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ANNUAL DISTRICT REPORT  
FOREST INSECT AND DISEASE SURVEY  
BRITISH COLUMBIA, 1973  
PART II, PRINCE RUPERT FOREST DISTRICT

by

R. J. Andrews and R. D. Erickson<sup>1/</sup>

PACIFIC FOREST RESEARCH CENTRE  
CANADIAN FORESTRY SERVICE  
VICTORIA, BRITISH COLUMBIA  
INTERNAL REPORT

DEPARTMENT OF THE ENVIRONMENT  
January, 1974

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## INTRODUCTION

This report outlines the status of forest insect and disease conditions in the Prince Rupert Forest District for 1973, and forecasts pest population trends. Emphasis is placed on pests capable of sudden, damaging outbreaks.

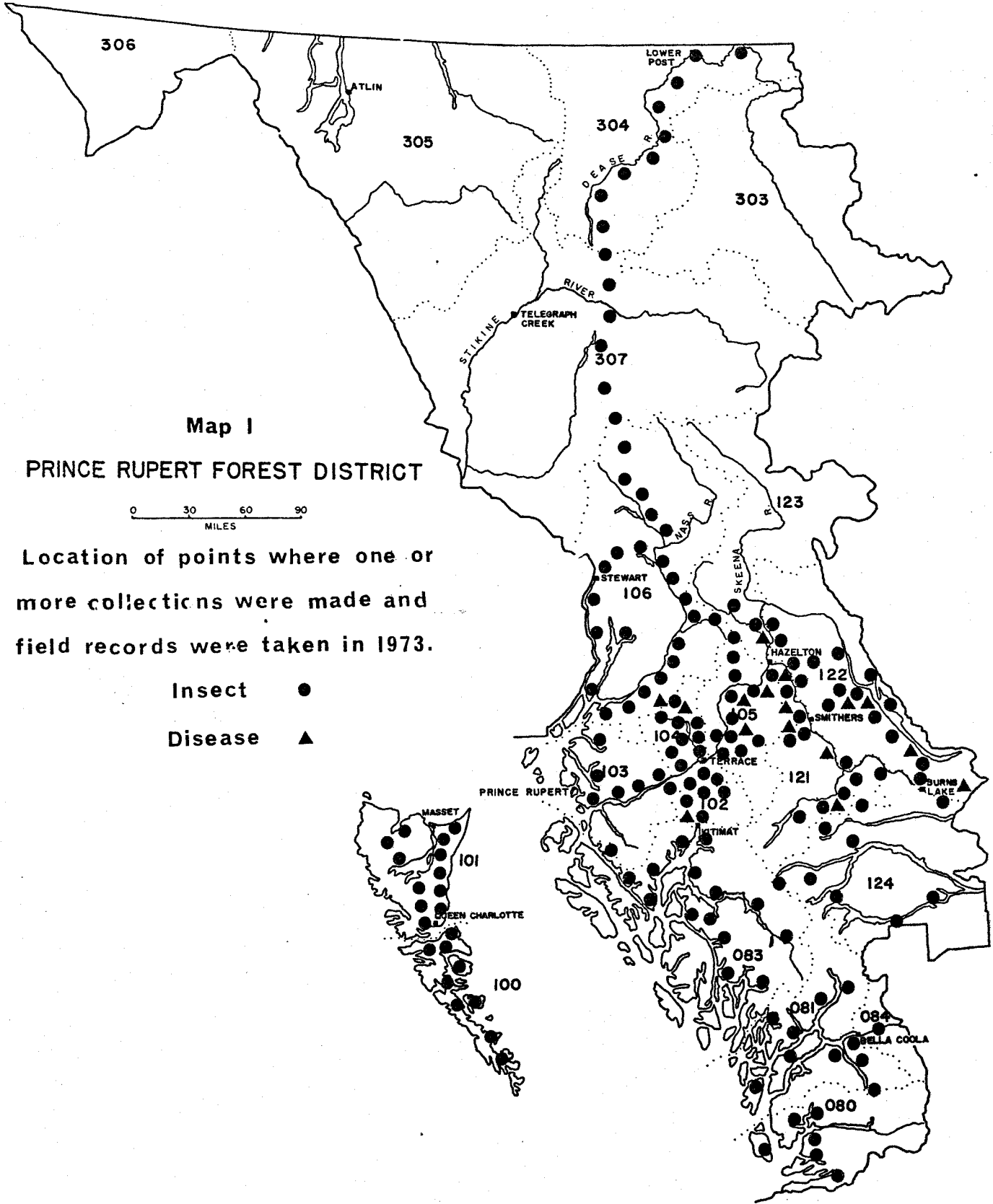
Forest pest infestations reported to the Forest Insect and Disease Survey by public or private cooperators assist in the interpretation of the general pest situation and in gauging population trends.

Regular field work in the District extended from June 1 to August 5. Special surveys were as follows: black army cutworm, June 18-19, black cottonwood seed collections, June 20-25, Queen Charlotte Islands aerial survey, July 12-13, coastal aerial survey July 21-26, black army cutworm September 13-14, mountain pine beetle September 14-16, blackheaded budworm egg sampling, October 9-16.

A total of 474 insect and 31 disease collections were submitted in 1973. Map 1 shows the collection localities and drainage divisions.

Numbers of larval defoliators found in field collections increased slightly this year: 90 and 83% of beating collections in the western and eastern parts of the District, respectively, contained larvae. The mountain pine beetle continued to spread in the Kitwanga-Hazelton area even though large areas of 1972 killed timber had been logged in the past year. The blackheaded budworm reached epidemic proportions over much of the southern coastal stands, in localized stands on the Queen Charlotte Islands and in three areas of the Interior forests. The black army cutworm caused considerable damage to newly planted conifer stock in the Interior portion of the District. This is the second infestation of this kind recorded in the District.

A shoot blight, causing considerable damage to advanced regeneration was again found in the areas near Kitimat, Skeena and Nass Rivers. A needle cast of second year's needles on Sitka spruce was widespread on the northern portion of Moresby Island. Frost damage, causing wilting of current year's shoots, was recorded along the Kispiox River, Emerson Creek and near Pinkut Lake on white spruce.



FOREST INSECT CONDITIONS

Currently Important Insects

Bark Beetles

Mountain pine beetle, *Dendroctonus ponderosae*

The current outbreak of mountain pine beetle began at Date Creek in 1969 followed in 1970 by an outbreak at Weegett Creek in the Cranberry drainage. In 1971, the Weegett Creek infestation expanded and scattered infestations occurred near Kitwanga, east along the Skeena River to Hazelton and north along the Kispiox River to Kline Lake. In 1972 all recorded infestations expanded and British Columbia Forest Service began salvage cutting infested stands thereby greatly reducing existing mountain pine beetle populations. However, some areas could not be completely logged by beetle flight time and numerous small infested patches were not considered as feasible to log. Broods successfully overwintered during 1972-73 and large beetle flights occurred during the summer.

In 1973 aerial surveys by the British Columbia Forest Service in cooperation with the Forest Insect and Disease Survey disclosed numerous new small infestations west of Houston and expansion of all known infestations that were not logged. Table 1 and Maps 2 and 3 show locations of known infestations, acreage involved, number of trees infested in 1972 and logging plans for the areas.

Two areas were cruised to determine the status of current attack; they were: near Seeley Lake and near Radio Hill north of Kitwanga. The following table shows the percentage of lodgepole pine in the areas cruised attacked by the mountain pine beetle.

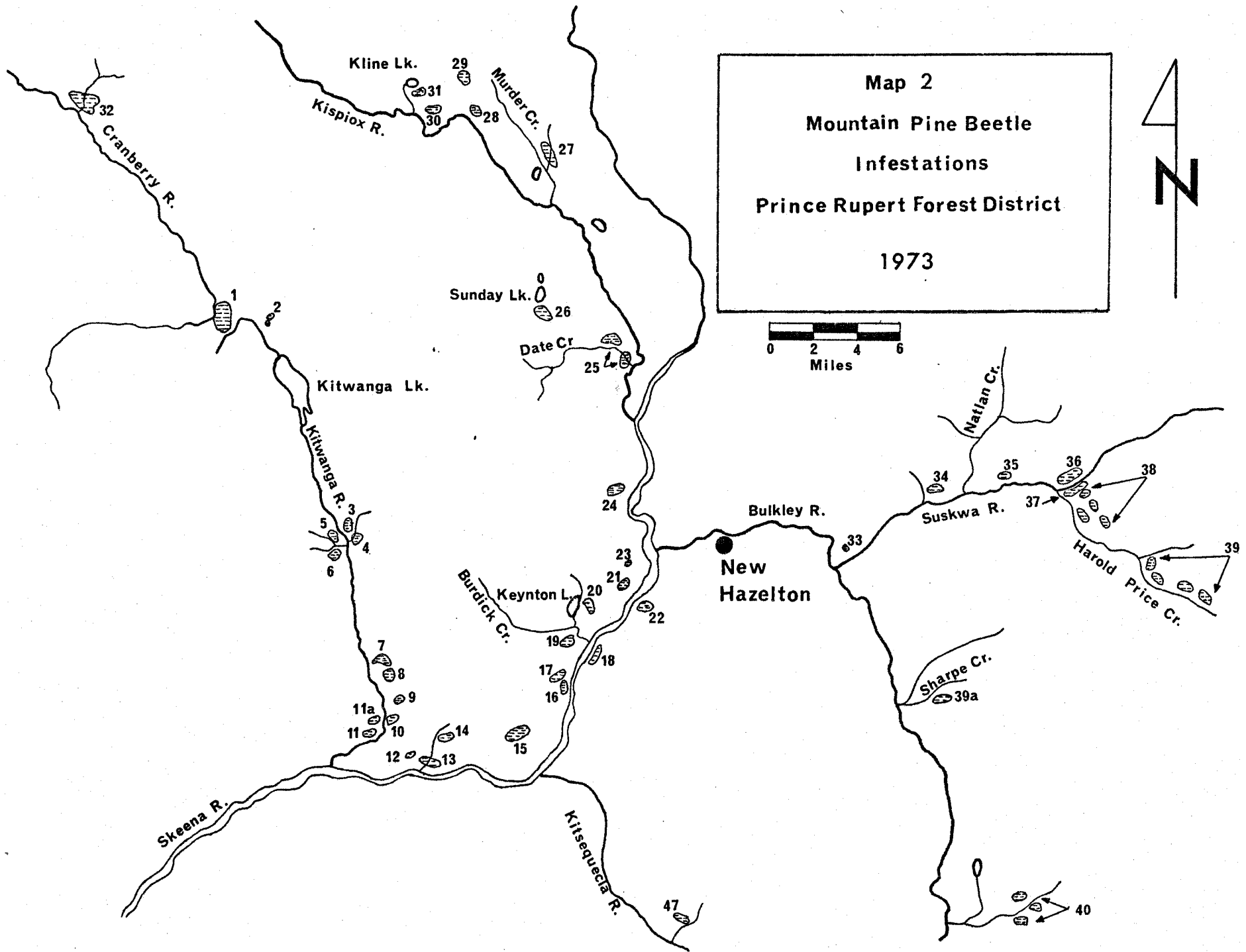
Location	Unattacked	Year attacked		
		1973	1972	Prior to 1972
Seeley L	38	35	14	13
Radio Tower Hill	61	23	12	4

The number of trees attacked in 1973 increased from 1972. The large numbers of overwintering beetles in trees examined indicate a continuing expansion of infestations in 1974.

Table 1. Status of mountain pine beetle infestations, Prince Rupert Forest District, 1973

Map no.	Infestation no.	Locality	Estimated acreage	No. of red trees
<u>Being logged</u>				
1	1	Cranberry R	1500	900-1200
1	25	Date Cr		
1	32	Weegett Cr	1700	
<u>Areas soon to be logged</u>				
1	7,8	Radio Tower Hill	640	1070
1	9	5 mile	50	200
1	22	Seeley L	60	400
1	30	Line L	40	150
1	39	Sharpe Cr	10	30
<u>Indian Reserve</u>				
1	3-6	Kitwancool	460	370
1	12-13	Andimaul	50	170
<u>No immediate logging planned</u>				
1	2	Kitwanga	20	30
1	10	Kitwanga Dump	30	75
1	11,11a	W. side Kitwanga R	20	20
1	14	Andi Cr	20	65
1	15	Hazelton-Kitwanga	150	175
1	16,17	Skeena R	160	350
1	18	Carnaby Sta	60	70
1	19	Burdick Cr	40	200
1	20	Keynton L	30	30
1	21	Williams Farm	60	250
1	23	Hazelton	10	40
1	24	Glen Vowell	30	95
1	26	Sunday Lake	60	90
1	27	Murder Cr	20	90
1	28,29	First Cabin	18	60
1	31	Kline L	40	150
1	33	Suskwa R Jct	10	20
1	34	Eighteen Mi Cr	5	20
1	35	Natlan Cr	80	150
1	36,37,38	Harold Price Cr	540	1100
1	40	Gramophone Cr	5	30
1	41	Dahlie Cr	5	30
2	42	Gilmore L	30	40
2	43	Aitken Cr	60	150
2	44,45	McKilligan Cr	120	285
2	46	Boling Pt	10	50
1	47	Kitsequecla R	10	30

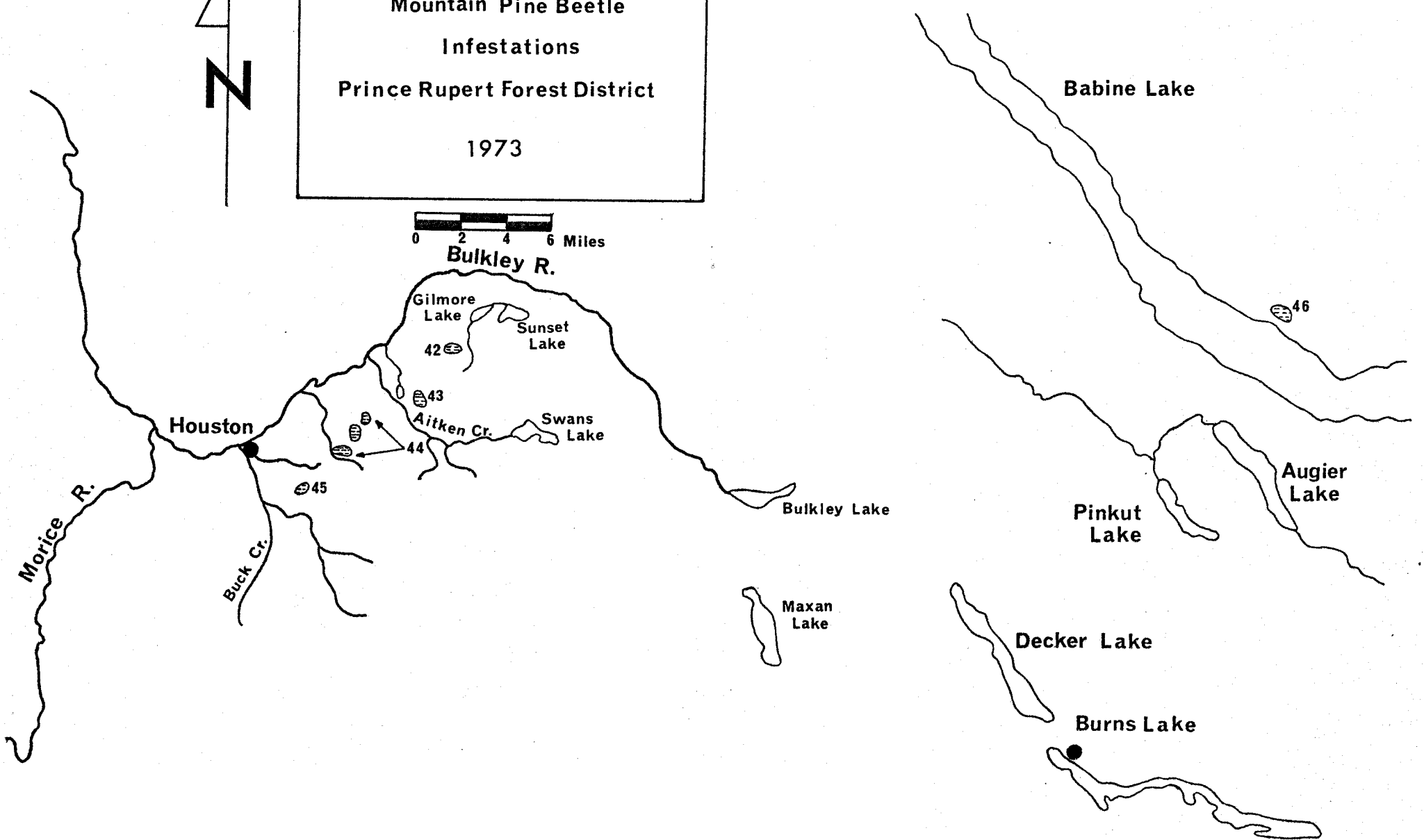
Map 2  
Mountain Pine Beetle  
Infestations  
Prince Rupert Forest District  
1973



**Map 3**  
**Mountain Pine Beetle**  
**Infestations**  
**Prince Rupert Forest District**  
**1973**



0 2 4 6 Miles



Defoliators

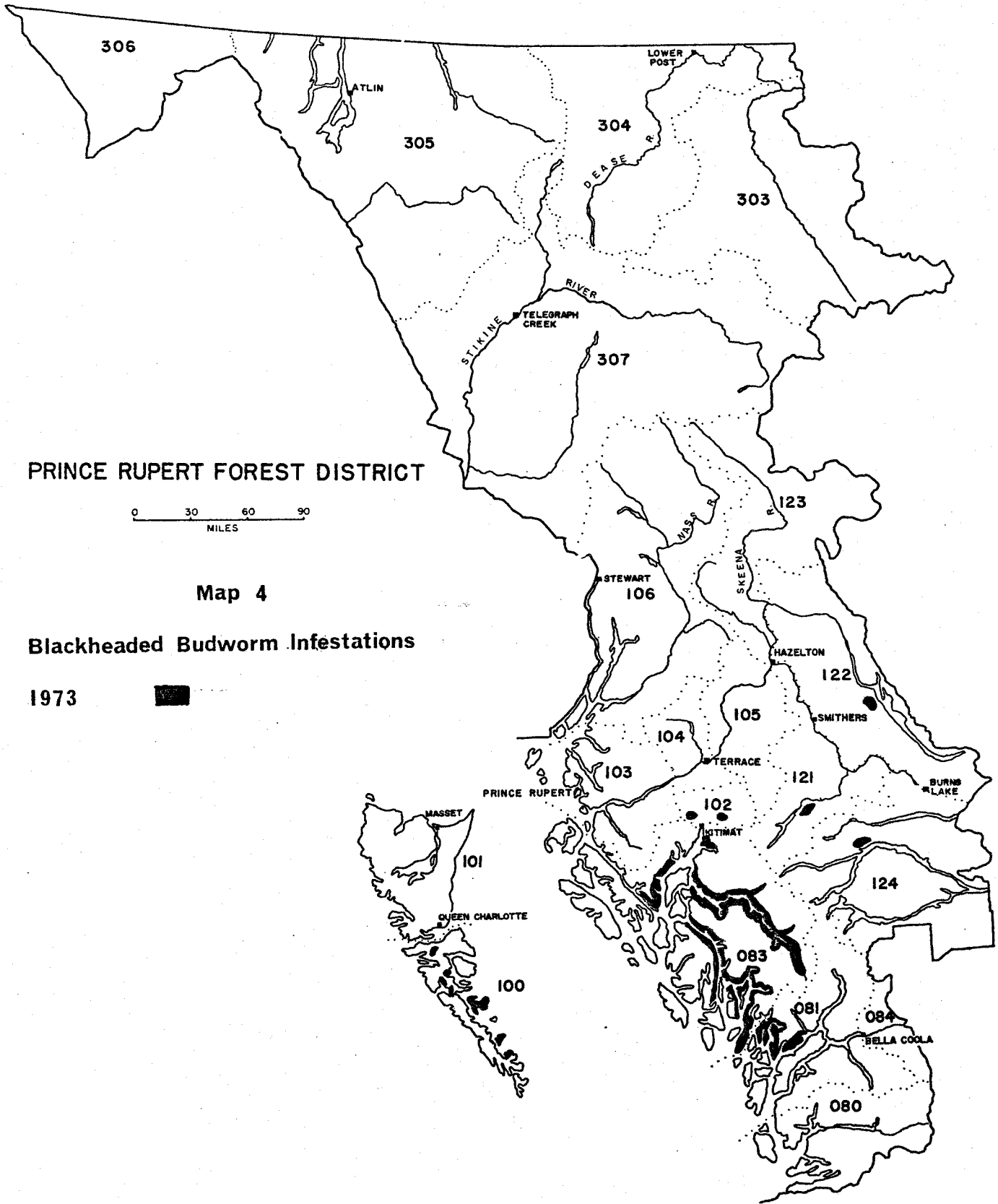
Western blackheaded budworm, *Acleris gloverana*

There was a general increase in budworm populations throughout the District in 1972 with light to moderate populations in localized stands of western hemlock from Calvert Island north to Douglas Channel, Lyell and Burnaby Islands of the Queen Charlotte Islands, and on alpine fir west of Babine Lake. In 1973, populations increased to epidemic levels and defoliation by budworm was mapped on over 280,000 acres of western hemlock and alpine fir in the District. Development of larvae was normal for the Mainland but slow on the Queen Charlotte Islands. In mid July collections of second instar larvae were made at most locations on the Queen Charlottes whereas on the Mainland fifth instar larvae were common and defoliation by blackheaded budworm was noticeable. All drainage divisions (Map 1) south of Terrace along the Coast showed a substantial increase in the number of collections containing blackheaded budworm larvae and in the number of larvae per collection. The average and the maximum number of larvae per collection respectively in each drainage division south of Terrace were: D.D.104 - 10 and 70; D.D.102 - 8 and 70; D.D.083 - 154 and 500; D.D.081 - 138 and 360; D.D. 080 - 138 and 165. On the Queen Charlotte Islands the average and maximum number of larvae per collection in each drainage division were: D.D.100 - 100 and 600; D.D. 101 - 4 and 500. Corresponding collections in the Interior were: D.D.121 white spruce - 145 and 450; D.D.122 - 65 and 350; alpine fir, D.D.121 - 106 and 300; D.D.122 - 72 and 300. Table 2 shows a three-year comparison of blackheaded budworm populations on western hemlock in the Prince Rupert District.

In addition to ground surveys, Eurocan Pulp and Paper Co. and Rayonier of Canada forestry personnel conducted aerial surveys to map defoliation in their respective areas during August. In October, Forest Insect and Disease Survey personnel in cooperation with B.C. Forest Service and Eurocan Pulp and Paper Co. personnel conducted egg surveys along the Mainland coast, in the Interior and in the Deena River drainage on the Queen Charlotte Islands. In all, over 70 hours of aircraft time, 30 hours Federal Forestry and 40 hours Provincial Forestry and Industry time were used in appraising the outbreak.

Overwintering egg populations were assessed, based on counts of eggs on two 18" branches from the mid-crown of each of three trees at 10 locations within the Eurocan T.F.L., 8 locations along the Mainland coast from Ocean Falls north to Douglas Channel, at one location in the Deena River drainage, Queen Charlotte Islands and at 4 locations in the Interior of the District. The highest average egg counts per 18" branch were recorded along Kemano River (140) and at Terrace (78). Table 3 gives a summary of blackheaded budworm infestations in the Prince Rupert District, the average defoliation of 10 trees, the average number of eggs per 18" branch, and the predicted defoliation hazard for 1974. The criterion is as follows: 1 to 26 eggs - light defoliation; 27 to 59 - moderate; 60 or more - heavy.





PRINCE RUPERT FOREST DISTRICT



Map 4

Blackheaded Budworm Infestations

1973



Table 2. Summary of blackheaded budworm collections from western hemlock, white spruce and alpine fir, by drainage division, Prince Rupert Forest District

Host	Drainage <sup>1/</sup> division	No. samples during larval period			% samples containing larvae			Avg no. larvae per positive sample		
		1971	1972	1973	1971	1972	1973	1971	1972	1973
W. hemlock	080	13	7	5	15	85	100	1	17	133
	081	18	5	9	0	100	100	0	18	138
	083	9	13	13	22	84	92	1	86	154
	100	6	14	20	0	50	50	0	86	100
	101	12	17	22	0	18	27	0	4	4
	102	0	0	26	0	0	65	0	0	8
	103	0	0	4	0	0	50	0	0	2
	104	0	0	40	0	0	53	0	0	10
	105	0	0	18	0	0	67	0	0	5
White spruce	121	32	29	16	15	62	75	1	10	145
	122	35	36	26	17	47	69	1	5	65
Alpine fir	121	20	21	15	20	86	80	2	20	106
	121	22	13	25	22	93	72	2	10	72

<sup>1/</sup> See Map 1.

Table 3. Blackheaded budworm infestations,  
Prince Rupert Forest District, 1973

Location	% defoliation 1973	Avg no. eggs per 18" branch	Predicted defoliation 1974
<u>Terrace and T.F.L. #41</u>			
Terrace	17	78	Heavy
Hirsch Cr	21	44	Moderate
Dahl Cr	18	42	Moderate
Emsley Cove	23	7	Light
Foch Lagoon	7	22	Light
Kildala Arm	12	54	Moderate
Kiltuish Inlet	49	15	Light
Kemano River	43	140	Heavy
Chief Mathews Bay	67	30	Moderate
Gamsby River	36	56	Moderate
Kitlope River	29	9	Light
<u>Douglas Channel-Ocean Falls</u>			
Kishkosh Inlet	11	8	Light
Hartly Bay	31	40	Moderate
Klekane Inlet	35	40	Moderate
Green Inlet	66	15	Light
Lizette Lake	19	12	Light
Watson Bay	29	8	Light
Salmon Bay	52	21	Light
Link Lake	40	21	Light
<u>Queen Charlotte Islands</u>			
Deena River	59	24	Light
<u>Interior</u>			
Fort Babine Road	25	60	Moderate
Ootsa Lake	25		Moderate
Morice Lake	25	12	Light

Moderate defoliation was recorded at four egg sample locations: Chief Mathews Bay, Salmon Bay, Green Inlet and Deena River. From 2-8 trees in the 10 tree plots suffered up to 8 feet of top stripping, mostly on intermediate sized trees. Salmon Bay and Green Inlet populations are expected to

decrease and no further damage is expected, however moderate defoliation is expected again at Chief Mathews Bay and Deena River and if so, top killing of intermediate trees could occur.

It is predicted that defoliation will decrease from Ocean Falls along Matheson, Tolmie and Princess Royal channels, and increase along Douglas and Grenville channels and from Kemano north to Terrace. Populations in the Queen Charlotte Islands are expected to remain the same, causing scattered light to moderate defoliation. Defoliation of current year's growth on white spruce and alpine fir at Ft. Babine, Smithers Landing, Morice Lake and Andrew Bay probably will occur again.

Black army cutworm, *Actebia fennica*

The black army cutworm had until 1973 been known mainly as an agricultural pest. In June of 1973, British Columbia Forest Service reported severe damage to widely scattered 300-400-acre blocks of newly planted conifer seedlings. Sparse ground cover plants were almost completely defoliated in these areas by June 12. In most cases, burning of these areas had preceded planting by six months to a year. Table 4 shows the areas infested, year when burning and planting took place, the acreage infested and expected percentage mortality.

Table 4. Infestations of black army cutworm in conifer seedling plantations, Prince Rupert Forest District, 1973

Location	Burned	Planted	Acreage infested	*Estimated % mortality
Quick	1971	1973	80	58
Goosly Lake	"	"	70	30
Tagetochlain Lake	"	1972	400	75
<u>Andrew Bay</u>				
C.P.067 Blk. 12	1971	1972	270	75
C.P.067 Blk. 13	"	"	210	75
C.P.012 Blk. 7	"	"	220	100
C.P.012 Blk. 11	1970	1971	140	50
C.P.056 Blk. 2	1971	1972	180	90
C.P.002 Blk. 9	"	1973	180	90
C.P.002 Blk. 11	"	"	180	100

\*B.C. Forest Service figures.

The black army cutworm is a dark brown to black caterpillar with a double white line extending lengthwise on each side of the body. Larvae range in size from 1/4" when newly hatched to nearly 2" when fully grown. In the spring they feed nocturnally in and on the buds until the buds have

flushed. At this time all weeds, shrubs and plants may be fed on, and damage becomes apparent. The larvae congregate and move en masse, hence the name army worm. In the later instars, larvae stop feeding and go into the soil to pupate. Moths emerge in July and August and lay eggs.

Soil samples to determine pupal populations were taken near Quick, Goosly Lake and at three locations near Andrew Bay (Table 5).

Table 5. Black army cutworm pupae in soil samples taken in infested areas

Locality	Total no. samples	Avg no. pupae/ft <sup>2</sup>	Maximum no. pupae/ft <sup>2</sup>
Quick	20	6	30
Goosly Lake	7	29	110
<u>Andrew Bay</u>			
C.P.002 Blk. 19	5	14	23
C.P.002 Blk. 11	12	25	100
C.P.012 Blk. 11	5	3	10

There was no evidence of disease in pupae sent to the Insect Pathology Research Institute from the infestation areas.

Past epidemics affecting agricultural crops have been severe for two years only, and 1974 will be the second year of the current epidemic. One other outbreak occurred in Prince Rupert Forest District in 1964 on conifer seedlings. It lasted one year only.

Survival plots within the 1973 infested areas will be established in the spring of 1974, after new growth becomes apparent, to determine damage or mortality.

The following are summaries of insects known to cause damage but in 1973 were of minor significance.

Spruce beetle, *Dendroctonus rufipennis*

Light populations were encountered near the Stewart-Cassiar highway where recent right-of-way felling had taken place. Moderate to heavy populations have been encountered in nearby Alaska for the past two years.

Spruce budworm, *Choristoneura* spp.

Two species of spruce budworm occur in the District, *Choristoneura orae* on the Coast on amabilis fir, and *C. biennis* in the Interior on alpine fir. Larval populations of both species were at low levels. Traps baited with a sex pheromone attracted numerous adults at two of four locations; near Skunsnat Creek, 170 adults were trapped, and near Smithers Landing, 33 adults were caught. At two other localities fewer than 5 adults were caught.

Balsam bark beetle, *Dryocoetes confusus*

The balsam bark beetle is a continuous problem in the Interior sub-alpine forests of the District. Areas of chronic attack are the Upper Skeena and Nass rivers, McKendrick Creek and Telkwa River. Aerial surveys of the latter two areas revealed that a total of 2,000 trees had been attacked over the past four years.

Green spruce aphid

Light to moderate damage to open grown Sitka spruce was reported from Skidegate Village to Tlell by British Columbia Forest Service personnel.

A pine midge, *Cecidomyia* spp.

A slight decrease in occurrence of damaged lodgepole pine branch tips was noted in the Terrace-Kitimat areas and along Kitwanga River. However, up to 60% of tips were damaged in lodgepole pine stands along the Kispiox River.

Saddleback looper, *Ectropis crepuscularia*

Of 41 western hemlock 3-tree beating samples taken on the Queen Charlotte Islands 20% were positive, containing an average of 2.5 larvae per collection, an increase over 1972 samples.

## 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.

### Shoot blight of conifers, *Sirococcus strobilinus*

This blight caused light to moderate browning of foliage and light defoliation of regeneration and pole-sized western hemlock on one to two-acre patches from Kitimat north to the Nass River, near Williams Creek and along eastern tributaries of the Kitimat River.

### Needle disease of conifers, *Lirula macrospora*

Caused moderate to heavy discoloration of second year needles on groups of regeneration and pole-sized Sitka spruce on Moresby Island from Sandspit to Cumshewa Inlet and near Cedarvale, where up to 80-90% of two-year-old needles were infected.

### Fir-fireweed rust

Infection was generally lighter on alpine fir in the western portion of the Interior. However, moderate to heavy infection was recorded in localized areas near Topley Landing, Lamprey Creek and Taltapin Lake.

PRINCE RUPERT DISTRICT

Appendix I

Permanent Sample Stations

Permanent sampling stations have been established throughout the District for the purpose of monitoring defoliator populations annually at a given number of locations. The stations are located in representative stands of the major tree species and three each of the major tree species are sampled by the three-tree beating method. There are 140 stations in the District and with some containing more than one tree species it is possible to obtain 239 three-tree beating samples from the 140 stations. Following is a list of permanent sampling stations showing hosts sampled and date established.

Tree species sampled	Year established																	Total
	49	50	55	57	60	61	62	63	64	65	66	68	69	70	71	72	73	
Western hemlock	1	5	1		1	2	13	12	17			7	14	2	4	-	-	79
Western cedar	-	-	1	-	-	-	4	2	5	-	-	1	5	-	2	-	-	20
Sitka spruce	1	3	1	-	1	-	10	10	4	-	-	6	4	1	2	-	-	43
Amabilis fir	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	2
White spruce	1	-	1	1	-	16	4	-	2	1	1	-	-	-	7	4	1	39
Alpine fir	-	-	-	1	-	10	1	-	3	1	2	-	-	1	4	4	-	27
Lodgepole pine	-	-	-	2	-	11	-	-	2	-	2	1	-	-	5	-	-	23
Douglas-fir	-	-	-	-	-	1	-	-	5	-	-	-	-	-	-	-	-	6
No. of stations	2	7	10	13	14	39	60	73	97	99	103	111	123	125	135	139	140	239

Sample station records are in the Prince Rupert District file in room 6 of the Survey building, P.F.R.C.



Appendix II

Tree Damage Appraisal Plots

During the course of the survey a number of marked-tree plots have been established in the Prince Rupert District to record the impact of pest attack on individual trees and follow the trend of infestations. Following is a list of appraisal plots showing pest, date established and purpose.

<u>Pest</u>	<u>Plot location</u>	<u>Date established</u>	<u>Purpose</u>
Spruce budworm	Taltapin Lake	1961	Damage appraisal
	Fisheries Fence	61	
	McKendrick Is.	61	
	North of Doris Lake	61	
	Cronin Mine Rd.	61	
	Chapman Lake	61	
Blackheaded budworm	Chief Mathews Bay	Oct. 1973	Defoliation impact
	Salmon Bay	Oct. 1973	" "
Spruce weevil	Nelson River	Oct. 1972	Infestation trend - low
	Cedar River	"	
	Kitsumkalum River	"	
	12 Mi Kalum Lake Rd.	"	
	Lava Lake	"	
	Copper River	"	
	Taltapin Lake	"	
	Endako	"	
	Moricetown	"	
	Kitsequecla Lake Rd.	"	
	Byman Creek	"	
	Buck Flats	"	
	Morice FDR	"	
	Chapman Lake	"	
	McKendrick Creek	"	
Telkwa River	"		

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Plot descriptions and examination records are on the Prince Rupert District file in room 6, Survey building, Pacific Forest Research Centre.

Appendix III

Special and Pest Reports in 1973

<u>Title</u>	<u>Author</u>	<u>Date</u>
Black Army Cutworm	R.L. Fiddick	June 22, 1973
Blackheaded Budworm Infestation in the Prince Rupert Forest District, 1973	R.J. Andrews R.D. Erickson	Nov. 27, 1973
Blackheaded Budworm Infestations in the Prince Rupert Forest District, 1973. Special report to Eurocan Pulp and Paper Co.	R.J. Andrews R.D. Erickson	Jan. 28, 1974
<u>Information Report</u>		
Forest Insect and Disease Conditions, 1973, Prince Rupert District	R.J. Andrews R.D. Erickson	December, 1973

Appendix IV

Exotic Plantations

There are 23 plantations of trees, not native to the area, planted in the Prince Rupert Forest District. The number of exotic plantations by tree species is listed below.

<u>Plantation no.</u>	<u>Tree species planted</u>	<u>No. of plantations</u>	<u>Date established</u>
	Populus spp.	8	
	European larch	4	
	Interior Douglas-fir	3	
	Red pine	2	
	Ponderosa pine	2	
	Scots pine	1	
	Japanese larch	1	
	White spruce	1	
	Grand fir	1	
	Total number of plots	23	

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Plantation records are on file with the Appraisal group of the F.I.D.S. in the Survey building, P.F.R.C.