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Timber Killed by Insects

IN BRITISH COLUMBIA

1971-1975

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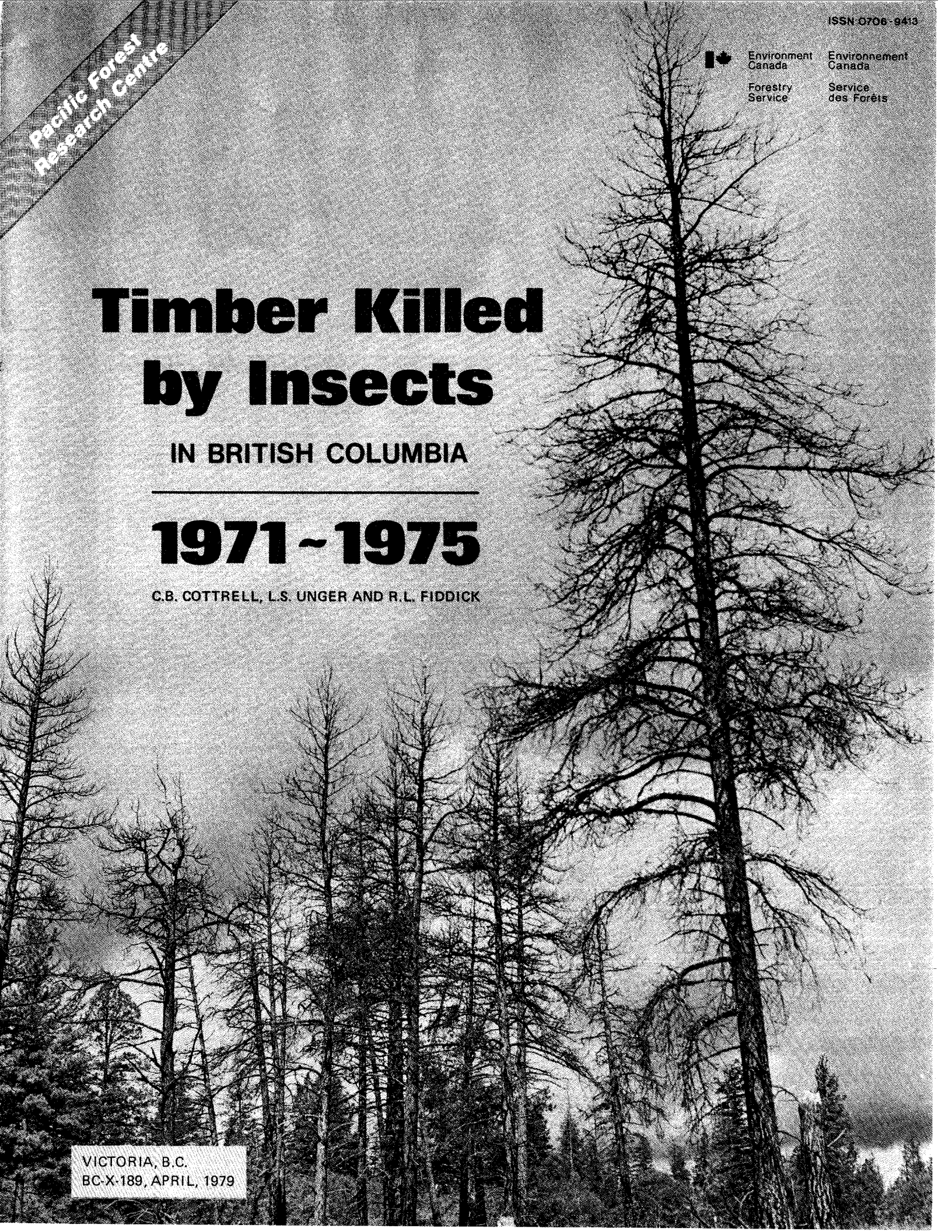

VICTORIA, B.C.
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ABSTRACT

During 1971-75, bark beetles continued as the major cause of tree mortality in British Columbia. The total volume of timber killed decreased markedly, particularly in spruce-alpine fir stands. However, increased mortality occurred in pine stands throughout the Interior of the Province. Defoliating insects caused tree mortality in localized areas in Kamloops and Vancouver Forest regions.

RESUME

Au cours des anne'es 1971 à 1975, les scolytes de l'e'corce ont été la principale cause de mortalite' des arbres en Colombie-Britannique. Le volume total d'arbres tués a diminué de façon marque'e, particulièrement dans les peuplements d'Épinette-Sapin subalpin. Cependant, la mortalité s'est accrue dans les pineraies partout à l'intérieur de la province. Les insectes défoliateurs ont cause' la mortalite' des arbres dans certains secteurs des Régions forestières de Kamloops et de Vancouver.

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• "Forest Regions" refer to previously named "Forest Districts"

INTRODUCTION

This report, the fifth of a series of such 5-year summaries since 1955, presents a summary of trees killed by forest insects in British Columbia, from 1971 to 1975 inclusive. Most data were collected by field staff of the Forest Insect and Disease Survey based at the Pacific Forest Research Centre, Victoria, B.C.

The severe and extensive outbreaks of spruce beetle in interior white and Engelmann spruce stands during the 1960s declined, and except for localized infestations in the Kamloops Forest Region, there was little spruce beetle activity during the period covered by this report.

Mountain pine beetle populations increased and intensive lodgepole and white pine mortality occurred in a number of locations, generally in the interior pine stands.

The amount of Douglas-fir killed by Douglas-fir beetle has been reduced annually, due mainly to a recommendation from the Pacific Forest Research Centre which resulted in more sanitary methods of logging that prevented beetle population increases,

Alpine fir mortality was considerably reduced, with only individual or small groups of trees killed at high elevations.

The volume of timber killed by defoliating insects increased considerably from the previous summary period, due to an extensive outbreak of western hemlock looper in the Vancouver Forest Region and Douglas-fir tussock moth and western false hemlock looper in the Kamloops Forest Region.

The cooperation of the British Columbia Forest Service is gratefully acknowledged, especially for the provision of aircraft and assistance in ground surveys.

METHODS

During detection sampling, rangers cover large portions of assigned districts and are in touch with Provincial and industry forest protection and management personnel who inform them of pest problems on management areas. By using this information, together with the rangers' knowledge of conditions, aerial surveys were designed to cover problem areas and areas where susceptibility to damage existed, Loss figures were considered to be conservative, since small infestations in isolated areas may have been overlooked.

Bark beetle infestations were delineated on 2- or 4-mile to 1-inch maps by intensity, using the categories of 1 to 5% of trees infested (discolored) as light; 6 to 30% as moderate and 31% + as heavy, In small infestations, the areas were outlined on the maps and the number of red trees was recorded. Ground cruises, generally 1 mile long, with prism plots every 2 chains, were run through stands of varying attack intensity for information on percentage of trees attacked, year of attack, status of beetle brood in trees, and tree measurements for use in computing the volume estimates for this report.

Defoliator infestations were mapped from the air and damage was classified as light, moderate or severe. Annual examination of trees on a number of ground cruise strips and numbered plots was used to obtain information on percent defoliation, length of top-kill, and cumulative tree mortality until the effect of the defoliation was no longer evident. While it is true that severe defoliation on coniferous trees often resulted in top-kill and reduced increment growth, this type of loss is not presented here.

The volume calculations were based on the British Columbia Forest Service volume tables and the losses recorded as gross volumes, with no deduction for cull or breakage. Area and volumes are converted to metric measure and, as in past reports, arranged by region and compartment within each British Columbia Forest Service Forest Region.

RESULTS AND DISCUSSION

Mortality of coniferous trees, caused by bark beetles, during 1971-75 was considerably lower than in the earlier 5-year period. A total of 695000 m^3 (24,550,700 ft^3) were killed from 1971-75 compared with 4 627 730 m^3 (163,426,140 ft^3) from 1966-70 (Table 1).

Considerable increases occurred in the amount of lodgepole and western white pine killed from the previous 5-year period but ponderosa pine mortality decreased substantially.

Mortality of Engelmann spruce was recorded only in the Kamloops Forest Region; no significant amount of white spruce was killed by beetles even though windthrow occurred extensively in the Cariboo and Prince George Forest regions.

Table 1. Volume of timber killed by bark beetles in British Columbia, 1961-65, 1966-70 and 1971-75

Tree species	Gross volume (in thousands of cubic metres)		
	1961-65	1966-70	1971-75 2/
Lodgepole pine	116.9	72.2	311.8
Western white pine	352.2	54.6	128.3
Ponderosa pine	22.3	29.0 1/	4.3
Engelmann spruce	3.0	3 425.5	175.3
White spruce	14 299.1	848.0 1/	
Douglas-fir	263.6	76.6	38.0
Alpine fir	13 603.2	122.0	42.5
TOTALS	28 660.2	4 627.7	695.5

1/ including mortality caused by engraver beetles, Ips spp.

2/ for explanation of increase or decrease in amount of tree mortality recorded see pages 2 and 3.

With the decline of spruce beetle infestations, less flying was done over high elevation spruce, alpine fir stands and this may be reflected in the reduced amount of alpine fir mortality recorded. However, any observations made of alpine fir stands indicated a reduction of mortality for this report period.

The volume of Douglas-fir trees killed by beetles was less than half of the previous 5 years, although Douglas-fir trees weakened by tussock moth defoliation were being attacked by beetles during 1975.

The severe infestations of western hemlock looper in Vancouver Forest Region and Douglas-fir tussock moth and western false hemlock looper in the Kamloops Forest Region caused the only tree mortality attributed to defoliators (Table 2).

Appendices 1 to 9 list the volume of timber killed in cubic metres by region, compartment, general location, number of trees and/or area where applicable.

Table 2. Volume of timber killed by defoliating insects in British Columbia, 1961-65, 1966-70, 1971-75

Tree species	Gross volume (in thousands of cubic metres)		
	1961-65	1966-70	1971-75
Douglas-fir	2.6		185.5
Western hemlock, amabilis fir	242.4	26.4	141.0
Western red cedar	2.8		
TOTALS	247.8	26.4	326.5

REFERENCES

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Appendix 1

Lodgepole pine trees killed by mountain pine beetle, Dendroctonus ponderosae, 1971-75

Region	Comp.	Location	No. Trees	Area (ha)	Volume (m^3)
		VANCOUVER FOREST REGION			
27	10	Falls Cr	400	32	158
			400	32	158
33	10	Gates R	300	40	136
			300	40	136
49	27	Klinaklini R	400	56	158
	28	Klinaklini R	5 870	729	2 325
	32	Knot Cr	600	60	238
	33	Klinaklini R	42 000	3 238	16 632
			48 870	4 083	19 353
Total for Vancouver Forest Region			49 570	4 155	19 647
		KAMLOOPS FOREST REGION			
13	13	Ashnola R	20	2	11
	15	Ashnola R	260	20	147
	17	Ashnola R	320	32	181
	18	Ashnola R	1 200	141	679
	19	Wall Cr	700	78	396
	40	Shinnish Cr	300	32	170
	41	Osprey L	450	32	255
	60	Friday Cr	150	16	85
	82	Skwum Cr	700	78	396
	83	Olivine Cr	350	47	198
			4 450	478	2 518
14	15	Riddle Cr	13 500	475	5 346
	19	Isintok Cr	7 600	648	3 010
	20	Lost Chain Cr	8 200	415	3 247
	21	Trout Cr	7 500	599	2 970
	22	Empress Cr	600	62	238
	30	Jack Cr	800	81	317
	32	Bellevue Cr	50	4	20
	33	Priest Cr	700	78	277
	34	Daves Cr	1 500	160	722
	35	Hydraulic Cr	1 300	120	625
	36	Joe Rich Cr	2 500	265	1203
	37	Belgo Cr	2 950	300	1419
	38	Mission Cr	4 500	420	2 165
	40	Scotty Cr	2 250	305	1082
	41	Powers Cr	385	40	152

Appendix **1**

Region	Comp.	Location	No. Trees	Area (ha)	Volume (m^3)
14	42	Paynter L	1150	140	455
	44	Sweid Cr	4 350	770	1723
	45	Lambly Cr	27 000	2 750	10 692
	46	Vernon Cr	1250	101	601
	47	Vernon Cr	400	32	192
	52	Shorts Cr	3 200	552	1 267
	53	Shorts Cr	3 400	599	1 346
	54	Bouleau Cr	1000	174	396
	55	Whiteman Cr	15 000	1214	5 940
			111 085	10 304	45 405
25	21	Murray L	350	20	139
	37	Chapperon Cr	650	95	257
	46	Clapperton Cr	15	4	6
			1015	119	402
33	9	Cayoosh Cr	1 100	101	498
	19	Bridge R	100	10	45
	20	Gun L	70	8	34
	22	Downton L	790	182	380
			2 060	301	957
Total for Kamloops Forest Region			118 610	11 202	49 282
		NELSON FOREST REGION			
15	2	Moody Cr	60	16	41
	10	Motherlode Cr	515	22	350
	12	Fiva Cr	3 700	340	2 516
	13	Kelly R	50	4	34
			4 325	382	2 941
18	33	St Mary R	320	10	199
			320	10	199
19	18	Morrissey Cr	500	60	312
			500	60	312
20	2	Sage Cr	180	24	112
	3	Flathead R	80	10	72
	4	Flathead R	70	10	63
			330	44	247
21	4	Lussier R	50	4	28
	5	Lussier R	2 670	185	1511
	6	Lussier R	500	20	283
	9	Doctor Cr	800	40	317
	11	Toby Cr	1 500	162	849

Appendix 1

Region	Comp.	Location	No. Trees	Area (ha)	Volume (m^3)
21	15	Horsethief Cr	200	40	113
	18	Frances Cr	50	8	28
	23	Dry Cr	900	68	509
	24	Lower White R	21,725	1 424	14 773
	25	Elk Cr	61,745	2 196	34 948
	26	Whiteswan L	10,420	1487	5 898
	27	Blackfoot Cr	225	20	153
	28	N + E White R	10,460	681	7 113
	30	Fenwick Cr	825	81	467
	31	Napee Mtn	240	14	136
	32	Palliser R	25	2	17
	33	Palliser R	1,950	161	1326
	37	Cochran Cr	25	2	17
			114,310	6 595	68 486
22	4	Slocan L	250	445	170
			250	445	170
24	2	Boomerang Cr	110	50	75
	3	Little Goat Cr	135	22	92
	4	King Solomon Mtn	375	72	255
	6	Clark L	10	6	7
	7	Goathide Cr	7,200	769	4 896
	9	Trapping Cr	140	44	95
	10	Whitefoot Cr	140	40	95
	17	Fourth of July Cr	30	4	20
			8,140	1007	5 535
41	3	Harrogate	125	10	50
	7	Castledale	300	16	119
	19	McMurdo	50	8	20
	23	Cedar Cr	200	20	79
	24	Lang Cr	50	4	20
	25	Moberly Bench	850	60	337
	26	Horse Cr	550	44	218
	32	Blaeberry R	1,875	271	743
	33	Donald	300	24	144
	34	Redgrave	4,320	243	2 078
	35	Blackwater Ridge	24,525	1821	13 882
	36	Waitabit Cr	4,000	324	2 264
	44	Bush,R	10	2	6
	48	Succour Cr	1,600	162	906
	49	Bush Ls	100	8	57
	68	Swan Cr	300	40	170
			39,155	3 057	21 093
Total for Nelson Forest Region			167,330	11 600	98 983

Appendix 1

Region	Comp.	Location	No. Trees	Area (ha)	Volume (m^3)
		CARIBOO FOREST REGION			
47	1	Hawks Cr	7,590	198	5 161
	2	O'Keefe L	70	10	48
	3	Williams L	1,450	182	986
	4	Jones Cr	670	81	456
	6	San Jose R	800	101	544
	17	Chimney Cr	1,250	141	850
	18	Alkali L	1,180	162	802
	19	Brigham Cr	570	64	388
	20	Dog Cr	2,960	571	2 013
	21	Pigeon Cr	300	24	204
	22	Canoe Cr	2,580	216	1754
	23	China L	3,320	550	2 258
	24	Jesmond	8,620	1230	5 862
	26	Clinton	250	24	170
	28	Meadow L	150	16	102
	30	Bonaparte R	35	4	24
	42	Bonaparte R	75	8	51
	58	Thunder Cr	20	2	14
	59	Brigade Cr	35	4	24
	60	Loon L	30	4	20
			31,955	3 592	21 731
48	6	Higginbottom Cr	20	2	12
	7	Lone Cabin Cr	1,350	226	841
	8	Churn Cr	390	40	243
	12	Ward Cr	170	30	106
	13	Gaspard Cr	430	81	268
	16	Farwell Cr	1,650	214	1028
	17	Big Cr	450	60	280
	18	Joes Cr	1,010	162	629
	19	Kirkpatrick Cr	330	30	206
	20	Dog Cr	1,950	202	1215
	24	Fletcher L	400	64	249
	26	Alexis Cr	150	20	93
	42	Eagle L	80	48	50
	49	Konni L	3,930	259	2 448
	54	Ross Gulch	280	137	174
	55	Doc English Gulch	1,170	129	729
	56	Riske Cr	5,785	518	3 604
	57	Hanceville	620	121	386
	58	Soda Cr	200	20	125
	59	Buckskin Cr	755	81	470
	60	Meldrum Cr	2,060	162	1283
	61	Drummond L	2,135	129	1 330
	62	Mackin Cr	350	129	218
	64	Anahim Cr	200	16	125
	82	Tatla L	155	32	97

Appendix 1

Region	Comp.	Location	No. Trees	Area (ha)	Volume (m^3)
48	83	Martin L	1,090	162	679
			27,110	3 074	16 888
49	37	Tatlayoko L	35	8	14
	38	One Eye L	2,175	279	861
	39	Clearwater L	5,350	583	2 119
	40	Calwell Cr	76,205	8 025	30 117
			83,765	8 895	33 171
54	83	Takia R	450	81	178
	91	Dean R	2,500	283	990
			2,950	364	1168
55	2	Webster L	505	48	343
	3	Narcosli Cr	30	4	20
	4	Castle Rock	80	16	54
	6	Macalister	200	24	136
	9	Narcosli Cr	100	16	68
	10	Higdon Cr	40	8	27
			955	116	648
56	15	Nyland L	100	12	74
	22	Cuisson Cr	1,135	141	835
	23	Skelton Cr	730	60	537
	24	Buxton Cr	130	20	96
	25	Little L	530	60	390
	26	Wolverine L	1,500	162	1104
	27	Spanish L	90	12	66
	28	Keithley Cr	3,470	906	2 554
	29	Seller Cr	150	16	110
	30	Cariboo L	4,170	202	3 069
	31	Little R	2,250	194	1656
	51	Bootjack L	50	6	37
	52	Tyee L	3,340	344	2 458
	53	Big L	845	48	622
	55	Moffat L	400	36	294
	60	Tisdall L	200	24	147
	67	Molybdomite Cr	300	40	221
	69	Big Camp Cr	3,900	518	2 870
			23,290	2 801	17 141
Total for Cariboo Forest Region			170,025	18 842	90 747
		PRINCE GEORGE FOREST REGION			
42	27	Blackman Cr	100	10	57
	29	Grouse Cr	200	20	113
	31	Ptarmigan Cr	100	10	57
			400	40	227

Appendix **1**

Region	Comp.	Location	No. Trees	Area (ha)	Volume (m^3)
68	63	Stuart L	45	8	38
	71	Tsilcoh R	50	8	42
	74	Pinchi L	15	4	13
	80	Hatdudatehl Cr	120	20	102
	86	Whitefish L	150	16	128
	87	Cunningham L	230	36	196
	101	Leo Cr	110	16	94
	110	Takla L (N.W.)	10	2	9
	115	Maclaing Cr	20	2	17
			750	112	639
69	26	Jean Marie Cr	140	20	119
			140	20	119
Total for Prince George Forest Region			1,290	172	985
		PRINCE RUPERT FOREST REGION			
54	39	Hootch L	20	2	8
			20	2	8
60	128	Fisher Ls	10	1	6
			10	1	6
65	25	Flint Cr	35	4	22
	26	Kitwanga	910	121	567
	32	Ritchie	1,690	243	1053
	33	Woodcock	925	121	576
	35	Kitwanga	2,000	172	1 246
	39	Kitsequecla R	290	30	181
	40	The Nipples	975	101	607
	41	Seeley L	5,825	344	3 629
	42	Kitwanga R	9,850	809	6 137
	43	Kitwancool Cr	1,625	162	1012
	44	Kitwanga L	450	81	280
	45	Nash	3,375	303	2 103
	46	Burdick Cr	4,9 75	364	4 502
	47	Glen Vowell	385	36	240
	48	Date Cr	640	60	399
	49	Bras-Sunday Ls	620	68	386
	50	Moonlit Cr	380	40	237
	52	Kline-Elizabeth Ls	1,960	222	1221
	56	Kispiox R	600	70	373
	57	Murder Cr	2,630	374	1 638
	66	Kuldo Cr	50	4	31
			40,190	3 729	26 440

Appendix 1

Region	Comp.	Location	No. Trees	Area (ha)	Volume (m^3)
66	6	Sheraton	15	1	9
	13	Taltapin L	40	4	25
	14	Donald Ldg	30	4	19
	16	Donald Ldg	430	40	268
	17	Tintagel	265	10	165
	39	Fulton L	50	4	31
	44	Burbridge Cr	50	2	31
	45	Gonokwa Cr	20	2	12
	51	Hagen Arm	40	4	25
	65	Meed Cr	35	2	22
	66	Bulkley R	285	24	178
	70	Harold Price Cr	8,780	526	5 470
	71	Suskwa R	2,130	243	1327
	73	Suskwa R	485	40	275
	74	Natlan Cr	3,100	182	1755
	75	Natlan Cr	940	121	532
	78	Nine Mile Cr	100	16	57
	79	Shegunia Cr	320	40	181
	81	Sediesh Cr	20	4	11
			17,135	1 269	10 393
67	4	McKilligan L	1,580	263	894
	6	Aitken Cr	270	40	168
	7	Barrett	40	4	25
	9	Coffin L	40	4	25
	12	Smithers	65	6	40
	14	John Brown Cr	130	4	81
	14	John Brown Cr	20	4	12
	15	Beament	35	8	22
	16	Rossvale L	180	20	112
			2,360	353	1379
75	28	Weegett Cr	4,000	688	4 532
	29	Cranberry R	5,150	364	4 661
	30	Cranberry R	5,300	445	4 797
			14,450	1497	13 990
Total for Prince Rupert Forest Region			74,165	6 851	52 216
Total for British Columbia			580990	52822	311 860

Appendix 2

Western white pine trees killed by mountain pine beetle, Dendroctonus ponderosae, 1971-75

Region	Comp.	Location	No. Trees	Volume (m^3)
		VANCOUVER FOREST REGION		
10	20	Lillooet R	300	544
			300	544
11	1B	Silverhope Cr	20	36
	IC	Silverhope Cr	10	18
			30	54
12	12	Skaist Cr	120	217
	13	Skaist Cr	325	589
	14	Allison Pass	3,700	7 441
	17	Skagit R	165	332
			4,310	8 579
13	65	Manning Park	2,000	4 022
			2,000	4 022
26	6	Spuzzum Cr	20	23
	9	Scuzzy Cr	990	1122
	10	Kookipi Cr	3,725	4 220
	11	Nahatlatch R	350	397
	14	Nahatlatch L	560	634
	15	Nahatlatch R	30	34
	20	East Anderson R	620	702
	21	Anderson R	515	583
	22	Tsileuh Cr	70	79
			6,880	7 794
27	10	Squamish R	250	503
	18	Cheakamus L	190	382
	19	Alta L	100	201
	20	Billygoat Cr	115	231
	21	Roger Cr	50	101
	22	Lizzie Cr	70	141
	23	Lillooet L	15	30
	25	Joffre Cr	285	573
	27	Soo R	125	251
	28	Miller Cr	55	111
	29	Birkenhead L	170	342
	30	Wolverine Cr	115	231
	32	Meager Cr	10	20
	33	Salal Cr	50	101
	34	Upper Lillooet R	50	101
			1,650	3 319

Appendix 2

Region	Comp.	Location	No. Trees	Volume (m^3)
33	10	Gates R	720	1448
			720	1448
Total for Vancouver Forest Region			15,890	25 760

KAMLOOPS FOREST REGION

14	61	Vance Cr	490	430
			490	430
25	2	Siska Cr	750	659
	4	Nicoamen Cr	1,250	1098
			2,000	1757
33	2	Nohomin Cr	80	161
	3	Stein R	675	1357
	8	Downton Cr	800	1609
	9	Cayoosh Cr	1,810	3 640
	16	Cayoosh Cr	500	1006
	18	Cayoosh Cr	200	402
	19	Cayoosh Cr	50	101
			4,115	8 276
37	3	Mt Ida	1,000	2011
	10	Bastion Mtn	50	101
	11	Eagle Bay	100	201
	13	Gardom L	500	1006
	15	Queest Mtn	50	101
			1,700	3 420
38	4	Upper Shuswap R	30	44
	5	Upper Shuswap R	295	434
	6	Tsuius Cr	1,280	1884
	7	Tsuius Cr	150	302
	8	Curwen Cr	980	1971
	9	Vigue Cr	460	925
	10	Spectrum Cr	750	1508
	12	Kingfisher Cr	400	804
	18	Trinity Hills	170	250
	19	Latewhos Cr	50	74
	20	Sugar L	1,680	2 473
	21	Sitkum Cr	210	309
	22	Outlet Cr	125	184
	23	Ireland Cr	1,400	2 815
	24	Ireland Cr	1,755	3 529
	25	Trinity Va	50	101
	27	Cherry Cr	580	1166
	29	Monashee Cr	90	181
			10,455	18 954

Appendix 2

Region	Comp.	Location	No, Trees	Volume (m^3)
43	1	Adams L	320	471
	3	Celista	100	147
	5	Momich L	600	680
	7	Humamilt L	660	748
	10	Ratchford Cr	680	1 001
	11	Adams L	4,250	6 256
			6,610	9 303
44	3	Shuswap L	50	74
			50	74
57	23	Vavenby	1,200	1 360
	29	Murtle L	80	91
			1,280	1451
58	2	N Barriere L	700	793
	3	E Barriere L	480	544
	5	Saskum L	3,330	3 773
	10	Wire Cache	230	261
	11	Cottonwood Flats	75	85
	12	Finn Cr	580	657
	13	Angus Horne	1,200	1 360
	14	Froth Cr	535	606
	15	Blue R	4,500	5 099
	16	Mud L	5,500	6 232
	17	Thunder Cr	70	79
	18	Bone Cr	10	11
	19	Lempriere Cr	380	431
	23	Dominion Cr	225	255
			17,815	20 186
Total for Kamloops Forest Region			44,515	63 851

NELSON FOREST REGION

15	2	Christina L	90	79
			90	79
17	24	Erie Cr	1,350	1185
	40	Kaslo	50	44
	42	Davis Cr	520	457
			1,920	1 686
22	7	Little Slocan L	65	57
	14	Wilson Cr	70	61
			135	118

Appendix **2**

Region	Comp.	Location	No. Trees	Volume (m^3)
23	6	Whatshan R	160	140
	8	Fauquier	120	105
	10	Snow Cr	665	584
	17	Ladybird Cr	75	66
			1,020	895
39	1	Slewiskin Cr	55	47
	2	Box L	30	26
	3	Kuskanax Cr	150	128
	6	Saddle Mtn	1,290	1097
	7	Mosquito Cr	200	170
	8	Cusson Cr	3,000	2 550
	9	Fosthall Cr	1,750	1488
	11	Pingston Cr	4,955	4 212
	13	Shelton Cr	1,850	1573
	14	Halfway R	1,485	1 262
	15	McKenzie Cr	1,345	1143
	16	Staubert L	720	612
	17	Pool Cr	150	128
	21	Beaton	935	795
	22	Akolkolex R	190	162
			18,105	15 393
40	4	Meadow Cr	1,425	1211
	6	Howser Cr	80	68
	7	Duncan R	350	298
	13	Lake Cr	310	264
	14	Mobbs Cr	830	706
	15	Trout L	4,140	3 519
			7,135	6 066
41	3	Jubilee Mtn	195	166
	6	Upper Kootenay R	75	64
	42	Bush R	300	255
	44	Lyell Cr	800	680
	48	Succour Cr	300	255
	49	Bush Ls	6,800	5 780
	54	Garrett Cr	2,850	2 423
	55	Kinbasket R	675	574
	58	McNaughton L	375	319
	66	McNaughton L	225	191
	68	McNaughton L	750	638
	69	Gold R	550	468
	70	Gold R	200	170
	73	Ventego Cr	300	255
	74	Sentry Mtn	250	213
	78	Bostock Cr	230	196
	79	Glacier	250	213
	81	Grizzly Cr	55	47
			15,180	12 907

Appendix 2

Region	Comp.	Location	No. Trees	Volume (m^3)
42	1	Rogers Pass	150	128
	4	Jordan R	195	166
	5	La Forme Cr	225	191
	6	Frisby Cr	420	357
	9	Downie Cr	250	213
	14	Goldstream R	265	225
	19	Mica Cr	15	13
			1,520	1293
Total for Nelson Forest Region			45,105	38 437
		PRINCE GEORGE FOREST REGION		
42	21	Franchere Cr	30	26
	25	Howard Cr	30	26
	26	Hugh Allen Cr	75	64
	31	Ptarmigan Cr	100	85
			235	201
Total for Prince George Forest Region			235	201
Total for British Columbia			105,745	128 249

Appendix 3

Ponderosa pine trees killed by mountain pine beetle, Dendroctonus ponderosae, 1971-75

Region	Comp.	Location	No. Trees	Volume (m^3)
		KAMLOOPS FOREST REGION		
13	3	Cawston	10	12
	52	Mt Miner	150	175
	71	Otter L	35	41
	73	Thynne Cr	10	12
			205	240
14	5	Carston	15	18
	12	Matheson Cr	30	46
	20	Bearpaw Cr	190	291
	27	Chute L	90	138
	29	Peachland Cr	60	92
	45	Lambly Cr	20	31
			405	616
25	21	Coldwater R	1,000	1161
	47	Guichon Cr	75	87
			1,075	1 248
33	20	Gun L	320	372
	22	Lajoie L	270	313
	25	Tyaughton L	85	99
			675	784
37	6	Olsand Cr	20	23
			20	23
47	44	Upper Hat Cr	150	174
	45	Pavilion L	120	139
			270	313
Total for Kamloops Forest Region			2,650	3 224
		NELSON FOREST REGION		
15	12	Zamora	45	69
			45	69
39	8	Cusson Cr	825	701
	15	Payne Cr	50	43
			875	744
Total for Nelson Forest District			920	813

Appendix 3

Region	Comp.	Location	No. Trees	Volume (m^3)
		CARIBOO FOREST REGION		
47	26	Clinton	225	261
	42	Bonaparte R	25	29
			250	290
Total for Cariboo Forest Region			250	290
Total for British Columbia			3,820	4 327

Appendix 4

Engelmann spruce trees killed by spruce beetle, Dendroctonus rufipennis, 1971-75

Region	Comp.	Location	Area (ha)	Volume (m^3)
		KAMLOOPS FOREST REGION		
14	31	Mt Gottfriedsen	283	28 583
	35	Mt Gottfriedsen	121	12 221
	42	Whiterocks Mtn	486	49 086
	45	Whiterocks Mtn	607	39 455
	55	Whiteman Cr	40	7 880
	59	Equesis Cr	4	788
			1 541	138 013
25	36	Dome Rock Mtn	283	28 583
			283	28 583
33	9	Van Horlick Cr	81	2 835
			81	2 835
45	15	McGillivray L	8	280
			8	280
58	6	Chu Chua	101	3 535
	18	Bone Cr	40	1400
	19	Lempriere Cr	20	700
			161	5 635
Total for Kamloops Forest Region			2 074	175 346
Total for British Columbia			2074	175346

Appendix 5

Douglas-fir trees killed by Douglas-fir beetle, Dendroctonus pseudotsugae, 1971-75

Region	Comp.	Location	No. Trees	Volume (m^3)
		VANCOUVER FOREST REGION		
11	1A	Sowerby Cr	150	425
	4G	Chilliwack L	100	283
			250	708
12	17	Skagit R	35	99
			35	99
Total for Vancouver Forest Region			285	807
		KAMLOOPS FOREST REGION		
13	11	Shoemaker Cr	25	50
			25	50
14	8	Vaseux Cr	20	37
	26	Naramata Cr	100	184
			120	221
25	49	Mamit L	45	89
			45	89
33	3	Stein R	600	I 189
	4	Stein Mtn	300	595
	7	Towinock Cr	80	159
			980	1943
34	5	Mt Anne	25	50
	11	Clapperton Cr	100	198
			125	248
35	7	Cherry Cr	15	30
			15	30
36	5	Monte Hills	20	42
			20	42
38	7	Tsuius Cr	20	42
	15	Brash Cr	15	32
			35	74
44	1	Adams L	20	57
			20	57
Total for Kamloops Forest District			1,385	2 754

Appendix 5

Region	Comp.	Location	No. Trees	Volume (m^3)
		NELSON FOREST REGION		
15	1	Cascade	25	42
	2	Christina L	15	25
	10	Boundary Cr	15	25
	13	Westbridge	20	34
			75	126
19	4	Wigwam Cr	55	93
			55	93
21	4	Lussier R	70	119
	5	Lussier R	40	68
	6	Lussier R	75	127
	9	Doctor Cr	10	17
	12	Columbia L	25	42
	13	Windermere	175	297
	14	Invermere	110	187
	26	Whiteswan L	25	42
			530	899
23	10	Burton	10	17
			10	17
24	3	Westbridge	10	17
			10	17
Total for Nelson Forest Region			680	1152
		CARIBOO FOREST REGION		
47	1	Hawks Cr	1,740	3 696
	3	Buckskin Cr	1,000	2 124
	4	Borland Cr	195	414
	6	San Jose R	1,050	2 230
	7	Knife Cr	820	1 742
	17	Chimney L	730	1 550
	18	Alkali Cr	80	170
	19	Kirkpatrick Cr	325	690
	20	Dog Cr	1,425	2 824
	23	Little Big Bar L	70	139
	24	Jesmond Cr	40	79
	30	Bonaparte R	125	248
	38	Rayfield R	75	212
	42	Maiden Cr	50	99
	45	Pavilion L	75	149

Appendix 5

Region	Comp.	Location	No. Trees	Volume (m^3)
47	46	Fountain Cr	245	486
	47	Cinquefoil L	200	396
	49	Botanie L	100	198
	54	Pass Va	45	89
	55	Arrowstone Cr	70	139
	58	Kelly Cr	20	40
	59	Brigade Cr	210	416
	60	Upper Loon L	50	99
			8.7 40	18 229
48	6	Lone Cabin Cr	20	410
	8	Churn Cr	160	317
	12	Gaspard Cr	300	722
	13	Gaspard Cr	490	1179
	24	S of Hanceville	100	212
	25	Minton Cr	30	64
	26	Haines Cr	335	712
	44	Chilko Cr	200	425
	55	Sheep Cr	90	191
	57	Hanceville	220	467
	58	Soda Cr	400	850
	59	Soda Cr	1,325	2 814
	60	Meldrum Cr	825	1752
	61	Drummond L	190	404
	64	Anahim Cr	200	425
			4,885	10 574
55	3	Narcosli Cr	120	255
	4	Narcosli Cr	30	64
	6	Tingley L	445	945
			595	1264
56	51	Bootjack L	50	106
	59	Horsefly R	15	32
	60	McKinley L	10	21
	69	McLeese L	1,060	2 251
			1,135	2 410
Total for Cariboo Forest Region			15,355	32 477

PRINCE GEORGE FOREST REGION

68	7	Larson L	5	11
			5	11

Appendix 5

Region	Comp.	Location	No. Trees	Volume (m^3)
69	110	Davie L	10	21
	114	Crooked R	10	21
	115	Summit L	65	138
			85	180
Total for Prince George Forest Region			90	191
Total for British Columbia			17,795	37 381

Appendix 6

Alpine fir trees killed by western balsam bark beetle, Dryocoetes confusus, and the fungus disease, Ceratocystis dryocoetidis, 1971-75

Region	Comp.	Location	No. Trees	Volume (m^3)
		VANCOUVER FOREST REGION		
11	18	Richmond	50	50
			50	50
12	10	Eleven Mile Cr	25	25
	13	Skaist Cr	1,500	1 487
			1,525	1512
Total for Vancouver Forest Region			1,575	1562
		KAMLOOPS FOREST REGION		
13	82	Skwum Cr	60	59
			60	59
14	3	Oliver	150	170
	17	Penticton Cr	75	85
	23	Crescent L	500	567
	29	Peachland Cr	300	340
	31	Trepanier Cr	1,400	1 586
	32	Lorna	200	227
	35	Pooley Cr	100	113
	37	Belgo Cr	500	567
	42	Paynter L	50	57
	45	Terrace Cr	500	567
	47	Oyama L	170	193
	53	Terrace Mtn	450	510
	54	Bouleau L	40	45
	55	Whiteman Cr	1,000	1133
	57	Naswhito Cr	1,500	1 700
	58	Equesis Cr	50	57
	59	Equesis Cr	1,370	1552
			8,355	9 469
25	34	Nicola R	200	198
	36	Dome Rock Mtn	200	198
			400	396
33	9	Duffy L	200	198
	18	Carpenter L	75	74
	21	Hurley L	150	149
	22	Downton L	100	99
	25	Tyaughton L	50	50
			575	570

Appendix **6**

Region	Comp.	Location	No. Trees	Volume (m^3)
37	1	Glenemma Rge	500	567
	4	Fly Hill	1,070	1212
	8	Fly Hill	200	227
			1,770	2 006
38	6	Whip Cr	450	510
	20	Upper Sugar L	200	227
	28	Cherry Cr	100	113
			750	850
43	1	Spapilem Cr	200	198
	5	Momich L	200	198
	15	Adams R	60	59
			460	455
45	6	Heffley L	600	595
			600	595
46	2	McCauley Cr	380	484
	3	Wentworth Cr	250	319
	4	Tranquille Cr	50	64
	5	Watching Cr	100	127
			780	994
57	2	Fishtrap Cr	15	15
	3	Peterson Cr	50	50
	4	Bare L	10	10
	5	Caverhill Cr	95	94
	6	Latremoville Cr	675	669
	7	Taweel L	270	268
	8	Monticala L	250	248
	9	Moira L	560	555
	11	Maury L	100	99
	12	Canimred Cr	100	99
			2,125	2 107
58	1	S. Barriere L	100	99
			100	99
Total for Kamloops Forest District			15,975	17 600

NELSON FOREST REGION

18	32	White Cr	500	496
	39	Dewar Cr	200	198
	40	Dewar Cr	1,200	1189
			1,900	1883

Appendix 6

Region	Comp.	Location	No. Trees	Volume (m^3)
20	5	Flathead	400	396
			400	396
21	7	Skookumchuck Cr	700	694
			700	694
24	17	Hellroarer Cr	1,000	991
			1,000	991
41	20	Spillimacheen R	600	595
	21	Spillimacheen R	1,900	1883
	22	Spillimacheen R	300	297
	32	Blaeberry R	600	595
			3,400	3 370
Total for Nelson Forest Region			7,400	7 334
		CARIBOO FOREST REGION		
47	40	Bonaparte L	300	297
	41	Eagan L	150	149
			450	446
56	13	Swift R	400	396
	26	Spinks Cr	50	50
	27	Grogan Cr	200	198
	39	Isaac L	140	139
	40	Mitchell L	20	20
	49	Hen Ingram L	200	198
	55	Moffat L	1,100	1090
	60	Tisdall L	200	198
	67	McKinley Cr	300	297
			2,610	2 586
57	19	Hendrix Cr	130	129
			130	129
Total for Cariboo Forest Region			3,190	3 161
		PRINCE GEORGE FOREST REGION		
42	30	Canoe R	80	79
			80	79
59	2	Ghita Cr	110	140
	25	East Twin Cr	130	166
	27	La Salle Cr	10	13
	119	Narrow L	80	102

Appendix 6

Region	Comp.	Location	No. Trees	Volume (m^3)
59	122	Stephanie Cr	80	102
	124	Crescent L	50	64
			460	587
68	7	Nicholl L	20	23
	35	Philip Cr	20	23
	82	Grostete Cr	100	113
			140	159
69	20	Rainbow Cr	50	57
	22	Mt Sylvester	40	45
	66	Isadore Cr	25	28
			115	130
70	44	Pine Pass	80	91
	47	Callazon Cr	220	249
	48	Silver Sands Cr	70	79
			370	419
74	15	Ospika R	30	34
	20	Davis R	130	147
	26	Trident Pk	350	397
	41	Tenakihi Cr	200	227
			710	805
Total for Prince George Forest Region			1,875	2 179
		PRINCE RUPERT FOREST REGION		
60	137	Nadina R	100	99
	138	Mosquito Hills	50	50
	150	Sibola Cr	20	20
	153	Huckleberry Mtn	180	178
			350	347
66	22	Twain Cr	120	136
	31	Tacheck Cr	50	57
	37	Dome Mtn	600	680
	38	Baboon L	60	68
	45	Gonokwa Cr	200	227
	48	McKindrick Mtn	4,200	5 892
	65	Gramophone Cr	100	113
			5,330	7 173
67	7	Morice R	50	57
	11	Pine Cr	1,300	1473
	17	McDonnell L	800	906
	18	Copper R	210	238

Appendix *6*

Region	Comp.	Location	No. Trees	Volume (m^3)
67	24	Lamprey Cr	150	170
	28	Morice R	250	283
			2,760	3 127
Total for Prince Rupert Forest Region			8,440	10 647
Total for British Columbia			38,455	42 483

Appendix 7

Douglas-fir trees killed by Douglas-fir tussock moth, Orygia pseudotsugata, 1971-75"

Region	Comp.	Location	Area (ha)	Volume (m^3)
		KAMLOOPS FOREST REGION		
14	2	Kilpoola L	20	840
	46	Winfield	81	2 835
	48	Glenmore	162	5 670
	50	Coldstream	40	80
	56	McKinley Ldg	162	5 670
			465	15 095
35	5	Savona	607	35 206
	10	Cherry Cr	405	24 490
			1012	59 696
45	6	Heffley Cr	526	22 092
			526	22 092
46	2	Dairy Cr	688	4 128
	3	Jamieson Cr	1052	44 184
			1740	48 312
Total for British Columbia			3 743	145 195

- **Mortality ranged from 3% of the Douglas-fir trees in stands at Dairy Creek to 43% on Jamieson Creek road.**

Appendix 8

Western hemlock and amabilis fir trees killed by western hemlock looper, Lambdina fiscellaria lugubrosa, 1971-75

Region	Comp.	Location	Area (ha)	Volume (m^3)
		VANCOUVER FOREST REGION		
9	62	Coquitlam L	80	141 035
Total for British Columbia			80	141 035

Appendix 9

Douglas-fir trees killed by western false hemlock looper, Nepytia freemani, 1971-75

Region	Comp.	Location	Area (ha)	Volume (m^3)
		KAMLOOPS FOREST REGION		
37	4	Gleneden	20	80
	6	Chase	1295	11 655
	9	White L	30	1260
	10	Sunnybrae	121	11 979
			1466	24 974
45	8	Little Shuswap L	728	15 288
			728	15 288
Total for British Columbia			2 194	40 262

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