

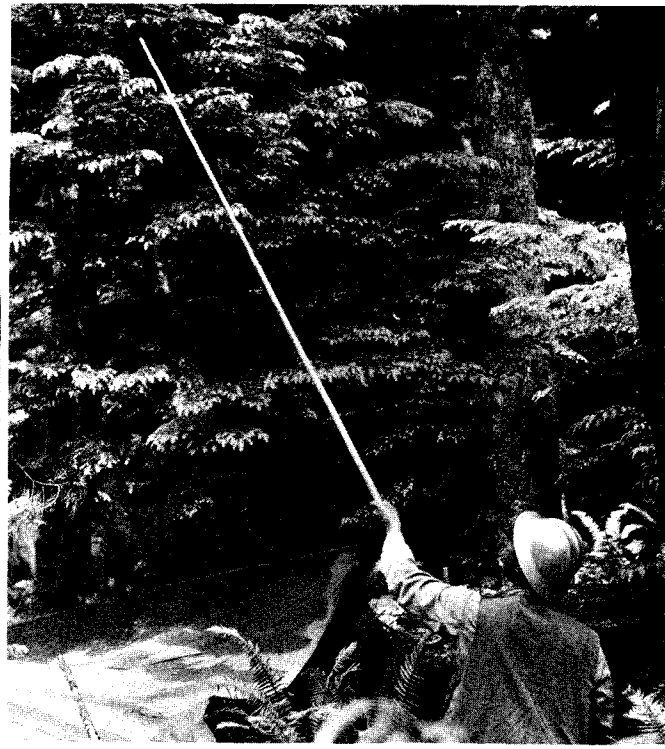
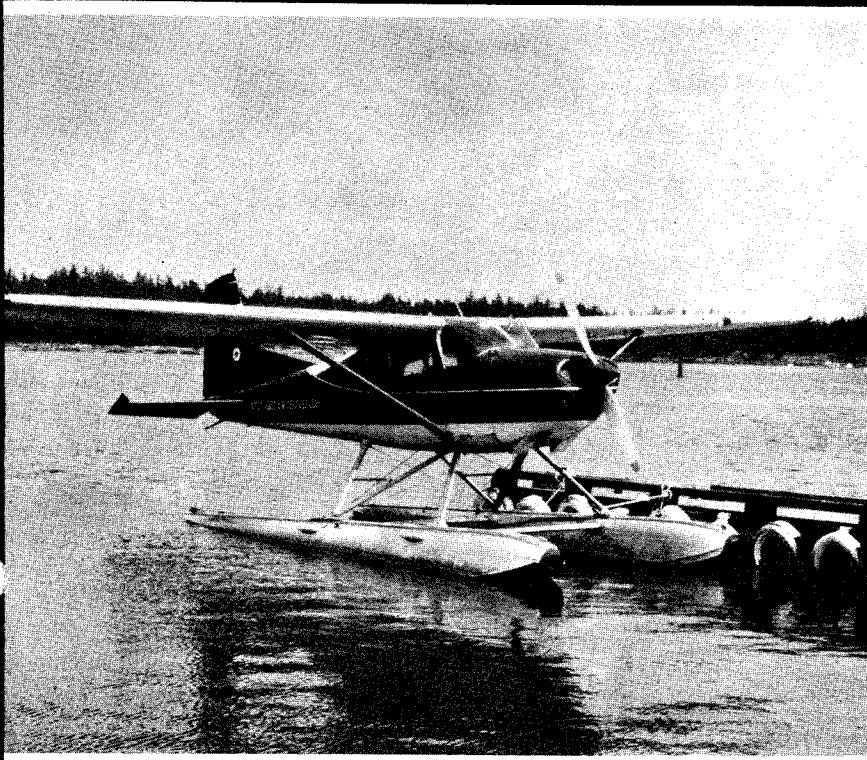
1972 ANNUAL DISTRICT REPORT  
FOREST INSECT AND DISEASE SURVEY

# Nelson Forest District

BC-X-77 PART FIVE

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PACIFIC FOREST RESEARCH CENTRE • CANADIAN FORESTRY SERVICE • VICTORIA, B.C.



ANNUAL DISTRICT REPORT  
FOREST INSECT AND DISEASE SURVEY  
BRITISH COLUMBIA, 1972  
PART V, NELSON FOREST DISTRICT

by

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CANADIAN FORESTRY SERVICE  
VICTORIA, BRITISH COLUMBIA  
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DEPARTMENT OF THE ENVIRONMENT

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## INTRODUCTION

This report outlines the status of forest insect and disease conditions in the Nelson Forest District for 1972, and attempts to forecast pest populations capable of sudden, damaging outbreaks.

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

Regular field work in the District began on May 15 and ended November 3. Special surveys were as follows: larch casebearer, May 17 to 19; aerial, July 31 to August 4; hemlock looper egg and mountain pine beetle, September 18 to 23, and overwintering larch casebearer October 31 to November 3.

A total of 484 insect and 102 disease collections were submitted to the Pacific Forest Research Centre in 1972. Map 1 shows collection localities and drainage divisions.

Numbers of larval defoliators found in field collections increased from last year; in the western and eastern parts of the District, 87 and 81% of beating collections, respectively, contained larvae.

The mountain pine beetle and larch casebearer were again the major insect problems in the District. Western white pine red-top counts totalled over 22,000 trees and lodgepole pine, over 6,000. The largest concentrations of red-top white pine occurred in the Upper Arrow and Trout lakes area. The number of beetle-killed lodgepole pine trees decreased at Elk Creek in the East Kootenays and at Kallis Creek in the West Kootenays. Spruce beetle populations were light in Engelmann spruce stands. The larch casebearer defoliated western larch trees at several localities in the southern part of the District. Hemlock looper larvae caused light defoliation of western red cedar and western hemlock along the Upper Arrow Lake and along the Columbia River from Revelstoke to Boat Encampment. Filament-bearer larvae caused moderate defoliation of western hemlock near Nakusp and at Trout Lake. Tent caterpillars defoliated deciduous trees and shrubs in the Trail - Warfield area, at Revelstoke and Golden.

A needle blight disease caused discoloration and defoliation of western larch in higher elevation stands in the southern part of the District. Winter damage was evident in lodgepole pine stands at a number of localities in the eastern part of the District.

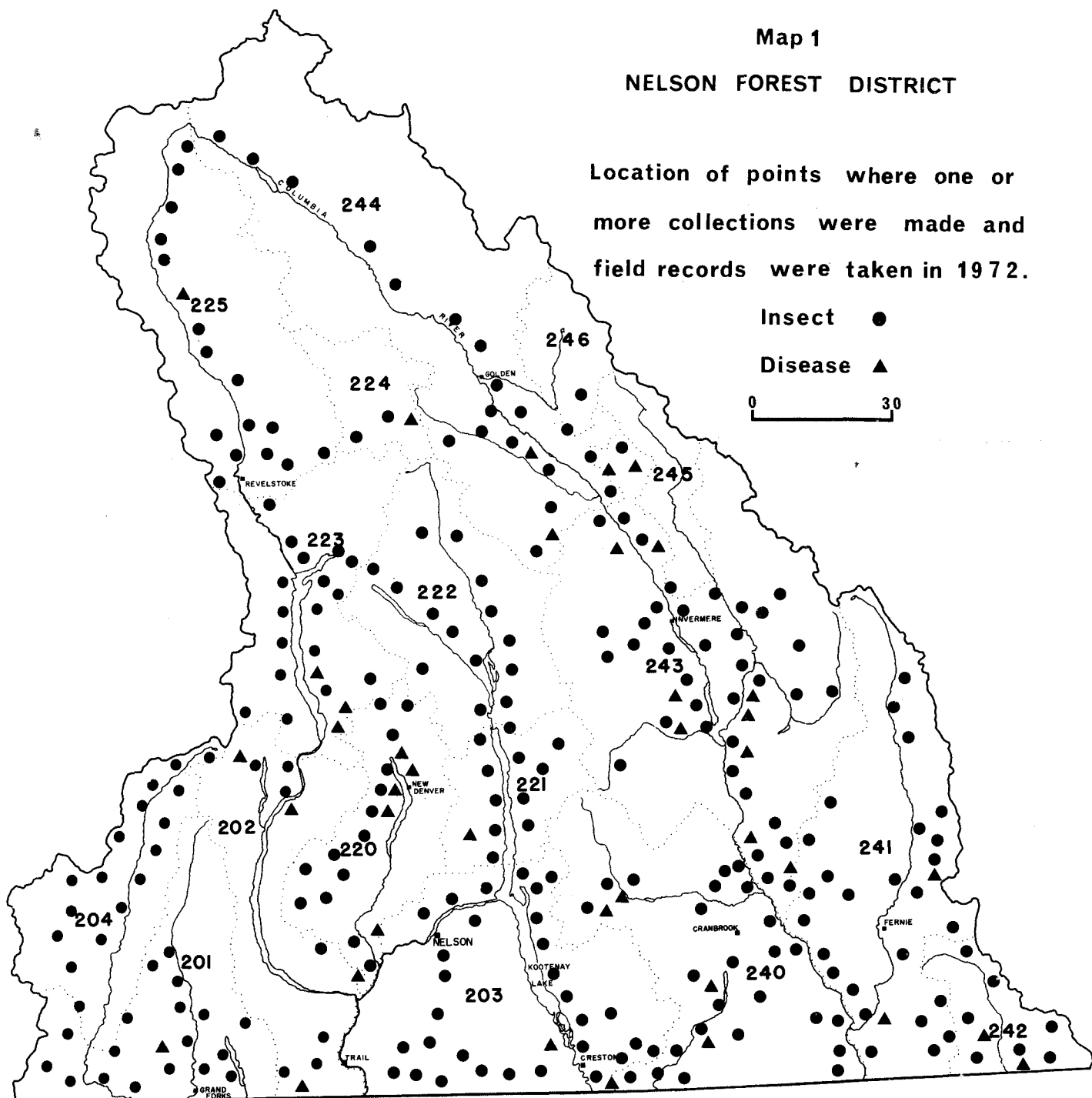
Details on individual insect and disease problems appear in subsequent sections.

Map 1  
NELSON FOREST DISTRICT

Location of points where one or more collections were made and field records were taken in 1972.

Insect ●

Disease ▲



FOREST INSECT CONDITIONS

Currently Important Insects

Bark Beetles

Mountain pine beetle, Dendroctonus ponderosae

There was a decrease in the number of western white pine and lodgepole pine red-tops in 1972. Over 22,000 western white pine red-tops were counted in wet belt areas of the District; the highest concentrations were along the Upper Arrow Lake, Armstrong - Trout lakes and Erie Creek in the Salmo District. More than 6,000 red-top lodgepole pine trees were counted; the highest numbers were at Elk Creek and Redgrave in the East Kootenays and at Kallis Creek in the West Kootenays (Table 1).

Table 1. No. red-top pine trees determined by aerial and ground surveys, Nelson Forest District, 1972

Pine species	Locality	No. trees
Western white	West side Upper Arrow L	8,340
	East side Upper Arrow L	3,200
	Galena Pass	450
	Northeast Arm Arrow L	490
	Shelter Bay to Revelstoke	445
	Akolkolex R	190
	Incomappleux R	150
	Armstrong - Trout L(s)	2,815
	Lardeau R	790
	Duncan L and R	885
	North end Kootenay L	1,345
	Erie Cr (Salmo)	1,350
	Little Slocan L(s)	65
	Mt. Revelstoke National Park	110
	Tangier R	25
	Illecillewaet R	150
	Jordan R	85
	Columbia R (Revelstoke to Boat Encamp.)	650
	Kinbasket L	125
	Bush L(s)	400
	Total	22,060

Table 1. (Concluded)

Pine species	Locality	No. trees
Lodgepole	Kallis Cr	2,000
	Stirling Cr	30
	Dale Cr	20
	Elk Cr area	2,550
	North White R	245
	Kootenay R	150
	Lussier R	340
	Redgrave	975
	Bush R	150
	Total	6,460

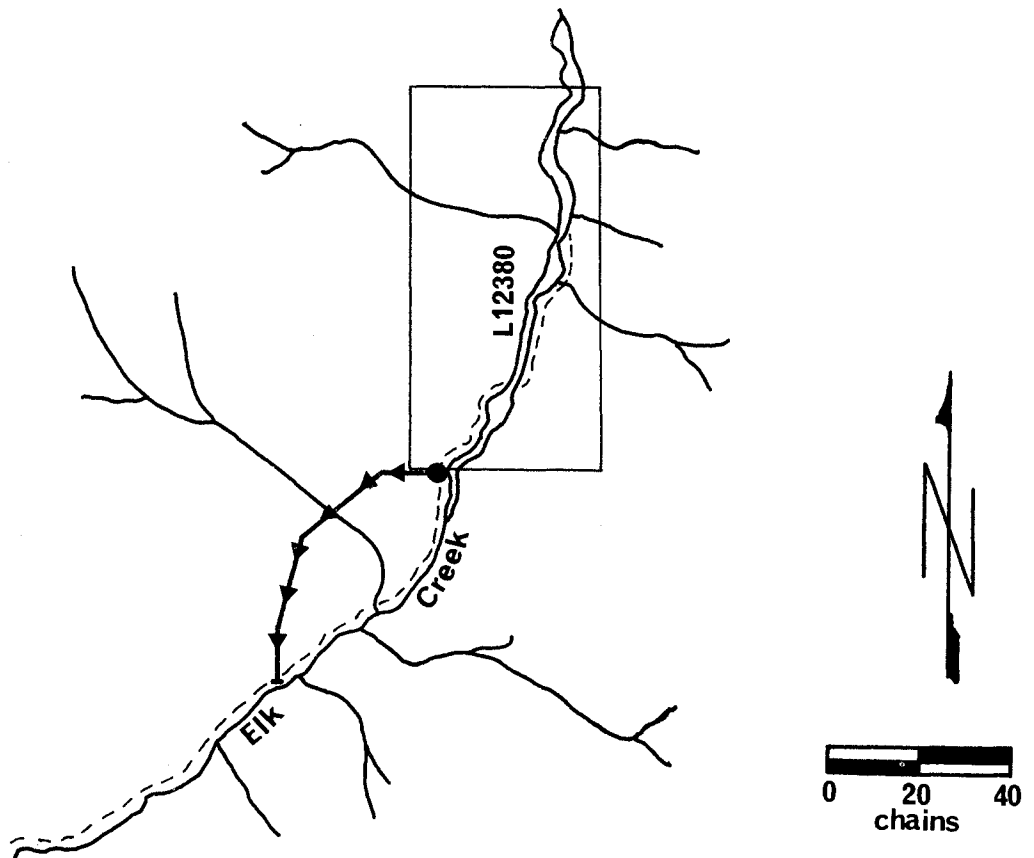
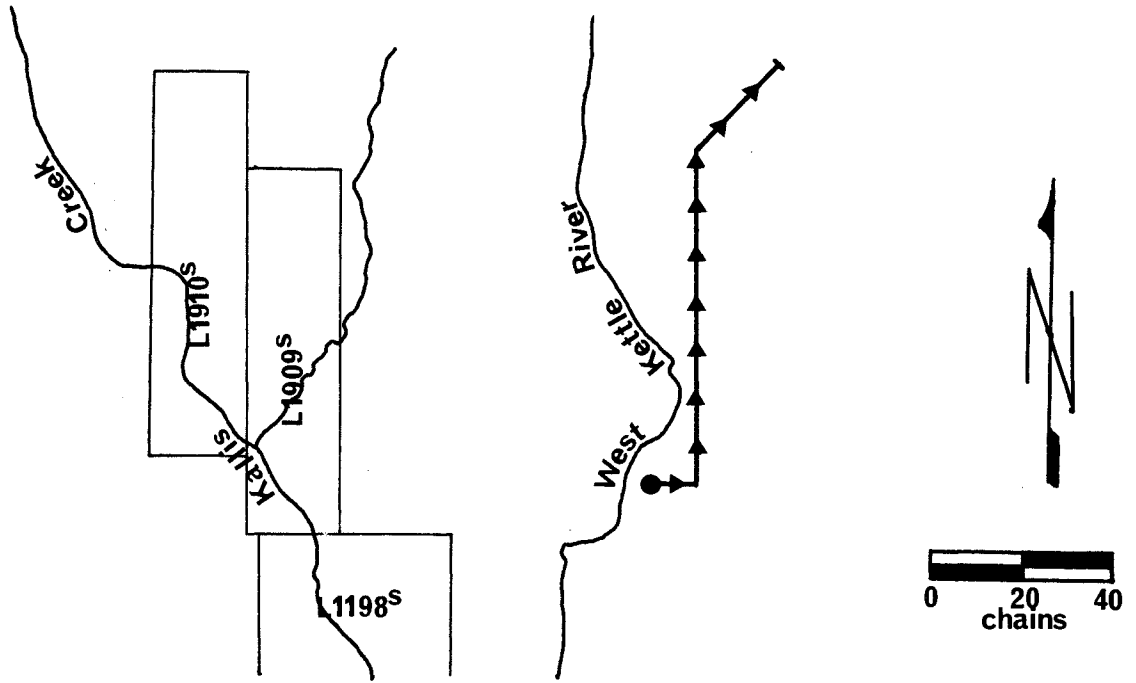
Two cruise strips, totalling 140 chains in length, with prism plots every two chains, were run in the Elk and Kallis creeks infestations (Map 2). Lodgepole pine trees in the plots were classified by the year of beetle attack, as follows:

Location	% Not attacked		% attacked				Average	
	Healthy	Green	1972	1971	Prior to 1971	D.b.h.	Height	
Elk Cr	65	7	9	10	9	14"	105	
Kallis Cr	83	6	10	1	0	12"	85	

At Elk and Kallis creeks, attacks were lighter in 1972 than in 1971. There were moderate numbers of overwintering mountain pine beetles in 1972-attacked trees. Most were in the larval stage, although some parent adults were present. Sanitation logging has reduced the number of infested trees at these two areas.

Salvage logging of beetle-killed western white pine has reduced the number of infested trees in the Armstrong Lake infestation. Salvage logging of beetle-killed white pine is planned for the Cusson Creek infestation in the Upper Arrow Lake area.

Map 2  
Location of prism cruise strips  
in mountain pine beetle infestations  
Nelson Forest District  
September, 1972



Spruce beetle, Dendroctonus rufipennis

No new spruce beetle attacks were observed on standing Engelmann spruce trees during aerial or ground surveys in 1972. There were moderate broods of larvae in current windfelled Engelmann spruce at Line, Sage and Bighorn creeks but none at Burnham, Lodgepole and Kilmarnock creeks. Populations are expected to remain at low density levels in 1973.

Douglas-fir beetle, Dendroctonus pseudotsugae

Increased numbers of red-top Douglas-fir trees, killed by the Douglas-fir beetle, were recorded during aerial and ground surveys. In the East Kootenays, scattered attacks were generally confined to small patches on the bench lands along the Kootenay and Columbia rivers from Skookumchuck north to Edgewater, as follows: Skookumchuck Creek (70); Kootenay River (75); Lussier River (40); Columbia Lake (35); Kootenay Park (25) and Wigwam River (55). In the West Kootenays, there was an increase in the number of red-tops counted. A total of 455 trees were recorded at the following localities: Duncan Lake (350); Burton (10); Cascade (25); Stewart Creek (25); Greenwood (15) and Kelly River (30).

Dryocoetes-Ceratocystis complex

Aerial surveys during August showed light alpine fir mortality in high-elevation spruce-balsam stands in the East Kootenays. Counts of red-top trees were as follows: Bighorn Creek (295); Alexander Creek (60); Bull River (50); Palliser River (260); Munroe Lake (60); Luxor Creek (50); Spillimacheen River (390); Bobbie Burns Creek (200); Kootenay National Park (125); Glacier National Park (40).

Ambrosia beetle, Trypodendron sp.

An examination was made of 10 cedar pole decks at Glacier Creek in the Lardeau area for ambrosia beetle damage. Nine of the pole decks were cut in 1972; no significant beetle damage was found in these decks. The cedar poles in one deck cut in 1971, had surface poles with up to six ambrosia beetle entrance holes per square foot, penetrating up to one-quarter inch.

Defoliators

Larch casebearer, Coleophora laricella

Distribution of the larch casebearer remained about the same as 1971, except north of Crescent Valley, where larvae were found for the first time at Winlaw in the Slocan Valley.



Larch casebearers caused moderate to heavy defoliation of western larch at a number of localities in the southern part of the District (Map 3). Heaviest defoliation was along the International Boundary from Cascade east to Roosville, north along the Columbia and Kootenay rivers to Nelson, along the west arm of Kootenay Lake to Balfour and north of Creston to Boswell. Defoliation was confined to stands below 3,000 feet elevation.

Casebearer larvae and pupae were collected in parasite release plots at Fruitvale and East Arrow Creek to determine if the parasite, Agathis pumila, released in 1969, had become established. Seven Agathis parasites were recovered from the Fruitvale collection of 100 casebearer pupae and three from the 100 pupae from East Arrow Creek near Creston.

Populations of overwintering casebearers were sampled in November for forecasting defoliation in 1973 (Table 2).

Table 2. Larch casebearer larval populations at five plots, Nelson Forest District, November 1972.

Location	Average no. casebearer larvae per 18-inch branch			
	1969	1970	1971	1972
Fruitvale	34	92	143	79
Salmo	67	275	273	201
Rykerts	24	312	69	164
East Arrow Creek	37	177	75	94
Yahk	13	120	64	16



Assessment of the density of overwintering larval populations indicates that heavy defoliation of western larch trees will probably occur at Salmo and Rykerts, with moderate defoliation at East Arrow Creek and Fruitvale, and light defoliation at Yahk.

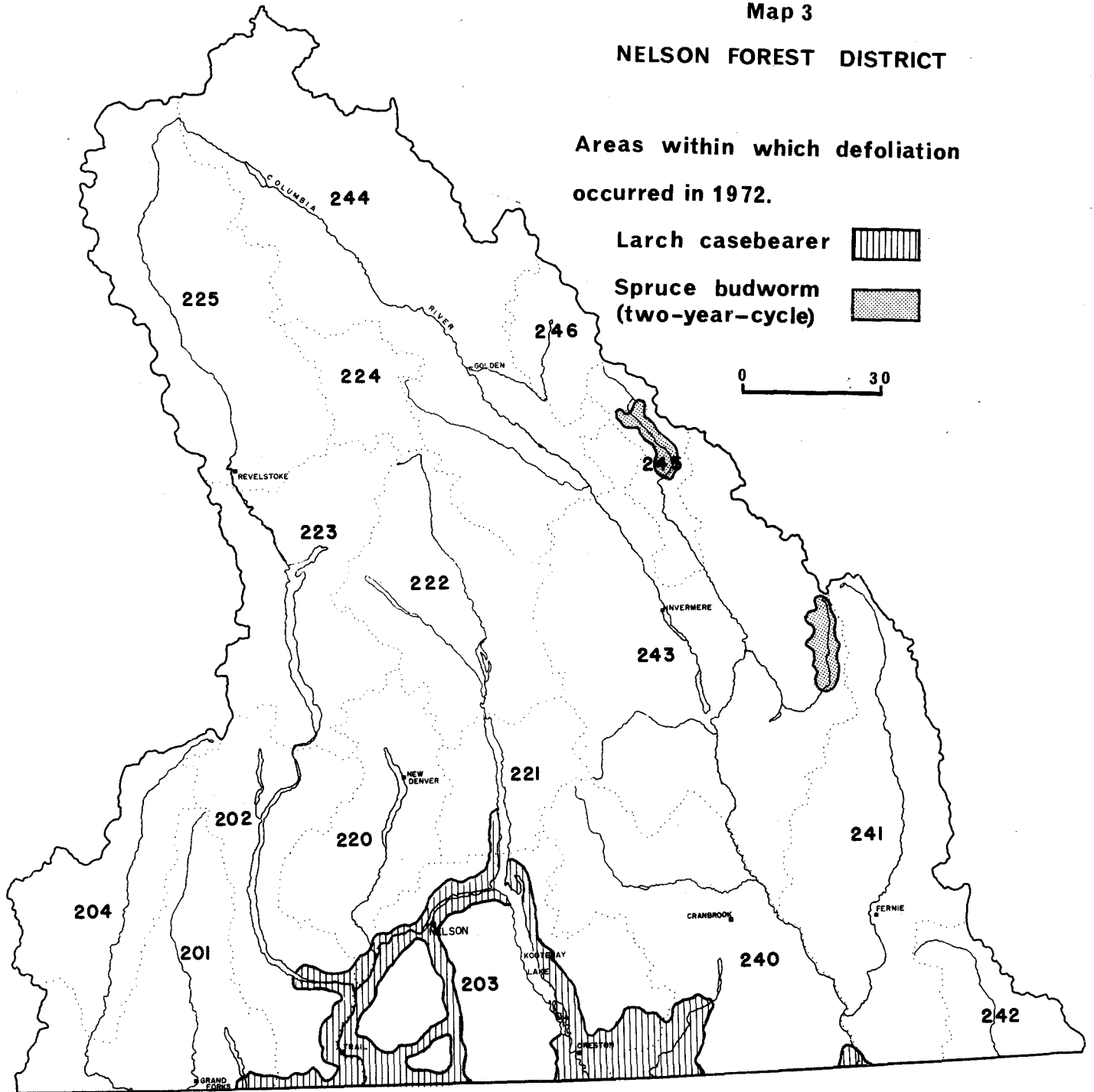
Two-year-cycle spruce budworm, Choristoneura biennis

An infestation of two-year-cycle spruce budworms caused moderate and occasionally severe defoliation of high-elevation mature alpine fir and Engelmann spruce trees on some 17,000 acres west of Canal Flats in the North White River Valley (Map 3). Large populations of larvae caused up to 100% defoliation of the current foliage of understory and pole-sized trees. Occasional alpine fir saplings were completely defoliated and the lower crown of mature trees were lightly defoliated. Beating samples from alpine fir and Engelmann spruce contained 650 and 275 larvae, respectively. Larvae sent to the Insect Pathology Research Institute at Sault Ste. Marie, Ontario, in June, contained a virus Entomopox, which may reduce the population.

Map 3  
NELSON FOREST DISTRICT

Areas within which defoliation  
occurred in 1972.

Larch casebearer   
Spruce budworm  
(two-year-cycle) 



There was light defoliation of understory Engelmann spruce trees on 22,000 acres along Vermillion River in Kootenay National Park from Vermillion Crossing north to Mt. Whympier.

Large moth flights in August at both infestations indicate that a significant population will continue. In 1973, C. biennis larvae will be in the first year of a two-year-cycle, and defoliation will be restricted to bud damage.

Western hemlock looper, Lambdina fiscellaria lugubrosa

In 1972, hemlock looper populations increased in mature and overmature hemlock-cedar forests in the wet belt areas of the District. The largest numbers of larvae were found along the Upper Arrow Lake, from Arrow Park to Revelstoke, and along the Big Bend Highway from Revelstoke to Boat Encampment. Light defoliation was observed in these areas on western red cedar and western hemlock.

During September, there were large moth flights at Nakusp, Revelstoke, Downie and Mica creeks. Egg sampling in late September showed a moderate to heavy overwintering egg population at Mica Creek, Goldstream River and Downie Creek, and a light egg population at Kuskanax Creek near Nakusp.

If the climate is favorable to the insect during the winter and spring of 1973, moderate to severe defoliation can be expected in the Big Bend area and light defoliation along the Upper Arrow Lake.

Filament bearer, Nematocampa filamentaria

Filament bearer larvae were present in high numbers at several wet-belt localities of the District in mature hemlock-cedar stands. They caused heavy defoliation of understory hemlock along the Kuskanax Creek Road from mile 8 to 12, along the Trout Lake road south of Trout Lake townsite and along the Keen Creek Road near Kaslo.

In August, at Kuskanax Creek and Trout Lake, filament bearer larvae were small and apparently in poor condition. Larvae sent to the Pathology Research Institute at Sault Ste. Marie showed no evidence of disease or virus.

No overwintering eggs were found on samples of hemlock and cedar bark and lichen at Kuskanax Creek.

### Other Noteworthy Insects

#### Forest tent caterpillar, Malacosoma disstria

Tent caterpillars caused moderate to heavy defoliation of trembling aspen and other deciduous trees and shrubs along the east side of the Columbia River from Revelstoke to Wigwam, along the Columbia Valley from Donald to Parsons, and in the Trail - Warfield area. In September, there was a moderate overwintering egg population in these areas. If the climate is favorable to the insect during the winter and spring of 1973, moderate defoliation can be expected again.

#### Larch sawfly, Pristiphora erichsonii

Larch sawfly again caused light defoliation of pole-sized and mature western larch trees in mixed and pure stands along the Blueberry-Paulson Highway and along the Rossland Cutoff.

#### Blackheaded budworm, Acleris gloverana

Beating samples from western hemlock yielded 20 larvae at Keen Creek near Kaslo and 13 larvae at Koch Creek near Passmore. These were areas of heavy infestation in the blackheaded budworm outbreak in the mid 1960's. Beating samples in other areas of the District showed the budworm to be at a low population level with just the occasional larva collected.

#### Spruce budworm, Choristoneura occidentalis

Up to 15 spruce budworm larvae were taken in beating samples at Kuskanax Creek in association with the filament bearer. Samples from other areas of the District showed the one-year-cycle spruce budworm to be at low population levels.

#### Douglas-fir needle midges, Contarinia spp.

Foliage damage by needle midges on Douglas-fir Christmas trees in the East Kootenays was light in 1972. The only significant damage was in a plot at Invermere, where occasional trees had up to 20% of the new foliage infested. An average of one per cent of the new needles were infested in plots at Canal Flats, Edgewater and Brisco. In the West Kootenays, moderate foliage damage was evident at Grand Forks.

#### Spruce weevil, Pissodes strobi

Seven plots of 100 trees each were examined for incidence of weevil attack in spruce plantations and one in natural regeneration (Table 3). Trees were tagged for future examination.

Table 3. Locations of spruce weevil plots and incidence of attack, Nelson Forest District, 1972

Location	Year planted	Acres	% attack
Rodd Creek	1964	40	0
Banting Creek	1965	78	0
Kuskanax Creek	1956	31	0
Sullivan Creek	1966	160	0
Pitt Creek	1963	12	0
Yahk River	1963	30	0
Gold Creek	1965	126	0
Wildhorse River	(natural regeneration)		0

Table 4. Other insects of current minor significance

Insect	Host	Locality	Remarks
<u>Anoplonyx</u> spp. Conifer sawflies	Western larch	Nelson District	Defoliators. Wide- spread; common in collections.
<u>Conophthorus</u> <u>monticolae</u> Cone beetle	Western white pine cones	Crawford Bay	Up to 25% of the cones were infested.
<u>Nepytia</u> <u>freemanni</u> A looper	Western hemlock, Douglas-fir	Kootenay and Premier lakes, Upper Arrow L	Defoliator. Found in small numbers.
<u>Stilpnotia</u> <u>salicis</u> Satin moth	Silver poplar	Revelstoke	Defoliator. Heavy defoliation of shade trees on a commerc- ial property. New distribution record.

## 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.

### Currently Important Diseases

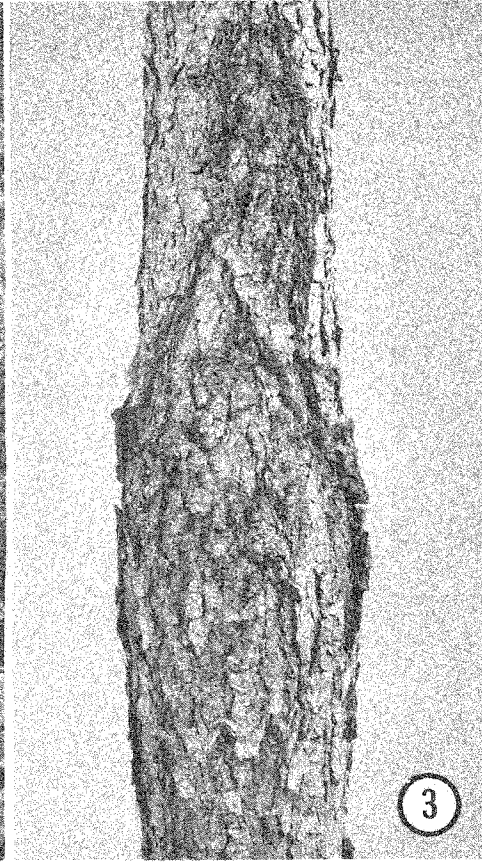
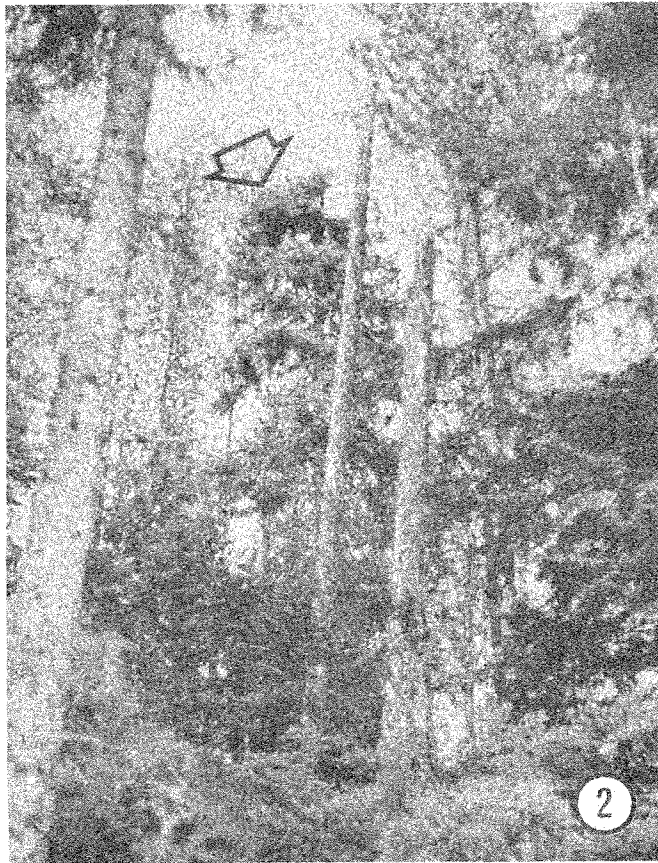
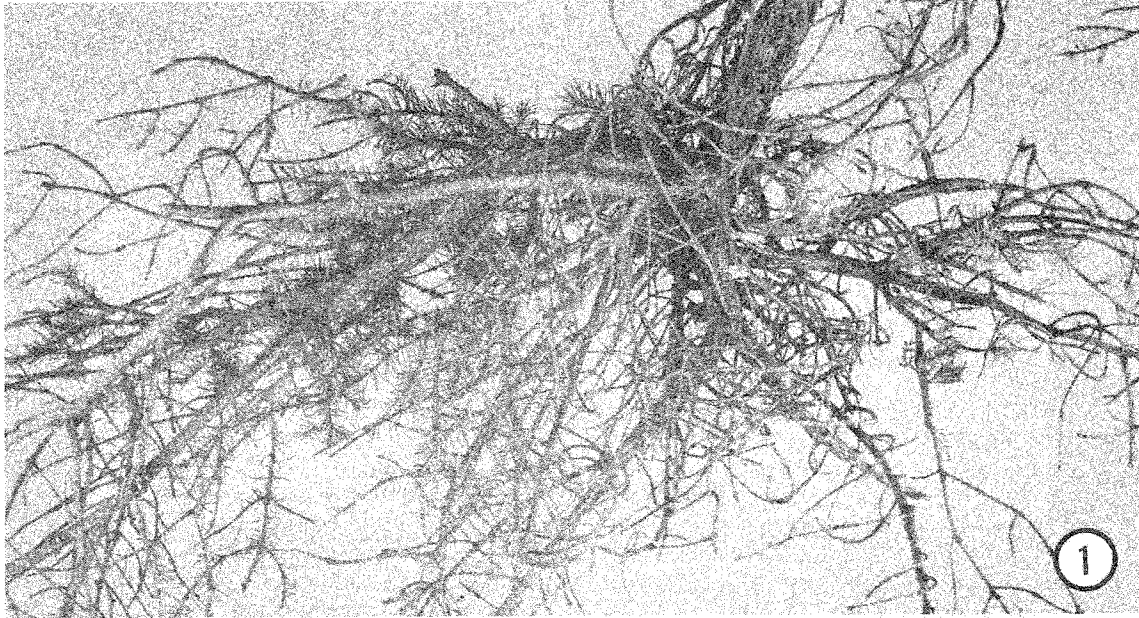
#### Stem Diseases

##### Larch dwarf mistletoe, Arceuthobium laricis

Engelmann spruce growing in mixed stands with severely mistletoe-infected western larch was found also infected by this mistletoe at several localities. The heaviest infections were at Mile 5 Glacier Creek (Lardeau), Christina Lake and 15 miles north of Grand Forks. A survey was done to determine the number of Engelmann spruce trees infected by dwarf mistletoe at four localities (Table 5).

Table 5. Larch mistletoe on Engelmann spruce,  
Nelson Forest District, 1972

Stand characteristics	Sample location			
	Champion L	Christina L	Glacier Cr	Grand Forks
Stand age	50-75	100-150	110-140	90
Species composition:				
western larch %	25	50	5	50
hgt ft	100	110	100	90
crown class	D	D	D	D
% mistletoe infection	80	100	100	75
lodgepole pine %	50	0	15	25
hgt	75		115	75
crown class	I		D	Co
% mistletoe infection	0		85	0
Engelmann spruce %	5	5	10	10
hgt	75	90	100	50
crown class	S	I	Co	I
% mistletoe infection	20	72	100	60
white pine %	5	10	0	0
crown class	Co	D		
Douglas-fir %	0	25	15	15
crown class		D	D	I
alpine fir %	5	0	0	0
crown class	S			
western hemlock %	5	5	35	0
crown class	S	I	Co	
western red cedar %	5	5	20	0
crown class	S	I	I	



- Fig. 1. Witches' broom on Engelmann spruce caused by larch dwarf mistletoe.
- Fig. 2. Heavily infected Engelmann spruce tree with numerous witches' brooms caused by larch dwarf mistletoe.
- Fig. 3. Stem swelling on Engelmann spruce caused by larch dwarf mistletoe



### Foliage Diseases

#### Needle cast of Douglas-fir, Rhabdocline pseudotsugae

Up to 10% of Douglas-fir saplings in Christmas tree cutting areas at Canal Flats, Invermere and Radium had up to 25% of the foliage infected with R. pseudotsugae.

#### Needle blight of western larch

Western larch trees above 3,000 ft were affected by an unknown disease that caused the needles to die and drop prematurely. Heavy infections on sapling, pole-sized and mature trees were evident along Kootenay Lake from Nelson to Kaslo, Blueberry-Paulson Highway, Phoenix Mountain and Boundary Creek. The disease was widespread throughout these areas in mixed and pure western larch stands.

### Root Diseases

#### Root rot, Rhizina undulata

Rhizina fruiting bodies were found growing at the root collars of a few Douglas-fir seedlings planted in a recently burned area at Kuskanax Creek near Nakusp. The area, comprising 218 acres, was burned in August 1971 and planted with 131,000 seedlings in 1972. No tree mortality was attributed to this disease. This is a new eastern distribution record for R. undulata in British Columbia.

### Physiological Diseases

#### Drought damage

Drought damage during 1970-71 caused some tree mortality and pre-disposition to insect attack in the East Kootenays from Cranbrook north to Radium. Subsequent attacks by the Douglas-fir beetle, Dendroctonus pseudotsugae, caused mortality of more than 275 Douglas-fir trees from Canal Flats north to Edgewater. Engelmann spruce trees on exposed sites along Windermere Lake suffered foliage loss and browning. In most cases drought-damaged trees are expected to recover.

#### Winter injury

During the winter of 1971-72, semi-mature lodgepole pine trees from Elko to Fernie, near Crowsnest Pass and in Kootenay and Yoho National parks suffered moderate to heavy foliage damage as a result of

winter injury. Spectacular foliage browning occurred on south and west exposures between 3,500 and 4,500 feet elevation. Ponderosa pine and occasional Douglas-fir trees in the Elko area sustained moderate and light damage, respectively.

No extensive mortality is expected as a result of the winter damage, however, the weakened trees may be subject to attack by other pests.

Table 6. Other diseases of current minor significance

Organisms	Host(s)	Locality	Remarks
<u>Chrysomyxa</u> <u>weirii</u> A needle rust	Engelmann spruce	Quinn Cr, Moyie R	Found on current foliage. Widespread.
<u>Coleosporium</u> <u>asterum</u> A needle rust	Lodgepole pine	Morrissey, Sparwood, Kootenay R	Common on older foliage.
<u>Elytroderma</u> <u>deformans</u> Needle cast	Lodgepole pine, ponderosa pine	Kootenay R, Grand Forks	Common in these areas.
<u>Herpotrichia</u> <u>juniperi</u> Brown felt blight	Alpine fir	Mt. Revelstoke National Park	Heavy infections were found at higher elevations.
<u>Lirula abietis-</u> <u>concoloris</u> Needle cast	Alpine fir	Sage Cr, Spillimacheen R	Common on year-old foliage.
<u>Melampsora</u> <u>medusae</u> A needle rust	Douglas-fir, western larch	Horse Creek, Cranbrook	Scattered occurrence. Light on larch.
<u>Pucciniastrum</u> <u>epilobii</u> Foliage rust	Alpine fir	Sage Cr, Spillimacheen R, Bugaboo Cr	Moderate damage on current needles.