

Nelson District



Forest Insect & Disease Conditions 1973

NELSON
DISTRICT

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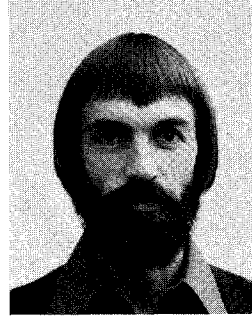
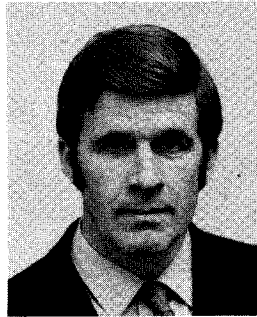
IMPORTANT NOTICE

Pests and damage at low levels and of minor consequence are not mentioned herein but the data are recorded and preserved in the form of Internal Reports. Such reports and those relative to other B. C. districts are available on request by contacting:

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FOREST INSECT AND DISEASE CONDITIONS 1973
NELSON DISTRICT

by



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INTRODUCTION

The year 1973 was highlighted by a number of insect infestations in widely separated areas of the District. The mountain pine beetle continued to kill lodgepole pine in the East Kootenay and western white pine in the West Kootenay. The western hemlock looper and filament bearer looper defoliated western hemlock and western red cedar trees in wet belt forests. Larch casebearer and larch budmoth defoliated western larch trees in the southern areas. Tent caterpillars stripped deciduous stands in the Trail and Golden areas.

The extremely dry conditions during 1973 resulted in drought damage to trees growing on poor sites. A needle cast disease caused foliage damage to ponderosa pine in the East Kootenay from Fort Steele to Premier Lake.

HEMLOCK LOOPER
CAUSES EXTENSIVE DEFOLIATION
IN HEMLOCK -
CEDAR FORESTS

Western hemlock looper was epidemic in many of the mature to overmature hemlock - cedar forests along the Columbia River and its tributaries from Shelter Bay to north of Mica Creek, from Galena Bay south to Nakusp and at Flat and Quartz creeks along the Rogers Pass Highway. High larval populations were also found in mixed immature coniferous stands between Shelter Bay and Revelstoke, and in the Nakusp area.



Sampling during June and July along the Columbia River north of Revelstoke produced up to 1,000 larvae per three-tree beating sample from western hemlock and western red cedar. Beating samples taken in immature stands yielded up to 500 larvae south of Revelstoke and near Nakusp. Larvae showed no evidence of disease.

A total of nearly 70,000 acres of defoliation were mapped from aerial and ground surveys (Map 1). Tree mortality was evident on suppressed understory western hemlock and western red cedar trees and on individual and groups of overstory trees in mature stands along the Columbia River from Shelter Bay north to Mica Creek. Mixed immature coniferous stands, including Douglas-fir, at the Shelter Bay Ferry Landing and at Nakusp, suffered tree mortality on approximately 200 acres.

Following the larval period, plots were established at Goldstream River, and four miles north of Shelter Bay Ferry Landing, in mature hemlock - cedar stands to assess defoliation. One hundred trees,

eight inches d.b.h. and over, were numbered and evaluated from each plot. The average defoliation was 50% at Goldstream River and 40% north of Shelter Bay. These plots will be examined annually to study the effects of hemlock looper defoliation.

In September, following the large moth flights, egg surveys were conducted to determine the overwintering hemlock looper egg population. Eggs were collected from samples of "old mans beard" (lichen) taken from the branches and main stems of overstory western hemlock and western red cedar in the mature stands, and on Douglas-fir in the mixed immature stands. Predictions of larval populations in 1974 were based on the number of eggs per 100 grams of lichen taken from the lower, mid and upper crowns of sample trees (Table 1).

The highest egg populations occurred in the mid-crown.



Dead hemlock looper moths after egg laying, Goldstream River.

Table 1. Average number of hemlock looper eggs per 100 grams of lichen and predicted 1974 defoliation, Nelson Forest District, 1973

Locality	Tree species ^{1/}	1973 defoliation	No. eggs	Predicted 1974 defoliation
<u>COLUMBIA RIVER</u>				
Shelter Bay	mixed	heavy	107	heavy
N. of Shelter Bay	wH, wC	moderate	240	heavy
Br. 5 Shelter Bay	wH, wC	moderate	63	heavy
Mulvehill Creek	mixed	light	78	heavy
Mi. 10 Big Bend Hwy.	wH, wC	moderate	45	moderate
Downie Creek	wC, wH	moderate	42	moderate
Goldstream River	wC, wH	moderate	133	heavy
Mi. 5 Goldstream River	wC, wH	moderate	40	moderate
Bigmouth Creek	wH, wC	heavy	54	moderate
<u>ROGERS PASS HIGHWAY</u>				
Tangier River	wH, wC	moderate	84	heavy
Albert Canyon	wH, wC	light	24	light
Quartz Creek	wH, wC	light	108	heavy
<u>UPPER ARROW LAKE</u>				
St. Leon	wH, wC	moderate	58	moderate
Kuskanax Creek	wH, wC	moderate	28	light

^{1/}wH = western hemlock wC = western red cedar



Egg mortality, mostly the work of parasites, was evident at a number of sample plots. The highest incidence occurred at the following localities: Mulvehill Creek, 55%; Shelter Bay (Br. 5), 39%; Shelter Bay Ferry Landing, 38%; four miles north of Shelter Bay, 38%; Downie Creek, 33%; Bigmouth Creek, 29% and Goldstream River, 24%.

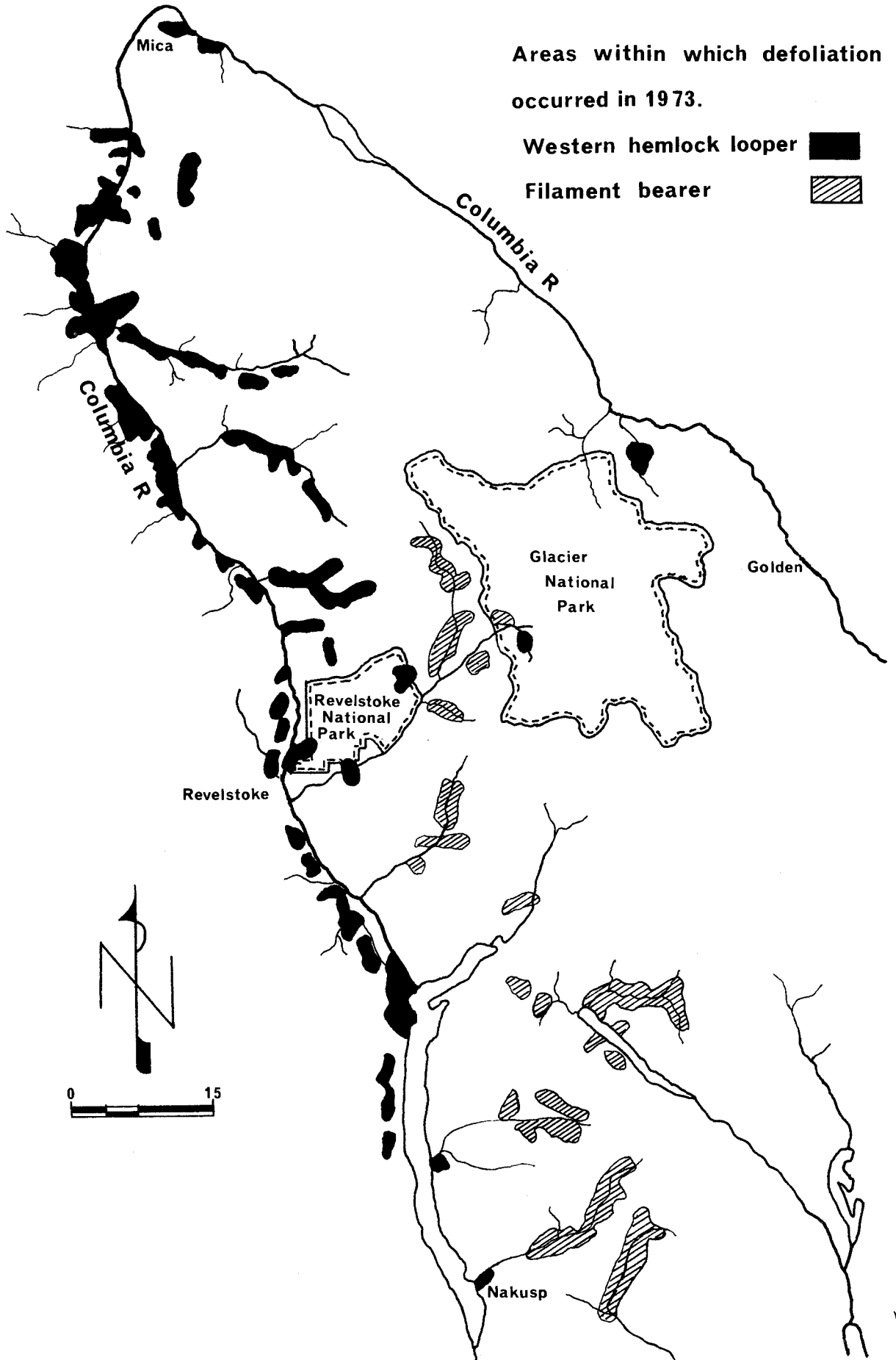
The overwintering egg populations indicate that moderate to heavy defoliation may occur in 1974 along the Columbia River from Shelter Bay to Mica Creek, light to heavy defoliation along the Rogers Pass Highway and light defoliation from Galena Bay south to Nakusp. Large moth flights that occurred in the Trout Lake area in 1973 indicate that defoliation can also be expected in that area in 1974.

Map 1

NELSON FOREST DISTRICT

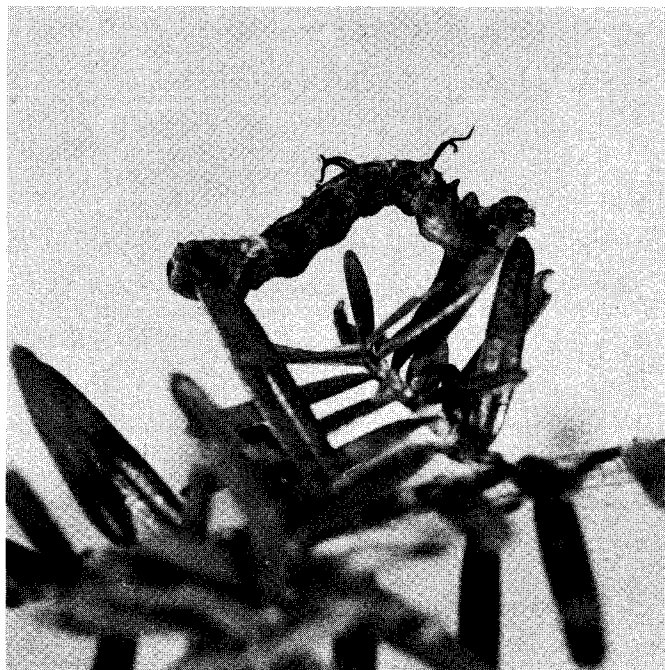
Areas within which defoliation occurred in 1973.

Western hemlock looper 
Filament bearer 



FILAMENT BEARER LOOPERS DEFOLIATE HEMLOCK TREES

Filament bearer loopers were epidemic in mature to overmature hemlock - cedar forests on some 50,000 acres in the Upper Arrow and Trout lakes area, along the Akolkolex and Tangier rivers near Revelstoke and along Bremner Creek in the New Denver district (Map 1).



Heavy mortality of suppressed understory hemlock trees occurred in all the infestation areas examined; notably at Kuskanax Creek, Ferguson and Tangier River.

Several mass collections of larvae sent to the Insect Pathology Research Institute showed no evidence of disease, which is indicative of continuing infestations in 1974.

LARCH CASEBEARER POPULATIONS DECLINE

Larch casebearer caused moderate to heavy defoliation to western larch trees in the southern areas of the District. The heaviest defoliation occurred along the International Boundary from Cascade east to Roosevelt, north along the Columbia and Kootenay rivers to Nelson, along the west arm of Kootenay Lake to Balfour, north of Balfour to Kaslo and from Rykert's north to Boswell. Heaviest defoliation was confined to stands below 3000 feet elevation. The range of larch casebearer increased along the Slocan Valley to New Denver and from Waldo to Elko.

The extreme high temperatures during the summer, in the areas of larch casebearer infestations, caused widespread desiccation which greatly reduced their populations and should result in light to moderate

defoliation in 1974. However, larch casebearer populations can build up rapidly and if climatic factors are favorable to the insect, heavier defoliation can be expected in 1975.

Since the larch casebearer is an introduced pest and was first discovered in British Columbia in 1966, efforts to establish parasites were initiated. In 1969, the parasite *Agathis pumila* was released at Fruitvale and East Arrow Creek near Creston, and has since become established. In 1973, 30% of the casebearer were parasitized at Fruitvale and 6% at East Arrow Creek. Further biological control efforts and research relative to western larch growth loss are being planned by the Pacific Forest Research Centre.

MOUNTAIN PINE BEETLE CAUSES PINE MORTALITY

Mountain pine beetle infestations persisted in lodgepole pine stands in the Elk Creek area and at Blackwater Ridge. A total of over 8,500 red-top trees were counted in these areas. Although western white pine red-tops were fewer than in 1972, 5,200 were counted, the highest concentrations being along the Pingston Ridge and Trout Lakes (Table 2).

An appraisal of lodgepole pine conditions was conducted at Elk Creek, Jack Creek, White River and Blackwater Ridge by examination of trees along cruise lines. The results (Table 3) indicate that roughly two-thirds of the lodgepole pine at Elk Creek, Jack Creek and White River have been attacked but only about 10% show red-tops, which is indicative of impending death. Many of the remaining attacked trees, however, are likely to be red in 1974. At Blackwater Ridge, about 40% are already dead but the relative low proportion of fresh attacks signifies a decline in beetle populations.

A similar type assessment in the white pine stands along Upper Arrow Lake indicates moderate populations and continued attacks in 1974.

Table 2. Numbers of red-top pine trees determined from aerial and ground surveys, Nelson Forest District, 1973

Pine species	Locality	No. red-tops
Lodgepole	Elk Creek	4,400
	Jack Creek	675
	Haskell Creek	400
	North of Whiteswan Lake	175
	Mary Creek	300
	East of Akutlak Creek	150
	Lussier River	300
	Akai Creek	125
	Copper Creek	75
	Blackwater Ridge	3,500
	Total	10,100
Western white	Trout Lake	1,700
	Davis Creek	100
	Galena Pass	275
	Halfway River	375
	Pingston Ridge	1,125
	Saddle Mtn	525
	Downie Creek	550
	Tangier River	275
	McGill Mtn	150
	Beaver River	125
	Total	5,200

Table 3. Status of lodgepole pine trees in mountain pine beetle infestations, Nelson Forest District, 1973

Location	% Healthy	% attacked			
		1973 Green	1973 Partial	1972 Red	Prior to 1972 Old grey
Elk Creek	35	31	22	10	2
Jack Creek	38	27	16	13	6
White River	35	23	20	13	9
Blackwater Ridge	46	5	9	0	40

DOUGLAS-FIR BEETLES attacked scattered individual and small groups of Douglas-fir trees in the Lake Windermere area. Counts of red-tops between Fairmont and Radium totalled 175 trees. An additional 60 were observed on the west side of Lake Windermere near Invermere, and 55 at Athalmer and Wilmer. Beetle-killed trees appear to have been pre-disposed to attack by 1973 drought conditions, which will probably continue to have adverse effects during 1974.

SPRUCE BEETLE POPULATIONS LOW

Spruce beetle populations remain at low density, with only occasional attacks on current windfall.

LARCH BUDMOTH DEFOLIATES LARCH

Larch budmoth caused moderate to heavy defoliation of western larch above 3,500 feet elevation along the Inonoaklin Valley from two miles west of Inonoaklin Crossing to Edgewood, along the east side of Arrow Lake from Applegrove to McDonald Creek near Nakusp, and west of Trail along the "Rossland Cutoff". Infestations were in pure and mixed stands of mature and immature western larch. The presence of numerous pupae from samples taken at Inonoaklin Crossing indicates a continuing infestation in 1974.

TENT CATERPILLARS STRIP TREES

Tent caterpillars caused heavy defoliation of deciduous trees in the Trail - Warfield area, and moderate to heavy defoliation east of Golden along the Kicking Horse River as far east as Yoho National Park, along the west side of the Columbia River from Golden south to Brisco, and along Windermere Lake, south of Invermere. Overwintering egg counts in September at Trail and Golden indicate moderate defoliation in 1974.

FALSE HEMLOCK LOOPER INFESTATION AT NAKUSP

False hemlock looper larvae were common in the hemlock looper infestations in the Nakusp area. A stand of immature mixed coniferous

trees on 25 acres at Glenbank near Nakusp was heavily defoliated by a combination of false hemlock looper and hemlock looper. Individual western hemlock and Douglas-fir trees were also heavily defoliated on residential properties in Nakusp. Light defoliation was evident on the new growth of Douglas-fir regeneration and pole-sized trees along the east side of Lake Windermere from Dutch Creek to Swansea Mountain.

Egg sampling at Nakusp in September indicated that moderate defoliation will probably occur in this area in 1974.

CUTWORMS DEFOLIATE SPRUCE SEEDLINGS

Black army cutworms defoliated Engelmann spruce seedlings in plantations established on the site of the 1971 "Sue" fire at Blackwater Ridge. In addition to the seedlings, cutworm larvae devoured most of the ground cover, including fireweed and willow foliage, on an estimated 250 acres. Seedlings at lower elevations were 40% defoliated, but damage was lighter along the upper slopes of Blackwater Ridge. The infestation is expected to continue in 1974.

TWO-YEAR-CYCLE SPRUCE BUDWORM

Since this species of budworm does not develop beyond the 4th instar during the first year of its cycle, damage is greater during the second year. Consequently, the infestations that occurred along the North White River in 1972 were not apparent in 1973. However, some noticeable defoliation may be expected in this area in 1974.

BLACKHEADED BUDWORM POPULATIONS INCREASE

Western blackheaded budworm populations increased in 1973. Beating samples from western hemlock in the Galena Pass area produced over 100 larvae per sample in a mature hemlock - cedar stand. Some tip defoliation was evident at this locality. Budworm larvae were also common along the Saddle Mountain and Low Pass roads near Upper Arrow Lake and in collections along the Big Bend Highway in hemlock looper infestations.

DOUGLAS-FIR NEEDLE MIDGE damage on Douglas-fir Christmas trees in the East Kootenay was light in 1973. Only about five percent of the new needles were infested at the sample plots at Canal Flats, Invermere, Edgewater and Brisco. Damage was also light in the West Kootenay except at Grand Forks, where 30% of the new needles were infested.

FUME DAMAGE caused by sulphur dioxide fumes occurred on 150 acres near Kimberley on a southeast slope of Sullivan Mountain. The fumes, which originate underground from oxidizing ore, escaped through an old ventilation shaft. The stand affected is comprised mainly of semi-mature lodgepole pine and Douglas-fir, with some western larch, ponderosa pine and occasional Engelmann spruce trees. The 1973 foliage of all trees was severely damaged and trees in the direct path of the fumes were completely discolored. The mining operation is continuing to clear away the oxidizing material underground and expect to complete it early in 1974.

DROUGHT DAMAGE to trees growing on poor sites was evident in the District during the latter part of the season. The full impact of the 1973 drought will not become evident until the 1974 field season, when trees that have been predisposed by drought may be attacked by secondary pests.

NEEDLE CAST OF PONDEROSA PINE was evident from Fort Steele to Premier Lake. Heavy damage to previous years' needles occurred on groups of exposed trees. Ponderosa pine trees at Wasa Lake and near Fort Steele had about 40% of their needles infected. Most trees affected were on dry sites, with the occasional infected tree near Wasa Lake.

CURRENT STATUS OF MAJOR PESTS IN B. C.

PEST	D I S T R I C T S					
	PRINCE GEORGE	PRINCE RUPERT	VANCOUVER	CARIBOO	KAMLOOPS	NELSON
Mountain Pine Beetle	light on Pw Canoe R	epidemic Hazelton area	patchy on Pw Fraser Canyon	light on P1 Cariboo L	outbreaks expanding	epidemics E and W Kootenays
Spruce Beetle	trace Monkman area	trace Stewart area	not found	trace Quesnel L	localized epidemics	light
Douglas-fir Beetle	light Canoe R	not found	trace Pemberton area	expanding Fraser R	light	light
Western Blackheaded Budworm	sporadic increase	new outbreaks	declined	moderate Wingdam	localized outbreaks	trace
Spruce Budworm	epidemic Liard R	light	epidemic Pemberton Fraser Cn	light Hendrix L	epidemic Lillooet area	trace
Douglas-fir Tussock Moth	absent	absent	declined	not found	localized epidemics	not found
Western Hemlock Looper	light	trace	light	not found	localized outbreaks	outbreaks Columbia R
False Hemlock Looper	absent	absent	light	not found	localized epidemics	trace
Black Army Cutworm	localized outbreaks	localized outbreaks	not found	not found	outbreak Blue R	outbreak Golden
Forest Tent Caterpillar	epidemic S & E of Pr. George	light	light	epidemic Quesnel - Horsefly	epidemic Raft R	epidemic Golden - Trail
Larch Casebearer	absent	absent	no host	no host	trace	declined
White Pine Blister Rust	light Canoe R	light	scattered light	light	frequent	common
Dwarf Mistletoe	southern areas on P1	widespread on Hw, P1	widespread on Hw	Cariboo - Chilcotin on P1	Okanagan on F	widespread on P1, Lw
Drought	not apparent	not apparent	localized	moderate	widespread severe	widespread moderate

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