

RESULTS OF FOREST INSECT AND
DISEASE SURVEYS IN THE
EASTERN REGION OF ONTARIO
1989

(FOREST DISTRICTS: NAPANEE, TWEED, CARLETON PLACE,
and BROCKVILLE)

A. Keizer

FORESTRY CANADA
ONTARIO REGION
GREAT LAKES FORESTRY CENTRE
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MISCELLANEOUS REPORT NO. 93

SURVEY HIGHLIGHTS

The following report summarizes forest damage by insects, diseases and abiotic agents observed in the Eastern Region of Ontario in 1989. Included are summaries of forest decline and dieback evaluations as well as special surveys, infestation forecasts and miscellaneous pests.

Reduced levels of cedar leafminer damage were offset by regional foliar "browning" induced by a multitude of stress factors. Thin crowns and branch-tip mortality were evident across the region; however, in most of the severely affected areas, new growth was evident as early as mid-June.

The forest tent caterpillar infestation which, when it first appeared in 1987, caused over 980 ha of moderate-to-severe defoliation, has increased considerably, causing moderate-to-severe defoliation over 438,919 ha of mixed hardwoods in 1989. Egg-band surveys indicate an overall decline in populations in 1990.

The area of moderate-to-severe defoliation caused by gypsy moth increased over 2.5 times (from the 28,070 ha infested in 1988 to 68,981 ha in 1989), primarily in oak forests. Egg-mass surveys completed by Ontario Ministry of Natural Resources (OMNR) staff indicate that high population levels will occur in the Tweed, Napanee, Carleton Place and Brockville districts in 1990.

Increased populations of the jack pine sawfly, eastern tent caterpillar and various bark beetles were found at numerous locations throughout the region, causing severe defoliation and mortality.

A special survey for pear thrips in sugar maple has revealed that this insect is prevalent across southern Ontario. It was identified at nine locations in the Eastern Region, although associated damage levels were negligible.

Six areas of hardwood decline, possibly drought-induced, were noted in five districts; the condition was aerially mapped over 10,991 ha.

Increased infection levels of white pine blister rust occurred in most districts and another infection by a beech bark disease was found in Presqu'ile Provincial Park.

Additional maple health surveys were conducted, with 10 additional plots being placed in urban and rural settings, to bring the total number of plots in this project to 20.

A number of special surveys were conducted, and evaluations are provided.

A. Keizer

Frontispiece



Most sugar maple (*Acer saccharum* Marsh.) branch mortality was found in high-use areas such as roadsides and laneways, where root compaction, exposure to salt, mechanical damage and other anthropogenic stresses are most likely to occur.

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INSECTS

Major Insects

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

A 1-ha plantation of 2.0-m red pine (*Pinus resinosa* Ait.) was severely defoliated for the third consecutive year on Lanark County Road 22 in Fitzroy Township, Carleton Place District. Whole-tree and branch-tip mortality has occurred (<1%) on occasional fringe trees. Average defoliation and webs per tree were lower this year (60% and 16, respectively, in comparison with 92% and 28 in 1988).

Single webs were also evident on scattered young red pine and white pine (*Pinus strobus* L.) trees up to 5 m tall in Sharbot Lake Provincial Park, Tweed District, and Frontenac Provincial Park, Napanee District.

Cedar Leafmining Complex, *Argyresthia aureoargentella* Brower, *A. canadensis* Free. and *A. thuiella* (Pack.)

In 1989, leafmining damage levels were reduced to light sporadic infestations located primarily in the Cornwall, Carleton Place, Brockville and Napanee districts. Foliar "browning" of eastern white cedar (*Thuja occidentalis* L.) induced primarily by climatic extremes occurred throughout the region, reducing the amounts of foliage available to leafminers and complicating assessments. Only early assessments were reliable because of the quick onset of foliar desiccation, which turned the green foliage to light red. Typically, leafminer damage assessed ranged from 1% in Oxford on Rideau Township, Brockville District, to 80% in a 5.0-ha stand in Madoc Township, Tweed District. Foliar damage averaged 52% in five stands, ranging in size from 1.0 to 3.0 ha, in Carleton Place and Brockville districts.

Mature cedar windbreaks at the G.H. Ferguson Forest Station sustained foliar damage ranging from 1% to 60%. The systemic-action insecticide Cygon was used as a control measure in late May and mid-August.

Spruce Budworm, *Choristoneura fumiferana* (Clem.)

Provincial Situation

As predicted, budworm populations have increased over approximately 1 million ha of balsam fir (*Abies balsamea* [L.] Mill.) and spruce (*Picea* spp.), causing 6,239,636 ha of moderate-to-severe defoliation. This increase has reversed the declining trend of the past several years. Infestations have been confined primarily to forests in the Northwestern and North Central regions (Fig. 1). The area of defoliation

is much the same as in 1988. Increases occurred in 1989 in the Sioux Lookout and Kenora districts, Northwestern Region, and in the Thunder Bay, Nipigon, Terrace Bay and Geraldton districts, North Central Region.

In 1989, OMNR staff aerially sprayed 30,516 ha of spruce/fir forests in the Thunder Bay and Nipigon districts with the bacterial insecticide *Bacillus thuringiensis* (B.t.).

Eastern Region

All surveys in the Eastern Region, including light trap and pheromone captures, indicate that populations will remain at low levels in 1990. Pheromone traps set in Lovant Township, Carleton Place District and in Denbigh Township, Tweed District caught no adults, and a single light trap in Oxford on Rideau Township, Brockville District, attracted only three adults.

Birch Leafminer, *Fenusa pusilla* (Lep.)

Areas of foliar browning appeared to have decreased in 1989. Despite this trend, roadside and ornamental birch (*Betula* spp.) trees displayed up to 100% foliar browning in the urban areas of Ottawa, Kingston, Kemptville, Belleville and Brighton, and in Presqu'ile and Sharbot Lake provincial parks.

Fall Webworm, *Hyphantria cunea* (Drury)

Large numbers of webs and accompanying severe defoliation were observed in localized areas in the southern portions of the Brockville and Napanee districts. These areas consisted of small groups of deciduous trees, primarily ash (*Fraxinus* spp.), maple (*Acer* spp.) and cherry (*Prunus* spp.); they varied in size, and ranged in number from 2 to 18. Defoliation ranged from 2% (one or two webs per tree) to 100% (as many as 38 webs per tree). Most of these areas were in Oxford on Rideau Township along Highway 16, along the St. Lawrence River near the city of Prescott and along the St. Lawrence Parkway from Brockville to Gananoque, all in Brockville District. In Napanee District, webs and defoliation were observed along both sides of Highway 401. Single trees containing a few webs were scattered throughout most of the region.

Gypsy Moth, *Lymantria dispar* (L.)

For the second consecutive year an increase in moderate-to-severe defoliation increased in the Eastern Region; the total area defoliated in 1989 was 68,981 ha. The increase amounted to 40,911 ha, or approximately 2.5 times the 28,070 ha aerially mapped in 1988 (Fig. 2), and occurred primarily in the Tweed, Brockville and Napanee districts (Table 1).

Table 1. Gross area (ha) of moderate-to-severe defoliation by the gypsy moth in the Eastern Region of Ontario in 1988 and 1989 (by district)

| District | 1988 | 1989 | Change | |
|----------------|--------|--------|--------|-----------|
| | | | % | Area (ha) |
| Tweed | 16,089 | 39,096 | 243 | +23,007 |
| Napanee | 6,198 | 15,001 | 242 | +8,803 |
| Carleton Place | 3,918 | 2,634 | -33 | -1,284 |
| Brockville | 1,865 | 12,250 | 657 | +10,385 |
| Total | 28,070 | 68,981 | 246 | 40,911 |

The Tweed District contained 57% or 39,096 ha of the total area defoliated. New infestations occurred primarily in Lake, Tudor, Grimsthorpe and Madoc townships in the northeastern portion of the district and in Sheffield and Hinchinbrooke townships in the southeastern portion (Fig. 3, Table 2). Most of these areas were severely defoliated by the earlier-feeding forest tent caterpillar, *Malacosoma disstria* Hbn, (Fig. 4).

Napanee and Brockville districts contained 39% of the regional defoliation (15,001 ha in the former and 12,250 ha in the latter). Percy, Rawdon, Sidney, Murray and Seymour townships contained the majority of defoliation in the Napanee District, while Crosby South, Front of Leeds and Lansdowne, Front of Yonge and Front of Escott townships were infested in the Brockville District. Parts of the Napanee District infested by gypsy moth also experienced earlier feeding damage by the forest tent caterpillar, primarily in the northwestern portion of the district. The area of damage was reduced in Carleton Place District, where 2,634 ha were defoliated in Bathurst, Darling and Pakenham townships. This reduction of approximately 1,284 ha occurred primarily in Bathurst Township. In the St. Lawrence River area, Howe, Hill and Grenadier islands were reinfested. New infestations were aerially mapped on Tar, Club and Stave islands.

Egg-mass surveys performed by staff of OMNR and Forestry Canada, Ontario Region (FCOR) in the fall of 1989 indicate high populations for 1990. These areas of projected high populations are located in the northwestern portion of Tweed District and extend into northwestern Carleton Place District, western Brockville District and eastern Napanee District.

The average number of adults captured in pheromone traps placed at 14 parks (two per park) across the region has remained fairly constant, with 13.2 in 1988 and 14.9 in 1989 (Table 3). Burlap traps have revealed higher numbers of larvae at most locations trapped during the month of June. Once again, Sharbot Lake Provincial Park contained the highest number of larvae (2,159).

Table 2. Gross area (ha) of moderate-to-severe defoliation by the gypsy moth in 1988 and 1989 (by county)

| County | Area (ha) | |
|----------------------|-----------|--------|
| | 1988 | 1989 |
| Lennox and Addington | 10,007 | 12,660 |
| Northumberland | 5,341 | 8,231 |
| Hastings | 5,625 | 22,262 |
| Lanark | 1,355 | 2,590 |
| Leeds and Grenville | 1,865 | 12,250 |
| Frontenac | 1,861 | 11,625 |
| Prince Edward | 0 | 340 |
| Ottawa-Carleton | 0 | 44 |

Eastern Tent Caterpillar, *Malacosoma americanum* (F.).

Large numbers of tents appeared throughout the region; cherry, apple (*Malus* spp.) and a variety of other deciduous hosts were defoliated. Host trees varied in size and damage levels varied as well, although the smaller regeneration was often 100% defoliated. Tents ranged in number from 1 to 25 per tree. Larger numbers of tents were found in Tweed District along Highway 7 in Oso, Olden and Hungerford townships; in Seymour and Kingston townships and Frontenac Provincial Park in Napanee District; along Leeds and Lansdowne County Road 14 in North Crosby Township, Brockville District; along Highway 401 in Elizabethtown Township; and through the urban areas of Ottawa in Carleton Place District.

Forest Tent Caterpillar, *Malacosoma disstria* Hbn.

As expected, the area of moderate-to-severe defoliation by this pest increased in 1989, for the fifth consecutive year. The total area defoliated amounted to 438,919 ha, an increase of $3\frac{1}{2}$ times over the 125,644 ha recorded in 1988 (Table 4). This represents 21% of the total area defoliated in southern Ontario in 1989 (Algonquin, Central, South-western and Eastern regions). The largest area of defoliation was 1,319,956 ha in the Algonquin Region (Fig. 4).

The infestation has extended southward to the Eastern Region from central Ontario. Of the total area defoliated in the Eastern Region, 345,104 ha were in Tweed District. This area includes most of the mixed hardwood stands in the southwestern half of the Tweed District; in addition the infestation extended over 81,248 ha of the northwestern portion of the Napanee District. Scattered pockets occurred throughout both of these districts around the main body of infestation.

Table 3. A summary of the results of gypsy moth burlap and pheromone trapping and defoliation estimates at 14 parks in the Eastern Region of Ontario in 1989 (concl.)

| Location (Provincial Park) | Burlap traps (10 per location) | | Pheromone traps ^a (2 per location) | | Avg defoliation estimates | | Egg-mass estimate ^d |
|-------------------------------|-----------------------------------|-------|--|------|------------------------------|----|-----------------------------------|
| | Total no. of larvae 1988 | 1989 | No. of male moths captured 1988 | 1989 | Host(s) | Z | |
| <u>Tweed District</u> | | | | | | | |
| Bon Echo | 0 | 296 | 10 ^c | 24 | rO, tA, wB | 5 | 3 |
| Sharbot Lake | 1,195 | 2,159 | 21 | 34 | rO, sM, tA, wB | 12 | 2 |

^a USDA Deltoid stick type

^b data unavailable

^c 1 trap missing

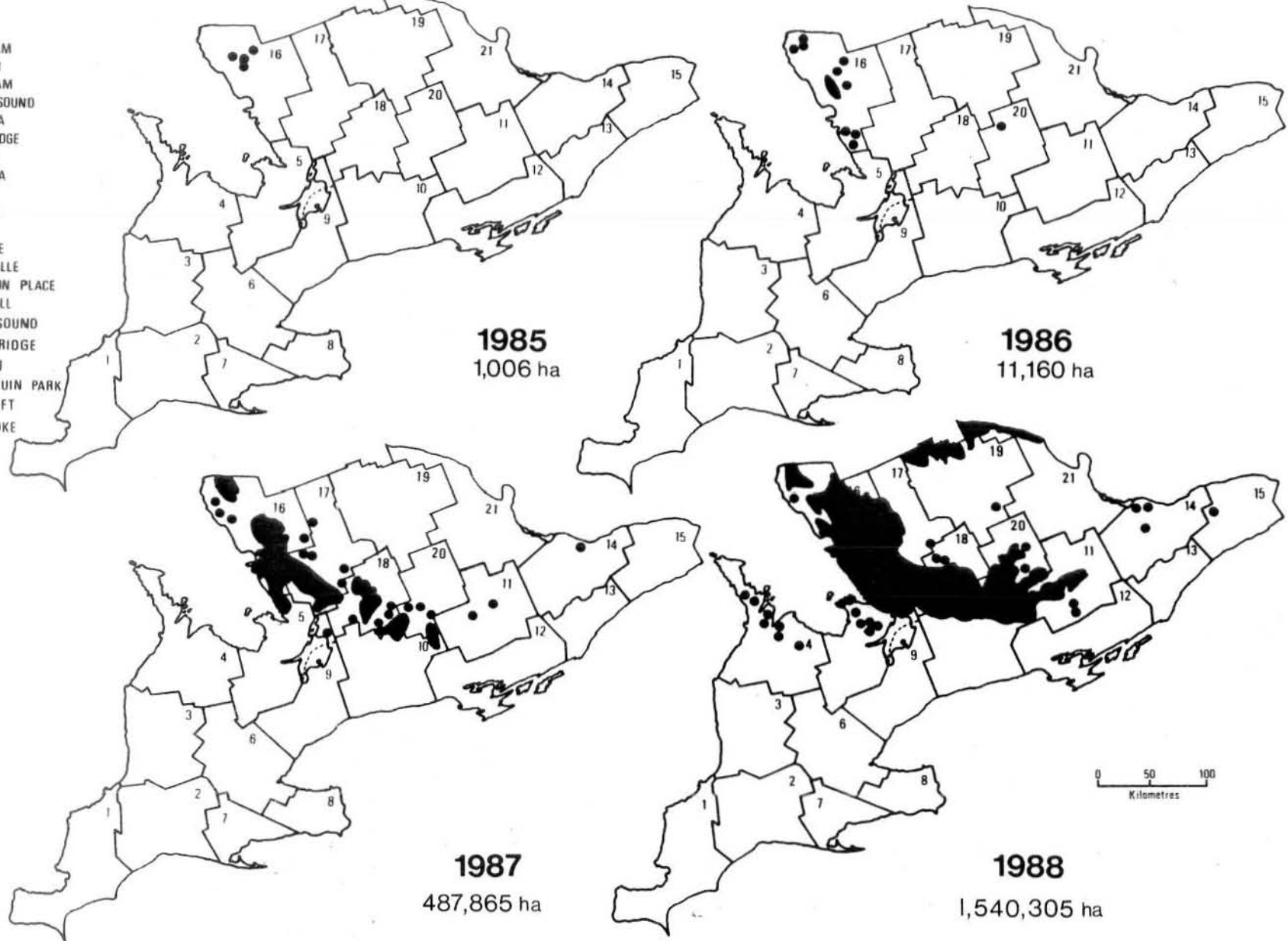
^d avg no. based on 5-minute walk method

^e includes forest tent caterpillar

SOUTHERN ONTARIO

DISTRICTS

- 1 CHATHAM
- 2 AYLMER
- 3 WINGHAM
- 4 OWEN SOUND
- 5 HURONIA
- 6 CAMBRIDGE
- 7 SIMCOE
- 8 NIAGARA
- 9 MAPLE
- 10 LINDSAY
- 11 TWEED
- 12 NAPANEE
- 13 BROCKVILLE
- 14 CARLETON PLACE
- 15 CORNWALL
- 16 PARRY SOUND
- 17 BRACEBRIDGE
- 18 MINDEN
- 19 ALGONQUIN PARK
- 20 BANCROFT
- 21 PEMBROKE



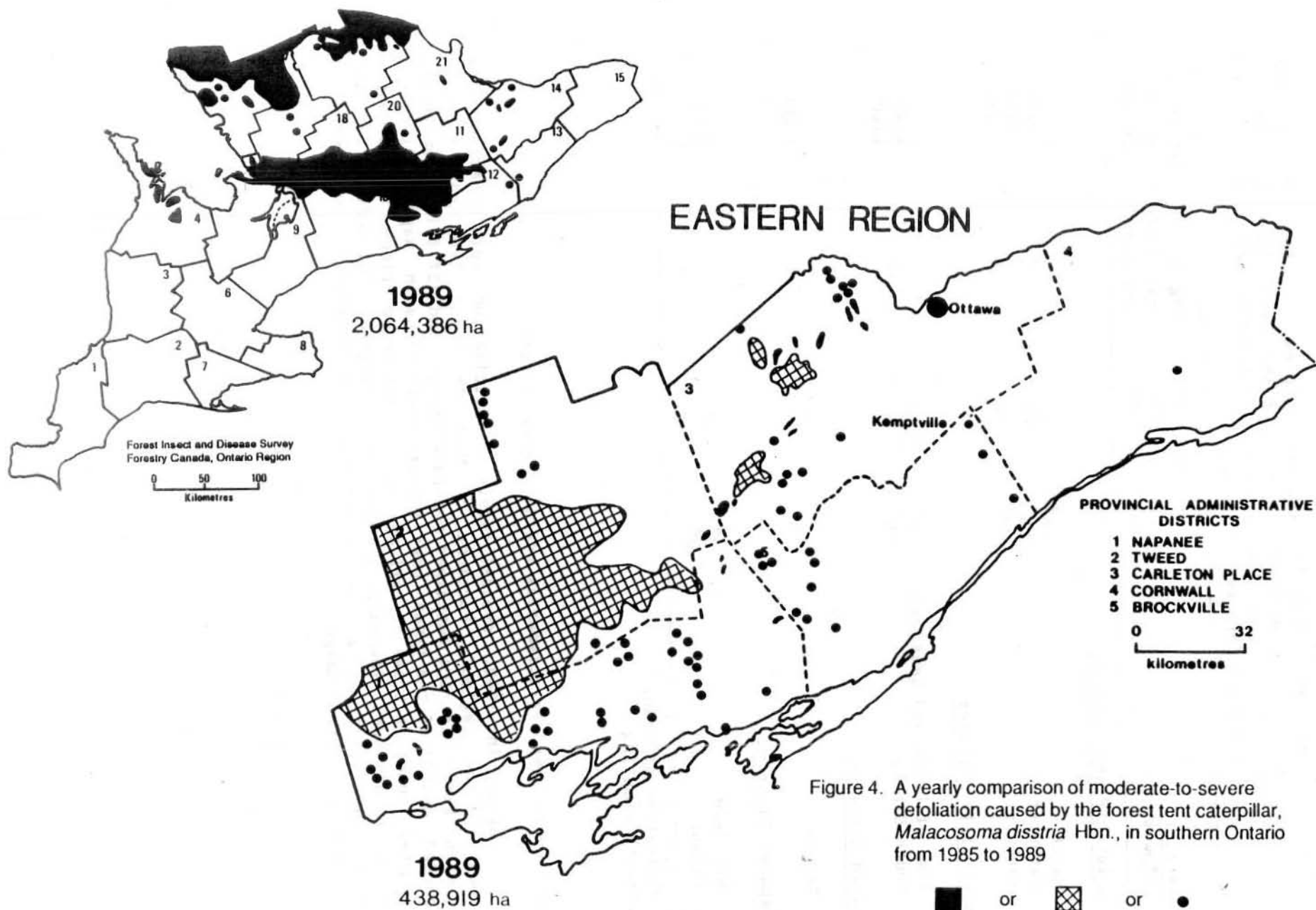


Figure 4. A yearly comparison of moderate-to-severe defoliation caused by the forest tent caterpillar, *Malacosoma disstria* Hbn., in southern Ontario from 1985 to 1989

Table 5. Forest tent caterpillar egg-band samples collected from sugar maple (*Acer saccharum* Marsh.) and trembling aspen (*Populus tremuloides* Michx.) in four districts of the Eastern Region in 1989, with infestation forecasts for 1990

| District (Township) | Host | Avg DBH of tree(s) (cm) | Avg no. of egg bands per tree | Infestation forecast for 1990 |
|--------------------------------|-----------------|-------------------------------|-------------------------------------|-------------------------------------|
| <u>Carleton Place District</u> | | | | |
| March | tA ^a | 18 | 1 | light |
| Bathurst | tA ^a | 17 | 1 | light |
| Bathurst | sM ^b | 17 | 0 | light |
| <u>Brockville District</u> | | | | |
| Rear of Leeds and Lansdowne | sM ^a | 17 | 1 | light |
| South Crosby | sM ^a | 20 | 1 | light |
| <u>Tweed District</u> | | | | |
| Kaladar | tA ^b | 17 | 1 | light |
| <u>Napanee District</u> | | | | |
| Sheffield | sM ^a | 20 | 1 | light |
| Seymour | sM ^a | 24 | 1 | light |

^a whole-tree sampling

^b branch sampling

Maple Leafcutter, *Paraclemensia acerifoliella* (Fitch)

Again in 1989, overall levels of defoliation were generally low throughout the region. Portions of Murphy's Point Provincial Park in Carleton Place District contained moderate damage, and 25% foliar damage was recorded on 20% of the trees over approximately 10 ha in Napanee District. Scattered roadside trees of all ages and sizes along Prince Edward County Road 12 in Hallowell Township sustained an average of 30% defoliation, and 80% of the trees in a 15-ha sugar bush near Sandbanks Provincial Park sustained 20% foliar damage.

Table 6. Summary of jack pine sawfly evaluations in six jack pine plantations in the Eastern Region of Ontario in 1989 (evaluations based on the examination of 150 trees)

| Location (Twp) | Avg ht of trees (m) | Estimated trees per ha | Estimated area affected (ha) | Trees affected (%) | Avg defolia- tion per affected tree (%) |
|--------------------------------|------------------------------|------------------------------|---------------------------------------|--------------------------|--|
| <u>Carleton Place District</u> | | | | | |
| Montagne | 3.5 | 900 | 1 | 100 | 80 |
| Dalhousie | 2.2 | 1,000 | 12 | 10 | 10 |
| <u>Napanee District</u> | | | | | |
| Ernestown | 2.1 | 800 | 3 | 5 | 10 |
| Kingston | 2.0 | 1,200 | 1 | 100 | 60 |
| Portland | 2.0 | 1,200 | 12 | 90 | 78 |
| <u>Tweed District</u> | | | | | |
| Hungerford | 2.8 | 1,200 | 18 | 80 | 70 |

Minor Insects

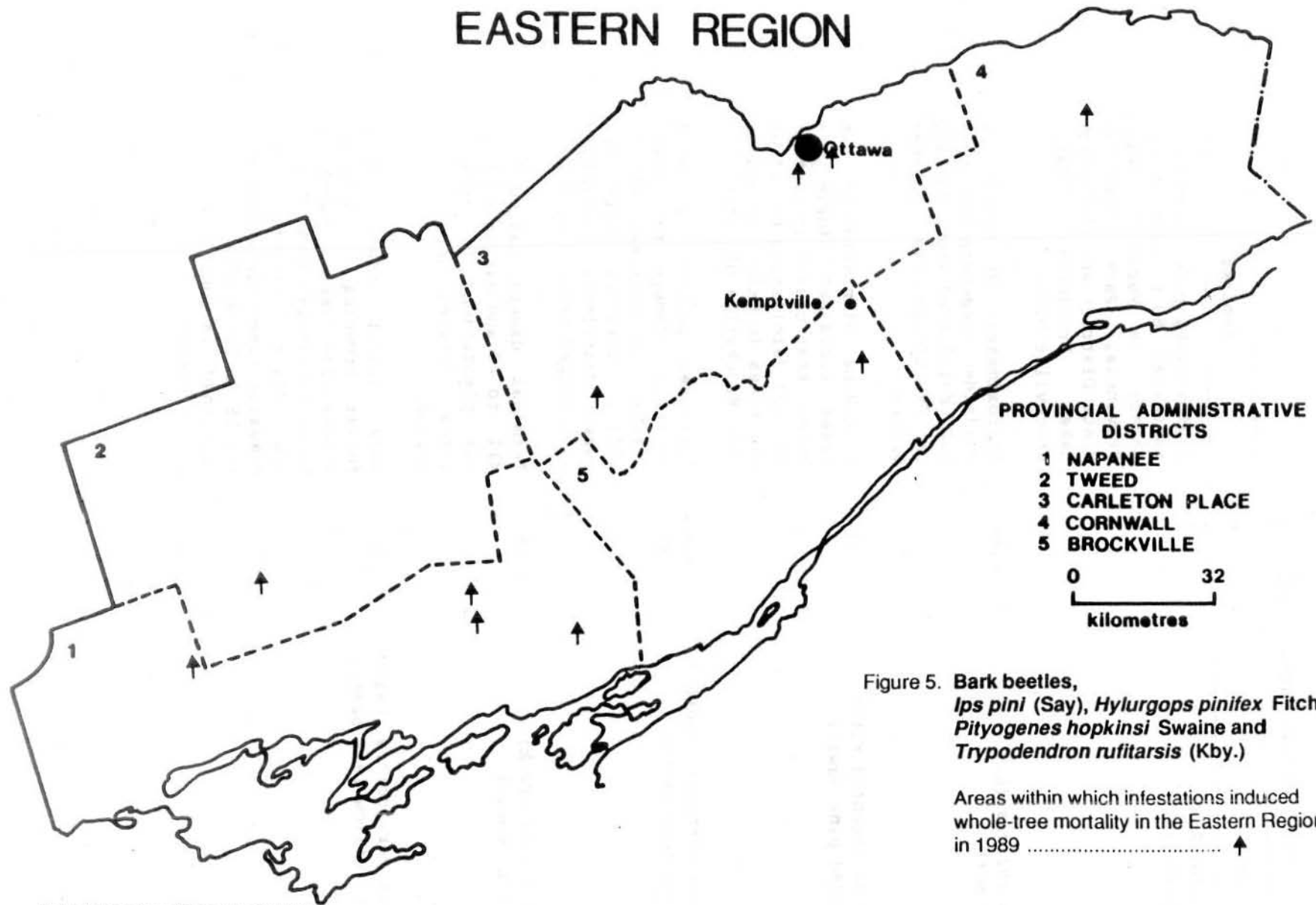
Maple Trumpet Skeletonizer, *Epinotia aceriella* (Clem.)

A slight reduction in the occurrence of this insect was apparent through the region in 1989. Light foliar damage (<5%) was observed primarily on 1- to 5-m regeneration through a 15-ha maple woodlot near the town of Athens in Rear of Yonge and Escott Township, Brockville District. The highest populations were observed in two areas of Napanee District for the third consecutive year. In Presqu'ile Provincial Park in Brighton Township, approximately 90% of the maple trees in a 20-ha area sustained severe damage to 60% of their foliage. In Hallowell Township on Prince Edward County Road 12, 60% of the trees in a 10-ha sugar bush sustained similar foliar damage.

Bark Beetles, *Ips pini* (Say), *Hylurgops pinifex* (Fitch), *Pityogenes hopkinsi* Swaine and *Trypodendron rufitarsis* (Kby.)

In 1989, red pine and white pine stands that were on shallow soils or were exposed to drought conditions, winter drying and/or salt damage became attractive to active populations of bark beetles. These bark beetles quickly began feeding and multiplying under the bark, causing rapid decline of the trees. Pockets of semimature and mature dead and declining trees were observed at 10 locations across the region (Fig. 5). These areas contained between 3 and 80 affected trees, generally along stand edges facing roadsides and ridges.

EASTERN REGION



Forest Insect and Disease Survey
Forestry Canada, Ontario Region

Figure 5. **Bark beetles,**
Ips pini (Say), *Hylurgops pinifex* Fitch,
Pityogenes hopkinsi Swaine and
Trypodendron rufitarsis (Kby.)

Areas within which infestations induced
whole-tree mortality in the Eastern Region
in 1989 ↑

Table 7. Other forest insects

| Insect | Host(s) | Remarks |
|--|---------|--|
| <i>Caliroa fasciata</i> (Nort.) Oakslug sawfly | wO | Two single 2.5-m trees were 100% skeletonized beside Hwy 38, Portland Twp, Napanee District. |
| <i>Cameraria ostryarella</i> (Cham.) Ironwood leafblotchminer | I | Foliar browning averaged 50% on regeneration in Murphy's Point Provincial Park, Carleton Place District. |
| <i>Coleophora pruniella</i> Clem. Cherry casebearer and <i>C. comptoniella</i> (McD.) Lesser birch casebearer | wB | Large numbers of casebearers caused an average of 10% foliar damage to Lake Ontario shoreline trees in Sandbanks Provincial Park, Napanee District and at various points in Carillon Provincial Park in Cornwall District. |
| <i>Corthylus punctatissimus</i> (Zimm.) Pitted ambrosia beetle | sM | Approximately 56% of the 0.5-m regeneration was girdled in a 2-ha area of the Mill Pond Conservation Area, South Elmsley Twp, Brockville District. |
| <i>Diprion similis</i> (Htg.) Introduced pine sawfly | wP | Six 3.0-m trees contained single larvae in a North Fredericksburgh Twp plantation, Napanee District. |
| <i>Epinotia timidella</i> (Clem.) Oak trumpet skeletonizer and <i>Stigmella latifasciella</i> (Cham.) Oak serpentine leafminer | rO, wO | A complex of insects again caused foliar browning ranging from 50 to 100% on occasional roadside and ornamental trees throughout the region. |
| <i>Eucosma gloriola</i> Heinr. Eastern pine shoot borer | wP | In four plantations surveyed across the region, damage to lateral shoots averaged <1%. Trees ranged from 0.5 m to 10 m in height. |

(cont'd)

Table 7. Other forest insects (cont'd)

| Insect | Host(s) | Remarks |
|--|------------|--|
| <i>Fenusa ulmi</i> Sund. Elm leafminer | wE | Regenerating pole-sized trees sustained 80 to 100% foliar damage in Murphy's Point Provincial Park, Carleton Place District and Charleston Lake Provincial Park, Brockville District. |
| <i>Leucoma salicis</i> (L.) Satin moth | siPo | Approximately 20 stems of roadside regeneration were 60% defoliated along Hwy 401 in Tyendinaga Twp, Napanee District. |
| <i>Neodiprion lecontei</i> Fitch Redheaded pine sawfly | rP | A 2.0-ha plantation of 2-m trees contained single colonies that caused an average of 10% defoliation to 2% of the trees in Oxford on Rideau Twp, Brockville District. |
| <i>Neodiprion sertifer</i> (Geoff.) European pine sawfly | scP, rP | Increased populations caused variable damage to small stands in Napanee, Brockville, Carleton Place and Tweed districts. Defoliation ranged from 10 to 50%. |
| <i>Pissodes strobi</i> (Peck) White pine weevil | wP | Terminal damage ranged from <1% to 3% and averaged 2% in six plantations of various sizes located across the region. |
| <i>Plagioderia versicolora</i> (Laich.) Imported willow leaf beetle | Wi | This insect caused 100% foliar browning on 0.5 km of stream-side trees in Murphy's Point Provincial Park, Carleton Place District; many roadside trees along Hwys 401 and 16 in Brockville District sustained various levels of foliar damage. |

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EASTERN REGION

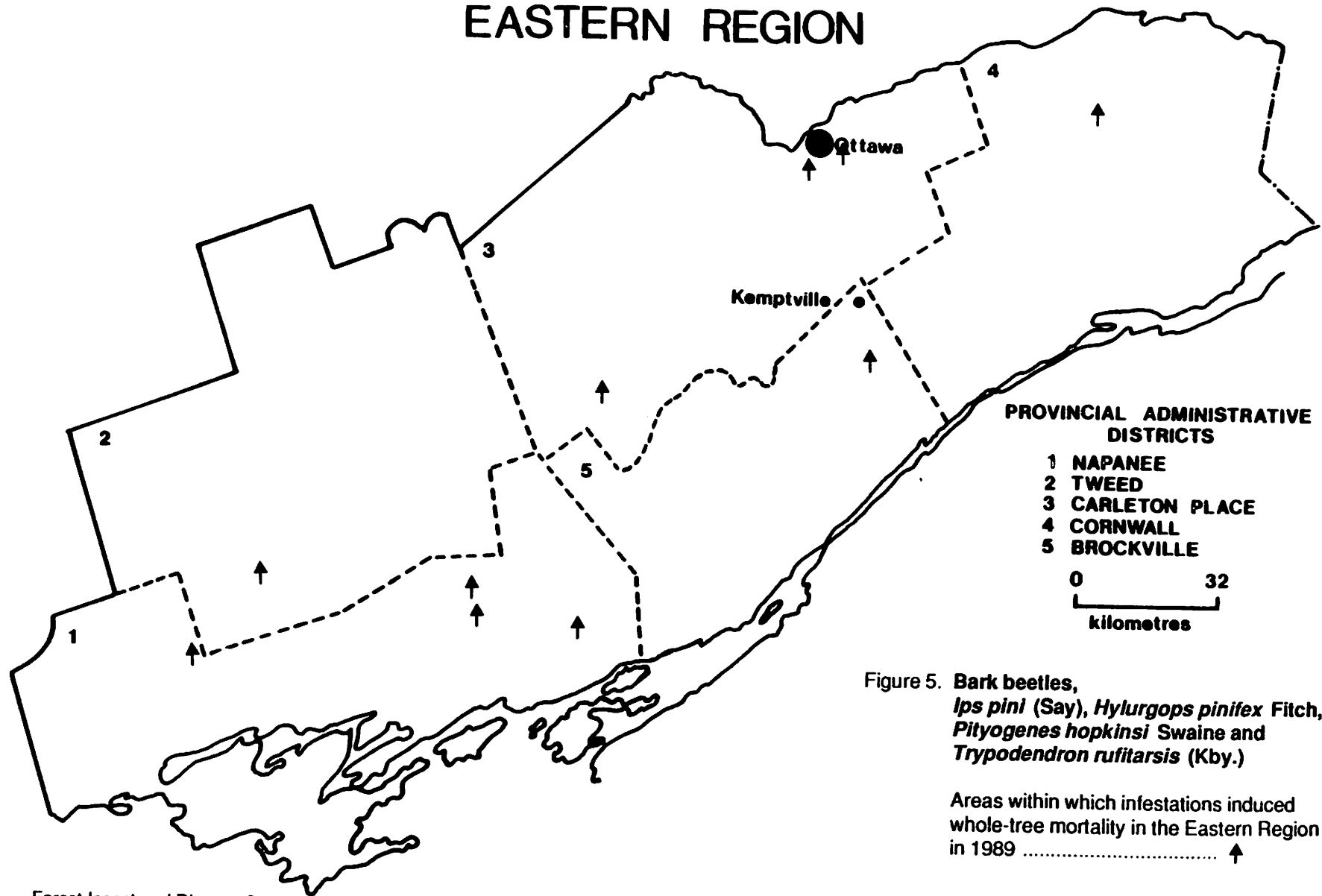
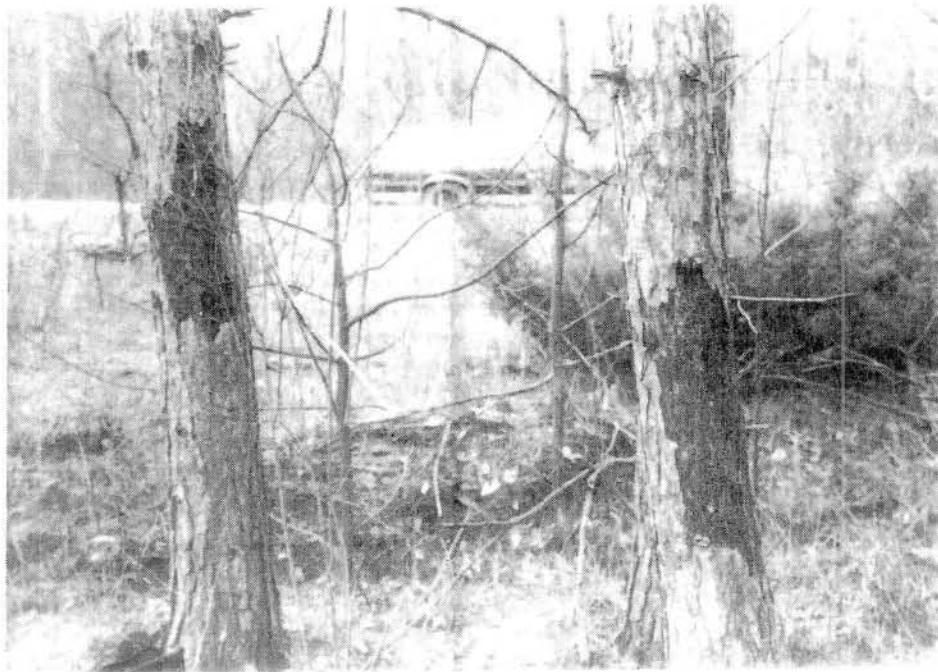
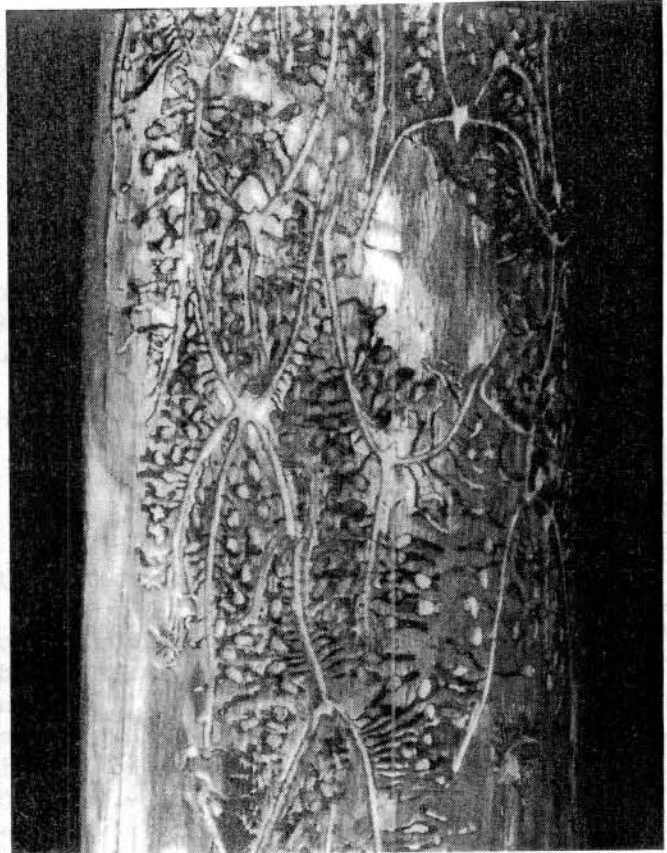
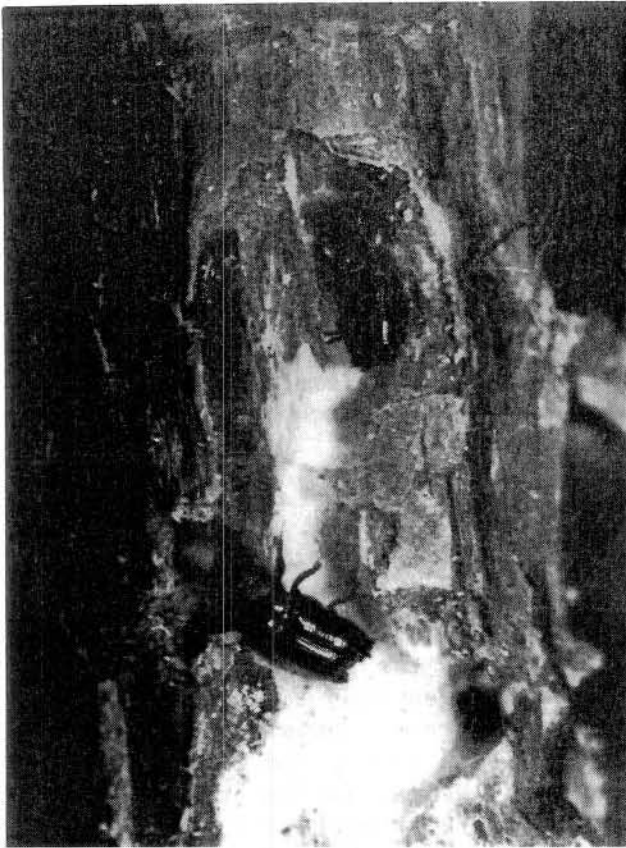


Figure 5. Bark beetles, *Ips pini* (Say), *Hylurgops pinifex* Fitch, *Pityogenes hopkinsi* Swaine and *Trypodendron rufitarsis* (Kby.)



Many stands containing trees stressed by drought or some other factor soon succumbed to the onslaught of bark beetles such as *Ips pinus* (Say).

TREE DISEASES

Major Diseases

Scleroderris Canker, *Ascocalyx abietina* (Lagerb.)

Aerial and ground surveys again failed to establish the presence of this disease in the region in 1989. Twenty-four plantations were ground surveyed (500 trees/site) and numerous areas contained abnormalities that were detected from the air. The most frequent causes of these discolored areas were bark beetle infestations and porcupine feeding damage.

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

An increase in infections has occurred through the region, perhaps because of favorable climatic conditions over the past two seasons (i.e., a hot, humid spring). Infection levels ranged from 1 to 20%. In a single 1-ha plantation, 10.7% of the 1-m-tall trees contained branch infections and 9.3% succumbed to stem infections in Lots 1 and 2 on Concession IV in Rawden Township, Tweed District. Many roadside trees of various sizes along Highway 7 between Perth and Kaladar and along Highway 401 from Brockville to Kingston displayed top and branch mortality.

Beech Bark Disease, *Nectria galligena* Bresad.

In 1988, the first association of a beech bark disease and the insect *Cryptococcus fagisuga* Linding. was recorded by FIDS staff at Presqu'ile Provincial Park (see Beech Scale). In 1989 the fungus *N. galligena* was recovered from a second mature beech (*Fagus* spp.) tree in the same area, which was infested with the beech scale. Both trees are newly infected and contain the early symptoms of small cracks bearing reproductive fungi. Surveys of stands containing beech will continue in 1990.

The classic and most serious beech bark disease, *N. coccinea* (Pers.) Fr. var. *faginata* Lohman, Watson and Ayers, though not yet found in Ontario, has caused extensive cankering and mortality in neighboring Quebec, the Maritime provinces and New York State.

FOREST HEALTH

Hardwood Decline

Hardwood decline was identified in six areas within the region in 1989. Poorly drained areas, mountainous ridges, hilltops containing shallow soils overlying Canadian Shield outcroppings, and drought-like conditions in 1988 were probably responsible for the stressful conditions that caused a rapid decline and mortality of approximately 10,991 ha of hardwoods (Fig. 6). In the Cornwall District an area of approximately 4,200 ha in Osnabruck Twp, east of Grantley and north of North Valley, contained smaller pockets of declining aspen (*Populus* spp.), maple and birch, on poorly drained soils. Brockville District contained two small pockets (62 ha and 57 ha) southwest of the town of Freeland in Bastard Township. Both areas are situated on ridges and contained dead maple, birch and aspen. In the Carleton Place District two areas south of the Mississippi River (668 ha and 491 ha) in Dalhousie Township consisting of red maple (*Acer rubrum* L.), poplar and white birch (*Betula papyrifera* Marsh.) on marginal lowland/swamp also showed evidence of disease. The largest areas of decline were found in the Napanee District in pockets of mixed hardwoods near the shoreline of Bob's Lake in Bedford Township (totaling approximately 3,050 ha) and within Frontenac Provincial Park around Big Salmon and Big Clear Lakes (totaling approximately 2,100 ha). In the Tweed District, a small area on Nowlans Mountain in Ashby Township contained an additional 363 ha of poplar, birch and maple in a declining state. Ground evaluations of all situations described above will be continued in 1990.

Maple Health Surveys

Since 1987, 10 sugar maple (*Acer saccharum* Marsh.) woodlots have been assessed annually across the region for general conditions and health (Fig. 7). In 1989, assessments revealed that current branch mortality had remained relatively light, with 91% of 250 trees suffering <5% dieback. Cumulative branch mortality increased slightly, with 80% of the trees containing 6-20% dieback (Table 9a).

Insects accounted for an average of <10% defoliation in 6 of 10 plots; the principal defoliators were the maple trumpet skeletonizer, forest tent caterpillar, gypsy moth and maple leafcutter. In Napanee District, the Cramahe Township plot suffered an average of 20% foliar damage caused by the forest tent caterpillar and three plots in Brighton Township sustained an average of 25% defoliation caused by the maple trumpet skeletonizer.

An additional 10 plots were established in 1989 in rural (i.e., windrows, roadsides, driveways, etc.) and urban (i.e. city parks, shade trees, boulevard trees, etc.) areas throughout the region. The majority of these trees were open-growing and overmature. Current branch mortality was estimated to be higher here than in the woodlot plots (Table 9a), but generally remained under 20% (Table 9b). Most trees

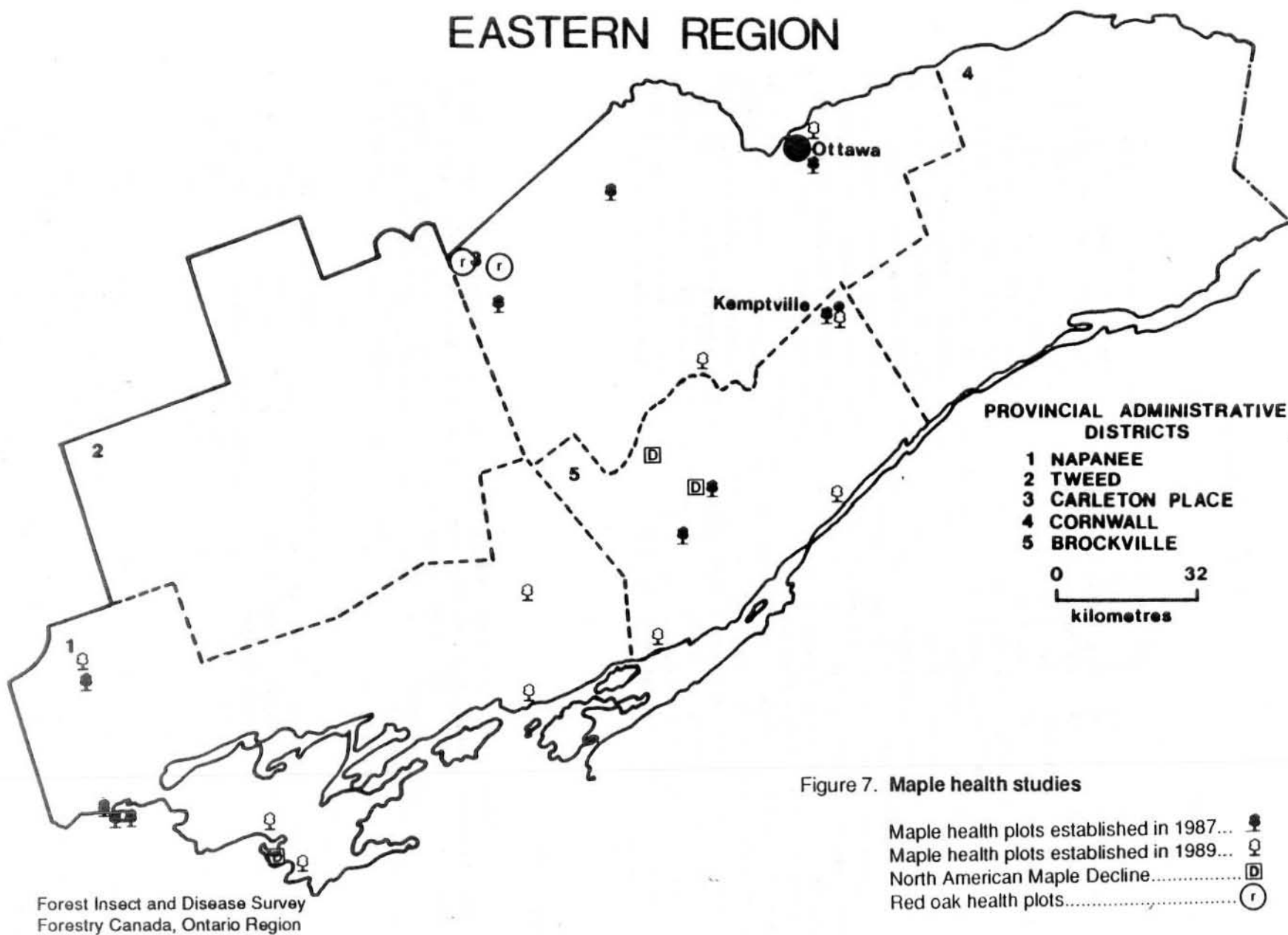


Figure 7. Maple health studies

- Maple health plots established in 1987... ●
- Maple health plots established in 1989... ○
- North American Maple Decline..... □
- Red oak health plots..... (r)

Table 9(a). Annual summary of results from 10 plots established in **woodlots** in 1987 to monitor sugar maple health in the Eastern Region of Ontario (data based on the examination of a minimum 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 ^a | | | | | | | | | | |
|-------------------------|--------------------|------------------|---------------------------------|------|--|----|---|---|---|---------------|----|----|---|---|---|
| | | | | | Current | | | | | Cumulative | | | | | |
| | | | | | 0 | 1 | 2 | 3 | 4 | Trees dead | 0 | 1 | 2 | 3 | 4 |
| <u>Napanee District</u> | | | | | | | | | | | | | | | |
| Brighton, Staff House | 40.0 | 20 | 1 | 1987 | 23 | 2 | 0 | 0 | 0 | 0 | 14 | 11 | 0 | 0 | 0 |
| | | | | 1988 | 23 | 2 | 0 | 0 | 0 | 0 | 10 | 14 | 1 | 0 | 0 |
| | | | | 1989 | 23 | 2 | 0 | 0 | 0 | 0 | 5 | 20 | 0 | 0 | 0 |
| Brighton, Campsite | 44.0 | 21 | 1 | 1987 | 24 | 1 | 0 | 0 | 0 | 0 | 20 | 4 | 1 | 0 | 0 |
| | | | | 1988 | 21 | 4 | 0 | 0 | 0 | 0 | 3 | 22 | 0 | 0 | 0 |
| | | | | 1989 | 25 | 0 | 0 | 0 | 0 | 0 | 3 | 22 | 0 | 0 | 0 |
| Brighton, Entrance | 42.0 | 20 | 2 | 1987 | 25 | 0 | 0 | 0 | 0 | 0 | 23 | 2 | 0 | 0 | 0 |
| | | | | 1988 | 21 | 4 | 0 | 0 | 0 | 0 | 12 | 13 | 0 | 0 | 0 |
| | | | | 1989 | 19 | 6 | 0 | 0 | 0 | 0 | 3 | 22 | 0 | 0 | 0 |
| Cramahe | 36.0 | 18 | 2 | 1987 | 25 | 0 | 0 | 0 | 0 | 0 | 24 | 1 | 0 | 0 | 0 |
| | | | | 1988 | 25 | 0 | 0 | 0 | 0 | 0 | 14 | 11 | 0 | 0 | 0 |
| | | | | 1989 | 25 | 0 | 0 | 0 | 0 | 0 | 12 | 13 | 0 | 0 | 0 |
| % of total trees | | | | 1987 | 90 | 10 | 0 | 0 | 0 | 0 | 71 | 27 | 2 | 0 | 0 |
| | | | | 1988 | 85 | 14 | 0 | 0 | 0 | 1 | 43 | 54 | 0 | 0 | 1 |
| | | | | 1989 | 91 | 7 | 0 | 0 | 0 | 2 | 16 | 80 | 2 | 0 | 2 |

^a Dieback classification: 0 = 0-5%, 1 = 6-20%, 2 = 21-40%, 3 = 41-60%, 4 = >61%

^b Felled tree(s)

assessed (66%) contained cumulative dieback in the 6-20% range while 16% of the trees had <20% dieback and were in various stages of decline. Insect damage in these plots was generally less than 5%, with the principal defoliators being the maple trumpet skeletonizer, forest tent caterpillar, gypsy moth and maple leafcutter. The exception was in the Seymour Township plot, where an average of 50% of the foliage was destroyed by the forest tent caterpillar.

North American Maple Project

This project was established in 1988 under a cooperative program with the United States Forest Service. Three plots located in the Brockville and Napanee districts of the Eastern Region were reassessed in 1989 (Fig. 7, Table 10). All three plots have remained virtually unchanged, with 90% of the trees containing less than 15% branch mortality. The South Burgess Township plot has declined slightly, with 52% of 42 trees containing 6-15% crown dieback in 1989 in comparison with only 13% in this class in 1988 (Table 10). This same plot has a history of heavy tapping, and maple sugar demonstrations and operational tours are conducted regularly. Assessments of all plots will continue in 1990.

Oak Health

Red oak (*Quercus rubra* L.) branch mortality estimates from two plots in Lavant Township, Carleton Place District have remained consistently low since 1977 (Fig. 7). Current branch mortality at the Joe Lake plot (Table 13) increased slightly, with 86% of the trees rated in the 0-20% class. Total cumulative branch mortality has remained fairly constant, with 75% of the trees in the 6-40% dieback range. Gypsy moth was the principal defoliator, accounting for an average of 14% defoliation. The situation is similar in the Flower Station plot, with 86% of 100 trees suffering current dieback in the 0-20% range and 82% suffering cumulative branch mortality in the 0-40% range. Defoliation by insects averaged 4%, with gypsy moth once more the principal defoliator. Mortality has increased slightly to 1% at the Joe Lake plot and 2% at the Flower Station plot.

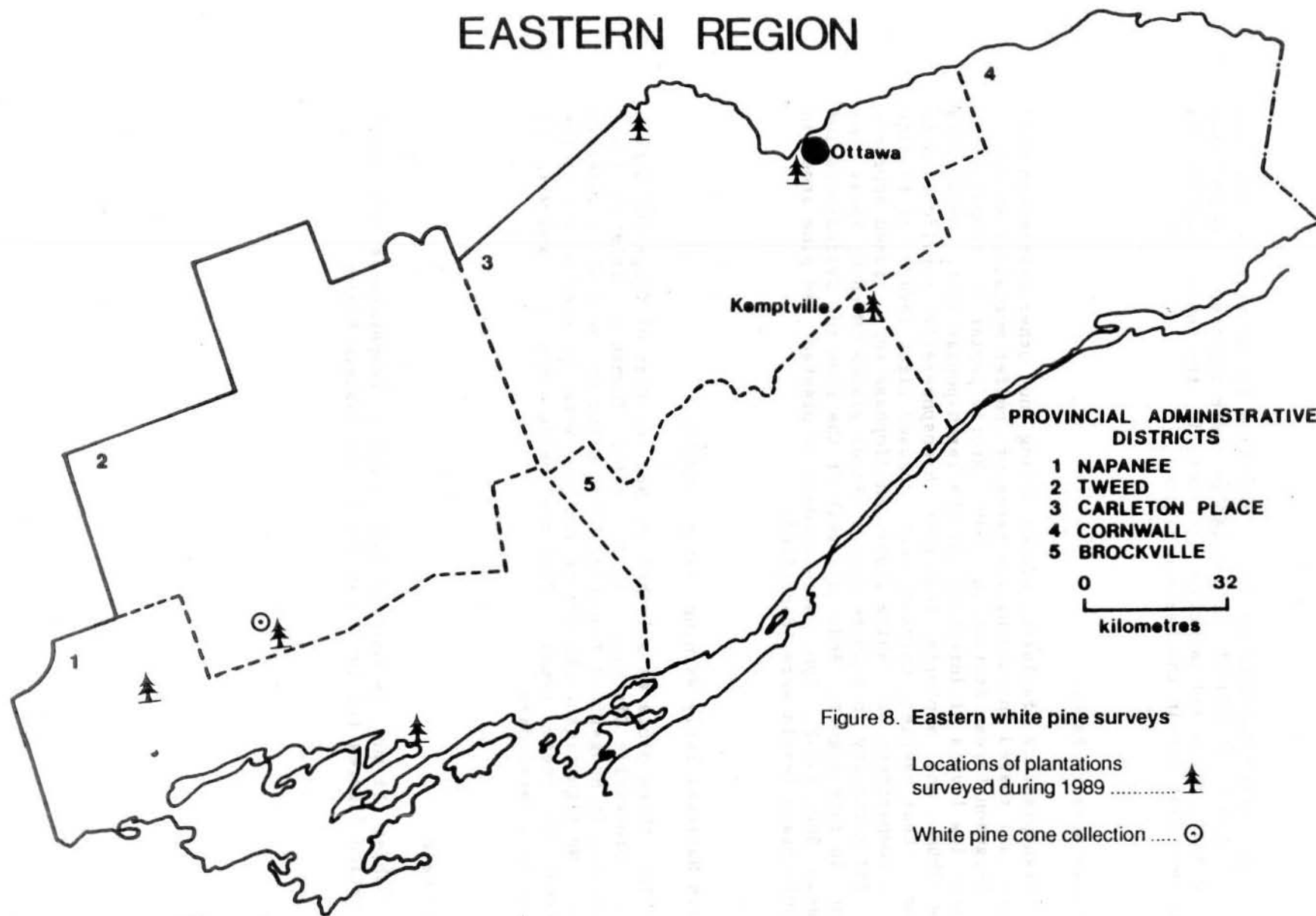
Table 11. A 13-year summary of data collected from two red oak plots established in 1977 in Carleton Place District in the Eastern Region of Ontario (based on the examination of 100 tagged trees per location)

| Location | Avg DBH of trees (cm) | Stand size (ha) | Year | Current Dieback Classes ^a (% of trees) | | | | | | New trees dead | Cumulative Dieback Classes ^b (% of trees) | | | | | Total trees dead |
|---------------------------------------|-----------------------------|-----------------------|------|--|----------------|----|----|----|---|----------------------|---|----|----|---|----|------------------------|
| | | | | 0 | 1 ^c | 2 | 3 | 4 | 0 | | 1 | 2 | 3 | 4 | | |
| | | | | | | | | | | | | | | | | |
| <u>Carleton Place District</u> | | | | | | | | | | | | | | | | |
| Lavant Twp - Plot 1 | 24.0 | 40.0 | | - | 46 | 38 | 12 | 4 | 0 | - | - | - | - | - | 0 | |
| | | | | - | 21 | 59 | 13 | 7 | 0 | - | - | - | - | - | 0 | |
| | | | | - | 5 | 51 | 32 | 8 | 4 | - | - | - | - | - | 4 | |
| | | | | - | 7 | 41 | 36 | 11 | 1 | - | - | - | - | - | 5 | |
| | | | | - | 11 | 33 | 37 | 12 | 2 | - | - | - | - | - | 7 | |
| | | | | - | 6 | 32 | 40 | 15 | 0 | - | - | - | - | - | 7 | |
| | | | | - | 7 | 33 | 40 | 13 | 0 | - | - | - | - | - | 7 | |
| | 26.3 | | 1984 | 10 | 51 | 20 | 6 | 6 | 0 | 0 | 26 | 43 | 15 | 5 | 7 | |
| | | | 1985 | 36 | 35 | 14 | 7 | 1 | 0 | 0 | 26 | 47 | 15 | 5 | 7 | |
| | 26.5 | | 1986 | 43 | 35 | 11 | 1 | 0 | 3 | 0 | 30 | 42 | 12 | 6 | 10 | |
| | | | 1987 | 56 | 31 | 2 | 0 | 0 | 1 | 3 | 40 | 32 | 11 | 3 | 11 | |
| | | | 1988 | 51 | 36 | 1 | 1 | 0 | 0 | 6 | 56 | 23 | 4 | 0 | 11 | |
| | | | 1989 | 28 | 58 | 1 | 1 | 0 | 1 | 2 | 49 | 26 | 11 | 0 | 12 | |
| Lavant Twp - Plot 2 Flower Station | 19.0 | 15.0 | | - | 28 | 50 | 11 | 1 | 0 | - | - | - | - | - | 0 | |
| | | | | - | 14 | 72 | 10 | 4 | 0 | - | - | - | - | - | 0 | |
| | | | | - | 5 | 73 | 18 | 2 | 2 | - | - | - | - | - | 2 | |
| | | | | - | 2 | 53 | 33 | 7 | 3 | - | - | - | - | - | 5 | |
| | | | | - | 2 | 41 | 40 | 8 | 4 | - | - | - | - | - | 9 | |
| | 20.0 | | | - | 0 | 40 | 41 | 10 | 0 | - | - | - | - | - | 9 | |
| | | | | - | 0 | 49 | 31 | 10 | 1 | - | - | - | - | - | 10 | |

(cont'd)

Table 12. Summary of the results of white pine plantation surveys conducted at six locations in the Eastern Region in 1989 (counts based on the examination of 150 trees at each location)

| Location (Twp) | Avg ht of trees (m) | Estimated stand area (ha) | Estimated no. of trees per ha | White pine weevil | Eastern pine shoot borer | | White pine blister rust | |
|--------------------------------|---------------------------|---------------------------------|-------------------------------------|-------------------------|--------------------------|-----------------|-------------------------|---------------------|
| | | | | Leaders attacked (%) | Leaders (%) | Laterals (%) | Trees affected (%) | Stem cankers (%) |
| <u>Brockville District</u> | | | | | | | | |
| South Gower | 2.5 | 2 | 1,200 | 1 | 0 | 0 | 5 | <1 |
| <u>Carleton Place District</u> | | | | | | | | |
| Fitzroy | 7.0 | 5 | 600 | 0 | 0 | 0 | 0 | 0 |
| Nepean | 2.0 | 1 | 1,000 | 2 | 0 | <1 | 2 | 0 |
| <u>Napanee District</u> | | | | | | | | |
| Rawdon | 1.5 | 1 | 1,200 | <1 | 0 | 0 | 20 | 9 |
| North Fredericksburgh | 3.2 | 5 | 1,500 | 3 | 0 | 0 | 1 | 0 |
| <u>Tweed District</u> | | | | | | | | |
| Hungerford | 7 | 1 | 1,000 | <1 | 0 | 2 | 0 | 0 |



Forest Insect and Disease Survey
Forestry Canada, Ontario Region

Figure 8. Eastern white pine surveys

tained pear thrips and nine of these were from the Eastern Region (see Fig. 9). Light levels of foliar damage were reported from Huronia, Maple, Niagara Falls and Cambridge districts in the Central Region, and from Napanee District in the Eastern Region.

Forest Tree Nursery Report

Transplanting failures, winter drying and other weather-induced anomalies all shared in causing low rates of conifer mortality at the G. Howard Ferguson Forest Station in 1989. Hybrid poplar in compartments sustained low levels of infection by the larch-poplar rust, *Melampsora medusae* Thum., and septoria leaf spot, *Mycosphaerella populicola* G.E. Thompson. Leaf beetles, Chrysomelidae, caused light levels of feeding damage in Compartment 42. White grubs, *Phyllophaga* spp., caused approximately 25% mortality in a white spruce (*Picea glauca* [Moench] Voss) compartment in late August. Reduced levels of the root rot *Cylindrocladium floridanum* Sob. & C.P. Sym. were evident in planted red pine stock in 1989; only trace levels were identified.

Acid Rain National Early Warning System (ARNEWS)

The three plots established in 1984 in Rear of Yonge and Escott Township, Brockville District, in Gloucester Township, Carleton Place District, and in Hungerford Township, Tweed District, were all reassessed in 1989. No significant changes or symptoms were observed in any of the plot trees in these areas. Data are being summarized and will be available at a later date.

Climatic Data

Tables 13 and 14 contain mean monthly temperatures and total precipitation figures for two locations in the Eastern Region.

Table 13. A comparison of 1989 mean temperature and total precipitation with their normal values (based on a 30-year period) (figures obtained from the Ottawa International Airport).

| Month | Mean temp. 1989 (°C) | Normal temp. (°C) | Deviation from normal temp. (°C) | Total precip. 1989 (mm) | Normal precip. (mm) | Deviation from normal precip. (mm) |
|-------|----------------------------|-------------------------|--|-------------------------------|---------------------------|--|
| Jan. | -8.0 | -10.9 | +2.9 | 63.8 | 61.0 | +2.8 |
| Feb. | -9.6 | -9.5 | -0.1 | 30.8 | 60.3 | -29.5 |
| Mr. | -5.0 | -3.0 | -2.0 | 80.8 | 67.5 | +13.3 |
| April | 4.5 | 5.6 | -1.1 | 24.2 | 69.1 | -44.9 |
| May | 14.1 | 12.8 | +1.3 | 101.2 | 67.9 | +33.3 |
| June | 18.9 | 18.0 | 0.9 | 70.8 | 73.4 | -2.6 |
| July | 22.2 | 20.6 | 1.6 | 67.2 | 85.9 | -18.7 |
| Aug. | 19.4 | 19.2 | 0.2 | 53.2 | 88.4 | -35.2 |
| Sept. | 15.2 | 14.3 | 0.9 | 61.2 | 79.3 | -18.1 |
| Oct. | 9.0 | 8.1 | 0.9 | 95.2 | 68.1 | +27.1 |
| Nov. | -1.4 | 1.2 | -2.6 | 140.3 | 77.7 | +62.6 |
| Dec. | -16.6 | -7.7 | -8.9 | 45.8 | 80.7 | -34.9 |

Table 14. A comparison of 1989 mean temperatures and total precipitation with their normal values (based on a 30-year period) (figures obtained from the Trenton Air Base).

| Month | Mean temp. 1989 (°C) | Normal temp. (°C) | Deviation from normal temp. (°C) | Total precip. 1989 (mm) | Normal precip. (mm) | Deviation from normal precip. (mm) |
|-------|----------------------------|-------------------------|--|-------------------------------|---------------------------|--|
| Jan. | -3.8 | -7.6 | +3.8 | 46.2 | 68.9 | -22.7 |
| Feb. | -6.8 | -6.5 | -0.3 | 26.4 | 57.0 | -30.6 |
| Mar. | -3.4 | -1.0 | -2.4 | 57.2 | 72.0 | -14.8 |
| April | 4.4 | 6.4 | -2.0 | 34.3 | 76.1 | -41.8 |
| May | 13.3 | 12.5 | +0.8 | 86.2 | 73.0 | +13.2 |
| June | 18.5 | 17.8 | +0.7 | 84.2 | 63.7 | +20.5 |
| July | 20.9 | 20.6 | +0.3 | 20.0 | 60.9 | -40.9 |
| Aug. | 19.1 | 19.7 | -0.6 | 51.8 | 71.9 | -20.1 |
| Sept. | 14.9 | 15.3 | -0.4 | 75.0 | 72.8 | +2.2 |
| Oct. | 8.6 | 9.2 | -0.6 | 109.1 | 70.1 | +39.1 |
| Nov. | 1.3 | 3.2 | -1.9 | 156.2 | 86.1 | +70.1 |
| Dec. | -12.5 | -4.5 | -8.0 | 41.0 | 82.9 | -41.9 |