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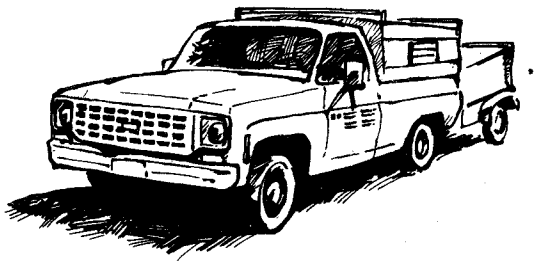
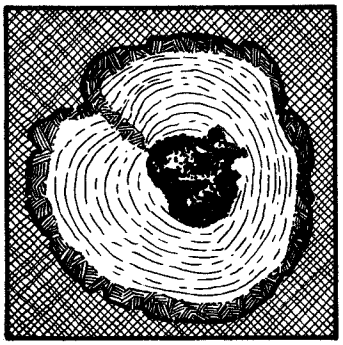
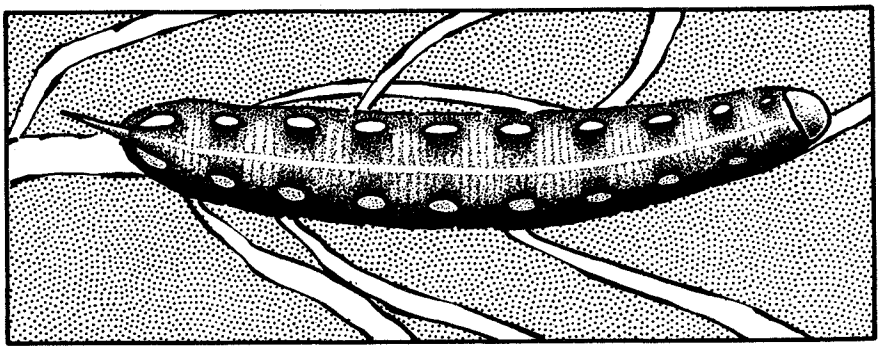


1980
Forest Insect and Disease Conditions

Cariboo Forest Region

S.J. Allen





Canadian Forestry Service - Pacific Forest Research Centre

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Appendix (available from Pacific Forest Research Centre)

I. Pest Report: Black army cutworm, Jack Fire, Cariboo Forest Region S.J. Allen, June 18, 1980.

II. Cone and seed pests 1980, D.S. Ruth et al., Nov. 3, 1980.

SUMMARY

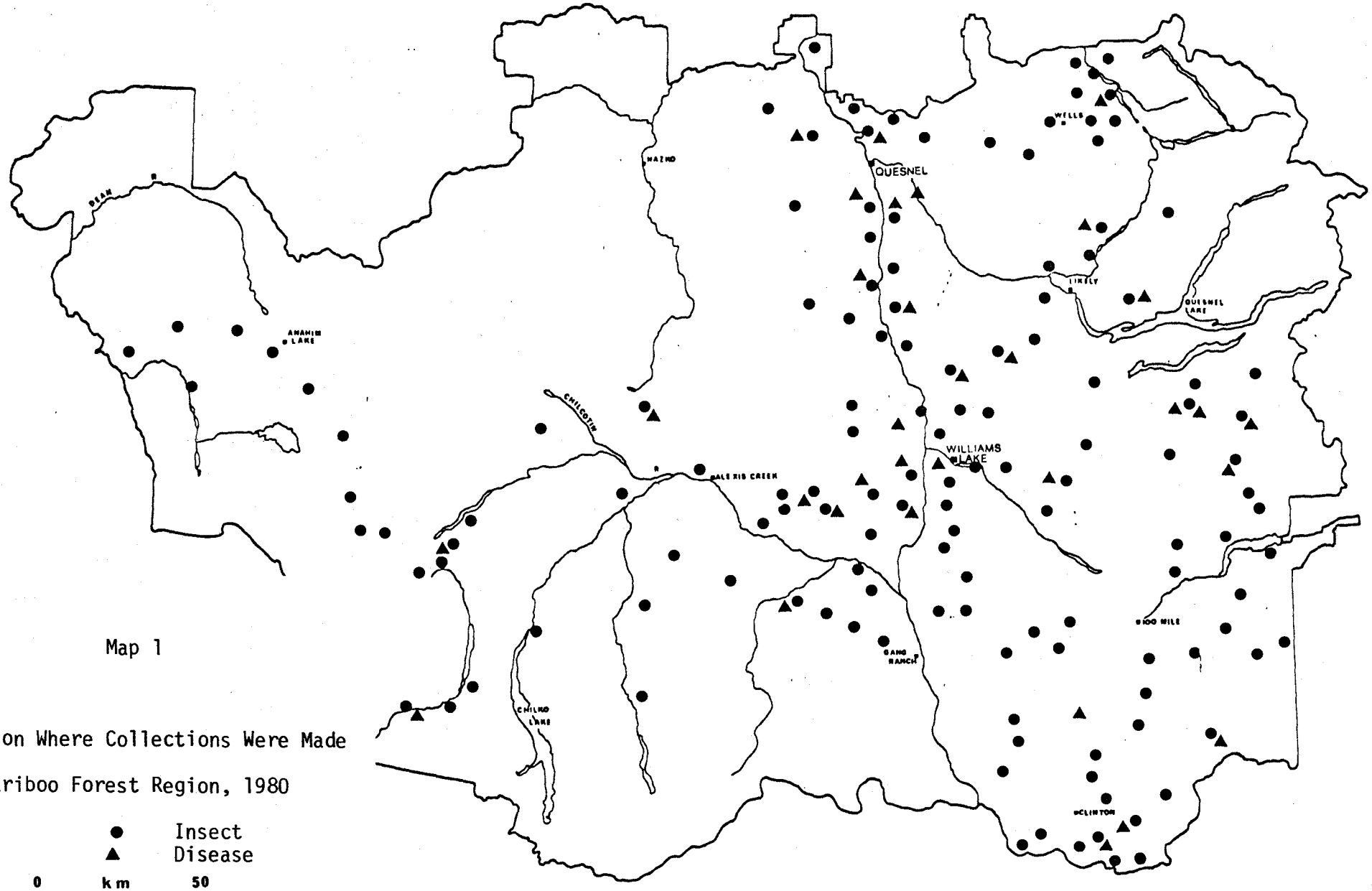
This report outlines forest pest conditions in the Cariboo Forest Region for 1980, which were highlighted by the mountain pine beetle, western spruce budworm, two-year-cycle spruce budworm and spruce beetle, and atttempts to forecast pest population trends.

The area of lodgepole pine trees killed by the Mountain pine beetle increased to 63 000 ha in 1980, compared with 31 000 ha in 1979. Spruce beetles killed several hundred white spruce trees north of Bowron Lake Provincial Park. Western spruce budworm defoliated 10 600 ha of Douglas-fir stands in the Clinton area, compared with 3 100 ha in 1979, and the two-year-cycle budworm defoliated 231 000 ha of mature alpine fir and white spruce stands in the Horsefly River - Quesnel Lake-Bowron Lakes areas. Douglas-fir beetles killed scattered groups of two to ten trees between Clinton and Soda Creek in the south end of Tweedsmuir Park, and partially attacked two trees in a 100-tree plot on Hart Ridge which were severely defoliated by western spruce budworm. A lodgepole pine needle miner partially defoliated young pine trees in spaced stands near Alex Graham Mountain, where damage to immature lodgepole pine terminals by the lodgepole pine terminal weevil persists, but at less intensive levels than in 1979. Needle diseases in lodgepole pine stands were less prominent in 1980 than in 1979. Details of individual insect and disease problems appear under host trees in subsequent sections.

A total of 258 forest insect and disease collections were submitted by F.I.D.S. pest survey technicians, personnel from industry and other agencies; location of collections are shown on Map 1. The number of collections containing larvae in 1980 was 64%, the same as in 1979.

Twenty-one flying hours, provided by the C.F.S. and B.C. Ministry of Forests in fixed wing aircraft were used to map and photograph pine beetle, spruce beetle and spruce budworm infestation areas, and disease and weather damage; aerial survey flight lines are shown on Map 2.

The Forest Insect and Disease Survey program extended from June 1 to September 28 and included: ground appraisals to determine the status and trend of mountain pine beetle, spruce beetle and spruce budworm infestations; assessment of forest pests in twenty natural and managed second growth lodgepole pine stands; assessment of cone and seed pests and cone crop abundance; monitoring of adult male populations of the Douglas-fir tussock moth and two-year-cycle spruce budworm with sex attractant traps.



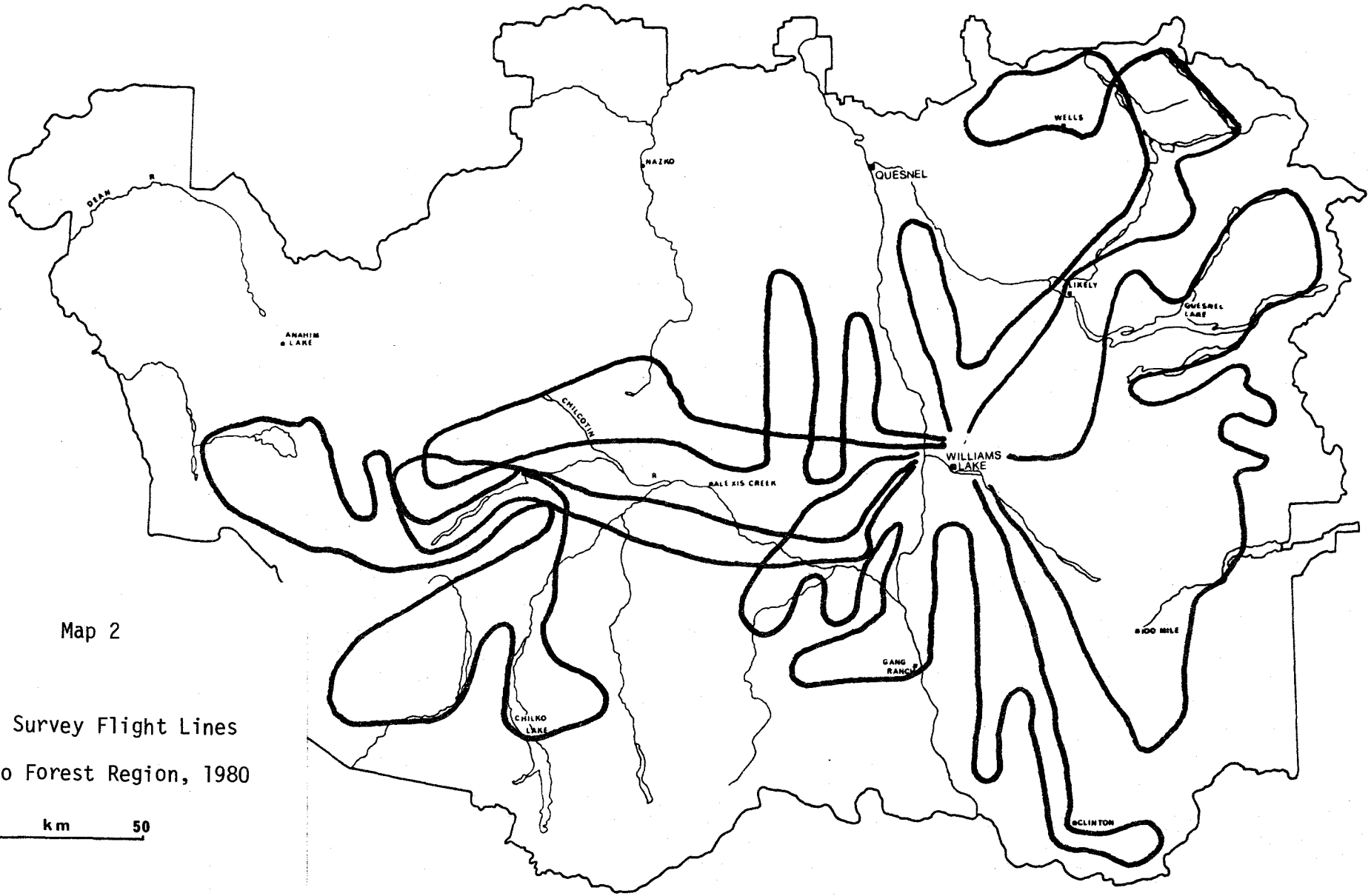
Map 1

Location Where Collections Were Made

Cariboo Forest Region, 1980

● Insect
▲ Disease

0 km 50



Map 2

Aerial Survey Flight Lines

Cariboo Forest Region, 1980

0 km 50

PINE PESTS

Mountain pine beetle, Dendoctronus ponderosae

Mountain pine beetle killed more than five million lodgepole pine trees in the Cariboo Forest Region in the early 1970's, mainly in the Klinaklini River - Puntzi Lake area; around Chilko-Tazeko lakes; near Riske Creek, Williams Lake, Cariboo Lake and in the Dog Creek-Jesmond area. Since 1977 new infestations developed in the Charlotte Lake area, in the Puntzi-Tatla lakes-Chilanko River Valley triangle and in the Riske Creek-Alexis Creek area. In 1980 the major infestation areas persisted in the above areas (Table 1, Maps 3 & 4), and covered 63 500 ha, compared with 31 000 in 1979; this excludes 18 000 ha in the Klinaklini River Valley where much of the lodgepole pine was killed prior to 1977.

Table 1. Locations and area of mountain pine beetle infestations. Cariboo Forest Region, 1980

Location	Area infested (ha)	Location	Area infested (ha)
CARIBOO LAKE		DOG CREEK - JESMOND	
Cariboo R N	154	Dog Cr	585
Cariboo L	2 462	Canoe Cr	3 205
Cariboo R SW	518	Jesmond	2 730
Beaver Cr	486	Clinton	225
	3 620		6 745
WILLIAMS LAKE		PUNTZI LAKE-KLINAKLINI R	
Tyee L	435	Puntzi L	2 955
Skelton L	210	Chezacut L	510
Chimney L	110	Tatla L	11 125
Williams L	2 000	Chilanko R	9 475
Cuisson L	100	One Eye Lake	5 920
Springhouse	1 095	Calwell Cr	1 815
	3 950	Klinaklini R	860
		Nimpo L	160
RISKE CREEK		Charlotte L	3 420
Meldrum Cr	1 035	Tweedsmuir Pk	465
Narcosli Cr	145	Knot Cr	500
Mackin Cr	65	Mosley Cr	1 425
Drummond L (DND)	1 310		38 630
N Hanceville	285		
S Hanceville	565		
Riske Cr	1 725	CHILKO-TATLAYOKO LKS	
Big Cr	1 155	Chilko R	1 360
Churn Cr		Konni L	630
Gaspard Cr	1 245	Tatlayoko L	850
Alexis Cr	194		2 840
	7 725		
		TOTAL	63 515

Mortality of overwintering populations exceeded 90% at seven locations examined in early June, (Table 2), but this did not result in a significant reduction in the beetle population. Samples consisted of two .045 m^2 bark samples from the base of each of five trees at each location. Woodpecker predation of the overwintering broods between the crown base to within two feet from the ground occurred on more than 50% of the trees in the seven locations examined.

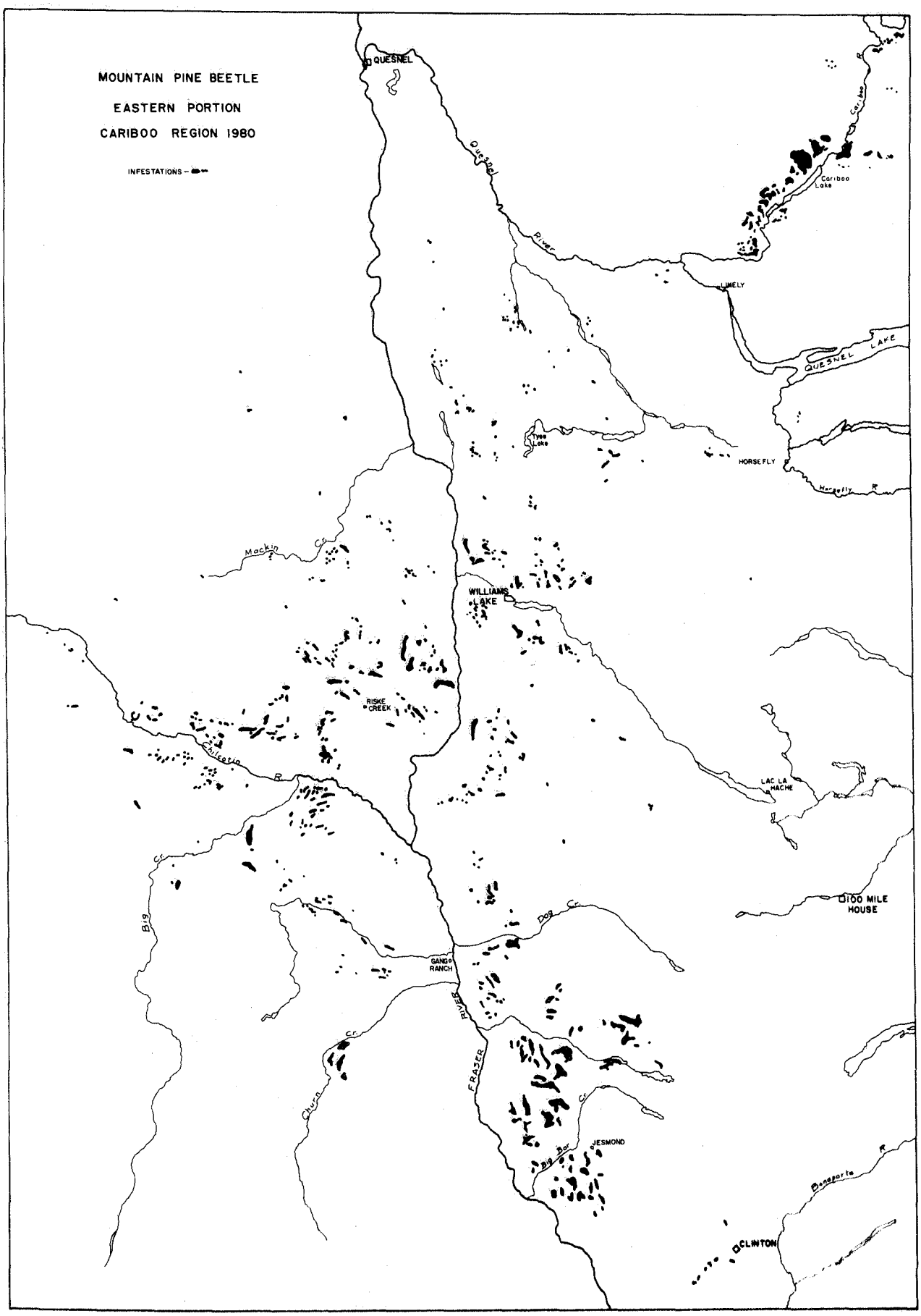
Table 2. Overwintering mortality of mountain pine beetle. Cariboo Forest Region, 1980

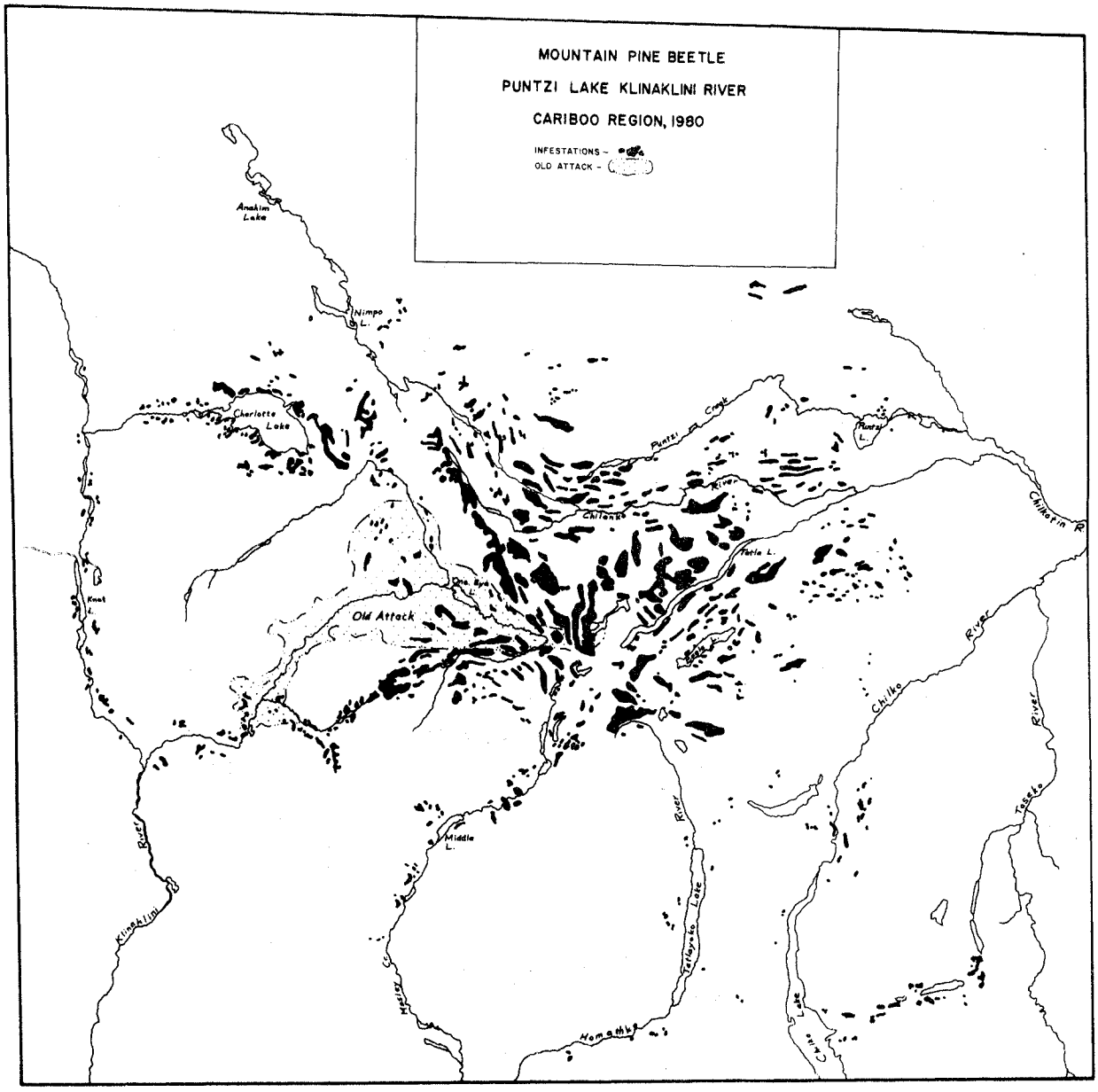
Location	Avg no. living beetle progeny/045 m^2	Percent mortality
Tatla Lake	4.5	94
Tatlayoko Lake Road	4.5	94
Alex Graham Mt.	7.6	90
Beaumont Lake Road	6.4	91
Big Creek Road	5.6	93
China Lake	3.7	95
McClinchy Creek	3.6	96

Data from cruise strips examined at 13 locations to determine the incidence of beetle attack and the status of attacked trees, (Table 3), indicated that there were significant reduction in the numbers of trees attacked at eight areas, a static status at two and an increasing incidence of attack at three locations. Populations are expected to continue to attack lodgepole pine stands in all areas in 1981, precluding adverse climatic impact.

Table 3. Status of lodgepole pine trees in appraisal plots. Cariboo Forest Region, 1980

Location	No. trees in plot	Percent of trees			
		Healthy	1980 attack	1979 attack	Prior to 1979
Joes Lake Rd	158	86	2	2	10
Beaumont Lk	110	60	13	12	15
Big Creek Rd	125	56	27	9	8
Big Creek X Rd	99	47	17	30	6
China L Rd	147	70	8	11	11
Vert Lake	85	32	7	19	42
Tatla Lake	149	69	6	20	5
Tatlayoko L Rd	130	26	23	29	22
McClinchy Cr	166	58	21	8	13
Thaddeus L	149	44	3	19	34
Drummond L	120	25	2	61	12
Puntzi Mtn	137	70	4	15	11
Beaumont L	176	28	48	16	7


MOUNTAIN PINE BEETLE
EASTERN PORTION
CARIBOO REGION 1980
INFESTATIONS –
QUESNEL
Quesnel River
Cariboo Lake
LIKELY
QUESNEL LAKE
Tyee Lake
HORSEFLY
Horsefly R.
Mackin Cr.
WILLIAMS LAKE
RISKE CREEK
Chilcotin R.
LAC LA HACHE
100 MILE HOUSE
Big Cr.
Dog Cr.
GANG RANCH
FRASER RIVER
Churn Cr.
Big Bar Cr.
JESMOND
Bonaparte R.
CLINTON



Foliage diseases, Lophodermella concolor, Scirrhia pini and Elytroderma deformans

These diseases have caused discoloration of young lodgepole pine trees over widespread areas in the Cariboo since 1977. However, in 1980, light infection occurred only at Springhouse and Big Creek.

DOUGLAS-FIR PESTS

Douglas-fir beetle, Dendroctonus pseudotsugae

Small groups of 2 to 10 recently killed Douglas-fir trees were recorded at Soda Creek, McLeese Lake, Meldrum Creek, Springhouse, Dog Creek, Big Creek, Clinton and two trees in a 100-tree plot at Hart Ridge, near Clinton, were partially attacked by beetles after defoliation by spruce budworm.

In the Atnarko River Valley, approximately 40 beetle-killed trees occurred between Knot Lake and Hotnarko River, a decrease from 100 in 1979.

Western spruce budworm, Choristoneura occidentalis

Defoliation of Douglas-fir stands covered 10 600 ha. Defoliation was severe on 3 500 ha; moderate on 3 300, and light on 3 800 and extended from Hart Ridge near Clinton and the adjacent highway 97 area, along the ridges north and south of Maiden Creek and in the Loon Lake - Scottie Creek area. About 5% of the understory and intermediate trees have been killed in the Hart Ridge area after four consecutive years of defoliation.

Egg counts from two branches from the mid-crown of each of ten trees at six locations in the Clinton area to predict the population trend and potential damage indicated that severe defoliation will persist at five of the areas and moderate defoliation at the sixth, (Hart Ridge E.), (Table 4).

Table 4. Egg population and predicted defoliation for 1981. Cariboo Forest Region, 1980

Location	Number of egg masses per 10 m^2 of foliage	Predicted defoliation for 1981
Hart Ridge W	304	severe
Hart Ridge E	96	moderate
Loon Lake	243	severe
Scottie Creek	226	severe
Maiden Creek	333	severe
Maiden Creek #2	181	severe

Douglas-fir tussock moth, Orgyia pseudotsugata

Sticky traps, baited with a pheromone, to monitor adult populations were located in Douglas-fir stands at Canim Lake, Riske Creek, Alexis Creek, Kleena Kleene and Quesnel. Adult males were caught at Kleena Kleene (2), Alexis Creek (1) and Riske Creek (42). However, little significance can be attached to their presence.

Douglas-fir-aspen rust, Melampsora medusae

Discoloration of Douglas-fir needles was common throughout the host range wherever trembling aspen, the alternate host, occurred.

A conifer sawfly, Neodiprion spp.

There was a slight increase in the number of sawfly larvae in collections from Douglas-fir in the region however, numbers were low and no defoliation is expected to occur in 1981.

Site Damage

Scattered groups of 2 to 10 Douglas-fir trees were killed by environmental disturbances, such as land clearing and road construction, in the Williams Lake, Soda Creek, McLeese Lake and Meldrum Creek areas. There was no evidence of Douglas-fir bark beetle in the damaged trees.

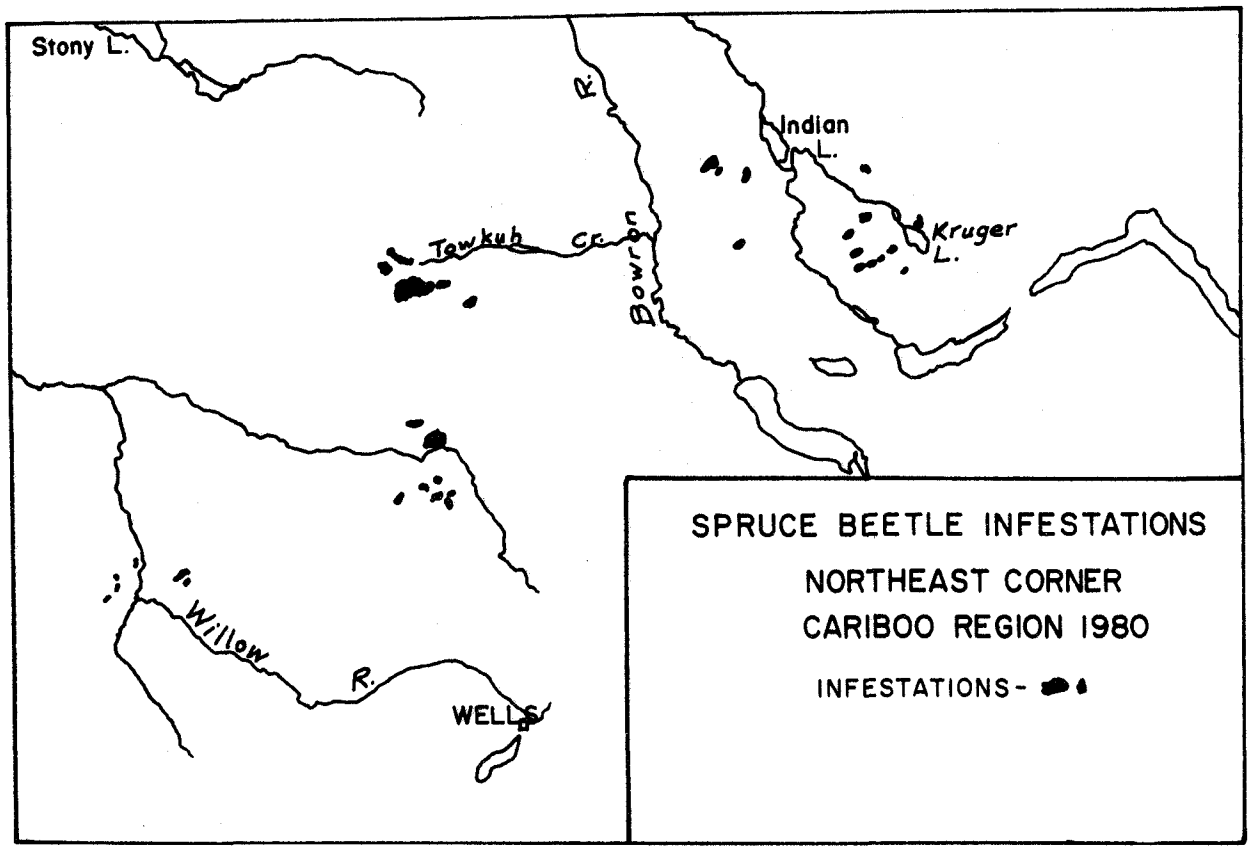
SPRUCE PESTS

Spruce beetle, Dendoctronus rufipennis

Spruce beetles killed white spruce trees over an estimated 100 ha in the Kruger Lake, Indian Lake, Big Valley, Towkuh and Two Bit creeks area in the Willow and Bowron rivers drainages (Map 5). White spruce trees killed prior to 1978 were also recorded in the Matthew and Horse Fly rivers, Mitchell Lake, Cameron Creek and near Spectacle Lake in Bowron Lakes Provincial Park. No attacks were evident in standing white spruce trees at Devils Club Mountain where large areas of spruce were windthrown in 1975.

An estimated 500 trees examined at four locations showed 24 attacked in 1979 and only two in 1980, however, populations are expected to continue in 1981.

Windstorms in late July and early August resulted in windthrown spruce throughout Bowron Lakes Provincial Park and Horse Fly River areas, which may provide additional suitable host material for the beetle populations in 1981.



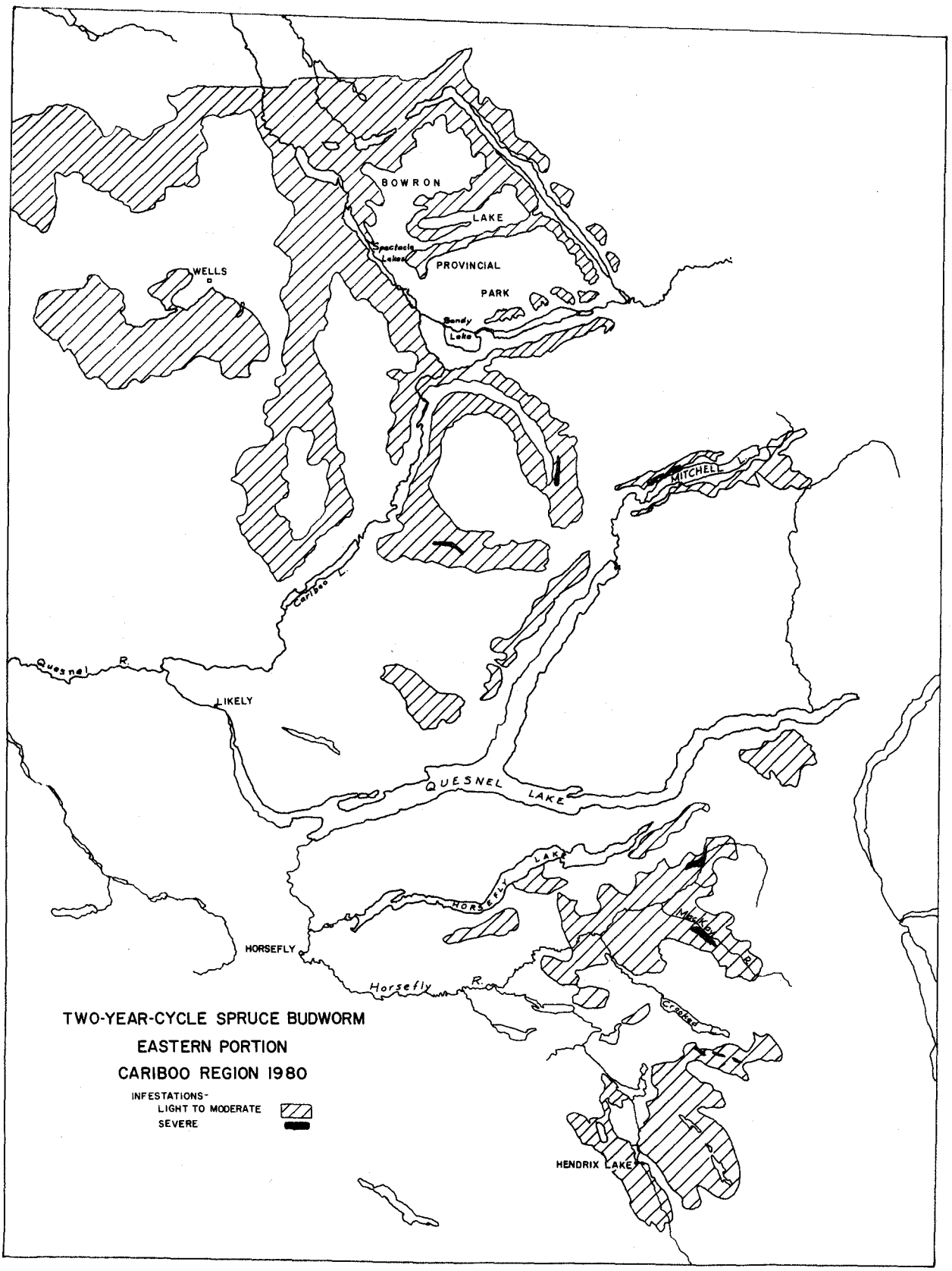
Two-year-cycle spruce budworm, Choristoneura biennis

The budworm defoliated 231 000 ha of mature white and Engelmann spruce and alpine fir stands between Hendrix Lake north to Bowron Lakes Provincial Park an increase from 15 000 ha in 1978.

Defoliation was largely light to moderate with areas of severe defoliation in the headwaters of the Horsefly, McKay, Matthew and Little River valleys (Map 6).

Since 1972 repeated defoliation has resulted in scattered mortality of suppressed alpine fir trees. In the Horsefly River Valley six of 103 alpine fir trees, in an appraisal plot examined in 1980, were killed; similar damage was recorded in plots at Little and Matthew rivers.

Larval parasitism and disease were recorded from populations in the infestation areas for the first time in 1980. There was also a decrease in the number of egg masses which indicates a possible decline in the budworm population in 1981.


BOWRON
LAKE
Spectacle Lakes
PROVINCIAL
PARK
Sandy Lake
WELLS
MITCHELL L.
Quesnel R.
LIKELY
QUESNEL LAKE
HORSEFLY LAKE
HORSEFLY
Horsefly R.
Crooked R.
HENDRIX LAKE
TWO-YEAR-CYCLE SPRUCE BUDWORM
EASTERN PORTION
CARIBOO REGION 1980
INFESTATIONS-
LIGHT TO MODERATE
SEVERE

Sticky traps, baited with a sex attractant to monitor male moth populations, located at Hendrix Lake and Wells, indicated a continuing population, (Table 5).

Table 5. Numbers of two-year-cycle spruce budworm male moths trapped in pheromone baited traps.
Cariboo Forest Region, 1980

Location	Pheromone concentration	Total number of moths trapped	Average number of moths per trap
	1980	1980	1980
Hendrix Lake	.1	121	24
	.01	56	11
	.001	8	1.5
Wells	.1	210	42
	.01	123	25
	.001	19	4

ALPINE FIR PESTS

Western balsam bark beetle, Dryocoetes-Ceratocystis complex

Only single, scattered, higher elevation alpine fir trees were killed by this insect-disease complex in 1980, compared with 100 in 1979.

WESTERN RED CEDAR PESTS

Winter damage

Winter damage discolored and thinned foliage of trees at Gavin, Bootjack, Polley, Wolverine, Jacques, Hen Ingram, Suey and Horsefly lakes, at Bouldery Creek, near Lynx Bay and north of Likely, however the trees are expected to recover in 1981.

PESTS OF NATURAL AND MANAGED SECOND GROWTH STANDS AND PLANTATIONS

Twenty lodgepole pine stands were examined to determine the incidence of pests which may occur naturally or be influenced by management practices.

Western gall rust, Endocronartium harknessii was a major problem in four of sixteen unmanaged stands; infection ranged from 2%

north of Coyote Creek; 6% along Puntzi Lake road; 41% at Twan Creek to 68% at Bosk Lake, and Stalactiform blister rust, Cronartium coleosporioides infected 23% of the trees at Twan Creek. A lodgepole pine needle miner, Recurvaria sp. defoliated 50% of the 1979 foliage on the upper half of the crowns of trees in a spaced stand at km 24 on the Palmer Lake Road near Alex Graham Mountain.

Lodgepole pine terminal, Pissodes terminalis infected between 1 and 9% of the terminal leaders in four of the sixteen natural stands, a reduction from 2 to 36% in 80% of the stands examined in 1979. Warren's collar weevil, Hylobius warreni damaged fewer than 5% of the second growth trees, in a pure lodgepole pine stand at km 25 on the Palmer Lake Rd, by girdling the bark at the root collar. The incidence of damage to young trees by this pest is becoming more common in spaced stands and plantations where trees may be damaged or weakened by men and/or equipment.

Other pests which were common in the examined stands but which caused minimal damage included a pine needle cast, Lophodermella concolor and Atropellis canker, Atropellis piniphila. Lodgepole pine dwarf mistletoe, Arceuthobium americanium although widespread in the Chilcotin region infected only 6% of the trees in one young fire-originated stand, bordering an area of infected residuals near Puntzi Lake.

In a Douglas-fir plantation in the Jack fire, south of Cottonwood House, seedlings planted in 1980 were 50 to 100% defoliated by black army cutworm, Actebia fennica over a 10 ha area. Damage was severe only where herbaceous growth was scarce.

Pupal counts of less than 0.5 pupae per 0.1 sq. metre and average male moth counts of 1.9 per pheromone-baited trap bolt indicated low populations and little potential for damage in 1981.

CONE AND SEED PESTS

Samples of 20 cones from three trees at each of fifteen locations in the region were examined to evaluate the incidence of insect damage (Pest Report: Cone and Seed Pests 1980, D.S. Ruth et al., pp 13-14: Appendix II).

The percent attack on Douglas-fir cones from ten areas ranged between 15 to 100% with cones from nine of the areas unsuitable for collecting. The most damaging pests were the Douglas-fir cone moth, Barbara colfaxiana; the coneworm, Dioryctria abietivorella and a Douglas-fir cone scale midge, Contarinia washingtonensis all of which infested cones at nine of the ten sample locations.

The percent attacked by insects in Engelmann spruce cones from two areas ranged between 35 and 80%, with cones unsuitable for collection in all areas. The spruce seedworm, Laspeyresia youngana and the spiral spruce cone borer, Hylema anthracina were common in all the samples. A cone rust Chrysomyxa pirolata infected between 15 and 35% of the Engelmann spruce cones at three of the nine sample areas. The rust was found also on its alternate host, Pyrola aphylla at Keithley Creek.