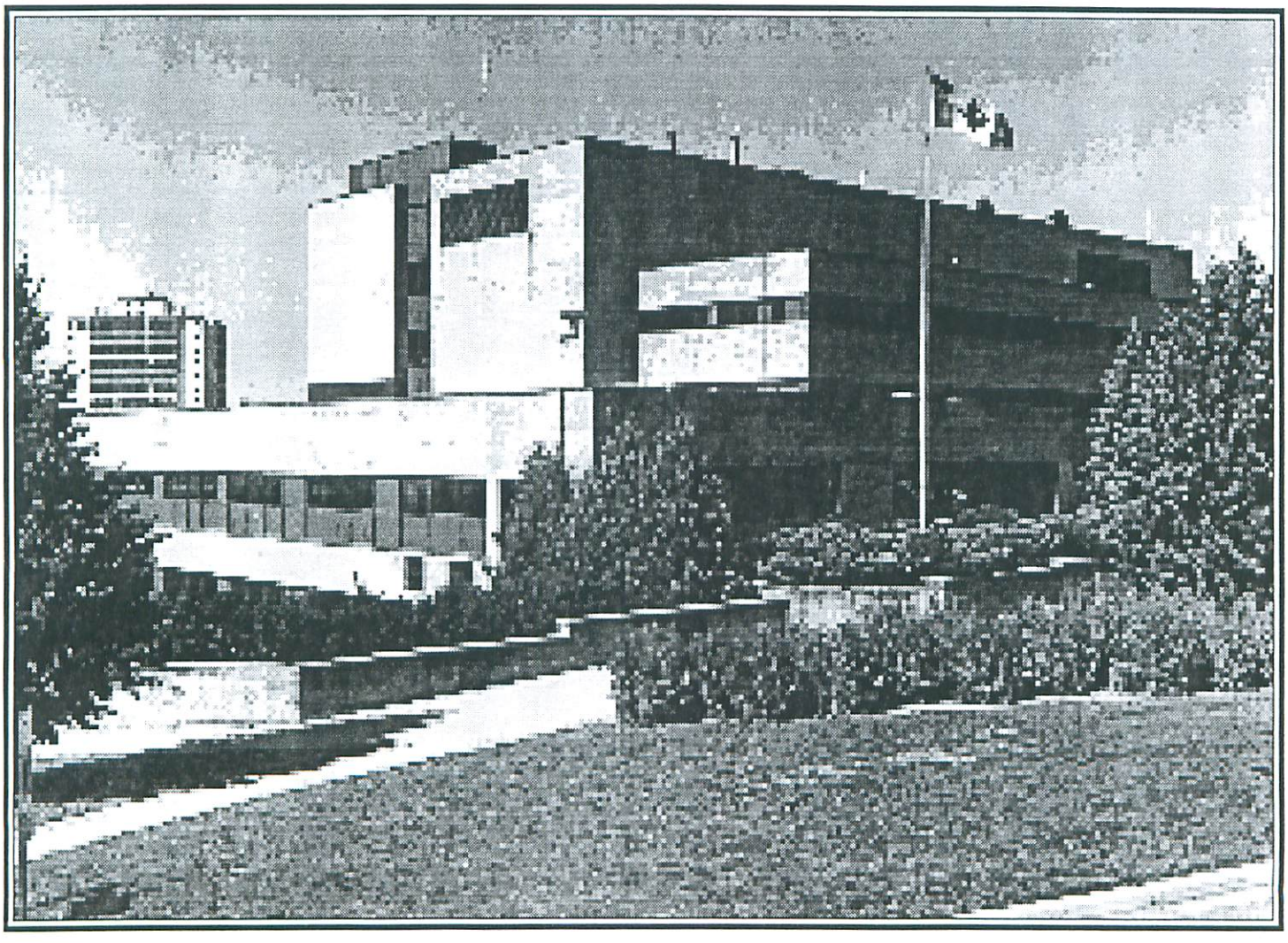
1988

FILE REPORT

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



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

Compiled by

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FORESTRY CANADA

ONTARIO REGION

GOVERNMENT OF CANADA

1988

[1] *Forest Research Technicians, Forest Insect and Disease Survey Unit*

FOREWORD

The first forest insect 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 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 from the earliest reports are taken to the second decimal point, i.e., [sq. mi. to km^2 = area (sq. mi.) x 2.59 = area km^2]. 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 Unit; Miss C.A. Plexman, Chief, Communications Services; and Mr. P. Jakibchuk, Technical Services Officer, for advice and support during the preparation of this review.

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

1950-1951	R.J. Du Breuil, J.C. Charbonneau
1952-1953	J.C. Charbonneau
1954-1955	A.S. Danard
1956-1960	M.J. Thomson
1961	W.J. Miller
1962-1966	J. Hook
1967-1970	M.J. Applejohn
1971-1972	H.J. Weir, M.J. Applejohn
197	H.J. Weir, W.D. Biggs
1974	H.J. Weir, C.A. Barnes
1975-1979	C.A. Barnes
1980	R.J. Sajan

TABLE OF CONTENTS

(cont'd)

TABLE OF CONTENTS (concluded)

INTRODUCTIONS

This is a review of significant forest insects and diseases in the area covered by the Brockville District from 1950 to 1980. The district was formed in 1973 when the former Kemptville District was subdivided. In the selection of pests for this 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 or 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.)
Coleotechnites thujaella (Kft.)
pages

This group of leafminers causes serious damage to host trees by thinning foliage and killing twigs and branches. After several years of medium-to-heavy infestation tree mortality will occur. All of the above species have been found intermingled on mined trees.

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

Defoliation by this insect seldom caused mortality of the host but weakened trees are subject to attack by secondary insects and diseases. Large outbreaks of this insect usually last 3 to 4 years, then decline rapidly. The largest infestation in the district was reported in 1961.

Spruce Budworm, *Choristoneura fumiferana* (Clem.) [Major]

pages

This insect is considered the most destructive insect 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. Small pockets of moderate-to-severe defoliation were reported from 1973 to 1978.

Pine Bud Moth, *Exoteleia dodecella* (L.) [Major]
pages

Repeated attacks by this insect kills a high percentage of buds on Scots pine trees resulting in sparse foliage and deformed branches. High numbers were found in plantations in 1958, 1959 and 1969.

Birch Leafminer, *Fenusa pusilla* (Lep.) [Major]

pages

Defoliation by this miner can weaken trees and leave 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. Medium-to-heavy infestations were reported from 1956 to 1972.

Fall Webworm, *Hyphantria cunea* (Drury) [Major]

pages

Outbreaks of this pest can cause complete defoliation of many host species. Repeated moderate-to-severe defoliation weakens trees making them susceptible to attack by other insects and by diseases. Varying degrees of infestation were general in the district from 1950 to 1980.

Forest Tent Caterpillar, *Malacosoma disstria* Hbn. [Major]
pages

This caterpillar is widely distributed through North America. Infestations usually last an average of five years and high populations denude large areas of susceptible stands. The principal host attacked is aspen, however, many other deciduous species also suffer severe defoliation. Repeated defoliation retards tree growth and vigor leaving the susceptible to attack by other pests. Infestations were reported in the district from 1952 to 1954 and in 1977.

Balsam Fir Sawfly, *Neodiprion abietis* complex [Major]

pages

Severe defoliation can cause mortality of balsam fir and white spruce trees when an infestation persists over a period of years. No extensive infestations were reported in the district.

Redheaded Pine Sawfly, *Neodiprion lecontei* (Fitch) [Major]
pages

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 pure stands. Fluctuating populations caused problems in plantations necessitating spraying operations on several occasions.

Jack Pine Sawflies, *Neodiprion pratti banksianae* Roh. and *Neodiprion pratti paradoxicus* Ross [Major]
pages

The sawflies listed are capable of causing mortality of semimature and plantation pine trees when populations are high. These sawflies caused moderate-to-severe damage in plantations in the Leeds County Forest and at other locations.

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

This destructive insect has been categorized as a serious pest of young spruce plantations and open-growing ornamentals. High mortality can occur after successive years of severe defoliation. Pockets of moderate-to-severe defoliation of small spruce trees were reported frequently from 1955 to 1975.

White Pine Weevil, *Pissodes strobi* (Peck) [Major]
pages

This weevil is considered the most destructive pest of eastern white pine in North America. Successive weevilling over a period of years results in multiple-stemmed trees. Varying degrees of leader mortality were recorded from 1954 to 1980.

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

pages

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. Although widely distributed through the district, no extensive damage was attributed to this insect during the review period.

Other Noteworthy Insects [Major and Minor]
pages

Insects that have the potential for causing damage to stands, regeneration and plantations.

FOREST DISEASES

Armillaria Root Rot, *Armillaria mellea* (Vahl:Fr.) Kummer [Major]
pages

This root rot disease often kills trees previously stressed by drought, insects, other pathogens or unfavourable environment. However, under some circumstances the fungus, or certain strains of the fungus, can kill vigorous trees. Both deciduous and coniferous trees are attacked. Light tree mortality was reported in several conifer plantations in 1964, 1966 and 1976.

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

This major disease organism, which affects all species of elm, was first recorded in Ontario in Prescott County in 1946, and has gradually spread throughout most of the known range of elm in Ontario. It was first recorded in the district in 1959 and quickly spread through elm stands.

Ink Spot of Aspen, *Ciborinia whetzelii* (Seaver) Seaver [Major]
pages

This ink spot disease is widespread throughout the range of aspen. Many poplar species and hybrids are susceptible, but trembling aspen is most commonly affected. Heavily infected trees may be defoliated prematurely and repeated attacks can reduce increment and even kill regeneration. No extensive damage to aspen stands was reported in the district.

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

White pine blister rust is the most serious disease of eastern white pine. The disease caused top killing and mortality in trees of all ages. The disease was found district-wide and in 1967 caused mortality of seedlings at the Kemptville Nursery.

Hypoxylon Canker, *Hypoxylon mammatum* (Wahlenb.) J. Miller [Major]
page

Mortality caused by this disease is usually restricted to trees in the 7-cm to 13-cm class, growing on poor sites, but branch and top mortality may occur in trees of greater diameter. The disease occurred regularly in aspen stands through the district.

Shoot Blight, *Venturia macularis* (Fr.) E. Müller & v. Arx. [Major]
page

Reduced stocking of regeneration aspen occurs when the incidence of this disease is high. Trees more than 5 years old are seldom affected and, therefore, the disease is of little economic importance in natural stands. Although the organism was found at many locations through the district, the infection levels were generally light.

Other Noteworthy Diseases
pages

These are diseases with the potential for causing damage to natural stands, regeneration and plantations.

DIEBACKS AND DECLINES

Maple Decline

This condition was reported from 1950-1980.

ABIOTIC DAMAGE

pages

Abiotic damage is caused by a variety of influences, i.e., frost, winter drying, salt, etc. Weakened trees are susceptible to a number of diseases.

I N S E C T S

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

Host(s): cedar [Major]

Year	Remarks
1950-1956	not reported
1957-1958	low numbers found at several locations
1959-1960	not reported
1961	trace populations
1962	Light and medium-to-heavy infestations were found at several points in the district (see map, page).
1963	Moderate-to-severe foliage discoloration was observed through Leeds and Grenville counties.
1964	Infestation intensities decreased and only light damage was observed.
1965	Light infestations of miners were found through the district.
1966	Small numbers were found at several points.
1967	not reported
1968	Populations increased and a medium-to-heavy infestation was found in Bastard Twp.
1969	Moderate-to-severe foliage discoloration occurred through Leeds and Grenville counties.
1970	Moderate-to-severe discoloration of foliage was common at many points in the district (see map, page).
1971	Moderate-to-severe foliage discoloration was general throughout the district (see map, page).
1972	Moderate-to-severe defoliation recurred and mortality of 10 m high trees was observed along Highway 43 in Oxford Twp (see map, page).
1973	Some reduction in population intensities was noted at several locations but generally medium-to-heavy infestations were general (see map, page).
1974	Moderate-to-severe mining persisted at many locations in the district.

(cont'd)

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

Year	Remarks
1975	low numbers in the district
1976-1978	trace populations
1979	Populations increased generally through the district and open-grown clumps of cedar were severely discoloured at many locations (see map, page).
1980	Populations continued to increase and medium-to-heavy infestations were found throughout the district (see map, page).

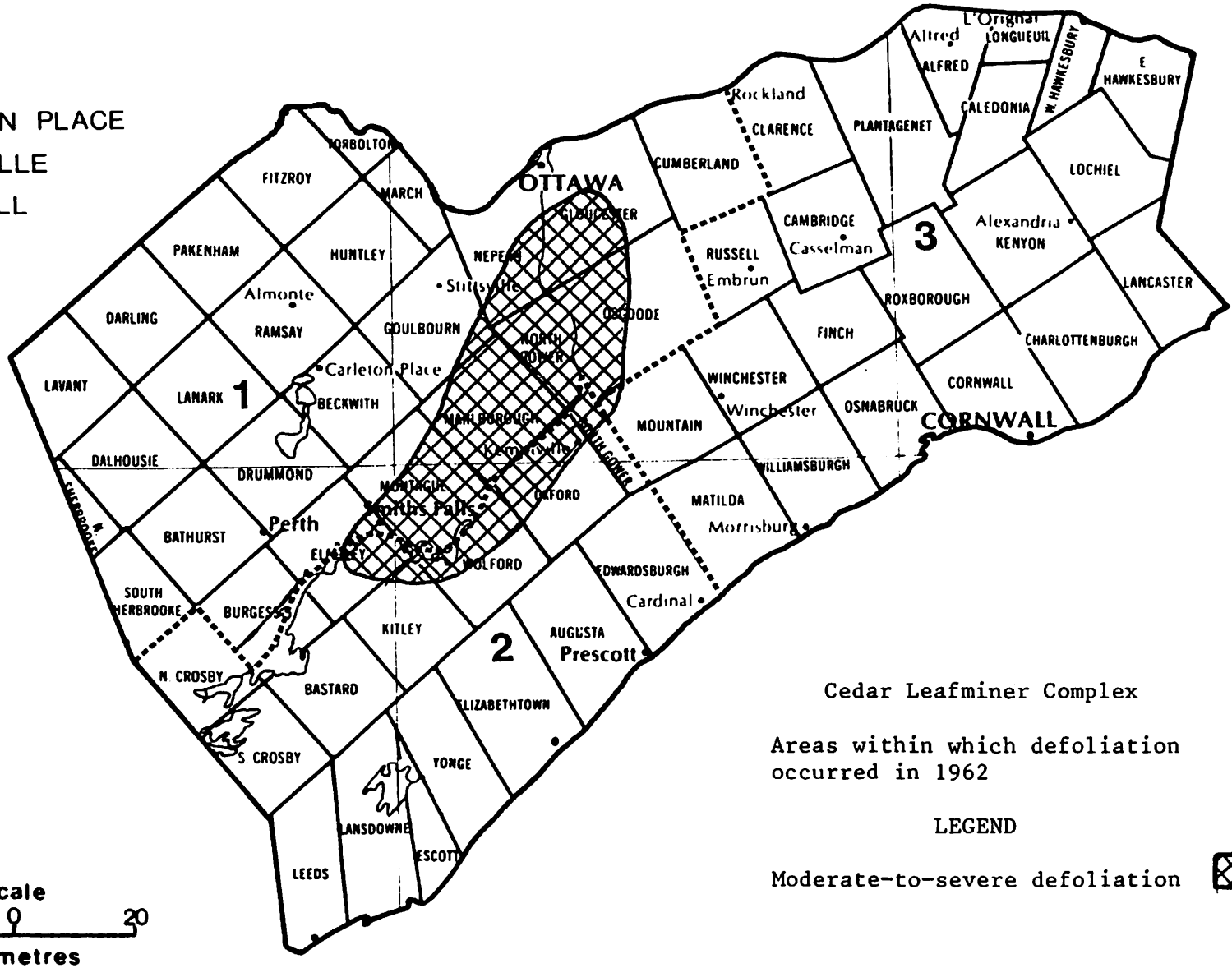
Birch Skeletonizer, *Bucculatrix canadensisella* Cham.

Host(s): birch [Major]

Year	Remarks
1950-1960	not reported
1961	Moderate-to-severe defoliation was recorded in the Northeastern part of the district (see map, page). In the remainder of the district defoliation was very light.
1962	Light infestations were found along the St. Lawrence River.
1963	Very low numbers were found in Leeds County.
1964	Light defoliation was recorded on small clumps of white birch west of Brockville.
1965	Populations declined to trace levels.
1966-1978	not reported
1979	trace populations
1980	not reported

CARLETON PLACE, BROCKVILLE and CORNWALL DISTRICTS

1. CARLETON PLACE
2. BROCKVILLE
3. CORNWALL



Scale
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Kilometres

Cedar Leafminer Complex

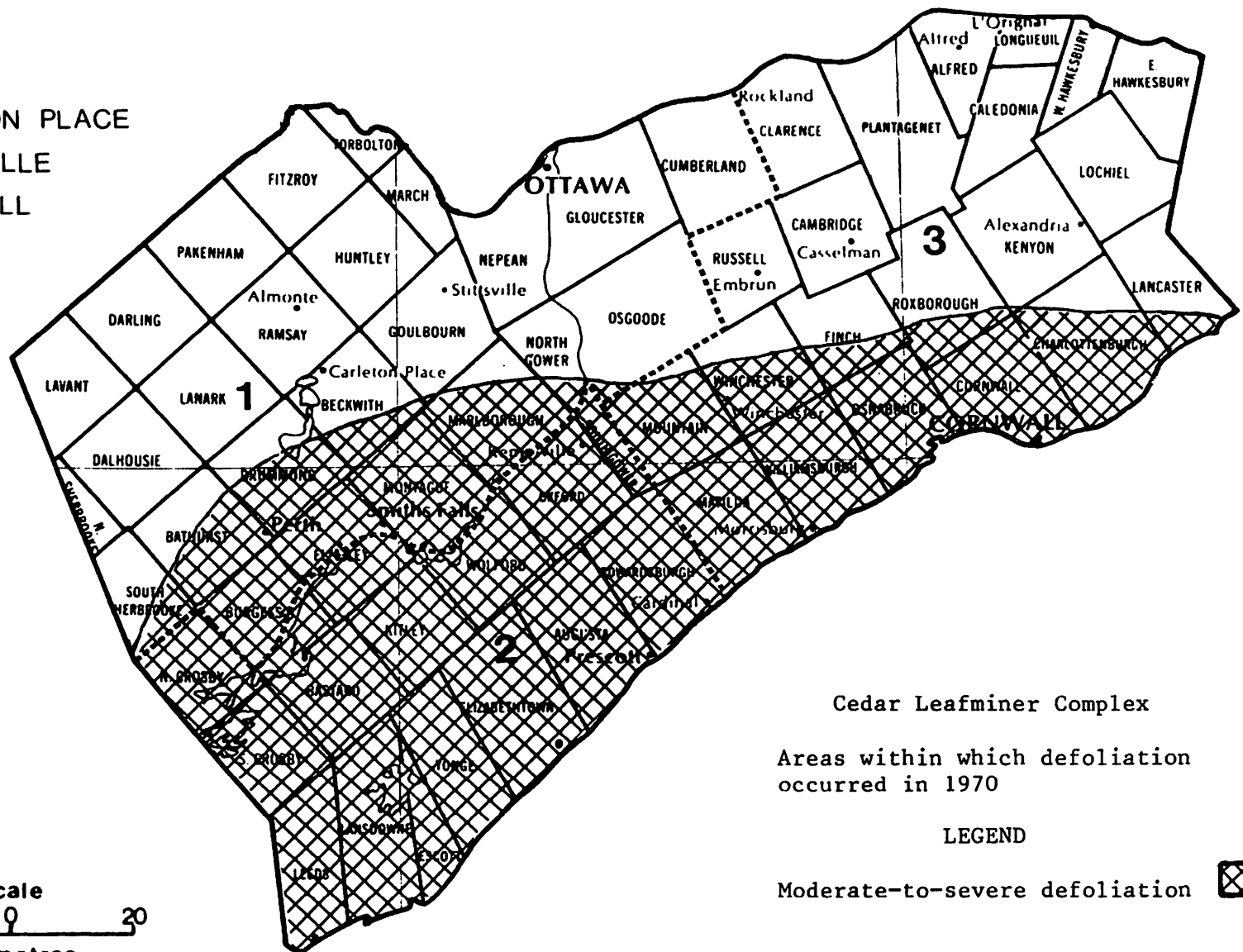
Areas within which defoliation occurred in 1962

LEGEND

Moderate-to-severe defoliation

CARLETON PLACE, BROCKVILLE and CORNWALL DISTRICTS

1. CARLETON PLACE
2. BROCKVILLE
3. CORNWALL



Cedar Leafminer Complex

Areas within which defoliation occurred in 1970

LEGEND

Moderate-to-severe defoliation

Forest Insect and Disease Survey
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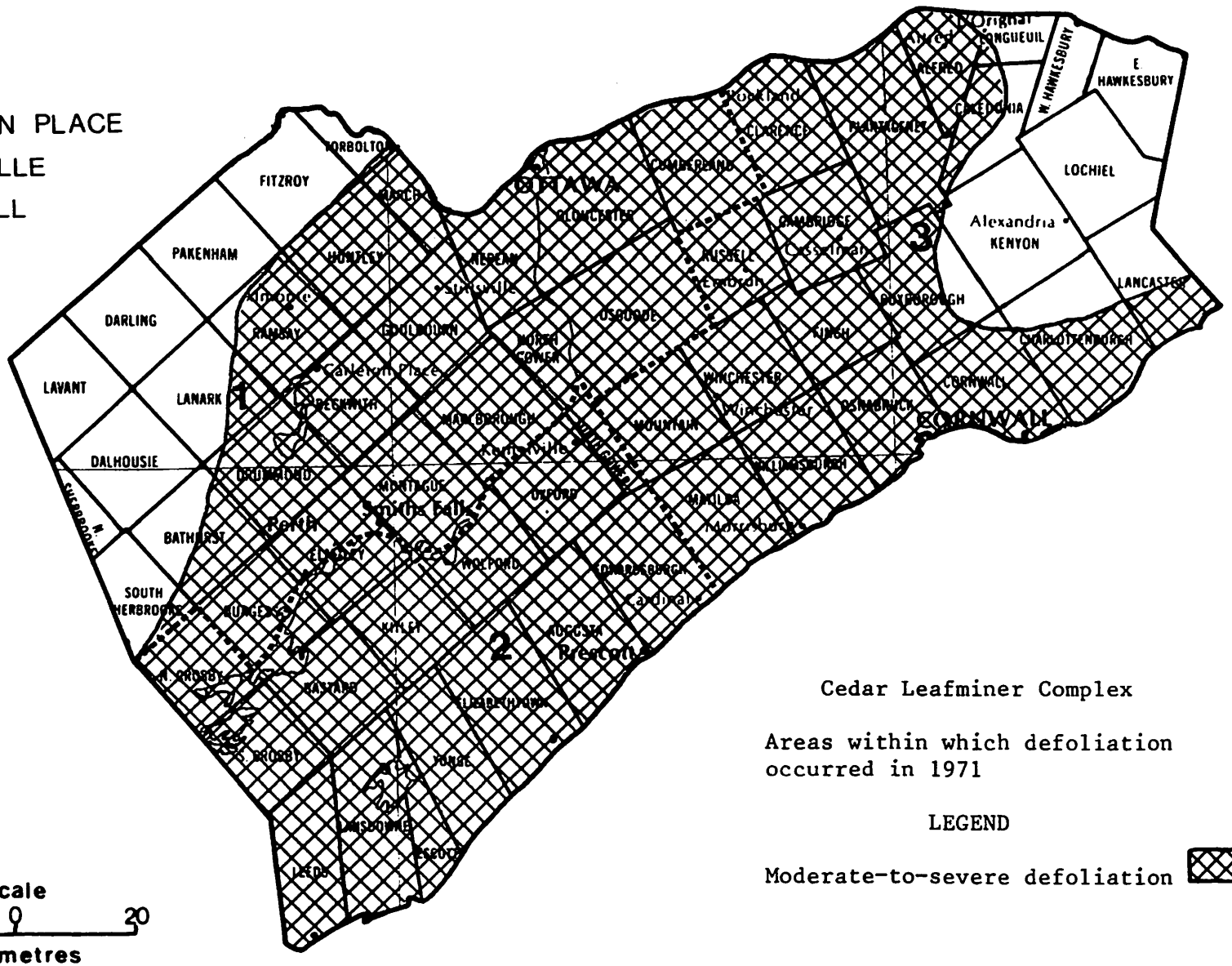
CARLETON PLACE, BROCKVILLE and CORNWALL DISTRICTS

1. CARLETON PLACE
2. BROCKVILLE
3. CORNWALL



Cedar Leafminer Complex

Areas within which defoliation occurred in 1971

LEGEND

Moderate-to-severe defoliation

Scale

20 10 0 20

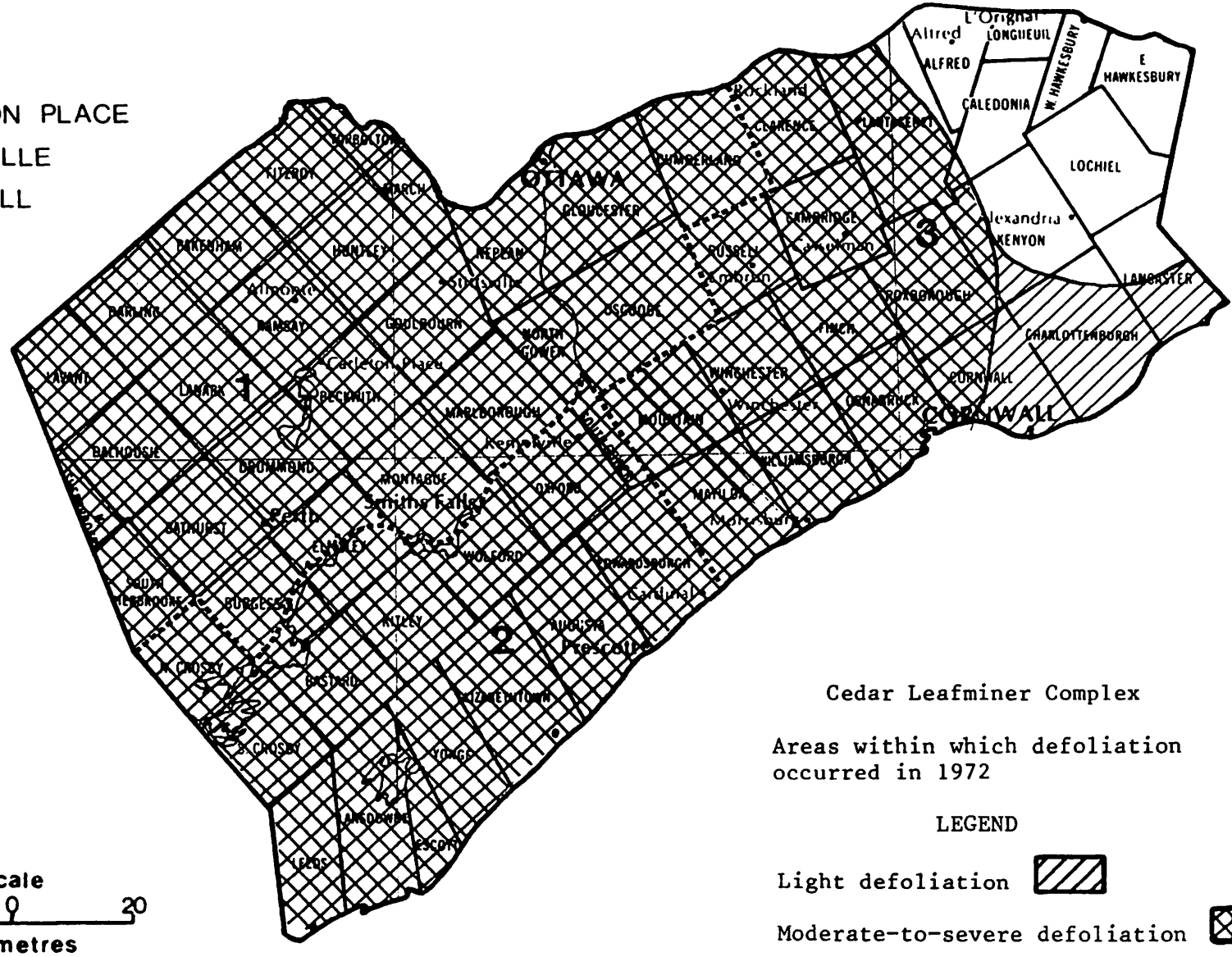
Kilometres

Forest Insect and Disease Survey

Great Lakes Forestry Centre

CARLETON PLACE, BROCKVILLE and CORNWALL DISTRICTS

1. CARLETON PLACE
2. BROCKVILLE
3. CORNWALL



Cedar Leafminer Complex

Areas within which defoliation occurred in 1972

LEGEND

Light defoliation

Moderate-to-severe defoliation

Scale

20 10 0 20

Kilometres

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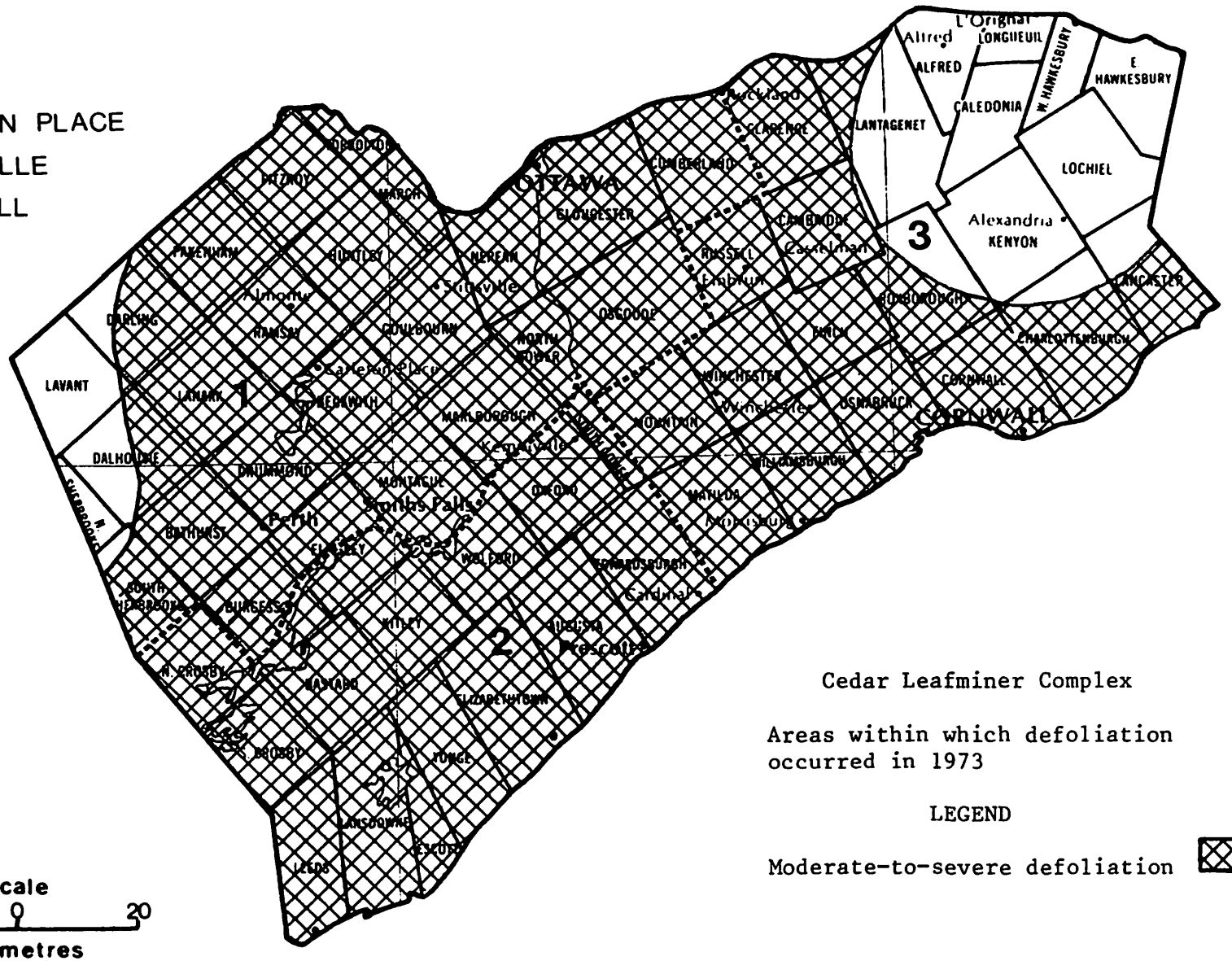
Great Lakes Forestry Centre

CARLETON PLACE, BROCKVILLE and CORNWALL DISTRICTS

1. CARLETON PLACE
2. BROCKVILLE
3. CORNWALL



Cedar Leafminer Complex

Areas within which defoliation occurred in 1973

LEGEND

Moderate-to-severe defoliation

Scale
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Kilometres

Forest Insect and Disease Survey
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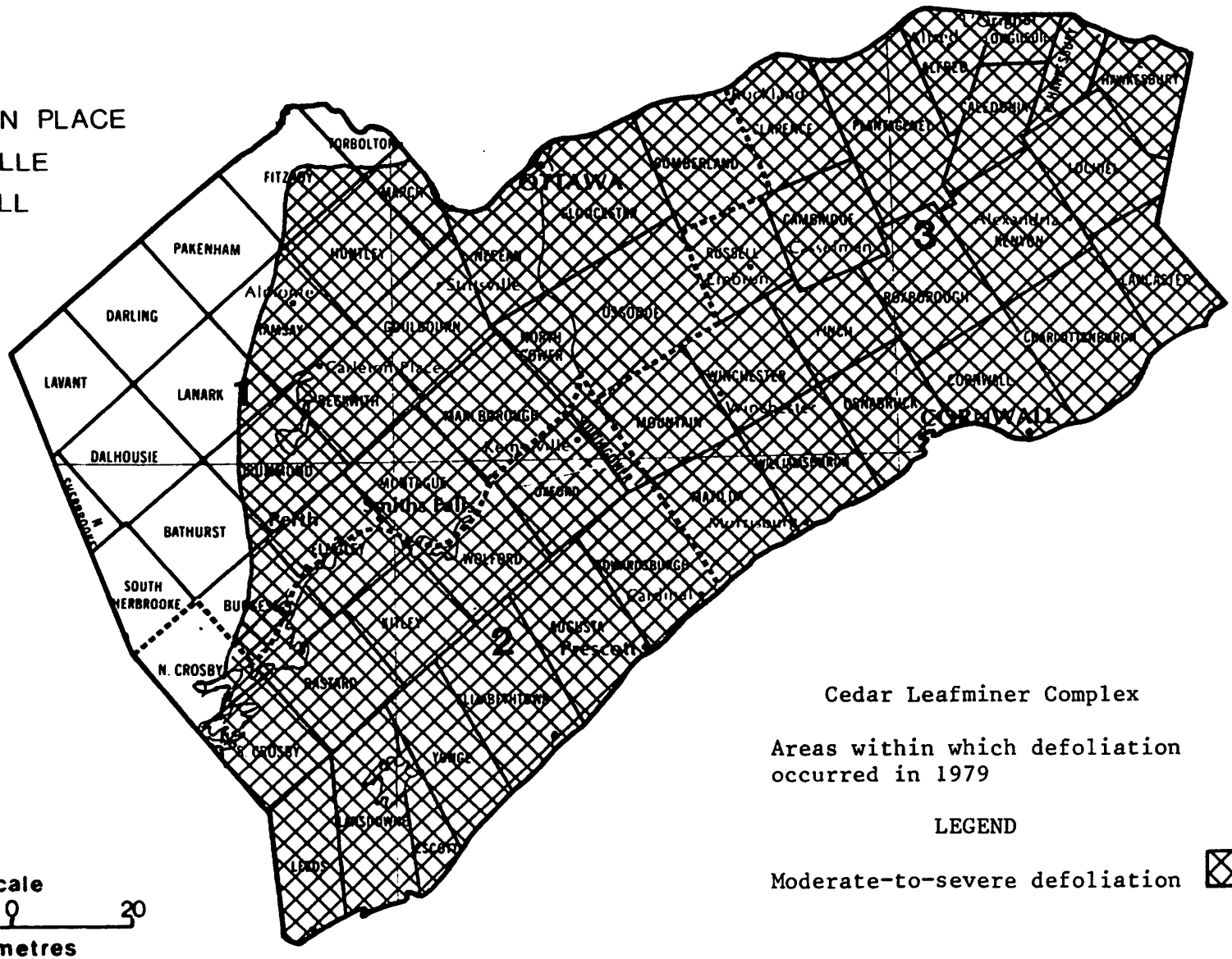
CARLETON PLACE, BROCKVILLE and CORNWALL DISTRICTS

1. CARLETON PLACE
2. BROCKVILLE
3. CORNWALL



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Great Lakes Forestry Centre

CARLETON PLACE, BROCKVILLE and CORNWALL DISTRICTS

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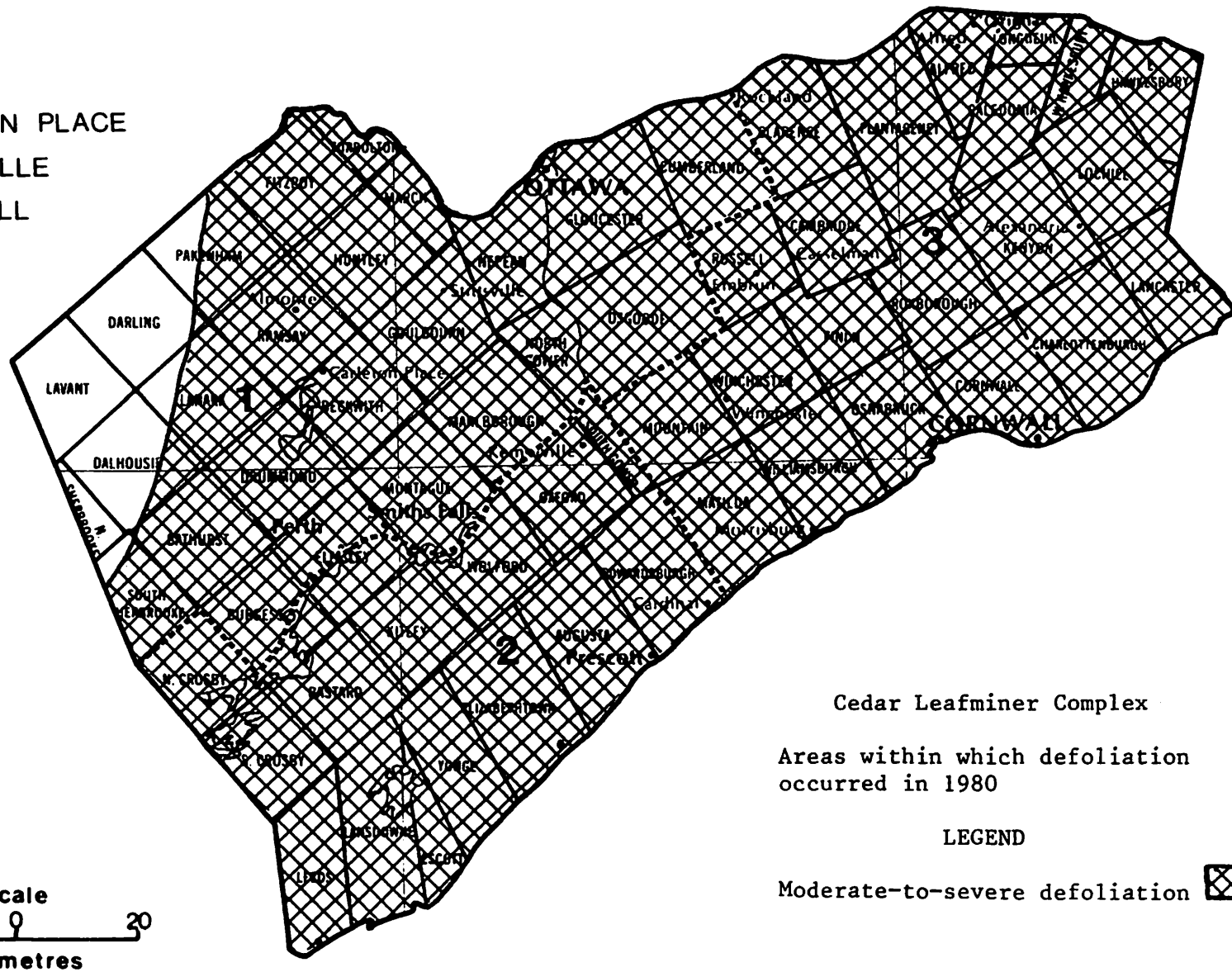

Cedar Leafminer Complex

Areas within which defoliation occurred in 1980

LEGEND

Moderate-to-severe defoliation

Scale

20 10 0 20

Kilometres

CARLETON PLACE, BROCKVILLE and CORNWALL DISTRICTS

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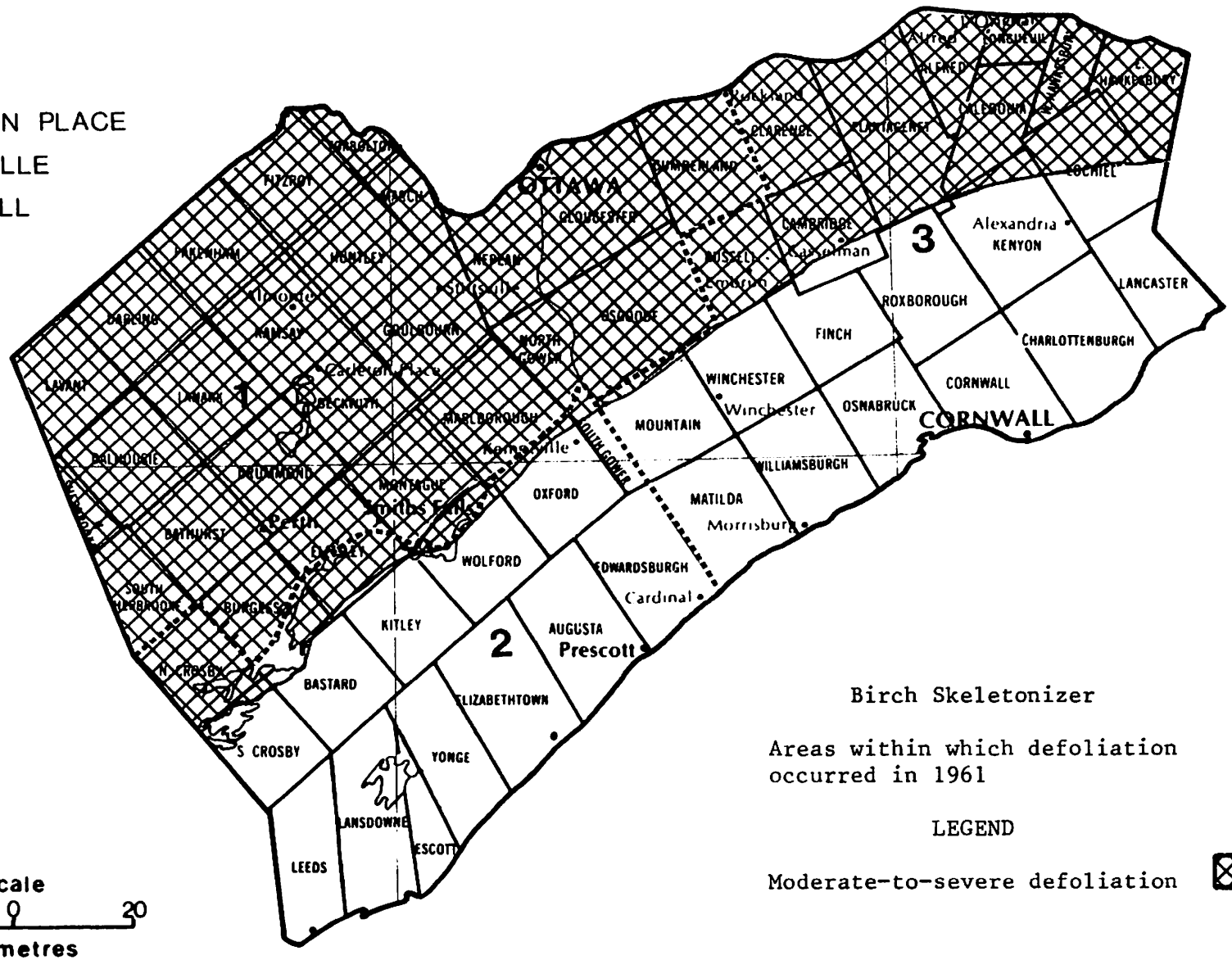
2. BROCKVILLE
3. CORNWALL



Scale

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Kilometres

Birch Skeletonizer

Areas within which defoliation occurred in 1961

LEGEND

Moderate-to-severe defoliation

Forest Insect and Disease Survey
Great Lakes Forestry Centre

Spruce Budworm, *Choristoneura fumiferana* (Clem.)

Host(s): balsam fir, spruce [Major]

Year	Remarks
1950-1951	occasional larvae in beating samples
1952-1954	not reported
1955	trace levels in Wolford Twp
1956-1961	trace levels only
1962-1967	not reported
1968-1969	Low numbers were found through the district.
1970	A light infestation was reported in Oxford Twp and low numbers were found at numerous other locations in the district.
1971-1972	Low numbers were found through the district.
1973	Small pockets of moderate-to-severe defoliation were reported in Wolford and Oxford twps.
1974	A pocket of moderate-to-severe defoliation was recorded in Augusta Twp.
1975	Moderate-to-severe defoliation recurred in Augusta Twp.
1976	Populations declined to light levels in the district.
1977	A small pocket of medium-to-heavy infestation was reported in Oxford Twp.
1978	One small pocket of light defoliation was observed in Oxford Twp.
1979	only low numbers found in the district
1980	Lightly defoliated white spruce were found in Oxford Twp.

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

Host(s): pine [Major]

Year	Remarks
1950-1957	not reported
1958-1959	Scots pine trees with heavily infested bud clusters in a windbreak in Edwardsburgh Twp
1960	Lightly infested Scots pine were observed at the Kemptville Nursery.
1961-1962	Approximately 4% of bud clusters were infested at one location in Oxford Twp. Small numbers of insects were found through the district.
1963-1964	Lightly infested trees were found throughout the district.
1965	Infestation levels subsided and few insects were observed.
1966	not reported
1967	Lightly infested trees were reported in Oxford and Wolford twps.
1968	not reported
1969	Medium-to-heavy infestations were present in plantations in Oxford and Wolford twps.
1970-1980	not reported

Birch Leafminer, *Fenusa pusilla* (Lep.)

Host(s): birch [Major]

Year	Remarks
1950-1955	not reported
1956	Medium-to-heavy infestations were found throughout Grenville County.
1957	Severe mining occurred through Grenville County.
1958	Moderate-to-severe mining was general in Leeds and Grenville counties.
1959	A pocket of moderate-to-severe mining persisted along the St. Lawrence River in Leeds County.
1960	Light mining was general with a few pockets of moderate-to-severe foliage damage.
1961	pockets of moderate-to-severe foliage damage in Oxford Twp

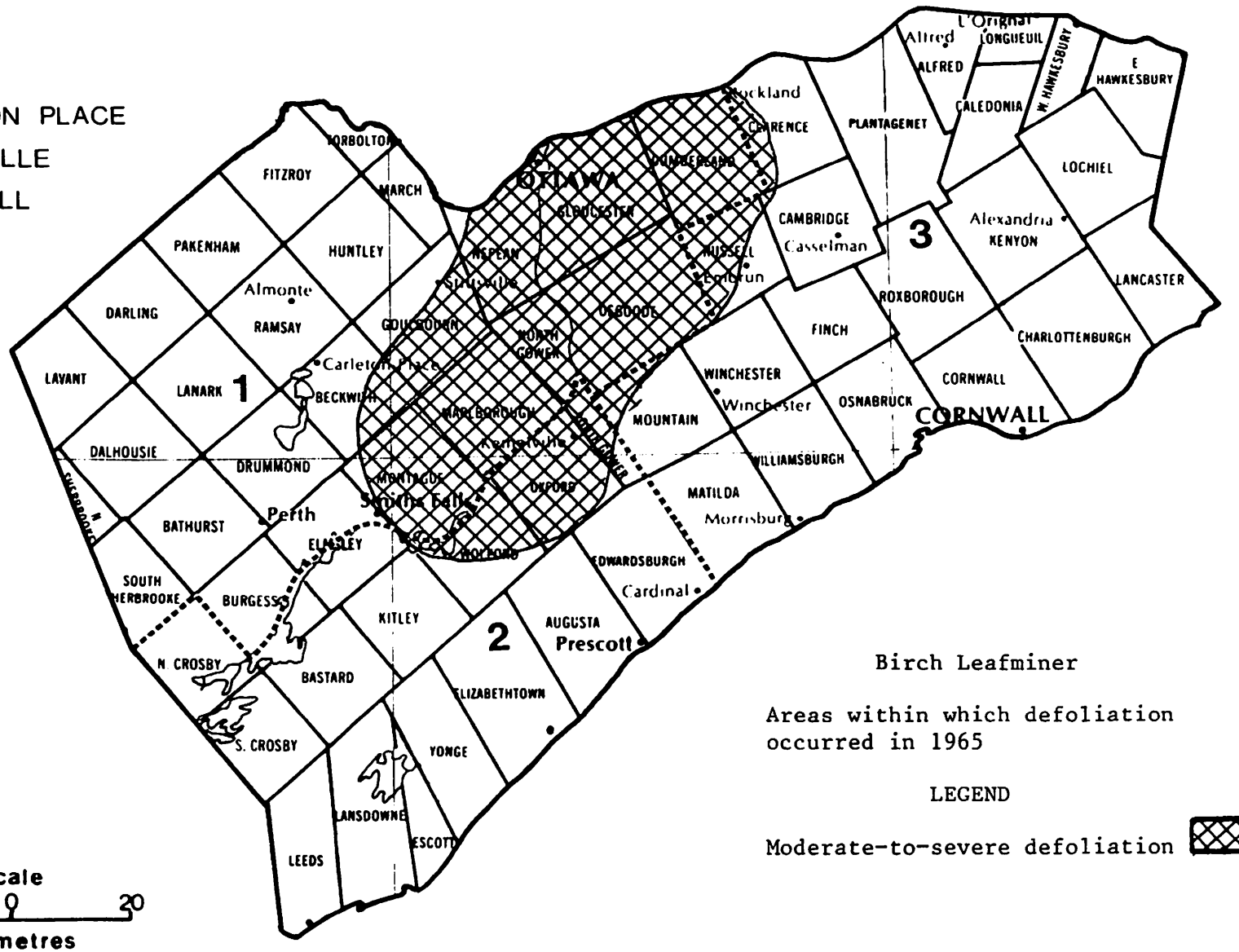
(cont'd)

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

Year	Remarks
1962	A pocket of moderate-to-severe damage was recorded in South Crosby Twp.
1963	Light infestations were noted in Oxford Twp.
1964-1965	Groups of heavily infested trees were common in Leeds and Grenville counties (see map, page).
1966	Moderate-to-severe foliage damage occurred in the northeastern part of Oxford Twp (see map, page).
1967	Moderate-to-severe foliage damage was general in the eastern part of the district (see map, page).
1968	Little change in intensity or extent of infestation occurred in 1968 (see map, page).
1969	No important change in the infestation was noted (see map, page).
1970	Medium-to-heavy infestations were found through the southern part of Grenville County.
1971	common in the district
1972	Little change occurred in the infestation.
1973-1974	not reported
1975-1976	Light infestations were general in the district.
1977	Small pockets of light infestation were noted at several points.
1978	Little damage was observed.
1979	Leaf mining was common but mostly at a low level of damage.
1980	Generally found in low numbers through the district; ornamental trees sustained moderate-to-severe foliar damage in Brockville.

CARLETON PLACE, BROCKVILLE and CORNWALL DISTRICTS

1. CARLETON PLACE
2. BROCKVILLE
3. CORNWALL



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Kilometres

Birch Leafminer

Areas within which defoliation occurred in 1965

LEGEND

Moderate-to-severe defoliation

Forest Insect and Disease Survey

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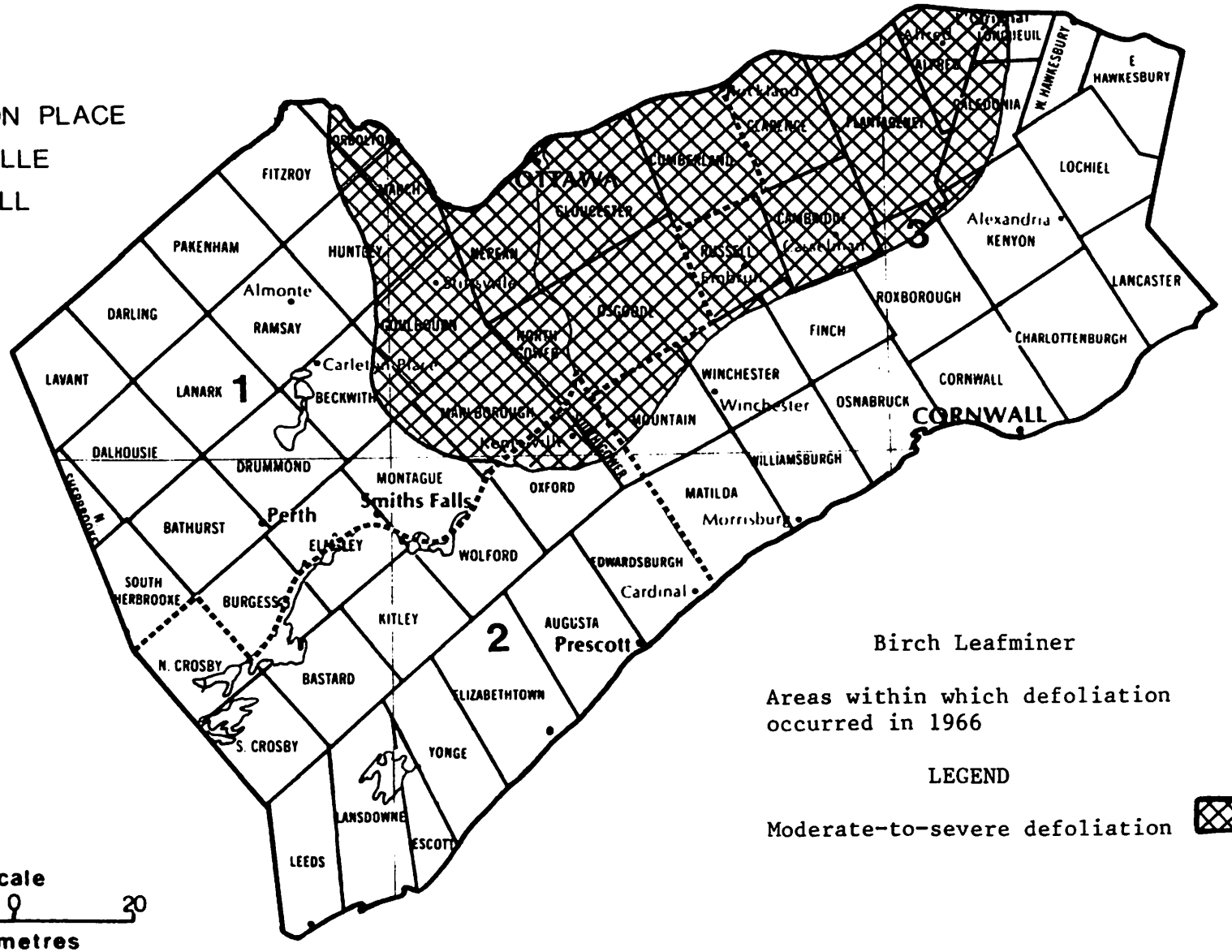
3. CORNWALL



Birch Leafminer

Areas within which defoliation occurred in 1966

LEGEND

Moderate-to-severe defoliation

CARLETON PLACE, BROCKVILLE and CORNWALL DISTRICTS

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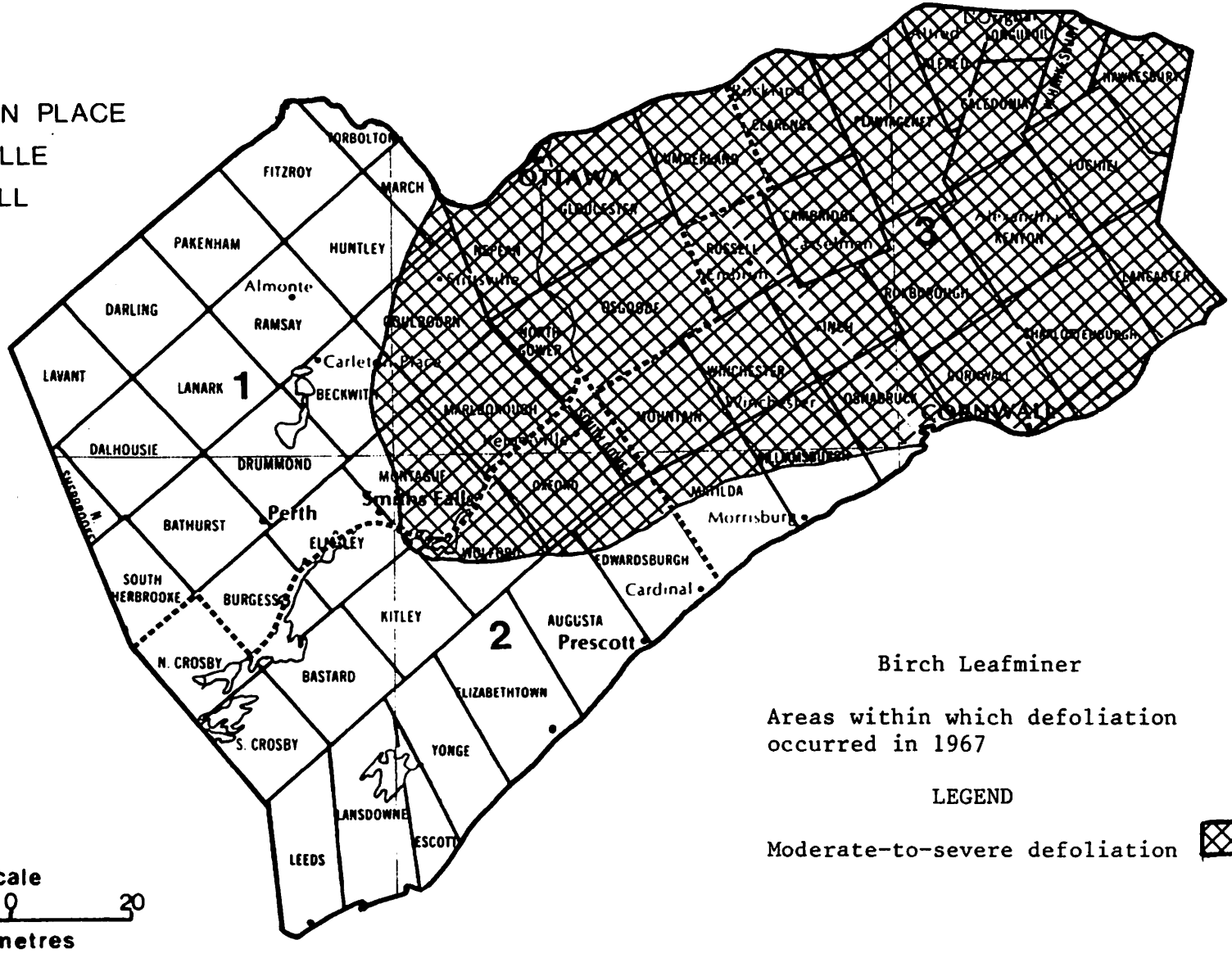

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Kilometres

Birch Leafminer

Areas within which defoliation occurred in 1967

LEGEND

Moderate-to-severe defoliation

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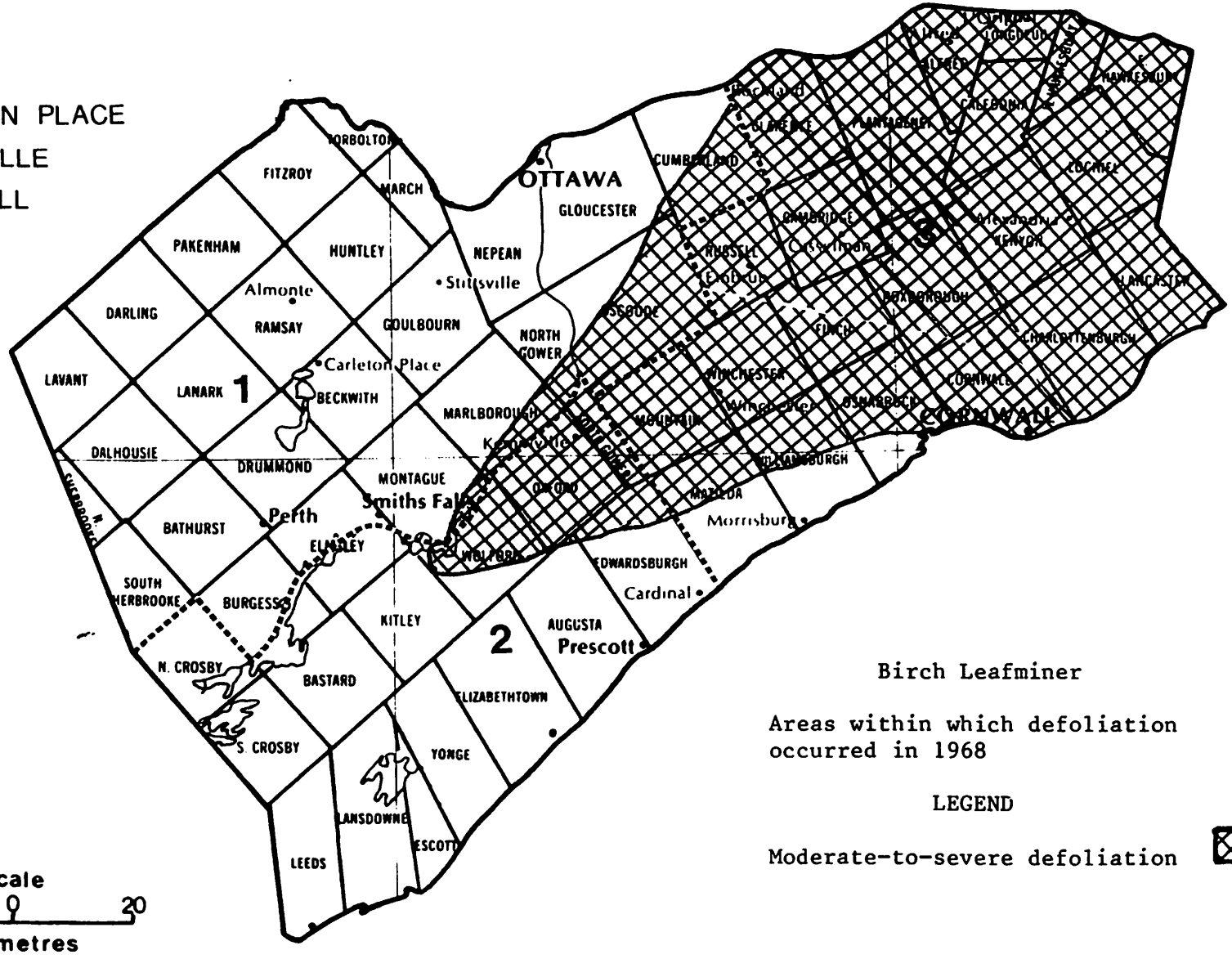

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Birch Leafminer

Areas within which defoliation occurred in 1968

LEGEND

Moderate-to-severe defoliation

CARLETON PLACE, BROCKVILLE and CORNWALL DISTRICTS

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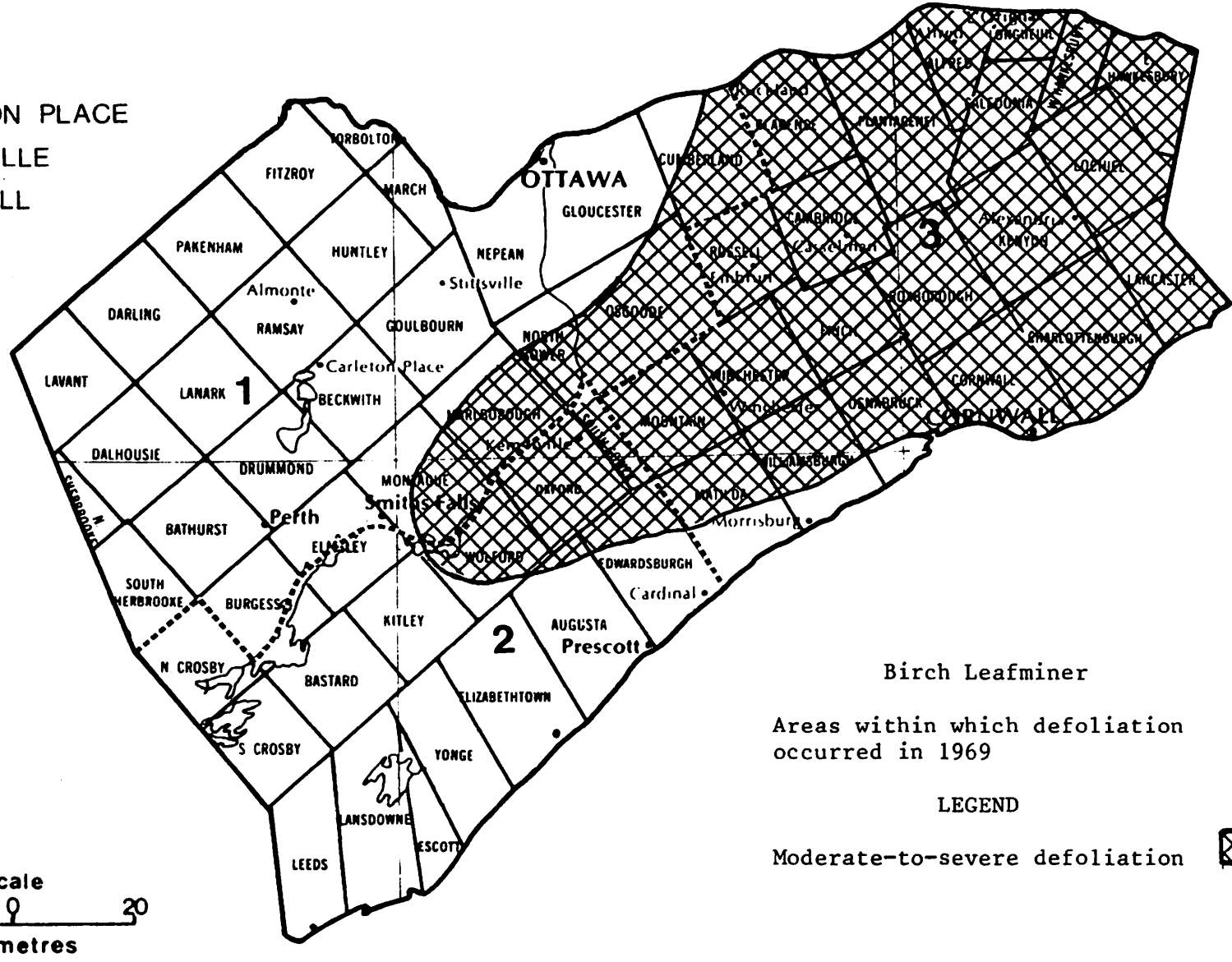

Scale
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Kilometres

Birch Leafminer

Areas within which defoliation occurred in 1969

LEGEND

Moderate-to-severe defoliation

Forest Insect and Disease Survey
Great Lakes Forestry Centre

CARLETON PLACE, BROCKVILLE and CORNWALL DISTRICTS

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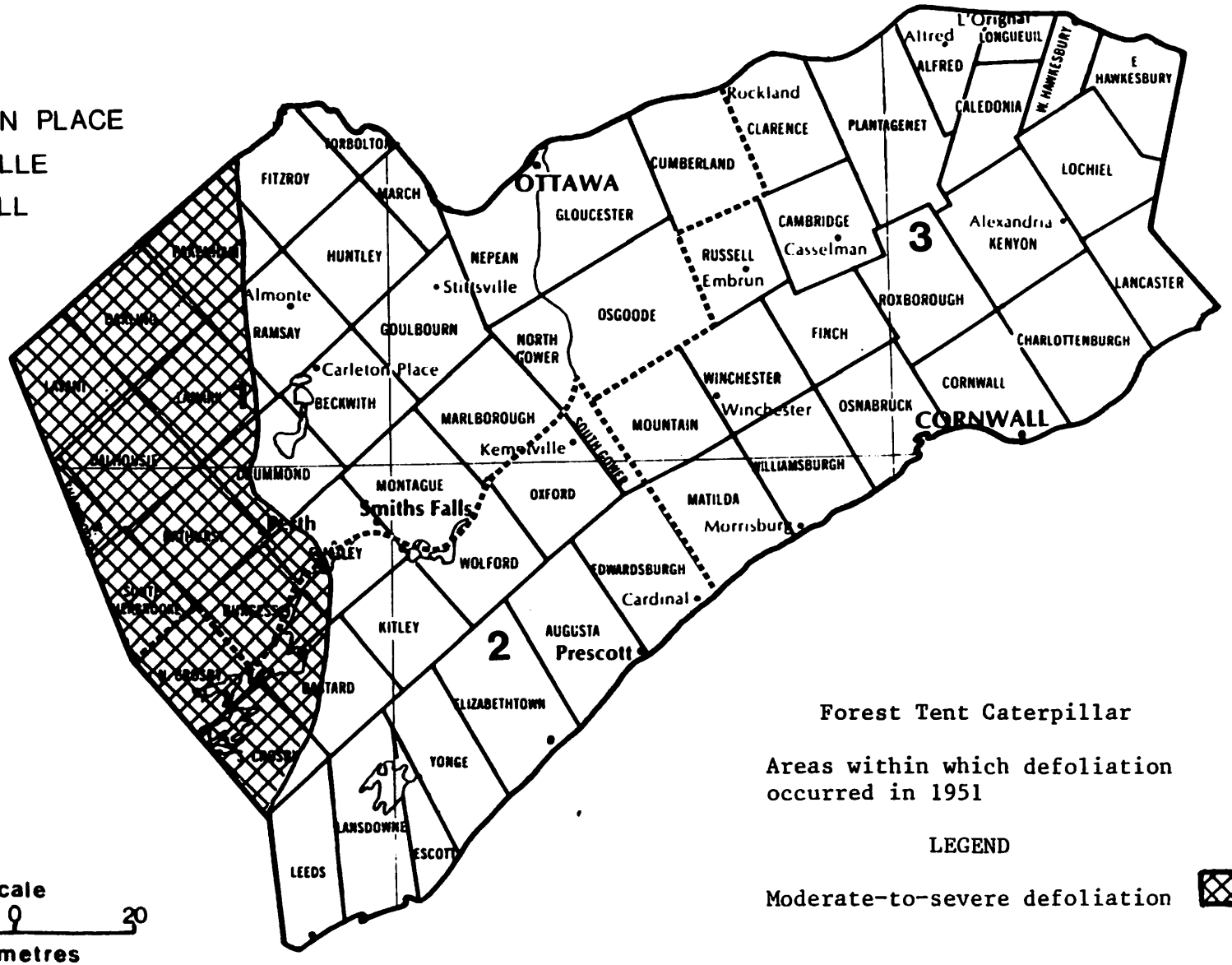
3. CORNWALL



Scale
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Kilometres

Forest Tent Caterpillar

Areas within which defoliation occurred in 1951

LEGEND

Moderate-to-severe defoliation

Forest Insect and Disease Survey
Great Lakes Forestry Centre

Fall Webworm, *Hyphantria cunea* (Drury)

Host(s): deciduous [Major]

Year	Remarks
1950	tents observed commonly through the district
1951	rarely observed
1952	low numbers throughout the district
1953	not reported
1954	occasional tents through the district
1955	not reported
1956-1961	observed commonly through the district
1962	Population levels increased, particularly in South Crosby and Oxford twps.
1963	Tents were observed district-wide and high concentrations were found on Oxford and South Crosby Twps.
1964	Populations declined generally except in South Crosby Twp where tents were numerous.
1965	low numbers at several points
1966-1967	trace populations
1968	A few tents were observed in Wolford Twp.
1969	A general increase in the numbers of tents was evident in the district.
1970	heavily infested trees at several locations
1971	High populations were reported along the St. Lawrence River between Brockville and Gananoque.
1972-1973	High numbers were present through Leeds and Grenville counties.
1974	Medium-to-heavy infestation of deciduous species was general through the southern part of the district.
1975-1977	Medium-to-heavy infestations persisted, particularly in the southern part of the district.
1978	Populations declined abruptly and fewer tents were observed.
1979	Light infestations were general through the district.
1980	little change in population levels or distribution through the district

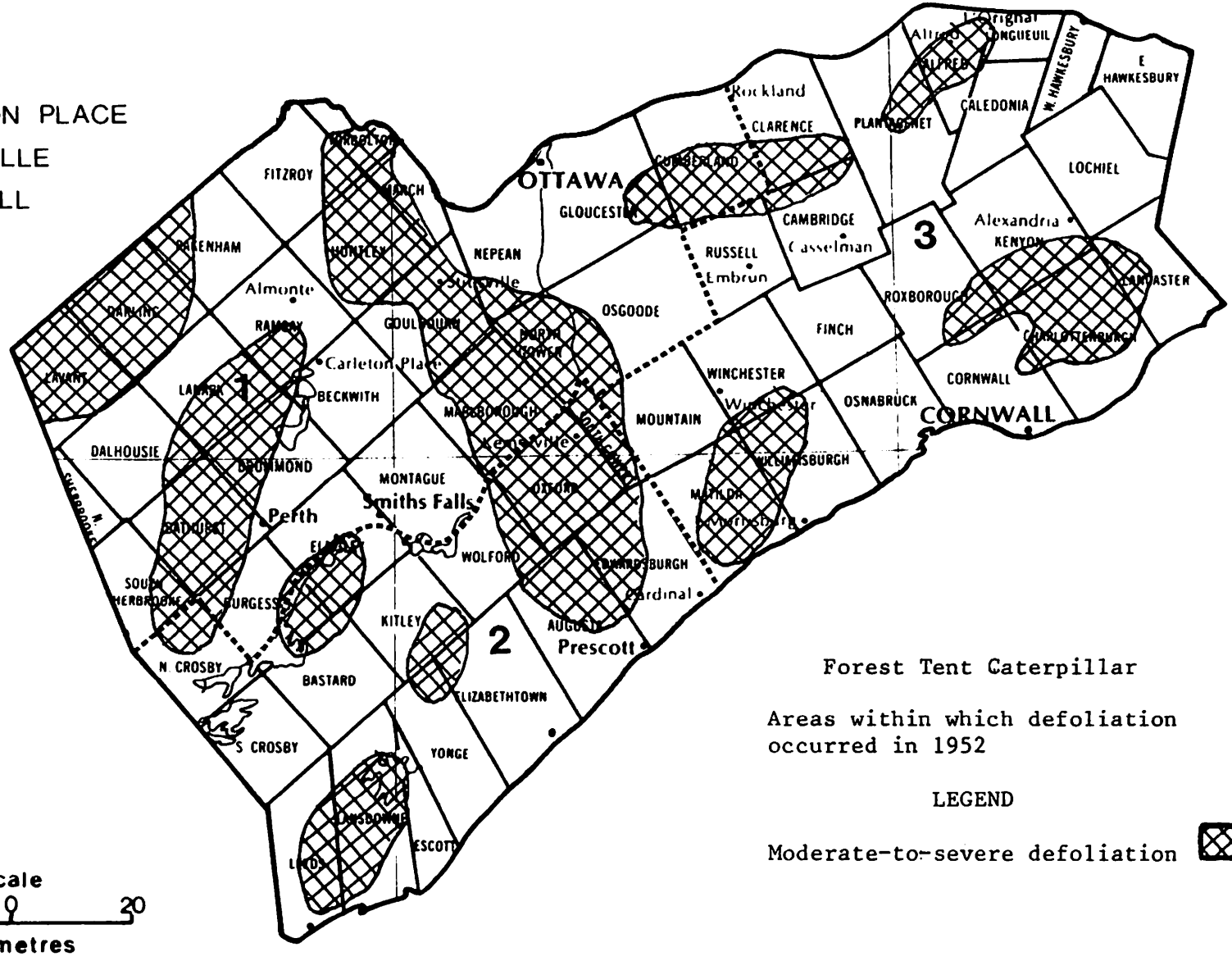
Forest Tent Caterpillar, *Malacosoma disstria* Hbn.

Host(s): deciduous [Major]

Year	Remarks
1950	small numbers throughout the district
1951	increased numbers through the district (see map, page)
1952	a small area of moderate-to-severe defoliation in North Crosby Twp; moderate-to-severe defoliation at many points in Leeds and Grenville counties (see map, page).
1953	Moderate-to-severe defoliation was reported in the northern part of Grenville County (see map, page).
1954	Populations decreased, small pockets of moderate-to-severe defoliation persisted in Leeds and Grenville counties.
1955-1959	not reported
1960	one colony found in Oxford Twp, Grenville County
1961	one colony found in Wolford Twp, Grenville County
1962-1976	not reported
1977	Moderate-to-severe defoliation was recorded in Oxford (see map, page).
1978	populations collapsed
1979-1980	not reported

CARLETON PLACE, BROCKVILLE and CORNWALL DISTRICTS

1. CARLETON PLACE
2. BROCKVILLE
3. CORNWALL



Scale

20 10 0 20

Kilometres

Forest Tent Caterpillar

Areas within which defoliation occurred in 1952

LEGEND

Moderate-to-severe defoliation

Forest Insect and Disease Survey
Great Lakes Forestry Centre

CARLETON PLACE, BROCKVILLE and CORNWALL DISTRICTS

1. CARLETON PLACE
2. BROCKVILLE
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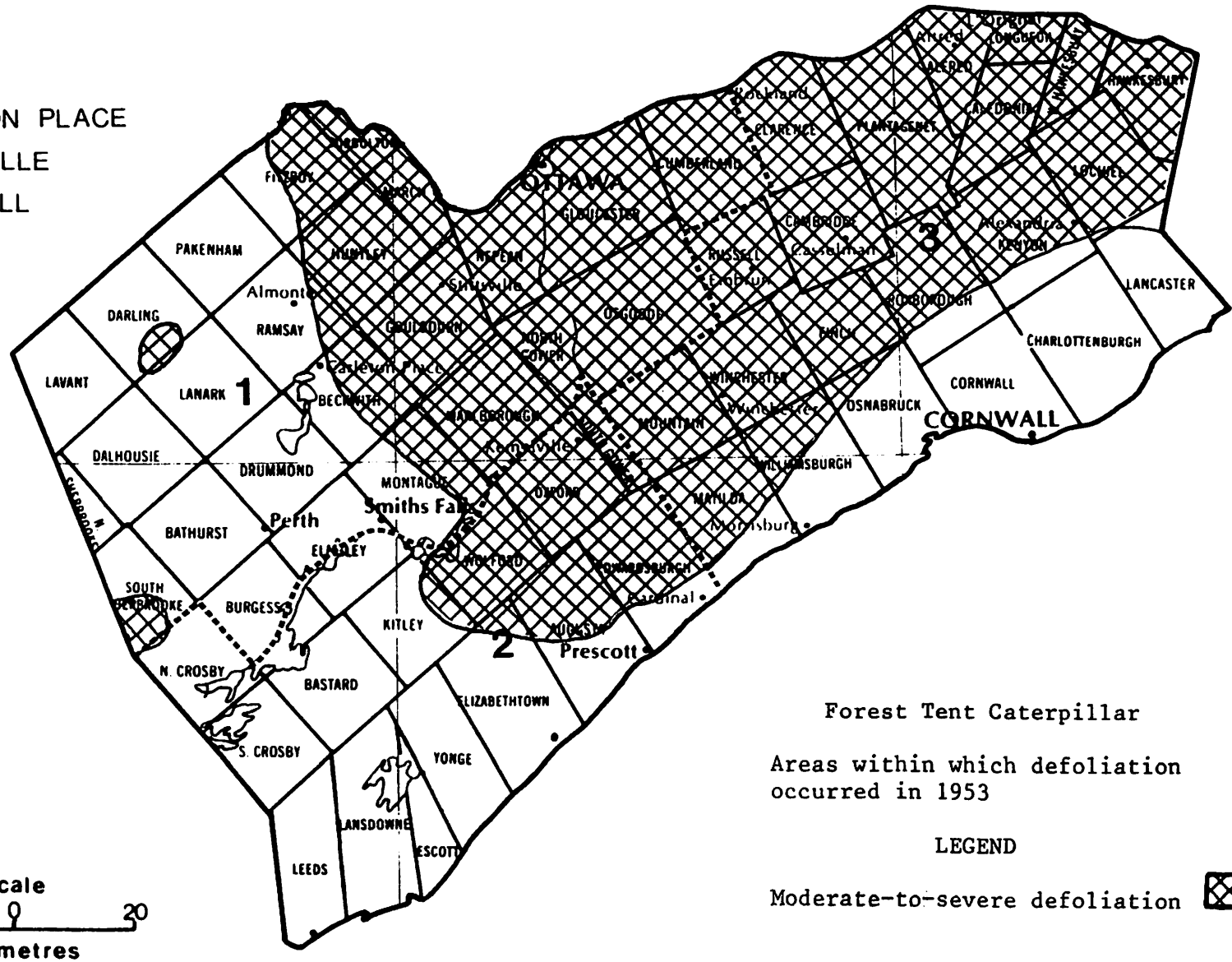


Forest Tent Caterpillar

Areas within which defoliation occurred in 1953

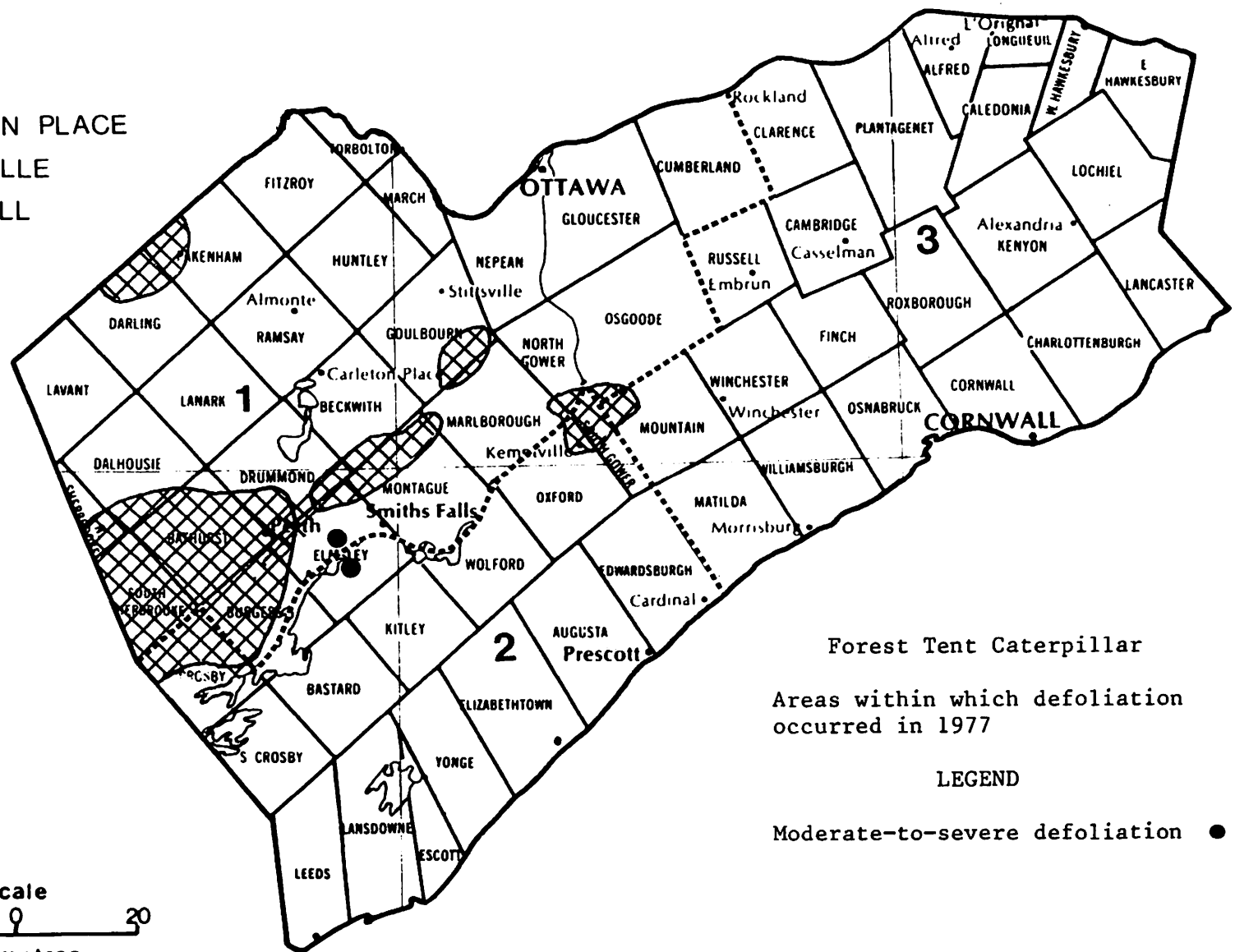
LEGEND

Moderate-to-severe defoliation

Forest Insect and Disease Survey
Great Lakes Forestry Centre

CARLETON PLACE, BROCKVILLE and CORNWALL DISTRICTS

1. CARLETON PLACE
2. BROCKVILLE
3. CORNWALL



Forest Tent Caterpillar

Areas within which defoliation occurred in 1977

LEGEND

Moderate-to-severe defoliation ● or

Scale

20 10 0 20

Kilometres

Forest Insect and Disease Survey
Great Lakes Forestry Centre

Balsam Fir Sawfly, *Neodiprion abietis* complex

Host(s): bF [Major]

Year	Remarks
1950-1955	not reported
1956	A few colonies were observed at widely separated locations in the district.
1957-1958	trace populations
1959	A small pocket of light infestation was detected in Oxford Twp.
1960	The infestation in Oxford Twp declined to a few colonies.
1961-1966	not reported
1967-1968	One small area of medium-to-heavy infestation was reported in Oxford Twp.
1969-1970	Scattered colonies were found at many locations in the district.
1971	trace populations
1972-1980	not reported

Redheaded Pine Sawfly, *Neodiprion lecontei* (Fitch)

Host(s): rP, jP, scP [Major]

Year	Remarks
1950-1951	not reported
1952	Light and medium-to-heavy infestations occurred in the Limerick Forest.
1953	Moderate-to-severe defoliation was reported in red pine plantations in South Crosby and Oxford twps.
1954	Defoliation ranged up to 100% on small red pine trees in the Leeds County Forest in South Crosby Twp.
1955	Approximately 8 ha of red pine, 2.5 m high sustained defoliation ranging from 50-100% in the Leeds County Forest.
1956	A medium-to-heavy infestation occurred in a 40-ha red pine plantation in South Crosby Twp. This area was sprayed and good control was obtained.
1957	No larvae were found in the plantation which was sprayed in 1956 in South Crosby Twp and only low numbers were found in the district.
1958	Population levels increased generally and colonies were readily found through the district.

(cont'd)

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

Year	Remarks
1959	Light infestations and scattered colonies were found in Oxford Twp.
1960	no larvae found in the Limerick Forest and only scattered colonies through the district
1961	very low numbers in the district
1962	low numbers in Oxford and South Crosby twps
1963	One small pocket of medium-to-heavy infestation was treated with chemicals in Oxford Twp with good results.
1964-1965	Scattered colonies were found in Oxford and Wolford twps.
1966	Several plantations were again sprayed in the Limerick County Forest.
1967	Populations increased and moderate-to-severe defoliation was recorded in South Gower and Oxford twps.
1968	A sharp decrease in populations was attributed to egg parasitism. Only scattered colonies were found.
1969	Small, light infestations were reported in Oxford Twp.
1970	low numbers only found in the district
1971	Light infestations were reported in Oxford Twp.
1972-1973	not reported
1974	Medium-to-heavy infestations were again reported in Oxford Twp and spray operations were used to control defoliation.
1975	Small pockets of light infestation were recorded in Elizabethtown Twp.
1976	Occasional colonies were observed through the district.
1977	Light infestations were found near Merrickville, Athens, Prescott and Burritt's Rapids.
1978-1979	Scattered colonies were found through the district.
1980	In Kitley Twp 91% of the trees examined were infested but colonies averaged only 1%, so little defoliation resulted.

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

Host(s): jP [Major]

Year	Remarks
1950	not reported
1951	lightly defoliated trees at one point in Leeds County
1952	not reported
1953	A medium-to-heavy infestation occurred in the Leeds Forest near Athens. Defoliation average 70%.
1954	Defoliation reached 90% on some trees in the Leeds County Forest near Athens. Heavily defoliated trees were observed in Kitley Twp.
1955	Defoliation recurred in the Leeds County Forest at approximately the same levels as in 1954. Lightly defoliated trees were observed through Leeds and Grenville counties.
1956	not reported
1957	Defoliation ranged up to 75% of old foliage in a small plantation in Kitley Twp.
1958	Only scattered colonies were found at a few locations in the district.
1959-1961	Scattered colonies were observed at several points.
1962-1964	not reported
1965	scattered colonies in Oxford Twp
1966	Colonies of the sawfly were more abundant in 1966.
1967	Moderate-to-severe defoliation was recorded in South Crosby Twp and light damage occurred in Oxford and Front of Yonge twps.
1968	Moderate-to-severe defoliation was reported in South Crosby Twp and light defoliation in Oxford Twp.
1969	A medium-to-heavy infestation was recorded in South Crosby Twp and scattered colonies were found through Oxford and Bastard twps.
1970-1971	A medium-to-heavy infestation recurred in Oxford Twp.
1972-1973	not reported
1974	lightly infested trees near Merrickville in Oxford Twp
1975	Small localized, medium-to-heavy infestations were reported near Kemptville and Merrickville.
1976	small, medium-to-heavy infestations in the North Augusta, Athens and Merrickville areas

(cont'd)

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

Year	Remarks
1977	Light infestations were recorded near Athens, Merrickville, Prescott and Burritt's Rapids.
1978	Lightly infested trees were observed through Oxford Twp.
1979	Light infestations were detected in the Limerick Forest.
1980	trace populations.

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

Host(s): spruce [Major]

Year	Remarks
1950-1952	not reported
1953	Lightly defoliated open-grown trees were observed at several locations.
1954	not reported
1955	Moderate-to-severe defoliation of white spruce was recorded in the Leeds County Forest and in Oxford Twp near Kemptville.
1956	A medium-to-heavy infestation occurred in a 4-ha white spruce plantation in Oxford Twp where approximately 50% of the trees were heavily defoliated.
1957	Moderate-to-severe defoliation was reported in Wolford Twp in white spruce plantations and light defoliation occurred at several points in August Twp.
1958	Moderate-to-severe defoliation occurred in a 10-ha white spruce plantation in Oxford Twp.
1959	Small pockets of moderate-to-severe defoliation were recorded in South Crosby and Oxford twps.
1960	Light defoliation occurred at one point in Oxford Twp.
1961-1962	One small area of moderate-to-severe defoliation was recorded in a white spruce plantation in South Gower Twp.
1963	A low population was found in Oxford Twp.
1964	Populations were reported in the same area in Oxford Twp at the same level as in 1963.
1965	Pockets of light defoliation were found in the Limerick Forest.
1966	Groups of white spruce trees along highways suffered defoliation ranging from light to severe.
1967	Small pockets of medium-to-heavy infestations were noted in Augusta and Kitley twps.

(cont'd)

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

Year	Remarks
1968-1970	not reported
1971	light and moderate-to-severe defoliation of single and small groups of trees along highways
1972-1973	White spruce trees along roads and highways sustained light and moderate-to-severe defoliation at several points.
1974	not reported
1975	Medium-to-heavy infestations were observed at several points in the district. Most areas were sprayed to control the insect.
1976-1978	not reported
1979-1980	lightly defoliated white spruce trees observed at several points in the district

White Pine Weevil, *Pissodes strobi* (Peck)

Host(s): pine, spruce [Major]

Year	Remarks
1950-1951	common through the district
1952-1953	not reported
1954	Infested leaders of white pine were observed commonly in the district and red pine and white spruce were occasionally attacked.
1955	Quantitative sampling in Augusta Twp showed 75% leader mortality in a white pine plantation.
1956	14% leader mortality was recorded in a white pine plantation in Oxford Twp
1957	Current leader mortality was 3% in Oxford Twp.
1958-1960	Little change in population levels was noted at sample points.
1961	Leader damage of 4 and 6% was recorded in Oxford and August twps.
1962	Checks at sampling points in Oxford and Augusta twps showed weevilling of 4 and 8%, respectively.
1963	Infested leader counts were 6% in Augusta and 4% in Oxford Twp.
1964	Damaged leaders averaged 5% in plantations examined in the district.
1965-1966	Little variation in population levels occurred.

(cont'd)

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

Year	Remarks
1967	Slight increases in population levels were recorded.
1968	11% leader mortality was recorded in Oxford Twp
1969	Leader damage of 25% was noted in Wolford Twp.
1970	not reported
1971	39 and 83% white pine leaders killed in Wolford and August twps, respectively
1972	Little change in population levels occurred in 1972.
1973	Leader damage of 22% was recorded in white pine in Wolford Twp.
1974	not reported
1975	Leader damage of 32 and 18% was recorded in white pine plantations in Augusta and Wolford twps.
1976-1977	Varying degrees of leader mortality were reported through the district.
1978	Leader damage of 3% was recorded in a Scots pine plantation in Oxford Twp.
1979	not reported
1980	Varying degrees of leader damage were observed at several locations.

Larch Sawfly, *Pristiphora erichsonii* (Htg.)

Host(s): tL, European larch [Major]

Year	Remarks
1950-1955	not reported
1956	Lightly defoliated trees were found at several points in Edwardsburgh Twp.
1957-1959	Low numbers were found at several locations.
1960	Defoliation ranged from 20 to 90% on some trees in a small stand in South Gower Twp.
1961	Medium-to-heavy infestations recurred in South Gower Twp.
1962-1963	not reported
1964	scattered colonies at a few locations
1965	Lightly defoliated trees were observed in Oxford Twp.
1966	Scattered colonies were reported in Oxford and South Crosby twps.
1967-1974	trace populations
1975	Pockets of moderate-to-severe defoliation occurred in the Limerick Forest.
1976	Lightly defoliated trees were observed in the Limerick Forest.
1977	Single and small groups of trees were lightly defoliated along Highway 16 north of Prescott.
1978	Lightly infested trees were observed at several points.
1979	Scattered colonies were found through the district but defoliation was negligible.
1980	Only scattered colonies were observed in the district.

Other Noteworthy Insects

Fall Cankerworm, *Alsophila pometaria* (Harr.)

Host(s): deciduous [Major]

Year	Remarks
1950-1958	not reported
1969	lightly defoliated woodlots in Kitley Twp
1970-1974	not reported
1975	trace populations
1976-1980	not reported

Shorthorned Oakworm, *Anisota finlaysoni* Riotte

Host(s): oak [Major]

Year	Remarks
1950-1972	not reported
1973	Low populations were observed in Front of Leeds and Lansdowne twps near Gananoque.
1974	not reported
1975	scattered colonies along roadside near Gananoque
1976	occasional colonies on oak near Gananoque
1977-1980	not reported

Pine Spittlebug, *Aphrophora cribrata* (Wlk.)

Host(s): conifers [Major]

Year	Remarks
1950	not reported
1965	Several plantations were lightly infested in the Limerick Forest.
1966-1970	not reported
1971	Low numbers were reported through the district.
1972-1973	not reported
1974	medium-to-heavy infestation on hemlock near Spencerville, Edwardsburgh Twp
1975-1976	not reported
1977	found commonly on a wide variety of hosts through the district
1978-1980	not reported

Uglynest Caterpillar, *Archips cerasivorana* (Fitch)

Host(s): cherry [Major]

Year	Remarks
1950-1953	not reported
1954	Numerous tents formed by the insect were observed on chokecherry through Leeds County.
1955	123 tents were counted on a small clumps of cherry shrubs in Wolford Twp; tents common through the district
1956-1957	not reported
1958-1962	trace populations; not reported
1963	trace populations
1964	small numbers throughout the district
1965-1967	tents observed commonly through the district
1968-1974	not reported
1975-1976	clumps of heavily infested cherry at many points in the district
1977	not reported
1978	small numbers on cherry along roads and highways through the district
1979-1980	not reported

Birch Sawfly, *Arge pectoralis* (Leach)

Host(s): birch [Minor]

Year	Remarks
1950-1965	not reported
1966	scattered colonies on white birch trees in the Limerick Forest
1967	not reported
1968	a few scattered colonies in Oxford Twp
1969-1970	lightly infested trees in Oxford Twp
1971	scattered colonies at a few locations
1972-1978	not reported
1979	numerous colonies on small open-grown, white birch trees near Kemptville
1980	not reported

Larch Shoot Moth, *Argyresthia laricella* Kft.

Host(s): tamarack, European larch

Year	Remarks
1950-1955	not reported
1956	trace populations
1957	not reported
1958	trace populations
1959-1966	not reported
1967	low numbers at a few locations
1968-1973	not reported
1974-1975	high numbers of infested shoots at one point in the Limerick Forest
1976-1980	not reported

Larch Casebearer, *Colephora laricella* (Hbn.)

Host(s): tamarack, European larch [Major]

Year	Remarks
1950-1955	not reported
1956-1957	low numbers through the district
1958-1962	trace populations
1963	not reported
1964-1965	Small numbers were found in stands examined.
1966-1967	trace populations
1968	High numbers caused conspicuous discoloration of foliage in Augusta, Oxford and Edwardsburgh twps.
1969-1972	not reported
1973	Moderate-to-severe defoliation was reported at one location in Oxford Twp.
1974	not reported
1975-1977	A light infestation was reported in the Limerick Forest.
1978-1979	not reported
1980	One small area of moderate-to-severe defoliation was recorded near Spencerville in Edwardsburgh Twp. Light defoliation also occurred at several other locations.

Walnut Caterpillar, *Datana integerrima* G. & R.

Host(s): walnut, hickory, oak, basswood [Major]

Year	Remarks
1950-1953	not reported
1954-1955	Defoliation ranged from 5 to 70% on several small hickory trees at Westport in Leeds County.
1956-1966	not reported
1967	lightly defoliated trees at several points
1968	not reported
1969-1970	Moderate-to-severe defoliation of white oak, basswood and hickory was recorded in Front of Leeds and Lansdowne twps.
1971-1979	not reported
1980	Moderate-to-severe defoliation of ornamental bitternut hickory was reported near Westport in North Crosby Twp.

Yellownecked Caterpillar, *Datana ministra* (Drury)

Host(s): deciduous [Minor]

Year	Remarks
1950-1953	not reported
1954	found commonly in Oxford Twp
1955	not reported
1956	trace populations
1957-1980	not reported

Twig Pruner, *Elaphidionoides villosus* (F.)

Host(s): red oak [Minor]

Year	Remarks
1950-1953	not reported
1954	found at many locations through the district
1955	not reported
1956	trace populations
1957-1963	not reported
1964	light damage at one point in Front of Leeds and Lansdowne Twp
1965	not reported
1966	light damage in Front of Yonge Twp
1967-1980	not reported

Linden Looper, *Erannis tiliaria* (Harr.)

Host(s): deciduous [Major]

Year	Remarks
1950-1968	not reported
1969	light infestation on basswood in North Crosby Twp
1970-1973	not reported
1974-1975	small numbers at several locations
1976-1980	not reported

Eastern Pine Shoot Borer, *Eucosma gloriola* Heinr.

Host(s): pine [Major]

Year	Remarks
1950-1951	not reported
1952	numerous leaders killed in pine plantations in the Limerick Forest and through Leeds County
1953-1954	not reported
1955	low numbers in Oxford Twp
1956-1959	not reported
1960-1962	small numbers at several locations
1963	damaged leaders observed commonly in Oxford Twp
1964-1966	not reported
1967	Small numbers of infested leaders were found in Wolford Twp.
1968-1969	Damaged leaders were common in pine plantations in Oxford Twp.
1970-1971	trace populations
1972-1973	not reported
1974	trace populations
1975-1977	not reported
1978-1979	low numbers reported in Oxford Twp
1980	not reported

Pine Needleminer *Exoteleia pinifoliella* (Cham.)

Host(s): jP [Major]

Year	Remarks
1950	A light infestation was recorded in an 8-ha plantation in Oxford Twp.
1951-1953	not reported
1954	Low numbers were found through Grenville County.
1955-1956	not reported
1957	Pockets of light infestation were observed in the Limerick Forest in Grenville County.
1958	trace populations
1959	A medium-to-heavy infestation caused approximately 60% foliage mining in a plantation in Wolford Twp. Light mining also occurred in Rear of Yonge and Escott twps.
1960	A new infestation in the Limerick Forest caused 75% of 1959 foliage to discolour and shed by late summer. Light infestations occurred in North Crosby and Oxford twps.
1961-1968	not reported
1969	A medium-to-heavy infestation was reported in a Scots pine plantation near Phillipsville in Bastard Twp.
1970-1980	not reported

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

Host(s): spruce [Minor]

Year	Remarks
1950-1954	low numbers at several locations
1955	Quantitative sampling failed to yield a single larva in 1955.
1956-1966	trace populations in quantitative sampling
1967	Increased numbers were found at sampling points but little defoliation resulted.
1968	Small numbers were found at sample points.
1969-1974	not reported
1975	low populations at sampling points
1976-1980	not reported

Sugar Maple Borer, *Glycobius speciosus* (Say)

Host(s): maple [Minor]

Year	Remarks
1950-1951	much incidence of these borers in woodlots in Leeds County
1952-1956	not reported
1957	extensive damage in sugar maple stands at several locations
1958-1980	not reported

Hemlock Looper, *Lambdina fiscellaria fiscellaria* (Gn).

Host(s): hemlock, balsam fir [Major]

Year	Remarks
1950-1951	A light infestation was present on Hill Island and Leeds and Lansdowne twps.
1952	The infestation on Hill Island and area declined abruptly and few insects were found.
1953-1957	not reported
1958	one larva recovered in beating sample on Hill Island
1959-1960	trace population
1961	a few larvae recovered in sampling in South Gower Twp
1962-1980	not reported

Satin Moth, *Leucoma salicis* (L.)

Host(s): deciduous [Major]

Year	Remarks
1950-1978	not reported
1979	Ornamental silver poplar sustained moderate-to-severe defoliation near Brockville.
1980	not reported

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

Host(s): deciduous [Minor]

Year	Remarks
1950-1954	found in varying numbers throughout the district, particularly along roads, old fields and woodlots
1955-1960	During this period populations remained at a very low level in the district.
1961-1965	A gradual increase in the number of tents was evident through the district.
1966-1969	Medium-to-high numbers of tents were observed throughout the district.
1970-1978	High numbers throughout the district caused moderate-to-severe defoliation of cherry, apple and hawthorn.
1979	A general decrease in the numbers of tents was general and diseased larvae were observed at several locations.
1980	Tents were observed commonly along roadsides through the district.

Red Pine Sawfly, *Neodiprion nanulus nanulus* Schedl

Host(s): rP, jP [Major]

Year	Remarks
1950-1954	not reported
1955	small numbers in Oxford Twp
1956-1958	not reported
1959	scattered colonies observed in the Athens Tract of the Leeds County Forest
1960-1967	trace populations
1968	a few colonies on pitch pine near Browns Bay Park west of Brockville
1969-1974	not reported
1975	small numbers of colonies near Kemptville
1976-1977	not reported
1978	scattered colonies on small red pine trees near Burritts Rapids and Merrickville
1979	trace populations
1980	not reported

Spring Cankerworm, *Paleacrita vernata* (Peck)

Host(s): deciduous [Minor]

Year	Remarks
1950	not reported
1951-1952	lightly defoliated elm trees at several locations
1953-1967	not reported
1968	small numbers found at several locations
1969	lightly defoliated trees at a few locations
1970-1974	not reported
1975	trace populations
1976-1980	not reported

Maple Leafcutter, *Paraclemensia acerifoliella* (Fitch)

Host(s): maple [Major]

Year	Remarks
1950-1958	not reported
1959	small numbers at a few locations
1960	Medium-to-heavy infestations caused extensive leaf drop in woodlots in North Crosby and Rear of Leeds and Lansdowne twps (see map, page).
1961	not reported
1962	Medium-to-heavy infestations were detected in Oxford and South Crosby twps causing early shedding of sugar maple foliage.
1963	Light infestations were present in South Crosby and Oxford twps.
1964	Pockets of light infestation were found in maple woodlots throughout Leeds and Grenville counties.
1965	Moderate-to-severe defoliation was recorded in the Limerick Forest in Wolford Twp.
1966	A general population decrease was evident and little evidence of the insect was observed.
1967	trace population in Rear of Leeds and Lansdowne Twp
1969-1980	not reported

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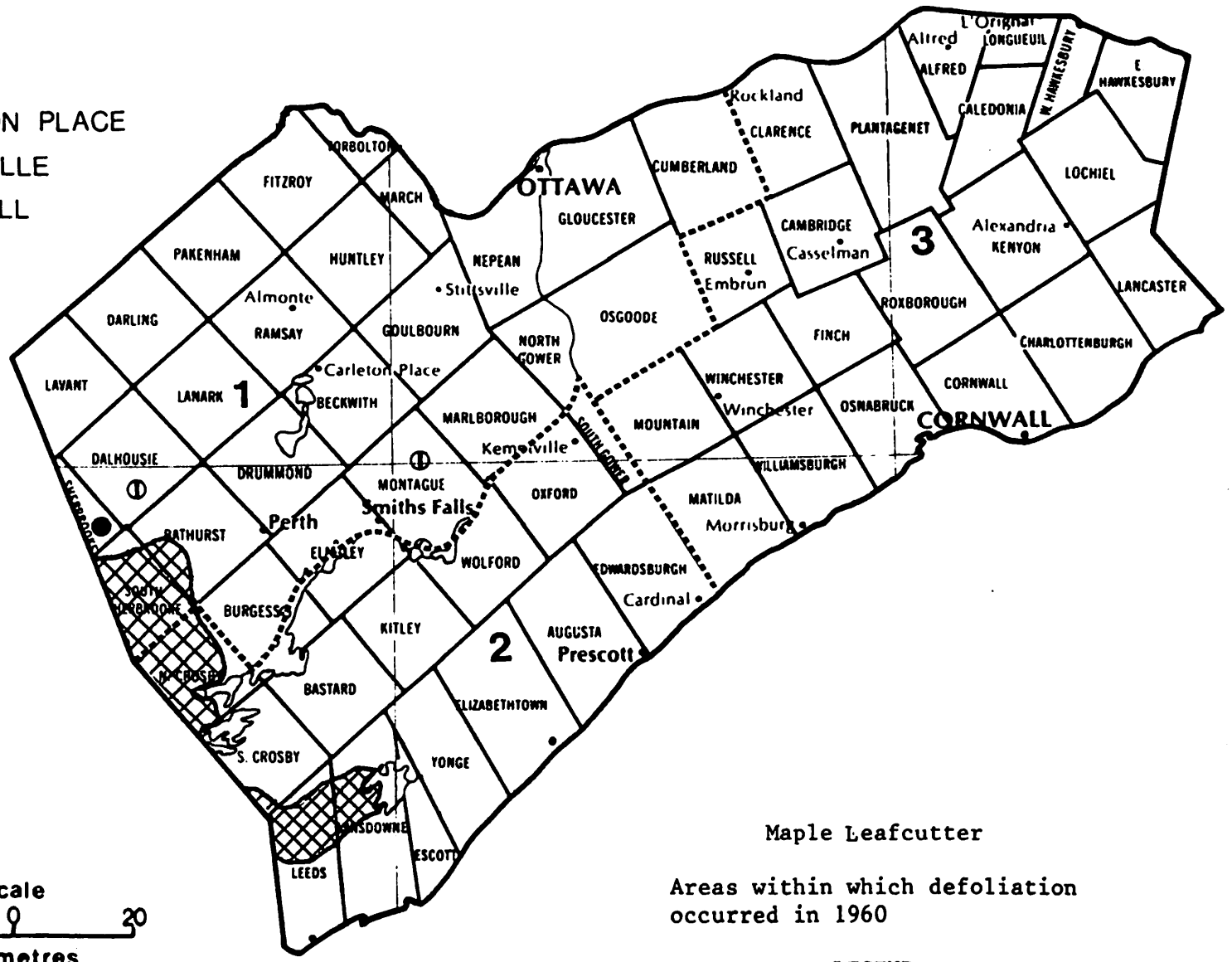

Scale
20 10 0 20
Kilometres

Maple Leafcutter

Areas within which defoliation occurred in 1960

LEGEND

Light defoliation ◐

Moderate-to-severe defoliation ▨ or ●

Mountain-ash Sawfly, *Pristiphora geniculata* (Htg.)

Host(s): Mo, European mountain-ash [Major]

Year	Remarks
1950-1951	not reported
1952	light defoliation of ornamental and forest trees at many locations
1953-1954	not reported
1955	Ornamental trees were severely defoliated at Westport.
1956-1957	trace populations
1958-1961	not reported
1962-1965	common on ornamentals at several points in Oxford Twp
1966	lightly defoliated trees at several points in the district
1967	A light infestation was reported at the G. Howard Ferguson Nursery in Oxford Twp.
1968-1970	not reported
1971	found commonly on ornamental trees at many locations
1972	trace populations
1973-1974	not reported
1975	Stock trees on the G. Howard Ferguson Nursery were heavily infested but were sprayed to control defoliation.
1976-1980	not reported

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

Host(s): rP, jP, scP, MP [Major]

Year	Remarks
1950	not reported
1951	Small numbers were found along Highway 2 from Gananoque to Brockville.
1952-1980	not reported

D I S E A S E S

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

Host(s): coniferous, deciduous [Major]

Year	Remarks
1950-1963	not reported
1964	occasional trees killed in jack pine and red pine plantations
1965	not reported
1966	small centers of light infection at several points
1967-1971	not reported
1972-1973	single trees killed at several locations
1974-1975	not reported
1976	a few dead red pine trees in a plantation in the Limerick Forest
1977-1980	not reported

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

Host(s): elm [Major]

Year	Remarks
1950-1958	not reported
1959	occasional infected trees found in the eastern part of the district
1960-1964	Incidence of the pathogen increased and dead trees were common through the district.
1965	Approximately 10% of elm were infected in plots in Augusta Twp.
1966	Tree mortality averaged 5% at sample plots in the district.
1967	86% of ornamental elm in Brockville exhibited symptoms of the disease.
1968-1971	Severe mortality of elm was reported along the north shore of St. Lawrence River.
1972-1974	Incidence and mortality continued to increase across the district.
1975	Little change in incidence of the disease or mortality levels was observed.
1976-1977	The disease continued to cause mortality throughout the district.
1978-1980	not reported

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

Host(s): trembling aspen [Major]

Year	Remarks
1950-1960	not reported
1961	light foliar damage at several points
1962-1966	not reported
1967	A single pocket of heavy infection was reported near Chaffey's Locks in South Crosby Twp.
1968	trace infection levels at several locations
1969	Lightly infected trees were found at several points in Oxford and Wolford twps. A small isolated stand in South Crosby Twp sustained moderate-to-severe discoloration of foliage.
1970-1976	not reported
1977	low infection levels near North Augusta
1978-1979	not reported
1980	trace infections at several points in Augusta Twp

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

Host(s): wP [Major]

Year	Remarks
1950-1953	not reported
1954-1955	infected trees observed commonly through the district
1956-1958	not reported
1959	infected trees observed commonly through the district
1960	not reported
1961-1966	infected trees common through the district
1967	Light mortality occurred in seedlings at the Kemptville Nursery.
1968-1971	not reported
1972	infected trees observed throughout the district
1973	5% mortality of 6-m trees was recorded at a sample point in Wolford Twp.
1974	not reported

(cont'd)

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

Year	Remarks
1975	3% mortality of 4-m trees in Augusta and Wolford twps
1976-1977	not reported
1978	observed commonly in the district
1979-1980	not reported

Hypoxylon Canker, *Hypoxylon mammatum* (Wahlenb.) J. Miller

Host(s): poplar [Major]

Year	Remarks
1950-1954	not reported
1955	A survey showed the canker was present in most aspen stands in the district.
1956-1957	found commonly through the district
1958-1963	not reported
1964	Small pockets of light infection were observed through the district.
1965-1968	cankers common through the district
1969-1974	not reported
1975	found commonly through the district
1976-1979	not reported
1980	found commonly through the district

Shoot Blight, *Venturia macularis* (Fr.) E. Müller & v. Arx

Host(s): poplar [Major]

Year	Remarks
1950-1960	not reported
1961	trace infections at several locations
1962	Lightly infected trees were found commonly through the district.
1963-1965	Small numbers of lightly infected trees were found at many locations in the district.
1966	A small center of heavy infection was observed in Oxford Twp.
1967	Light infections on Carolina poplar nursery stock were reported at the G. Howard Ferguson Nursery.
1968	trace infections at a few locations
1969	Light infections on Carolina poplar stock were reported at the G. Howard Ferguson Nursery
1970-1972	not reported
1973	light infections in Augusta Twp
1974-1977	light infections at several locations
1978-1980	not reported

Other Noteworthy Diseases

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

Host(s): pine [Major]

Year	Remarks
1950-1965	not reported
1966	reported to have caused heavy mortality in transplanted eastern white pine stock at the G. Howard Ferguson Nursery
1967-1970	not reported
1971	Intensive surveys of plantations and the G. Howard Ferguson Nursery failed to reveal this organism.
1972-1977	not reported
1978	Intensive surveys were carried out in plantations and tree nurseries for the European strain of the disease. No evidence of the organism was found.
1979-1980	Surveys were continued with negative results

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

Host(s): pine [Major]

Year	Remarks
1950-1959	not reported
1960	30% trees infected in a jack pine plantation in Oxford Twp
1961-1964	not reported
1965	light infections on red pine in Oxford Twp
1966-1970	not reported
1971-1973	trace infections at several locations
1974	20% incidence on 3-m red pine trees in Edwardsburgh Twp
1975-1978	trace infections at several points
1979	5% foliar damage on 100% of 3-m red pine trees in a plantation in Oxford Twp
1980	trace infections in Edwardsburgh and Front of Yonge twps

Eastern Gall Rust, *Cronartium quercuum* (Berk.) Miyabe ex Shirai

Host(s): jP, scP [Major]

Year	Remarks
1950-1977	not reported
1978	common on Scots pine near Kemptville and in the Limerick Forest
1979	not reported
1980	found commonly through the southern part of the district

Cytospora Canker, *Cytospora kunzei* Sacc.

Host(s): spruce [Major]

Year	Remarks
1950-1966	not reported
1967	light damage on windbreaks at the G. Howard Ferguson Nursery
1968	light damage at the G. Howard Ferguson Nursery and at several points in Oxford Twp
1969	Moderate branch damage was reported at the G. Howard Ferguson Nursery in plantations in Oxford Twp.
1970-1978	not reported
1979	many Norway spruce and white spruce hedgerows infected with cankers through the district
1980	not reported

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

Host(s): pines [Major]

Year	Remarks
1950-1976	not reported
1977	rust galls found commonly on Scots pine at many points
1978-1980	not reported

Anthracnose, *Gloeosporium* spp.

Host(s): deciduous [Minor]

Year	Remarks
1950-1954	not reported
1955	basswood foliage heavily infected in the southern part of the district
1956-1960	not reported
1961	oak and ash heavily infected at several points
1962	not reported
1963	approximately 95% of ironwood infected in Wolford Twp
1964-1976	not reported
1977	leaf anthracnose common on hybrid poplar in Compartment 59 at the G. Howard Ferguson Tree Nursery
1978-1979	not reported
1980	trace infections on sugar maple stock in Compartment 47 at G. Howard Ferguson Tree Nursery

DIEBACKS AND DECLINES

Maple Decline

Year	Remarks
1950-1976	occasional dead trees along roads and in woodlots reported during the period
1977	Surveys were carried out in a variety of situations to establish causes of apparent increasing mortality. No single cause was identified.
1978	Surveys continued, severe drought over the past three years may have been partly responsible for increasing mortality.
1979	decline appears to be stabilized
1980	Trees showing typical symptoms are common through Oxford, Wolford and Elizabethtown twps.

A B I O T I C D A M A G E

Drought

Year	Remarks
1950-1965	not reported
1966-1967	Drought conditions caused by below normal precipitation caused conspicuous leaf discoloration and premature foliage loss between Gananoque and Brockville.
1975	Premature leaf fall, attributed to lack of normal precipitation was observed at several locations.
1976	Pockets of mortality attributed to drought in 1975 were reported in the Limerick Forest.
1977	Severe drought conditions and premature leaf drop were encountered from Brockville west to the district boundary.
1978-1980	not reported

Frost

Year	Remarks
1950-1963	not reported
1964	Widespread foliage damage by late spring frosts was reported throughout the district
1965-1968	not reported
1969	Late spring frosts severely damaged deciduous foliage, particularly oak and ash through the southern part of the district. Light damage was recorded on deciduous seedlings at the G. Howard Ferguson Nursery.
1970-1976	not reported
1977	Late spring frosts caused moderate damage to the new foliage of hybrid poplars and to the expanding shoots of conifers at several points in the district.
1978-1979	not reported
1980	Heavy damage occurred on a hybrid poplar clone at the G. Howard Ferguson Nursery where freezing temperatures were recorded on the nights of June 9 and 10. Trace damage levels were observed in planted larch at several locations through the district.

Salt Damage

Year	Remarks
1950-1953	not reported
1954	Conifers planted along highways 15 and 401 were heavily damaged. Red pine, Scots pine, balsam fir and white spruce up to 11 cm DBH were most seriously affected.
1955-1966	not reported
1967	Light mortality attributed to salt damage occurred along highways 43 and 16 in the district.
1968-1977	not reported
1978	severe damage to red pine and white cedar trees along highways 401 and 43 in the district
1979-1980	not reported

Semimature Tissue Needle Blight

Host(s) wP [Minor]

Year	Remarks
1950-1959	not reported
1960	trace infections in Front of Escott Twp
1961-1963	not reported
1964	trace infections at several locations
1965-1969	not reported
1970	conspicuous discoloration of foliage in the southern part of the district
1971-1980	not reported

Sleet

Year	Remarks
1950-1952	not reported
1953	deciduous trees, particularly American elm heavily damaged at several points in Grenville County
1954	not reported
1955	Balsam fir and white cedar were heavily damage by sleet and ice at several points through Grenville County.
1956-1980	not reported

Winter Drying

Year	Remarks
1950-1966	not reported
1967	lightly damaged conifer foliage through the district
1968-1970	not reported
1971	light foliar damage at several points
1972-1977	not reported
1978	Moderate-to-severe foliar damage was recorded in a Scots pine plantation in Oxford Twp.
1979-1980	not reported

A P P E N D I C E S

APPENDIX A

DECIDUOUS HOST

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

(continued)

APPENDIX A (continued)

DECIDUOUS HOST

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

APPENDIX B

CONIFEROUS HOST

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

A P P E N D I X C

MAPS - SOUTHERN ONTARIO

SOUTHERN ONTARIO

DISTRICTS

1. CHATHAM
2. AYLMER
3. WINGHAM
4. OWEN SOUND
5. HURONIA
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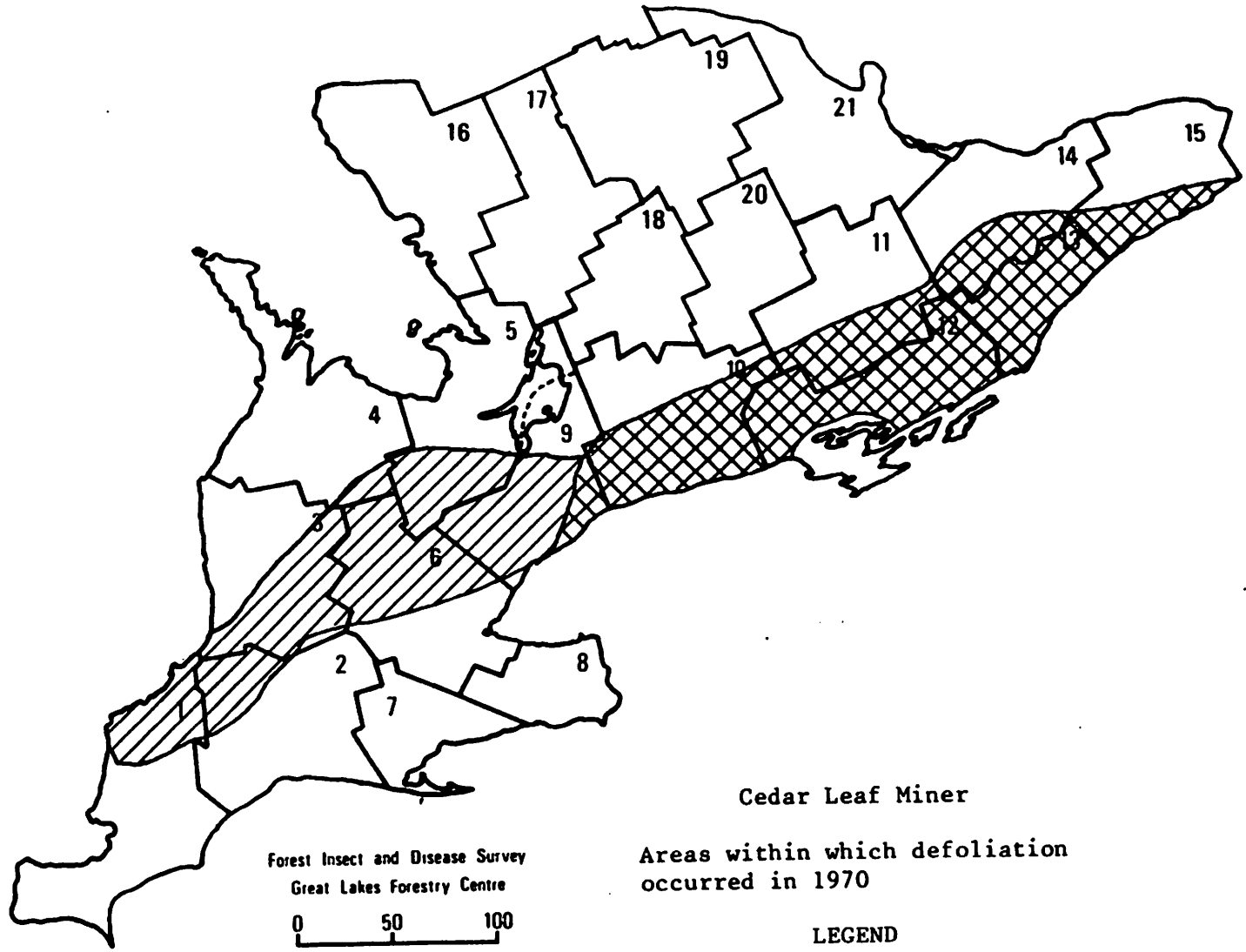

Cedar Leaf Miner

Areas within which defoliation occurred in 1970

LEGEND

Light defoliation

Moderate-to-severe defoliation • or

SOUTHERN ONTARIO

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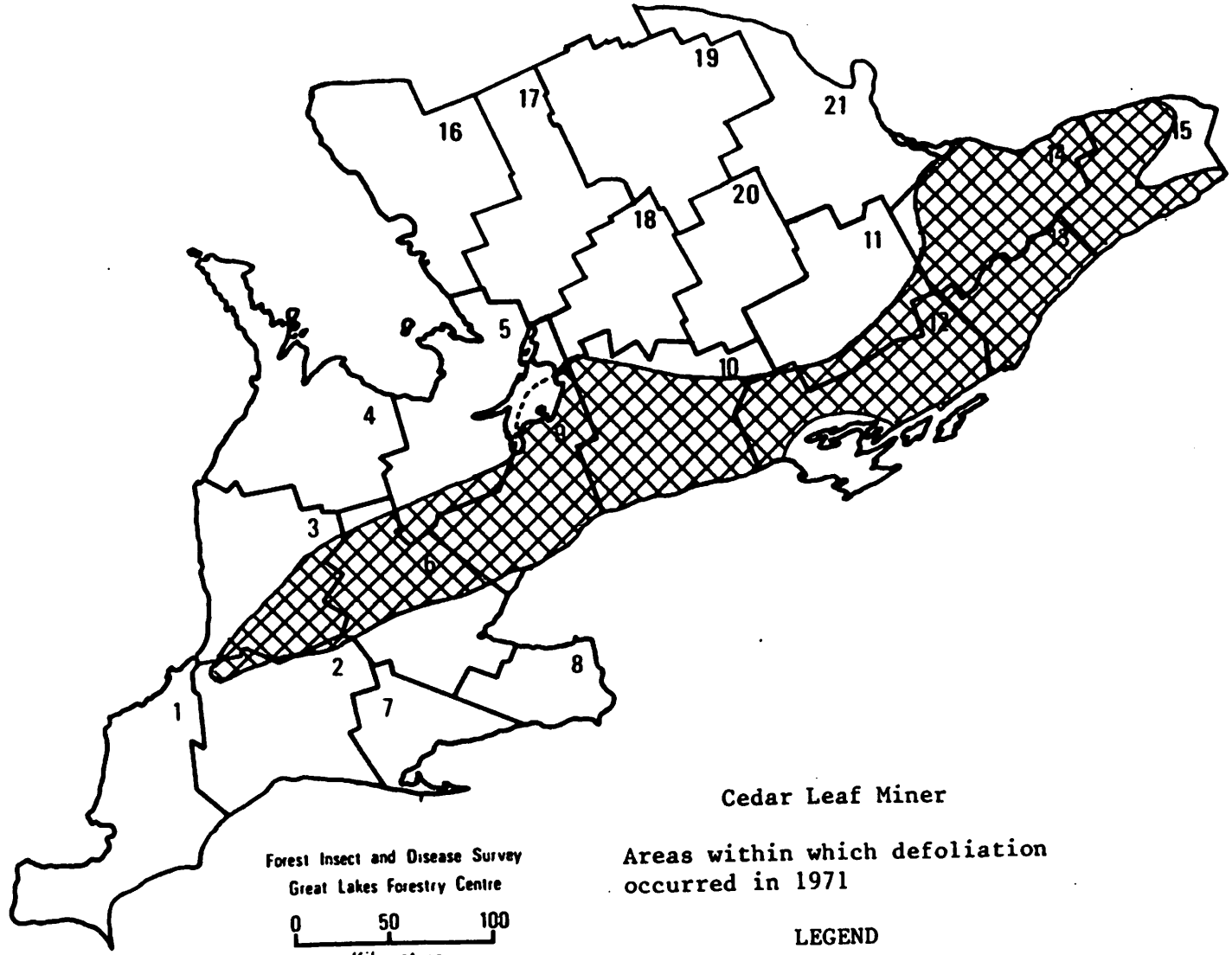

Forest Insect and Disease Survey
Great Lakes Forestry Centre

0 50 100
Kilometres

Cedar Leaf Miner

Areas within which defoliation occurred in 1971

LEGEND

Moderate-to-severe defoliation

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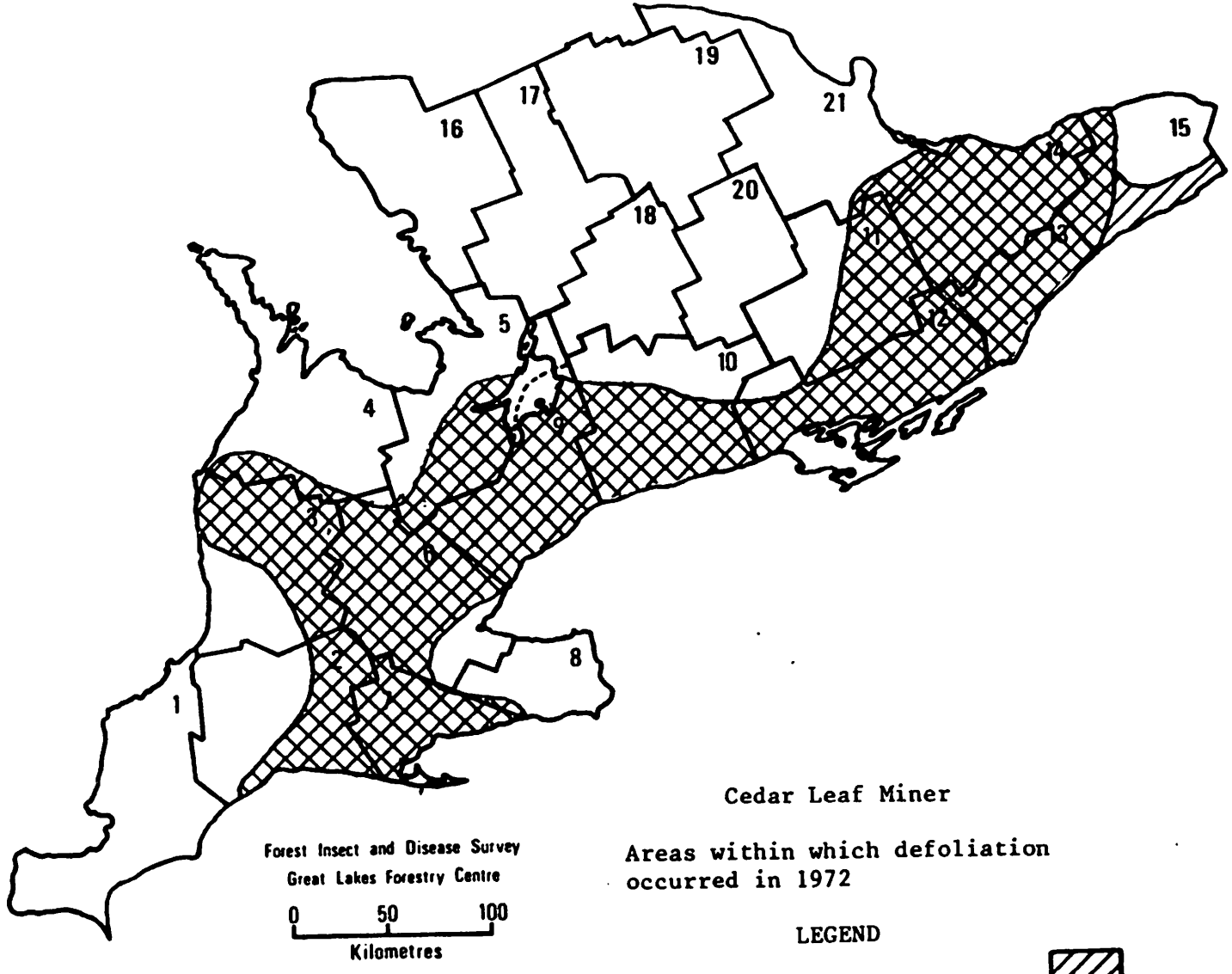

Cedar Leaf Miner

Areas within which defoliation occurred in 1972

LEGEND

Light defoliation

Moderate-to-severe defoliation • or

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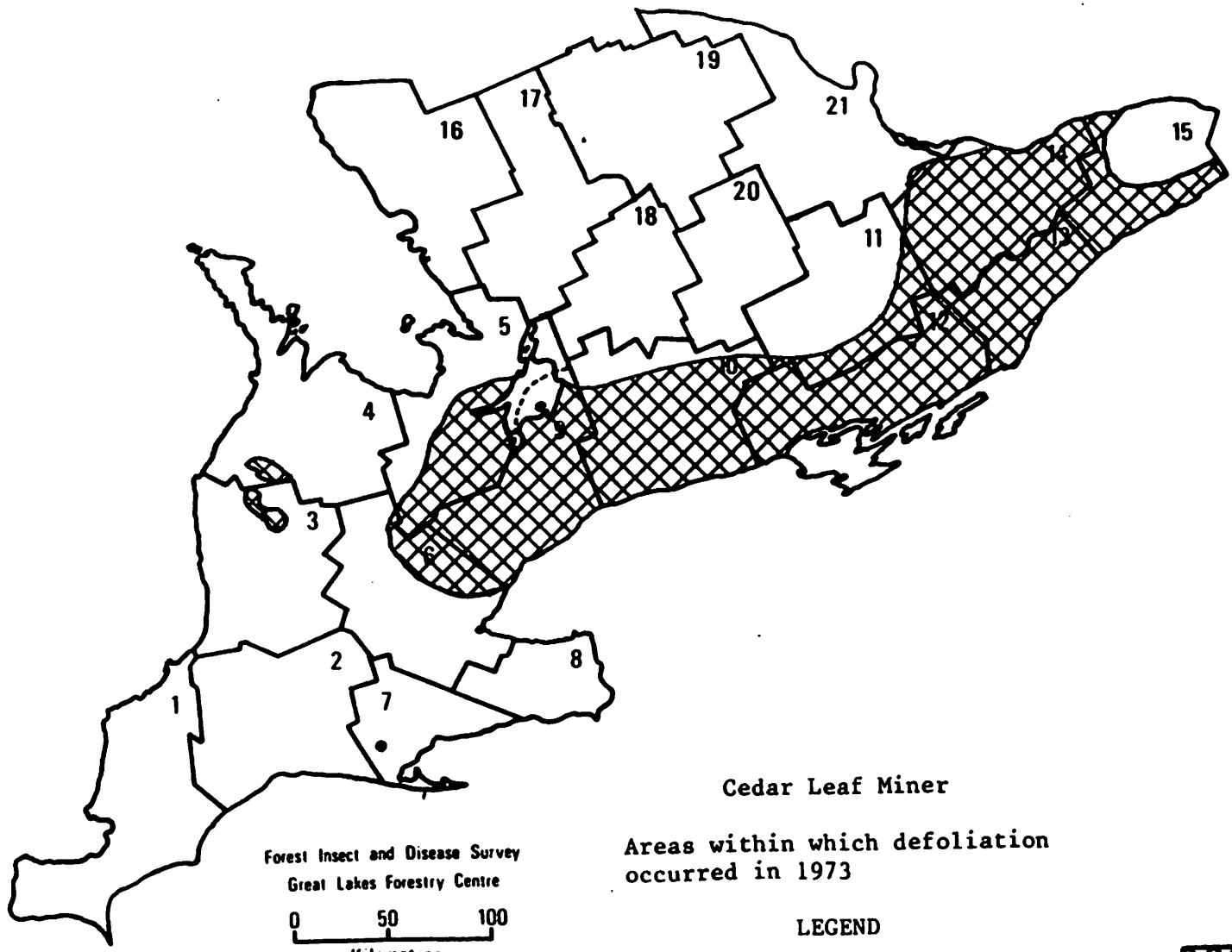

Cedar Leaf Miner

Areas within which defoliation occurred in 1973

LEGEND

Moderate-to-severe defoliation • or

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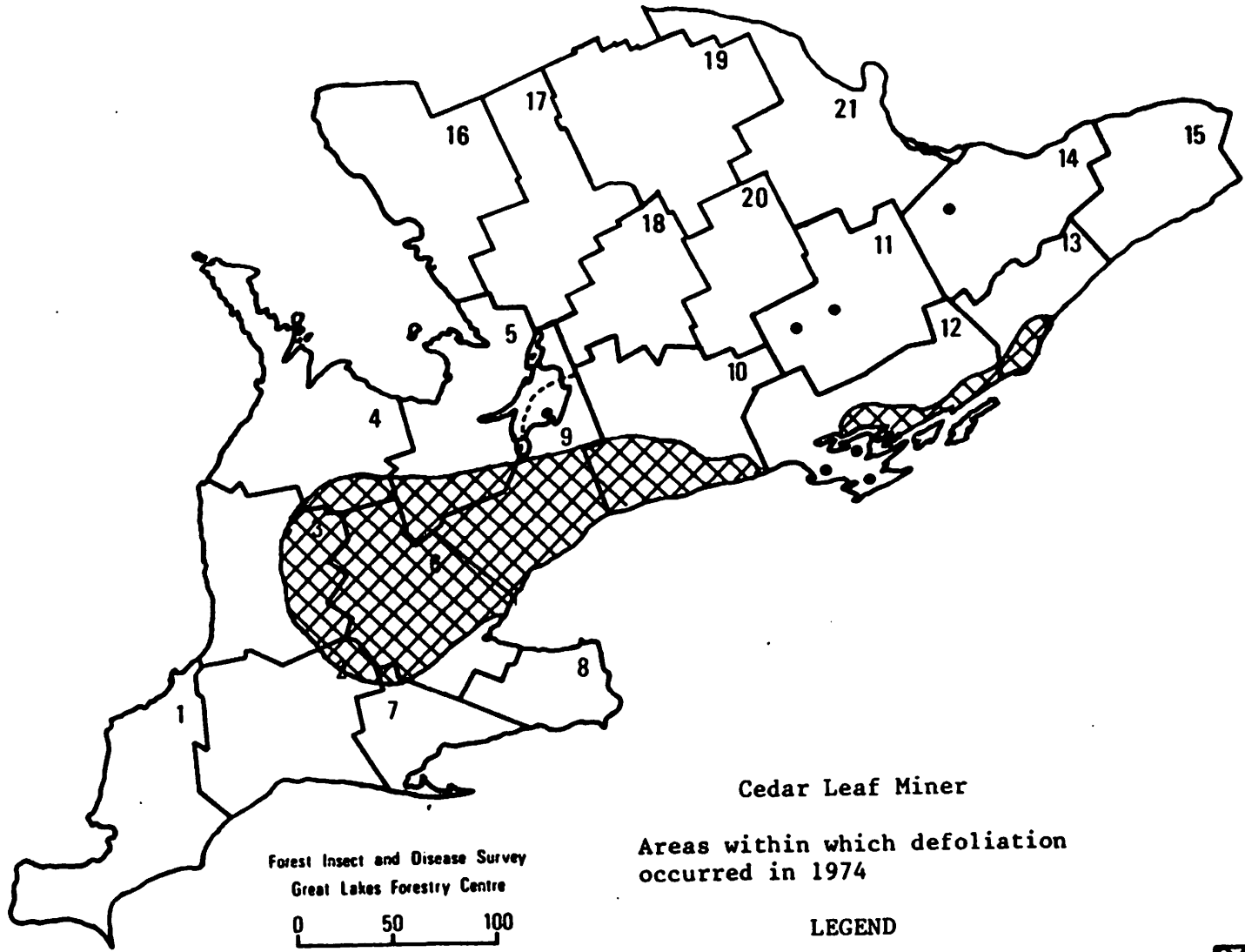

Cedar Leaf Miner

Areas within which defoliation occurred in 1974

LEGEND

Moderate-to-severe defoliation • or

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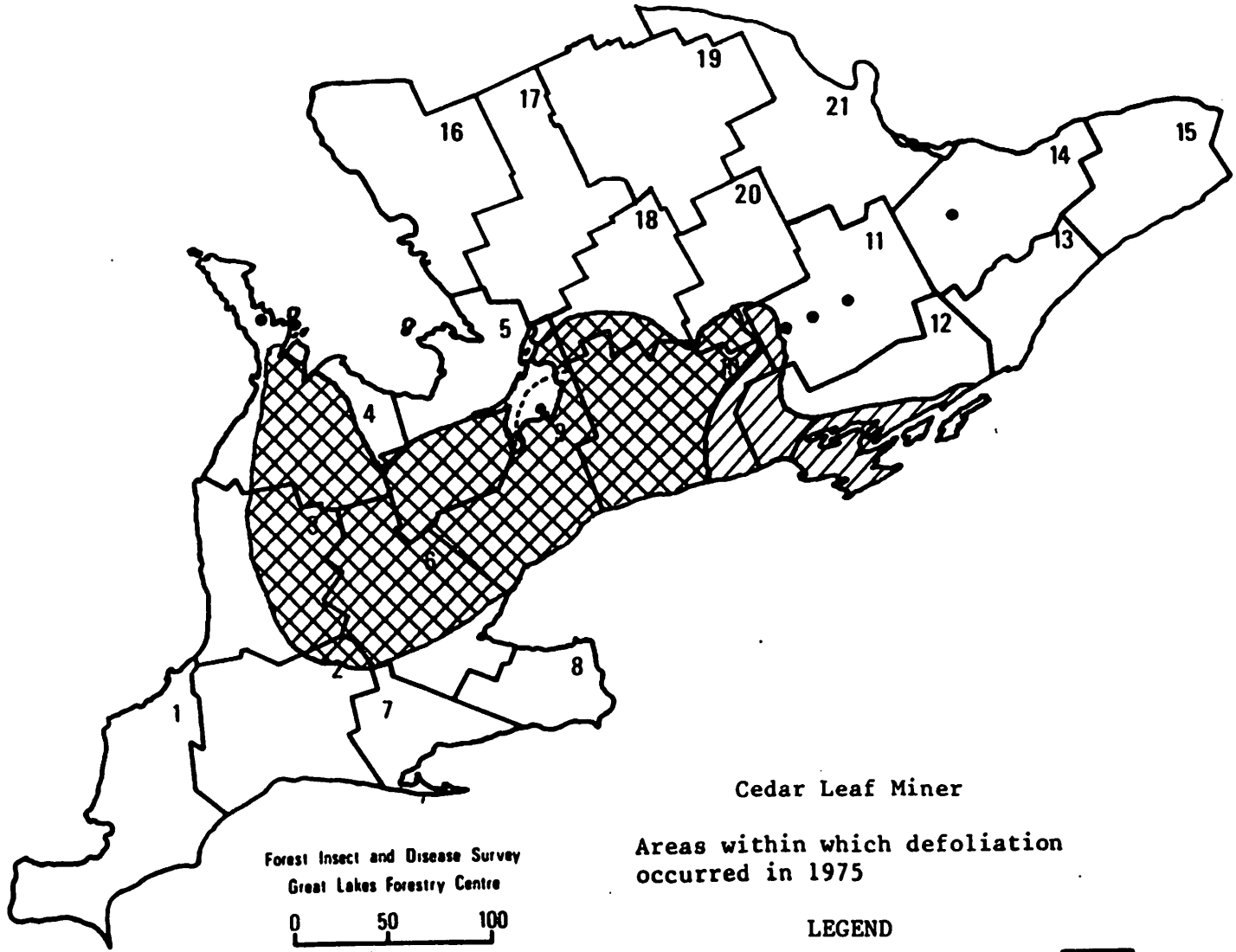

Cedar Leaf Miner

Areas within which defoliation occurred in 1975

LEGEND

Light defoliation

Moderate-to-severe defoliation

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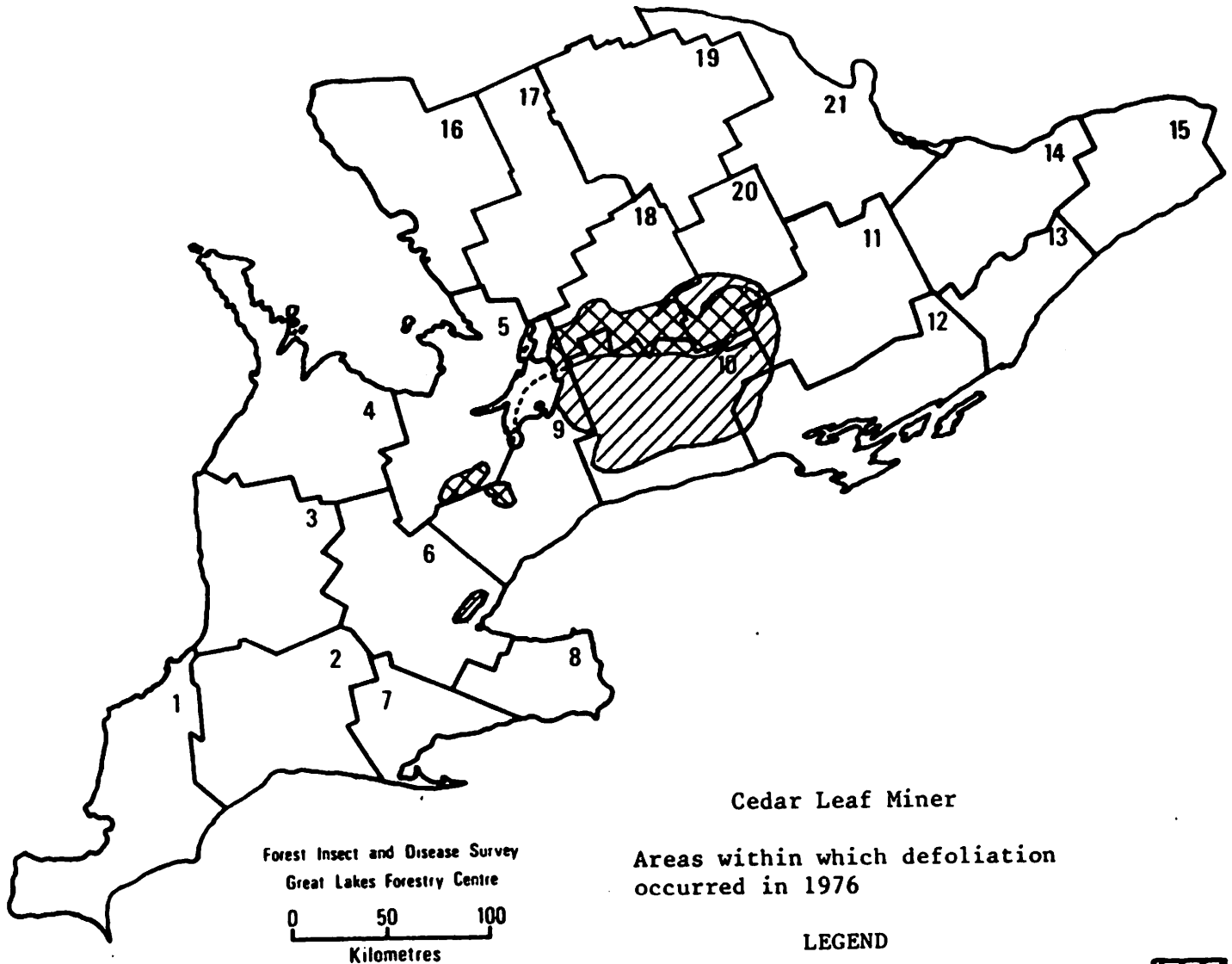

Cedar Leaf Miner

Areas within which defoliation occurred in 1976

LEGEND

Light defoliation

Moderate-to-severe defoliation

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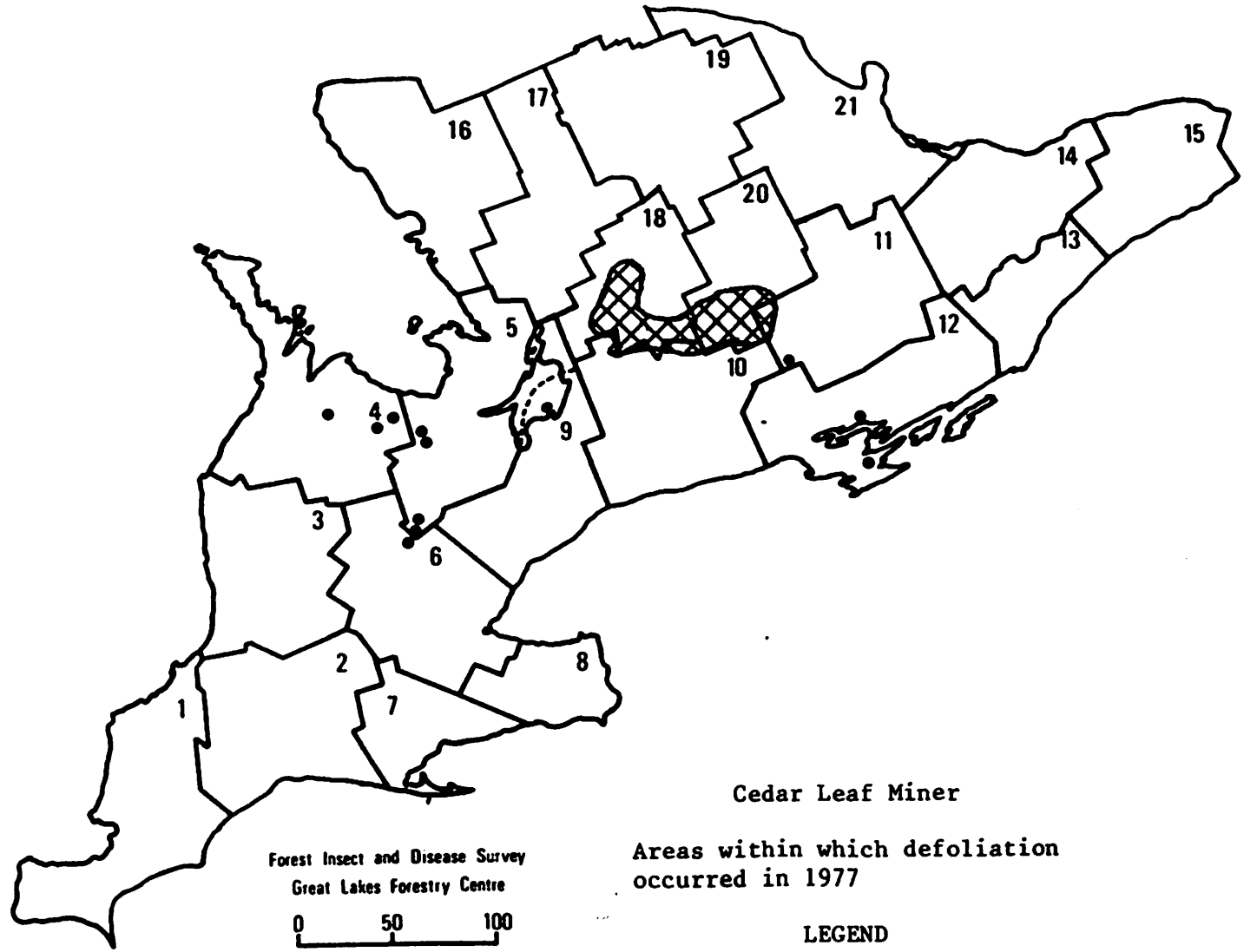

Cedar Leaf Miner

Areas within which defoliation occurred in 1977

LEGEND

Moderate-to-severe defoliation • or

SOUTHERN ONTARIO

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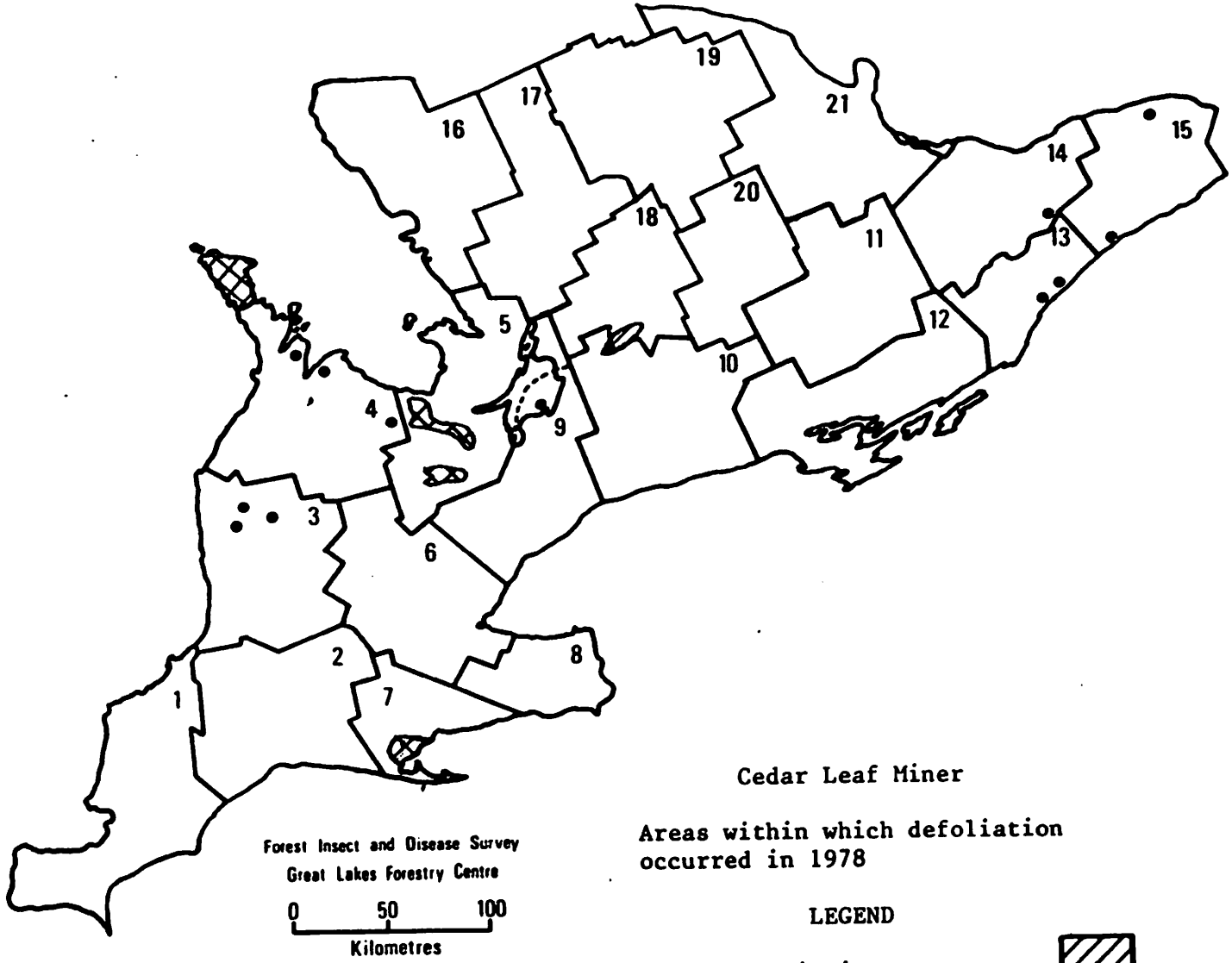

Cedar Leaf Miner

Areas within which defoliation occurred in 1978

LEGEND

Light defoliation

Moderate-to-severe defoliation • or

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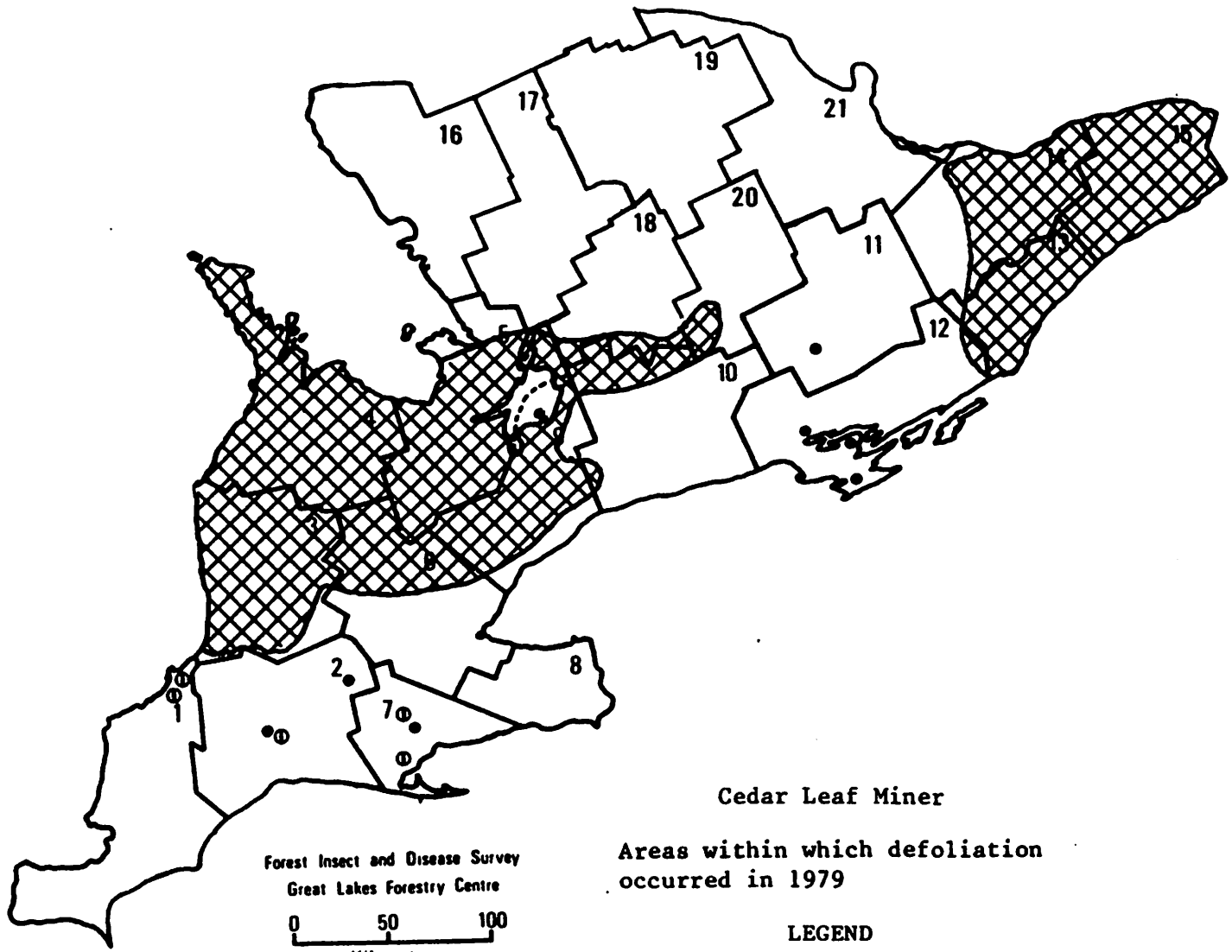

Cedar Leaf Miner

Areas within which defoliation occurred in 1979

LEGEND

Light defoliation

Moderate-to-severe defoliation

SOUTHERN ONTARIO

DISTRICTS

1. CHATHAM
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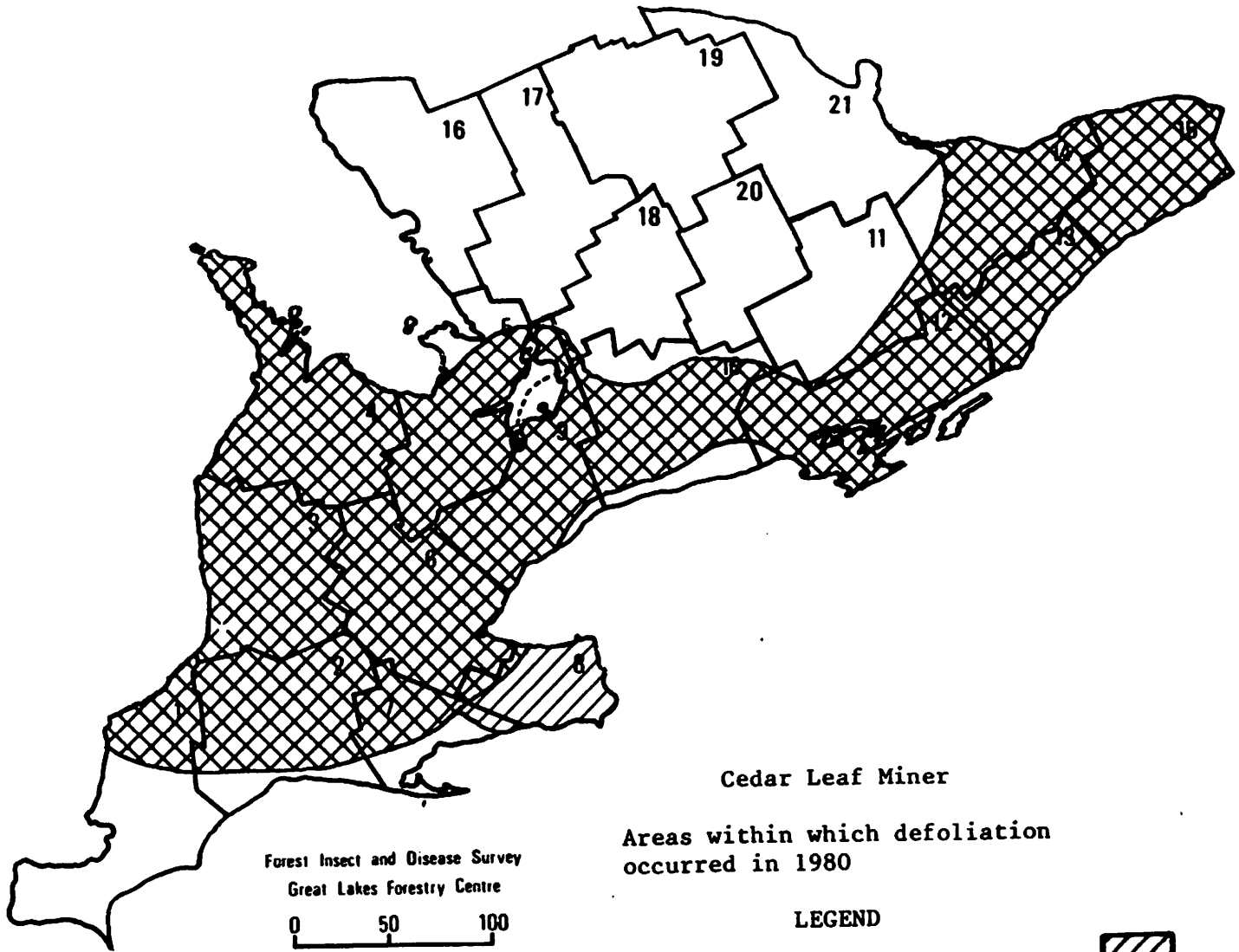

Cedar Leaf Miner

Areas within which defoliation occurred in 1980

LEGEND

Light defoliation

Moderate-to-severe defoliation

SOUTHERN ONTARIO

DISTRICTS

1. CHATHAM
2. AYLMER
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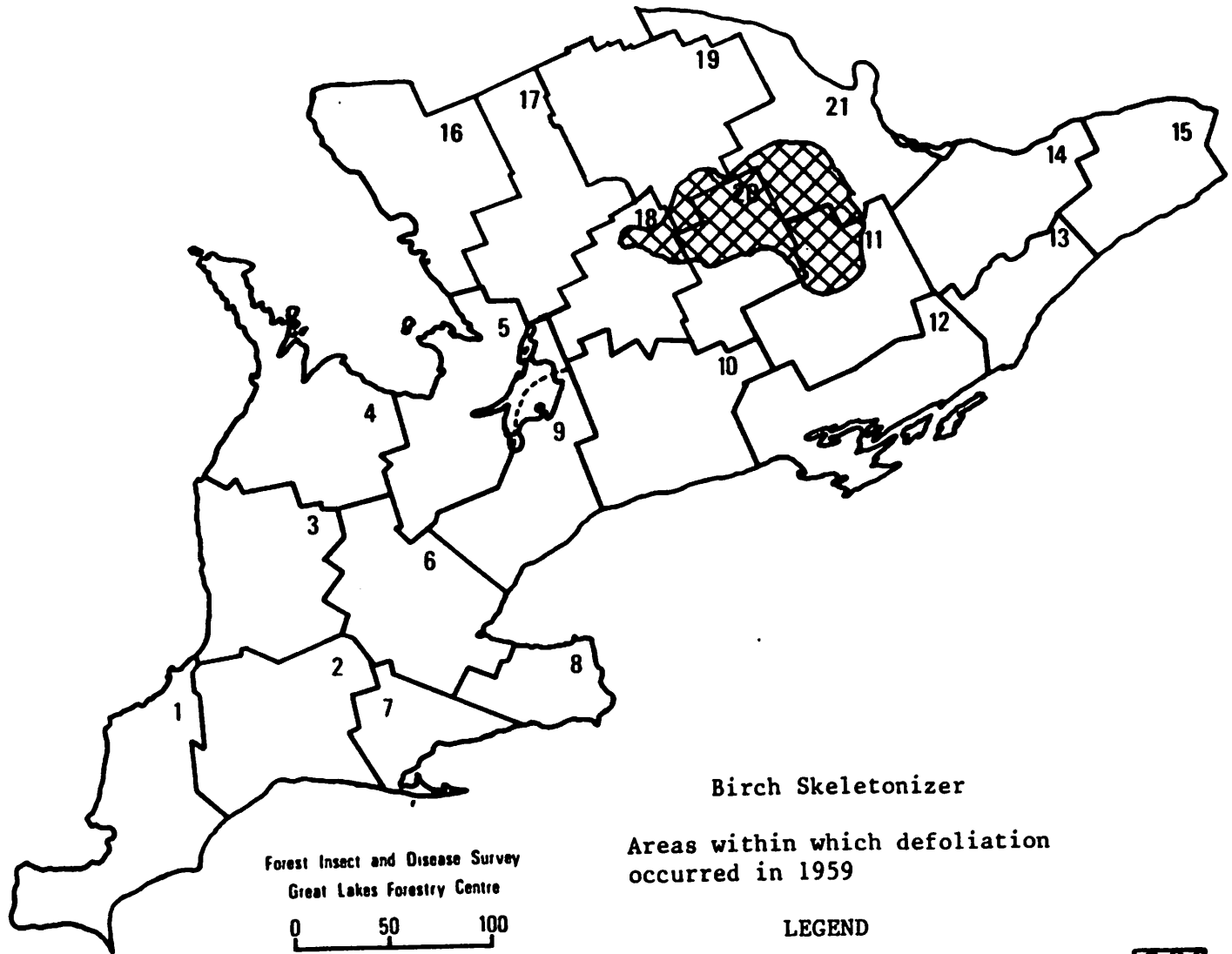

Birch Skeletonizer

Areas within which defoliation occurred in 1959

LEGEND

Moderate-to-severe defoliation

SOUTHERN ONTARIO

DISTRICTS

1. CHATHAM
2. AYLMER
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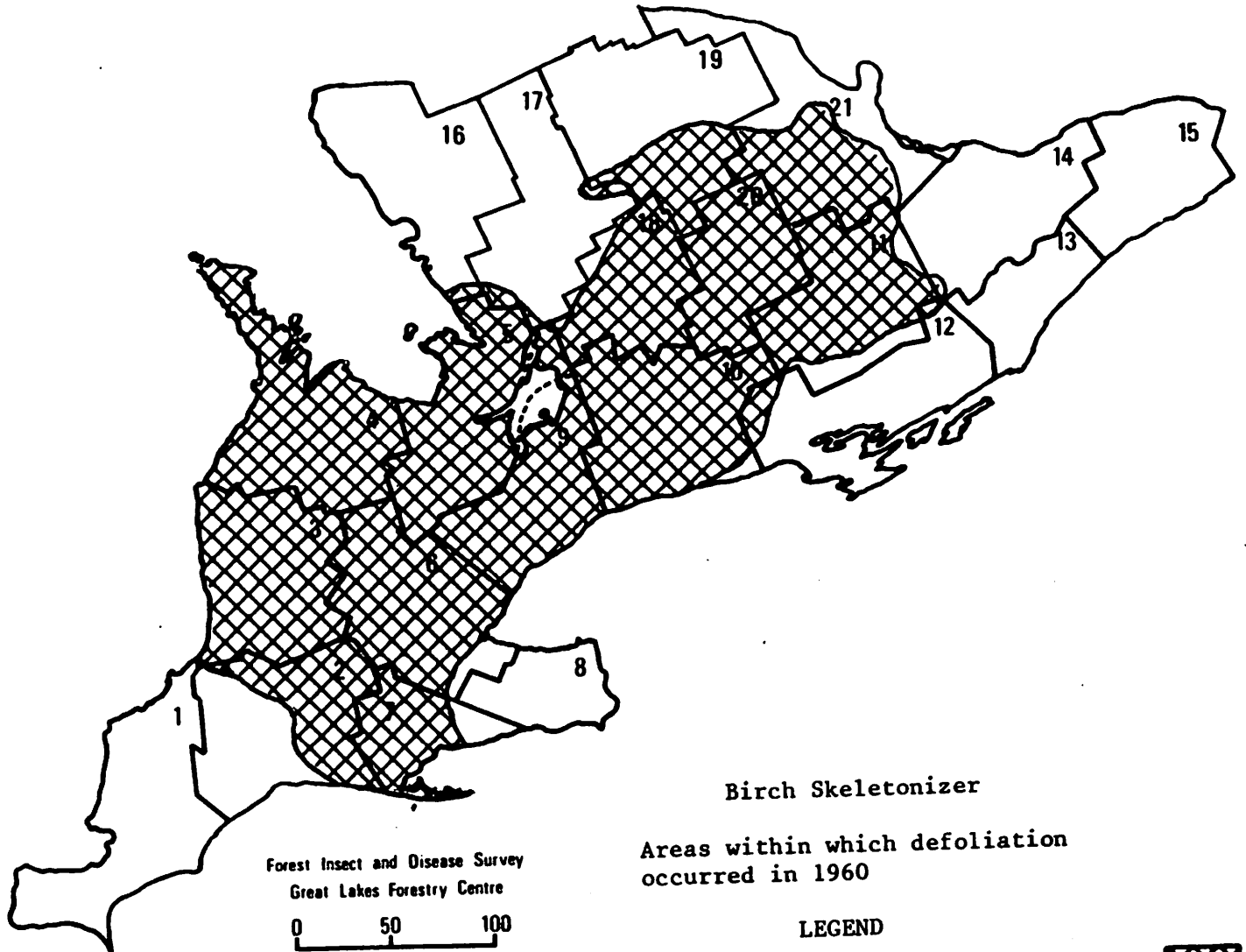

Birch Skeletonizer

Areas within which defoliation occurred in 1960

LEGEND

Moderate-to-severe defoliation

SOUTHERN ONTARIO

DISTRICTS

1. CHATHAM
2. AYLMER
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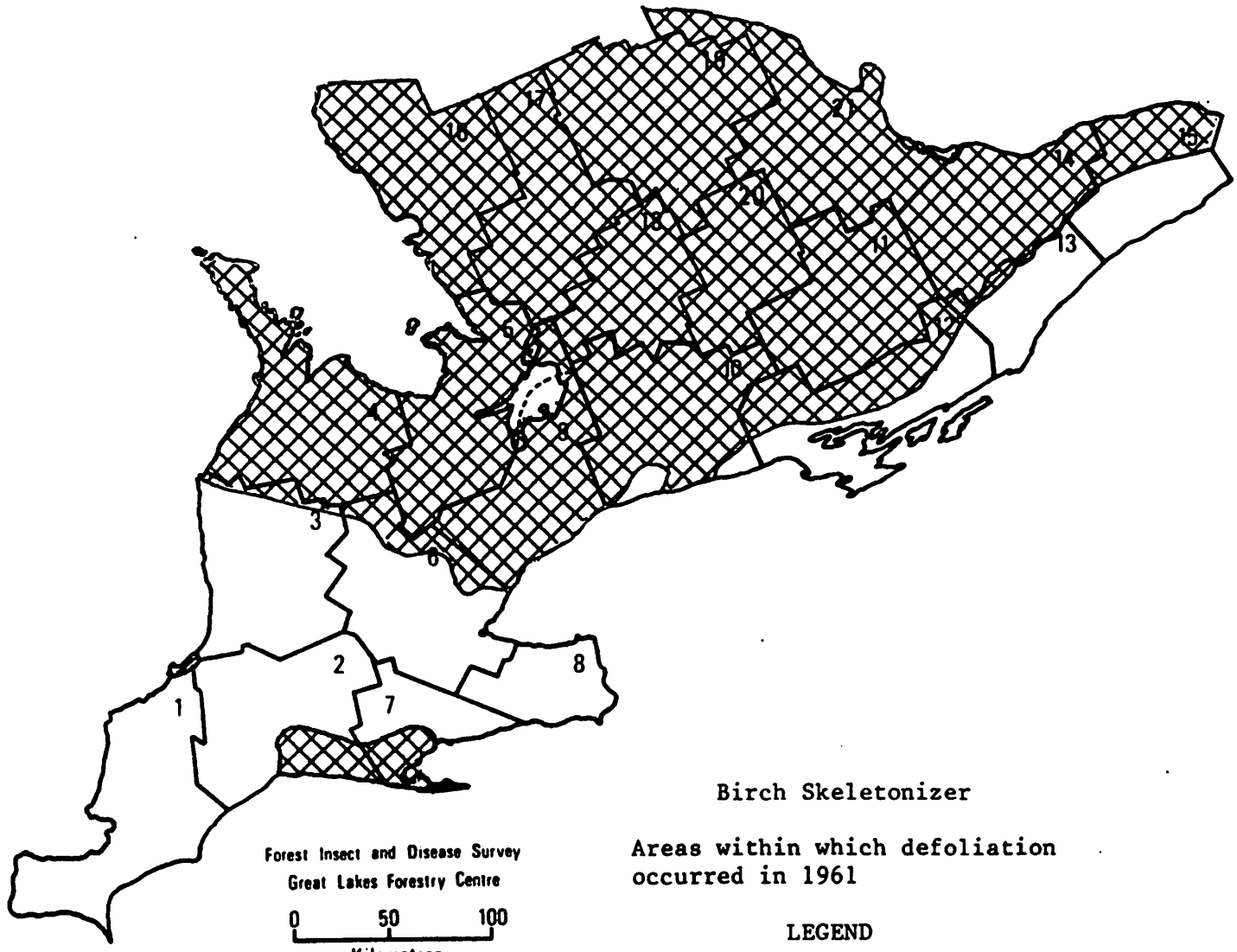


Birch Skeletonizer

Areas within which defoliation occurred in 1961

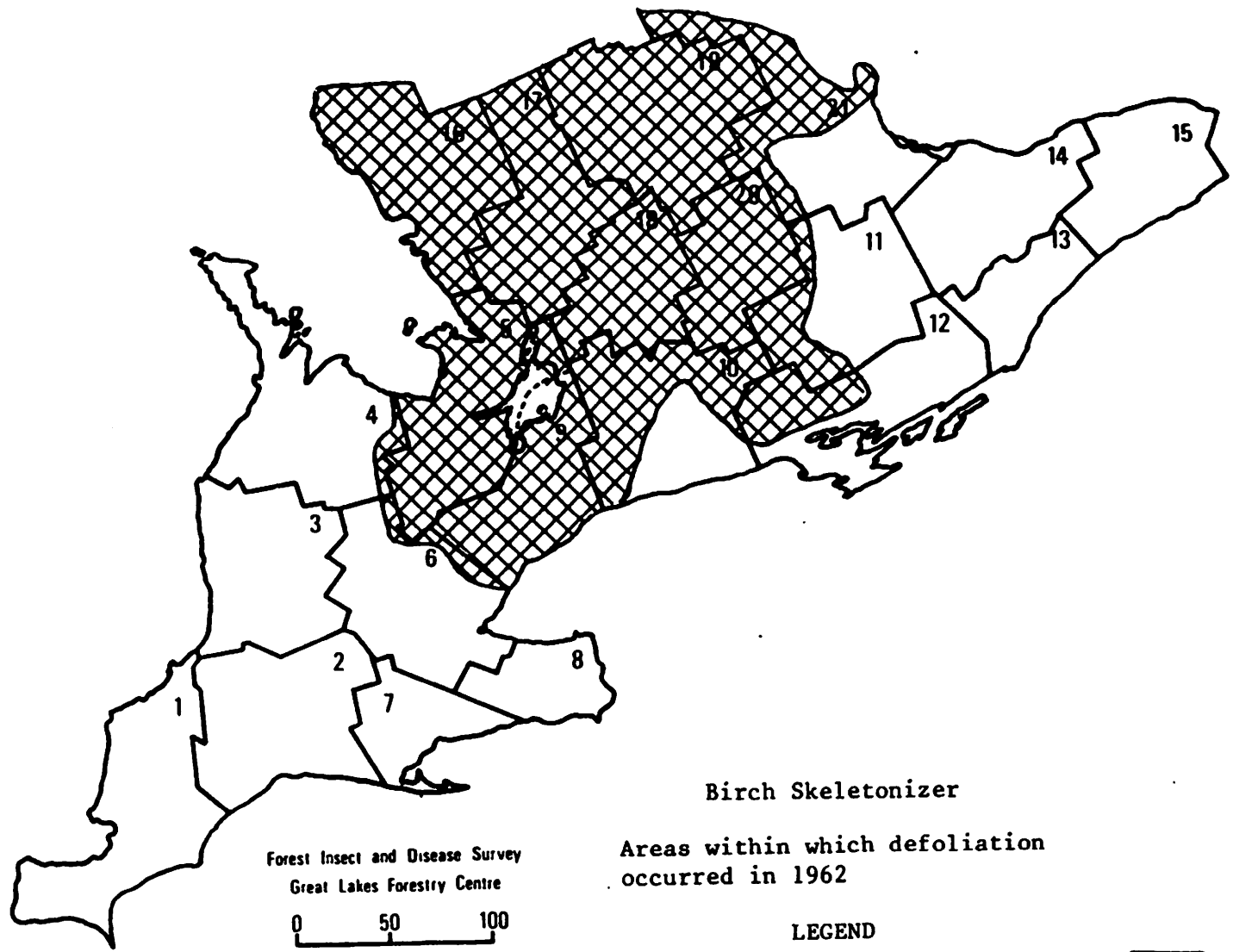
LEGEND

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



Birch Skeletonizer

Areas within which defoliation occurred in 1962

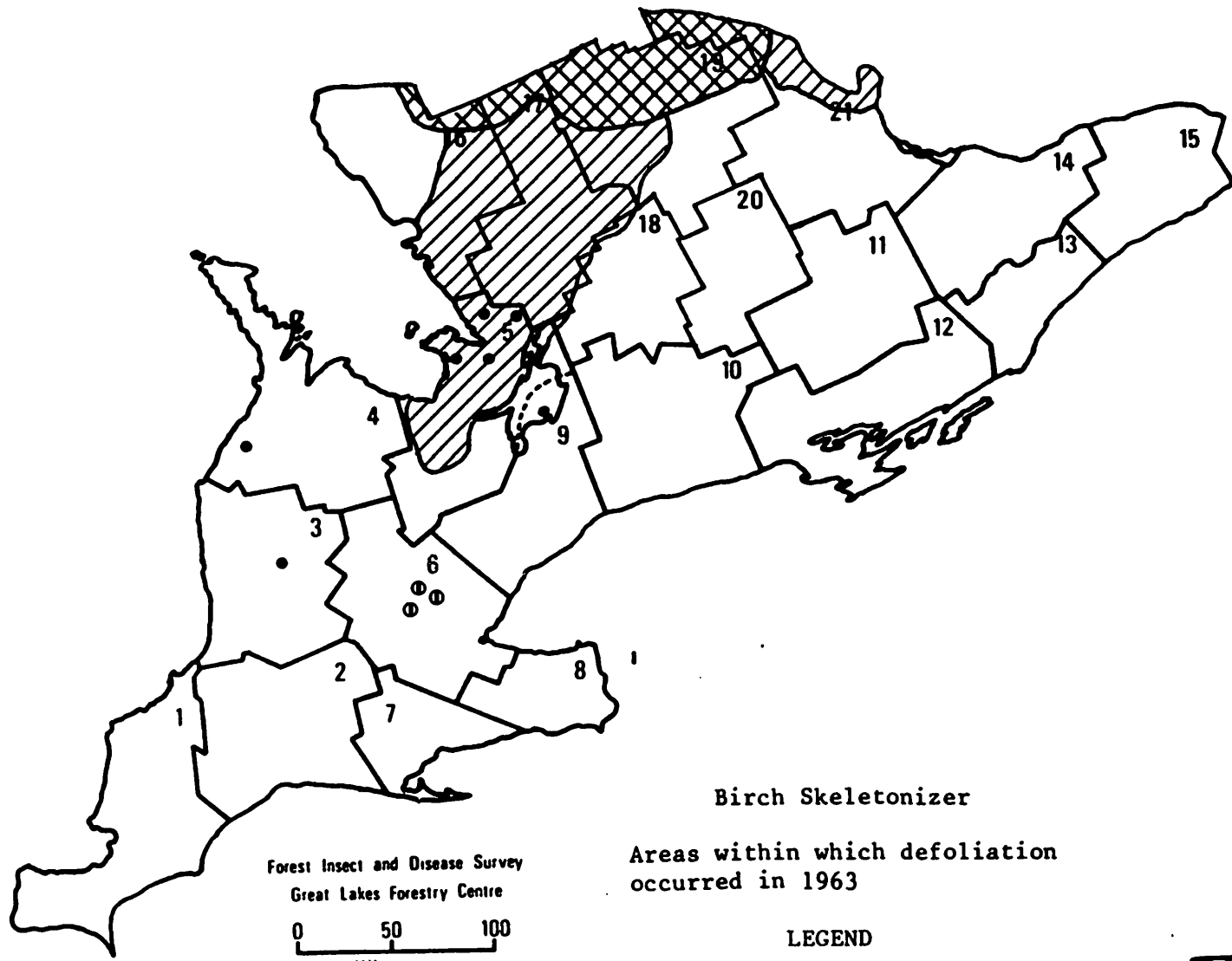
LEGEND

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



Birch Skeletonizer

Areas within which defoliation occurred in 1963

LEGEND

Light defoliation Φ 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
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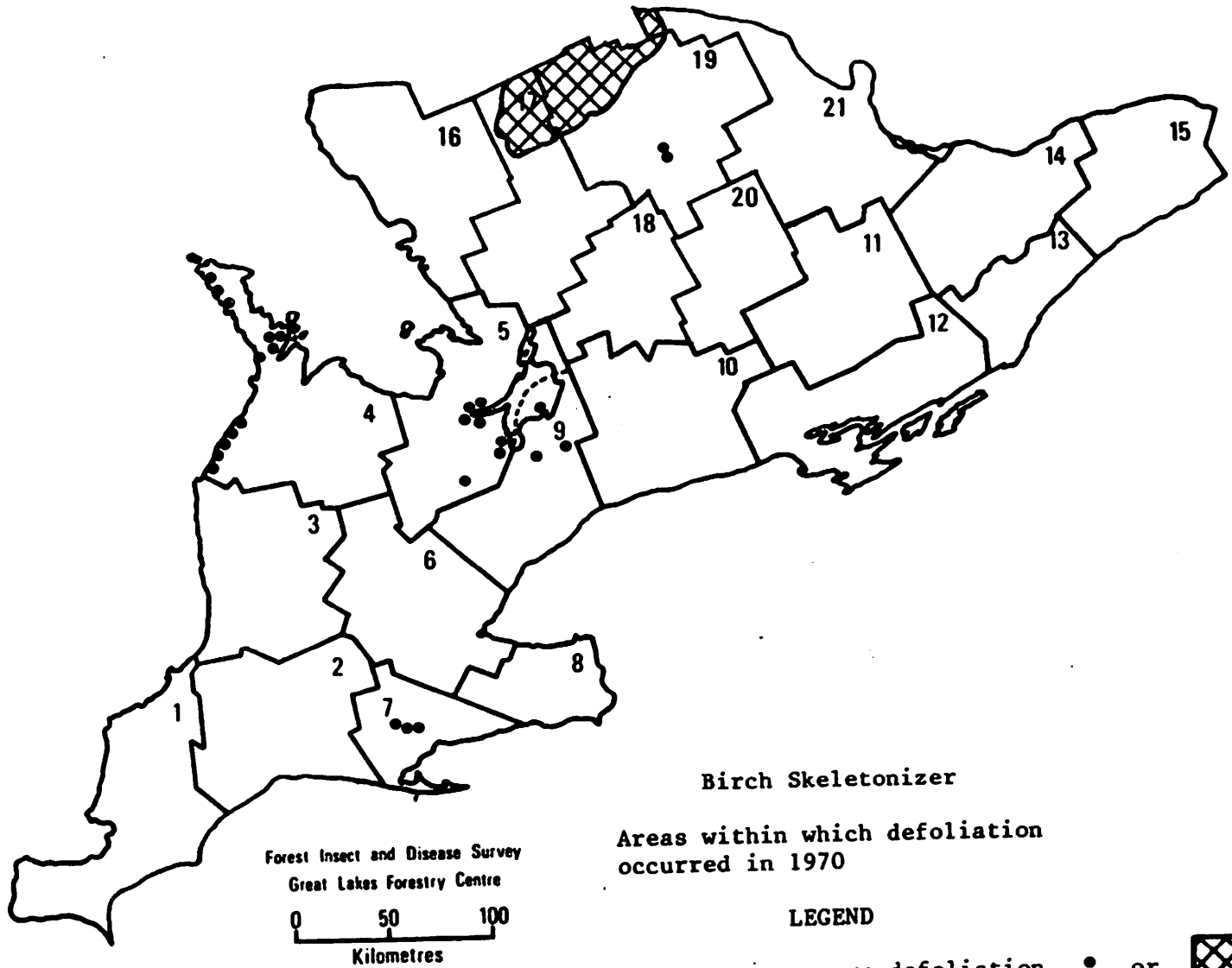
15. CORNWALL
16 PARRY SOUND
17 BRACEBRIDGE
18 MINDEN
19 ALGONQUIN PARK
20 BANCROFT
21 PEMBROKE



Birch Skeletonizer

Areas within which defoliation occurred in 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
8. NIAGARA
9. MAPLE
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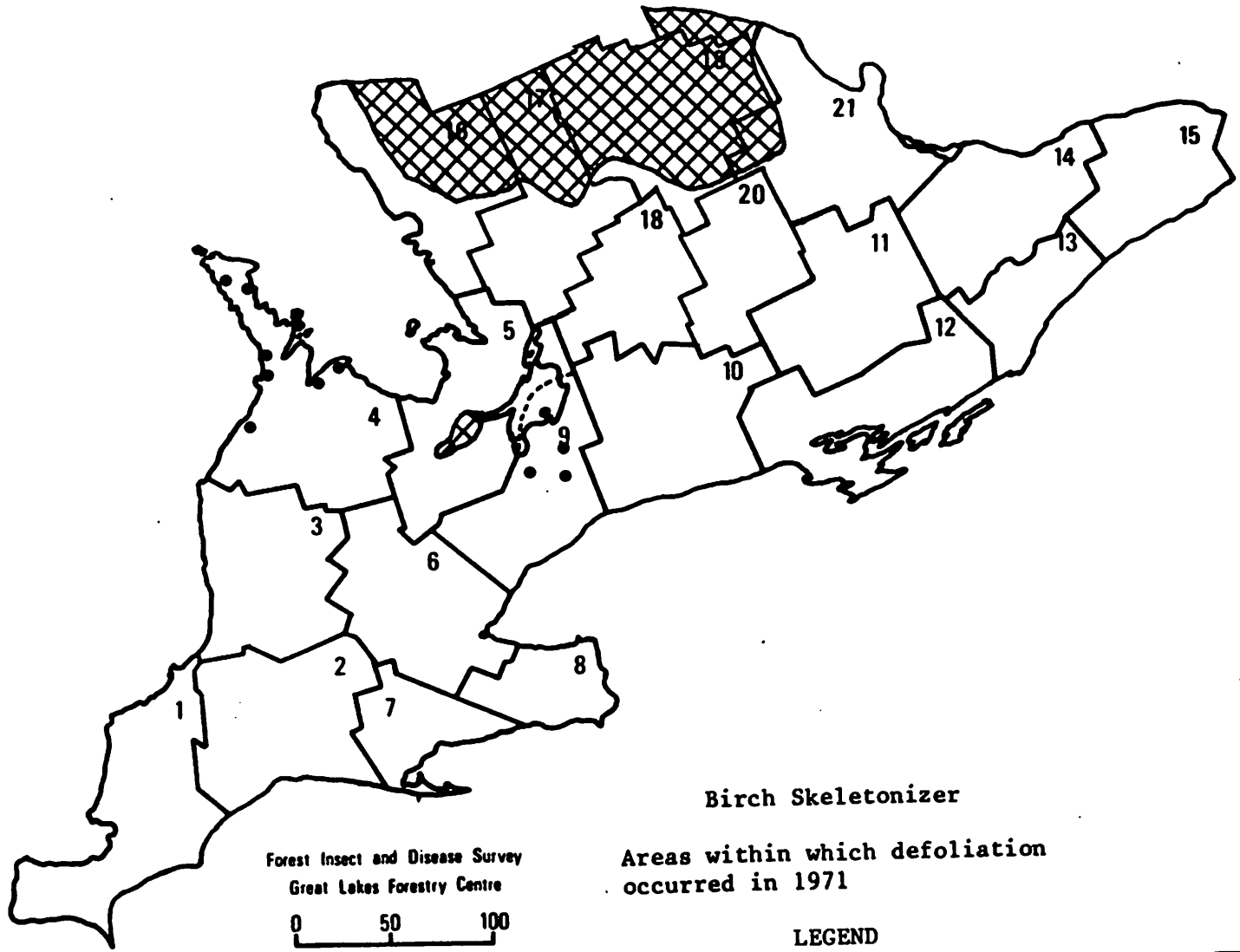
18 MINDEN
19 ALGONQUIN PARK
20 BANCROFT
21 PEMBROKE



Forest Insect and Disease Survey
Great Lakes Forestry Centre

0 50 100
Kilometres

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
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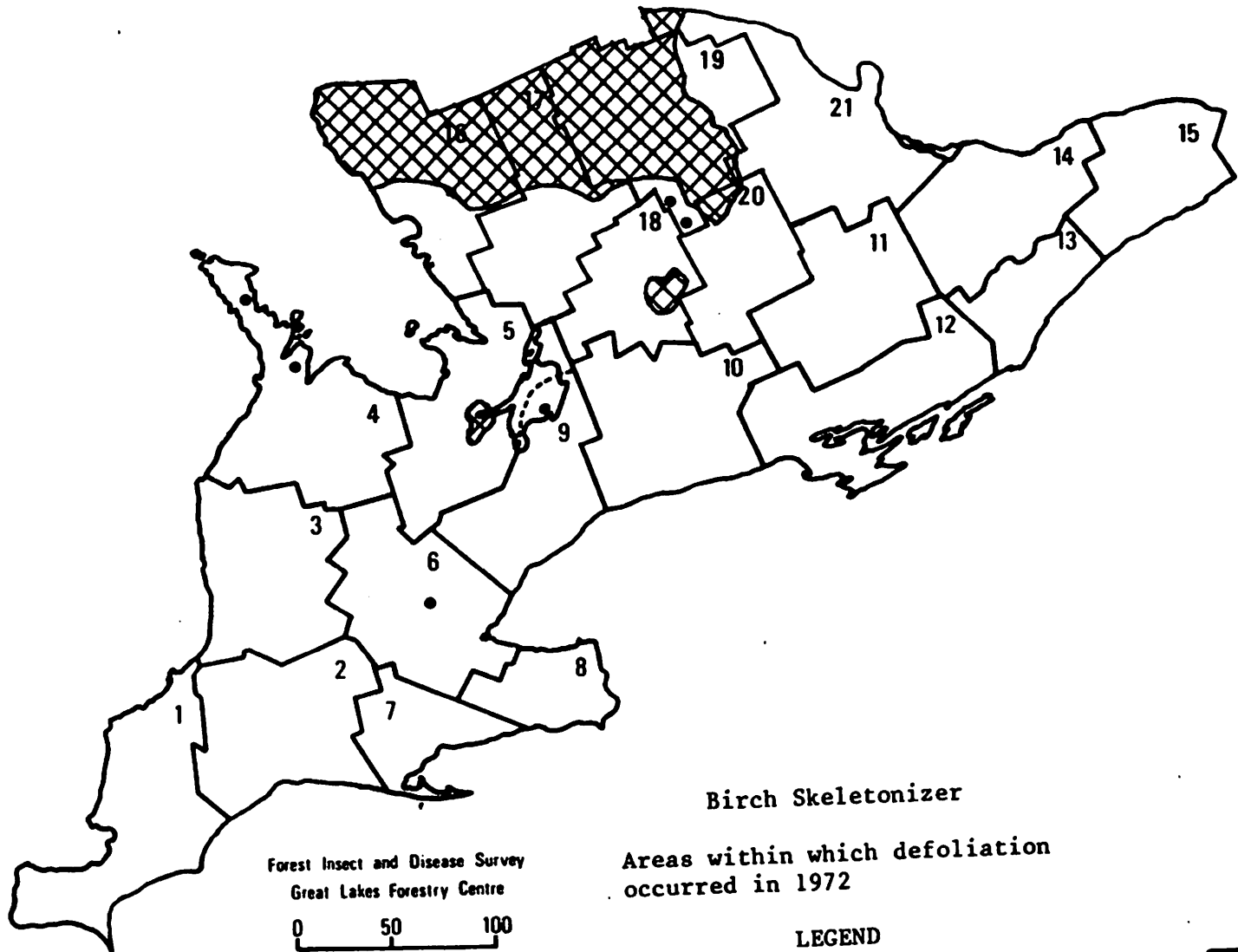

Birch Skeletonizer

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
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18 MINDEN
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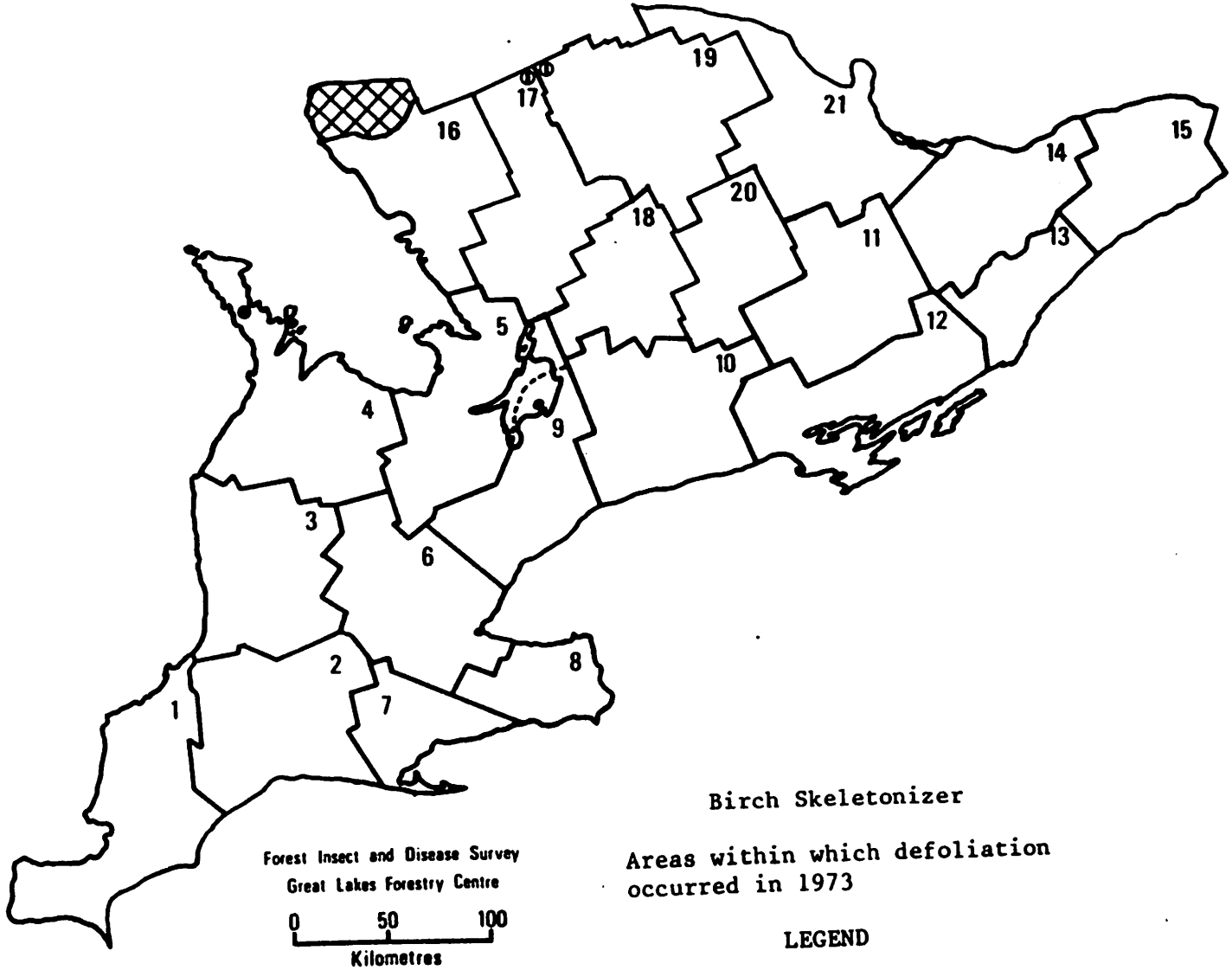
20 BANCROFT
21 PEMBROKE



Forest Insect and Disease Survey
Great Lakes Forestry Centre

0 50 100
Kilometres

Birch Skeletonizer

Areas within which defoliation occurred in 1973

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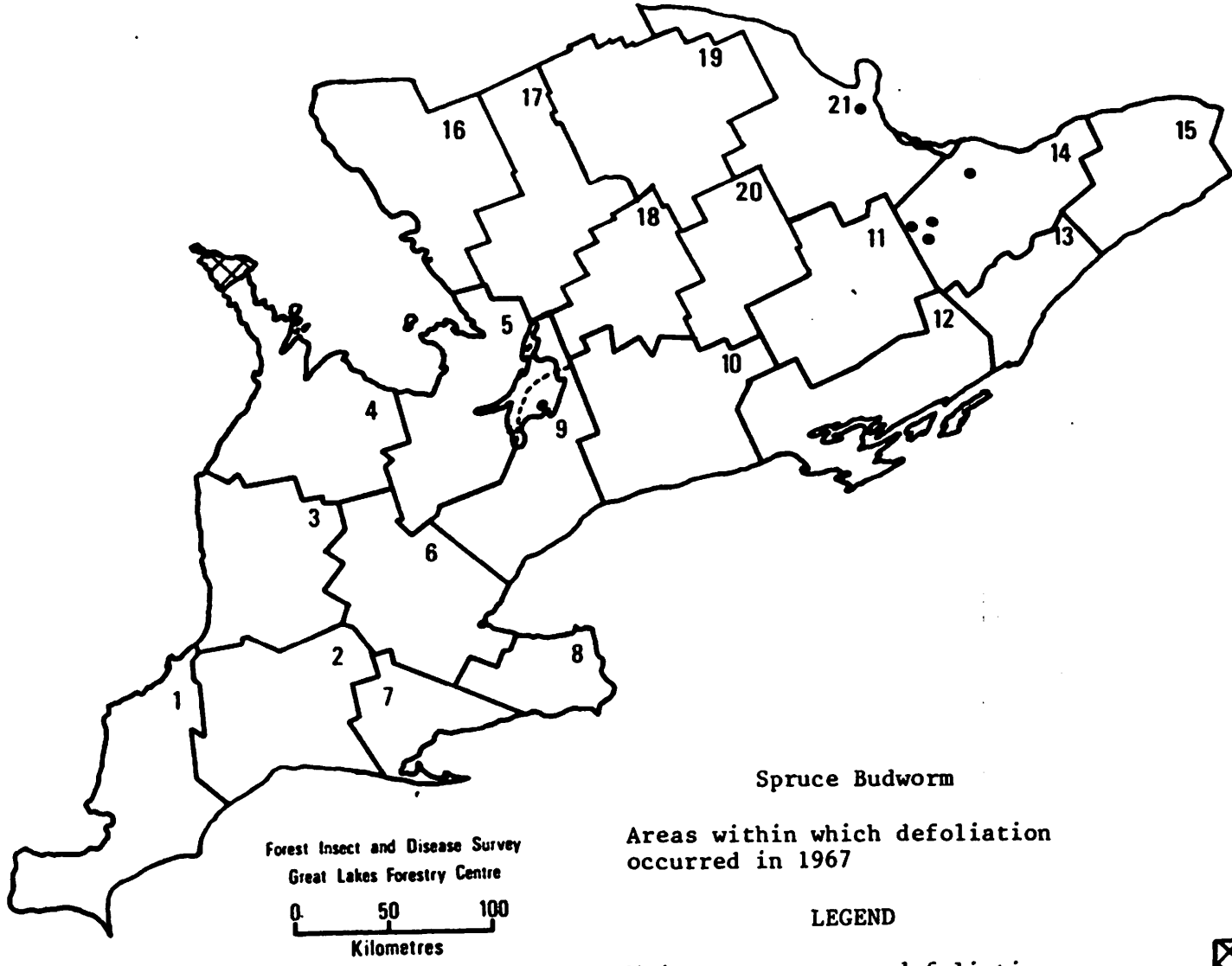
13. BROCKVILLE
14. CARLETON PLACE
15. CORNWALL
16 PARRY SOUND
17 BRACEBRIDGE
18 MINDEN
19 ALGONQUIN PARK
20 BANCROFT
21 PEMBROKE



Spruce Budworm

Areas within which defoliation occurred in 1967

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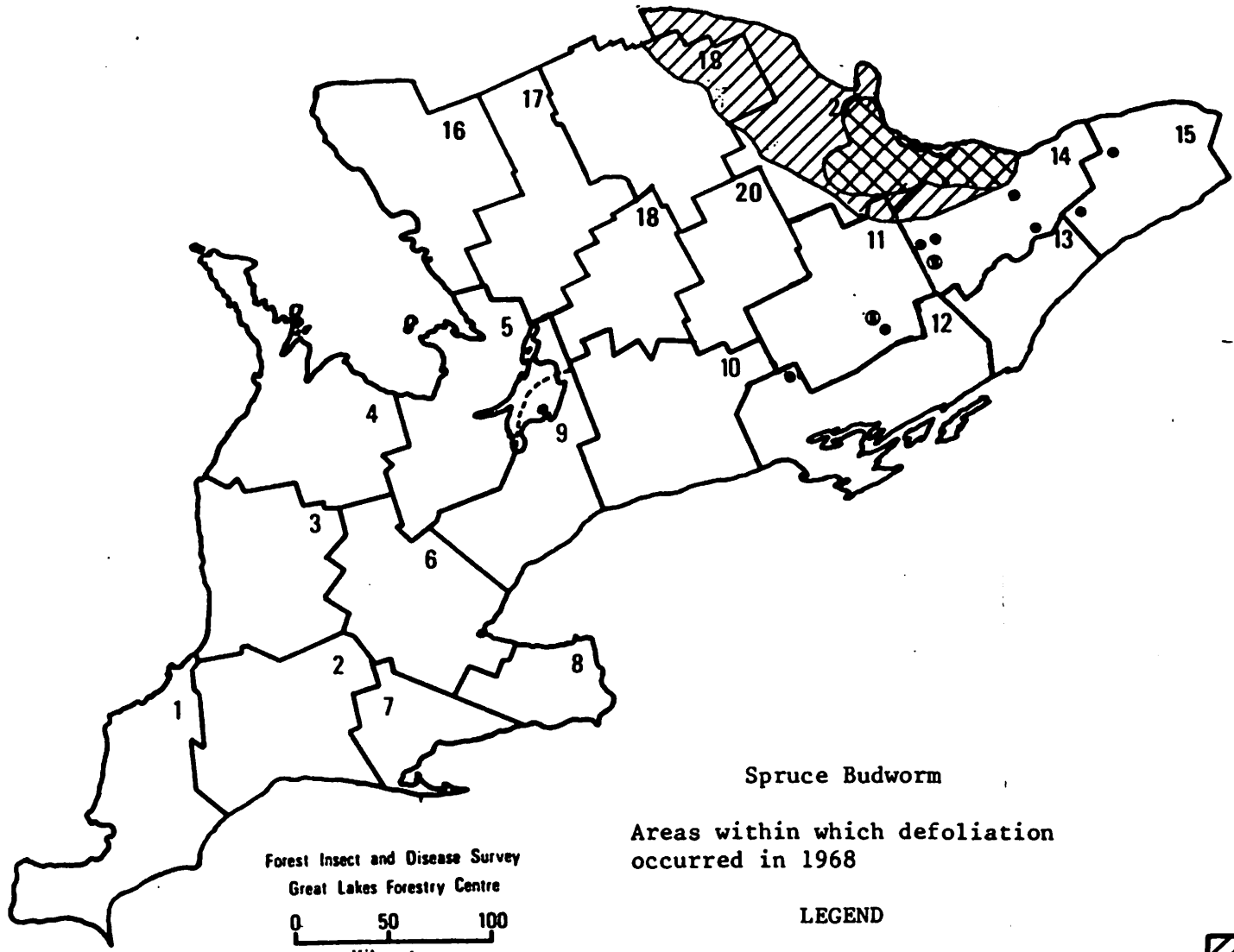
14. CARLETON PLACE
15. CORNWALL
16 PARRY SOUND
17 BRACEBRIDGE
18 MINDEN
19 ALGONQUIN PARK
20 BANCROFT
21 PEMBROKE



Spruce Budworm

Areas within which defoliation occurred in 1968

LEGEND

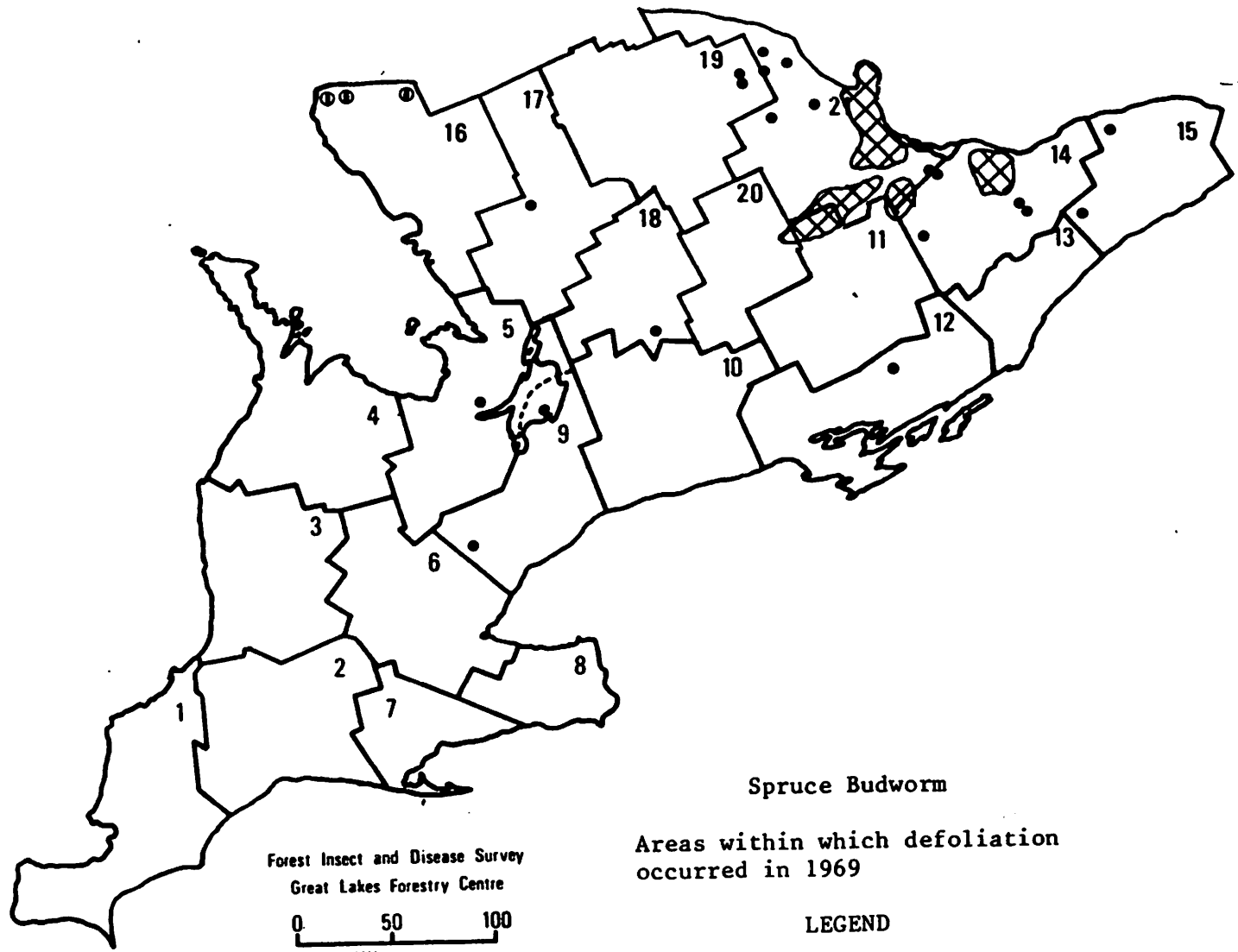
Light defoliation • or

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 • or

SOUTHERN ONTARIO

DISTRICTS

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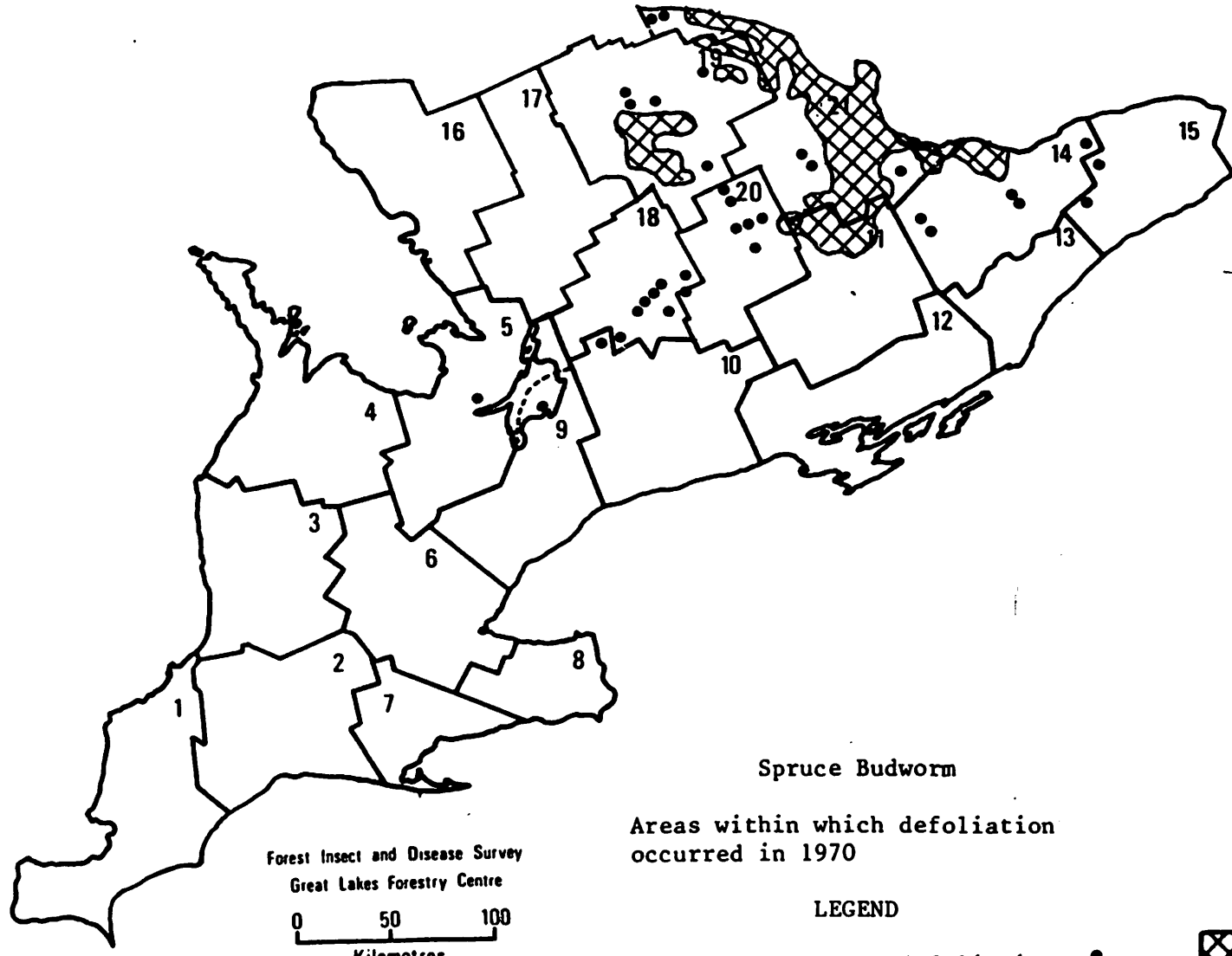
13. BROCKVILLE
14. CARLETON PLACE
15. CORNWALL
16 PARRY SOUND
17 BRACEBRIDGE
18 MINDEN
19 ALGONQUIN PARK
20 BANCROFT
21 PEMBROKE



Spruce Budworm

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
8. NIAGARA
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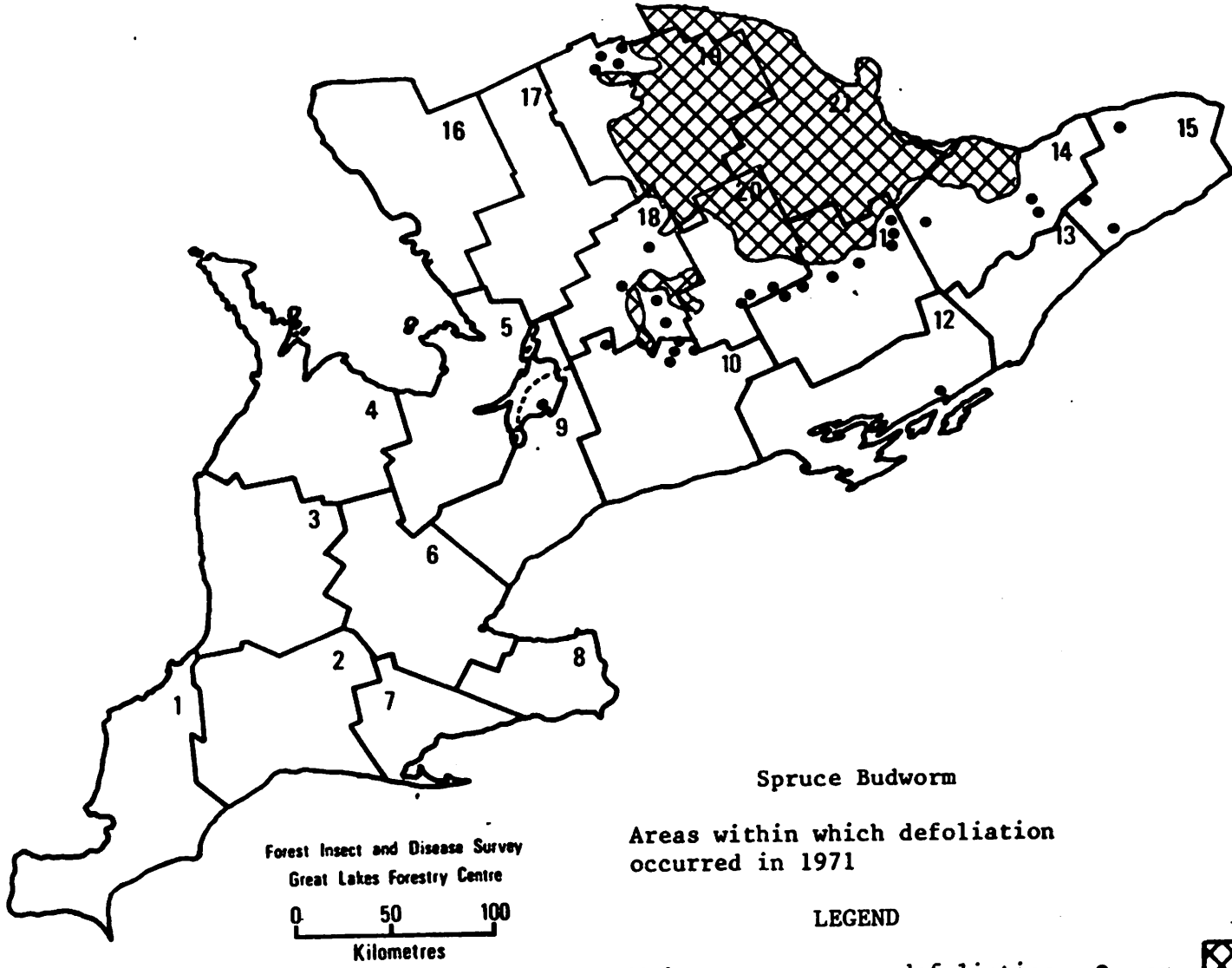
17 BRACEBRIDGE
18 MINDEN
19 ALGONQUIN PARK
20 BANCROFT
21 PEMBROKE



Spruce Budworm

Areas within which defoliation occurred in 1971

LEGEND

Moderate-to-severe defoliation • or

SOUTHERN ONTARIO

DISTRICTS

1. CHATHAM
2. AYLMER
3. WINGHAM
4. OWEN SOUND
5. HURONIA
6. CAMBRIDGE
7. SIMCOE
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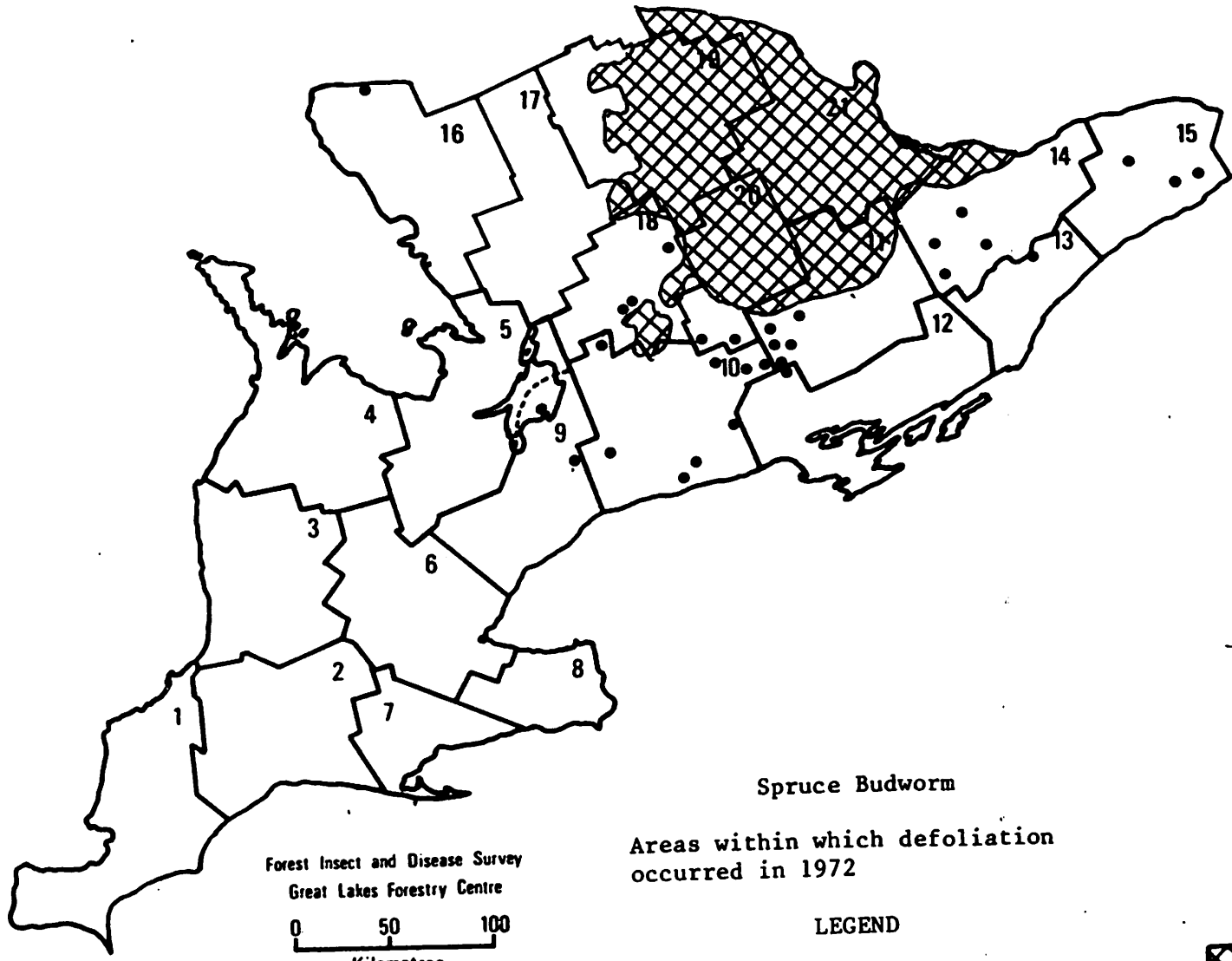
21 PEMBROKE



Spruce Budworm

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
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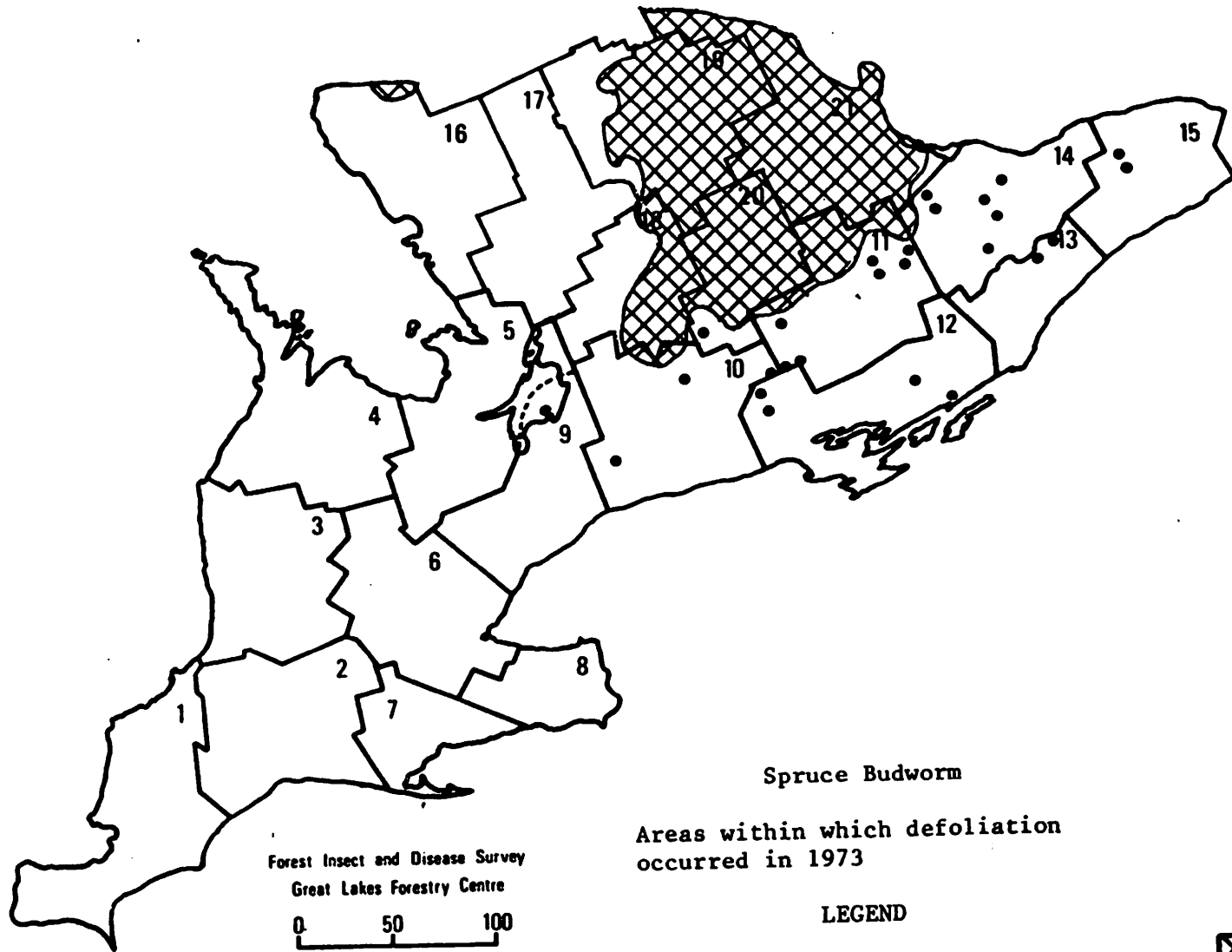

Spruce Budworm

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
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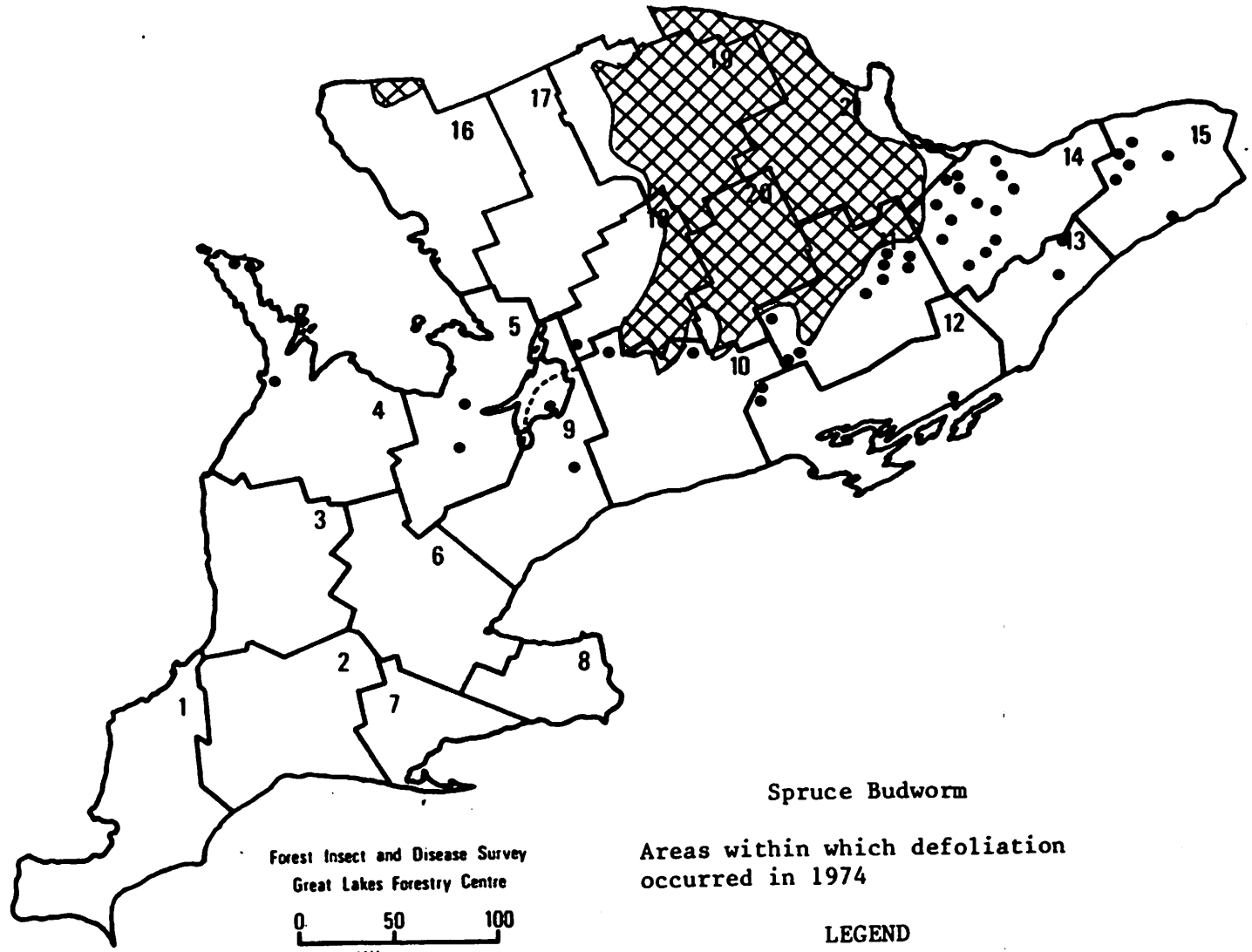
17 BRACEBRIDGE
18 MINDEN
19 ALGONQUIN PARK
20 BANCROFT
21 PEMBROKE



Spruce Budworm

Areas within which defoliation occurred in 1974

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
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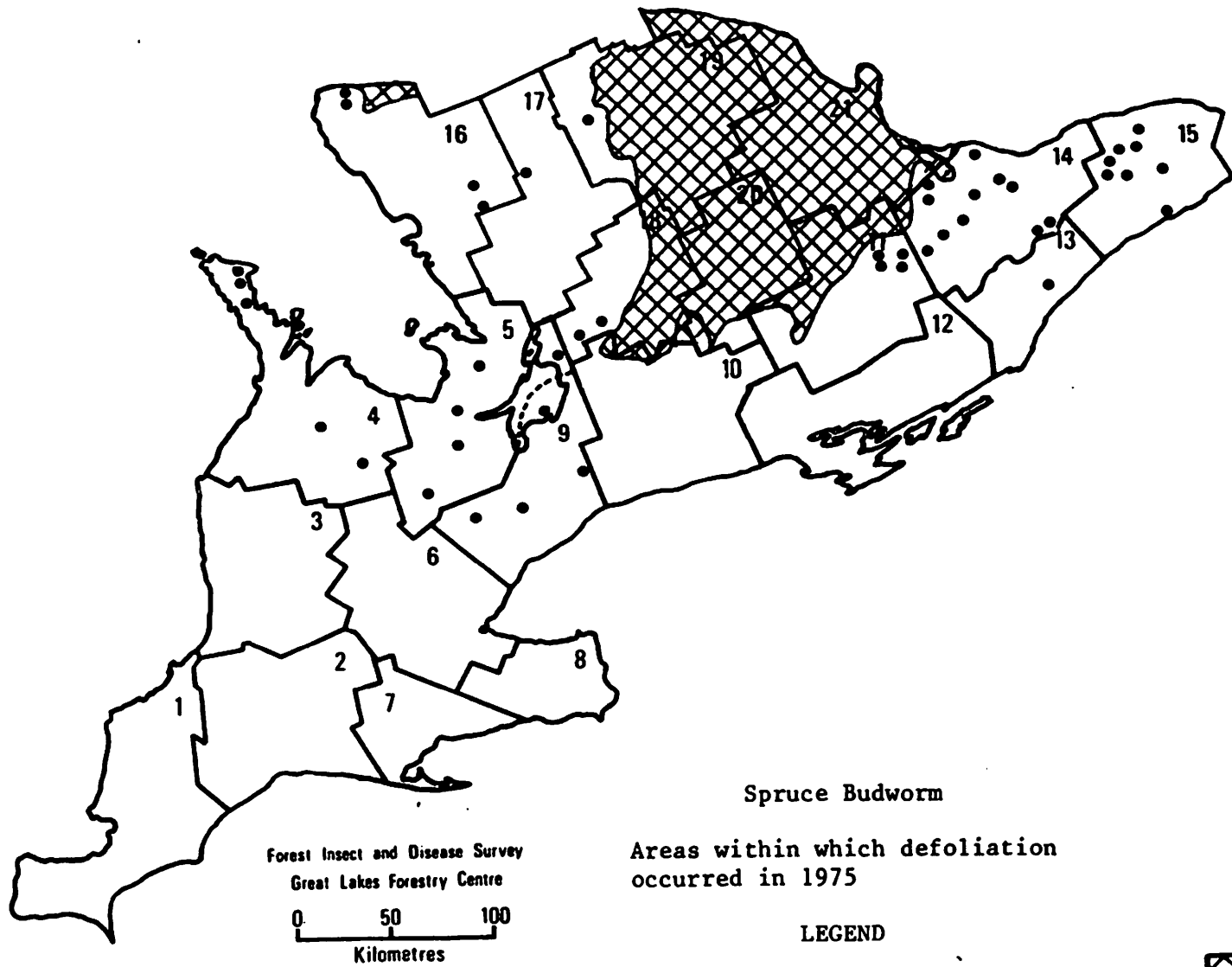
17 BRACEBRIDGE
18 MINDEN
19 ALGONQUIN PARK
20 BANCROFT
21 PEMBROKE



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
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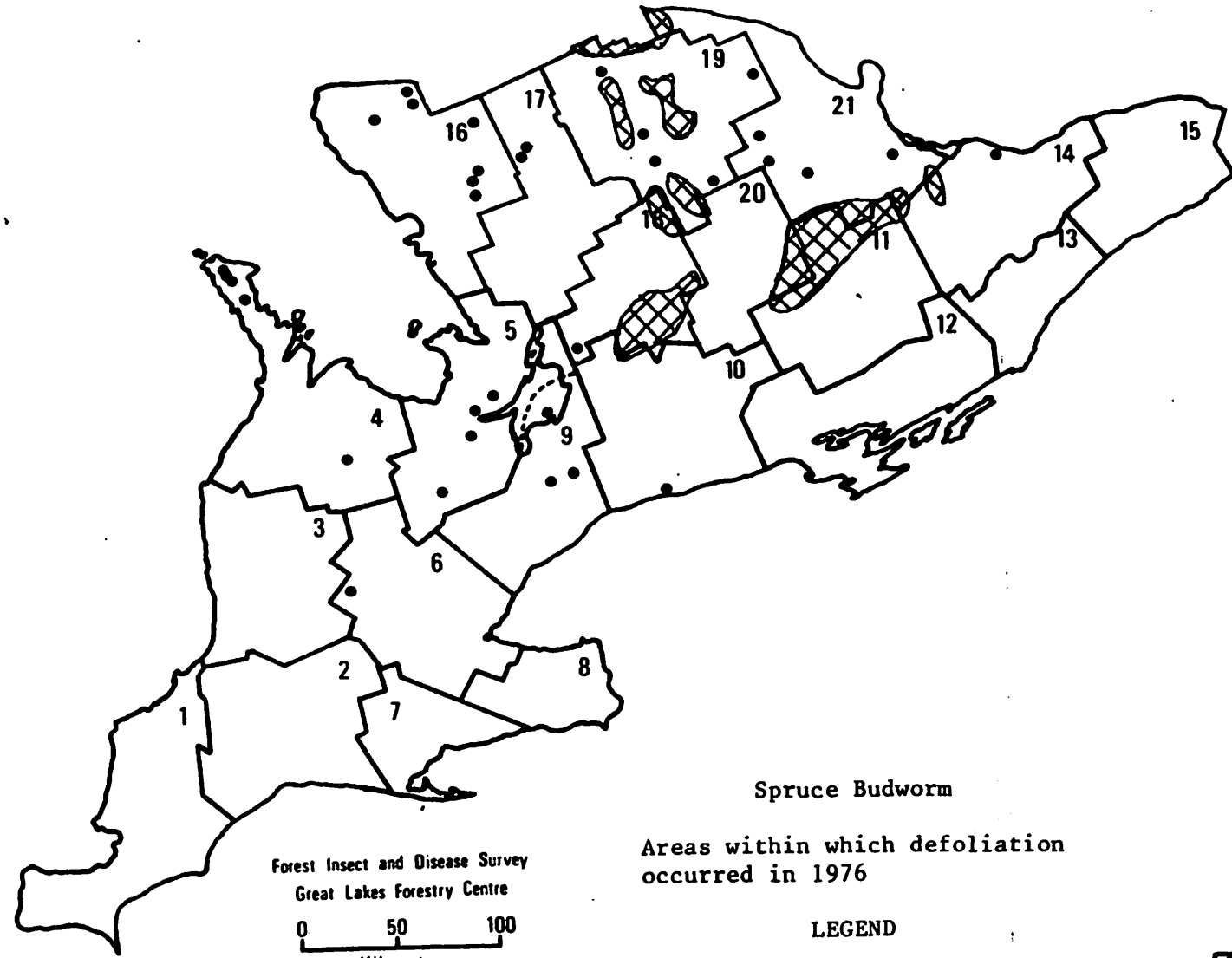
17 BRACEBRIDGE
18 MINDEN
19 ALGONQUIN PARK
20 BANCROFT
21 PEMBROKE



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
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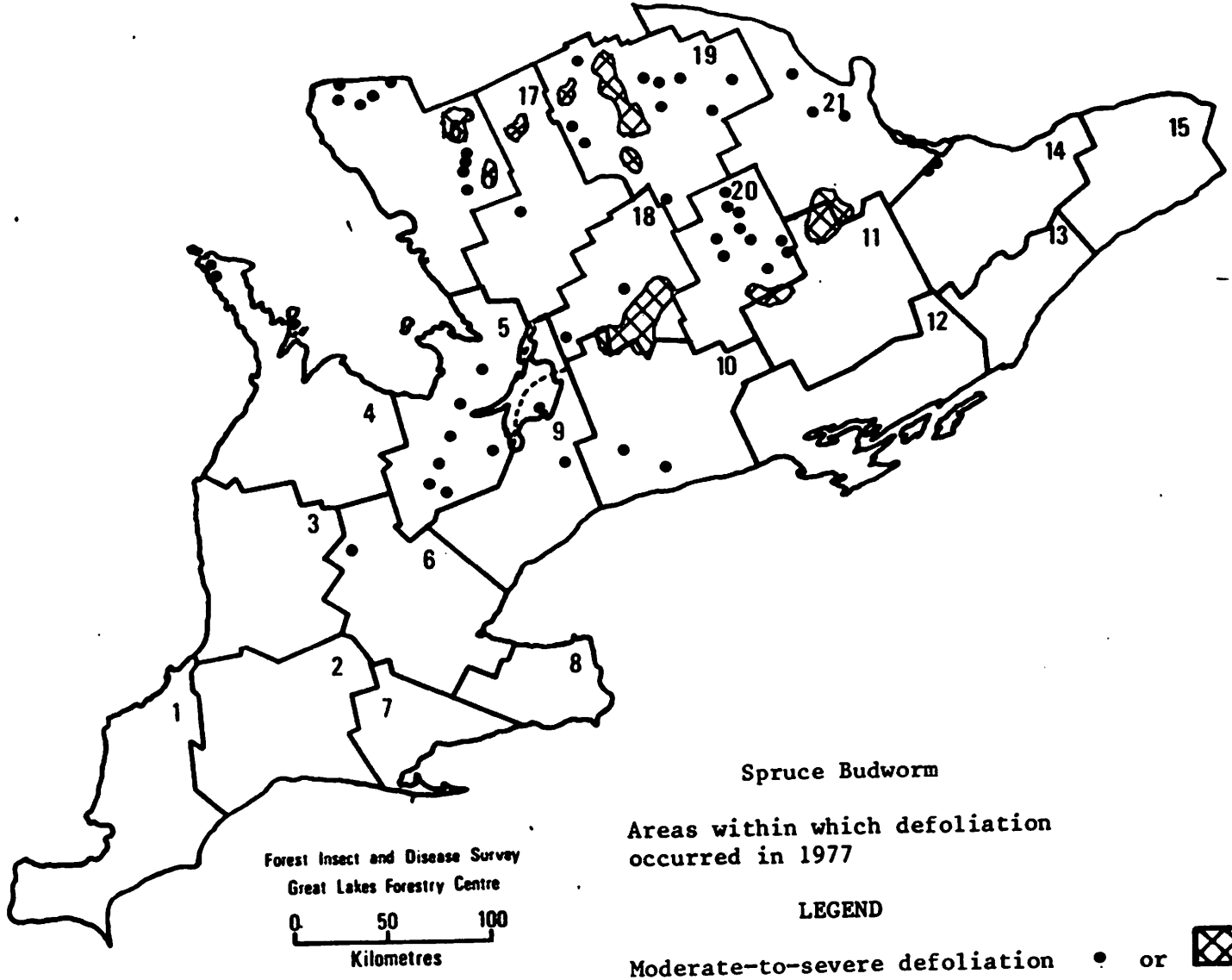
18 MINDEN
19 ALGONQUIN PARK
20 BANCROFT
21 PEMBROKE



Spruce Budworm

Areas within which defoliation occurred in 1977

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
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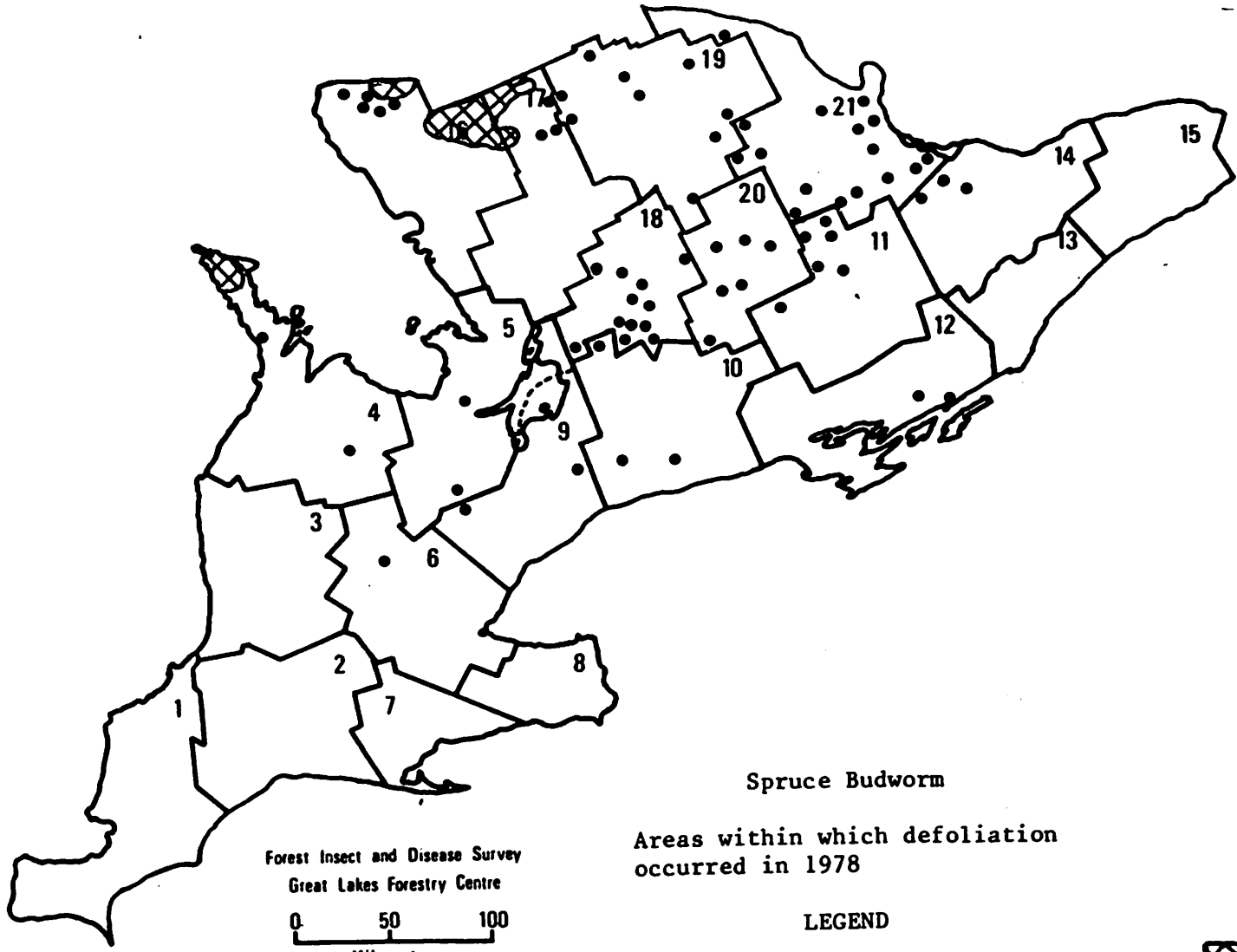

Forest Insect and Disease Survey
Great Lakes Forestry Centre

0 50 100
Kilometres

Spruce Budworm

Areas within which defoliation occurred in 1978

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
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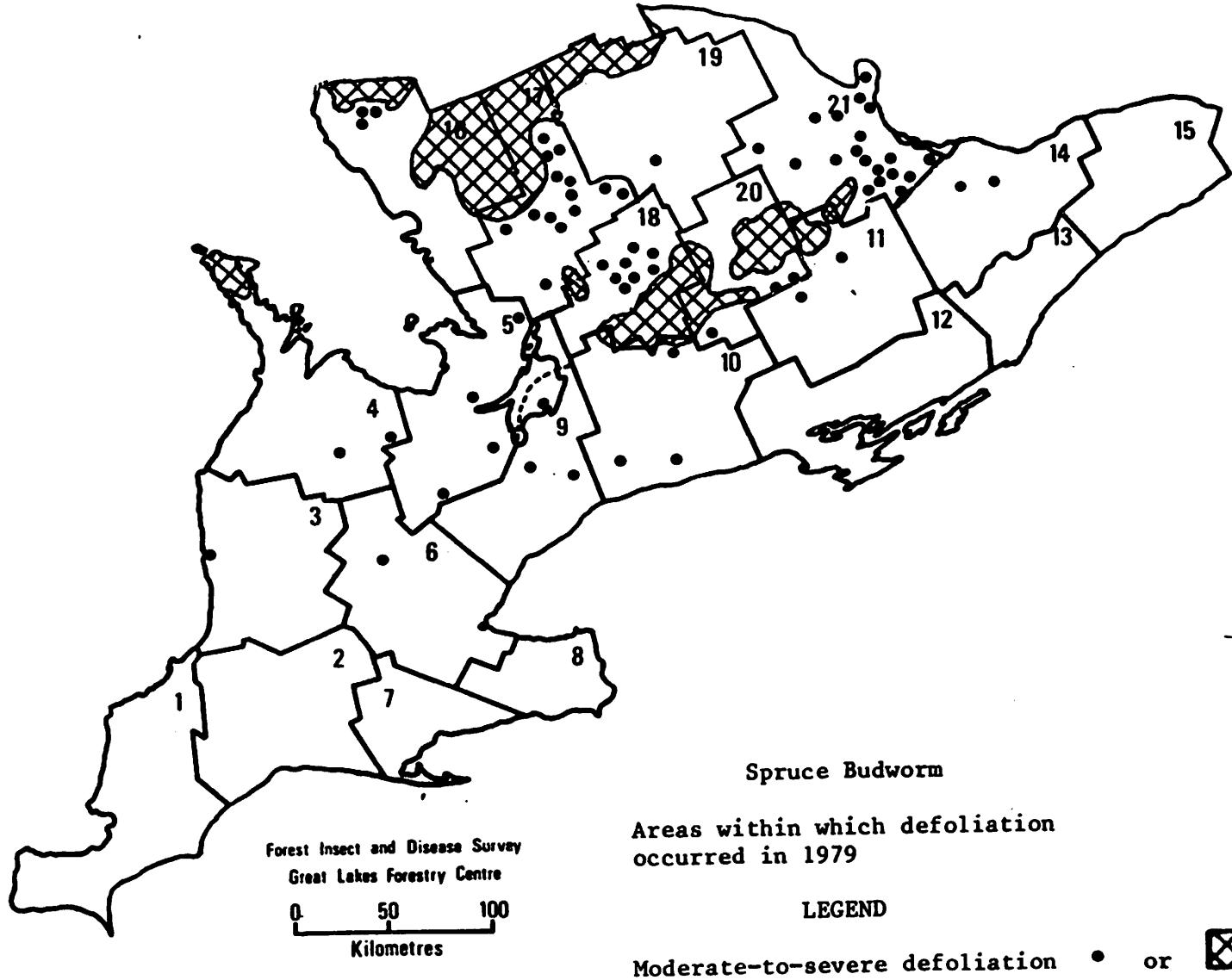

Spruce Budworm

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
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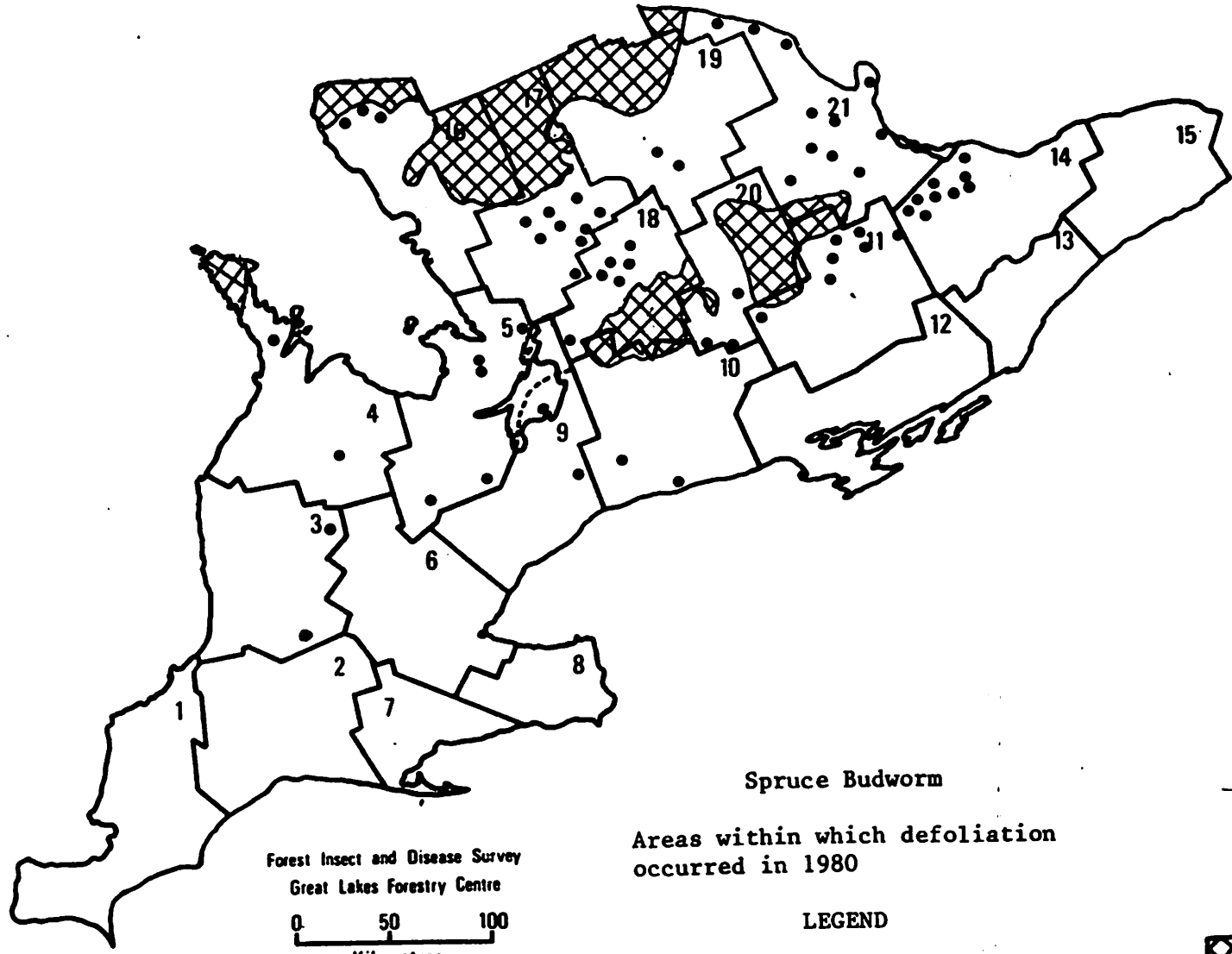
21 PEMBROKE



Spruce Budworm

Areas within which defoliation occurred in 1980

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
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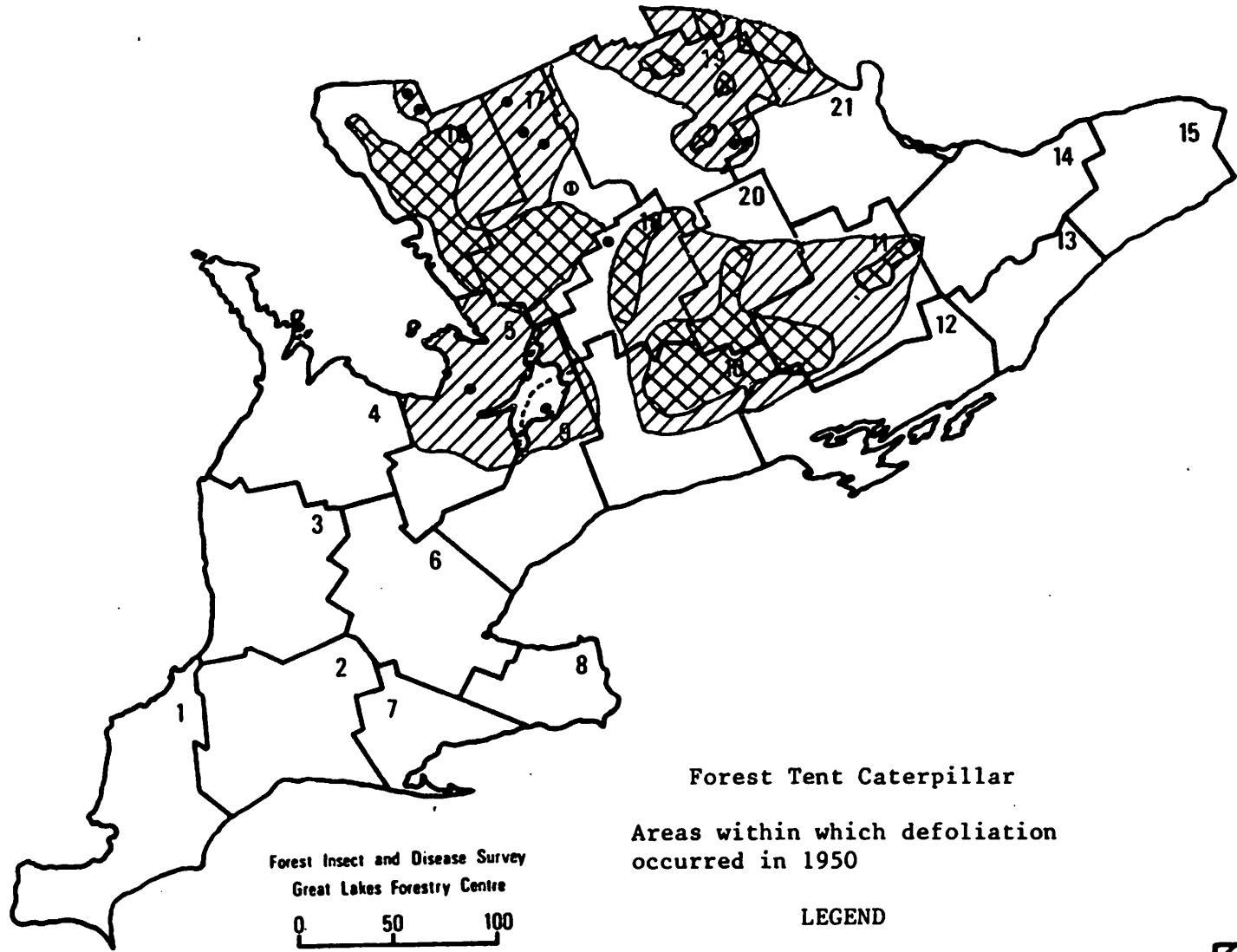
15. CORNWALL
16 PARRY SOUND
17 BRACEBRIDGE
18 MINDEN
19 ALGONQUIN PARK
20 BANCROFT
21 PEMBROKE



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
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18 MINDEN
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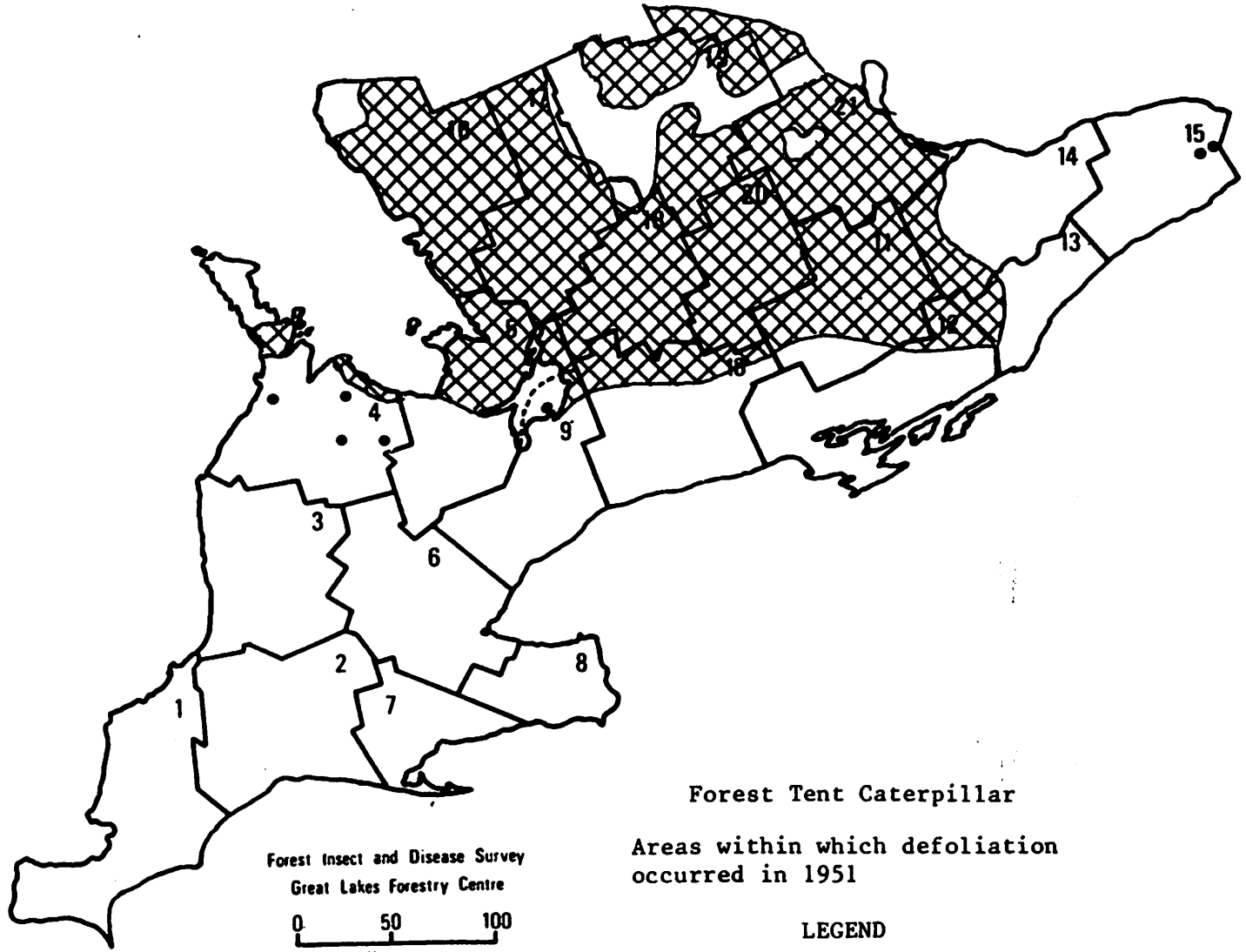
20 BANCROFT
21 PEMBROKE



Forest Tent Caterpillar

Areas within which defoliation occurred in 1951

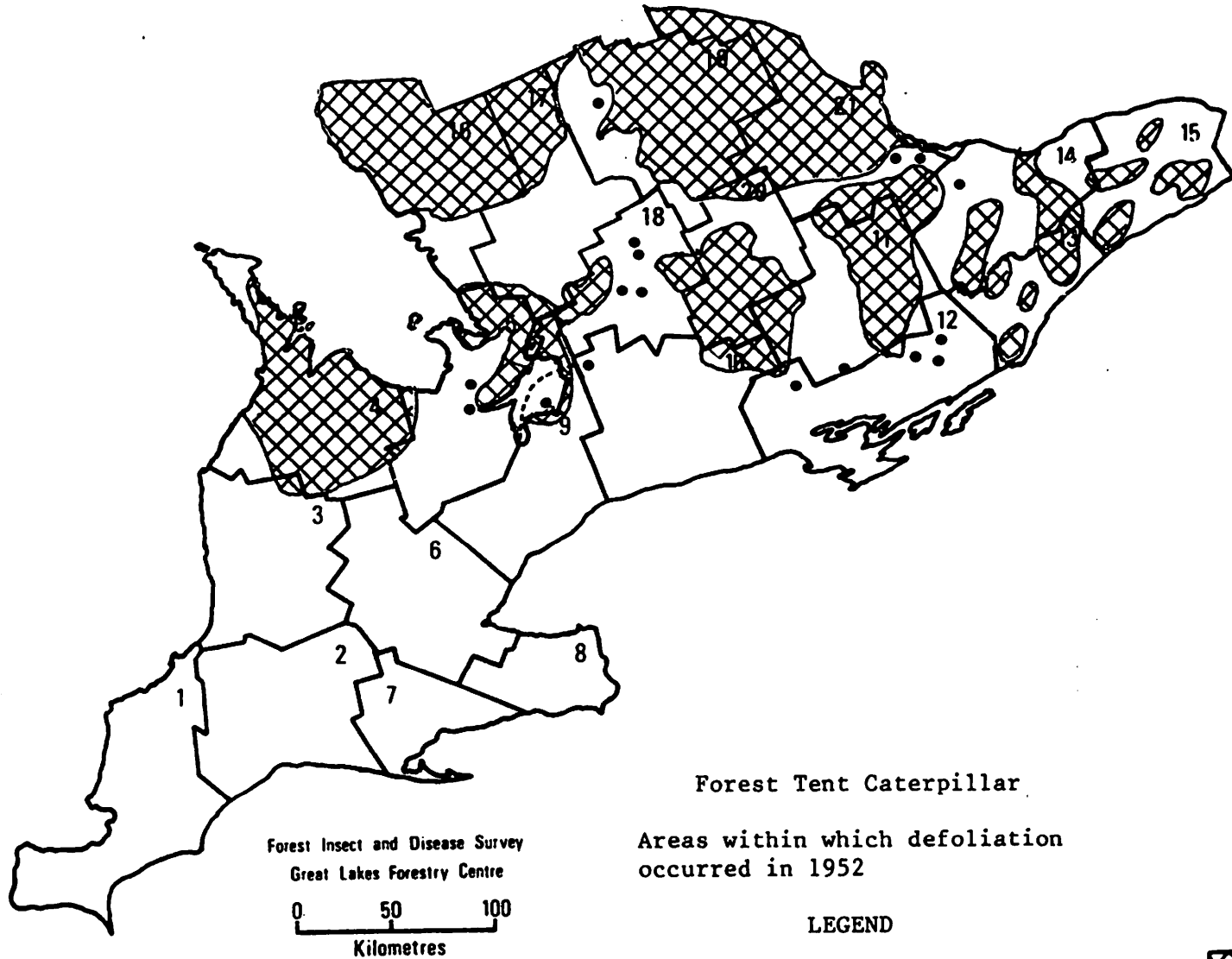
LEGEND

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



Forest Tent Caterpillar

Areas within which defoliation occurred in 1952

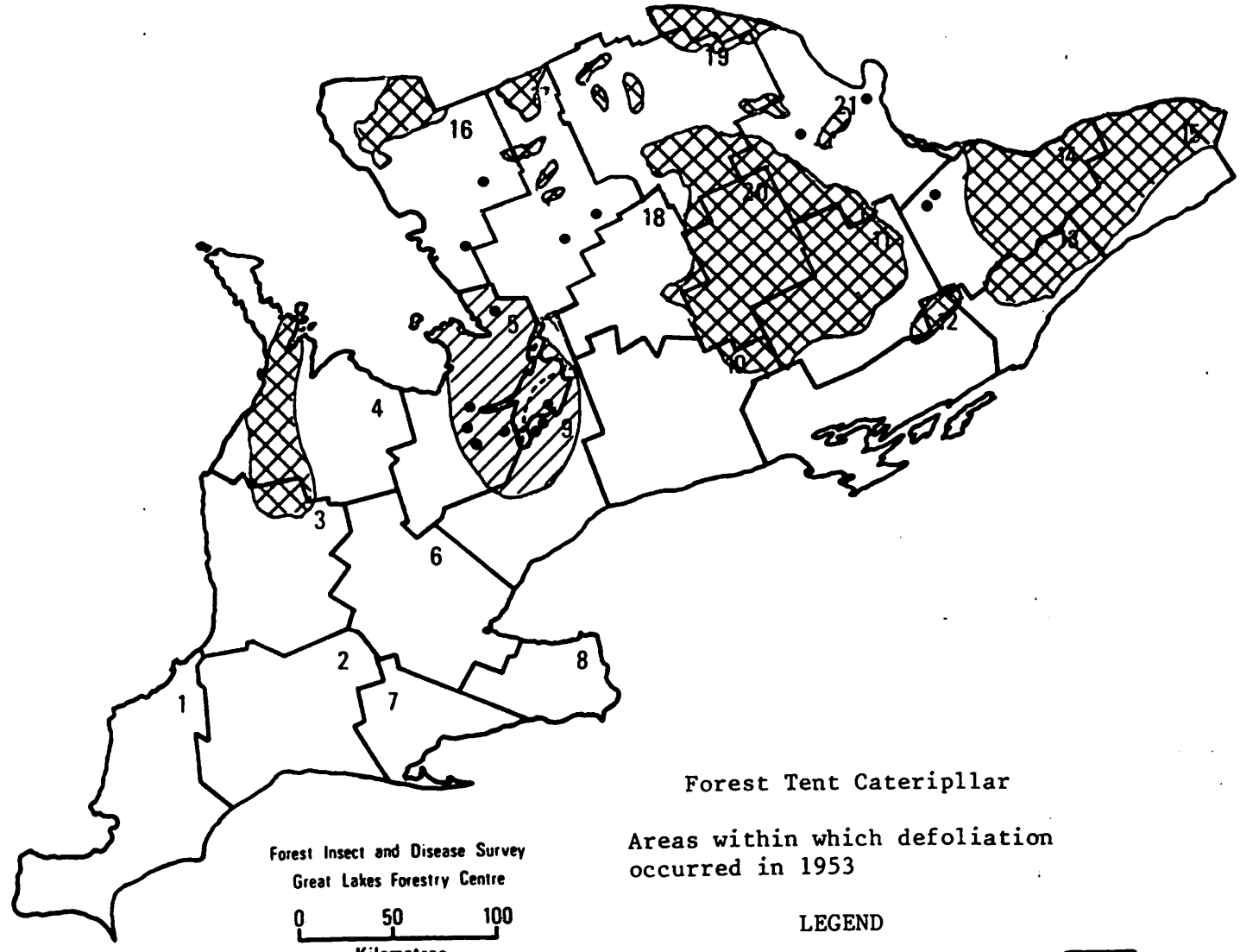
LEGEND

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



Forest Tent Caterpillar

Areas within which defoliation occurred in 1953

LEGEND

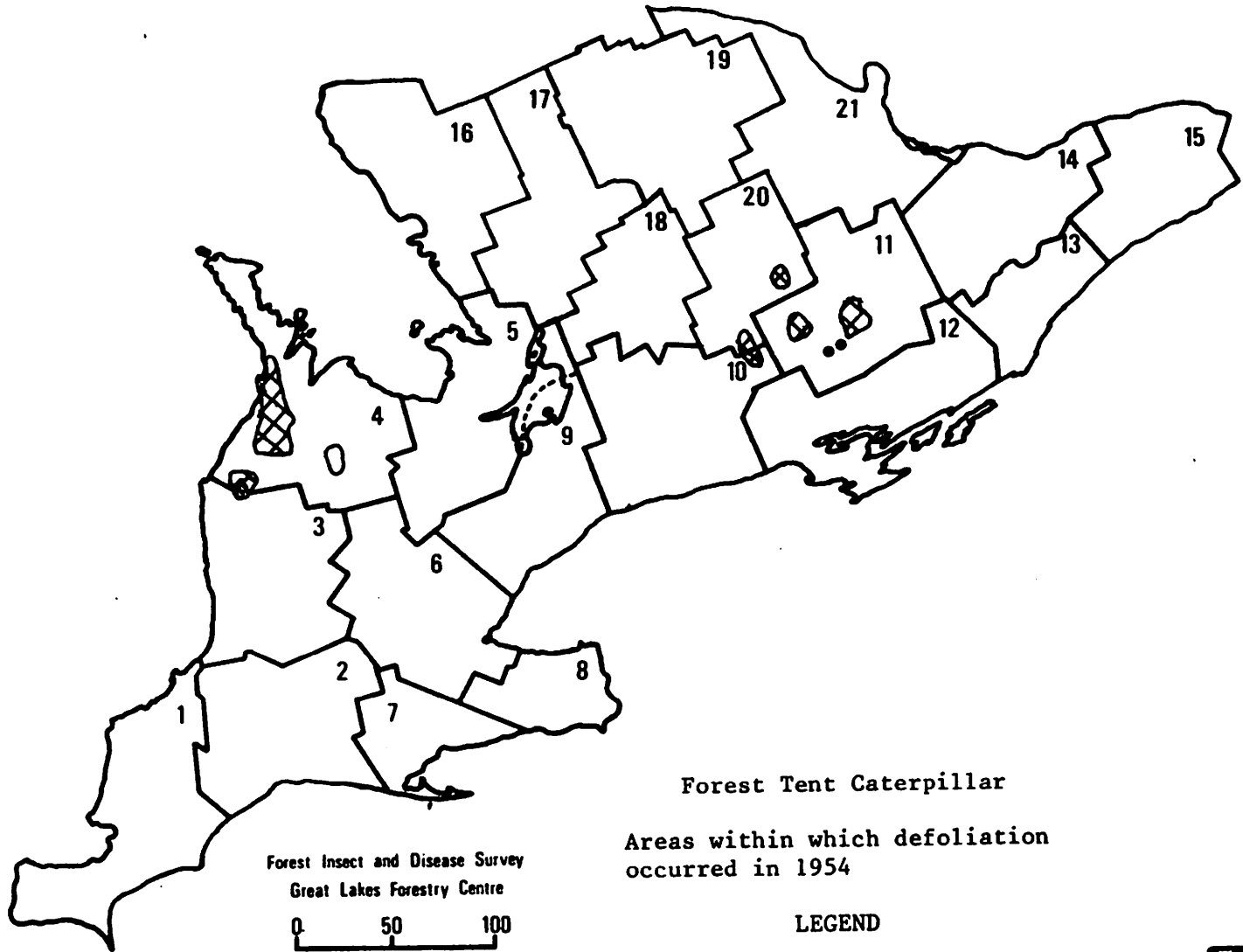
Light defoliation

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



Forest Tent Caterpillar

Areas within which defoliation occurred in 1954

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
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13. BROCKVILLE
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16 PARRY SOUND
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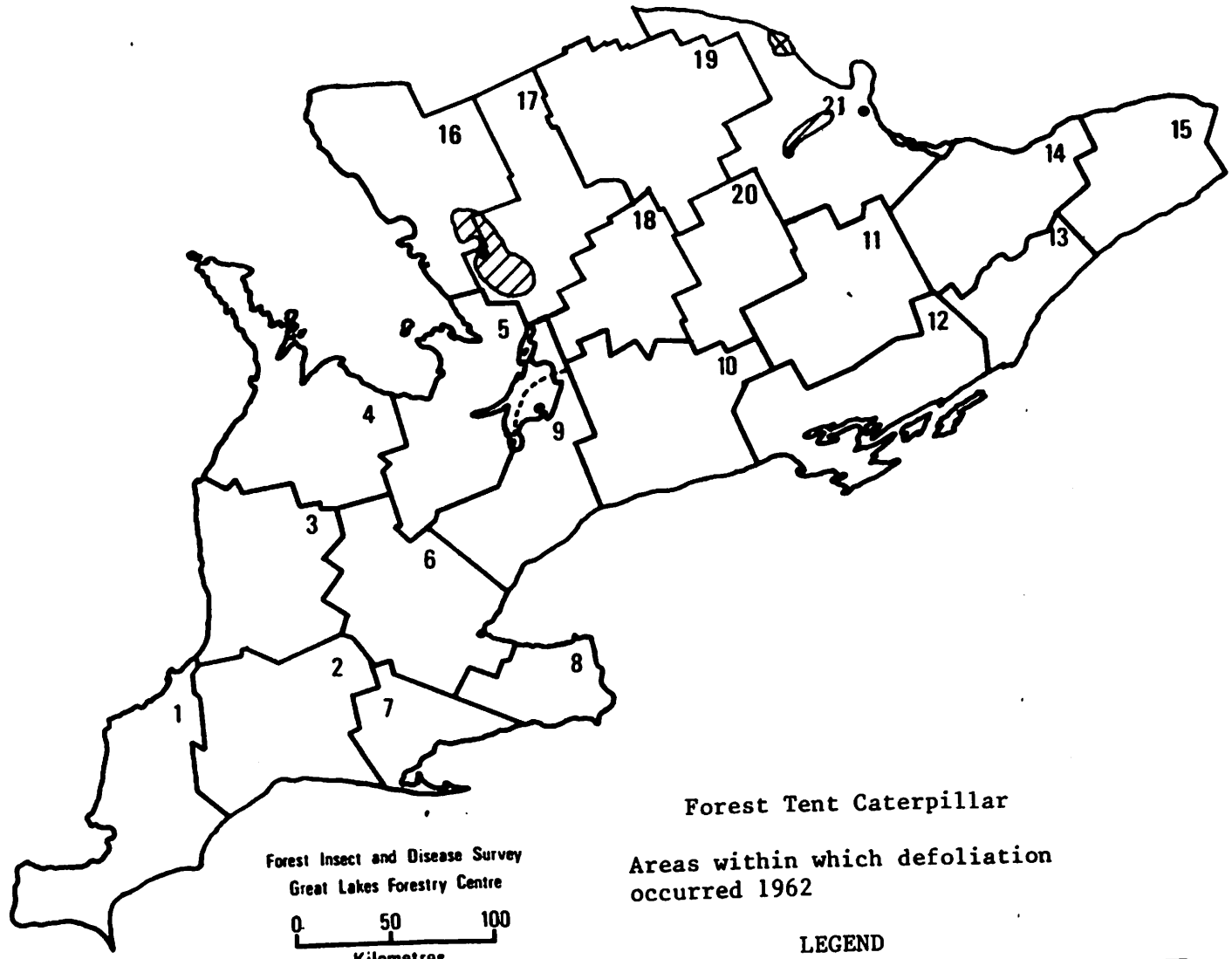
18 MINDEN
19 ALGONQUIN PARK
20 BANCROFT
21 PEMBROKE



Forest Tent Caterpillar

Areas within which defoliation occurred 1962

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
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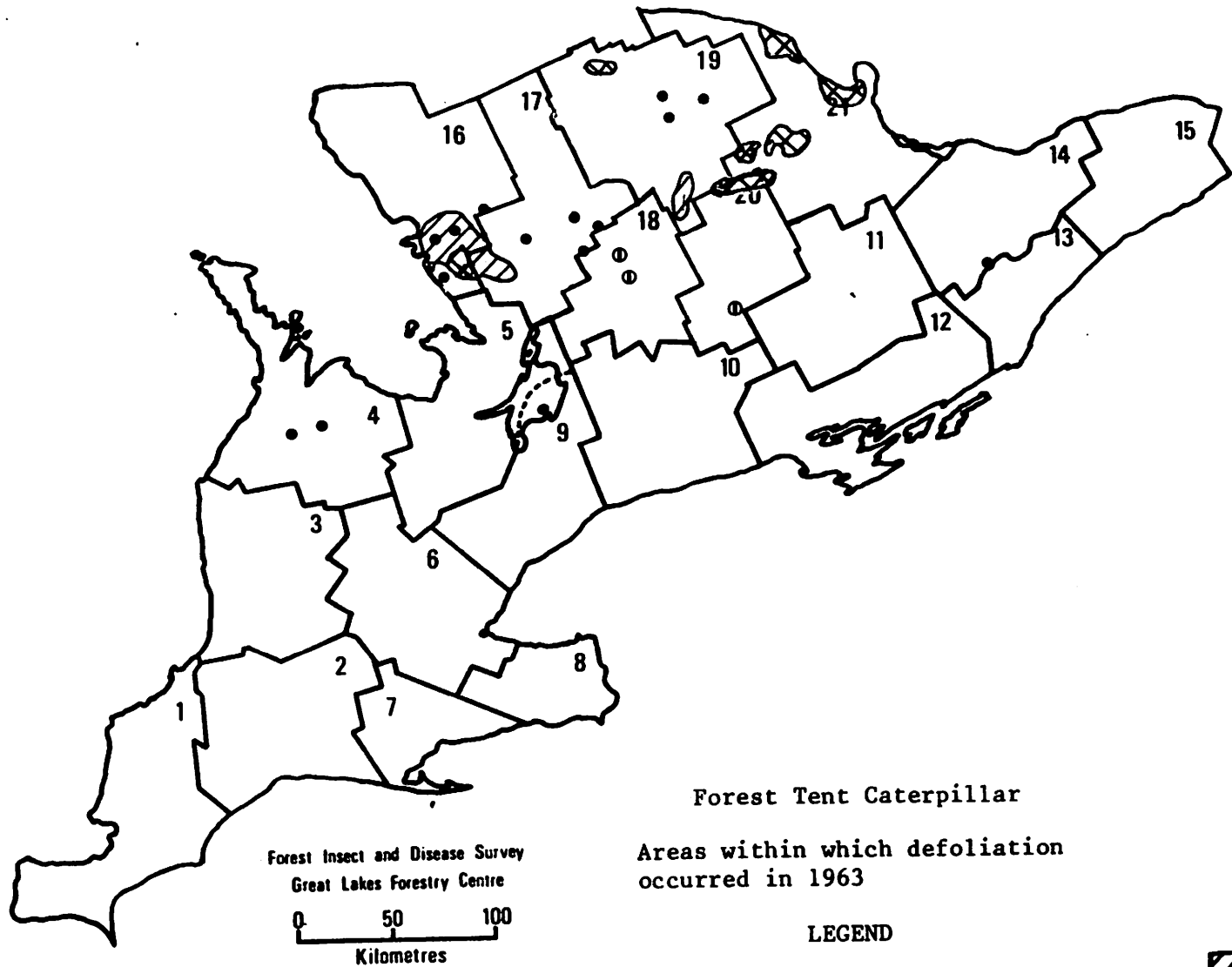

Forest Tent Caterpillar

Areas within which defoliation occurred in 1963

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
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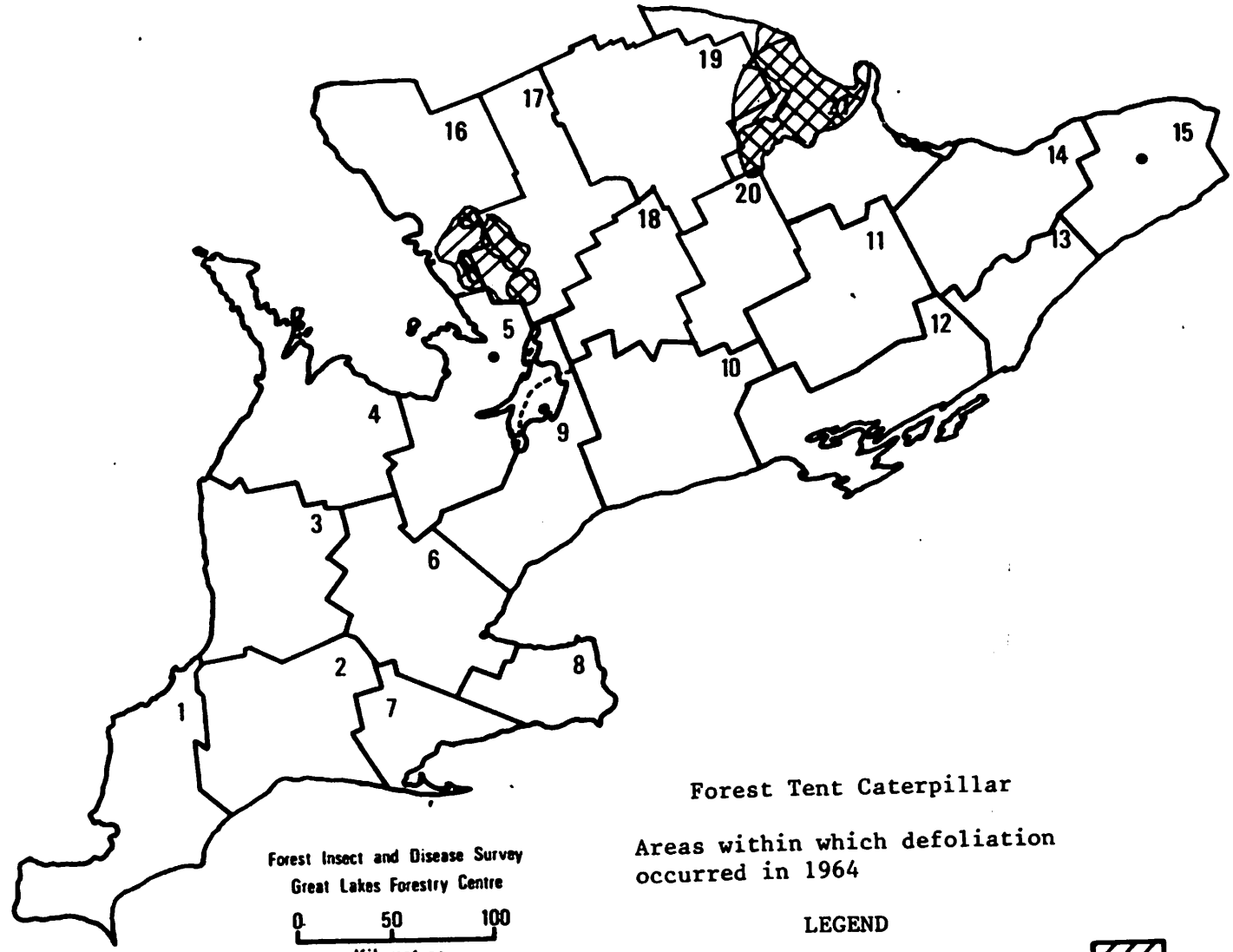

Forest Insect and Disease Survey
Great Lakes Forestry Centre

0 50 100
Kilometres

Forest Tent Caterpillar

Areas within which defoliation occurred in 1964

LEGEND

Light defoliation

Mode [illegible] severe defoliation • or

SOUTHERN ONTARIO

DISTRICTS

1. CHATHAM
2. AYLMER
3. WINGHAM
4. OWEN SOUND
5. HURONIA
6. CAMBRIDGE
7. SIMCOE
8. NIAGARA
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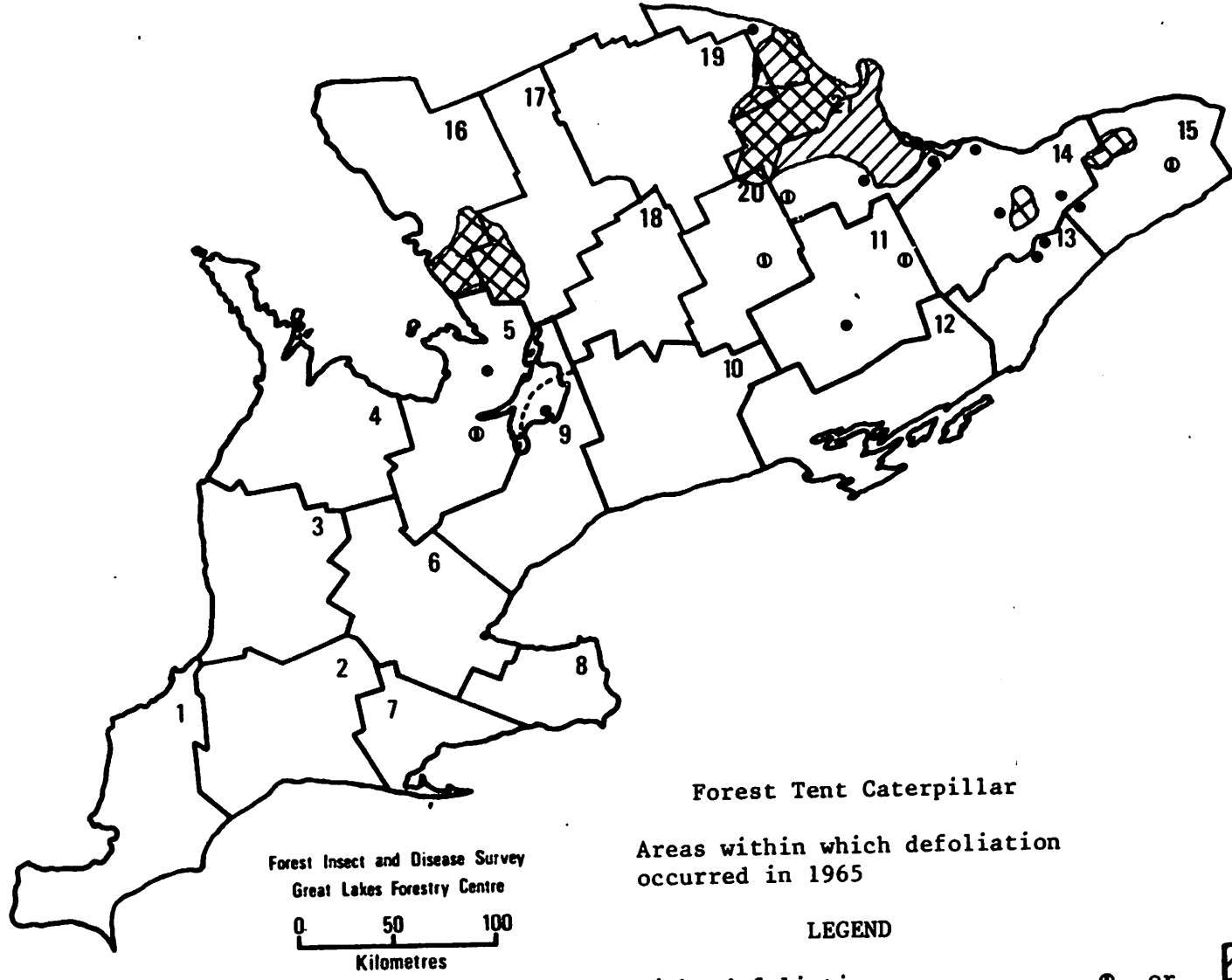

Forest Tent Caterpillar

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
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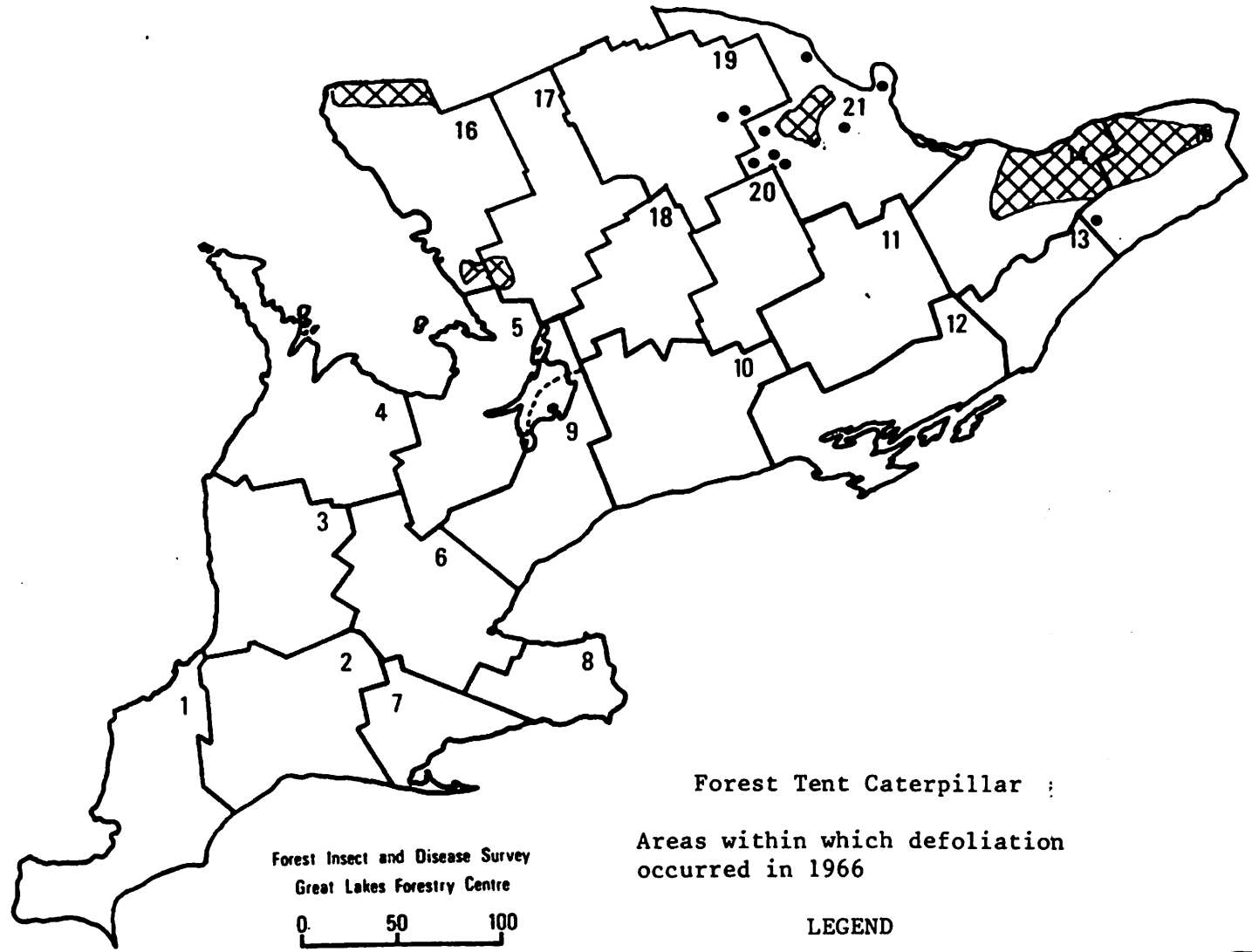

SOUTHERN ONTARIO

DISTRICTS

1. CHATHAM
2. AYLMER
3. WINGHAM
4. OWEN SOUND
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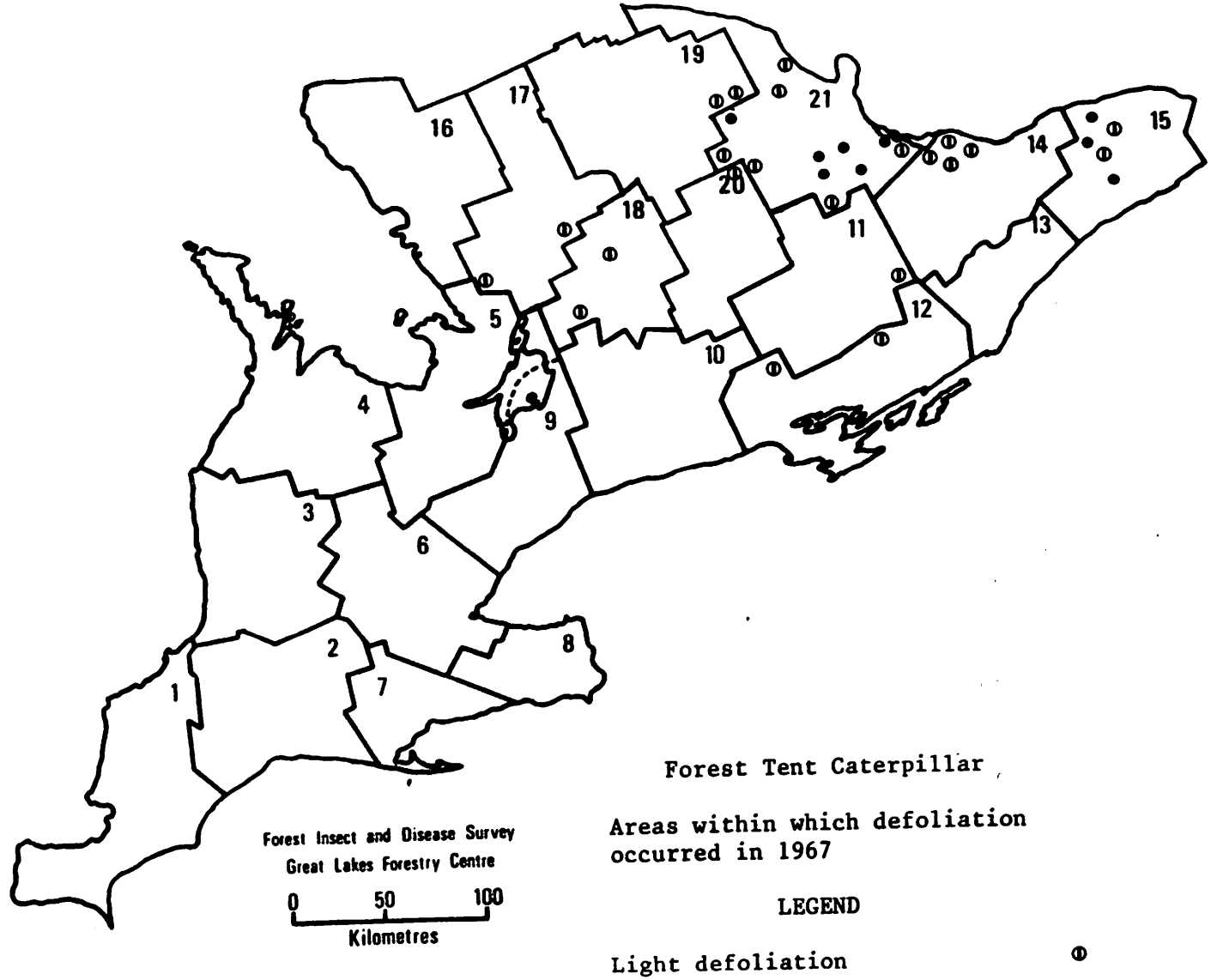

Forest Tent Caterpillar

Areas within which defoliation occurred in 1967

LEGEND

Light defoliation ⊕

Moderate-to-severe defoliation •

SOUTHERN ONTARIO

DISTRICTS

1. CHATHAM
2. AYLMER
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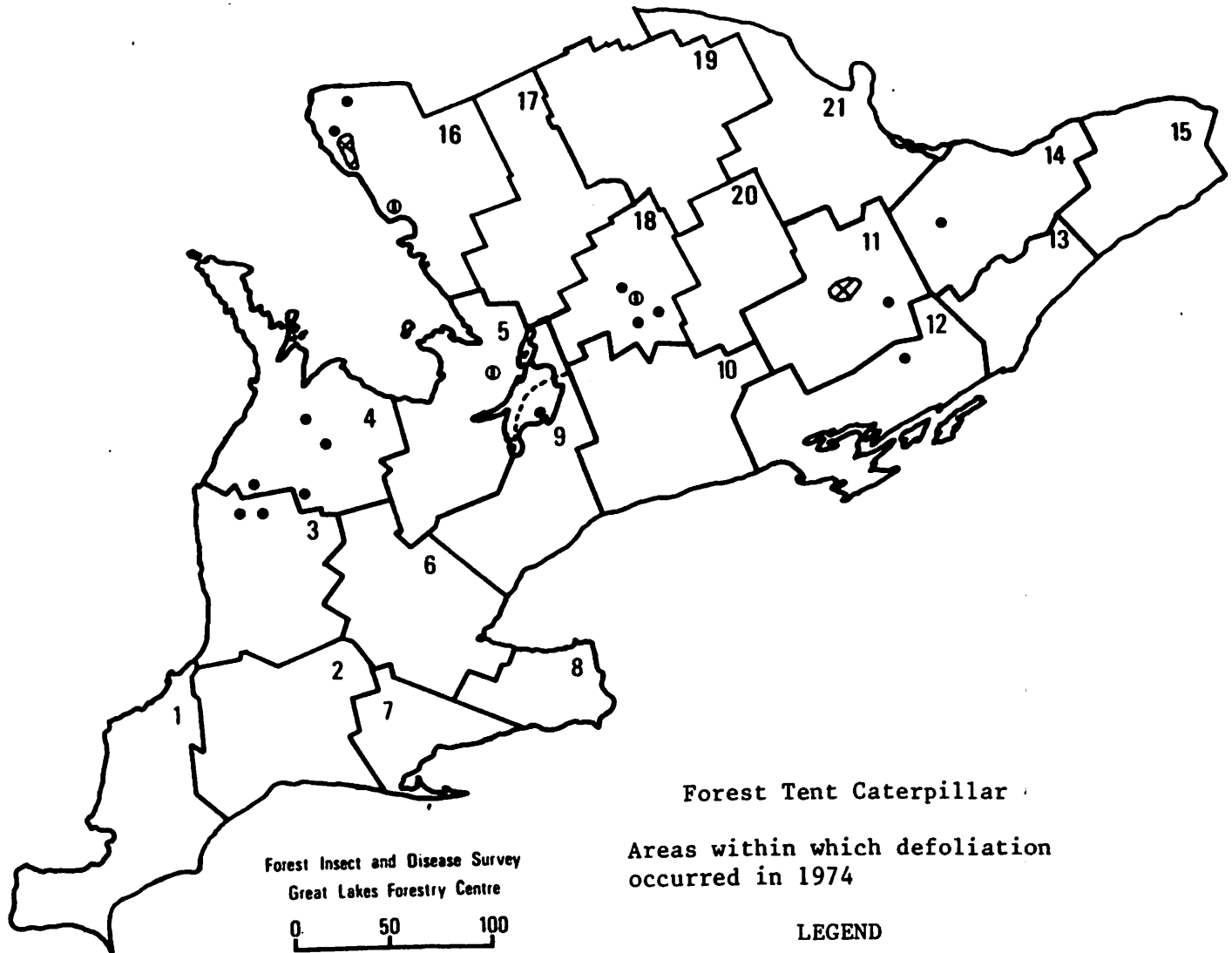

Forest Tent Caterpillar

Areas within which defoliation occurred in 1974

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
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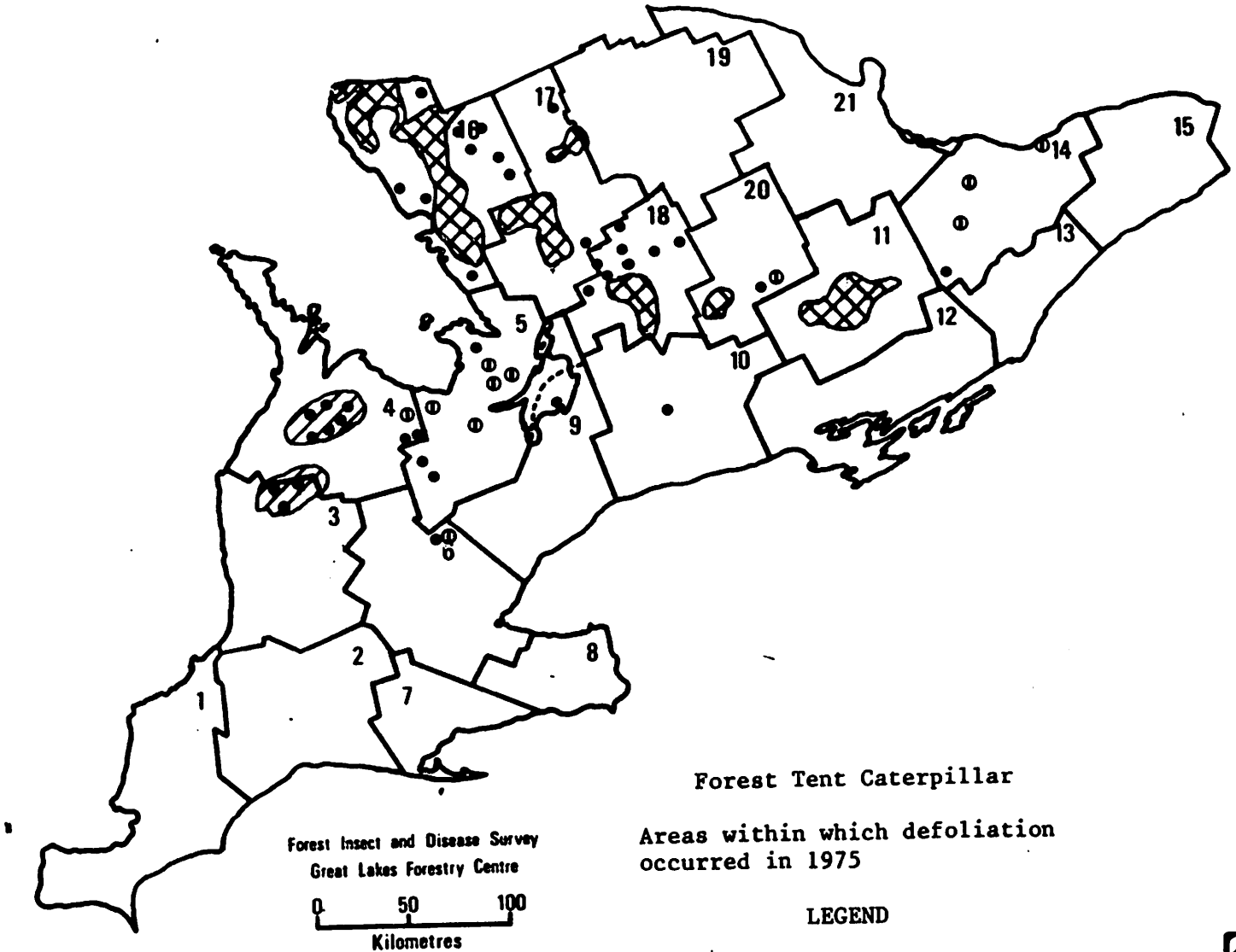

Forest Tent Caterpillar

Areas within which defoliation occurred in 1975

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
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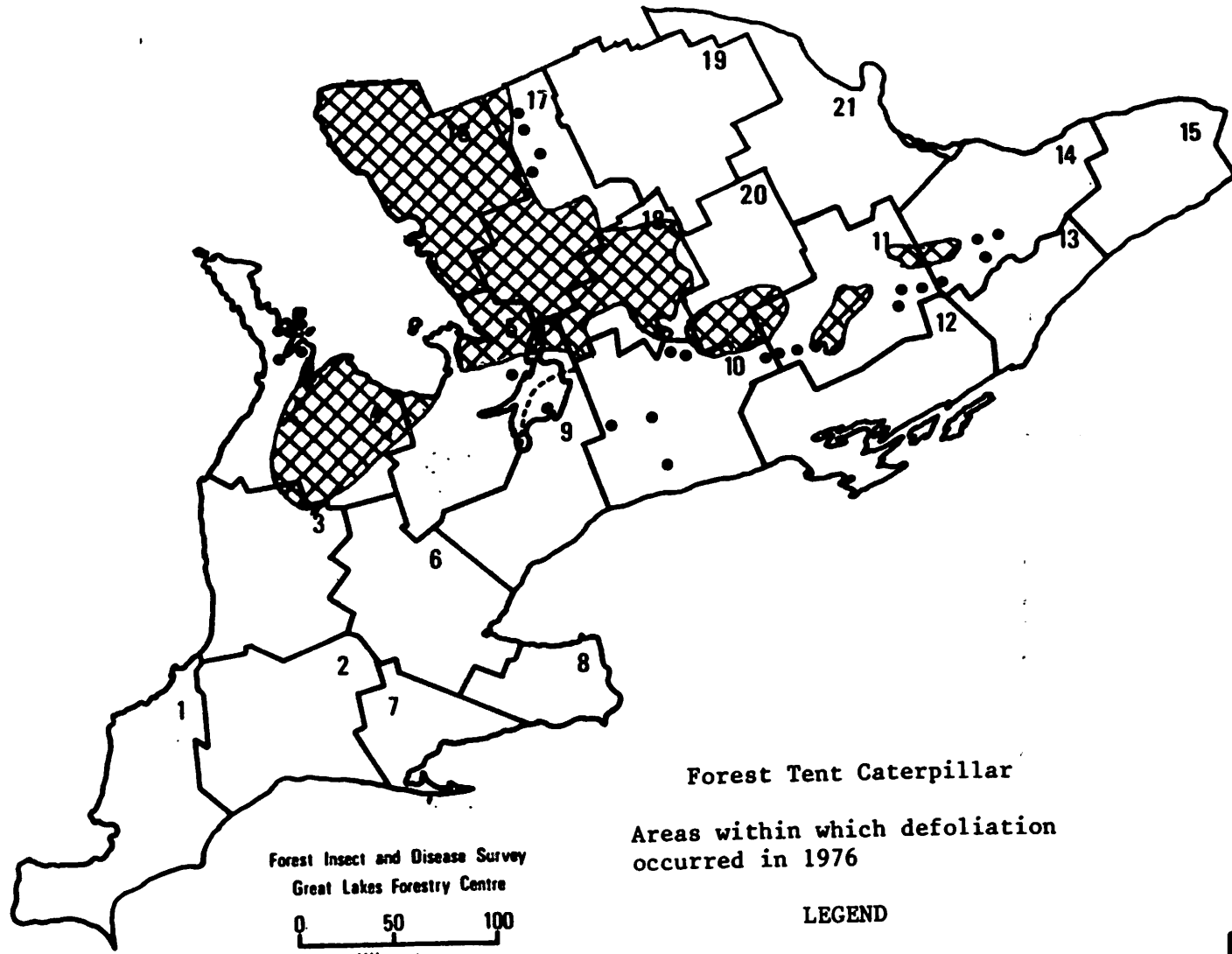

Forest Tent Caterpillar

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
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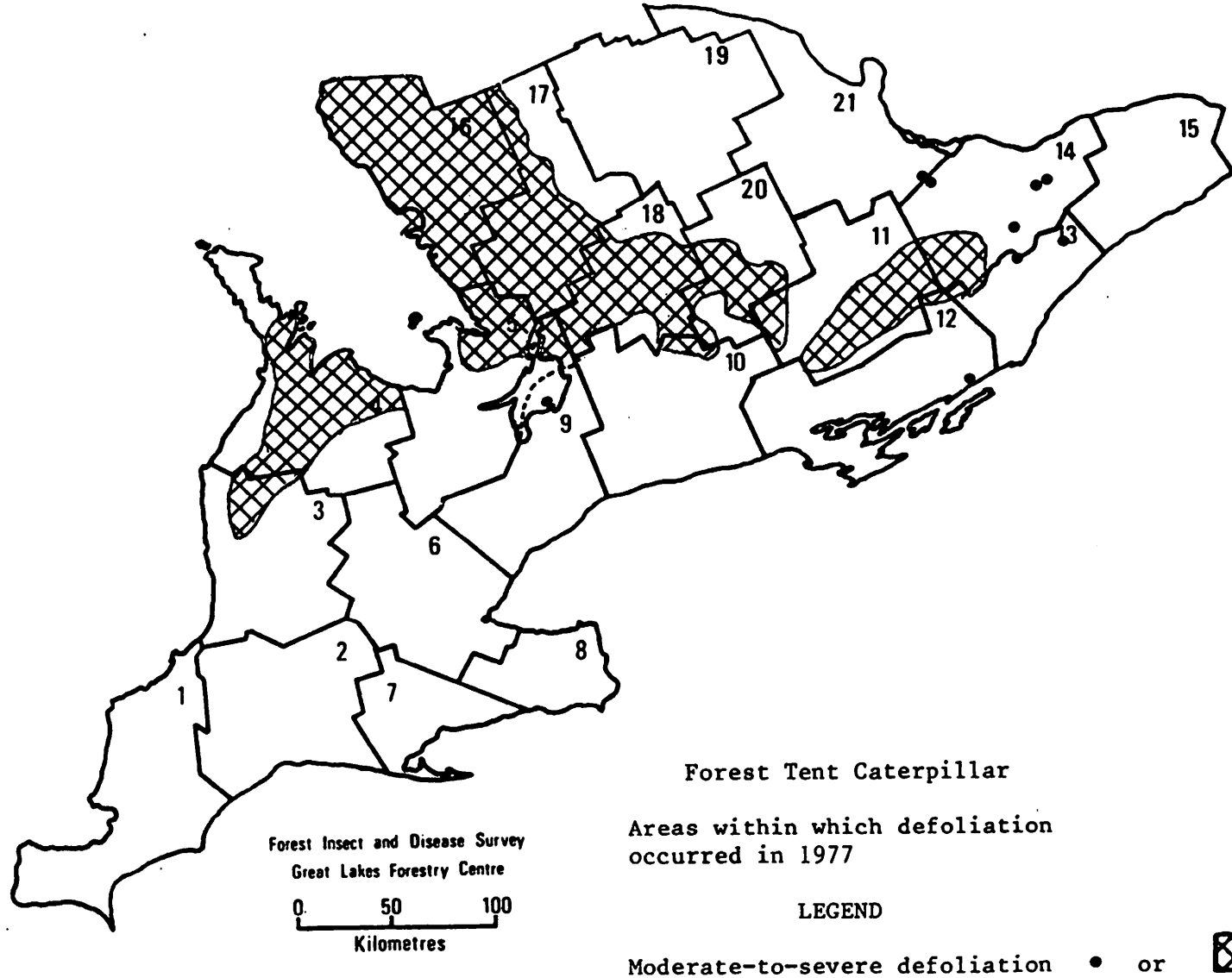

Forest Tent Caterpillar

Areas within which defoliation occurred in 1977

LEGEND

Moderate-to-severe defoliation • or

SOUTHERN ONTARIO

DISTRICTS

1. CHATHAM
2. AYLMER
3. WINGHAM
4. OWEN SOUND
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7. SIMCOE
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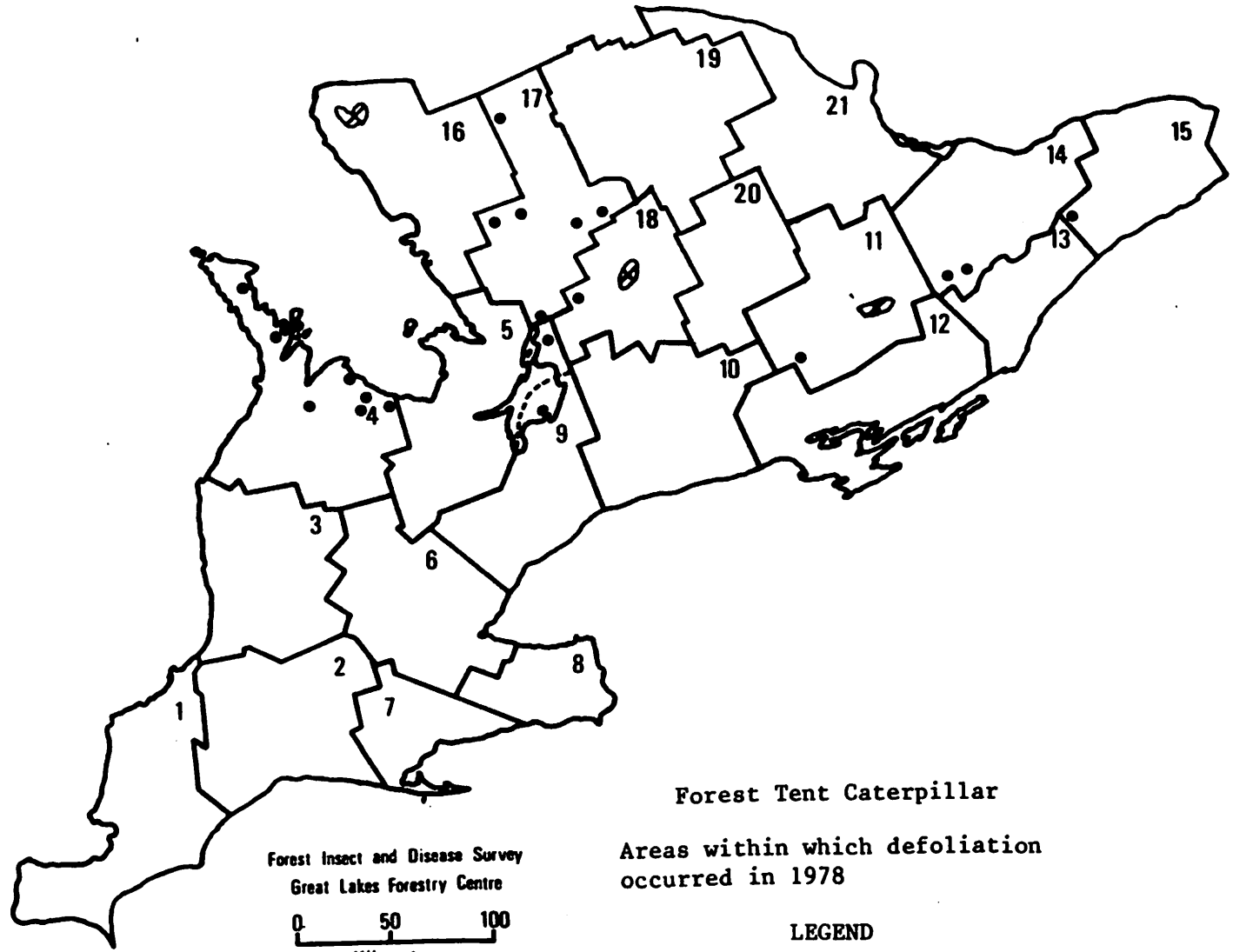

Forest Tent Caterpillar

Areas within which defoliation occurred in 1978

LEGEND

Moderate-to-severe defoliation • or