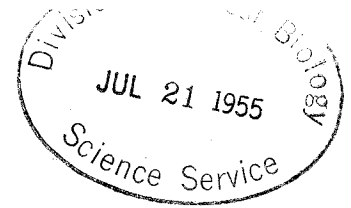


ANNUAL REPORTS OF FOREST BIOLOGY RANGERS
BRITISH COLUMBIA, 1954.



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FOREST BIOLOGY LABORATORY
VICTORIA, B. C.

CANADA
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April, 1955

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by Ranger Districts
British Columbia

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FOREWORD

This is the first report in which the Forest Biology Ranger District Reports of the Victoria and Vernon laboratories have been combined.

The Vernon ranger reports are a departure from the style of previous years. This year they are based on drainage divisions and Forest Biology Ranger Districts rather than on the British Columbia Forest Service administrative regions.

The ranger districts in British Columbia were re-organized prior to the field season. The original seven districts were retained in the coastal area but there are now nine ranger districts in the interior rather than ten. This allows one extra ranger to assist in surveying the more difficult areas in the Prince George and other districts. As a result of the new classifications in ranger grades the ranger staff in the province is as follows:

Victoria	Vernon
1 Ranger Supervisor Grade 2	
2 Forest Biology Rangers Grade 2	3 Forest Biology Rangers Grade 2
5 Forest Biology Rangers Grade 1	7 Forest Biology Rangers Grade 1

Ranger personnel were engaged actively in survey work from May until the end of September. Egg counts in areas of black-headed budworm infestation or high population were made in the winter after work on the ranger cabins was completed. Two rangers from the Vernon laboratory spent some time in the fall instructing British Columbia Forest Service personnel on the recognition of symptoms of spruce bark beetle attacked trees in the Nelson Forest District.

Insect collections during 1954 totalled 4,582. The Victoria laboratory received 1,974 and the Vernon sub-laboratory 2,608. The total number of collections is less than 1953. This was due partially to a late wet season, and partially to concentrated survey work on several insect species.

Diseased insects were collected during sampling and submitted directly to the survey disease laboratory in Victoria. These collections were not confined to any one species but included any larvae which showed disease symptoms.

Principal insect species causing damage this year were:

1. Black-headed budworm.
2. Spruce budworm.
3. Forest tent caterpillar.
4. Spruce bark beetles.
5. Douglas fir beetle.
6. Hemlock looper.

The black-headed budworm infestation in the West Prince Rupert District collapsed along the Portland Canal and Alice Arm. Elsewhere in the district populations persisted but were lighter than in 1953. A number of spot infestations were found in the North Vancouver Island District.

The large outbreak of spruce budworm in the Lillooet and Fraser River valleys reported in 1953 increased during 1954. Aerial surveys were made of the affected areas and ground parties made a survey of defoliation damage and egg deposits.

The 2-year cycle budworm in the Prince Rupert and Prince George Forest districts recurred in infestation proportions in several areas and declined in others. It was particularly severe along the west slope of the Rockies in the vicinity of Pine Pass.

A marked decline in the population of forest tent caterpillar was apparent in much of the interior of British Columbia. A few areas of infestation did expand although defoliation in many cases was not severe. Several spot infestations appeared on the mainland and Vancouver Island.

Spruce bark beetle continues to be a problem in the East Nelson District. Spot infestations of 50 to 100 trees are present throughout the spruce stands in that area. A number of lightly infested spots have been logged during the past year.

One of the most relentless destroyers of Douglas fir in the province is the Douglas fir beetle which continues to kill small groups of trees wherever Douglas fir is prevalent. It is particularly severe on Vancouver Island where an estimated 50 million board feet have been killed in the Nimpkish Valley.

The population of hemlock looper increased considerably throughout the province in 1954 and in the Prince George District attained outbreak proportions on a square mile area between Eaglet Lake and the Fraser River.

For the third year the Forest Disease survey was operated in conjunction with the insect survey. A total of 2,400 collections was submitted to the Forest Disease Laboratory in Victoria although not all the collections were submitted by forest biology rangers..

Four new vehicles acquired at the Vernon laboratory during the year completes the survey vehicle requirements for the ranger staff. To facilitate survey work on the many lakes in the interior of the province three 12-foot fibre glass dinghies and three 7 1/2 H. P. outboard motors have been purchased. Ranger personnel constructed a 16-foot plywood boat which is equipped with a 10 H. P. motor.

Rangers from both the Victoria and Vernon laboratories participated in ranger cabin construction during the year. Two ranger cabins were constructed in the spring at Christina Lake in West Nelson and at New Denver in Central Nelson. In the fall two more were built at Williams Lake in West Kamloops and Wasa Lake in East Nelson, although the latter two still lack the essential services.

Nine of the sixteen ranger districts now have ranger cabins more or less strategically located as the rangers' headquarters. The North Prince George District is of such tremendous size and as it is traversed by one main road hundreds of miles in length a trailer is the most satisfactory method of accommodating the ranger in this area. Other areas are surveyed from the survey boat or by rangers operating from the two laboratories.



FOREST BIOLOGY RANGER
DISTRICTS
OF
BRITISH COLUMBIA

FOREST BIOLOGY SURVEY
VANCOUVER FOREST DISTRICT

1954

E. G. Harvey

INTRODUCTION

The four ranger districts in the Vancouver Forest District were surveyed by the following rangers:

- (a) South Vancouver Island - E. G. Harvey
- (b) North Vancouver Island - D. G. Collis
- (c) South Vancouver - E. L. Avison
- (d) North Vancouver by the above three rangers

The spruce budworm was the most serious insect in the district in 1954. The present infestation is in the South Vancouver Ranger District. Severe defoliation and some top killing has resulted, but no tree mortality has been reported.

The hemlock looper and the green hemlock looper were found in the spruce budworm infested areas in high numbers. No increase was noted in the rest of the district.

The Douglas fir bark beetle, which caused considerable damage in an infestation in the North Vancouver Island Ranger District in 1953, has decreased considerably. In other areas it appeared in small patches.

The silver-spotted halisidota increased, both in numbers of colonies and extent of range. Colonies were plentiful on the islands and coastal areas in the southern part of the district.

The tent caterpillar reached infestation proportions in the South Vancouver Island Ranger District, where deciduous trees and bushes were heavily defoliated.

FOREST BIOLOGY SURVEY
SOUTH VANCOUVER ISLAND DISTRICT

1954

E. G. Harvey

INTRODUCTION

A total of 359 insect collections and six tree disease collections was made in the district during the season. Although special survey trips into other ranger districts interrupted the work on several occasions, good coverage was attained, as shown in Map 1. All of the permanent sampling stations were visited at least once.

Table 1 shows the different agencies submitting samples in 1954. Collections by hosts are shown in Table 2.

Table 1.

Insect collections by agencies,
South Vancouver Island, 1954.

Collector	No. of collections
Forest Biology Rangers	223
Other Forest Biology Personnel	44
B. C. Forest Service	85
Miscellaneous co-operators	7
Total collections	359

Table 2.

Distribution of insect collections by host,
South Vancouver Island, 1954.

Coniferous		Deciduous	
Douglas fir	157	Oak	14
Hemlock	49	Alder	13
Red cedar	9	Willow	6
Amabilis fir	10	Hawthorn	5
Grand fir	8	Apple	3
Alpine fir	1	Cherry	1
White pine	6	Cottonwood	2
Lodgepole pine	8	Silver poplar	5
Sitka spruce	7	Arbutus	1
Yellow cedar	2	Maple	2
Monterey cypress	3	Miscellaneous	24
Total	260	No hosts	23
		Total	99

II STATUS OF INSECTS

Spruce Budworm, Choristoneura fumiferana (Clem.)

No larvae of this insect were found in 1954.

Western Hemlock Looper, Lambdina fiscellaria lugubrosa (Hlst.)

No change was observed in the population of hemlock looper in South Vancouver Island. Larvae were found in five collections, all from the Nitinat Valley. Two of the collections produced six larvae each. An attempted mass collection for special rearing produced only twenty-five specimens from twenty trees.

Black-headed Budworm, Acleris variana (Fern.)

The black-headed budworm decreased in numbers everywhere in the district except for a small area behind Sarita River Camp where two collections from hemlock regeneration averaged about 100 larvae each. Elsewhere, even within a few hundred yards of this area, larvae were very scarce. They were found in only twelve collections in the entire district.

Douglas Fir Bark Beetle, Dendroctonus pseudotsugae Hopk.

The Douglas fir bark beetle did noticeable damage only in the Copper Canyon holdings of MacMillan and Bloedel Ltd., in the Chemainus River valley. Several small patches, at an elevation of 2,500 feet, with a total area estimated at about five or six acres, were found to be infested. These areas consisted of from one to about six dead, dry trees, devoid of needles, surrounded by about the same number, or a few more, dead trees still covered with red needles. These latter trees were found to contain adult beetles in small numbers. Large numbers of adults had emerged.

Living trees immediately surrounding each area of dead trees were heavily attacked. Pairs of adults were in the galleries, most of which contained eggs.

Silver-spotted Halisidota, Halisidota argentata Pack.

As predicted last year, this insect was very prevalent in the stands of Douglas fir in drainage 001, 002 and 004. The infestation was heaviest on trees at low elevations and close to tide water. Thus it was confined to a narrow strip along the coast line from Parksville south to Sooke, and on adjacent islands. A small area at Youbou, on Cowichan Lake, contained the only infested trees found inland. The most heavily infested area was around Crofton, where single trees contained up to fourteen webs.

Ninety-one collections were made, 76 of which were from Douglas fir. The remainder were from cedar, hemlock, lodgepole pine, grand fir and Monterey cypress. Most of these collections were hand picked and contained up to 350 larvae per colony.

Mass rearings in the insectary produced several species of parasites, the most common being a dipterous fly, Uromacquartia halisidotae Tns., and a hymenopterous parasite Meteorus hyphantriae, Riley. Total parasitism amounted to only about five per cent. No disease was found, so these natural factors exerted little control on the 1954 population. An increase in population is expected in 1955.

Map 2 shows the infestation in 1954.

Western Tent Caterpillar, Malacosoma pluviale (Dyar).

The western tent caterpillar has increased to infestation numbers in parts of the district. Colonies were found from Sooke across the south east end of Vancouver Island to Sidney (Map 3). Around Victoria and Langford, and in North Saanich, many deciduous trees and bushes were completely defoliated. Mass rearings indicated that parasitism is still too low to give any control. A high population is expected again in 1955.

Forest Tent Caterpillar, Malacosoma disstria Hbn.

Several fruit trees in the Oaklands district of Victoria were stripped bare of foliage. A few larvae were also found in Saanich, on hawthorn and rose bushes in association with western tent caterpillar.

Hemlock Sawfly, Neodiprion tsugae Midd.

No large collections of Neodiprion spp. were made in 1954. Although larvae were found in 30 collections, the total number did not exceed 50. They were found in all drainages and on the following hosts: hemlock, Douglas fir, spruce, lodgepole pine, amabilis fir and grand fir.

Green Spruce Aphid, Neomyzaphis abietina (Wlkr.)

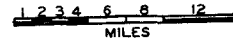
No aphids were found on the trees which were heavily attacked last year.

Satin Moth, Stilpnotia salicis (L.)

The satin moth, which periodically defoliates the silver poplar shade trees, has appeared again in Victoria. So far only a few trees have been attacked, but they were completely defoliated.

Map 1

SOUTH VANCOUVER ISLAND
DISTRICT

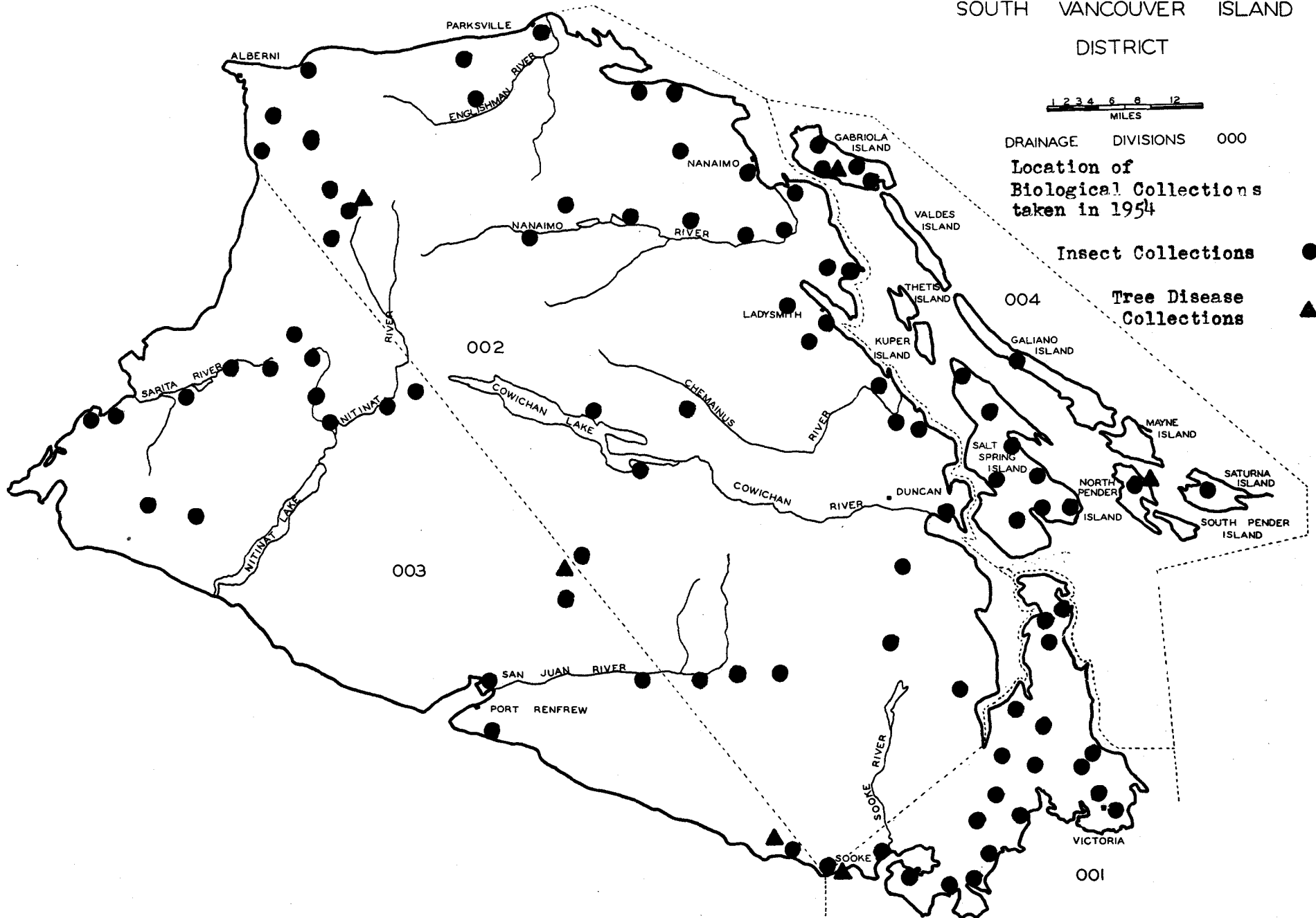


DRAINAGE DIVISIONS 000

Location of
Biological Collections
taken in 1954

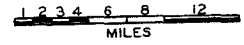
Insect Collections ●

Tree Disease
Collections ▲



Map 2

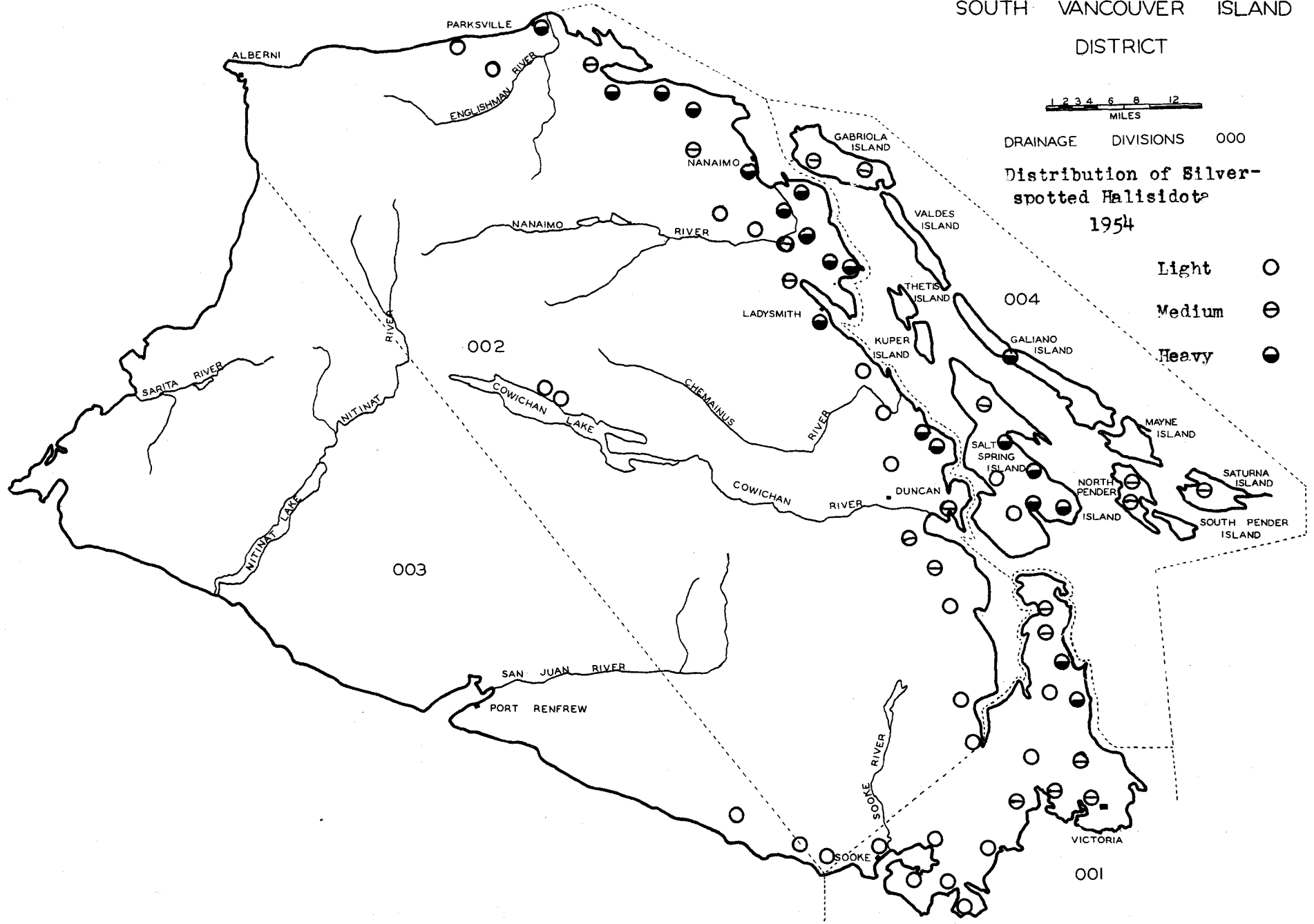
SOUTH VANCOUVER ISLAND DISTRICT



DRAINAGE DIVISIONS 000

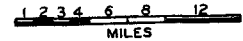
Distribution of Silver-spotted Halisidote
1954

- Light ○
- Medium ⊖
- Heavy ●



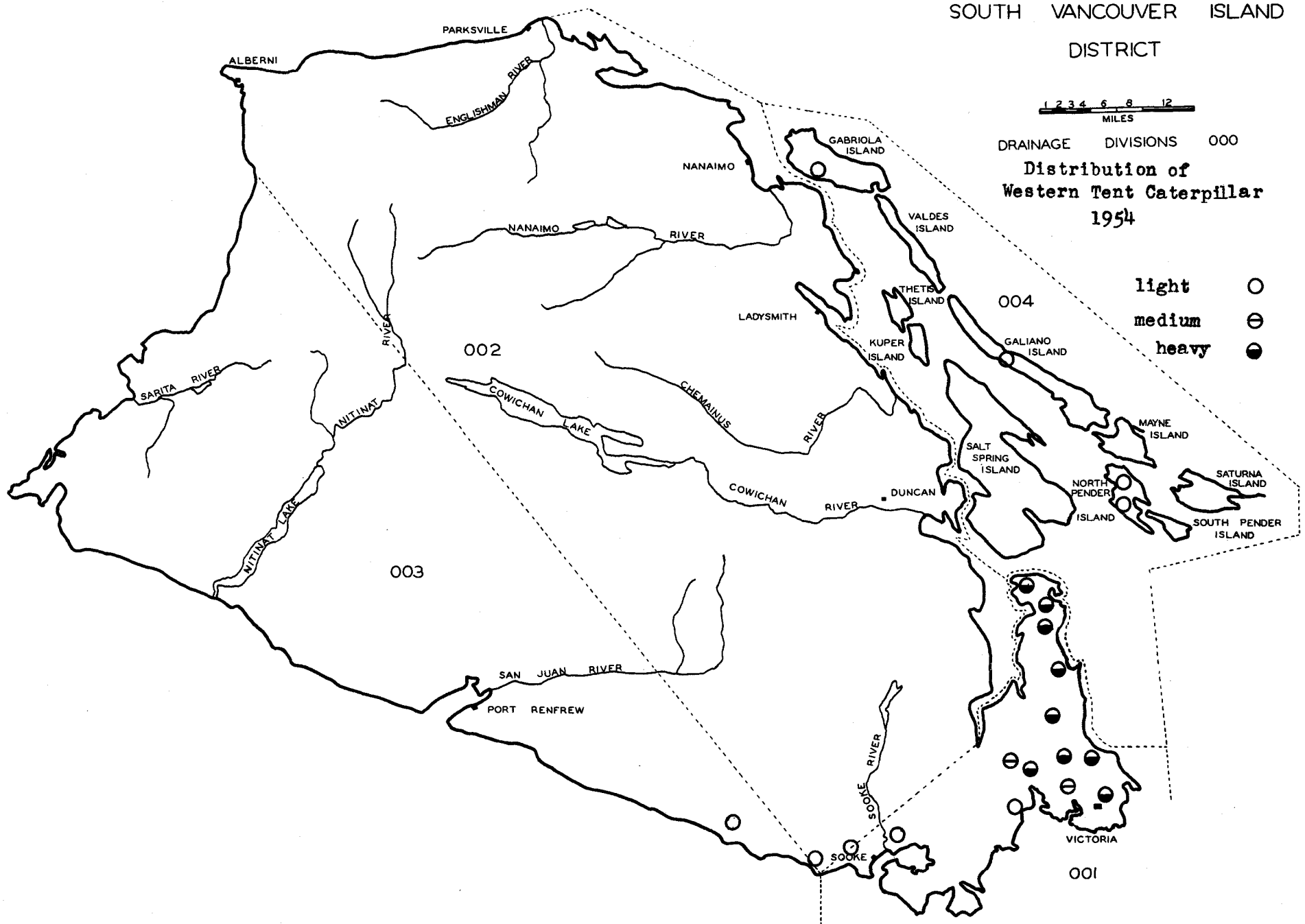
Map 3

SOUTH VANCOUVER ISLAND
DISTRICT



DRAINAGE DIVISIONS 000
Distribution of
Western Tent Caterpillar
1954

light ○
medium ⊖
heavy ●



FOREST BIOLOGY SURVEY
NORTH VANCOUVER ISLAND

1954

D. G. Collis

I INTRODUCTION

In view of the apparent increase in black-headed budworm Acleris variana (Fern.) population the whole district was surveyed as nearly as possible during the budworm larval period to ascertain the distribution of this insect. The coverage attained was the best thus far for the district.

During the season 393 insect collections were made from 297 locations in the district. In other districts an additional 58 collections were participated in. Table 1 shows the distribution of collections by host.

TABLE 1

Distribution of Insect Collections by Host,
North Vancouver Island, 1954.

Host	Number of Collections
Western hemlock	222
Douglas fir	100
Amabilis fir	20
Sitka spruce	15
Western red cedar	13
Alder	7
Wild apple	3
Lodgepole pine	3
White pine	3
Grand fir	2
Alpine fir	1
Yellow pine	1
No host	3

In the course of the survey 1,050 miles were travelled by outboard boat and 6,000 miles by truck.

Over a large portion of this district the ranger is dependent upon the logging industry for transportation and lodging. This assistance has been given by the whole forest industry without hesitation. The British Columbia Forest Service was also most accommodating when help was required.

II STATUS OF INSECTS

The Douglas fir beetle, Dendroctonus pseudotsugae (Hopk.)

The Van West infestation reported in 1953 appears to have subsided this year. Information gathered from the check plot established in the fall of 1953 is shown in Table 2.

TABLE 2

Number of infested and dead Douglas fir in check plot, Cumberland, North Vancouver Island.

Status	1953	1954
Number of trees infested	31	7
Number of trees dead	2	7
Number of trees not attacked	<u>49</u>	<u>68</u>
Total number of trees	82	82

Trees which were not infested in September of 1953 remained unattacked this year. They were considered as attacked if fresh boring dust showed on the outside of the bark. In the instances where the bark was removed on August 30 of this year no adults or progeny were found. The adults had made a short gallery and then disappeared. Because of this population suppression and the decrease in attack shown in the plot and the whole area generally, the possibility of further serious attack is slight.

Evidence of the seriousness of bark beetle activity during 1953 became very apparent in 1954. The most heavily affected area is in the Nimpkish River Valley where company foresters estimate 50,000,000 board feet of timber was dead or dying in the summer of 1954. The severity of this infestation came as a complete

surprise. The main attack took place at the base of the crown which would be 100 feet or more above the forest floor on most trees. The attack was not detected until some of the infested trees were felled. As summer progressed the dying trees started turning colour in groups ranging in size from small patches up to 5 acres. The age of the attacked stands runs from 100 to 1,100 years. All the infested areas examined are associated with some windfall and a few old snags. The larger groups are being salvaged where possible.

Clusters of dead Douglas fir around Buttle Lake which were considered as not infested in 1953 were probably attacked in the crown. This year the dying timber showed up in almost continuous patches on the west side of the lake and to a lesser degree on the east side. Occasional dying infested trees were located between Buttle Lake and Upper Campbell Lake.

Other areas where dying Douglas fir was found to have been attacked were at Bonanza Lake near Beaver Cove, Sproat Lake and the Ash River drainage near Port Alberni.

In standing timber, over all these areas, no successful broods were found. Living adults were removed from one standing tree at Buttle Lake. The attacks were similar to the Van West infestation, the adults would mine out a short gallery, usually lay no eggs and then disappear. Where the female did lay eggs the larvae would commence to feed, travel various distances in the cambium and then die. It would appear that it is not necessary for the beetles to complete their life cycle to cause tree mortality.

The beetles did not always follow the usual pattern of attack; they would ignore a damaged tree, such as one with half the bark knocked off the trunk and attack adjoining, apparently healthy trees.

The scope of this survey was limited and most of the samples were confined to the bole of the tree where brood mortality is probably higher. It should, however, be adequate to indicate a definite decline in beetle activity. This infestation built up during the dry summers of 1951 and 1952, reached its peak in 1953 and although the damage showed up in 1954 the population was then on the decline. This coincides with the weather which turned relatively cool and moist in 1953 and followed the same pattern in 1954.

The Black-headed Budworm, Acleris varians (Fern.)

Although the population of this insect increased this year the distribution, compared with 1953, remained unchanged. Beating samples taken at the same sample points indicate the general rise in population (Table 3).

TABLE 3

Number of black-headed budworm larvae collected in beating samples, North Vancouver Island.

Location	1953	1954
Port Alice	0	3
Mahatt River	0	11
Branch 60-Holberg	5	561
Port Hardy	9	137
Englewood	18	174
Ida Lake-Beaver Cove	20	312
Elk Creek - Sayward	11	93
Dove Creek - Courtenay	13	0
Great Central Lake	<u>44</u>	<u>6</u>
Total	120	1,297

The 1953 sample point at Great Central Lake has been logged. The 1954 figure was obtained from the same valley at a point with similar aspect and exposure.

The only decrease in population occurred at Dove Creek where larvae were found in conjunction with a Neodiprion sp. infestation in 1953. This season neither insect was found in the area.

Medium to heavy populations of black-headed budworm were found in many other areas. The largest sample was in Johnstone Straits, where 753 larvae were collected in one 3-tree sample.

A system of branch sampling was instituted where the population became so high it was felt the tree beating method sampling was becoming impractical. This consisted of cutting a 22-inch branch tip from the crown of a tree, counting the number of larvae feeding on it, the number of twig tips on the branch and the number of these tips which were defoliated. This information is presented in Table 4.

TABLE 4

Black-headed budworm on 22-inch branch samples
and comparable 3-tree beating samples where applicable
North Vancouver Island, 1954.

Location	Per cent of Branch Tips Defoliated	Larvae Found on 22-inch Branch	Larvae From Three Tree Beatings
PL 329 Holberg	48	60	-
W end Holberg Inlet	46	49	-
San Josef River	24	21	8
School-house - Holberg	84	28	-
Port Hardy	46	12	137
Englewood	27	1	174
TL-4425 Kimpkish Valley	25	3	53
Ida Lake - Beaver Cove	77	33	312
Kokish River - Beaver Cove	81	60	-
Johnstone Straits	59	31	753
Tsitika River	45	50	-
Naka Cr. Johnstone St.	03	5	67

The crown of sample trees was divided into three equal parts and 10-inch branch tips removed. The length of all twigs on the sample unit was measured. The results are expressed as number of eggs per 100 inches of twig length (Table 5).

More intensive egg sampling was carried out in the Sayward Forest to obtain information on budworm egg distribution within the tree crown. This information has not yet been analyzed.

Eleven eggs per 100 inches of twig length has been considered a high population in the West Prince Rupert Ranger District. Applying this rule to the figures in Table 5 indicates a heavy population in eight of the 12 areas sampled.

TABLE 5

Number of black-headed budworm eggs per 100 inches of twig length
North Vancouver Island, 1954.

No.	Location	Total Twig Length	Number of Eggs	Eggs per 100 inches of Twig
1	NW end Holberg Inlet	514	377	73
2	Fire break-branch 60 Holberg	268	13	5
3	NE main Holberg	158	87	55
4	San Josef River	127	61	48
5	Port Hardy	51	25	49
6	Clexewe River	190	33	17
7	E half S 19-Port McNeill	187	25	13
8	Head of Bonanza Lake	201	8	4
9	Ida Lake - Beaver Cove	161	31	19
10	Kokish River - Beaver Cove	148	9	6
11	Englewood - Nimpkish Lake grade	110	14	12
12	Elk Creek Sayward	63	5	7

With two exceptions a negligible number of parasites emerged from the larvae during rearing in the insectary. One hundred and thirty larvae were collected at Port Hardy on August 3rd. Of these 33 were parasitized. At Elk Creek near Sayward samples were taken on two dates. The first on July 21 contained 93 larvae from which only three parasites emerged. On September 1st a second sample contained 47 pupae of which 25 were parasitized. This heavy pupal parasitism could have occurred in areas where no pupal collections were made and so make what appears to be a very low parasite population a doubtful factor.

With the exception of locations two, nine and ten in Table 5 the largest number of eggs were found in areas of highest larval populations. The number of egg samples in each area was probably too small to be completely representative.

At the head of Rupert Inlet, one of the few locations where no budworm larvae were found in the northern portion of the district, 13 eggs were counted on a ten-inch branch tip in November. In all probability any of the hemlock-balsam stands in the north eastern portion of Vancouver Island will support some degree of budworm population in 1955.

The infestation is shown in Map 2.

The Silver-spotted Tiger Moth, Halisidota argentata Pack.

Colonies extended from Parksville to Comox but were very scarce in the Courtenay - Comox area (Map 3). None were found north of Comox. The largest population in the North Vancouver Island District was on Denman Island.

Four Halisidota cocoons were found at Kennedy Lake, a colony was recorded at Gunner Inlet near Tofino and two larvae were collected on the Gold River road at Muchalat Inlet.

Spruce Budworm, Choristoneura fumiferana (Glem.)

One larva was found on Douglas fir in Tahsish Inlet.

Neodiprion spp.

It is unfortunate that the request for mass collections of this tenthredinid was not made in 1953. Collections of up to 500 larvae were made in 1953 but this high population had disappeared completely in 1954. The insectary records show parasitism to have been extremely low. Thirty-nine collections averaged less than two larvae at 37 locations. The remaining two samples follow.

Location	Host	Larvae found
L-328 Holberg Inlet	H	47
Winter Harbour	H	37

Western Hemlock Looper, Lambdina fiscellaria lugubrosa (Hlst.)

Only eight larvae were found in five locations.

The Spruce Gall Aphid, Adelges cooleyi (Gill.)

Douglas fir regeneration was attacked by this aphid throughout the host range in the North Vancouver Island District. Attacks were heavier than has been noted in past years.

Spruce Aphididae.

Sitka spruce trees at the entrance to Ucluelet Harbour which were reported as completely brown in the 1953 report were recovering this year. No new attacks were observed.

Striped Alder Sawfly, Hemichroa crocea (Fourc.)

The activity of this insect was limited to Campbell Lake and the Oyster River Valley. The only trees defoliated were a few young alders along the edge of the John Hart Dam on Campbell Lake. At the end of August, on request for special collections, both areas were visited. In the Oyster River Valley eggs had been laid in the mid-rib section of some leaves, a few had hatched but no larvae were found. A small number of larvae and numerous eggs were collected at the John Hart Dam. However, none survived in the laboratory. Another visit was made on September 20 but no second generation larvae were found.

Zeiraphera spp.

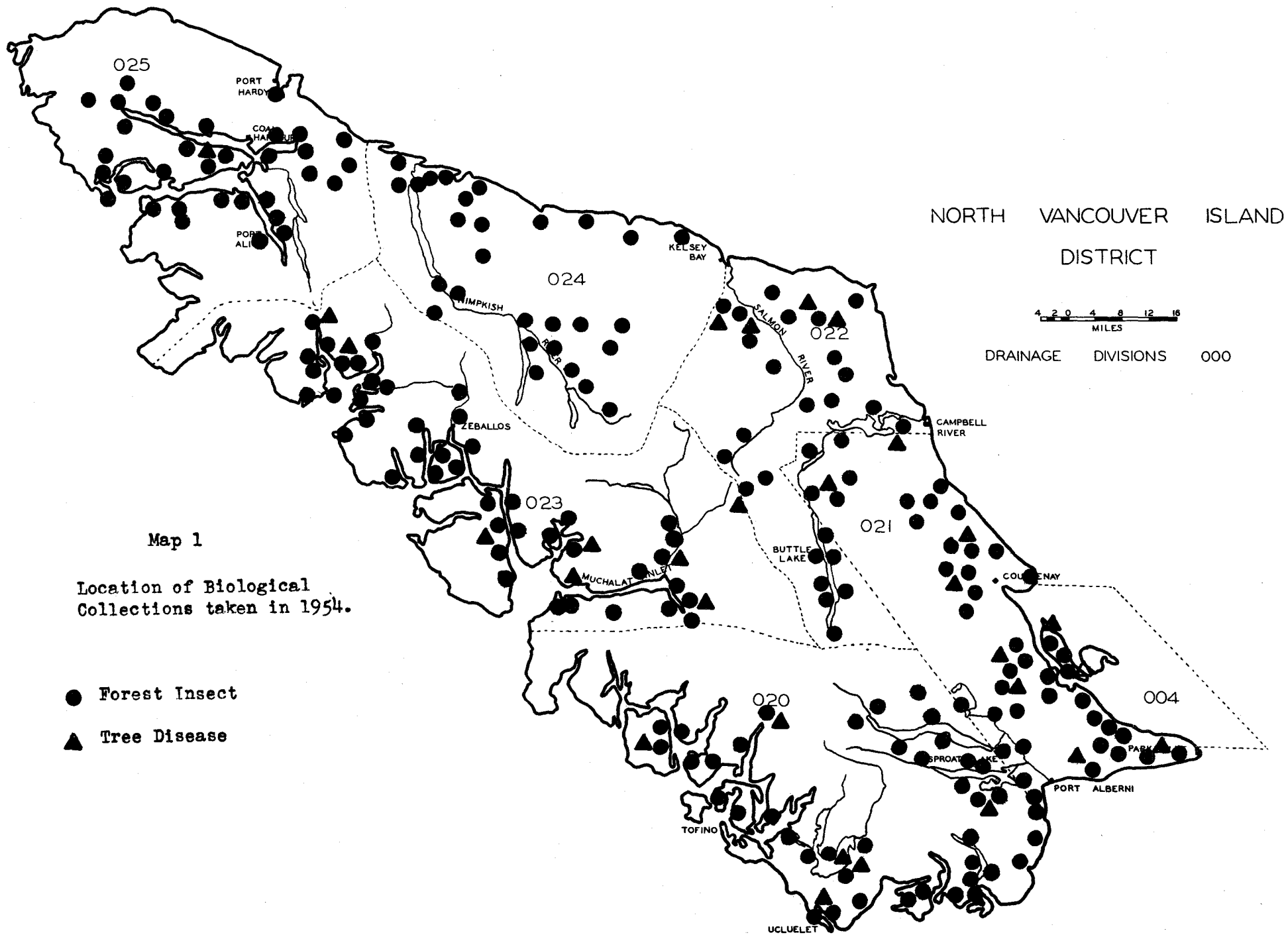
From the start of the west coast survey in mid-June these tortricids were found frequently in collections from Sitka spruce. Pupation appears to take place at sea level around the end of June. Although the effect of their feeding was still evident as the survey progressed larvae were not found after July 1st. Defoliation was restricted to new growth but was not heavy enough to cause any tip kill.

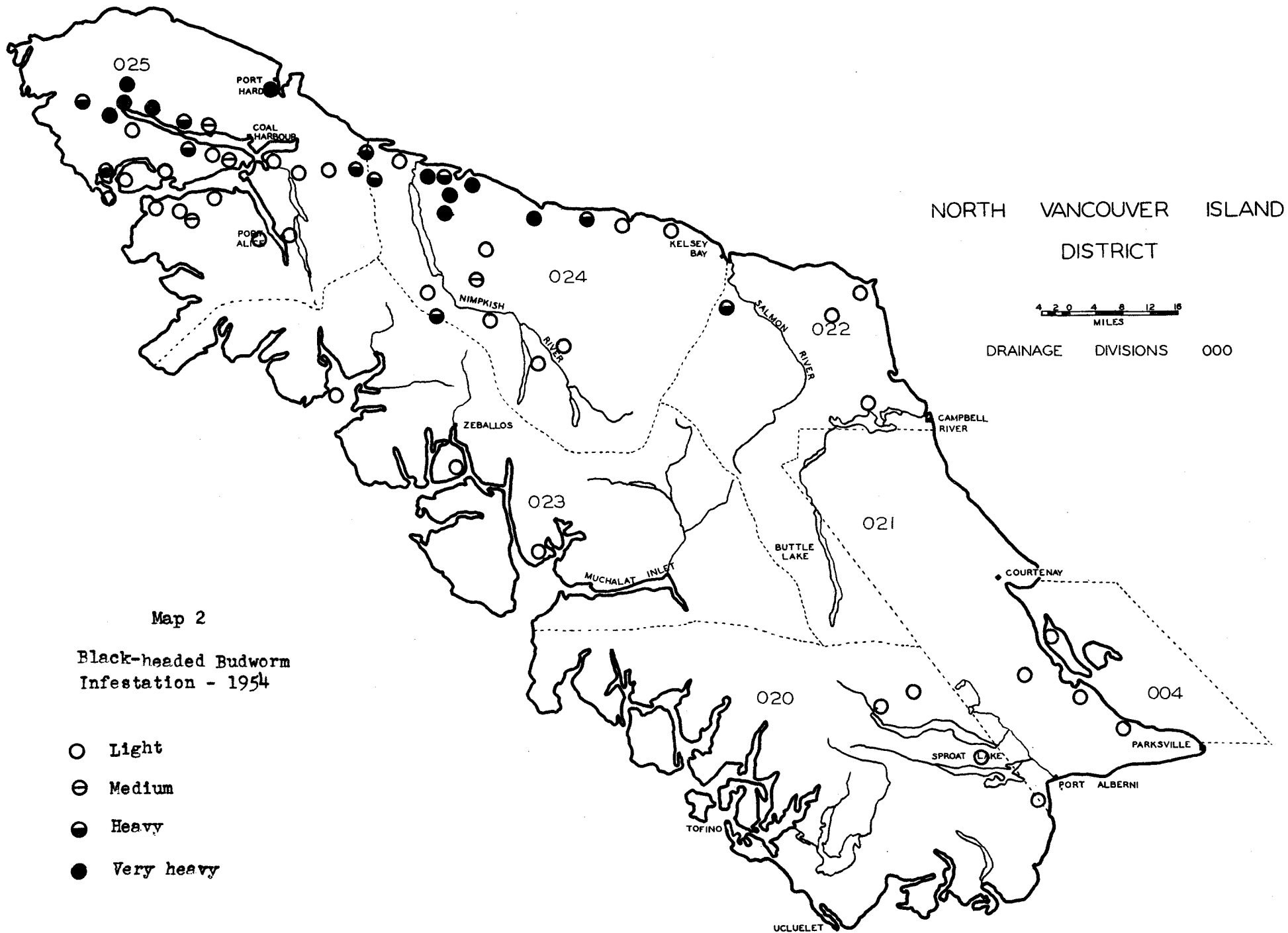
Dioryctria reniculella Grt.

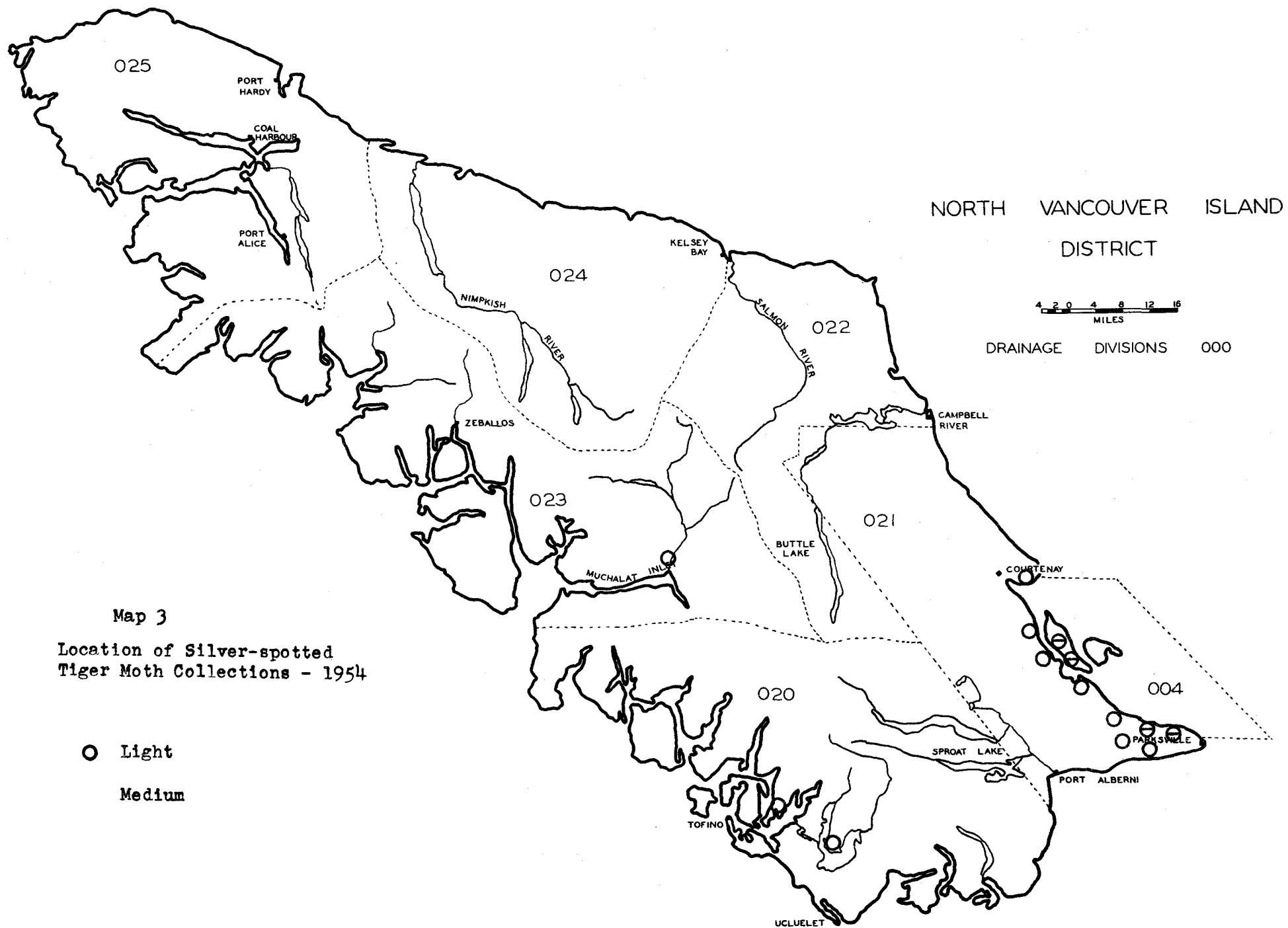
These larvae were found feeding in conjunction with the Zeiraphera spp.

III STATUS OF TREE DISEASES

The 37 tree disease samples contributed during the summer consisted mainly of foliage disorders and were classified as not known to do serious damage. Seven of these samples are yet to be identified.







Map 3

Location of Silver-spotted
Tiger Moth Collections - 1954

- Light
- Medium

FOREST BIOLOGY SURVEY
SOUTH VANCOUVER DISTRICT

1954

E. L. Avison

I INTRODUCTION

Field work commenced in the South Vancouver Ranger District on June 2nd and continued until September 18, 1954. During this period, 283 forest insect and nine tree disease collections were 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.

In the course of the survey, approximately 9,800 miles were travelled by motor vehicle and 160 miles by dinghy and lake ferries.

Ranger personnel were engaged jointly in the collection of egg samples from the spruce budworm infestation, in the Pemberton, Lillooet and Port Douglas regions.

The writer wishes to acknowledge the assistance of the British Columbia Forest Service and Canadian Forest Products Limited who made possible the aerial reconnaissance of the spruce budworm infestation. The generous co-operation given the survey by Trethewey Logging Company, Harrison Lake, B. C. is also gratefully acknowledged.

During the summer 34 co-operators were contacted of which 17 were British Columbia Forest Service personnel.

TABLE 1

Summary of Insect Collections by Agencies.
South Vancouver District 1954.

Personnel involved in collections	No. of Collections						TOTALS
	May	June	July	Aug.	Sept.	Oct.	
Coll. by Forest Biology personnel independently	2	86	124	17	-	-	229
Coll. by B. C. F. S. personnel	10	14	34	18	6	6	88
Coll. by Biology and B. C. F. S. personnel combined	-	9	5	-	-	-	14
Coll. from other sources	-	-	-	6	1	-	7
TOTALS	12	109	163	41	7	6	338

TABLE 2

Insect Collections by Host Trees,
South Vancouver District, 1954.

Coniferous	No. Coll.	Deciduous	No. Coll.
Douglas fir	101	Red alder	50
Western hemlock	92	Broad-leaved maple	1
Red cedar	18	Vine maple	2
Amabilis fir	11	Willow	3
Mountain hemlock	9	Silver birch	4
Yellow cedar	2	Black cottonwood	2
Sitka spruce	2	Balsam poplar	2
Ponderosa pine	4	Apple	3
Lodgepole pine	3	Plum	3
Grand fir	2	Ash	1
Alpine fir	2		71
	<u>246</u>		
Collections from miscellaneous spp.			9
Collections having no host			<u>12</u>
			21
GRAND TOTAL			338

II STATUS OF INSECTS

Spruce Budworm, Choristoneura fumiferana (Clem.).-

The spruce budworm infestation reported in 1953 in the Lillooet River and Lake and the Fraser-Nahatlatch River valleys continued this year. The total area affected is about 113 square miles. Twenty-four square miles were recorded in the Fraser-Nahatlatch River regions compared with 89 square miles in the Lillooet River valley.

Severe defoliation of Douglas fir and balsam fir occurred in each area at elevations ranging from 50 to 3,000 feet. In general, smaller trees, of about 10 to 12 inches D. B. H. were more heavily defoliated. The amount of defoliation appeared to be inconsistent and ranged from approximately 15 to 75 per cent within local areas. Reproduction was heavily attacked but no dead trees were found. There were numerous widely scattered groups of dead trees on the slopes in the Port Douglas, Lillooet River region, but these were not killed by spruce budworm. Bark beetles are active in the infestation area and probably caused the death of some of these trees.

METHOD OF SURVEY

A ground reconnaissance was conducted from June 22nd to July 5, 1954, for the purpose of appraising damage in the heavily defoliated areas. Larval and pupal samples were obtained by means of the three-tree random beating method, together with data from permanent sampling stations situated throughout the infestation areas.

By July 5, 1954, the data procured by Forest Biology Rangers, supplemented by reports from the British Columbia Forest Service, indicated that the present infestation was in its second and in some areas its third year of heavy defoliation.

It was therefore necessary to incorporate further study which included:

- (1) Aerial mapping to determine the full extent of all infested areas.
- (2) Plot studies to determine the amount of damage already inflicted, and, if possible, to predict the population trend for 1955.

Aerial Survey.

Through the courtesy of the British Columbia Forest Service and Canadian Forest Products Limited, two flights for aerial observation and reconnaissance were made in 1954.

The first of two flights was made on July 29th and covered Harrison Lake, Lillooet River, Glacier Lake, Lillooet Lake and Pemberton. The second, on August 6th surveyed the Lillooet River and lake areas a second time and then flew over Joffre Creek, Duffy Lake, Cayoosh Creek, Seton Lake, the Fraser River between Lillooet and China Bar and the Nahatlatch River.

Areas showing red foliage were marked on one inch to the mile aerial mosaics. The 1954 infestation, as determined by aerial mapping, is shown in Map 2.

Plot Studies.

Two field parties of Forest Biology personnel established study plots in seven predetermined localities.

Location of plots are as follows:

Pemberton

August 11th to 18th, 1954.

- Area No. 1. South of Joffre Creek.
2. Caribou Trail.
3. South of L-2679.

Lillooet River

September 12th to 17th, 1954.

- Area No. 4. Tenas Lake
5. Rogers Creek
6. Skookum Chuck.
7. 1.3 miles north of Gowan Creek.

Plots were established at 10, 20, and 40 chain intervals along existing roads. In each plot, ten trees of the major species were measured and tagged for future observation. The destruction of current year's foliage and total defoliation was then estimated with binoculars.

In each plot, one Douglas fir tree was felled and sample branches removed for calculating egg mass density. Both the green hemlock looper, Nepytia phantasmaria (Stkr.) and the western hemlock looper Lambdina fiscellaria lugubrosa (Hlst.) were present, and are discussed under separate headings in this report.

RESULTS

Larval Sampling.

A summary of the collections obtained from the ground reconnaissance of June 22nd to July 4, 1954, is shown below.

Total coll. taken in budworm areas	No. of coll. containing budworm	Total No. of budworm larvae	Av. per sample
78	40	1,594	39.8

Disease or parasites present.

Of the larvae submitted to the Victoria laboratory, no evidence was found that disease was of any significance as a control factor. There were occasional signs of parasite activity but their population did not appear to be sufficiently high to provide effective control (Table 3).

The parasite Glypta fumiferanae (Vier) accompanied by two species of Ichneumonoidea, occurred in small numbers.

TABLE 3.

Number of spruce budworm larvae and pupae received at the laboratory, from survey in the Fraser and Lillooet River infestation, and the amount of parasitism as obtained from insectary rearing, 1954.

Date of Sample	Number of specimens		Per cent parasitism	
	Larvae	Pupae	Larvae	Pupae
June				
7	8	-	-	-
8	57	-	3.5	-
9	10	-	-	-
22	472	42	6.6	-
.....				
July				
2	223	28	9.0	-
3	148	140	15.5	-
4	335	7	5.4	-
29	-	15	-	100
TOTALS	1,253	232	7.5	6.5

Egg Samples.

Four branches were taken from the mid-half of the crown of sample trees in each plot. The egg population is presented in Table 4.

Areas 1, 3, 4, 5 and 6 supported a heavy egg population which is sufficiently high to provide a large initial population in 1955.

Fifty egg masses examined at random averaged 45± 43 eggs per mass.

TABLE 4
Spruce budworm egg masses per 100 square feet of foliage 1954.

Area	Location	Plot and Tree	No. egg masses
1	South of Jeffre Creek	1	304
		2	198
		3	386
.....			
2	Caribou Trail (I. R. No. 6 and 7)	1	32
		2	99
		3	50
.....			
3	South of L-2679	1	742
		2	93
		3	467
.....			
4	Tenas Lake	1	194
		2	133
.....			
5	Rogers Creek	1	186
		2	568
.....			
6	Skeokum Chuck	1	150
		2	80
.....			
7	1.3 mi. north of Gowan Creek	1	15
		2	65

Defoliation Estimates

Heavy defoliation has occurred for the last two or three years. Adventitious buds were put out in 1953 and 1954. In some areas the normal year's growth as well as the adventitious buds were completely defoliated in 1954. In other areas, particularly near the Old Caribou Trail and near Glacier Creek there was little new growth. Some tip killing was observed, but this condition is not widespread.

In the Gowan Creek vicinity of the Lillooet River valley, noticeable defoliation was observed 0.9 miles north of the creek. There is a change of timber type here from pre-dominantly Douglas fir to predominantly lodgepole pine. The latter type extends several miles south of Gowan Creek before Douglas fir appears again. Very light defoliation was observed on one tree cut south of the lodgepole pine type. Only one egg mass was found on three sample branches. Apparently this barrier, combined with consistent south winds, helped prevent the budworm infestation from spreading southward.

A brief description of the stand, together with the estimates of average defoliation in each plot, is given in Tables 5 and 6.

TABLE 5

Estimates of average defoliation of Douglas fir on check plots, Pemberton Region. August 11th to 18, 1954.

Location	Stand composition* (% stems)					D. B. H Douglas fir (inches)		Ocular estimate of per cent defoliation			
	Fd	Pw	Hw	Bi	Cw	Av.	Sd**	Total		1954 growth	
								Av.	Sd	Av.	Sd
1.1 South of Jeffre Creek	60	30		8	2	25±	17	23±	8	80±	14
	100					24±	6	20±	0	88±	4
	100					18±	6	18±	4	82±	6
.....											
2.1 Caribou 2 Trail 3 (L.R. No. 6 and 7	75			25		14±	5	33±	8		
	75		15	5	5	15±	9	19±	5	87±	5
	50	5	35		10	35±	17	16±	5	72±	15
.....											
3.1 South 2 of 3 L2679	75				25	12±	4	23±	5	100±	0
	75				25	9±	1	30±	7	99±	3
	100					12±	3	27±	7	100±	0

* Fd.- Douglas fir; Pw.- White pine; Hw.- Western hemlock;
Bi.- Birch; Cw.- Western red cedar.

** Sd.- Standard deviation.

Tables 5 and 6 are from unpublished report of the spruce budworm infestation by Messrs. M. G. Thomson and G. T. Silver.

TABLE 6

Estimates of average defoliation of Douglas fir on check plots in the Lillooet and Fraser River valleys, September 12th to 17, 1954.

Location	Stand Composition (% stems)				D. B. H. Douglas fir (inches)		Ocular Estimate of Per Cent Defoliation Total 1954 Growth			
	Fd	Hw	Gw	Pl	Av.	Sd.	Av.	Sd.	Av.	Sd.
4.1 Tenas	100		20		17 \pm	4	20 \pm	6	55 \pm	10
2 Lake	80				18 \pm	7	29 \pm	8	65 \pm	12
.....										
5.1 Rogers	60			40	9 \pm	2	32 \pm	6	83 \pm	6
2 Creek	90		2	8	12 \pm	4	29 \pm	4	84 \pm	9
.....										
6.1 Skookum	98		2		17 \pm	4	15 \pm	5	53 \pm	20
2 Chuck	96		4		10 \pm	3	28 \pm	5	78 \pm	11
.....										
7.1 1.3 miles	98		2		24 \pm	5	9 \pm	3	27 \pm	11
2 N. of Gowan Cr.	80			20	9 \pm	2	22 \pm	5	69 \pm	12

SUMMARY

1. Egg counts taken in 17 study plots averaged 221 masses per 100 square feet of foliage surface. This is sufficient to give a large initial larval population in 1955.
2. The defoliation of current year's growth ranged from 27+ 11 to 100+ 0 per cent.
3. It is doubtful if the number of buds in the more heavily defoliated areas is sufficient to support the expected larval population. Therefore, heavy mortality due to starvation may result.
4. There was no marked reduction of radial increment found on the sample trees.

REFERENCES

1. Thomson, M. G. Preliminary report on the spruce budworm in the Lillooet and Fraser River areas. Unpublished report for Forest Biology Laboratory, Victoria, B. C.

Silver, G. T. The spruce budworm infestation in the Lillooet River valley.

Douglas Fir Beetle, Dendroctonus pseudotsugae Hopk.

Evidence of current damage by the Douglas fir beetle was observed again in 1954 at high elevations on both sides of the Lillooet River from Port Douglas to Tenas Lake. These attacks were made upon groups of thrifty mature to over-mature Douglas fir. Many of the attacks, which are comparatively new, are in stands where little, if any, previous damage had occurred. The infested groups represent an insignificant percentage of the stand volume.

Infestations of the Douglas fir bark beetle in the Anderson and Silver - Skagit River valleys appear to have declined considerably in 1954. Although the beetle has been active in these two areas since at least 1951 and caused some tree mortality, it has remained comparatively localized.

Visual appraisals, thus far, offer the only source of information on the extent of these infestations due to their occurrence in remote regions.

Western Tent Caterpillar, Malacosoma pluviale (Dyar).

The two infestations reported in 1953, one 3 miles north east of Port Coquitlam at Pitt Meadows, the other 3 miles south west of Lindell Beach, in the Columbia Valley, were active again in 1954.

Pitt Meadows - Port Coquitlam area (Drainage Div. - 042).

For the second consecutive year, heavy defoliation was restricted to an area of some ten square miles. An estimated 90 per cent of current foliage on willow, hawthorn and wild rose was defoliated. By mid-August deciduous trees and shrubs were beginning to leaf out again.

Columbia Valley - Lindell Beach Area (Drainage Div. 040)

The extensive outbreak of forest tent caterpillar in 1953 at the head of the Columbia Valley increased in intensity in 1954, but was confined to the same area. Complete defoliation of red alder and apple occurred.

On June 3rd a plot was established for obtaining samples for parasite and disease studies. One thousand four hundred and fifty-eight larvae and 83 pupae were collected from this plot.

On June 6th, six tents were collected from 12 trees of from 3 to 5 inches D. B. H. and from heights of 10 to 20 feet above the ground. These colonies contained a total of 859 early instar larvae, an average of 143 larvae per colony.

A third and fourth examination was made on the 19th and 28th of June. Defoliation estimates made on the latter date disclosed an estimated 95 to 100 per cent defoliation of both red alder and apple.

Appreciable numbers of late instar larvae were found dead at the base of trees while others on the foliage were quite sluggish. The presence of disease and parasites did not appear to account for all the mortality. This abnormal occurrence was therefore attributed to starvation, as larvae in this area had fed considerably and adhered to the leaves on which they had fed.

Examination of the limited field data from the 1954 survey, suggests that the best conditions for tent caterpillar development is humid, partly cloudy weather. Conversely, on warm to hot sunny days, feeding activity was almost nil.

No disease was found in larvae submitted from the field in 1953. Of 270 tent caterpillars examined in 1954, polyhedrosis was present in 18. Although other micro-organisms were present polyhedral disease is considered the most important.

Parasite activity has so far been negligible (Table 7).

Barring abnormal climatic conditions, the outlook for 1955 is severe defoliation of the host trees. An increase in larval mortality may be expected from starvation and polyhedral virus.

TABLE 7.

Number of forest tent caterpillar larvae and pupae received at the laboratory from plot No. 1, Columbia Valley infestation, and the amount of parasitism as obtained from insectary rearings. 1954.

Columbia Valley - Plot No. 1

Date of Sample	Number of Specimens		Per cent Parasitism	
	Larvae	Pupae	Larvae	Pupae
June 3rd	156	-	6.4	-
June 3rd	170	-	1.2	-
June 3rd	270	-	-	-
June 3rd	220	-	-	-
.....
June 6th	126	-	3.2	-
June 6th	108	-	-	-
.....
June 19th	104	1	3.8	-
June 19th	51	-	2.0	-
June 19th	49	-	2.0	-
June 19th	104	-	1.9	-
.....
June 28th	27	13	-	23.1
June 28th	37	21	2.9	4.8
June 28th	26	24	3.8	4.2
June 28th	20	24	5.0	4.2
.....
TOTALS	1,458	83	2.3	9.1

Of the 1,458 larvae collected (Table 7) 270 were examined for insect diseases. The results are shown below:

Pathogenic Micro-organisms		Negative or Pathogenicity Undetermined	
Polyhedral	18	Protozoa	11
Capsules	0	Secondary Bacteria	29
Bacteria	3	Secondary Fungi	34
Pathogenic Fungi	14	Negative	161

Black-headed Budworm, Acleris varians (Fern.)

Samples taken in both the eastern and western portions of the district, from June 19th to August 29th indicated a significant increase over that of 1952 and 1953.

In the upper Lihumitson Valley, six miles northeast of Cultus Lake, six collections averaged 34 larvae each. These collections were taken at elevations ranging from 800 to 1,200 feet from under-story western hemlock in a mature hemlock-cedar stand.

Collections from permanent sampling station, number S. V. -040-2 in the Columbia Valley, averaged 3.1 larvae for 18 collections. The average for 1952 was 0.1 with none recorded in 1953.

The distribution by drainage divisions is shown in Table 8.

TABLE 8.

The number of black-headed budworm obtained from samples taken in the respective drainage divisions of the South Vancouver District, June 19 to August 29, 1954.

Drainage Div.	Host	Total Samples	No. Larvae 1954	Av. No. Larvae
040	Hw	19	264	13.9
040	Fd	25	8	0.3
040	B	2	1	0.5
040	C	8	1	0.1
040	Hm	1	30	30.0
040	Totals	55	304	5.5
041	Fd	2	6	3.0
042	Hw	48	25	0.5
042	Fd	15	2	0.1
042	Ba	2	1	0.5
042	Totals	65	28	0.4
043	Hw	7	1	0.1
044	Hw	2	3	1.5
044	B	2	9	4.5
044	Totals	4	12	3.0
GRAND TOTALS		133	351	12.0

Hemlock and Balsam Fir Sawfly, Neodiprion sp.

A decline in populations of this tenthredinid appeared general in all areas sampled in 1954. From June 8th to August 29th thirty-nine random beating samples averaged 9.0 larvae per sample, compared with 18.2 in 1953.

A localized spot infestation occurred at the southwest corner of Jones Lake at an elevation of 3,300 feet. Intermittent tip defoliation was observed in a thrifty mature stand of hemlock *Tsuga heterophylla* (Raf.) Sarg., and balsam fir *Abies amabilis* (Dougl.) Forbes.

Three 18-inch tips were selected at random from three trees of the major species and examined for insects. A total of 136 insects were removed. This was an average of 45 larvae per eighteen-inch tip. A total of 135 larvae were obtained in a three tree beating sample, in the same area.

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

For the eighth consecutive year, this geometrid was not abundant in the district. The average number of larvae per sample, based on 29 samples, from June 22 to August 26, was 4.0.

Some larvae were found in the Douglas fir dominated stands of the Lillooet, Nahatlatch-Fraser River drainages, in association with the spruce budworm.

Green Hemlock Looper, *Nepytia phantasmaria* (Stkr.)

The green hemlock looper was prevalent throughout the district in small numbers, except for more concentrated populations encountered in the Lillooet River Valley from Port Douglas, northeast to Tenas Lake.

Collections in these areas averaged 6 larvae per sample. The largest collection, taken in the budworm infestation at Tenas Lake, contained 15 larvae.

Red Alder Sawfly, Hemichroa crocea (Fourc.)

Analysis of insect data collected annually since 1949 yielded little significant information regarding activity of this tenthrudinid. In 1954, however, nine samples taken at the Seymour River in the Vancouver watershed and Bridal Falls, twelve miles north of Chilliwack, averaged 34 larvae per sample.

The Green-striped Forest Looper, Melanolephia imitata Wlk.

The green-striped forest looper continued to appear in a few collections. Eleven collections this year averaged 1.0 larvae compared with an average of 1.6 larvae found in 23 collections in 1953.

Spruce Aphid

The current depredations of this small green aphid were confined largely to ornamental trees in Stanley Park and the residential areas of Vancouver. The preferred host in these areas, is blue spruce Picea pungens (Engelm.).

Fall Webworm, Hyphantria textor Harr.

Light, sporadically distributed populations of this caterpillar were observed along main highways in the Fraser Valley. There was no perceptible defoliation.

III STATUS OF TREE DISEASES

Of the nine collections submitted only two diseases are worthy of note.

Cedar Leaf Blight, Keithia thujina Durand

This disease is of common occurrence throughout this district. Infected foliage of its host, red cedar, is increasingly common in moist, low lying isolated areas encompassing inland lakes.

The Tinder Fungus, Fomes fomentarius (Fr.) Kickx.

One collection of this horseshoe shaped conk was found on white birch Betula papyrifera Marsh. on the Old Caribou Trail, 14 miles northeast of Pemberton, B. C.

This fungus decays chiefly the sapwood and heartwood of dead timber. Occasionally, it is responsible for heart rot of living trees and also attacks living sapwood. Other known hosts are beech and poplar.

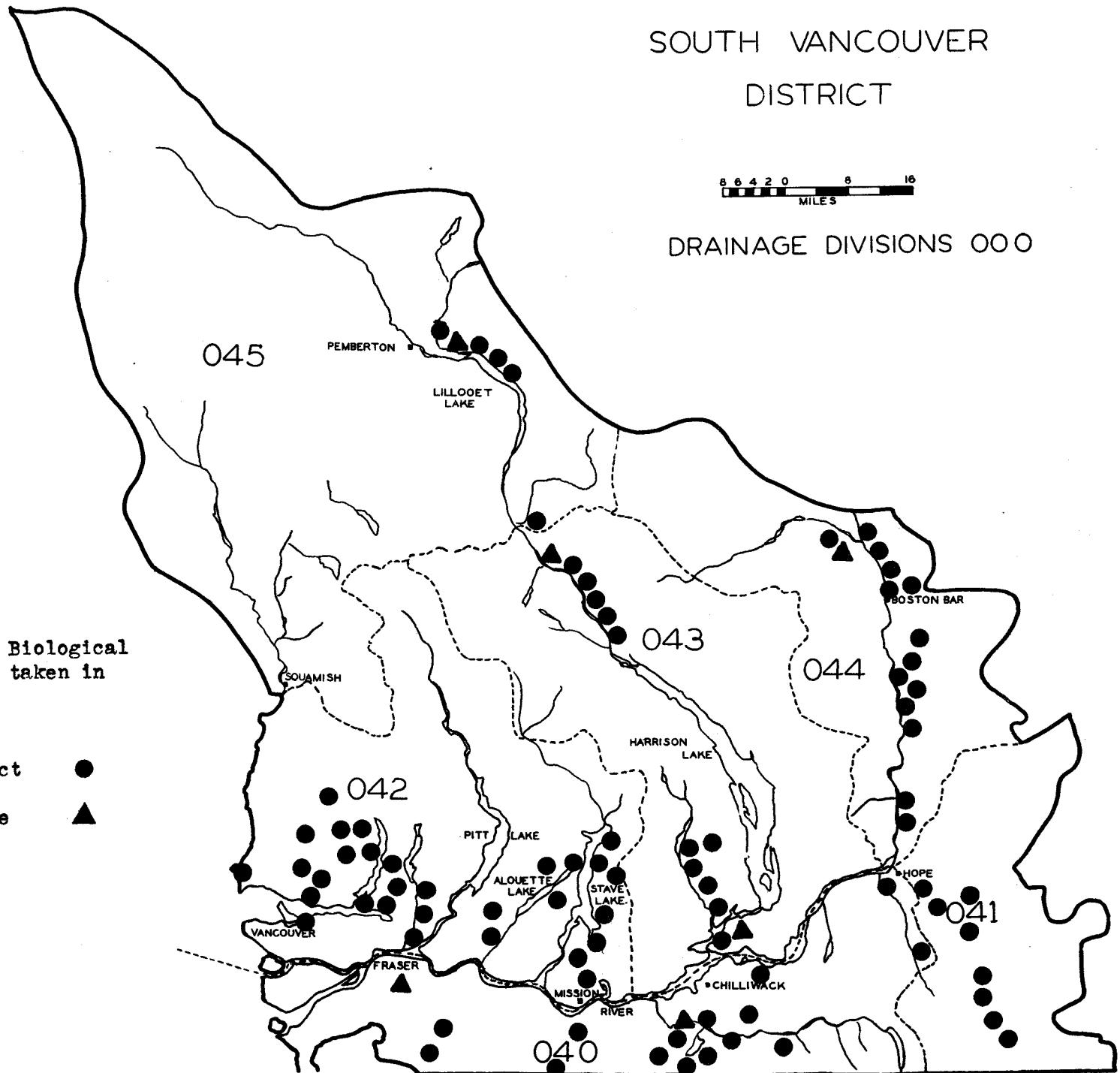
SOUTH VANCOUVER
DISTRICT



DRAINAGE DIVISIONS 000

Map 1
Location of Biological
Collections taken in
1954

Forest Insect ●
Tree Disease ▲



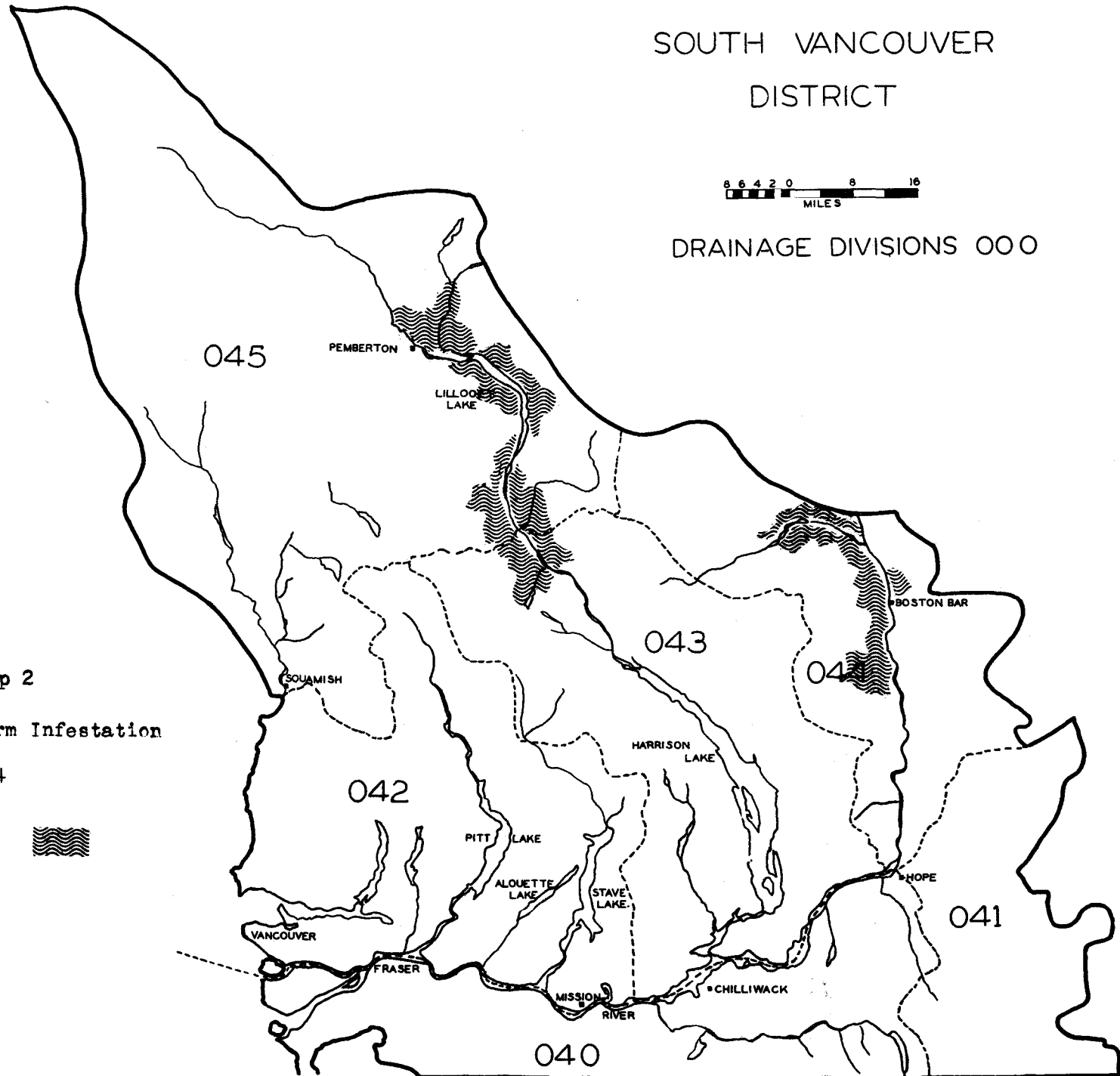
SOUTH VANCOUVER
DISTRICT



DRAINAGE DIVISIONS 000

Map 2
Spruce Budworm Infestation
1954

Very heavy



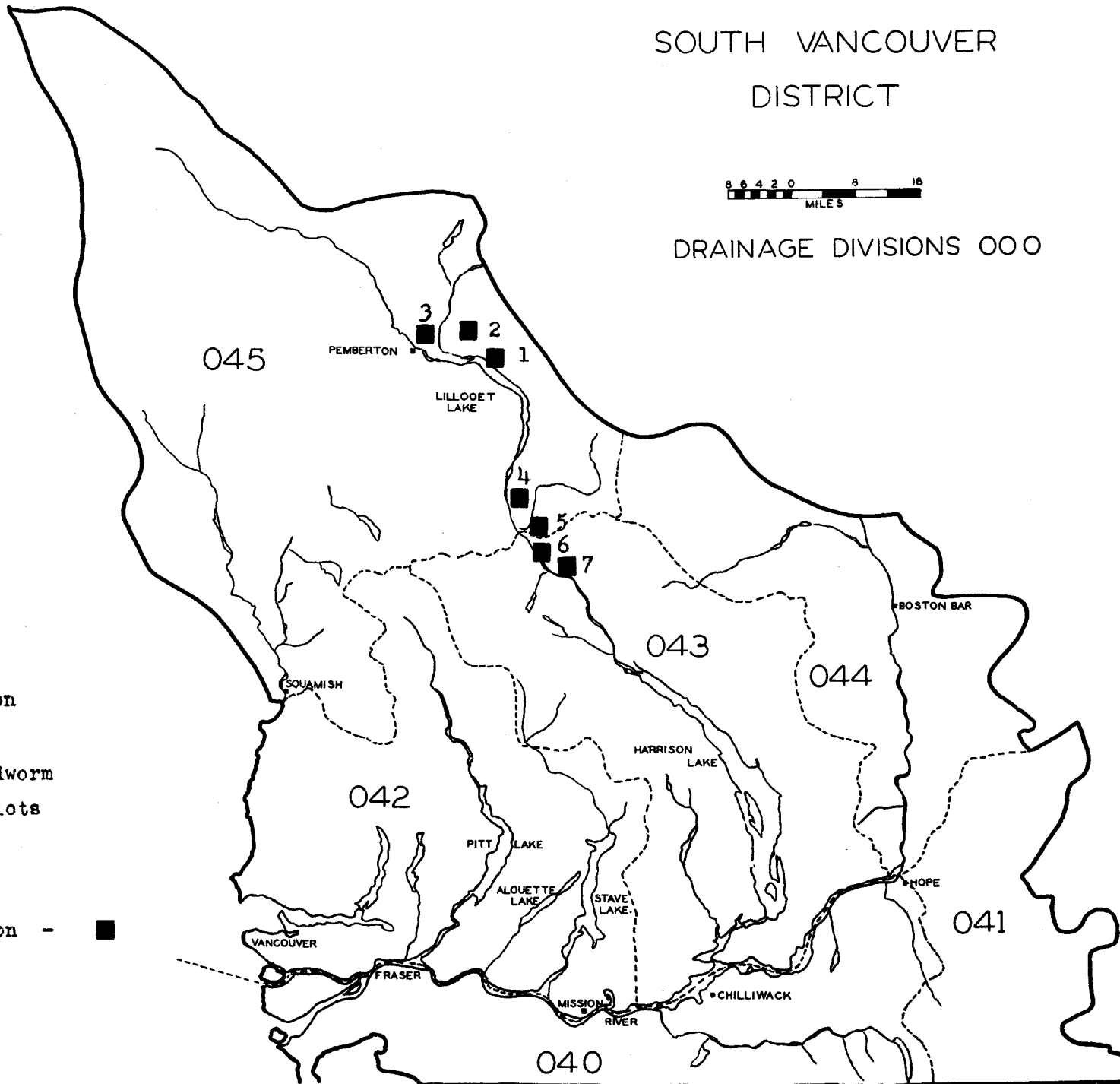
SOUTH VANCOUVER
DISTRICT

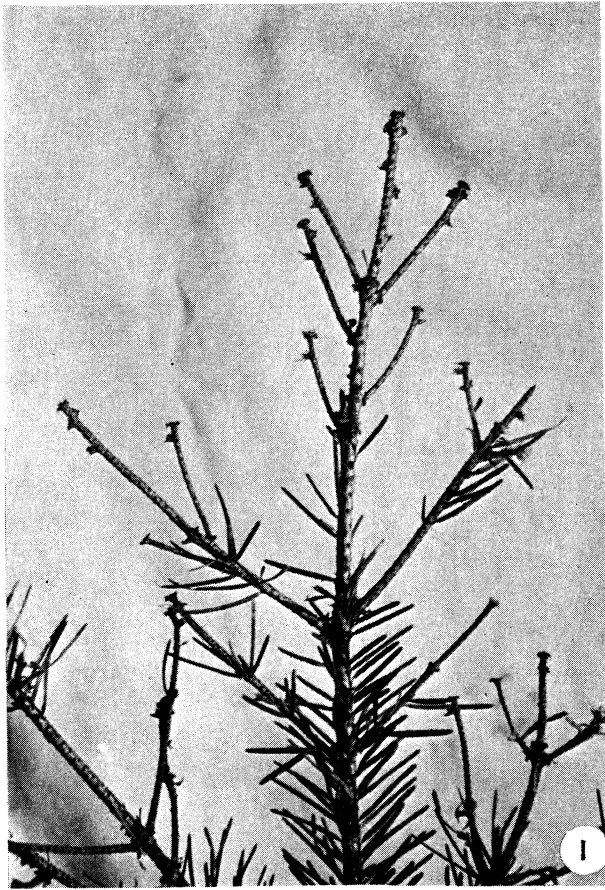


DRAINAGE DIVISIONS 000

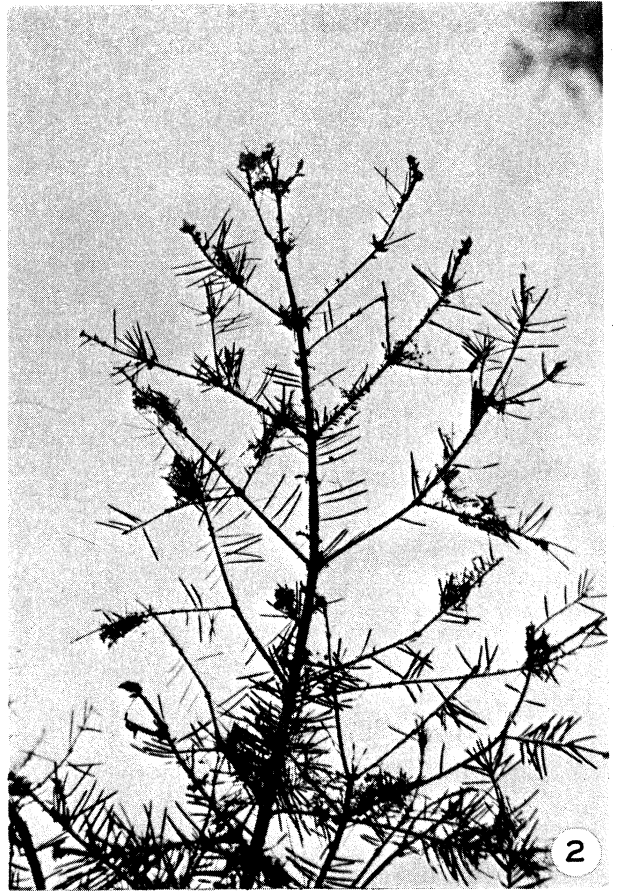
Map 3
Location
of
spruce budworm
study plots
1954

Location - ■





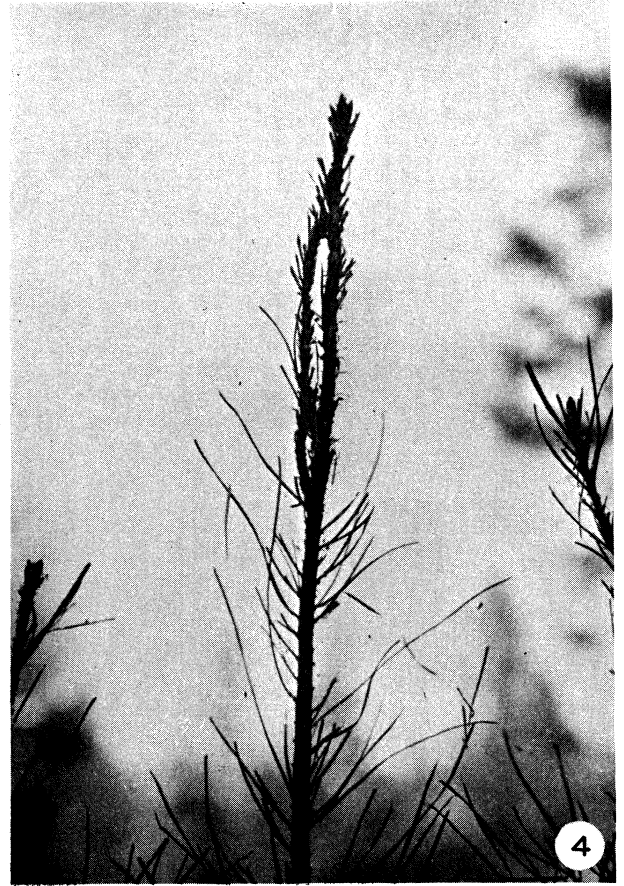
BRANCH, TREE 2-1



BRANCH, TREE 3-2



DEFOLIATION, PLOT 2-1



PINE REGENERATION



FIGURE 5

Defoliation of red alder by the forest tent caterpillar,
as photographed in Plot 1, Columbia Valley.

FOREST BIOLOGY SURVEY

NORTH VANCOUVER DISTRICT

1954

E. G. Harvey

I INTRODUCTION

There were 110 insect collections made in the district, and of these only 43 were by biology rangers. The balance were sent in by British Columbia Forest Service personnel. The survey of the district is dependent mainly on the boat, which spent most of the summer in the Prince Rupert Forest District. Map 1 shows the location of the biology ranger collections.

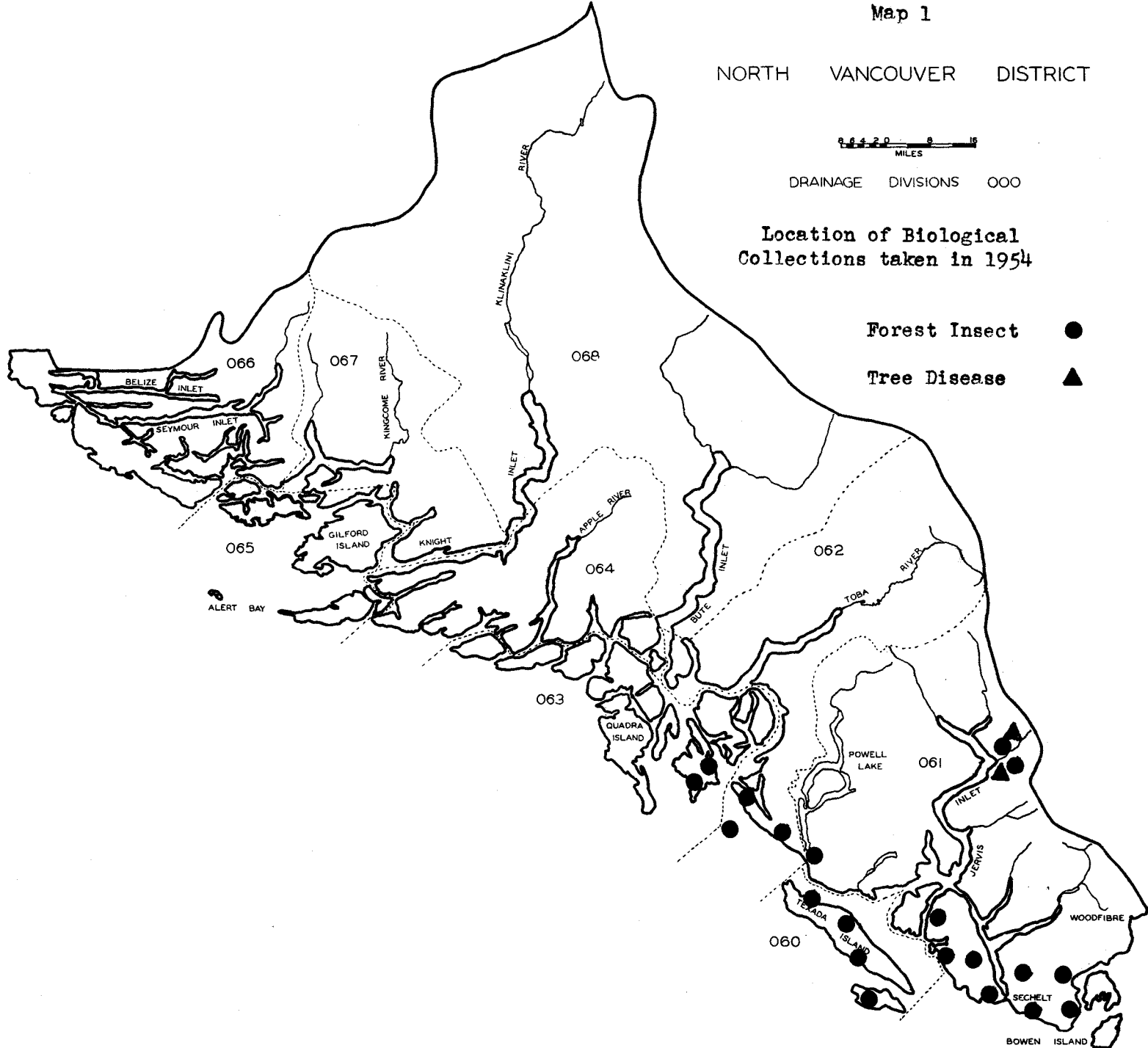
II STATUS OF INSECTS

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

Hemlock looper appeared in only one area, Vancouver River, in 1953. A thorough check of the area in 1954 showed that they had decreased considerably in numbers. An attempt to make a large collection for special rearing produced only 32 larvae from 25 trees. Since the collecting was done in the middle of July and most of the larvae were found to be in their first instar, it is doubtful that many of them would be able to complete their life cycle.

Silver-spotted Tiger Moth, *Halisidota argentata* Pack.

Larvae of this species were found on all the islands and on the coastal mainland bordering on the Straits of Georgia. Webs were visible along the road on Cortes Island, averaging five to the half mile on one side of the road. Farther south they were more numerous in all areas visited. The heaviest infestation was on Savary Island. Here several of the trees along the waterfront contained several colonies per tree. Map 2 shows the distribution of this insect in 1954.



Map 2

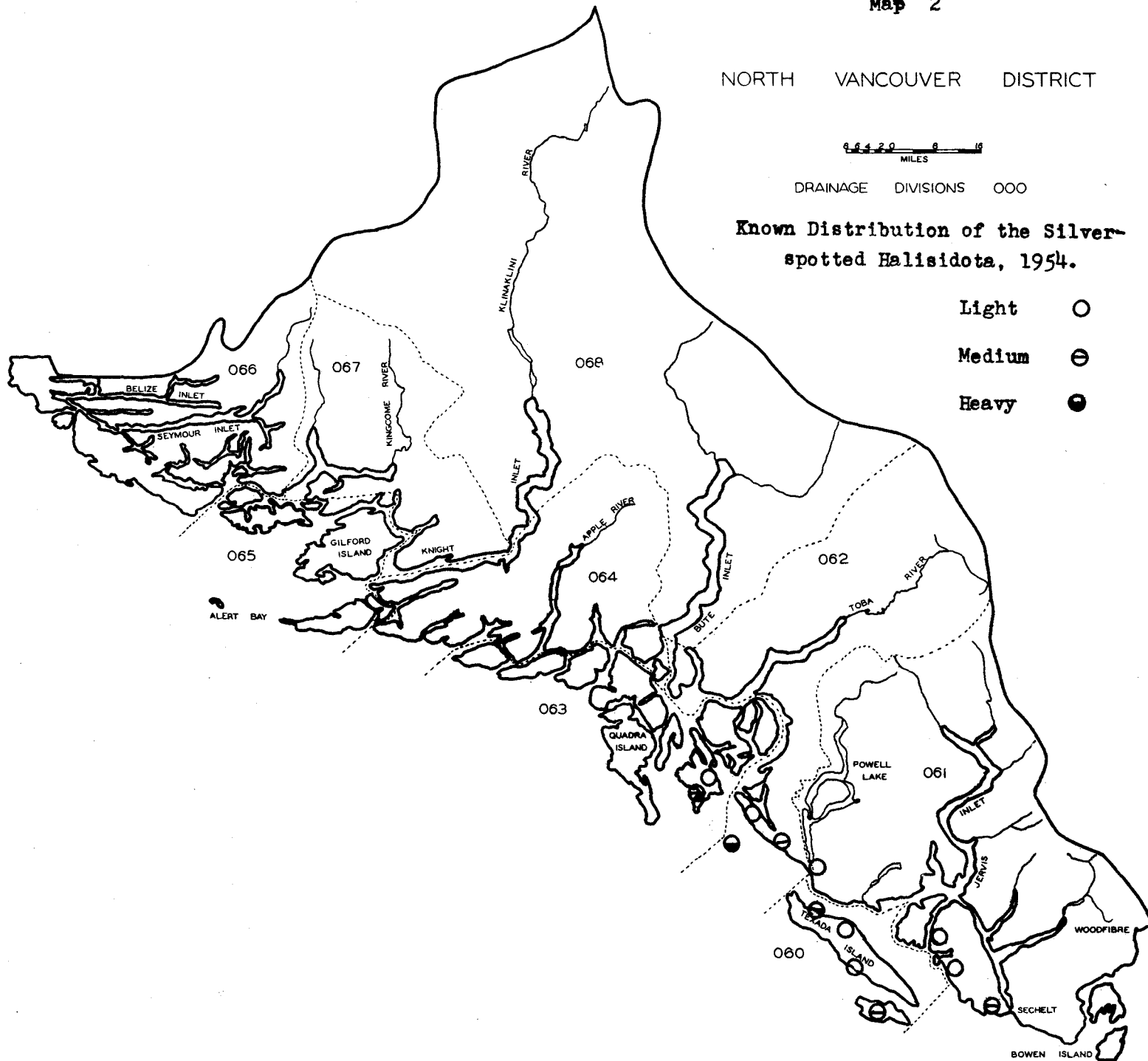
NORTH VANCOUVER DISTRICT



DRAINAGE DIVISIONS 000

Known Distribution of the Silver-spotted *Halisidota*, 1954.

- Light ○
- Medium ⊖
- Heavy ●



FOREST BIOLOGY SURVEY
PRINCE RUPERT FOREST DISTRICT

1954

INTRODUCTION

Survey work commenced in June although insect activity and development was very slow. The black-headed budworm in West Prince Rupert declined somewhat on the mainland but increased on the Queen Charlotte Islands. In South Prince Rupert a heavy population was found from Butedale to Prince Rupert.

The hemlock looper continued its gradual rise in population in West Prince Rupert and showed a noticeable increase in South Prince Rupert in the Bella Coola Valley and South Bentinck Arm. The antique tussock moth was found in numbers from 11 to 80 larvae per sample in a 250 square mile area around Bella Bella.

The 2-year-cycle spruce budworm showed a slight decline in the Burns Lake - Babine Lake area but two new outbreaks were found in the district.

The motor vessel Forest Biologist was used in surveying the South Prince Rupert District and the coastal section of the West Prince Rupert District.

Station maintenance at Lakelse Lake and Babine Lake and the addition of a new wood and tool shed occupied several weeks of the rangers' time in the spring and fall.

FOREST BIOLOGY SURVEY
SOUTH PRINCE RUPERT DISTRICT

1954

I INTRODUCTION

The survey of the South Prince Rupert District and some coastal sections of the West Prince Rupert District was carried out by Rangers D. W. Taylor and K. W. Robertson with the M/V Forest Biologist as a means of transportation.

In May the survey boat was employed for 10 days, surveying in the Gulf Islands and North Vancouver District. The survey of the northern coastal areas started in early June.

One week, June 20-26, was spent with forest pathologists, conducting an intensive insect and disease survey in the Kitimat Arm area prior to the commencement of smelter operations.

In the course of the season's work 230 entomological and 15 pathological samples were collected. After a preliminary survey of the area the decision was made to attempt wide-spread coverage of the whole coastal strip rather than intensive coverage of a few areas. This policy was agreed upon because of the type of terrain encountered and the suspected presence of black-headed budworm throughout the area.

At Prince Rupert, Ranger K. Robertson was replaced by Ranger S. Allen of the West Prince Rupert District. Robertson proceeded inland for survey work while Allen accompanied the boat north to the Alaska border. On completing this northern portion, both rangers returned to their respective areas.

Excellent co-operation was extended to the boat crew by Mr. P. Young, District Forester, Prince Rupert. This situation prevailed wherever British Columbia Forest Service personnel were contacted. Navigation aid and information was given by Captain R. Farmer, British Columbia Forest Service, and free use of their radio channel materially assisted in the safer and more efficient operation of the motor vessel.

The Forest Biologist was used as a base in operating a ten-foot fibre-glass dinghy. The motor vessel logged a total of 302 hours 35 minutes, or a distance of 2,570 miles. The dinghy mileage brought this to a total of 3,820 miles for the survey. The boats performed well, with no more than normal maintenance and troubles.

The distribution of collections by host trees is shown in Tables 1 and 2.

TABLE 1

Distribution of Insect Collections by Host Trees,
South Prince Rupert District, 1954.

Coniferous trees	No. Samples	Deciduous trees	No. Samples
Douglas fir	6	Red alder	3
Western hemlock	80	Black cottonwood	1
Western red cedar	21	Birch	1
Yellow cedar	1		
Sitka spruce	44		
Balsam fir	9		
Lodgepole pine	3		
Total	164		5

TABLE 2

Distribution of Insect Collections by Host Trees,
West Prince Rupert District, 1954

Coniferous trees	No. Samples	Deciduous trees	No. Samples
Western hemlock	34	Red alder	4
Western red cedar	2	Black cottonwood	1
Sitka spruce	15	Mountain ash	1
Balsam fir	3		
Mountain hemlock	1		
Total	55		6

II STATUS OF INSECTS

Black-headed Budworm, Acleris variana (Fern.)

As in 1953, this defoliator remained a serious problem in the West and South Prince Rupert districts. A complete report on the West Prince Rupert area has been covered thoroughly in the report by Ranger S. J. Allen. Sampling was for the most part restricted to stands accessible from the beach. The preferred host was western hemlock with an occasional Sitka spruce or balsam yielding a moderate number of larvae.

Collections containing this species averaged 48 larvae each in the area from Butedale to Prince Rupert. There was, however, no defoliation visible except on close examination, perhaps due to heavy, consistent rains during the summer which washed damaged foliage from the trees. The greatest number of black-headed budworm collected this season, in one sample, was 620 larvae from an island near Prince Rupert harbour. Collecting over the whole area produced 15 collections with over 50 larvae per collection.

A check of insectary records showed larval parasitism to be low, 1.9 per cent of the total number of larvae submitted. Pupal parasitism was nil.

Map 3 shows quantity and distribution of the population.

Spruce Budworm, Choristoneura fumiferana (Glem.)

This budworm was found in only nine samples, eight of which were from the Dean River - Bella Coola area.

Western Hemlock Looper, Lambdina fiscellaria lugubrosa (Hlst.)

Hemlock looper increased in the Bella Coola - South Bentinck Arm region.

Table 3 shows the increase in the number of larvae found in 1954, over the two previous years. A large part of this increase was due to collections taken in the Taleomey River area in South Bentinck Arm. Collections, the first in this valley, accounted for 55 per cent of the larvae found in the area.

Location of sample points are shown on Map 4.

TABLE 3

Comparison of hemlock looper populations by hosts, for the last three years as indicated by beating samples. South Prince Rupert District.

	Hemlock			Spruce			Others			Total		
	1952	1953	1954	1952	1953	1954	1952	1953	1954	1952	1953	1954
Total samples taken	7	19	18	4	7	1	7	11	10	18	37	29
Samples containing larvae	6	4		1	2	0	1	3	2	8	9	14
Number of larvae found	7	7	153	2	2	0	1	3	5	10	12	158

Hemlock Sawfly, Neodiprion spp.

Hemlock sawfly were second in quantity to the black-headed budworm. Thirty-nine samples containing this larva were widely distributed over the South and West Prince Rupert area. With an average of 15.3 larvae per sample, collections commonly contained both hemlock sawfly and black-headed budworm, however, the fluctuations in the budworm population seemed to have no bearing on the hemlock sawfly. A comparison of records does not indicate a serious increase in population.

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

Seventeen collections of this liparid averaged 18.1 larvae. This occurred in only one area of approximately 250 square miles near Bella Bella. There are no previous records of this insect being economically dangerous to timber stands. Table 4 shows the locations where the higher populations were found.

TABLE 4

LOCATION OF TUSSOCK MOTH COLLECTIONS

Location	Host	No. of larvae
Opposite Chatfield Is.	cedar	50
Opposite Chatfield Is.	hemlock	45
Lama Passage (north)	cedar	11
Gunboat Passage	cedar	15
Spiller Channel	hemlock	47
Spiller Channel	cedar	10
Bullock Passage	cedar	80
Bullock Passage	cedar	18

Spruce Sawfly, Pikonema spp.

A total of 47 collections, averaging 5.1 larvae each, was found at widely distributed points throughout the district. Ninety-five per cent of the collections were from spruce.

Green Spruce Looper, Semiothisa granitata (Guen.)

Only two larvae were found this season, on the Bear River delta.

Spruce Tip Moth, Zieraphera sp.

This insect appeared consistently along the coast. The largest collection, 11 larvae, was from Link Lake, north of Ocean Falls.

III STATUS OF TREE DISEASES

A total of 15 tree disease samples were submitted for identification. These were collected from the timber bordering the beaches. During the summer's survey very little evidence of tree diseases was found. Large areas of blow-down were found in a mixed stand of western hemlock, western red cedar, and spruce, but no evidence of insects or tree diseases was discovered.

Table 5 shows distribution of disease organism by host plant.

TABLE 5

HOST PLANT	DISEASE ORGANISM
Salix sp.	Fomes igniarius
Picea sitchensis	Fomes pinicola
Betula sp.	Poria obliqua
Betula sp.	Fomes igniarius
Acer macrophyllum	Fomes igniarius
Betula sp.	Fomes igniarius
Tsuga heterophylla	Fomes pinicola
Picea sitchensis	Fomes pini
Picea sitchensis	Fomes pinicola

Mortality in Western Red Cedar, Thuja plicata Donn.

There are several isolated stands of western red cedar along the coast in a dead or dying condition. Three representative areas, Gunboat Pass, Rattenbury Point (Dean Channel) and Stone Point (Rivers Inlet) were examined. There was no evidence of insect damage and samples forwarded to Victoria had no evidence of tree diseases. Similar stands have been noted before but no causal agency has been identified. The condition has therefore been termed a "physiological disease".

FOREST BIOLOGY SURVEY
WEST PRINCE RUPERT DISTRICT

1954

S. J. Allen

I INTRODUCTION

A total of 345 insect and 14 tree disease samples were collected throughout the district in 1954. This report presents the more important insect conditions as they appear to the writer. Due to logging, inaccessibility, inconsistency of timber, lack of suitable sample trees and an over abundance of sampling stations in some small areas, twenty-six permanent sample stations have been cancelled. In conducting the survey, a total of 9,800 miles was travelled by motor vehicle and 550 miles by boat (M/V Forest Biologist and dinghy).

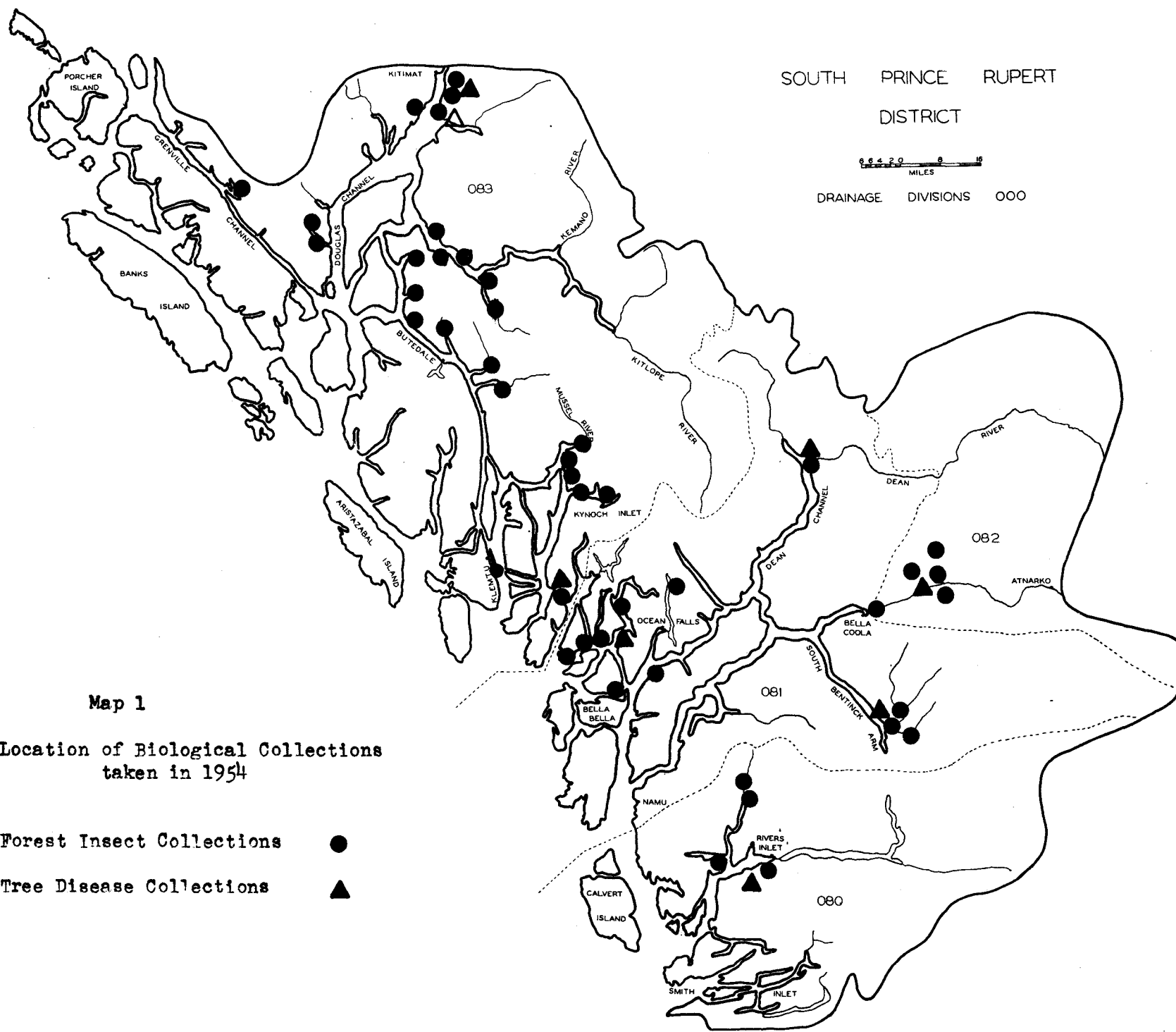
During the season 24 co-operators were contacted of which 16 were British Columbia Forest Service personnel.

The distribution of collections by host species is shown in Table 1.

TABLE 1.

Collections by host species,
West Prince Rupert District, 1954.

Coniferous		Deciduous	
Host	No. Sampled	Host	No. Sampled
Western hemlock	149	Red alder	12
Sitka spruce	58	White birch	5
Western red cedar	51	Aspen	3
Amabilis fir	28	Black cottonwood	3
Alpine fir	10	Willow	2
Mountain hemlock	6	Maple	1
Lodgepole pine	6	Apple	2
White spruce	8	Mountain ash	1
	316		29
Total 345			



Map 1

Location of Biological Collections
taken in 1954

Forest Insect Collections ●

Tree Disease Collections ▲

Air Travel

Three flights were undertaken with Pacific Western Airlines through the courtesy of the British Columbia Forest Service. Four hours of flying were used on aerial reconnaissance for black-headed budworm or other insect damage and on a dead timber examination.

1. On June 17, the Terrace - Kitimat flight was made to check on forest foliage conditions prior to commencement of smelter operations. No insect damage was observed in the over-mature stand surveyed.

2. On July 29 a flight was made over the Skeena River valley west of Terrace, the Prince Rupert coastal sector, the Nass River valley and the Tseax - Kitsumkalum River valley to detect any black-headed budworm defoliation and to take a ground sample for insects at Lava Lake.

3. On September 30 a flight was made to examine a dead area of timber ten miles north-east of Dragon Lake. The area formed approximately 20 acres in a hemlock - cedar stand in a wide flat valley near the Kiteen River. No ground check could be made at this time but the trees appear to have been dead for several years. The branches and twiglets are still intact.

II STATUS OF INSECTS

Black-headed Budworm, Acleris variana (Fern.)

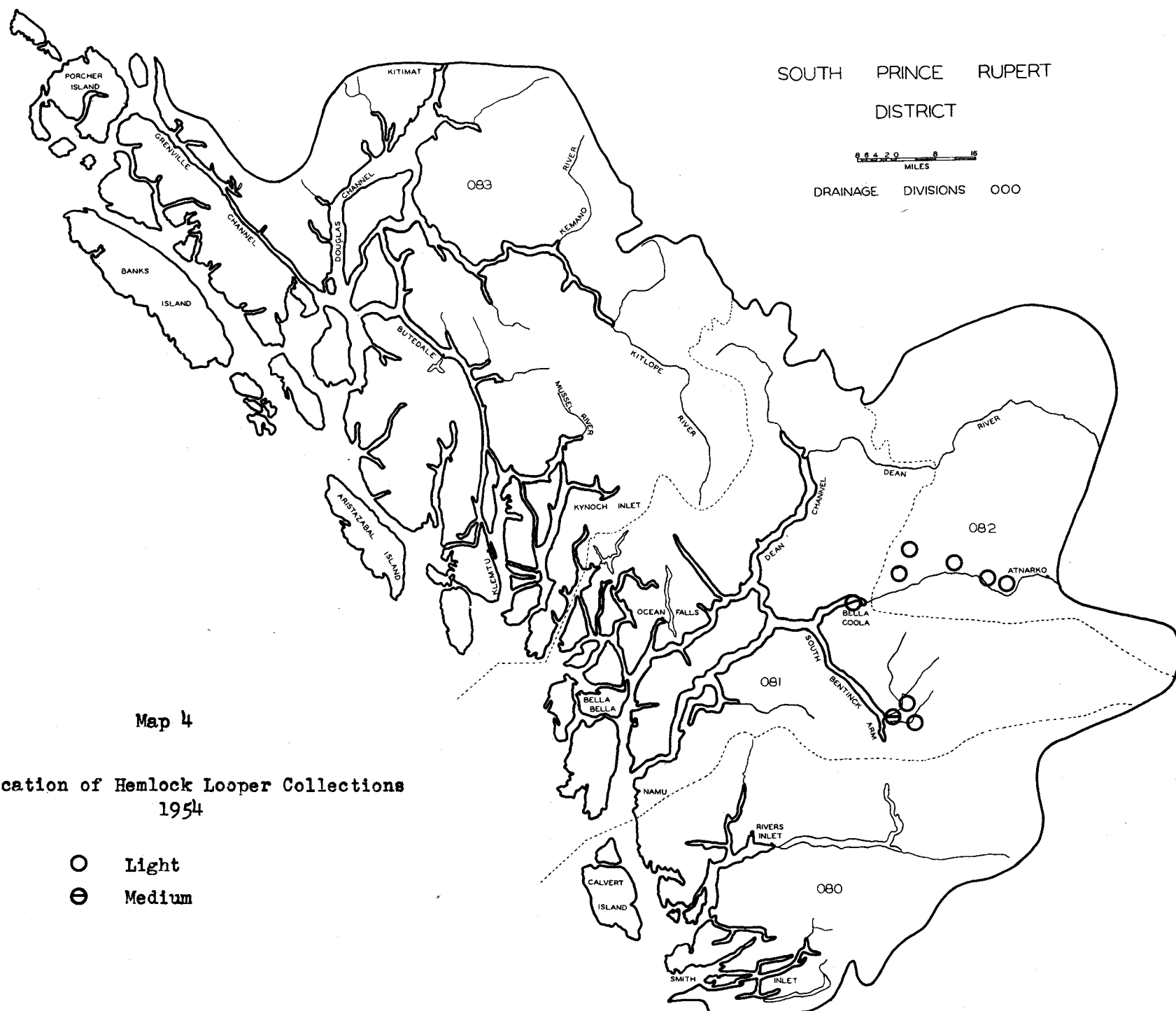
The infestation from Nass Harbour to Stewart and Alice Arm collapsed in 1954. Only six larvae were found in twenty-eight samples. Four of these larvae were parasitized.

Populations showed a slight decrease elsewhere throughout the mainland portion of the district during the early larval period. Areas of heavy population were found, as in 1953, in the Prince Rupert coastal area from Khutzeymateen Inlet to the Ecstall River, in the Skeena River valley from Terrace to Cedarvale and in the Kitsumkalum River valley (Map 3). A medium population from Kitimat River to Terrace showed a definite rise over 1953 although defoliation was hardly noticeable. A comparison of average sampling results from 1952 to 1954 is shown in Table 2. On the Queen Charlotte Islands the average number of larvae was double that of 1953. Heavy populations were found near Massett, from Alliford Bay to Skidegate Lake and an area of heavy defoliation was reported at Tasu Harbour (Map 4). Western hemlock was the preferred host while Sitka spruce was the secondary host.

TABLE 2.

Table Showing the Average Number of Black-headed Budworm Larvae per Beating Sample for 1952 - 1954. West Prince Rupert District.

Location	No. Samples	Hosts	1952	1953	1954
Prince Rupert Area	4	H, Hm	92	144	78
Kitsumkalum Valley	6	H	5	132	111
Copper River - Cedarvale	7	H	15	55	33
Shames - Kitimat River	10	H	5	14	45
Graham Island (Q.C.I.)	4	H	47	143	218
Moresby Island (Q.C.I.)	4	H	47	143	301



SOUTH PRINCE RUPERT
DISTRICT



DRAINAGE DIVISIONS 000

Map 4

Location of Hemlock Looper Collections
1954

- Light
- ⊖ Medium

Throughout the mainland and Queen Charlotte Island, larval development was retarded by cold weather and parasitism so only a small percentage of the early instar larvae developed to the pupal and adult stages.

During an aerial survey on July 29, a ground sample taken at Lava Lake indicated a medium black-headed budworm population in that area. A small amount of top defoliation was seen from the air at Tuck Inlet, Work Channel, Steamer Passage and near the mouth of Tseax River, but most of it was 1953 defoliation. A small amount of tree mortality and some top kill resulted from 1952 and 1953 defoliation at White Point on Portland Canal.

Egg counts from western hemlock indicated a further decrease in population for 1955.

A series of collection points in the infestation areas were sampled twice during the season. The first samples were taken in mid-July, and the second in early August. The decrease in larval population, based on these samples, was 82 per cent (Table 3). Seventy-seven dead and dying larvae were submitted for diagnosis but no disease was found. Larval development was greatly retarded. When the larvae should have been in the late instars or close to pupation they were still small and yellow in color rather than the characteristic green. It is therefore believed that adverse weather conditions resulted in slow development with eventual starvation. The fact that defoliation was negligible in areas of high early instar populations shows that little feeding was done.

TABLE 3

Table of Sampling Results July and August Showing the Drop in Larval Population, West Prince Rupert District, 1954.

Location	Host	July Sample	August Sample
Kaien Island	H	66	14
Tyee	H	50	2
Shames	H	36	27
5 mi. E/Shames	H	108	62
Zimagotitz	H	55	8
Kalum Road mi. 2	H	92	12
Kalum Park	H	21	8
Lean-to Creek	H	153	13
Deep Creek	H	92	15
W side/Kalum Lake	H	225	26
Rene Road	H	151	58
Scully Creek	H	50	3
Copper River	H	80	2
Sanderson Creek	H	29	3
2 mi. S/Cedarvale	H	63	14
	Total	<u>1,271</u>	<u>267</u>
	Average	85	14

(Average decrease of 84 per cent)

Parasites

On the mainland the period of pupation between August 21 and September 1 was used to sample permanent sample stations for parasitism purposes. Late instar larvae and pupae were collected and submitted. The per cent parasitism is shown in Table 4.

TABLE 4
Parasitism in Black-headed Budworm,
West Prince Rupert District, 1954

Drainage Division	Area	No. of Samples	Insects Received by Laboratory	Number Parasitized	Per cent Parasitism
100	Moresby Island	18	202	35	17
101	Graham Island	12	225	51	23
103	Prince Rupert area	21	370	95	26
104	Kalum - Lakelse	31	286	106	37
105	Copper River - Skeena Crossing	12	84	14	17

Egg Counts

Egg counts were made from September 17 to October 1 and showed a pronounced decrease in the population potential compared to the previous year. An average of one egg per hundred inches of twig was found on the mainland and six eggs per hundred inches of twig on the Queen Charlotte Islands in 1954 compared to 26 and 24 eggs respectively in 1953. Table 5 shows the average number of eggs and larvae found in each area as compared to 1953.

TABLE 5

Average number of larvae per 3-tree beating sample and number of eggs per 100 inches of twig in areas sampled. West Prince Rupert District.

Drainage Division	Location	1953		1954	
		Larvae	Eggs	Larvae	Eggs
100	Moresby Island	243	6.5	341	4
101	Graham Island	106	7	192	4
103	Prince Rupert area	157	1.5	91	0.3
104	Kalum River	77	4.5	99	0.5

The number of eggs indicates a lower population, but with the absence of disease in the budworm and with ideal weather conditions in 1955, a heavy population could recur in some areas on the Queen Charlotte Islands and possibly the mainland.

Population Trends

Table 6 is taken from the 1953 ranger report so that predictions can be easily compared with the actual populations found in 1954.

TABLE 6

Estimated Population Trends of the Black-headed Budworm in the West Prince Rupert District

Area	Condition of 1953 Infestation			Egg Population	Trend
	Defoliation	Population	Parasitism		
Portland Canal - Observatory Inlet	medium with severe spots	very heavy	heavy	light	decrease
Prince Rupert	light to medium	heavy	heavy	light	decrease
Kalum Lake	very light	medium to heavy	light	heavy	increase
Sanderson Creek	unnoticeable	medium	very light	heavy	increase
Queen Charlotte Islands	unnoticeable	medium	light	heavy	increase

In the Prince Rupert and Portland Canal - Observatory Inlet infestations in 1953, larvae were heavily parasitized and eggs were scarce, thus the population subsided as predicted in 1954, especially in the northern sector adjacent to Alaska. Around Kitsumgallum Lake and north-east of Terrace, a slight increase in population was found where a heavy population was forecast. The increase in population expected in the Queen Charlotte Islands for 1954 was correct, although defoliation was very light except at Massett and Tasu Harbour.

TABLE 7.

Estimated Population Trend of the Black-headed Budworm for West Prince Rupert District in 1955.

Area	Condition of 1954 Infestation					Trend
	Larval July Sample	Population Aug. Sample	Per cent Decline	Parasitism	Egg Population	
Portland Canal Observatory In.	-	light	-	heavy	-	unknown
Prince Rupert	heavy	light	86	medium	very light	decrease
Kalum Lake	heavy	light	77.5	medium	very light	decrease
Sanderson Cr.	medium	light	81.5	medium	-	unknown
Graham Island	very heavy	-	-	medium	medium	static
Moresby Island	very heavy	-	-	medium	medium	static

The Hemlock Looper, Lambdina fiscellaria lugubrosa (Hlst.)

The hemlock looper showed a considerable increase over 1953 and larvae were found concentrated from Kitsumkalum Lake to Lakelse Lake and from Shames to Cedarvale (Map 5). The average count per sample tripled that of 1953. No defoliation was noticeable. The highest larval counts occurred at Scully Creek where three samples

from western hemlock averaged fifty larvae per collection. Other high counts were obtained at Legate Creek, Sanderson Creek, Chindemash Creek, Williams Creek, and Kitsumkalum Park.

Of a total of 465 larvae submitted in 1954 only nine were parasitized and two were diseased, so a further increase in population seems imminent in 1955. Sampling results, 1952 to 1954, are shown in Table 9.

Few 1954 eggs were found at Scully Creek during egg sampling but a considerable number of 1953 eggs were present (Table 8). One hemlock sample produced thirty-eight new eggs fifty feet from the tree base and one at forty feet, while the remaining three trees contained no eggs. The one group of eggs on tree number 3 suggests that a medium to heavy, unevenly distributed, egg population could be present.

TABLE 8

Table of Hemlock Looper Egg Counts Taken at Scully Creek
August 29 and October 3, 1954.

Host	Date	Base	10'	20'	30'	40'	50'	60'	70'	80'	90'
1	H	August 29	0	0	0	0	0	0	0	0	0
2	H	August 29	0	0	0	0	0	0	0	0	1 ^e
3	H	August 29	0	0	0	1f	38f	0	-	-	-
4	H	October 3	1 ^e	4 ^e	13 ^e	0	0	0	-	-	-

e - eggshell, 1953 eggs

f - fertile 1954 eggs

TABLE 9

Hemlock Looper Sampling Results from 1952 to 1954 Showing the Increase in Population, West Prince Rupert District.

Location	Host	Number of Larvae per Collection		
		1952	1953	1954
3 mi. W/Skeena Crossing	H	-	4	4
	Ba	-	10	2
	C	-	0	2
9 mi. S/Skeena Crossing	C	-	-	2
	Ba	1	2	2
Kitwanga	Sw	0	0	2
	Ba	0	3	4
Legate Creek	H	0	2	3
Legate Creek	C	0	2	18
Sanderson Creek	H	0	0	22
Chindemash Creek	H	1	1	4
Copper River	C	0	1	3
Usk	H	0	1	3
Lakelse	H	1	0	4
Granite Creek	H	0	-	4
Remo	H	0	1	2
Williams Creek	S	3	15	15
Williams Creek	H	0	3	10
Williams Creek	C	4	3	8
W. side Kalum Lake	C	0	4	3
Maroon Creek	Ba	-	4	3
Shames River	H	0	0	3
Salvus	H	1	8	6
W. Kalum Bl.	H	0	0	4
Exchamsiks River	H	0	0	30
Scully Creek	H	2	13	52,38,60
	C	4	6	10
Kalum Park	H	0	6	9
	C	0	4	2
Zimacord River	H	0	2	11
Kitimat River	H	0	4	1
TOTAL		17	99	346
Average		0.7	3.4	10.5

The Spruce Budworm, Choristoneura fumiferana (Clem.)

Although the number remained low, there was a small increase over the 1953 population, Table 10. Thirty-four larvae were found in 1954 compared with only eight in 1953 and eleven in 1952. Twenty-four of these Tortricidae were found from Shames River to Kitsumkalum Lake, six from the east side of Lakelse Lake and three between Terrace and Skeena Crossing. The hosts in order of preference were (1) amabilis fir, (2) alpine fir, (3) Sitka spruce, and (4) western hemlock. On the Queen Charlotte Islands, four larvae were found in 1952, one in 1953 and none in 1954. Collection points are shown on Map 6.

TABLE 10

The Average Number of Spruce Budworm Collected from 1952 to 1954.

Year	No. of Collections Containing Larvae	No. of Larvae	Average
1952	10	11	1.1
1953	8	8	1.0
1954	19	34	1.8

The Hemlock Sawflies, Neodiprion tsugae Midd. and Neodiprion abietis Harr.

The population increased noticeably this year in the Portland Canal region. Elsewhere throughout the mainland the population remained unchanged. The highest number found, 171, was at Belle Bay. Thirty-eight larvae were taken in one sample at Fords Cove. The sample stations at Cedarvale and Chindemash Creek produced thirteen and twenty-two larvae respectively. Collection points are shown on Map 7.

On the Queen Charlotte Islands the population decreased for the second straight year.

The Antique Tussock Moth, Notolophus antiqua badius Hy. Ed.

Six larvae were found during the 1954 season, two at the south end of Lakelse Lake, two in the Bear River valley near Stewart and two between Terrace and Skeena Crossing. This is a decrease from 1953 when twenty-three larvae were found in nineteen samples.

The Striped Alder Sawfly, Hemichroa crocea (Fourc.)

The alder sawfly population on the Queen Charlotte Islands had almost disappeared in 1954. No defoliation was observed and only an occasional group of larvae was found feeding on a single leaf.

At Seal Cove, near Prince Rupert, alder reproduction was ninety per cent defoliated on the south side of the air base. A few larvae were found in the Hastings Arm area.

The Green Striped Forest Looper, Melanolophia imitata (Wlk.)

A low evenly distributed population was present again this year in the Kitsumkalum River valley. Throughout the district, a total of forty-two larvae was found in twenty-three samples, a decrease from 1953.

The Spruce Sawflies, Pikonema alaskensis (Roh.) and Pikonema dimmockii (Cress.)

In 1954, sixteen samples averaged 3.3 larvae as compared with an average of 2.4 larvae from twenty-six samples in 1953. Twenty larvae were collected in one Sitka spruce sample near Port Essington.

A Spruce Tip Moth, Zeiraphera diniana Gn.

Only twenty-four larvae were collected. Fifty-two larvae were taken in 1953 and 103 in 1952. The tip moth population has declined noticeably since 1952.

The Forest Tent Caterpillar, Malacosoma pluviale (Dyar.)

Larvae of the forest tent caterpillar defoliated shore willow on the banks of the Kasiks River in 1953. In 1954 they spread to the tall black cottonwoods on the islands adjacent to Kasiks River mouth on the Skeena River between Silma Island and Salvus. Defoliation amounted to fifty per cent. The top half of the cottonwoods on some islands was stripped.

Aspen Leaf Miner, Phyllocnistis populiella Cham.

WPR 1954

Damage by this leaf miner was recorded from Shames to Skeena Crossing. A light attack was prevalent around Terrace and a heavy attack was seen from Oliver Creek to Skeena Crossing and in the Kitwanga and Kitseguecla valleys. These attacks have been observed since 1952.

The Green Spruce Leoper, Semiothisa granitata Guen.

During 1954, thirty-nine samples averaging 5.1 larvae per sample were found throughout the mainland portion of the district. This is a slight increase over the 3.2 average per sample found in 1953. The largest collection, 39 larvae, was found at Onion Lake.

A steady population increase has been apparent since 1952.

III STATUS OF TREE DISEASES

The tree disease survey, as in 1953, was wholly dependent on insect sample points. One species, Fomes igniarius (L.) Gill., was not checked thoroughly on the Queen Charlotte Islands as the ranger was unable to visit any of the principal red alder stands.

Fomes pini (Thore) Lloyd was found in 1953 on the Lakelse Lake to Kitsumgallum Lake plateaux on western hemlock and amabilis fir. This fungus was also found in the dry site hemlock stands of St. Croix Creek and Chindemash Creek where a much scrubrier stand existed.

Fungi imperfecti occurred on leaves of vaccinium species at Granite Creek, Salvus, Kwinitza, and in the Khyex River valley.

Fomes igniarius - Conks of this fungus were found on red alder from Lakelse Lake to Kitimat River and at Kleanza Creek. Generally, samples were very scarce in the alder stands of the West Prince Rupert area.

Wind Damage - On the east coast of the Queen Charlotte Islands, a condition of broken, dead and dying new growth was evident on all tree species on the fringe of the shoreline and slightly inland in some areas. South-easterly gales which occurred in early July, and which are uncommon for the time of year, were the probable cause of the damage as samples of the dead tips showed no apparent signs of disease or fungus in the pathology laboratory.

Map 1
 WEST PRINCE RUPERT
 DISTRICT (MAINLAND)

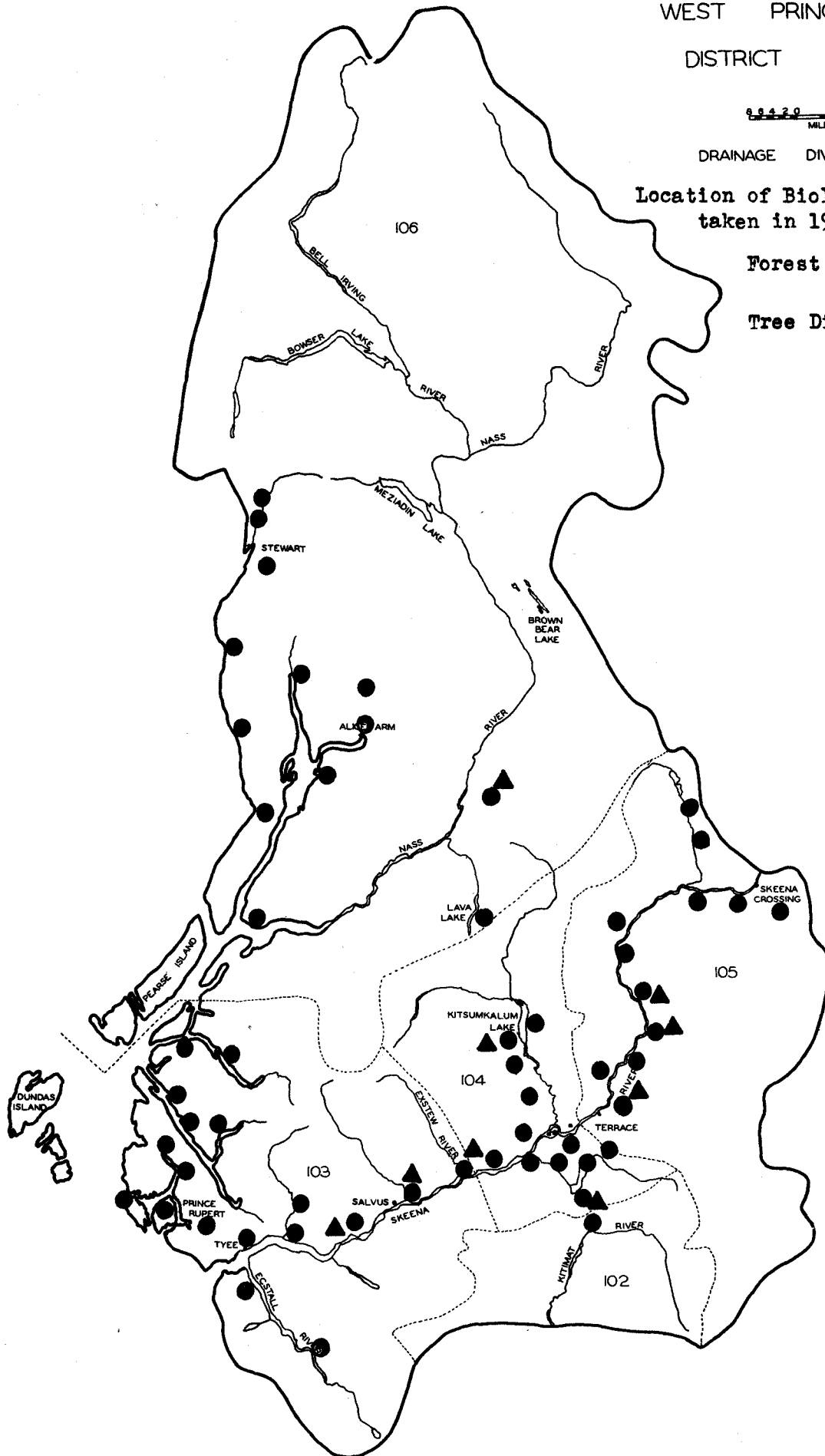


DRAINAGE DIVISIONS 000

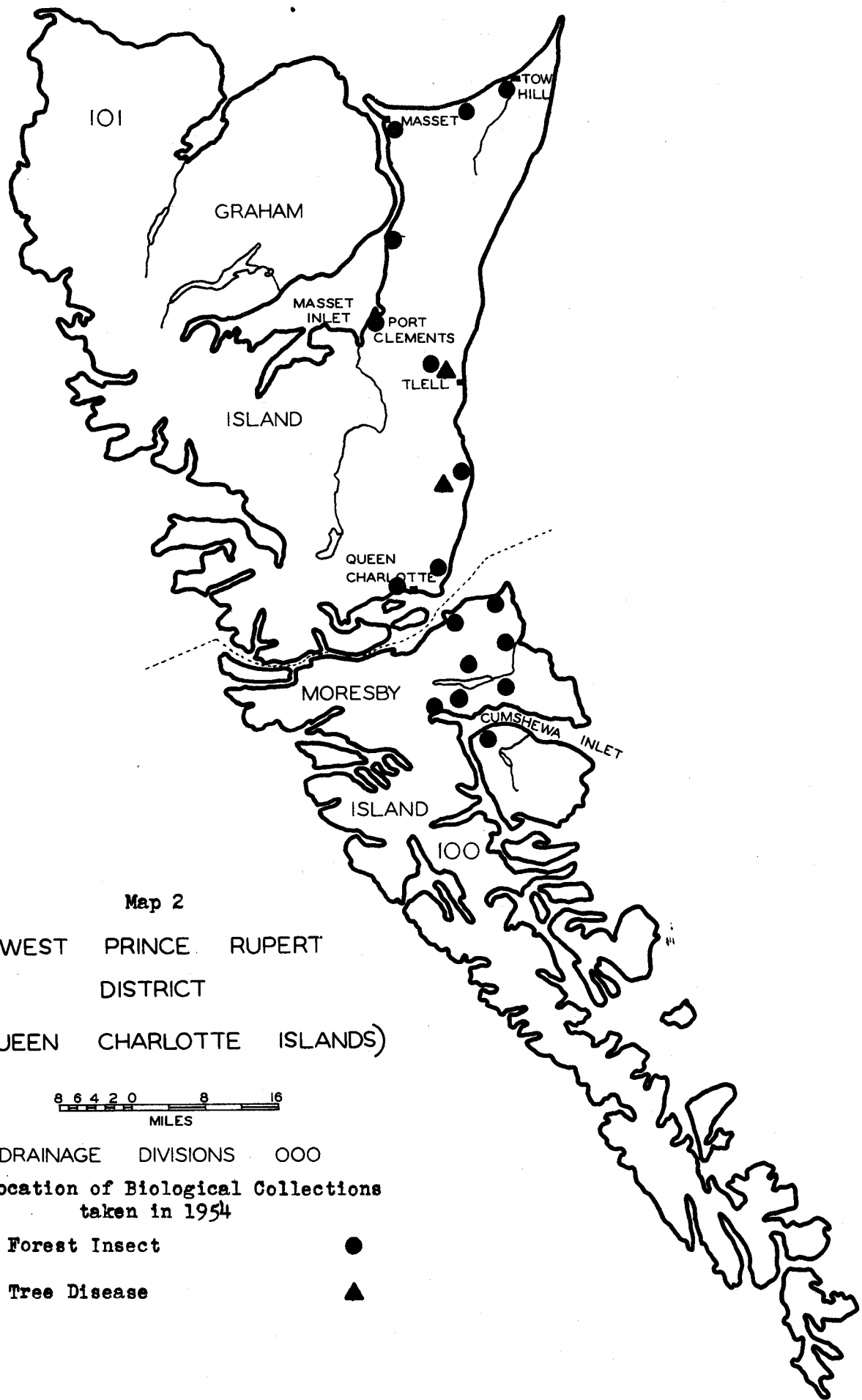
Location of Biological Collections
 taken in 1954

Forest Insect ●

Tree Disease ▲



WEST PRINCE RUPERT DISTRICT



Map 2
 WEST PRINCE RUPERT
 DISTRICT
 (QUEEN CHARLOTTE ISLANDS)



DRAINAGE DIVISIONS OOO
 Location of Biological Collections
 taken in 1954

- Forest Insect ●
- Tree Disease ▲

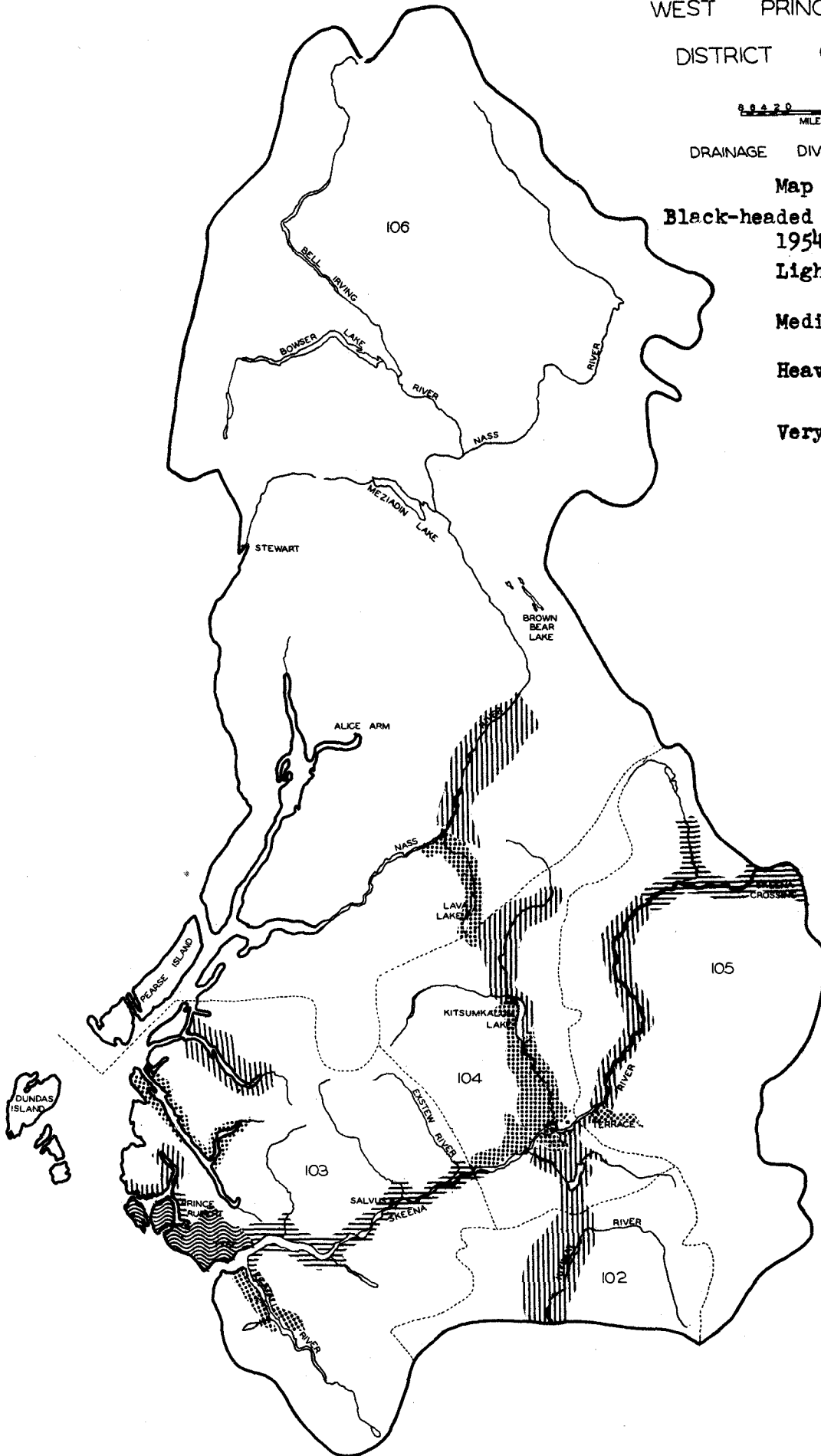
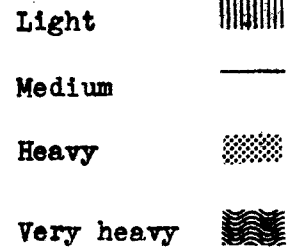
WEST PRINCE RUPERT
DISTRICT (MAINLAND)

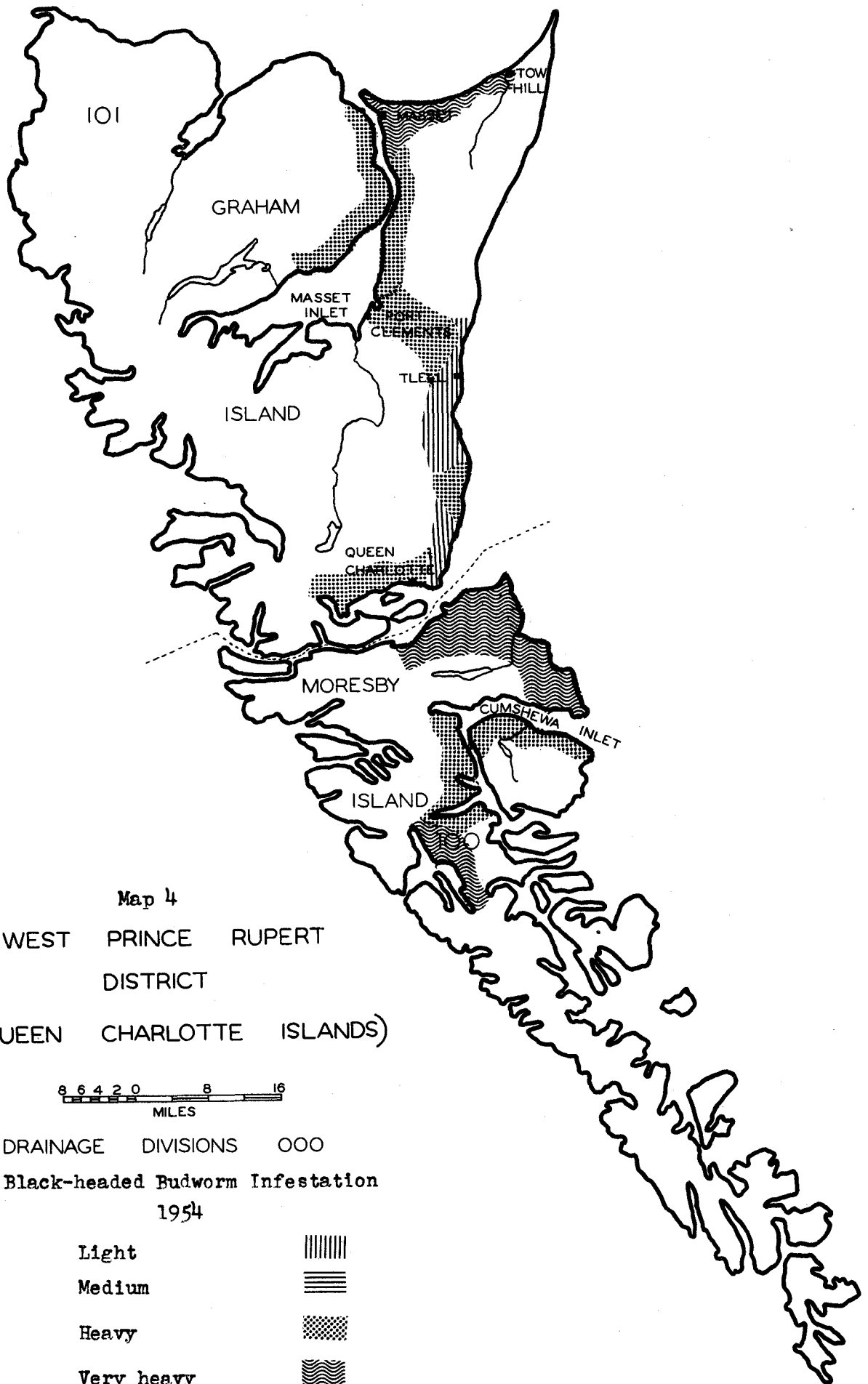


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Map 3

Black-headed Budworm Infestation
1954





Map 5
 WEST PRINCE RUPERT
 DISTRICT (MAINLAND)



DRAINAGE DIVISIONS 000

Hemlock Looper Populations

1954

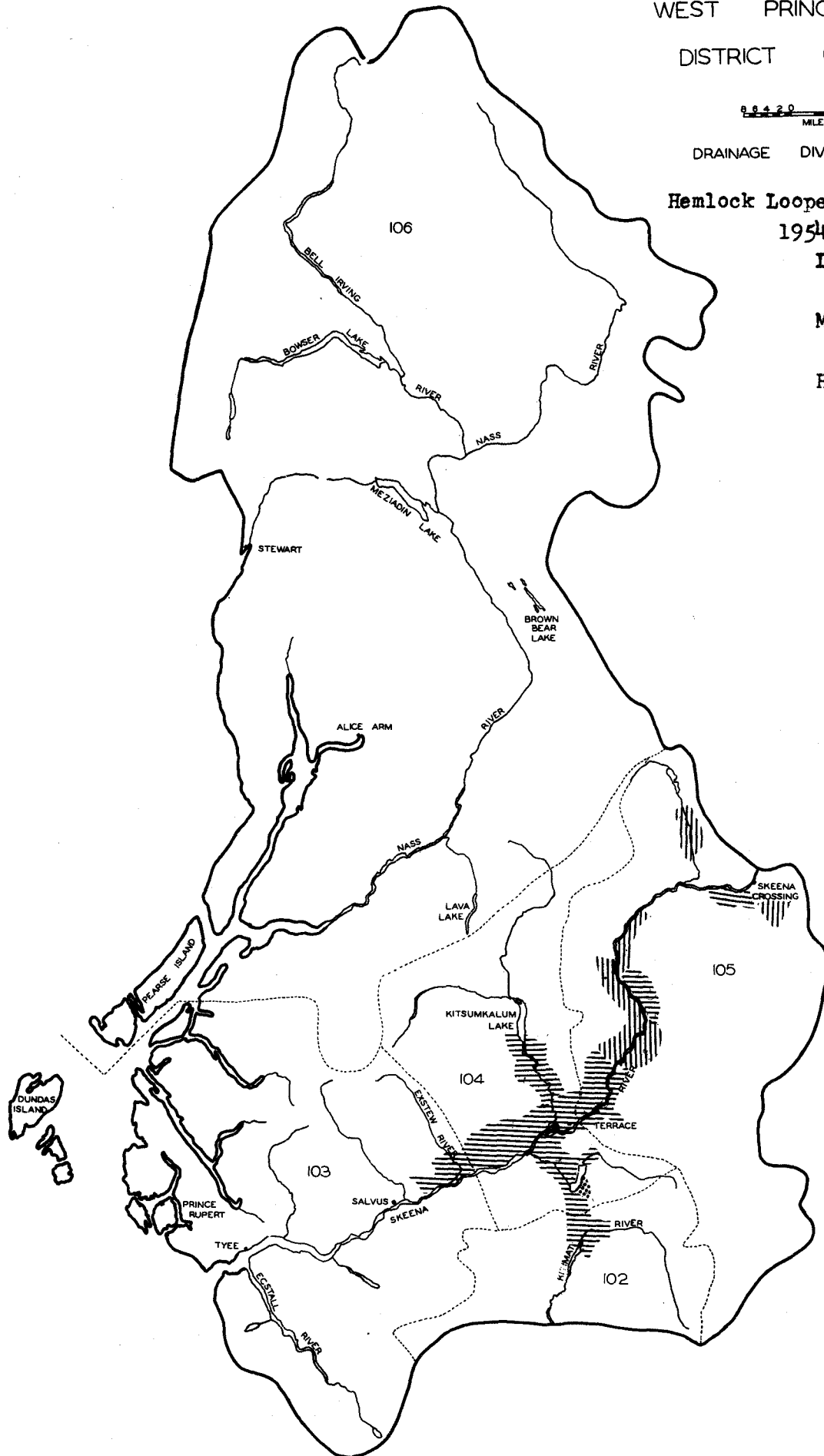
Light



Medium



Heavy



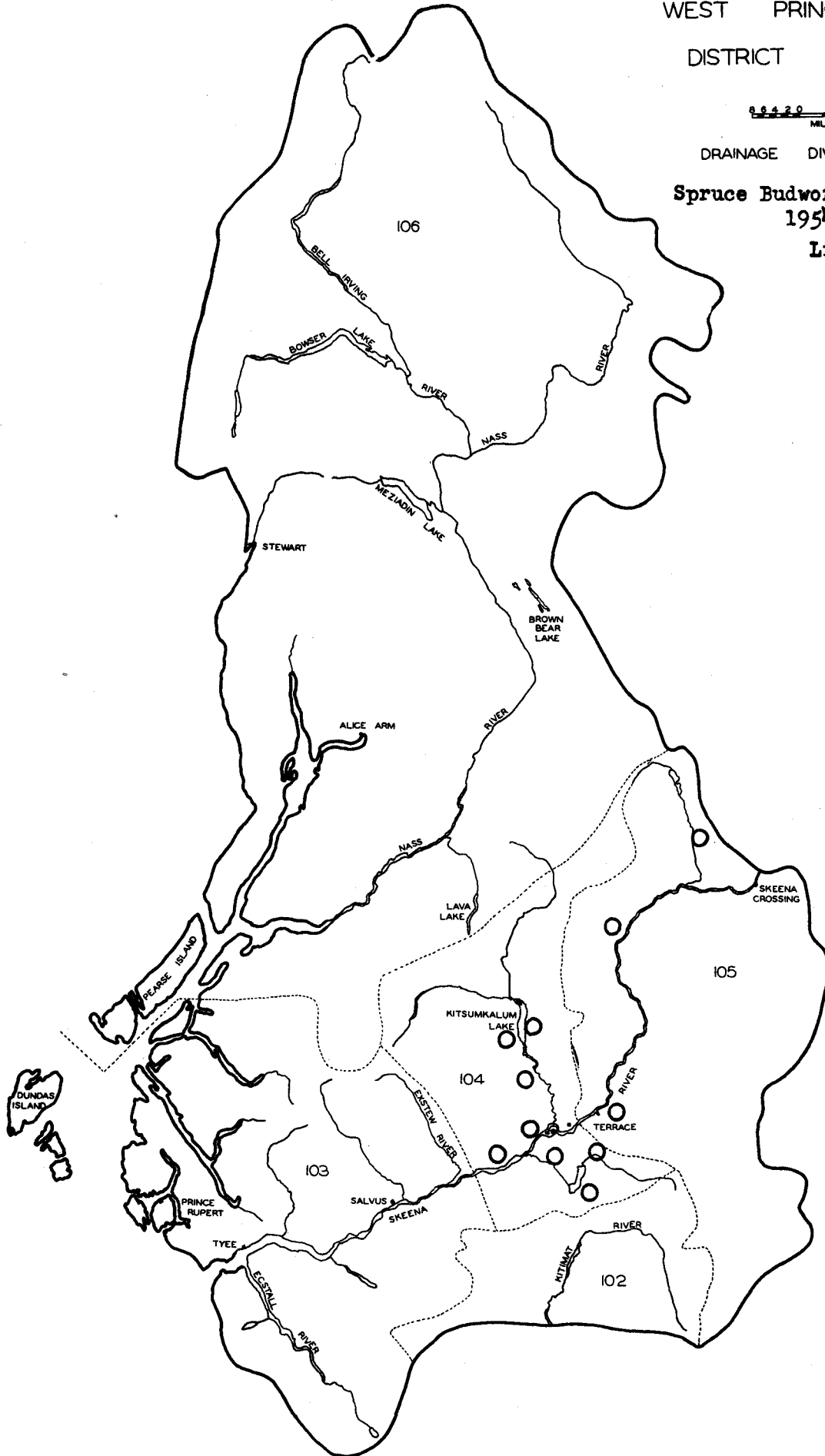
Map 6
WEST PRINCE RUPERT
DISTRICT (MAINLAND)



DRAINAGE DIVISIONS 000

Spruce Budworm Population
1954

Light ○



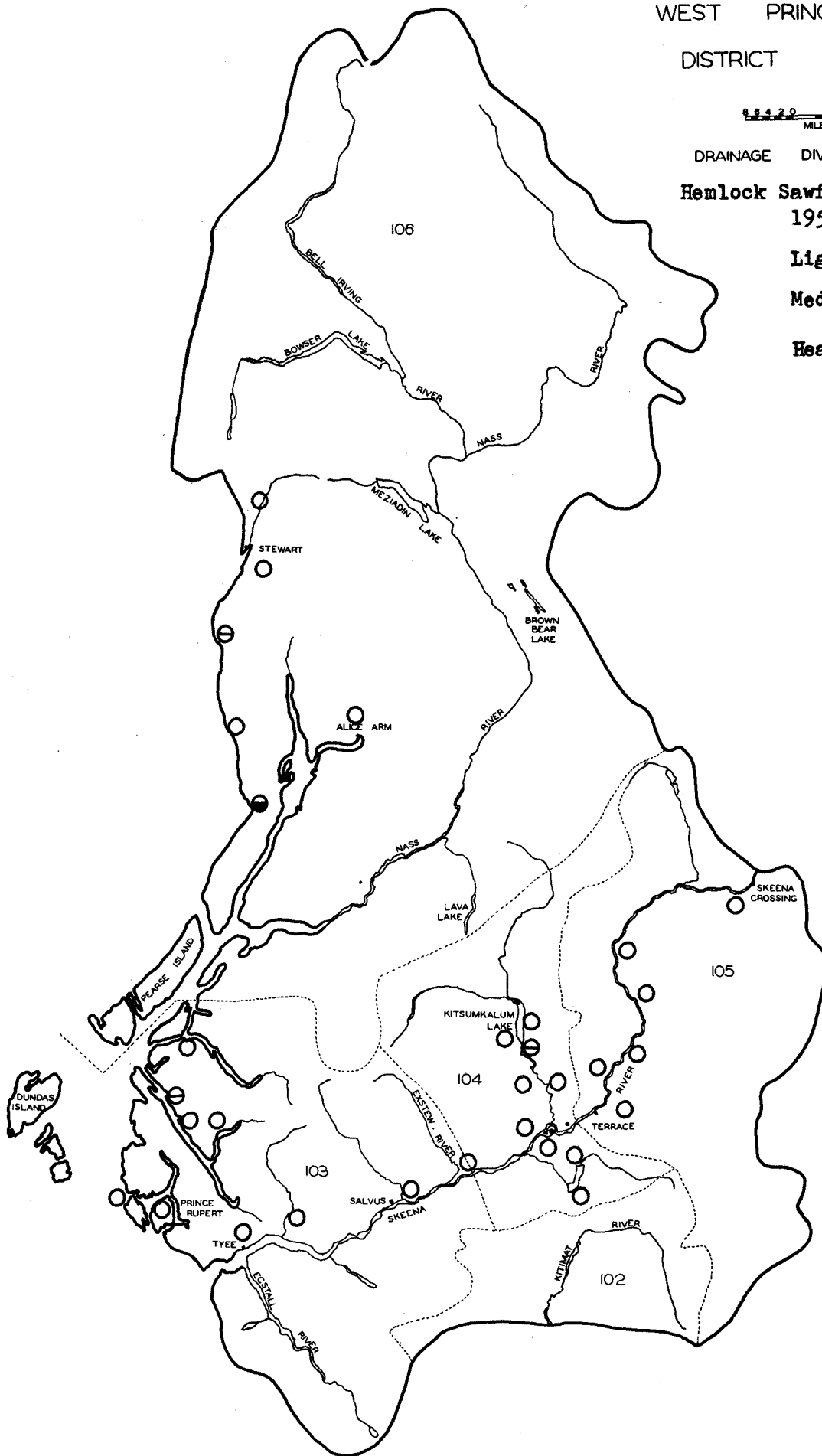
Map 7
 WEST PRINCE RUPERT
 DISTRICT (MAINLAND)



DRAINAGE DIVISIONS 000

Hemlock Sawfly Population
 1954

- Light ○
- Medium ⊖
- Heavy ●





Dead Timber 10 miles NE of Dragon Lake, Nass River Valley. September 30, 1954.



Black-headed budworm tip defoliation on young western hemlock, Copper Bay
Queen Charlotte Islands. September 21, 1954.



Wind damage on young Sitka spruce, east coast of
Graham Island near Lawn Point, September 20, 1954.

FOREST BIOLOGY SURVEY
EAST PRINCE RUPERT DISTRICT

1954

M. T. Hughes and K. W. Robertson

I INTRODUCTION

Total coverage of the East Prince Rupert District during the summer of 1954 was not achieved. The area surveyed extended from the Kispiox River, north of Hazelton, south along the Bulkley River to and including the Babine Forest Reserve and Babine Lake. The southern portion of the district, Tweedsmuir Park area, was not sampled. The data presented in this report represents approximately half of the total district. (Map 1).

The forest biology survey was conducted during the following dates shown below:

Date	No. of Insect Samples Submitted	Ranger
July 10 - July 20	30	M. T. Hughes
August 1 - August 15	70	K. W. Robertson
August 25 - September 1	14	M. T. Hughes

A total of 161 entomological and 20 pathological samples were submitted during the summer. Of the 161 insect collections, 47 were submitted by co-operators and the British Columbia Forest Service. Collections by host trees are shown in Table 1.

TABLE 1

Distribution of Samples by Host Trees,
East Prince Rupert District, 1954.

Coniferous Trees	No. Collections	Deciduous Trees	No. Collections
Alpine fir	46	Trembling aspen	5
White spruce	59	Miscellaneous	14
Western hemlock	4		
Lodgepole pine	28		
Douglas fir	3		
Red cedar	<u>2</u>		
Total	142	Total	19

II STATUS OF INSECTS

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

Populations of the insect were negligible in 1954. Minor occurrences continued in the western hemlock dominated forests through the McCully Creek and Nine Mile Mountain areas just north of Hazelton. One occurrence was also recorded on Douglas-fir at Moore Pt., on Babine Lake. This is a relative decrease over 1953 samples in the latter area, which produced one larva per host tree in a 210 acre isolated stand of Douglas fir. This area, Moore Pt., sampled twice annually since 1949 had no records of this pest until 1953. (Map 2)

Two-year-cycle Spruce Budworm, *Choristoneura fumiferana* (Clem.)

Three budworm infestations are known to exist in the following areas: McKendrick Creek, near Smithers; Star Lake - Boer Mountain and the Nilkitkwa River area. The stands affected are predominantly alpine fir, *Abies lasiocarpa* (Hook.) Nutt., with white spruce, *Picea glauca* (Moench.) Voss. and lodgepole pine, *Pinus contorta* Dougl., as co-dominants in that order respectively.

The McKendrick Creek - Cronin Creek infestation lies in an easterly direction 21.8 miles from Smithers. The main host was alpine fir. Defoliation varied from 15 per cent to 100 per cent of the current year's foliage. Top defoliation varies from the 1954 growth to complete loss of foliage on the upper three feet of the terminal in over mature trees. Understory firs were also stripped of 1954 foliage and in some cases the 1953 growth was also defoliated.

At the time of sampling, August 6, mainly pupae were found with some later instar and prepupal larvae. No parasites or insect diseases were recorded in the field or the insectary rearing records.

At a later check on this infestation, August 15, numerous adults were present. They were noted to be flying about the trees and mating was observed. It was not possible to take egg samples.

In the Star Lake - Boer Mountain area, near Burns Lake and east to Babine Lake, the 2-year cycle budworm completed its development with continued light to heavy defoliation of the current year's growth. The exact extent of the infestation is not known. It is believed, however, to extend north, south and

east from Beer Mountain toward and including portions of the Babine Forest Reserve to Babine Lake. Top defoliation in some cases varied from six inches to 24 inches. Hosts were mainly alpine fir with light feeding on white spruce.

Almost all pupae were found in samples taken August 13. An earlier submission of 405 larvae from the Babine Forest Reserve produced only seven parasites.

The third spruce budworm infestation occurs in the upper waters of the Nilkitkwa River, extending south to encompass that portion of the Babine River immediately north of Nilkitkwa Lake. The infestation does not reach to Nichyeskwa Creek where the stand is 150-year old dominant white spruce and co-dominant lodgepole pine as compared to an alpine fir dominated stand in the Nilkitkwa River area. The defoliation of alpine fir, according to British Columbia Forest Service inventory surveys, is very heavy and uniform throughout the infested area.

Egg mass samples were made September 1 near the southern fringe of the Nilkitkwa River infestation. These samples indicated an average of one spruce budworm egg mass per 18 inches of branch length.

Black-headed Budworm, Acleris variana (Fern.)

This defoliator occurred sporadically throughout the area surveyed, from the Kispiox River south to and including the Babine Forest Reserve.

McKendrick Creek was the exception to the above statement, where 155 larvae were found in one three-tree beating. However, no noticeable feeding or defoliation was visible. It is thought this particular sample was extremely localized and of little significance although samples such as this greatly increase and distort the annual average.

The average number of black-headed budworm obtained by 3-tree beating method is shown below:

Year	No. of Collections	Average Number of Larvae
1951	23	5.5
1952	62	8.5
1953	63	2.5
1954	41	10.0

Alaska Spruce Bark Beetle, Dendroctonus borealis Hopk.

Approximately 5,000 cubic feet of timber has been salvaged in a small infestation of beetle-killed trees at Rose Lake, X-62534. The remaining unsalvaged beetle-killed snags do not exceed an estimated volume of 2,000 cubic feet, or four per cent of the total volume of spruce. This tree killing quite possibly resulted from the beetle broods emerging from the slash of the previous logging operation.

The Aspen Leaf Miner, Phyllocnistis populiella Cham.

EPR 1954

Considerable leaf mining was evident on aspen saplings approximately 26 miles up the Kispiox River valley. However, populations were not in infestation proportion. No serious defoliation or destruction of foliage was noted.

The aspen leaf miner was also noticed, in minor occurrences only, on aspen regeneration in the Smithers area.

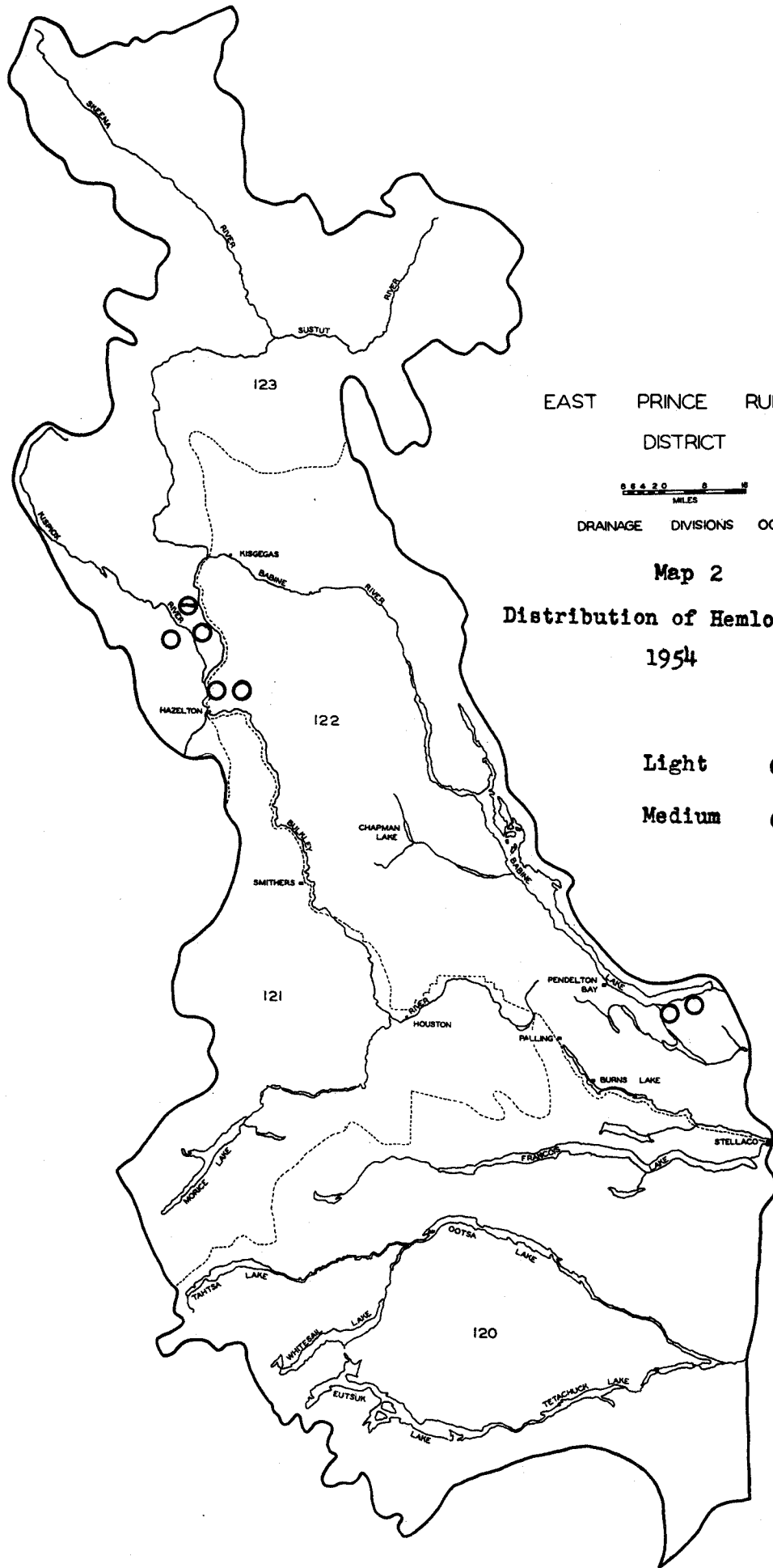
III STATUS OF TREE DISEASES

One noteworthy tree pathogen was recorded in the East Prince Rupert District, in the area surveyed, during the summer of 1954.

A Foliage Rust, Pucciniastrum pustulatum (Pers.) Diet.

This foliage disorder characterized by small round yellow or orange spots usually confined to the undersurface of needles, causes some damage to seedlings and saplings. However, it is usually not lethal but does retard growth and radial increment.

It was confined to small isolated patches of alpine fir and white spruce regeneration in the Topley Landing, Carr and McKendrick creeks area.



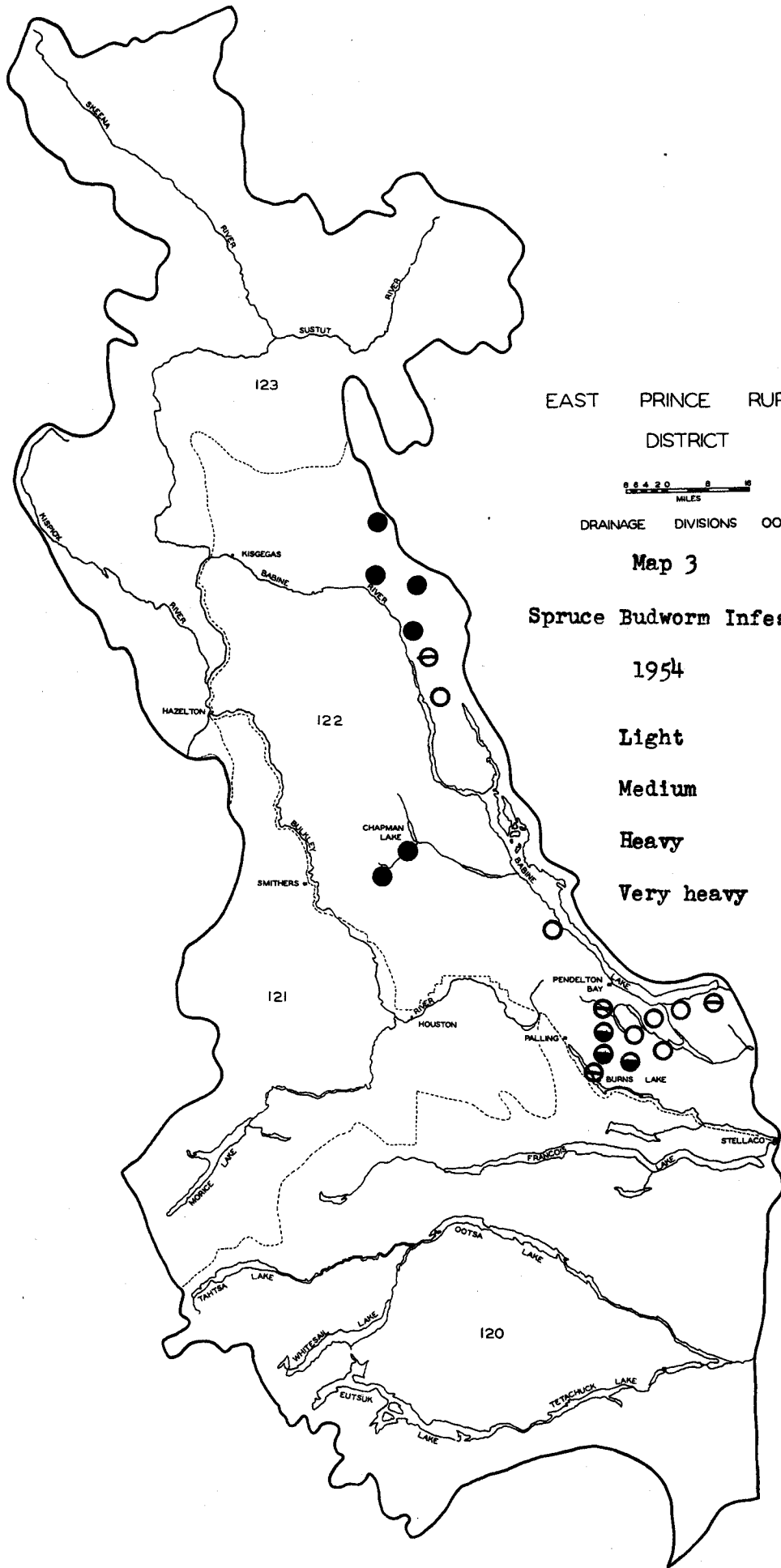
EAST PRINCE RUPERT
DISTRICT



DRAINAGE DIVISIONS 000

Map 2
Distribution of Hemlock Looper
1954

Light ○
Medium ⊖



EAST PRINCE RUPERT
DISTRICT



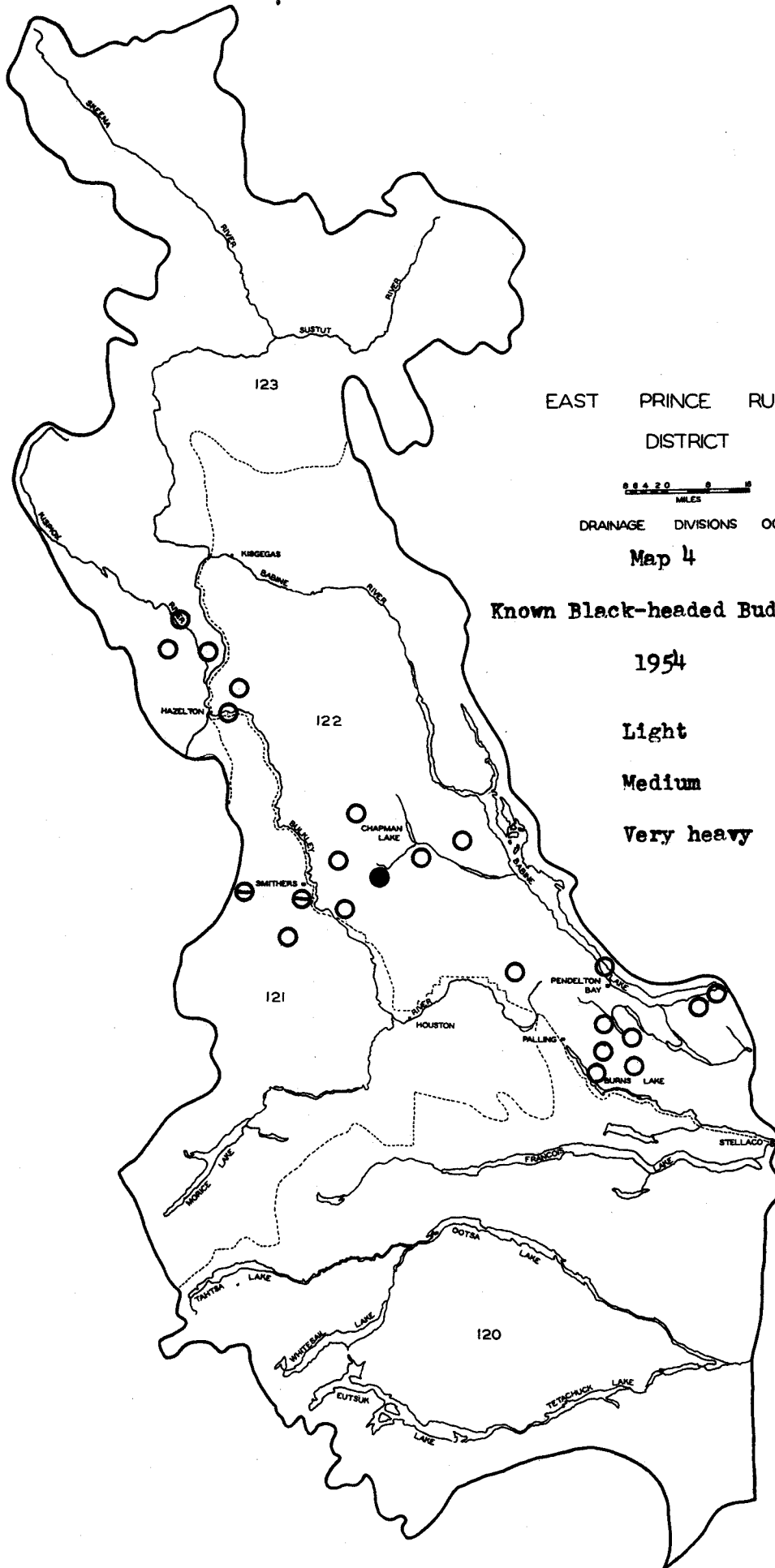
DRAINAGE DIVISIONS 000

Map 3

Spruce Budworm Infestations

1954

- Light ○
- Medium ⊖
- Heavy ⊕
- Very heavy ●



EAST PRINCE RUPERT
DISTRICT



DRAINAGE DIVISIONS 000

Map 4

Known Black-headed Budworm Distributions,
1954

- Light ○
- Medium ⊖
- Very heavy ●

KAMLOOPS FOREST DISTRICT - 1954

INTRODUCTION

by
B. A. Sugden

For the 1954 field season Forest Biology Ranger B. A. Sugden was assigned to the East Kamloops and also covered the Revelstoke Forest Ranger District of the Central Nelson District. Ranger D. H. Ruppel was to be assigned to West Kamloops and Ranger L. M. Wallington to Central Kamloops but, due to the delay in the delivery of an additional vehicle, these officers took turns working the combined area, with Wallington assisting Sugden in East Kamloops during August.

The bark beetles remained the major forest pest in the Kamloops Forest District during 1954. Infestations of mountain pine beetle continued to destroy ponderosa pine and white pine in the Little Shuswap Lake, Shuswap Lake, Cambie, Aspen Grove, Blue River, and Mud Lake areas.

The Douglas-fir beetle persisted in small scattered infestations along the west side of Okanagan Lake north from Wilson's Landing; southwest of Monte Lake; and Lower Lawless Creek in the East Kamloops District. Larger infestations of this species were located in the West and Central districts near Bestwick; along Louis Creek; and from Lac la Hache north, to Soda Creek.

An infestation of spruce bark beetle near Murphy Lake had apparently subsided. During a survey conducted in August little evidence of fresh beetle damage was observed.

Light infestations of spruce budworm were prevalent in the sub-alpine forests of alpine fir and Engelmann spruce. Foliage discoloration from budworm feeding was evident in the Bear Lake region, part of S. M. Simpson Co. Forest Management Licence.

A slight increase in the population of hemlock looper was noted in two areas in the Kamloops Forest District, larvae being most numerous in the hemlock-cedar forests of the Hidden Lake and Blue River localities. Defoliation was not apparent.

Larvae of the black-headed budworm were not generally common this year but light to medium populations occurred throughout the North Thompson and Clearwater River valleys.

A large flight of satin moth during late July caused some concern to the residents of the city of Kamloops. This flight probably originated at Bestwick where a small though severe infestation of this species has been active since 1951.

Sporadic outbreaks of a dipterous needle miner continued to render unmerchantable as Christmas trees many young Douglas fir over widely separated points in the Kamloops Forest District. The most severe damage occurred in the central Okanagan and on the Nisconlith Indian Reserve near Squilax.

The false hemlock looper remained common on fir throughout most of the Douglas fir forest type in the Interior Dry Belt region of the District. A heavy population of this species was located south of Squilax where mass collections of fourth, final feeding stage larvae, and pupae were made.

WEST KAMLOOPS

by
D.H. Ruppel and L.M. Wallington

Introduction

The Forest Insect and Disease Survey in West Kamloops was carried out by Forest Biology Rangers Ruppel and Wallington in conjunction with the Survey in the Central Kamloops District. The Survey work was begun by Wallington on June 22 and by Ruppel on August 3 and terminated late in September.

Table 1 of this report shows forest insect collections by agencies and Table 2 shows forest insect and trees disease collections by hosts.

Status of Insects

Douglas-fir Beetle, Dendroctonus pseudotsugae Hopk. Areas of Douglas fir killed by the Douglas-fir beetle showed a heavy increase over 1953 and were much more widespread. Groups of "red tops" previously noted as 12 or less now include 25 to 100 trees and in some areas the groups are almost continuous.

The chief areas of attack were Lac la Hache to 150 Mile House on both sides of the lake (heavy), Timothy Lake road (medium), Canim Lake road (medium to heavy), Williams Lake to Soda Creek (medium to heavy), Soda Creek to 150 Mile House (light to medium), south side of Horsefly Lake (medium), Canoe Creek (light attack at south end of valley). In addition to these areas there was evidence of attack in almost all areas where the Douglas fir host occurs. Beetle activity was noted within areas of "winter injury" in the West Kamloops area and is mentioned again under the heading "Winter Injury".

An apparent scarcity of live beetles and larvae was noted in standing timber, possibly due to the very wet summer. Numerous beetles were found, however, in felled timber and slash. All beetle areas were on or adjacent to logging operations. Some of these logging operations were in progress and some had been discontinued in the past two or three years.

Spruce Budworm, Choristoneura fumiferana (Clem.). As in 1953, this insect appeared only in small numbers in the West Kamloops District. It occurred on Douglas fir, Pseudotsuga taxifolia, and Engelmann spruce, Picea engelmanni, in the Kelly Lake, Horsefly, and Alkali Lake regions.

Poplar Leaf Miner, Phyllocnistis populiella Cham. Trembling aspen, Populus tremuloides, in the Big Bar Lake area was 50 to 75 per cent infested with this leaf miner. It was observed also in other parts of West Kamloops but in fewer numbers.

WK
1954

TABLE 1

FOREST INSECT COLLECTIONS BY AGENCIES

WEST KAMLOOPS - 1954

Personnel Involved in Collection	Number of Collections						Totals
	May	June	July	Aug.	Sept.	Oct.	
Forest Biology Rangers Independently			75	50	14		139
Forest Biology Rangers with Forest Service Personnel							
Forest Service Personnel Independently		4	9	4	5	1	23
Other Co-operators			1				1
TOTALS		4	85	54	19	1	163

TABLE 2
COLLECTIONS BY HOSTS
WEST KAMLOOPS - 1954

Coniferous Hosts	Fo		Broad-leaved Hosts	Forest Insects	Tree Diseases
Douglas fir	73	2	Trembling aspen	17	9
Lodgepole pine			Birch sp.	2	-
Engelmann spruce	16	2	No Host	3	-
Ponderosa pine	12	2			
Rocky mountain juniper	8	1			
White spruce	5	1			
Western hemlock	1	-			
Spruce sp.	1	-			
Western red cedar	-	1			
			Totals	22	9
Totals	141	9	GRAND TOTALS	163*	18

*Includes 24 collections by Co-operators

Black-headed Budworm, *Acleris variana* (Fern.). The black-headed budworm was collected only in very inconsequential numbers from Douglas fir in the West Kamloops area. It should be noted, however, that some areas of potential infestation were not visited until very late in the season. Areas where black-headed budworm were consistently found were Kelly Lake, Pavilion Lake, and Fountain Creek.

Western Tent Caterpillar, *Malacosoma disstria* Hbn. Due to a late start on Survey work this year, it was not possible to get complete information on this insect but it seems, generally, to have subsided slightly from 1953. There was still medium defoliation of trembling aspen around Soda Creek, Williams Lake to Horsefly and east of Lac la Hache. Heavy defoliation occurred in the Beaver Lake area, south of Quesnel Lake and an area of 15 to 20 square miles at the west end of Horsefly Lake on the south side. Most areas, with the exception of Horsefly Lake, have made a very good recovery by late August. Egg masses at Horsefly Lake in early September were very numerous. Dissection of the eggs in five masses yielded the following information:

Mass No.	Live Larvae	Parasitized Larvae	Infertile Eggs	Total
1	125		-	125
2	111	-	23	134
3	133	1	2	136
4	103	2	16	121
5	120	-	5	125
Total	592	3	46	641

The number of egg masses collected from three aspen trees of approximately six inches d.b.h. and 55 feet in height with a 15-foot crown totaled 136 masses deposited in 1954 and 26 from previous years. From this information it would appear that there will probably be a continuation of the Horsefly infestation in 1955.

Western Hemlock Looper, *Lambdina fiscellaria lugubrosa* (Hlst.). The hemlock looper was not found in any of the surveyed areas with the exception of a very light population density on Douglas fir at Pavilion Lake and Fountain Creek.

Status of Tree Diseases

Winter Injury:- Trees damaged by winter injury in the spring of 1953 were observed to be making a very poor recovery. The injury was mainly to Douglas fir but cedar, lodgepole pine and spruce showed damage in some areas. The buds were severely damaged and in many cases few or no buds remain on the trees to provide new foliage. The old foliage in many cases was "yellow-brown" and "red tops" were common. The areas affected were all on exposed bluffs or hilltops. In stands of Douglas fir the Douglas-fir beetle, *Dendroctonus pseudotsugae* Hopk., was found to be attacking weakened trees but the abnormally wet summer may have helped to hold them in check and retard the drying out of damaged trees.

West of Clinton on the east side of the Fraser River for about 1.5 miles on both sides of Dog Creek on the 3,000-foot contour starting five miles east of Dog Creek P.O. was one extensive area of winter injury of Douglas fir in patches of about 100 acres. The B.C. Forest Service reported an area of 1,500 to 2,000 acres of "red tops" on the west side of the Fraser River south of the Chilcotin River consisting of Douglas fir and lodgepole pine suffering the same damage. To the east of Lac la Hache on 111 Mile Creek, damage was noted on Douglas fir. The stands here were chiefly over-mature two-storied Douglas fir and the upper half of the overstory trees were most heavily damaged.

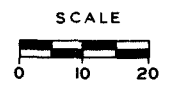
Other areas visited were along the south side of Horsefly Lake and Woodjam Creek (Horsefly River) where cedar, lodgepole and spruce were damaged as well as Douglas fir. Lodgepole pine at an altitude of 4,000 to 5,000 feet southeast of Canim Lake P.O., which was visited by the B.C. Forest Service in 1953, continues to show severe discoloration. Winter injury was also reported from Quesnel Lake but not visited this year.

From observations made at some of the above areas it would appear that there will be considerable mortality from the 1953 winter injury, especially Douglas fir which is being attacked by the Douglas fir beetle in the wake of the winter injury.

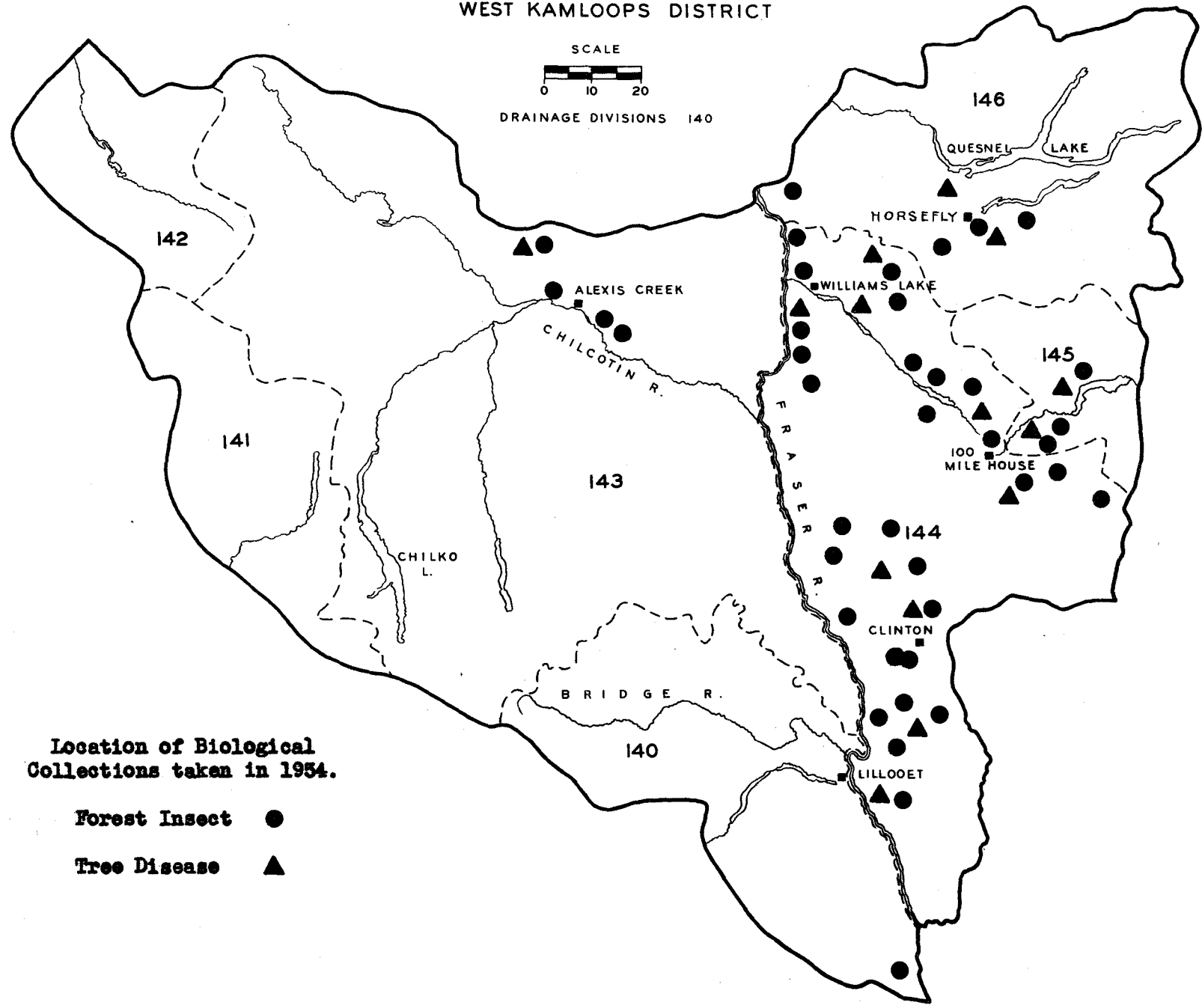
Keithia thujina Durand. The cedar leaf blight of western red cedar, Thuja plicata Dann., was collected at Canim Lake but the host range is very limited in this district.

Fomes igniarius Gill. This fungus was collected along Alkali Lake road, Horsefly Lake road, north of Horsefly, Canim Lake road, Bridge Lake road, and Spring Lake road on trembling aspen, Populus tremuloides Michx.

WEST KAMLOOPS DISTRICT



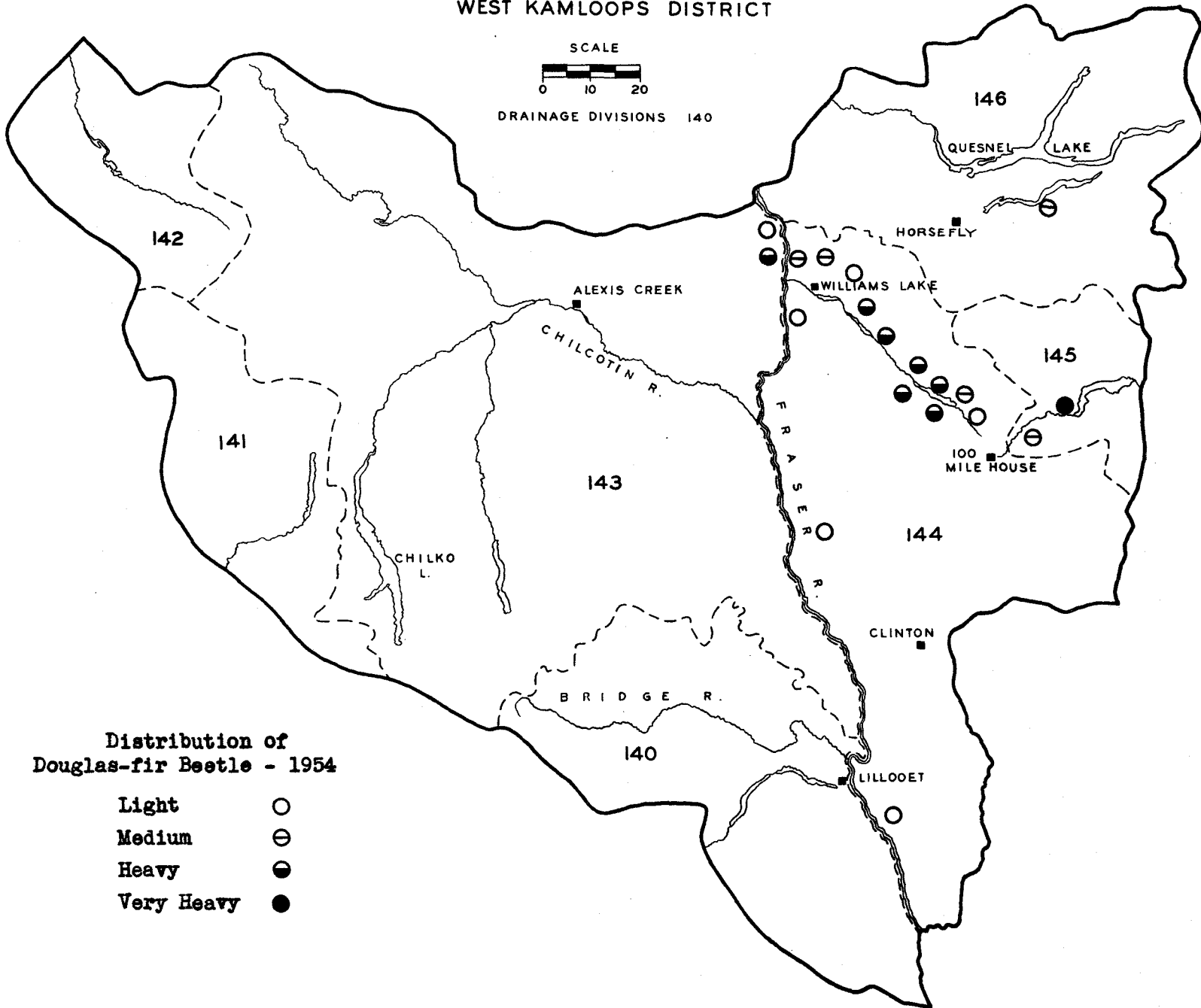
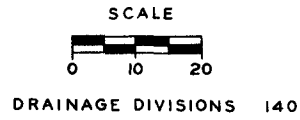
DRAINAGE DIVISIONS 140



Location of Biological
Collections taken in 1954.

- Forest Insect ●
- Tree Disease ▲

WEST KAMLOOPS DISTRICT



Distribution of
Douglas-fir Beetle - 1954

- Light ○
- Medium ⊖
- Heavy ⊖
- Very Heavy ●

CENTRAL KAMLOOPS

by

L.M. Wallington and D.H. Ruppel

Introduction

Central Kamloops and West Kamloops were surveyed as one district in 1954 due to the late arrival of new vehicles. L. M. Wallington started the Survey on June 22 and was replaced by D. H. Ruppel on August 3. The field season ended in late September, except that during the first week of October a special survey of bark-beetle damage in the ponderosa pine stands south of Aspen Grove was made by Rangers Grant, Sugden and Simms.

Table 1 shows insect collections by agencies and Table 2 shows all collections by hosts.

Status of Insects

Douglas-fir Beetle, *Dendroctonus pseudotsugae* Hopk. Damage to Douglas fir by the Douglas-fir beetle was increasingly evident in most of the travelled portions of the district. Groups of "red tops" observed in 1953 averaged seven or eight trees to a group but this year groups contained from 25 to 100 trees.

The chief areas of beetle attack observed were at Mud Lake and Blue River (light), Louis Creek and Heffley Creek southeast of Barriere (medium to heavy), Barriere River road (medium to heavy), Paul Lake (medium), Criss Creek road via Tranquille River Valley (heavy) and, south of Bestwick (heavy). Small areas may be found almost throughout the entire Douglas fir range in Central Kamloops.

No detailed survey of the infested areas was made but accumulated losses are no doubt very heavy. Live beetles and larvae were hard to find in standing timber and it would appear that the abnormally wet summer reduced such populations substantially. This, however, may be offset by an abundance of logs and slash in most areas which, in most cases, were found to be harbouring active beetles and their broods.

Western Hemlock Looper, *Lambdina fiscellaria lugubrosa* (Hlst.). The hemlock looper was again present in the North Thompson River Valley and was collected from western red cedar, western hemlock, Engelmann spruce, alpine fir and Douglas fir.

Collections were made at the following places, with bracketed remarks indicating population density; Thunder River (light to heavy), Mud Lake (light to medium), Blue River (light to medium), Vavenby (light), Birch Island (light), Wells Grey Park entrance (light), Clearwater (light) and, Adams Lake (light). At the above places the timber type is chiefly hemlock-cedar changing to spruce-alpine fir at the higher altitudes. A very light population occurred on Douglas fir at Merritt.

TABLE 1

FOREST INSECT COLLECTIONS BY AGENCIES

CENTRAL KAMLOOPS - 1954

Personnel Involved In Collections	Number of Collections						TOTALS
	May	June	July	Aug.	Sept.	Oct.	
Forest Biology Rangers Independently		63	68	95	32		258
Forest Biology Rangers with Forest Service Personnel			2	16			18
Forest Service Personnel Independently		10	6	8	2		26
Other Co-operators	1						1
TOTALS	1	73	76	119	34		303

TABLE 2

COLLECTIONS BY HOSTS

CENTRAL KAMLOOPS - 1954

Coniferous Hosts	Forest Insects	Tree Diseases	Broad-leaved Hosts	Forest Insects	Tree Diseases
Douglas fir	114	4	Trembling aspen	13	7
Ponderosa pine	45	1	Birch	4	2
Engelmann spruce	37	1	Willow	4	-
Lodgepole pine	26	2	Cottonwood	1	-
Western hemlock	18	2	Cherry	1	-
Western red cedar	13	4	Alder	1	-
Alpine fir	7	1	Miscellaneous	6	1
Rocky mountain juniper	5	-			
White spruce	3	-			
Spruce sp.	3	-			
White pine	2	2			
			Totals	30	10
Totals	273	17	GRAND TOTALS	303*	27

*Includes 27 collections by Co-operators

No damage to the host was noted except in the Thunder River area where hemlock was also being attacked by Nematocampa sp., Neodiprion tsugae, Ectropis sp., and Nepytia canosaria. The noted defoliation was light to medium.

Mountain Pine Beetle, Dendroctonus monticolae Hopk. The mountain pine beetle was found to be causing some mortality of western white pine and lodgepole pine in the Blue River and Mud Lake areas.

On both sides of Mud Lake there were about half a dozen groups of 15 to 20 white pine with "red tops" and some old grey trees. This pine was from 15 to 30 inches d.b.h. and very decadent. It was in a cedar-hemlock type and the pine was rather scattered.

West of Blue River for about five miles north and south of the town there were some small patches of "red topped" pine including some lodgepole. This stand was more of a pole-size although the lodgepole is mature. In all cases there did not seem to be any green infested trees in August but there was some blowdown in the area this year and these trees contained beetles.

Filament Bearer, Nematocampa limbata Haw. The filament bearer was very common in the North Thompson River Valley on various hosts and, while not known to be a dangerous pest, it was present in very light infestation proportions on western hemlock at Thunder River. There was some defoliation but this was attributed to a combination of insects noted under the hemlock looper heading. The maximum collection was 35 larvae.

Saddled-back Looper, Ectropis crepuscularia Schiff. A light population density of this looper occurred throughout the hemlock-cedar forests in the North Thompson River Valley. The only defoliation noted was where this insect was in combination with others as noted under the hemlock looper heading. No defoliation of ground cover was noted and the population build-up of saddled-back looper observed over the past few years appears to have levelled off.

Black-headed Budworm, Acleris variana (Fern.). The black-headed budworm was common in collections throughout the North Thompson and Clearwater River valleys and was found on western hemlock, alpine fir, Douglas fir and Engelmann spruce. The population was of "light infestation" proportions with the exception of Mud Lake where a medium infestation occurred, but little or no damage was noted at the time of the visit in August.

Spruce Budworm, Choristoneura fumiferana (Clem.). This insect continued to show in Central Kamloops, but in relatively small numbers. It was most common in the Deadman Creek, Spius Creek and Tunkwa Lake areas. Interesting was the fact that it appeared only on Douglas fir, Pseudotsuga taxifolia.

Poplar Leaf-miner, Phyllocnistis populiella Cham. Throughout the North Thompson River Valley and near the town of Merritt this leaf-miner was very abundant on trembling aspen, Populus tremuloides. Adams Lake and Red Lake were the most heavily infested areas with approximately 90 per cent of the foliage affected.

CK
1954

Douglas-fir Needle Miner, Contarinia sp. This needle mining diptera is causing concern to the Christmas tree industry since infested foliage drops from the trees and thereby impairs their appearance. It was collected from reproduction Douglas fir along the North Thompson with the following percentages of infestation:

Location	Per Cent of Needles Infested 1954
McMurphy	5
Birch Island	304
Barriere	5
Barriere - Darfield	5
Nehalliston Creek (Little Trout)	20

The Sequoia Pitch Moth, Vespamima sequoia (Hy. Edw.). This pitch moth was very common on lodgepole pine, Pinus contorta, and locally common on ponderosa pine, Pinus ponderosa, in the Adams Lake and Chu Chua areas. Damage by this insect is characterized by large pitch masses at the base of the tree and in which the insect feeds. This pitch moth is not considered to be serious but healed-over galleries may cause defects in the lumber. See Figures 1 and 2.

Satin Moth, Stilpnotia salicis L. The satin moth continued active at Bestwick and an infestation was found at Lac Du Bois, a newly recorded locality for this insect. Bestwick (elevation 3,400 feet) is ten miles southeast from Kamloops and Lac Du Bois (elevation 3,200 feet) five miles northwest from the city. The infestation at Bestwick consisted of three groves of trembling aspen, Populus tremuloides, each approximately 75 feet by 40 feet in size. One grove was 100 per cent defoliated, with the remaining two groves defoliated about 65 per cent. At Lac Du Bois the infestation was in one grove 400 feet by 90 feet and contained 100 per cent defoliation.

Near the end of July a large flight of satin moth invaded the business district of Kamloops and Dr. R. H. Handford of the Field Crop Insect Laboratory at Kamloops reported that the moths were attracted particularly to blue neon lights. The concern felt by the residents of the city instigated an egg survey during the fall to check on the survival of the larvae and the possibility of resulting damage next year to shade and ornamental trees.

Egg masses were extremely numerous but the majority of these had been deposited on the walls of buildings, mainly in the S. Jaquist block of the business district. A check made of 82 trees in the residential area produced few egg masses. Only eight were located and of these, four had been damaged by humans and had not hatched.

The trees examined were mainly varieties of maple and American elm with the occasional birch and black walnut. All the lombardy poplars in the sample area were examined as these, of the species listed, would be the preferred host.

Notes on Life History

Presumably the young caterpillars began to feed during the late spring. By the first week in July most of the larvae at Bestwick were full-grown. By July 8, pupation had begun and the majority were in the pupal stage by July 16. Pupae were found on the main trunk, in rolled leaves, on twigs and even on fallen logs. Adults were in flight during late July. Eggs were deposited in early August. On September 14, all of the second crop of leaves in two of the groves at Bestwick were completely skeletonized by the young larvae and great numbers of 1st and 2nd instar larvae were observed hanging from the trees by silken threads. At the same time many young larvae were found in hibernation. The hibernacula were spun in protected places such as the crevices of the tree trunks. A few late instar larvae, pupae, and adults were also still present in the field on September 14. Hibernating satin moth larvae from Lac Du Bois were examined microscopically by the pathologist and found to be free from disease, but due to the possibility of disease latency or subsequent infection, this does not necessarily mean that disease will not appear in the field population next season.

Dr. R. H. Handford reported that during the latter part of August newly hatched larvae of the satin moth were very common hanging from webbing in the business district of Kamloops.

Egg Sampling

Egg mass samples were taken in the middle of September at both Lac Du Bois and Bestwick. The flat egg masses were a dull white colour and were laid on the leaves, branches, twigs and trunks. As a preliminary to sampling, egg masses were counted on one tree at Bestwick in order to obtain some figures on their distribution over the tree. The sample tree was four inches d.b.h., 24 feet high, with a 16-foot crown length. Sample counts were made on three parts of the tree:

1. on the twigs of the outer crown;
2. on the main branches of the inner crown (main stems only); and
3. on the trunk only.

The following tables show that egg masses were scattered over the tree:

TABLE 3

Egg mass counts on four 2-foot long branch tips at each of three crown levels.

Crown	Average Number of
Upper	0.25
Middle	1.0
Lower	2.0

TABLE 4

Egg mass counts on four 2-foot long basal sections of branches at each of three crown levels.

Crown	Average Number of Eggs
Upper	2
Middle	3.75
Lower	4

TABLE 5

Distribution of egg masses on the trunk of the sample tree.

Height in feet above ground level of egg masses	Number of Egg Masses
15	2
14	1
13	1
12	1
8	1
7	1
6	1
2	3
1	1

Since from the egg sampling and general observations it was gathered that representative egg mass counts could be taken from the tree trunks, it was decided arbitrarily that the lower eight feet of trunk, of five different trees, be sampled at each infested grove at Lac Du Bois and Bestwick. D.b.h., height and crown length were also recorded for each tree and the averages for all five trees are listed in Table 6.

TABLE 6

Average number of satin moth egg masses on basal 8 feet of trunks of 5 trees at each sampling point.

Location	Average measurements of trees			Average number of egg masses on basal 8 feet of trunk
	D.B.H.	Height	Crown Length	
Bestwick (Grove I)	4.4"	25.4'	14'	14.4
Bestwick (Grove II)	4.7"	30.4'	19'	5.3
Bestwick (Grove III)	4.9"	30.2'	19.4'	4.4
Lac Du Bois	4.5"	25.5'	13'	18.8

The results show that there was a high egg population in these groves. This information will serve as a useful comparison for similar samples taken in future years.

Observations indicated that most of the eggs hatched. This was borne out by a detailed count and observation of three sample egg masses collected at Lac Du Bois:

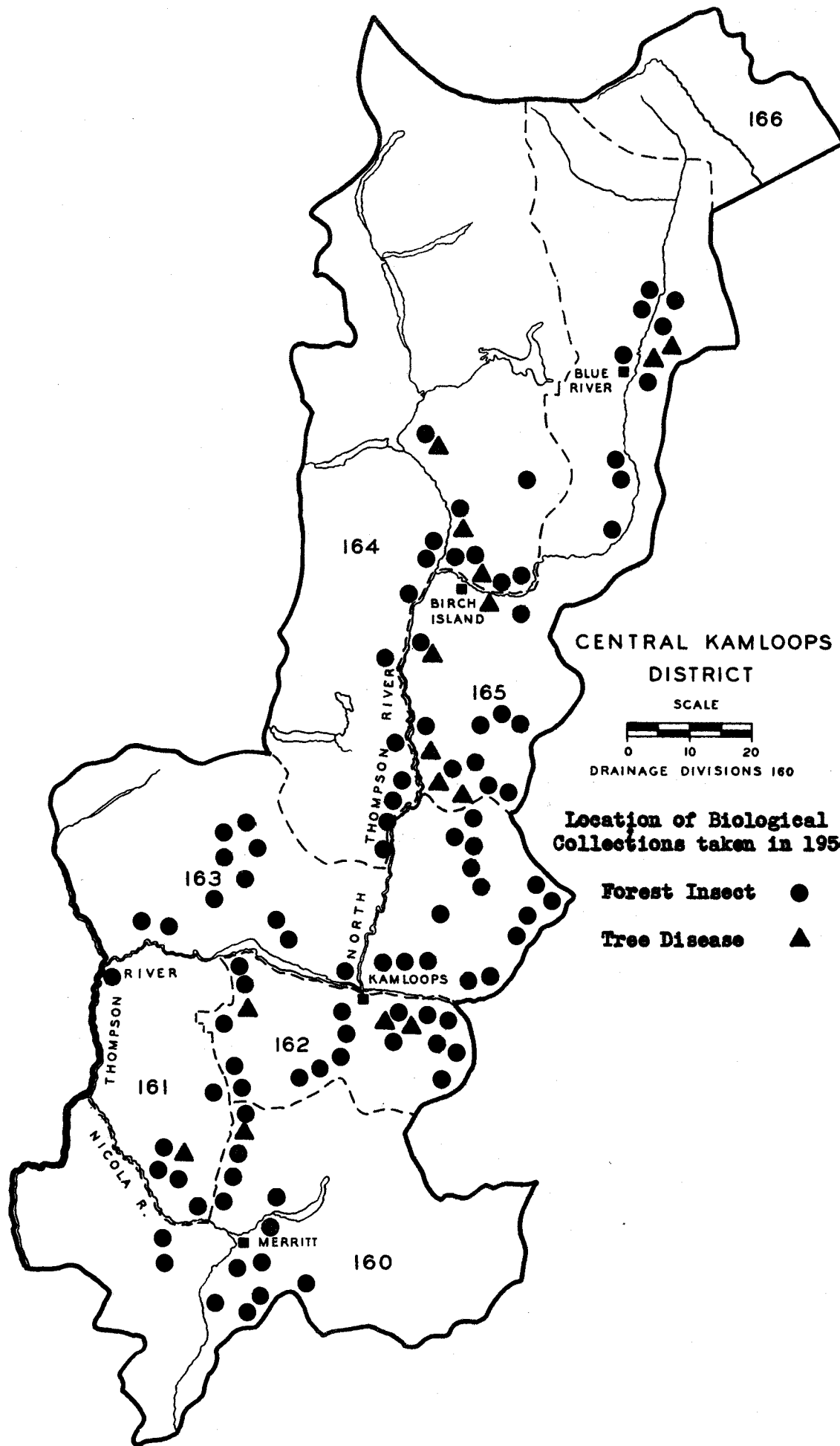
Mass 1 - 120 eggs - 2 unhatched,
Mass 2 - 95 eggs - 3 unhatched,
Mass 3 - 116 eggs - 5 unhatched.

Status of Tree Diseases

Hypoxyton pruinaum (Klot.) Cke. This canker of trembling aspen, Populus tremuloides Michx., was found at Bestwick.

Keithia thujina Durrand. The cedar leaf blight of western red cedar, Thuja plicata Dann., was collected along Adams Lake road, at Birch Island and Mud Lake. It was noted throughout the host range, particularly the North Thompson River Valley.

Fomes igniarius Gill. This fungus was collected from trembling aspen, Populus tremuloides Michx., along Adams Lake road, Chu Chua near Barriere and Bestwick.



Location of Biological Collections taken in 1954.

- Forest Insect** ●
- Tree Disease** ▲

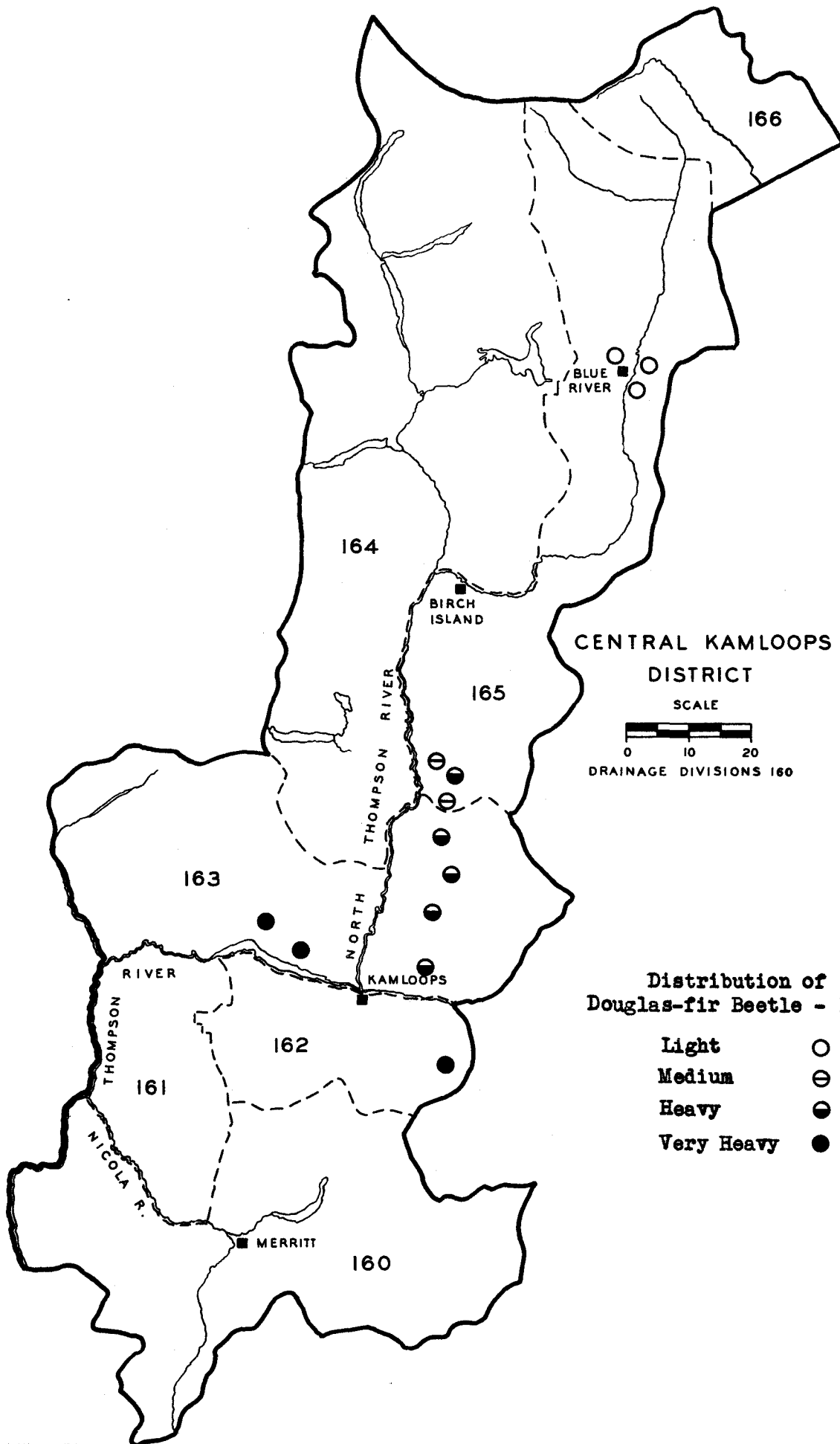




Fig. 1



Fig. 2

Pitch masses on lodgepole pine caused
by Sequoia pitch moth, Vespa mima sequoiae
Hy. Edw. July 7, 1954.

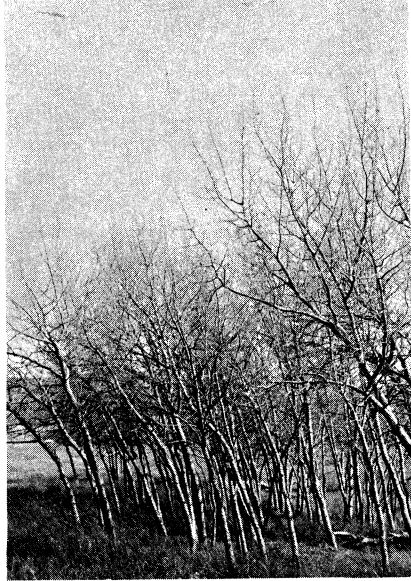


Fig. 3 Satin Moth defoliation of trembling aspen at Grove I - Bestwick. July 8, 1954.



Fig. 4 Satin Moth cocoons on trembling aspen at Bestwick. July 8, 1954.



Fig. 5 Satin Moth larvae and pupae on trembling aspen at Bestwick. July 8, 1954.

EAST KAMLOOPS

by B. A. Sugden

Introduction

The field season commenced in the East Kamloops District on June 8 and continued until the end of September. Prior to June short periods were spent in the field during March, April and May making special collections of Laspeyresia spp. in ponderosa pine cones and white pine stems of Petrova sp. from lodgepole pine; collecting field data concerning a dipterous needle miner, Contarinia sp., on Douglas fir; and surveying bark beetle, Dendroctonus spp., activity on a Farm Woodlot Management near Westbank.

During the field season 602 forest insect collections and 43 tree disease collections were made in the district. Table 1 shows the source of the insect collections on a monthly basis. Table 2 contains a list of the host trees and shrubs and the number of forest insect and tree disease collections made from each.

Status of Insects

Mountain Pine Beetle, Dendroctonus monticolae Hopk. The infestation of mountain pine beetle in western white pine in the forests bordering Seymour Arm of Shuswap Lake was first reported in 1947. At that time only a few trees near Cape Horn were infested. Since then the infestation has extended, in patches, north ten miles to Albas on the western side of the Arm and has spread over an estimated 3,200 acres in a mixed forest composed mainly of Douglas fir, white pine, western red cedar, and western hemlock. The accumulated loss of pine over the past seven years is no doubt quite heavy, as much of the pine in the 70- to 80-year age group has been destroyed. A strip 32 chains by one chain was cruised north of Beach Bay on Seymour Arm. The results are shown in the following table:

Condition of white pine	No. of white pine recorded ^A
Pine not attacked by bark beetle	45
Pine attacked during 1954	29
Pine attacked during 1953	19
Pine attacked prior to 1953	30
^A Weighted average d.b.h. of pine recorded was 10 inches.	

Fresh "red tops" were present again this year northwest of Cambie. When the infestation was surveyed this year white pines recently attacked by beetle were noted particularly near the northwestern perimeter of the infested area. Some logging has been conducted south of the infestations.

The small infestation in ponderosa pine reported last year north of Little Shuswap Lake has remained active and now affects about 36 acres forested mainly with ponderosa pine. A logging operation during 1951-52

TABLE 1

FOREST INSECT COLLECTIONS BY AGENCIES

EAST KAMLOOPS - 1954

Personnel Involved In Collection	Number of Collections						TOTALS
	April	May	June	July	Aug.	Sept.	
Forest Biology Rangers Independently	25	6	195	112	105	19	462
Forest Biology Rangers with Forest Service Personnel				40		19	59
Forest Service Personnel Independently	2	3	13	15	37	5	75
Other Co-operators	1	2		3			6
TOTALS	28	11	208	170	142	43	602

TABLE 2

COLLECTIONS BY HOSTS

EAST KAMLOOPS - 1954

Coniferous Hosts	Forest Insects	Tree Diseases	Broad-leaved Hosts	Forest Insects	Tree Diseases
Douglas fir	297	4	Western white birch	20	6
Ponderosa pine	67	5	Willow spp.	13	1
Lodgepole pine	28	4	Alder spp.	11	
Engelmann spruce	28	3	Cherry spp.	8	
Western hemlock	27		Trembling aspen	7	11
Western larch	19		Pin cherry	1	
Western white pine	15		Black cottonwood	1	
Alpine fir	15	1	Red osier dogwood	1	
Western red cedar	9	5	Maple spp.	1	
Rocky mountain juniper	9	2			
Spruce spp.	5				
Common juniper	2				
Colorado blue spruce	2				
Miscellaneous	5	1			
No host	11				
			Totals	63	18
Totals	539	25	GRAND TOTALS	602*	43

*Includes 79 collections by Co-operators.

was mainly responsible for the existing beetle population. Ponderosa pine was cut and some logs had not been removed from the bush and, in addition, the tops and large limbs were not burned. This material was the initial breeding site for the resulting large population of beetles which has now destroyed many of the uncut pine left after logging ceased. The following table shows the tree mortality resulting from attack by bark beetles on two strips, each 18 chains by one chain. Strip "A" was cruised through the centre of the infested area, and strip "B" along the western perimeter.

Condition of the ponderosa pine	Strip "A"	Strip "B"
Pine undamaged by beetle	57	49
Pine attacked during 1954	7	22
Pine attacked during 1953	45	24
Pine attacked prior to 1953	14	6

There appeared to be an association of Dendroctonus monticolae, D. brevicomis and D. valens; however, D. monticolae was most numerous judging by the galleries examined in the logs and large tops and standing trees attacked prior to 1953.

The destruction of lodgepole pine by the mountain pine beetle on approximately 100 acres east of Adra has almost subsided. No current damage to lodgepole pine was observed this year. No salvage of beetle-killed pine will be made as the pine is too small and the site too remote to make such a venture practical. A good stand of mature and semi-mature ponderosa pine, bordering the western perimeter of the infestation, was surveyed as there was the possibility that the beetles might transfer their attentions to the ponderosa pine as the supply of lodgepole pine had been almost depleted. Beetle damage to the ponderosa pine was not serious. Only 11 trees had been attacked: seven during 1953, and four during 1954; of the latter, two pine had received only a partial attack.

Engelmann Spruce Beetle, Dendroctonus engelmanni Hopk. The infestation of Engelmann spruce beetle southeast of Murphy Lake (Bear Lake), first surveyed during 1953, was checked for further damage this year. No 1954 successfully-attacked spruce was found. A few trees had been lightly infested but the beetles had apparently been "drowned out". Evidence of woodpecker activity was extensive; the industry of these birds has undoubtedly greatly reduced the beetle population. The infestation affects about ten acres of property controlled by the Penticton Saw Mills Limited and, since 1952, 187 mature and semi-mature Engelmann spruce have been destroyed by beetle attack.

Douglas-fir Beetle, Dendroctonus pseudotsugae Hopk. Small scattered infestations by the Douglas-fir beetle continue to take a toll of Douglas fir in the East Kamloops District. The following table lists the location of the infestations in 1954 and the number of fresh "red tops" to a group or groups. The infestation of Douglas-fir beetle on upper Whiteman Creek was surveyed in company with Mr. J. Walters of the Forest Biology Laboratory at Vernon and Mr. A. Moss, forester in charge of forest management for the S.M. Simpson Co. of Kelowna. Mr. Walters was of the opinion that the discontinuation

Location	No. of fresh "red tops"
Upper Whiteman Creek (3 groups)	56
Terrace Mountain	14
Ewing's Landing	10
Winfield	9
Long Mountain	15
Yellow Lake	21
Southwest of Monte Lake	7
Lower Lawless Creek (3 groups)	18

of logging during 1951-53 was probably responsible for the beetle damage to the standing Douglas fir during 1953. No fresh attacks were observed in 1954.

Western Hemlock Looper, Lambdina fiscellaria lugubrosa (Hlst.). Larvae of the hemlock looper were present, in small numbers, throughout most of the district. They were collected from a variety of hosts: hemlock, Douglas fir, cedar, spruce, and occasionally from alder and birch. The only locality where a slight increase in larval population occurred was in the hemlock-cedar forest around Hidden Lake. The larval increase was not sufficient to cause any obvious defoliation.

Spruce Budworm, Choristoneura fumiferana (Clem.). Light to medium populations of this species remained active in the sub-alpine forests of Engelmann spruce and alpine fir of the following regions: Bolean Lake (Spa Hills Plateau), Monashee, upper Whiteman Creek, Adams Plateau and Bear Lake. With the exception of the Bear Lake area, no discoloration was observed. Near Bear Lake some alpine fir and spruce had a slight reddish cast due to the needles destroyed by the feeding larvae. The understory alpine fir suffered the most damage, occasional young trees were found with almost all the current foliage destroyed.

A mass collection of 200 last instar spruce budworm larvae was made on the southwestern side of Bolean Lake for Dr. G. W. K. Stehr at Sault Ste. Marie. Parasitism apparently was very light; only four of the 133 larvae alive on arrival were parasitized.

Large flights of spruce budworm moths were reported from the east and west ends of the Spa Hills Plateau. This area was surveyed for damage and, although defoliation was evident, it was not excessive, but appeared to be comparable to that of preceding flight years.

Forest Tent Caterpillar, Malacosoma disstria Hbn. Only two infestations of this species remained active in the East Kamloops District. The larger, near Bear Lake, extended over 30 acres in an old burn forested mainly with aspen and lodgepole pine. Defoliation was not severe generally, though some aspen had been about 75 per cent defoliated. The smaller infestation near Taft, east of Crazy Creek, affected about two or three acres, also on an old burn in a mixed stand of aspen, western white birch, black cottonwood, willow and alder. Defoliation was not severe.

False Hemlock Looper, *Nepytia canosaria* Wlk. Throughout the dry predominantly Douglas fir stands, larvae of the false hemlock looper were collected frequently. Occasionally areas were encountered where the larval population was quite high. Squilax was one of these: there, mass collections of fourth instar and penultimate instar larvae, prepupae, and pupae of *N. canosaria* were made. Mortality due to parasitism and disease is shown in the following table:

Stage collected	Number collected	Number Killed by Parasites & Disease			Per cent parasitism	Per cent disease
		Diptera	Hymenoptera	Disease		
Larvae (iv)	198	5	17	6	11	3
Larvae (Penultimate)	206	4	20	16	12	8
Prepupae) Pupa)	229	18	25	11	15	5

19 per cent of larvae collected killed by disease and parasitism.

No defoliation was observed at Squilax or on the other areas having a larger than usual population of this species.

Douglas-fir Needle Miner, *Contarinia* sp. A needle-mining Diptera continued its activity in the Douglas fir forests near Winfield, Kelowna, Westbank, and Peachland. Additional infestations were encountered this year near Squilax, Shuswap Lake, Osoyoos, and Hedley. Throughout most of the infestations small Douglas fir, ranging from two to 12 feet in height, received the most damage. This pest has caused concern to people employed in harvesting fir for the Christmas tree trade as the severe drop of infested needles made the trees useless for this purpose. The following table shows the per cent of the current needles infested and the localities from which the samples were taken.

Location	Per cent of needles infested 1954
Scotch Creek)	70
Celista)	40
Seymour Arm) Shuswap Lake	40
Anstey Arm)	10
Carlin	25
Squilax	80
Kalamalka (Long) Lake	5
Winfield	75
East Kelowna	40
Peachland	80
Summerland	25
Trout Creek	5
Osoyoos	15
Hedley	50

Douglas-fir Tussock Moth, *Hemerocampa pseudotsugata* McD. Larvae of the Douglas-fir tussock moth were collected again this year from Douglas fir near Oyama and lower Hydraulic Creek northeast of Kelowna. The larvae were not numerous and specimens collected and reared at the insectary in Vernon showed some mortality due to a polyhedral virus. Additional larval material was requested by Mr. S. M. Sager, Insect Pathologist, Forest Biology Laboratory, Victoria, but unfortunately, no larvae of this species were located when the areas were revisited on July 26.

A Sawfly on Douglas fir, *Neodiprion* sp. Small populations of this species were general throughout most of the stands which were dominantly Douglas fir. Near Squilax some discoloration was observed, usually on a few branch tips of the lower third of the crown. Throughout the remainder of the district defoliation by this species was very light. There was some mortality, due to a virus, among the sawfly larvae collected near Oyama Lake road, and northeast of Kelowna.

A Sawfly on Ponderosa Pine, *Neodiprion* sp. Colonies of sawflies occurring on ponderosa pine were noticeably fewer this year. Only one small group was collected east of Oliver where, during 1951-52-53, larvae of this species were extremely common. Elsewhere in the district this sawfly was at an equally low ebb.

A Lodgepole Pine Needle-miner, *Recurvaria* sp. A medium to light population of needle miner persisted in the lodgepole pine of a mixed stand of this species, Douglas fir, and ponderosa pine. They are apparently restricted to that portion of the Nisconlith Indian Reserve lying north of Little River between Shuswap and Little Shuswap lakes. Damage to the needles of the lodgepole pine was light, a maximum of three larvae were found per 15-inch branch sample. A mass collection of needle miner was made from this area.

Spotless Fall Webworm, *Hyphantria textor* Harr. There was a marked decline in the population of the fall webworm in the vicinity of Oliver and Osoyoos. Throughout the remainder of the drier sections of the district, sporadic outbreaks of this species continued. Defoliation was most severe on marginal or open-growing chokecherry which seemed to be the favoured host and consequently suffered the most damage. Black cottonwood, alder, wild rose, and willow were also attacked.

Black-headed Budworm, *Acleris variana* (Fern.). A light population of this species persisted in the spruce-alpine fir-lodgepole pine forest south of Beaver Lake. Larvae were collected only from the spruce and alpine fir in this locality. Elsewhere in the district the black-headed budworm was not common this year.

Petrova sp. Damage by the larvae of *Petrova* sp. was noted in lodgepole pine reproduction in a mixed stand of this species, ponderosa pine and Douglas fir on the Squilax Indian Reserve and south of Salmon Arm in a mixed stand of lodgepole pine, larch and Douglas fir. No tree mortality was found that could be attributed directly to this species; however, 44 per cent of 111 young lodgepole examined, on two acres near Squilax, had been attacked.

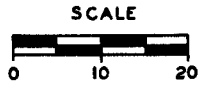
Status of Tree Diseases

Hypoxyton pruinaum (Klot.) Cke. Emphasis was placed again this year on the collection of a canker of trembling aspen, Hypoxyton pruinaum. The canker was collected near Taft only: apparently it is not too common in the groves of aspen in the East Kamloops District.

Keithia thujina Durand. Collections of the cedar leaf blight were requested again this year. It was fairly common near Yard Creek, west of McCulloch, and south of Beaver Lake.

Fomes igniarius (L.) Gill. Samples of this fungus on hardwoods were taken at widely separated points throughout the district. It was noted at Bernie Range (Vernon) on aspen; upper Whiteman Creek on western white birch; near the eastern boundary of Manning Park on aspen; and south of Beaver Lake on aspen and birch. At the last locality listed, all the aspen and birch on about an acre had been attacked by this fungus.

EAST KAMLOOPS DISTRICT

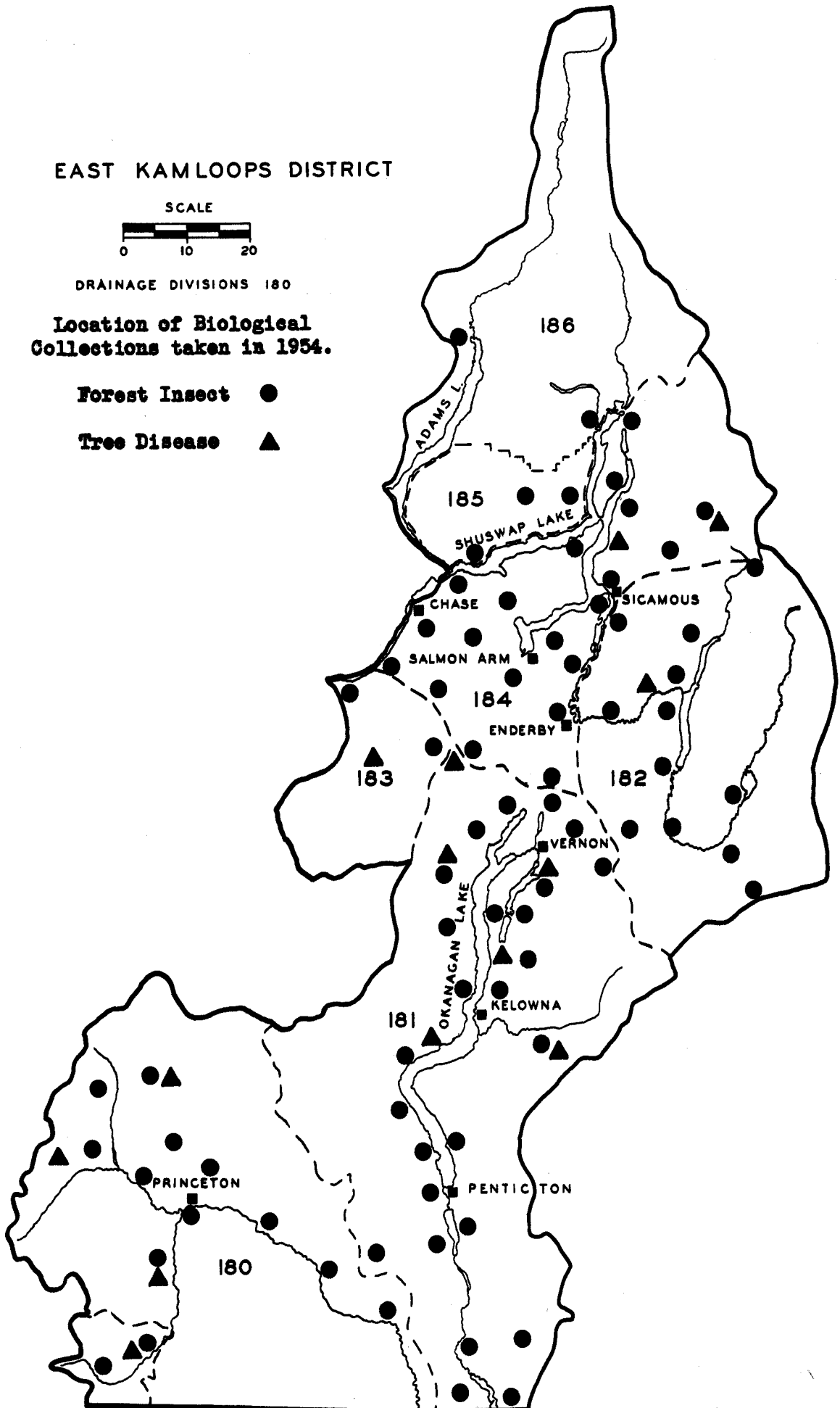


DRAINAGE DIVISIONS 180

Location of Biological
Collections taken in 1954.

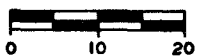
Forest Insect ●

Tree Disease ▲



EAST KAMLOOPS DISTRICT

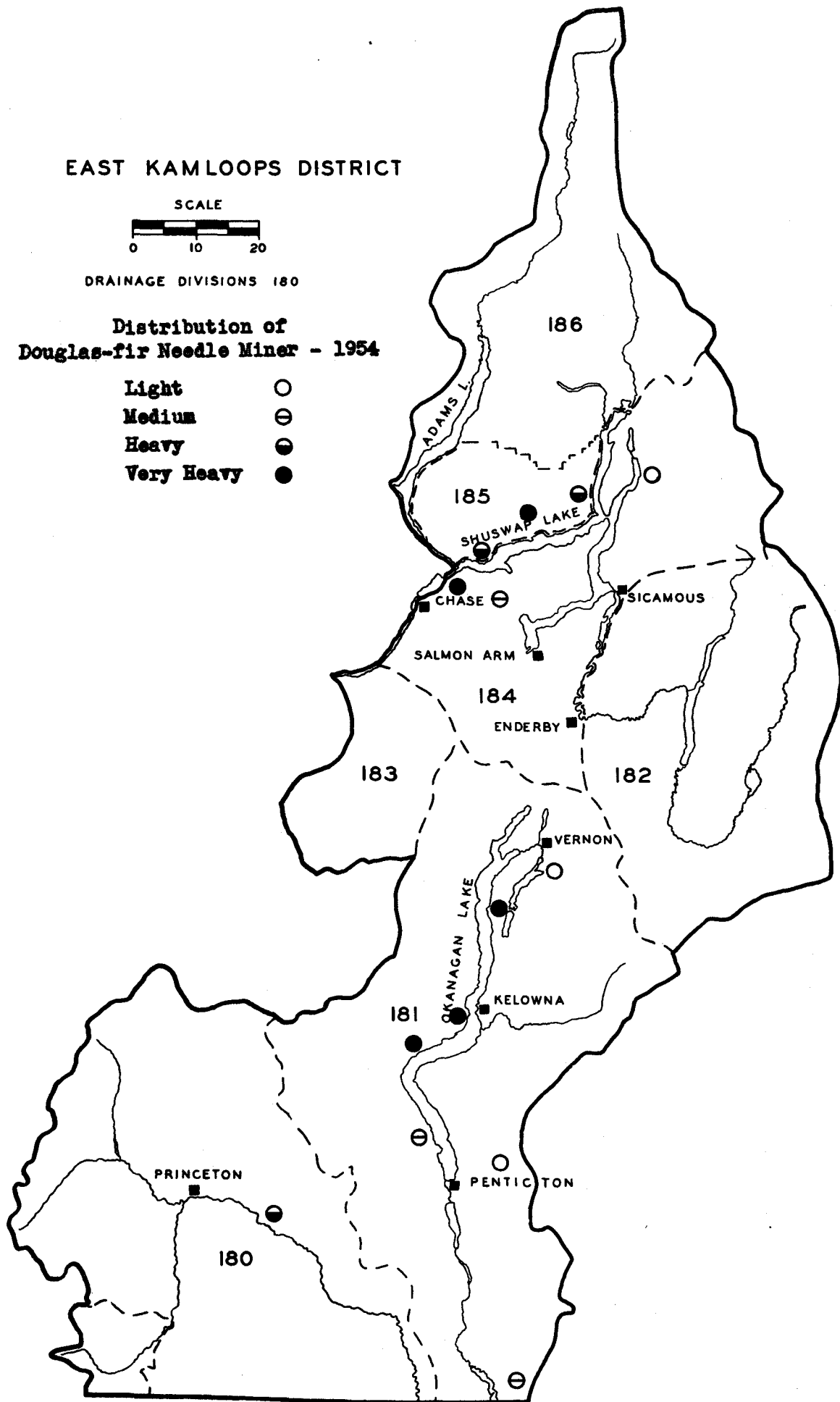
SCALE



DRAINAGE DIVISIONS 180

Distribution of Douglas-fir Needle Miner - 1954

- Light ○
- Medium ⊖
- Heavy ●
- Very Heavy ●



NELSON FOREST DISTRICT - 1954

INTRODUCTION

by
W. G. Simms

Due to late delivery of additional vehicles in 1954 it was necessary for forest biology rangers to operate in more than one district in order to secure the most satisfactory Survey coverage.

Forest Biology Ranger W. G. Simms was responsible for East Nelson and that part of the West Nelson District east of Kootenay Lake, while Forest Biology Ranger W. E. Bitz covered the balance of West Nelson and all of the Central Nelson District except that portion included in the Revelstoke Forest Ranger District. Information on the latter district was supplied by B.A. Sugden. G. M. Jones accompanied W. G. Simms from July 26 to September 23 and L. M. Wallington assisted W. E. Bitz on a special survey in the Upper Arrow Lake region from September 7 to 11. Wallington also accompanied W. G. Simms on a larval survey of the forest tent caterpillar, Malacosoma disstria, in the Golden and Spillimacheen Ranger districts on the 27th and 28th of May. Mr. W. G. Mathers spent September 21 and 22 in the Columbia Valley with Simms and Jones. Rangers J. Grant and Simms instructed B. C. Forest Service cruisers on the identification of spruce beetle-infested trees in the Priest River area of Boundary Lake, Creston Ranger District, on September 27 and 28.

Total number of forest insect collections made by forest biology rangers and co-operators throughout the Nelson Forest District was 1,011. Tree disease collections totaled 157.

The spruce budworm, Choristoneura fumiferana (Clem.), population remained at a medium to low level in spruce-balsam stands on the summit and east side of the Monashee Range.

The black-headed budworm, Acleris variana (Fern.), continued active in the Kaslo and Mission Creek (Creston) areas although it showed little increase over 1953.

The Douglas-fir tussock moth, Hemerocampa pseudotsugata McD., showed a population density almost treble that of 1953, in a localized area near Christina Lake.

The hemlock looper, Lambdina fiscellaria lugubrosa (Hlst.), became prominent again in 1954. A marked increase was found in the number of larvae taken in collections from western hemlock along the Big Bend Highway between Mile 30 near Revelstoke and Blackwater lakes. Highest population appeared near Mile 60.

The Douglas-fir beetle, Dendroctonus pseudotsugae Hopk., activity is continuing in the Kettle River basin in West Nelson, and also in the area near Fairmont Hot Springs in the East Nelson District. Several new patches of infested Douglas fir were noted in these areas this year.

Spruce bark beetle, Dendroctonus engelmanni Hopk., activity was considerably reduced in most areas of Cranbrook and Creston as a result of clear logging of Engelmann spruce on sites where the insect was active. One new beetle-infested area was reported in 1954, this being in the Nun Creek valley, southwest of Boundary Lake, Creston Ranger District.

The status of the mountain pine beetle, Dendroctonus monticolae Hopk., in stands of lodgepole pine in the East Kootenays remained much the same as in 1953.

WEST NELSON

by W. E. Bitz

Introduction

A total of 47 days was spent in the West Nelson District. Biology rangers obtained 375 forest insect collections and 59 trees disease collections. An additional 18 insect collections were obtained by co-operators. Table 1 shows number of forest insect collections by months and agencies, and Table 2 shows all collections by hosts.

The information concerning the Creston portion of Drainage Division 203 was provided by Ranger W. G. Simms.

Status of Insects

Douglas-fir Tussock Moth, *Hemerocampa pseudotsugata* McD. The infestation at Cascade in the Grand Forks area, reported for the first time in 1953, has increased three-fold at its heaviest population point but the area affected did not appear to have expanded. Larvae were obtained singly in collections over an area of about 2,500 acres along the slopes of the Cascades but heaviest populations were concentrated in a small area of two or three acres. Maximum number of larvae in a collection was 91 compared to 32 in 1953.

No parasites were recovered from collections reared in the Vernon Insectary but a polyhedral virus caused nearly 100 per cent larval mortality. Insectary records show no diseased larvae were recorded in collections reared in 1953 from the same area.

Spruce Budworm, *Choristoneura fumiferana* (Clem.). This was a flight year for the two-year cycle budworm. As in past years a light population persisted at the Monashee Summit. Due to the exceptionally late season the spruce buds had not yet opened at the time of inspection; however, a visual examination of the spruce plus standard collections from balsam, established the population level as about the same as the last flight year of 1952. The collections yielded an average of 12 larvae compared to 13 in 1952. Other areas in the same general locality supporting light populations of this species were in the Lightning Peak area and Kettle River cutoff. The average at both areas was four larvae per collection from both spruce and balsam.

Single specimens of the one-year cycle form were obtained from Douglas fir and Engelmann spruce at a number of points in the Kettle River valley. Single specimens were also obtained from Douglas fir near Rock Creek and in several collections from lodgepole pine near Beaverdell.

European Larch Sawfly, *Pristiphora erichsonii* (Htg.). With the exception of a small area between Sand and Snowball creeks in the Granby River valley, the occurrence of this species was slightly less than in 1953. An average of 3.2 larvae per collection was obtained in this area. Other scattered points in

TABLE 1
 FOREST INSECT COLLECTIONS BY AGENCIES
 WEST NELSON - 1954

Personnel Involved In Collection	Number of Collections						TOTALS
	May	June	July	Aug.	Sept.	Oct.	
Forest Biology Rangers Independently	2	54	116	104	52		328
Forest Biology Rangers with Forest Service Personnel		10	34		3		47
Forest Service Personnel Independently	1	6	9	1	1		18
Other Co-operators							
TOTALS	3	70	159	105	56		393

TABLE 2
COLLECTIONS BY HOSTS
WEST NELSON - 1954

Coniferous Hosts	Forest Insects	Tree Diseases	Broad-leaved Hosts	Forest Insects	Tree Diseases
Douglas fir	154	4	Willow	11	1
Western larch	48	7	Birch	8	7
Ponderosa pine	31	4	Alder	5	2
Western hemlock	29	4	Chokecherry	4	-
Lodgepole pine	26	3	Black cottonwood	3	1
Engelmann spruce	20	1	Trembling aspen	2	7
Alpine fir	19	6	Miscellaneous	6	4
Western red cedar	18	8	No Host	5	-
Western white pine	3	-			
Grand fir	1	-			
			Totals	44	22
Totals	349	37	GRAND TOTALS	393 [*]	59

^{*}Includes 65 collections by other Co-operators.

the same general vicinity where this species was recovered were at Sutherland Creek and along the Cascade Highway; at Myncaster and McKinley creeks in the Kettle Valley area; and at several points near Beaverdell. The host was western larch in all cases.

Western Hemlock Looper, *Lambdina fiscellaria lugubrosa* (Hlst.). A decrease in population density was evident in nearly all areas examined. The distribution of the species, however, seemed to be unaffected. One or two larvae per collection were obtained at widely separated points in the Kettle and West Kettle River systems. The main host was Douglas fir but specimens were also found on western larch, alpine fir and Engelmann spruce. Another area supporting very light but consistent populations was the western Cascades. The host was Douglas fir. One collection containing three larvae was obtained from western hemlock at Sitkum Creek in the Nelson area.

Douglas-fir Beetle, *Dendroctonus pseudotsugae* Hopk. Activity is centred mainly in the Kettle River system. Main area of attack is in the West Kettle River valley where surveys have been carried out during the past two years. One new patch of attack was discovered near State Creek in the Kettle River valley. The status of this beetle would indicate a slight decrease in activity from previous years along the West Kettle, but new areas of attack are constantly appearing in other parts of the district wherever the stand is of mature or overmature Douglas fir.

Western Tent Caterpillar, *Malacosoma pluviale* (Dyar). The infestation along the slopes of Inonoaklin Creek in the Monashee Mountains has increased in density and distribution. The infestation centred at Deep Creek has spread up the slopes on both sides of Inonoaklin Creek valley for a distance of nearly ten miles (10,000 acres).

A "tent" count made along two strips of one mile each is given in Table 3. New areas of attack were observed late in the season at Whatshan

TABLE 3

Location	1953	1954
Strip No. 1 - Deep Creek	175 tents	612 tents
Strip No. 2 - Boulder Creek	121 tents	277 tents

Lake in the same general vicinity. A light but consistent population also exists between the Inonoaklin Creek infestation and Whatshan Lake, indicating an extension of the infestation towards the north and east from the original area of attack at Deep Creek, a tributary of Inonoaklin Creek.

Forest Tent Caterpillar, *Malacosoma disstria* Hbn. The infestation in the Granby River valley collapsed completely this year due to a polyhedral virus. A mass collection of early instar larvae was obtained in June but at the time of peak larval development no larvae could be found. A subsequent inspection in August revealed no trace of pupae. An inspection of three trees for an egg mass collection revealed not a single fresh egg mass.

Douglas-fir Needle Miner, Contarinia sp. This Dipterous needle miner on Douglas fir was recorded in widely-scattered sections of the district. It affected current new foliage in various degrees of from 10 to 75 per cent.

Areas of most severe attack were at Cascade, coincident with the attack by Hemerocampa pseudotsugata at Edgewood and in the Pend d'Orielle River valley. All these areas contained an infestation intensity up to 75 per cent of current foliage.

Other areas not as severely affected were at Needles showing a 40 per cent attack, at Westbridge showing 20 per cent attack, and at Grand Forks and McRae Creek showing 15 per cent and 10 per cent respectively.

Willow Leaf Miner, Lyonetia saliciella Bask. The infestation extending from the Monashee to the boundary of the Central Nelson District near Burton, was active for the third consecutive year. The intensity and area of infestation has not changed appreciably during the past two years. No attempt was made to map the area, but the infestation was noted for a distance of about 35 miles between Lower and Upper Arrow Lakes, and along the slopes wherever the favoured host, willow, occurred. Intensity of attack varied from 10 to 100 per cent of foliage affected.

Engelmann Spruce Beetle, Dendroctonus engelmanni Hopk. At the instigation of Ranger A. Larsen of the British Columbia Forest Service at Nelson, an area of apparent infestation by this beetle was examined at Granite Creek, a tributary of Erie Creek, near Salmo. Very large sections of the country are burned-over and contain light deciduous growth, the timbered areas occur mainly at the higher elevations.

The area examined was of mature Engelmann spruce-alpine fir type. Profuse ground litter from bark flakes, and smooth reddish appearance of the boles of dead or unhealthy spruce trees indicated strong woodpecker activity. A few old, dry pitch tubes were noted, but no evidence of fresh attack was seen and no specimens of D. engelmanni could be found. The evidence is, however, typical of attack by this beetle, and a further and more detailed examination over a larger area will be undertaken. Other areas reported by Ranger Larsen as containing attacks by D. engelmanni were at Grohman Creek on the West Arm of Kootenay Lake, and at Oscar Creek near Ymir.

Areas of activity in the Boundary Creek area, Creston District, are described in a special report by J. Grant which follows.

"SPRUCE BEETLE IN BOUNDARY LAKE-PRIEST RIVER AREA"

"Forest Biology Rangers J. Grant and W. G. Simms spent the period from September 27 to September 29, 1954 in the Boundary Lake-Priest River area of the Nelson Forest District, where they instructed six B. C. Forest Service cruisers in the detection of trees infested by the Engelmann spruce beetle, Dendroctonus engelmanni. The cruising pairs concerned consisted of: F. Sutherland (in charge) and P. Haycroft; D. Melenka and J. Muraro; and R. Bates and G. Midge."

"The object of the instruction was to ensure that the cruisers would be able to recognize all infested trees on their cruise strips so that the severity of the attack could be determined, and so that all the infested areas could be included in the timber sale."

"While the spirit of co-operation on the part of the cruisers was excellent, it did not reach the point where they were willing to supplement normal cruising procedure with measures which we felt were necessary if the survey were to be reasonably accurate. These were (1) close examination for boring dust, of every tree trunk on the strips, and (2) a 10% instead of the designated 5% cruise. It was agreed, however, that the tally man would pay particular attention to the larger and more susceptible trees, and in the vicinity of infested trees would inspect the trunks carefully. Even with this concession it seemed probable that many trees would be missed owing to the difficulty of detecting fresh attack without a close inspection."

"It was unfortunate that we were unable to contact any interested parties in the Nelson District Office so that these points could have been settled before leaving for the field. However, Mr. Payne was absent from the office and we could not locate anyone with any information on the subject except the cruisers themselves."

"Regarding the severity of beetle attack in the area, the valley of Nun Creek, a tributary entering Priest River from the west, was found to contain a considerable number of beetle-killed and recently infested trees. The heaviest attack was along the creek bottom where groups of from 30 to 50 infested trees were common. It was estimated that this infestation had been under way at least three years."

"Adjacent to logging at the east end of Boundary Lake, several infested trees were scattered along the watercourse and there was also a small group of recently infested trees on the ridge south of the lake, very close to the International Boundary. Along the trail between Boundary Lake and Monk Creek, in undisturbed forest, no evidence of beetle attack was found, suggesting that the infestation occurs in well-defined patches rather than throughout the stand."

"An impression gained from our short stay in the area was that a long-term sale embracing about 16 square miles (much of it uninfested), such as is proposed, hardly seems to be the most effective means of either preventing further losses from beetle attack, or of efficiently salvaging the timber already killed."

False Hemlock Looper, Nepytia canosaria Wlk. A decided population decrease occurred throughout the area of N. canosaria's occurrence. Areas that had been showing an increase for the past two or three years suddenly showed a decrease to almost negative. Table 4 gives the average number of larvae per collection from Douglas fir between 1953 and 1954.

TABLE 4

Location	No. of larvae	
	1953	1954
Kootenay Lake - West Arm	10	.8
- Kootenay Bay	6.5	1.4
- Pend d'Orielle	3.5	0

In the Creston area this species achieved its lowest population since 1951. Areas previously yielding an average of 20 larvae per collection yielded only two or three in 1954.

Black-headed Budworm, *Acleris variana* (Fern.). The population of this species remained at a high level in the Mission Creek area of Creston. Biology Ranger W. G. Simms obtained two special collections of early instar larvae for Dr. G. W. K. Stehr of the Sault Ste. Marie Laboratory. The host was western hemlock.

Single specimens were obtained from Douglas fir at several points in the Cascade Mountains and at Mulligan Creek in the Kettle River valley; also from alpine fir at the Kettle River cutoff in the Monashee Range.

Status of Tree Diseases

White Trunk Rot, *Fomes igniarius* (L.) Gill. Only one area yielded specimens of this disease. Two collections were obtained: one from red alder, *Alnus rubra*, at Sand Creek in the Granby River valley, and one from trembling aspen, *Populus tremuloides*, at 10-mile point of the same area.

Hypoxylon Canker of Poplar, *Hypoxylon pruinaum* (Klot.) Cke. Intensive examinations throughout the district have failed so far to locate any sign of this canker.

Needle Cast of Western Larch, *Hypodermella laricis* v. Tubeuf. This needle cast was widely distributed but was not severe at any single location. The heaviest infestation occurred in the vicinity of lower Kootenay Lake, where small localized areas had suffered up to 50 per cent of the foliage affected.

Needle Cast, *Hypoderma deformans*. This fungus was prevalent throughout the range of ponderosa pine across the southern portion of the district. The main areas are at Grand Forks and Kettle Valley. It appears to be affecting the lower portion of the trees only, causing heavy needle drop.

Needle Rust, *Pucciniastrum pustulatum* (Pers.) Diet. This needle rust was observed on alpine fir at Sitkum Creek near Nelson. No apparent damage could be found.

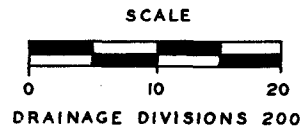
Foliage Rust, *Melampsora bigelowii* Thüm. This fungus was affecting the foliage of western larch and willow in varying degrees from 10 to 90 per cent. Area affected extended from the Monashee Range to the eastern boundary of the West Nelson District.

Flagging on Ponderosa Pine, *Cenangium ferruginosum* Fr. Two collections of this fungus were obtained near Kettle Valley: one at Johnstone Creek, and one at McKinney Creek. *Hypoderma deformans* was also present on the same trees. Damage appeared to be light; most of the dead branches were believed to be due to the latter fungus.

Witch's Broom on Saskatoon Bushes, *Asposporina collinsii*. Several patches of this disease were noted on saskatoon near the Edgewood-Whatsan Lake area.

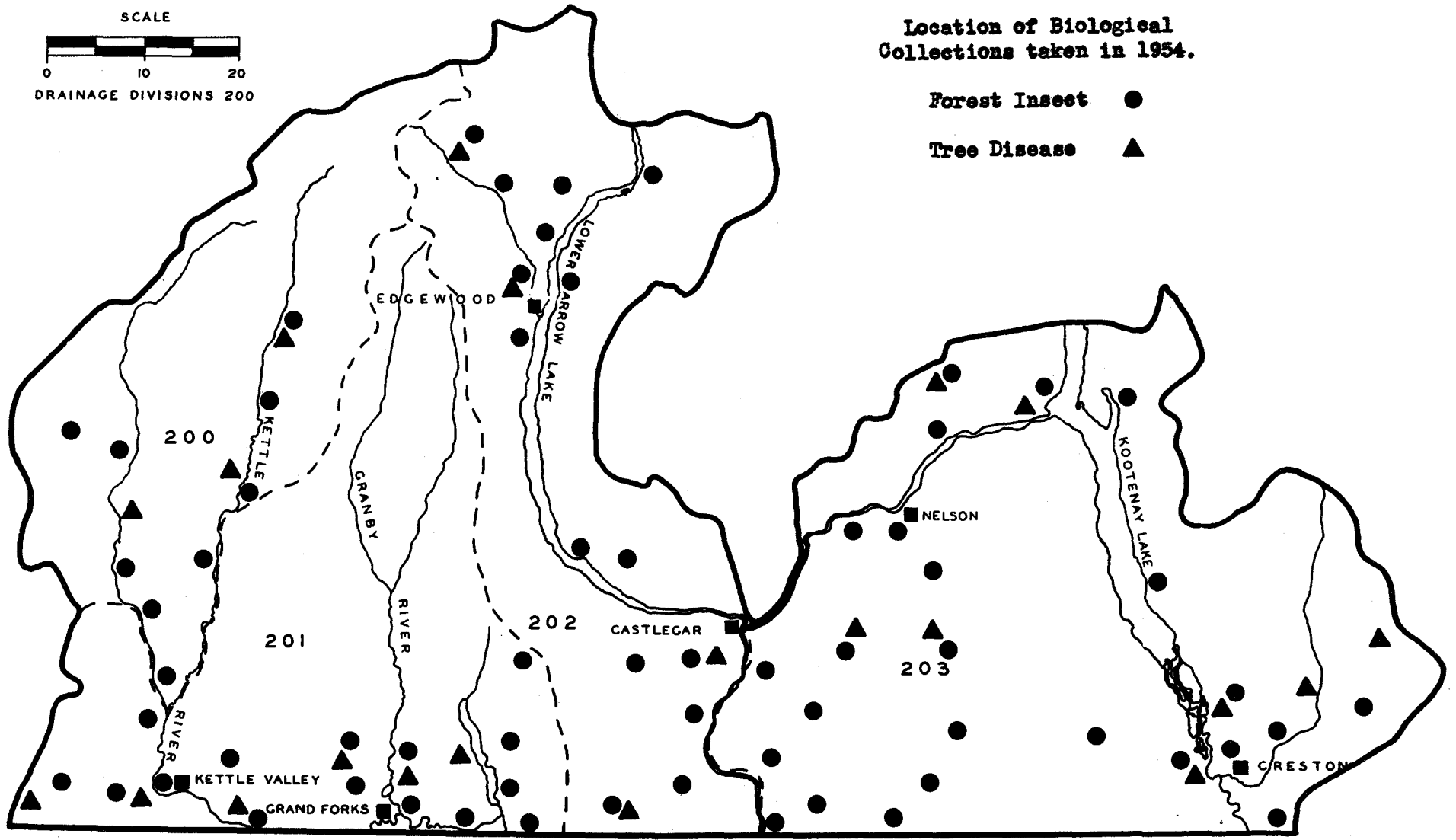
Indian Paint Fungus, Echinodontium tinctorium E. and E. Conks of this fungus were found in only one area. This was near Inonoaklin Crossing of the Monashee Range. The host was western hemlock. One specimen was also found on alpine fir in this same area.

WEST NELSON DISTRICT

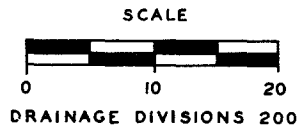


Location of Biological
Collections taken in 1954.

- Forest Insect ●
- Tree Disease ▲

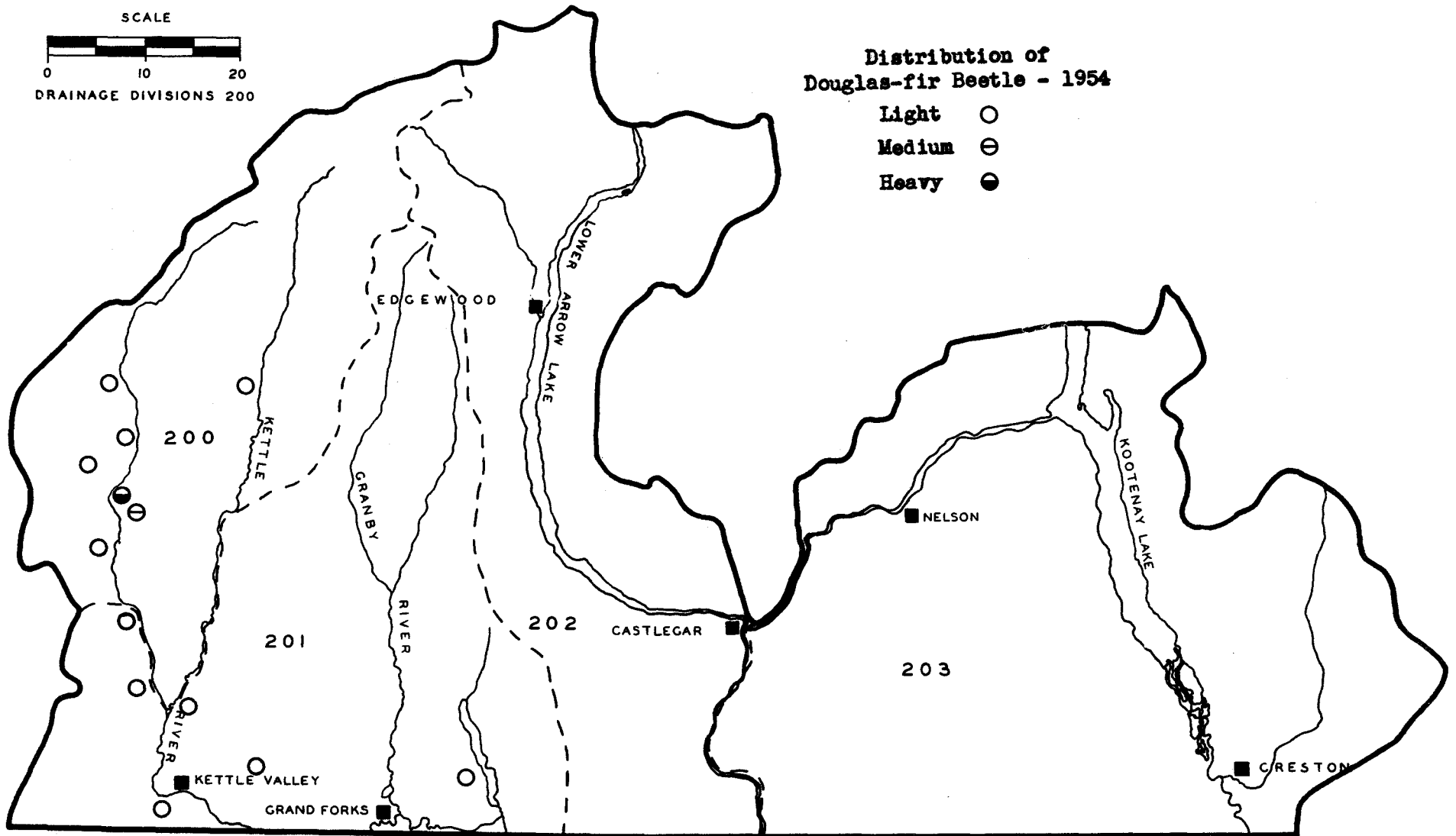


WEST NELSON DISTRICT



Distribution of
Douglas-fir Beetle - 1954

- Light ○
- Medium ⊖
- Heavy ●



CENTRAL NELSON

by W.E. Bitz

Introduction

A total of 43 days was spent in the Central Nelson District. Biology Rangers obtained 224 forest insect collections and 47 tree disease collections, in addition to which, 21 insect collections were submitted by co-operators. Table 1 shows number of forest insect collections by months and agencies, and Table 2 shows all collections by hosts.

A 16-foot outboard boat, built during the winter by the rangers at the Vernon Laboratory, was initiated on a special survey of the Upper Arrow Lake region.

The information concerning the Revelstoke and Big Bend area was provided by Ranger B. A. Sugden.

Status of Insects

Tent Caterpillar, Malacosoma spp. The infestation areas reported in the Slocan Valley area have expanded in all cases. The Summit Lake area expanded from last year's 250 acres to an estimated 1,200 acres. The spread was mainly southward toward the New Denver area, where the deciduous growth is more abundant. An interesting item, noted for the first time this year, was the presence of large numbers of adults of a dipterous parasite, Sarcophagidae, at the time of 4th and 5th instars of the host M. disstria.

In the area surrounding Three Forks the localized infestations have now spread so as to form a more or less continuous infestation joining Kane Creek, Carpenter Creek and Seaton Creek. The attack is expanding eastward toward Kaslo. Light populations of M. pluviale existed to a point beyond Retallack, a distance of approximately 16 miles. M. disstria populations became lighter at the higher elevations toward Retallack.

The Arrowhead infestation, which consisted mainly of M. disstria, has decreased this year to medium intensity. Patches of 100 per cent defoliation were very scarce. General attack showed less than 50 per cent defoliation of the favoured host, aspen.

The population along the valley bottom from Arrowhead to Revelstoke was generally light with patches of medium defoliation evident at scattered intervals. The infestations at Mt. McPherson and Williamson Lake near Revelstoke subsided completely this year due mainly to a polyhedral virus.

Two infestation points north of Revelstoke; one at Mile 17 and one at Downie Creek, also have subsided completely.

An egg survey was conducted to determine next year's potential populations in the infestation areas. Dissection of eggs from five egg

TABLE 1

FOREST INSECT COLLECTIONS BY AGENCIES

CENTRAL NELSON - 1954

Personnel Involved In Collection	Number of Collections						TOTALS
	May	June	July	Aug.	Sept.	Oct.	
Forest Biology Rangers Independently	2	35	73	90	10		210
Forest Biology Rangers with Forest Service Personnel				17	4		21
Forest Service Personnel Independently	1	2	2	1			6
Other Co-operators				8			8
TOTALS	3	37	75	116	14		245

TABLE 2
COLLECTIONS BY HOSTS
CENTRAL NELSON - 1954

Coniferous Hosts	Forest Insects	Tree Diseases	Broad-leaved Hosts	Forest Insects	Tree Diseases
Western hemlock	107	1	Trembling aspen	13	11
Douglas fir	44	5	Willow	9	1
Western red cedar	19	11	Black cottonwood	6	1
Western larch	12	3	Alder	2	-
Engelmann spruce	7	-	Birch	2	3
Lodgepole pine	7	1	Miscellaneous	3	1
Western white pine	6	6	No host	3	-
Alpine fir	4	3			
Ponderosa pine	1	-			
			Totals	38	17
Totals	207	30	GRAND TOTALS	245*	47

* Includes 35 collections by other Co-operators.

masses from each of four areas was carried out to determine egg mortality. The results of the egg survey and the egg dissection are given in Table 3.

TABLE 3

Location	Egg masses per tree	Per Cent Mortality		Population forecast for 1955
		Parasitized	Other causes	
Summit Lake	31	.6	18.3	Heavy
Zincton	16.6	1.6	31.6	Heavy
Sandon	3.7	3.3	28.1	Light
Sidmouth	1.6	1.3	25.7	Light

Western Hemlock Looper, *Lambdina fiscellaria lugubrosa* (Hlst.). An increase in the average number of larvae per collection was evident this year in the Columbia River valley. The area affected extended from Mile 33 to Mile 100 north of Revelstoke on the Big Bend Highway. Table 4 gives a comparison for the last three years, based on average number of larvae per collection.

TABLE 4

Year	Host	Larvae
1952	Hemlock	1.5
1953	Hemlock	2.0
1954	Hemlock	11.6

During the month of August three mass collections were made from this area, each containing 100 larvae.

The hemlock looper population remained light on the Cranberry Creek area near Arrowhead. The average number of larvae per collection for 1952, 1953 and 1954 are shown in Table 5.

TABLE 5

Year	Host	Larvae
1952	Hemlock	2.1
1953	Hemlock	3.4
1954	Hemlock	2.2

Collections containing only one or two larvae were also made from hemlock in the Trout Lake area, in the vicinity of Kaslo at Keen and Woodbury creeks, and Sitkum Creek in the Nelson area.

False Hemlock Looper, *Nepytia canosaria* Wlk.? This species remained at a very low population level throughout the district. The areas of highest incidence were at Arrowhead and in the Lardo area. Both places showed an average of 2.2 larvae per collection. The host was western hemlock. Single specimens were also obtained from Douglas fir at Kaslo and Slocan Lake.

Black-headed Budworm, *Acleris variana* (Fern.). The infestation along Keen Creek showed an increase in intensity from an average of 54 larvae per collection in 1953 to an average of 76 this year, but the size of the infested area has not increased. Beginning at about one mile from Kaslo River, it extends for nearly six miles along Keen Creek from the valley bottom to an elevation of nearly 4,000 feet. The population over this entire area is very light, except for one area of about 300 acres where an average population of 76 larvae per collection was obtained. The host is western hemlock in a stand of overmature cedar-hemlock.

A light population of this species exists throughout the cedar-hemlock stands of the Upper Kootenay Lake area, Lardo, and parts of Upper Arrow Lake region. Average number of larvae per collection for localized areas in this region are shown in Table 6.

TABLE 6

Location	Host	
	Hemlock	Engelmann Spruce
Upper Kootenay Lake	3.9	2.5
Lardo	1.7	
Arrowhead	1	

Spruce Budworm, *Choristoneura fumiferana* (Clem.). Only four collections in the entire district contained larvae of this species. They are shown in Table 7.

TABLE 7

Location	Host	Larvae per Collection
Slocan Lake	Western Larch	1
Nakusp	Douglas Fir	1
Keen Creek (Kaslo)	Western Hemlock	1
Woodbury Creek (Kaslo)	Alpine Fir	1

Mountain Pine Beetle, *Dendroctonus monticolae* Hopk. There is a considerable amount of continuing beetle activity throughout the range of western white pine in the Upper Arrow Lake region and the Columbia River valley from Arrowhead to Mile 70 north of Revelstoke. The most intense activity is still centred near Downie Creek. However, scattered patches of "red tops" can be found wherever suitable white pine occurs throughout the overmature cedar-hemlock stands.

A special survey of the Upper Arrow Lake region revealed practically no activity at the sites of earliest attack at Pingston Ridge and Beaton, due largely to lack of suitable host material. These infestations were described in special reports in 1951 and 1952. Other areas in this region showing fresh attack were at Nacilleweat Creek, Bannock Point and along the north shore of the Northeast Arm. Fresh attack was also noted at Craig Creek and Asher Creek along the west side of Trout Lake.

Willow Leaf Miner, Lyonetia saliciella Bsk. The infestation of the past two years contained unabated during 1954. It extended a distance of over 25 miles from the boundary of the West Nelson District near Burton, to a point beyond Nakusp wherever the natural host, willow, occurred. Up to 100 per cent of the foliage was affected in some localized areas.

Poplar Leave Miner, Phyllocnistis populiella Cham. This species was present affecting aspen and cottonwood in varying degrees from 10 per cent to 100 per cent. The area of most noticeable activity was between New Denver and Retallack, where it is competing with Malacosoma spp., a distance of about 16 miles. Widely scattered spots of attack were also noted along the Slocan Valley. CN 1954

Douglas-fir Beetle, Dendroctonus pseudotsugae Hopk. No activity by this beetle was located this year in this district. One collection obtained in 1953 at Kaslo is the only record to date.

Saddle-back Looper, Ectropis crepuscularia Schiff. This species was associated with hemlock looper in the Columbia River valley north of Revelstoke. Its distribution was possibly greater than that of the hemlock looper, and the population level was about the same.

Status of Tree Diseases

White Trunk Rot, Fomes igniarius (L.) Gill. No evidence of this disease could be found in the district.

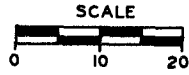
Indian Paint Fungus, Echinodontium tinctorium E. and E. Conks of this fungus have been noted throughout the range of western hemlock in this district.

Needle Cast of Western Larch, Hypodermella laricis v. Tubeuf. Only a trace of very light attack could be seen throughout the district except in the vicinity of Kootenay Lake where up to 50 per cent of foliage was discolored.

Cedar Leaf Blight, Keithia thujina Durand. This was the most common leaf disease in the Central Nelson District. It occurred in varying degrees throughout the range of cedar.

Needle Rust, Pucciniastrum pustulatum (Pers.) Diet. An area of attack by this rust was located along the Jackson Basin road near Retallack. The area was only two to three acres in extent and current foliage of alpine fir was the principal host.

CENTRAL NELSON DISTRICT

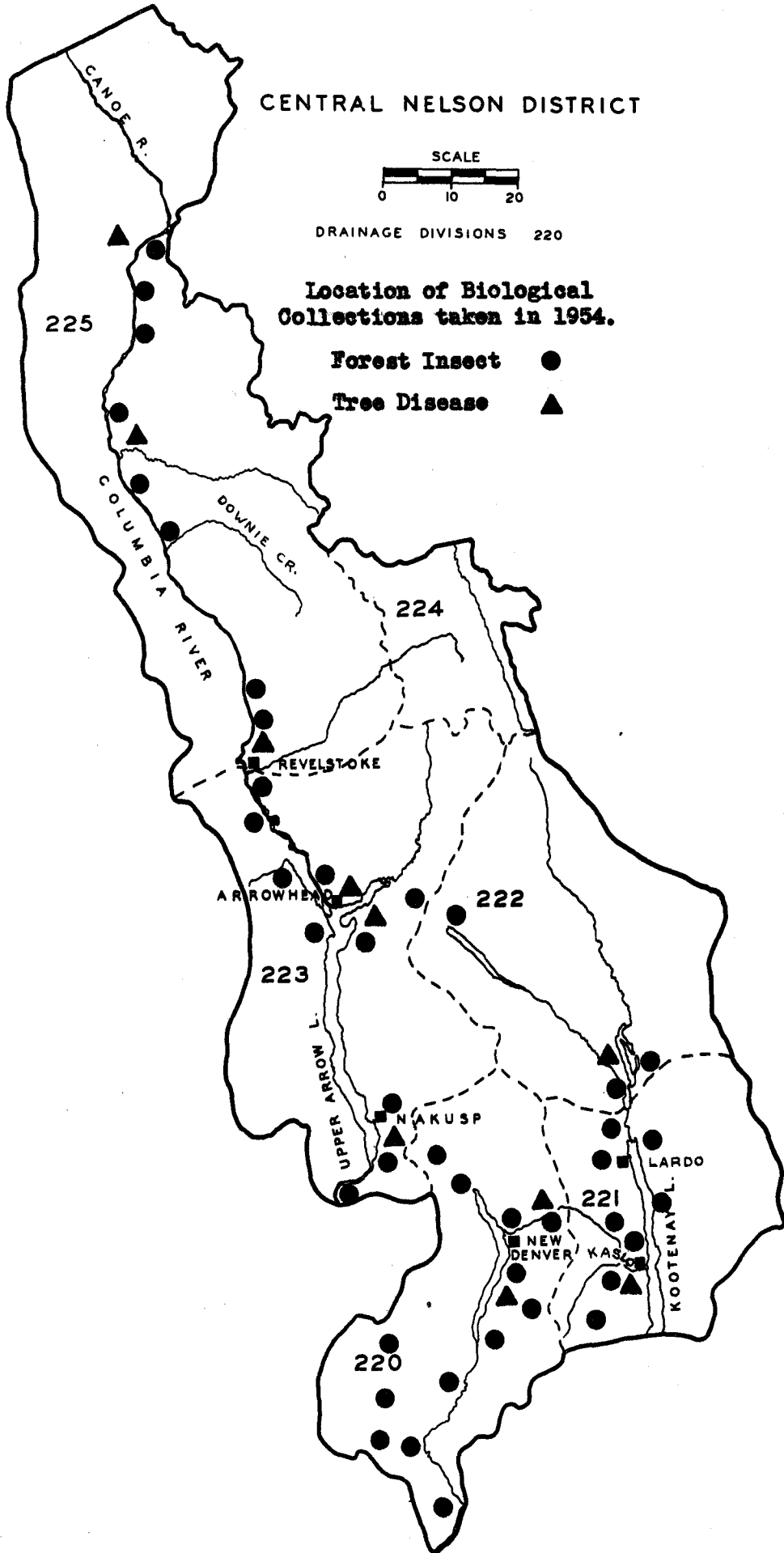


DRAINAGE DIVISIONS 220

Location of Biological
Collections taken in 1954.

Forest Insect ●

Tree Disease ▲



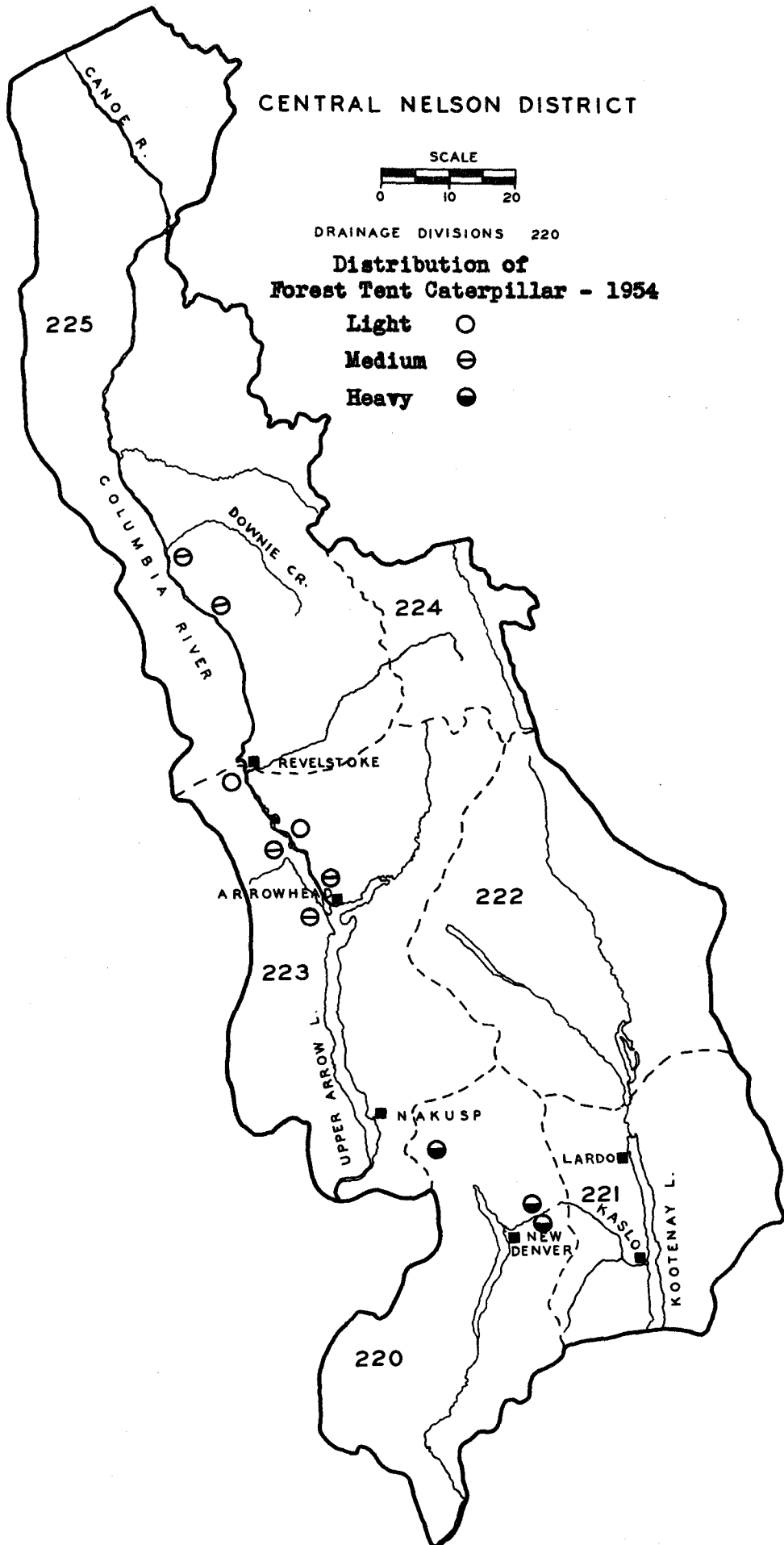
CENTRAL NELSON DISTRICT



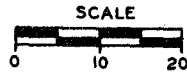
DRAINAGE DIVISIONS 220

Distribution of
Forest Tent Caterpillar - 1954

- Light ○
- Medium ⊖
- Heavy ●



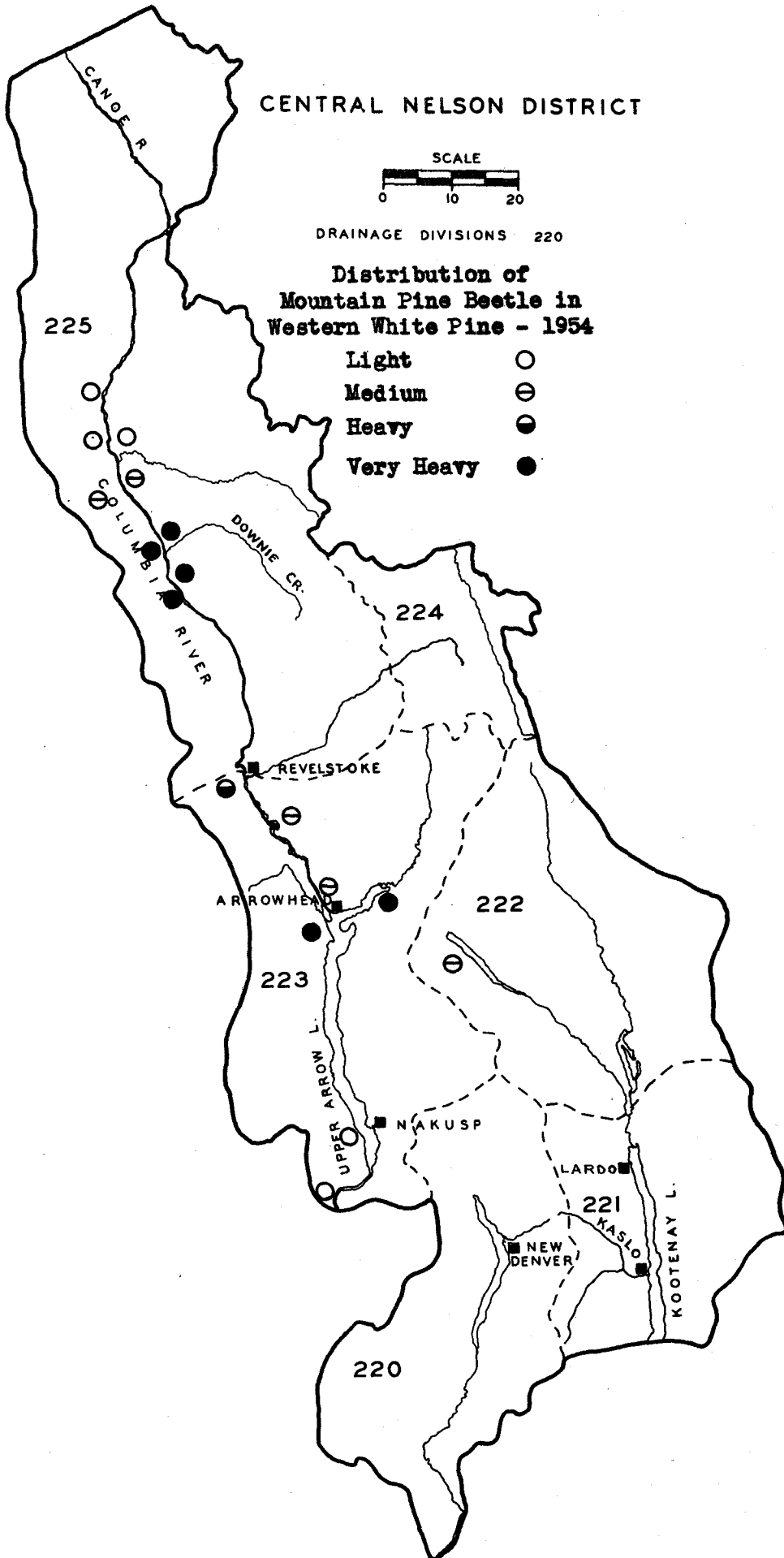
CENTRAL NELSON DISTRICT



DRAINAGE DIVISIONS 220

Distribution of Mountain Pine Beetle in Western White Pine - 1954

- Light ○
- Medium ⊖
- Heavy ⊙
- Very Heavy ●



EAST NELSON

by W. G. Simms

Introduction

The Forest Insect and Disease Survey in the East Nelson Forest District commenced on June 23 and ended on September 23. A preliminary survey was made on May 27 and 28 to gather information on the larval population of forest tent caterpillars, Malacosoma disstria Hbn., in the Golden and Spillimacheen districts.

Forest insect collections made by biology rangers during the 1954 season numbered 352. Co-operators added 21, to bring the total to 373. Tree disease collections made by biology rangers totaled 51. Table 1 shows the source of the insect collections on a monthly basis by agencies. Table 2 contains a list of the host trees and shrubs showing the number of forest insect and tree disease collections made from each.

Status of Insects

Forest Tent Caterpillar, Malacosoma disstria Hbn. A preliminary survey of the forest tent caterpillar larval population in the Golden and Spillimacheen districts was made during the last part of May. Three colonies of early instar larvae were found at that time. A further survey was made in the fourth week of June in the same areas but no larvae of this species were to be found then. Egg surveys were conducted again in the fall to estimate the larval population for 1955. Egg mass collections were made at Brisco, Spillimacheen and Nicholson. Information gathered from these areas is shown in the following table:

Location	Average d. b. h.	Average crown length	Average No. of egg masses per tree	Infestation forecast for 1955
Brisco	7"	24'	.33	Nil
Spillimacheen	6"	22'	.33	Nil
Nicholson	7"	24'	0	Nil

All collections were made from trembling aspen trees. Malacosoma disstria larvae appeared in only three random collections throughout the East Nelson District during the field season of 1954.

Black-headed Budworm, Acleris variana (Fern.). Larvae became more numerous in collections during 1954. Hand-picked collections of early instar larvae were made during late June from Engelmann spruce all along Moberly Bench north of Golden, and on Windermere Creek, near Invermere. The insect was also common on western hemlock, Douglas fir and Engelmann spruce along the Big Bend Highway, and on Lamb Creek (Moyie Lake), Big Sand Creek (Elko) and Upper Elk River.

TABLE 1

FOREST INSECT COLLECTIONS BY AGENCIES

EAST NELSON - 1954

Personnel Involved In Collection	Number of Collections						TOTALS
	Prior to June	June	July	Aug.	Sept.	Oct.	
Forest Biology Rangers Independently	2	37	156	130	26		351
Forest Biology Rangers with Forest Service Personnel					1		1
Forest Service Personnel Independently	3	4	7	2	4	1	21
Other Co-operators							
TOTALS	5	41	163	132	31	1	373

TABLE 2

COLLECTIONS BY HOSTS

EAST NELSON - 1954

Coniferous Hosts	Forest Insects	Tree Diseases	Broad-leaved Hosts	Forest Insects	Tree Diseases
Douglas fir	113	1	Trembling aspen	11	14
Engelmann spruce	87	7	Willow spp.	4	1
Lodgepole pine	60	8	Birch spp.	3	
Western hemlock	25	4	Mixed Hosts	8	
Ponderosa pine	16		No Host	5	
Western larch	14	1			
Alpine fir	11	2			
Western red cedar	9	12			
Rocky mountain juniper	5	1			
White pine	2				
			Totals	31	15
Totals	342	36	GRAND TOTALS	373*	51

*Includes 21 collections by other Co-operators.

Western Hemlock Looper, Lambdina fiscellaria lugubrosa Hlst. An increase in the population of the hemlock looper along the Big Bend between Blackwater Lakes and Czar Creek, was evident during 1954. Collections from western hemlock and western red cedar produced up to 12 larvae per collection with the average being six. Adults were numerous in this area during the third week of September. The Big Bend Highway was the only area in which the hemlock looper was common in collections during 1954.

Also found in conjunction with hemlock looper larvae were numerous filament bearers, Nematocampa filamentaria Guenee, which, while not reaching epidemic proportions, have increased in population over the last few years.

A Sawfly on Hemlock, Neodiprion sp. Larvae were common but low in numbers in collections from western hemlock along Big Sand Creek, Lamb Creek, and the Big Bend Highway.

Sawfly on Lodgepole Pine, Neodiprion sp. Larvae of this species were common on lodgepole pine throughout the Invermere and Spillimacheen districts during late June.

False Hemlock Looper, Nepytia canosaria Wlk.?. A sharp decline in the number of larvae found in collections was noted when attempts were made in July and August to acquire mass collections of this insect in stands of Douglas fir, in the Canal Flats, Invermere, and Elko Forest Ranger districts. Nepytia larvae averaged less than one per collections.

Spotless Fall Webworm, Hyphantria textor Harr. "Tents" were more numerous this year in the East Cranbrook and Elko districts. In a one-mile strip, south of Elko, near Dorr, 26 "tents" were counted on chokecherry bushes. Only 11 tents were counted in 1952 on the same area and no count was made in 1953. Special collections were sent to Dr. W. G. Wellington in Victoria.

Ugly-nest Caterpillar, Archips cerasivorana (Fitch). Larvae stripped roadside chokecherry bushes between Fairmont P.O. and Shuswap Creek, in the Invermere District.

Western Tent Caterpillar, Malacosoma pluviale (Dyar). Larvae were numerous on antelope bush, Purshia tridentata, again this year throughout the Elko District.

Mountain Pine Beetle, Dendroctonus monticolae Hopk. The mountain pine beetle infestation in lodgepole pine along Frances and Forster creeks showed very little activity in 1954. A few trees were lightly attacked this year but most beetles appeared to have been drowned out. A considerable amount of salvage cutting of dead and dying trees has been done in this area. An examination of the Steamboat Mountain infestation showed bark beetle activity to be about the same as in 1953. The infestation still persists along the east side of the mountain but the attack is light.

The Windermere Creek infestation is still spreading slowly east and west along the mountain on the south side of the creek.

Still very active is the area on the mountainside west of Whitetail Lake, Canal Flats, where the infestation is spreading to the north. A small patch of infested lodgepole pine now exists on the east side of the lake, directly opposite the main patch.

A very heavy blowdown area of lodgepole pine in the vicinity of Cartwright Lake, Spillimacheen District, was inspected by W. G. Mathers and Forest Biology rangers during the third week in September. They were shown through the area by D. Munro, Silviculturist of the B. C. Forest Service. The blowdown, which occurred in July of 1952, is too severe and extensive to warrant a salvage operation. No sign of bark beetle build-up was evident at the time of investigation. Only one lodgepole pine tree (standing) was found supporting a population of mountain pine beetle, Dendroctonus monticolae, on this area.

Douglas-fir Beetle, Dendroctonus pseudotsugae Hopk. Small patches of mature and overmature Douglas fir trees, one to two miles north of Fairmont Hot Springs, along the east side of Windermere Lake, are still being attacked by this beetle. Spot infestations are also present along the mountainside east of Windermere.

Engelmann Spruce Beetle, Dendroctonus engelmanni Hopk. Last year's beetle-infested Engelmann spruce stands on Van, Little Jim, and Lamb creeks, in the Cranbrook District, were found free of attack this fall when examined by Forest Biology rangers. All infested trees on the three locations were logged off during the fall of 1953 and the spring of 1954. Beetle-infested spruce stumps were peeled on the Lamb Creek infestation and logs were taken to the mill in the spring.

Status of Tree Diseases

Forest Biology rangers collected a total of 51 tree disease samples in the East Nelson District in 1954 and attention was concentrated during the season on locating two fungi. These two were Keithia thuja Durand, and Fomes igniarius (L.) Gill. A special lookout was kept when travelling through stands of trembling aspen for a canker disease, Hypoxyton pruina (Klotzsch) Cke., however, no evidence of this disease was found.

Most significant disease affecting the forests in 1954 was Hypodermella laricis Tubeuf, which caused heavy discoloration and needle drop to large stands of western larch in the Canal Flats, Elko, West Cranbrook, and Creston districts.

Keithia thuja Durand lightly affected the needles on western red cedar in most areas throughout the district.

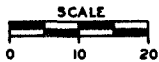
Fomes igniarius (L.) Gill., fungi were found on Populus spp., and Betula spp. in small numbers. Its distribution was scattered throughout the East Nelson District.

A leaf spot, not yet identified, caused the leaves of trembling aspen, Populus tremuloides, to turn brown and drop off during the last week in June, along Moberly Bench, north of Golden.

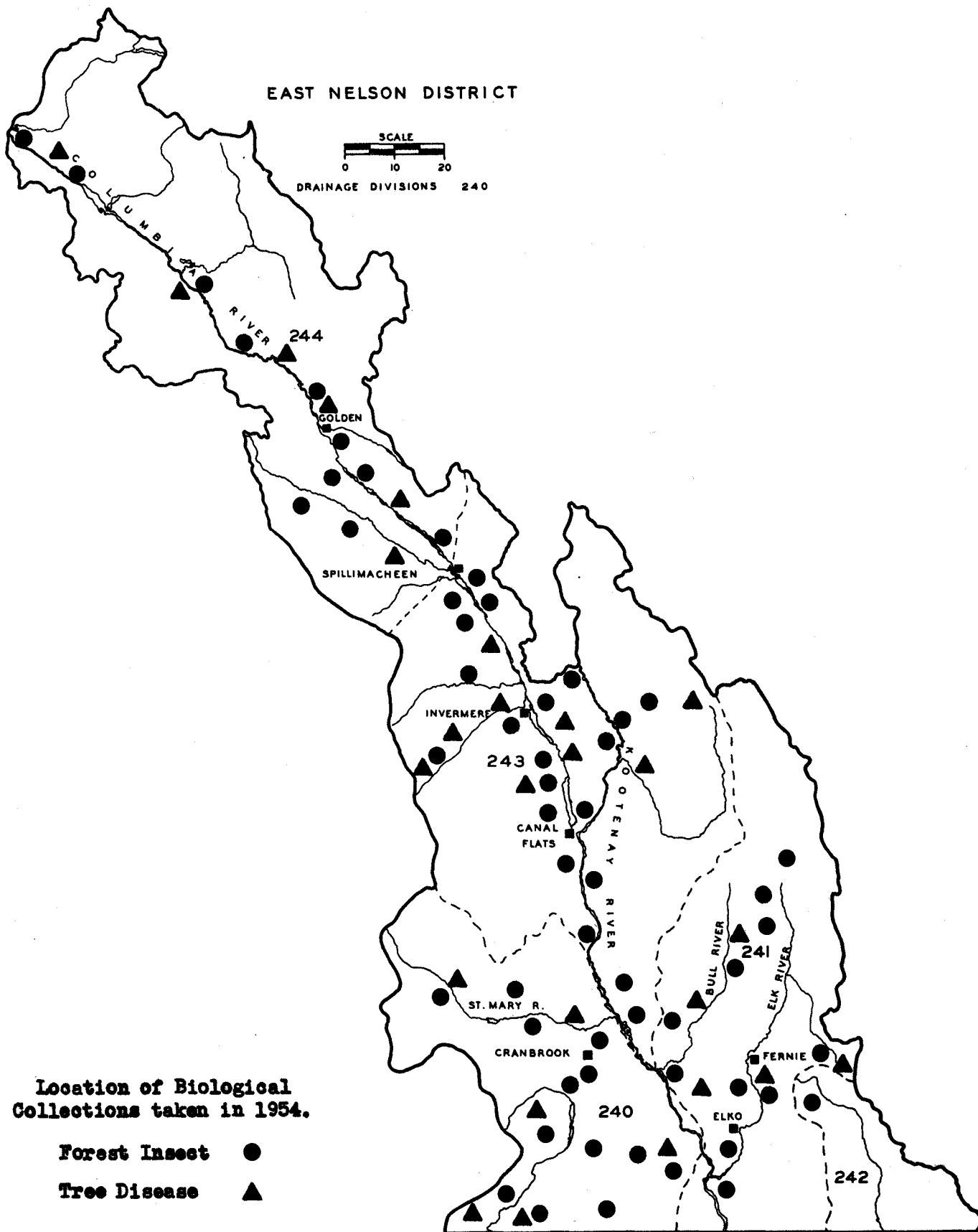
The dwarf mistletoe, Arceuthobium americanum Nutt., was fairly common and was distributed throughout most stands of lodgepole pine. It appeared most numerous on this species in the Canal Flats, Invermere and Spillimacheen districts.

An unidentified rust on the needles of Engelmann spruce was very heavy and appeared in small concentrated areas along Frances Creek, Upper Kootenay River, Palliser River, and Toby Creek, all in the Invermere and Canal Flats districts.

EAST NELSON DISTRICT



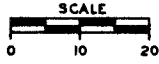
DRAINAGE DIVISIONS 240



Location of Biological Collections taken in 1954.

- Forest Insect ●
- Tree Disease ▲

EAST NELSON DISTRICT

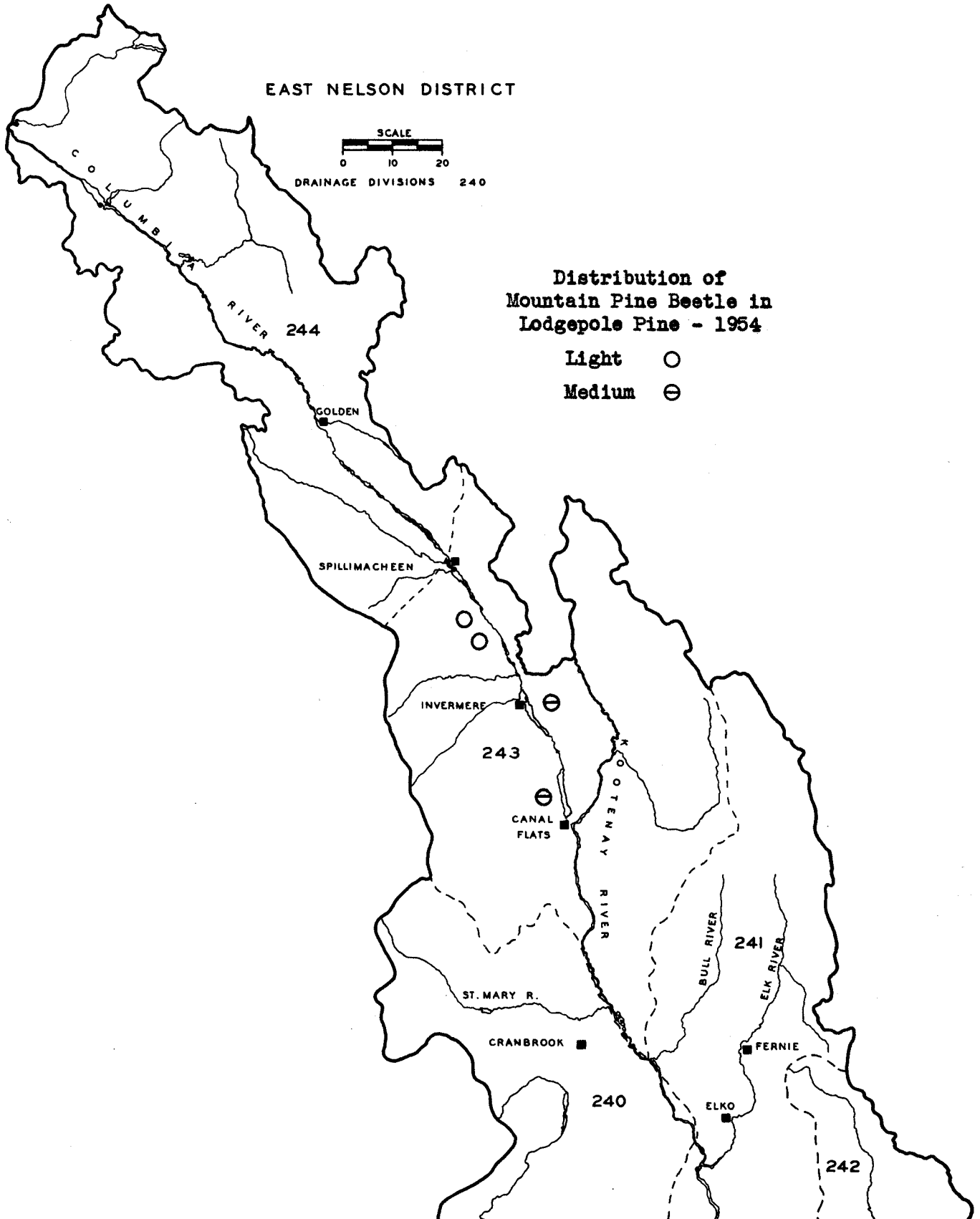


DRAINAGE DIVISIONS 240

Distribution of
Mountain Pine Beetle in
Lodgepole Pine - 1954

Light ○

Medium ⊖



PRINCE GEORGE FOREST DISTRICT - 1954

INTRODUCTION

by
J. Grant

In the 1954 field season, Forest Biology Rangers J. Grant and C. B. Cottrell were assigned to the Prince George Forest Biology Ranger District. Their arrival on June 16 was considerably later than usual, and this, coupled with the necessity of working together until the end of July when a second vehicle became available, resulted in less complete coverage of the district than was attained in 1953. Field work ended in the third week of September.

Cottrell spent the month of August in the North Prince George District where he conducted routine survey work along the Northwest Highway System in Northern British Columbia and Yukon Territory. This was the first time that a cabin trailer had been used in this district.

Two aeroplane flights were provided by the British Columbia Forest Service and one by a logging company.

The spruce budworm, Choristoneura fumiferana (Clem.), in the flight year of its two-year life-cycle was the most important forest pest in 1954. Defoliation caused by the forest tent caterpillar, Malacosoma disstria Hbn., was again widespread but covered very little new territory.

For the first time since the inception of the Forest Insect Survey in the Prince George District, the western hemlock looper, Lambdina fiscellaria lugubrosa (Hlst.), reached infestation proportions in several localities.

The Douglas-fir beetle, Dendroctonus pseudotsugae Hopk., was again the most serious pest in the southern part of the district, where heavy losses occurred.

The population of a spruce beetle, Dendroctonus ? borealis Hopk., at Sinclair Mills declined in 1954 but several other local infestations were found in the Penny Forest Ranger District.

Some extensive stands of aspen between Fort St. John and Beaton River on the Alaska Highway were defoliated by the large aspen tortrix, Archips conflictana (Wlk.). Further north, along the Liard River valley, the aspen leaf miner, Phyllocnistis populiella Cham., disfigured aspen and poplar foliage for the third consecutive year.

In the Forest Disease Survey particular attention was given to the aspen canker, Hypoxyton pruinatum (Klotzsch) Oke., and to Fomes igniarius (L.) Gill. Rusts and foliage diseases made up the bulk of the collections, which were submitted to the Forest Pathology Laboratory at Victoria.

SOUTH PRINCE GEORGE and WEST PRINCE GEORGE

by
J. Grant

Introduction

Field work commenced on June 16 and was continuous in these districts until September 23. Rangers Grant and Cottrell worked together until the end of July when Cottrell left for North Prince George.

Four mass collections of forest tent caterpillars were submitted to the Vernon Laboratory and one mass collection of spruce budworm was taken for Dr. G. W. K. Stehr at Sault Ste. Marie, Ontario. Eleven collections of western hemlock loopers were mailed to the Insect Disease Survey at Victoria.

Tables 1 and 2 show the number of forest insect collections by months and agencies for South Prince George and West Prince George districts respectively. Tables 3 and 4 show Forest Insect and Tree Disease collections by hosts for these districts.

Status of Insects

Spruce Budworm, *Choristoneura fumiferana* (Clem.). In 1954 the maturing larvae of the two-year cycle budworm caused varying degrees of damage over much of the district. Defoliation of sufficient severity to cause discoloration occurred along the western slopes and in the sheltered valleys of the Rocky Mountains from near the headwaters of the Parsnip River northward to Peace Pass. In some of the valleys and particularly in Pine Pass, populations were very high and the crowns of alpine fir were partially denuded of old foliage as well as suffering the loss of all the current growth. Heavy recent mortality of alpine fir was observed from the air in Clearwater River valley, a tributary of the Peace, but it could not definitely be attributed to the spruce budworm.

West of the Parsnip and Crooked River valleys defoliation occurred at elevations of from 3,000 to 5,000 feet elevation wherever suitable forest cover remained, from the vicinity of Carp Lake northward to the eastern slope of the Wolverine Range about 30 miles southwest of Finlay Forks. Although defoliation was again severe a decrease from the 1952 population level occurred in the overmature spruce-alpine fir forest on the Nation River Mine road; in the surrounding second growth stands discoloration was more noticeable than in previous years. North of Fort St. James, light to medium defoliation of spruce and alpine fir stands occurred westward to the district boundary.

Defoliation ranged from light to medium along the length of the Pack and Crooked River valleys and over most of the uplands to the east, as far south as Averil Mountain.

TABLE 1

FOREST INSECT COLLECTIONS BY AGENCIES

SOUTH PRINCE GEORGE - 1954

Personnel Involved In Collection	Number of Collections						TOTALS
	May	June	July	Aug.	Sept.	Oct.	
Forest Biology Rangers Independently		41	89	22	34		186
Forest Biology Rangers with Forest Service Personnel			2	16			18
Forest Service Personnel Independently	1	5	10	5	6	1	28
Other Co-operators							
TOTALS	1	46	101	43	40	1	232

TABLE 2

FOREST INSECT COLLECTIONS BY AGENCIES

WEST PRINCE GEORGE - 1954

Personnel Involved In Collection	Number of Collections						TOTALS
	May	June	July	Aug.	Sept.	Oct.	
Forest Biology Rangers Independently		17	62	46	11		136
Forest Biology Rangers with Forest Service Personnel				8			8
Forest Service Personnel Independently	1	17	3	2	3	1	27
Other Co-operators							
TOTALS	1	34	65	56	14	1	171

TABLE 3

COLLECTIONS BY HOSTS

SOUTH PRINCE GEORGE - 1954

Coniferous Hosts	Forest Insects	Tree Diseases	Broad-leaved Hosts	Forest Insects	Tree Diseases
White & Engelmann spruce	67	6	Trembling aspen	21	7
Alpine fir	53	11	Willow spp.	4	1
Douglas fir	23	5	Alder spp.	1	
Western hemlock	22		Birch spp.	5	
Lodgepole pine	18	3	Miscellaneous	8	17
Black spruce	4				
Western red cedar	3				
Rocky mountain juniper	3				
Whitebark pine		1			
			Totals	39	24
Totals	193	26	GRAND TOTALS	232*	50

*Includes 46 collections by other Co-operators.

TABLE 4

COLLECTIONS BY HOSTS

WEST PRINCE GEORGE - 1954

Coniferous Hosts	Forest Insects	Tree Diseases	Broad-leaved Hosts	Forest Insects	Tree Diseases
White spruce	57	3	Trembling aspen	17	7
Alpine fir	35	1	Willow spp.	8	3
Lodgepole pine	15	1	Alder spp.	3	
Douglas fir	13	3	White birch	1	2
Black spruce	9	4	Cottonwood	1	
Eastern larch	7		Miscellaneous	5	
			Totals	35	12
Totals	136	12	GRAND TOTALS	171*	24

*Includes 35 collections by other Co-operators.

The most noteworthy change in the status of the budworm occurred in the eastern part of the Wells District, where there was a marked decrease. From Summit Creek valley to Bowron Lake, eleven random collections yielded an average of only 6.6 larvae, compared with an average of 236 larvae per sample in the same area in 1952. In the vicinity of Barkerville there was a slight decrease but defoliation was again quite heavy, while from Wells west to Wingdam the population rose perceptibly.

Light defoliation also occurred in the mountains north of Sinclair Mills, along the valley of Ptarmigan Creek, between 3,000 and 4,000 feet elevation southwest of McBride, and along the height of land between the Fraser and Willow rivers.

Forest Tent Caterpillar, Malacosoma disstria Hbn. The trend of the tent caterpillar epidemic in 1954 was toward continued heavy defoliation around the perimeter of the outbreak and decreased damage near the centres where the attack began in 1951. Only locally were there any extensions of the 1953 infestation boundaries.

Heavy defoliation of aspen, and occasionally of practically all deciduous growth, was general in the following districts: in the Fraser River valley from Quesnel south to Macalister; in the Quesnel River valley; the Prince George area north to Salmon River district; and along the upper Fraser River valley from McBride to Mt. Robson where patches up to several hundred acres in extent were denuded. In addition, partial defoliation of small but heavy "spot" infestations occurred as far west as Cluculz Lake and throughout the region between Quesnel and Prince George, on both sides of the Fraser River.

Of natural control factors a polyhedral virus disease appeared to be the most effective in 1954 although it was of erratic distribution. Starvation resulting from over-population was not noted as frequently as in 1953. Of the dipterous parasites reared at the Vernon Laboratory, Sarcophaga aldrichi Parker, was the most common. Table 5 shows relative abundance of parasites reared from two mass collections taken near Prince George.

TABLE 5

Recovery of Parasites from Forest Tent Caterpillars Collected near Prince George

Species	Number of Parasites	
	83 prepupal larvae and 101 cocoons collected	216 cocoons collected
<u>Sarcophaga aldrichi</u> Park.	2	71
<u>Patelloa</u> sp. or spp.	24	24
<u>Rileymyia americana</u>	3	7
<u>Pseudosarcophaga affinis</u> (Fall.)	2	2
<u>Carcelia malacosomae</u> Sell.	1	1

Egg-mass samples were taken in seven localities in the Prince George, Hixon, and Quesnel districts. At each sample point, three dominant or co-dominant aspen trees were cut down and the egg masses counted. Table 6 shows the average number of egg-masses per tree for the years 1951 to 1954 in each locality where sampling was carried out.

TABLE 6
Average Number of Egg Masses per Tree

Locality	Average No. of Egg-masses per Tree			
	1951	1952	1953	1954
5 mi. SW of Prince George	-	101	118	41
Reid Lake	-	34	95	45
Woodpecker	66	35	70	16
Yardley Lake	54	67	29	6
Barlow Creek	61	143	39	6
P.G.E. Cottonwood River Bridge	36	179	35	8
Dragon Lake	-	74	48	38

Dissection of five egg masses from each of three trees at six sample points showed a reduction in both the number of eggs laid, and in the number of larvae surviving. The percentage of egg mortality resulting from miscellaneous causes such as predation, infertility, and the death of the partially-developed larvae, rose considerably in 1954, while parasitism remained low and was of erratic occurrence.

Table 7 shows by localities the egg mortality and survival figures for the years 1953 and 1954.

TABLE 7

Locality	Total No. of Eggs examined	Dead Eggs		Parasitized		Eggs containing living larvae	
		No.	%	No.	%	No.	%
Dragon Lake 1954	2030	230	11.3	49	2.4	1751	86.2
Dragon Lake 1953	2458	225	9.2	33	1.3	2200	89.5
Barlow Creek 1954	1736	174	10.0	22	1.3	1550	89.3
Barlow Creek 1953	2020	133	6.6	28	1.4	1859	92.0
Yardley Lake 1954	1455	167	11.5	35	2.4	1243	85.4
Yardley Lake 1953	2293	133	8.1	56	2.4	2052	89.5
Woodpecker 1954	1879	209	11.1	28	1.5	1642	87.4
Woodpecker 1953	2314	156	6.7	24	1.0	2134	92.2
5 Mi. SW, Pr. George 1954	1734	168	9.7	62	3.6	1504	86.7
5 Mi. SW, Pr. George 1953	2222	146	6.6	48	2.2	2028	91.3
Reid Lake 1954	1639	146	8.9	13	.8	1480	90.3
Reid Lake 1953	-	-	-	-	-	-	-

Douglas-fir Beetle, Dendroctonus pseudotsugae Hopk. South of Quesnel bark beetle attacks in mature Douglas fir stands increased in severity. The largest concentrations of infested trees occurred west of the Fraser River and were usually associated with recent logging; 140 "red tops" were counted within an area of about 40 acres near Buck Ridge, and another 120 trees in an adjoining stand. While less timber has so far been destroyed east of the river in this locality, the increased number of "spot" infestations probably foreshadows heavier losses within the next few years.

Scattered groups of infested Douglas fir were noted at Stuart Lake, near Giscome, and on Western Plywood's Management Licence.

Spruce Beetle, Dendroctonus (?) borealis Hopk. Light infestations were recorded at several localities in the Penny District. In Ptarmigan Creek valley, beetle-killed white spruce were scattered throughout a mature stand from Mile 2 to Mile 7 on the Forest Service trail. The population build-up responsible for this damage probably resulted from favourable breeding conditions in windthrown trees.

Local infestations were observed from the air in the valleys of Kenneth, Hungary and Slim Creeks, with the heaviest losses occurring in the last-named locality. The heaviest concentration of attack was almost invariably in the vicinity of the watercourses. It was believed that most or all of the local infestations in the Penny District stemmed from the extensive blowdown which was caused by a violent storm in October 1948, and that the peak of the resulting population build-up has been passed.

The light attack in the logging area of Sinclair Spruce Mills subsided in 1954. Only one freshly-attacked tree was found in an examination of the six strips established there in 1953, compared with seven attacked trees in 1953.

Western Hemlock Looper, Lambdina fiscellaria lugubrosa (Hlst.). Following a steady increase over the past four years, hemlock looper populations reached infestation proportions in 1954 in several localities east of Prince George. On Eaglet Mountain, a low ridge lying north of Giscome, an area about one mile in length and up to one-quarter of a mile in width was affected. The upper crowns of overmature western hemlock, white spruce and alpine fir were partially denuded and a few smaller alpine fir up to ten inches d.b.h. were completely stripped. This susceptible forest type did not extend below 3,000 feet elevation and the surrounding forest was not affected.

Small patches of light to medium defoliation of western red cedar and western hemlock occurred at several points along the slopes south of the Fraser River, from Lunate Creek to Slim Creek and in upper Slim Creek valley. South of the Fraser River at Penny, light defoliation occurred between 2,500 and 3,200 feet elevation in a stand of very large overmature cedar. Scattered mature white spruce, alpine fir, and hemlock whose tops extended above the cedar canopy were conspicuously discoloured. Foliage fragments and frass were abundant beneath the cedar although defoliation was not noticeable. Most of the larvae collected were infected with a polyhedral virus disease; however, larvae from a hemlock stand at slightly higher elevations in this same area were healthy.

Six collections taken in July in overmature hemlock-cedar type southwest of McBride contained an average of 156 larvae, with the maximum being 355. No defoliation resulted anywhere in this locality, however.

Higher than average populations developed near Fyfe Lake where 68 larvae were taken in one sample from alpine fir, and in the Hixon Creek area.

Mountain Pine Beetle, Dendroctonus monticolae Hopk. There was no change in the status of the local infestation of mountain pine beetle near Puntchesakut Lake, 35 miles west of Quesnel. Only eight overmature lodgepole pine were heavily infested in 1954, and several trees nearby drowned out the attacking beetles.

Larch Sawfly, Pristiphora erichsonii (Htg.). In 1954, larch sawfly larvae were collected for the first time on eastern larch growing in a chain of swamps north of Cluculz Lake. Light to medium defoliation and occasional thinning of the crown occurred on a few pole-sized trees and saplings.

A Sawfly on Hemlock, Neodiprion sp. This species was scarce in 1954. Six larvae collected from understory hemlock near Sinclair Mills, and three taken near Penny constituted the only records.

Large Aspen Tortrix, Archips conflictana (Wlk.). About 50 acres of pole-sized aspen four miles north of Vanderhoof were 80 per cent defoliated.

Black-headed Budworm, Acleris variana (Fern.). The maximum number of larvae taken was 16 from white spruce at Aleza Lake. No defoliation was observed anywhere in 1954.

Douglas-fir Needle Miner, Contarinia sp. Noticeable discoloration of Douglas fir reproduction was caused by dipterous needle miners over an area of several acres two miles south of Marguerite. Elsewhere, damage was negligible, although mined needles were found in most parts of the Quesnel District and as far north as Cluculz Lake.

Poplar Leaf Beetle, Phytodecta americana Schaef. Aspen reproduction over an area of about two acres was stripped by the larvae of this beetle six miles west of Vanderhoof. Defoliation occurred in this exact locality in 1952 but not in 1953.

Willow Leaf Beetle, Galerucella carbo (Lec.). The foliage of willows, particularly along forest fringes and on open hillsides in the Aleza Lake, Prince George, and Hixon districts, was heavily skeletonized by the larvae of this beetle.

Status of Tree Diseases

Hypoxyton pruinaum (Klotzsch) Cke. Very little information pertaining to the distribution and abundance of this canker was added to that gathered in 1953. It has been collected in most of the southern and central parts of the district except in the McBride area, but is apparently of negligible

importance. Frequently, considerable searching was necessary in order to obtain samples and it was not common anywhere.

False Tinder Fungus, *Fomes igniarius* (L.) Gill. This fungus seems to occur throughout the district. Aspen was the usual host.

Melampsora albertensis Arth. This rust of Douglas fir was particularly abundant on both mature and seedling trees on the north shore of Stuart Lake at Fort St. James; some understory trees were badly weakened by a combined attack of Adelges and this disease. It was also collected from foliage at McBride, and was found on Douglas fir cones at Australian, on the Naver Access Road, and at Fort St. James. Unlike the cone rusts of spruce, it infected only the bracts and exterior of the cone scales, and did not affect the production of seed.

Peridermium holwayi Syd. This rust affected 30 to 50 per cent of the previous year's foliage of alpine fir one mile south of Barkerville. A light infestation occurred at Azouzetta Lake and near Canyon Lake on the Nazko road.

Peridermium coloradense (Diet.) A. & K. Witch's broom caused by this perennial rust was common on white and black spruce throughout the district, with the latter host suffering the most serious deformity.

Cronartium stalactiforme A. & K. Twenty to thirty per cent of dense lodgepole pine reproduction over an area of several acres 36 miles west of Quesnel was killed by this stem rust.

White Pine Blister Rust, *Cronartium ribicola* Fisch. This rust was rare on whitebark pine, *Pinus albicaulis*, on Teare Mountain north of McBride. Two infected branches were found at about 6,000 feet elevation.

Shoot Blight, (?) *Fusicladium radiosum* (Lib.) Lind. A disease of the young growth of aspen, tentatively identified as this blight, was widespread in 1954, and was especially prevalent in the McBride, Fort St. James and Vanderhoof areas. It caused the young shoots of aspen reproduction to blacken, wither and bend over. The fruiting stage appeared as dark green, mouldy patches on the blackened leaves.

Chrysomyxa pyrolae Rostr. Spruce cone rust was recovered only at Cluculz Lake where 30 per cent of black spruce cones examined were infested.

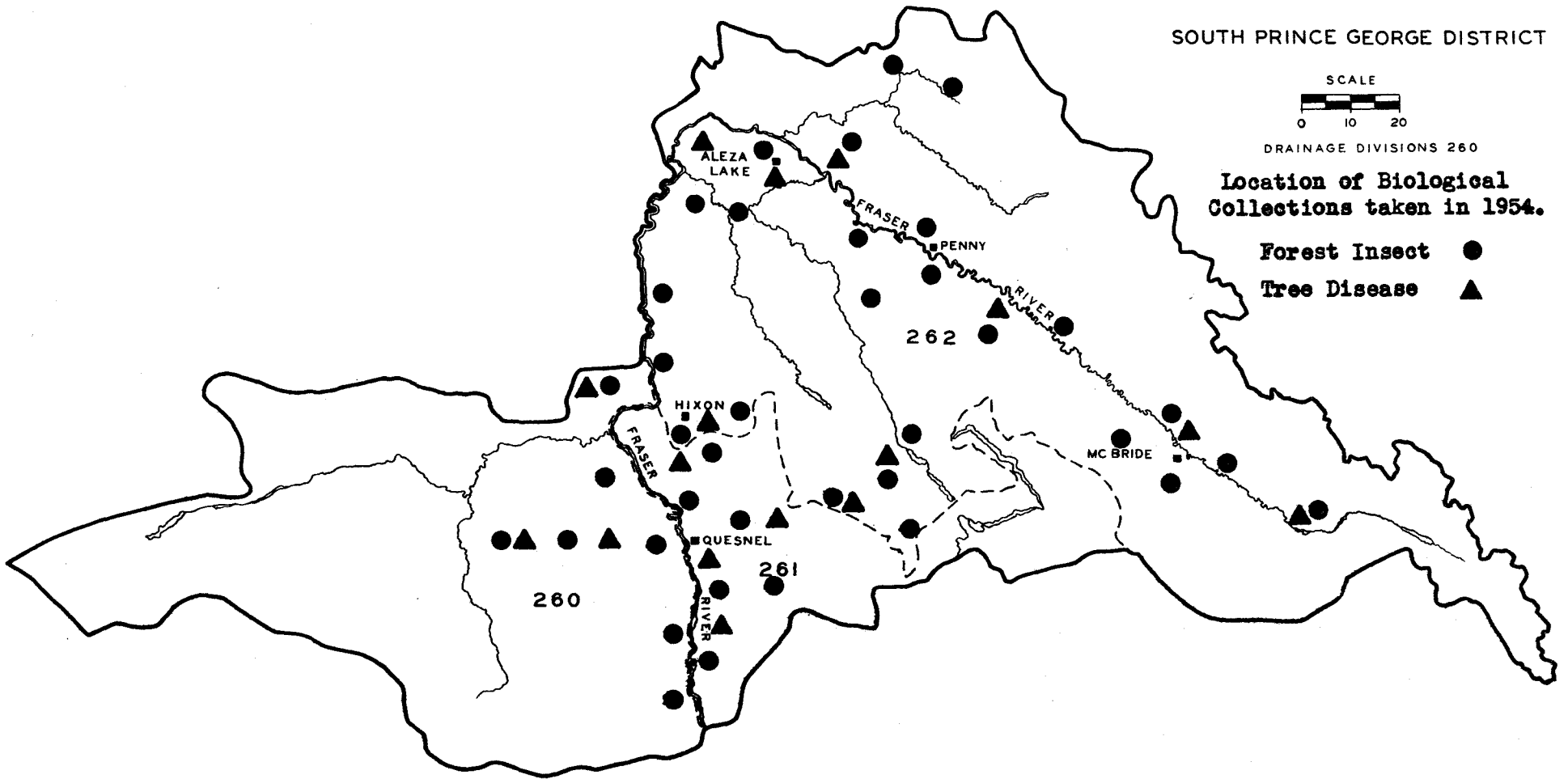
SOUTH PRINCE GEORGE DISTRICT

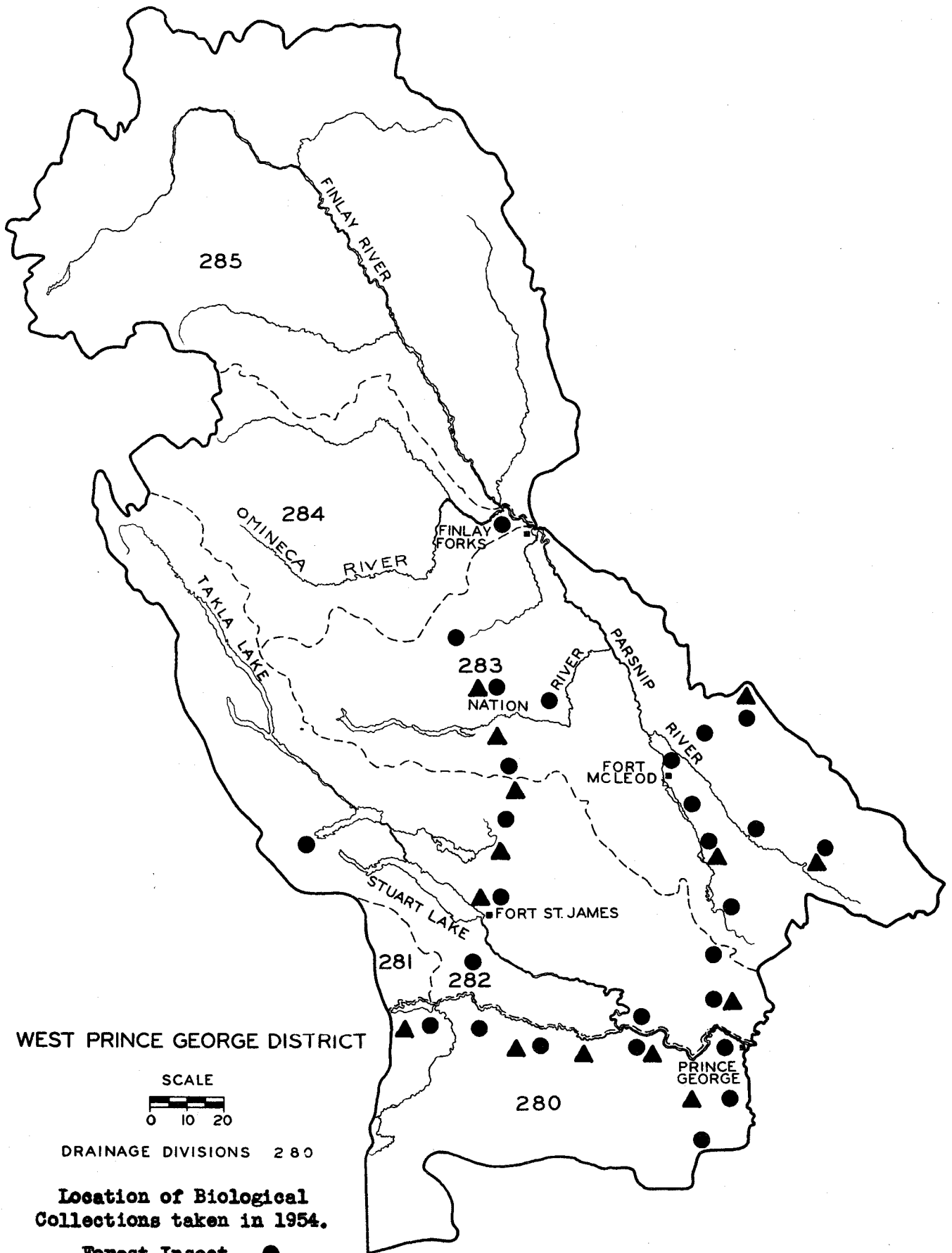


DRAINAGE DIVISIONS 260

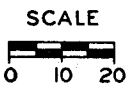
Location of Biological
Collections taken in 1954.

Forest Insect ●
Tree Disease ▲





WEST PRINCE GEORGE DISTRICT






DRAINAGE DIVISIONS 280

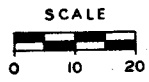
Location of Biological Collections taken in 1954.

- Forest Insect ●
- Tree Disease ▲

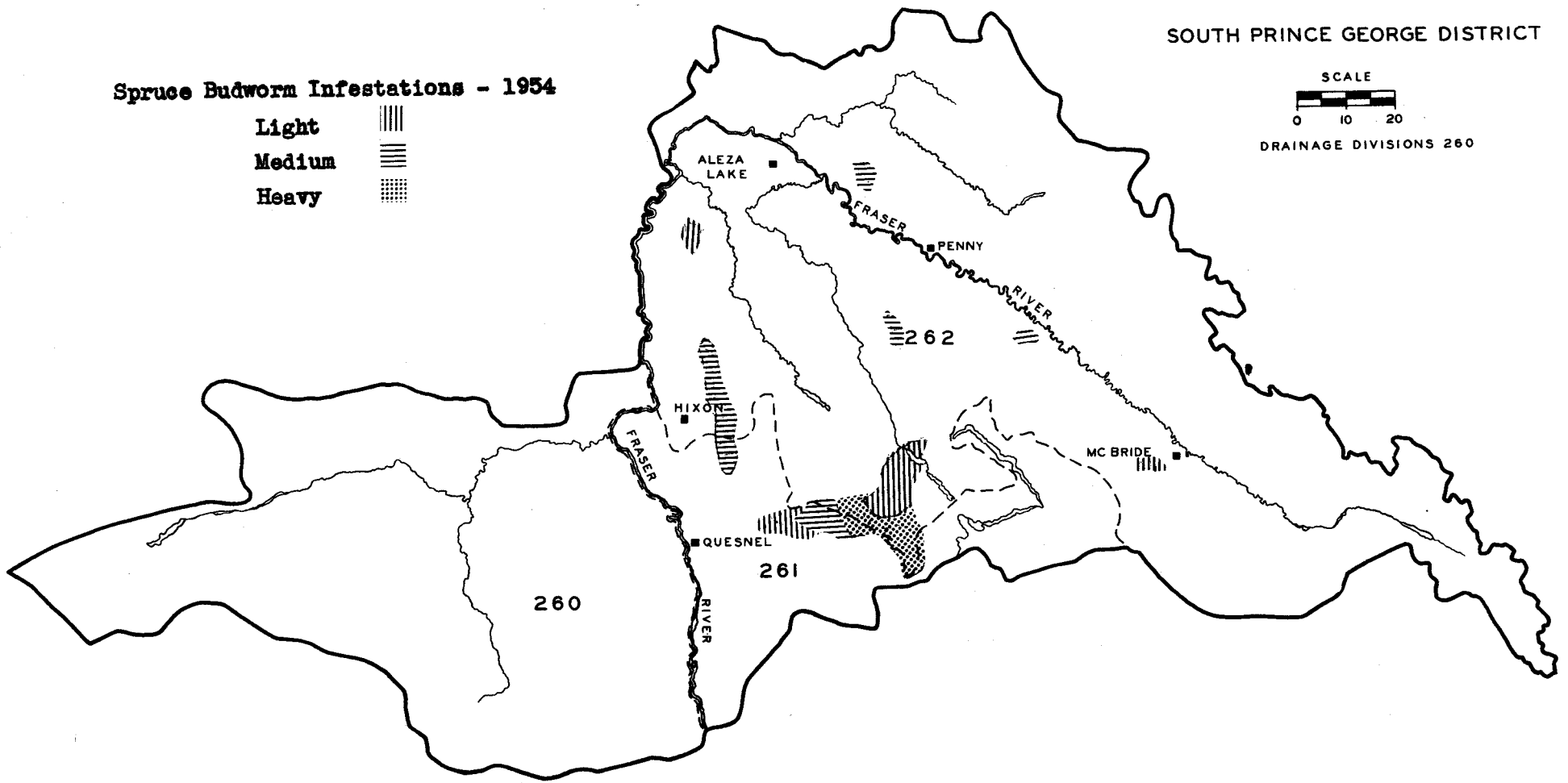
Spruce Budworm Infestations - 1954

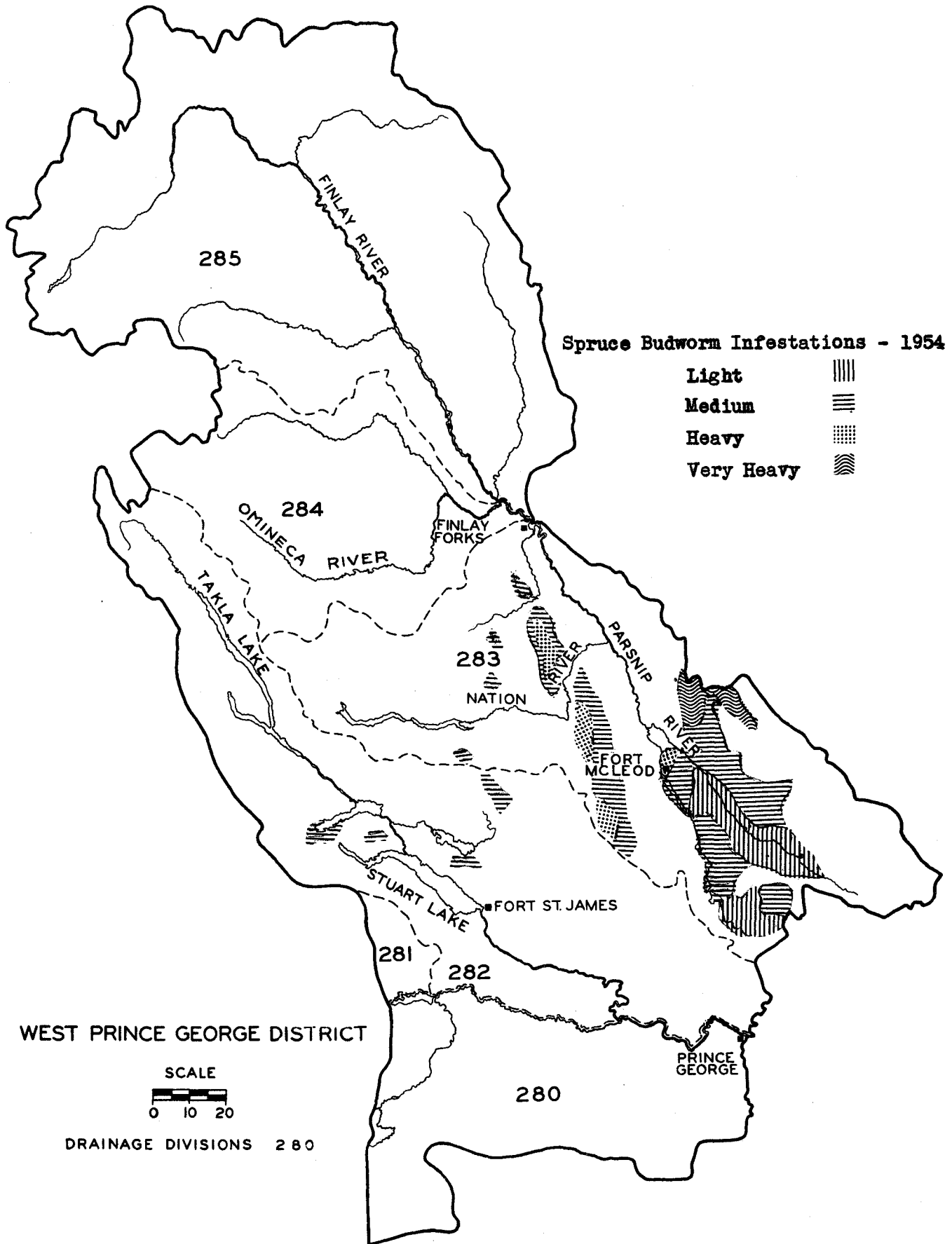
- Light 
- Medium 
- Heavy 

SOUTH PRINCE GEORGE DISTRICT



DRAINAGE DIVISIONS 260





Forest Tent Caterpillar
Infestations - 1954

Medium

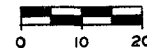
Heavy

Very Heavy

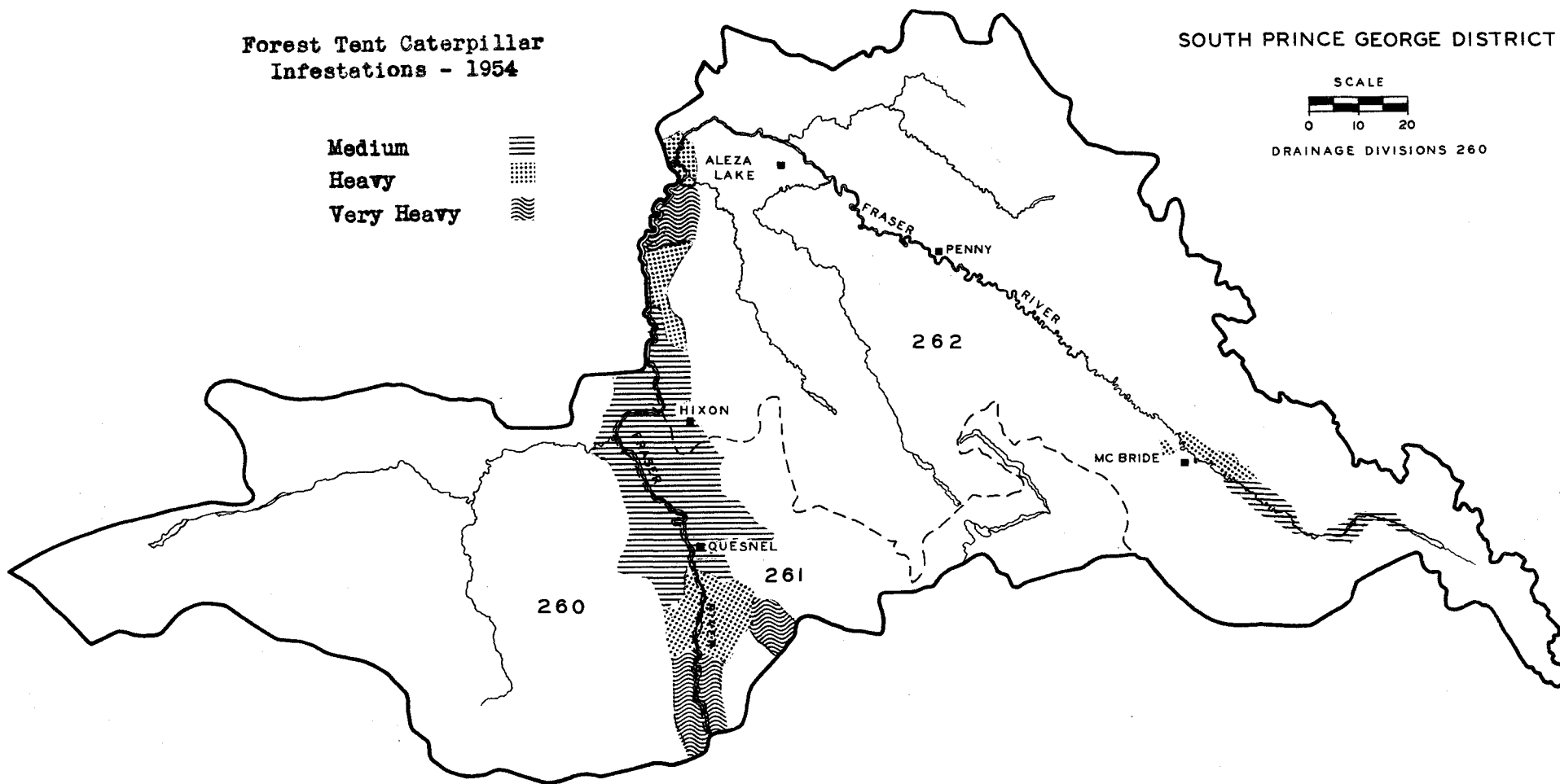


SOUTH PRINCE GEORGE DISTRICT



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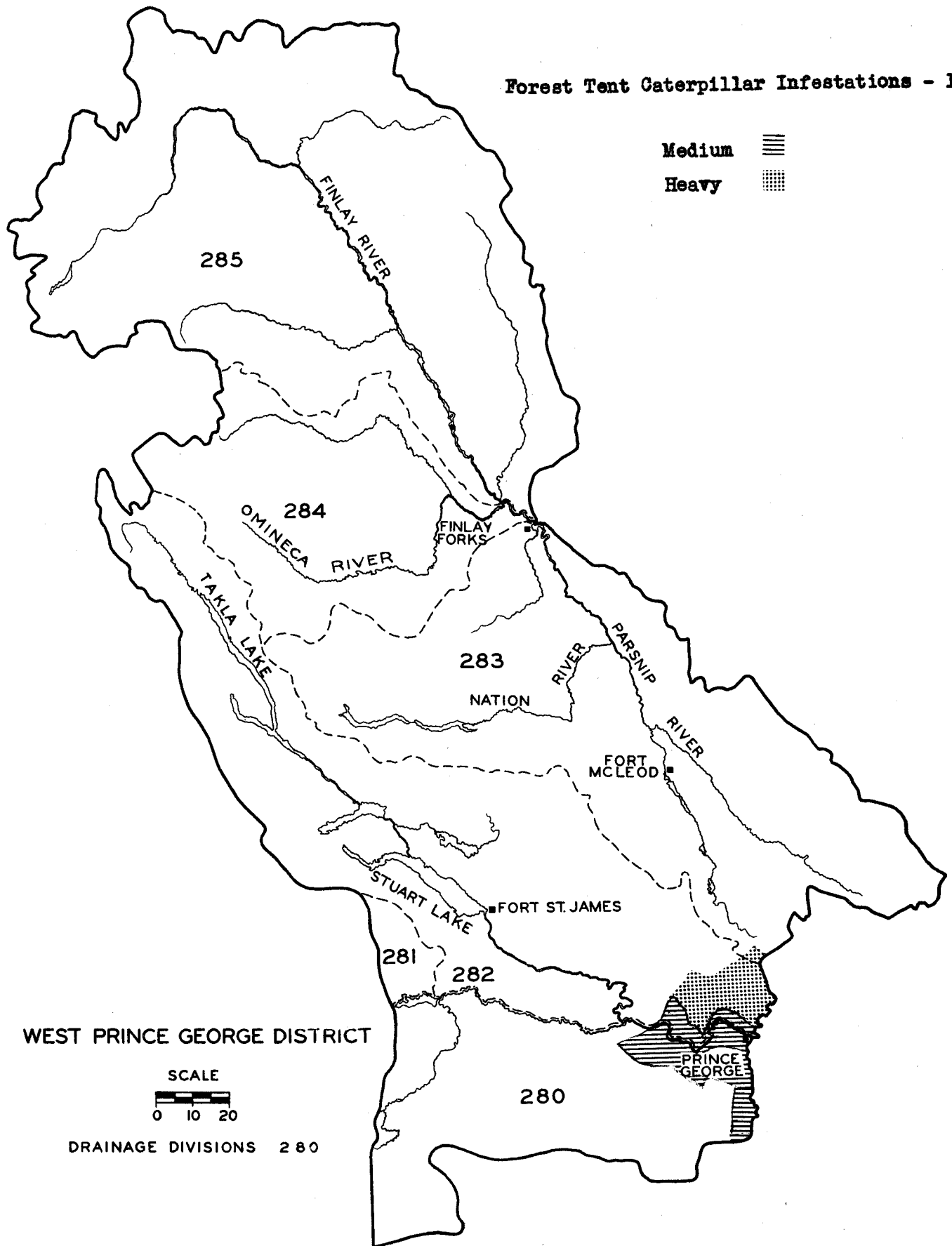


DRAINAGE DIVISIONS 260



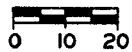
Forest Tent Caterpillar Infestations - 1954

Medium 
Heavy 



WEST PRINCE GEORGE DISTRICT

SCALE



DRAINAGE DIVISIONS 280

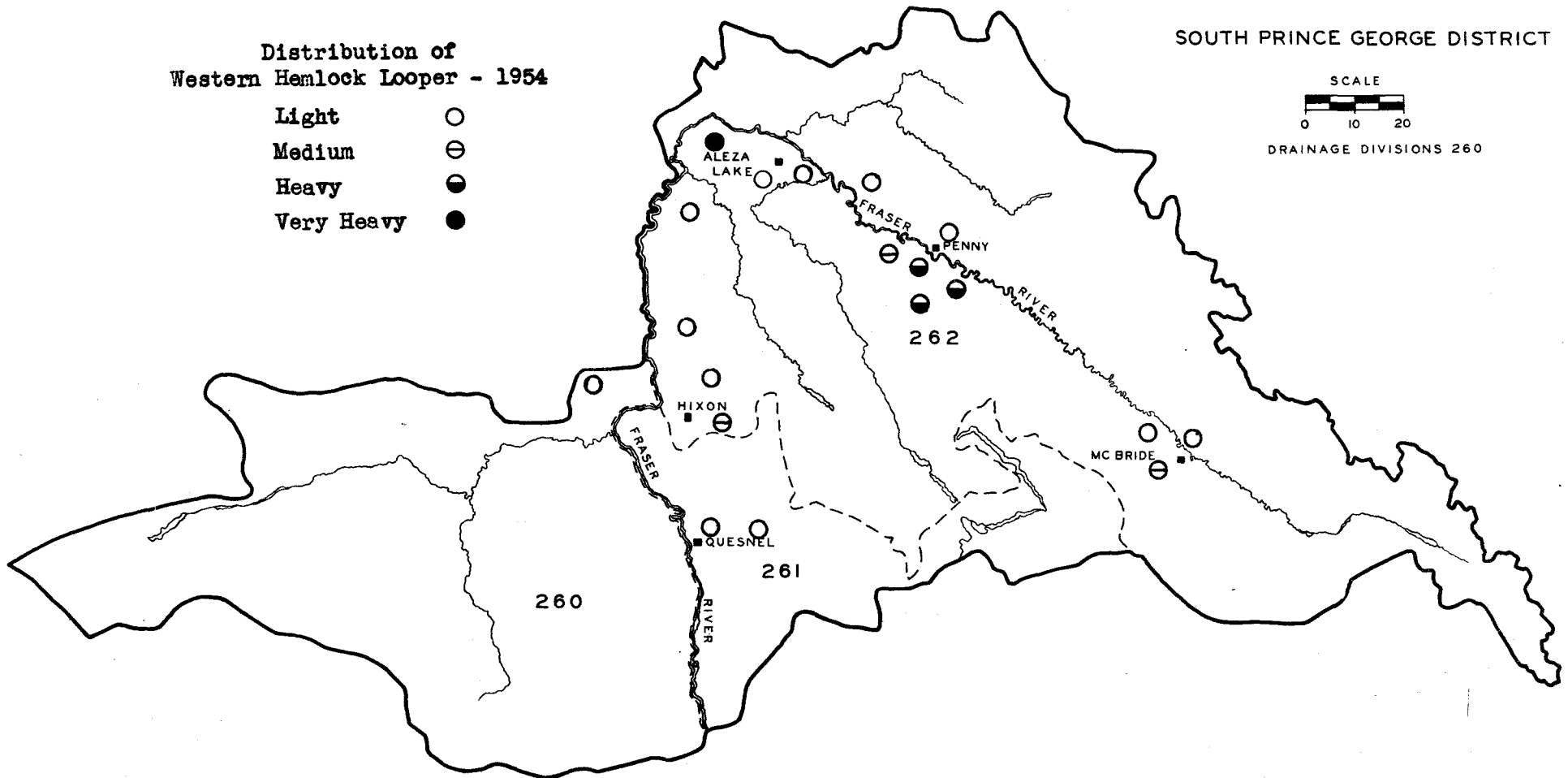
Distribution of
Western Hemlock Looper - 1954

- Light ○
- Medium ⊖
- Heavy ⊙
- Very Heavy ●

SOUTH PRINCE GEORGE DISTRICT



DRAINAGE DIVISIONS 260



NORTH PRINCE GEORGE

by
C. B. Cottrell

Introduction

With the acquisition of a new vehicle on August 1, a month-long survey was made on the Alaska Highway (northern British Columbia and the southern Yukon).

Table 1 shows forest insect collections made by agencies and Table 2 contains a list of the host trees and shrubs showing the number of forest insect and tree disease collections made from each.

Status of Insects

Large Aspen Tortrix, *Archips conflictana* (Wlk.). There were three large areas of aspen defoliation in Drainage Division 301, Fort St. John Forest Ranger District. This entire area is of an aspen type although broken up to 1/2- to 5-mile blocks of white spruce left untouched by past forest fires. First and second areas of defoliation were from Mile 80 to Mile 101 and from Mile 127 to Mile 140 on the Alaska Highway. These areas extended from 1/2 a mile to 2 miles on each side of the highway. Eighty per cent of the aspen was 50 per cent defoliated. The third area, reported by J. McKenzie, Provincial Land Surveyor, was from Mile 20 to Mile 30 on the Beaton Air-strip Road, and defoliation was estimated at 75 per cent.

The identification of this insect late in the field season (August) was from empty pupal cases found in the rolled leaves.

Black-headed Budworm, *Acleris variana* (Fern.). In the Pine Pass area only one larva was taken in eight random collections. The only other area in which this insect was encountered was from Mile 40 to Mile 60 on the Haines Road, where 17 larvae were taken in five collections on western hemlock.

Spruce Budworm, *Choristoneura fumiferana* (Clem.). The only heavy spruce budworm infestation in this district was a continuation of the Pine Pass infestation in the West Prince George District. It remained heavy from Pine Pass to Pine River Bridge.

A lighter attack was found on the Haines Road from Mile 40 to Mile 60, elevation 1,000 to 2,000 feet. Defoliation on Sitka spruce was 10 per cent to 20 per cent of current growth.

Poplar Leaf Miner, *Phyllocnistis populiella* (Cham.). The Liard River valley infestation continued in much the same area as it has done in the past several years. Aspen and cottonwood from Mile 483 to Mile 596 on the Alaska Highway were almost 100 per cent infested. A lighter attack continued 50 miles at both ends of the main area. It occurs in a mixed stand of aspen and white spruce, the aspens' average diameters were 10 to 12 inches and the cottonwoods' up to three feet in the valley bottom.

NPB
1954

TABLE 1

FOREST INSECT COLLECTIONS BY AGENCIES

NORTH PRINCE GEORGE - 1954

Personnel Involved In Collection	Number of Collections						TOTALS
	May	June	July	Aug.	Sept.	Oct.	
Forest Biology Rangers Independently		3		94			97
Forest Biology Rangers with Forest Service Personnel				1			1
Forest Service Personnel Independently	2	6	9	6	1		24
Other Co-operators							
TOTALS	2	9	9	101	1		122

TABLE 2
COLLECTIONS BY HOSTS
NORTH PRINCE GEORGE - 1954

Coniferous Hosts	Forest Insects	Tree Diseases	Broad-leaved Hosts	Forest Insects	Tree Diseases
White spruce	43	4	Trembling aspen	10	1
Eastern larch	11	-	Willow spp.	8	2
Lodgepole pine	9	1	Alder spp.	5	-
Black spruce	8	2	Birch spp.	4	1
Alpine fir	7	4	Cottonwood	2	-
Western hemlock	4	-	Miscellaneous	8	-
Sitka spruce	3	-			
			Totals	37	4
Totals	85	11	GRAND TOTALS	122*	15

*Includes 25 collections by other Co-operators

Larch Sawfly, *Pristiphora erichsonii* (Htg.). In a dozen collections on eastern larch in Drainage Divisions 302 and 304, not one *Pristiphora* was found.

Zeirophera (?) *fortunana* Kft. One hundred and forty-five larvae were collected in one sample from understory white spruce beneath a stand of white birch at the Pine River bridge. No other concentrations were found.

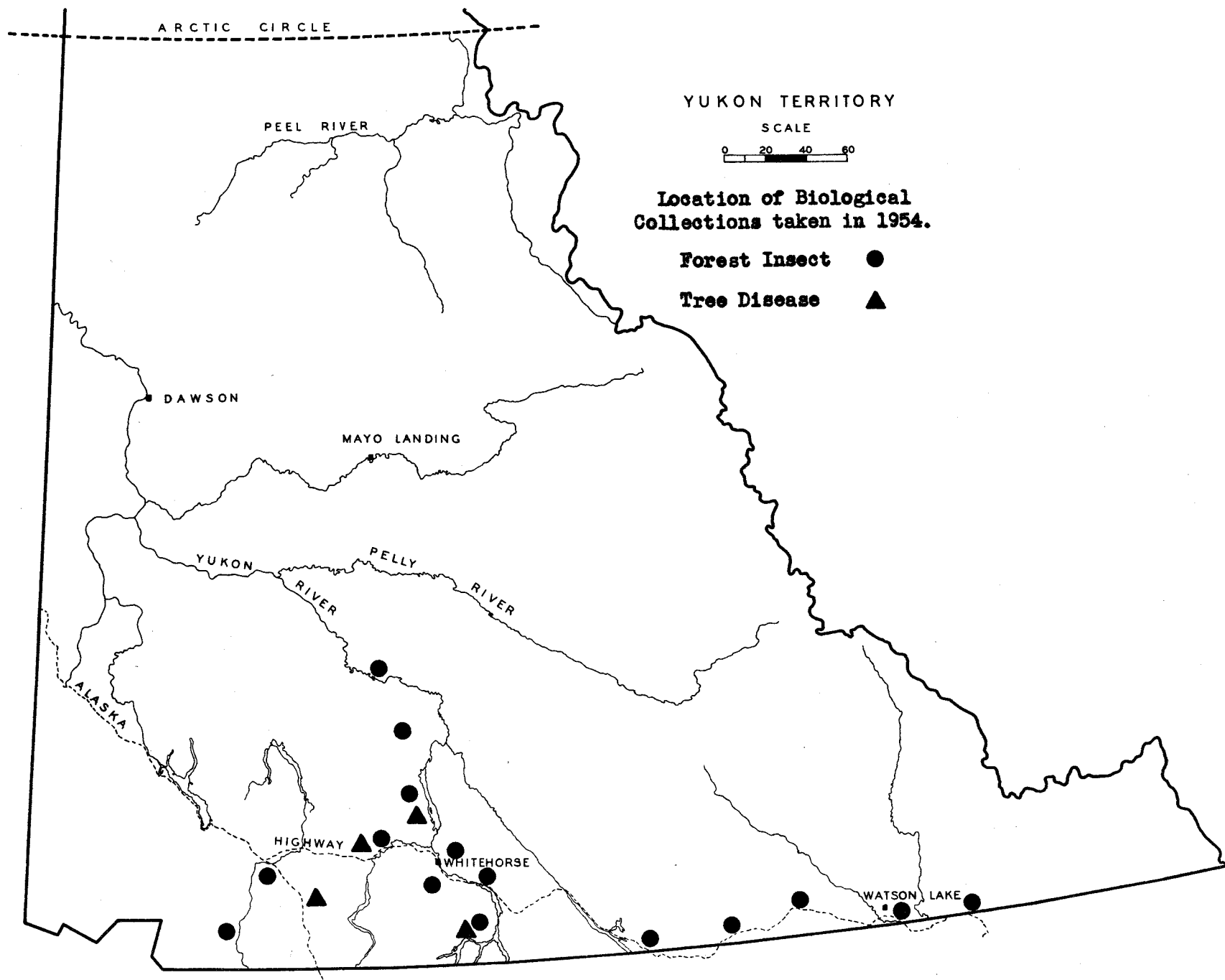
Status of Tree Diseases

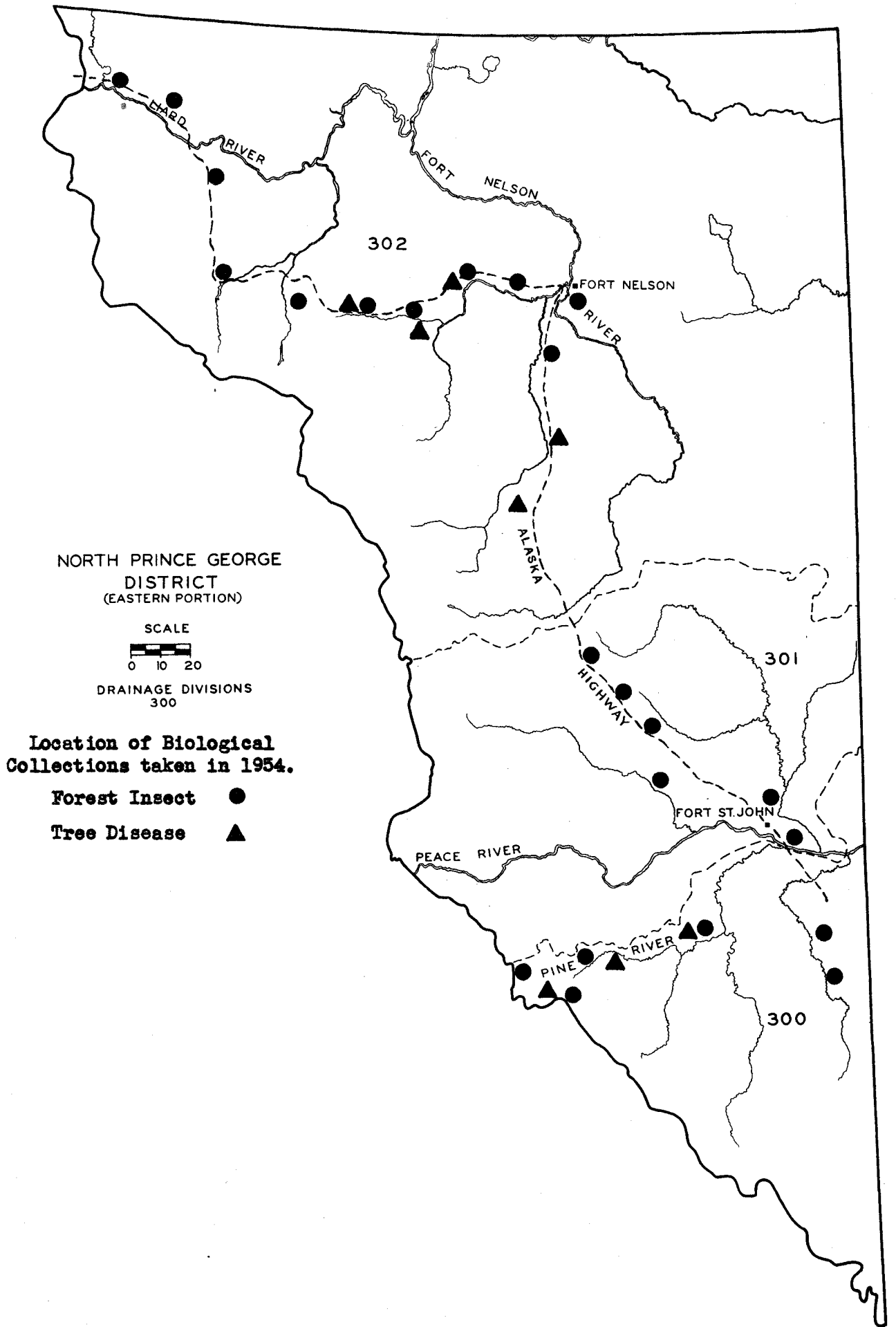
White Spruce Needle Rust, *Chrysomyxa ledicola* Lagerh. This needle rust could be found on 75 per cent of white spruce between Mile 180 and Mile 230, Alaska Highway. In most cases 75 to 100 per cent of the foliage was affected. In this area white spruce occurs in small groups in an aspen stand.

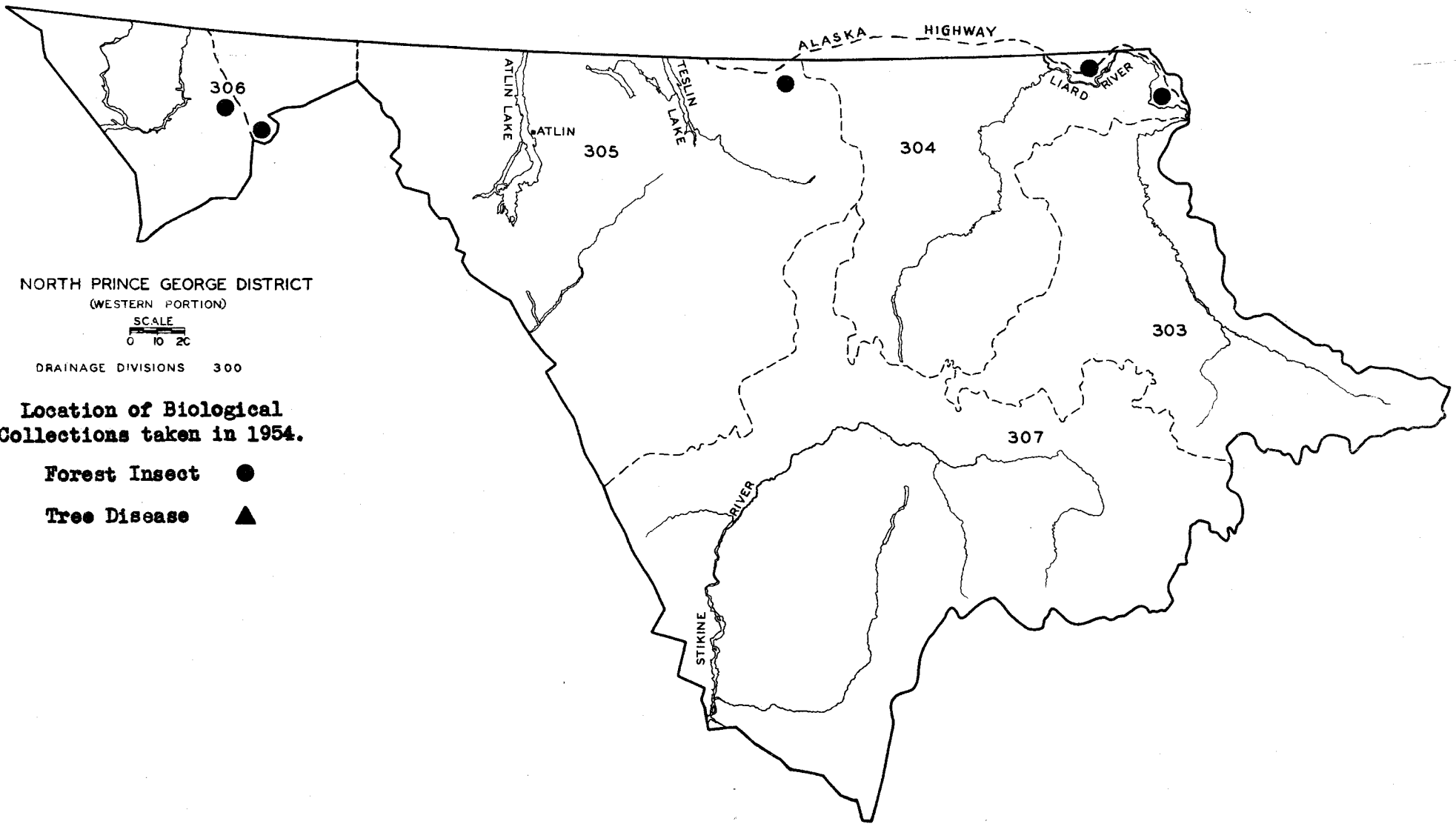
Spruce Needle Rust, *Peridermium coloradense* (Diet.) A. and K. Very common throughout the black spruce stands of northern British Columbia and the southern Yukon.

Blister Rust, *Cronartium harknessii* (Moore) Meinecke. Found commonly in northern British Columbia and the Yukon Territory on lodgepole pine but very seldom causing serious damage.

Winter Damage:- No new areas of winter damage were found, with the exception of a square mile on the east side of Muncho Lake. Twenty-five per cent of the needles of a 25- to 30-foot stand of lodgepole pine were dead. However, as the damage was so scattered and inconsistent, the cause was doubtful.







NORTH PRINCE GEORGE DISTRICT
(WESTERN PORTION)

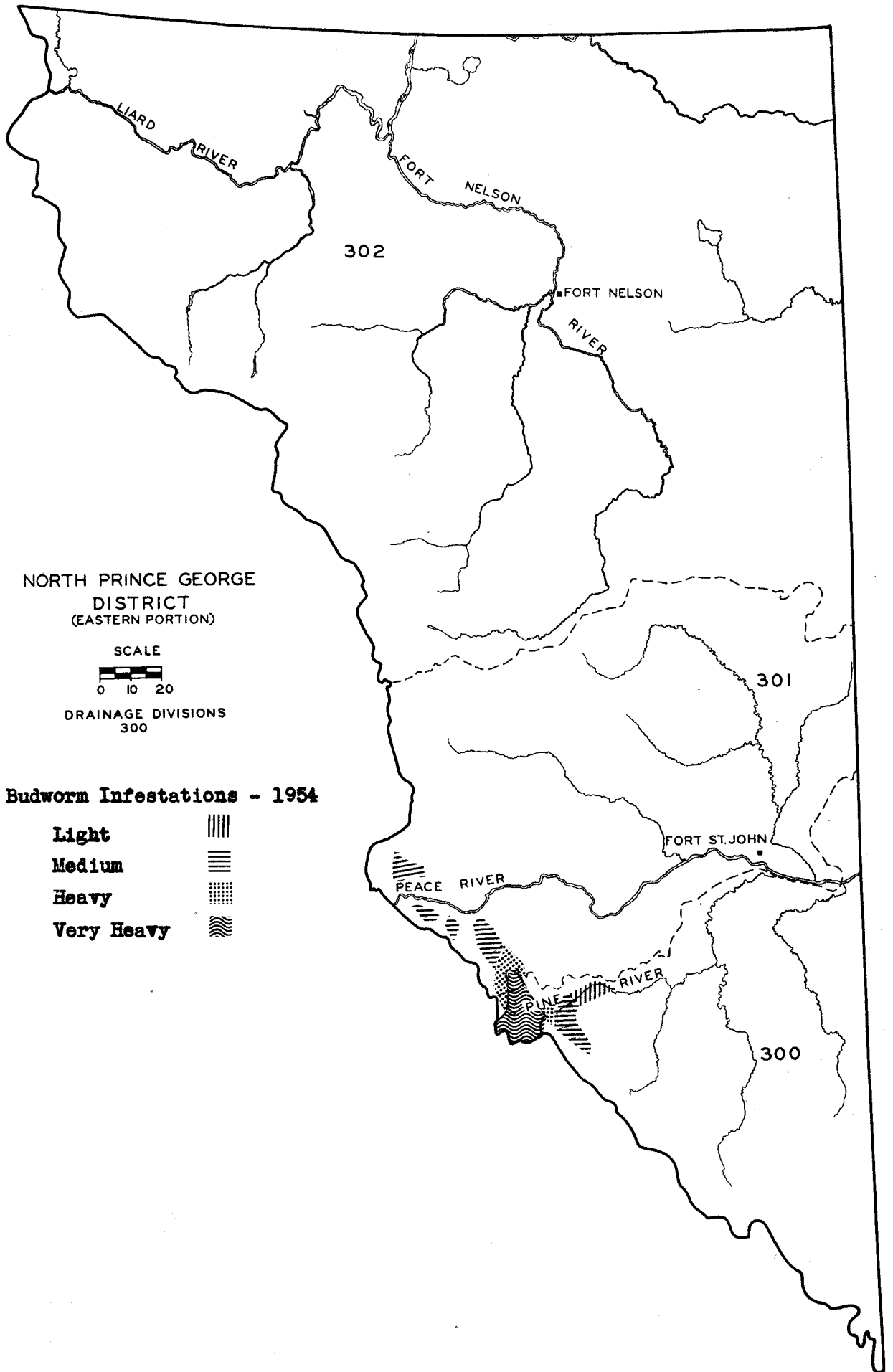
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DRAINAGE DIVISIONS 300

**Location of Biological
Collections taken in 1954.**

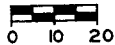
Forest Insect ●

Tree Disease ▲






NORTH PRINCE GEORGE
DISTRICT
(EASTERN PORTION)

SCALE



DRAINAGE DIVISIONS
300

Spruce Budworm Infestations - 1954

- Light** 
- Medium** 
- Heavy** 
- Very Heavy** 