per ton compared with \$23.23 per ton in 1997. On a unit-value basis, packaged sphagnum moss was valued at \$91.72 per ton f.o.b. plant; hypnum moss, \$52.47 per ton; humus, \$19.46 per ton; and reed-sedge, \$17.87 per ton (table 7).

Foreign Trade

Imports of sphagnum peat moss increased slightly to 761,000 t in 1998 (table 8). The total customs import value was \$142 million, or \$186.51 per ton. Imports of sphagnum moss from Canada reached a record high of 760,000 t, which represented 67% of total Canadian production. The United States exported 30,000 t of peat.

World Review

World production decreased slightly from that of 1997 but was down by 13% compared with that of 1996. Production in Ireland and Finland leveled off after the wet weather during summer 1997 resulted in a reduction in the peat harvest. Mild weather during winter 1998 also reduced the demand for fuel peat. Production in other regions remained stable or increased slightly.

According to information available to the USGS, 23 countries were known to have produced peat (table 9). Production was dominated by, in order of importance, Finland, Ireland, Russia, Germany, Canada, Sweden, Estonia, and Ukraine. The remainder was produced principally by the United Kingdom and the United States, with minor contributions from countries in Europe, Latin America, and Oceania. Peat was an important regional source of energy in Northern Europe and the former Soviet Union (FSU), accounting for 10% of energy consumption in Ireland, 6% each in Finland and Estonia, 2% in Latvia, and 1% in Sweden (European Energy Foundation, March 23, 1999, Process for peat-derived energy in a wider Europe, accessed May 14, 1999 at URL http://www.f-e-e.org/events/1999/s_230399.htm). Approximately 12.5 million metric tons (Mt) of reported world production was exclusively for fuel use and an additional 4.3 Mt was thought to be for fuel use.

Estimated production from countries of the FSU accounted for a significant portion of global peat production; output from these countries, however, has declined since 1990. Political restructuring, the reduced use of peat as a fuel, and unfavorable economic trends were all believed to have been major factors causing the drop in production. Peat production in Belarus, Russia, and Ukraine was believed to have been primarily for fuel use (table 9). The overall percentage of energy generated for peat in the FSU, however, has decreased in the past several years, primarily in the Baltic countries. Horticultural peat now accounts for two-thirds of production in Lithuania and more than one-half of its exports. The percentages in Estonia and Latvia were slightly lower, at 40% of the total for production and exports (Baltic Environmental Forum, 1998, Peat cutting chap. 5.D.1.1 of Baltic State of the Environment Report, accessed May 14, 1999, at URL <http://www.bef.lv/baltic/HTML/Chapt5dp.htm>). As in other European countries, nearly all fuel peat was for domestic consumption.

Canada.—According to Natural Resources Canada (1999),

production of sphagnum moss increased by 7%, to 1.127 Mt; New Brunswick, Quebec, and Alberta where the major producing Provinces in order of importance. Exports to the United States reached a record high of 760,000 t.

Ireland.—In January, the Irish Government selected IVO Group of Finland to build, own, and operate the country's sixth peat-fueled power station. IVO established Edenberry Power Ltd. to build and operate the plant, which will be located near Clonbulloge, County Offaly. Bord na Móna will supply the station with 1 million metric tons per year of milled peat from existing bogs in the region (Bord na Móna, [July 29, 1998], New peat-fired power station, accessed November 9, 1998, at URL http://www.bnm.ie/energy/power_station.htm).

Outlook

The outlook for horticulture and associated business is bright because global demand for plants, flowers, ornamental trees, natural turf, and outdoor recreational activities continue to grow at impressive rates. The U.S. Department of Agriculture anticipates that the growth in monetary value for the peat industry in the United States will outpace that of the traditional agriculture throughout the remainder of the decade. The outlook for the domestic peat industry, therefore, will likely be governed by several variables, including future wetlands environmental regulations, the ability to permit new bogs, growth and competition from recycled yard wastes and other natural organic materials, Canadian competition, and the degree of market penetration by flowers and ornamental plants from offshore.

References Cited

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- Szumigala, D.J., and Swainbank, R.C., 1999, Alaska's mineral industry 1998—A summary: Alaska Department of Natural Resources Information Circular 45, 14 p.
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SOURCES OF INFORMATION

U.S. Geological Survey Publications

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- Peat. Ch. in Minerals Yearbook, annual.¹
- Peat. Ch. in United States mineral resources, U.S. Geological Survey Professional Paper 820, 1973.

Other

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- Thibault, J.J., 1998, Peat industry fact sheet: New Brunswick Department of Natural Resources and Energy, Bathurst, N.B., Canada.

¹Prior to January 1996, published by the U.S. Bureau of Mines.

TABLE 1
SALIENT PEAT STATISTICS 1/

(Thousand metric tons, unless otherwise specified)

	1994	1995	1996	1997	1998	
United States:						
Number of active producers	70	64	59	56	60	
Production	574	648	549	661	676	
Sales by producers	552	660	640	753	785	
Bulk	255	339	325	432	392	
Package	297	320	314	320	393	
Value of sales	thousands	\$15,300	\$17,000	\$18,500	\$17,500	\$18,900
Average per metric ton		\$27.22	\$25.80	\$28.90	\$23.23	\$24.07
Average per metric ton, bulk		\$18.70	\$22.54	\$23.90	\$21.65	\$24.54
Average per metric ton, packaged or baled		\$26.44	\$29.24	\$34.00	\$25.34	\$23.60
Exports	23	20	19	22	30	
Imports for consumption	669	669	667	754	761	
Consumption, apparent 2/	1,240	1,170	1,240	1,310	1,420	
Stocks, December 31: Producers'	252	384	342	421	408	
World: Production	26,500 r/	28,100 r/	29,600 r/	25,800 r/	25,500 e/	

e/ Estimated. r/ Revised.

1/ Data are rounded to three significant digits.

2/ Apparent consumption equals U.S. production plus imports minus exports plus adjustments for industry stock changes.

TABLE 2
RELATIVE SIZE OF PEAT OPERATIONS IN THE UNITED STATES

Size (metric tons per year)	Active operations		Production (thousand metric tons)	
	1997	1998	1997	1998
23,000 and over	10	9	495	460
9,000 to 22,999	5	7	84	119
5,000 to 8,999	7	8	47	57
2,000 to 4,999	5	9	18	25
1,000 to 1,999	5	7	8	10
Under 1,000	24	20	8	5
Total 1/	56	60	661	676

1/ Data may not add to totals shown because of independent rounding.

TABLE 3
U.S. PEAT PRODUCTION AND SALES BY PRODUCERS IN 1998, BY STATE 1/

Region and State	Active operations	Production, (thousand metric tons)	Sales		
			Quantity (thousand metric tons)	Value 2/ (thousands)	Percent packaged
East:					
Florida	8	306	391	\$7,360	26
Pennsylvania	5	10	6	154	61
Other 3/	6	58	58	2,100	58
Total or average	19	374	454	9,610	31
Great Lakes:					
Michigan	9	190	190	5,500	84
Minnesota	11	38	30	1,630	34
Other 4/	13	67	97	1,900	80
Total or average	33	295	317	9,030	78
West 5/	8	8	14	251	50
Grand total or average	60	676	785	18,900	50

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

2/ Values are f.o.b. at producing plant.

3/ Includes Maine, New Jersey, New York, North Carolina, and West Virginia.

4/ Includes Illinois, Indiana, Ohio, and Wisconsin.

5/ Includes Colorado, Iowa, Montana, North Dakota, and Washington.

TABLE 4
U.S. PEAT PRODUCTION AND PRODUCERS' YEAREND STOCKS IN 1998, BY TYPE

Type	Active operations	Production 1/ (metric tons)	Percent of production	Yearend stocks 1/ (metric tons)
Sphagnum moss	10	157,000	23.2	43,500
Hypnum moss	9	53,400	7.9	15,100
Reed-sedge	29	413,000	61.2	338,000
Humus	12	52,300	7.7	11,200
Total	60	676,000	100.0	408,000

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

TABLE 5
U.S. PEAT SALES BY PRODUCERS IN 1998, BY TYPE AND USE 1/

Use	Sphagnum moss			Hypnum moss			Reed-sedge		
	Quantity			Quantity			Quantity		
	Weight (metric tons)	Volume 2/ (cubic meters)	Value (thou- sands)	Weight (metric tons)	Volume (cubic meters)	Value (thou- sands)	Weight (metric tons)	Volume (cubic meters)	Value (thou- sands)
Earthworm culture medium	75	115	\$2	211	297	\$3	565	956	\$11
General soil improvement	54,300	165,000	2,890	12,600	22,500	583	308,000	544,000	5,810
Golf courses	4,930	15,800	236	728	1,530	18	8,040	22,200	534
Ingredient for potting soils	83,500	136,000	1,810	50,500	80,500	1,540	123,000	223,000	1,980
Mixed fertilizers	--	--	--	--	--	--	22,700	38,200	475
Nurseries	6,760	22,800	342	3,000	6,120	76	36,300	61,300	794
Packing flowers, plants, shrubs, etc.	426	3,000	20	--	--	--	21	38	1
Seed inoculant	--	--	--	--	--	--	10,300	23,700	332
Vegetable growing	4,500	15,200	227	184	765	10	2,270	3,820	48
Other	--	--	--	3,630	3,060	40	907	1,800	40
Total	155,000	358,000	5,530	70,900	115,000	2,270	512,000	918,000	10,000
	Humus			Total					
	Quantity			Quantity					
	Weight (metric tons)	Volume (cubic meters)	Value (thou- sands)	Weight (metric tons)	Volume (cubic meters)	Value (thou- sands)			
Earthworm culture medium	381	612	\$7	1,230	1,980	\$23			
General soil improvement	8,000	12,200	190	383,000	743,000	9,470			
Golf courses	481	726	8	14,200	40,300	796			
Ingredient for potting soils	7,870	10,700	149	265,000	450,000	5,480			
Mixed fertilizers	1,640	1,970	40	24,300	40,200	515			
Nurseries	1,520	2,330	47	47,500	92,600	1,260			
Packing flowers, plants, shrubs, etc.	19,300	80,700	382	19,800	83,700	403			
Seed inoculant	--	--	--	10,300	23,700	332			
Vegetable growing	816	1,150	21	7,770	20,900	306			
Other	7,620	9,590	231	12,200	14,400	311			
Total	47,700	120,000	1,080	785,000	1,510,000	18,900			

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

2/ Volume of nearly all sphagnum moss was measured after compaction and packaging.

TABLE 6
AVERAGE DENSITY OF DOMESTIC PEAT SOLD IN 1998 1/

(Kilograms per cubic meter)

	Sphagnum moss	Hypnum moss	Reed- sedge	Humus
Bulk	526	618	552	676
Package	225	617	561	347
Bulk and package	432	618	558	397

1/ To convert kilograms per cubic meter to pounds per cubic yard multiply by 1.685.

TABLE 7
PRICES FOR PEAT IN 1998 1/

(Dollars per unit)

	Sphagnum moss	Hypnum moss	Reed- sedge	Humus	Average
<u>Domestic:</u>					
<u>Bulk:</u>					
Per metric ton	24.79	28.86	22.52	31.26	24.54
Per cubic meter	13.04	17.84	12.43	21.12	13.63
<u>Packaged or baled:</u>					
Per metric ton	91.72	52.47	17.87	19.46	23.60
Per cubic meter	20.67	32.37	10.03	6.75	11.52
<u>Average:</u>					
Per metric ton	35.76	32.00	19.59	22.53	24.07
Per cubic meter	15.43	19.78	10.92	8.95	12.50
Imported, total, per metric ton 2/	XX	XX	XX	XX	186.51

XX Not applicable.

1/ Prices are f.o.b. plant.

2/ Average customs value.

TABLE 8
U.S. IMPORTS FOR CONSUMPTION OF PEAT MOSS, BY COUNTRY 1/

Country	1997		1998	
	Quantity (metric tons)	Value 2/ (thousands)	Quantity (metric tons)	Value 2/ (thousands)
Canada	752,000	\$132,000	760,000	\$141,000
Denmark	354	87	575	147
Ireland	766	183	205	23
Netherlands	165	42	273	84
Other 3/	270 r/	398 r/	83	211
Total	754,000	133,000	761,000	142,000

r/ Revised.

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

2/ Customs value.

3/ Includes Chile (1998), China (1997), Finland (1997), France (1997), Germany, Mexico (1997), New Zealand, Norway, Sri Lanka, Sweden (1997), Taiwan (1998), and the United Kingdom (1998).

Source: Bureau of the Census.

TABLE 9
PEAT: WORLD PRODUCTION, BY COUNTRY 1/ 2/

(Thousand metric tons)

Country 3/	1994	1995	1996	1997	1998 e/
Argentina: Horticultural use	3	4	3	9 r/	5
Australia e/	15	15	15	15	15
Belarus 4/	348	315	279	300 e/	300
Burundi	10	10	10	5 e/	5
Canada: Horticultural use	914	877	901	1,054 r/	1,127 p/
Denmark: Horticultural use (sales) e/	190	205	204 5/	205	205
Estonia: Horticultural and fuel use	1,274	952 r/	1,000 r/ e/	1,070 r/	1,000
Finland: e/					
Horticultural use	1,040 r/	400 r/	400 r/	400 r/	400
Fuel use	6,960 r/	8,000 r/	8,000 r/	7,000 r/	7,000
Total	8,000	8,400	8,400	7,400	7,400
France: Horticultural use e/	200	200	200	200	200
Germany: e/					
Horticultural use	2,800	2,800	2,800	2,800	2,800
Fuel use	180	180	180	180	180
Total	2,980	2,980	2,980	2,980	2,980
Hungary: Horticultural use e/	65	48 5/	45	45	45
Ireland:					
Horticultural use e/	250	300	300	300	300
Fuel use	4,696	4,788	6,578 r/	4,351 r/	4,500
Total e/	4,950	5,090	6,880	4,650	4,800
Latvia: Horticultural and fuel use	647	455	552	442	450
Lithuania: Horticultural and fuel use	411	214	250 r/ e/	295 r/	195 5/
Netherlands e/	300	300	300	300	300
Norway: e/					
Horticultural use	30	30	30	30	30
Fuel use	1	1	1	1	1
Total	31	31	31	31	31
Poland: Horticultural and fuel use	109	199	198 r/	200 e/	200
Russia 4/	2,900	4,400 r/	4,100 r/	3,300 r/	3,000
Spain e/	70	70	60	60	60
Sweden: e/					
Horticultural use	250	250	250	250	250
Fuel use	800 r/	800 r/	800 r/	800 r/	800
Total	1,050	1,050	1,050	1,050	1,050
Ukraine e/ 4/	1,000	1,000	1,000	1,000	1,000
United Kingdom e/	500	590	550	550	500
United States: Horticultural use	574	648	549	661	676 5/
Grand total	26,500 r/	28,100 r/	29,600 r/	25,800 r/	25,500
Of which:					
Horticultural use	6,320	5,760	5,680	5,950	6,040
Fuel use	12,600 r/	13,800 r/	15,600 r/	12,300 r/	12,500
Unspecified	7,580	8,520	8,310	7,540	7,030

e/ Estimated. p/ Preliminary. r/ Revised.

1/ World totals and estimated data are rounded to three significant digits; may not add to totals shown.

2/ Table includes data available through June 25, 1999.

3/ In addition to the countries listed, Austria, Iceland, and Italy produced negligible amounts of peat.

4/ Production appears to be for fuel use.

5/ Reported figure.