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ANNUAL DISTRICT REPORT
FOREST INSECT AND DISEASE SURVEY
BRITISH COLUMBIA, 1975
PART V, NELSON FOREST DISTRICT

by

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PACIFIC FOREST RESEARCH CENTRE
CANADIAN FORESTRY SERVICE
VICTORIA, BRITISH COLUMBIA

- FILE REPORT -

DEPARTMENT OF THE ENVIRONMENT
March, 1976

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B. C.

INTRODUCTION

This report outlines the status of forest insect and disease conditions in the Nelson Forest District for 1975, and forecasts pest population trends. Emphasis is placed on pests capable of sudden, damaging outbreaks.

Forest pest infestations reported to the Forest Insect and Disease Survey by public or private cooperators assist in the interpretation of the general pest situation and in gauging population trends.

Regular field work in the District commenced April 28 and ended October 31. Special surveys were as follows: larch casebearer, April 28 to May 1; black army cutworm, May 26 to June 6; aerial, August 11 to 14; mountain pine beetle, September 15 to 26 and overwintering larch casebearer, October 28 to October 31.

A total of 390 insects and 25 disease collections were submitted in 1975. Map 1 shows the collection localities and drainage divisions.

Numbers of larval defoliators found in field collections decreased in the District this year; 72% of beating collections in the western part of the District and 71% in the eastern part contained larvae.

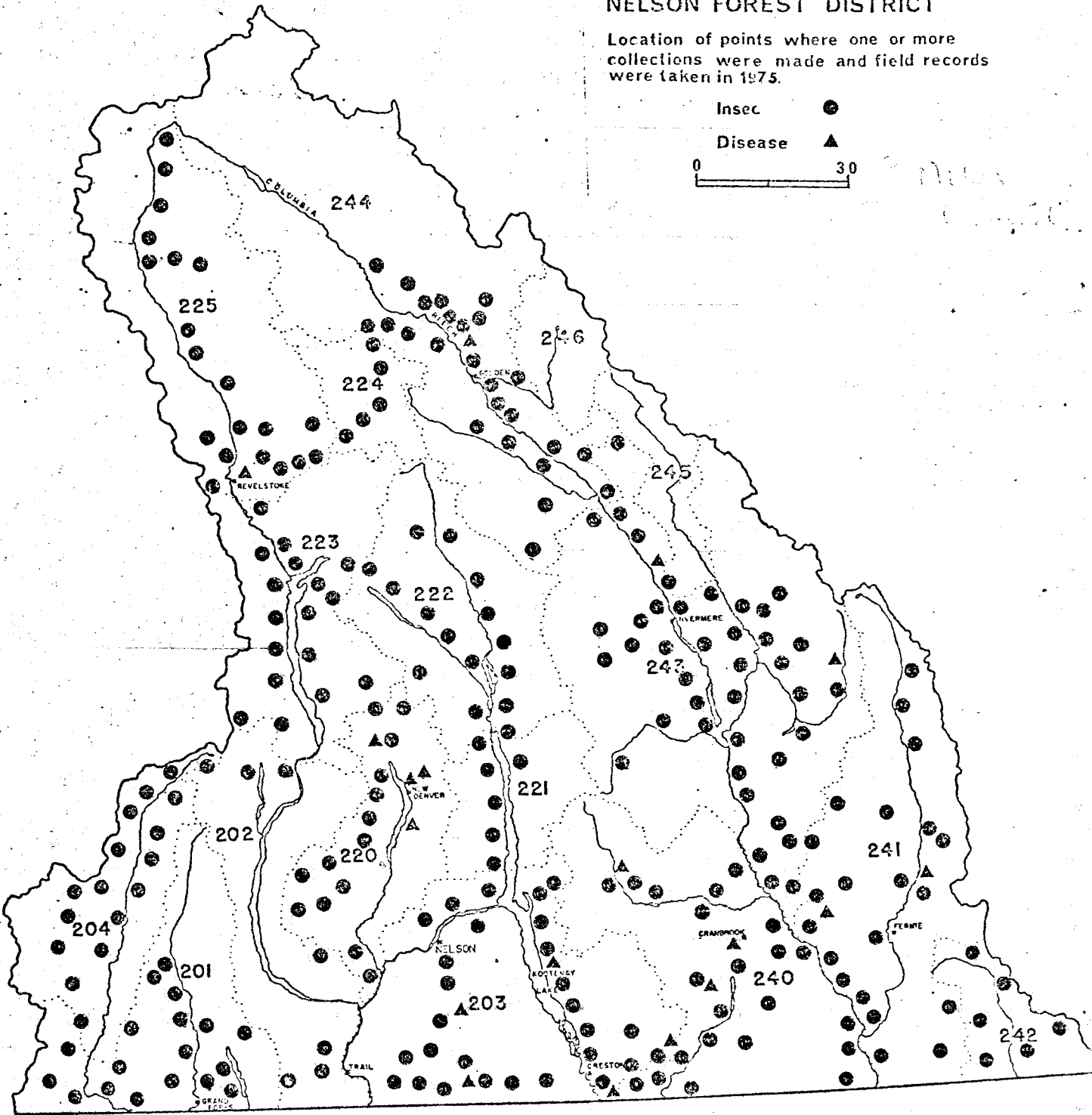
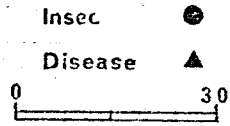
The major insect problems were the mountain pine beetle, black army cutworm, false hemlock looper, and spruce budworm. The mountain pine beetle caused extensive lodgepole pine mortality in the Elk Creek - White River area, at Blackwater Ridge near Golden and in the Kettle River Valley. Over 73,000 red-topped trees were counted in these areas. Black army cutworms defoliated Engelmann spruce and Douglas-fir seedlings on 2,500 acres in the Beaverfoot area, southeast of Golden. Infestations of false hemlock looper caused moderate defoliation to Douglas-fir at several locations in the Windermere Valley. Spruce budworm defoliated high elevation alpine fir - Engelmann spruce stands at McMurdo Creek and along the Spillimacheen River Valley.

Sulphur dioxide fumes from the Sullivan Mountain mine damaged the foliage of all tree species near Kimberley.

Details on individual insects and disease problems appear in subsequent sections.

Map 1
NELSON FOREST DISTRICT

Location of points where one or more collections were made and field records were taken in 1975.



FOREST INSECT CONDITIONS

Currently Important Insects

Bark Beetles

Mountain pine beetle, *Dendroctonus ponderosae*

Mountain pine beetles, which have been at outbreak levels for the past five years, caused increased mortality of lodgepole and western white pine trees in 1975. Pine mortality was determined by aerial photography and ground surveys of areas where red-top pine trees occurred in 1975 (Maps 1, 2, 3 and 4). Oblique color photographs were used to estimate numbers of red-top trees (1974 attack), to establish infestation boundaries, and determine acreages. Ground surveys included cruise lines with prism plots and tree examinations at 2-chain intervals.

A total of over 79,000 red-top pines were counted in 1975 (Table 1) compared to 33,000 counted in 1974. The most significant areas relative to damage, were in the Elk Creek - White River area and at Blackwater Ridge near Golden. New infestations were recorded in the Kettle Valley at Fiva Creek, Arlington Lakes, Ptarmigan Creek, Greenwood, and Chatter and Prattle creeks north of Golden.

Table 1. Number of red-top pine trees and acres infested as determined from aerial surveys, Nelson Forest District, 1975

Pine species	Locality	No. red-tops	No. acres
lodgepole	<u>West Kootenay</u>		
	Goathide Creek	2,000	500
	Fiva Creek	2,000	600
	Arlington Lakes	400	100
	Rhone	50	20
	Ptarmigan Creek	125	50
	Greenwood	500	50
	Memphis Creek (Slocan L)	250	100
	<u>East Kootenay</u>		
	Upper Elk Creek	2,100	285
	Elk Creek Canyon	30,000	590
	Lower Elk Creek	17,500	550
	White River Junction	4,370	470

... Cont'd.

Pine species	Locality	No. red-tops	No. acres
<u>East Kootenay, Cont'd.</u>			
	Rock Creek	1,000	55
	Mary, Akutlak creeks	2,360	185
	Lussier River	800	95
	White River	500	50
	Whiteswan Lake	150	20
	Dry Creek	375	65
	Queen Mary Creek	850	250
	Pedley Creek	50	10
	Kootenay River	25	5
	Toby Creek	30	10
	Parson	300	40
	Blackwater Ridge	6,000	1,200
	Chatter-Prattle creeks	1,750	390
	Total	73,485	5,690
western white	<u>West Kootenay</u>		
	Trout Lake	450	150
	Shelter Bay	200	150
	Pingston Ridge	550	150
	Fosthall	100	50
	S. Fosthall Creek	725	250
	Plant Creek	550	175
	Cusson Creek	600	200
	Saddle Mtn	550	200
	<u>East Kootenay</u>		
	Bush River	1,050	470
	Smith Creek	550	300
	Kinbasket River	375	155
	Beaver River	150	40
	Illecillewaet River	250	45
	Total	6,100	2,335

Data from the ground surveys showed an increase in 1975 attack compared with that of 1974 (Table 2), and that most of the 1975 attack occurred within the areas of 1974 attack (red-tops), with lighter attacks occurring adjacent to the infested areas. Overwintering beetle populations were high in all areas.

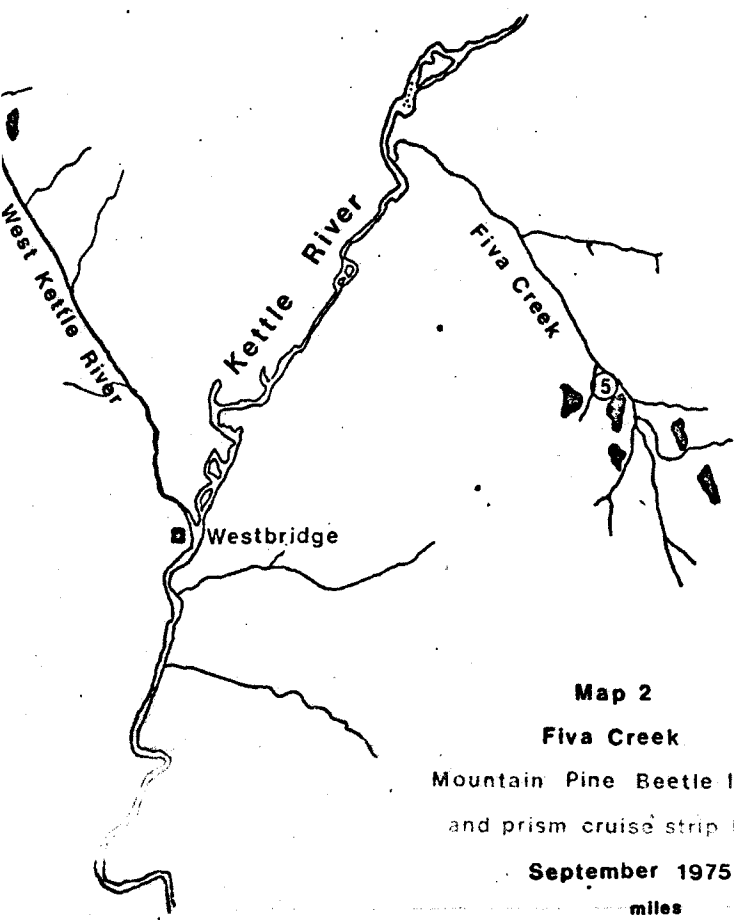
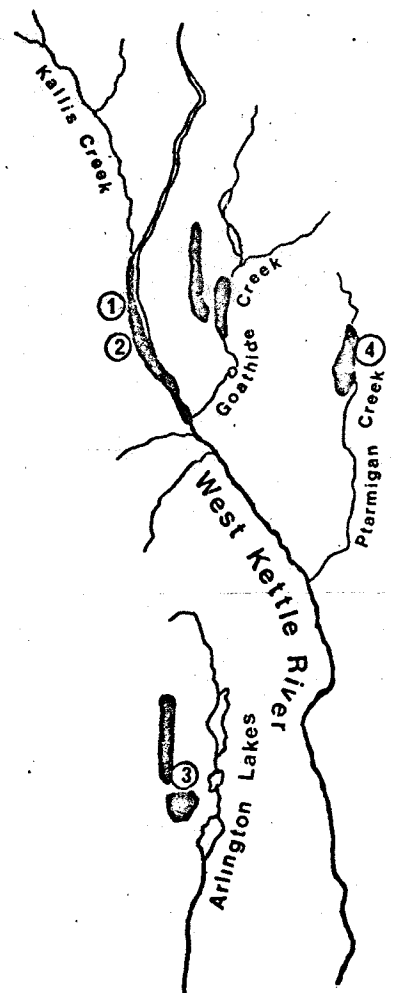
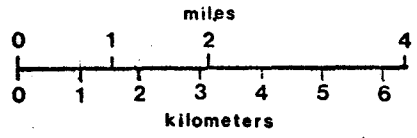
Ground checks conducted in infested western white pine stands along the Upper Arrow Lakes showed a moderate attack in 1975, with a healthy overwintering beetle population.

Table 2. Status of lodgepole pine trees on cruise strips, Nelson Forest District, 1975

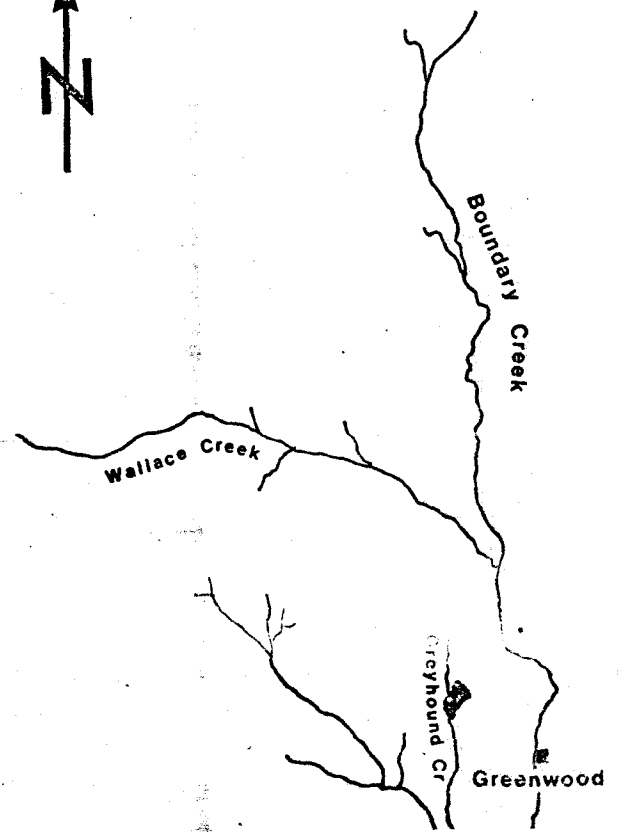
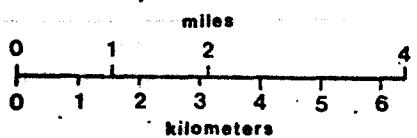
Strip no.	Location	% healthy	% attacked		
			Green attack 1975	Red attack 1974	Grey attack prior to 1974
<u>West Kootenay</u>					
1	Goathide Cr	82	7	4	7
2	Goathide Cr	70	18	6	6
3	Arlington Lakes	70	10	14	6
4	Ptarmigan Cr	73	19	8	0
5	Fiva Cr	50	20	20	10
<u>East Kootenay</u>					
6	Akutlak Cr	49	22	23	6
7	Mary Cr	76	13	10	1
8	Lower Elk Cr	77	18	5	0
9	Upper Elk Cr	70	22	3	5
10	White River Jct.	25	42	22	11
11	Blackwater Ridge	76	16	4	4

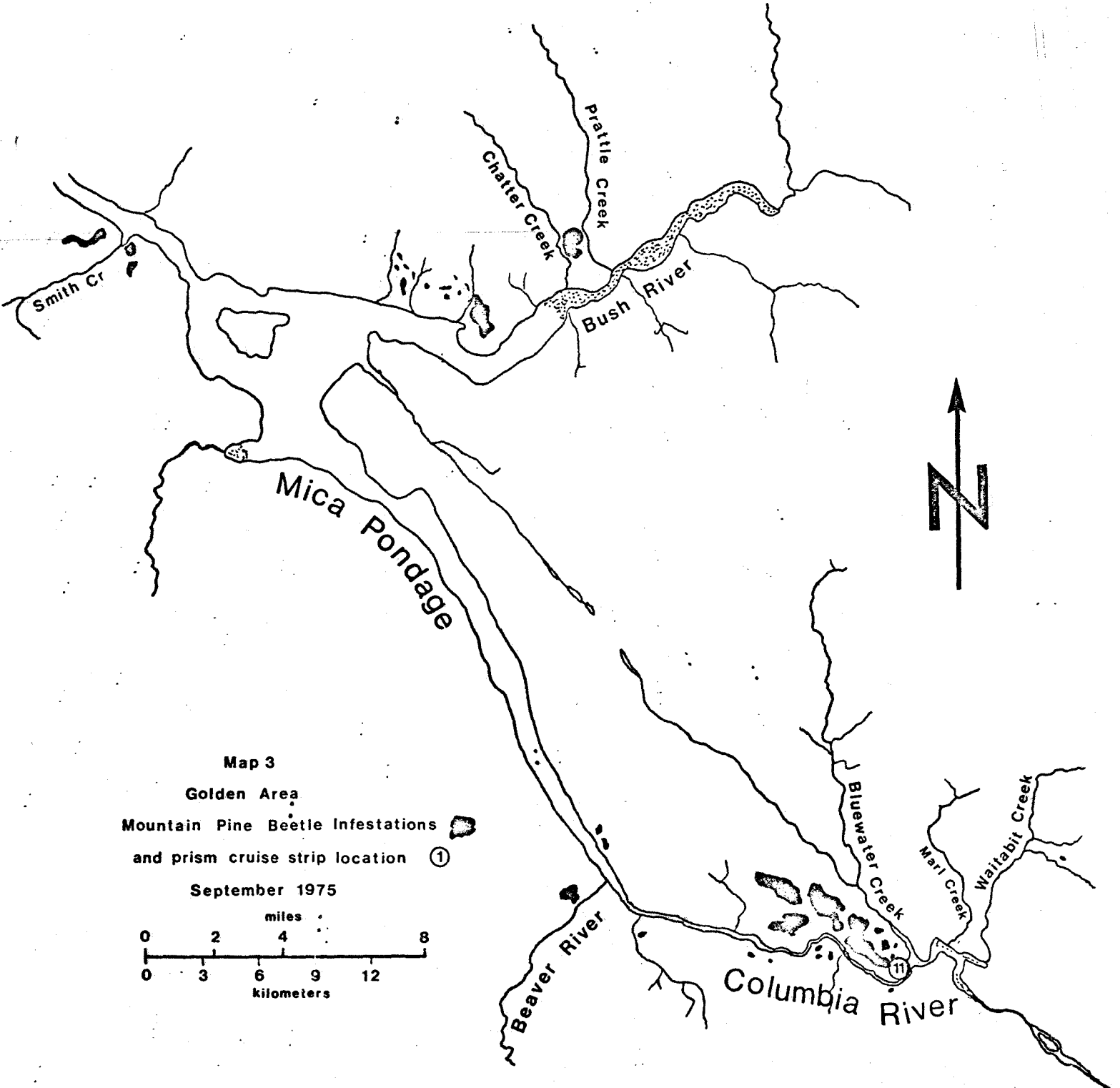
The expansion of mountain pine beetle infestations in 1975, and the large overwintering beetle populations, indicate even greater tree mortality in 1976, provided climatic factors remain favourable for the beetles' development.

Map 1
West Kettle River
 Mountain Pine Beetle Infestations and prism cruise strip locations
 September 1975

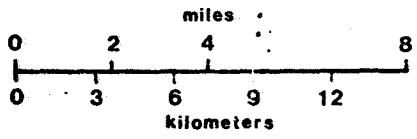


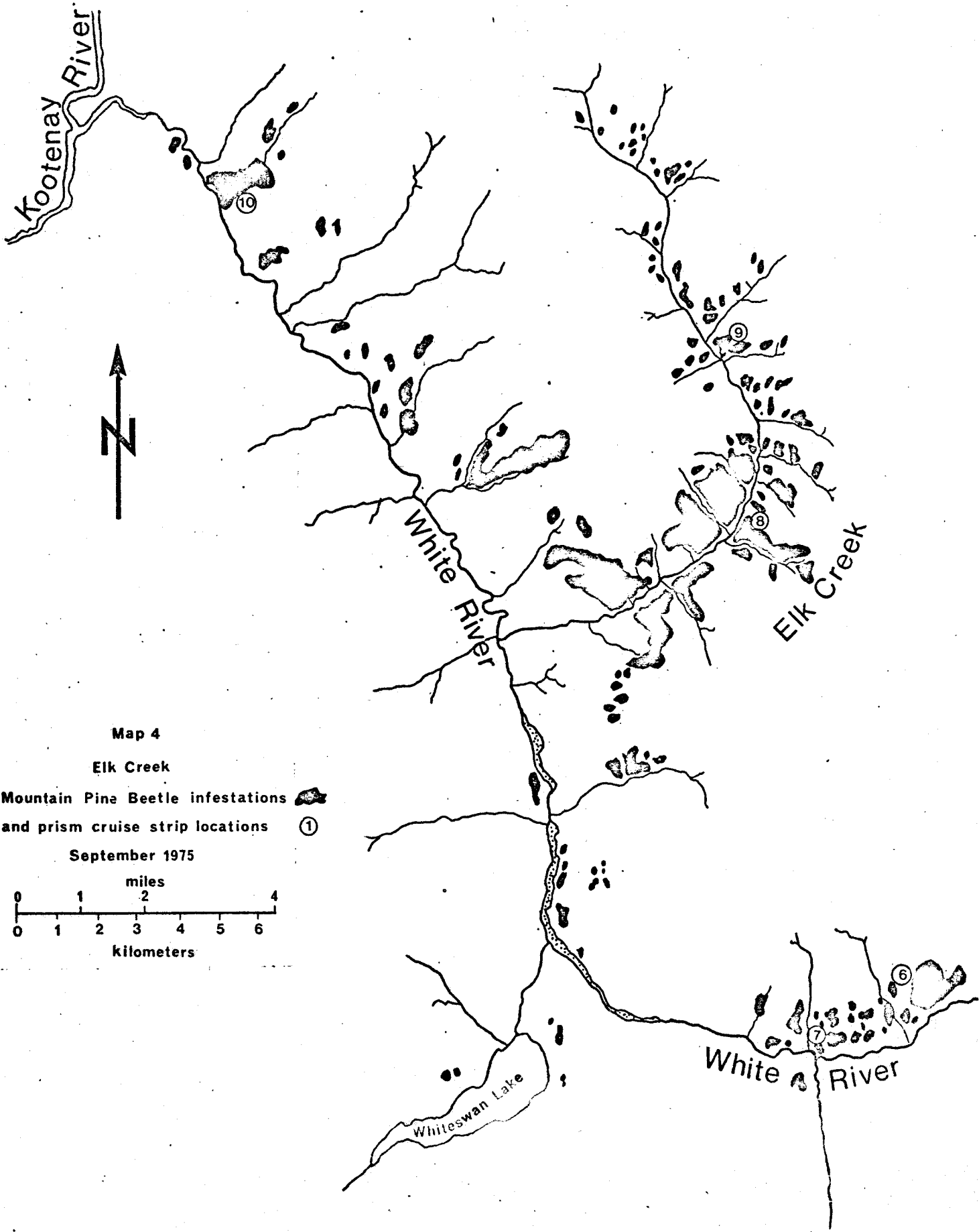
Map 2
Fiva Creek
 Mountain Pine Beetle Infestations and prism cruise strip location
 September 1975







Map 3
Golden Area
Mountain Pine Beetle Infestations
and prism cruise strip location ①
September 1975



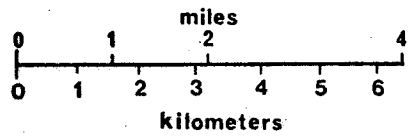


Map 4

Elk Creek

Mountain Pine Beetle infestations  and prism cruise strip locations 

September 1975



Dryocoetes-Ceratocystis complex

Aerial and ground surveys were carried out to determine the amount of alpine fir mortality on the Ottawa Hill above Slocan. The size of the area where the tree mortality occurs is approximately 2,000 acres, with alpine fir comprising 60 per cent of the stand and Engelmann spruce and other tree species 40 per cent. Aerial surveys showed the red-topped alpine fir occurring in small patches in many parts of the stand.

The method used to assess tree mortality and the current status of the infestation was to examine seven prism cruise plots. Each tree on the plot was classified as follows: healthy, red infested (beetles present), red not infested (beetles departed), grey (old attack), and other tree species. The results of these examinations are shown in Table 3.

Table 3. Status of alpine fir on prism plots, Ottawa Hill, 1975

Location of plots	Number of alpine fir trees				Other tree species	
	Healthy	Red infested	Red not infested	Grey	Healthy	Grey
<u>Strip No. 1</u>						
Plot No. 1	6	0	1	3	0	0
" " 2	2	0	0	7	4	0
" " 3	15	0	0	1	10	1
<u>Strip No. 2</u>						
Plot No. 1	4	3	6	3	1	0
" " 2	4	0	0	2	9	3
" " 3	9	0	2	2	1	0
" " 4	4	0	0	0	7	1
Total	44	3	9	18	32	5
Per cent	39.7	2.7	8.1	16.2	28.8	4.5

The relatively large percentage of grey alpine fir trees plus "red not infested" present in the plots, show that mortality has been occurring in this area for the past several years but that recent mortality has declined (red infested).

The grey alpine fir trees have deteriorated with sap rot, checking and woodborer damage evident. The red trees not infested have some evidence of sap rot and woodborer damage, and the infested red trees had young adults and larvae present.

In the East Kootenay, 250 red-top balsam trees were counted along the West Fork St. Mary River and 200 along Whiskey Creek, a tributary of the Spillimacheen River.

Douglas-fir beetle, *Dendroctonus pseudotsugae*

Red-top Douglas-fir trees were observed along the south side of the Kettle Valley from Christina Lake to Rock Creek. A total of 250 trees occurred in small patches and individually. In the East Kootenay, scattered red-top Douglas-fir trees were recorded at Dutch Creek and along Windermere Lake.

Western pine beetle, *Dendroctonus brevicomis*

Small patches and individual yellow-top ponderosa pine trees were observed along both sides of the Kettle Valley from Christina Lake to Rock Creek. A total of approximately 50 trees were counted.

Defoliators

Black army cutworm, *Actebia fennica*

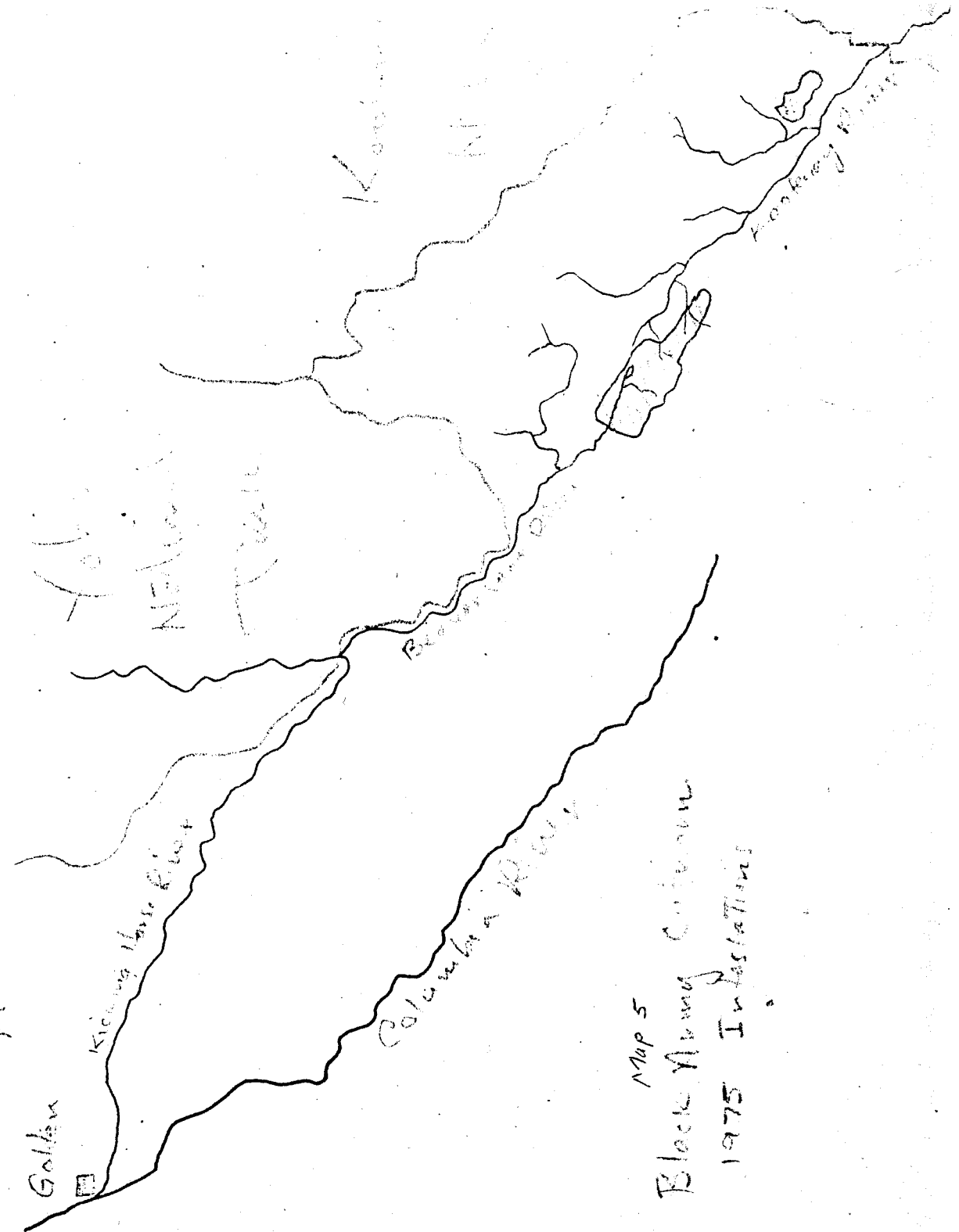
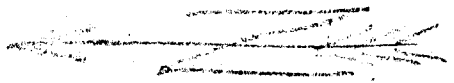
Infestations of black army cutworms caused moderate to heavy defoliation of conifer seedlings planted in the Beaverfoot area southeast of Golden (Map 5). The pest occurred on an estimated 2,500 acres of Engelmann spruce, Douglas-fir and lodgepole pine plantations established on sites burned in 1973 and planted in 1974 and 1975.

Cutworm larvae stripped most of the sparse deciduous ground cover including fireweed, colts foot and willow before feeding on the seedlings. Engelmann spruce and Douglas-fir sustained the heaviest damage; lodgepole pine suffered only light defoliation.

In June, the British Columbia Forest Service sprayed 250 acres of the infested area with the insecticide Dylox. A helicopter was used to apply the insecticide at one pound per acre. Some control was obtained, resulting in lighter defoliation to the seedlings in the treated area.

Parasitism and rodent predation in the pupal stage greatly reduced cutworm populations throughout the infested areas. Duff samples taken in October for overwintering larval counts indicated the infestation had collapsed. No infestations are expected to occur in the Beaverfoot area in 1976.

Cutworms defoliated deciduous plants and shrubs at Bourne Creek north of Revelstoke. Twenty-six acres of the area had been planted with Douglas-fir in June. No damage was found on the seedlings as there was enough deciduous growth to support the cutworm feeding.



Map 5
 Black Army Contaminants
 1975 Installations



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Spruce budworm, *Choristoneura* sp.

Spruce budworm infestations caused spectacular foliage discoloration in high elevation alpine fir - Engelmann spruce stands at McMurdo Creek and along the Spillimacheen River Valley. Heavy defoliation extending from the valley bottom to 6,000 feet elevation covered an estimated 2,000 acres at McMurdo Creek. Defoliation was light to moderate on approximately 7,000 acres along the south side of the Spillimacheen River Valley from Spillimacheen Mountain to Caribou Peak. Infestations are expected to continue in these areas in 1976.

Soolure traps for trapping male spruce budworm moths were set out at seven localities in the District. The results are shown in Table 4. The traps were baited with a sex attractant and coated on the inside with a sticky substance to trap the moths.

Table 4. Average number of *Choristoneura occidentalis* moths trapped in Soolure traps at seven localities, Nelson Forest District, 1975

Locality	Stand type	No. of larvae collected	Avg no. of moths trapped
Wilson Cr	western hemlock	0	12.6
Kuskanax Cr	" "	2	18.6
Galena Bay	" "	0	11.7
Whiteswan L	Douglas-fir	0	45.6
Premier L	" "	0	35.0
Dutch Cr	" "	0	44.2
North White R*	Engelmann spruce	0	49.6

**Choristoneura biennis*

Western false hemlock looper, *Nepytia freemani*

Infestations of western false hemlock looper caused moderate defoliation of Douglas-fir trees at several locations in the Windermere Valley. Defoliation of Douglas-fir occurred on 100 acres at Major Creek on Columbia Lake, 15 acres at Dutch Creek, 80 acres at MacCarthy Lakes, 50 acres at Johnson Creek, and 25 acres at Stoddart Creek. Severe defoliation occurred on 110 acres at Brady Creek.

Egg counts taken in the fall indicate a substantial decline in looper populations at Brady Creek, Columbia Lake and Stoddart Creek, probably due to

a virus infection in the larvae.

There may be isolated areas of defoliation in the Windermere Valley in 1976 since the nuclear polyhedral virus would not effectively control the population in the first year.

Pine needle sheathminer, *Zelleria haimbachi*

Pine needle sheathminers caused foliage discoloration to young lodge-pole pine stands along Torrent Creek northwest of Skookumchuck, Lost Dog Creek northeast of Kimberley, near Skookumchuck Creek, Hahas Lake and near Canal Flats at the confluence of Findlay Creek and Kootenay River.

Larval feeding within the needle sheaths caused the developing needles on the 1975 shoots to discolor and die, giving the infested stands a scorched appearance. Given a mild winter, similar foliage damage could result in 1976, but this pest is not known to cause tree mortality.

Larch casebearer, *Coleophora laricella*

Larch casebearer defoliation of western larch in the southern areas of the District was generally light in 1975. Moderate defoliation occurred in the Creston - Kitchener area and along the east shore of Kootenay Lake north of Creston to Boswell. Light defoliation occurred in the Salmo - Castlegar and Christina Lake areas. Table 5 shows larch casebearer populations at five locations in the Nelson Forest District.

Table 5. Larch casebearer larval populations at five plots, Nelson Forest District, 1971-1975

Location	Avg no. casebearer larvae per 18-inch branch				
	1971	1972	1973	1974	1975
Fruitvale	143	79	8 (15)*	10 (8)*	2 (2)*
Salmo	273	201	15 (16)	6 (6)	14 (16)
Rykerts	69	164	60 (66)	33 (28)	63 (68)
East Arrow Cr	75	94	22 (32)	37 (51)	105 (57)
Yahk	64	16	3 (4)	5 (5)	3 (4)

*Number per 100 fascicles in brackets.

Assessment of data on overwintering larval populations indicates that moderate to heavy defoliation is likely to occur in the spring of 1976 at the East Arrow Creek and Rykerts plot localities, and light defoliation at the Yahk, Salmo and Fruitvale plot localities.

Casebearer larvae and pupae were collected in parasite release plots at Fruitvale and East Arrow Creek to determine the population level of the introduced parasite, *Agathis pumila*, released in 1969. per cent of the casebearers were parasitized by *Agathis* at the Fruitvale plot, and per cent at East Arrow Creek.

A contract to study the native parasites of the larch casebearer was awarded to S. F. Condrashoff in 1974. A total of 15 plots were established by the contractor from Anarchist Mountain in the western part of the District to East Arrow Creek in the East. A small number of parasites imported from Europe and Japan were planted in five areas, mostly on caged western larch infested with larch casebearer, during 1974. Collections from these areas in 1975 showed that the parasites *Agathis pumila* and *Diadegma* had been successful in becoming established at Thrums near Castlegar, Blewett near Nelson, and Sheep Creek south of Salmo.

Parasites imported from Europe and Japan were released in 1975 at the following localities (Table 6).

Table 6. Parasite release sites, Nelson Forest District, July 1975

Locality	Parasite name	Type of release
East Arrow Cr	<i>Agathis pumila</i>	sleeve cage on
	<i>Diadegma nana</i>	wL branches
West Creston	<i>Agathis pumila</i>	free release
Blewett	<i>Agathis pumila</i>	caged wL tree
Thrums	<i>Agathis pumila</i>	caged wL tree
	<i>Diadegma nana</i>	
Pass Cr	<i>Agathis pumila</i>	sleeve cage on wL branches

Imported parasites were reared in 1975 by S. F. Condrashoff to be released in 1976 at a number of localities in the southern areas of the Nelson Forest District where larch casebearer infestations are active.

Larch casebearer eggs collected at Thrums in June were sent to the Victoria Laboratory for examination, which showed that out of 500 eggs examined 92% had emerged, 5% were unhatched and 3% were parasitized.

The five plots established in 1974 to study the effects of larch casebearer defoliation of western larch were examined in late May for defoliation estimates (Table 7).

Table 7. Larch casebearer defoliation estimates at five localities, Nelson Forest District, May 1975

Localities	Degree of defoliation*
Thrums	light
Salmo	light
Rykerts	moderate
East Arrow Cr	moderate
Yahk	light

* light = up to 25% discolored
moderate = 26-50% discolored
heavy = 51-75% discolored
severe = over 75% discolored

European pine shoot moth, *Rhyacionia buoliana*

Approximately 150 Mugho pines, planted in 1968 at the Hi Arrow dam viewpoint, were found to be heavily infested with pine shoot moth larvae in 1974, and 17 Austrian and one Scots pine were lightly infested. The British Columbia Hydro Authority undertook a control program in 1974 by clipping all the infested shoots from the Scots and Austrian pines and clipping all the shoots of the Mugho pines and burning them before moth emergence. They also sprayed all the exotic pines with the insecticide Cygon (dimethoate) several times during the summer of 1974.

Examination of the exotic pines in 1975 showed the Mugho pines were lightly infested with shoot moth larvae and the one Scots pine had two infested shoots; no infested shoots were found on the Austrian pines or on the surrounding native pines. The British Columbia Hydro Authority again undertook control measures by clipping the infested shoots and burning them. They also sprayed the Mugho pines with the insecticide Cygon (dimethoate).

Traps baited with a sex attractant were set out in the surrounding ponderosa pine stands and in the exotic pines to attract adult male pine shoot moths. A total of 15 traps were set out in three areas, to gain a measure of the moth population in these stands. One adult was trapped in the native ponderosa pine stand, and no moths were trapped in the exotic pines at the viewpoint.

Fifteen traps were set out in the Creston area at three localities: five traps at the Wayside Nursery, five traps at Cemetery Hill and five at the J. S. Steele property. No moths were trapped at these three localities.

Gypsy moth, *Porthetria dispar*

Five traps baited with a sex attractant were set out in four of the National Parks to monitor the presence of gypsy moth adults. One trap was set out in Revelstoke Park, two at Glacier Park, one at Yoho and one at Kootenay Park. No gypsy moths were trapped.

Western blackheaded budworm, *Acleris gloverana*

Blackheaded budworm lightly defoliated the new growth of western hemlock trees along the Saddle Mountain road opposite Nakusp. Up to 30 larvae per beating collection were taken in this area. Elsewhere in the District, populations remained at a low level.

Larch budmoth, *Zeiraphera improbana*

A light infestation of larch budmoth persisted in western larch stands along the Monashee Highway near Inonoaklin Crossing. Examination of the stands on June 11 showed the larvae in the prepupal stage. One hundred larvae were collected for rearing at the Victoria Laboratory to see if the parasite *Chrysocharis laricinella* occurs in larch budmoth larvae.

Douglas-fir needle midges, *Contarinia* spp.

Needle midge damage was light in Douglas-fir Christmas tree areas in the East Kootenay in 1975. The percentage of current year's needles infested was Edgewood, five per cent, Canal Flats, three per cent and Invermere and Brisco two per cent.

Hemlock sawfly, *Neodiprion* sp.

Hemlock sawfly larvae were less numerous in 1975, compared with 1974. At Lauretta in Revelstoke National Park, 175 larvae were taken from western hemlock in a beating sample, and 125 larvae collected along the Tangiers River.

FOREST DISEASE CONDITIONS

The organisms currently causing tree mortality, growth loss and quality reduction attributed to diseases are dwarf mistletoes and stem and root rot fungi. Once established in a stand, they persist for many years. They usually intensify at a slow rate, making annual summaries of their status repetitious; for this reason the following report may omit some of the more important diseases. Emphasis is placed on new outbreaks, the status of the annually varying foliage diseases and abnormal weather conditions, i.e. frost, drought, snow damage, etc., which immediately affect tree appearance and often cause dieback and growth loss, and factors influencing the occurrence of the more important diseases are summarized elsewhere.

Fume Damage

Sulphur dioxide fumes which continued to escape from an old mine ventilation shaft near Kimberley, severely discolored Douglas-fir, lodgepole pine and western larch trees on a small area northeast of the fume source. Trees damaged on about 200 acres in 1973 and 1974 have been removed.

Scleroderris canker of pine, *Gremmeniella abietina*

This canker disease was found infecting ponderosa pine at Canal Flats, Ranger Station. Five of 25 trees examined had similar symptoms. Approximately 30 per cent of the lateral tips of four trees had turned yellow; one tree was entirely yellow. This is the first record of it being found in the Nelson Forest District.

Root rot, *Rhizina undulata*

Rhizina fruiting bodies were found growing in a recently planted Douglas-fir plantation at Downie Creek north of Revelstoke. An average of three fruiting bodies per square foot was counted in this area. The Douglas-fir seedlings appeared undamaged.

NELSON DISTRICT

Appendix I

Permanent Sample Stations

There are 142 permanent sample stations in the Nelson District which are sampled annually to monitor defoliator populations. More than one tree species is sampled in many of the locations and it is possible to obtain 343 three-tree beating samples from the 142 stations. Following is a list of the stations showing trees sampled and year of establishment.

Tree sampled	Year established											Totals
	1961	1962	1963	1964	1965	1968	1970	1971	1972	1973	1974	
wH	6	15	6	-	-	3	2	2	3	2	-	39
wC	6	11	4	1	-	3	16	2	2	2	-	47
D	26	21	8	1	2	4	4	4	-	1	-	71
wL	7	13	4	1	1	-	10	3	-	-	-	39
1P	14	12	5	-	1	2	1	5	2	-	-	42
pP	9	3	1	-	-	-	2	-	-	-	-	15
wwP	1	-	-	-	-	1	16	-	-	-	-	18
eS	6	6	5	-	1	-	16	8	3	1	-	46
alF	7	2	2	-	1	-	1	5	2	1	-	21
gF	-	2	-	-	-	-	-	1	-	-	-	3
roJ	1	-	-	-	-	-	-	-	-	1	-	2
	83	85	35	3	6	13	68	30	12	8	-	343

The sampling station records including descriptions are stored in the Nelson Forest District file in room 6 of the Survey building, P.F.R.C.

NELSON DISTRICT

Appendix II

Tree Damage Appraisal Plots

Tree appraisal plots have been established in the Nelson Forest District to follow population trends of some defoliators and to record damage to individual trees.

Following is a list of appraisal plots showing pest, date established and purpose.

Pest	Location	Date established	Purpose
Western hemlock looper	Shelter Bay	1973	defoliation impact
	Goldstream River	1973	" "
Larch casebearer	Fruitvale	1969	larval and parasite studies and defoliation impact
	Salmo	1966	
	Rykerts	1966	
	East Arrow Creek	1969	
	Yahk	1966	
Needle miners <i>Contarinia</i> spp.	Canal Flats	1963	insect population trend and damage appraisal
	Windermere Lake	1963	
	Edgewater	1963	
	Brisco	1963	
Spruce budworm <i>Choristoneura</i> spp. Soolure traps	Kuskanax Creek	1972	monitor spruce budworm moth populations
	Wilson Creek	1972	
	Galena Bay	1972	
	Dutch Creek	1972	
	Whiteswan Lake	1972	
	Premier Lake	1972	
	North White River	1972	

Plot records are on file in the Nelson Forest District file, Room 6, Survey Building, P.F.R.C.

NELSON DISTRICT

Appendix III

PEST REPORTS AND SPECIAL REPORTS
1975

<u>Title</u>	<u>Author</u>	<u>Date published</u>
Black army cutworm infestations in Beaverfoot area near Golden	Jack S. Monts	May 30, 1975
Alpine fir mortality Ottawa Hill near Slocan	E. V. Morris	June 6, 1975
Mountain pine beetle infestations, Nelson Forest District	Ernie V. Morris and Jack S. Monts	July 10, 1975
Western false hemlock looper outbreak in the Windermere Valley	Jack S. Monts and R. Lew Fiddick	July 18, 1975
A lodgepole pine needle miner infestation in Nelson Forest District	Jack S. Monts	July 22, 1975
Spruce budworm infestations within the Spillimacheen tree farm license	Jack S. Monts	July 25, 1975
Mountain pine beetle conditions Nelson Forest District, 1975	E. V. Morris and J. S. Monts	November, 1975