ANNUAL DISTRICT REPORT

FOREST INSECT AND DISEASE SURVEY

BRITISH COLUMBIA, 1976

PART V, NELSON FOREST DISTRICT

by

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PACIFIC FOREST RESEARCH CENTRE

CANADIAN FORESTRY SERVICE

VICTORIA, BRITISH COLUMBIA

- FILE REPORT -

DEPARTMENT OF FISHERIES AND THE ENVIRONMENT

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INTRODUCTION

This report outlines the status of forest insect and disease conditions in the Nelson Forest District for 1976, and attempts to forecast pest population trends.

Regular field work in the District began May 17 and ended September 10. Special surveys were as follows: larch casebearer parasite (i.e. parasitized larvae) releases, April 26 to 29; mountain pine beetle cruising, September 8 to 12; larch sawfly overwintering populations, September 12 to 15, and larch casebearer overwintering populations, October 20 to 24. Aerial surveys consisting of 27 flying hours, 10 of which were supplied by the B. C. Forest Service, were done in July and August.

A total of 527 insect and disease collections were submitted to the Pacific Forest Research Centre in 1976. Map 1 shows collection localities.

Numbers of larval defoliators found in field collections increased in the western part of the District but remained static in the eastern part; 85% of collections in the West Kootenay and 70% in the East Kootenay contained larvae.

Surveys for mountain pine beetle attack indicated that the 1975 attack increased slightly over that in 1974 to 81,000 red-topped lodgepole and 11,000 western white pine trees. However, the 1976 attack was delayed and many beetles were "pitched-out" before laying eggs. Populations are expected to temporarily decline in 1977. One small infestation of spruce beetle occurred near Kootenay Lake, but populations remained generally low, as were populations of Douglas-fir beetle.

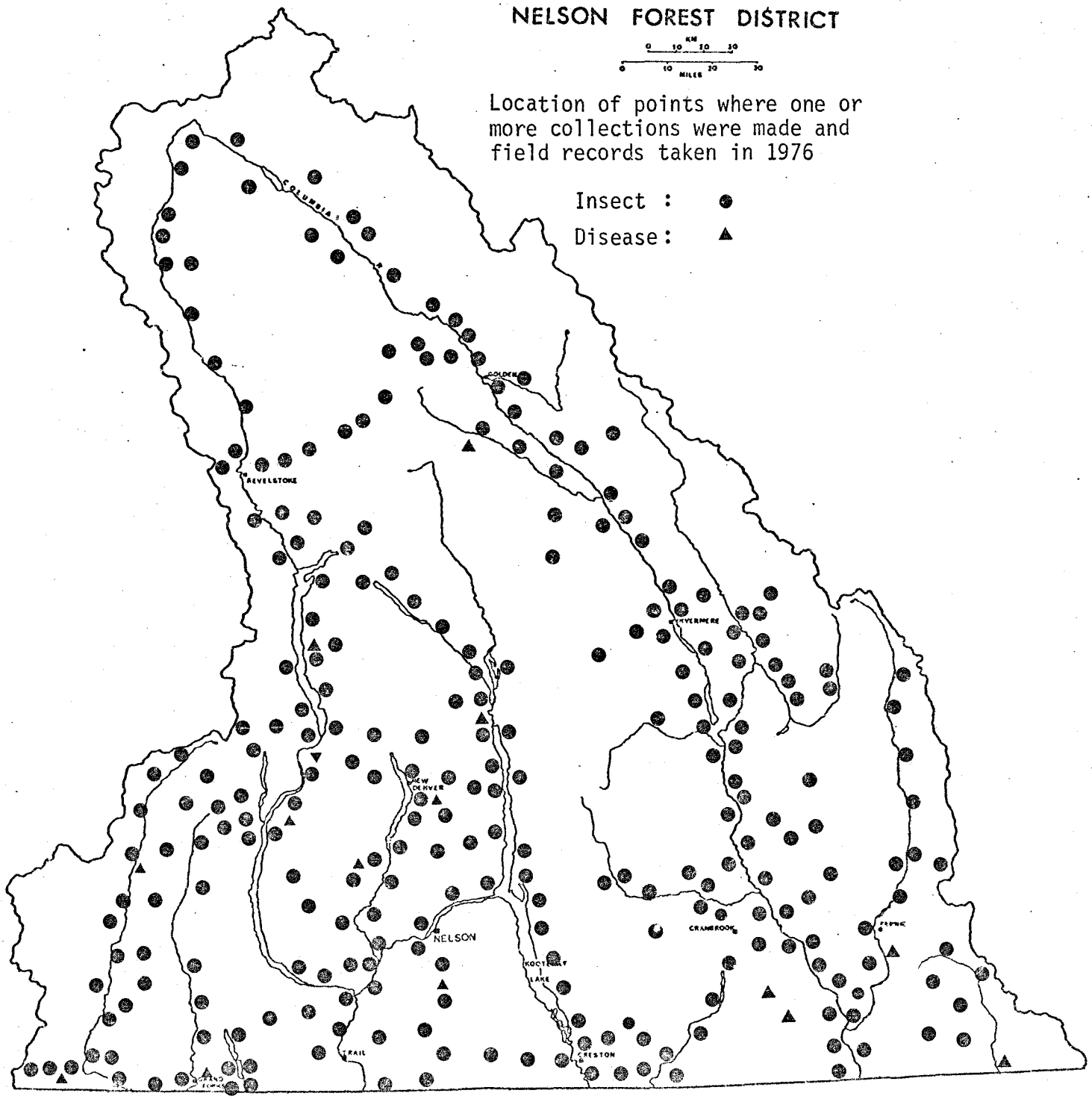
Larch casebearer continued to cause light to moderate defoliation of western larch. Other conifer defoliating insects caused less damage than in 1975. Western false hemlock looper, black army cutworm and larch budmoth outbreaks collapsed. The 2-year-cycle spruce budworm caused only light defoliation on the "off year". A small infestation of larch sawfly occurred near Fernie.

The forest and western tent caterpillars caused heavy defoliation of deciduous trees in the Golden and Fort Steele areas.

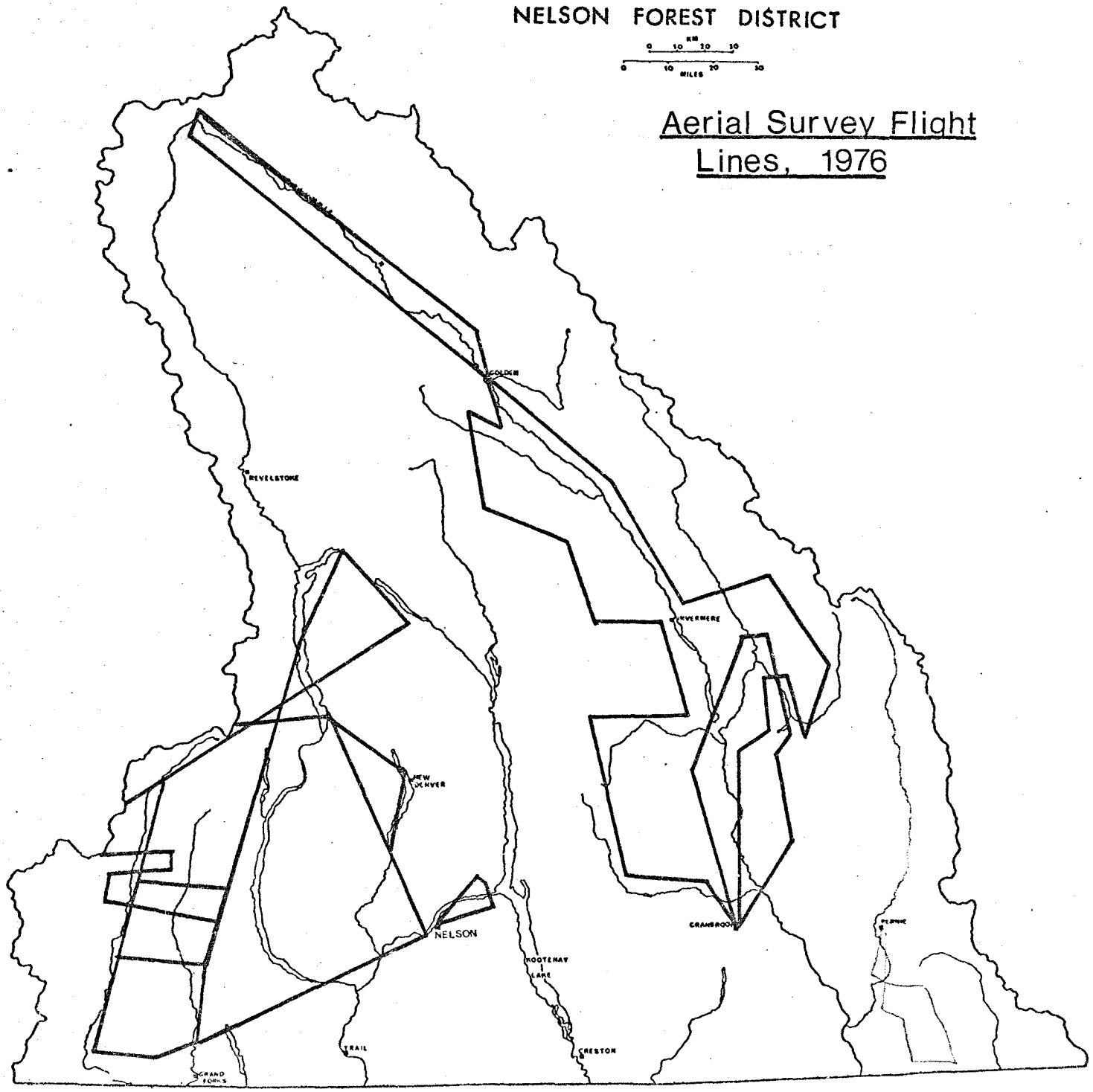
There were few spectacular disease problems noted in 1976, however, white pine blister rust, western gall rust and Armillaria root rot continue to cause tree mortality, top-killing and increment loss.

Maps showing location of collections and aerial survey flight lines follow.

NELSON FOREST DISTRICT



NELSON FOREST DISTRICT



FOREST INSECT CONDITIONS

Currently Important Insects

Bark Beetles

Mountain pine beetle, *Dendroctonus ponderosae*

The mountain pine beetle continued to kill large numbers of lodgepole and western white pine trees in the Nelson Forest District, although there was, at least, a temporary decline in 1976.

In 1975, the number of lodgepole pine trees killed in 1974 was estimated at 73,000. Although the number of trees killed in 1975 (as determined in 1976) increased slightly to 81,000 on 9 300 ha (23,000 acres) (see Table 1), the beetle attack occurred late in the season which increased the chance of beetle mortality. The 1976 attack was also delayed, possibly due to cold, wet summer weather.

In the larger infestations in the East Kootenay, such as in the White River drainage and along the Columbia River north of Golden, beetle flights were late; many of the attacking beetles were drowned in copious pitch flows and few eggs were found.

In the West Kootenay, beetle attacks were more successful as eggs and larvae were found in the fall. Infestations are expected to continue at about the same level in 1977.

More than 11,000 red-topped western white pine trees were noted on 1 215 ha (3,000 acres), mostly in the Columbia River Valley (Table 1).

Maps 1 to 5 show locations of mountain pine beetle infestations.

Table 1. Number of red-top pine trees and hectares (acres) infested as determined from aerial surveys, Nelson Forest District, 1976

Pine species	Location	No. red-tops	No. hectares	No. acres
lodgepole	West Kootenay			
	Goathide Cr	1,640	243	600
	Ptarmigan Cr	370	101	250
	Arlington L(s)	620	162	400
	Whitefoot Cr	90	20	50
	Copperkettle Cr	50	20	50
	Trapping Cr	90	40	100
	China Cr	50	4	10
	Clark L	10	2	5
	Carmi	75	10	25
	King Solomon Mtn	270	61	150
	West of Horse Cr	30	2	5
	Little Goat Cr	40	8	20

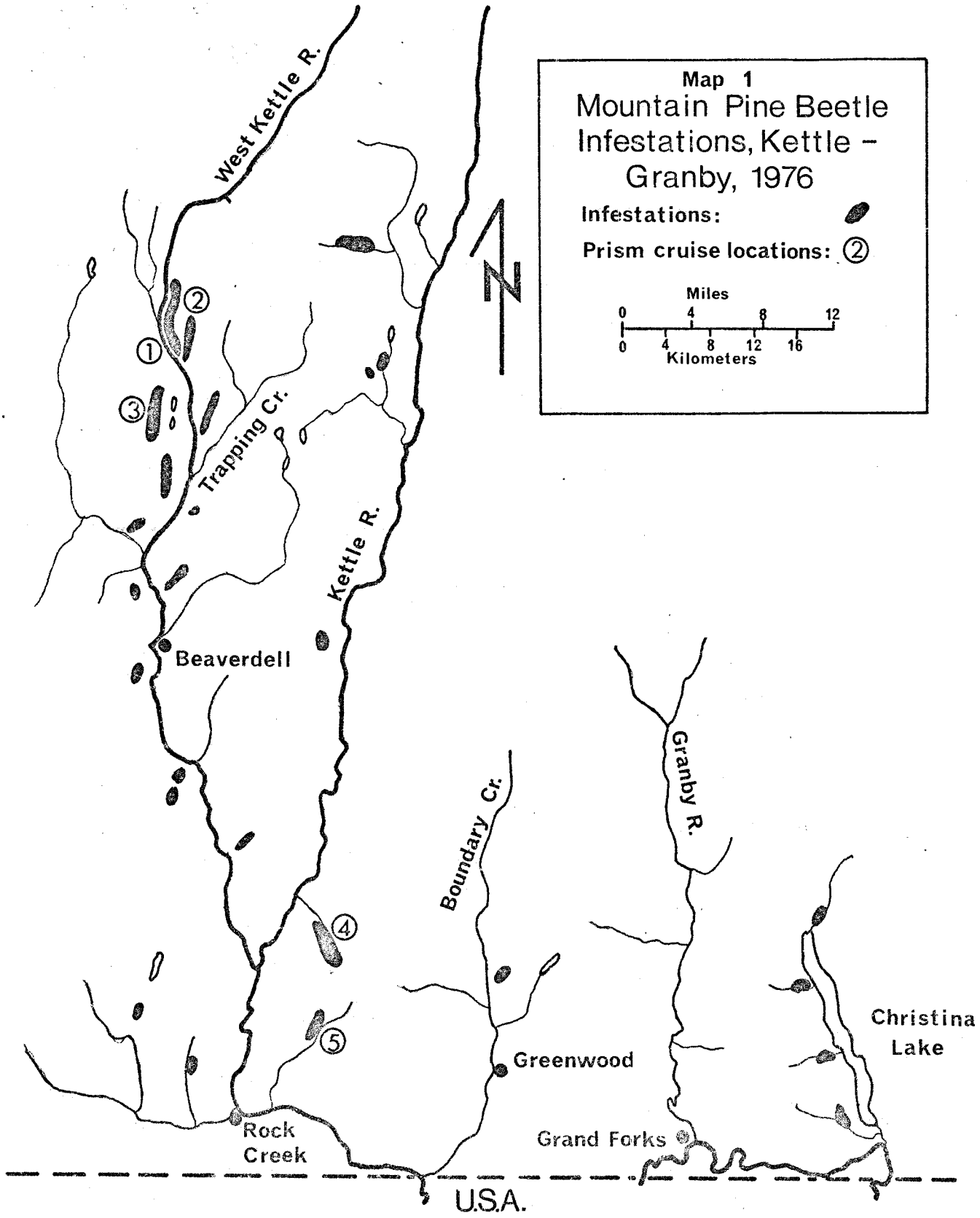
cont'd.

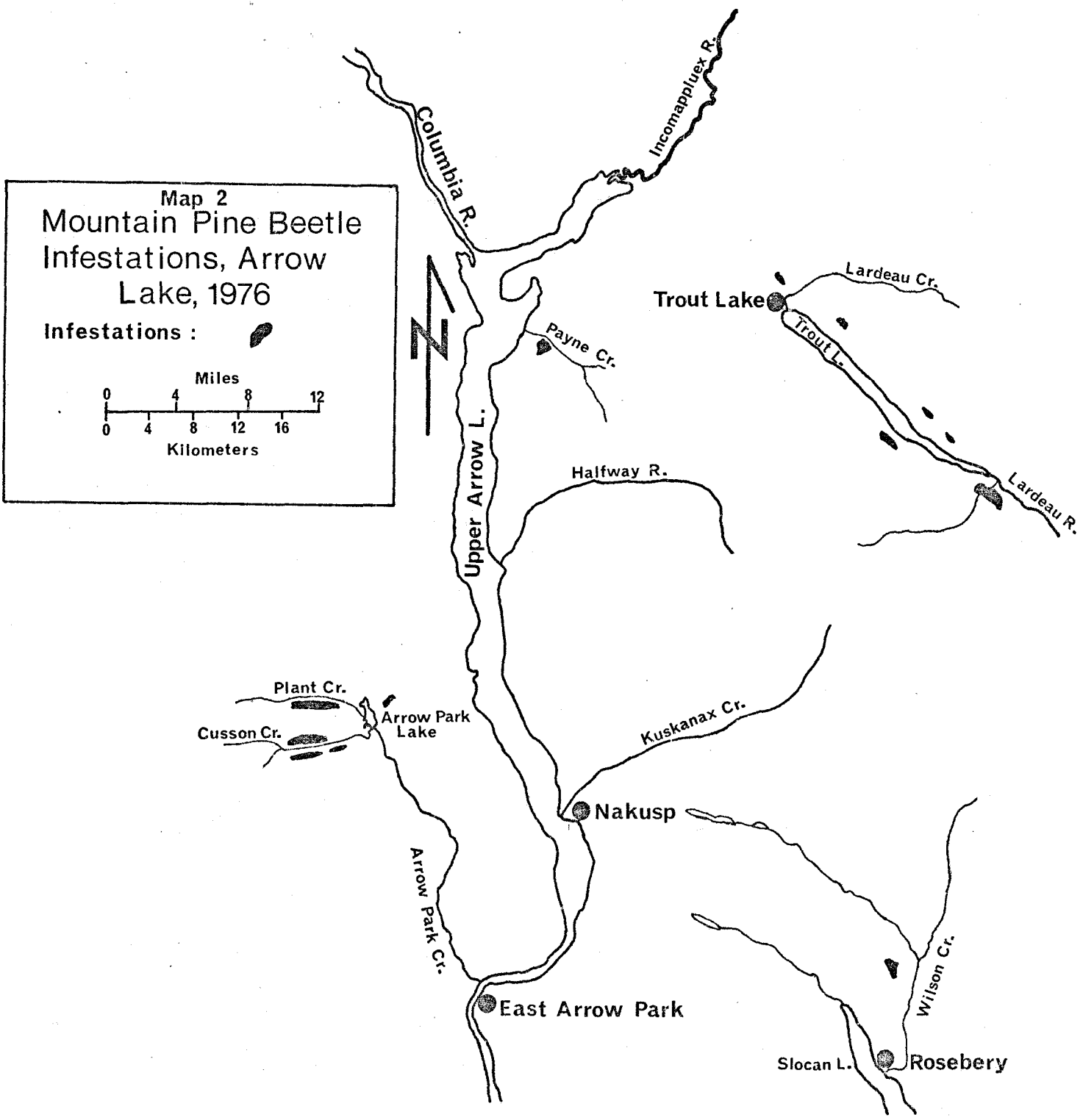
Table 1, cont'd.

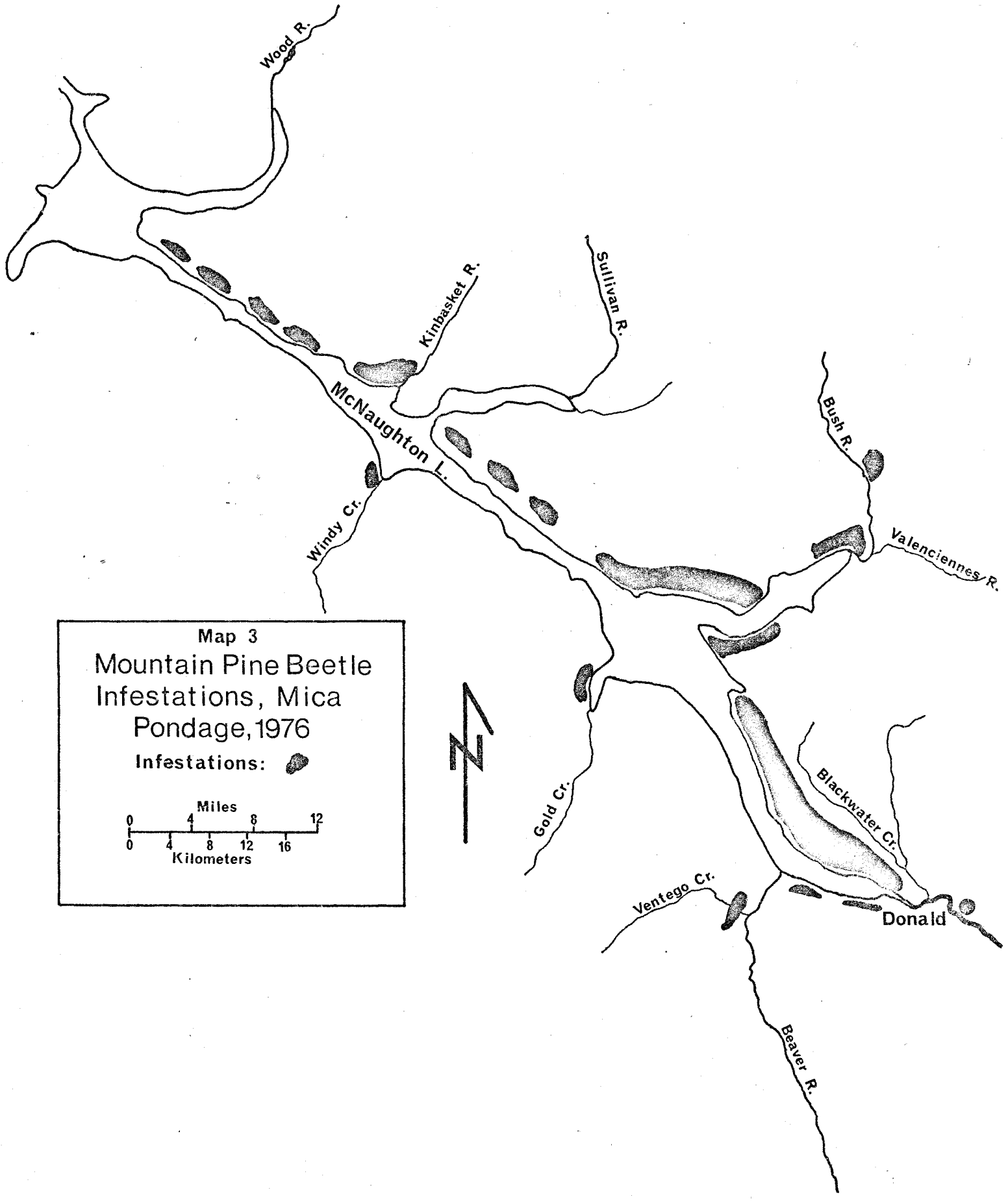
Pine species	Location	No. red-tops	No. hectares	No. acres
lodgepole	West Kootenay			
	Boomerang Cr	50	40	100
	Logan Cr	60	6	15
	Chenier Cr	35	8	20
	Taurus	10	2	5
	Zamora	25	2	5
	Fourth of July Cr	30	4	10
	Fiva Cr	1,700	81	200
	Nicholson Cr	70	16	40
	Johnston Cr	20	2	5
	Jolly Cr	25	2	5
	Rice Cr	5	2	5
	Clement Cr	15	2	5
	Christina L	135	44	110
	Sandner Cr	15	2	5
	East Kootenay			
	Bush R	700	40	100
	Succour Cr	900	121	300
	Gold R	300	40	100
	Blackwater Cr	2,500	607	1,500
	Blackwater Ridge	15,000	1 214	3,000
	Waitabit Cr	2,000	162	400
	Beavermouth	2,500	202	500
	Redgrave	500	40	100
	Donald	3,350	190	470
	Willowbank Mtn	800	81	200
	Blaeberry R	1,000	182	450
	Moberly Bench	250	20	50
	Golden	625	65	160
	Nicholson	225	20	50
	Horse Cr	500	40	100
	McMurdo	50	8	20
	Castledale	125	10	25
	Frances Cr	50	8	20
	Horsethief Cr	200	40	100
	Toby Cr	800	81	200
	Goldie Cr	700	81	200
	Palliser R	800	61	150
	Nappe Mtn	100	10	25
	Dry Cr	500	40	100
	Elk Cr	12,000	1 619	4,000
	White R	25,450	3 055	7,550
	N. White R	1,100	202	500
	Whiteswan L	370	40	100
	Lussier R	1,020	125	310
	Premier L	50	4	10
	St. Mary L	200	10	25
	Morrissey Cr	500	61	150
	Flathead R	150	20	50
	Sage Cr	180	24	60
		81,025	9 409	23,270

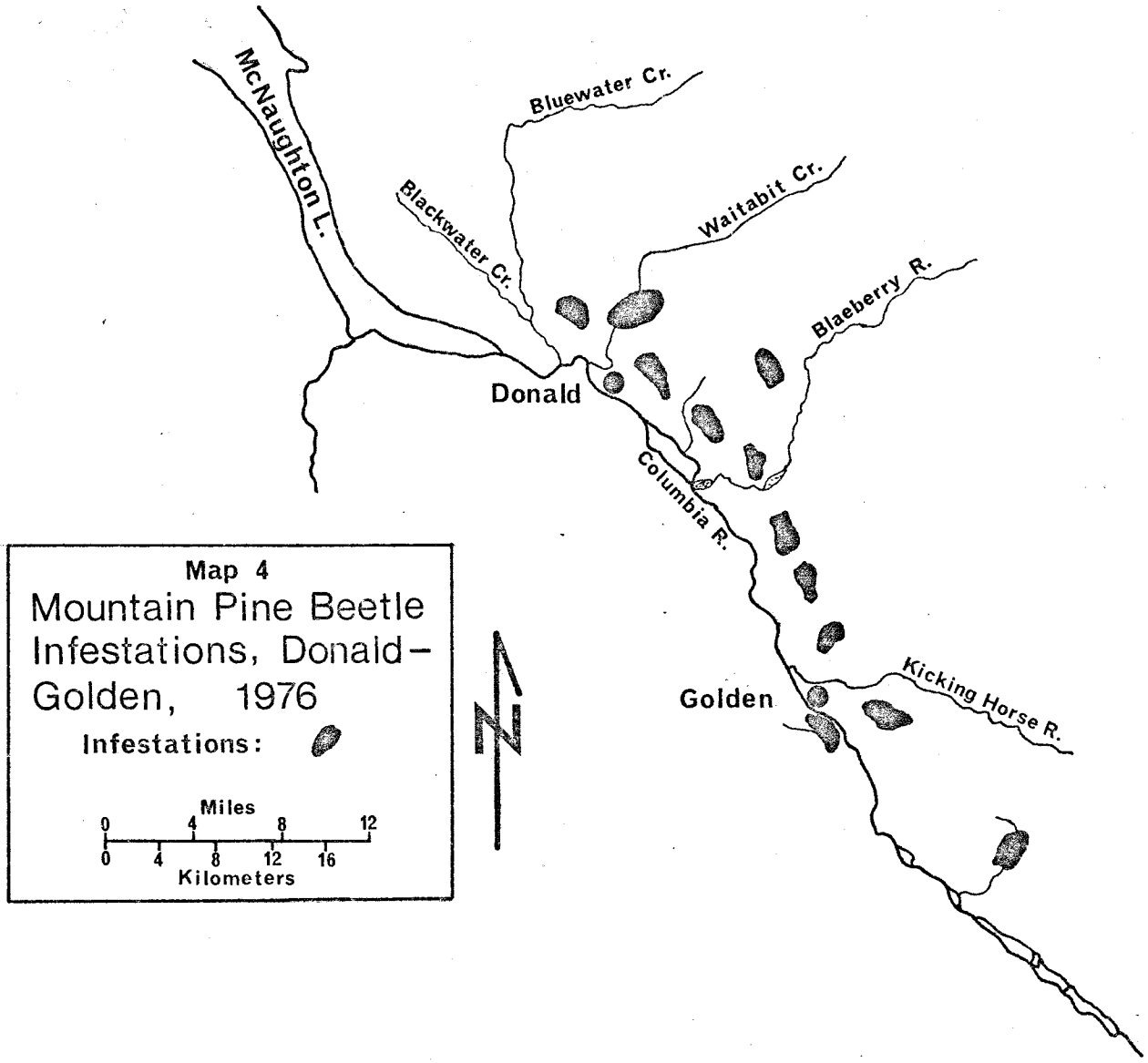
Table 1, cont'd.

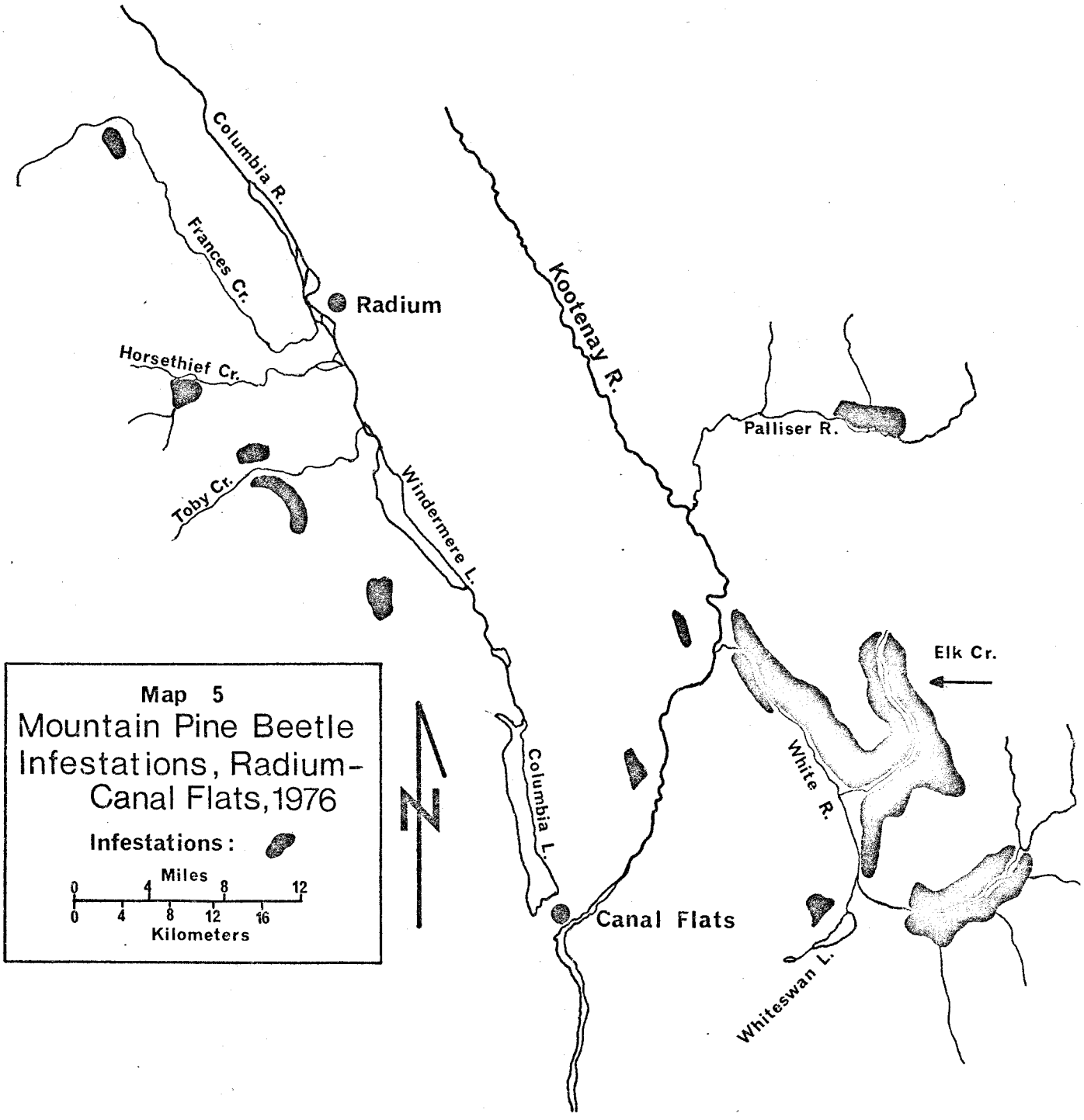
Pine species	Location	No. red-tops	No. hectares	No. acres
western white	West Kootenay			
	Payne Cr	50	4	10
	Trout L	130	6	15
	Plant Cr	300	12	30
	Cusson Cr	500	12	30
	Arrow Park L	25	2	5
	Wilson Cr	70	6	15
	East Kootenay			
	Top of the Bend	2,150	435	1,075
	Cummins R	250	32	80
	Tsar Cr	300	40	100
	Windy Cr	75	14	35
	Molson Cr	100	20	50
	Goosegrass Cr	150	20	50
	Lyell Cr	400	40	100
	Bush R	4,700	445	1,100
	Bush Lakes	300	40	100
	Game Cr	300	30	75
	Sentry Mtn	100	10	25
	Gold R	250	24	60
	Smith Cr	600	40	100
	The Elbow	100	10	25
	Beaver R	300	40	100
		11,150	1 282	3,180
ponderosa	West Kootenay			
	Kettle R Park	20	4	10


Map 1
Mountain Pine Beetle Infestations, Kettle - Granby, 1976
Infestations:
Prism cruise locations: ②
Miles
0 4 8 12
0 4 8 12 16
Kilometers
West Kettle R.
Trapping Cr.
Kettle R.
Beaverdell
Boundary Cr.
Granby R.
Greenwood
Christina Lake
Grand Forks
Rock Creek
U.S.A.
①
②
③
④
⑤


Map 2
Mountain Pine Beetle Infestations, Arrow Lake, 1976
Infestations :
Miles
0 4 8 12
0 4 8 12 16
Kilometers
Columbia R.
Incomappluex R.
Trout Lake
Lardeau Cr.
Trout L.
Lardeau R.
Payne Cr.
Upper Arrow L.
Halfway R.
Plant Cr.
Arrow Park Lake
Cusson Cr.
Kuskanax Cr.
Nakusp
Arrow Park Cr.
East Arrow Park
Wilson Cr.
Slocan L.
Rosebery


Wood R.
Kinbasket R.
Sullivan R.
McNaughton L.
Windy Cr.
Bush R.
Valenciennes R.
Gold Cr.
Blackwater Cr.
Ventego Cr.
Donald
Beaver R.
Map 3
Mountain Pine Beetle Infestations, Mica Pondage, 1976
Infestations:
Miles
0 4 8 12
0 4 8 12 16
Kilometers


McNaughton L.
Bluewater Cr.
Blackwater Cr.
Waitabit Cr.
Blaeberry R.
Donald
Columbia R.
Golden
Kicking Horse R.
Map 4
Mountain Pine Beetle Infestations, Donald–Golden, 1976
Infestations:
Miles
0 4 8 12
0 4 8 12 16
Kilometers
N


Columbia R.
Frances Cr.
Radium
Horsethief Cr.
Toby Cr.
Windermere L.
Kootenay R.
Palliser R.
Elk Cr.
White R.
Columbia L.
Canal Flats
Whiteswan L.
Map 5
Mountain Pine Beetle Infestations, Radium-Canal Flats, 1976
Infestations:
Miles
0 4 8 12
0 4 8 12 16
Kilometers
N

Spruce beetle, *Dendroctonus rufipennis*

A small infestation of spruce beetle occurred at the headwaters of Cultus Creek (elevation 1 675 m; 5,500 feet) on Darkwoods Forest Products property on the southwest side of Kootenay Lake. Two 2-ha (5-acre) pockets of Engelmann spruce had been attacked in 1974. Most infested trees were removed from the area just prior to the 1976 beetle flight, but some beetles escaped from several exposed log decks early in May during a period of warm weather. A few attacks occurred on standing trees and stumps.

Douglas-fir beetle, *Dendroctonus pseudotsugae*

Only a few red-topped Douglas-fir trees were noted in 1976. Small groups of trees totalling about 50 were noted in the Lussier River Valley and near Whiteswan Lake. Attacks in standing trees declined in the Grand Forks - Christina Lake area.

Dryocoetes-Ceratocystis complex

The western balsam bark beetle, *Dryocoetes confusus*, in association with the fungus, *Ceratocystis dryocoetidis*, continued to take an annual toll of high elevation alpine fir trees. The number of red-topped trees is shown in Table 2.

Table 2. Location and numbers of alpine fir trees killed by *Dryocoetes-Ceratocystis* complex, Nelson Forest District, 1976 aerial survey

Location	No. of trees
Willowbank Mtn	600
Spillimacheen R	2,800
Skookumchuck Cr	700
White Cr	500
Dewar Cr	1,400
Morrissey Cr	500
Harvey Cr	400
Rampalo Cr	200
Hellroarer Cr	300
Gable Cr	500
Total	7,900

Defoliators

Larch casebearer, *Coleophora laricella*

Defoliation of western larch by larch casebearer was light at Christina Lake, Salmo and Yahk. North of Creston to Crawford Bay and from Blewett to Thrums, the defoliation was light to moderate. New infestations were found at Sparwood near Fernie, and Argenta on Kootenay Lake.

Table 3 indicates the degree of defoliation at five permanent plots in the southern part of the Nelson Forest District.

Table 3. Western larch defoliation by larch casebearer at five permanent plots, Nelson Forest District, 1976

Plot location	Elevation	Defoliation[1/]
Fruitvale	2,300'	light
Salmo	2,200'	light
Rykerts	2,200'	moderate
East Arrow Cr	2,400'	light
Yahk	2,800'	light

[1/] light: 0-25% discolored.

Imported larch casebearer parasites, *Agathis pumila* and *Diadegma nana* were released at three locations (Table 4) in the Nelson Forest District in July 1976. The three releases were free releases of adults in established casebearer infestations and plots.

Table 4. Larch casebearer parasite releases, Nelson Forest District, 1976

Location	Date	Number	Species	Source
N. Creston, Plot #2	July 9, 1976	12 male, 6 female	*Diadegma nana*	Italy
Christina Lake, Plot #13	July 22, "	25 male, 30 female	*Agathis pumila*	Austria
Ross Spur, Plot #6	July 23, "	24 male, 28 female	" "	"

Parasitised casebearer larvae, overwintered by S. Condrashoff, were released by tying infested branches onto trees at two locations, North Salmo and North Creston, in April, 1976. Approximately 400 casebearer larvae infested with *Agathis* sp. were released at Plot #5, North Salmo, and about 25 casebearer larvae parasitised with *Diadegma* sp. were released at Plot #2, North Creston.

Collections of casebearer prepupae and pupae were made in 1976 at the five plots on May 24 (No. 1) and an additional collection for East Arrow and Fruitvale June 5 (No. 2) to determine larch casebearer parasitism. Two sampling systems were used, one "A", the standard method taking four 45 cm (18 inch) branch tips from the mid-crown of four trees, and the other, "B" using three 15 cm (6 inch) sections from each of four branches taken from four trees. The results of these collections are displayed in Table 4a.

Agathis pumila, a parasite introduced in 1969 at two plots, Fruitvale and East Arrow Creek, was found in 5% and 7% of the larch casebearer pupae, respectively. *Chrysocharis laricinellae*, an exotic parasite which has been recently introduced in Washington and other states against the larch casebearer, was found in four out of five plots! Parasitism by this species was 7% at Yahk, 10% at East Arrow Creek, 15% at Salmo and 7% at Fruitvale. This is the first year that *C. laricinellae* has been reared from any of these plots.

Comparing the two sampling systems, "A", the standard system and "B", the three section system devised under contract to the Department of Environment contract number DSS. OSW4-0140, shows the following: (a) the 3-section-system necessitates the removal of four whole branches from the sample trees which severely denudes the plots, some of which are on private land; (b) many more casebearers are obtained for use with the standard 18-inch branch tip system; (c) the section system requires quadruple the time of the standard system. Therefore it is recommended that the standard system be retained as the larch casebearer population sampling system.

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Table 4a. Larch casebearer parasite sampling systems comparison 24 May, including No. 1 (5 June No. 2 collection from East Arrow and Fruitvale)

A. Results from 18 inch branch sampling system

Location	Yahk	East Arrow		Rykerts	Salmo	Fruitvale	
		No. 1	No. 2			No. 1	No. 2
No. of casebearer pupae	200	101	200	257	149	36	183
% parasitism by							
Agathis pumila		7%	1%			5%	1%
Chrysocharis laricinellae	7%	5%	10%		15%	5%	7%
Mesopolobus sp.		1%	2%	0.3%	4%		
Spilochalcis albifrons			0.5%	0.3%	1%		
Dicladocerus spp. (freak)				0.3%			
Dicladocerus nearctica				0.3%			
Total							

B. Results from three 6 inch branch sections (inner (I), mid (M) and outer (O) positions on branch)

Location	Yahk	East Arrow		Rykerts	Salmo	Fruitvale	
		No. 1	No. 2			No. 1	No. 2
No. of casebearer pupae	I: 4 M: 0 O: 5	I: 19 M: 31 O: 52		I: 30 M: 32 O: 36	I: 15 M: 17 O: 24	I: 4 M: 2 O: 8	
% parasitism by			not sampled twice				not sampled twice
Agathis pumila							
Chrysocharis laricinellae		9%			11%	7%	
Mesopolobus sp.				1%	2%		
Spilochalcis albifrons		1%			2%		
Dicladocerus spp. (freak)							
Dicladocerus nearctica		1%					

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In October, 1976, employing the same two sampling systems used in the spring, the overwintering larval population was measured (Table 5).

Table 5. Overwintering larval population at five plots using two sampling systems, October, 1976

Location	18" branch sample	6" branch sections O. M. I.
	Avg casebearers per 100 fascicles	Avg casebearers per 100 fascicles
Yahk	9	7
East Arrow	31	14
Rykerts	64	47
Salmo	21	9
Fruitvale	9	6

Table 5a. Average number of overwintering casebearer larvae per 45 cm (18") branch and 100 fascicles, 1966-76 (October)

Year	Fruitvale	Salmo	Rykerts	East Arrow	Yahk
1966		16			14
67		55			23
68		128	165		13
69		67	24		13
70	92	275	312	177	120
71	143	273	39	75	64
72	79	201	164	94	16
73	8 (15)[2/]	15 (16)	60 (66)	22 (32)	3 (4)
74	10 (8)	6 (6)	33 (28)	37 (51)	5 (5)
75	2 (2)	14 (16)	63 (68)	105 (57)	3 (4)
76	18 (9)	47 (21)	157 (64)	91 (31)	17 (9)

2/ Figures in brackets are numbers of casebearers per 100 fascicles.

The defoliation in 1977 should be the same as in 1976, except at Rykerts, where the defoliation may increase to moderate.

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Larch sawfly, *Pristiphora erichsonii*

In 1976, the first outbreak of larch sawfly since 1967, occurred near Sparwood, 32 km (20 miles) north of Fernie. During the summer larvae lightly defoliated about 4 ha (10 acres) of immature and mature western larch trees. Up to 110 larvae were collected in 3-tree beating samples. In October 1976, duff samples from beneath infested trees yielded relatively few overwintering sawfly cocoons, 0.8 per .07 m^2 (1 square foot) of duff. However, 90% of the cocoons were undamaged and, unless predation by rodents is exceptional, increased sawfly infestations near Sparwood are predicted for 1977.

Since the first record of occurrence in 1930 of the larch sawfly on western larch, the pest has been epidemic during two periods - from 1942 to 1945 and from 1965 to 1967. The latter epidemic resulted in moderate to severe defoliation of approximately 145 700 ha (360,000 acres) of larch in the Nelson Forest District. In both instances the outbreaks appeared first in the Fernie area.

In the past, epidemics in B. C. apparently were eventually terminated by a combination of several native and one introduced species of parasitic insects. However, the insect community in western larch stands lacks the exotic parasite, *Olesicampe benefactor*, which is credited with holding the larch sawfly in check in eastern Canada.

Spruce budworm, *Choristoneura* sp.

Spruce budworm larvae lightly defoliated Engelmann spruce and alpine fir trees in the McMurdo Creek Valley. By July 26, 1976 about 25% of the 1976 foliage was destroyed by small larvae on an estimated 200 ha (500 acres). By September 2 larvae had hibernated. The population appeared to have declined possibly because of the cold, wet summer weather, therefore only moderate defoliation is predicted for 1977.

In 1975, budworm caused heavy defoliation on 810 ha (2,000 acres) at McMurdo Creek and light to moderate defoliation on 2 830 ha (7,000 acres) in the Spillimacheen River Valley.

This budworm appears to be the 2-year-cycle spruce budworm, *Choristoneura biennis*, although its habits do not conform with the usual pattern of heavy feeding by large larvae on the even-numbered years and light feeding by small larvae on the odd-numbered years.

Western spruce budworm, *Choristoneura occidentalis*

Budworm populations were generally low in Douglas-fir and western hemlock stands except for a small area west of Revelstoke. This is an extension of a large infestation in the Kamloops Forest District. The current foliage of Douglas-fir and western hemlock was lightly defoliated. Three-tree beatings contained an average of 47 larvae.

Soolure traps for trapping male budworm moths were set out in six localities, as shown in Table 6.

Table 6. Average number of *C. occidentalis* moths in Soolure traps, Nelson Forest District, 1976

Location	Stand type	No. of larvae collected		Avg no. of moths trapped	
		1975	1976	1975	1976
Wilson Cr	western hemlock	0	0	13	9
Kuskanax Cr	" "	2	0	19	18
Galena Bay	" "	0	1	12	2
Radium	Douglas-fir	-	0	-	17
Dutch Cr	" "	0	0	44	71
Premier L	" "	0	0	35	71

Western false hemlock looper, *Nepytia freemani*

Infestations in the Windermere Valley collapsed, presumably as a result of a virus infection which appeared in 1975. In 1976 the largest 3-tree beating sample on Douglas-fir contained five larvae. There was no tree mortality and past defoliation was barely discernible by summer 1976.

Tent caterpillars

Forest tent caterpillar, *Malacosoma disstria*

Western tent caterpillar, *Malacosoma californicum pluviale*

Forest tent caterpillars severely defoliated several thousand acres of mature trembling aspen on Moberly Bench north of Golden. Other deciduous species such as black cottonwood, western white birch, willow, and understory plants were also damaged. Lesser numbers of the western tent caterpillar occurred in association with the forest tent caterpillar at Moberly and were a pest in residential areas of Golden and surrounding communities.

Forest tent caterpillars also defoliated approximately 405 ha (1,000 acres) of mature black cottonwood east of Fort Steele near the junction of the Wildhorse and Kootenay rivers.

The infestation on Moberly Bench is expected to decline since numerous larvae died from virus disease and many pupae were parasitised. The Fort Steele infestation, however, appears more healthy with little evidence of disease[1/] or parasites, therefore the infestation is expected to persist in 1977.

1/ Nuclear polyhedral virus was detected by I.P.R.I., but there was no indication of intensity.

Douglas-fir needle midges, *Contarinia* spp.

Cooley spruce gall aphid, *Adelges cooleyi*

Needle midge infestations increased significantly in Douglas-fir Christmas tree cutting areas of the Windermere Valley. These attacks plus damage caused by the Cooley spruce gall aphid made many trees unsuitable for the export market. Needles were examined from five branch tips from each of five trees in five areas. The percentage of needles infested, with 1975 figures in brackets, were as follows: Brisco, 5 (2); Edgewater, 10 (5); Radium, 45 (-); Invermere, 28 (2); and Canal Flats, 3 (3).

Per cent needles infested by Cooley spruce gall aphid were as follows: Brisco, 19; Edgewater, 27; Radium, 12; Invermere, 14 and Canal Flats, 35. Attacks were severe on Douglas-fir seedlings in plantations in the Spillimacheen River Valley.

The number and percentage of needles infested by needle midges and aphids are shown in Tables 7 and 8.

Table 7. Number of Douglas-fir needles infested by needle midges and aphids, Nelson Forest District, 1976

Location	*Contarinia*	*Adelges*	Healthy	Total
Brisco	100	363	1,434	1,897
Edgewater	203	561	1,351	2,115
Radium	1,141	299	1,085	2,525
Invermere	698	338	1,442	2,478
Canal Flats	66	677	1,188	1,931

Table 8. Per cent Douglas-fir needles infested by needle midges and aphids, Nelson Forest District, 1976

Location	% needles infested		
	Contarinia	*Adelges*	Healthy
Brisco	5.3	19.1	75.6
Edgewater	9.6	26.5	63.9
Radium	45.2	11.8	43.0
Invermere	28.2	13.6	58.2
Canal Flats	3.4	35.1	61.5

Leaf beetles on conifer foliage, *Dichelonyx* spp.

Dichelonyx beetles destroyed from 50 to 90% of the Douglas-fir foliage produced in 1976 in many of the Christmas-tree cutting permit areas in the Windermere Valley. Defoliation was heaviest in dense stands in the vicinity of Skookumchuck, Canal Flats and Fairmont. Damage was less severe in the open-growing stands on Christmas-tree farms.

Beetles caused light defoliation of immature Douglas-fir, lodgepole and ponderosa pine trees in the Cranbrook and Elko B. C. Forest Service ranger districts.

Sequoia pitch moth, *Vespamima sequoiae*

The sequoia pitch moth is commonly found attacking ponderosa and lodgepole pine trees in the Kootenay and upper Columbia River valleys. Annually a small number of attacked trees are windthrown as a result of larval girdling at the bases of trees. However, with numerous attacks on open-growing pine in grassland areas, the pitch moth has greatly increased the risk of extensive fires. Often a grass fire may only scorch tree trunks but not ignite the tree crowns, but with numerous large masses of pitch caused by the pitch moth, a fire may be sustained long enough to ignite tree trunks and crowns, allowing the fire to spread from crown to crown.

photo

Pine needle scale, *Phenacaspis pinifoliae*

Pine needle scale was severe on Christmas-tree-size and mature Douglas-fir along the west side of Windermere Lake and light on lodgepole and ponderosa pine in most of the East Kootenay area. In the West Kootenay, light attacks occurred on immature lodgepole and ponderosa pine near Beaverdell and Midway. No black pineleaf scale, *Nuculaspis californica*, was noted.

A leaf blotch miner, *Lyonetia* sp.

This leaf miner caused severe browning of western white birch foliage in West Kootenay along the Kaslo River and from Kaslo to Trout Lake. In the East Kootenay, infestations were extensive in the Columbia River Valley from Donald to Spillimacheen, along Kicking Horse River and the Beaver River extending several miles into Glacier National Park.

Black army cutworm, *Actebia fennica*

All infestations in forest plantations collapsed. No larvae were found nor any reports of damage from planting crews. Pheromone[1/] traps in the Beaverfoot River, km 60 (mile 37.5) burn-plantation area yielded an average of one male adult per trap (7 in 7 traps). Traps at km 51 (mile 32), Blaeberry River yielded an average of three adults (19 in 6 traps). The Blaeberry fire was the only area burned in 1975 in the East Kootenay but was not planted by the fall of 1976.

[1/] (Z)-7-Dodecen-1-01 Acetate.

European pine shoot moth, *Rhyacionia buoliana*

The only European pine shoot moth found in the Nelson Forest District was at the Hugh Keenlyside Dam Viewpoint at Robson. Ten infested mugho pine tips were discovered in June and burned. No adults were found in pheromone traps set out in mid-June, five in a nearby Austrian pine plantation and ten in an adjacent native ponderosa pine stand. Traps were set out at Creston, two at the Wayside Nursery and three in surrounding ponderosa pine trees; no adults were trapped.

Other Noteworthy Insects

Pine butterfly, *Neophasia menapia*

Moderate numbers of pine butterfly were observed hovering around the crowns of Douglas-fir, ponderosa and lodgepole pine trees near Castlegar, Robson and Brilliant, and in an extensive area between Kitchener, Yahk and Kingsgate. There was no noticeable defoliation.

photo

Pine needle sheathminer, *Zelleria haimbachi*

Infestations in lodgepole pine stands in the Skookumchuck - Canal Flats area collapsed. Very few larvae were found in any part of the District.

Western hemlock looper, *Lambdina fiscellaria lugubrosa*

Very few larvae were collected throughout the District.

Green-striped forest looper, *Melanolophia imitata*

Green-striped forest loopers were collected from western hemlock and Douglas-fir throughout the District. The largest number of larvae per 3-tree beating was 12.

Western blackheaded budworm, *Acleris gloverana*

The small infestation of western blackheaded budworm on western hemlock along the Saddle Mountain road west of Nakusp subsided in 1976.

Douglas-fir tussock moth, *Orgyia pseudotsugata*

Rusty tussock moth, *Orgyia antiqua badia*

Pheromone traps were set out in July at three locations to attract male moths. Six kilometers (4 miles) north of Kingsgate, five traps averaged 14.0 adults. Near Grasmere, five traps averaged 7.3. At Cascade, 10 traps averaged 3.3 Douglas-fir tussock moths plus an average of one rusty tussock moth. Larvae have been collected in the West Kootenay in the past but there is no previous record of Douglas-fir tussock moth in the East Kootenay.

Hemlock sawfly, *Neodiprion* sp.

Hemlock sawfly was common in beatings throughout the District. On western hemlock in the Columbia River Valley north of Revelstoke and in the Incomappleux River Valley the number of larvae per 3-tree beating reached as high as 180 larvae. The average number of larvae per positive beating on Douglas-fir and western hemlock in the West Nelson District was 19.0 larvae.

Larch budmoth, *Zeiraphera improbana*

No larch budmoth larvae were collected in 1976 near Inonoaklin Crossing along the Monashee Highway, where a light infestation occurred in 1975.

Gypsy moth, *Porthetria dispar*

No gypsy moth adults were caught in pheromone traps. Five traps each were set out in July at Kikomun Park (Elko) and at Wasa Lake Park, and collected early in September.

Poplar-and-willow borer, *Cryptorhynchus lapathi*

This weevil attacked scattered groups of willows in the lower Beaver River Valley and in the vicinity of Parson and Golden.

Lodgepole terminal weevil, *Pissodes terminalis*

The leaders of immature lodgepole pine were killed in scattered pockets in Gold Creek Valley, southeast of Cranbrook.

Leaf beetles, *Chrisomelidae*

Chrysomelid leaf beetles caused light defoliation of black cottonwood trees near Champion Lakes in the vicinity of Trail.

Cone insects

Cone crops were generally light and few cone insects were encountered.

FOREST DISEASE CONDITIONS

White pine blister rust, *Cronartium ribicola*

Infected mature western white pine trees were noted during aerial surveys in August, 1976 along the Columbia River north of Golden. The largest concentrations were along Cummins River, 400 trees, and Succour Creek, 300 trees.

Armillaria root rot, *Armillaria mellea*

Armillaria root rot has been responsible for numerous dead and dying immature Douglas-fir trees around Windermere Lake. Groups of from three to 25 dying trees are particularly common at Fairmont, Windermere and Invermere. In the West Kootenay, Armillaria root rot was found in the Pend-d'Oreille River Valley, several places in the Kettle River and from Slocan Lake to Galena Bay. The pockets of dead and dying Douglas-fir ranged in size from three trees to many trees, and up to 1 acre in area.

Western gall rust, *Endocronartium harknessii*

Branch flagging of lodgepole pine was very common in the East and West Kootenays and some tree mortality occurred in the Canal Flats B. C. Forest Service Ranger District, particularly along Kootenay and White rivers.

Black stain root disease of conifers, *Verticicladiella wagenerii* Kend.

Samples of lodgepole pine and Douglas-fir taken from Jolly Creek, Matthews and Joe Dandy lakes, Arlington Lakes, Ptarmigan Creek, Kettle River Recreational Area and Hellroarer Creek indicated infection by "black stain root disease". The fungus appeared as a black stain in the lower bole sapwood, causing mortality of the tree.

This is the first time black stain root disease has been collected in British Columbia.

Dothistroma needle blight of pines, *Dothistroma pini*

This disease caused reddening of lodgepole pine foliage in many areas of the West Kootenay in 1976. The most serious damage occurred on the Upper Kettle and Little Slocan rivers, Ladybird Creek near Castlegar and south of Nelson near Hall for 8 km (5 miles).

Scleroderris canker of pine, *Gremmeniella abietina*

Scleroderris canker disease caused reddening of branch tips on lodgepole pine near Nancy Green Lake.

This is the first time Scleroderris has been collected in the West Kootenay.

A leaf blotch of aspen, *Munssonina populi*

Numerous trembling aspen trees in the Elko and Fernie B. C. Forest Service districts were moderately affected. The most conspicuous damage occurred in the Bull and Elk River valleys.

Porcupine damage

Western larch trees near Paulson east of Christina Lake and southeast of Elko were damaged by porcupines in 1976. These animals chewed the bark and girdled approximately the top 3 m (10 feet) of the trees. The damage was recognizable by the yellowing of the upper crowns in early August.

Fume damage

Sulphur dioxide fumes caused only light foliar damage of coniferous and deciduous plants in 1976, where severe damage had occurred in the past. Recently installed ventilation shafts and pumps have funneled fumes into previously mined areas that do not support plant life.

Wind damage

About 120 ha (300 acres) of beetle-killed and mature healthy lodgepole pine blowdown occurred in June in the Elk Creek Valley and about 40 ha (100 acres) along the White River. Scattered mature western red cedar and western hemlock were windthrown along Summit Creek on the Salmo-Creston Highway.

Salt damage

Douglas-fir trees for 1 km (1/2 mile) along the Trans-Canada Highway east of Golden were extensively damaged, apparently by salt. Trees growing along the "downhill" side of a steep hill receive numerous applications of road salt from snow-blowing equipment.

NELSON DISTRICT

Appendix I

Pest and Special Reports

1976

Title	Author(s)	Date published
Spruce beetle in the Nelson Forest District	C.B. Cottrell and R.D. Erickson	June 18, 1976
Tent caterpillars in the East Kootenay area	C.B. Cottrell	July 14, 1976
Larch sawfly in Nelson Forest District, 1976	C.B. Cottrell and D.A. Ross	November 19, 1976