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ANNUAL DISTRICT REPORT  
FOREST INSECT AND DISEASE SURVEY  
BRITISH COLUMBIA, 1974  
PART VI, CARIBOO FOREST DISTRICT

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D. F. Doidge<sup>1/</sup>

PACIFIC FOREST RESEARCH CENTRE  
CANADIAN FORESTRY SERVICE  
VICTORIA, BRITISH COLUMBIA

- FILE REPORT -

DEPARTMENT OF THE ENVIRONMENT

January, 1975

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<sup>1/</sup> Forest Research Technician, Forest Insect and Disease Survey, Victoria, B. C.

## INTRODUCTION

This report outlines the status of forest insect and disease conditions in the Cariboo District for 1974, and forecasts pest population trends. Emphasis is on pests capable of sudden, damaging outbreaks.

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

Regular field work in the District extended from May 22 to Sept. 27. Special surveys were as follows: one week each for Soolure trap program for both one- and two-year-cycle spruce budworms in July and August; forest tent caterpillar egg sampling in late August; sampling Douglas-fir for incidence of *Contarinia* spp. and *Adelges cooleyi*; aerial surveys (Map 2) for beetles in late August, and tree damage plots and egg sampling for two-year-cycle spruce budworm in September.

A total of 300 insect and 35 disease collections were submitted in 1974. Map 1 shows collection localities and drainage divisions.

The numbers of larval defoliators found in field collections increased sharply (40%) due mainly to increased populations of two-year-cycle spruce budworm and *Neodiprion* spp., even though once again the west Chilcotin forests supported relatively few defoliating larvae.

<u>Numbers of larvae collected in field collections</u>		
<u>1972</u>	<u>1973</u>	<u>1974</u>
205	282	717

In the District, 57% of the collections contained larvae, compared with 60% in 1973 and 71% in 1972. Although the per cent positive collections dropped for the third consecutive year, the average number of larvae per positive collection doubled again in 1974.

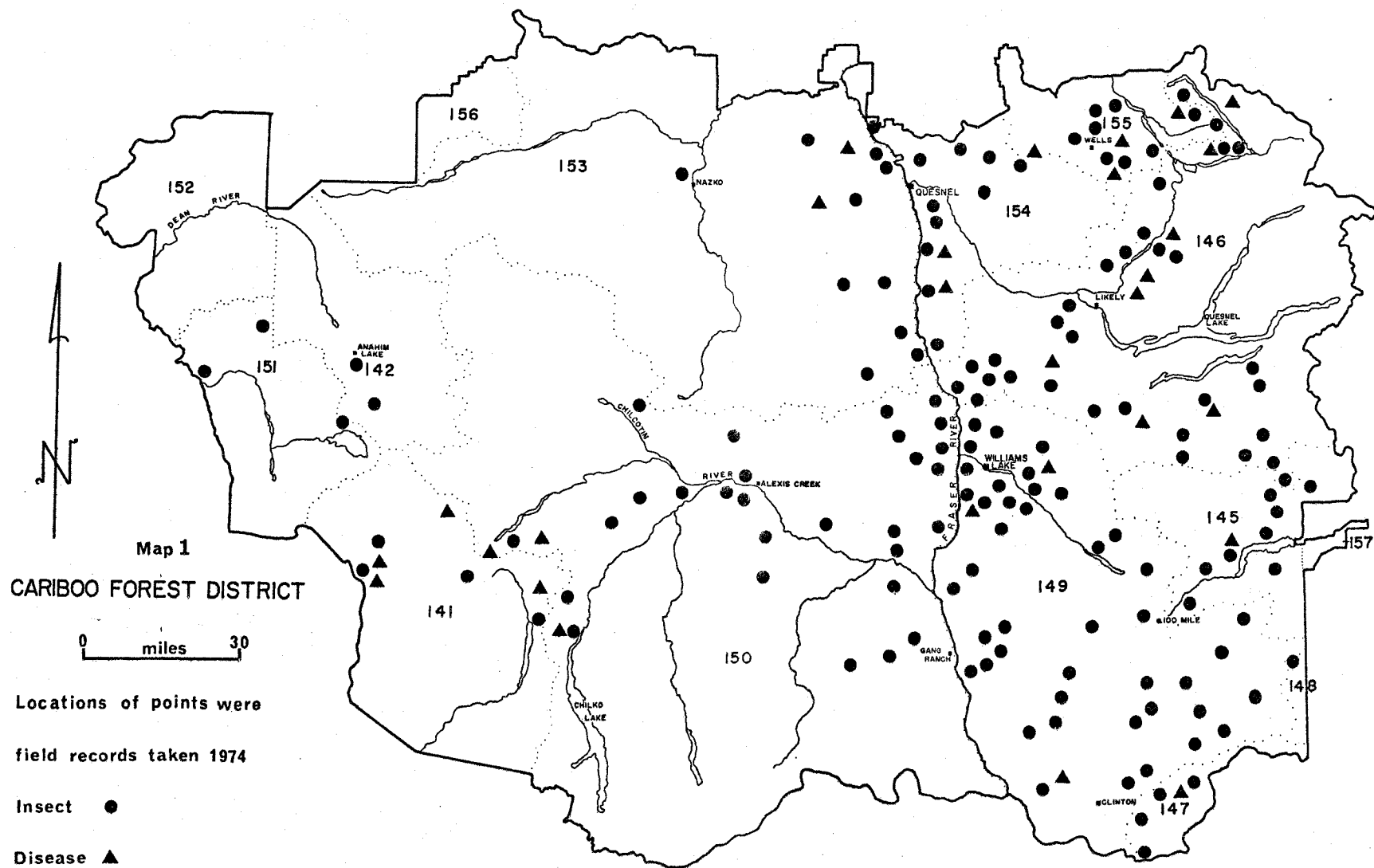
Douglas-fir and mountain pine beetles, potentially the most destructive insects in the Cariboo District, increased in 1974. Mountain pine beetle killed 10,000 lodgepole pines; Douglas-fir beetle killed 7,000 Douglas-fir trees. Spruce beetle and western balsam bark beetle remained at low population levels.

Two-year-cycle spruce budworm increased dramatically on 100,000 acres of spruce and alpine fir in the interior wet belt portion of the District. Forest tent caterpillar, which defoliated 175,000 acres of trembling aspen in 1973, collapsed in 1974 after moderate defoliation of 3,600 acres of aspen. Populations of other defoliating insects remained at low levels.

About 40,000 acres of lodgepole pine and western red cedar were winter-damaged in the District. Disease problems were mainly stem and gall rusts of lodgepole pines in the Cariboo and Chilcotin areas. Dwarf mistletoe continued to infect lodgepole pine stands throughout the District.

Aerial survey time was provided by the British Columbia Forest Service, including a helicopter reconnaissance of the mountain pine beetle infestation along the Klinaklini River.

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





## FOREST INSECT CONDITIONS

### Currently Important Insects

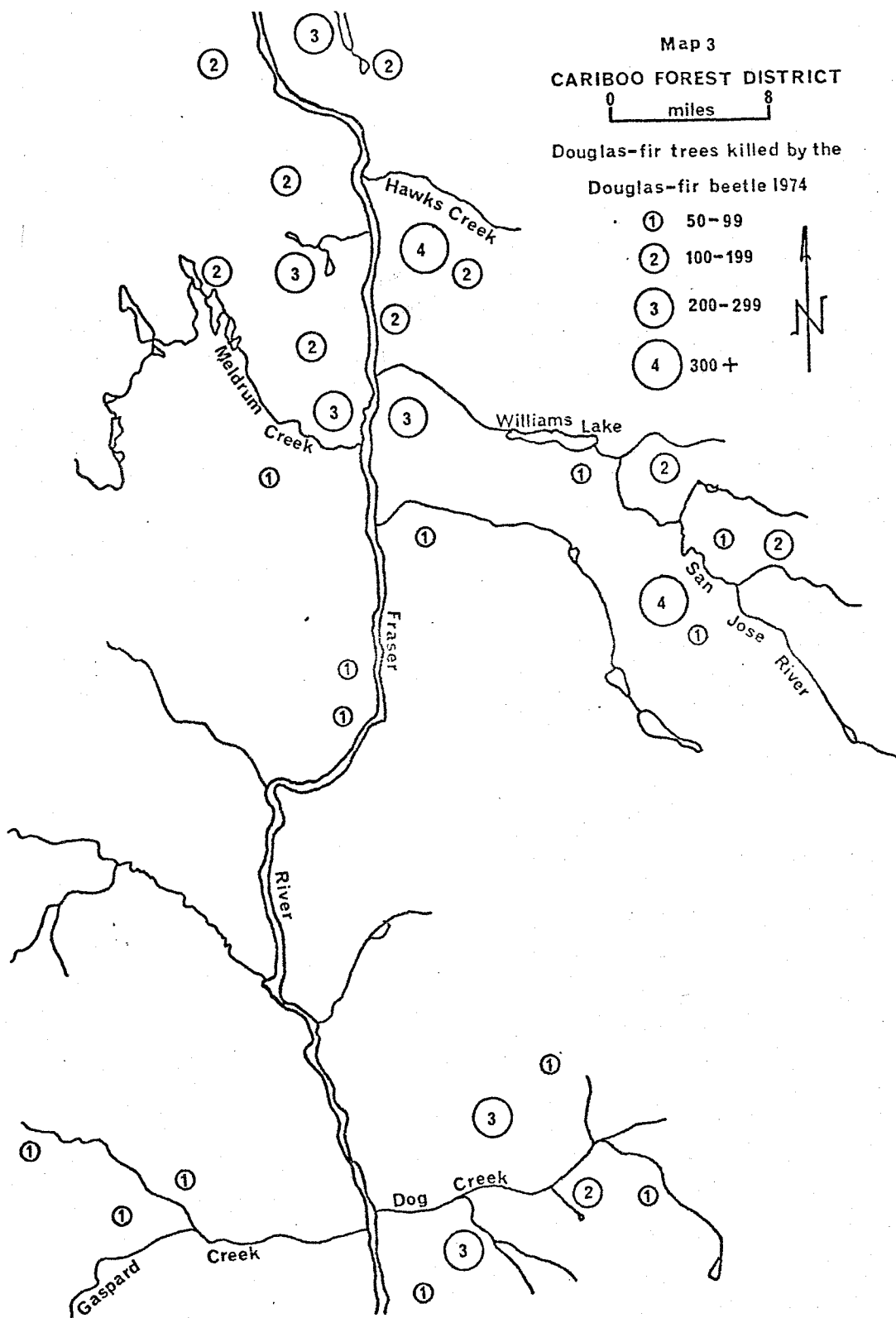
#### Bark Beetles

Douglas-fir beetle, *Dendroctonus pseudotsugae*

Populations of this bark beetle continued an upward trend for the fourth consecutive year. There were 7,500 dead Douglas-fir trees in 1974, as compared with 1,700 in 1973, more than a fourfold increase. The warm, dry summer of 1973 probably weakened the Douglas-fir trees to some extent, increasing their susceptibility to the already increasing beetles.

The concentrations of dead trees were in the vicinities of Williams Lake, along the Fraser River, and Hawk, Meldrum and Dog creeks (Map 3). Specific counts and areas were: Hawks Creek Valley (680), San Jose River, southeast of Williams Lake (525), Buckskin Lake (400), Dog Creek (380), Meldrum Creek (370), Buckskin Creek (320), Gaspard Creek (310), Knife Creek (300), Meldrum Creek to the Fraser River (300), Williams Lake River (275), Timmusket Creek (250), McLeese Lake (250), Gulatch Creek (200), Chimney Lake (200), Snardie Creek (200), Fraser River, across from Buckskin Creek (200), Yorston Lake (200), Duckworth Creek (200), Alexis Creek (200), Vert Lake (150), Jones Creek (150), Canim Lake (150), Bonaparte River (100), Sheep Creek Hill (90), Chimney Creek (80), Bull Canyon (75), Macalister (75), Rayfield River (75), Marguerite (60), Drummond Lake (60), Anahim Reserve (60), Natsy Lake (50), Chilko Ranch (50), Knox Lake (50), Narcosli Creek (40), Lee's Corner (30), Brigade Creek (30), and Enterprise (20).

Greater populations of bark beetles are predicted for 1975 but this could be altered by light snow cover and severely cold temperatures during the winter of 1974-75.



Mountain pine beetle, *Dendroctonus ponderosae*

The numbers of beetle-killed lodgepole pine trees increased dramatically in the District in 1974. Aerial surveys in August revealed 9,700 red-topped pines (Maps 4 and 5). Cariboo Lake and the Klinaklini River are chronic beetle areas, but Bald Mountain, southwest of Riske Creek, is an entirely new infestation. The beetle-killed pines are generally in areas of past winter damage; this may have had some predisposition effect on the lodgepole pine, thus allowing an endemic population of beetles to suddenly surge. Areas of specific counts were: Klinaklini River (3,650), Cariboo River - north end of Cariboo Lake (1,500), Bald Mountain (1,150), Cariboo Lake - Ditch Creek (700), Tyee Lake (700), Little River mouth (400), Beveridge Lake (250), Little Lake (200), Tinmusket Lake (200), Borland Creek (150), Cuisson Lake (150), Granite Mountain (150), Cariboo Bill Lake (100), Dewar Lake (100), Hart Lake (100), Drummond Lake (100), Rose Lake (70), and Narcosli Creek (70).

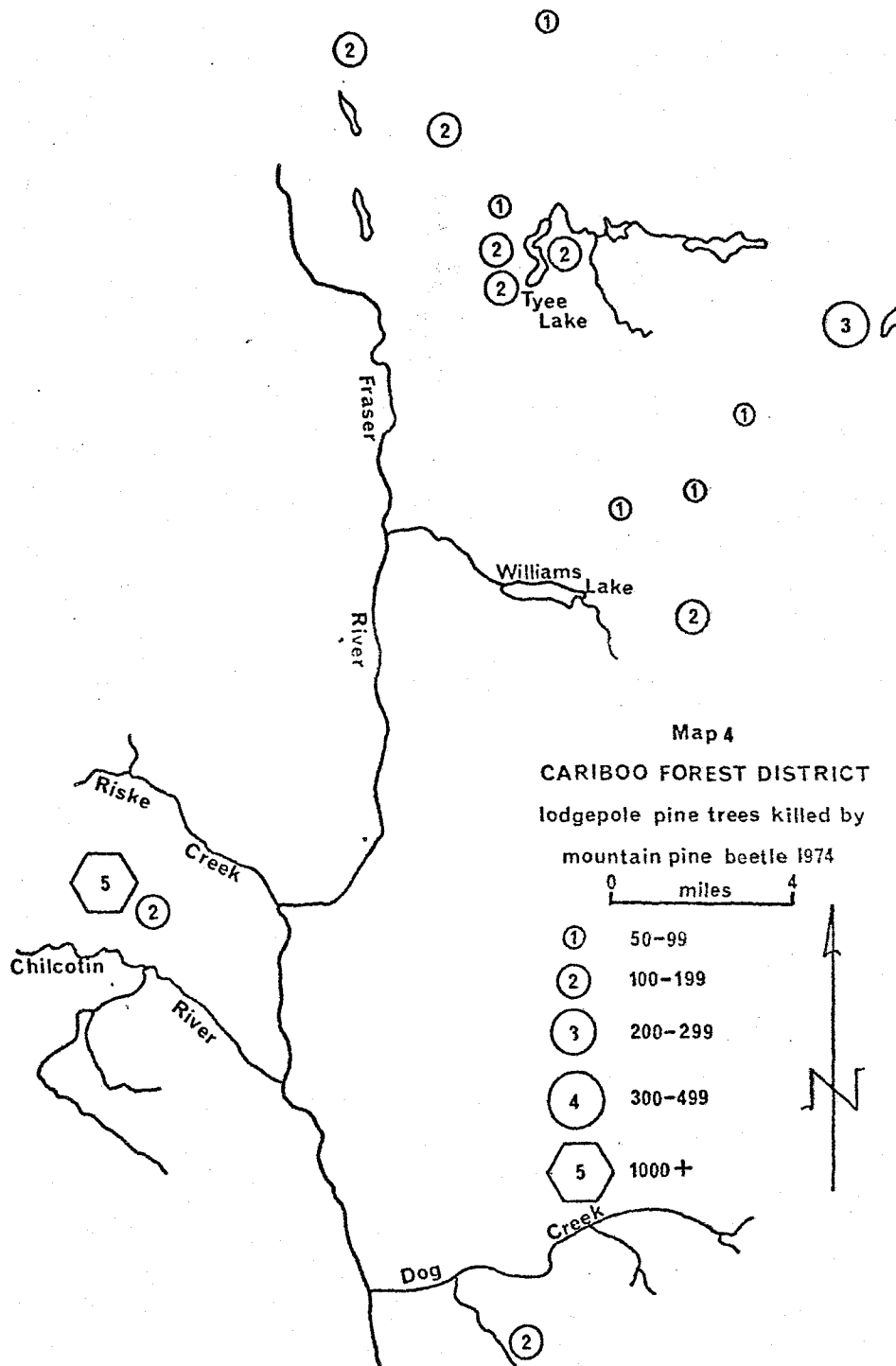
A further increase is expected in 1975 as there were large areas of winter-damaged lodgepole pine in 1973-74. This climatic damage could have predisposed the pine, providing more attractive host material for the beetle. The situation may be affected by severely fluctuating temperatures and light snow cover in the winter of 1974-75.

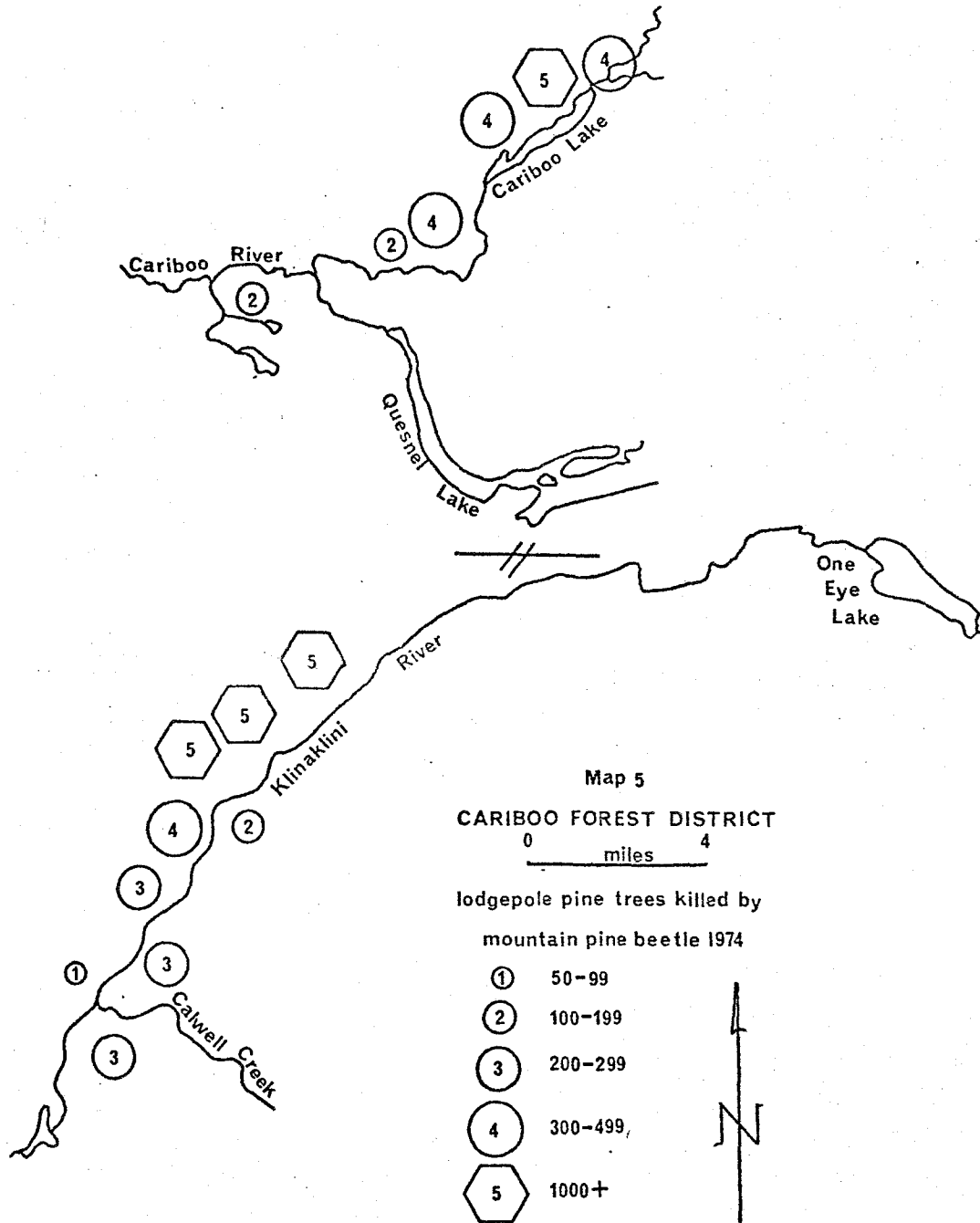
Western balsam bark beetle, *Dryocoetes confusus*, in association with the fungus *Ceratocystis dryocoetidis* Kendr. and Molnar

Alpine fir in high elevation stands have frequently been attacked by the western balsam bark beetle. In 1974, 1,100 alpine fir trees killed by western balsam bark beetle were recorded during aerial surveys. This bark beetle, in association with a fungus, kills trees, therefore even a light attack can cause tree mortality. The fungus causes lesions which destroy the cambium. Specific counts and areas were: Moffat Lakes (500), Sovereign Creek (400), and Buster Lake (200).

A further increase in beetle populations is expected in 1975. In the winter of 1973-74, large areas of high elevation timber suffered winter damage which may increase susceptibility of the alpine fir to attacks of an increasing beetle population.







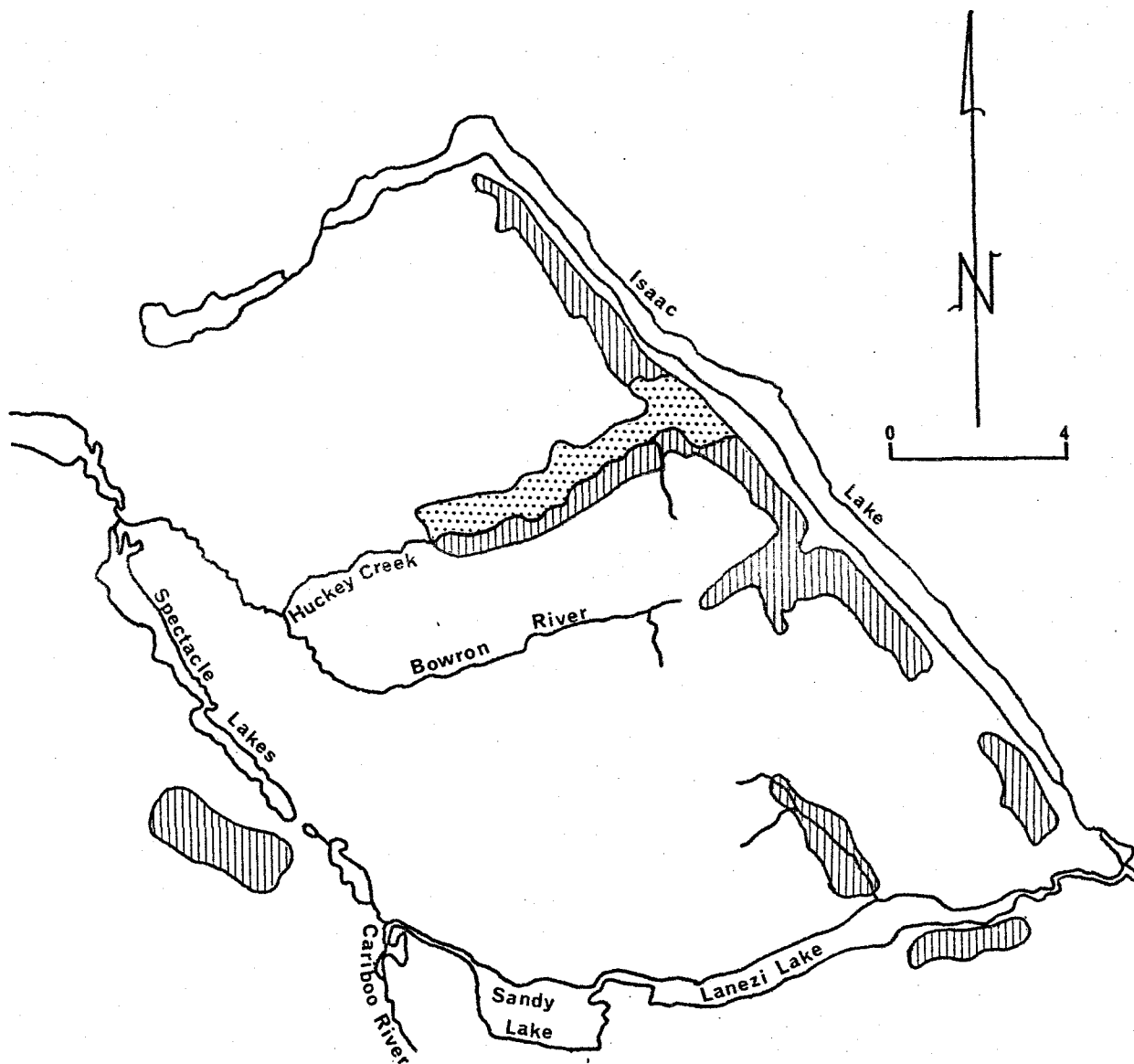
# Defoliators

## Two-year-cycle spruce budworm, *Choristoneura biennis*

This spruce budworm increased greatly in alpine fir, Engelmann and white spruce on over 100,000 acres in 1974, the first major population build-up since the last infestations ended in 1964. Rising populations were noted in the regular larval collections and by light defoliation of alpine fir near Hendrix Lake in 1973, which was the "off" or non-flight year. Most of the overstory defoliation (89,000 acres) was either light or light to moderate. Understory trees at Little River, up to 10 feet in height, were 80-100% defoliated in scattered patches. On July 2, alpine fir trees at Spectacle Lake up to 2 feet high were 100% defoliated, trees 10-20 feet, 50%, and the overstory white spruce and alpine fir approximately 100 feet tall had 100% current and 20% total defoliation. At Hendrix Creek on July 3 there was 100% defoliation of new growth and approximately 15-30% total defoliation, and some top-stripping. Five areas were affected: Hendrix - Bosk - Gotchen - McNeil lakes, MacKay - Horsefly rivers, Little River, Cunningham Creek and the Bowron Lake circle (Maps 6, 7, 8, and Table 1).

Table 1. Acreage of alpine fir, Engelmann and white spruce stands defoliated by two-year-cycle spruce budworm, Cariboo District, 1974

Location	Intensity of defoliation				
	light	light-moderate	moderate	moderate-heavy	heavy
Hendrix Cr	3,200			960	800
Hendrix L	2,020	1,920			
Bosk L	640				
Gotchen L			4,480		
McNeil L	4,640		2,260		
MacKay R	10,400	18,800			
Horsefly R	1,280				1,600
Little R		8,000			
Cunningham Cr	5,440	8,800			960
Spectacle L	2,880				
Turner Cr	1,920				
Lanezi L	1,440				
S. end Isaac L	1,440				
S.W. side Isaac L and Huckey Cr	11,520	4,800			
Totals	46,880	42,320	6,740	960	3,360
Grand Total	100,260				



Map 6

CARIBOO FOREST DISTRICT

Spruce budworm infestations

1974

light

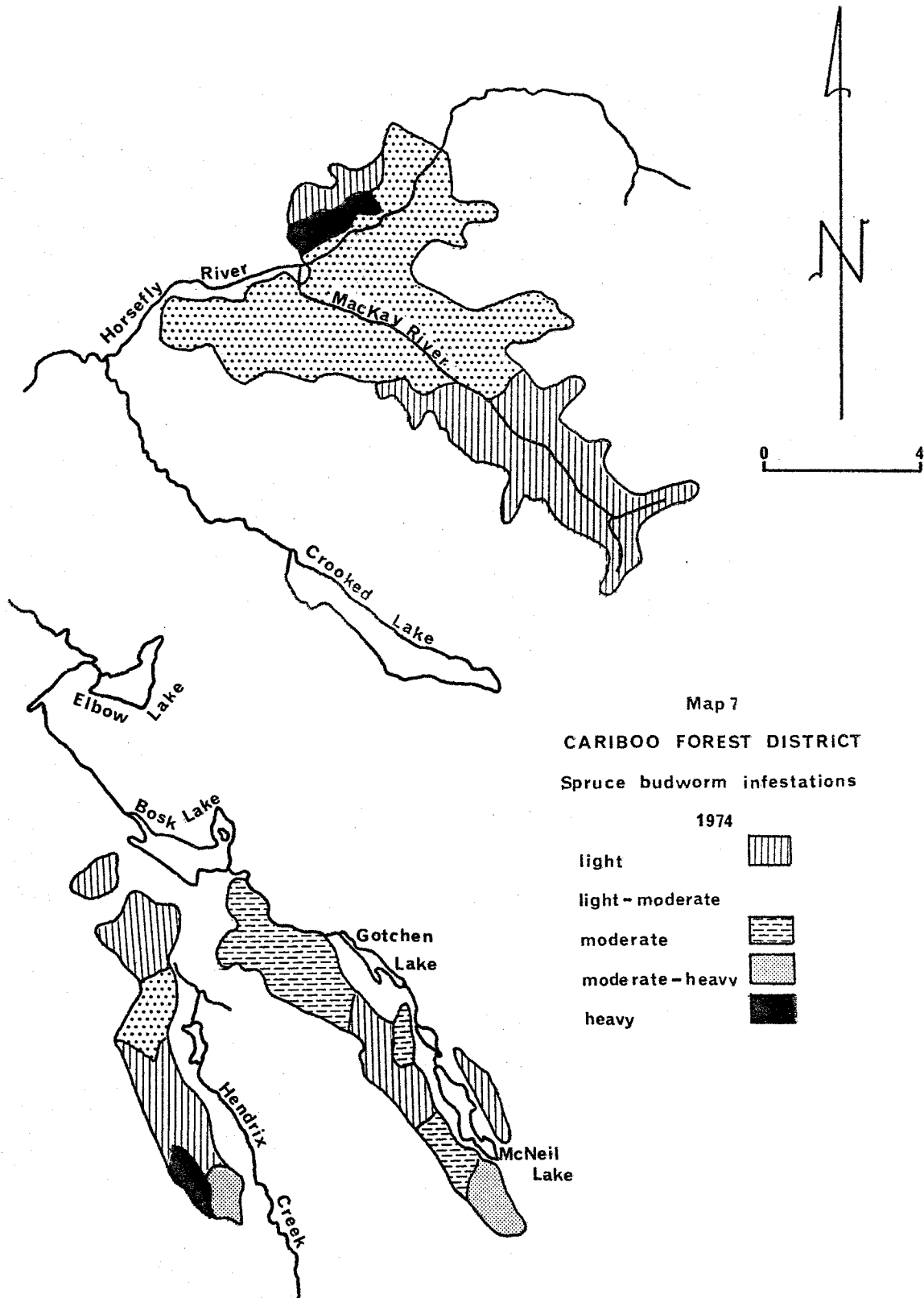
light-moderate

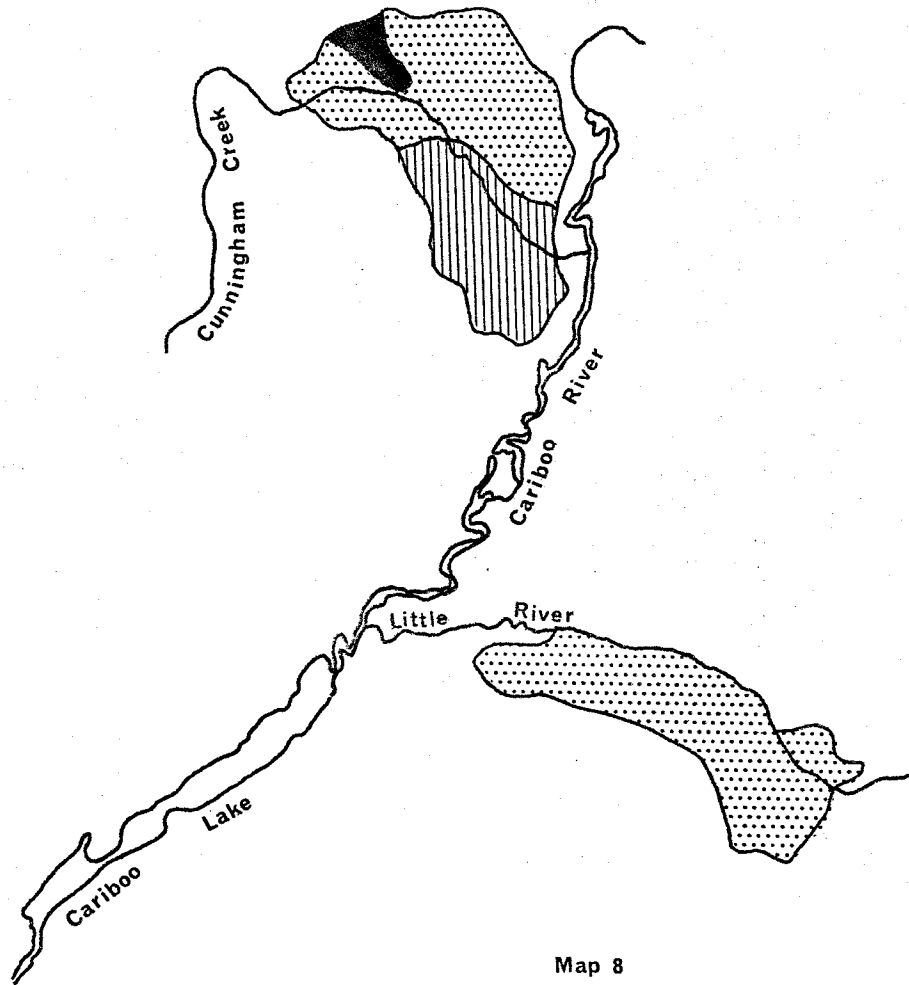
moderate

moderate-heavy

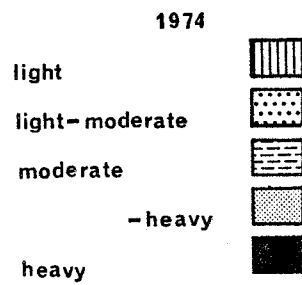
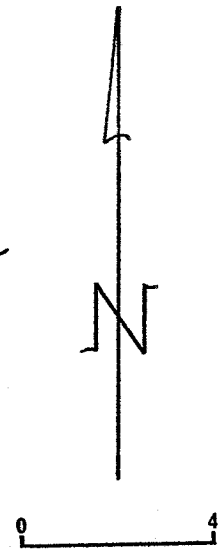
heavy







Map 8  
CARIBOO FOREST DISTRICT  
Spruce budworm infestations



Another method used to assess budworm populations was with sector traps baited with magicaps containing a pheromone Soolure sex attractant (10 mg/cap of trans-11-tetradecenal), set out near Umiti Creek, Wells, Barkerville and Hendrix Creek to attract males in low larval population situations (Table 2). Hendrix Creek was the only area that actually had previous defoliation, and a moderate larval population.

Table 2. Comparison of numbers of spruce budworm larvae taken in beating collections with numbers of male moths in Soolure traps, Cariboo District, 1974

Location	No. larvae in beating collections	Trap	No. of adults per trap
Umiti Cr	1	1	13
		2	7
		3	4
		4	6
		5	<u>7</u>
		Total	<u>37</u>
Wells	0	1	33
		2	30
		3	5*
		4	20
		5	<u>52</u>
		Total	<u>140</u>
Barkerville	3	1	6
		2	6
		3	8
		4	17
		5	<u>2</u>
		Total	<u>39</u>
Hendrix Cr	49	1	80
		2	60
		3	78
		4	65
		5	77
		Total	360

\* Trap damaged.

The Soolure traps were successful in attracting adult male moths even in areas of low larval population. This indicates that probably there was a higher population of adults in the areas than the larval collections indicated. Presumably the density of the adult population is a more reliable indicator for making predictions for 1976 than density of larvae. Use of traps is still in the testing stage, and conclusions from trapping are chancy.

Egg samples were taken in September in five areas to determine population trends. There was visible defoliation in four areas and none in the chronic spruce budworm area at Barkerville. Samples consisted of two 18-inch branches from the mid-crown of either alpine fir or spruce. The eggs were visually counted. Damage appraisal plots containing about 100 trees were also established in the same areas. Predicted defoliation for 1976 was based on the criterion that between 50 and 145 egg masses per 100 square feet of foliage<sup>1/</sup> will result in moderate defoliation, and more than 150 in heavy defoliation<sup>1/</sup> (Table 3).

Table 3. Number of spruce budworm egg masses and degree of defoliation of tree crowns in 1974, and predicted defoliation for 1976, Cariboo District

Locations	Avg no. egg masses per 100 sq ft foliage 1974	Per cent defoliation 1974	Predicted defoliation 1976
Spectacle L	219	13	heavy
Hendrix L	240	12	heavy
Horsefly R	381	41	heavy
Little R	245	11	heavy
Barkerville	0	no plot	light <sup>2/</sup>

*Choristoneura biennis* has a two-year life cycle, with the most extensive feeding damage and later flight of adults on the even years. Therefore only light defoliation can be expected in 1975, as the larvae only develop from second to fourth instars. In 1976, the larvae will feed much more extensively, then pupate, and the ensuing adults will lay eggs. All predictions for a higher population and greater damage are based on 1974 information and will be subject to change because the insect must survive through two winters and two summers of cold and heat, parasites or predators. A limited survey will be conducted in 1975 to determine the status of the population of small larvae.

<sup>1/</sup>M.E. Knight, 1969. Estimating numbers of eggs in western spruce budworm egg masses. Forest Service, U.S. Dep. Agr. 4 p.

<sup>2/</sup>Based on number adults captured in Soolure trap.



Forest tent caterpillar, *Malacosoma disstria*

Populations of the forest tent caterpillar collapsed in 1974, after defoliating 3,600 acres of trembling aspen, much less than the 175,000 acres defoliated in 1973. In 1973, the defoliation was in two main areas; along the Fraser River centered around Quesnel, and along the Horsefly River. Defoliation in 1974 was in scattered patches along the Fraser River from Macalister to Cottonwood Canyon north of Quesnel. The Horsefly River area supported only a light population. Specific areas of defoliated trembling aspen were: Charleson Creek (1,280 acres), Cottonwood Canyon (1,120), Hill Lake (480), Dragon Mountain (320), and Macalister (100).

*M. disstria* overwinter as eggs in masses banded around twigs of aspen. In September, counts of these egg masses were made at three locations to provide forecast data on the 1975 tent caterpillar population (Table 4). High populations forecast for 1974 failed to materialize because a nuclear polyhedrosis disease infected the larvae and contributed to the population collapse.

Table 4. Number of forest tent caterpillar egg masses on trembling aspen, Quesnel area, 1974, and predicted defoliation for 1975, Cariboo District

Location	Tree no.	DBH	No. egg masses collected	Predicted defoliation
Hush L	1	6"	9	light
	2	4"	4	
	3	4"	1	
Dragon L	1	6"	2	light
	2	5"	1	
	3	6"	1	
Quesnel R	1	6"	1	light
	2	5"	1	
	3	4"	0	

Egg sampling in 1974 indicated that populations will be light in 1975, although there will probably still be scattered patches of light to moderate defoliation of trembling aspen on the periphery of the present infestation.

Other Noteworthy Insects

One-year-cycle spruce budworm, *Choristoneura occidentalis*

Douglas-fir in the District supported low populations of this insect - 40% of the collections contained one or more larvae. The only area where budworm damage was noticeable was at Kelly Lake, where light tip defoliation occurred. As in 1973, sector traps baited with magicaps containing a pheromone (10 mg/cap of trans-11-tetradecenal), a sex attractant, were set out near Stuie on the western border of Tweedsmuir Park to attract adult males in a low population situation (Table 5).

Table 5. Comparison of numbers of spruce budworm larvae taken in beating collections with numbers of male moths in Soolure traps, Cariboo District.

Location	No. larvae in beating collections		Trap no.	No. adults per trap	
	1973	1974		1973	1974
Stuie #1	5	2	1	3	2
			2	damaged	0
			3	0	0
			4	11	0
			5	14	2
			Totals	28	4
Stuie #2	0	6	1	9	1
			2	8	0
			3	3	0
			4	8	0
			5	14	0
			Totals	42	1

The results from the Soolure traps are inconclusive when compared year to year; about the only definite conclusion is that traps do attract adult males in low populations. Prediction for 1975 is that there may be a continuing low population.

Conifer sawfly, *Neodiprion* spp.

This insect caused light tip defoliation of Douglas-fir at Borland Creek where 29 larvae were collected in a 3-tree beating. Engelmann spruce also had occasional tip defoliation at Ruth Lake (30 larvae collected), Buffalo Lake (100 larvae), Hawkins Lake (60 larvae), and Timothy Lake (33 larvae). Throughout the District generally, *Neodiprion* spp. was one of the most common insects collected on Engelmann and white spruce, Douglas-fir and lodgepole pine, with 30% of the beating collections containing an average of 9 larvae, compared with 24% and 6 larvae in 1973. No increase in damage is expected in 1975.

Green rose chafer, *Dichelonyx backi*

Lodgepole pine in about a 10-year-old burn had the current growth 20-40% defoliated over about 200 acres near Horn Lake (south of Tatla Lake). No permanent damage is expected.

Cooley spruce gall aphid, *Adelges cooleyi*

This sucking insect attacks Douglas-fir and spruce. Its presence on Douglas-fir is indicated by small, white tufts of wool on the needles. It infests Christmas-tree size Douglas-fir, causing needle discoloration and drop. Five permanent study plots were established in the District in 1973. The percentage of needles infested increased sharply at all plots (Table 6).

Table 6. Percentage of Douglas-fir needles infested by Cooley spruce gall aphid, Cariboo District

Location	% needles infested	
	1973	1974
Clinton	34	61
108 Mile House	50	89
Williams Lake	37	91
McLeese Lake	21	88
Ten Mile Lake	7	68

Specific areas of very noticeable infestation of mature Douglas-fir were at Williams Lake, Horn Lake, and the north end of Chilko Lake. No permanent damage is expected on these trees.

On spruce, the aphid produces cone-like galls on the branch tips. These galls are red when they are forming. No extremely heavy areas were noted although there was a general increase on all Engelmann spruce in the Williams Lake, Lac la Hache and 100 Mile House areas.

A needle midge, *Contarinia* spp.

This midge infests the needles of Douglas-fir, causing them to become distorted and discolored. Even light infestations can degrade Christmas trees and mar the appearance of shade trees. Five permanent study plots were established in 1973 to assess damage. To assess the intensity of infestation, all needles were examined on five branch tips from each of five trees at each plot. There was little change in the percentage of infested needles (Table 7).

Table 7. Percentage of Douglas-fir needles infested by needle midges, Cariboo District

Location	% needles infested	
	1973	1974
Clinton	1	0
108 Mile House	2	2
Williams Lake	2	5
McLeese Lake	4	5
Ten Mile Lake	1	4

No needle midge problem exists in the District, and none is expected in 1975.

Pine terminal weevil, *Pissodes terminalis*

This terminal borer of reproduction lodgepole pine was common throughout the Chilcotin area of the District on trees 10-30 feet in height, usually in old burns or along roadsides. A count of infested trees was made along the highway for one-half mile in a mixed age stand on the west side of the Dean River crossing. Terminal weevils had infested 42 trees, compared with 170 in 1973. Possibly the long, cold spring had an adverse effect on the weevil population.

Pine terminal weevils will probably continue to infest lodgepole pine throughout the Chilcotin.

Table 8. Other insects of current minor significance

Insect	Host(s)	Locality	Remarks
<i>Acleris gloverana</i> western blackheaded budworm	alpine fir	Wingdam	Defoliator. Low population, no damage. No increase expected in 1975.
<i>Dendroctonus rufipennis</i> spruce beetle	Engelmann and white spruce	Quesnel Lake area	Bark beetle. Low populations continued in 1974.
<i>Malacosoma pluviale</i> western tent caterpillar	willow	Lavoie Road	Defoliator. Approximately 1 acre of willow 80-100% defoliated in a swamp. No permanent damage is expected.
<i>Pikonema alaskensis</i> yellow-headed spruce sawfly	Engelmann and white spruce	General	Defoliator. Low populations, no damage.
<i>Pikonema dimmockii</i> green-headed spruce sawfly	Engelmann and white spruce	General	Defoliator. Low population, no damage.

## FOREST DISEASE CONDITIONS

### Currently Important Diseases

#### Physiological Diseases

##### Winter drying

In 1974, about 40,000 acres of lodgepole pine, western red cedar and some areas of white spruce suffered winter drying. The largest area of damage was 10,000 acres along the east side of the Marble Range near Clinton. Other general areas affected were: Klinaklini River, Bowron Lake circle, Cariboo Lake, Wells - Barkerville, and the west Chilcotin. The accessible areas will be checked in 1975 to determine if affected trees may be attacked by bark beetles. Specific areas of damage are listed in Table 9.

Table 9. Areas affected by winter drying in the Cariboo District, 1974

Location	Host(s)	Acres (ha)
E. side Marble Range	1P	10,000 (4,000)
Klinaklini R	1P,wC	4,500 (1,800)
Isaac L	1P,wC	4,000 (1,620)
Lanezi L	1P,wC	2,200 (890)
Blackbear Cr	1P,wC,wS	2,000 (810)
Woodjam Mtn	1P	1,200 (486)
Peavine Mtn	1P	1,500 (607)
Eagle L	1P	1,500 (607)
Seller Cr	1P,wC,wS	1,200 (486)
Loon L	1P	1,200 (486)
Deserters Cr	1P	1,800 (729)
Beaver House Pass	1P,wC,wS	1,000 (405)
Chilko L	1P	1,000 (405)
Little R	1P	1,000 (405)
McKusky Cr	1P	1,000 (405)
Huckey Cr	1P	1,000 (405)
Menzinger Cr	1P	800 (324)
Eveline Cr	1P	800 (324)
Whittier Cr	1P	800 (324)
Borland Cr	1P	600 (243)
Bowron L Rd.	1P,wC	500 (203)
Mt. Skinner	1P	500 (203)
Total		40,100

Normally, the trees affected by winter drying don't suffer permanent damage, however in the past some areas in the District have been hit two years in a row, and lodgepole pine have died as a direct consequence.

### Stem and Branch Diseases

#### Stalactiform rust, *Cronartium coleosporioides*

This rust was common along roadsides and in burns in the Cariboo and Chilcotin on 1 - 3-foot lodgepole pine. At present, infection centers are small and scattered through the District. Along Likely road, 25% of the pine examined were infected; Bluff Lake (40%), Chilko Lake (30%), and Tatlayoko Lake (20%). Stalactiform rusts cause branch and tree mortality by girdling. The disease is perennial and will continue until the host is dead.

#### Western gall rust, *Peridermium harknessii*

This gall rust is a perennial problem of lodgepole pine throughout the District. No specific survey was conducted in 1974; however, in one area along the Hendrix Lake Forest Development Road, 30% of the pines 1 to 3 feet high were infected. This is a short cycle rust, therefore it doesn't need an alternate host and can infect from pine to pine. Pines may be killed by girdling, but usually the result of the infection is deformity of the tree by the rust galls.

### Foliage Diseases

#### Elytroderma disease of pines, *Elytroderma deformans*

This needle cast infects both ponderosa and lodgepole pines in the District. Infection in lodgepole pine stands was not noticeable in 1974. A permanent study plot at Clinton in ponderosa pine showed a small decrease (5%) in infection for the first time in four years. The disease is still classified as moderate, and an increase in damage is not expected.

Table 10. Other diseases of current minor significance

Organism	Host	Locality	Remarks
<i>Epipolaeum abietis</i>	alpine fir	Barkerville	Sooty mold. No apparent injury to affected trees.
<i>Phragmidium</i> sp. leaf rust	rose	General	Common rust affecting leaves of wild roses.
<i>Puccinia coronata</i> leaf rust	soopallallie	General	Common as usual.
<i>Pucciniastrum goeppertianum</i> fir-blueberry rust	alpine fir	Barkerville	Foliage disease. Causes discoloration of previous year's needles.