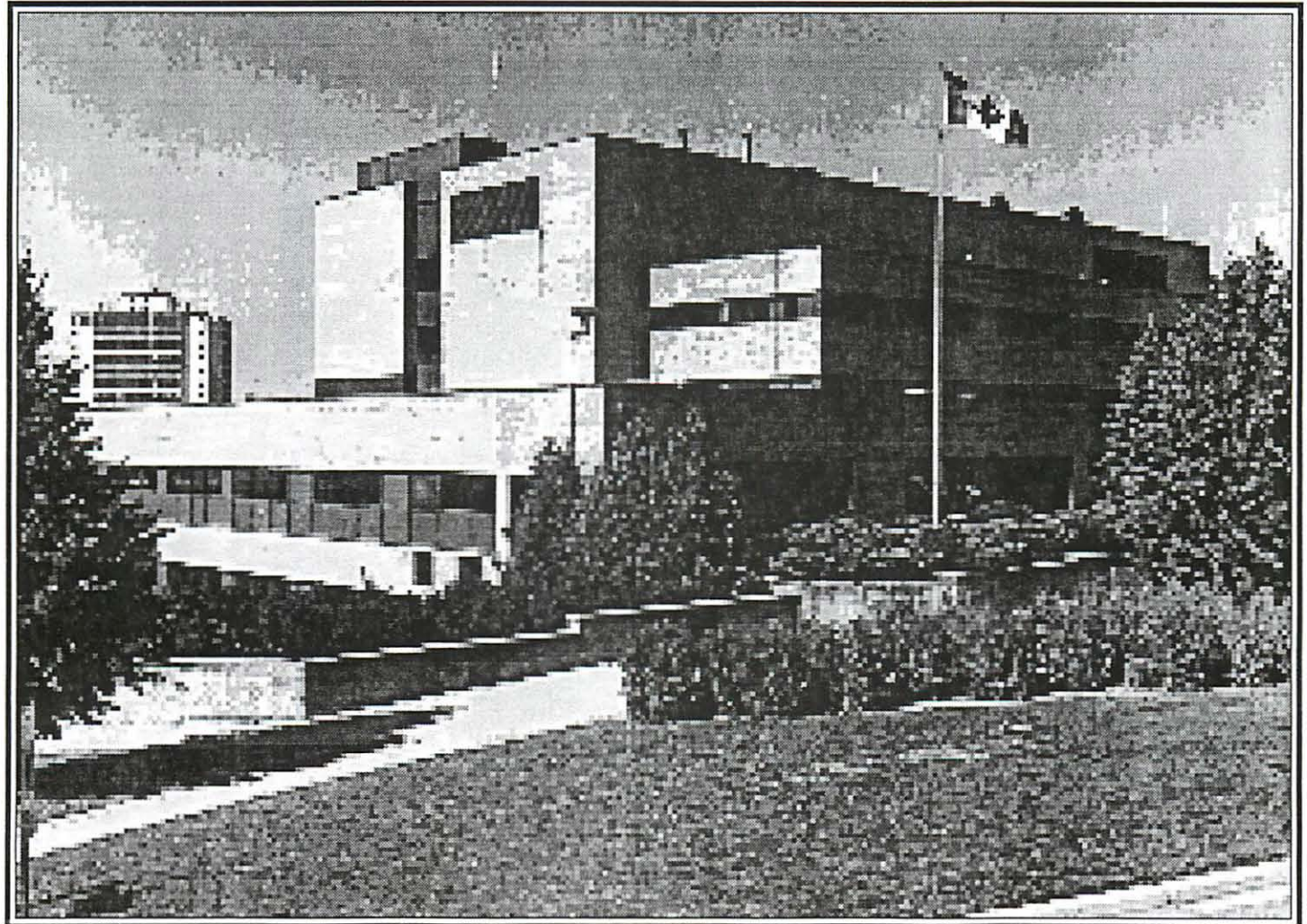




A Review of Important Forest Insect and Disease Problems in the Tweed District of Ontario, 1950 – 1980



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A REVIEW OF IMPORTANT FOREST
INSECT AND DISEASE PROBLEMS
IN THE TWEED DISTRICT
OF ONTARIO, 1950 - 1980

Compiled by

D.C. Constable, W.D. Biggs, W.A. Ingram, B.E. Smith, E. Czerwinski and
P. Bolan¹

FORESTRY CANADA
ONTARIO REGION
GOVERNMENT OF CANADA
1991

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FOREWORD

The first forest surveys in Ontario were carried out in 1936 from the Dominion Entomological Laboratory in Ottawa and continued from this location until 1944, when the province of Ontario was divided, for the purpose of these surveys, into northern and southern Ontario. In 1945, personnel from Ottawa continued to conduct and report on surveys in the area south of the Algonquin Park and Parry Sound forest districts, while personnel from the Forest Insect Laboratory in Sault Ste. Marie carried out surveys in the area to the north. In 1950 responsibility for reporting insects for all of Ontario fell to the Sault Ste. Marie laboratory. In 1952 the Forest Disease Survey was initiated with headquarters in Maple, Ontario, then was moved to Sault Ste. Marie in 1967. The results of these surveys of insects and diseases are reported in the Annual Report of the Forest Insect and Disease Survey (FIDS) published by Forestry Canada headquarters in Ottawa. In addition, annual district and regional reports, begun in 1948, are prepared by FIDS technicians (Rangers) in Sault Ste. Marie. In 1980 a new provincial report was released in Ontario. The contents of the following review have been abstracted from these reports and compiled in alphabetical order by the scientific names of species in each of the following three categories:

Major Insects or Diseases

Capable of causing serious injury to or death of living trees or shrubs.

Minor Insects or Diseases

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

Abiotic Damage

Damage caused by non-living factors.

All measurements in this review are in metric form and conversions from Imperial measurements given in the earliest reports are taken to the second decimal point [i.e. sq. mi. to km² = area (sq. mi.) x 2.59 = area km²]. Infestation maps in this review were copied from the original maps in the FIDS technicians' reports. Abbreviations for the common names of the host tree species, along with the scientific names, are shown in Appendices A and B. To facilitate the location of hosts, deciduous and coniferous species have been separated and listed alphabetically under the common names.

Appendix C is a series of maps for southern Ontario grouped alphabetically by insect species or disease pathogen and showing the location of infestations within a region or infestation boundaries that extend beyond regions.

ACKNOWLEDGMENTS

The authors wish to acknowledge Dr. G.M. Howse, Chief, Forest Insect and Disease Survey; Mr. G. Hart, Communication Services; and Mr. P. Jakibchuk, Technical Services Officer, for advice and support during the preparation of this review.

We also wish to acknowledge the following authors of the FIDS district and regional reports from which this review was abstracted.

1950-1951	R.J. Dubreil, J.C. Charbonneau
1952	J.C. Charbonneau
1953	L.S. MacLeod, J.C. Charbonneau
1954-1955	L.S. MacLeod,, A.S. Danard
1956-1957	L.S. MacLeod, M.J. Thomson
1958-1960	W.J. Miller, M.J. Thomson
1961	W.J. Miller
1962-1964	W.J. Miller, J. Hook, H.J. Weir
1965-1966	W.J. Miller, F. Livesey
1967-1969	M.J. Thomson, F. Livesey
1970-1972	H.J. Weir, M.J. Applejohn
1973	H.J. Weir, W.D. Biggs
1974	H.J. Weir, C.A. Barnes
1975-1979	C.A. Barnes
1980	R.J. Sajan

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Larch Casebearer, *Coleophora laricella*

Linden Looper, *Erannis tiliaria*

Pine Bud Moth, *Exoteleia dodecella*

Birch Leafminer, *Fenusa pusilla*

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Other Noteworthy Diseases

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INTRODUCTION

This report is a review of significant forest insects and diseases that have occurred in the Tweed District during the period between 1950 and 1980. The district was formed in 1973 from part of the former Tweed District. In the selection of pests for the report, particular attention was paid to the major working groups of host species in the area. The insects and diseases included are capable of causing and have caused tree mortality or a reduction in growth. Also included are abiotic problems that cause damage, i.e., frost, hail, wind, winter drying, etc.

SUMMARY

FOREST INSECTS

Cedar Leafminers, *Argyresthia aureoargentella* Brower [Major]
A. canadensis Free., *A. thuiella* (Pack)
 and *Coleotechnites thujaella* (Kft.)

pages

These serious pests of eastern white cedar can cause tree mortality after a number of years of severe defoliation. Moderate-to-severe defoliation occurred in 1962-1963, 1970-1973 and again in 1980.

Birch Skeletonizer, *Bucculatrix canadensisella* Cham. [Major]
 page

Defoliation by this insect seldom causes mortality of the host, but weakened trees are subject to attack by secondary insects and diseases. Moderate-to-severe defoliation occurred from 1959 to 1962 at several locations in the district.

Spruce Budworm, *Choristoneura fumiferana* Clem. [Major]
 page

This insect is considered the most destructive pest of several coniferous hosts in eastern Canada, the main hosts being white spruce and balsam fir. Though not major hosts, black spruce, eastern hemlock and tamarack are attacked and considerable tree mortality can occur. Moderate-to-severe defoliation occurred at numerous locations from 1969 to 1980.

Larch Casebearer, *Coleophora laricella* (Hbn.) [Major]
 page

A serious pest of both native and European larch, this insect can cause reduced tree growth and tree mortality after two successive years of complete defoliation. Population levels of this insect have been mostly light since 1950.

Linden Looper, *Erannis tiliaria* (Harr.)
 page

Because outbreaks are normally short-lived, it is rare that hardwoods die from defoliation by this looper. However, moderate-to-severe defoliation may weaken trees. Varying degrees of defoliation were reported since 1950.

Pine Bud Moth, *Exotelia dodecella* (L.)
page

[Major]

Repeated attacks by this insect kills a high percentage of buds on pine trees resulting in sparse foliage and deformed branches. Medium- to-heavy infestations occurred in Hinchinbrooke and Sheffield townships in 1962, however, for most of the period from 1950 to 1980 damage remained light.

Birch Leafminer, *Fenusa pusilla* (Lep.)
page

[Major]

Defoliation by this miner can weaken trees and leaves them susceptible to secondary insects and diseases, and may be a predisposing factor in birch decline. As a rule, these insects attack single trees but when populations build up, stands of trees are severely defoliated. High number occurred in 1967, 1970 and again in 1974 to 1975.

Fall Webworm, *Hyphantria cunea* Dru.
page

[Major]

This insect attacks a wide variety of deciduous hosts, however, because defoliation occurs late in the growing season, damage usually is considered serious where aesthetic values are important. Colonies of webworm have varied greatly since 1950.

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

[Major]

This caterpillar feeds primarily on pin cherry, choke cherry and apple and is more common on roadside trees and ornamentals than in forest stands.

This caterpillar feeds primarily on pin cherry, choke cherry and apple and is more common on roadside trees and ornamental trees than in forest stands; commonly observed in the district since 1951.

Forest Tent Caterpillar, *Malacosoma disstria* Hbn.
page

[Major]

This caterpillar is widely distributed throughout North America. Infestations usually last an average of five years and high populations usually defoliate vast areas of susceptible stands. The principal host is aspen; however, many other deciduous species also suffer severe defoliation. Repeated defoliation retards tree growth and reduces vigor, leaving the trees susceptible to attack by other pests. Moderate-to-severe defoliation occurred during the periods from 1950 to 1954, 1965 and from 1973 to 1978 in the district.

Redheaded Pine Sawfly, *Neodiprion lecontei* Fitch
page

[Major]

This destructive pest of pine plantations can cause mortality after several years of severe defoliation. The preferred hosts are Scots pine, red pine and jack pine planted in pine stands. Varying degrees of damage have occurred during the past 30 years in red pine plantations.

Jack Pine Sawflies, *Neodiprion pratti banksianae* Roh. [Major]
N. pratti paradoxicus Ross.
 page

These sawflies are capable of causing mortality of plantation or semimature pine trees when populations are high. The two species mentioned above have caused varying degrees of defoliation and damage to natural and plantation trees in the district.

Yellowheaded Spruce Sawfly, *Pikonema alaskensis* (Roh.) [Major]
 page

This destructive insect has been categorized as a serious pest of young spruce plantations and open-grown ornamentals. High mortality can occur after successive years of severe defoliation. Varying degrees of defoliation has occurred at widely scattered points in the district.

White Pine Weevil, *Pissodes strobi* Peck. [Major]
 page

This weevil is considered the most destructive pest of white pine in North America. Successive weeviling over a period of years results in multiple-stemmed trees. Upwards of 90% leader damage occurred in a 30-ha white pine plantation in Abinger Twp.

Larch Sawfly, *Pristiphora erichsonii* (Htg.) [Major]
 page

The larch sawfly is the primary defoliating insect of native and most exotic species of larch. On good sites, larch trees can withstand six to nine years of severe defoliation before mortality occurs; on less favourable sites, mortality may follow three or more years of complete defoliation. Varying degrees of foliar damage has occurred since 1959.

European Pine Shoot Moth, *Rhyacionia buoliana* (D. & S.) [Major]
 page

This destructive pest attacks all species of pine but red and Scots pine are the preferred host. Repeated attacks on host trees causes crooked stems and branches. When buds are destroyed, dead or spiked tops are produced. This insect has not been a problem in the district and rarely reported.

Other Noteworthy Insects [Major and Minor]
 pages

These are insects that have the potential for causing damage to stands, regeneration and plantations.

FOREST DISEASES

Armillaria Root Rot, *Armillaria mellea* (Wahl:Fr.) Kummer [Major]
page

This root rot is capable of killing both weakened and healthy trees and is a particularly serious pest in pine plantations that have been planted around old stumps. Light mortality was reported in 1955 and again in a three-year period from 1964 to 1966.

Scleroderris Canker, *Ascocalyx abietina* (Lagerb.) [Major]
Schlöpfer-Bernhard
page

This pathogen can cause serious problems and considerable mortality in young natural regeneration and in plantations. This disease was recorded only once in the district in 1967 in a plantation near Moira Lake in Huntingdon Township. Extensive surveys in the district from 1978-1980 failed to detect the presence of the much more virulent European strain of the organism.

Dutch Elm Disease, *Ceratocystis ulmi* (Buism.) C. Moreau [Major]
page

This major disease organism, which affects all varieties of native elms was first recorded in the district in 1957. Since its introduction this organism's affects have resulted in widespread mortality to much of the elm host throughout the district.

White Pine Blister Rust, *Cronartium ribicola* Fischer [Major]
page

This introduced pathogen is particularly damaging to white pine of all ages. Commonly found in the district since 1954, this organism has been commonly recorded at generally low incidence levels, but on occasion as in 1972, plantations have had up to 80% of the trees affected resulting in 30% mortality.

Other Noteworthy Diseases
page

These include disease organisms with the potential for causing heavy damage to natural stands, regeneration or plantations.

ABIOTIC DAMAGE
page

This condition is caused by a variety of influences, i.e., salt, frost, winter drying, drought, etc. Weakened trees are then susceptible to other diseases. Sporadic damage has been recorded from both late spring frosts and summer droughts over the thirty-year period. Flooding damage caused heavy mortality during the construction of Hwy #7 between Sharbot Lake and Maberly in 1954 and 1955.

DIEBACKS

Balsam Fir Dieback
page

Mortality of single trees or small groups of trees on more open or dry, rocky sites has been recorded sporadically across the district. The most extensive damage occurred between 1955 and 1958 when mortality figures reached 20% in the northern portions of the district.

Maple Dieback
page

This condition is believed to be caused by a variety of influences including logging, climate, salt damage, road construction, severe infestation of insects, etc. First recorded in the district in 1958, this condition is most frequently associated with roadside or shade trees in the southern portion of the district.

I N S E C T S

[Faint, illegible text, likely bleed-through from the reverse side of the page. The text is too light to transcribe accurately.]

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

Host(s): cedar

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1960	not reported
1961	Low numbers were encountered.
1962	Medium-to-heavy infestations occurred across the southern portion of the district (see map, page).
1963	Medium-to-heavy infestations extended through the southern half of Addington, Hastings and Lennox counties and into the central portion of Frontenac County.
1964	A belt of infestation extended across the southern portion of the district.
1965	Abrupt decline was experienced throughout the area previously infested.
1966	Light infestations were encountered in the western portion of the district (see map, page).
1970	Surveys disclosed severe browning of cedar in the southern portion of the district (see map, page).
1971	Moderate-to-severe defoliation was recorded in the southern part of the district (see map, page).
1972	Populations increased causing moderate-to-severe defoliation throughout the eastern portion of the district (see map, page).
1973	Populations declined slightly and, as a result, foliar damage was encountered only in the southeastern section of the district (see map, page).
1974	Population decreased significantly throughout the areas previously infested. Two small pockets of moderate-to-severe defoliation were observed in Anglesea and Madoc twps (see map, page).
1975	Surveys revealed moderate-to-severe defoliation in Lake, Madoc, Marmora and Tudor twps and at scattered locations along Hwy 7 (see map, page).
1976	Moderate-to-severe defoliation was encountered in Lake, Marmora and Tudor twps (see map, page).
1977	Infestations continued to persist in Lake, Marmora and Tudor twps (see map, page).
1978	Infestations collapsed.

(cont'd)

Cedar Leafminer, *Argyresthia aureoargentella* Brower,
A. canadensis Free., *A. thuiella* (Pack.),
 and *Coleotechnites thujaella* (Kft.) (concl.)

<u>Year</u>	<u>Remarks</u>
1979	A single pocket of defoliation was encountered in Elzevir Twp (see map, page).
1980	Moderate-to-severe defoliation was observed in the southern part of the district (see map, page).

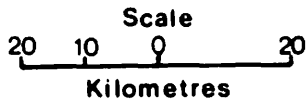
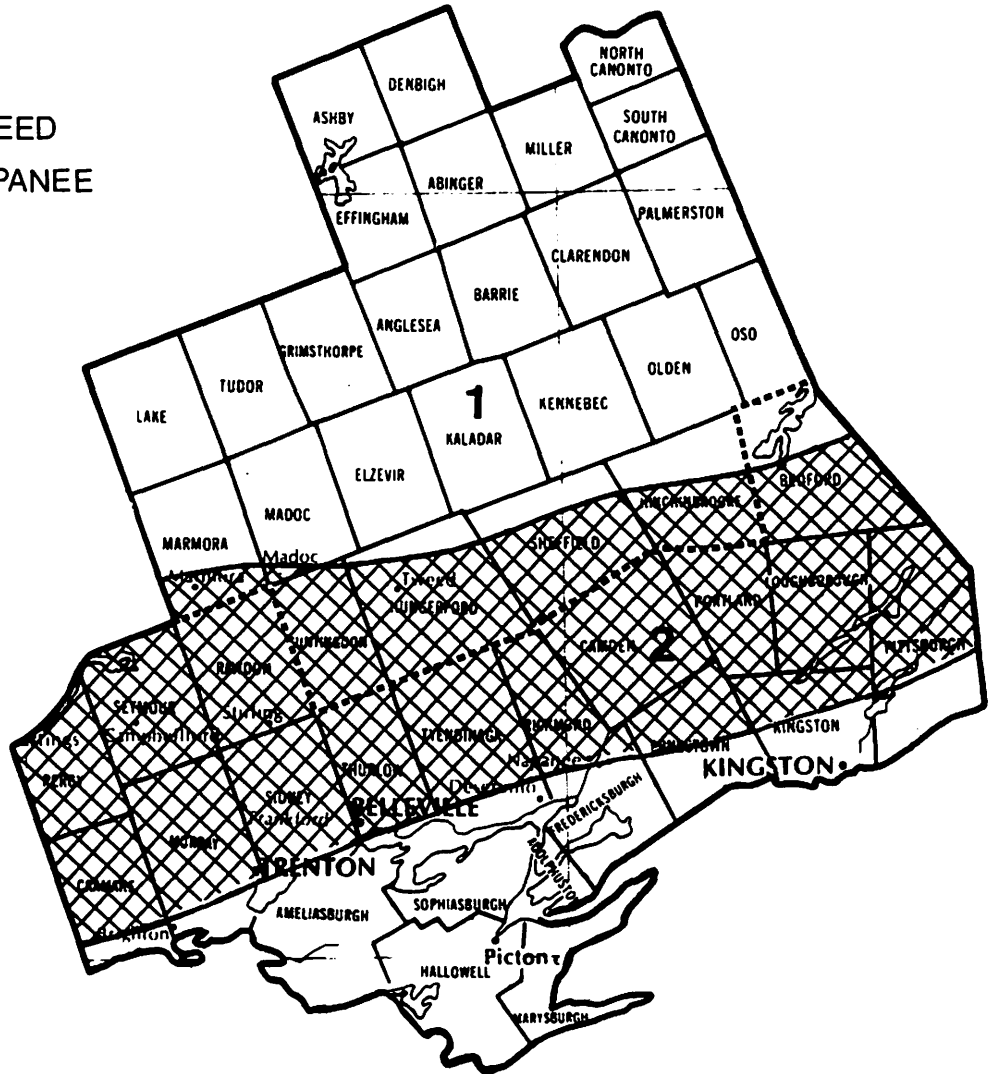
Birch Skeletonizer, *Bucculatrix canadensisella* Cham.

Host(s): birch [Major]

<u>Year</u>	<u>Remarks</u>
1950-1958	not reported
1959	A medium-to-heavy infestation was reported in Olden Twp.
1960	Moderate-to-severe defoliation was recorded throughout the entire area north of Hwy 7 (see map, page).
1961	Moderate-to-severe defoliation occurred throughout the district (see map, page).
1962	Small pockets of moderate-to-severe defoliation were observed at scattered locations.
1963	Populations continued to decline with only small pockets of light infestations being encountered.
1964-1980	not reported

TWEED and NAPANEE DISTRICTS

- 1. TWEED
- 2. NAPANEE




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Great Lakes Forestry Centre

Cedar Leafminer

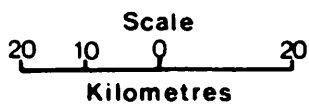
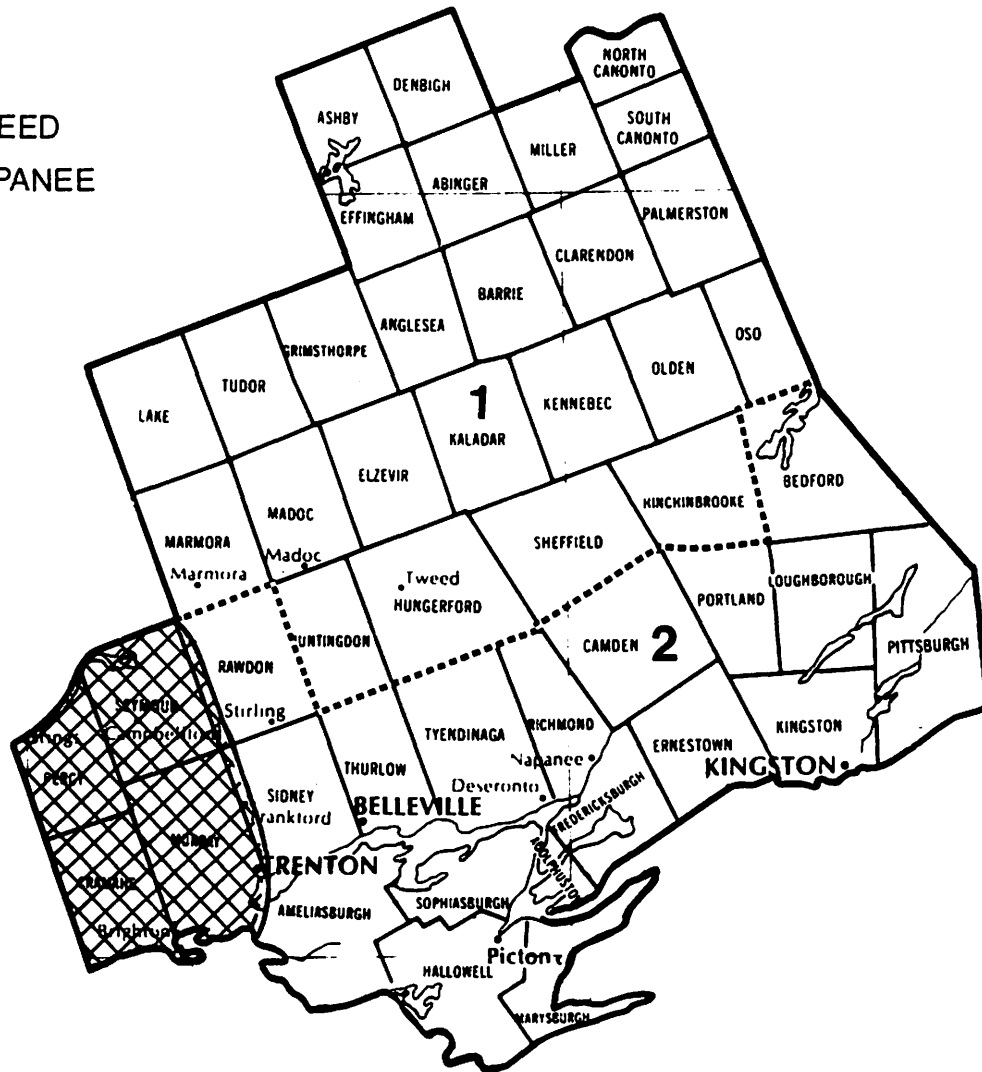
Areas within which defoliation
occurred in 1962

LEGEND

Moderate-to-severe defoliation 

TWEED and NAPANEE DISTRICTS

- 1. TWEED
- 2. NAPANEE




Forest Insect and Disease Survey
Great Lakes Forestry Centre

Cedar Leafminer

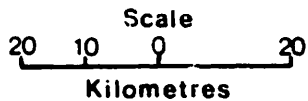
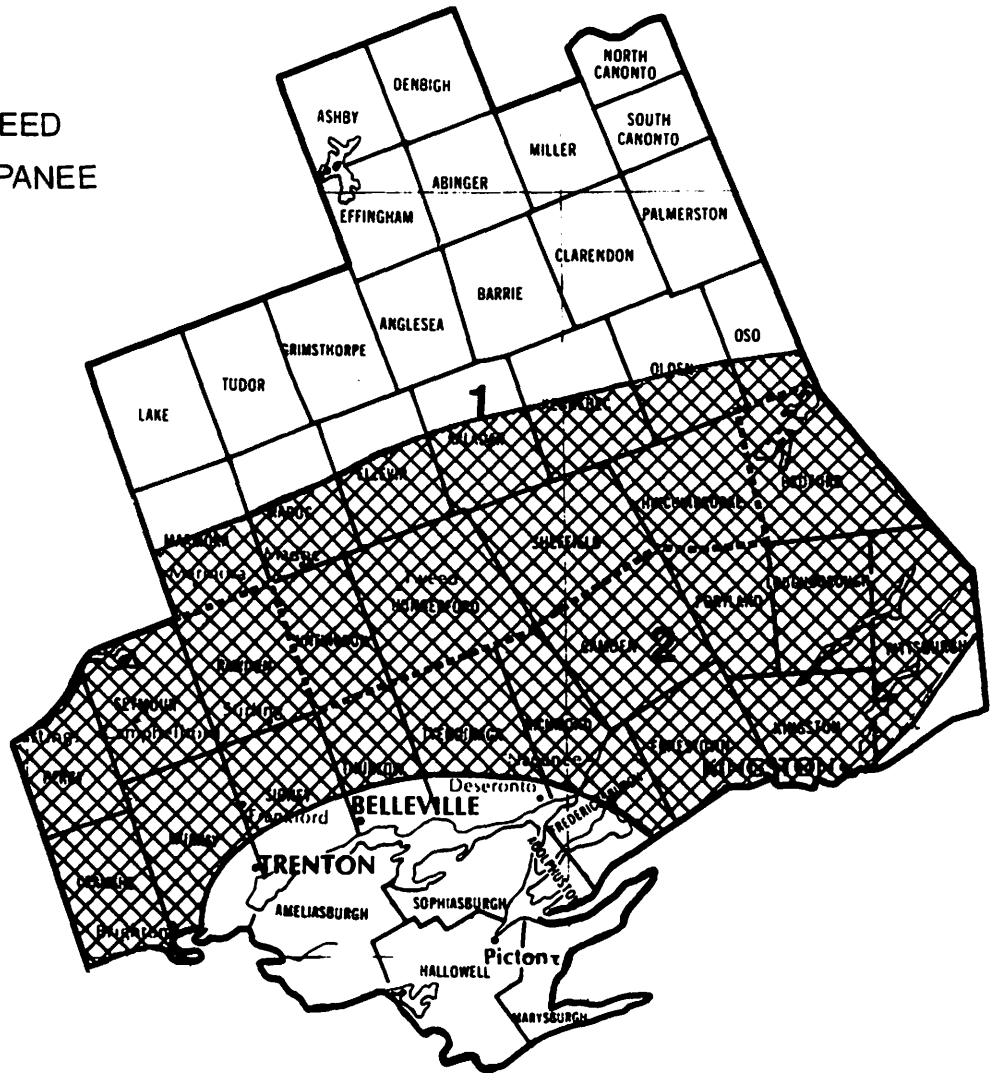
Areas within which defoliation
occurred in 1966

LEGEND

Moderate-to-severe defoliation 

TWEED and NAPANEE DISTRICTS

1. TWEED
2. NAPANEE




Forest Insect and Disease Survey
Great Lakes Forestry Centre

Cedar Leafminer

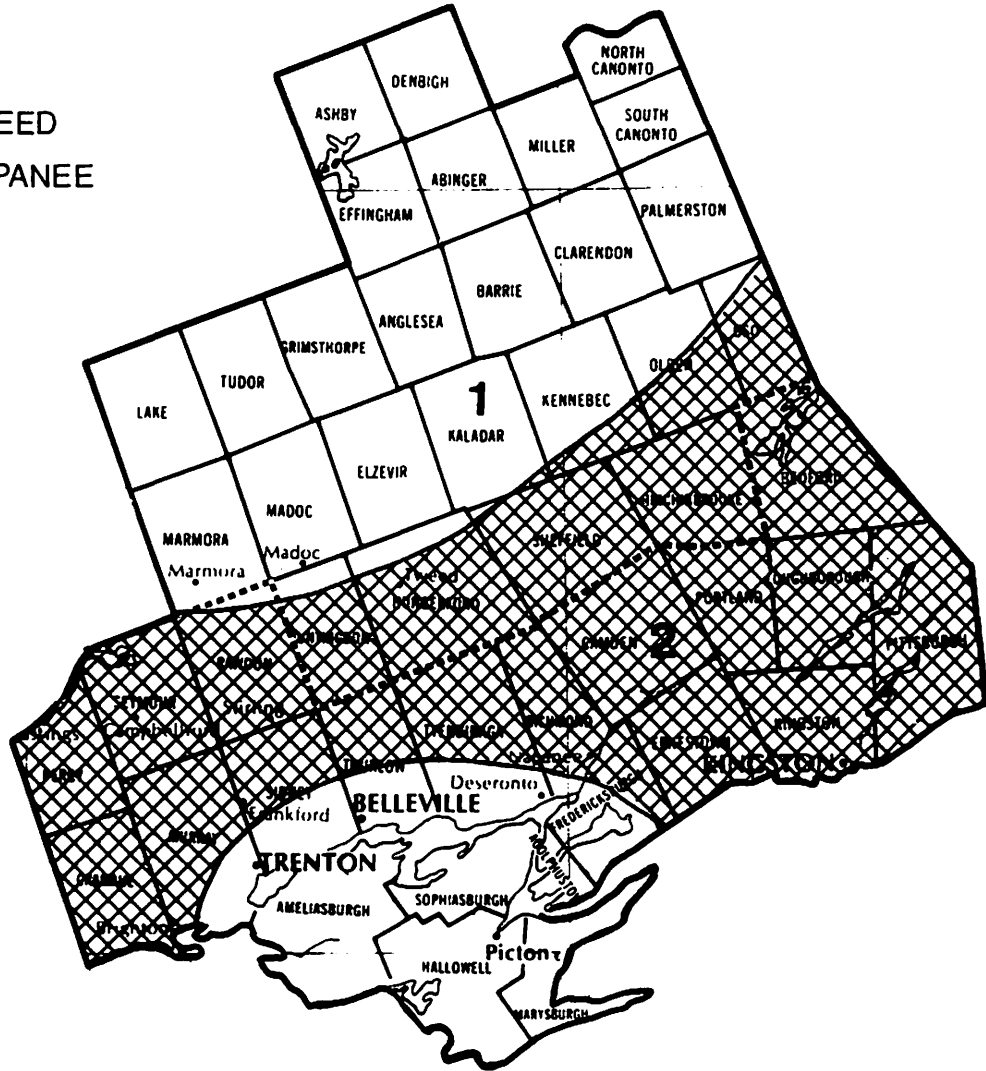
Areas within which defoliation
occurred in 1970

LEGEND

Moderate-to-severe defoliation 

TWEED and NAPANEE DISTRICTS

- 1. TWEED
- 2. NAPANEE

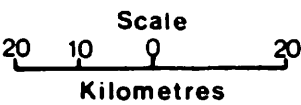


Cedar Leafminer

Areas within which defoliation occurred in 1971

LEGEND

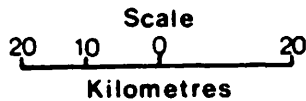
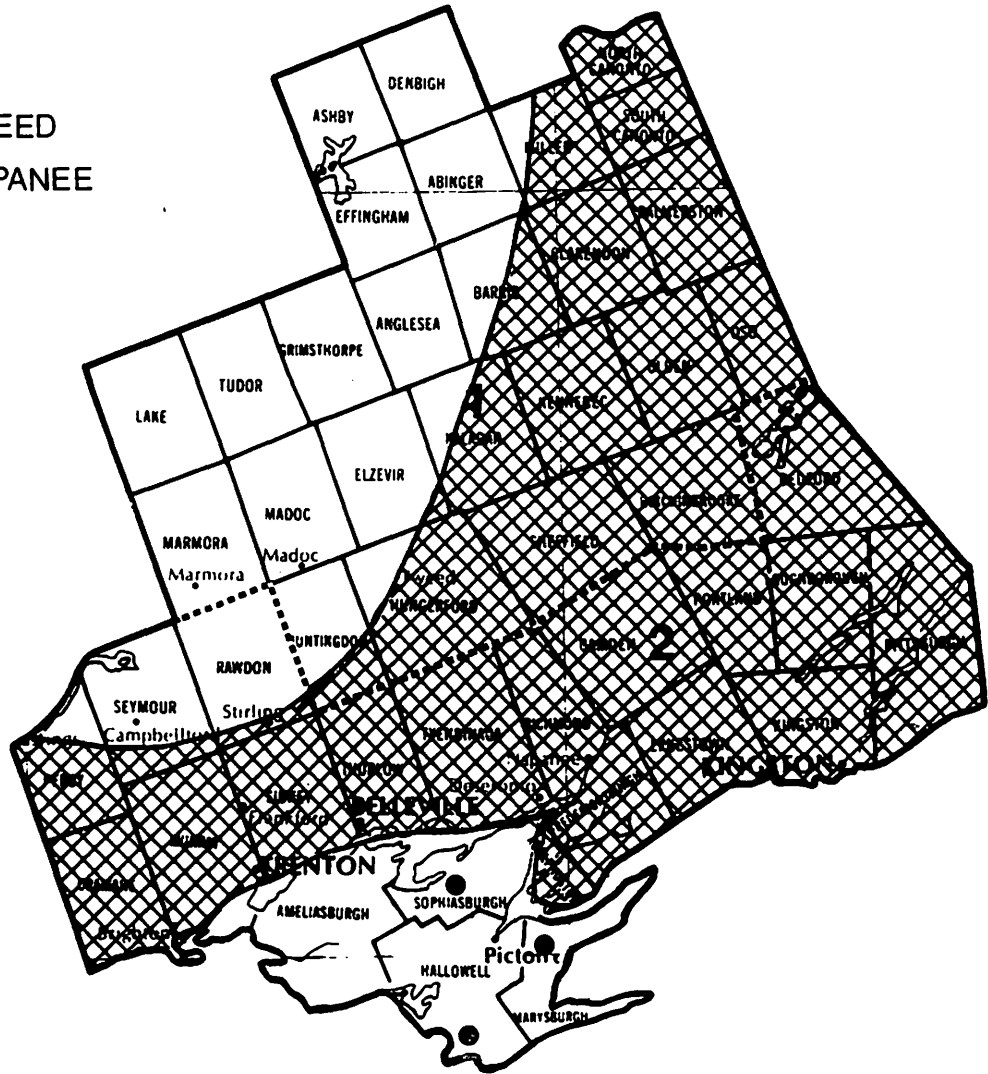
Moderate-to-severe defoliation



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TWEED and NAPANEE DISTRICTS

- 1. TWEED
- 2. NAPANEE



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Great Lakes Forestry Centre

Cedar Leafminer

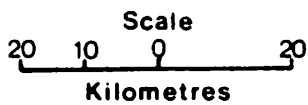
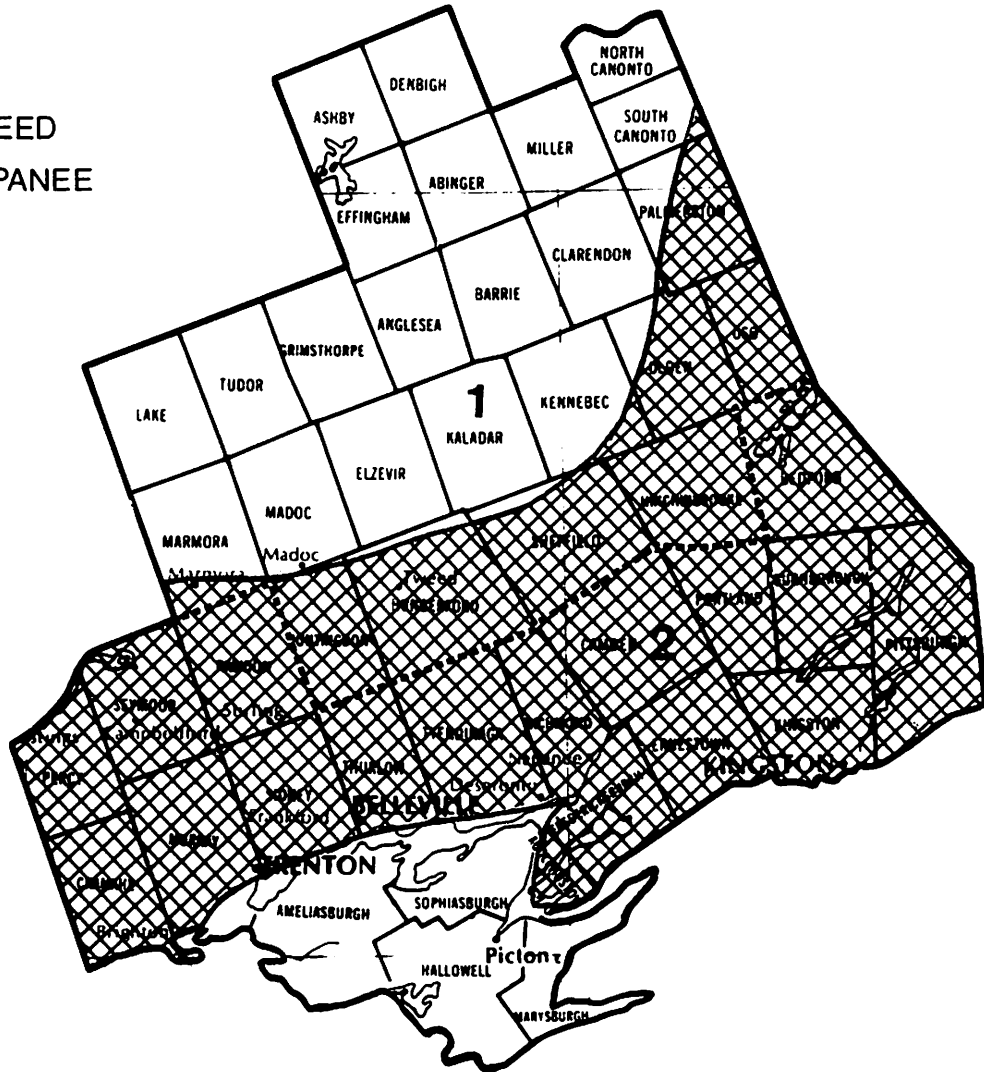
Areas within which defoliation
occurred in 1972

LEGEND

Moderate-to-severe defoliation ● or |

TWEED and NAPANEE DISTRICTS

- 1. TWEED
- 2. NAPANEE



Forest Insect and Disease Survey
Great Lakes Forestry Centre

Cedar Leafminer

Areas within which defoliation
occurred in 1973

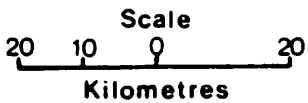
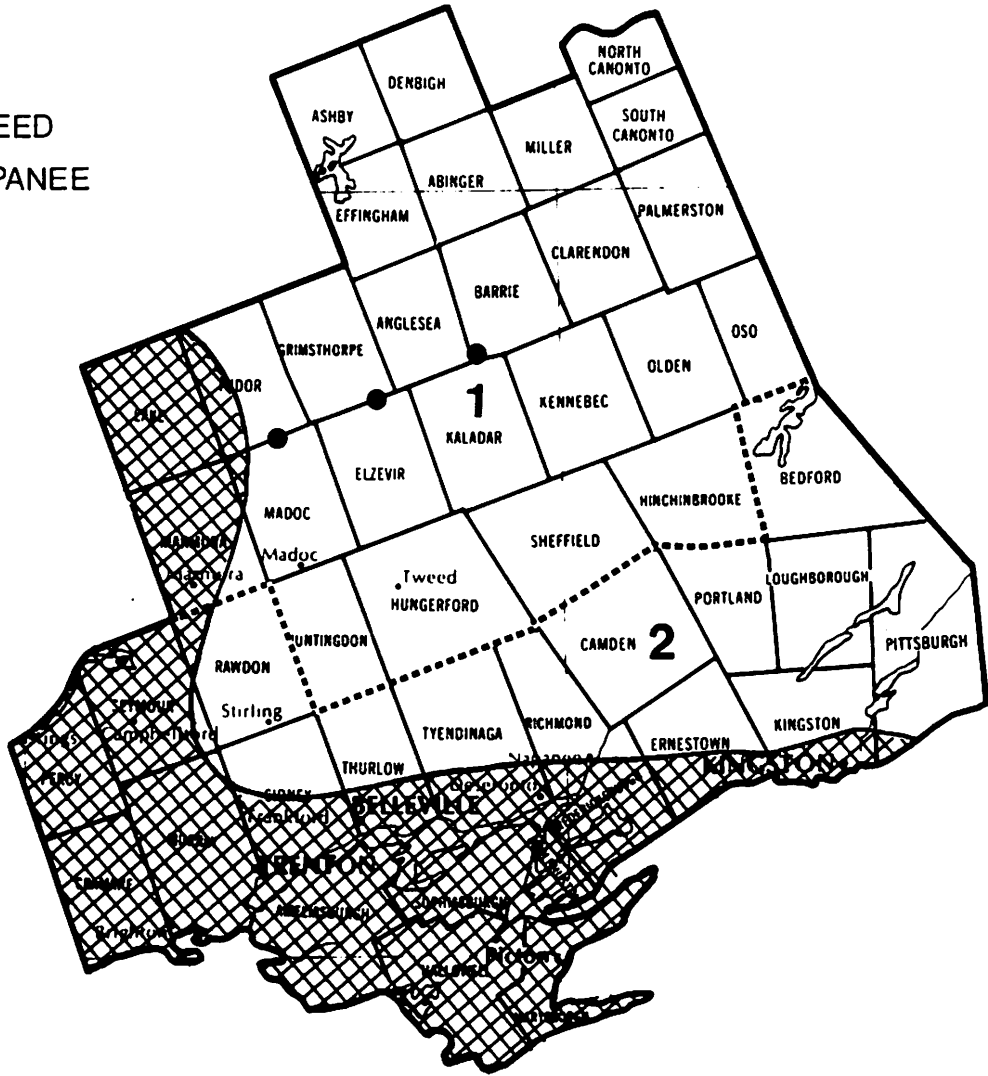
LEGEND

Moderate-to-severe defoliation



TWEED and NAPANEE DISTRICTS

- 1. TWEED
- 2. NAPANEE




Forest Insect and Disease Survey
Great Lakes Forestry Centre

Cedar Leafminer

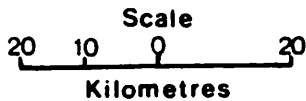
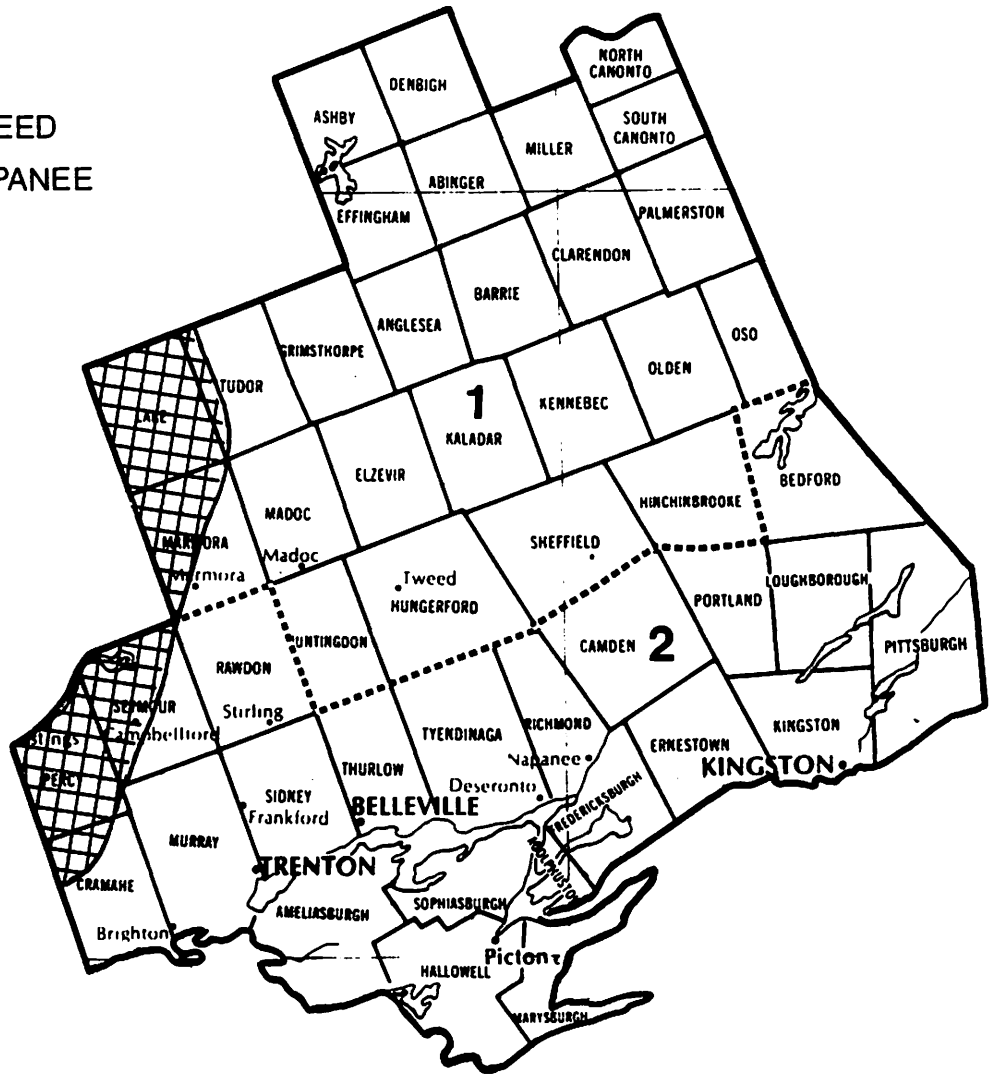
Areas within which defoliation
occurred in 1975

LEGEND

Moderate-to-severe defoliation ● or 

TWEED and NAPANEE DISTRICTS

- 1. TWEED
- 2. NAPANEE



Forest Insect and Disease Survey
Great Lakes Forestry Centre

Cedar Leafminer

Areas within which defoliation
occurred in 1976

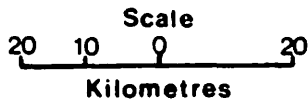
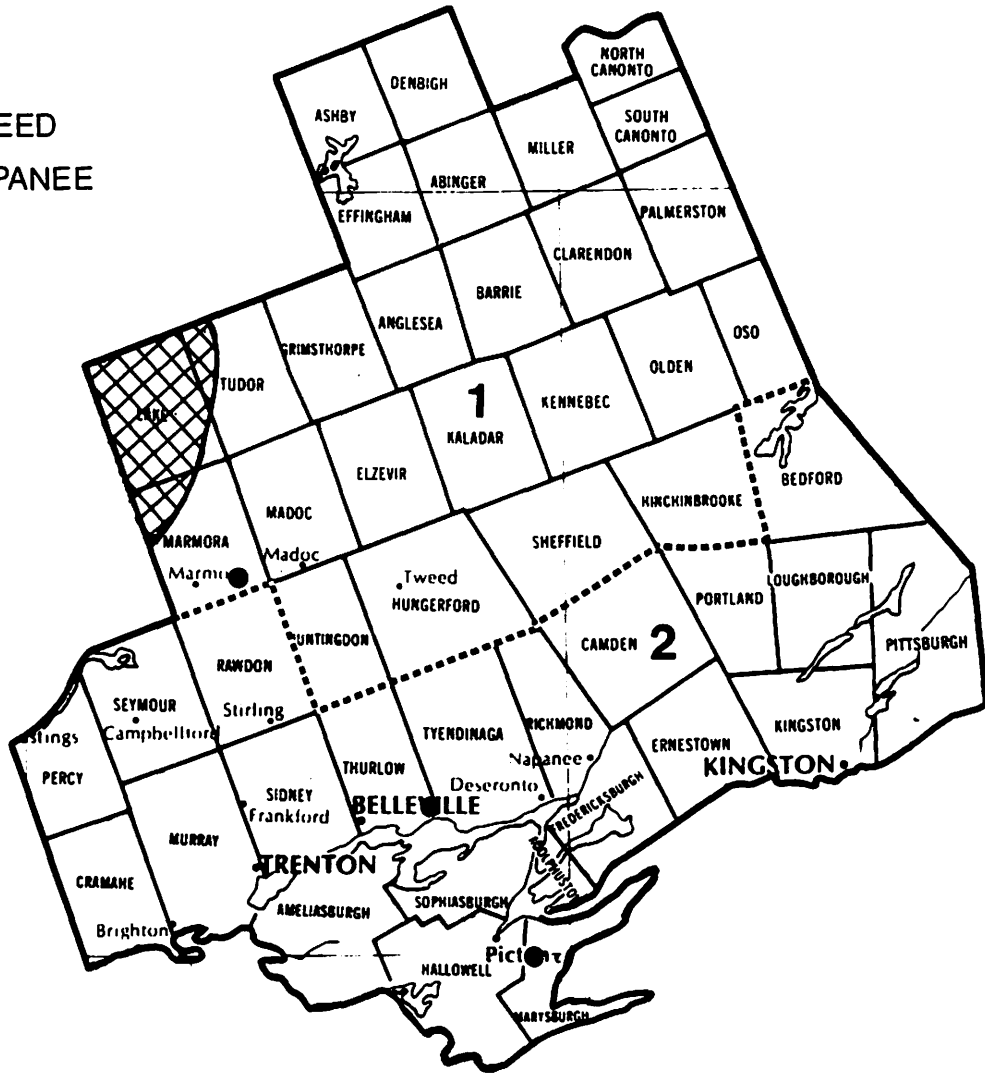
LEGEND

Moderate-to-severe defoliation



TWEED and NAPANEE DISTRICTS

- 1. TWEED
- 2. NAPANEE



Forest Insect and Disease Survey
Great Lakes Forestry Centre

Cedar Leafminer

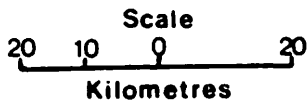
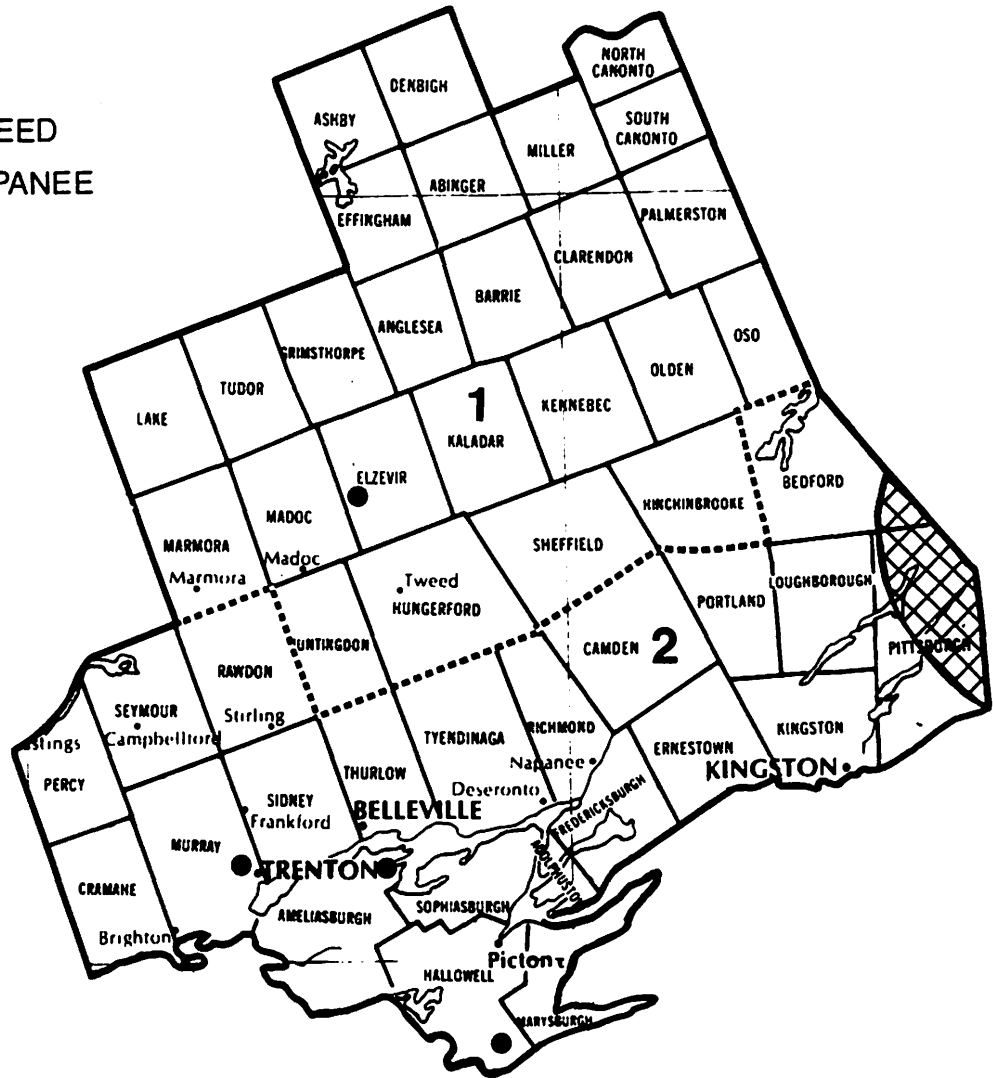
Areas within which defoliation occurred in 1977

LEGEND

Moderate-to-severe defoliation ● or 

TWEED and NAPANEE DISTRICTS

- 1. TWEED
- 2. NAPANEE



Forest Insect and Disease Survey
Great Lakes Forestry Centre

Cedar Leafminer

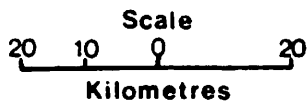
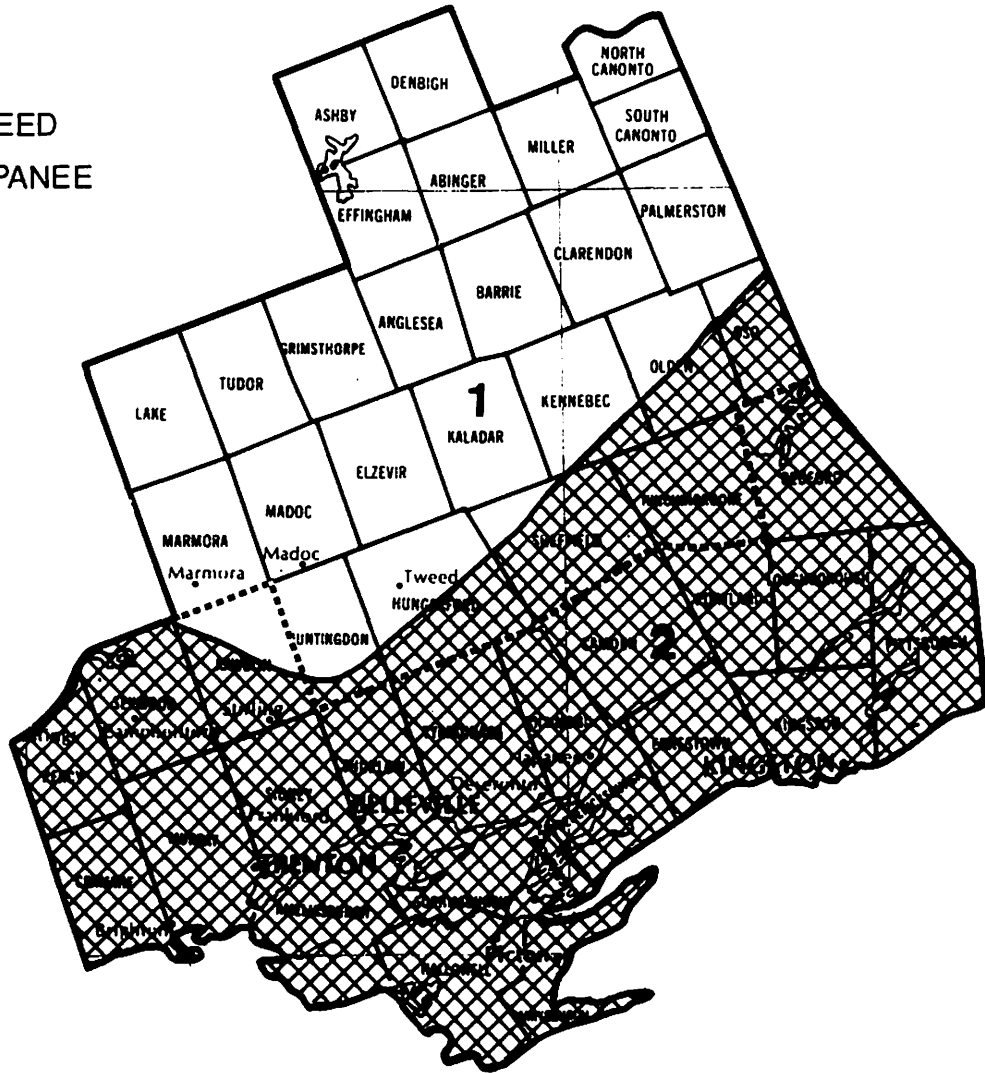
Areas within which defoliation
occurred in 1979

LEGEND

Moderate-to-severe defoliation ● or ☒

TWEED and NAPANEE DISTRICTS

- 1. TWEED
- 2. NAPANEE



Forest Insect and Disease Survey
Great Lakes Forestry Centre

Cedar Leafminer

Areas within which defoliation
occurred in 1980

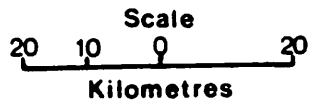
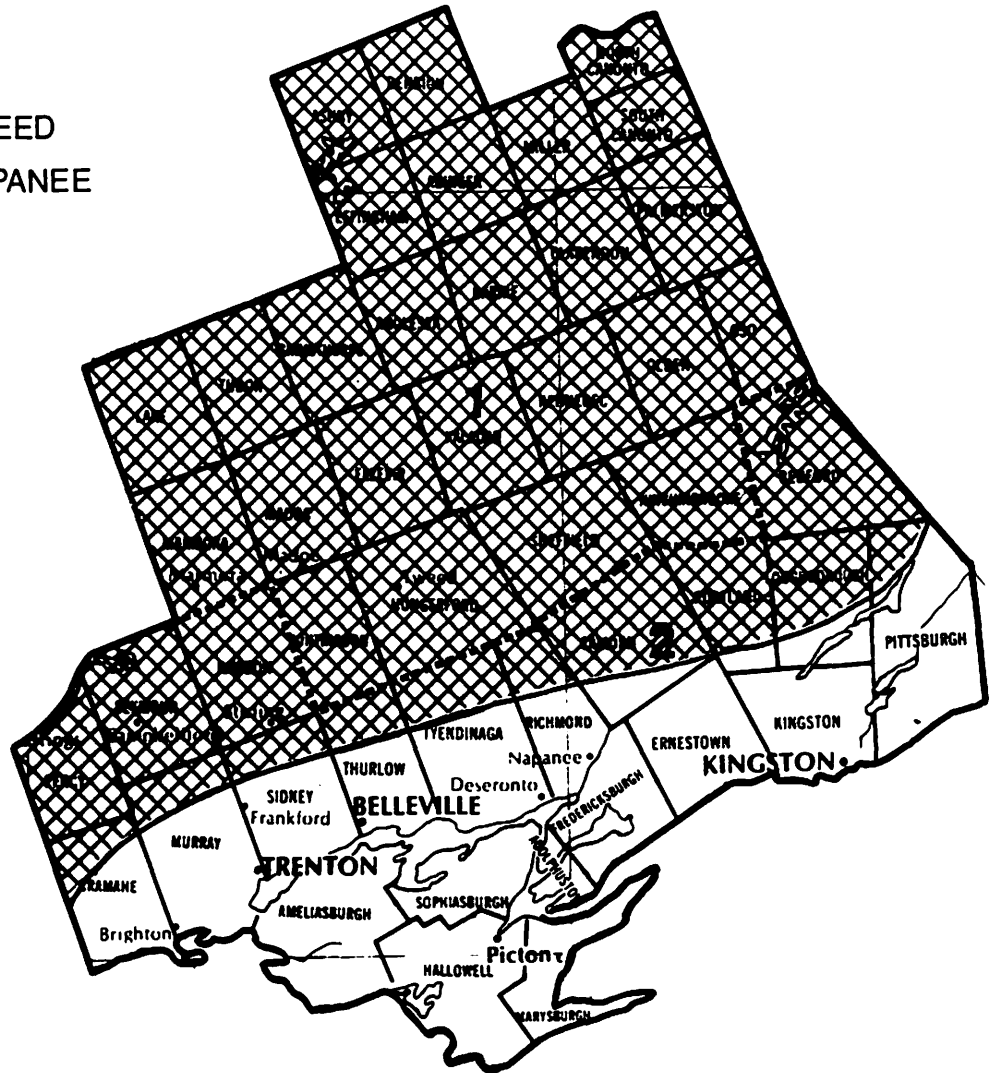
LEGEND

Moderate-to-severe defoliation



TWEED and NAPANEE DISTRICTS

1. TWEED
2. NAPANEE



Forest Insect and Disease Survey
Great Lakes Forestry Centre

Birch Skeletonizer

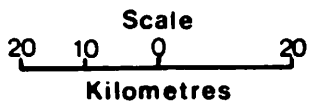
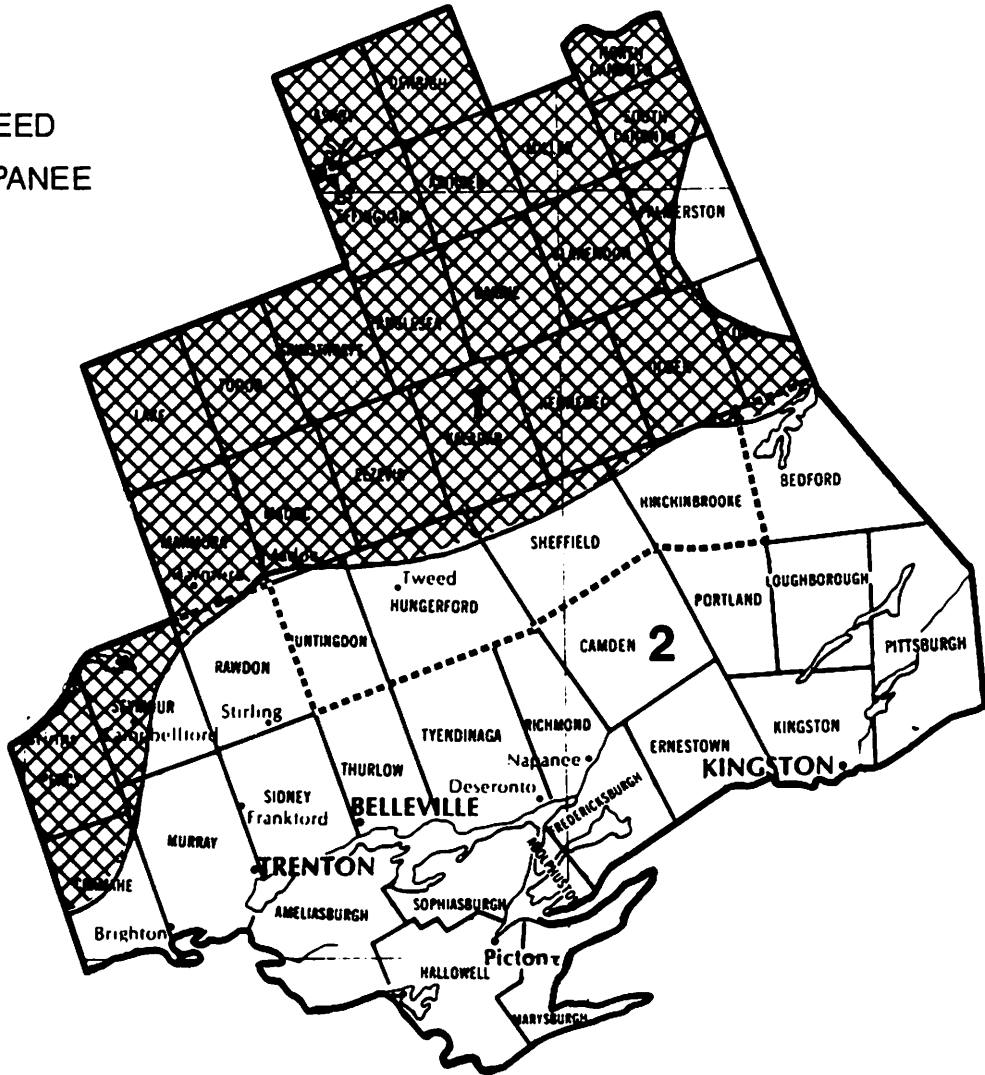
Areas within which defoliation
occurred in 1960

LEGEND

Moderate-to-severe 

TWEED and NAPANEE DISTRICTS

- 1. TWEED
- 2. NAPANEE



Forest Insect and Disease Survey
Great Lakes Forestry Centre

Birch Skeletonizer

Areas within which defoliation occurred in 1961

LEGEND

Moderate-to-severe 

Spruce Budworm, *Choristoneura fumiferana* Clem.

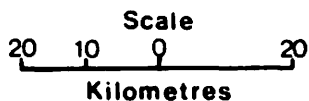
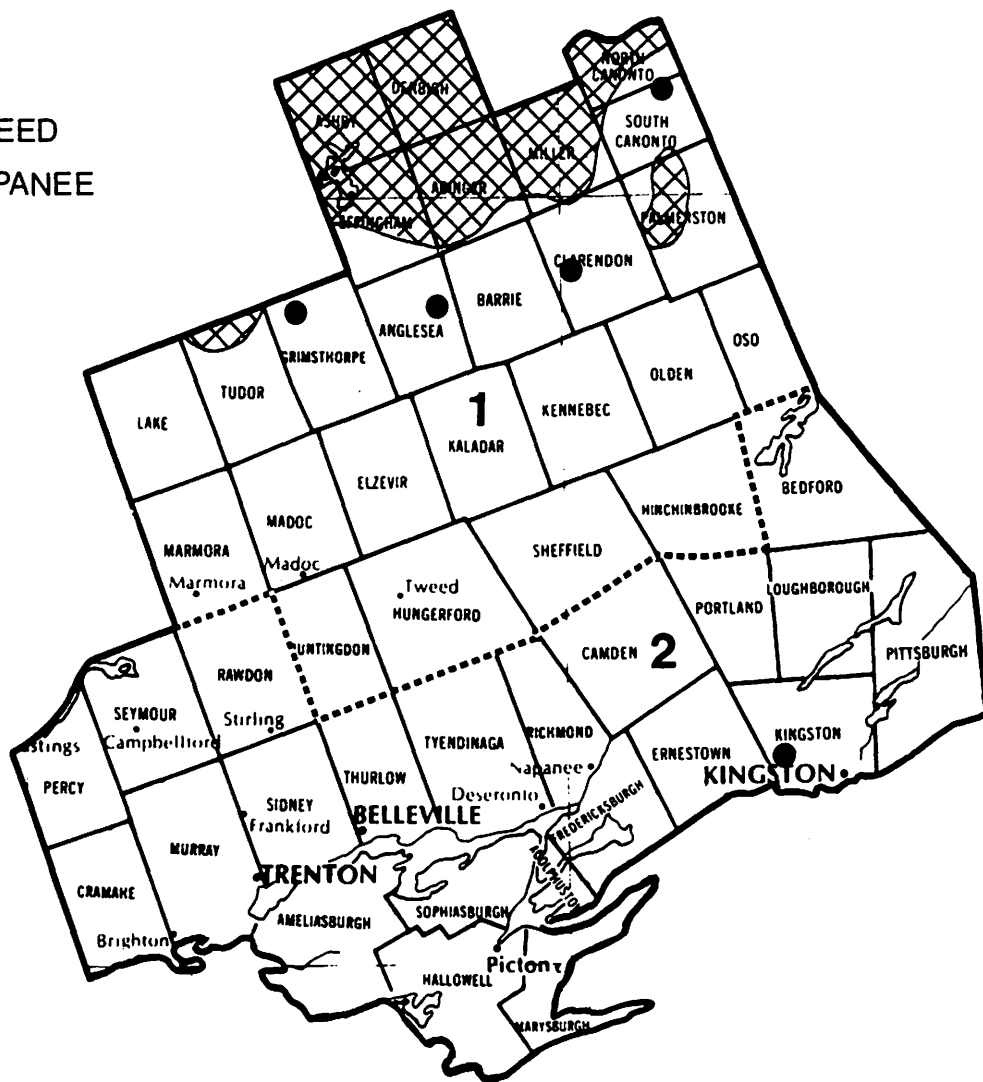
Host(s): wS, bS, bF

[Major]

<u>Year</u>	<u>Remarks</u>
1950	low numbers near Denbigh
1951	low numbers in Abinger Twp
1952-1966	not reported
1967	Light defoliation was recorded on open-grown white spruce trees in Palmerston and Oso twps.
1968	A few lightly infested trees were found in the northern part of the district.
1969	A small pocket of moderate-to-severe defoliation of white spruce was observed west of Denbigh. A large area of light infestation covered parts of the North Canonto and South Canonto twps and a small, light infestation was recorded at Massanoga in Effingham Twp.
1970	Moderate-to-severe defoliation was recorded in the townships of Ashby, Denbigh, Effingham, Abinger, Miller and North Canonto.
1971	Pockets of moderate-to-severe defoliation occurred through the northern part of the district (see map, page).
1972	Moderate-to-severe defoliation was general through most of the district north of Highway 7 (see map, page).
1973	Minor changes in infestation boundaries occurred. Moderate-to-severe defoliation was general through the northern part of the district and in Palmerston and Marmora twps (see map, page).
1974	Little change in infestation boundaries was recorded in 1974 (see map, page).
1975	Minor changes were recorded in Clarendon, Palmerston, Oso and Olden twps (see map, page).
1976	Moderate-to-severe defoliation persisted through the northern part of the district (see map, page).
1977	The infestation declined appreciably and defoliation was restricted to Ashby, Denbigh and northern parts of the Effingham and Abinger twps (see map, page).
1978-1979	Small pockets of moderate-to-severe defoliation were recorded in Denbigh, Effingham and Abinger twps (see map, page).
1980	Large areas of defoliation were noted in Denbigh and Grimsthorpe twps and small pockets were found in Anglesea, Abinger, Miller and Lake twps (see map, page).

TWEED and NAPANEE DISTRICTS

- 1. TWEED
- 2. NAPANEE




Spruce budworm

Forest Insect and Disease Survey
Great Lakes Forestry Centre

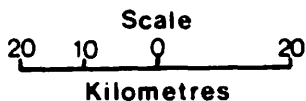
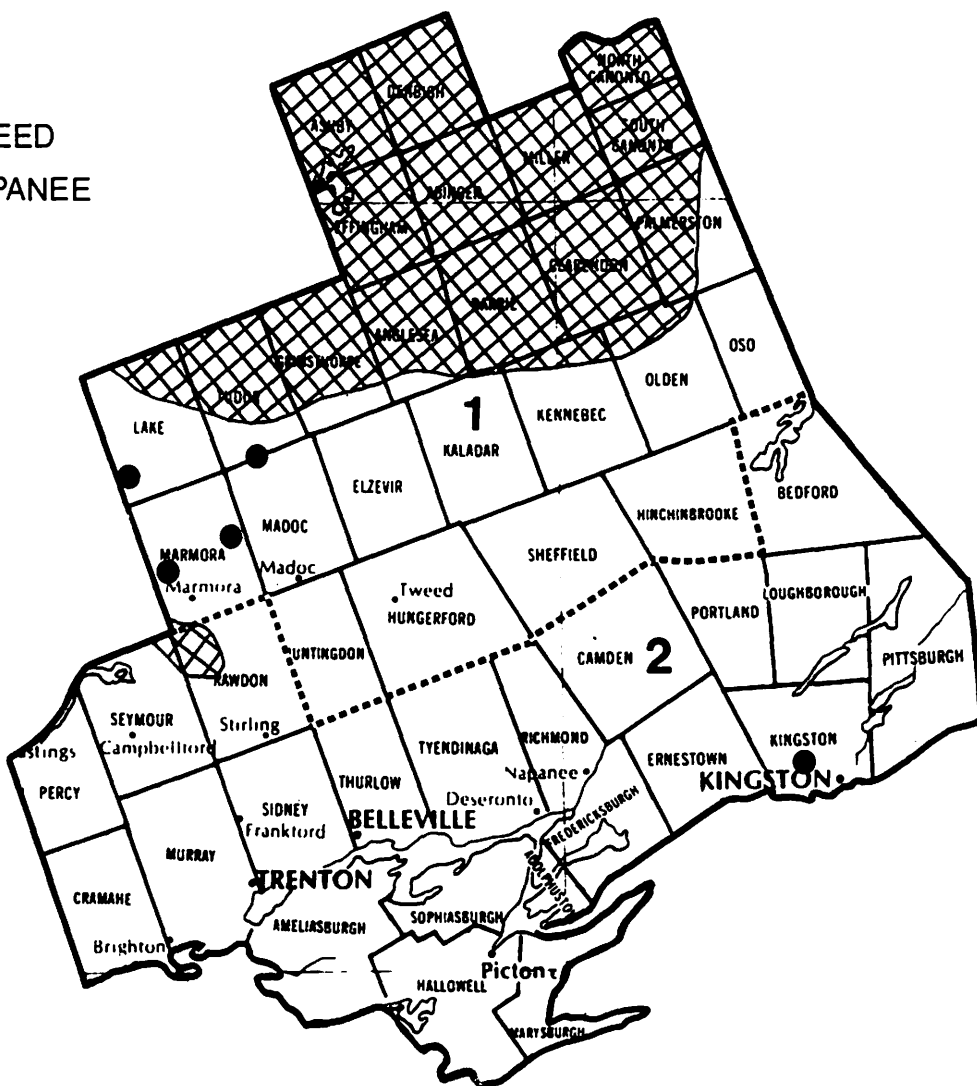
Areas within which defoliation
occurred in 1971

LEGEND

Moderate-to-severe defoliation  or 

TWEED and NAPANEE DISTRICTS

- 1. TWEED
- 2. NAPANEE





Forest Insect and Disease Survey
Great Lakes Forestry Centre

Spruce budworm

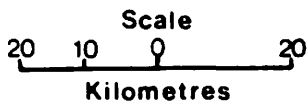
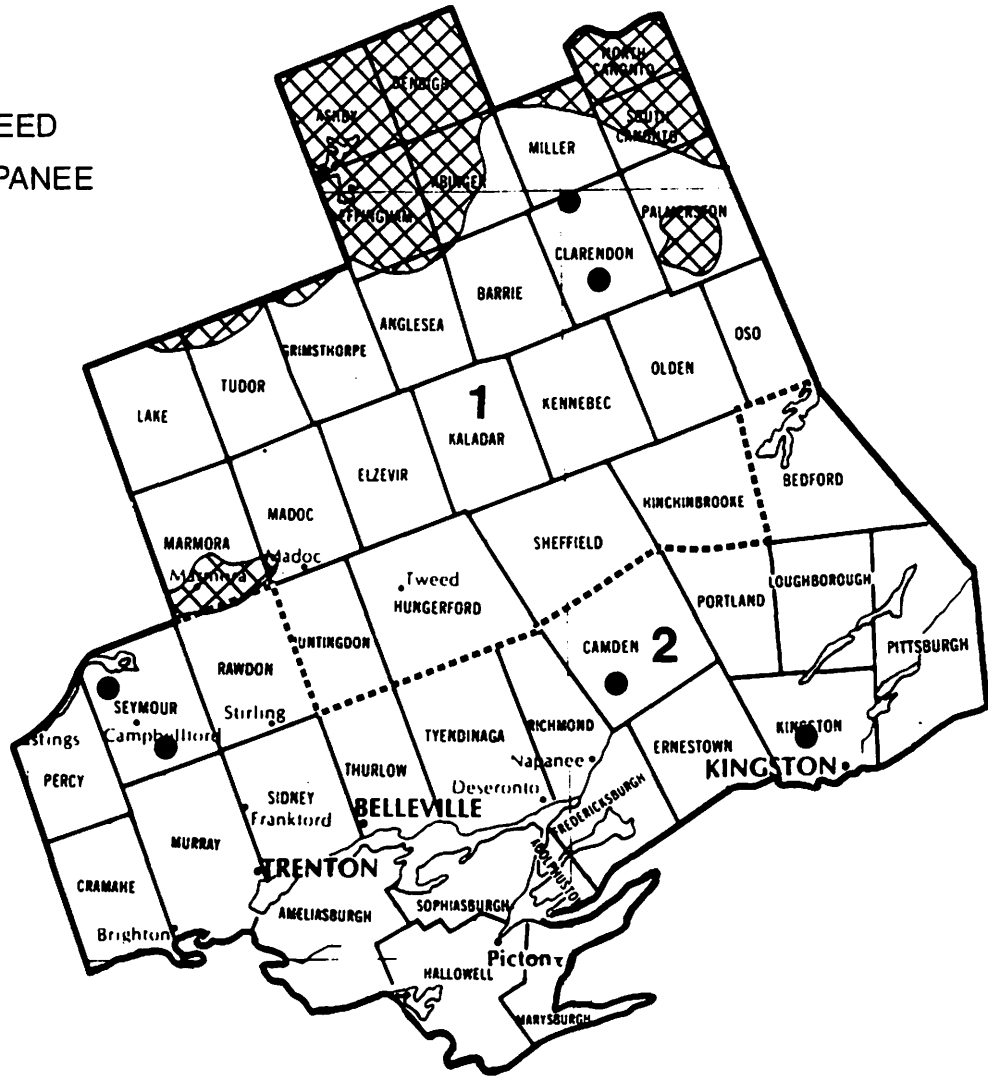
Areas within which defoliation
occurred in 1972

LEGEND

Moderate-to-severe defoliation  or 

TWEED and NAPANEE DISTRICTS

- 1. TWEED
- 2. NAPANEE





Forest Insect and Disease Survey
Great Lakes Forestry Centre

Spruce budworm

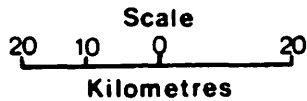
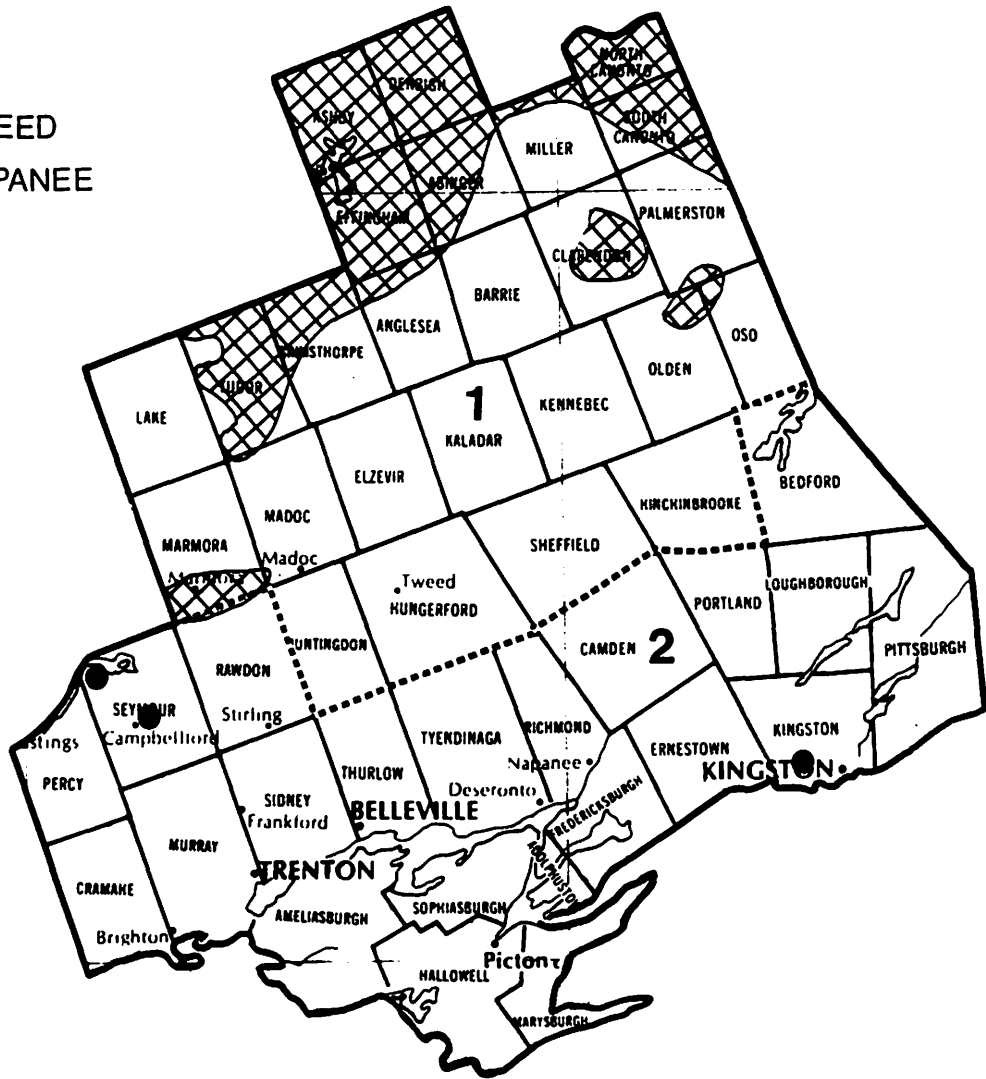
Areas within which defoliation
occurred in 1973

LEGEND

Moderate-to-severe defoliation  or 

TWEED and NAPANEE DISTRICTS

- 1. TWEED
- 2. NAPANEE





Forest Insect and Disease Survey
Great Lakes Forestry Centre

Spruce budworm

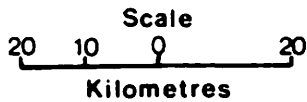
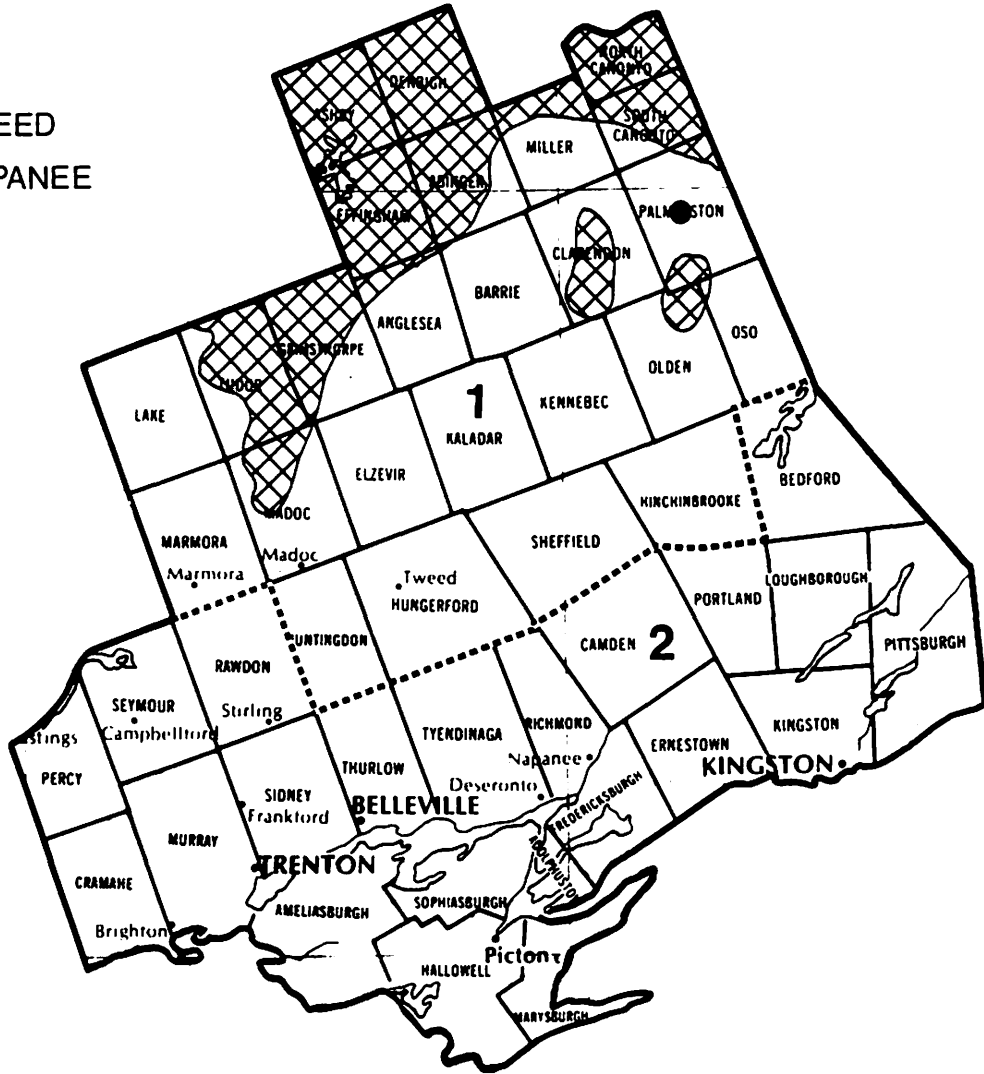
Areas within which defoliation
occurred in 1974

LEGEND

Moderate-to-severe defoliation  or 

TWEED and NAPANEE DISTRICTS

- 1. TWEED
- 2. NAPANEE





Forest Insect and Disease Survey
Great Lakes Forestry Centre

Spruce budworm

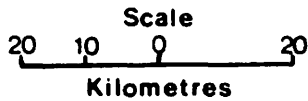
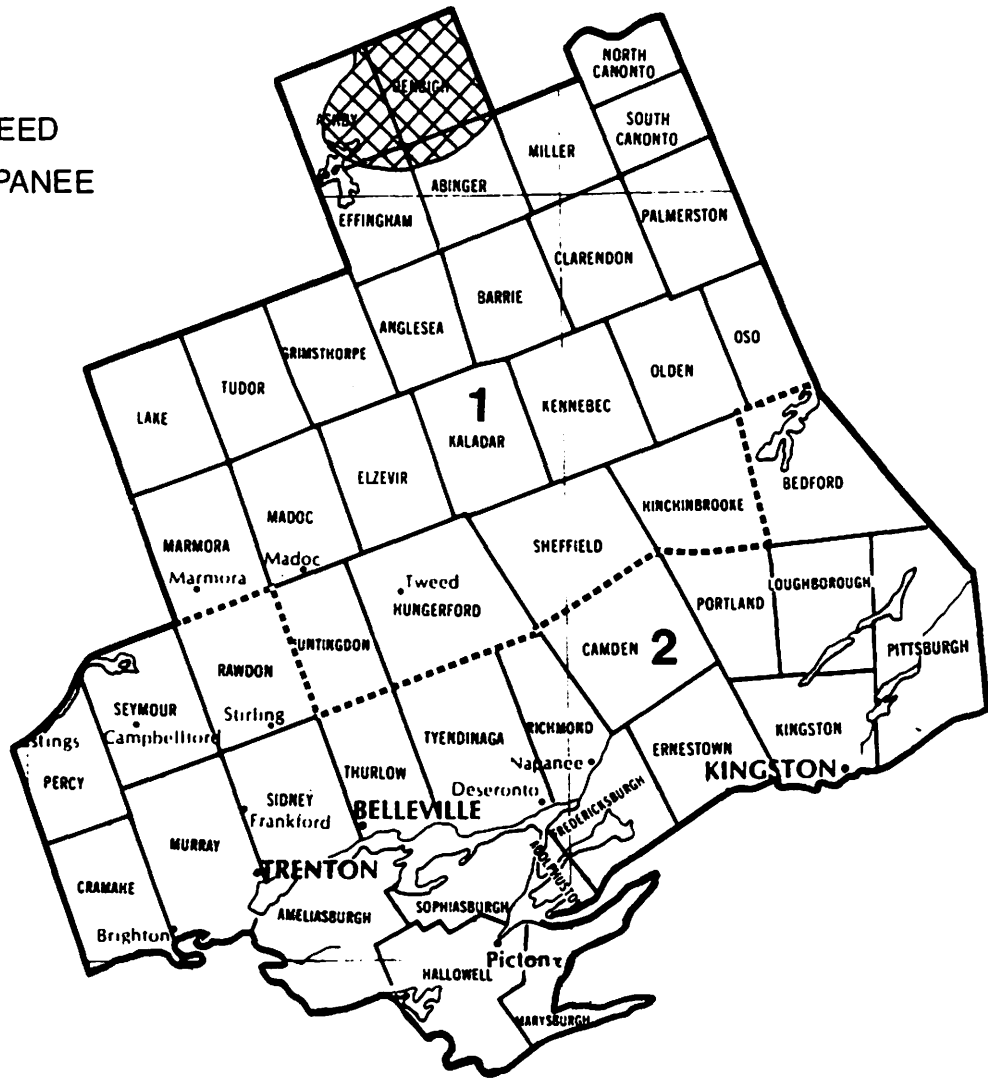
Areas within which defoliation
occurred in 1975

LEGEND

Moderate-to-severe defoliation  or 

TWEED and NAPANEE DISTRICTS

- 1. TWEED
- 2. NAPANEE



Forest Insect and Disease Survey
Great Lakes Forestry Centre

Spruce budworm

Areas within which defoliation
occurred in 1977

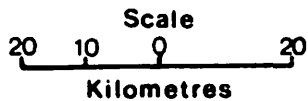
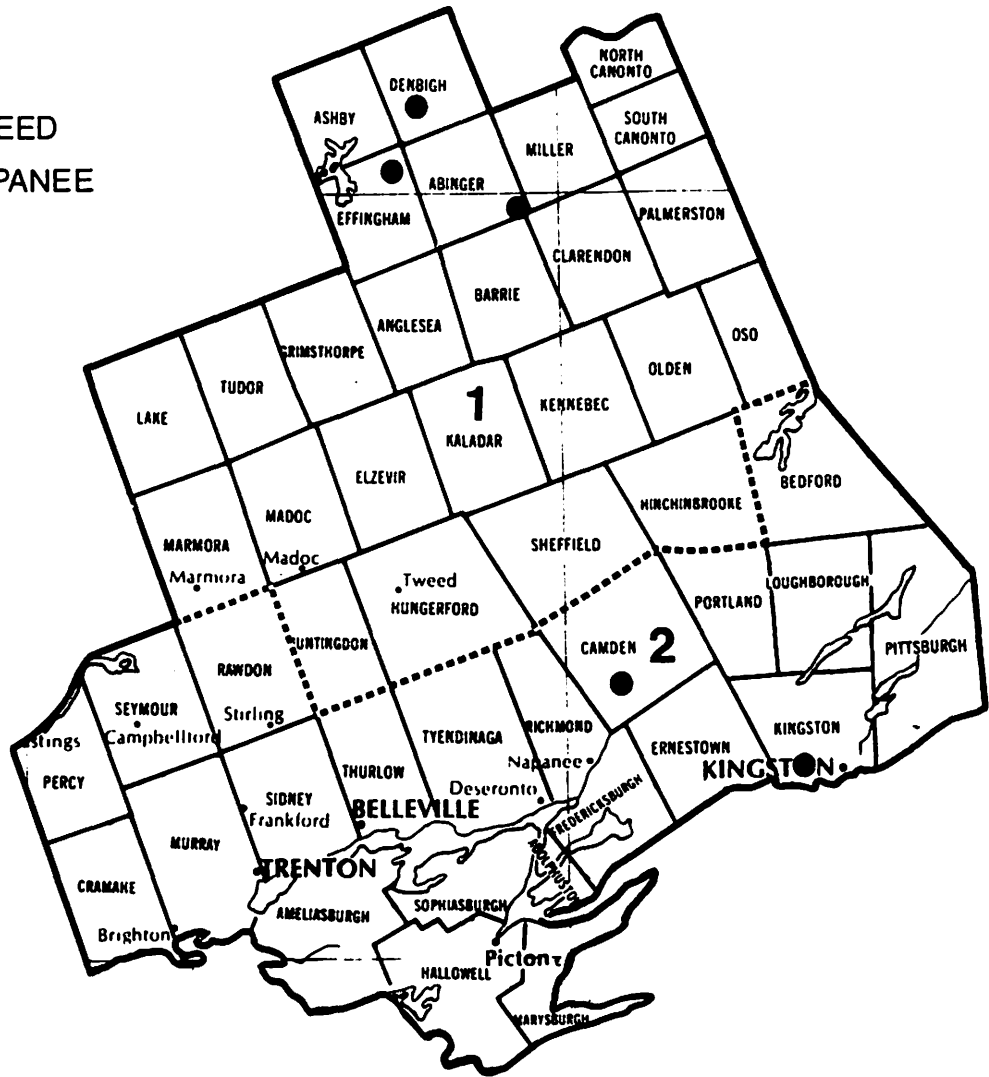
LEGEND

Moderate-to-severe defoliation



TWEED and NAPANEE DISTRICTS

- 1. TWEED
- 2. NAPANEE



Spruce budworm

Forest Insect and Disease Survey
Great Lakes Forestry Centre

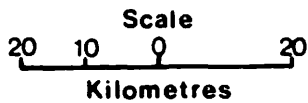
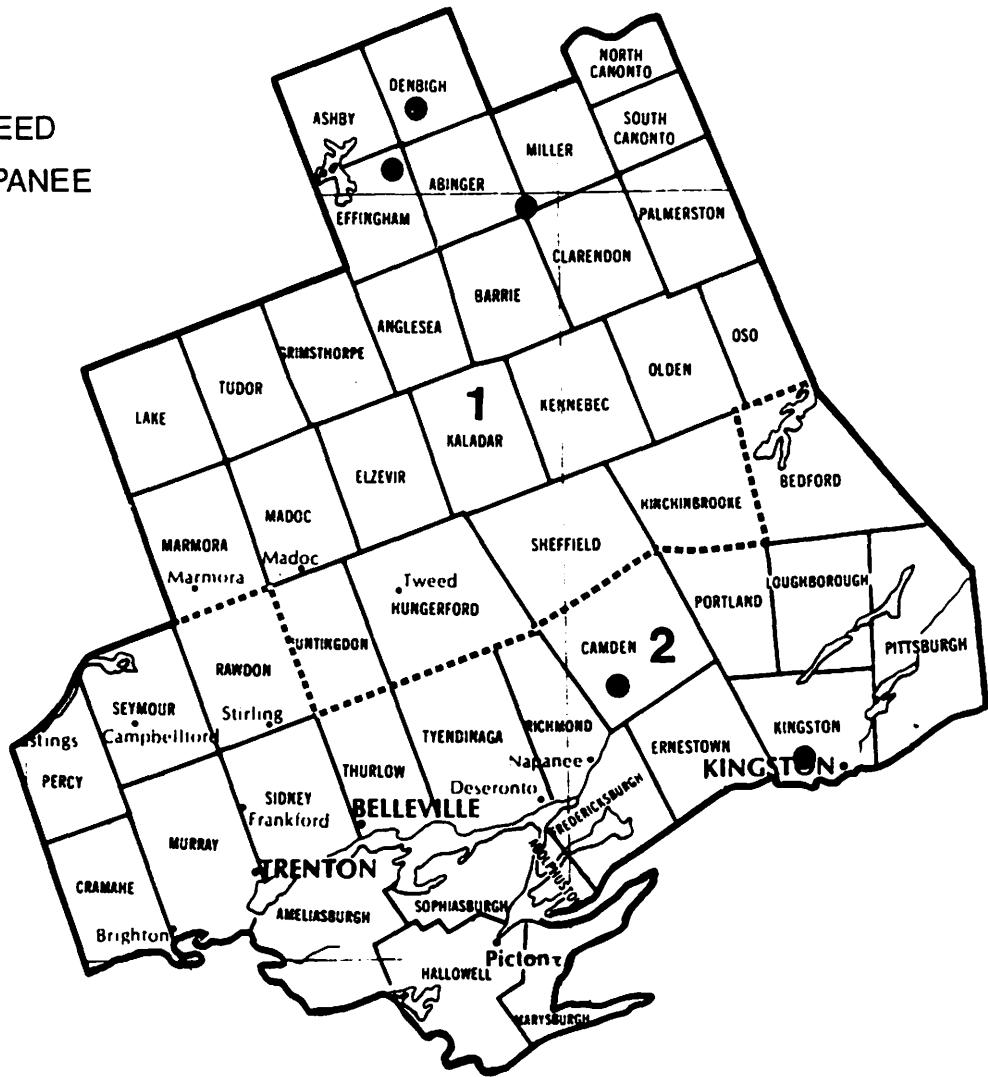
Areas within which defoliation
occurred in 1978

LEGEND

Moderate-to-severe defoliation ●

TWEED and NAPANEE DISTRICTS

- 1. TWEED
- 2. NAPANEE



Forest Insect and Disease Survey
Great Lakes Forestry Centre

Spruce budworm

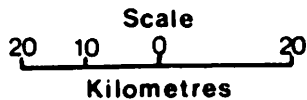
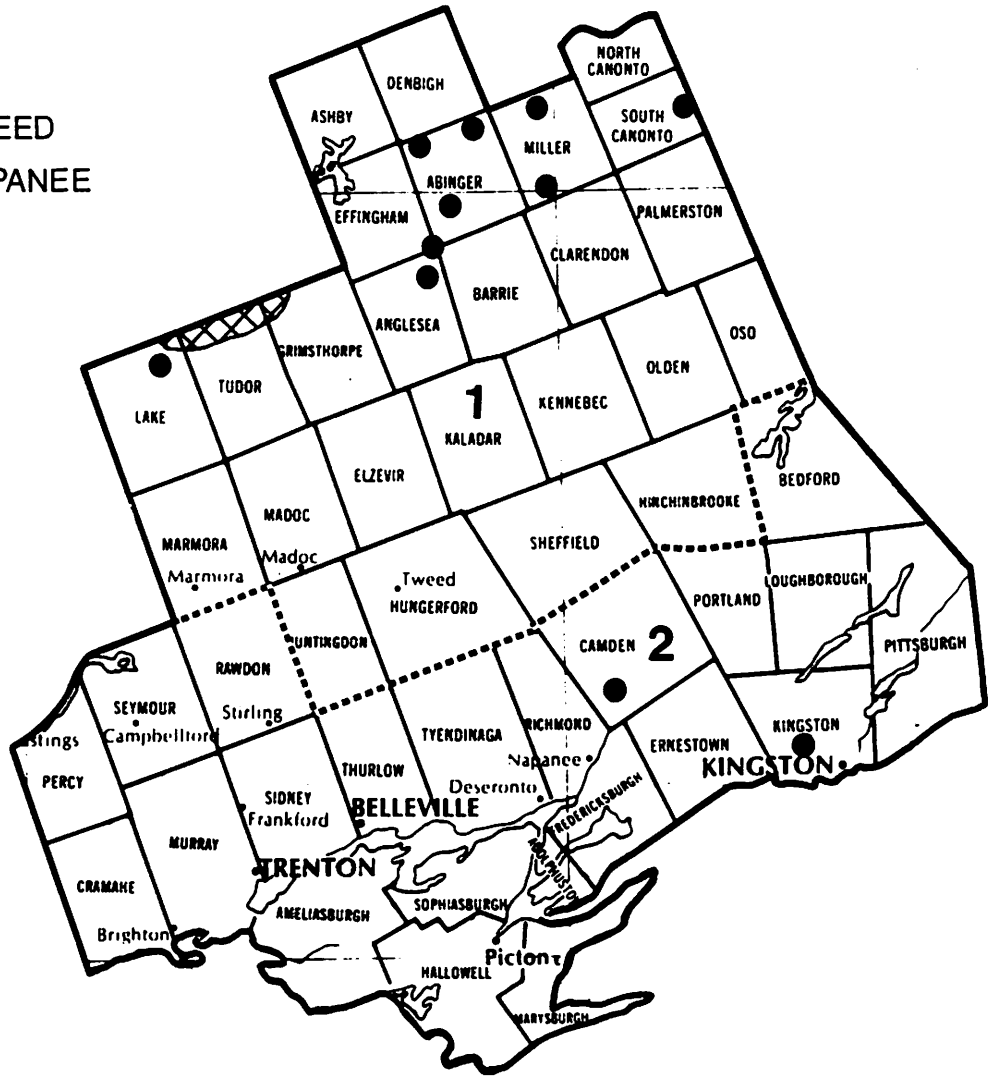
Areas with which defoliation
occurred in 1979

LEGEND

Moderate-to-severe defoliation ●

TWEED and NAPANEE DISTRICTS

- 1. TWEED
- 2. NAPANEE





Spruce budworm

Forest Insect and Disease Survey
Great Lakes Forestry Centre

Areas within which defoliation
occurred in 1980

LEGEND

Moderate-to-severe defoliation  or 

Larch Casebearer, *Coleophora laricella* (Hbn.)

Host(s): larch

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1952	not reported
1953	Light populations were recorded in Kennebec Twp.
1954	not reported
1955	Light populations were found throughout the district.
1956	Light populations were recorded at six locations.
1957-1958	Light populations were encountered at seven locations.
1959-1961	Low numbers were reported at four locations in the district.
1962-1964	Light infestations occurred at four locations.
1965-1967	Light defoliation was noted at five locations.
1968	Moderate-to-severe defoliation was observed in Kaladar Twp.
1969	Low numbers were encountered on trees examined at three locations.
1970	Light populations were observed throughout the district.
1971-1974	not reported
1975	Light infestations were encountered near Marmora.
1976	Medium-to-heavy infestations were noted on understory trees near Kaladar.
1977-1978	not reported
1979	Light infestations were observed in Madoc Twp.
1980	not reported

Linden Looper, *Erannis tiliaria* (Harr.)

Host(s): deciduous

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1951	not reported
1952	An increase in populations was encountered in the district. Larvae were found on most deciduous hosts.
1953	Moderate and high numbers were observed throughout the district.
1954	Light defoliation was observed on white elm trees in Kennebec Twp
1955	not reported
1956-1957	trace populations
1958-1959	not reported
1960	Low numbers were reported.
1961	High populations occurred on deciduous trees in Lake and Marmora twps.
1962	High populations were encountered throughout Ashby and Denbigh twps.
1963	Light infestations were observed at scattered points in the district.
1964	trace populations
1965-1966	not reported
1967	Low numbers occurred across the district.
1968	trace populations
1969-1972	not reported
1973-1975	trace populations
1976-1977	not reported
1978	Light defoliation occurred across the district.
1979-1980	not reported

Pine Bud Moth, *Exoteleia dodecella* (L.)

Host(s): pine

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1957	not reported
1958	Light infestations were reported in plantations in Kaladar and Sheffield twps.
1959-1960	not reported
1961	Light infestations were recorded in Hinchinbrooke, Kaladar and Sheffield twps.
1962	Medium-to-heavy infestations were observed in Hinchinbrooke and Sheffield twps and light infestations were encountered in Kaladar Twp.
1963	Population levels declined throughout Hinchinbrooke, Kaladar and Sheffield twps.
1964	Populations continued to decline in Hinchinbrooke, Kaladar and Sheffield twps.
1965	Trace populations were recorded in Hinchinbrooke, Kaladar and Sheffield twps.
1966-1967	Light infestations were encountered in Hinchinbrooke, Kaladar and Sheffield twps.
1968	Populations declined to low levels.
1969-1980	not reported

Birch Leafminer, *Fenusa pusilla* (Lep.)

Host(s): birch

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1957	not reported
1958	Light populations were encountered on white birch in Palmerston Twp. This collection represented a new distribution record.
1959-1966	not reported
1967	Surveys disclosed high numbers throughout the town of Tweed and light infestations in Barrie, Hinchinbrooke, Kennebec and Oso twps.
1968-1969	not reported
1970	Heavy infestations were encountered east of Marmora in Marmora Twp.
1971-1972	not reported
1973	Light-to-moderate defoliation was observed on scattered host in Tudor Twp.
1974	Medium-to-heavy infestations were observed at several locations along Hwy 62 in Tudor Twp.
1975	Severe defoliation of ornamentals was encountered in towns and villages throughout the district.
1976-1980	not reported

Fall Webworm, *Hyphantria cunea* Dru.

Host(s): deciduous

[Major]

<u>Year</u>	<u>Remarks</u>
1950	Moderate-to-severe defoliation of white and black ash trees occurred along Highway 7 in Kaladar Twp.
1951	Populations declined sharply and few tents were observed.
1952-1954	trace numbers only
1955	Although widely distributed throughout the district on a variety of hosts, populations were light. One area of medium infestation occurred in a black ash stand near Clareview in Sheffield Twp.
1956-1957	A slight increase in population levels occurred and lightly defoliated trees were observed at several points.

(cont'd)

Fall Webworm, *Hyphantria cunea* Dru. (concl.)

<u>Year</u>	<u>Remarks</u>
1958	Small pockets of medium-to-heavy infestations occurred along Highway 7 in Madoc, Marmora, Olden and Kennebec twps and at several points in Sheffield Twp.
1959	Pockets of heavy infestation were recorded in Marmora, Madoc, Sheffield and Olden twps.
1960	Heavy infestations occurred in Madoc and Marmora twps; at other locations only light populations were observed.
1961	Populations declined generally except for one small pocket in Madoc Twp.
1962	Numbers were low and defoliation was negligible.
1963	Moderate numbers were observed in Madoc Twp but very low numbers were observed at other locations.
1964	Populations declined at trace levels.
1965-1966	Tents were more common than in 1955 and 1956.
1967	Tents were more common than in 1955 and 1956.
1968-1970	not reported
1971	Severely defoliated roadside trees were observed at several points in Huntingdon Twp.
1972	Light and moderate defoliation was general throughout the district.
1973	Low populations were found throughout the district.
1974	Populations increased slightly and tents were observed commonly throughout the district.
1975	White elm and black ash trees were heavily defoliated at several points along Highway 7.
1976	Many small, localized infestations resulted in severe defoliation of elm and ash trees throughout the district.
1977	Although a population decline was evident, severely defoliated trees were observed at several locations.
1978	Population decline continued and few tents were observed.
1979	A general increase in the numbers of tents and defoliation was observed throughout the district.
1980	Tents were observed commonly throughout the district.

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

Host(s): deciduous

[Major]

<u>Year</u>	<u>Remarks</u>
1950	not reported
1951	An increase in populations was observed throughout the district.
1952	not reported
1953	High populations were observed in the district. Ground surveys of roadside trees disclosed defoliation ranged from 70 to 75%.
1954	Populations remained high on choke cherry, wild apple and hawthorn trees throughout the district.
1955-1958	Populations declined to low levels.
1959	not reported
1960	High populations were observed south of Hwy 7 in Hastings County. Medium-to-heavy infestations were noted in the rest of the district.
1961	Surveys disclosed high populations in the central part of the district and light infestations in the remaining parts.
1962	High populations persisted in Elzevir, Hinchinbrooke and Oso twps. Light infestations occurred throughout the rest of the district.
1963	Population declines were witnessed in the district with the exception of Oso and Hinchinbrooke twps where high populations persisted for the third consecutive year.
1964	With the exception of Sheffield Twp, where high populations were encountered, light infestations were common on roadside shrubs and bushes in the rest of the district.
1965	High populations were observed in Oso, Madoc and Sheffield twps. Populations increases were evident throughout the rest of the district.
1966	A major increase in populations was observed in the district.
1967	Surveys disclosed a downward trend in population levels throughout the district.
1968	Populations declined to low levels.
1969	not reported
1970	Moderate and high populations were observed on roadside shrubs throughout the district.

(cont'd)

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

<u>Year</u>	<u>Remarks</u>
1971-1978	High populations with moderate-to-severe defoliation occurred throughout the district.
1979	Populations declined throughout the district. Diseased larvae were observed at many locations.
1980	common on roadside regeneration and ornamental fruit trees in the district

Forest Tent Caterpillar, *Malacosoma disstria* Hbn.

Host(s): tA, oak, maple [Major]

<u>Year</u>	<u>Remarks</u>
1950	Moderate-to-severe defoliation occurred in the eastern part of the district and in parts of Barrie, Clarendon and Palmerston twps (see map, page).
1951	Moderate-to-severe defoliation occurred throughout most of the district (see map, page).
1952	Moderate-to-severe defoliation was mapped from Hinchinbrooke and Sheffield twps north to the district boundary and in five townships in the eastern part of the district (see map, page).
1953	Moderate-to-severe defoliation occurred in the northern half of the district and in parts of Sheffield, Hinchinbrooke and Oso twps (see map, page).
1954	Two small pockets of moderate-to-severe defoliation occurred in Kaladar and in parts of Tudor and Madoc twps (see map, page).
1955	Only one small colony of larvae was found in Kaladar Twp.
1956-1959	not reported
1960	A few larvae were found in Marmora Twp and 16 adults were captured in a light trap in Olden Twp.
1961	not reported
1962	trace populations
1963	Very light defoliation was observed in stands in Kaladar, Oso and Denhigh twps.
1964	not reported

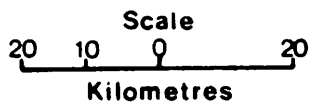
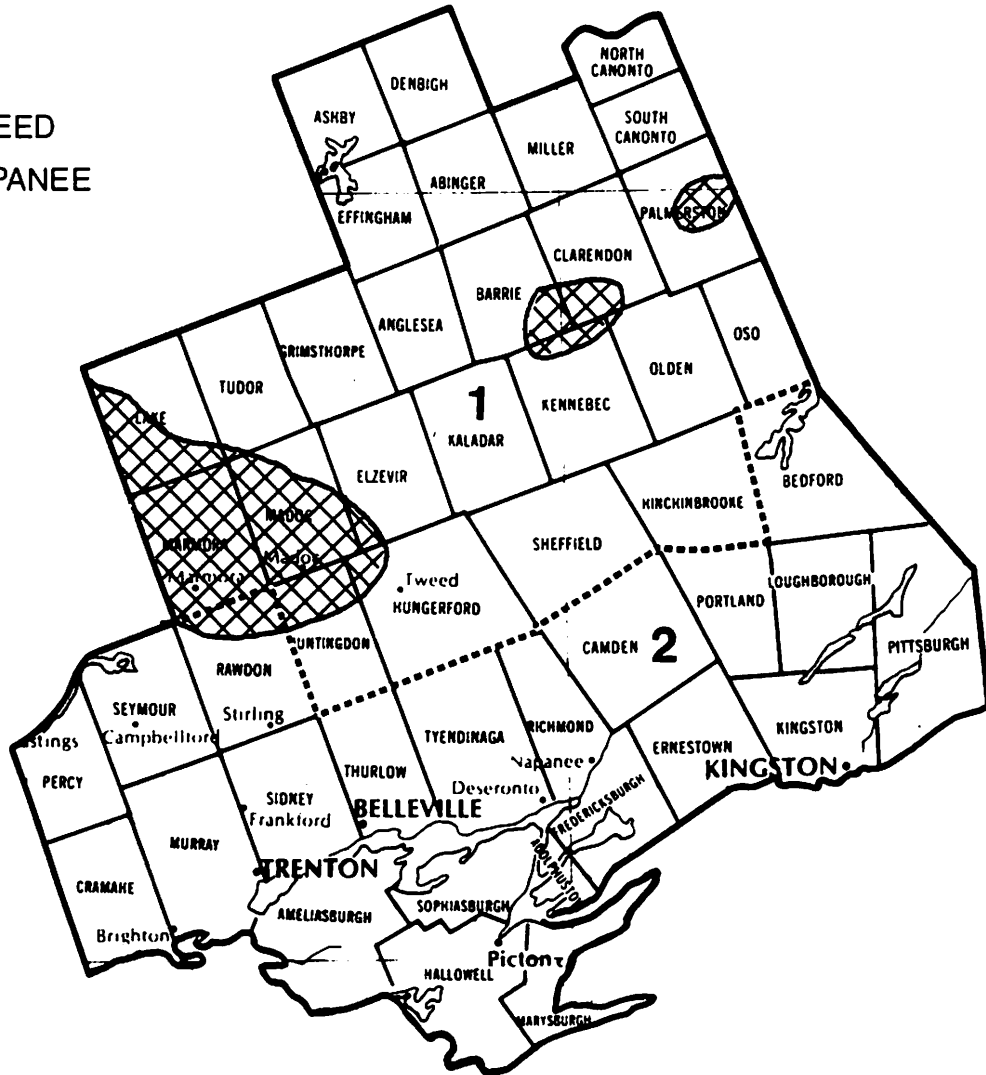
(cont'd)

Forest Tent Caterpillar, *Malacosoma disstria* Hbn. (concl.)

<u>Year</u>	<u>Remarks</u>
1965	A new pocket of moderate-to-severe defoliation was reported in Kaladar Twp. Light feeding also occurred at several locations through Lennox, Addington and Frontenac counties (see map, page).
1966	Small areas of light infestations occurred in Oso and Palmerston twps.
1967	Adverse weather conditions resulted in a collapse of light infestations that occurred in the district.
1968-1971	not reported
1972	A total of 227 adults were captured in a light trap in Olden Twp.
1973	A 1.5-ha stand of trembling aspen was severely defoliated along Highway 41 in Kaladar Twp and a small area of moderate-to-severe defoliation occurred in Olden Twp (see map, page).
1974	Moderate-to-severe defoliation occurred in parts of Kaladar, Anglesea, Barrie and Kennebec twps.
1975	Approximately 350 ha of trembling aspen sustained moderate-to-severe defoliation in the central part of the district (see map, page).
1976	Moderate-to-severe defoliation occurred over an area of approximately 800 km ² in the central part of the district (see map, page). Numerous smaller areas of moderate-to-severe defoliation also occurred in Marmora, Madoc, Olden and Palmerston twps (see map, page).
1977	Moderate-to-severe defoliation continued in the central part of the district and in parts of Marmora and Lake twps (see map, page).
1978	Population levels declined in the district. Moderate-to-severe defoliation occurred in Madoc and Kennebec twps (see map, page).
1979	The infestation completely collapsed.
1980	not reported

TWEED and NAPANEE DISTRICTS

- 1. TWEED
- 2. NAPANEE



Forest Insect and Disease Survey
Great Lakes Forestry Centre

Forest tent caterpillar

Areas within which defoliation occurred in 1950

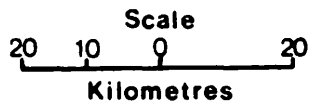
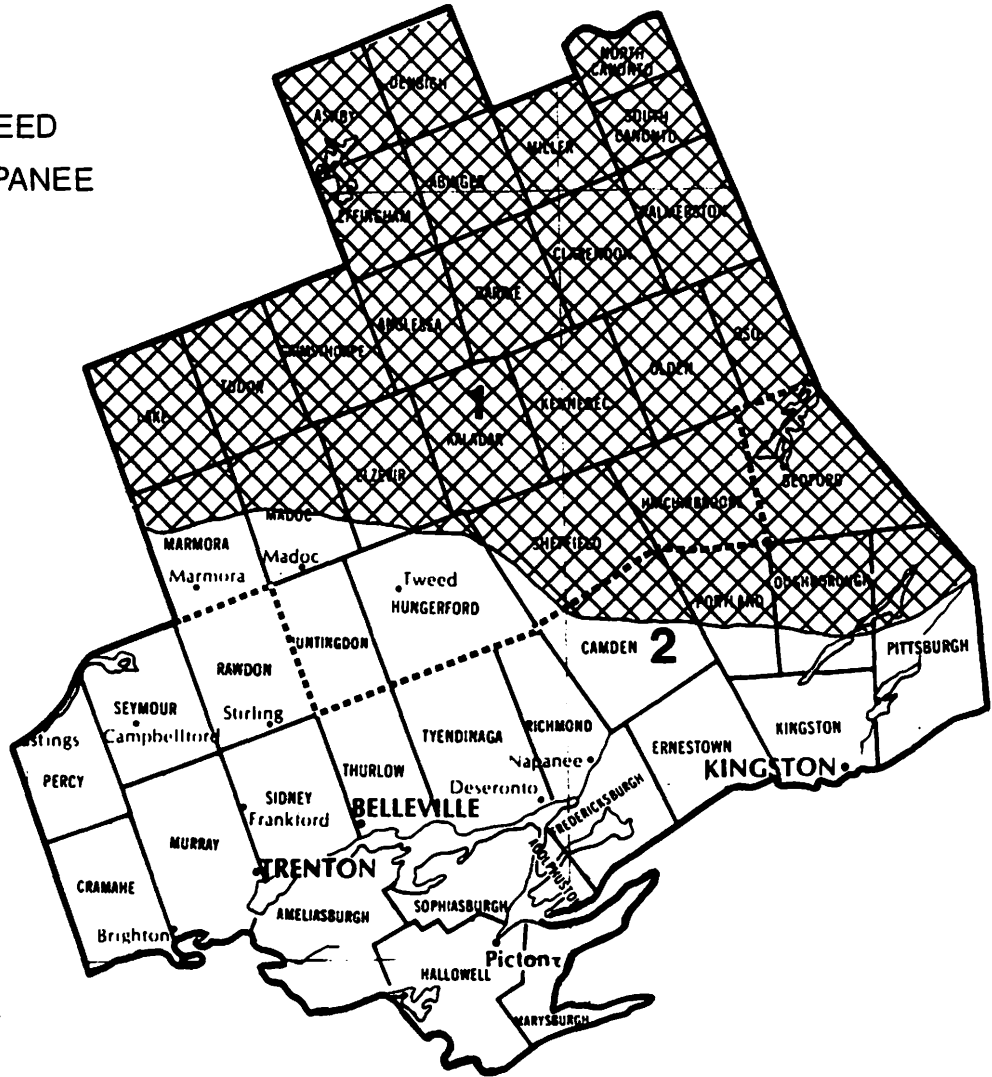
LEGEND

Moderate-to-severe defoliation



TWEED and NAPANEE DISTRICTS

- 1. TWEED
- 2. NAPANEE



Forest Insect and Disease Survey
Great Lakes Forestry Centre

Forest tent caterpillar

Areas within which defoliation
occurred in 1951

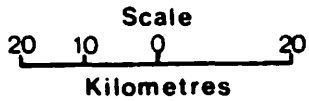
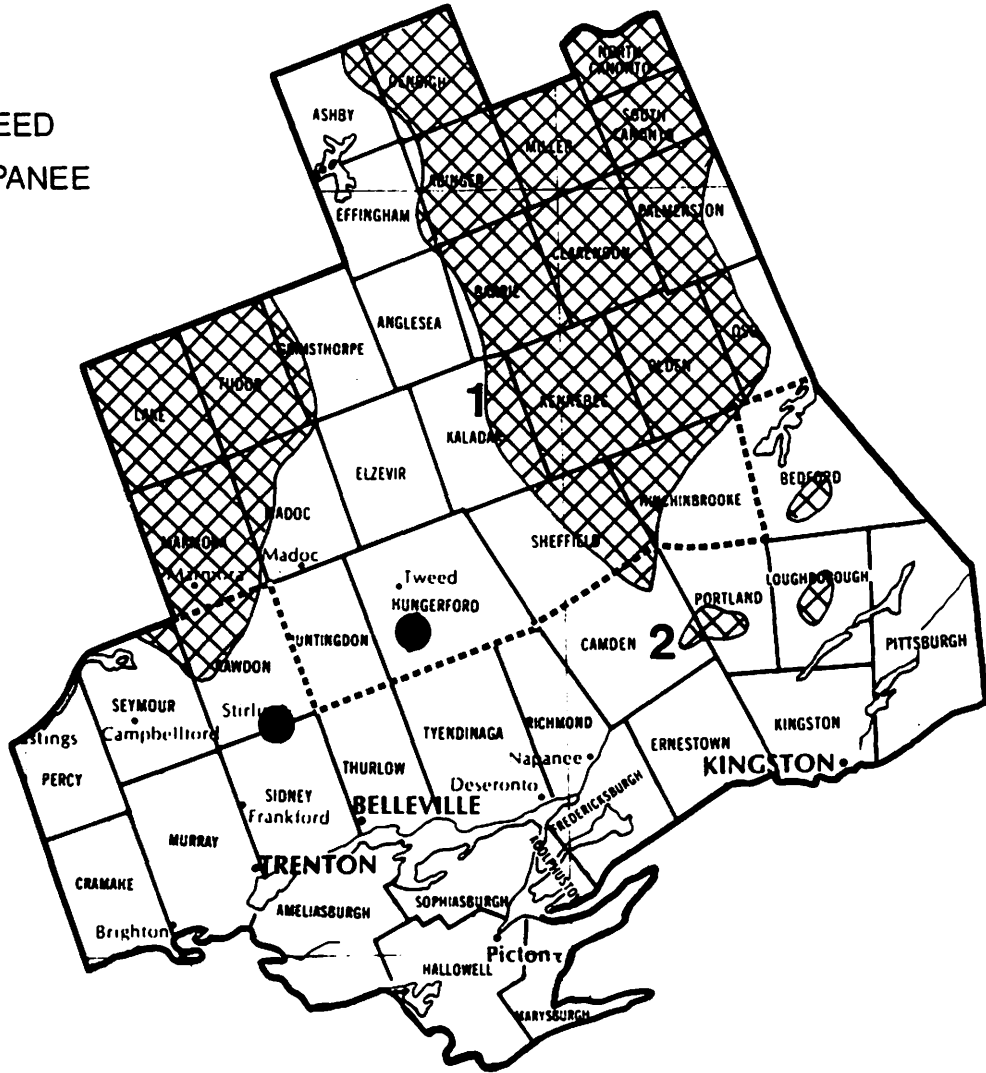
LEGEND

Moderate-to-severe defoliation



TWEED and NAPANEE DISTRICTS

- 1. TWEED
- 2. NAPANEE





Forest Insect and Disease Survey
Great Lakes Forestry Centre

Forest tent caterpillar

Areas within which defoliation
occurred in 1952

LEGEND

Moderate-to-severe defoliation  or 

Redheaded Pine Sawfly, *Neodiprion lecontei* Fitch

Host(s): pine

[Major]

<u>Year</u>	<u>Remarks</u>
1950	several colonies on natural red pine regeneration near Dickey Lake in Lake Twp
1951	not reported
1952	500 jack pine trees at one locations in Tudor Twp were heavily defoliated; a few red pine trees in Kaladar Twp were killed by repeated defoliation
1953	Approximately 1.5 ha of mixed red, white and Scots pine plantation was heavily infested and defoliation averaged 40%; 500 red pine trees near Cloyne sustained 80% defoliation. A medium-to-heavy infestation occurred in a 2.5 ha red pine plantation in Hungerford Twp where defoliation averaged 40%. Lightly defoliated trees were observed in Kaladar, Thurlow and Marmora twps.
1954	not reported
1955	Moderate-to-severe defoliation occurred in small red pine plantations in Olden and Oso twps. Lightly defoliated red pine were observed in Barrie Twp.
1956	Colonies of the sawfly were found commonly on roadside trees in Olden and Kaladar twps.
1957	Lightly infested red pine plantations were observed in Denbigh, Kaladar and Hungerford twps. Red and jack pine trees at the White Lake Fish Hatchery were sprayed by the Ministry of Natural Resources and good control was obtained.
1958	Scattered colonies were found on red and jack pine in Hinchinbrooke, Kaladar and Denbigh twps.
1959	Only scattered colonies of sawflies were found in Madoc, Hungerford and Kaladar twps.
1960	A medium-to-heavy infestation occurred in a 1-ha red pine plantation in Olden Twp and scattered colonies were found on red and jack pine windbreaks in Huntingdon Twp.
1961	Pockets of light infestation occurred in jack and red pine plantations in Hungerford Twp.
1962	Lightly infested trees were sampled in Olden and Hungerford twps.
1963	Light defoliation of jack pine trees was recorded in Oso Twp and of red pine plantings in Olden and Elzevir twps.
1964	trace populations
1965	Populations increased and small red pine trees were severely defoliated at several points in Olden and Elzevir twps.

(cont'd)

Redheaded Pine Sawfly, *Neodiprion lecontei* Fitch (concl.)

<u>Year</u>	<u>Remarks</u>
1966	Numerous small pockets of heavy infestation were recorded in Effingham, Elzevir and Marmora twps.
1967	A large area of light infestation was recorded on small trees along a county road between Actinolite and Flinton in Elzevir Twp.
1968	Populations declined and only very low numbers were found in Olden, Effingham and Elzevir twps.
1969	The sawfly was not found in the district in 1969.
1970-1971	not reported
1972	Populations increased markedly. Moderate-to-severe defoliation was observed in red pine plantations in Hinchinbrooke and Oso twps. Trace populations were found in Hungerford Twp.
1973	Populations increased for the second consecutive year and moderate-to-severe defoliation in red pine plantations was reported in Kennebec and Oso twps. Light infestations were also found in Marmora, Olden, Hungerford and Hinchinbrooke twps.
1974	Moderate-to-heavy infestations occurred on roadside plantings in Olden Twp; low numbers were found at several locations.
1975	Small pockets of moderate-to-severe infestations were largely controlled by spraying. An exception occurred in Marmora Twp where sprays were applied too late and 6-m red pine trees were completely defoliated.
1976	Potential for damage appeared high early in the season but effective spraying operations kept numbers very low.
1977	Spraying operations were continued and the only notable defoliation occurred in a 100-ha red pine plantation in Olden Twp where spraying was late in the season.
1978	Spraying was continued. Scattered, heavy infestations were observed in Oso and Olden twps but no extensive damage occurred.
1979	High numbers were observed along Highway 509 north of Sharbot Lake. A 4-ha red pine plantation was moderate-to-severely defoliated in this area.
1980	Trace populations were found in Oso Twp.

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

Host(s): jack pine

[Major]

<u>Year</u>	<u>Remarks</u>
1950	light infestation in jack pine plantations in the Flinton Forest
1951	Light and medium-to-heavy infestations persisted in the Flinton Forest and at several points in Denbigh Twp.
1952	Light infestations persisted at Flinton and in two plantations in Hastings County.
1953	not reported
1954	Light defoliation was reported in jack pine in Denbigh, Elzevir, Hungerford and Abinger twps.
1955	Up to 40% defoliation of 13 cm DBH trees was recorded near Mazinaw Lake. Small pockets of moderate-to-severe defoliation were reported in Anglesea, Clarendon, Effingham, Denbigh and Elzevir twps.
1956-1958	Light infestations persisted in Abinger, Elzevir and Hungerford twps.
1959	Trace populations in Elzevir, Hungerford and Marmora twps.
1960	A small, heavy infestation occurred in a private plantation in Kaladar Twp. Scattered colonies were found in Marmora, Hungerford and Elzevir twps.
1961	Heavy infestations were reported in Kaladar and Marmora twps where the number of colonies on 10 cm DBH trees averaged 50 and 14. Light infestations occurred in Elzevir, Hungerford and Anglesea twps.
1962	Small pockets of heavy infestation occurred in Marmora, Olden and Oso twps. Scattered colonies were found in Hungerford, Elzevir and Kaladar twps.
1963-1964	Heavy infestations recurred in Marmora, Oso and Olden twps and small numbers were found in Kaladar, Hungerford and Elzevir twps.
1965	Pockets of moderate-to-severe defoliation occurred in Marmora Twp and repeated defoliation has caused some tree mortality in this area. Moderate-to-severe defoliation was recorded in Olden Twp.
1966	Pockets of heavy infestation persisted in Marmora, Elzevir and Hungerford twps.
1967	Populations declined appreciably in Marmora and Elzevir twps but heavy infestations persisted in Hungerford Twp.

(cont'd)

Jack Pine Sawflies, *Neodiprion pratti banksianae* Roh.
N. pratti paradoxicus Ross. (concl.)

<u>Year</u>	<u>Remarks</u>
1968	Small, heavy infestations occurred in highway plantings along Highway 7 between Marmora and Actinolite, and on roadside trees in Denbigh Twp.
1969	not reported
1970	Heavy infestations were again reported in Hungerford, Sidney and Anglesea twps.
1971	A heavy infestations was reported at White Lake in Olden Twp and small numbers were found in Palmerston and Abinger twps.
1972	Lightly defoliated trees were observed in Abinger Twp.
1973	Moderate-to-severe defoliation was recorded in Abinger Twp.
1974	not reported
1975-1976	Heavily infested windbreaks, hedgerows and small plantations were found south of Denbigh in Abinger Twp.
1977	The infestations continued in the Denbigh area and colonies were found commonly near Tweed and along Highway 41 north of Kaladar.
1978	Heavily defoliated trees were common in Palmerston Twp.
1979	Open-grown jack pine near Mazinaw Lake sustained 20% defoliation.
1980	75% defoliation in one plantation in Hungerford Twp

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

Host(s): spruce [Major]

<u>Year</u>	<u>Remarks</u>
1950-1951	not reported
1952	Fifty white spruce trees 8 cm DBH sustained approximately 70% defoliation at Cloyne in Frontenac County.
1953-1955	Scattered white and black spruce trees suffered 10-90% defoliation at several locations.
1956	Severe defoliation of a white spruce hedgerow was recorded in Sheffield Twp but little damage occurred elsewhere.
1957	Trace population levels only were observed.
1958	Small, medium-to-heavy infestations occurred on hedgerows, ornamentals and open-grown trees in Tudor and Marmora twps.

(cont'd)

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

<u>Year</u>	<u>Remarks</u>
1959	Small numbers were found throughout the district.
1960	Small pockets of moderate-to-severe defoliation occurred in Elzevir and Abinger twps and on scattered trees along Highway 60 north of Marmora Twp.
1961-1962	not reported
1963	Medium-to-heavy infestations were recorded in Ashby, Hungerford and Elzevir twps.
1964	Small pockets of heavy infestation occurred in plantations in Hungerford Twp and on white spruce in open-grown situations in Kaladea and Anglesea twps.
1965	Spraying operations in Hungerford Twp in 1964 reduced populations and defoliation was negligible in 1965. A heavy infestation was recorded in the O'Hara Mill Conservation Area in Madoc Twp.
1966	A heavy infestation recurred in white spruce plantations at O'Hara Mill in Madoc Twp and on a white spruce windbreak along Highway 41 in Lennox-Addington County.
1967	Hundreds of 1-2-m white spruce trees were completely defoliated in a Christmas tree plantation near Flinton in Lennox-Addington County. Numerous ornamentals and spruce in open-grown situations were severely defoliated at many points in the district.
1968	Heavy infestations recurred in the central and western parts of the district and privately owned plantations near Flinton suffered extensive damage. OMNR sprayed several plantations in Hastings and Lennox-Addington counties.
1969	Small, local, medium-to-heavy infestations were observed at many locations in the district.
1970	Small, medium-to-heavy infestations occurred in Oso Twp.
1971	High numbers were found through the district.
1972	not reported
1973	Lightly infested trees were observed at several locations.
1974-1978	not reported
1979	Lightly infested trees were observed at several points.
1980	Light damage was recorded in Marmora and Hungerford twps.

White Pine Weevil, *Pissodes strobi* Peck

Host(s): pine, spruce

[Major]

<u>Year</u>	<u>Remarks</u>
1950	not reported
1951	Infested leaders were found throughout the district.
1952	Widespread damage was reported in all counties of the district. A 1-ha white pine plantation near Actinolite sustained severe leader damage.
1953-1954	Heavy leader damage was reported in pine plantations through the district.
1955	Quantitative sampling in Kaladar Twp revealed that 42% of white pine trees sustained leader mortality.
1956	In mixed pine and spruce plantations in Hungerford Twp current years weeviling averaged 7%.
1957	Light leader damage was reported through the district.
1958	not reported
1959	Small numbers were reported from several locations.
1960	Light and high populations were recorded in Hungerford and Kaladar twps, respectively.
1961	Moderate weeviling was observed in Hungerford Twp.
1962	not reported
1963	Light damage was noted in Kaladar Twp.
1964	Heavy infestations were reported in Effingham and Marmora twps and a light infestation was recorded in the Flinton Forest.
1965	Infestation levels ranged from 6 to 25% at quantitative sampling locations through the district.
1966	Highest incidence of damaged leaders at sampling points was 16%.
1967-1968	Little change in population levels was noted.
1969	A general population increase was noted and quantitative sampling averaged 26% in white pine plantations.
1970	Heavy infestations caused severe leader damage in Hungerford and Effingham twps.
1971-1972	Light infestations were general in the district.
1973	not reported
1974	not reported

(cont'd)

White Pine Weevil, *Pissodes strobi* Peck (concl.)

<u>Year</u>	<u>Remarks</u>
1975	Heaviest damage was recorded in Hungerford Twp where 36% leader mortality occurred in a white pine plantation.
1976	Moderate damage was recorded in Hungerford Twp.
1977	Moderate damage recurred in Hungerford Twp and near the Snow Road in Palmerston Twp.
1978	Light damage was observed at several locations.
1979	not reported
1980	In a 30-ha white pine regeneration stand in Abinger Twp, 90% leader mortality occurred. Heavy infestations were recorded in Hungerford and Sheffield twps and control measures were undertaken (aerial spraying, hand clipping and burning infested leaders) at all three locations.

Larch Sawfly, *Pristiphora erichsonii* (Htg.)

Host(s): tL

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1958	not reported
1959	Pockets of moderate-to-severe defoliation were recorded in Barrie and Kaladar twps.
1960	Pockets of moderate-to-severe defoliation recurred in Barrie and Kaladar twps and small pockets of new infestations were found in Olden and Clarendon twps. Lightly infested trees were noted in Madoc Twp.
1961	Several pockets of moderate-to-severe defoliation recurred in Kaladar Twp and populations declined to low numbers in Barrie Twp.
1962	population levels to light throughout the district
1963	Trace numbers of larvae were found.
1964	Trace numbers were found in Oso, Kaladar and Olden twps.
1965	A general increase in population levels was noted. Approximately 75% defoliation occurred in a 40-ha stand near Flinton in Kaladar Twp. Light infestations occurred in Kennebec, Olden, Oso and Clarendon twps.
1966	Population levels declined and defoliation of 65% was recorded in a 40-ha stand in Kaladar Twp. Trace populations were observed elsewhere in the district.
1967-1968	trace populations
1969	not reported
1970	Light defoliation occurred along Highway 509 between Sharbot Lake and Snow Road.
1971	Pockets of moderate-to-severe defoliation occurred in Palmerston Twp, along Highway 41 in Kaladar Twp, south of Cloyne in Barrie Twp and near Slate Falls Road in Denbigh Twp.
1972	Low populations were reported.
1973	trace populations
1974	Moderate defoliation was observed along Highway 62 north of Madoc and on occasional trees near Sharbot Lake.
1975	Small pockets of moderate-to-severe defoliation occurred at scattered locations across the district.
1976-1977	not reported
1978-1980	Low populations were reported across the district.

European Pine Shoot Moth, *Rhyacionia buoliana* (D. & S.)

Host(s): pine [Major]

<u>Year</u>	<u>Remarks</u>
1950-1952	not reported
1953	Low larval populations were recorded in Hungerford Twp.
1954-1980	not reported

Other Noteworthy Insects

Fall Cankerworm, *Alsophila pometaria* (Harr.)

Host(s): deciduous [Major]

<u>Year</u>	<u>Remarks</u>
1950-1953	not reported
1954	Moderate-to-severe and light defoliation was recorded in Kennebec and Oso twps, respectively.
1955	Several roadside trees were lightly defoliated near Arden in Kennebec Twp.
1956-1974	not reported
1975	Low population levels were observed throughout the district.
1976	Light infestations were encountered at scattered locations.
1977-1980	not reported

Pine Spittlebug, *Aphrophora cribrata* (Wlk.)

Host(s): conifers [Major]

<u>Year</u>	<u>Remarks</u>
1950-1965	not reported
1966	Plantations in Kaladar and Sheffield twps supported moderate populations.
1967-1969	not reported
1970	Heavy infestations were reported at several locations.
1971	Populations declined.
1972	Moderate-to-high populations were encountered near Northbrook in Kaladar Twp.
1973	High populations recurred in Kaladar Twp.
1974-1980	not reported

Uglynest Caterpillar, *Archips cerasivorana* (Fitch)

Host(s): cherry

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1963	not reported
1964-1965	Light populations were recorded in Madoc and Oso twps.
1966	Medium-to-heavy infestations occurred on roadside choke cherry shrubs in Hungerford, Huntingdon and Madoc twps.
1967-1980	not reported

Larch Shoot Moth, *Argyresthia laricella* Kft.

Host(s): tamarack

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1957	not reported
1958-1959	Low numbers of shoot moths were recorded in Tudor Twp.
1960	A small pocket of medium-to-heavy infestation occurred on young aspen in Palmerston Twp.
1961-1973	not reported
1974	Light damage was observed at one location in Limerick Forest.
1975-1980	not reported

Pine Tube Moth, *Argyrotaenia pinatubana* (Kft.)

Host(s): white pine

[Minor]

<u>Year</u>	<u>Remarks</u>
1950-1964	not reported
1965	A medium-to-heavy infestation occurred on ornamentals and shoreline white pine trees in Kennebec Twp.
1966	Low population occurred throughout the district.
1967-1980	not reported

Solitary Oak Leafminer, *Cameraria hamadryadella* (Clem.)

Host(s): oak

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1959	not reported
1960	A pocket of light infestation was observed on red oak in North Canonto Twp.
1961-1966	not reported
1967	A light infestation occurred along the Moira River in Hungerford Twp.
1968-1970	not reported
1971	Heavy infestations were encountered at scattered locations.
1972-1974	not reported
1975	High populations occurred in Denbigh Twp.
1976-1980	not reported

Pitted Ambrosia Beetle, *Corthylus punctatissimus* (Zimm.)

Host(s): maple

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1961	not reported
1962	Light mortality of sugar maple regeneration was recorded in Madoc, Olden and Tudor twps.
1963	An average of 10% mortality to maple regeneration was recorded in Olden and Oso twps.
1964	Fourteen percent mortality was recorded on up to 1 metre regeneration in Olden Twp.
1965-1980	not reported

Eastern Pine Shoot Borer, *Eucosma gloriola* Heinr.

Host(s): pine

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1964	not reported
1965	An average of 2 infested lateral shoots per tree was recorded on Scots pine regeneration in Kaladar Twp.
1966-1980	not reported

Pine Needleminer, *Exoteleia pinifoliella* (Cham.)

Host(s): jack pine

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1960	not reported
1961	Medium-to-heavy infestations were encountered on a few trees in Elzevir and Huntingdon twps.
1962-1980	not reported

Elm Leafminer, *Fenusa ulmi* Sund.

Host(s): elm

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1964	not reported
1965	Medium-to-heavy infestations were recorded at scattered locations in Hungerford and Huntingdon twps.
1966	Moderate-to-severe defoliation occurred in Hungerford, Huntingdon and Madoc.
1967-1980	not reported

Nursery Pine Sawfly, *Gilpinia frutetorum* (F.)

Host(s): pine

[Minor]

<u>Year</u>	<u>Remarks</u>
1950-1961	not reported
1962	Low numbers were collected on beating mat samples in Clarendon and Hungerford twps.
1963-1964	Low numbers persisted in Hungerford Twp.
1965	Low numbers were commonly recorded throughout Elzevir and Hungerford twps.
1966	Population levels remained light in Elzevir, Hungerford and Sheffield twps.
1967	Light populations persisted in Elzevir, Hungerford and Sheffield twps.
1968	Low numbers were encountered throughout the district.
1969-1980	not reported

European Spruce Sawfly, *Gilpinia hercyniae* (Htg.)

Host(s): spruce

[Minor]

<u>Year</u>	<u>Remarks</u>
1950-1956	not reported
1957	Light populations were recorded in Hungerford and Denbigh twps.
1958	Light populations persisted throughout the district.
1959	not reported
1960-1962	Trace populations were encountered throughout the district.
1963-1964	Trace populations persisted in Hungerford Twp.
1965	A slight increase in population levels was recorded in Hungerford and Oso twps.
1966	Populations declined in Hungerford and Oso twps.
1967	A seven-fold increase in populations was recorded across the district.
1968	Populations declined to low levels except in Hungerford Twp where moderate populations were recorded.
1969	not reported
1970	Low populations were encountered throughout the district.
1971-1980	not reported

Sugar Maple Borer, *Glycobius speciosus* (Say)

Host(s): maple

[Minor]

<u>Year</u>	<u>Remarks</u>
1950-1965	not reported
1966	This beetle caused considerable mortality to mature sugar maple trees in Sheffield Twp.
1967-1980	not reported

Saddled Prominent, *Heterocampa guttivitta* (Wlk.)

Host(s): sugar maple, beech

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1968	not reported
1969	Moderate-to-severe defoliation was recorded in Oso Twp. Light defoliation occurred in Olden Twp.
1970	Infestations declined to low levels.
1971-1980	not reported

Pine Root Collar Weevil, *Hylobius radialis* Buch.

Host(s): pine

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1964	not reported
1965	This insect caused 6% tree mortality in a Scots pine Christmas tree plantation in Kaladar Twp. Similar damage was encountered in a hedgerow situation in Sheffield Twp.
1966-1980	not reported

Cedar Sawfly, *Monoctenus fulvus* (Nort.)

Host(s): cedar, juniper

[Minor]

<u>Year</u>	<u>Remarks</u>
1950-1960	not reported
1961	Light infestations were recorded in Huntingdon, Oso and Sheffield twps.
1962	Light infestations were encountered in Huntingdon and Oso Twp.
1963	Marked decreases were noted in Huntingdon and Oso twps.
1964	Populations collapsed in Huntingdon Twp but increased in Oso Twp.
1965	Population levels increased in Huntingdon, Kennebec and Sheffield twps but declined in Oso Twp.
1966-1967	Light population levels persisted in Huntingdon, Oso and Sheffield twps.
1968	common throughout the district
1969-1980	not reported

Balsam Fir Sawfly, *Neodiprion abietis* Complex

Host(s): balsam fir [Major]

<u>Year</u>	<u>Remarks</u>
1950-1957	not reported
1958	Lightly infested open-grown balsam fir were encountered in Madoc Twp.
1959-1969	not reported
1970	Heavy infestations were observed in Effingham Twp.
1971-1974	not reported
1975	Light damage was recorded at scattered locations.
1976-1980	not reported

Red Pine Sawfly, *Neodiprion nanulus nanulus* Schedl.

Host(s): red and jack pine [Major]

<u>Year</u>	<u>Remarks</u>
1950-1967	not reported
1968	Low population levels were observed in plantations and natural stands in Hungerford and Oso twps.
1969-1972	not reported
1973	A light infestation was observed along Hwy 41 in Anglesea Twp.
1974	not reported
1975	Defoliation averaging 20% was encountered in a jack pine plantation along Hwy 41 in Denbigh Twp.
1976-1977	not reported
1978	scattered colonies in red and jack pine plantings near Burritts Rapids and Merrickville
1979	low populations reported at several locations with defoliation less than 5%
1980	trace populations

Maple Leaf Cutter, *Paraclemensia acerifoliella* (Fitch)

Host(s): maple

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1957	not reported
1958	A light infestation was recorded in Olden Twp.
1959	Moderate-to-severe defoliation was encountered in Olden Twp.
1960	A major increase in moderate-to-severe defoliation was reported in Hinchinbrooke, Olden and Oso twps.
1961	Medium-to-heavy infestations occurred in the central portion of the district.
1962	Medium-to-heavy infestations persisted in Olden, Oso, Kaladar and Hinchinbrooke twps.
1963	Medium-to-heavy infestations occurred in Barrie, Kaladar, Olden and Oso twps.
1964	Medium-to-heavy infestations persisted in Olden and Oso twps. Light infestations were recorded in Elzevir and Hinchinbrooke twps.
1965	Medium-to-heavy infestations were encountered in Clarendon and Palmerston twps. Declining populations were observed in the remainder of the district.
1966-1980	not reported

Small European Elm Bark Beetle, *Scolytus multistriatus* (Marsh)

Host(s): elm

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1961	not reported
1962	This introduced insect was found for the first time in the district.
1963-1972	This beetle continued to spread throughout the district.
1973	The recovery of larvae and adults on white elm in Denbigh Twp represented a distribution extension of approximately 80 km north of previous infestations.
1974-1980	Dead and dying trees common throughout the district.

DISEASES

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

Host(s): coniferous, deciduous [Major]

<u>Year</u>	<u>Remarks</u>
1950-1954	not reported
1955	commonly reported in areas with poorly drained soils
1956-1963	not reported
1964	Light infection levels occurred across the district.
1965	Scattered light infections occurred in pines near the town of Flinton.
1966	Light infection levels occurred across the district.
1967-1980	not reported

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

Host(s): pine [Major]

<u>Year</u>	<u>Remarks</u>
1950-1966	not reported
1967	Light mortality recorded in a plantation near Moira Lake, Huntingdon Twp.
1968-1977	not reported
1978-1980	Extensive surveys throughout the district failed to reveal the presence of the European race of this organism.

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

Host(s): wE

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1956	not reported
1957-1958	Light damage occurred within the known area of infestation.
1959	Further expansions occurred in Hastings and Northumberland County.
1960	Further expansion was recorded into the Olden Twp area.
1961-1962	no change in distribution; mortality more noticeable
1963	disease became more prevalent in the north of the district
1964	Mortality started in the northern portion of the district.
1965	incidence and mortality increased in the northern portion of the district
1966	Incidence of the disease increased; 27% of the trees examined were affected.
1967-1968	Incidence of the disease increased to an average of 32%.
1969	Heaviest damage was reported in the southern part of the district.
1970	high incidence along Hwy #7; 37% mortality in Madoc Twp
1971	In Madoc Twp, 49% of the host examined were either diseased or dead.
1972	not reported
1973	Elm in Hungerford Twp were 52% diseased.
1974	Elms in Hungerford Twp received mortality or 45%.
1975-1980	Widespread mortality was experienced across the district.

White Pine Blister Rust, *Cronartium ribicola* Fischer

Host(s): white pine

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1953	not reported
1954	found commonly throughout the district
1955	Heavy mortality was recorded on open-grown regeneration at several locations.
1956-1958	not reported
1959	light infections reported in most pine stands examined
1960	not reported
1961	Lightly infected trees were commonly observed.
1962	not reported
1963-1964	Low infection levels were recorded across the district.
1965	numerous medium-to-heavy infection recorded in the northern portion of the district
1966	observed commonly on all age classes of pine
1967	commonly found on regeneration throughout the district.
1968	medium-to-heavy infection levels recorded across the district
1969	common throughout the district
1970-1971	not reported
1972	A 80% incidence rate with a current mortality rate of 30% was recorded in Abinger Twp.
1973	A moderate level of damage resulted in 5% mortality in Kaladar Twp.
1974-1980	not reported

Other Noteworthy Diseases

Ink Spot of Aspen, *Ciborinia whetzellii* (Seaver.) Seaver.

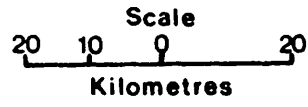
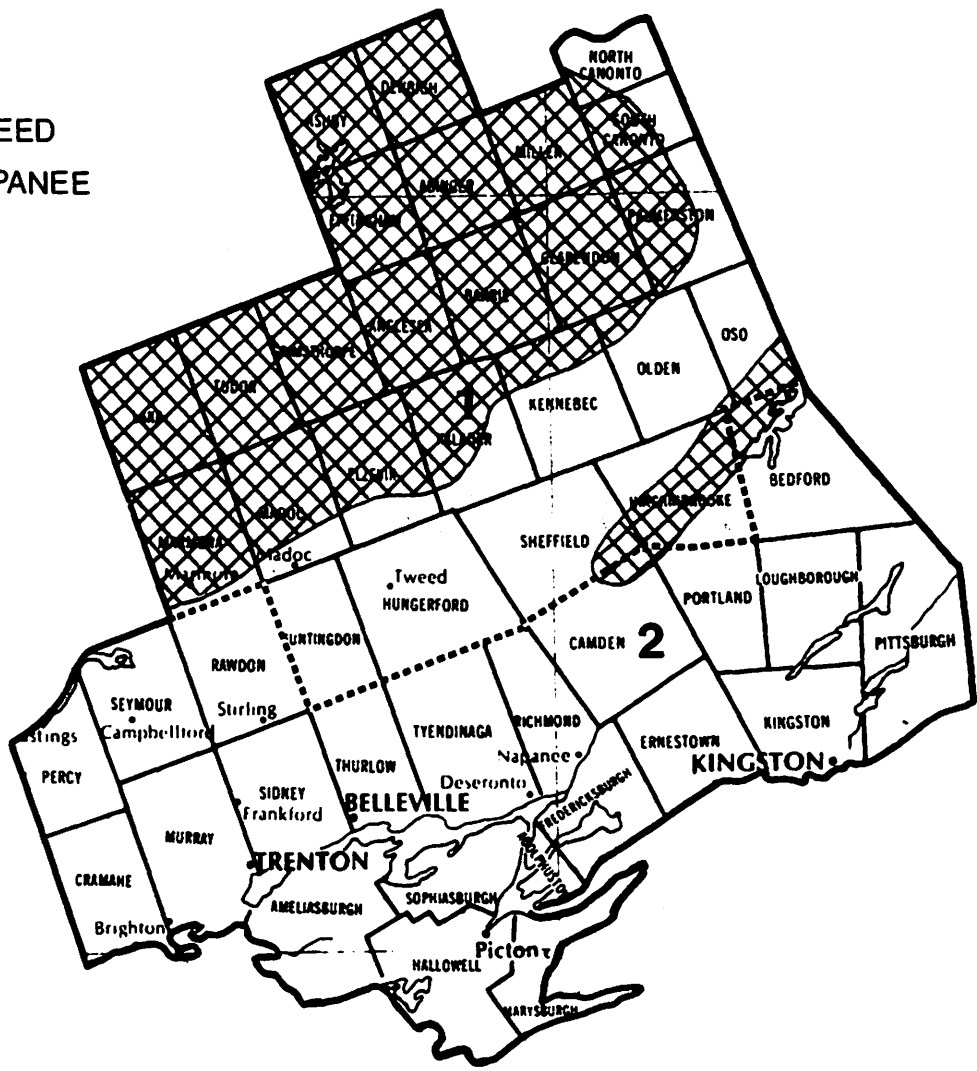
Host(s): trembling aspen

[Minor]

<u>Year</u>	<u>Remarks</u>
1950-1959	not reported
1960	Light infection levels were recorded in Hungerford Twp.
1961	Moderate-to-severe defoliation was recorded in Elzevir Twp.
1962-1963	not reported
1964-1966	light infection common throughout the district
1967	not reported
1968	light defoliation recorded on open-grown and fringe trees
1969	not reported
1970	trace infection levels recorded in Oso Twp
1971	not reported
1972	Moderate-to-severe defoliation was recorded in Bon Echo Provincial Park.
1973-1974	not reported
1975	trace infection levels recorded across the district
1976-1978	not reported
1979	common throughout the eastern portion of the district
1980	not reported

TWEED and NAPANEE DISTRICTS

- 1. TWEED
- 2. NAPANEE




Forest Insect and Disease Survey
Great Lakes Forestry Centre

Forest tent caterpillar

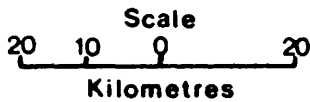
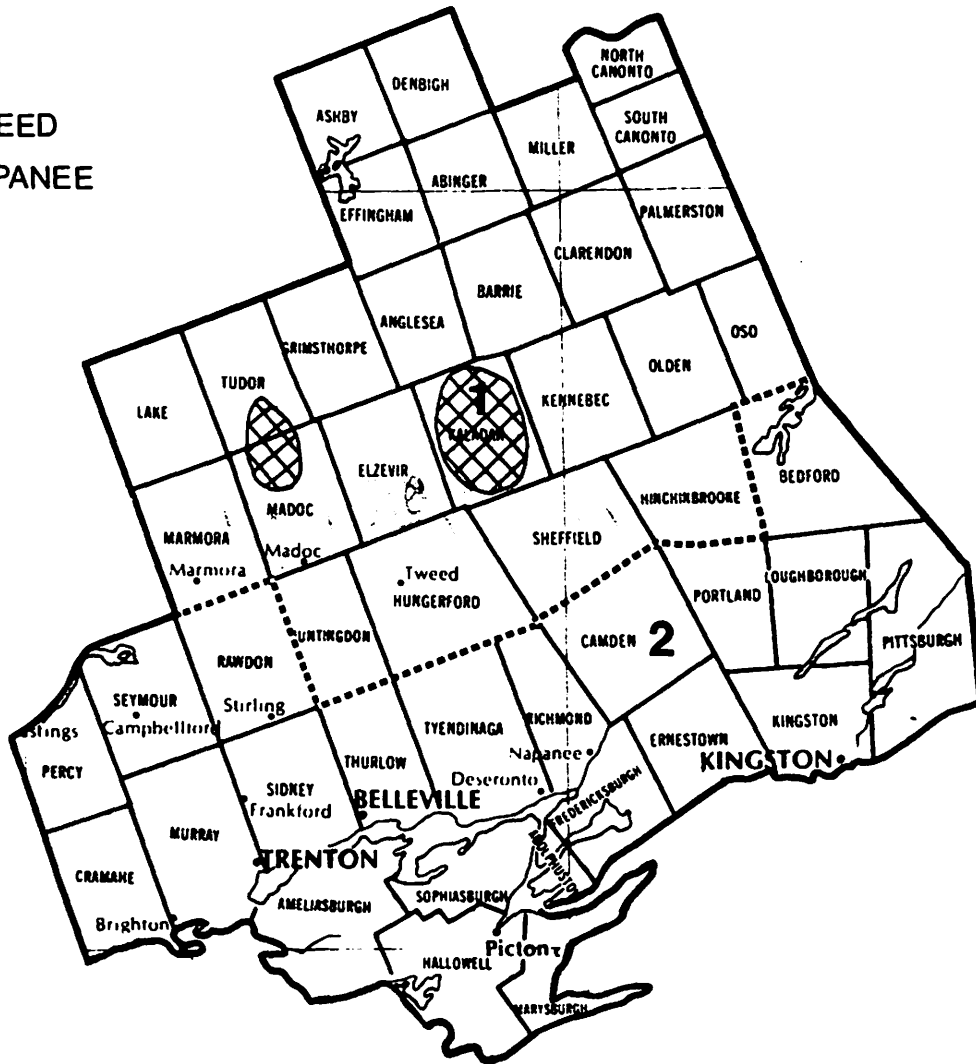
Areas within which defoliation occurred in 1953

LEGEND

Moderate-to-severe defoliation 

TWEED and NAPANEE DISTRICTS

- 1. TWEED
- 2. NAPANEE



Forest Insect and Disease Survey
Great Lakes Forestry Centre

Forest tent caterpillar

Areas within which defoliation
occurred in 1954

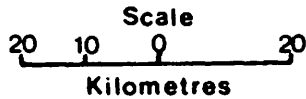
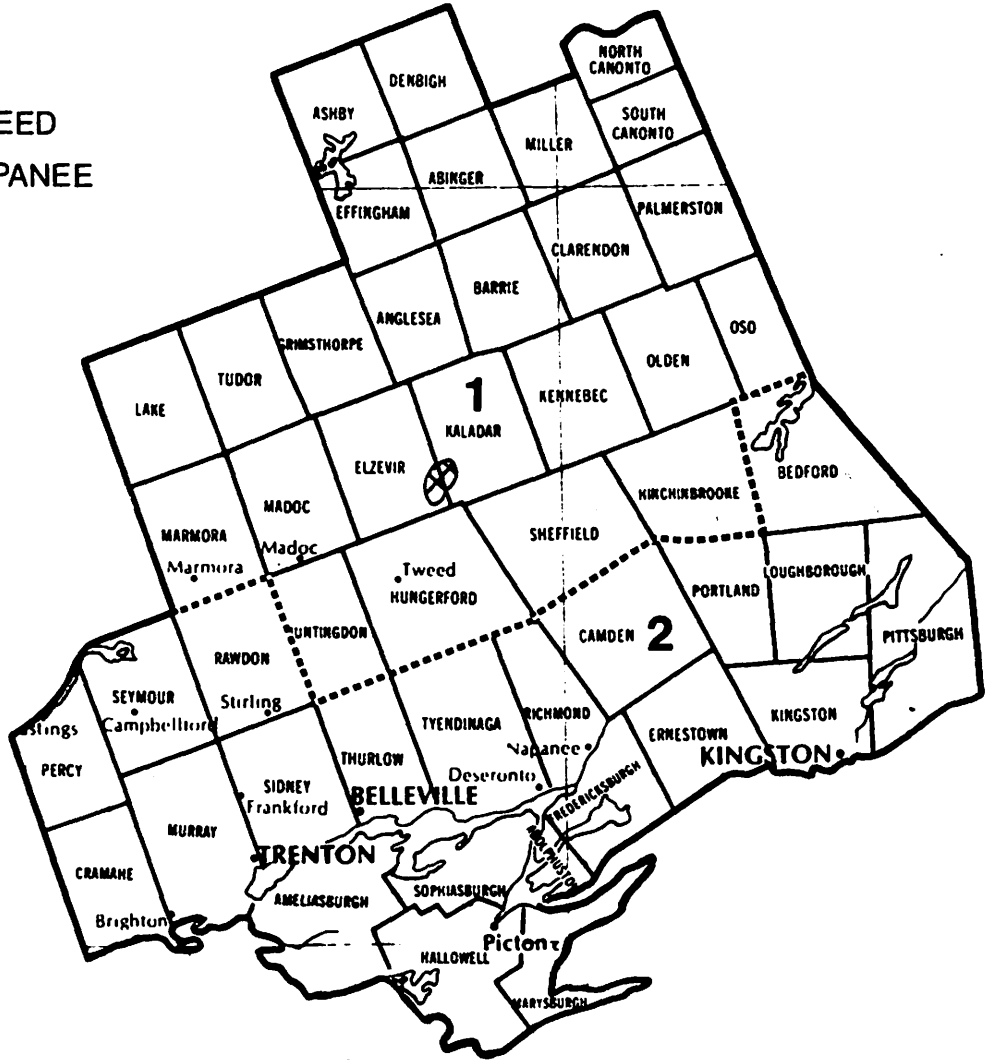
LEGEND

Moderate-to-severe defoliation



TWEED and NAPANEE DISTRICTS

- 1. TWEED
- 2. NAPANEE



Forest Insect and Disease Survey
Great Lakes Forestry Centre

Forest tent caterpillar

Areas within which defoliation
occurred in 1965

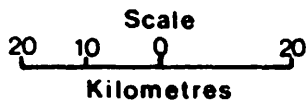
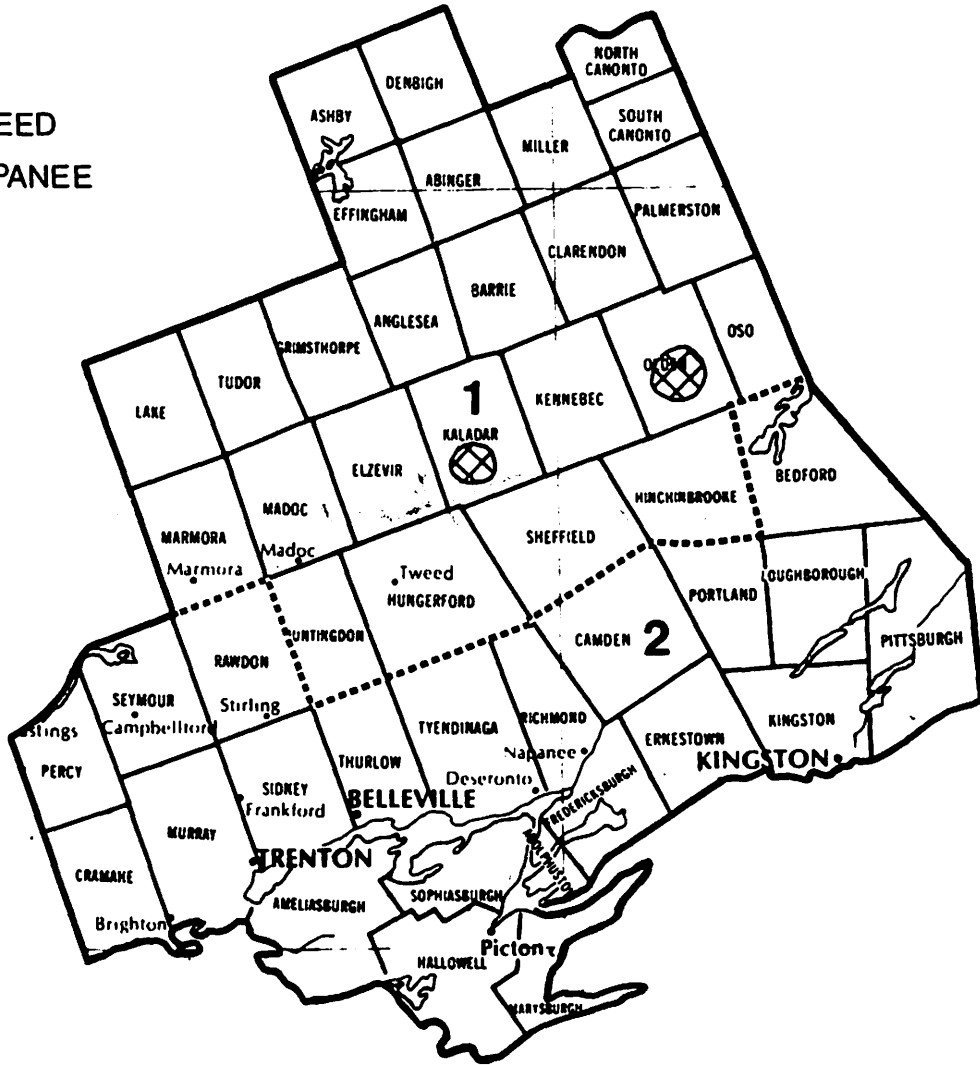
LEGEND

Moderate-to-severe defoliation



TWEED and NAPANEE DISTRICTS

- 1. TWEED
- 2. NAPANEE



Forest Insect and Disease Survey
Great Lakes Forestry Centre

Forest tent caterpillar

Areas within which defoliation occurred in 1973

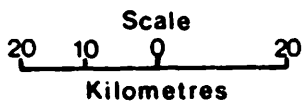
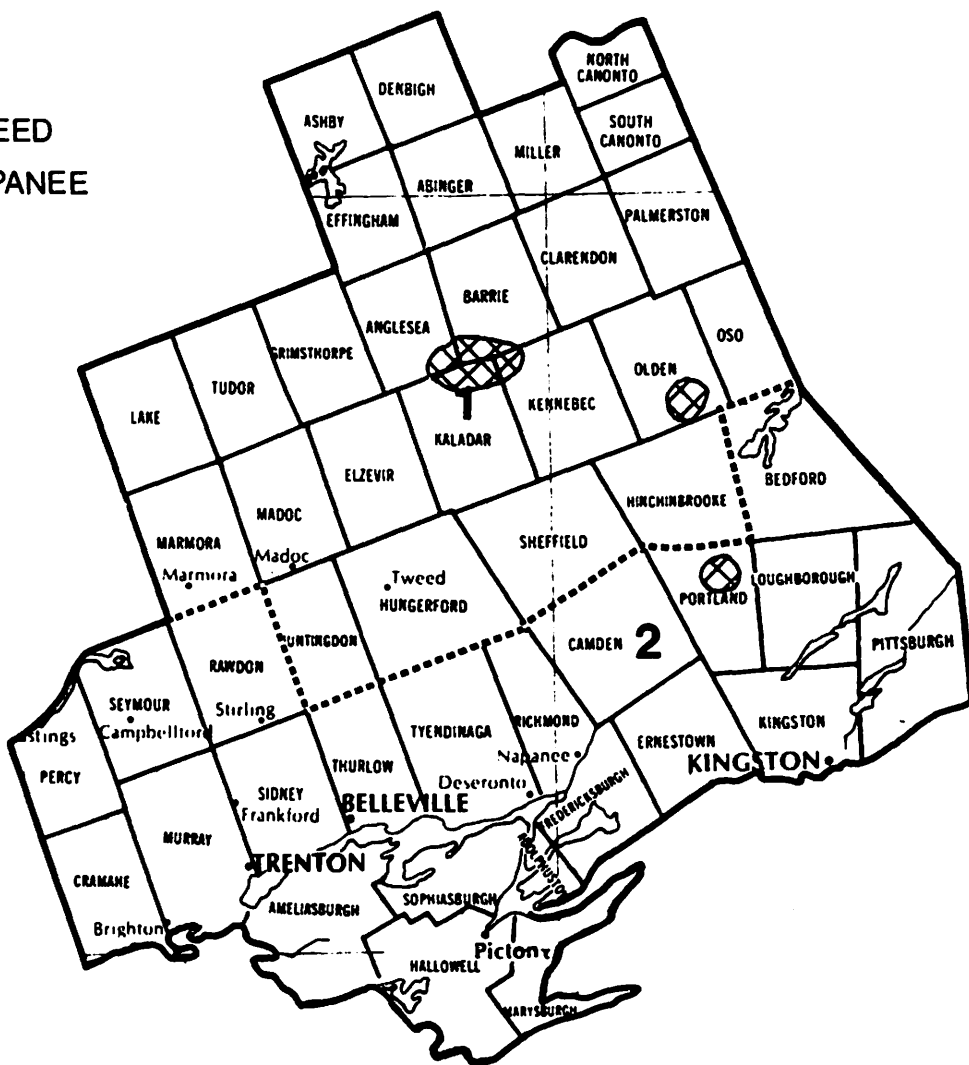
LEGEND

Moderate-to-severe defoliation



TWEED and NAPANEE DISTRICTS

- 1. TWEED
- 2. NAPANEE



Forest Insect and Disease Survey
Great Lakes Forestry Centre

Forest tent caterpillar

Areas within which defoliation occurred in 1974

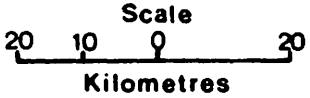
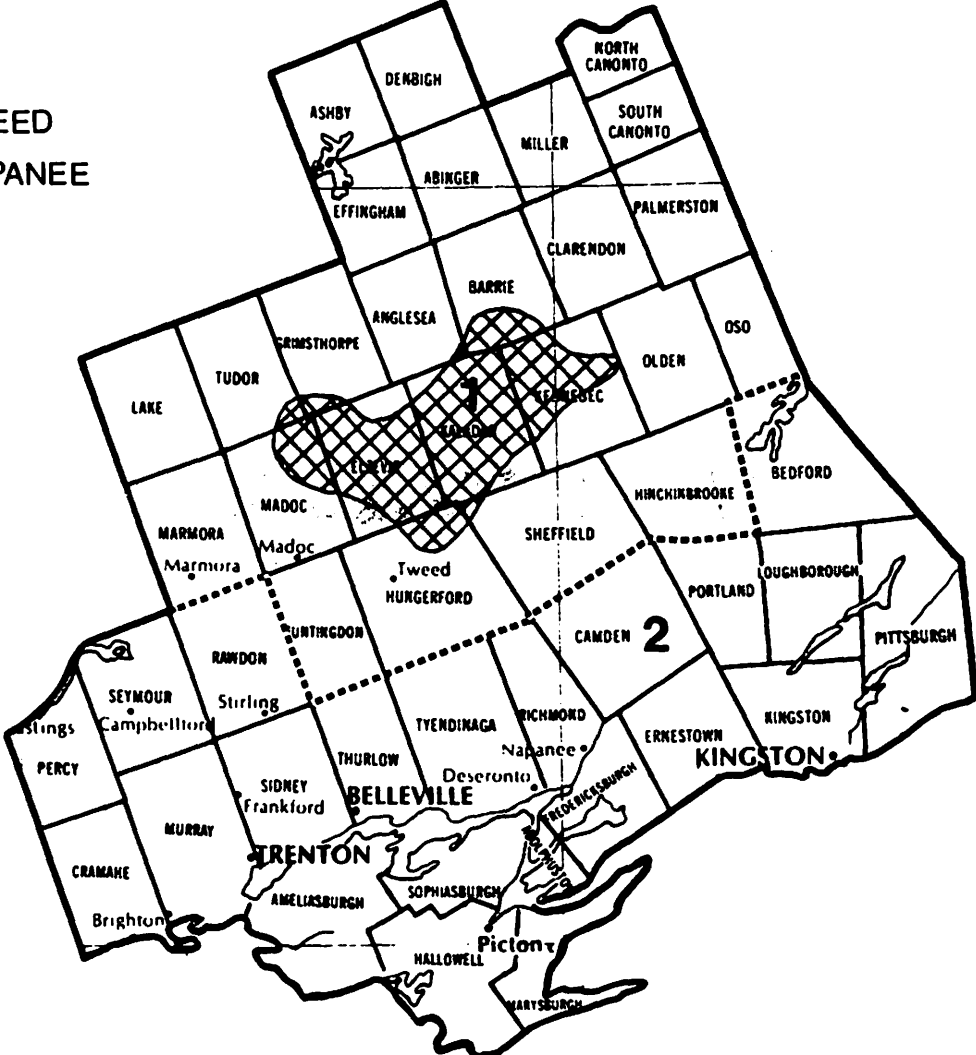
LEGEND

Moderate-to-severe defoliation



TWEED and NAPANEE DISTRICTS

- 1. TWEED
- 2. NAPANEE



Forest Insect and Disease Survey
Great Lakes Forestry Centre

Forest tent caterpillar

Areas within which defoliation occurred in 1975

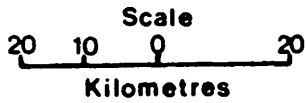
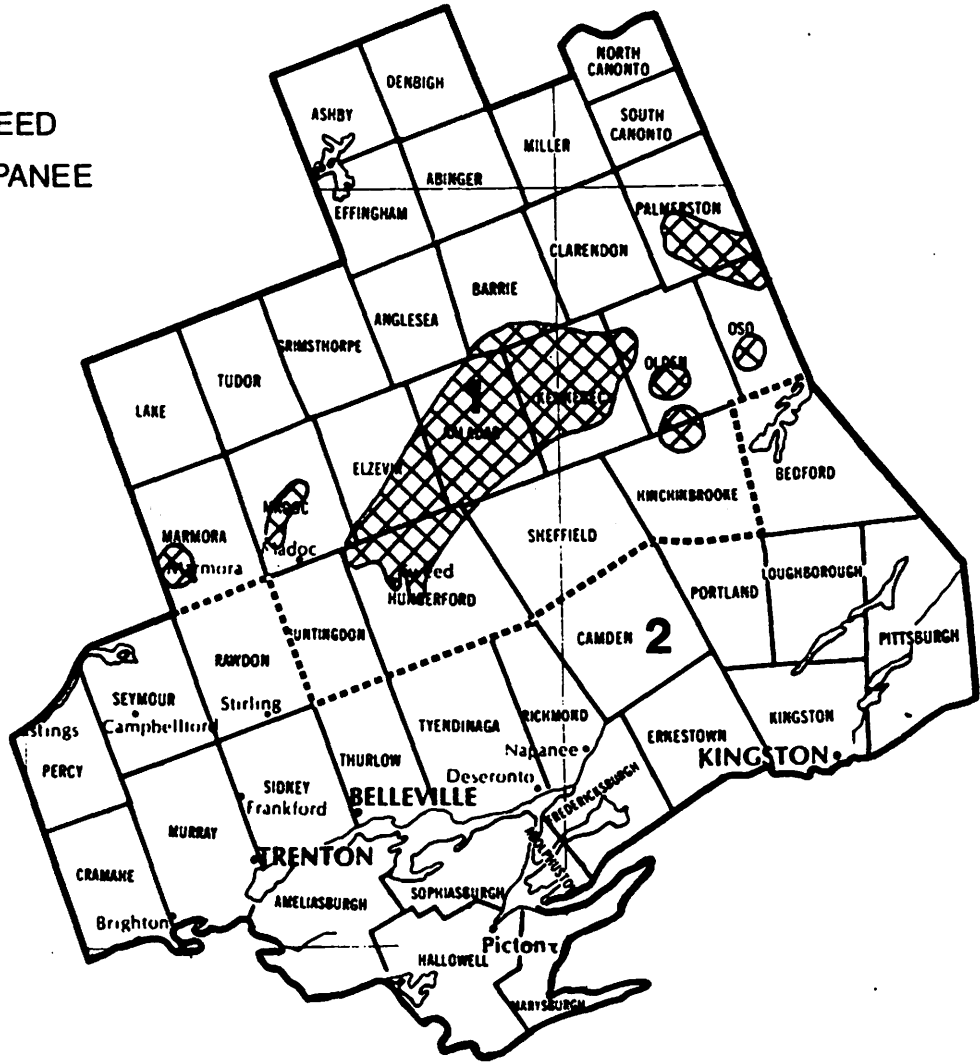
LEGEND

Moderate-to-severe defoliation



TWEED and NAPANEE DISTRICTS

- 1. TWEED
- 2. NAPANEE



Forest Insect and Disease Survey
Great Lakes Forestry Centre

Forest tent caterpillar

Areas within which defoliation
occurred in 1976

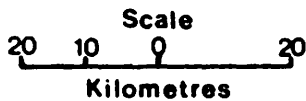
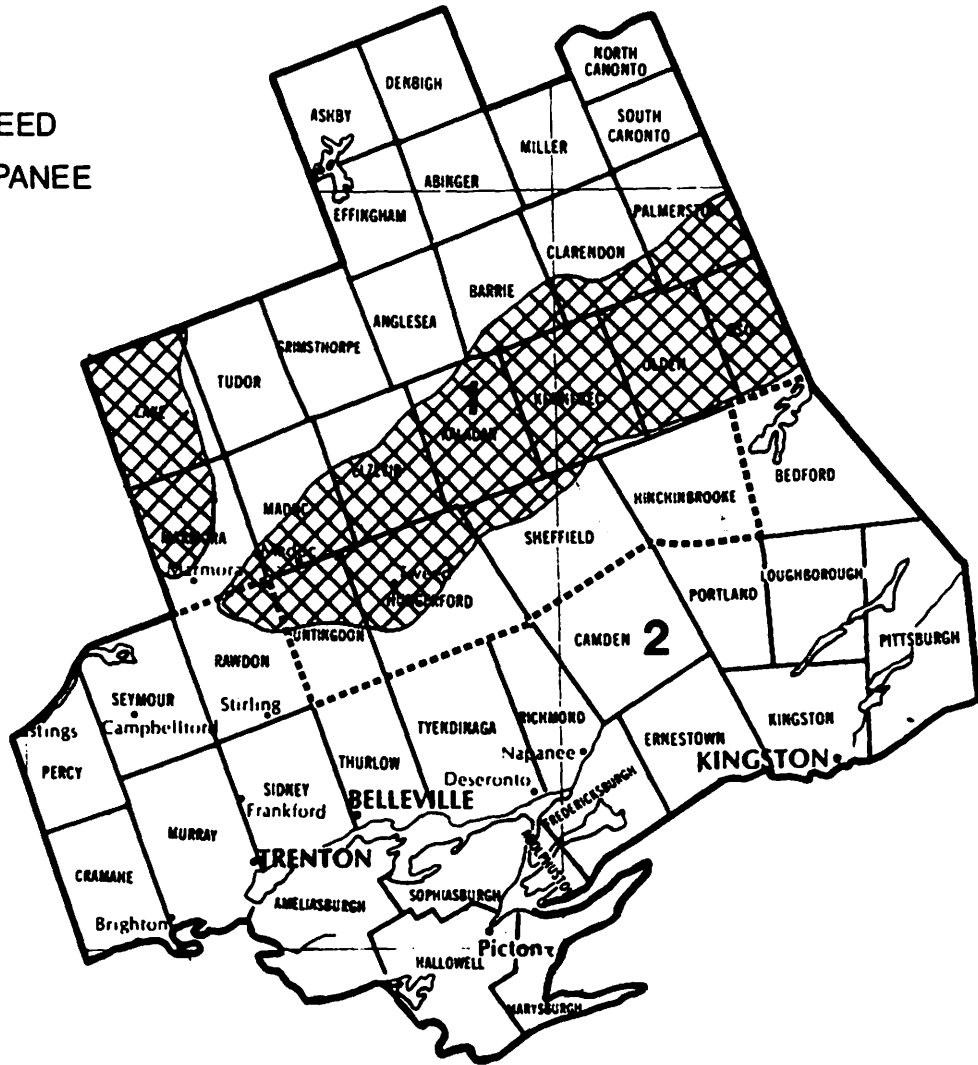
LEGEND

Moderate-to-severe defoliation



TWEED and NAPANEE DISTRICTS

- 1. TWEED
- 2. NAPANEE



Forest Insect and Disease Survey
Great Lakes Forestry Centre

Forest tent caterpillar

Areas within which defoliation
occurred in 1977

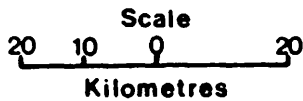
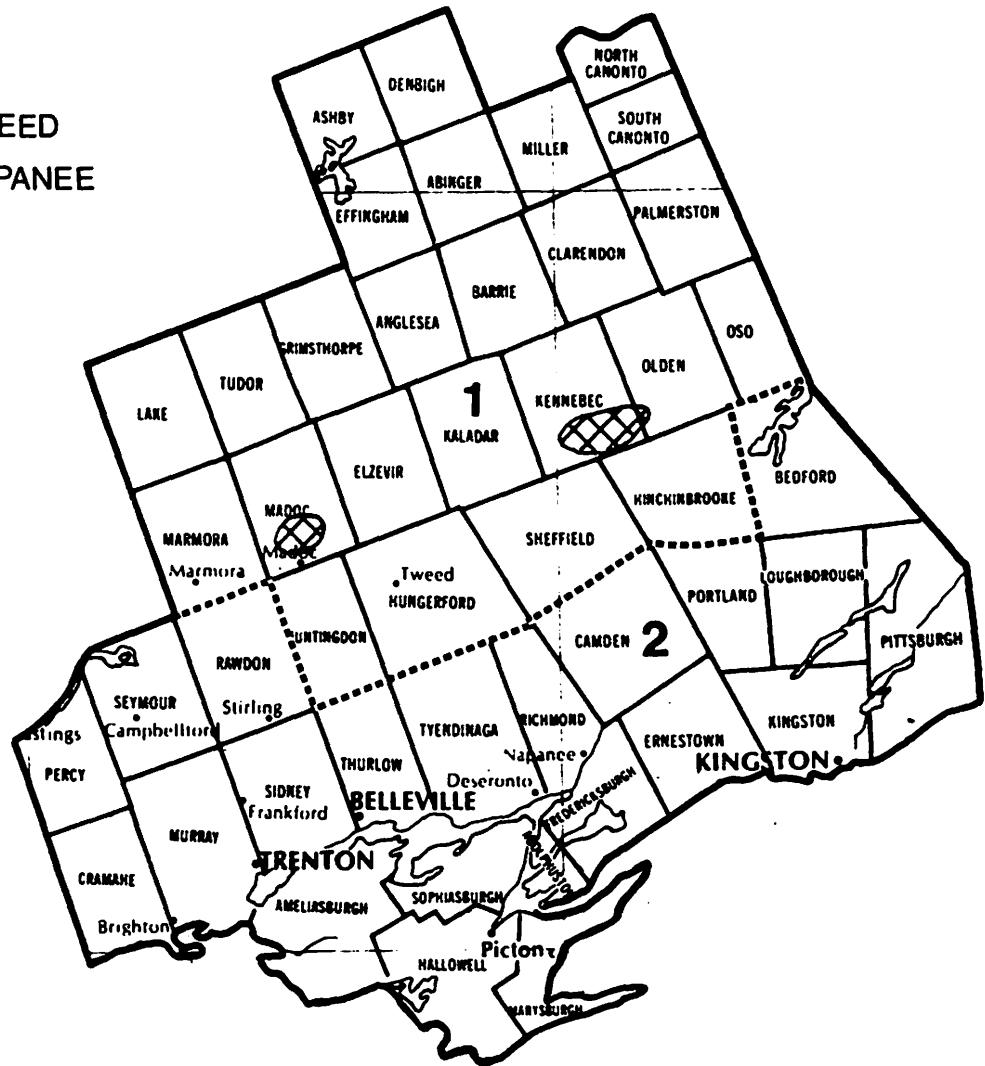
LEGEND

Moderate-to-severe defoliation



TWEED and NAPANEE DISTRICTS

- 1. TWEED
- 2. NAPANEE



Forest Insect and Disease Survey
Great Lakes Forestry Centre

Forest tent caterpillar

Areas within which defoliation
occurred in 1978

LEGEND

Moderate-to-severe defoliation



Cedar Apple Rust, *Gymnosporangium juniperi-virginianae* Schw.

Host(s): red cedar

[Minor]

<u>Year</u>	<u>Remarks</u>
1950-1964	not reported
1965	commonly observed throughout Hungerford and Huntingdon twps
1966-1967	heavy infections throughout the southern portion of the district
1968-1979	not reported
1980	common throughout the southwestern portion of the district

Hypoxyylon Canker of Poplar, *Hypoxyylon mammatum* (Whal.) J.H. Miller

Host(s): trembling aspen

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1952	not reported
1953	poplar stands frequently affected north of Hwy #7 and occasionally in woodlots south of the highway
1954	Varying degrees of damage were recorded in the extensive aspen stands in Kennebec Twp.
1955-1956	not reported
1957	found commonly throughout the district
1958-1963	not reported
1964	Light infections were common across the district.
1965	scattered pockets of heavy infection with related light mortality
1966-1967	light infections at numerous locations across the district
1968	Infection levels remain high, resulting in considerable tree mortality.
1969-1973	not reported
1974	light damage reported along Hwy #41 north of Kaladar
1975-1980	not reported

Leaf and Twig Blight of Poplar, *Pollaccia radios* (Lib.) Bald. & Cif.

Host(s): trembling aspen

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1958	not reported
1959	found commonly on regeneration throughout the central portion of Hastings County
1960	not reported
1961	light damage to regeneration at several locations
1962-1965	not reported
1966	incidence and severity were generally light across the district
1967	occasional lightly infested aspen shoots
1968	commonly found at low levels of infection
1974	commonly found at low levels
1975	understory trees heavily damaged at many locations
1976	Damage levels varied greatly across the district.
1977-1980	not reported

ABIOTIC DAMAGE

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Drought Damage

Host(s): wP, deciduous hosts

<u>Year</u>	<u>Remarks</u>
1950-1954	not reported
1955	Considerable mortality was recorded on seedlings and saplings growing on poor sites.
1956-1965	not reported
1966	Heavy damage was recorded in white pine plantations throughout the central portion of the district.
1967	Further mortality of branch tips and some entire branches was recorded in the area of previous damage.
1968-1980	not reported

Flood Damage

Host(s): bAsh, bF

<u>Year</u>	<u>Remarks</u>
1950-1953	not reported
1954-1955	Highway construction along Hwy #7 caused pooling of water and mortality to low lying balsam fir and black ash host between Sharbot Lake and Maberly.
1956-1980	not reported

Frost Damage

Host(s): rM, rO, wS, bAsh, bF

<u>Year</u>	<u>Remarks</u>
1950-1953	not reported
1954	Newly exposed fringe trees along Hwy #7, particularly in Kaladar Twp, were moderately damaged and some trees also received frost cracks.
1955-1959	not reported
1960	light damage recorded on conifers in the northern portion of the district
1961-1962	not reported
1963	new shoots damaged by late frosts across the entire district
1964-1971	not reported
1972	Mid-June frosts damaged spruce, balsam and black ash in the northern portion of the district.
1973-1979	not reported
1980	Trace damage levels were observed at numerous points across the district.

DIEBACKS

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Balsam Fir Dieback

Host(s): balsam fir

<u>Year</u>	<u>Remarks</u>
1950-1954	not reported
1955	found commonly across the district in pastured woodlots, dry rocky sites and along roadsides
1956	not reported
1957	High numbers of dead and dying balsam fir trees were observed throughout the northern portion of the district. Mortality occurred more frequently on open-grown trees.
1958	Heavy damage was confined to the northern portions of Lennox and Addington and Hastings counties. Mortality in these areas reached 20% in the pockets of mature, open-grown tree.
1959-1980	not reported

Maple Dieback

Host(s):

<u>Year</u>	<u>Remarks</u>
1950-1957	not reported
1958	dead and dying trees observed commonly along Hwy #7
1959	light damage to individual trees
1960	not reported
1961	heavy damage reported on shade trees and trees adjacent to Hwy #7 between Peterborough and Actinolite.
1962-1964	Light mortality was recorded on roadside trees in the southern portion of the district.
1965-1967	Light dieback conditions persisted on roadside trees across the district.
1968-1977	not reported
1978	crown and branch dieback on maple in Oso and Olden twps
1979-1980	not reported

APPENDICES

[The following text is extremely faint and largely illegible due to low contrast and noise. It appears to be a list of items or a table of contents, possibly including names and dates. Some faint words like "Appendix", "List", and "Table" are visible.]

Appendix A

Appendix B

Appendix C

Appendix D

Appendix E

Appendix F

Appendix G

Appendix H

Appendix I

Appendix J

Appendix K

Appendix L

Appendix M

Appendix N

Appendix O

Appendix P

Appendix Q

Appendix R

Appendix S

Appendix T

Appendix U

Appendix V

Appendix W

Appendix X

Appendix Y

Appendix Z

APPENDIX A

DECIDUOUS HOST

<u>Common Name</u>	<u>Scientific Name</u>	<u>Abbreviations</u>
Alder	<i>Alnus</i> spp.	Al
Apple	<i>Malus</i> spp.	Ap
Ash, black	<i>Fraxinus nigra</i> Marsh.	bAs
white	<i>americana</i> L.	wAs
Aspen, largetooth	<i>Populus grandidentata</i> Michx	lA
trembling	<i>tremuloides</i> Michx.	tA
Basswood	<i>Tilia americana</i> L.	Ba
Beech	<i>Fagus grandifolia</i> Ehrh.	Be
Birch, white	<i>Betula papyrifera</i> Marsh.	wB
yellow	<i>alleghaniensis</i> Britt.	yB
Butternut	<i>Juglans cinerea</i> L.	Bu
Catalpa	<i>Catalpa</i> spp.	Ca
Cherry, eastern choke	<i>Prunus virginiana</i> L.	eaCh
pin	<i>pensylvanica</i> L.f.	pCh
Elm, white	<i>Ulmus americana</i> L.	wE
Hackberry	<i>Celtis occidentalis</i> L.	Ha
Hickory, bitternut	<i>Carya cordiformis</i> (Wang.) K. Koch	bHi
shagbark	<i>ovata</i> (Mill.) K. Koch	sHi
Horse-chestnut	<i>Aesculus carnea</i> Hayne	hChe
Ironwood	<i>Ostrya</i> spp.	I
Maple, Manitoba	<i>Acer negundo</i> L.	mM
red	<i>rubrum</i> L.	rM
silver	<i>saccharinum</i> L.	siM
sugar	<i>saccharum</i> Marsh.	sM

APPENDIX A (continued)

DECIDUOUS HOST

<u>Common Name</u>	<u>Scientific Name</u>	<u>Abbreviations</u>
Mountain-ash, American	<i>Sorbus americana</i> Marsh.	aMo
Oak, black	<i>Quercus velutina</i> Lam.	blO
bur	<i>macrocarpa</i> Michx.	bo
red	<i>rubra</i> L.	ro
white	<i>alba</i> L.	wO
Poplar, balsam	<i>Populus balsamifera</i> L.	bPo
Carolina	<i>eugenei</i> Simon-Louis	cPo
Lombardy	<i>nigra</i> L. var. <i>italica</i> Muench.	lPo
silver	<i>alba</i> L.	sPo
Sycamore	<i>Platanus occidentalis</i> L.	Sy
Walnut, black	<i>Juglans nigra</i> L.	Wa
Willow	<i>Salix</i> spp.	W

APPENDIX B

CONIFEROUS HOST

<u>Common Name</u>	<u>Scientific Name</u>	<u>Abbreviations</u>
Cedar, eastern white	<i>Thuja occidentalis</i> L.	eC
Fir, balsam	<i>Abies balsamea</i> (L.) Mill.	bF
Larch, European	<i>Larix decidua</i> Mill.	eL
Pine, Austrian	<i>Pinus nigra</i> Arn.	auP
eastern white	<i>strobus</i> L.	ewP
jack	<i>banksiana</i> Lamb.	jp
mugho	<i>mugho</i> Turra	mP
red	<i>resinosa</i> Ait.	rP
Scots	<i>sylvestris</i> L.	scP
Spruce, black	<i>Picea mariana</i> (Mill.) B.S.P.	bS
Colorado	<i>pungens</i> Engelm.	colS
Norway	<i>abies</i> (L.) Karst.	nS
red	<i>rubens</i> Sarg.	rS
white	<i>glauca</i> (Moench) Voss	wS
Tamarack	<i>Larix laricina</i> (Du Roi) K. Koch	tL

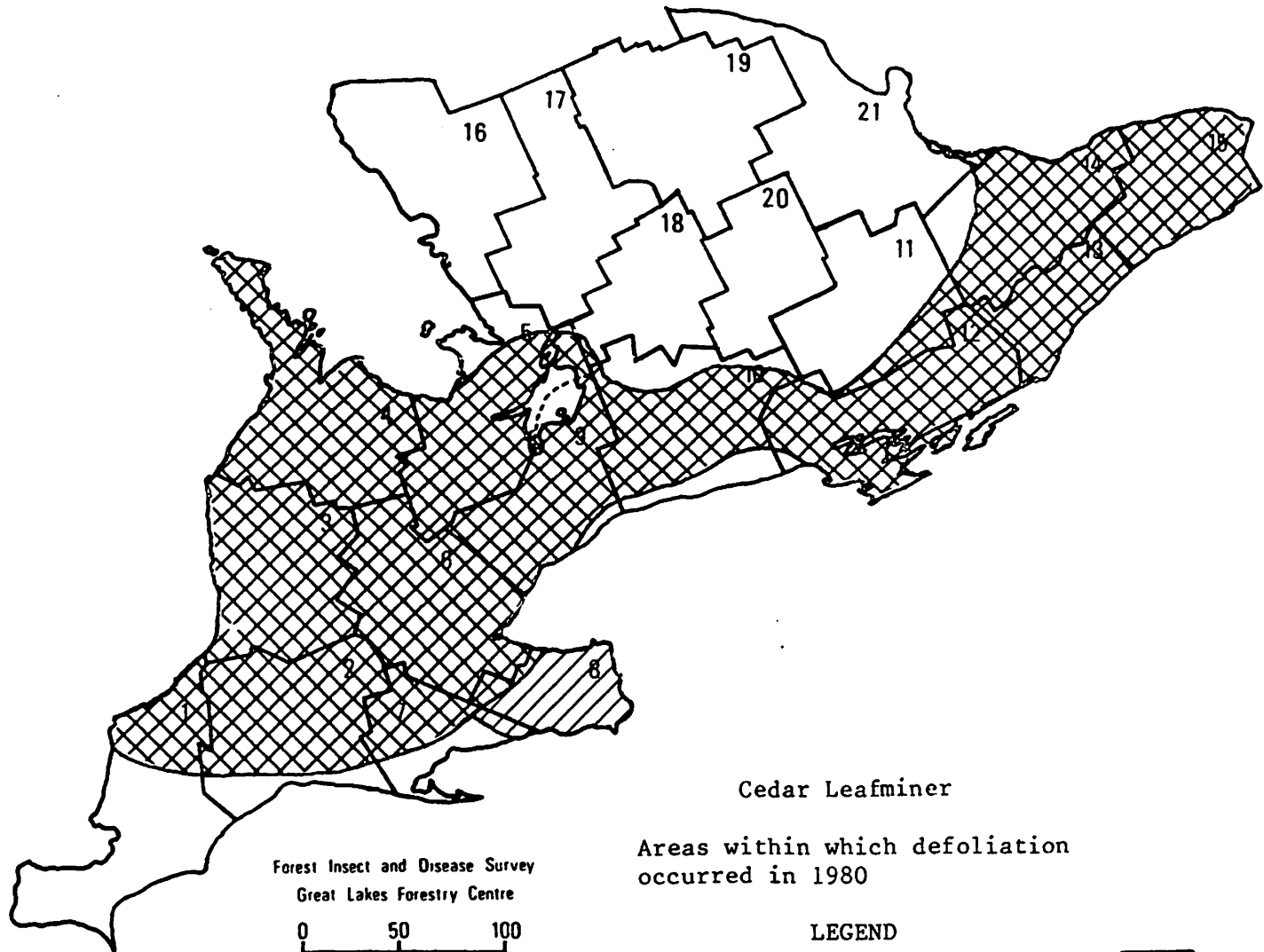
APPENDIX C

MAPS - SOUTHERN ONTARIO

SOUTHERN ONTARIO

DISTRICTS

1. CHATHAM
2. AYLMER
3. WINGHAM
4. OWEN SOUND
5. HURONIA
6. CAMBRIDGE
7. SIMCOE
8. NIAGARA
9. MAPLE
10. LINDSAY
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19. ALGONQUIN PARK
20. BANCROFT
21. PEMBROKE



Cedar Leafminer

Areas within which defoliation
occurred in 1980

LEGEND

Light defoliation

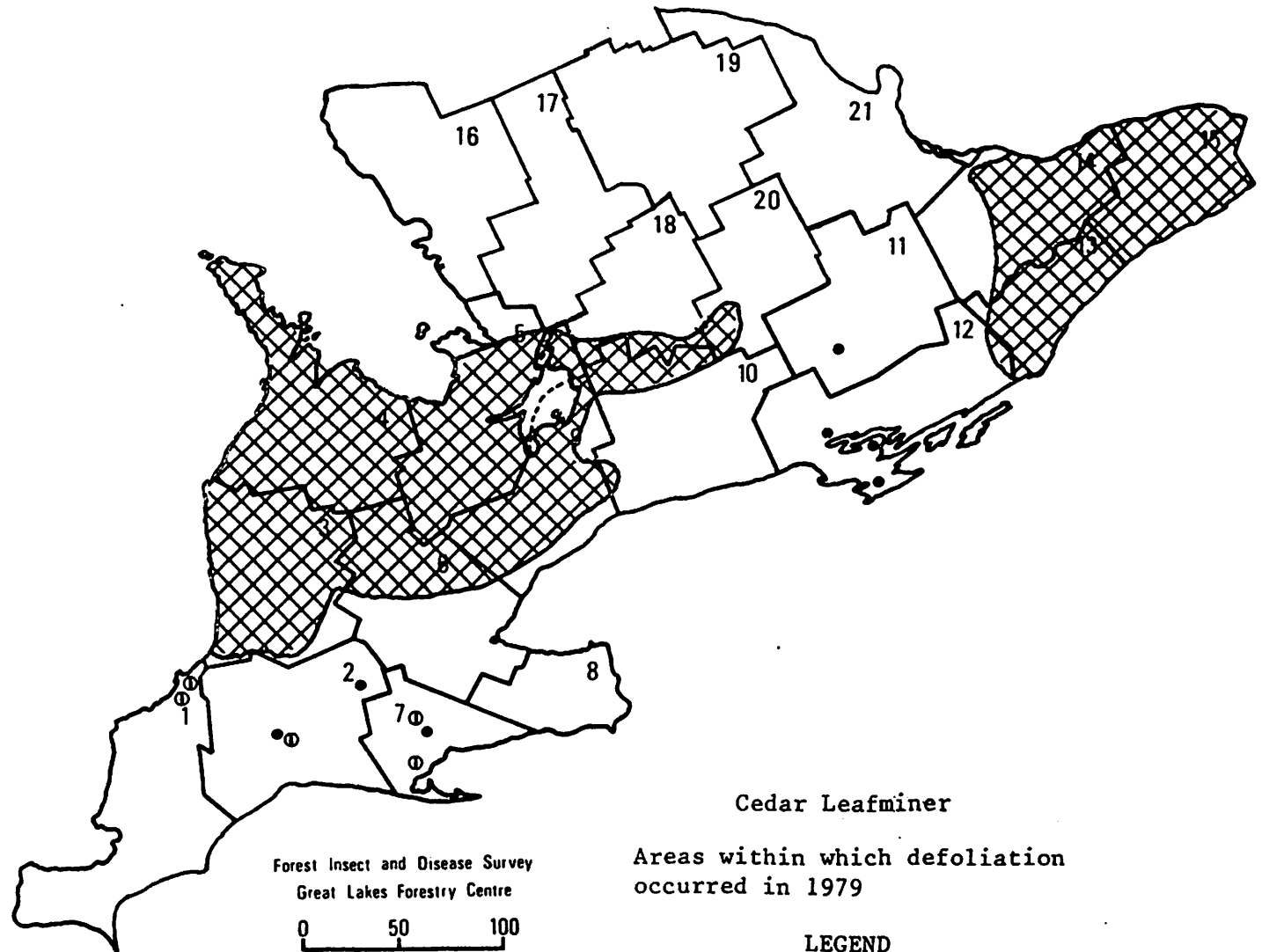
Moderate-to-severe defoliation



SOUTHERN ONTARIO

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Cedar Leafminer

Areas within which defoliation
occurred in 1979

LEGEND

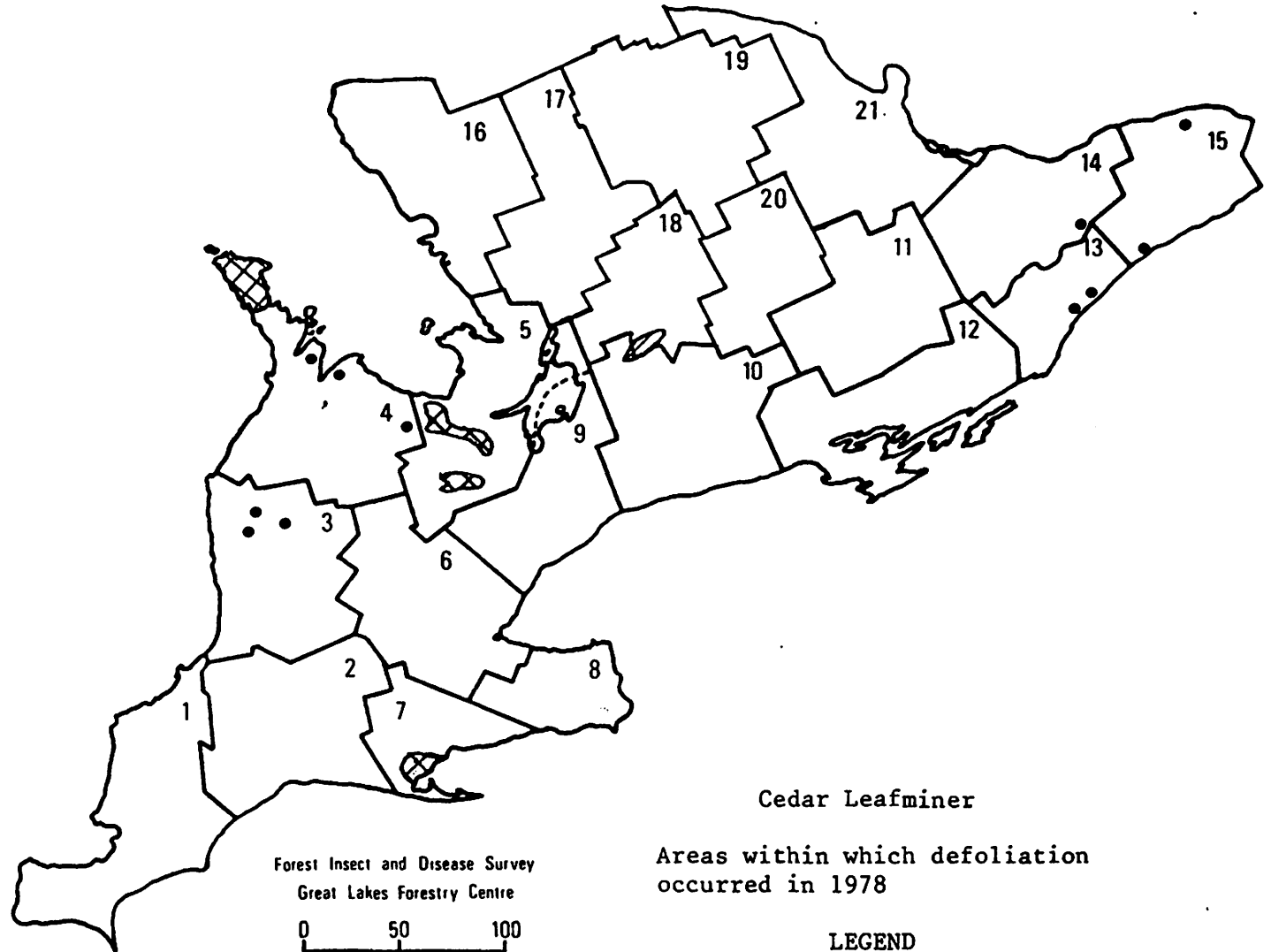
Light defoliation



SOUTHERN ONTARIO

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Cedar Leafminer

Areas within which defoliation
occurred in 1978

LEGEND

Light defoliation



Moderate-to-severe defoliation

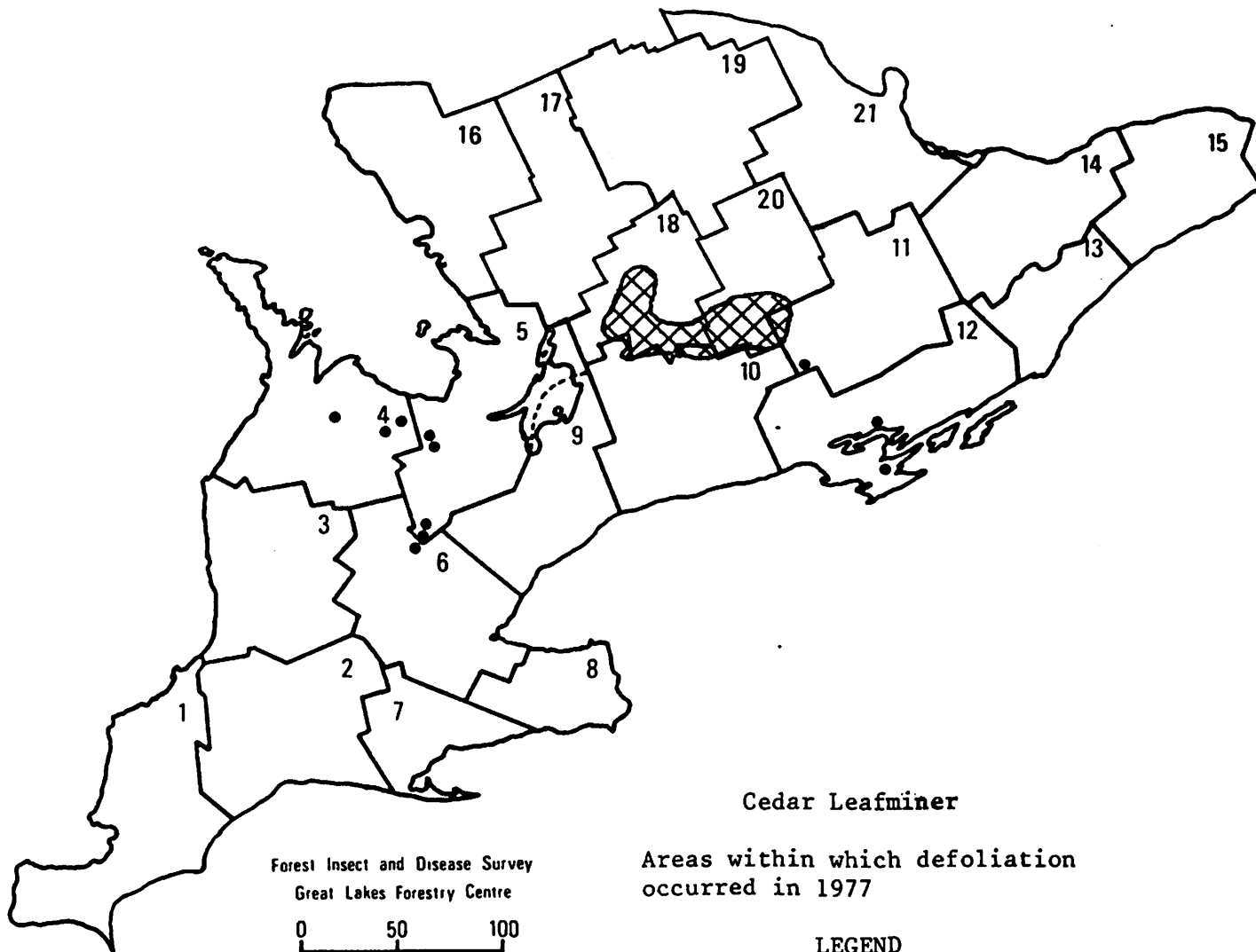
• or




SOUTHERN ONTARIO

DISTRICTS

1. CHATHAM
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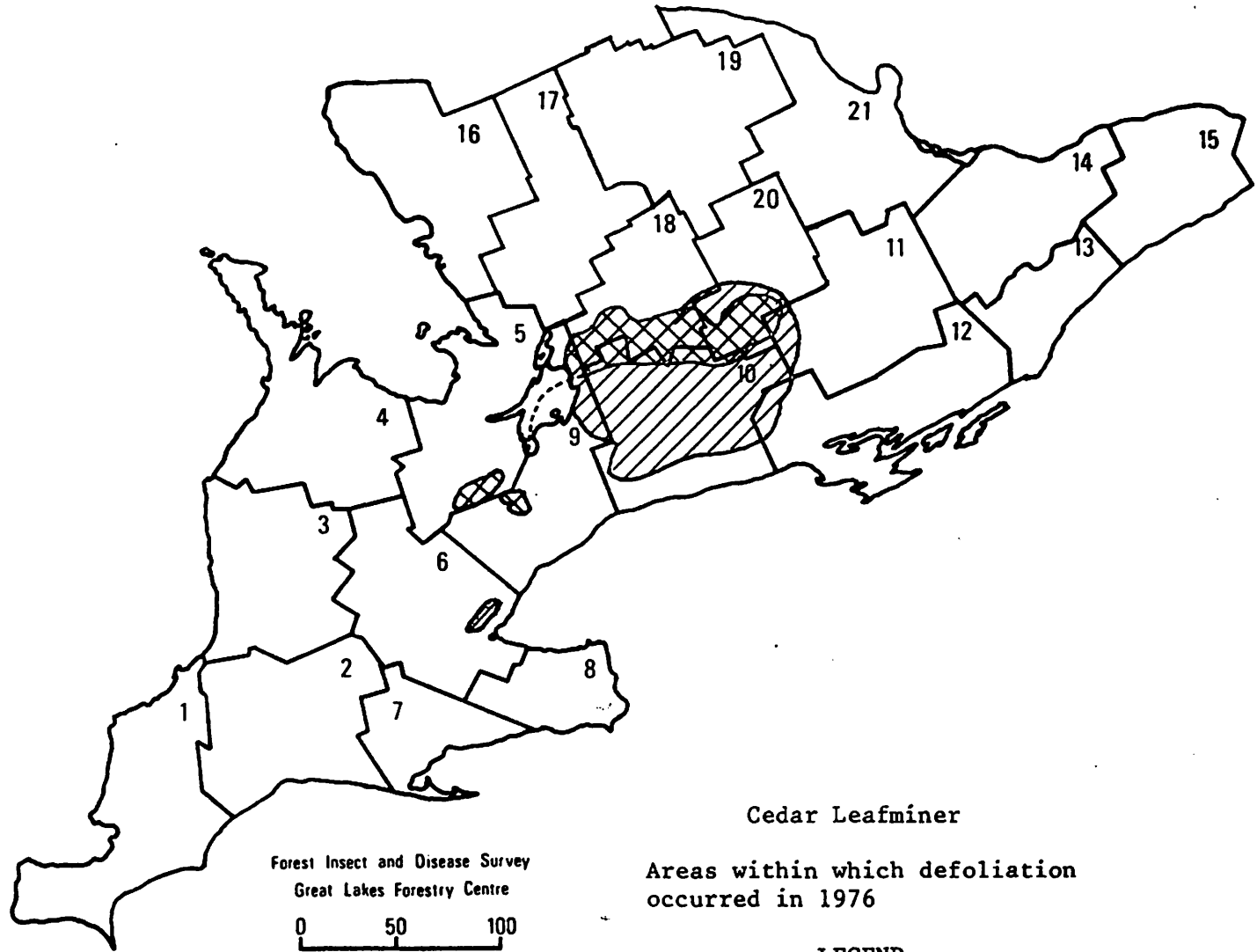
LEGEND

Moderate-to-severe defoliation • or 

SOUTHERN ONTARIO

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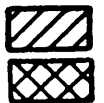
Cedar Leafminer

Areas within which defoliation
occurred in 1976

LEGEND

Light defoliation

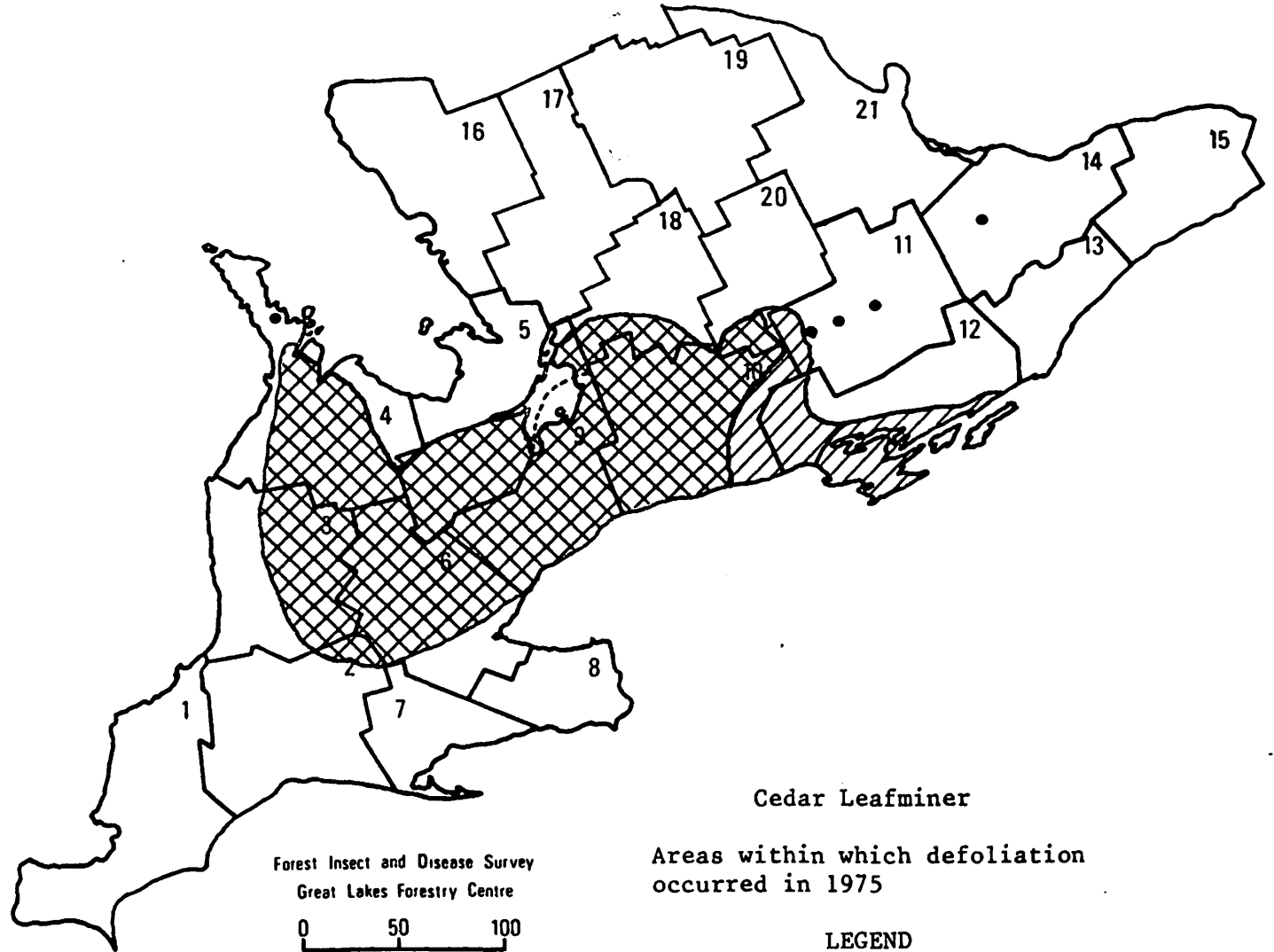
Moderate-to-severe defoliation



SOUTHERN ONTARIO

DISTRICTS

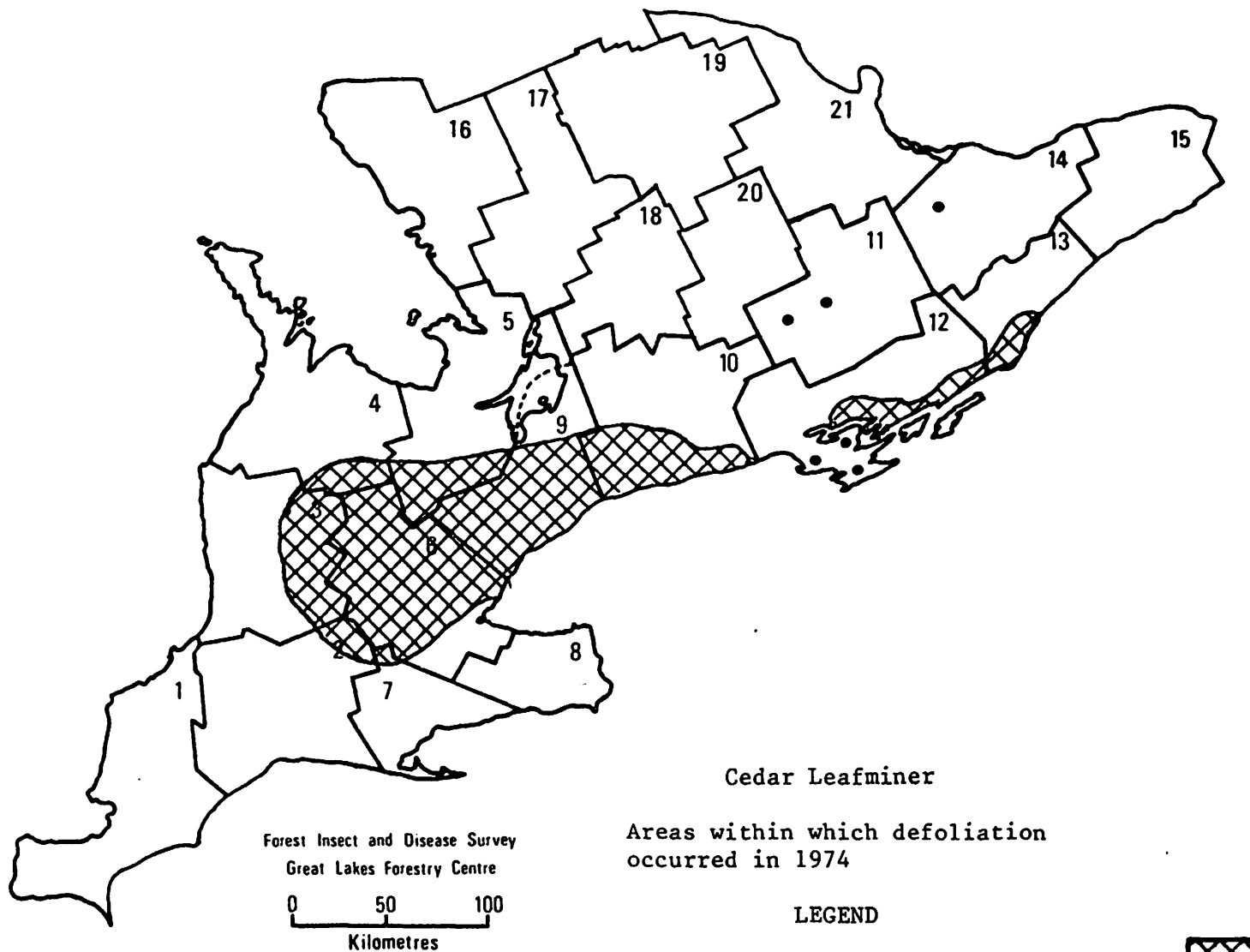
1. CHATHAM
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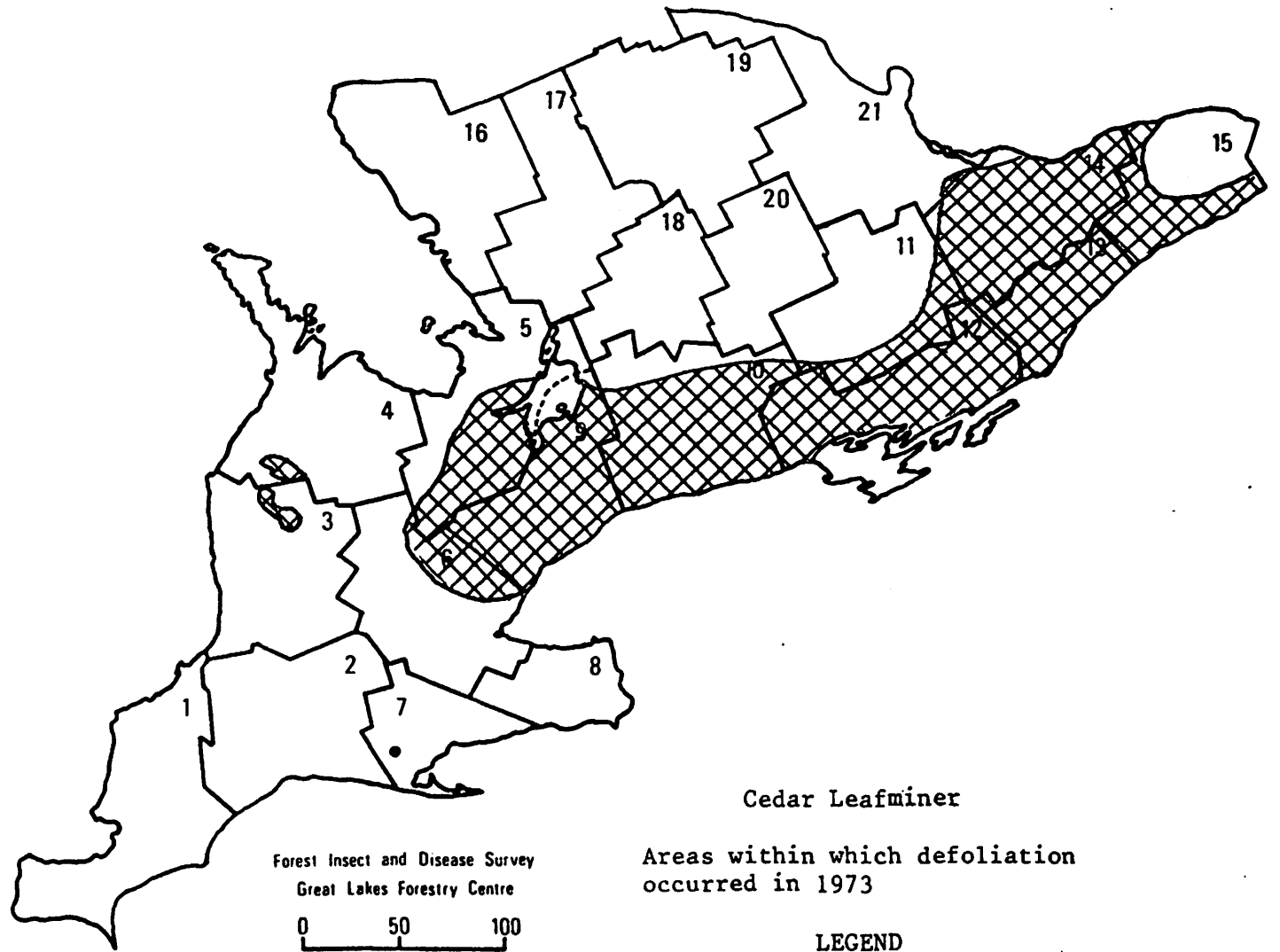


Moderate-to-severe defoliation • or 

SOUTHERN ONTARIO

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Cedar Leafminer

Areas within which defoliation
occurred in 1973

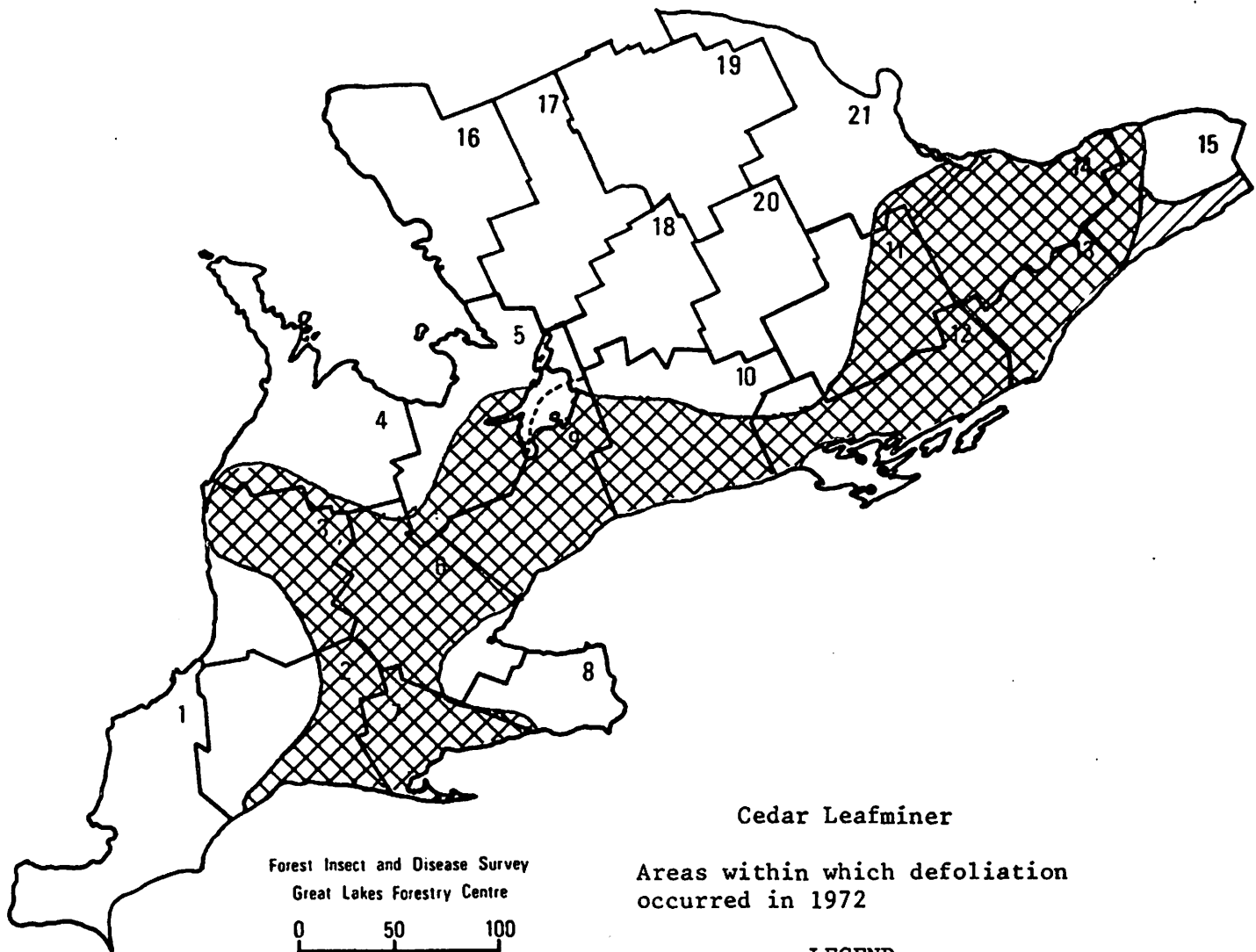
LEGEND

Moderate-to-severe defoliation • or 

SOUTHERN ONTARIO

DISTRICTS

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Cedar Leafminer

Areas within which defoliation
occurred in 1972

LEGEND

Light defoliation



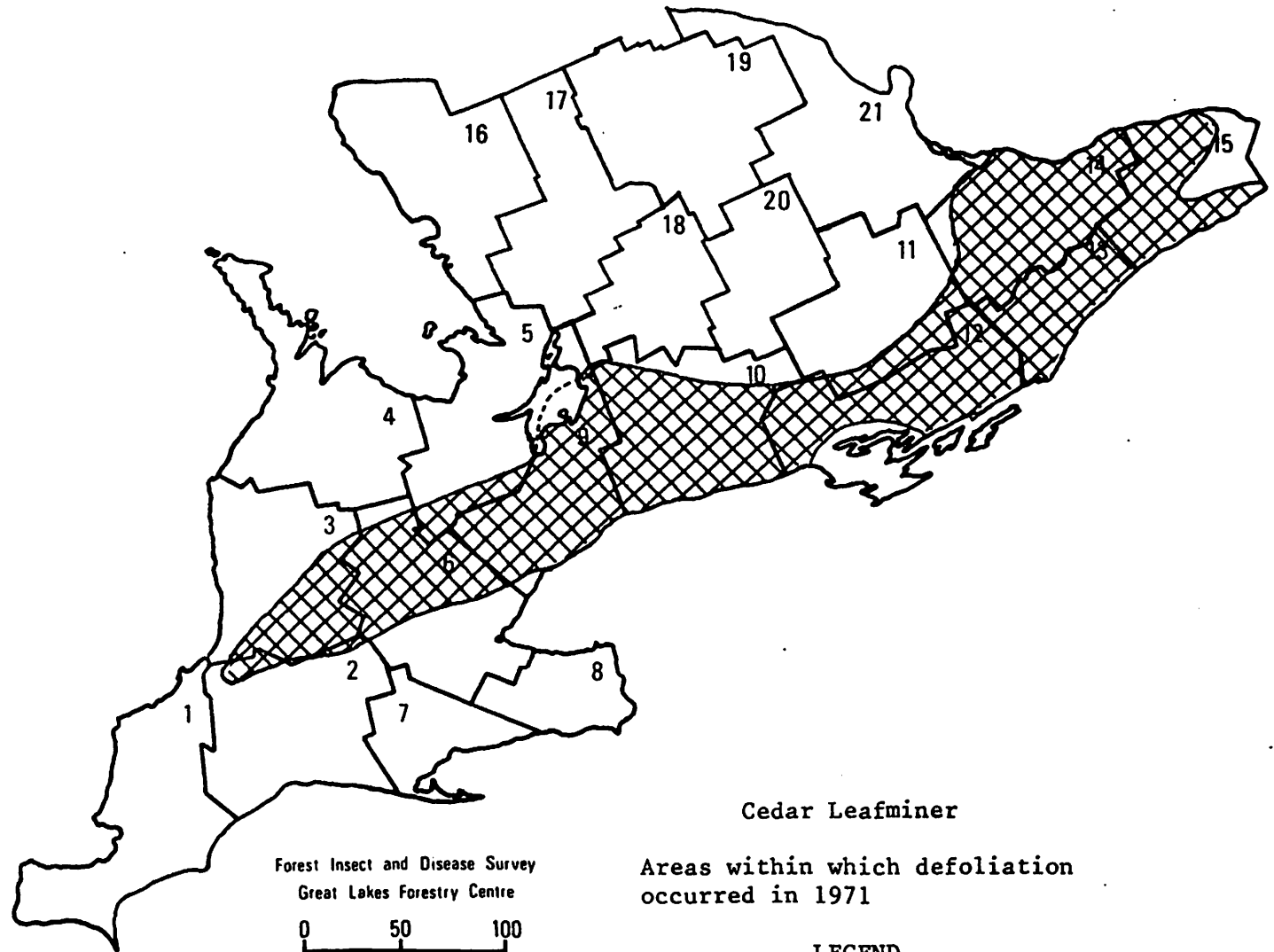
Moderate-to-severe defoliation • or



SOUTHERN ONTARIO

DISTRICTS

1. CHATHAM
2. AYLMER
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21. PEMBROKE



Cedar Leafminer

Areas within which defoliation
occurred in 1971

LEGEND

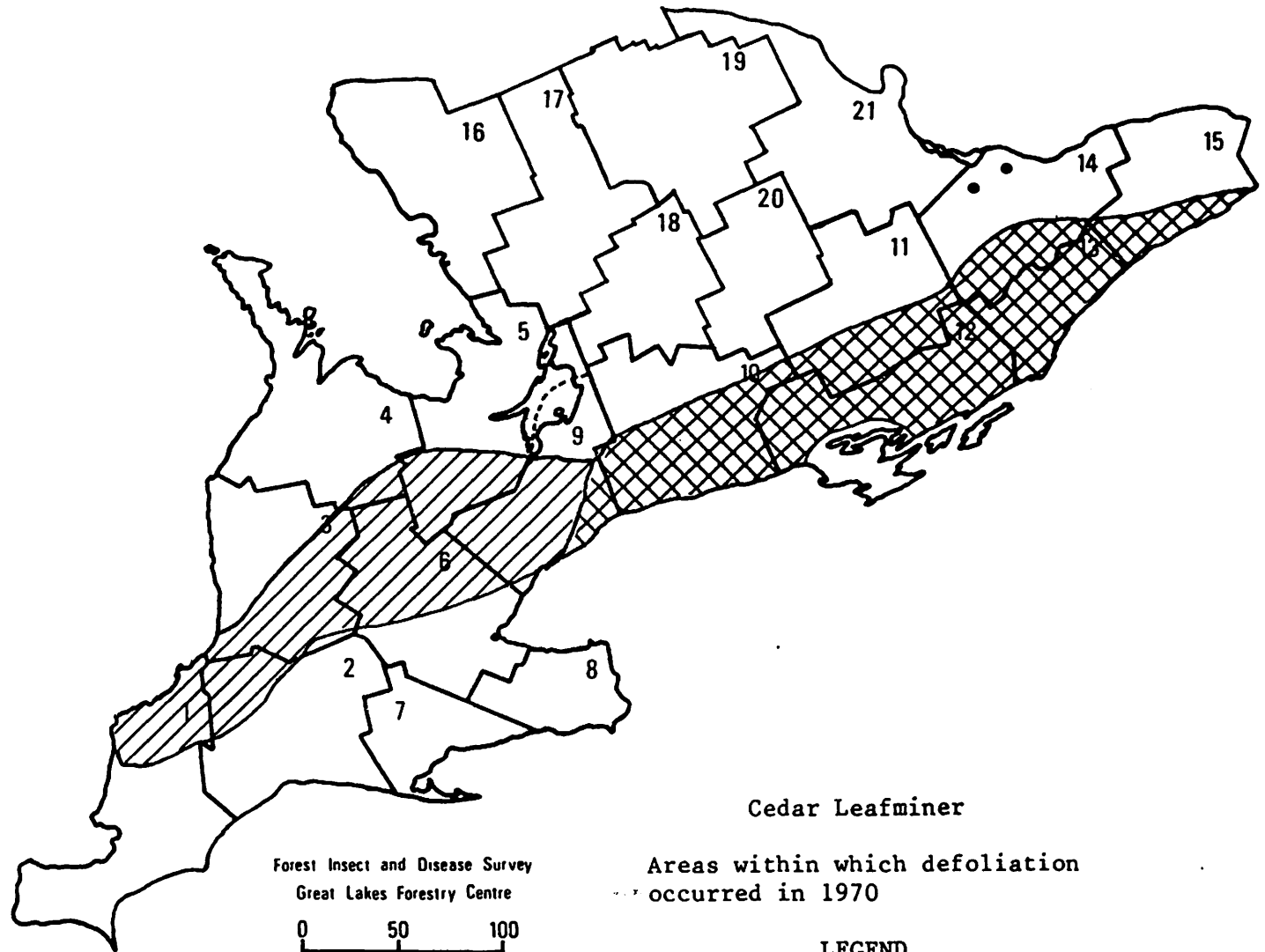
Moderate-to-severe defoliation



SOUTHERN ONTARIO

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Cedar Leafminer

Areas within which defoliation
occurred in 1970

LEGEND

Light defoliation



Moderate-to-severe defoliation

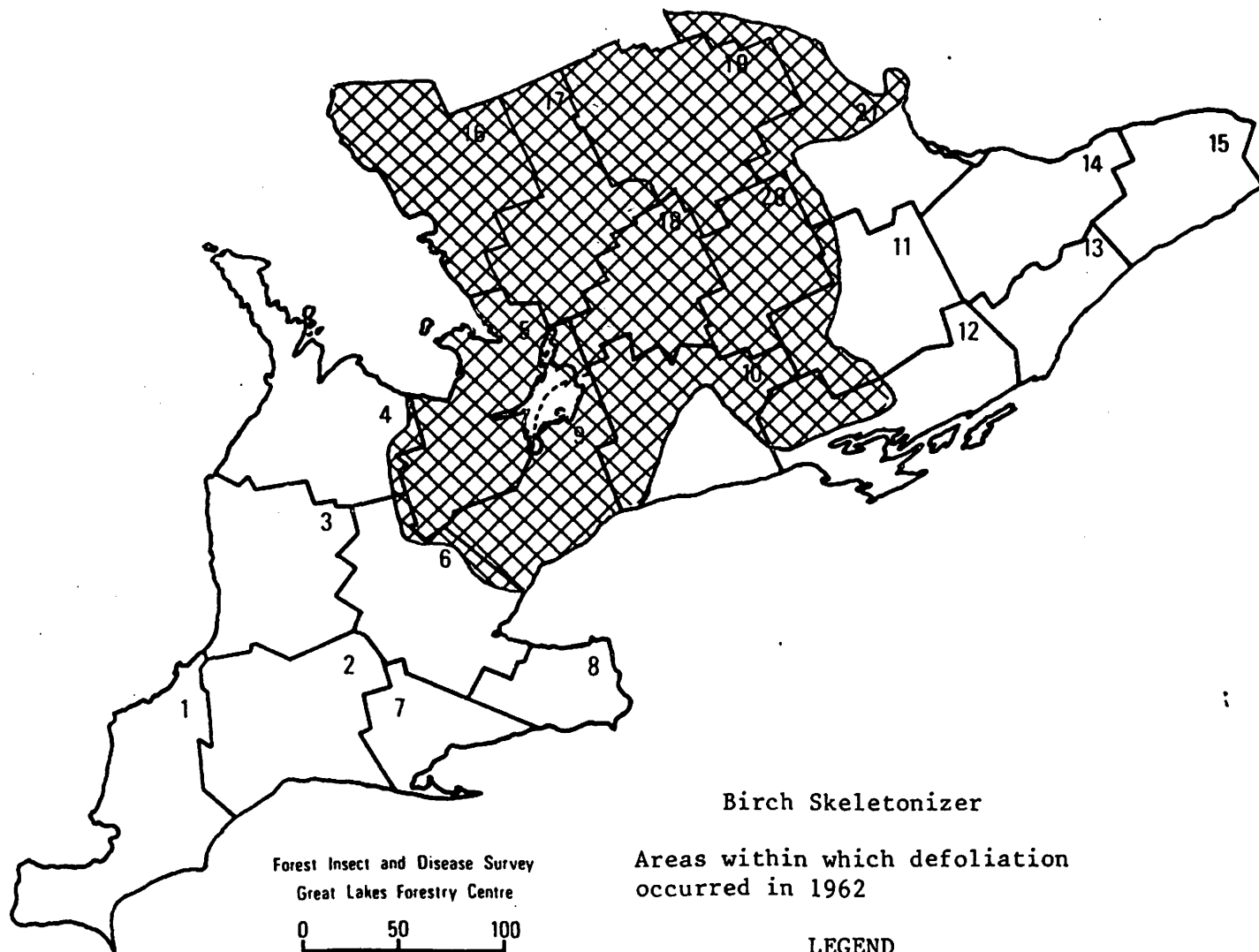
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SOUTHERN ONTARIO

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Birch Skeletonizer

Areas within which defoliation occurred in 1962

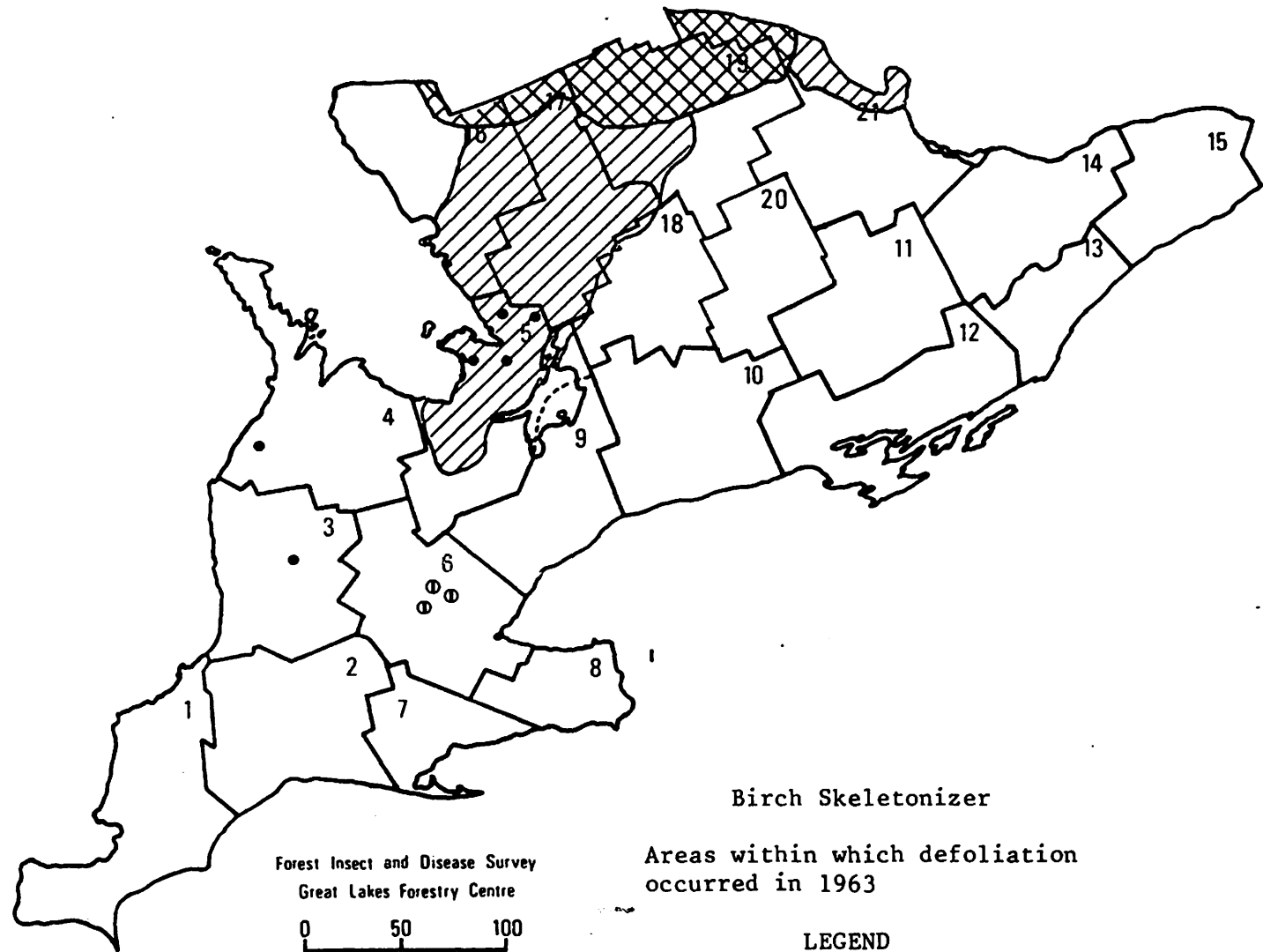
LEGEND

Moderate-to-severe defoliation 

SOUTHERN ONTARIO

DISTRICTS

1. CHATHAM
2. AYLMER
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21. PEMBROKE



Light defoliation

⊙ or



Moderate-to-severe defoliation

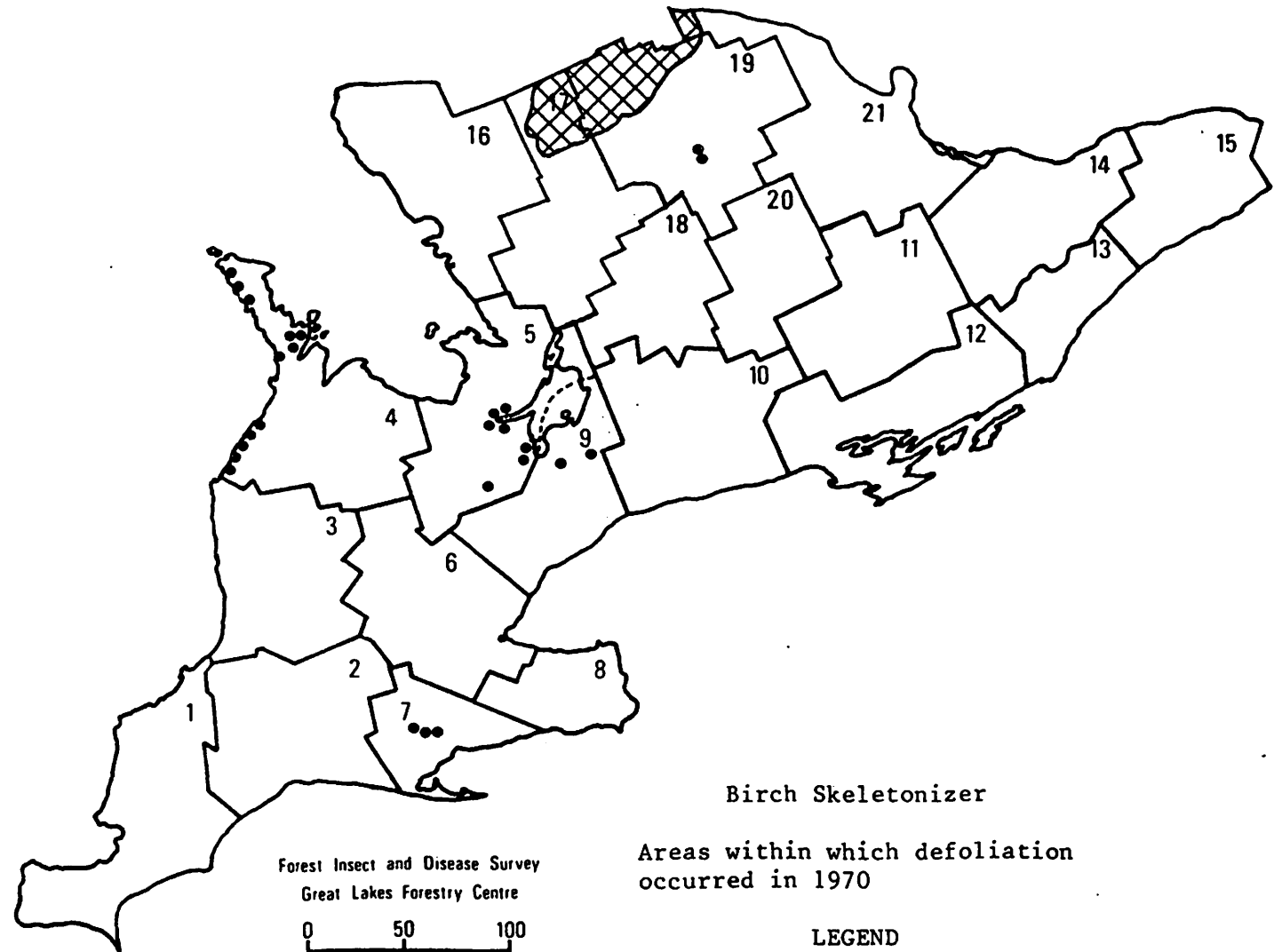
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SOUTHERN ONTARIO

DISTRICTS

1. CHATHAM
2. AYLMER
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21. PEMBROKE



Birch Skeletonizer

Areas within which defoliation occurred in 1970

LEGEND

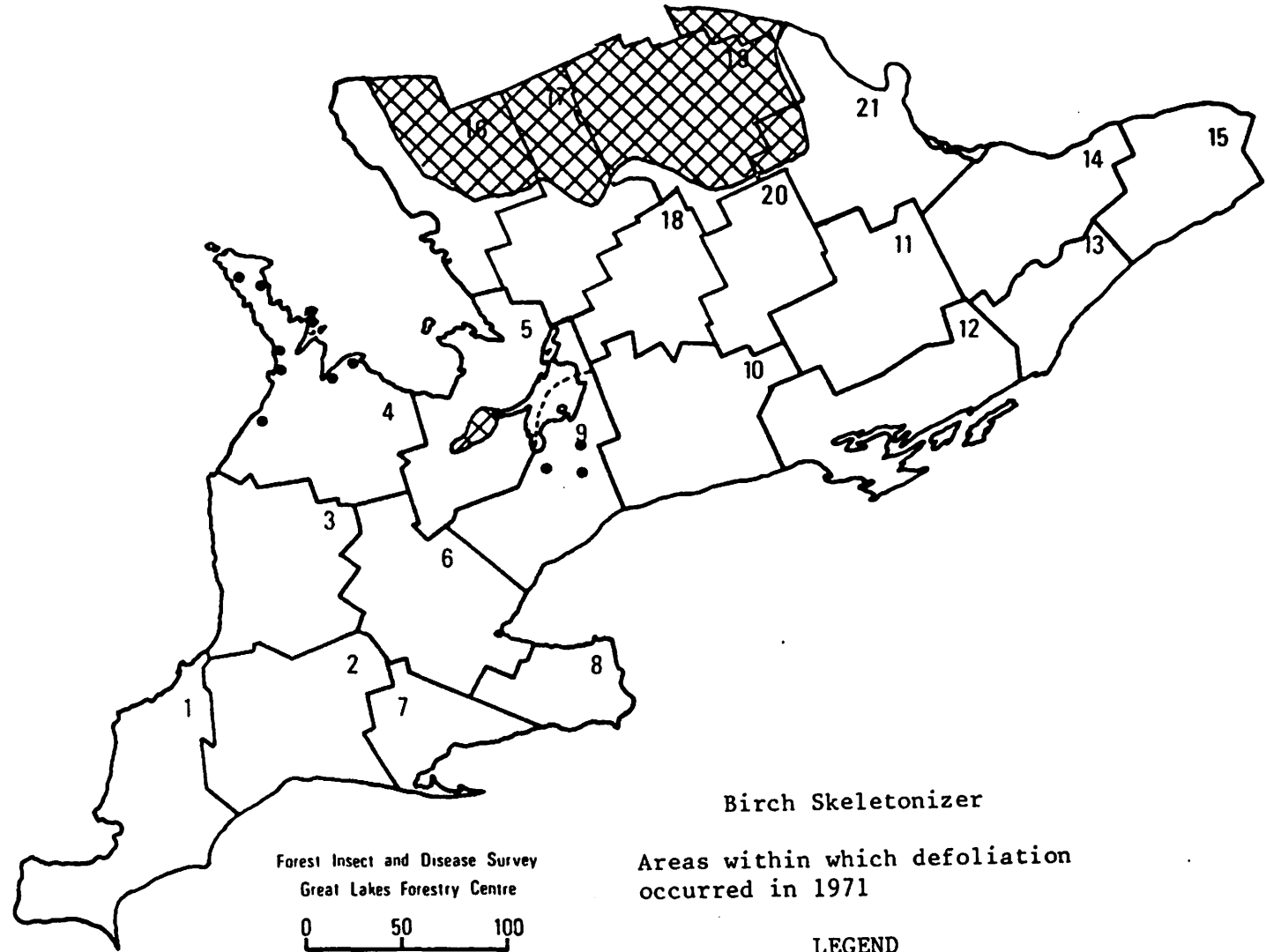
Moderate-to-severe defoliation • or



SOUTHERN ONTARIO


DISTRICTS

1. CHATHAM
2. AYLMER
3. WINGHAM
4. OWEN SOUND
5. HURONIA
6. CAMBRIDGE
7. SIMCOE
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15. CORNWALL
16. PARRY SOUND
17. BRACEBRIDGE
18. MINDEN
19. ALGONQUIN PARK
20. BANCROFT
21. PEMBROKE



Birch Skeletonizer
 Areas within which defoliation
 occurred in 1971

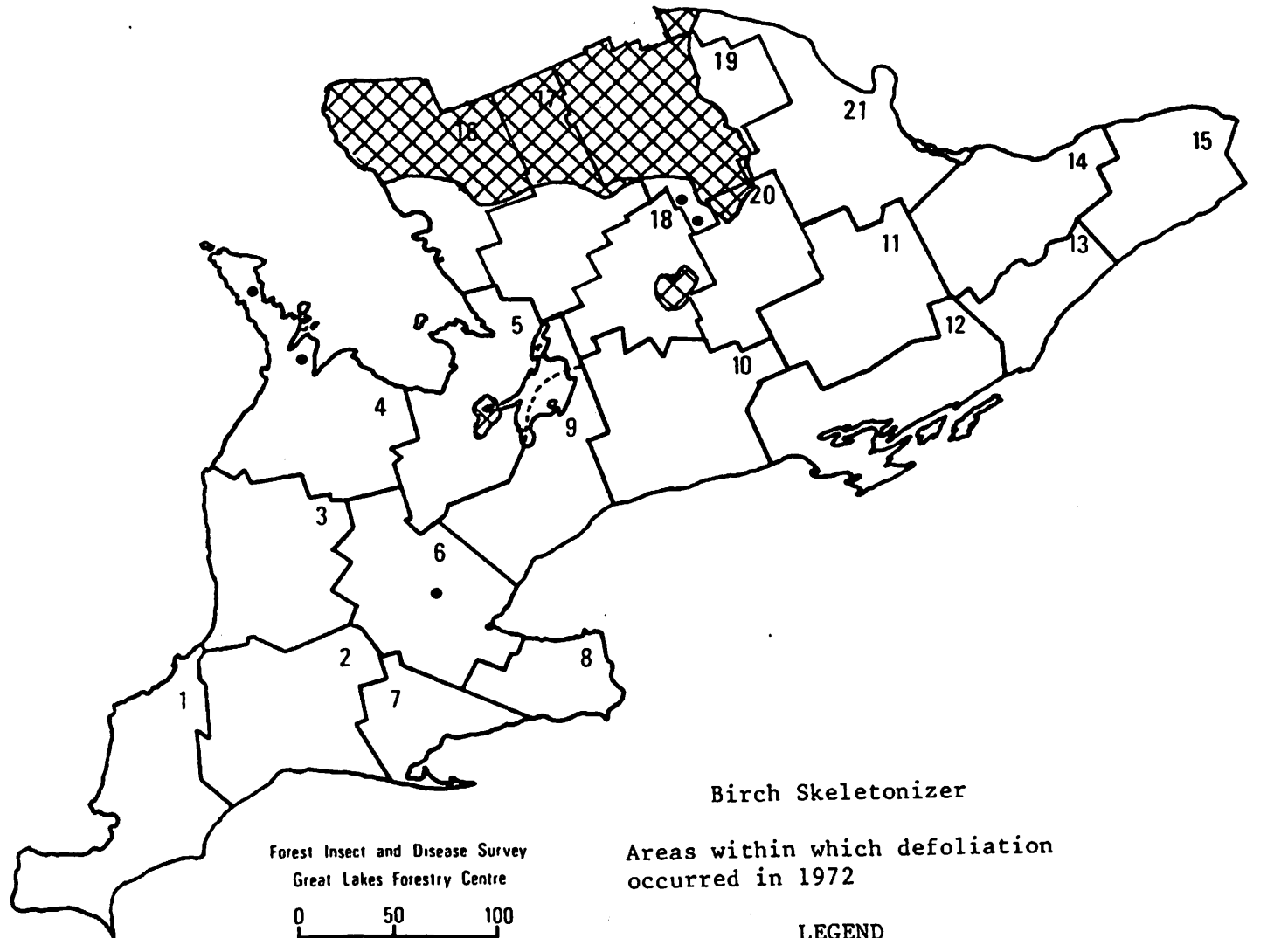
LEGEND

Moderate-to-severe defoliation • or 

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



Birch Skeletonizer

Areas within which defoliation
occurred in 1972

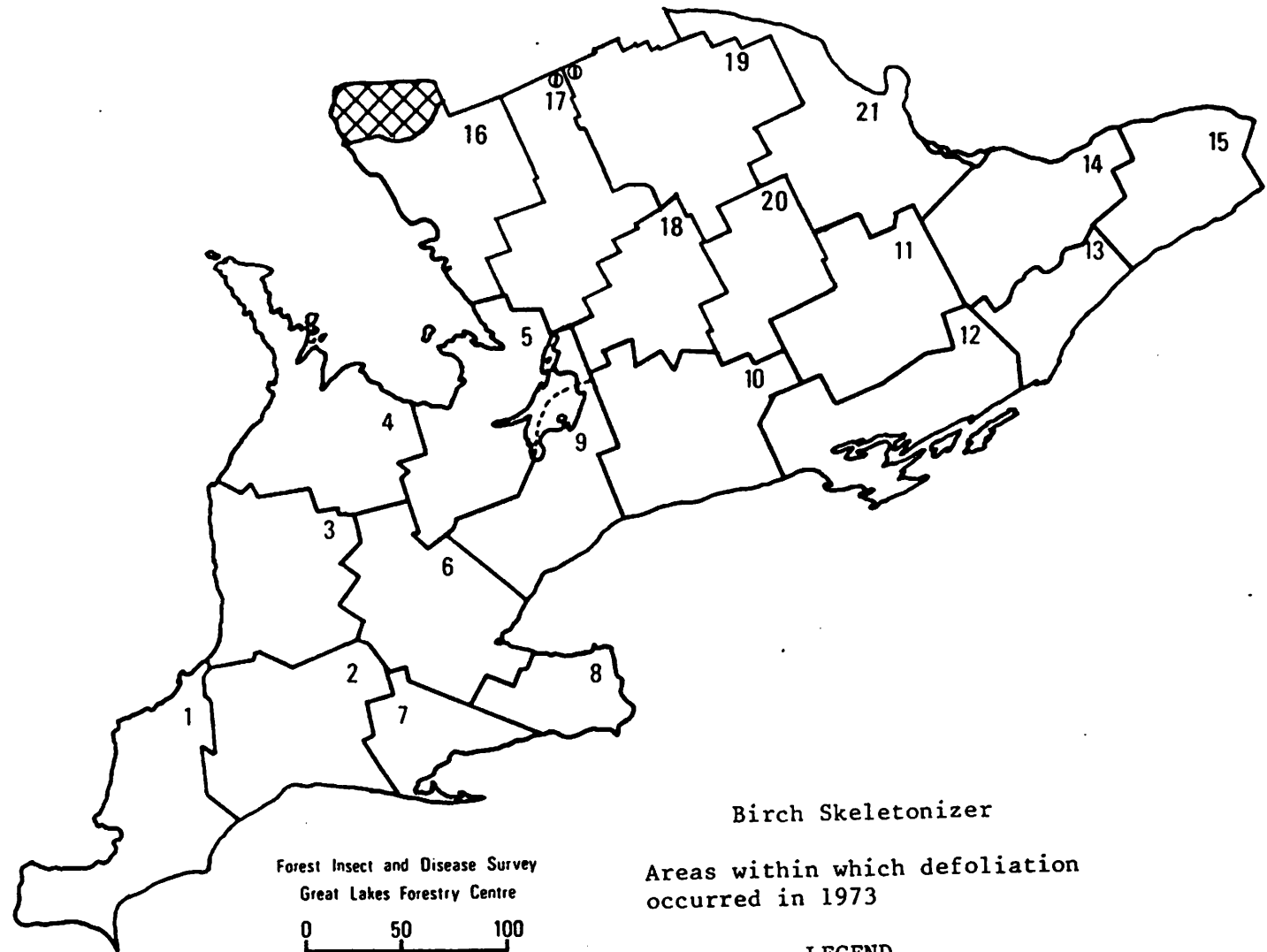
LEGEND

Moderate-to-severe defoliation • or 

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



Areas within which defoliation occurred in 1973

LEGEND

Light defoliation

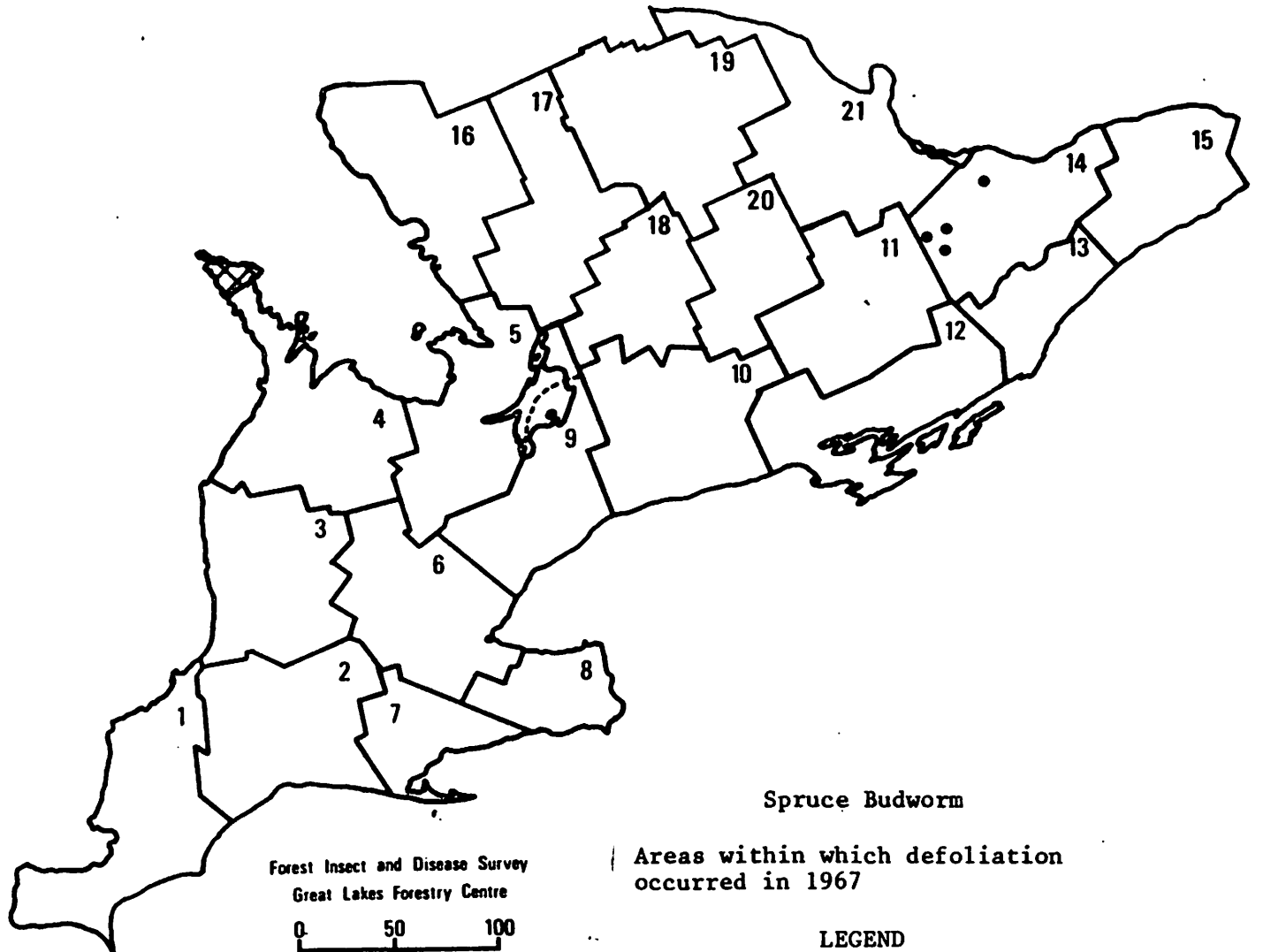
Moderate-to-severe defoliation




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

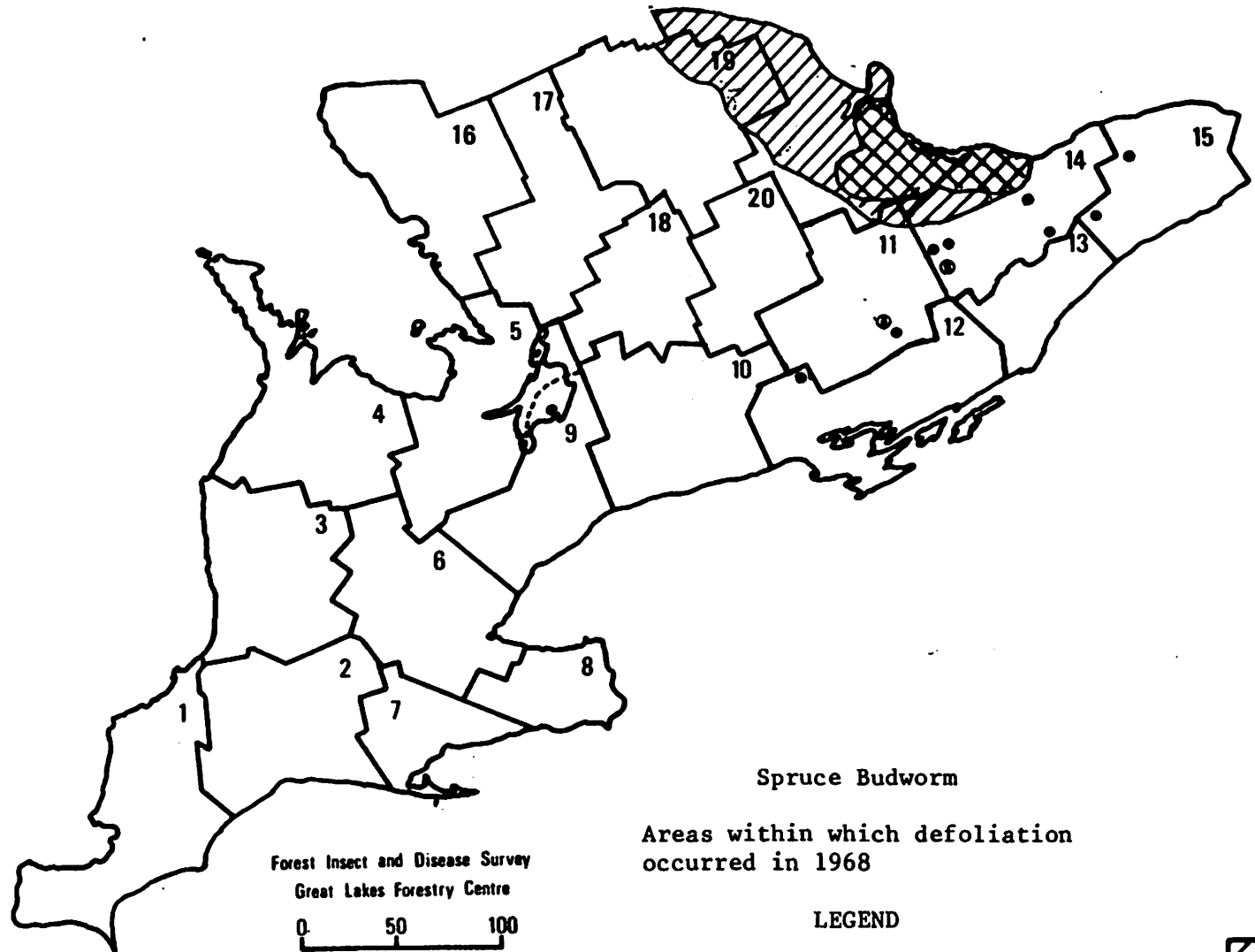


Moderate-to-severe defoliation • or 

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



Spruce Budworm

Areas within which defoliation occurred in 1968

LEGEND

Light defoliation

• or

Moderate-to-severe defoliation

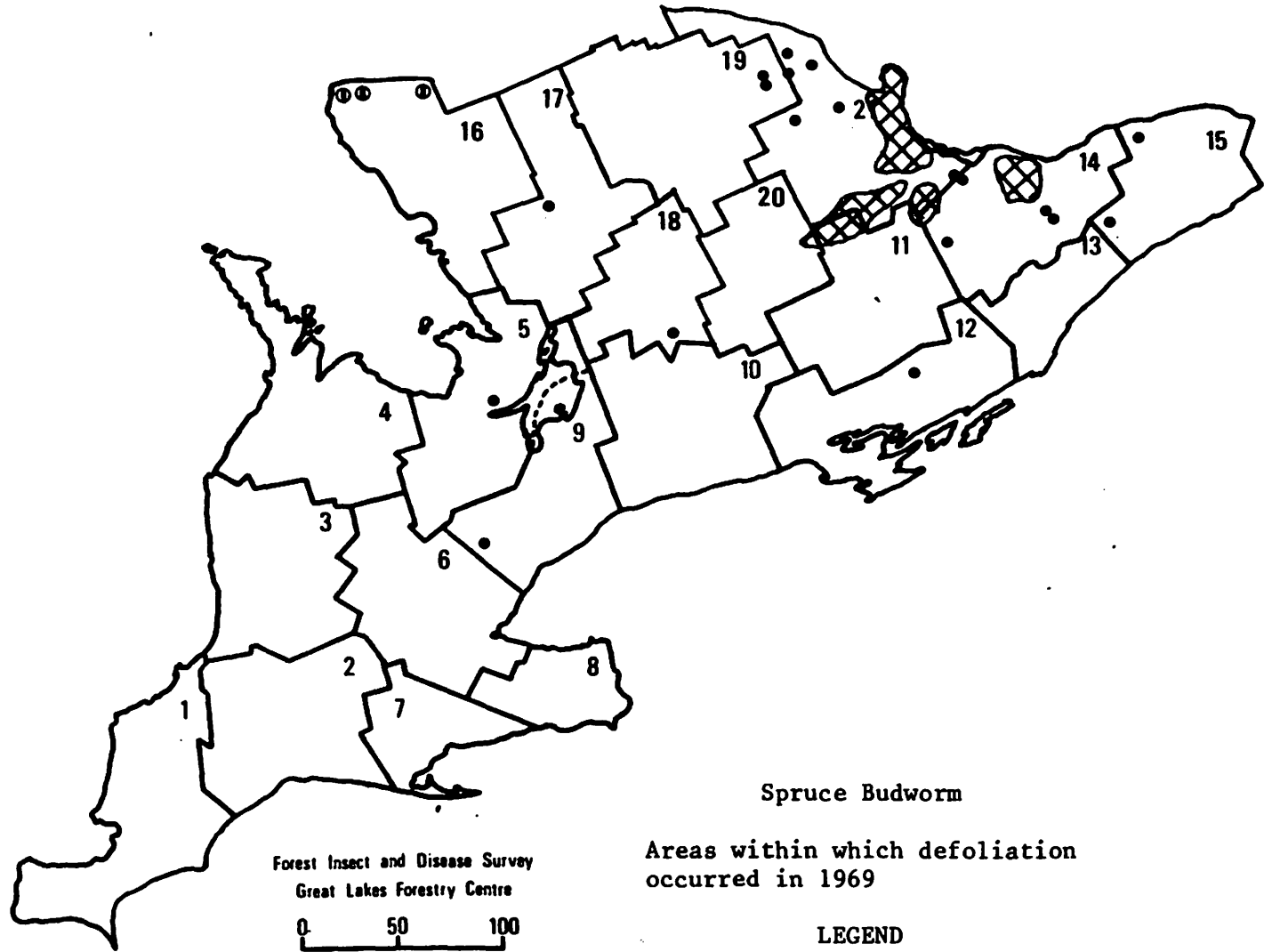
⊙ or



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



Spruce Budworm

Areas within which defoliation
occurred in 1969

LEGEND

Light defoliation

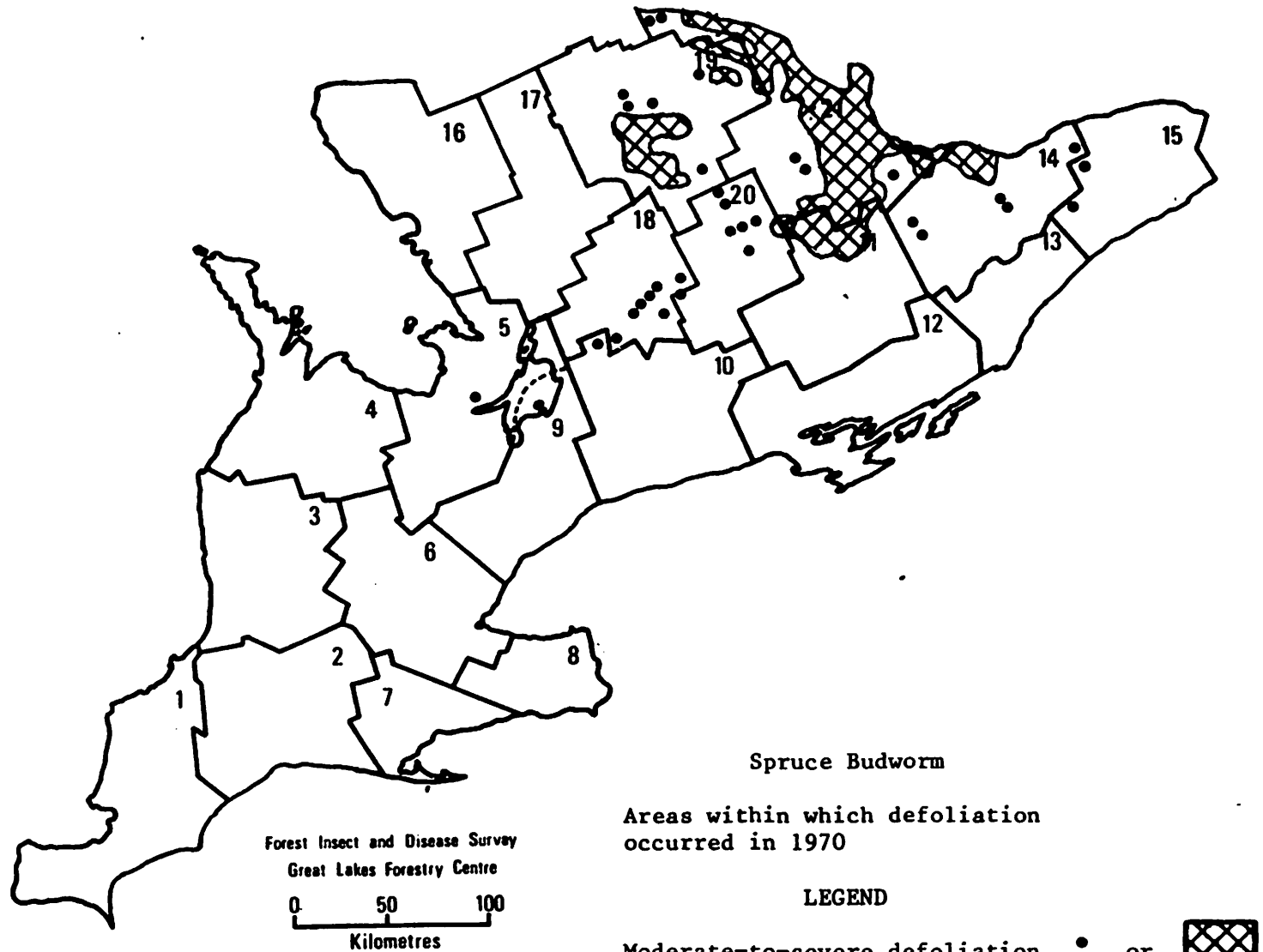
Moderate to severe defoliation



SOUTHERN ONTARIO

DISTRICTS

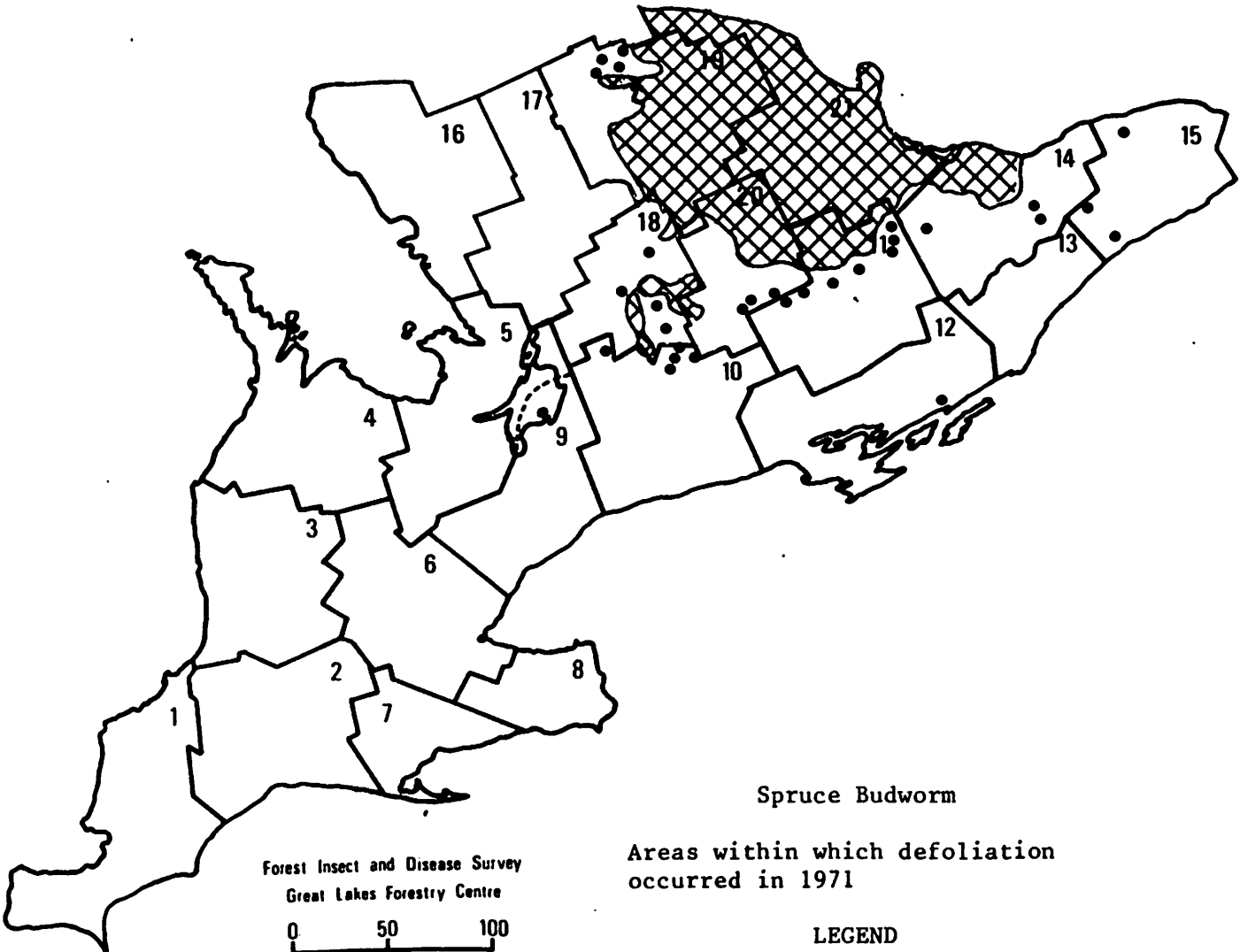
1. CHATHAM
2. AYLMER
3. WINGHAM
4. OWEN SOUND
5. HURONIA
6. CAMBRIDGE
7. SIMCOE
8. NIAGARA
9. MAPLE
10. LINDSAY
11. TWEED
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13. BROCKVILLE
14. CARLETON PLACE
15. CORNWALL
16. PARRY SOUND
17. BRACEBRIDGE
18. MINDEN
19. ALGONQUIN PARK
20. BANCROFT
21.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



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



Spruce Budworm

Areas within which defoliation occurred in 1971

LEGEND

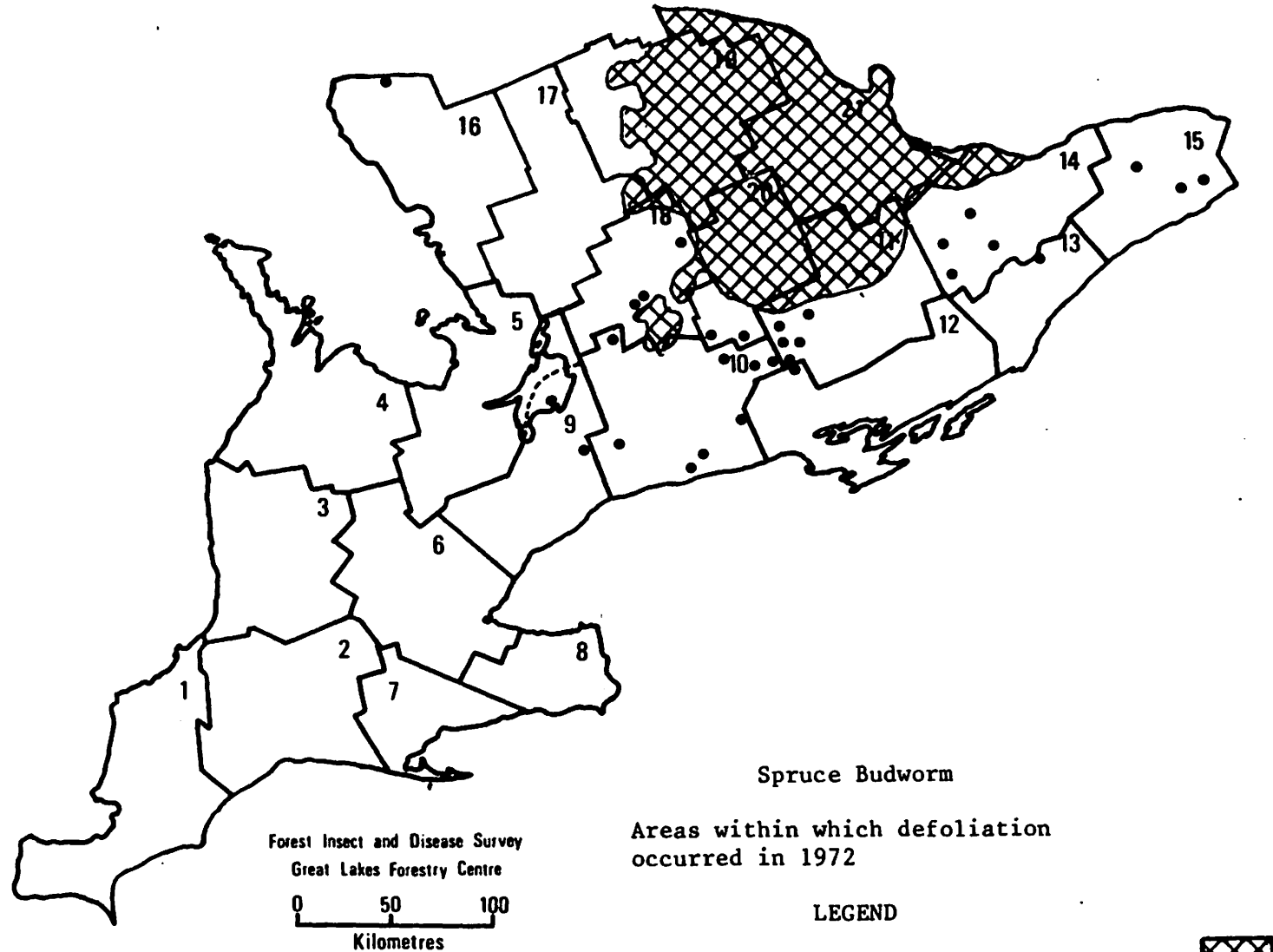
Moderate-to-severe defoliation • or

Forest Insect and Disease Survey
Great Lakes Forestry Centre
0 50 100
Kilometres

SOUTHERN ONTARIO

DISTRICTS

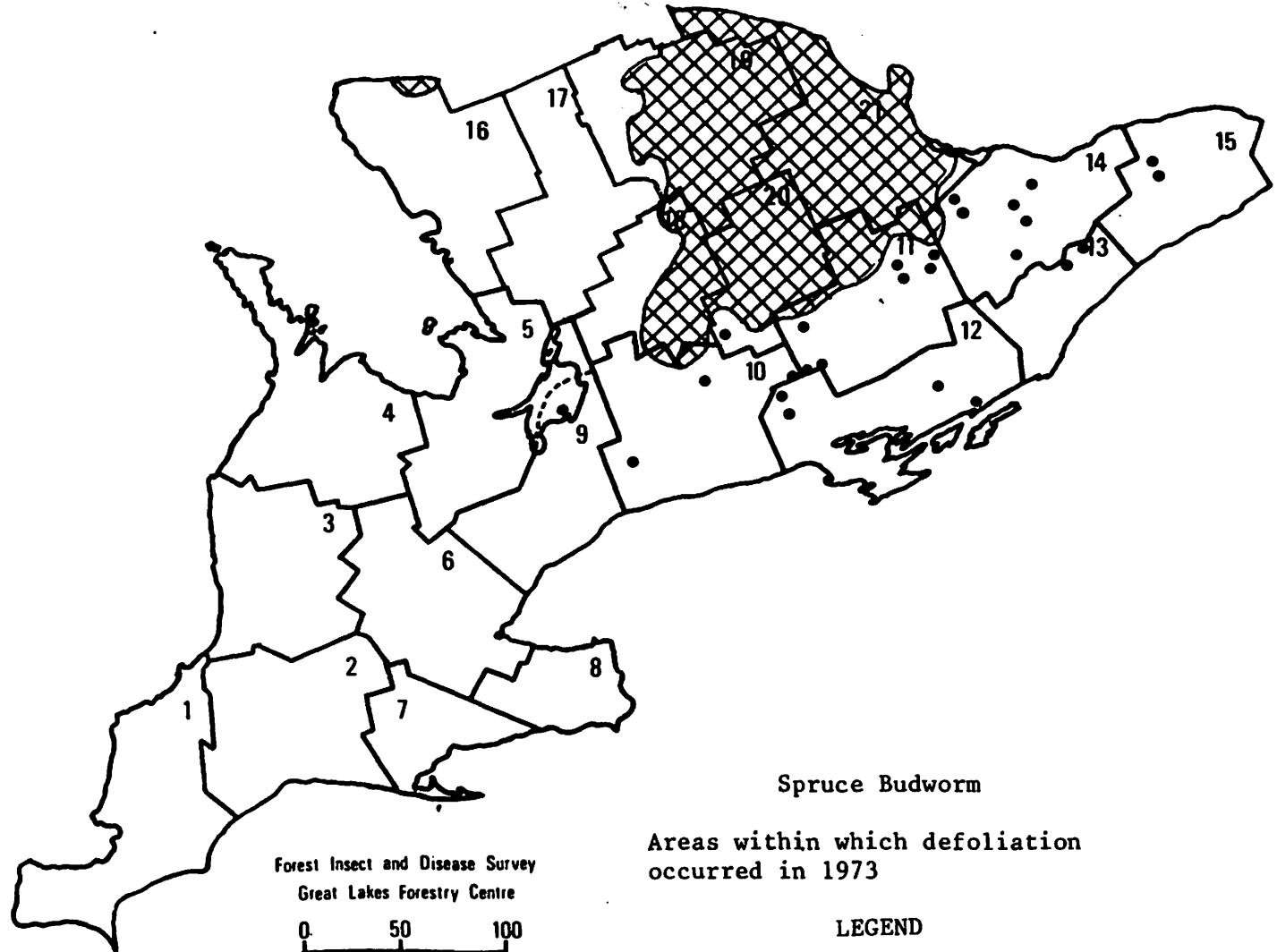
1. CHATHAM
2. AYLMER
3. WINGHAM
4. OWEN SOUND
5. HURONIA
6. CAMBRIDGE
7. SIMCOE
8. NIAGARA
9. MAPLE
10. LINDSAY
11. TWEED
12. NAPANEE
13. BROCKVILLE
14. CARLETON PLACE
15. CORNWALL
16. PARRY SOUND
17. BRACEBRIDGE
18. MINDEN
19. ALGONQUIN PARK
20. BANCROFT
21. PEMBROKE



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



Spruce Budworm

Areas within which defoliation occurred in 1973

LEGEND

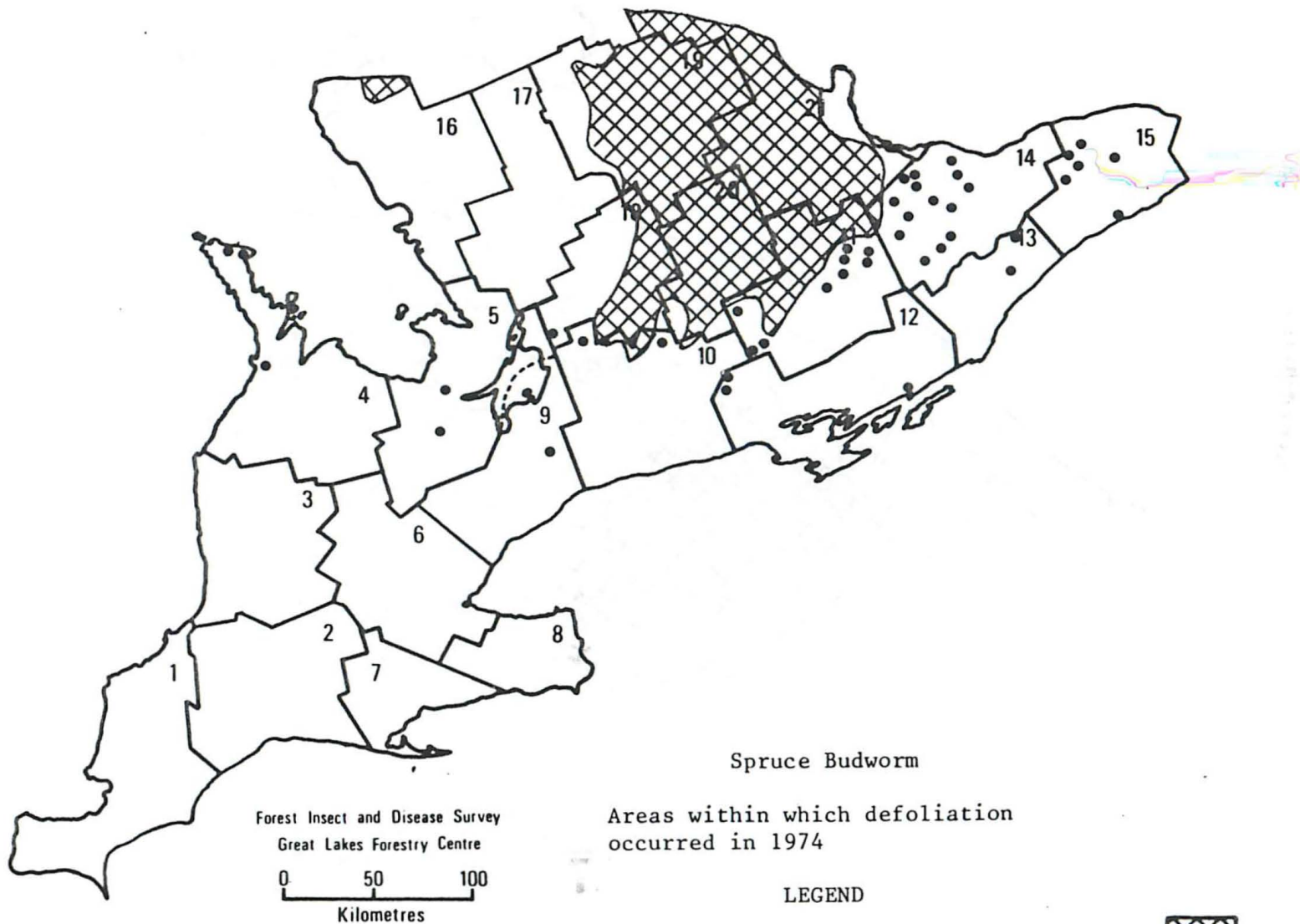
Moderate-to-severe defoliation • or




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

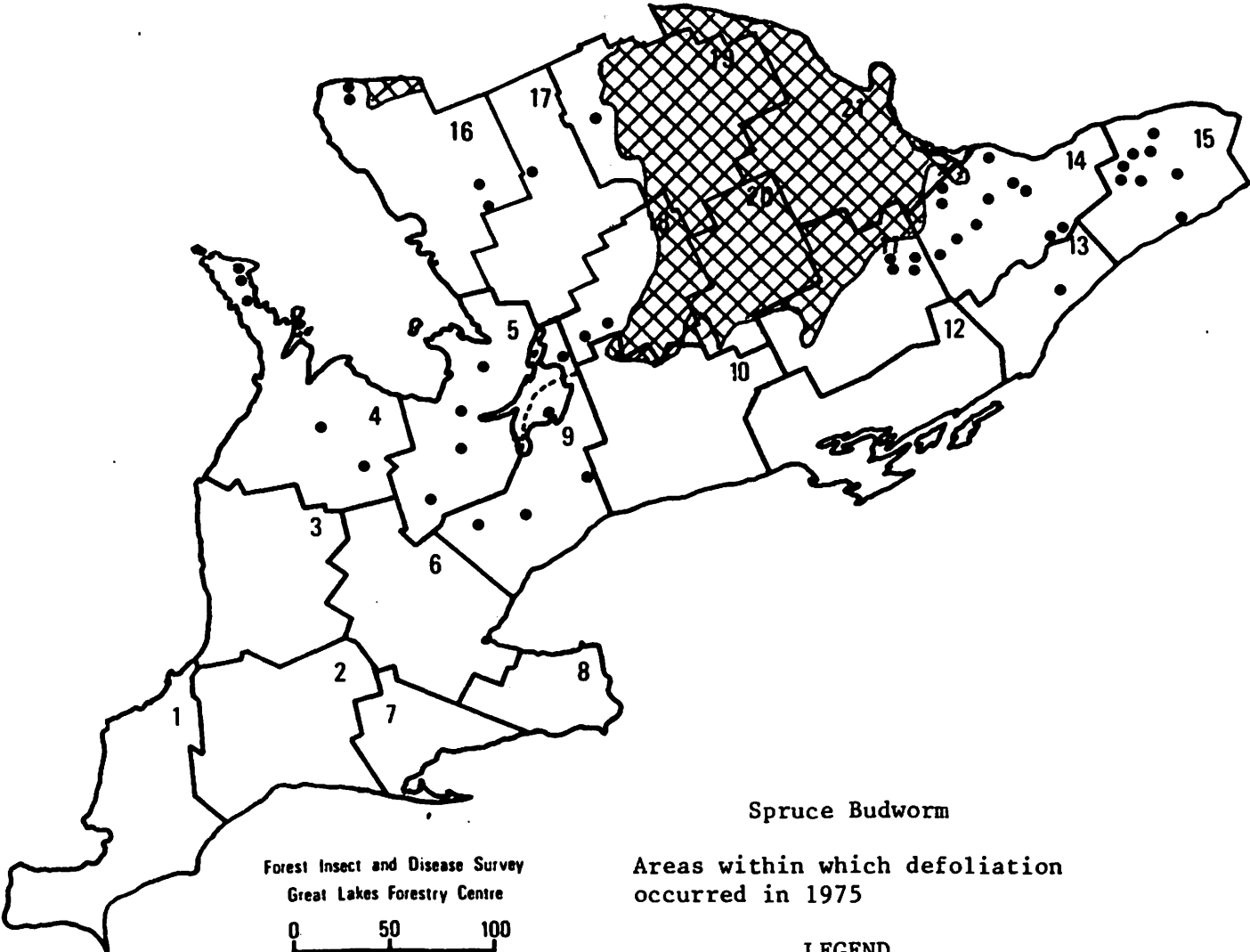


Moderate-to-severe defoliation • or 

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



Spruce Budworm

Areas within which defoliation occurred in 1975

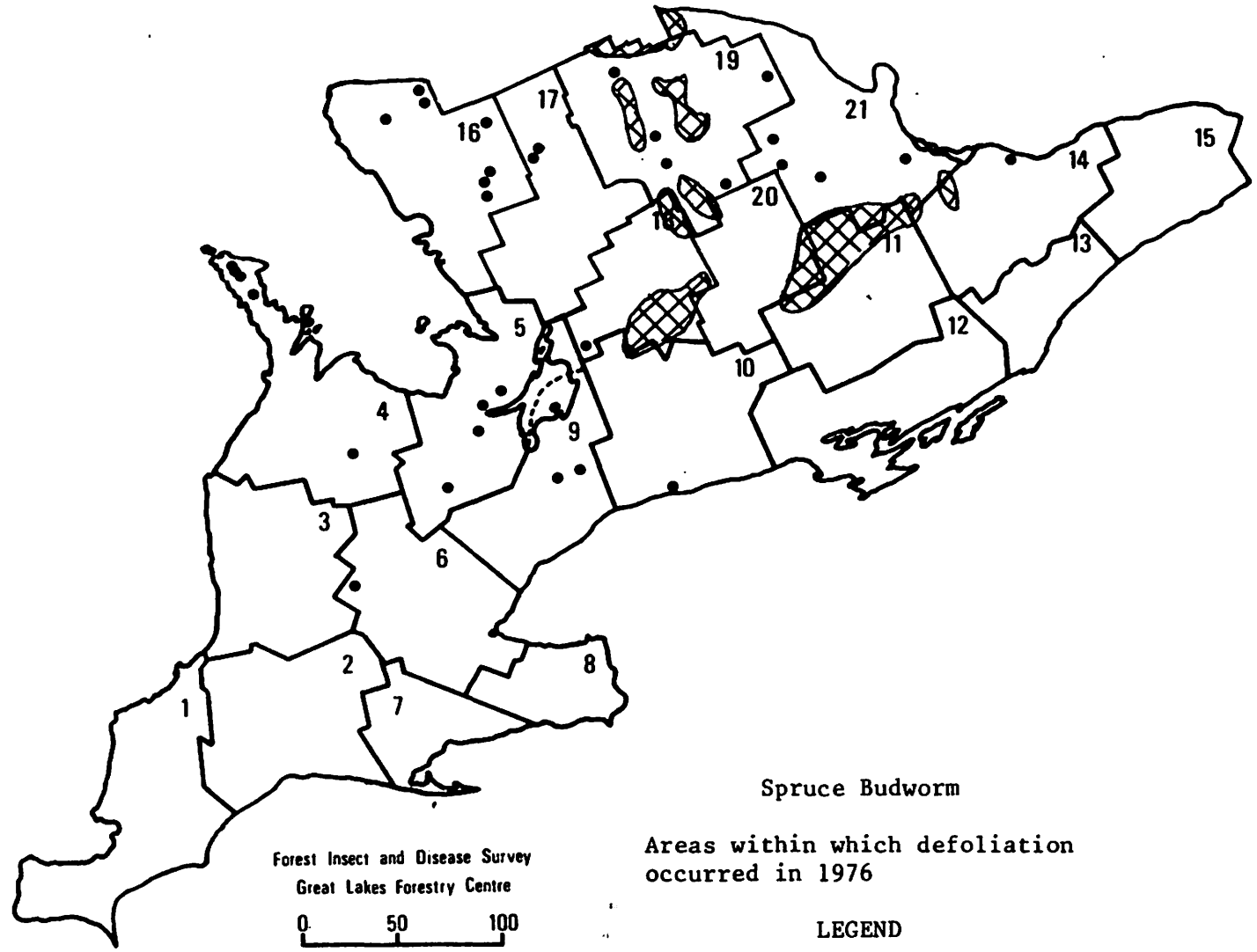
LEGEND

Moderate-to-severe defoliation • or 

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



Spruce Budworm

Areas within which defoliation
occurred in 1976

LEGEND

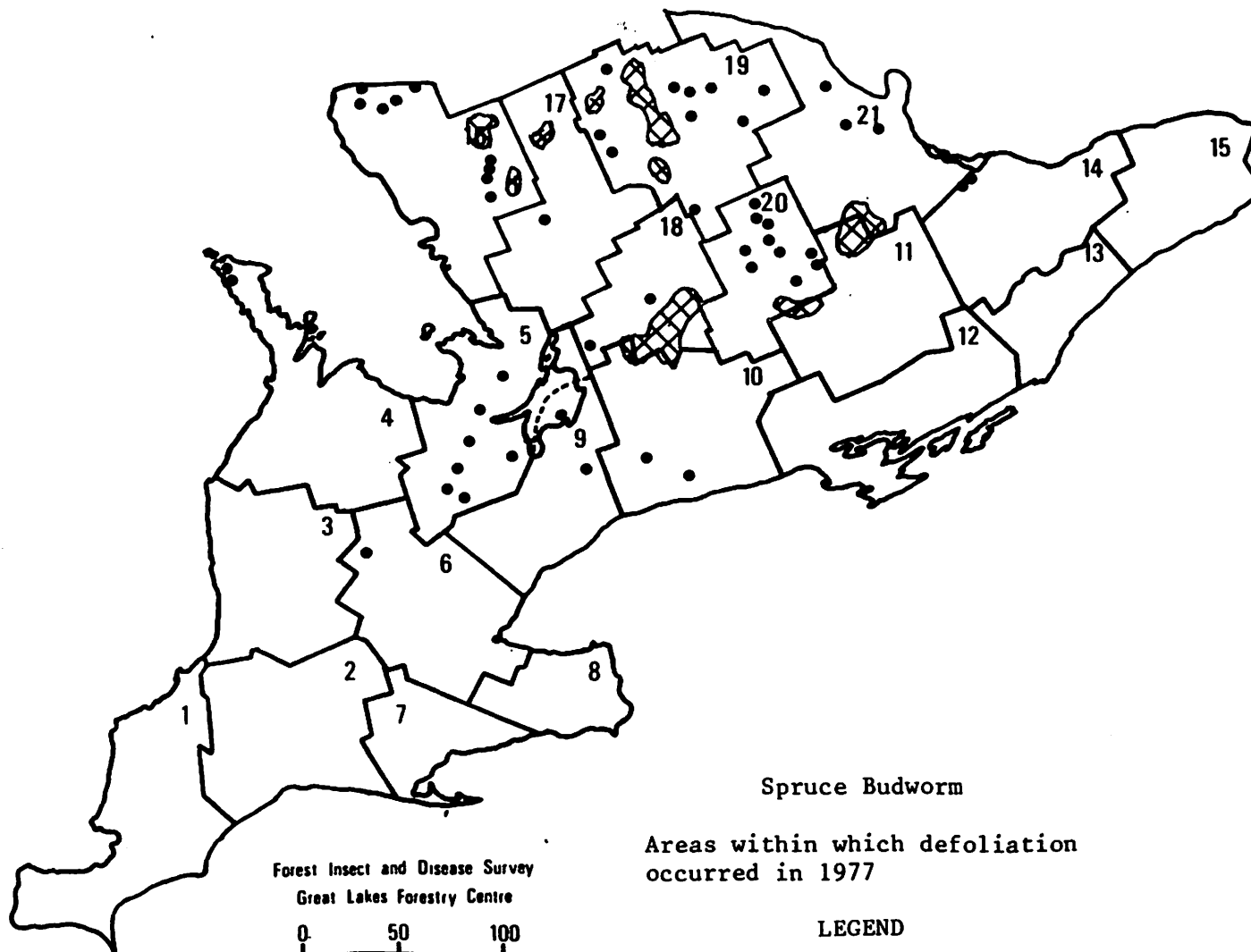
Moderate-to-severe defoliation • or



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

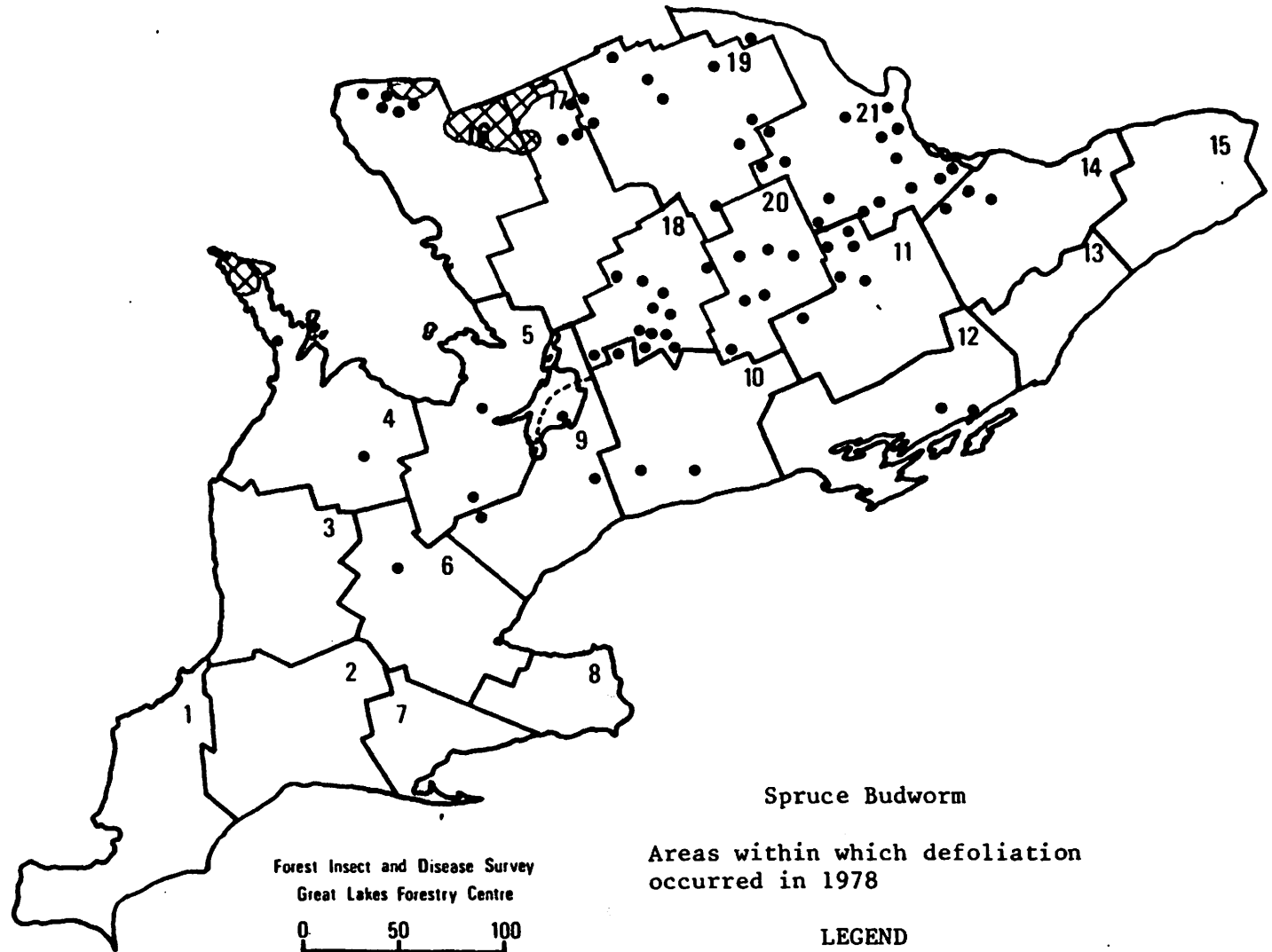



Moderate-to-severe defoliation • or 

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

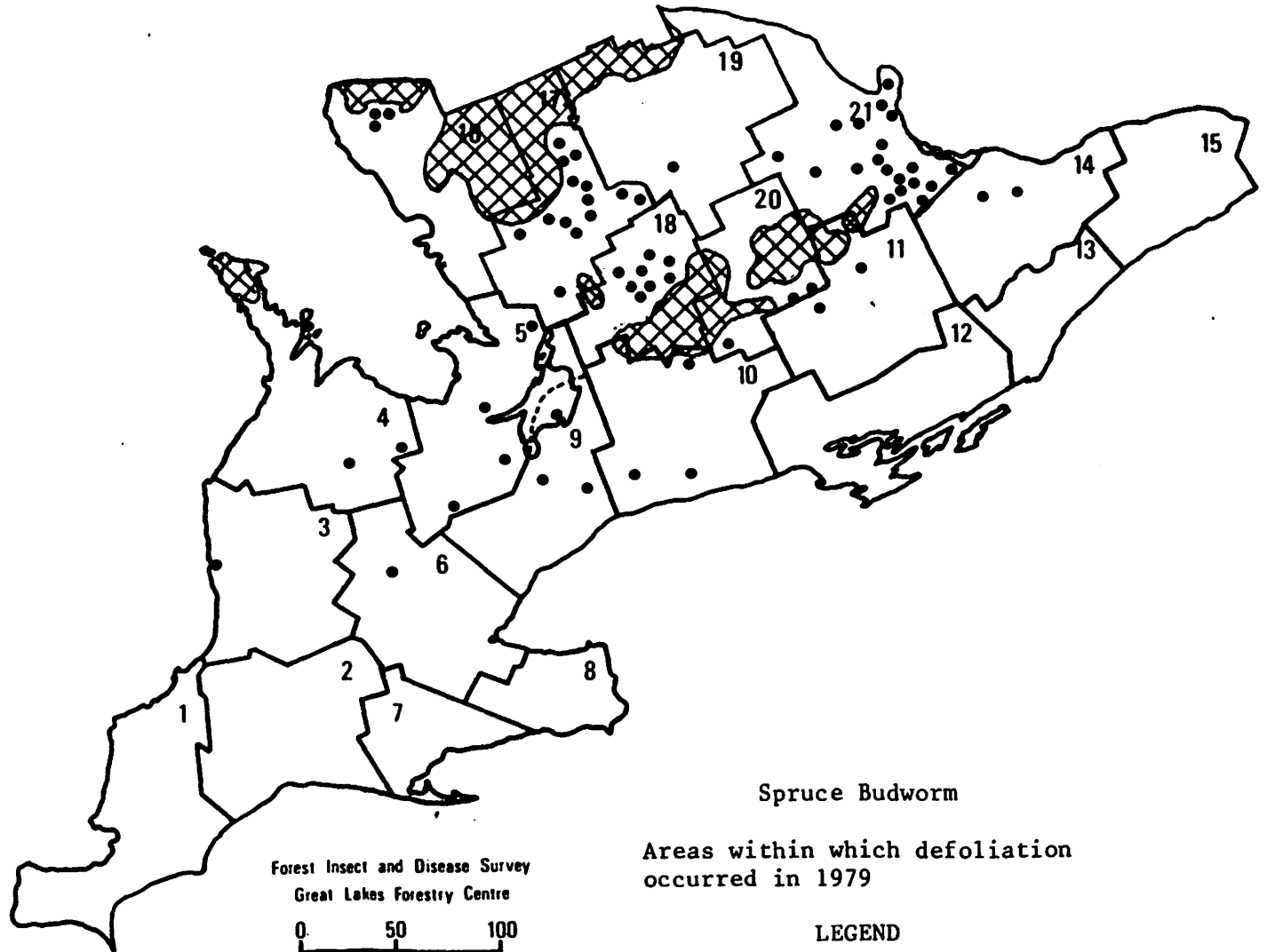


Moderate-to-severe defoliation • or 

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



Spruce Budworm

Areas within which defoliation
occurred in 1979

LEGEND

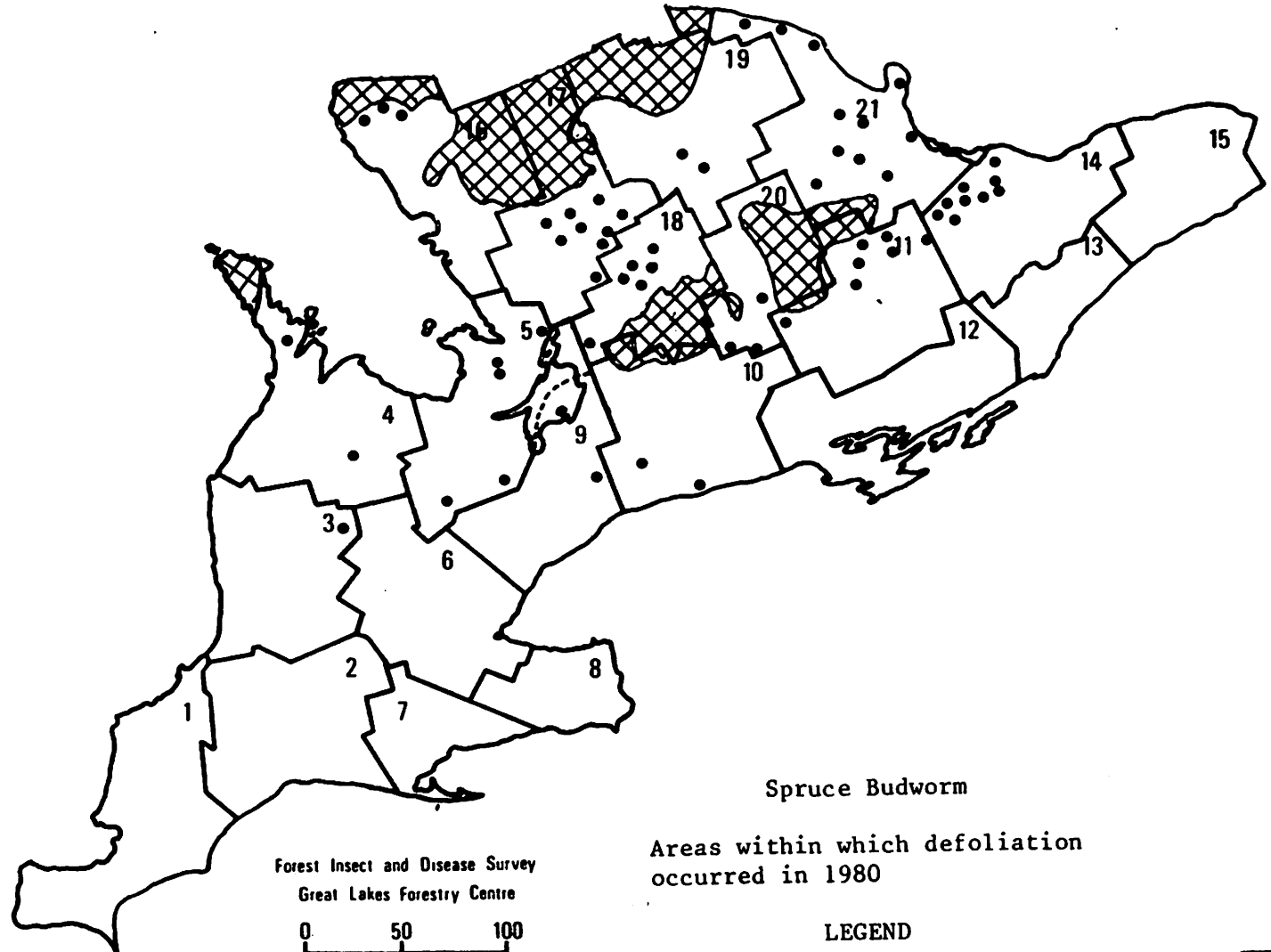
Moderate-to-severe defoliation • or




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

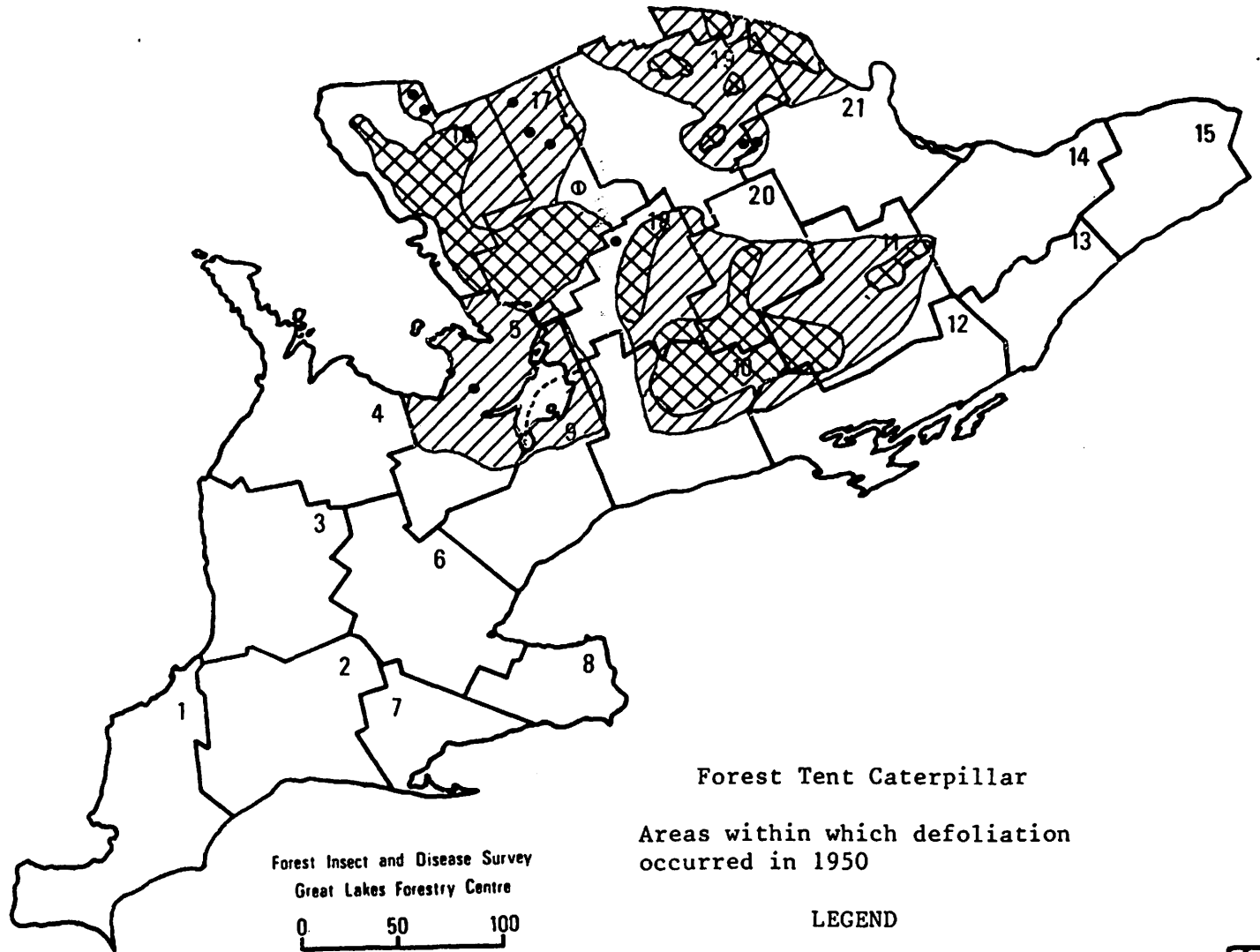


Moderate-to-severe defoliation • or 

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



Forest Tent Caterpillar

Areas within which defoliation occurred in 1950

LEGEND

Light defoliation

○ or



Moderate-to-severe defoliation

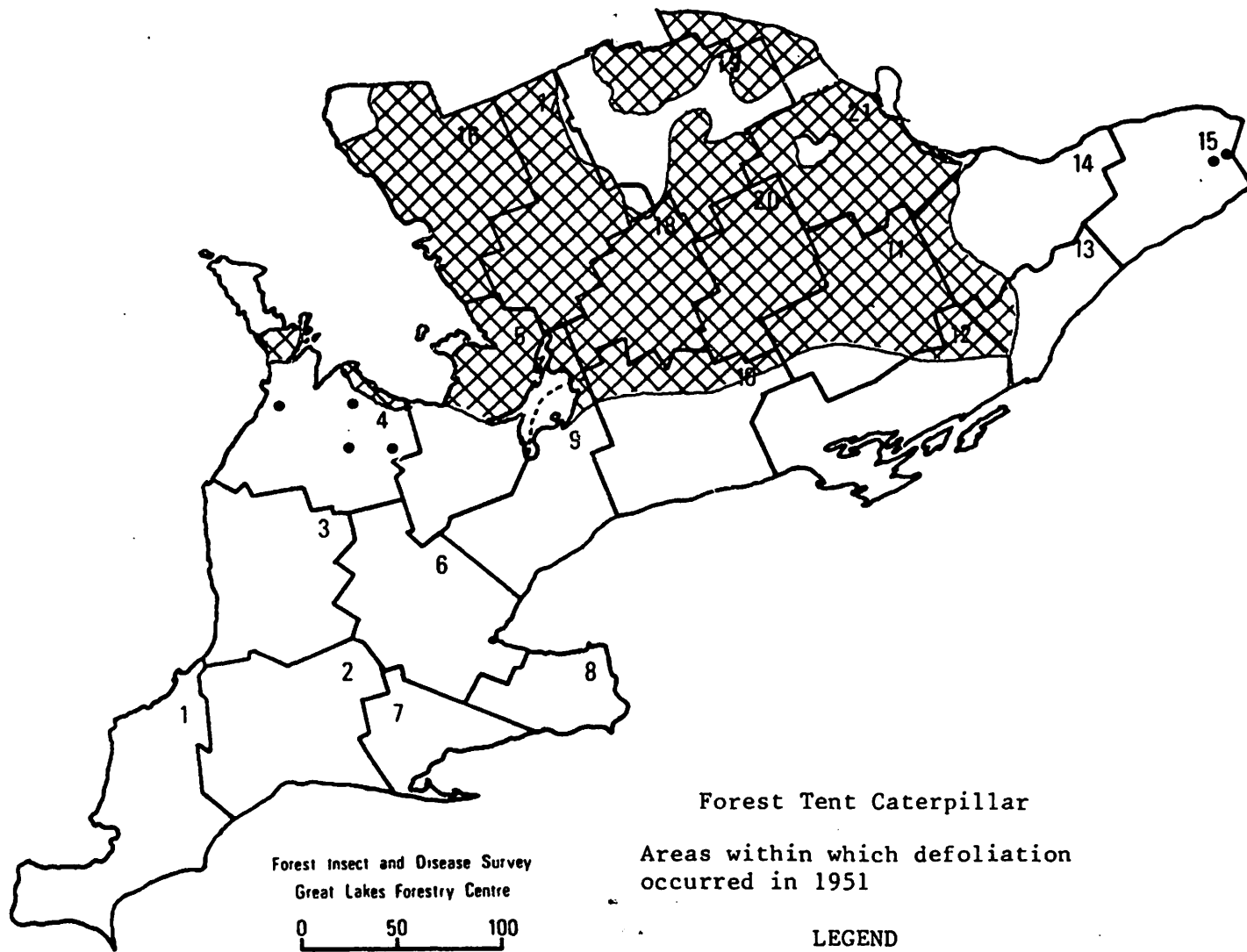
• or



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



Forest Tent Caterpillar

Areas within which defoliation occurred in 1951

LEGEND

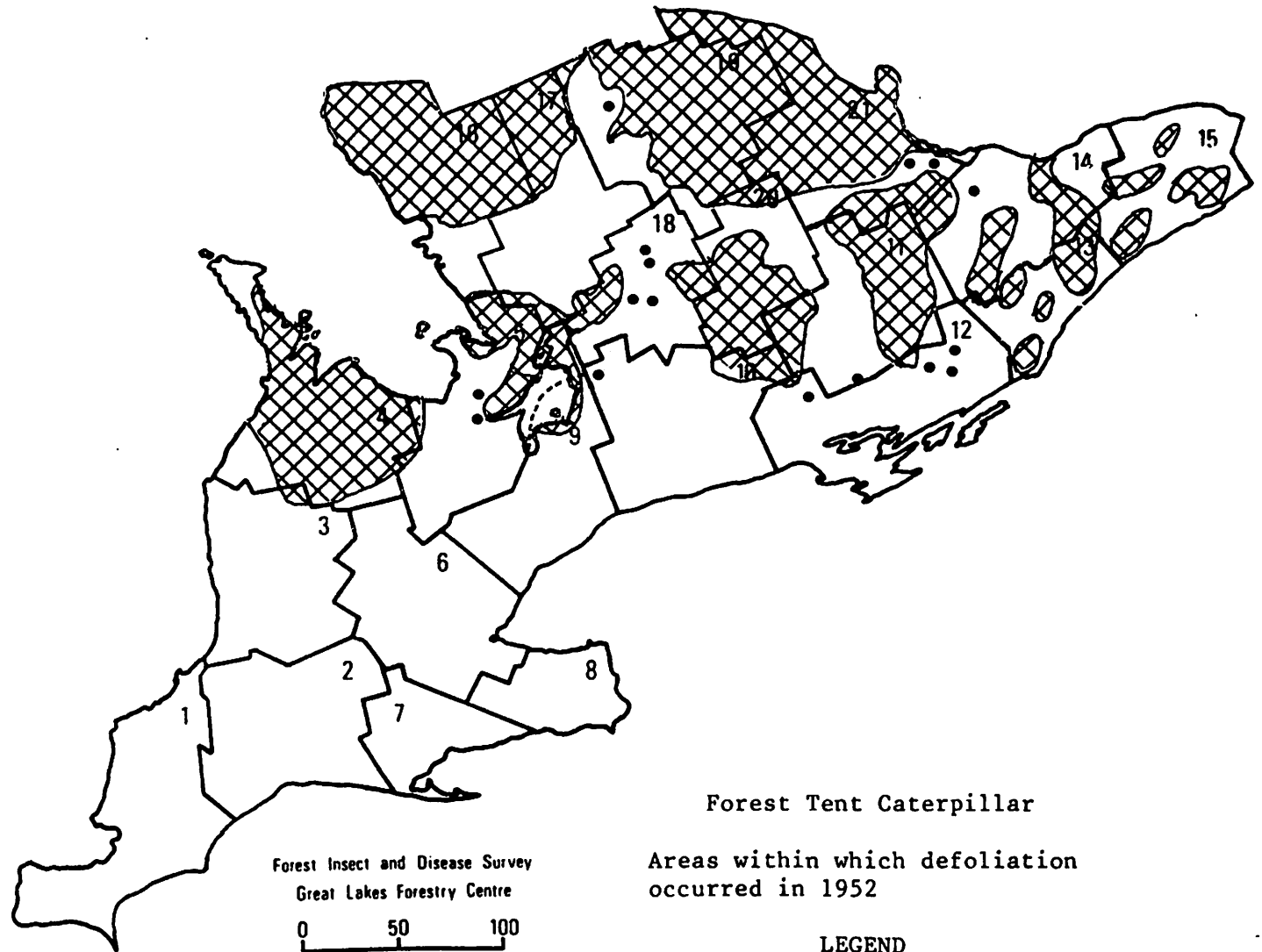
Moderate-to-severe defoliation • or



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

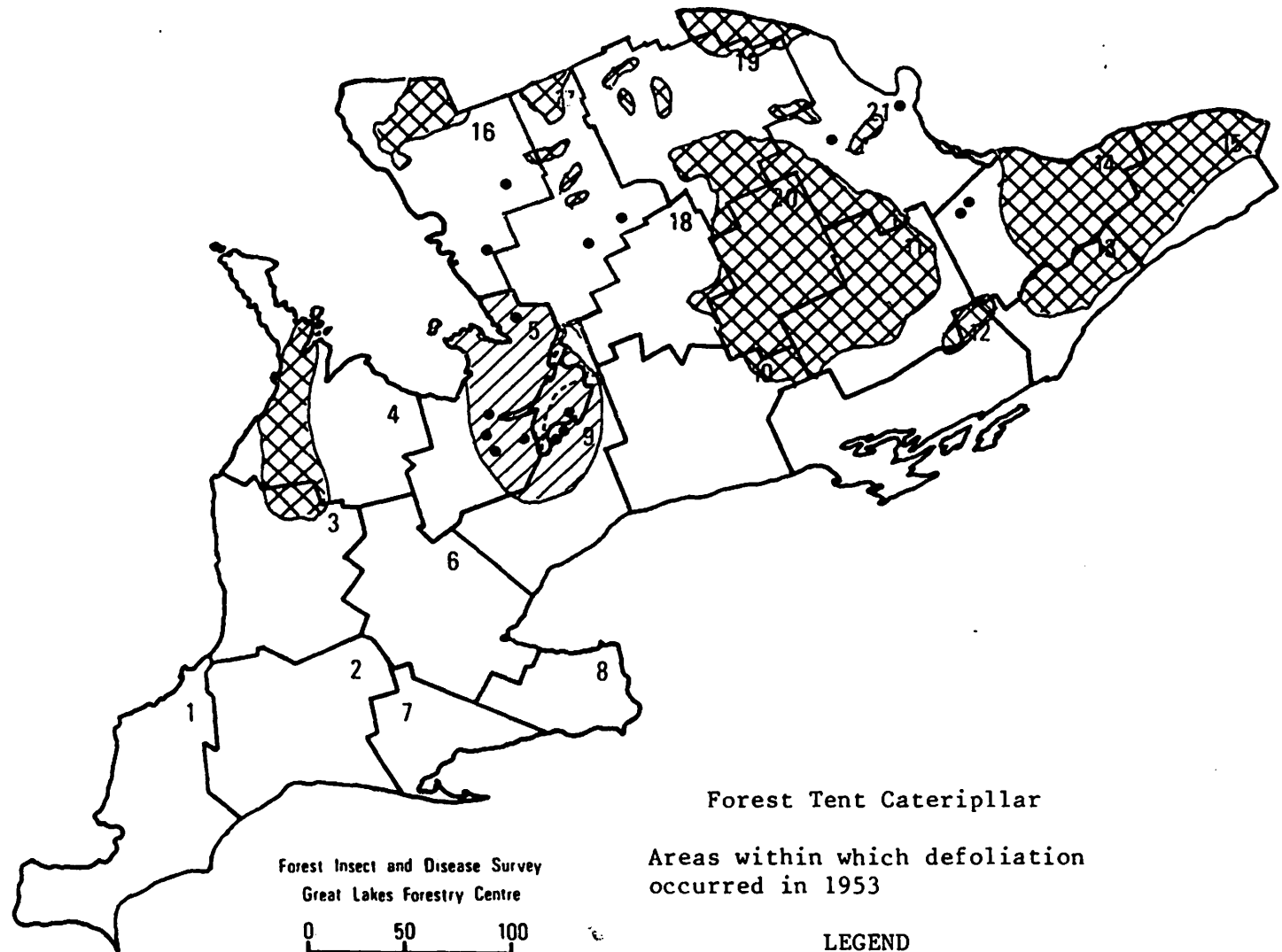


Moderate-to-severe defoliation • or [cross-hatched box]

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



Forest Tent Caterpillar

Areas within which defoliation
occurred in 1953

LEGEND

Light defoliation



Moderate-to-severe defoliation

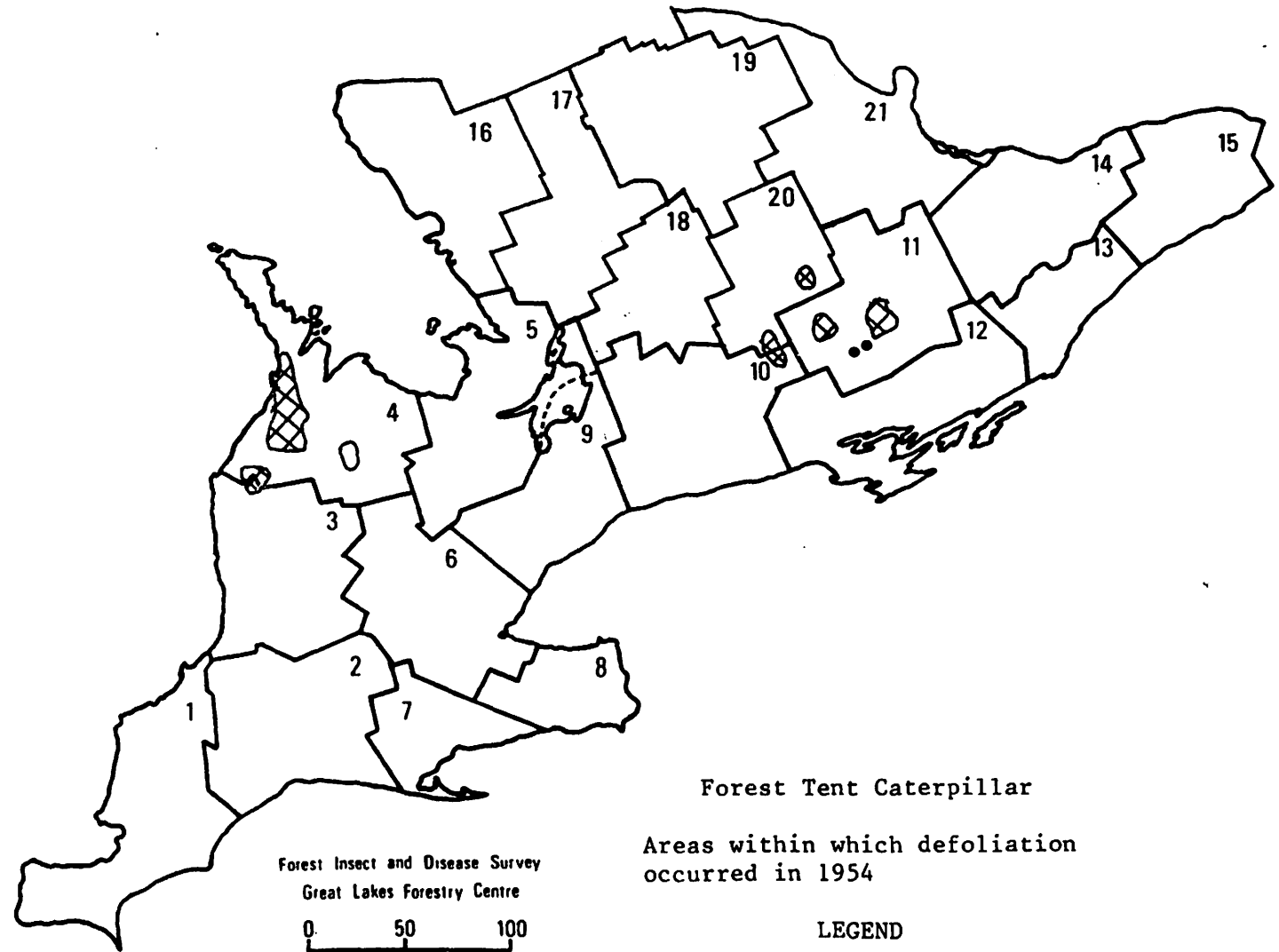
• or




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

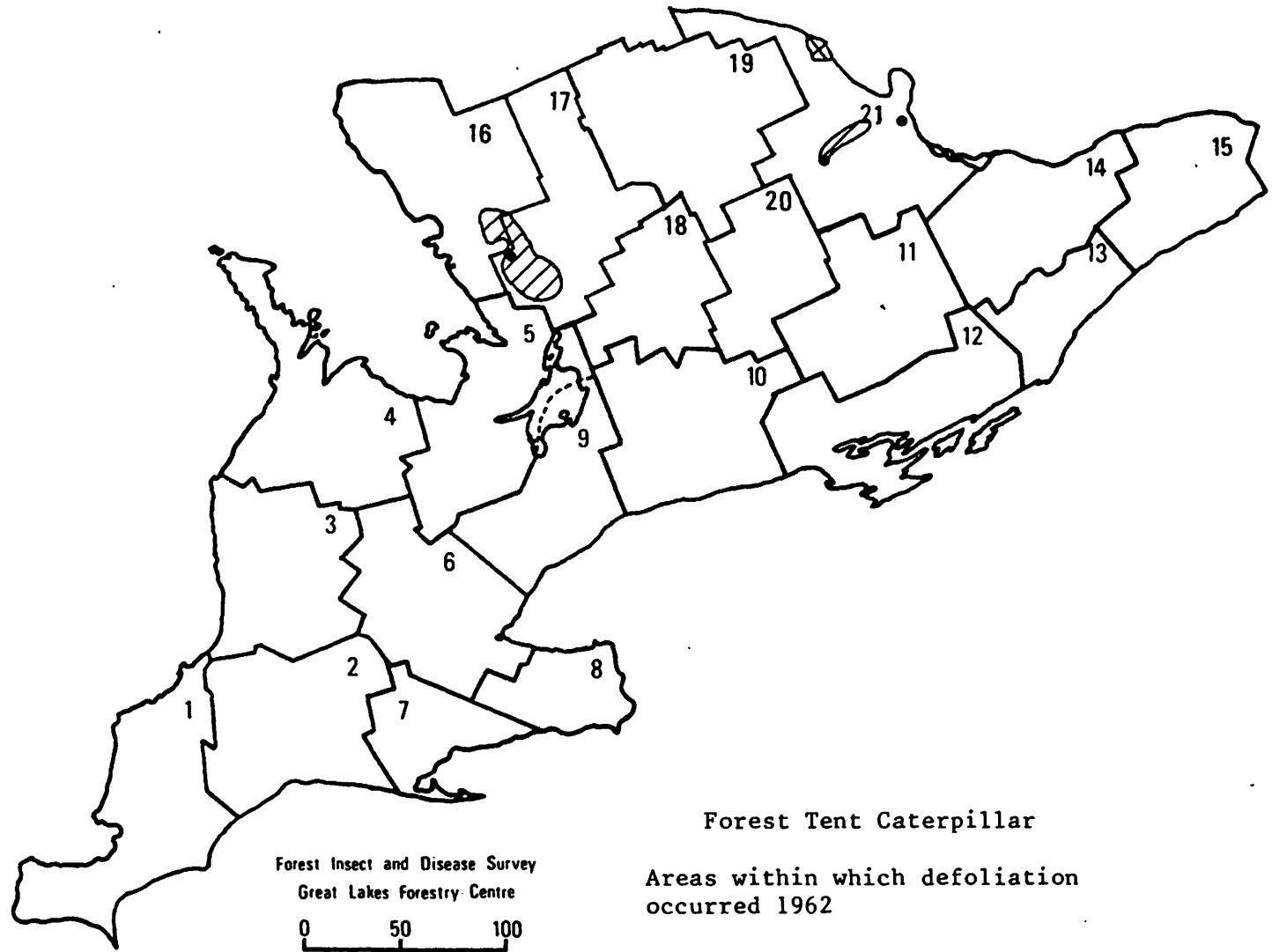


Moderate-to-severe defoliation • or 

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



LEGEND

Light defoliation



Moderate-to-severe defoliation

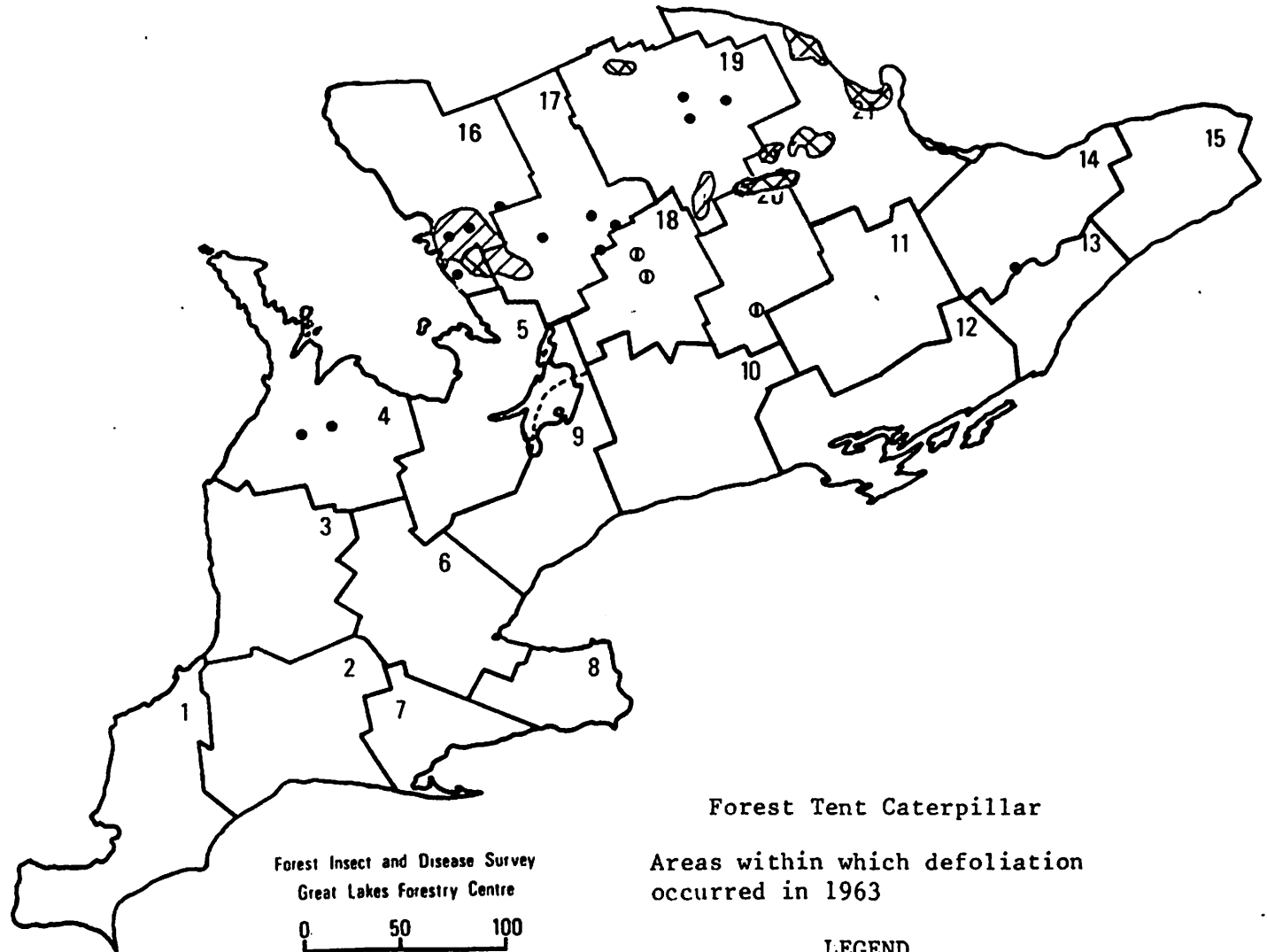
• or



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



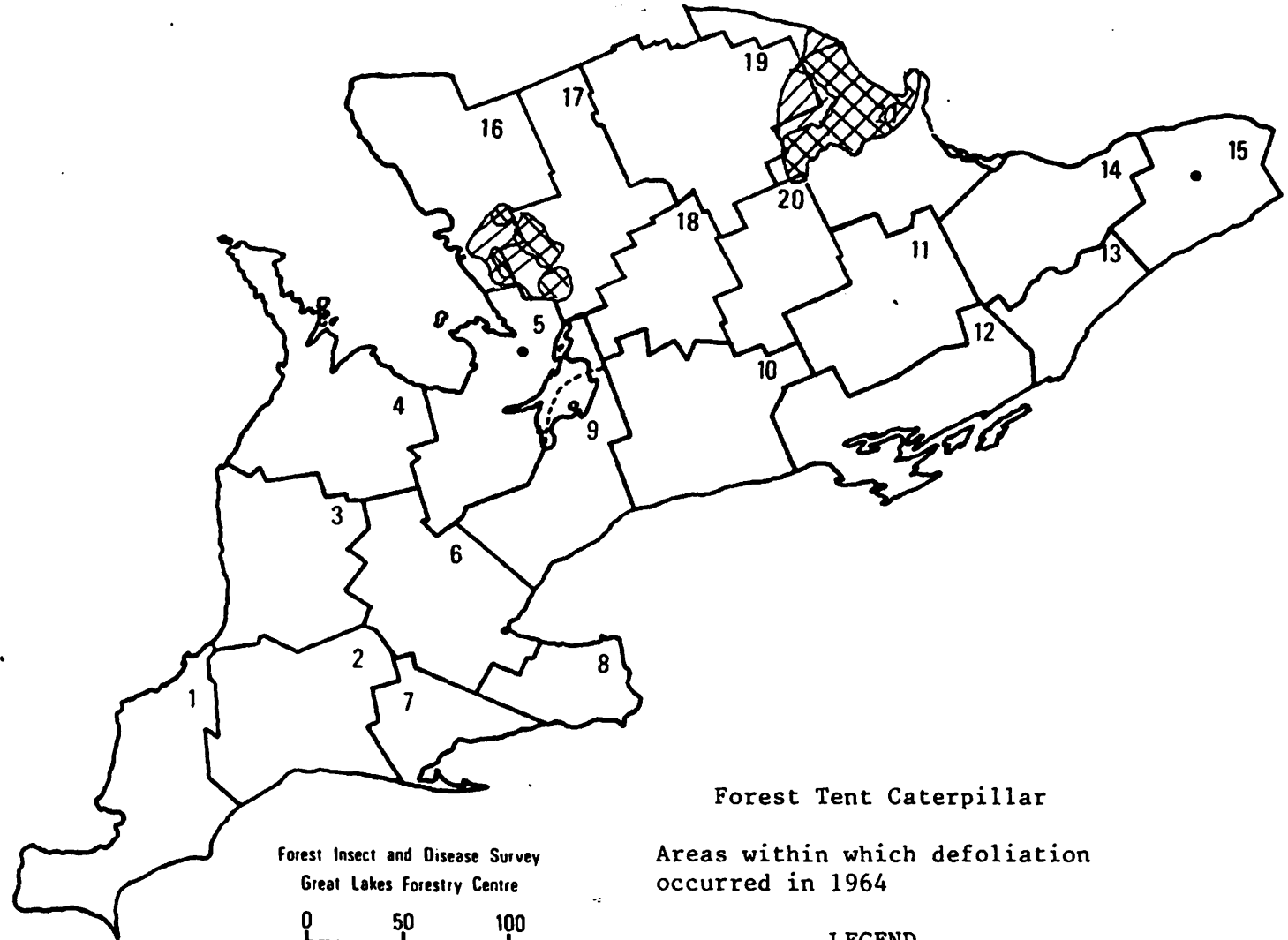
Light defoliation ○ or [diagonal lines]

Moderate-to-severe defoliation • or [cross-hatch]

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
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13. BROCKVILLE
14. CARLETON PLACE
15. CORNWALL
16. PARRY SOUND
17. BRACEBRIDGE
18. MINDEN
19. ALGONQUIN PARK
20. BANCROFT
21. PEMBROKE



Forest Insect and Disease Survey
Great Lakes Forestry Centre
0 50 100
Kilometres

Forest Tent Caterpillar

Areas within which defoliation
occurred in 1964

LEGEND

Light defoliation



Moderate-to-severe defoliation

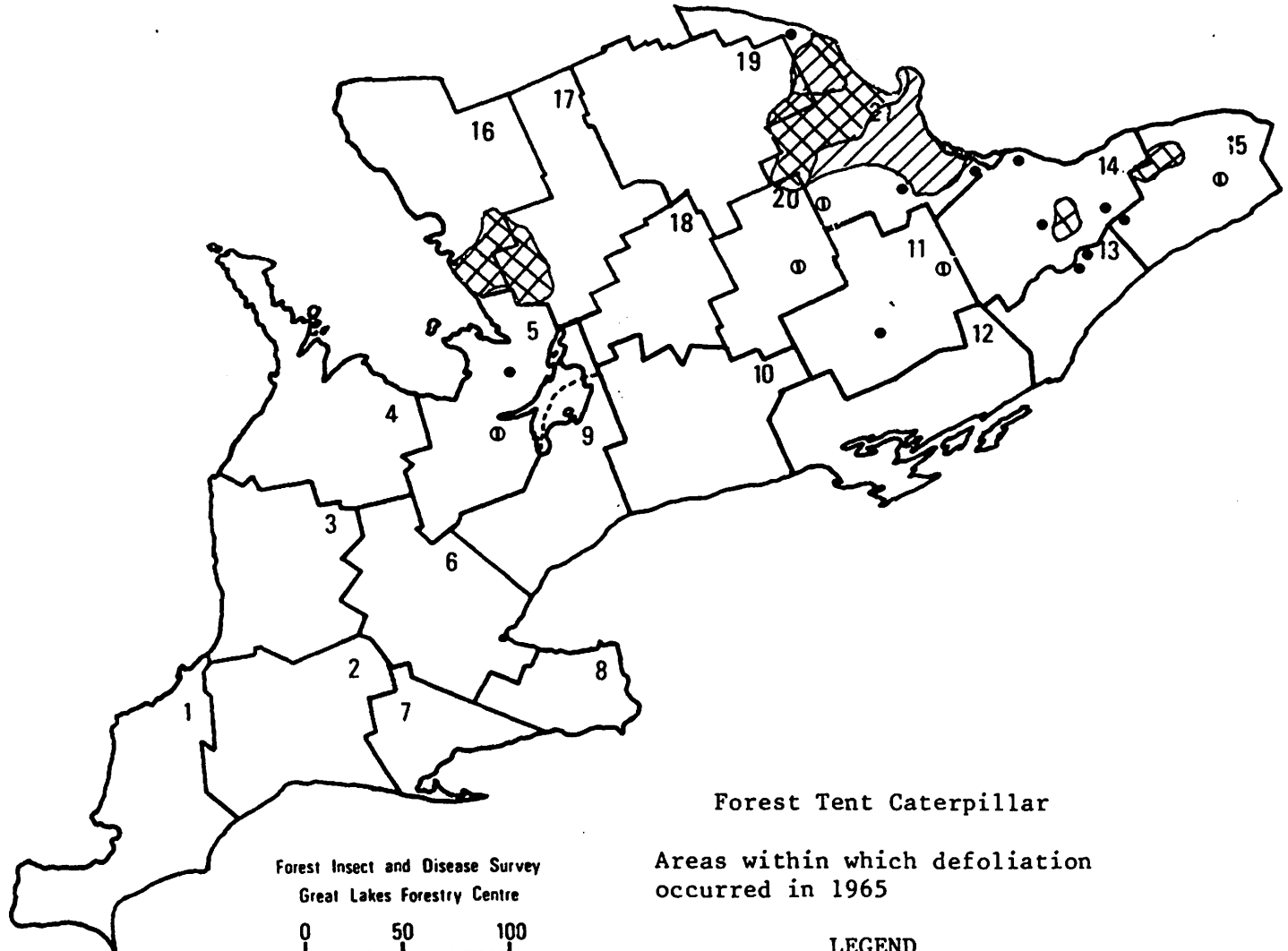
• or



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



Forest Tent Caterpillar

Areas within which defoliation occurred in 1965

LEGEND

Light defoliation

⊙ or



Moderate-to-severe defoliation

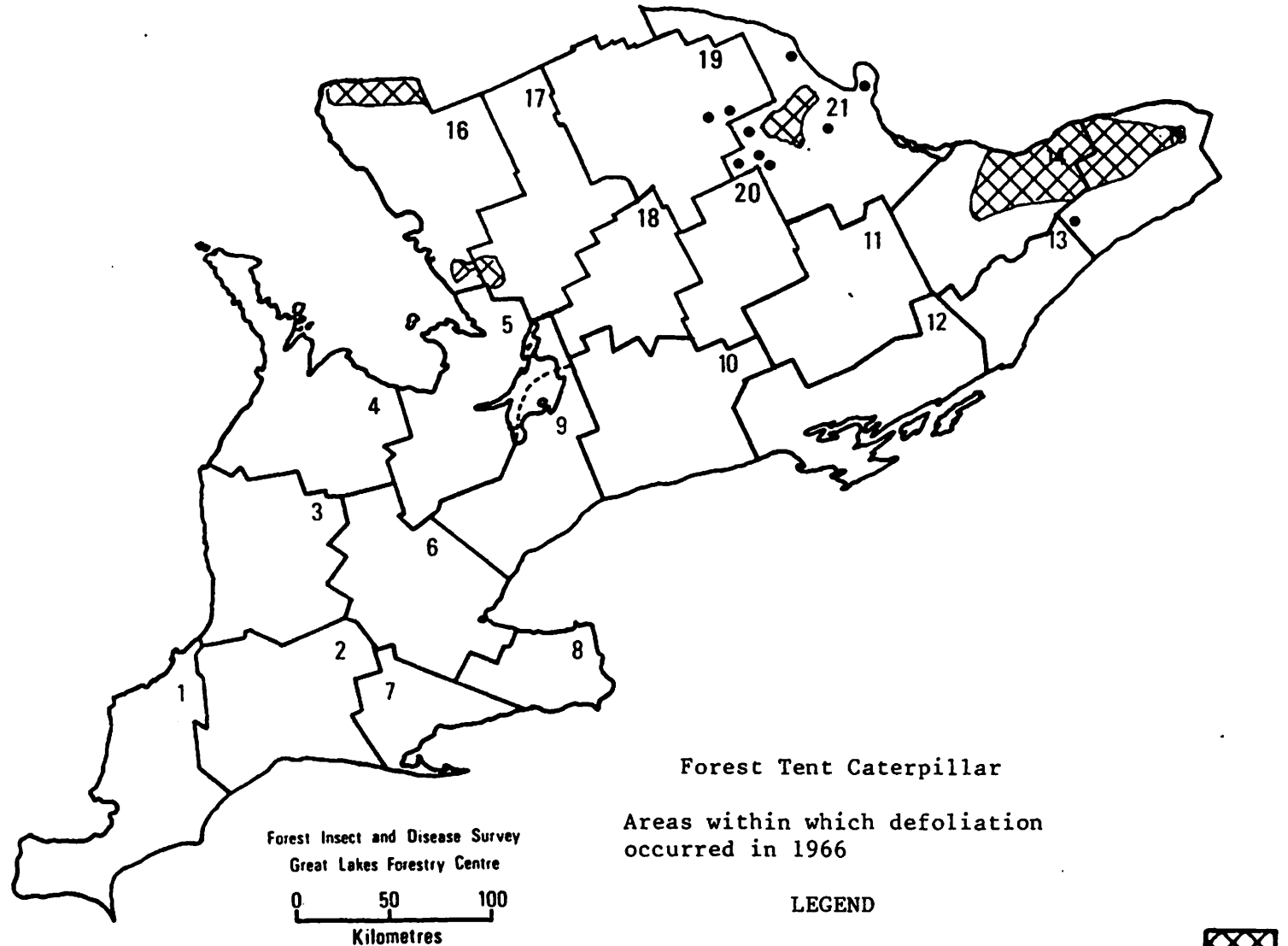
• or



SOUTHERN ONTARIO

DISTRICTS

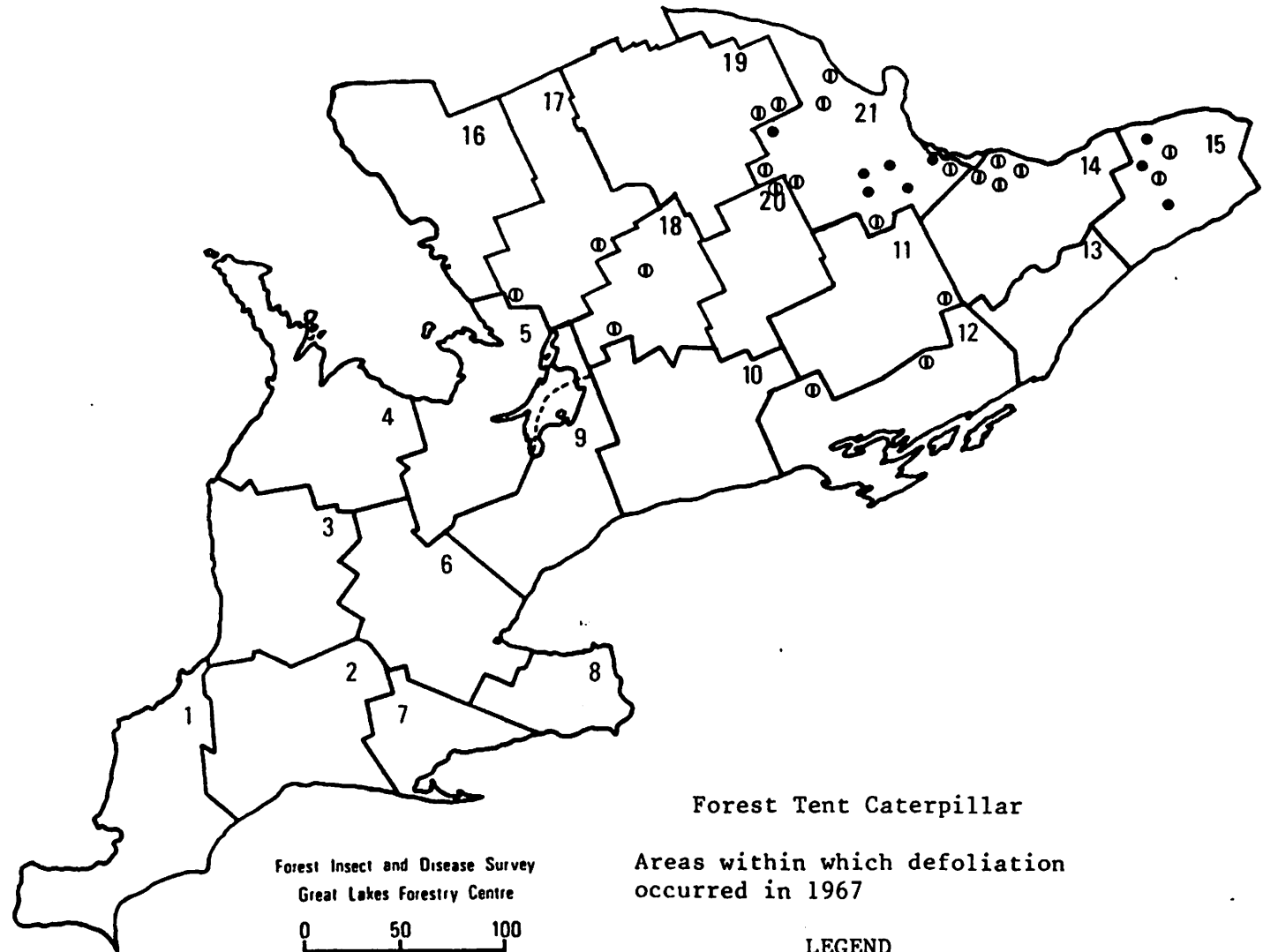
1. CHATHAM
2. AYLMER
3. WINGHAM
4. OWEN SOUND
5. HURONIA
6. CAMBRIDGE
7. SIMCOE
8. NIAGARA
9. MAPLE
10. LINDSAY
11. TWEED
12. NAPANEE
13. BROCKVILLE
14. CARLETON PLACE
15. CORNWALL
16. PARRY SOUND
17. BRACEBRIDGE
18. MINDEN
19. ALGONQUIN PARK
20. BANCROFT
21. PEMBROKE



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

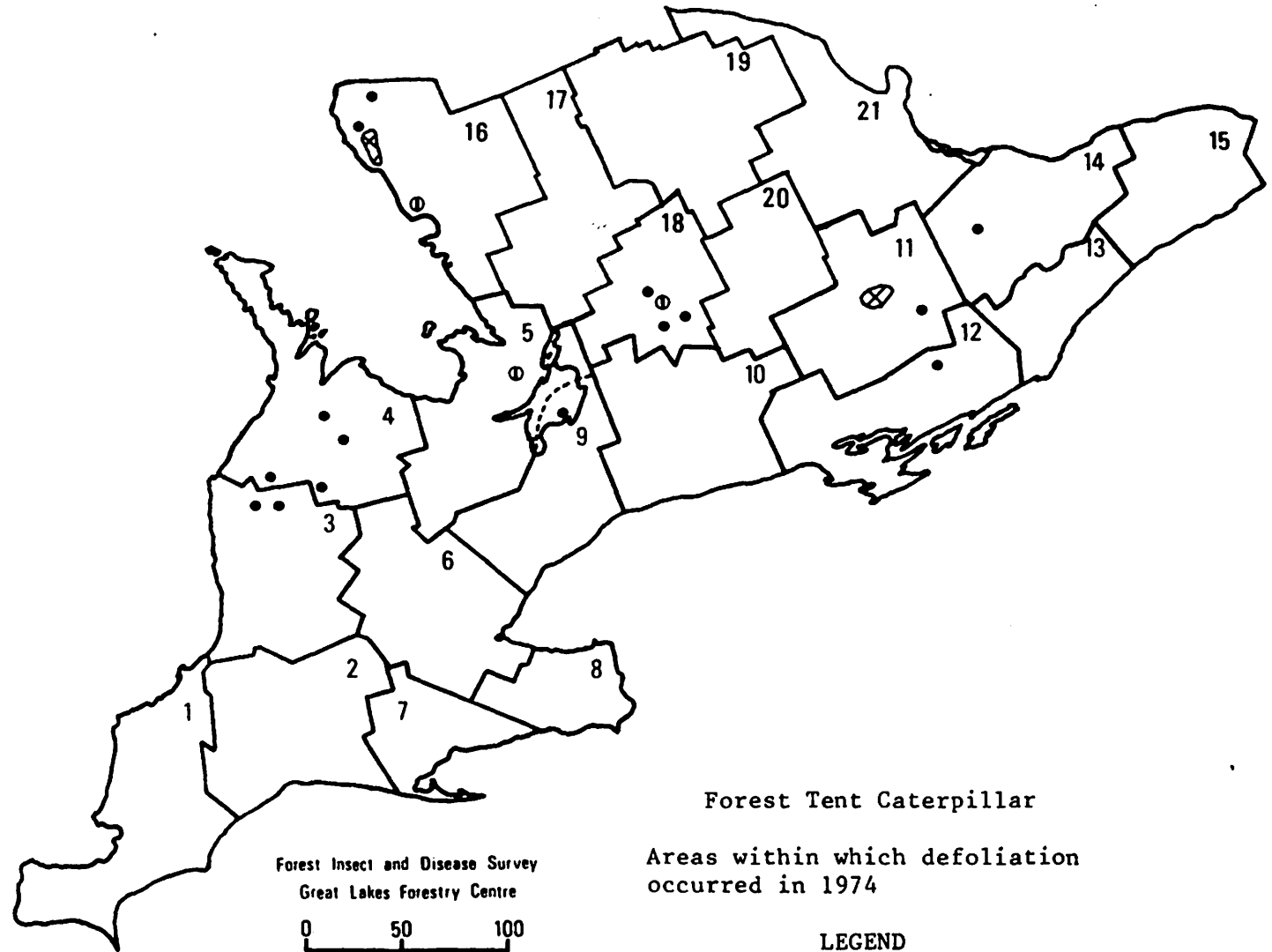


- Light defoliation ○
- Moderate-to-severe defoliation ●


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



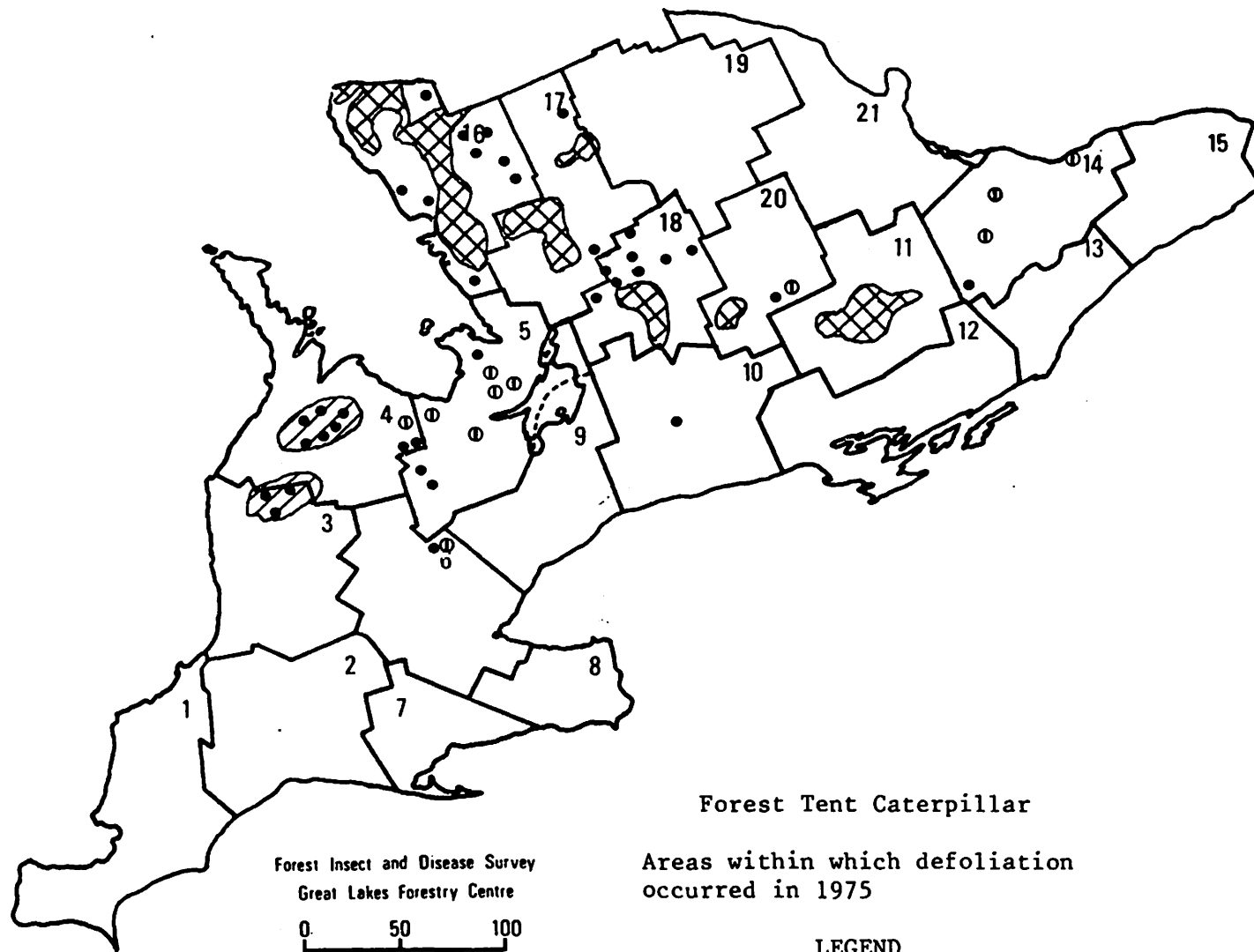
Light defoliation ○

Moderate-to-severe defoliation • or 

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LEGEND

Light defoliation

⊙ or



Moderate-to-severe defoliation

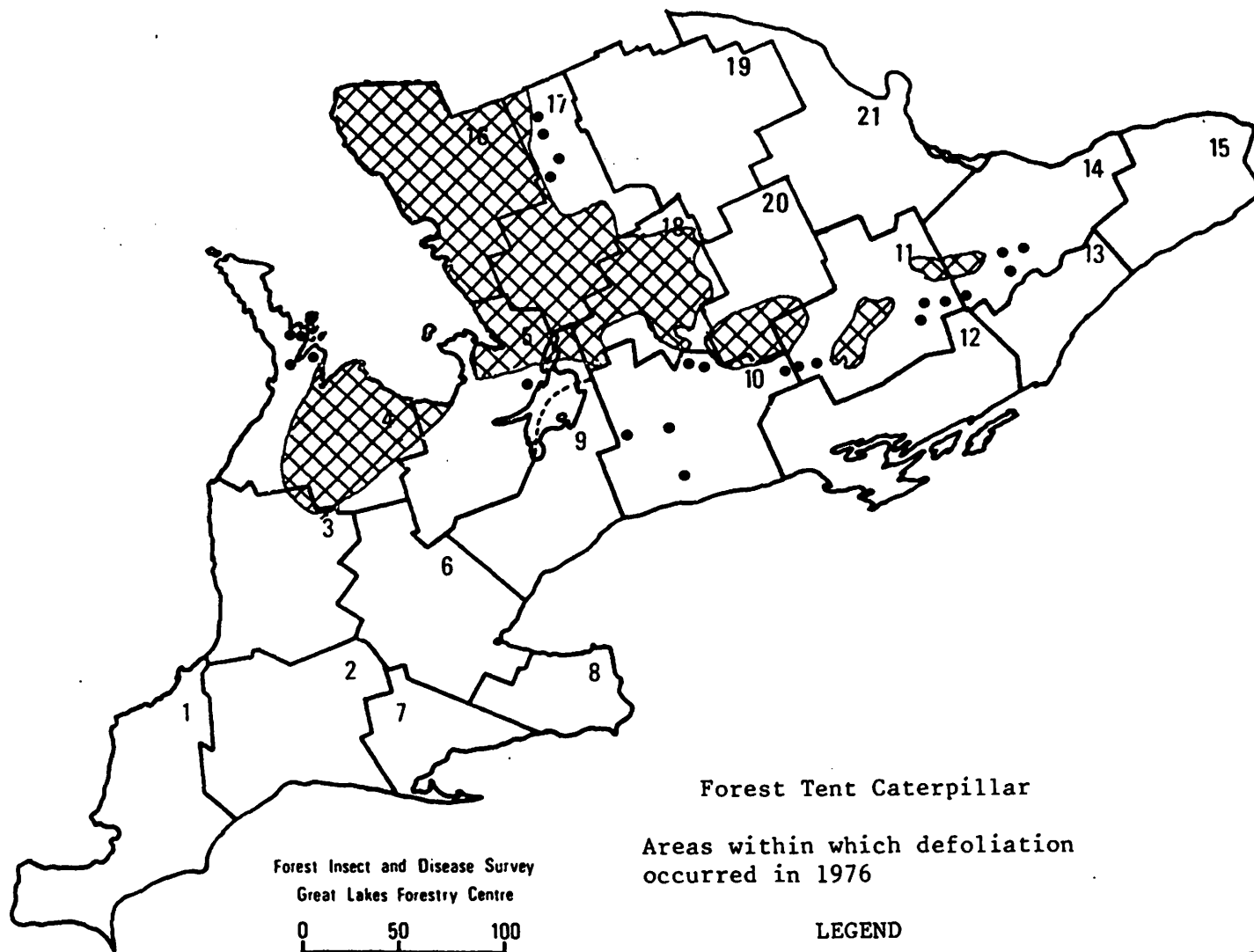
• or



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Forest Tent Caterpillar

Areas within which defoliation occurred in 1976

LEGEND

Moderate-to-severe defoliation • or 

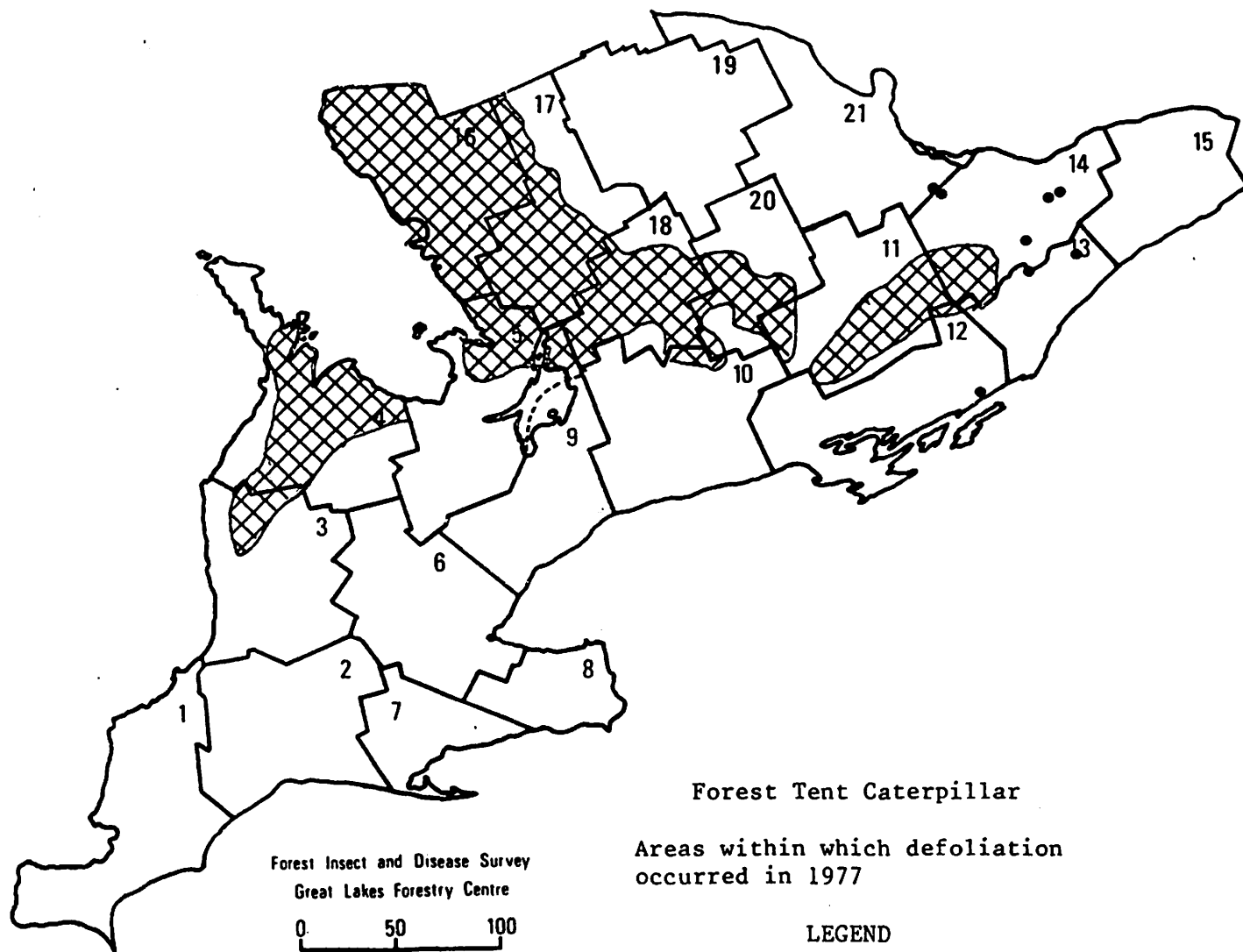
Forest Insect and Disease Survey
Great Lakes Forestry Centre




SOUTHERN ONTARIO

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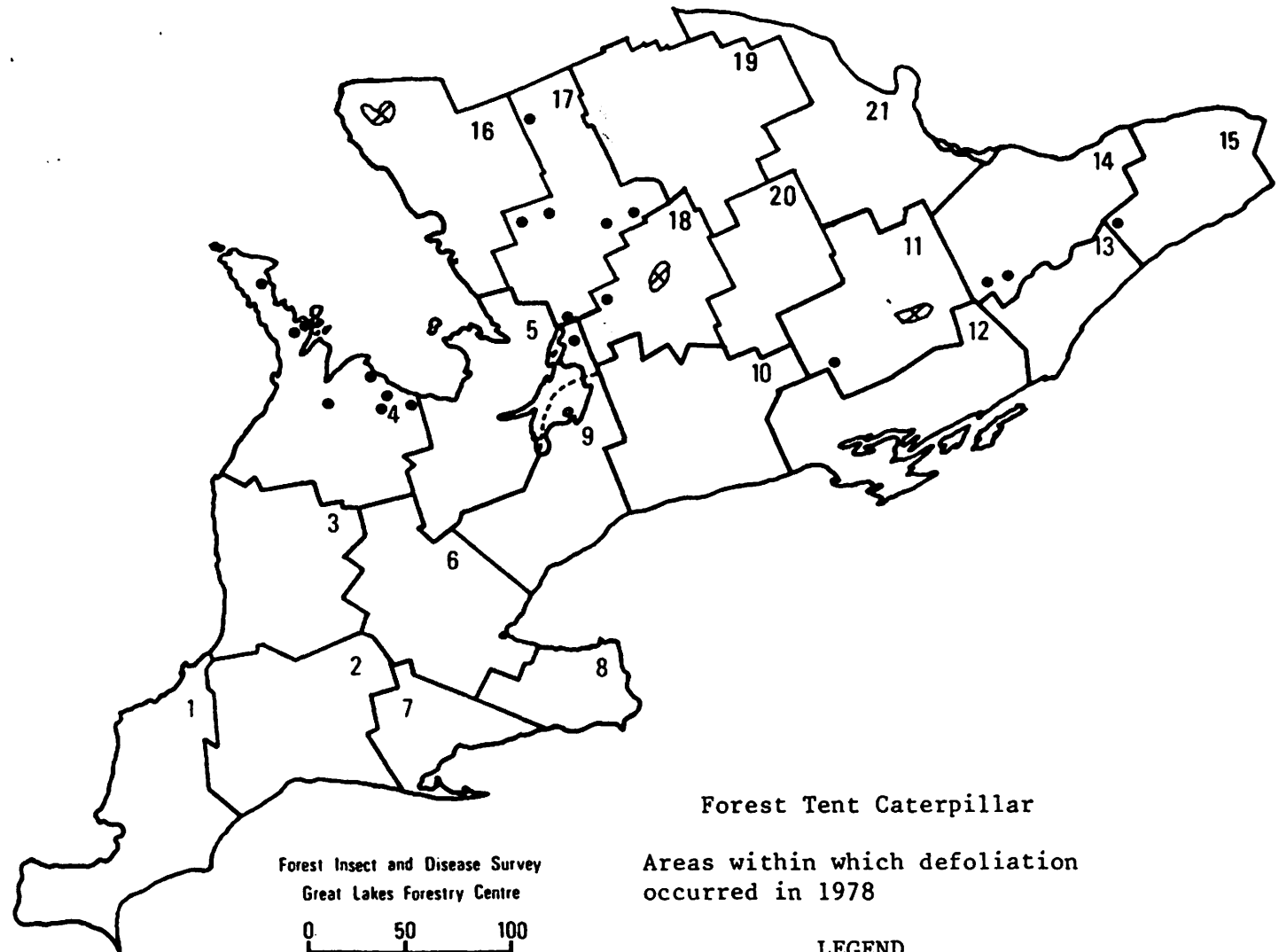


Moderate-to-severe defoliation • or 

SOUTHERN ONTARIO

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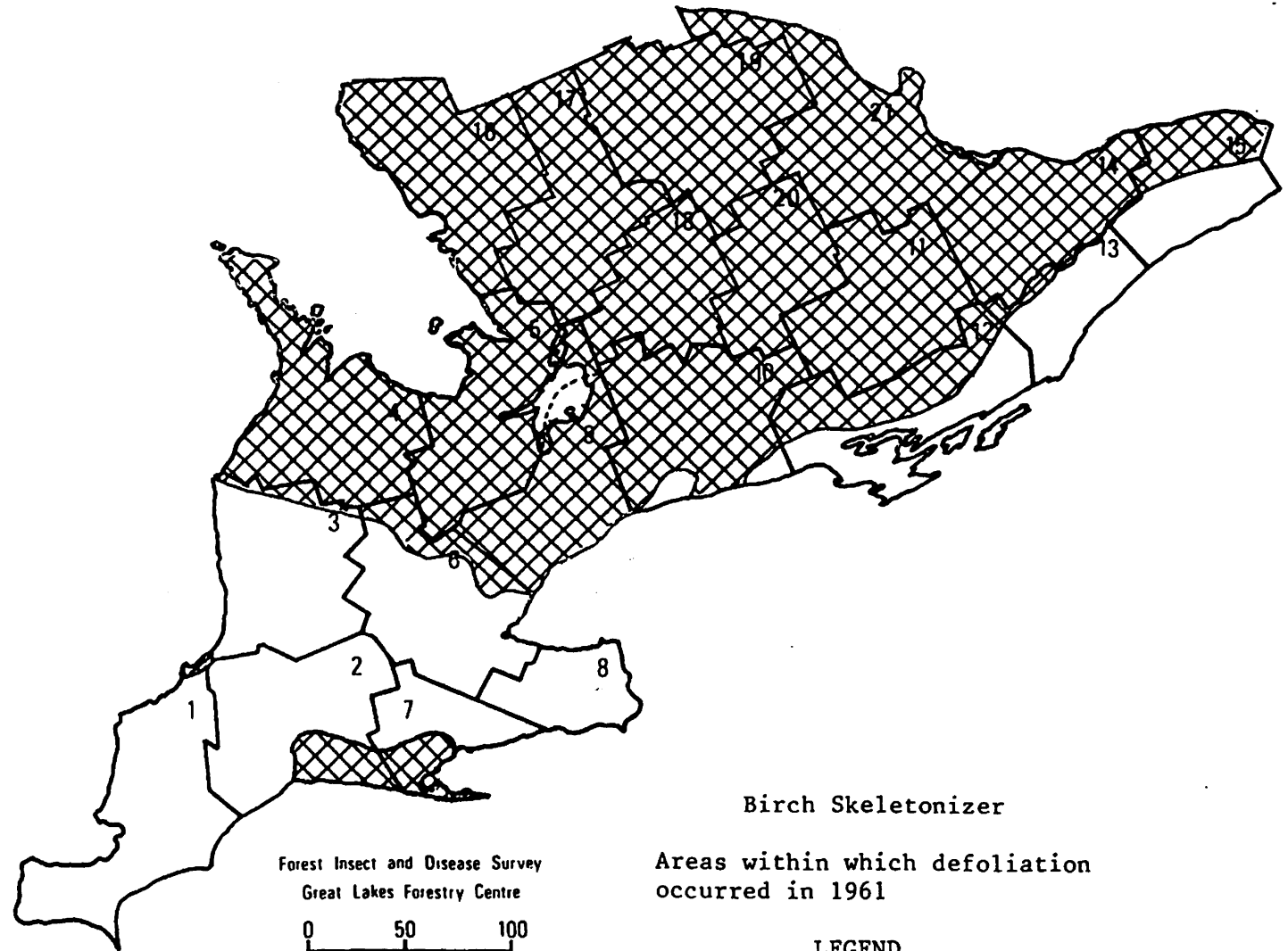
Moderate-to-severe defoliation • or



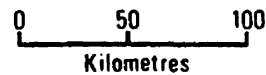
SOUTHERN ONTARIO

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Forest Insect and Disease Survey
Great Lakes Forestry Centre



Birch Skeletonizer

Areas within which defoliation
occurred in 1961

LEGEND

Moderate-to-severe defoliation

