

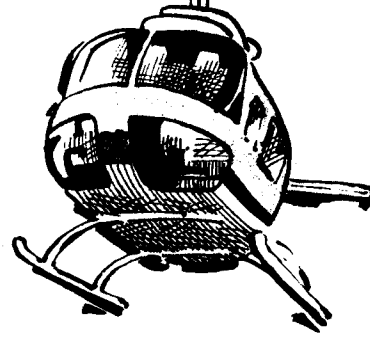


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Forest Insect and Disease Conditions

Prince George Forest Region 1981

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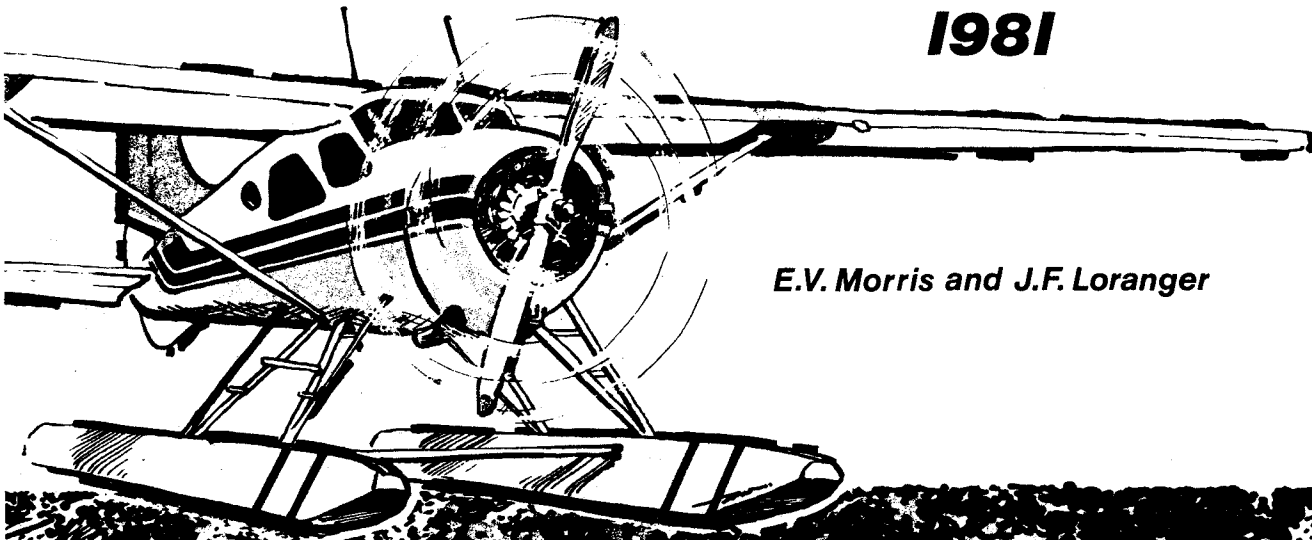


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SUMMARY

This report outlines the status of forest insect and disease conditions in the Prince George Forest Region for 1981, emphasizing pests capable of sudden damaging outbreaks and listing them by importance according to their hosts.

Spruce beetle attacked and killed an estimated 3 million m³ of mature white spruce on over 59 000 hectares in the Bowron-Willow and McGregor river drainages, west of McBride, Stuart-Trembleur, Carp-Weedon and Williston lakes.

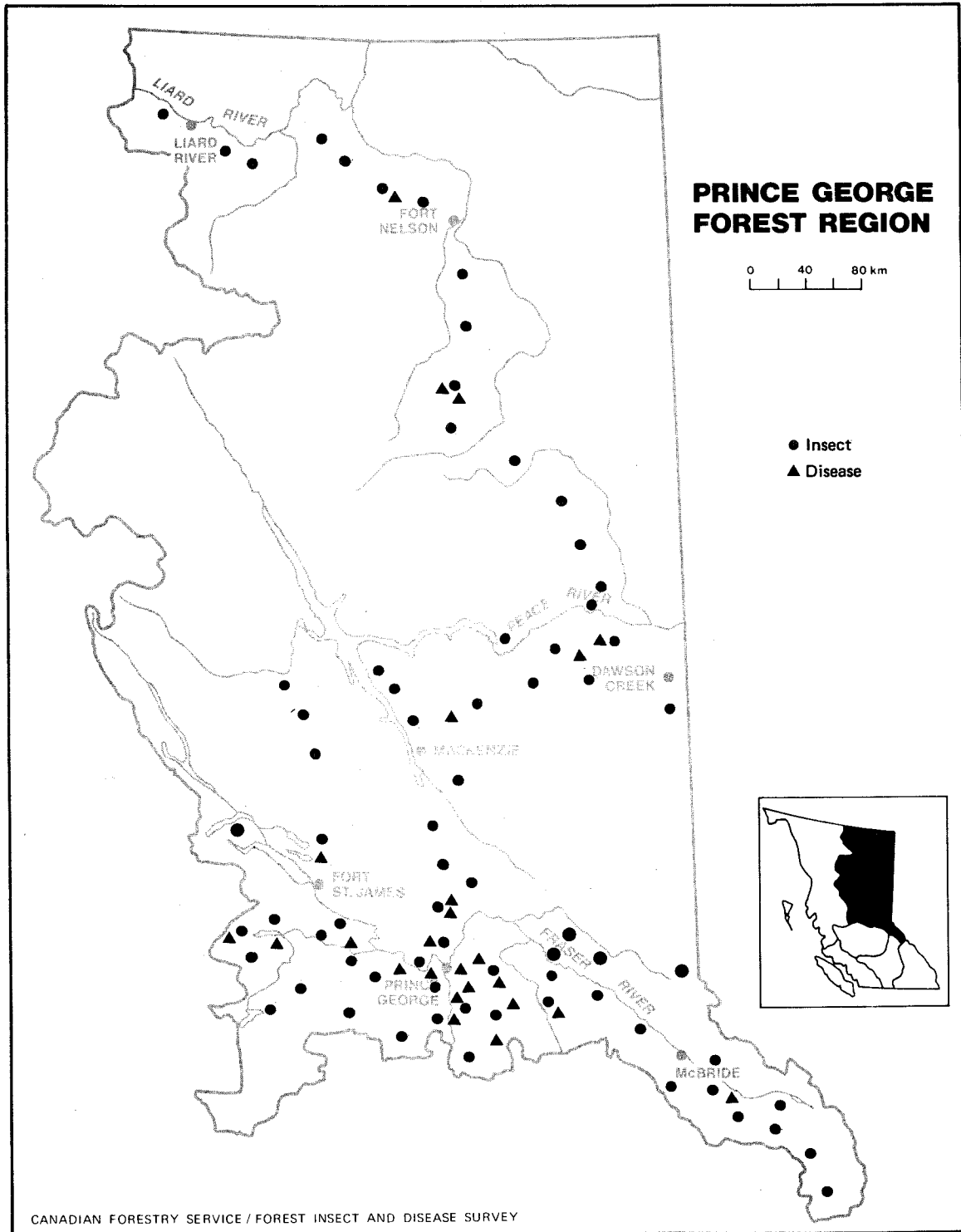
Mountain pine beetle recently killed an estimated 2,500 lodgepole and 3,800 western white pine on over 900 hectares in the Valemount-Canoe Arm and Tezzeron-Trembleur-Takla lake areas.

Lodgepole pine needle cast disease severely infected and discolored older foliage of lodgepole pine at widespread locations throughout the Region. Winter drying severely discolored old foliage of lodgepole pine, with moderate discoloration of white spruce and alpine fir along the eastern slopes of the Rocky Mountains from Pine Pass north along the Alaska Highway to Fireside.

The field season extended from May 25 to Sept. 28 during which a total of 225 insect and 45 disease samples were collected by Forest Insect and Disease Survey personnel (Map 1).

The number of three-tree-beating samples containing defoliator larvae decreased to 43% from 62% in 1980. Twenty nine managed and natural plantations and second growth stands were examined for pest damage.

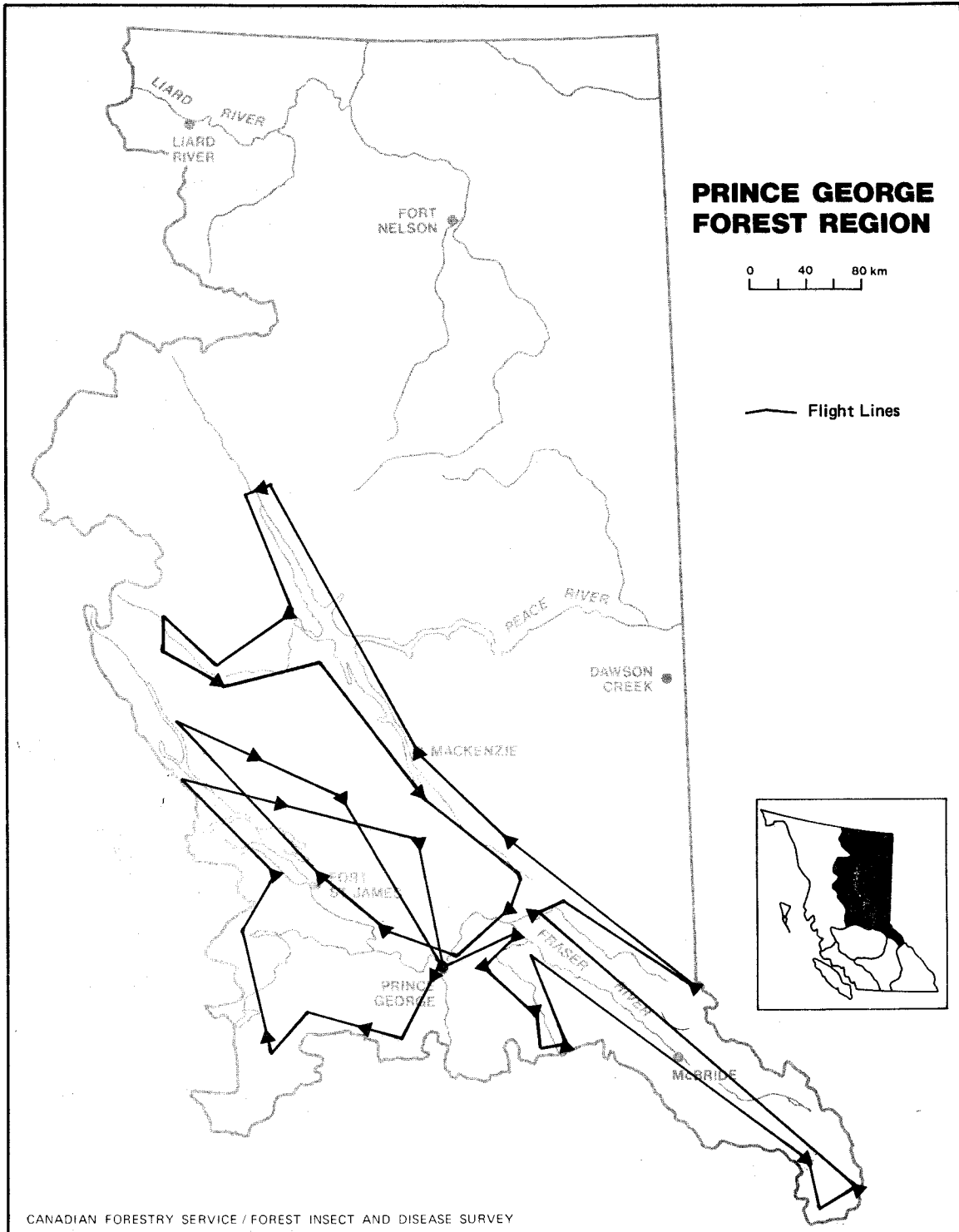
The B.C. Ministry of Forests, Prince George, Protection Branch, provided 37 hours of fixed wing and 12 hours of helicopter time to map, photograph and assess bark beetle infestation areas (Map 2). In addition to this, ground surveys of the infestation areas were conducted.



Map 1

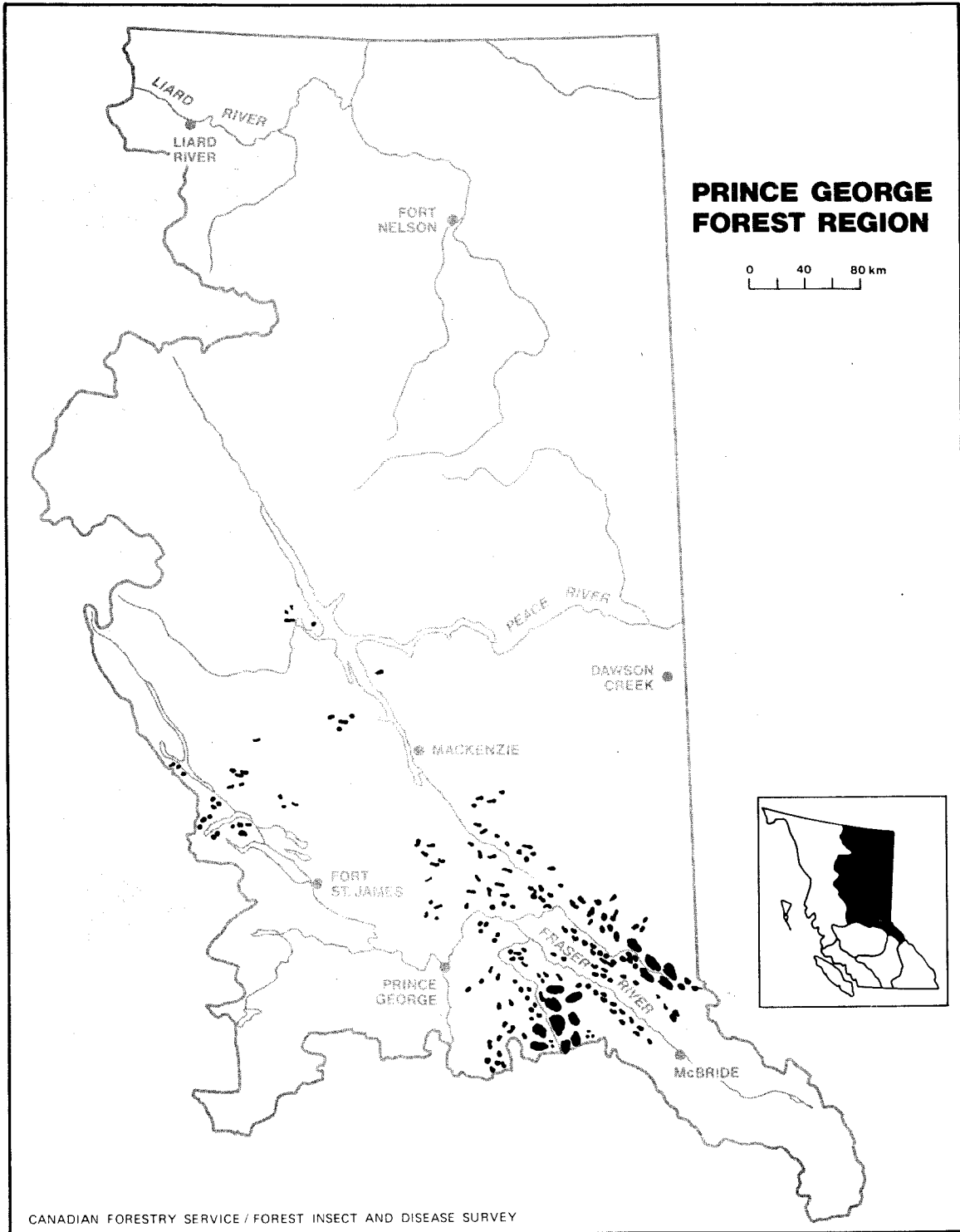
**Collection Locations
1981**

Locations Where One or More Insect or Disease Samples Were Collected



Map 2

**Aerial Surveys
1981**



Map 3

**Spruce Beetle
1981**

Areas of Recently Killed White Spruce, As Determined From Aerial Surveys

SPRUCE PESTS

Spruce Beetle, Dendroctonus rufipennis

Spruce beetle infestations in mature white spruce stands as determined from aerial surveys, were recorded on over 59 000 hectares (Map 3). Of this, 24 000 hectares were classified as light tree mortality (1-5%), 25 600 moderate (6-30%) and 9 400 severe (31%+) (Table 1). The areas of severest recent (1979-80) tree mortality was recorded northeast and southeast of Prince George in the Prince George TSA in the Bowron-Willow, McGregor-Parsnip and Seebach-Herring drainages. Areas of light tree mortality occurred in the McBride TSA, east of Prince George, in the Goat-WestTwin-Morkill drainages and in the Prince George TSA north and northwest of Prince George, in the Carp-Weedon, Stuart-Trembleur-Takla lakes and in the Williston Lake areas north of MacKenzie (Table 1).

Photograph available from
P.F.R.C.

Spruce beetle infestation in white spruce stands Upper McGregor River - 1981

A total of 296 prism plots were established at 50 metre intervals at 18 locations to determine the status of the spruce beetle population and to estimate the volume attacked and killed in 1979-80. Data recorded included: all coniferous tree species, diameters, representative tree heights, and the current status of spruce trees (table 2).

TABLE 1. Areas and intensity of spruce beetle infestations in white spruce stands recorded from aerial surveys.
Prince George Forest Region, 1981

Timber Supply Area Location	Supply Block	Intensity and area infested (ha) ^{1/}			
		Light	Moderate	Severe	Total (ha)
<u>Prince George T.S.A.</u>					
Takla-Nation lakes	B	389	64	0	453
Stuart-Trembleur lakes	C	842	669	0	1 511
Carp-Weedon lakes	E	2 137	1 035	0	3 172
Bowron-Willow rivers	G	4 659	13 395	6 040	24 094
McGregor-Parsnip rivers	H	11 000	8 060	3 384	22 444
Eaglet Lake	I	129	64	0	193
TOTAL		19 156	23 287	9 424	51 867
<u>McBride T.S.A.</u>					
Goat River	A	1 748	259	0	2 007
WestTwin Creek	B	323	64	0	387
Morkill River	I	647	129	0	776
TOTAL		2 718	452	0	3 170
<u>Mackenzie T.S.A.</u>					
Scott Creek	A	64	0	0	64
Manson River	I	323	0	0	323
Mesilinka River	L	194	0	0	194
Manson River	M	259	0	0	259
TOTAL		840	0	0	840
Herring-Seebach creeks, T.F.L. 30		1 294	1 877	0	3 171
TOTAL		1 294	1 877	0	3 171
GRAND TOTAL		24 008	25 616	9 424	59 048

1/ Aerial rating (1979 and 1980 killed white spruce)
 Light = 1 - 5% of the white spruce stems killed
 Moderate = 6 - 30% of the white spruce stems killed
 Severe = 31% + of the white spruce stems killed

Table 2. Status of white spruce trees on cruise strips.
Prince George Forest Region - 1981.

Location of strips	Percentage of white spruce stems ^{1/}					
	Healthy	Current	Red (1980)	Red (1979)	Partial	Grey
<u>Bowron River (drainage)</u>						
Purden Lake	60	1	10	14	7	8
Mackay Road	31	0	31	33	1	4
Bowron R. (2nd crossing)	29	0	34	28	4	5
Indianpoint Creek	18	0	73	5	4	0
AVERAGE	34.5	.2	37.0	20.0	4.0	4.2
<u>Willow River (drainage)</u>						
Slender Lake	56	3	34	3	2	2
Narrow Lake (north)	86	2	4	3	3	2
Narrow Lake (south)	63	0	26	7	0	4
Stephen Lake	56	5	18	5	16	0
Teapot Mtn.	86	0	4	8	1	1
AVERAGE	69.4	2.0	17.2	5.2	4.4	1.8
<u>McGregor River (drainage)</u>						
Logan Road	90	1	0	7	2	0
Einar Creek	66	10	4	14	2	4
Jarvis Creek	16	3	68	0	10	3
Bastille Creek	68	0	14	18	0	0
West of Bastille Creek	35	5	30	25	5	0
Herring Creek	63	0	9	17	4	7
AVERAGE	56.3	3.2	20.8	13.5	3.8	2.3
<u>Carp-McLeod lakes (drainage)</u>						
Weedon Lake	86	0	0	10	1	3
AVERAGE	86	0	0	10	1	3
<u>Stuart-Trembleur lakes (drainage)</u>						
Tarnazell Creek	64	6	10	9	5	6
Trembleur Lake	78	0	4	17	1	0
AVERAGE	71.0	3.0	7.0	13.0	3	3

^{1/} Current = attacked and killed in 1981. Partial = successful 1980 or
 Red = attacked and killed in 1979 or 1980. Grey = killed prior to 1979.
 = attacked and killed in 1979 or 1980. side of tree.

Ground examination of infested areas showed the 1981 current beetle attack to be 2% compared with 20% attack in 1980 and 12% attack in 1979. The severest current (1981) attacks were recorded at Einar and Bastille creeks (Upper McGregor River), Tarnazell Creek (Trembleur Lake), and Stephen Lake (Willow River).

Photographs available from
P.F.R.C.

Woodpecker scaling on infested (1980) white spruce Bowron River 1981

Volume loss figures were compiled from cruise strips run in representative infestation categories and applied to average volume/hectare killed in each category: Light category, 17.06 m³; Moderate, 50.41 m³; Severe 137.83, m³/ha.

Spruce killed by spruce beetle in 1979 and 1980 totalled nearly 3 000 000 m³ with the highest losses occurring in the Prince George Timber Supply Area in Supply Block G (Bowron-Willow rivers), supply block H (McGregor-Parsnip rivers) and on Tree Farm License 30^{1/} (Table 3).

Overwintering beetle population assessments were completed in September at the 18 ground cruised locations. Bark samples (15 cm x 15 cm) from the lower bole of 40% of the 1980 infested trees at each

^{1/} Northwood Pulp and Timber Ltd.

were examined and the number of adults counted. The results showed an 1981-1982 overwintering adult beetle population in excess of 25 per sample. Trees attacked and killed in 1981 showed a moderate beetle population (\pm 25) present with some of their progeny developing through to the adult stage. Trees attacked in 1979 yielded few beetles as the majority had flown in 1980 and 1981.

Spruce beetle progeny that developed through to the adult stage in the 1981 attacked trees will emerge in 1982 and beetle populations in 1980 attacked trees will also emerge in 1982. Prime targets for this flight will be recent windfall, trap trees and standing green trees in adjacent mature white spruce stands.

Windfall occurring from 1979 to 1981 was light (less than 1/ha) in all areas examined during the ground cruising in September. However, the numbers of overwintering larvae and adults present were between 5 and 35 per (15 cm X 15 cm) bark sample which indicates a high hazard potential. Windfall (pre 1979) was common (5/ha) throughout many of the infestation areas with the heaviest occurring at Bastille and Indian point creeks and Slender and Stephen lakes. Beetles from these windfall had emerged (pre 1979).

Photographs available from
P.F.R.C.

White spruce blowdown Upper McGregor River

Table 3. Volume loss of white spruce killed by spruce beetle 1979 and 1980 as determined from aerial and ground surveys.
Prince George Forest Region, 1981.

Timber Supply Area Location	Supply Block	Volume Loss (m ³) ^{1/}			Total
		Light	Moderate	Severe	
<u>Prince George T.S.A.</u>					
Takla-Nation lakes	B	6 636	3 226	0	9 862
Stuart-Trembleur lakes	C	14 365	33 725	0	48 090
Carp-Weedon lakes	E	36 457	52 175	0	88 632
Bowron-Willow rivers	G	79 482	675 255	832 493	1 587 230
McGregor-Parsnip rivers	H	287 660	406 312	466 416	1 060 388
Eaglet Lake	I	2 200	3 226	0	5 426
TOTAL		326 800	1 173 919	1 298 909	2 799 628
<u>McBride T.S.A.</u>					
Goat River	A	29 820	13 056	0	42 876
West Twin Creek	B	5 510	3 326	0	8 736
Morkill River	I	11 037	6 503	0	17 540
TOTAL		46 367	22 785	0	69 152
<u>Mackenzie T.S.A.</u>					
Scott Creek	A	1 091	0	0	1 091
Manson River	I	2 200	0	0	2 200
Mesilinka River	L	3 309	0	0	3 309
Manson River	M	3 326	0	0	3 326
TOTAL		9 926	0	0	9 926
Herring-Seebach creeks T.F.L. 30		22 075	94 621	0	116 696
TOTAL		22 075	94 621	0	116 696
GRAND TOTAL		405 168	1 291 325	1 298 909	2 995 402

^{1/} Light = 17.06 m³ per hectare
Moderate = 50.41 m³ per hectare
Severe = 137.83 m³ per hectare

The B.C. Ministry of Forests, Prince George, Protection Branch established trap tree sites in co-operation with the forest industry to trap and monitor 1980-81 overwintering populations. In the Bowron-Willow river areas approximately 300 sites were established with an average of 20 to 25 non-treated trees located at each site. In the Herrick Creek drainage 72 sites were established with ten trees treated with monosodium methanoearsonate (M.S.M.A.) per site. Results of these trap tree programs are being compiled by the B.C.M.F. Prince George Regional Office.

From the results of ground surveys and field observations made in 1981 and anticipating low overwintering mortality, it is predicted that the spruce beetle epidemic will continue in the Prince George Forest Region in 1982. Some expected areas of attack will be where logging is carried out in the winter of 1981-82 and the uninfested logs are left in the woods or where fresh windfall is abundant. Some noteworthy attacks may be expected on living trees. Areas with a high incidence of 1980 beetle attack were in the Bowron-Willow and McGregor river drainages and currently have the largest overwintering adult beetle populations and therefore pose a threat to the mature spruce stands in the above mentioned areas.

Two-year-cycle spruce budworm, Choristoneura biennis

White spruce and alpine fir stands in the Bowron, Willow and Holmes river drainages were lightly defoliated in 1981, the non feeding year, where moderate defoliation occurred in 1980, the feeding year. Infested bud counts taken at five locations in the Bowron-Willow river areas, showed 4% of the buds were infested indicating light defoliation in 1982.

One-year-cycle spruce budworm, Choristoneura fumiferana

Examination of white spruce stands along the Liard River from Liard to Fireside where outbreaks persisted between 1960-1972, showed an average of three larvae per 3-tree-beating sample with no evidence of current defoliation.

Roundheaded woodborers, Monochamus spp.

More than 75% of an estimated 280 000 cubic metres of white spruce logs decked at the Fort Nelson Forest Products and Tackama Forest Products yards at Fort Nelson were infested by the woodborers. The severest damage was to logs cut in 1979 resulting in significant quality degrade. Adults that emerged from the 1979 attacked logs, attacked logs cut in the winter of 1980-81. The B.C. Ministry of Forests encouraged the milling of the most severely infested log decks to reduce potential for further attacks by the borers.

PINE PESTS

Mountain pine beetle, Dendroctonus ponderosae

A total of 2,500 recently killed lodgepole and 3,800 western white pines were recorded on over 900 hectares. The highest concentrations of tree mortality occurred east of Prince George in the Valemount-Canoe Arm and northwest of Prince George in the Tezzeron-Trembleur-Takla lake areas (Table 4).

Table 4. Areas and intensity of mountain pine beetle infestations in lodgepole and western white pine stands, recorded from aerial surveys.

Prince George Forest Region, 1981.

<u>Timber Supply Area</u> Location	Supply Block	Pine specie	<u>Intensity and area infested</u> ^{1/}			
			Light	Moderate	Severe	Total
<u>McBride T.S.A.</u>						
Swift Creek	C	1P	25	0	100	125
Canoe Arm	C	wwP	450	50	0	500
Canoe Arm	H	wwP	100	0	0	100
TOTAL			575	50	100	725
<u>Prince George T.S.A.</u>						
Takla Lake	B	1P	40	10	0	50
Tezzeron- Trembleur lakes	C	1P	150	50	0	200
Purden Mtn.	G	1P	10	0	0	10
TOTAL			200	60	0	260
GRAND TOTAL			775	110	100	985

^{1/} Aerial rating (1979 and 1980 killed pines)

Light = 1 - 5% of the pine stems killed
 Moderate = 6 - 30% " " " "
 Severe = 31+% " " " "

Areas where pine mortality occurred in 1981 have sustained mountain pine beetle infestations for the past six years. The 1981 infestation hectareage is down compared to 1980, due to logging and lack of mature host material. Based on historical data it is expected that outbreaks will continue in 1982.

Winter drying (Red Belt)

Discoloration of 1980 and earlier foliage of lodgepole pine, white spruce and alpine fir was widespread in the Pine Pass area from Pine Pass to Chetwynd, along the Alaska Highway north of Fort St. John, Trutch Mountain, Minnaham River Valley, Summit and Muncho Lake and northwest of Fireside. The severest damage generally was to lodgepole pine with less damage to white spruce and alpine fir, although in the Trutch Mountain area white spruce was severely damaged with some damage apparent to 1981 buds.

Lodgepole pine needle cast, Lophodermella concolor

Infection of 1980 needles severely discolored immature understory and the lower crowns of overstory lodgepole pine at widespread location. Up to 75% of the needles on 50% of the trees were infected along the Hart Highway from Summit Lake to Bear Lake; 40% of the needles on 25% of the trees along the South Willow Forest Access Road and along the Beaver Forest Access Road 30% of the trees were 40% infected. Infections could cause reduced growth, but seldom results in tree mortality.

PEST OF NATURAL AND MANAGED SECOND GROWTH STANDS AND PLANTATIONS

A survey of 29 immature stands of lodgepole pine, white spruce and alpine fir to appraise and identify damaging forest pests determined only 5 healthy stands and 24 stands with a variety of pest problems.

In lodgepole pine stands western gall rust Endocronartium harknessi was found in 40% of the managed and 70% of the natural stands with the severest infections occurring at Punchaw Lake and Naver Access Road. A blister rust Cronartium coleosporioides was found in 20% of the managed and 14% of the natural stands with an average of 1% of the stems infected. Also a needle cast disease Lophodermella concolor occurred in 10% of the managed and 70% of the natural stands.

Spruce weevil Pissodes strobi was found in two natural white spruce stands with an average of 7% of the leaders damaged. Spruce gall aphid was found in 50% of the managed spruce stands (Results of Examination and Sampling of Plantations and Second Growth Stands Prince George Forest Region 1981 Appendix 1).

ALPINE FIR PESTS

Western balsam bark beetle, Dryocoetes confusus

Up to 5% of the mature alpine fir were killed in white spruce-alpine fir stands in the Takla Lake area; at Frypan Creek (125 ha); Lovell Cove (100 ha); West Landing (40 ha) and on the south side of Tsayta Lake (50 ha).

Recently and previously beetle-killed alpine fir were scattered over several thousand hectares of high elevation white spruce-alpine-fir stands in the McGregor, Parsnip river drainages and in the Pine Pass area.

Fir-Fireweed rust, Pucciniastrum epilobii

Needle rust damage to current foliage of alpine fir was common throughout the Region. Areas where damage was most evident were along the Hart Highway from Summit Lake to Mackenzie turnoff (60% of the foliage infected on 40% of the trees), McGregor River-Herrick Creek (75% of the foliage infected on 50% of the trees) and from the Hart Highway to 32 km north of Mackenzie (10% of the foliage infected on 10% of the trees). The understory and lower crowns of alpine fir trees were the most severely damaged by this needle rust, causing reduced growth but seldom results in tree mortality.

DOUGLAS-FIR PESTS

Douglas-fir beetle, Dendroctonus pseudotsugae

A total of 200 recently killed mature Douglas-fir trees were recorded during aerial surveys at McLeod and Stuart lakes, McGregor River and in the McBride area. Dead trees occurred singly and in pockets from 5 to 10 trees in mixed coniferous stands.

Swiss needle cast, Phaeocryptopus gaeumannii

A special survey was carried out to determine the distribution of swiss needle cast infection in Douglas-fir regeneration and immature stands in the Region. The needle cast was found at low infection levels and was confined to the wetter areas of the Region. No discoloration or loss of foliage was detected on trees that were identified as infected.

Collections were made at Pinchi, Fraser, Cluculz, West and Opatcho lakes and the Strathnaver area. Of these Opatcho Lake was the severest with 80% of the needles in a 4 shoot sample infected. At West Lake 20% of the needles in a 3 shoot sample were infected and at Strathnaver 1% of the needles in a 3 shoot sample were infected.

DECIDUOUS PESTS

Large aspen tortrix, Choristoneura conflictana

Defoliation of trembling aspen stands by the aspen tortrix occurred in areas from 50 to 200 plus hectares along the Alaska Highway from Trutch Mountain to Muncho Lake.

The defoliation was spotty and ran from light to severe on individual trees. Light defoliation was also evident along the Liard River from Liard to Fireside, along the Hart Highway from Chetwynd to Dawson Creek and along the highway from Chetwynd to Hudson Hope and Hudson Hope to Fort St. John. Evidence of disease and parasitism was common (approximately 75%) in the larvae and pupae along the Liard River. Sporadic light defoliation was noted west of Prince George in the Vanderhoof-Fraser Lake areas where extensive defoliation occurred on 38 000 hectares in 1980.

Gypsy moth, Lymantria dispar

Gypsy moth pheromone traps were set out at 15 locations in the Prince George, Hixon, Fraser Lake, Dawson Creek, Fort St. John and Mackenzie areas (with one or two traps per location). All traps showed negative results.

NURSERY PESTS

Two nurseries were examined in the Region. The B.C.M.F. Red Rock Nursery and the Northwood Pulp and Timber Ltd. - Willow Canyon Nursery. Red Rock Nursery had minor damage to lodgepole pine seed trees caused by fertilization burn (70% of the trees, 1% of foliage), a small amount of damping off occurred (less than 1%) and damage by winter wind blown sand to seedlings exposed by lack of snow cover. The Willow Canyon Nursery, in its first year of operation, had no insect, disease, or environmental problems observed.

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