FOREST INSECT AND DISEASE SURVEYS IN THE ALGONQUIN REGION OF ONTARIO, 1977

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DEPARTMENT OF THE ENVIRONMENT

MARCH 1978

Copies of this report may be obtained from

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P6A 5M7

Frontispiece. Larvae of the forest tent caterpillar, *Malacosma disstria* Hbn., migrating from defoliated trees in search of green foliage. Crushed larvae on highway surface cause slippery road conditions.

SURVEY HIGHLIGHTS

The following report describes insect and disease conditions in the Algonquin Region in 1977.

The most noteworthy insect was the forest tent caterpillar which defoliated hardwoods in an area of approximately 1.6 million hectares (4 million acres). Aerial spraying, using *B.t.*, reduced populations at five provincial parks and in the Bracebridge Research Management Centre. Spruce budworm continued to defoliate spruce and balsam fir, and population levels increased in the Bracebridge District. Bruce spanworm and oak leaf shredder populations declined, and redheaded pine sawfly populations increased, necessitating control measures at numerous locations. The Saratoga spittlebug population in Pembroke District remained low after the control spraying in 1976.

Surveys designed to determine the amount of oak and maple decline were undertaken throughout the four southern regions. Leaf anthracnose of maple caused severe browning of foliage, while the distribution of Gremmeniella (≡ Scleroderris) canker of pine continued to increase locally.

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ACKNOWLEDGMENTS

The authors of this report gratefully acknowledge the excellent cooperation and assistance received from personnel of the Ontario Ministry of Natural Resources and from private individuals in the Region.

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INSECTS

Saratoga Spittlebug, *Aphrophora saratogensis* (Fitch)

In recent years this insect caused considerable branch and top mortality in a number of young red pine (*Pinus resinosa* Ait.) plantations in the Pembroke District. In 1975 sample plots were established in 10 plantations to monitor population densities and damage levels. In 1976 an aerial spray program, using Malathion was carried out in seven Crown managed plantations in an effort to prevent further damage. Post-spray surveys indicated drastic reductions in adult populations and in feeding damage in the sprayed areas compared to untreated plantations. In 1977 populations of spittlebug remained low. The highest number occurred in a red pine plantation in Alice Township, Pembroke District, that had not been treated in 1976 where 37 nymphs were found on 100 randomly examined sweetfern (*Comptonia peregrina* [L.] Coult.) plants.

A few feeding scars were observed in a 4 ha (10 acre) red pine plantation in Somerville Township, Minden District.

Cedar Leafminers, *Argyresthia thuiella* Pack. and
Pulicalvaria thujaella Kft.

High populations of this leafminer complex continued to cause severe browning of white cedar (*Thuja occidentalis* L.) foliage in Harvey, Somerville, Galway, Lutterworth and Minden townships, Minden District and in Burleigh, Methuen and parts of Wollaston, Chandos and Anstruther townships, Bancroft District (see Appendix, Fig. A1). Low populations were observed on the periphery of the infestation. Although some tree and tip mortality has occurred most trees appear to have recovered from heavy feeding in past years.

Pine Webspinning Sawfly, *Cephalcia* sp. prob. *frontalis* Westw.

These destructive insects which feed on the foliage inside frass nests have steadily increased in numbers in Peterborough County since 1972. The larvae normally feed on old foliage but at three locations in Minden District current foliage was also consumed (Fig. 1).

Severe damage to planted red pine occurred in Somerville, Galway and Minden townships, Minden District; in one large plantation in Burleigh Township, Bancroft District; in Watt Township, Bracebridge District; and in Killbear Provincial Park, Parry Sound District (Table 1).

Table 1. Summary of damage caused by the webspinning sawfly on red pine in four districts of the Algonquin Region in 1977 (based on the examination of 100 trees at each location).

Location (Twp)	Avg ht of sample trees (m)[a]	No. of trees infested
Bancroft District		
Burleigh	1.5	87
Bracebridge District		
Watt	1.4	37
Minden District		
Somerville	1.7	78
Minden	1.5	61
Galway	1.0	36
Parry Sound District		
Carling	1.3	100

[a] 1 m = 3.28 ft

Large Aspen Tortrix, *Choristoneura conflictana* Wlk.

Following outbreaks in the eastern part of the Region in 1975 populations of this insect declined to a low level in 1976. In 1977 light damage was observed in trembling aspen (*Populus tremuloides* Michx.) stands in Griffith, Radcliffe and Lyndoch townships, Pembroke District, and in Murchison Township, Algonquin Park District.

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-280). This report provides a complete description and analysis of the spruce budworm situation in Ontario in 1977 and gives infestation forecasts for the province for 1978.

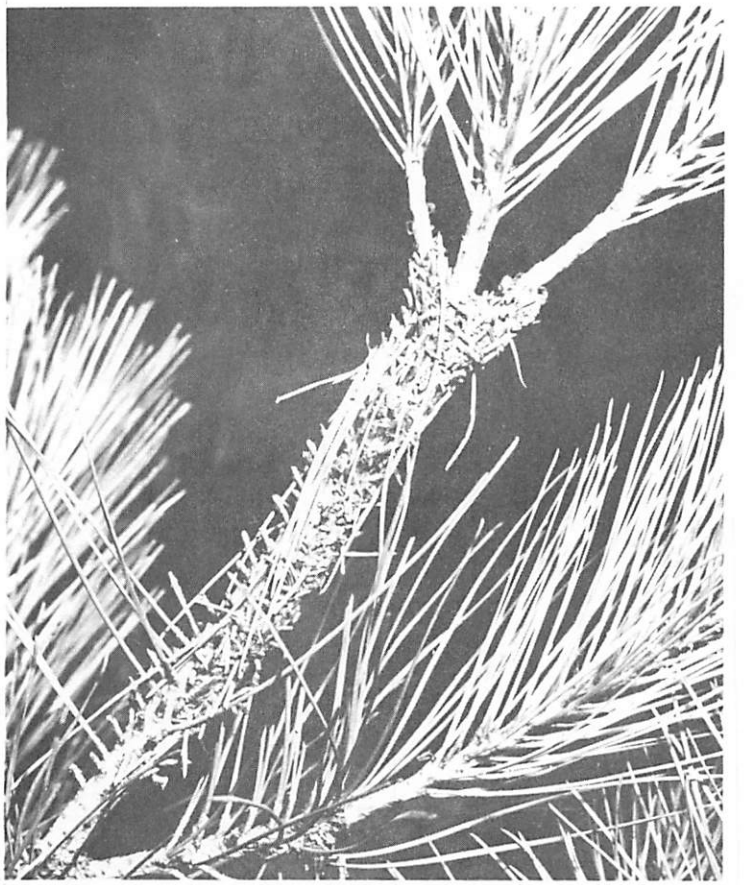

Figure 1

Severe defoliation of a red pine branch by the pine webspinning sawfly, *Cephalcia frontalis* Westw.

Figure 2

Severe frost damage on young current shoots of white spruce in plantations.

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

Low populations persisted in numerous areas in the Region. Light defoliation was observed in a red oak (*Quercus rubra* L.) stand in McKay Township and along Highway 41 in Griffith Township, Pembroke District, light-to-moderate defoliation occurred in Sinclair, Finlayson, Bethune and Watt townships, Bracebridge District. Light defoliation was observed on scattered trees at several other locations.

Birch Leafminer, *Fenusa pusilla* (Lep.)

Severe browning of white birch (*Betula papyrifera* Marsh.) foliage was again apparent in numerous areas. High populations recurred between Bracebridge and Huntsville in the central part of Bracebridge District, and near Parry Sound and Killbear Provincial Park, Parry Sound District (Table 2). Medium infestations occurred along Highway 60 in Algonquin Park District, and in the northern part of Parry Sound District. Light infestations were common throughout the remainder of the Region.

Table 2. Summary of damage by the birch leafminer on white birch at six locations in the Algonquin Region in 1977 (based on the examination of 100 leaves selected randomly from three trees at each location).

Location (Twp)	Avg DBH (cm)[a]	Leaves mined (%)
Bracebridge District		
Macaulay	7.5	93
Chaffey	7.5	98
Parry Sound District		
Blair	15.0	73
Mowat	10.0	67
Carling	10.0	87
Carling	10.0	76

[a] 1 cm = 0.39 in.

Fall Webworm, *Hyphantria cunea* Dru.

Unsightly webs were again common at several locations on white ash (*Fraxinus americana* L.), black ash (*F. nigra* Marsh.), white elm (*Ulmus americana* L.) and Manitoba maple (*Acer negundo* L.). The most severe defoliation was observed along the Ottawa River in Petawawa Township, Pembroke District. Population reductions occurred south of Parry Sound along Highway 69 in Freeman and Gibson townships, Parry Sound District, north of the Trent Canal in Harvey and Somerville townships, Minden District, and in Ross and Bagot townships, Pembroke District.

Eastern Tent Caterpillar, *Malacosoma americanum* F.

This insect, which is often confused with the forest tent caterpillar, may be recognized by the fact that it feeds from a silken tent constructed usually on fruit bearing trees, whereas the other does not construct a tent and feeds mainly on aspens, maples and oaks. The eastern tent caterpillar was abundant throughout the Region. Extremely high larval populations, in excess of 500 tents per 1.6 km (1 mi.) of roadside shrubs, in conjunction with the forest tent caterpillar caused complete defoliation of roadside trees and shrubs in the Parry Sound-Muskoka Lakes area. High populations were also observed commonly in the Bancroft, Minden and Pembroke districts.

Forest Tent Caterpillar, *Malacosoma disstria* Hbn.

Population increases were commensurate with those forecast on the basis of egg-band counts taken in the fall of 1976 and spring of 1977. Unusually hot and humid weather prevailed in the latter part of April and early May and proved ideal for early emergence and subsequent rapid larval development. As a consequence of high populations and rapid development severe defoliation was observed throughout Parry Sound, Bracebridge, Minden and the southern part of Bancroft districts (see Appendix, Fig. A2). Populations were so high in some parts of the Muskoka area that host trees were completely defoliated before the insect had developed fully and high larval mortality occurred as a result of starvation. Large numbers of larvae migrating across roadways in these areas caused slippery road surfaces (see Frontispiece).

To preserve the aesthetic quality in five provincial parks in the Bracebridge and Parry Sound districts, the Ontario Ministry of Natural Resources carried out aerial spraying operations using *Bacillus thuringiensis* Berliner, more commonly known as *B.t.*, during the second week in May. Also included in the spraying program was the Bracebridge Resource Management Centre in Macaulay Township, Bracebridge District. Ground and aerial observations in early June indicated, in general, that the treatments were effective, with only a few individual trees being defoliated.

The naturally occurring parasitic fly, *Sarcophaga aldrichi* Park., which lays a living maggot on forest tent caterpillar cocoons, increased in intensity in 1977. Results of field dissections to determine the amount of cocoon parasitism are shown in Table 3.

Table 3. Results of forest tent caterpillar cocoon dissections made at 17 locations following moth emergence (100 cocoons dissected at each location).

Location (Twp)	Parasitized (%)	Successful emergence (%)	Other (%)
Bracebridge District			
South River	51	46	3
Sundridge	64	32	4
Huntsville	57	43	0
Bracebridge	68	30	2
Minden District			
Minden	73	13	14
Somerville	56	40	4
Cavendish	61	32	7
Haliburton	47	51	2
Hindon	72	24	4
Parry Sound District			
Blair	63	35	2
McConkey	28	72	0
Bancroft District			
Cardiff	68	23	9
Cardiff	63	22	15
Wollaston	54	19	27
Chandos	58	28	14
Anstruther	44	34	22
Burleigh	57	18	25

Egg-band counts to forecast larval population in 1978 were taken throughout the Region. Examination of trees in the provincial parks was carried out using the "cherry picker", supplied by OMNR. This method was utilized to prevent the destruction of valuable park trees by cutting. Results of this survey are shown in Table 4.

Table 4. Summary of forest tent caterpillar egg-band counts using the felling method or with the aid of a "cherry picker" at five provincial parks and the Leslie M. Frost Centre.

Area	Host	Avg DBH (cm)[a]	No. of egg bands	Infestation forecasts for 1978[c]
Bracebridge District				
Arrowhead Prov. Park				
Maple ridge	tA	12	2	M
	tA	12	1	L
	tA	12	1	L
	tA	10	1	L
Gate	tA	10	10	S
	tA	15	9	M
	tA	10	6	S
	tA	15	10	S
Poplar flats	tA	10	0[b]	Nil
	tA	10	4	M
	tA	10	0[b]	Nil
Mikisew Prov. Park				
Lot 252	tA	10	3	M
	tA	10	3	M
	tA	12	10	S
Wood lot	tA	10	15[b]	S
	tA	10	17[b]	S
Parry Sound District				
Grundy Prov. Park				
Entrance	tA	15	9	M
	tA	15	7	M
	tA	15	6	M
Clear Lake	tA	12	10	S
	tA	12	11	S
	tA	10	11	S
Poplar camp	tA	10	8	S
	tA	15	11	S
	tA	15	10	S
Killbear Prov. Park				
Amphitheatre	rO	22	2	L
	rO	15	0	Nil
Blind Bay	sM	15	0	Nil
	sM	15	1	L
	sM	12	0	Nil
Gate	sM	15	0	Nil
	sM	15	0	Nil
	sM	15	0	Nil

(continued)

Table 4. Summary of forest tent caterpillar egg-band counts using the felling method or with the aid of a "cherry picker" at five provincial parks and the Leslie M. Frost Centre (concluded).

Area	Host	Avg DBH (cm)[a]	No. of egg bands	Infestation forecasts for 1978[c]
Minden District				
Leslie M. Frost Centre				
Headquarters	sM	33	23	S
Sugar bush	sM	15	0	Nil
	sM	15	1[b]	L
	sM	15	23	S
	sM	15	5[b]	L-M
	sM	15	3[b]	L
	sM	15	3[b]	L
Nature trail	sM	15	2[b]	L
	tA	15	5[b]	M
	tA	15	3[b]	M
	tA	15	13[b]	S
	tA	15	0[b]	Nil
	tA	15	9[b]	S
U of T woodlot	sM	20	35[b]	S
	sM	20	10[b]	M
	sM	20	9[b]	M
Bancroft District				
Silent Lake Prov. Park				
Location 1	sM	15	5[b]	L-M
	sM	15	5[b]	L-M
	sM	15	6[b]	L-M
Location 2	sM	12	1[b]	L
	sM	12	1[b]	L
	tA	12	2[b]	M
Location 3	sM	15	1[b]	L
	sM	15	1[b]	L
	rO	15	3[b]	L

[a] 1 cm = 0.39 in.

[b] felled trees

[c] L - Light, M - Moderate, S - Severe

Egg-band sampling in the late summer and early fall using the standard felling method, and also using extension pole pruners, was carried out in the remainder of the Region in and around present infestations (Table 5). Sampling systems designed to rate infestation levels and provide forecasts have not been researched for sugar maple (*Acer saccharum* Marsh.) or red oak, for either whole trees or branch samples. Consequently, forecasts in the following table are based on experience and considered judgment, and may not be accurate.

Table 5. Summary of forest tent caterpillar egg-band counts at 45 locations in the Algonquin Region (counts based on the examination of one to five trees at each location).

Location (Twp)	Host	Avg DBH (cm)[a]	No. of trees examined	Avg no. of egg bands per tree 1976	1977	Infestation forecasts for 1978[c]
Algonquin Park District						
Biggar	sM	12	2	1.6	0	Nil
Pentland	tA	12	3	-	0.3	L
Wilkes	tA	10	3	2.3	0	Nil
Bancroft District						
Herschel	tA	10	2	-	0	Nil
Faraday	tA	15	2	2.0	3.5	M
Cardiff	tA	12	2	4.0	11.5	S
Wollaston	sM	15	2	-	3.5	L
Chandos	sM	10	2	-	4.0	L
Chandos	tA	10	2	-	3.5	M
Methuen	tA	15	3	-	4.0	M
Bracebridge District						
Chaffey	tA	12	1	19.0	0	Nil
Stisted	tA	12	1	43.0	0	Nil
Stisted	tA	10	1	27.0	0	Nil
Sinclair	sM	12	3	-	1.0	L
Finlayson	sM	10	5	-	0.2[b]	M
Macaulay BRMC	sM	12	4	-	1.3	L
Macaulay	sM	15	3	173.0	0	Nil
Monck	tA	10	5	-	0[b]	U
Muskoka	sM	10	5	-	0[b]	U
Brunel	tA	27	3	15.6	0.3	L
Ridout	tA	12	5	-	0	U
Machar	tA	15	2	16.0	3.0	M
Lount	tA	12	1	21.0	7.0	S
Strong	tA	10	5	-	1.2	S
Proudfoot	tA	10	3	-	1.0	L
Cardwell	tA	12	1	23.0	0	Nil
Wood	sM	12	5	-	0.2	M
Watt	tA	10	3	84.0	0.3	L

(continued)

Table 5. Summary of forest tent caterpillar egg-band counts at 45 locations in the Algonquin Region (counts based on the examination of one to five trees at each location) (concluded).

Location (Twp)	Host	Avg DBH (cm)[a]	No. of trees examined	Avg no. of egg bands per tree 1976	Avg no. of egg bands per tree 1977	Infestation forecasts for 1978[c]
Minden District						
Minden	tA	15	5	-	0.8[b]	S
Hindon	sM	12	3	76.0	0.6	L
Guilford	tA	12	5	-	0.6[b]	M
Snowdon	tA	10	3	28.0	6.6	S
Lutterworth	tA	12	5	-	1.2[b]	S
Parry Sound District						
Carling	tA	10	5	-	0.2[b]	M
Ferguson	tA	15	5	-	0.2[b]	M
Foley	cPo	12	5	-	0.2[b]	M
Freeman	sM	12	5	-	0[b]	U
Croft	tA	10	3	40.0	2.6	M
Mowat	tA	10	1	11.0	8.0	S
Mowat	tA	10	1	12.0	5.0	M
Henvey	tA	10	1	31.0	4.0	M
Henvey	tA	10	1	16.0	5.0	M
Blair	tA	10	1	23.0	6.0	S
Pembroke District						
Bagot	tA	10	2	-	1.0	L
Richards	tA	15	2	-	0	Nil

[a] 1 cm = 0.39 in.

[b] one 1.25 m branch from each of five trees (using pole pruners).

[c] L - Light, M - Moderate, S - Severe, U - Uncertain.

Population forecasts for 1978 are varied for all districts in the Region. Defoliation in the northern part of Parry Sound and Bracebridge districts is expected to be moderate to severe, whereas in the southern part it is expected to be light with some moderate pockets. In the Minden District defoliation is expected to be light in the western part but

moderate in the east with moderate-to-severe pockets in and around the Leslie M. Frost Centre. Defoliation in the southern part of the Bancroft District is expected to be moderate with severe pockets. The drastic decline in the number of egg bands in certain locations is due mainly to the failure of larvae to complete development to pupae, because of starvation. Another contributing factor to the decline was moderate pupal parasitism which helped generally to reduce oviposition throughout the infestation.

Balsam Fir Sawfly, *Neodiprion abietis* complex

Several pockets of severe defoliation were observed in the northern part of Machar and Laurier townships, Bracebridge District. A general increase in population levels occurred in the Pembroke and Bancroft districts. Light-to-moderate defoliation of small groups and single balsam fir (*Abies balsamea* [L.] Mill.) trees was common in Chandos and Wollaston townships, Bancroft District and in Radcliffe, Raglan, N. Algona, Sherwood and Hagarty townships, Pembroke District. Light defoliation of scattered trees was observed in Maria and Clara townships, Algonquin Park District.

Redheaded Pine Sawfly, *Neodiprion lecontei* (Fitch)

Severe defoliation of planted red pine occurred in numerous areas. Particularly heavily defoliated was a 12.1 ha (30 acre) red pine plantation in Minden Township where 4.5 m (14 ft) high trees were almost completely defoliated. Severe defoliation was observed in a 10.1 ha (25 acre) red pine plantation in Ridout Township, Bracebridge District and in numerous small red pine plantations in Burton and McKenzie townships, Parry Sound District. Light-to-moderate defoliation was observed at numerous other locations (Table 6).

An experimental spray project using Nuclear Polyhedral Virus was carried out by the Forest Pest Management Institute to propagate the virus for further control projects. Numerous chemical control projects using Malathion were employed by OMNR and private owners to reduce defoliation of planted red pine throughout the Region.

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

This defoliator of pines, first observed north of the Trent Canal System in 1972, continued to spread northward, when new distribution points were recorded in Monteagle Township in Bancroft District and in Watt Township in Bracebridge District. The infestation at the former location was on newly planted Mugho pine (*Pinus mugho* Turra), an extension of 19 km (12 mi.) north of the 1976 infestation in Dungannon Township the latter was in an established 8.1 ha (20 acre) red pine plantation 24 km (15 mi.) north of Bracebridge, where roadside Mugho pine were lightly infested in 1974. At all locations examined, populations were light (Table 7).

Table 6. Summary of redheaded pine sawfly colony counts made on red pine in three districts in 1977 (based on the examination of 100 randomly selected trees at each location).

Location (Twp)	Avg ht of sample trees (m)[a]	No. of trees infested	No. of colonies per infested tree
Bancroft District			
Dungannon	1.2	18	1.4
Bracebridge District			
Ridout	2.5	94	1.1
Stisted	2.0	1	1.0
Minden District			
Somerville	0.6	29	1.5
Lutterworth	2.0	61	1.2
Minden	3.0	19	1.0
Hindon	2.0	71	1.2
Minden	4.5	100	1.2
Parry Sound District			
Burton	1.5	40	1.2
McKenzie	2.0	51	1.2
Pembroke District			
Wilberforce	1.3	14	1.6
Raglan	2.0	9	1.6
McNab	1.8	5	1.0
Ross	1.0	37	0.7

[a] 1 m = 3.28 ft

Yellowheaded Spruce Sawfly, *Pikonema alaskensis* Roh.

High populations continued on both naturally grown and planted spruce trees. Moderate-to-severe defoliation was observed on ornamental blue spruce (*Picea pungens* Engelm.) in the towns of Huntsville and Bracebridge, on planted white spruce (*Picea glauca* [Moench] Voss) trees in Arrowhead and Mikisew provincial parks and in a private plantation in Strong Township in the Bracebridge District. Light-to-moderate defoliation persisted on small open-grown trees in Grattan and Admaston townships, Pembroke District. Controls using Malathion with portable sprayers carried out in the provincial parks by OMNR proved effective.

Table 7. Summary of European pine sawfly colony counts made at five locations in the Algonquin Region from 1975 to 1977 (based on the examination of 100 trees at each location).

Location (Twp)	Host	Avg ht of sample trees (m)[a]	Trees infested (%) 1975	1976	1977	Avg no. of colonies per infested tree 1975	1976	1977
Bancroft District								
Dungannon	mP	0.6	-	6	5	-	1.2	1.0
Chandos	scP	1.5	-	5	4	-	1.8	1.5
Chandos	rP	1.5	24	7	4	1.2	1.0	1.2
Burleigh	rP	1.5	21	37	18	1.2	1.5	1.0
Bracebridge District								
Watt	rP	1.5	-	-	16	-	-	1.0

[a] 1 m = 3.28 ft

White Pine Weevil, *Pissodes strobi* (Peck)

As in recent years damage levels remained relatively unchanged (Table 8), except in one area in Blair Township, Parry Sound District, where 93% of the current leaders of young planted jack pine (*Pinus banksiana* Lamb.) were infested. A small plantation of Sitka spruce (*Picea sitchensis* [Bong.] Carr.) in the Petawawa Forest Experiment Station in Wylie Township, Pembroke District, was lightly infested.

Larch Sawfly, *Pristiphora erichsonii* (Htg.)

Defoliation was more apparent in five of the six districts in 1977. Numerous pockets of moderate-to-severe defoliation were observed in the northern part of the Pembroke District. A small pocket of severe defoliation was found in Hindon Township, Minden District and moderate defoliation occurred in Watt and Stisted townships, Bracebridge District. Light defoliation was observed in several tamarack (*Larix laricina* [Du Roi] K. Koch) stands in Algonquin Park and Bancroft districts.

Table 8. Summary of damage caused by the white pine weevil in the Algonquin Region in 1976 and 1977 (based on the examination of 100 trees at each location).

Location (Twp)	Host	Avg DBH (cm)[a]	Trees weeviled (%) 1976	1977
Algonquin Park District				
Lyell	wP	5	47	35
Bancroft District				
Faraday	wP	5	65	41
Bracebridge District				
Stisted	wP	5	6	5
Spence	wP	5	13	14
Minden District				
Stanhope	wP	2	-	6
Minden	wP	7	-	7
Hindon	wP	3	7	14
Parry Sound District				
Blair	jP	3	-	93
Pembroke District				
Hagarty	wP	7	57	38
McNab	wP	7	42	44
Wylie	Sitka S	2	-	6

[a] 1 cm = 0.39 in.

Table 9. Other forest insects

Insect	Host(s)	Remarks
Altica ambiens alni Harr. Alder flea beetle	Al	severe defoliation at one location in Nightingale Twp, Algonquin Park District
Anacampsis innocuella Zell. Poplar leafroller	tA	low populations in Lyndock, Alice and Rolph twp, Pembroke District
Aphrophora parallela (Say) Pine spittlebug	wP, scP, jP	populations very high in Minden Twp, Minden District, and Stisted Twp., Bracebridge District; some tip mortality at latter location, low populations elsewhere
Apion simile Kby. White birch cone weevil	wB	light damage to catkins in Rolph Twp, Pembroke District
Archips cerasivoranus (Fitch) Uglynest caterpillar	ecCh	High populations continued through the Region.
Archips myricanus McD. Leafroller	ecCh	light damage at one location in White Twp, Algonquin Park District
Argyresthia goedartella Linn. Birch ermine moth	wB	light damage to catkins in Machar Twp, Bracebridge District
Badebecia urticana Hbn. Leafroller	wB	light damage to catkins in Machar Twp, Bracebridge District
Cecidomyia reeksi Vock. Jack pine resin midge	jP	infestations declined in Stratton, Edgar and White twp, Algonquin Park District
Corythuca arcuata (Say) Oak lace bug	wO	infestations caused light damage in Bagot and Buchanan twp, Pembroke District
Dichelonyx sp. Leaf chafer	Be	High number of adults caused light defoliation in Brudnell Twp, Pembroke District.

(continued)

Table 9. Other forest insects (continued)

Insect	Host(s)	Remarks
Diprion hercyniae (Htg.) European spruce sawfly	wS	low populations throughout the Region
Dryocampa rubicunda rubicunda (Fabr.) Greenstriped mapleworm	rM	Populations remained low for second consecutive year in Pembroke and Algonquin Park districts.
Enargia decolor Wlk. Aspen twinleaf tier	tA	low populations general in the Region
Epinotia timidella Clem. Oak tube moth	rO	moderate browning of foliage, Killbear Prov. Park, Parry Sound District
Eucosma gloriola Heinr. Eastern pineshoot borer	rP, wP	moderate infestation in Minden Twp, Minden District; 22% red pine infested in Dungannon Twp, Bancroft District; low populations on white pine in McNab Twp, Pembroke District
Eupareophora parca (Cress.) Spiny ash sawfly	wAs	light defoliation in Wylie Twp, Pembroke District
Fenusa dornhii (Tischb.) European alder leafminer	Al	low population in Bangor Twp, Bancroft District
Gonioctena americana (Schaef.) American aspen beetle	tA	pockets of light defoliation in Anstruther and McClure twp, Bancroft District; low populations in Arrowhead Prov. Park, Bracebridge District
Hemichroa crocea (Four.) Striped alder sawfly	wB	few larval colonies in Grundy Lake Prov. Park, Parry Sound District
Heterocampa guttivitta Wlk. Saddled prominent	sM	low population in Horton Twp, Pembroke District

(continued)

Table 9. Other forest insects (continued)

Insect	Host(s)	Remarks
Hylobius sp. Pine root collar weevil	rP	root collar weevils caused mortality of several trees in Carlow Twp, Bancroft District
Lithocolletis ontario Free. Aspen leafblotch miner	tA	severe leafmining on young trees in Anglin, White, Fitzgerald and Clara twp, Algonquin Park District; low populations elsewhere in the Region
Lithocolletis ostryarella Cham. Ironwood leafblotch miner	I	leafminers plentiful in Macaulay Twp, Bracebridge District; light browning in McKay Twp, Algonquin Park District
Meroptera pravella Grt. Lesser aspen webworm	tA	low populations on roadside aspen, Grundy Lake Prov. Park, Parry Sound District
Messa nana Klug. Birch leafmining sawfly	wB	no change in distribution; low populations common in the Region
Neodiprion pratti banksianae Roh. Jack pine sawfly	jP	light defoliation on a few trees in Buchanan Twp. Pembroke District
Neuroterus umbilicatus Bass. Oak gall	wO	severe damage on several trees in Petawawa Twp, Pembroke District
Paraphytogromyza populicola (Wlk.) Poplar leafminer	lPo	severe leafmining on a few trees in Petawawa Twp, Pembroke District
Paraprociphilus tessellatus (Fitch) Woolly alder aphid	Al	light infestation Bangor Twp, Bancroft District
Petrova albicapitana (Busck.) Pitch nodule moth	scP, jP	moderate infestation on hedgerow in Stisted Twp, Bracebridge District

(continued)

Table 9. Other forest insects (concluded)

Insect	Host(s)	Remarks
Pityokteines sparsus Lec. Balsam fir bark beetle	bF	numerous throughout the Region on trees killed recently by budworm
Profenusa lucifex Ross Oak leafmining sawfly	wO	numerous mined leaves north of Trent Canal in Harvey Twp, Minden District
Pseudexentera oregonana Wlshm. Aspen leafroller	tA	low populations in McClure and Bangor twp, Bancroft District
Psilocorsis reflexella Clem. Leaftier	rO, lA Ba	light damage throughout the Region
Pyrrhalta tuberculata Say Willow leaf beetle	W, bPo	severe browning of foliage in a 2.5 ha willow swamp in Hagarty Twp, Pembroke District
Recurvaria quercivorella Cham. An oak leaftier	rO	moderate browning in Killbear Prov. Park, Parry Sound District

TREE DISEASES

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

This disease continues to decimate the elms remaining throughout the Region. Evaluations made at widely separated locations are used to monitor the increase in infections (Table 10).

Table 10. Incidence of Dutch elm disease in five districts in the Algonquin Region in 1977.

Location (Twp)	No. of trees examined	Trees infected (%)
Bancroft District		
Wollaston	50	32
Faraday	50	54
Bracebridge District		
Brunel	100	65
Watt	100	54
Minden District		
Harvey	100	69
Dysart	100	60
Parry Sound District		
Croft	100	57
Pembroke District		
Alice	50	47
Bagot	100	62
Westmeath	100	53
Horton	100	41

Chemical Damage Na NO_3

Spillage of this chemical on the ground near healthy trees, when it was being used for treatment of stumps after thinning operations in red pine plantations, was thought to have caused mortality of living trees. To determine the time and amount of chemical necessary to cause mortality, three different quantities (22.5, 45, and 67.5 L, or 5, 10,

and 15 Imp. gal.) were dumped 30.4 m (100 ft) apart along the edge of a red pine plantation in the Victoria County Forest, Minden District on 19 November, 1976. The first sign of deterioration was observed on 8 June, 1977 and the number of trees dying varied from seven at the 22.5 L site to 21 at the 67.5 L site.

A Needle Cast, *Davisomycella ampla* (Davis) Darker

The incidence of this needle cast declined in the Region. In 1977 light defoliation on 84% of trees was observed in a 4 ha (10 acre) jack pine plantation in Buchanan Township, Pembroke District. Trace damage level occurred at several other locations in the Region.

Drought Injury

During the second half of July foliage of largetooth aspen (*Populus grandidentata* Michx.) growing on rocky hillsides and ridges turned brown and by mid-August the affected trees were denuded. This condition, which followed a period of drought, was most prominent in Lyell Township, Algonquin Park District, in Bangor Township, Bancroft District, and in Jones, Sherwood and Radcliffe townships, Pembroke District.

Gall Rust of Pine, *Endocronartium harknessii* (J.P. Moore) Y. Hirotsuka

This gall rust occurred at a high level of damage in a 4 ha (10 acre) Scots pine plantation in Buchanan Township, Pembroke District. Light damage was observed on jack pine in White Township, Algonquin Park District, and at other locations in the Region. Results of evaluations are shown in Table 11.

Table 11. Gall rust damage in two districts of the Algonquin Region in 1977.

Location (Twp)	Host	Avg ht of sample trees (m)[a]	Area affected (ha)[b]	Trees affected (%)
Pembroke District				
Buchanan	scP	4	10	100
Buchanan	jP	5	10	10
Algonquin Park District				
White	jP	3	100	7

[a] 1 m = 3.28 ft

[b] 1 ha = 2.47 acres

Frost Damage

Damage to the current shoots of white spruce and balsam fir trees resulted from unusually low temperatures in early June (Fig. 2). Particularly severe damage occurred in white spruce plantations in Stisted and Bethune townships, Bracebridge District, and in Somerville Township, Minden District (Table 12). Light damage was observed in Algonquin Park, Pembroke and Bancroft districts.

Table 12. Summary of frost damage to white spruce foliage at three locations in the Region in 1977 (based on the examination of 150 trees at each location).

Location (Twp)	Avg ht of sample trees (m)[a]	Trees affected (%)
Bracebridge District		
Bethune	1.0	100
Stisted	.8	100
Minden District		
Somerville	3.0	92

[a] 1 m = 3.28 ft

Gremmeniella (≡ Scleroderris) Canker of Pine, *Gremmeniella abietina* (Lagerb.) Morelet (≡ *Scleroderris lagerbergii* Gremmen)

Infection centres of this destructive disease continued to spread outside the known area of infection. Table 13 provides an update of the number of trees infected and lists damage at three new infection centres. One of the sanitation trials carried out in 1976 was in a red pine plantation in Stisted Township, Bracebridge District, where all trees were infected. When the site was re-evaluated in 1977, only three trees were infected.

Anthracnose, *Kabatiella apocrypta* (Ellis & Everth) Arx

This disease was observed more commonly on sugar maple than in former years. Observations indicate that it was more prevalent in urban areas where an average of 49% of the trees were infected compared to only 9% in rural areas.

Table 13. The incidence of Gremmeniella (Scleroderris) canker in eight pine plantations in the Algonquin Region for 1975 to 1977 (based on the examination of 100 trees at each location).

Location (Twp)	Host	Avg ht of trees (m)[a]	Trees affected 1975 (%)	1976 (%)	1977 (%)
Bracebridge District					
Stisted Lot 18 Con. VI	rP	1	-	-	95[b]
Lot 10 Con. XII	rP	1	-	-	79[b]
Lot 13 Con. XIV	rP	4	85	100	3[c]
Lot 11 Con. XI	jP	1.5	-	25	27
Bethune Lot 25 Con. X	rP	2	-	-	87[b]
Parry Sound District					
McMurrich Lot 20 Con. VIII	jP	1.2	27	50	42
Spence Lot 20 Con. IV	rP	1.5	48	66	28

[a] 1 m = 3.28 ft

[b] new locations

[c] sanitation trial

Pine Needle Cast, *Lophodermium pinastri* (Schrad. ex Hook) Chev.

In recent years this disease has caused heavy damage to red pine seedlings in some tree nurseries and various damage levels have been observed in scattered red pine plantations in the Region. In 1977 damage occurred in Dungannon and Herschel townships, Bancroft District and in Lyell Township, Algonquin Park District (Table 14). In Stisted Township, Bracebridge District, this organism was found associated with *Gremmeniella abietina* causing damage to red pine.

Maple Decline

Concern about what appears to be a decline in vigor of sugar maple prompted a study of conditions related to this decline. A series of evaluations was made in urban, rural and woodlot areas to assess foliar, stem, and root rots, and branch diseases. Average findings are shown in Table 15. Disease organisms and abiotic conditions found in association with them are listed below.

Foliage diseases: *Kabatiella apocrypta* (Ell. & Ev.) Arx
Discula sp.

Stem diseases: *Tubercularia vulgaris* Tode ex Fr.
Cephalosporium sp.
Eutypella parasitica Davids. & Lorenz
Nectria sp.
Steganosporium ovatum (Pers. ex Merat) Hughes
Coniothyrium negundinis Teh. & Dan.

Roots: *Armillaria mellea* (Fr.) Kummer
Fomes connatus (Weinm. ex Fr.) Gill

Wilts: *Verticillium* sp.

Abiotic conditions: Frost cracks
Leaf scorch
Salt
Soil compaction

Table 14. Summary of damage caused by pine needle cast at four locations in the Algonquin Region in 1977.

Location (Twp)	Avg ht of trees (m)[a]	Area affected (ha)[b]	Trees affected (%)	Defoliation (%)
Algonquin Park District				
Lyell	1.5	2.0	96	16
Bracebridge District				
Stisted	0.8	0.4	3	10
Bancroft District				
Dungannon	1.2	2.0	65	8
Herschel	1.3	5.0	93	20

[a] 1 m = 3.28 ft

[b] 1 ha = 2.47 acres

Table 15. Summary of maple decline at 19 locations in the Algonquin Region in 1977 (based on the examination of 100 or 150 trees at each location).

Type of evaluation	Avg ht of sample trees (m)[a]	Avg DBH (cm)[b]	Crown class[c] 1 & 2 (%)	3 & 4 (%)
Urban	14	17	81	19
Rural	15	18	81	19
Woodlot	15	17	97	3

[a] 1 m = 3.28 ft

[b] 1 cm = .39 in.

[c] class 1 - healthy trees; classes 2, 3 and 4 have more than 20, 40 and 60% of the crown dead, respectively.

Oak Decline

Because of concern about the deterioration of red oak trees in southern Ontario, and the complexity of causes, semi-permanent plots were established at three locations in the Algonquin Region to determine the amount of deterioration that has occurred (Table 16).

Salt Damage

Considerable browning of foliage caused by road salt was observed on red pine and white pine along sections of Highway 62 in Herschel and Wicklow townships in the Bancroft District (Table 17) and along Highway 11 north of Huntsville in Bracebridge District. This type of damage occurs every year on coniferous trees adjacent to well-travelled major highways.

Table 16. Summary of oak decline at three locations in the Algonquin Region in 1977 (based on the examination of 100 trees at each location).

Location (Twp)	Avg DBH (cm)[a]	Avg ht of sample trees (m)[b]	Crown class[c] 1	2	3	4
Bracebridge District						
Macaulay	28	20	17	44	29	10
Pembroke District						
Alice	16	16	44	45	11	0
Wylie	28	16	26	43	30	1

[a] 1 cm = 0.39 in.

[b] 1 m = 3.28 ft

[c] Oak decline is principally branch mortality; class 1 is healthy; classes 2-4 have more than 20, 40, and 60% of the branches dead, respectively. Class 5 is dead, and this class was not rated in 1977.

Table 17. Summary of damage caused by road salt at three locations in the Bancroft District in 1977.

Location (Twp)	Host	Avg ht of sample trees (m)[a]	Trees affected (%)	Defoliation (%)
Bancroft District				
Herschel	wP	2.5	91	35
Herschel	rP	2.5	83	28
Wicklow	wP	3.8	80	50

[a] 1 m = 3.28 ft

Table 18. Other forest diseases

Organism	Host(s)	Remarks
Armillaria mellea (Fr.) Kummer Armillaria root rot	rP, sM bF	0.5 ha of mortality in a 35-year-old red pine plantation in Somerville Twp, Minden District; several dead maple trees in a woodlot in Joly Twp, Bracebridge District, and scattered dead trees through the Region
Ciborinia whetzelii (Seaver) Seaver Ink spot of aspen	tA	trace infection levels commonly observed in the Region
Chrysomyxa ledi d By. Needle rust of spruce	bS	trace infection in Wylie Twp, Pembroke District
Cronartium ribicola J.C. Fischer White pine blister rust	wP	11.3% incidence in a 6 ha plantation of 2 m trees in Minden Twp, Minden District; infections common throughout the Region
Cryptodiaporthe salicina (Curr.) Wehm. Willow blight	W	severe shoot mortality, Wylie Twp, Pembroke District
Cytospora chrysosperma (Pers.) Fr. Cytospora canker	eCo	caused branch mortality in a hybrid poplar plantation, Ross Twp, Pembroke District
Cytospora kunzei Sacc. Cytospora canker	bF	caused scattered single-tree mortality throughout the Region
Dothichiza populae Sacc. & Briard. Dothichiza canker of poplar	cPo	caused severe branch and top mortality in Rolph Twp, Pembroke District; infections common throughout the Region
Dothiora sorbi (Wahl.) Rehm Ash dieback	aMo	severe branch tip mortality on several trees in Petawawa Twp, Pembroke District

(continued)

Table 18. Other forest diseases (concluded)

Organism	Host(s)	Remarks
Hendersonia pinicola Wehm. Needle cast of pine	jP	severe browning of foliage on several trees in Richards Twp, Pembroke District
Hendersonia sp. Leaf spot	Su	4 ha (10 acres) of sumac (*Rhus typhina*) severely infected in Somerville Twp, Minden District
Lophodermella concolor (Dear.) Dark. Needle cast of pines	jP	found in association with *H. pinicola*
Marssonina populi (Lib.) Magn. Shoot blight of poplars	Po	infections found in hybrid poplar plantation, Ross Twp, Pembroke District
Melanconium oblongum (E. & E.) Graves Dieback of butternut	Bu	branch tip mortality, McNab and Grattan twp, Pembroke District
Micropera abietina (Pk.) Hoehn. Stem canker	bF	on dead trees, Wilkes Twp, Algonquin Park District
Naemacyclus niveus (Pers. ex Fr.) Sacc. Needle cast of pines	scP	light infection level in a 2 ha (5 acre) plantation in Dungannon Twp, Bancroft District
Pucciniastrum arctium Franz. Needle rust	shrub	high incidence on ground cover in Stisted Twp, Bracebridge District, and McMurrich Twp, Parry Sound District
Rhytisma acerinum Pers. ex Fr. Tar spot of maples	rM	trace infection Wylie Twp, Pembroke District
Semi-mature tissue needle blight	wP	several ornamental trees severely infected in Somerville Twp, Minden District
Uncinula salicis (DC. ex Mérat) Mildew	bPo	severe infection Wylie Twp, Pembroke District

APPENDIX

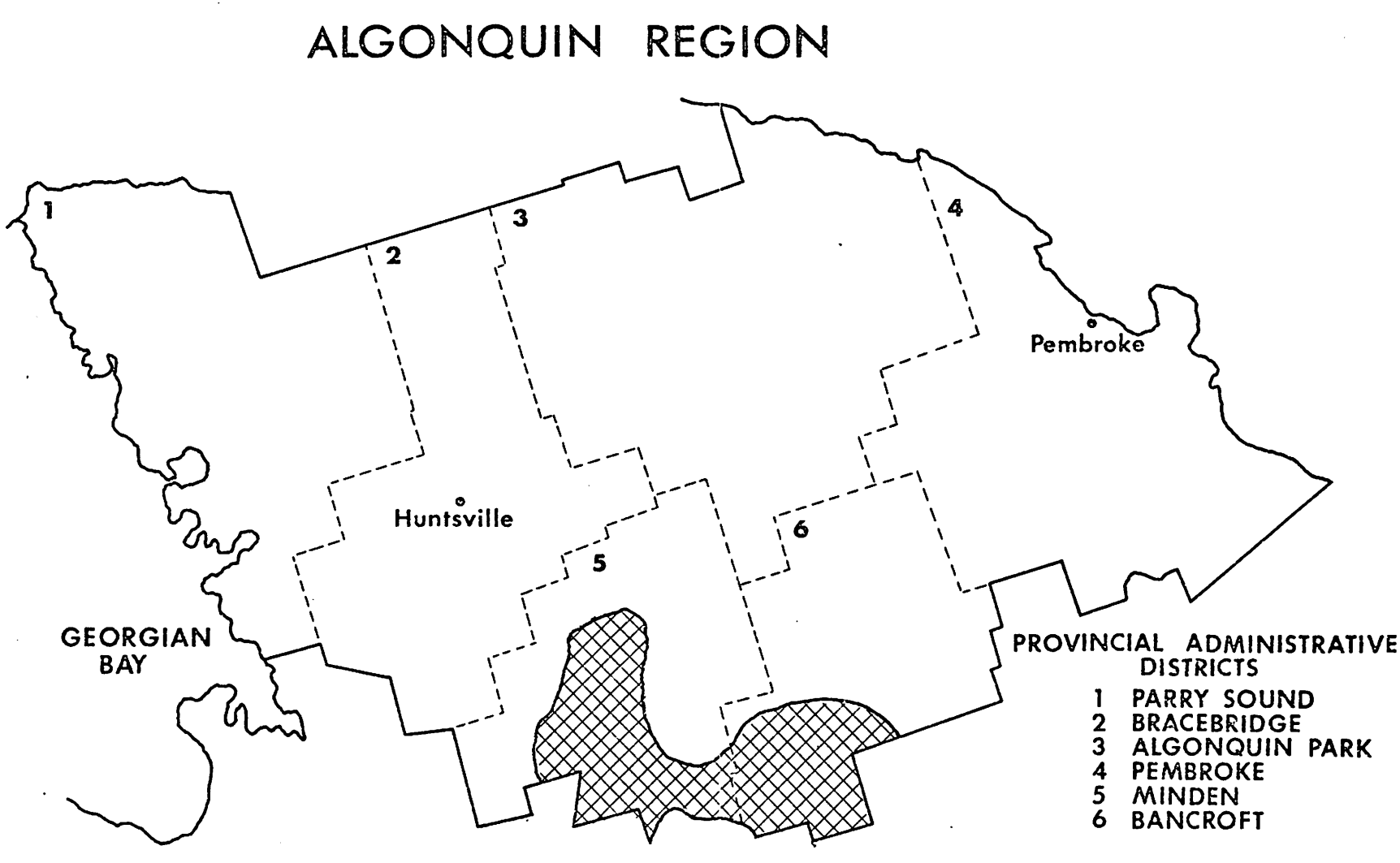

Fig. A1. CEDAR LEAFMINERS

Areas within which damage to eastern white cedar occurred in 1977

Moderate-to-severe browning of foliage . .

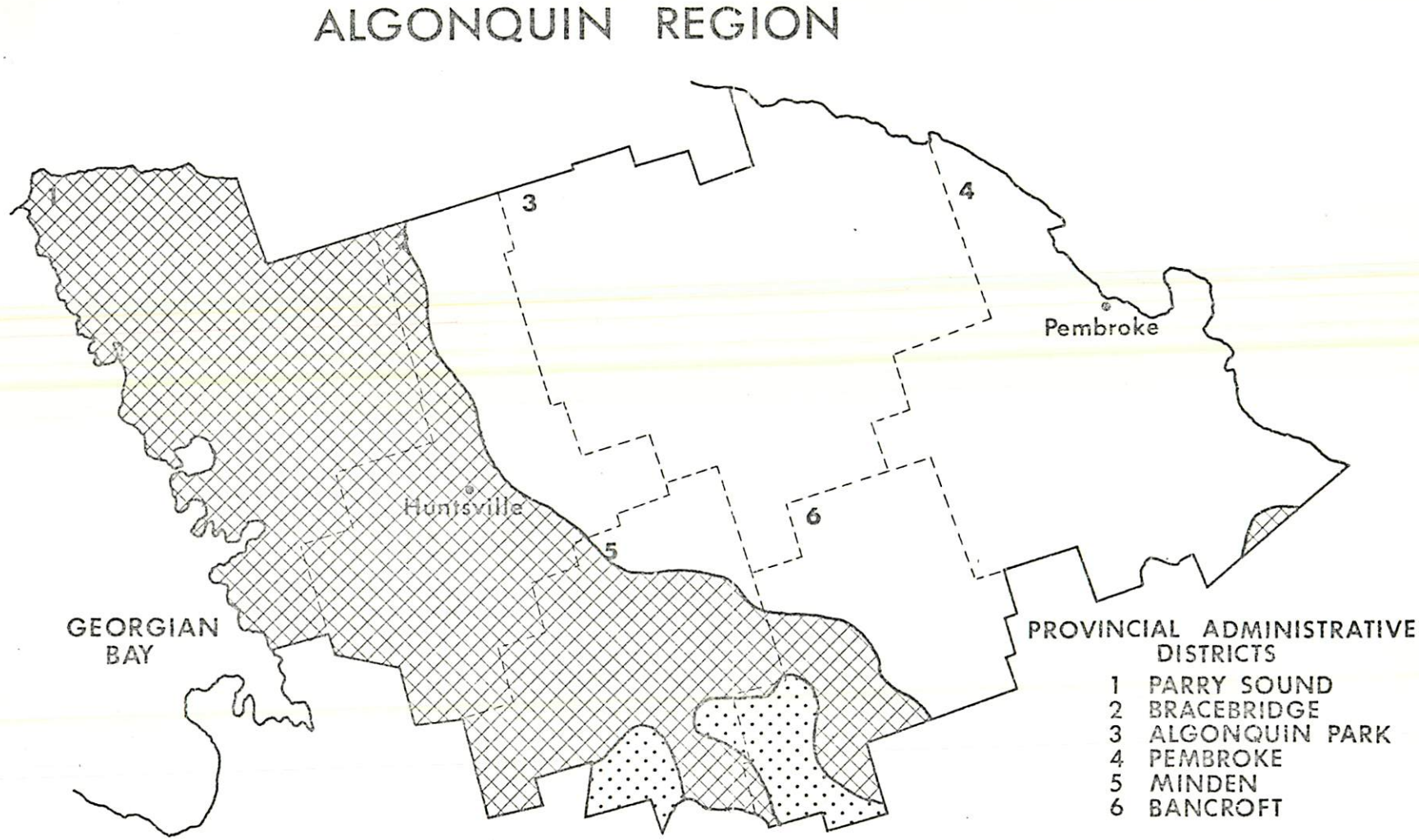

Fig. A2. FOREST TENT CATERPILLAR

Areas within which defoliation (of broad-leaved trees) occurred in 1977

Moderate-to-severe defoliation . .

Light defoliation . . . . . .