

Mineral Aggregates

Oliver Vagt

*The author is with the Minerals and Metals Sector,
Natural Resources Canada.
Telephone: (613) 992-2667
E-mail: ovagt@nrcan.gc.ca*

Total Canadian shipments of regular weight mineral aggregates in 2000 have been estimated to be 351 Mt, based on preliminary data, compared to 345 Mt in 1999, based on final data. Specifically, these data relate to the combined amounts of crushed stone and miscellaneous stone, and sand and gravel, essentially all for construction uses (Table 1, By Use, and Table 2, respectively). Relevant subtotals of shipments of crushed stone and miscellaneous stone by rock type, e.g., limestone, granite and other types of stone, are included in a separate commodity chapter entitled *Stone*.

Increased demand for construction aggregates is expected in 2001 based on growth in the residential and non-residential construction sectors. The average unit values of construction aggregates shipped, as reported by producers, generally continued to increase in pace with the rate of inflation with selling prices varying considerably depending on proximity to consumers.

In follow-up to the Canada Infrastructure Works from 1994 to 1999, a new six-year Infrastructure Canada Program to enhance physical infrastructure has been introduced beginning in the fiscal year 2000/01. This cost-shared program is expected to contribute about \$6 billion to construction spending and to be supported by all three levels of government.

Trade in construction aggregates, mainly with the United States, is particularly important in Atlantic Canada and in British Columbia. It is expected that the U.S. *Transportation Equity Act for the 21st Century*, which will have appropriated a total of about US\$200 billion during the planned five-year period through 2003, may result in additional export opportunities for strategically located producers in Canada.

Information on lightweight aggregates, including ferrous slags, is included in Tables 6-11, inclusive.

Notes: (1) For definitions and valuation of mineral production, shipments and trade, please refer to Chapter 65. (2) Information in this review was current as of February 1, 2001. (3) This and other reviews, including previous editions, are available on the Internet at http://www.nrcan.gc.ca/mms/cmy/index_e.html.

NOTE TO READERS

The intent of this document is to provide general information and to elicit discussion. It is not intended as a reference, guide or suggestion to be used in trading, investment, or other commercial activities. The author and Natural Resources Canada make no warranty of any kind with respect to the content and accept no liability, either incidental, consequential, financial or otherwise, arising from the use of this document.

TABLE 1. CANADA, TOTAL PRODUCTION OF STONE, 1998-2000

	1998		1999		2000P	
	(000 t)	(\$000)	(000 t)	(\$000)	(000 t)	(\$000)
BY PROVINCE/TERRITORY¹						
Newfoundland	2 606	19 837	3 091	20 206	4 938	29 095
Nova Scotia	7 628	45 348	7 881	48 064	7 951	46 328
New Brunswick	3 500	20 796	4 388	23 141	3 436	19 212
Quebec	32 220	215 171	30 269	218 744	29 375	215 234
Ontario	50 689	344 707	51 258	385 675	55 204	434 935
Manitoba	4 992	24 971	4 314	20 089	4 357	20 342
Alberta	633	5 362	465	4 623	431	4 752
British Columbia	6 321	46 995	7 440	54 505	6 473	49 180
Northwest Territories	336	4 760	78	452	184	2 848
Total	108 924	727 947	109 184	775 499	112 348	821 926
BY USE²						
Stone (Dimension)						
Dimension stone						
Rough	302	34 100	315	41 031	..	..
Monumental and ornamental stone (n.f.)	68	5 691	88	7 939	..	..
Other (flagstone, curbstone, paving blocks, etc.)	66	8 668	104	13 550	..	..
Total dimension stone	436	48 459	507	62 520	..	..
Stone (Crushed)						
Crushed stone for						
Concrete aggregate	17 537	99 721	20 718	122 299	..	..
Asphalt aggregate	10 398	63 791	11 097	69 608	..	..
Road metal	31 135	165 001	30 663	165 040	..	..
Railroad ballast (includes traprock)	2 187	16 668	1 830	15 437	..	..
Other uses	35 318	181 157	34 873	181 907	..	..
Chemical and metallurgical						
Cement plants, Canada	14 334	46 555	14 082	50 085	..	..
Cement plants, foreign	1 632	7 973	525	1 919	..	..
Flux in iron and steel furnaces	3 406	21 830	1 295	10 476	..	..
Flux in nonferrous smelters	129	900	101	818	..	..
Glass factories	203	3 635	163	2 739	..	..
Lime plants, Canada	3 353	18 558	5 261	19 877	..	..
Lime plants, foreign	216	1 843	1 229	6 269	..	..
Pulp and paper mills	89	1 046	96	1 120	..	..
Sugar refineries	—	—	—	—	..	..
Other chemical uses	1 748	11 787	1 550	9 360	..	..
Miscellaneous stone						
Manufacture of artificial stone	10	395	3	120	..	..
Roofing granules	580	25 388	751	27 309	..	..
Poultry grit	188	2 080	176	1 775	..	..
Stucco dash	25	3 598	25	2 682	..	..
Terrazzo chips	4	153	7	303	..	..
Rock wool	14	214	26	424	..	..
Rubble and riprap	1 415	8 147	942	4 415	..	..
Other uses	944	8 350	1 090	8 506	..	..
Pulverized stone						
Whiting	48	3 631	274	9 956	..	..
Asphalt filler	175	261	178	247	..	..
Dusting coal mines	3	219	2	145	..	..
Agricultural purposes and fertilizer plants	1 169	17 914	1 049	15 377	..	..
Other uses	806	37 892	897	58 632	..	..
Total crushed stone	127 066	748 708	128 903	786 848	..	..
Total all stone	127 502	797 167	129 410	849 368	..	..

Source: Natural Resources Canada.

— Nil; .. Not available; n.f. Not finished or dressed; P Preliminary.

¹ Data exclude stone used in the Canadian cement, lime and clay industries. ² Data include stone used in the Canadian cement, lime and clay industries.

Note: Numbers may not add to totals due to rounding.

TABLE 2. CANADA, PRODUCTION OF SAND AND GRAVEL,¹ BY PROVINCE AND TERRITORY, 1998-2000

	1998		1999		2000 ^p	
	(000 t)	(\$000)	(000 t)	(\$000)	(000 t)	(\$000)
Newfoundland	3 714	17 764	2 836	7 305	2 837	7 043
Prince Edward Island	199	898	257	1 258	244	1 144
Nova Scotia	2 400	10 927	2 250	10 605	2 408	11 303
New Brunswick	4 336	x	4 492	13 190	3 721	11 721
Quebec	27 319	72 414	30 274	83 473	25 405	82 774
Ontario	88 186	325 109	105 714	408 321	115 478	413 459
Manitoba	10 135	x	10 428	29 989	9 158	26 785
Saskatchewan	12 032	x	11 094	37 865	10 960	34 098
Alberta	43 998	200 823	41 229	195 630	41 525	196 580
British Columbia	31 908	161 084	32 615	164 019	32 915	163 422
Yukon	690	2 123	807	2 105	1 142	3 075
Northwest Territories	419	2 009	374	4 453	539	4 805
Nunavut	-	-	-	-	-	-
Total	225 338	875 226	242 369	958 215	246 331	956 209

Source: Natural Resources Canada.

- Nil; ^p Preliminary; x Confidential.¹ Production represents shipments of natural gravel, sand and crushed gravel. Does not include shipments to Canadian cement plants.

Note: Numbers may not add to totals due to rounding.

TABLE 3. AVAILABLE DATA ON USE OF SAND AND GRAVEL, BY REGION, 1998 AND 1999

	Year	Atlantic	Quebec	Ontario	Western	Canada
		Provinces			Provinces ¹	
		(000 tonnes)				
Road bed, surface	1998	5 778	16 351	40 193	46 601	108 923
	1999	4 210	18 097	42 086	47 324	111 717
Roads, ice control	1998	476	716	2 713	3 768	7 672
	1999	655	672	3 024	2 107	6 458
Concrete aggregate	1998	1 514	2 668	13 997	17 301	35 479
	1999	1 769	3 477	13 030	16 180	34 457
Asphalt aggregate	1998	886	2 570	7 904	10 071	21 430
	1999	634	2 648	8 154	10 021	21 457
Railroad ballast	1998	38	1	5	177	221
	1999	22	19	4	210	255
Mortar sand	1998	40	283	1 091	284	1 698
	1999	42	206	1 367	239	1 853
Backfill for mines	1998	...	32	1 188	791	2 011
	1999	286	21	1 244	249	1 801
Fill	1998	884	2 446	9 301	7 397	20 027
	1999	1 409	2 970	11 429	7 173	22 981
Other purposes	1998	1 076	2 253	12 304	13 028	28 661
	1999	853	2 165	25 770	13 246	42 034
Total	1998	10 690	27 319	88 694	99 418	226 122
	1999	9 880	30 274	106 109	96 751	243 013

Source: Natural Resources Canada.

... Amount too small to be expressed.

¹ The western provinces include the Yukon and Northwest Territories.

Note: Numbers may not add to totals due to rounding.

TABLE 4. CANADA, EXPORTS AND IMPORTS OF SAND AND GRAVEL AND CRUSHED STONE, 1998-2000

Item No.	1998		1999		2000P	
	(tonnes)	(\$000)	(tonnes)	(\$000)	(tonnes)	(\$000)
EXPORTS						
2505.90	Natural sands n.e.s., excluding metal-bearing sands					
United States	333 040	3 735	452 415	5 060	456 377	4 736
Bahamas	21 009	548	41 220	968	61 811	1 258
Venezuela	75	40	427	156	455	99
Argentina	—	—	—	—	313	67
Trinidad and Tobago	—	—	101	16	202	33
Philippines	—	—	—	—	201	30
Thailand	11 594	116	—	—	—	—
Chile	25	5	56	17	—	—
Bermuda	7 691	76	16 066	153	—	—
Mexico	152	47	76	24	—	—
Saint Pierre and Miquelon	—	—	30	10	—	—
Iceland	—	—	4 313	285	—	—
Malaysia	—	—	39	14	—	—
Barbados	—	—	53 538	1 719	—	—
Total	373 586	4 567	568 281	8 422	519 359	6 223
2517.10	Pebbles, gravel, broken or crushed stone used for aggregates, etc.					
United States	3 075 787	27 522	3 287 916	33 381	3 129 470	31 706
Panama	—	—	—	—	536 580	1 258
Bahamas	34 021	727	45 865	1 103	47 239	1 079
Jamaica	—	—	—	—	44 631	931
Bermuda	25 927	462	4 743	50	18 965	191
Japan	—	—	—	—	6	47
France	12	25	—	—	—	—
India	14 700	86	—	—	—	—
Guyana	19 181	231	—	—	—	—
Suriname	32 620	414	—	—	—	—
Germany	—	—	57	1	—	—
Iceland	—	—	3 715	243	—	—
Barbados	—	—	15 832	467	—	—
Total	3 202 248	29 467	3 358 128	35 245	3 776 891	35 212
2517.41	Marble granules, chippings and powder of 25.15 or 25.16, heat-treated or not					
United States	244 565	27 251	267 109	37 943	347 873	56 015
France	8	24	85	15	—	—
Total	244 573	27 275	267 194	37 958	347 873	56 015
2517.49	Granules, chippings and powder, n.e.s., of 25.15 or 25.16, heat-treated or not					
United States	1 638	158	1 427	118	100 810	6 089
Barbados	—	—	39 711	1 011	—	—
Other countries	94	48	17	10	43	14
Total	1 732	206	41 155	1 139	100 853	6 103
2518.10	Dolomite, not calcined					
United States	967 762	9 075	2 082 332	21 650	2 800 364	28 836
Venezuela	—	—	75 889	1 034	396 323	4 101
Mexico	—	—	227 070	2 022	311 456	2 771
Trinidad and Tobago	—	—	—	—	109 469	1 976
Brazil	—	—	—	—	26 445	161
Romania	—	—	5	94	73	14
Total	967 762	9 075	2 385 296	24 800	3 644 130	37 859
2518.20	Calcined dolomite					
United States	32 515	6 459	29 466	6 696	15 749	4 112
India	—	—	110	30	—	—
Total	32 515	6 459	29 576	6 726	15 749	4 112
2521.00	Limestone flux; limestone and other calcareous stone used for lime or cement					
United States	2 761 101	21 515	2 521 646	16 487	2 856 799	18 632
Mexico	—	—	—	—	35 322	293
Australia	20	15	—	—	—	—
Total	2 761 121	21 530	2 521 646	16 487	2 892 121	18 925
IMPORTS						
2505.90	Natural sands n.e.s., excluding metal-bearing sands					
United States	310 580	8 402	301 864	7 981	321 577	9 105
China	11	...	160	44	488	126
Philippines	111	42	533	35	239	51
United Kingdom	2 632	58	1 320	46	168	41
South Africa	2	...	1	...	171	30
Taiwan	1	...	5	...	429	29
India	414	66	618	99	169	26
Netherlands	—	—	—	—	1 809	17
Other countries	768	120	357	45	308	49
Total	314 519	8 688	304 858	8 250	325 358	9 474

TABLE 4 (cont'd)

Item No.	1998		1999		2000p		
	(tonnes)	(\$000)	(tonnes)	(\$000)	(tonnes)	(\$000)	
IMPORTS (cont'd)							
2517.10	Pebbles, gravel, broken or crushed stone used for aggregates, etc.						
	3 188 068	18 688	3 174 168	17 719	3 083 383	16 860	
	16 077	141	7 674	73	8 976	137	
	–	–	–	–	18 364	74	
	461	28	1 316	49	695	67	
	–	–	10	..	5 361	50	
	1 508	18	1 035	12	2 527	48	
	351	4	453	4	578	26	
	1 390	9	1 578	14	1 979	20	
	823	10	836	7	1 090	13	
	–	–	–	–	1 139	6	
	326	11	1 028	9	1 276	14	
	Total	3 209 004	18 909	3 188 098	17 887	3 125 368	17 315
2517.20	Macadam of slag, dross or similar industrial waste, etc.						
	5 746	45	5 209	34	30 028	228	
	133	1	317	2	1 464	11	
	Total	5 879	46	5 526	36	31 492	239
2517.30	Tarred macadam						
	1 149	47	119	6	158	7	
	Total	1 149	47	119	6	158	7
2517.41	Marble granules, chippings and powder of 25.15 or 25.16, heat-treated or not						
	103 938	17 120	88 377	15 207	58 870	10 384	
	51	11	155	25	187	22	
	181	38	96	16	63	10	
	8	1	16	2	33	8	
	Total	104 178	17 170	88 644	15 250	59 153	10 424
2517.49	Granules, chippings and powder, n.e.s., of 25.15 or 25.16, heat-treated or not						
	38 491	1 588	25 852	1 324	28 466	1 613	
	104	10	191	23	476	33	
	–	–	–	–	374	28	
	570	68	109	10	210	25	
	28	1	58	6	105	11	
	1 334	72	–	–	8	..	
	56	5	359	36	305	14	
	Total	40 583	1 744	26 569	1 399	29 944	1 724
2518.10	Dolomite, not calcined						
	2 635	499	3 329	659	4 784	866	
	10	2	20	7	82	22	
	Total	2 645	501	3 349	666	4 866	888
2518.20	Calcined dolomite						
	2 946	584	3 078	615	3 810	761	
	143	13	756	86	320	35	
	Total	3 089	597	3 834	701	4 130	796
2518.30	Agglomerated dolomite (including tarred dolomite)						
	100	28	159	44	556	181	
	–	–	–	–	103	37	
	Total	100	28	159	44	659	218
2521.00	Limestone flux; limestone and other calcareous stone used for lime or cement						
	3 858 730	17 619	4 140 503	18 286	4 027 510	17 810	
	–	–	196	1	98 963	459	
	–	–	4 077	15	57 466	70	
	300	1	–	–	14 835	53	
	–	–	–	–	3 144	15	
	6 652	17	4 043	14	2 622	10	
	–	–	–	–	2 987	10	
	4 156	11	7 948	34	1 692	6	
	Total	3 869 838	17 648	4 156 767	18 350	4 209 219	18 433

Source: Statistics Canada.

– Nil; .. Amount too small to be expressed; n.e.s. Not elsewhere specified; P Preliminary; † Revised.

Note: Numbers may not add to totals due to rounding.

TABLE 5. LIGHTWEIGHT AGGREGATE PRODUCERS IN CANADA, 1999

Company	Location	Commodity	Remarks
ATLANTIC PROVINCES			
Fafard Peat Moss Company Ltd.	Inkerman, N.B.	Perlite, vermiculite	Processed for use in horticulture.
Sun Gro Horticulture Canada Ltd.	Lamèque, N.B.	Perlite	Processed for use in horticulture.
QUEBEC			
Premier Horticulture Vermi-Lite Inc., subsidiary of Perlite Canada Inc.	Rivière-du-Loup Baie-du-Febvre	Perlite, vermiculite Perlite, vermiculite	Processed for use in horticulture. Processed for use in horticulture.
ONTARIO			
Grace Canada, Inc.	Ajax	Vermiculite, perlite	Vermiculite processed for use in horticulture, as loose insulation, and in friction materials. Perlite processed for use in gypsum plaster, horticulture, refractories and as loose insulation.
Lafarge Canada Inc., Hamilton Slag Division V.I.L. Vermiculite Inc.	Hamilton Woodbridge Lachine, Que. (plant)	Slag Vermiculite, perlite	Used in concrete products industry. Vermiculite processed for use in loose insulation, horticulture and concrete products. Perlite processed for use in horticulture.
PRAIRIE PROVINCES			
Cindercrete Products Ltd.	Saskatoon, Sask.	Expanded clay	Processed for concrete products industry.
Grace Canada, Inc.	Winnipeg, Man.	Vermiculite, perlite	Perlite processed for use in gypsum plaster, loose insulation and in horticulture.
	Edmonton, Alta.	Vermiculite, perlite	Vermiculite processed for use in horticulture and in friction material and as loose insulation.
Inland Cement Limited	Calgary, Alta.	Expanded shale	Processed for concrete products industry and for loose insulation.
	Edmonton, Alta.	Expanded clay	Processed for concrete products industry, and for loose insulation.
Sun Gro Horticulture Canada Ltd.	Elma, Man. Seba Beach, Alta.	Perlite Perlite, pumice	Processed for use in horticulture. Processed for use in horticulture.
BRITISH COLUMBIA			
Canada Pumice Corporation	Nakzo, Quesnel	Pumice	A range of pumice products for construction and landscaping material.
Great Pacific Pumice Inc.	Mt. Meager	Pumice	Used in horticulture, concrete products industry and as fill.
Ocean Construction Supplies Limited	Vancouver	Pumice	Purchased for concrete products industry.

Source: Natural Resources Canada, reported from NRCan survey questionnaire "Production of Lightweight Aggregates in Canada."

TABLE 6. CANADA, IMPORTS AND EXPORTS OF VERMICULITE, PERLITE AND PUMICE, 1998-2000

Item No.		1998		1999		2000P	
		(tonnes)	(\$000)	(tonnes)	(\$000)	(tonnes)	(\$000)
EXPORTS							
2513.11	Pumice stone, crude or in irregular pieces, including crushed pumice						
	United States	443	76	-	-	-	-
	Total	443	76	-	-	-	-
2530.10	Vermiculite, perlite and chlorites, unexpanded						
	United States	..	75	..	49	..	17
	Chile	-	-	..	6	..	8
	Netherlands	-	-	..	21	-	-
	Total	..	75	..	76	..	25
IMPORTS							
2513.11	Pumice stone, crude or in irregular pieces, including crushed pumice						
	United States	4 841	756	4 807	782	4 985	804
	Turkey	3 450	528	3 877	504	5 298	684
	Greece	337	94	117	16	93	14
	Other countries	435	89	42	9	56	12
	Total	9 063	1 467	8 843	1 311	10 432	1 514
2513.19	Pumice stone, other						
	United States	2 816	578	2 861	600	3 806	675
	Other countries	574	117	861	181	816	204
	Total	3 390	695	3 722	781	4 622	879
2530.10.00.10	Vermiculite, unexpanded						
	United States	10 894	1 806	13 196	2 445	16 532	2 918
	South Africa	12 293	3 110	18 628	4 749	11 115	2 663
	Cayman Islands	-	-	475	101	1 044	195
	Greece	3 518	333	1 792	227	181	21
	Other countries	60	12	1 515	226	22	7
	Total	26 765	5 261	35 606	7 748	28 894	5 804
2530.10.00.20	Perlite, unexpanded						
	United States	27 157	5 058	33 955	6 435	27 854	4 961
	Greece	17 094	2 037	23 915	2 632	20 974	2 554
	Other countries	3	-	-	-	24	10
	Total	44 254	7 095	57 870	9 067	48 852	7 525
3802.90.00.20	Activated perlite, excluding expanded perlite ground to be employed in filtering						
	United States	413	219	438	218	503	288
	Total	413	219	438	218	503	288
6806.20.00.10	Exfoliated (expanded) vermiculite						
	United States	326	1 237	487	1 873	449	1 619
	Other countries	2	5	23	53	1	4
	Total	328	1 242	510	1 926	450	1 623
6806.20.00.20	Expanded perlite						
	United States	9 012	5 892	8 383	5 933	9 636	6 766
	Other countries	13	9	-	-	9	4
	Total	9 025	5 901	8 383	5 933	9 645	6 770

Source: Statistics Canada.

- Nil; . . Not available; P Preliminary; r Revised.

Note: Numbers may not add to totals due to rounding.

TABLE 7. CANADA, LIGHTWEIGHT AGGREGATES PRODUCED, SOLD AND USED, 1998 AND 1999

	1998				1999			
	Produced		Sold and Used		Produced		Sold and Used	
	(m ³)	(\$)	(m ³)	(\$)	(m ³)	(\$)	(m ³)	(\$)
From domestic and/or imported raw materials								
Expanded clay, shale and slag ¹	192 636	6 117 329	195 718	6 579 311	391 352	11 192 017	371 934	10 168 975
From imported crude materials								
Expanded perlite and exfoliated vermiculite ¹	569 204	29 904 132	611 318	32 098 810	658 770	35 304 186	662 770	35 548 186
Total	761 840	36 021 461	807 036	38 678 121	1 050 122	46 496 203	1 034 704	45 717 161

Source: Natural Resources Canada, reported from NRCan survey questionnaire "Production of Lightweight Aggregates in Canada" (see Table 5 for list of establishments surveyed).

¹ Combined to avoid disclosing confidential company data.

TABLE 8. CANADA, SALES OF EXPANDED SLAG, PERCENTAGE BY END USE, 1997-99

Use	1997	1998	1999
Concrete block manufacture	74.5	72.6	90.0
Ready-mix concrete	3.3	5.3	10.0
Miscellaneous uses	22.2	22.1	—

Source: Natural Resources Canada, reported from NRCan survey questionnaire "Production of Lightweight Aggregates in Canada."
— Nil.

Notes: See Table 5 for list of establishments surveyed. Sales also imply quantities consumed for own use.

TABLE 9. CANADA, SALES OF EXPANDED CLAY AND SHALE, PERCENTAGE BY END USE, 1997-99

Use	1997	1998	1999
Concrete block manufacture	54.0	44.2	52.7
Loose insulation	41.6	52.2	43.4
Precast concrete manufacture	1.5	1.2	2.0
Ready-mix concrete	2.9	1.1	2.0
Horticulture and miscellaneous uses	—	1.2	—

Source: Natural Resources Canada, reported from NRCan survey questionnaire "Production of Lightweight Aggregates in Canada."
— Nil.

Notes: See Table 5 for list of establishments surveyed. Sales also imply quantities consumed for own use.

TABLE 10. CANADA, SALES OF EXPANDED PERLITE, PERCENTAGE BY END USE, 1997-99

Use	1997	1998	1999
Horticulture and agriculture	92.0	94.7	93.9
Loose insulation and miscellaneous uses	7.3	4.7	5.7
Insulation in gypsum products	0.8	0.6	0.4

Source: Natural Resources Canada, reported from NRCan survey questionnaire "Production of Lightweight Aggregates in Canada."
— Nil.

Notes: See Table 5 for list of establishments surveyed. Sales also imply quantities consumed for own use.

TABLE 11. CANADA, SALES OF EXPANDED Vermiculite, PERCENTAGE BY END USE, 1997-99

Use	1997	1998	1999
Horticulture	86.1	83.6	78.9
Loose insulation	2.1	2.9	2.6
Miscellaneous uses	11.8	13.6	18.5

Source: Natural Resources Canada, reported from NRCan survey questionnaire "Production of Lightweight Aggregates in Canada."
— Nil.

Notes: See Table 5 for list of establishments surveyed. Sales also imply quantities consumed for own use.