ANNUAL DISTRICT REPORT
FOREST INSECT AND DISEASE SURVEY
BRITISH COLUMBIA, 1978
PART VI, CARIBOO FOREST DISTRICT

by
S.J. Allen[1/]

PACIFIC FOREST RESEARCH CENTRE
CANADIAN FORESTRY SERVICE
VICTORIA, BRITISH COLUMBIA

- FILE REPORT -

DEPARTMENT OF ENVIRONMENT
January, 1979

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

INTRODUCTION

This report outlines in detail the status of forest insect and disease conditions in the Cariboo Forest Region in 1977 and forecasts pest populations trends.

Regular field work in the District extended from June 1 to August 24. Special surveys were as follows: Pheromone-baited trap program for western spruce budworm, two-year-cycle spruce budworm and Douglas-fir tussock moth; egg and defoliation survey for western spruce budworm and two-year-cycle spruce budworm; Douglas-fir needle sampling for incidence of Contarinia sp. and Adelges cooleyi; aerial surveys for beetles throughout the Region; ground appraisal surveys for mountain pine beetle and Douglas-fir beetle damage.

Totals of 249 insect and 24 disease collections were submitted in 1978. Map 1 shows locations of collections.

The numbers of larval defoliators found in field collections decreased by 16%. Few defoliating larvae were found in the west Chilcotin forests.

Numbers of larvae collected				
1974	1975	1976	1977	1978
717	810	1030	2199	1842

In the Region 72 % of the collections contained larvae compared with 76% in 1977 and 67% in 1976.

B.C. Forest Service Protection Division of the Region Office at Williams Lake provided invaluable assistance in the form of 20 hours of fixed wing flying time (Map 2) and assistance from members of the pest co-ordinator crew. These are herby acknowledged. A further six hours of flying time was used to fly the Klinaklini River Valley and Dean River Valley Mountain pine beetle infestations.

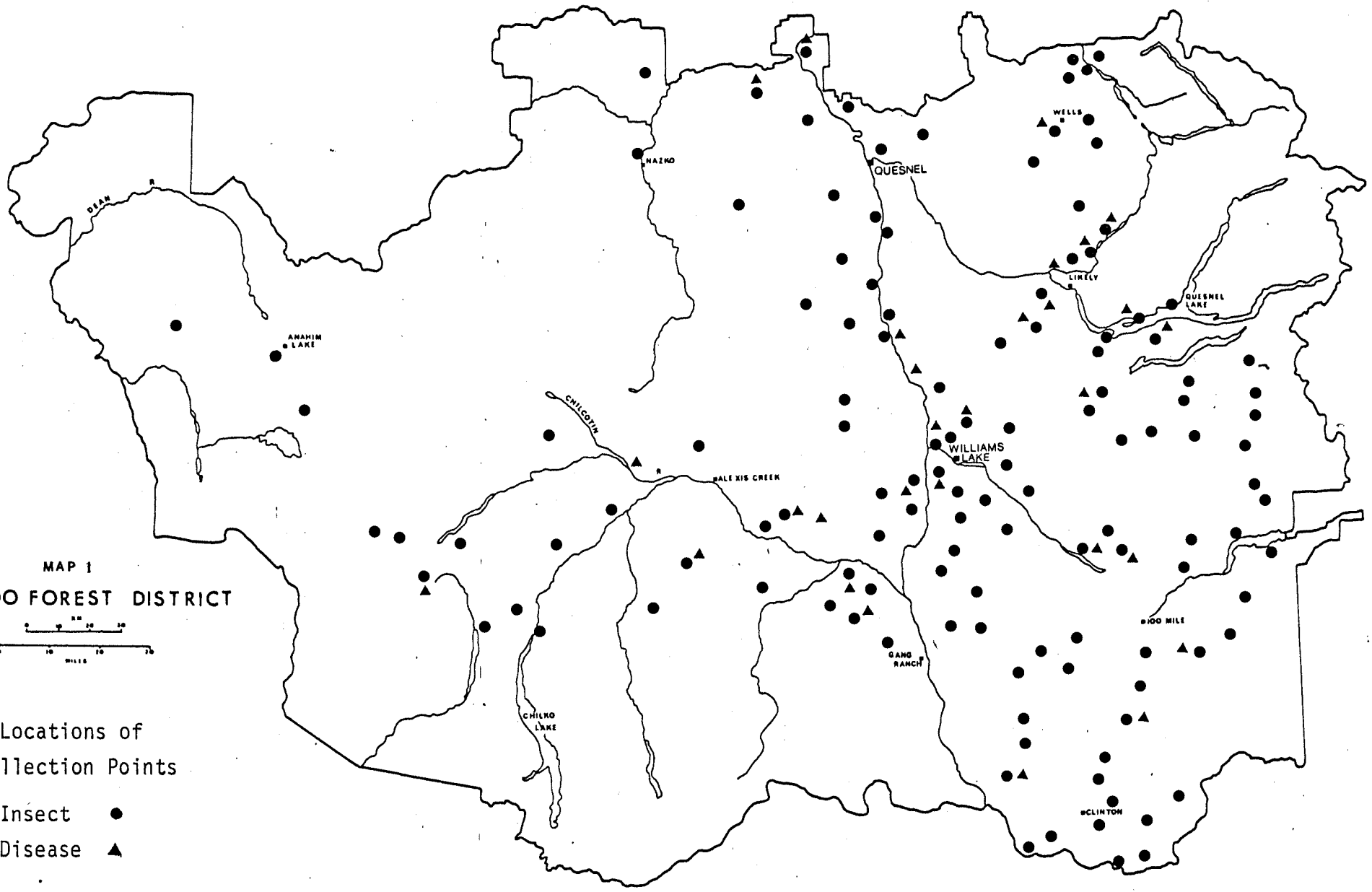
Special collections of western and two-year-cycle spruce budworm were submitted to the Insect Pathology Research Institute at Saulte Ste Marie, Ontario and to Dr. Datterman at Corvallis, Oregon.

Red-top lodgepole pines increased this year to over 860,000 compared to 36,280 in 1978. The increase in the current attack found in 1978 will show as an even greater number of new red-tops in 1979.

Douglas-fir beetle remained at a low population level in the dog Creek - Williams Lake area as did spruce beetles in windfall at Bowron Lake Provincial Park.

The western spruce budworm infestations around Clinton and the two-year cycle budworm populations in the Horsefly area declined.

Disease problems included severe reddening of young lodgepole pine trees caused by Lophodermella concolor, red-belt damage at Tatlayoko Lake and Venturia leaf blight damage to trembling aspen leaves over widely scattered areas from Big Lake to Canim Lake.



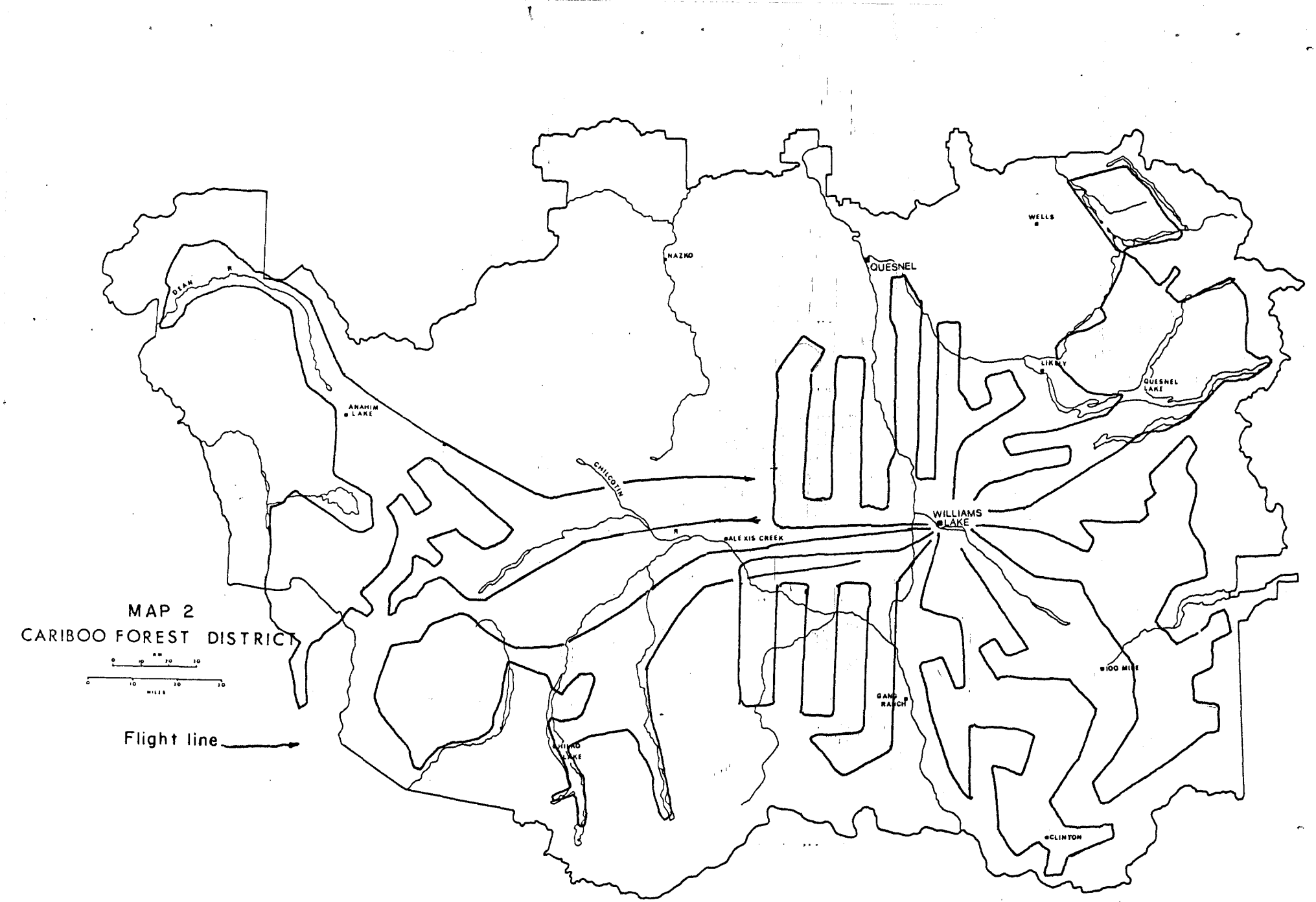
MAP 1

CARIBOO FOREST DISTRICT

Locations of
Collection Points

Insect ●

Disease ▲


MAP 2
CARIBOO FOREST DISTRICT
Flight line
DEAN R.
ANAHIM LAKE
NAZKO R.
QUESNEL
WELLS
LIKELY
QUESNEL LAKE
CHILCOTIN R.
ALEXIS CREEK
WILLIAMS LAKE
100 MILE
GANG RANCH
CLINTON

INSECT CONDITIONS

Mountain pine beetle, Dendroctonus ponderosae

Mountain pine beetles continued to cause tree mortality in 1978. The numbers of red-top lodgepole pine trees increased in spite of heavy overwintering brood mortality during the winter of 1977-78 (Table 1), the population continued to increase.

The heaviest tree mortality occurred in the One Eye Lake - Clearwater lake area where an estimated 800,000 lodgepole pine trees were killed on 13,000 ha (Table 2). Most of the mature lodgepole pine trees in the Klinaklini River Valley east of Klinaklini Lake were killed during 1974-1977 and the infestation moved east toward Tatla Lake and north toward the Charlotte Lake - Aktaklin Lake area.

Table 1. Overwintering Beetle Brood Mortality and Survival in Samples Areas, Cariboo Forest Region, June, 1978.

Location	Total no. Samples	Area sq. ft.	Total larvae & pupae	L &/or p. per sq. ft.	Survival	Mortality
McIntyre L.	120	60	1130	18.8	6%	94%
Drummond L.	120	60	1458	24.3	8%	92%
Tatla L.	120	60	495	8.3	3%	97%
One Eye L.	120	60	281	4.7	2%	98%

Table 2. Areas and Numbers of Lodgepole Pine Trees Killed by Mountaain pine beetles, Cariboo Forest Region.

Locality	PSYU Or Park	1977 Area affected (ha)	1977 No. red-tops	1978 Area affected (ha)	1978 No red-tops
Williams L. - Skelton L.	Williams Lake	102	900	1088	5700
Riske Cr. - Gaspard Cr.	Stum	2100	4100	4470	12100
Dog Cr. - Jesmond	Big Bar	2560	5250	3584	8800
Castle Rock	SSA	32	75	20	40
Cariboo L.	Quesnel L.	1344	1000	1500	6300
One Eye L. - Clearwater L.	Quesnel L.	2740	16505	13000	800000
Klinaklini R.	Quesnel L.	6160	14600	7238	29500
Konni Lake		512	870	260	900
Knot Lakes	Tweedsmuir Park	10	20	24	180
Dean River - Takia R.	Tweedsmuir Park	384	380	60	130
TOTALS		15,944	43,700	31,244	863,650

Infestations in the One Eye Lake - Clearwater Lake areas and in the Williams Lake, Stum, Big Bar, Chilko and Quesnel Lake PSYU's, increased in size and numbers, (Table 2 maps 3, 4 and 5). In some of the less significant infestations such as in the Special Sale Area and Tweedsmuir Park there ws a drop in the number of red trees, the former may have been reduced by logging and the latter by winter-kill of the beetle broods.

Fixed radius plots were examined on cruise-strips in the principle infestations. Strips 1 to 7 were in the Stum PSYU; 8-10, Big Bar; 11, Quesnel Lake; 12-16, Chilko. Numbers 1-4 and 8-11 were in older infestations areas while 5-7 and 12-16 were in newer outbreaks. The numbers of trees attacked in 1978 increased two to three fold in some areas and decreased at only two locations (Table 3).

The eastward movement of the infestation was more pronounced with the collapse of the Klinaklini River infestation. Most of the mature pine trees around One Eye Lake have been killed. New attacks are spreading east and north toward Tatla Lake and Charlotte Lake, (Map 1). Unless winter temperatures cause heavy mortality of the beetle broods, tree mortality will continue.

Table 3. Status of lodgepole pine trees on cruise strips, Cariboo Forest District, 1978.

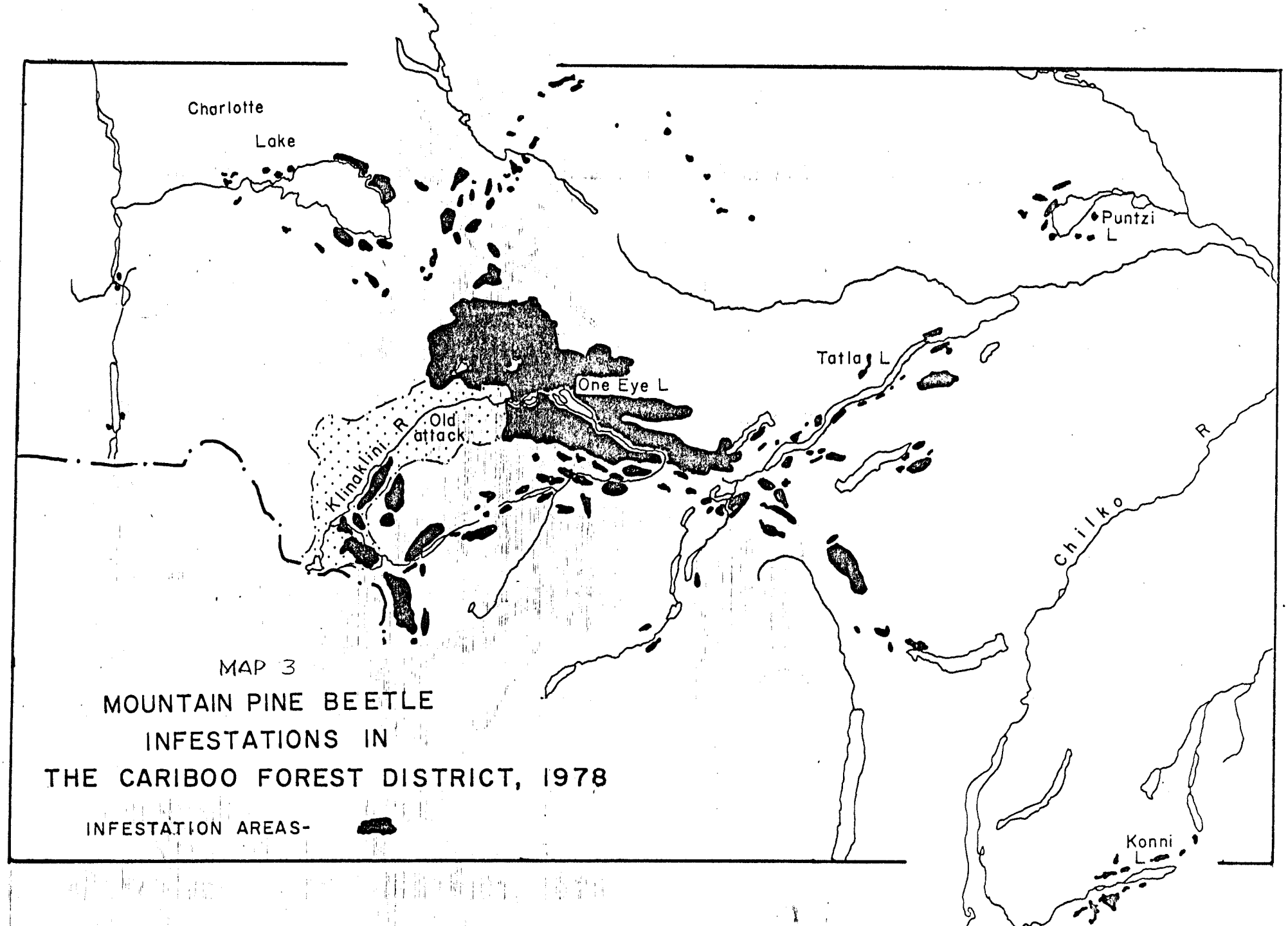
Location	Total no lP trees examined	% healthy	% attacked by mountain pine beetles: Green (1978) attack	Red (1977) attack	Gray attack prior to 1977
1. McIntyre L.	388	56	21	4	19
2. Thaddeus L.	347	43	19	8	30
3. Drummond L.	316	50	33	9	8
4. Beaumont L.	163	60	17	11	12
5. Big Cr. FDR2200	313	82	11	4	3
6. Big Cr. rd. mi 28	229	91	4	3	2 1/
7. Big Cr. cross road	454	72	17	6	5
8. Vert L. N side	313	61	14	11	14
9. China L. SE.	476	52	23	12	13
10. S. side Jesmond	233	47	10	25	18
11. Cariboo L.	124	35	14	33	48
12. McClinchy Cr.#1	212	89	8	2	1
13. McClinchy Cr.#2	318	81	8	10	2
14. Tatla L. SW end	177	85	11	4	0
15. Eagle L. acc. rd.	199	78	7	14	1
16. Tatlayoko L. rd.	251	49	36	16	2 1/
TOTALS	4553	63%	17%	10%	10%

1/ Outbreaks which have occured since 1975

History

So far the mountain pine beetle infestation has spread over both widely scattered and concentrated stands throughout most of the Cariboo Forest Region. It originated in the Klinaklini River Valley and in the Cariboo Lake area during the early 1970's when infestations were light and small. By 1975, the Klinaklini infestation had spread from Calwell Creek to One Eye Lake and many other localized outbreaks occurred throughout the Stum and Williams Lake PSYU's, causing scattered mortality from Hanceville to Big Lake and from Narcosli Creek to Clinton where Ponderosa pine was also affected.

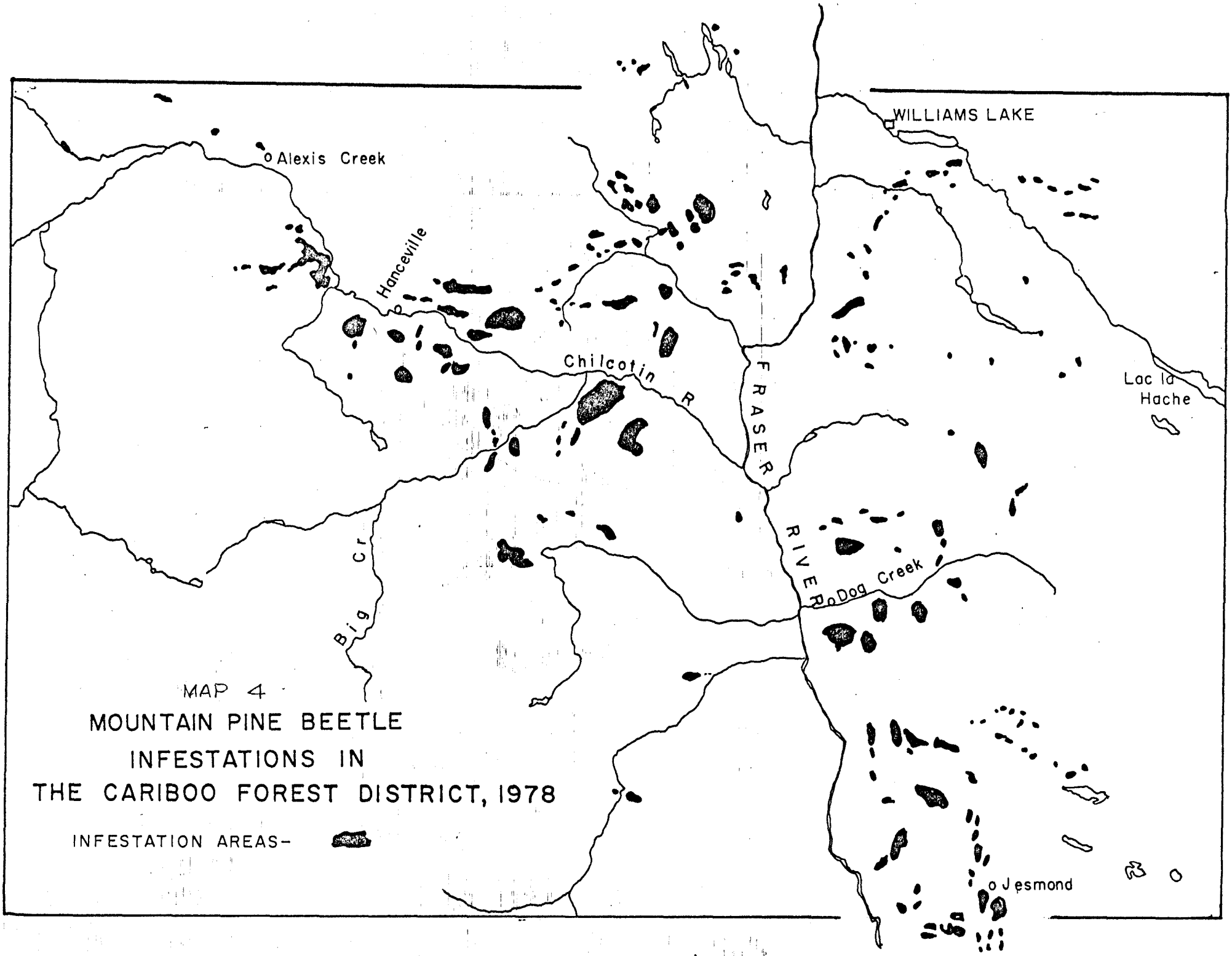
Weather during the 1970's was wetter and winters were milder than normal until the winter of 1977 when, for a brief period in November, temperatures fell to -30° to -40°C. Surveys in the spring of 1978 showed over 90% brood mortality, and resultant woodpecker predation had increased. New 1978 attacks were light in the McClinchy Creek and Tatla Lake areas indicating a cutback in the increase trend for these areas.



MAP 3

MOUNTAIN PINE BEETLE
INFESTATIONS IN
THE CARIBOO FOREST DISTRICT, 1978

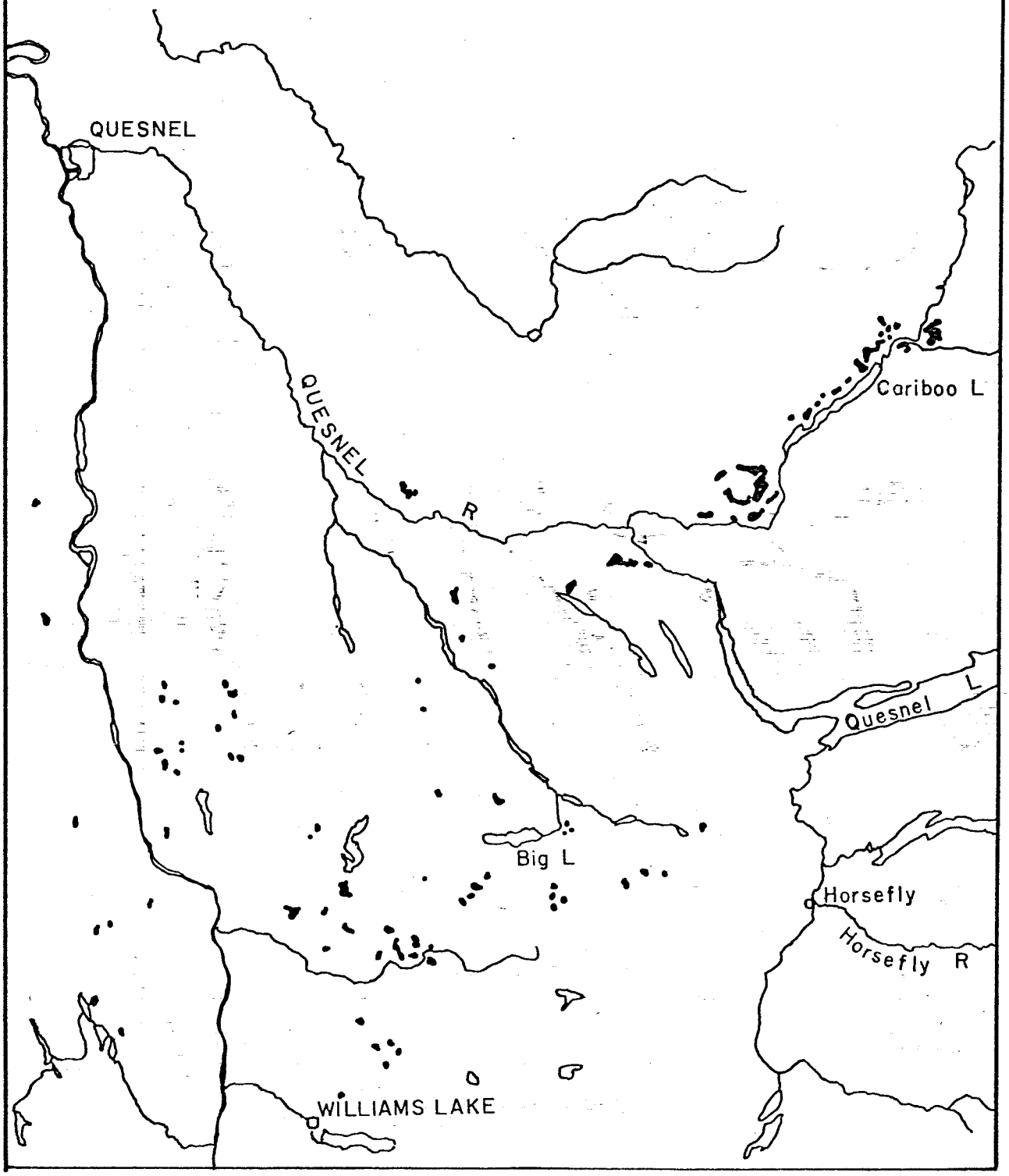
INFESTATION AREAS-


WILLIAMS LAKE
Alexis Creek
Hanceville
Chilcotin R
FRASER
RIVER
Lac la Hache
Dog Creek
Big Cr
Jesmond
MAP 4
MOUNTAIN PINE BEETLE
INFESTATIONS IN
THE CARIBOO FOREST DISTRICT, 1978
INFESTATION AREAS-

MAP 5

MOUNTAIN PINE BEETLE INFESTATIONS IN THE CARIBOO FOREST DISTRICT 1978

INFESTATION AREAS -



Douglas-fir beetle, Dendroctonus pseudotsugae

Douglas-fir beetle caused light mortality in 1978. One hundred and sixty red-top Douglas-fir trees were counted during aerial surveys. These were in the Beaver Creek. McLeese Lake, Soda Creek, Dog Creek and Gaspard Creek areas. Some of the red-topped trees were probably the result of 1976 attacks.

Some boring dust was found in healthy standing Douglas-fir trees during mountain pine beetle ground surveys, but no successful attacks were found near ground level.

Western balsam bark beetle, Dryocoetes confusus

Mortality of alpine fir caused by the western balsam bark beetle, Dryocoetes confusus in association with the lesion causing fungus Certocystis dryocoetidis increased during 1978 to 1150 trees from 650 in 1977 and 160 in 1976. Some 220 red-topped alpine fir trees were observed southwest of Sigutlat Lake, 75 in the Klinaklini River Valley, 170 on the west side of Tatlayoko Lake, 550 on the sidehills of Franklyn Arm on Chilko Lake and 150 in the Matthew River Valley.

The areas affected are higher elevations of wet-belt regions where alpine fir trees form a significant percentage of the stand.

Spruce beetle, Dendroctonus rufipennis

Spruce beetle populations in windthrown spruce in Bowron Provincial Park remained at low poulation levels. The windthrown spruce was examined for beetles during July but attacks were scarce. Two of the 20 windfalls examined had very light attcks on the shaded undersides with beetles in the adult and small larval stages. one recent windfall contained adults and larvae of a 1978 attack. Most of the original (1975) windfelled trees were starting to dry out and check and contained moderate populations of ambrosia beetles. Twenty standing white spruce trees were examined but no attacks were found.

Western spruce budworm, Choristoneura occidentalis

Western spruce budworm populations declined during 1978, causing less defoliation and top-kill than in 1977. The principle areas were Maiden Creek, Hart Ridge, Loon Lake, Scottie Creek and Big Bar Lake road near Highway 97. Egg samples taken during August indicated a lower population for 1979 in all areas except Hart Ridge (Table 4).

Tree recovery from 1977 defoliation was excellent in all areas. This probably resulted from late larval development which allowed the buds to survive and produce twig growth prior to the main feeding period. Some defoliation may be expected in the Hart Ridge area in 1979.

Table 4. Western spruce budworm egg sampling results on Douglas-fir, Cariboo Forest Region, 1978.

Location	Average no/egg masses per 10 M ^{2}	
	1977	1978
Maiden Cr.	231	36
Hart Ridge	280	293
Scotty Cr.	50	104
Loon Lake, W. end	-	104
Big Bar Lake Rd.	140	50

Stickum traps, baited with a sex-attractant, were set out in four areas for spruce budworm moths and the numbers of male moths found are recorded in Table 5.

Det'n 2500 acres - light - not discernable from the air.

FIG 2. AVG NUMBER OF WESTERN SPRUCE BUDWORM FOUND, 1949-1978, CARIBOO FOREST DISTRICT

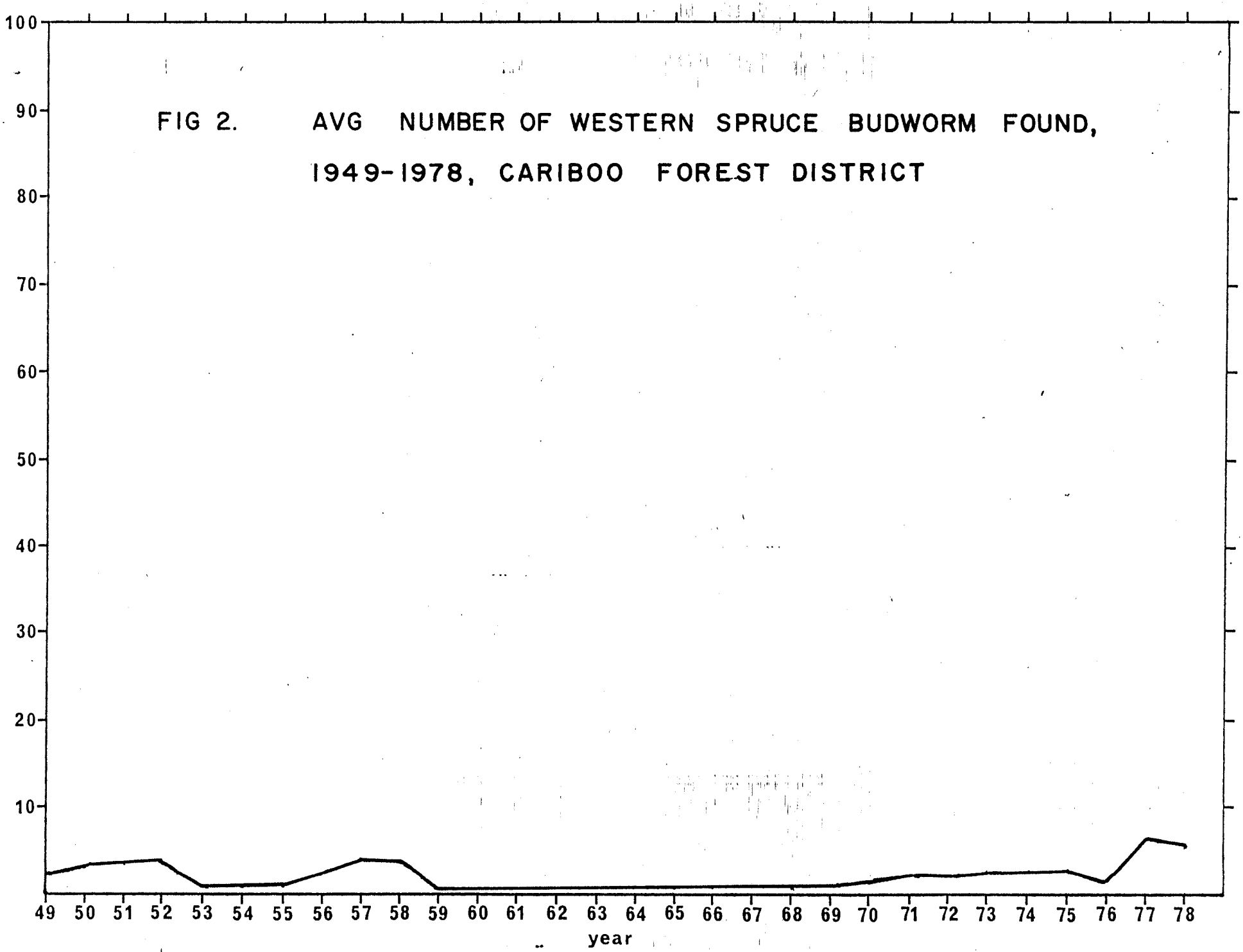


Table 5. Number of western spruce budworm moths caught using sex attractant traps, 1978 and the numbers of larvae taken in samples from the same plot.

Location	No. larvae	Total male moths	Avg.
Hart Ridge	78	297	59.4
Maiden Cr.	46	376	75.0
Loon Lake	48	339	68.0
Big Bar Cr.	1	229	46.0

Two year cycle spruce budworm, Choristorieura biennis.

Two-year-cycle budworm defoliated Englemann spruce and alpine fir from Bowron Lake Provincial Park to Hendrix Creek as in 1976, but with less intensity.

Heavy defoliation occurred over 3800 ha in the MacKay Creek Valley while light to moderate defoliation occurred on 3000 ha from Hendrix Lake to Bosk Lake, 575 ha northwest of Crooked Lake, 2300 ha in the Matthew River Valley, 3070 ha in Bowron Lake Provincial Park and 2350 ha in the Grain Creek Valley.

In the MacKay Creek Valley intermediate and suppressed alpine fir trees were up to 80 percent defoliated and there was some leader and lateral tip mortality. Dominant spruce and alpine fir trees were moderately defoliated with little or no top-kill.

Stickum traps, baited with sex attractant were placed out in five areas for two-year spruce budworm male moths and the numbers caught are recorded in Table 6.

Table 6. Number of two-year-cycle spruce budworm moths caught using sex attractant traps, and numbers of larvae taken in three-tree-beating samples at same locations.

Location	No of larvae in beating collections				Avg. no. of male moths per trap			
	1975	1976	1977	1978	1975	1976	1977	1978
Umiti Cr.	0	1	1	0	36	24	26	41
Wells	0	0	0	0	70	92	31	38
Barkerville	0	0	0	1	24	60	42	30
Hendrix Cr.	78	121	1	76	112	65	34	70
MacKay Cr.	-	-	-	-	-	-	-	70
Horsefly R.	-	-	-	272	-	-	-	58

Douglas-fir tussock moth, Orgyia pseudotsugata

Douglas-fir tussock moth populations remained at low level from Clinton to LacLa Hache. No larvae were found in beating samples during 1978.

Thirty-five traps containing sex attractant were set out from Chasm to Likely at six different localities. Since it is not known how far males will fly or can be blown by wind, the presence of adults indicates that the area should be checked for larvae the following year.

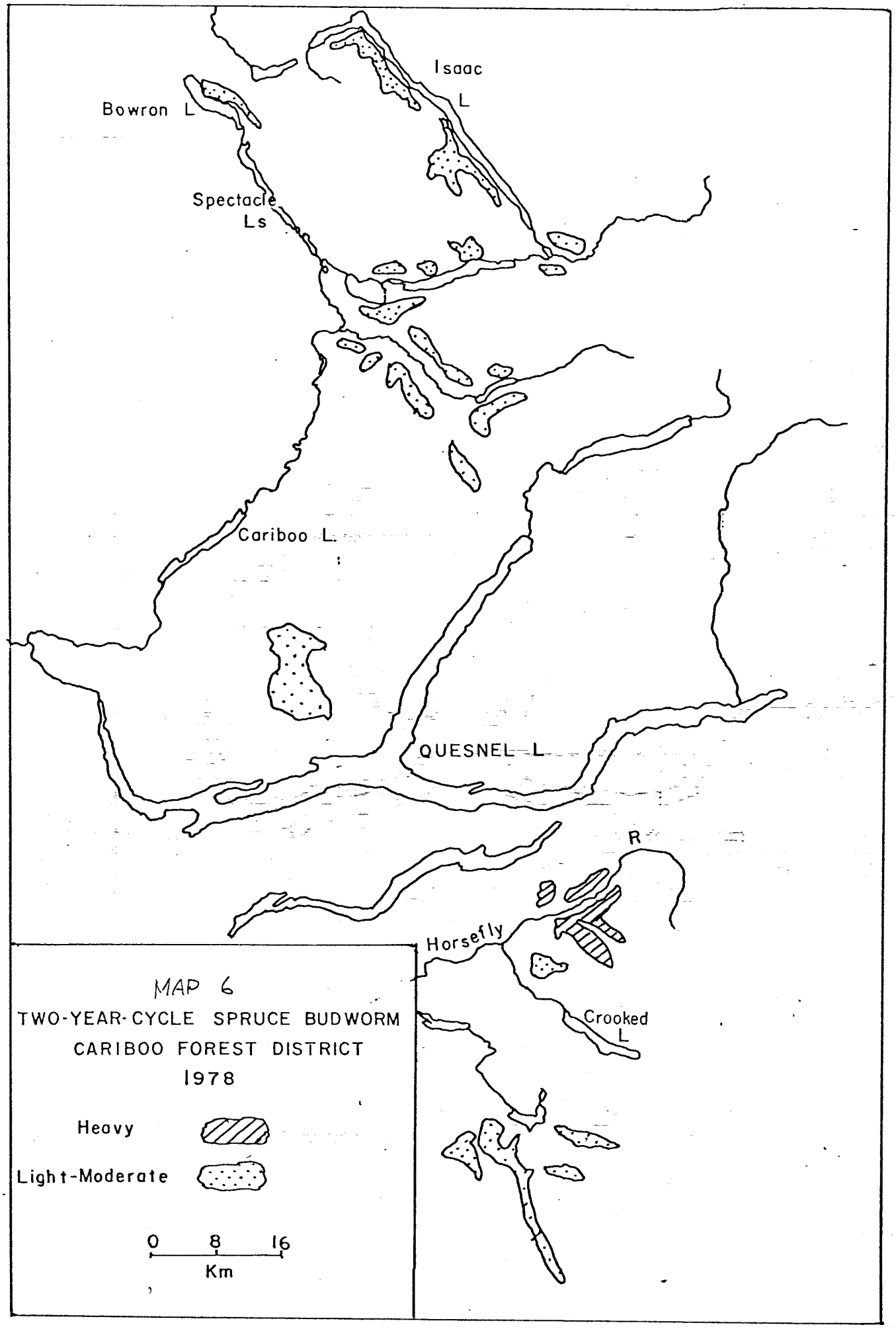
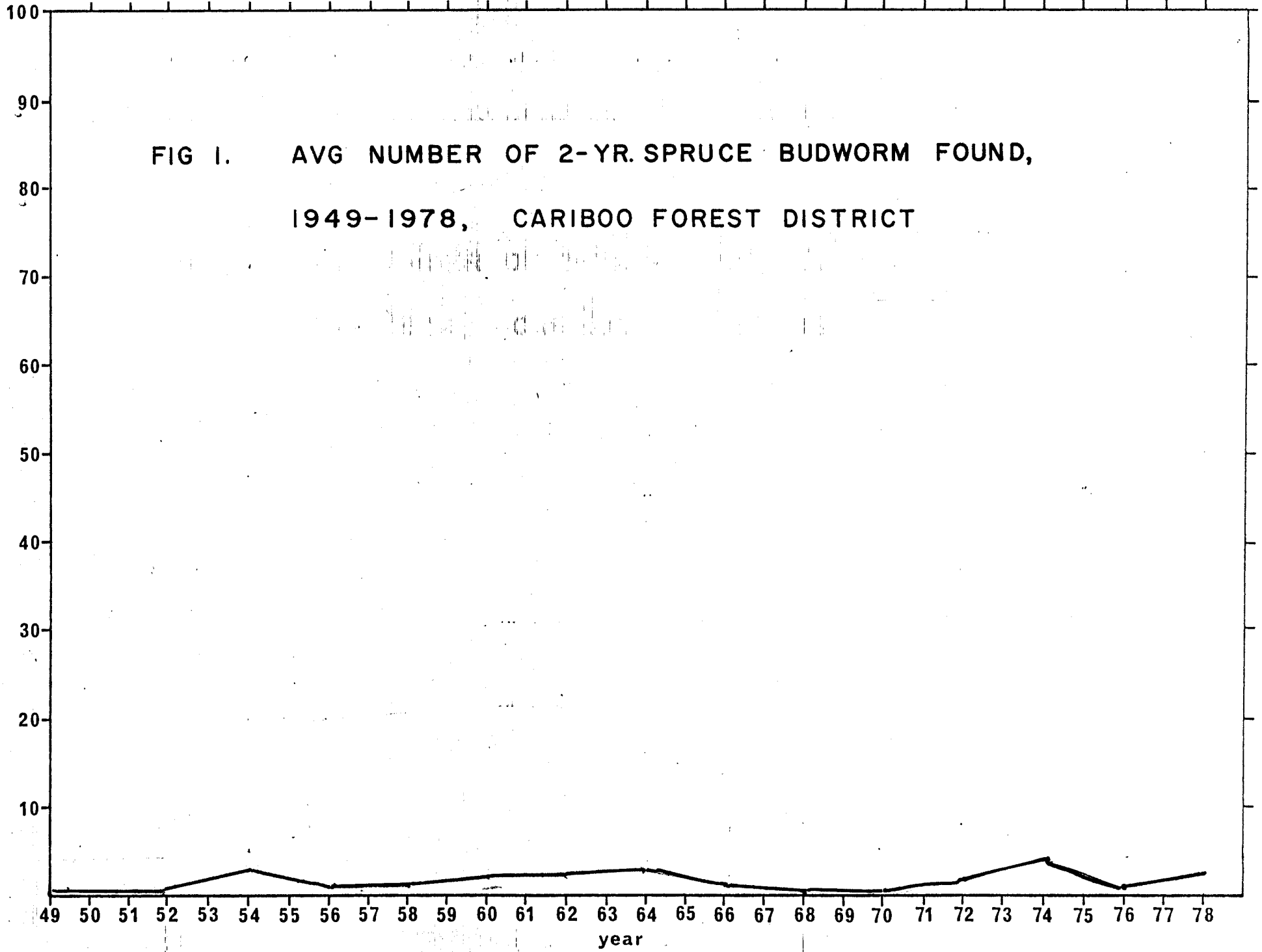

Isaac
L
Bowron L
Spectacle
Ls
Cariboo L.
QUESNEL L
R
Horsefly
Crooked
L
MAP 6
TWO-YEAR-CYCLE SPRUCE BUDWORM
CARIBOO FOREST DISTRICT
1978
Heavy
Light-Moderate
0 8 16
Km

FIG 1. AVG NUMBER OF 2-YR. SPRUCE BUDWORM FOUND, 1949-1978, CARIBOO FOREST DISTRICT



Following are locations where moths were trapped in 1978.

Location	No/traps	Total no. moths found	Avg. no. moths per trap
Bridge Lake	5	1	0.2
Green Lake	5	2	0.4
Likely	5	12	2.5
Horsefly	5	0	0
Canim Lake	5	0	0
Chasm	10	8	0.8

Lodgepole terminal weevil, Pissodes terminalis

The lodgepole terminal weevil attacked pure stands of immature lodgepole pine in the Alex Graham burn area north of Hanceville. Up to 20% of lodgepole pine terminals had been attacked by weevils in 1977 while less than one per cent were attacked in 1978.

A root collar weevil, Hylobius piceus

This weevil killed weakened reproduction lodgepole pine trees by girdling the root collars throughout old skidder sites on Lyne Creek road and near Niquidet Lake. Many of the trees had been trampled by logging equipment and while they continued to grow had been weakened by site deficiencies resulting from erosion and exposure.

Cone Insects

Since cone crops were abundant on Douglas-fir in 1978, 20 samples were taken, 18 from Douglas-fir and two from lodgepole pine.

The Douglas-fir cone moth, Barbara colfaxiana was the most destructive throughout the Region and caused cone and seed damage.

Douglas-fir seed chalcid, Megastigmas spermatrophus was present in 20% of the cone samples and probably caused only light seed losses.

Spruce seed moth, Laspeyresia youngana larvae were abundant in Englemann spruce cones in 1978 causing about 100% damage to the meager spruce seed crop throughout the eastern belt of the Cariboo Forest Region.

Insects of Current minor significance

Insect	Host(s)	Locality	Remarks
Acleris gloverana	D, alF, wS eS, wH	Clinton, Canim L., Williams L., Riske Cr., Wells	10 larvae in 8 samples, decrease.
Ectropis crepuscularia	WH	Keithley Cr.	1 only, decrease
Epirrita autumnata	wS, alF, D, wH	East Cariboo District	15 larvae in 13 samples static.
Lambdina f. lugubrosa	D, wH, eS, wS	Fraser R. Valley and Quesnel L. areas	10 larvae in 7 samples decrease.
Neodiprion spp sawflies	D, wH, wS, eS	Throughout District	12 larvae in 32 samples, decrease.
Nyctabia limitaria	D, wS, eS, wH	Likely and Spanish L	2 larvae in 2 samples, decrease
Pikonema dimmockii	eS, wS	Throughout District	48 larvae in 23 samples, static
Semiothisa sp.	D, wS	Throughout District	59 larvae in 24 samples, static.

DISEASE CONDITIONS

Needle diseases

Reddening of lodgepole pine foliage caused by needle casts (principally Lophodermella concolor)

Many immature lodgepole pine stands in the drier areas of the Cariboo Region were infected by a needle cast disease, Lophodermella concolor which caused foliage discoloration. This was noticeable at McIntyre Lake, Big Bar Lake, Tatlayoko Lake, Indian Meadows, Springhouse, Knife Creek, 70 Mile House and Mahood Falls. Symptoms were seen from the air near Anahim Lake at Holtry Meadows and Lilie Lake, but some of these were associated with excess moisture conditions. So far, no mortality has resulted from infection since it has only attacked the previous years foliage each season.

Venturia sp. on poplar.

Venturia macularis, a leaf spot disease of trembling aspen, caused severe leaf discoloration throughout the eastern part of the Cariboo District in Lac La Hache, Quesnel Lake and S.S.A. PSYU's. The heaviest defoliation occurred in the Big Lake - Beaver Valley area and the south Bridge Lake area as in 1977.

Venturia populina caused light discoloration of black cottonwood trees in 1978 and only the occasional tree was noticeably affected.

Weather damage.

Red Belt

Adverse weather conditions during the winter of 1977-78 caused red-belt of lodgepole pine on the northeast side of Tatlayoko Lake between 1200 and 1500 meters elevation and west of Tatlayoko Lake in the Homathko River valley on 100 ha on the south edge of the Niut Range at 1500 meters elevation. This discolored foliage had almost disappeared by August, and most of the trees appeared normally green.