ANNUAL REPORT

FOREST INSECT AND DISEASE SURVEY ALBERTA-NORTHWEST TERRITORIES-YUKON REGION 1968

FOREST RESEARCH LABORATORY
CALGARY, ALBERTA
INFORMATION REPORT A-X-22

FORESTRY BRANCH
DEPARTMENT OF FISHERIES AND FORESTRY
FEBRUARY, 1969

ANNUAL REPORT

Forest Insect and Disease Survey

Alberta-Northwest Territories-Yukon Region

1968

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PREFACE

The principal components of this report are the "Annual District Reports" which were prepared by the respective District Rangers. Each district report is available as a separate to individuals and ag ncies who are likely to have an interest only in local conditions. The full report, however, includes summaries of the activities for 1968 of all the various elements of the Forest Insect and Disease Survey Section, Alberta-Northwest Territories-Yukon Region.

Howard A. Tripp
Section Head
Forest Insect and Disease Survey.

CONTENTS

INTRODUCTION

The Insect and Disease Survey Section is required to ascertain on an annual basis the status of forest insects and diseases of the Alberta/NWT/Yukon Region with respect to distribution, abundance and depreciating effects on the forests. In general, the District Rangers make the initial contacts with the problems through regular ground and aerial surveys. Normally, ocular estimates of abundance and damage is recorded but for certain organisms a predetermined sampling system is employed. When very significant damage is suspected a detailed appraisal is conducted by a crew of Appraisal Rangers. If the biology and control are well understood recommendation on remedial action are issued immediately but if not, research is conducted by the Insect or Disease Survey Officer or other researchers dependent upon the complexity of the problem.

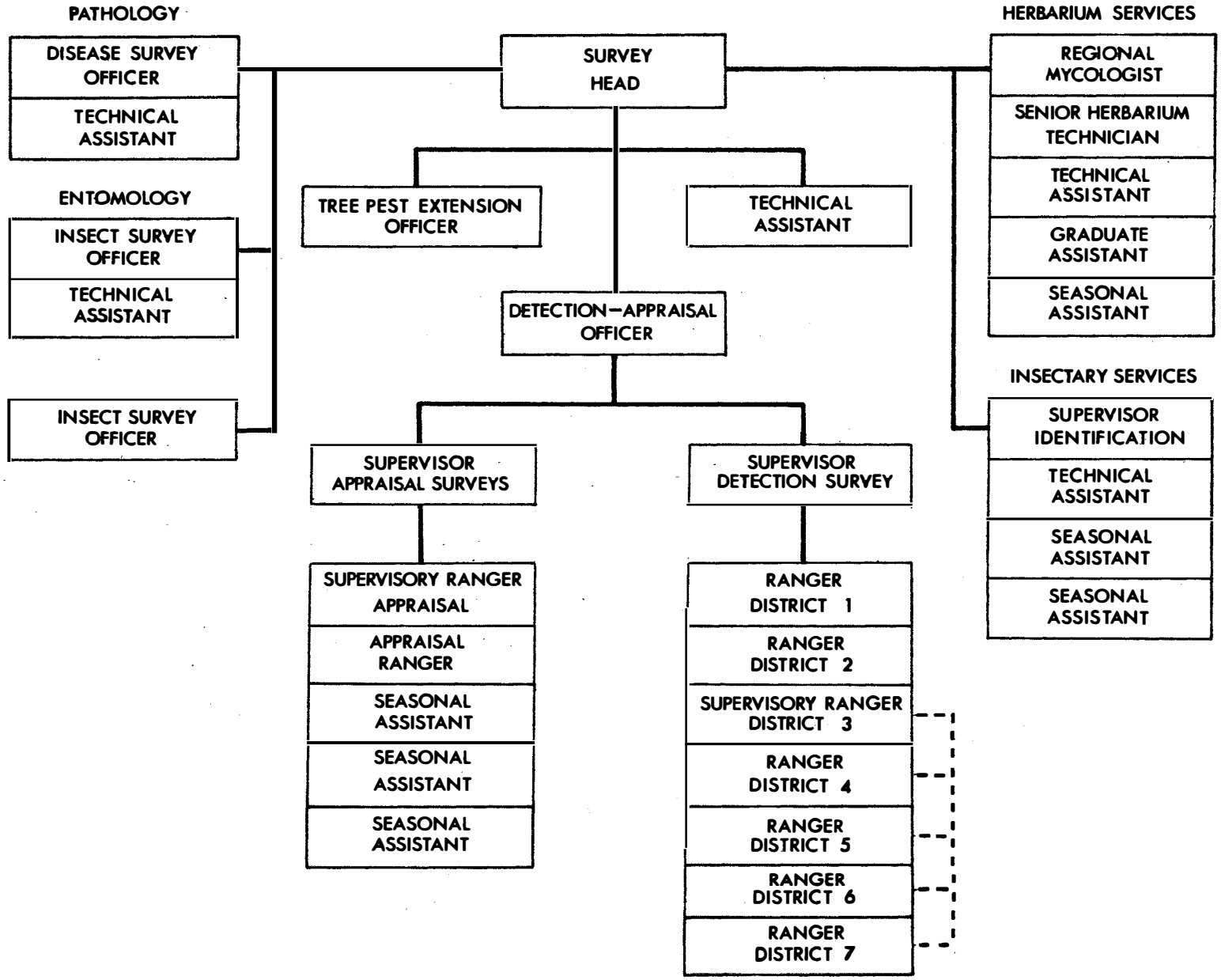
In the normal process of detection, insect and disease samples are collected along with ecological data which are recorded on a comprehensive sampling form. The samples are forwarded to headquarters in Calgary where a Senior Insectary or Herbarium technician checks the identifications through a process of rearing, culturing and comparison, with specimen in the reference collections. Assistance with difficult and little known organisms is provided by the Regional Mycologist or specialists in entomology. The accompanying ecological data which are coded and recorded on magnetic tape in Ottawa serve as valuable information on epidemiology, relationship to stand-types, etc., and in compilations which record distribution, hosts prevalence, and seasonal history.

Enquiries relative to insect and disease problems from outside agencies and the general public are processed by the Tree Pest Extension Officer. Each enquiry must be treated as the circumstances dictate. Although the majority of enquiries are routine and are handled by the Extension Officer he may call upon other survey personnel when the problem goes beyond the capability of a single individual. Other extension services includes lectures on forest insects and diseases to youth groups, and the liaison performed on a district basis by the respective District Ranger.

To further assist the reader in comprehending the operational procedures of the Section, an organization chart, staff list and a map outlining the districts are included.

The staff of the Forest Insect and Disease Survey gratefully acknowledge the assistance rendered by the Alberta Forest Service, the Provincial Agricultural Services, the Department of Indian Affairs and Northern Development and a number of other co-operating agencies.

ORGANIZATION CHART
FOREST INSECT AND DISEASE SURVEY
ALBERTA – N.W.T. – YUKON



STAFF

SURVEY HEAD - H. A. Tripp

DETECTION-APPRAISAL OFFICER - J. K. Robins

SURVEYS

DETECTION

Supervisor - J. Petty
Ranger, Dist. 1 - G. D. Bigalow
Ranger, Dist. 2 - G. J. Smith
Ranger, Dist. 3 - F. J. Emond
Ranger, Dist. 4 - C. R. Layton
Ranger, Dist. 5 - R. M. Caltrell
Ranger, Dist. 6 - E. J. Gautreau
Ranger, Dist. 7 - J. P. Susut

APPRAISAL

Supervisor - V. B. Patterson
Ranger - G. R. Stevenson
Ranger - R. J. Rowswell
Student
Student
Student

SERVICES

INSECTARY

Supervisor - D. S. Kusch
Assistant - (vacant)
Student
Student

HERBARIUM

Senior Technician - L. E. McArthur
Student

RESEARCH

ENTOMOLOGY

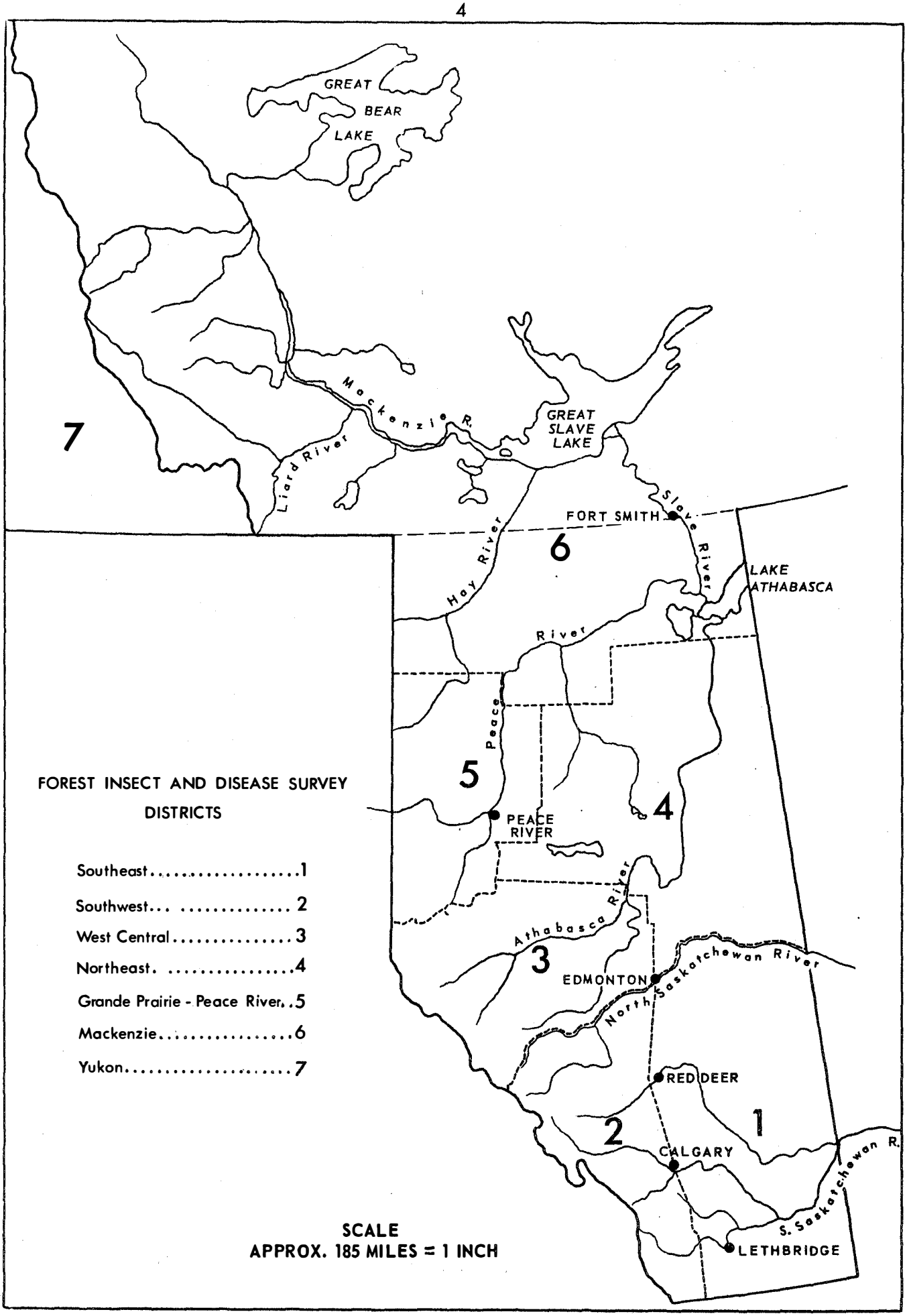
Survey Officer - R. E. Stevenson
Survey Officer - A. G. Raske
Assistant - B. M. Dahl

PATHOLOGY

Regional Mycologist - Y. Hiratsuka
Technical Assistant - P. Maruyama
Survey Officer - R. A. Blauel
Technical Assistant - J. Shuya

TREE PEST EXTENTION OFFICER

N. W. Wilkinson


GREAT
BEAR
LAKE
7
Mackenzie R.
Liard River
GREAT
SLAVE
LAKE
FORT SMITH
Slave River
6
Hay River
LAKE
ATHABASCA
River
Peace
5
4
PEACE
RIVER
Athabasca River
3
EDMONTON
North Saskatchewan River
RED DEER
2
1
CALGARY
S. Saskatchewan R.
LETHBRIDGE
FOREST INSECT AND DISEASE SURVEY
DISTRICTS
Southeast.....1
Southwest.....2
West Central.....3
Northeast.....4
Grande Prairie - Peace River..5
Mackenzie.....6
Yukon.....7
SCALE
APPROX. 185 MILES = 1 INCH

DETECTION SURVEYS

The field activities of the detection survey began in mid-May and ended in mid-October. In this period conditions of forest insects and forest diseases in the Region were determined by general surveys and the following special surveys: a detailed examination of a number of pine stands in northern and northeastern Alberta to establish the presence or absence of Atropellis canker; examination of Marmot, Streeter and Deer Creek watershed basins; examination of all Provincial parks; sequential sampling for forest tent caterpillar in central Alberta; assistance in the appraisal of spruce bark beetle in southwestern Alberta and examination of log decks and fire killed timber for the presence of wood borers. Field technicians made collections of pine samples with the necessary measurements, to determine thepure or hybrid nature of the pine; gave lectures on forest entomology and forest pathology to Junior Forest Wardens and Junior Forest Rangers and fulfilled the following requests for specific organisms from persons outside the Region:

1.	Chilocorus sp.	Dr. S.G. Smith
2.	Operophtera bruceata	Dr. D.M. Wood
3.	Pristiphora erichsonii	Dr. H.R. Wong
4.	Malacosoma disstria	Dr. K.J. Stevenson
5.	Malacosoma spp.	Dr. A. Mansingh
6.	Neodiprion sp.	Dr. Carl Atwood
7.	Cones from N.W.T.-Yukon	Mr. P.S. Haskins

A total of 102 hours and 39 minutes was flown in fixed-wing aircraft and helicopter to map infestations of spruce budworm, forest tent caterpillar, spruce bark beetle, large aspen tortrix and to survey inaccessible areas. Table I shows the flying time used on each survey.

Of major importance in 1968 was the outbreak of spruce bark beetle in stands of mature and overmature spruce in southwestern Alberta. The size and intensity of budworm infestations decreased in northern Alberta but increased somewhat in the Northwest Territories. The severity of defoliation and the extent of the area in which forest tent caterpillar occurred increased in west-central Alberta. Populations of the large aspen tortrix were still present over much of the Yukon and, in southwestern Alberta where they were in association with Bruce spanworm.

The fall cankerworm was again a notable defoliator of deciduous trees in farm shelterbelts in southern Alberta and the yellow-headed spruce sawfly caused moderate to severe defoliation of spruce in the agricultural areas of central Alberta and the Peace River District.

A combination of lodgepole needle miner and a pine needle cast caused severe discoloration and needle drop of pine foliage along the Bow River Valley in Banff National Park.

Foliar diseases on deciduous trees were present throughout the Region but moderate or severe infections were reported from only a few areas. Atropellis canker, common in pine stands along the foothills of Alberta, was not found in northern Alberta or the Northwest Territories.

ANNUAL DISTRICT REPORT

SOUTHEAST DISTRICT

ALBERTA 1968

by

G. C. Bigalow

FOREST RESEARCH LABORATORY

CALGARY, ALBERTA

FORESTRY BRANCH

DEPARTMENT OF FISHERIES AND FORESTRY

FEBRUARY, 1969

INTRODUCTION

The outbreak of fall cankerworm near Irvine decreased in severity in 1968; high populations in shelterbelts south of Lethbridge continued to cause considerable damage. Damage by the large aspen tortrix decreased in Cypress Hills Provincial Park. Higher populations of the ugly-nest caterpillar were evident in southern Alberta. A slight rise in forest tent caterpillar populations occurred throughout the aspen bluff area and around Medicine Hat. The poplar bud-gall mite continued to cause considerable suppression of foliage in poplar shelterbelts and shade trees in the southern part of the District.

Damage by drought, hypoxylon canker, cytospora canker, and herbicides continued to cause injury and mortality in shelterbelts and aspen bluffs in the District.

INSECT CONDITIONS

Fall Cankerworm, *Alsophila pometaria* (Harr.)

The outbreak of fall cankerworm south of Lethbridge continued to cause considerable severe defoliation of Manitoba maple, American elm and green ash. High populations occurred from Raymond south to New Dayton, Warner and Coutts. Populations around Magrath were generally low, although some shelterbelts had severe infestations. Low populations caused light defoliation at Cardston, Lethbridge, Claresholm, Vulcan and Purple Springs.

Moderate defoliation of native Manitoba maple was evident along Ross Creek near Pashley. This outbreak declined in 1968 and did not appear to be spreading as no larvae were found to the east at Irvine, or to the west at Medicine Hat.

Willow Flea Beetle, *Altica plicipennis* Mann.

High concentrations of adult flea beetles were observed on willow in the Drumheller, Ft. Macleod, Medicine Hat and Grassy Lake areas and in Writing on Stone Provincial Park. Severe defoliation occurred in localized areas along the banks of rivers and streams.

Ugly-nest Caterpillar, *Archips cerasivoranus* (Fitch)

Populations of ugly-nest caterpillar continued to increase in the

southern portion of the District. Severe defoliation of chokecherry occurred from Medicine Hat to Irvine, north to Hilda, in Indian Battle Park at Lethbridge and near Ft. Macleod. Colonies of this insect were observed over the range of this host, with generally light defoliation.

Large Aspen Tortrix, Choristoneura conflictana (Wlk.)

The outbreak of this insect in Cypress Hills Provincial Park declined in 1968. Low populations were general throughout the Park although patches of moderate defoliation were noted at higher elevations and near Reesor Lake Campground.

Low populations were found in the aspen bluff region near Carstairs, Innisfail and Ranfurly.

Leaf Beetle, Chrysomela falsa Brown

Populations of this leaf beetle on willow decreased markedly in the Irvine area, possibly due in part to adverse weather early in the season. Severe defoliation occurred in a small area along Ross Creek south of Irvine.

Forest Tent Caterpillar, Malacosoma disstria Hbn.

In central Alberta an increase in population levels of the forest tent caterpillar was evident. In the Red Deer, Stettler and Wetaskiwin areas defoliation of trembling aspen was generally light, with some small areas of moderate damage. Low populations were found from Red Deer east to Castor, Wetaskiwin to Wainwright, and Edmonton to Vermilion.

In southern Alberta, low populations in the Medicine Hat area caused light damage to willow, hybrid poplar, plum and cottonwood.

Yellow-headed Spruce Sawfly, Pikonema alaskensis (Roh.)

Damage caused by this sawfly was general throughout the northern part of the District. Moderate to severe defoliation occurred in scattered spruce shelterbelts and open-grown ornamentals between Calgary and Wetaskiwin and in the Drumheller - Three Hills - Stettler area. Light defoliation was noted in the north-central part of the District between Castor, Coronation and Vermilion. No damage was observed south of High River and Brooks.

OTHER NOTEWORTHY INSECTS AND DISEASES, 1968

Causal Agent	Host	Remarks
INSECT		
Poplar bud-gall mite, *Aceria parapopuli* (Kiefer)	Hybrid poplar T. aspen	Common in the south. High populations in Bow Island and Medicine Hat.
Spruce gall aphid, *Adelges* sp.	W. spruce	Populations generally low in the District.
Twice-stabbed lady beetle, *Chilocorus stigma* (Say)	W. spruce Lp. pine	Low populations in Cypress Hills Provincial Park.
Spruce budworm, *Choristoneura fumiferana* (Clem.)	W. spruce	Slight increase in populations in Cypress Hills Provincial Park.
Zimmerman pine moth, *Dioryctria zimmermani* (Grote)	Lp. pine	Low populations feeding in *P. harknessii* galls in Cypress Hills Provincial Park.
A willow sawfly, *Euura atra* (Jur)	Golden willow Willow sp.	Light damage reported from Brooks, Little Bow Provincial Park and Vermilion.
Pine root collar weevil, *Hylobius* sp.	Lp. pine W. spruce	Widespread in Cypress Hills Provincial Park. Caused some mortality in regeneration lodgepole pine.
A twig borer, *Laspeyresia* sp.	Hybrid poplar	Light damage in shelterbelts near Sibbald.
Boxelder bug, *Leptocorus trivittatus* (Say)	M. maple	High populations around Irvine.
Blister beetle, *Lytta sphaericollis* Say	Honeysuckle Caragana Buckbrush	Moderate to severe defoliation to scattered shelterbelts and ornamentals in southern Alberta.
Prairie tent caterpillar, *Malacosoma californicum lutescens* (N. & D.)	Rose Chokecherry	Low populations throughout southern Alberta.
Poplar vagabond aphid, *Mordwilkoja vagabunda* (Walsh)	Plains cottonwood	Low populations in southern Alberta.
Sawflies, *Neodiprion* spp.	B. spruce W. spruce	Low populations in black spruce near Red Deer. High populations in a shelterbelt near Trochu.

Other Noteworthy Insects and Diseases - Cont'd.

Causal Agent	Host	Remarks
Spruce spider mite, *Oligonychus ununguis* (Jac.)	W. spruce C. spruce Lp. pine	Low populations in Cypress Hills Provincial Park. General decrease in the District.
Bruce spanworm, *Operophtera bruceata* (Hulst)	T. aspen	Low populations in parkland region.
Pine needle scale, *Phenacaspis pinifoliae* (Fitch)	W. spruce Lp. pine	Low populations in the District.
Four-eyed spruce bark beetle, *Polygraphus rufipennis* Kby.	W. spruce	Low populations in Cypress Hills Provincial Park.
Larch sawfly, *Pristiphora erichsonii* (Htg.)	Larch sp.	Severe defoliation in a shelterbelt near Blackfalds. Low populations observed near Tofield, Vermilion Provincial Park and Langdon.
Boxelder twig borer, *Proteoteras willingana* (Kearfott)	M. maple	Caused light damage to shelterbelts in southern Alberta.
Spruce bud midge, *Rhabdophaga swainei* Felt	W. spruce	Low populations in native spruce stands from Red Deer north to Musidora.
Poplar borer, *Saperda calcarata* Say	T. aspen	Low populations in aspen bluffs in the District. Damage mainly to overmature trees.
Leaf roller, *Sciaphila duplex* Wlshm.	T. aspen	Low populations throughout aspen bluff area.
Spruce needle miner, *Taniva albolineana* (Kearf.)	C. spruce	Caused light damage to a few ornamentals in Taber.

Other Noteworthy Insects and Diseases - Cont'd.

Causal Agent	Host	Remarks
DISEASE		
Dwarf mistletoe, *Arceuthobium americanum* Nutt. ex Engelm.	Lp. pine	Noted in several areas in Cypress Hills Provincial Park.
Shoestring root rot, *Armillaria mellea* (Vahl. ex Fr.) Quél.	Lp. pine W. spruce	Caused some mortality to regeneration in Cypress Hills Provincial Park.
Atropellis canker, *Atropellis piniphila* (Weir) Lohman & Cash	Lp. pine	No noticeable increase in incidence or distribution in Cypress Hills Provincial Park. A light infection was observed near the spring on Graburn Creek.
Pine needle rust, *Coleosporium asterum* (Diet.) Syd.	Lp. pine Aster	Light damage to Lp. pine throughout Cypress Hills Provincial Park. Aster severely infected three miles south of Elkwater.
Hyperparasite of dwarf mistletoe, *Colletotrichum gloeosporioides* Penz. sensu von Arx	Dwarf mistletoe	Low incidence along Graburn Creek in Cypress Hills Provincial Park.
Comandra blister rust, *Cronartium comandrae* Pk.	Toad flax	High incidence on this host near Police Point in Cypress Hills Provincial Park.
Pine needle cast, *Davisomycella ampla* (Darker) Darker	Lp. pine	Light damage in Cypress Hills Provincial Park with moderate patches along Graburn Creek Road.
Pine needle cast, *Elytroderma deformans* (Weir) Darker	Lp. pine	Moderate on some trees along Graburn Creek Road in Cypress Hills Provincial Park.
Fire blight, *Erwinia amylovora* (Burr.) Winsl. et al	Mtn. ash Apple	Continued to spread in central and southern Alberta.

Other Noteworthy Insects and Diseases - Cont'd.

Causal Agent	Host	Remarks
Leaf rust, *Gymosporangium bethelii* Kern	Hawthorn	Light damage in Cypress Hills Provincial Park.
Hypoxylon canker *Hypoxylon mammatum* (Wahl.) Miller (*Hypoxylon pruinatum* (Klotzche) (Cke.)	T. aspen	Present throughout the aspen grove area.
Juniper needle cast, *Lophodermium juniperinum* (Fr.) de N.	Juniper	Collected in Cypress Hills Provincial Park
Leaf rust on willow, *Melampsora epitea* Thuem.	Willow	High incidence in Taber Provincial Park.
Western gall rust, *Peridermium harknessii* J. P. Moore	Lp. pine	Common in Cypress Hills Provincial Park, caused light damage
Crown rust, *Puccinia coronata* Cda.	Shepherdia	Common in Cypress Hills, with patches of high incidence.
Rust, *Puccinia recedens* Syd.	Goldenrod Groundsel	Collected in Cypress Hills Provincial Park. New regional record.
Rust, *Puccinia rubefaciens* Johans.	Bedstraw	Low incidence in Cypress Hills Provincial Park.
Rust, *Pucciniastrum vaccinii* (Wint.) Jørst.	Dwarf bilberry	Moderate infection 3 miles south of Elkwater.
Cytospora canker, *Valsa sordida* Nits. (*Cytospora chrysosperma*) (Pers. ex Fr.)	Hybrid poplar Willow Mtn. ash	Widespread in aspen groves and shelterbelts throughout the agricultural area of the District.
Aspen shoot blight, *Venturia tremulae* Aderh.	T. aspen	Light damage to regeneration aspen in Cypress Hills Provincial Park.

SUMMARY OF INSECT AND DISEASE COLLECTIONS BY HOSTS

Host Coniferous	Collections Insect	Collections Disease	Host Deciduous	Collections Insect	Collections Disease
White spruce	58	7	Plains cottonwood	9	3
Black spruce	3	1	Trembling aspen	62	5
Colorado spruce	9	3	Balsam poplar	4	1
Lodgepole pine	8	11	Misc. poplar	9	2
Misc. pine	0	1	Manitoba maple	24	0
Larch	4	0	Willow	20	5
			Green ash	6	2
			American elm	7	1
			Birch	1	0
			Basswood	1	0
	82	23		143	19
	Insect collections from miscellaneous hosts				27
	Disease collections from miscellaneous hosts				24
			GRAND TOTAL		318

ANNUAL DISTRICT REPORT

SOUTHWEST DISTRICT

ALBERTA 1968

by

G. J. Smith

FOREST RESEARCH LABORATORY

CALGARY ALBERTA

FORESTRY BRANCH

DEPARTMENT OF FISHERIES AND FORESTRY

February, 1969

INTRODUCTION

Forest insect damage was widespread and severe in the Southwest District in 1968. Populations of the spruce bark beetle increased along the mountains in southwestern Alberta and subsequently attacked a large volume of living mature spruce: this was the most damaging insect in the District and was the cause of major concern. The lodgepole needle miner caused severe stand discoloration and needle loss along the Bow River Valley in Banff National Park. Populations of aspen defoliators, namely forest tent caterpillar, large aspen tortrix and Bruce spanworm, increased considerably along the outer foothills between Pigeon Lake and the Porcupine Hills.

The fluctuating forest foliage diseases, namely needle casts, needle rusts, leaf blights and climatic damage, caused considerable stand discoloration and foliage loss. The systemic diseases, namely root and butt rots, canker diseases, blister rusts, gall rusts and dwarf mistletoe continued to cause growth loss, deformity and tree mortality.

INSECT CONDITIONS

Black-headed Budworm, Acleris variana (Fern.)

Larvae of this budworm caused light defoliation and bud damage to spruce in the mountain valleys and along the foothills. Damage was observed in the following areas; along the upper North Saskatchewan River, Deer Creek, Red Lodge Provincial Park, Bragg Creek Provincial Park, Marmot Creek Basin, Dutch Creek, the Livingstone River, Lynx Creek, Beauvais Lake Provincial Park, along the Simpson River in Kootenay National Park, and near Leanchoil in Yoho National Park.

Large Aspen Tortrix, Choristoneura conflictana (Wlk.)

In 1968, defoliation by this insect occurred in the aspen belt of the foothills from the Red Deer River to the United States Border. This represented a much wider distribution than in 1967 when it was only present from Tod Creek south to United States Border.

Patches of moderate to severe defoliation were observed from the Bottrel-Calgary area southward through the Sarcee Reserve, Priddis, Millarville, Turner Valley, Royalties, Chain Lakes, Porcupine Hills, Tod Creek, Lees Lake, Beaver Mines and Fish Lake to Twin Butte. In the outbreak along the Red Deer River, patches of moderate to severe defoliation were observed near Elkton, Bergen Sundre, James River Bridge, Garrington and 13 miles west of Innisfail. Patches of light defoliation were observed throughout the above areas and also southward through the oldest part of the outbreak from Twin Butte through Waterton Lakes National Park to the United States Border. (see map, page 30).

From observations of the 1968 moth flight, it appeared that populations in 1969 south of the Crowsnest Pass would continue to decrease; from the Porcupine Hills northward to the Red Deer River an increase is expected.

Spruce Budworms, Choristoneura biennis Freeman, Choristoneura fumiferana (Clem.)

The two-year cycle budworm, C. biennis, caused light defoliation to Engelmann spruce in the Numa Creek area and along the Vermilion River between Numa Creek and Floe Creek in Kootenay National Park. Larvae were present but defoliation was negligible near the mouth of the Simpson River, at Vermilion Crossing and in the Paint Pots area of Kootenay National Park, along the Kicking Horse River in Yoho National Park, in the Saskatchewan Crossing area of Banff National Park and along Thompson Creek in the Clearwater Forest.

A one-year cycle budworm, possibly C. fumiferana, but still in doubt due to a color variation of the larvae, was found in southwestern Alberta. This species severely defoliated the understory white spruce and lightly defoliated the overstory spruce in Beauvais Lake Provincial Park. Some feeding on Douglas fir and lodgepole pine was also noted in this area. Light defoliation of Engelmann spruce was noted near the headwaters of the South Castle River and around Cameron Lake in Waterton Lakes National Park.

Larvae, positively identified as C. fumiferana, caused light defoliation and bud damage to white spruce in Red Lodge Provincial Park.

Lodgepole Needle Miner, Coleotechnites starki Freeman

The larvae of this species caused extensive damage to the foliage of lodgepole pine and subsequent stand discoloration in Banff National Park during 1968.

Severe damage was evident on the north and south slopes of the Bow Valley from the Mt. Eisenhower-Boom Lake area eastward to the Mt. Corey-Massive Mtn. area. Smaller patches of severe damage were observed on the south slopes of Mt. Edith, Mt. Norquay, Stony Squaw Mtn. and on the west slopes of Mt. Inglismaldie and Mt. Girouard.

Mountain Pine Beetle, Dendroctonus ponderosae Hopk.

In 1968, there were no known infestations of this bark beetle within the District but encroachment in areas bordering Kootenay National Park was investigated and reported as a caution to those concerned.

During an aerial survey severe infestations of this beetle in lodgepole pine were observed approximately 2 miles west of the Park Boundary in the Luxor Pass area and 12 miles southeast of the Park along the Palliser River.

Spruce Bark Beetle, Dendroctonus obesus (Mann.)

In southwestern Alberta, populations of this beetle have gradually increased in recent years and have caused considerable tree mortality in mature and overmature stands of Engelmann spruce. From surveys between 1957 and 1967 it was known that these beetles were attacking a few living trees each year, a situation usually considered normal in old stands. In 1968 a significant increase in the number of attacked living trees was noted.

During an aerial survey of the Crowsnest Forest, tree mortality caused by bark beetles was observed in the following locations: along upper South Hidden Creek, Dutch Creek, North Racehorse Creek, First Creek, Smith Creek, Window Lake Road, South Racehorse Creek, Glacier Creek, North York Creek, South York Creek, Lynx Creek, Goat Creek, Byron Creek, North Lost Creek, the upper Carbondale River, MacDonald Creek, Gardiner Creek, Gravenstafel Creek, the West Castle River from the headwaters to Castle Ranger Station, Scarpe Creek, Jutland Creek, Font Creek, the upper South Castle River, Gladstone Creek and along Heath and Beaver creeks in the Porcupine Hills (see map, page 31).

In Waterton Lakes National Park, infestations were observed along Lost Lakes Trail, Twin Lakes Trail, Bauerman Brook Valley, the north slopes of Mt. Bauerman, Lost Mtn., Anderson Peak and along the east and west sides of Cameron Lake. Several other areas in the Park in which overmature spruce stands occur will be examined in 1969.

A damage appraisal survey was carried out in the Crowsnest Forest during the fall of 1968 to determine the percentage volume per acre of merchantable timber affected by bark beetles. Cruise strips set up in 25 locations between the south boundary of the Crowsnest Forest and Dutch Creek revealed that 44 per cent of the merchantable volume per acre of the timber cruised had been affected. The most beetle activity and tree mortality occurred in the upper West and South Castle river basins and along upper North Racehorse Creek where the affected merchantable volume per acre averaged 54 percent; along one cruise line it was 96 percent. Elsewhere in the Crowsnest Forest beetle damage was usually patchy and confined to large diameter trees along streams. The preference by the beetles for trees growing along streams was evident when no attacks were found on five of the cruise strips along slopes above streams.

Forest Tent Caterpillar, Malacosoma disstria Hbn.

In 1968, aspen defoliation by this insect extended southward from

that reported in 1967 to a line approximately along Highway 11 from Sylvan Lake west to the Rocky Mountain House area.

In the oldest part of the outbreak, extending northward from the Pigeon Lake - Buck Lake area to the North Saskatchewan River, defoliation was generally light but scattered patches of moderate to severe damage occurred in the Breton-Warburg, Genesee-Telfordville areas and along the south side of the North Saskatchewan River between Huggett and Edmonton.

Almost continuous severe defoliation was noted within an approximate parallelogram shaped area formed by a line from Medicine Lake northeast to Falun, north to Wizard Lake, southwest to Pendryl and south to Medicine Lake. This outline encompassed an area of approximately 500 square miles. An additional 60 square miles of severe defoliation extended in a neck southward from the Hoadley-Muskeg Creek area to near Leedale.

South of the line from Medicine Lake to Falun, scattered patches of moderate to severe defoliation were noted on the hills southeast of Faraway Pasture, north of Carlos, around Willesden Green and on the Medicine Lodge Hills west of Bentley. Patchy light to moderate defoliation extended from Medicine Lake south to the Rocky Mountain House area and southeast to the Sylvan Lake area. Similar defoliation was observed from Falun to the Rimbey-Gull Lake area.

Elsewhere in the District, larvae were found from the outbreak area south to Calgary, west to the upper Baptiste River and upper Prairie Creek and southeast to the Lacombe-Red Deer area. A small isolated outbreak was noted one mile east of James River Bridge (see map, page 32).

Bruce Spanworm, Operophtera bruceata (Hulst)

Populations of this aspen defoliating insect increased in 1968 along the foothills west of Calgary from the Jumping Pound-Exshaw area north to the Red Deer River. Larvae of this species were often found intermixed with those of the large aspen tortrix.

Patches of moderate to severe defoliation were observed along Highland Ridge west of Bergen,3 miles northwest of Cremona, west of Big Prairie, 3 miles south of Water Valley, near the head of Grande Valley Creek. along both sides of the Bow Valley between Mitford and Seebe, throughout the Stony Indian Reserve and south to Jumping Pound Creek. Similar defoliation was noted north of the Stony Reserve from Kangienos Lake northward through the Ghost Ranger Station area to Meadow Creek and along the Trans Canada Highway one mile inside the East Gate of Banff National Park (see map, page 30).

Yellow-headed Spruce Sawfly, Pikonema alaskensis (Roh.)

Larvae of this sawfly severely defoliated spruce shelterbelts in

the following locations; north of the Calgary Airport, west of Bowness along the Trans Canada Highway, in the Bowden-Innisfail area and west to Garrington, along Highway 11 from Sylvan Lake west to Rocky Mountain House, 4 miles east of Gilby, near the north end of Sylvan Lake, 8 miles southwest of Bentley and between Mulhurst and Calmar.

Larch Bud Moth, Zeiraphera diniana Gn.

Larvae of this insect severely defoliated approximately 50 acres of alpine larch near the treeline on the upper slopes of the south tributary of Marmot Creek. Light defoliation was observed in the Snow Ridge area and in Highwood Pass.

DISEASE CONDITIONS

Dwarf Mistletoe, Arceuthobium americanum Nutt. ex Engelm.

This parasitic plant caused mortality in severely infected lodgepole pine stands on the slopes along Cataract and Wilkinson creeks in the Bow River Forest. In five infected patches, which totalled several hundred acres, approximately 75 percent of the trees had stem infections and mortality averaged from 40 to 50 percent.

Tree mortality was low until 1968, thus it appeared that the extremely dry summer in 1967 contributed to the mortality rate of the trees predisposed by dwarf mistletoe.

Shoestring Root Rot, Armillaria mellea (Vahl. ex Fr.) Quél.

This root rot was the cause of mortality of young lodgepole pine in Waterton Lakes, Kootenay and Banff national parks, Deer Creek Basin, south of Burnstick Lake and near Strachan. Infected and dying Douglas fir were noted in the Kootenay Valley and Radium area of Kootenay National Park and along Beaver Creek in the Porcupine Hills.

A gradual spread and intensification of this root rot in aspen was noted in the Crimson Lake Provincial Park camping area.

Poplar Ink Spot, Ciborinia whetzelii (Seaver) Seaver

This organism caused patchy discoloration to aspen foliage near Paine Lake, along the South Castle and Carbondale rivers, York and Allison creeks and along the Trunk Road near Vicary Creek, Livingstone River, Cataract and Lineham creeks.

White Pine Blister Rust, Cronartium ribicola J.C. Fischer

During aerial surveys of the District, stands of whitebark and limber pine severely damaged by this rust were observed in Waterton Lakes National Park, the Crowsnest Forest, the southern portion of the Bow River Forest and east of these forest boundaries between Pincher Creek and the Highwood River. Most of the damage observed was in the form of dead tops and branches. During a ground survey it was noted that some trees had been killed by cankers that girdled the main stem below the crown.

In some areas patches of whitebark pine were observed in which approximately 25 percent of the trees were dead. Further examinations will be carried out in 1969 to determine if blister rust was the cause of this mortality.

Stalactiforme Rust, Peridermium stalactiforme Arth. & Kern

This rust caused considerable mortality in young dense stands of lodgepole pine in the Waterfowl Lakes and Saskatchewan Crossing areas of Banff National Park and in Marmot Creek Basin.

In the Marmot Creek area the infected trees were scattered through the stands and the disease was merely a thinning agent. In the Saskatchewan Crossing area, patches of sapling sized trees were observed in which most of the stems were infected or had been previously killed.

Red Flagging of Cedar

This condition was prevalent along Sinclair Canyon and the headquarters area of Kootenay National Park and along the Kicking Horse Valley in Yoho National Park.

The "red flagging" resulted from the dying of branch terminals and the subsequent reddening of the foliage. The cause of this was not definitely determined but it appeared to be a natural process in which non-functional foliage on the lower crown is periodically cast.

A needle blight fungus, Didymascella thujina (Durand) Maise, was found in the affected areas but was not believed the primary causal agent. The relationship between this organism and "red flagging" will be further investigated in 1969.

Dying Douglas Fir

Patches of dead and dying mature Douglas fir were observed along

the Kootenay River near the south boundary of Kootenay National Park. The only visible agent found was the decay fungus Fomes pinicola (Sw. ex Fr.) Cke. which was fruiting prolifically on the affected trees. As this fungus is considered a secondary agent, the primary cause of the tree mortality was not known and further investigations will be carried out in 1969.

Animal Damage

Along the Kootenay River in Kootenay National Park, numerous lodgepole pine trees have been killed by bear damage over the past 2 years. In this type of damage the animals debark the lower 3 to 4 feet of the tree boles by vertical clawing. Usually the debarking was continuous around the circumference and the trees died. The attacked trees were observed singly throughout the stands, but occasionally a group of several trees were debarked. This type of damage has been reported previously in the State of Oregon, U.S.A.

Climatic Damage

This type of damage to conifers, commonly called "red belt", was observed along the slopes of mountain valleys from Marble Mountain in the Clearwater Forest south to the United States Border.

Severe damage was observed in the following areas: on Mt. Inglismaldie and Mt. Girouard in Banff National Park, along the west sides of the Fairholm, Fisher, and Livingstone ranges and along the east sides of the Flathead and Clark ranges.

Most of the damage was observed near or surrounding clearings on mountain sides, rather than in a typical "belt" along heavily forested slopes. The damaged stands will be examined in 1969 to determine if any tree mortality occurred.

OTHER NOTEWORTHY INSECTS AND DISEASES, 1968

Causal Agent	Host	Remarks
Insect		
Clearwing moth, Aegeriidae	Lp. pine	Larvae caused severe butt girdling and mortality to young lodgepole pine in the Red-Streak Camp Ground area in K.N.P.

Other Noteworthy Insects and Diseases, 1968 cont'd.

Causal Agent	Host	Remarks
Defoliator of balsam poplar, Brachylomia populi Stkr.	B. poplar	Infestations found along the Bow Valley in B.N.P. and along the Highwood River.
Cone insects, Lepidoptera	E. spruce	Caused cone damage in Deer and Marmot Creek Watersheds and on the east slope of Hailstone Butte.
Budworm, Choristoneura lambertiana Bsk.	Limber pine	Severe infestations noted along the foothills between Maycroft and Waterton.
Leaf beetle, Chrysomela aeneicollis Schffr.	Willow	Caused patches of moderate to severe defoliation along the upper Red Deer River, in Snow Pass, near Waterfowl Lakes, the N. Saskatchewan River between Sask. Crossing and Sunwapta Pass and along Smith-Dorrien Creek.
Lodgepole pine beetle, Dendroctonus murrayanae Hopk.	Lp. pine	Light infestations in living trees at Eisenhower Field Station, on Mt. Heffner, along the Kootenay, Carbondale and West Castle rivers.
Rose chafers, Dichelonyx backi Kby. Dichelonyx fulgida Lec.	D. fir	Numerous adults found feeding on opening buds along Settlers Road in K.N.P.
American aspen beetle, Gonioctena americana (Schaeff.)	T. aspen	Caused scattered patches of defoliation 3 miles east of Clearwater Ranger Station, along Old Fort Creek west of Morley and Beaver Creek in the Porcupine Hills.
Bark beetle, Ips amiskwiensis G. Hopp.	E. spruce	Severe infestation in avalanche killed spruce along the north shore of Emerald Lake Y.N.P.

Other Noteworthy Insects and Diseases, 1968 cont'd

Causal Agent	Host	Remarks
Balsam-fir sawfly, *Neodiprion abietis* (Harr.)	W. spruce	Caused light to moderate defoliation in Red Lodge and Mameo Beach provindial parks and along the Red Deer River west of Innisfail.
Sawfly, *Neodiprion* sp.	Lp. pine	Numerous larval colonies found on planted pine near Hespero and in native pine along the West Kootenay Fire Road K.N.P.
Poplar twig borer, *Oberea schaumi* Lec.	T. aspen	Infestations noted in saplings 10 miles south of Leedale, 5 miles southeast of Burmis.
Pine needle scale, *Phenacaspis pinifoliae* (Fitch)	Lp. pine	Severely infested trees noted in the Crowsnest Pass area and Redstreak Campground K.N.P.
Poplar serpentine miner, *Phylloconistis populiella* (Cham.)	T. aspen	Caused severe stand discoloration in mountain valleys in the National parks and along the east slopes in southwestern Alberta.
Poplar borer, *Saperda calcarata* Say	T. aspen	Severe infestation in mature aspen on the Stony Indian Reserve.
Ambrosia beetle, *Trypodentron lineatum* (Oliv.)	E. spruce Lp. pine	Population buildup in the Crowsnest Forest in stumps, logging slash and decked logs.
Budworm, *Zeiraphera fortunana* Kft.	E. spruce W. spruce	Caused severe bud damage in a shelterbelt 5 miles southwest of Innisfail and light damage in native stands along Deer Creek, in the Bow River Forest, near the mouth of the Simpson River, K.N.P., and Leanchoil area Y.N.P.

Other Noteworthy Insects and Diseases, 1968 cont'd.

Causal Agent	Host	Remarks
Disease		
Needle cast, *Bifusella linearis* (Pk.) Hoehn.	Whitebark pine	Found along MacDonald Creek in the Crowsnest Forest. New host record for the region.
Spruce cone rust, *Chrysomyxa pirolata* Wint.	E. spruce W. spruce	Severe damage between Brown Creek and the Brazeau River, along McCue, Deer and Marmot Creeks and to cones gathered by the A.F.S. in the Crowsnest Forest.
Spruce needle rust, *Chrysomyxa weirii* Jacks.	E. spruce W. spruce	Present throughout the coniferous forests. Occasional small patches or individual trees were severely affected.
Black rib of willow, *Ciborinia foliicola* (Cash & Davidson) Whet.	Willow	Perfect stage found along South Castle River. New herbarium record.
Pine needle rust, *Coleosporium asterum* (Diet.) Syd.	Lp. pine	Light damage noted along the Kootenay River, Spray and Kananaskis Valleys.
Canker, *Cucurbidothis pithyophila* (Fr.) Petr.	Limber pine	Found in upper Saskatchewan River area on living trees. New regional record.
Cucurbitaria staphula Dearn. ex R. N. Arnold & R. C. Russell	B. poplar	Common on poplar east of Drayton Valley. New regional record.
Pine needle cast, *Davisomycella ampla* (J. J. Davis) Darker	Lp. pine	Severely infected patches in the Chungo Creek - Blackstone River area. Light elsewhere.
Tip blight, *Delphinella abietis* (Rostr.) E. Muell.	A. fir	Common in Paint Pots area of K.N.P. New regional record.

Other Noteworthy Insects and Diseases, 1968 cont'd.

Causal Agent	Host	Remarks
Pine needle cast, *Elytroderma deformans* (Weir) Darker	Lp. pine	Severe infection persisted in the same areas as reported in 1967.
Leaf spot, *Fabraea maculata* Atk.	Mtn. ash	Found along Upper West Castle River. New regional record.
Pine needle cast, *Gloeocoryneum cinereum* (Dearn.) Weindlmayr	Lp. pine	Caused severe stand discoloration along the North Ram River, the head of Rough Creek and the Spray River. Common in K.N.P.
Needle rust, *Gymnosporangium gaeumanni* Zogg	Juniper	Collected along the Bow Valley in B.N.P. First collection from North America.
Needle blight, *Isthmiella quadrispora* Ziller	A. fir	Found in the Paint Pots area of K.N.P. and along Bauerman Brook in W.L.N.P. New regional record.
Leaf blight of balsam poplar, *Linospora tetraspora* Thompson	B. poplar	Caused light stand discoloration in the Rocky Mountain House-Strachan area.
Needle cast, *Lirula macrospora* (Hartig) Darker	E. spruce	Common along Smith - Dorrien Creek. Severe along the Cascade River B.N.P.
Pine needle cast, *Lophodermella concolor* (Dearn.) Darker	Lp. pine	Caused severe stand discoloration in Chungo Creek - Blackstone River area, along the Red Deer River west of Sundre, the Bow and Cascade River valleys B.N.P. Vermilion Crossing and Redstreak Campground areas K.N.P., Spray Lakes and Kananaskis Valley areas of the Bow River Forest.

Other Noteworthy Insects and Diseases, 1968 cont'd

Causal Agent	Host	Remarks
Pine needle cast, *Lophodermella montivaga* Petr.	Lp. pine	Caused severe discoloration and needle loss in the Waterfowl Lakes area B.N.P.
Larch needle cast, *Lophodermium laricinum* Duby	Western larch	Found along Settlers Road K.N.P. New herbarium host record.
Pine needle cast, *Lophodermium pinastri* (Schrad. ex Hook.) Chev.	Lp. pine	Caused severe stand discoloration and needle loss north of Kootenay Crossing Warden Station.
Spruce needle cast, *Lophomerum darkeri* Ouellette	W. spruce	Caused severe needle loss 40 miles southeast of Nordegg.
Poplar leaf spot, *Marssonina tremuloidis* (Ell. & Ev.) Kleb.	T. aspen	Caused severe stand discoloration in the Willow Creek area, the Porcupine Hills, along the Trunk Road between Dutch Creek and the Oldman River, along the Crowsnest River and in the Paine Lake area.
Red root and butt rot, *Polyporus tomentosis* Fr.	E. spruce	Incidence increased in overmature stands in upper West Castle River area.
Douglas fir needle cast, *Rhabdocline pseudotsugae* Syd.	D. fir	Small patches of severely infected D. fir found in the National Parks and southern Foothills.
Needle fungus, *Rhizothyrium abietis* Naum.	A. fir	Found 36 miles northwest of Rocky Mountain House, Marble Canyon K.N.P., Lake Louise B.N.P. and in W.L.N.P. New regional record.

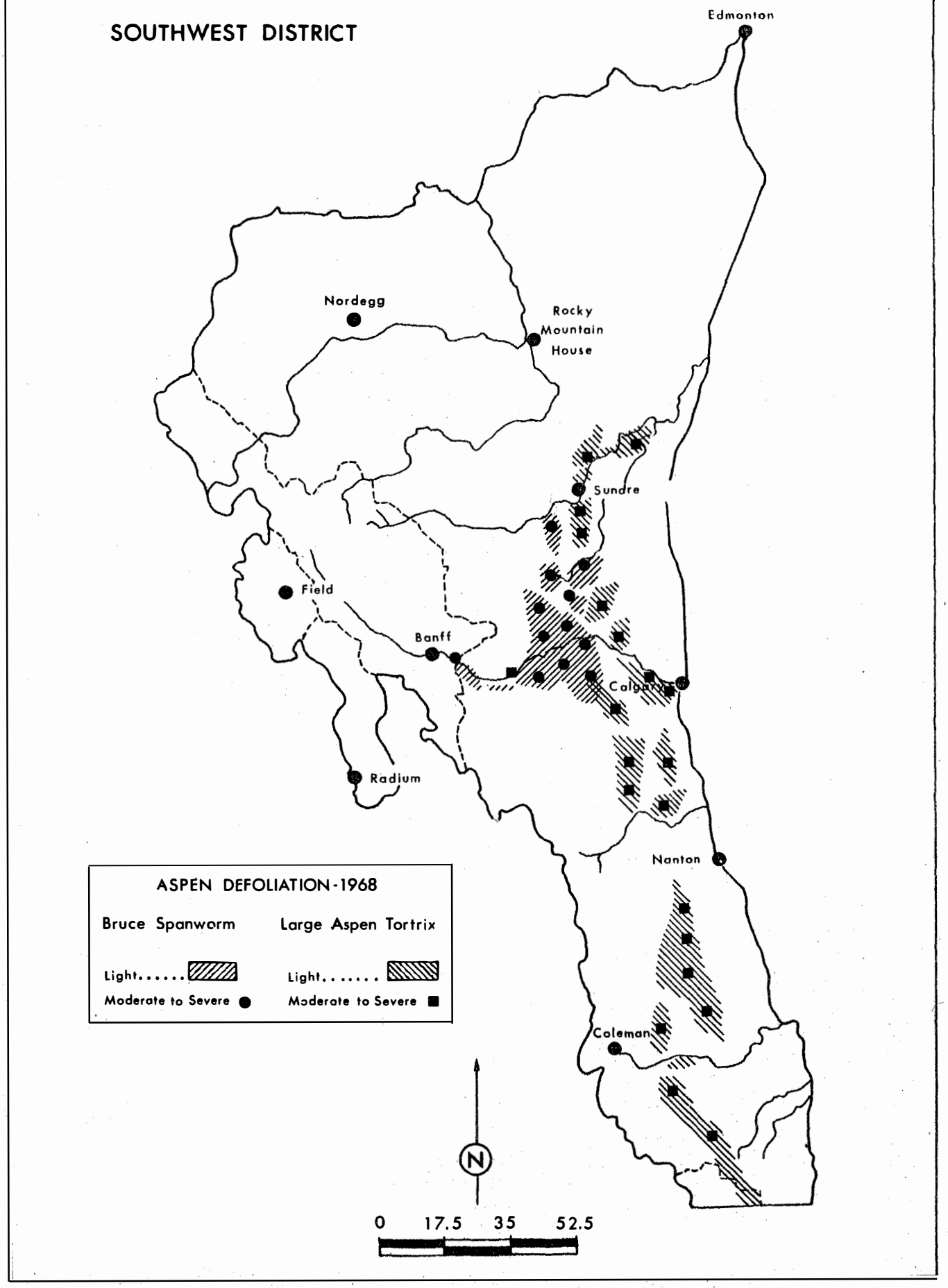
Other Noteworthy Insects and Diseases, 1968 cont'd.

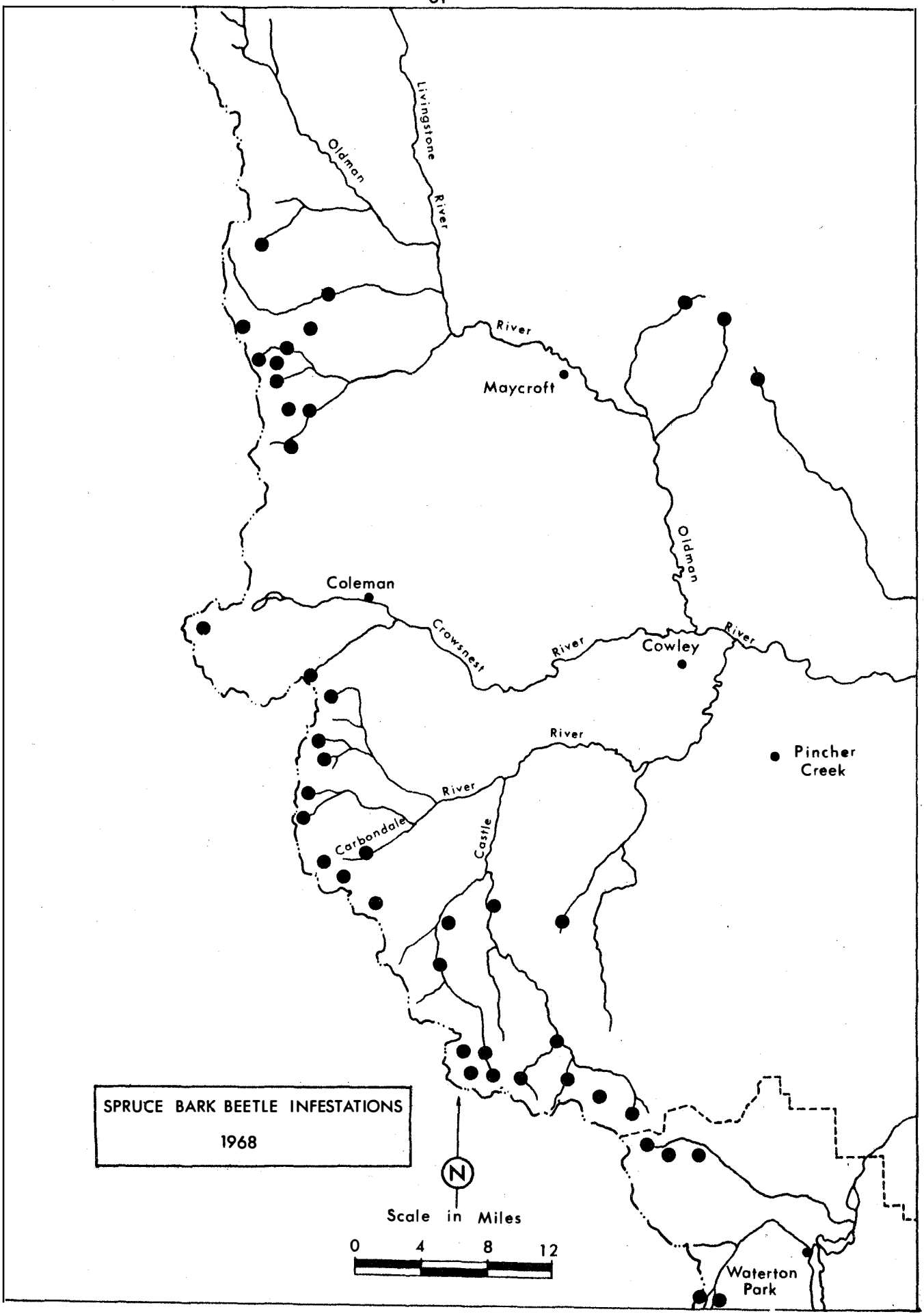
Causal Agent	Host	Remarks
Leaf spot, Septogloeum rhopaloideum Dearn. & Bisby	T. aspen	Caused severe stand discoloration near the Porcupine Ranger Station and along Sharples Creek in the Porcupine Hills.
Needle fungus, Seynesiella juniperi (Desm.) Arn.	Rocky Mtn. juniper	Common in the Radium area K.N.P. New herbarium host record.

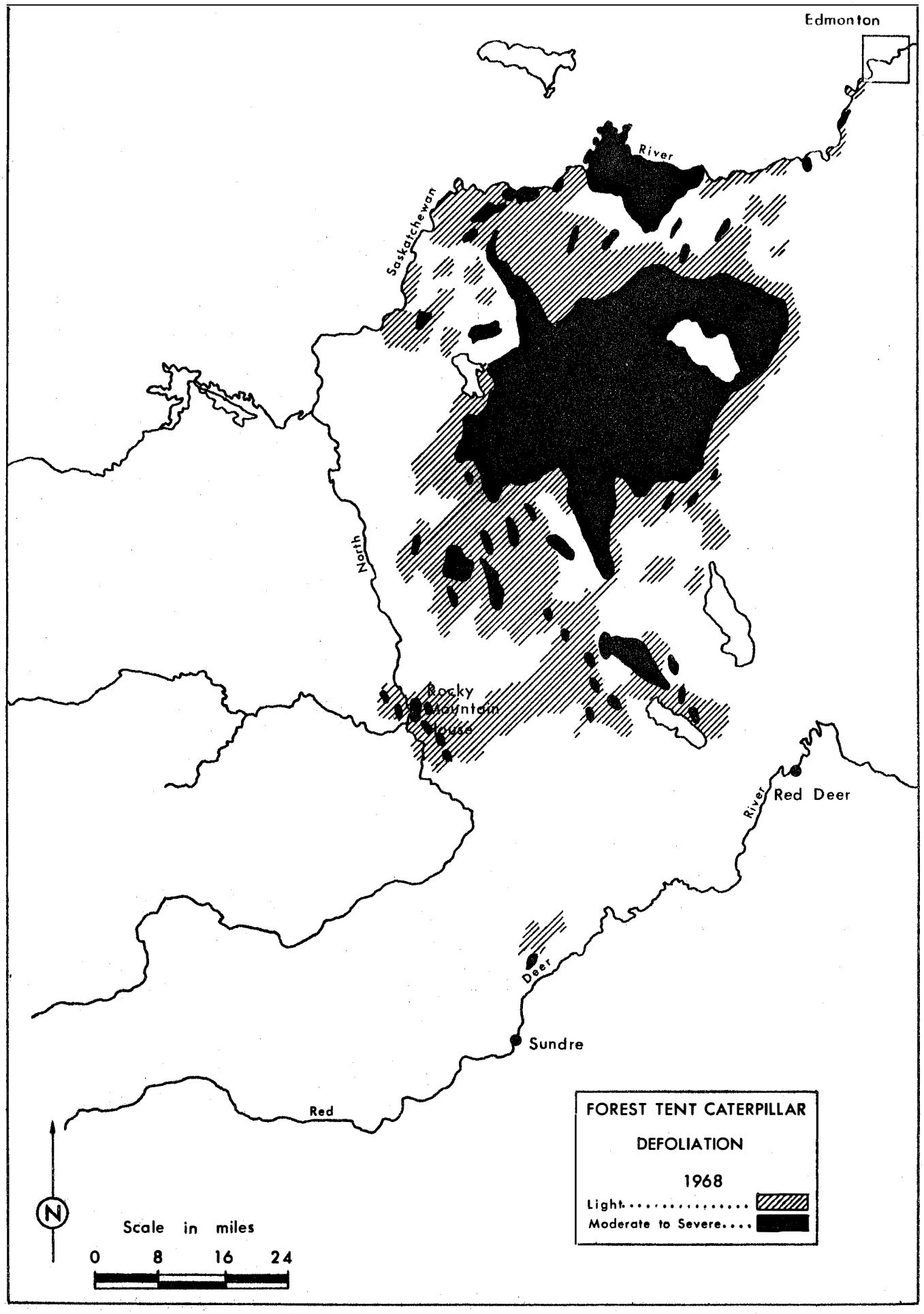
SUMMARY OF INSECT AND DISEASE COLLECTIONS BY HOSTS

Host Coniferous	Collections Insect	Collections Disease	Host Deciduous	Collections Insect	Collections Disease
White spruce	17	29	Trembling aspen	27	10
Engelmann spruce	16	7	Balsam poplar	2	3
Black spruce	0	0	Willow	6	5
Lodgepole pine	13	31			
Whitebark pine	2	12			
Limber pine	2	2			
Alpine fir	1	11			
Douglas fir	1	8			
Western larch	1	2			
Alpine larch	1	1			
Cedar	0	1			
	54	104		35	18

Insect collections from miscellaneous hosts	5
Disease collections from miscellaneous hosts	30
GRAND TOTAL	246


SOUTHWEST DISTRICT
Edmonton
Nordegg
Rocky Mountain House
Sundre
Field
Banff
Calgary
Radium
Nanton
Coleman
ASPEN DEFOLIATION-1968
Bruce Spanworm
Large Aspen Tortrix
Light.....
Moderate to Severe
Light.....
Moderate to Severe
N
0 17.5 35 52.5


Oldman River
Livingstone River
Maycroft
Coleman
Crowsnest River
Oldman River
Cowley
Pincher Creek
Carbondale River
Castle River
Waterton Park
SPRUCE BARK BEETLE INFESTATIONS
1968
N
Scale in Miles
0 4 8 12


Edmonton
River
Saskatchewan
North
Rocky Mountain House
River
Red Deer
Deer
Sundre
Red
FOREST TENT CATERPILLAR
DEFOLIATION
1968
Light
Moderate to Severe
N
Scale in miles
0 8 16 24

ANNUAL DISTRICT REPORT

WEST CENTRAL DISTRICT

ALBERTA 1968

by

F. J. Emond

FOREST RESEARCH LABORATORY

CALGARY, ALBERTA

FORESTRY BRANCH

DEPARTMENT OF FISHERIES AND FORESTRY

FEBRUARY 1969

INTRODUCTION

The forest tent caterpillar continued to be the major defoliator of aspen in the District with a marked increase in populations and damage reported in 1968. Bruce spanworm populations increased and reached outbreak proportions in two areas. Leaf beetle adults and larvae caused significant defoliation of aspen and balsam poplar. An increase in population levels of the western tent caterpillar was evident in the west half of the District. Black-headed budworm caused considerable damage throughout the foothills region and in Jasper National Park. Defoliation and discoloration of shelterbelt and ornamental spruce by the yellow-headed spruce sawfly and spruce spider mite respectively was of prime concern in the agricultural and urban areas. Population levels of the larch sawfly remained low.

An increase in the incidence of needle casts of conifers was evident and needle rusts of conifers continued to decline. Light to moderate damage by spruce cone rust was reported from several areas. Winter drying of conifers was conspicuous in several locations throughout the foothills region and Jasper National Park.

INSECT CONDITIONS

Black-headed Budworm, Acleris variana (Fern.)

This spruce defoliator was common in all areas of the District. High populations caused moderate to severe damage from Hinton through to Jasper Townsite. Moderate damage was evident south of Jasper Townsite for a distance of 22 miles, along the Celestine Lake Road, along the Trunk Road north of Entrance for 20 miles, between Obed and Hinton and 5 miles southeast of Fox Creek. Light damage to spruce was common throughout the remainder of the forested area.

Leaf Beetles

Calligrapha verrucosa Suffr., was responsible for moderate to severe defoliation of coyote willow and regeneration balsam poplar 4 miles south of Tomahawk and 4 miles southeast of Drayton Valley.

Chrysomela scripta Fab., caused moderate defoliation in scattered pockets of balsam poplar along Deep Valley Creek, near Little Smoky and 2 miles west of Obed.

Chrysomela semota Brown, continued to be a serious defoliator of open-growing regeneration balsam poplar in the District. Moderate to severe skeletonizing was reported in the following areas: 5 miles south of

Whitecourt along the Peers Road, 2 miles east of Whitecourt along Highway 43, 9 miles south of Swan Hills along the Mobil Road and near the Fiddle River Crossing in Jasper National Park. Moderate damage was evident between Edson and Hinton, along the North Saskatchewan River east of Drayton Valley and south of Tomahawk, 6 miles north of Robb and 54 miles south of Valleyview. Light damage was common along Highway 16 between Edson and Evansburg.

Gonioctena americana (Schaeff.) caused light to moderate defoliation of regeneration aspen in the following areas: 3 miles north of Seba Beach, Pembina River Provincial Park, 3 miles south of Entwistle, 4 miles north of Drayton Valley and at various locations along Highway 43 between Greencourt and Fox Creek.

Forest Tent Caterpillar, Malacosoma disstria Hbn.

Wabamun-Lac Ste. Anne Outbreak

The outbreak of these caterpillars which has persisted for the past several years in this area continued unabated in 1968. The boundaries of the outbreak remained much the same as in 1967 but the degree of defoliation was considerably less. The degree of damage varied within this outbreak, bounded by an irregular line as follows: from Stony Plain northwest through Gunn to Cherhill, southwest to Entwistle, south to Drayton Valley and northeast back to Stony Plain. Within this area, scattered patches of moderate to severe defoliation, varying in size from 5 to 25 square miles, occurred along the north side of Lake Isle to the west end of Lac Ste. Anne, between Ross Haven and Glenevis, west of Stanger, near Sunset Point and Alberta Beach and near Wabamun. Isolated pockets of moderate to severe damage were evident near Keephills, Mewassin, Highvale, Drayton Valley and Easyford. Light defoliation was common in the remainder of the outbreak area (see map, page 44).

Whitecourt-Chip Lake Outbreak

In this area, where isolated patches of defoliation occurred during 1967, a marked increase in populations and damage was evident in 1968. The approximate boundaries of this outbreak were as follows: from Rangeton north through Mystery Lake to Five Mile Island, west to Carson Lake and to Chickadee Creek where it intersects with Highway 43, south to Shiningbank Lake and east to Rangeton. Moderate to severe defoliation occurred between Whitecourt, Chickadee Creek and Carson Lake, from Whitecourt southeast to Greencourt, between Five Mile Island and Peavine and in the area north of Chip Lake between Ronan, Rangeton and Hattonford. Isolated patches of moderate to severe defoliation were reported north and west of Highway, Anselmo and Balm. Light defoliation was evident from Shiningbank Lake north to a point 4 miles south of Whitecourt, surrounding Baseline and Carson lakes and to Blue Ridge, north of Hattonford, Lobstick, Beta Lake and Chip Lake (See map, page 44).

Cynthia Outbreak

This outbreak, which covered approximately 235 square miles, situated between Granada and Cynthia is described as follows: from the north half of Twp. 49, Rges. 10 and 11, W. 5., through to the south half of Twp. 53, Rge. 10, W. 5. Within this area defoliation was light with the exception of two small patches of moderate to severe defoliation north of Cynthia in Twps. 50 and 53.

In the remainder of the District, patches of moderate to severe damage occurred west of Woodbend and along the Saskatchewan River Valley in Edmonton. Scattered pockets of light defoliation were noted in the vicinities of Golden Spike, Winterburn, Graminia, St. Albert, Riviere Qui Barre, 4 miles west of Edson and near Crane, Bara and Shoal lakes.

The following table indicates defoliation of aspen expected in 1969 in the vicinities of permanent sampling stations where egg band sampling was carried out.

Location	Defoliation 1968	Predicted defoliation 1969
Gilbey	moderate	light
Rocky Mtn. House	moderate	severe
Alder Flats (Tower road)	moderate	moderate
Fern Creek	moderate	severe
Lodgepole	nil	nil
Horen	light	moderate

Bruce Spanworm, Operophtera bruceata (Hulst)

A marked increase in populations of this aspen defoliator was evident in two areas of the District in 1968. Outbreak proportions were reached in the vicinity of the junction of Highways 16 and 47, with moderate to severe damage occurring along both sides of Highway 16 east for 3 miles. West of the Junction through to Obed damage was light to moderate. From Obed to the Jasper Park Gate defoliation gradually decreased. In the Whitecourt-Windfall area, scattered patches of severe damage were noted along the Windfall Cutoff Road. Light to moderate

damage occurred throughout the remainder of this area.

Yellow-headed Spruce Sawfly, Pikonema alaskensis (Roh.)

This sawfly continued to be the major defoliator of shelterbelt and ornamental spruce in west-central Alberta. Severe defoliation was reported near Legal, 2 miles west of Winterburn, 2.5 miles north of Drayton Valley and in Edmonton. Moderate damage was evident east and west of Westlock, between Clyde and Edmonton and Edmonton and Edson. Light defoliation was common south of Duffield, in Wabamun and Pembina River provincial parks and at several locations between Mayerthorpe and Carvel Corner.

Low populations persisted on native spruce throughout the forested area.

DISEASE CONDITIONS

Fir needle rusts

Pucciniastrum epilobii Otth., was reported throughout the range of alpine and balsam fir within the District. Light infections were evident in the following areas: 5 miles southeast of Fox Creek, 3 miles east of Cynthia, 15 miles southwest of Whitecourt, 30 miles northwest of Whitecourt and 5 miles southeast of Swan Hills. Moderate infections were evident on regeneration alpine fir 5 miles northwest of Robb and in the Camp 22 lease of Northwest Pulp and Power. Light infections on the alternate host, fireweed, were noted in these areas. Light infections of Pucciniastrum goeppertianum (Kuehn) Kleb., on 2 year old growth of alpine and balsam fir regeneration was noted 30 miles north of Entrance, 4 miles north of Muskeg and 18 miles southeast of Coalspur.

Pine Needle Casts

In 1968 the most prevalent needle casts of lodgepole pine in the District were Elytroderma deformans (Weir) Darker and Lophodermella concolor (Dearn.) Darker. Extensive discoloration and needle drop caused by E. deformans was common in the Obed-Hinton area, 12 miles south of Peers and 5 miles south of Whitecourt. L. concolor, in association with Hendersonia pinicola Wehm., caused discoloration and needle loss in the Edson - Robb - Coalspur area and 7 miles north of Jasper.

Spruce Needle Casts

"Black dotted needle cast of spruce" (as yet undescribed) was

common on mature white spruce along the North Saskatchewan River Valley southeast of Drayton Valley and on regeneration spruce 2 miles east of Granada.

Isthmiella crepidiformis (Darker) Darker, was responsible for moderate discoloration and needle loss of black spruce 18 miles northwest of Robb, 2 miles northwest of Violet Grove and 3 miles west of Evansburg. Light needle loss was evident on white spruce 2 miles north of Cadomin, along Deep Valley Creek south of Valleyview, 5 miles east of Fox Creek and in Pembina River Provincial Park.

Lirula macrospora (Hartig) Darker, caused needle drop and discoloration to white spruce between the Brazeau River and Simonette Tower, in Jasper National Park, between Edson and Hinton and in the Drayton Valley - Lodgepole area. Severe damage occurred in the following locations: 34 miles southeast of Coalspur, 2 miles and 20 miles north of Entrance, 12 miles south of Jasper, in the town of Hinton and immediate area, one mile east of Marlboro and 5 miles southeast of Drayton Valley.

Sarcotrichila piniperda (Rehm) Korf., caused moderate discoloration and needle loss of white spruce along the Freeman River 10 miles south of Swan Hills.

Spruce needle rusts

The incidence and intensity of Chrysomyxa ledicola Lagerh., on white and black spruce remained at approximately the same level as reported in 1967. Moderate infections, affecting individual or small groups of trees, were reported from several locations between Fox Creek and Little Smoky, 5 miles southeast of Fox Creek, between Whitecourt and Peers and one mile east of Chip Lake. Light infections were common throughout the remainder of the District. Infections on the alternate host, Labrador tea, were common in all areas.

Chrysomyxa weirii Jacks., caused moderate foliage loss on white spruce 20 miles north of Entrance, 3 miles south of Mercoal and 10 miles southeast of Swan Hills. Light infections were noted at several other locations in the District.

Climatic Damage

Moderate to severe "red belting" of lodgepole pine occurred at several locations throughout the foothills of the District. This type of damage was prevalent from 6 miles east of Obed west to Hinton, southwest of Hinton along Highway 16 for 12 miles, southeast of Hinton along the Trunk Road for approximately 8 miles, 4 miles south of Mercoal, 2 miles north of Cadomin, near Embarras, near Jasper and along the west

slopes of the Maligne Range south of Jasper. Light to moderate damage was evident along Ashlar Ridge in Jasper National Park and at several locations along the Trunk Road north and south of Hinton.

Moderate and severe climatic damage to aspen was evident in the areas adjacent to the red belt damage.

Frost damage to buds of regeneration balsam fir and spruce was common in the Hinton and Whitecourt areas.

OTHER NOTEWORTHY INSECTS AND DISEASES, 1968

Causal Agent	Host	Remarks
Insect		
Bud-gall mite, *Aceria neoessigi* (K.)	T. aspen	Light infestations common in the Edson-Whitecourt-Edmonton areas.
Poplar bud-gall mite, *Aceria parapopuli* (Kiefer)	T. aspen	Light damage in the Wabamun-Thunder lakes area and in Edmonton.
Cooley spruce gall, *Adelges cooleyi* (Gill.)	W. spruce E. spruce C. spruce	Low populations throughout the District.
Western grape rootworm, *Adoxus obscurus* (L.)	Fireweed	High populations 24 miles S.E. of Coalspur.
Bronze birch borer, *Agrilus anxius* Gory	W. birch	Medium populations in Jackfish Lake area. Low populations in Edmonton.
Birch skeletonizer, *Bucculatrix canadensisella* Chamb.	W. birch	Medium populations in Edmonton and in the Whitecourt-Edson-Fox Creek areas.
Eastern larch beetle, *Dendroctonus simplex* Lec.	Tamarack	Medium populations in Blue Ridge area.
Bark beetle, *Hylurgops rugipennis* Mann.	B. fir W. spruce	Low populations common in mature trees in the Whitecourt-Windfall area.

Other Noteworthy Insects and Diseases - Cont'd.

Causal Agent	Host	Remarks
Bark beetle, *Ips borealis* Sw.	W. spruce	Common in the Whitecourt-Swan Hills area.
Bark beetle, *Ips perroti* Sw.	J. pine	Low population in slash 1 mile north of Blue Ridge.
Bark beetle, *Ips perturbatus* Eich.	W. spruce	Low populations in blowdown north of Whitecourt, near Windfall and Edson.
Pine engraver beetle, *Ips pini* (Say)	Lp. pine	Low populations north of Entrance.
Western tent caterpillar, *Malacosoma californicum pluviale* (Dyar)	Chokecherry Willow B. poplar S. birch	High populations near Granada and Peers. Low populations near Tomahawk, Swan Hills and Seba Beach.
A sawfly, *Neodiprion* sp.	Lp. pine J. pine	Moderate damage 7 miles south of Duffield on J. pine. Light damage near Obed and Coalspur on Lp. pine.
Spruce spider mite, *Oligonychus ununguis* (Jac.)	W. spruce C. spruce	Common on shelterbelts and ornamentals in the District.
Pitch nodule maker, *Petrova albicapitana* (Busck)	Lp. pine	Common in regeneration stands in the District.
Spruce gall aphid, *Pineus pinifoliae* (Fitch)	W. spruce Lp. pine	Medium infestations near Nojack and Swan Hills.
Poplar serpentine miner, *Phyllocnistis populiella* Cham.	T. aspen	Low populations in the District.
Bark beetle, *Pityokteines minutus* Sw.	B. fir A. fir	Common in overmature and dying trees near Fox Creek, Muskeg and Whitecourt.
Four-eyed spruce bark beetle, *Polygraphus rufipennis* Kby.	W. spruce	Low populations in the Edson-Whitecourt-Hinton area.

Other Noteworthy Insects and Diseases - Cont'd.

Causal Agent	Host	Remarks
Larch sawfly, *Pristiphora erichsonii* (Htg.)	Tamarack	Moderate damage near Fox Creek and Seba Beach. Light damage in remainder of the District.
Poplar borer, *Saperda calcarata* Say	T. aspen	Numerous brood trees noted in the Wabamun Lake - Lac. Ste. Anne area.
A noctuiidae, *Zenobia pleonoctusa* Grt.	T. aspen	Medium populations near Whitecourt and Edson.
Disease		
Shoestring root rot, *Armillaria mellea* (Vahl. ex Fr.) Quél.	Lp. pine B. fir W. birch	Light infections common in pine near Robb and B. fir in the Windfall area. Moderate infection in birch near Jackfish Lake.
Poplar ink spot, *Ciborinia whetzelii* (Seaver) Seaver	T. aspen	Light infections in all aspen areas.
Leaf spot, *Coccomyces hiemalis* Higgins	Chokecherry Pincherry	Common in Edmonton and near Wabamun Lake.
Pine needle rust, *Coleosporium asterum* (Diet.) Syd.	Lp. pine J. pine	Light damage throughout the forested area.
Needle cast, *Davisomycella ampla* (J.J. Davis) Darker	J. pine	Low incidence in the Seba Beach area.
Hypoxylon canker, *Hypoxylon mammatum* (Wahl.) Miller (*Hypoxylon pruinatum* (Klotzche) Cke.)	T. aspen	Cankers common in Edmonton and near Wabamun Lake.

Other Noteworthy Insects and Diseases - Cont'd.

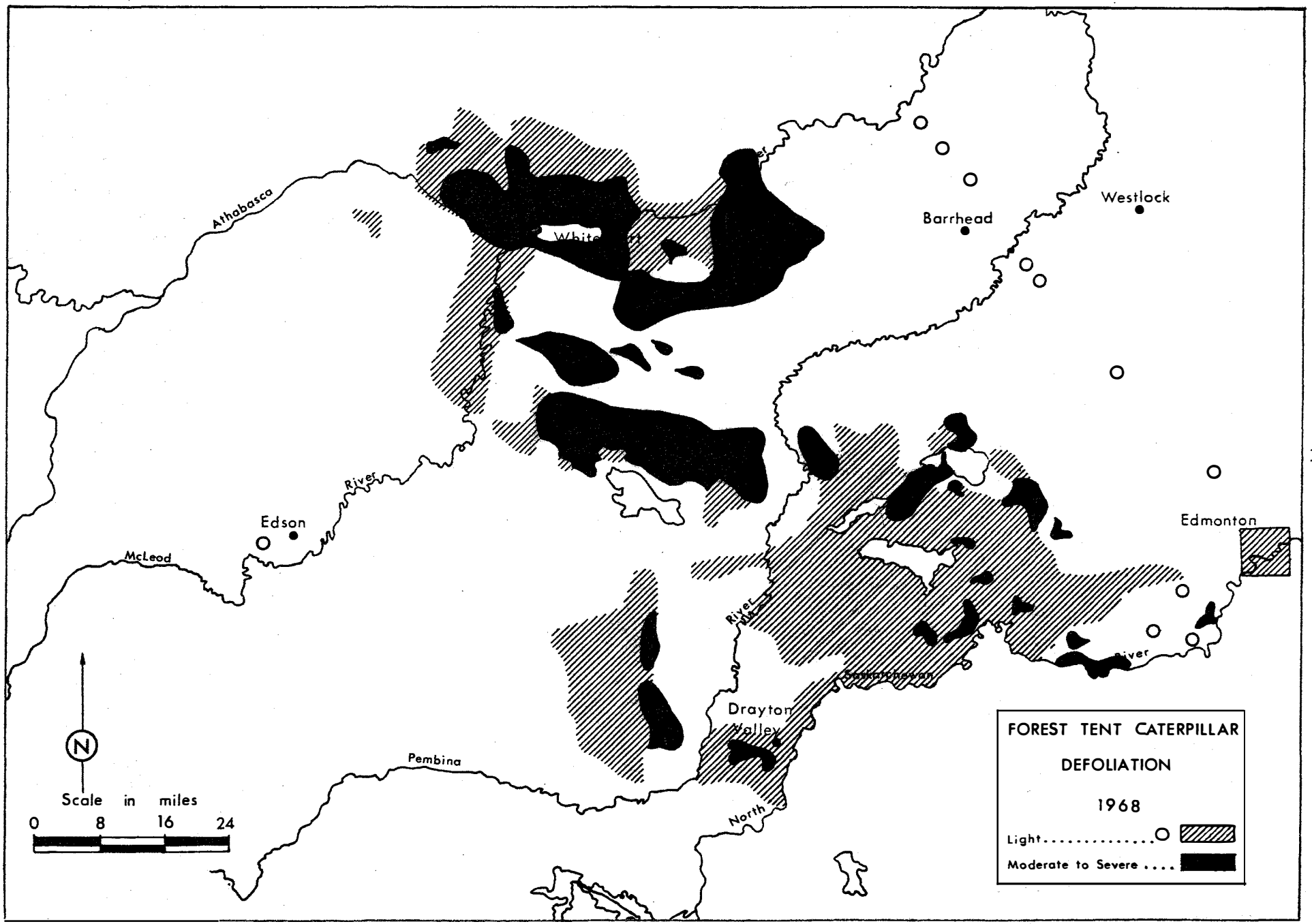
Causal Agent	Host	Remarks
Needle cast, *Lirula mirabilis* (Darker) Darker	B. fir	Light infection on regeneration 5 miles east of Fox Creek.
Needle cast, *Lirula nervata* (Darker) Darker	B. fir	Light to medium infection on regeneration 3 miles east of Cynthia.
Needle cast, *Lophodermium juniperinum* (Fr.) de N.	Juniper	Medium infection throughout the foothills and in J.N.P.
Needle cast, *Lophodermium nitens* Darker	Limber pine	Common along the Edith Cavell Road in J.N.P.
Western gall rust, *Peridermium harknessii* J.P. Moore	Lp. pine	Common throughout the District.
Stalactiforme rust, *Peridermium stalactiforme* Arth. & Kern	Lp. pine	Medium infection south of Whitecourt. Light infection common near Edson, Nojack and Robb.
Douglas fir needle cast, *Rhabdocline pseudotsugae* Syd.	D. fir	Common on mature trees south of Jasper near Edith Cavell turnoff.
Shoot blight of balsam poplar. *Venturia populina* (Vuill.) Fabric.	B. poplar	Common on regeneration in all areas of the District.
Aspen shoot blight, *Venturia tremulae* Aderh.	T. aspen	Common on regeneration in all areas of the District.

SUMMARY OF INSECT AND DISEASE COLLECTIONS BY HOSTS

Host Coniferous	Collections Insect	Disease	Host Deciduous	Collections Insect	Disease
White spruce	30	33	T. aspen	51	7
Colorado spruce	19	0	B. poplar	22	1
Misc. spruce	2	6	Willow	19	2
Lodgepole pine	24	26	Birch	10	2
Misc. pine	2	3	Alder	4	0
Balsam fir	4	10			
Misc. fir	2	9			
Tamarack	21	1			
	104	88		106	12

Insect collections from miscellaneous hosts 14
Disease collections from miscellaneous hosts 5

GRAND TOTAL 329


Athabasca
River
Edson
McLeod
River
Barrhead
Westlock
Edmonton
Drayton
Valley
Pembina
River
North
Saskatchewan
River
N
Scale in miles
0 8 16 24
FOREST TENT CATERPILLAR
DEFOLIATION
1968
Light
Moderate to Severe

ANNUAL DISTRICT REPORT

NORTHEAST DISTRICT

ALBERTA 1968

by

C. R. Layton

FOREST RESEARCH LABORATORY

CALGARY, ALBERTA

FORESTRY BRANCH

DEPARTMENT OF FISHERIES AND FORESTRY

FEBRUARY 1969

INTRODUCTION

The spruce budworm remained the major defoliating insect in the Northeast District during 1968 but intensity and damage was less than that reported in 1967. Forest tent caterpillar populations increased. The yellow-headed spruce sawfly was a serious pest in many spruce shelterbelts throughout the agricultural areas. Populations of larch sawfly remained low and little damage was observed. Leaf beetles and leaf rollers were present in low numbers throughout the District.

Leaf and needle rusts caused little foliage damage during 1968. Two new outbreaks of dwarf mistletoe were recorded. Moderate damage by red belt was observed. Perennial stem and branch diseases occurred on many hosts throughout the District.

Special surveys to ascertain the population of woodborers in decked logs and the incidence of Atropellis canker in pine stands were conducted in 1968.

INSECT CONDITIONS

Black-headed Budworm, Acleris variana (Fern.)

The populations of black-headed budworm showed little change in the District from that reported in 1967. Low populations were observed in white spruce stands in the Swan Hills, between Lesser Slave and Utikuma lakes and in the McMurray area.

Medium populations were evident in the Red Earth area. Light damage was evident to white spruce in the Newbrook Campsite.

Birch Skeletonizer, Bucculatrix canadensisella Chamb.

A decrease in the population of the birch skeletonizer was evident in the Slave Lake Forest. Light leaf skeletonizing was observed along the south shore of Lesser Slave Lake. A low population was observed in the Athabasca area.

Woodborers, Buprestidae and Cerambycidae

Large areas of timber were burned over in 1968 and the possibility of woodborers in merchantable timber caused concern

to forestry personnel. Surveys made in the Slave Lake and Calling Lake burns revealed only trace populations of Buprestidae and Cerambycidae.

A sampling program was carried out in logs decked in the spring of 1968 to ascertain the species and population levels of the woodborers present. The results are given in the following table. The most common Cerambycidae encountered was Tetropium cinnemopterum parvalum Casey. Other woodborer populations were low. Only light damage was observed.

RESULTS OF WOODBORER SAMPLING

Location	Spruce Log	Dia.	Exposure	No. of larvae per sq. ft.		
				Cerambycidae		Buprestidae
				Tetropium sp.	Monochamus sp.	
High Prairie	1	14	north	3	0	0
	2	10	north	10	0	0
	3	24	top	4	0	0
	4	12	top	4	0	0
	5	13	south	3	0	0
	6	10	south	1	0	0
Calling Lake	1	16	north	0	0	0
	2	7	north	5	0	0
	3	18	top	0	0	7
	4	10	top	1	0	4
	5	14	south	0	0	7
	6	9	south	0	0	0
McMurray	1	9	north	2	0	0
	2	8	north	0	0	0
	3	17	top	1	0	0
	4	10	top	0	0	0
	5	20	south	3	0	0
	6	10	south	0	1	0

Spruce Budworm, Choristoneura fumiferana (Clem.)

The spruce budworm continued to be the most important forest insect in the District. An increase in distribution but a sharp decline in intensity was evident in areas severely infested in 1967. Approximately

128,000 acres of spruce in the Athabasca Forest and 21,000 acres of spruce in Slave Lake Forest received measurable defoliation during 1968 (see map, page 54).

In the McMurray area, light infestations were observed along the Athabasca River in the following areas: at the mouth of Little Fishery Creek, from Mountain Rapids south for 3 miles, at Crooked Rapids, 5 miles west of the mouth of Grand Rapids, and from House River to Boivin Creek. From McMurray north to Stony Island, defoliation was light with patches of moderate defoliation interspersed through the area. Light defoliation was observed 25 miles east of McMurray along the Clearwater River.

In the Fort McKay area light defoliation was evident along the Athabasca River from Saline Lake to the mouth of the Dover River. West of Fort McKay light damage occurred to spruce at and near the confluence of the McKay and Dover rivers. Along the McKay River, through Twps. 92 and 93, Rges. 12 and 13, defoliation was generally light with a few interspersed patches of moderate damage.

In the Bitumount area, light defoliation was observed along the west side of the Athabasca River at Lafont Island and from Morrisons Island north to Eymundson Creek. Along Eymundson Creek defoliation was light for approximately 4 miles. Along the east side of the River from Eymundson Creek north to Furlough Island defoliation was predominantly light; some patches of moderate damage were interspersed throughout the area. On the east slopes of the Birch Mountains light defoliation, with patches of moderate, were evident from Asphalt Creek south to the Tar River. South of McCelland Lake a stand of spruce sustained light to moderate defoliation.

In the Slave Lake Forest light to moderate defoliation occurred in the following areas: along the Wabasca River through Twp. 96, north of the Wabasca River through Twp. 94, Rge. 6 and in Twp. 97, Rge 6. Small pockets of light defoliation persisted southeast of Loon Lake.

American Aspen Beetle, Gonioctena americana (Schaeff.)

The population of the American aspen beetle remained much the same as that reported in 1967. Medium populations were evident in the following locations: 3.6 miles southeast of Waterways, 15 miles south of Beaverdam, one mile west of Owl River, 4.5 miles north of Goodridge and along Crooked Creek north of Red Earth Tower. Low populations could be found in most aspen stands in the remainder of the District.

Forest Tent Caterpillar, Malacosoma disstria Hbn.

An upward trend in the population level of the forest tent caterpillar was evident in the southwest portion of the District in 1968. Healthy

colonies were observed in the following areas: Legal, Egremont, Warspite, Rochester, Newbrook, Morinville, Clyde, Athabasca, Amber Valley and Wandering River. Individual larvae were observed along the south shore of Lesser Slave Lake and in the Swan Hills. Small patches of moderate defoliation were observed in the Bon Accord and Clyde areas.

Yellow-headed Spruce Sawfly, Pikonema alaskensis (Roh.)

Moderate to severe damage was again evident to spruce used as ornamentals and shelterbelts throughout the agricultural areas of Northeastern Alberta. Severe damage was observed in the following areas: Bon Accord, Bellis, Boyne Lake, Spedden, St. Paul, Lessard, Lac La Biche, Plamondon, Atmore, Newbrook, Venice, Rochester, Legal and High Prairie.

Larch Sawfly, Pristiphora erichsonii (Htg.)

Populations of the larch sawfly remained low throughout the District in 1968. Light damage was detected in the Slave Lake area, near Panny Airstrip and near Wandering River. In other tamarack stands checked, larvae could generally be found but no noticeable damage was observed.

DISEASE CONDITIONS

Dwarf Mistletoe, Arceuthobium americanum Nutt. ex Engelm.

Two new outbreaks of dwarf mistletoe were recorded in the District during 1968. One, east of the Grand Rapids on the Athabasca River and the other 19 miles south of Red Earth Base Camp. In the Red Earth outbreak light damage was confined to old residual pine while at Grand Rapids both old and young trees were severely damaged.

Atropellis Canker, Atropellis piniphila (Weir) Lohman & Cash

A thorough search for this disease, which causes severe damage to lodgepole pine in the foothills of Alberta, was conducted in pine stands throughout the District. Examinations were conducted in the following areas: Cold Lake, House River, McMurray, Birch Mountains, Burnt Lakes, Red Earth and Hondo. No atropellis canker was found.

Spruce Needle Rusts, Chrysomyxa spp. and Pucciniastrum sp.

Spruce throughout northeastern Alberta had little damage by spruce needle rusts. Light damage by Chrysomyxa sp. was observed along the Hart Lake Tower Road and 5 miles southwest of Cross Lake Provincial Park. Chrysomyxa weirii Jacks. and Pucciniastrum sp. were collected along the McMurray Highway.

OTHER NOTEWORTHY INSECTS AND DISEASES, 1968

Causal Agent	Host	Remarks
Insect		
Leaf beetle, *Chalcoides* sp.	T. aspen B. poplar	Moderate foliage damage to regeneration near Lac La Biche and High Prairie.
Leaf beetle, *Chrysomela semota* Brown	B. poplar	Low populations north of Swan Hills.
Leaf tier, *Compsolechia niveopulvella* Cham.	T. aspen	Low populations common throughout the District.
Lodgepole pine beetle, *Dendroctonus murrayanae* Hopk.	J. Pine	A low population in fire weakened pine north of Clyde.
Spruce bark beetle, *Dendroctonus obesus* (Mann.)	W. spruce	Present in weakened trees near Slave Lake and Calling Lake.
Eastern larch beetle, *Dendroctonus simplex* Lec.	Tamarack	Common in fire weakened trees throughout the District.
Leaf beetle, *Disonycha alternata* Ill.	Willow	Moderate foliage damage observed along the east shore of Lesser Slave Lake.
Grey willow leaf beetle, *Galerucella decora* Say	T. aspen Willow	Low populations scattered throughout the District.
Striped alder sawfly, *Hemichroa crocea* (Fourc.)	Alder	Severe foliage damage along north shore of Lesser Slave Lake.
Willow leaf miner, *Lyonetia* sp.	Willow	Moderate foliage damage in the McMurray area.
Western tent caterpillar, *Malacosoma pluviale* (Dyar)	T. aspen Willow	Low populations near Swan Hills and Slave Lake.

Other Noteworthy Insects and Diseases - cont'd

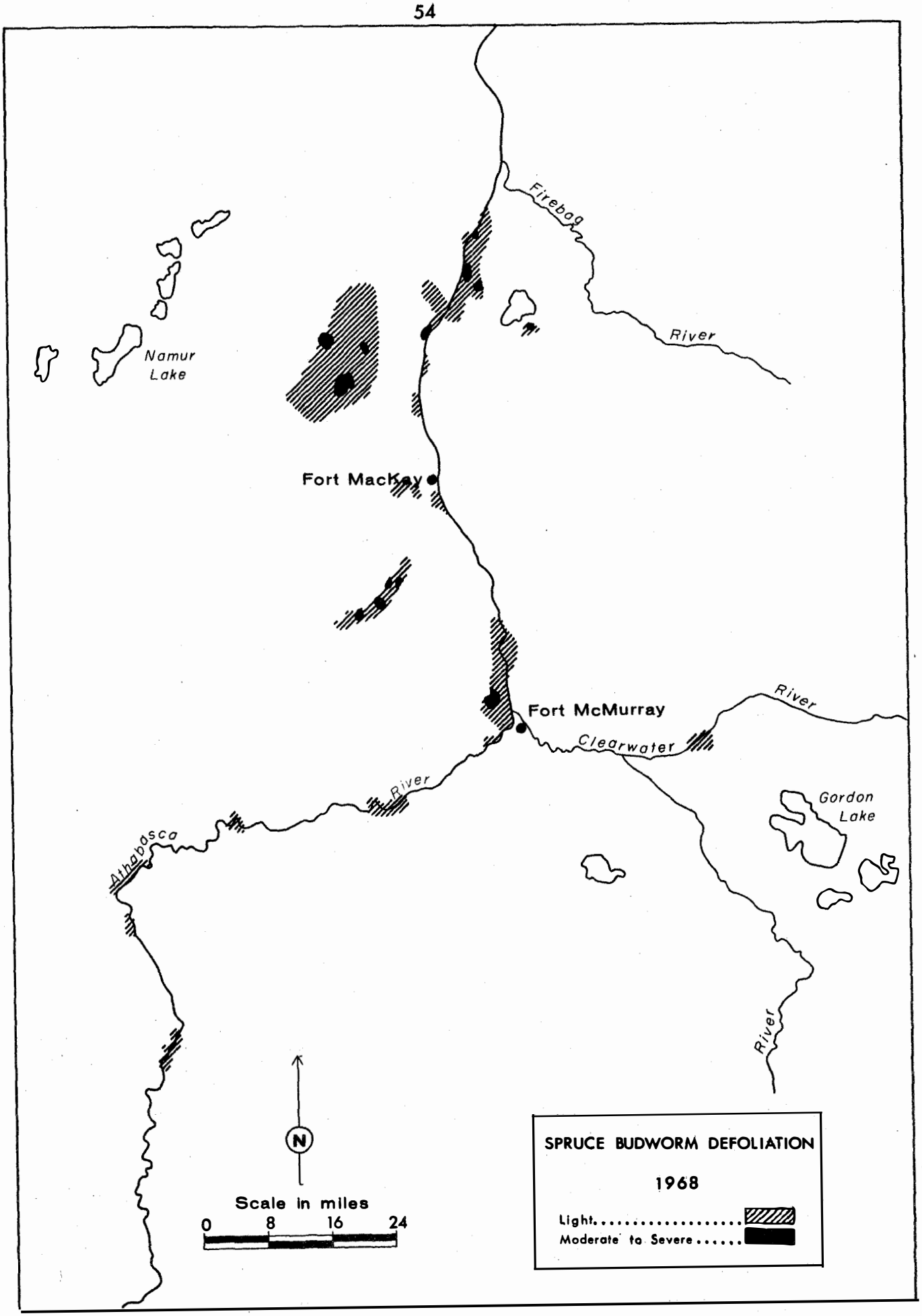
Causal Agent	Host	Remarks
Spruce gall midge, *Mayetiola piceae* Felt	W. spruce	Present throughout the District. A few trees sustained moderate damage one mile south of Egremont.
Cone maggot, *Pegohylemyia* sp.	W. spruce	Caused moderate cone damage in many areas in the Slave Lake Forest.
Engelmann spruce weevil, *Pissodes engelmanni* Hopk.	W. spruce	Light terminal damage 22 miles north of Smith.
Lodgepole terminal weevil, *Pissodes terminalis* Hopping	J. pine	High populations evident 4 miles south and 2 miles east of Bellis.
Boxelder twig borer, *Proteoteras willingana* (Kearfott)	M. maple	Light twig damage north of St. Albert and in the Athabasca area.
Spruce bud midge, *Rhabdophaga swainei* Felt	W. spruce	Light bud damage in many stands in the District.
Disease		
Shoestring root rot, *Armillaria mellea* (Vahl. ex Fr.) Quél.	W. spruce B. fir	Caused mortality to weakened trees on the east side of Lesser Slave Lake.
Spruce cone rust, *Chrysomyxa pirolata* Wint.	W. spruce	Light damage to cones in the Slave Lake Forest.
Pine needle rust, *Coleosporium asterum* (Diet.) Syd.	J. pine	Light needle damage in the Calling Lake area.
Comandra blister rust, *Cronartium comandrae* Pk.	J. pine	Caused some moderate branch damage in the Lesser Slave Lake, Loon Lake and Tawatinaw areas.
Canker, *Cryptomyces maximus* (Fr.) Rehm	Willow	Light stem damage at McMurray. New regional record.

Other Noteworthy Insects and Diseases - cont'd

Causal Agent	Host	Remarks
Cucurbitaria staphula Dearn. ex R.H. Arnold & R.C. Russell	T. aspen	Common along Hart Lake Tower Road and north of Whitefish Lake. New regional record.
Pine needle cast, Davisomycella ampla (J.J. Davis) Darker	J. pine	Light damage to foliage 11 miles south of Calling Lake.
Hypoxylon canker, Hypoxylon mammatum (Wahl.) J. H. Miller	T. aspen	Collected at McMurray and near Utikuma Lake.
Leaf blight of balsam poplar, Linospora tetraspora Thompson	B. poplar	Small areas of moderate foliage damage near Assineau.
Pine needle cast, Lophodermium pinastri (Schrad. ex Hook.) Chev.	J. pine	Moderate needle damage in a stand 22.5 miles north of McMurray.
Leaf spots Mycosphaerella populicola G. E. Thompson	B. poplar	Moderate foliage damage to regeneration in Long Lake Provincial Park.
Stalactiforme rust, Peridermium stalactiforme Arth. & Kern	J. pine	Moderate stem damage 37 miles south of McMurray.
Fir needle cast, Phaeocryptopus nudus (Pk.) Petr.	B. fir	Moderate foliage damage to young trees in Sir Winston Churchill Provincial Park. Severe damage to a few trees near Touchwood Lake.
Tar spot, Rhytisma salicinum (Pers.) Fr.	Willow	Common on foliage east of Slave Lake.
Aspen shoot blight, Venturia tremulae Aderh.	T. aspen	Light damage common in the District. Moderate damage in Touchwood Lake Campsite.
Climatic damage,	J. pine	Moderate damage to foliage near Hondo.

SUMMARY OF INSECT AND DISEASE COLLECTIONS BY HOSTS

Host Coniferous	Collections Insect	Disease	Host Deciduous	Collections Insect	Disease
White spruce	62	9	T. aspen	45	5
Black spruce	0	2	B. poplar	6	2
Tamarack	9	1	Alder	2	0
Jack pine	11	17	Birch	3	0
Lodgepole pine	1	3	Willow	3	0
Balsam fir	3	5			
	86	37		59	1
Insect collections from miscellaneous hosts					13
Disease collections from miscellaneous hosts					13
			GRAND TOTAL		220


Firebag
River
Namur
Lake
Fort MacKay
Fort McMurray
River
Clearwater
River
Athabasca
Gordon
Lake
River
N
Scale in miles
0 8 16 24
SPRUCE BUDWORM DEFOLIATION
1968
Light.....
Moderate to Severe.....

ANNUAL DISTRICT REPORT

GRANDE PRAIRIE - PEACE RIVER DISTRICT

ALBERTA 1968

by

R. M. Caltrell

FOREST RESEARCH LABORATORY

CALGARY, ALBERTA

FORESTRY BRANCH

DEPARTMENT OF FISHERIES AND FORESTRY

FEBRUARY 1969

INTRODUCTION

Defoliation by Bruce spanworm was noted in 3 areas of the Grande Prairie - Peace River District. Wood borers caused some damage to decked logs in the Grande Prairie area. Low populations of black-headed budworm were present throughout the District. A leaf beetle of balsam poplar suffered a sharp decline from populations levels of 1967. The American aspen beetle was found in low numbers in several areas. As in 1967, the yellow-headed spruce sawfly was present in high populations in farm shelterbelts.

Winter drying of conifer and aspen stands was prevalent in the foothills area of the District. An increase of spruce cone rust was evident while spruce needle rust and western gall rust remained at the 1967 level. An examination of lodgepole and jack pine stands was carried out to determine northern distribution of Atropellis canker.

INSECT CONDITIONS

Black-headed Budworm, Acleris variana (Fern.)

Low populations of black-headed budworm were present on white spruce in the following areas: south of Grande Prairie near Bald Mountain Tower and at Mile 6 and Mile 34 on the Camp 5 Road, around Three Creeks and Clear Prairie and in the Saddle Hills. Trace levels of this spruce defoliator were observed in other white spruce stands in the District.

American Aspen Beetle, Gonioctena americana (Schaeff.)

Severe defoliation by the American aspen beetle was evident on regeneration aspen 12 miles northeast of Three Creeks. Low populations were observed in the Grovedale area, 1 mile east of Demmitt and 9 miles north of Whitemud Creek.

Bruce Spanworm, Operophtera bruceata (Hulst)

Moderate defoliation of aspen by this insect was reported in the following areas: on the north slopes of Saskatoon Mountain, 11 miles northeast of Grande Prairie and 12 miles north of Dixonville. In the remainder of the District larvae were frequently taken in beating samples, but population levels remained low.

Yellow-headed Spruce Sawfly, Pikonema alaskensis (Roh.)

The yellow-headed spruce sawfly was the most destructive insect on planted spruce in the agricultural areas of the District. Moderate to severe defoliation occurred in many spruce shelterbelts and ornamental spruce. Light defoliation of regeneration native spruce was common adjacent to infested shelterbelts. Populations of this insect were reduced in Provincial Parks and some shelterbelts by use of insecticides.

Wood Borer, Tetropium cinnamopterum parvulum Casey

This round-headed wood borer, which generally attacks white spruce, was common in the District in 1968. Low infestations were found in the following locations: 16 miles southeast of Grovedale, 8 miles west of Snuff Mountain Tower, 16 miles south of Snuff Mountain Tower and at Grande Prairie.

Sampling of logs, decked for a period of from 6 to 8 months, was carried out in the North Canadian Forest Industries mill yard in Grande Prairie to determine wood borer populations and damage. A thorough check revealed that the overall population was low. It was found that damage was confined to the outer surface of the log to a maximum depth of 1.5 inches. As this portion of the log is removed in manufacture, it was felt that no control measures were required. Following are results of the decked-log sample taken in Grande Prairie.

Location	Log No.	Diameter	Exposure	No. of Larvae/sq. ft. Cerambycidae	Buprestidae
Grande Prairie	1	10"	South	5	0
	2	16"	South	0	0
	3	17"	Top	5	0
	4	9"	Top	1	0
	5	9"	North	0	0
	6	15"	North	0	0

DISEASE CONDITIONS

Atropellis Canker, Atropellis piniphila (Weir)Lohman and Cash

This canker disease of lodgepole pine occurred in most lodgepole pine stands in the southern part of the District. During 1968 a thorough

search was made in lodgepole and jack pine stands in the northern part of the District. Check plots were established at the following locations: Bear Canyon, Notikewin Tower and Cadotte Lake. No evidence of infection was noted in these plots.

Spruce Needle Rust, Chrysomyxa ledicola Lagerh.

Although unusually wet summer weather was experienced throughout the District during 1968, the level of infection of this spruce needle rust declined in areas reported as moderate to severe in 1967. Light infections were evident throughout the District on both black and white spruce.

Spruce Cone Rust, Chrysomyxa pirolata Wint.

Spruce cone rust was common in most white and black spruce stands. Trace infections were reported in the following areas: Mile 26 Trunk Road, 2 miles northeast of Hythe, 11 miles northwest of Hines Creek and in Lac Cardinal Provincial Park. Light infections were reported from: 7 miles northeast of Teepee Creek, 6 miles northwest of La Glace, 3 miles southeast of Poplar Hill and 9 miles south of Crooked Creek. A moderate infection was noted 16 miles south and 5 miles west of Grovedale.

Western Gall Rust, Peridermium harknessii, J. P. Moore

This rust of lodgepole and jack pine was common throughout the District in 1968. Areas of high incidence remained the same as reported in 1967, with no new outbreaks located. These areas were: 90 miles southwest of Grande Prairie, southwest of Clear Prairie and near Demmitt.

Low levels of incidence were recorded along the Kakwa Tower Road, Two Lakes Road and near Puskwaskau Tower.

Aspen Shoot Blight, Venturia tremulae Aderh.

This shoot blight of aspen, which causes a characteristic "shepherds crook" to the new shoots of regeneration trembling aspen, was common in 1968. Moderate damage was evident in the following areas: 8 miles southeast of Bezanson, north of Sturgeon Lake and near Musreau Lake.

Climatic Damage

Winter drying of conifers and aspen stands was prevalent in the foothills of the District. Moderate to severe red belt damage to lodgepole

pine and white spruce occurred in the following localities: along Chinook Ridge, on Nose Mountain and near Smoky, Bald Mountain and Kakwa towers. Light damage was observed in small, localized areas west of Sherman Meadows. Some mortality to spruce and pine could occur in the Chinook Ridge, Nose Mountain and Smoky Tower areas.

Aspen in close proximity to red belt areas received moderate climatic damage.

OTHER NOTEWORTHY INSECTS AND DISEASES, 1968

Causal Agent	Host	Remarks
Insect		
Cooley spruce gall, *Adelges cooleyi* (Gill.)	W. spruce B. spruce	Low populations present throughout the District.
Gall aphid on conifers, *Adelges lariciatus* (Patch)	W. spruce B. spruce	Moderate damage 6 miles south of Grande Prairie. Light damage 2 miles southwest of Clear Prairie.
Ugly-nest caterpillar, *Archips cerasivoranus* (Fitch)	Chokecherry Pincherry	Low population present south of Grande Prairie on the Wapiti River banks.
Flatheaded borer, *Buprestidae* sp.	W. spruce	Low populations common in the District.
Large aspen tortrix, *Choristoneura conflictana* (Wlk.)	T. aspen	Low populations were found 6 miles west of Beaverlodge, 5 miles north of Webster and 4 miles east of Halcourt.
Leaf beetle, *Chrysomela semota* Brown	B. poplar	A decline in populations in the District.
Leaf tier, *Compsolechia niveopulvella* Cham.	T. aspen	Medium populations were located on the north side of Saskatoon Mountain and in the Demmitt area. Low populations occurred in the Grovedale, Whitemud Creek and Guy areas.

Other Noteworthy Insects and Diseases - Cont'd.

Causal Agent	Host	Remarks
Spruce bark beetle, Dendroctonus obesus (Mann.)	W. spruce	Medium populations at Mile 39 Can -For. Road. Low population in the Bald Mountain Tower area.
Eastern larch beetle, Dendroctonus simplex Lec.	Tamarack	Medium population 8 miles south and 9 miles west of South Wapiti.
Bark beetle, Dryocoetes affaber Mannh.	W. spruce	Low populations found 16 miles southeast of Grovedale and at Sherman Meadows.
Woolly elm aphid, Eriosoma americanum (Riley)	A. elm	High population 5 miles west of Grande Prairie.
Grey willow leaf beetle, Galerucella decora Say	B. poplar	Low populations were located in the Whitemud Creek and Three Creeks areas.
Pine root collar weevil, Hylobius sp.	L. pine	A medium population of this weevil was located on the north side of Sturgeon Lake. Low populations existed along the Kakwa, Two Lakes and Trunk roads.
Engraver beetle, Ips borealis Sw.	W. spruce	Low populations existed in the Sherman Meadows and Musreau Lake areas.
Engraver beetle, Ips pertubatus Eich.	W. spruce	Low populations were observed in all areas of the southern half of the District.
Forest tent caterpillar, Malacosoma disstria Hbn.	T. aspen	This insect was found in an area 4 miles north and 9 miles east of Grande Prairie.

Other Noteworthy Insects and Diseases - Cont'd.

Causal Agent	Host	Remarks
Oregon fir sawyer, Monochamus oregonensis (Le Conte)	W. spruce	High populations present at Mile 10 Deep Valley Creek Road and Wozney Sawmills south of Grande Prairie. A low population was found 9 miles south of Crooked Creek.
Poplar twig borer, Oberea schaumi Lec.	T. aspen	Low populations found from Grande Prairie to Peace River in the eastern half of the District.
Bark beetle, Orthotomicus callatus Eich.	W. spruce	Low populations in the Musreau Lake area.
Engelmann spruce weevil, Pissodes engelmanni Hopk.	W. spruce	Low populations were found in the Boone Creek area and at Mile 50 of the Imperial Lumber Road south of Grande Prairie.
Four-eyed spruce bark beetle, Polygraphus rufipennis Kby.	W. spruce	Low populations located at Mile 10 Deep Valley Creek Road and 16 miles southeast of Grovedale.
Larch sawfly, Pristiphora erichsonii (Htg.)	Tamarack	Low populations existed in the Gage, Boone Creek, Pinto Creek, Snuff Tower and Goodwin areas.
Spruce bud midge, Rhabdophaga swainei Felt	W. spruce	Low populations were evident throughout the southern portion of the District.
Poplar borer, Saperda calcarata Say	T. aspen B. poplar	Common in most aspen stands. High populations existed 8 miles southwest of Grande Prairie and 6 miles north east of Hythe. A medium population existed on balsam poplar in Lac Cardinal Provincial Park.

Other Noteworthy Insects and Diseases - Cont'd.

Causal Agent	Host	Remarks
Disease		
Apiosporinia witch's broom, *Apiosporinia collinsii* (Schw.) v. Höhnel	Saskatoon	Common throughout the District.
Dwarf mistletoe, *Arceuthobium americanum* Nutt. ex Engelm.	Lp. pine	A medium infection existed in the Wapiti River area 8 miles south of Grande Prairie.
Poplar ink spot, *Ciborinia whetzelii* (Seaver) Seaver	T. aspen	Reduced from 1967. Trace levels in the District in 1968.
Pine needle rust, *Coleosporium asterum* (Diet.) Syd.	Lp. pine	Low infections located in the following areas: Sturgeon Lake, Bald Mountain, Silver Valley and along the Imperial Lumber Road south of Grande Prairie.
Comandra blister rust, *Cronartium comandrae* Pk.	Lp. pine	Light damage at Mile 50 Imperial Lumber Road.
Cucurbitaria staphula, Dearn. ex R. H. Arnold & R. C. Russell	T. aspen	High occurrence on individual trees near Dunvegan Crossing. New regional record.
Pine needle cast, *Elytroderma deformans* (Weir) Darker	Lp. pine	Low incidence 10.5 miles west of Grovedale.
Spruce needle cast, *Isthmiella crepidiformis* (Darker) Darker	W. spruce	Collected 10.5 miles west of Grovedale.
Balsam poplar leaf blight, *Linospora tetraspora* Thompson	B. poplar	Light incidence observed 5 miles southwest of South Wapiti Ranger Station.

Other Noteworthy Insects and Diseases - Cont'd.

Causal Agent	Host	Remarks
Stalactiforme rust, Peridermium stalactiforme Arth. & Kern	Lp. pine	Light infections at Mile 80 Trunk Road, Mile 49 Imperial Lumber Road and 2 miles west of Silver Valley.
Needle fungus, Thyriopsis halepensis (Cke.) Th. Syd.	Lp. pine	Light infection at Mile 49.5 Imperial Lumber Road.
Hyperparasite of dwarf mistletoe, Wallrothiella arceuthobii (Pk.) Sacc.	Dwarf mistletoe	Present in the Wapiti River area south of Grande Prairie.

SUMMARY OF INSECT AND DISEASE COLLECTIONS BY HOSTS

Host Coniferous	Collections Insect	Disease	Host Deciduous	Collections Insect	Disease
White spruce	84	39	Trembling aspen	61	14
Black spruce	0	4	Balsam poplar	2	4
Lodgepole pine	11	29	Misc. poplar	0	1
Jack pine	1	2	Willow	3	3
Balsam fir	2	0	Alder	1	0
Tamarack	11	1			
	109	75		67	22
	Insect collections from miscellaneous hosts				12
	Disease collections from miscellaneous hosts				1
			GRAND TOTAL		286

ANNUAL DISTRICT REPORT

MACKENZIE DISTRICT

ALBERTA 1968

by

E. J. Gautreau

FOREST RESEARCH LABORATORY

CALGARY, ALBERTA

FORESTRY BRANCH

DEPARTMENT OF FISHERIES AND FORESTRY

FEBRUARY 1969

INTRODUCTION

The spruce budworm outbreak in the Northwest Territories increased in extent and intensity, while in the Footner Lake Forest the severity of attacks were generally reduced from that reported in 1967. Two species of leaf tiers caused severe defoliation to aspen stands in the Footner Lake Forest and parts of Wood Buffalo National Park. A marked increase occurred in the distribution and abundance of the large aspen tortrix, particularly in the Ft. Liard area. During the late summer most willow foliage showed premature discoloration due to feeding by the willow leaf miner. Other noteworthy insects occurring in the District were the larch sawfly, poplar serpentine miner, black-headed budworm, and the spruce cone worm.

Winter drying of conifers in exposed locations was common along the east slopes of the Mackenzie Mountains. The incidence of several common foliage diseases was reduced, possibly due to an exceptionally cool summer.

INSECT CONDITIONS

Black-headed Budworm, Acleris variana (Fern.)

Low populations of black-headed budworm were present on white spruce near Tompkins Landing, Fort Vermilion, High Level, Watt Mountain, Zama City and along the Hay River between Meander River and Enterprise. Medium populations occurred at Little Buffalo Falls. Elsewhere larvae were observed in low numbers along the Lower Peace River in Wood Buffalo National Park and along the Slave River.

Cone and Seed Insects

The 1968 cone crop on spruce was generally light in the Northwest Territories and in the Footner Lake Forest. In the Fort Smith area severe damage to white spruce cones was caused by the cone worm, Dioryctria reniculella (Grote) and the spruce budworm, Choristoneura fumiferana (Clem.). The principal damage to cones in the Footner Lake Forest was caused by the spruce seed moth, Laspeyresia youngana (Kft.) and a cone maggot, Pegohylemyia sp.

Results of Cone Examinations Footner Lake Forest

Location	Number of cones	% damaged by cone maggot	% damaged by seed moth	% cones not damaged
High Level (18 miles west)	25	68	4	28
Tompkins Landing	25	8	8	84
Watt Mountain	25	12	24	64

Leaf Beetle, Chalcoides sp.

These leaf beetles were widely distributed throughout the northern forest on broad-leafed trees and a significant increase in population levels was evident in 1968. Light damage occurred to dogwood, aspen, balsam poplar and willow foliage in the Footner Lake Forest and in the Upper Mackenzie River area.

Large Aspen Tortrix, Choristoneura conflictana (Wlk.)

This leaf roller, sometimes a serious defoliator of poplar forests in Alberta, was located along the Liard River Valley in the Northwest Territories. Pockets of light to moderate defoliation occurred to poplar stands from Nahanni Butte south to the Northwest Territories - British Columbia Boundary. No larvae were noted elsewhere in the District.

Spruce Budworm, Choristoneura fumiferana (Clem.)

The spruce budworm continued to be the most important forest insect causing damage to spruce stands in the District. In the Footner Lake Forest, Wood Buffalo National Park and Northwest Territories, 1,961,000 acres of defoliation occurred in 1968, as compared to 1,250,000 acres in 1967. The accompanying maps show the areas where notable defoliation occurred in 1968.

In the Footner Lake Forest, defoliation by the budworm in spruce stands west of High Level decreased from that reported in 1967. Light defoliation was present along the Chinchaga River from the middle of Twp. 108,

Rge. 3, W. 6., to Twp. 111, Rge. 3., W. 6., and in a 77 square mile area near Amber Tower. Light to moderate defoliation occurred along the south slopes of the Cameron Hills immediately north of Zama City. West of the Chinchaga River, new outbreaks recorded in 1967 near Assumption, Rainbow Lake and the headwaters of the Hay River subsided. The infestations north of High Level at Watt Mountain, Meander River, and along the Hay River between Steen River and Indian Cabins declined to a low level.

In the Wabasca River drainage, populations of the spruce budworm were much lower than reported in 1967. The main infestation, estimated to cover an area of 10,000 acres, occurred in a band 2 miles wide along the east bank of the River from the mouth of Senex Creek to Twp. 101, Rge. 9., W. 5. Defoliation in this area was light. Along the Muddy River drainage, 1,280 acres of moderate defoliation occurred. Repeated defoliation by the budworm has caused considerable tree mortality in the area.

In Wood Buffalo National Park, budworm numbers increased greatly from 1967 and defoliation was widespread especially along the Peace and Little Buffalo rivers. Pockets of light to moderate defoliation were common along the Peace River from Big Slough to Jackfish River. Scattered pockets of light defoliation occurred east of this area to Peace Point. East of Peace Point, light defoliation occurred in a band approximately 2 miles wide along the River to Point Providence. North of the Peace River two new outbreaks were located. One in Twp. 118., Rge. 17., W. 4., where moderate defoliation was evident and the other near Pine Lake where defoliation was light. Infestations of moderate damage occurred along the east slopes of Salt Mountain and along the Little Buffalo River from the Little Buffalo Ranger Station to the Klewi River. West of this area, moderate defoliation occurred to spruce stands bordering the Sass River for a distance of 20 miles. Moderate defoliation also occurred along the Klewi River and along Preble and Seton creeks. Repeated defoliation by the budworm has caused tree mortality at Little Buffalo Falls.

In the Northwest Territories populations of the budworm increased markedly in the Fort Smith area. The main infestation, estimated to cover an area of 545,000 acres, occurred in a wide band along the Slave River from Mountain Rapids to Long Island. Defoliation throughout the area varied from light to moderate with pockets of severe at Brulé Point and Pointe Ennuyeuse. Re-examination of a permanent sampling plot established at Le Grande Detour revealed no increase in tree mortality since the plot was established in 1965.

The infestation along the Mackenzie River increased in size and intensity in some areas, while a decrease was noted in other areas. Light defoliation was evident to white spruce along the Mackenzie River from 15 miles east of Mills Lake to just east of Fort Simpson and north of the River to the Horn Mountains. Scattered pockets of moderate defoliation occurred within this area. Along the slopes of the Horn Mountains, between the 1500 to 2000 foot level, defoliation was moderate to severe. Light infestations occurred along the Liard River from Fort Simpson south to the Poplar River.

Populations of the budworm were the lowest ever recorded in spruce stands bordering the Mackenzie River from Fort Simpson to Wrigley. From the mouth of the Ochre River north to the Dahadinni River pockets of light to moderate defoliation occurred.

No increase in budworm defoliation was noted along the Willowlake River from that reported in 1967. Only a few small pockets of light defoliation occurred from the mouth of the River to Gunn Rapids. The outbreak located in 1967 along the southeast slopes of the hills north of Gunn Rapids persisted. Defoliation in this area ranged from light to severe.

The infestations along the slopes of the Ebbutt and Martin hills declined to a low level.

A Leaf Roller, Epinotia solandriana Linn.

Although less common than in 1968, this insect caused light foliage damage to birch and alder in the vicinities of Fort Smith and Yellowknife. In the Footner Lake Forest low populations were observed on birch along the Watt Mountain Tower Road, and on alder along Highway 58 between Rocky Lane and Jean D'or Prairie.

Willow Leaf Miner, Lyonetia sp.

In 1968, high populations of this leaf miner extended across the northern portions of the Footner Lake Forest and into the Northwest Territories. Severe infestations recurred in the Mackenzie River Valley, along the Slave River and along many of the small river valleys of northern Alberta and the Northwest Territories. Light infestations were noted at Rae and Yellowknife.

Bruce Spanworm, Operophtera bruceata (Hulst)

Larvae of the Bruce spanworm were commonly taken in aspen beating samples but no serious defoliation was observed. Collections were made in the Footner Lake Forest near Fort Vermilion and High Level. In the Northwest Territories collections were made near Fort Fitzgerald, Fort Smith and at several locations along the Fort Smith - Hay River Highway.

Poplar Serpentine Miner, Phyllocnistis populiella Cham.

Populations of this serpentine miner increased in the valleys of the Liard and Mackenzie rivers, where foliage damage to aspen and balsam poplar ranged from light to moderate. Light damage occurred along the valleys of the Peace and Slave rivers, and along the Mackenzie and Yellowknife highways.

Larch Sawfly, Pristiphora erichsonii (Htg.)

In 1968, populations of the larch sawfly in the Footner Lake Forest and in the Northwest Territories declined to a very low level. Traces of defoliation occurred to tamarack in the Footner Lake Forest at La Crete, Fort Vermilion, High Level, and Steen River. In the Northwest Territories traces of defoliation occurred to tamarack bordering the Mackenzie and Yellowknife highways. Low populations were present in the Fort Smith area and Wood Buffalo National Park, but defoliation was negligable.

Leaf Tiers, Pseudexentra improbana oregonana Wlshm., Compsolechia niveopulvella Cham.

High populations of leaf tiers caused pockets of moderate to severe defoliation to aspen stands in the Footner Lake Forest from High Level east to Jean D'or Prairie and from these points south to the Buffalo Head Hills. In the Northwest Territories these insects were found in all aspen stands south of Great Slave Lake. A trace of defoliation occurred in this area. No damage occurred to aspen north of the Mackenzie River.

Spruce Bud Midge, Rhabdophaga swainei Felt

The presence of this bud midge on both black and white spruce was common in the District. Low populations occurred in the Footner Lake Forest and Wood Buffalo National Park. Further north, light infestations were found near Rae and Yellowknife.

Ambrosia Beetles, Trypodendron sp.

Small ambrosia beetles were observed infesting white birch in many areas of the Northwest Territories. The known range of this insect extended from Porter Lake in the east to Enterprise in the west, the most northerly points of occurrence were Snowdrift and Yellowknife. A search for these beetles was made in the Footner Lake Forest but none were located.

DISEASE CONDITIONS

Spruce Needle Rust, Chrysomyxa spp.

Due to an exceptionally cool summer in the Northwest Territories only light infections of needle rusts were observed on spruce foliage. In the Footner Lake Forest light infections were common in the Watt Mountain and Buffalo Head Hills areas.

Leaf Blight of Balsam Poplar, Linospora tetraspora Thompson

This disease was common on immature and mature trees near La Crete, Fort Vermilion, High Level and Meander River. Further north light infections were particularly common on fringe trees in the Fort Smith area.

Climatic Damage

Moderate to severe reddening of foliage was observed in pine and spruce stands along the east slopes of the Nahanni Mountains from Little Doctor Lake south to Nahanni Butte. Other pockets of reddening occurred along the east slopes of the Liard Mountains near Mount Flett, Mount Coty and 12 miles east of Sawmill Mountain. Along the north slopes of the Martin Hills, severe damage occurred to spruce stands at the 1500 to 2000 foot level.

OTHER NOTEWORTHY INSECTS AND DISEASES, 1968

Causal Agent	Host	Remarks
Insect		
Gall aphid on conifers, Adelges lariciatus (Patch)	W. spruce	Caused light damage to spruce foliage.
Spruce bark beetle, Dendroctonus obesus (Mann.)	W. spruce	Widely distributed, but in low numbers.
Grey willow leaf beetle, Galerucella decora Say	Willow	Low populations general, no serious defoliation.
A looper, Itame loricaria julia Evers.	T. aspen	Larvae commonly found, but no serious defoliation.
Western tent caterpillar, Malacosoma californicum pluviale (Dyar)	Willow	Collected for the first time at Yellowknife. Low populations.
Leaf roller Pandemis canadana Kft.	T. aspen	Low incidence.

Other Noteworthy Insects and Diseases - Cont'd.

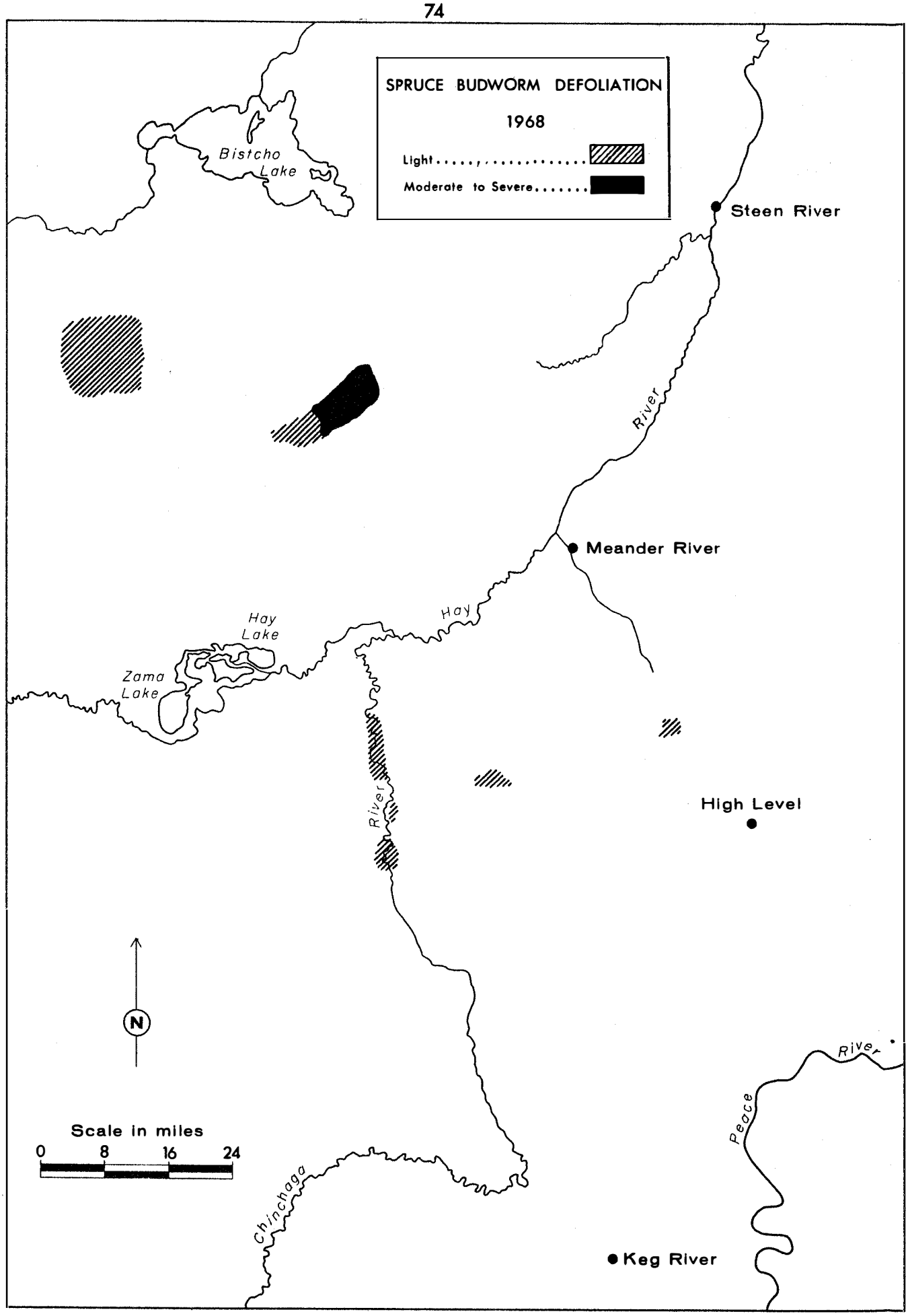
Causal Agent	Host	Remarks
Yellow-headed spruce sawfly, Pikonema alaskensis (Roh.)	W. spruce	Caused light damage at La Crete, Fort Vermilion, Fort Smith, Hay River, Fort Providence, and Fort Simpson.
Disease		
Dwarf mistletoe, Arceuthobium americanum Nutt. ex Engelm.	J. pine	Severe infection near Peace Point.
Spruce cone rust, Chrysomyxa pirolata Wint.	W. spruce	Light infection in Footner Lake Forest. Range extention.
Hyperparasite of rust fungi, Cladosporium sp.	W. spruce	New herbarium host record. Collected near Watt Mountain.
Comandra blister rust, Cronartium comandrae Pk.	J. pine Lp. pine	Branch and stem cankers common.
Sweet fern blister rust, Cronartium comptoniae Arth.	J. pine	Common in the District.
Fruit stem rust, Gymnosporangium clavipes (Cke. & Pk.) Cke. & Pk.	D. juniper	Light infection at Louise Falls. New regional record.
Needle cast, Isthmiella crepidiformis (Darker) Darker	W. spruce	Light infections common.
Needle cast, Lirula macrospora (Hartig) Darker	W. spruce	Very light infection at Salt River Campsite.
Needle cast, Lophodermium pinastri (Schrad. ex Hook.) Chev.	J. pine	Commonly found in the District.

Other Noteworthy Insects and Diseases - Cont'd.

Causal Agent	Host	Remarks
Leaf rust on willow, Melampsora epitea Thuem.	Willow	Moderate infection on several small trees near Yellowknife.
Aspen shoot blight Venturia tremulae Aderh.	T. aspen	Caused some twig mortality along Mackenzie Hwy.

SUMMARY OF INSECT AND DISEASE COLLECTION BY HOSTS

Host Coniferous	Collections Insect	Disease	Host Deciduous	Collections Insect	Disease
White spruce	149	9	Trembling aspen	33	3
Black spruce	15	2	Balsam poplar	4	2
Jack pine	9	12	Willow	5	2
Lodgepole pine	2	2	Birch	13	2
Tamarack	4	1	Alder	4	0
Balsam fir	2	4			
	181	30		59	9
Insect collections from miscellaneous hosts					10
Disease collections from miscellaneous hosts					15
GRAND TOTAL					304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1968
Light
Moderate to Severe
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Steen River
River
Meander River
Hay
Hay Lake
Zama Lake
River
High Level
N
Scale in miles
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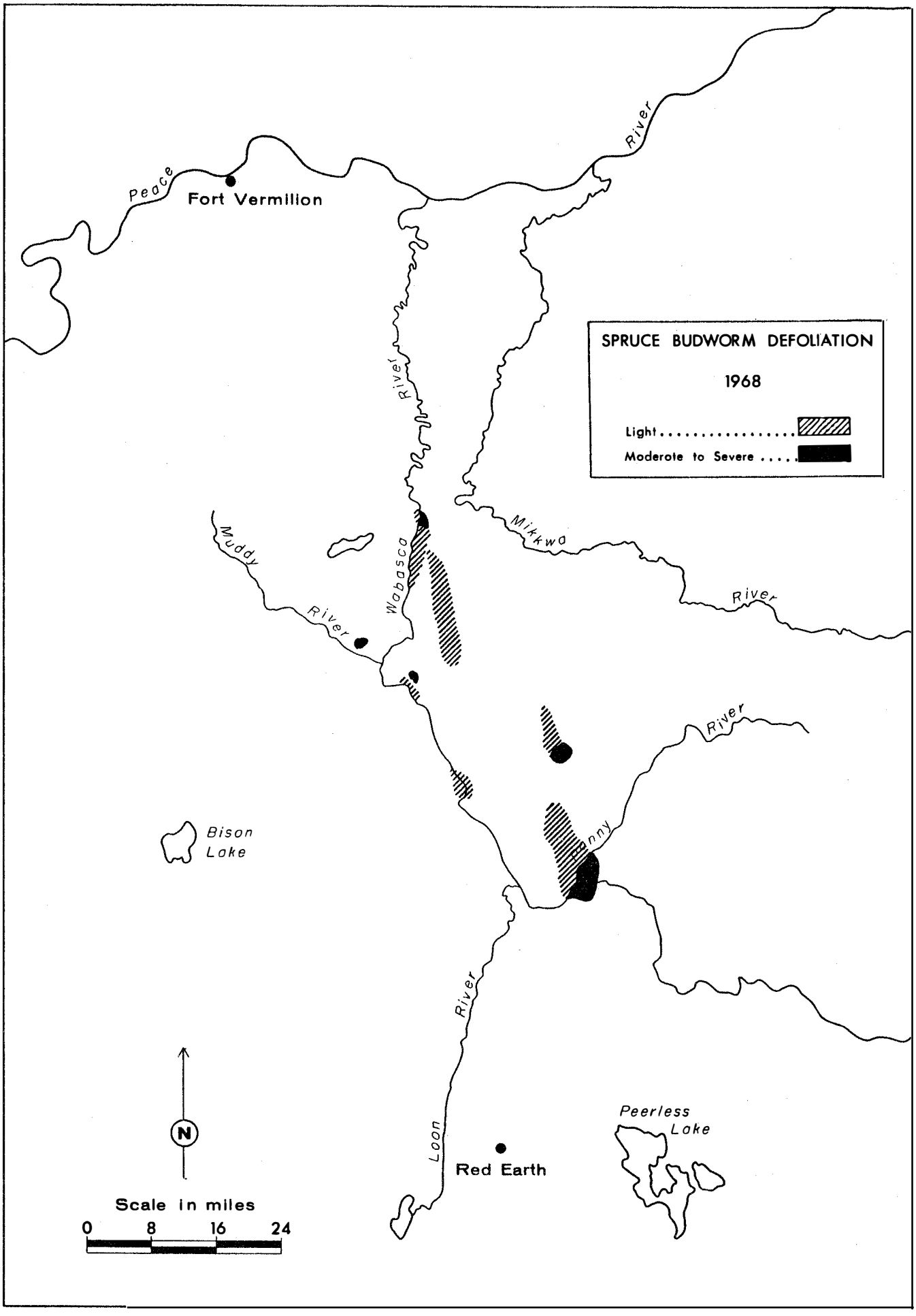
Chinchaga
Peace River
Keg River


Peace River
Fort Vermilion
SPRUCE BUDWORM DEFOLIATION
1968
Light
Moderate to Severe
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Wabasca River
Mikkwa River
Bison Lake
Penny River
Loon River
Red Earth
Peerless Lake
N
Scale in miles
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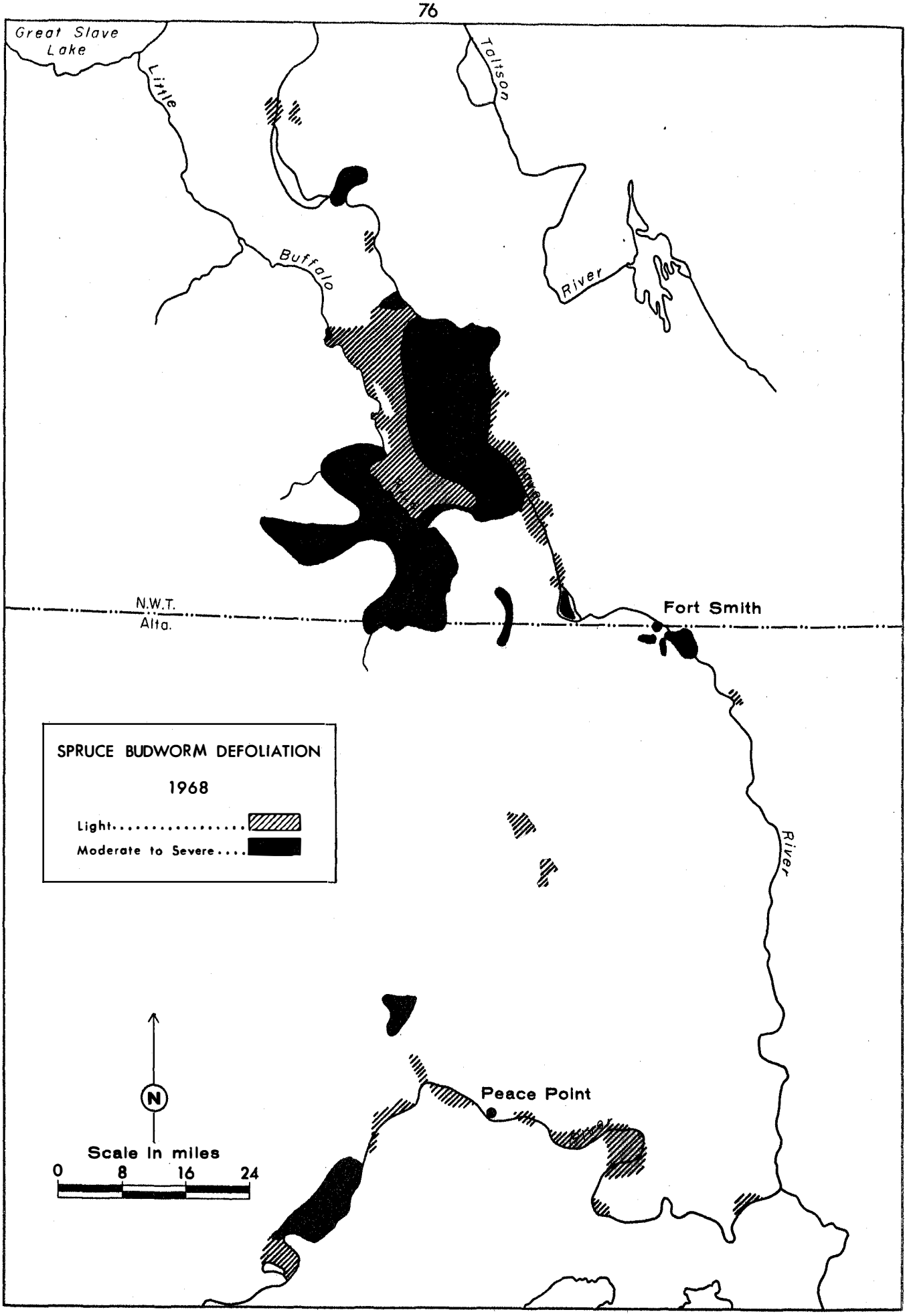
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Little
Buffalo
Talison
River
N.W.T.
Alta.
Fort Smith
River
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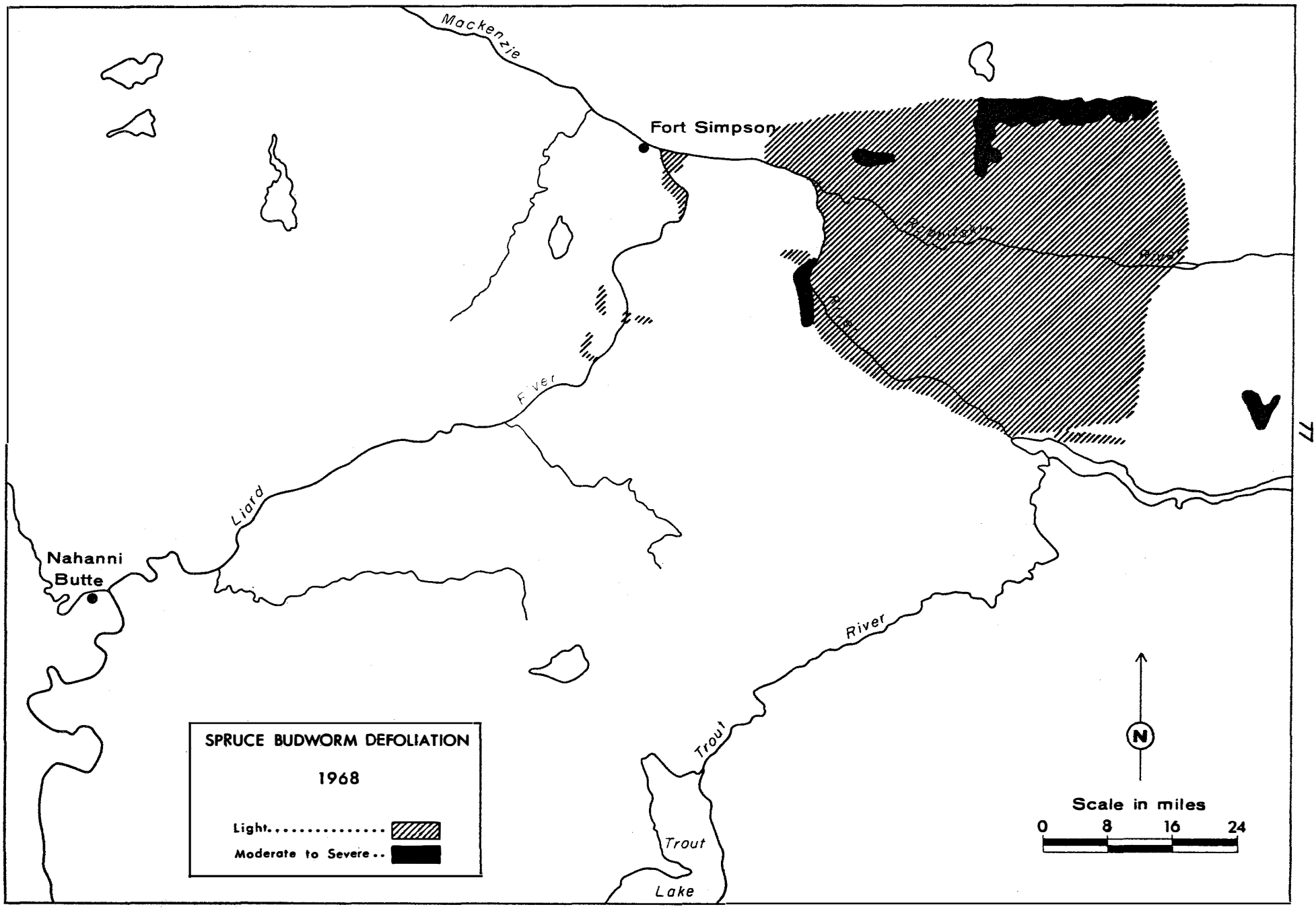
1968
Light.....
Moderate to Severe....
N
Scale in miles
0 8 16 24
Peace Point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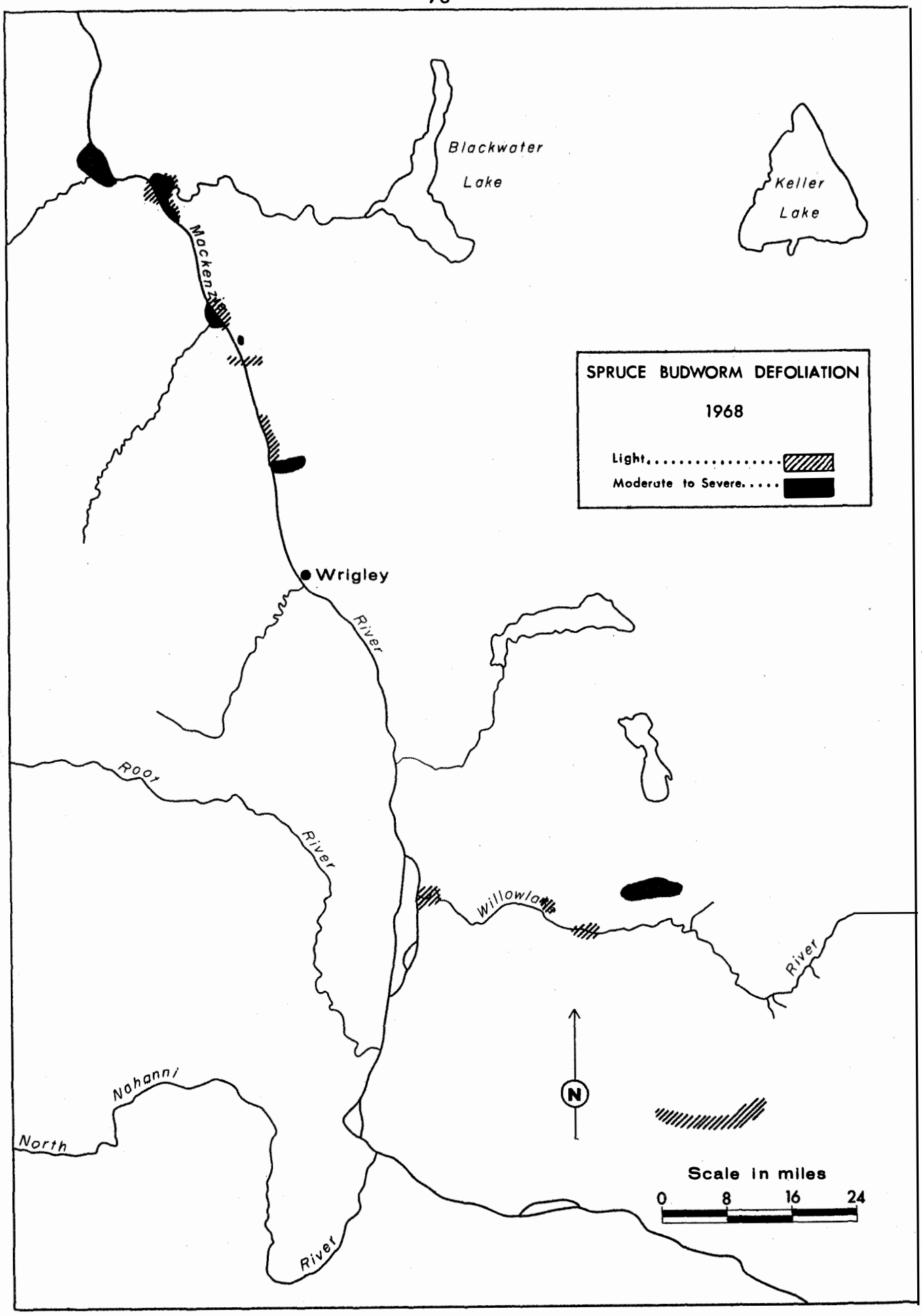
Fort Simpson
Liard
River
Nahanni
Butte
Trout
River
Trout
Lake
SPRUCE BUDWORM DEFOLIATION
1968
Light.....
Moderate to Severe..
N
Scale in miles
0 8 16 24


Blackwater
Lake
Keller
Lake
Mackenzie
SPRUCE BUDWORM DEFOLIATION
1968
Light
Moderate to Severe
Wrigley
River
Root
River
Willowlake
River
Nahanni
North
River
N
Scale in miles
0
8
16
24

ANNUAL DISTRICT REPORT

YUKON DISTRICT

YUKON TERRITORY 1968

by

J. P. Susut

FOREST RESEARCH LABORATORY

CALGARY, ALBERTA

FORESTRY BRANCH

DEPARTMENT OF FISHERIES AND FORESTRY

FEBRUARY 1969

INTRODUCTION

The large aspen tortrix was the most destructive defoliator of aspen poplar in the Yukon Territory in 1968. Discoloration of aspen foliage by poplar serpentine miner was extensive in southern parts of the District. A high percentage of the spruce cone crop was destroyed by two species of spruce cone insects. Population levels of most other insects remained relatively the same as in 1967. An aerial survey of spruce stands in the southeastern Yukon revealed no evidence of spruce budworm damage.

Spruce needle rust infections were generally light throughout the District. Comandra blister rust caused notable mortality in many stands of regeneration lodgepole pine. Needle casts of spruce and pine were common and red belt occurred in two areas of the District.

INSECT CONDITIONS

Large Aspen Tortrix, *Choristoneura conflictana* (Wlk.)

Light defoliation, intermixed with patches of severe defoliation, occurred throughout most of the aspen covered areas of the Yukon. The patchy defoliation pattern which prevailed in 1968 indicated a reduction in populations from the previous year.

Along the Alaska Highway patchy, severe defoliation was observed in the Dezadeash Valley between Champagne and Haines Junction and in an area 38 miles southeast of Beaver Creek.

North of Whitehorse along the Klondike Highway, patches of severe defoliation were evident near Fox Lake, at Carmacks, 18 and 21 miles north of Carmacks, 28.7 miles north of Pelly Crossing and 9.2 miles south of Stewart Crossing. Along the Stewart River, between Stewart Crossing and Mayo, patchy light to moderate defoliation was observed. Severe defoliation occurred in a small area 11 miles north of Elsa.

Along the Dawson Highway patchy moderate to severe defoliation was observed west of Stewart Crossing for 20 miles. Patches of severe defoliation occurred from 15 miles west of McQuesten to Dawson City with the largest occurring 42 miles west of McQuesten.

In the Ross River area moderate to severe defoliation was evident at Frances Lake and in scattered patches along the Pelly River from Campbell Creek to Ross River.

Spruce Budworm, Choristoneura fumiferana (Clem.)

White spruce in the major river drainages east of Watson Lake to the Northwest Territories Border were checked by aerial survey and no defoliation by spruce budworm was observed. Ground checks at Fantasque, Hyland and Stewart lakes revealed no evidence of budworm.

Spruce Gall Midge, Mayetiola piceae Felt

Damage by this gall midge was common in the southwest portion of the Yukon. At Canyon Lake, high populations on the lower branches caused large numbers of tips to die which gave the trees a brown appearance. Light damage was found at Sulphur Lake, 3.4 miles north of Haines Junction and 11.7 miles west of Burwash Landing.

Poplar Serpentine Miner, Phyllocnistis populiella Cham.

Two major infestations of poplar serpentine miner were noted in the Yukon in 1968. Severe discoloration of foliage occurred in the larger stands of aspen throughout the Beaver Creek area. In the southwestern portion of the District severe discoloration occurred from a point 100 miles west of Watson Lake east to the Beaver River and north to Frances Lake. Light damage was noted in numerous other stands.

Spruce Cone Insects, Dasyneura rachiphaga Tripp, Laspeyresia youngana (Kft.), Pegohylemyia sp.

White spruce cones in several locations in the Yukon contained high populations of cone insects. Severe damage was caused by the cone worm, L. youngana and a cone maggot, Pegohylemyia sp. Of the cones examined, 67.5 per cent were damaged by these two species. The spruce cone axis midge D. rachiphaga was found in all cones examined, but damage was negligible.

DISEASE CONDITIONS

Spruce Cone Rust, Chrysomyxa pirolata Wint.

Spruce cone rust infected cones of white spruce in several locations across the southern Yukon. Light infections were recorded at Haines Junction, southeast of Whitehorse and 79.6 miles east of Teslin.

Spruce Needle Rusts, Chrysomyxa spp.

The spruce needle rust, Chrysomyxa ledicola Lagerh. was noted on

both black and white spruce throughout the Yukon in 1968. Moderate to severe damage was encountered in spruce on the tops of the mountains in the Dawson City area although little damage was found in the valleys. Light to moderate damage was recorded 52 miles south of Haines Junction and on understory regeneration at Canyon Lake. A high incidence of Chrysomyxa woroninii Tranz. was recorded on Midnight Dome near Dawson City and a low incidence at Mile 36.2 of the Dempster Highway, Keno, Beaver Creek, Carmacks and Squanga Lake.

Chrysomyxa ledicola Lagerh. was collected on spruce cones 43 miles east of Teslin and 52 miles south of Haines Junction.

Comandra Blister Rust, Cronartium comandra Pk.

Regeneration lodgepole pine in several areas between Watson Lake and Whitehorse were infected with this stem rust and some mortality was noted. The most severely infected stand was found 55.9 miles east of Teslin where rodents chewed out cankers and a high incidence of mortality occurred.

The known range of comandra blister rust on the alternate host, Geocaulon lividum, was extended north from Whitehorse with collections at Carmacks, Stewart Crossing and Mayo.

A hyperparasite of rust fungi, Cladosporium sp. was found on a rust canker 130 miles north of Watson Lake.

Climatic Damage

Typical reddening of foliage due to winter drying was observed in two locations in the Yukon in 1968. Black spruce in a valley bottom 4.8 miles southeast of Beaver Creek sustained severe damage. Although the old foliage was killed, new buds survived and the trees appeared to have recovered. Lodgepole pine on the north side of the town of Whitehorse sustained light damage.

OTHER NOTEWORTHY INSECTS AND DISEASES, 1968

Causal Agent	Host	Remarks
Insect		
Bark beetle, Cryphalus nitidus Sw.	Willow	Collected 12.7 miles west of Destruction Bay.

Other Noteworthy Insects and Diseases - Cont'd.

Causal Agent	Host	Remarks
Lodgepole pine beetle, Dendroctonus murrayanae Hopk.	Lp. pine	Low populations in several locations. Caused some mortality in a small area near Teslin.
Spruce bark beetle, Dendroctonus obesus (Mann.)	W. spruce	Collected from logs at Kluane Lake.
Eastern larch beetle, Dendroctonus simplex Lec.	Tamarack	Low populations at Frances Lake.
Zimmerman pine moth, Dioryctria zimmermani (Grote)	Lp. pine	Collected 26.5 miles west of Watson Lake.
Bark beetle, Ips perturbatus Eich.	W. spruce	Appeared to have caused some tree mortality 25.8 miles west of Destruction Bay.
Poplar leaf miner, Lithocolletis spp.	T. aspen	Common in the southern portion of the District. High populations on regeneration at Whitehorse.
Willow leaf miner, Lyonetia sp.	Willow	Caused light damage at Watson Lake.
Bark beetle, Orthotomicus latidens Lec.	Lp. pine	Collected 68.4 miles east of Teslin.
Pitch nodule maker, Petrova albicapitana (Busck)	Lp. pine	Collected near Watson Lake.
Pitch nodule maker, Petrova metallica (Busck)	Lp. pine	Collected 11 miles west of Watson Lake.
Root collar weevil, Pissodes sp.	Lp. pine	Medium populations at Johnson's Crossing. Low populations at Watson Lake, Carmacks and Mayo.

Other Noteworthy Insects and Diseases - Cont'd.

Causal Agent	Host	Remarks
Four-eyed spruce bark beetle, Polygraphus rufipennis Kby.	W. spruce	Collected from several locations in the Yukon.
Leaf tier, Pseudexentera improbana oregonana. Wlshm.	T. aspen	Light damage east of Whitehorse.
Spruce bud midge Rhabdophaga swainei Felt	W. spruce B. spruce	Low populations throughout the Yukon. Moderate damage occurred at Mile 44, Dempster Highway.
Bark beetle, Taenioglyptes ruficollis ruficollis Hopk.	A. fir	Collected at Rose Lake. A northern extension of distribution in the Region.
Disease		
Leaf spot of birch, Atopospora betulina (Fr.) Petr.	Birch	Collected 52 miles south of Haines Junction.
Pine needle rust, Coleosporium asterum (Diet.) Syd.	Goldenrod	Collected at Watson Lake, Mayo and 75 miles north of Whitehorse.
Spruce needle cast, Isthmiella crepidiformis (Darker) Darker	W. spruce B. spruce	Caused light needle drop in numerous locations.
Needle cast, Lirula macrospora (Hartig) Darker	W. spruce	Collected at Minto and Teslin.
Pine needle cast, Lophodermella montivaga Petr.	Lp. pine	Caused severe needle drop along the Canol Road 60 miles south of Ross River.
Snow blight, Lophophacidium hyperboreum Lager.	W. spruce	Collected south of Dawson City at an elevation of 3500 feet.
Poplar leaf spot, Marssonina tremuloidis (Ell. & Ev.) Kleb.	T. aspen	Severe discolored patches at Carcross, Tagish, Haines Junction, Johnson's

Other Noteworthy Insects and Diseases - Cont'd.

Causal Agent	Host	Remarks
		Crossing and the Lewis River Crossing.
Leaf rust of willow, Melampsora epitea Thuem.	Willow	Common throughout the Yukon. High incidence at Carcross, Mile 33 Dempster Highway and Frances Lake.
Western gall rust, Peridermium harknessii J. P. Moore	Lp. pine	Collected in the Watson Lake area.
Fir needle rust, Pucciniastrum epilobii Otth.	A. fir Fireweed	Light infection on alpine fir at Quiet Lake. Fireweed was severely infected at Tagish and Frances Lake, moderate at Squanga Lake and light at Watson Lake.
Leaf rust, Pucciniastrum sparsum (Wint.) E. Fisch	W. spruce Alpine bearberry	Collected at McClintock on bearberry. A rust, believed to be P. sparsum, was collected from white spruce at Destruction Bay.
Tar spot, Rhytisma salicinum (Pers.) Fr.	Willow	Common in the District. High incidence at McClintock and Destruction Bay.

SUMMARY OF INSECT AND DISEASE COLLECTIONS BY HOSTS

Host Coniferous	Collections Insect	Disease	Host Deciduous	Collections Insect	Disease
White spruce	33	33	T. aspen	42	7
Black spruce	6	20	B. poplar	1	2
Lodgepole pine	12	19	Birch	0	4
Alpine fir	3	9	Willow	9	8
Larch	1	0			
	55	81		52	21
Insect collections from miscellaneous hosts					2
Disease collections from miscellaneous hosts					26
			GRAND TOTAL		237

PROVINCIAL PARKS

As a continuation of a project begun in 1967, all Provincial Parks of Alberta were visited at least once in the 1968 field season. The insect species & disease organisms present on all tree species were recorded and where possible the park official was made aware of the conditions within the Park.

Damage by insects and disease was generally low in 1968. Populations of forest tent caterpillar appeared in a number of parks in Central Alberta and moderate defoliation occurred in three parks. Defoliators of spruce which are capable of causing notable damage were present in low numbers in some parks. The spruce budworm, the black-headed budworm and yellow-headed spruce sawfly are the species which bear watching. Medium infestations of spruce spidermite were present on regeneration spruce growing adjacent to roadways and, gall aphids of spruce detracted from the aesthetic value of this tree species in many areas. The poplar borer was present in most parks where large aspen occurred.

Many of the disease organisms reported were foliar diseases and generally were not severe enough to cause notable injury. Hypoxylon canker was present in most parks where aspen poplar was found. A weak canker disease of poplar, Cytospora sp, was present in many of the parks, most of which were in Southern Alberta. Armillaria root rot caused notable mortality in Bow Valley and Crimson Lake parks.

Mechanical damage by various agents and soil compaction around roots of trees in high-use areas were reported from a number of parks. Climatic damage was noted in parks along the west side of the Province and smoke damage was noted in Bow Valley Park.

A more detailed report of Insect and Disease Conditions in Alberta Provincial Parks may be had by writing:

Regional Director
Department of Fisheries & Forestry
132A - 9th Avenue S. W.
Calgary 2, Alberta

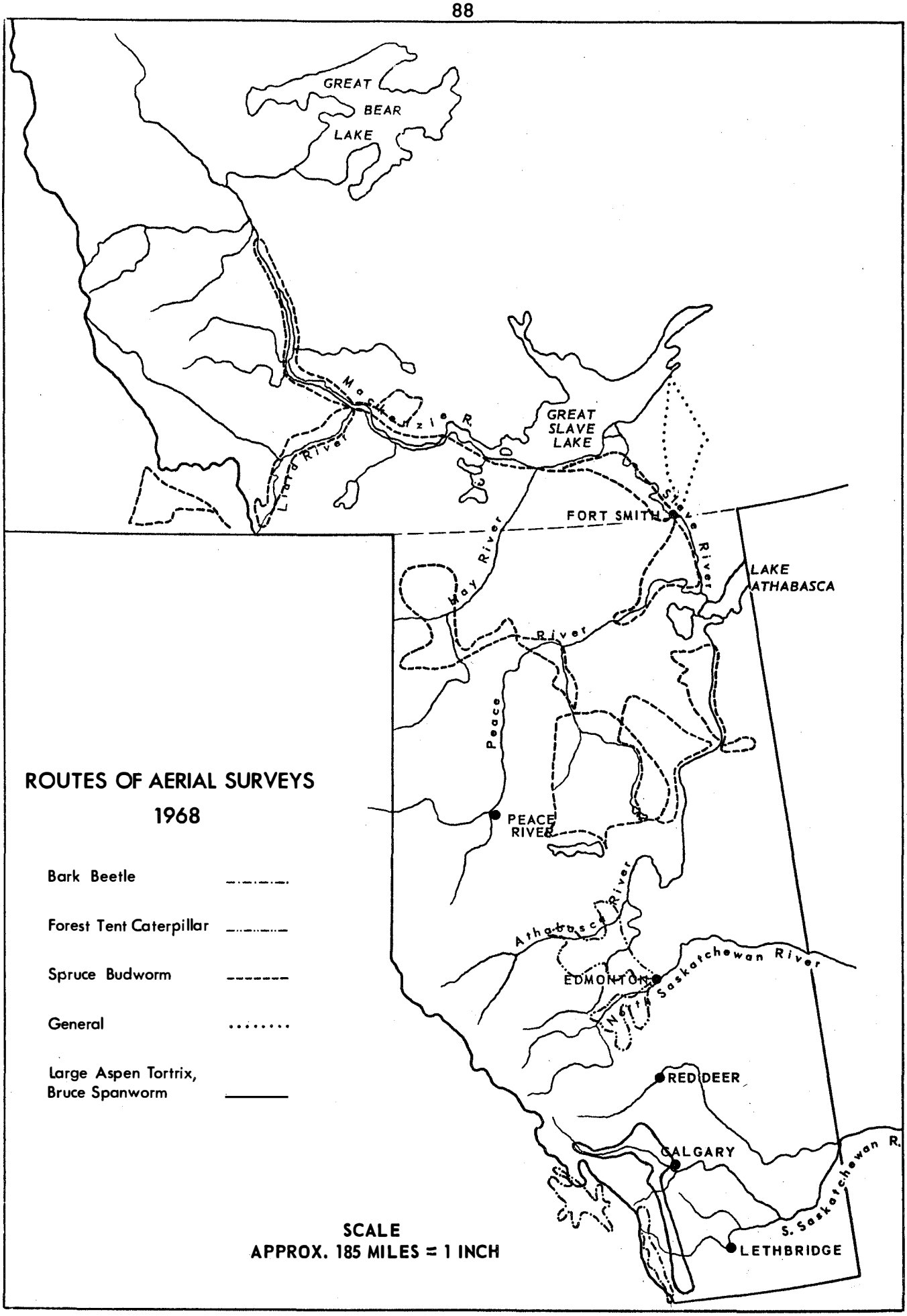

GREAT BEAR LAKE
Mackenzie R.
Liard River
GREAT SLAVE LAKE
FORT SMITH
Slave River
Way River
LAKE ATHABASCA
Peace River
PEACE RIVER
Athabasca River
EDMONTON
N. Saskatchewan River
RED DEER
CALGARY
S. Saskatchewan R.
LETHBRIDGE
ROUTES OF AERIAL SURVEYS
1968
Bark Beetle
Forest Tent Caterpillar
Spruce Budworm
General
Large Aspen Tortrix, Bruce Spanworm
SCALE
APPROX. 185 MILES = 1 INCH

TABLE I

SUMMARY OF AERIAL SURVEYS, 1968

DATE	PURPOSE	AREAS	AIRCRAFT	COST PER HOUR	TOTAL HOURS	TOTAL COST
June 9, 10	General	Mackenzie	Cessna 206 (Floats)		**5:00	
June 18	Woodborer	Slave Lake	Bell 47 AJ-2 (Helicopter)		*3:00	
June 27	Woodborer	Slave Lake	Bell 47 AJ-2 (Helicopter)		*3:00	
June 28	Large aspen tortrix Bruce spanworm	Southwestern Alberta	Cessna 172 (Wheels)	36.00	5:00	180.00
June 30	Forest tent caterpillar	Central Alberta	Cessna 172 (Wheels)	36.00	7:45	279.00
June 5, 6	Spruce budworm	Northeastern Alberta	Cessna 180 (Floats)	50.00	7:45	388.50
July 11	Spruce budworm	Wabasca	Cessna Skymaster (Floats)	74.00	2:00	148.00
July 11	Spruce budworm	Yukon	Cessna 180 (Floats)	60.00	4:55	295.00
July 14	Spruce budworm	Wabasca and Chinchaga rivers	Cessna 180 (Wheels)	48.00	6:49	292.80
July 15, 16, 17 18, 19	Spruce budworm	Mackenzie	Cessna 180 (Floats)	60.00	21:35	1308.45

SUMMARY OF AERIAL SURVEYS, 1968 cont'd.

DATE	PURPOSE	AREAS	AIRCRAFT	COST PER HOUR	TOTAL HOURS	TOTAL COST
July 16	Spruce budworm	Northeastern Alberta	Cessna 150 (Wheels)		*6:00	
July 23	Woodborer	Fort Smith	Bell 47 AJ-2 Helicopter		**1:00	
August 11, 12 13, 14, 15	Spruce budworm	Wabasca	Bell 47 AJ-2 Helicopter		*16:00	
August 17	Bark beetle	Southeastern Alberta	Bell 47 AJ-2 Helicopter		*5:4	
August 30	Bark beetle	Kootenay National Park	Piper Apache (Wheels)		***3:45	
September 18	Spruce budworm	Wabasca	Bell 47 AJ-2 Helicopter	115.00	4:1	471.50
			TOTALS		103:24	3363.25

* Alberta Forest Service
** Mackenzie Forest Service
*** Entomology Research

Note: Total cost includes pilot expenses.

APPRAISAL SURVEYS

During 1968 the appraisal crew consisted of three technicians - V. B. Patterson (Supervisor), D. P. Elliott, R. J. Rowswell, and three student assistants. Assistance was also provided by G. R. Stevenson (Disease Survey), H. Stewart (Tree Biology) and members of the detection ranger staff. During September Mr. Elliott resigned to continue his education and his position was filled by Mr. G. R. Stevenson. The extent of involvement with Survey studies is briefly summarized below.

1. Hypoxylon Canker, Hypoxylon mammatum (Wahl.) J. H. Miller (Hypoxylon pruinatum (Klotzche) Cke.)

Permanent sample plots were established at 27 points throughout central Alberta to study the impact of Hypoxylon canker on aspen poplar. The initial examinations revealed a mean infection of 10.5 per cent. Periodic inspections are planned at five year intervals to determine the rate of change.

2. Pine Root Collar Weevil, Hylobius warreni Wood.

An intensive survey of H. warreni was started in 1967 and completed in 1968. The current year's investigations were confined to lower elevations than in 1967. The survey clearly indicated that the incidence of weevils is more continuous and intense at elevations below 4600 feet.

3. Spruce Bark Beetle, Dendroctonus obesus (Mann.)

Surveys were conducted in the Crowsnest Forest to appraise the potential damage of the current outbreak of the spruce bark beetle to Engelmann spruce. A line cruise made in the West Castle Snow Accumulation Study area revealed that an estimated 272,440 FBM. of timber was infested. Point sampling conducted at 23 locations throughout the Crowsnest Forest revealed 38.3 per cent of all trees tallied were infested or had died due to attack by the spruce bark beetle.

4. Shoestring Root Rot, Armillaria mellea (Vahl. ex Fr.) Quel.

An experiment to determine whether fungicides would control shoestring root rot was initiated in the Robb area in 1964. Seven study plots were established and chemical controls applied at various intervals during the next two years.

The appraisal crew was assigned the task of assessing the results of the project. Although analyses of the data is incomplete it appears that the chemicals had no controlling effect upon the fungus.

5. Wood Borers, Monochamus sp.

A study was made in the fire-killed timber south of Mitsue Lake in the Slave Lake Forest to ascertain population levels and the depth of penetration by adult wood borers into the burned area.

Twenty-four insect traps were set up along the eighteenth baseline north of the Salteaux River. The complete absence of potentially destructive species of wood borers provided the assurance that lumber from salvage operations would be free of wood borer damage.

6. Fir Needle Rust, Pucciniastrum epilobii, Otth.

A pilot study was inaugurated to study the impact of needle rust on Alpine fir regeneration in the Camp 22 area on Northwest Pulp and Power's lease southeast of Hinton.

Annual examination of the specific study trees will be continued as required.

7. Exotic Plantations

The annual examination of tree species introduced to North America and of North American species growing outside of their natural range was continued. Information obtained indicates that a longer interval between examinations is necessary to observe appreciable changes. Future examinations will be continued at five-year intervals.

8. Needle Miner, Coleotechnites starki Freeman.

Four study plots were established on Mount Norquay in Banff National Park in 1964 to appraise the impact of this needle miner on lodgepole pine. Results are not conclusive.

Internal reports are being prepared on all 1968 Appraisal Crew projects.

INSECTARY OPERATIONS

The regional insect museum originated in 1949 to serve as a reference collection and to provide specimens for taxonomic studies. It currently contains about 43,000 specimens representing about 2000 species. Many other specimens from this Region are deposited in the Canadian National Collection in Ottawa.

The operations of the insectary and museum are under the supervision of Mr. Dave Kusch who is assisted by a junior insectary technician and two to three students during the field season. Except for certain species which are identified by specialists in Ottawa, most of the identifications are performed by Mr. Kusch.

During 1968, a total of 1275 collections and reports including 2062 records and approximately 17,000 insects were processed. Many of these were identified and discarded as only the records were required. However, more than 300 were placed in rearing in order to obtain identifiable forms. Material for incubation was placed in cold storage for approximately three months and returned to controlled temperature and humidity conditions in January of 1969. Enclosure slips were coded and periodically sent to Ottawa for the purpose of transferring the information to magnetic tape. During the winter, additional information and corrections were prepared on scanning forms and sent to Ottawa in order to up-date the records.

Special insectary operations to obtain biological information included multiple rearings of the spruce bud midge, the spruce gall midge, and the spruce budworm. Four collections containing 16 adult Mulsantina and over 50 Chilocorus for cytology studies were sent to Dr. S. G. Smith at Sault Ste. Marie. About 250 larch sawfly cocoons were sent to Dr. H. R. Wong of the Winnipeg laboratory.

HERBARIUM OPERATIONS

The regional mycological herbarium which was originated in 1952 and designated by the international code letters CFB serves as a reference collection of forest diseases. Encouragement is expressed for loans and exchanges with other herbaria. Approximately 9000 specimens representing 300 genera and 600 species are on deposit. The rate of annual increase is about 10 per cent.

The operations of the herbarium are supervised by the regional mycologist, Dr. Y. Hiratsuka with a senior herbarium technician, Mrs. L. E. McArthur, performing as assistant curator. Additional assistance is rendered by a clerk-typist during the winter and a student assistant during the field season.

Except for some specific identifications which are made by specialists in Ottawa or in other research centers most of the identifications are made by Dr. Hiratsuka and Mrs. McArthur. Dr. Y. Hiratsuka renders a national and international service through his specialization in western species of tree rusts.

During 1968 outside agencies and local researchers were provided with material through the herbarium. A total of 722 collections were processed. New pathogens, host and distribution records were obtained as listed in Table 2 page 95.

TABLE 2

NEW HERBARIUM RECORDS, 1968

Organism and Disease	Host(s)	Locality	Remarks
Arceuthobium americanum Nutt. ex Engelm. Dwarf mistletoe	Pinus sylvestris Scots pine	Kananaskis Forest Experiment Station	New herbarium host record and first record in Canada.
Bifusella linearis (Pk.) Hoehn. Needle cast	Pinus albicaulis Whitebark pine	21 mi. SW. of Hillcrest	New herbarium host record.
Ciborinia foliicola (Cash & Davidson) Whet. Black rib of willow	Salix sp. Willow	32 mi. SW. of Pincher Creek	New regional record. Mature perfect stage was present.
Cladosporium sp. Hyperparasite of rust fungi	Chrysomyxa arctostaphyli on Picea glauca Rust causing yellow witches' broom on white spruce.	Carcross, Y. T.	New record for the Yukon.
	Chrysomyxa pirolata on Picea glauca Cone rust on white spruce.	18 mi. W. of High Level	New herbarium host record.
	Puccinia caricina on Ribes hirtellum Rust on wild gooseberry	2 mi. W. of Stavely 7 mi. NE. of Cochrane	New herbarium host records.
	Puccinia coronata on Shepherdia canadensis Rust on Canadian Buffalo-berry	1 mi. SW. of Elkwater	New herbarium host record.

TABLE 2

NEW HERBARIUM RECORDS - Cont'd.

Organism and Disease	Host(s)	Locality	Remarks
Cronartium comandrae Pk. Comandra blister rust	Geocaulon lividum Northern comandra	13 mi. N. of Carmacks, Y. T. 12 mi. S. of Stewart Crossing Y. T. 15 mi. S. of Mayo Landing, Y. T.	Range extensions far to the north.
Cryptomyces maximus (Fr.) Rehm Canker	Salix sp. Willow	McMurray	On living branches and twigs. New regional record. Previously reported from B.C. and Sask.
Cucurbidothis pithyophila (Fr.) Petr. Canker	Pinus flexilis Limber pine	45 mi. SW. of Nordegg	New regional record; identified by Dr. A. Funk.
Cucurbitaria staphula Dearn. ex R. H. Arnold & R. C. Russell	Populus tremuloides Trembling aspen Populus balsamifera Balsam poplar	25 mi. NE. of Lac la Biche Utikuma Lake Drayton Valley Dunvegan	New regional records. Develops on galls on branches and trunks in association with Diplodia tumefaciens (Shear) Zalasky.
Cylindrosporium saximontanense Solh. Leaf spot	Populus angustifolia Narrowleaf cottonwood	Cardston	New regional record. Previously reported from Colorado.
Delphinella abietis (Rostr.) E. Muell. Tip blight	Abies lasiocarpa Alpine fir	13 mi. SW. of Eisenhower, Kootenay National Park	New regional record; identified by Dr. W. G. Ziller.

TABLE 2

NEW HERBARIUM RECORDS - Cont'd.

Organism and Disease	Host(s)	Locality	Remarks
Exobasidium vaccinii Wor.	Vaccinium membranaceum Tall bilberry	39 mi. SW. of Pincher Creek	New herbarium host record.
Fabraea maculata Atk. Leaf spot	Sorbus scopulina Mountain ash	38 mi. SW. of Pincher Creek	New regional record. Conidial stage Entomosporium maculatum Lev.
Gibbera pulchella (Cke. & Pk.) Petr. Leaf spot	Vaccinium uliginosum Bog bilberry	100 mi. NW. of Ft. Providence, N. W. T.	New regional record; identified by Dr. B. C. Sutton
Gymnoconia peckiana (Howe) Trott. Rust	Rubus strigosus Wild red raspberry	Tatchun Creek, Y. T.	New herbarium host record.
Gymnosporangium clavipes (Cke. & Pk.) Cke. & Pk. Rust gall	Juniperus communis Common juniper	Louise Falls, N. W. T.	New herbarium host record.
Gymnosporangium gaeumanii Zogg Needle rust	Juniperus communis Common juniper	8 mi. W. of Banff, Banff National Park. Columbia Icefield, Jasper National Park	First North American records. Previously reported from Europe.

TABLE 2

NEW HERBARIUM RECORDS - Cont'd.

Organism and Disease	Host (s)	Locality	Remarks
Isthmiella quadrispora Ziller Needle blight	Abies lasiocarpa Alpine fir	13 mi. SW. of Eisenhower, Kootenay National Park 15 mi. NW. of Waterton, Waterton Lakes National Park	New regional records; identified by Dr. W. G. Ziller.
Lachnellula agassizii (Berk. & Curt.) Dennis	Abies balsamea Balsam fir	22 mi. N. of High Level	New herbarium host record.
Lirula macrospora (Hartig) Darker Needle cast	Picea glauca White spruce	Minto and Teslin, Y. T.	New records for the Yukon. (=Lophodermium macrosporum (Hartig) Rehm.)
Lophodermella concolor (Dearn.) Darker Needle cast	Pinus contorta Lodgepole pine	Pelly Crossing and Watson Lake, Y. T.	In association with Hendersonia pinicola Wehm. New record for the Yukon (=Hypodermella concolor (Dearn.) Darker).
Lophodermella montivaga Petr. Needle cast	Pinus contorta Lodgepole pine	60 mi. S. of Ross River, Y. T.	New record for the Yukon. (=Hypodermella montivaga (Petr.) Dearn.).
Lophodermium laricinum Duby Needle cast	Larix occidentalis Western larch	14 mi. NE. of Radium, Kootenay National Park	New herbarium host record.

TABLE 2

NEW HERBARIUM RECORDS - Cont'd.

Organism and Disease	Host(s)	Locality	Remarks
Lophomerum darkeri Ouellette Needle cast	Picea glauca White spruce	40 mi. SE. of Nordegg 54 mi. S. Haines Junction, Y. T.	New regional records; identified by Dr. W. G. Ziller
Nectria cinnabarina (Tode ex Fr.) Fr. Canker and dieback	Elaeagnus angustifolia Russian olive	Brooks Horticultural Station	New herbarium host record.
Puccinia dioicae Magn. Rust	Aster sp. Aster Carex sp. Sedge	Smith Lake, Banff National Park	New regional records. (Syn. Puccinia extensicola (Plowr.).
Puccinia hieracii (Rohling) Mart. Rust	Taraxacum sp. Dandelion	2 mi. E. of Elkwater	New herbarium host record.
Puccinia recedens Syd. Rust	Senecio indecorus Groundsel, Ragwort	3 mi. S. of Elkwater	New herbarium record.
Rhizothyrium abietis Naum. Needle fungus	Abies lasiocarpa Alpine fir	13 mi. SW. of Eisenhower, Kootenay National Park 10 mi. S. of Lake Louise, Banff National Park 36 mi. NW. of Rocky Mountain House 15 mi. NW. of Waterton, Waterton Lakes National Park	New regional records; identified by Dr. W. G. Ziller.

TABLE 2

NEW HERBARIUM RECORDS - Cont'd.

Organism and Disease	Host(s)	Locality	Remarks
Seynesiella juniperi (Desm.) Arn. Needle fungus	Juniperus scopulorum Rocky Mountain juniper	Radium, Kootenay National Park	New herbarium host record.
Uromyces glycyrrhizae Magn. Rust	Glycyrrhiza lepidota Wild licorice	9 mi. SW. of Stavely	New herbarium record.

TREE PEST EXTENSION SERVICES

The tree pest extension service established in 1967 was continued in 1968. Re-organization during the 1967 season resulted in fewer requests from the general public in 1968 and an increase in the number of regional agencies using the service. During 1968, there was an increase of 16.5 percent in the number of inquiries processed. The inquiries included 94 personal interviews, 79 mail inquiries, 38 extension calls and 37 queries answered by phone. The decrease in inquiries from the general public allowed a greater dispensation of information in an advisory capacity to other government departments, junior governments and industrial agencies throughout the region.

Following is a list of agencies that requested information during the 1968 season and the number of requests received from each.

General public	105
Provincial Department of Agriculture	32
Alberta Forest Service	8
Canada Department of Agriculture	8
Alberta Provincial Parks	1
Federal Parks Branch	6
County of Newell, Agriculture Service Board	6
Municipal District of Rockyview	8
Yukon Forest Service	1
Industry	12
Inter-Laboratory	33
Calgary City Parks Department	21
Provincial Horticulture Station	1
P.F.R.A.	1
Provincial Attorney General Department	1
U.S.A. Forest Service	1
Calgary City Health Department	1
Federal Department of Public Works	1
Canada Wildlife Service	1
	248

Causal agents and hosts for which tree pest information was requested are listed in Table 3 page 102.

TABLE 3

Causal Agent	Host and Number of Specimens
Insect	
Adelginae Gall aphids on conifers.	Fir 1, Pine 1, Spruce 11,
Agrilus sp. Poplar agrilus.	Aspen 1,
Aphid spp. Aphids	Poplar 1, Spruce 3,
Archips argyrospila (Wlkr.) Fruit tree leaf roller.	Russian-olive 2,
Archips cerasivorana (Fitch) Ugly-nest caterpillar.	Prunus 2,
Bark beetles.	Spruce 1,
Cecidomyiidae	Willow 1,
Choristoneura conflictana (Wlk.) Large aspen tortrix.	Aspen 1,
Chrysomela knabi Brown Leaf beetles	Willow 1,
Diplohepis sp. Rose gall maker.	Rose 1,
Gonioctena americana (Schaeff) American aspen beetle.	Poplar 1, Willow 1,
Halisidota maculata (Harr.) Spotted tussock moth.	Apple 1,
Leaf miners.	Birch 4, Lilac 4,

Table 3 cont'd.

Causal Agent	Host and Number of Specimens
Lytta sp. Blister beetle.	Honeysuckle 1,
Malacosoma spp. Tent caterpillar.	Poplar 1, Saskatoon 1, Willow 1,
Mayetiola sp. Cecidomyiid.	Spruce 4,
Mechanical injury.	Ash 1, Poplar 1,
Nematus sp. Sawfly	Poplar 1, Willow 1,
Neoborus sp. Plant bug.	Ash 1, Poplar 1,
Nymphalis antiopa L. Spiny elm caterpillar	Elm 1,
Orgyia antiqua LINN. Rusty tussock moth.	Apple 1,
Orthosia hibisci Gn. Phalaenidae.	Aspen 1,
Pamphiliidae	Spruce 4,
Physiological damage.	Apple 3, Birch, Cotoneaster 1, Elm 1, Fir 2, Juniper 1, Lilac 3, May-day 2, Pine 7, Poplar 3, Spruce 31,
Phyllocnistis populiella Cham. Serpentine leaf miner.	Aspen 1,
Physokermes piceae Schr. Spruce bud scale.	Spruce 1
Pikonema alaskensis (Roh.) Yellow-headed spruce sawfly.	Spruce 4,

Table 3 cont'd.

Causal Agent	Host and Number of Specimens
Pineus strobi (Htg.) Pine bark aphid.	Pine 1,
Pissodes spp. Weevils.	Pine 1, Spruce 1,
Rhabdophaga sp. Cabbage gall maker.	Willow 1,
Rynchites sp. Rose curculio.	Rose 1,
Scale insects	Fir 1, Spruce 2,
Spider mites.	Cherry 1, Fir 1, Pine 1, Poplar 3, Spruce 11,
Taniva albolineana Kft. Spruce needle miner.	Spruce 5,
Trichiosoma sp. Sawfly.	Cotoneaster 1,
Unknown	Ash 3, Caragana 1, Elder 4, Fir 1, Maple 1, Pine 2, Spruce 1, Willow 1,
Woodpecker damage.	Birch 1, Spruce 1,
Disease	
Apiosporina collinsii (Schw.) V. Hohnel Apiosporina witches broom.	Saskatoon 1,
Armillaria mellea (Vahl ex Fr.) Quel. Shoe string root rot.	Birch 1,
Chrysomyxa arctostaphyli Diet. Yellow witches broom of spruce.	Spruce 1,

Table 3 cont'd.

Causal Agent	Host and Number of Specimens
Cladosporium subsessile Ell. & Barth	
Leaf spot.	Poplar 1,
Cytospora chrysosperma (Pers.) Fr.	
Cytospora canker.	Ash 2, Aspen 2, Poplar 1,
Erwinia amylovora (Burrill) Winslow	
Fruit stem rust.	Apple 1, Ash 1, May-day 1,
Fomes igniarius (L. ex Fr.) Kickx	
White trunk rot.	Aspen 1,
Gymnosporangium clavipes (Cke. & Pk.)	
Fruit stem rust.	Juniper 2,
Hypodermella concolor (Dearn.) Darker	
Pine needle cast.	Pine 1,
Linospora tetraspora Thompson	
Balsam poplar leaf blight.	Poplar 1,
Natural needle drop.	Pine 3,
Nectria cinnabarina (Tode ex Fr.) Fr.	
Nectria canker.	Elm 2,
Needle cast.	Fir 1,
Peridermium stalactiforme Arth.& Kern	
Stalactiforme rust.	Pine 1,
Slime flux.	Poplar 1,
Herbicide.	Maple, Poplar 1, Willow 1,

RESEARCH

Research is being conducted by Survey officers on wood borers, spruce budworm, forest tent caterpillar, tree rusts and biotaxonomy of forest fungi. Plans for 1969 include preliminary investigation of the spruce bark beetle and needle cast disease of pine.

Wood borers - Damage caused by wood borers in decked logs at mill sites in Alberta occasionally reaches intolerable levels. The conventional methods of decreasing the losses by rapid utilization, water sprays, or the application of chemicals are not always possible or economically feasible.

The sporadic occurrence of wood borers in decked logs, burned forests and areas of windfall suggests that intense attack is largely dependent upon the relationship between the insects seasonal history and the timing of harvest, burn or blowdown. Investigation of these aspects were commenced in 1967 by Dr. A. Raske. Briefly, the methods employed involve the study of wood borer behaviour on spruce and pine which was cut, burned or windthrown during the different seasons in various geographical areas. Additional experimentation was conducted using fumigants and plastic covering to develop an economical method of protecting decked logs. Progress of these investigations are summarized by the following list of proposed reports and publications:

(1) Distribution of wood-borer larvae in decked pine logs.
(2) Sequential sampling system for wood borers in decked logs.
(3) Biology of Tetropium parvulum in spruce.
(4) Biology of Oberea schaumii.
(5) Fumigating conifer logs with PDB to control wood borers.
(6) List and field key to insect families commonly found under bark.
(7) Dispersal of wood borers into large burns.
(8) Notes on hybridization of Monochamus beetles.

Forest Tent Caterpillar - Noticeable defoliation of aspen by the forest tent caterpillar has occurred in varying degrees throughout central Alberta for the past eight years. During this period the insect survey recorded in considerable detail the distribution and abundance of the insect by means of aerial and ground surveys. Much of this information was published annually in the Annual Report of the Forest Insect and Disease Survey. Beginning in 1967 Dr. A. Raske with the assistance of Mr. J. K. Robins undertook to collate these data and perform certain experiments in an attempt to explore and explain factors investigated involved the effect of prolonged warm winter periods on hatching, time of hatch in relation to host development, cold hardiness of young larvae, qualitative differences between larvae, and the incidence of disease. Progress has developed to the stage where a comprehensive report will be available for general distribution during 1969. Included in the report will

be a cartographic history of the outbreak showing some obvious correlations with apparent environmental variations.

The Spruce Budworm - Detection surveys have been conducted intermittently since the inception of Alberta surveys in 1948 and on annual basis since 1955 to determine the geographic distribution and relative abundance of the spruce budworm. These data along with distribution maps have been published on a regular basis in the Annual Report of the Forest Insect and Disease Survey. With the advent of noticeable amounts of tree mortality and top killing in 1965 Mr. R. E. Stevenson supplemented aerial surveys with ground surveys in the Wabasca outbreak of northern Alberta. This area along with others now constitute important components of national park and provincial management plans. Coincident with and pursuant to an increased incidence of tree mortality, now comprising 66 percent of all trees at the epicenter of the Wabasca outbreak, preliminary studies commenced in 1967 and expanded in 1968 to assess the impact of spruce budworm damage and its relationship to forest management. In addition, the history of the spruce budworm in Alberta and the Northwest Territories is being investigated through a complete stem analysis investigation. Presently, survey records have been collated and incorporated with damage figures, growth profile data and hazard rating maps into a report to be released in 1969.

Aerial photography at scales 1:2640 and 1:1320 was taken over 18 sq. miles of the Wabasca area. Within this area a sample strip 4 miles x 1/2 mile through the epicenter was photographed in ectrachrome at scales 1:100, 1:200, 1:300.

No chemical control is contemplated for the Alberta outbreaks although it is believed the major re-alignment of cutting priorities and increased allowable cut in the outbreak areas will prove to be meaningful management measures to reduce economic losses.

In 1969 aerial surveys will be concentrated on major outbreak areas. An expansion of the stem analysis work will occur in the Chinchaga and Athabasca river areas of northern Alberta. Detailed hazard rating surveys will be conducted between Senex Creek and the Muddy River in the Wabasca outbreak. Preparation of a technical report based on stem analysis data from the Wabasca outbreak will be prepared in terms of loss in annual increment and history of spruce budworm activity.

Spruce bark beetle, Dendroctonus obesus (Mann) - During the course of routine surveys in 1968, a serious outbreak of D. obesus was detected in southwestern Alberta. Subsequently, it was learned that the outbreak was part of a larger infestation which covered large areas in the Crowsnest Forest and Waterton Lakes National Park in Alberta, adjacent portions of the Nelson Forest in British Columbia, and in the Flathead Forest in Montana. An aerial survey

in mid-August of the spruce stands in southwest Alberta revealed scattered patches of dead spruce along most of the streams from the International Boundary to near the north end of the Crowsnest Forest. Ground checks, however, revealed that many trees, recently killed by bark beetles, still retained green foliage and hence were not detected from the air. In view of the urgency of instituting salvage operations further ground surveys were restricted to areas of high value, readily accessible stands of spruce.

The spruce bark beetle normally requires two years to complete its life cycle but one- and three-year cycles have been reported. Data on the normal life cycle for the Crowsnest area is required to make reliable forecasts.

Plans for 1969 include further ground surveys as time permits, experimentation with color film to detect those dead or dying trees that retain green foliage, and life cycle studies.

Mycology of forest fungi - Identification of forest fungi and supervision of the regional mycological herbarium are the responsibility of the regional mycologist, Dr. Y. Hiratsuka. In addition, Dr. Hiratsuka, with the technical assistance of Mr. P. J. Maruyama and Mrs. L. E. McArthur, is actively engaged in research involving life histories, morphology, cytology and taxonomy of forest pathogens with particular emphasis on the forest tree rusts of western North America.

A decision has been reached to propose a taxonomic revision of autoecious pine stem rusts by establishing a new genus Endocronartium to accommodate Peridermium harknessii from North America and P. pini from Europe. This proposal is based on the cytological and morphological investigation of this group of fungi conducted by Dr. Hiratsuka in previous years.

On the basis of cytological examinations of germ tubes, distribution of western gall rust (Peridermium harknessii) was confirmed in Maritime provinces and the results are published.

Taxonomic studies of spruce and fir needle rusts are well under way following extensive field observations, inoculation experiments, and morphological studies.

Further improvements of immunofluorescent techniques to be used for forest fungi were made during the summer of 1968 with the assistance of a graduate student (Miss Elizabeth Leuke) and significant results were obtained.

Needle cast disease of pine, Elytroderma deformans - Detection surveys have revealed high levels of infection by E. deformans in commercially important

pine stands in Alberta. Very little is known about this pathogen but studies in Montana of Elytroderma on ponderosa pine show a perennial systemic infection that may seriously damage large numbers of trees. In the light of these findings, Mr. R. Blauel will undertake in 1969 to determine the infection rate, extent of systemic infection, and impact of E. deformans on lodgepole-jack pine hosts in Alberta.

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