

RESULTS OF FOREST INSECT AND  
DISEASE SURVEYS IN THE  
NORTHEASTERN REGION OF ONTARIO

1989

(FOREST DISTRICTS: WAWA, SAULT STE. MARIE, BLIND RIVER  
ESPANOLA, SUDBURY, TEMAGAMI AND NORTH BAY)

D.C. CONSTABLE, W.A. INGRAM, L.S. MacLEOD and S. MELBOURNE

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## SURVEY HIGHLIGHTS

This report describes the status of the more important insect and disease conditions that affected forests in the Northeastern Region of Ontario in 1989 as determined by ground and aerial surveys.

The area infested by the forest tent caterpillar in the region increased over all by 948,525 ha in 1989; however, decreases occurred in the Temagami District. Numerous gypsy moth egg masses were found at the Wikwemikong Indian Reserve on Manitoulin Island; six egg masses were found in Killarney Provincial Park, Sudbury District, and one in Aberdeen Township, Sault Ste. Marie District. No larvae were observed in any of the abovementioned areas. Populations of the jack pine budworm remained at endemic levels and small numbers of spruce budworm larvae were found at several locations in the region. Egg-mass sampling at 26 locations indicated that light and light-to-moderate infestations by the spruce budworm could occur in three districts in 1990. Surveys for the presence of pear thrips proved positive in nine areas across the region.

Surveys were conducted once again for the European race of *Scleroderris* canker; however, once again it was not found. High temperatures and little precipitation for the second year in a row resulted in loss of planted stock in two areas. Conspicuous browning and premature leaf drop were prevalent in numerous areas as a result of these drought-like conditions, especially in ridges and on hilltops.

Sugar maple health plots were re-evaluated and 12 additional plots were established to monitor maple health. Special surveys were carried out in 10 white spruce plantations, and the four semipermanent jack pine plots established in 1984 were retallied. The North American Maple Project plots and the Acid Rain National Early Warning System (ARNEWS) plots were all revisited. Routine visits were also conducted at the Thessalon tree nursery; however, no major insects or diseases were encountered.

In this report, the following categories are used to describe the importance of insects or diseases.

### *Major Insects/Diseases*

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

### *Minor Insects/Diseases*

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

*Other Forest Insects/Diseases (Tables)*

These tables provide information on two types of pest:

- 1) those that are of minor importance and have not been known to cause serious damage to forest trees;
- 2) those that are capable of causing serious damage but, because of low incidence or for other reasons, did not cause serious damage in 1989.

Districts affected by specific insects or diseases are listed beneath the names of those insects or diseases in the Table of Contents.

The authors would like to express their appreciation to personnel of the Ontario Ministry of Natural Resources (OMNR) and wood-using industries for their cooperation during the 1989 field season.

D. C. Constable  
W.A. Ingram  
L.S. MacLeod  
S. Melbourne

Frontispiece



Leaves damaged by pear thrips, *Taeniothrips inconsequens* (Uzel)

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## INSECTS

### Major Insects

Cedar Leafminer, *Argyresthia aureoargentella* Brower,  
*Coleotechnites thujaella* (Kft.)

Populations of these leafminers, which have caused moderate-to-severe browning of eastern white cedar (*Thuja occidentalis* L.) since 1983 at scattered points in Robinson, Burpee, Carnarvon and Tehkummah townships on Manitoulin Island, Espanola District, collapsed in 1989.

Ground and aerial surveys carried out in the abovementioned areas revealed only light defoliation. Mortality in the areas affected since 1983 is averaging 20% as a result of heavy defoliation in the past.

Spruce Budworm, *Choristoneura fumiferana* (Clem.)

No major infestations by this pest of spruce (*Picea* spp.) and balsam fir (*Abies balsamea* [L.] Mill.) were observed within the forests of the region. The only areas of moderate-to-severe defoliation in the province were in the North Central and Northwestern regions, where a total of 6,239,639 ha of damage was mapped from the air (Fig. 1).

Damage was much more commonly observed, however, on ornamental and open-growing trees than in the previous three years. In Blind River District, moderate-to-severe damage occurred in 12 ornamental blue spruce (*Picea pungens* Engelm.) plantations at the junction of the Eldorado Road and Highway 17, just west of the town of Blind River. Approximately 50% of the new buds were destroyed on trees averaging 3 to 4 m in height. In Gordon Township on Manitoulin Island, Espanola District, several open-growing, 25-m white spruce (*Picea glauca* [Moench] Voss) trees sustained 10 to 30% defoliation. Single white spruce trees at scattered locations in Hugel Township, North Bay District sustained similar defoliation.

Egg-mass sampling was carried out at 26 locations in the region (Table 1). However, as indicated in the table, only three areas of light and two areas of light-to-moderate defoliation are predicted for 1990.

In conjunction with egg-mass branch sampling, pheromone traps were deployed at various sites across the region. These traps are part of a program to develop an inexpensive and effective method of monitoring and forecasting budworm populations. The traps are equipped with a synthetic pheromone to attract male moths and are placed in the field before the adult flight period; in the fall they are removed and the trapped insects are counted. Results of the pheromone trapping are summarized in Table 2.

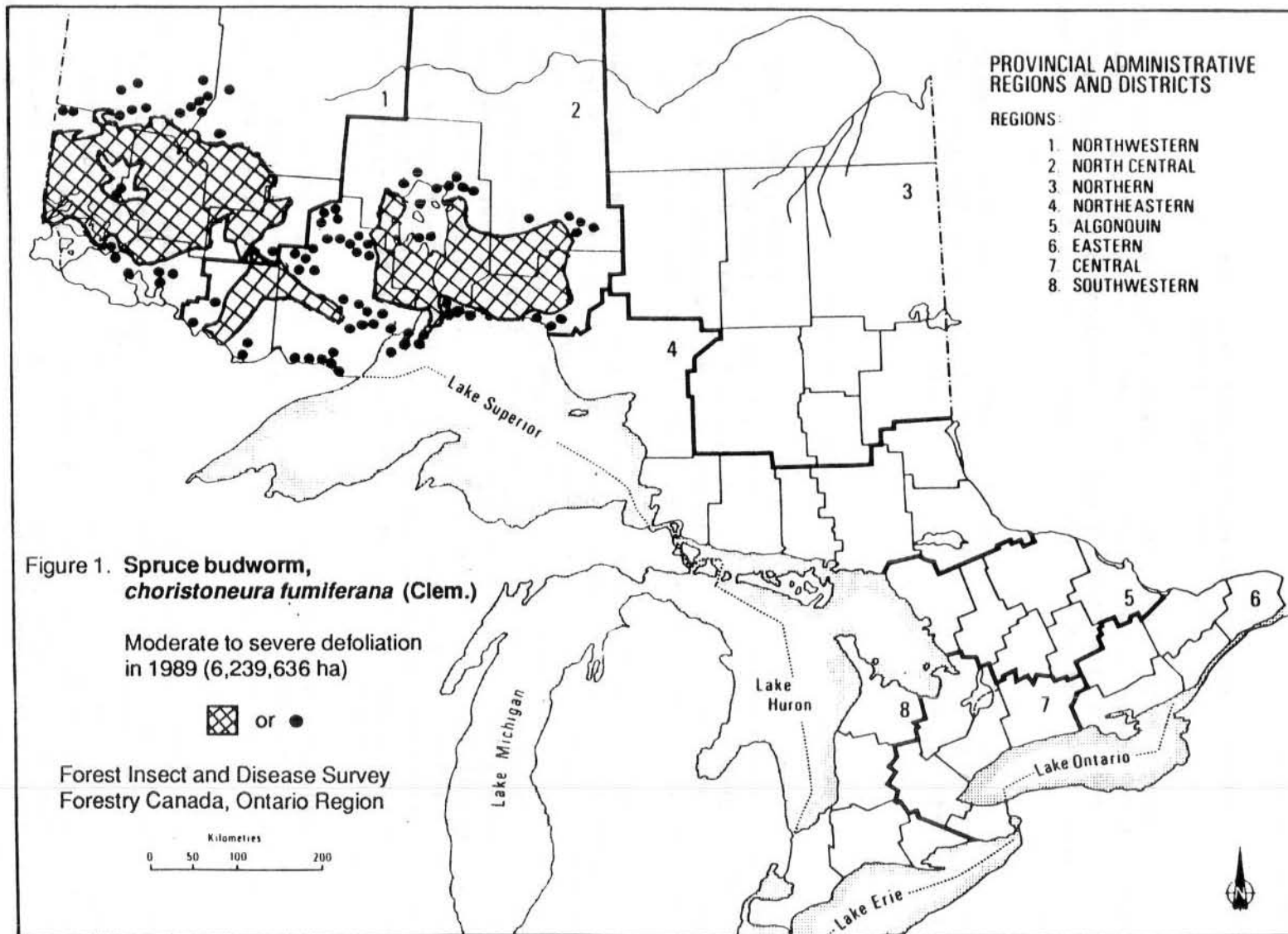


Table 1. Northeastern Region - Spruce Budworm: Summary of defoliation estimates and egg-mass counts in 1989, and infestation forecasts for 1990.

Location	Host <sup>a</sup>	Estimated defoliation in 1989 (%)	No. of egg masses per 9.29 m <sup>2</sup> of foliage	Infestation forecasts for 1990 <sup>b</sup>	Accumulated damage <sup>c</sup>
<u>Blind River District</u>					
(3 locations)					
Kirkwood Twp - nursery area	WS	0	11	L	0
Nicholas Twp	bF	0	19	L-M	0
Villeneuve Twp	WS	0	0	0	0
<u>Espanola District</u>					
(2 locations)					
Boon Twp	bF	2	0	0	0
Robinson Twp - Deer Yard	WS	1	0	0	-
<u>North Bay District</u>					
(3 locations)					
Jocko Twp	bF	0	0	0	9
McBeth Twp	bF	0	0	0	1
Sisk Twp - Martin River Prov. Pk	bF	0	0	0	+
<u>Sault Ste. Marie District</u>					
(2 locations)					
Jollineau Twp	bF	0	0	0	+
Tarbutt Additional Twp	bF	0	0	0	0
<u>Sudbury District</u>					
(2 locations)					
Antrim Twp - Halfway Lake Prov. Pk	WS	1	0	0	+
Cascaden Twp	bF	3	0	0	9
<u>Temagami District</u>					
(2 locations)					
Gillies Limit Twp	WS	0	0	0	+
Strathcona Twp	bF	0	11	L	+

(cont'd)

Table 1. Northeastern Region - Spruce Budworm: Summary of defoliation estimates and egg-mass counts in 1989, and infestation forecasts for 1990. (concl.).

Location	Host <sup>a</sup>	Estimated defoliation in 1989 (%)	No. of egg masses per 9.29 m <sup>2</sup> of foliage	Infestation forecasts for 1990 <sup>b</sup>	Accumulated damage <sup>c</sup>
<u>Wawa District</u>					
(12 locations)					
Asselin Twp	bF	0	0	0	+
Dahl Twp - Obatanga Prov. Pk	bF	0	0	0	0
Dambrossio Twp - impact plot	bF	0	0	0	5
	bS	0	0	0	5
Lalibert Twp - impact plot	bF	0	0	0	5
	bS	0	0	0	5
LaRonde Twp	bF	0	0	0	0
Maness Twp	bF	0	0	0	0
McCron Twp	bF	5	26	L-M	1
Peever Twp	bF	0	0	0	+
Recollet Twp	bF	0	8	L	0
White Lake Prov. Pk	bF	18	0	0	1

<sup>a</sup> bF = balsam fir, bS = black spruce, wS = white spruce

<sup>b</sup> S = severe, M = moderate, L = light, 0 = nil

<sup>c</sup> Accumulated damage codes: 0 = undamaged; 1 = light damage, <25% total defoliation, usually one season of severe defoliation; 2 = moderate damage, 25 to 60% total defoliation, 2 or 3 seasons of severe defoliation; 3 = severe damage, 60 to 80% total defoliation, 3 to 5 seasons of severe defoliation, will recover; 4 = moribund or dying, 80 to 100% total defoliation, crowns gray in appearance, top 50-150 cm dead or bare; 5 = <25% of stand dead; 6 = 25-50% of stand dead; 7 = 50-70% of stand dead; 8 = >70% of stand dead; 9 = <25% of stand dead, no significant (0-25%) defoliation for several years; + = 25-50% of stand dead, no significant defoliation for several years; - = 51-70% of stand dead, no significant defoliation for several years.

Jack Pine Budworm, *Choristoneura pinus pinus* Free.

For the third year in a row there were no infestations of this insect in the region. The only areas of moderate-to-severe infestation were in the Red Lake and Sioux Lookout districts, where a total of 248,311 ha of moderate-to-severe defoliation occurred.

Egg-mass sampling was once again carried out at 11 locations across the work area, but the results were negative.

Mortality plots were established across the region in 1985 to monitor whole-tree and bare-top mortality (Table 3). No change in mortality has occurred since 1987 at four sample plots in Blind River District; therefore, the plots were not examined in 1989. However, in the Espanola and Sudbury districts, mortality continues at several sample plots.

Table 2. Summary of spruce budworm pheromone trapping in five districts across the region.

Location	Number of adults (males) captured <sup>a</sup>		
	1988 PVC	1989 PVC	1989 Biolure
<u>Blind River District</u>			
Kirkwood Twp	10	66	109
<u>North Bay District</u>			
Sisk Twp	0	4	12
<u>Sault Ste. Marie District</u>			
Jollineau Twp	0	8	18
<u>Sudbury District</u>			
Dowling Twp	1	36	26
<u>Wawa District</u>			
Dambrossio Twp impact plot	5	53	26
Lalibert Twp impact plot	6	27	27

<sup>a</sup> Biolure - new in 1989, PVC - lures in polyvinyl chloride

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

Infestation forecasts in 1989 were for moderate defoliation at a sample point in Long Township, Blind River District. However, it was impossible to distinguish the amount of defoliation on red oak trees (*Quercus rubra* L.) caused by the oak leaf shredder because of simultaneous severe defoliation caused by the forest tent caterpillar, *Malacosoma disstria* Hbn. In a sample plot at Maple Ridge in Thessalon Township, Blind River District and in Hiawatha Park, Tarentorus Township, Sault Ste. Marie District, red oak trees were completely defoliated.

Egg-mass sampling at four locations indicated that light defoliation will reoccur at the two sample points in Blind River District and in one area in Sault Ste. Marie District (Table 5). Pheromone trapping was also carried out at all sample points, and the results presented in Table 4.

Table 3. Summary of whole-tree mortality and incidence of bare tops associated with damage caused by jack pine budworm in the Northeastern Region of Ontario in 1987, 1988 and 1989 (counts based on 100 trees).

Location (Twp)	Avg DBH (cm)	Whole-tree mortality (%)			Bare tops		
		1987	1988	1989	1987	1988	1989
<u>Blind River District</u>							
Gaunt <sup>a</sup>	10	18	18	not tallied	0	0	not tallied
Lane	13	11	11	not tallied	0	0	not tallied
Sagard	10	7	7	not tallied	9	9	not tallied
Winkler	15	10	10	not tallied	2	2	not tallied
<u>Espanola District</u>							
Gervais	22	13	17	17	6	19	24
Monestime Area 1	22	21	22	24	13	20	22
Monestime Area 2	13	10	14	15	27	39	39
Olinyk	24	13	14	14	5	2	2
<u>Sudbury District</u>							
Cartier	19	2	4 <sup>b</sup>	7	1	4	3
Cascaden	15	0	6 <sup>b</sup>	5	2	8	8
Cox	17	17	37	53	17	34	22
Hart	17	0	3	4	1	1	2
Ulster	17	4	20	23	2	1	1

<sup>a</sup> mortality only on suppressed trees

<sup>b</sup> sparse foliage, incorrectly tallied as dead in 1988

Table 4. Summary of oak leaf shredder egg counts for 1988 and 1989, with 1990 infestation forecasts (egg counts based on the examination of eight 30-cm branch tips selected randomly from four trees at each location).

Location (Twp)	Avg no. of eggs per branch tip		Infestation forecast		Pheromone trapping (no. of adults captured)	
	1988	1989	1989	1990	1988	1989
<u>Sault Ste. Marie District</u>						
Tarentorus	0.2	2.4	light	light	65	101
Hilton	0.0	0.0	nil	nil	84	83
<u>Blind River District</u>						
Long	19.0	0.9	medium	light	1706	1519
Thessalon	4.6	2.4	light	light	341	86

Eastern Pine Shoot Borer, *Eucosma gloriola* Heinr.

Population levels of this shoot borer varied widely across the region. Once again, damage was most prevalent on jack pine (*Pinus banksiana* Lamb.), although damage was observed on eastern white pine (*P. strobus* L.), red pine (*P. resinosa* Ait.), and pitch pine (*P. rigida* Mill.). The incidence of trees affected ranged from 1 to 45.3%; leader damage was less than 10% (Table 5).

Pine Needle Miner, *Exoteleia pinifoliella* (Cham.)

A total of 132 ha of moderate-to-severe defoliation was recorded at five locations across the Espanola, Sudbury and North Bay districts in 1989. The heaviest damage was recorded on 12-m jack pine trees in Bigwood Township, Sudbury District, where 80% of the old foliage was damaged over a 130-ha area adjacent to Highway 69. Smaller pockets (2-5 ha in size) were recorded at two locations in each of Curtin and MacPherson townships in the Espanola and North Bay districts, respectively.

An additional area of light defoliation (2-5%) scattered over a 15-ha stand of open-growing jack pine was recorded in Latchford Township, North Bay District.

Table 5. Damage by the eastern pine shoot borer in the Northeastern Region in 1989 (counts based on the examination of 150 randomly selected pine trees at each location).

Location (Twp)	Host <sup>a</sup>	Estimated area of stand (ha)	Estim. stand density (trees/ha)	Avg ht of trees (m)	Trees affected, 1989 (%)	Leaders attacked (%)
<u>Blind River District</u>						
Lane (progeny)	jP	4	2,500	1.6	2	2
Kirkwood (progeny)	jP	4	2,500	2.7	-	1
Viel	jP	25	3,906	2.0	-	2
Villeneuve	jP	16	2,500	2.1	-	3
<u>Espanola District</u>						
Allan	wP	2	1,750	2.3	1.3	0.0
Hallam	jP	0.5	3,777	2.4	8.6	0.0
Hallam	jP	4.0	4,444	2.3	5.3	0.0
Nairn	jP	4.0	4,444	2.0	2.0	0.0
Robinson	jP	-	1,750	1.7	0.7	0.0
Tennyson	wP	2.8	3,400	1.7	2.0	0.0
Tennyson	jP	6.0	4,000	2.7	10.7	0.0
Tennyson	rP	9.0	2,375	1.8	1.3	0.0
<u>North Bay District</u>						
Chisholm	rP	5.0	3,777	1.2	2.7	0.0
Gurd	piP	2.2	2,500	2.2	5.3	0.0
Gurd	wP	2.2	550	7.3	22.6	0.7
<u>Sault Ste. Marie District</u>						
Hurlburt	jP	50	2,500	2.1	18.0	7.3
Smilsky	jP	4	2,500	1.9	0.0	0.0
<u>Sudbury District</u>						
Hanmer	jP	25	2,500	1.8	45.3	10.0
Hanmer	jP	40	2,500	2.0	14.7	6.0
<u>Temagami District</u>						
Barr	jP	5	4,000	2.0	-	9.3
Coleman	jP	4	4,000	2.0	-	4.0
Milne	jP	5	4,000	4.5	-	4.6

<sup>a</sup> jP = jack pine, wP = white pine, piP = pitch pine

Birch Leafminer, *Fenusa pusilla* (Lep.)

Once again, high levels of this leafminer on white birch (*Betula papyrifera* Marsh.) were observed at numerous points in the region. Discoloration and defoliation by this introduced pest were particularly conspicuous on ornamental plantings throughout urban areas and on open-growing birch in rural areas.

Small pockets of white birch trees ranging from 1 to 3 ha were 80-100% discolored throughout Hudson, Dymond, Casey, Bucke and Lorrain townships, Temagami District. In the same district, the infestation that began in 1988 in the Cobalt-Gillies-Latchford areas continued in 1989 but damage was much lighter than in 1988 and defoliation of trees averaged 50% over approximately 200 ha. In Sault Ste. Marie District, 3 km of roadside trees in Ryan Township sustained foliar damage of 100% and approximately 75% damage occurred in a 1-ha stand of trees near Searchmont in Hodgins Township.

A similar situation was apparent throughout the Blind River, Sudbury, Espanola and North Bay districts. Foliage on open-growing trees in both rural and urban areas was, in many instances, completely discolored. The areas of damage ranged from 0.5 to 20 ha.

Damage was also evident on yellow birch (*Betula alleghaniensis* Britton) and on the one European species, commonly known as silver or weeping birch (*Betula pendula* Roth); however, it was less noticeable than the damage on white birch.

Gypsy Moth, *Lymantria dispar* (L.)

No defoliation was observed during aerial and ground surveys of the region.

In 1988, two egg masses were found for the first time in Prince Township, Sault Ste. Marie District; one egg mass and two larvae were collected in Killarney Provincial Park, Sudbury District. In 1989, numerous egg masses were observed on red oak trees at the Wikwemikong Indian Reserve on Manitoulin Island, Espanola District, and six egg masses were collected from Killarney Provincial Park, Sudbury District. One egg mass was found in the Bass Lake area of Aberdeen Township, Sault Ste. Marie District. No larval activity was observed during surveys, nor were larvae collected from burlap trapping sites.

Pheromone trapping was increased in 1989; 41 extra locations were chosen across the region (Table 6, Fig. 2). In the Espanola, North Bay and Sudbury districts, males were caught at all trap locations except Halfway Lake Provincial Park, Sudbury District, where both traps were missing. In Killarney Provincial Park, which is also in Sudbury District, there was a significant decrease in the number of adults

Table 6. Results of gypsy moth pheromone trapping in the Northeastern Region of Ontario in 1988 and 1989.

Location	No. of traps		No. of males captured	
	1988	1989	1988	1989
<u>Blind River District</u>				
Albanel Twp		1		2
Bouck Twp		1		1
Gladstone Twp		1		2
Mississagi Prov. Pk	10	10	11	10
Spragge Twp		1		0
Thessalon Twp		1		missing
<u>Espanola District</u>				
Aux Sables River	1	1		8
Bidwell Twp	10	6	12	8
Birch Island	2	1	missing	3
Chutes Prov. Pk	10	4	28	16
Gordon Twp - Gordons Lodge	2	5	0	9
- Gore Bay Airport		1		4
Great La Cloche Island		1		7
Mills Twp - Lake Wolsey		1		5
Nairn Twp		1		5
South Bay Mouth - Ferry Dock	2	6	2	21
- Trailer Pk	10	5	24	37
- Memorial Pk	2	5	27	42
Whitefish Falls	2	1	14	4
Willisville	2	2	12	8
Victoria Twp		1		12
<u>North Bay District</u>				
Antoine Prov. Pk	10	2	10	5
Beaucage Lookout	2	5	1	18
Beaucage Pk	2	.	1	
East Mills Twp - Dump		1		10
- Port Loring		1		12
Martin River Prov. Pk	2	2	5	3
Restoule Prov. Pk	10	9	11	45
Samuel de Champlain Prov. Pk	10	2	29	12
South Himsworth Twp		1		3

(cont'd)

Table 6. Results of gypsy moth pheromone trapping in the Northeastern Region of Ontario in 1988 and 1989 (concl.).

Location	No. of traps		No. of males captured	
	1988	1989	1988	1989
<u>Sault Ste. Marie District</u>				
Batchawana Bay Campgrounds		2		
Gros Cap - Prince Twp		2		24
Hilton Beach		1		17
Marshall Road - Prince Twp		1		8
Oak Pk Cres. - Sault Ste. Marie		1		2
Ojibway Pk - Garden River Indian Reserve		1		13
Pancake Bay Campgrounds	2	2	0	1
Prince Lake (South)		1		8
Pointe Louise - Pk Twp		1		missing
Richards Landing		1		8
<u>Sudbury District</u>				
Fairbanks Prov. Pk	2	2	6	6
Halfway Lake Prov. Pk	2	2	0	missing
Killarney Prov. Pk	10	6	241	35
Ramsey Lake Ranger Cabin		3		12
Ratter Township - Roadside Pk		2		2
Science North - Ramsey Lake		2		2
Windy Lake Prov. Pk	2	10	2	2
<u>Temagami District</u>				
Finlayson Point Prov. Pk	10	10	1	0
<u>Wawa District</u>				
Agawa Bay Campgrounds		2		3
Bailloquet Twp		1		0
Hawk Lake - Esquega Twp		1		0
KOA Campgrounds - Lendrum Twp		1		0
Obatanga Prov. Pk	2	1	1	0
OMNR District Office		1		0
Potholes Prov. Pk - Miskokomon Twp	1		0	
Rabbit Blanket Campgrounds	1	10	1	1
Temawa Road - Dahl Twp		1		0
Twin Lake - Esquega Twp		1		0

# NORTHEASTERN REGION

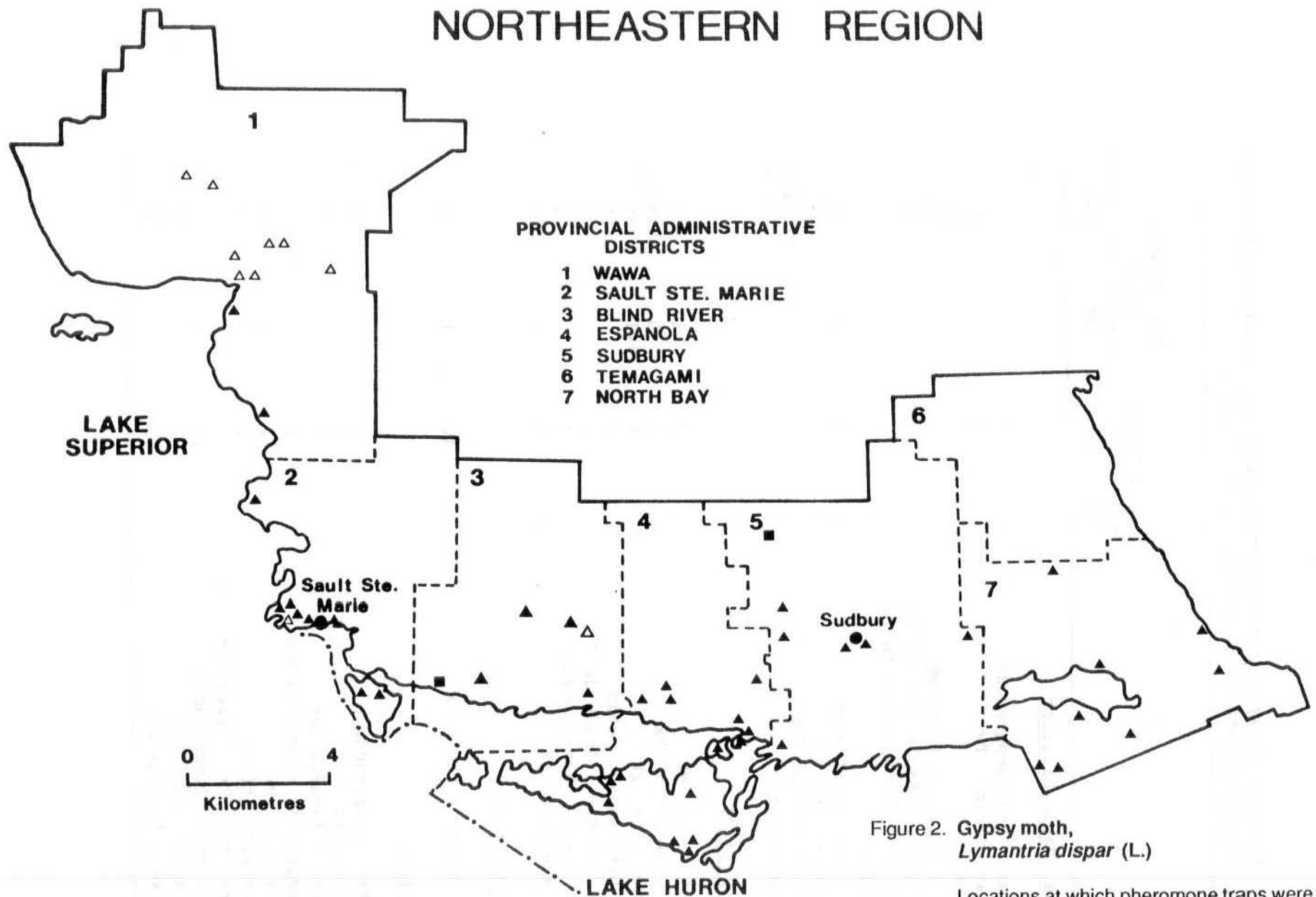


Figure 2. Gypsy moth, *Lymantria dispar* (L.)

Locations at which pheromone traps were deployed in 1989

Positive results ..... ▲  
 Negative results ..... △  
 Trap removed ..... ■

Forest Insect and Disease Survey  
 Forestry Canada, Ontario Region

trapped (206 fewer than in 1988). In Sault Ste. Marie District, 81 adults were trapped, 24 of them in Prince Township. In Blind River District, 10 adults were captured at the Mississagi Provincial Park.

Elsewhere in the province, 81,640 ha of moderate-to-severe defoliation were mapped at points in the Eastern, Algonquin, Central and Southwestern regions; the bulk of this damage occurred in Eastern Region, where 68,981 ha were defoliated.

Forest Tent Caterpillar, *Malacosoma disstria* Hbn.

Moderate-to-severe defoliation continued in the region in 1989 (Fig. 3). Increases occurred in six districts and decreases in one district (Table 7). The most noticeable increases were in the Sudbury, Espanola and North Bay districts. In Temagami District there was a decrease of 91,880 ha.

The present infestation in Northeastern Region stretches from the city of Sault Ste. Marie eastwards through the southern portion of Blind River District, encompasses approximately half of the Espanola and Sudbury districts, most of North Bay District, and extends northward into the southern townships of Temagami District.

Numerous smaller pockets of moderate-to-severe damage occurred outside the main infested area. In Sault Ste. Marie District, trembling aspen (*Populus tremuloides* Michx.) was defoliated in the Havilland-Harmony Bay area, and in isolated patches in Kars, Denis and Aweres townships; trembling aspen and sugar maple (*Acer saccharum* [Marsh.]) were defoliated at numerous locations on St. Joseph Island. Many islands in the North Channel of Lake Huron, including most of Manitoulin Island in Espanola District, sustained extensive damage.

Farther north, in Wawa District, two large pockets of moderate-to-severe defoliation were mapped; one (28,117 ha of trembling aspen) was in the Lochalsh-Renabie area and the other (27,200 ha) was in the White Lake Provincial Park area. Another 5,052 ha of defoliation was mapped in parts of Dumas, Chenard, Dunphy and Carmody townships in the Dubreuilville area. Numerous new smaller pockets ranging in size from 25 to 110 ha were observed in several townships approximately midway between the towns of Wawa and White River.

In most situations, the preferred hosts were trembling aspen and sugar maple; however, in many areas, oaks (*Quercus* spp.), ashes (*Fraxinus* spp.) and elms (*Ulmus* spp.) were completely stripped, as were ornamentals such as apple (*Malus* spp.).

Egg-mass sampling (Table 8, Fig. 4) at 135 locations indicates that moderate-to-severe defoliation will occur again in many areas within the region. Over the past two years, population reductions have

# NORTHEASTERN REGION

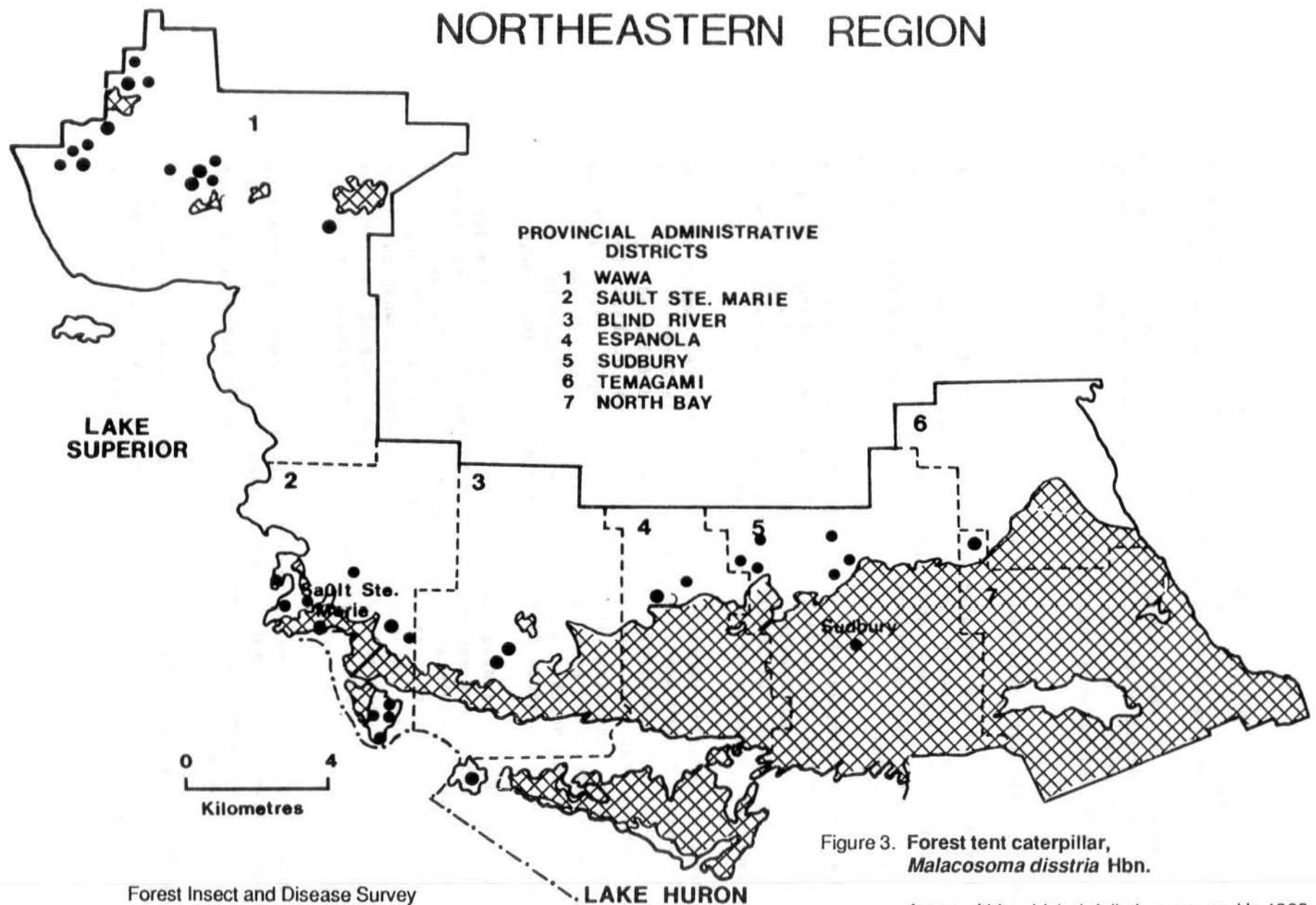


Figure 3. Forest tent caterpillar, *Malacosoma disstria* Hbn.

Areas within which defoliation occurred in 1989

Moderate-to-severe defoliation    ●    or    ☒

Table 7. Comparison of areas of forest defoliated by the forest tent caterpillar from 1987 to 1989.

District	Defoliation (ha)			Change (ha)	
	1987	1988	1989	1988	1989
Blind River	35,867	102,852	208,878	+66,985	+106,026
Espanola	67,010	415,273	615,345	+348,263	+200,072
North Bay	584,501	856,053	1,031,622	+271,552	+175,869
Sault Ste. Marie	11,340	25,560	116,107	+15,220	+89,547
Sudbury	39,394	442,274	843,409	+402,880	+401,135
Temagami	292,913	252,650	160,770	-40,263	-91,880
Wawa	10,720	12,087	80,143	+1,367	+68,056
Total	1,041,745	2,107,749	3,056,274	+1,066,000	+948,825

Table 8. Results of forest tent caterpillar egg-band counts in 1989 and infestation forecasts for 1990 (on trembling aspen).

Location	Avg DBH of sample trees (cm)	Avg no. of egg bands per tree	Infestation forecast for 1990 <sup>a</sup>
<u>Blind River District</u>			
Albanel Twp	11.0	3.9	M
Bouch Twp	11.0	28.0	S
Bridgland Twp	9.0	4.0	M
Bright Twp	11.5	43.0	S
Gladstone Twp	11.5	12.0	S
Gould Twp	14.0	14.0	S
Gunterman Twp	11.0	37.0	S
Hembruff Twp	10.5	28.0	S
Kamichisitit Twp	9.0	6.0	S
Kirkwood Twp	10.0	11.0	S
Long Twp	9.5	17.0	S
Patton Twp	9.0	2.3	M
Proctor Twp	10.6	8.0	S
Raimbault Twp	10.0	1.7	M
Sagard Twp	8.0	1.0	L
Scarfe Twp	8.0	1.3	L
Serpent River Indian Reserve	8.3	14.3	S
Spragge Twp	12.0	40.0	S
Striker Twp	8.0	7.0	S
Thompson Twp	13.0	30.0	S

(cont'd)

Table 8. Results of forest tent caterpillar egg-band counts in 1989 and infestation forecasts for 1990 (on trembling aspen) (cont'd).

Location	Avg DBH of sample trees (cm)	Avg no. of egg bands per tree	Infestation forecast for 1990 <sup>a</sup>
<u>Espanola District</u>			
Bidwell Twp	9.6	13.0	S
Bidwell Twp	8.2	28.0	S
Boon Twp	16.4	27.0	S
Burpee Twp	12.4	15.0	S
Campbell Twp	10.5	18.0	S
Carnarvon Twp	11.1	28.0	S
Dawson Twp	11.4	51.0	S
Fort La Cloche	8.0	2.0	L
Gordon Twp	7.8	32.0	S
Great La Cloche Island	9.2	18.0	S
Hotte Twp	9.1	7.0	S
Indian Reserv. No. 4	7.4	9.0	S
Indian Reserv. No. 5	8.4	13.0	S
Indian Reserv. No. 26	10.8	34.0	S
May Twp	12.4	22.0	S
Moses Twp	14.1	39.0	S
Nairn Twp	11.3	49.0	S
Prescott Twp	8.3	9.0	S
Robinson Twp	10.1	10.0	S
Rowat Twp	14.2	23.0	S
Salter Twp	11.4	8.0	S
Shakespeare Twp	12.3	31.0	S
Teasdale Twp	14.2	46.0	S
Tehkummah Twp	8.9	15.0	S
Tennyson Twp	16.6	14.0	S
Victoria Twp	8.7	15.0	S
Weeks Twp	16.7	29.0	S
<u>North Bay District</u>			
Bonfield Twp	9.0	8.0	S
Caldwell Twp	10.8	9.0	S
Calvin Twp	11.0	12.0	S
Cameron Twp	8.6	7.0	S
Chisholm Twp	12.0	16.0	S
Falconer Twp	6.8	7.0	S
La Salle Twp	9.7	12.0	S
Lauder Twp	14.2	19.0	S
Lyman Twp	7.3	4.3	M

(cont'd)

Table 8. Results of forest tent caterpillar egg-band counts in 1989 and infestation forecasts for 1990 (on trembling aspen) (cont'd).

Location	Avg DBH of sample trees (cm)	Avg no. of egg bands per tree	Infestation forecast for 1990 <sup>a</sup>
<u>North Bay District (concl.)</u>			
Papineau Twp	8.4	9.0	S
Poitras Twp	6.8	10.0	S
Sisk Twp	12.0	27.0	S
Stewart Twp	7.4	2.7	M
Thistle Twp	8.5	2.7	M
Gurd Twp	7.3	8.0	S
<u>Sault Ste. Marie District</u>			
Fenwick Twp	8.0	4.3	M
Fort Creek	10.0	21.0	S
Garden River Indian Reserv.	11.0	12.0	S
Harmony Bay	7.0	1.3	L
Havilland Bay	8.0	3.7	M
Highway 17B			
- Finn Hill	10.0	24.0	S
Hodgins Twp			
- Searchmont	12.0	9.0	S
Johnson Twp			
- Desbarats Lake	12.0	25.0	S
Kars Twp			
- Goulais Mission	10.0	9.0	S
Laird Twp			
- Lakeview Road	10.5	8.0	S
MacDonald Twp			
- Watsons Road	11.0	12.0	S
Park Twp			
- Pointe des Chenes	9.0	29.0	S
Plummer Additional Twp (DHO)	11.0	30.0	S
Plummer Twp			
- Ottertail Lake	12.0	43.0	S
Prince Twp			
- Prince Lake Rd	8.0	12.0	S
Reilly Twp			
- Laurence Lake	10.0	16.0	S
Sault Ste. Marie			
- water treatment plant	11.6	69.0	S
St. Joseph Island			
- I Line	10.0	8.0	S

(cont'd)

Table 8. Results of forest tent caterpillar egg-band counts in 1989 and infestation forecasts for 1990 (on trembling aspen) (cont'd).

Location	Avg DBH of sample trees (cm)	Avg no. of egg bands per tree	Infestation forecast for 1990 <sup>a</sup>
<u>Sault Ste. Marie District (concl.)</u>			
St. Joseph Island			
- McMenomy Bay	11.0	31.0	S
- Milford Haven	12.0	23.0	S
- Richardson Pt	12.0	32.0	S
- Sailor's Encampment	8.0	7.0	S
- Whiskey Bay	12.0	17.0	S
<u>Sudbury District</u>			
Antrim Twp	10.4	8.0	S
Appleby Twp	8.5	11.0	S
Attlee Twp	13.4	12.0	S
Awrey Twp	7.9	21.0	S
Bigwood Twp	7.6	26.0	S
Cartier Twp	11.6	13.0	S
Cascaden Twp	10.3	14.0	S
Cox Twp	7.4	10.0	S
Dill Twp	6.4	18.0	S
Dowling Twp	10.3	10.0	S
Hagar Twp	12.2	36.0	S
Hanmer Twp	10.0	32.0	S
Hendrie Twp	8.6	30.0	S
Hoskin Twp	9.6	37.0	S
Humboldt Twp	11.2	46.0	S
Killarney Twp	11.4	24.0	S
Laura Twp	8.9	23.0	S
Moncrieff Twp	8.2	1.0	L
Neelon Twp	2.7	22.0	S
Rayside Twp	8.5	26.0	S
Waldie Twp	11.6	31.0	S
<u>Temagami District</u>			
Askin Twp	16.0	23.0	S
Best Twp	20.0	0	N
Eldridge	18.0	0	N
Hartle Twp	20.0	5.0	L
Hebert Twp	18.0	3.0	L
Milne Twp	16.0	1.0	L
Olive Twp	14.0	4.7	M
Strathcona Twp	16.0	17.0	S

(cont'd)

Table 8. Results of forest tent caterpillar egg-band counts in 1989 and infestation forecasts for 1990 (on trembling aspen) (concl.).

Location	Avg DBH of sample trees (cm)	Avg no. of egg bands per tree	Infestation forecast for 1990 <sup>a</sup>
<u>Temagami District (concl.)</u>			
Strathy Twp	16.0	18.0	S
Yates Twp	15.0	2.0	L
<u>Wawa District</u>			
Ashley Twp	9.5	0.3	L
Bryant Twp	9.1	15.0	S
Cecile Twp	12.0	2.7	M
Dahl Twp	14.9	31.0	S
Dambrossia Twp			
- Desdation Lake	8.0	5.3	S
Dumas Twp			
- Soulop Lake	13.0	32.0	S
Echum Twp			
- Dalton	9.0	0	N
Hunt Twp	12.0	13.0	S
Laberge Twp	13.0	129.00	S
<u>Wawa District (concl.)</u>			
Lendrum Twp			
- Trembley Falls	9.0	0.3	L
Mikano Twp	8.0	14.0	S
Chapais Twp			
- Obatanga Pk - University River	9.0	2.7	M
Dahl Twp			
- Obatanga Pk (campground)	10.0	10.0	S
Rennie Twp			
- Renabie Mine Rd	11.0	32.0	S
Riggs Twp			
- Camp Lochalsh	10.0	30.0	S
Vasilof Twp	9.3	0	N
West Twp			
- Dog Lake	9.0	11.0	S
White Lake			
- Bridge E. side	13.0	165.0	S

<sup>a</sup> L - light  
M - moderate  
S - severe  
N - nil

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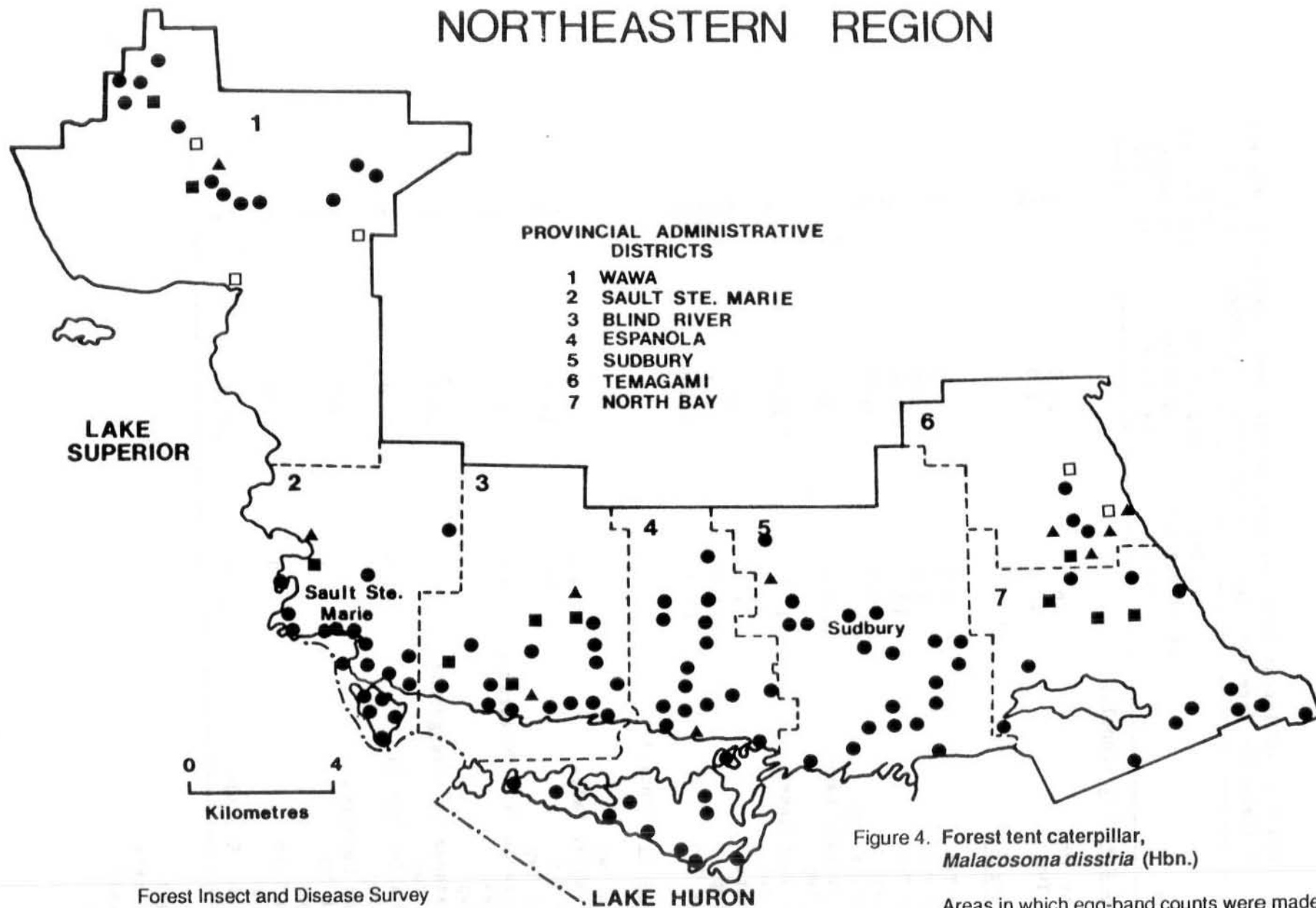


Figure 4. Forest tent caterpillar, *Malacosoma disstria* (Hbn.)

Areas in which egg-band counts were made in 1989, and defoliation forecast for 1990

Nil	□	Moderate	■
Light	▲	Heavy	●

been recorded in the Temagami District and in the Powassan-Mattawa areas of North Bay District, and further reductions could occur in 1990. Although egg-mass counts were down in many areas of the region, the reduction is not significant and defoliation will still be in the moderate-to-severe range. High population levels will probably persist in the Blind River, Espanola, Sudbury and Wawa districts in 1990.

Redheaded pine sawfly, *Neodiprion lecontei* (Fitch)

This sawfly was commonly observed in four districts of the region (Table 9). Defoliation varied across the work area and it was not uncommon to see roadside red pine and small pockets of planted red pine 100% defoliated. Surveys were carried out in several red pine and jack pine plantations; defoliation ranged from 1 to 20%.

Once again, roadside red pine trees approximately 4 m tall sustained 80 to 100% defoliation along Highway 17 just east of Bruce Mines in Plummer Additional Township, Sault Ste. Marie District. As a result of repeated defoliation during the past 2-3 years, coupled with severe salt damage, these roadside trees are dying.

In Hallam Township, Espanola District, this sawfly was of primary concern to timber personnel of the Ontario Ministry of Natural Resources. In a 60-ha mixed red pine and jack pine seedling orchard, defoliation was confined to trees 1.8-2.4 m tall in small areas ranging in size from 5 to 40 ha. Defoliation was much more prevalent on red pine than on jack pine trees in this orchard; 26% of the red pine were attacked and sustained 15% foliar damage, whereas 2% of the jack pine were affected and defoliation ranged from 2 to 5%. However, it was not uncommon to observe scattered trees with 100% defoliation. Ground spraying with the Lecontvirus was conducted in mid-July. At the time of control operations, there was a wide range of larval development and, therefore, the effectiveness of spraying was inconclusive.

In a 30-ha red pine plantation in Orlig Township, North Bay District, the incidence of sawfly on trees 2 m tall was 15%, and foliar damage amounted to 20%. The number of colonies per tree varied from 4 to 18. Whole-tree mortality was less than 1% and top-kill averaged 2%.

This insect was not reported causing damage in Temagami District and has not been found to date in Wawa District.

Table 9. Summary of defoliation caused by the redheaded pine sawfly in four districts of the region in 1989.

Location (Twp)	Host <sup>a</sup>	Estimated area (ha)	Avg tree ht (m)	Trees affected (%)	Avg defoliation (%)
<u>Blind River District</u>					
Parkinson	rP	5.0	1.9	20.6	15.5
Parkinson	rP	0.4	10.6	10.6	20.0
<u>Espanola District</u>					
Hallam	jP	5.0	2.4	2.0	5.0
Hallam	rP	1.5	1.2	26.0	15.0
Hallam	jP	40.0	2.3	1.3	2.0
Hallam	rP	5.0	1.8	26.0	12.0
<u>North Bay District</u>					
Gurd	scP	0.2	1.4	2.0	2.0
Olrig	rP	30.0	2.1	15.0	20.0
<u>Sudbury District</u>					
Dryden	jP	0.5	1.2	1.0	1.0

<sup>a</sup>rP = red pine, jP = jack pine, scP = Scots pine

*Swaine Jack Pine Sawfly, Neodiprion swainei* Midd.

Moderate-to-severe defoliation was again recorded on jack pine trees in an area approximately 0.2 ha in size on Island 127 in Lake Temagami. Defoliation in this area averaged 80%. Scattered colonies persisted on other islands and in shoreline stands in Lake Temagami, as well as in the Gamble-McGiffin plantations in the northwestern part of the district.

A survey was made (by helicopter) over the former infestation, which encompassed parts of the Temagami and Kirkland Lake districts. Light defoliation recurred in two small areas mapped in 1988 in Trethewey Township, Temagami District and top mortality was observed at several points within this area.

No defoliation or colonies were observed at other points within Northeastern Region.

White Pine Weevil, *Pissodes strobi* (Peck)

Populations of this insect increased at many points in the region. In the areas evaluated, the proportion of leaders attacked ranged from 2 to 25% (Table 10). Although white spruce and black spruce (*Picea mariana* [Mill.] B.S.P.) were not evaluated, damage on these trees appeared to be much less than that on jack pine.

The highest number of leaders destroyed was near Garden Lake in Hurlburt Township, Sault Ste. Marie District. At this location, 25% of trees approximately 2 m tall had terminals destroyed, and in most cases they lost up to 2 years' growth. Although it was observed in jack pine plantations in Wawa District, this insect caused very little damage. Evaluations of eight plantations revealed damage of less than 3%.

Minor Insects

Jack Pine Tip Beetle, *Conophthorus banksianae* McP.

This insect causes extensive shoot-tip mortality when population levels are high. Attacked branches terminate abruptly where the tips have broken off. Branches and terminal shoots become forked where lateral buds develop and assume dominance.

After two years of high population levels in Lane Township, Blind River District, a reduction in the percentage of damaged shoots occurred. In 1987, 58% of trees 2.5 m tall were affected, and in 1988, the incidence was 68% in this same area. However, in 1989, only 23% of the trees were attacked.

This apparent reduction is attributed to competition from other insects such as the pine weevil, *Cimberis elongatus* (LeC.), and bark beetles of the genus *Pityophthorus*.

Table 10. Damage by the white pine weevil in plantations in the North-eastern Region of Ontario from 1987 to 1989 (counts based on the examination of 150 randomly selected trees at each site).

Location (Twp)	Host <sup>a</sup>	Estim. area (ha)	Estim. no. of trees/ha	Avg ht of trees (m)	Leaders attacked (%)		
					1987	1988	1989
<u>Blind River District</u>							
Kirkwood	jP	4	2,500	2.7	-	6.0	6.0
Lane	jP	4	2,500	1.6	-	1.3	2.0
Timbrell	jP	50	2,500	3.8	8.0	11.0	10.6
Viel	jP	16	2,500	2.1	-	-	18.6
Viel	jP	16	2,500	2.8	-	-	17.3
Villeneuve <sup>b</sup>	jP	25	3,906	2.0	2.0	1.8	6.7
Villeneuve <sup>b</sup>	jP	20	2,990	3.8	-	4.0	4.2
Wells <sup>c</sup>	wP	2	2,000	3.5	-	-	8.0
Lefroy <sup>c</sup>	wP	50	2,500	12.0	-	-	0.0
Kirkwood <sup>c</sup>	wP	25	500	14.0	-	-	0.0
<u>Espanola District</u>							
Allan <sup>c</sup>	wP	2	1,750	2.3	-	-	2.0
Hallam	jP	0.5	3,777	2.4	-	-	2.0
Nairn	jP	40	4,444	1.9	-	-	13.3
Robinson	jP	25	1,750	1.7	-	-	1.3
Tennyson <sup>c</sup>	wP	2.8	3,400	1.7	-	-	22.0
Tennyson	jP	6	4,000	2.7	-	-	6.0
<u>North Bay District</u>							
Antoine <sup>c</sup>	wP	31	1,750	1.1	-	-	2.0
Gurd	rS	10		1.4	-	-	3.3
Pardo <sup>c</sup>	wP	8	2,125	1.7	-	-	24.0
<u>Sault Ste. Marie District</u>							
Hurlburt <sup>b</sup>	jP	50	5,000	3.7	-	15.1	16.7
Hurlburt	jP	50	2,500	2.1	-	-	25.0
Smilsky	jP	4	2,500	1.9	-	1.3	3.3
<u>Sudbury District</u>							
Hanmer	jP	25	2,500	1.8	-	-	12.7
Hanmer	jP	40	2,500	2.0	-	-	17.3
Moncrieff	jP	10	2,500	4.2	-	-	3.3

(cont'd)

Table 10. Damage by the white pine weevil in plantations in the Northeastern Region of Ontario from 1987 to 1989 (counts based on the examination of 150 randomly selected trees at each site) (concl.).

Location (Twp)	Host <sup>a</sup>	Estim. area (ha)	Estim. no. of trees/ha	Avg ht of trees (m)	Leaders attacked (%)		
					1987	1988	1989
<u>Temagami District</u>							
Barr	jP	5	4,000	2.0	-	6.6	4.0
Coleman	jP	5	4,000	4.5	-	-	6.0
Milne	jP	5	4,000	4.5	9.0	24.0	18.0
<u>Wawa District</u>							
Cecile	jP	25	2,500	3.6	-	-	0.0
Cecile	jP	20	3,500	2.6	-	-	1.3
Chenard							
- Seedling Orchard	jP	22	1,800	1.5	-	0.0	1.3
Esquega	jP	48	2,500	1.5	-	-	2.6
Hunt	jP	50	1,600	2.5	-	-	0.0
Jacobson	jP	50	2,500	3.0	-	-	2.0
Knowles	jP	50	2,500	1.3	-	-	2.0
Labonte <sup>c</sup>	wP	20	1,568	1.5	-	-	2.7

<sup>a</sup> jP = jack pine, wP = white pine, rS = red spruce

<sup>b</sup> semipermanent jack pine plots

<sup>c</sup> white pine plantation survey

Table 11. Other forest insects.

Insect	Host(s)	Remarks
<i>Acantholyda erythrocephala</i> (L.) Pine false webworm	wP, rP	Light damage (1-5%) was recorded sporadically across the lower portion of the Espanola and North Bay districts. A possible new northern distribution point was recorded at the Cameco Refinery, Blind River District, on 2- to 3-m white pine trees.
<i>Acrobasis betulella</i> Hlst. Birch tubemaker	wB	Heavily damaged (40%) tips were recorded over 0.5-ha areas in Restoule Twp, North Bay District, and McKim Twp, Sudbury District.
<i>Adelges abietis</i> (L.) Eastern spruce gall adelgid	wS	Heavy damage was recorded on roadside trees along Gordon Lake Road, Plummer Additional Twp, Sault Ste. Marie District.
<i>Andricus quercuspetiolicola</i> (Bass.) a gall on oak	bur oak	Areas of oak, up to 0.5 ha in size, received heavy (80%) damage in May Twp, Espanola District.
<i>Aphrophora cribrata</i> (Wlk.) Pine spittlebug	scP, wP	Large populations were recorded on ornamental pine at Cameco Refinery, Blind River District. Light populations were recorded in many of the pine plantations examined in the special surveys in 1989.
<i>Archips cerasivorana</i> (Fitch) Uglynest caterpillar	cherry	Areas of complete defoliation, up to 3 m <sup>2</sup> in size, were recorded in Gurd Twp, North Bay District, Victoria Twp, Espanola District, and between Hailebury and New Liskeard in Temagami District.
<i>Cameraria aceriella</i> (Clem.) Maple leafblotch miner	rM, sM	Heavy foliar damage was recorded in a 0.5-ha stand of red maple ( <i>Acer rubrum</i> L.) at Fort La Cloche, Espanola District, and in a 0.2-ha area of sugar maple in Billings Twp, Espanola District.

(cont'd)

Table 11. Other forest insects (cont'd).

Insect	Host(s)	Remarks
<i>Cameraria hamadryadella</i> (Clem.) Solitary oak leafminer	rO	Defoliation averaging 50% was recorded in a 0.5-ha stand of 15 m trees on Wolsey causeway in Mills Twp, Espanola District.
<i>Coleophora comptoniella</i> (McD.) Lesser birch casebearer	wB	Conspicuous 10-20% defoliation was recorded on 7- to 13-m trees over areas up to 0.5 ha in size in Bertram and Falconer twps, North Bay District.
<i>Coleophora laricella</i> Hbn. Larch casebearer	tL	Populations at sample locations ranged from 0 to 6.1 larvae per 18-in. branch tip. The heaviest populations resulted in 40-60% defoliation of 14-m trees over an area of 20 ha in Pedley Twp, North Bay District.
<i>Coleophora pruniella</i> Clem. Cherry casebearer	wB	Light defoliation (2-5%) was recorded in areas ranging from 0.5 to 2 ha in size at two locations in Sudbury and Espanola districts and at one location in North Bay District.
<i>Conophthorus resinosae</i> Hopk. Red pine cone beetle	rP	Once again, high population levels were recorded on islands and in shoreline stands on Lake Temagami.
<i>Corthylus punctatissimus</i> (Zimm.) Pitted ambrosia beetle	sM	Understory regeneration in the Maple Health Plot in Allan Twp, Espanola District sustained heavy, spotty mortality.
<i>Dendroctonus rufipennis</i> (Kby.) Spruce beetle	wS	commonly found on dying mature and overmature trees in Lake Superior Prov. Park, Wawa District

(cont'd)

Table 11. Other forest insects (cont'd).

Insect	Host(s)	Remarks
<i>Dioryctria abietivorella</i> (Grt.) Fir coneworm	wS, nS	Heavy cone production of spruce across the North Bay and Espanola districts resulted in increased activity by this cone-boring insect. An average of 9% of the cones were affected, but 10 to 100% of the host trees were affected.
<i>Exoteleia dodecella</i> (L.) Pine bud moth	scP	A 0.5-ha area of 1.7-m-tall open-growing Scots pine ( <i>Pinus sylvestris</i> L.) in Gordon Twp, Espanola District experienced an average of 3% defoliation.
<i>Gonioctena americana</i> (Schaeff.) American aspen beetle	tA	Spotty but heavy damage was recorded on young regeneration in cutover areas in the northern portion of the Espanola, Sudbury and North Bay districts.
<i>Hylobius warreni</i> Wood Warren's root collar weevil	rP, scP	Grafted (red pine to Scots pine root stock) trees 5-8 m tall in the OMNR Seed Orchard in Gurd Twp, North Bay District experienced 2-4% mortality over a 5-ha area because of this root collar weevil and an associated gall rust.
<i>Hyphantria cunea</i> (Drury) Fall webworm	Decid- uous	Small numbers of webs and light defoliation were recorded from Sault Ste. Marie east into North Bay District and north into the southern portion of Temagami District.

(cont'd)

Table 11. Other forest insects (cont'd).

Insect	Host(s)	Remarks
<i>Malacosoma americanum</i> F. Eastern tent caterpillar	Ch, choke cherry, tA, wB	Numerous tents and resultant defoliation were recorded at two locations in Blind River District. Similar damage was recorded south of Hwy 17 in the Espanola-Manitoulin Island-Powassan areas of the Espanola, Sudbury and North Bay districts.
<i>Malacosoma californicum pluviale</i> (Dyar) Northern tent caterpillar	wB, ch	Numerous tents and resultant moderate defoliation were observed over small areas at single locations in each of the Sudbury, North Bay and Temagami districts.
<i>Messa nana</i> (Klug.) Early birch leaf edgeminer	wB	Populations were much reduced from those of previous years in McKim and Neelon twps, Sudbury District.
<i>Neodiprion nanulus nanulus</i> Schedl. Red pine sawfly	jP	Low defoliation levels (< 5%) were observed in Proctor and Esten twps, Blind River District. Colonies were also observed (scattered in the Pointe des Chenes area) in Parke Township, Sault Ste. Marie District.
<i>Neodiprion sertifer</i> (Geoff.) European pine sawfly	scP	Light defoliation (10-25%) was recorded along Avery Road in Korah Twp, Sault Ste. Marie District, and over a 0.5-ha area of open-growing trees in Gordon Twp, Espanola District.
<i>Neodiprion virginiana</i> complex Redheaded jack pine sawfly	jP	In Moncrieff Twp, Sudbury District, 9% of the 4.2-m trees in a 10-ha stand experienced an average of 8% defoliation. Small numbers of insects were observed in the Temagami and Espanola districts.

(cont'd)

Table 11. Other forest insects (cont'd)

Insect	Host(s)	Remarks
<i>Operophtera bruceata</i> (Hlst.) Bruce spanworm	sM, tA	There was a total collapse of populations across the region in 1989. Only occasional larvae were recorded.
<i>Paraclemensia acerifoliella</i> (Fitch) Maple leafcutter	sM	Light defoliation (2-5%) was recorded in a 2-ha area at Fort La Cloche, Espanola District, and in a 10-ha area in Restoule Prov. Pk in Patterson Twp, North Bay District.
<i>Petrova albicapitana</i> (Bsk.) Northern pitch twig moth	jP	Evaluations at two locations in Sudbury District revealed damage to 2% of the growing stock of 1.9- to 4.2-m trees over areas ranging in size from 10 to 40 ha.
<i>Pikonema alaskensis</i> (Roh.) Yellowheaded spruce sawfly	wS, bS	Severely defoliated individual trees were recorded in the northern portion of North Bay District and the southern portion of Temagami District. Defoliation of 50% was common on open-growing regeneration 0.5 to 3 m in height in Finlayson Prov. Pk, Temagami District.
<i>Pissodes approximatus</i> Hopk. Northern pine weevil	jP	Mortality of 2-3% was recorded over a 4-ha area of 1.9-m trees in Smilsky Twp, Sault Ste. Marie District, in a 40-ha plantation in Antoine Twp, North Bay District, and in a 20-ha plantation in Tennyson Twp, Espanola District.
<i>Pityokteines sparsus</i> LeC. Balsam fir bark beetle	bF	commonly associated with single-tree mortality throughout Lake Superior Prov. Pk, Wawa District

(cont'd)

Table 11. Other forest insects (concl.).

Insect	Host(s)	Remarks
<i>Pristiphora geniculata</i> (Htg.) Mountain-ash sawfly	aMo	Defoliation ranging from 50 to 100% was commonly observed in Wishart Twp, Sault Ste. Marie District, and in Rabbit Blanket campground, Peterson Twp, Wawa District. Ornamental trees were severely defoliated in the cities of Sault Ste. Marie, Sudbury and North Bay.
<i>Profenusa thomsoni</i> (Konow) Ambermarked birch leafminer	wB	Light defoliation was commonly observed across the northern portion of the Sudbury and North Bay districts and at Fort La Cloche in Espanola District.
<i>Psilocorsis cryptolechiella</i> (Cham.) Twoleaf tier	rO	Light defoliation (10-40%) was recorded over a 5-ha area of mature 13-m trees adjacent to the OMNR field office at Fort La Cloche, Espanola District.
<i>Psilocorsis reflexella</i> Clem. Flat leaftier	wB, rO	Light (5-20%) defoliation was observed on 10-m birch over a 0.5-ha area in McBeth Twp, North Bay District, and on open-growing 5-m oak in Curtin Twp, Espanola District.
<i>Sparganothis acerivorana</i> Mack. Maple leafroller	sM	Light damage (5%) was recorded on 15-m trees over a 0.5-ha area in Restoule Prov. Pk, Patterson Twp, North Bay District.
<i>Tetralopha aplastella</i> (Hlst.) Aspen webworm	tA	Small clumps (up to 2 ha in size) of semimature trembling aspen along the Aubrey Lake Road in Meen Twp, Blind River District, experienced 50% defoliation.
<i>Toumeyella parvicornis</i> (Ckll.) Pine tortoise scale	jP	Small pockets of two to five trees, averaging 2 m tall, experienced heavy branch damage (60-100%) in a 10-ha stand in Durban Twp, Espanola District.

## TREE DISEASES

### Major Diseases

Armillaria Root rot, *Armillaria ostoyae* (Romagn.) Herink

Although this root rot was observed at widely scattered points, evaluations performed throughout the region revealed that mortality averaged not more than 2.0%. However, in a 20-ha white pine plantation in Labonte Township, Wawa District, 7% current mortality was recorded on trees averaging 1.7 m in height.

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

Surveys continued in the region to determine the extent of damage caused by the North American and the more virulent European race of Scleroderris canker. Only the North American race has been collected to date in the Northeastern Region.

This disease was detected in three districts of the region. In Recollet Township, Wawa District, approximately 40% damage to the lower portion of 1.5-m-tall jack pine trees was recorded on naturally occurring regeneration and on planted trees. For the third year in succession, large numbers of red pine trees were affected in Haughton Township, Blind River District. In this 10-ha red pine plantation, with trees averaging 2.5 m in height, incidence levels of 60, 67 and 78% have occurred from 1987 to 1989. Mortality, however, is less than 2% and only the lower branches of trees are affected. Lower-branch mortality is occurring.

In Orlig Township, North Bay District, 13% of trees 0.8 m tall had lower branch damage in a 20-ha red pine plantation. To date, mortality levels have not exceeded 2% in this area.

Table 12. Other forest diseases.

Disease	Host(s)	Remarks
<i>Cercospora microsora</i> Sacc. Leaf spot of basswood	Ba	Complete defoliation was recorded on open-growing 3-m trees in the OMNR experimental area in Gurd Twp, North Bay District.
<i>Chrysomyxa pirolata</i> (Körn.) Winter Spruce cone rust	WS	Approximately 3% of the cones were affected on open-growing 14-m trees over a 0.5-ha area in Robinson Twp, Espanola District. Evaluations conducted on 2- to 3-m trees in Allan Twp, North Bay District revealed that an average of 5% of the cones were affected on 10% of the trees examined.
<i>Ciborinia whetzellii</i> (Seaver) Seaver Ink spot of aspen	tA	Average defoliation of 40% was recorded throughout a 4-ha cutover area of 2.5-m trembling aspen sucker stems in Street Twp, Sudbury District.
<i>Coleosporium asterum</i> (Dietel) Sydow Pine needle rust	jP	A 10-ha family-test area of 1.2 m trees experienced an average of 5% defoliation of 49% of the growing stock in Street Twp, Sudbury District.
<i>Cronartium ribicola</i> J.C. Fischer White pine blister rust	wP	Light damage is recorded every year on mature trees and on understory regeneration in the Killarney Road area of Sudbury District and in the Dokis Indian Reservation in North Bay District.

(cont'd)

Table 12. Other forest diseases (cont'd)

Disease	Host(s)	Remarks
<i>Cylindrocladium floridanum</i> Sob. & C.P. Seym. Root rot	wP	This organism was isolated from both soil samples and stem cankers in compartment 52 in the Kirkwood Tree Nursery, Blind River District. Approximately 2% of the seedlings were lost to this organism.
<i>Davisomycella ampla</i> (J. Davis) Darker Tar spot needle cast	jP	Defoliation averaging 14% was recorded in a 40-ha plantation of 1.4-m trees in Muldrew Twp, and over a 5-ha natural stand of 2.5-m trees in Cox Twp, both in Sudbury District.
<i>Endocronartium harknessii</i> (J.P. Moore) Y. Hirats. Western gall rust	jP	In a 20-ha area in Weeks Twp, Espanola District, 15% of the 2-m-tall trees were affected (7.3% had severe stem galls.) Evaluations at several locations in the Espanola and Sudbury districts revealed damage levels from 0.6 to 8.7%.
<i>Fabrella tsugae</i> (Farl) Kirschst. Needle blight	He	Low foliar damage levels (2-5%) were recorded on large 15-m trees at Fort La Cloche, Espanola District and in Restoule Prov. Pk, Patterson Twp, North Bay District.
<i>Hypoxyylon mammatum</i> (Wahlenb.) J. Miller Hypoxyylon canker	tA	A 0.5-ha area of aspen trees 16 m high and 15 cm in diameter in Dowling Twp, Sudbury District experienced damage to 70% of the stems (30% of which have subsequently died).
<i>Lophodermium seditiosum</i> Minter, Staley & Millar Needle cast	wP	In an 8-ha plantation, 19% of 1.7-m trees experienced an average of 6% defoliation in Pardo Twp, North Bay District.

(cont'd)

Table 12. Other forest diseases (concl.)

Disease	Host(s)	Remarks
<i>Rhytisma acerinum</i> (Pers.) Fr. Tar spot	rM	Low infection levels (1-15%) were observed over areas ranging from 0.1 to 1.5 ha throughout the Espanola and North Bay districts. Infection levels of 100% were recorded in a few low, wet areas on Manitoulin Island.
<i>Septoria betulae</i> Pass. Leaf blight	wB	Moderate damage levels (40-80%) were recorded in older cutover areas in the northern portions of the Espanola and Sudbury districts. Foliar damage of 100% was reported over an old 50-ha burned area in Moncrieff Twp, Sudbury District.

#### FOREST HEALTH

##### White Birch Health

Birch top mortality was aerially mapped in parts of the Sault Ste. Marie, Sudbury and Wawa districts (Fig. 5). In Wawa District, especially in Lake Superior Provincial Park, approximately 41,510 ha of old top-kill were mapped. All mortality was observed on mature and overmature white birch in the abovementioned areas. In Sudbury District, approximately 1,440 ha were mapped in parts of Dunbar, Sweeney and Muldrew townships. One small pocket, approximately 985 ha, was mapped in Palmer Township, Sault Ste. Marie District.

A 100-tree birch plot was established in a 145-year-old stand in Bailloquet Township, Wawa District, and will be monitored for several years to record any new dieback or abnormalities related to this problem, which has existed for at least 35-40 years. Results of monitoring for top dieback are summarized in Table 13.

##### Maple Health

Since 1987, 42 plots have been established in the region (Fig. 6) to determine the amount of crown dieback. Each plot consists of 25 mature or overmature trees selected along a 3-m-wide strip on a random azimuth. Trees were permanently numbered, heights and diameters were measured, insect, disease and animal damage were recorded and abiotic damage such as that caused by frost was noted.

# NORTHEASTERN REGION

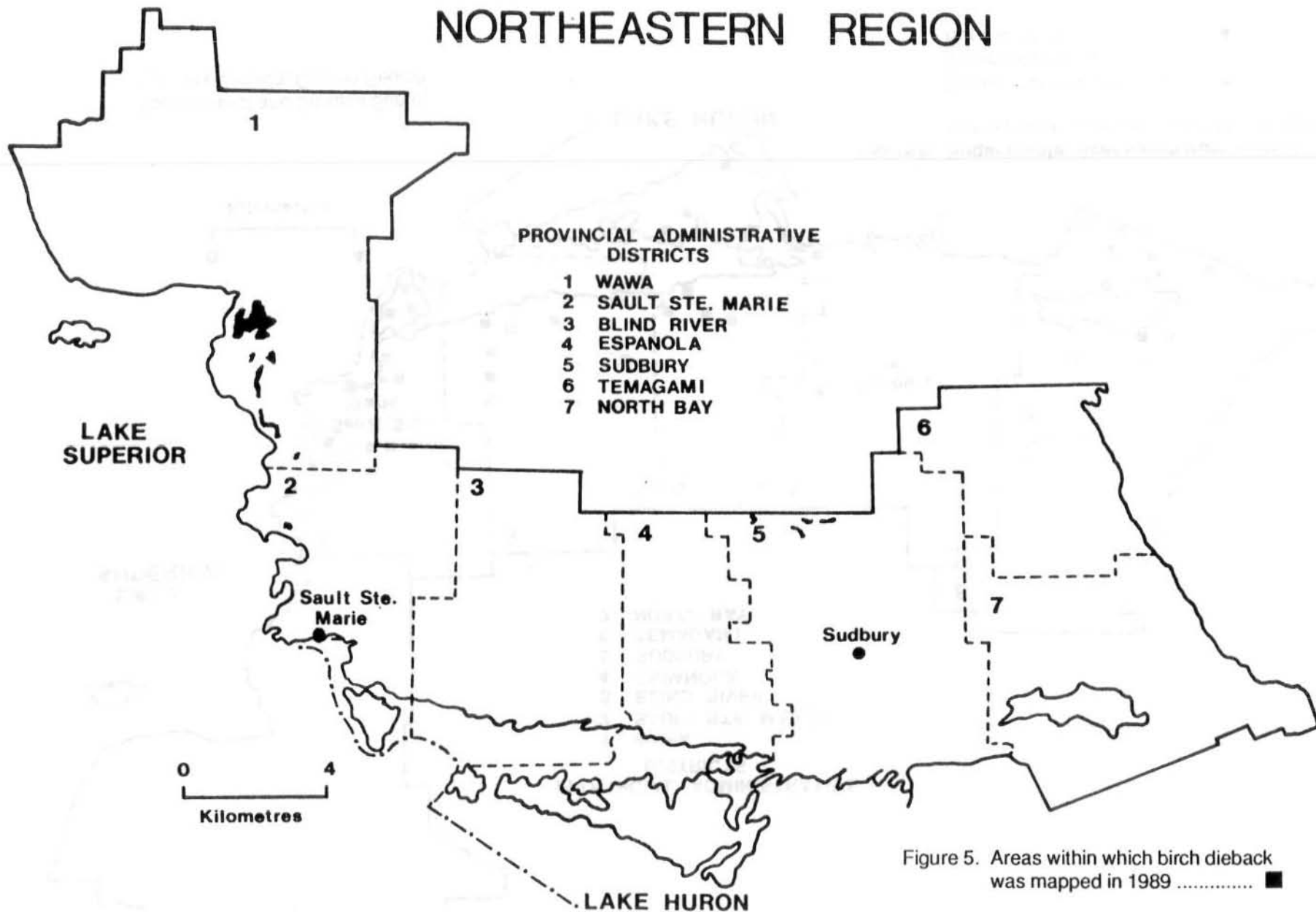
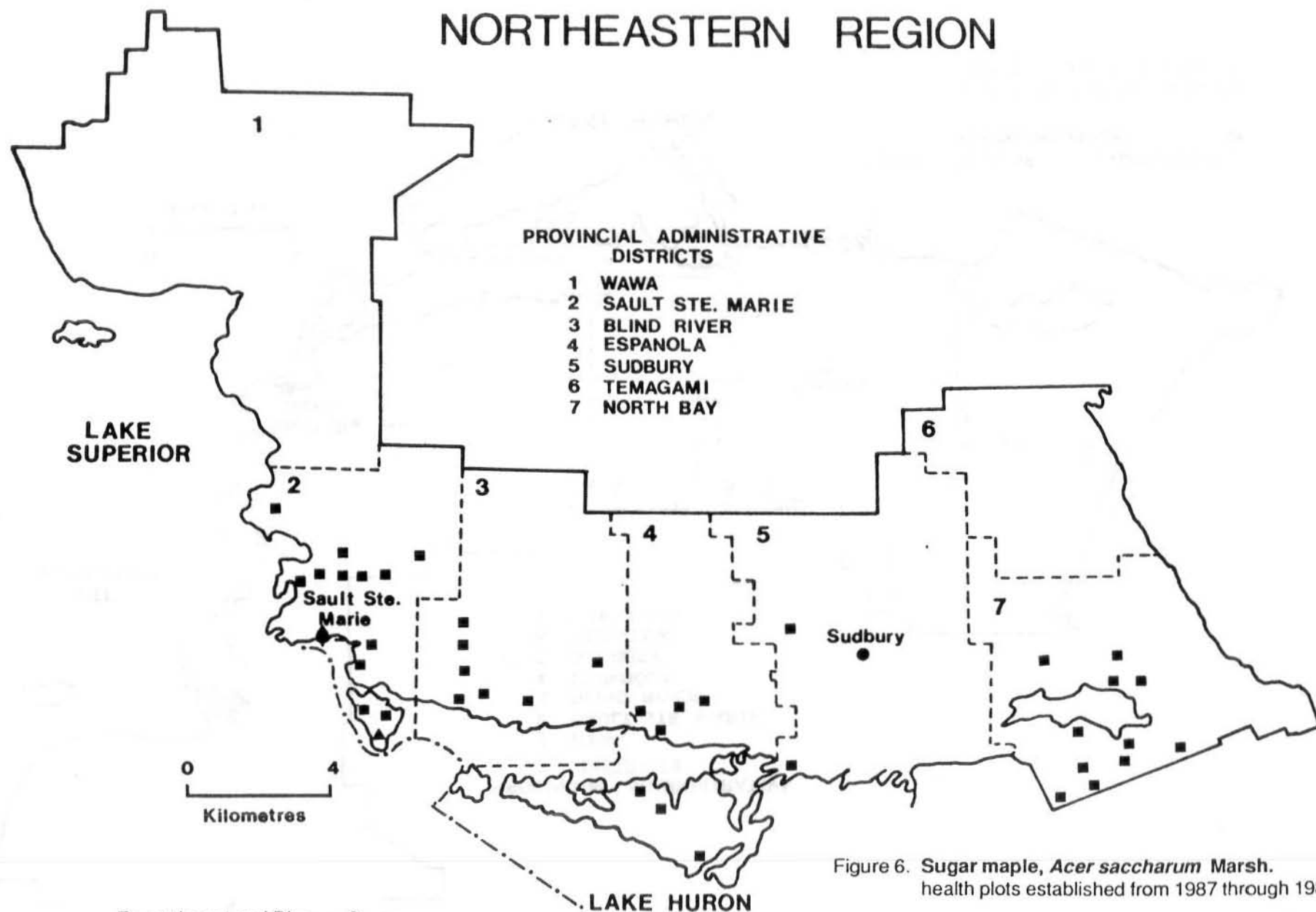


Figure 5. Areas within which birch dieback was mapped in 1989 .....

Forest Insect and Disease Survey  
Forestry Canada, Ontario Region

# NORTHEASTERN REGION



Forest Insect and Disease Survey  
Forestry Canada, Ontario Region

Figure 6. Sugar maple, *Acer saccharum* Marsh.  
health plots established from 1987 through 1989

Natural stand location..... ■  
Urban location ..... ◆  
Rural location ..... ▲

Table 13. Summary of the results of monitoring a white birch dieback plot established in 1989 (data based on the examination of 100 host trees).

Location (Twp)	Avg DBH (cm)	Avg ht (m)	Esti- mated stand area (ha)	No. of trees with crown dieback											
				Current <sup>a</sup>						Cumulative <sup>a</sup>					
				0	1	2	3	4	5	0	1	2	3	4	5
<u>Wawa District</u>															
Bailloquet	24.3	20.5	36	72	26	0	0	0	2	30	39	17	4	8	2

<sup>a</sup> Dieback classification: 0 = 0-5%, 1 = 6-20%, 2 = 21-40%, 3 = 41-60%, 4 = >61%, 5 = dead tree

In 1989, the most commonly encountered insect was the forest tent caterpillar, which caused 2-50% defoliation in 54% of the plots examined. *Eutypella* canker, *Eutypella parasitica* Davidson & Lorenz., was the most damaging disease encountered: 3-9% of the trees examined were cankered. However, very little mortality has occurred and at present it amounts to less than 1%.

Results of current dieback surveys (for the period 1987-1989) are summarized in Table 14.

#### North American Maple Project

In 1988, 24 plots consisting of five 10- x 10-m subplots were established at preselected sites throughout the province. Four plots were placed in Northeastern Region, two of them in sugar maple bushes. In all, 62 plots were placed across Ontario, New Brunswick, Nova Scotia and Quebec, and 103 sites were selected across seven states in the United States. This is part of a cooperative agreement between the United States Forest Service and Forestry Canada, and may conclude in 1990.

Data on maple dieback obtained for the past two years are summarized in Table 15.

The forest tent caterpillar was present in three of the four plots. Defoliation in Patterson and Nipissing townships, North Bay District averaged 40 and 50%, respectively, and in Tarentorus Township, Sault Ste. Marie District, defoliation averaged about 20%. No major diseases were observed; however, in one subplot in Patterson Township, North Bay District, drought damage was affecting 10% of the trees, and there was 30% foliar damage.

Table 14. Summary of results obtained from 42 plots established between 1987 and 1989 to monitor sugar maple health in the Northeastern Region of Ontario (data based on the examination of 25 host trees per location).

Location (Twp)	Avg DBH (cm)	Avg ht (m)	Estimated stand area (ha)	Year	No. of trees with crown dieback											
					Current <sup>a</sup>						Cumulative <sup>a</sup>					
					0	1	2	3	4	Trees dead	0	1	2	3	4	Trees dead
<u>Sault Ste. Marie District</u>																
Aweres	27.3	20.9	32	1987	18	7	0	0	0	0	18	7	0	0	0	0
				1988	22	3	0	0	0	0	13	11	1	0	0	0
				1989	24	1	0	0	0	0	10	15	0	0	0	0
Deroche	18.4	22.0	91	1987	20	5	0	0	0	0	20	5	0	0	0	0
				1988	21	3	0	1	0	0	17	7	1	0	0	0
				1989	25	0	0	0	0	0	21	3	1	0	0	0
Fenwick	23.1	21.3	7	1987	21	4	0	0	0	0	21	4	0	0	0	0
				1988	25	0	0	0	0	0	22	3	0	0	0	0
				1989	22	3	0	0	0	0	13	10	2	0	0	0
Hilton	23.0	21.4	194	1987	18	7	0	0	0	0	18	7	0	0	0	0
				1988	21	4	0	0	0	0	19	6	0	0	0	0
				1989	22	3	0	0	0	0	22	3	0	0	0	0
Hodgins	24.5	22.2	22	1987	18	0	3	4	0	0	18	0	3	4	0	0
				1988	20	4	1	0	0	0	15	6	2	3	0	0
				1989	17	6	2	0	0	0	13	8	3	1	0	0
Jocelyn	33.5	23.0	33	1988	24	1	0	0	0	0	22	2	1	0	0	0
				1989	24	1	0	0	0	0	22	3	0	0	0	0
Jollineau	25.8	19.7	43	1988	23	2	0	0	0	0	14	9	1	1	0	0
				1989	20	4	1	0	0	0	13	7	4	1	0	0
Laird	23.9	21.3	62	1987	24	1	0	0	0	0	24	1	0	0	0	0
				1988	25	0	0	0	0	0	14	5	5	1	0	0
				1989	25	0	0	0	0	0	16	9	0	0	0	0

(cont'd)

Table 14. Summary of results obtained from 42 plots established between 1987 and 1989 to monitor sugar maple health in the Northeastern Region of Ontario (data based on the examination of 25 host trees per location) (cont'd).

Location (Twp)	Avg DBH (cm)	Avg ht (m)	Estimated stand area (ha)	Year	No. of trees with crown dieback											
					Current <sup>a</sup>						Cumulative <sup>a</sup>					
					0	1	2	3	4	Trees dead	0	1	2	3	4	Trees dead
<u>Sault Ste. Marie District (cont'd)</u>																
Meredith	35.0	20.3	39	1987	13	0	5	4	0	3	13	0	5	4	0	3
				1988	24	0	0	0	0	1	13	5	5	1	0	1
				1989	22	2	0	0	0	1	0	6	4	14	0	1
Palmer	32.0	21.3	-	1988	23	2	0	0	0	0	17	7	1	0	0	0
				1989	25	0	0	0	0	0	19	6	0	0	0	0
Shield	26.2	21.4	33	1988	22	2	1	0	0	0	15	6	3	1	0	0
				1989	25	0	0	0	0	0	20	5	0	0	0	0
Tarentorus <sup>b</sup> (urban)	48.6	19.4	-	1989	15	5	0	0	0	0	9	5	2	0	4	0
Van Koughnet	20.8	21.1	28	1988	25	0	0	0	0	0	21	4	0	0	0	0
				1989	24	0	0	0	0	1	23	1	0	0	0	1
Whitman	26.5	21.0	58	1988	23	1	1	0	0	0	16	7	1	1	0	0
				1989	20	3	1	1	0	0	14	9	0	2	0	0
Hilton (rural)	43.0	22.8	-	1989	21	3	1	0	0	0	15	7	2	1	0	0
<u>Blind River District</u>																
Casson	23.2	18.0	79	1988	25	0	0	0	0	0	25	0	0	0	0	0
				1989	24	1	0	0	0	0	22	2	1	0	0	0
Gladstone	30.6	22.8	7	1987	25	0	0	0	0	0	25	0	0	0	0	0
				1988	25	0	0	0	0	0	21	3	0	1	0	0
				1989	25	0	0	0	0	0	23	2	0	0	0	0

(cont'd)

Table 14. Summary of results obtained from 42 plots established between 1987 and 1989 to monitor sugar maple health in the Northeastern Region of Ontario (data based on the examination of 25 host trees per location) (cont'd).

Location (Twp)	Avg DBH (cm)	Avg ht (m)	Estimated stand area (ha)	Year	No. of trees with crown dieback											
					Current <sup>a</sup>						Cumulative <sup>a</sup>					
					0	1	2	3	4	Trees dead	0	1	2	3	4	Trees dead
<u>Blind River District (concl.)</u>																
Gould	24.9	21.2	10	1988	25	0	0	0	0	0	18	7	0	0	0	0
				1989	25	0	0	0	0	0	19	6	0	0	0	0
Gunterman	23.2	20.8	15	1988	24	1	0	0	0	0	22	2	0	0	0	0
				1989	24	1	0	0	0	0	23	1	1	0	0	0
Scarfe	18.4	18.9	9	1988	25	0	0	0	0	0	24	1	0	0	0	0
				1989	25	0	0	0	0	0	22	3	0	0	0	0
Thessalon	22.0	20.8	15	1987	25	0	0	0	0	0	25	0	0	0	0	0
				1988	25	0	0	0	0	0	22	3	0	0	0	0
				1989	25	0	0	0	0	0	22	3	0	0	0	0
Wells	24.5	21.7	7	1987	24	0	0	1	0	0	24	0	0	1	0	0
				1988	24	1	0	0	0	0	22	2	1	0	0	0
				1989	24	0	1	0	0	0	20	4	0	0	1	0
<u>Espanola District</u>																
Allan	28.0	20.9	-	1989	17	8	0	0	0	0	8	12	4	1	0	0
				Billings	18.5	15.2	-	1987	25	0	0	0	0	0	25	0
Gough	23.3	16.1	-	1988	18	7	0	0	0	0	22	3	0	0	0	0
				1989	20	5	0	0	0	0	16	8	1	0	0	0
				1987	24	1	0	0	0	0	24	1	0	0	0	0
				1988	19	6	0	0	0	0	17	6	2	0	0	0
				1989	18	7	0	0	0	0	8	15	2	0	0	0

(cont'd)

Table 14. Summary of results obtained from 42 plots established between 1987 and 1989 to monitor sugar maple health in the Northeastern Region of Ontario (data based on the examination of 25 host trees per location) (cont'd).

Location (Twp)	Avg DBH (cm)	Avg ht (m)	Estimated stand area (ha)	Year	No. of trees with crown dieback												
					Current <sup>a</sup>					Cumulative <sup>a</sup>							
					0	1	2	3	4	Trees dead	0	1	2	3	4	Trees dead	
<u>Espanola District (concl.)</u>																	
Shakespeare	28.1	18.0	-	1989	23	2	0	0	0	0	0	14	11	0	0	0	0
Shedden	33.1	20.7	-	1989	16	8	1	0	0	0	0	3	12	8	2	0	0
Spanish Indian Reserv.	21.4	16.1	-	1987	25	0	0	0	0	0	0	25	0	0	0	0	0
				1988	24	1	0	0	0	0	24	1	0	0	0	0	
				1989	23	2	0	0	0	0	20	5	0	0	0	0	
Tehkummah	28.6	16.2	-	1989	20	5	0	0	0	0	0	13	10	1	1	0	0
<u>Sudbury District</u>																	
Cascaden	16.8	12.8	-	1987	25	0	0	0	0	0	0	25	0	0	0	0	0
				1988	23	2	0	0	0	0	19	6	0	0	0	0	
				1989	18	6	0	0	0	1	12	9	3	0	0	1	
Rutherford	21.0	15.2	-	1987	24	1	0	0	0	0	0	24	1	0	0	0	0
				1988	24	1	0	0	0	0	23	1	0	1	0	0	
				1989	23	2	0	0	0	0	18	6	1	0	0	0	
<u>North Bay District</u>																	
Blyth	20.0	14.8	-	1987	21	4	0	0	0	0	0	21	4	0	0	0	0
				1988	16	9	0	0	0	0	16	3	3	3	0	0	
				1989	20	3	1	0	1	0	15	7	2	0	1	0	
Chisholm	23.7	17.6	-	1989	25	0	0	0	0	0	0	25	0	0	0	0	0
Commanda	22.4	15.5	-	1989	23	2	0	0	0	0	0	18	7	0	0	0	0

(cont'd)

Table 14. Summary of results obtained from 42 plots established between 1987 and 1989 to monitor sugar maple health in the Northeastern Region of Ontario (data based on the examination of 25 host trees per location) (concl.).

Location (Twp)	Avg DBH (cm)	Avg ht (m)	Estimated stand area (ha)	Year	No. of trees with crown dieback											
					Current <sup>a</sup>						Cumulative <sup>a</sup>					
					0	1	2	3	4	Trees dead	0	1	2	3	4	Trees dead
<u>North Bay District (concl.)</u>																
East Mills	21.2	15.1	-	1989	17	8	0	0	0	0	9	13	3	0	0	0
French	16.3	13.9	-	1987	22	3	0	0	0	0	22	3	0	0	0	0
				1988	23	2	0	0	0	0	14	6	5	0	0	0
				1989	17	7	0	0	0	0	12	8	3	2	0	0
Nipissing	22.0	16.0	-	1987	25	0	0	0	0	0	25	0	0	0	0	0
				1988	24	1	0	0	0	0	21	4	0	0	0	0
				1989	18	7	0	0	0	0	11	12	1	0	1	0
Nipissing Patterson	20.6 18.3	16.6 15.9	- -	1989	24	1	0	0	0	0	17	8	0	0	0	0
				1987	25	0	0	0	0	0	25	0	0	0	0	0
				1988	22	3	0	0	0	0	20	4	0	1	0	0
				1989	22	3	0	0	0	0	13	11	1	0	0	0
				1989	23	1	1	0	0	0	14	10	0	1	0	0
				1989	24	1	0	0	0	0	19	6	0	0	0	0
Widdifield	31.1	18.6	-	1989	15	10	0	0	0	0	7	13	5	0	0	0

<sup>a</sup> 0 = 0-5%, 1 = 6-20%, 2 = 21-40%, 3 = 41-60%, 4 = >60%, 5 = dead tree

<sup>b</sup> 20-tree plot

Table 15. Summary of the crown condition of sugar maple at seven North American Maple Project plots in 1988 and 1989 in the Southwestern Region of Ontario.

Location (Twp)	Avg	Year	No. of trees	Percentage of dead crown											Trees dead	Trees
	DBH			0	1-5	6-15	16-25	26-35	36-45	46-55	56-65	66-75	> 76	blown		
	(cm)													No. of trees		down or cut
<u>Sault Ste. Marie</u>																
Wishart <sup>a</sup>	27.0	89	72	19	31	14	4	3	0	1	0	0	0	1	1	
Tarentorus <sup>b</sup>	24.4	89	82	3	31	28	19	0	1	0	0	1	0	0	2	
<u>North Bay</u>																
Nipissing <sup>b</sup>	19.8	89	113	20	69	16	6	2	0	0	0	0	0	0	0	
Patterson <sup>a</sup>	22.2	89	65	23	22	16	3	0	0	0	0	1	0	0		

<sup>a</sup> undisturbed woodlot

<sup>b</sup> trees currently tapped for maple syrup

### Single-tree mortality

The sudden death of apparently healthy balsam fir and, to a lesser degree, white spruce, in old budworm-damaged forests was common in several districts of Northeastern region in 1989.

Mortality was especially noticeable in Lake Superior Provincial Park throughout Asselin, Brimacombe, Giles, Goodwillie, Tiernan and Peterson townships. It was confined to mature and overmature balsam fir and white spruce; more balsam fir than spruce were affected in all of the above-mentioned townships. In dead trees that were sampled, *Armillaria* root rot, the balsam fir bark beetle, the spruce beetle, and *Monochamus* spp. were closely associated with this mortality.

Single-tree mortality of balsam fir was also observed at a number of points along the Ranger Lake Road, Sault Ste. Marie District and along Highway 129 from Casson Township north to Villeneuve Township.

Although this mortality cannot be attributed to any one cause, it appears that the problem occurs in budworm-damaged stands, and the abovementioned insects and disease are contributing factors.

### ABIOTIC DAMAGE

#### Drought

In 1988, a total of 37,318 ha of drought damage occurred in the region. This condition was a result of higher-than-normal temperatures and lower-than-normal precipitation. These conditions prevailed once again in 1989.

Aerial surveys were conducted; however, as a result of other work priorities, mapping was performed too late and it was extremely difficult to distinguish drought from premature fall colors. Ground surveys revealed that damage was widespread throughout the region; however, the damage was not as severe as in the previous year. Again, damage was usually confined to hills, ridge tops and rocky sites, with sugar maple the most commonly affected host, followed by red oak, white birch and trembling aspen.

Evaluations were carried out in two areas of Sault Ste. Marie District. In Curtis Township, 50% mortality was recorded in a newly established 11-ha black spruce seedling orchard, with trees averaging 0.2 m-0.3 m in height. In Prince Township, 2 ha of newly planted red pine trees 0.5 m in height sustained 80% mortality as a result of extremely dry conditions.

## Salt

Although salt damage was observed in many areas of the region, it was most noticeable in several parts of the Blind River and Sault Ste. Marie districts.

In Sault Ste. Marie District, 50-75% foliar damage occurred on mature eastern white pine and red pine trees averaging 40 cm DBH along Highway 17 through the Garden River Indian Reserve to the town of Echo Bay. As a result of repeated heavy salting of the highway, mortality is occurring, particularly among roadside eastern white pine trees in this area. Similar damage was apparent on semimature red pine trees along Highway 17, east of Iron Bridge in Thompson Township. Foliar damage on affected trees averaged 50% and was especially noticeable on the lower portion of the trees.

## Winter Drying

This condition was reported in several districts of the region.

At one location in Bouck Township, Blind River District, the incidence of winter drying was 58% among planted red pine trees 1.4 m in height over approximately 4 ha. Foliar damage was in the 30% range. Once again in Parkinson Township, Blind River District, 75% incidence was recorded in a 1-ha pitch pine (*Pinus rigida* Mill.) plantation, where trees averaged 1.7 m in height; foliar damage averaged 28%. In North Bay District, this damage was most noticeable at one location in Olrig Township. In a young, 10-ha eastern white pine plantation, the incidence of winter drying was 35% among trees 1.3 m in height; 20% foliar damage was recorded.

Elsewhere in the region, the incidence of trees attacked did not exceed 10%, and only slight foliar damage was observed.

## Acid Rain National Early Warning System (ARNEWS)

The four ARNEWS study plots that were established in 1984 and 1985 in the North Bay, Sault Ste. Marie, Sudbury and Wawa districts were revisited in 1989. Trees within a 10- x 40-m rectangle were assessed for vertical and radial growth, crown structure and density, branch and stem mortality, incidence of insects and diseases and specific acid rain symptoms.

In Wishart Township, Sault Ste. Marie District, no insect activity was observed; however, 24% of sugar maple trees displayed chlorotic (yellow green) foliage and 6.8% displayed yellow foliage. In Huotari Township, Wawa District, there have been no insect or disease problems to date in a pure stand of jack pine trees. In Samuel de Champlain Provincial Park, North Bay District, 100% defoliation by the forest tent caterpillar was recorded in 1988; however, a total collapse

of populations of this insect occurred in 1989. At Agnew Lake in Hyman Township, Sudbury District, defoliation of trembling aspen averaged 70%. No disease problems were encountered in the last two areas mentioned.

#### SPECIAL SURVEYS

##### Pear Thrips, *Taeniothrips inconsequens* (Uzel)

The pear thrips, an insect found on many plants but mainly on fruit trees, has recently become a serious pest of forest trees, mainly sugar maple, in several American states. In an effort to detect the presence of this insect, surveys were conducted across Ontario in 1989. In the Northeastern Region, 20 areas were examined (Fig. 7); pear thrips was found in 15 of them (Table 16).

The adult thrips emerges from the soil in early spring to feed and reproduce. Eggs are laid mainly along veins and petioles. Feeding damage consists of fallen green leaves, dwarfed foliage, chlorotic and tattered leaves or wilted leaves. Outbreaks can result in growth loss and crown dieback, as well as top killing. After feeding, the thrips larvae enter the soil, where they complete their development. To date, no evidence of feeding damage has been detected at sample points.

##### Semipermanent Jack Pine Plots

In 1982, semipermanent jack pine sample plots were established in the region in four plantations of trees <2 m tall. In each plantation 300 trees were measured and numbered and each tree was rated for insect and disease problems. These plots were evaluated and measured annually until 1985, then were re-evaluated in 1988 and 1989. The results of the surveys are summarized in Tables 17(a) and 17(b) for the period from 1982 to 1989.

##### Forest Tree Nursery Report

Routine visits throughout the field season revealed no major insect or disease problems in the Thessalon Tree Nursery.

Samples received and calls answered by the Forest Insect and Disease Survey Unit revealed that only minimal damage occurred. Insects identified, causing trace levels of damage, were: the black vine weevil, *Otiorhynchus sulcatus* (F.), the strawberry root weevil, *Otiorhynchus ovatus* L., the pales weevil, *Hylobius pales* Hbst., springtails (Collembolans) and the variegated cutworm, *Peridroma saucia* (Hbn.). *Cylindrocladium* root rot, *Cylindrocladium floridanum* Sob. & C.P. Seym., was also present in samples taken from soil beneath bare-root seedlings by OMNR staff; however, no losses were reported.

# NORTHEASTERN REGION

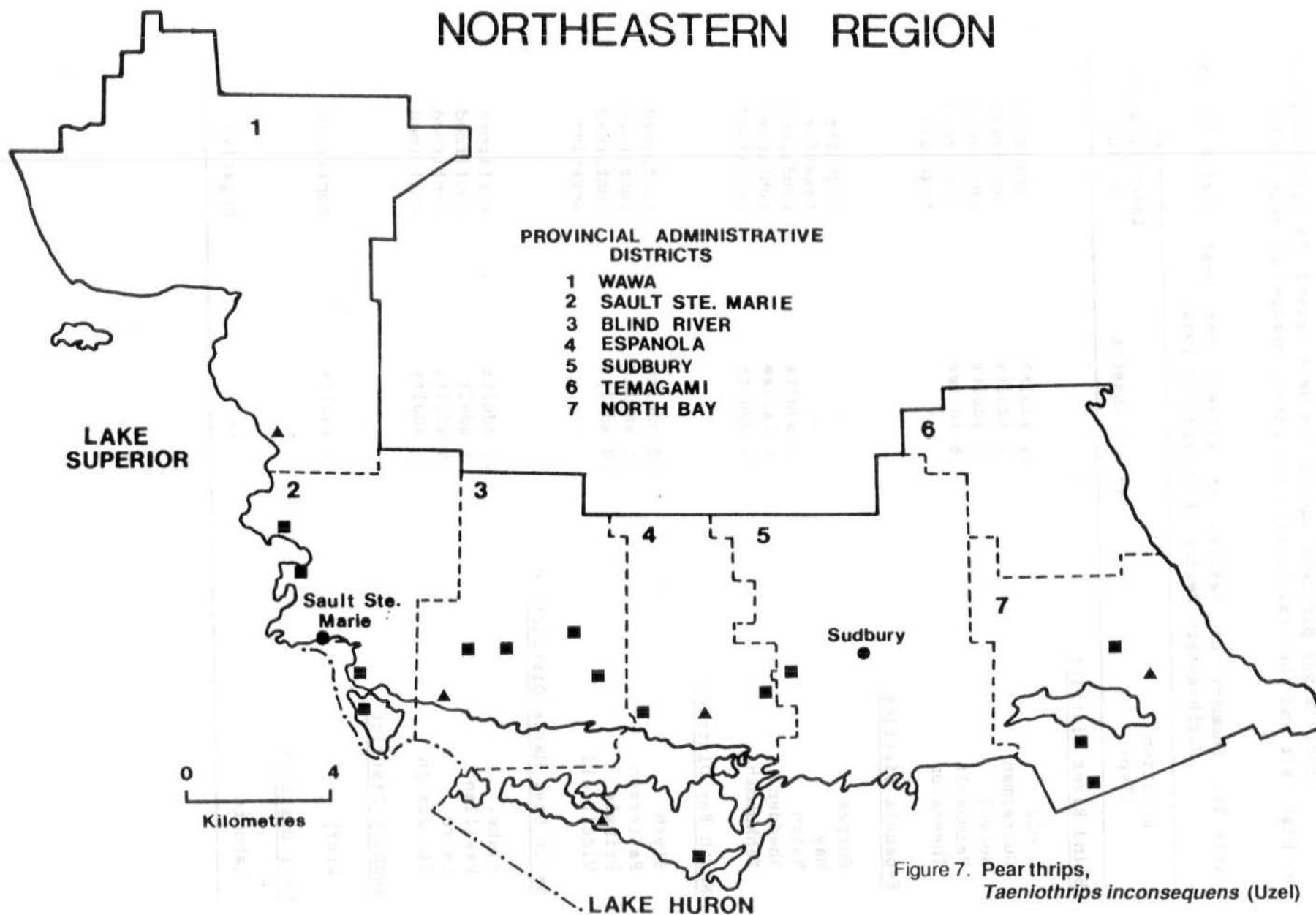


Figure 7. Pear thrips, *Taeniothrips inconsequens* (Uzel)

Other minor problems identified were caused by fertilizers and by high salt and chemical levels, but again, damage was very light.

Table 16. Summary of results of surveys for pear thrips in the Northeastern Region of Ontario in 1989.

Location (Twp)	No. of insects	Identification status
<u>Blind River District</u>		
Gould	29 adults	confirmed
Gunterman	2 adults	confirmed
Nouvel	12 adults	confirmed
Raimbault	26 larvae	confirmed
Thessalon	--	negative
<u>Espanola District</u>		
Burpee	--	negative
May	--	negative
Nairn	2 adults	confirmed
Shedden	4 larvae	confirmed
Tehkummah	14 adults	confirmed
<u>North Bay District</u>		
Blyth	10 adults	confirmed
Patterson	51 adults	confirmed
Pringle	20 adults	confirmed
Widdifield	--	negative
<u>Sault Ste. Marie District</u>		
Fisher	41 adults	confirmed
Havilland	1 adult	confirmed
Laird	5 adults	confirmed
St. Joseph	15 adults	confirmed
<u>Sudbury District</u>		
Drury	9 adults	confirmed
<u>Wawa District</u>		
Labonte	--	negative

Table 17(a). Summary of the incidence of insect-caused damage noted in a survey conducted in sample plots in four jack pine plantations in the Northeastern Region of Ontario from 1982 to 1989 (counts based on the examination of 300 trees at each location unless otherwise noted).

Location (Twp)	Estimated area of stand (ha)	Estimated no. of trees per ha	Year	Avg ht of trees (m)	White pine weevil	Eastern pine shoot borer	Jack pine tip beetle	Northern pitch twig moth	Jack pine budworm
					Trees affected (%)	Leaders attacked (%)	Leaders attacked (%)	Trees infested (%)	Trees infested (%)
<u>Sault Ste. Marie District</u>									
Hurlburt	50	5,000	1982	0.7	1.0	0.0	0.0	0.0	9.3
			1983	1.1	1.3	0.0	0.0	0.0	0.0
			1984	1.6	3.6	0.7	0.0	0.3	4.0
			1985	2.2	3.0	0.0	0.0	0.0	0.0
			1988 <sup>a</sup>	3.2	15.1	0.0	0.0	0.8	0.0
			1989 <sup>a</sup>	3.7	16.7	0.8	0.0	0.0	0.0
<u>Blind River District</u>									
Villeneuve	20	3,000	1982	0.7	0.0	0.0	0.0	0.0	0.0
			1983	1.1	0.7	1.0	2.3	6.0	0.0
			1984	1.5	1.6	0.0	1.6	0.6	0.3
			1985	2.0	2.3	1.0	0.6	0.0	0.0
			1988 <sup>b</sup>	3.4	0.4	0.0	0.0	0.0	0.0
			1989 <sup>b</sup>	4.4	4.4	0.0	0.0	0.0	0.0
<u>Espanola District</u>									
Nairn	24	5,000	1982	1.4	2.0	0.0	1.0	0.0	0.0
			1983	1.8	4.7	0.0	0.0	1.0	0.0
			1984	2.3	6.0	0.0	0.0	1.0	2.7
			1985	2.8	1.6	0.3	0.0	0.0	0.0
			1988	5.8	3.3	1.7	0.0	0.0	0.0
			1989	6.1	3.0	1.3	0.0	0.0	0.0

(cont'd)

Table 17(a). Summary of the incidence of insect-caused damage noted in a survey conducted in sample plots in four jack pine plantations in the Northeastern Region of Ontario from 1982 to 1989 (counts based on the examination of 300 trees at each location unless otherwise noted). (concl.)

Location (Twp)	Estimated area of stand (ha)	Estimated no. of trees per ha	Year	Avg ht of trees (m)	White pine weevil	Eastern pine shoot borer	Jack pine tip beetle	Northern pitch twig moth	Jack pine budworm
					Trees affected (%)	Leaders attacked (%)	Leaders attacked (%)	Trees infested (%)	Trees infested (%)
<u>Sudbury District</u>									
Hendrie	50	3,000	1982	1.9	0.0	4.0	0.0	0.0	0.0
			1983	2.5	4.0	0.7	0.0	1.0	0.0
			1984	3.0	2.3	0.0	0.3	0.3	0.0
			1985	3.5	0.6	1.3	0.0	0.0	18.6
			1988	6.0	2.0	1.7	0.0	0.0	0.0
			1989	6.2	1.7	0.0	0.0	0.0	0.0

<sup>a</sup> 240 trees examined

<sup>b</sup> 232 trees examined

Table 17(b). Summary of the incidence of disease-caused damage noted in a survey conducted in sample plots in four jack pine plantations in the Northeastern Region of Ontario from 1982 to 1989 (counts based on the examination of 300 trees at each location unless otherwise noted).

Location (Twp)	Estimated area of stand (ha)	Estimated no. of trees per ha	Year	Avg ht of trees (m)	Armillaria	Pine needle	Tar spot	Western	Scleroderris	Mortality
					root rot	rust	needle cast	gall rust	canker	
					Trees affected (%)	Trees affected (%)	Trees affected (%)	Trees affected (%)	Trees affected (%)	
<u>Sault Ste. Marie District</u>										
Hurlburt	50	5,000	1982	0.7	0.0	1.3	0.0	0.0	0.0	0.0
			1983	1.1	0.7	0.0	0.0	0.0	0.0	0.7
			1984	1.6	0.0	0.0	0.0	0.0	0.0	0.0
			1985	2.2	0.0	0.0	1.0	0.0	1.3	0.3
			1988 <sup>a</sup>	3.2	0.7	0.0	0.0	1.3	0.0	1.3
			1989 <sup>a</sup>	3.7	0.0	0.0	0.0	1.7	0.0	1.3
<u>Blind River District</u>										
Villeneuve	20	3,000	1982	0.7	0.0	1.0	2.0	0.0	0.0	0.0
			1983	1.1	0.0	0.0	0.0	0.0	0.0	0.0
			1984	1.5	0.0	0.6	0.0	0.0	0.0	0.0
			1985	2.0	0.7	0.6	11.6	0.3	0.0	0.7
			1988 <sup>b</sup>	3.4	0.0	0.0	12.1	0.0	0.0	0.9
			1989 <sup>b</sup>	4.4	0.0	0.0	0.0	16.3	0.0	0.9
<u>Espanola District</u>										
Nairn	24	5,000	1982	1.4	0.0	0.0	0.0	0.0	0.0	0.0
			1983	1.8	0.0	0.0	0.0	0.0	0.0	0.0
			1984	2.3	0.3	0.0	0.0	0.3	0.0	0.3
			1985	2.8	0.7	0.0	0.0	0.0	0.0	0.7
			1988	5.8	0.0	0.7	0.0	0.0	0.0	6.0
			1989	6.1	0.0	0.0	0.0	0.0	0.0	5.0

(cont'd)

Table 17(b). Summary of the incidence of disease-caused damage noted in a survey conducted in sample plots in four jack pine plantations in the Northeastern Region of Ontario from 1982 to 1989 (counts based on the examination of 300 trees at each location unless otherwise noted) (concl.).

Location (Twp)	Estimated area of stand (ha)	Estimated no. of trees per ha	Year	Avg ht of trees (m)	Armillaria root rot	Pine needle rust	Tar spot needle cast	Western gall rust	Scleroderris canker	Mortality (%)
					Trees affected (%)	Trees affected (%)	Trees affected (%)	Trees affected (%)	Trees affected (%)	
<u>Sudbury District</u>										
Hendrie	50	3,000	1982	1.9	0.0	0.0	0.0	0.0	0.0	0.0
			1983	2.5	0.7	0.0	0.0	0.0	0.0	0.7
			1984	3.0	0.3	5.0	0.0	1.0	0.0	0.3
			1985	3.5	0.3	45.6	0.0	1.3	0.0	0.3
			1988	6.0	0.0	0.0	0.0	1.3	0.0	0.3
			1989	6.2	0.0	0.0	0.0	0.0	0.0	0.3

<sup>a</sup> 240 trees examined

<sup>b</sup> 232 trees examined

## Eastern White Pine Plantations

Special surveys were conducted in eastern white pine plantations in 1983, 1986 and again in 1989. Three stand sizes, with trees averaging <2 m, 2-6 m and >6 m in height, were selected. Each stand was surveyed for specific insects and diseases by means of a standard sampling procedure. Two visits were made to each site, the first about 15 June and the second between 15 July and 1 August.

Insects and diseases surveyed and the results for 1989 are summarized in Table 18. In addition to these results, the following problems were encountered: 6% of trees were damaged by drought, 10% by winter drying, 4% by rodent damage and 14% by semimature tissue blight.

## Eastern White Pine Cone and Seed Pests

A survey of insects and diseases damaging eastern white pine cones was conducted in 1983, 1986 and again in 1989. Cone collections were made in a plantation in Kirkwood Township, Blind River District, and in Gurd Township, North Bay District. However, the sample from North Bay District was not examined because the cones were dried out and, therefore, results were not available.

One hundred second-year cones in the green succulent stage were collected in the first week of July. Cones were examined in Sault Ste. Marie for the proportion of damaged cones, the proportion of damaged seeds and the identity of insects and diseases causing the damage. Results are summarized in Table 19. No disease organisms were observed or found to have caused seed reduction.

## Climatic Data

Environmental factors such as temperature and precipitation play an important role in the development of insects and diseases and in tree growth in the forest. Certain weather conditions can predispose the forest to damage, and can be the cause of marked fluctuations in insect populations or in the incidence of disease. Adverse weather conditions predispose trees to abiotic damage from agents such as frost, winter drying, wind, snow, hail and drought. Weather data for three locations across the region are recorded in Table 20. This table presents the monthly mean temperature, total precipitation for 1989 and deviation of both parameters in 1988 and 1989 from the normals for previous years.

More detailed weather information can be obtained from local Atmospheric Environment Service weather offices.

Table 18. Summary of the incidence of insect- and disease-caused damage noted in a survey conducted in eastern white pine plantations in the Northeastern Region of Ontario in 1989 (counts based on the examination of 150 randomly selected trees at each location).

Location (Twp)	Estimated area of stand (ha)	Estimated no. of trees per ha	Avg ht of trees (m)	White pine weevil	Pine bark adelgid	Eastern pine shoot borer	Pine spittlebug	White pine blister rust	Armillaria root rot
				Leaders attacked (%)	Trees infested (%)	Leaders attacked (%)	Trees infested (%)	Stems attacked (%)	Trees dead (%)
<u>Wawa District</u>									
Labonte	20	1,568	1.5	2.7	0.0	0.0	0.0	7.3	7.3
<u>Blind River District</u>									
Wells	2	2,000	3.8	8.0	0.0	0.0	0.0	2.6	1.3
Lefroy	50	2,500	11.5	0.0	0.0	0.0	0.0	0.0	0.7
Kirkwood	25	500	14.0	0.0	0.0	0.0	0.0	0.0	0.0
<u>North Bay District</u>									
Antoine	31	1,750	1.13	2.0	0.0	0.0	0.0	12.0	0.7
Pardo	8	2,125	1.7	24.0	0.0	0.0	6.7	0.0	2.0
Gurd	4	550	12.6	2.7	0.0	0.0	44.6	4.0	0.0
<u>Espanola District</u>									
Allan	2	1,750	2.3	2.0	0.0	1.3	0.7	0.0	1.3
Burpee	2	3,333	2.5	0.0	29.3	1.7	63.9	1.3	0.0
Tennyson	2.8	3,400	1.7	22.0	53.0	2.0	0.7	0.0	0.0

Table 19. Summary of the incidence of insect damage and seed loss in white pine cones at one location in Kirkwood township, Blind River District, Northeastern Region of Ontario in 1989 (counts based on the examination of 100 randomly selected cones)

No. of cones examined:	100	
No. of sound cones:	81	
No. of damaged cones:	19	
	Causal agent (%)	No. of cones affected <sup>a</sup>
1. Unknown	90.92	19
2. Lepidoptera	9.08	2
Mean seed count (sound):	28.96	
Mean seed count (damaged):	24.42	
Seed loss (damaged cones):	4.54	
Total Seed reduction (%):	15.68	

<sup>a</sup>Some cones were damaged by both Lepidoptera and an unknown organism.

Table 20. Mean temperatures and total precipitation in 1988 and deviation from the norms for 1988 and 1989 at three locations in the Northeastern Region of Ontario.

Location	Month	Mean temperature (°C)		Deviation from norm (°C)		Total precipitation (mm)		Deviation from norm (%)	
		Normal	Actual	1988	1989	Normal	Actual	1988	1989
<u>Sault Ste. Marie Airport</u>									
	January	-10.1	-7.1	-0.2	+3.0	74.0	63.2	+4.6	-14.6
	February	-10.0	-6.3	-1.7	+3.7	68.0	58.9	-45.3	-13.4
	March	-5.1	-7.6	-0.5	-2.5	60.4	59.6	+42.2	-1.3
	April	3.1	2.5	+0.3	-0.6	64.4	51.8	-2.0	-19.6
	May	9.1	10.5	+2.2	+1.4	84.2	54.2	-56.2	-35.6
	June	14.6	14.4	+0.6	-0.2	74.2	74.2	-86.3	0.0
	July	17.3	19.2	+2.2	+1.9	55.6	8.4	+19.4	-84.9
	August	16.9	16.6	+1.3	-0.3	82.7	85.2	+66.6	+3.0
	September	12.8	13.0	+0.3	-0.2	95.3	32.4	+19.4	-66.0
	October	7.6	7.5	-2.4	-0.1	74.2	64.4	+87.9	-13.2
	November	0.7	-2.2	+2.0	-1.5	85.7	129.6	+98.0	+51.2
	December	-6.7	-14.1	-0.4	-7.4	79.6	55.8	+3.9	-29.9
<u>Sudbury Airport</u>									
	January	-13.7	-10.4	+1.5	+3.3	57.5	81.6	+22.1	+41.9
	February	-12.5	-13.6	-1.0	-1.1	47.0	13.3	+61.1	-71.7
	March	-6.0	-8.2	-0.6	-2.2	55.2	79.3	+73.2	+43.7
	April	2.7	1.4	+0.6	-1.3	61.1	58.2	+16.4	-4.7
	May	10.5	12.1	+2.4	+1.6	67.1	71.9	+35.0	+7.2
	June	16.0	15.9	-0.3	-0.1	82.8	160.9	-55.2	+96.2
	July	18.7	20.7	+3.2	+2.0	83.1	56.4	-64.1	-32.1
	August	17.3	17.7	+1.7	+0.4	82.9	81.6	+126.9	-1.6
	September	12.2	13.1	+0.3	+0.9	106.5	25.6	-14.1	-76.0
	October	6.3	6.7	-2.2	+0.4	74.6	69.0	+63.8	- 7.5
	November	-1.2	-5.3	+1.7	-4.1	77.8	104.6	+54.2	+34.4
	December	-10.2	-18.5	-0.1	-8.3	65.8	46.1	+0.6	-29.9
<u>North Bay Airport</u>									
	January	-13.0	-10.0	+2.2	+3.0	63.5	88.7	+24.1	+39.7
	February	-11.3	-13.2	-1.5	-1.9	56.2	37.1	+33.1	-34.0
	March	-5.3	-7.5	-1.0	-2.2	61.1	99.1	+4.9	+62.2
	April	3.2	1.1	+0.7	-2.1	62.3	32.3	+23.6	-48.2
	May	10.6	11.7	+2.1	+1.1	69.3	115.7	+9.7	+67.0
	June	15.7	20.7	-0.8	+5.0	85.1	142.4	-25.3	+67.3
	July	18.3	19.9	+2.5	+1.6	102.4	37.6	-31.6	-63.3
	August	17.0	17.2	+1.1	+0.2	98.7	80.6	+108.3	-18.3
	September	12.2	12.6	0.0	+0.4	115.9	55.8	+2.0	-51.9
	October	6.4	7.0	-2.0	+0.6	87.7	96.6	+46.8	+10.1
	November	-1.0	-4.8	+1.5	-3.8	86.6	129.5	+14.3	+49.5
	December	-9.7	-17.8	-0.4	-8.1	75.4	65.5	-13.5	-13.1