ANNUAL DISTRICT REPORT

FOREST INSECT AND DISEASE SURVEY

BRITISH COLUMBIA, 1973

PART III, PRINCE GEORGE FOREST DISTRICT

by

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CANADIAN FORESTRY SERVICE

VICTORIA, BRITISH COLUMBIA

- INTERNAL REPORT -

DEPARTMENT OF THE ENVIRONMENT

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INTRODUCTION

This report outlines the status of forest insect and disease conditions in the Prince George Forest District for 1973 and attempts to forecast population trends.

Reports of forest pest outbreaks to the Forest Insect and Disease Survey by public and private cooperators assist in the interpretation of the general pest situation and in gauging population trends.

Regular field work in the District extended from May 28 to October 15. Special surveys were as follows: Collection of cottonwood seed for IUFRO, May 29 - June 16; monitoring of overwinter spruce beetle population, May 30 - June 5; survey of black army cutworm infestations, June 8 - 18, July 12 - 18; setting out and collecting spruce budworm "pheromone" traps, July 13 and August 10; plot establishment and analysis of globose gall rust, *Endocronartium harknessii*, September 25 - 29; forest tent caterpillar egg survey, October 2 - 4; blackheaded budworm egg survey, September 30 - October 1.

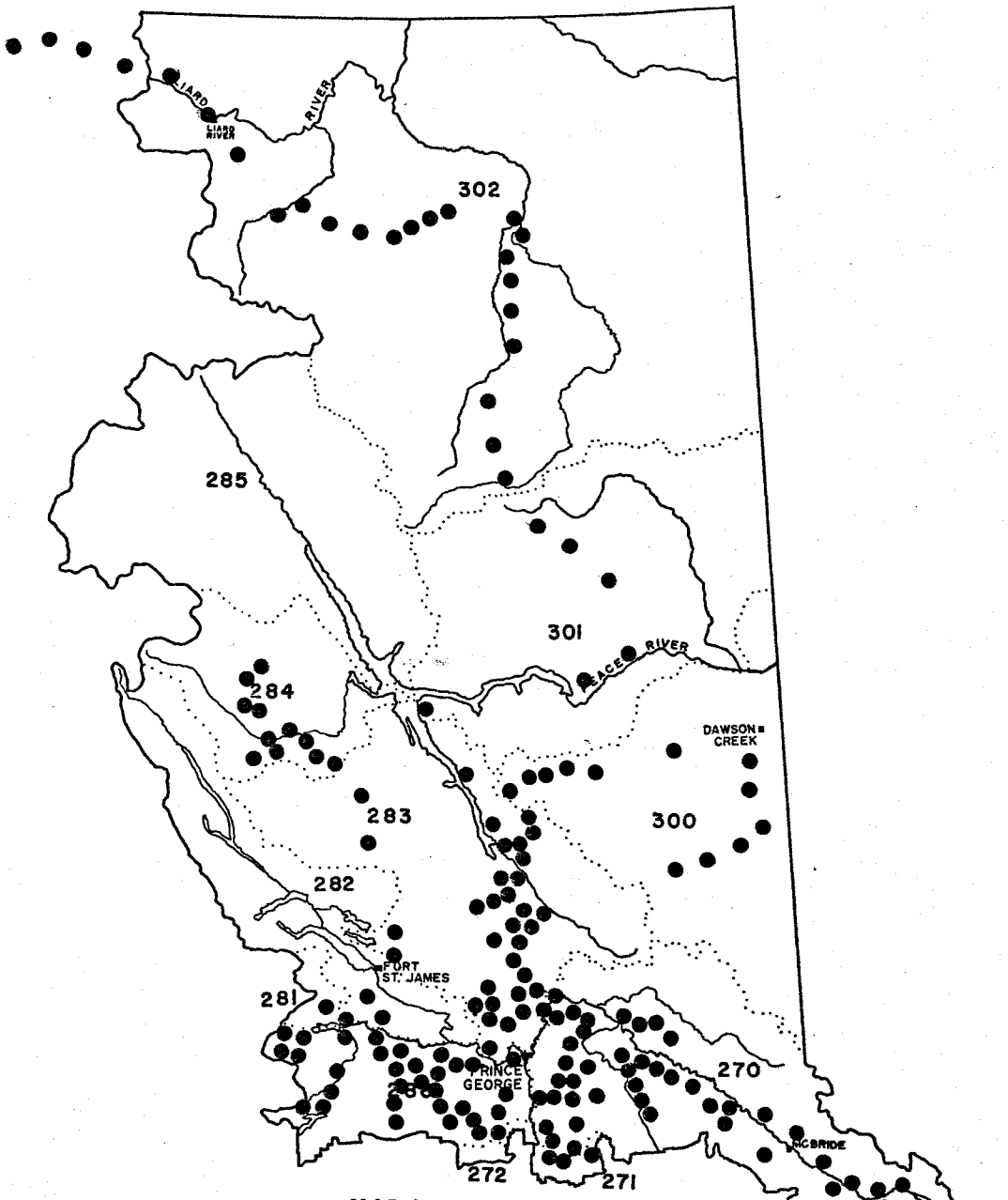
A total of 370 insect and 106 disease collections were submitted in 1973. Map 1 shows collection localities and drainage divisions.

Numbers of larval defoliators in collections increased slightly from 1972 levels; 90% and 88% of collections from the northern and southern parts of the District contained larvae.

One-year-cycle spruce budworm caused moderate to severe defoliation in the Liard Hotsprings - Fireside area. Forest tent caterpillar severely defoliated trembling aspen from Strathnaver to Prince George, and in the McBride - Mount Robson area. Black army cutworm defoliated and killed lodgepole pine and white spruce seedlings in three known plantations. Large aspen tortrix infestations collapsed around Prince George, Strathnaver, Vanderhoof, Kenny Dam and McBride. Blackheaded budworm populations quadrupled from 1972 levels. Spruce beetle populations remained at a low level.

Foliage diseases were generally light on coniferous trees in 1973. An unknown stem canker and an associated heart rot caused mortality of trembling aspen in a number of locations.

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



MAP I

PRINCE GEORGE FOREST DISTRICT

0 30 60 90
MILES

PERMANENT SAMPLE STATION LOCATIONS

PSS – ●

FOREST INSECT CONDITIONS

Currently Important Insects

Bark Beetles

Spruce beetle, *Dendroctonus rufipennis*

Beetle populations remained light in white spruce stands throughout the District. Some 1973 attacks were found on a small number of living trees at Sundown Creek. Windthrown trees were attacked at Naver Access Road, Pitoney Lake and the west side of Williston Lake in the Nation River Valley.

Weather influences since 1970 have discouraged beetle survival. Heavy rainfall during June and July of 1971 and 1972 probably increased the vigour of white spruce and lessened their susceptibility to beetle attack. During both years there was enough windfall to absorb most of the existing beetle population. Lack of snow-cover over windfalls during the coldest periods of the past two years probably resulted in high beetle mortality. So far, during the winter of 1973-1974, exceptionally heavy snowfalls have occurred which may promote a higher incidence of beetle survival. However, since standing green trees should be under no stress in 1974, emerging beetles will probably attack available windfall, slash, or mechanically damaged trees.

Mountain pine beetle, *Dendroctonus ponderosae*

A number of 1973 beetle-killed lodgepole pine trees were recorded in the Punchaw region southwest of Prince George and near Sundown Creek. These represent the first increase in the incidence of beetle attack since 1965. Salvage logging in Sundown Creek area is planned prior to spring of 1974. There were fewer beetle-killed trees in the Canoe River area, where a number of attacks were found in 1972.

Douglas-fir beetle, *Dendroctonus pseudotsugae*

Two hundred beetle-killed Douglas-fir trees were observed in the Canoe River Valley at Foster Creek. The population increase may have been triggered by beetles breeding in weakened trees which had fallen or been fire-scarred or damaged in clearing and burning operations prior to the flooding of the Canoe River.

Defoliators

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

Spruce budworm larvae caused moderate to severe defoliation of white spruce over approximately 30,000 acres in the Liard River Valley between Fireside and Liard Hotsprings along the Alaska Highway (Map 1). Defoliation has occurred annually since 1957, and although no mortality has been recorded to date, severe increment loss has occurred in mature stands in the infestation area, particularly at Smith River Falls.

High populations will continue to cause light to moderate defoliation in 1974.

Two-year-cycle spruce budworm, *Choristoneura biennis*

Two-year-cycle spruce budworm larvae have been scarce for a number of years. Beating samples since 1971 have indicated little change in the light population and no fluctuation in larval numbers (Table 1).

Table 1. Summary of two-year-cycle spruce budworm collections by drainage divisions, Prince George District

Drainage divisions*	No. samples taken during larval period			% samples containing larvae			Avg no. larvae per sample		
	1971	1972	1973	1971	1972	1973	1971	1972	1973
166	17	10	16	0	0	0	-	-	-
270	113	165	141	3	4	6	1.3	1.5	1.2
282	68	21	13	0	5	0	-	1.0	-
283	30	42	53	0	2	15	-	1.0	1.1
284	13	5	9	0	0	0	-	-	-
286	26	46	20	4	16	0	1.0	2.1	-
Totals	270	114	252	2	8	6	1.2	1.9	1.1

In 1972, a flight year, several adults were collected at Naver Access Road in Sectar traps baited with a pheromone attractant.

In 1973, a non-flight year, the number of adults collected in the Sectar traps increased over the 1972 levels. There is a possibility that moths from one-year-cycle budworm infestations in the northern part of the District were dispersed into the Pine Pass area. According to Greenbank, female moths may disperse from 30 to 70 miles in a night. Highest numbers of budworm moths found were at Pine Pass, Link Creek and Beaver Creek, where 92, 42 and 80 moths, respectively, were collected in the five traps, an average of 18.0 moths per trap (Table 2).

Table 2. Results from 3-tree beating and pheromone trap sampling at spruce budworm sample points, Prince George District

Location	PSS no.	Avg no. larvae per beating sample		No. of adults trapped		Avg no. of adults per trap	
		1972	1973	1972	1973	1972	1973
Naver Road	22	4	2	8	-*	1.6	-
Genevieve Lake	-	1	-	0	0	0	0
George Creek	18	-	0	-	9	-	1.8
Hay Lake	-	0	0	-	3	-	0.7
Hwy. 16 & Willow River	50	0	0	-	0	-	0
Crystal Lake	15	0	2	-	0	-	0
Davie Lake	17	0	0	-	0	-	0
Tudyah Lake	28	0	0	-	1	-	0.25
Pine Pass	38	0	1	-	92	-	18.0
Link Creek (NG)		0	0	0	42	-	8.4
Beaver Creek (NG)		0	0	0	80	-	16.0

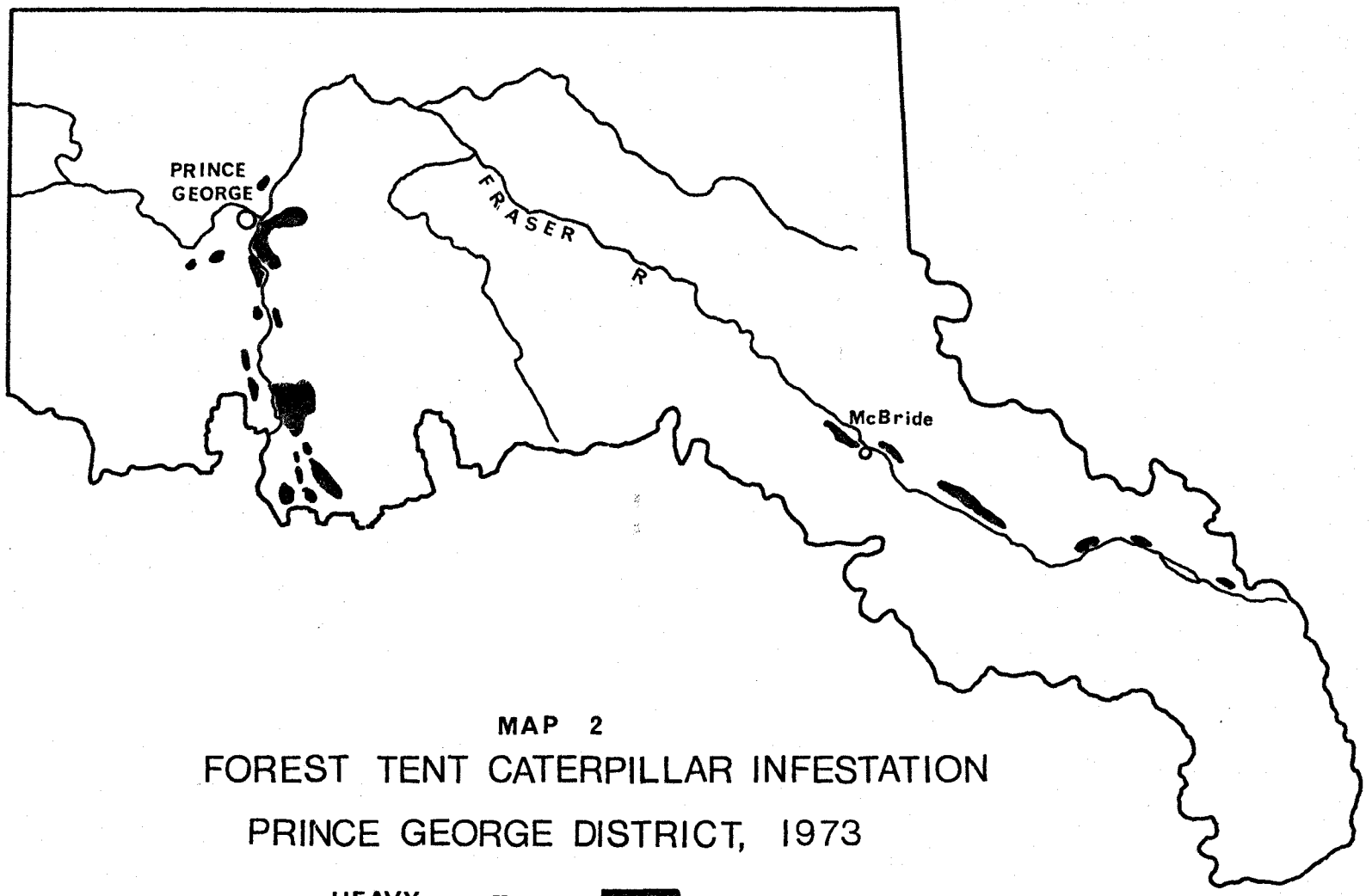
* missing traps.

Forest tent caterpillar, *Malacosoma disstria*

Forest tent caterpillar populations severely defoliated trembling aspen stands south and east of Prince George. The heaviest defoliation occurred over a widespread area from Ahbau to Hixon. Heavy defoliation also occurred west of Prince George to the Chilako River Valley, in the McBride area at Lamming Mills, from Clyde Creek to Horsey Creek and from Tete Jaune Cache to Mount Robson Station (Map 2). Defoliation extended up to 2600 feet elevation in the Fraser River Valley and up to 4000 feet in the Mount Teare area at McBride and in the Mount Robson area.

Most of the trembling aspen stands were completely stripped by mid-June and understory willow and other deciduous species were heavily defoliated.

Egg sampling, carried out at five locations from Prince George to Strathnaver and at McBride, indicated a high population will continue in 1974, especially in the McBride area where an average of 159 egg masses per tree was found (Table 3).



MAP 2

FOREST TENT CATERPILLAR INFESTATION

PRINCE GEORGE DISTRICT, 1973

HEAVY –

0 10 20

MILES

Table 3. Number of tent caterpillar egg masses per three-tree samples, Prince George District, 1973

Location	Avg no. egg masses per tree	Predicted defoliation
McBride	159	H
Ahbau	63	H
Yardley Lake Rd.	118	H
Strathnaver	89	H
Woodpecker	11	M

Black army cutworm, *Actebia fennica*

The black army cutworm reached epidemic proportions and caused heavy mortality of white spruce and lodgepole pine seedlings at Bearcub Creek, Dog Creek, Mile 16 Naver Road and Canoe River. Heaviest damage occurred in cleanly logged and burned areas which lacked ground cover plants on which the cutworms normally feed.

Numerous cutworm larvae were observed moving about and feeding on abundant ground cover plants in a 1969 burn area. Lodgepole pine seedlings, planted during June while the cutworms were active, were not noticeably damaged.

Pupal populations were sampled at Bearcub Creek and Naver Access Road. One-square-foot samples were examined at 20 locations in each of the two infestation areas. An average of 16 pupae per square foot sample was recorded in each area, indicating a continuing high population in 1974.

Prior to 1973 this insect had caused only minor damage to deciduous trees and shrubs and had been considered an agricultural pest.

No disease was found in 600 pupae sent to the Insect Pathology Research Institute. However, predation of pupae by crows and robins was noted. The abundant pupal and adult populations indicate further damage may occur in 1974 under favorable conditions.

Blackheaded budworm, *Acleris gloverana*

Populations increased markedly from 1972 and there was light defoliation of white spruce and alpine fir north of Uslika Lake, on Tumuch Lake Road, and in the McLeod and Carp Lake areas. High larval populations were recorded at miles 7, 12 and 17 on Tumuch Lake with 79, 102 and 55 larvae per sample, respectively; Whiskers Point, 70; Carp Lake Road, 52 and 31; and Pine Pass, 43. The most significant population increase was in Drainage Division 283 where 80% of beating collections contained larvae, compared to 21% in 1972 (Table 4).

Table 4. Summary of blackheaded budworm collections by Drainage Divisions, Prince George District

DD	No. samples taken during larval period			% samples containing larvae			Avg no. larvae per sample		
	1971	1972	1973	1971	1972	1973	1971	1972	1973
166	17	10	15	0	0	0	-	-	-
270	122	163	145	15	14	36	2.6	3.0	9.6
282	66	25	8	30	10	12	2.5	1.5	3.0
283	27	109	64	30	21	80	1.5	2.5	9.8
284	1	5	9	0	0	4	-	-	11.8
286	49	39	20	12	10	10	1.0	1.4	2.2
Totals	282	351	261	19	16	45	2.2	2.5	9.1

Hemlock looper, *Lambdina fiscellaria lugubrosa*

Hemlock looper populations increased in 1973. The number of samples containing larvae increased from 10% in 1972 to 25% in 1973 throughout the southeastern portion of the District (Table 5). A total of 125 larvae were collected in 1973 compared to 46 in 1972. Higher larval numbers occurred in the Carp Lake, Tumuch Lake, Stone Creek and Bowron River areas.

Table 5. Summary of hemlock looper collections by Drainage Divisions, Prince George District

DD	No. samples taken during larval period			% samples containing larvae			Avg no. larvae per sample		
	1971	1972	1973	1971	1972	1973	1971	1972	1973
166	18	14	17	5	36	47	1	1.6	2.9
270	102	168	130	13	8	25	1.7	2.5	2.2
282	43	6	6	2	0	0	1.0	-	-
283	35	30	48	3	10	19	1.0	1.3	3.2
Totals	198	218	201	8	10	25	1.5	2.1	2.5

Other Noteworthy Insects

Large aspen tortrix, *Choristoneura conflictana*

Populations collapsed in the Prince George, Strathnaver, Fraser Lake and McBride areas. There were light populations in trembling aspen stands during early June but by late June these declined and defoliation was unnoticeable. In the vicinity of Progress, aspen on a 300-acre area was lightly defoliated, however since pupal parasitism was high, the 1974 population should be light.

A carpenterworm, *Prionoxystus robiniae*

Carpenterworm larvae and specimens of boring damage were collected by B. C. Forest Service personnel at Fort Nelson in the spring of 1973 from mature balsam poplar, *Populus balsamifera*. Only old attacks were evident in broken tops and logging debris on the ground in July. However, there may be larvae in infested standing trees in the area.

This collection constitutes the most northerly distribution record for this species in British Columbia. Previously it had been recorded only as far north as the southern Cariboo.

The larch sawfly, *Pristiphora erichsonii*

Larval populations increased to slightly above the 1972 level, causing light defoliation of individual eastern larch at widespread locations in the Peace and Monkman areas in the northeastern part of the District.

Spruce weevil, *Pissodes strobi*

There was a slight increase in the number of weevil attacks on young white spruce in the Monkman Pass area. Otherwise there was little change from 1972, when from one to fifteen per cent of the white spruce terminals were attacked at a number of areas.

Conifer sawflies, *Neodiprion* spp.

Larval populations remained light throughout the District although some increase occurred near McBride at Clyde and McKale creeks and at Dore River. No significant defoliation was observed.

Table 6. Other insects of current minor significance

Insect	Host(s)	Locality	Remarks
Cooley spruce gall aphid *Adelges cooleyi*	White spruce, Douglas-fir	South half of District	Sucking insect, heavy localized populations.
Lodgepole terminal weevil *Pissodes terminalis*	Lodgepole pine	Alaska Highway	Terminal borer. Isolated single attacks.
Rusty tussock moth *Orgyia antiqua badia*	Alpine fir, white spruce, western hemlock, Douglas-fir	Southern portion of District	Defoliator. Light population, slight decrease from 1972.
Spruce sawflies *Pikonema* spp.	Western white spruce	Throughout District	Defoliator. Light population, decrease from 1972.
Tussock moth *Parorgyia* spp.	Alpine fir, white spruce, western hemlock, Douglas-fir	Southern portion of the District	Defoliator. Light population, slight increase over 1972.

FOREST DISEASE CONDITIONS

The organisms currently causing tree mortality, growth loss, and quality reduction attributed to diseases are dwarf mistletoes and stem and root rot fungi. These organisms, once established in a stand, persist for many years. They usually intensify at a slow rate making annual summaries of their status repetitious; for this reason the following report may omit some of the more important diseases. Emphasis is placed on new outbreaks, the status of annually varying foliage diseases and abnormal weather conditions, i.e. frosts, drought, snow damage, etc., which immediately affect tree appearance and often cause dieback and mortality. Other aspects of the Disease Survey dealing with mortality, growth loss and factors influencing the occurrence of the more important diseases are summarized elsewhere.

Currently Important Diseases

Stem Diseases

A stem canker of trembling aspen, (cause unknown)

The canker and associated heart rot have caused extensive mortality of semi-mature and mature aspen at widespread locations throughout the northern parts of the District. Understory trees are killed first, then infection spreads outward to the mature trees. This results in open pockets which expose the surrounding trees to windthrow and bending.

Atropellis canker, *Atropellis piniphila*

This stem disease is extensive in lodgepole pine stands along the Boundary, Monkman and Sundown Creek access roads in the Dawson Creek ranger district and at Canoe River southeast of Valemount. The incidence of attack varies and in some instances up to 60% of the stems were infected in semi-mature and mature stands.

Foliage Diseases

Spruce needle rust, *Chrysomyxa ledicola*

Spruce needle rust was common throughout most of the District. Intensity was light except for one localized heavy infection in the Groundbirch-Progress area on white spruce. Light infections were found on the alternate host, *Ledum* species, at Francis Lake, Goat River, Lucerne, Camp Creek and Valemount.

Conifer - aspen rust, *Melampsora medusae*

Light infections of Douglas-fir foliage were common throughout the host range west and southwest of Prince George. Incidence of the rust on Douglas-fir over the past ten years has been sporadic.

Fir-fireweed rust, *Pucciniastrum epilobii*

Infection by this rust was common but light on alpine fir throughout the District.

Larch-willow rust, *Melampsora paradoxa*

The needle rust of eastern larch was collected for the first time in British Columbia in 1972. In 1973 it was recorded on eastern larch south and west of Fort Nelson, expanding the known distribution of the disease. Only a small proportion of the needles on individual scattered trees was affected.

Physiological Diseases

Fume injury

Mature white spruce and lodgepole pine, affected by fume emission from a natural gas plant at mile 94, Alaska Highway, in 1972, showed signs of recovery, except for approximately 40 small diameter trees on the eastern fringe of the five acre area.

Winter damage

Lodgepole pine, trembling aspen and white birch in the Chetwynd, Moberly and Alaska Highway regions, damaged by "red-belt" in 1971 and 1972, all show signs of recovery, but evidence of the damage still exists in the form of red needles on the pine and bunched 1973 foliage "staghead" tops on aspen and birch.

Reddening of western red cedar foliage.

Recovery of red cedar foliage in the McBride area was more noticeable in 1973 although some current reddening had occurred, probably from unseasonal frosts during late May and early June.

Lodgepole pine dwarf mistletoe, *Arceuthobium americanum*

Lodgepole pine stands north of Aiken Lake were examined for the presence of dwarf mistletoe, but results were negative. Distribution records of dwarf mistletoe in stands in the District south of 56° latitude are largely complete.

Spruce needle blight, *Lirula macrospora*

This disease, found on one-year-old needles of white spruce, was common and widespread in the District. Intensity was generally light, with a few areas of heavy infections.

Table 7. Other diseases of current minor significance

Organism	Host(s)	Locality	Remarks
Spruce cone rust *Chrysomyxa pyrolata*	White spruce, *Pyrola* sp.	Tete Jaune Cache, McLeod Lake, Prince George	Found on alternate host only, cone crop very scarce.
Spruce needle rust *Chrysomyxa weirii*	White spruce	Naver Creek, Ahbau Lake, Purden Lake, Hungary Creek, Torpy River	Light needle infection.
Pine-aster rust *Coleosporium asterum*	Lodgepole pine, aster	Blackwater	Light needle infection.
Globose gall rust *Endocronartium harknessii*	Lodgepole pine	Aiken Lake, Red Willow River	Common.
		Ste. Marie Lake	Plot survey: 17% infection in 3442 stems in 30-year-old stand.

PRINCE GEORGE DISTRICT

Appendix I

Permanent Sample Stations

The detection survey for defoliators is done by 3-tree beating samples at permanent sample stations which are established strategically throughout the Prince George District according to timber types, terrain, pest hazard, etc. These are sampled at least once annually and the numbers of larvae may be indicative of defoliator populations and trends in an area.

Following is a list of permanent sample stations showing trees sampled and year of establishment.

Trees sampled	Year established												Totals
	61	62	63	64	65	66	67	68	69	70	71	72	
White spruce	16	34	8	24	20	-	1	-	-	22	5	6	136
Alpine fir	6	13	4	1	8	-	-	-	-	10	3	-	45
Western hemlock	-	2	2	-	1	-	-	-	-	8	-	-	13
Lodgepole pine	1	2	-	2	2	-	-	-	-	2	2	-	11
Douglas-fir	2	5	-	-	1	-	-	-	-	4	4	-	16
Black spruce	1	2	-	2	1	-	-	-	-	-	1	-	7
Western red cedar	-	-	-	-	-		-	-	-	2	1	-	3
Totals	26	58	14	29	33		1			48	16	6	231

From a total of 137 permanent sample stations it is possible to obtain 231 3-tree beating samples.

Appendix II

Tree Damage Appraisal Plots

A number of marked tree plots have been established in the Prince George Forest District for monitoring pest populations and appraising damage. Some have not been examined continuously since outbreaks subsided; however, they may be re-activated if necessary. Following is a list of appraisal plots showing pest, plot location, date established and purpose.

Pest	Plot location	Date established	Purpose
Spruce budworm	George Mountain	1955	Defoliation impact
	Strathnaver Access Rd.	"	"
	Genevieve Lake	"	"
	Hay Lake	"	"
	Davie Lake	"	"
	Tudyah Lake	"	"
	Pine Pass	"	"
	Big Creek (Fort St. James)	"	"
Spruce beetle	Pitoney Lake	1972	Population monitor
	Bowron Access Rd. nr.Hansard	"	"
	Naver Access Rd. mi. 16	"	" (discontinued)
	Stoney Lake[1/]	1969	appraisal of mortality and population trend.
	Lodi Lake[1/]	"	
	Hay Lake[1/]	1970	
	Wansa Lake[1/]	"	"
	Rebman Creek[1/]	"	"

[1/] Plots discontinued due to logging; windthrow examinations continued in white spruce hazard areas.

Appendix III

Title	Author	Date
Pest Reports		
Black Army Cutworm	S.J. Allen	June 8, 1973
Aspen Defoliation in Prince George Forest District	S.J. Allen	June 18, 1973
One-year-cycle Spruce Budworm Infestation in the Liard Hotsprings - Fireside Region, Prince George Forest District	C.S. Wood	Sept. 10, 1973
Information Reports		
Forest Insect and Disease Conditions, Prince George District, 1973	S.J. Allen C.S. Wood	December 1973

Appendix IV

Exotic Plantations

Of six exotic plantations established in the Prince George District only two are of any concern at the present time. They are listed below.

Plantation No.	Location	Tree species	Examinations
XP 50	Aleza Lake	Scots pine	annual
XP 117	Prince George Experimental Farm	Pinus spp.	annual
		Piceae spp.	"