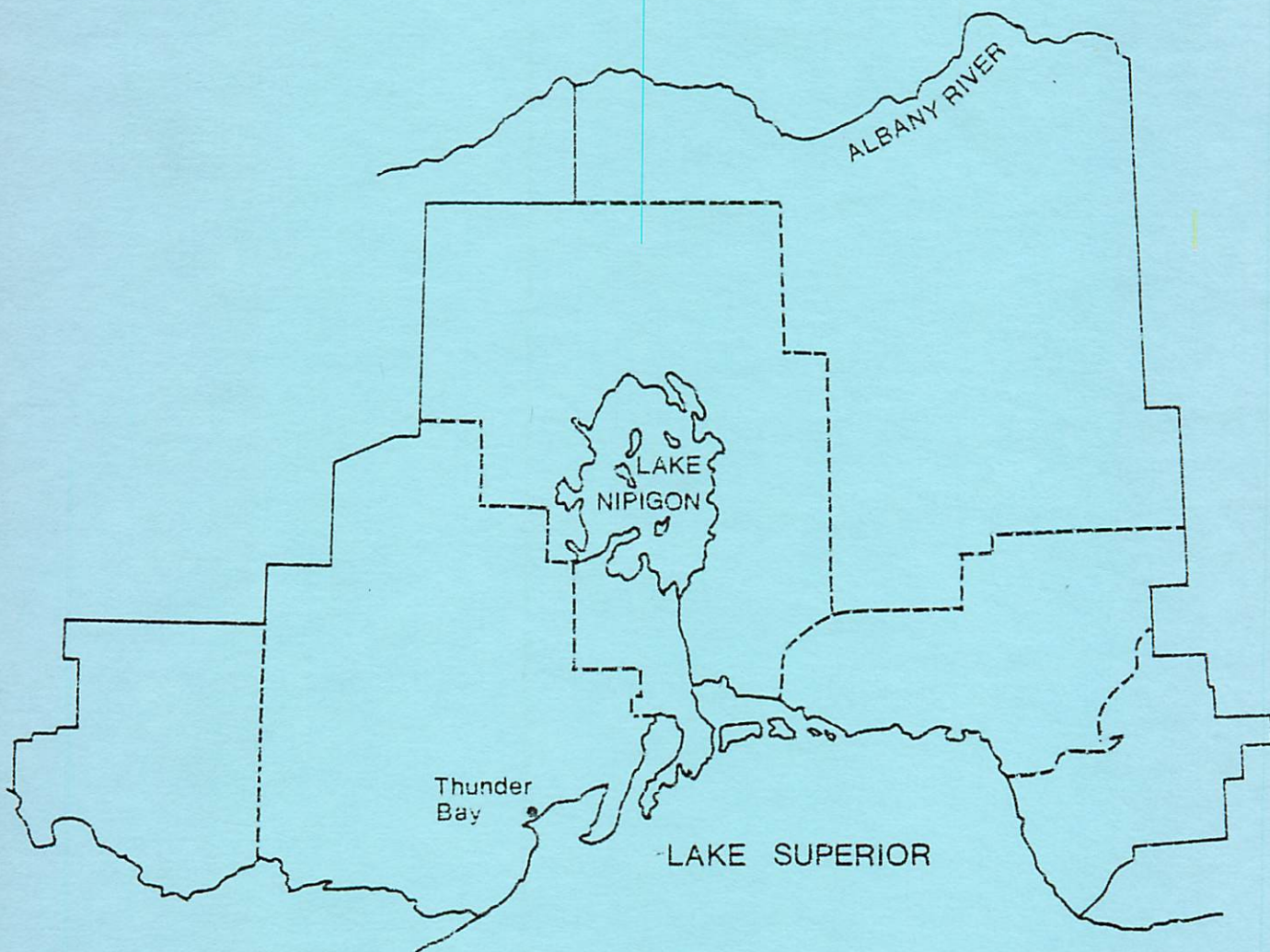


AUTHOR FILE

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Results of forest insect and disease surveys in the NORTH CENTRAL 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

Weather conditions were an important factor in 1978 in the North Central Region. Cool, wet weather caused most insect development to be up to two weeks later than normal. Severe frost in early June caused considerable damage to conifers across parts of the Region. The cold weather also affected the survival of young forest tent caterpillar.

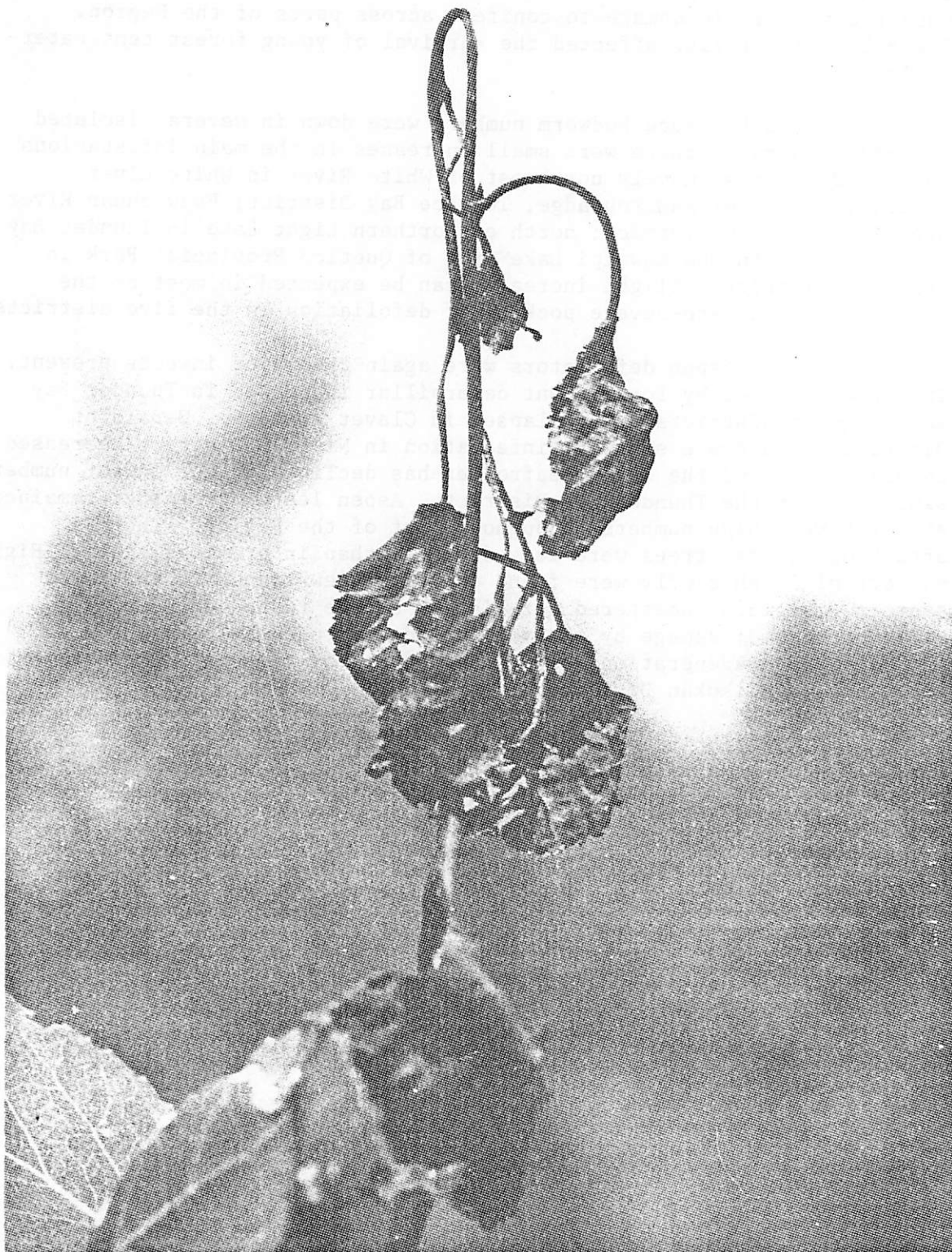
Although spruce budworm numbers were down in several isolated pockets, generally there were small increases in the main infestations in five districts, namely northwest of White River in White River District; north of Manitouwadge, Terrace Bay District; Pagwachuan River area in Geraldton District; north of Northern Light Lake in Thunder Bay District; and in the Kawnipi Lake area of Quetico Provincial Park in Atikokan District. Slight increases can be expected in most of the existing moderate-to-severe pockets of defoliation in the five districts.

Several aspen defoliators were again the major insects present. The area attacked by forest tent caterpillar increased in Thunder Bay and Atikokan districts but collapsed in Clavet Township, Geraldton District. The Bruce spanworm infestation in Nipigon District decreased considerably, and the aspen leafroller has declined to the lowest numbers since 1975 in the Thunder Bay District. Aspen leafblotch miner remained at relatively high numbers throughout most of the Region. Insects attacking conifer trees were less dramatic than in previous years. High numbers of larch sawfly were found only in a few stands in the three eastern districts; scattered defoliation by the redheaded jack pine sawfly recurred; damage by the yellowheaded spruce sawfly was common; and jack pine regeneration was again attacked by the eastern pineshoot borer in the Atikokan District.

In addition to extensive frost damage several other foliage diseases were prominent. Young aspen stands showed widespread damage by the leaf and twig blight of aspen. A foliage rust on balsam fir was commonly observed in a portion of Thunder Bay and Nipigon districts and light defoliation by spruce needle rust was frequently observed. A chlorotic condition of spruce, noticeable in the Limestone Lake area, Nipigon District, in 1977, was not detected elsewhere in the Region.

H. D. Lawrence

W. D. Biggs



Frontispiece. Trembling aspen shoot showing typical damage caused by leaf and twig blight, *Venturia macularis* (Fr.) E. Müll. & Arx.

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INSECTS

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 O-X-300). This report provides a complete description and analysis of developments in the spruce budworm situation in Ontario in 1978 and gives information forecasts for the province for 1979.

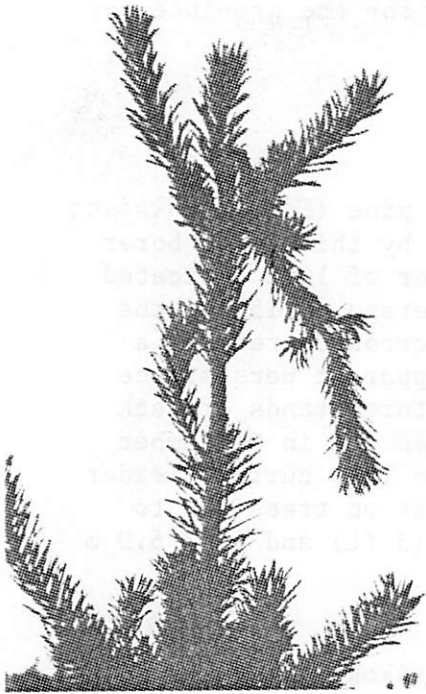
Eastern Pineshoot Borer, *Eucosma gloriola* Heinr.

Regenerated areas of 7 to 10 year old jack pine (*Pinus banksiana* Lamb.) in the Atikokan District have been infested by this shoot borer for the past three years. Surveys during the summer of 1978 indicated the insect recurred across the district with an average of 15% of the trees being attacked (Table 1). The formation of crooked trees as a result of leader attack (see photograph) and the apparent persistence of this insect has initiated some concern about future stands of jack pine in the district. More detailed surveys carried out in September of 1978 showed a lower average of 5.2% (range 0% to 14%) current leader attack in the 13 areas examined. Damage was highest on trees 2.0 to 3.0 m in height (6 to 9 ft) and trees under 1.0 m (3 ft) and over 5.0 m (15 ft) were not attacked.

Table 1. Summary of jack pine trees attacked in Atikokan District in 1978 (counts based on the examination of 100 trees at each location).

Location	Avg ht of sample trees (m) ^a	Trees attacked (leader and/or lateral shoots) in 1978
East of Pipe Lake	2.7	6
Samuels Lake	2.1	14
Darby Lake	1.5	3
Southeast of Crystal Lake	1.8	15
West of Nydia Lake	2.7	10
East of Sawmill Lake	2.4	19
East of Tower Lake	2.4	25
Disk Lake	2.7	25

^a 1 m = 3.28 ft



Leader of a young jack pine broken
at the exit point following feeding
by the eastern pineshoot borer,
Eucosma gloriola Heinr.

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



Birch Leafminer, *Fenusa pusilla* (Lep.)

Each year for the past decade high numbers of this introduced pest on ornamental birch (*Betula* spp.) have been reported in the city of Thunder Bay and at scattered points to the east. The situation did not change in 1978 as severe leafmining was again apparent, not only within the city of Thunder Bay, but in surrounding rural areas. Light damage was commonly seen through most of the Region with scattered trees suffering moderate-to-severe attack. Collections made south of Geraldton in the Geraldton and Terrace Bay districts indicate the insect is now present throughout the area south of a line running along Highway 11 through Geraldton, crossing Lake Nipigon south of Gull Bay to north of English River, and along the north side of Atikokan District.

Aspen Leafblotch Miner, *Lithocolletis ontario* Free.

For the sixth consecutive year appreciable numbers of this leafblotch miner occurred throughout most of the Region, except in the White River District. Heavy browning of understory and semimature trembling aspen (*Populus tremuloides* Michx.) was observed in the Black River area of Pic Township, Terrace Bay District; along the Pagwa River Road, Clavet Township in Geraldton District; from Thunder Bay southwest to Northern Light Lake, Thunder Bay District; and in the Flanders-Kirk Lake area of Atikokan District. Elsewhere in the above districts and in the Nipigon District, populations were widespread but low.

Forest Tent Caterpillar, *Malacosoma disstria* Hbn.

As forecast, there was an increase in the area heavily infested by the forest tent caterpillar in the Thunder Bay and Atikokan districts. But, east of Thunder Bay there was very little evidence of feeding except in Boyce and Clavet townships, Geraldton District. The most notable spread occurred in Atikokan District where scattered pockets of severe defoliation were detected through the west half of the district from the United States border north to Ignace District (Fig. 1). Of these pockets, covering approximately 673 km² (260 mi.²), the main area was from Nym Lake west along Highway 11 to the district boundary.

In the Thunder Bay District severe defoliation recurred in Neebing, Paipoonge, and O'Connor townships with some defoliation in adjacent townships. As trees were defoliated, large numbers of larvae became a nuisance factor as they wandered onto roads, lawns, and houses.

Table 2. Summary of forest tent caterpillar egg-band counts on trembling aspen in three districts in 1978 with infestation forecasts for 1979.

Location	Avg DBH of trees (cm) ^a	No. of trees sampled	Avg no. of egg bands per tree	Infestation forecast for 1979
Atikokan District				
Aramis Lake	12	1	24.0	severe
Atikokan, north side	10	1	54.0	severe
Atikokan, south side	7	1	16.0	severe
Hwy 11, 8 km west of Atikokan	11	1	26.0	severe
Hwy 11, 24 km west of Atikokan	11	1	81.0	severe
Hwy 11, 40 km west of Atikokan	15	1	18.0	severe
Clearwater West Lake	16	1	74.0	severe
Williamson Lake	10	1	11.0	severe
Thunder Bay District				
Gillies Twp	11	1	26.0	severe
Neebing Twp	9	1	85.0	severe
O'Connor Twp	10	1	32.0	severe
Oliver Twp	10	1	36.0	severe
McIntyre Twp	9	1	9.0	severe
Paipoonge Twp	11	1	23.0	severe
Scoble Twp	10	2	0.5	light
Geraldton District				
Clavet Twp, Pagwa Road	12	3	0.0	nil
Clavet Twp, Eureka Lake Road	12	3	0.0	nil

^a 1 cm = 0.39 in.

NORTH CENTRAL REGION

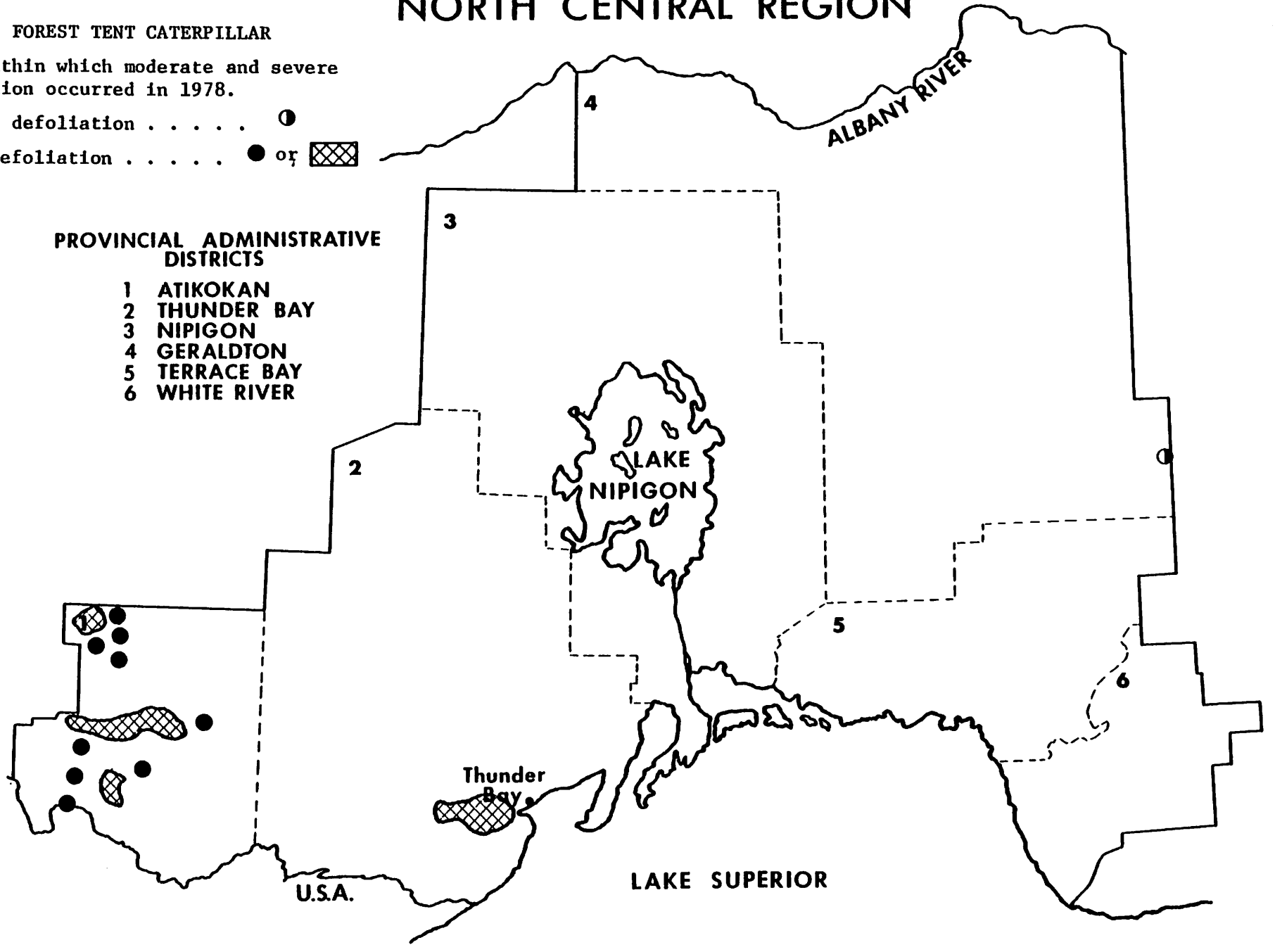
Fig. 1. FOREST TENT CATERPILLAR

Areas within which moderate and severe defoliation occurred in 1978.

Moderate defoliation ○
Severe defoliation ● or ☒

PROVINCIAL ADMINISTRATIVE DISTRICTS

- 1 ATKOKAN
- 2 THUNDER BAY
- 3 NIPIGON
- 4 GERALDTON
- 5 TERRACE BAY
- 6 WHITE RIVER



Only moderate defoliation was observed this year, where high numbers occurred in 1977 west of Eureka Lake in Clavet and Boyce townships. Freezing temperatures may have caused considerable mortality of young larvae in this area. A few larvae were observed at one point east of Geraldton, but this was the only other observation of the pest.

Cocoon parasitism counts indicate the parasite *Sarcophaga aldrichi* Park., a natural control agent of the forest tent caterpillar, is slowly increasing around Atikokan where an average of 17% of the cocoons were attacked in three areas checked. However, in the Thunder Bay infestation, parasitism has reached an average of 52%.

Infestations are expected to continue in 1979 in the Atikokan and Thunder Bay districts and increases in the area of severe defoliation will probably occur in both districts (Table 2). No noticeable defoliation is expected in the Geraldton District where egg-band counts were negative in two areas.

Sawyer Beetles, *Monochamus* spp.

Since 1976 adult beetles have been commonly observed in the Region. In 1977 effects of adult beetle feeding became obvious southeast of Armstrong, Nipigon District, and at a few points as far east as Longlac. Also a buildup of sawyer beetles has occurred in strip-cut areas south of Kopka Lake, Nipigon District, where cut material has been left for several years. The resulting adult feeding has caused considerable branch, top, and total tree mortality of residual fringe trees. Two species of sawyer beetles and two species of flatheaded wood borers were retrieved from piled material in this area, indicating populations were still active. This material was removed before complete adult emergence, and damage of standing timber was minimal. However, adults were still observed here and at other locations in Nipigon, Geraldton, and Thunder Bay districts, particularly in stands of drought-killed balsam fir (*Abies balsamea* [L.] Mill.) in the latter district.

Redheaded Jack Pine Sawfly, *Neodiprion virginianus* complex

This sawfly, a common pest of jack pine in the Region for the past several years, was again observed frequently in 1978. Increased amounts of defoliation occurred in the Geraldton District, where moderate-to-severe damage was found along Highway 11 approximately 40 km (25 mi.) east of the town of Longlac and at one location along the Goldfield Road. Heavy defoliation, for the third consecutive year, was recorded on hedgerow trees along Highway 17 west of Upsala in Thunder Bay District. Light infestation levels were common in the townships of Ashmore and Croll and near the Kimberly-Clark Tree Nursery, all located in Geraldton District; in the Hourglass Lake area and north of Hillsport in Terrace Bay District; and in the Matawin River area, Thunder Bay District.

Bruce Spanworm, *Operophtera bruceata* (Hlst.)

Population levels of this hardwood defoliator decreased in the southern part of the Nipigon District. Light defoliation of trembling aspen was observed north of the town of Nipigon from the middle of Purdom and Booth townships east to the northwest corner of Patience Township. Isolated pockets of light damage were found east of Pine Portage, and in Corrigan and Lett townships. In contrast, the area of moderate-to-severe defoliation in the Beardmore area remained about the same size, 267 km² (103 mi.²), but shifted eastward away from Lake Nipigon (Fig. 2). Larvae were not found elsewhere in the Region.

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

High numbers of this sawfly, evident on open-grown, ornamental, and planted white spruce (*Picea glauca* [Moench] Voss) and black spruce (*Picea mariana* [Mill.] B.S.P.) since 1975, recurred at widely scattered areas in all districts but White River. Heavy feeding was observed on several fringe trees near the Black River, Terrace Bay District; on a few young white spruce in Klotz Lake Provincial Park in Geraldton District; on ornamentals within the city of Thunder Bay, on roadside white spruce north of Beardmore and in a black spruce plantation north of Hurkett in Nipigon District. In the latter area control measures were carried out by the Ontario Ministry of Natural Resources (OMNR). In Atikokan District heavy defoliation was observed on planted white spruce east of Eva Lake, on open-grown trees around French Lake and Nym Lake and at scattered points west of Atikokan. Elsewhere, low numbers were commonly observed.

White Pine Weevil, *Pissodes strobi* (Peck)

This perennial pest of conifers occurred at damage levels on young black spruce in the Limestone Lake area, Nipigon District, and on jack pine regeneration near Jordain Lake and at km 22 (mi. 14) on the Matawin River road in Thunder Bay District (Table 3). Elsewhere, counts in a lodgepole pine (*Pinus contorta* Dougl.) plantation in O'Meara Township, a Kimberly-Clark black spruce seed orchard in Geraldton District and at eight other young jack pine stands in Terrace Bay and Atikokan districts showed an average of 2% attack.



Larch Sawfly, *Pristiphora erichsonii* (Htg.)

Population levels declined in most areas of the Region. However, pockets of moderate-to-severe defoliation were found east of Longlac along Highway 11, Geraldton District; near Obatanga Provincial Park, White River District; and near the Prairie River in Tuuri Township,

NORTH CENTRAL REGION

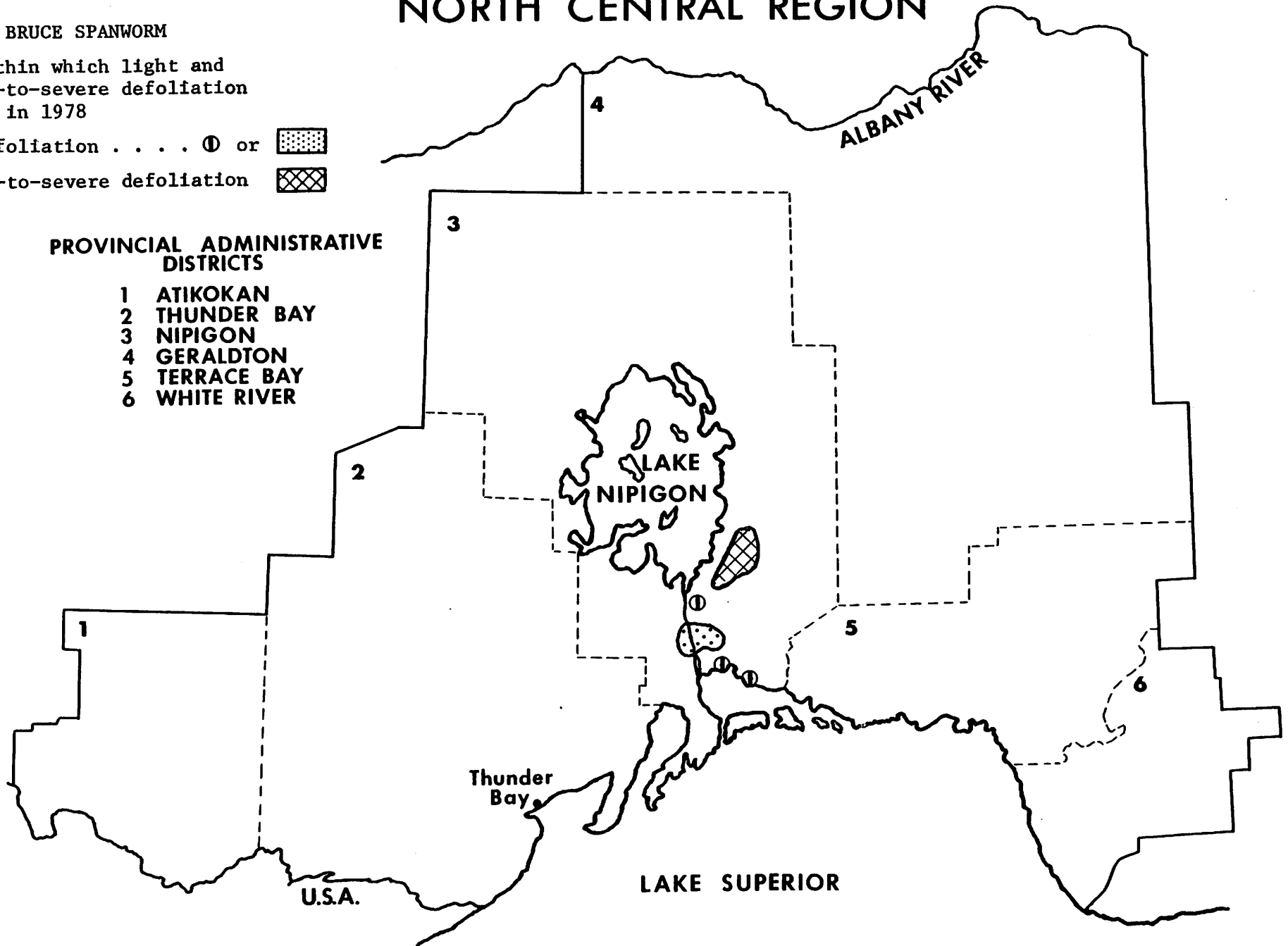
Fig. 2. BRUCE SPANWORM

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

Light defoliation ① or 
Moderate-to-severe defoliation 

PROVINCIAL ADMINISTRATIVE DISTRICTS

- 1 ATIKOKAN
- 2 THUNDER BAY
- 3 NIPIGON
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Terrace Bay District. Light-to-moderate damage was present east of Marathon in Pic and Lecours townships, Terrace Bay District. Low numbers were found along the Catlonite Road and in Ashmore Township in Geraldton District. Individual colonies were collected in the Atikokan, Thunder Bay, and Nipigon districts.

Table 3. Summary of damage by the white pine weevil in five districts in 1978 (counts based on the examination of 100 trees at each location).

Location	Host	Avg DBH of sample trees (cm) ^a	Trees weeviled (%)
Geraldton District			
Kimberly-Clark Seed Orchard	bS	6	3
O'Meara Twp	lP	4	4
Nipigon District			
Limestone Lake (Hydro line)	bS	4	15
Limestone Lake	bS	4	21
Thunder Bay District			
SE of Jordain Lake	jP	3	6
Matawin River Rd., km 22	jP	2	9
Terrace Bay District			
Herbert Twp	jP	3	3
Atikokan District			
Samuels Lake	jP	3	2
Darby Lake	jP	2	0
Pipe Lake	jP	3	3
Nydia Lake	jP	4	2
Trottier Twp, Tower Lake	jP	3	0
Sawmill Lake	jP	3	0
Hutchinson Twp, Disk Lake	jP	4	3

^a 1 cm = 0.39 in.

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

Population levels of this insect remained much the same in 1978. Individual host trees suffered heavy defoliation west of the town of White River, White River District, and from the southern end of the Manitouwadge Highway along Highway 17 to Marathon. Heavy damage was more noticeable in the young stands at the Limestone Lake area, Nipigon District, where mountain ash trees (*Sorbus americana* Marsh.) were more abundant. Light-to-moderate defoliation was common through the southeast half of Thunder Bay District, portions of Nipigon District, and east of Longlac in Geraldton District. No extension occurred west or north of the known range of this introduced sawfly.

Aspen Leafroller, *Pseudexentera oregonana* Wlshn.

Trembling aspen trees at scattered locations west of Thunder Bay have suffered severe attack since 1972. The large aspen tortrix *Choristoneura conflictana* Wlk. was prevalent from 1972 to 1974 and high numbers of this leafroller covered 2 850 km² (1,100 mi.²) in 1975. Since then the area attacked has been steadily decreasing and this year only 36 km² (14 mi.²) of forest southeast of Whitefish Lake were severely defoliated (Fig. 3). However, the insect was present in low numbers through 4 144 km² (1,600 mi.²) stretching from the United States border north to Highway 11 and west of Highway 11 and 17. Light-to-moderate defoliation was again detected around Upsala.

A small pocket of severe defoliation was observed west of Price Lake on the west boundary of Atikokan District, and some light feeding probably occurred in areas heavily defoliated by forest tent caterpillar in the same area. No larvae were observed in the other four districts.

Spruce Shootworms, *Zeiraphera canadensis* Mut. & Free., *Z. destitutana* (Walker), and *Z. fortunana* Kft.

These three species of shootworms, a common occurrence for the last four years on white spruce in the Thunder Bay and Nipigon districts, were again the most notable defoliators of large white spruce east of Thunder Bay. Moderate numbers of *Z. canadensis*, four times as many as spruce budworm, were found on mature white spruce in Boulevard Lake Park in Thunder Bay. Light damage by these insects, *Z. canadensis*, being the most abundant, was observed through the east half of Thunder Bay District and west of Lake Nipigon and Nipigon River in the Nipigon District. The only other occurrence of shootworms in the Region was in Bain Township, Geraldton District, where a few larvae were collected.

NORTH CENTRAL REGION

Fig. 3. ASPEN LEAFROLLER

Areas within which defoliation of trembling aspen occurred in 1978.

Light with scattered trees moderately defoliated . . .



Severe defoliation



or ●

PROVINCIAL ADMINISTRATIVE DISTRICTS

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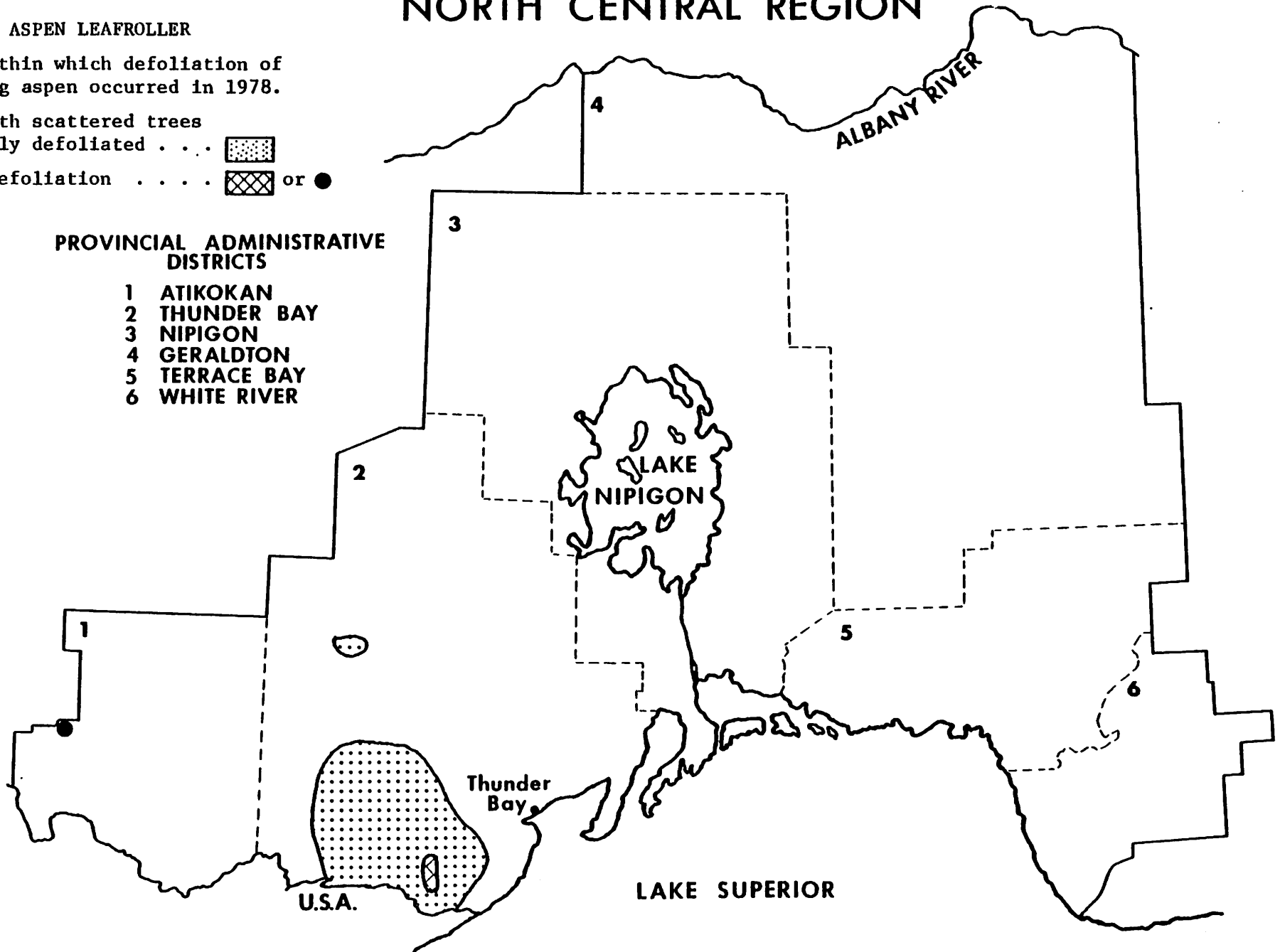


Table 4. Other forest insects.

Insect	Host(s)	Remarks
<i>Acrobasis betulella</i> Hlst. Birch tubemaker	wB	common along the Whalen Lake Road, Atikokan District, and at one location in White River District
<i>Acrobasis rubrifasciella</i> Pack. Alder tubemaker	A1	frequently observed in Atikokan District
<i>Altica ambiens alni</i> Harr. Alder flea beetle	A1	severe browning again this year from Sapawe to Windigoostigwan Lake, Atikokan District
<i>Archips argyrospilus</i> (Wlk.) Fruit tree leafroller	wB, tA, bPo	light defoliation in the Atikokan, Thunder Bay, and White River districts
<i>Archips cerasivoranus</i> (Fitch) Uglynest caterpillar	ecCh	High numbers recurred on roadside trees southwest of Thunder Bay, and occasional nests in Nipigon District.
<i>Choristoneura pinus pinus</i> Free. Jack pine budworm	jP	trace levels in the western part of Thunder Bay District
<i>Cinara</i> sp. Aphids	jP, wS	common on planted trees at various locations in most districts of the Region
<i>Dioryctria reniculelloides</i> Mut. & Mun. Spruce coneworm	wS	found in conjunction with spruce budworm in the eastern part of Geraldton District, a few collections in Nipigon District and one collection in Thunder Bay District
<i>Dryocampa rubicunda rubicunda</i> Fabr. Greenstriped mapleworm	rM	light feeding in the Flanders area, Atikokan District
<i>Enargia decolor</i> Wlk. Aspen twinleaf tier	tA	light damage at scattered locations in the Atikokan and Thunder Bay districts

(continued)

Table 4. Other forest insects (continued).

Insect	Host(s)	Remarks
<i>Eriocampa ovata</i> Linn. Alder woolly sawfly	A1	numerous in Neebing and Paipoonge twp, Thunder Bay District
<i>Fenusa dohrni</i> (Tischb.) European alder leafminer	A1	common in the southern part of the Nipigon and Thunder Bay districts
<i>Gonioctena americana</i> (Schaeef.) American aspen beetle	tA	generally low numbers on regeneration trees across the Region; most noticeable defoliation north of Dorion in Thunder Bay District
Gracillariidae	W	heavy browning at numerous locations in Geraldton District and parts of Nipigon District
<i>Lithocolletis nipigon</i> Free. Balsam poplar leafblotch miner	bPo	heavy leafmining from Whitefish Lake to Pigeon River, Thunder Bay District
<i>Messa populifoliella</i> Town. Poplar leafmining sawfly	tA	low numbers in the Atikokan, Thunder Bay and Geraldton districts
<i>Neurotoma inconspicua</i> (Nort.) Plum webspinning sawfly	pCh	common in the Atikokan and Thunder Bay districts
<i>Nycteola frigidana</i> Wlk. Willow leaftier	W	small numbers at scattered points in Atikokan District
<i>Otiorhynchus ovatus</i> Linn. Strawberry rootweevil	bS	considerable girdling of greenhouse seedlings in the Thunder Bay Forest Station, OMNR
<i>Pityogenes hopkinsi</i> Sw. Bark beetle	jP	common on dead and weakened trees in Bain Twp and km 124 (mile 77) on the Catlonite Road, Geraldton District

(continued)

Table 4. Other forest insects (concluded).

Insect	Host(s)	Remarks
<i>Rhabdophaga swainei</i> Felt Spruce bud midge	wS	low populations at Neys Provincial Park, Terrace Bay District
<i>Rheumaptera hastata</i> Linn. Black looper	wB, A1	common in Thunder Bay, Nipigon, and Atikokan districts with the heaviest damage in the latter district
<i>Zelleria haimbachi</i> Busck Pine needle sheathminer	jP	populations declined to low levels in the Thunder Bay District

TREE DISEASES

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

From general detection and the examination of eight jack pine and three white spruce stands in 1978, none of the areas observed had as great a degree of mortality as those recorded over the past two years in Terrace Bay, Nipigon, and Geraldton districts (see 1976 & 1977 reports). The slightly over 3% average mortality found in stands checked is considered a normal rate in young coniferous regeneration. The only areas to exceed 5% mortality level were two 8-year-old jack pine stands. One in Sackville Township, Thunder Bay District, sustained 7% mortality and the other, east of Pipe Lake in Atikokan District, had 8% annual mortality.

Dutch Elm Disease, *Ceratocystis ulmi* (Buism.) C. Moreau

In this Region, the disease was first confirmed in 1976 south of Moose Hill, Thunder Bay District. The inevitable spread to the city of Thunder Bay occurred this year. The fungus was positively identified from cultured samples taken from white elm (*Ulmus americana* L.) trees along the Kaministikwia River at Highway 61 on the south side of the city, within the city limits. Suspect elm trees on the Old Fort William grounds were sampled and all were rated to be disease-free.

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

White and black spruce stands commonly sustained light damage across the Region in 1978. Moderate defoliation was observed only north of Drift Lake and east of English River in Thunder Bay District (Table 5). In most stands where the percent of trees affected was high, defoliation was confined mainly to understory trees and the lower branches of dominant trees.

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

This foliage disease was more prevalent than in previous years and was commonly observed from Thunder Bay east to the White River District. In stands where the disease was present the percentage of trees affected ranged from 10% to 90%. However, only light defoliation was observed at four locations in the Region (Table 6).

Table 5. Trees affected and defoliation caused by spruce needle rusts in five districts in 1978

Location	Host	Avg ht of trees (m) ^a	Trees affected (%)	Defoliation level (%)
Atikokan District				
Williamson Lake	bs	7.5	90	20
Thunder Bay District				
Arrowroot Lake	wS	1.4	22	4
Drift Lake	bs	1.5	80	30
East of English River	bs	10.0	80	30
Terrace Bay District				
North of Hillsport	wS	0.5	0	0
Syine Twp	wS	3.5	60	20
Wintering Rd., km 21 (mi. 13)	bs	0.5	90	3
Geraldton District				
O'Meara Twp	wS	1.2	0	0
Chipman Lake	wS	2.0	30	5
Goldfield Rd.	bs	2.0	0	0
White River District				
Bryant Twp	wS	0.5	14	1

^a 1 m = 3.28 ft

Leaf Spot of Poplar, *Mycosphaerella populicola* G.E. Thomps.
(= *Septoria populicola* Pk.)

Increased amounts of browning caused by this disease were found in 1978 resulting in premature leaf-drop of balsam poplar (*Populus balsamifera* L.) foliage in late summer. Moderate-to-heavy infection was observed west of Atikokan and through portions of western Quetico Provincial Park, Atikokan District; in the Thunder Bay, Pigeon River, and Sandstone Lake areas of Thunder Bay District; the northern parts of Nipigon District; across most of the Geraldton District; and west of White River in the White River District. Light damage was present at other locations in the Region.

Table 6. Summary of trees affected and defoliation caused by ink spot of aspen in eleven stands infected in 1978

Location	Trees affected (%)	Defoliation level (%)	Area affected (ha) ^a
Terrace Bay District			
North of Hillsport	90	4	15
Grenville Twp	80	13	40
Geraldton District			
O'Meara Twp	10	1	20
Nipigon District			
Eva Twp	50	10	10
Kilkenny Twp	20	1	20
Domtar Camp 75	85	15	15
Ledger Twp	30	5	5
Nipigon Twp	60	10	16
Thunder Bay District			
Lybster Twp	19	2	12
Finmark	22	4	8
Muskrat Lake Rd.	40	2	16

^a 1 ha = 2.47 acres

A Rust of Balsam Fir, *Pucciniastrum epilobii* Otth

Significant defoliation by this rust was evident through the area north of Black Bay to McMaster Township and east to the town of Nipigon in the Thunder Bay and Nipigon districts. One stand 5 km (3 miles) north-east of Dorion had a 60% damage level and another stand west of Wolfpup Lake had 35% of the current foliage damaged. Other stands in this area had only individual trees or small pockets of trees with moderate-to-heavy damage. The disease was not seen elsewhere in the Region.

Leaf and Twig Blight of Aspen, *Venturia macularis* (Fr.) E. Müll. & Arx
(= *Pollaccia radiosa* [Lib.] Bald. & Cif.)

The percentage of affected trees increased across the Region; as a consequence, amount of defoliation increased (see Frontispiece). The trees affected averaged 70% and the percentage of foliage damaged

averaged 30%. High numbers of 1 to 3 m in height (3-9 ft) trees were affected in all the stands examined, except for two areas in Atikokan District and one in Geraldton District (Table 7). Generally, defoliation levels were in the low-to-moderate range except in Kilkenny Township and near Domtar Camp 56 in Nipigon District where heavy defoliation was present. A 2% mortality level was found in a 4-year-old aspen stand in Lybster Township, Thunder Bay District. This disease was present at low levels elsewhere in the Region.

Spruce Chlorosis

A special survey of ten 6-12 year old white spruce plantations was carried out in five districts to determine if the severe chlorotic condition, apparent in the Limestone Lake area of the Nipigon District in 1977, was more widespread the following year. In each stand 150 trees were checked. Aside from the Limestone Lake area, only spruce planted in an abandoned field in Pearson Township and spruce in a burned-over area near Arrowroot Lake, Thunder Bay District, showed any measurable degree of chlorosis (Table 8). Trees in these areas had a 2.0% and 1.3% yellow chlorotic condition, respectively, that may or may not be the disease referred to as white spruce chlorosis.

Drought

Since 1974 sizeable pockets of dead balsam fir (*Abies balsamea* [L.] Mill.), jack pine, black spruce, red pine (*Pinus resinosa* Ait.), eastern white cedar (*Thuja occidentalis* L.), and to a lesser extent white birch (*Betula papyrifera* Marsh.), and trembling aspen have been attributed to the drought conditions of 1974, 1975 and 1976. More surveys were carried out this year in the major areas of mortality, namely, from Lake Superior west to Whitefish Lake, Thunder Bay District and through the south half of Quetico Provincial Park in Atikokan District. Five areas were examined and mortality ranged from 22% in pole-sized balsam fir north of Whitefish Lake to a high of 71% in black spruce growing on shallow soil on the north side of Louisa Lake, Quetico Park (Table 9).

Table 7. Summary of trees attacked and defoliation caused by the leaf and twig blight of aspen in six districts in 1978.

Location	Trees affected (%)	Foliage damage (%)	Area affected (ha) ^a
Atikokan District			
Crystal Lake	10	<5	200
Hutchinson Twp	5	<5	80
Geraldton District			
Clavet Twp	75	20	5
O'Meara Twp	20	10	10
Nipigon District			
Abitibi Camp 40 Rd.	47	3	100
Domtar Camp 56	90	80	10
Kilkenny Twp	100	85	<1
Ledger Twp	80	60	40
Limestone Lake	85	55	40
Onaman Lake	85	30	100
Terrace Bay District			
Herbert Twp	60	20	20
North of Hillsport	86	27	30
North of Stevens	90	50	150
Polyanthus Lake	94	5	100
South of Hourglass Lake	85	30	150
Thunder Bay District			
Finmark	50	12	8
Inwood Twp	100	30	16
Lybster Twp	80	22	12
Michener Twp	100	35	400
Muskrat Lake Rd.	50	15	16
Reta Lake	90	30	40
Tilly Lake Rd.	70	15	200
Wardrobe Twp	60	20	120
White River District			
Cecile Twp	70	10	40

^a 1 ha = 2.47 acres

Table 8. Summary of stands surveyed for white spruce chlorosis in five districts in 1978.

Location	Avg tree height (m) ^a	Percentage of chlorotic trees	
		Faded green	Yellow
Geraldton District			
O'Meara Twp	1.2	0	0.0
Nipigon District			
Abitibi Camp 40 Rd.	1.8	0	0.0
Limestone Lake	1.3	61	7.0
Terrace Bay District			
North of Hillspport	0.5	0	0.0
Thunder Bay District			
Arrowroot Lake	1.4	15	1.3
Fowler Twp	1.6	0	0.0
Matawin Seed Orchard	2.5	7	0.7
Pearson Twp	3.3	43	2.0
Spytz Lake	0.5	15	0.7
White River District			
Bryant Twp	0.5	0	0.0

^a 1 m = 3.28 ft

Frost

Once again damage by June frosts occurred across the Region. Damage was more widespread but less severe than in 1977. The heaviest current shoot mortality (see photograph) occurred in Nipigon and Geraldton districts, where frost was recorded for five nights between June 1 and June 13. Atikokan and White River districts were least affected and only scattered pockets, primarily in semimature balsam fir stands, were damaged. Affected foliage turned black and was very conspicuous on black ash (*Fraxinus nigra* Marsh.) in Thunder Bay and west Atikokan districts following the frost, but the trees soon refoliated. The most severe damage to new shoots was observed on semimature balsam fir in Kilkenny Township and on young white spruce at the junction of Highway 11 and Domtar Camp 93 road, Nipigon District, where 80% and 75%, respectively, of the foliage was damaged. Thirty-one balsam fir and white spruce stands were examined in five districts. Average percent of trees affected and foliage damage per district are shown in Table 10.

Table 9. Mortality caused by drought conditions at five areas in two districts in 1978 (counts based on the examination of 100 trees at each location).

Location	Tree species	Avg DBH (cm) ^a	Tree Mortality (%)
Atikokan District			
Agnes Lake	rP	28	28
Louisa Lake	bS	15	71
Poacher Lake	bS	15	47
Thunder Bay District			
East side Whitefish Lake	bF	9	28
North side Whitefish Lake	bF	10	22

^a 1 cm = 0.39 in.

Table 10. Summary of averages for five districts of trees affected and foliar damage caused by frost in 1978.

District	Tree species	No. of stands examined	Avg tree height (m) ^a	Trees affected (%)	Current foliage damage (%)
Atikokan	bF	2	11.8	45	16
Geraldton	bF	2	13.5	98	66
	wS	3	2.3	87	18
Nipigon	bF	7	10.0	88	51
	wS	3	5.8	90	53
Terrace Bay	wS	2	1.0	98	28
Thunder Bay	bF	8	8.8	74	32
	wS	4	1.9	88	31

^a 1 m = 3.28 ft

Table 11. Other forest diseases.

Organism	Host(s)	Remarks
<i>Chrysomyxa arctostaphyli</i> Diet. Yellow witches' broom	wS, bS	brooms commonly seen in Region
<i>Cronartium ribicola</i> J.C. Fisch. White pine blister rust	wP	50% damage level in mature stand south of Sabawi Lake, Atikokan District
<i>Cytospora chrysosperma</i> (Pers.) Fr. Cytospora canker	tA	15% branch mortality in Lybster Township, Thunder Bay District
<i>Davisomycella ampla</i> (Davis) Darker Needle cast	jP	generally trace levels in the Region, pocket of moderate damage in Limestone Lake area, Nipigon District
<i>Endocronartium harknessii</i> (J.P. Moore) Y. Hiratsuka Western gall rust	jP	galls frequently observed in Region, low mortality in 10-year-old stand at Eva Lake, Atikokan District
<i>Gremmeniella abietina</i> (Lagerb.) Morelet Scleroderris disease	jP	light damage still present in Bain Twp and Kimberly-Clark Nursery, Geraldton District; new infections in Davies Twp and km 62 (mi. 37) Goldfield Rd, Terrace Bay District; and English River in Thunder Bay District
<i>Lirula macrospora</i> (Hartig) Darker Needle cast	bS	browning of last year's foliage common on scattered trees in Limestone Lake area, Nipigon District
<i>Lophodermium pinastri</i> (Schrad. ex Hook.) Chev. Needle cast	rP, jP	single observations of needle cast in Terrace Bay, Thunder Bay and Atikokan districts
<i>Melampsorella caryophyllacearum</i> Schroet. Yellow witches' broom	bF	occasional brooms observed in the Region

(continued)

Table 11. Other forest diseases (concluded).

Organism	Host(s)	Remarks
<i>Meloderma desmazierii</i> (Duby) Darker Needle cast	wP	browning of last year's foliage common on small trees near Niobe Lake, Atikokan District
<i>Phacidium abietis</i> (Dearn.) Reid & Cain Snow blight	bF	snow mold at many locations in Thunder Bay District
<i>Pucciniastrum goeppertianum</i> (Kuehn) Kleb. Needle rust	bF	scattered trees heavily attacked in Glen Twp, Thunder Bay District
<i>Septoria musiva</i> Pk. Leaf spot	bPo	common on regeneration at one location in Geraldton District
<i>Venturia populina</i> (Vuill.) Fabric. (= <i>Pollaccia elegans</i> Serv.) Leaf and twig blight of poplar	bPo	noticeable foliage damage between Red Rock and Nipigon, Nipigon District
Single-tree mortality	bF	no noticeable change in this condition in the Region; mortality increased 1% in the plot north of Caramat, Geraldton District