

# **2019 Minerals Yearbook**

## **PEAT [ADVANCE RELEASE]**

### PEAT

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In 2019, the United States produced and consumed peat for horticultural and industrial purposes. Peat produced in the conterminous United States was 456,000 metric tons (t), a 5% decrease from that in 2018 (table 1). The United States imported 78% of its total consumption requirements, primarily from Canada (tables 1, 8). World peat production for 2019 was estimated to be 31.9 million metric tons (Mt) (table 9). The leading peat-producing countries, in descending order of tonnage, were Finland, Germany, Sweden, Belarus, Latvia, Ireland, and Canada, which accounted for 84% of world production.

Types of peat are classified by the degree of decomposed component plant material: sphagnum moss is the least decomposed, followed by hypnum moss, reed-sedge, and humus. Reed-sedge accounted for 93% of domestic peat production, and sphagnum moss accounted for 3% (table 4). Florida accounted for 77% of U.S. peat production, at 353,000 t (table 3).

Peat is a natural organic material of botanical origin and commercial significance. Peatlands occur in wetland areas, primarily in the temperate and cold belt of the Northern Hemisphere, where large peat deposits develop from the gradual decomposition of plant matter under anaerobic conditions. Approximately 15% of the world's peatlands, by area, are in the United States, and most U.S. peatlands are located in Alaska (Lappalainen, 1996, p. 55). Peatlands cover more than 400 million hectares (Mha) on the Earth, of which 86% remain undisturbed. Of the 56 Mha that has been used by humans, 51% has been used for agriculture; 26%, forestry; 22%, drained tropical peatlands; and 1%, energy and growing media (World Energy Council, 2013, p. 6.2). Peat continues to accumulate on 55% of global peatlands; however, the volume of global peat resources decreases at a rate of 0.05% per year owing to human activity (Joosten and Clarke, 2002, p. 32-33).

### Production

The U.S. Geological Survey developed domestic production data for peat from a voluntary canvass of operations in the conterminous United States. Of the 30 operations to which a survey request was sent, 21 responded. All of the respondents were active operations. Two operations that were closed in 2018 restarted production in 2019. Data for nonrespondents were estimated based on responses to the 2018 survey or other sources. Most peat operations were relatively small (producing less than 5,000 metric tons per year) and sold their products regionally. Peat production in the conterminous United States in 2019 was 456,000 t, a 5% decrease from that in 2018 (table 1). In 2019, 75% of domestic production came from the five largest operations (table 2). In the eastern United States, the region with the most peat production (table 3), output increased by 10% from that in 2018. Peat production for Alaska in 2019 was unavailable because the Alaska Department of Natural

Resources, Division of Geological & Geophysical Surveys, discontinued its survey of peat producers in Alaska.

Two peat facilities that were closed in 2018 after completing mining operations in 2017 restarted production in 2019. Other mining operations reported permit issues that caused disruptions in production. The permitting procedures for new peat operations have become increasingly time-consuming and expensive, causing some companies to abandon harvesting and reducing the number of new fens and bogs brought into production. In addition, extensive areas of peatlands were located in protected wetlands, parks, or other natural areas that restricted commercial development.

### Consumption

Peat was widely used as a plant-growth medium in a variety of agricultural and horticultural applications where its fibrous structure and porosity enabled a unique combination of optimal water-retention and drainage characteristics. Commercial applications included lawn and garden soil amendments, potting soils, and turf maintenance on golf courses. In industry, peat was used primarily as a filtration medium to remove toxic materials from process-waste streams, pathogens from sewage effluents, and deleterious materials suspended in municipal stormdrain water. In its dehydrated form, peat is a highly effective absorbent for fuel and oil spills on land and in water.

Sales of domestic peat increased slightly to 556,000 t in 2019 from 545,000 t in 2018 (table 1). Packaged products accounted for 24% of total domestic sales tonnage and commanded premium prices for all grades of peat (tables 3, 7). Apparent consumption decreased by 11% from that in 2018 (table 1). Potting soil and general soil improvement were the two leading use categories, accounting for 88% of the domestic sales tonnage and 87% of the volume (table 5). Other significant uses, by quantity of sales, included nurseries, golf course applications, and earthworm culture medium. The United States imported 75% of its total consumption requirements, primarily from Canada, where deposits of high-quality sphagnum moss are extensive. Peat from Canada was sold in bulk for blending in custom soil mixes and was packaged for horticultural use; however, a detailed distribution of imports from Canada was not available. Subsidiaries of Canadian peat producers own many of the soil-blending facilities in the southern and western United States and import much of their peat requirements.

### Stocks

U.S. yearend stocks of peat increased by 43% to 280,000 t in 2019 from 196,000 t in 2018 (table 1). Reed-sedge peat accounted for 95% of total stocks (table 4).

### Prices

The total reported free on board (f.o.b.) value for domestic peat sold in the United States was about \$13.7 million, according to the annual survey of domestic peat producers. The average unit value decreased by 5% to \$24.59 per metric ton compared with \$25.88 per metric ton in 2018 (table 1). The average cost of peat has decreased steadily since 2016, when the price per metric ton was \$31.97. The last time peat had an average value similar to that in 2019 was in 2012, when the value was \$24.44 per metric ton. The average unit value f.o.b. plant of sphagnum moss was \$67.44 per metric ton; hypnum moss, \$49.80 per metric ton; reed-sedge, \$20.77 per metric ton; and humus, \$13.79 per metric ton (table 7).

### **Foreign Trade**

U.S. companies exported 46,000 t of peat (table 1) in 2019. Canada was the leading destination, accounting for 54% of exports, followed by Mexico with 38% of exports. Imports of peat decreased by 3% to 1.16 Mt from 1.20 Mt in 2018 (tables 1, 8). The total customs import value was \$347 million, which averaged \$299.31 per metric ton (tables 7, 8). Imports of peat (sphagnum moss) from Canada decreased by 3% to 1.11 Mt, which represented 96% of total United States imports and 88% of Canada's total production (tables 8, 9).

### **World Review**

World peat production in 2019 was estimated to be 31.9 Mt, a 25% decrease from that in 2018 (revised) (table 9). Peat was a significant source of energy in Finland, Ireland, and Sweden and, to a lesser extent, in the countries of Eastern Europe (table 9).

**Belarus.**—Belarus continued peatland restoration efforts with a 5-year wetlands project launched in 2018. The project was funded by the Global Environment Facility and was to be executed by the Ministry of Natural Resources and Environmental Protection of Belarus and the United Nations Development Programme. The restoration program was designed to restore ineffectively drained peatlands, preventing carbon dioxide emissions of up to 5 million metric tons per year for 20 years (United Nations Development Programme, 2018). The project began to show signs of success as water levels rose about 2 meters in 2019 (United Nations Convention to Combat Desertification, 2019).

*Canada.*—Production of peat (sphagnum moss) was estimated to have decreased by 4% to 1.26 Mt in 2019 from 1.31 Mt (revised) in 2018. Quebec, New Brunswick, Manitoba, and Alberta were the major producing Provinces, in descending order of tonnage, accounting for 96% of production. Newfoundland and Labrador, Nova Scotia, Prince Edward Island, and Saskatchewan also reported peat production (Natural Resources Canada, 2019). The 2019 Canadian peat harvest season had periods of unfavorable weather conditions, resulting in lower-than-expected production for all of Canada's producing regions. New Brunswick's northern and southern regions produced lower-than-expected quantities of peat. The spring in New Brunswick was cool and transitioned into a summer of inclement weather conditions causing a much lowerthan-expected peat harvest. Quebec's South Shore and North Shore experienced a peat harvest season just short of expected volumes, owing to a moist spring and storms throughout the summer. Production in both Alberta and Saskatchewan was also lower than expected, owing to cool and wet weather during the summer months, despite the season starting mostly dry (Canadian Sphagnum Peat Moss Association, 2019).

*Finland.*—In 2019, Finland announced its goal of becoming carbon neutral by 2035. To achieve this goal, peat production would be phased out in favor of other forms of noncarbon energy, such as wind and solar power. In 2019, about 40% of Finland's energy consumption was supplied by peat and other fossil fuels. Communities where many people were employed within the peat sector were expected to be greatly affected by this change (Darby, 2019).

*Ireland.*—In 2019, Bord na Móna P.L.C. reduced its peat harvest and its peat briquettes capacity by 50% (Bord na Móna P.L.C., 2020, p. 15, 39). This reduction was consistent with plans reported in 2018 to make 70% of the company's profits from non-peat-based energy sources by 2021 (McCormack, 2018). Approximately 15,000 hectares of peatlands that were previously used for production were rehabilitated. Sustainable fish and herbal farms were started on peat bogs previously used for peat extraction with the goals of providing for the predicted increase in aquaculture demand and diversifying Bord na Móna's profit sources away from peat production (Bord na Móna P.L.C., 2020, p. 8, 22, 24).

#### Outlook

Preservation and restoration of peatlands may become a high priority in the efforts to reduce greenhouse gas emissions. Peatlands are identified as carbon sinks, storing more carbon dioxide per hectare than any other ecosystem. Research is ongoing on restoration measures for cut-away and post-harvest peatlands and rehabilitation measures such as rewetting or afforestation. Rewetting, an effort to raise the water table, is done to begin the natural regeneration of peat. Afforestation (when trees are planted to establish a forest in treeless areas) in tropical areas may help retain the surface moisture in peatlands. In the short term, domestically, imports from Canada are likely to continue to increase and domestic peat production is likely to fluctuate. Factors such as competition from organic soil amendments [for example, coir (coconut fiber) and composted yard waste], Federal and State wetlands regulations, and restrictions on permitting new production sites, are likely to limit growth in the domestic peat industry.

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### **GENERAL SOURCES OF INFORMATION**

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### Other

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### TABLE 1 SALIENT PEAT STATISTICS<sup>1</sup>

#### (Thousand metric tons and thousand dollars unless otherwise specified)

	2015	2016	2017	2018	2019
United States: <sup>2</sup>					
Number of active producers	29	31	31	28	30
Production	455	441	498	479	456
Sales by producers:					
Quantity:					
Bulk	419	372	413	413	425
Packaged	41	71	102	132	132
Total	460	443	515	545	556
Value	13,000	14,200	14,200	14,100	13,700
Average value dollars per metric ton	28.39	31.97	27.55	25.88	24.59
Average value, bulk do.	29.03	31.58	28.54	27.40	25.06
Average value, packaged or baled do.	21.77	33.96	23.51	21.09	21.16
Exports	28	30	30	37	46
Imports for consumption	1,150	1,130	1,150	1,200	1,160
Consumption, apparent <sup>3</sup>	1,620	1,590	1,520	1,670	1,480
Stocks, December 31, producers'	179	125	222	196	280
World, production	28,700 <sup>r</sup>	30,200 <sup>r</sup>	29,700 <sup>r</sup>	42,400 <sup>r</sup>	31,900 <sup>e</sup>

<sup>e</sup>Estimated. <sup>r</sup>Revised. do. Ditto.

<sup>1</sup>Table includes data available through June 24, 2020. Data are rounded to no more than three significant digits, except average values; may not add to totals shown.

<sup>2</sup>Does not include Alaska.

<sup>3</sup>U.S. production plus imports minus exports plus adjustments for industry stock changes.

Peat. Ch. in United States Mineral Resources, Professional Paper 820, 1973.

# TABLE 2 PEAT PRODUCTION IN THE UNITED STATES, BY SIZE OF OPERATION<sup>1</sup>

			Producti	on	
Size	Active operation	ations	(thousand metric tons)		
(metric tons per year)	2018	2019	2018	2019	
23,000 or more	5	5	356	342	
9,000 to 22,999	4	3	75	63	
5,000 to 8,999	4	4	26	27	
1,000 to 4,999	6 <sup>r</sup>	9	14 <sup>r</sup>	21	
Less than 1,000	9 <sup>r</sup>	9	4 <sup>r</sup>	3	
Total	28	30	477 <sup>r</sup>	456	

<sup>r</sup>Revised.

<sup>1</sup>Table includes data available through June 24, 2020. Data are rounded to no more than three significant digits, may not add to totals shown.

### TABLE 3

### U.S. PEAT PRODUCTION AND SALES BY PRODUCERS IN 2019, BY REGION AND STATE<sup>1</sup>

				Sales	
Region and State	Active operations	Production (metric tons)	Quantity (metric tons)	Value <sup>2</sup> (thousands)	Percent packaged
East:	I	· · · · · ·	× /	· · · · · · · · · · · · · · · · · · ·	1 0
Florida	6	353,000	347,000	\$6,430	
Other <sup>3</sup>	7	11,300	40,400	2,030	
Total or average	13	364,000	387,000	8,450	
Great Lakes:	-				
Minnesota	8	50,500	45,100	3,650	77
Other <sup>4</sup>	- 7	36,000	121,000	1,300	79
Total or average	15	86,600	166,000	4,940	79
West <sup>5</sup>	2	5,830	3,110	291	
Grand total or average	30	456,000	556,000	13,700	24

-- Zero.

<sup>1</sup>Table includes data available through June 24, 2020. Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Free on board producing plant.

<sup>3</sup>Includes Maine, New Jersey, New York, and Pennsylvania.

<sup>4</sup>Includes Illinois, Indiana, Michigan, and Ohio.

<sup>5</sup>Includes Iowa and Washington.

# TABLE 4 U.S. PEAT PRODUCTION AND PRODUCERS' YEAREND STOCKS IN 2019, BY $\mbox{TYPE}^1$

Туре	Active operations <sup>2</sup>	Production (metric tons)	Percent of production	Yearend stocks (metric tons)
Sphagnum moss	6	W	W	W
Hypnum moss	4	W	W	W
Reed-sedge	15	424,000	93	267,000
Humus	4	W	W	W
Total	30	456,000	100	280,000

W Withheld to avoid disclosing company proprietary data; included in "Total."

<sup>1</sup>Table includes data available through June 24, 2020. Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Some plants produce multiple types of peat.

TABLE 5
U.S. PEAT SALES BY PRODUCERS IN 2019 BY TYPE AND USE <sup>1</sup>

	S	phagnum n	noss <sup>2</sup>	Н	ypnum m	oss		Reed-sedge	e		Total <sup>3</sup>	
	Qua	antity		Qua	ntity		Qu	antity		Qu	antity	
	Weight	Volume		Weight	Volume		Weight	Volume		Weight	Volume	
	(metric	(cubic	Value	(metric	(cubic	Value	(metric	(cubic	Value	(metric	(cubic	Value
Use	tons)	meters)	(thousands)	tons)	meters)(	thousands)	tons)	meters)	(thousands)	tons)	meters)	(thousands)
Earthworm culture medium				W	W	W	W	W	W	W	W	W
General soil improvement	10,400	59,200	W	W	W	W	W	251,000	\$1,420	170,000	450,000	\$3,480
Golf course applications							W	W	W	W	W	W
Potting soil	W	W	W	W	W	W	312,000	653,000	5,930	321,000	684,000	6,540
Nurseries				W	W	W	W	W	W	W	W	264
Other <sup>4</sup>	W	W	W							W	W	W
Total	17,800	86,800	\$1,200	W	W	W	496,000	1,070,000	10,500	556,000	1,310,000	13,700

W Withheld to avoid disclosing company proprietary data; included in "Total." -- Zero.

<sup>1</sup>Table includes data available through June 24, 2020. Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Includes humus.

<sup>3</sup>Includes mixed fertilizers; packing flowers, plants, shrubs, and so forth; seed inoculant; and vegetable growing.

<sup>4</sup>Nearly all measured after compaction and packaging.

### TABLE 6

### AVERAGE DENSITY OF DOMESTIC PEAT SOLD IN 2019<sup>1</sup>

### (Kilograms per cubic meter)<sup>2</sup>

	Sphagnum	Hypnum	Reed-	
	moss	moss	sedge	Humus
Bulk	353	593	615	744
Packaged	229		586	
Bulk and packaged	269	593	608	744

-- Zero.

<sup>1</sup>Table includes data available through June 24, 2020.

<sup>2</sup>To convert kilograms per cubic meter to pounds per cubic yard, multiply by 1.685.

### TABLE 7PRICES FOR PEAT IN 2019<sup>1, 2</sup>

### (Dollars per unit)

	Sphagnum moss	Hypnum moss	Reed- sedge	Humus	Average
Domestic:			0		
Bulk:	_				
Per metric ton	62.48	49.80	22.03	13.79	25.06
Per cubic meter	22.06	16.78	13.55	10.26	14.23
Packaged or baled:					
Per metric ton	71.01		16.90		21.16
Per cubic meter	16.27		9.90		11.04
Average:					
Per metric ton	67.44	49.80	20.77	13.79	24.59
Per cubic meter	18.11	16.78	12.62	10.26	13.43
Imported, total, per metric ton <sup>3</sup>	XX	XX	XX	XX	299.31
VV Not applicable Zaro					

XX Not applicable. -- Zero.

<sup>1</sup>Table includes data available through June 24, 2020.

<sup>2</sup>Free on board plant.

<sup>3</sup>Average customs value. Source: U.S. Census Bureau.

TABLE 8

### U.S. IMPORTS FOR CONSUMPTION OF PEAT, BY COUNTRY OR LOCALITY $^{\rm 1}$

	201	8	20	19
	Quantity	Value <sup>2</sup>	Quantity	Value <sup>2</sup>
Country or locality	(metric tons)	(thousands)	(metric tons)	(thousands)
Canada	1,150,000	\$329,000	1,110,000	\$326,000
Estonia	699	68	263	62
Finland	1,150	562	695	325
Germany	1,400	688	6,050	3,050
India	1,010	479	61	33
Ireland	1,190	232	907	146
Latvia	29,700	13,500	30,100	14,800
Lithuania	2,770	1,270	394	81
Netherlands	7,390	3,100	5,190	1,360
New Zealand	1,430	365	1,820	464
Other	549 <sup>r</sup>	741 <sup>r</sup>	233	426
Total	1,200,000	350,000	1,160,000	347,000

<sup>r</sup>Revised.

<sup>1</sup>Table includes data available through June 18, 2020. Data are rounded to no more than three significant digits; may not add to totals shown. Includes Harmonized Tariff Schedule of the United States code 2703.00.0000.

<sup>2</sup>Customs value.

Source: U.S. Census Bureau.

### TABLE 9 PEAT: WORLD PRODUCTION, BY COUNTRY OR LOCALITY<sup>1</sup>

#### (Thousand metric tons)

Country or locality <sup>2</sup>	2015	2016	2017	2018	2019
Argentina, horticultural use	1	2	2	1 <sup>r</sup>	1 e
Belarus:					
Fuel use	1,000	1,457	2,034 r	2,354 <sup>r</sup>	2,400 °
Horticultural use	237	164	151 <sup>r</sup>	270 <sup>r</sup>	270 °
Total	1,237	1,621	2,185 <sup>r</sup>	2,624 <sup>r</sup>	2,670 °
Burundi, fuel use	4	10	14	14	18
Canada, horticultural use	1,297	1,452	1,459	1,306 r	1,259
Chile, horticultural use	2	4	8	6 <sup>r</sup>	6 <sup>e</sup>
Denmark, including sphagnum <sup>3</sup>	137	144	94	188	91
Estonia:					
Fuel use	89	89	13 <sup>r</sup>	70 <sup>r</sup>	70 °
Horticultural use	720	783	929	1,420 r	820 °
Total	809	872	942 <sup>r</sup>	1,489 <sup>r</sup>	890 °
Finland: <sup>4</sup>					
Fuel use	9,634	9,907	8,366 <sup>r</sup>	17,306 <sup>r</sup>	10,077
Horticultural use	1,013	1,046	1,409 <sup>r</sup>	2,272 <sup>r</sup>	1,763
Total	10,647	10,953	9,775 <sup>r</sup>	19,578 <sup>r</sup>	11,840
Germany, horticultural use	3,699	4,051	3,787	4,289 <sup>r</sup>	4,200 e
Hungary, horticultural use	97	90	57	57 <sup>r</sup>	57 °
Ireland, fuel use	3,138	2,779	3,185 <sup>r</sup>	3,463 <sup>r</sup>	1,730 °
Latvia, horticultural and fuel uses	1,805	1,762 <sup>r</sup>	2,040 r	2,218 <sup>r</sup>	2,200 e
Lithuania:					
Fuel use	74	17	24	28 <sup>r, e</sup>	30 <sup>e</sup>
Horticultural use	479	369	394	485 <sup>r</sup>	470 <sup>e</sup>
Total	553	386	418	513 <sup>r</sup>	500 e
Norway, horticultural use <sup>e</sup>	100	100	100	100	100
Poland, horticultural and fuel uses	877	907	955 <sup>r</sup>	872 <sup>r</sup>	870 <sup>e</sup>
Russia, horticultural and fuel uses	900	960	733 <sup>r</sup>	1,124 <sup>r</sup>	909 <sup>e</sup>
Rwanda, unspecified <sup>e</sup>	13	13	100	100	100
Spain, horticultural use	79	113	85 <sup>r</sup>	90 <sup>r, e</sup>	90 °
Sweden: <sup>5</sup>					
Fuel use	992	1,240	957	1,639 <sup>r</sup>	1,600 °
Horticultural use	1,115	1,476	1,464	1,412 <sup>r</sup>	1,400 °
Total	2,107	2,716	2,421	3,051 r	3,000 °
Turkey, unspecified	135	134	228	200 °	200 e
Ukraine:					
Fuel use	491	539	518	540 <sup>r</sup>	540 <sup>e</sup>
Horticultural use	79	136	88	146 <sup>r</sup>	145 °
Total	570	675	606	686 <sup>r</sup>	685 °
United Kingdom, unspecified	NA	NA	NA	NA	NA
United States, horticultural use	455	441	498	479	456
Grand total	28,700 r	30,200 r	29,700 r	42,400 r	31,900 °
Of which:			,	,	,
Fuel use	15,400	16,000	15,100 <sup>r</sup>	25,400 <sup>r</sup>	16,500
Horticultural use	9,370	10,200	10,400 r	12,300 <sup>r</sup>	11,000
Unspecified	3,870 <sup>r</sup>	3,920 r	4,150 <sup>r</sup>	4,700 <sup>r</sup>	4,370

<sup>e</sup>Estimated. <sup>r</sup>Revised. NA Not available.

<sup>1</sup>Table includes data available through June 24, 2020. All data are reported unless otherwise noted. Grand totals, U.S. data, and estimated data are rounded to no more than three significant digits; may not add to totals shown. <sup>2</sup>In addition to the countries and (or) localities listed, Australia, Austria, Chile, Iceland, India, Italy, New Zealand, and Romania may have produced peat, but available information was inadequate to make reliable estimates of output.

<sup>3</sup>Unspecified use reported, in thousand cubic meters: 2015—156; 2016—163; 2017—107; 2018—213; and 2019—103. One cubic meter of peat equals 0.8806 metric ton.

<sup>4</sup>Horticultural use reported, in thousand cubic meters: 2015—1,153; 2016—1,425; 2017—1,600; 2018—2,580; and 2019—2,002. Fuel use reported, in thousand cubic meters: 2015—10,945; 2016—9,411; 2017—9,500; 2018—19,653; and 2019—11,443. One cubic meter of peat equals 0.8806 metric ton.

<sup>5</sup>Horticultural use reported, in thousand cubic meters: 2015—1,266; 2016—1,676; 2017—1,662; and 2018—1,604. Fuel use reported, in thousand cubic meters: 2015—1,127; 2016—1,408; 2017—1,087; and 2018—1,278. One cubic meter of peat equals 0.8806 metric ton.