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(FOREST DISTRICTS: ATIKOKAN, THUNDER BAY, NIPIGON,
GERALDTON AND TERRACE BAY)

W.D. BIGGS AND S.G. PAYNE

GREAT LAKES FORESTRY CENTRE
CANADIAN FORESTRY SERVICE
GOVERNMENT OF CANADA

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SURVEY HIGHLIGHTS

This report summarizes information gathered on various pests and abiotic damage found in the North Central Region in 1985. The cooperation and assistance provided by the Ontario Ministry of Natural Resources (OMNR), the various forest industries in the Region, Parks Canada and the Atmospheric Environment Service are gratefully acknowledged.

The spruce budworm infestation now encompasses all of Atikokan, Thunder Bay and Terrace Bay districts, the southern half of Nipigon District and the southern portion of Geraldton District. Moderate-to-severe defoliation now covers a gross area of 6,221,392 ha. Whole-tree and top mortality of balsam fir caused by spruce budworm increased by 210% since 1984, to reach 764,567 ha. A large aspen tortrix infestation of approximately 20,900 ha was found in the south-central Thunder Bay District. It has been a decade since damage by this aspen defoliator was seen in the Region. The jack pine budworm infestation decreased in Atikokan and Thunder Bay districts, but did shift to some very important management units in the former district. Scattered jack pine stands in southern Quetico Provincial Park with whole-tree and top mortality covered approximately 6,749 ha. Forest tent caterpillar populations decreased again this year, and it appears that the infestation will diminish further in 1986. Red pine sawfly populations increased in the eastern half of the Region.

Samples were taken from known Scleroderris canker infection centers during searches for the European race of the disease. The native race only was found. Spruce needle rust damage decreased, as did that caused by ink spot of aspen; however, there was a slight increase in the incidence of tar spot needle cast on jack pine.

Losses from abiotic damage were high in 1985. Because of frost heaving and winter drying, very high numbers of bare-root and container stock had to be destroyed at the Thunder Bay Forest Nursery. A mid-summer hail storm caused extensive damage to all species of trees and shrubs over 14,500 ha in Atikokan District.

Jack pine was the focus of special surveys this year. Plantations and cones were examined, and a 4-year study on the semipermanent plots was finished. Efforts to find the pinewood nematode in the Region were increased. A new acid rain plot was established in Geraldton District and the two existing plots were visited as well.

If further information is required about pest conditions in the North Central Region, please contact the authors or write to the Head, Forest Insect and Disease Survey Unit, Great Lakes Forestry Centre, P.O. Box 490, Sault Ste. Marie, Ontario, P6A 5M7.



Frontispiece. Spruce budworm, *Choristoneura fumiferana* (Clem.), control operation in the Matawin Tree Seed Orchard.

The same format was followed in ranking pests as in previous North Central Region reports:

Major Insects or Diseases

capable of causing serious injury to or death of living trees or shrubs

Minor Insects or Diseases

capable of causing sporadic or localized injury but not usually a serious threat to living trees or shrubs

Other Forest Insects/Diseases (Tables)

These tables provide information on two types of pest:

- (1) those which are of minor importance and have not been known to cause serious damage to forest trees,
- (2) those which are capable of causing serious damage but, because of low populations or for other reasons, did not cause serious damage in 1985.

W.D. Biggs

S.G. Payne

TABLE OF CONTENTS

Page

INSECTS

Major Insects

Fall Cankerworm, <i>Alsophila pometaria</i>	1
(Thunder Bay District)	
Large Aspen Tortrix, <i>Choristoneura conflictana</i>	1
(Geraldton, Terrace Bay and Thunder Bay districts)	
Spruce Budworm, <i>Choristoneura fumiferana</i>	1
(All districts)	
Jack Pine Budworm, <i>Choristoneura pinus pinus</i>	3
(Atikokan, Geraldton, Terrace Bay and Thunder Bay districts)	
Eastern Pine Shoot Borer, <i>Eucosma gloriola</i>	7
(Atikokan and Thunder Bay districts)	
Birch Leafminer, <i>Fenusa pusilla</i>	7
(Geraldton, Nipigon and Thunder Bay districts)	
Gypsy Moth, <i>Lymantria dispar</i>	8
(All districts)	
Forest Tent Caterpillar, <i>Malacosoma disstria</i>	8
(Geraldton, Terrace Bay and Thunder Bay districts)	
Red Pine Sawfly, <i>Neodiprion nanulus nanulus</i>	10
(Atikokan, Geraldton and Thunder Bay districts)	
Redheaded Jack Pine Sawfly, <i>Neodiprion virginianus</i> complex .	10
(Terrace Bay and Thunder Bay districts)	
Aspen Leafblotch Miner, <i>Phyllonorycter ontario</i>	11
(All districts)	
Yellowheaded Spruce Sawfly, <i>Pikonema alaskensis</i>	11
(Geraldton, Nipigon and Thunder Bay districts)	
White Pine Weevil, <i>Pissodes strobi</i>	11
(Geraldton and Thunder Bay districts)	
Larch Sawfly, <i>Pristiphora erichsonii</i>	12
(Atikokan, Geraldton, Nipigon and Thunder Bay districts)	
Mountain-ash Sawfly, <i>Pristiphora geniculata</i>	12
(Geraldton, Nipigon, Terrace Bay and Thunder Bay districts)	

(cont'd)

TABLE OF CONTENTS (cont'd)

	<i>Page</i>
<i>Minor Insects</i>	
Eastern Blackheaded Budworm, <i>Acleris variana</i>	12
(Geraldton and Nipigon districts)	
Fall Webworm, <i>Hyphantria cunea</i>	13
(Atikokan and Thunder Bay districts)	
Gray Willow Leaf Beetle, <i>Pyrrhalta decora decora</i>	13
(Atikokan and Thunder Bay districts)	
Other forest insects	14
TREE DISEASES	
<i>Major Diseases</i>	
Armillaria Root Rot, <i>Armillaria mellea</i>	17
(Geraldton and Thunder Bay districts)	
Scleroderris Canker, <i>Ascocalyx abietina</i>	17
(Geraldton and Nipigon districts)	
Spruce Needle Rusts, <i>Chrysomyxa ledi</i> var. <i>ledi</i> , var. <i>cassandrae</i> and <i>C. ledicola</i>	18
(Atikokan and Thunder Bay districts)	
Ink Spot of Aspen, <i>Ciborinia whetzelii</i>	18
(Nipigon and Terrace Bay districts)	
Tar Spot Needle Cast, <i>Davisomycella ampla</i>	18
(Geraldton, Nipigon and Thunder Bay Districts)	
<i>Minor Diseases</i>	
Leaf Spot, <i>Marssonina brunnea</i>	19
(Atikokan, Nipigon, Terrace Bay and Thunder Bay districts)	
Other forest diseases	19
ABIOTIC DAMAGE	
Blowdown	21
(Geraldton District)	
Frost Damage	21
(Atikokan and Thunder Bay districts)	

(cont'd)

TABLE OF CONTENTS (concl.)

	<i>Page</i>
ABIOTIC DAMAGE (concl.)	
Hail Damage (Atikokan District)	21
Winter Drying (Thunder Bay District)	23
SPECIAL SURVEYS	
Jack Pine Plantations (All districts)	24
Semipermanent Jack Pine Plots (Geraldton, nipigon and Thunder Bay districts)	24
Jack Pine Seed and Cone Pests (Geraldton and Thunder Bay districts)	30
Pinewood Nematode, <i>Bursaphelenchus xylophilus</i> (All districts)	30
Acid Rain National Early Warning System (Geraldton, Terrace Bay and Thunder Bay districts)	33
Climatic Data (Geraldton and Thunder Bay districts)	33

INSECTS

Major Insects

Fall Cankerworm, *Alsophila pometaria* (Harr.)

There was a slight increase from the low populations of 1984 in the Thunder Bay District. Shade trees, with Manitoba maple (*Acer negundo* L.) the preferred host, were defoliated at scattered locations around the city of Thunder Bay. By the time the larval feeding stage was finished, some trees, particularly in the west end of the city, were 100% defoliated. However, most of them refoliated by the end of August. No serious damage resulted from the defoliation, only the loss of esthetic value and the nuisance of large numbers of caterpillars dropping from the trees. The female moths are wingless and must crawl up the tree trunk from the ground to lay their eggs for the next generation. Therefore, putting some type of physical barrier around the stem in the fall will help prevent damage in the next growing season.

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

A substantial increase in population levels of this leaf-tier occurred in 1985. The last time this insect was at the infestation level was 10 years ago. This year an area of damage about 20,900 ha was mapped in the southern portion of the Thunder Bay District along the Ontario-Minnesota border (Fig. 1). Defoliation levels ranging from 40% to 90% on trembling aspen (*Populus tremuloides* Michx.) were observed in the southern parts of Devon and Hardwick townships, and most of Robbins and Hartington townships as well. Smaller pockets of moderate-to-severe defoliation were located between Arrow and Iron Range lakes, and east of Prelate Lake. Low populations were found in Exton and Croll townships in Geraldton District, and in Grenville Township in Terrace Bay District. Trace damage levels were seen at other points in the Region. It appears that this major aspen pest is gaining momentum in the North Central Region.

Spruce Budworm, *Choristoneura fumiferana* (Clem.)

Results of damage surveys, population sampling and egg-mass counts of this pest will be published with those of other regions at a later date in a report specifically devoted to this insect. That report will provide a complete description and analysis of developments in the spruce budworm situation in Ontario in 1985 and will give infestation forecasts for the province for 1986.

THUNDER BAY DISTRICT

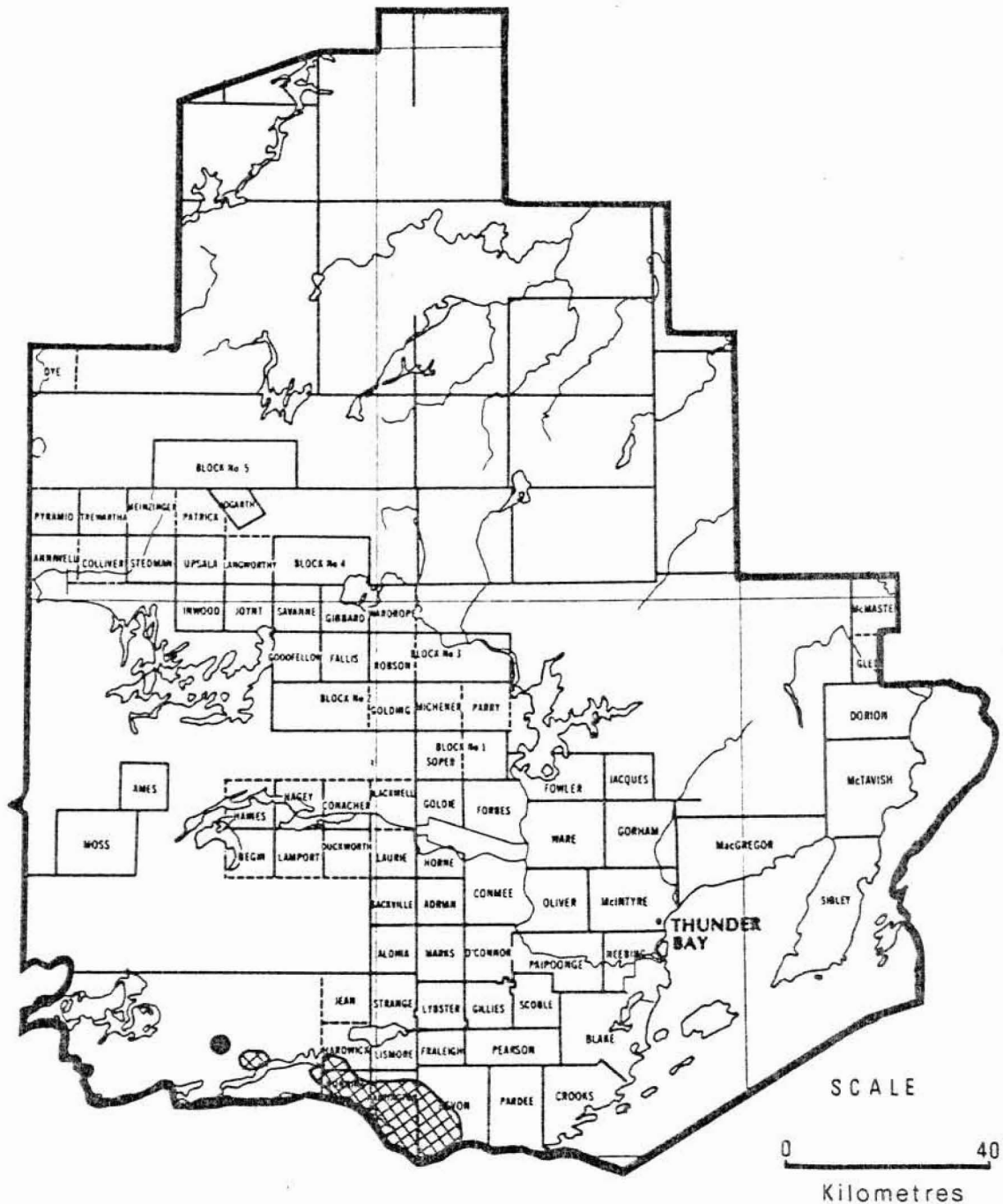




Figure 1. Large Aspen Tortrix,
Choristoneura conflictana Wlk.

Areas within which moderate-
to-severe defoliation occurred
in 1985 . . .  or 

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Jack Pine Budworm, *Choristoneura pinus pinus* Free.

The infestation declined from 370,568 ha in 1984 to 285,406 ha this year. Much of the decline occurred in the southern Atikokan District where the large 1984 infestation broke up into a number of large and small moderate-to-severe pockets. Most of the heavy defoliation was observed along the western side of the Atikokan District, more specifically in the Pekagoning Lake area, between Clearwater West and Calm lakes and in the Flanders Management Unit. Two other pockets were found in the western and southwestern parts of the Quetico Provincial Park (Fig. 2). A large area with mainly moderate defoliation was mapped in the central part of Quetico Park between Basswood Lake in the south and Highway 11 near Sapawe in the north, with much smaller pockets north of this area near Marmion Lake, Nydia Lake and in the Sanford-Irene lakes area. A decrease in the area infested was also recorded in the Thunder Bay District. Moderately damaged jack pine (*Pinus banksiana* Lamb.) stands were mapped north of Sagangons Lake, in the vicinity of Northern Light and Granite lakes and in the Burchell-Upper Shebandowan lakes area (Fig. 2). Low populations were present at various points along the Lemay and Industrial roads and Highway 17 between Terrace Bay and Schreiber in Terrace Bay District as well as in the Lukinto Lake area of the Geraldton District.

Scattered pockets of whole-tree and top mortality of jack pine (see photo page) totalling 6,749 ha were mapped in the south central portion of Quetico Provincial Park in Atikokan District (Fig. 3). The damage was present mainly on poor shallow sites along the east side of Agnes Lake south to Roacher Lake, along the west side of Kahshahpiwi Lake, from Ted Lake south to Burt Lake and near Kett Lake and Burke Lake. Six locations were visited within the aforementioned areas. Damage levels are summarized in Table 1.

Egg-mass counts made in the fall of 1985 indicate that a moderate-to-heavy jack pine budworm infestation will persist in 1986 in the areas infested along the western side of Atikokan District in the Flanders Unit and in the Pekagoning Lake area. Moderate forecasts resulted from five samples taken in the south central portion of Quetico Park, with the exception of one location on the west side of Basswood Lake, where only light damage is forecast (Table 2). To the east at Cache Bay and north to a point on Highway 11 near Windigoostigwan Lake no eggs were found. The sample point on Nym Lake that was surrounded by moderately damaged stands has a light damage forecast for 1986. Egg-mass sampling indicates that infestations will decline or disappear in the Thunder Bay District in 1986. All of the egg-mass samples taken resulted in nil forecasts except for one (Table 2). The site at Curran Bay in the southwest corner of the District has a moderate forecast for 1986.

NORTH CENTRAL REGION

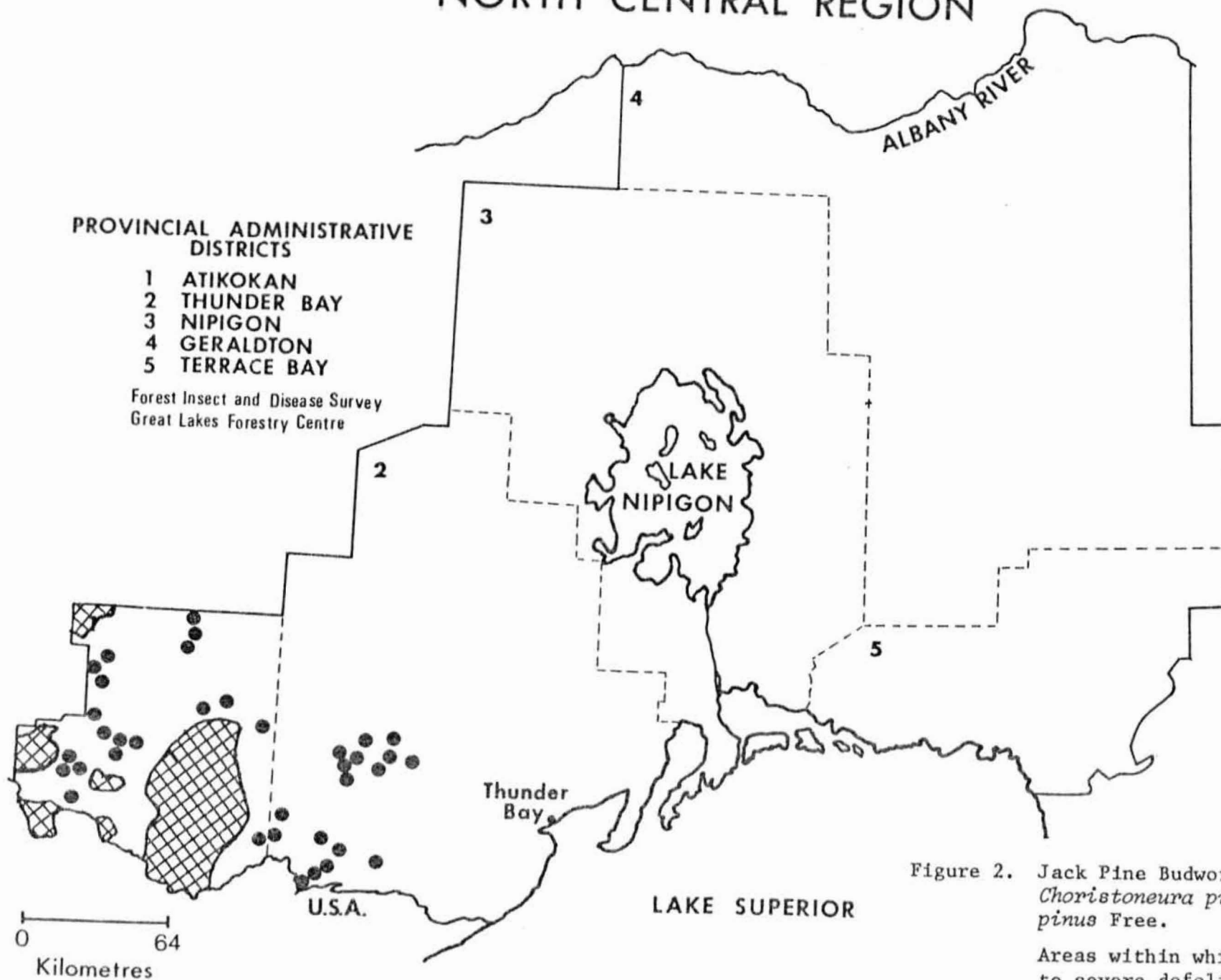




Figure 2. Jack Pine Budworm,
Choristoneura pinus
pinus Free.

Areas within which moderate-
to severe defoliation occurred
in 1985 . . .  or 

ATIKOKAN DISTRICT

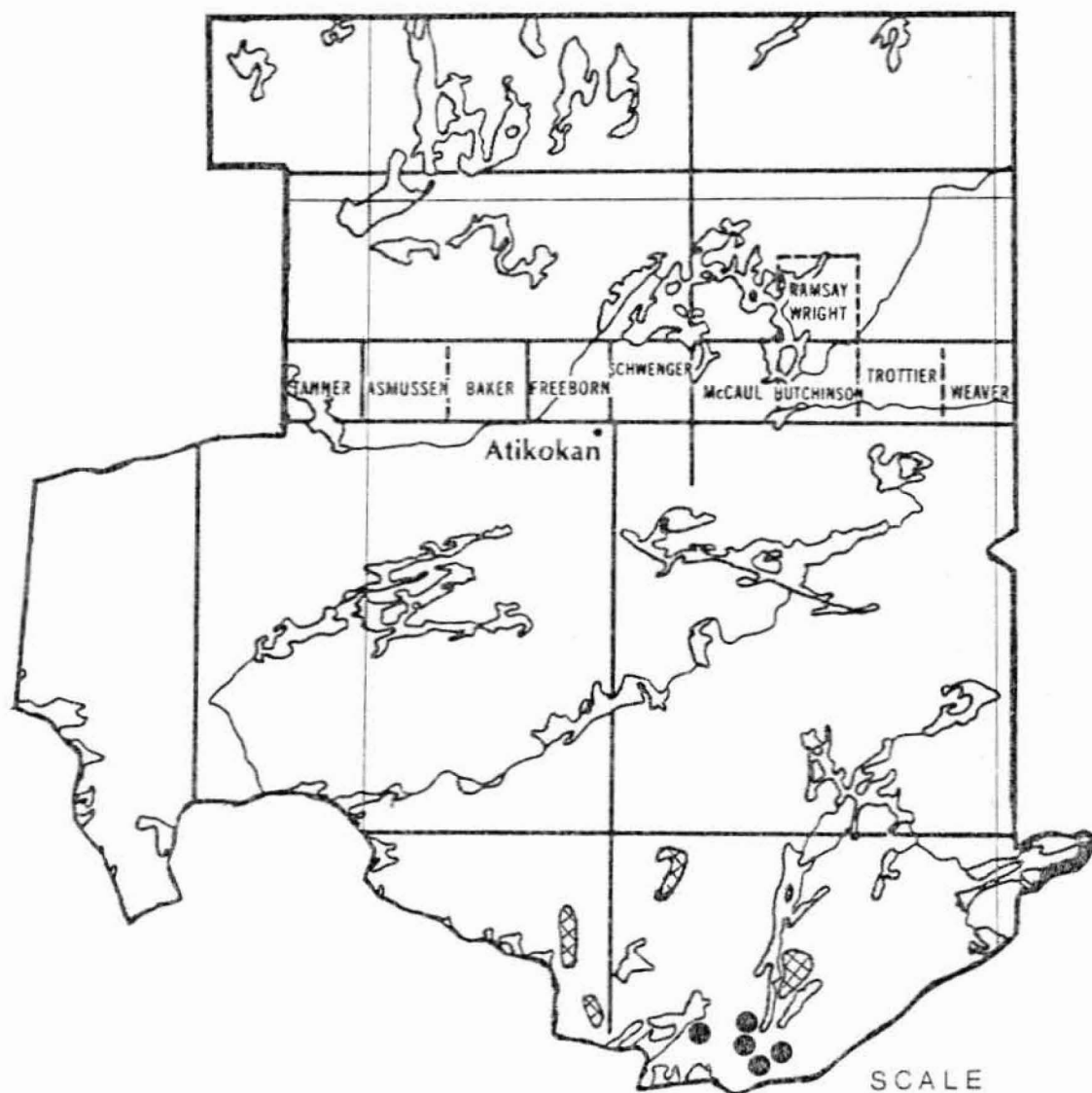


Figure 3. Jack Pine Budworm, *Choristoneura pinus pinus* Free.

Areas within which whole
tree or top mortality
occurred in 1985



0 20
Kilometres
Forest Insect and Disease Survey
Great Lakes Forestry Centre

Table 1. A summary of whole-tree and top mortality of jack pine caused by jack pine budworm in Atikokan District (counts based on the examination of 100 trees at each location).

Location	Top mortality (%)	Tree mortality (%)
Agnes Lake	1	5
Burke Lake	9	16
Kahshahpiwi Lake	27	10
Kett Lake	14	17
Robinson Lake	9	9
Ward Lake	0	28

Table 2. Jack pine budworm egg-mass counts and defoliation estimated in 1985 and infestation forecasts for 1986 in the Atikokan and Thunder Bay districts (based on the examination of six 61-cm jack pine branches at each location).

Location	Defoliation 1985 (%)	Total no. of egg masses		Infestation forecasts for 1986
		1984	1985	
<u>Atikokan District</u>				
Argo Lake	19	11	3	medium
Basswood Lake	8	17	1	light
Burt Lake	29	21	5	medium
Cache Bay	8	3	0	nil
Darby Creek	9	-	1	light
Dibble Lake	62	-	15	heavy
Duff Lake	10	-	11	heavy
Greer Lake	57	-	9	heavy
Harvey Lake	15	3	3	medium
Heuston Lake	14	-	2	light
Irene Lake	8	-	0	nil
Kett Lake	12	36	3	medium
Lindgen Lake	68	-	4	medium
Little Eva Lake	28	5	5	medium
Mahon Lake	58	-	6	heavy

(cont'd)

Table 2. Jack pine budworm egg-mass counts and defoliation estimated in 1985 and infestation forecasts for 1986 in the Atikokan and Thunder Bay districts (based on the examination of six 61-cm jack pine branches at each location) (concl.).

Location	Defoliation 1985 (%)	Total no. of egg masses		Infestation forecasts for 1986
		1984	1985	
<u>Atikokan District (cont'd)</u>				
Nym Lake	8	1	2	light
Pekagoning Lake	57	-	18	heavy
Rutter Lake	11	-	10	heavy
Sedgwick Lake	6	-	2	light
Side Lake	41	-	37	heavy
Sunday Lake	33	10	5	medium
Thompson Lake	69	21	10	heavy
Turtle River	17	-	14	heavy
Windigoostigwan Lake	10	3	0	nil
<u>Thunder Bay District</u>				
Ames Twp	5	0	0	nil
Hardwich Twp	7	0	0	nil
Nelson Lake	8	2	0	nil
Northern Light Lake - Curran Bay	41	8	4	medium
- Southeast Bay	7	-	0	nil
Plummes Lake	5	2	0	nil
Pyramid Lake	8	0	0	nil
Squeers Lake	6	5	0	nil
Upper Shebandowan Lake	7	0	0	nil

Eastern Pine Shoot Borer, *Eucosma gloriola* Heinr.

Observations indicate that populations declined in 1985. Damage levels in the 1% to 3% range were observed in various areas of jack pine regeneration in the Flanders Unit and Crooked Pine Lake area of Atikokan District, as well as in the Mack Road - Camp 234 area of Thunder Bay District. This pest was not found at damaging population levels elsewhere in the Region.

Birch Leafminer, *Fenusa pusilla* (Lep.)

In 1985 the frequency with which damage to white birch (*Betula papyrifera* Marsh.) was observed increased over 1984. However, most of

this damage was light. Areas of heavy damage where 80-90% of the foliage was brown were confined mostly to urban trees in the city of Thunder Bay, and the towns of Geraldton and Longlac. The only area outside of an urban setting where heavy browning was seen was in Fowler Township, Thunder Bay District where a small clump of trees was affected: about 70% of the foliage was brown. Light-to-moderate damage was observed in the Kakabeka Falls area, Thunder Bay District, and at the following areas in Geraldton District: the Pagwa River area, along Highway 625 between the village of Caramat and Highway 11, and in the Wig Lake area along the Goldfield Road. Near the village of Macdiarmid, Nipigon District, 100% of young roadside trees suffered 40% defoliation. Light damage was seen at many locations in the remainder of the Region.

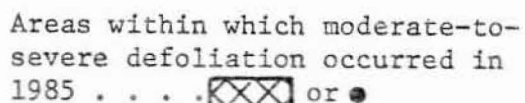
Gypsy Moth, *Lymantria dispar* (L.)

In 1985 a trapping program was carried out in 11 provincial parks across the Region. Two pheromone traps designed to attract and capture male moths were put into each provincial park. Because of a positive catch last year in Rainbow Falls Provincial Park, Terrace Bay District, 10 traps were deployed at this location in 1985. Traps were checked periodically, then collected near the end of the season, with all results negative.

Forest Tent Caterpillar, *Malacosoma disstria* Hbn.

A considerable decrease in the size of the Thunder Bay District infestation was observed in 1985. The infestation was made up of several pockets of defoliation on trembling aspen totalling approximately 5,000 ha, a substantial decline from 1984, when 32,000 ha were affected. The largest pockets of defoliation, in the 50% to 100% range, were located in Crooks Township, and smaller ones were found along the shore area of Lake Superior in Blake Township and on Indian Reserve No. 52 (Fig. 4). About 7 km offshore in Lake Superior on Pie Island four small pockets of moderate-to-severe defoliation were also mapped. A few larvae were found around the ranger cabin in Ashmore Township and at one point along Highway 614 in Geraldton and Terrace Bay districts, respectively.

Because of the geographic location of the infestation, it was not practical to do complete egg-band counts around the area damaged. Of the six sites sampled, only two yielded enough eggs that moderate-to-heavy damage could be forecast for 1986. Both locations were within the area infested this year in Crooks and Blake townships (Table 3). Three egg bands were found on three trees in Neebing Township, and it is doubtful if defoliation will result in 1986. Eggs were not found at the other sample points to the north and west of the infestation. Another decrease in the size of the infestation is probable in 1986.



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Table 3. A summary of forest tent caterpillar egg-band counts on trembling aspen in Thunder Bay District in 1985, with infestation forecasts for 1986.

Location (Twp)	Avg DBH of trees (cm)	Avg no. of egg bands per tree	Infestation forecast for 1986
Blake - Sturgeon Bay	14	6	moderate
Crooks - Cloud River Rd W.	15	19	heavy
Neebing - Grand Pt	14	0	nil
Neebing - Con. II, Hwy 61	14	1	light
Pardee - Con. III, Lot 7	15	0	nil
Scoble - Con. I, Lot 4	14	0	nil

Red Pine Sawfly, *Neodiprion nanulus nanulus* Schedl.

Population levels of this insect decreased in the western half of the Region, while in the eastern half a marked increase was noted in parts of Geraldton District. Severe defoliation of old foliage averaged 75% in a 1.5-ha jack pine stand in the Highway 11-Sturgeon River area and on scattered overstory trees along Highway 584, 20 km north of the town of Geraldton, in Geraldton District. Moderate-to-severe defoliation ranging from 50% to 80% was found in the Shabaqua and Shebandowan areas, Thunder Bay District, and the French Lake area east to Highway 633 in Atikokan District. Moderate defoliation was present in the Wildgoose Lake area in Geraldton District. Areas of light defoliation were observed at scattered points along Highway 11 in Geraldton District. In and around Hogarth Township, Thunder Bay District, there was moderate-to-severe defoliation of scattered trees. At one location in this area dead and dying larvae were found, probably as a result of natural virus.

Redheaded Jack Pine Sawfly, *Neodiprion virginianus* complex

After this sawfly had been reported at low levels at scattered points throughout the Region for the past few years, a small infestation developed in southeastern Terrace Bay District in 1985. Along Highway 614, from Phillips Creek to the Black River, jack pine of all sizes were affected at varying levels. On the younger trees, less than 4 m tall, defoliation levels averaged 33%, with both new and old foliage consumed. On trees larger than 4 m, defoliation levels were lower. Damage was found up to 5 km east of Highway 614. The only other area in which this insect was found was in Thunder Bay District, where a few small roadside trees had 10% defoliation near Hood Lake. This pest is a colonial insect that feeds in late summer on the new foliage, then back-feeds on the old foliage.

Aspen Leafblotch Miner, *Phyllonorycter ontario* (Free.)

High populations of this insect recurred this year in the eastern half of the Region, whereas in the west, populations that had declined in 1984 rebounded. In 1985 there were very few locations in the Region in which trembling aspen was not moderately to severely damaged. Young aspen under 10 cm in diameter were the favored host. Also attacked were the bottom branches of larger trees. It was common to find five or six insects per leaf on these trees, and generally, 100% of the foliage was damaged (see photo page).

Yellowheaded Spruce Sawfly, *Pikonema alaskensis* (Roh.)

Population levels of this insect continued to decline in the eastern half of the Region. However, in the western half, population levels remained the same as in 1984. The only high-value stands damaged were a young black spruce (*Picea mariana* [Mill.] B.S.P. tree seed orchard in O'Connor Township, Thunder Bay District, and the Kimberly-Clark black spruce and white spruce (*Picea glauca* [Moench] Voss) seed production area near Longlac in Geraldton District. About half a dozen 1.8-m-high trees suffered 40-60% defoliation over about 1.5 ha at the O'Connor seed orchard, and light defoliation (about 5%) was present on 30% of the trees at the Kimberly-Clark seed production area. Small ornamental white spruce and black spruce around the entrance to Kakabeka Falls Provincial Park suffered defoliation levels of up to 80%. Varying damage levels were observed on small roadside trees along the Highway 11-17 right-of-way in Thunder Bay District near Pass Lake, in Paipoonge Township, and between Shabaqua and Raith in Patience Township, Nipigon District; and at Klotz Lake Provincial Park, Geraldton District. Damage was evident on ornamental plantings on the trans-Canada pipeline right-of-way along Highway 11 in the Geraldton and Nipigon districts. Damage was also observed on ornamental spruce in and around the city of Thunder Bay and other urban areas in the Region.

White Pine Weevil, *Pissodes strobi* (Peck)

Population levels of this coniferous pest decreased across the Region in 1985. The tree species most often affected in this part of the province are jack pine (see photo page), black spruce and white spruce. Within a 10-ha portion of a large regenerated tract in the Shuniah area, Thunder Bay District, 3% of the jack pine were attacked. Trace levels of weeviled black spruce and white spruce were observed at scattered locations along the Highway 17 right-of-way in Thunder Bay District and along the Highway 11 right-of-way in Geraldton District. To our knowledge no control operations against this pest were carried out in the Nipigon District as had been the case in the previous few years.

Larch Sawfly, *Pristiphora erichsonii* (Htg.)

There was no substantial increase in damage caused by this mid-season defoliator of tamarack (*Larix laricina* [Du Roi] K. Koch) in 1985. An infestation in a 5-ha stand of tamarack in Errington Township, Geraldton District, was reduced to scattered pockets of light defoliation this year. A reduction in damage also occurred in a 2-ha stand 2 km north of Murky Creek along Highway 584, Geraldton District, where 75% of the trees suffered only 20% defoliation. Levels of defoliation in Thunder Bay District ranged from 60% to 100% in a 1-ha stand of young trees beside Highway 11-17 in Neebing Township, along with a 0.5-ha stand in Upsala Township and a 2-ha stand of semimature trees near Kabaigon Lake. Scattered young trees had defoliation levels ranging from 15% to 50% along Highway 622 northeast of the town of Atikokan and a small pocket of severe damage was found near Lerome Lake, in Atikokan District. Low populations were observed causing light damage at various sample points throughout the remainder of the Region.

Mountain-ash Sawfly, *Pristiphora geniculata* (Htg.)

There was no change in the area of infestation of this insect in 1985; however, in the western half of the Region, damage levels on American mountain-ash (*Sorbus americana* Marsh.) declined, while remaining constant in the remainder of the Region. Low levels of damage were common throughout the western half of the Region, with the exception of the Upsala area in Thunder Bay District, where defoliation ranged from 50% to 100% on scattered hosts. Along Highway 17 in the southeastern Nipigon and southern Terrace Bay districts, there was moderate-to-severe (30-60%) defoliation. In areas north of Highway 17, defoliation was lighter, usually less than 15%; however, in the southern Steel Lake area of Terrace Bay District, defoliation levels of 40% were observed. As in previous years, this pest was common on ornamentals in urban areas throughout the Region, and its presence prompted some calls from concerned citizens. It is interesting to note that, even though mountain-ash is the favored host of this sawfly, a collection was made on hawthorn (*Crataegus* sp.) at Moose Lake, Thunder Bay District.

Minor Insects

Eastern Blackheaded Budworm, *Acleris variana* (Fern.)

In the past this insect was found at scattered points in the Region in conjunction with spruce budworm. However, this year larvae were found more frequently by themselves in concentrated areas in the eastern portion of the Region. In Tyrol Lake Management Unit, Nipigon District, young understory black spruce within a large jack pine plantation had low populations that caused defoliation of approximately 3%.

In this same area, a 7-year-old 20-ha black spruce plantation was similarly affected. At km 9 along the Lukinto Lake Road, O'Meara Township, Geraldton District, a 6-m black spruce plantation was examined in early July and approximately 10% of the shoots examined had larvae present. Another area of interest was the Kimberly-Clark Seed Orchard near Longlac, Geraldton District, where several of the trees had trace levels of defoliation. This insect was found at several sample points in conjunction with spruce budworm in the eastern portion of the Region. In most areas it was difficult to estimate the damage caused solely by the eastern blackheaded budworm because of the severe defoliation by the spruce budworm.

Fall Webworm, *Hyphantria cunea* (Dru.)

Population levels remained much the same as they had been the previous year in Thunder Bay District. A variety of tree species, such as speckled alder (*Alnus rugosa* [Du Roi] Spreng.), willow (*Salix* sp.) and white birch were host to this insect. Nests were found commonly throughout the rural townships around the city of Thunder Bay, and some ornamental trees were also infested within the city. Again this year, a small isolated population was present along Highway 11 near McCauley Lake in Atikokan District. This late summer pest was not found elsewhere in the Region.

Gray Willow Leaf Beetle, *Pyrrhalta decora decora* (Say)

This is one of those situations that develop every so often when a normally innocuous insect experiences a population explosion and noteworthy damage results. Damage was extensive on the common willow shrubs that grow profusely in old fields and along roadsides in Atikokan and Thunder Bay districts. Initially, the overwintering adults feed on the foliage in early summer, and during midsummer the larvae skeletonize the leaves, causing entire bushes to appear gray or brownish. Then again in early fall, the adults feed for a short time on willow and poplar (*Populus* spp.) before seeking out hibernation sites. Numerous inquiries about this insect were made by the public.

Table 4. Other forest insects.

Insect	Host(s)	Remarks
<i>Adelges lariciatus</i> (Patch) Spruce gall adelgid	wS	few trees moderately affected with galls in Klotz Lake Provincial Park and Ashmore Twp, Geraldton District
<i>Aphrophora cribrata</i> (Wlk.) Pine spittlebug	jP	common at low numbers at many points in the Region
<i>Archips cerasivoranas</i> (Fitch) Uglynest caterpillar	cherry	low numbers in the area near the city of Thunder Bay and in the Hematite area, Atikokan District
<i>Bucculatrix canadensisella</i> Cham. Birch skeletonizer	wB	populations collapsed; one collection made in Thunder Bay District; elsewhere not observed
<i>Dasineura balsamicola</i> (Lintn.) False balsam gall midge	bF	scattered individual trees 90% affected in Wig Lake area along Goldfield Rd, Geraldton District
<i>Dioryctria reniculelloides</i> Mut. & Mun. Spruce coneworm	bF, bS wS	light damage in conjunction with spruce budworm, Geraldton and Terrace Bay districts
<i>Diprion similis</i> (Htg.) Introduced pine sawfly	wP	small numbers on a few trees at Lakehead University, Thunder Bay District
<i>Epinotia solandriana</i> L. Birch-aspen leafroller	wB	light damage to scattered roadside trees along Hwy 17, Terrace Bay District
<i>Gonioctena americana</i> (Schaeef.) American aspen beetle	tA	severe defoliation of young regeneration at Tyrol Lake Management Unit and light defoliation of saplings, Stirling Twp, Nipigon District

(cont'd)

Table 4. Other forest insects (cont'd).

Insect	Host(s)	Remarks
<i>Micurapteryx salicifoliella</i> Cham. Willow leafminer	W	High populations continued to cause severe browning of foliage throughout the eastern half of the Region.
<i>Neodiprion abietis</i> complex Balsam fir sawfly	bS, bF	10% to 30% defoliation of small clumps of trees, Croll Twp, Geraldton District, and Legault Twp, Nipigon District.
<i>Neodiprion maurus</i> Roh. Pine sawfly	jP	scattered trees with 100% of the old foliage consumed along Hwy 584, 20 km north of the town of Geraldton, Geraldton District, in conjunction with red pine sawfly
<i>Nymphalis antiopa</i> (L.) Spiny elm caterpillar	tA, wE	shrub-sized aspen occasionally defoliated in western half of Region; large elm with 25% defoliation in the town of Longlac, Geraldton District
<i>Phyllocnistis populiella</i> (Cham.) Poplar serpentine leafminer	tA	in conjunction with aspen leafblotch miner causing moderate damage in east Geraldton District
<i>Phyllonorycter nipigon</i> (Free.) Balsam poplar leafblotch miner	bPo	low populations at scattered locations in Thunder Bay District
<i>Pseuderentera oregonana</i> Wlshm. Aspen leafroller	tA	common on roadside trees in eastern half of Region, with less than 10% of foliage affected
<i>Pulicalvaria piceaella</i> (Kft.) Orange spruce needleminer	bF, wS	with spruce budworm at several sample points in eastern half of Region

(cont'd)

Table 4. Other forest insects (concl.).

Insect	Host(s)	Remarks
<i>Rhabdophaga swainei</i> Felt Spruce bud midge	WS	commonly found on roadside and ornamental trees in Geraldton and Nipigon districts



Jack pine (*Pinus banksiana* Lamb.) mortality caused by jack pine budworm, *Choristoneura pinus pinus* Free.



Trembling aspen (*Populus tremuloides* Michx.) foliage heavily infested by aspen leafblotch miner, *Phyllonorycter ontario* (Free.)



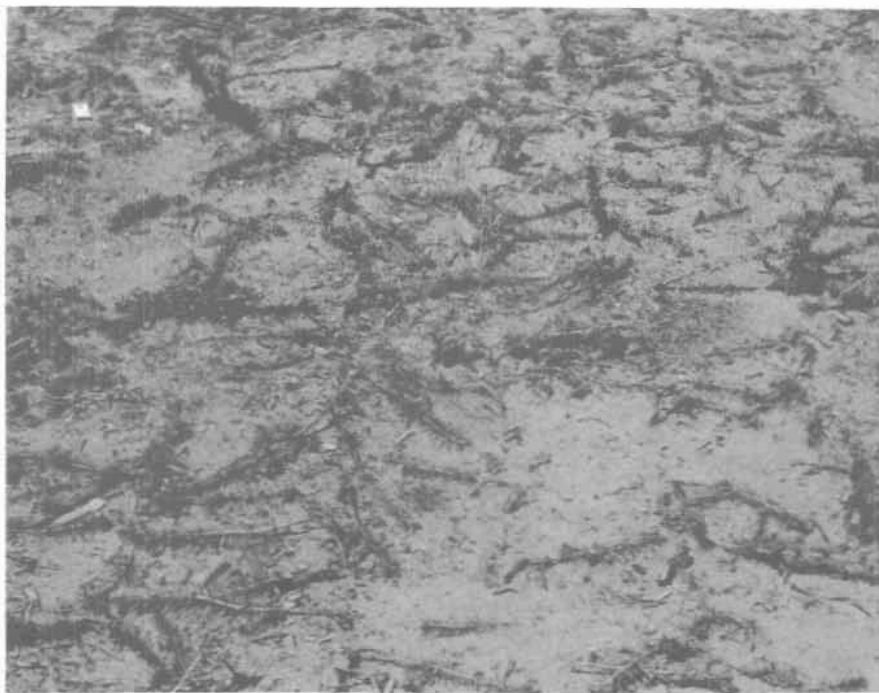
A jack pine (*Pinus banksiana* Lamb.) leader killed by white pine weevil, *Pissodes strobi* (Peck)



Jack pine infected by *Armillaria* root rot, *Armillaria mellea* (Vahl: Fr.) Kummer. Note the whitish areas are mycelial fans in the cambial region.



Western gall rust, *Endocro-*
nartium harknessii (J.P. Moore)
Y. Hirats., on a jack pine
(*Pinus banksiana* Lamb.) stem



Seedlings pushed out of the ground by frost

TREE DISEASES

Major Diseases

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

Damage levels caused by this disease remained much the same as they have over the past few years. Low levels of mortality were found in jack pine plantations across the Region (see photo page). This root rot is more prevalent in plantations because these artificially reproduced stands, in general, are growing under more stressful conditions than natural stands. Table 5 gives the results of evaluations completed in 1985. These results are representative of the damage found at scattered locations in the Region.

Table 5. A summary of damage caused by *Armillaria* root rot in two districts in the North Central Region in 1985 (counts based on the examination of 150 trees at each location).

Location	Area affected (ha)	Estimated trees per ha	Host	Avg ht of trees (m)	Tree mortality (%)
<u>Geraldton District</u>					
Hwy 625	3	1,500	jP	2.5	3.3
Greer Rd	5	2,000	jP	1.0	2.0
Kimberly-Clark Rd 15-1	10	1,500	jP	1.5	1.0
<u>Thunder Bay District</u>					
Stedman Twp	20	2,500	jP	0.7	3.0

Scleroderris Canker, *Ascochyta blight* (Lagerb.) Schlöpfer-Bernhard

In the eastern half of the Region, this disease has been a perennial problem in young jack pine plantations. Low levels of damage, mainly to branches, were found at various sample locations, the highest level of infection being noted in an 8-year-old plantation along the Sturgeon River Road, Nipigon District, where 15% of the trees were affected. The infection level was 10% in a 9-year-old plantation near Lukinto Lake, Geraldton District. Infection levels of 1% to 2% were commonly found in the eastern half of the Region.

There are two known races of this disease, the native and European. The European race is much more serious as it can kill trees

of all sizes, while the native race kills only trees that are less than 2 m high. In the spring of 1985, samples of this disease were submitted to Disease Survey staff at the Great Lakes Forestry Centre for race identification. All tests for the European race were negative.

Spruce Needle Rusts, *Chrysomyxa ledi* (Alb. & Schwein.) de Bary
var. *ledi*, var. *cassandrae* (Peck & G.P. Clinton)
Saville, and *C. ledicola* (Peck) Lagerh.

There was a decrease in the incidence of these foliage diseases across the Region. The only high-value stand in which needle rusts were found was in the portion of the Whistle Lake plantations adjacent to Highway 527 in Thunder Bay District. Over much of this area, there were occasional 2-m-high white spruce trees with 10% to 20% foliar damage, and others were damaged to a lesser degree. Stunted black spruce, ranging from individual trees to very small groups and growing on wet, bog-like sites along Highway 17 in Trewartha Township, Thunder Bay District, were affected at trace-to-low levels, and the occasional tree had about 60% foliar damage. Trace levels of damage were observed at other points in the western half of the Region.

Ink Spot of Aspen, *Ciborinia whetzelii* (Seaver) Seaver

After a slight increase in 1984, a general decrease was observed in the damage caused by this disease in 1985. The only noteworthy damage was to semimature trembling aspen in a picnic area along Highway 17, Lahontan Township, Terrace Bay District, where 40% of the leaves were affected. Light-to-moderate damage was found in Tyrol Lake Management Unit, Nipigon District. Elsewhere in the Region, trace levels of infection were found at several sample locations.

Tar Spot Needle Cast, *Davisomycella ampla* (J. Davis) Darker

A slight increase in the incidence of this disease was observed in 1985; however, the intensity of damage did not change. Moderate damage, about a 30% infection level, was observed on semimature trees within the space of 0.5 ha on the Kimberly-Clark nursery property near Longlac, Geraldton District. Low levels of defoliation, averaging about 10% on scattered jack pine, were found in the Graham and Upsala areas in Thunder Bay District, in Hele Township, Nipigon District, and along Highway 625 north of the village of Caramat in Geraldton District. Tar spot needle cast is an early-season foliage disease that causes the second- and third-year needles to turn yellow and fall off the tree.

Minor Diseases

Leaf Spot, *Marssonina brunnea* (Ell. and Ev.) Magnus

This is the first time in recent years that this foliage disease has occurred frequently enough to warrant an individual writeup in this report. Leaf browning on trembling aspen, followed by premature leaf drop, was observed across the southern portion of the Region. Pockets of heavy infection were found at numerous points in southern Atikokan, Thunder Bay and Nipigon districts and at scattered locations along Highway 17 in Terrace Bay District. Because this disease occurs late in the growing season, serious damage does not usually result.

Table 6. Other forest diseases.

Disease	Host(s)	Remarks
<i>Aureobasidium apocryptum</i> (Ell. and Ev.) Hermanides- Nijhof Anthracnose	siM, sM	common in city of Thunder Bay; two ornamental trees moderately damaged in town of Geraldton
<i>Ceratocystis ulmi</i> (Buism.) C. Moreau Dutch elm disease	wE	tree and branch mortality common on many shade trees in the city of Thunder Bay
<i>Coleosporium asterum</i> (Dietel) Sydow Pine needle rust	jP	low levels of foliar damage on young jack pine in plantations near Manitouwadge and along Lemay Road, Terrace Bay District
<i>Cronartium coleosporioides</i> Arthur Stalactiform blister rust	jP	trace foliar damage on three trees in a young plantation along road 15-1 near Longlac, Geraldton District
<i>Cronartium comandra</i> Peck Comandra blister rust	jP	trace damage to 1-m-high trees in a plantation along Hwy 625, 3 km south of Hwy 11, Geraldton District
<i>Endocronartium harknessii</i> (J.P. Moore) Y. Hirats. Western gall rust	jP	found commonly at various damage levels throughout the Region (see photo page)

(cont'd)

Table 6. Other forest diseases (concl.).

Disease	Host(s)	Remarks
<i>Hypoxylon mammatum</i> (Wahlenb.) J. Miller Hypoxylon canker	tA	8% of trees cankered in Ashmore Twp, Geraldton District; common across the Region
<i>Lophodermium</i> sp. Needle cast	jP	40% of trees affected in Rainbow Falls Provincial Park, Terrace Bay District, with 60% of foliage damaged
<i>Mycosphaerella populicola</i> G.E. Thompson Leaf spot	bPo	heavy damage at various locations in eastern Geraldton District
<i>Venturia macularis</i> (Fr.) E. Müller and V. Arx Shoot blight	tA	low infection levels common in many cutovers where aspen regeneration is prolific

ABIOTIC DAMAGE

Blowdown

A very heavy windstorm swept through Geraldton District the evening of 23 September. Although this wind did not cause any large areas of damage, scattered individual trees and small pockets of trees were knocked down. Damage was observed at the OMNR airbase, along the Margo Lake Road and along Highway 625, Geraldton District. The damage was most prevalent on mature trees in more susceptible areas, such as along the edges of cutovers and road right-of-ways.

Frost Damage

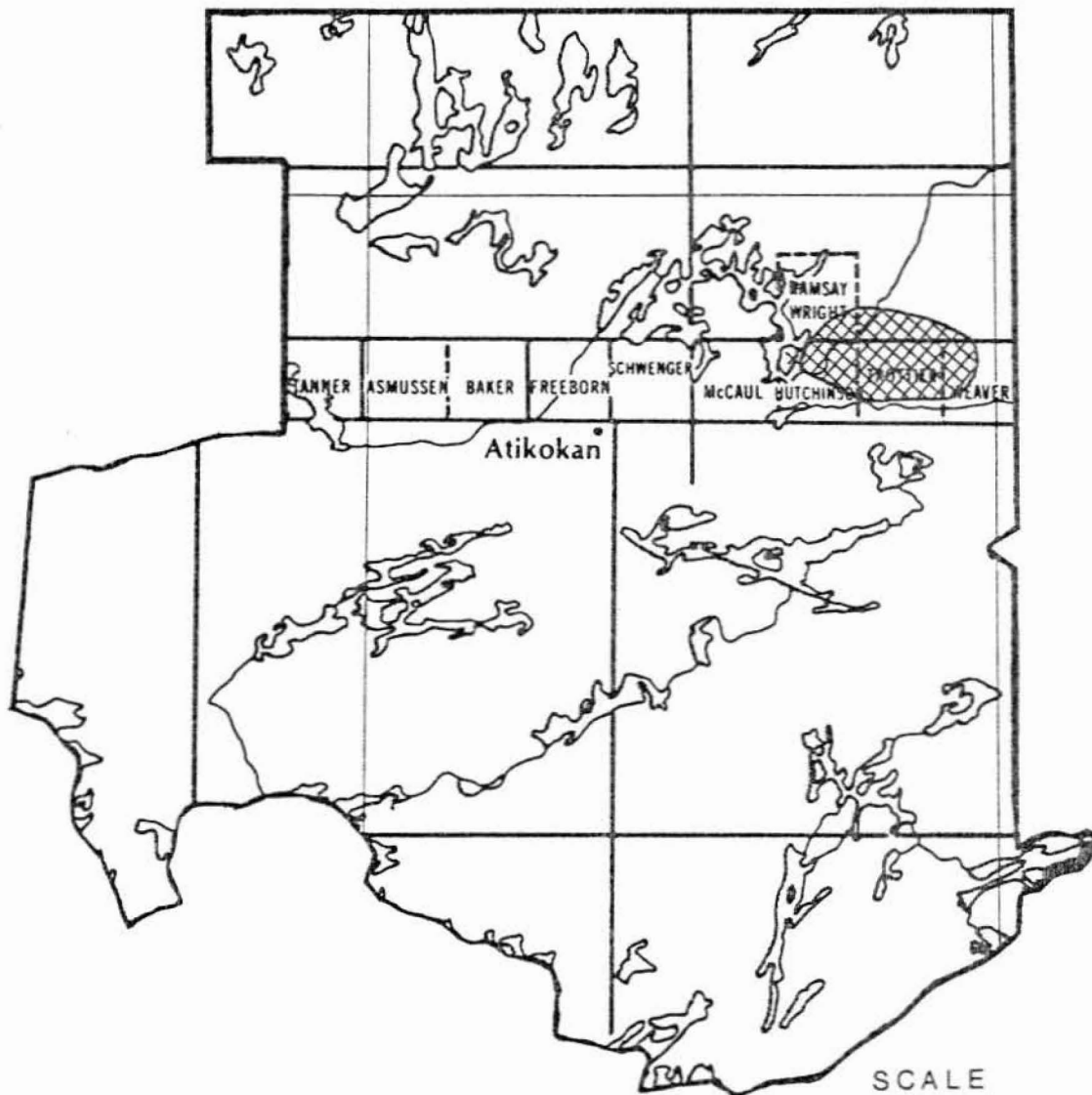
Low levels of damage to the new shoots of young balsam fir (*Abies balsamea* [L.] Mill.) and black spruce were found at a few locations in the Atikokan District. A 16-ha black spruce plantation in the Pluswood area of Atikokan District had an average foliar damage level of 11%, with 100% of the trees affected. Frost damage of this type was not seen elsewhere in the Region.

The lack of good snow cover and fluctuating temperatures in late winter (see Winter Drying) also resulted in an extreme frost-heaving problem at the Thunder Bay Forest Nursery. Approximately 11 million transplant black spruce and white spruce bare-root seedlings were lost. Frost heaving is caused by repeated freezing and thawing in the upper soil layers and the formation of ice crystals. The expansion and contraction may raise the root collar above the soil surface, or the seedling may be completely thrown out of the ground (see photo page). The roots are usually broken off just below the surface. The losses will have an impact on the amount of stock available for the next planting season.

Hail Damage

A severe hail storm touched down in the eastern part of the Atikokan District on 7 July, 1985. Heavy damage to all tree and shrub species covered an area 14,300 ha in the Melema, Mercutio and Crooked Pine lakes area (Fig. 5). Forests in more than half the Township of Trottier were damaged, along with smaller portions of Weaver, Hutchinson and Ramsay Wright townships and a small part of the unsurveyed territory to the northeast. The effects of this storm will still be noticeable in 1986. This type of damage was not seen elsewhere in the Region.

ATIKOKAN DISTRICT



SCALE

0 20

Kilometres

Figure 5. Hail Damage

Area where hail damage
occurred in 1985 . . .



Forest Insect and Disease Survey
Great Lakes Forestry Centre

Winter Drying

Damage to overwintering container stock was heavy in 1985 in Thunder Bay District. This was for the most part due to the lack of good snow cover in early winter and warmer-than-normal temperatures in late winter (see Table 10). Bright sunshine and wind during the month of March also contributed to the drying of the foliage. The Thunder Bay Atmospheric Environment Service recorded 193.2 hours of bright sunshine and a mean wind speed of 15.8 km/hr in March, 1985. (Figures of 172.8 hours and 13.8 km/hr are the respective normals for that month.) Approximately 1.9 million trees, of which 95% were black spruce, were lost by the Thunder Bay Forest Nursery and some of the private growers as a result of winter drying. The dormant above-ground portion of the trees dried out, and consequently the needles turned brown and eventually fell off, killing many of the new buds. In small trees, such as these container stock plants, the root systems were frozen and moisture could not be moved up to help the stressed part of the plant. Other examples of winter drying were observed a little more frequently in 1985, particularly in a few young red pine (*Pinus resinosa* Ait.) plantations in the Region.

SPECIAL SURVEYS

Jack Pine Plantations

This is the third time that a special survey has been carried out in high-value jack pine stands in the Region (see also Semipermanent Jack Pine Plots). In all, seven plantations were examined, and the pest levels were lower in comparison with those noted in a similar survey carried out in 1982 (Fig. 6).

Although it is one of the most damaging pests of jack pine, the jack pine budworm was present only at very low levels at one site (Table 7). The only other important insect detected was the white pine weevil, which was found at two plantations in Atikokan District (see photo page).

Western gall rust was the most damaging pathogen observed this year (see photo page). Pine needle rust and tar spot needle cast were common at a few of the sites, but defoliation was at trace levels only (Table 7). Branch infection caused by the native race of *Scleroderris* canker was found on 1% of the trees at one location in Geraldton District. *Armillaria* root rot (see photo page) was present on 1% of the trees in one plantation in Atikokan District. In Stirling Township, Nipigon District, 2% of the trees had broken tops. Heavy snow or ice appeared to be the cause. Increment cores were taken 15 cm above ground level from 20 trees at each of the four oldest plantations. The cores were examined for the presence of stain and/or decay, but none was found.

Semipermanent Jack Pine Plots

In 1982, as part of the continuing survey of high-value conifer stands, four semipermanent plots were established in the Region (see Fig. 6). These four plots were examined each year, and data were collected on damage present and tree growth.

There was little damage in any of the plantations this year. Jack pine budworm was found at three sites, but defoliation levels were less than 1%. The plantation along the Mack Road in Thunder Bay District had trace levels of white pine weevil (see photo page), eastern pine shoot borer and red pine sawfly. In 1985, *Armillaria* root rot and *Scleroderris* canker were the most damaging diseases found. Needle cast was also common but defoliation was only at trace levels (Table 8).

Over the 4-year period, 13 pests caused varying degrees of damage in the four plantations. *Armillaria* root rot was the most consistent pest in the four areas while *Scleroderris* canker had some impact on the trees near Lukinto Lake in Geraldton District (Table 8). Jack pine

NORTH CENTRAL REGION

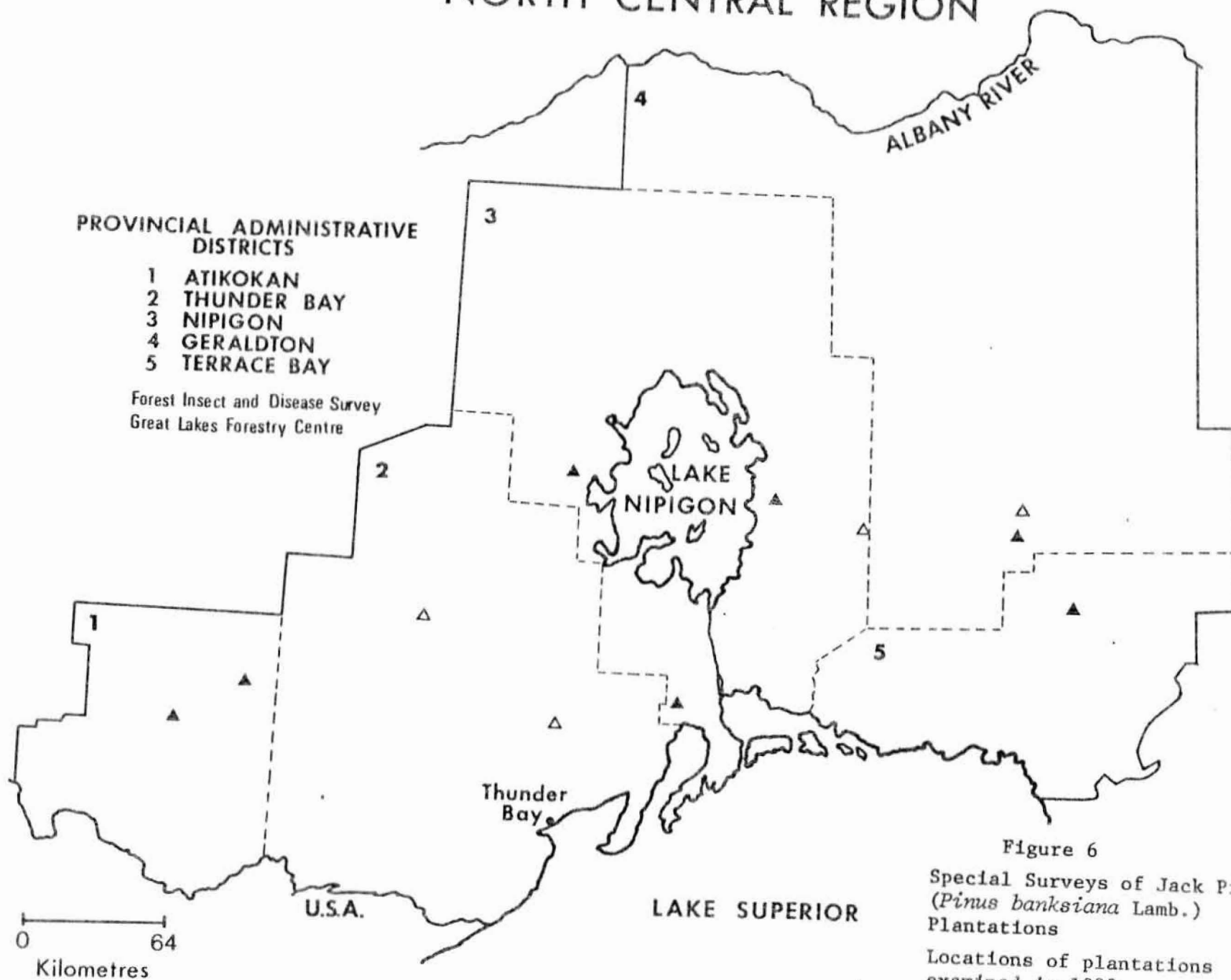


Figure 6
Special Surveys of Jack Pine
(*Pinus banksiana* Lamb.)
Plantations
Locations of plantations
examined in 1985 ▲
Semipermanent plots △

Table 7. A summary of insect and disease damage in a special survey of high-value jack pine in the North Central Region in 1985 (percentages based on the examination of 150 trees at each location).

Location	Avg ht of trees (m)	Plan tation area (ha)	Estimated trees/ha	Jack pine budworm		Jack pine tip beetle	White pine weevil
				Trees affected (%)	Avg defoliation (%)	Leaders attacked (%)	Leaders attacked (%)
<u>Atikokan District</u>							
Broadbent Lake	1.3	16	1,500	0	0	1	1
Hematite area	1.5	5	2,000	0	0	0	2
<u>Geraldton District</u>							
Kimberly-Clark Rd 15-1	1.3	20	2,500	0	0	0	0
<u>Nipigon District</u>							
Gull Bay	11.0			0	0	0	0
Stirling Twp	9.0	5	2,000	0	0	0	0
Tyrol Lake M.U.	9.5	50	1,500	0	0	0	0
<u>Terrace Bay District</u>							
Lemay Rd.	6.0	5	2,990	9	3	0	0

(cont'd)

Table 7. A summary of insect and disease damage in a special survey of high-value jack pine in the North Central Region in 1985 (percentages based on the examination of 150 trees at each location) (concl.).

Location	Armillaria root rot	Scleroderris canker	Western gall rust		Pine needle rust		Tar spot needle cast	
	Mortality (%)	Trees affected (%)	Trees affected (%)	Severely galled (%)	Trees affected (%)	Avg defoliation (%)	Trees affected (%)	Avg defoliation (%)
<u>Atikokan District</u>								
Broadbent Lake	1	0	0	0	5	1	0	0
Hematite area	0	0	0	0	100	1	0	0
<u>Geraldton District</u>								
Kimberly-Clark Rd 15-1	0	1	2	0	0	0	0	0
<u>Nipigon District</u>								
Gull Bay	0	0	66	3	0	0	0	0
Stirling Twp	0	0	0	0	0	0	0	0
Tyrol Lake M.U.	0	0	33	3	0	0	0	0
<u>Terrace Bay District</u>								
Lemay Road	0	0	2	0	9	1	37	6

Table 8. Summary of insects and diseases found in the semipermanent jack pine plots in the North Central Region from 1982 to 1985 (percentages based on the examination of 300 trees at each location).

Location	Plan- tation area (ha)	Trees/ ha	Year	Avg height	White pine weevil	Eastern pine shoot borer	Jack pine tip beetle	Northern pitch twig moth	Red pine sawfly	Jack pine budworm	
					Leaders attacked (%)	Leaders attacked (%)	Trees affected (%)	Trees affected (%)	Trees affected (%)	Trees affected (%)	Avg defoliation (%)
<u>Geraldton District</u>											
Lukinto Lake	50	2,500	1982	1.2	0	0	0	0	0	0	0
			1983	1.5	0	0	0	1	0	0	0
			1984	1.8	0	0	0	0	0	0	0
			1985	2.2	0	0	1	0	0	1	1
<u>Nipigon District</u>											
Sturgeon River	20	2,500	1982	0.9	0	0	0	0	0	0	0
			1983	1.6	0	0	1	0	0	0	0
			1984	1.9	1	0	0	0	0	0	0
			1985	2.2	0	0	0	0	0	0	0
<u>Thunder Bay District</u>											
East Bay	61	4,500	1982	0.8	0	1	0	1	1	0	0
			1983	1.1	0	1	1	2	0	0	0
			1984	2.2	0	0	0	0	0	0	0
			1985	2.6	0	0	0	0	2	9	1
Mack Road	14	4,300	1982	0.8	1	2	0	1	1	0	0
			1983	1.0	1	2	4	2	1	0	0
			1984	1.9	6	4	0	0	0	0	0
			1985	2.4	1	1	0	0	1	2	1

(cont'd)

Table 8. Summary of insects and disease found in the semipermanent jack pine plots in the North Central Region from 1982 to 1985 (percentages) based on the examination of 300 trees at each location) (concl.).

Location	Year	Scleroderris canker		Western gall rust		Pine needle rust		Comandra blister rust	Stem rust	Tar spot needle cast		Armillaria root rot
		Trees affec- ted (%)	Mortal- ity (%)	Trees affected (%)	Severely affected (%)	Trees affected (%)	Avg defolia- tion (%)	Trees affected (%)	Trees affected (%)	Trees affec- ted (%)	Avg defolia- tion (%)	Mortality (%)
<u>Geraldton District</u>												
Lukinto Lake	1982	59	1	0	0	0	0	0	0	13	1	1
	1983	61	1	0	0	0	0	0	0	0	0	0
	1984	23	1	3	1	0	0	0	0	1	1	1
	1985	11	2	3	1	0	0	0	0	2	3	1
<u>Nipigon District</u>												
Sturgeon River	1982	3	0	0	0	0	0	0	1	0	0	0
	1983	0	0	0	0	0	0	0	0	0	0	0
	1984	0	0	0	0	0	0	0	0	0	0	0
	1985	15	1	0	0	0	0	0	0	2	1	0
<u>Thunder Bay District</u>												
East Bay	1982	0	0	0	0	3	1	0	0	0	0	0
	1983	0	0	0	0	0	0	0	0	0	0	0
	1984	0	0	1	0	0	0	0	0	0	0	4
	1985	0	0	1	0	0	0	0	0	0	0	1
Mack Road	1982	0	0	1	1	0	0	0	1	0	0	1
	1983	0	0	1	1	0	0	2	0	2	2	1
	1984	0	0	1	1	0	0	0	0	0	0	2
	1985	0	0	8	2	0	0	0	0	7	2	0

tip beetle, *Conophthorus banksianae* McPherson, and northern pitch twig moth, *Petrova albicapitana* (Busck), were common at most of the sites for some of the years, but only at trace levels. White pine weevil and eastern pine shoot borer were present at varying levels at the Mack Road site. The average annual height growth over the 4 years was 0.5 m. No one pest had significant impact at all locations, but the combination of the different types of insect and disease damage did affect the plantations, albeit some more than others.

Jack Pine Seed and Cone Pests

To complete a survey on insect and disease damage to jack pine cones, a collection was made in early to mid-July of cones in their second year of development at two locations in the Region. A sample of 100 green, succulent cones was taken from stands in the Kimberly-Clark nursery, Geraldton District, and Paipoonge Township, Thunder Bay District. Results show little identifiable damage by insects other than red pine cone beetle, *Conophthorus resinosae* Hopk., and no disease damage (Table 9). On the sample from Geraldton District 73% of the cones were damaged, and there was a 69% seed loss in the damaged cones, while 13% of the cones from Thunder Bay District were damaged, and there was 69% seed loss.

Pinewood Nematode, *Bursaphelenchus xylophilus* (Steiner and Buhrer) Nickle

This year increased efforts were made to determine if pinewood nematode is present in the Region. In all, 36 samples were taken from conifer species at various points in every district (Fig. 7). Nematodes are known to cause a wilting disease of many conifer species. There is reason to believe that nematodes are not the primary cause of tree mortality, but are a contributing factor, along with various tree pests. In all, 33 suspect conifers were sampled, mostly jack pine and balsam fir. At three of the sites a healthy tree of the same species as the symptomatic trees was sampled as well. Nematodes were not found in the healthy trees; examinations of 47% of the damaged tree samples have not yet been completed. Many of these samples had nematodes present but it has yet to be determined if they are pinewood nematode.

Table 9. A summary of a special survey of jack pine seed and cone pests at two locations in the North Central Region in 1985 (percentages based on the examination of 100 cones at each location).

Location	Damaged cones (%)	Seed loss within damaged cones (%)	Cone pests and percentage of damaged cones affected	
<u>Geraldton District</u>				
Kimberly-Clark Nursery	73	69	Unknown	89
			<i>Dioryctria abietivorella</i>	4
			<i>Laspeyresia toreuta</i>	2
			Lepidopterous larvae	2
			<i>Reselliella</i> sp.	1
<u>Thunder Bay District</u>				
Paipoonge Township	13	69	<i>Conophthorus resinosae</i>	38
			Lepidopterous larvae	38
			<i>Dioryctria abietivorella</i>	16
			<i>Laspeyresia toreuta</i>	8

NORTH CENTRAL REGION

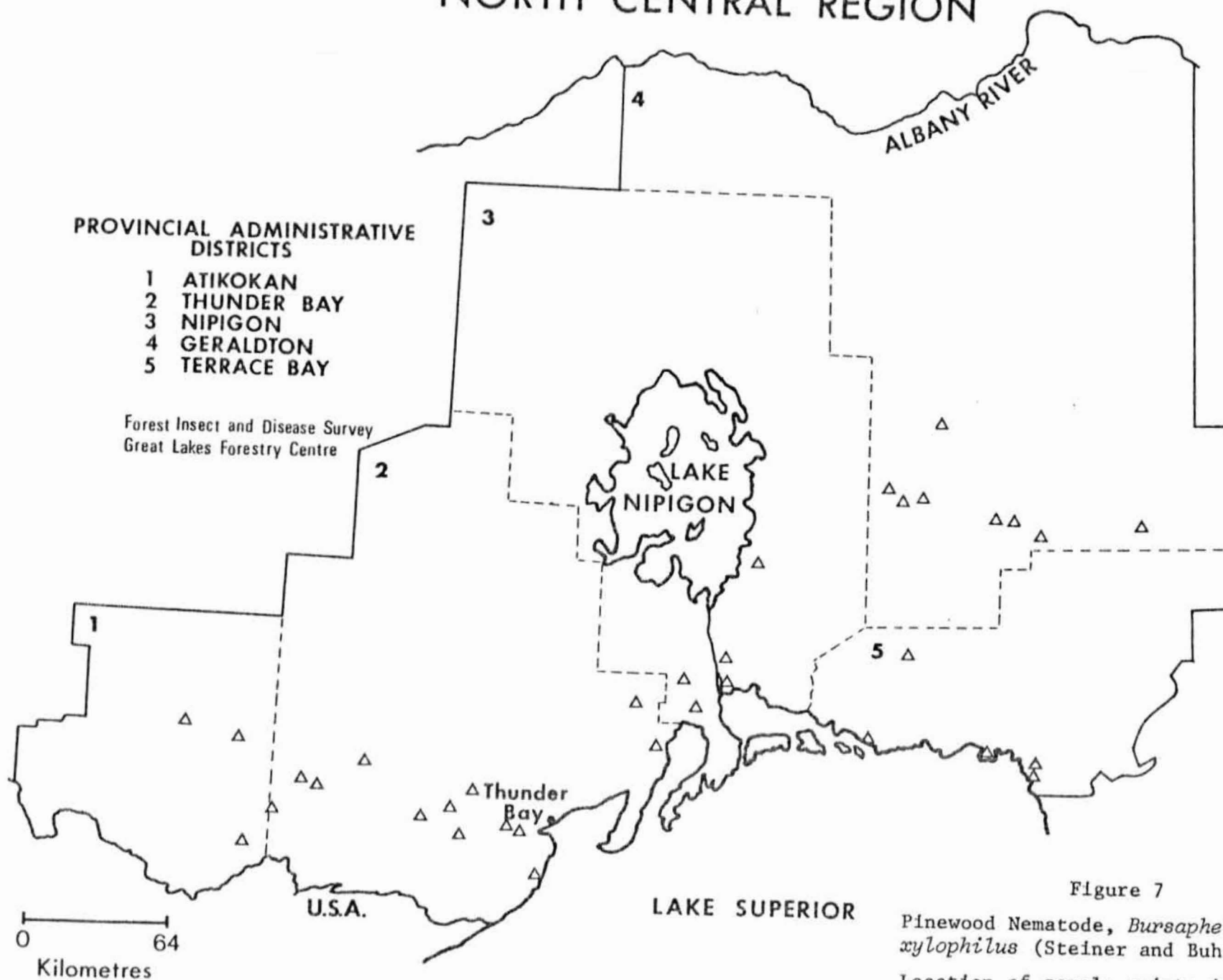


Figure 7
Pinewood Nematode, *Bursaphelenchus xylophilus* (Steiner and Buhrer) Nickle
Location of sample points in 1985
.....△

Acid Rain National Early Warning System (ARNEWS)

Concern over the effects of acid precipitation on our forests has prompted studies to detect damage caused by this environmental disturbance. The Great Lakes Forestry Centre Forest Insect and Disease Survey Unit was selected to monitor specific stands for any symptoms of acid rain damage. Two 400-m² study plots were established in the North Central Region in 1984. The first plot was established in a black spruce stand within the Ontario Ministry of the Environment study area near Hawkeye Lake in Fowler Township, Thunder Bay District. The other was in a white spruce working group east of the Gravel River in Wiggins Township, Terrace Bay District. In 1985, a new plot was established near Margo Lake, Geraldton District, in a semimature jack pine working group. During the field season detailed studies were done on these plots to monitor any changes that might have been caused by acid rain. As of the fall of 1985, no symptoms that could be attributed to acid rain were found.

Climatic Data

Extremes in the various meteorological phenomena can have an impact on the forest. The atmospheric conditions that have the most potential to cause damage to trees are temperature, precipitation and wind. Table 10 lists monthly mean temperatures and total precipitation for 1985 from two locations in the Region, with the deviation from a 30-year normal. Whenever possible, weather-related damage is surveyed as it occurs and is included as a separate entry under "Abiotic Damage" in this report.

Table 10. A summary of temperature and precipitation for 1985 from two locations in the North Central Region.

Location	Month	Mean temperature (°C)		Deviation from normal (°C)	Total precipitation (mm)		Deviation from normal (%)
		Actual	Normal		Actual	Normal	
Geraldton Airport							
	January	-19.4	-20.0	+0.6	21.8	38.2	-43
	February	-17.7	-17.9	+0.2	26.0	33.3	-22
	March	-7.8	-11.0	+2.2	16.3	38.2	-47
	April	1.7	-0.5	+2.2	27.5	43.3	-36
	May	9.0	7.7	+1.3	86.8	63.2	+37
	June	12.1	13.5	-1.4	64.4	91.9	-30
	July	15.2	16.3	-1.1	130.2	81.6	+60
	August	14.7	14.6	+0.1	141.2	66.8	+111
	September	10.1	9.3	+0.8	189.6	75.6	+151
	October	4.4	3.9	+0.5	66.0	64.6	+2
	November	-10.8	-5.5	-5.3	118.6	61.5	+93
	December	-19.0	-15.4	-3.6	16.8	38.8	-57
Thunder Bay Airport							
	January	-16.0	-15.4	-0.6	13.3	40.9	-67
	February	-13.7	-13.0	-0.7	18.7	28.3	-34
	March	-2.4	-6.3	+3.9	31.2	45.0	-31
	April	3.6	2.5	+1.1	28.1	50.7	-45
	May	10.0	8.8	+1.2	109.5	73.3	+49
	June	12.7	14.0	-1.3	127.6	76.6	+67
	July	16.7	17.6	-0.9	84.3	75.4	+12
	August	15.8	16.4	-0.6	107.6	83.1	+29
	September	11.4	11.1	+0.3	147.8	89.1	+66
	October	5.7	5.7	0	63.0	54.8	+15
	November	-6.9	2.6	-9.5	95.8	52.9	+81
	December	-15.4	-11.1	-4.3	13.5	41.1	-61