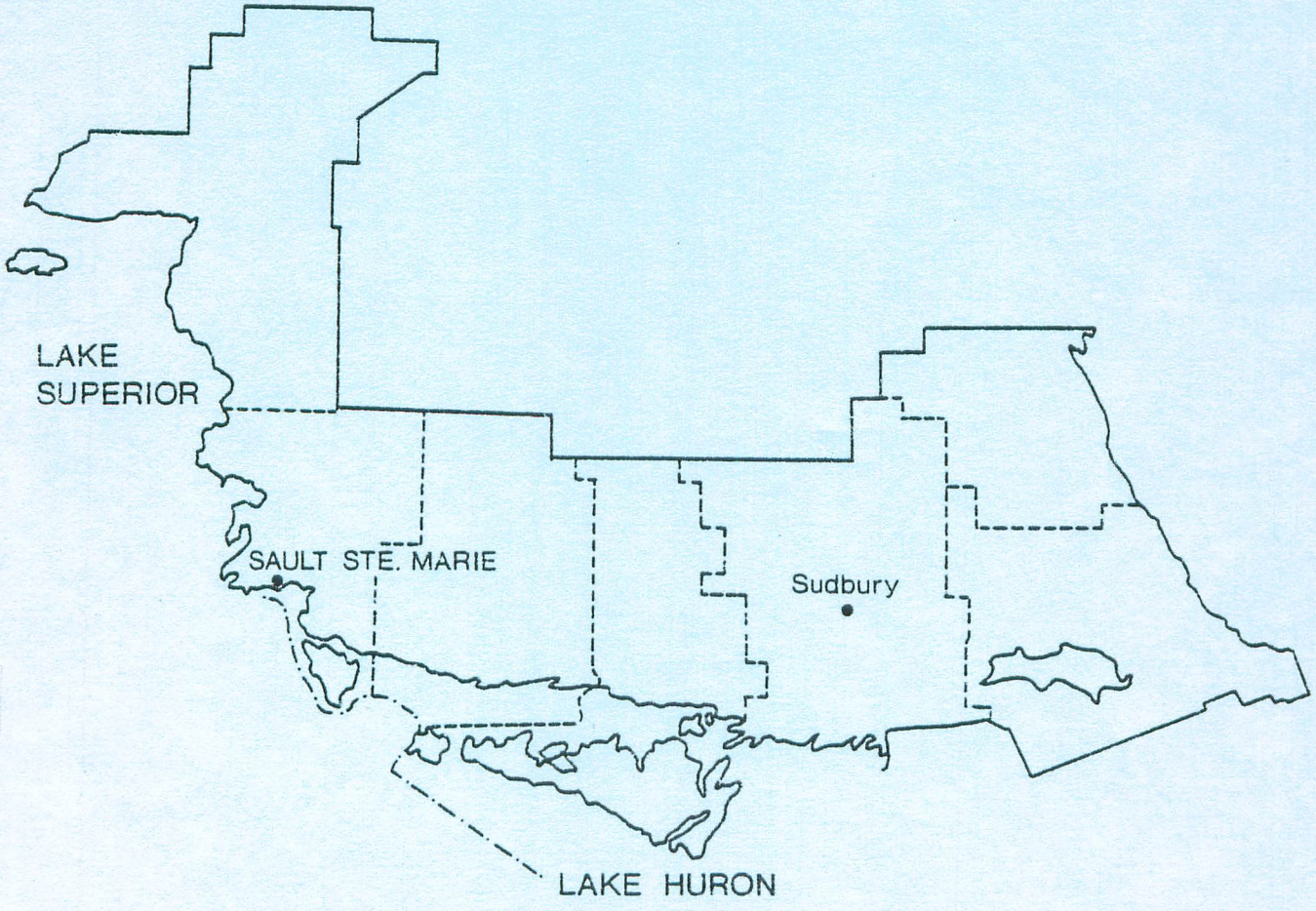
Results of forest insect and disease surveys in the NORTHEASTERN REGION of Ontario, 1978



CARRIED OUT BY THE GREAT LAKES FOREST RESEARCH CENTRE IN CO-OPERATION WITH THE ONTARIO MINISTRY OF NATURAL RESOURCES

SURVEY HIGHLIGHTS

Information on insect and disease conditions affecting the forest in the Northeastern Region in 1978 is herein presented. H. Bordersen replaced W.D. Biggs as survey field technician covering the Espanola, Sudbury and North Bay districts.

Spruce budworm was again the most destructive forest pest in the Region; however, a marked decline in feeding damage did occur. Mortality of balsam fir continued to increase. Population levels of the forest tent caterpillar declined in some localities resulting in reduced areas of moderate-to-severe infestation. Oak leaf shredder populations declined to light levels in most areas. The incidence of leader damage caused by the white pine weevil increased sharply in Blind River and Sudbury districts but declined elsewhere.

Early June frosts caused extensive damage to new growth of small white spruce in many plantations. Infection centres of spruce needle rust in Wawa District and Scleroderris disease in Blind River District persisted. Special surveys were conducted to determine the incidence and degree of severity of a condition known as spruce chlorosis.

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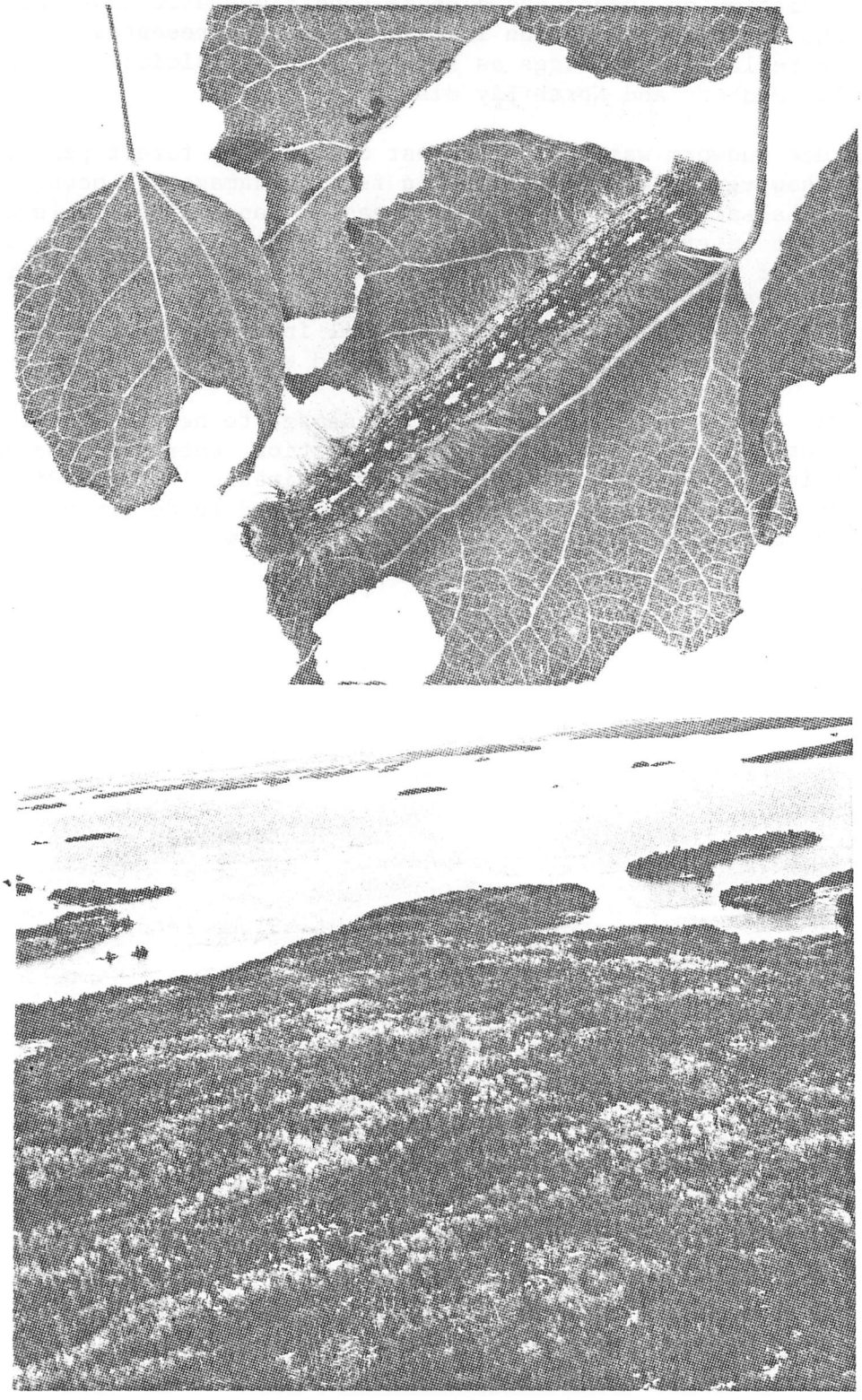

Frontispiece. Late-instar forest tent caterpillar, *Malacosoma disstria* Hbn. (top), and heavily defoliated aspen trees as viewed from the air (bottom).

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TREE DISEASES DESCRIBED

INSECTS

Maple Petiole Borer, *Caulocampus acericaulis* MacG.

A substantial increase in the occurrence of this borer took place in the Sault Ste. Marie District. The highest concentrations were present at one location in Hilton Township on St. Joseph Island where heavy populations infested understory sugar maple (*Acer saccharum* Marsh.). Light damage occurred at Root River and in the eastern part of the city of Sault Ste. Marie. The eggs are laid near the base of the petiole of maple leaves. On hatching, the larvae bore into the petiole or leaf stem causing the stem to break and the leaf to fall late in May or early June.

Spruce Budworm, *Choristoneura fumiferana* (Clem.)

The results of damage surveys, population sampling, and egg-mass counts have been included with those of other survey regions in a special report by Howse et al. (Report 0-X-300). This report provides a complete description and analysis of developments in the spruce budworm situation in Ontario in 1978 and gives infestation forecasts for the province for 1979.

Larch Casebearer, *Coleophora laricella* Hbn.

The declining trend of insect numbers for the past several years in the Garden River Indian Reserve in Sault Ste. Marie District reversed when larval densities increased from 2.7 per 45.7 cm (18 in.) branch tip in 1977 to 11.7 in 1978. Similarly small pockets of trace defoliation occurred in Laird Township, Sault Ste. Marie District, and in Kirkwood Township in Blind River District. The insects were found more frequently and throughout a larger area than in previous years in both these districts.

Red Pine Cone Beetle, *Conophthorus resinosae* Hopk.

High populations were again present in mature and overmature stands of red pine (*Pinus resinosa* Ait.) at many locations in Temagami District. Extensive damage to cones resulted in a greatly reduced cone crop. Damage was particularly severe in the seed orchard at Hound Chute. Infested cones and accumulated fallen twigs were conspicuous along the northeast arm of Lake Temagami.

Oak Leaf Shredder, *Croesia semipurpurana* (Kft.)

Populations of this defoliator continued to decrease and aerial mapping failed to show any areas of heavy infestation. The highest levels occurred on scattered red oak (*Quercus rubra* L.) trees in Parke

Township, west of Sault Ste. Marie. Light populations were found at many widely scattered locations in Sault Ste. Marie, Blind River and Espanola districts. Repeated heavy defoliation has resulted in red oak mortality in several areas of Blind River District. Mortality assessments showed 39% at one location on Highway 555 north of Blind River and 56% just west of Algoma Mills on Highway 17.

Birch-Alder Sawfly, *Dimorphopteryx melanognathus* Roh.

After an absence of three years this insect recurred in infestation proportions north of Pancake Bay in Sault Ste. Marie District. Unlike past outbreaks which have encompassed large stands of yellow birch (*Betula alleghaniensis* Britton), this infestation was confined to only small numbers of scattered mature trees. Defoliation ranged from 60% to 90%. Outbreaks have occurred periodically in this area for the past 20 years with the interval between outbreaks being governed by the length of larval diapause which ranges from 1 to at least 5 years.

Spruce Coneworm, *Dioryctria reniculelloides* Mut. & Mun.

High populations of this insect were recovered from mat samples taken from white spruce (*Picea glauca* [Moench] Voss) in Poulin Township in Blind River District. The insect has also been recovered in substantial numbers in Kirkwood and Thessalon townships in recent years. Possibly the impact potential of this insect, in light of its association with spruce budworm, has not been fully realized and may well prove to be of greater concern than previously envisioned.

Greenstriped Mapleworm, *Dryocampa rubicunda rubicunda* Fabr.

Although not in infestation proportions, surveys showed the number of colonies of this Lepidoptera to be more abundant in several locations in Rose and Kirkwood townships in Blind River District. Low populations persisted on red maple (*Acer rubrum* L.) in Cameron Township, North Bay District. No increase in tree mortality has been recorded in Cameron Township due to the consistently low populations during the past three years.

Birch Leafminer, *Fenusa pusilla* (Lep.)

Throughout the Region damage to white birch (*Betula papyrifera* Marsh.) was almost exclusively confined to open-grown small diameter roadside trees or ornamentals. High populations were noted along the Frater road and Highway 17 north in Wawa District, along the White River road in Blind River District and the Ranger Lake road in Sault Ste. Marie District. Light populations occurred at scattered locations

in Sudbury and North Bay districts except in Widdifield Township, North Bay District, where semimature windbreak birch sustained moderate-to-severe defoliation.

American Aspen Beetle, *Gonioctena americana* (Schaef.)

Population levels fluctuated considerably in 1978. Medium-to-heavy infestation recurred at many locations in the central and northern part of Temagami District. The moderate levels, present in 1977 along Highway 557 north of Blind River, increased, causing heavy damage and in some instances complete stripping. Small pockets of heavy defoliation occurred in Plummer and Curtis townships in Sault Ste. Marie District and in Kirkwood Township in Blind River District. In contrast, the high levels reported north of Iron Bridge in 1977 declined to light intensity, and the light-to-moderate levels in North Bay, Sudbury and Espanola districts declined to low levels. In all instances damage was confined to small diameter open-grown trembling aspen (*Populus tremuloides* Michx.).

Aspen Leafblotch Miner, *Lithocolletis ontario* Free.

High populations persisted on small open-grown trembling aspen trees in Rose, Kirkwood, Bridgland and Galbraith townships in Blind River District. A new area of heavy infestation occurred along the Frater road in Wawa District. In Temagami District light-to-moderate infestations were general in most aspen stands.

Forest Tent Caterpillar, *Malacosoma disstria* Hbn.

The total area of moderate-to-severe defoliation in 1978 was approximately 325 700 ha (804,479 acres) compared to 814 200 ha (2,011,900 acres) in 1977. This population reduction occurred in Sudbury and North Bay districts resulting in six smaller pockets of infestation rather than the large continuous area reported in 1977 (see Frontispiece).

The largest area of moderate-to-severe defoliation was present in Espanola District extending from Tehkummah Township in the southeast part of Manitoulin Island north to Shakespeare Township. Smaller areas of damage were centred in Denison Township, Espanola District; Haddo Township, Sudbury District and in three different parts in North Bay District. In addition to these areas, populations persisted in Lorrain Township in Temagami District and in Laird and McDonald townships in Sault Ste. Marie District (Fig. 1). In St. Joseph Township, Sault Ste. Marie District, the presence of moderate numbers of the parasite *Sarcophaga aldrichi* Park. was a contributing factor in the reduction of moderate-to-high populations to light intensity.

NORTHEASTERN REGION

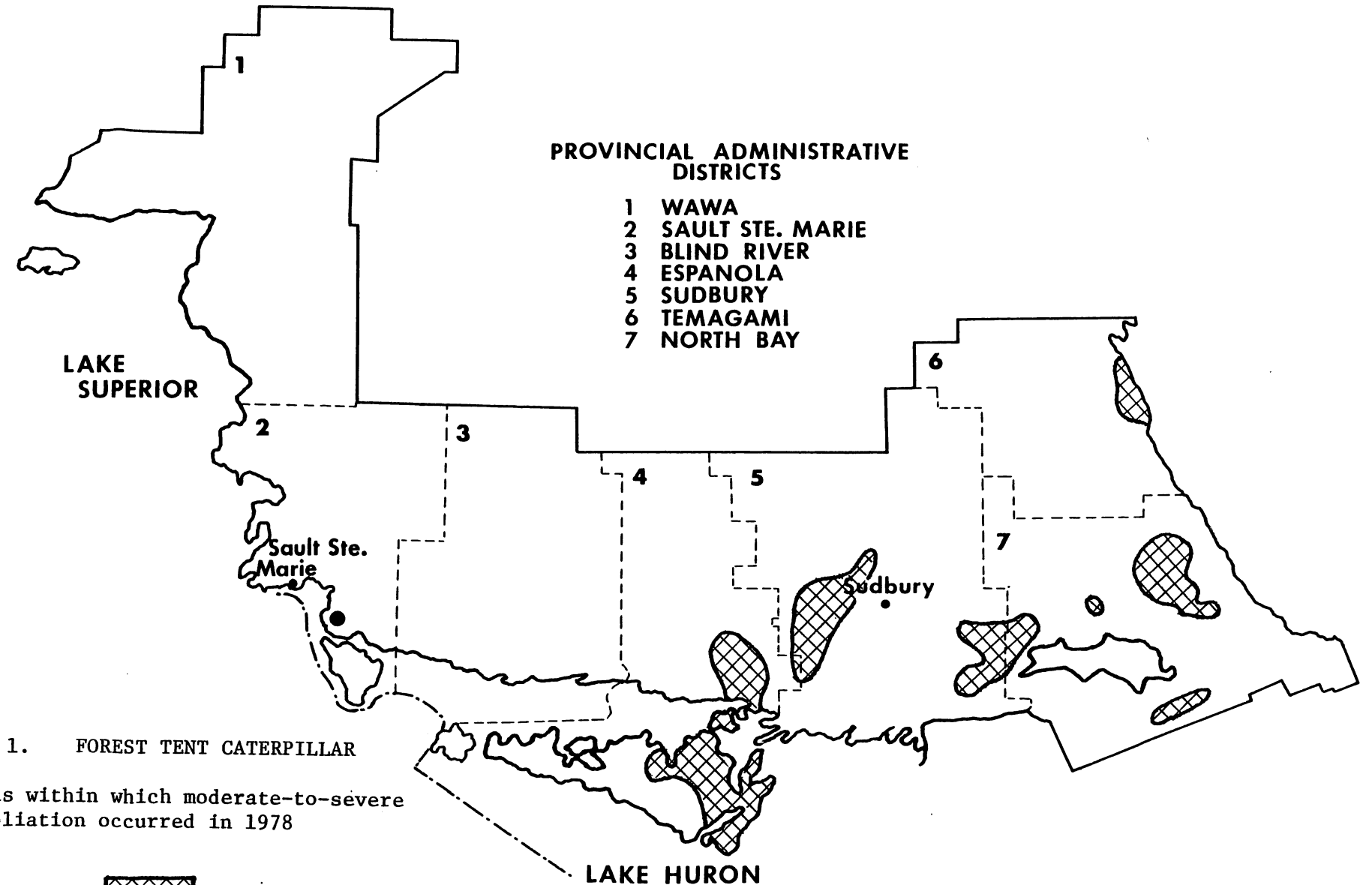


Fig. 1. FOREST TENT CATERPILLAR

Areas within which moderate-to-severe defoliation occurred in 1978

Egg-band counts in 1978 indicate populations will recur at a comparable level in most areas except in Temagami District where a modest spread is forecast in the South Lorrain area. Reduced populations are indicated in Sheguindah Township, Espanola District (Table 1).

Table 1. Summary of forest tent caterpillar egg-band counts and infestation forecasts for 1979 in Northeastern Region (counts based on examination of one to three trembling aspen per location).

Location (Twp)	Avg DBH (cm)[a]	No. of trees sampled	Avg no. of egg bands per tree	1979 infestation forecast[b]
Espanola District				
Hallam	10	1	8	S
Assaginack	10	1	9	S
Sheguindah	10	3	1	L
North Bay District				
McPherson	13	1	14	S
French	10	3	1	L
Merrick	10	3	1	L
Sault Ste. Marie District				
Laird	13	3	14	S
Tarbutt Add'l	13	3	23	S
St. Joseph	15	3	7	M
Plummer	10	3	0	Nil
Sudbury District				
Balfour	13	1	15	S
Casimir	10	1	11	S
Temagami District				
South Lorrain	13	3	3	L
Lorrain	5	1	10	S
Bucke	13	3	0	Nil
Gillies Limit	13	3	1	L
Strathcona	13	3	0	Nil

[a] 1 cm = 0.39 in.

[b] L = light, M = moderate, S = severe

Redheaded Pine Sawfly, *Neodiprion lecontei* (Fitch)

Heavy infestation of this destructive sawfly was found in a small plantation of red pine in Jocelyn Township on St. Joseph Island. Virus was introduced by the Ontario Ministry of Natural Resources. Spraying was also carried out in Cobden Township north of the Mississauga Indian Reserve to prevent a buildup of residual populations following last year's control operations.

European Pine Sawfly, *Neodiprion sertifer* (Geoff.)

This defoliator persisted at a population level comparable to 1977 within the city of Sault Ste. Marie causing moderate-to-severe damage at various locations. Three successive years of decline have reduced the populations in Scots pine (*Pinus sylvestris* L.) plantations on Manitoulin Island to an endemic level (Table 2).

Table 2. Summary of colony counts of European pine sawfly in Scots pine plantations on Manitoulin Island, 1976 to 1978.

Location (Twp)	No. of trees examined each year	Avg no. of colonies per tree		
		1976	1977	1978
Billings	200	.11	.05	.00
Carnarvon	100	.01	.00	.00
Carnarvon	100	.16	.07	.00
Carnarvon	50	.28	.00	.00
Carnarvon	50	.84	.06	.00
Dawson	100	.13	.03	.00
Dawson	300	.06	.01	.00
Dawson	100	.06	.00	.00
Gordon	100	.25	.08	.00
Gordon	50	.00	.02	.00
Sandfield	100	.19	.07	.00

Swaine Sawfly, *Neodiprion swainei* Midd.

Heavy infestation of this sawfly continued to cause severe defoliation to jack pine (*Pinus banksiana* Lamb.) trees in the Banks-Malobe lakes area in the northern part of Temagami District. Repeated defoliation has caused considerable tree mortality along the shorelines. Aerial observations revealed many dead tops in this area and in a smaller infestation

north of Lady Evelyn Lake in parts of Klock, Leo and Van Nostrand townships. Lightly defoliated trees were observed at widely scattered locations around Wakimika, Lady Evelyn, Obabika and Temagami lakes.

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

High populations persisted in the New Liskeard area, Temagami District, causing severe damage to hedges, windbreaks and ornamentals. Heavy damage was again recorded in the Conservation Authority plantation in Neelon Township in Sudbury District. Repeated severe defoliation at this location during the past several years has resulted in some tree mortality and increasing amounts of top-kill. Elsewhere in the Region populations were low.

White Pine Weevil, *Pissodes strobi* (Peck)

Fluctuations in leader damage to white pine (*Pinus strobus* L.) plantations and regeneration occurred in 1978. Early observations of large numbers of adult weevils in several areas in Blind River District indicating potential severe leader damage were confirmed in assessments carried out in late summer. In Kamichisitit Township approximately 99% of the trees in a 60-ha (150-acre) plantation showed leader damage; in Gladstone Township 77% was recorded and in Parkinson 72%. A high level of damage was observed in Patton, Kirkwood and Lefroy townships; however, control by leader clipping was carried out. In Sudbury District the most noticeable change occurred in Burwash Township where 30% leader damage was found compared to 7% the previous year. Conversely, in Espanola District a moderate decline was recorded but populations still remain relatively high. Populations in North Bay and Temagami districts showed minor differences except in Lauder Township where weevil incidence decreased from 17% to 2%.

Larch Sawfly, *Pristiphora erichsonii* (Htg.)

High populations persisted for the second consecutive year on large diameter trees at one location on the Garden River Indian Reserve and on smaller trees in St. Joseph Township in Sault Ste. Marie District. Small numbers of colonies were present in Hilton Township on St. Joseph Island and in Kirkwood, Rose and Patton townships in Blind River District.

Mountain Ash Sawfly, *Pristiphora geniculata* (Htg.)

Severe defoliation of mountain ash (*Sorbus americana* [Marsh.]) trees caused by the feeding of this insect was common throughout Temagami District and in Calibert and McMurray townships in Wawa District. Elsewhere, populations, although widespread, were at a low level.

Red Pine Needle Midge, *Thecodiplosis piniresinosae* Kearby

For the second consecutive year varying populations were present in the Kirkwood Management Unit in Blind River District. The heaviest infestation recurred on large-diameter red pine trees in Kirkwood Township. Light-to-moderate damage was observed in most other stands in Rose and Bridgland townships. Light intensities were present in several plantations in Plummer, Plummer Additional and Johnson townships in Sault Ste. Marie District.

Table 3. Other forest insects.

Insect	Host(s)	Remarks
Aphrophora cribrata (Say) Pine spittlebug	scP, jP, wP	Populations declined to moderate levels in Kirkwood Twp, Blind River District; low levels were noted in Espanola and North Bay districts.
Archips argyrospilus (Wlk.) Fruit tree leafroller	wB, yB, tA, mM	high levels on mM in Scadding Twp, Sudbury District, and on understory wB in Michano Twp, Wawa District; moderate levels on alder (*Alnus* spp.) in Laird Twp, Sault Ste. Marie District; trace levels in Espanola and North Bay districts
Archips cerasivoranus (Fitch) Uglynest caterpillar	ecCh	moderate populations in Victoria Twp, Espanola District, and Phelps Twp, North Bay District; reduced levels in Blind River and Sault Ste. Marie districts
Archips myricanus McD. Leafroller	A	high populations along airport road in Patton Twp, Blind River District
Argyresthia aureoargentella Brower Cedar leafminer	eC	moderate browning in Carnarvon Twp; light discoloration elsewhere on Manitoulin Island
Argyresthia oreasella Clem. Cherry shoot borer	Se	moderate population at Hiawatha Park, Sault Ste. Marie District, and Eley road, Blind River District

(continued)

Table 3. Other forest insects (continued).

Insect	Host(s)	Remarks
Cecidomyia reeksi Vock. Jack pine resin midge	jP	occasional trees heavily infested along Dubreuilville road, Wawa District
Choristoneura rosaceana Harr. Obliquebanded leafroller	tA, blA, pCh, W, wB	high populations on willow (*Salix* spp.) in Kirkwood Twp, moderate on pin cherry (*Prunus pensylvanica* L.f.) in Twp 4F, Blind River District; trace and light numbers at many widely scattered locations in Region
Chrysomela interrupta Fab. Leaf beetle	bPo	moderate populations along McCreight dam road in Kirkwood Twp, Blind River District
Cryptorhynchus lapathi (Linn.) Poplar root borer	bPo, W	found commonly in Blind River District
Eriophes sp. Gall-mite	sM	trace levels widespread on regeneration hard maple in Espanola, North Bay and Sudbury districts
Eucosma gloriola Heinr. Eastern pineshoot borer	rP	light populations in one large plantation in Patton Twp, Blind River District
Hyphantria cunea (Dru.) Fall webworm	blA	light populations on the southwest and north shores of Lake Nipissing
Lecanium sp. Scale insect	blA	high populations on understory trees along Boyle road, St. Joseph Twp, Sault Ste. Marie District
Malacosoma americanum (F.) Eastern tent caterpillar	ecCh	large numbers of tents at one location in Long Twp, Blind River District; reduced populations elsewhere

(continued)

Table 3. Other forest insects (concluded).

Insect	Host(s)	Remarks
Meroptera pravella Grt. Lesser aspen webworm	tA	moderate populations on semi-mature trees in Widdifield Twp, North Bay District
Neurotoma inconspicua (Nort.) Plum webspinning sawfly	pCh	large numbers of tents along McCreight's dam road, Kirkwood Twp, Blind River District
Zeiraphera canadensis Mut. & Free Yellow spruce shootworm	wS	high populations on scattered trees in Carlyle Twp, Sudbury District
Zelleria haimbachi Busck Pine needle sheathminer	jP	moderate numbers on small trees in Poulin Twp, Blind River District

TREE DISEASES

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

Needle rust of spruce was again common in the western and northern part of Wawa District. Stands suffered light-to-moderate defoliation along the Dubreuilville road where virtually all black spruce (*Picea mariana* [Mill.] B.S.P.) were affected. This area has had the highest amount of foliar damage for several years. Elsewhere in the Region trace levels occurred infrequently.

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

Defoliation by ink spot in the Region was generally higher this year compared to 1977. Five pockets of moderate defoliation were observed in the Region. Defoliation ranged from 25% to 40% in these areas and confined to stands less than a hectare in size. Single pockets were located in Blind River, Sudbury and Wawa districts; two were located in North Bay District. A 4-ha (10-acre) stand in Herrick Township in Sault Ste. Marie District had light defoliation. Infection has occurred at this location sporadically over the past several years. The disease was observed at many other locations in the Region and although the incidence level was high, in most areas defoliation was generally light (Table 4).

White Pine Blister Rust, *Cronartium ribicola* J.C. Fisch.

The highest level of infection was observed in Foster Township in Espanola District where the number of trees with cankers increased from 19% in 1977 to 40% in 1978. More than half were noted as having stem cankers rather than branch infection. Incidence was moderate in understory white pine in Peever Township, Wawa District, and in open-growing plantations in McLaren Township in North Bay District (Table 5). Low levels of cankering are widespread elsewhere in the Region.

Scleroderris Disease of Pine, *Gremmeniella abietina* (Lagerb.) Morelet

Incidence of this disease is high in the Kirkwood Management Unit, Blind River District, and continues to infect and cause serious damage to young red and jack pine in several areas. Two plantations, one red and one jack pine, 1 m (3 ft) in height, were evaluated in Kirkwood Township. Incidence levels of 69% and mortality of 17% were comparable in both plantations; however, the degree of severity differed substantially with 45% of the red pine severely infected and 62% recorded for jack pine. In addition the incidence of stem cankers was higher on jack pine. In this case the occurrence of clusters of seedlings at each planted spot could have contributed to the severity of damage to jack pine, which is considered to be more resistant to the disease than red pine. In Haughton

Table 4. Defoliation damage caused by ink spot of poplar at 18 locations in the Northeastern Region in 1978.

Location (Twp)	Avg tree ht (m)[a]	Area affected (ha)[b]	Trees affected (%)	Defoliation (%)
Blind River District				
Cobden	4.5	5	100	5
Vance	7.6	<1	100	30
Tweedle	4.5	<1	50	5
Espanola District				
Victoria	6.0	<1	100	5
Nairn	2.0	<1	100	5
Bonnifield	4.0	<1	95	5
Baldwin	2.0	8	20	5
North Bay District				
Gibbons	11.0	1	100	5
Crerar	11.0	<1	100	35
Calais	9.0	<1	54	25
Lauder	2.0	<1	10	5
Sault Ste. Marie District				
Herrick	9.0	4	100	19
Sudbury District				
Scadding	4.0	<1	100	5
Drury	6.0	2	100	25
Waldie	5.0	6	90	5
Wawa District				
Dumas	4.5	<1	5	5
Maness	12.2	<1	100	40
Miskokomon	9.0	<1	10	5

[a] 1 m = 3.28 ft

[b] 1 ha = 2.47 acres

Township two red pine plantations, one 0.5 m (1.6 ft) and one 0.2 m (7.8 in.) in height, were examined. Incidence of the disease was 80% and 20%, level of cankering was 70% and 20% and tree mortality 60% and 20%, respectively. A red pine plantation of small trees in Galbraith Township, well removed from the areas of infected pine, had no evidence of Scleroderris disease.

Hypoxylon Canker of Poplar, *Hypoxylon mammatum* (Wahl.) Miller

This disease is widespread in the Region. Quantitative sampling in a number of stands showed that the incidence of the disease is low, except in Curtis and Plummer townships in Sault Ste. Marie District where moderate levels of cankering occurred (Table 6). New mortality did not exceed 1% in stands evaluated.

Maple Anthracnose, *Kabatiella apocrypta* (Ell. & Ev.) Arx

Most maple stands along Highway 561 north of Rydal Bank to Ophir, and along Highway 638 throughout Sylvan Valley in Sault Ste. Marie District were affected by this disease. Overall infection levels were generally light; however, in Meredith and Aberdeen Additional townships heavy damage occurred in occasional stands. In Blind River District, along the Shaw road and in Dunns Valley, the disease was found infrequently and at a low level of infection.

Needle Rust of Larch, *Melampsora paradoxa* Diet. & Holw.

A sharp increase in the incidence of this rust occurred in the Blind River and Sault Ste. Marie districts. Trace levels of infection were present in all larch (*Larix* spp.) stands in Galbraith and Kirkwood townships in Blind River District, in Plummer, Hynes, St. Joseph, Jocelyn, Laird, Parke townships, and on the Garden River Indian Reserve in Sault Ste. Marie District. Past occurrences show that damage to this host rarely exceeds the light level as usually only a few needles are affected. Damage of epidemic proportions, however, can be reached on the alternate host, willow.

Spruce Chlorosis

The occurrence of chlorotic spruce in the vicinity of Limestone Lake in Ledger Township, Nipigon District, in 1977 prompted a survey throughout the northern regions to determine the prevalence of this condition. Affected spruce are characterized by a yellow foliar color due to reduced levels of chlorophyll.

Nine locations, widely distributed throughout the Region, were examined. All areas showed negative results except in Kirkwood Township, Blind River District, where 31% of the white spruce in an 8-ha (20-acre) plantation were rated as chlorotic.

Table 5. Summary of percentage of trees affected by the white pine blister rust at eight locations in the Northeastern Region in 1978.

Location (Twp)	Avg ht of sample trees (m)[a]	Avg DBH (cm)[b]	Area affected (ha)[c]	Trees affected (%)
Blind River District				
Thessalon	4.5	13	<1	1.0
Gladstone	2.1	3	<1	2.0
Wells	3.6	8	<1	4.0
Espanola District				
Foster	2.7		<1	40.0
North Bay District				
McLaren	2.0		44	12.0
McLaren	1.6		102	2.0
Boulter	2.0		8	5.0
Wawa District				
Peever	4.5	8	<1	18.0

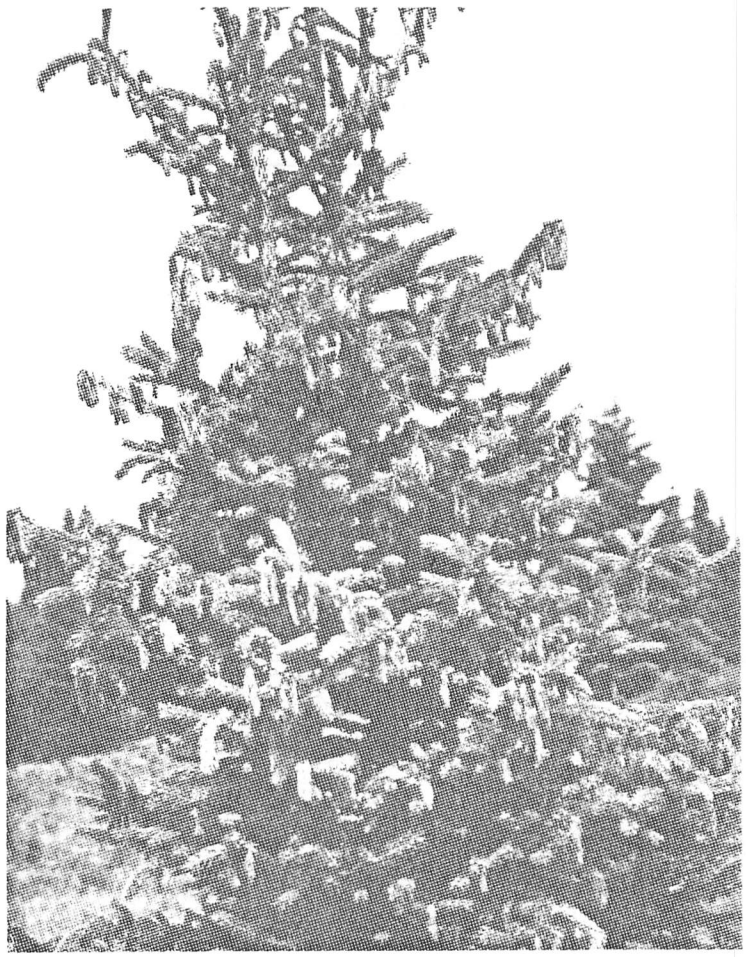
[a] 1 m = 3.28 ft

[b] 1 cm = 0.39 in.

[c] 1 ha = 2.47 acres

Frost Damage

Low temperatures during early June caused varying degrees of frost damage in the Region (see photograph). Small white spruce trees suffered the heaviest damage. Evaluations made in Kirkwood and Kamichisitit townships in Blind River District showed 23% and 26% of the new shoots killed, respectively. In Curtis Township, Sault Ste. Marie District, a similar level of damage was observed. In the eastern part of the Region the heaviest damage, 18%, occurred in Crerar Township, North Bay District. Low damage levels were common elsewhere (Table 7).



White spruce tree showing typical damage to new shoots caused by late spring frost.

Table 6. Summary of percentage of trembling aspen (*Populus tremuloides* Michx.) trees affected by hypoxylon canker in nine locations in the Northeastern Region in 1978.

Location (Twp)	Avg ht of sample trees (m)[a]	Avg DBH (cm)[b]	Area affected (ha)[c]	Trees affected (%)
Blind River District				
Mack	9.1	10	<1	2
Wardle	7.6	10	2	1
Tweedle	4.6	5	2	3
Sault Ste. Marie District				
Curtis	13.1	13	4	9.5
Plummer	12.2	10	<1	7
Laverendrye	7.6	10	10	4
Gaudette	12.2	13	10	2
St. Joseph	18.3	18	2	3
Herrick	9.1	10	4	3.1

[a] 1 m = 3.28 ft

[b] 1 cm = 0.39 in.

[c] 1 ha = 2.47 acres

Winter Drying

Foliage damage due to winter injury was widespread in the Region. The most pronounced discoloration was observed in the Portelance Lake area in Blind River District where small white pine suffered moderate-to-severe damage and red pine light-to-moderate damage. Light damage levels occurred on red, Scots and jack pine in Espanola, North Bay and Sudbury districts.

Table 7. Summary of frost damage to white spruce foliage at ten locations in the Region in 1978 (based on the examination of 150 trees at each location).

Location (Twp)	Tree height (m)[a]	Area affected (ha)[b]	Trees affected (%)	Defoliation (%)
Blind River District				
Kirkwood	1.3	8	100	23.0
Kamichisitit	2.3	4	100	26.0
Espanola District				
Baldwin	2.0	8	83	5.0
North Bay District				
Crerar	1.3	7	100	18.0
Boulter	2.0	8	90	5.0
Phelps	0.5	10	10	10.0
Bonnifield	2.6	0	9	5.0
Sault Ste. Marie District				
Curtis	1.1	4	100	22.5
Sudbury District				
Burwash	1.0	7	1	5.0
Wawa District				
Lendrum	1.3	19	97	1.2

[a] 1 m = 3.28 ft

[b] 1 ha = 2.47 acres

Table 8. Other forest diseases.

Organism	Host(s)	Remarks
Armillaria mellea (Vahl ex Fr.) Kummer Shoestring root rot	conifers	low incidence throughout the Region
Cylindrosporium sp. Leaf spot	wB	moderate damage levels on small branches in Baldwin Twp, Espanola District
Cytospora sp. Stem canker	MtA	occasional trees affected throughout Lake Superior Park, Wawa District
Davisomycella ampla (Davis) Darker Needle cast	jP	small area of moderate infection in Gladstone Township, Blind River District
Lophodermium pinastri (Schrad. ex Hook.) Chev. Needle cast	rP	occasional trees affected in Parkinson and Patton townships, Blind River District
Melampsora medusae Thuem. Larch needle rust	tL	trace levels in Cobden and Gladstone townships, Blind River District; Fisher Township, Sault Ste. Marie District
Phyllosticta sp. Leaf spot	rO, MtA	moderate damage levels on mature oak (*Quercus* spp.) Dawson Township, Espanola District; trace levels in Lake Superior Park and along Michipicoten road, Wawa District, on mountain ash.
Venturia macularis (Fr.) E. Muell. & Arx Leaf and twig blight	tA, ltA	small area of heavy infection on tA in Labelle Twp, Wawa District, and on ltA in Kirkwood Twp, Blind River District