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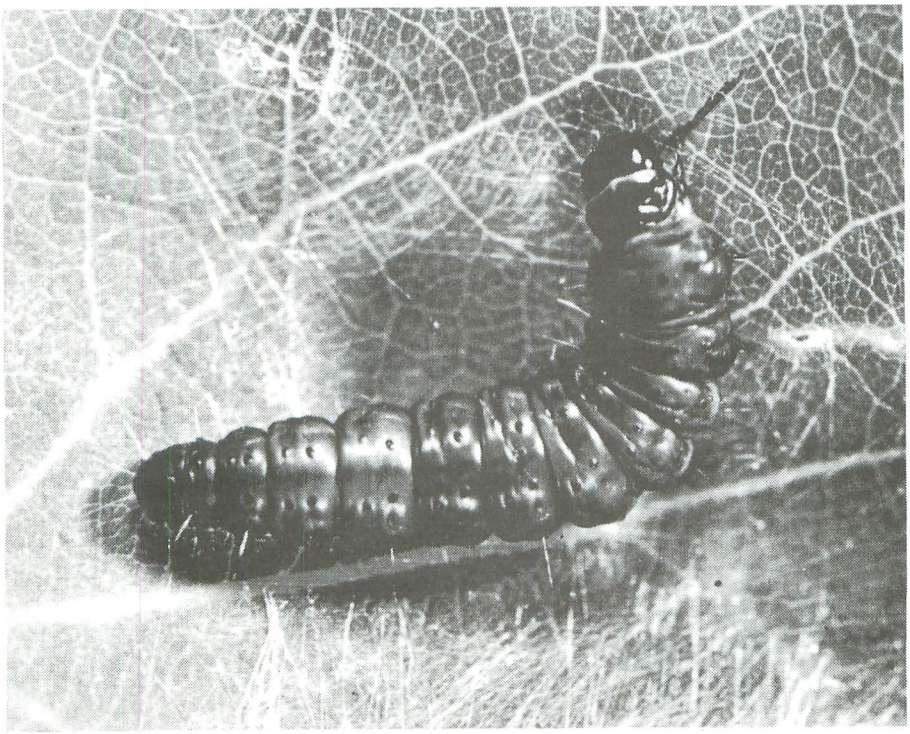
SURVEY BULLETIN

Forest Insect and Disease Conditions in Ontario

Summer 1986



Large aspen tortrix, *Choristoneura conflictana* (Wlk.), feeding on trembling aspen (*Populus tremuloides* Michx.)

GREAT LAKES FORESTRY CENTRE
Box 490 • Sault Ste. Marie Ontario

FOREST INSECT AND DISEASE CONDITIONS IN ONTARIO

Summer 1986

This is the second Survey Bulletin for 1986. A third and final bulletin will be issued later in the year.

ANNUAL FOREST PEST REVIEWS

The 10th annual Forest Pest Reviews for Ontario will be held in November this year. The southern Ontario review will take place in the Huron Room, McDonald Block, Queen's Park, Toronto on 5 November, while the northern review will be held in the Best Western Motor Inn, Dryden, on 13 November.

SCLERODERRIS WORKSHOP

A Scleroderris workshop, jointly organized by the Ontario Ministry of Natural Resources (OMNR) and the Forest Insect and Disease Survey Unit (FIDS) of the Great Lakes Forestry Centre (GLFC) was held in Bracebridge (indoor session) and the Huntsville area (field trip) on 22 and 23 May, 1986. The workshop was attended by approximately 70 people, primarily OMNR forest management personnel from southern Ontario. FIDS staff members Dr. H.L. Gross, R.J. Sajan and C.N. Davis gave talks on the biology, control and disease process of the canker, identification and detection of the disease, and lab processing of samples, including race identification by serology. Dr. J. Juzwik, OMNR, Pest Control Section, discussed the current disease management policy, while D. Renwick, OMNR, Parry Sound District, and G. Schultz, OMNR, Bracebridge District, described eradication work conducted in 1985 where the European race of the fungus had been detected. S. Reid, OMNR, Central Region discussed the role of pest management in operational forestry.

On the second day, a field tour covered various aspects of the current control program against the North American race of the fungus, and the site in McMurrich Township, Parry Sound District, where eradication efforts were made in 1985 was viewed and discussed.

FOREST INSECTS

Spruce Budworm, *Choristoneura fumiferana* (Clem.)

Spruce budworm infestations declined in Ontario in 1986. Across the province, some 8,855,687 ha of moderate-to-severe defoliation were mapped by ground and aerial surveys, a reduction of 3,476,678 ha or 28% from the 12,332,365 ha mapped in 1985 (Table 1 and Figure 1).

The biggest change occurred along the eastern edge of the main infestations in the Wawa and Hearst districts where decreases in excess of 2.5 million ha were recorded. Substantial declines also occurred in the main infestation in Thunder Bay, Nipigon, Geraldton, Dryden, Fort Frances and Terrace Bay districts. These were partially offset by increases in the Red Lake and Sioux Lookout districts. Nevertheless, a large infestation persists from the Pagwa River-Marathon area of the Geraldton and Terrace Bay districts westward to the Manitoba border, encompassing large areas of the Geraldton, Terrace Bay, Nipigon, Thunder Bay, Atikokan, Ignace, Fort Frances, Dryden, Kenora and Sioux Lookout districts.

Several pockets of moderate-to-severe defoliation occurred north of the main infestation in the Kenora, Red Lake and Thunder Bay districts, along with a number of small pockets that persist in previously infested areas in the Wawa and Hearst districts.

In the Thunder Bay District, two large areas totalling 101,719 ha showed considerable variation in the pattern of defoliation. While overall defoliation was still in the moderate-to-severe range, it was much less consistent than in surrounding areas, and consequently, aerial mapping was extremely difficult.

Elsewhere in the northeastern part of the province infestations continued to decline rapidly, although a few pockets, totalling 2,665 ha, persisted in the Espanola, North Bay and Sudbury districts.

Infestations in southern Ontario were further reduced to 642 ha. These consisted of small, widespread patches in the Bracebridge and Algonquin Park districts.

Egg-mass and tree mortality surveys are now in full swing and results of these will be presented in the fall Survey Bulletin.

During May and June, 1986 OMNR aerially treated some 147,000 ha of spruce-fir forest in northern Ontario to minimize defoliation by the spruce budworm. Both helicopter and fixed-wing aircraft were used to apply the biological insecticide *Bacillus thuringiensis (B.t.)* in commercial and high-value stands (parks, plantations, wildfire habitat) in four regions of the province: Northwestern (168 ha), North Central (95,382), Northern (39,300 ha) and Northeastern (12,150 ha).

Jack Pine Budworm, *Choristoneura pinus pinus* Free.

The jack pine budworm situation in Ontario changed considerably in 1986. The overall area of moderate-to-severe defoliation was 1,728,825 ha, a decrease of 53% from the 3,660,069 ha recorded in 1985 (Table 2 and Figure 2).

In the Northwestern Region, the area of moderate-to-severe defoliation increased by about 76,000 ha, some of which was located in the large infestation that straddled the four corners of the Fort

Table 1. Gross area (ha) of current moderate-to-severe defoliation by spruce budworm from 1984 to 1986

Region	District	Area of moderate-to-severe defoliation 1984	1985	1986
Algonquin	Bracebridge	28,606	720	436
	Algonquin Park	44,234	800	206
	Parry Sound	0	0	0
		72,840	1,520	642
Northeastern	Blind River	4,935	0	0
	Espanola	42,278	1,980	408
	North Bay	345,062	20,305	1,802
	Sault Ste. Marie	30,255	7,875	0
	Sudbury	250,483	105,805	455
	Temagami	241,901	245	0
	Wawa	1,288,475	1,386,547	11,839
		2,203,389	1,522,757	14,504
Northern	Chapleau	0	6,120	70
	Cochrane	85,358	600	0
	Gogama	11,906	11,570	428
	Hearst	784,202	1,173,734	32,384
	Kapuskasing	6,827	0	0
	Timmins	0	0	0
	Kirkland Lake	35,633	1,125	0
		923,926	1,193,149	32,882
North Central	Atikokan	918,500	918,500	890,691
	Geraldton	189,863	683,178	400,486
	Nipigon	235,372	1,125,751	985,961
	Thunder Bay	1,809,741	2,315,563	2,005,718
	Terrace Bay	726,420	1,168,400	1,023,773
		3,879,896	6,211,392	5,306,629
Northwestern	Dryden	454,099	952,385	891,997
	Fort Frances	566,831	700,172	542,176
	Ignace	456,526	599,895	530,761
	Kenora	63,314	911,037	906,917
	Red Lake	200	10	200,349
	Sioux Lookout	126,831	240,048	428,830
		1,667,801	3,403,547	3,501,030
Total		8,747,852	12,332,365	8,855,687

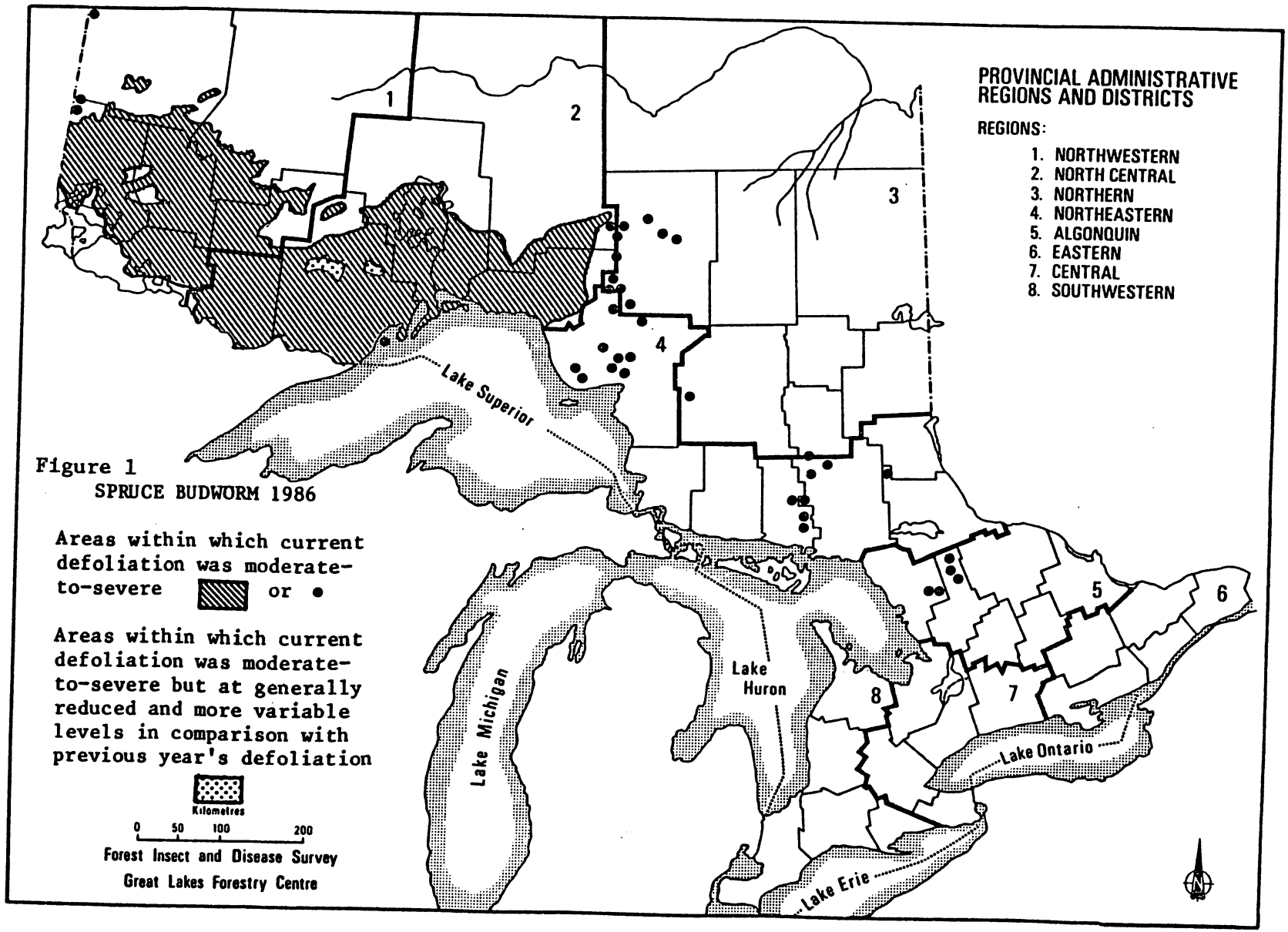


Figure 1
SPRUCE BUDWORM 1986

Table 2. Gross area (ha) of current moderate-to-severe defoliation by the jack pine budworm from 1984 to 1986

Region	District	Area of moderate-to-severe defoliation 1984	1985	1986
Northwestern	Red Lake	139,334	1,027,202	877,521
	Fort Frances	14,044	44,652	99,391
	Ignace	0	15,973	37,435
	Kenora	0	372,242	315,731
	Sioux Lookout	0	1,646	90,408
	Dryden	0	16,103	133,653
		153,378	1,477,818	1,554,139
North Central	Atikokan	335,770	278,623	31,391
	Thunder Bay	34,798	6,783	0
		370,568	285,406	31,391
Northeastern	Sault Ste. Marie	746	14,262	0
	Blind River	118,021	256,351	24,741
	Espanola	233,027	217,665	1,212
	Sudbury	76,896	385,762	30,129
	Temagami	530	6,224	0
	North Bay	0	6,792	545
		429,220	887,056	56,627
Northern	Chapleau	95,598	546,198	60,929
	Gogama	49,102	334,815	17,640
	Kirkland Lake	26,895	74,742	0
		171,595	955,755	78,569
Algonquin	Parry Sound	25,397	54,034	8,099
TOTAL		1,150,158	3,660,069	1,728,825

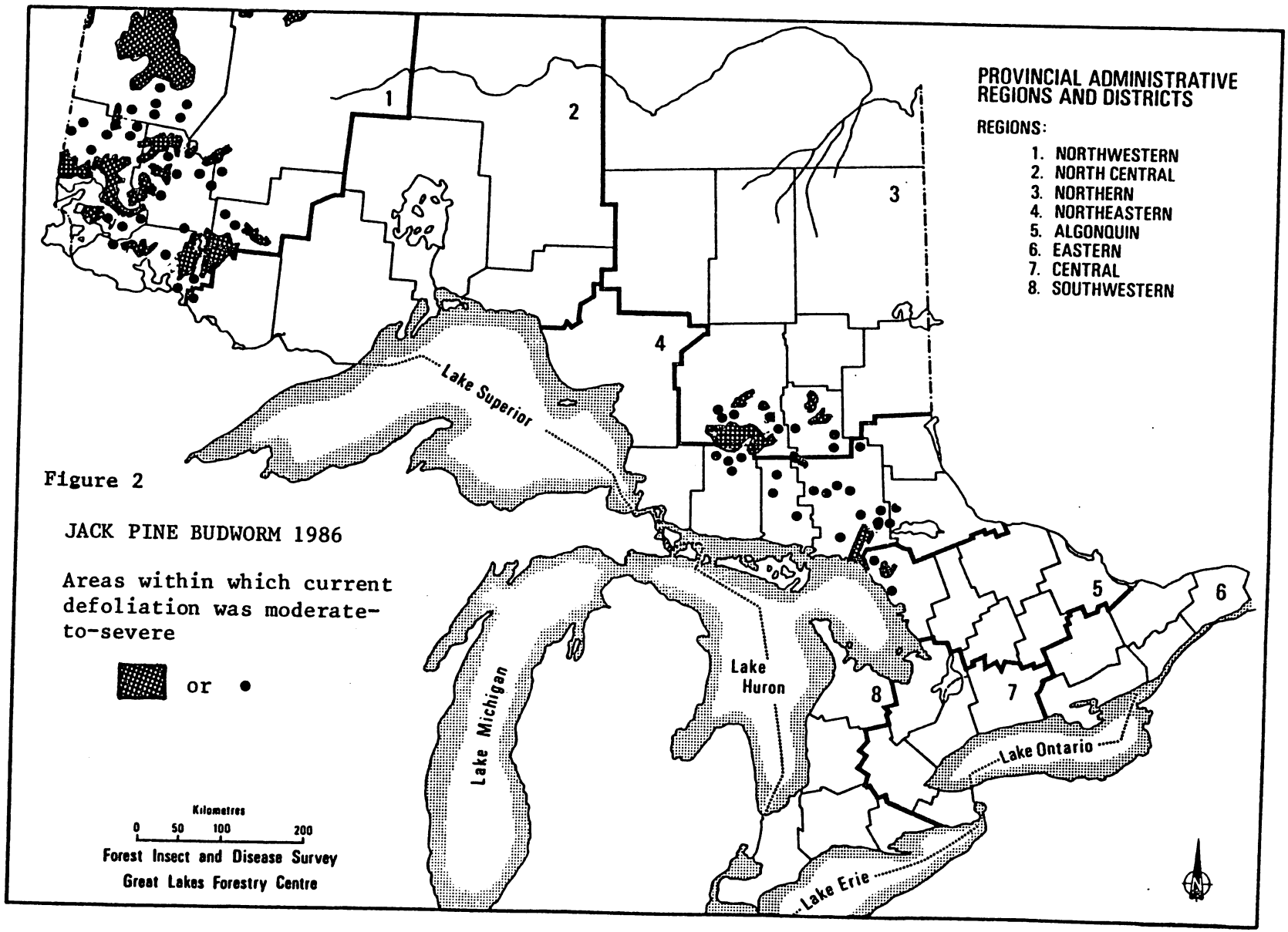


Figure 2

JACK PINE BUDWORM 1986

Areas within which current defoliation was moderate-to-severe

Frances, Dryden, Ignace and Atikokan districts. In the Sioux Lookout District, approximately 90,000 ha of new moderate-to-severe defoliation were mapped in the Wendigo Lake area. The bulk of the defoliation, over 800,000 ha, persists in the Red Lake District, with the main infestation stretching from the Red Lake-Balmertown area north to Deer Lake and west to the Manitoba border. Although infestations in the Kenora District declined by 56,800 ha, approximately 315,000 ha recurred in scattered pockets throughout the district.

Infestations in the North Central Region virtually collapsed in 1986. The only moderate-to-severe defoliation remaining consists of about 31,000 ha in the northwest corner of the Atikokan District, which was part of the infestation described above.

There was a substantial decline in the Northern and Northeastern regions as well. The area of moderate-to-severe defoliation totalled 135,196 ha in 1986, in comparison with 1,842,811 ha in 1985, a reduction of 93%. Populations completely collapsed in the Sault Ste. Marie, Temagami and Kirkland Lake districts where no defoliation was recorded. The largest infestation remaining (70,107 ha) is located on the Chapleau-Blind River district boundary. The remainder consists of scattered pockets located in the Chapleau and Gogama districts of the Northern Region and the Blind River, Espanola, Sudbury and North Bay districts of the Northeastern Region.

Infestations in the Parry Sound District of the Algonquin Region were reduced from about 54,000 ha in 1985 to approximately 8,100 ha this year. Infestations in this area consisted of scattered pockets along the Georgian Bay Coast between Ojibway Island and the Sudbury District boundary.

Egg-mass surveys are also under way for this pest and results of these will also be presented in the fall Survey Bulletin.

In 1986, aerial spraying operations were carried out against the jack pine budworm over some 493,000 ha in northern Ontario. Helicopters and fixed-wing aircraft were used to apply *B.t.* to jack pine stands in four regions of the province: Northwestern (173,400 ha), North Central (67,600 ha), Northern (61,000 ha) and Northeastern (191,000 ha).

Gypsy Moth, *Lymantria dispar* L.

After five years of expanding infestations, the gypsy moth outbreak in eastern Ontario declined in 1986 (Table 3). Over all, moderate-to-severe defoliation of hardwood forest totalled 167,776 ha in 1986 in comparison with 246,342 ha in 1985 (Figure 3). This represents a decrease of 32%.

The bulk of the decline occurred in the older infested areas in the Kaladar-Tweed area of the central Tweed District. In this area the infestation broke up into a number of scattered pockets, and moderate-to-severe defoliation in the Tweed District was reduced from 172,232 ha

Table 3. Gypsy moth infestations in the Eastern Region, 1981-1986

Year of infestation	Gross area (ha) of moderate-to-severe defoliation
1981	1,450
1982	4,800
1983	40,954
1984	80,624
1985	246,342
1986	167,776

Table 4. Gross area (ha) of moderate-to-severe defoliation by the gypsy moth in 1985 and 1986

Region	District	1985	1986
Eastern	Tweed	172,232	73,525
	Napanee	58,326	57,780
	Carleton Place	4,197	13,386
	Brockville	11,232	22,283
Algonquin	Pembroke	90	221
	Bancroft	240	164
Central	Lindsay	25	417
TOTAL		246,342	167,776

Table 5. Gross area (ha) of moderate-to-severe defoliation by the gypsy moth in 1986

County	1986
Northumberland	1,430
Peterborough	179
Hastings	11,668
Lennox and Addington	8,627
Prince Edward	540
Frontenac	109,442
Leeds	22,283
Lanark	13,356
Renfrew	221
Ottawa-Carleton	30
	167,776

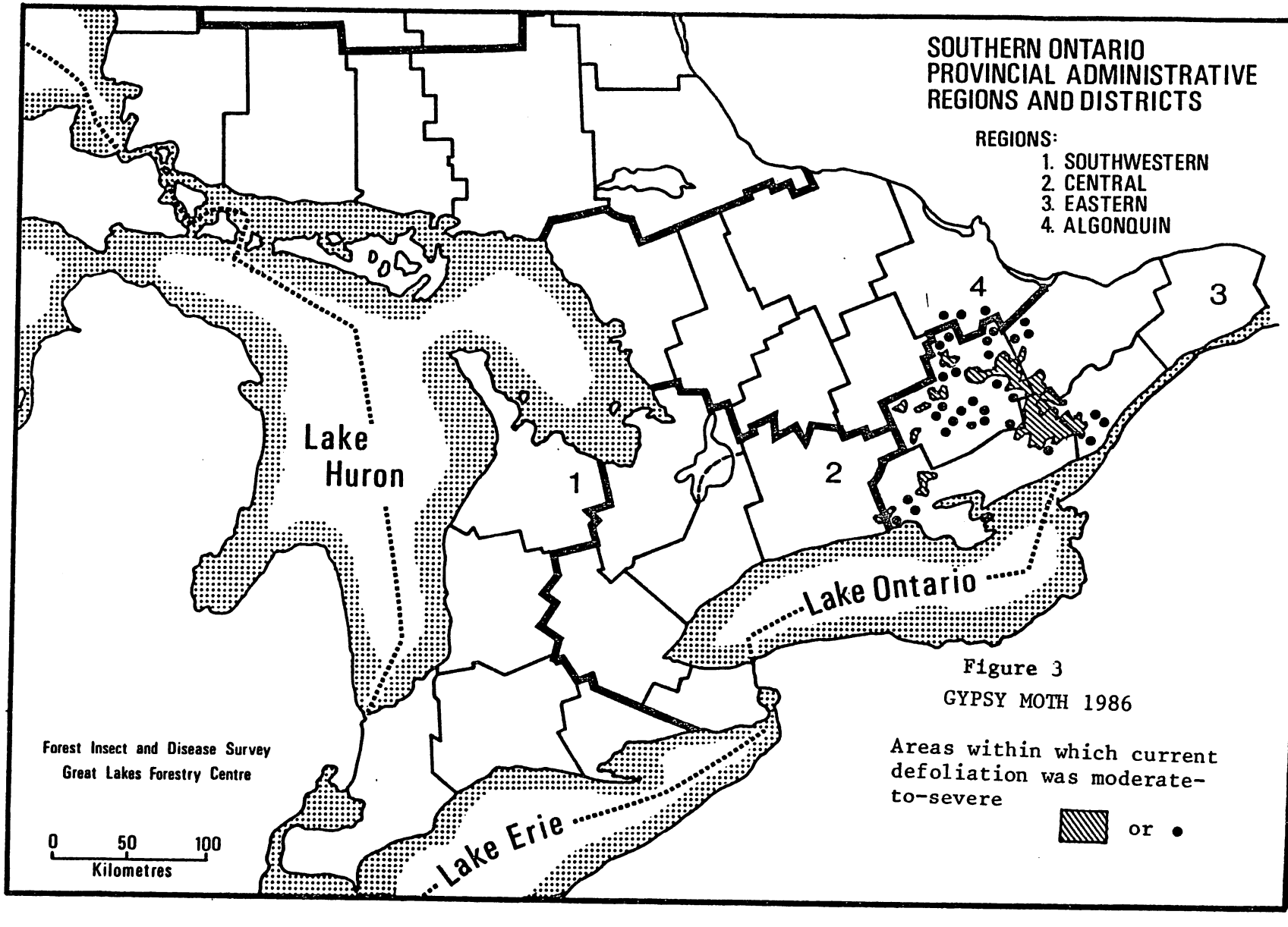


Figure 3
GYPSY MOTH 1986

in 1985 to 73,525 ha this year. Table 4 lists the area of defoliation by OMNR district and Table 5 summarizes defoliation by county. In spite of the decline, the periphery of the infestation continued to expand, with substantial increases in the amount of moderate-to-severe defoliation recorded in the Carleton Place and Brockville districts of the Eastern Region. Smaller increases were recorded in the Pembroke District of the Algonquin Region and the Lindsay District of the Central Region, where moderate-to-severe defoliation was first recorded in 1985.

In the Carleton Place District, most of the expansion occurred in the Christie Lake-Silver Lake area of South Sherbrooke Township, along with a number of pockets in Lavant Township. Infestations in the Brockville District expanded in the Jones Falls-Chaffeys Locks area of South Crosby Township, in the Crosby Lake-Westport area of North Crosby Township, in the Marble Rock area and on the north and south sides of Charleston Lake. New infestations were recorded on the west side of the Napanee District in Cramahe Township, one of which extended some distance into adjacent Haldimand Township of the Lindsay District, Central Region. Infestations in the Lindsay District consisted of 402 ha of moderate-to-severe defoliation in Haldimand Township as described above, and 15 ha in Belmont Township, with a slight extension into adjacent Methuen Township, Bancroft District. In Bancroft District the area infested consisted of 164 ha of moderate-to-severe defoliation in small pockets in Belmont Township, down from the 240 ha recorded in the same area last year. Infestations which in 1985 encompassed 90 ha in Lyndoch, Griffiths, Brougham, Blithfield, and McNab townships, Pembroke District, expanded to about 221 ha this year.

Elsewhere in the Algonquin Region, small numbers of larvae were found in many widely scattered areas in the Pembroke District, in Airy Township, Algonquin Park District and in Burleigh, Faraday, Dungannon and Bangor townships, Bancroft District. Small numbers of larvae were also collected from nine townships throughout the Lindsay District, including Emily, Darlington and Serpent Mounds Provincial Parks.

In the Central Region a single collection of three caterpillars was made at Bronte Creek Provincial Park, Cambridge District, and low numbers of larvae persisted in the Silver Bay area of Humberstone Township and the Crystal Beach area of Bertie Township, Niagara District.

In the Southwestern Region, OMNR staff reported low numbers of larvae and egg-masses in a 40-ha woodlot in Charlotteville Township, Simcoe District. Small numbers of larvae were also collected in St. Williams tree nursery in South Walsingham Township. A small number of egg-masses was reported south of Sarnia in Moore Township, Chatham District, by personnel of the Plant Protection Division of Agriculture Canada; however, followup larval surveys failed to disclose any insects.

In 1986, OMNR conducted the largest aerial spraying program to date against the gypsy moth in southeastern Ontario. A total of some 103,100 ha of forest were treated with two or three applications of *B.t.* Both helicopters and fixed-wing aircraft were used to treat some

45,700 ha of crown land and 57,400 ha of private land. Spraying operations, which began in mid-May and ended in late June, were conducted in Tweed, Carleton Place, Brockville and Napanee districts in the Eastern Region and in Pembroke District in the Algonquin Region.

Forest Tent Caterpillar, *Malacosoma disstria* Hbn.

Populations of the forest tent caterpillar increased to outbreak proportions in the Northeastern, Northern and Algonquin regions while declining to relatively low levels in the North Central Region. All together, an area of 433,000 ha sustained moderate-to-severe defoliation in the province in 1986 (Table 6) compared to 208,942 ha in 1985.

Table 6. Gross area (ha) of moderate-to-severe defoliation by the forest tent caterpillar in Ontario in 1986

Region	District	Area of moderate-to-severe defoliation
North Central	Thunder Bay	250
Northeastern	Wawa	14,335
	Blind River	4,940
	Espanola	5,230
	North Bay	86,920
	Temagami	163,540
Northern	Kirkland Lake	123,280
	Gogama	21,370
	Chapleau	1,975
Algonquin	Parry Sound	11,160
TOTAL		433,000

The largest infestation was located along the Quebec border from Bayly and Marter townships, Kirkland Lake District, and through the eastern Temagami District to Mulock Township, North Bay District, affecting trembling aspen over an area of 333,190 ha. A second large infestation encompassed 51,555 ha on the Gogama-Kirkland Lake district boundary between Churchill and Asquith townships, Gogama District, and Haultain and Nichol townships, Kirkland Lake District (Fig. 4). Some 32 additional small pockets totalling 5,545 ha were mapped in the central Gogama District. In the North Bay District, some 10 additional patches of infestation with a total area of 4,460 ha were recorded along with the area that was part of the largest infestation described earlier. The biggest of these, which covered 3,200 ha, was located between Sturgeon Falls and Tomiko Lake. Three infestations totalling 5,230 ha

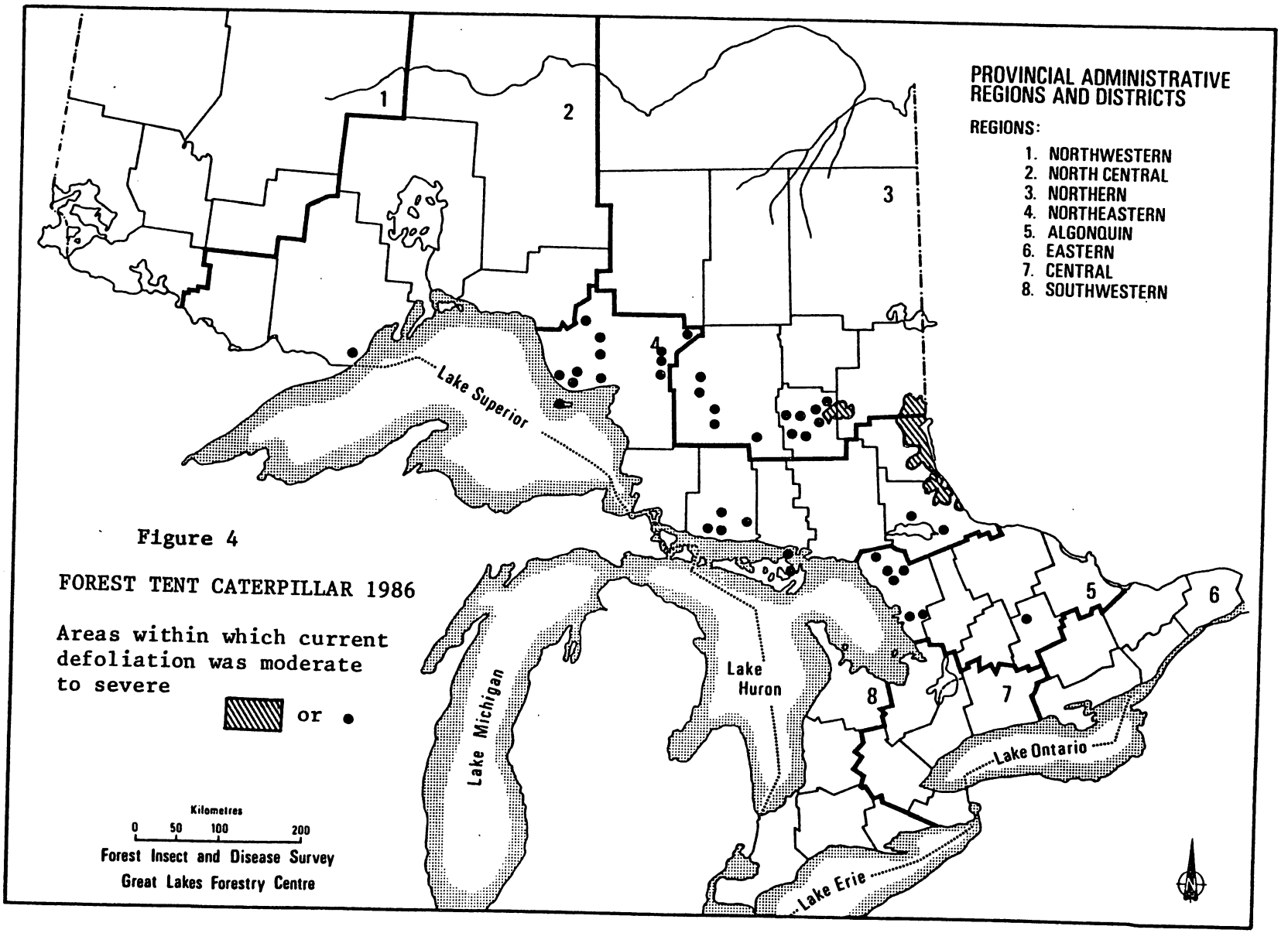


Figure 4

FOREST TENT CATERPILLAR 1986

Areas within which current defoliation was moderate to severe

or •

occurred in the Espanola District on Great La Cloche and Strawberry islands and in Howland Township on Manitoulin Island. In the southern Blind River District, 14 scattered pockets of infestation totalling 4,940 ha were mapped. The largest of these were located near Endikai Lake (500 ha), in Scarfe and Cobden townships (1,540 ha) and near Depot Lake (1,260 ha). Thirteen widely separated and small infestations were mapped in the Chapleau District over a total area of 1975 ha. Twenty-three pockets of infestation were mapped in the eastern and western Wawa District, where they affected an area of 14,335 ha. The largest of these occurred on the western end of Michipicoten Island where 8,750 ha of sugar maple stands were severely defoliated. Other sizeable infestations occurred near Mountain Ash Hill in Franchere Township (1,560 ha) and north and south of Highway 17 near White Lake Provincial Park (930 ha). Substantial population increases occurred in the western Parry Sound District between the French River and Healey Lake, where 13 pockets of moderate-to-severe defoliation totalling 11,160 ha were mapped. The largest of these were located in the central part of East Burpee and Burton townships (4,340 ha) in the northwest corner of McKenzie Township (1,740 ha) and in the northeast corner of Grundy Lake Provincial Park, Mowat Township (1,700 ha).

The longstanding infestation in Crooks Township south of the city of Thunder Bay, Thunder Bay District, declined from 5,000 ha in 1985 to 250 ha this year. A similar decline occurred in the old infestation near Painkiller Lake in the Kirkland Lake District where only sporadic pockets of light defoliation were observed this year.

Egg-band counts for this insect will be carried out shortly and the results of these will be presented in the fall Survey Bulletin.

Large Aspen Tortrix, *Choristoneura conflictana* Wlk.

Populations of this insect, which began increasing in 1985 when 27,500 ha of defoliation were mapped, reached outbreak proportions in 1986. Across the province, a total area of 620,899 ha of moderate-to-severe defoliation were mapped in seven districts (Table 7). The largest single infestation was 175,140 ha in an area located in trembling aspen stands, mainly in the southeast Chapleau District, with extensions into adjacent areas of the Gogama, Espanola and Sudbury districts (Fig. 5). Numerous smaller infestations occurred in the southern Chapleau District, the southwestern Gogama District, the northwestern Sudbury District and the northern Espanola District. Numerous pockets of moderate-to-severe defoliation were also mapped on the mainland areas and on Manitoulin Island in the southern Espanola District. In the Sault Ste. Marie District, a single infestation occurred in the city of Sault Ste. Marie and environs and numerous small pockets were detected in the southwest corner of the district in the Bruce Mines-Rydal Bank area. A single small pocket was mapped in Galbraith Township, Blind River District. Throughout this area a number of other insects fed in conjunction with the large aspen tortrix, as follows: the aspen twoleaf tier, *Enargia decolor* (Wlk.), the Bruce spanworm, Operophtera bruceata (Hlst.) and the forest tent caterpillar.

Table 7. Gross area of moderate-to-severe defoliation (ha) by the large aspen tortrix in Ontario in 1986

Region	District	Area of moderate-to-severe defoliation
Northeastern	Sudbury	31,739
	Espanola	94,770
	Blind River	110
	Sault Ste. Marie	1,440
Northern	Chapleau	215,535
	Gogama	43,745
North Central	Thunder Bay	233,560
TOTAL		620,899

In the Thunder Bay District of the North Central Region, moderate-to-severe defoliation increased from 20,900 ha in 1985 to 233,560 ha in 1986. The bulk of this was located in three sizeable infestations as follows: along the United States border from Gunflint Lake to Lake Superior (120,200 ha), northeast of the city of Thunder Bay in the Sibley Peninsula-Escape Lake area (76,670 ha) and east of Lac des Isles (23,600 ha). A number of smaller infestations were mapped in the Dog Lake area, north of Dorion, immediately south of the city of Thunder Bay, and on Pie Island at the entrance to Thunder Bay on Lake Superior. Significant numbers of the Bruce spanworm, aspen twoleaf tier and forest tent caterpillar also fed in conjunction with the large aspen tortrix in a few locations in the Thunder Bay District.

A single small stand of trembling aspen near the town of Terrace Bay, Terrace Bay District, sustained moderate-to-severe defoliation. Low numbers of larvae and occasional light infestations were present in a number of other areas in the Terrace Bay District as well as in the Geraldton and southern Nipigon districts.

Pine False Webworm, *Acantholyda erythrocephala* (L.)

A general population decline of this insect which has occurred for the past several years continued in 1986. The only exception to this trend occurred in the Lindsay District of the Central Region and the Parry Sound and Minden districts of the Algonquin Region, where new infestations were found in a number of areas. The highest populations were recorded in a 20-ha red pine plantation in Harvey Township, Lindsay District, where 3-m red pine were 90% defoliated. Somewhat lesser damage, with defoliation in the 25% range, was recorded in a 6-ha plantation of 2-m red pine in Stanhope Township, Lindsay District. Light

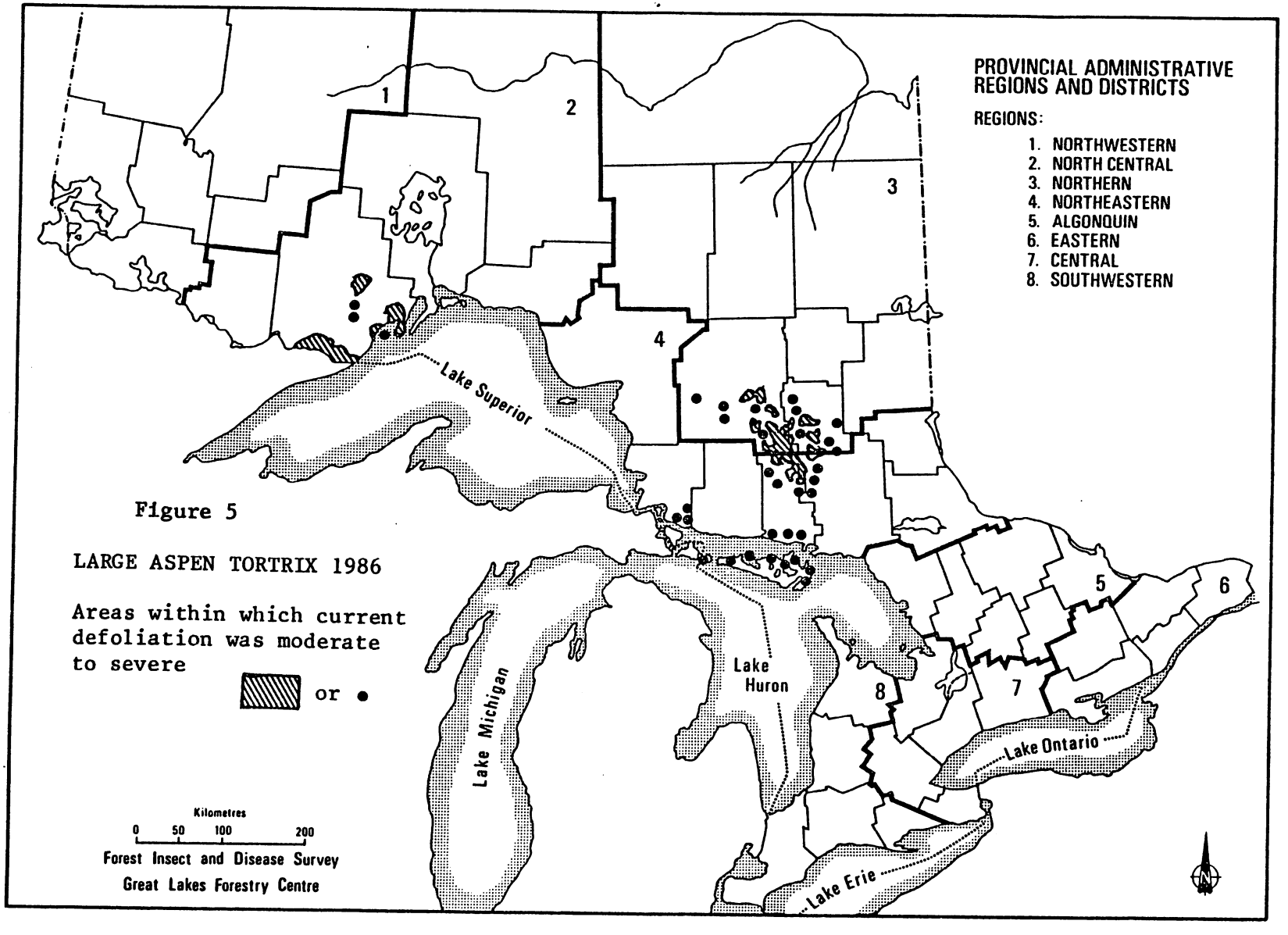


Figure 5

LARGE ASPEN TORTRIX 1986

Areas within which current defoliation was moderate to severe

or •

infestations were observed in a number of other districts in southern Ontario. Two collections from the city of Thunder Bay on eastern white pine and Swiss stone pine represent a new distribution record for this introduced insect.

Black Army Cutworm, *Actebia fennica* (Tausch.)

Populations of this serious pest of new plantations declined to low levels in 1986. A single heavy infestation was recorded on a prescribed burn site in Hill Township, Gogama District; however, the insects fed mainly on plentiful herbaceous ground cover, leaving young trees undamaged. Small numbers of larvae were reported in seedbeds at the Dryden Forest Tree Nursery, Dryden District. A pheromone trapping program for adults of this insect will be reported at a later date.

Fall Cankerworm, *Alsophila pometaria* (Harr.)

Populations of this spring defoliator, which have been high in the North Central and Northwestern regions for several years, collapsed in 1986. The only infestations remaining were in the West Fort area of the city of Thunder Bay, where ornamental Manitoba maple and white elm had defoliation in the 40% range, and in the town of Dryden, where similar damage occurred in Manitoba maple. A few ornamentals in the town of Sioux Lookout were about 30% defoliated.

Saratoga Spittlebug, *Aphrophora saratogensis* (Fitch)

Increased tree mortality was evident in previously infested red pine plantations in Hagarty and Fraser townships, and increased branch mortality was apparent in a small infestation in Ross Township, Pembroke District. High numbers of nymphs were observed on sweetfern in some of these infested stands but no new infestations were observed this year. A small number of nymphs were collected on sweetfern in a jack pine stand at Nellie Lake, Cochrane District.

Cedar Leafminers, *Argyresthia aureoargentella* Brower, *A. canadensis* Free., *A. thuiella* (Pack.) and *Pulicalvaria thujaella* (Kft.)

With a few exceptions, numbers of this leafmining complex remained low throughout the province. One exception was in the Owen Sound District, where a 10-ha stand near Pike Bay on the Bruce Peninsula suffered 80% to 100% foliar damage. Numerous small stands sustained light and occasionally moderate foliar damage in six other townships on the Bruce Peninsula. Low populations were widespread in the remainder of the Southwestern Region but in all cases foliar damage was less than 10%. Low populations were also reported from two areas in the Brockville District. High populations were present in cedar stands along the southern shorelines of Manitoulin Island in the Espanola District, with

the most severe damage occurring in the Wikwemikong Indian Reserve, where foliar damage was nearly complete. In the remainder of the infested area foliar damage ranged from 40% to 60%.

A single medium-to-heavy infestation was reported in a 20-ha cedar stand in Warren Township, Chapleau District.

Oak Skeletonizer, *Bucculatrix ainsliella* Murt.

Damage by the first generation of this insect was much reduced from levels recorded for the past several years in the Central Region. Low populations, with very light leaf damage, were observed in red oak stands in the Niagara, Maple and Huronia districts. A single 1-ha stand of semimature red oak at Bronte Creek Provincial Park, Cambridge District, sustained moderate damage. Feeding by the second generation of this insect is now under way and the results of current surveys will be presented in the fall Survey Bulletin.

Larch Casebearer, *Coleophora laricella* (Hbn.)

Generally low and declining populations were reported across the province. The highest populations occurred in Brockville and Carleton Place districts in small stands of European larch and tamarack, where defoliation as high as 60% was recorded. Declining populations still caused moderate damage to a 10-ha European larch plantation in West Gwillimbury Township, Huronia District, and similar damage levels were recorded on fringe trees of the same species in Manvers Township, Lindsay District. Low populations and light defoliation were reported from the Owen Sound, Algonquin Park, Bancroft, Wingham, Geraldton, Terrace Bay and Kapuskasing districts.

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

Populations of this potentially damaging insect remain widespread but very low in the Central and Southwestern regions. The only exception was in the Durham Regional Forest near Uxbridge, where a light infestation caused defoliation of red oak in the 5-15% range. Very low populations were also reported on red oak in Minden Township, Minden District, and in Kaladar and Kennebec townships, Tweed District.

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

Infestations that were medium to heavy in a number of white pine plantations in the Owen Sound District of the Southwestern Region declined to very low levels in 1986. Infestations that occurred in 1985 in the Lake of the Woods area of the Kenora District, Northwestern Region also declined to low levels this year. Low populations were reported in Madoc Township, Tweed District, Tyendinaga Township, Napanee

District, Augusta, Elizabethtown and Front of Yonge townships, Brockville District and Darling Township, Carleton Place District. The second generation of this insect begins feeding in August. Results of further surveys will be presented in the fall Survey Bulletin.

Basswood Looper, *Erannis tiliaria* (Harr.)

High populations caused moderate-to-severe defoliation of red oak stands 2 ha and 10 ha in size in Howland and Sheguiandah townships, respectively, on Manitoulin Island, Espanola District. A 5-ha stand of trembling aspen near the village of Echo Bay in the Sault Ste. Marie District sustained similar defoliation. Small numbers of the insect were found on red oak and sugar maple in numerous other areas of the Sault Ste. Marie and Blind River districts. Low populations were reported in mixed hardwood stands at several locations in the Parry Sound, Minden and Bracebridge districts. Small, heavy infestations occurred on young white birch, mountain maple and willow near Barbara Lake and the town of Marathon in the Terrace Bay District.

Birch Leafminer, *Fenusa pusilla* (Lep.)

Reports on the status of this insect were quite variable across southern Ontario. The most severe damage was reported from the Eastern Region, where a number of stands of gray and white birch, up to 5 ha in size, in the Cornwall and Napanee districts were moderately to severely defoliated. Similar damage was observed by aerial surveys in white birch stands in numerous areas in the Tweed and Napanee districts. Heavy damage was apparent on ornamental birch trees in most urban areas in this Region. Damage was less severe in the Central Region, where small clumps of white birch suffered moderate-to-severe defoliation in Nassagaweya Township, Cambridge District, Flos and Mona townships and C.F.B. Borden, Huronia District and Whitchurch Township, Maple District. Although the insect was widespread in the Southwestern Region, damage to ornamentals and small clumps of birch was generally light except in one location in Lobo Township, Aylmer District, where defoliation in excess of 75% was observed. Decreased populations were reported from the Algonquin Region except in McKay Township, Pembroke District, where numerous 0.5-ha pockets of white birch sustained foliage damage in the 80% range.

In northern Ontario, the most serious damage occurred in the Latchford-Haileybury area of Temagami District, Northeastern Region, where approximately 200 ha of white birch had severe foliar damage. Moderate foliar damage was apparent in a 50-ha area of white birch regeneration in the Leguerrier Township of the Wawa District. In the Northern Region, moderate-to-severe defoliation was prevalent on ornamental white birch in most urban areas in the Kirkland Lake, Timmins, Chapleau, Gogama, Cochrane, Kapuskasing and Hearst districts. Similar damage was apparent on ornamental trees in most urban areas in the Geraldton, Nipigon and Thunder Bay districts of the North Central

Region. A 5-ha stand of white birch west of Clavet Township in the eastern Geraldton District had 99% foliar damage. Open-grown, fringe and small clumps of trees suffered moderate-to-severe defoliation in numerous areas west of the city of Thunder Bay, Thunder Bay District. Light and occasionally moderate foliar damage occurred on ornamentals in the towns of Ignace and Sioux Lookout in the Northwestern Region.

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

Populations of this defoliator remained at generally low levels throughout the province. The only exceptions occurred in Hallam Township, Sudbury District, where defoliation in the 60-80% range was recorded in a 5-ha stand of trembling aspen regeneration. Increasing but still low populations were reported from the Geraldton, Terrace Bay and Wawa districts. Light infestations with generally declining populations occurred in the Kirkland Lake, Chapleau, Gogama and Bancroft districts.

Balsam Fir Sawfly, *Neodiprion abietis* complex

Although an overall population decline was evident in the Northwestern Region, moderate-to-severe defoliation persisted on scattered stands of balsam fir within an area of approximately 11,000 ha in the Pakwash Lake-Ear Falls area of the Red Lake District. Infestations declined to light intensity in scattered stands of balsam fir in a number of areas south and north of Kenora, Kenora District, in Smellie and Van Horne townships, Dryden District and in Claxton Township, Fort Frances District. In the Algonquin Region approximately 1,300 ha of moderate-to-severe defoliation were recorded in scattered stands in the Algonquin Park, Pembroke and Bancroft districts. Aerial surveys disclosed that the largest infestation occurred in a 100-ha nearly pure stand of balsam fir near North Tea Lake in Ballantyne and Wilkes townships, Algonquin Park District. The most widespread infestations, however, occurred in the central and southeast Pembroke District, where numerous small stands were affected.

Light defoliation was reported on small stands of balsam fir in Olden Township, Tweed District, Fitzroy and Torbolton townships, Carleton Place District, Mattawan and Papineau townships, North Bay District, and Fairbanks Provincial Park, Sudbury District.

Red Pine Sawfly, *Neodiprion nanulus nanulus* Schedl.

Numbers of this insect continued to decline in the Northwestern and North Central regions where they had been high for several years. Only occasional colonies of the insect were observed in Smellie and Wabigoon townships, Dryden District, where about 8,700 ha of moderate-to-severe defoliation occurred in 1985. A similar situation prevailed in the Corman-Skey townships area of Ignace District where light defoliation was widespread in 1985. Populations also declined to low levels

in the Thunder Bay District and in the Geraldton and Nipigon districts, where they had been on the increase last year.

In contrast, high populations persisted in the Lake Temagami area of Temagami District, Northeastern Region. Medium and high populations were also recorded in several areas in the Pembroke District and at one location in the Bancroft District, Algonquin Region. Low populations were reported on open-grown jack pine at one location in Cox Township, Sudbury District.

Jack Pine Sawflies, *Neodiprion pratti banksianae* Roh. and *N. pratti paradoxicus* Ross

Increased and more widespread infestations of *N. pratti paradoxicus* were recorded in the Pembroke and Bancroft districts. The largest area affected was in the Pembroke District, where small stands of jack pine in a 7,500-ha area between Barry's Bay and Pembroke suffered defoliation in the 25% range. Similar defoliation was recorded in small jack pine stands in the Petawawa-Rolfton area of Pembroke District and somewhat heavier defoliation (30-40%) was observed in Radcliffe Township, Pembroke District, and in Chandos, Methuen and Herchell townships, Bancroft District. High populations caused moderate-to-severe defoliation of small jack pine plantations in Elizabethtown, Walford, Front of Yonge and Oxford on Rideau townships, Brockville District, and in Hungerford Township, Tweed District. High populations were also reported on hedgerow jack pine in Lanark Township and somewhat lower numbers were recorded in a 10-ha jack pine plantation in Marlborough Township, Carleton Place District.

In contrast, populations of the closely related *N. pratti banksianae* declined markedly in northern Ontario. Light defoliation and small numbers of colonies occurred in a few locations in Chapleau, Peters and Wakami townships, Chapleau District, and in Jack and Dublin townships, Gogama District. Small numbers of insects were also reported at single locations in Ashmore Township, Geraldton District, Foster Township, Espanola District, and at several locations in the Timmins District.

European Pine Sawfly, *Neodiprion sertifer* Geoff.

Populations of this introduced defoliator, which were on the increase in 1985, declined sharply in 1986. Although low populations were common in southern Ontario, the only infestations of any consequence occurred in the Carleton Place District, where moderate damage was recorded in a 2-ha red pine plantation in Marlborough Township, and in the Huronia District, where similar damage occurred in an 8-ha red pine plantation. In Espanola District, Northeastern Region, heavy defoliation was recorded in a small, 2-m Scots pine plantation in Gordon Township, Manitoulin Island, along with several light infestations in Billings, Allan and Gordon townships. A single colony was collected

near Batchawana Bay on Lake Superior in the Sault Ste. Marie District, where a new distribution record was established in 1985.

Bruce Spanworm, *Operophtera bruceata* (Hlst.)

For the third consecutive year, large increases occurred in populations of this early-season defoliator. Across the province, an area of 209,090 ha of moderate-to-severe defoliation was mapped, up from 28,764 ha in 1985 and 4,285 ha in 1984. The largest infestations occurred in the Bancroft and Minden districts of the Algonquin Region, where sugar maple stands within an area of 172,750 ha sustained moderate-to-severe defoliation. A number of scattered pockets of moderate-to-severe defoliation were also mapped in adjacent areas of the Bracebridge (3,100 ha), Algonquin Park (1,000 ha) and Pembroke (3,800 ha) districts. A small, heavy infestation (5 ha) was reported in Pakenham Township, Carleton Place District, and medium infestations were observed in Oro Township, Huronia District, and Collingwood Township, Owen Sound District. Numerous areas of moderate-to-severe defoliation recurred for the third consecutive year in trembling aspen and sugar maple stands on Manitoulin and Cockburn islands in the Espanola District and on St. Joseph Island in the Sault Ste. Marie District. Scattered pockets of new infestations were also mapped in the Sault Ste. Marie District. All together, some 23,400 ha were affected in the Sault Ste. Marie District, along with 5,925 ha in the Espanola District.

In addition to the above, varying numbers of the insect were reported feeding on trembling aspen in conjunction with the large aspen tortrix in a number of areas in the Chapleau, Sudbury, Espanola, Sault Ste. Marie and Thunder Bay districts.

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

Incomplete surveys indicate that populations of this pest have collapsed in the Northwestern Region. Only occasional insects were found in the Ignace, Sioux Lookout and Red Lake districts in areas where heavy infestations have occurred for the past several years. Similar declines were apparent in the Kenora and Fort Frances districts, except in one area in Pellatt Township, Kenora District, where roadside white spruce along Highway 596 sustained 40-60% defoliation and in Caliper Lake Provincial Park, Fort Frances District, where ornamental white spruce were moderately defoliated.

In the Northern Region, heavy defoliation persists on open-grown white spruce in old fields and along roadsides in the Matheson, Elk Lake and New Liskeard areas of Kirkland Lake District. A similar situation persists in the Chapleau and Gogama districts, where severe defoliation was apparent on open-grown trees and ornamentals in the towns of Chapleau, Foleyet, Ramsay and Gogama along with ornamentals in Shoals, Wakami, Missinaibi, Ivanhoe and Five Mile Lake Provincial Parks. Heavy infestations also occurred on ornamental white spruce in Findlayson Point Provincial Park in the Temagami District, Northeastern Region.

In southern Ontario, a single instance of moderate-to-severe defoliation was reported in a small stand of blue spruce in Tiny Township, Huronia District. Low populations were reported at one location in Nepean Township, Carleton Place District.

Other Noteworthy Insects

High populations of the satin moth, *Leucoma salicis* (L.), caused moderate-to-severe defoliation of ornamental silver and Lombardy poplar at two locations in East Hawkesbury Township, Cornwall District, and in Hallowell and Sophiasburgh townships and the city of Belleville in the Napanee District.

Medium numbers of the spruce coneworm, *Dioryctria reniculelloides* Mutt. & Mun., were observed on mature white spruce in a seed production area in Nimitz Township, Chapleau District, near Nagagamisis Lake in McEwing Township, Hearst District, in Adamson Township, Nipigon District, and south of the Kabitotikwia River, Thunder Bay District. Small numbers of Larvae were also reported from Pellatt Township, Kenora District, and at a number of points in the Nipigon and Wawa districts.

Varying and occasionally high numbers of the aspen twoleaf tier were reported feeding in conjunction with the large aspen tortrix at a number of locations in the Chapleau, Gogama, Sudbury, Espanola and Thunder Bay districts.

The European pine shoot moth, *Rhyacionia buoliana* (Schiff.), was reported in low numbers at numerous locations in the Aylmer and Simcoe districts. The highest incidence occurred in a 0.5-m, 7.5-ha red pine plantation, where 36% of the trees were infested.

Varying numbers of pine spittlebug, *Aphrophora cribrata* (Wlk.), were reported from the Sioux Lookout, Ignace, Red Lake, Owen Sound, Tweed, Wingham, Aylmer, Geraldton, Terrace Bay, and Nipigon districts. The highest populations were in Colborne Township, Wingham District, where light twig mortality was evident on Scots pine and on white pine in Hungerford Township, Tweed District.

The spiny ash sawfly, *Euporeophora parca* (Cress.), caused heavy defoliation to the upper crowns of black ash at many locations in the Temagami and Kirkland Lake districts.

Small, heavy infestations of the pine tortoise scale, *Toumeyella parvicornis* (Ckll.), occurred on jack pine at many points in the Kirkland Lake District.

High numbers of woolly alder sawfly, *Eriocampa ovata* (L.), caused 50% defoliation of European alder at the Orono Forest Tree Nursery, Lindsay District. Severe foliar damage was also caused to the same trees by the European alder leafminer, *Fenusa dohrnii* (Tischb.).

A heavy infestation of the pine gall weevil, *Podapion gallicola* Riley, occurred in a small stand of red pine in the Northumberland County Forest, Lindsay District.

A heavy infestation of the solitary oak leafminer, *Cameraria hamadryadella* (Clem.), occurred on bur oak in a 1-ha woodlot in Townsend Township, Simcoe District.

The northern pine weevil, *Pissodes approximatus* Hopk., caused 6% mortality in a small plantation of 5-m white pine in Windham Township, Simcoe District.

Very high populations of the eastern tent caterpillar, *Malacosoma americanum* F., were reported on a number of deciduous species from the Eastern, Algonquin and Central regions. Somewhat lower populations occurred in the Southwestern Region.

High populations of a balsam poplar leaf beetle, *Chrysomela* sp., are feeding in a number of areas in the Espanola and Sudbury districts.

A heavy infestation of the early birch leaf edgeminer, *Messa nana* (Klug), occurred on grey birch in Brighton Township, Napanee District. Light infestations occurred on white birch at Ramsay Lake in the city of Sudbury and at Deer Creek in Hugel Township, Sudbury District.

TREE DISEASES

Scleroderris Canker, *Ascocalyx abietina* (Lagerb.) Schläpfer-Bernhard

The European race of this disease was found for the first time in Ontario in the summer of 1985. Infection centers in Macaulay Township, Bracebridge District, McMurrich Township, Parry Sound District and Mayo Township, Bancroft District were sanitized by high pruning and clearcut and burn programs.

In 1986, intensive aerial and ground surveys were carried out in areas surrounding the initial finds. As a result, two new infection centres have been confirmed in Mayo Township, adjacent to the original find, and one new infection centre has been found in the south part of McMurrich Township. In addition, the regular southern Ontario survey for the European race, in which selected plantations are scrutinized twice a year, was maintained throughout the remainder of southern Ontario. To date some 130 plantations (mainly red pine) have been checked, with negative results.

In northern Ontario, in addition to regular surveys, known infection centers of the North American race are being rechecked for race determination in order to be certain that the European race has not been overlooked in these areas. To date, all checks have proven negative. Overall surveys in northern Ontario indicate that infections of the North American race are at a low ebb in 1986. The only infection of

any note was reported in Haughton Township, Blind River District, where an evaluation revealed 42% infection and 5.3% mortality in a mixed red pine and jack pine plantation, where the disease has been present for some time. A small plantation of 1-m red pine in adjacent Kirkwood Township suffered 20% infection and 0.6% mortality. Reports of the disease, usually at low infection levels, were also received from the Wawa, Sault Ste. Marie, Kenora, Fort Frances, Dryden, North Bay and Chapleau districts.

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

The pinewood nematode was first found in Ontario in 1984 when it was identified in samples collected from single locations in each of the Brockville, Maple, Lindsay and Simcoe districts. In 1985, the FIDS Unit conducted a widespread sampling program consisting of 295 samples from about 260 locations to try to define better the range of this pest in Ontario. Nematodes of some species were recovered from the majority (about 185) of these species. Although all 1985 samples have not yet been identified, results to date, including the 1984 results, indicate that the pinewood nematode has been found in 33 samples from 29 locations in 19 districts. It would seem that the organism is present throughout the province (Figure 6). The host tree in most cases was jack pine in northern Ontario and red pine or eastern white pine in southern Ontario, although three collections were made from Scots pine and a single collection from white spruce.

A closely related nematode was identified in 11 samples from 10 locations in eight districts throughout the province. The majority of these collections were from balsam fir but collections were also made on jack pine and red pine.

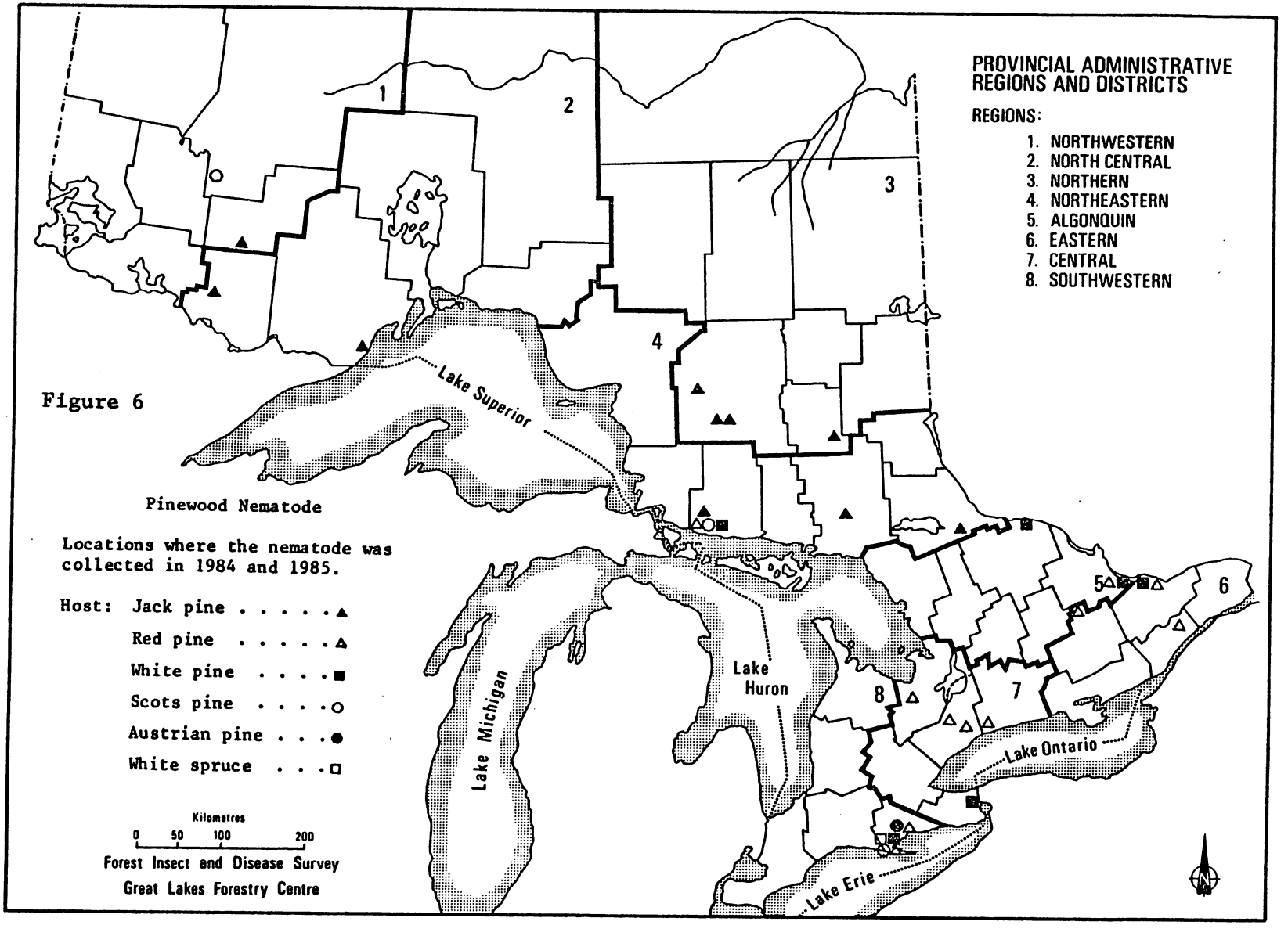
The FIDS Unit is continuing the nematode sampling program in 1986 to fill the gaps in coverage.

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

This disease was widespread in young jack pine and red pine stands in northern Ontario and the Algonquin and Central regions of southern Ontario. In all instances reported, however, infection and consequent mortality were less than 5%.

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

Preliminary reports indicate that infections by this leaf disease are widespread in the Timmins, Kirkland Lake, Sudbury, Espanola, Algonquin Park and Pembroke districts. The most severe damage recorded so far was on Cockburn Island, Espanola District, and in Rutherford Township, Sudbury District, where 100% of the trees were infected with foliar damage of 25% and 30%, respectively. In Ulster Township, Sudbury District, 70% of the trees were infected with 45% foliar damage.


PROVINCIAL ADMINISTRATIVE REGIONS AND DISTRICTS
REGIONS:
1. NORTHWESTERN
2. NORTH CENTRAL
3. NORTHERN
4. NORTHEASTERN
5. ALGONQUIN
6. EASTERN
7. CENTRAL
8. SOUTHWESTERN
Figure 6
Pinewood Nematode
Locations where the nematode was collected in 1984 and 1985.
Host: Jack pine
Red pine
White pine
Scots pine
Austrian pine
White spruce
Kilometres
0 50 100 200
Forest Insect and Disease Survey
Great Lakes Forestry Centre
Lake Superior
Lake Michigan
Lake Huron
Lake Ontario
Lake Erie
1
2
3
4
5
6
7
8

Pine Needle Rust, *Coleosporium asterum* (Dietel) Sydow

This foliage disease was widespread in the province in 1986, sometimes at high infection levels, but in most cases, actual foliar damage did not exceed 5%. The most severe damage reported was in Hardwick Township, Thunder Bay District, and Stirling Township, Nipigon District, where young jack pine stands had infection levels of 76% and 55%, respectively, and 15% foliar damage.

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

The overall status of this disease has changed little over the past several years. This year reports were received from a number of areas, with the highest infection levels in Ojibway Provincial Park, Sioux Lookout District, where 57% of the trees examined were infected. A high infection level was also recorded in Alarie Township, Wawa District, where a spot-planted white pine plantation had 33% infection and 6% mortality. Mortality of 5% was recorded on the white pine component of a 10-ha mixed stand in Jones Township, Algonquin Park District. Reports of the disease, usually with infection levels of less than 10%, were received from Bancroft, Pembroke, Napanee, Brockville, Espanola and Blind River districts.

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

This disease was widespread in the Pembroke, Algonquin Park and Bancroft districts of the Algonquin Region. The heaviest infection in this area was in a 12-ha plantation in Richards Township, Pembroke District, where foliar damage averaged 25%. Numerous other infections, with foliar damage ranging from 5 to 10%, were recorded. Sporadic, widespread infections were reported from the Northwestern and North Central regions. The highest incidence was in a 500-ha, 1.7-m jack pine stand near the Crystal River in Ignace District, where 100% of the trees were affected and foliar damage averaged 15%. Infection levels of 77% were encountered in a 500-ha, 1.6-m jack pine stand near Skurban Lake, Sioux Lookout District, with an average of 21% foliar damage. Similar foliar damage of 20% and 15%, respectively, was reported in jack pine stands at Limestone Lake, Nipigon District, and Obatanga Provincial Park, Wawa District. Lower infection levels, ranging from 5 to 10%, with foliar damage as high as 50% on individual trees, were reported from stands at two locations in the Atikokan District and one location in the Chapleau District.

Western Gall Rust, *Endocronartium harknessii* (J.P. Moore) Y. Hirats.

Infections by this gall rust are widespread in northern Ontario. The most serious damage occurred in Chapleau Township, Chapleau District, where 19% of 1,500 grafted scion 3-0 jack pine were infected. Chemical control measures were necessary at this location as

well as in the Dryden Forest Tree Nursery where surrounding jack pine stands are heavily infected. A sanitation program is under way at Dryden Nursery to remove the most severely galled trees from the surrounding stand. A similar situation exists at the Kimberly-Clark Nursery in Geraldton District, where a surrounding 20-ha jack pine stand is heavily infected. A heavy infection was also reported in a 0.5-m jack pine plantation in Lane Township, Sault Ste. Marie District, where 31% of the trees were infected and 23% of the trees supported stem galls, which often girdle young trees. Reports of the disease, with infection ranging from 1% to 10%, were received from the Red Lake, Sioux Lookout, Ignace, Thunder Bay, Nipigon, Fort Frances, Kenora, Espanola and Algonquin Park districts.

Larch Needle Cast, *Meria laricis* Vuill.

This introduced disease was collected for the first time in Ontario in 1983 in Sullivan Township, Owen Sound District. It was later found in Hardwick Township, Chatham District. In 1986, a new distribution record occurred when the fungus was found damaging rising 2-0 European larch seedlings at the Orono Forest Tree Nursery, Lindsay District. This is the first record of the disease in a tree nursery in eastern Canada. While European larch in the nursery was heavily infected, little or no damage was observed on native tamarack in the same compartments. The disease was effectively controlled by the application of a fungicide.

Other Noteworthy Diseases

Preliminary surveys for shoot blight, *Venturia macularis* (Fr.) E. Müller & v. Arx, show a decrease in both incidence and damage levels in the Wawa and Blind River districts. Widespread infections with low levels of foliar damage were observed in trembling aspen stands in the Timmins and Kirkland Lake districts.

Heavy infections of cedar-apple rust, *Gymnosporangium globosum* Farlow, were reported on red cedar throughout the Southwestern Region and the Niagara District of the Central Region. Heavy orange fruiting on the alternate hosts, apple and hawthorn, was also observed in a number of areas in the Central Region and the Tweed and Napanee districts of the Eastern Region.

The needle blight, *Kabatina thujae* A. Schneider & v. Arx, caused branch and whole-tree mortality in most concentrations of red cedar south of Highway 401 in the Napanee District.

An anthracnose disease, *Apiognomonia veneta* (Sacc. & Speg.) Höhnel, caused 20% branch mortality on ornamental sycamore trees in the town of Delhi, Simcoe District.

The white mold, *Microstroma juglandis* (Bereng.) Sacc., caused 40% foliar damage on 20% of mature shagbark hickory trees in Bertie Township, Niagara District.

Dutch elm disease, *Ceratocystis ulmi* (Buism.) C. Moreau, was found infecting 17% of 12-m white elm trees in Lancaster Township, Cornwall District, and 8% of ornamental white elm in the city of Thunder Bay, Thunder Bay District. Medium infection levels were reported on young white elm along fence rows and in creek bottoms in Horton Township, Pembroke District.

Hypoxylon canker, *Hypoxylon mammatum* (Wahlenb.) J. Miller, was found infecting 25% of roadside trembling aspen near Purdy in Bangor Township, Bancroft District. Infection levels of 15% with 10% mortality were recorded in a small stand in Hagarty Township, Pembroke District, and stem cankers were observed on 6% of 14-m trembling aspen trees in Gloucester Township, Carleton Place District.

Sweet fern blister rust, *Cronartium comptoniae* Arthur, caused severe stem cankers on 9.3% of the trees in a young jack pine plantation in Carew Township, Chapleau District. The tip blight, *Sphaeropsis sapinea* (Fr.) Dyko & B. Sutton, caused heavy foliar damage and tree mortality in planted Austrian pine at single locations in Eldon and Manvers townships, Lindsay District. Light branch killing was also evident on red pine at French Lake in Quetico Provincial Park, Atikokan District, and on the same host in Gurd Township, North Bay District, and Servos Township, Sudbury District.

A needle cast, *Lophodermium* sp., caused an average foliage loss of 19% on 98% of the trees in a 5-ha red pine plantation in Tiny Township, Huronia District. Somewhat heavier infections have caused light mortality of young red pine a 5-ha plantation in Horton Township, Pembroke District.

ABIOTIC DAMAGE

Frost

Frost damage was widespread throughout the province in 1986. Unusually warm weather in late April which caused early flushing of a number of species was followed by low temperatures in early May and June. For example, temperatures of -3, -3, -4 and -1°C were recorded at the Haliburton Fire Centre on 2, 3, 4 and 5 May, respectively, and a low temperature of -6°C was recorded in Geraldton in early June.

In northern Ontario, the species most often affected were white spruce and balsam fir, although black spruce, trembling aspen and black ash were occasionally damaged. The most widespread and serious damage occurred in the Northern Region, where evaluations at 31 locations showed an average of 59% of the trees affected, with actual foliar damage ranging from 5% to 90%. Extensive damage occurred to the new growth of black ash in the Chapleau and Gogama districts in the same region.

Widespread but usually less severe damage occurred in the Northeastern Region, with the most severe in Gurd Township, North Bay District, where one white spruce plantation had 100% of the new shoots destroyed. In the North Central Region, frost damage was widespread but confined mainly to small, open-grown regeneration white spruce and balsam fir. An exception to this was observed at Limestone Lake, Nipigon District, where 4-m white spruce in a 30-ha plantation had an average of 75% defoliation on 100% of the trees. In most of the Northwestern Region only traces of frost damage were recorded; an exception occurred in the Fort Frances and Kenora districts, where heavy damage (100%) was recorded on trembling aspen at several locations and less severe damage (as high as 4%) was recorded in black spruce seed orchards and progeny tests.

Frost damage was recorded in most of southern Ontario on many hardwood and coniferous species. The most widespread damage occurred on trembling aspen, white spruce and balsam fir in the Algonquin Region. The heaviest damage occurred on white spruce and balsam fir in the southwestern Pembroke District, in the eastern Pembroke District and in a number of areas in the Minden and Bracebridge districts.

In the Eastern Region, frost damage as high as 73% was recorded on hybrid poplar in the G. Howard Ferguson Forest Tree Nursery in the Brockville District. Foliar damage ranging from 5% to 100% was recorded on a number of other deciduous and coniferous species in many locations.

Damage in the Central Region was most severe in trembling aspen stands in the northern Lindsay District. Scattered basswood was also severely damaged in the Kawartha Lakes area of the same district. Heavy damage was also observed in a small 2-year old red and white pine plantation in Sunnidale Township, Huronia District.

In the Southwestern Region, small pockets of frost damage occurred on a number of hardwood and coniferous species, including the new shoots and flowers of walnut. In most cases actual foliar damage ranged from 5% to 10%, but in Haughton Township, Simcoe District, 30% foliar damage was recorded on 30% of the trees in a 2-ha plantation of 1-m white pine.

Tornado and Wind Damage

Damage by high winds was reported from several districts. The most concentrated damage occurred in the Minden and Bancroft districts, where a tornado on 16 June caused damage in a broken, narrow strip 100-200 m wide and about 78 km long between Minden Township, Minden District, and Monteagle Township, Bancroft District. A total area of about 400 ha of mixed timber was destroyed in Minden District and similar damage occurred in Bancroft District. The most widespread blowdown, however, was in the Chapleau and Gogama districts, where a total area of 3,541 ha in 59 separate patches was blown down. The largest single area was in Copperfield Township, Chapleau District, where an area of 844 ha was affected. Approximately 20 ha of mixed forest was blown down in

several areas in the central Tweed District. Less severe damage, usually in the form of broken branches with single tree windsnap, occurred in the Brockville District, although small patches of blowdown were mapped on islands on shoreline areas of the Big Rideau Lake in North Burgess Township.

Winter Drying

This condition is caused by moisture loss during warm, dry periods in early spring when frozen root systems cannot replace water loss from the foliage. In severe cases, bud, branch and whole-tree mortality can occur.

Reports of winter drying were comparatively scarce in 1986. The most severe damage occurred in the Chapleau District where complete foliage browning was recorded on about 100 ha of eastern white cedar in Carter, Sandy and Pinogami townships. About 50 ha of the same host were similarly damaged in Asquith and Kelvin townships, Gogama District. Winter drying caused approximately 20% mortality of red pine seedlings in two compartments in the Orono Forest Tree Nursery in Lindsay District. Small pockets of lightly damaged red and white pine were reported from a number of areas in the Pembroke District and red pine, white pine and white spruce were similarly damaged in a number of locations in the Sudbury and North Bay districts.

Salt Damage

This problem occurs annually wherever large amounts of road salt are used to improve winter driving conditions. Major intersections, corners, hills and the more heavily travelled portions of main highways are usually the sites where most damage occurs. Salt carried in wind-driven spray will sometimes injure trees a considerable distance from the travelled portion of the highway. This year the most severe damage reported was near the junction of Highway 417 and Anderson Road in Gloucester Township, Carleton Place District, where 4 ha of 10-m red and white pine had 100% of the old foliage destroyed. Similar heavy damage with defoliation as high as 75% occurred on young white pine plantations in North Dorchester Township, Aylmer District, and Mornington Township, Wingham District. Small groups of red and white pine were damaged along Highway 69 in the Parry Sound District, Highway 11 in the Bracebridge District and Highways 35, 115 and 401 in the Lindsay District. Conspicuous salt damage occurred on white pine, white spruce and jack pine along Highway 17 between North Bay and Mattawa and along Highway 11 near Powassan in the North Bay District. Similar damage was reported on red pine and white pine along Highways 11-17 and 102 in the vicinity of the city of Thunder Bay, Thunder Bay District.

Needle Droop

Needle droop caused moisture stress and damaged 82% of the trees in a 2-ha red pine plantation in Villeneuve Township, Blind River District, and 32% of the trees in a 10-ha plantation in Parkinson Township, Blind River District.

Heat Stress

Nearly 50,000 bare-root jack pine were lost to heat stress in a recently planted 40-ha area in Oates Township, Chapleau District.

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