

FOREST INSECT AND DISEASE SURVEYS
IN THE WESTERN SURVEY REGION, 1971

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

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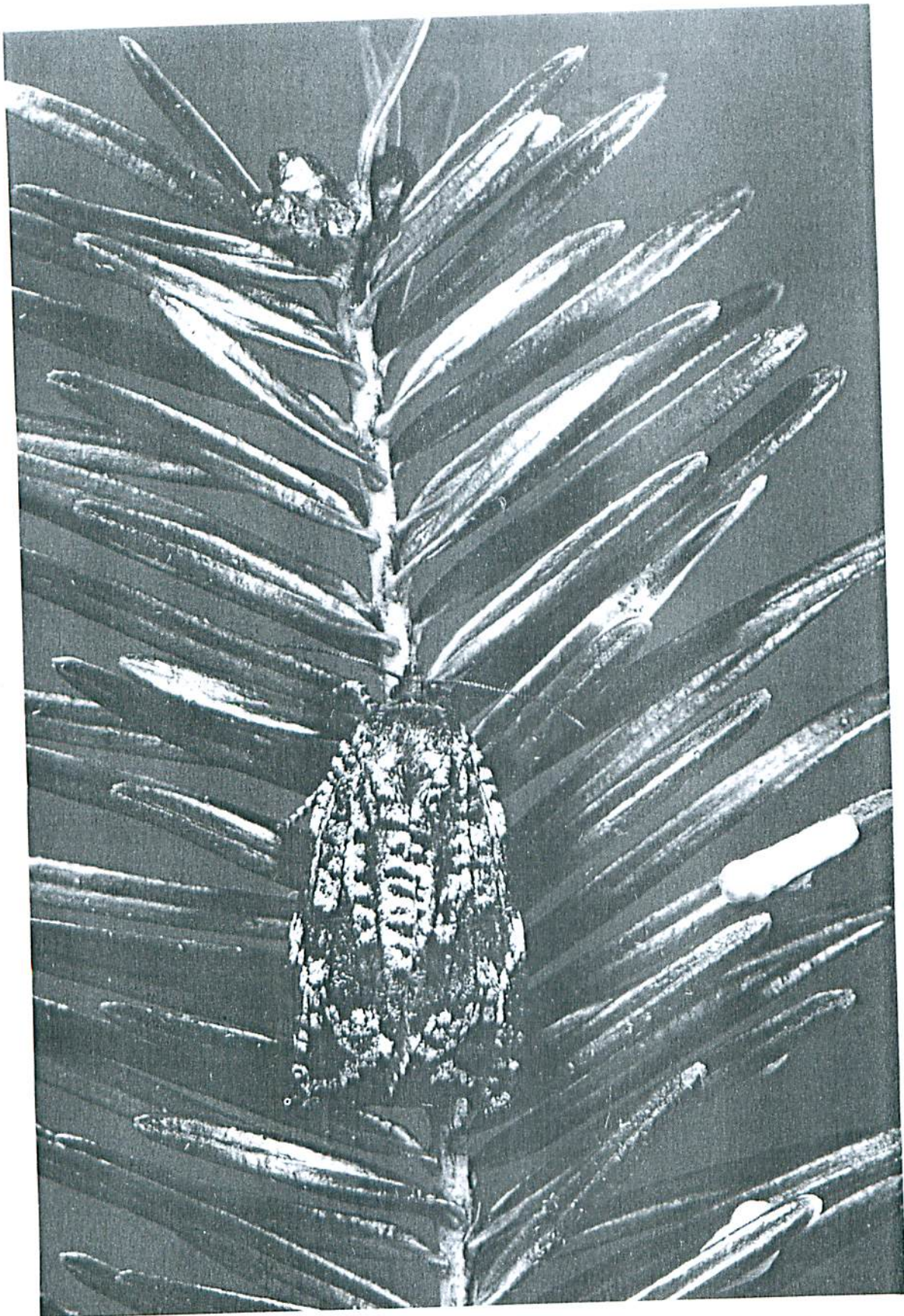
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Frontispiece. A spruce budworm adult in the process of laying eggs on the foliage of balsam fir

SURVEY HIGHLIGHTS

The following report describes the more important forest insect and disease conditions in the Western Survey Region in 1971.

Considerable time was devoted to searching for evidence of new infestations of the spruce budworm. Although infestation boundaries changed somewhat in the Fort Frances District, the overall area infested remained approximately the same as in 1970. Two Survey technicians provided assistance over an extended period with timing and evaluation of the chemical control operations carried out by the Ontario Department of Lands and Forests. A new heavy infestation of the forest tent caterpillar was recorded in the Kenora District. New pockets of infestation of the jack pine budworm were found in Sioux Lookout, Kenora and Fort Frances districts. Notable increases in the distribution of infestations of the large aspen tortrix and introduced pine sawfly were recorded. Tree disease surveys in planted or regenerated pine stands revealed that Armillaria root rot continued to cause some tree mortality, especially in jack pine regeneration. Pockets of Scleroderris canker of pines were recorded at new locations in the Sioux Lookout, Kenora and Thunder Bay districts. A survey for root and butt diseases was carried out in stands of balsam fir, black spruce and white spruce at 18 points in the Region. Surveys for Dutch elm disease in the southern part of the Region failed to turn up the disease.

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INSECTS

Birch Skeletonizer, *Bucculatrix canadensisella* Cham.

Infestations of the birch skeletonizer persisted for the second consecutive year and spread into birch stands throughout approximately 60,000 square miles of the Region. Infestations, ranging from light to heavy intensity, were observed at many points throughout the southern part, from a boundary, running eastward from Umfreville Lake, near the Ontario-Manitoba border to Lac Seul, Churchill and Savant lakes and to Gull Bay, Lake Nipigon. Accurate aerial mapping was virtually impossible because of early foliage discoloration and leaf drop caused by drought. The early drying of the leaves undoubtedly caused considerable larval mortality through starvation and should help to reduce populations in 1972.

Large Aspen Tortrix, *Choristoneura conflictana* Wlk.

Infestations of this insect recurred for the fourth consecutive year causing moderate, or moderate to severe defoliation through approximately 1,200 square miles of aspen forests. Numerous pockets of light to medium infestation were recorded as well (see Appendix, Fig. A1).

The most notable increases occurred in the northwestern and southeastern parts of the Sioux Lookout District and from Highway 17 near the Town of Kenora to the English River watershed west of Ear Falls in the Kenora District. Defoliation was as much as 80% at some points. Small pockets of new medium to heavy infestation were recorded at three points in the Fort Frances District.

Heavy moth flights of the insect were observed in many parts of the Region but particularly in the City of Thunder Bay indicating a recurrence of infestations in 1972.

Spruce Budworm, *Choristoneura fumiferana* (Clem.)

A considerable proportion of the field season was devoted to different types of surveys and sampling related to the determination of the spruce budworm situation in Ontario as a whole. In view of the magnitude and importance of the current outbreak in this province and to avoid a piecemeal presentation, our results will be presented in a single report, as in 1970, along with those of other Survey Regions (see appended Information Report O-X-163 by G. M. Howse *et al.*).

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

After decreasing for 4 consecutive years, jack-pine budworm populations increased markedly in 1971. New infestations were found near the District boundary in the southern parts of the Sioux Lookout and Kenora districts and at one point in the Fort Frances District, (see Appendix, Fig. A2). Approximately 75 square miles of nearly mature jack pine [*Pinus banksiana* Lamb.], extending from Islets and Pekagoning lakes in the Sioux Lookout District to the Turtle River basin in the Kenora District were heavily infested and two small heavy infestations were observed between the western boundary of that infestation and Kinnyu Lake. Small pockets of light to medium infestation were recorded in the surrounding areas. Light defoliation was observed on nearly mature shoreline jack pine at Kairaskons Lake in the Fort Frances District.

An egg survey carried out on the perimeter of the heavily infested areas indicated relatively low populations (Table 1), and very little spread is anticipated in 1972.

Table 1. Summary of counts of jack-pine budworm egg clusters made on the perimeter of infested areas, and infestation forecasts for 1972 in the Western Survey Region. (Counts were based on examination of one 2-foot branch tip from six trees at each location)

Location	Avg DBH of sample trees (in.)	Avg no. of egg clusters/branch tip	Forecast for 1972
Sioux Lookout Dist			
Pekagoning L	8	0.0	Nil
Rutter L	8	0.0	Nil
Islets L	7	0.1	Light
Kenora Dist			
Bernadine L	7	0.8	Moderate
Jones L	10	0.0	Nil
Entwine L	8	0.1	Light
Eltrut L	8	0.1	Light

Larch Casebearer, *Coleophora laricella* (Hbn.)

Although this insect is presently not a serious forest pest in Ontario, surveys are conducted annually to determine its spread westward and northward in northern Ontario. Since 1961 when the insect was first discovered in the Fort Frances District, little change has occurred. In 1971, a new distribution record was established when the insect was collected for the first time in the Kenora District near Sioux Narrows. This represents a northward extension of approximately 60 miles. In the Thunder Bay District, the insect was observed commonly at many points in the southeast section of the District and a collection was made for the first time in the Pigeon River area.

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

This sawfly was collected for the first time in northwestern Ontario when it was found in the Fort Frances District in 1970, within an area of approximately 20,000 acres east of the Town of Fort Frances. In 1971, the pest was found infesting pine over more than 100,000 acres from Fort Frances in the west, east along Highway 11 for 30 miles, north to MacDonald Inlet on Rainly Lake and south to the International Border.

White pine [*P. strobus* L.] was the principal host; however, colonies of larvae were also observed on red [*P. resinosa* Ait.] and jack pine at many points, particularly in the vicinity of Bear Pass and MacDonald Inlet.

Birch Leaf Miner, *Fenusa pusilla* Lep.

No appreciable change in population levels of this leaf miner on birch was noted over 1970 (Table 2). In the Fort Frances District, new distribution records were established for this introduced pest when collections were made at numerous points in the eastern half of the District. In the Thunder Bay District, heavy infestations were recorded for the third consecutive year at Black Sturgeon Lake and at Gull Bay on Lake Nipigon. A pocket of new heavy infestation occurred at mileage 36, on Highway 800.

Table 2. Summary of birch leaf miner counts in the Western Survey Region from 1969 to 1971. (Counts were based on examination of 100 leaves taken at random from three trees at each location)

Location	Avg DBH of sample trees (in.)	% of leaves mined		
		1969	1970	1971
Thunder Bay District				
Black Sturgeon L	2	23	63	53
Gull Bay, L Nipigon	3	67	65	60
Northern Light L	3	--	--	9
Marks Lake Rd	3	--	--	21
Mileage 36, Hwy 800	2	--	--	64
Scoble Twp	2	35	29	31

Aspen Blotch Miner, *Lithocolletis ontario* Free.

An increase in population levels of this leaf miner on trembling aspen [*Populus tremuloides* Michx.] occurred at many points. Most notable infestations were observed on fringe trees, just west of the English River in the Sioux Lookout District, where over 90% of the leaves were mined. Many trees in Quetico Park, particularly near Nym and French lakes in the Fort Frances District, near Northern Light Lake, Lac des Mille Lacs and Shebandowan in the Thunder Bay District also had increased infestations. Light to moderate damage was observed at many points in the Region to as far north as Attawapiskat Lake in the Sioux Lookout District.

Forest Tent Caterpillar, *Malacosoma disstria* Hbn.

The distribution of this aspen defoliator has increased each year for the past three and in 1971 the forest tent caterpillar infested stands through approximately 900 square miles (see Appendix, Fig. A3).

The most notable increase was recorded in the Kenora District where new infestations were observed 15 miles east of Nestor Falls, and in the Eagle River basin, 15 miles west of Dryden. Severe defoliation occurred in the former area (Fig. 1). In the Fort Frances District, an infestation that has persisted for several years west of Rainy Lake spread eastward as far as Redgut Bay.



Figure 1. Aspen stand heavily defoliated by the forest tent caterpillar, *Malacosoma disstria* Hbn.

Dissections of cocoons following emergence of moths indicated an increased rate of parasitism by *Sarcophage aldrichi* Park, and thus a reduced rate of successful moth emergence compared with 1970 (Table 3). Despite these trends, forecasts based on egg counts again call for high populations in 1972, over a somewhat larger area (Table 4).

Table 3. Summary of forest tent caterpillar cocoon dissections in the Western Survey Region in 1970 and 1971. (Counts were based on the examination of 100 cocoons at each location)

Location	%		%		%	
	<u>parasitized</u>		<u>diseased</u>		<u>adult emergence</u>	
	1970	1971	1970	1971	1970	1971
Fort Frances District						
Rainy Lake N/W	69	76	6	9	25	15
Crozier Twp	51	78	5	11	44	11
Lash Twp	52	69	15	14	33	17
Aylesworth Twp	68	83	11	9	21	8
Dance Twp	69	73	9	14	22	13
Dobie Twp	62	66	7	7	31	27
Miscampbell Twp	53	81	9	9	38	10

Table 4. Summary of forest tent caterpillar egg band counts and infestation forecasts for 1972 in the Western Survey Region. (Counts were based on the examination of one to three trees at each location)

Location	Avg DBH of sample trees (in.)	No. of trees examined	Avg no. of egg bands/tree	Infestation forecast for 1972
Fort Frances District				
Pipestone L	6	1	27	Heavy
Redgut Bay, Rainy L	6	3	5	Medium
Claxton Twp	4	3	6	Medium
Dance Twp	5	1	14	Heavy
Lash Twp	5	3	8	Heavy
Mather Twp	4	1	17	Heavy
Kingsford Twp	4	1	9	Heavy
Burris Twp	3	1	8	Heavy

White Pine Weevil, *Pissodes strobi* Peck

Although the incidence of weeviling fluctuated somewhat compared with 1970, moderate to severe damage was recorded at 11 of 14 points sampled. The most serious damage occurred in a white spruce [*Picea glauca* (Moench) Voss] plantation in Conmee Township, Thunder Bay District, where 56% of the trees were weeviled. In the other three districts, damage ranged from 2 to 18% (Table 5).

Table 5. Summary of damage by the white pine weevil in the Western Survey Region from 1969 to 1971. (Counts were based on examination of 100 trees at each location)

Location	Host	Avg DBH of sample trees (in.)	% of trees weeviled		
			1969	1970	1971
Sioux Lookout District					
Heyson Twp	jP	1	0	18	8
Basket Lake Rd	jP	1	-	17	7
Camp 319, G.L.P.Co.	jP	1	-	6	7
Centrefire L	jP	1	-	8	7
Kenora District					
Webb Twp	jP	1	-	-	2
Fort Frances District					
Williamson L	jP	3	-	-	16
Thunder Bay District					
Marks Twp	nS	3	16	17	18
Paipoonge Twp	jP	1	6	5	11
Conmee Twp	scP	5	-	-	15
Conmee Twp	wS	3	-	-	56
Marks Lake Rd	rP	1	-	9	1
Marks Lake Rd	jP	2	-	-	15
Kopka L	jP	2	-	2	2
English R	jP	2	3	4	9

Larch Sawfly, *Pristiphora erichsonii* (Htg.)

In the Sioux Lookout District, medium to heavy infestations persisted from Highway 17 southward, whereas north of the Highway populations decreased markedly. Infestations increased in size and intensity in the Kenora District, particularly along the Jones

Road, highways 17 and 71, and on scattered trees near Ingolf. In the Fort Frances District, a large stand of larch was denuded of foliage near Joyce Lake in Quetico Provincial Park. Pockets of heavy infestation were observed at many locations along highways 11, 621 and 600 in the western part of the District. Infestations persisted in the Thunder Bay District and caused severe defoliation in stands along Highway 17, from the Village of Raith westward to the English River. Medium infestations were observed for the second consecutive year near the City of Thunder Bay and at scattered points along the Armstrong Road.

Mountain Ash Sawfly, *Pristiphora geniculata* Htg.

This insect was first recorded in the Region in 1970, when it was found causing appreciable defoliation to mountain ash in and near the City of Thunder Bay. In 1971, populations increased and spread south, as far as Pigeon River and north along 10 miles of the Spruce River Road. Occasional colonies were observed as far west as Rosslyn and east along Highway 11 to Nipigon. The insect has not been found elsewhere in the Region although mountain-ashes on fringes and along many miles of roadsides were surveyed in 1971.

Table 6. Other noteworthy insects

Insect	Host(s)	Remarks
<i>Acleris variana</i> Fern.	bF, wS	Small numbers at scattered locations in the Region.
<i>Adelges abietis</i> Linn.	wS	Needle galls heavy at one point in the Thunder Bay District.
<i>Adelges lariciatus</i> Patch	bS	Light to moderate needle gall damage at two locations in the Sioux Lookout District.
<i>Alsophila pomataria</i> Harr.	Ba	Heavy infestations on shade trees in the Town of Fort Frances.
<i>Archips cerasivoranus</i> Fitch	cCh	Scattered colonies on roadside cherry at many points throughout the Region.
<i>Cenopsis pettitana</i> Rob.	Ba	Heavy infestations of leaf rolling insects common on this host near Rainy River, Fort Frances District.

(continued)

Table 6. Other noteworthy insects (continued)

Insect	Host(s)	Remarks
<i>Coleophora betulivora</i> McD.	wB	Small numbers in Fort Frances and Thunder Bay districts.
<i>Conophthorous banksianae</i> McPherson	jP	Populations of this tip beetle common in jack pine regeneration in the Sioux Lookout District.
<i>Epinotia solandriana</i> Linn	wB	Light infestations on small trees near Sioux Narrows in the Kenora District.
<i>Gonioctena americana</i> Schaef	tA	Scattered colonies at three locations in the Thunder Bay District.
<i>Hyllobius warreni</i> Wood	scP	Moderate infestations of this root collar weevil in the Rotary tree farm and Boy Scout plantation near Kakabeka Falls in the Thunder Bay District.
<i>Hylurgopinus rufipes</i> Eich	wE	Distribution of the native elm bark beetle in the Fort Frances and Thunder Bay districts is unchanged.
<i>Hyphantria cunea</i> Dru.	W, A1	Although numerous colonies were observed at widely separated locations, only light infestations were observed in the Region.
<i>Malacosoma californicum pluviale</i> (Dyar.)	wB, W	Occasional colonies at scattered locations throughout the Region.
<i>Nematus fulvicrus</i> Prov.	W	Heavy infestations observed on roadside willow near Longbow Corners in the Kenora District.
<i>Neodiprion abietis</i> complex	wS, bF	Occasional colonies observed in the Kenora, Fort Frances and Thunder Bay districts.

(continued)

Table 6. Other noteworthy insects (continued)

Insect	Host(s)	Remarks
<i>Neodiprion compar</i> Leach	jP	Small numbers of colonies three locations in the Sioux Lookout District.
<i>Neodiprion nanulus nanulus</i> Schedl.	jP	Light infestations of this sawfly observed at each of two locations in the Kenora and Fort Frances districts.
<i>Neodiprion virginianus</i> complex	jP	Numerous colonies of this sawfly observed in the Region, with most notable infestations near Sioux Narrows in the Kenora District, along Highway 11 near French Lake in the Fort Frances District and in Sibley Township in the Thunder Bay District.
<i>Nymphalis antiopa</i> L.	Ornamentals W	Ornamentals severely defoliated in Atikokan and Fort Frances, occasional colonies on roadside willow near Sioux Lookout.
<i>Paleacrita vernata</i> Peck	Manitoba maple	Ornamentals heavily infested in the Town of Dryden in the Kenora District.
<i>Pikonema alaskensis</i> Roh.	WS	New growth moderately infested by this sawfly at many points in the Region.
<i>Pikonema dimockii</i> Cress.	WS	Common at many points particularly in beating samples throughout the Region.

(continued)

Table 6. Other noteworthy insects (concluded)

Insect	Host(s)	Remarks
<i>Pleroneura borealis</i> Felt	bF	Moderate infestations on understory trees near Loon and Lilac lakes in the Fort Frances District.
<i>Vasates quadripes</i> Shim.	siM, rM	Heavy infestations at many points in the Region.

TREE DISEASES

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

This root rot continued to be a major problem in pine stands in the Region. Scattered mortality of young jack and red pine trees was common. Seven of 11 evaluations carried out at widely separated locations showed that moderate infection levels were present. These were located along the Red Lake Road, near Centrefire and Basket lakes, and in Webb Township in the Sioux Lookout District; near Boffin and Lindsay lakes in the Fort Frances District; and at one point in Goldie Township in the Thunder Bay District. Mortality ranged upward to 10% at these locations (Table 7). Elsewhere, light infection levels were noted at one location in the Kenora District, near Williamson Lake in the Fort Frances District and in Goldie Township and along the Boreal Road in the Thunder Bay District.

Table 7. Summary of incidence and level of infection of *Armillaria* root rot of jack and red pine and current mortality of host trees in the Western Survey Region in 1971. (Counts were based on examination of 40 trees, 4 from each of 10 plots at each location)

Location	Tree species	Tree ht	% incidence	% current mortality	Level of infection
Sioux Lookout Dist					
Red Lake Rd	jP	4	7.5	7.5	Moderate
Centrefire L	jP	4	5.0	5.0	Moderate
Basket Lake Rd	jP	3	7.5	7.5	Moderate
Webb Twp	jP	3	10.0	10.0	Moderate
Kenora Dist					
Hwy 105-15 miles N of Vermilion Bay	jP	1.5	2.5	2.5	Low
Fort Frances Dist					
Williamson L	jP	15	2.5	0.0	Low
Lindsay L	rP	4	7.5	7.5	Moderate
Boffin L	rP	10	5.0	5.0	Low
Thunder Bay Dist					
Mileage 12-Boreal Rd	jP	5	2.5	0.0	Low
Goldie Twp	rP	4	2.5	0.0	Low
Goldie Twp	jP	10	5.0	0.0	Moderate

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

Generally infection levels of these needle rusts declined throughout the Region. In addition to the two infection centres mentioned in Table 8, moderate infections were noted near Sioux Narrows in the Kenora District, and along the Blackhawk-Off Lake Road in the Fort Frances District. Elsewhere, trace levels of infection were commonly observed.

Table 8. Summary of incidence and level of infection of needle rusts on black spruce in the Western Survey Region in 1971.
(Counts were based on examination of 40 trees, 4 from each of 10 plots at each location)

Location	Basal area/ acre	Acres affected	% incidence	Level of infection
Kenora District				
Aerobus Lake Rd	52	100	90	Low
Thunder Bay District				
2 miles S Waweig L	87	1000	100	Low

A Needle Rust of Jack Pine, *Coleosporium asterum* (Diet.) Syd.

Although several isolated heavy infections of this needle rust were observed (Table 9), the levels of incidence were generally trace to light in the majority of the Region. Heavy infection levels were noted north of Vermilion Bay in the Kenora District, and at Lindsay Lake and Turtle Tank Siding in the Fort Frances District.

Table 9. Summary of incidence and level of infection of a needle rust on jack pine in the Western Survey Region in 1971. (Counts were based on examination of 40 trees, 4 from each of 10 plots at each location)

Location	Tree ht	Acres affected	% incidence	Level of infection
Sioux Lookout District				
Webb Twp	3.0	2000	12.5	Trace
Kenora District				
15 miles N of Vermilion Bay on Hwy 105	1.5	1000	60.0	High
Fort Frances District				
Lindsay L	2.0	150	65.0	High
Turtle Tank Siding	1.0	100	57.5	High
Thunder Bay District				
Mi 12 Boreal Rd	5.5	50	52.5	Low

Sweetfern Blister Rust, *Cronartium comptoniae* Arth.

Surveys to locate previously unrecorded or unevaluated infections of this stem canker were continued and five new infections were recorded, (Table 10). Infections on the stems of young trees often result in mortality (Fig. 2). Surveys were also carried out to determine further the range of sweetfern [*Comptonia peregrina* (L.) Coult.], an alternate host of the fungus. It occurs throughout the southern portion of the Fort Frances District as far east as MacKenzie Lake in Quetico Provincial Park, but it is thought to be nonexistent in the remainder of the Region.

Table 10. Summary of incidence and level of infection of sweetfern blister rust on jack pine in the Western Survey Region in 1971. (Counts were based on examination of 40 trees, 4 from each of 10 plots at each location)

Location	Tree ht (ft)	Basal area	% incidence	Level of infection
Kenora District				
Dryden Tree Nursery	15	66	10	Moderate
Fort Frances District				
East of Fort Frances, mileage 43, Hwy 11	70	57	17	Moderate
Turtle Tank Siding Rd	45	48	5	Moderate
Tanner L	50	51	5	Moderate
Glenorchy Rd	60	61	12	Moderate
Thunder Bay District				
West District Boun- dary on Hwy 11	45	44	5	Moderate



Figure 2. Fruiting bodies of *Cronartium comptoniae* Arth. on the branches and stem of jack pine.

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

Surveys which were conducted again this year to locate, evaluate and record infections of this disease resulted in 11 new infection centers being found. Infection levels ranged from trace to high (Table 11).

Table 11. Summary of incidence and level of infection of gall rust of hard pines on jack pine regeneration in the Western Survey Region in 1971. (Counts were based on examination of 40 trees, 4 from each of 10 plots at each location)

Location	Tree ht (ft)	% incidence	% mortality	Level of infection
Sioux Lookout District				
Heyson Twp	8.0	30.0	2.5	Moderate
Webb Twp	3.0	35.0	2.5	Moderate
Pickle Lake Rd	6.0	27.5	0.0	Low
Basket Lake Rd	4.0	5.0	0.0	Trace
Kenora District				
North of Vermilion Bay on Hwy 105	1.5	20.0	0.0	Moderate
Fort Frances District				
Williamson L	15.0	82.5	0.0	High
Turtle Tank Rd	3.0	17.5	10.5	Moderate
Lindsay L	5.0	17.5	2.5	Moderate
Glenorchy Rd	12.0	10.0	2.5	Light
Thunder Bay District				
Mileage 15.5-Graham Rd	4.0	67.5	37.5	High
Mileage 12-Boreal Rd	5.0	5.0	2.5	Low

Stalactiform Canker of Pine, *Peridermium stalactiforme* Arth. & Kern

Two significant centers of infection of this disease were found. One of these was located in Lomond Township in the Sioux Lookout District, where 10% of the trees examined had stem cankers; however, the most notable and largest was centered in 1,000 acres of predominantly jack pine forest at Ouimet Canyon in Thunder Bay District, where 22.5% of the trees were cankered (Table 12). Cankers were common on jack pine over approximately 10 square miles in the surrounding area.

Table 12. Summary of incidence and level of infection of stalactiform cankers on jack pine in the Western Survey Region in 1971. (Counts were based on examination of 40 trees, 4 from each of 10 plots at each location)

Location	Basal area/acre	Acres affected	% incidence	% current mortality	Level of damage
Sioux Lookout Dist					
Lomond Twp	99	100+	10.0	0	Moderate
Thunder Bay Dist					
Dorion Twp (Ouimet Canyon)	107	1000+	22.5	0	Moderate

Scleroderris Canker of Pine, *Scleroderris lagerbergii* Gremmen

This canker was found over a broader area in the Sioux Lookout, Kenora and Thunder Bay districts, but the fungus has yet to be collected in the Fort Frances District.

In the Sioux Lookout District, infected trees were found in jack pine regeneration 6 feet in height, approximately 5 miles northwest of the Pipestone River and 100 miles northwest of Pickle Lake, and in jack pine regeneration averaging 1 foot in height in a burned over area 5 miles southeast of the Pinemuta River, approximately 85 miles northwest of Pickle Lake (Table 13). In the latter, examination of several infected areas showed very small patches of previous mortality within larger areas of current mortality. Considerable new mortality was observed approximately 50 miles northwest of Pickle Lake, near Lysander Lake, where the disease was found in 1970. A small infection center was recorded in a red pine plantation averaging

6 feet in height near Gulliver River, adjacent to a 200-acre jack pine plantation where a heavy infection had been reported in 1970.

In the Kenora District, additional infection centers were recorded in red pine plantings near Camp Robinson, and at the Dryden Tree Nursery. The infection, recorded at the Nursery in 1970, remained at a trace level.

Several new centers of infection were found in the Thunder Bay District. The most significant was observed near Graham where at least 600 acres of jack pine regeneration were heavily infected along the Graham Road between mileage 13.5 and 16. It also occurred along all runways of the Graham airport.

New light infections occurred in a large stand of 5-foot jack pine at mileage 4 of the Graham Road, and on roadside regeneration in the English River area. A light infection was also noted on the Beaverkit Lake Road in Jacques Township, where three 1-foot trees in a clump of 25 closely spaced regeneration trees had stem cankers. Careful inspection of the existing infection at the Thunder Bay nursery showed fruiting to be extremely light in 1971.

Table 13. Summary of incidence and level of infection of Scleroderris canker of pine on jack pine in the Western Survey Region in 1971. (Counts were based on examination of 40 trees, 4 from each of 10 plots at each location)

Location	Tree ht (ft)	Acres affected	% incidence	% current mortality	Level of infection
Sioux Lookout Dist					
Pipestone R	6	1000+	5.0	0.0	Low
Thunder Bay Dist					
Mileage 14.5, Graham Rd	5	1000	37.5	15.0	High
Mileage 4, Graham Rd	4	640	2.5	0.0	Low
English R	4	100	2.5	0.0	Low

Current Mortality and Deterioration of Jack Pine

Aerial surveys through the summer of 1971 revealed five pockets of recently dead or severely deteriorated jack pine, ranging from 1 to 2 acres, in mature or nearly mature stands in the Sioux Lookout District. The damage areas were observed southeast of Nungesser Lake, south of Pert and Kilbarry lakes, on the north side of Highway 17 near Martin Siding, and 3 miles northeast of Sioux Lookout. Extensive surveys were carried out in the areas near Sioux Lookout and Martin Siding in late summer to determine the causal agent. Foliage, stems and root systems were examined. Rotted roots found at each location were submitted to the Great Lakes Forest Research Centre (GLFRC) in Sault Ste. Marie for examination. *Armillaria mellea* (Vahl ex Fr.) Kummer was isolated from a sample submitted from the infected area near Martin Siding. Cultures made from samples submitted from the Sioux Lookout area proved uninformative. Further work is contemplated in 1972.

Nursery Problem

For the second consecutive year, 2-1 black spruce nursery stock was damaged in the Ontario Department of Lands and Forests tree nursery near Dryden. Approximately 1,000,000 seedlings were affected.

Symptoms were similar to those reported in 1970, i.e., severe browning of the foliage and needle drop by the end of May or early June. The cambium and root systems of affected trees appeared healthy. Considerable attention was given to examination of affected seedlings in the GLFRC in Sault Ste. Marie. Culturing revealed the presence of, *Phoma glomerata* (Cda.) Wr. & Hockl., *Fusarium* sp., *Aureobasidium* sp., and *Alternaria* sp. All organisms determined were considered to be secondary, although perhaps contributing to the problem. Field and laboratory work on this problem will be increased in 1972.

Drought

Aerial reconnaissance revealed that the foliage of pines was red at many points from Bear Pass northwesterly to Nestor Falls in the Fort Frances District (see Appendix, Fig. A4). More extensive surveys including detailed examination of damaged stands revealed that the condition was largely confined to dry or shallow soil sites. Tree mortality was high near Loonhaunt, South Caliper and Pipestone lakes, and somewhat less near Bear Pass, Rainy Lake, Kaiarskons and Clarkson lakes (Table 14). Scattered damage was also observed in varying degrees near Redgut Bay and at scattered points near Nestor Falls.

Table 14. Summary of incidence and level of damage to pine stands caused by drought in the Western Survey Region in 1971. (Counts were based on examination of 40 trees, 4 from each of 10 plots at each location)

Location	Tree species	Basal area/acre	% incidence	% mortality	Level of damage
Fort Frances Dist					
South Caliper L	rP,jP,wP	62	27.0	17.0	High
Pipestone L	rP,jP,wP	78	25.0	2.0	High
Loonhaunt L	jP	107	32.0	32.0	High
Bear Pass	rP,wP	47	7.5	5.0	Moderate
Kaiarskons L	jP	92	7.5	5.0	Moderate
Clarkson L	rP,jP,wP	89	5.0	5.0	Low

Elm Deterioration

Since 1969 extensive surveys have been carried out each year in search of Dutch elm disease, *Ceratocystis ulmi* (Buism.) C. Moreau. Trees showing typical symptoms were sampled, but failed to reveal the presence of the organism. Should Dutch elm disease reach Fort Frances District from Minnesota, where reports indicate the closest infection centers are located, it is liable to spread rapidly, especially in the Fort Frances District, where populations of a known vector, the native elm bark beetle [*Hylurgopinus rufipes* Eich.], are high near Fort Frances and Rainy River.

Hail Damage

Hail storms in the late fall or winter 1970-71 and in midsummer of 1971 caused damage to forest stands at two locations in the Sioux Lookout District. Nearly mature jack pine through approximately 1 square mile of mixed stands on the west side of Williams Lake was heavily damaged by the fall or winter storm. Surveys carried out in July 1971, revealed that tree mortality was light and branch mortality severe. Overstory white birch [*Betula papyrifera* Marsh.], through approximately 50 square miles of forest in the Birch and Springpole lakes area, was moderately damaged by the mid-summer storm. Foliage damage was evident throughout the crowns; however the heaviest defoliation occurred to that part having a westerly exposure.

Mortality in Red Pine Stock

A condition that had all the symptoms associated with drought occurred in newly planted red pine stock at four locations in the Fort Frances District. Near Wasaw and Boffin lakes, 81 and 93% of the trees examined had died. Surveys carried out in the affected area showed that the trees had started to flush before planting; this, coupled with the lowering of water tables owing to the prolonged hot spell in the summer of 1970, was probably the reason for the mortality of several thousand trees in these two areas. In the Glenorchy and Ferguson Lake areas, less severe mortality was observed, ranging from a low of 7% to a high of 15%.

Although observations carried out in the Boffin and Wasaw lakes area pointed to drought as the primary cause of mortality, several disease organisms were isolated from specimens that showed characteristic symptoms usually associated with a pathological problem, namely, cankering, stain, dieback and wilting of needles etc. The following fungi were cultured: *Valsa pini* (Alb. & Schw.) Fr., *Trichoderma viride* Pers. ex Fr., *Phoma* sp., *Candida* and *Fusarium* spp.

Rodent Damage to Conifers

During the past winter, rodent feeding caused considerable damage to many small natural and planted conifers in the Region (Table 15). The heaviest damage generally occurred in open stands. In addition to the areas mentioned in the following table, damage ranging from trace to light, along with light current mortality, was common throughout the Region.

Table 15. Summary of damage to conifers caused by rodents in the Western Survey Region in 1971. (Counts were based on examination of 40 trees, 4 from each of 10 plots at each location)

Location	Tree species	Tree ht	% incidence	% mortality	Level of damage
Kenora District					
15 miles N of Vermilion Bay on Hwy 105	jP	1.5	50	50	High
Thunder Bay District					
Stedman Twp	jP	3	22.5	17.5	Moderate
O'Connor Twp	rP,jP	6	97.5	55.0	High

Root and Butt Rots of Conifers

In 1971, a concerted effort was made to determine through specific survey procedures the reasons for scattered instances of dead and dying balsam fir and black and white spruce trees within the Region. Eighteen plots were chosen at widely separated locations, mainly because of stand openings or the generally poor condition of the trees (see Appendix, Fig. A5). A careful examination of root systems of suspect trees was carried out by using a standard sampling technique for root and butt rots. This entailed examining part of the root systems from one to five trees at each point. Samples of wood rot or stain were submitted to the GLFRC in Sault Ste. Marie for analysis. Four principal root rots were isolated from cultures (Table 16), namely, *Armillaria mellea* (Vahl ex Fr.) Kummer, *Polyporus tomentosus* Fr., *P. schweinitzii* Fr., and *Coniophora puteana* (Schum. ex Fr.) Karst.

Table 16. Summary of locations where four major root and butt rots were collected in 1971

Location	Tree species	Disease organism
Sioux Lookout District		
Hartman L	bF	<i>Armillaria mellea</i>
Sturgeon L	bS	<i>A. mellea</i>
Sandybeach L	bS	<i>Polyporus tomentosus</i>
Kenora District		
Docker Twp	bS	<i>A. mellea</i>
Willard L	bS	<i>A. mellea</i>
Fort Frances District		
Nickle Lake Rd	bS	<i>P. tomentosus</i>
Reef Point Rd	bF	<i>Coniophora puteana</i>
French L		<i>A. mellea</i>
Thunder Bay District		
MacTavish Twp	bF	<i>P. tomentosus</i>
Trewartha Twp	bS	<i>P. tomentosus</i> <i>P. schweinitzii</i>

Summer Drought Condition

A drought condition caused by dry weather through the month of July and the first half of August caused premature foliage discoloration in many deciduous stands through the southern two-thirds of the Region. The most notable damage occurred in white birch stands on high dry sites. Generally, foliage was severely browned and trees of small diameter were almost denuded of foliage by mid-September. It was impossible to map damaged stands from the air because of damage attributed to a heavy infestation of the birch leaf skeletonizer, which occurred in the same general area during August and September. Some mortality of small diameter trees is expected.

Table 17. Other noteworthy diseases

Organism	Host(s)	Remarks
<i>Arceuthobium americanum</i> Nutt. ex Engelm.	jP	Light mortality in infected area, South Inlet Bay, Lac Seul, Kenora District.
<i>Arceuthobium pusillum</i> Pk.	jP	Light infection of dwarf mistletoe, Gordon L., Kenora District. Rare record on jP.
<i>Cenangium abietis</i> (Pers.) Rehm.	jP	Cankers common in hail damaged jP, Kenora District.
<i>Ciborinia whetzeli</i> (Seaver) Seaver	tA	Light infection levels of ink spot throughout Region, incidence generally lower than 1970.
<i>Dermea balsamea</i> (Pk.) Seaver	bF	Cankering on stems near Lake Despair, Fort Frances District.
<i>Gymnosporangium cornutum</i> Arth. ex Kern	Mo	Leaf rust heavy near Aerobus L., Kenora District and Windigoostigwan L., Fort Frances District, light elsewhere in Region.
<i>Lophodermium pinastri</i> (Schrad. ex Hook.) Chev.	jP	Trace infection level near French L., Fort Frances District.
<i>Pollaccia elegans</i> Serv.	bPo	Leaf and tip blight common at trace to light levels of infection throughout Region.
<i>Pucciniastrum epilobii</i> Otth	bF	Trace to light infection levels of needle rust common throughout Region.
<i>Scolecconectria cucurbitula</i> (Tode ex Fr.) Booth	jP, rP	Common throughout Region especially in association with <i>Scleroderris lagerbergii</i> .

APPENDIX

WESTERN SURVEY REGION

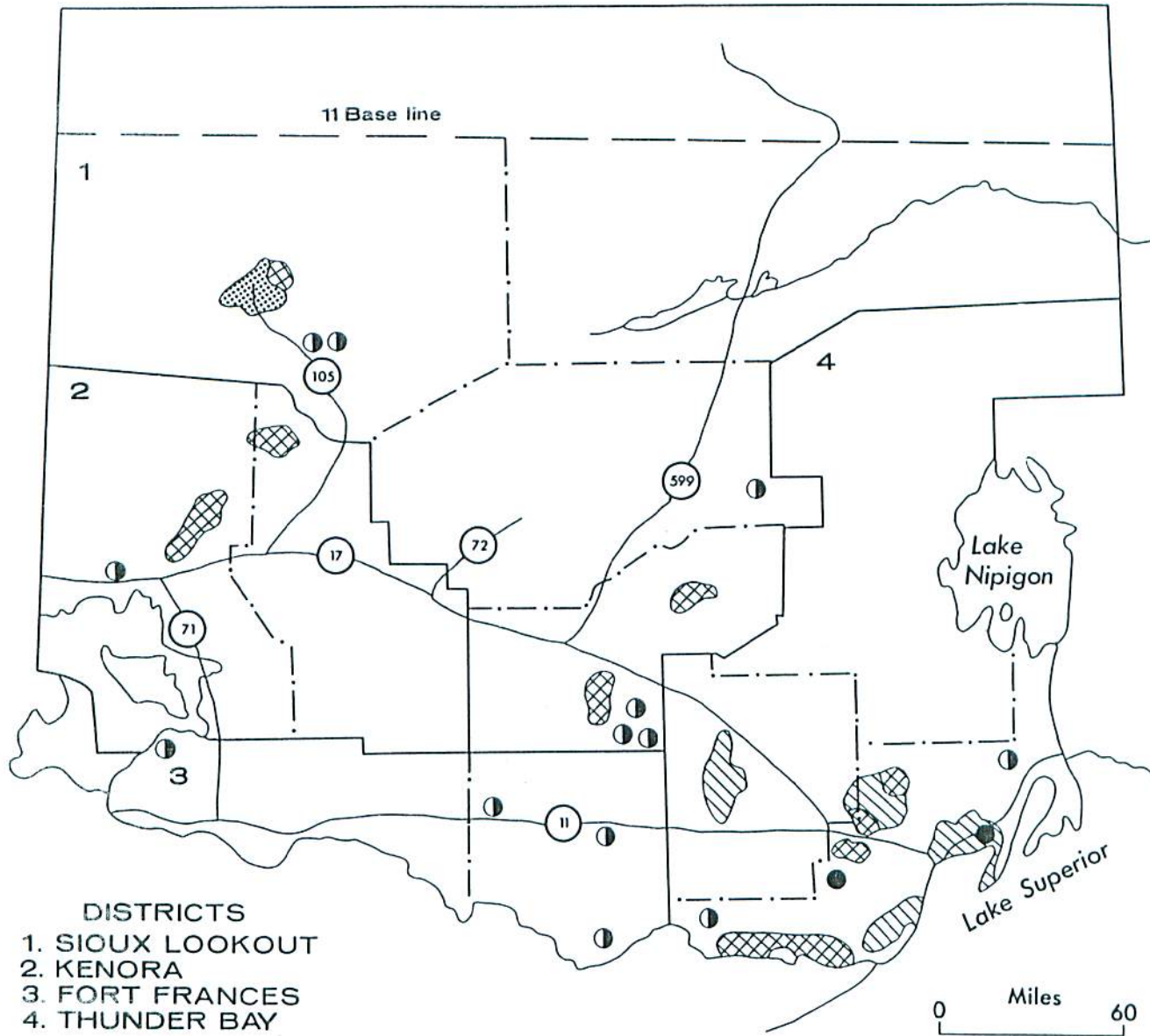


Fig.A1. Large Aspen Tortrix
 Areas within which defoliation occurred in 1971

Severe defoliation	● or ▨
Moderate defoliation	◐ or ▧
Light defoliation	◑ or ▩

WESTERN SURVEY REGION

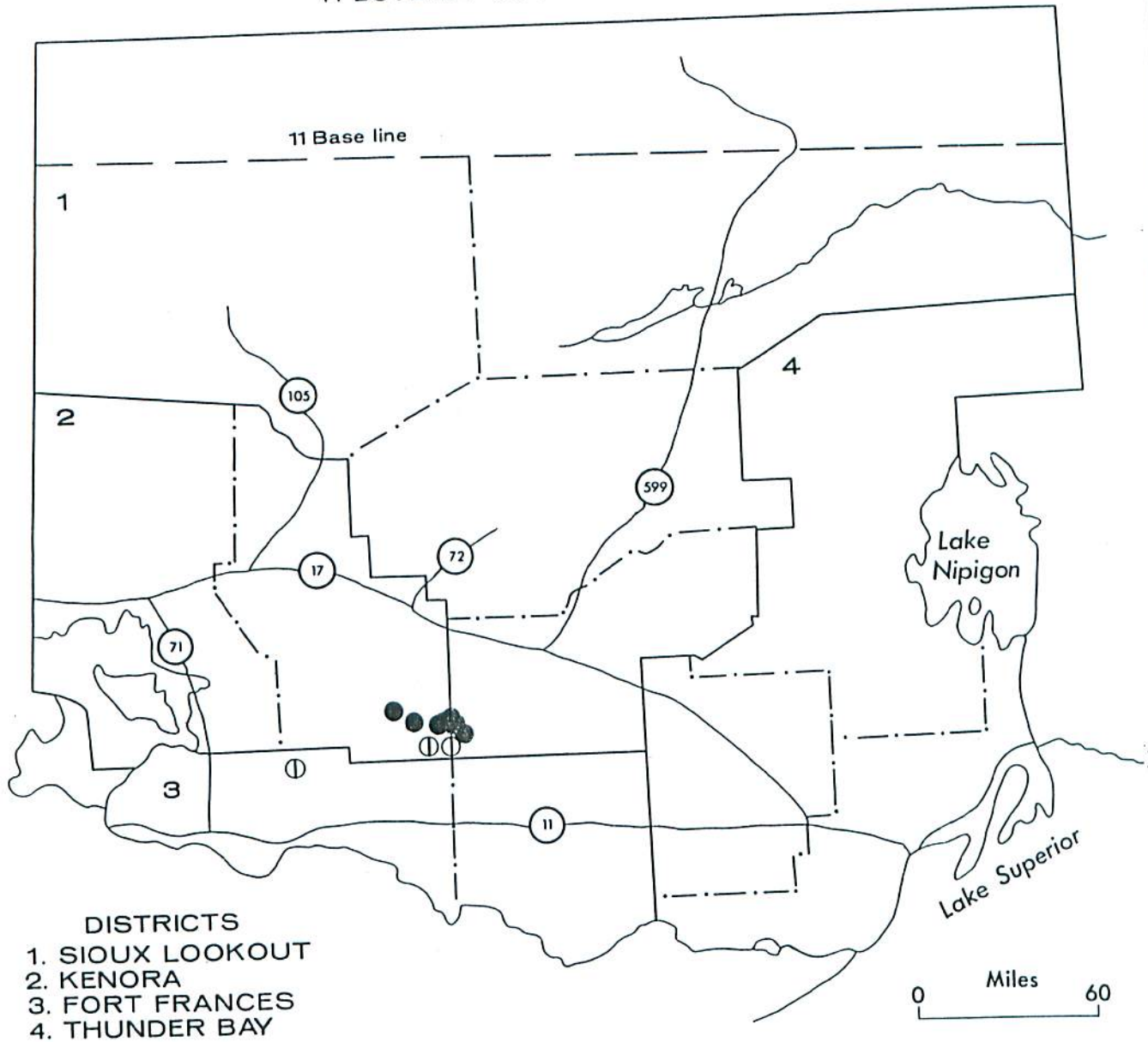


Fig.A2. Jack Pine Budworm
 Areas within which defoliation occurred in 1971

Moderate to severe defoliation.....●
 Light defoliation.....⓪

WESTERN SURVEY REGION

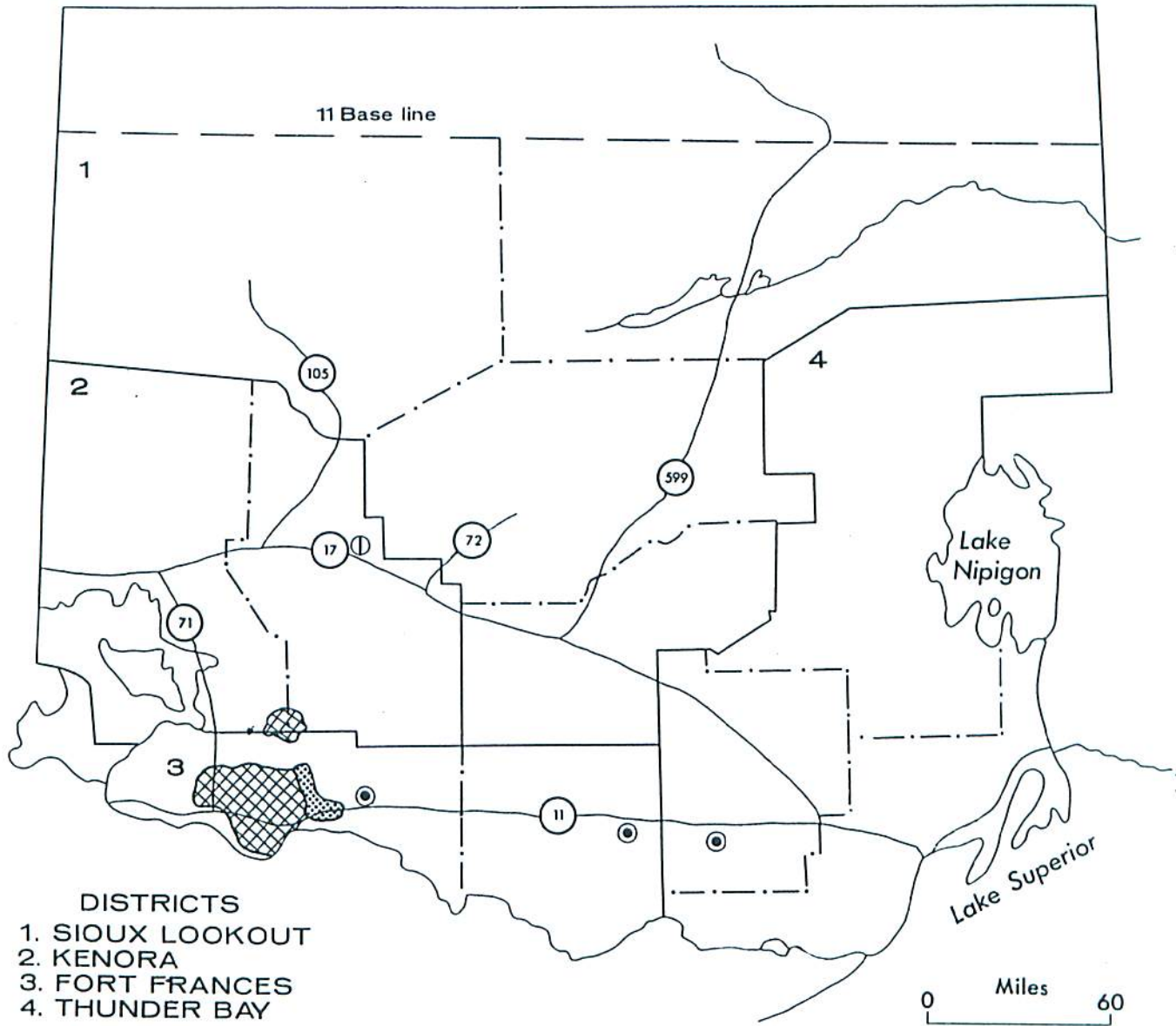


Fig.A3 Forest Tent Caterpillar

Areas within which defoliation of Aspen occurred and points where the insect was collected in 1971

- Moderate to severe defoliation.....
- Light defoliation..... or
- Collection points

WESTERN SURVEY REGION

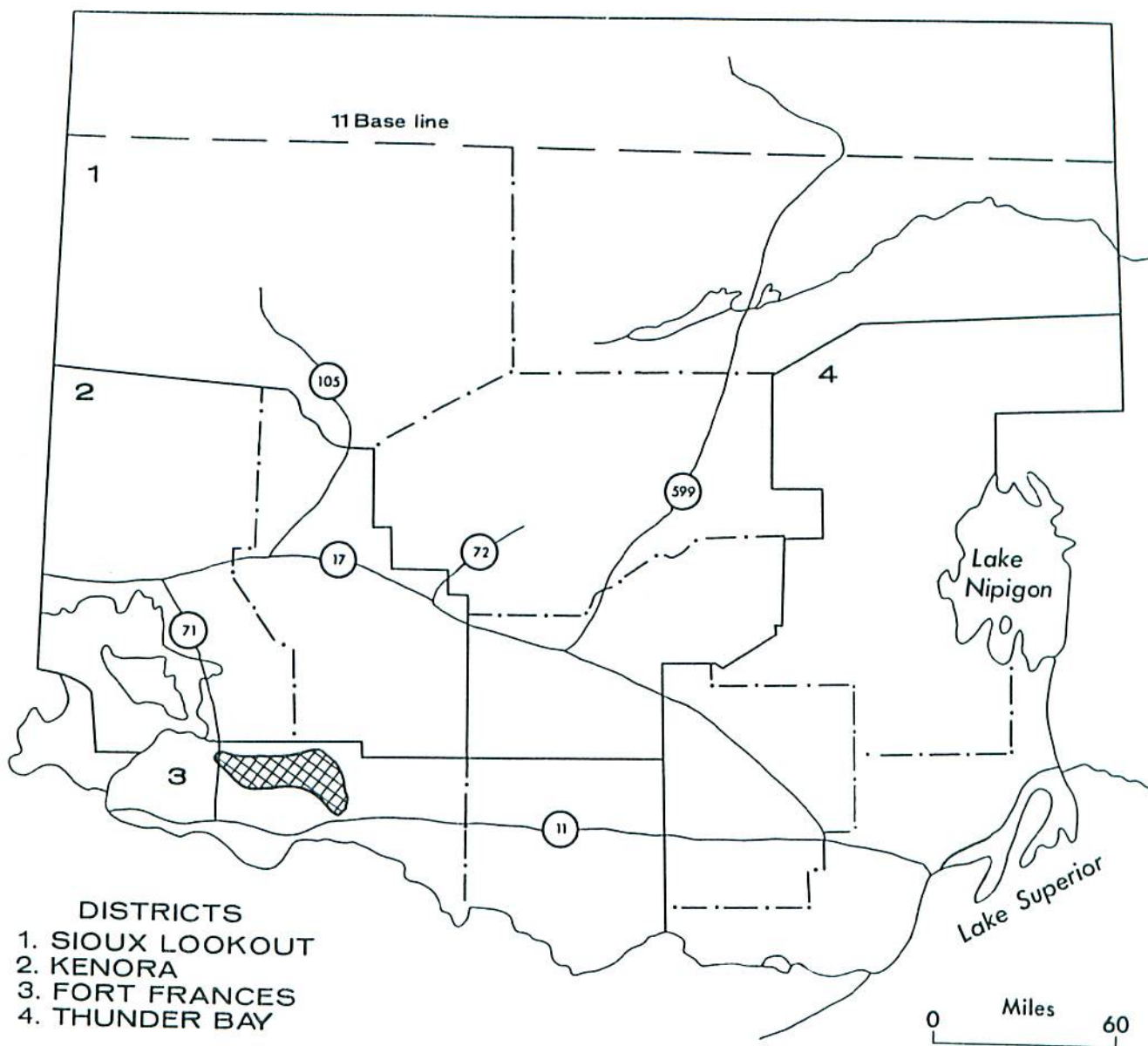
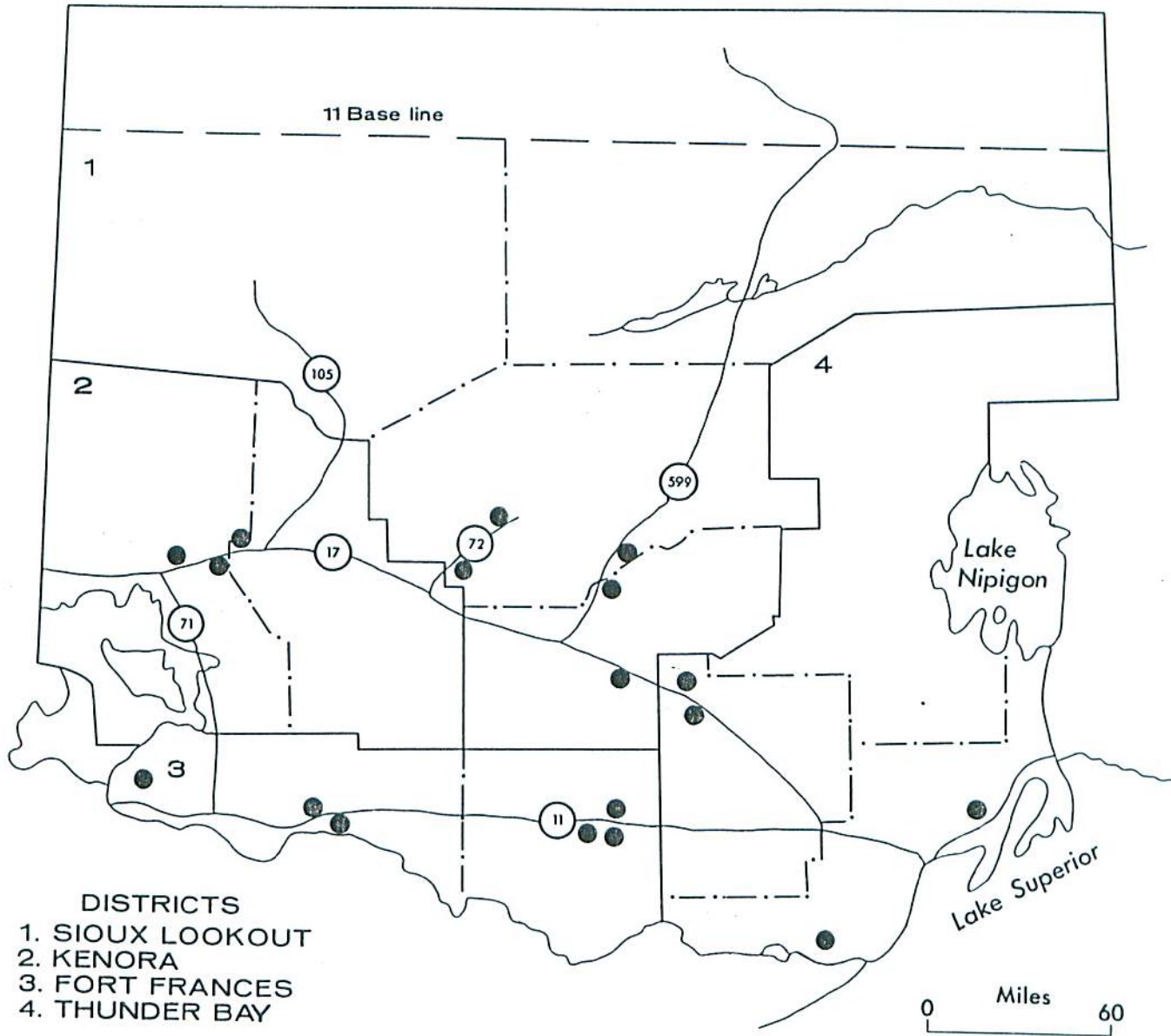


Fig.A4. Drought damage to species of Pine
 Area within which drought damage
 occurred in 1971..... XXXX

WESTERN SURVEY REGION



- DISTRICTS**
- 1. SIOUX LOOKOUT
 - 2. KENORA
 - 3. FORT FRANCES
 - 4. THUNDER BAY

Fig.A5. Root Rots
Locations where root rot sampling
was carried out in 1971.....●