FOREST INSECT AND DISEASE SURVEYS IN THE WESTERN SURVEY REGION

(FOREST DISTRICTS: THUNDER BAY, FORT FRANCES, KENORA AND SIOUX LOOKOUT)

1970

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FOREST RESEARCH LABORATORY

ONTARIO REGION

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SURVEY HIGHLIGHTS

In 1970, the working unit for surveying forest insect and disease conditions in Ontario was changed from an individual technician assigned to a forest district, to a survey team led by an experienced supervisor and consisting of one to three additional technicians. Each team covered three to six forest districts. The Western Survey Region, which was designated to include four forest districts, was staffed by a 3-man team as follows:

Sioux Lookout District: - M. J. Thomson, Supervisor

Kenora and
Fort Frances districts: - C. A. Barnes

Thunder Bay District: - C. Davis

This report deals with the more important, or potentially more important, forest insect and disease conditions found by the team in 1970.

Considerable time was devoted to the detection of new outbreaks of the spruce budworm and to biological work associated with chemical control programs carried out by the Ontario Department of Lands and Forests. Increases in the amount of damage caused by spruce budworm and the large aspen tortrix are defined, with infestations of the former found at many points in the southern part of Fort Frances District and of the latter at many points throughout the Region as far north as Red Lake in the Sioux Lookout District. Foliage in stands of white birch turned brown in late August over a large part of the Region as a result of the birch skeletonizer. A potentially dangerous pest of pines, the introduced pine sawfly, *Diprion similis* (Htg.), was found for the first time in the Western Survey Region, when it was collected at several points near the town of Fort Frances. A marked increase in the distribution of Scleroderris canker of pines, an important fungus disease of conifers, was recorded when the disease was found causing serious damage in jack pine regeneration approximately 45 miles northwest of Pickle Lake in the Sioux Lookout District. An intensive survey for Dutch elm disease in the Fort Frances and Thunder Bay districts provided negative results, however a prime vector of the disease, the native elm bark beetle was recorded for the first time in the Thunder Bay District.

M. J. Thomson
Supervisor
Western Survey Region

INSECTS

Birch Skeletonizer, *Bucculatrix canadensisella* Cham.

Infestations of the birch skeletonizer were present in scattered birch stands throughout the Western Survey Region. Pockets of moderate-to-severe defoliation were recorded within an area of approximately 23,000 square miles in 1970. Most of these were located in the Sioux Lookout, Fort Frances and Kenora forest districts.

The boundary of the large infestation ran in an easterly direction from the Ontario-Manitoba border to the north end of Savant Lake, hence southward to Tilly Lake in the Thunder Bay District. From this point the boundary ran westerly to Lake of the Woods Provincial Park in the northwestern part of the Fort Frances District (see map).

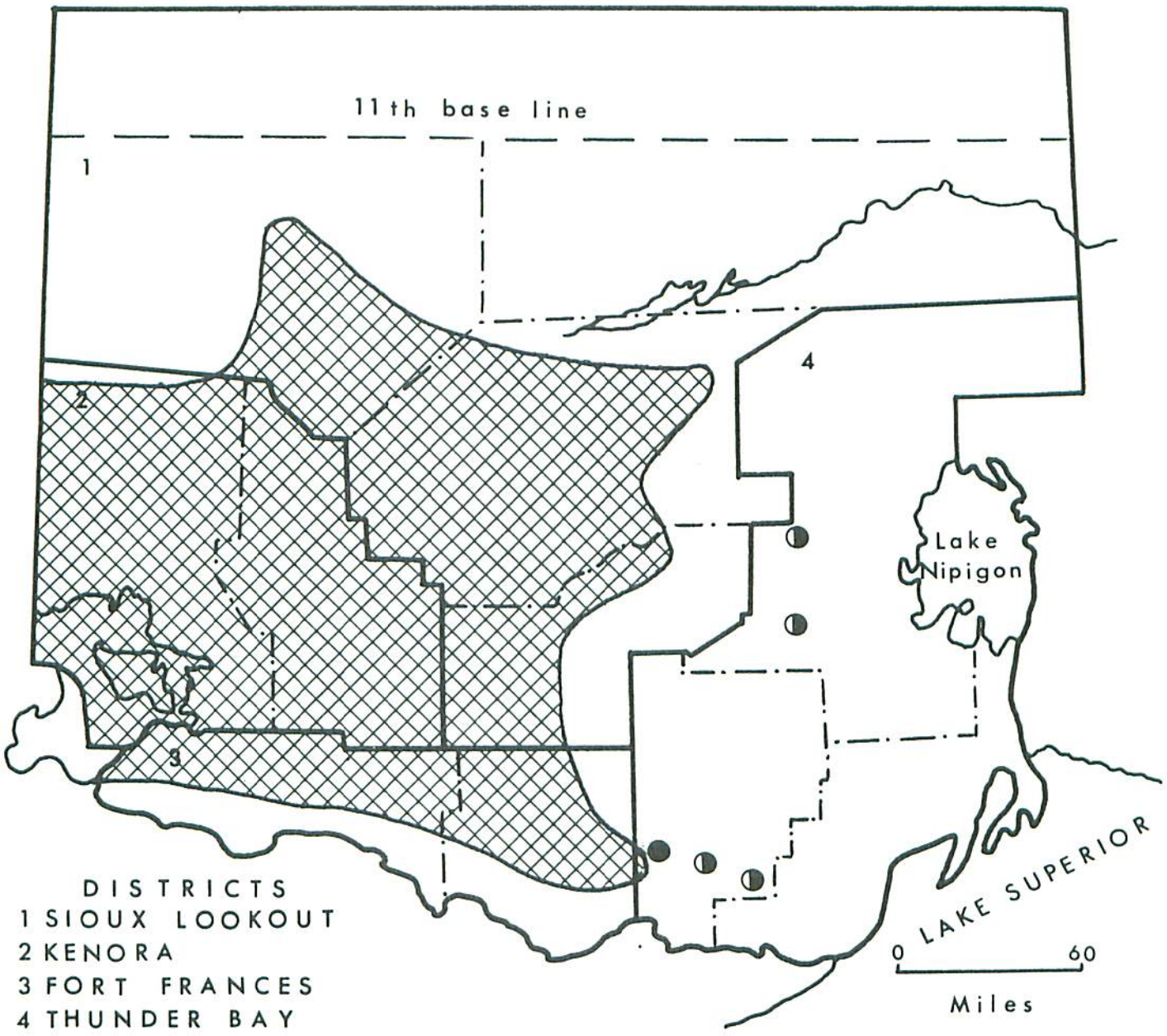
Accurate estimates of defoliation were impossible to determine by aerial surveys in some instances because of hardwood foliage discoloration caused by drought conditions in July and August. However, aerial observations and ground checks made at many points showed that extremely heavy skeletonizing had occurred in the Red Lake area, between Ignace and Kenora and along the Pickle Lake Road in the northern part of the mapped area. Heavy defoliation was observed in the Finland-Nestor Falls area in the southwestern part of the infestation and along Highway 11 in the Atikokan-Quetico Park area in the southeastern part. Ground surveys revealed pockets of moderate-to-heavy infestation at Uneven and Garden lakes, at various points on the west end of the Boreal Road and at the west end of Highway 11 in the Thunder Bay District.

Large Aspen Tortrix, *Choristoneura conflictana* Wlk.

This defoliator of aspen was a serious problem for the third consecutive year in the Western Survey Region (see map). The 200 square miles of heavy infestation reported in the Thunder Bay District in 1969 increased to over 700 square miles and new areas of moderate-to-heavy infestation were recorded in the southwestern part of the Sioux Lookout District. Pockets of light infestation were observed at many points elsewhere in the Region.

In the Thunder Bay District, new heavy infestations were found north of Dog Lake, in MacGregor Township, and near the International Border in the Pigeon River area, with infested areas of approximately 480, 100, and 40 square miles respectively. A 45-square mile infestation which has persisted since 1968 along Highway 17 in Conmee and Oliver townships decreased in size to approximately 35 square miles and a 150 square mile infestation reported south of Dog Lake in 1969 collapsed in 1970. In the Sioux Lookout District moderate-to-heavy defoliation covered an area of approximately 40 square miles south of Red Lake.

WESTERN SURVEY REGION



BIRCH LEAF SKELETONIZER

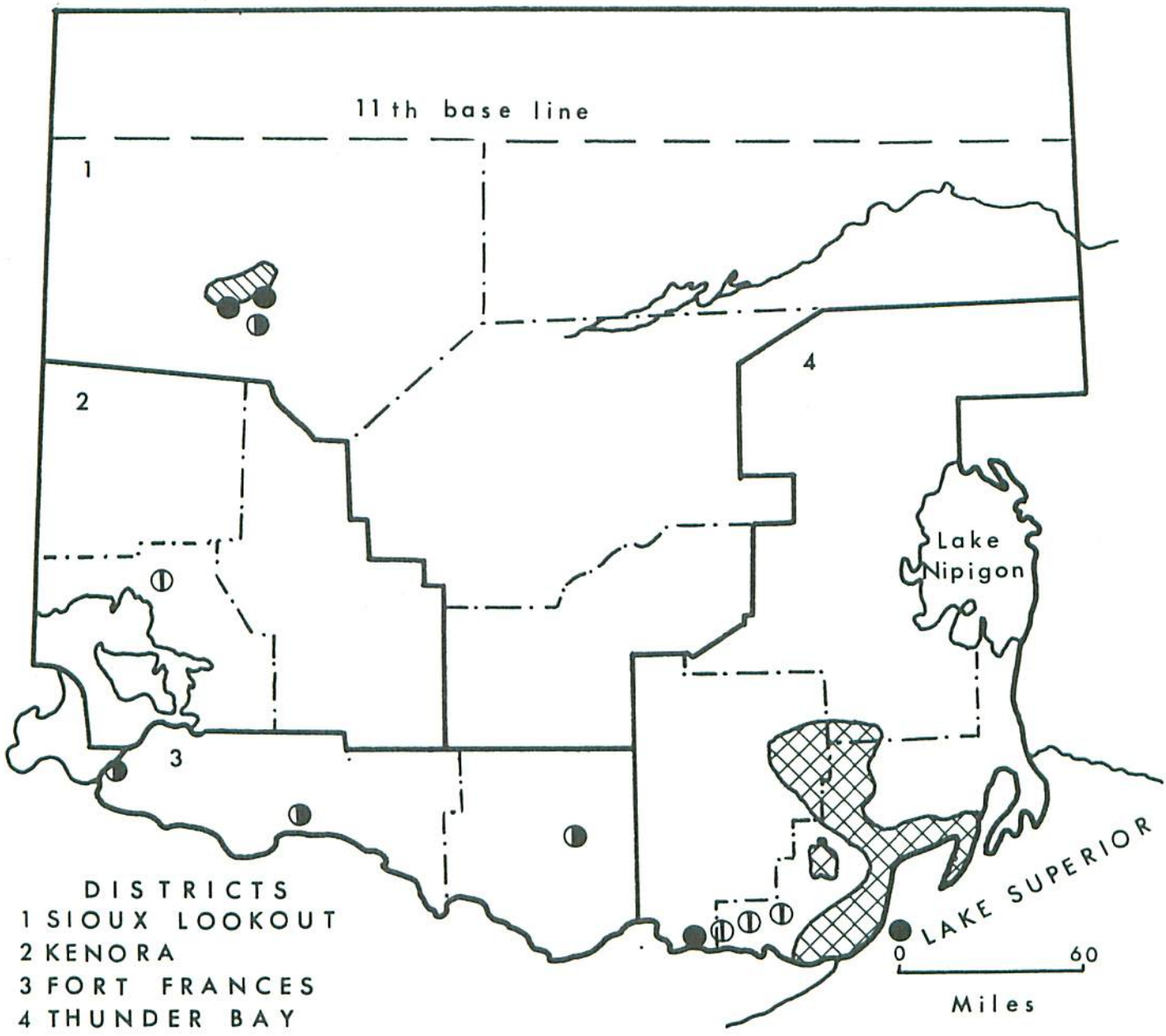
Areas within which defoliation occurred in 1970

Legend

Moderate to severe defoliation..... or ●

Moderate defoliation.....◑

WESTERN SURVEY REGION



LARGE ASPEN TORTRIX

Areas within which defoliation occurred in 1970

Legend

Severe defoliation..... ● or

Moderate defoliation..... ◑ or

Light defoliation..... ◐

Defoliation ranged between 80 and 90 per cent in the four larger infestations in the Thunder Bay District and averaged approximately 50 per cent in the Red Lake infestation in the Sioux Lookout District.

Based on a count of 100 pupal cases at each location, it was determined that an average of 95 per cent of adults emerged successfully in the four large infestations in the Thunder Bay District.

Spruce Budworm, *Choristoneura fumiferana* Clem.

The importance of this pest and the widespread damage it caused in 1970 led to a separate report outlining its activities on a province-wide basis. Specific information summarizing the various outbreaks is provided in Information Report O-X-147 included herein.

Jack-pine Budworm, *Choristoneura pinus pinus* Free.

For the second consecutive year, population levels of this budworm on jack pine declined in all districts in the Western Survey Region.

Egg surveys carried out in 1969 indicated that a moderate infestation would persist in the Dryden Paper Company limits north of the town of Dryden, however, only small numbers of larvae were found. In the Fort Frances District, the infestation virtually collapsed and only a few larvae were collected in beating tray samples. Small numbers of larvae were observed near Mine Centre, along the shoreline of Rainy Lake and at one point in Quetico Park. A small localized infestation located near the Thunder Bay Nursery, showed a sharp reduction in larval population compared with 1969.

Although populations increase rapidly, as a rule they are of short duration. The 2 or 3 years of severe defoliation which occurred in northwestern Ontario has caused some noticeable branch mortality in the upper crowns of host trees. This condition is now evident, particularly in the Dryden Paper Company limits, north of Dryden and west of Vermilion Bay in the Kenora District.

Larch Casebearer, *Coleophora laricella* (Hbn.)

No appreciable change was noted in population levels of this insect in the Fort Frances and Thunder Bay districts (Table 1). This casebearer on tamarack was first recorded in the Fort Frances District in 1961, however, defoliation in northwestern Ontario has not been a serious problem to date. In past years, surveys have been carried out to follow the spread of this introduced pest. Records show that the insect has advanced only 25 miles over the past 10 years from the point where it was first found in the Fort Frances District, near the town of Fort Frances.

Surveys conducted elsewhere in the Region proved negative.

TABLE 1

Summary of Larch Casebearer Larval Counts Based on the Examination of 16 Branch Tips From Each Location in the Western Survey Region From 1968 to 1970

Location	Av. d.b.h. of sample trees in inches	Total no. of larvae collected at each sample point		
		1968	1969	1970
Fort Frances District				
Crozier Township	4	11	10	4
Dobie "	4	5	5	3

A Jack-pine Tip Beetle, *Conophthorous banksianae* McPherson

Although populations in 1970 remained at approximately the same level as in 1969, this beetle continued to cause appreciable mortality to lateral and leading shoots of jack pine regeneration at many points in the Sioux Lookout District. A medium infestation was observed in the Dryden Paper Company limits near Centrefire Lake, where six per cent of the trees examined had infested leading shoots (Table 2). Light infestations were common in a stand of young jack pine south of the Valora crossing on the Pickle Lake road in the Sioux Lookout District, near the Dryden Nursery and in Webb Township in the Kenora District. Observations in an old burn south of Red Lake indicated a build up of populations in this area. Surveys to determine the extent and incidence of the level of infestation will continue in 1971. No collections were made in the remainder of the Western Survey Region.

TABLE 2

Summary of Damage Caused by the Jack-pine Tip Beetle in the Western Survey Region in 1970 (Counts based on the examination of 100 trees at each location.)

Location	No. of trees infested	No. of shoots attacked	
		lateral	leading
Sioux Lookout District			
Valora Crossing (six miles south)	17	42	0
Lomond Twp.	27	34	6
Kenora District			
Zealand Twp.	27	34	1

Introduced Pine Sawfly, *Diprion similis* (Htg.)

This sawfly, a European species, was first discovered in North America near New Haven Connecticut in 1914, and was first recorded in Canada near Oakville Ontario in 1931. Since 1914, its distribution has extended appreciably and it is now common from the eastern seaboard in Maine, south to Virginia and westward through the Central and Lake States to Minnesota. The known distributional boundaries in southern Ontario extend from Oakville north to Lake Simcoe, hence westerly to Lake Huron, including the Bruce Peninsula.

In 1970, the sawfly was collected for the first time in the Fort Frances District in northwestern Ontario, within a 20,000-acre triangular area bounded by the town of Fort Frances in the west, Bear Passage in the east and Rice Bay in the north. Moderate to high populations were observed on numerous islands, including Nowhere, Orton, Goose, Noden, Lichen and Maki in Rainy Lake and at many points along the mainland. Defoliation ranged from zero to a high of 75 per cent at many points.

Although the sawfly was found only on eastern white pine in the Fort Frances District, Scots, jack, red, and Mugho pine are also important hosts. The sawfly lays its eggs in early August, with each female laying approximately 70 eggs in slits on the new or old foliage. Young larvae feed gregariously and at first consume only the more tender part

of the needles; older larvae are solitary feeders and devour the entire needle (see photograph). Pupation takes place in September and cocoons are generally spun up on the host as well as on grass stalks and on the duff layer.

Ontario records indicate that this insect shows a preference for nursery, plantation and ornamental type trees, however the sawfly has on occasion defoliated natural growing white pine trees ranging in size from saplings to mature trees. In Ontario past records indicate that mortality has, in most instances, been light.

Larch Sawfly, *Pristiphora erichsonii* (Htg.)

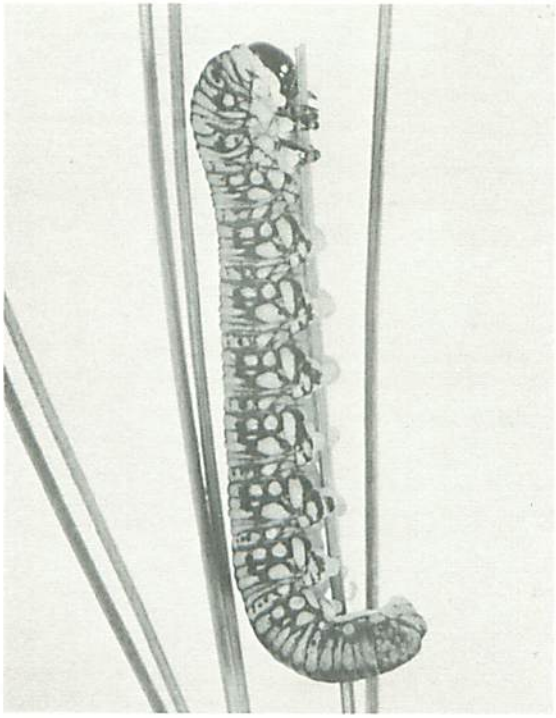
Although little change occurred in the status of this sawfly in the Thunder Bay District where moderate-to-heavy infestations have persisted for several years, marked increases in population levels were recorded in the Fort Frances District for the fourth consecutive year and in the Kenora and Sioux Lookout districts, for the second consecutive year.

Severe defoliation of larch stands recurred along Highway 17 between Raith and English River and along the Armstrong Road while moderate defoliation occurred near the city of Thunder Bay in the Thunder Bay District. Moderate-to-severe defoliation occurred in most larch stands in the remainder of the Region as far north as Cat and Greenbush lakes in the Sioux Lookout District. Numerous stands in river valleys and swamps east of Lac Seul and in the Sturgeon-Metionga lakes area northeast of Ignace were almost completely denuded of foliage.

Birch Leaf Miner, *Fenusa pusilla* Lep.

Populations of this leaf miner declined at two sample points but increased significantly at a third in the Thunder Bay District. Heavy infestations were noted at Gull Bay on Lake Nipigon and at Black Sturgeon Lake as well as on several ornamental birch in the city of Thunder Bay. A moderate infestation recurred on open-grown regeneration in Scoble Township (Table 3). Low populations were common elsewhere in the district. This pest has not been collected in the three western districts.

INTRODUCED PINE SAWFLY



Late instar larva

Severe defoliation of white pine tree

TABLE 3

Summary of Birch Leaf Miner Counts in the Western Survey Region in 1969 and 1970 (Counts based on the examination of 100 leaves taken at random from three trees at each location.)

Location	Av. d.b.h. of sample trees in inches	Per cent leaves mined 1969	1970
Thunder Bay District			
Black Sturgeon L.	2	23	63
Gull Bay, Lake Nipigon	3	67	65
Scoble Twp.	2	35	29

Native Elm Bark Beetle, *Hylurgopinus rufipes* Eich.

Intensive surveys were carried out to determine whether or not this vector of the Dutch Elm Disease, *Ceratocystis ulmi* was present in the Western Survey Region. One recently dead tree in Blake Township, Thunder Bay District was found to be heavily infested with this bark beetle. This is the first record of this insect in the district and while extensive surveys were carried out it was not collected from any other point in the Region, although feeding galleries were noted in the Rainy River area of the Fort Frances District. Although this vector is now known to be present, Dutch Elm Disease has not been recorded in the Region.

Forest Tent Caterpillar, *Malacosoma disstria* Hbn.

Between 1966 and 1968, populations of the forest tent caterpillar declined from an area covering 6500 square miles to a pocket of heavy infestation just west of the town of Fort Frances. In 1969 an increase in populations occurred and light infestations were observed as far west as Richardson and Tait townships. In 1970 a further increase in populations was observed and heavy infestations were common from Fort Frances west along the International border to Emo and north to just south of Lake Despair (see map). Pockets of heavy infestation were common near Lake Despair and light to moderate infestations were common along the eastern shoreline of Rainy Lake. Occasional larvae were observed as far east as Atikokan and French Lake in the Fort Frances District and near Dryden in the Kenora District. Small numbers were

collected near Sioux Lookout in the Sioux Lookout District and near Burchell Lake in the Thunder Bay District.

Severe defoliation occurred within the heavily infested area and approximately 550 square miles of forest land were heavily defoliated, an increase of 100 square miles over 1969.

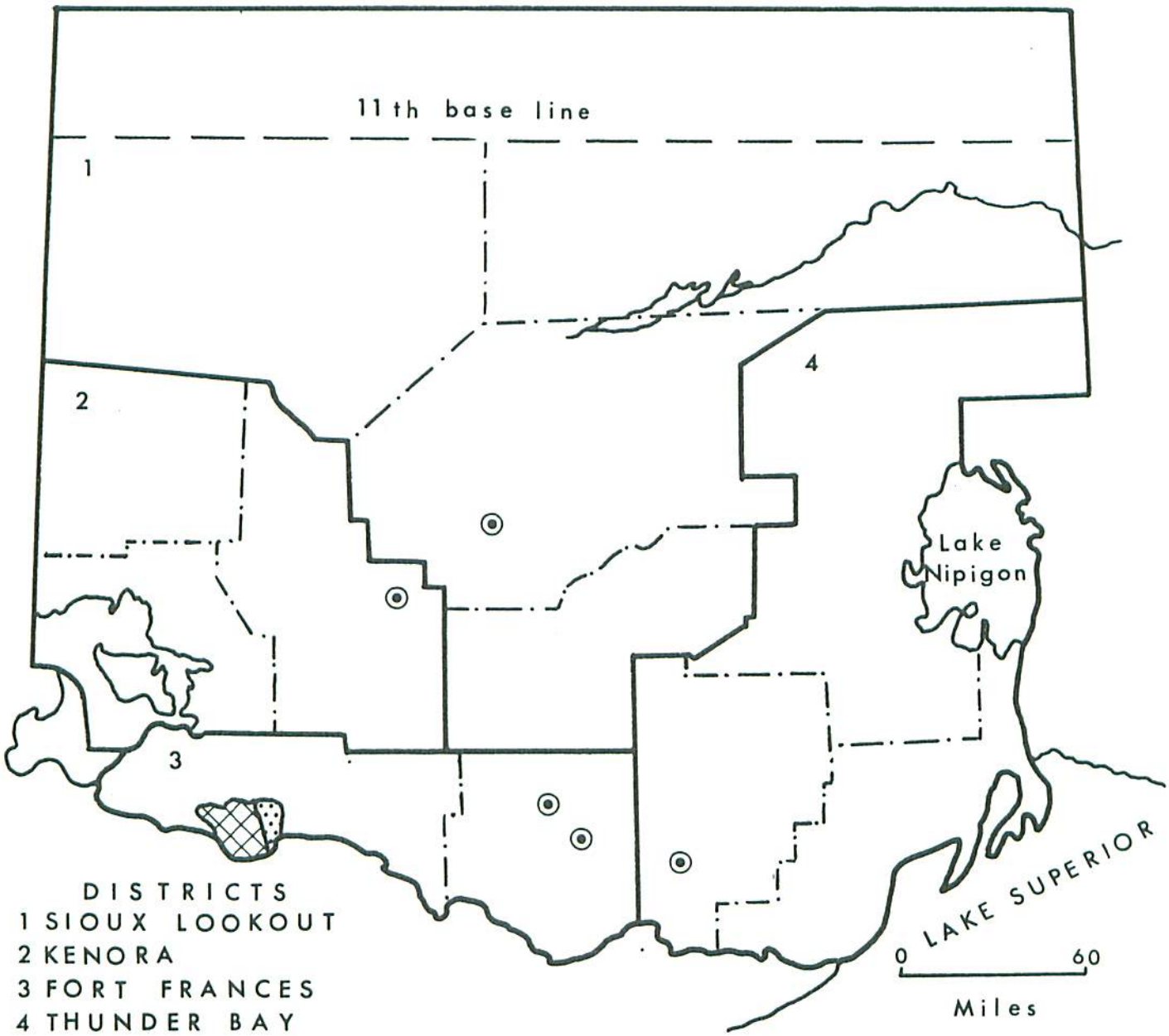
Natural control factors have not as yet reached a level where populations are expected to decline. However, surveys carried out in seven areas within the infestation showed a range of from 56 to 79 per cent diseased and parasitized pupae (Table 4). Egg surveys carried out in the same general areas indicate that heavy infestations can be expected in 1971, if a successful hatch of overwintering eggs occurs (Table 5).

TABLE 4

Summary of Forest Tent Caterpillar Cocoon Dissections in the Western Survey Region in 1970 (Counts based on the examination of 100 cocoons at each location.)

Location	Per cent parasitized	Per cent diseased	Per cent emerged
Fort Frances District			
Rainy Lake N/W	69	6	25
Crozier Township	51	5	44
Lash "	52	15	33
Aylesworth "	68	11	21
Dance "	69	9	22
Dobie "	62	7	31
Miscampbell "	53	9	38

WESTERN SURVEY REGION



FOREST TENT CATERPILLAR

Areas within which defoliation of aspen occurred in 1970

Legend

Moderate to severe defoliation...

Light defoliation.....

Collection points.....⊙

TABLE 5

Summary of Forest Tent Caterpillar Egg Band Counts and Infestation Forecasts for 1971 in the Western Survey Region (Counts based on the examination of from one to three trees at each location.)

Location	Av. d.b.h. of sample trees in inches	No. of trees examined	Av. no. of egg bands per tree	Forecast for 1971
Fort Frances District				
Aylesworth Township	5	1	18	S
Potts "	5	1	38	S
Dance "	6	1	65	S
Kingsford "	6	1	27	S
Mather "	5	1	22	S
Miscampbell "	8	1	112	S
Crozier "	4	1	15	S
Burris "	5	1	42	S
Claxton "	5	3	1	L
Couchiching (Indian Reserve)	5	1	16	S
Red Gut Bay	5	3	1	L

White Pine Weevil, *Pissodes strobi* Peck

Although surveys revealed little change in population levels of this insect, damaged host trees were observed at several points in the Western Survey Region in 1970. Infestations were found in jack pine regeneration stands in the Sioux Lookout District and on red pine, jack pine and spruce species in the Thunder Bay District, while light damage was observed at widely separated points elsewhere in the Region (Table 6).

TABLE 6

Summary of Damage by the White Pine Weevil in the Western Survey Region from 1968 to 1970 (Counts based on the examination of 100 trees at each location.)

Location	Host	Av. d.b.h. of sample trees in inches	Per cent trees weevilled 1968	1969	1970
Sioux Lookout District					
Heyson Township	jP	1	1	0	18
Centrefire Lake	jP	1	--	--	8
CP 319 GLP Co.	jP	1	--	--	6
Basket Lake	jP	1	--	--	17
Thunder Bay District					
Stirling Township	wS	3	--	--	7
Conmee "	jP	1	--	5	5
Marks "	nS	3	25	16	17
Paipoonge "	jP	1	5	6	5
Adamson "	bS	2	--	--	2
English River	jP	2	--	3	4
Marks Lake Rd.	rP	1	--	--	9
Kopka Lake	jP	2	--	--	2
Kenora District					
Willingdon Township	wP	1	--	--	2
Fort Frances District					
Hutchinson Township	jP	1	--	--	3
Clearwater Lake Rd.	jP	1	--	--	6

Moderate infestations were recorded at a sample point in the Dryden Paper limits near Basket Lake, northwest of Ignace and in Heyson Township south of Red Lake. Several hundred acres of jack pine in the 3 to 5 foot class were lightly infested in the Dryden Paper limits north of the town of Dryden and near Camp 319, Great Lakes Paper limits northeast of Ignace. Populations remained static in the Thunder Bay District with a moderate infestation persisting for the third consecutive year in Marks Township.

The Yellow Spruce Budworm, *Zeiraphera canadensis* Mut. & Free.

A heavy infestation of this defoliator persisted and intensified in the Thunder Bay District. Thousands of white and several other species

of ornamental and windbreak spruce were completely denuded of all current foliage in the city of Thunder Bay and surrounding areas. The feeding habits of this insect are such that defoliation was either complete or nearly complete before it was noticed by most people. In many instances single trees would sustain only light defoliation while adjacent trees were severely defoliated. The insect was not observed above the trace level in the remainder of the Region.

TABLE 7

Other Noteworthy Insects

Insect	Host(s)	Remarks
Alsophila pometaria Harr.	wAs, wE	Heavy infestations on shade trees in town of Dryden, Kenora District, and on occasional trees west of Fort Frances
Anchylopera discigerana Wlk.	wB	Heavy infestations observed on shoreline trees near Donald and Musclow lakes, Sioux Lookout District.
Aphrophora parallela Say	wP, bF	Moderate levels of infestation observed on scattered trees on Rebecca Island, Rainy Lake, Fort Frances District.
Contarinia virginianiae Felt.	cCh	Heavy on fruit of this species at one location in the City of Thunder Bay.
Dasineura balsamicola Lint.	bF	Common on understory trees near Atikokan, Fort Frances District.
Datana ministra Dru.	wild crab-apple, cPl	Occasional colonies near Hudson, Sioux Lookout District, Wabigoon, Kenora District and near the Thunder Bay Nursery.

TABLE 7 continued

Insect	Host(s)	Remarks
Diprion hercyniae Htg.	wS	Only small numbers collected at four widely separated locations in the Sioux Lookout, Fort Frances and Kenora districts, however an extension of the known distribution was recorded in the northeast part of the Kenora District.
Enargia decolor Wlk.	tA	Light infestation along Kenricia Road near Kenora and on occasional trees near Lake of the Woods Provincial Park, Fort Frances District.
Eucordylea atrupictella Dietz.	jP	Medium infestation near the Thunder Bay Nursery.
Eucosma gloriola Heinr.	jP	Low populations in small plantation near Blue Lake, Kenora District.
Fenusa dohrnii Tischb.	Al	Heavy infestation near Pass Lake, Thunder Bay District, light infestation near Donald Lake, Sioux Lookout District.
Gonioctena americana Schaeff.	tA	Two small localized infestations near Thunder Bay.
Gracellaria syringella Fabr.	lilac	Ornamentals moderately infested near Middle Falls and in Thunder Bay.
Halisidota maculata Harr.	wB, Al, W	Medium infestations common near Kakabeka Falls, Pass Lake and on numerous ornamentals in the city of Thunder Bay.

TABLE 7 continued

Insect	Host(s)	Remarks
Hemichroa crocea Four.	Al	High populations observed near Pass Lake and along Armstrong Road no. 1, Thunder Bay District and small numbers at two locations in the Sioux Lookout District.
Hyphantria cunea Dru.	W, rAs, Al	Colonies common at three locations, Thunder Bay District and along highway 71, Fort Frances District.
Lithocolletis salicifoliella	tA	Heavy infestations observed at numerous points in the four districts, most notable infestations were at scattered locations near Kakabeka Falls and Thunder Bay, Thunder Bay District, near Ignace and Gulliver River, Sioux Lookout District, near Nym Lake, Fort Frances District and near Vermilion Bay, Kenora District.
Mindarus abietinus Koch.	bF	Common on occasional trees near Kakabeka Falls, Thunder Bay District.
Nematus limbatus Cress.	W	Heavy infestations common on ornamentals in Quetico Park, Fort Frances District and on occasional trees along the Marks Lake road, Thunder Bay District.
Nematus ventralis Say	W	Small roadside trees heavily infested near Longbow Corners, Kenora District.

TABLE 7 continued

Insect	Host(s)	Remarks
Neodiprion nanulus Schedl.	jP	Three colonies on 100 trees near the junction of highway 71 and 17, Kenora District.
Neodiprion pratti banksianae Roh.	jP	Several colonies on Sandy Island, Rainy Lake and on scattered trees near Mine Centre, Fort Frances District.
Neodiprion virginianus complex	jP	Scattered colonies observed on occasional trees near Hudson, Sioux Lookout District, at two locations in Kenora District and near Pearsons side road, Fort Frances District.
Nycteola cinereana N. & D.	bPo	Moderate infestation on scattered trees near Sleeman, Fort Frances District.
Nymphalis antiopa L.	W, tA	Fort Frances, Kenora, Sioux Lookout districts had varying degrees of infestation.
Peridroma saucia Hbn.	jP	This climbing cutworm caused light mortality to tube seedlings in the Department of Lands and Forests greenhouse near Fort Frances. Severe damage similar to the above was observed in the greenhouse at Ignace, Sioux Lookout District.
Petrova albicapitana Busck.	jP	Medium infestation observed near French Lake, Fort Frances District and trace levels of infestation near Ignace, Sioux Lookout District.
Pikonema alaskensis Roh.	wS	Infestations varied from light to heavy at many points in the Western Survey Region.

TABLE 7 continued

Insect	Host(s)	Remarks
Pineus similis Gill.	wS	Needle galls common at three locations, Fort Frances District and near Eagle River, Kenora District.
Pineus strobi Htg.	wP	High populations on three trees near Black Sturgeon Lake, Thunder Bay District.
Podapion gallicola Riley	rP	Light infestations on small trees near Hale Bay, Fort Frances District.
Pristiphora geniculata Htg.	Mo.	A westerly extension of 120 miles in the known distribution of this insect was recorded in the Thunder Bay District. High populations were observed on several trees near Thunder Bay.
Profenusa thomsoni Konow	wB	Low populations observed at many points in the Sioux Lookout District.
Rhabdophaga swainei Felt.	wS	Medium infestation on new buds of white spruce along the Trout Lake shoreline, Fort Frances District.
Rhynchaenus rufipes Lec.	W	High populations on shoreline trees near Wilcox Lake, Sioux Lookout District.
Schizura concinna J. E. Smith	W, tA	Common in varying degrees of intensity at many points in the Western Survey Region.
Tetralopha aplastella Hlst.	tA	Common on numerous trees near Ignace, low populations at two other locations in the Sioux Lookout District.

TABLE 7 continued

Insect	Host(s)	Remarks
Trichiocampus irregularis Dyar.	W	Scattered colonies along the Savanne Portage, Thunder Bay District.
Zelleria haimbachi Busck.	jP	Moderate infestation on occasional trees near the Thunder Bay Nursery.

TREE DISEASES

Dwarf Mistletoe on Jack Pine, *Arceuthobium americanum* (Nutt ex Engelm.)

Although this disease was found prior to 1969 in Ontario, it was not positively identified until that year in an area south of Scout Bay, Lac Seul near the Sioux Lookout-Kenora boundary (see photograph). Symptoms in the form of witches'-brooms would indicate that the disease has been present for several years. This record constitutes an eastern extension of approximately 100 miles in the known range of the organism. Intensive surveys were carried out in the surrounding areas to determine whether or not the parasite was attacking jack pine on a broad front, but no other centres of infection could be found.

At Scout Bay, more than 1000 acres of jack pine in coniferous stands had been infected. However, after a clear-cutting operation in the late sixties, infection was confined to a small unmerchantable stand approximately five miles southeast of Scout Bay and a shoreline reserve stand approximately one-half mile further east on the western shoreline of South Inlet, Lac Seul.

Disease evaluations of surviving and recently dead trees were carried out in each of the areas affected. These showed a high level of infection at each point and 12.5 per cent recent mortality at one (Table 8).

DWARF MISTLETOE ON JACK PINE

Mortality caused by this mistletoe in mature jack pine

Female plant infected by a fungus Wallrothiella arceuthobii

Broom on jack pine

TABLE 8

Summary of Incidence and Level of Infection of Dwarf Mistletoe on Jack Pine and Current Mortality of Host Trees in Two Small Areas near Lac Seul. (Counts based on the examination of forty trees, four from each of ten plots at each location.)

Location	Tree height in feet	Basal area per acre	Per cent incidence	Level of infection	Per cent current mortality
Scout Bay No. 1	50	15	59	High	0.0
Scout Bay No. 2	75	40	29	High	12.5

A parasitic fungus *Wallrothiella arceuthobii* (Pk.) Sacc. which attacks female mistletoe flowers and prevents seed maturation was observed on several female plants in the area.

Since the seeds cannot be carried far by the wind, animals and birds are thought to be responsible in instances when a long distance spread of the mistletoe occurs. Local distribution and spread of the organism occurs when the seed is ejected from ripened fruit. In even-aged stands the seeds may travel as far as 30 feet horizontally when ejected. Consequently in even-aged stands the annual spread is very slow, however in uneven-aged stands an infected tree in the overstory may scatter seeds as far as 60 feet into the understory, or nearby regeneration such as occurs adjacent to the shoreline reserve stand at South Inlet.

Armillaria Root Rot, *Armillaria mellea* (Vahl ex Fr.) Kummer

This root rotting pathogen continued to cause tree mortality in pine stands at numerous points throughout the Region. Although trees in all age and diameter classes are susceptible, infection and mortality was more common in small jack pine growing on scarified or burned areas. Evaluations made at five points where the effects of the disease were obvious showed mortality values from 2.5 to 7.5 per cent of natural jack pine regeneration (Table 9).

TABLE 9

Summary of Incidence and Level of Infection of Armillaria Root Rot of Jack Pine Regeneration and Current Mortality of Host Trees. (Counts based on examination of forty trees, four from each of ten plots at each location.)

Location	Tree height in feet	Per cent incidence	Level of infection	Per cent current mortality
Sioux Lookout District				
Basket Lake Rd.	4	5.0	Light	5.0
Pickle Lake Rd.	4	2.5	Light	2.5
Kenora District				
Webb Township	4	2.5	Light	2.5
Thunder Bay District				
Stedman Township	3	7.5	Moderate	7.5
Aldina "	12	12.5	Moderate	7.5

Needle Rust of Spruce, *Chrysomyxa ledi* (Alb. & Schw.) d By. and *C. ledicola* Lagh.

Infection levels of needle rusts on black and white spruce increased slightly throughout the Region. The most notable infections were observed in the Thunder Bay and Kenora districts. High levels of infection were recorded in a 600-acre stand of white spruce under jack pine at the south end of the Dog River Road in the Thunder Bay District and in a 10-acre stand of black spruce in Devonshire Township in the Kenora District (Table 10). A moderate level of infection was noted in a 25-acre stand of black spruce in Gorham Township in the Thunder Bay District. Elsewhere in the region trace to light levels of infection were common.

TABLE 10

Summary of Incidence and Infection Levels of Needle Rust on Black and White Spruce in the Western Survey Region in 1970. (Counts based on examination of forty trees, four from each of ten plots at each location.)

Location	Tree species	Basal area per acre	Area affected	Per cent incidence	Level of infection
Thunder Bay District					
Dog River Rd.	bS	127	600 acres	100	Light
Dog River Rd.	wS	127	600 acres	100	High
Gorham Township	bS	97	25 acres	100	Moderate
Kenora District					
Devonshire Twp.	bS	66	10 acres	95	High
Fort Frances District					
Nestor Falls	bS	51	5 acres	18	Light

Sweetfern Blister Rust, *Cronartium comptoniae* Arth.

Surveys of jack pine stands in the Western Survey Region revealed infected stands at widely scattered points in the Thunder Bay, Fort Frances and Kenora districts. Random disease evaluations conducted in eight stands showed that levels of infection were generally light to moderate. However, jack pine stands located 38 miles east of Fort Frances along Highway 11 were heavily infected (Table 11).

TABLE 11

Summary of Incidence and Level of Infection of Sweetfern Blister Rust on Jack Pine in the Western Survey Region in 1970 (Counts based on examination of forty trees from each of ten plots at each location.)

Location	Tree height	Basal area	Per cent incidence	Level of infection
Thunder Bay District				
Dog Lake	30	79	5	Light
Madeline Lake	40	58	11	Moderate
Meinzinger Township	35	57	10	Moderate
O'Connor "	35	42	5	Light
Fort Frances District				
Mileage 38 Hwy. 11	65	52	30	High
Farrington Township	60	27	5	Light
Parksite, Mileage 30 Hwy. 11	55	43	15	Moderate
Kenora District				
Dryden Tree Nursery	30	-	5	Light

The disease damages by its girdling action. Past records show that the smaller the tree the more likely it is to be girdled and killed. However, after a tree has reached a basal diameter of about three inches, it is relatively safe. On the whole, the disease is not serious in natural stands, since a relatively severe infection may not even result in final understocking because a high proportion of trees always survive infection. However, young seedlings are killed, so that restocking is delayed. Losses in nurseries have ranged from 5 to 20 per cent, but it is in plantations that the most severe damage has occurred.

Surveys were also carried out in the Region to determine the range of Sweet Gale, *Myrica gale* L. and Sweetfern, *Comptonia peregrina* (L.) Coult., alternate hosts of this fungus. Sweet gale was observed at many points throughout the Region, however sweetfern was found only in the Fort Frances District from near Mine Centre southward to the Rainy Lake shoreline in the Stokes and Hale Bay area.

Gall Rust of Hard Pines, *Endocronartium harknessii* (J. P. Moore) Y. Hiratsuka

This gall forming pathogen which attacks all age classes of jack pine was observed throughout the Region in 1970. Galls caused appreciable mortality to branches and twigs in young and semi-mature stands. This kind of damage was especially noticeable north of Dryden in the Watch Lake area and along the timber access road between Millidge and McIntyre Bay, Lac Seul in the Sioux Lookout District, and in an immature stand of dense jack pine at the Dryden Nursery in the Kenora District.

Disease evaluations were carried out in young jack pine regeneration at three points (Table 12). Stem galls which very often girdle small trees causing mortality were present at each point with the most notable infection being found in Stedman Township, Thunder Bay District where 17.5 per cent of the stems had galls. Although no current tree mortality was found in the sample plots, examination of scattered recently dead trees elsewhere in the stand showed that stem galls in most instances were responsible.

TABLE 12

Summary of Incidence and Level of Infection of Gall Rust of Hard Pines on Jack Pine Regeneration in the Western Survey Region in 1970 (Counts based on examination of forty trees, four from each of ten random plots at each location.)

Location	Tree height in feet	Per cent incidence	Level of infection
Sioux Lookout District			
Webb Township	4	17.5	Light
Heyson "	5	15.0	Light
Thunder Bay District			
Stedman Township	3	17.5	Moderate

Elm Deterioration, *Phoma* sp., *Penicillium* sp., *Mucor* sp., *Cantemularia* sp.

In 1970 special surveys were conducted to determine if Dutch Elm Disease, *Ceratocystis ulmi* (Buis.) C. Moreau was present in the Fort Frances and Thunder Bay districts. Suspect areas failed to reveal

the presence of this wilt on elms. However, other wilts as noted above and associated with branch dieback in white elm were cultured from samples submitted from several areas in the Fort Frances District. Premature yellowing of the leaves was first noticed in a stand of elm just west of the town of Fort Frances in early July. Additional surveys showed this symptom to be widespread occurring in varying degrees of intensity from Fort Frances west along Highway 11 to the village of Rainy River. A plot of 100 trees was evaluated and 18 of the trees examined had varying degrees of branch mortality.

This condition was not noted elsewhere in the Western Survey Region. Surveys will continue in 1971.

Scleroderris Canker of Pine, *Scleroderris lagerbergii* Gremmen

An intensive and detailed survey which was made for the presence of this fungus in northwestern Ontario revealed a number of infections. These were found northwest of Pickle Lake near Lysander Lake, in the Sioux Lookout District and near Dryden in the Kenora District (see map). The largest area of infection occurred over approximately 5000 acres of jack pine regeneration in a seven-year-old burn near Lysander Lake. An evaluation based on the selection of sample trees at random in a representative area showed an incidence of 27.5 per cent mortality. Many pockets of heavy damage with up to 80 per cent mortality were recorded and ranged in size from 1 to 32 acres. In a 200-acre, 15-year-old jack pine plantation east of Ignace approximately 63 per cent of the trees were seriously affected. However, several other pathogens were present in samples submitted from this area, making it difficult to determine the amount of damage caused by *S. lagerbergii*. In the Thunder Bay tree nursery red pine seedlings and some nearby windbreaks were affected.

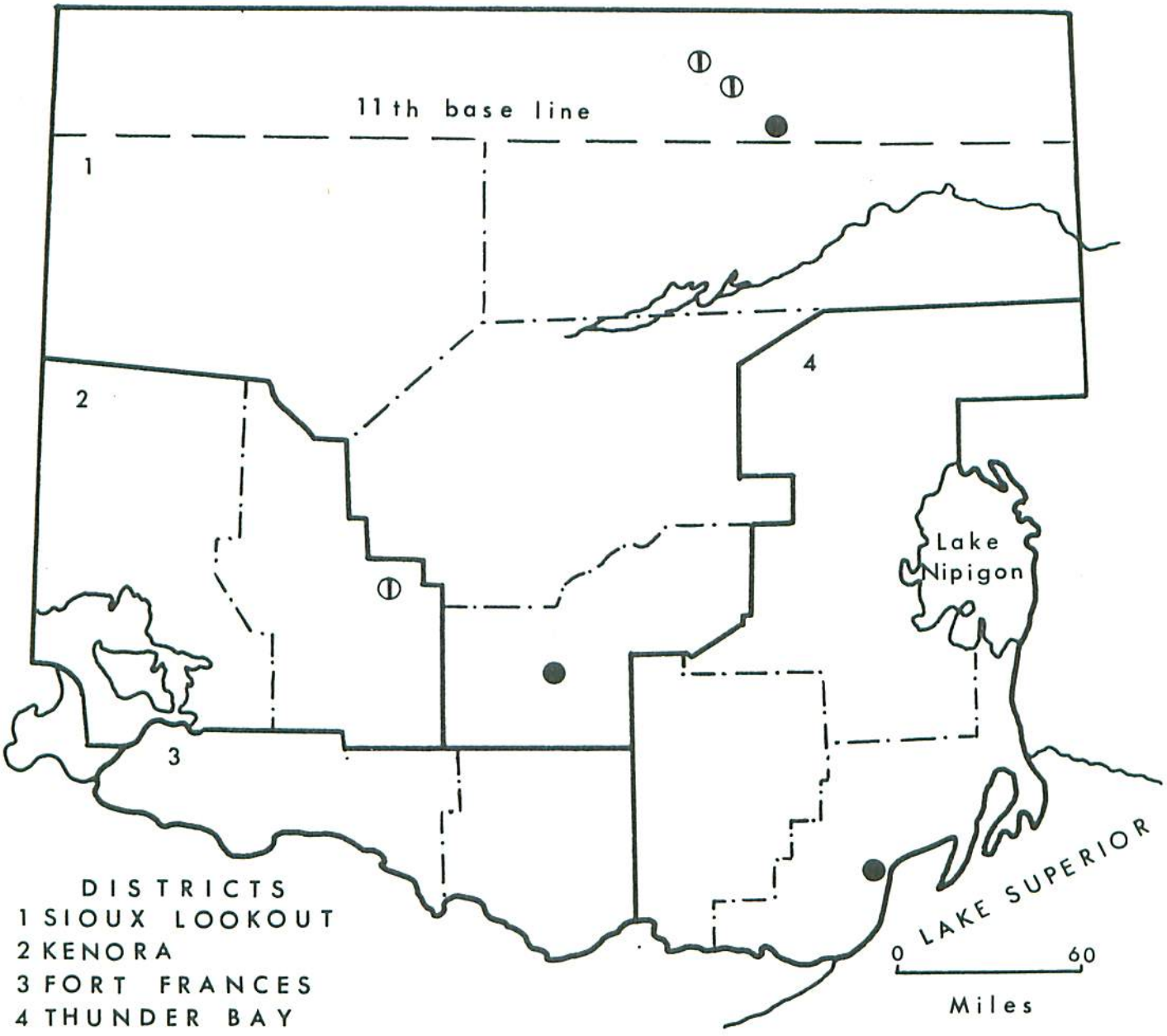
Additional surveys carried out elsewhere in the Region failed to reveal other centres of infection.

Deterioration of Nursery Stock

In the spring of 1970 severe damage occurred to black spruce nursery stock in the Department of Lands and Forests tree nursery near Dryden. Between 350,000 and 400,000 seedlings were affected.

Examination of the root systems, cambium layer and current buds in early May showed each to be in a healthy condition, although much of the foliage was seriously deteriorated and discolored in shades of purple, purple-brown or brown. Severe needle drop occurred in the latter part of May and in June. Samples of affected trees were submitted to the Forest Research Laboratory in Sault Ste. Marie but no causal fungus was found. It was determined that the problem was an above-ground condition and likely caused by the trees entering the dormant season in a substandard physiological state, the latter caused by moisture stress.

WESTERN SURVEY REGION



SCLERODERRIS CANKER ON PINE

Locations where heavy or light infections occurred in 1970

Legend

Heavy..... ●

Light..... ◐

Summer Drought Condition

Unusually hot dry weather during the months of July and August resulted in premature yellowing and leaf drop in large areas of deciduous trees throughout the Western Survey Region. Damage occurred mostly to white birch on dry rocky sites, although in several areas, especially in the Thunder Bay District, all species of deciduous trees were affected. It was virtually impossible to aerial map damaged stands because of defoliation attributed to the birch skeletonizer, *Bucculatrix canadensisella* Cham. at this time. Past records show that when conditions similar to the above occurred, mortality was common to small diameter trees growing on high, rocky or shallow soil sites.

Wind Damage

In mid-August a severe wind storm caused considerable damage to stands of jack pine, white birch, trembling aspen and balsam fir in the Fort Frances District. Most notable damage occurred near Mine Centre and along the shoreline of Rainy Lake to a point north of Highway 11, where trees between 8 and 10 inches d. b. h. were snapped off or uprooted. Most damage was confined to pockets within the above mentioned area.

Elsewhere in the Western Survey Region small pockets of wind damage were observed near Ignace, Sioux Lookout District and at scattered points in the Thunder Bay District.

Winter Drying of Conifers

Unseasonably warm weather in the latter part of the winter of 1969-1970 caused moderate to heavy browning to foliage on small-diameter red, white and jack pine, in plantations and regeneration. Ornamental plantings in residential areas were also affected.

Considerable bud mortality was recorded on red and white pine in plantations and trees in open-grown sites. However little bud damage was noted in large areas of jack pine regeneration examined in the Basket Lake area, 30 miles northwest of Ignace and south of Valora Crossing in the Sioux Lookout District. Random disease evaluations at six widely separated points showed a damage incidence ranging from 18 to 67.5 per cent (Table 13).

TABLE 13

Summary of Incidence and Level of Damage to Conifers Caused by Winter Drying in the Western Survey Region in 1970 (Counts based on examination of forty trees, four from each of ten plots at each location.)

Location	Tree height	Tree species	Per cent incidence	Level of damage
Thunder Bay District				
Fowler Township	4	rP	67.5	Moderate
Sioux Lookout District				
Basket Lake Road	2	jP	52.5	Moderate
Kenora District	5	rP	17.5	Moderate
Jones Road				
Fort Frances District				
LaVallee Road	6	rP	47.5	High
Domtar Road				
Northland Gateway	6	rP	32.5	High
Woodyatt Township	6	wP	70.0	High

TABLE 14

Other Noteworthy Diseases

Organism	Host(s)	Remarks
Arceuthobium pusillum Pk.	jP, bS	Moderate infection on jP and heavy infection on bS in a 10 acre stand, Northern Light Lake, Thunder Bay District. Second record on jP in Ontario.
Ciborinia whetzelli (Seaver) Seaver	tA	Moderate infection, Drayton Twp., Sioux Lookout District, trace levels common elsewhere.

TABLE 14 continued

Organism	Host(s)	Remarks
Coleosporium asterum (Diet.) Syd.	jP	Trace to light infections common throughout Region.
Cronartium comandrae Pk.	jP	Moderate infection, Goldie Twp., Thunder Bay District and trace infection 45 m. North Pickle Lake, Sioux Lookout District.
Cronartium ribicola J. C. Fischer	wP	Heavy infection on regeneration trees, Sibley Twp., Thunder Bay District, and moderate infection on mature trees, Farrington Twp., Fort Frances District.
Peridermium stalactiforme Arth & Kern.	jP	Light infection level, Dryden Nursery, Kenora District.
Pollaccia radiosa (Lib.) Bald. & Cif.	tA	Trace to light infections common throughout Region.
Pollaccia saliciperda (Allesch. & Tub.) Arx	W	Heavy infection on hedgerow near Dryden, Kenora District.
Pucciniastrum epilobii Otth.	bF	Trace infections common throughout Region.
Scoleconectria cucurbitula (Tode ex Fr.) Booth	jP	Trace to light infections common throughout Region especially in association with *Scleroderris lagerbergii*.
Valsa pini (Alb. & Schw.	rP	Light infection Woodyatt Twp., Fort Frances District.