ANNUAL REPORTS OF FOREST BIOLOGY RANGERS

BRITISH COLUMBIA, 1956

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FOREST BIOLOGY LABORATORY

VICTORIA, B. C.

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DEPARTMENT OF AGRICULTURE

SCIENCE SERVICE

FOREST BIOLOGY DIVISION

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FOREST BIOLOGY RANGERS' ANNUAL REPORT

British Columbia

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FOREST BIOLOGY RANGERS' ANNUAL REPORT

1956

R. L. Fiddick

FOREWORD

There was a general decrease, both in the number of specimens and in the number of miscellaneous species of forest insects collected in 1956. Therefore, some ranger districts, particularly those with no current infestations, have relatively little to report.

The black-headed budworm infestation on northern Vancouver Island highlighted survey activities in the coastal region in 1956. An experimental spray program was conducted during the summer. The Forest Biology Division, the British Columbia Forest Service, and interested timber companies participated in an extensive egg and defoliation survey of the infestation area.

In the interior of the province a concentrated effort was made to determine the amount of timber killed by bark beetles during the past three years. Beetle damage is widespread, particularly in the Kamloops Forest District.

Large areas of yellow pine and Douglas fir suffered heavy winter damage in the Princeton-Merritt and Cariboo regions.

The total number of collections submitted by co-operators has decreased, but an increased interest in the survey is indicated by greater assistance in the form of air and ground transportation, and the number of reports and inquiries from logging companies, the British Columbia Forest Service, and individuals.

The tree disease survey operated as usual with the rangers making collections of certain requested specimens when possible and random collections in conjunction with regular survey work.

ANNUAL REPORT OF FOREST BIOLOGY RANGERS

BRITISH COLUMBIA

1956

VANCOUVER FOREST DISTRICT

FOREST BIOLOGY SURVEY

VANCOUVER FOREST DISTRICT

1956

E. G. Harvey

INTRODUCTION

The 1956 forest biology survey was carried out in the four ranger districts of the Vancouver Forest District by the following rangers:

South Vancouver Island	- E. G. Harvey
North Vancouver Island	- S. J. Allen
South Vancouver	- E. L. Avison
North Vancouver	- K. W. Robertson and D. J. MacPherson

The survey boat, Forest Biologist, under the charge of K. W. Robertson, was employed chiefly in the Prince Rupert Forest District during the summer. Some time was spent in surveying the Gulf Islands and some of the main forested areas of the North Vancouver Ranger District.

New roads and recently inaugurated ferry services have made the whole eastern side of the Strait of Georgia, including Texada Island, accessible by car. This made it possible for rangers from adjacent ranger districts to survey this area during the time the survey boat was in the Prince Rupert District.

The spruce budworm infestation in the Lillooet River area again increased in extent, although the larval population decreased considerably in the older outbreak areas.

The black-headed budworm infestation in the North Vancouver Island District increased greatly in area compared with 1955. Defoliation was heavy over much of the area, and further feeding in 1957 could result in tree mortality. A large scale aerial spray program is anticipated in 1957. Black-headed budworm populations also increased in the South Vancouver Island and North Vancouver districts.

The phantom looper appeared in spot infestations in the South Vancouver District, where a small area was sprayed.

The silver-spotted tiger moth infestation has declined greatly. Only a few colonies were found in the northern portion of the outbreak area.

The western tent caterpillar infestation remained at a high level in the South Vancouver Island District.

The striped alder sawfly caused heavy defoliation to red alder in the South Vancouver District.

Neodiprion sawflies on hemlock increased in intensity in the North Vancouver Island District, particularly in the Holberg Inlet - Quatsino Inlet regions.

ANNUAL REPORT OF FOREST BIOLOGY RANGER

for

SOUTH VANCOUVER ISLAND DISTRICT

1956

FOREST BIOLOGY SURVEY

SOUTH VANCOUVER ISLAND DISTRICT

1956

E. G. Harvey

INTRODUCTION

Collections made during 1956 totalled 485, of which 462 were insect and 23 tree disease. Table 1 shows the insect collections by agencies. Table 2 shows the host trees for both the insect and tree disease collections. The location of collection points is shown in map 1.

This year the table of host trees lists several exotic tree species. This is because the British Columbia Forest Service and some of the large logging companies have set out exotic tree plantation plots in the district. These plots in future will receive periodic inspection by the ranger.

A few changes in numbers and distribution of some of the important insects were found, but no new outbreaks or infestations developed in the district in 1956.

STATUS OF INSECTS

Black-headed Budworm, Acleris variana (Fern.)

This insect showed a pronounced increase, both in numbers and distribution. Fifty-four beating collections yielded 147 larvae, compared with 1955 when this insect was found only in two collections. Larvae were evenly distributed throughout the district, as shown in Map 2. Collections ranged from one to eight larvae per 3-tree beating sample, with the exception of the Port Renfrew area, where up to 19 larvae were found in a collection.

Spruce Budworm, Choristoneura fumiferana (Clem.)

Nine larvae were collected in seven samples this year, compared with none in 1955. These collections were from widely scattered parts of the district, as shown in Map 3.

Table 1

Forest Insect Collections by Agencies,
South Vancouver Island District - 1956

Personnel involved in Collection	Number of collections						Total*
	May	June	July	Aug.	Sept.	Oct.	
Forest Biology Rangers independently	30	99	81	8	27	-	261
Forest Biology Rangers with Forest Service Personnel	-	-	-	-		-	0
Forest Service Personnel independently	11	18	33	19	4		83
Other co-operators	49	22	7	7	11	6	118
Total							462

* Totals include collections made in months other than shown.

Table 2

Collections by Hosts
South Vancouver Island District - 1956

Coniferous hosts	Forest insects	Tree diseases	Broad-leaved hosts	Forest insects	Tree diseases
Douglas fir	102	?	willow	29	
western hemlock	75	1	alder	23	
grand fir	19	2	Garry oak	17	
amabilis fir	17	2	apple	13	
alpine fir	1	1	hawthorn	10	
balsam fir		1	cherry	7	
western red cedar	16		maple	4	
Sitka spruce	11		silver poplar	4	
lodgepole pine	8		Lombardy poplar	3	
western white pine	3	1	arbutus	3	
Austrian pine	2		dogwood	2	
Scotch pine	1	2	European ash	1	
red pine		3	aspen	1	
European larch		2	cottonwood	1	
mountain hemlock	1		misc. hosts	38	
yellow cedar	1		no host	49	
Monterey cypress		1	Total	205	
Total	257	23	Grand Total	462	23

Non-native hosts are from exotic tree plantation plots

Western Hemlock Looper, Lambdina fiscellaria lugubrosa (Hlst.)

The status of this insect has not changed noticeably in the last year. Larvae were found in five areas; collections contained up to three larvae (Map 4). All but one collection from Harris Creek were in old hemlock-looper-kill areas.

Western Tent Caterpillar, Malacosoma pluviale (Dyar)

The population of this insect remained high during 1956. Colonies were found at Nitinat Lake and as far north as Nanaimo (Map 5). Heavy feeding occurred in the Saanich Peninsula where alder, hawthorn, wild rose, apple and willow were up to 100 per cent defoliated. In some cases heavy feeding was noted on Garry oak.

Parasitism was high. Parasites killed an average of 7 per cent of the larvae and 49 per cent of the pupse reared. Mortality was very light in collections made early in the season, but up to 90 per cent of the larvae collected in the late part of the season died of parasites. Disease was present in most of the colonies examined, but did not develop to epidemic proportions. A decrease in population is expected in 1957.

Silver-spotted Tiger Moth, Halisidota argentata Pack.

The silver-spotted tiger moth infestation on Vancouver Island collapsed early in 1956. A few small colonies were observed, and collections made, between Nanaimo and Parksville but all apparently failed to feed through to maturity. The cause of the collapse is unknown. Parasitism was low, under 10 per cent, on those reared in the insectary. It will not be known until early spring, when the colonies become large enough to observe readily, if there are any survivors of the outbreak.

Satin Moth, Stilpnotia salicis (L.)

Silver poplar and Lombardy poplar trees were again completely defoliated in 1956 along the east side of the island from Metchosin to Nanaimo. Parasitism ranged from 7 per cent in the first collections made in the spring to 100 per cent in a collection taken two weeks later when the larvae were beginning to pupate. About half the parasites were Hymenoptera, Meteorus sp. and the other half Diptera, which are yet unidentified.

STATUS OF TREE DISEASES

Douglas Fir Sapling Die-back

A die-back of leaders and some laterals on young Douglas-fir trees ranging in height from about three feet to 30 feet was quite common in Robertson River Valley. The same condition was found in the Gordon River, Englishman's River, Franklin River, and San Juan River areas, but was not

so common as at Robertson River. The agent or agents responsible for the die-back is unknown, but several fungi have been isolated. Work is in progress on this project.

Twig Die-back on Western White Pine

Western white pine trees near Ladysmith were found to contain many small dying branches. The causal agent is unknown pending return of samples sent to Ottawa for identification.

Deer Browsing on Red Pine

Examination of exotic tree plantation plots indicated that deer prefer red pine to native trees. Many seedlings which have been planted for two years were eaten off to within three or four inches of the ground. In the Nanaimo River area browsing was exceptionally heavy, with nearly 100 per cent of the seedlings browsed. However, most of them are producing new buds and terminals. Some of the plot trees which were individually fenced to prevent browsing showed exceptional growth.

Litter Damage to Seedlings

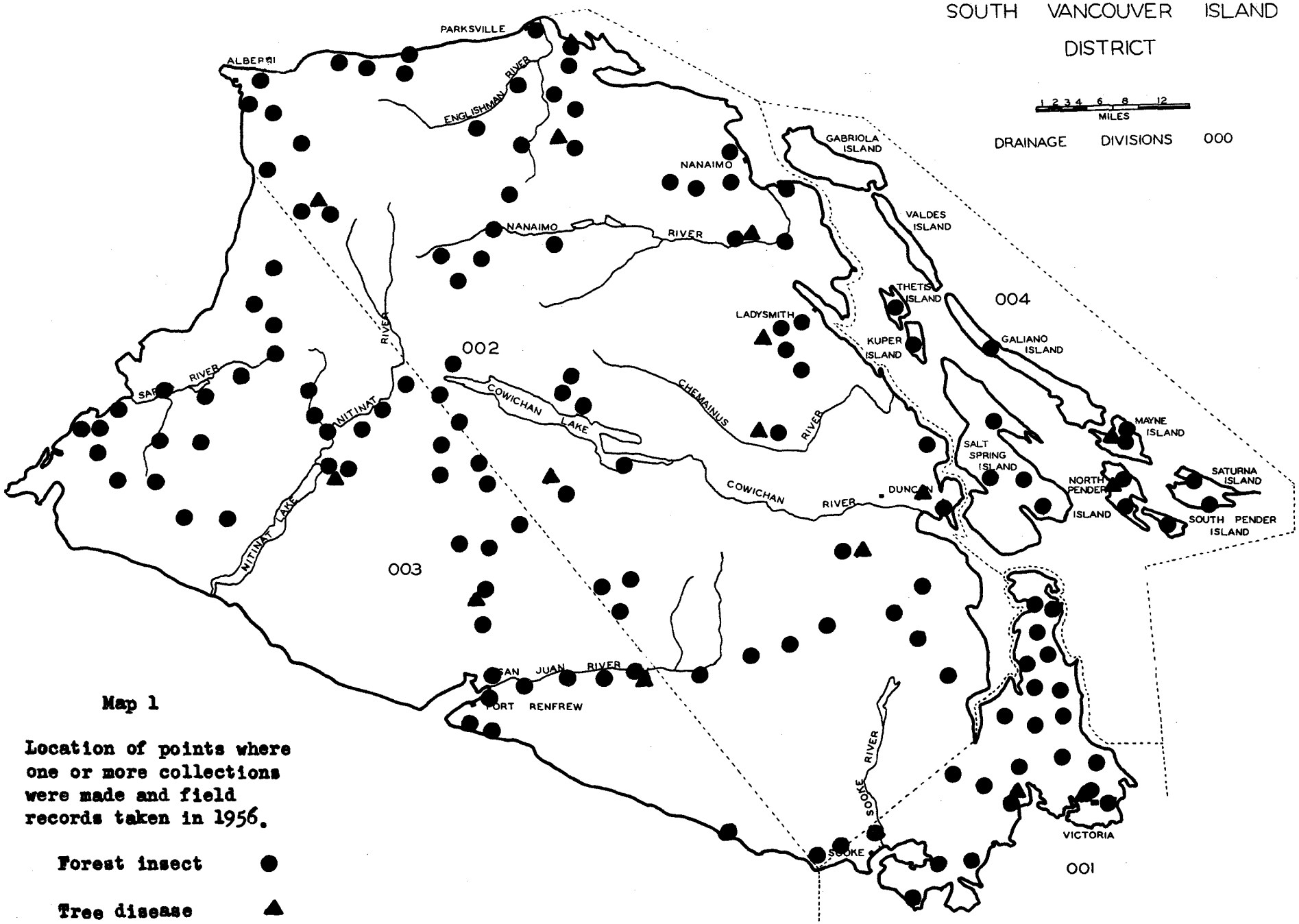
Examination of the red pine plantation in Copper Canyon showed that, although there was nearly 100 per cent survival, the area was covered with a rank growth of fire weed and bracken. The weight of this tangle of litter, pushed down by the winter snow, flattened a large percentage of the young trees which are now sending up new leaders, at right angles to the last year's growth.

Frost Damage to European Larch

European larch in a plantation plot in the Robertson River Valley suffered severe frost damage in the fall of 1955. Many leaders and branch terminals were killed and 20 trees appeared to be dying. The growth of these trees was so rapid, with terminal growth up to 30 inches, that the stems of many are too thin and weak to hold the young trees upright. Many are leaning and bent over, making them potential victims of a heavy snow fall or wind. Several trees in the plot were severely damaged by deer rubbing.

Mortality in Plantations

There was very poor survival in pinaster pine and Monterey pine plantations set out in the fall of 1955 near Mayo. It is believed that an early heavy frost which occurred shortly after planting, before the root system had become established, was responsible for the heavy mortality.

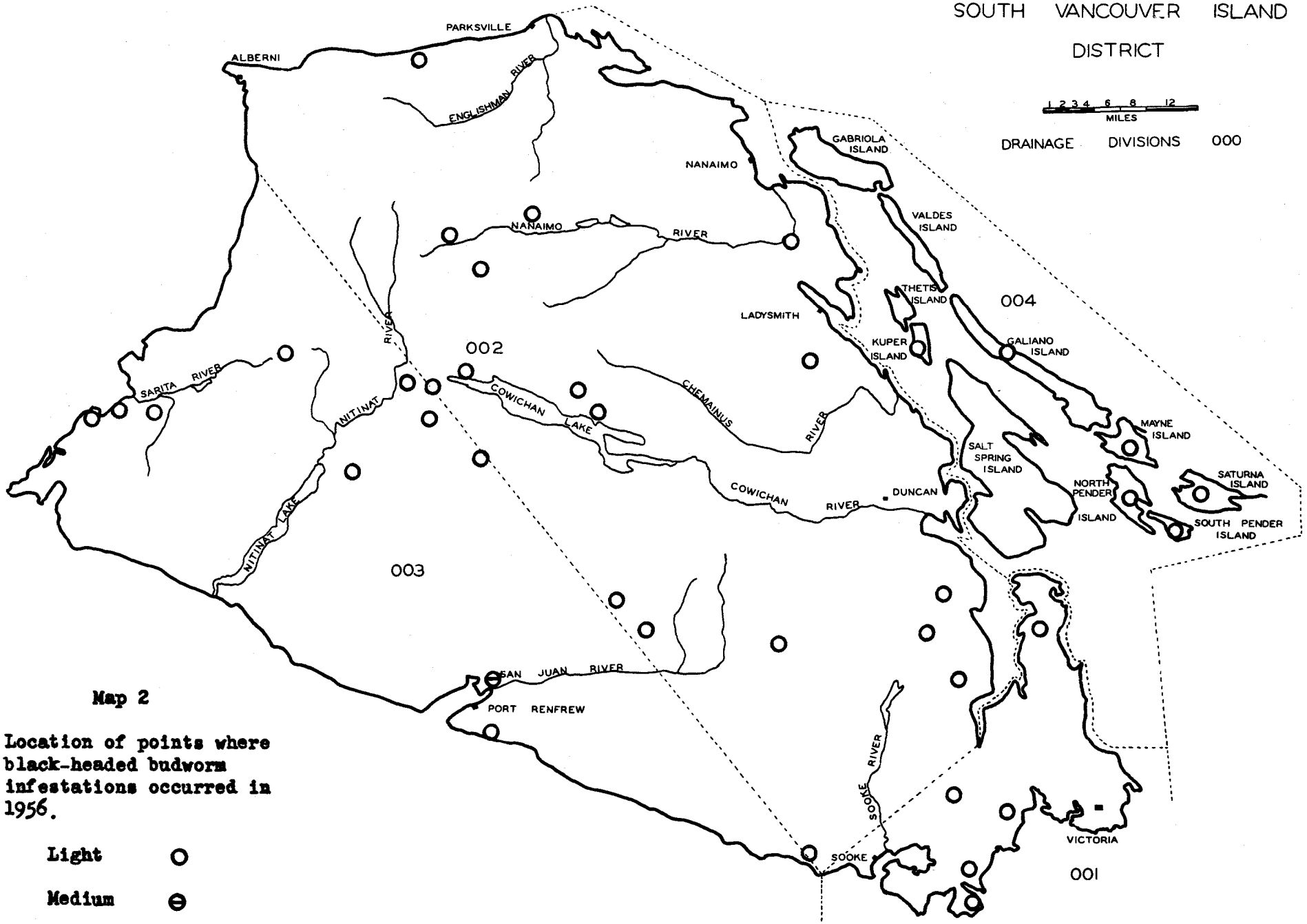


Map 1

Location of points where one or more collections were made and field records taken in 1956.

Forest insect ●

Tree disease ▲

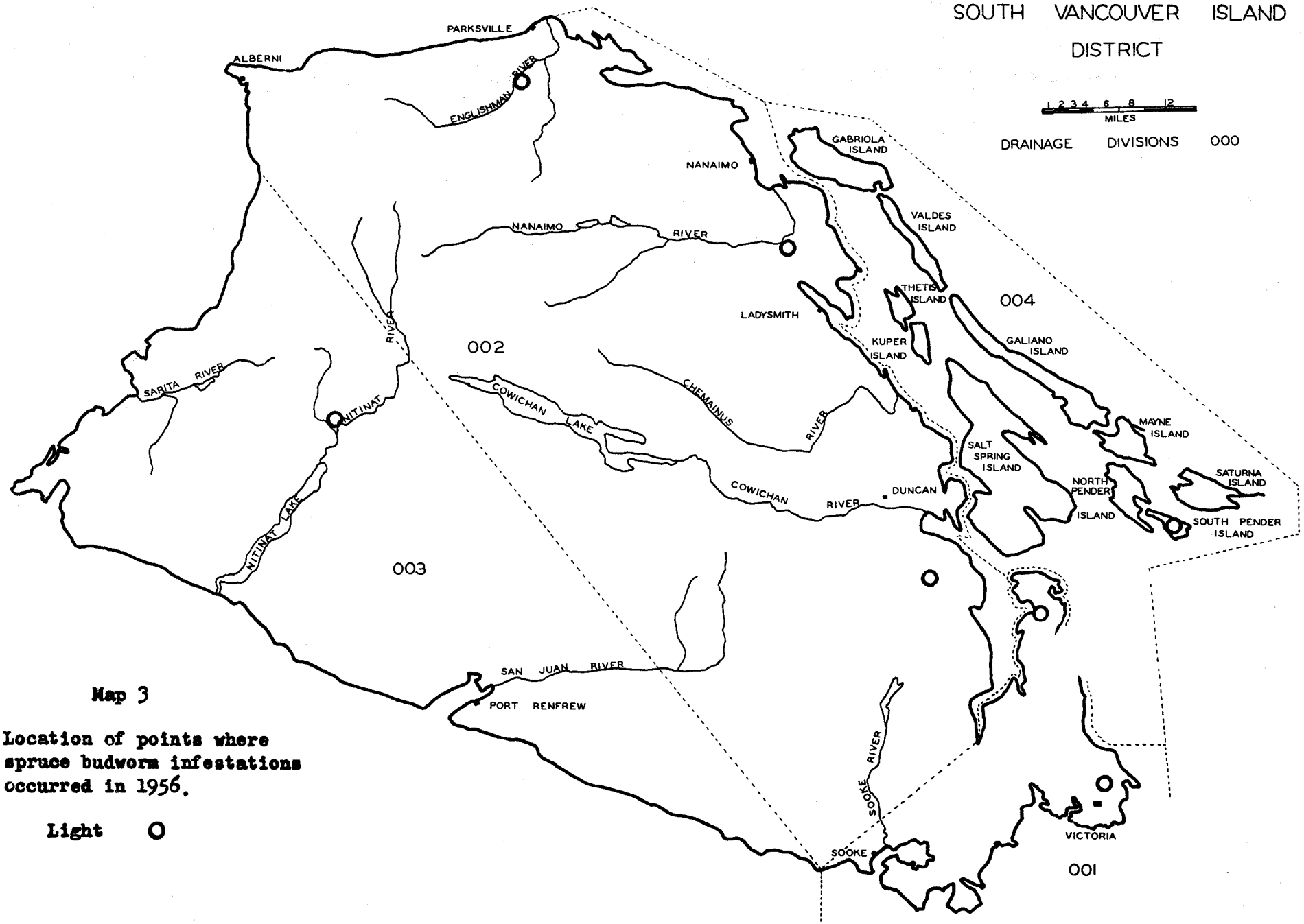


Map 2

Location of points where black-headed budworm infestations occurred in 1956.

Light O

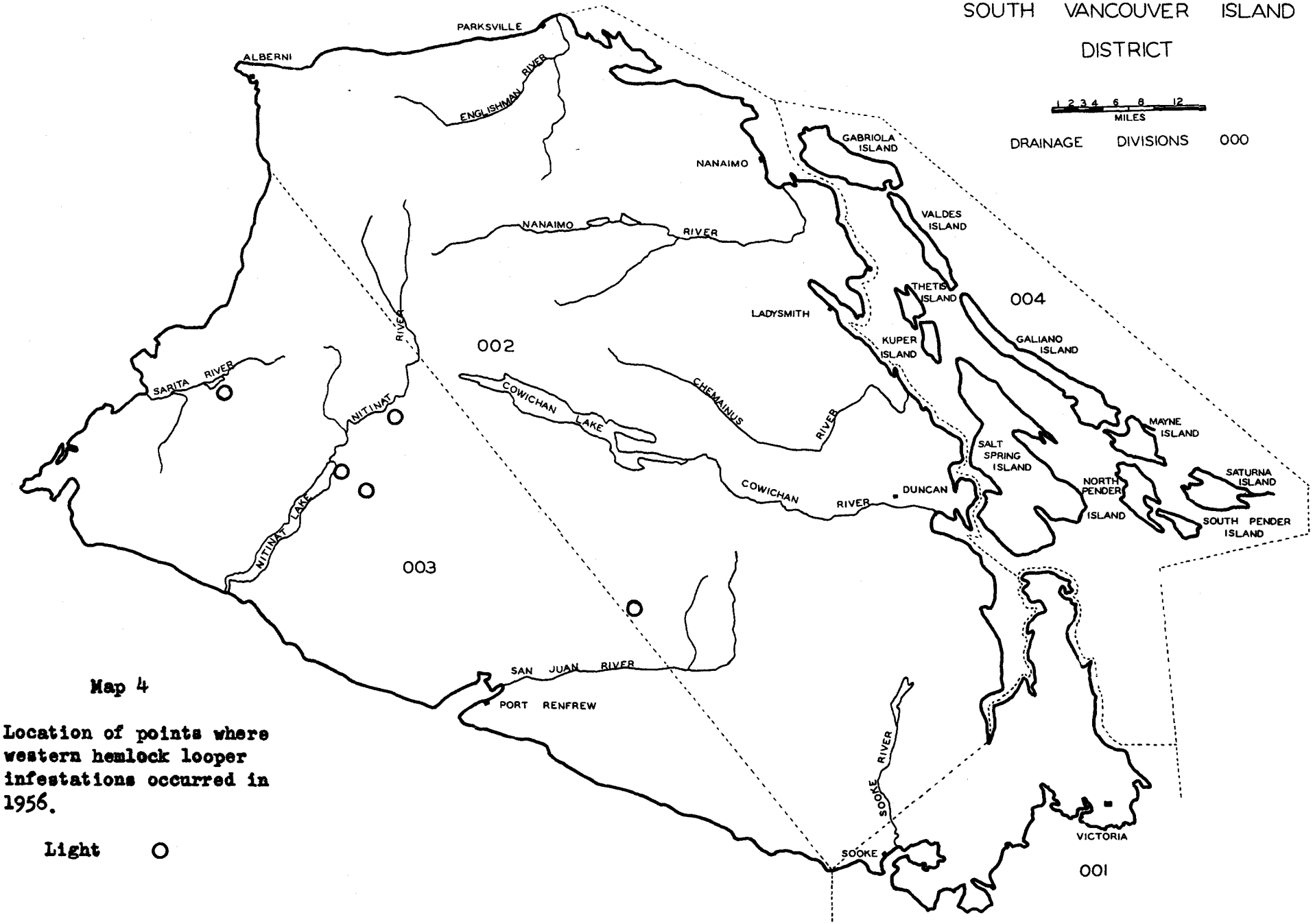
Medium ⊖



Map 3

Location of points where spruce budworm infestations occurred in 1956.

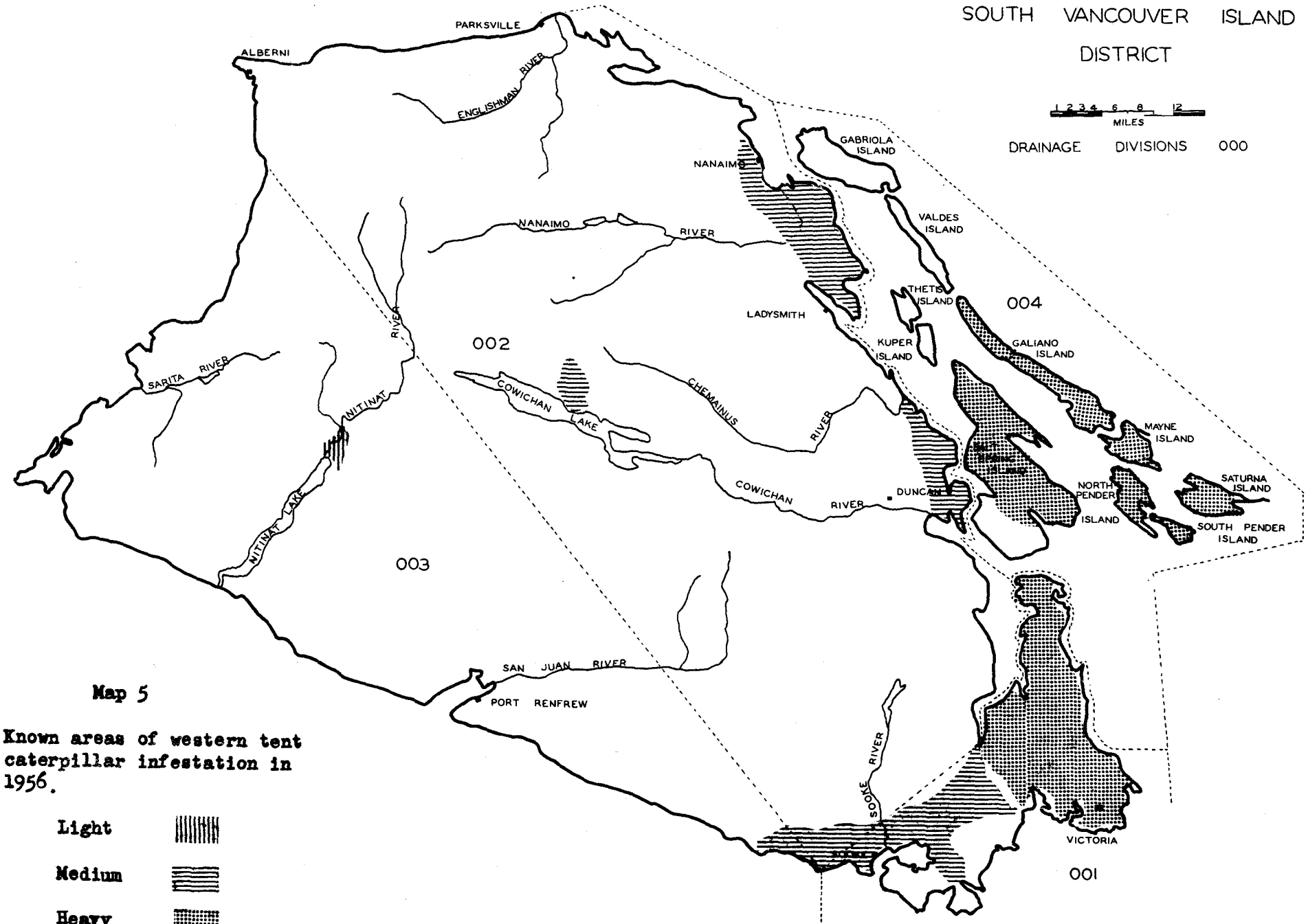
Light O



Map 4

Location of points where western hemlock looper infestations occurred in 1956.

Light O



Map 5

Known areas of western tent caterpillar infestation in 1956.

Light

Medium

Heavy

ANNUAL REPORT OF FOREST BIOLOGY RANGER

for

NORTH VANCOUVER ISLAND DISTRICT

1956

FOREST BIOLOGY SURVEY

NORTH VANCOUVER ISLAND DISTRICT

1956

S. J. Allen

INTRODUCTION

The Forest Biology Survey of North Vancouver Island commenced on May 10 and ended on October 15.

Tables 1 and 2 list collections by agencies and hosts, and Map 1 shows the location of points where collections were made.

Ten pathological samples were submitted for identification, of which 3 samples were from a die-back of Douglas fir reproduction in the Campbell River - Sayward area.

STATUS OF INSECTS

Black-headed Budworm, Acleris variana (Fern.)

Extensive ground surveys were conducted during 1956 to determine the extent and intensity of the black-headed budworm outbreak. Ground surveys were supplemented with an aerial reconnaissance on August 19. Good visibility enabled much of the area to be covered from Campbell River to Cape Scott.

The known area of the infestation is 2,970 square miles as compared with about 1,600 square miles in 1955. Of the total area 990 square miles were classified as heavy, 540 square miles as medium, and 1,440 square miles suffered light defoliation.

The immature 40-year old hemlock stands bordering Rupert Inlet, Quatsino Inlet and Neroutsos Arm suffered heavy top defoliation. Mature hemlock in this area was heavily attacked but defoliation was more evenly distributed throughout the crown. Other areas of heavy defoliation were noticeable in young hemlock stands from Port Hardy south-east from False Head to O'Connor Lake, lower Nimpkish River to Beaver Cove and in the Tsitika River Valley. Heavy defoliation was observed in stands scattered south-west of Nimpkish Lake and in the headwaters of Tahsish and Kashutl River valleys northwest to Mahatta River area.

Mass collections of larvae and pupae were made during three periods in the infestation area at Robson Bight, Englewood and Quatse Lake. These were submitted to the laboratory for the determination of disease and parasitism. The dates of collections were:

Table 1

Forest Insect Collections by Agencies
North Vancouver Island District - 1956

Personnel involved in collection	Number of collections						Total
	May	June	July	Aug.	Sept.	Oct.	
Forest Biology Rangers independently	16	100	86	46	32	141	421
Forest Biology Rangers with Forest Service Personnel	-	-	-	-	-	8	8
Forest Service Personnel independently	-	1	8	3	-	-	12
Other co-operators	2	3	8	9	1	-	23
Total	18	104	102	58	33	149	464

Table 2

Collections by Hosts
North Vancouver Island District - 1956

Coniferous hosts	Forest insects	Tree diseases	Broad-leaved hosts	Forest insects	Tree diseases
western hemlock	322		red alder	4	
Douglas fir	53		willow	3	
Sitka spruce	19		choke cherry	1	
western red cedar	16		silver poplar	5	
amabilis fir	13		apple	1	
grand fir	9		no host	2	
white pine	7				
lodgepole pine	4				
alpine fir	3				
red pine	1				
European larch	1		Total	16	
Total	448		Grand total	464	

June 27 - 29 - Larval instars 2 and 3

July 11 - 24 - Larval instars 4 and 5

Aug. 22 - 24 - Prepupal and pupal stage

Three samples, each of 200 or more specimens, were submitted from each location. Due to late sampling of the pupal stage at Robson Bight and Englewood, the specimens collected consisted largely of pupal skins and dead larvae which were useful for parasitism and disease analysis.

In addition to the above, 45 other localities in the infestation area were sampled. All larval samples taken in the infestation were based on 18-inch branch samples rather than beating samples.

Other special collections of black-headed budworm larvae were submitted for the following purposes:

Approximately 200 larvae to Sault Ste. Marie laboratory

Approximately 400 larvae to Victoria laboratory for phenological studies

Approximately 600 larvae to Victoria laboratory for disease analysis.

Nineteen beating samples containing 27 black-headed budworm larvae were collected from Campbell River to Parksville and Henderson Lake. Some adults were submitted from Espinosa Arm, Zeballos and Tahsis on the west coast where there was some defoliation. The above mentioned localities are outside the delimited infestation area, and indicate a southward movement of the budworm population.

Parasitism

A total of 4,264 larvae were reared in the insectary. Of these 1,488 were parasitized, 1,677 survived to the adult stage and 1,099 died of unknown causes. Table 3 lists the parasitism and adult survival for the separate areas throughout the infestation.

The heaviest parasitism was found in the Port Hardy - Rupert Inlet Port McNeill area, and within this area the heaviest parasitism was at Quatse Lake.

Elsewhere throughout the infestation parasitism was light to medium.

Disease

One hundred and seven specimens were examined by the insect disease survey. Two were infected by a polyhedral virus and twelve with Empusia sp. A special trip to the area where these larvae had been collected failed to find any disease in the field population.

Table 3

Summary of Insectary Reared Material Showing Parasitism and Adult Survival. North Vancouver Island. 1956.

Infestation area	No. of samples	No. specimens reared	Parasitism		Adult survival	
			No.	Per cent	No.	Per cent
Port Hardy-Rupert Inlet	13	833	570	68	200	24
Port McNeill	21	710	380	53	256	36
Holberg Inlet	7	135	30	22	54	40
Quatsino	4	81	10	12	39	44
Port Alice	6	196	29	15	148	76
Nimpkish Valley	6	65	27	42	28	43
Brooks Peninsula - Zeballos	3	356	113	32	159	45
Johnson Strait	23	1,759	310	18	777	44
Salmon River	9	129	19	15	16	12
Total	92	4,264	1,488	35	1,677	39

Egg Survey

An egg survey was carried out between October 1 and 18. Eight biology rangers together with personnel supplied by Alaska Pine, Powell River, Canadian Forest Products, Crown-Zellerbach, and McMillan-Bloedel timber companies and the British Columbia Forest Service took part in the egg sampling.

The following sampling method was employed. Two 18-inch branch samples were selected at random from the upper third of the crown of each sample tree. Three trees, or a total of six branches, constituted a sample.

The egg population, based on the average number of eggs per 18-inch sample, was classified as follows:

No. eggs per 18-inch sample	Population class
1 - 14	light
15 - 34	medium
35 - 109	heavy
110 +	very heavy

The field men worked in 2-man groups from motor vehicle (Port Hardy, Port McNeill, Hardy Bay and Rupert Inlet areas by roads), water taxi (Holberg Inlet, Rupert Inlet, Quatsino Inlet, Neroutsos Arm), chartered motor-vessel (Johnstone Straits, Queen Charlotte Straits, and adjacent islands), and aircraft (inaccessible areas on the west coast and north of Holberg Inlet). One hundred and sixty-two egg samples were taken (Map 3) throughout the infestation area. The egg population, by areas, is shown in Table 4. The Port Hardy - Rupert Inlet, Port McNeill, and Port Alice areas which contain the highest average egg population, are classed as hazard areas. This is because the stands have suffered two years heavy defoliation and even the reduced egg population is sufficiently large to cause great damage to the trees.

Table 4

Average Black-headed Budworm Egg Population by Areas.
North Vancouver Island, 1956.

Infestation area	No. samples	Average no. eggs/18" branch	Population class
Cape Scott - Shushartie	9	10.8	Light
Port Hardy - Rupert Inlet	15	22.7	Medium
Port McNeill	22	18.3	Medium
Holberg Inlet	15	7.4	Light
Quatsino	18	15.6	Medium
Port Alice	16	28.1	Medium
Nimpkish Valley	25	4.2	Light
Brooks-Peninsula - Zeballos	13	11.4	Light
Johnstone Straits	10	11.9	Light
Salmon River	13	2.4	Light

Trend of the black-headed budworm infestation

During the 1956 egg survey a total of 162 egg samples were made compared with 33 in the 1955 egg survey. Of the 33 egg samples taken in 1955, 7 contained over 50 eggs per 18-inch sample, (261, 111, 92, 72, 67, 60 and 56), while the average of all samples was 37.5. In 1956 only 6 out of the 158 samples taken contained over 50 eggs per 18-inch branch sample, (97, 75, 62, 54, 53 and 52), while the average of all samples was 13.2.

The egg populations for 1955 and the larval population for 1956 are compared in Table 5.

Table 5

Comparison of 1955 Egg populations and 1956 Larval Populations.
North Vancouver Island. 1956.

Location	Eggs 1955		Larvae 1956	
	No. samples	Average no. eggs/18" branch	No. samples	Average no. larvae/18" branch
Port Hardy-Rupert Inlet	5	41.7	9	14
Port McNeill	5	80.9	6	15
Holberg Inlet	6	14.0	6	3
Quatsino	2	36.5	4	7
Port Alice	4	31.7	5	10
Nimpkish Valley	3	25.2	6	1
Johnstone Strait	7	41.0	17	14
Salmon River	1	29.3	2	6
Total	33	300.3	55	70
Average		37.5		8.7

Although a potentially lighter population is evident in all areas, egg counts indicate a heavy enough population to cause serious top killing and possibly mortality to trees which have been heavily defoliated for the last two years.

The predicted population trend is shown in Table 6. This trend should not be confused with expected defoliation. Records are available showing that a medium insect population in an area which has suffered heavy defoliation can result in heavy or very heavy damage the following year.

Table 6

Predicted Black-headed Budworm Population Trend for 1957.
North Vancouver Island.

Infestation area	1956 Population (larvae & pupae)	Adult survival	Average egg populations 1955	Average egg populations 1956	Expected trend for 1957
Cape Scott - Shushartie	-	-	-	10.8	-
Port Hardy - Rupert Inlet	heavy	medium	41.7	22.7	decrease
Port McNeill	heavy	medium	80.9	18.3	"

(continued)

Table 6 (continued)

Infestation area	1956 Population (larvae & pupae)	Adult survival	Average egg populations 1955	1956	Expected trend for 1957
Holberg Inlet	light	medium	14.0	7.4	decrease
Quatsino	medium	medium	36.5	15.6	"
Port Alice	heavy	heavy	31.7	28.1	"
Nimpkish Valley	medium	medium	25.2	4.2	"
Brooks Peninsula - Zeballos	-	-	-	11.4	-
Johnstone Strait	heavy	medium	41.0	11.9	"
Salmon River	light	medium	29.3	2.4	"

Douglas-fir Beetle, Dendroctonus pseudotsugae Hopk.

The Douglas-fir beetle attack of 1954 and 1955 which was so prominent in the Nimpkish River valley subsided in 1956. A survey of the infestation was carried out by Canadian Forest Products company foresters using vertical aerial photography and ground checks. Within the patches an average of 64 per cent by volume of Douglas fir was killed, which was 45 per cent of the total volume. The total volume killed since 1954 was approximately 66,000,000 board feet. Salvage operations up to July, 1956, had logged 15,000,000 board feet with an approximate cull factor of 20 per cent due to Polyporous rot and damage by ambrosia beetle attacks.

Attacks in all the areas mentioned in the 1955 report have subsided and only one small attack on three trees near the mouth of Naka Creek was recorded in 1956.

Hemlock Sawflies, Neodiprion spp.

Large populations of sawfly larvae were encountered during branch sampling from Holberg and Quatsino areas. Several colonies were noted and defoliation on the 1952 to 1954 hemlock foliage was common in some areas where tip feeding by the black-headed budworm had occurred.

The heaviest population was found at Winter Harbour where 55 larvae were found on seven 18-inch branch samples. Other heavy populations were found at Henricksen Point, Dahlstrom Point, Holberg, San Josef Road, Mahatta River and Koprino Harbour.

Neodiprion larvae were found in other areas throughout the North Vancouver Island district in small numbers (Map 5).

Western Hemlock Looper, Lambdina fiscellaria lugubrosa (Hlst.)

Hemlock looper larvae were found in only one locality this year, at the mouth of the Oyster River. One 3-tree beating sample from hemlock contained three larvae, and one larva was collected in a sample from spruce.

Satin Moth, Stilpnotia salicis (L.)

As in 1955 this insect was prevalent on silver poplar in the vicinity of Courtenay. Two hundred and seventy larvae were submitted to Victoria. During May the silver poplar shade trees in Courtenay Ball Park showed very light defoliation and by July had completely leafed out again.

Phantom Hemlock Looper, Nepytia phantasmaria (Stkr.)

Only two larvae, both collected from Douglas fir at Tsolum River, were found in the North Vancouver Island District in 1956.

Spruce Budworm, Choristoneura fumiferana (Clem.)

Spruce budworm larvae were found singly in two localities in 1956. Elk Falls Dam and Gracie Creek, Sproat Lake.

Spruce Gall Aphid, Adelges cooleyi (Gill.)

Attacks by gall makers on Sitka spruce were evident in all reproduction areas. Heavy populations of wingless colonizers and some winged emigrants were observed on open growing reproduction Douglas fir along the east slope of the North Vancouver Island District.

Striped Alder Sawfly, Hemichroa crocea (Fourc.)

This sawfly, which declined in 1955, completely disappeared this year. No larvae or feeding were observed.

Tip Moth, Zeiraphera diniana Gn.

Twelve larvae were found on Douglas fir, amabilis fir, western hemlock, western white pine and western red cedar hosts during the 1956 season.

Western Tent Caterpillar, Malacosoma pluviale (Dyar)

A medium population of tent caterpillar was found on the east coast of North Vancouver Island and heavy defoliation of alder, willow, and wild rose occurred on Denman Island.

Western Tent Caterpillar (continued)

None of the 390 larvae collected between Union Bay and Campbell River was parasitized.

Silver-spotted Tiger Moth, Halisidota argentata Pack.

Light populations of this insect were observed from Qualicum to Campbell River during May. Of 111 larvae submitted in May, 29 were parasitized.

STATUS OF TREE DISEASES

Die-back on Douglas Fir, cause unknown

Some young trees in the vast area of Douglas fir reproduction between Courtenay and Salmon River showed evidence of die-back. Red top trees and trees with yellowing foliage exhibited bark splits, some of which contained frass in the resinous material secreted through the splits. Cracks were found in the bark of a number of green trees. Three samples were submitted in May, July and early September from the Salmon River access road and Elk Falls dam. Two fungi were consistently isolated from diseased material, a species of Pullularia, and an unknown. The symptoms found with the latter were distinctly different from those with which Pullularia was associated, so there may be two primary pathogens.

Examination of exotic tree plantations, May 24 - June 1

In the North Vancouver Island Forest Biology Ranger District, 19 plantations of tree species including Scots pine, Pinus sylvestris L.; Red pine, Pinus resinosa Ait; Norway spruce, Picea abies (L.) Karst.; Port Orford cedar, Chamaecyparis lawsoniana (A. Murr.) Parl.; Silver fir Abies alba Mill.; Ponderosa pine, Pinus ponderosa Laws., Scarlet oak, Quercus coccinea Muench.; English oak, Quercus robur L.; American elm, Ulmus americana L.; Lodgepole pine (interior), Pinus contorta Dougl.; and Hackberry, Celtis occidentalis L., were examined for symptoms of insect and disease attack.

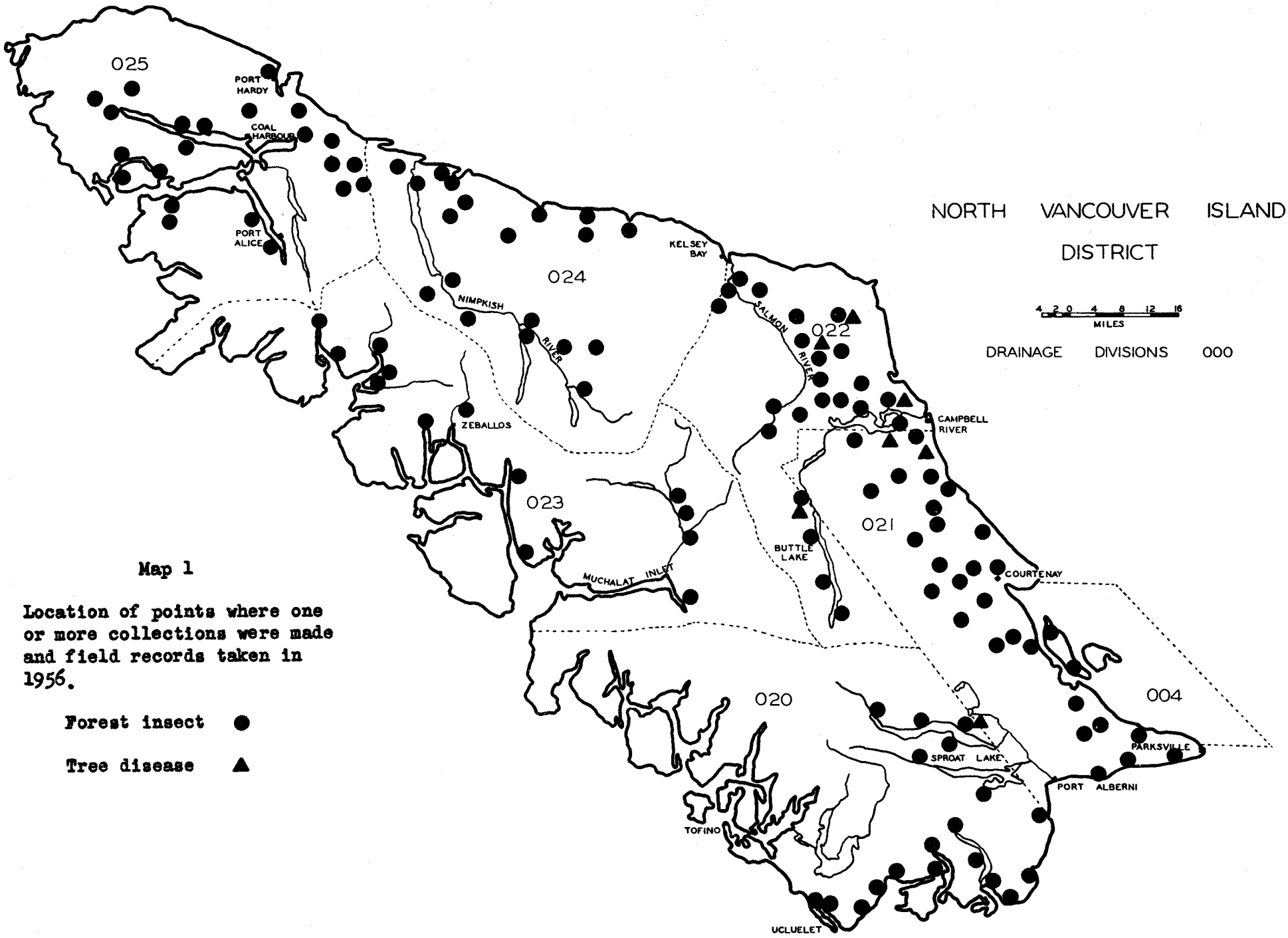
Three of the plantations, numbers 36, 38 and 39 containing scarlet oak, American elm and hackberry were completely obliterated by unknown causes. All three species were in close proximity at Campbell River experimental forest.

Two plantations contained signs of disease while three others contained symptoms of mechanical damage and non-adaptability to surroundings. (Table 7).

Table 7

Damage to Exotic Tree Plantations,
North Vancouver Island, 1956.

Plantation number	Host	Symptoms of host	Organism	Intensity of damage
57	European larch	Dying of complete tree plant	Unknown Physiological	Very light
27	Lodgepole pine	branch and twig cankers	Cronartium coleosporiodes Arth. var Harknessii (Meinecke) Arth	common
25	Ponderosa pine	windthrow resulting from abnormal growth due to excessive competition from fir		common
26	Scotch pine	Multi leadered tops affected 1952-54 by weevil attack or breakage		common to heavy

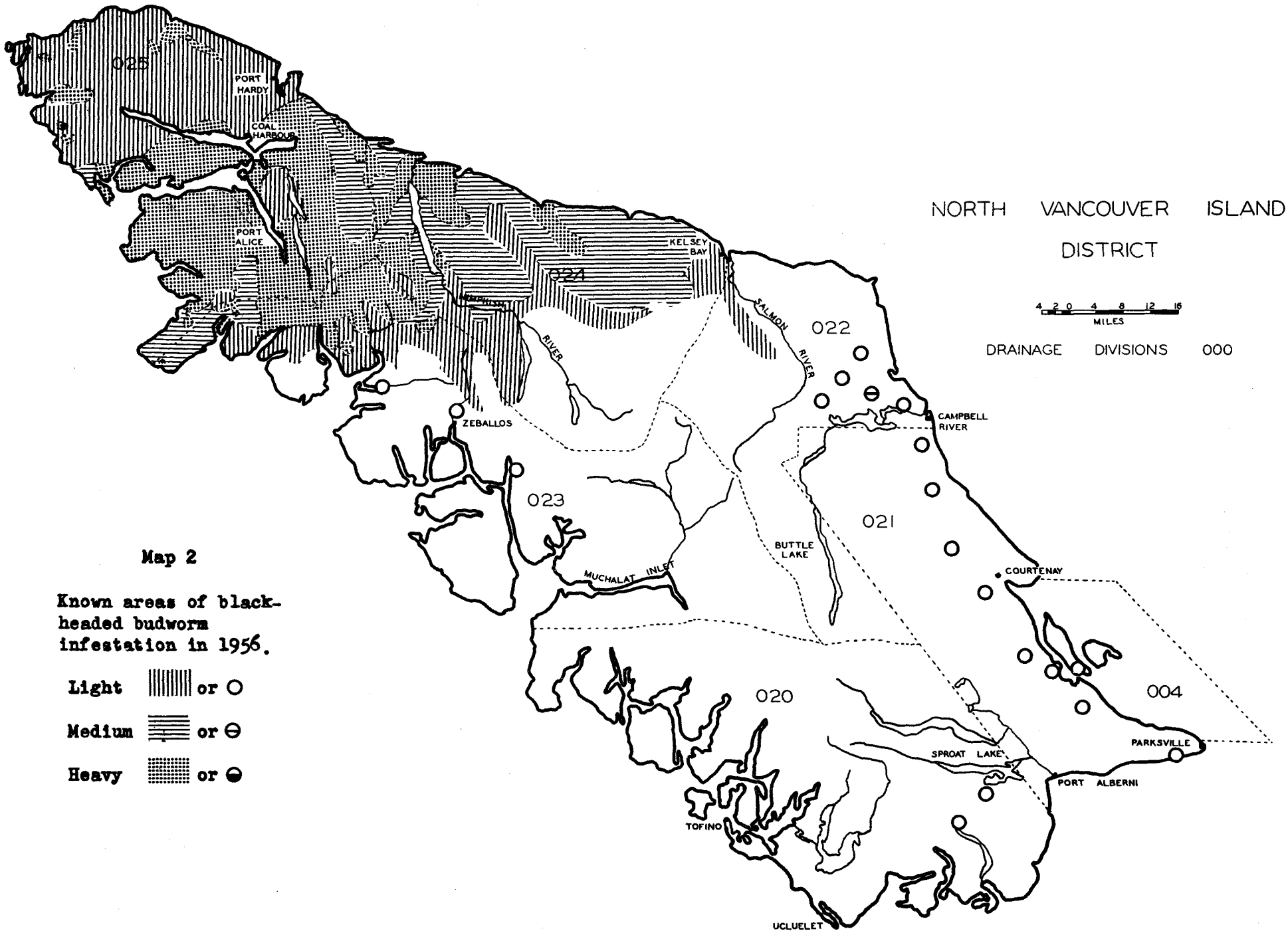


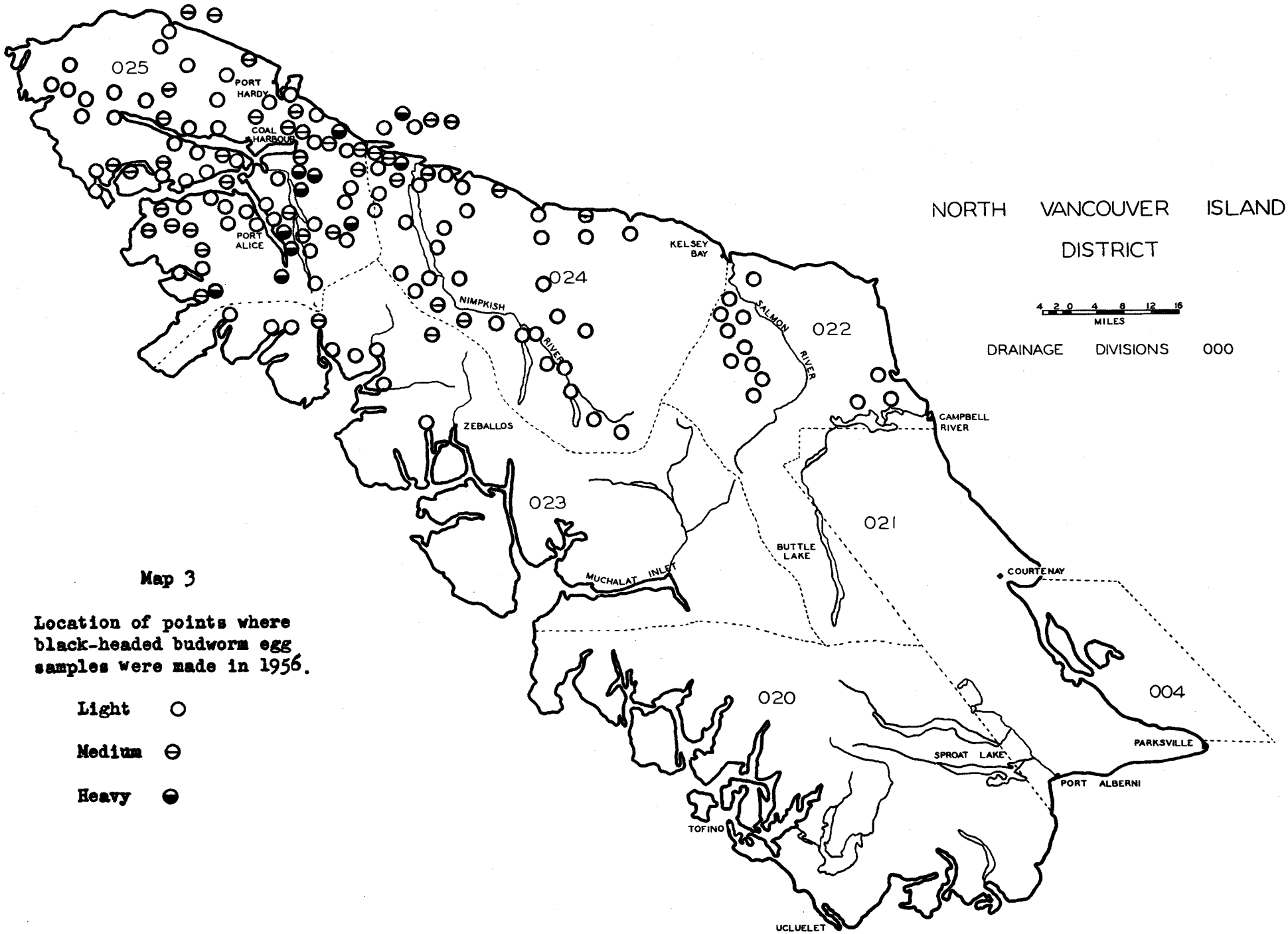
Map 1

Location of points where one or more collections were made and field records taken in 1956.

Forest insect ●

Tree disease ▲


NORTH VANCOUVER ISLAND
DISTRICT
4 2 0 4 8 12 16
MILES
DRAINAGE DIVISIONS 000
025
024
023
022
021
020
004
PORT HARDY
COAL HARBOUR
PORT ALICE
KELSEY BAY
ZEBALLOS
SALMON RIVER
CAMPBELL RIVER
BUTTLE LAKE
COURTENAY
MUCHALAT INLET
PARKSVILLE
SPROAT LAKE
PORT ALBERNI
TOFINO
UCLUELET
Map 2
Known areas of black-headed budworm infestation in 1956.
Light or O
Medium or ⊖
Heavy or ◒



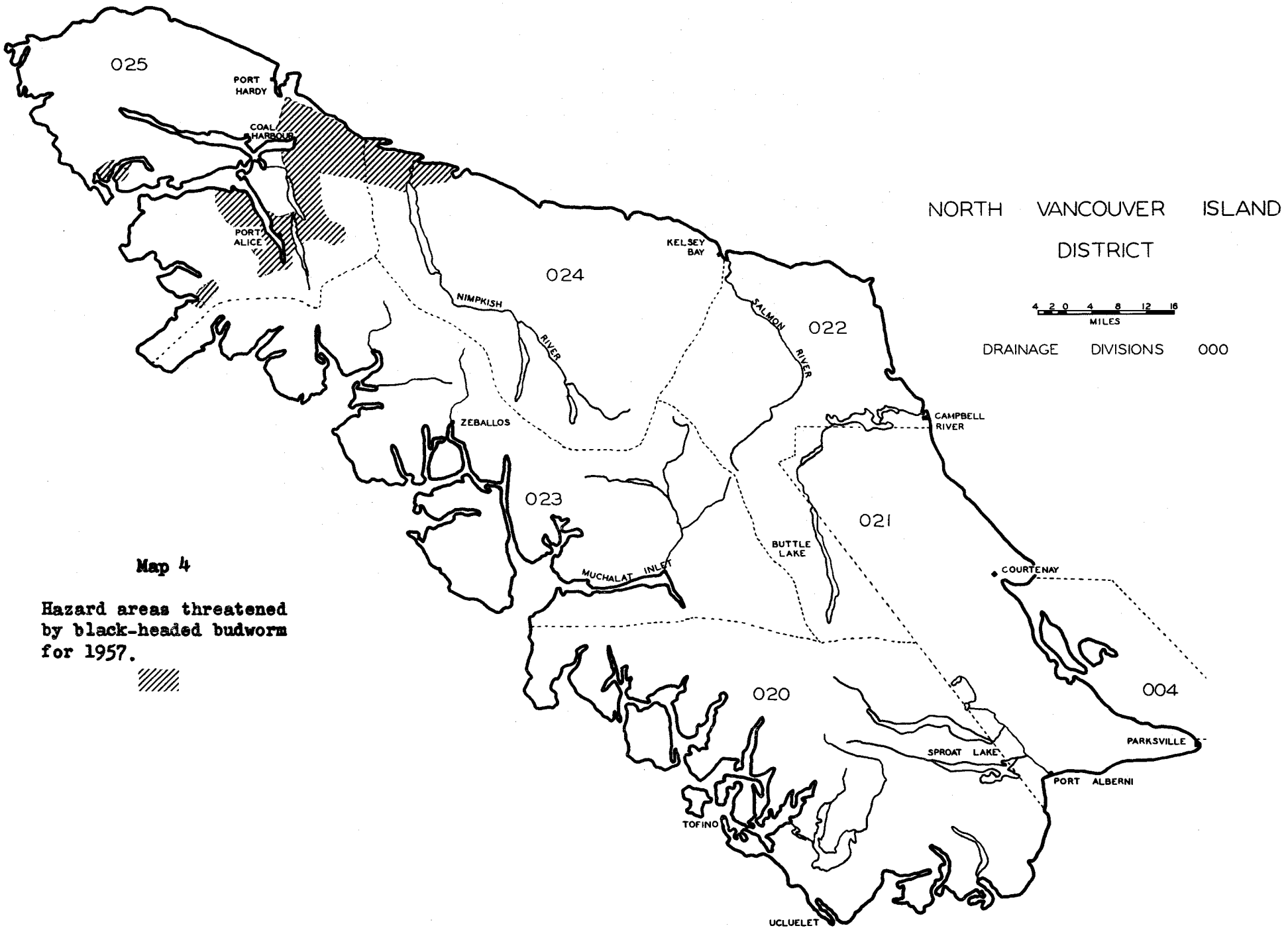
Map 3

Location of points where black-headed budworm egg samples were made in 1956.

Light ○

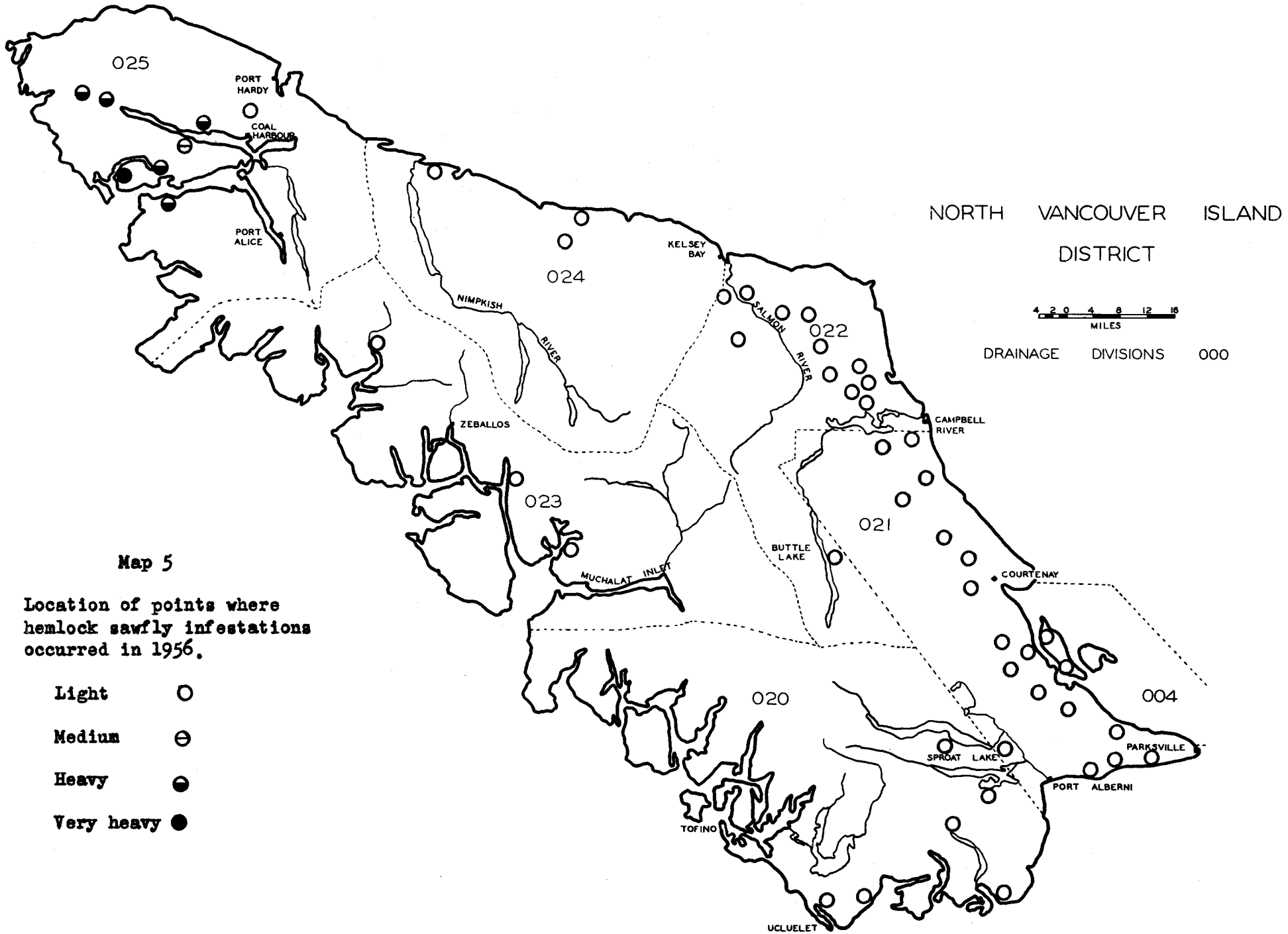
Medium ⊖

Heavy ◒



Map 4

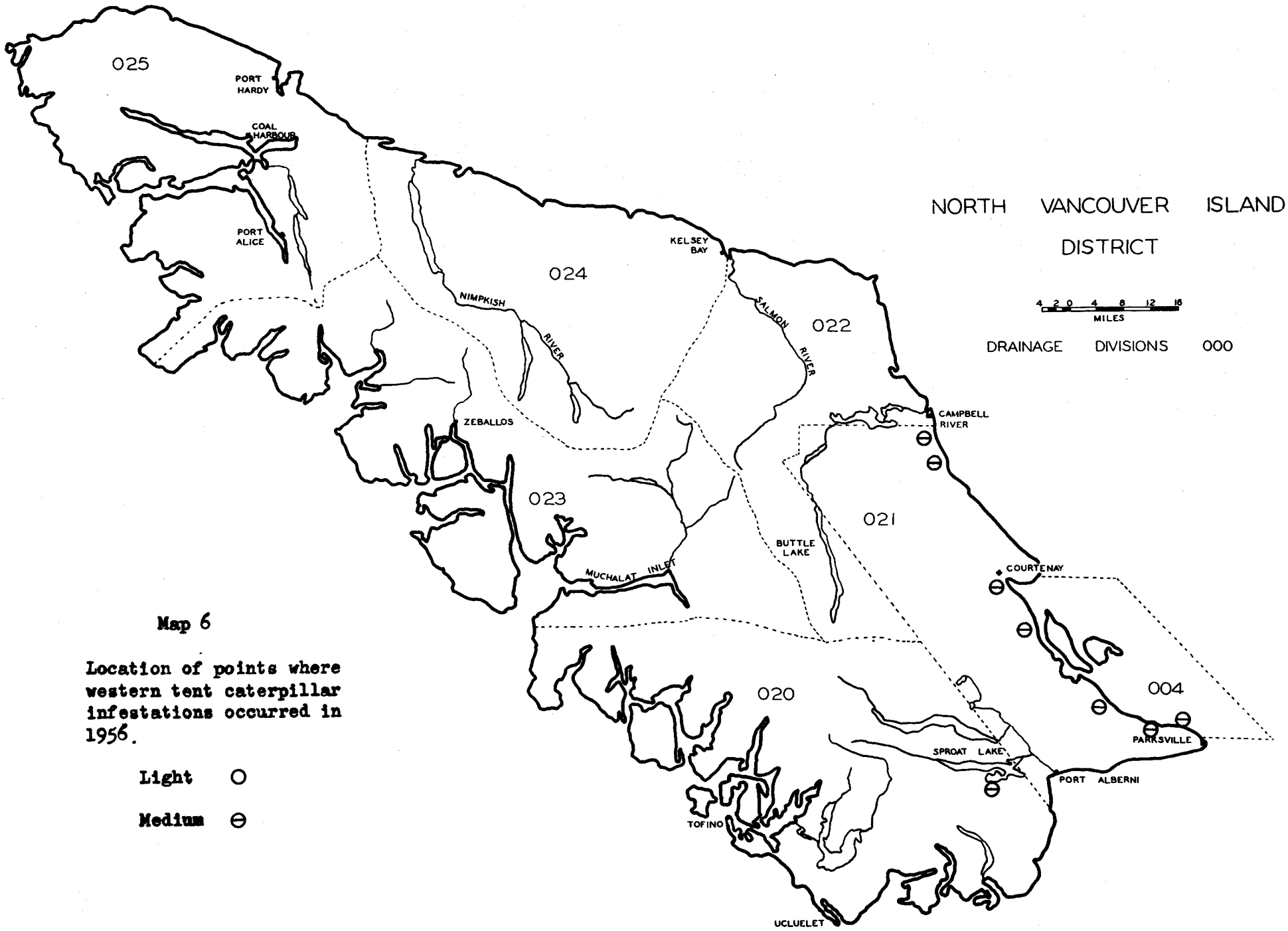
Hazard areas threatened by black-headed budworm for 1957.



Map 5

Location of points where hemlock sawfly infestations occurred in 1956.

- **Light** O
- **Medium** ⊖
- **Heavy** ◒
- **Very heavy** ●



Map 6

Location of points where western tent caterpillar infestations occurred in 1956.

Light O

Medium ⊖

ANNUAL REPORT OF FOREST BIOLOGY RANGER

for

SOUTH VANCOUVER DISTRICT

1956

FOREST BIOLOGY SURVEY

SOUTH VANCOUVER DISTRICT

1956

E. L. Avison

INTRODUCTION

Persistently high temperature with less precipitation than in recent years characterized the 1956 field season. These conditions were responsible for unusually early and rapid development of all forest insects, particularly the spruce budworm.

A total of 289 forest insect and seven tree disease collections was submitted to the Victoria laboratory. A summary of insect collections by agencies is shown in Table 1 and a summary of collections by hosts in Table 2. Localities where collections were made are shown in Map 1.

In the course of the survey, approximately 10,500 miles were travelled by motor vehicle and 300 miles by dinghy and lake ferries.

An egg and defoliation survey of the spruce budworm infestation in the Lillooet River Valley was conducted again this year.

STATUS OF INSECTS

Spruce Budworm, Choristoneura fumiferana (Clem.)

The 1956 season was marked in general by a continued increase in the area occupied by the spruce budworm infestation. The known extent, as determined primarily by aerial reconnaissance was calculated at 452 square miles, of which about 30 are in the Anderson River Valley. The total area of the outbreak is probably larger than shown, as ground surveys in the West Kamloops Ranger District indicate the extent is larger than was observed and mapped from the air. The increase occurred mainly to the north of D'Arcy to include McGillivray Falls, Anderson Lake, Seton Lake and Lillooet district. (Map 2). That portion of the infestation from D'Arcy north to Lillooet, is reported on by Ranger W. Bitz in charge of the West Kamloops District.

Aerial Survey

Through the courtesy of Canadian Forest Products Limited, a flight for aerial observation and reconnaissance was made on July 30, 1956 by the writer and Ranger E. G. Harvey.

Table 1

Forest Insect Collections by Agencies
South Vancouver District - 1956

Personnel involved in collection	Number of collections						Total
	May	June	July	Aug.	Sept.	Oct.	
Forest Biology Rangers independently	7	108	60	94	20	-	289
Forest Biology Rangers with Forest Service Personnel	-	-	-	-	-	-	-
Forest Service Personnel independently	4	7	4	6	3	-	24
Other co-operators	-	1	1	3	-	1	6
Total	11	116	65	103	23	1	319

Table 2

Collections by Hosts
South Vancouver District - 1956

Coniferous hosts	Forest insects	Tree diseases	Broad-leaved hosts	Forest insects	Tree diseases
western hemlock	101		red alder	38	
Douglas fir	86	6	vine maple	6	
western red cedar	27		miscellaneous shrubs	5	1
lodgepole pine	17		willow	4	
western white pine	7		trembling aspen	4	
amabilis fir	5		mountain alder	3	
alpine fir	5		no host	3	
Sitka spruce	4		broad-leaved maple	1	
ponderosa pine	1		white alder	1	
western yew	1				
			Total	65	1
Total	254	6	Grand total	319	7

The flight passed over all the heavily infested areas commencing at Tisdall, 43 miles north of Squamish. Areas surveyed included the upper Lillooet River Valley to its headwaters, Pemberton, Birken, D'Arcy, Anderson Lake, and north as far as Lillooet at the head of Seton Lake. The flight from this point returned to Pemberton and proceeded in a southerly direction down the Lillooet River Valley to Harrison Lake. After refueling at Harrison Hot springs, the flight passed over Big Silver Creek, Nahatlatch River Valley, Boston Bar and the Anderson River Valley. The flight from this point followed the course of the Fraser River back to Vancouver. Time in the air was approximately 6 hours.

Defoliation Estimates

The study plots established in 1954 were re-examined again this year. Plot numbers 6-1 and 7-1 were logged out in 1955 but egg samples were taken in the immediate vicinity. Random plots were established between Pemberton, Blackwater Creek, D'Arcy and Tisdall.

Ocular estimates on the defoliation of current year's foliage and total defoliation were recorded for each of the ten tagged trees in each plot (Table 3).

Trees in the more recent outbreak areas around Tisdall and D'Arcy, although suffering heavy loss of new foliage, are in relatively good condition due to a limited amount of back feeding.

The hardest hit stands are those on dry hill tops around Pemberton. Heavy defoliation has occurred in these areas for three or four years and bare twigs and upper crowns show up gray rather than the characteristic reddish colour. There has been a noticeable decrease in defoliation at the southern end of the Lillooet River. Very little feeding was observed in the Nahatlatch River Valley but feeding in the Anderson River Valley remained relatively heavy.

The per cent defoliation of new growth decreased on all plots compared with 1955. An outstanding feature in the infestation areas was the remarkable recovery of the trees. A very common occurrence was trees with two to four feet of completely bare terminal topped with a tuft of healthy new foliage.

Taking the average for all plots examined, there was a 12 per cent decrease in the number of buds killed, a 33 per cent decrease in completely defoliated buds, and a 5 per cent decrease in partially defoliated shoots. This represents an over-all increase of 50 per cent in the number of normal shoots.

Table 3

Ocular Estimate of Per Cent Defoliation of Douglas Fir Trees on Study Plots and Selected Localities. Figures are an Average of 10 trees. August, 1956.

Area and plots	Defoliation 1955 shoots Av.	Sd.	Estimated total defoliation 1955 Av.	Defoliation 1956 shoots Av.	Sd.	Estimated total defoliation 1956 Av.	Sd.
1 - 1	70 ±	22	37	22 ±	7	34 ±	15
1 - 2	85 ±	9	37	32 ±	22	30 ±	9
1 - 3	92 ±	6	36	38 ±	19	30 ±	13
2 - 1	68 ±	25	47	12 ±	5	27 ±	10
2 - 2	55 ±	25	30	16 ±	9	28 ±	10
2 - 3	54 ±	26	27	36 ±	22	29 ±	12
3 - 1	86 ±	15	40	40 ±	21	45 ±	18
3 - 2	90 ±	14	48	61 ±	16	50 ±	11
3 - 3	92 ±	9	45	47 ±	18	60 ±	13
4 - 1	81 ±	11	36	19 ±	8	25 ±	8
4 - 2	69 ±	22	43	42 ±	21	36 ±	16
5 - 1	- ±	-	-	-	-	-	-
5 - 2	73 ±	16	44	26 ±	14	22 ±	6
6 - 1	67 ±	14	28	25 ±	10	25 ±	7
6 - 2	72 ±	18	42	12 ±	8	20 ±	7
7 - 1	- ±	-	-	-	-	-	-
7 - 2	72 ±	18	40	33 ±	22	37 ±	14
Nairn Falls				53 ±	20	9 ±	3
B. C. Electric Camp - Tisdall				83 ±	6	10 ±	1
4.2 mi. W of D'Arcy				85 ±	7	19 ±	3
8.3 mi. W. of D'Arcy				49 ±	20	10 ±	5

Larval Sampling

A summary of the collections obtained from 3-tree beating samples from June 7th to July 14, 1956 is shown below:

Total collections taken in budworm areas		No. of collections containing budworm		Total no. of budworm larvae		Av. per sample	
1955	1956	1955	1956	1955	1956	1955	1956
65	105	54	37	1,581	579	29.3	15.6

Disease or Parasites Present

No disease of any significance was found in the larvae reared in the insectary at Langford this year. Parasitism was quite high in mass collections of larvae submitted from special collection points in the infestation. A total of 997 larvae from 44 collections were reared. The per cent parasitism is given in Table 4.

Mortality due to pupal parasites in the old infestation areas (Gowan Creek) averaged 47.9 per cent compared with 26.6 per cent in the newer areas. This represents an over-all average of 32.5 per cent.

The number of egg masses containing one or more parasites averaged 16 per cent, a drop of 10 per cent compared with 1955.

Egg Samples

One sample tree in each plot was cut, two branches selected from the center third of the crown, the area measured, and the foliage examined for egg masses, pupal cases, parasites, and other insects. (In addition fifty buds from each sample branch were selected at random and classified as killed, normal, or completely or partially defoliated. Discs were cut from each sample tree at D. B. H. for growth measurements). The egg population is presented in Tables 5 and 6.

Analysis of these data obtained in the egg survey of early August in the infestation areas, showed that although the egg population in half the plots increased, an over-all decrease occurred in plots that had heavy egg populations last year. The result is a lower, and a more evenly distributed population.

Table 4

Results of Spruce Budworm Rearings at
Forest Biology Insectary, Langford, 1956.

Location of collections	Number of collections	Date of collections	Number of larvae	Percentage parasitized	Number of pupae R 3/	Number of pupae F.c 4/	Percentage parasitized R	Percentage parasitized F.c	Percentage moths emerged R.	Percentage moths emerged F.c
Pemberton area 1/	14	June 13 - 18	335	11.0	174	87	0	5.7	81.6	41.3
Lillooet area 2/	16	June 15 - 17	558	10.2	218	238	1.8	9.7	61.3	59.7
Pemberton area	4	June 26	50	54.0	4	30	0	26.7	100	23.3
Lillooet area	4	June 26	54	68.9	9	18	0	16.7	77.8	72.2
Pemberton area	6	July 7-8	9	55.5	2	22	100	13.6	0	63.6
Total	44		997		407	395				

1/ Tisdall to D'Arcy and Pemberton south to Rogers Creek, Lillooet Lake

2/ Lillooet Lake and River south of Rogers Creek

3/ R: Pupae reared in insectary from larvae

4/ F.c: Pupae collected in the field

Table 5

Number of Spruce Budworm Egg Masses Per 100 Square Feet of Foliage Surface. Data Collected at Permanent Sample Plots. August, 1956.

Area	Plot and tree	1954	1955	1956	Increase from 1955	Decrease from 1955
1	1	304	229	47	-	182
	2	198	208	31	-	177
	3	386	108	103	-	5
Average		296	182	60	-	122
2	1	32	29	57	28	
	2	99	31	58	27	
	3	50	19	7		12
Average		60	26	41	14	
3	1	742	517	38	-	479
	2	93	265	91	-	174
	3	467	204	63	-	141
Average		434	329	64	-	265
4	1	194	58	136	78	
	2	133	13	50	37	-
Average		164	36	93	57	-
5	1	186	-	26	-	-
	2	568	16	122	106	-
Average		377	-	74	-	-
6	1	150	71	153	82	-
	2	80	7	50		
Average		115	39	102	63	-
	1	15	16	11	-	5
	2	65	6	52	46	-
Average		40	11	32	21	-
Over-all Average (All plots)		221	172	64	-	48

Table 6

Number of Spruce Budworm Egg Masses Per 100 Square Feet of Foliage Surface. Samples Taken at Random Points. August, 1956.

Area	No. egg masses	Increase from 1955	Decrease from 1955
4.2 mi. west of D'Arcy *	109	64	-
8.3 mi. west of D'Arcy *	27	-	7
11.4 mi. west of D'Arcy *	21	-	51
20.5 mi. west of D'Arcy *	6	2	-
Nairn Falls	41	no data	no data
Tisdall	108	"	"
Blackwater Creek Logging Rd 3.7 mi	65	"	"
Blackwater Creek Logging Rd 8 mi.	48	"	"

* Areas sampled in 1955

Annual Increment

The effect of heavy defoliation of the last four years showed up this year in a great reduction in radial growth. In calculating the per cent reduction of increment the years 1951 and 1952 were chosen as normal. The average per cent reduction in radial growth for the infestation years was as follows:

Year	Per Cent Reduction in Radial Growth
1953	7.1
1954	14.2
1955	50.4
1956	78.0

Summary.

1. The infestation has apparently passed its peak since the population is decreasing and parasitism is increasing.

2. Although still relatively high there has been a marked decrease in the egg population.

3. Stands in the older outbreak areas are in better condition, from the standpoint of foliage and healthy shoots, than at any time in the last three years. There has been some scattered top killing.

4. There has been a relatively serious loss in radial growth in 1956 but annual increment should increase as the trees recover.

Striped Alder Sawfly, Hemichroa crocea (Fourc.)

A severe outbreak of this insect now covers an area of approximately 125 square miles. The outbreak extends from a point 3 miles west of Barnet in the Capitol Hill district eastward to Port Coquitlam, and northward across Burrard Inlet to Pleasantside and Ioco. From the latter point it extends further north to encompass Buntzen Lake and then passes in a westerly direction over Indian Arm to include Deep Cove, Lynmore and Seymour Provincial Park to an elevation of 1,100 feet. With the exception of the narrow strip of light infestation on Mt. Seymour, complete defoliation has occurred throughout the affected area (Map 3).

On June 26th a plot was established at Port Moody to obtain data on the population density. Six 1-foot branch samples contained a total of 432 late instar larvae of the first generation, an average of 72 larvae per sample.

A second plot was established on July 12th in the Pleasantside area. The same number of branch samples contained 491 early instar larvae of the second generation, an average of 82.0 larvae per sample.

Nine hundred and sixty-five larvae were submitted to the Victoria laboratory for parasite and disease studies but attempts to rear these specimens proved unsuccessful.

Heavy defoliation is expected again in 1957.

Phantom Hemlock Looper, Nepytia phantasmaria (Stkr.)

Population of this geometrid, although found in about the same areas, increased tremendously this year. Two severe localized infestations occurred, one at Central Park, Burnaby, the second, in Queens Park, New Westminster. (Map 7).

Central Park, Burnaby - Drainage Division 042.

This park is located adjacent to the Vancouver, Burnaby boundary on Kingsway. It is approximately 225 acres in size of which 200 acres are undeveloped. The forested portion consists of an open stand of mature hemlock with a dense second story of intermediate hemlock, Douglas fir and cedar.

Extremely heavy populations were found on small exposed trees. Thinning of the upper crown was general throughout the park. Many of the intermediate trees had the top 20 feet stripped of needles and a number of trees suffered considerably heavier defoliation. At the time of inspection the majority of the larvae had just entered the fifth instar.

In view of the additional defoliation that could be expected before pupation it was decided to spray the area to eliminate the possibility of further damage to the timber. On August 3rd on the advise of the Victoria laboratory the Burnaby Parks Board hired Skyway Air Service of Langley to spray the 200 acres of timber. A solution of 10 per cent D. D. T. in number 1 fuel oil applied at the rate of 1 gallon per acre was used. The project was considered successful in that it minimized the amount of additional defoliation that would have resulted before the larvae pupated. However, large numbers of adult moths were observed in the park in early September. Therefore, heavy feeding may occur in 1957.

Parasite and disease activity was negligible.

Queens Park, New Westminster - Drainage Division 042.

This park is located on the corners of McBride Boulevard and Royal Avenue, at the west end of the Pattullo Bridge. It is approximately 75 acres in size. The main forested portion comprising a mature to overmature hemlock cedar type is situated at the northwest corner on 6th Avenue.

The infestation here followed much the same pattern as that in Central Park. Extremely heavy populations were encountered on mature hemlock and deciduous undergrowth.

Defoliation estimates ranged from 30 to 70 per cent on mature trees. Of twenty-three heavily defoliated trees examined, sixteen were classed as over-mature. Some mortality may occur in these trees.

A total of 430 larvae exhibiting the presence of disease were forwarded to the Victoria laboratory for analysis. Results of these tests showed an extremely high incidence of a polyhedral virus. A sharp decline in this infestation should occur in 1957 due to increased control by this virus.

Large numbers of adult moths of this geometrid were also observed in the municipal park at Hope. However, there was no feeding in this area during 1956.

Western Tent Caterpillar, Malacosoma pluviale (Dyar)

The two severe outbreaks at Pitt Meadows and the Columbia Valley subsided this year as predicted. The recession was due in part to unfavourable weather conditions which prevailed during the early larval feeding period in the spring of 1955. Further reductions also occurred during late larval stages due to polyhedral virus and parasites.

Elsewhere, in the western portion of Drainage Division 040 and 042 light, sporadically distributed populations were observed along main and secondary roads.

Douglas-fir Beetle, Dendroctonus pseudotsugae Hopk.

During 1956 there was no apparent change in the general status of this insect. Beetles continued to take an impressive toll of Douglas fir timber in two widely separated areas of the district.

Lillooet River Valley - Drainage Division 043 and 045.

A general reconnaissance of this valley from Port Douglas north twenty-four miles to Tenas Lake indicated that the beetle population was still active, although the infested areas had not increased in size. Logging was being conducted in the Rogers Creek area when surveyed in June. The stand, composed mostly of Douglas fir had been more heavily attacked than on other areas in the valley, but with the logging practically completed the attack is of no immediate economic importance.

A cruise was conducted along a line approximately 2 miles in length through the centre of the residual stand near the valley bottom. Two diversions of approximately 10 chains were made up the hillside, and the number of infested trees recorded. Only five currently infested trees were found in the whole area.

Anderson River Valley - Drainage Division 044.

With the exception of a small isolated group of infested trees at the northeast end, the four year old epidemic in this valley has practically disappeared as a result of selective logging of beetle infested trees in 1955. The known areas of Douglas-fir beetle are shown in Map 4.

Western Hemlock Looper, Lambdina fiscellaria lugubrosa (Hlst.)

The larvae of this species remained generally common but not abundant. The greatest numbers came from the Douglas fir dominated stands of the Rogers Creek area.

Collections in this area averaged 9.1 larvae per sample. The largest collection , taken in spruce budworm infested timber, contained 40 larvae.

This insect was found in collections made between June 15th and August 27th.

Black-headed Budworm, Acleris variana (Fern.)

As may be observed in Table 7 the average number of larvae per sample has shown a steady decrease since 1954.

Seventeen collections from the Lillooet River Valley contained an average of 5.0 larvae each, while five collections from a permanent sampling station at Green Timbers averaged 6.0 larvae each.

Map 6 indicates the localities where collections of this tortricid have been made this year.

Table 7

Number of Black-headed Budworm per 3-tree Beating Sample Collected in the Respective Drainage Divisions of the South Vancouver District, 1954, 1955, and 1956.

Drainage division	Total no. samples taken during larval period			No. samples containing black-headed budworm			Average no. larvae per sample		
	1954	1955	1956	1954	1955	1956	1954	1955	1956
040	67	79	46	11	5	10	30.0	5.2	4.1
041	17	25	39	0	6	1	0	2.0	2.0
042	100	75	90	10	14	7	1.1	4.2	2.0
043	12	18	26	1	0	4	1.0	0	3.0
044	50	45	24	6	11	7	3.1	9.2	2.0
045	21	15	64	1	0	15	8.0	0	5.0
Total	267	257	289	29	36	44	12.7	5.5	4.0

Sawflies, Neodiprion spp.

The sawfly population was still very light on the lower mainland though there was approximately a two-fold increase in numbers in the northern areas where the population density has been highest during the last two years. Hosts were lodgepole pine, Douglas fir, and western hemlock.

The highest populations were encountered in the twenty-two mile area from Pemberton north to D'Arcy including the Owl Creek region.

In the latter area, a group of immature lodgepole pine on approximately 3/4 of an acre supported a comparatively large population. Six collections from this area contained 430 larvae, an average of 72 larvae per sample. Defoliation was light but quite evident when trees were examined closely. The damage was confined, on most of the pine examined, to the lower third of the crown. A summary of Neodiprion collections is shown in Table 8.

Table 8

Number of Neodiprion spp. per Collection in the Respective Drainage Divisions of the South Vancouver District, 1956.

Drainage division	Total no. samples taken during larval period	No. samples containing sawfly larvae	Average number larvae per sample
040	46	7	4.0
041	39	7	6.0
042	90	4	1.0
043	26	5	5.0
044	24	10	5.0
045	64	21	22.0
Total	289	54	11.3

Green-striped Forest Looper, Melanolophia imitata Wlk.

Small numbers of this insect were present in collections made between June 16th and August 29th. The highest population was found in the University of British Columbia Forest at Haney where 24 larvae were taken in 5 collections. Altogether this species occurred in 44 collections of which 19 were Douglas fir, 15 western hemlock, 8 red cedar, 1 Sitka spruce and 1 red alder.

Yellow-lined Forest Looper, Nyctobia limitaria nigroangulata Stkr.

This geometrid was prevalent throughout the district in small numbers. The average number of larvae per sample based on 18 samples, from June 15th to July 23rd, was 2.0 compared with an average of 1.0 from 14 samples in 1955.

Spruce Aphid, Neomyzaphis abietina (Wlk.)

This pest of ornamental blue spruce, Pecia pungen (Engelm.), was much less numerous in 1956. Only moderate defoliation occurred in the residential areas of Vancouver. No observation of its presence elsewhere was reported.

Spotless Fall Webworm, Hyphantria textor Harr.

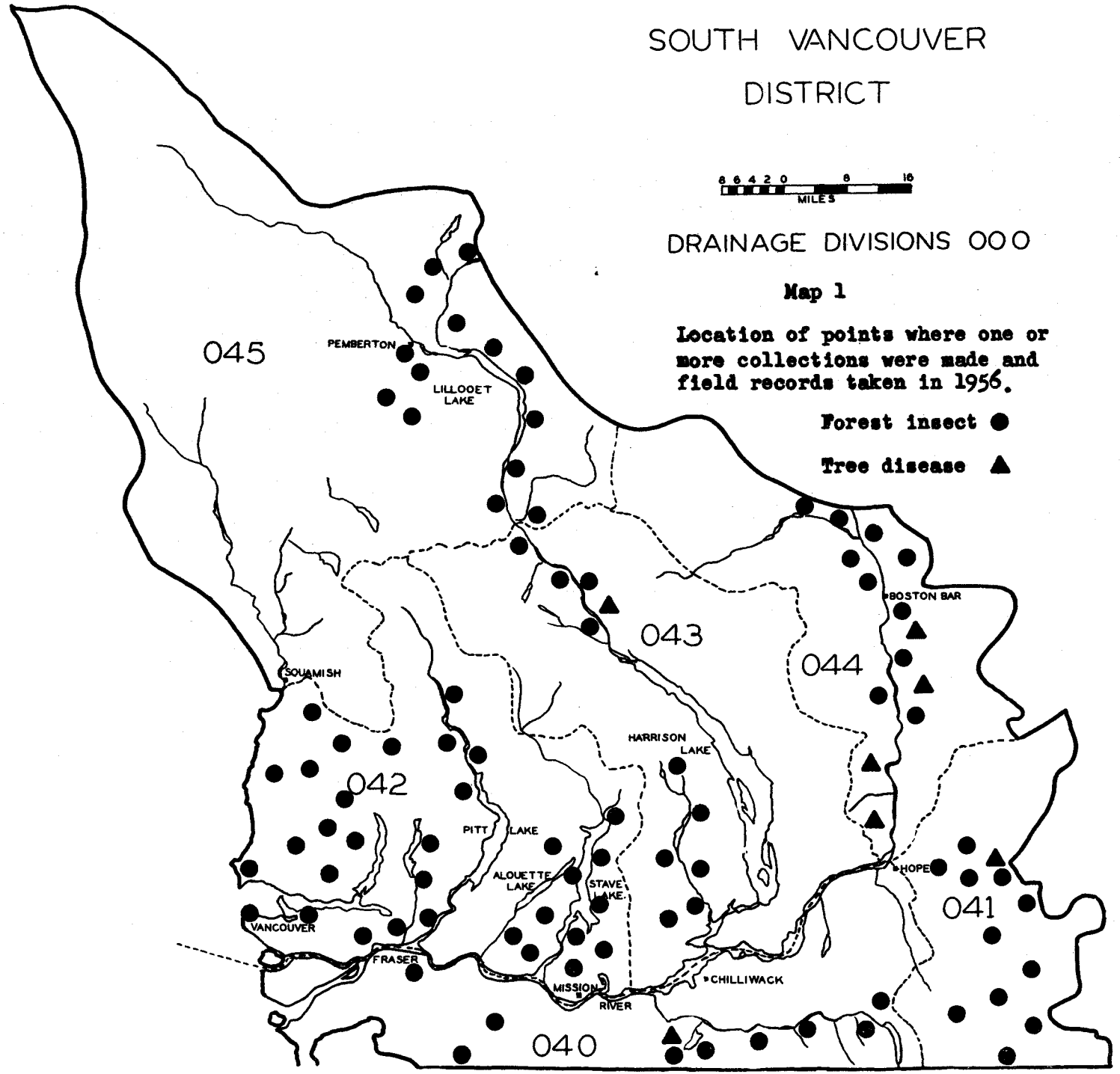
Population levels of this insect throughout the lower Fraser Valley were slightly higher than in 1955 but remained generally light.

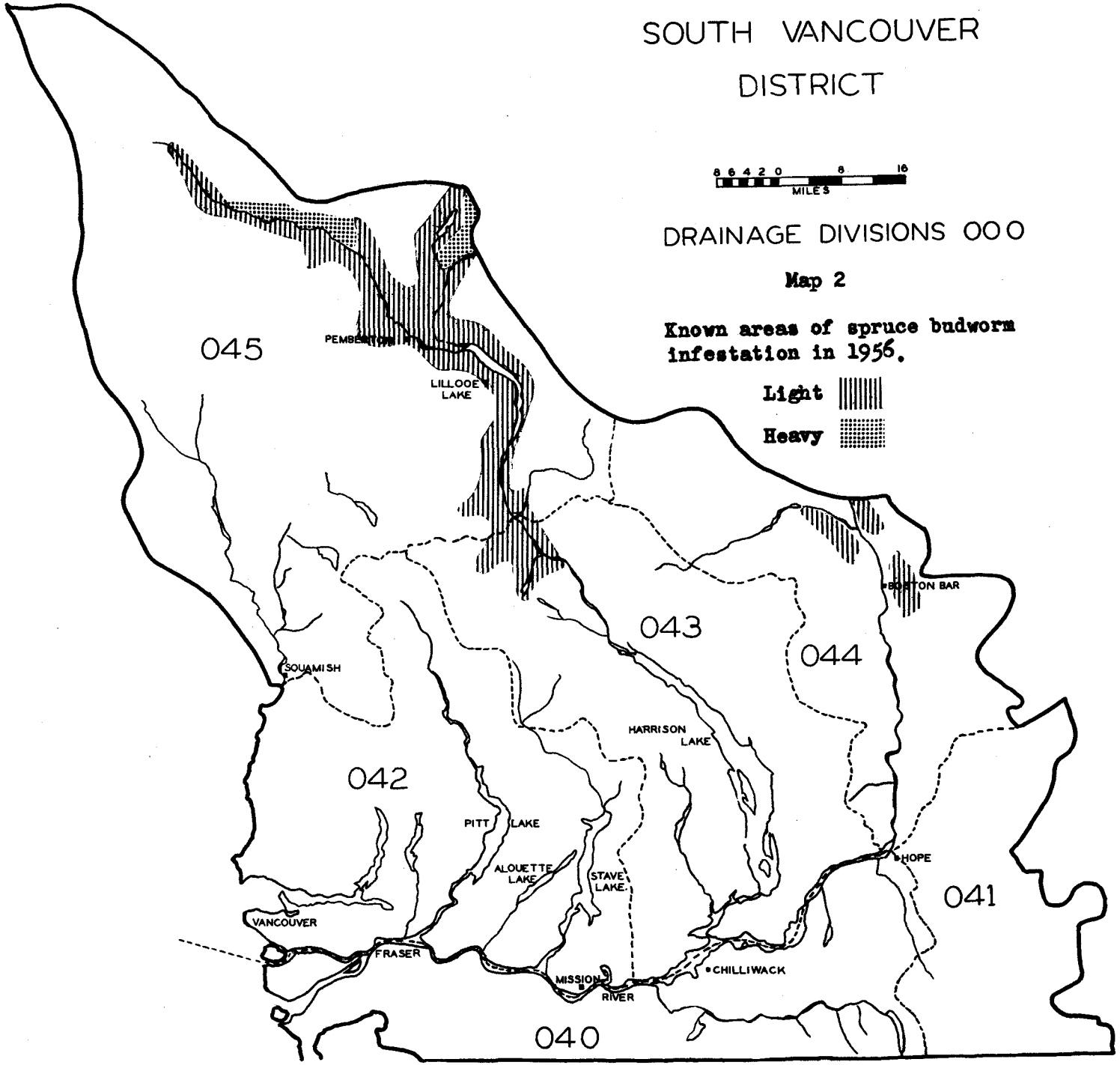
STATUS OF TREE DISEASES

Of the seven tree disease samples submitted for identification one is worthy of note.

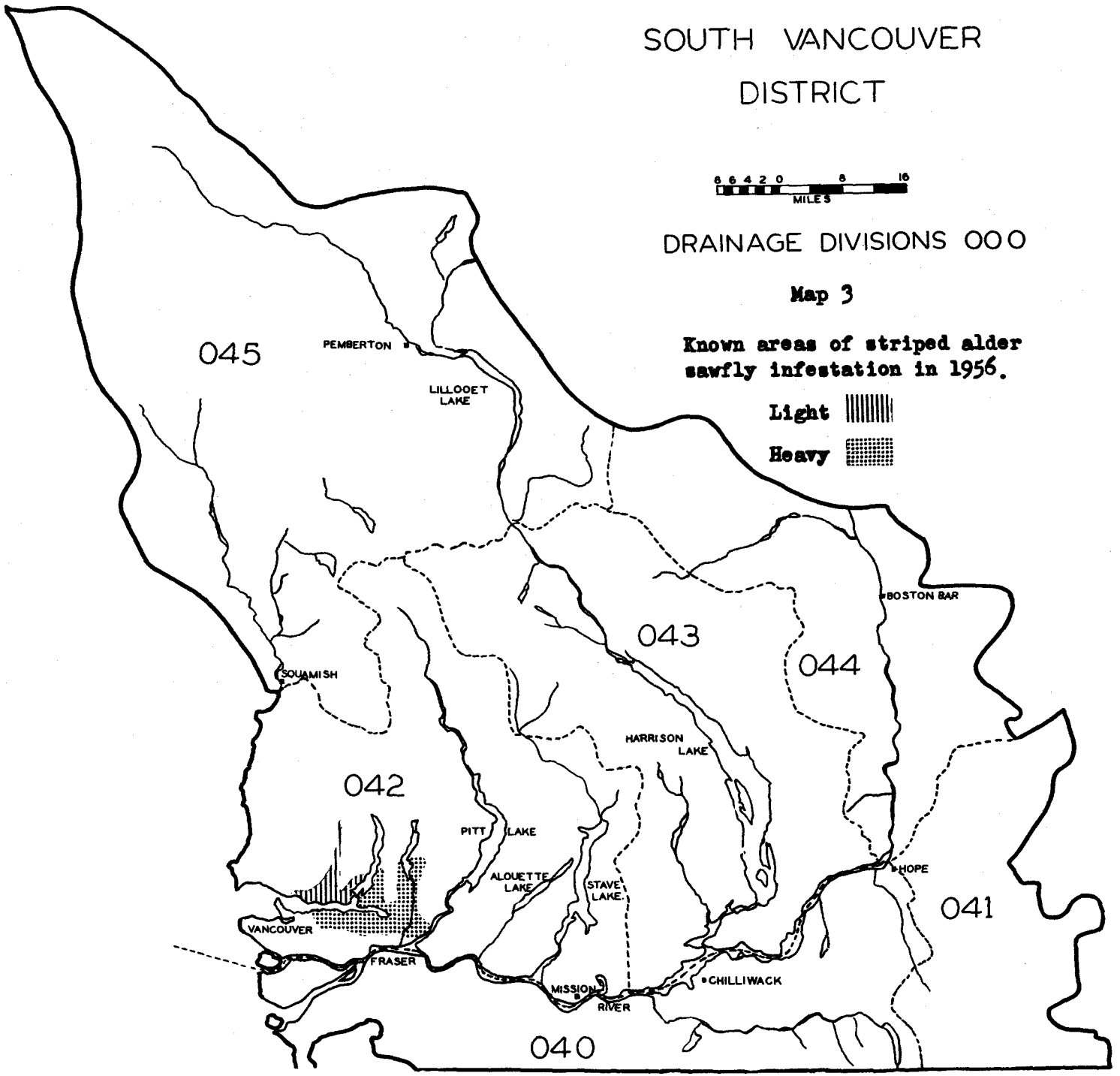
Douglas-fir Needle Blight, Rhabdocline pseudotsugae Syd.

During 1956 needle blight in varying intensities was noted throughout the Fraser Valley, from Chilliwack as far north as Boston Bar. The most damaging outbreaks were again noted at the west end of Cultus Lake in the Columbia Valley, where from 20 to 60 per cent of the old needles were lost. In general, trees of low vigor and those on poorer open growing sites were most severely affected.

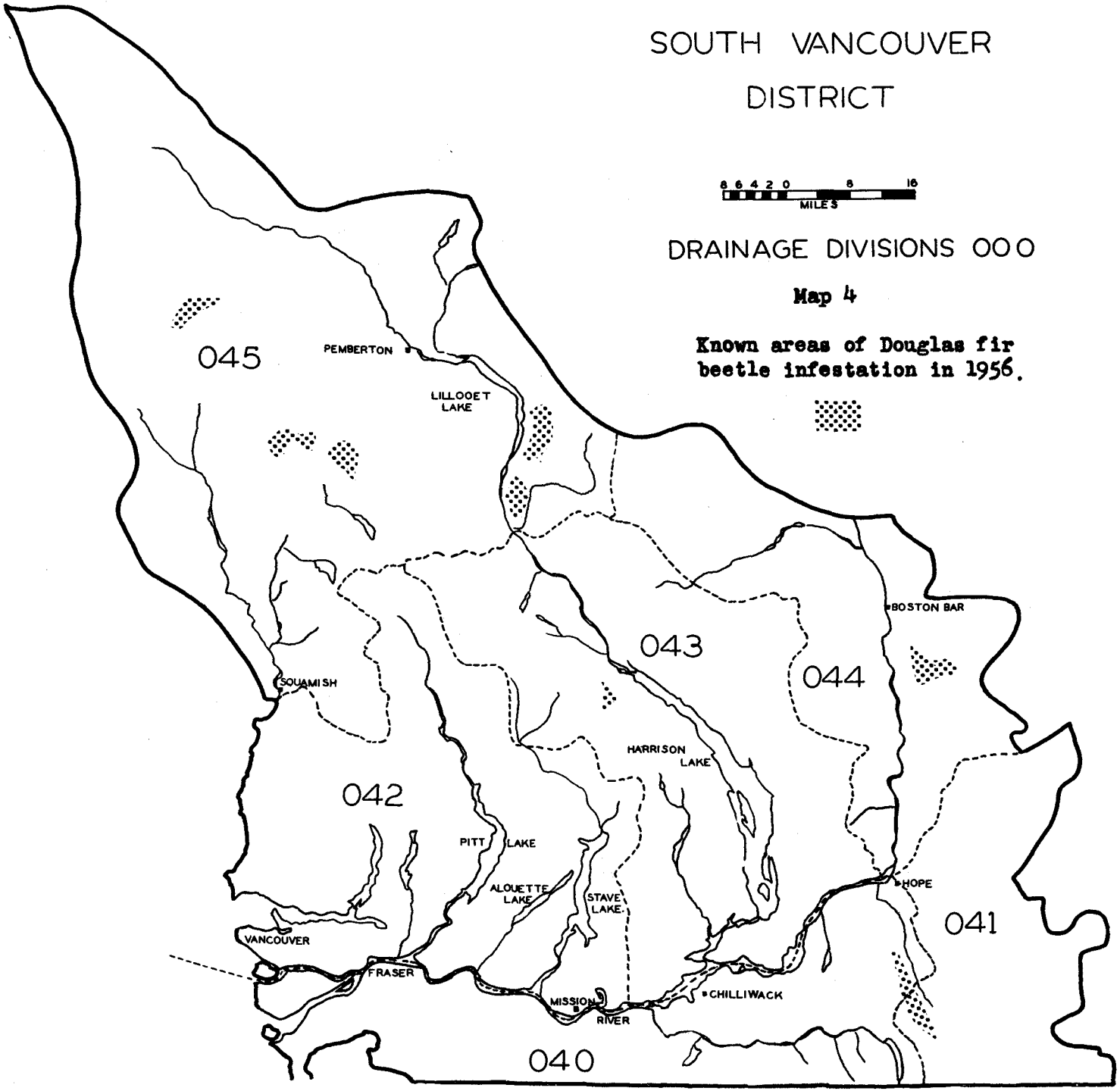

SOUTH VANCOUVER
DISTRICT
8 6 4 2 0 8 16
MILES
DRAINAGE DIVISIONS 000
Map 1
Location of points where one or more collections were made and field records taken in 1956.
Forest insect ●
Tree disease ▲
045
PEMBERTON
LILLOOET LAKE
043
044
BOSTON BAR
SQUAMISH
HARRISON LAKE
042
PITT LAKE
ALOUETTE LAKE
STAVE LAKE
HOPE
041
VANCOUVER
FRASER
MISSION
RIVER
CHILLIWACK
040


SOUTH VANCOUVER
DISTRICT
8 6 4 2 0 8 16
MILES
DRAINAGE DIVISIONS 000
Map 2
Known areas of spruce budworm infestation in 1956.
Light
Heavy
045
043
044
042
041
040
PEMBERTON
LILLOOET LAKE
BOSTON BAR
SQUAMISH
HARRISON LAKE
PITT LAKE
ALOUETTE LAKE
STAVE LAKE
HOPE
VANCOUVER
FRASER
MISSION
RIVER
CHILLIWACK

SOUTH VANCOUVER DISTRICT



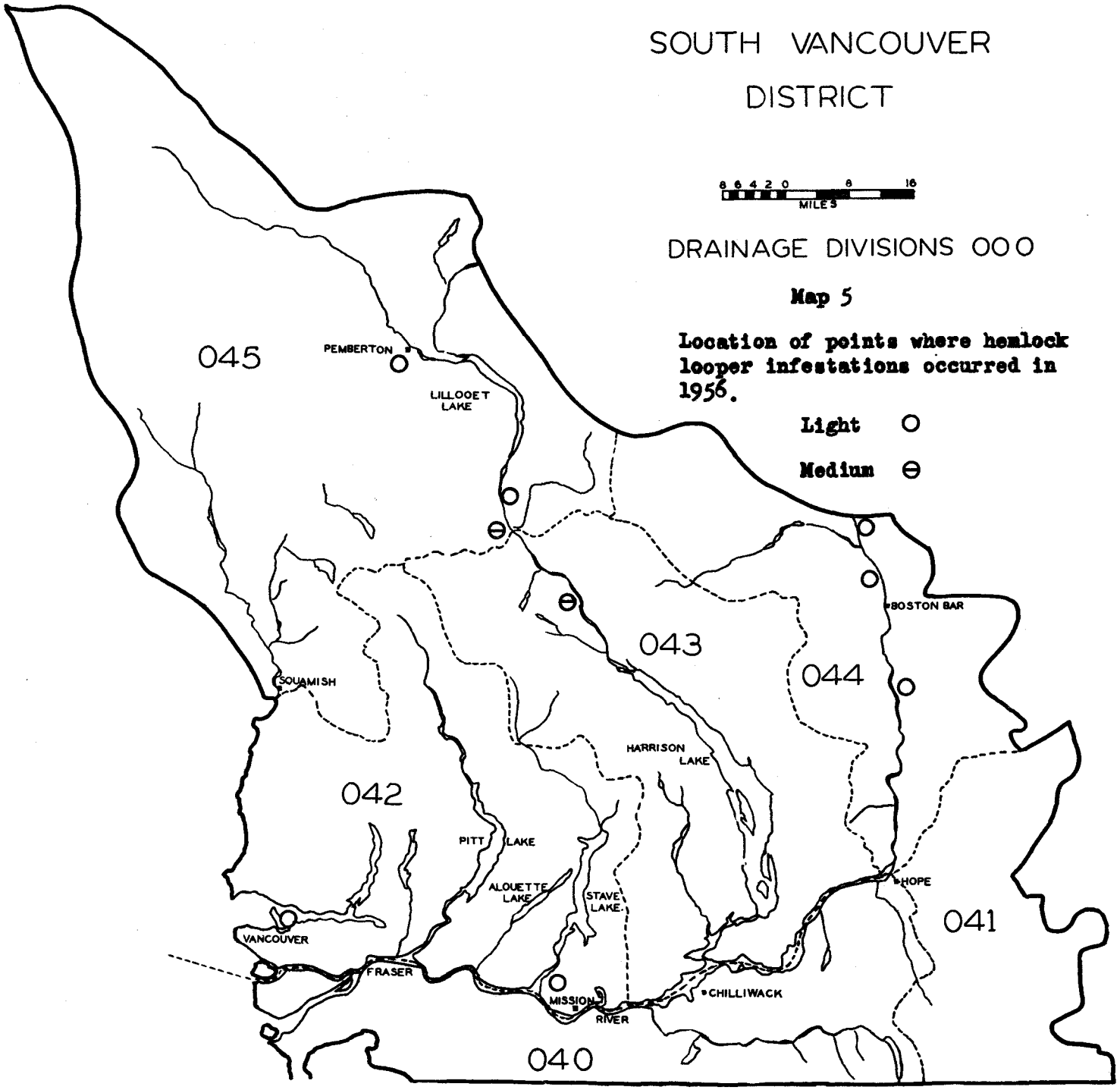
SOUTH VANCOUVER DISTRICT

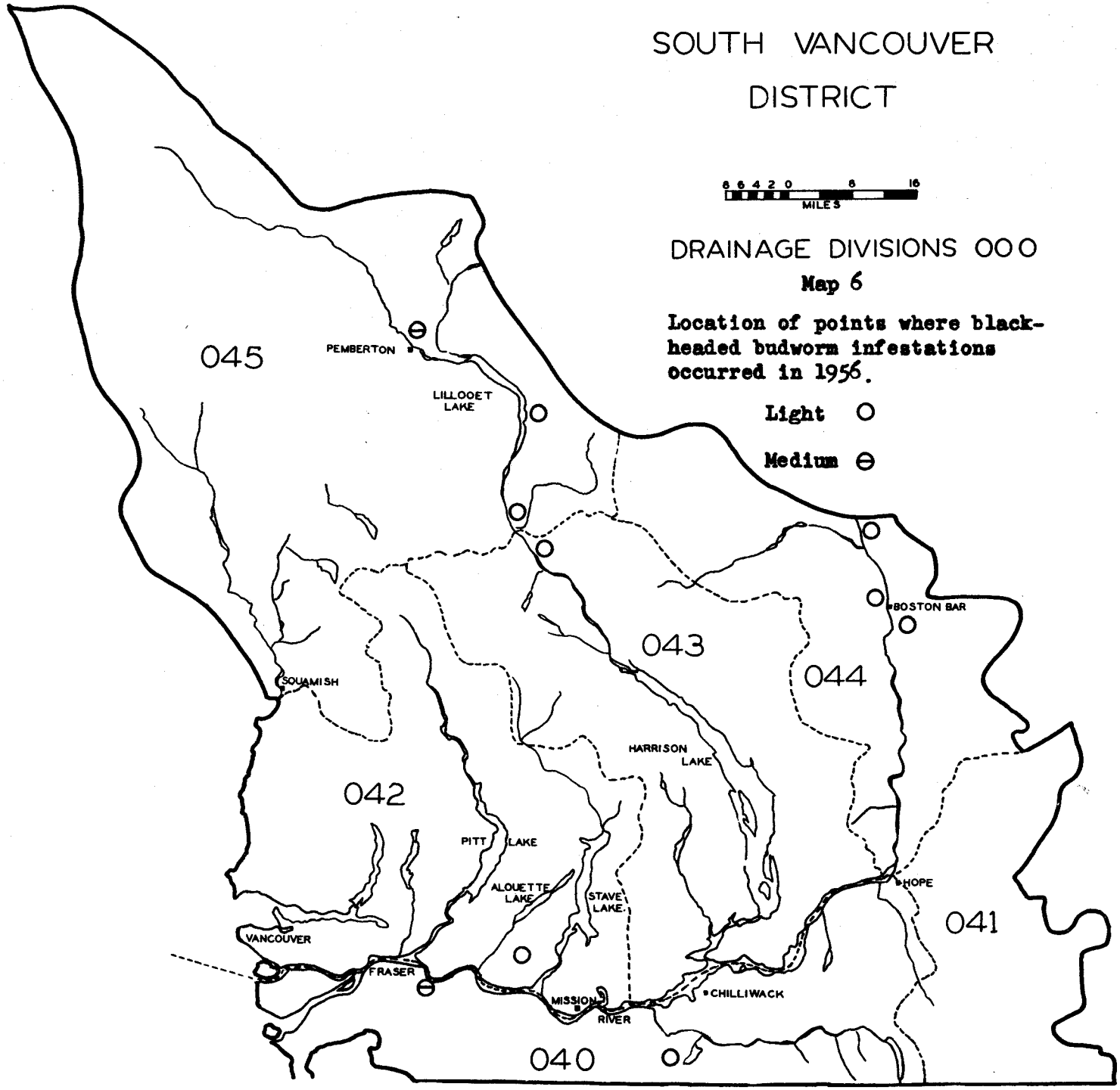


DRAINAGE DIVISIONS 000

Map 4

Known areas of Douglas fir beetle infestation in 1956.


SOUTH VANCOUVER
DISTRICT
8 6 4 2 0 8 16
MILES
DRAINAGE DIVISIONS 000
Map 5
Location of points where hemlock looper infestations occurred in 1956.
Light
Medium
045
PEMBERTON
LILLOOET LAKE
043
044
BOSTON BAR
SQUAMISH
HARRISON LAKE
042
PITT LAKE
ALOUETTE LAKE
STAVE LAKE
HOPE
041
VANCOUVER
FRASER
MISSION
RIVER
CHILLIWACK
040


SOUTH VANCOUVER
DISTRICT
8 6 4 2 0 8 16
MILES
DRAINAGE DIVISIONS 000
Map 6
Location of points where black-headed budworm infestations occurred in 1956.
Light O
Medium Θ
045
PEMBERTON
LILLOOET LAKE
043
044
BOSTON BAR
SQUAMISH
HARRISON LAKE
042
PITT LAKE
ALOUETTE LAKE
STAVE LAKE
HOPE
041
VANCOUVER
FRASER
MISSION
RIVER
CHILLIWACK
040

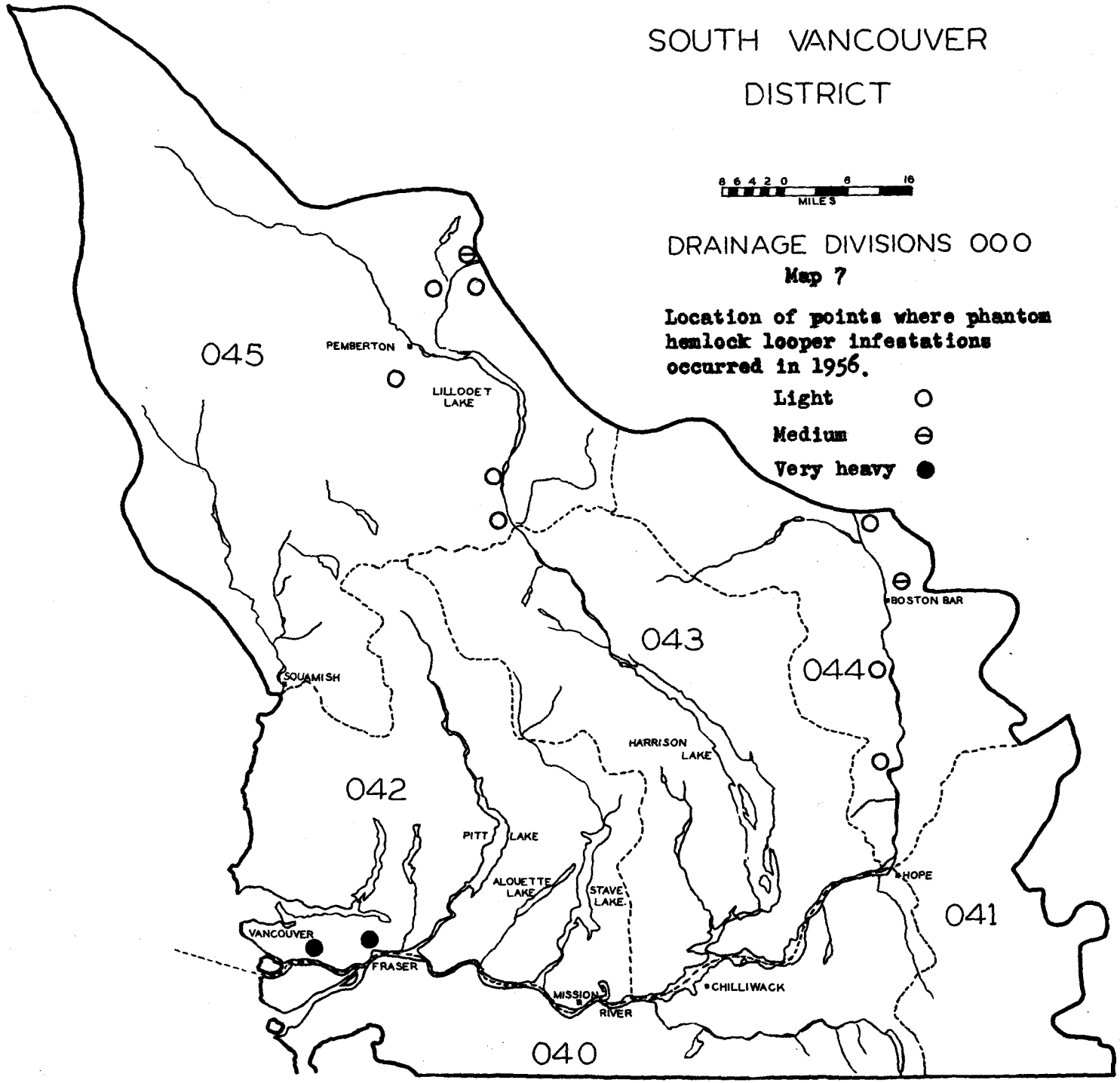

SOUTH VANCOUVER
DISTRICT
8 6 4 2 0 8 16
MILES
DRAINAGE DIVISIONS 000
Map 7
Location of points where phantom hemlock looper infestations occurred in 1956.
Light
Medium
Very heavy
045
PEMBERTON
LILLOOET LAKE
043
044
BOSTON BAR
SQUAMISH
HARRISON LAKE
042
PITT LAKE
ALOUETTE LAKE
STAVE LAKE
HOPE
041
VANCOUVER
FRASER
MISSION
RIVER
CHILLIWACK
040

Figure 1. Phantom hemlock looper, Nepytia phantasmaria (Stkr.). Mass of mature larvae at Queen's Park, New Westminster, South Vancouver, Aug. 10, 1956. E.L. Avison

Figure 2. Phantom hemlock looper, Nepytia phantasmaria (Stkr.). Western hemlock trees heavily defoliated by this looper at Queen's Park, New Westminster, South Vancouver. Aug. 12, 1956. E.L. Avison

Figure 3. Striped alder sawfly, Hemichroa crocea (Fourc.). Typical defoliation of red alder which extended over large area near Port Moody, South Vancouver. July 12, 1956. E.L. Avison

ANNUAL REPORT OF FOREST BIOLOGY RANGER

for

NORTH VANCOUVER DISTRICT

1956

FOREST BIOLOGY SURVEY

NORTH VANCOUVER DISTRICT

1956

K. W. Robertson and D. S. MacPherson

INTRODUCTION

Two hundred and fifty-one insect samples were submitted to the Victoria laboratory, 17 of which were made by British Columbia Forest Service personnel. The distribution of sample points throughout the North Vancouver District is shown in Map 1. Tables 1 and 2 show collections by agencies and hosts.

STATUS OF INSECTS

Black-headed Budworm, Acleris variana (Fern.)

A marked increase from 1955 in black-headed budworm populations occurred throughout the Johnstone Strait Islands, adjacent channels and inlets through to, and including Seymour Inlet (Map 2). Western hemlock was the primary host while Douglas fir, amabilis fir and Sitka spruce were secondary.

Number of larvae per sample were generally light with more concentrated populations in the Port Neville, McKenzie Sound and Seymour Inlet where light tip feeding was noticeable. The sample period was from June 24th to July 20th.

Natural control factors such as parasites and disease appeared to be almost non-existent. Larval populations may increase during 1957 and light tip feeding on western hemlock should be more noticeable throughout the northern half of the district. No egg samples were made due to inaccessibility of the area.

Western Hemlock Looper, Lambdina fiscellaria lugubrosa (Hlst.)

Hemlock looper populations remained almost static during 1956. The 1955 larval average per sample was 1.3 as compared to the 1956 average of 1.5. Map 3 shows distribution of larval incidence.

Spruce Budworm, Choristoneura fumiferana (Clem.)

Only one larva was collected from Douglas fir at Port Neville.

Table 1

Forest Insect Collections by Agencies
North Vancouver District - 1956

Personnel involved in collection	Number of collections						Total
	May	June	July	Aug.	Sept.	Oct.	
Forest Biology Rangers independently	10	52	84	44	31	12	233
Forest Biology Rangers with Forest Service Personnel	-	-	-	-	-	-	-
Forest Service Personnel independently	1	1	7	5	3	-	17
Other co-operators	-	-	-	1	-	-	1
Total	11	53	91	50	34	12	251

Table 2

Collections by Hosts
North Vancouver District - 1956

Coniferous hosts	Forest insects	Tree diseases	Broad-leaved hosts	Forest insects	Tree diseases
western hemlock	132	2	red alder	7	
Douglas fir	38		willow	3	
Sitka spruce	27		apple	1	
western red cedar	23		cherry	1	
amabilis fir	6		Sitka alder	1	
grand fir	2		no host	5	
lodgepole pine	1		miscellaneous	2	
Scotch pine	2				
			Total	20	0
Total	231	2	Grand Total	251	2

Silver-spotted Tiger Moth, Halisidota argentata Pack.

The silver-spotted halisidota infestation decreased to an endemic population during 1956 on the west coast of the mainland and the southern Johnstone Strait islands. Heavy defoliation which occurred in 1955 caused no damage to Douglas fir. All trees have completely recovered.

Western Tent Caterpillar, Malacosoma pluviale (Dyar)

The widespread distribution of this pest throughout the Sechelt and Malaspina peninsulas in 1955 decreased to more localized spot infestations in the same areas, especially around Gibson's Landing. The main host, again, was red alder, with domestic and wild apple, cherry, and wild rose as secondary hosts. No tree mortality has been observed.

Green Spruce Looper, Semiothisa granitata (Guen.)

This insect was found uniformly distributed along the west coast of the mainland from Gibson's Landing to Seymour Inlet. The hosts in order of preference were western hemlock, Douglas fir, Sitka spruce and grand fir. Larvae averaged 2.6 per 3-tree beating collection. Sampling was conducted from August 20th to September 16th.

Yellow-lined Forest Looper, Nyctobia limitaria nigroangulata Stkr.

Populations of this defoliator were collected from the Johnstone Strait islands, including adjacent channels and inlets, to Seymour Inlet. Western hemlock was the preferred host although larvae were found on Douglas fir and Sitka spruce.

Larval samples from June 22 to August 21 averaged 3.3 per sample.

Green-striped Forest Looper, Melanolophia imitata Wlk.

An increase from 1.3 to 2.6 larvae per 3-tree beating sample was apparent from Sechelt Inlet north to and including Seymour Inlet. Larvae were found mainly on western hemlock over a wide date range from June 21 to September 14. These larvae have very economical feeding habits, therefore any defoliation is usually negligible.

Saddle-back Looper, Ectropis crepuscularia Schitt.

The saddle-back looper appeared only rarely, in scattered samples, from June 21 to July 13 throughout the northern half of the North Vancouver District. Western hemlock was the dominant host.

STATUS OF TREE DISEASES

A Branch Canker, Dasyscypha sp.

Dasyscypha sp., was associated with several minor incidences of branch cankers on immature pole western hemlock in the Redonda and East Thurlow Island area and Vancouver Bay in Jervis Inlet.

Resinosus was quite common on all affected trees. No tree mortality was observed.

Needle Blight, Dimerosporium tsugae and D. abietis Dearn.

This sooty mold characterized by small black spots on the under-surface of western hemlock, grand fir and amabilis fir needles occurred sporadically throughout the North Vancouver District. Some needle shedding will occur. However, no permanent injury should result.

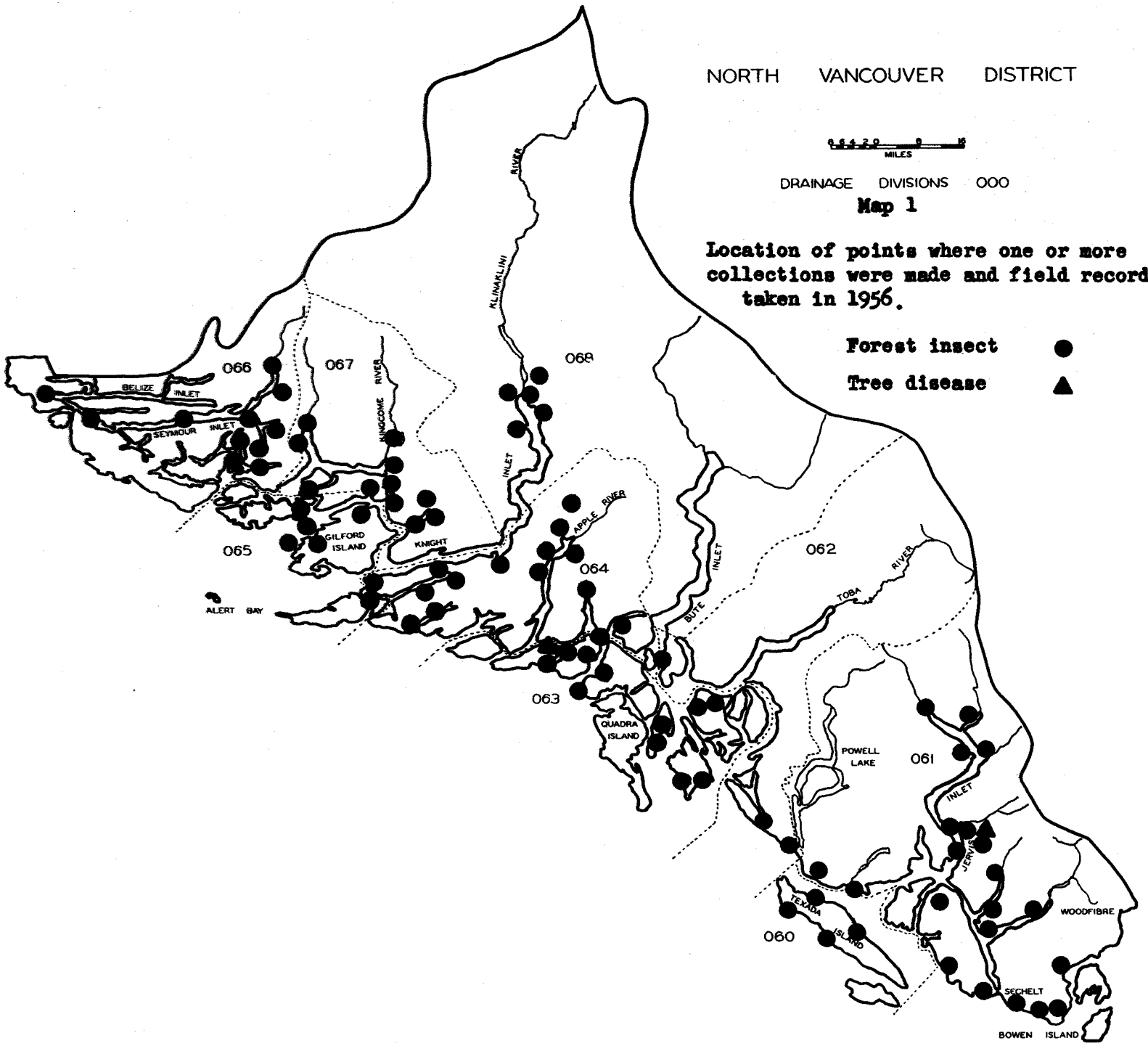
A Root Rot, Sparassis radicata Weir

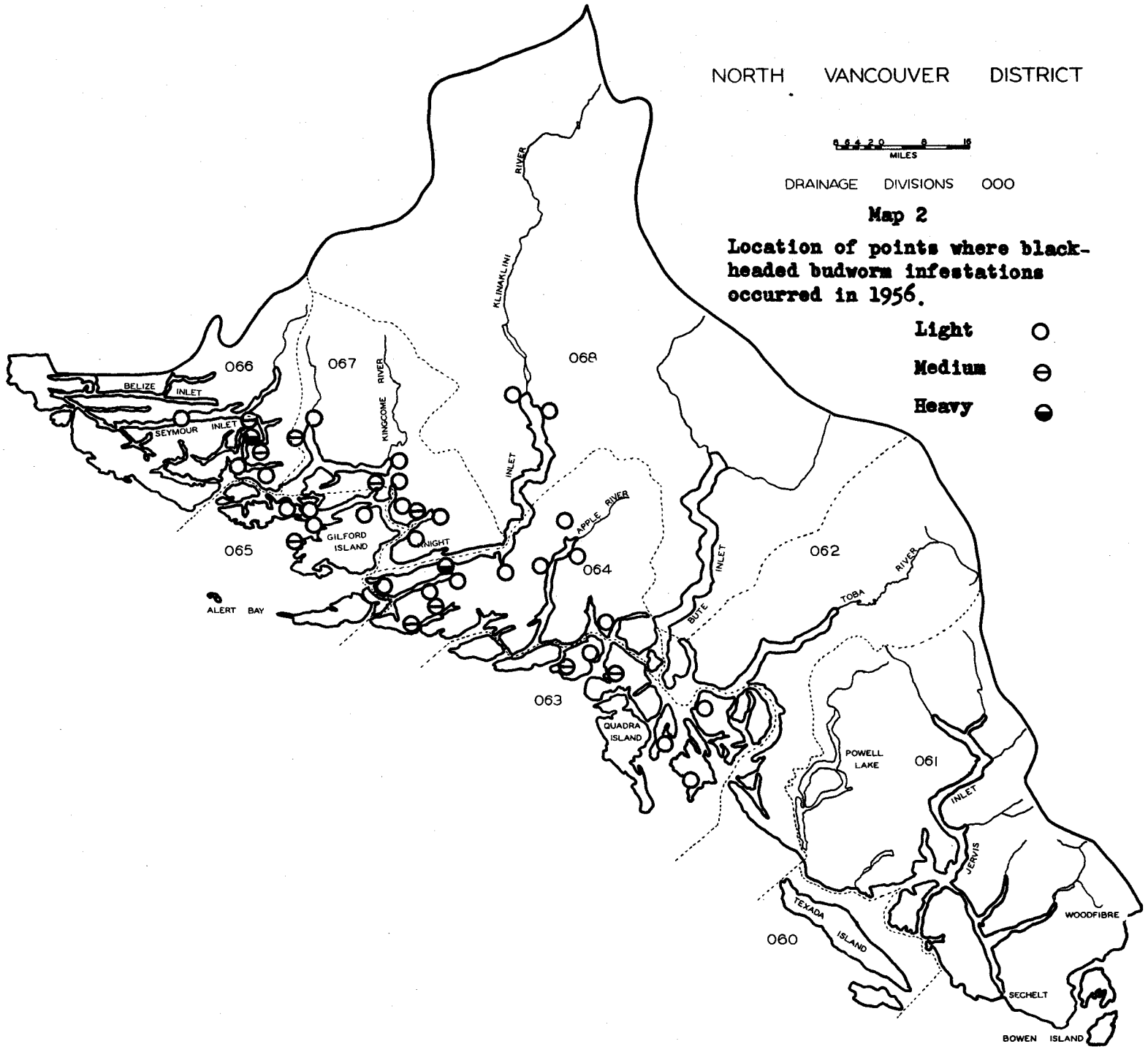
A 3-foot d. b. h., Douglas fir tree infected with sparassis root rot was found dead on Turnour Island.

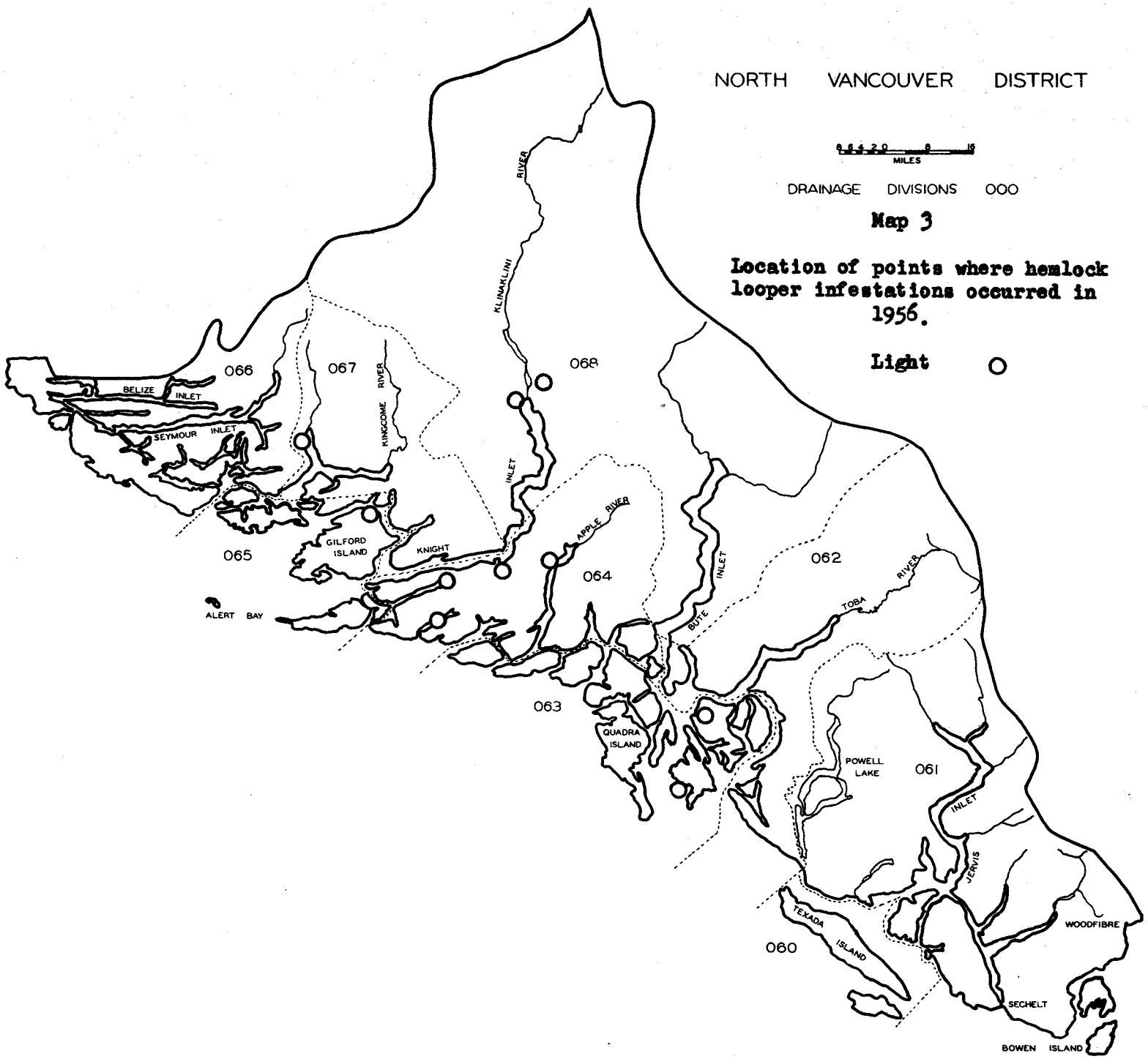
The inner bark, sapwood, and heartwood of the roots were infected and showed characteristic yellowish-white mycelial fans under the bark. There was much resinosis of the diseased roots. The decay did not extend into the trunk.

A Blister Rust, Peridermium sp.

This blister rust of pine was found on the stems of Scotch pine seedlings in an exotic tree plantation, XP-12, at Powell River. During 1956 the rust was confined to three hosts but could become important.


NORTH VANCOUVER DISTRICT
MILES
DRAINAGE DIVISIONS 000
Map 1
Location of points where one or more collections were made and field records taken in 1956.
Forest insect
Tree disease
066
067
068
065
064
062
063
061
060
BELIZE INLET
SEYMOUR INLET
KLINAKLINI RIVER
KINGCOME RIVER
INLET
APPLE RIVER
GILFORD ISLAND
KNIGHT
ALERT BAY
BUTE INLET
TOBA RIVER
QUADRA ISLAND
POWELL LAKE
INLET
JERVIS
TEXADA ISLAND
WOODFIBRE
SECHELT
BOWEN ISLAND


NORTH VANCOUVER DISTRICT
MILES
DRAINAGE DIVISIONS 000
Map 2
Location of points where black-headed budworm infestations occurred in 1956.
Light
Medium
Heavy
066
067
068
065
064
062
063
061
060
BELIZE INLET
SEYMOUR INLET
KINGCOME RIVER
KLINAKLINI RIVER
INLET
APPLE RIVER
GILFORD ISLAND
KNIGHT
ALERT BAY
BUTE INLET
TOBA RIVER
QUADRA ISLAND
POWELL LAKE
JERVIS INLET
TEXADA ISLAND
WOODFIBRE
SECHELT
BOWEN ISLAND


NORTH VANCOUVER DISTRICT
6 4 2 0 8 16
MILES
DRAINAGE DIVISIONS 000
Map 3
Location of points where hemlock looper infestations occurred in 1956.
Light O
066
067
068
065
064
062
063
061
060
BELIZE INLET
SEYMOUR INLET
KINGCOME RIVER
KLINAKLINI RIVER
INLET
APPLE RIVER
GILFORD ISLAND
KNIGHT INLET
ALERT BAY
BUTE INLET
TOBA RIVER
QUADRA ISLAND
POWELL LAKE
JERVIS INLET
TEXADA ISLAND
WOODFIBRE
SECHELT
BOWEN ISLAND

ANNUAL REPORT OF FOREST BIOLOGY RANGERS

BRITISH COLUMBIA

1956

PRINCE RUPERT FOREST DISTRICT

FOREST BIOLOGY SURVEY

PRINCE RUPERT FOREST DISTRICT

1956

D. G. Collis

INTRODUCTION

There are three Biology Ranger districts in the Prince Rupert Forest District. Personnel involved in the survey were:

South Prince Rupert - K. W. Robertson and D. MacPherson

West Prince Rupert - N. E. Alexander

East Prince Rupert - D. G. Collis

The black-headed budworm was still active in portions of the South Prince Rupert area but the outbreak in the West Prince Rupert District which includes the Queen Charlotte Islands, collapsed after three years of heavy defoliation.

At the north end of Babine Lake an infestation of 2-year-cycle spruce budworm covers an estimated 1,000 square miles.

Mortality from mountain pine beetle, Dendroctonus monticolae Hopk., attacks continued in the vicinity of Babine Lake but to a lighter degree than in 1955. A small infestation in the Bella Coola valley, active since 1948, is still in progress.

ANNUAL REPORT OF FOREST BIOLOGY RANGER

for

SOUTH PRINCE RUPERT DISTRICT

1956

FOREST BIOLOGY SURVEY

SOUTH PRINCE RUPERT DISTRICT

1956

K. W. Robertson and D. J. MacPherson

INTRODUCTION

From July 21st to August 16th, 171 insect samples were collected and forwarded to the Victoria laboratory. Map 1 shows location of random insect and tree disease samples. Tables 1 and 2 depict insect collections by agencies and hosts respectively.

Because the M. V. "Forest Biologist" surveys both the North Vancouver Ranger District (from Howe Sound to Seymour Inlet), and the South Prince Rupert Ranger District (from Seymour Inlet to Grenville Channel), the time of insect sampling in the latter area is conducted when some important insects have completed, or are well advanced in their development. Therefore, the northern portion of the South Prince Rupert region shows little insect activity which is not necessarily true.

STATUS OF INSECTS

Black-headed Budworm, Acleris variana (Fern.)

Scattered light to medium defoliation on western hemlock continued in 1956 in the Elcho Harbour, Labouchere Channel and South Bentinck Arm region. The Smitley River Valley was one of two exceptions where feeding was heavy. Defoliation in this area ranged from scattered tip feeding to complete stripping of the top ten feet of the crown, especially on fringe, immature pole hemlock. A small and more concentrated population of black-headed budworm larvae was located at the mouth of the Wannock River, head of Rivers Inlet. Defoliation was heavy on the 1956 growth.

The infestation as a whole, during 1956, was somewhat lighter than last year. Light budworm populations reported from the Bella Bella and Bella Coola region in 1955 disappeared. Map 2 shows the extent of the 1956 infestation.

Due to the relative lateness of the sampling period, budworm larvae were abundant enough to take mass collections for disease and parasitic studies.

Light to medium defoliation is expected to continue during 1957 but no tree mortality is anticipated.

Table 1

Forest Insect Collections by Agencies,
South Prince Rupert District, 1956.

Personnel involved in collection	Number of collections						Total
	May	June	July	Aug.	Sept.	Oct.	
Forest Biology Rangers independently	-	-	64	105	-	-	169
Forest Biology Rangers with Forest Service Personnel	-	-	-	-	-	-	-
Forest Service Personnel independently	-	-	-	1	-	-	1
Other co-operators	-	-	-	1	-	-	1
Total							171

Table 2

Collections by Hosts,
South Prince Rupert District - 1956.

Coniferous hosts	Forest insects	Tree diseases	Broad-leaved hosts	Forest insects	Tree diseases
western hemlock	94	1	red alder	3	
Sitka spruce	52	1	willow	1	
western red cedar	6		no host	1	
amabilis fir	7				
Douglas fir	5				
lodgepole pine	2				
			Total	5	-
Total	166	2	Grand Total	171	2

Western Hemlock Looper, Lambdina fiscellaria lugubrosa (Hlst.)

This economically important defoliator was found distributed in small populations from the Asseek River - South Bentinck Arm to North Bentinck Arm and the Bella Coola Valley. The larval average per 3-tree beating sample decreased slightly in 1956. The above distribution boundaries have not changed in the last five years. Table 3, represents samples taken and resulting larval averages in this area only.

Table 3

Summary of Hemlock Looper Larval Collections,
North and South Bentinck Arms, Bella Coola Valley.

Year	Number of collections	Number collections containing hemlock looper	Average number larvae per sample
1952	18	8	1.2
1953	37	9	1.3
1954	29	14	11.2
1955	16	12	5.2
1956	37	25	4.8

Spruce Budworm, Choristoneura fumiferana (Clem.)

The time of survey was too late to collect spruce budworm larvae, so the status of this defoliator remains unknown for 1956.

Mountain Pine Beetle, Dendroctonus monticolae Hopk.

A small and progressive infestation of lodgepole pine has been in existence since 1948. The infestation, which has confined itself to rocky hillsides, is now beginning to infest and kill scattered stands of pine in the valley bottom near the Stuie area. All the hosts are small mature trees on dry open sites.

Willow Leaf-miner, Gelechiid

Several species of willow were heavily infested with a leaf-miner tentatively identified as a Gelechiid. The infestation occurred sporadically over approximately a four mile area near Burnt Bridge in the Bella Coola Valley. All hosts were mainly shrub forms. No mortality is expected.

Green-striped Forest Looper, Melanolophia imitata Wlk.

Forty samples, collected from July 21 to August 14, averaged 3.0 larvae per 3-tree beating sample. They were uniformly distributed from Rivers Inlet to Grenville Channel. Western hemlock was the preferred host.

Yellow-lined Forest Looper, Nyctobia limitaria nigroangulata Stkr.

Distribution of this defoliator was uniform throughout the entire district from Draney Inlet to Klewnuggitt Inlet. These larvae are commonly associated in samples with Melanolophia imitata Wlk. Larvae averaged 4.1 per sample and were found from July 21st to August 15th. Western hemlock was the dominant host. Evidence of feeding or needle defoliation by these larvae is usually not apparent.

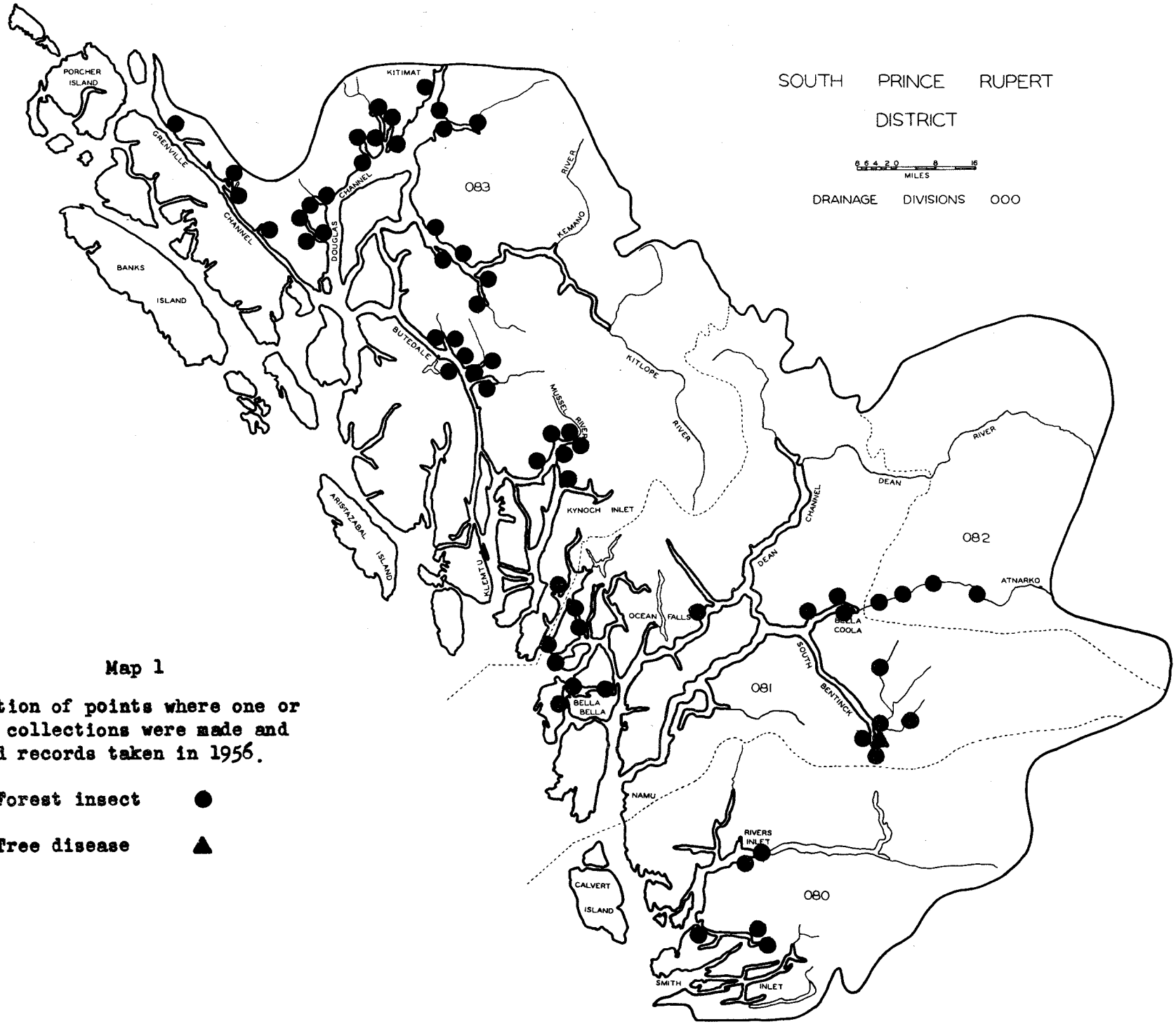
STATUS OF TREE DISEASES

Needle Blight, Dimerosporium tsugae Dearn.

Confined to the undersurface of older western hemlock needles, this sooty mold causes no apparent injury. It was found on scattered immature pole western hemlock in the wouthern end of South Bentinck Arm.

Mortality in Western Red Cedar, Thuja plicata Donn.

Scattered small stands of western red cedar, as reported in the 1954 ranger report, were still suffering progressive mortality in 1956. No insect or infectious disease could be found. All sites, i. e., Gunboat Passage, Boscowitz Point in Fisher Channel, and Europa Reach in Gardner Canal are generally exposed to strong winds. Relatively shallow root systems on rocky sites with probably poor nutrients were common on all sites. Trees were mainly scrub having little commercial value. In 1954 the mortality was attributed to physiological causes.

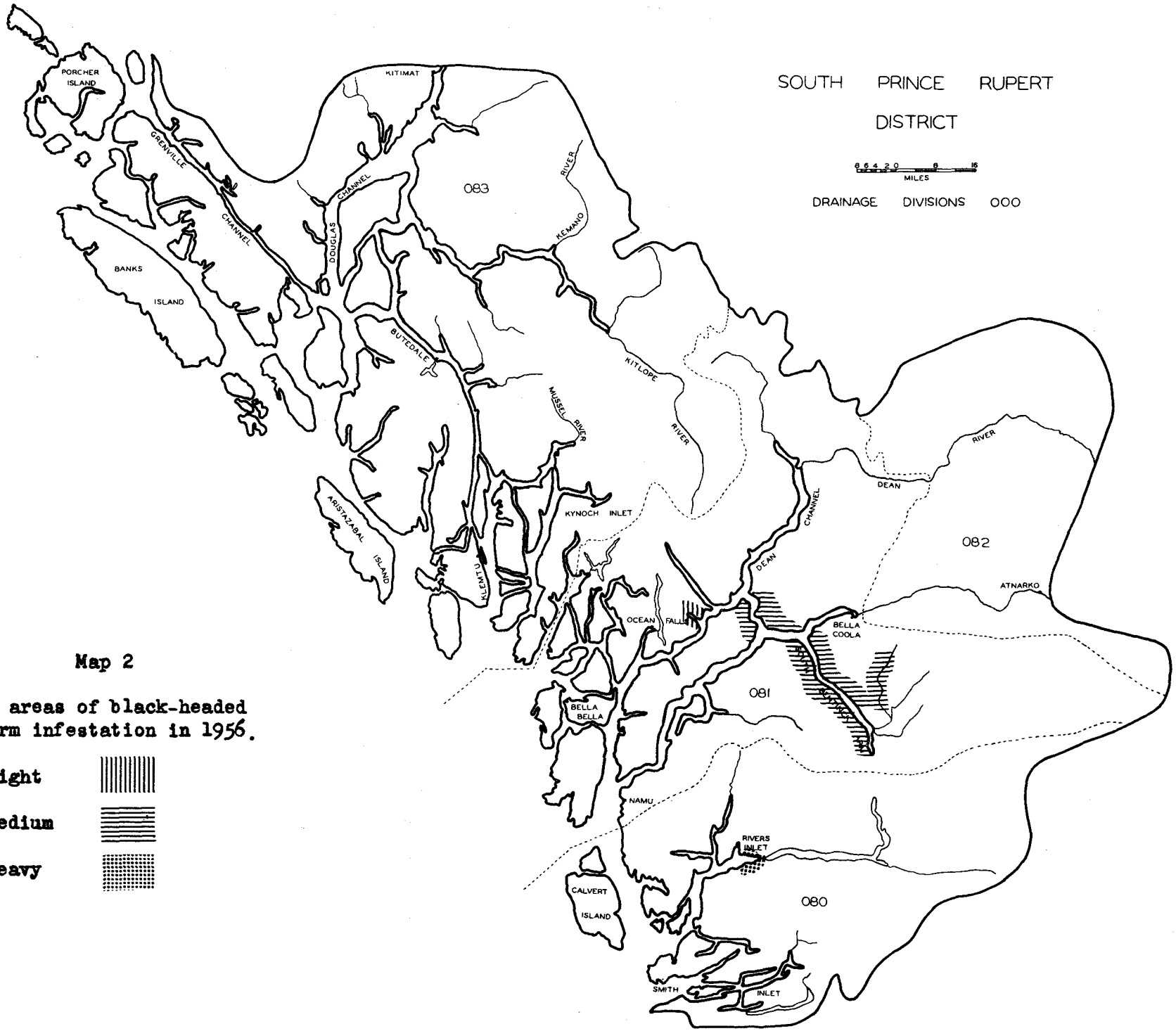


Map 1

Location of points where one or more collections were made and field records taken in 1956.

Forest insect ●

Tree disease ▲



Map 2

Known areas of black-headed budworm infestation in 1956.

Light

Medium

Heavy

ANNUAL REPORT OF FOREST BIOLOGY RANGER

for

WEST PRINCE RUPERT DISTRICT

1956

FOREST BIOLOGY SURVEY

WEST PRINCE RUPERT DISTRICT

1956

N. E. Alexander

INTRODUCTION

The 1956 field season commenced in June and ended in late September. A total of 222 insect samples and 29 tree disease samples were submitted.

Through the co-operation of the British Columbia Forest Service and by the use of the survey's district outboard boat several previously inaccessible areas were surveyed in the Queen Charlotte Islands.

A flight with the British Columbia Game Commission to Meziadin Lake in the northern part of the district provided an opportunity for extensive aerial reconnaissance and a limited amount of sampling.

Collections by agencies and by hosts are shown in Tables 1 and 2 respectively and points at which collections were made are shown in Maps 1 and 2.

STATUS OF INSECTS

Black-headed Budworm, Acleris variana (Fern.)

As indicated by the egg survey in 1955, the black-headed budworm infestation has collapsed completely in the Queen Charlotte Islands. The infestation on the mainland area subsided in 1954. Only three larvae in two collections were found in the district.

Throughout the infestation area, both on the Queen Charlotte Islands and the mainland, evidence of the severity of the attack is quite apparent. Some mature and overmature trees have already assumed a grayish appearance but the amount of tree mortality will not be known for several years. Mortality plots were established in areas of heavy defoliation. A total of 200 trees were tagged and data were taken on their present condition. A yearly check will be made on these trees to determine the effect of heavy defoliation on their eventual recovery or death.

Table 1

Forest Insect Collections by Agencies
West Prince Rupert District - 1956.

Personnel Involved in collection	Number of collections						Total
	May	June	July	Aug.	Sept.	Oct.	
Forest Biology Rangers independently	-	14	65	84	42	-	205
Forest Biology Rangers with Forest Service Personnel	-	-	-	2	-	-	2
Forest Service Personnel independently	1	-	13	-	-	-	14
Other co-operators	-	-	-	1	-	-	1
Total	1	14	78	87	42	0	222

Table 2

Collections by Hosts
West Prince Rupert District - 1956

Coniferous hosts	Forest insects	Tree diseases	Broad-leaved hosts	Forest insects	Tree diseases
western hemlock	122	4	western white birch	1	
mountain hemlock	4		trembling aspen	1	
Sitka spruce	29	11	black cottonwood	5	1
western white spruce	6		willow sp.	1	
western red cedar	15	1	mountain alder	2	
amabilis fir	10		red alder	7	2
alpine fir	7	5	miscellaneous	3	
lodgepole pine	9	5			
			Total	20	3
Total	202	26	Grand Total	222	29

Table 3

Condition of Plot Trees, Defoliated by Black-headed Budworm, Queen Charlotte Islands, 1956.

Area	No. of Trees	Number of trees defoliated				Crown class of trees suffering heavy to very heavy defoliation		
		Light	Medium	Heavy	V. Heavy	Int.	Co-Dom.	Dom.
Moresby Camp*	100	-	-	-	-	-	-	-
Juskatla Inlet	50	20	24	5	1	-	1	5
Maude Island	50	1	14	29	6	18	7	10

* The current foliage was too far advanced in the Moresby Camp plot to allow individual tree estimates of defoliation. However, data were taken on the condition of the tops. As a whole the plot suffered light to medium defoliation in 1956 with the heaviest feeding on the intermediate trees.

Hemlock Sawfly, Neodiprion spp.

In 1956 the hemlock sawfly population continued to rise in the mainland area. Averages of 1.1 and 6.8 larvae per collection in 1954 and 1955 respectively increased to 10.6 larvae in 1956. The heaviest population was found in the Kitsumkalum Lake area. Several colonies were submitted from this region.

The population in the Queen Charlotte Islands dropped from 26.3 larvae per collection in 1955 to 12.2 larvae in 1956. There was no noticeable defoliation in any of the areas where larvae were found.

Distribution remained unchanged throughout the areas surveyed during the larval season (Maps 3 and 4).

Striped Alder Sawfly, Hemichroa crocea (Fourc.)

A small infestation of the striped alder sawfly was found in the lower Nass River Valley in 1956. An area about 1/4 mile square was noticeably defoliated. A small population was found in Masset Sound but there was no sign of defoliation.

Aspen Leaf-miner, Phyllocnistis populiella Chamb.

The aspen leaf miner remained at infestation level throughout the range of the aspen in the West Prince Rupert District. The area affected lies roughly between Terrace and the eastern boundary of the district along the Skeena drainage (Map 5). Approximately 80 to 100 per cent of the larvae were mined in all areas.

Green-striped Forest Looper, Melanolophia imitata Wlk.

A total of 8 larvae in 7 collections were found distributed throughout the district. All collections containing this looper were made in early August.

Yellow-lined Forest Looper, Nyctobia limitaria nigroangulata Stkr.

The number of yellow-lined forest loopers remained constant with an average of 1.5 larvae per sample as compared to 1.6 larvae in 1955 and 2.5 larvae in 1954. Collections were well distributed throughout the district.

Spruce Sawfly, Pikonema alaskensis Roh.

Occurrence of this insect was very light. Four collections, each containing one larva, were made.

Tip Moth, Zeiraphera diniana Gn.

Bud-mining, attributed to the tip moth, was common on Graham Island but no specimens were collected during sampling. At Juniper Creek in Drainage Division 105, nine larvae were found in one 3-tree beating sample but no feeding was observed. This was the only collection which contained this insect in 1956. Sampling on Graham Island was conducted at sea level in late June whereas the collection containing the larvae at Juniper Creek was made in early July at an elevation of 4,300 feet.

Western Hemlock Looper, Lambdina fiscellaria lugubrosa (Hlst.)

The hemlock looper population decreased to a new low level within the district in 1956. Six collections averaged 1.0 larvae per 3-tree beating sample compared with 4.9 larvae in 1955 and 7.9 larvae in 1954. The larvae were found in the areas adjacent to Lakelse Lake and Terrace, Drainage Division 104.

Spruce Budworm, Choristoneura fumiferana (Clem.)

No spruce budworm were collected in the district this year.

Antique Tussock Moth, Notolophus antiqua badia (Hy. Ed.)

This insect did not occur in the district this season.

Leaf Beetle, Calligrapha verrucosa Suffr.

The only occurrence of this beetle were in the Skeena Valley near the mouth of the Gitnadoix River. Two samples, containing large numbers of adults were collected on black cottonwood and willow. The collection

from the latter contained more than 136 adults. It is of interest that the only other survey records of this insect within the province were made in this area in 1949 and 1950.

Western Tent Caterpillar, Malacosoma pluviale (Dyar)

The western tent caterpillar was not recorded in the West Prince Rupert District in 1956.

Green Spruce Looper, Semiothisa granitata (Guen.)

The green spruce looper population decreased slightly this year. In 1955 the average number of larvae per 3-tree beating collection was 4.0 compared with 2.0 in 1956. The largest number was found at Onion Lake in Drainage Division 104.

Leaf Beetle, Galerucella punctipennis Mann.

A small infestation of this leaf beetle was found in the lower Skeena Valley opposite Ayton Island. Medium to heavy feeding was evident on red alder and a hand-picked collection of 26 adults was submitted. This was the only occurrence of this insect noted within the district in 1956. An area of approximately 1/4 mile square was involved.

STATUS OF TREE DISEASES

As in previous years, tree disease samples were taken whenever disease conditions were encountered. Of the 29 samples submitted in 1956, three bear further mention.

Lodgepole Pine Kill

About 1949 an area of lodgepole pine some 1/2 mile in diameter was killed. The trees affected ranged in size from 1/2" to 9" D. B. H. Every tree was dead. Some pine surrounding the area still appeared to be dying. This area was previously inaccessible to our survey and lies northwest of Kitsumkalum Lake in Forest Management License #1.

A close examination disclosed no primary insect damage and it was not possible to determine the causal agent in the field. There was evidence of an old ground fire but growth had continued since that time. Two unidentified fungi have been sent to Ottawa from specimens submitted to the laboratory and identifications are pending. (See Figures 2 and 3).

Needle Rust, Chrysomyxa ledicola Lagehr.

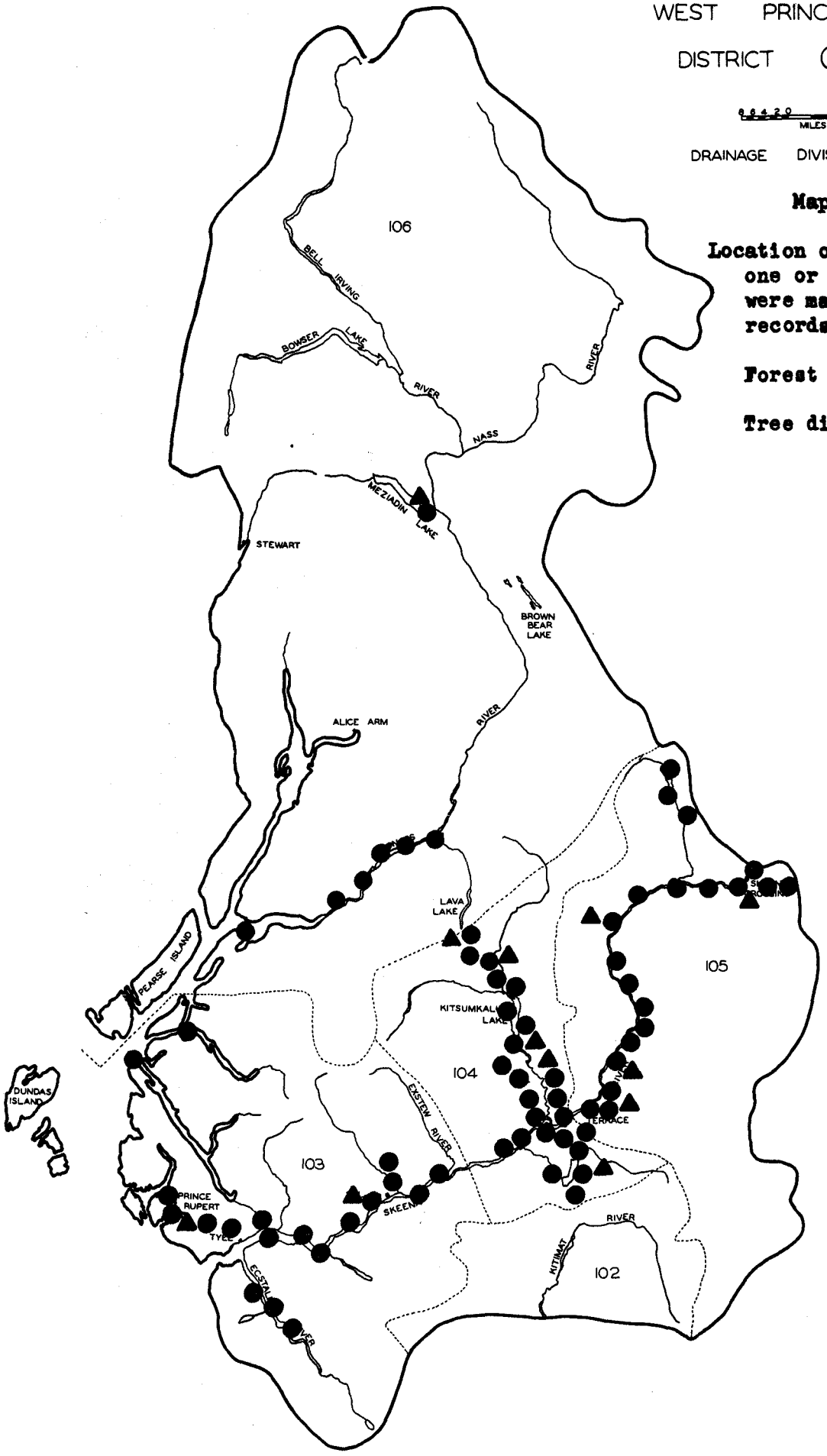
This needle rust of spruce occurs in abundance on Graham Island. In some areas every needle on every tree was infected. Heaviest infection occurred in the swampy region traversed by the Port Clements - Tlell road (Map 6). As all needles infected by the rust are cast by the tree, it is surprising that severe mortality has not been experienced in the stand. Five heavily infected young trees have been tagged and any future mortality will be recorded.

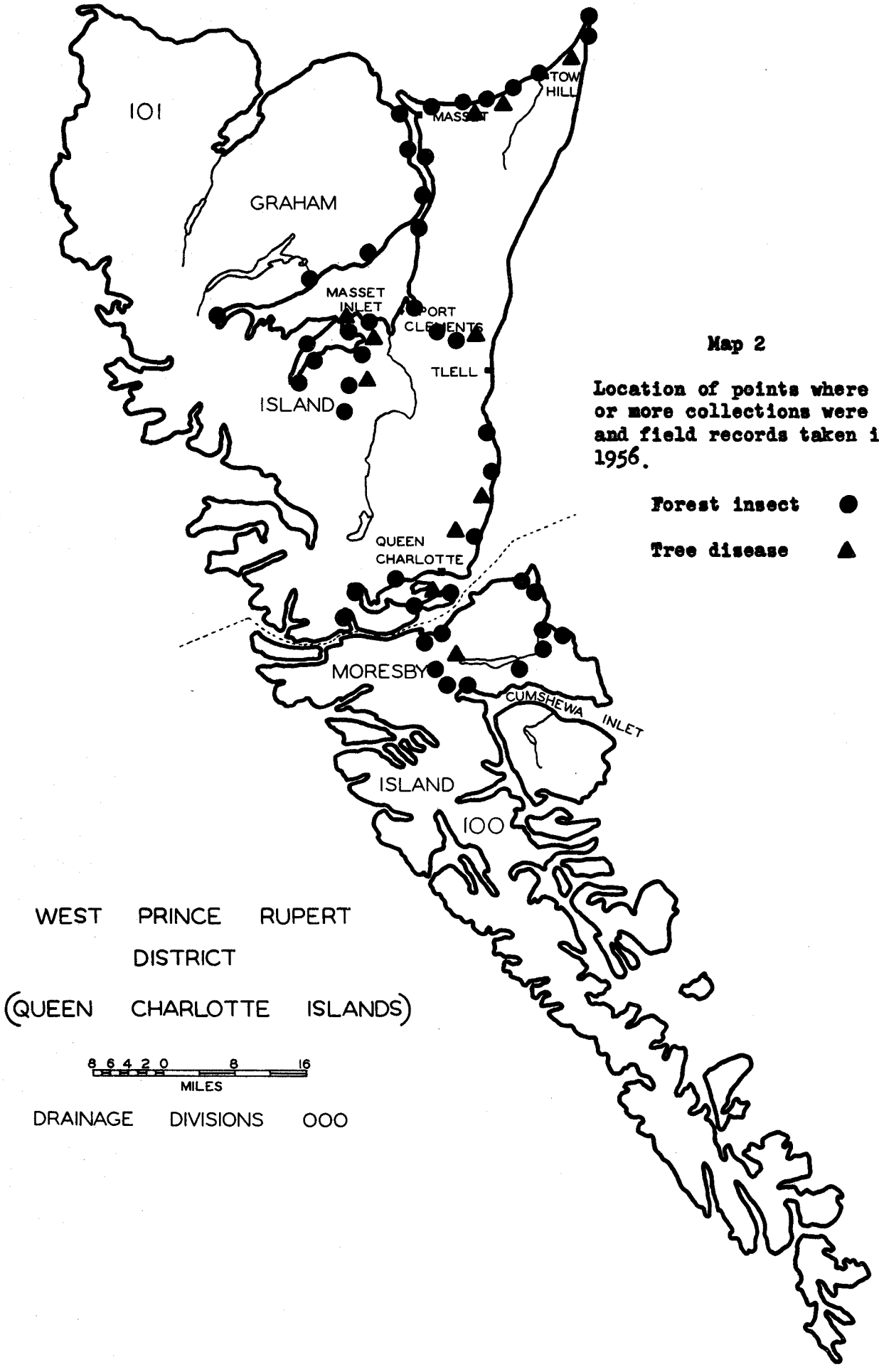
Melampsora occidentalis Jacks.

The unusual aspect in the occurrence of this rust fungus on black cottonwood is the absence, so far as is known, of the coniferous host, Douglas fir. The specimen submitted was taken at the mouth of the Kasiks River in the lower Skeena Valley. The closest known stands of Douglas fir are found at Babine Lake and in the Gardner Canal region, some 175 miles east and 80 miles southeast respectively.

Other diseases recorded in 1956 are listed below.

Disease	Host
Chrysomyxa monesis Ziller	Monesis uniflora
Peridermium "balsameum" Peck	Thuja plicata
Polyporous sulphureus (Bull.) Fr.	Tsuga heterophylla
?Dimerosporium sp.	Picea sitchensis
Hypodermataceae	Picea sitchensis
Peridermium "balsameum" Peck.	Abies lasiocarpa


WEST PRINCE RUPERT
DISTRICT (MAINLAND)
MILES
DRAINAGE DIVISIONS 000
Map 1
Location of points where one or more collections were made and field records taken in 1956.
Forest insect
Tree disease
106
BELL IRVING
BOWSER LAKE
RIVER
NASS
RIVER
MEZIADIN LAKE
STEWART
BROWN BEAR LAKE
ALICE ARM
RIVER
LAVA LAKE
105
PEARSE ISLAND
KITSUMKALUM LAKE
104
DUNDAS ISLAND
EXSTEW RIVER
TERRACE
103
PRINCE RUPERT
TYEE
SKEENA
RIVER
KITIMAT
102
ECSTALL RIVER

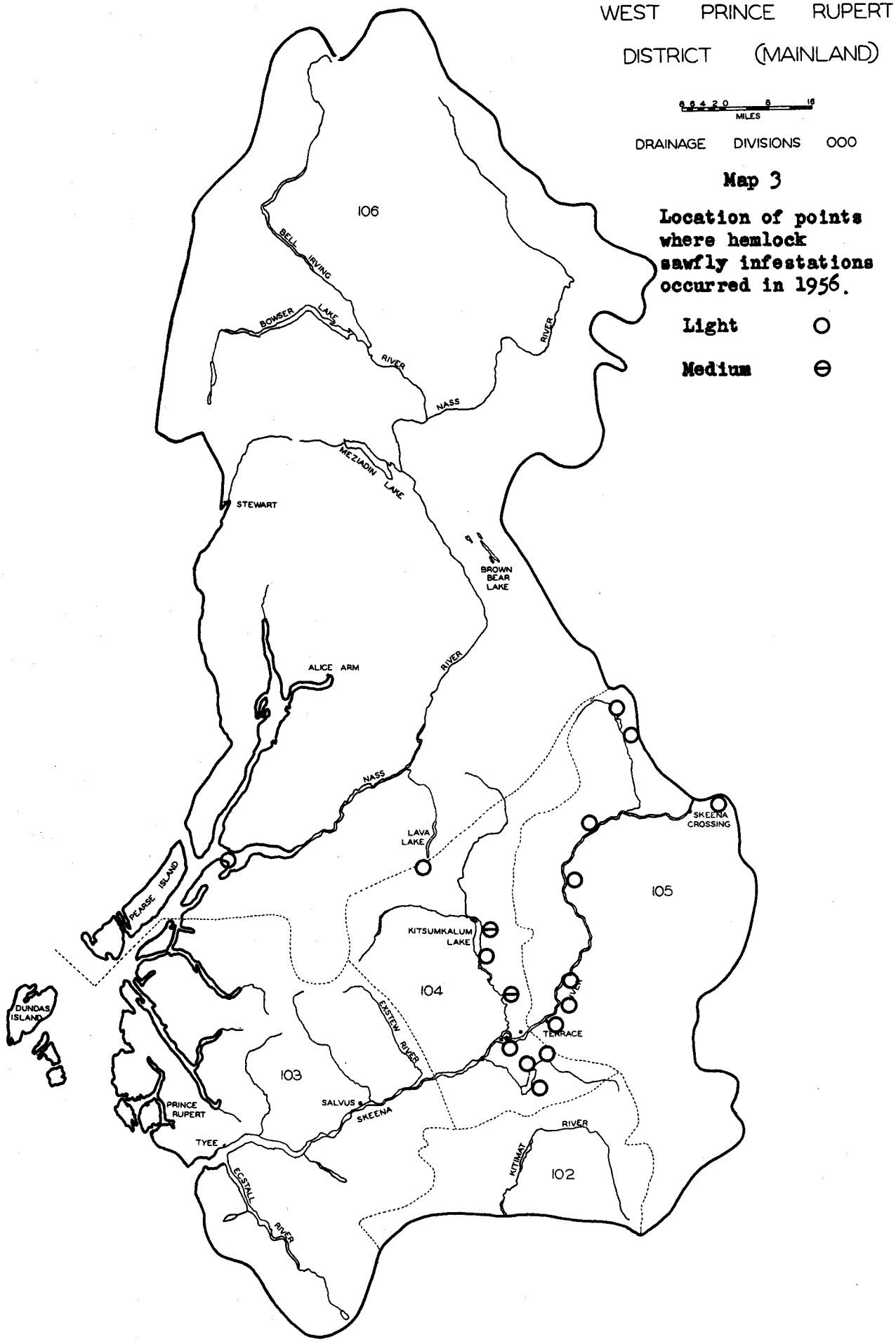


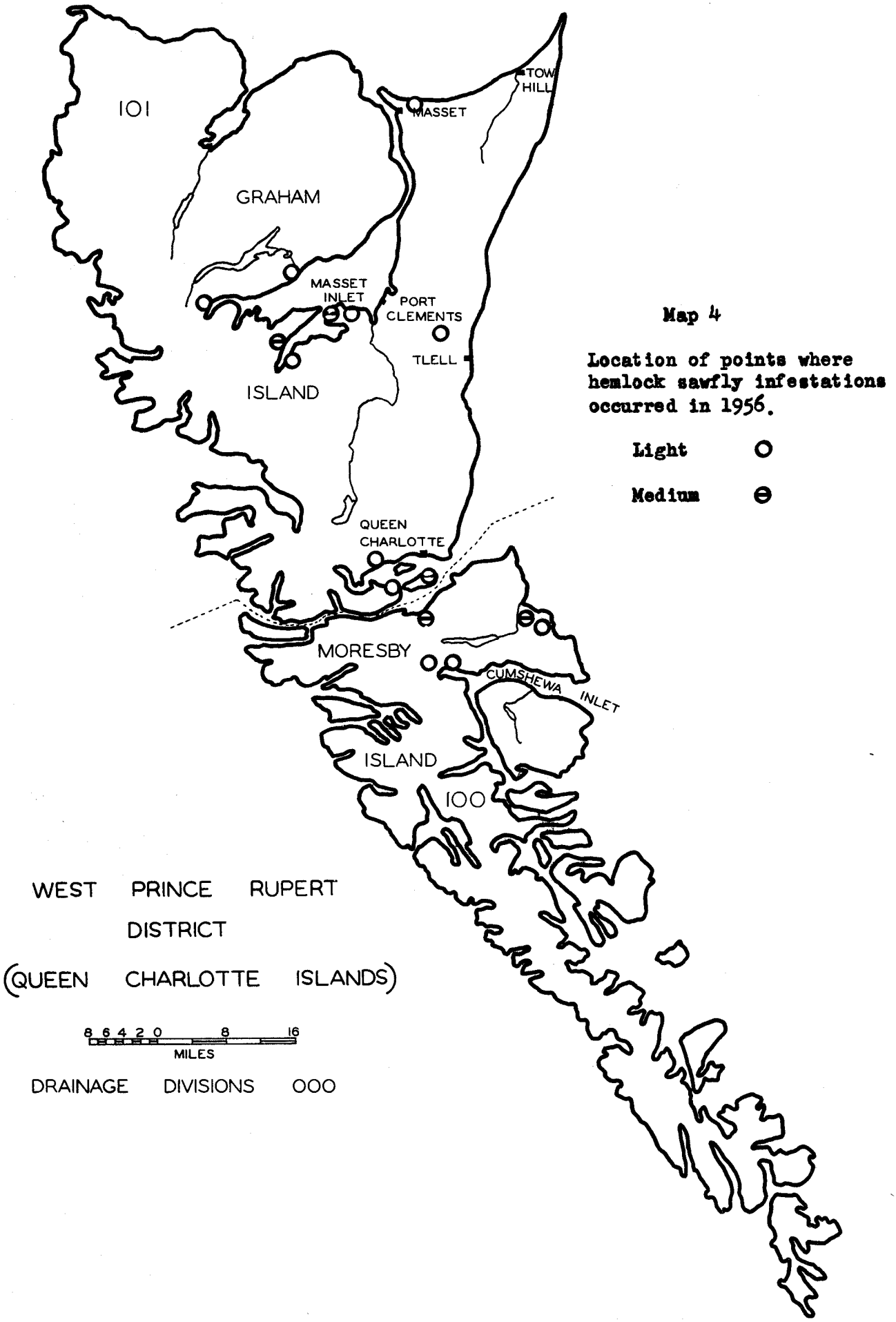
Map 2

Location of points where one or more collections were made and field records taken in 1956.

Forest insect ●

Tree disease ▲


WEST PRINCE RUPERT
DISTRICT (MAINLAND)
0 8 4 2 0 8 16
MILES
DRAINAGE DIVISIONS 000
Map 3
Location of points where hemlock sawfly infestations occurred in 1956.
Light O
Medium ⊖
106
BELL IRVING
BOWSER LAKE
RIVER
NASS
RIVER
MEZIADIN LAKE
STEWART
BROWN BEAR LAKE
ALICE ARM
RIVER
NASS
LAVA LAKE
SKEENA CROSSING
105
PEARSE ISLAND
KITSUMKALUM LAKE
104
DUNDAS ISLAND
EXSTEW RIVER
TERRACE
103
PRINCE RUPERT
SALVUS
SKEENA
RIVER
TYEE
KITIMAT
102
EGSTALL RIVER

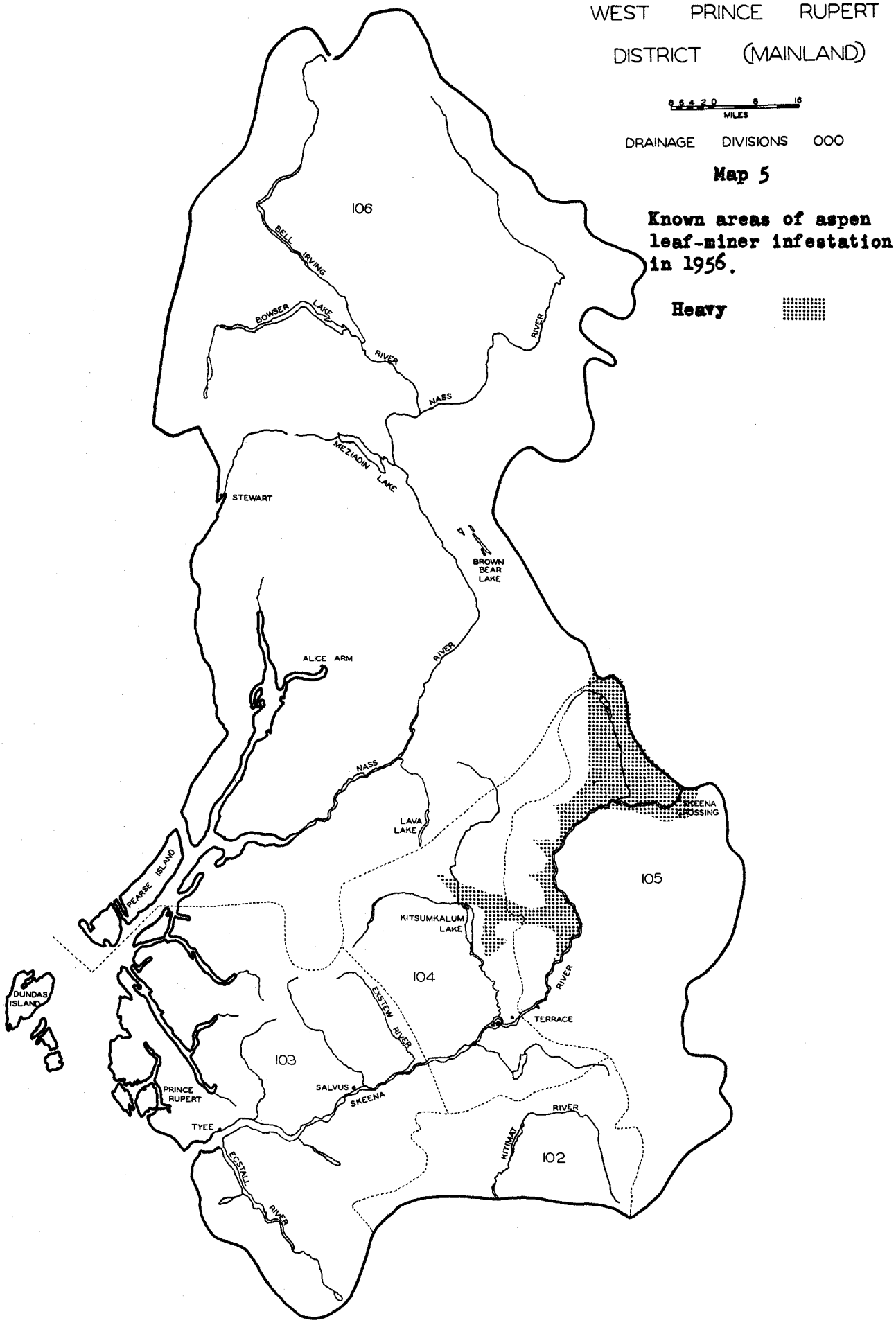


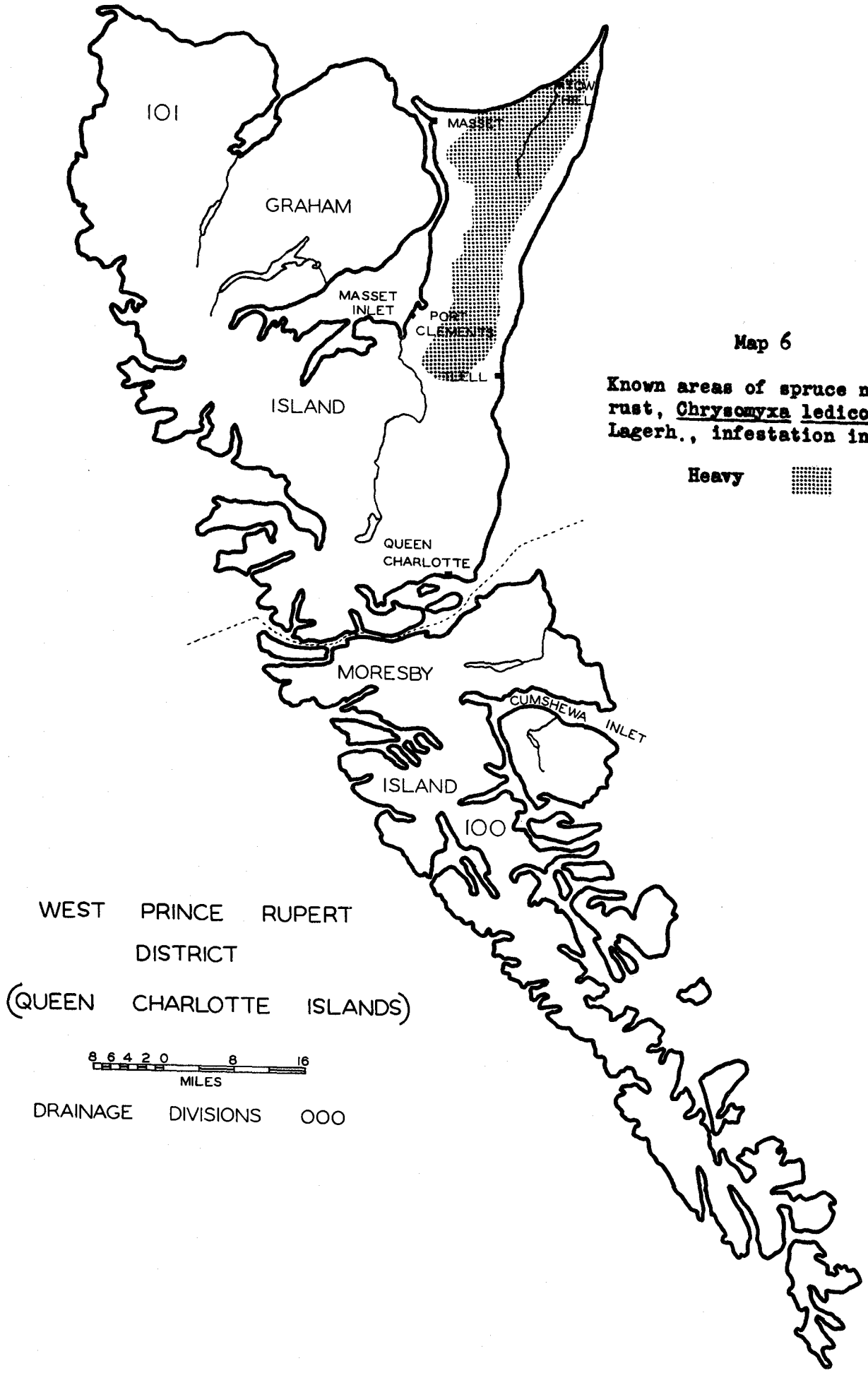
Map 4

Location of points where hemlock sawfly infestations occurred in 1956.

Light O

Medium ⊖


WEST PRINCE RUPERT
DISTRICT (MAINLAND)
MILES
DRAINAGE DIVISIONS 000
Map 5
Known areas of aspen leaf-miner infestation in 1956.
Heavy
106
BELL IRVING
BOWSER LAKE
RIVER
NASS
RIVER
MEZIADIN LAKE
STEWART
BROWN BEAR LAKE
ALICE ARM
RIVER
NASS
LAVA LAKE
KITSUMKALUM LAKE
105
104
RIVER
TERRACE
EXSTEW RIVER
103
SALVUS
SKEENA
PRINCE RUPERT
TYEE
RIVER
KITIMAT
102
EGSTALL RIVER
PEARSE ISLAND
DUNDAS ISLAND



Map 6

Known areas of spruce needle-rust, Chrysomyxa ledicola Lagerh., infestation in 1956.

Heavy

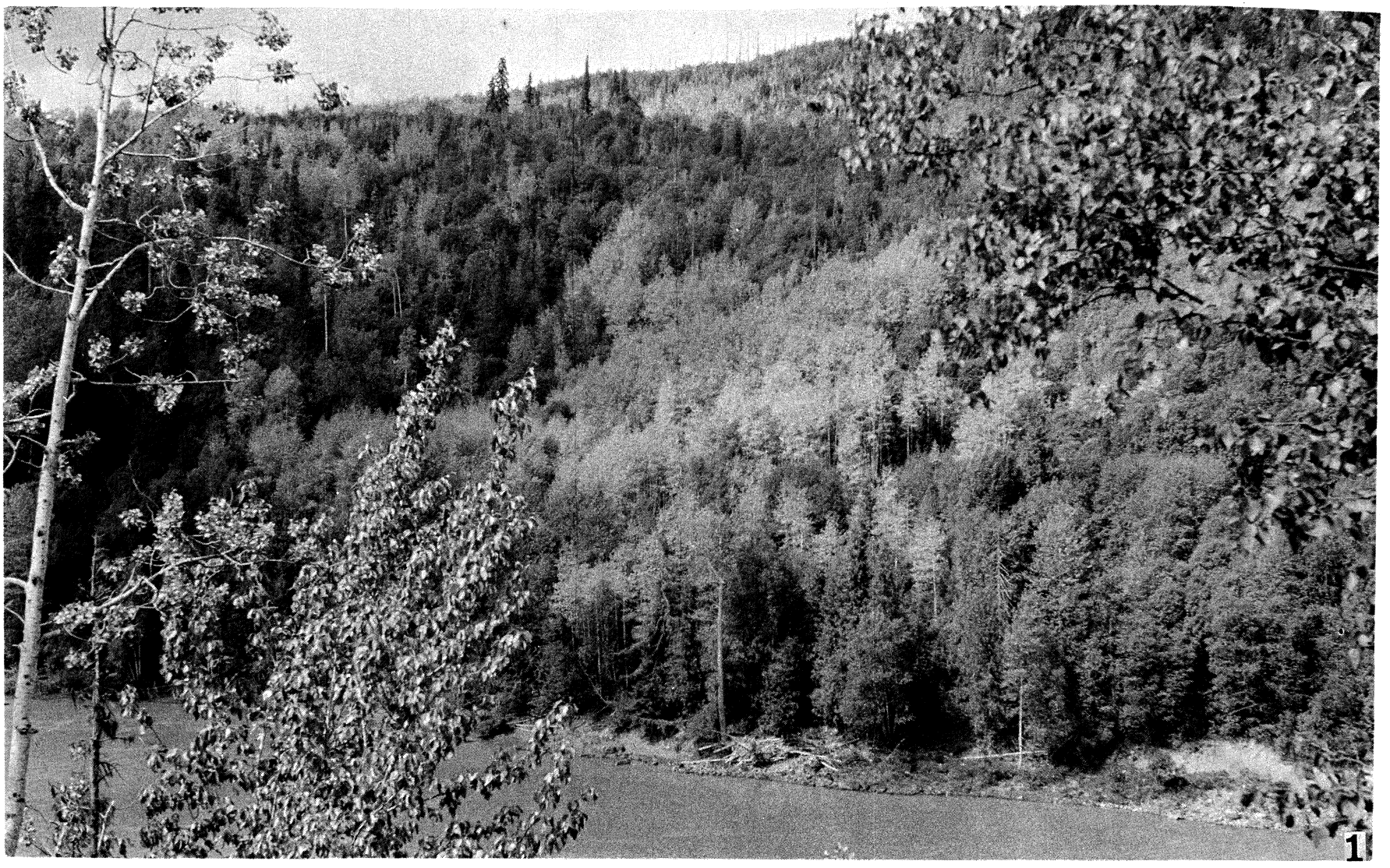


Figure 1. Trembling aspen infested by the aspen leaf-miner, Phyllocnistis populiella Chamb. Note the pronounced "whitish" appearance of the foliage. Terrace, West Prince Rupert, July 22, 1956. N.E. Alexander.

Figure 2. Lodgepole pine stand killed by undetermined agent(s) at Kitsumkalum Lake, West Prince Rupert. August 26, 1956. N.E. Alexander

Figure 3. Close-up of lodgepole pine inside stand shown in Figure 2. Note basal scars and sizes affected. August 26, 1956. N.E. Alexander.

ANNUAL REPORT OF FOREST BIOLOGY RANGER

for

EAST PRINCE RUPERT DISTRICT

1956

FOREST BIOLOGY SURVEY

EAST PRINCE RUPERT DISTRICT

1956

D. G. Collis

INTRODUCTION

In the course of conducting the Forest Biology Survey 275 insect collections and 33 pathological samples were taken between the end of May and the first of October. Collections by host trees and by agencies are shown in Tables 1 and 2 respectively. The location of collection points are shown on Map 1.

STATUS OF INSECTS

Spruce Budworm, Choristoneura fumiferana Clem.

The 2-year-cycle spruce budworm in the East Prince Rupert District was in the second or heavy feeding phase of development during 1956.

Investigations in 1955 indicated a sharp reduction in the budworm infestation which has been recorded in the Burns Lake - Babine Lake areas since 1950. This prediction held true in 1956 as only a small population persists in the area. One point of interest was the increase in the number of "off cycle" larvae, that is first-year larvae, during 1956. One sample on Augier Lake contained 14 of these specimens.

Table 3 shows a comparison between the number of larvae collected from 3-tree beatings at various points throughout the Burns Lake - Babine Lake infestation for the years 1950, 1952 and 1956.

In 1954 defoliation and a heavy moth flight were reported along the Babine Lake road to its junction with the Cronin Mine road 22 miles east of Smithers. Survey work up to this point in 1955 disclosed no larvae, but a light population was found from Smithers to Babine Lake. In 1956 there were still no larvae up to the mine road junction but from there north along Babine Lake and the Babine River to Mt. Horetzky and south to Tochcha Lake a severe infestation was recorded which covers approximately 1,000 square miles of territory. The known areas of infestation are shown on Map 2.

The mature timber involved includes an estimated 301,443,000 cubic feet of white spruce, Picea glauca (Moench) Voss, and 183,585,000 cubic feet of alpine fir, Abies lasiocarpa (Hook) Nutt. Lodgepole pine Pinus contorta var. latifolia Engelm. occasionally comprises a portion of these stands but thus far it has not been fed upon by the spruce budworm to any extent.

Table 1

Forest Insect Collections by Agencies
East Prince Rupert District - 1956.

Personnel involved in collection	Number of collections						Total
	May	June	July	Aug.	Sept.	Oct.	
Forest Biology Rangers independently	-	39	104	78	23	-	243
Forest Biology Rangers with Forest Service Personnel	-	-	3	-	-	-	3
Forest Service Personnel independently	1	-	3	15	6	2	27
Other co-operators	-	-	-	1	-	-	1
Total							275

Table 2

Collections by Hosts
East Prince Rupert District - 1956

Coniferous hosts	Forest insects	Tree diseases	Broad-leaved hosts	Forest insects	Tree diseases
white spruce	109		trembling aspen	12	
alpine fir	85		black cottonwood	8	
lodgepole pine	29		willow	4	
western hemlock	14		birch	3	
Douglas fir	3		wild cherry	1	
red cedar	2		no host	1	
mountain hemlock	2				
black spruce	1				
white bark pine	1				
			Total	29	
Total	246		Grand Total	275	

Table 3

Average number of Spruce Budworm Larvae Collected at Sample Points in the Burns Lake - Babine Lake Infestation.*

Location	1950	1952	1956
Henrietta Cr. - Taltapin Lk.	150	45	3
15 mi. Creek - Taltapin Lk.	116	3	5
N. side Babine Lake	65	64	5
Star Lake	67	86	0
Silver Island Landing Babine Lake	65	77	8

* No data available for 1954.

Defoliation was heavy over most of the infestation, with only a small area along Fulton Lake not showing discoloration. Many alpine fir understory trees were almost completely defoliated. This occurred after the middle of June when many of the larvae commenced to drop from the overstory and fed on these small trees. In early June, when the buds were about 3/4 of an inch long the trees appeared to be only lightly defoliated. On removing the bud cap only a shell of needles remained with a neat exit hole at the base. As feeding progressed in areas of high population all new growth was consumed. By September these trees had lost all 1956 foliage and had practically no 1956 twig growth. This lack of 1956 growth gave a false impression of the severity of defoliation. There was no noticeable loss of increment on the trees that were examined.

Defoliation of overstory trees ranged from 70 to 100 per cent of the 1956 needles, 5 to 100 per cent of the 1955 growth, and in some areas up to 15 per cent of the 1954 growth. Up to 15 feet of the tops of some trees were completely defoliated.

Five permanent sample plots were established in the East Prince Rupert District to study the effect of defoliation on tree growth. Table 4 shows the insect and defoliation conditions in these plots during 1956. All branch sample figures are the averages from six 18-inch branches, defoliation is an average of six trees. Egg mass figures are for August, 1956.

Table 5 shows the results of random egg samples taken in August and September throughout the current infestation at the north end of Babine Lake. The samples consist of six 18-inch branches from the mid-crown of 6 trees. The figures for branch widths and egg masses are an average of 6 branches.

Table 4.

Insect and Defoliation Conditions in Permanent Spruce Budworm Study Plots. 1956.

Location	Plot no.	Larval Samples		% 1956 Defoliation Needle year			Egg Samples	
		18" branch width	Av. no. larvae	1956	1955	Earlier	Branch width	Av. no. egg masses
Pinkut Lake	1	1.7	11.9	7	0	0	1.1	0.8
Smithers Ldg. Rd.	2	1.5	2.3	9	0	0	1.1	0
Nilkitkwa Trail	3	1.2	3.0	100	27	1	1.3	2.6
Babine Lake	4	1.7	11.5	100	97	7	1.3	1.0
Cronin Mine Rd.	5			100	94	9	1.0	5.3

Table 5

Egg counts and Defoliation Estimates in Random Plots in the Spruce Budworm Infestation, North End of Babine Lake. 1956.

Location	Av. width 18" branches	Av. no. egg masses per branch	Per cent 1956 defoliation		
			1956 growth	1955 growth	Earlier
Babine Lk. opposite Old Fort	1.2	1.1	100	90	10
Smithers Ldg. Babine Lk.	1.4	1.5	100	40	1
10 mi. S. of Fort Babine	1.2	1.1	100	90	7
Suskwa R. Fort Babine	1.1	3.1	100	100	4
Nichyeskwa Cr. trail	1.1	2.6	100	50	3
N. end Babine Lk.	1.0	4.5	100	100	10
Doris Lake	1.0	6.6	100	100	15
Cronine Mine Road	1.4	5.3	100	100	10
Babine R. near Kisgegas	1.0	1.6	100	70	10
Tochcha Lake	1.0	5.5	100	60	1

Although the ice on Babine Lake did not break up until the eighth of May, larvae were well developed by June 8. Samples taken on July 7 contained only pupae. Larvae commenced hatching from egg masses between August 7 and August 10.

Egg masses averaged approximately 50 eggs each. The highest ratio of eggs per mass occurred in the areas where defoliation and egg mass counts were highest. Larval emergence from the egg masses was high.

Parasitism in the insectary amounted to just over one per cent. No parasites had emerged from pupal cases collected at Pinkut Lake, Tochcha Lake and the Cronin Mine Road.

If the high budworm population indicated by the egg samples is maintained into 1958 the larvae will again inflict severe defoliation on these stands, causing at least an eventual decrease in increment, a loss of vigour and susceptibility to injurious attacks from other agents.

Figure 1 shows defoliation on a small understory alpine fir, Abies lasiocarpa (Hook) Nutt. The photograph was taken on June 19, 1956, when feeding was still in progress.

Mountain Pine Beetle, Dendroctonus monticolae Hopk.

Lodgepole Pine continued to die from attacks by the mountain pine beetle along Morrison and Babine lakes. The areas involved are indicated on Map 3.

There was a decrease in mortality during 1956 though the beetles were still active. An estimate based on the number of red tops visible indicated that approximately 750,000 f.b.m. of timber died this season. Red top trees tagged in September of 1955 had lost all their foliage by the fall of 1956. On the majority of green trees inspected that showed signs of attack the beetles had been drowned out by pitch. On one pine 45 pitch tubes occurred in four square feet of bark. None of these attacks was successful. However, such a heavy pitch flow tends to weaken the tree's resistance to further infestation.

Black-headed Budworm, Acleris variana (Fern.)

Table 6 shows a comparison of budworm collections from 1952 to 1956.

Aspen Leaf-miner, Phyllocnistis populiella Chamb.

All trembling aspen, Populus tremuloides Michx., trees in the area between Smithers and Hazelton, and in the Babine and Kispiox River valleys were heavily attacked by the aspen leaf miner (Map 4). Up to 100 per cent of the leaves on many trees contained larval mines. The mines gave the leaves a striking silvery appearance by mid-summer. This is the second year of heavy attack.

Table 6

Comparison of Black-headed Budworm Populations 1952 to 1956.

Year	No. of samples collected during larval period	No. of samples containing larvae	Average no. of larvae per sample
1952	145	62	8.5
1953	188	63	2.5
1954	85	41	10.0
1955	154	33	2.5
1956	97	11	1.4

The locations at which larvae were found in 1956 are shown on Map 3.

Engelmann Spruce Weevil, Pissodes engelmanni Hopk.

Leader damage was observed on white spruce, Picea glauca (Moench) Voss, reproduction throughout the district. The most severe infestation occurred near Sheraton Station in an old field where 19 of 72 young spruce suffered leader damage.

Spruce Gall Aphid, Adelges cooleyi (Gill)

This insect was very active on white spruce, Picea glauca (Moench) Voss. The heaviest attacks observed occurred in an area around the east end of Francois Lake. On one branch 52 of 85 branch tips supported galls.

Cottonwood Gall Aphid, Pemphigus populitrans versus Riley

Black cottonwood, Populus trichocarpa Torr. & Gray, in the vicinity of Francois and Babine lakes were severely infested by this aphid. The insect caused a gall to form on the leaf stem resulting in a premature loss of much foliage.

An Aspen Aphid.

Along the west side of Maclure Lake near Smithers aphis attacked a stand of aspen, Populus tremuloides Michx., with such intensity that the leaves and undergrowth became covered with sticky "honey dew". This condition attracted a tremendous wasp population.

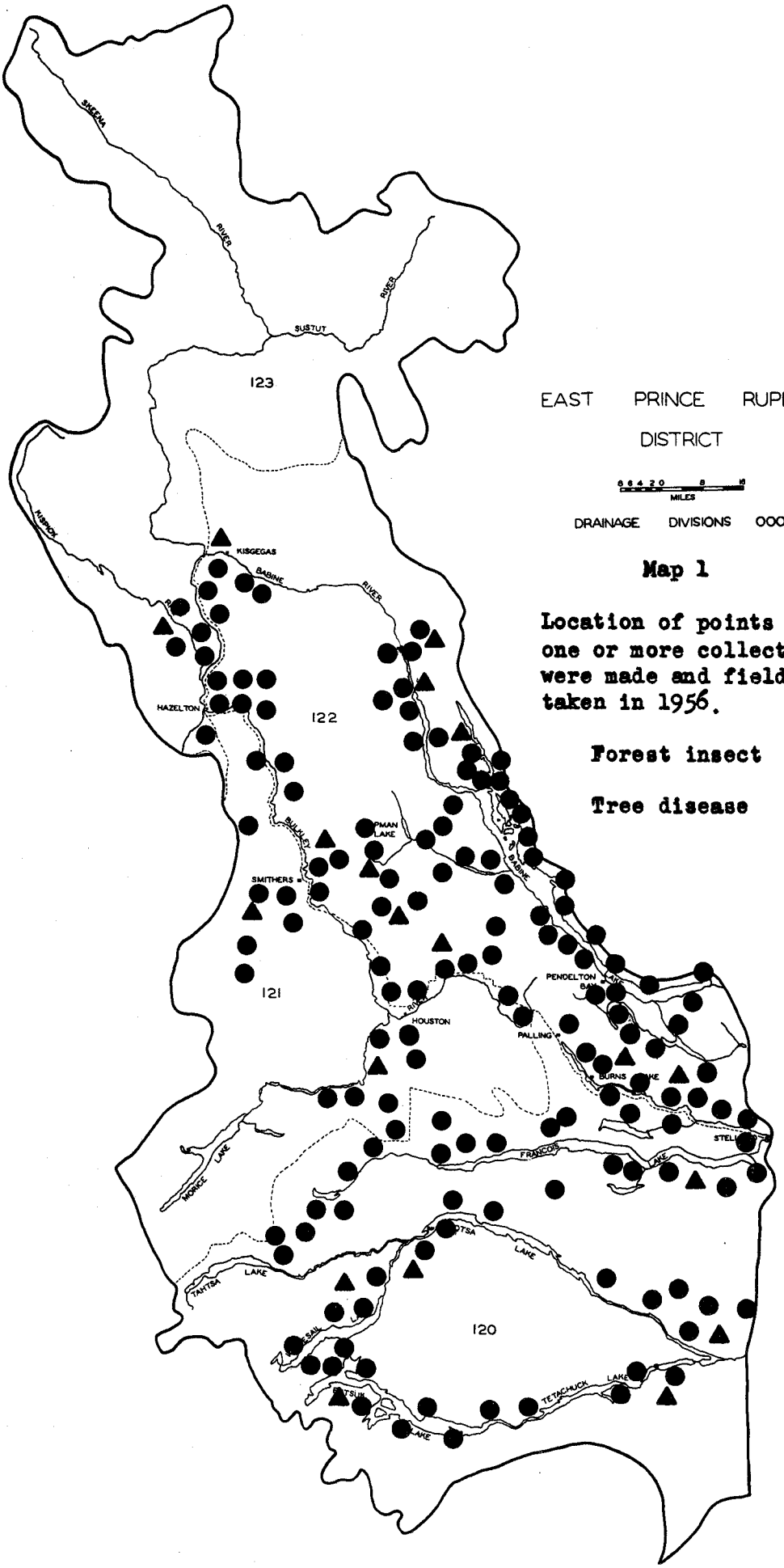
A Pine Aphid, Cinara spp.

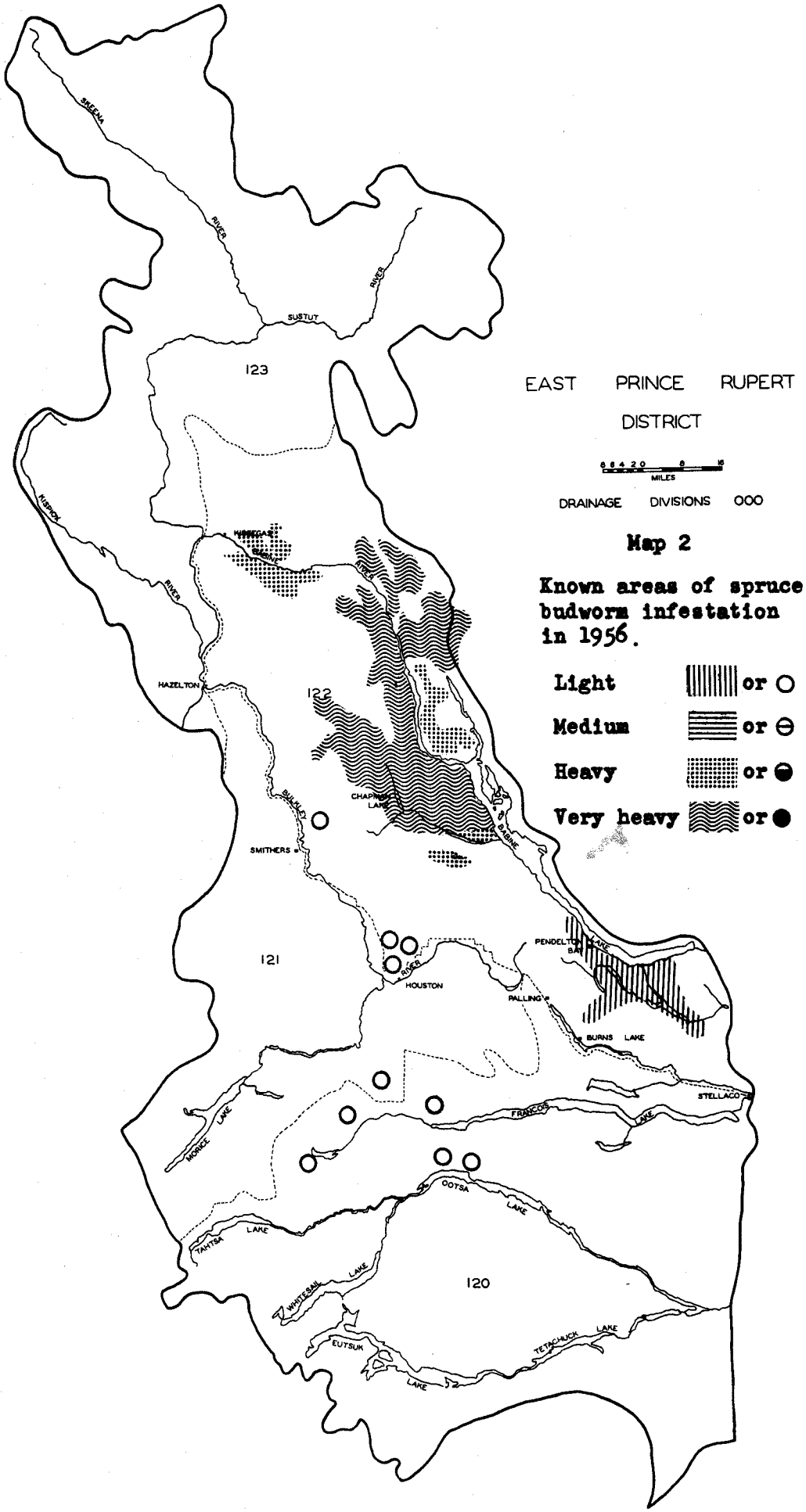
Lodgepole pine, Pinus contorta var. latifolia Engelm., was a favoured host of aphids during 1956, the feeding insects occasionally forming a black mass on the young growth. At one location on Cheslatta Lake, ants travelling to and from infested trees had worn trails in the grass up to three inches wide.

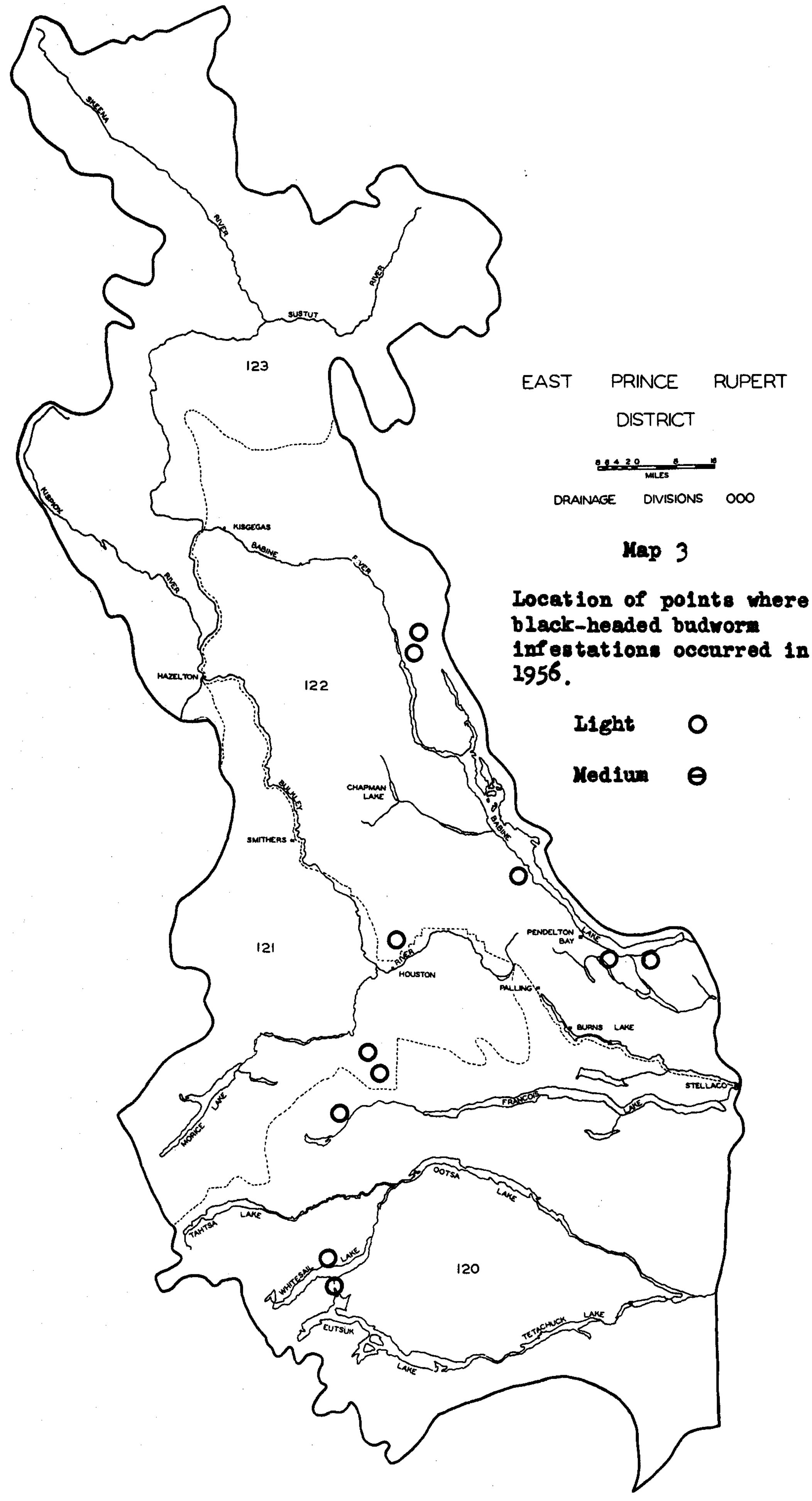
STATUS OF TREE DISEASES

The majority of the 33 disease collections taken in the East Prince Rupert District during 1956 consisted of foliage rusts. The occurrence and intensity of foliage rusts was not nearly as severe as in 1955.

Western hemlock, Tsuga heterophylla (Raf.) Sarg. in the Skeena and Kispiox River drainages suffered from heavy needle drop during 1956. The causal agent could not be determined either in the field or the Victoria laboratory.


SIKEENA
RIVER
SUSTUT
RIVER
123
EAST PRINCE RUPERT
DISTRICT
6 4 2 0 6 10
MILES
DRAINAGE DIVISIONS 000
Map 1
Location of points where one or more collections were made and field records taken in 1956.
Forest insect
Tree disease
KISPIOX
KISGEGAS
BABINE
RIVER
HAZELTON
122
BULKLEY
SMITHERS
121
HOUSTON
PENDELTON
PALLING
BURNS
FRANCOIS
LAKE
MORICE
LAKE
TAHTSA
LAKE
LAKE
120
TETACHUCK
LAKE
LAKE


SKEENA
RIVER
SUSTUT
RIVER
123
KISPIOX
RIVER
HAZELTON
122
BULKLEY
SMITHERS
121
HOUSTON
PENDELTON BAY
PALLING
BURNS LAKE
STELLAKO
FRANCOIS LAKE
MORICE LAKE
OOTSA LAKE
TAHTSA LAKE
WHITESAIL LAKE
120
EUTSUK LAKE
TETACHUCK LAKE
EAST PRINCE RUPERT
DISTRICT
8 6 4 2 0 8 16
MILES
DRAINAGE DIVISIONS 000
Map 2
Known areas of spruce budworm infestation in 1956.
Light or
Medium or
Heavy or
Very heavy or



Map 3

Location of points where black-headed budworm infestations occurred in 1956.

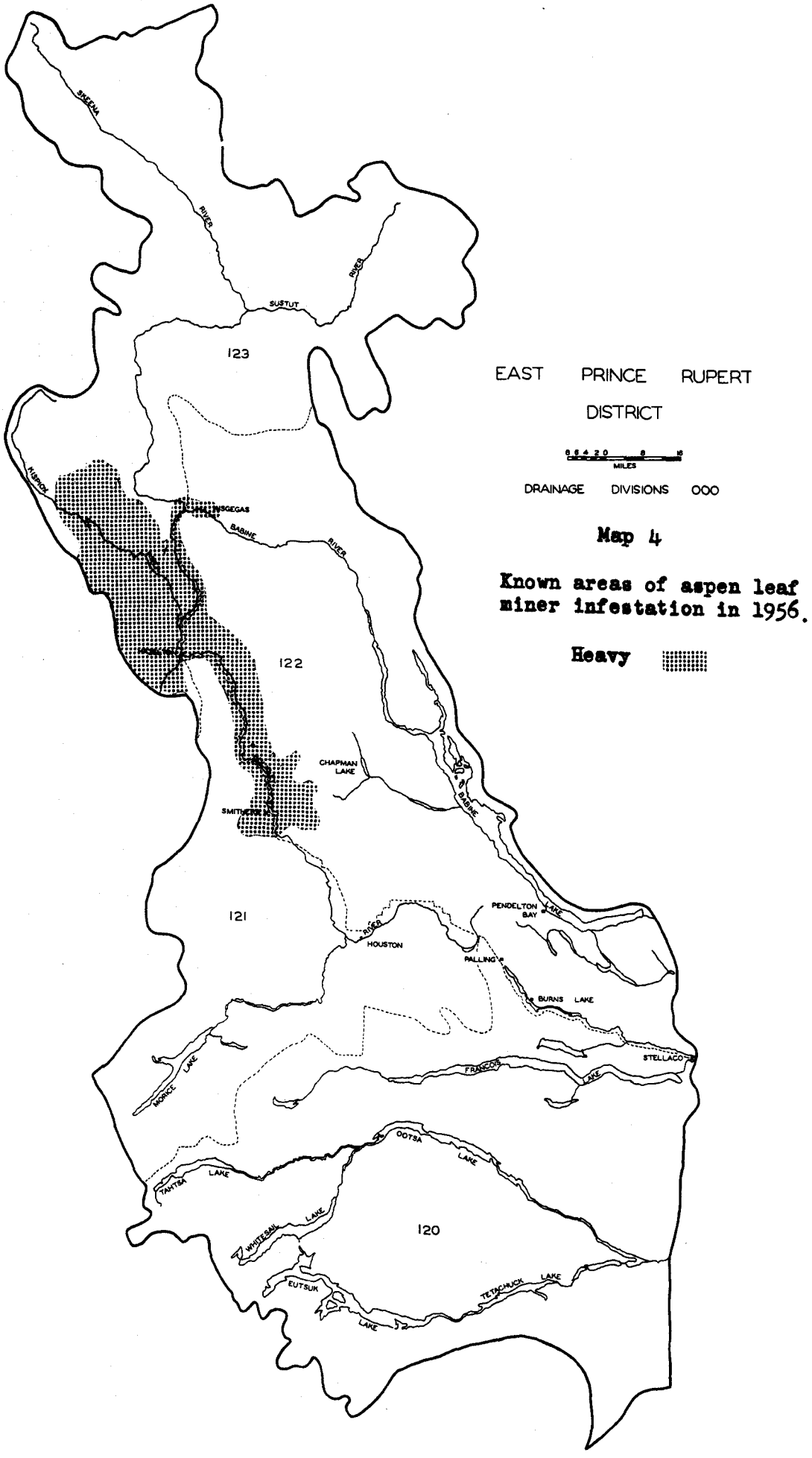

SKEENA
RIVER
SUSTUT
RIVER
123
EAST PRINCE RUPERT
DISTRICT
0 6 4 2 0 8 16
MILES
DRAINAGE DIVISIONS 000
Map 4
Known areas of aspen leaf miner infestation in 1956.
Heavy
KUSKONKA
BABINE
RIVER
122
CHAPMAN LAKE
SMITHERS
BABINE
PENDELTON BAY
LAKE
121
HOUSTON
PALLING
BURNS LAKE
STELLACO
FRANCOIS
LAKE
MORICE LAKE
OOTSA
LAKE
TAHTSA
LAKE
WHITESAIL LAKE
120
EUTSUK
LAKE
TETACHUCK
LAKE

Figure 1. Spruce budworm, Choristoneura fumiferana (Clem.), defoliation on understory alpine fir. Smither's Landing, Babine Lake, East Prince Rupert. June, 1956. D.G. Collis

ANNUAL REPORT OF FOREST BIOLOGY RANGERS

BRITISH COLUMBIA

1956

KAMLOOPS FOREST DISTRICT

FOREST BIOLOGY SURVEY

KAMLOOPS FOREST DISTRICT

1956

B. A. Sugden

INTRODUCTION

Personnel of the Vernon Forest Biology Laboratory assigned to the Kamloops Forest District for 1956 were: Forest Biology Rangers W. E. Bitz, C. B. Cottrell, and B. A. Sugden. These rangers conducted the field work in the West, Central, and East Kamloops Forest Biology Ranger districts respectively.

In 1954 a cabin was built at Williams Lake for the convenience of the ranger working in the West Kamloops Forest Biology Ranger District. This cabin was used almost continuously from April to the end of September. A fully equipped house trailer was assigned to the Central District. The trailer proved satisfactory and increased efficient coverage of the District.

This year a general decline was evident in the populations of bark beetles, Dendroctonus spp.; however, they continued to be the most destructive forest insects of merchantable timber in Kamloops Forest District. The sudden, early advent of cold weather during November of 1955, may have been responsible for the decrease in populations, particularly the Douglas-fir and mountain pine beetles. An examination of the broods of these two species, made early in the season, showed unusually high mortality of overwintering adults and larvae.

During the latter portion of the field season a damage appraisal was made of timber destroyed by bark beetles during the years 1953, '54, and '55. The appraisal was confined to trees of merchantable size and included those damaged by four species of bark beetle: the Douglas-fir, mountain pine, western pine, and Engelmann spruce beetles.

Defoliation of trembling aspen trees by the satin moth continued near Lac du Bois, Harper Ranch, and Currie Lake. Parasitism increased and a decline in population of this species occurred.

Only one infestation of the forest tent caterpillar was observed in the District. Defoliation was severe over a large area near the north end of Adams Lake. An egg survey indicated that a high population may be expected in 1957.

The small outbreak of Douglas-fir tussock moth near Olalla has subsided. However, larvae of this species were collected from widely separated points. Tussock moths undoubtedly are increasing in the District.

An infestation of 1-year-cycle spruce budworm extended over 120,000 acres in the Lillooet District. Defoliation of the current Douglas-fir foliage ranged from 30 to 100 per cent.

The year 1956 was the flight year for the 2-year-cycle spruce budworm and the damage resulting from the feeding larvae reached a maximum for the current cycle. Surveys made in the spruce-alpine fir forests revealed little defoliation by the spruce budworm. Generally populations were much lighter than during the 1954 flight.

An increase was noted in the number of black-headed budworm collected on Douglas-fir foliage from Lytton north to Clinton. Defoliation was light.

The aspen leaf-miner continued to damage trembling aspen over most of the Central and Eastern districts. In many cases 100 per cent of the leaves had been infested.

Winter injury to ponderosa pine trees extended over about 200 square miles in the Merritt and Princeton Ranger districts. Mortality so far has been confined to some of the small reproduction pine.

ANNUAL REPORT OF FOREST BIOLOGY RANGER

for

WEST KAMLOOPS DISTRICT

1956

FOREST BIOLOGY SURVEY

WEST KAMLOOPS DISTRICT

1956

W. E. Bitz

INTRODUCTION

In 1956, the Forest Insect Survey field season extended from May 30 to September 30. Random sampling was carried on until August 14 and the remainder of the season's activity was spent on the "Damage Appraisal Survey".

Prior to the field season the writer assisted in the Douglas-fir beetle project of Dr. L. H. McMullen, and with improvements and maintenance work on the ranger cabin at Williams Lake.

During the 1956 season, 234 forest insect collections and 18 tree disease collections were obtained from a number of hosts in the West Kamloops District. Table 1 shows these collections by agencies and Table 2 by hosts.

STATUS OF INSECTS

Douglas-fir Beetle, Dendroctonus pseudotsugae Hopk.

The Douglas-fir beetle continued to be the most destructive insect pest in the West Kamloops District, although an over-all decrease in tree mortality due to this species was evident. This observation was substantiated by examination of beetle broods in areas where heavy attack had occurred in 1955. An examination of log sections from the Williams Lake area in January showed mortality of 67 to 96 per cent of the adults due to the early and severe winter. A subsequent field examination in April in the Lac la Hache area showed similar but less severe results. Mortality ranged between 57 and 64 per cent; a normal winter mortality in this area is believed to be about 12 per cent. Apparently winter mortality was a major factor in the decline of beetle populations and a subsequent decline of tree mortality.

In the "winter damaged" area, west of Lac la Hache, a number of additional strip plots were established this year making a total of 16 at Helena and Place lakes. These strips, 80 by 6 chains, are maintained for an annual check on bark beetle fluctuations. Table 3 gives the comparable figures for 1955 and 1956 tree mortality for this area. The average number of trees infested per acre in 1956 was 0.28 and 0.88 in 1955.

Table 1

Forest Insect Collections by Agencies
West Kamloops District - 1956

Personnel involved in collection	Number of collections						Total
	May	June	July	Aug.	Sept.	Oct.	
Forest Biology Rangers independently	-	89	93	52	-	-	224
Forest Biology Rangers with Forest Service Personnel	-	-	-	-	-	-	-
Forest Service Personnel independently	-	-	-	-	-	-	-
Other co-operators	-	-	-	10	-	-	10
Total	-	89	93	62	-	-	234

Table 2

Collections by Hosts
West Kamloops District - 1956

Coniferous hosts	Forest insects	Tree diseases	Broad-leaved hosts	Forest insects	Tree diseases
Douglas fir	104	4	trembling aspen	7	2
Engelmann spruce	42	3	alder spp.	5	
lodgepole pine	33	1	willow spp.	4	-
ponderosa pine	12	4	chokecherry	2	-
western hemlock	10	2	western white birch	1	-
common juniper	4	1	miscellaneous	4	-
western red cedar	3	-			
alpine fir	3	1			
			Total	23	2
Total	211	16	Grand Total	234	18

Table 3

Cruise of Strip Plots in Winter Damaged
Douglas-fir Trees at Helena and Place Lakes

	November 1955			August 1956		
Strip	Size of strip (chains)	No. of attacked trees	No. per acre	Size of strip (chains)	No. of attacked trees	No. per acre
Helena Lake						
1				80 x 6	8	0.17
2	80 x 6	6	0.13	80 x 6	27	0.56
3	80 x 6	31	0.65	80 x 6	15	0.31
4				80 x 6	2	0.04
5	80 x 6	12	0.25	80 x 6	6	0.12
6				80 x 6	5	0.10
7	80 x 6	137	2.85	80 x 6	15	0.31
8					5	0.10
	Total	186	Av. 0.97	Total	83	Av. 0.21
Place Lake						
1	80 x 6	9	0.28	80 x 6	6	0.12
2				80 x 6	0	0.0
3				80 x 6	47	0.98
4	60 x 4	56	2.33	80 x 6	43	0.90
5				80 x 6	10	0.21
6				80 x 6	24	0.50
7				80 x 6	0	0.0
8				80 x 6	2	0.04
9	22 x 4	1	0.11			
10	80 x 4	3	0.09			
	Total	69	Av. 0.71	Total	132	Av. 0.34
Average			0.88			0.28

A "Damage Appraisal Survey" was made in the remainder of the District to obtain an estimate of tree mortality caused by this beetle during the years 1953 to 1955 inclusive. The figures were obtained by a visual count of attacked trees from vantage points and roads, and from published data of the timber stands. Table 4 gives the number of beetle-killed trees by areas.

Table 4

Douglas-fir Trees Killed by Douglas-fir Beetle
from 1953 to 1955 inclusive in West Kamloops District

Location	No. of trees	sub-total
Macalister - Williams Lake		
Macalister	214	
McLeese Lake	101	
Fraser River (west bank)	792	
Fraser River (east bank)	87	
Williams Lake	205	
Hawks Creek	184	1,583
San Jose River - Lac la Hache		
Spokin Lake	40	
150 Mile House	165	
Springhouse - Chimney Lake	1,366	
Fraser River (Chilcotin)	328	
San Jose River	1,495	
Lac la Hache	1,165	4,559
100 Mile House		
Bridge Creek	1,465	
Canim Lake	75	
100 Mile - Lac la Hache	485	
100 Mile - Clinton	200	2,225
Clinton		
Loon Lake	315	
Pavilion	118	433
Total		8,800

Spruce Budworm, Choristoneura fumiferana (Clem.)

Larvae of the 1-year-cycle spruce budworm were found in light to heavy infestation proportions over an area of about 120,000 acres. Douglas-fir stands extending from the Fraser River south of Lillooet through Seton and Anderson lakes to the north and west were attacked. The terrain in this area is generally very steep and is traversed by deep ravines with a few agriculture benches at irregular intervals usually close to the Fraser River. Due to the rough, rocky nature of the country it is irregularly timbered making it difficult to assess damage or intensity of attack except by localized areas. The areas of heaviest attack were: at Cayoosh Creek near Lillooet; along the west bank of the Fraser River below Lillooet; along the south shoreline of Seton Lake and extending halfway along Anderson Lake.

Eight study plots were established at sites of heavy attack throughout the infestation (see Map 3). One tree selected at random in each plot was used to obtain detailed information on the budworm population. Two sample branches were taken from the centre section of each tree; 50 terminals from each branch were examined and their condition classified. A count of needles and needle scars was also made on terminals for a defoliation estimate. Table 5 gives the details of terminal classification and Table 6 gives the estimate of defoliation for each plot; Table 7 gives an ocular estimate of defoliation.

Table 5

Percentage of New Douglas-fir Terminals Defoliated and Extent of Defoliation. Based on Two Branch Samples from One Tree on Each Plot, Lillooet Area, September, 1956

Plot No.	Terminals 100% defoliated		Terminals more than 50% defoliated	Terminals less than 50% defoliated
	Alive	Dead		
1	40	22	20	18
2	4	0	64	32
3	34	0	36	30
4	74	0	10	16
5	50	0	24	26
6	18	0	18	64
7	2	0	2	96
8	18	0	44	38

Table 6

Estimated Defoliation of Current and Old Foliage, Based on a Count of Needles and Needle Scars. Lillooet Area, September, 1956

Plot No.	Per cent defoliation	
	Current foliage	Old foliage
1	77	7
2	58	6
3	66	26
4	100	28
5	90	20
6	53	7
7	0	20
8	85	10

Table 7

Ocular Estimate of Spruce Budworm Defoliation
of Current and Total Foliage.
Based on Average of Ten Trees in Each Plot.

Plot No.	Per cent defoliation	
	Current foliage	Total foliage
1	75	15
2	50	15
3	75	15
4	90	27
5	100	28
6	32	10
7	no data	no data
8	85	19

Areas of light attack were observed at Bridge River near its confluence with the Fraser River and along the east bank of the Fraser River from Lytton southward to the Vancouver Forest District boundary. Examination of terminals showed an average of 10 per cent attacked in both areas; variation was from 5 to 20 per cent. Standard collections at the Bridge River site contained an average of 26 larvae. No standard collections were taken from the vicinity of Lytton although a number of hand-picked collections were obtained for insectary rearing. The infestation along Seton and Anderson lakes was discovered after the larval season, consequently no rearing data were obtained for this area. Insectary records indicated a parasitism rate of 10 per cent at Lytton and 5 per cent at Lillooet. No information was obtained on the incidence of disease but it was assumed from larval survival that disease was negligible or absent.

Table 8

Summary of Spruce Budworm Emergence and Pupal Mortality
in the Lillooet Area, September, 1956.

Plot No.	No. of pupae	Mortality of pupae		Percentage emerged
		Parasitism	Other causes	
1	no data	no data	no data	no data
2	35	2	0	94
3	44	7	0	81
4	56	5	0	90
5	34	2	1	91
6	no data	no data	no data	no data
7	35	6	0	80
8	92	17	0	78

The data on adult emergence and pupal parasitism, appearing in Table 8, were obtained from pupal examinations by Dr. G. T. Silver who also provided the details on egg mass counts. Analysis of egg mass collections from the study plots are shown in Table 9. On the basis of an egg population of 200 masses per 100 square feet of foliage being necessary to cause complete defoliation of new growth and considerable "back feeding", a heavy infestation may be expected in 1957 at Plots 1, 2, 4, and 8. These plots are located mainly along the south shores of Seton and Anderson lakes.

Table 9

Number of Spruce Budworm Egg Masses per 100 Square Feet of Foliage on One Tree per Plot. Lillooet Area, September, 1956

Plot	Area	Sample	Egg masses per 100 sq. ft.	Egg masses with parasites	Prediction for 1957
1	Seton Lake	1	53.8	1	heavy
		2	244.9	3	heavy
2	Seton Lake	1	187.5	2	heavy
		2	423.1	1	heavy
3	Anderson Lake	1	71.4	0	light
		2	13.5	0	light
4	Anderson Lake	1	200	0	heavy
		2	130	0	medium
5	Spider Creek	1	61.9	1	light
		2	156.2	0	medium
6	Fraser River	1	16	0	light
		2	no data	0	light
7	Fraser River	1	46.9	0	light
		2	44.4	0	light
8	Cayoosh Creek	1	125.0	0	medium
		2	351.4	0	heavy

Black-headed Budworm, Acleris variana (Fern.)

In 1956, an increase in population density and extent was evident. Three-tree beating collections from two localities near Clinton, one at Pavilion Mountain and the other near Maiden Creek, contained a maximum of 30 and 17 budworm respectively. Up to 5 larvae per collection were common throughout the Douglas-fir stands near Lytton, Lillooet and Clinton; the host was Douglas-fir in all cases. One or two black-headed budworm per collection were obtained from Douglas-fir and Engelmann spruce trees near Williams Lake and Lac la Hache.

Douglas-fir Tussock Moth, Hemerocampa pseudotsugata McD.

This species was taken in the West Kamloops District for the first time since 1950. Specimens were collected from Douglas-fir along the Fraser River near Lillooet and at Bridge River near its confluence with the Fraser River. A maximum of three larvae was obtained near Bridge River.

Western Hemlock Looper, Lambdina fiscellaria lugubrosa (Hlst.)

Larvae of this species were obtained in collections from two locations only: one area near Lillooet yielded single specimens in two standard collections from Douglas-fir trees; the other collection was taken in the cedar-hemlock stands of the Quesnel Lake region where a maximum of five larvae was obtained in a standard sample from western hemlock.

False Hemlock Looper, Nepytia canosaria Wlk. ?

Two small areas of above-average numbers of larvae were located along the Fraser River about seven miles north of Lillooet and at the confluence of the Bridge and Fraser rivers. The maximum numbers per standard collection were 11 and 23 respectively. Collections containing one or two larvae were obtained from the Lytton area, along Lower Hat Creek and from the Clinton area. The host was Douglas fir in all cases.

A Web-spinning Sawfly, Pamphiliidae

A number of special collections from ponderosa pine from the Spences Bridge and Lillooet areas were sent to the Victoria laboratory. No noticeable damage due to this sawfly was encountered.

Pine Needle Fascicle Miner, Zelleria haimbachi Busck.

A small area of heavy attack by this species was located near Shaw Springs in the lower Fraser Valley. The infestation occupied about 100 acres of second growth and reproduction ponderosa pine. An examination of the infested trees showed between 40 and 100 per cent of new terminals had been attacked. A light population was noted for a distance of about 12 miles southward.

Spotless Fall Webworm, Hyphantria textor Harr.

A new northern locality record was established this year when this species was collected from western chokecherry, Prunus virginiana demissa, near Hawks Creek north of Williams Lake.

STATUS OF TREE DISEASES

Winter Damage

In 1956, prominent discoloration, believed to be due to adverse climatic conditions, was observed on Douglas fir foliage in the Chilcotin district. The area affected extended in a east-west direction along the valleys of Riske Creek, Chilcotin River, Chilanko River and Tatla Lake. The area consists mainly of undulating semi-open range land timbered with Douglas fir and lodgepole pine. The most severe discoloration occurred between Riske and Alexis creeks. An examination of the stands in this area revealed the overmature trees to be the most severely affected; entire branches in the upper half of the crowns were brown and up to 75 per cent of the foliage was damaged. Understory growth was not as severely affected although discoloration was considerably higher than normal, particularly in the inner crown foliage of the last two or three years' growth appeared healthy. An unusual aspect of the injury was the browning of foliage in September rather than in spring or early summer. This may have been caused by the long period of drought in 1956 following an early and severe winter in 1955-56. This damage extended in diminishing severity westward to Tatla Lake, and similar foliage browning was noted on some exposed hillsides, bluffs and at the higher elevations from Riske Creek eastward to Williams Lake.

Flagging of Ponderosa Pine caused by Cenangium ferruginosum (Fr.)

Samples tentatively identified as Cenangium ferruginosum were taken from ponderosa pine trees near Clinton.

A Needle Cast of Ponderosa Pine caused by Elytroderma deformans (Weir) Darker

This fungus was common on ponderosa pine at Clinton, Cache Creek, and in the vicinity of Lillooet.

A Bacterial Gall, Pseudomonas syringae

Samples taken from young trembling aspen trees near Beaver Lake in the Williams Lake district, contained galls tentatively identified as Pseudomonas syringae. Noticeable dieback had taken place over an area of about 10 acres in a pure stand of trembling aspen.

A Needle Rust on Alpine Fir, Peridermium holwayi

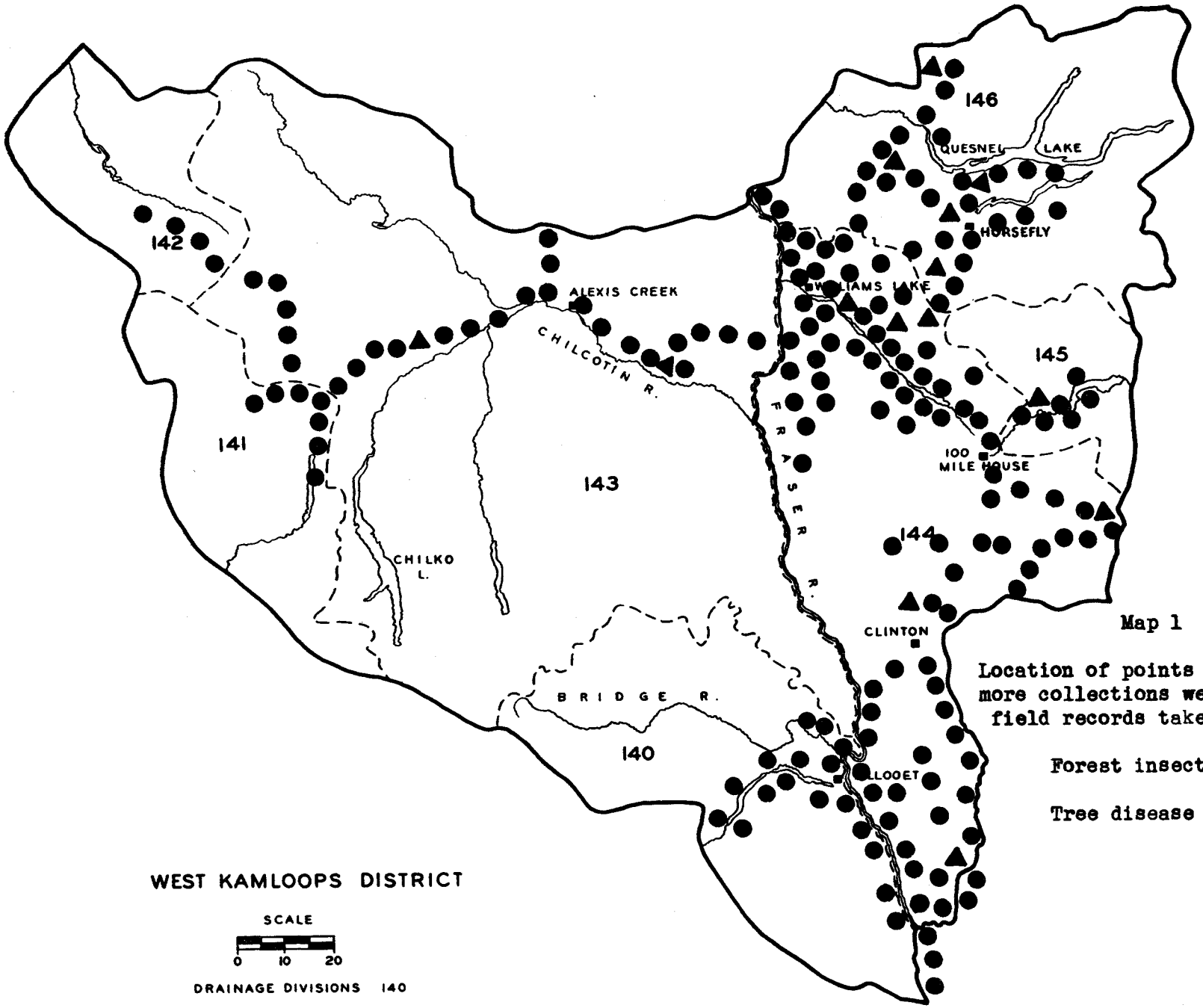
A light infection caused by this rust was found throughout the alpine fir growth between Likely and Keithley Creek in the Quesnel Lake region.

Indian Paint Fungus, Echinodontium tinctorium E. and E.

Conks formed by this fungus were common on western hemlock throughout the cedar-hemlock stands of the Quesnel Lake area.

Yellow Witch's Broom caused by Peridermium coloradense (Diet.)

This disease was widespread in Engelmann spruce stands throughout the District.



Map 1

Location of points where one or more collections were made and field records taken in 1956.

Forest insect ●

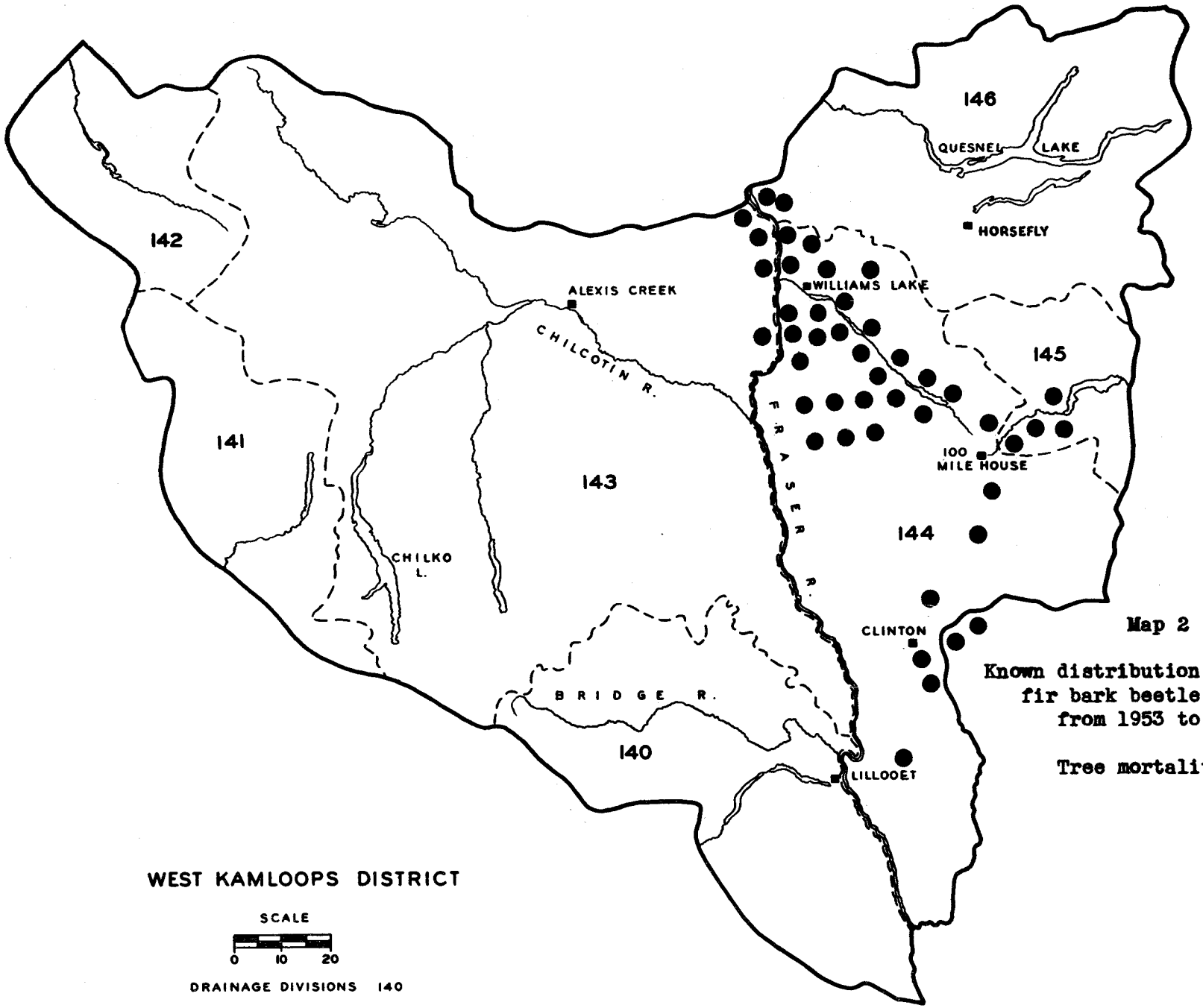
Tree disease ▲

WEST KAMLOOPS DISTRICT

SCALE

0 10 20

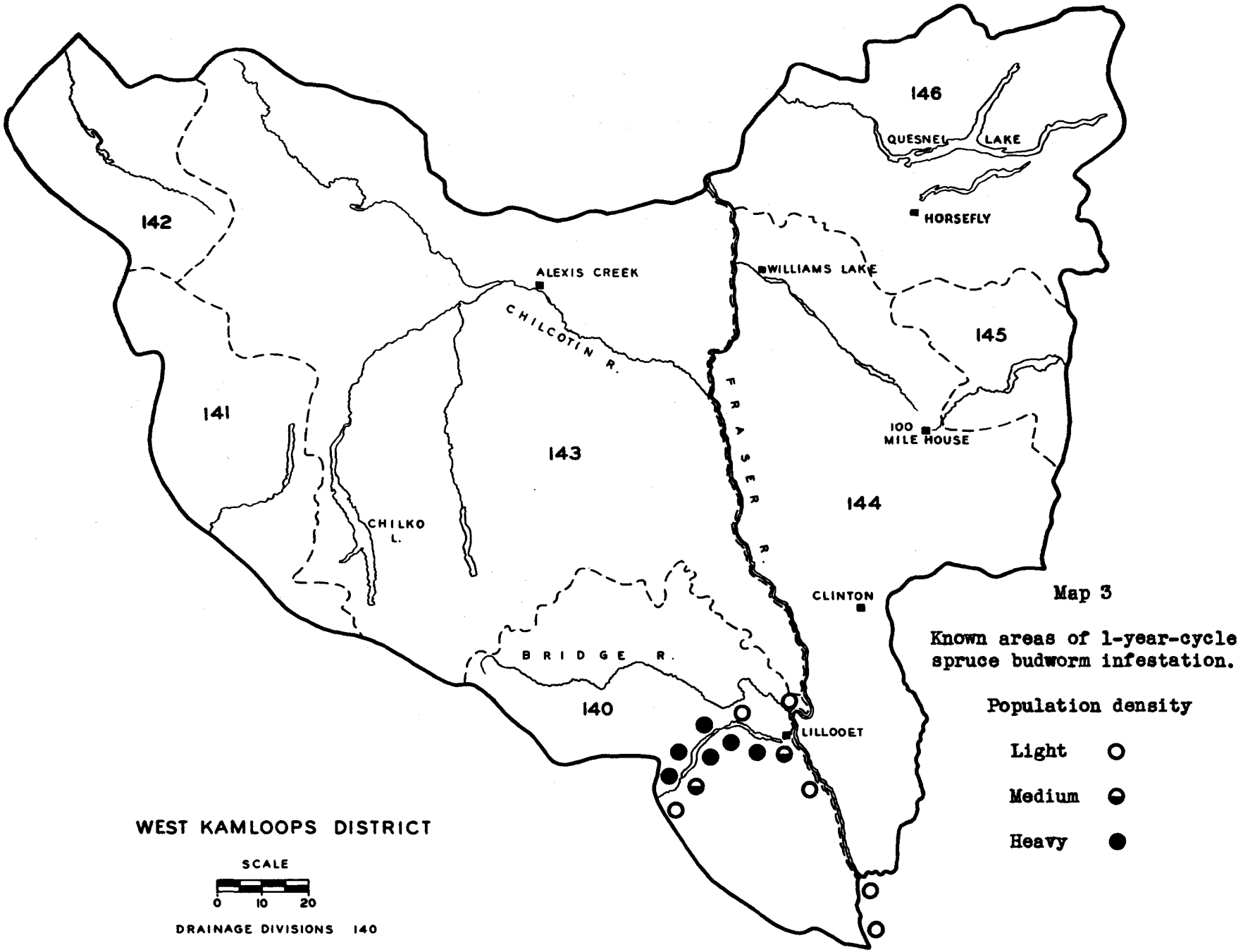
DRAINAGE DIVISIONS 140



Map 2

Known distribution of Douglas-fir bark beetle attacks from 1953 to 1955.

Tree mortality ●


146
QUESNEL LAKE
HORSEFLY
WILLIAMS LAKE
142
ALEXIS CREEK
CHILCOTIN R.
145
141
143
FRASER R.
100 MILE HOUSE
144
CHILKO L.
CLINTON
BRIDGE R.
140
LILLOOET
WEST KAMLOOPS DISTRICT
SCALE
0 10 20
DRAINAGE DIVISIONS 140
Map 3
Known areas of 1-year-cycle spruce budworm infestation.
Population density
Light
Medium
Heavy

ANNUAL REPORT OF FOREST BIOLOGY RANGER

for

CENTRAL KAMLOOPS DISTRICT

1956

FOREST BIOLOGY SURVEY

CENTRAL KAMLOOPS DISTRICT

1956

C. B. Cottrell

INTRODUCTION

Field work in Central Kamloops Forest Biology Ranger District began on April 23 and continued until October 5. In addition to the usual survey of insect and tree disease conditions, Douglas-fir beetle study plots were established in late April, and during the summer a damage appraisal was made of all beetle-killed Douglas fir timber.

Throughout the field season 258 insect collections and 15 tree disease collections were taken. Tables 1 and 2 show the collections by agency and host. Map 1 shows the location where one or more collections were made and field records taken in 1956.

STATUS OF INSECTS

Douglas-fir Beetle, Dendroctonus pseudotsugae Hopk.

In 1956 the Douglas-fir beetle spring flight was first noted on May 17 and continued until June 1. Numerous recently-cut Douglas-fir logs and windfalls were attacked throughout the range of Douglas fir in the Central Kamloops District. The two areas with the highest populations of Douglas-fir beetles were: (1) the Paul and Pinantan lakes region, and (2) Robbins and Campbell ranges. A total of 11 green-infested standing trees were recorded at Robbins Range.

In 1956, the spring flight apparently was lighter than those of the last four years. Before the current spring flight began, Douglas-fir trees infested by beetles in 1955, were examined in the above-mentioned areas. It was observed that more than half of the callow adults were dead probably due to the severe winter of 1955-56.

Although the foliage of spring-attacked trees sometimes turns red in late autumn, very few discoloured trees were observed at that time. This would indicate that few standing trees were attacked or, that the attacked trees will not change colour until the spring of 1957.

Table 1

Forest Insect Collections by Agencies
Central Kamloops District - 1956

Personnel involved in collection	Number of collections						Total
	May	June	July	Aug.	Sept.	Oct.	
Forest Biology Rangers independently	16	75	87	60	1	9	248
Forest Biology Rangers with Forest Service personnel	-	-	5	-	-	-	5
Forest Service personnel independently	-	1	4	-	-	-	5
Other co-operators	-	-	-	-	-	-	-
Total	16	76	96	60	1	9	258

Table 2

Collections by Hosts
Central Kamloops District - 1956

Coniferous hosts	Forest insects	Tree diseases	Broad-leaved hosts	Forest insects	Tree diseases
Douglas fir	65	2	trembling aspen	40	1
Engelmann spruce	48	-	black cottonwood	1	-
black spruce	1	-	western white birch	3	-
lodgepole pine	20	2	chokecherry	8	1
ponderosa pine	23	2	willow	2	-
western white pine	2	2	miscellaneous	5	1
western hemlock	18	2			
alpine fir	7				
western red cedar	5	2			
Rocky Mountain juniper	10	1			
			Total	59	3
Total	199	13	Grand Total	258	16

Damage Appraisal of Beetle-killed Douglas-fir Trees in the Period 1953, '54, and '55

The damage appraisal consisted of an ocular count of all Douglas-fir trees killed by the Douglas-fir beetle. Trees bearing red foliage were classified as having died in the three-year period from 1953 to 1955. A loss in excess of five million board feet of Douglas-fir timber was computed by multiplying the number of dead trees counted, by 500 board feet per tree. This is generally considered to be the average volume for beetle-killed Interior Douglas-fir trees.

Table 3 shows the number of trees counted and the estimated volume destroyed in each area. Map 2 illustrates the distribution of beetle-killed trees within the range of merchantable Douglas fir in the Central Kamloops District.

Table 3

Douglas-fir Trees Killed by the Douglas-fir Beetle in the Period 1953, '54, '55. Central Kamloops District

Locality	No. dead trees counted	Estimated volume of timber - board feet
Bestwick	1,161	580,500
Long Lake Forest Reserve	487	243,500
Tranquille Forest Reserve	2,126	1,063,000
North Thompson Valley	247	123,500
Niskonlith Forest Reserve	2,583	1,291,500
Highland Valley	529	264,500
Coldwater River Valley	2,560	1,280,000
Kane Valley	1,024	512,000
Total	10,717	5,358,500

Douglas-fir Beetle Study Plots

Six study plots were established within a 30-mile radius of Kamloops, for the determination of foliage colour changes of beetle-killed Douglas-fir trees. These plots, in areas of 1955 Douglas-fir beetle infestations, were located at: Louis Lake, Paul Lake, Tranquille Creek, Campbell Range, and Robbins Range (two plots).

In late April, one standing healthy Douglas-fir tree was felled in each plot to act as an 'attractor tree'. It was hoped that the felled tree would attract Douglas-fir beetles to attack not only itself but adjacent standing trees as well. Infested standing trees would yield such data as: the length of time between beetle attack and the first sign of foliage discoloration; the sequence of colour change; and the length of the period between first needle drop and complete loss of foliage.

Between May 17 and June 1 all the attractor trees had been attacked, but the only standing trees to be attacked were 11 trees at Robbins Range. The foliage of only one tree had begun to turn yellow by November. Further data on foliage colour changes will not be available until the summer of 1957, when the status of the attacked trees has been determined.

Mountain Pine Beetle, Dendroctonus monticolae Hopk.

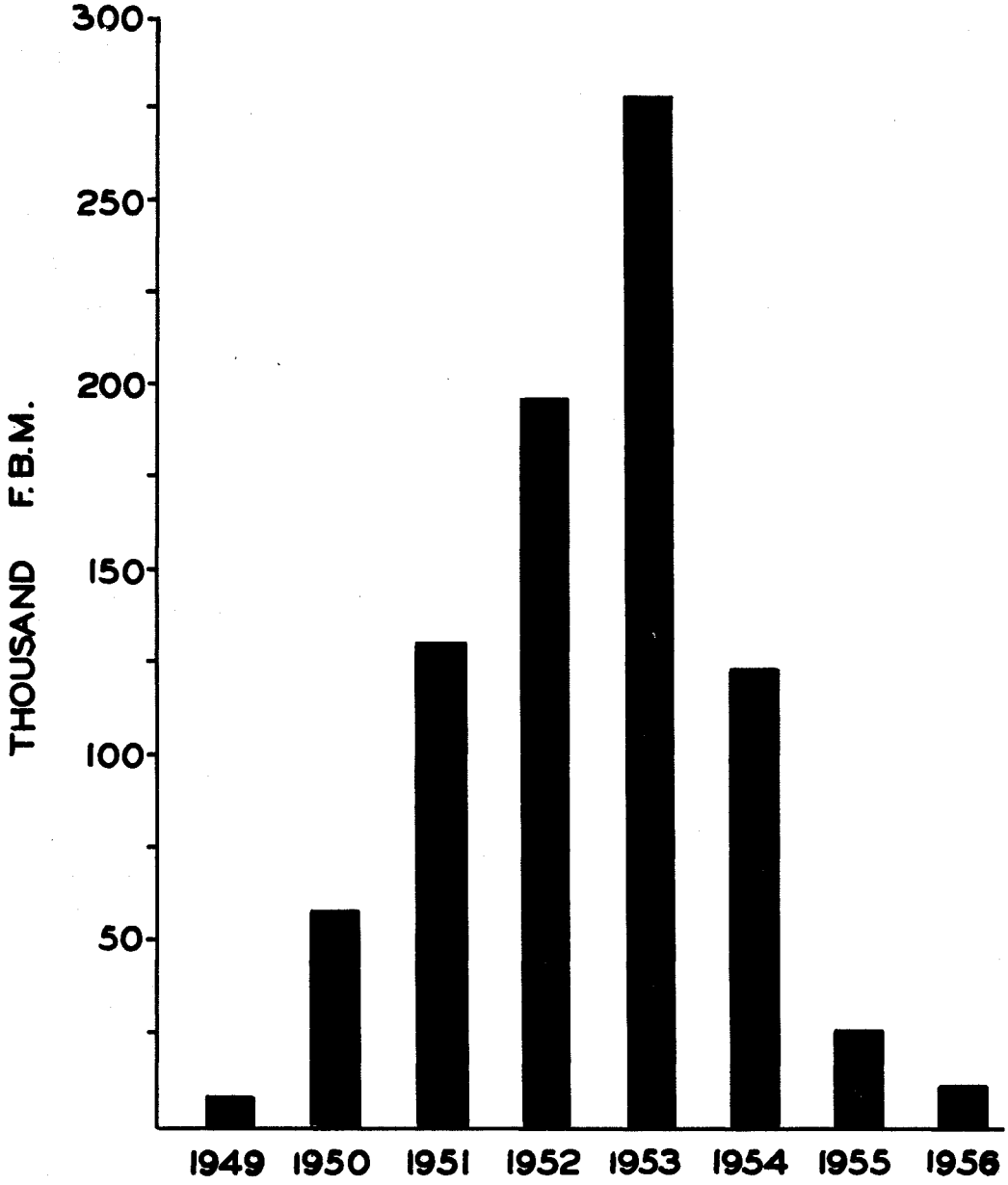
In 1956, only seven attacked ponderosa pine trees were observed in the vicinity of Alleyne Lake. As shown in Table 4 and Graph 1, this is the lightest attack since 1949. Between 1949 and 1955, most of the losses were caused by the mountain pine beetle, Dendroctonus monticolae Hopk.; however, the 1956 losses were caused chiefly by the western pine beetle, Dendroctonus brevicomis Lec. (see Figure 3).

Table 4 lists the number of ponderosa pine trees destroyed and the annual volume lost in each year from 1949 to 1956. Graph 1 illustrates the rise and fall of the infestation in the same period.

Table 4

Volume of Ponderosa Pine Trees Destroyed Annually by Dendroctonus spp. near Alleyne Lake, 1949 to 1956 inclusive.

Year	No. of trees	D. B. H. inches	Volume f. b. m.
1949	9	24.0	8,230
1950	70	22.6	57,650
1951	163	22.6	134,510
1952	265	20.5	195,260
1953	334	23.5	280,990
1954	139	22.2	123,760
1955	30	22.9	26,370
1956	7	31.9	10,480
Totals	1,017	22.4	837,250



Graph 1. Volume of ponderosa pine timber killed by Dendroctonus spp. in the vicinity of Alleyne Lake during the period 1949 to 1956 inclusive. Volumes for each year are presented in thousands of board feet.

Western Hemlock Looper, Lambdina fiscellaria lugubrosa (Hlst.)

A light, sporadic population of larvae persisted in the cedar-hemlock stands of the North Thompson Valley. The largest number of larvae in one random beating collection was six, while the average was only slightly more than one.

Black-headed Budworm, Acleris variana (Fern.)

Larvae were plentiful in the cedar-hemlock stands in the North Thompson Valley between Avola and Albreda, a distance of 70 miles. Random beating collections contained from 10 to 30 larvae. Black-headed budworm and Neodiprion sp. caused light defoliation of western hemlock trees in this area.

A light population density was present on Engelmann spruce and alpine fir trees in the Cariboo and Monashee mountain ranges.

Sawflies on Coniferous Hosts, Neodiprion spp.

Throughout the District larvae were commonly collected from five coniferous hosts: western hemlock, Douglas fir, Engelmann spruce, ponderosa pine, and lodgepole pine.

In the North Thompson Valley light defoliation occurred on western hemlock trees. Random samples taken in the vicinity of Clearwater, Blue River and Lempriere contained an average of more than 80 larvae per collection. Defoliation was most noticeable on the terminal growth of the understory.

In the southern portion of the District, larvae usually were not concentrated and light defoliation was observed on lodgepole pine only.

Satin Moth, Stilpnotia salicis (L.)

In 1956, the satin moth populations on trembling aspen trees in the vicinity of Kamloops showed a marked decrease. In 1955, more than 75 per cent defoliation was recorded at Currie Lake and Lac du Bois. Defoliation this year at Lac du Bois was only 10 per cent, while defoliation at Grove II and Grove III near Currie Lake was 25 and 40 per cent respectively. Most of the trembling aspen trees in Grove I near Currie Lake have died, presumably as a result of repeated defoliation.

A few trembling aspen trees were partially defoliated at Harper's Ranch near Kamloops.

It was noted that, when the majority of the satin moth larvae were pupating, approximately 25 per cent of the larvae were less than average size and clustered on the trunks of the trees (see Figure 1). Numerous parasite cocoons were present in these clusters.

Table 5 shows the percentage parasitism and percentage moth emergence of four mass collections of satin moth larvae and pupae near Currie Lake, while Table 6 shows similar data for material collected at Lac du Bois.

Table 5

Per Cent Parasitism of Satin Moth Larvae and Pupae and Per Cent Moth Emergence, Currie Lake, 1956.

Date collected	No. collected	Stage	% parasitism		Total % parasitism	% moth emergence
			Hymenoptera	Diptera		
May 24	219	iv instar larvae	8.7	0	8.7	55.7
June 15	224	ultimate instar larvae	0.6	0.7	1.3	85.2
July 5	217	"early cocoon"	0	2.8	2.8	76.5
July 17	206	late pupal	0.5	8.7	9.2	81.1

Table 6

Per Cent Parasitism of Satin Moth Mass Collections, and Per Cent Moth Emergence, Lac du Bois, 1956.

Date collected	No. collected	Stage	% parasitism		Total % parasitism	% moth emergence
			Hymenoptera	Diptera		
June 7	222	iv instar larvae	4.9	0	4.9	43.3
June 19	204	ultimate instar larvae	1.4	3.0	4.4	75.5
June 28	199	"early cocoon"	0	4.0	4.0	81.9
July 7	207	late pupal	0.9	13.1	14.0	78.7

Satin moth egg mass samples were collected at Currie Lake and Lac du Bois. Samples consisted of a count of the egg masses present on the basal eight feet of 25 trembling aspen trees. At Currie Lake the number of egg masses per tree ranged from 0 to 5 with an average of 1.8, as compared to an average of 5.3 in 1954. At Lac du Bois the 1956 average was 1.1 as compared to 18.8 in 1954. These figures substantiate the observation that there has been a marked decrease in the satin moth populations.

Aspen Leaf-miner, Phyllocnistis populiella Chamb.

Visual evidence of this leaf-miner's presence occurred throughout the District wherever trembling aspen trees grow (see Figure 2). The only exceptions were a few isolated groves in the open-range grasslands. The number of infested aspen leaves per tree varied from 9 to 98 per cent in areas in which 'aspen leaf counts' were made. Often 5 to 15 per cent of the leaves of black cottonwood trees were attacked when growing adjacent to infested aspen trees.

Aspen leaf counts were made as follows: a 12-inch branch sample was taken at random from each of 10 trees. Sample trees were at least 50 feet apart. The infested and uninfested leaves were then counted. Column 1 in Table 7 shows the total number of leaves present on 10, 12-inch branch samples; Column 2, the total number of leaves infested and Column 3, the per cent leaves infested in each of 15 localities.

Map 3 shows the areas in which aspen leaf counts were made. Symbols denoting the percentage of leaves affected are: light, 10 to 25 per cent; medium, 26 to 50 per cent; heavy, 51 to 75 per cent; very heavy, 76 to 100 per cent.

- Table 7

Percentage of Trembling Aspen Leaves Infested by the Aspen Leaf-miner, Phyllocnistis populiella Chamb.

Locality	Total No. of leaves	No. of leaves infested	Per cent leaves infested
Robbins Range	741	644	86.9
Campbell Range	533	478	89.7
Lac Le Jeune	489	220	45.0
Goose Lake	389	278	71.5
Westsyde	579	539	93.1
Stump Lake	446	268	60.1
Coldwater Valley	514	148	28.8
Mamette Lake	551	191	34.7
Douglas Lake	487	109	22.4
Falls Creek	411	404	98.3
Knouff Lake	528	523	99.1
Lac des Roches	482	431	89.4
Wells Grey Park	446	374	83.9
Valemount	516	51	9.9
Deadman River	503	467	92.8

Forest Tent Caterpillar, Malacosoma disstria Hbn.

Four hundred acres of trembling aspen trees were defoliated near the north end of Adams Lake. This, the only known infestation in the interior of British Columbia in 1956, was first reported by Mr. P. Bodman of the British Columbia Forest Service. Defoliation apparently was heavy as the aspen trees had 'leafed out' again. The presence of old egg masses on the sampled trees indicated that the infestation began at least one or two years ago.

The current year's egg masses were collected from nine trembling aspen trees early in October. Later in October, egg dissections were made by Forest Biology Ranger T. Woods which were intended to show the proportion of larvae which would have developed and fed upon a sampled tree the following year. Undeveloped and parasitized eggs were counted. The number of living larvae per egg mass averaged 108; the number of egg masses per tree averaged 45 and the number of larvae, 4,860 per tree. This quantity of larvae would appear to be more than sufficient to continue the infestation in 1957. According to the 1950 Forest Insect Survey Annual Report for Ontario, when 10 or more egg masses occur on aspen trees averaging six inches in diameter we may reasonably predict heavy defoliation.

Table 8 shows the sizes of trembling aspen trees sampled; the average number of eggs per mass in five sample egg masses per tree; the percentages of living and dead embryonic larvae, and the undeveloped and parasitized eggs for each of nine sample trees near Adams Lake. Egg masses were collected October 2 and eggs were dissected October 10,1956.

Spotless Fall Webworm, Hyphantria textor Harr.

Webs made by this webworm were conspicuous on chokecherry and black cottonwood in the following areas: The South Thompson Valley from Kamloops to Chase; the North Thompson Valley from Kamloops to Heffley; the Thompson Valley from Kamloops to Cache Creek; and along Deadman River. Generally, defoliation was light, but at Savona and along Deadman River, chokecherry, black cottonwood, and Lombardy poplar trees as well as saskatoon and wild rose bushes were heavily infested. Fall webworm 'strip counts' were established in these two areas.

Table 9 shows the number of webs on various hosts counted from a moving vehicle for a distance of three miles at Savona. Table 10 shows similar data for a three-mile strip along Deadman River.

Table 8

Analysis of Forest Tent Caterpillar Egg Masses
Collected from Trembling Aspen Trees near Adams Lake, October 2, 1956.

Survey No.	Tree diameter (inches)	Tree height (feet)	Crown length (feet)	Total No. of 1956 egg masses	Average No. of eggs in five masses	Per cent			
						Living larvae	Dead larvae	Undeveloped eggs	Parasitized eggs
56-7209	7	56	14	99	115.8	92.6	1.5	4.2	1.7
56-7210	6	46	15	42	110.0	88.8	0.9	7.2	3.1
56-7211	6	54	17	51	135.6	95.3	0.3	3.7	0.7
56-7212	6	44	12	53	148.2	86.6	1.0	8.1	4.3
56-7213	7	49	18	71	159.2	72.0	1.5	22.2	4.3
56-7214	6	44	13	32	120.0	88.7	0.5	6.0	4.8
56-7215	6	46	15	39	115.8	73.6	1.2	15.7	9.5
56-7216	6	51	12	16	98.2	84.3	0.4	12.6	2.7
56-7217	7	48	17	9	127.4	87.8	0.5	9.9	1.8
				412	127.6	85.3	0.9	10.2	3.6

Table 9

Spotless Fall Webworm Strip Counts -
Savona Cutoff from East to West, July 30, 1956.

Host	No. of webs counted in each mile			Totals
	Mile 0-1	Mile 1-2	Mile 2-3	
chokecherry	86	14	4	104
black cottonwood	8	1	11	20
saskatoon	2	-	-	2
wild rose	2	1	-	3
Lombardy poplar	3	-	-	3
Totals	101	16	15	132

Table 10

Spotless Fall Webworm Strip Counts - along Deadman River Road,
North of Trans-Canada Highway, July 30, 1956.

Host	No. of webs counted in each mile			Totals
	Mile 0-1	Mile 1-2	Mile 2-3	
chokecherry	12	14	25	51
black cottonwood	-	-	2	2
Totals	12	14	27	53

Ponderosa Pine Cone-borers, Dioryctria auranticella (Grote) and Dioryctria sp. nr. auranticella

In 1956, ponderosa pine cone crops were generally light, but were exceptionally heavy in the vicinity of Merritt. Cones were examined for cone-borers at Merritt, Nicola and Mamette Lake.

Table 11 shows the number of examined and infested cones at the three sample points, the percentage of infested cones, and the average number of borers per infested cone.

delete

Table 11

Percentage of Ponderosa Pine Cones Infested
by Ponderosa Pine Cone-borers, August, 1956.

Locality	No. cones examined	No. cones infested	Per cent cones infested	Average No. borers per infested cone
Merritt	126	38	30.1	1.1
Nicola	100	42	42.0	1.4
Mamette Lake	66	32	48.5	1.2
Totals	292	112	38.4	1.2

A Needle-feeding Scarabaeid, Dichelonyx sp.

Adult beetles were found feeding on approximately 50 reproduction Engelmann spruce trees in the vicinity of Knutsford. Three to five beetles fed on the needles of the terminal growth of each branch. A portion of each needle had been eaten or broken off leaving the remainder of the needle to discolour on the tree.

STATUS OF TREE DISEASES

Black-knot caused by Diobotryon sp.

Many small twigs of chokecherry trees were killed by this disease along the North Thompson River from Kamloops to Barriere. The most severely damaged trees were on four acres near McLure. Figure 4 shows that the conk kills the extremities of the twigs.

Dwarf Mistletoe, Arceuthobium sp.

Dwarf mistletoe was present on more than 50 per cent of the lodgepole pine trees near Face Lake, Lac Le Jeune and Highland Valley.

Juniper Leaf Rust, Gymnosporangium sp.

"Witch's brooms" caused by this rust were commonly found throughout the range of Rocky Mountain juniper trees. Infection was exceptionally extensive in the Deadman River Valley.

Winter Injury to Ponderosa Pine

South of Merritt, in the Coldwater and Kane valleys, 128 square miles

of ponderosa pine trees were severely discoloured during the winter of 1955-56. In the late summer of 1956 the only green growth on some of the trees was the current foliage. It will be several years before it is realized how seriously these trees have been damaged.

On Robbins Range, over 200 ponderosa pine trees of all ages were winter-injured; by late summer all but a few saplings continued to live. Some 60 to 70 trees in the Batchelor Range area were also winter damaged.

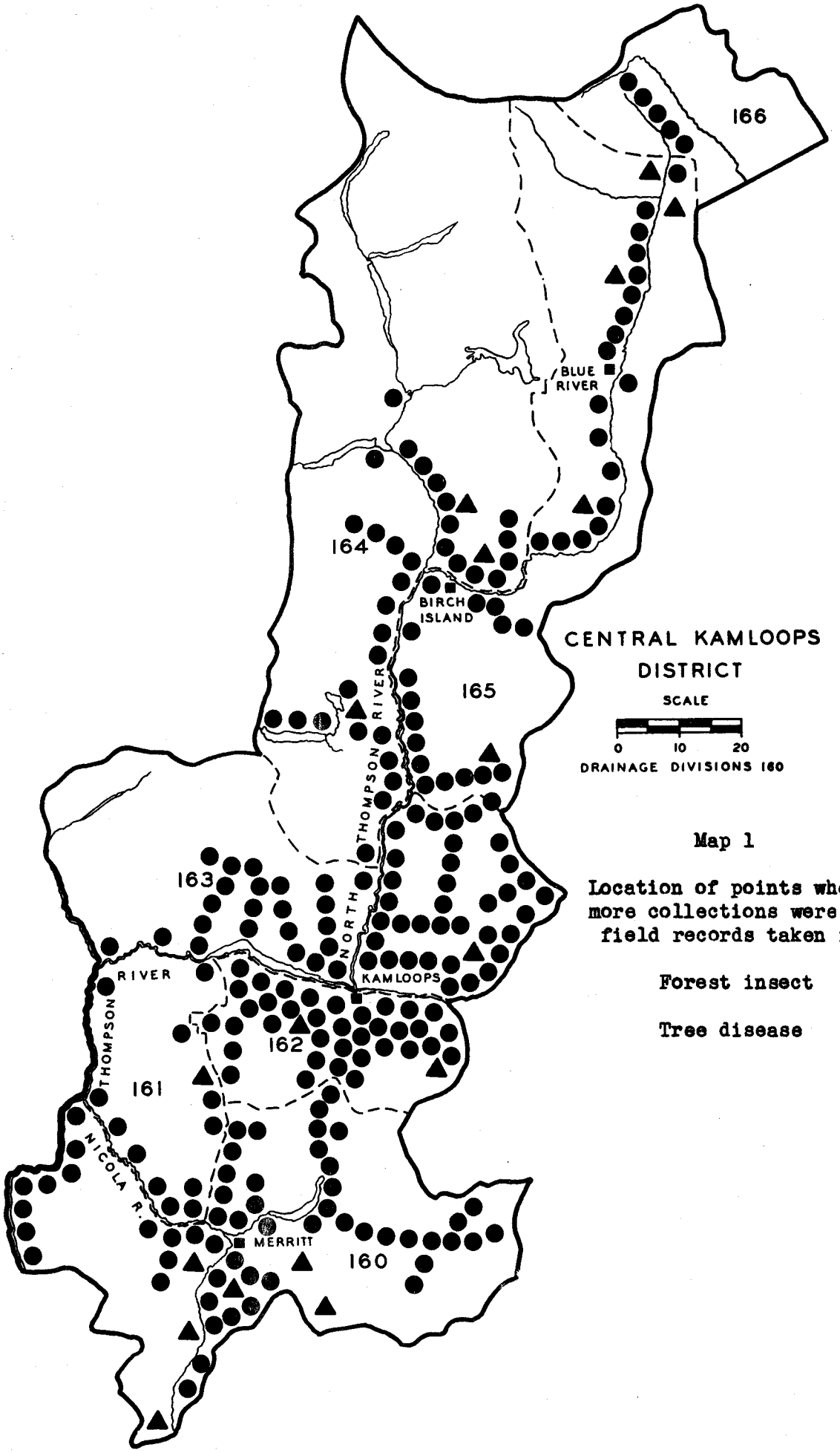
Winter Injury to Western Red Cedar

Mature and overmature western red cedar trees on the west side of the North Thompson Valley were heavily discoloured. An estimated 40 square miles of timber between Canoe River and Lempriere were severely injured, while trees on a similar sized area from Lempriere to Blue River suffered slight injury.

The only trees which totally escaped injury were sheltered saplings.

Winter Injury to Western White Pine

Approximately 10 square miles of overmature western white pine trees were winter-injured in the North Thompson Valley. This is an area north and south of Clemina on the east side of the Valley.

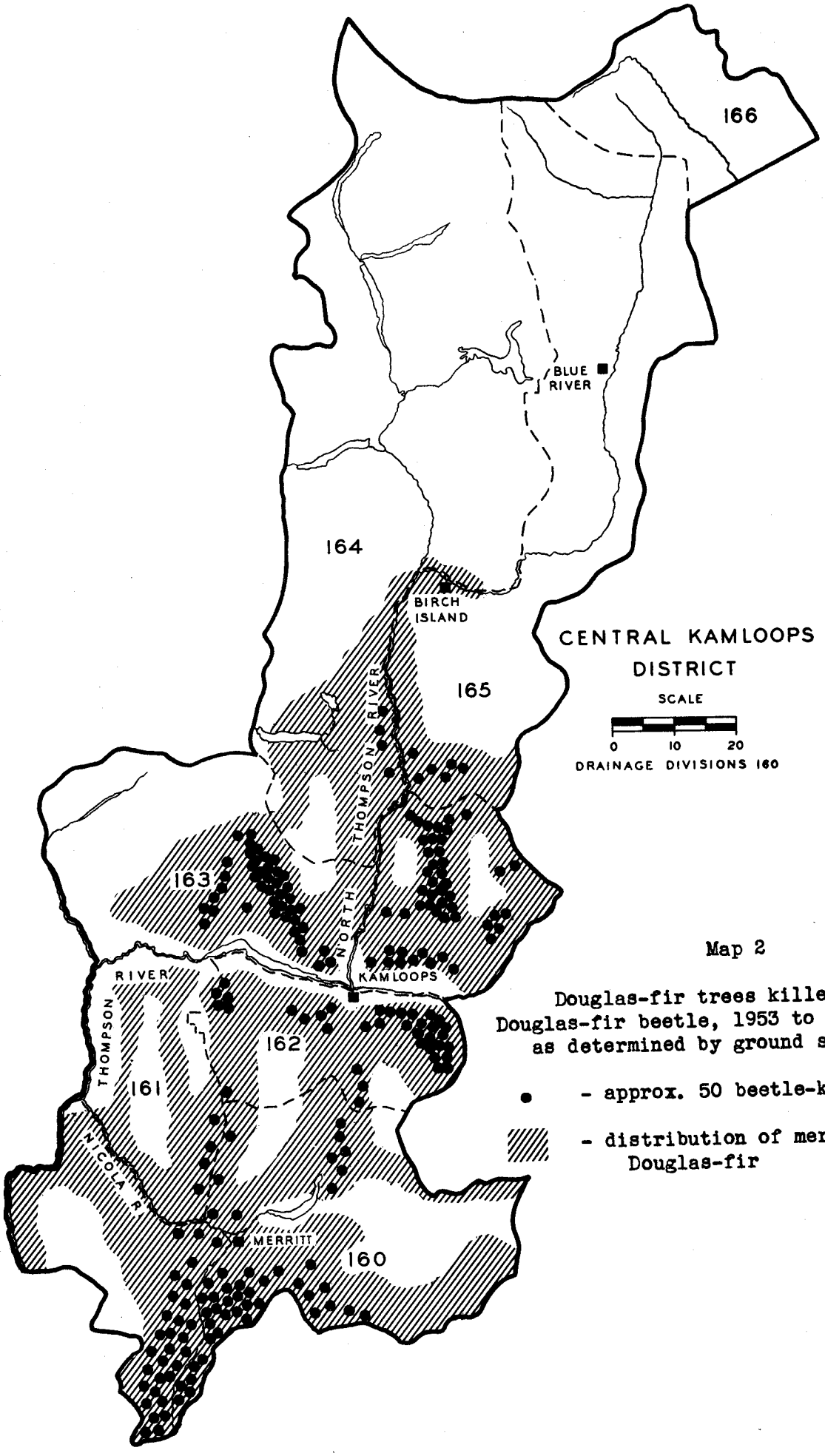


Map 1

Location of points where one or more collections were made and field records taken in 1956.

Forest insect ●

Tree disease ▲

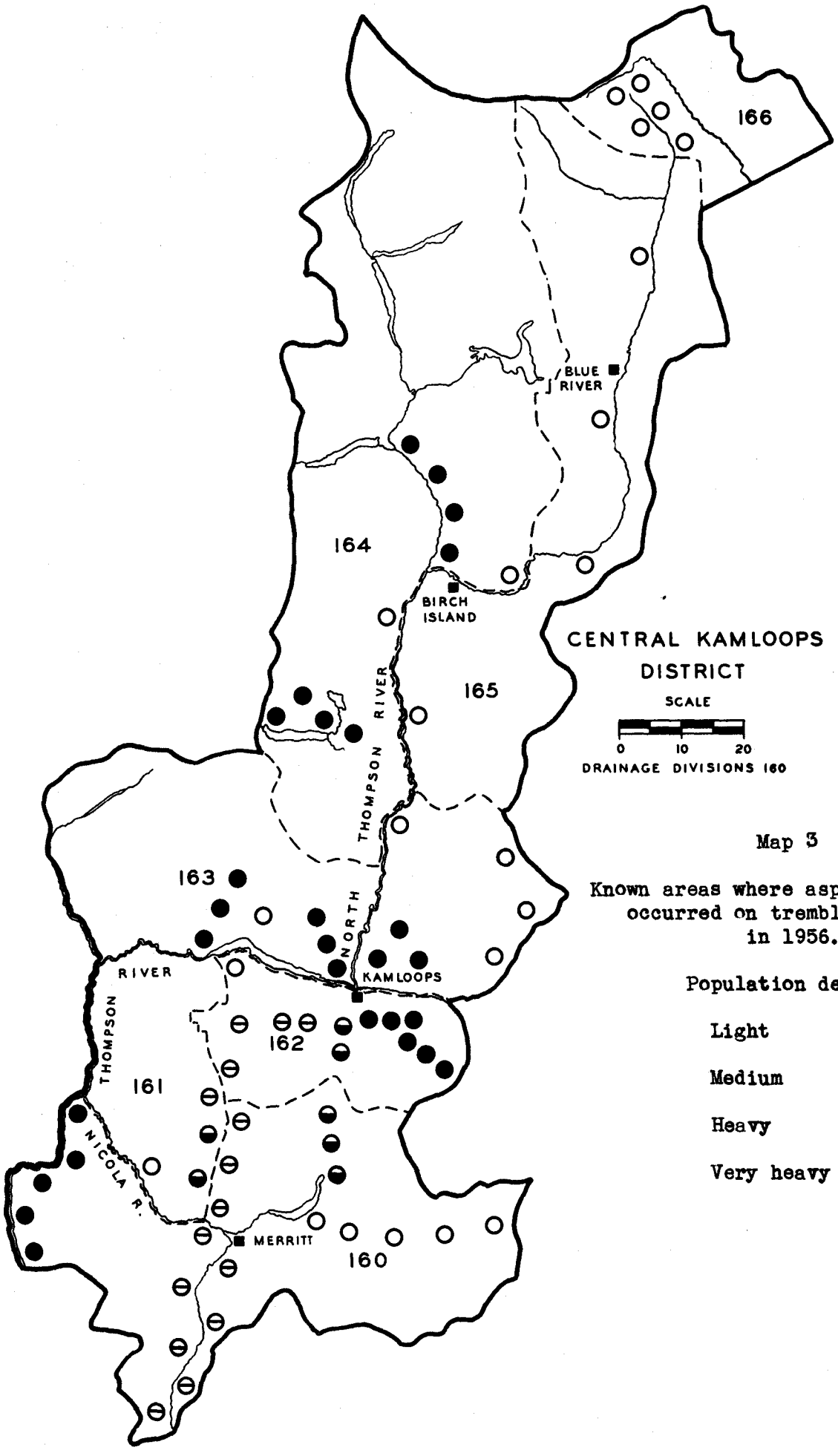


Map 2

Douglas-fir trees killed by the Douglas-fir beetle, 1953 to 1955 inclusive as determined by ground survey 1956.

● - approx. 50 beetle-killed trees

▨ - distribution of merchantable Douglas-fir



Map 3

Known areas where aspen leaf-miner occurred on trembling aspen in 1956.

Population density

Light	○
Medium	⊖
Heavy	◒
Very heavy	●

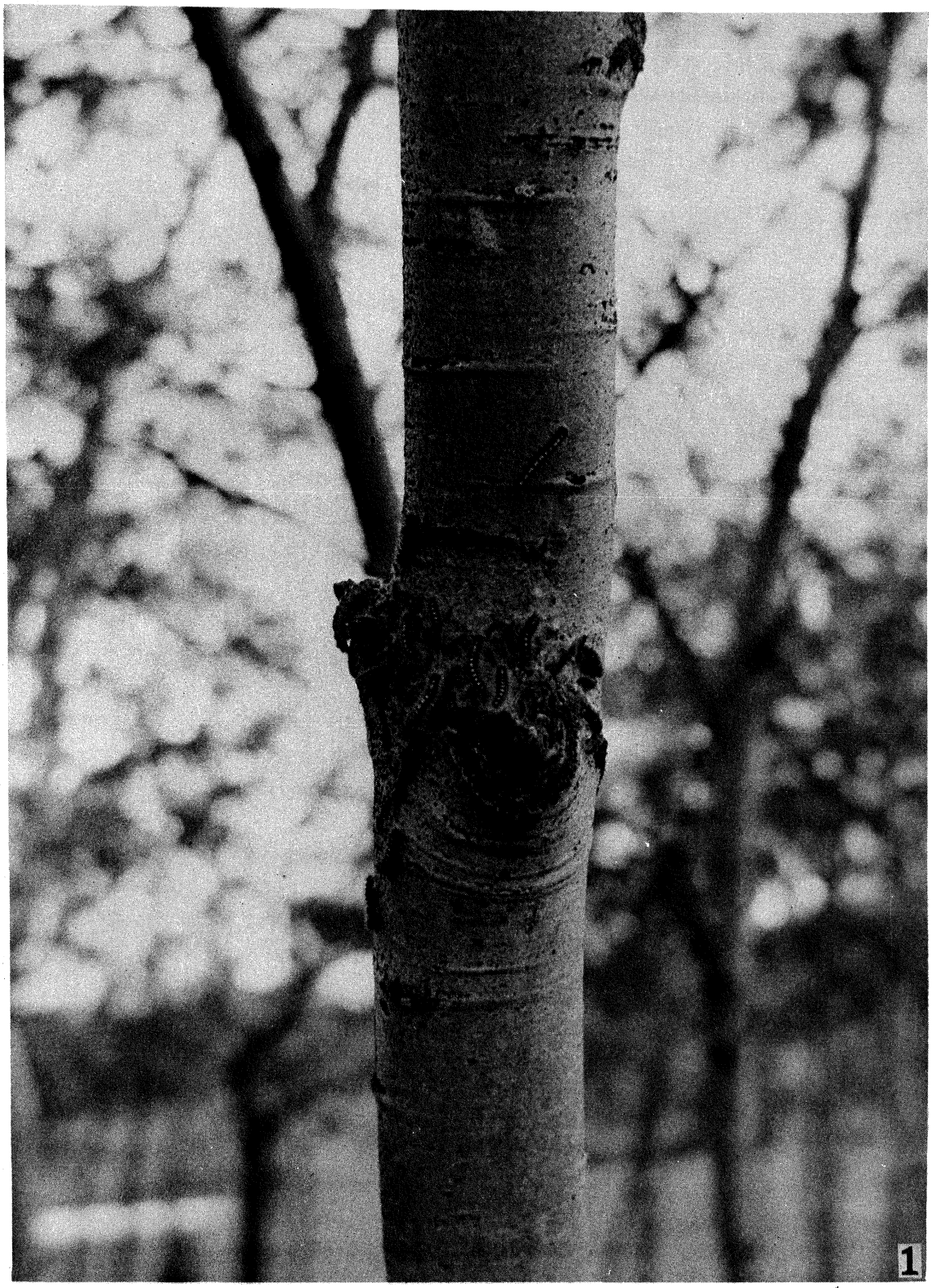


Figure 1. Satin moth, Stilpnotia salicis (L.), larvae on the trunk of a trembling aspen tree. Bestwick, Central Kamloops. June, 1956.
C.B. Cottrell

Figure 2. Aspen leaf miner, Phyllocnistis populiella Chamb., larval mines in trembling aspen leaves. Knutsford, Central Kamloops. July, 1956. C.B. Cottrell

Figure 3. Western pine beetle, Dendroctonus brevicomis Lec. The bark has been removed from a ponderosa pine tree to show the winding galleries. Aspen Grove, Central Kamloops. Sept., 1956. C.B. Cottrell

Figure 4. Black knot, Diobotryon sp. Small twigs of a choke cherry tree killed by this disease. McLure, Central Kamloops. June, 1956. C.B. Cottrell

ANNUAL REPORT OF FOREST BIOLOGY RANGER

for

EAST KAMLOOPS DISTRICT

1956

FOREST BIOLOGY SURVEY

EAST KAMLOOPS DISTRICT

1956

B. A. Sugden

INTRODUCTION

The earliest field work in the East Kamloops District began on April 11 and the final work was completed on November 6. Most of the period from April to the second week in May was devoted to Douglas-fir beetle problems. Exceptionally warm weather during the spring caused earlier forest insect activity than in 1955.

Table 1 contains the insect collections by agencies for the months of May to October and Table 2 shows the host trees and the number of insect and tree disease collections made from each.

Map 1 shows the location where one or more insect and tree disease collections or field records were obtained during 1956.

STATUS OF INSECTS

Douglas-fir Beetle, Dendroctonus pseudotsugae Hopk.

The Douglas-fir beetle persisted in most of the areas where it was active during 1955. Very few "green-infested" trees were noted, most of the current damage being observed in logs, stumps and slash.

A Douglas-fir tree, 14 inches d.b.h., was felled near Falkland during early May. The purpose was to attract a population of Douglas-fir beetles to a certain location and create a small infestation. The changes which occur in the needles of Douglas fir, destroyed by bark beetles, could then be observed from the time of the initial attack.

The results were not satisfactory. The tree felled as an attraction was heavily attacked by Douglas-fir beetles; unfortunately the standing trees within a radius of 150 feet were not attacked.

The sudden advent of sub-zero temperatures during early November of 1955 apparently destroyed many of the overwintering broods of Douglas-fir beetles in the vicinity of the experiment. Examination of overwintering adults and larvae showed 81 per cent mortality.

Table 1

Forest Insect Collections by Agencies
East Kamloops District - 1956

Personnel involved in collection	Number of collections						
	May	June	July	Aug.	Sept.	Oct.	Total
Forest Biology Rangers independently	20	89	87	54	1	-	251
Forest Biology Rangers with Forest Service personnel	-	-	7	-	-	-	7
Forest Service personnel independently	1	7	2	17	-	-	27
Other co-operators	4	3	4	-	-	-	11
Totals	25	99	100	71	1	-	296

Table 2

Collections by Hosts
East Kamloops District - 1956

Coniferous hosts	Forest insects	Tree diseases	Broad-leaved hosts	Forest insects	Tree diseases
Douglas fir	94	5	trembling aspen	8	2
ponderosa pine	52	-	western white birch	12	-
lodgepole pine	14	2	willow	10	-
western white pine	11	-	alder	6	-
western larch	10	-	black cottonwood	5	1
Engelmann spruce	15	-	hazel	5	-
alpine fir	4	1	miscellaneous	9	-
western red cedar	10	1			
western hemlock	19	-			
Rocky Mountain juniper	11	-			
western yew	1	-			
			Total	55	3
Total	241	9	Grand total	296	12

A count of Douglas-fir trees killed by Douglas-fir beetles from 1953 to 1955 was made throughout the District. Table 3 shows the results of these counts.

Table 3

Location and Volume of Dduglas Fir Destroyed by the Douglas-fir Beetle during the Years 1953 to 1955 Inclusive

Location	Area surveyed (acres)	Volume f.b.m.
Monte Lake	150	83,500
Falkland	100	45,000
Paxton Valley	70	97,000
Salmon River Valley (Silver Creek)	640	54,000
West side of Okanagan Lake	800	76,500
Yellow Lake	110	107,000
Richter Mountain	12	13,500
Shatford Creek	45	89,000
Joe Riche Valley	350	132,500
Lawless Creek	35	52,500
Trepanier Creek	3	7,500
Totals	2,306	778,000

The counts of beetle-killed Douglas-fir trees were usually made from vantage points. Only trees retaining some of their red needles were included, as most beetle-killed Douglas-fir trees apparently hold some of their foliage for about three years after a successful attack. Map 2 shows the location and the approximate number of Douglas-fir trees killed by Douglas-fir beetles during 1953, '54, and '55. It was noted while making the damage appraisal in this District that outbreaks of the Douglas-fir beetle were nearly always associated with logging operations.

Mountain Pine Beetle, Dendroctonus monticolae Hopk.

The populations of mountain pine beetle have declined throughout the District. Only seven western white pine trees showing 1956 attack were found in the northern Shuswap Lake region. White pine logs "decked" in the bush near the mouth of Yard Creek had attracted a light population of mountain pine beetle, however, standing pines in the vicinity had not been infested.

A count was made of ponderosa, lodgepole and western white pine stems destroyed by the mountain pine beetle from 1950 to 1955 inclusive. Table 4 gives the results of this survey.

Table 4

Location, Size of Area Surveyed and Volume of Ponderosa, Lodgepole and Western White Pine Trees Destroyed by the Mountain Pine Beetle during the Years 1950 to 1955 Inclusive

Location	Host	Area surveyed (acres)	Volume f.b.m.
Shuswap Lake:			
West side, Seymour Arm	white pine	12,800	465,120
East side, Seymour Arm	" "	100	43,560
West side, Anstey Arm	" "	750	89,040
Northeast end, Anstey Arm	" "	110	13,680
Celista and Magna Bay	" "	1,100	294,500
Northwest of Cambie	" "	350	58,330
			964,230
Little Shuswap Lake	ponderosa pine	40	46,760
Adra:			
Northeast of Penticton	lodgepole pine	600	3,000,000
Totals		15,850	4,010,990

An additional 198,240 f.b.m. of attacked ponderosa pine was recorded in the region north of Princeton to Aspen Grove. This figure was not included in the table because the beetle-killed timber occurred over a very large area in scattered groups comprised of 2 to 20 trees. The progress of the outbreaks of mountain pine beetle listed in Table 4 had been determined annually. Consequently there was no difficulty in making the damage appraisal except near Celista and Manga Bay where beetle-killed white pine had been salvaged.

Western Pine Beetle, Dendroctonus brevicomis Lec.

In 1956 the western pine beetle did little damage in the District. Occasional attacks occurred on some of the larger ponderosa pine trees weakened by repeated attacks of the black pine leaf scale, Nuculaspis californica (Coleman), in the South Penticton and eastern Skaha Lake districts.

Red Turpentine Beetle, Dendroctonus valens Lec.

The red turpentine beetle has been common in ponderosa pine stands in association with infestations of the mountain pine and western pine beetles. Ordinarily this beetle is not considered to be a tree killer, however, in 1956 two large, weather-damaged pine trees, south of Aspen Grove, were destroyed by this bark beetle. The red turpentine beetle, which usually attacks near the base of the bole, had in this instance

attacked from ground level up to eight feet. The larval galleries completely girdled the trees.

Engelmann Spruce Beetle, Dendroctonus engelmanni Hopk.

A ligh population of Engelmann spruce beetles persisted in the subalpine forest southwest of Murphy Lake. No current attacks were found in standing timber, but a large, windthrown spruce had attracted a few beetles. Engelmann spruce beetles have destroyed 147,840 f.b.m. of mature and semi-mature spruce on about 10 acres since 1954.

Spruce Budworm, Choristoneura fumiferana (Clem.)

Nineteen hundred and fifty-six was the flight year for the 2-year-cycle spruce budworm. A survey of some localities indicated a decline in population since the 1954 flight. Defoliation was light. Table 5 shows the results of an examination made of 100 terminal buds of Engelmann spruce and 100 terminal buds of alpine fir at Monashee Pass and Bolean Lake.

Table 5

Per Cent of Engelmann Spruce and Alpine Fir Terminal Buds Infested by Spruce Budworm at Monashee Pass and Bolean Lake, July 10 and 11, 1956

Locality	Host	No. trees examined	Total No. buds examined per tree species	Per cent buds infested
Monashee Pass	Engelmann spruce	5	50	16
Monashee Pass	alpine fir	5	50	10
Bolean Lake	Engelmann spruce	5	50	12
Bolean Lake	alpine fir	5	50	16

One-year-cycle spruce budworms were collected occasionally from Douglas fir, Engelmann spruce, western larch, western hemlock, and lodgepole pine. Larvae were not in sufficient numbers to cause noticeable defoliation.

Douglas-fir Tussock Moth, Hemerocampa pseudotsugata McD.

The small infestation of Douglas-fir tussock moths in marginal fir stands near Olalla has subsided. Only one egg mass was found there in September. Defoliation was light throughout the three-year period of infestation. Earlier in 1956 two mass collections were made containing

200 early instar and 200 late instar larvae. These were subsequently reared in the insectary at Vernon. The larvae were lightly parasitized and apparently incidence of disease was low. The cause of the collapse of this infestation has not yet been determined.

Light populations of the Douglas-fir tussock moth remained in the Douglas-fir forests on Long Mountain east of Oyama and west of Yellow Lake in the Penticton district. There has been no noticeable increase in the number of larvae taken in collections since 1954.

Satin Moth, Stilpnotia salicis (L.)

An infestation of this introduced species was recorded during 1955 for the first time in the Okanagan Valley. It was located in ornamental poplars on Kinsmen Beach at Okanagan Landing. When examined this year in late May, the larvae were numerous but little evidence of feeding was found on the new leaves. Experimental control measures were suggested, particularly since the infested trees were a valued asset to the beach property. The Provincial Department of Agriculture and the Forest Biology Laboratory combined forces on this experimental project. A wettable DDT spray was applied from a mobile spray unit. The spray reached only half-way up most of the trees; apparently this was adequate as no living satin moth larvae were found a week after spraying. During September a fruitless search was made for satin moth egg masses on the sprayed trees. Apparently the spray successfully controlled the infestation.

Black-headed Budworm, Acleris variana (Fern.)

A light population of black-headed budworm persisted in the hemlock-cedar forest around Hidden Lake. No discoloration due to larval feeding was evident. The maximum number of larvae in collections made in this area was nine. Throughout the remainder of the District larvae were not common.

Aspen Leaf-miner, Phyllocnistis populiella Chamb.

Damage to the leaves of trembling aspen by this leaf-miner continued over most of the District. Groves of infested trees were conspicuous due to the mining activities of the larvae which gave the leaves a silvery appearance. The heaviest attacks occurred near Salmon Arm, Chase, Ducks Range, Trinity Valley, Adams River, Celista, Grandview Bench, and Salmon River Valley. Branch sample counts made in these areas indicate that damage ranged from 60 to 100 per cent of the leaves. Map 3 shows the distribution of the aspen leaf-miner and intensity of attack.

Black Pine Leaf Scale, Nuculaspis californica (Coleman)

Severe damage has resulted from repeated attacks by this pest to marginal ponderosa pine on the east side of the valley extending from Naramata south to Osoyoos. Tree mortality has occurred on the lower

slopes of Campbell Mountain south to Skaha Lake. Most of the pine destroyed were reproduction up to 25 feet in height, though a few of the remaining mature and semi-mature trees have also succumbed (Figs. 1 and 2). There appeared to be a decline in the population of the black pine leaf scale in 1956.

Some bark beetle activity has been associated with the scale damage. Dead and dying trees have attracted a large Ips sp. probably emarginatus Lec., while some of the larger trees have been attacked by the western pine beetle.

Pine Needle Scale, Phenacaspis pinifoliae (Fitch)

The infestations of this species in marginal ponderosa pine near East Kelowna, Winfield, and Oyama have generally subsided. This decline in population may be due to the sudden cold which occurred in early November of 1955. Some pine trees have died as the result of continued infestation, however, tree mortality attributed to this species has not been as great as that caused by the black pine leaf scale.

A Sawfly on Douglas-fir, Neodiprion sp.

Mass collections of a sawfly on Douglas fir were made in the Oyama, Winfield, Falkland and Chase districts. Defoliation was light and was usually confined to one or two branches per tree. Sporadic defoliation extending over two and a half acres occurred at Larkin and Squilax. Reproduction Douglas fir, from 5 to 8 feet in height, suffered 50 to 80 per cent damage to the 1955 and 1956 foliage. When the larger trees were affected defoliation was restricted to the lower third of the crown. No eggs of this sawfly were found at Larkin and only three Douglas-fir needles containing eggs were collected at Squilax.

A Sawfly on Ponderosa Pine, Neodiprion sp.

Colonies of a sawfly on ponderosa pine were observed occasionally at widely separated points in the District. The larvae fed on the old needles and light defoliation occurred only on branches where a colony was established.

Ponderosa Pine Cone Borers, Dioryctria spp. and Laspeyresia sp.

The ponderosa pine cone crop was poor in most sections of the District. Where cones did develop they were quite heavily infested by two or possibly three species of Lepidoptera. Table 6 shows the results of the examinations of ponderosa pine cones made during July and early August.

Table 6

Percentage of Ponderosa Pine Cones Infested by *Dioryctria* spp. and *Laspeyresia* sp.

Locality	No. cones examined	Cones infested by *Dioryctria* spp.	Cones infested by *Laspeyresia* sp.	Per cent infested
Ronde Lake	20	9	6	75
Whiteman Creek	20	14	2	80
Nahun	20	7	9	80
Keremeos	20	13	-	65
Oliver	20	14	6	100
Winfield	20	12	5	85
Totals	120	69	28	81

All the cones examined were taken from the lower 10 feet of the crown of open growing pine. Cones infested by *Dioryctria* spp. frequently had more than one larva present. It was noted that many cones infested by *Dioryctria* spp. had been opened by Clark nutcrackers, *Nucifraga columbiana* (Wilson), presumably to feed on the larvae within.

Spotless Fall Webworm, *Hyphantria textor* Harr.

Defoliation by the larvae of the spotless fall webworm was common in the valleys throughout much of the District. The most severe damage was in the central and southern parts of the Okanagan Valley. Chokecherry was the preferred host and many of these had been completely defoliated (Figs. 3 and 4). Other tree species affected were black cottonwood, aspen, ornamental poplars and Manitoba maple. Generally, marginal shrubs and trees, or those growing on open rangeland, were the most heavily attacked.

Western Hemlock Looper, *Lambdina fiscellaria lugubrosa* (Hlst.)

Larvae were widespread in the District, but they were nowhere numerous. They were found on various tree species including Douglas fir, western hemlock, western red cedar, western white pine, and Engelmann spruce.

Douglas-fir Needle-miner, *Contarinia* sp.

Populations of this species have subsided over most of the District. Heavy infestation continued over a few acres of Douglas fir on the hillside southwest of Peachland Creek.

STATUS OF TREE DISEASES

Winter Injury to Ponderosa Pine

The foliage of ponderosa pine was severely damaged over an estimated 90 square miles in the Princeton Ranger District. Injury was probably the result of a sudden drop in temperature during the early part of November, 1955. The area most affected extended from east of Aspen Grove in a south-westerly direction to lower Whipsaw Creek. No mortality of larger pine trees was observed, however some small weather-damaged pines died. Early in the season the needles of many of the pines were completely red. During the summer these needles dropped leaving only the green current year's foliage. By fall it was difficult to tell, by casual observation, that many of the trees had been injured. Discoloration was not uniform but varied from a sorrel to bright red. Some pine trees were able to withstand the severe weather better than others; occasionally a tree of normal colour and apparently undamaged, was noted growing with a group of severely damaged trees.

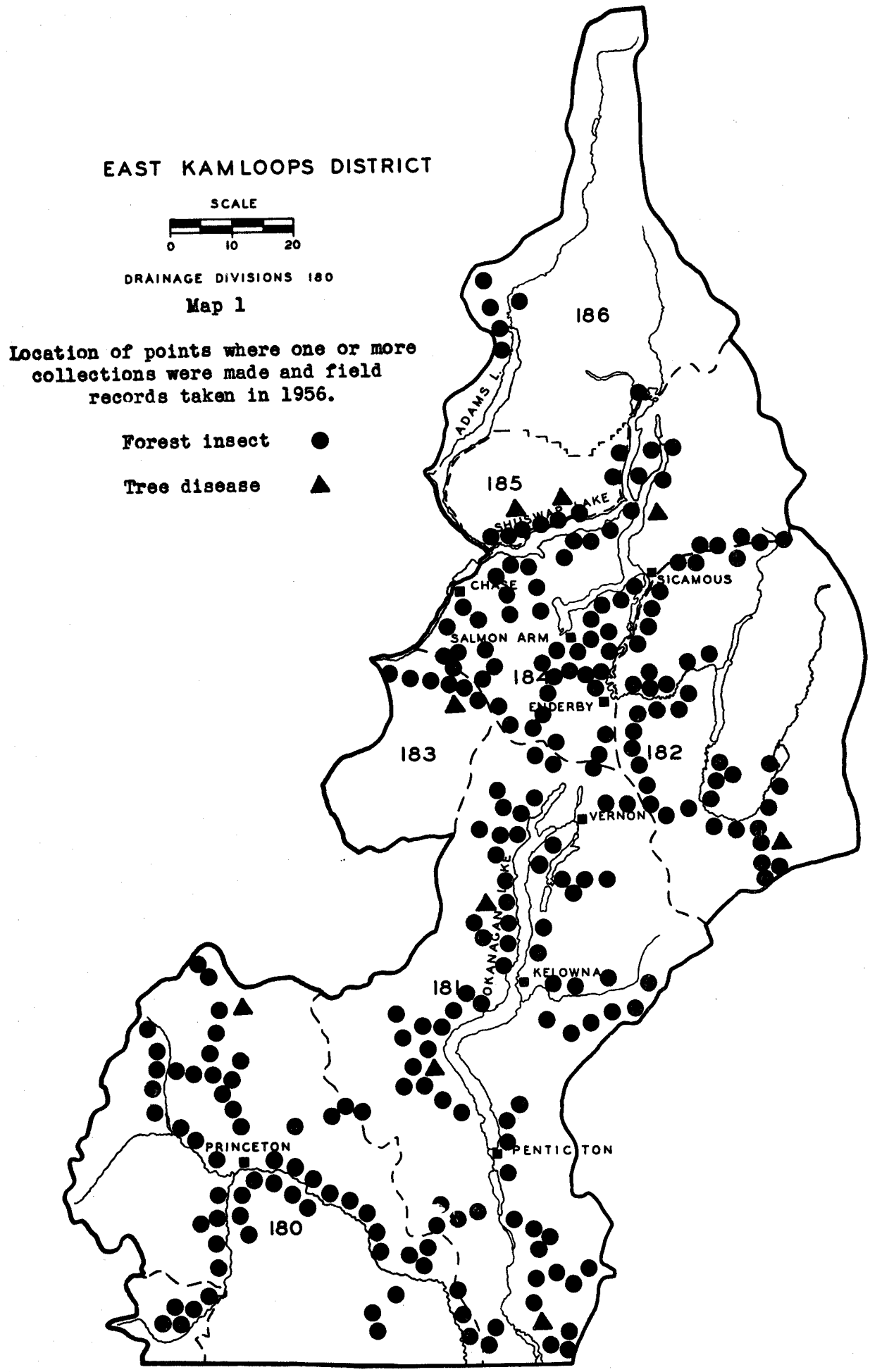
Additional areas where winter injury occurred were Upper Eneas Creek, Ronde Lake, Westwold, and Monte Lake. Only marginal pines on a few acres were affected and no mortality was observed.

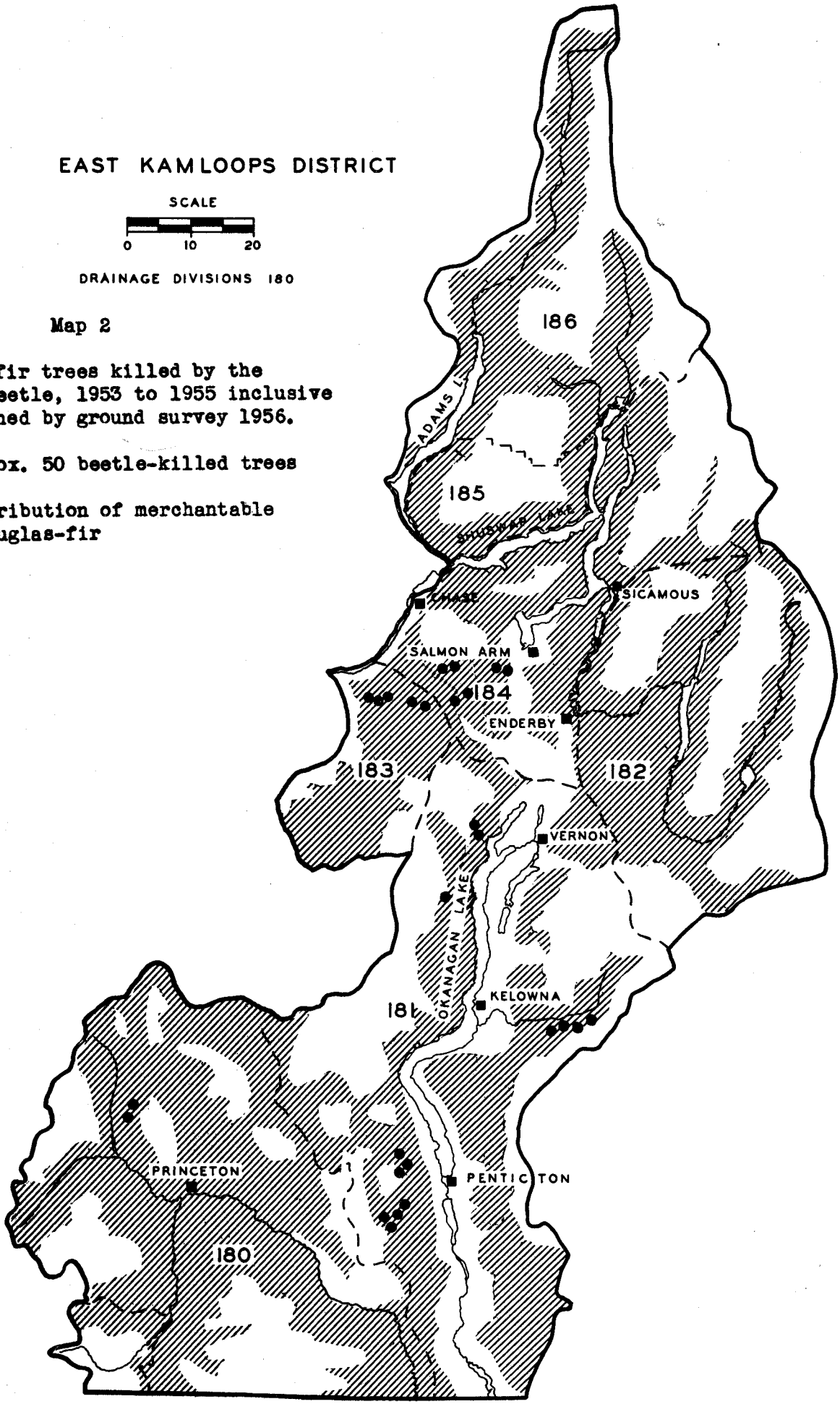
Larch Needle Cast caused by Hypodermella laricis Tub.

The needles of western larch were severely damaged by this disease on the east side of Shuswap Lake southeast of the Narrows. The damage extended over an area three miles by a quarter of a mile. Pole-sized and reproduction-sized larch were affected.

Canker caused by Caliciopsis pseudotsugae?

Branches and twigs injured by this fungus were noted at Monte Lake, Celista, and Magna Bay. Reproduction-sized Douglas-fir trees did not appear to be seriously damaged although dead branches were located that had probably been destroyed by Caliciopsis.


EAST KAMLOOPS DISTRICT
SCALE
0
10
20
DRAINAGE DIVISIONS 180
Map 1
Location of points where one or more collections were made and field records taken in 1956.
Forest insect
Tree disease
186
185
184
183
182
181
180
ADAMS L.
SHUSWAP LAKE
CHASE
SICAMOUS
SALMON ARM
ENDERBY
VERNON
OKANAGAN LAKE
KELOWNA
PRINCETON
PENTICTON


EAST KAMLOOPS DISTRICT
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0 10 20
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Map 2
Douglas-fir trees killed by the Douglas-fir beetle, 1953 to 1955 inclusive as determined by ground survey 1956.
● - approx. 50 beetle-killed trees
- distribution of merchantable Douglas-fir
186
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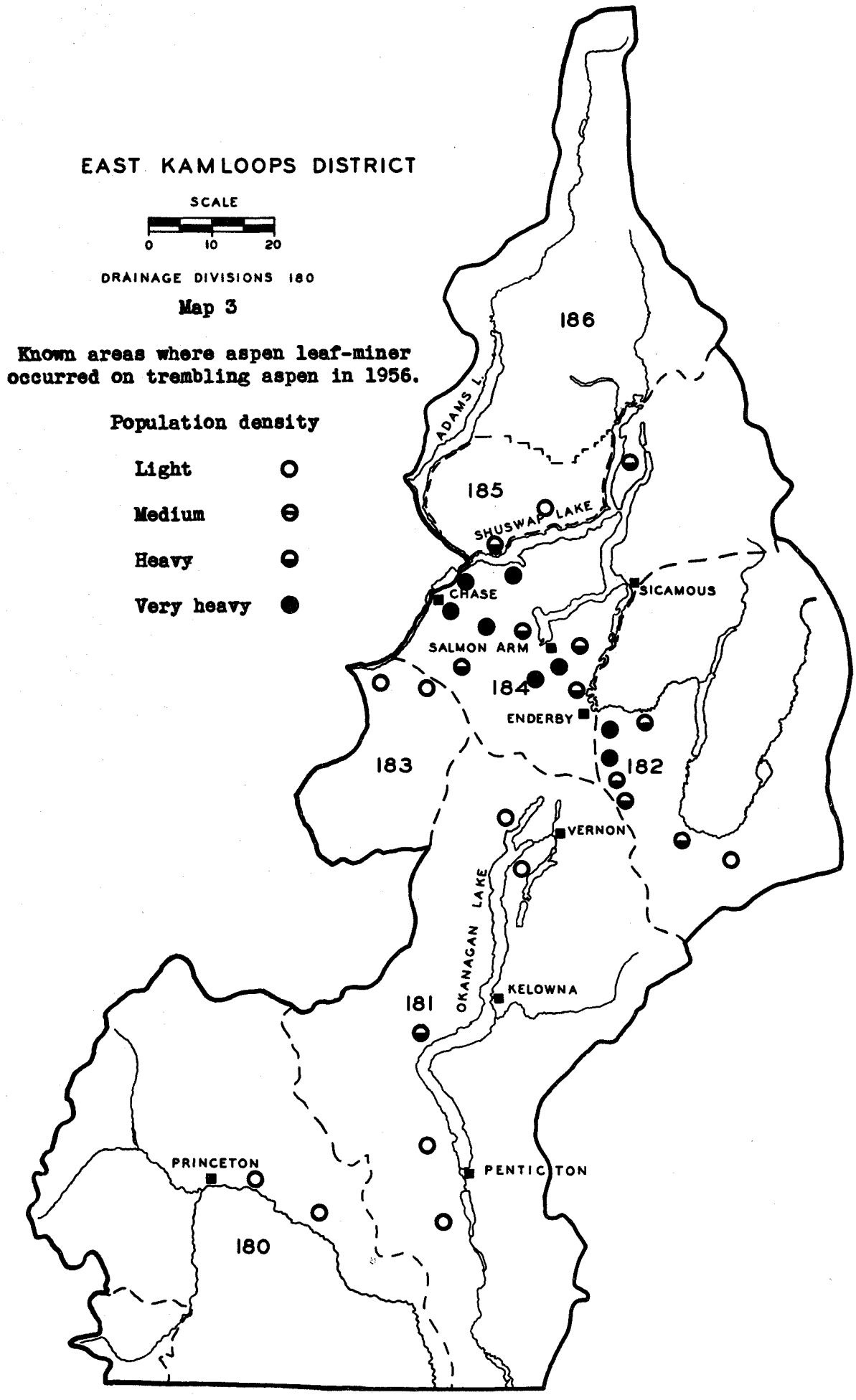
SICAMOUS
SALMON ARM
184
ENDERBY
183
182
VERNON
OKANAGAN LAKE
181
KELOWNA
PRINCETON
PENTICTON
180


EAST KAMLOOPS DISTRICT
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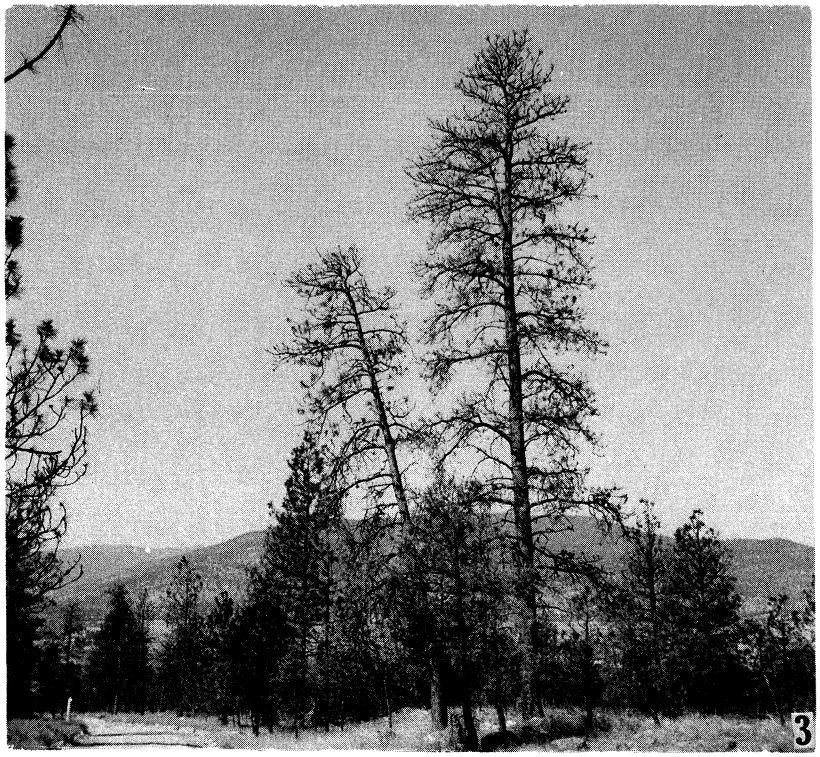
Map 3
Known areas where aspen leaf-miner occurred on trembling aspen in 1956.
Population density
Light
Medium
Heavy
Very heavy
186
185
184
183
182
181
180
ADAMS L.
SHUSWAP LAKE
CHASE
SICAMOUS
SALMON ARM
ENDERBY
VERNON
OKANAGAN LAKE
KELOWNA
PRINCETON
PENTICTON

Figure 1. Spotless fall webworm, Hyphantria cunea (Drury). Defoliation by this species on a preferred host, Choke cherry, in open rangeland. East Kamloops. Aug. 9, 1956. B.A. Sugden.

Figure 2. Close-up of web of spotless fall webworm on choke cherry. Aug. 9, 1956. B.A. Sugden.



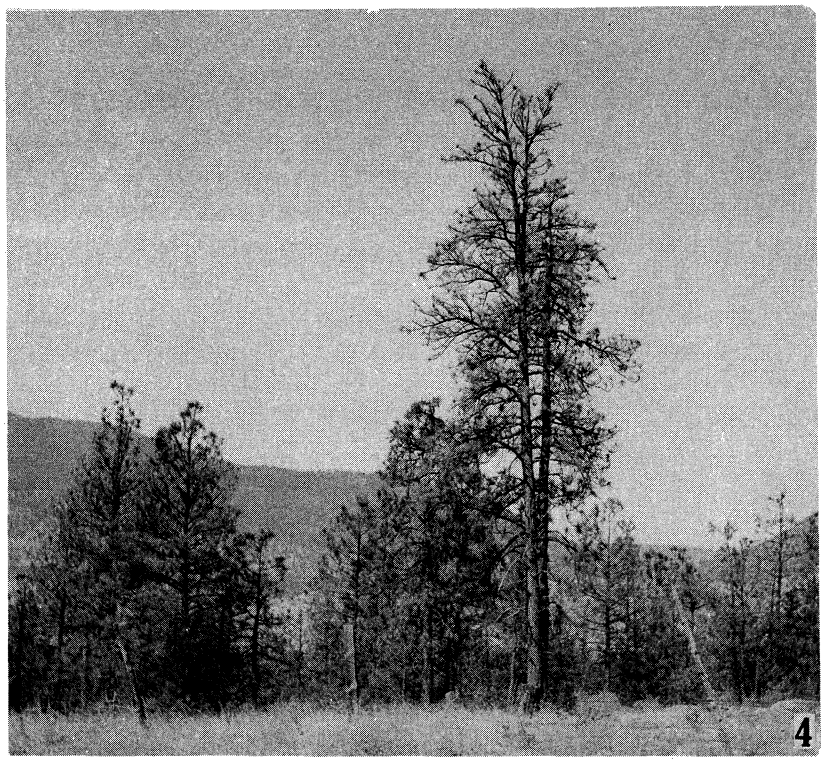


Figure 3. Black pine needle scale, Nuculaspis californica (Coleman). Large ponderosa pine killed by repeated attacks of this species of scale. Penticton, East Kamloops. July 31, 1956. B.A. Sugden

Figure 4. Many of the young ponderosa pine in this stand have been killed by the black pine needle scale, Penticton, East Kamloops. July 31, 1956. B.A. Sugden

ANNUAL REPORT OF FOREST BIOLOGY RANGERS

BRITISH COLUMBIA

1956

NELSON FOREST DISTRICT

FOREST BIOLOGY SURVEY

NELSON FOREST DISTRICT

1956

J. Grant

INTRODUCTION

In 1956, Forest Biology Rangers D. H. Ruppel, G. G. Duerksen and R. B. Tocher were assigned to the Central, West and East Nelson districts respectively. Forest Biology Ranger J. Grant spent most of the season in the Nelson District except for approximately six weeks in other areas.

The season was not marked by any major insect outbreaks. The mountain pine beetle, although its numbers had diminished, continued to destroy lodgepole pine in several localities in East Nelson District, and white pine in Central Nelson District.

The Engelmann spruce beetle killed a considerable amount of merchantable timber in the mountains west of Creston adjacent to the Idaho boundary.

The black-headed budworm infestations near LaForme and Downie creeks did not recur in 1956, but there was light defoliation of western hemlock over several square miles near Albert Canyon.

The western hemlock looper population decreased along the western side of The Big Bend but remained fairly close to the 1955 level between Blackwater Lake and Cummins River.

The Douglas-fir needle-miner was again widely distributed, but the only heavy infestation was confined to a small area east of Grand Forks.

ANNUAL REPORT OF FOREST BIOLOGY RANGER

for

WEST NELSON DISTRICT

1956

FOREST BIOLOGY SURVEY

WEST NELSON DISTRICT

1956

G. G. Duerksen

INTRODUCTION

Field work in the West Nelson District began on May 23 and continued until September 12. Effort was concentrated on getting a good sampling of forest insects and tree diseases in the area, since infestations in the District were few.

Table 1 contains the insect collections by agencies for the months of May to October, and Table 2 shows the host trees and the number of insect and tree disease collections made from each.

Map 1 shows the locations where one or more insect and tree disease collections or field records were obtained during 1956.

STATUS OF INSECTS

Douglas-fir Beetle, Dendroctonus pseudotsugae Hopk.

In 1956 only one small infestation of Douglas-fir beetle was discovered. It was located along Pend d'Oreille River between Waneta and Nelway. Beetles were infesting slash in a selective-cut logging operation. Tree mortality due to beetle infestation was negligible.

Engelmann Spruce Beetle, Dendroctonus engelmanni Hopk.

The Engelmann spruce beetle was active in the Priest River area, and in Summit Creek Valley, with the highest concentration in Nun Creek and Monk Creek valleys.

A strip one chain wide and a mile long was run along Nun Creek Valley to the vicinity of the Idaho boundary. It was learned that 93.8 per cent of the Engelmann spruce trees over 8 inches d. b. h. had been killed. Fifty-four per cent of the trees had been attacked in 1954 or earlier, and 46 per cent in 1955. Fresh attack in 1956 was negligible, owing to the fact that almost all of the susceptible trees were already infested; however, several instances of current year's attack in trees partially infested in 1955 were observed.

Table 1

Forest Insect Collections by Agencies
West Nelson District - 1956

Personnel involved in collection	Number of collections						
	May	June	July	Aug.	Sept.	Oct.	Total
Forest Biology Rangers independently	5	129	168	126	10		438
Forest Biology Rangers with Forest Service personnel	-	-	-	-	-		
Forest Service personnel independently	-	-	-	2	-	-	2
Other co-operators	-	1	-	-	-	-	1
Total	5	130	168	128	10	-	441

Table 2

Collections by Hosts
West Nelson District - 1956

Coniferous hosts	Forest insects	Tree diseases	Broad-leaved hosts	Forest insects	Tree diseases
Douglas fir	106	4	trembling aspen	7	-
ponderosa pine	30	1	western white birch	3	-
lodgepole pine	52	2	willow	6	-
western white pine	12	-	mountain alder	6	-
western larch	52	5	cottonwood	3	-
Engelmann spruce	44	3	Douglas maple	1	-
alpine fir	16	5	cascara	1	-
grand fir	19	1	hazelnut	1	-
western red cedar	11	-	bitter cherry	1	-
western hemlock	60	3	mountain ash	1	-
western yew	1	1	saskatoon	1	-
Rocky Mountain juniper	2	1	miscellaneous hosts	5	-
			Total	36	
Total	405	26	Grand total	441	26

Large broods of larvae, pupae, and teneral adults were found in standing trees, and in freshly cut logs, up to 50 feet from the butt, indicating that winter mortality in Nun Creek Valley had not seriously reduced the beetle population, as was reported to be the case in adjacent parts of the United States.

An aerial reconnaissance of Monk Creek Valley revealed that, although bark beetles had been causing losses for the past three years, the attack up to this year was not as heavy as in Nun Creek Valley. As trees infested in 1956 could not yet be readily detected, this year's losses were not determined, but it was considered unlikely that they would exceed the total previously killed.

Approximately 1,200 dead and infested trees were counted in Monk Creek Valley; allowing a similar figure for the current year's attack, the estimated total of trees infested to date would be 2,400. On the basis of the average volume of infested trees on the Nun Creek cruise, this would amount to a loss of 912,000 board feet.

European Larch Sawfly, Pristiphora erichsonii (Htg.)

A special effort was made to find quantities of the European larch sawfly. Larvae were scarce in 1956 as in previous years, nevertheless, a greater number was collected than in any of the past six years. The sawfly seemed to be concentrated in a ten-mile area in the vicinity of Phoenix. This is the only locality from which larvae were obtained. The total number, including 4 hand-picked colonies and numerous beatings, was 80 insects.

Striped Alder Sawfly, Hemichroa crocea (Fourc.)

This insect reached infestation proportions in and around the city of Nelson. In some parts where alder bushes had been completely denuded, larvae were found attacking nearby birch shoots. An example of the defoliation is illustrated in Fig. 1 in the photographic section. Hand-picked collections were taken and 25 or more larvae were found feeding on one leaf.

Douglas-fir Needle-miner, Contarinia sp.

The Douglas-fir needle-miner was present in most of the southern portions of West Nelson District, with a light population recorded as far north as McCulloch. Trees most severely affected were in an area around Cascade which comprised 63,000 acres. On some trees just east of Cascade an estimated 90 per cent of the current needle crop was infested. Another group of trees with a light to medium infestation was found on the east side of Granby River at Volcanic Creek.

Engelmann Spruce Weevil, Pissodes engelmanni Hopk.

In previous years the Engelmann spruce weevil has been reported from Inonoaklin Crossing up to and beyond the Kettle River on the Monashee Road. Table 4 illustrates this year's activity on a survey strip along the Upper Kettle River.

The weevil had also attacked spruce tips near Salmo, but to a lesser degree. No comparative table was drawn up because the damage here on a strip basis was considered negligible.

Table 4

Number and Per Cent of Engelmann Spruce Trees Attacked by Engelmann Spruce Weevil on a Strip 10 chains by 1 chain along the Upper Kettle River.

Status of Engelmann spruce	No. of trees	Per Cent
Attacked during 1956	12	27.2
Attacked prior to 1956	18	41.0
Not attacked by weevils	14	31.8

Douglas-fir Tussock Moth, Hemerocampa pseudotsugata McD.

Thirty or more trees at Cascade were examined in 1956 for current evidence of Douglas-fir tussock moth. An infestation had been reported here in 1955, (Forest Biology Rangers' Annual Report - 1955). Although trees showed previous defoliation, and old egg masses were present, no recent egg masses or larvae were found. It was concluded that the infestation had died out, apparently due to a polyhedral virus which became evident during 1955.

Black-headed Budworm, Acleris variana (Fern.)

The black-headed budworm was present throughout the area on the favoured hosts. Hemlock trees near Fauquier bore the highest number in any one area. Between 16 and 32 larvae were collected, however, defoliation was negligible. Twenty miles north of Carmi 43 larvae were obtained, the greatest number in any one collection. The host was Engelmann spruce.

A Sawfly on Western Hemlock, Neodiprion sp.

Colonies of a sawfly on western hemlock were found in the Boundary Lake area, on the mountain highway between Cascade and Rossland, Burrell Creek on the Upper Granby River, and Caribou Creek near Burton. Eight miles up Crawford Creek, on Kootenay Lake, defoliation caused by Neodiprion sp. was noticed but no collection was taken. The colonies were small and only light defoliation occurred.

White Pine Cone beetle, Conophthorus monticolae Hopk.

Premature dropping of cones was found in routine surveys in the Crawford Creek area, where two collections were made, and south of Salmo along Stagleap Creek where only one collection was made. In one of the Crawford Creek collections it was estimated that 60 per cent of the cone crop was infested. This estimate was based on the belief that the cones remaining on the tree were not infested.

Aspen Leaf-miner, Phyllocnistis populiella Chamb.

During 1956 extensive damage to foliage of trembling aspen recurred in the valley and on the lower hillsides of Upper Arrow Lake between Fauquier and Burton and also, though less severe, through the Inonoaklin River Valley at lower elevations.

Poplar and Willow Borer, Sternochetus lapathi (L.)

This weevil has attacked scattered stands of willow throughout the District. However, three areas in particular were noted to carry a heavier than average population; Grand Forks along the east bank of the Granby River, the Edgewood area, and the southern end of Kooteany Lake.

STATUS OF TREE DISEASES

Larch Needle Cast caused by Hypodermella laricis Tubeuf.

Discoloration of larch foliage caused by Hypodermella laricis was quite prominent in the Creston area, especially along Arrow Creek, east of Creston, where more than 70 per cent of the needles were red. Evidence of the disease was found in most of the Kaslo District and parts of Nelson, but to a lesser degree.

Dwarf Mistletoe on Western Larch, Arceuthobium sp.

Some western larch stands suffered severely from dwarf mistletoe. Barnes Creek, near Needles, and Volcanic Creek, near Grand Forks, were among the most heavily affected areas. Light "brooming" was common in most of the District.

Animal Damage

Estimated damage by the porcupine, Erithizon dorsatum L., was about 5 per cent in an area 5 miles south of Salmo on the Nelson-Trail Highway. In a strip one mile long 79 larch tips were damaged. The animals had chewed the bark off near the tip. Trees affected were in a 3- to 7-inch diameter class.

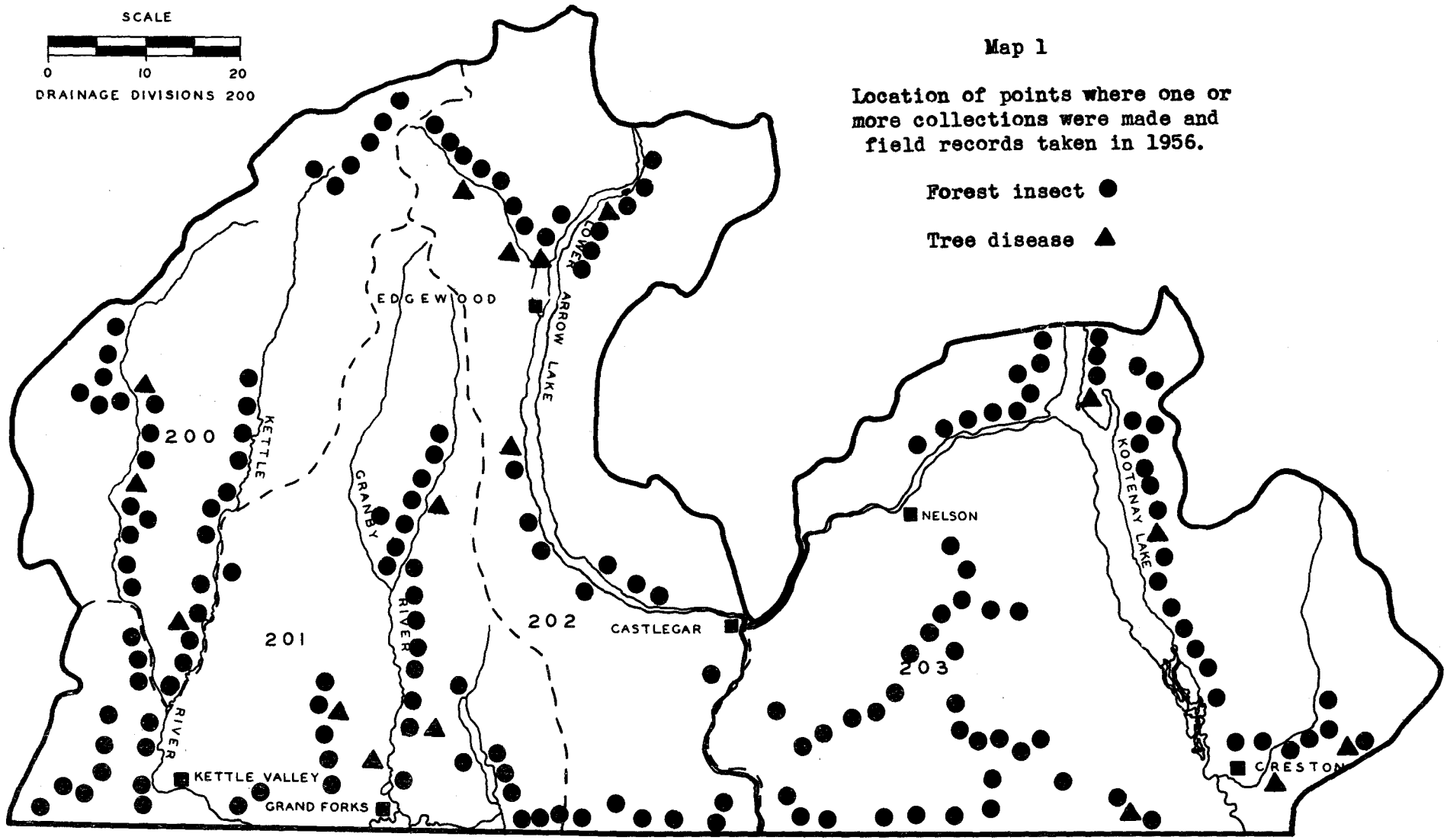

WEST NELSON DISTRICT
SCALE
0
10
20
DRAINAGE DIVISIONS 200
Map 1
Location of points where one or more collections were made and field records taken in 1956.
Forest insect
Tree disease
EDGEWOOD
LOWER ARROW LAKE
KETTLE
RIVER
GRANBY
RIVER
KOOTENAY LAKE
200
201
202
203
NELSON
CASTLEGAR
KETTLE VALLEY
GRAND FORKS
CRESTON

Figure 1. Striped alder sawfly, Hemichroa crocea (Fourc.). Mountain alder near Nelson almost completely defoliated. West Nelson. Sept. 7, 1956. G. Duerksen

Figure 2. Woodpecker scaling on Engelmann spruce tree infested by Engelmann spruce beetle, Dendroctonus engelmanni Hopk. Nun Creek, Boundary Lake area. West Nelson. July 26, 1956. G. Duerksen

Figure 3. Brown felt blight, Herpotrichia nigra Hart., on Engelmann spruce. Nun Creek. West Nelson. Sept. 6, 1956. G. Duerksen

Figure 4. Witches' brooms on Rocky Mountain juniper caused by Gymnosporangium nidus-avis Thaxter. West shore of Lower Arrow Lake. West Nelson. Aug. 28, 1956. G. Duerksen

ANNUAL REPORT OF FOREST BIOLOGY RANGER

for

CENTRAL NELSON DISTRICT

1956

FOREST BIOLOGY SURVEY

CENTRAL NELSON DISTRICT

1956

D. H. Ruppel

INTRODUCTION

Survey work was begun in the Central Nelson Forest Biology Ranger District the last week in May and continued till early October. In addition to routine survey work, two weeks were devoted to an appraisal of mountain pine beetle damage to western white pine.

The number of forest insect and disease collections taken in Central Nelson District are listed in Tables 1 and 2. Table 1 shows a breakdown of forest insect collections by months, and the agencies which made the collections; Table 2 shows the number of forest insect and tree disease collections by host species. Map 1 shows the location of points where one or more collections and field records were taken in 1956.

STATUS OF INSECTS

Black-headed Budworm, Acleris variana (Fern.)

The black-headed budworm continued to be very common in collections from western hemlock and other hosts throughout the District. The infestation reported in 1955 from areas bordering the Columbia River north of Revelstoke at LaForme and Downie creeks has subsided to a low level. The collapse of the infestation was possibly due to the unusually severe winter of 1955-56, coupled with disease and parasites.

In August a report was received of western hemlock defoliation at Albert Canyon east of Revelstoke. Subsequent investigation showed light defoliation in the crowns of western hemlock over several square miles, but larvae, eggs or adults of black-headed budworm were not numerous enough to endanger the stand.

Sixty collections containing black-headed budworm were obtained from western hemlock averaging 5.6 larvae per collection. This average does not include an unusual collection of 201 budworm larvae at Keen Creek which appeared to be non-representative of the immediate area. Budworms were also found on Engelmann spruce, Douglas fir, alpine fir, grand fir, and western white pine.

There does not appear to be any threat of severe damage by black-headed budworm in this District for 1957.

Table 1

Forest Insect Collections by Agencies
Central Nelson District - 1956

Personnel involved in collection	Number of Collections						Total
	May	June	July	Aug.	Sept.	Oct.	
Forest Biology Rangers independently	40	157	113	34	30	2	376
Forest Biology Rangers with Forest Service personnel	-	-	-	-	-	-	-
Forest Service personnel independently	-	-	-	2	-	-	2
Other co-operators	-	-	-	8	-	-	8
Total	40	157	113	44	30	2	386

Table 2

Collections by Hosts
Central Nelson District - 1956

Coniferous hosts	Forest insects	Tree diseases	Broad-leaved hosts	Forest insects	Tree diseases
western hemlock	162	1	willow	6	-
Douglas fir	83	5	western white birch	4	-
western white pine	33	5	alder	4	-
Engelmann spruce	30	-	trembling aspen	3	-
western red cedar	18	-	red-osier dogwood	2	-
western larch	14	2	mountain ash	2	-
alpine fir	9	1	black cottonwood	1	-
lodgepole pine	7	-	miscellaneous	2	-
ponderosa pine	4	-	no host	1	-
grand fir	1				
			Total	25	
Total	361	14	Grand total	386	14

Western Hemlock Looper, Lambdina fiscellaria lugubrosa (Hlst.)

The western hemlock looper population continued to decrease in 1956. Western hemlock, the preferred host, showed no signs of defoliation due to this insect in any of the areas visited. Thirty-seven collections containing this defoliator averaged 4.3 larvae per collection and the highest number was 18 larvae west of Boat Encampment.

Most of the sampling for population density, parasites, and plot work on this insect was abandoned due to the lack of material, although sampling was continued on plots established in 1955 on the Big Bend Highway north of Revelstoke.

The western hemlock looper population is at a low level in this District and it is not likely to cause any appreciable damage in 1957.

Mountain Pine Beetle, Dendroctonus monticolae Hopk.

Mountain pine beetle activity on western white pine continued at a low level, mostly on the fringes of old outbreaks. A small spot infestation of about one acre not previously recorded was found at Zwicky turnoff near Kaslo. Some blowdown occurred there in 1955. The beetle population was not thriving.

The 1955 blowdown area in Revelstoke National Park was inspected during the first week in July. Approximately 75 per cent of the windthrown western white pine examined at the 2,000- and 2,200-foot levels contained larvae and adults of mountain pine beetle. The beetle population was not thriving too well, possibly due in part to the severe winter in 1955-56. The beetle hazard continues as many of the "down" trees have sufficient root systems to keep them green for at least another year. No standing trees were infested.

The beetle was found in logging slash near Slocan City although no loss was suffered by standing timber.

An appraisal of mountain pine beetle damage to western white pine in this District was attempted in 1956. The methods used were ocular estimates coupled with sample strips. The period of loss covered was the past five years.

Mountain pine beetle damage to western white pine in the District is at the lowest level in several years but an active hazard exists where beetle populations infest blowdown and logging slash at widespread points.

Douglas-fir Beetle, Dendroctonus pseudotsugae Hopk.

The Douglas-fir beetle was found to be quite numerous and widespread in windthrow and slash in the District. In Revelstoke National Park a medium population was found in windthrown Douglas-fir trees at the 2,000, 2,200, and 3,000 foot levels, but was most prevalent at the lowest elevation.

Along the north-east arm of Upper Arrow Lake about 300 acres of Douglas-fir blowdown was beetle-infested. Salvage logging was going on at this locality but is unlikely to eliminate the hazard. A combination of slash and blowdown was infested east of Greenslide, northeast of Sidmouth, and southeast of Slocan City.

No standing timber has, so far, been found attacked but the prevalence of Douglas-fir beetle in Douglas-fir slash and windthrow from Slocan to Revelstoke is a hazard.

A Pine Root Weevil, Hypomolyx piceus (DeG.)

A further search was made in 1956 for the pine root weevil first reported damaging western white pine at Makinson Flats in 1955. It was found to be active south of Kaslo, north of Nakusp and south-west of Revelstoke. A sample at Zwicky, west of Kaslo, revealed no weevil activity. Ten trees were used as the basis of a sample.

Severe girdling of the root crown appeared to be the primary cause for mortality of a number of pines four inches d.b.h. and less, at Kuskanax Creek north of Nakusp. A pictorial specimen of the damage is shown in Figure 1.

A system of tree mortality plots was initiated at Kuskanax Creek. A plot one chain square was laid out and 25 "reproduction-sized" white pine trees within its boundaries were tagged. Notations were made of the present state of the trees. Periodic inspections will be made during the next few years.

No pole-size trees have been found dead as a result of weevil damage and the results of minor girdling are not known.

A Hemlock Sawfly, Neodiprion sp.

Hemlock sawfly was prevalent on western hemlock throughout the surveyed areas of the District as shown on Map 2. There was an apparent increase since 1955 with a number of beating sample collections in excess of 200 larvae, especially from Mile 60 to Mile 80 north of Revelstoke. The occurrence of this insect was very erratic and 1956 population foci did not coincide with those of 1955.

Noticeable defoliation took place on some hemlock reproduction and the low-hanging branches of larger trees, mostly on the fringe of stand openings. Since no appreciable feeding took place in the upper crown of stands examined, damage was considered as superficial.

Probably the hemlock sawfly will be numerous in 1957. It can cause serious defoliation, but is not recorded to have done so in the Interior except in combination with other insects.

Aspen Leaf-miner, Phyllocnistis populiella Chamb.

The aspen leaf-miner was again widespread on trembling aspen throughout the District. Trees in Slocan Valley were most severely infested, with approximately 75 per cent of the aspen leaves attacked in the vicinity of Enterprise Creek. In mid-summer many aspen stands had a "silvery" sheen due to leaf-miner activity.

A Birch Leaf Skeletonizer, (probably Bucculatrix canadensisella Chamb.)

It was active on western white birch at Trout Lake.

A Poplar Leaf Blotch Miner, Phyllonorycter sp.

A leaf-miner reported as severe on cottonwood in the Arrowhead region in 1955, subsided considerably this year. No discoloration of cottonwood foliage was noted.

Spruce Budworm, Choristoneura fumiferana (Clem.)

The spruce budworm was collected in very low numbers at widespread intervals in Central Nelson District. Hosts included Douglas fir, western hemlock, western larch, grand fir, and western white pine. This insect is considered as presently unimportant in the areas visited.

Engelmann Spruce Beetle, Dendroctonus engelmanni Hopk.

The Engelmann spruce beetle is not known to be doing any serious damage to Engelmann spruce stands in the District. It was reported to be slightly active on Forest Management Licence Number 3 (Passmore Lumber Company), and the area affected was being logged. The occurrence of this insect was also reported by Kootenay Forest Products Ltd. as being present at Meadow Creek. Due to the nature of the terrain and the fact that most spruce stands are at a high elevation and not readily accessible, it is quite possible that much of the damage by the Engelmann spruce beetle has gone undetected in the Central Nelson District.

STATUS OF TREE DISEASES

Needle Cast of Western Larch caused by Hypodermella laricis Tubeuf.

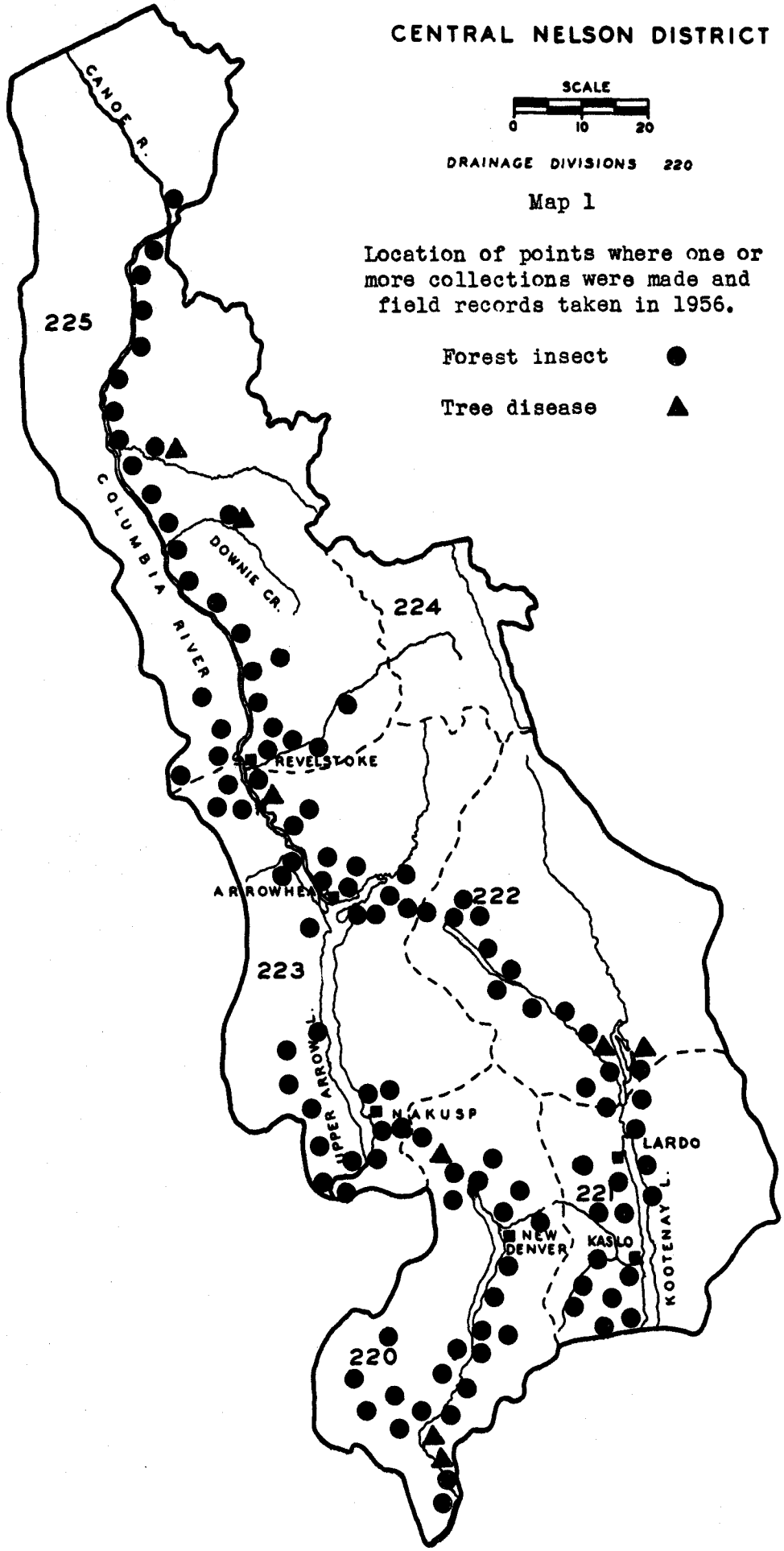
The "needle cast" of western larch in the area around the north end of Kootenay Lake was less severe in 1956. Persistence of the disease in a small area to the east of Duncan Lake, however, has caused thinning of the upper crown of some trees. No permanent injury was apparent.

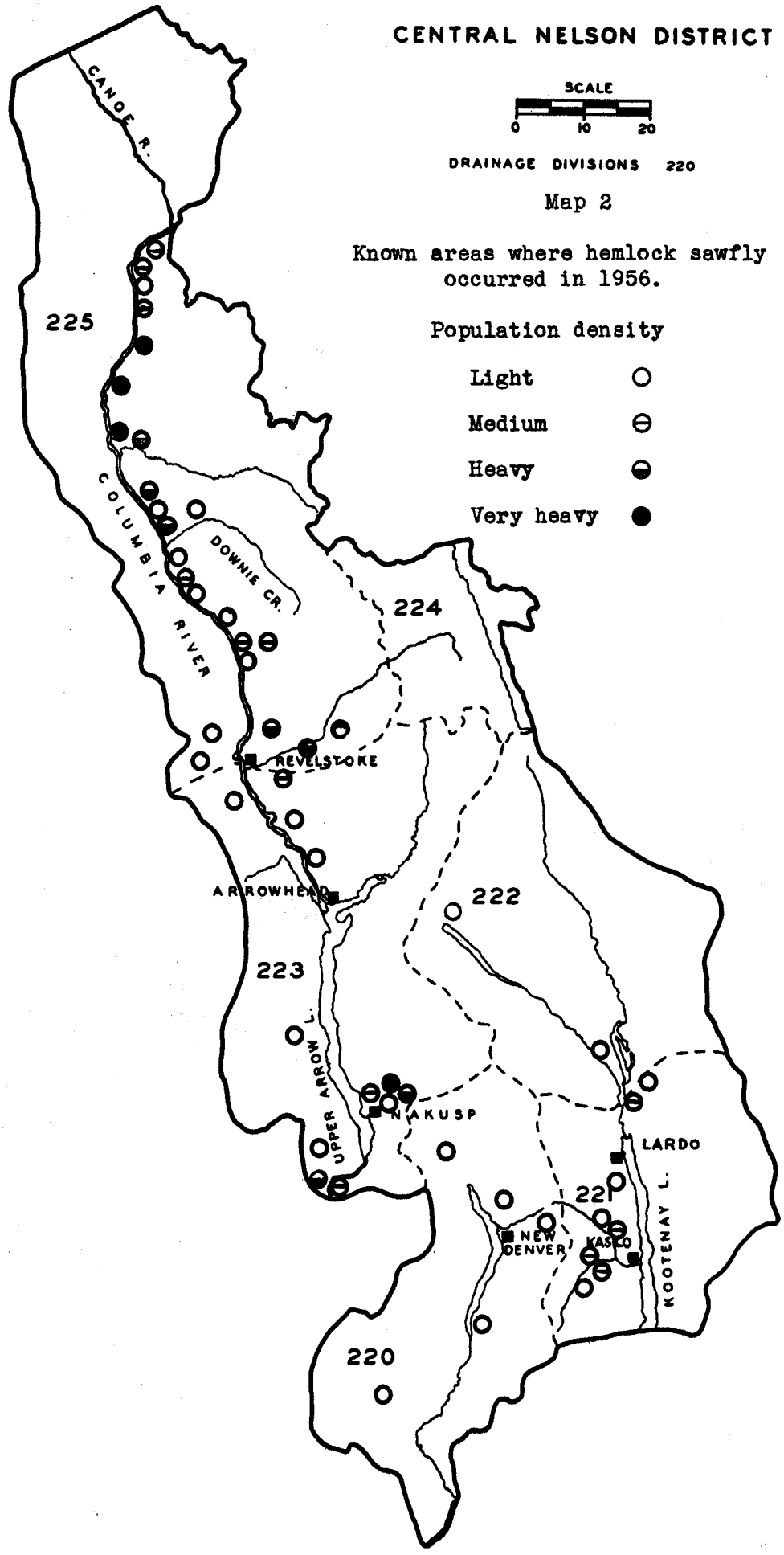
A Canker on Hemlock caused by Caliciopsis sp.

The above-mentioned canker was collected from western hemlock at Downie Creek. The disease was not prevalent.

Snow Damage 1955-56

An unestimated amount of damage was done by snow slides as a result of the unusually heavy snowfall last winter (1955-56). In many places the slides overflowed their usual runs, smashing whatever timber was in their path. The slide area was doubled and trebled in some cases. Deterioration of the stands on the slopes holding the snow may have contributed to increased damage in some areas. Figure 2 shows avalanche damage at Keen Creek near Kaslo.


CENTRAL NELSON DISTRICT
SCALE
0 10 20
DRAINAGE DIVISIONS 220
Map 1
Location of points where one or more collections were made and field records taken in 1956.
Forest insect
Tree disease
CANOE R.
225
COLUMBIA RIVER
DOWNIE CR.
224
REVELSTOKE
ARROWHEAD
222
223
UPPER ARROW L.
NAKUSP
LARDO
221
NEW DENVER
KASLO
KOOTENAY L.
220


CENTRAL NELSON DISTRICT
SCALE
0 10 20
DRAINAGE DIVISIONS 220
Map 2
Known areas where hemlock sawfly occurred in 1956.
Population density
Light
Medium
Heavy
Very heavy
CANOE R.
COLUMBIA RIVER
DOWNIE CR.
REVELSTOKE
ARROWHEAD
UPPER ARROW L.
NAKUSP
LARDO
NEW DENVER
KASLO
KOOTENAY L.
225
224
223
222
221
220

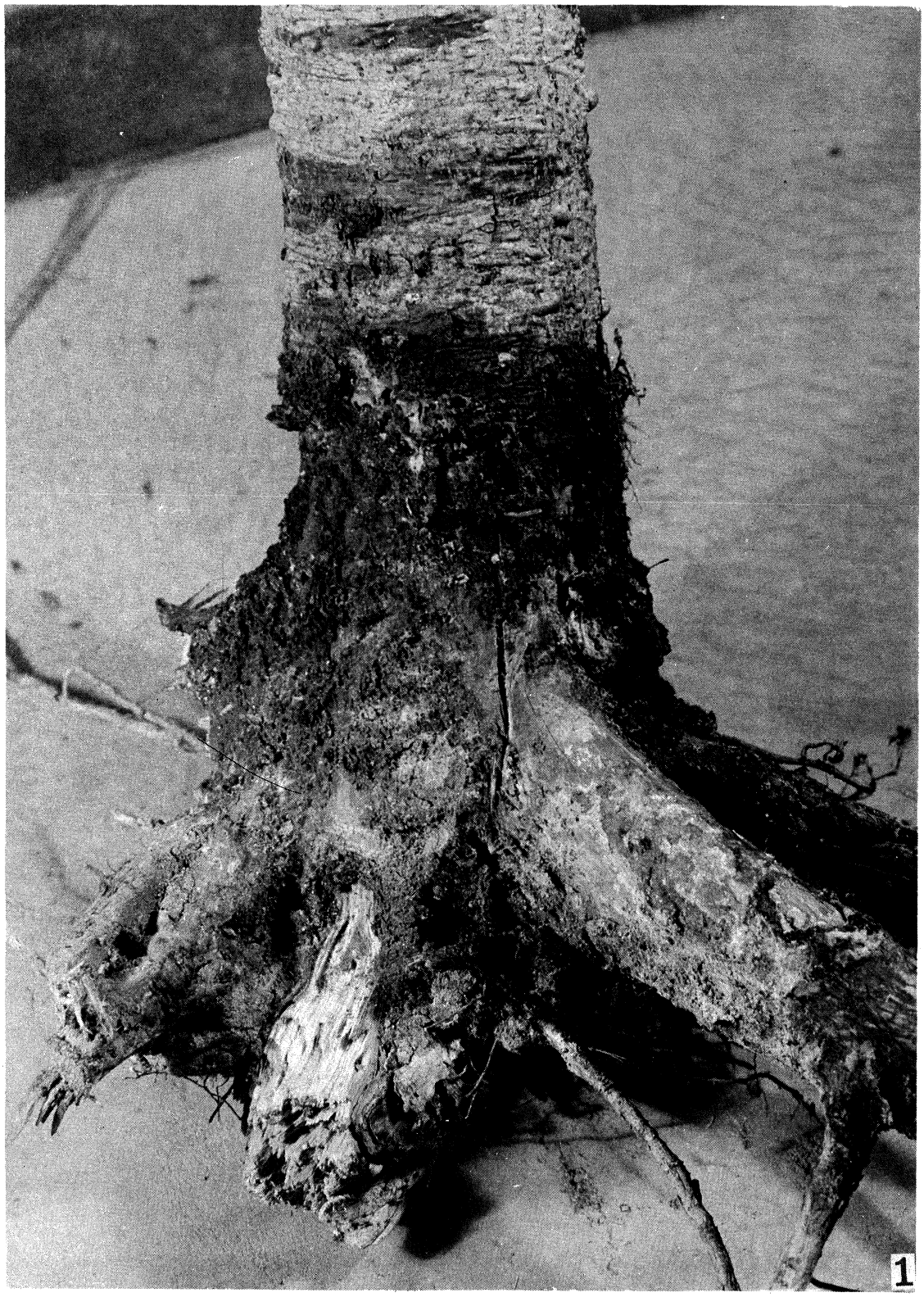


Figure 1. Root crown of western white pine, 3 inches d.b.h., showing damage by the pine root weevil, Hypomolyx piceus (DeG.). Damage occurred in the early summer of 1956 at Kuskanax Creek, Central Nelson, and killed the tree. August, 1956. D.H. Ruppel

Figure 2. Trees uprooted by a snow avalanche as a result of the unusually heavy snowfall during the winter of 1955–56 at Keen Creek near Kaslo, Central Nelson. The stand consisted chiefly of over-mature western hemlock and western red cedar up to 36 inches d.b.h., June 6, 1956. D.H. Ruppel

ANNUAL REPORT OF FOREST BIOLOGY RANGER

for

EAST NELSON DISTRICT

1956

FOREST BIOLOGY SURVEY

EAST NELSON DISTRICT

1956

Compiled by J. Grant for R. B. Tocher

INTRODUCTION

The Forest Insect and Disease Survey began in the second week of June and ended early in September.

A total of 195 forest insect collections and 2 tree disease collections were made by Forest Biology personnel and co-operators; Table 1 and 2 show summaries of collections by agencies and hosts respectively, and Map 1 shows localities where collections and field records were taken.

STATUS OF INSECTS

Mountain Pine Beetle, Dendroctonus monticolae Hopk.

All current infestations in lodgepole pine have apparently passed their peak and, although light losses continued in 1956, the trend was toward a decline in beetle populations. Known sites of recent or current bark beetle activity were:

Frances and Forster Creek valleys - This infestation has been present since 1946 or possibly earlier. During this period the majority of susceptible trees has probably been destroyed and it seems unlikely that any further serious losses are to be expected in this immediate area.

Windermere Creek Valley - First reported in 1950 but believed to have been present since 1947, this infestation is almost inactive at its western limit but is still destroying some timber in the eastern end of the Valley.

Steamboat Mountain - Scattered small groups of trees were attacked on the eastern slope of the ridge above Luxor. Losses have occurred annually in this area since 1948.

Table 1

Forest Insect Collections by Agencies
East Nelson District - 1956

Personnel involved in collection	Number of collections						
	May	June	July	Aug.	Sept.	Oct.	Total
Forest Biology Rangers independently	-	80	61	41	-	-	182
Forest Biology Rangers with Forest Service personnel	-	-	-	2	-	-	2
Forest Service personnel independently	2	3	2	2	1	-	10
Other co-operators	-	-	-	-	-	1	1
Total	2	83	63	45	1	1	195

Table 2

Collections by Hosts
East Nelson District - 1956

Coniferous hosts	Forest insects	Tree diseases	Broad-leaved hosts	Forest insects	Tree diseases
Douglas fir	53	1	trembling aspen	5	-
western hemlock	26	-	black cottonwood	2	-
Engelmann spruce	23	-	willow	2	-
alpine fir	20	1	alder	2	-
ponderosa pine	20	-	white birch	1	-
lodgepole pine	14	-	chokecherry	1	-
western larch	7	-	Douglas maple	1	-
western red cedar	5		miscellaneous hosts	7	-
Rocky Mountain juniper	5	-			
western white pine	1				
			Total	21	
Total	174	2	Grand total	195	2

Whiteswan Lake - No data were available for this locality, but an aerial reconnaissance did not reveal any fresh " red tops", indicating that the infestation has subsided.

Elk Creek - The infestation in the Elk Creek Valley near the confluence of that stream and White River was reported to have died out in 1951. However, in 1956, the British Columbia Forest Service reported that there were numerous recently killed trees in the locality.

Whitetail Lake - No fresh attack was found in 1956.

Toby Creek - This infestation was believed to have died out.

Canal Flats - A few small groups of lodgepole pine trees along the east side of the Kootenay River, between 6 and 10 miles above Canal Flats, were killed by mountain pine beetle.

Douglas-fir Beetle, Dendroctonus pseudotsugae Hopk.

The Douglas-fir beetle is not an important pest at present in the East Nelson District, and, in 1956, only small-scale losses occurred. For the most part they were confined to groups of scrubby trees along the dry slopes on the eastern margin of the Rocky Mountain Trench. Some trees of merchantable size were destroyed in the Kootenay River Valley above Canal Flats.

Western Hemlock Looper, Lambdina fiscellaria lugubrosa (Hlst.)

The only locality where this defoliator was found in quantity was along the Columbia River between Blackwater Lake and Cummins River. Here, the average number of larvae taken in standard beating samples during July and August was: western hemlock (5), alpine fir (6), and Engelmann spruce (12). These figures indicate that the population remained very close to the 1955 level.

Elsewhere in the district larvae were seldom taken in collections.

False Hemlock Looper, Nepytia canosaria Wlk.?

Very few larvae were collected in 1956.

Black-headed Budworm, Acleris variana (Fern.)

Collections taken along the Big Bend Highway north of Donald and on the Bugaboo Creek road contained small numbers of these larvae.

Pine Needle Scale, Phenacaspis pinifoliae (Fitch)

Light infestations of scale were noted on young Douglas-fir reproduction in the Spillimacheen and Invermere districts, and on open-grown lodgepole pine three miles southwest of Elko.

Engelmann Spruce Weevil, Pissodes engelmanni Hopk.

Thirty-five per cent of the open-grown Engelmann spruce reproduction along the Cold Creek Valley northeast of Yahk had been attacked by this weevil in the last four years.

A Juniper Needle-miner, Recurvaria sp.

Some of the Rocky Mountain junipers in the Canal Flats and Invermere Ranger districts were discoloured by the mining of larvae in the foliage tips. This scorched appearance was most noticeable in mid-June, when feeding had ended and the moths were beginning to emerge.

A Poplar Flea Beetle, Altica sp.

Mature cottonwood stands growing along the river flats from Wasa south to the vicinity of Newgate, were infested by the larvae of this beetle in July. The leaves were so heavily skeletonized that the trees assumed a brownish hue as feeding progressed. By the first week of August the larvae had left the trees, pupation taking place in the leaf mould and rotten wood of the forest floor.

Douglas-fir Cone Moth, Barbara colfaxiana Kft.

Between 5 and 75 per cent of the cones of open-grown Douglas fir between Invermere and Radium Junction were infested.

A Poplar Leaf Blotch Miner, Phyllonorycter sp.

Ten per cent of the foliage of open-grown aspens between Fort Steele and Wasa was affected by larvae of a blotch-miner.

A Branch-boring Buprestid, Agrilus politus (Say) ?

Branches of mountain alders along Cold Creek Valley northeast of Yahk had been killed by the girdling larval mines of this small buprestid.

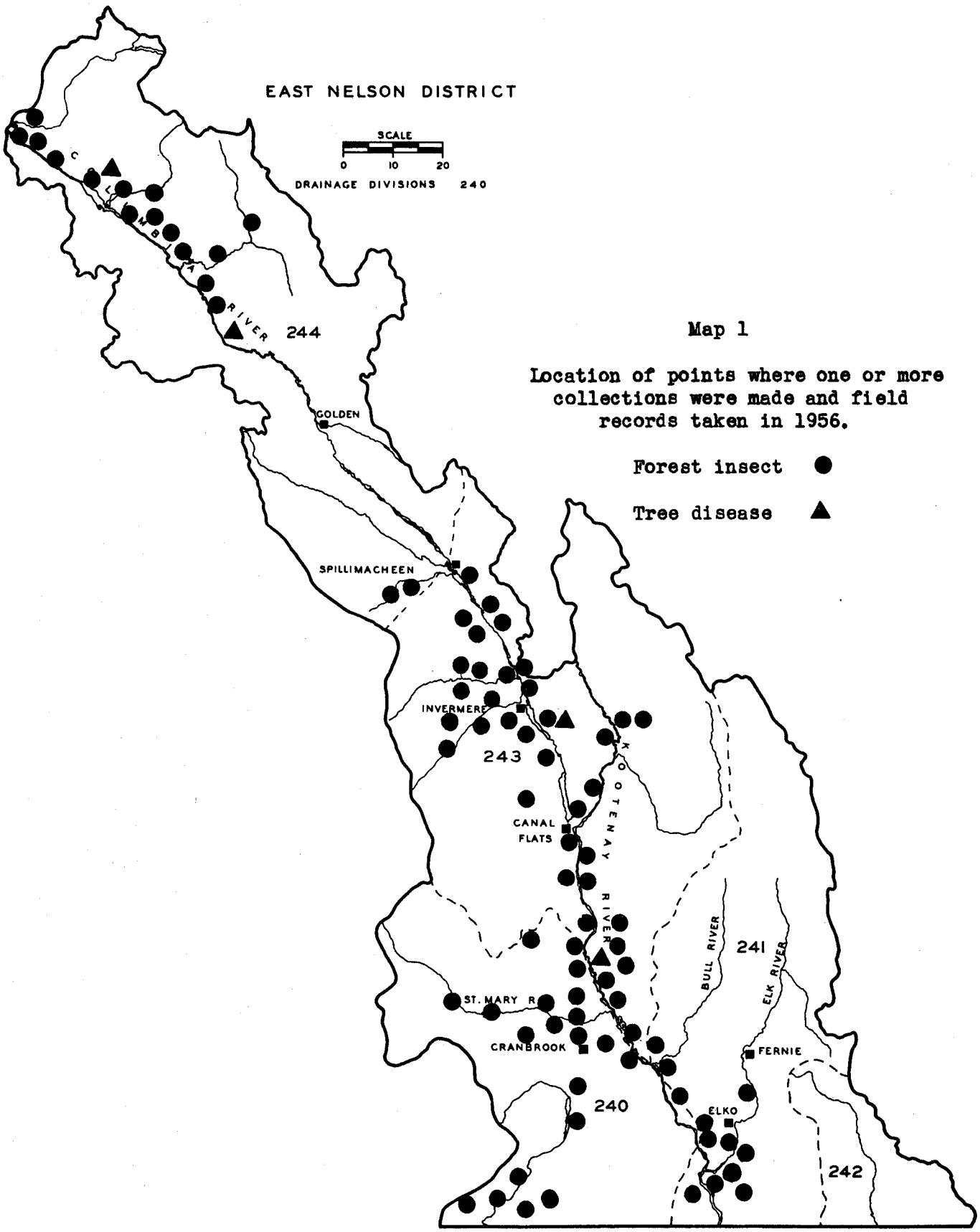
STATUS OF TREE DISEASES

Larch Needle Cast caused by Hypodermella laricis Tubeuf.

This disease caused heavy foliage discoloration in larch stands early in the season in the Moyie, St. Mary's River, and Canal Flats districts.

Winter Damage

Injury to the foliage of western red cedar and western white pine occurred in the winter of 1955-56 along a section of the Columbia River Valley between Donald and Kinbasket Lake. Abnormally heavy foliage drop of cedars resulted, and a few exposed reproduction white pines were killed outright.


EAST NELSON DISTRICT
SCALE
0 10 20
DRAINAGE DIVISIONS 240
COLUMBIA RIVER
244
GOLDEN
SPILLIMACHEEN
INVERMERE
243
KOOTENAY RIVER
CANAL FLATS
ST. MARY R.
CRANBROOK
240
BULL RIVER
241
ELK RIVER
FERNIE
ELKO
242
Map 1
Location of points where one or more collections were made and field records taken in 1956.
Forest insect
Tree disease

ANNUAL REPORT OF FOREST BIOLOGY RANGERS

BRITISH COLUMBIA

1956

PRINCE GEORGE FOREST DISTRICT

FOREST BIOLOGY SURVEY

PRINCE GEORGE FOREST DISTRICT

1956

D. W. Taylor

INTRODUCTION

In 1956 the three Prince George Forest Biology districts were surveyed by personnel new to these areas. North Prince George was surveyed briefly by R. J. Andrews; West Prince George by T. A. D. Woods, and South Prince George District by D. W. Taylor.

Since 1956 was a "flight" year, the first part of the season was devoted to sampling and investigating the areas in which the spruce budworm was present. A sampling program was carried out by the three rangers.

This serious pest was investigated in plots and through random sampling. Populations again increased in some areas while they decreased in others; however, in 1956 the general population in the Prince George Forest District appeared to decrease.

The hemlock looper population, in the McBride area, decreased sharply from the 1955 level.

Infestations of the Douglas-fir bark beetle continued on both sides of the Fraser River between Macalister and Quesnel. The number of red trees in some small groups increased and new groups appeared nearby. A damage appraisal was conducted in 1956 and a tally was kept of the trees killed from 1953 to 1955.

The mountain pine beetle continued to destroy lodgepole pine in the Takla Lake area. An aerial survey of this area was carried out in September.

In the Torpy River Valley, east of Sinclair Mills, and at Stone Creek, large stands of overmature alpine fir were infested by a bark beetle believed to be Dryocoetes confusus Sw.

The aspen leaf-miner continued a severe attack of trembling aspen trees along the Liard River Valley on the Alaska Highway and moderately infested aspen stands throughout the West and South Prince George districts.

The large aspen tortrix caused considerable defoliation and a small amount of "top-kill" of aspen trees bordering the Hart Highway, north of Prince George, and along the Alaska Highway, south of Fort Nelson.

The only pathological disturbances to appear over large areas were needle rusts.

Appreciation is expressed for assistance rendered by the British Columbia Forest Service personnel in the Prince George Forest District with particular reference to two surveys carried out in their aircraft.

Special Report on Extent, Population and Parasite Investigations of the Spruce Budworm in the Prince George Forest District

1956

For a number of years, the 2-year-cycle spruce budworm has maintained a noteworthy population in the Prince George Forest District. Areas of the greatest population were observed in 1956 along the Manson Creek Road, the Hart Highway, and in the Bowron Lake District.

A special sampling program was prepared. At pre-determined times samples of at least 200 immature budworms were to be collected and sent to the Vernon Laboratory for rearing. Collections were to be taken at Pine Pass, Tudyah Lake, Davie Lake, Lynx Creek, Bowron Lake, and Barkerville, where plots had been established previously. These plots were sampled according to plan, with the date of each visit being set back approximately 10 days to allow for late development due to inclement weather.

Two supplementary collections of 100 larvae in the 6th instar were sent from the Willow River district. These were picked at random from a moderately infested area. Lynx Creek was the only place of infestation at which reddening of the upper crown was noticeable without the use of binoculars.

Table 1 shows the date of the sample collection, the stage of the larvae and their abundance at the time of sampling.

Table 1

2-year-cycle Spruce Budworm Mass Collections
from Localities in the Prince George Forest District, 1956

Date	Sample point	Stage	No. individuals	Abundance
May 29	Davie Lake	4th instar	200	moderate
" 30	Tudyah Lake	4th instar	200	abundant
" 31	Pine Pass	4th instar	-	scarce
June 4	Bowron Lake	4th instar	200	moderate
" 6	Lynx Creek	4th instar	200	abundant
" 13	Davie Lake	6th instar	200	moderate
" 13	Tudyah Lake	6th instar	200	abundant
" 14	Pine Pass	6th instar	-	scarce
" 15	Barkerville	4th instar	-	nil
" 15	Lynx Creek	6th instar	200	abundant
" 17	Bowron Lake	6th instar	135	moderate
July 6	Davie Lake	6th instar & pupae	100	moderate
" 7	Tudyah Lake	pupae	300	abundant
" 8	Lynx Creek	6th instar & pupae	200	abundant
" 8	Bowron Lake	6th instar	68	scarce
" 12	Lynx Creek	6th instar	200	abundant
" 12	Lynx Creek	6th instar & pupae	100	abundant
	Total		2,503	

In order to follow population density trends, each plot was sampled in the following manner. Ten trees were chosen within the plot and marked. From these an 18-inch branch was clipped from the middle or upper crown and the larvae on the branch were counted. These clippings were made at such times as to obtain 4th and 6th instar larvae, pupae, and eggs. Table 2 shows the results of this work.

Table 2

Average Number of Spruce Budworm of each Stage for 10 Tree Samples, and Defoliation Estimates on 20 Marked Trees in Six Plots, Prince George Forest District, 1956.

Locality	Stage				Per cent defoliation	
	4th instar	6th instar	Pupa	Egg	New	Old
Barkerville	0	0	0	0	-	-
Lynx Creek	3.1	2.5	1.9	0.1	79.5	16.6
Pine Pass	0.5	1.3	0.4	0	0	13.7
Tudyah Lake	1.4	2.5	.5	0	59.5	31.2
Davie Lake	0.4	0.6	0.4	0	11.0	13.1
Bowron Lake	0.7	0.9	0.6	0	7.5	7.7

A sample alpine fir tree (average d.b.h. 12 inches and 75 feet in height) was cut down at each plot, and the crown examined for egg masses. A number of egg masses were discovered in the mid-crown close to the main stem. These averaged 30 to 40 eggs per mass. Present information from parasitism studies, of the larvae collected, shows mortality due to parasites to be very low.

Maps 4 and 5 give the location and intensity of known spruce budworm infestations in the Prince George Forest District in 1956.

ANNUAL REPORT OF FOREST BIOLOGY RANGER

for

SOUTH PRINCE GEORGE DISTRICT

1956

FOREST BIOLOGY SURVEY

SOUTH PRINCE GEORGE DISTRICT

1956

D. W. Taylor

INTRODUCTION

Beginning June 4, the survey of this district was carried out by Forest Biology Ranger D. W. Taylor and was concluded on September 12. One trip, to McBride, was made in late September.

In the course of the survey, 25 days were spent in the West Prince George District and 3 days in North Prince George for the purpose of spruce budworm mass sampling, familiarization, and ranger instruction. The budworm sampling required seven days in South Prince George District. The remaining time was spent in random sampling of forest insects in general. A total of 143 collections was made during this period and an analysis of these collections is shown in Table 1. Table 2 indicates the distribution of both insect and disease collections by hosts.

Map 1 shows where one or more collections and field records were made during 1956.

STATUS OF INSECTS

Spruce Budworm, Choristoneura fumiferana (Clem.)

Sampling of the 2-year-cycle budworm indicated a decline in population generally, in the South Prince George District. A known area of about 4 square miles, in the Willow River Valley, had sufficient populations to cause an estimated defoliation of 10 per cent of the new and old foliage in a stand of alpine fir and white spruce. This occurred mainly in the upper half of the crown. From Willow River south to Hixon, a low population was scattered throughout the area and feeding was light. East of Quesnel the number of larvae per sample decreased rapidly to nil, at about the 10-mile point on the Wells Road, and increased again at Summit Creek, east of Wells. Here the population reached its maximum at Antler Creek where defoliation was clearly visible with binoculars. An estimate of damage to foliage on 20 tagged trees was 7.5 per cent of the new foliage and 7.7 per cent of the old. This area covered approximately four square miles.

The ridge east of Sinclair Mills, in the Upper Fraser River Valley showed sporadic and light feeding on alpine fir. Inspection showed that damage was caused to about 1.25 inches of the 1956 growth on 10 per cent of the tips.

Table 1

Forest Insect Collections by Agencies
South Prince George District - 1956

Personnel involved in collection	Number of collections						Total
	May	June	July	Aug.	Sept.	Oct.	
Forest Biology Rangers independently	-	18	47	69	1	-	135
Forest Biology Rangers with Forest Service personnel	-	-	-	-	-	-	-
Forest Service personnel independently	1	1	3	1	2	-	8
Other co-operators	-	-	-	-	-	-	-
Total	1	19	50	70	3	-	143

Table 2

Collections by Hosts
South Prince George District - 1956

Coniferous hosts	Forest insects	Tree diseases	Broad-leaved hosts	Forest insects	Tree diseases
alpine fir	40	7	trembling aspen	4	1
western hemlock	18	2	white birch	4	-
white spruce	43	5	willow	3	-
black spruce	6	1	cottonwood	1	-
Douglas fir	10	-	miscellaneous	2	-
lodgepole pine	11	2			
western red cedar	1	-			
			Total	14	1
Total	129	17	Grand total	143	18

Douglas-fir Beetle, Dendroctonus pseudotsugae Hopk.

This insect continued to kill Douglas-fir trees on both sides of the Fraser River between Macalister and Quesnel. Old groups of infested trees were enlarged and new groups or single trees appeared. Damage appraisal figures, made available by Rangers J. Grant and W. E. Bitz, gave a total number killed during the period 1953 to 1955. Table 3 indicates the number of dead trees counted and the area in which they appeared.

Table 3

Mortality of Douglas-fir Trees
caused by Douglas-fir Bark Beetle in the
South Prince George District, 1953 to 1955

Area	No. trees killed by Douglas-fir beetle
Macalister - Marguerite, E. of Fraser R.	8
Macalister - Marguerite, W. of Fraser R.	135
Alexandria - Kersley, E. of Fraser R.	330
Buck Ridge, W. of Fraser R.	(Est.) 10,000
Narcosli Creek, W. of Fraser R.	625

Individual trees were killed north of Narcosli Creek on the west side of the Fraser River, and also near the Nazko road west of Bouchie Lake turnoff. Map 3 gives the approximate location of Douglas-fir trees killed by this beetle from 1953 to 1955.

Western Hemlock Looper, Lambdina fiscellaria lugubrosa (Hlst.)

A decrease in the population and extent of this geometrid in the McBride area was evident. Eight collections were taken, ranging in altitude from 4,000 feet down to 2,900 feet. The area sampled was near the egg study plots established in 1955. The stand type, in all but the highest collection point, was western red cedar and western hemlock. The average number of larvae for the eight collections was 11.5. The previous severe winter which caused heavy damage to western red cedar foliage throughout the Upper Fraser Valley may have had an effect on the population.

No larvae of this looper were collected at any other point along the valley.

The two tree mortality plots established in 1955, at McBride, were re-examined in September, 1956. Table 3 indicates the percentage mortality by hosts of the marked trees due to 1955 defoliation, since 1956 feeding was very light.

Table 3

Mortality, by Hosts, of Trees Defoliated by Western Hemlock Looper in 1955, near McBride, B. C.

Plot No.	Estimated average defoliation (1955)			Number of dead trees			Per cent mortality			Total per cent mortality
	hemlock	cedar	alpine fir	hemlock	cedar	alpine fir	hemlock	cedar	alpine fir	
1	89.7	49.1	62.0	15	4	1	44.1	17.3	20	32.2
2	53.9	18.5	60	0	0	0	0	0	0	0

Map 2 shows the points at which hemlock looper larvae were taken.

Western Balsam Bark Beetle, Dryocoetes confusus Sw.

The balsam bark beetle and an unidentified scolytid caused considerable mortality of alpine fir trees near Stone Creek. Both dead and dying trees were observed. Four trees, up to 85 feet in height, were cut down and examined; the two beetle species mentioned were the only cause of injury found and their combined attack was judged sufficient to have caused mortality. The stand was overmature, and, in most cases, was badly wind shaken. Alpine fir trees within a circular plot one chain in radius were examined. The plot contained 67 alpine fir trees ranging from 6 to 14 inches d.b.h. Thirty of these were infested.

Further evidence of the western balsam bark beetle was observed in an overmature stand of alpine fir in the Torpy River Valley east of Sinclair Mills. The main infestation extended about four miles along a northeast exposure of the range. The discoloration of alpine fir was general but an estimate of the number of stems affected was not attempted.

A Hemlock Sawfly, Neodiprion sp.

Only two larvae of this sawfly were collected during the season. Near Sinclair Mills, one area of medium population in 1955 was sampled in 1956, and six hemlock collections yielded no larvae.

Alaska Spruce Beetle, Dendroctonus borealis Hopk.

Woodpecker "debarking" activity showed the continued presence of this bark beetle in a few large white spruce trees at the British Columbia Forest Service Experimental Station at Aleza Lake.

Black-headed Budworm, Acleris variana (Fern.)

Two larvae were collected in 1956. One was taken near Stone Creek and one was from a high elevation at Dore Creek near McBride.

STATUS OF TREE DISEASES

Winter Injury

Results of winter injury were again apparent in 1956. Western red cedar was the most severely affected species, large areas on both sides of the Upper Fraser Valley showing almost total browning of the 1955 foliage.

In the vicinity of Wingdam and Lightning Creek large areas of lodgepole pine showed discoloration.

Indian Paint Fungus, Echinodontium tinctorium E. and E.

This common conk on western hemlock was again found on that host near Longworth and McBride, and on alpine fir at Aleza Lake Experimental Station. Its occurrence was frequent in most of the hemlock stands of the Prince George Forest District.

White Needle Rust on Alpine Fir, Peridermium balsameum

White tubercles of this needle rust were found in all alpine fir stands and it was the most common pathological disturbance in the district.

Needle Rust on White Spruce, Peridermium coloradense (Diet.) Arth. and Kern.

Dwarfing of whole branches, by this rust, was noticed frequently throughout the South Prince George District. In rare cases spruce trees with more than two "witch's brooms" were noted.

Needle Rust on Black Spruce and White Spruce, Chrysomyxa ledi (A. and S.)

Orange needle rust was fairly frequent throughout the District on black and white spruce. All black spruce trees were affected to some extent in a swamp 14 miles south of Prince George. Intensity of attack ranged from 20 to 100 per cent of the new growth.

Dwarf Mistletoe, Arceuthobium sp.

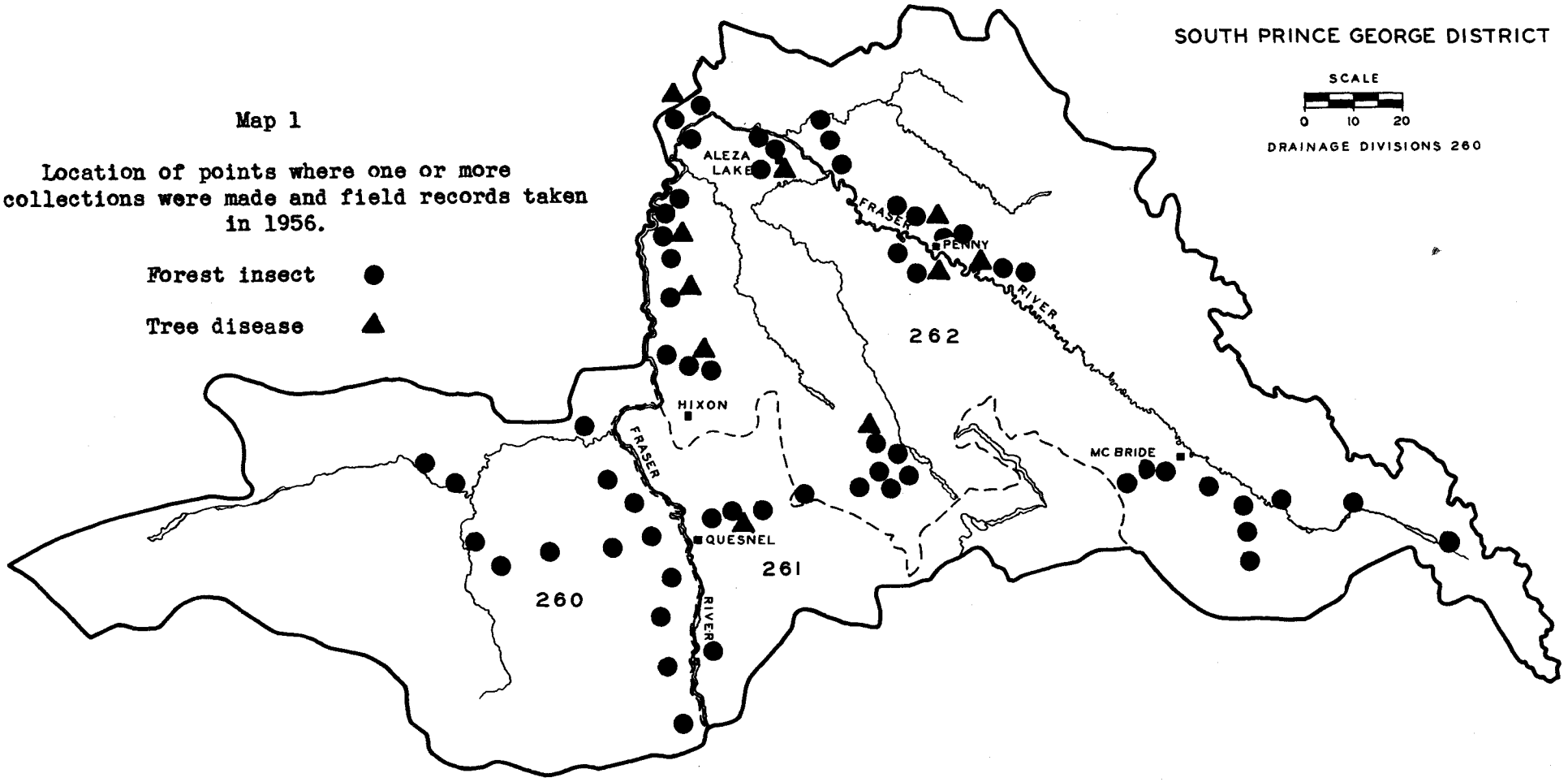
Lodgepole pine trees were infrequently attacked by this parasite. It appeared only in large areas of almost pure pine, rather than in mixed stands.

Map 1

Location of points where one or more collections were made and field records taken in 1956.

Forest insect ●

Tree disease ▲



Map 2

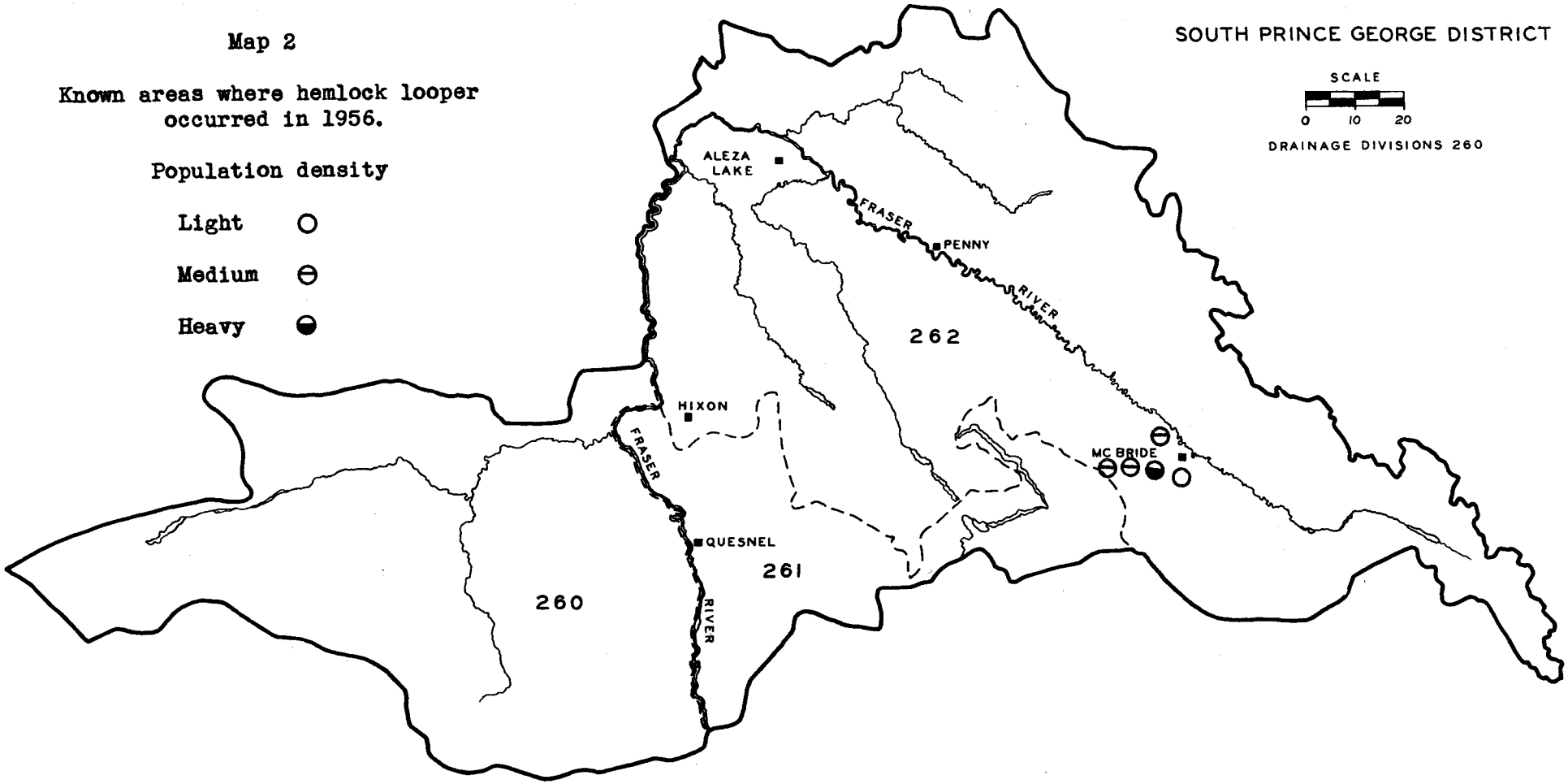
Known areas where hemlock looper occurred in 1956.

Population density

Light ○

Medium ⊖

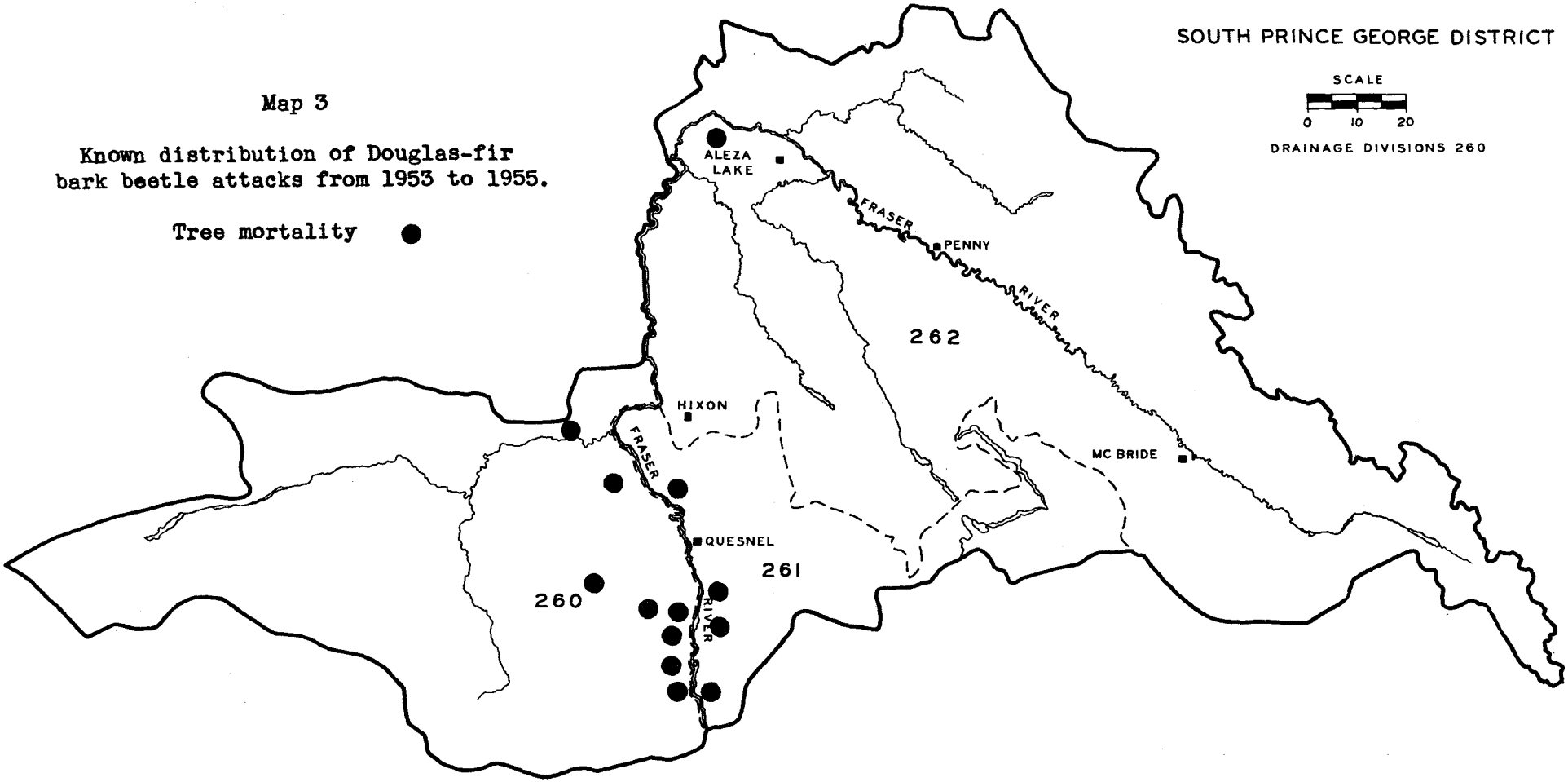
Heavy ◒



Map 3

Known distribution of Douglas-fir bark beetle attacks from 1953 to 1955.

Tree mortality ●

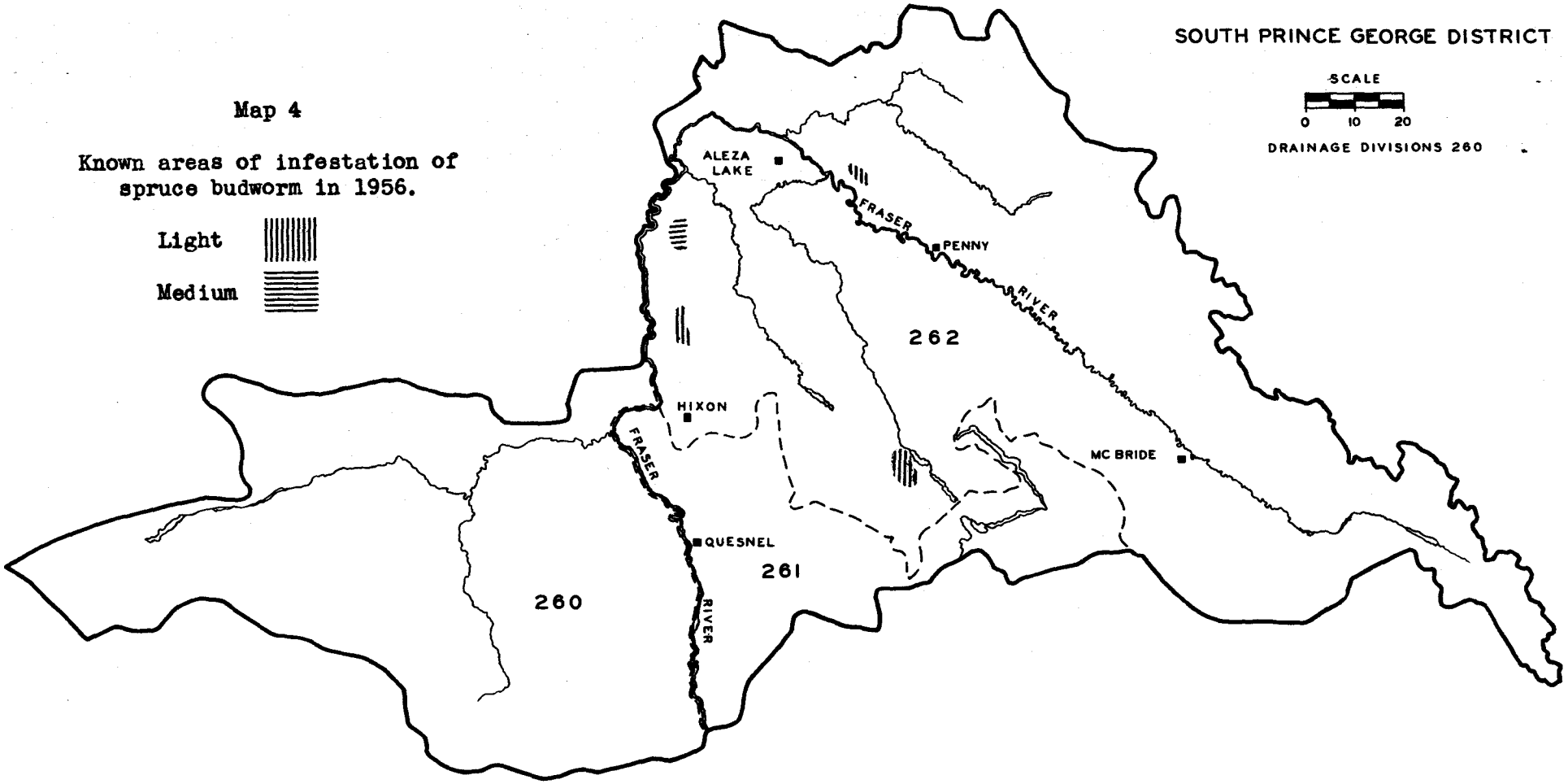


Map 4

Known areas of infestation of spruce budworm in 1956.

Light

Medium



ANNUAL REPORT OF FOREST BIOLOGY RANGER

for

WEST PRINCE GEORGE DISTRICT

1956

FOREST BIOLOGY SURVEY

WEST PRINCE GEORGE DISTRICT

1956

T. A. D. Woods

INTRODUCTION

In the West Prince George Forest Biology Ranger District survey work began on May 28 and ended on September 12. After August 10, the work in this district was carried out by Forest Biology Rangers Taylor and Andrews, the writer being engaged in the tree damage appraisal survey in the Williams Lake and Lac la Hache areas. The spruce budworm sampling program in this district required 20 working days. Over 2,000 specimens were submitted to the Vernon Laboratory. The rest of the season was devoted to the collection of random samples of forest insects and tree diseases.

Table 1 shows the number of forest insect collections by months and agencies, and Table 2 shows the number of forest insect and tree disease collections by hosts.

STATUS OF INSECTS

Mountain Pine Beetle, Dendroctonus monticolae Hopk.

In 1956, a survey of mountain pine beetle damage in the Takla Lake area was carried out by aircraft. Two observers noted the number of affected lodgepole pine trees per group. Sixteen groups had an average of 17 damaged trees per group throughout the scattered attack areas. At the junction of Takla Lake and West Arm, the number of dead trees per group increased until the patches of red discoloration merged with one another. The infestation extended along the Sakeniche River Valley and into the Natowite Lake area, as shown in Map 2. On the basis of the aerial counts and a figure derived in 1955 from counting stems at lake level, the estimated loss in the period 1954-56 inclusive, for the whole infestation was 65,000 trees. As a ground survey was not possible in 1956, no information was available on the trend of the infestation.

A Spruce Gall Midge, ? Rhabdophaga sp.

Two collections of white spruce foliage damaged by a spruce gall midge were sent to the Vernon Laboratory for identification, one on May 28 and the other on July 25. The only material containing living insects was obtained from the May 28 collection.

Table 1

Forest Insect Collections by Agencies
West Prince George District - 1956

Personnel involved in collection	Number of collections						Total
	May	June	July	Aug.	Sept.	Oct.	
Forest Biology Rangers independently	5	19	76	65	1	-	166
Forest Biology Rangers with Forest Service personnel	-	-	-	-	-	-	-
Forest Service personnel independently	-	1	-	-	-	-	1
Other co-operators	-	-	-	-	-	-	-
Total	5	20	76	65	1		167

Table 2

Collections by Hosts
West Prince George District - 1956

Coniferous hosts	Forest insects	Tree diseases	Broad-leaved hosts	Forest insects	Tree diseases
white spruce	53	1	trembling aspen	16	-
alpine fir	33	-	willow	3	-
lodgepole pine	25	1	birch	3	-
black spruce	20	1	miscellaneous	1	-
Douglas fir	11	-			
eastern larch	2	-			
			Total	23	-
Total	144	3	Grand total	167	3

J. Clark (1952)* describes the galls formed by Rhabdophaga swainei Felt as follows: "These enlarged buds were about 7 mm. long and 4 mm. in diameter, with lateral scales reflexed and their rosette-like apices loose and open." The midges found in Central British Columbia formed galls almost identical to those described by Clark.

By the time the infested white spruce buds were received at Vernon on May 31, some adult midges had emerged; they have not yet been identified. Clark states that, "In 1948 adults were observed emerging from June 1 to 4, and in 1949 adults were observed in flight from May 5 to 26."

In the May 28 collections some parasites, probably Amblymerus sp., were present; one of these parasite pupae is shown within a gall in Figure 1.

Both collections were taken from white spruce but black spruce, which Clark states, "... seems to be immune,...", was also infested. The trees examined averaged 20 feet in height. The midges attacked lateral as well as terminal buds.

So far it seems that the only authenticated records of the spruce gall midge are from New Brunswick, Prince Edward Island, and Newfoundland. This may be the first record of the pest in British Columbia.

During 1956, a survey of a spruce gall midge was carried out in three areas in British Columbia: Lily Lake south of Fort Fraser, Kenney Dam Road south of Vanderhoof, and north of Vanderhoof on the Vanderhoof-Fort St. James road. Samples consisted of 10 twigs, 10 inches long from each of 3 trees. In computing the percentage of buds infested, 15 buds per twig were selected at random, giving a total of 450 buds per sample. All galls were counted regardless of the year infested. Data from these samples appear in Table 3.

Table 3

Number and Per Cent of Spruce Buds Infested by a Midge, West Prince George, 1956.

Location	Tree species	No. of trees sampled	Buds infested	
			Number	Per cent
Lily Lake	white spruce	12	96	5.3
Kenney Dam	white spruce	12	107	5.9
Kenney Dam	black spruce	6	37	4.1
Vanderhoof-Fort St. James	white spruce	9	25	1.9

* Clark, J. 1952. The spruce bud midge, Rhabdophaga swainei Felt, (Cecidomyiidae: Diptera). Can. Ent. 84(3): 87-89.

This table reveals that out of a total of 5,850 buds examined there were 228, or 4.5 per cent, white spruce buds infested and 37, or 4.1 per cent, black spruce buds infested.

Douglas-fir Beetle, Dendroctonus pseudotsugae Hopk.

A group of about 25 trees north of Summit Lake and 15 trees at Pinchi Lake, north of Vanerhoof, were infested by this beetle. These were the only known infestations in this district.

Large Aspen Tortrix, Choristoneura conflictana (Wlk.)

From 60 to 70 per cent defoliation was noted in aspen stands north of the Salmon River Bridge, along 4 miles of the Hart Highway, on both sides of the road. Along the side-roads traversed in this area some trees were 70 to 90 per cent defoliated. Defoliation of trees north of Vanderhoof was light.

Larch Sawfly, Pristiphora erichsonii (Htg.)

Sampling in the eastern larch swamps in the vicinity of Cluculz Lake yielded one colony of 18 larvae. No defoliation was visible.

Black-headed Budworm, Acleris variana (Fern.)

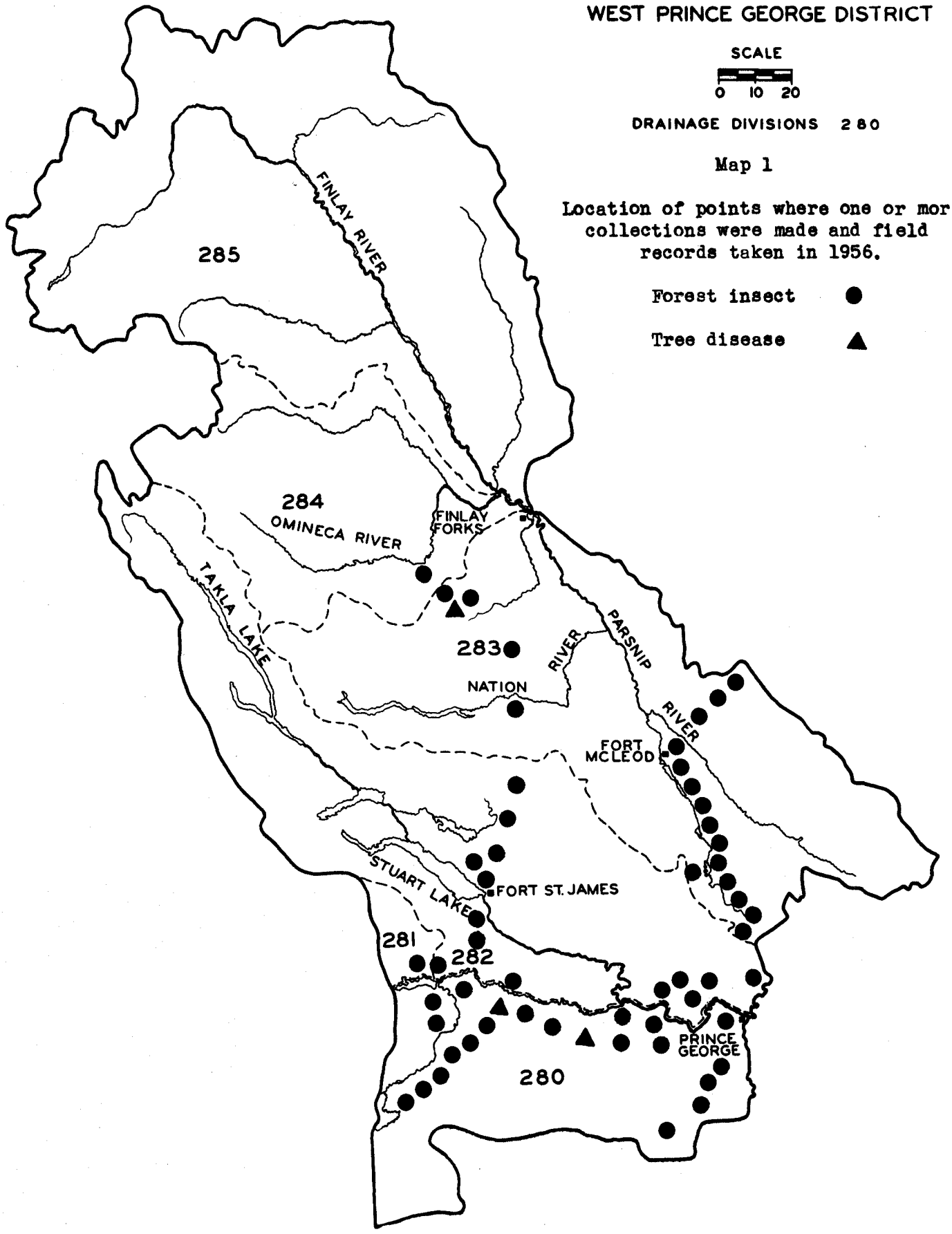
One or two larvae per collection were taken at locations on the Hart Highway and Black Water Road area.

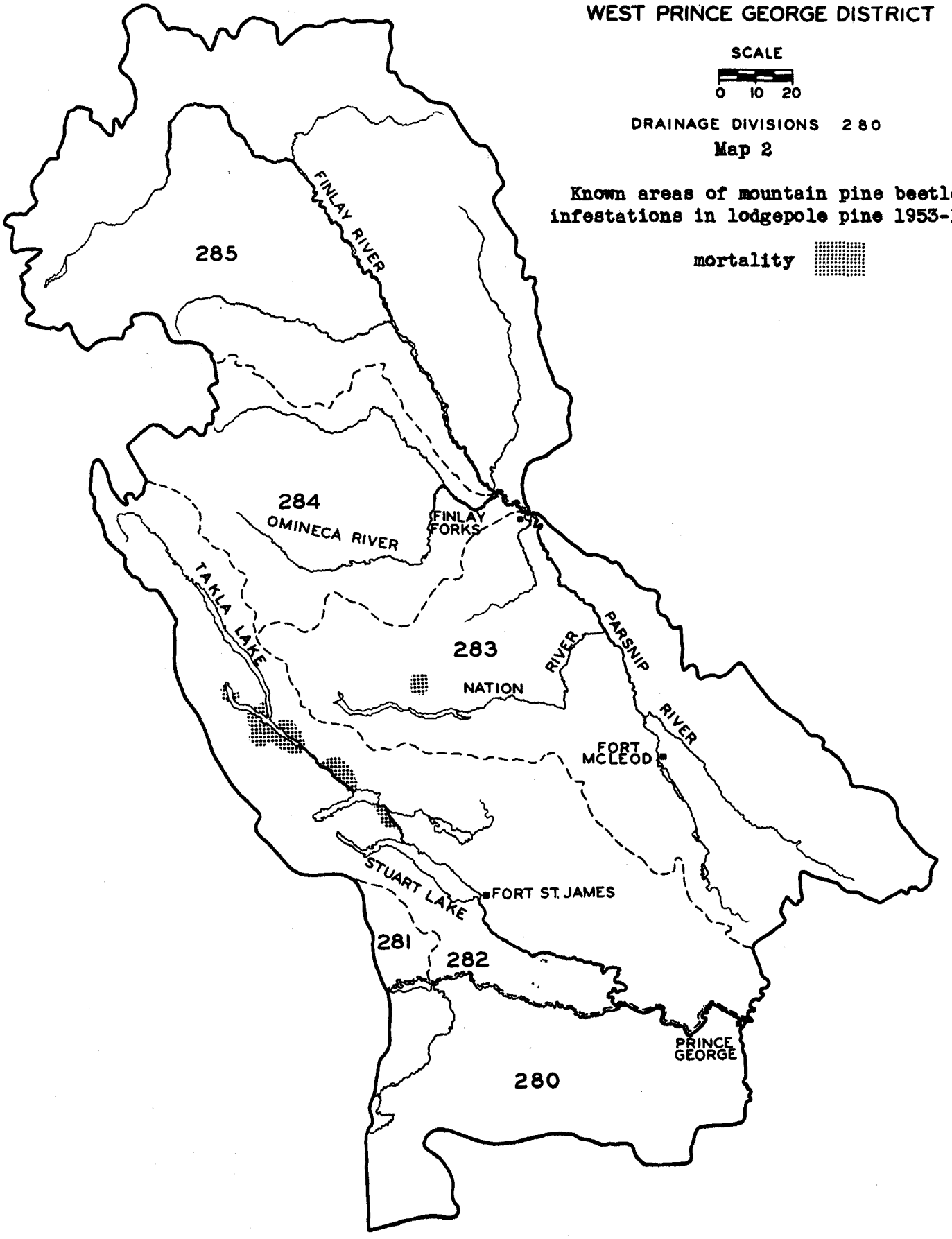
A Tent Caterpillar, Malacosoma pluviale Dyar var. ?

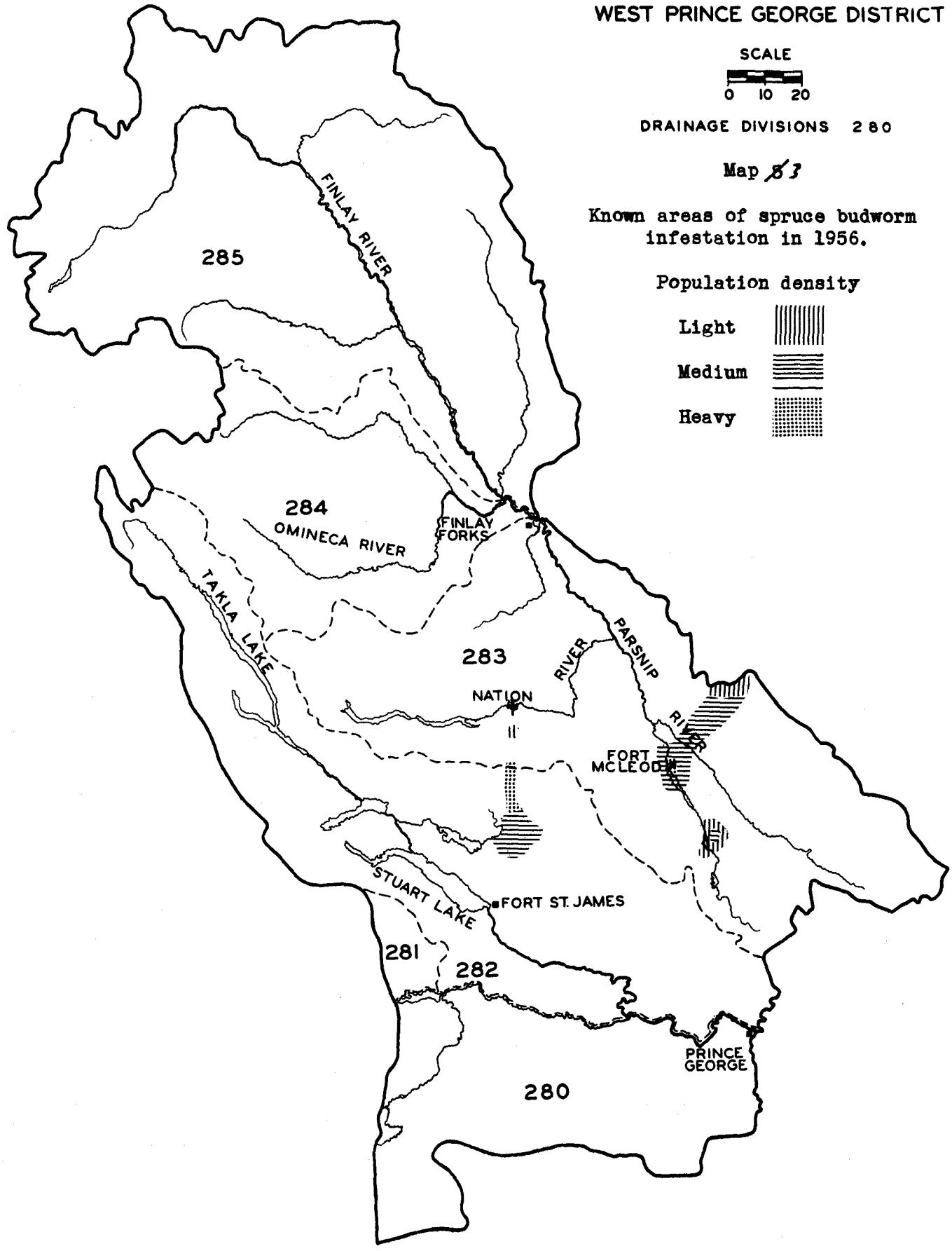
The area infested with this insect in 1955 was examined several times during the field season. No trace of the insect was found.

An Engraver Beetle in Lodgepole Pine, Ips sp.

Lodgepole pine trees infested by this beetle were found in two areas: in standing and cut trees on the Ormond Lake road northwest of Fort Fraser; and in a few acres of fire-damaged trees on the north side of the Nechako River west of Prince George.


WEST PRINCE GEORGE DISTRICT
SCALE
0 10 20
DRAINAGE DIVISIONS 280
Map 1
Location of points where one or more collections were made and field records taken in 1956.
Forest insect
Tree disease
285
FINLAY RIVER
284
OMINECA RIVER
FINLAY FORKS
TAKLA LAKE
283
NATION
PARSNIP RIVER
FORT MCLEOD
STUART LAKE
FORT ST. JAMES
281
282
PRINCE GEORGE
280


WEST PRINCE GEORGE DISTRICT
SCALE
0 10 20
DRAINAGE DIVISIONS 280
Map 2
Known areas of mountain pine beetle infestations in lodgepole pine 1953-1955
mortality
285
FINLAY RIVER
284
OMINECA RIVER
FINLAY FORKS
TAKLA LAKE
283
NATION
PARSNIP RIVER
FORT MCLEOD
STUART LAKE
FORT ST. JAMES
281
282
PRINCE GEORGE
280


WEST PRINCE GEORGE DISTRICT
SCALE
0 10 20
DRAINAGE DIVISIONS 280
Map 83
Known areas of spruce budworm infestation in 1956.
Population density
Light
Medium
Heavy
285
FINLAY RIVER
284
OMINECA RIVER
FINLAY FORKS
TAKLA LAKE
283
NATION
PARSNIP RIVER
FORT MCLEOD
STUART LAKE
FORT ST. JAMES
281
282
PRINCE GEORGE
280

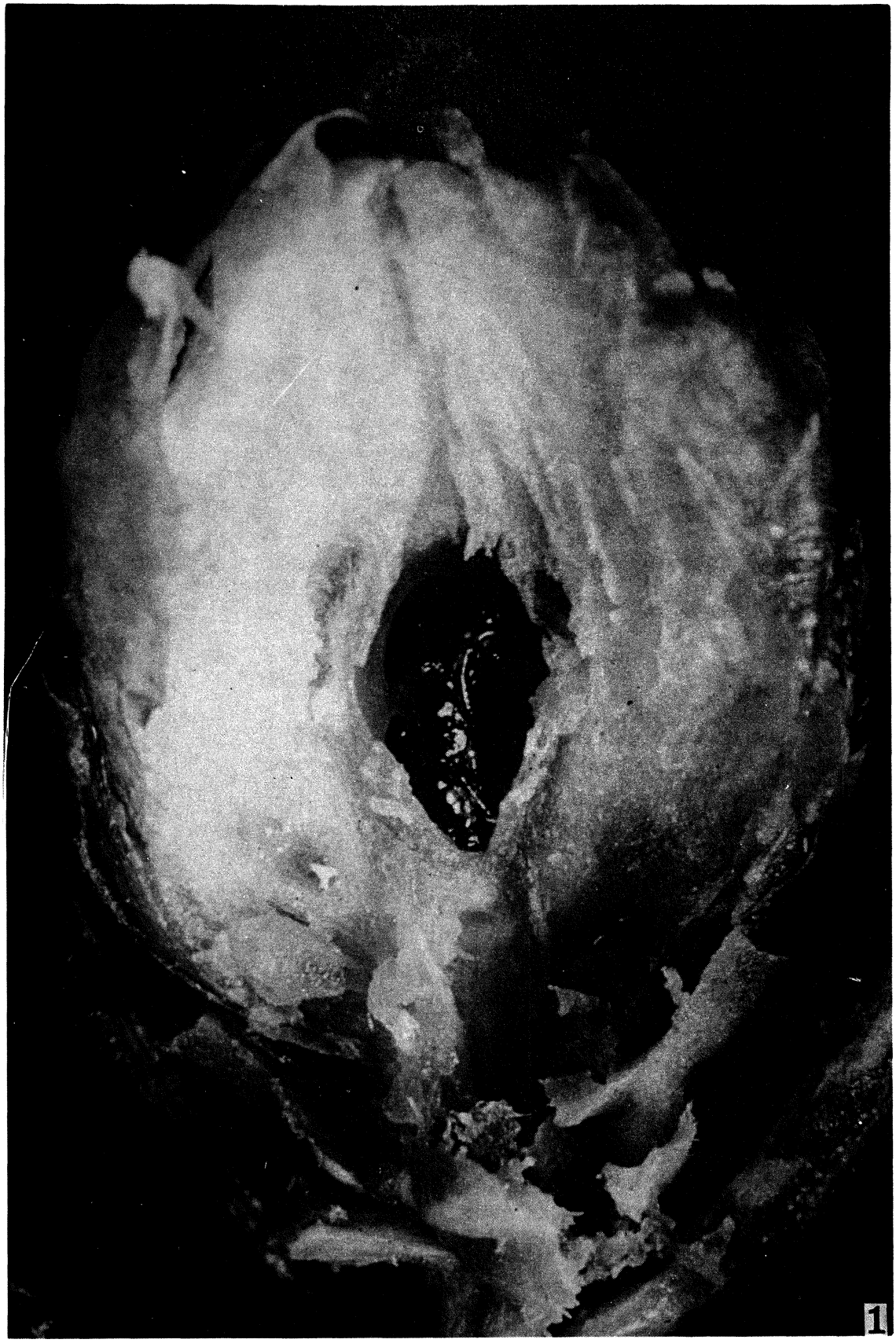


Figure 1. Pupa of a chalcid parasite in the center of a white spruce bud "rosette" caused by a spruce bud midge, Rhabdophaga sp. Prince George District. June, 1956. J. Obana

ANNUAL REPORT OF FOREST BIOLOGY RANGER

for

NORTH PRINCE GEORGE DISTRICT

1956

FOREST BIOLOGY SURVEY

NORTH PRINCE GEORGE DISTRICT

1956

R. J. Andrews

INTRODUCTION

In the 1956 field season, the writer, R. J. Andrews, was assigned to the North Prince George Forest Biology Ranger District. The early part of the field season was spent working with Rangers Taylor and Woods on spruce budworm investigations in West and South Prince George districts. Sampling of the North Prince George District was restricted to the period of July 13 to August 1 when Ranger Andrews was recalled for the Douglas-fir bark beetle survey.

The number of insect collections by agencies is shown in Table 1 and the number of forest insect and tree disease collections by hosts in Table 2.

Maps 1, 2 and 3 show the locations where forest insect and tree disease collections or field records were taken.

STATUS OF INSECTS

Aspen Leaf-miner, Phyllocnistis populiella Chamb.

The infestation along the Liard River Valley, as recorded in past years, is still severe and trembling aspen trees near Fort Nelson were also infested. A light population was found along the Carcross Road and the Yukon section of the Alaska Highway.

Cone Insects of White Spruce

Damage to a heavy crop of white spruce cones was severe in samples taken between Whitehorse and Mile 1083, Alaska Highway in Yukon Territory. Farther north along the Alaska Highway, note was taken of cone damage. It was found to range from 45 to 95 per cent.

A large portion of the damage was caused by Laspeyresia youngana (Kearf.). A great number of cones contained Cecidomyidae and other dipterous larvae.

Table 1

Forest Insect Collections by Agencies
North Prince George District - 1956

Personnel involved in collection	Number of collections						
	May	June	July	Aug.	Sept.	Oct.	Total
Forest Biology Rangers independently	-	4	87	7	-	-	98
Forest Biology Rangers with Forest Service personnel	-	-	-	-	-	-	-
Forest Service personnel independently	-	-	-	-	-	-	-
Other co-operators	-	-	-	-	-	-	-
Total	-	4	87	7	-	-	98

Table 2

Collections by Hosts
North Prince George District - 1956

Coniferous hosts	Forest insects	Tree diseases	Broad-leaved hosts	Forest insects	Tree diseases
white spruce	28	1	trembling aspen	12	2
eastern larch	4	-	willow	15	2
lodgepole pine	6	1	alder	3	-
black spruce	15	-	birch	1	-
alpine fir	5	-	cottonwood	7	-
western hemlock	2	-			
			Total	38	4
Total	60	2	Grand total	98	8

Location of samples and percentage infested is shown in Table 3.

Table 3

Degree of Cone Damage on White Spruce
West of Whitehorse, Y. T.

Location of collection	No. cones in sample	Per cent infested
Mile 996, Alaska Hwy.	43	93
Mile 1083, Alaska Hwy.	50	68
Mile 1083, Alaska Hwy.	50	76
Mile 1083, Alaska Hwy.	50	92

Large Aspen Tortrix, Choristoneura conflictana (Wlk.)

Heavy defoliation of aspen was spread along 20 miles of the Alaska Highway from Mile 77 to 98.

Spruce Sawflies, Pikonema spp.

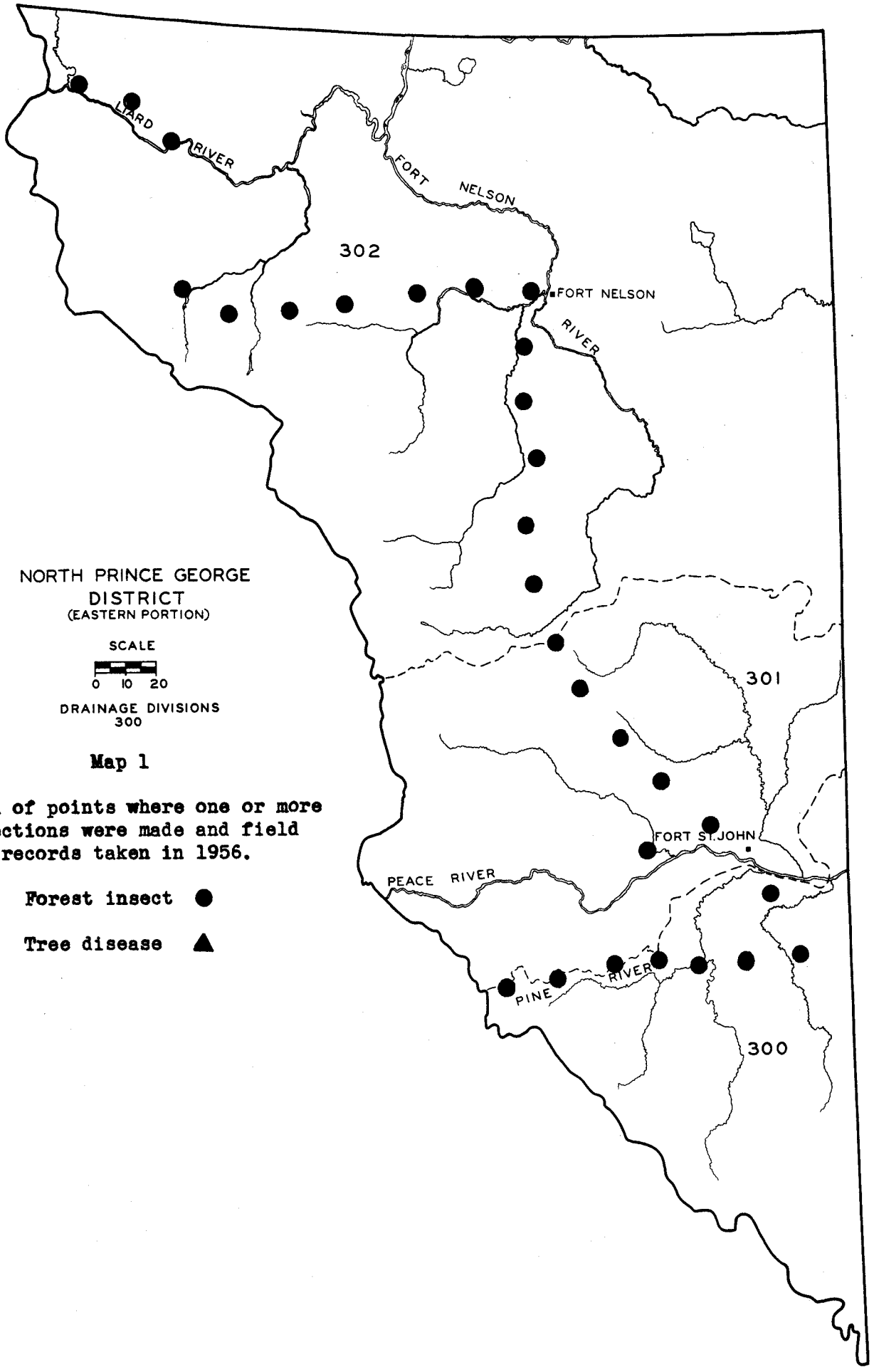
These larvae were found generally along the Highway as far as Whitehorse, Y. T. None occurred north of there.

Black-headed Budworm, Acleris variana (Fern.)

Larvae were found on alpine fir and white spruce along the Hart Highway from Pine Pass to Little Prairie. Five larvae in one collection was the largest number taken in any area. In samples taken from the coastal forest between Mile 40 and Mile 60 on the Haines Road from both western hemlock and Sitka spruce, no larvae were found. Previous years' sampling had shown a light infestation in this area.

A Leaf-rolling Tenthredinid

A leaf-rolling tenthredinid on aspen and cottonwood was common on the Hudson Hope Road, generally along the Alaska Highway, Atlin Road and in the Marsh Lake area.



NORTH PRINCE GEORGE
DISTRICT
(EASTERN PORTION)

SCALE

0 10 20

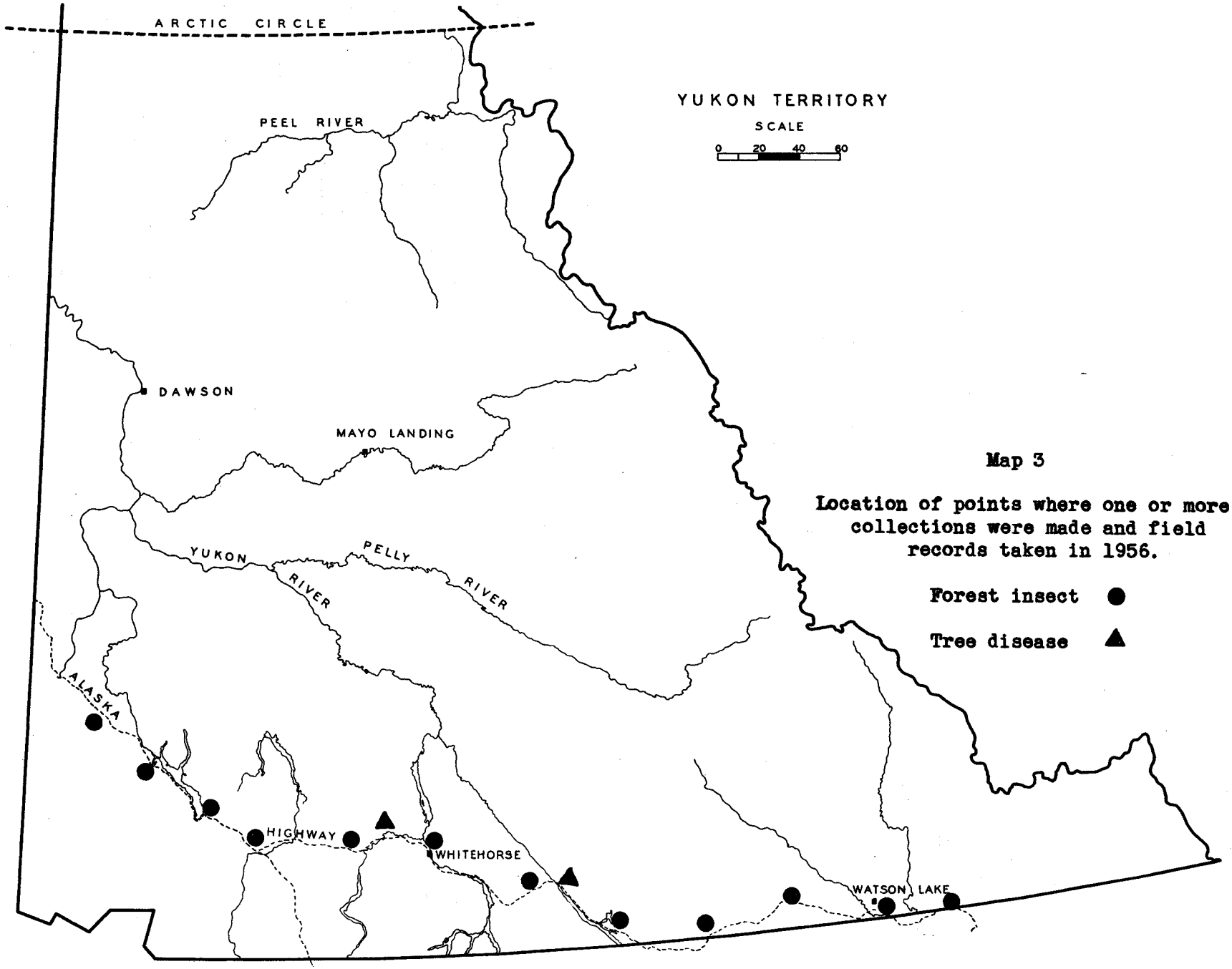
DRAINAGE DIVISIONS
300

Map 1

Location of points where one or more collections were made and field records taken in 1956.

Forest insect ●

Tree disease ▲

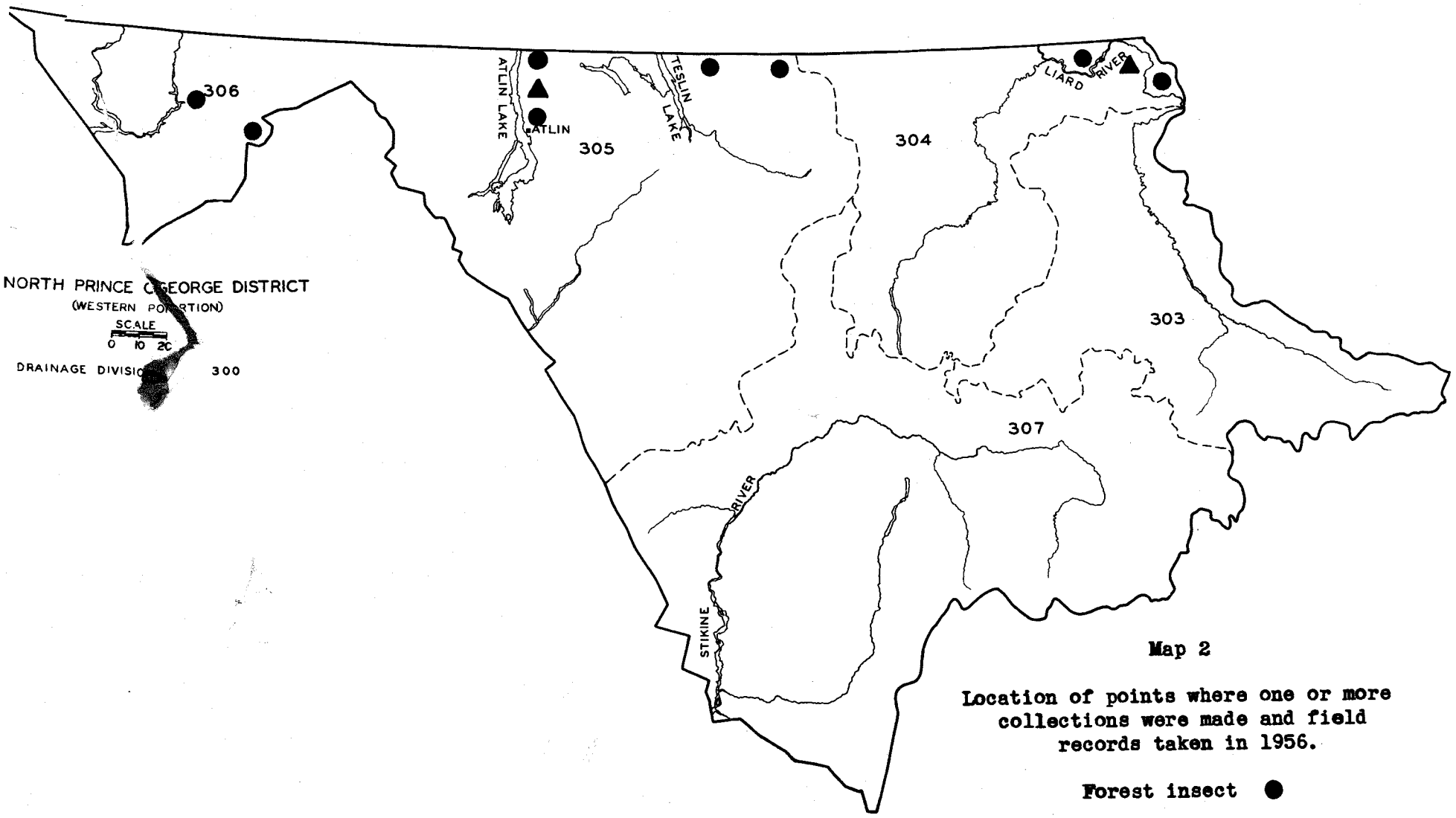


Map 3

Location of points where one or more collections were made and field records taken in 1956.

Forest insect ●

Tree disease ▲



Map 2

Location of points where one or more collections were made and field records taken in 1956.

Forest insect ●

Tree disease ▲