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ANNUAL DISTRICT REPORT  
FOREST INSECT AND DISEASE SURVEY  
BRITISH COLUMBIA, 1978  
PART II, PRINCE RUPERT FOREST REGION

by  
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Victoria, British Columbia

- File Report -

Environment Canada

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## Introduction

Above normal temperatures, with highs of 30°C prevailed in the Prince Rupert Region in June and July. The normal cool weather returned in August, and September was warm and wet.

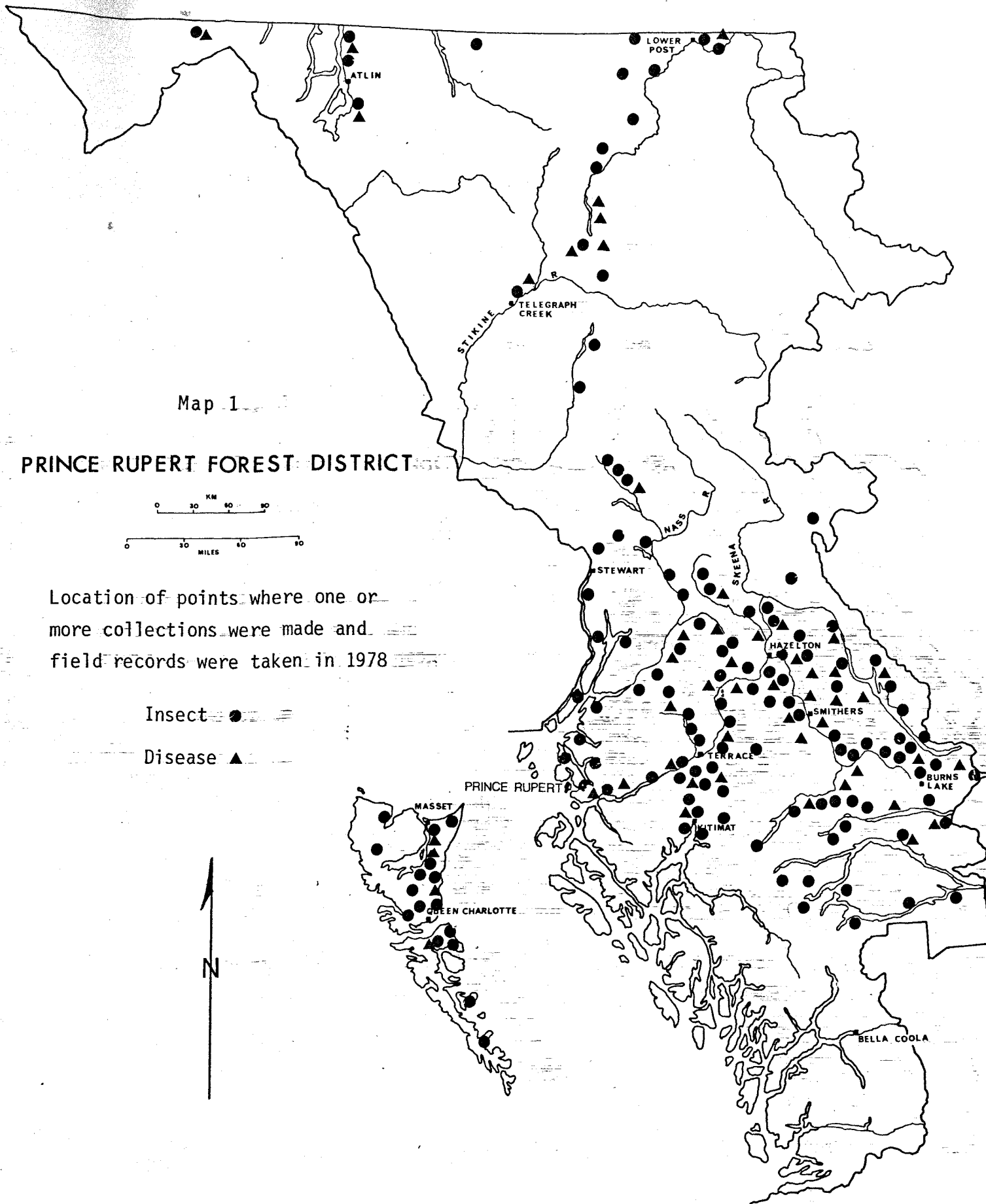
The field season extended from May 29 to October 25. Aerial surveys were conducted over the Queen Charlotte Islands in July in conjunction with a field sampling survey from July 11-18. The north coastal portion of the Region, Work Channel to Portland Canal was surveyed on July 19 and the interior lakes were flown and sampled on July 24 and 25. The detection aerial surveys of the Interior were done in September and October. The south coast wasn't flown or sampled in 1978.

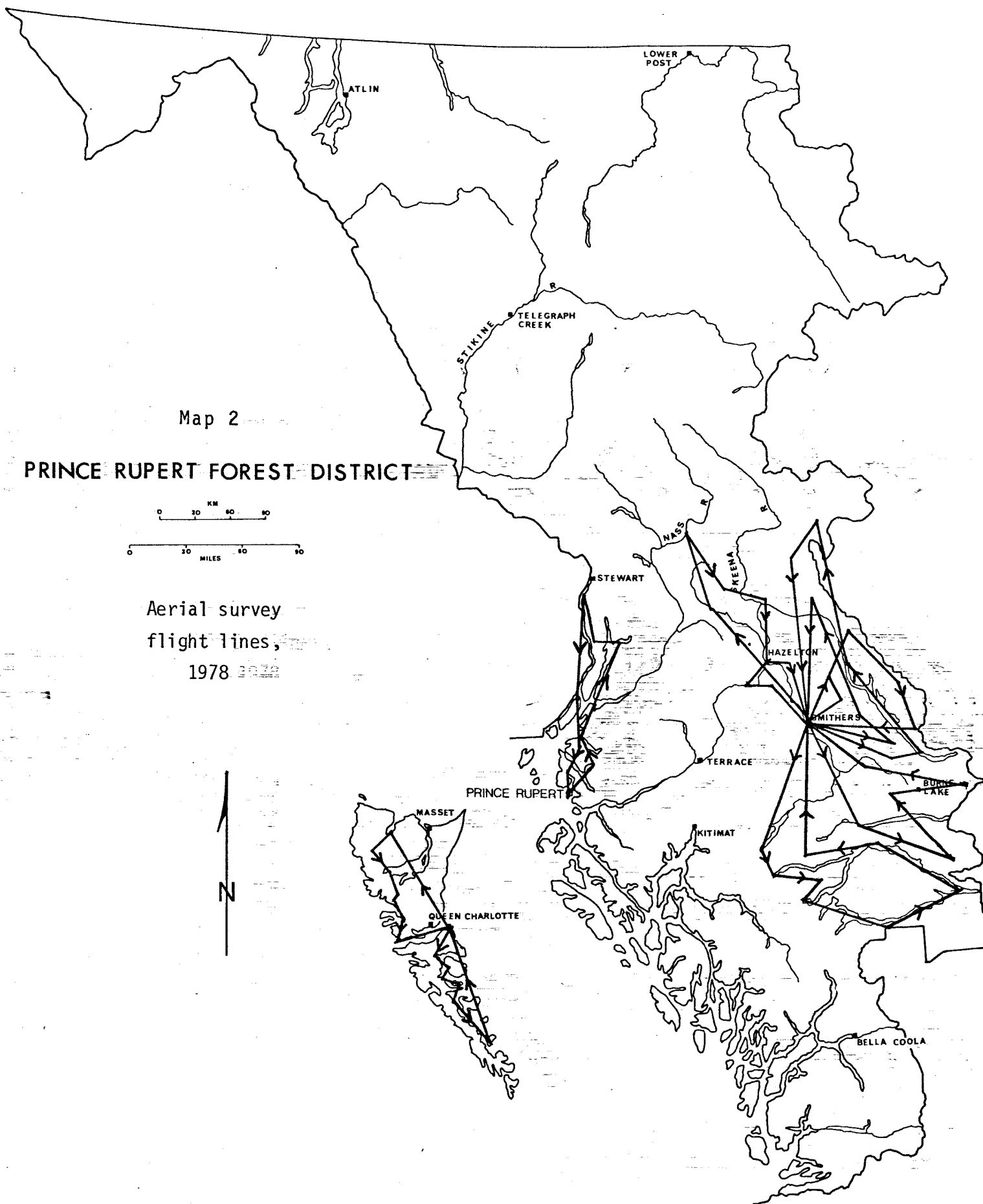
A total of 503 insect and 58 disease collections were submitted to the P.F.R.C. Map 1 shows the general location of field collection points; Map 2 shows the aerial flight lines.

There was little change in the number of collections containing larvae in the eastern portion of the Region, 64% positive in 1978, 65% in 1977 and 52% in 1976; in the western portion the number of collections containing larvae increased for the third year, 64% in 1976, 71% in 1977 and 80% in 1978.

Insect problems included spruce beetle, which reached epidemic proportions from 1977 attacks over 16 800 ha in the Region. Counts of mountain pine beetle killed pine doubled. Western balsam bark beetle continues to be a chronic problem in spruce-balsam stands. A hemlock sawfly defoliated western hemlock and alpine fir along the Skeena River and at Ironside Creek. A trace of defoliation of new growth on alpine fir, resulting from blackheaded budworm feeding, was found at Oweegee Creek on Highway 37. Green velvet loopers lightly defoliated alpine fir and white spruce at Km 58, Morice FDR and at the BCFS recreation site on Morice Lake. A spruce budmoth continued to cause deformation of tops and laterals of regeneration Sitka spruce at Deena Creek on the Queen Charlotte Islands. Stripped alder sawfly defoliated small areas of red alder on Kwaikans Island and at Rennell Sound which are also on the Queen Charlotte Islands.

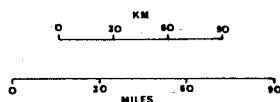
Important disease problems include dieback which continues to damage white spruce in plantations throughout the Region. Trembling aspen and black cottonwood were spectacularly infected with a leaf and twig blight in the Houston area. "Winter drying" affected conifers in the Kitimat valley and lodgepole pine near Fawnie mountain in the southeast corner of the Region. Labrador tea rust turned Sitka spruce golden in the Tlell-Port Clements area on the Queen Charlotte Islands, spruce cone rust lightly infected cones of white spruce, Rhizina root rot was collected from a clear cut and burned area on the Morice FDR and porcupines continue to plague western hemlocks near Stewart.





Map 2

PRINCE RUPERT FOREST DISTRICT



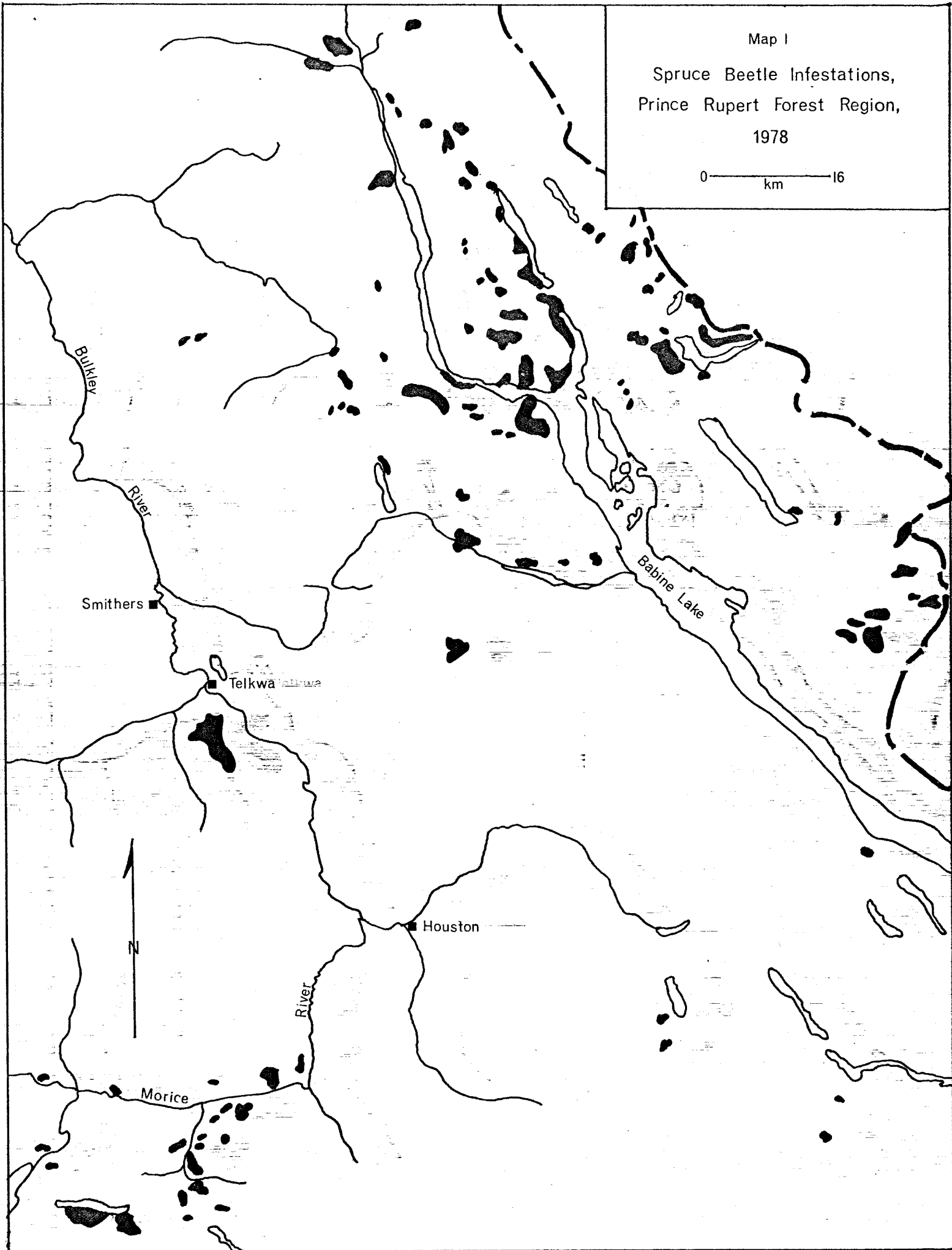
Aerial survey  
flight lines,  
1978



Map 1

Spruce Beetle Infestations,  
Prince Rupert Forest Region,  
1978

0 ————— 16  
km



Spruce beetle, Dendroctonus rufipennis

Spruce beetle infestations in the Prince Rupert Forest Region now cover 16 800 ha of spruce type. This is an increase from 100 ha in 1976 and 2 280 ha in 1977. The population build-up began in windfalls in 1973, with initial attack on standing trees probably occurring in 1975. The locations, estimated areas of dead spruce trees and intensity of attack in that particular area are listed in Table 1.

Table 1. Spruce beetle infested stands in the Prince Rupert Forest Region during 1978

Location	area (hectares)	intensity <sup>1/</sup>
Smithers Landing	2 500	M
Morrison Lake	2 265	M-H -scattered
Natowite Lake	1 400	M-H -scattered
Fleming Creek	1 300	M
Telkwa	1 200	M-H -scattered
Old Fort	1 000	L-M -scattered
Old Fort Mtn	650	L-M
McBride Lake	525	L
Babine River	445	L -scattered
Tildesley Creek	400	L
Frypan Lake - Morice River	365	M-H
NW end of Natowite Lake	345	L
Morice River	320	M-H
Nautete Creek	320	L-M
N end of Babine Lake	320	L
Fulton River (Chapman L end)	200	L
Houston Tommy Creek	200	M-H
Haul Lake	180	L
Eutsuk Lake (Redfern Rapids)	160	L -scattered
Holland Lake	160	M
Tahlo Creek	160	M
Between Babine & Morrison Lake	160	M
Pimpernel Creek	160	M-H
Bristo Creek	145	M
Tochcha Lake	140	M
Chapman Lake	130	M
Bittern Creek	120	H
Haul Lake	120	M
Fleming Lake	120	M
Fulton Lake (Babine Lake end)	80	L
Bill Nye Lake	80	H
Maxan Lake	70	L
Fedral Creek	65	M
Nilkitkwa Lake	60	L
Fulton Lake (mid)	50	L
Betty Creek	40	M
Guess Creek	40	M
Burbridge Creek	40	M
Tanglechain Creek	40	M
Lamprey Creek	40	L
Bittern Lake	40	H
Nichyeskwa Creek	40	L
Morice Lake (N end)	30	L
Tagit Creek	25	L
Charleston Creek	25	L
Tchesinkut Creek	20	L

Donald Landing	20	L
Gloyazikut Creek	20	L
Torkelsen Creek	20	L
Dorsay Lake	20	M
Gosnell Creek	10	L
Clota Lake	10	L
Guyishton Lake	5	L
Reiseter Creek	5	L

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1/ Intensity L=2-5% trees in stand killed, M=6-30%, H=31+%

Assessment of incidence of attack and brood development at thirteen infested areas revealed that there was very little successful 1978 attack on standing spruce trees. This was a direct contradiction of the results of the 1977 assessments which showed that in one area (Smithers Landing) 83% of the standing trees were infested and the brood would be ready to attack in the late spring of 1978. For some unknown reason the expected heavy flight didn't occur. Pitch-outs; trees that have successfully repulsed the beetle attack using heavy pitch flow were common and some partial or strip attacks established broods. Trap trees which had been felled during February 1977 were heavily infested along with any incidental windfalls in the infestations. In the Prince Rupert Forest Region the spruce beetle which normally has a two-year-cycle, i.e., overwintering first as a larva and the following winter as an adult, before attacking, changed to a one-year life cycle in 1977, thus brood from the 1976 attacked trees attacked in 1977. However brood assessments in the fall of 1978 indicated that the beetles have returned to the normal two-year pattern.

Cruise strips were run at 3 locations to gather additional information on tree losses. The data are summarized in Table 2.



Table 2. Cruise strip results, spruce beetle infested areas,  
Prince Rupert Forest Region, 1978

Location	healthy	Stems per hectare				gray	Volume per hectare (m <sup>3</sup> )			
		green attack	partial attack	red			healthy	green attack	partial attack	red gray
Smithers Ldg (Park Reserve)	145	0	1	7	24	252	0	4	19	41
Morrison Lake	118	3	0	0	3	241	8	0	0	8
Old Fort	244	0	7	2	5	250	0	11	7	9

In addition to the above categories (healthy, green attack etc.,) a tally was made of numbers of trees which had successfully resisted 1978 beetle attacks; at Smithers Landing 9% were resistant and at Old Fort 3%.

The scarcity of 1978 attack trees, and the occurrence of partials and pitch-outs indicate a declining beetle population. However, with high populations still infesting windfalls a hazard still exists and if conditions change, i.e., lack of windfall to absorb the next flight, standing trees could be attacked in 1980.

#### Mountain pine beetle, Dendroctonus ponderosae

Mountain pine beetle continues to be a major problem in the western portion of the region, 23 000 dead lodgepole pine trees were mapped in 1978, twice as many as were detected in 1977. Counts in 1977 showed the first decrease since 1969, however optimism that populations might be declining was premature.

In 1972 the British Columbia Forest Service mounted a salvage and control program, then expanded it in 1973, using methods recommended by Dr. L. Safranyik of the Canadian Forestry Service. This program has been continuous until 1977. The program was considered successful in eliminating beetle populations in the Smithers - Houston areas. The only areas in the eastern portion of the District with continued beetle damage were at Cunningham Lake (75 red-tops), across from Donald Landing on Babine Lake (50), and along Pierre Creek where 40 dead lodgepole pine were counted. Beetles continue to kill trees along the Bulkley River between Smithers and Hazelton, the Kispiox River Valley and along the Skeena River from Hazelton to Doreen and north up the Kitwanga River. Counts made during aerial survey are listed in Table 3.

The present infestation along Harold Price Creek isn't being salvaged due to the extreme roughness of the terrain and also because it is a sensitive fish and wildlife area. However, if the beetle shows signs of spreading onto the flats at the headwaters of the creek there is now a road within striking distance of this area and immediate action can be taken. At present, the beetle seems content to completely deplete the susceptible trees in the present attacked areas.

Brood checks along the Kispoix River and Harold Price Creek indicated that the beetle populations are sufficient to cause continuing problems.

Table 3. Mountain pine beetle killed lodgepole pine trees in the Prince Rupert Forest Region, 1976-78

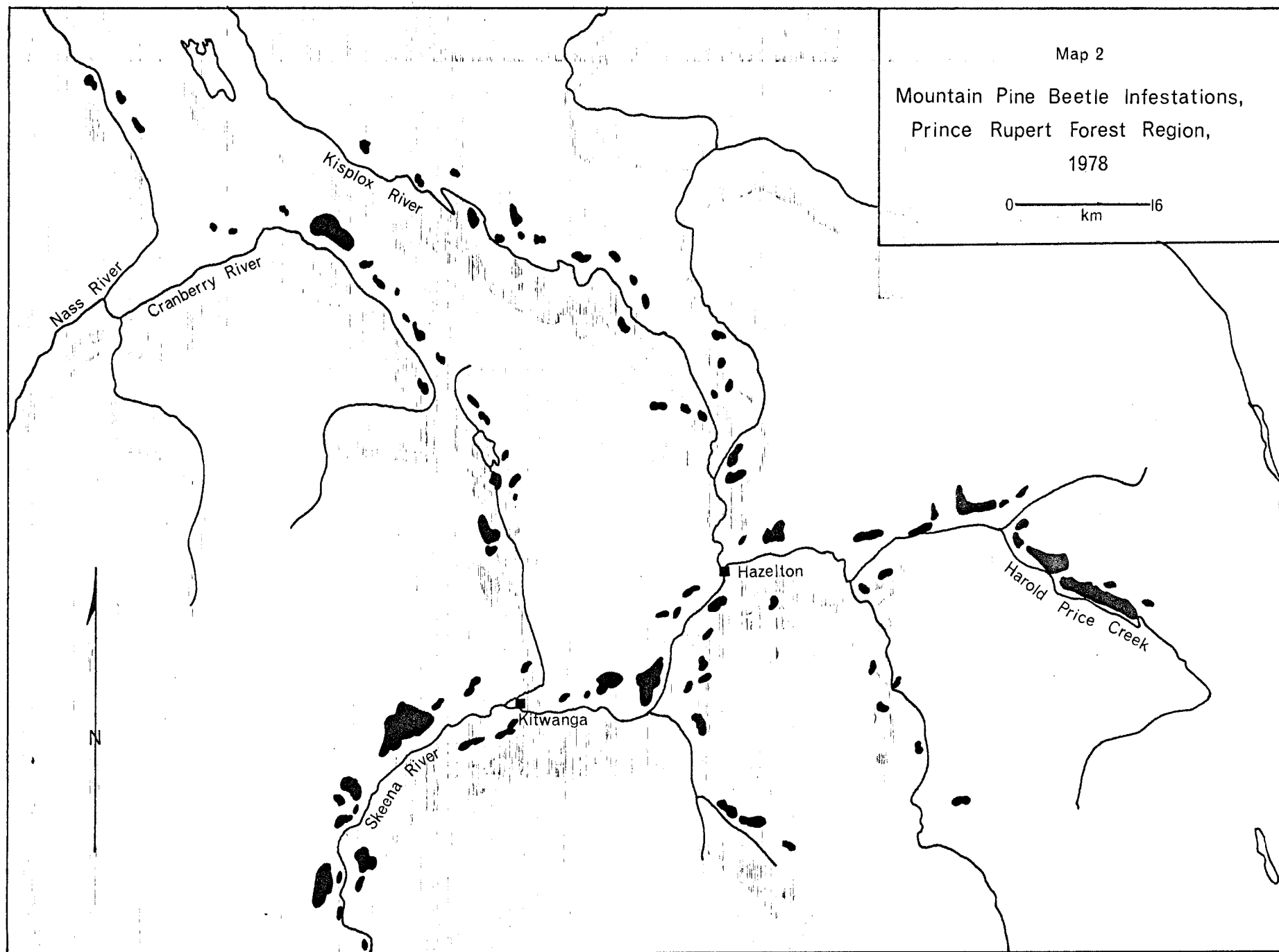
Location	Numbers of dead lodgepole pine		
	1976	1977	1978
Harold Price Creek	4 200	2 600	6 500
Kispiox River	1 900	1 200	3 000
Woodcock	500	1 000	3 000
Ritchie	1 000	1 500	2 000
Suskwa River Valley	1 900	465	1 600
Nash-Y (opposite Carnaby)	2 000	1 000	1 200
Price Creek	400	570	1 100
Seeley Lake	1 000	330	600
Two Mile Creek	-	140	400
Kitwanga Lake	250	180	350
The Nipples	350	150	350
Insect Creek	-	100	280
North Juniper Creek	-	50	250
Flint Creek	-	105	200
Mill Creek	125	55	200
Andimaul-Andi Creek	-	250	200
Juniper Creek	-	150	200
Four Mile Creek	-	140	180
New Hazelton	-	150	150
Porphyry Creek	-	25	150
Bulkley Canyon	-	200	130
Junction-Dean-Takia rivers	410	380	130
Cedarvale	110	100	120
Kitwancool	500	100	120
Cunningham Lake	-	40	75
Moonlit Creek	-	35	70
Wilson Creek	-	5	60
Nass River (S of Vandyke Island)	-	-	60
Doreen	-	25	50
Sedan Creek	-	5	50
S. Kitwanga	-	-	50
Kitwanga	-	110	50
Burdick Creek	-	50	50
Boling Point	-	70	50
Gramophone Creek	-	35	50
Pierre Creek	-	-	40
Opposite Woodcock	-	-	30
Lorne Creek	-	-	20
Atrill Creek	-	20	20
Sharpe Creek	-	15	20

Note \*

- a) The Cranberry River area not flown due to inclement weather.
- b) The 60 red-tops south of Vandyke Island are the most northern extension of mountain pine beetle in the Prince Rupert Region.
- c) The most dramatic increases were: Doreen to Hazelton 5 500 red-tops in 1977 to 9 500 in 1978; Harold Price Creek, 2 600 to 6 500 and Suskwa River 500 to 1 600,

Map 2  
Mountain Pine Beetle Infestations,  
Prince Rupert Forest Region,  
1978

0 ————— 16  
km



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Western balsam bark beetle, Dryocoetes-Ceratocystis complex

In 1978, Dryocoetes confusus, in association with the lesion-causing fungus Ceratocystis-dryocoetidis, continued to cause mortality of alpine fir in the Prince Rupert Forest Region. An estimated 8 300 red-topped alpine fir were mapped in scattered patches near Smithers in addition to 5 900 ha in the McKendrick Pass area, which is a chronic problem area of continuous alpine fir mortality. During the 1977 aerial surveys, 2 700 dead alpine fir were mapped; the decrease in numbers in 1977 (down from 5 200 red-tops in 1976) was probably due to poor aerial survey conditions, i.e. rain and smoke from slash burns which made mapping of red-topped alpine fir very difficult, and not to any actual decrease in beetle activity. Areas and numbers of red-tops mapped during aerial surveys in 1978 were: Higgins Creek (2 000); Howson Creek (1 800); Haystack Creek (1 000); Serb Creek (700); Harold Price Creek (500); John Brown Creek (300); Kitsequecla River (200); Owens Creek (200); Pine Creek (200); Nado Creek (200); Mooseskin Johnny Lake (150); Morice Lake (150); Tildesley Creek (100); Winfield Creek (100); Guess Lake (100); Deception Lake (100); Tsalitpn Lake (100); Troitsa Lake (100); Pondosy Bay (50); Cumming Creek (50); Goathorn Creek (50); Byman Creek (50); Dockril Creek (50); Nadina Mtn (50).

Studies have shown that approximately 35% of alpine fir mortality is due to direct attack by the beetle, the remainder being attributed to the beetle-induced, lesion-causing fungus Ceratocystis dryocoetidis. Initial beetle attacks may be pitched out, but subsequent attacks on trees weakened by lesions are often successful; coalescing lesions may kill trees without further beetle activity.

Alpine fir trees killed by the complex may retain their needles for up to 5 years, therefore determination of year of actual attack must be made on the ground. Aerial surveys are the best method for surveying the large tracts of infested alpine fir, especially since the infested stands are usually inaccessible.

Spruce budworm, Choristoneura biennis

Budworm larval populations on white spruce and alpine fir remain at very low levels in the Region. Only 3 larvae were found in 131 positive collections (beating samples containing insects). No significant defoliation by this species has occurred since the last outbreak subsided in 1964 along Babine Lake.

Traps to assess adult male budworm populations were used again for the seventh consecutive year at eight locations in the interior of the Region. These were baited with a sex attractant; 97 parts trans-11-tetra decenal.

Table 4. Average number of Choristoneura sp. male adults collected by pheromone traps, Prince Rupert Region

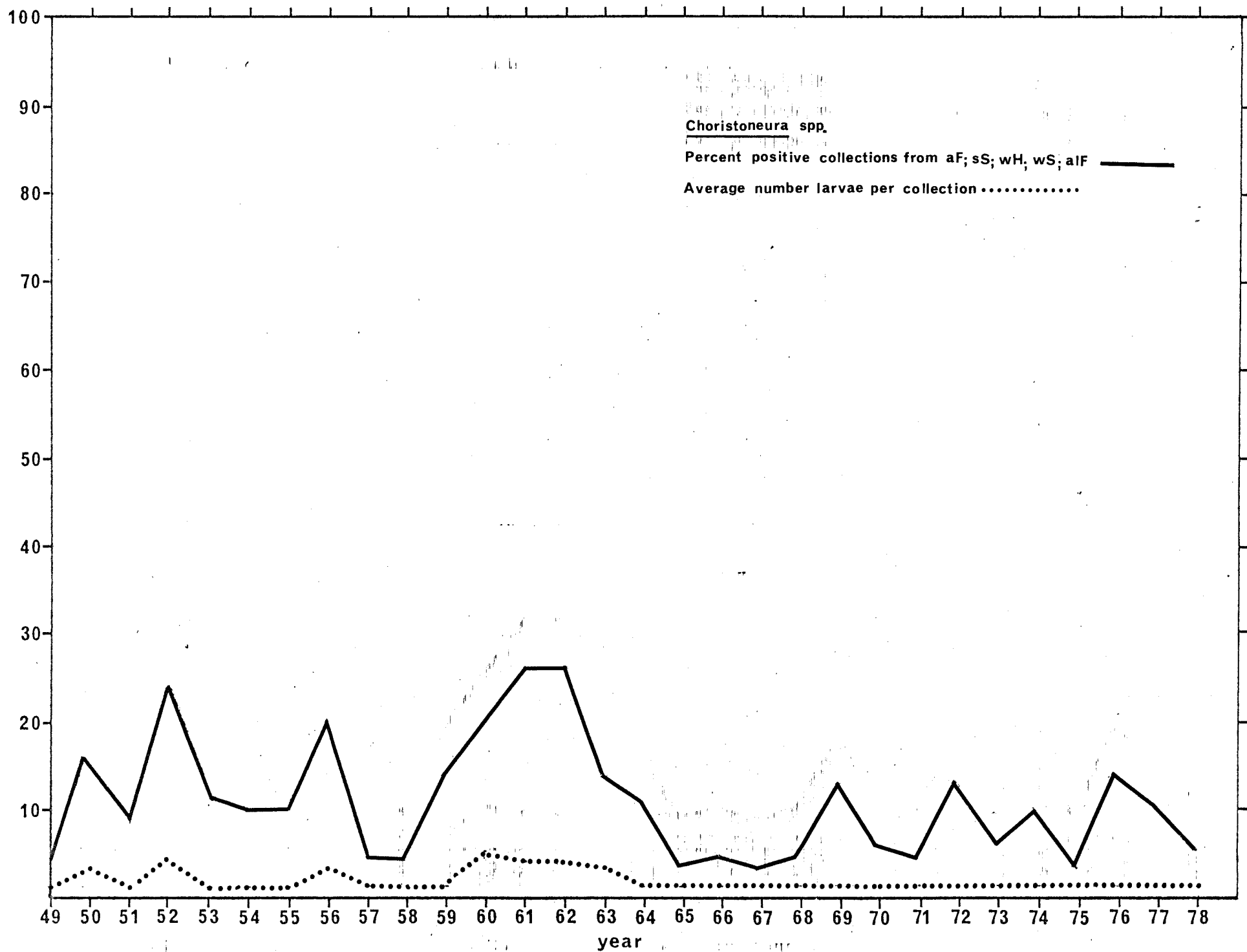
Location	1972	1973	1974	1975	1976	1977	1978
Oweegee Cr	-	-	-	102	150	70	100
Glacier Cr	-	-	-	65	201	56	100
Bell Irving R	-	-	-	118	202	59	100
Skunsnat Cr	69	3	-	75	17	37	116
Smithers Landing	8	5	-	74	34	23	56
Telkwa R	-	-	-	1	3	1	8
Morice R	2	4	31	19	6	0	11
W. Morice R	2	2	18	5	-	4	14

That 1978 was a flight year for C. biennis can be readily seen in Table 4 by the substantial increase in adults captures over 1977.

Continued low budworm populations are foreseen in 1979 in most areas and no damage is expected.

Table 5. Summary of Choristoneura spp. collections from aF, wH, sS, wS, alF, by year 1949-78, Prince Rupert Forest Region

Year	No. samples taken during larval period	Avg. no. larvae per sample	% samples containing larvae
1949	158	1	6
50	256	3	16
51	177	1	8
52	361	4	24
53	343	1	11
54	490	1	10
55	264	1	10
56	117	3	20
57	111	1	6
58	99	1	5
59	259	1	14
60	374	5	20
61	236	4	25
62	408	4	25
63	385	3	14
64	535	1	11
65	504	1	3
66	378	1	4
67	437	1	3
68	451	1	5
69	158	1	12
70	266	1	6
71	308	1	4
72	252	1	13
73	205	1	6
74	179	1	10
75	166	1	3
76	50	1	14
77	9	1	11
78	40	1	5





Blackheaded budworm, Acleris gloverana

Blackheaded budworms remain at low population levels in the Region, with only 4% of beating samples containing larvae (Table 6). Highest populations were found on alpine fir at Chapman Lake (14 larvae/beating). Some light defoliation (10%) of the current years growth of alpine fir and white spruce occurred along the Bell-Irving River at Glacier, and Oweegee creeks and the second crossing of Bell-Irving River. This is the third year of minor defoliation in the area. Populations are down from 1977, averaging only 1 larva per beating.

Plots of 100 trees each, established to study the effects of defoliation over a period of years, were re-examined in mid-summer on the Queen Charlotte Islands at Kwaikans Island in Masset Inlet and at Deena Creek. Cumulative tree mortality as a result of severe budworm defoliation in 1973 and 1974, was 66% on immature western hemlock at Kwaikans Island and 31% in a mature stand at Deena Creek; an increase over 1977 of 4% at both locations. Additional tree mortality can be expected in both areas for several more years. Increment core samples obtained will be examined at a later date.

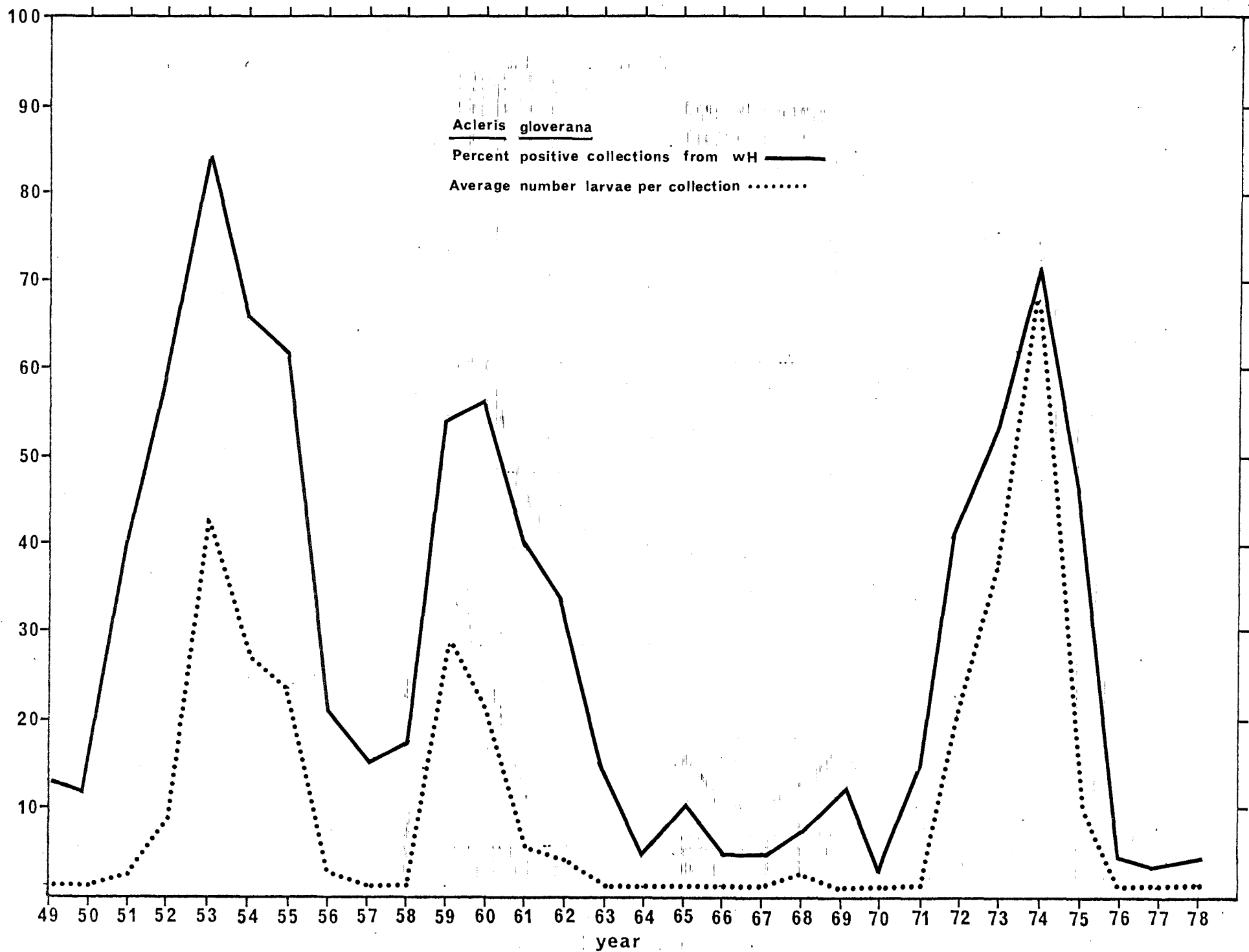
Saddleback looper, Ectropis crepuscularia

Saddleback loopers were obtained in 18 samples of western hemlock and Sitka spruce as compared to 10 in 1977; the average number of larvae per beating sample doubled to two. Near Kitimat, site of the former infestation, only two larvae were obtained.

Table 6. Summary of Acleris gloverana collections from wH by year

Prince Rupert Forest Region

Year	No. samples taken during larval period	Avg. no. larvae per sample	% samples containing larvae
1949	15	1	13
50	124	1	12
51	15	2	40
52	128	9	60
53	156	42	83
54	212	26	65
55	78	23	61
56	170	4	21
57	97	1	15
58	101	1	16
59	143	28	53
60	214	21	57
61	134	6	41
62	178	4	33
63	148	1	14
64	102	1	5
65	10	1	10
66	131	1	5
67	141	1	5
68	153	2	8
69	130	1	12
70	72	1	3
71	27	1	15
72	94	20	41
73	149	37	53
74	143	67	70
75	82	10	48
76	51	1	6
77	71	1	3
78	55	1	4



Green velvet looper, Epirrita autumnata

New growth of alpine fir was lightly defoliated (10-30%) at Morice Lake and at Km 34 Natlan FDR. Elsewhere this looper was common in low numbers in 26% of all positive insect collections, a small increase over 21% recorded in 1977.

Green-striped forest looper - Melanolophia imitata

Populations were common in low numbers in western portions of the Region, but nevertheless noteworthy as virtually none was found in recent years. Highest populations of 4 or 5 larvae per sample were obtained from western hemlock along the Kalum River.

Populations of M. imitata summarized in table 7 and following graph.

Black army cutworm, Actebia fennica

No problems by the cutworm were located or reported in 1978.

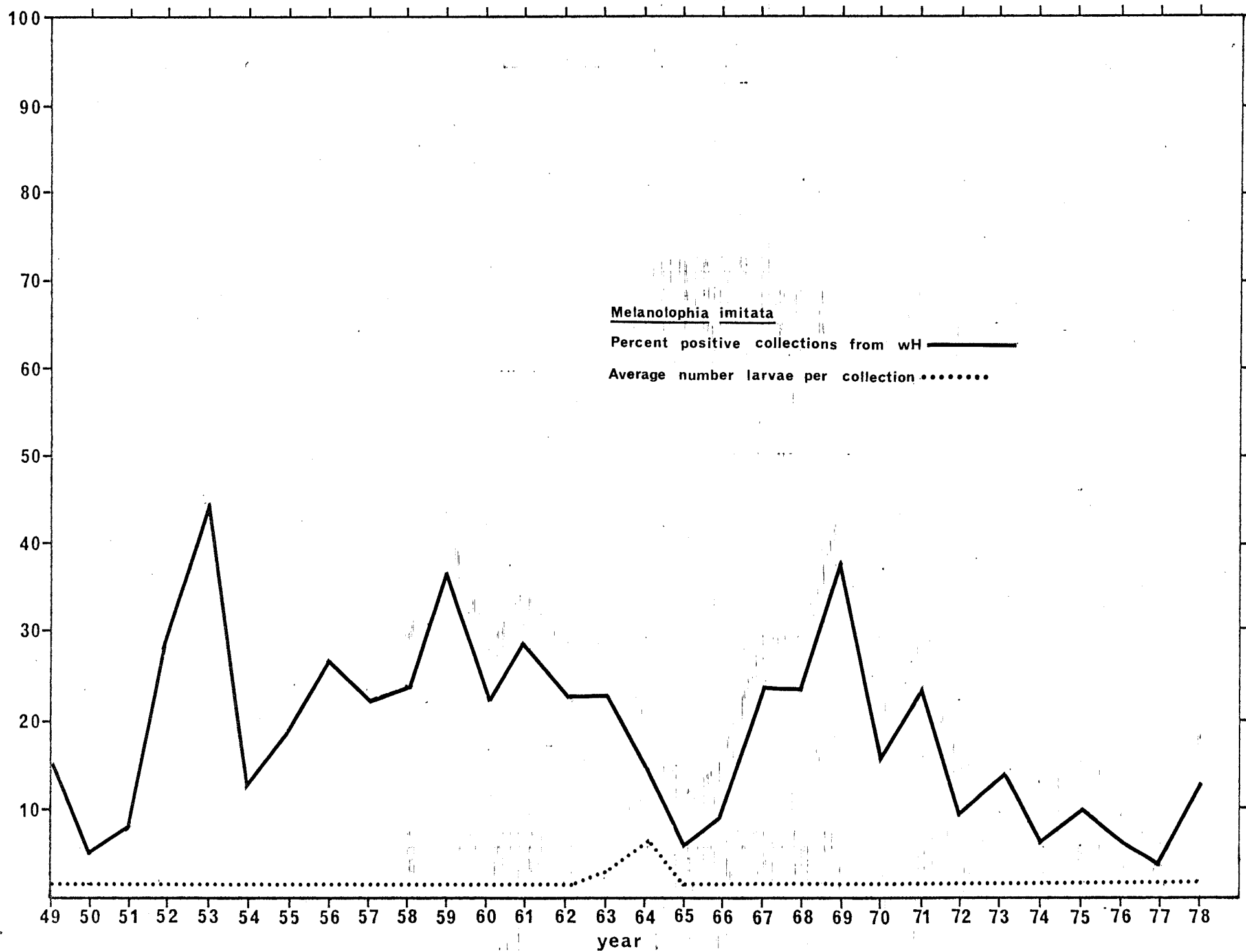
Hemlock sawflies, Neodiprion sp.

Two large patches of moderate to heavy defoliation of overmature western hemlock and some alpine fir were detected along the Skeena River south of Carrigan Creek (1 000 hectares) and in the Kispox River Valley near Ironside Creek (300 hectares). Examination of the area along the Skeena River in mid-October revealed numerous sawfly pupae many of which were parasitized, attached to remaining foliage of understory trees. Very few overwintering eggs were found. Observations from a helicopter indicated a small percentage of hemlocks were 100% defoliated.

As the areas are inaccessible by vehicle, a helicopter will be used in future monitoring.

Summary of Melanolophia imitata collections from wH by year  
Prince Rupert Forest Region

Year	No. samples taken during larval period	Avg. no. larvae per sample	% samples containing larvae
1949	41	1	15
50	194	1	5
51	33	1	9
52	49	1	29
53	119	1	44
54	210	1	12
55	80	1	19
56	132	1	26
57	18	1	22
58	84	1	24
59	141	1	36
60	184	1	22
61	107	1	28
62	145	1	20
63	154	2	20
64	110	6	15
65	112	1	6
66	143	1	9
67	189	1	24
68	142	1	24
69	110	1	37
70	112	1	17
71	13	1	23
72	74	1	9
73	130	1	14
74	93	1	7
75	51	1	10
76	42	1	7
77	92	1	4
78	69	1	12



Striped alder sawfly, Hemichroa crocea

This sawfly lightly defoliated red alder over several hectares on Kwaikans Island and for 1 km along the shore of Rennell Sound on the Queen Charlotte Islands in 1978.

Spruce budmoth, Zeiraphera sp.

First reported in 1975, Zeiraphera continues to cause deformed tops and laterals on 54 ha of pre-commercially thinned Sitka spruce at Spur 90 - Deena Creek on Moresby Island. Alteration in form and height growth of terminals resulting from bud destruction was evident in 56% of trees examined while the percentage of laterals infested averaged 7% per tree.

At nearby Spur 60 - South Bay, 44% of 12-15 year old Sitka spruce had deformed leaders over approximately a 90 ha spacing trial; infested lateral buds averaged 2% per tree.

Positive species identification was not obtained from adults caught in pheromone traps set out by Stan Coleman of Crown-Zellerbach Company.

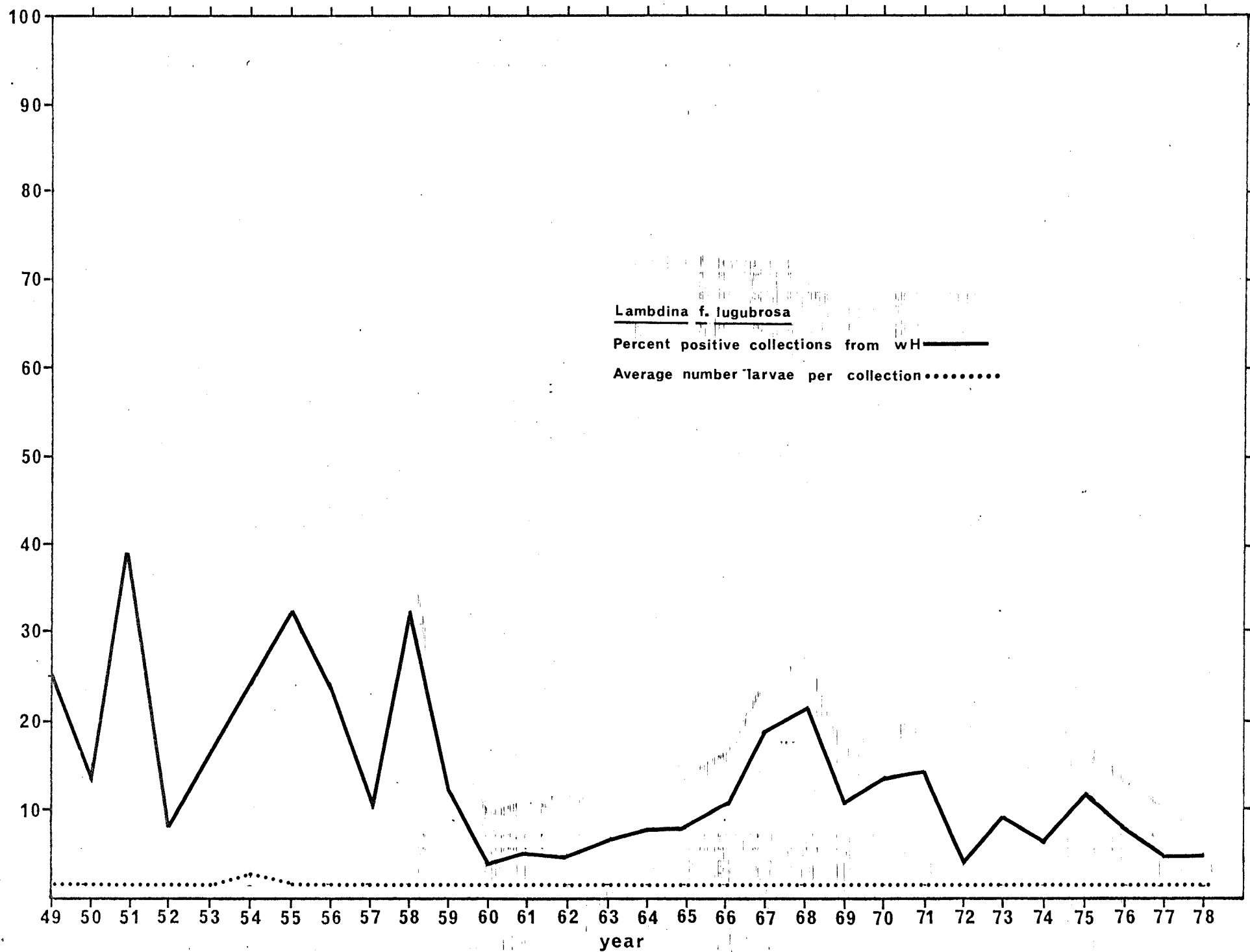
Hemlock looper, Lambdina f. lugubrosa

No problem in 1978; populations from years 1949-78 summarized in Table 8 and following graph.

Table 8. Summary of Lambdina f. lugubrosa collections from wH by year  
Prince Rupert Forest Region

Year	No. samples taken during larval period	Avg. no. larvae per sample	% samples containing larvae
1949	97	1	25
50	16	1	13
51	8	1	38
52	120	1	8
53	142	1	16
54	206	2	24
55	114	1	32
56	92	1	24
57	9	1	11
58	80	1	31
59	128	1	9
60	165	1	4
61	92	1	5
62	124	1	5
63	153	1	7
64	87	1	8
65	172	1	8
66	208	1	11
67	246	1	19
68	140	1	21
69	107	1	11
70	24	1	13
71	14	1	14
72	74	1	4
73	130	1	9
74	70	1	7
75	34	1	12
76	13	1	8
77	82	1	5
78	86	1	5





Spruce weevil, Pissodes strobi

Spruce weevil continues to cause minor amounts of damage throughout the Region. Areas which showed evidence of attack were examined and an estimation of the damage made; 4 Km Houston FDR, 6% attack on 10-15 year old white spruce, 4 km east of Smithers, 8% on 10-26 year old trees and at Moricetown where 16% of the 15-26 year old trees were attacked. A casual road-side survey from a vehicle revealed 87 attacks in 1978 compared with 78 in 1977. A permanent plot at Perow (Byman Creek) showed no evidence of attack in 1978.

Continued emphasis on the pure planting of white spruce in eastern areas of the Region could cause spruce weevil to become a major problem when the plantations are older.

North of Terrace weevil populations increased noticeably at Alice Creek, where 35% of young Sitka spruce on 2 ha had infested leaders. Very few damaged leaders were noted in this area previously. Damage also occurred near Km 9, Kalum Lake road, where 10% of planted spruce were attacked.

A-pine terminal weevil, Pissodes terminalis

Near Telegraph Creek about 40% of young lodgepole pine had dead leaders in a stand covering 60 hectares. Thirty-eight new attacks were noted in an area between miles 30 and 31 on the West Morice Forest Development Road, where only 9 were found in 1977, and 11 in 1976.

The incidence of damage is presently low and constitutes no problem in the Region.

Spruce aphid, Elatobium abietinum

Decrease. The spruce aphid which caused severe discoloration and needle drop of shoreline Sitka spruce on the Queen Charlotte Islands and adjacent mainland in the Prince Rupert area in 1977, has collapsed. Being susceptible to low temperatures it is assumed the aphids declined during last winters cold spell.

Some minor tree mortality was noted along the shoreline between Sandspit and Alliford Bay.

### Woolly aphids, Pineus prob similis

Plantations throughout the Prince Rupert Forest Region are infested in varying degrees by this aphid which causes galls to form on leaders and laterals of both white and Sitka spruces. One plantation which has been examined since 1976 is near Chapman Lake which has had infestation ratings varying from 38% of the trees infested in 1976, to 22% in 1977 and 27% in 1978.

Most trees in the plantations appear able to grow beyond the point where the insect causes major problems, however some trees seem to be more susceptible and never make progress. These highly susceptible trees become stunted and cactus topped as well as providing a continuing population source to infest other trees.

Control could be affected by removing the obvious susceptible trees and replanting or by spraying either on the ground or by helicopter, insecticidal soap would probably be successful.

### Cone insects

The cone crop on white spruce was generally light, whereas alpine fir was heavy throughout the Region. In 1978, 20 spruce stands were sampled to monitor insect populations. The most common insect found infesting white spruce cones was: Hylemya anthracina (a spiral spruce-cone borer) which damages scales and destroys seeds with no external evidence of damage until the larva emerge; all 20 stands sampled had cones infested by this borer. Other insects infesting spruce cones were: Laspeyresia youngana (a spruce seedworm) which feeds almost entirely on seeds with no external evidence of damage, 18 of the stands examined were infested; Dasineura canadensis (a spruce gall midge), forms a gall in the cone scale usually not adjacent to a seed, occurs in small numbers and probably has little effect on seed production, occurred at 13 locations; Dasineura rachiphaga (a spruce cone axis midge) one of the most common insects in spruce cones in British Columbia, but despite its large numbers it is less destructive than other cone and seed insects - no external evidence of damage, occurred at 13 locations; Mayetiola carpophaga (a spruce seed midge); in this case each larva feeds in and destroys a single seed, although it may occur in large numbers in some localities; it is not generally common, so overall losses are slight, five of the areas examined were infested.

Alpine fir cones were sampled at eight locations, insects infesting the cones were: Earomyia aquilonia (a fir-cone maggot), this larva feeds on seeds, moving from one seed to another, usually destroying all the seeds, found at two of the locations sampled; Megastigmus lasiocarpae (an alpine-fir seed chalcid), this larva feeds only on a single seed, not usually a serious pest, at five locations; Earomyia abietum (a fir-cone maggot), also basically a seed feeder moving from seed to seed, however it is also predacious and will devour other insects already present in the seeds, found at one location; Megastigmus pinus (a fir-seed chalcid), this larva spends its entire development in a single seed, important seed destroyer, no external evidence of damage, present at two sample areas; Dasineura abiesemia (a fir-cone seed midge), also a seed eater, one larva per seed, not a serious pest, present at four locations; Resselliella sp. (a cone-scale midge), larvae feed singly or in clusters on the inner surface of the cone scale, damage usually not severe because insects do not feed directly on seeds.

Bud necrosis, Camarosporium strobilinum

This disease, normally a bud fungus, but now attacking complete leaders, was first noticed in 1976 at Division Lake where 80% of the white spruce were infected in a 4- to 6-year-old plantation. This same area had 34% infection in 1977-78. The attacks in the Division Lake plantation are all on the leaders, thus potentially are very damaging.

The 6-year-old plantations along Ganokwa Creek also have a history of this disease, an examination in June 1978 revealed that 31% of the trees attacked in the past had recovered successfully, i.e. laterals had taken over, 8% were unsuccessful and were cactus tops and 6% had been re-attacked in 1977. A further examination of this area in the fall of 1978 indicated another change in the symptoms of the disease, it was now mostly affecting the buds of the laterals, out of 300 trees examined only five had their leaders infected, whereas 44 had lateral bud damage.

Leaf and twig blight of poplar, Venturia macularis

This leaf and shoot blight infected most of the trembling aspen in the Bulkley Valley from Burns Lake to Hazelton. The most noticeable area is a spectacular patchwork effect produced by heavy damage surrounding Houston for approximately 10 km. Hazelton, which had heavy infection in 1977, has only light infection this year. The area around Smithers is lightly infected, with the exception of pockets of heavy infection near Tye Lake and along the Telkwa River Road. Light to moderate infection occurs between Telkwa - Quick and near Round, Burns and Decker lakes areas. Moderate to heavy browning of aspen leaves is visible along Highway #16 from the Burns Lake airport to Palling and Decker Lake. The north side of Francois Lake has light infection generally, except for pockets of moderate to heavy browning near the west end of the lake. Light patches of infection also occur near Owen Lake.

Trembling aspen trees infected with this disease usually recover.

Snow blight, Lophophacidium hyperboreum

This blight continues to be a problem on the Perow Burn and Chapman Lake plantations in 1978. White spruce in the 8-14-year-old plantation on the Perow Burn area had an average of 33% infection on 79% of the trees, and the 9-year-old trees at Chapman Lake had an average of 12% infection on 30% of the trees examined. Most of the infection is on the lower branches and causes needle drop and die-back.

### Spruce - Labrador-tea rusts, Chrysomyxa ledicola, C. ledi

The large-spored spruce-Labrador-tea rust, C. ledicola was common on bog-site Sitka spruce between Tlell and Masset, where the alternate host, Labrador-tea, was abundant. Most spruce from seedling size to 8 metres had from 20 to 100% of their new growth infected. Severely infected trees exhibited a distinctive "golden" hue. This is the second year of severe rust infection in the area. At Diana Lake, near Prince Rupert this rust occurred on 67% of 100 young Sitka spruce examined. Infection intensity was generally less than 10% of the foliage.

The small-spored spruce-Labrador-tea rust, C. ledi caused light infections on open growing white spruce along Hatchery and Hagan arms on Babine Lake.

### Porcupine damage

Continued killing of immature lodgepole pine was noted in scattered pockets of 10 to 100 trees each along the Skeena River from Terrace to Flint Creek, and at Serb Creek west of Smithers where 150 dead trees were observed.

Porcupines killed approximately 200 young western hemlock along Bitter Creek, north of Stewart. They appear to be a chronic problem in this area and the adjacent Bear River Valley. Scattered mortality of 25-year-old hemlock is also continuing along Khutzeymateen Inlet over approximately 800 hectares.

### Climatic Injury

A type of injury commonly referred to as "winter drying" was common on natural regeneration and planted conifers in the Kitimat, Kalum and Nass river valleys. Injury can occur following rapid drops in temperature or, when sunny, dry weather and sometimes accompanying wind, follow periods of freezing temperatures. The needles transpire, but the water cannot be replenished from the frozen ground. This causes the needles to dry and discolor, often giving the trees a "scorched" appearance before the affected needles are prematurely shed. More mature trees were not as badly affected because of their deeper more extensive root system.

Up to 50% of the young western hemlock in some locations in the Kitimat Valley, and along the Nass River between Nass Camp and Cranberry Junction had lost up to 90% of their older foliage, although the average was less than 30%. Some minor top kill and tree mortality occurred in these areas.

Immature lodgepole pine in the Terrace area, the Nass Valley and at a few locations between Cedarvale and Hazelton were also affected with "flagging", mostly on the south sides of trees on exposed sites. To a much lesser degree injury occurred sporadically on young amabilis fir, and there was only minor reddening of western red cedar, Sitka and white spruce.

Winter injury also occurred to lodgepole pine and white spruce in a band along south-facing slopes between 900 and 1 100 metres elevation west of Dease Lake and along Tanzilla Butte. Similar damage was also found in some 500 hectares of lodgepole pine near Fawnie Nose Mountain, south of Nataalkuz Lake.

### Spruce cone rust, Chrysomyxa pirolata

Spruce cone rust infection was light in the Prince Rupert Forest Region in 1978 in conjunction with a generally light cone crop. Spruce makes up about 27% of the mature volume in the Region and with the current emphasis on planting a steady supply of seed is important. The rust causes the cone to open prematurely thus the seeds are unable to complete their development. Twenty cones from each of five trees were examined at 19 areas; the results are in Table 9.

Table 9. Spruce cone rust, Prince Rupert Forest Region 1978

Location	Host	Intensity (%)
Tseax River	sS	1
Cedarvale	sS	Neg
Seeley Lake	WS	1
Salmon River	WS	Neg
Kisgegas	WS	Neg
4 Km Houston FDR	WS	13
4 Km east of Smithers	WS	11
17 Km west of Smithers	WS	14
20 Km Smithers-Ldg road	WS	8
6 Km Telkwa Pass road	WS	Neg
12 Km Kitsequecla Lake road	WS	Neg
10 Km Telkwa-Hi road	WS	6
Ganokwa Creek	WS	Neg
Skeena Bridge	WS	22
Telkwa	WS	Neg
50 Km W. Morice FDR	WS	1
32 Km Morice FDR	WS	Neg
Smithers Landing	WS	Neg
Francois Lake	WS	Neg

Table 10. Diseases of current minor significance

<u>Chrysomyxa weirii</u> Spruce needle rust	White spruce	60% of trees lightly infected along Babine River.
<u>Cronartium comandrae</u> Comandra blister rust	Lodgepole pine	Dease Lake-2 areas-40-80% infection of trees 1-5 m over 2 ha.
<u>Fomes officinalis</u> Brown Trunk rot "Quinine fungus"	Western hemlock	Hoodoo Lake-Nass Valley, an incidental collection from a stump.
<u>Kabatina thujae</u>	Yellow cedar	Diana Lake, 80% infection causing tip die-back, 1st report on a non-ornamental tree in North America.
<u>Leptomelanconium cinereum</u> Needle blight of pine	Lodgepole pine	Co-op Lake, near Burns Lake in thinning operation over 2 400 ha 10-50% loss of needles.
<u>Lirula abietis-concoloris</u> Needle cast	Alpine fir	Suskwa River, Smithers Landing, Nadina River, Atlin Lake, and Km 92 Atlin Road. Common on individual trees.
<u>Lirula macrospora</u> Needle cast	Sitka spruce	Stewart, light, 12% of trees infected.
<u>Melampsora epitea</u> Foliage rust	Willow	Hudsons Bay Mtn - all bushes in area infected in one small area.
<u>Phragmidium fusiforme</u> Rose rust	Rose	Common throughout Region.
<u>Polyporus tomentosus</u> False velvet top fungus	White spruce	Dorsay Lake - small, 10 ha isolated stand of spruce heavily infected with root and butt rot.
<u>Puccinia angustata</u> Rust	Giant Ragwort	Whitesail Lake - all plants in area infected - 1st herbarium record since 1950 - second collection.
<u>Puccinia gigantea</u> Rust	Fireweed	Uncha Lake - light infection all plants.
<u>Puccinia recondita</u> Rust	Meadow Rue Baneberry	Fulton River, Skins Lake dam all plants light infected.
<u>Pucciniastrum epilobii</u> Fir-fireweed rust	Alpine fir	Smithers Landing - light infection.

Pucciniastrum goeppertianum  
Vaccinium rust

Alpine fir

McKendrick Creek - light  
infection.

Rhizina undulata  
Rhizina root rot

Duff-area  
not planted

Km 58 West Morice FDR on a  
1977 fall burn.

Trisetacus camponodus  
Kinky diseases

Lodgepole pine

Kitimat Valley - moderate  
infection on 40% of planted trees.

Uromyces gerani  
Plant rust

Northern  
geranium

Skunsnat Creek - all plants  
lightly infected.