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ANNUAL DISTRICT REPORT
FOREST INSECT AND DISEASE SURVEY
BRITISH COLUMBIA, 1977
PART III, PRINCE GEORGE FOREST DISTRICT

by

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CANADIAN FORESTRY SERVICE
VICTORIA, BRITISH COLUMBIA
FILE REPORT

DEPARTMENT OF ENVIRONMENT
DECEMBER 1977

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INTRODUCTION

This file report outlines the status of forest insect and disease conditions in the Prince George Forest District for 1977, emphasizing pests capable of sudden damaging outbreaks.

Regular field work in the District commenced on June 1 and terminated on August 22. Nineteen hours of helicopter and 8 hours of fixed wing flying time were provided by the British Columbia Forest Service in 1977. During the season talks on forest insects and diseases were given to a group of Swedish foresters and to British Columbia Forest Service personnel.

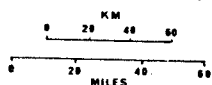
A total of 289 insect and 61 disease collections were taken in 1977. Collection localities and drainage divisions are shown on Map 1. Aerial survey flight lines are shown on Map 2.

The number of collections containing defoliating larvae increased to 79% in 1977 from 68% in 1976. Defoliation by a hemlock sawfly, *Neodiprion* sp., was extensive from Purden Lake to Clyde Creek. Forest tent caterpillars continued to defoliate aspen in the McBride - Tête Jaune Cache area. There was a notable decrease in the large aspen tortrix population in the Peace River region. Blotch mining of willow, alder and western white birch leaves was moderate to severe in the McBride - Tête Jaune Cache area. There was a large increase in the areas of mountain pine beetle damage in the Canoe River area but no increases occurred in the Stuart Lake area. Spruce beetles killed trees in moderate numbers in the Carp and Inzana lakes areas.

Winter drying caused widespread damage to lodgepole pine in the Pine Pass - Monkman area. A shoot and leaf blight damaged aspen in the Williston, Manson and Germansen lakes areas.

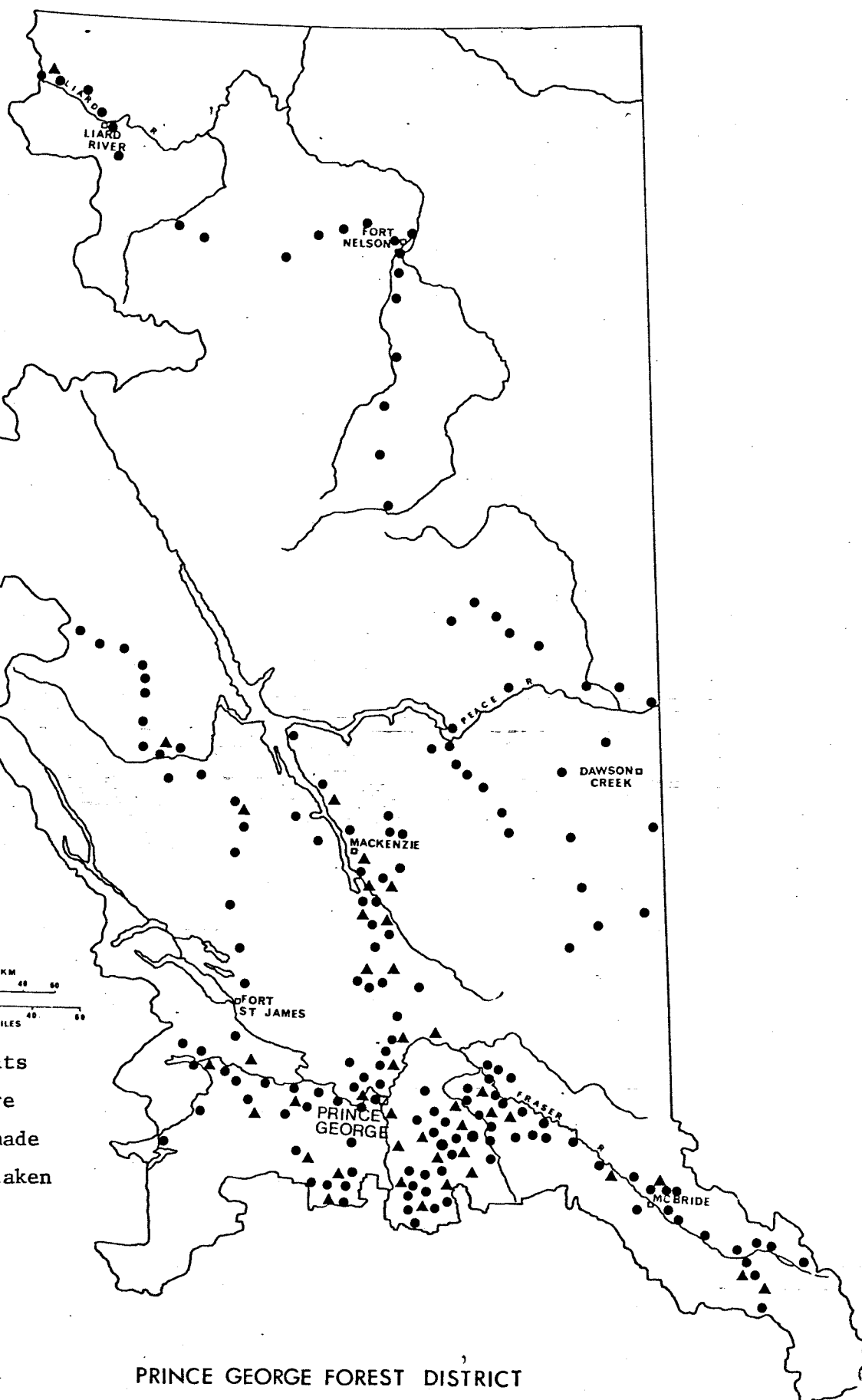
Details on individual insect and disease problems appear in subsequent sections.

Map 1

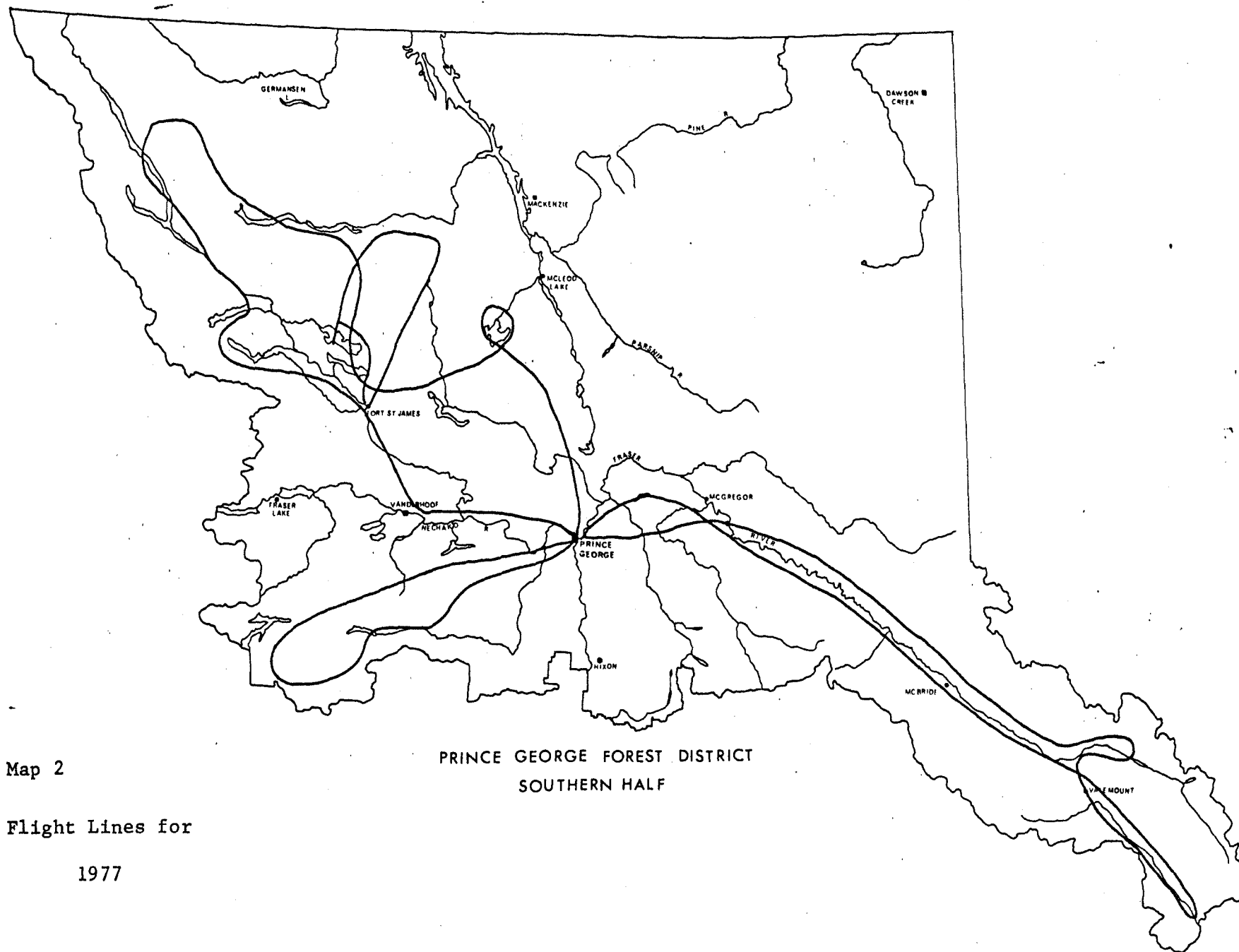


Location of points
where one or more
collections were made
and field records taken
in 1977.

Insect ●
Disease ▲



PRINCE GEORGE FOREST DISTRICT



Map 2

Flight Lines for

1977

A sawfly on western hemlock, *Neodiprion* sp.

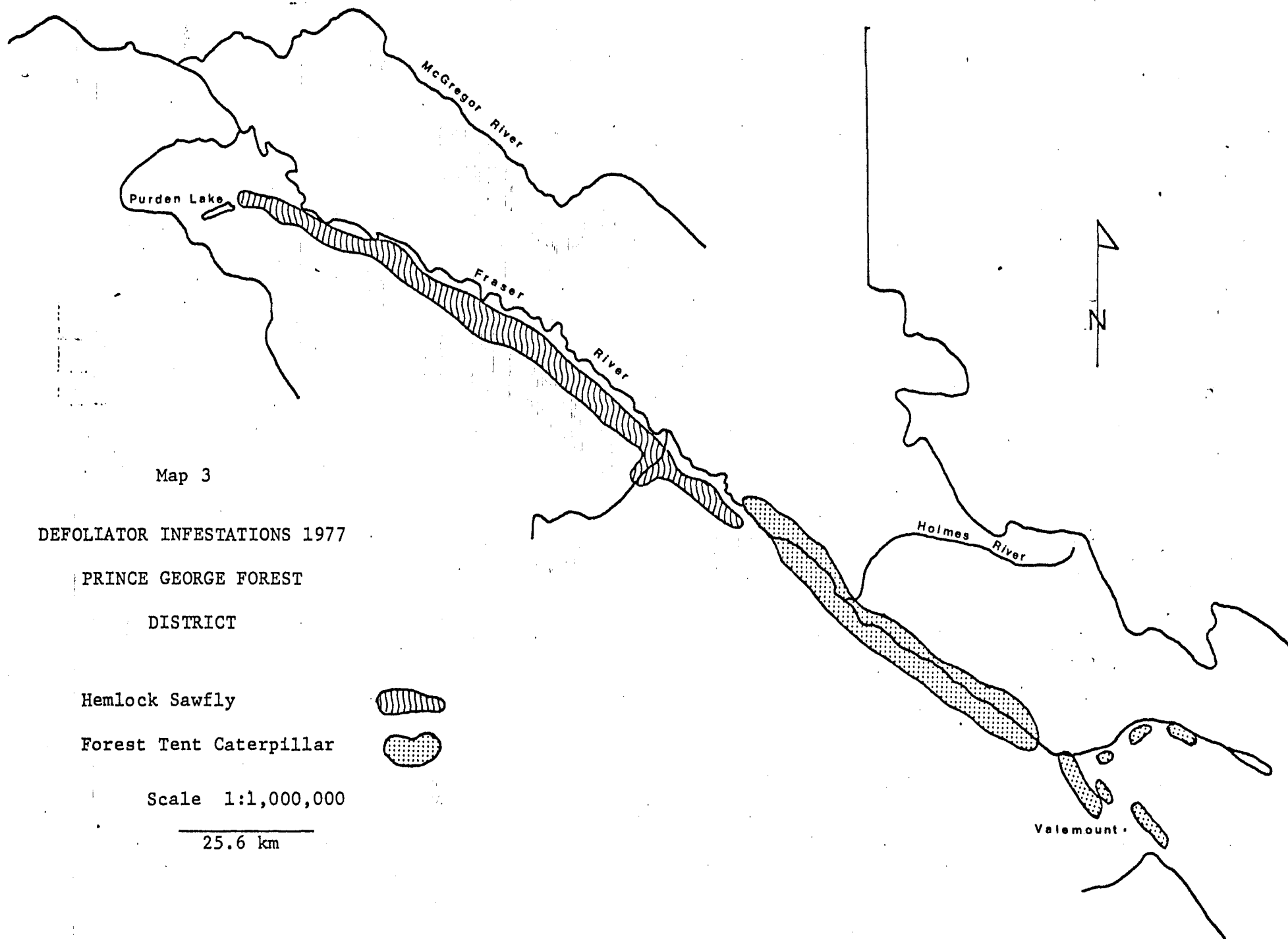
For the third consecutive year this insect has defoliated western hemlock east of Prince George. An aerial survey in mid-August showed a total of 64 000 ha of moderate to severe defoliation (Map 3). The pattern of defoliation was not consistent, with lightly and severely defoliated trees inter-mixed. In the most severely defoliated area between Hungary and Slim creeks, only a small portion of the 1977 foliage was left on the trees. Some areas of spruce-balsam type had severe defoliation of the understory of these species.

The average number of larvae per sample within the infestation increased to 656 in 1977 from 482 in 1976. Numbers of larvae in samples from hemlock were: Sinclair Mills, 227; Sugarbowl Creek, 602; Driscoll Creek, 702; Dome Creek, 1,504; Hungary Creek, 400, and Dore River, 502. Mass collections of larvae sent to the Insect Pathology Research Institute did not show any signs of disease.

Table 1. Summary of *Neodiprion* spp. collections from western hemlock, Douglas-fir, white spruce, and alpine fir in four drainages of the Prince George Forest District

Drainage Division	No. samples taken during larval period			% samples containing larvae			Avg no. larvae per positive sample		
	1975	1976	1977	1975	1976	1977	1975	1976	1977
359	118	101	102	27	22	37	37.7	125.0	126.2
368	30	7	8	17	0	0	1.2	0	0
369	55	44	27	11	7	15	6.2	1.6	1.0
360	45	23	30	27	26	17	1.8	8.8	2.2
Totals	248	175	162	22	18	23	23.0	90.5	102.2

Subsequent to the aerial survey the British Columbia Forest Service reported defoliation along the McGregor River which was attributed to *Neodiprion* as well.



Map 3

DEFOLIATOR INFESTATIONS 1977

PRINCE GEORGE FOREST

DISTRICT

Hemlock Sawfly



Forest Tent Caterpillar



Scale 1:1,000,000

25.6 km

Forest tent caterpillar, *Malacosoma disstria*

The forest tent caterpillar infestation in the McBride area increased from 6 000 ha in 1976 to 30 400 ha in 1977 (Map 3). Some of this increase can be attributed to the fact that the area was estimated from the roadside in 1976 but was mapped from the air in 1977. The infestation is continuous for 70 km between McKale and Kiwa creeks along the Fraser River in the McBride area. Additional patches of defoliation occurred from Tête Jaune Cache to Valemount and between Tête Jaune Cache and Alpland in Mount Robson Park. Although the area of infestation expanded the severity of defoliation decreased from 1976.

By mid-June, when a mass collection was made for the Insect Pathology Research Institute, the larvae were two-thirds to full grown, and by mid-July the majority had pupated. No disease was present in the larvae sent to I.P.R.I.

Two-year cycle spruce budworm, *Choristoneura biennis*

Larval populations of *C. biennis* remained low in 1977, except in the Holmes River area where beating samples in mid-June yielded up to 200 3rd and 4th instar larvae. During the second week of July, a maximum of 10 larvae per sample was collected, but this was probably due to their going into overwintering hibernation. The only other area that had more than the occasional larva was Tumuch Lake, where three of five samples yielded 4, 5 and 10 larvae. As the following table indicates, there has been an increase in the number of larvae over 1975, the last non-adult year. This would indicate that there was good survival of overwintering 2nd instar larvae from 1976 and could lead to increased defoliation in 1978 when the maturing larvae are feeding.

Drainage Division	No. samples taken during larval period			% samples containing larvae			Avg no. larvae per positive sample		
	1975	1976	1977	1975	1976	1977	1975	1976	1977
359	67	76	55	2	20	16	1.0	1.3	4.0

This year there was a significant amount of bud damage in the Holmes River area. Both alpine fir and white spruce had 95% of the buds damaged between km 32 to 37; light bud damage was evident from km 29 to 42.

Pheromone traps were again used in 1977 to determine the presence of adults even though this was not the adult year. The traps were redesigned this year in order to improve their effectiveness in the field. The three-sided 1-litre milk cartons reduced the surface area to 710 cm² from 994 cm² but they

eliminated the problem of collapsing during the summer. Bird tanglefoot was used in all of the traps.

The traps were set out between July 5th and July 8th, and retrieved on either August 10th or 20th.

Table 2. *Choristoneura* spp. larvae in 3-tree beating samples from white spruce and alpine fir, and adults in pheromone traps, Prince George Forest District

Location	No. larvae per 3-tree sample			Time traps in field 1977	Range of moths per trap 1977	Avg no. moths per trap		
	75	76	77			75	76	77
Mi. 16 Naver Rd.	0	1	0	July 7 - Aug. 10	0 - 6	12	77	3
George Cr	0	0	0	" "	1 - 6	12	41	3
Hay L	-	1	0	" "	0 - 5	7	34	2
Hwy. 16 Willow R	0	0	0	July 6 - "	0 - 2	0	27	1
Crystal L	1	0	0	July 8 - Aug. 20	0 - 3	1	24	1
Davie L	1	0	0	July 5 - "	0 - 3	1	2	1
Tudyah L	0	0	0	" "	1 - 10	1	2	3
Pine Pass	0	0	0	" "	9 - 24	18	11	18
Beaver Cr	0	0	0	" "	1 - 10	31	11	4
Link Cr	0	0	0	" "	5 - 16	16	39	10
Narrow L	0	0	0	July 7 - Aug. 10	0 - 3	14	54	1

One-year-cycle spruce budworm, *Choristoneura fumiferana*

The larval population continued to decrease, as indicated by the beating samples. Collections made between km 790 and 864 during the third week in June yielded only an average of 5.1 larvae, showing a marked decrease since 1975 (1975, 124 larvae; 1976, 35 larvae).

Three damage appraisal plots were established: at Smith River, km 863, and Coal River. At each location three prism sweeps were made, all tree diameters were taken, heights estimated and length of top-kill recorded. Two increment cores were taken from each of 10 host trees and three non-host trees. Top-kill, which is probably one of the most significant forms of damage resulting from budworm feeding, is summarized in Table 3.

Table 3. Spruce top-kill caused by spruce budworm in the Smith River infestation, Prince George Forest District

Location	Total no. of trees sampled	No. of trees with top-kill	% of trees top-killed	Total length of top-kill (m)	Avg length of top-kill (m)
Smith R	23	7	30	11.1	1.6
Coal R	25	4	16	2.7	.7
km 863	23	8	35	9.3	1.2

The number of trees with top-kill is probably conservative since trees have developed very bushy tops due to adventitious growth over the period of infestation and dead tops are very difficult to spot from the ground. This is substantiated by recent fallen trees of which ten were examined, and all but one had top-kill ranging from 4 to 15 years.

Larch sawfly, *Pristiphora erichsonii*

There was a general reappearance of sawfly larvae in all tamarack stands in the District. The last outbreak was between 1961 and 1965.

Only four tamarack beating samples were taken in the Peace River, Monkman, and Liard River areas, all of which were positive and yielded an average of 22 larvae per sample. No larval samples were taken in the Bednesti - Tatuk lakes area, but a square foot duff sample yielded 50 sawfly cocoons in mid-August.

Defoliation mapping of tamarack was done only in the Bednesti-Tatuk

lakes area, where eastern larch was up to 95% defoliated on an estimated 1 600 ha. Light to moderate defoliation was expected in the Peace River - Monkman and Liard River areas where feeding was not completed when examined in July .

Large aspen tortrix, *Choristoneura conflictana*

There was only light defoliation of aspen in the Clayhurst and Cecil Lake area. No sign of feeding was found in the Progress area, where severe feeding the previous 3 years had caused some twig dieback.

A budmoth of spruce, *Zeiraphera destitutana*

Budmoth populations declined to endemic levels in the Liard - Smith rivers area following a sudden surge in 1976, when 50 larvae were collected per sampling point.

Epirrita spp.

This was the most common larva collected in samples from white spruce, alpine fir, and western hemlock. It was present in 33% of the samples and averaged 2.2 larvae per sample.

A larch geometrid, *Semiothisa* sp.

An average of 112 early instar larvae were collected in samples from tamarack in the Monkman area. In late July, the light defoliation present was attributed to larch sawfly, *Pristiphora erichsonii*, but increased defoliation later in the summer was probably due to *Semiothisa* sp. Since this insect defoliates late in the season and the needles are shed anyway, little damage is expected.

Leaf blotch miner, *Lyonetia saliciella*

The leaves of birch, willow, and alder again were severely browned over extensive areas along McNaughton Lake from Dave Henry Creek south of Valemount to Tête-Jaune Cache and east into Mount Robson Park and west to McBride.

Mountain pine beetle, *Dendroctonus ponderosae*

The number of beetle-killed pine increased to 4,100 trees in 1977 from 860 in 1976. The largest increase was in white pine-lodgepole pine stands along McNaughton Lake (Map 4, Table 4).

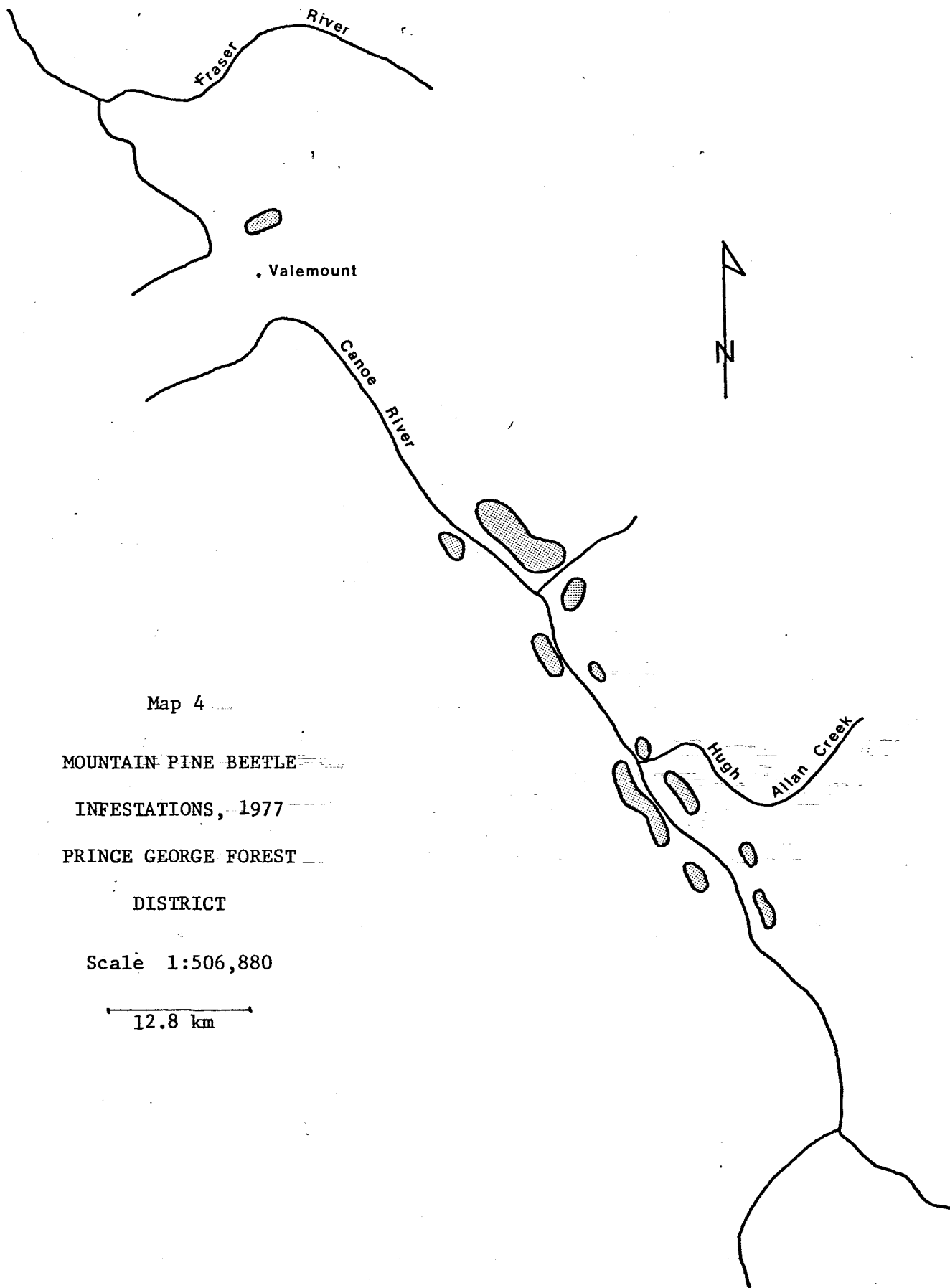
No fall examinations were made to determine the brood status. However, beetle activity is expected to continue in 1978.

Some control logging has been carried out in the more accessible areas along Stuart Lake near Camsell Creek, but no extensive control program was being planned by the British Columbia Forest Service.

Table 4. Number of lodgepole and white pine "red-top" trees, killed by mountain pine beetle, counted in 1977

Location	Year attacked	
	1975	1976
McNaughton Lake		
Ptarmigan Cr	100	1,500*
Ptarmigan Cr to Hugh Allen Cr	75	260*
Hugh Allen to Dist. boundary	30	550*
West side of McNaughton L opposite Bulldog Cr	0	175
Windfall to Howard crs	0	600
South of Howard Cr	0	120
Swift R north of Valemount	150	500
Stuart-Trembleur lakes		
Takla L, south end	50	5
Stuart L - Camsell Cr	50	5
Whitefish L	50	50
Nancut	90	30
Cunningham L	80	55
Southeast Chuius Mtn	120	75
Hatdudatehl Cr	50	95
North of Pinchi L	15	5
Tezzeron L, west end	0	5
Middle R	0	10
Southeast of Trembleur L	0	20
North of Inzana L	0	10
South of Wonder L (Vanderhoof)	0	30

* Mostly white pine.



Map 4

MOUNTAIN PINE BEETLE

INFESTATIONS, 1977

PRINCE GEORGE FOREST

DISTRICT

Scale 1:506,880

12.8 km

Spruce beetle, *Dendroctonus rufipennis*

Spruce blowdown still remains the main focus of attack for spruce beetle in most areas, but scattered attacks on standing white spruce greatly increased in the Tezzeron and Inzana lakes area and in the Carp - Weedon lakes area. Recent spruce blowdown during the winter of 1976-77 of 256 ha near Weedon Lake will have absorbed some of the attacking beetles in the spring, and if left, a larger population will mean increased attacks in 1979. Other areas of beetle activity were along the Nation River where a few standing spruce trees adjacent to previous infested windfall had been attacked this spring. Attacks on standing trees ranged from one to seven per .045 m² of bark surface.

Between km 141 and 146 along the Alaska Highway windfall and trees weakened by H₂S fumes were attacked by beetles. Current year's attacks ranged from four to eight per .09 m².

Windfall in the Johnson Creek area near Hudson Hope supported healthy populations of larvae and pupae from the 1976 attacks; an average of 28 per .045 m². Current year's attack averaged six per .045 m².

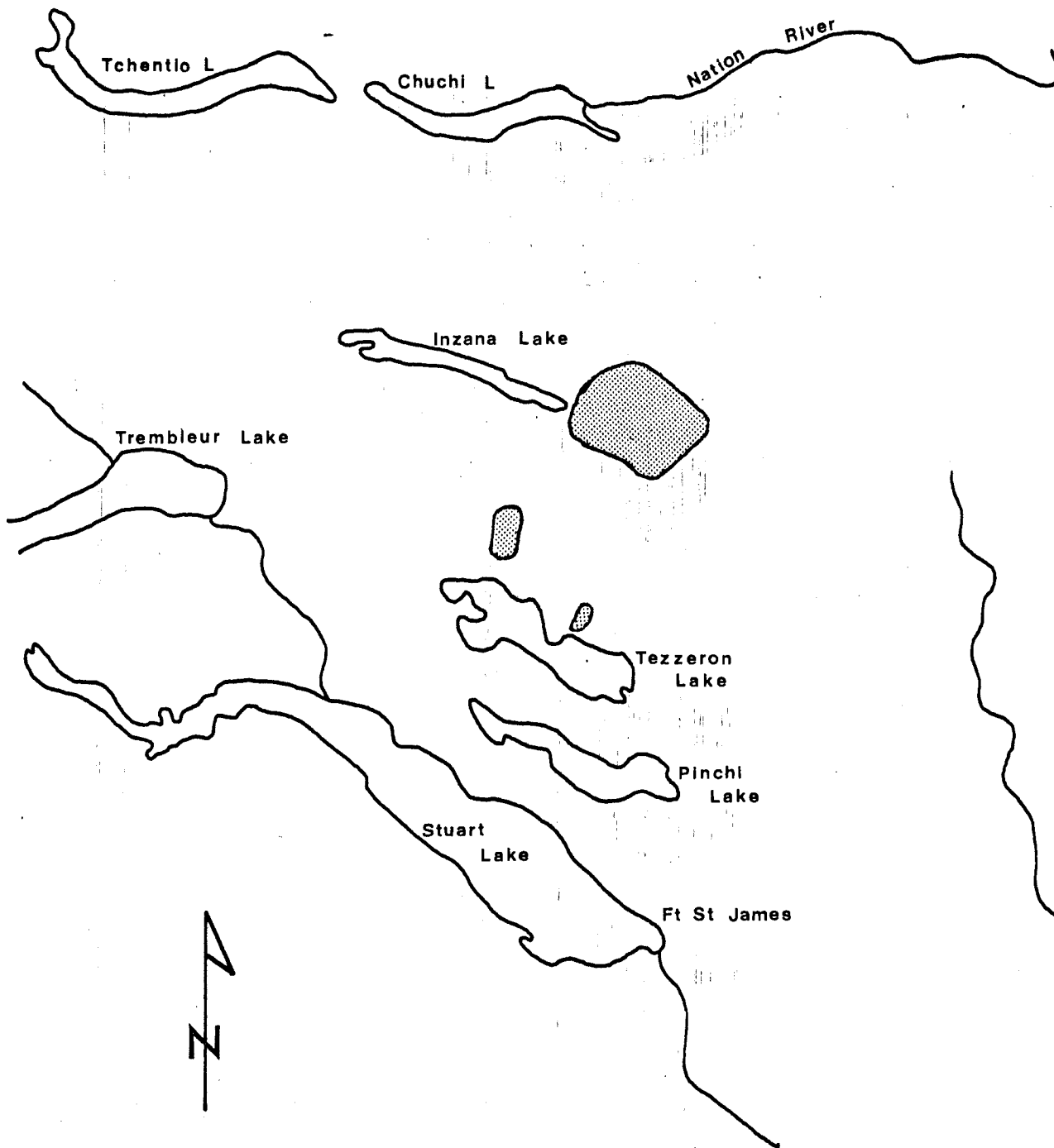
At Hodda Creek, poor logging practice and annual blowdown encouraged the buildup of a beetle population which will likely result in an epidemic if not controlled immediately.

East of the Willow River, Purden Lake Park, Holmes River, Stone Creek, and Bateman Road near Aleza Lake were other areas where occasional attack occurred on windfelled trees.

During fall aerial surveys, sizeable areas of recently killed spruce were observed at: Carp Lake, 800 ha; Weedon Lake, 240 ha; Merton Lake, 40 ha, and Weedon Creek, 120 ha. Small scattered pockets of 2 to 3, and occasionally up to 15 recently killed spruce trees were recorded over 8 000 ha southeast of Inzana Lake, and 600 ha south of Chuius Mountain. These are likely 1976-attacked trees, and if no control measures are taken before emergence next spring, the number of trees attacked will likely increase dramatically. Because of the warm summer in 1977, a portion of the 1976 broods may have flown in early fall. Some logging is planned for the Inzana Lake area.

Douglas-fir beetle, *Dendroctonus pseudotsugae*

Only light attacks were found in 1977 on decked and windfelled trees north of Summit Lake and west of Punchaw Lake.



Map 5
Spruce beetle
infestations
1977



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Ambrosia beetle, *Thypodendron lineatum*

Heavy attacks of ambrosia beetles occurred in most of the southern portion of the District on windthrown and decked white spruce, alpine fir, lodgepole pine and white pine logs. Bark samples of .09 m², taken from white spruce logs, showed the following number of attacks: north of Summit Lake, 30; Willow River, 10; Bowron River, 28, and Hodda Creek, from 14 to 210.

Dryocoetes-Ceratocystis complex

This insect-disease complex continued to cause mortality of alpine fir in the Pine Pass area, although only an estimated 100 trees were killed in 1977.

Spruce weevil, *Pissodes strobi*

In two areas examined at McGregor River, 12% and 30% of the trees were attacked, and south of Hixon, 5% and 20% were attacked.

The favoured host for this insect is young spruce between 1.5 and 9 m in height, but in the Limestone Creek area north of Prince George, overmature spruce had multiple leaders and dead stubs of leaders containing pupal galleries, and showed evidence of past weevil activity. Four to 50% of the spruce had multiple tops, although not all of it could be attributed to damage by spruce weevils.

Pine root weevil, *Hylobius warreni*

This insect was collected in a number of widely separated areas in 1977. Weevils were present in young lodgepole pine in plantations 20 miles west of Prince George on 2 ha, 12 trees; Norman Lake turnoff from Highway 16, 2 ha, 15 trees, and west of Punchaw Lake, 8 ha, 7 trees. Root weevil damage was also noted on many small lodgepole pine along roadsides from Bowron River, where 4 out of 6 dead pine had weevil damage, and from Naver Road to the Kenny Dam Road.

Lodgepole pine weevil, *Pissodes terminalis*

Weevil damage to regeneration lodgepole pine south of Uslika Lake continued but with fewer attacks in 1977 than in 1976. On four 25-tree strips only one current year's attack was recorded.

Aspen leaf miner, *Phyllocnistis populiella*

High populations of aspen leaf miner were present between Tete Jaune Cache and Mount Robson Park. Many individual trees had 100% of their leaves mined along a 32-mile stretch bordering the highway.

Table 5. Other insects of current minor significance

Insect	Host	Locality	Remarks
<i>Acleris gloverana</i> Western blackheaded budworm	alF, wS, D, wH	General	Defoliator; 13% of samples were positive with avg of 2.4 larvae.
<i>Actebia fennica</i> Black army cutworm	Shrubs and ground cover		Not found.
<i>Adelges cooleyi</i> Cooley spruce gall aphid	wS		Endemic.
<i>Ectropis crepuscularia</i> Saddleback looper	wH, wS, alF, wC	General, south part of District	Defoliator; 12% of collections positive, avg of 1.4 larvae.
<i>Ips</i> sp.	wS, 1P	General	Light population in blowdown and decked logs.
<i>Lambdina fiscellaria lugubrosa</i> Western hemlock looper	alF, wS, P, wH	South and east of Prince George	Defoliator; very low populations.

cont'd...

Table 5 - cont'd..

Insect	Host	Locality	Remarks
<i>Malacosoma pluviale</i> Western tent caterpillar	Deciduous shrubs	Cecil Lake	A few tents in Ecological Reserve.
<i>Nyctobia limitaria</i> Green balsam loopers	alF, wS, wH	General	Defoliator; low populations.
<i>Operophtera bruceata</i> Bruce spanworm	Deciduous trees and shrubs	General	Defoliator.
<i>Pikonema</i> spp. Spruce sawflies	wS	General	Defoliator; 29% of samples positive with avg of 1.5 larvae.

FOREST DISEASE CONDITIONS

Weather damage

Winter drying caused numerous lodgepole pine trees to turn red in the Pine Pass to Monkman area and also along the Alaska Highway on the slopes of Klingzut Mountain near Trutch. Near Pine Pass the following areas were affected: Solitude Mtn, 240 ha; Le Moray River, 720 ha, and Silver Sands Creek, 360 ha. Light damage was noted in early August south of Chetwynd near Gwillim Lake and on Tumbler Ridge in the Monkman area. At Klingzut Mountain, this was the second consecutive year of winter drying on the same 600 ha. Though this area is not accessible, from a distance the trees have a grayish appearance which may indicate some tree mortality or dieback has occurred. The accessible area, which was affected during the winter of 1975-76, is a mixture of lodgepole pine and white spruce. An examination, to determine recovery of white spruce, showed that only 20% of the normal buds survived but numerous adventitious buds were flushing.

Some climatic injury was observed on 240 ha of lodgepole pine at Taspai Creek south of Purden Lake during the fall aerial surveys. The cause was not determined.

Frost damage caused mortality of terminal buds of young spruce in much of the area between Hixon and McGregor River. The damage was the result of a snowfall after the bud scales had opened, followed by a thaw, then by a frost, which froze the retained water and killed the buds.

Near Weedon Lake some 250 ha of recent spruce blowdown was noted in mid-June.

Aspen leaf blight, *Venturia macularis*

This disease caused browning of leaves and foliage loss throughout a wide area of the District in 1977. It was probably more widespread than the 3 840 ha recorded during fall flight surveys and roadside observations would indicate. Areas were recorded as follows: Carp Lake, 600 ha; Cunningham Lake, 240 ha; Takla Landing, 180 ha; Chuchi Lake, 360 ha; Manson Lakes, 640 ha; Ditch River, 300 ha; Germansen, 840 ha; and Nina Creek, 680 ha. Other areas of extensive infection occurred along Williston Lake from Mackenzie to Finlay Forks, where up to 100% of the foliage was infected on 90% of the trees; also at Punchaw Lake, and north of Summit Lake where there were pockets of severe infection.

Porcupine damage, *Erethizon dorsatum nigrescens*

A 640-ha area of red-top lodgepole pine along the south side of Chuchi Lake which was previously thought to be caused by mountain pine beetle turned out to be porcupine damage. An estimated 150 young pine trees were killed.

Lodgepole pine mistletoe, *Arceuthobium americanum*

Young infected residuals are posing a threat to planted lodgepole pine on a 280-ha clearcut in TSHL A00516 CP5 near Mackenzie. There were 12 to 25 residuals of .6 to 1.2 m height per ha. On three areas examined within the clearcut, 4, 5, and 6 percent of the residuals were infected. The surrounding stand was heavily infected as well, although there was a 50-foot buffer zone between it and the planted area.

Douglas-fir needle casts, *Rhabdocline* spp.

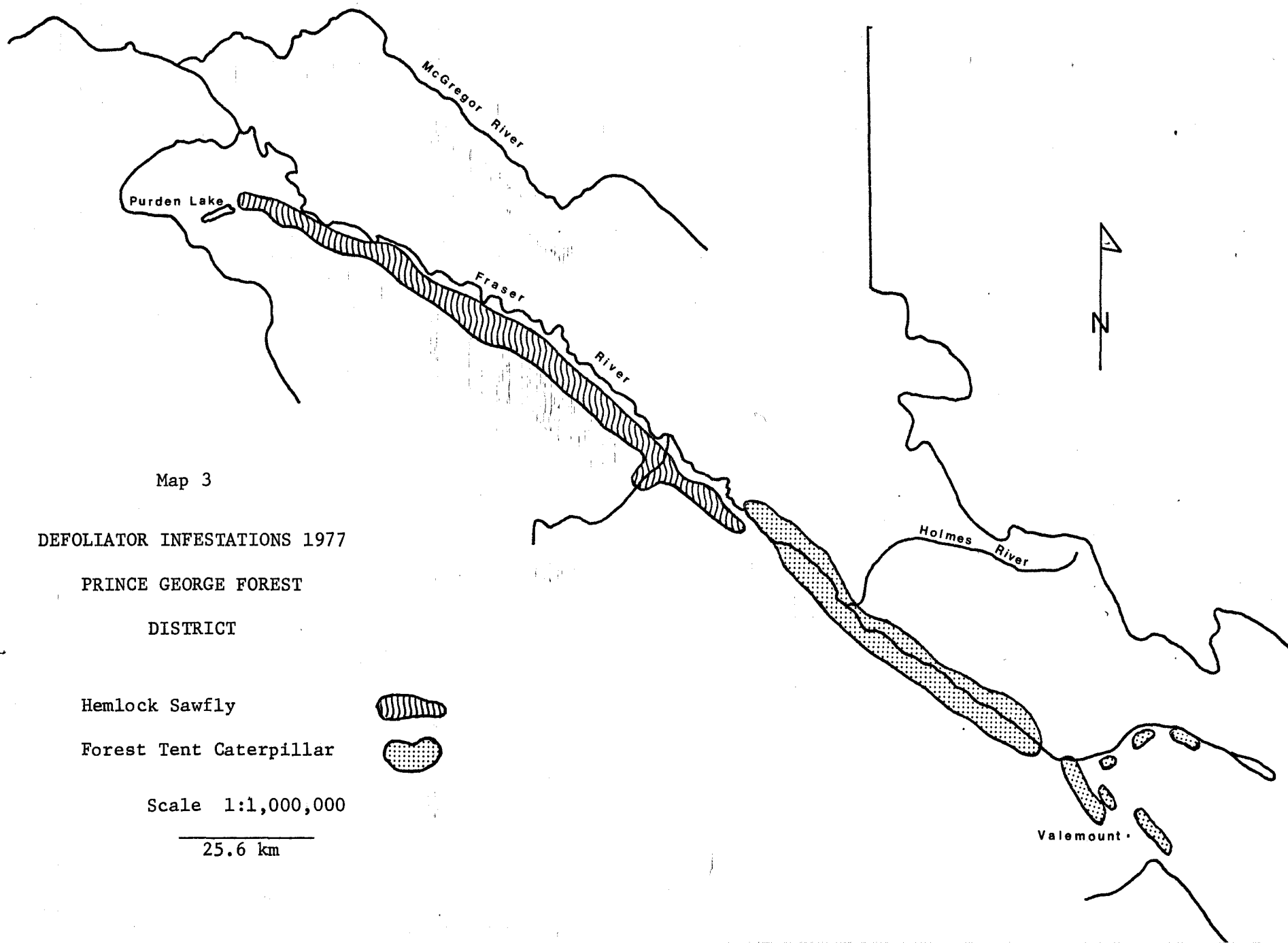
These needle casts were found in widely separated Douglas-fir stands. Infection ratings are shown in the following table.

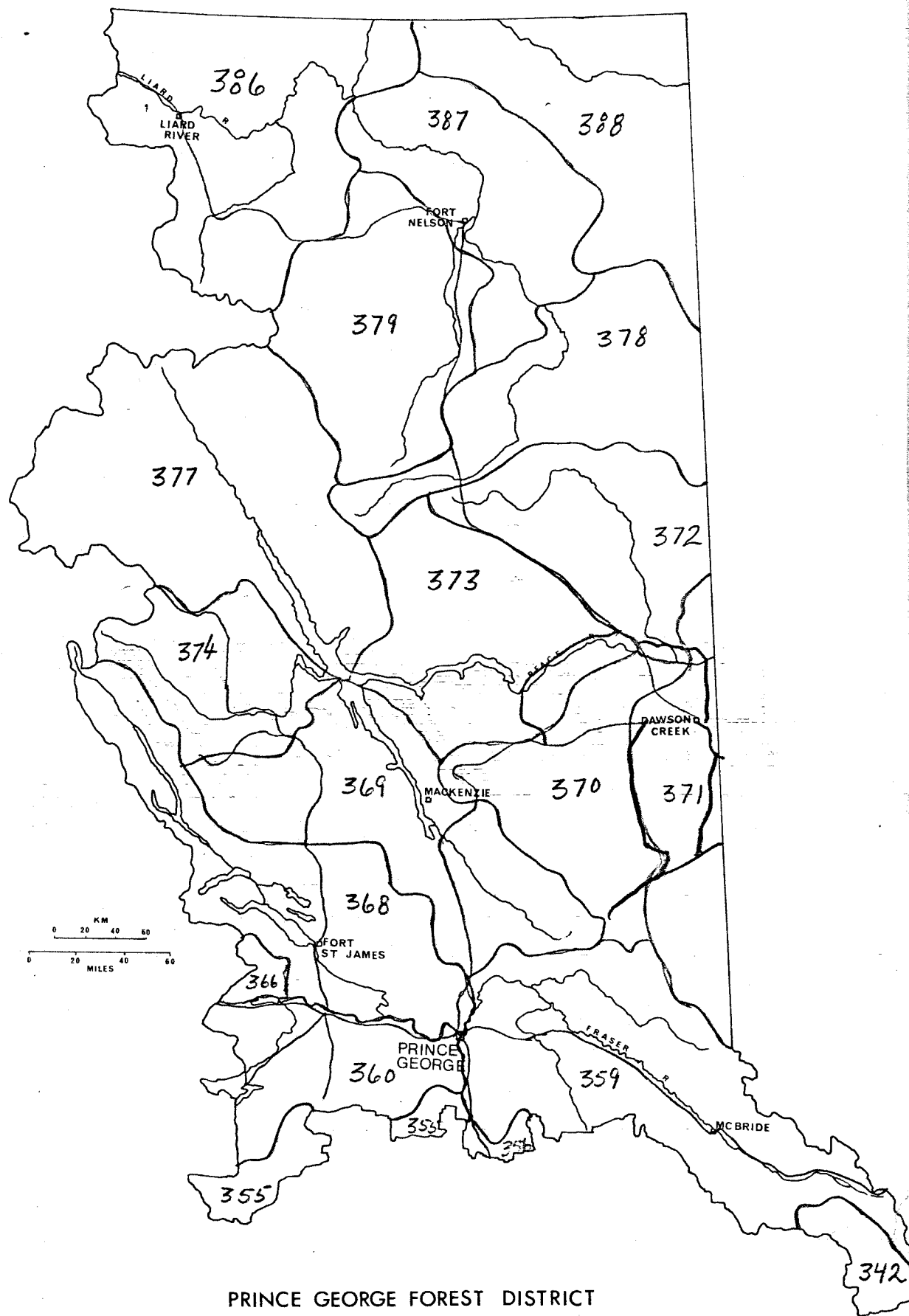
Table 6. Infection by *Rhabdocline* spp.

	Location	% of trees infected	% of needles infected
<i>Rhabdocline pseudotsugae</i>	Upper Canoe R Rd.	4	10
	Tatuk L Rd.	48	trace to 60
	Punchaw L	10	30
<i>R. weirii</i>	Cluculz L	100	10 to 85

Table 7. Diseases of current minor significance

Disease	Host(s)	Locality	Remarks
<i>Armillaria mellea</i> Shoestring root rot	1P tA	Vanderhoof Prince George	30 trees killed. 47 trees killed and 14 dying.
<i>Chrysomyxa weirii</i> Spruce needle rust	WS	George Cr	Light infection.
<i>Coleosporium asterum</i> Western pine- aster rust	1P	Gregg Cr	Lower branches infected on 4 of 25 trees examined.
<i>Delphinella abietis</i> <i>Melampsora abieticapræarum</i> <i>Pucciniastrum epilobii</i>	alF	Salmon R, Davie L, Tacheeda L, Hodda Cr	Scattered infection pockets; up to 85% of current foliage affected on lower crown.
<i>Lophodermella concolor</i> Pine needle cast	1P	Cluculz L, Holmes R	30 to 50% of the foliage infected on individual trees.
<i>Lophodermella montivaga</i> Pine needle cast	1P	Opatcho L	64% of the trees with 2 to 30% of the foliage infected.
<i>Marssonina</i> sp. Aspen leaf blight	tA	Flatbed Cr, Tupper	Small patches of infected trees.
<i>Scirrhia pini</i> Red band disease	1P	Anzac	100 acres infected.
<i>Venturia tremulae</i> Aspen shoot blight	tA	Liard R	Mainly roadside and young trees.
<i>Verticicladiella wagnerii</i>	1P	Norman L	Pocket of dead and dying pine.





PRINCE GEORGE FOREST DISTRICT