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

Compiled by

H.J. Weir, M.J. Thomson, D.C. Constable and C.G. Jones[1]

GREAT LAKES FORESTRY CENTRE

CANADIAN FORESTRY SERVICE

GOVERNMENT OF CANADA

1986

MISCELLANEOUS REPORT NO. 34

[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 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 Canadian Forestry Service 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 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 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 northeastern 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, Head, Forest Insect and Disease Survey; 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 also wish to acknowledge the following authors of the FIDS district and regional reports from which this review was abstracted.

1950-1951	P.E. Buchan
1952-1955	M.J. Thomson
1956	R.S. Welton
1957-1961	J. Hook
1962-1966	M.J. Applejohn
1967	H.R. Foster, L.S. MacLeod, W.A. Ingram
1968-1969	J. Lombard
1970-1973	L.S. MacLeod and H.D. Lawrence
1974	L.S. MacLeod, F. Livesey, J. Hook
1975-1977	L.S. MacLeod, H.J. Evans, J. Hook
1978-1979	L.S. MacLeod, H.J. Evans, W.A. Ingram
1980	L.S. MacLeod, D.C. Constable, W.A. Ingram

TABLE OF CONTENTS

	Page
INTRODUCTION	1
SUMMARY	1
FOREST INSECTS	1
Pine Spittlebug, *Aphrophora cribrata*	11
Birch Skeletonizer, *Bucculatrix canadensisella*	12
Large Aspen Tortrix, *Choristoneura conflictana*	19
Spruce Budworm, *Choristoneura fumiferana*	25
Jack Pine Budworm, *Choristoneura pinus pinus*	51
Larch Casebearer, *Coleophora laricella*	51
Jack Pine Tip Beetle, *Conophthorus banksianae*	53
Eastern Larch Beetle, *Dendroctonus simplex*	54
Greenstriped Mapleworm, *Dryocampa rubicunda rubicunda*	56
Aspen Defoliators, *Enargia decolor, Gonioctena americana, Pseudexentera oregonana*	57
Birch Leafminer, *Fenusa pusilla*	65
Forest Tent Caterpillar, *Malacosoma disstria*	66
Balsam Fir Sawfly, *Neodiprion abietis*	83
Swaine Jack Pine Sawfly, *Neodiprion swainei*	83
Pine Sawflies, *Neodiprion nanulus nanulus, N. pratti banksianae* and *N. virginianus* complex	84
Northern Pitch Twig Moth, *Petrova albicapitana*	87
Aspen Leafblotch Miner, *Phyllonorycter ontario*	88
Yellowheaded Spruce Sawfly, *Pikonema alaskensis*	90
White Pine Weevil, *Pissodes strobi*	92

(cont'd)

TABLE OF CONTENTS (concl.)

Page

FOREST INSECTS (concl.)

Larch Sawfly, *Pristiphora erichsonii* 93

Mountain-ash Sawfly, *Pristiphora geniculata* 96

Ambermarked Birch Leafminer, *Profenusa thomsoni* 98

Other Noteworthy Insects 99

FOREST DISEASES

Armillaria Root Rot, *Armillaria mellea* 117

Scleroderris Canker, *Ascocalyx abietina* 118

Dutch Elm Disease, *Ceratocystis ulmi* 120

Needle Rusts of Spruce, *Chrysomyxa ledi* and *C. ledicola* . . 120

Ink Spot of Aspen, *Ciborinia whetzelii* 121

Sweet Fern Blister Rust, *Cronartium comptoniae* 123

White Pine Blister Rust, *Cronartium ribicola* 125

Jack Pine Needle Cast, *Davisomycella ampla* 126

Western Gall Rust, *Endocronartium harknessii* 126

Hypoxylon Canker, *Hypoxylon mammatum* 127

Leaf and Twig Blight, *Venturia macularis* 129

Other Noteworthy Diseases 130

ABIOTIC DAMAGE

Frost 137

Hail 137

Wind 138

APPENDICES

INTRODUCTION

This report is a review of significant forest insects and diseases that have occurred in the Kirkland Lake District from 1950 to 1980, with a brief summary of outbreaks prior to 1950. In the selection of pests for this report, particular attention was paid to the major working groups of host species in the District, namely, hardwoods (birch and poplar) and conifers (jack, red and white pine, balsam fir, white and black spruce and larch). 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 tree damage, e.g., frost, wind and snow damage.

SUMMARY

FOREST INSECTS

Pine Spittlebug, *Aphrophora cribrata* (Wlk.) [Major]
page 11

Although the pine spittlebug is not a particularly damaging insect, numerous branch tips can be killed when populations are high. Varying degrees of infestation have been recorded since 1957.

Birch Skeletonizer, *Bucculatrix canadensisella* Cham. [Major]
pages 12-18

Defoliation by this insect seldom causes mortality of the host but the weakened trees are subject to attack by secondary insects and diseases, and this may be a predisposing factor in the condition referred to as "birch decline". Severe defoliation was reported from 1962 to 1964, in 1972 and again in 1980. This insect was not reported prior to 1962.

Large Aspen Tortrix, *Choristoneura conflictana* (Wlk.) [Major]
pages 19-24

Although this insect seldom causes tree mortality, continued high populations can cause a loss of increment in stands. High populations were recorded from 1970 to 1974, with lower populations observed periodically since 1956.

Spruce Budworm, *Choristoneura fumiferana* (Clem.) [Major]
pages 25-50

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 and tamarack are attacked and considerable tree mortality can occur. This report shows the decline of an infestation that was reported between 1947 and 1951, with endemic populations prevailing until 1966. A new outbreak occurred in 1967 and has increased in extent until the present time. Tree mortality was first observed in 1951, during the 1947-1951 outbreak. Tree mortality in the current infestation occurred first in 1975; by 1980 it had spread over approximately 75% of the District.

Jack Pine Budworm, *Choristoneura pinus pinus* Free. [Major]
page 51

This destructive pest of pines can cause tree mortality after about two years of defoliation. Very low infestation levels have occurred periodically since 1965.

Larch Casebearer, *Coleophora laricella* (Hbn.) [Major]
pages 51-53

This casebearer is a serious pest of native larch and can cause reduced tree growth and tree mortality after two to three consecutive years of severe defoliation. Moderate defoliation was recorded in 1966 and again in 1972. The insect was first recorded in the District in 1952.

Jack Pine Tip Beetle, *Conophthorus banksianae* McPherson [Major]
pages 53-54

This insect can cause branch and tip mortality when populations are high. High populations were reported from 1973 to 1980.

Eastern Larch Beetle, *Dendroctonus simplex* Lec. [Major]
pages 54-55

Larch trees weakened by other agents are susceptible to attack by this insect, which will cause tree mortality. High populations were reported with accompanying mortality in 1961 and 1962. This was the first record of the insect in the District.

Greenstriped Mapleworm, *Dryocampa rubicunda rubicunda* (Fabr.) [Major]
page 56

This insect defoliates both red and sugar maple but prefers red maple understory. Varying degrees of low populations were present in the District from 1950 to 1961, but the insect has not been reported since 1962.

Aspen Defoliators, *Enargia decolor* (Wlk.), *Gonioctena americana* (Schaef.), and *Pseudexentera oregonana* Wlshm. [Major]
pages 57-64

No tree mortality has been recorded as caused by this complex of defoliators, which affects primarily aspen and poplar. The first infestation was reported in 1950.

Birch Leafminer, *Fenusa pusilla* (Lep.) [Major]
pages 65-66

Although this insect is not known to cause tree mortality, weakened trees are susceptible to secondary insects and diseases, and this may be a predisposing factor in the condition referred to as "birch decline". As a rule this insect is a pest of individual ornamental trees, but when populations increase, stands of birch are severely defoliated. High populations have persisted in the District since 1963. The insect was not reported prior to 1960.

Forest Tent Caterpillar, *Malacosoma disstria* Hbn. [Major]
pages 66-82

Trembling aspen, the preferred host, is seldom killed in a prolonged infestation. Outbreaks have occurred periodically in the District since 1950. The first infestation occurred between 1950 and 1956, a smaller infestation was reported between 1963 and 1965, and the current infestation has persisted from 1972 to 1981.

Balsam Fir Sawfly, *Neodiprion abietis* complex [Major]
page 83

Severe defoliation can cause mortality of balsam fir and white spruce trees when an infestation persists over a period of years. Only low populations have been recorded periodically since 1952.

Swaine Jack Pine Sawfly, *Neodiprion swainei* Midd. [Major]
pages 83-84

This sawfly is capable of causing mortality of semimature jack pine when populations are high. High populations were recorded only in 1959. Varying degrees of infestation have occurred periodically since 1950.

Pine Sawflies, *Neodiprion nanulus nanulus, N. pratti banksianae,* and *N. virginianus* complex [Major]
pages 84-87

The sawflies listed in this report are capable of causing mortality of semimature and plantation jack pine when populations are high. Varying degrees of infestation have been recorded since 1950.

Northern Pitch Twig Moth, *Petrova albicapitana* (Busck.) [Minor]
pages 87-88

This insect is particularly damaging to plantation jack pine trees when populations are high. Heavy damage occurred in 1964 and 1966; low populations were reported periodically.

Aspen Leafblotch Miner, *Phyllonorycter ontario* (Free.) [Major]
pages 88-89

No tree mortality has been caused by this insect. High populations were recorded in 1951 and 1952, 1962 and 1963 and from 1974 to 1977. The insect was first reported in 1951.

Yellowheaded Spruce Sawfly, *Pikonema alaskensis* (Roh.) [Major]
pages 90-92

Defoliation by this serious pest of spruce was reported as heavy between 1953 and 1960, and between 1965 and 1980. Prolonged severe defoliation can cause mortality of young open-grown and plantation trees.

White Pine Weevil, *Pissodes strobi* (Peck) [Major]
pages 92-93

This pest of pines and spruces causes a reduction in height growth and eventual "cabbaging" if the tree is subjected to repeated attacks.

Varying degrees of leader damage have occurred in the District since 1956, with infested leaders ranging from 1% to 42%.

Larch Sawfly, *Pristiphora erichsonii* (Htg.) [Major]
pages 93-96

Severe defoliation occurred in 1951, from 1953 to 1959, in 1962, again from 1967 to 1969, and then again in 1971. Larch trees are able to refoliate after defoliation, so that increment loss is not apparent for 4 or 5 years and tree mortality does not usually occur until after 6 to 9 years of severe defoliation.

Mountain-ash Sawfly, *Pristiphora geniculata* (Htg.) [Major]
pages 96-97

Although mountain-ash are not considered merchantable trees, a great number are utilized as shade trees and ornamentals in rural and urban areas. This insect can weaken trees when prolonged severe defoliation occurs and subsequent borer infestations can cause mortality. The insect was first reported in 1958 and has subsequently caused varying degrees of defoliation.

Ambermarked Birch Leafminer, *Profenusa thomsoni* (Konow) [Major]
pages 98-99

High populations of this insect were recorded from 1958 to 1963, in 1965 and 1966, and in 1968 and 1969. Prolonged high populations can weaken trees and leave them susceptible to damage by secondary insects and diseases.

Other Noteworthy Insects [Major and Minor]
pages 99-114

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

FOREST DISEASES

Armillaria Root Rot, *Armillaria mellea* (Vahl : Fr.) Kummer. [Major]
page 117

This disease is capable of killing both weakened and healthy trees and is a particularly serious pest in pine and spruce plantations that

have been planted around old stumps. Varying levels of infection and some mortality have occurred periodically since 1955.

Scleroderris Canker, *Ascocalyx abietina* (Lagerb.) Morelet [Major]
pages 118-119

This disease can cause mortality of young trees up to the age of 3 or 4 years. The pathogen was first reported in the District in 1965 and persisted at varying levels of infection until 1980.

Dutch Elm Disease, *Ceratocystis ulmi* (Buism.) C. Moreau [Major]
page 120

This destructive disease was first reported in 1973 on a few trees near Englehart. Tree mortality has increased in this area since then.

Needle Rusts of Spruce, *Chrysomyxa ledi* (Alb. & Schwein.) de Bary and *C. ledicola* (Peck) Lagerh. [Major]
pages 120-121

Severe infections of spruce foliage can cause a loss of increment in trees when prolonged infection occurs. Low-to-moderate levels of infection have persisted periodically since 1955.

Ink Spot of Aspen, *Ciborinia whetzelii* (Seaver) Seaver [Major]
pages 121-123

As a rule, severe defoliation by this foliage disease results only in a loss of increment; to date, no tree mortality has been reported. Severe browning occurred from 1962 to 1965 and in 1969. Light-to-moderate browning occurred periodically from 1959 to 1980.

Sweet Fern Blister Rust, *Cronartium comptoniae* Arthur [Major]
pages 123-124

This fungus causes stem cankers on jack pine but tree mortality is usually restricted to trees under 7.6 cm DBH. Stem cankers on larger trees can cause up to 11% volume loss. This disease is not as serious in natural stands as in very young plantations because most infected trees survive after reaching approximately 7 cm in diameter. Pockets of heavy infection were reported in 1964 and 1968, from 1970 to 1972, and in 1977. Infection at various levels has occurred periodically since 1955.

White Pine Blister Rust, *Cronartium ribicola* J.C. Fischer ex Rabenh. [Major]
page 125

This destructive disease of white pine is damaging to white pine trees of all ages, but particularly to young trees, which are girdled and killed by the canker. The disease was first found in 1960. High levels of infection were reported from 1962 to 1964, then again in 1979 and 1980.

Jack Pine Needle Cast, *Davisomycella ampla* (J. Davis) Darker [Major]
page 126

This disease can cause severe defoliation when incidence is high. Severe infection levels were found only in 1965. The disease was not reported prior to 1960.

Western Gall Rust, *Endocronartium harknessii* (J.P. Moore) Y. Hirats. [Major]
pages 126-127

Low levels of infection were reported in 1962 and 1969, from 1971 to 1973, in 1977 and from 1979 to 1980. This rust was first reported in 1962.

Hypoxylon Canker, *Hypoxylon mammatum* (Wahl.) J.H. Miller [Major]
page 128

This disease usually attacks the stems of immature trees with diameters between 7.6 and 12.7 cm that are growing on poor sites, but also attacks the upper stems and branches of larger trees. The disease has been common in aspen stands in varying degrees of intensity each year since the inception of the Forest Disease Survey in 1953.

Leaf and Twig Blight, *Venturia macularis* (Fr.) Müller & v. Arx [Major]
pages 129-130

Reduced stocking of reproduction aspen occurs when the incidence of this disease is high. Severe damage was reported from 1964 to 1967, and in 1978 and 1979.

Other Noteworthy Diseases [Major]
pages 130-133

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

ABIOTIC DAMAGE

pages 137-138

This condition is caused by a variety of influences, e.g., frost, wind and hail. Weakened trees are then susceptible to other diseases. Severe damage has been caused periodically since 1964.

INSECTS

Pine Spittlebug, *Aphrophora cribrata* (Wlk.)

Host(s): jP, wP, wS, bS, bF [Major]

Year	Remarks
1950-1956	not reported
1957-1959	Low populations occurred at widely scattered points.
1960-1962	not reported
1963	low populations noted in Mickle, Eby and Nordica twps
1964-1965	not reported
1966	Light infestations occurred in Henwood, Dack and Maisonville twps.
1967	Populations decreased; light damage was noted in Henwood Twp.
1968-1971	not reported
1972	High populations occurred at widely separated points.
1973	Populations declined; however, small numbers were easily found.
1974	not reported
1975	High populations occurred in Truax Twp.
1976	not reported
1977	High populations were observed in Arnold, Marter, McCool and Munro twps.
1978	High populations were observed in several townships in the central part of the District.
1979	High populations persisted and were widely distributed throughout the District.
1980	not reported

Birch Skeletonizer, *Bucculatrix canadensisella* Cham.

Host(s): wB, yB [Major]

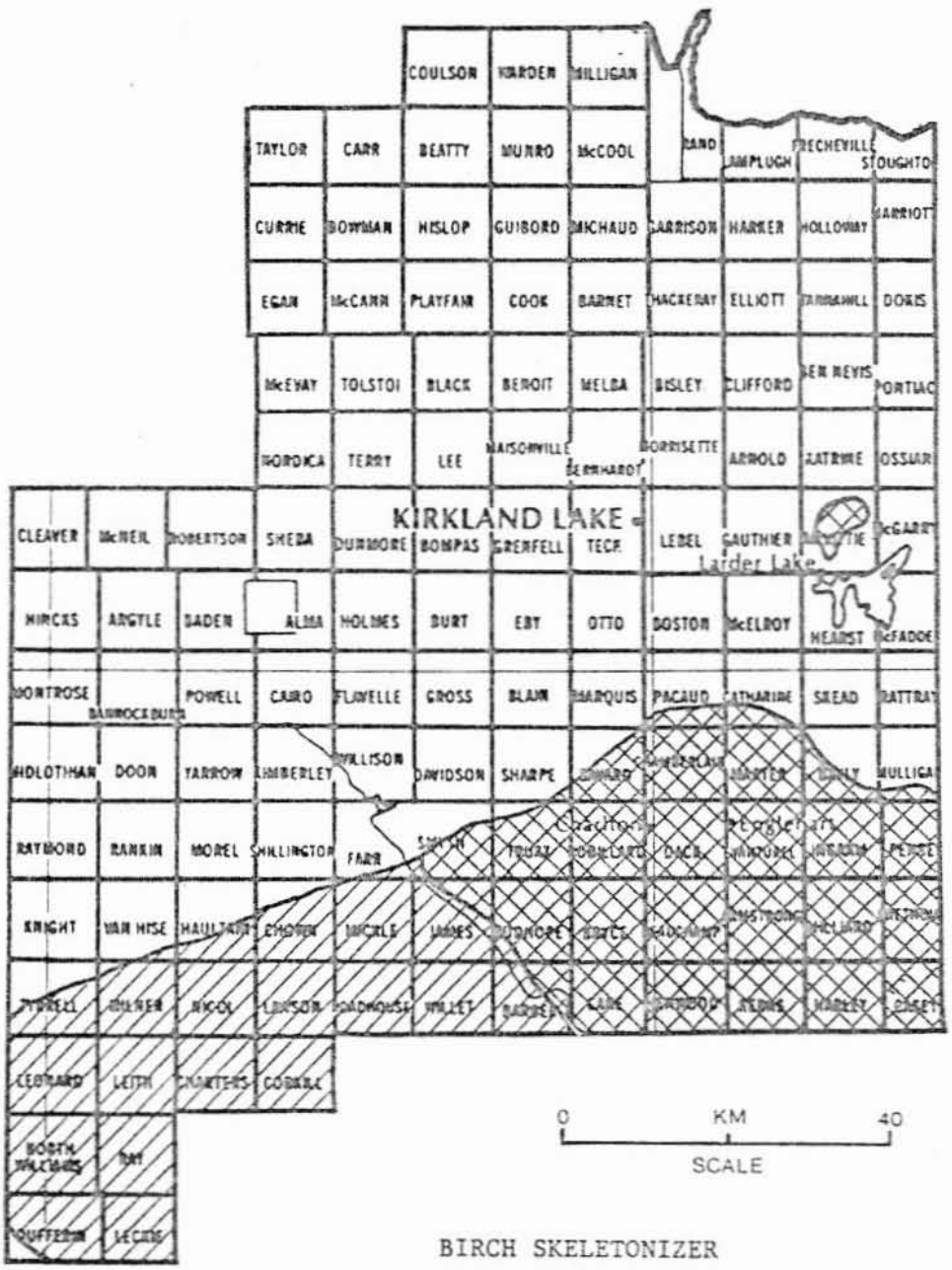
Year	Remarks
1950-1961	not reported
1962	High populations caused moderate-to-severe defoliation throughout the southeastern part of the District, extending eastward from Smyth, James and Barber twps to the eastern boundary, and northward from the southern boundary of the District to Pacaud Twp. A medium-to-heavy infestation extended from the western edge of the above-mentioned infestation through the southern part of the District to the western boundary and northward to Tyrrell, Van Hise, Haultain and Farr twps. A pocket of light defoliation was found in McVittie Twp (see map, page 14).
1963	There was a marked increase in the extent of infestations. The medium-to-heavy infestation reported in 1962 recurred in 1963. New heavy infestations were recorded east of Matheson along Hwy 101 and light defoliation was found in Eby, Coulson, Warden and Playfair twps.
1964	High populations caused moderate-to-severe defoliation through most of the eastern half and northern part of the District. Light defoliation occurred throughout practically all of the remainder of the District except in a small area in the southwestern corner (see map, page 15).
1965	Surveys revealed a decrease in the area infested and a marked decrease in population levels over the previous year. Damage was generally light in the area infested, except in the northeastern part of the District where medium-to-heavy infestations were recorded, and in the southern part where no defoliation could be found (see map, page 16).
1966	Populations collapsed, leaving the District free of infestations except in Casey, Harris and Ray twps where very small pockets of light damage were detected.
1967-1971	not reported

(cont'd)

Birch Skeletonizer, *Bucculatrix canadensisella* Cham. (concl.)

Year	Remarks
1972	Severe defoliation of host trees occurred in the northwestern part of the District in the Matheson, Monteith and Shillington areas (see map, page 17). Light damage was commonly observed throughout the remainder of the District.
1973	The heavy infestations reported in the northwestern part of the District in 1972 declined to light intensity. Elsewhere there was little change in population levels, and almost the entire District remained lightly infested (see map, page 18).
1974-1980	not reported

KIRKLAND LAKE DISTRICT



BIRCH SKELETONIZER

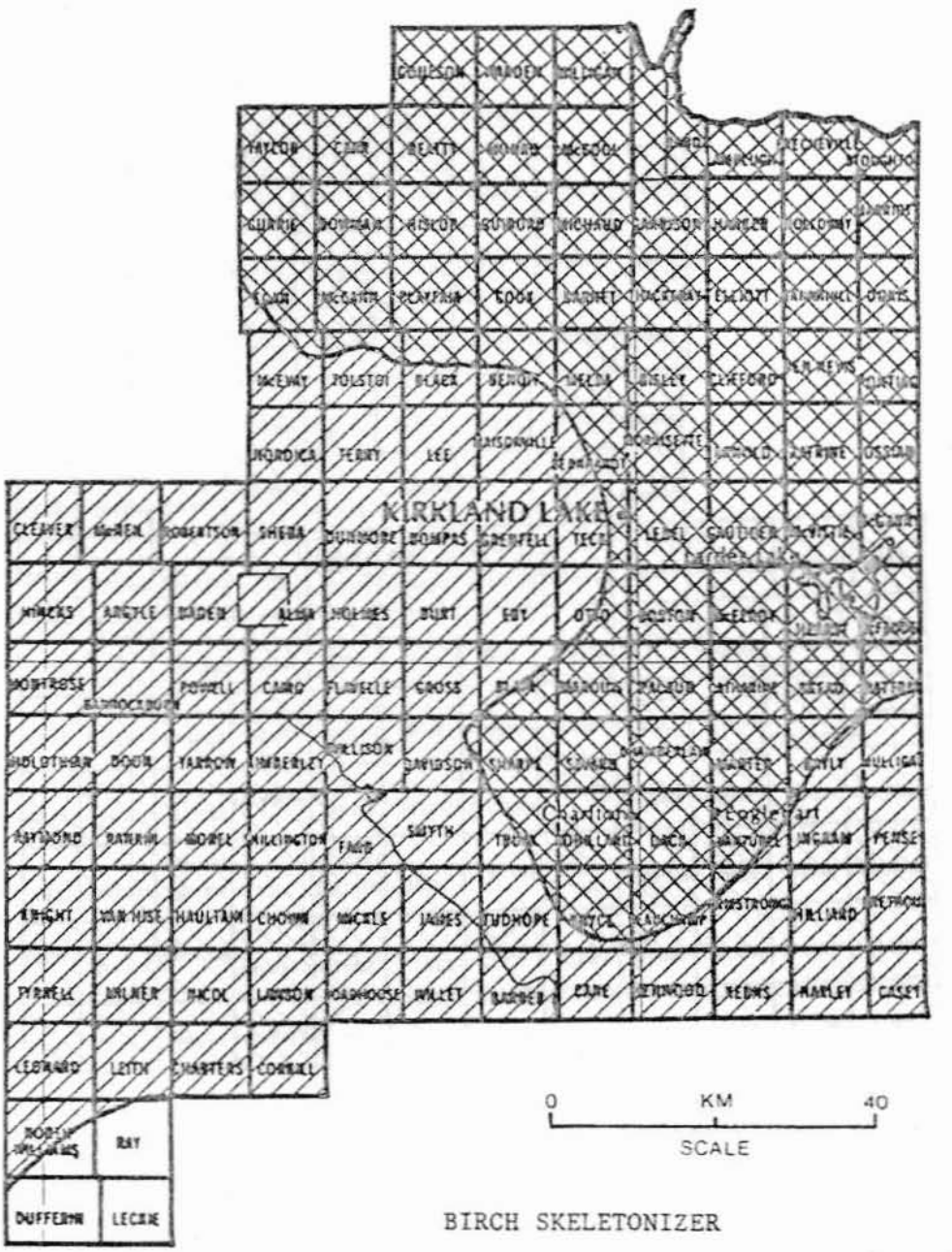
Areas within which defoliation occurred in 1962

LEGEND

Light defoliation

Moderate-to-severe defoliation

KIRKLAND LAKE DISTRICT



BIRCH SKELETONIZER

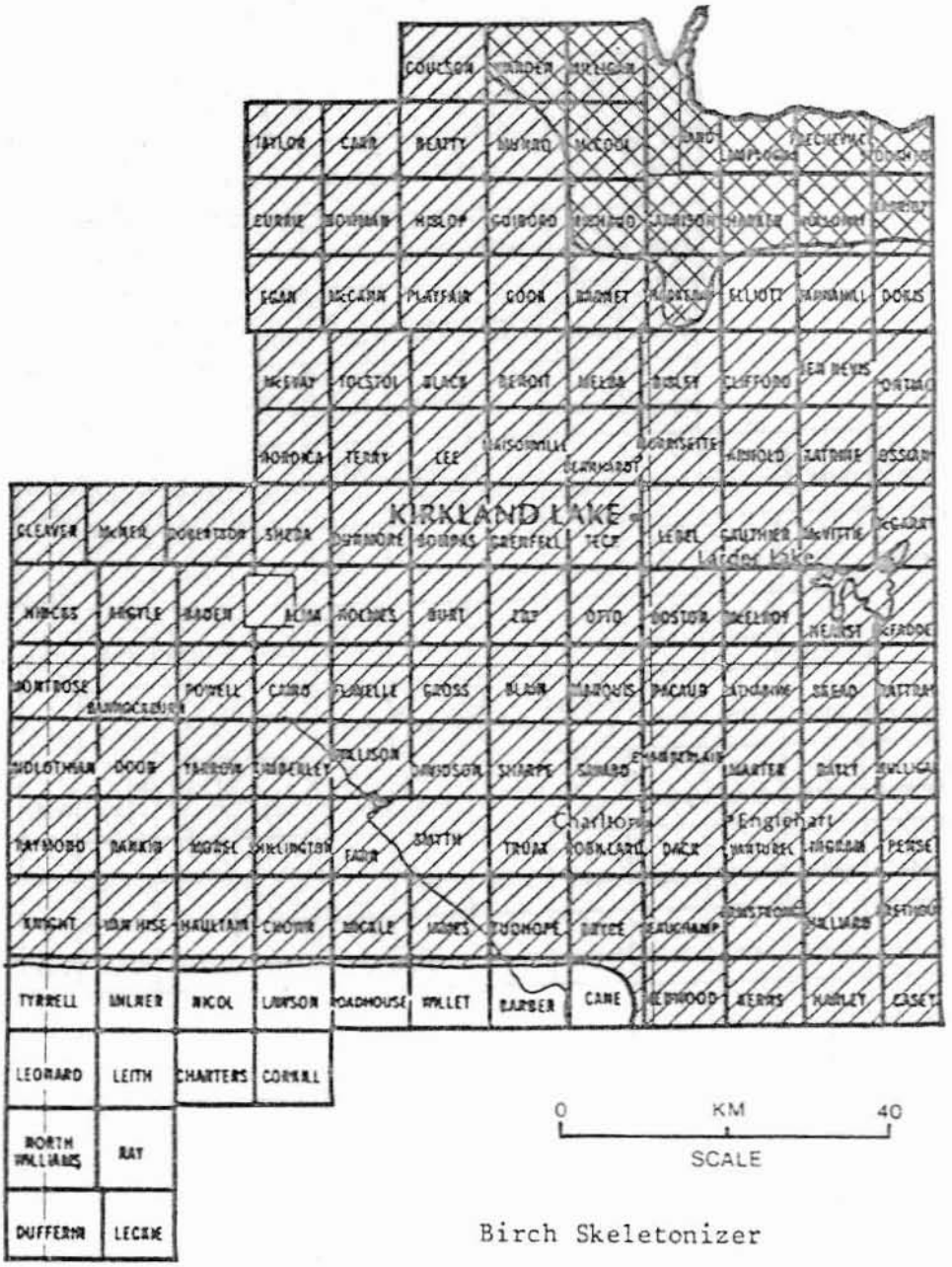
Areas within which defoliation occurred in 1964

LEGEND

Light defoliation

Moderate-to-severe defoliation

KIRKLAND LAKE DISTRICT



Birch Skeletonizer

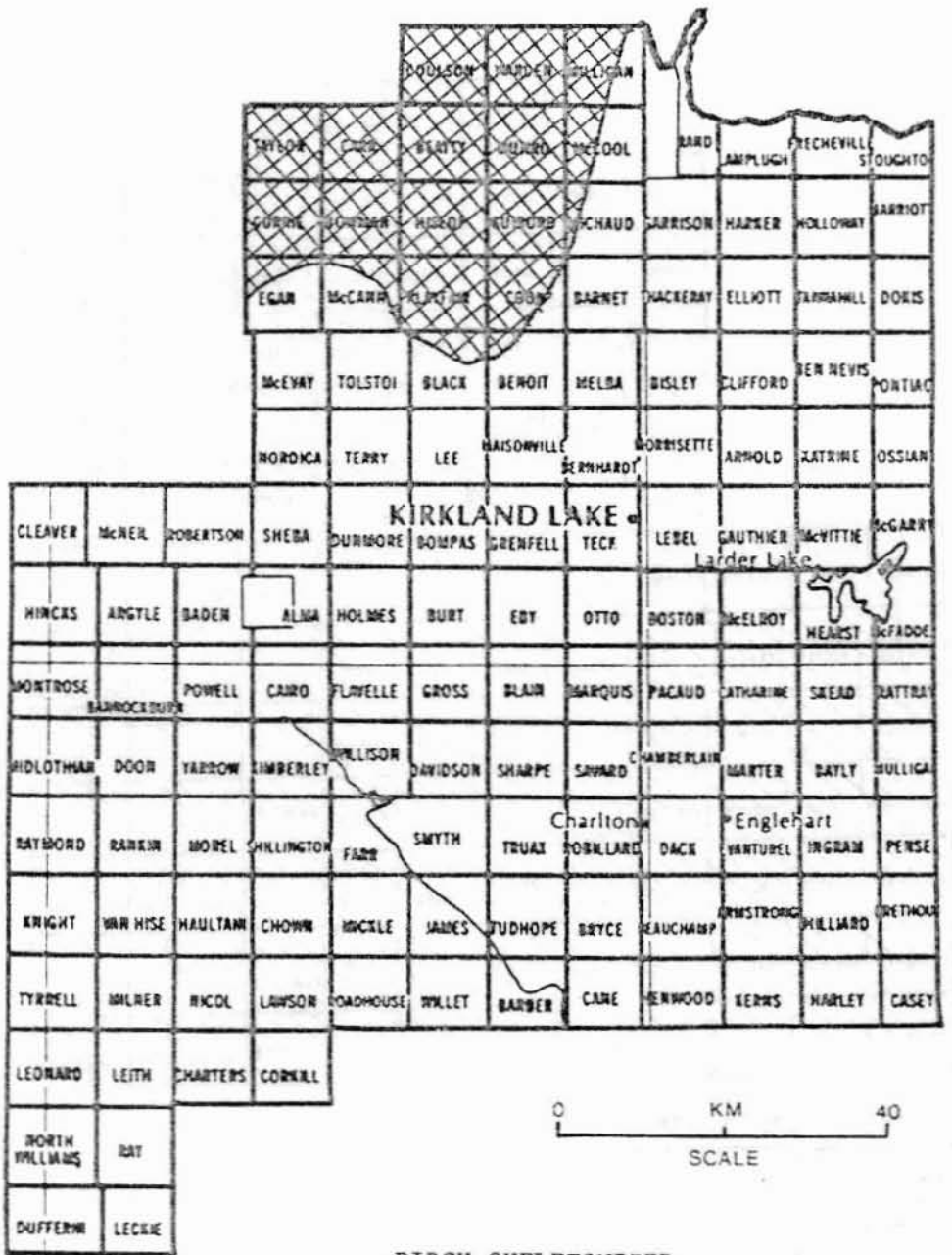
Areas within which defoliation occurred in 1965

LEGEND

Light defoliation

Moderate-to-severe defoliation

KIRKLAND LAKE DISTRICT



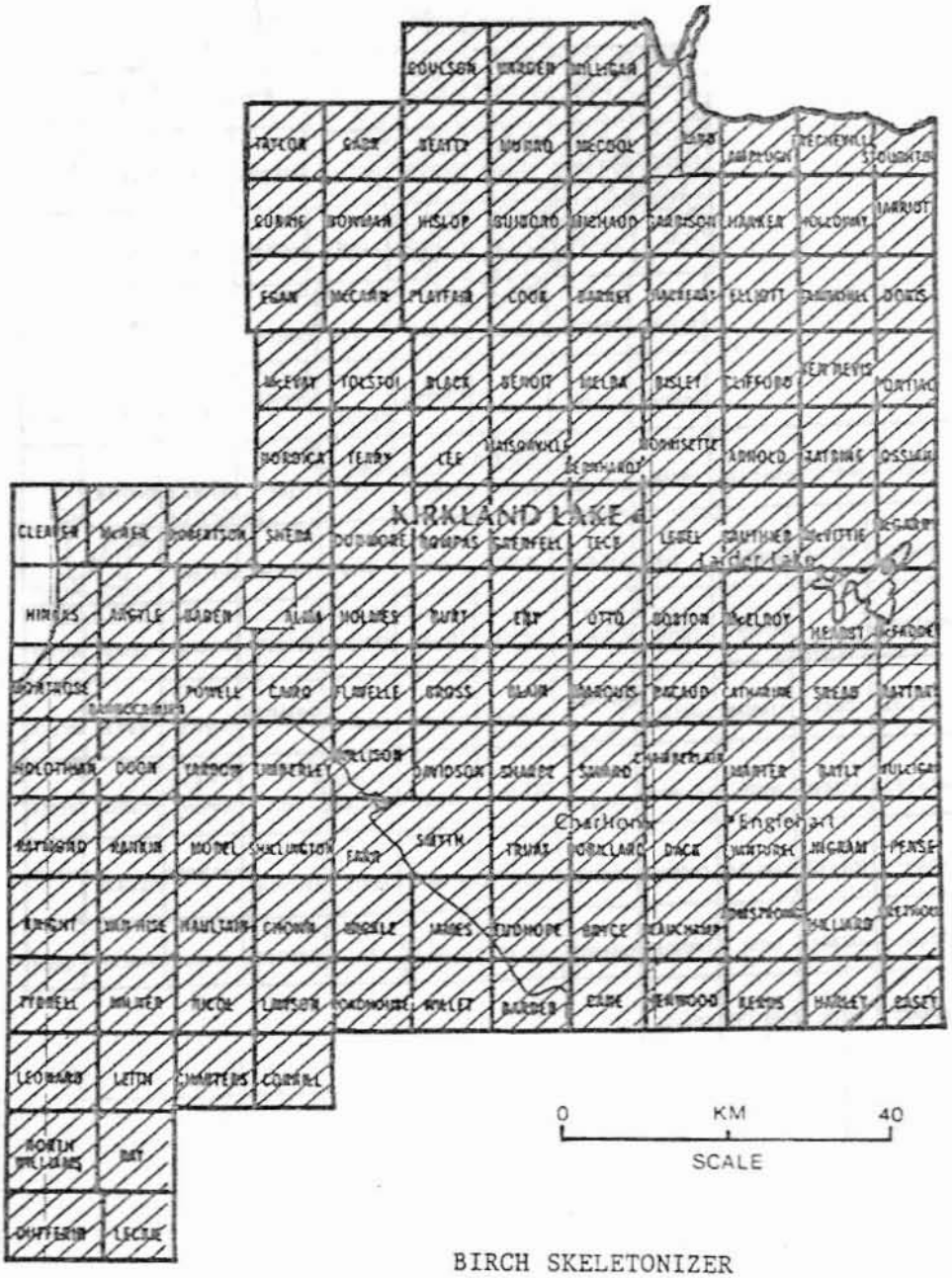
BIRCH SKELETONIZER

Areas within which defoliation occurred in 1972

LEGEND

Moderate-to-severe defoliation

KIRKLAND LAKE DISTRICT



BIRCH SKELETONIZER

Areas within which defoliation occurred in 1973

LEGEND

Light defoliation

Large Aspen Tortrix, *Choristoneura conflictana* (Wlk.)

Host(s): tA [Major]

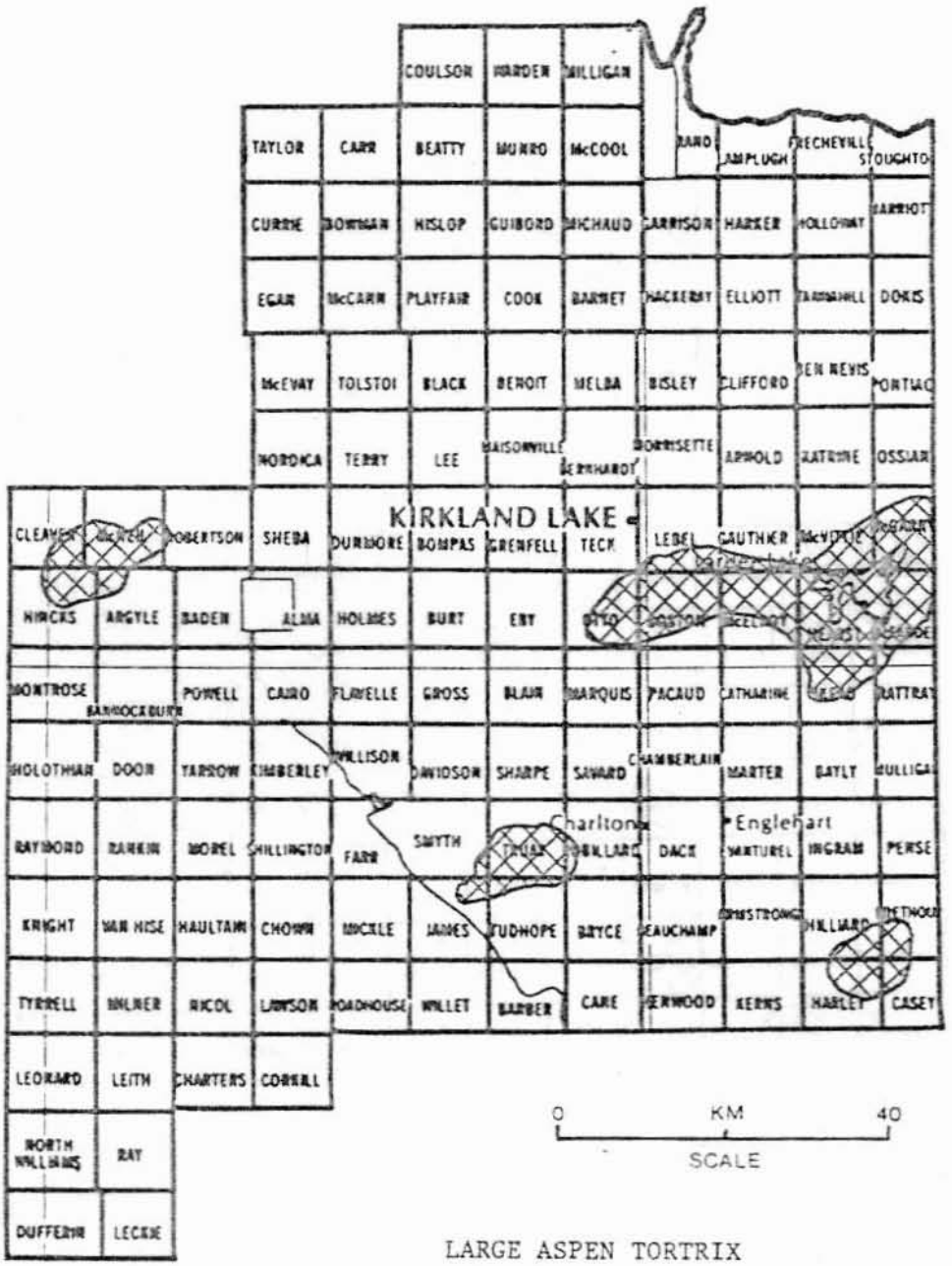
Year	Remarks
1950-1955	not reported
1956-1957	trace population observed
1958-1962	not reported
1963	small numbers in Nordica and Van Hise twps
1964-1967	not reported
1968	trace populations observed at scattered points
1969	not reported
1970	Medium-to-heavy infestations caused severe defoliation through extensive aspen stands in the Elk Lake, Matachewan, Kirkland Lake and Larder Lake areas.
1971	Moderate-to-severe defoliation occurred in aspen stands through a large area extending from the town of Swastika to the Quebec border. Pockets of heavy infestation were also observed at three other locations (see map, page 21).
1972	The area of infestation expanded and caused severe defoliation in aspen stands in the Matheson-Val Gagne area. Pockets of new medium-to-heavy infestations were found in Milner and Chown twps (see map, page 22).
1973	High populations persisted; however, an appreciable decrease in the area infested in the Kirkland Lake-Larder Lake and Matheson-Monteith areas was noted (see map, page 23).
1974	Little change occurred in the area of infestation previously reported in the Kirkland Lake-Larder Lake and Matheson-Monteith areas (see map, page 24).
1975	A marked decrease in area of infestation and population levels occurred.
1976	Populations decreased to a trace level at a few scattered points.

(cont'd)

Large Aspen Tortrix, *Choristoneura conflictana* (Wlk.) (concl.)

Year	Remarks
1977	small numbers observed at widely separated points
1978-1980	not reported

KIRKLAND LAKE DISTRICT



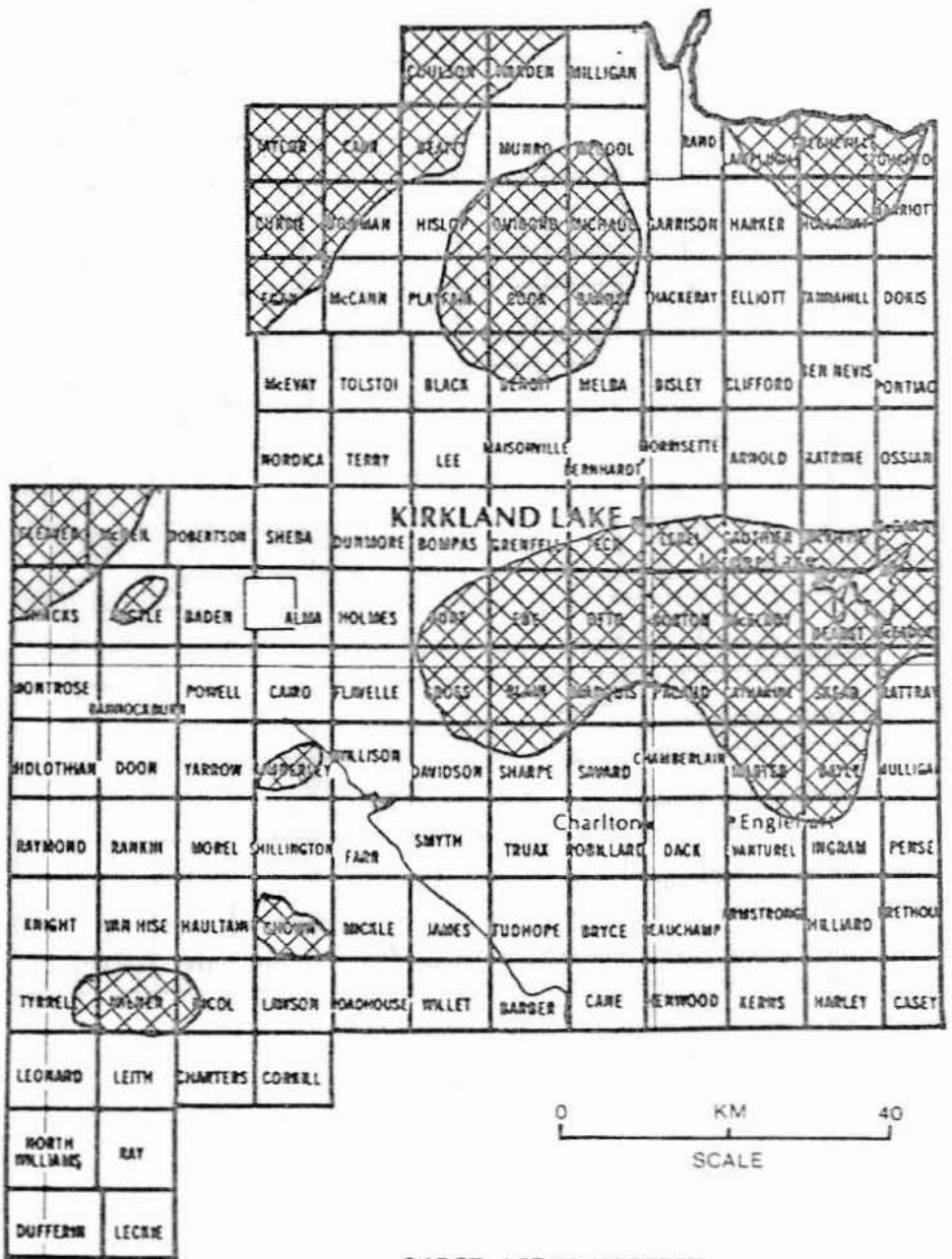
LARGE ASPEN TORTRIX

Areas within which defoliation occurred in 1971

LEGEND

Moderate-to-severe defoliation

KIRKLAND LAKE DISTRICT



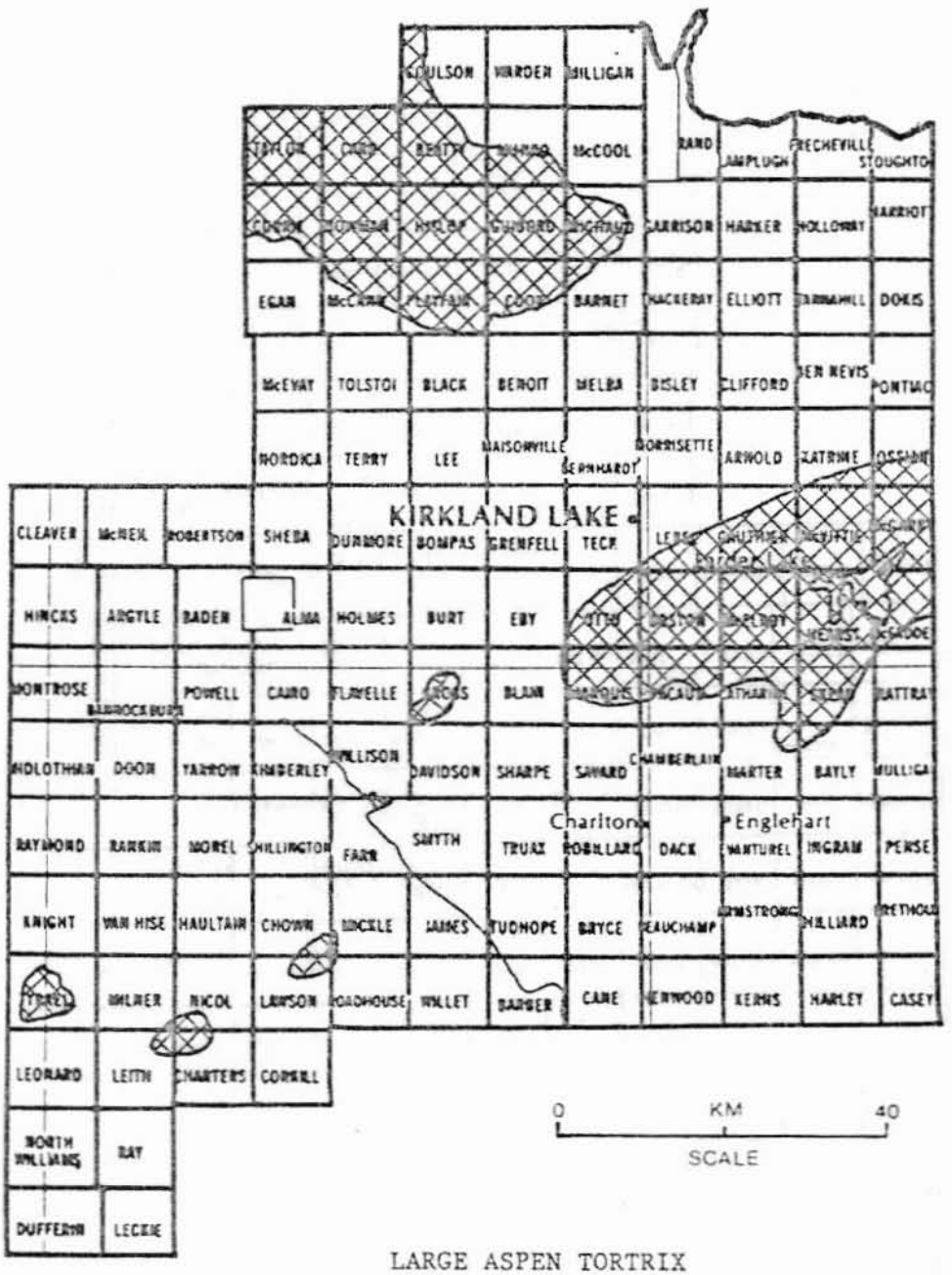
LARGE ASPEN TORTRIX

Areas within which defoliation occurred in 1972

LEGEND

Moderate-to-severe defoliation

KIRKLAND LAKE DISTRICT



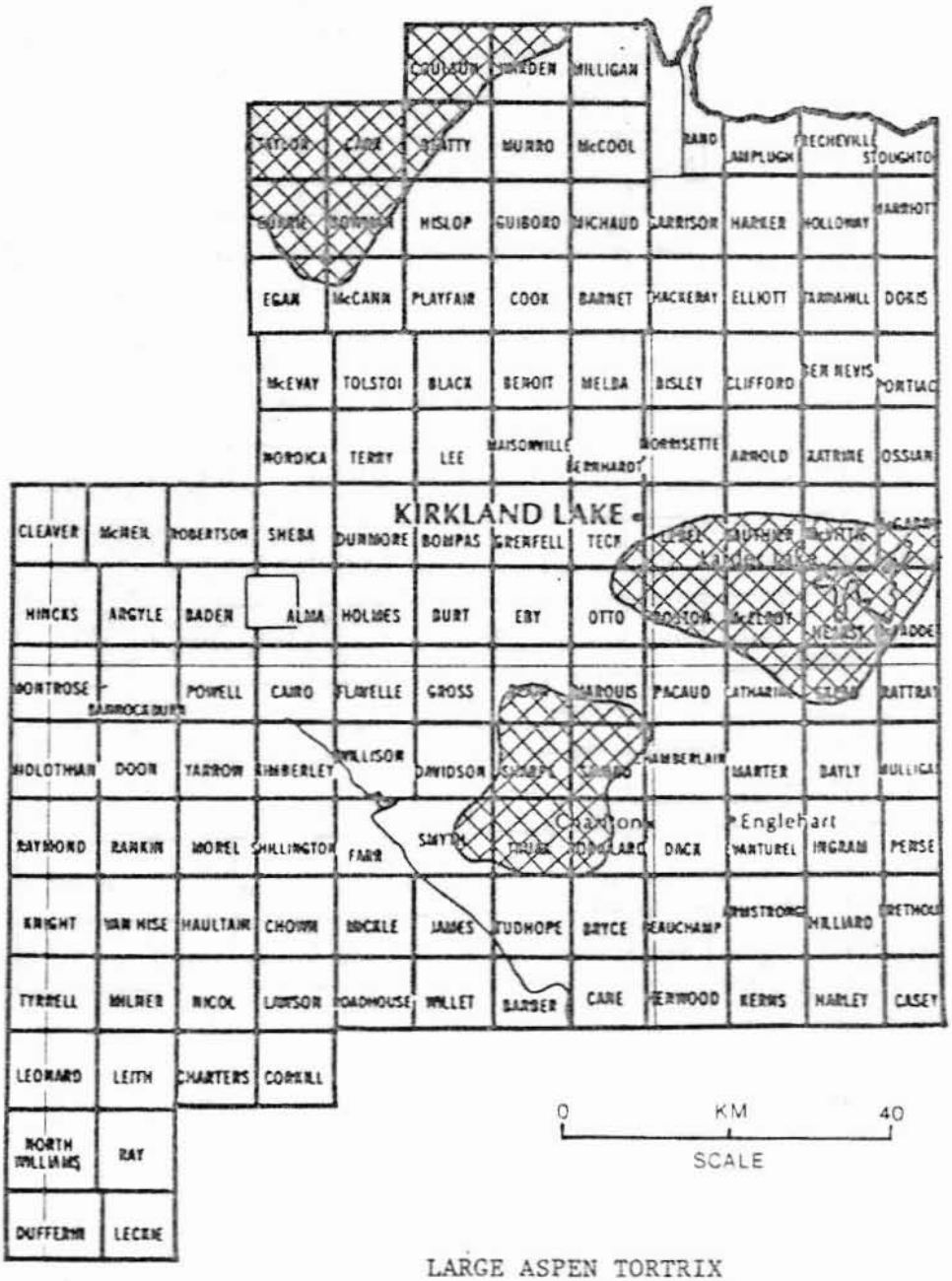
LARGE ASPEN TORTRIX

Areas within which defoliation occurred in 1973

LEGEND

Moderate-to-severe defoliation

KIRKLAND LAKE DISTRICT



LARGE ASPEN TORTRIX

Areas within which defoliation occurred in 1974

LEGEND

Moderate-to-severe defoliation

Spruce Budworm, *Choristoneura fumiferana* (Clem.)

Host(s): bF, wS, bS, eH, tL [Major]

Year	Remarks
1950	A small area of medium-to-heavy infestation occurred east of Matheson in Rand, Lamplugh and Frecheville twps. Defoliation of the current year's growth on balsam fir in the area was approximately 34%. Light damage was observed in Bannockburn Twp and small numbers of larvae were found at scattered points elsewhere.
1951	A medium-to-heavy infestation persisted and increased in size in the northeastern part of the District, infesting parts of Harker, Holloway, Marriott and Dokis twps (see map, page 30). Defoliation ranged up to 30% in the area. The light infestation previously reported in Bannockburn Twp decreased in area. Aerial sketch mapping revealed medium-to-heavy mortality in parts of the above townships and heavy mortality in four townships in the southwestern corner of the District (see map, page 31).
1952	Populations decreased to near-endemic levels.
1953	extremely low populations at scattered points
1954	larvae more common than in the previous two years
1955-1959	not reported
1960	trace populations in Milner Twp
1961	low numbers found at two points
1962-1964	not reported
1965	trace populations at two points
1966	low numbers observed at numerous locations
1967	Populations increased markedly at several locations. Mature white spruce trees were lightly infested in Garrison and Harker twps. Light defoliation was noted on young balsam fir trees in Benoit and Farr twps as well. Elsewhere low populations could be found in most host stands from Kirkland Lake to the southern boundary of the District.

(cont'd)

Spruce Budworm, *Choristoneura fumiferana* (Clem.) (cont'd)

Year	Remarks
1968	Populations continued to increase, infesting an area of approximately 400 km^2 in the vicinity of Matachewan. Within this area medium-to-heavy infestations occurred in host stands through approximately 96 km^2 in the northern part of the infested area. Heavy infestations were also found in Tyrrell and Milner twps (see map, page 32). Defoliation ranged up to 40% in the heavily infested areas.
1969	Populations in the vicinity of Matachewan increased over the previous year and caused moderate-to-severe damage in Yarrow Twp. A new heavy infestation was found south of the Matachewan infestation in Morel Twp (see map, page 33).
1970	The area of infestation increased markedly over the previous year, and varying degrees of damage were reported in stands through approximately 125,000 ha of forested land in the portion of the District lying west and southwest of Kirkland Lake (see map, page 34).
1971	Areas previously infested in the western part of the District expanded in size to include several small pockets at scattered points. A new infestation in stands through about 20,230 ha of forested land was detected south of and surrounding Larder Lake in Hearst, McFadden, Rattray, Skead and Bayly twps. Generally moderate-to-severe defoliation occurred in infested areas (see map, page 35).
1972	The area infested by spruce budworm continued to expand, and defoliation was moderate to severe in the infested areas (see map, page 36).
1973	The area of infestation expanded to include most of the uninfested area in the southwestern sections of the District. The infestation in the Larder Lake area persisted. Generally moderate-to-severe defoliation occurred throughout infested areas (see map, page 37).
1974	There was a marked increase in the area of infestation. The infestation in the western part of the District expanded northeastward to Eby Twp near Kirkland Lake. The Larder Lake infestation expanded westward as well. Moderate-to-severe defoliation persisted in infested areas (see map, page 38).

(cont'd)

Spruce Budworm, *Choristoneura fumiferana* (Clem.) (cont'd)

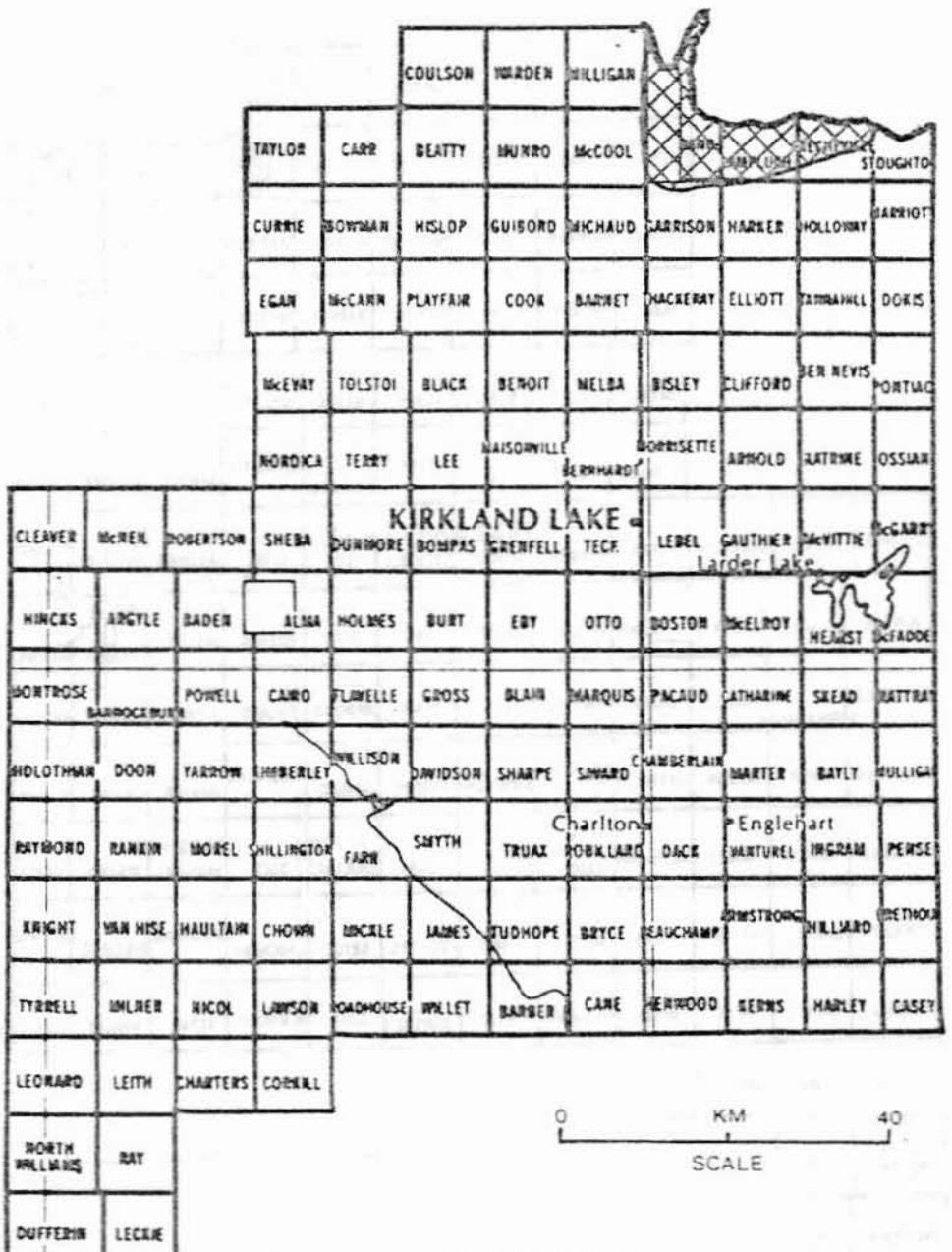
Year	Remarks
1975	The area of infestation expanded for the ninth consecutive year to include host stands through all but about 15 townships in the northwest corner and six townships in the southeast corner of the District. Moderate-to-severe defoliation occurred through most of the infested area (see map, page 39). Repeated budworm defoliation over the past several years has caused whole-tree or top mortality in Charters, Milner, Willett, Barber and Cane twps (see map, page 40).
1976	The area of infestation expanded, with the result that host stands throughout the District were infested by the insect. Moderate-to-severe defoliation (25 to 100% loss of current foliage) occurred through the infested area (see map, page 41). The area and incidence of mortality increased in the southwest quarter of the District. Ground checks at six points revealed an incidence of mortality ranging from 3 to 75% (see map, page 42). A chemical spray was applied over 80 ha to minimize budworm-caused damage at the Swastika Forest Station.
1977	There was no lessening in intensity of the attack. Defoliation was generally more severe than in previous years, and backfeeding on the old foliage was observed at many locations (see map, page 43). Mortality spread over a larger area and increased in intensity in the western part of the District. Ground checks at 14 points revealed an incidence ranging from 8 to 70% (see map, page 44). Aerial spray operations with the chemical Matacil were carried out to minimize budworm-caused damage over 160 ha at the Swastika Forest Station and Burt Twp Seed Production Area (SPA).
1978	Attacks by the budworm continued unabated in susceptible stands, and defoliation was generally severe in the area (see map, page 45). There was little change in the area in which mortality occurred; however, the incidence increased and ranged from 11 to 95% (see map, page 46). Chemical spraying operations were carried out at the Swastika Forest Station and Burt Twp SPA. The chemicals Matacil and Orthene (one application of each) were sprayed at the former and Matacil (two applications) at the latter location.

(cont'd)

Spruce Budworm, *Choristoneura fumiferana* (Clem.) (concl.)

Year	Remarks
1979	Moderate-to-severe infestations continued in susceptible stands except in a few townships in the southeast corner of the District (see map, page 47). A considerable increase in the area in which tree mortality occurred was noted in the western part, and some mortality also occurred in the eastern part of the District. Budworm-associated tree mortality in the above areas ranged from 23 to 86% (see map, page 48). Chemical spraying operations with either Matacil or Orthene were repeated at the Swastika Forest Station and Burt Twp SPA. In addition to the above, high-value stands through 1,579 ha in Lamplugh Twp and 9,597 ha in Elliott Twp were sprayed.
1980	Moderate-to-severe defoliation recurred through most susceptible stands (see map, page 49). Tree mortality spread into stands through about 75% of the District and ranged from 1 to 97% at 25 points examined (see map, page 50). Chemical spray operations were repeated to minimize budworm damage in Burt Twp SPA and in high-value stands in Lamplugh and Elliott twps. A total of 9,102 ha were sprayed with Matacil, Orthene or Novabac.

KIRKLAND LAKE DISTRICT



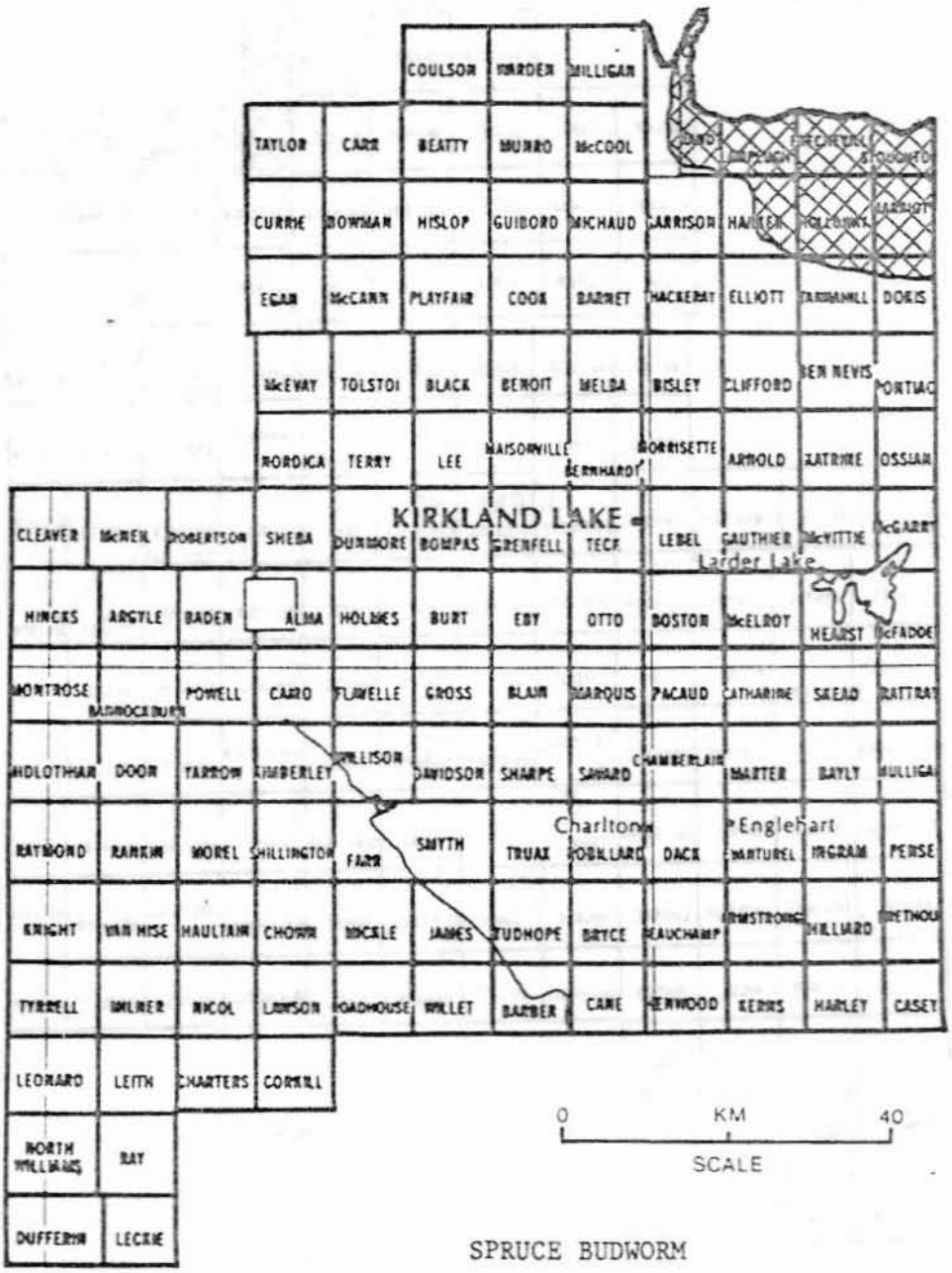
SPRUCE BUDWORM

Areas within which defoliation occurred in 1950

LEGEND

Moderate-to-severe defoliation

KIRKLAND LAKE DISTRICT



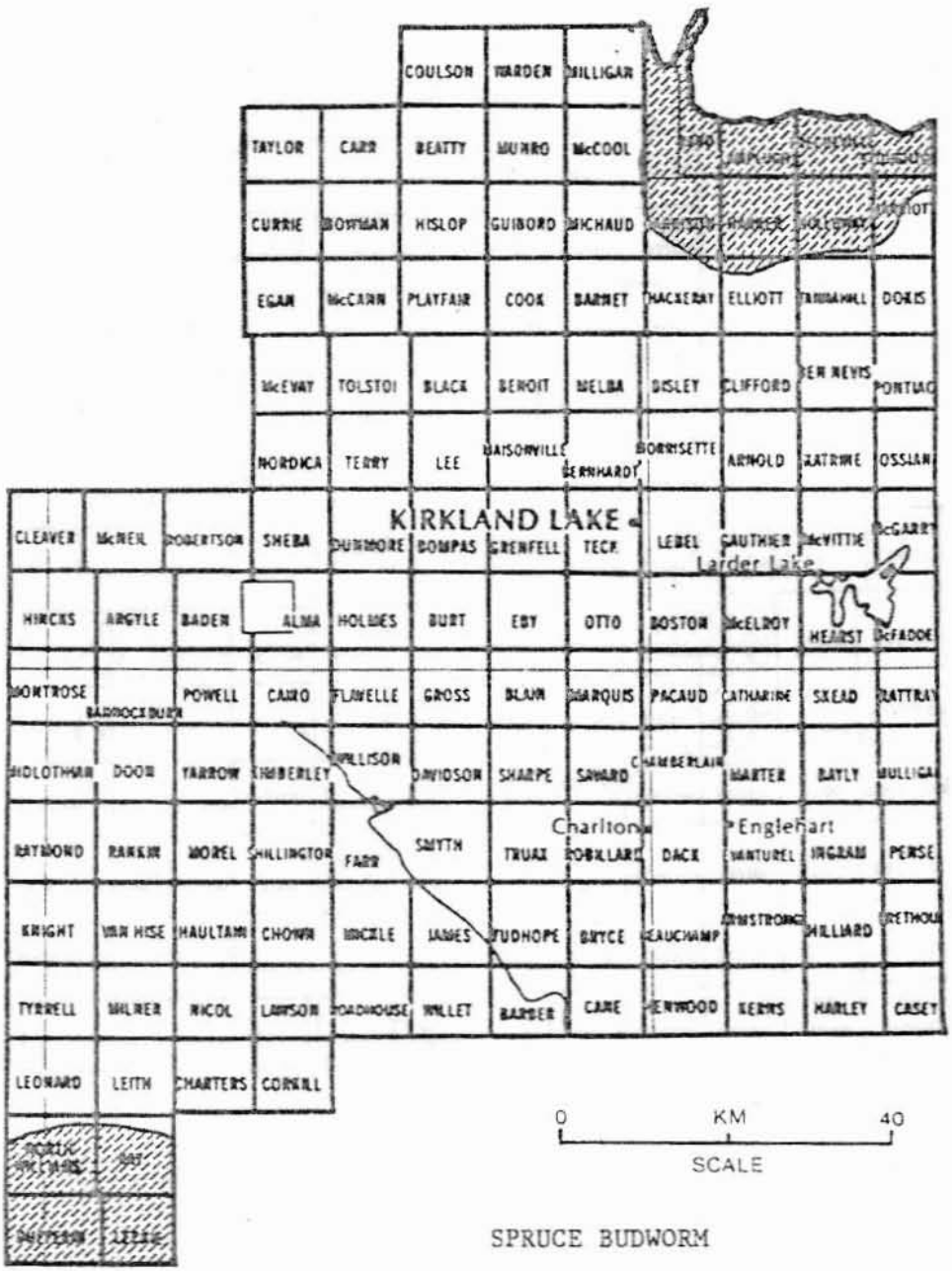
SPRUCE BUDWORM

Areas within which defoliation occurred in 1951

LEGEND

Moderate-to-severe defoliation

KIRKLAND LAKE DISTRICT



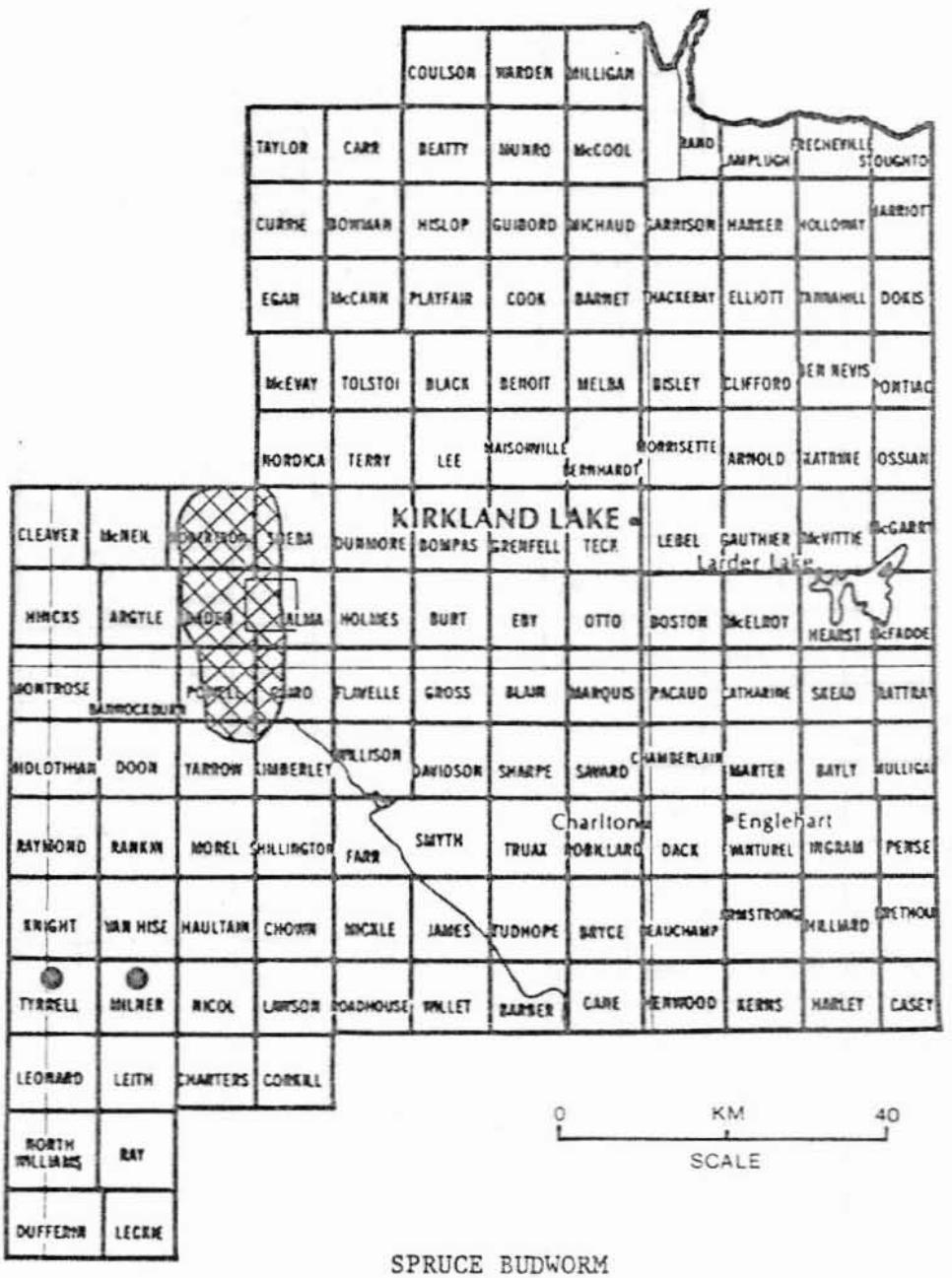
SPRUCE BUDWORM

Areas within which balsam fir whole-tree and top mortality occurred in 1951

LEGEND

Mortality

KIRKLAND LAKE DISTRICT



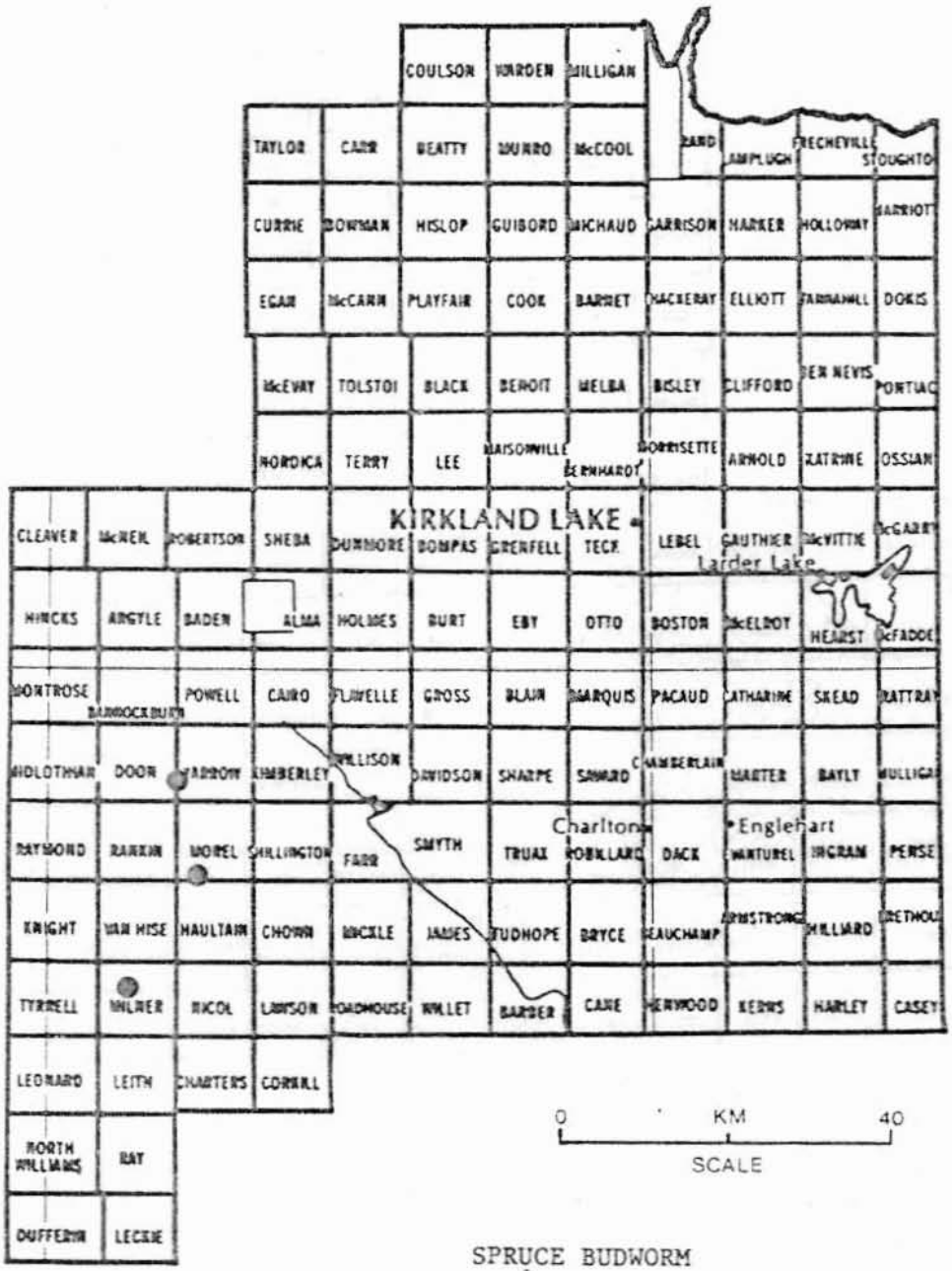
SPRUCE BUDWORM

Areas within which defoliation occurred in 1968

LEGEND

Moderate-to-severe defoliation ● or ▨

KIRKLAND LAKE DISTRICT



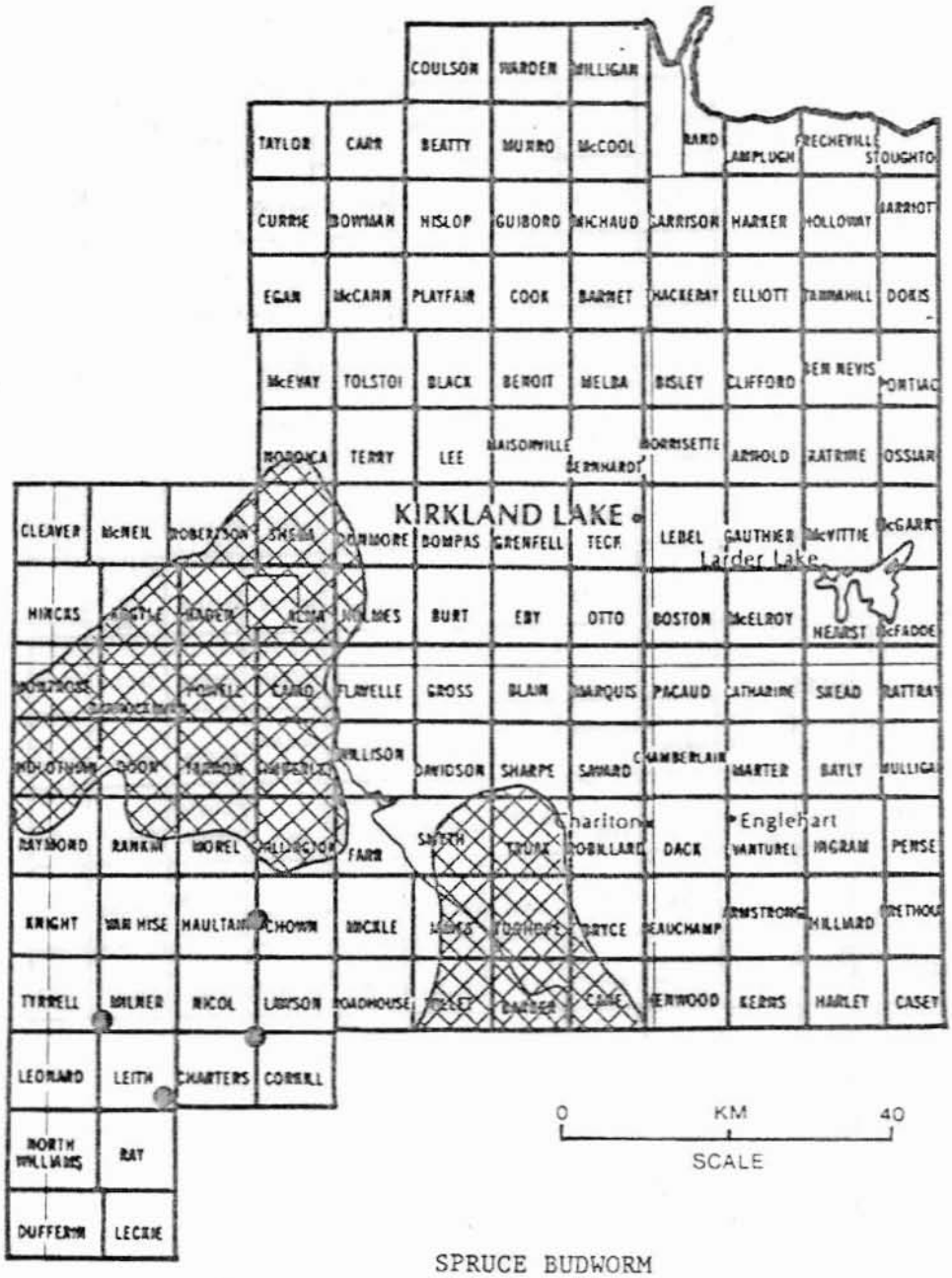
SPRUCE BUDWORM

Areas within which defoliation occurred in 1969

LEGEND

Moderate-to-severe defoliation ●

KIRKLAND LAKE DISTRICT



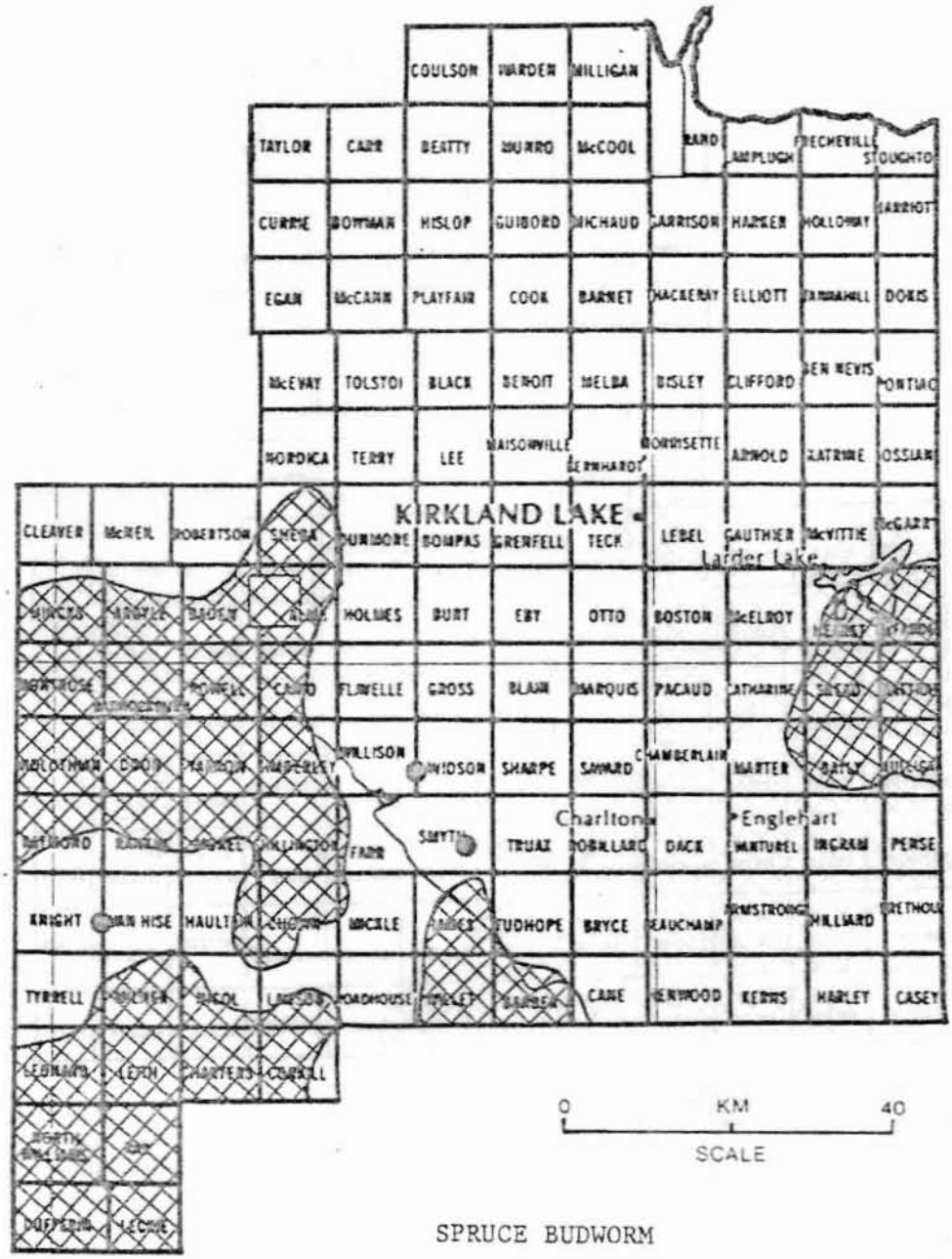
SPRUCE BUDWORM

Areas within which defoliation occurred in 1970

LEGEND

Moderate-to-severe defoliation ● or ▨

KIRKLAND LAKE DISTRICT



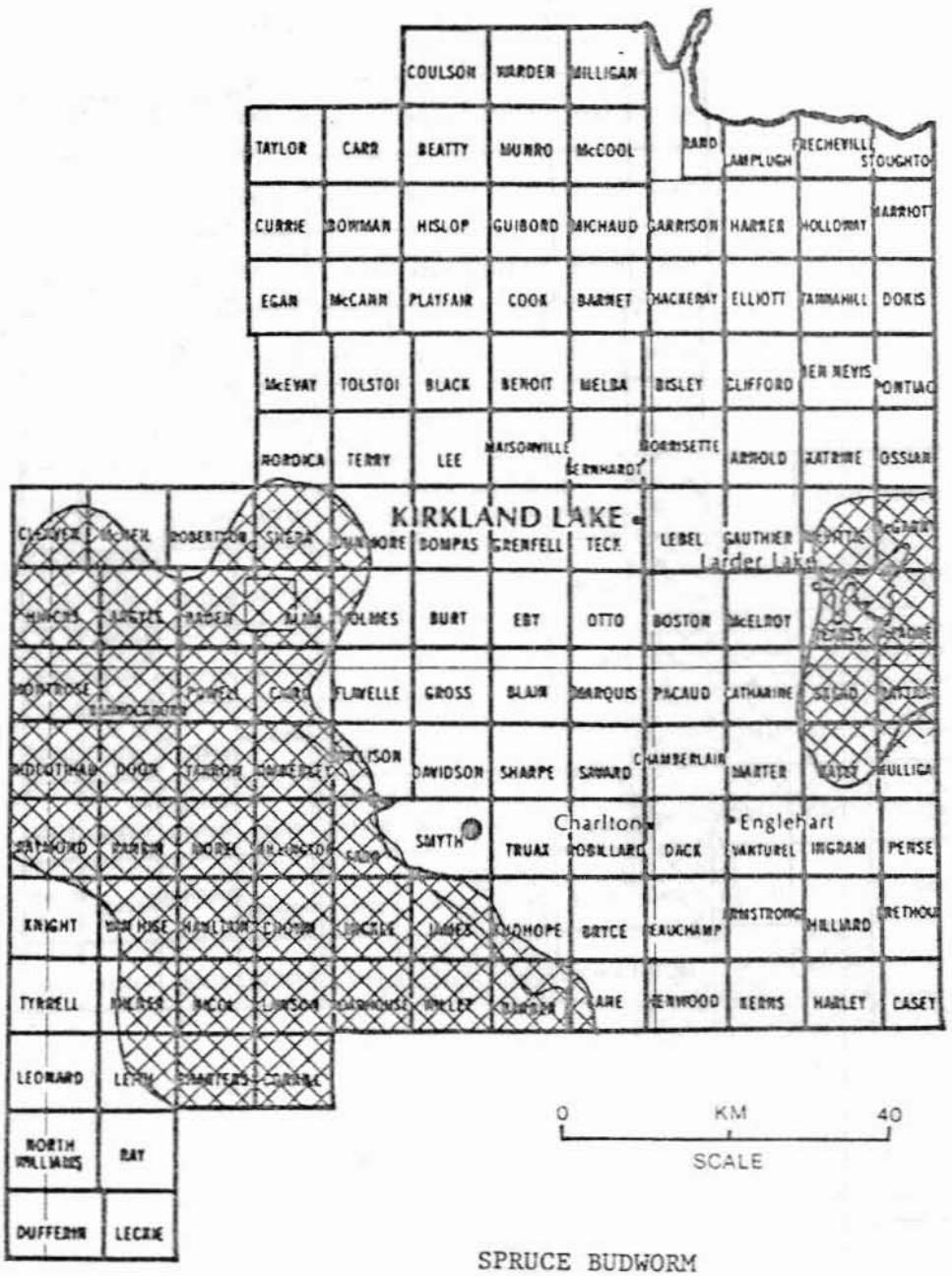
SPRUCE BUDWORM

Areas within which defoliation occurred in 1971

LEGEND

Moderate-to-severe defoliation ● or ▨

KIRKLAND LAKE DISTRICT



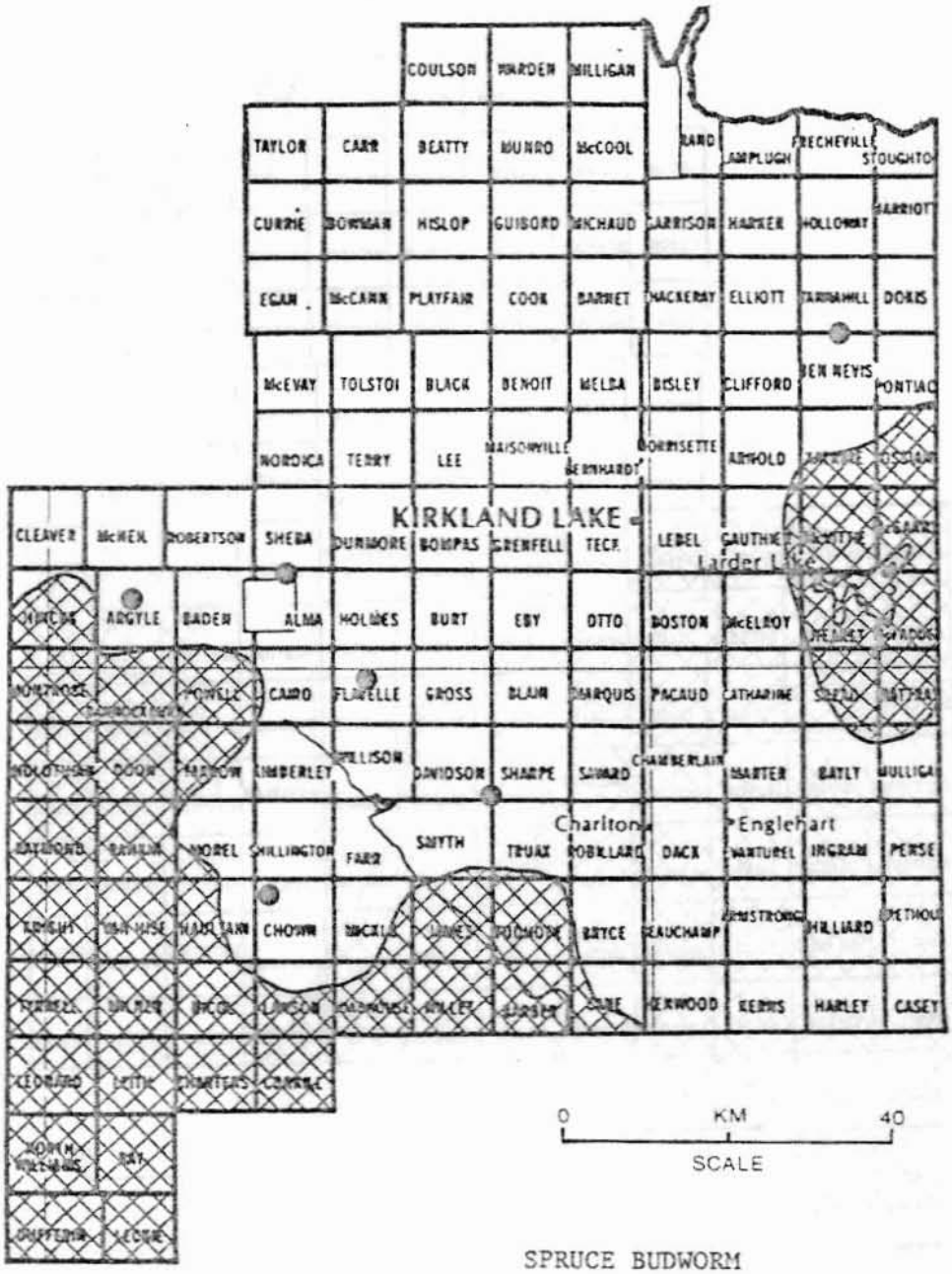
SPRUCE BUDWORM

Areas within which defoliation occurred in 1972

LEGEND

Moderate-to-severe defoliation ● or ▨

KIRKLAND LAKE DISTRICT



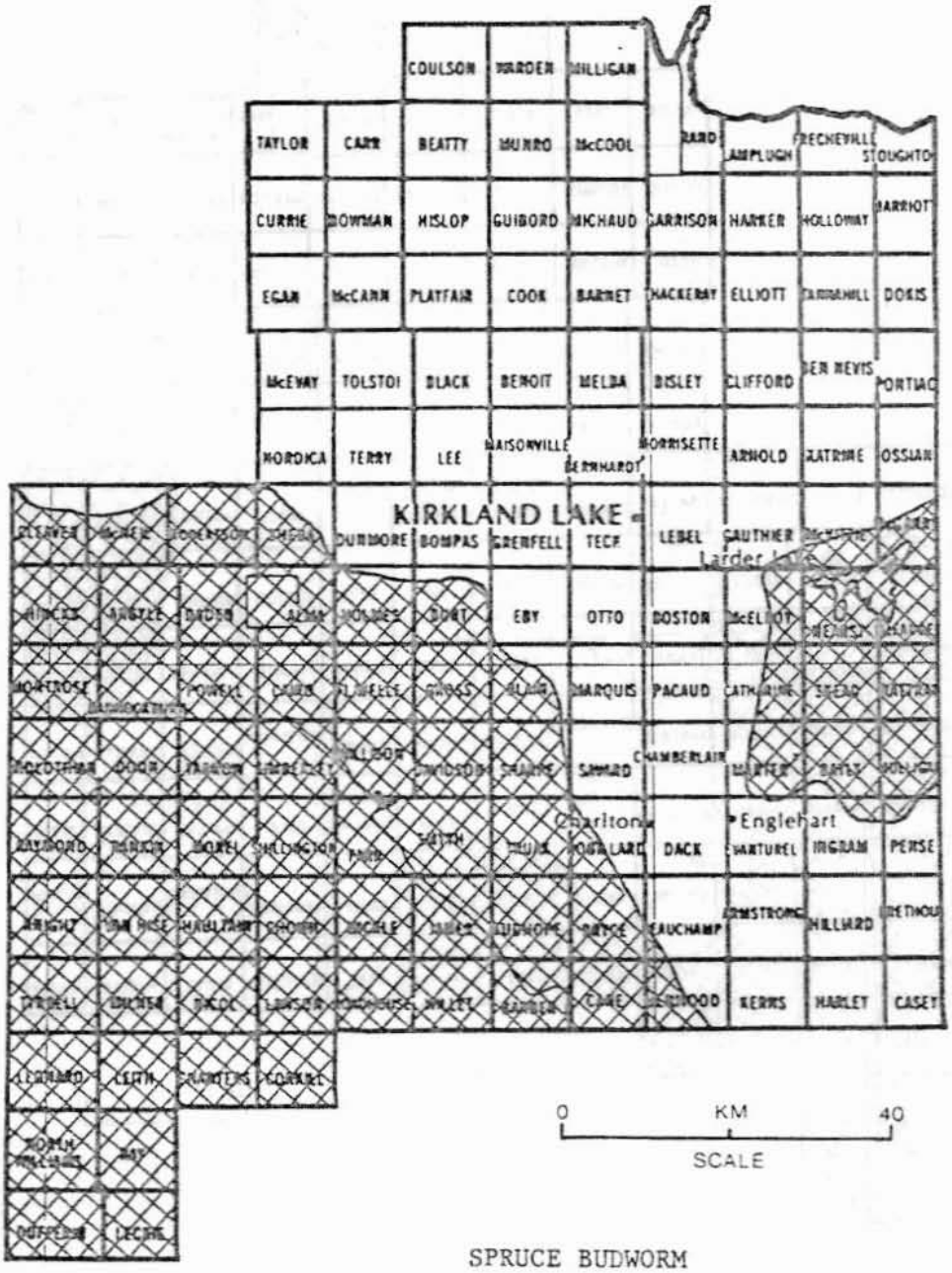
SPRUCE BUDWORM

Areas within which defoliation occurred in 1973

LEGEND

Moderate-to-severe defoliation ● or ▨

KIRKLAND LAKE DISTRICT



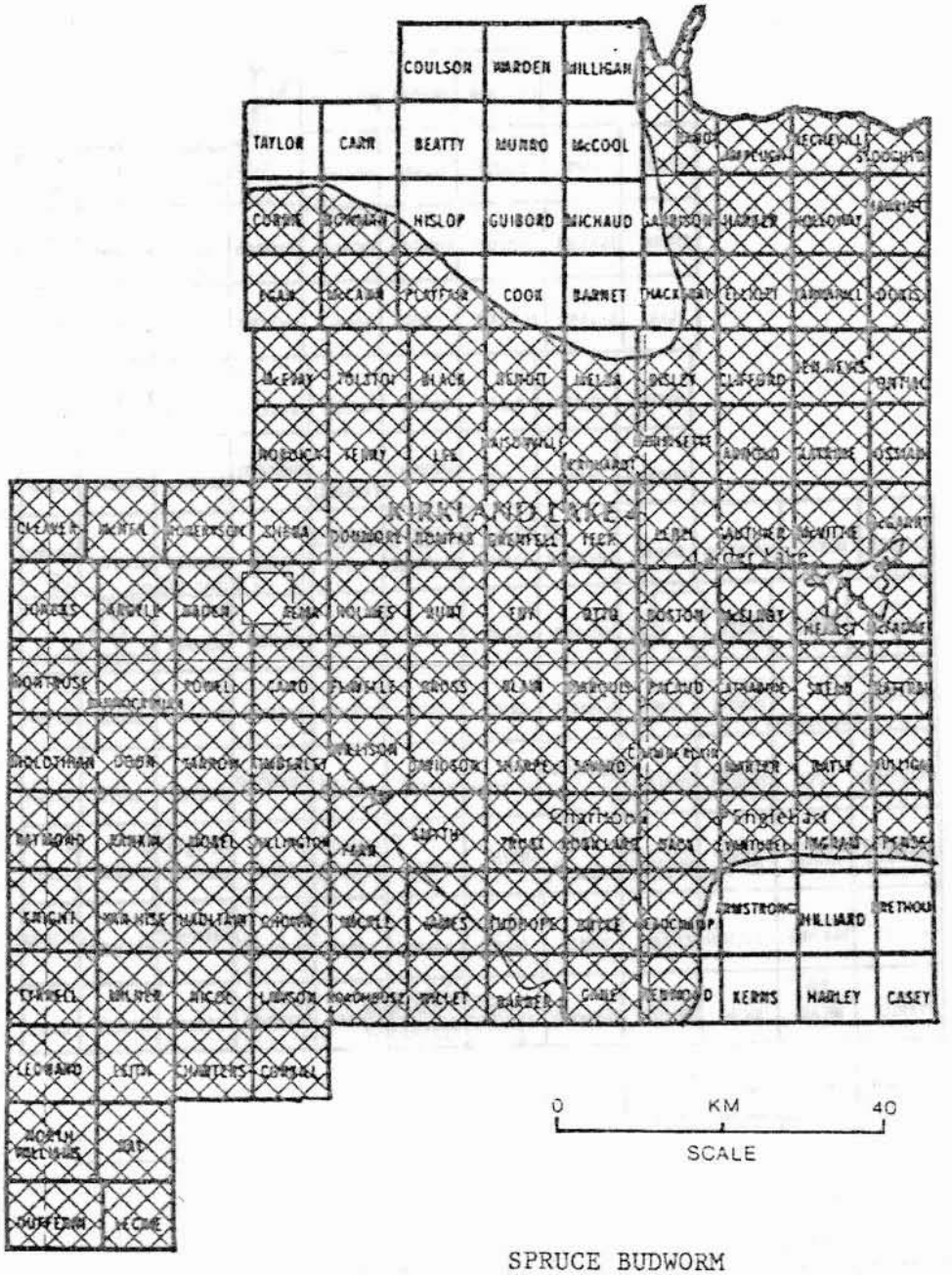
SPRUCE BUDWORM

Areas within which defoliation occurred in 1974

LEGEND

Moderate-to-severe defoliation

KIRKLAND LAKE DISTRICT



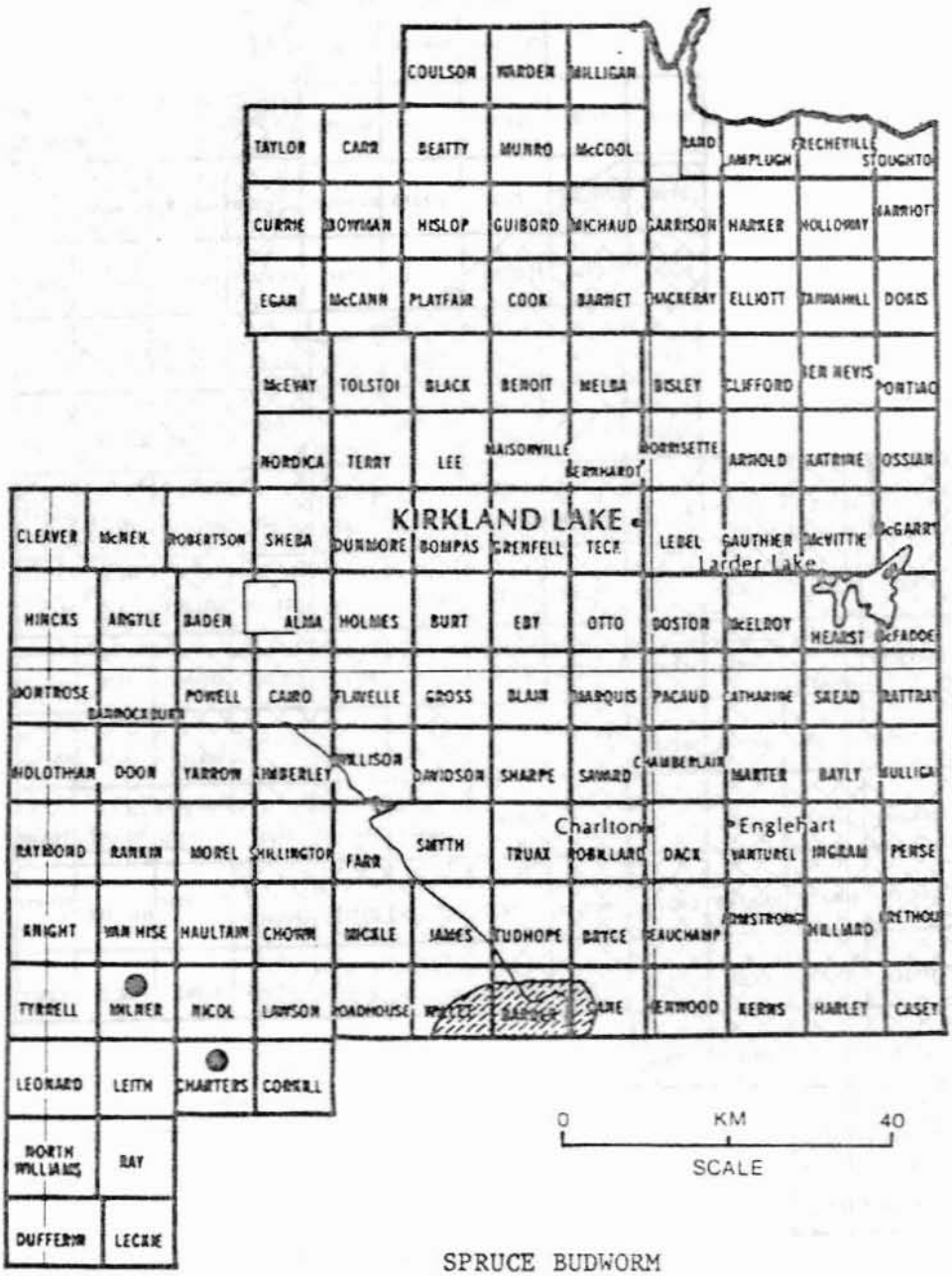
SPRUCE BUDWORM

Areas within which defoliation occurred in 1975

LEGEND

Moderate-to-severe defoliation

KIRKLAND LAKE DISTRICT



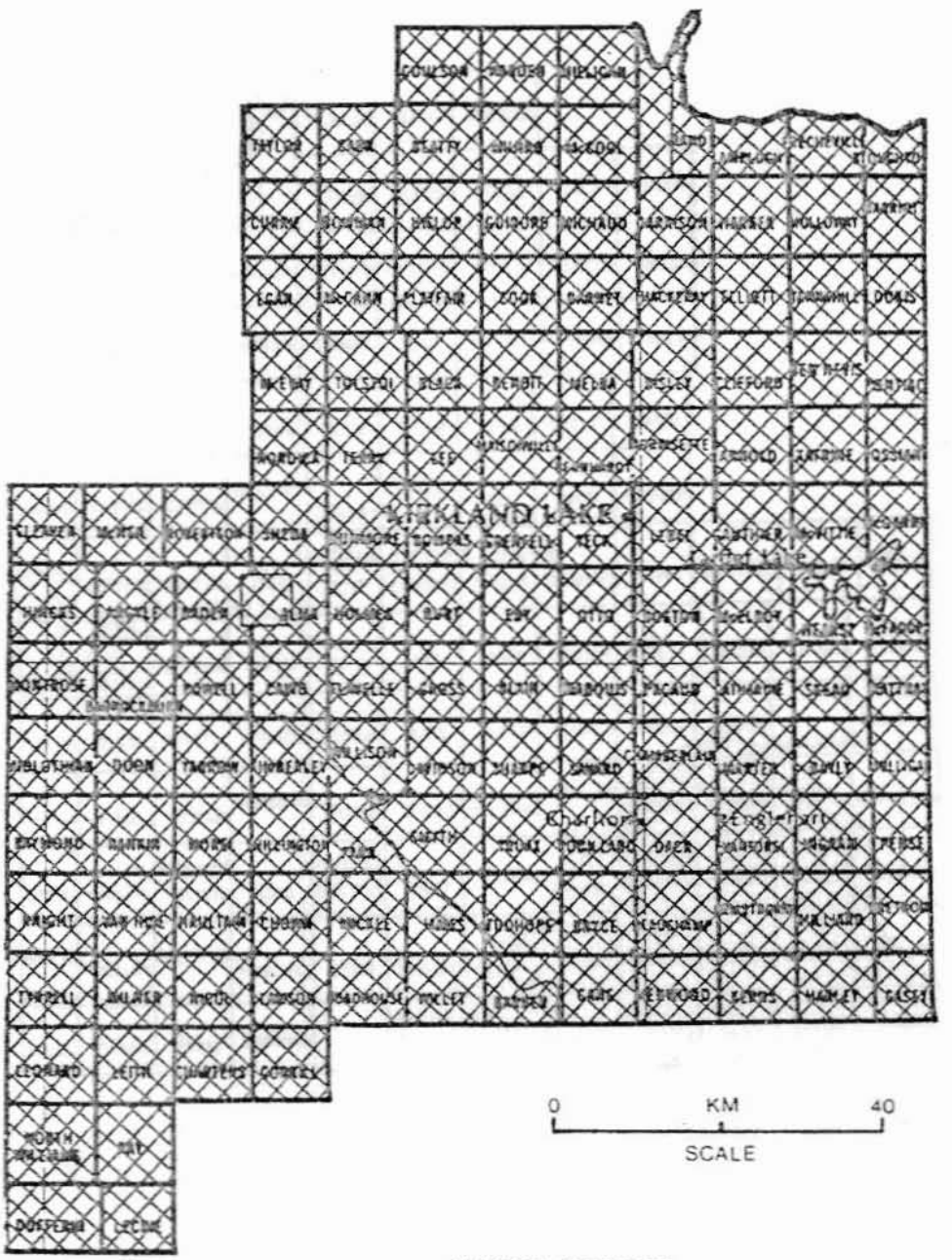
SPRUCE BUDWORM

Areas within which balsam fir whole-tree and top mortality occurred in 1975

LEGEND

Mortality ● or ▨

KIRKLAND LAKE DISTRICT



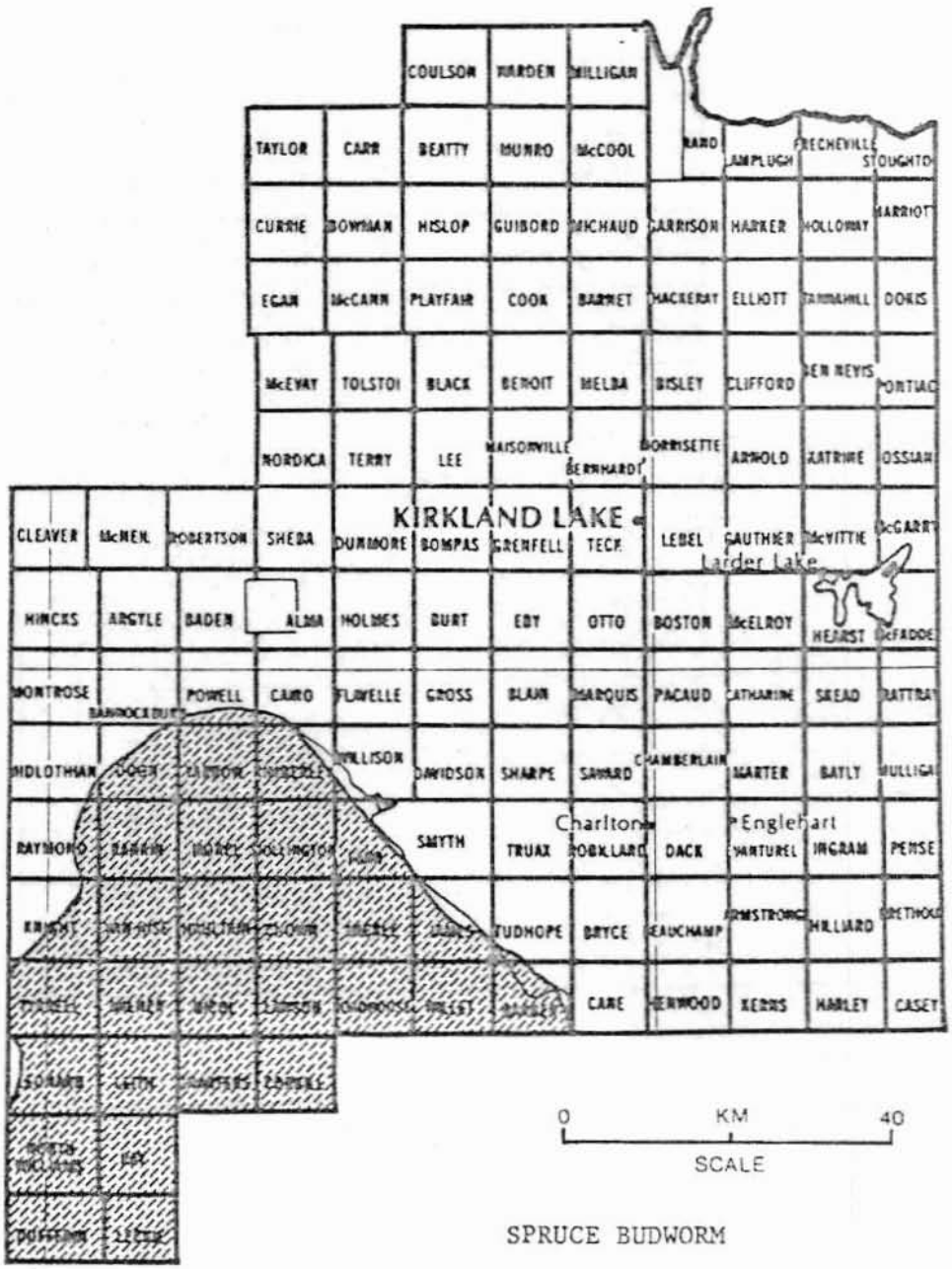
SPRUCE BUDWORM

Areas within which defoliation occurred in 1976

LEGEND

Moderate-to-severe defoliation

KIRKLAND LAKE DISTRICT



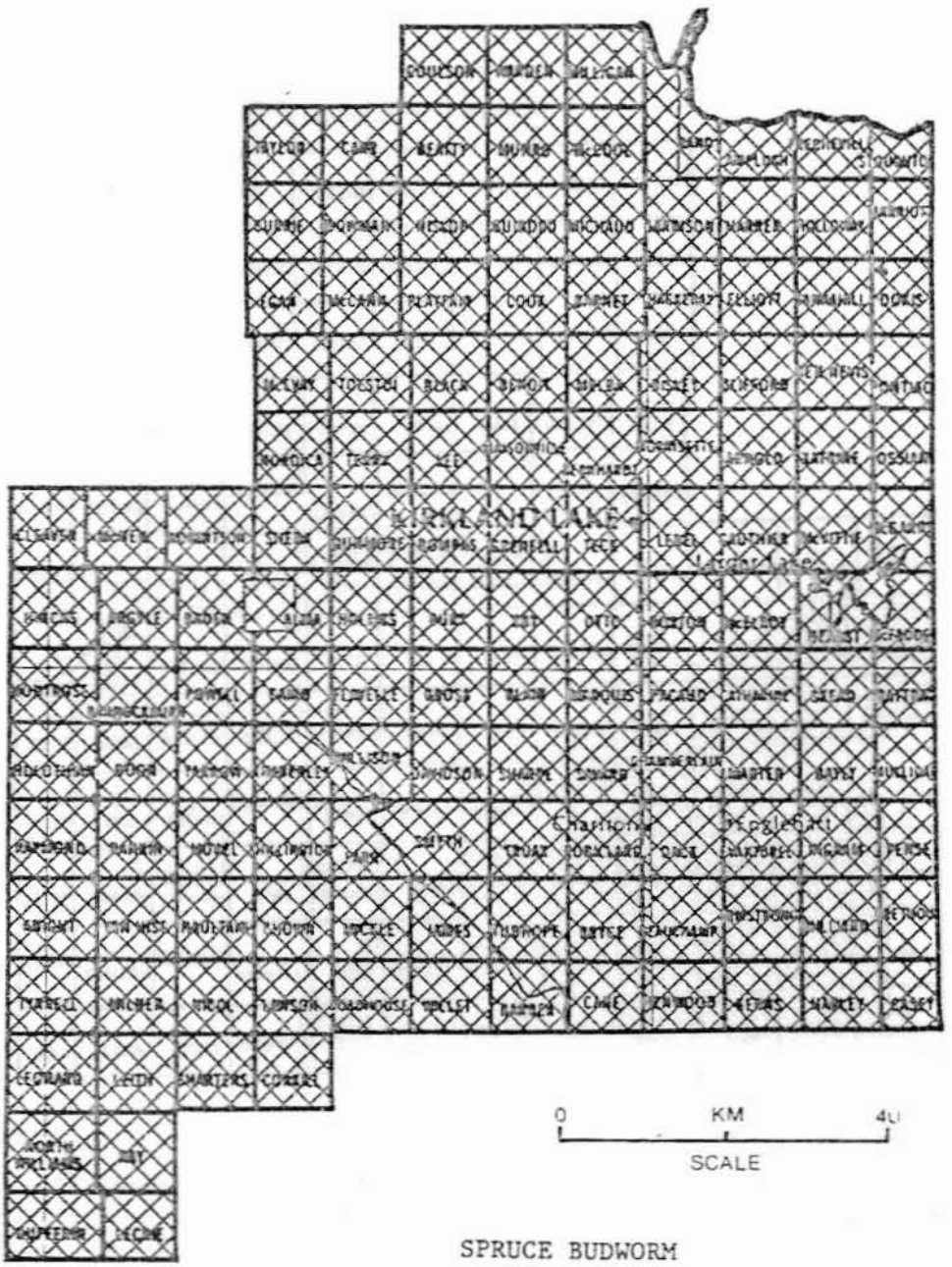
SPRUCE BUDWORM

Areas within which balsam fir whole-tree and top mortality occurred in 1976

LEGEND

Mortality

KIRKLAND LAKE DISTRICT



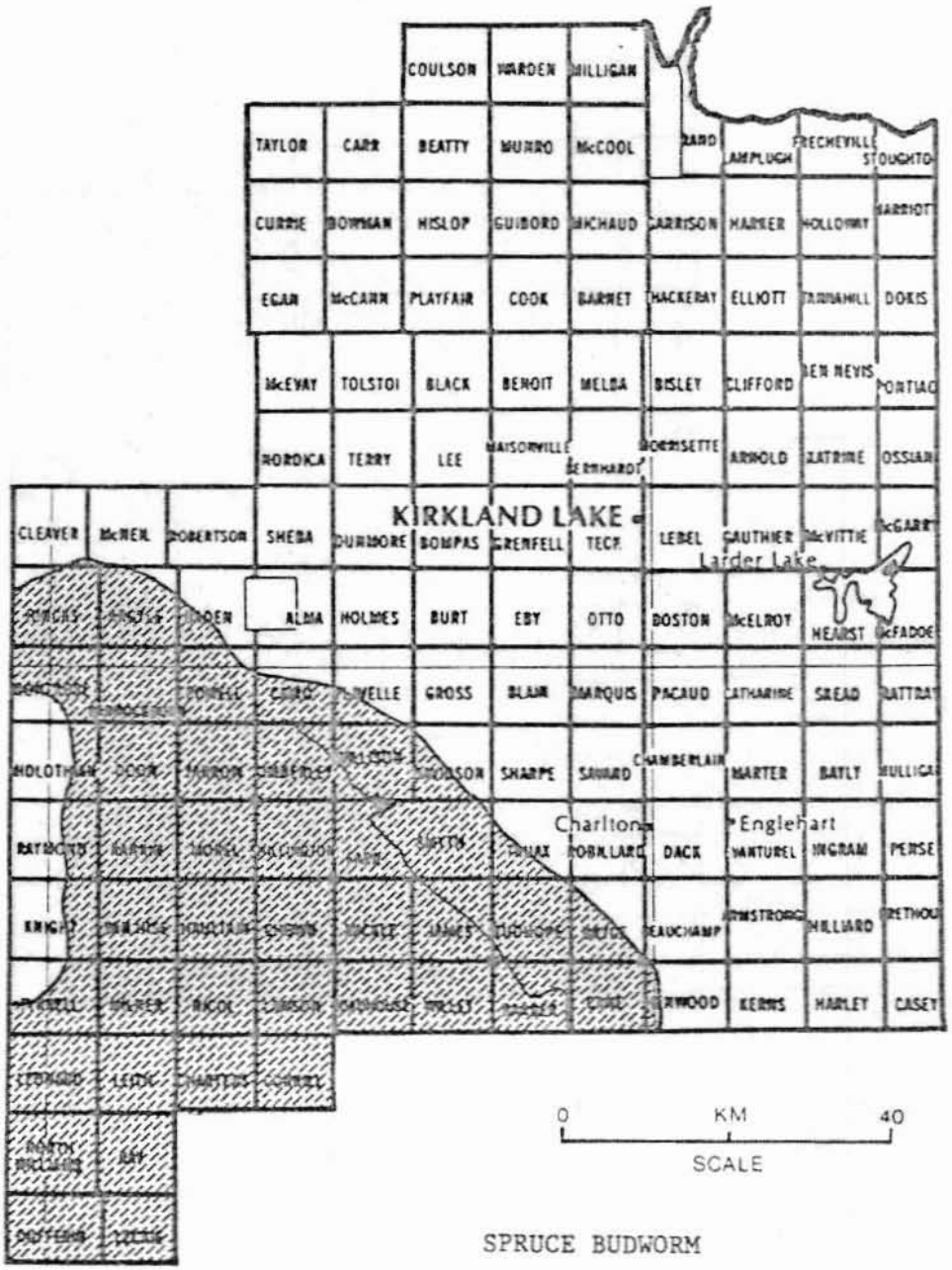
SPRUCE BUDWORM

Areas within which defoliation occurred in 1977

LEGEND

Moderate-to-severe defoliation

KIRKLAND LAKE DISTRICT



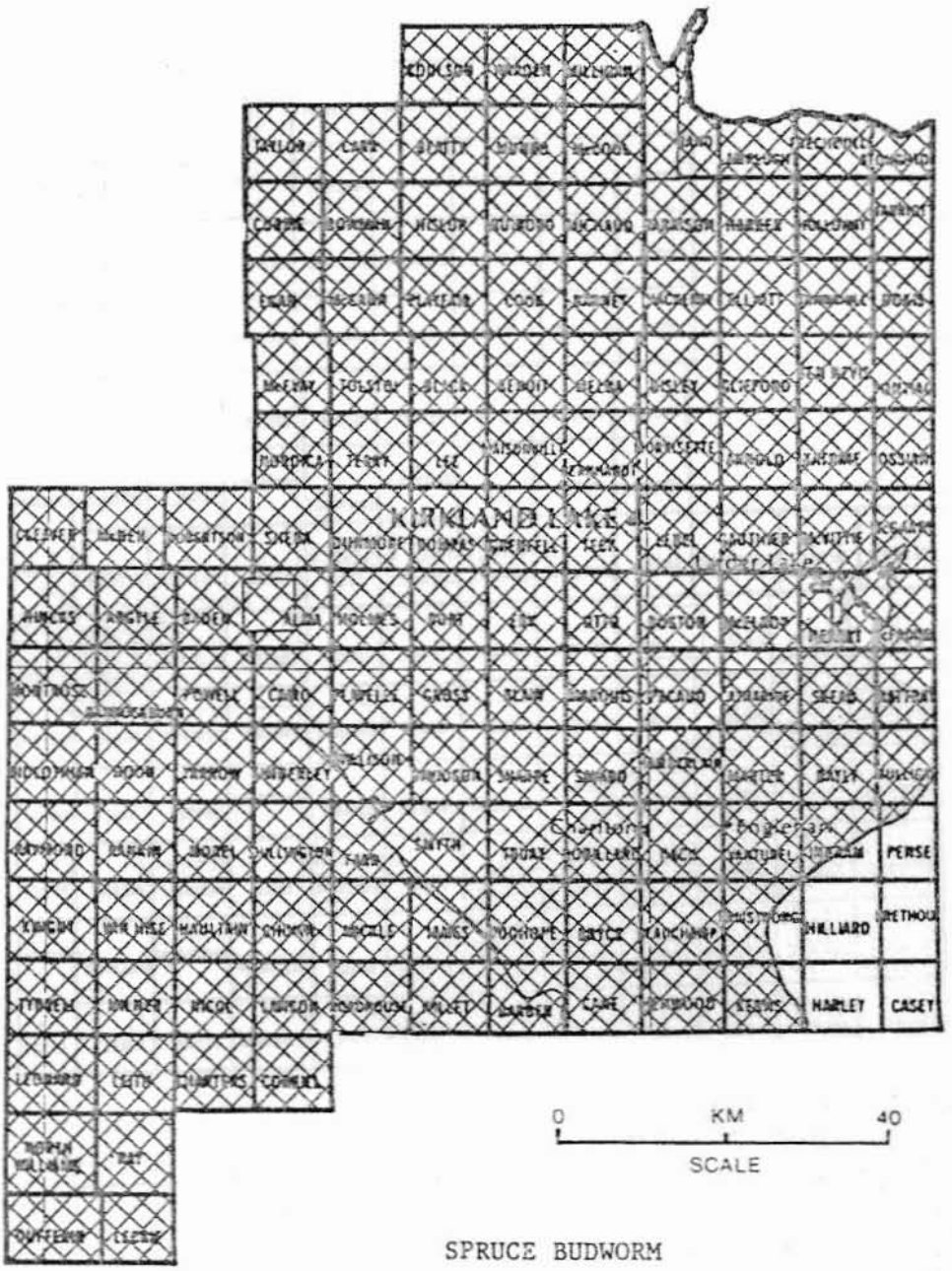
SPRUCE BUDWORM

Areas within which balsam fir whole-tree and top mortality occurred in 1977

LEGEND

Mortality

KIRKLAND LAKE DISTRICT



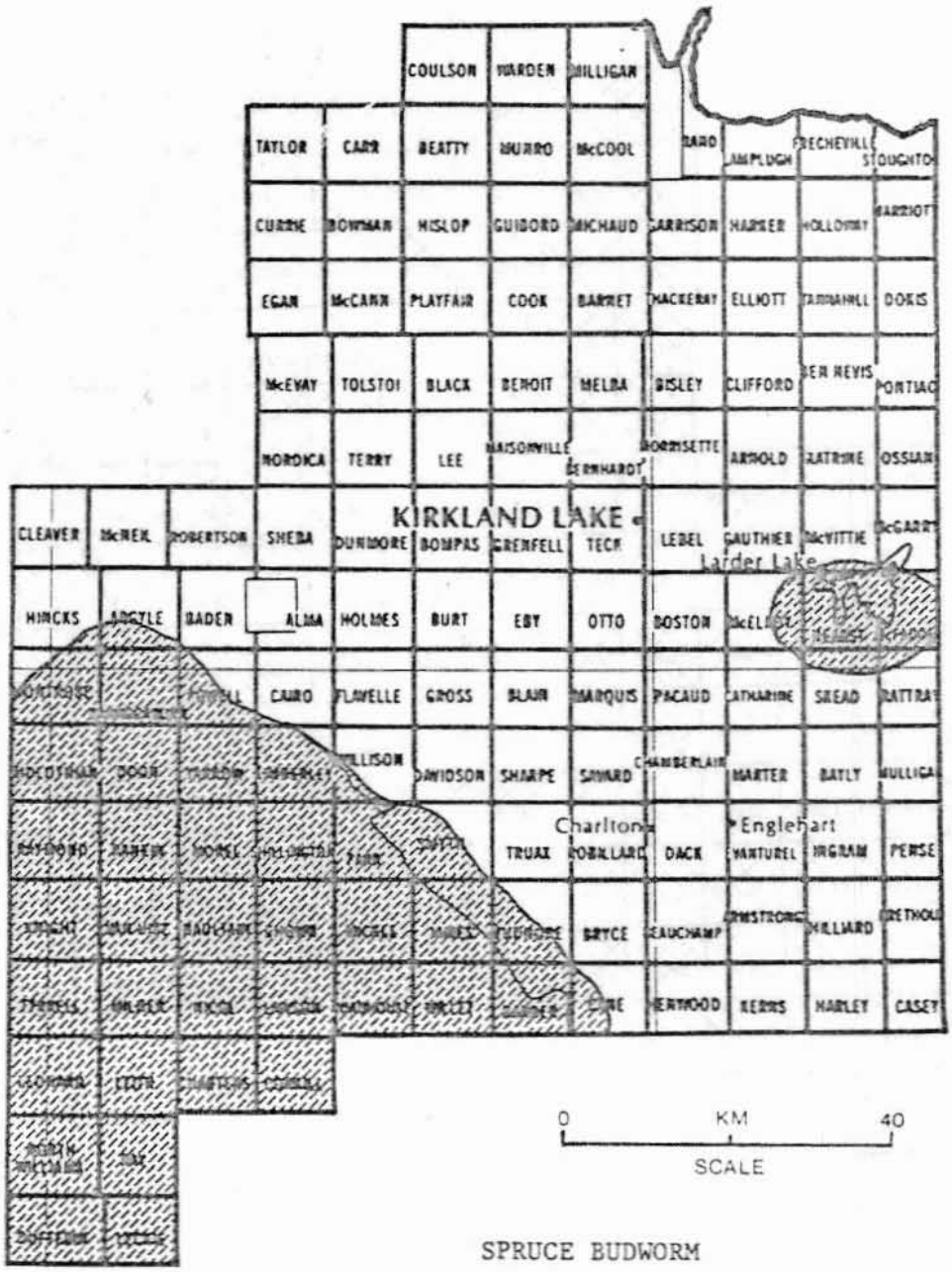
SPRUCE BUDWORM

Areas within which defoliation occurred in 1978

LEGEND

Moderate-to-severe defoliation

KIRKLAND LAKE DISTRICT



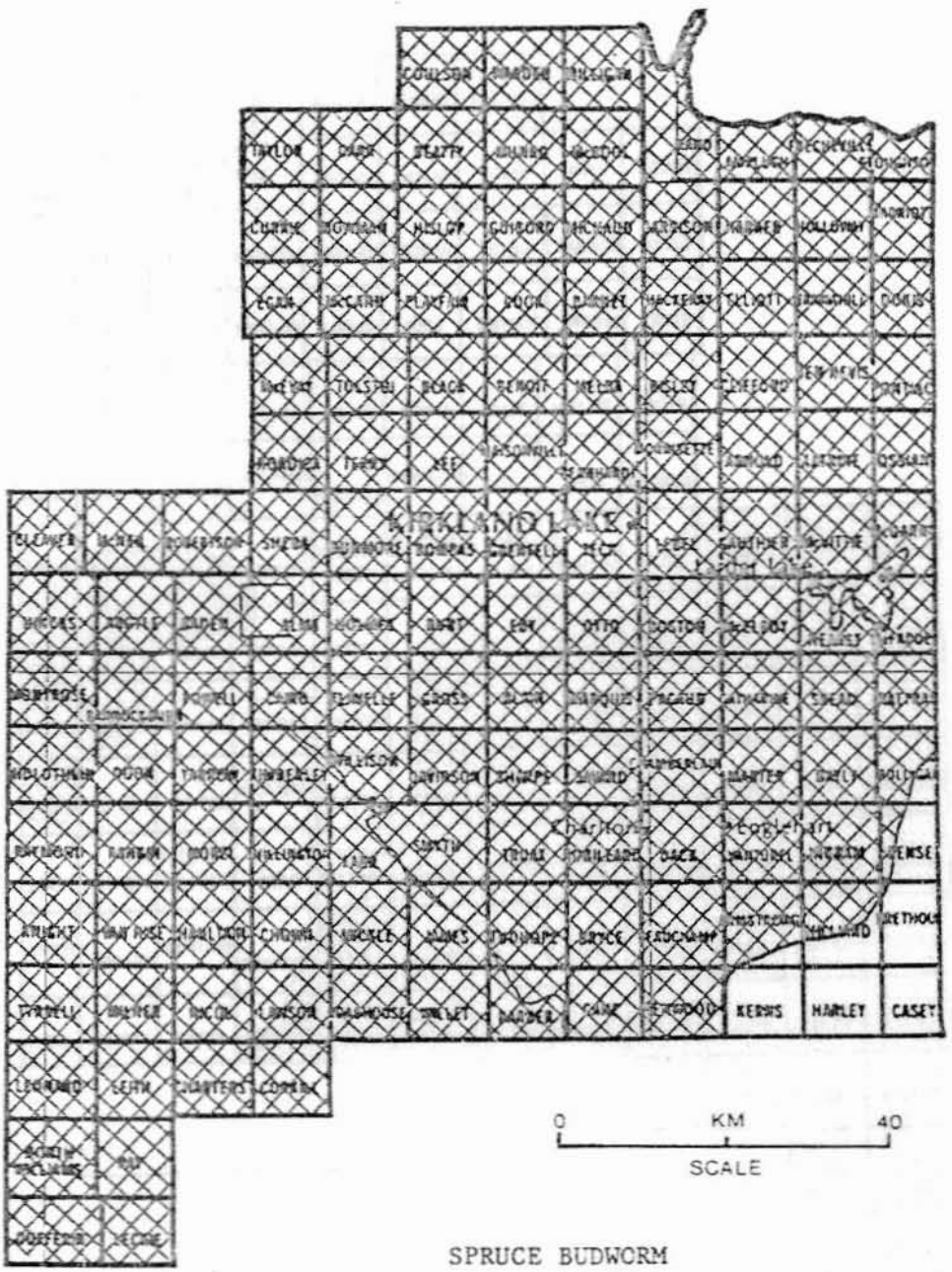
SPRUCE BUDWORM

Areas within which balsam fir whole-tree and top mortality occurred in 1978

LEGEND

Mortality

KIRKLAND LAKE DISTRICT



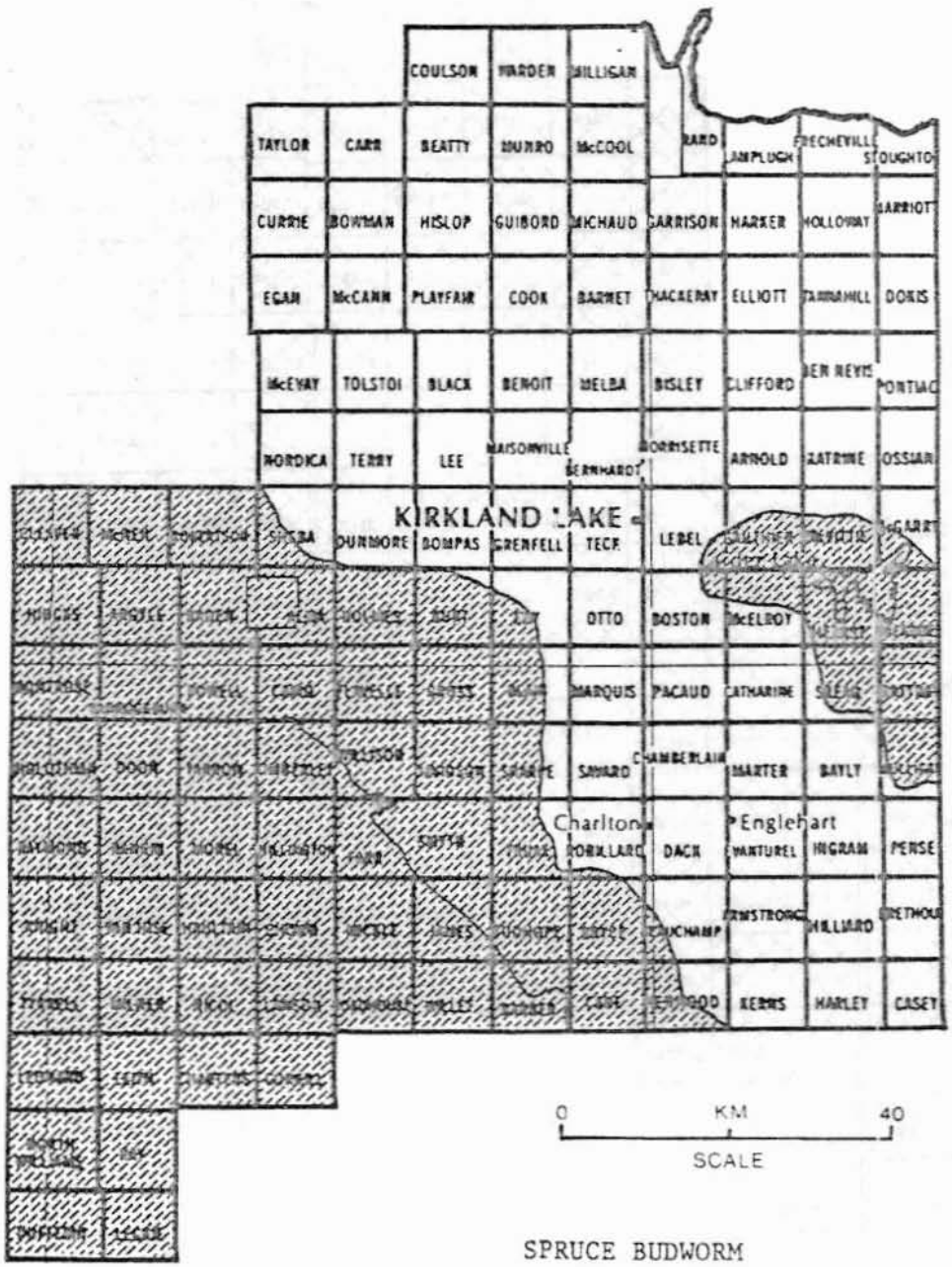
SPRUCE BUDWORM

Areas within which defoliation occurred in 1979

LEGEND

Moderate-to-severe defoliation

KIRKLAND LAKE DISTRICT



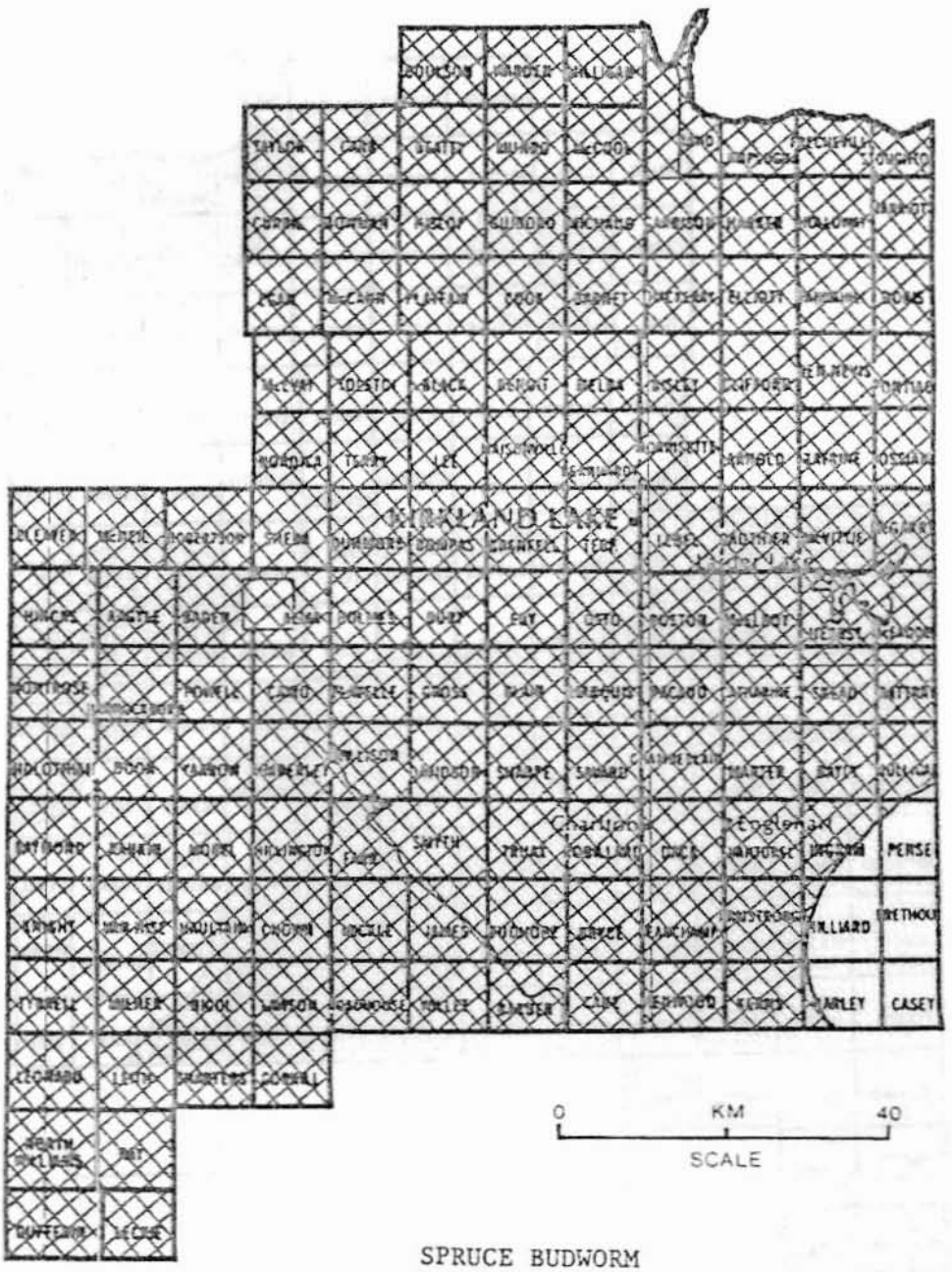
SPRUCE BUDWORM

Areas within which balsam fir whole-tree and top mortality occurred in 1979

LEGEND

Mortality

KIRKLAND LAKE DISTRICT



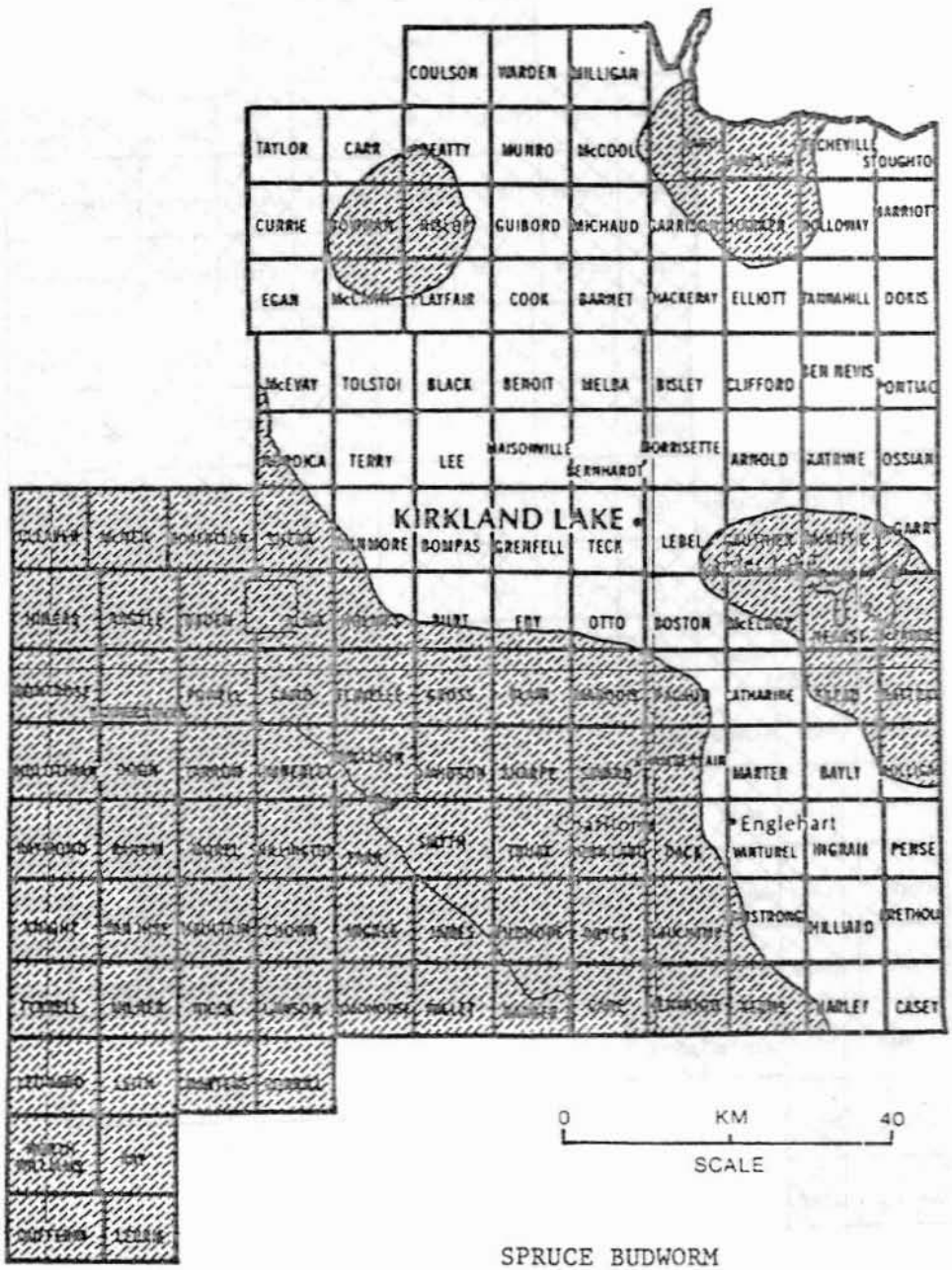
SPRUCE BUDWORM

Areas within which defoliation occurred in 1980

LEGEND

Moderate-to-severe defoliation

KIRKLAND LAKE DISTRICT



SPRUCE BUDWORM

Areas within which balsam fir whole-tree and top mortality occurred in 1980

LEGEND

Mortality

Jack Pine Budworm, *Choristoneura pinus pinus* Free.

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

Year	Remarks
1950-1959	not reported
1960	trace populations in Harker Twp
1961-1965	not reported
1966	Light infestations occurred in Ingram Twp. Low numbers were observed at scattered points elsewhere.
1967	Populations increased and light infestations were observed in Burt, McEvay and Davidson twps. Low numbers were common in jack pine stands in the Kirkland Lake-Larder Lake area.
1968	Populations declined to a trace level.
1969-1973	not reported
1974	trace population in Beauchamp Twp
1975	Low populations in Beauchamp, Burt and Nordica twps
1976-1980	not reported

Larch Casebearer, *Coleophora laricella* (Hbn.)

Host(s): larch [Major]

Year	Remarks
1950-1951	not reported
1952	Low numbers in Gauthier, Otto, Marter, Evanturel and Pense twps
1953	Low numbers in Lebel, Gauthier and McVittie twps
1954	Populations increased and caused light defoliation in larch stands in the Kirkland Lake-Larder Lake area. Low numbers were observed at numerous points elsewhere.

(cont'd)

Larch Casebearer, *Coleophora laricella* (Hbn.) (cont'd)

Year	Remarks
1955	There was little change in population levels over the previous year. Light infestations persisted in the Kirkland Lake-Larder Lake area.
1956	Although populations were widely distributed, a decrease in numbers was noted.
1957	Populations declined for the second consecutive year to reach a low ebb in the District.
1958-1961	not reported
1962	low numbers observed at widely separated locations
1963	low populations occurred at numerous points.
1964	An increase in numbers occurred. Light infestations were observed in McGarry, Teck and Bannockburn twps.
1965	Populations continued to increase and caused light defoliation in Montrose, Harker and Holloway twps. Low numbers were commonly observed throughout the remainder of the District.
1966	Population increased for the third consecutive year and caused moderate defoliation in Powell Twp. Light damage was observed in McGarry, Hearst and Hilliard twps.
1967	A marked decrease in populations occurred. Only small numbers could be found at widely separated points.
1968	A general increase in populations was noted and light defoliation was observed in Marter Twp.
1969	Populations decreased to very low numbers at scattered points.
1970	not reported
1971	small numbers common at many points
1972	moderate defoliation observed in the southern part of the District

(cont'd)

Larch Casebearer, *Coleophora laricella* (Hbn.) (concl.)

Year	Remarks
1973	small pockets of light damage observed at scattered points
1974	Populations decreased; low numbers were observed in Benoit, Grenfell and Hilliard twps.
1975-1977	very low populations at scattered points
1978-1980	only trace populations observed

Jack Pine Tip Beetle, *Conophthorus banksianae* McPherson

Host(s): jP [Minor]

Year	Remarks
1950-1957	not reported
1958	low numbers observed at two points
1959-1961	not reported
1962	trace populations observed at four points
1963	Light damage occurred at numerous points.
1964-1972	not reported
1973	High populations occurred and caused conspicuous shoot mortality in jack pine plantations.
1974	High populations persisted and caused considerable damage to new shoots of small jack pine trees in Beauchamp, Cairo and Davidson twps.
1975	High populations recurred and caused considerable shoot mortality on host trees at many points in the western part of the District.
1976-1977	High populations continued to cause considerable shoot mortality in plantations.

(cont'd)

Jack Pine Tip Beetle, *Conophthorus banksianae* McPherson (concl.)

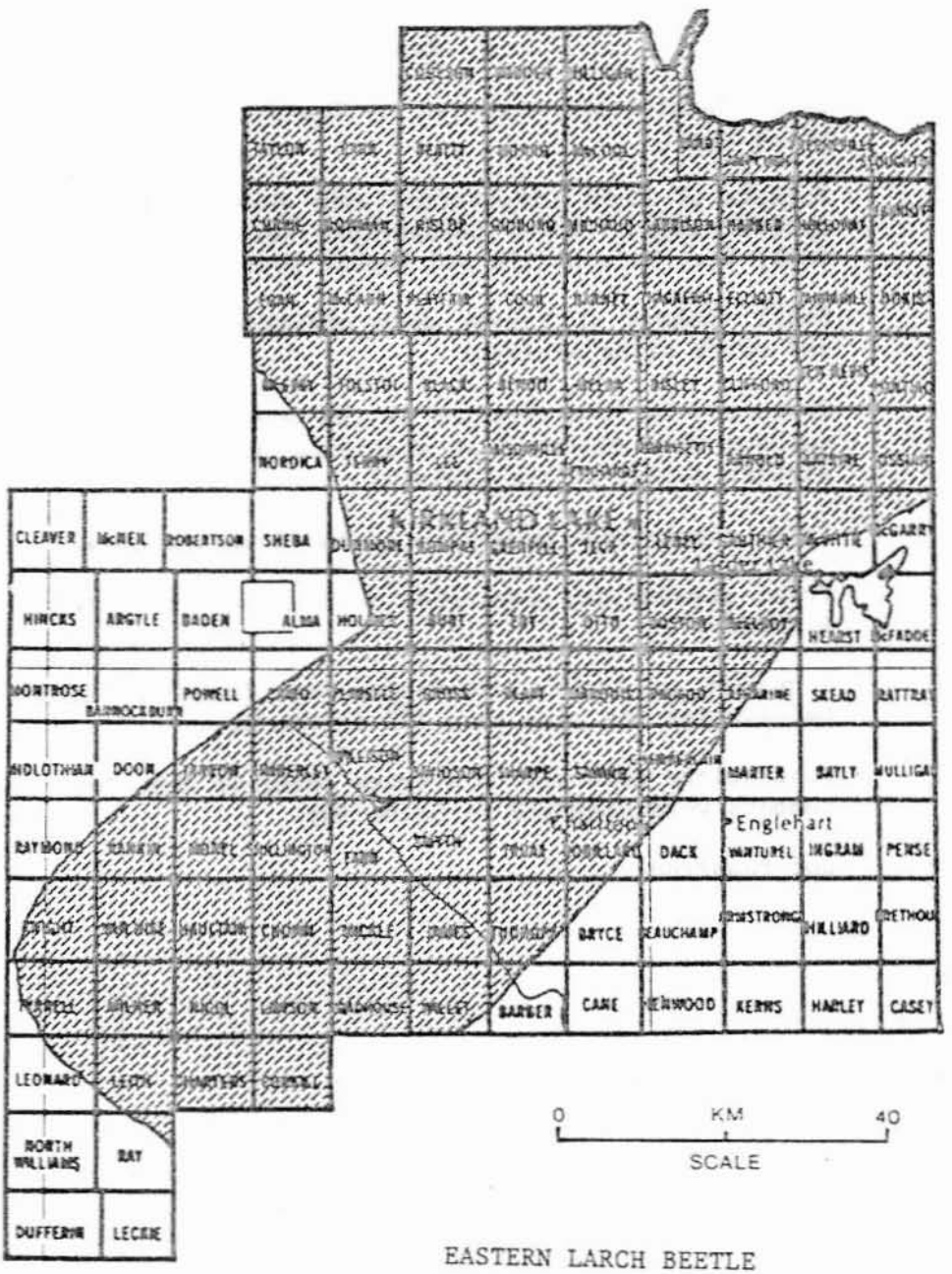
Year	Remarks
1978	Populations persisted and damaged up to 15% of the trees in some areas.
1979	Conspicuous shoot damage was observed at numerous points.
1980	Populations increased and infested 55% of young jack pine trees at one sample point. Elsewhere, varying degrees of damage were commonly observed.

Eastern Larch Beetle, *Dendroctonus simplex* Lec.

Host(s): Tamarack [Minor]

Year	Remarks
1950-1960	not reported
1961	Beetle populations were a factor contributing to mortality in tamarack stands at a few points
1962	populations present in 50% of the larger trees in stands within the area where tree mortality continued to occur (see map, page 55)
1963	Populations declined to a low level.
1964-1980	not reported

KIRKLAND LAKE DISTRICT



EASTERN LARCH BEETLE

Areas within which mortality occurred in 1962

LEGEND

Mortality

Greenstriped Mapleworm, *Dryocampa rubicunda rubicunda* (Fabr.) [Major]

Host(s): maple

Year	Remarks
1950	Light defoliation occurred in Grenfell, Lee and Maisonville twps.
1951	Pockets of light infestation were observed in Milner and Tyrrell twps. Trace populations were recorded in Grenfell, Lee, Maisonville and Benoit twps.
1952	Small numbers of larvae were observed west of Gowganda and north of Matachewan.
1953	Trace populations recurred in the Gowganda area and small numbers were observed at scattered points in the southeastern corner of the District.
1954	Trace populations persisted in the Gowganda area.
1955-1958	Trace populations persisted in the western part of the District.
1959	A pocket of light infestation was found in Alma Twp. Defoliation was less than 10% in the area.
1960-1961	Populations declined to a trace level in Alma Twp. Small numbers were observed in Cairo Twp.
1962-1980	not reported

Aspen Defoliators, *Enargia decolor* (Wlk.), *Gonioctena americana* (Schaef.), and *Pseudexentera oregonana* Wlsh. [Major]

Host(s): aspen

Year		Remarks
1950	*G. americana*	Small pockets of defoliation ranging from 20 to 90% were observed at scattered points.
1957-1960	*G. americana*	Light damage was observed on small regeneration trees at several points.
1961	*G. americana*	Light defoliation occurred in Milner, Otto and Nordica twps.
1962	*E. decolor*	A medium infestation occurred in the south-eastern part of the District and defoliation ranged from 18 to 90% in the area. Small numbers were observed at numerous points elsewhere.
1963	*E. decolor*	Populations declined to light intensity in the southeastern part of the District. Only small numbers could be found elsewhere.
1964	*E. decolor*	Small pockets of light infestation were found in Grenfell and Ingram twps. Populations collapsed elsewhere.
	P. oregonana	Heavy infestations were found in Brethour and Casey twps and low numbers were observed at numeorus points elsewhere in the southeastern part of the District.
1965	*P. oregonana*	Moderate-to-severe defoliation occurred in Armstrong, Harley and Hilliard twps. Light damage was observed at several points elsewhere.
1966	*P. oregonana*	Populations declined to light intensity in Armstrong, Harley and Hilliard twps and new light infestations were found in the northern part of the District.
1967	*G. americana*	Pockets of severe defoliation were observed in the area north and west of Elk Lake.

(cont'd)

Aspen Defoliators, *Enargia decolor* (Wlk.), *Gonioctena americana* (Schaef.), and *Pseudexentera oregonana* Wlsh. (cont'd)

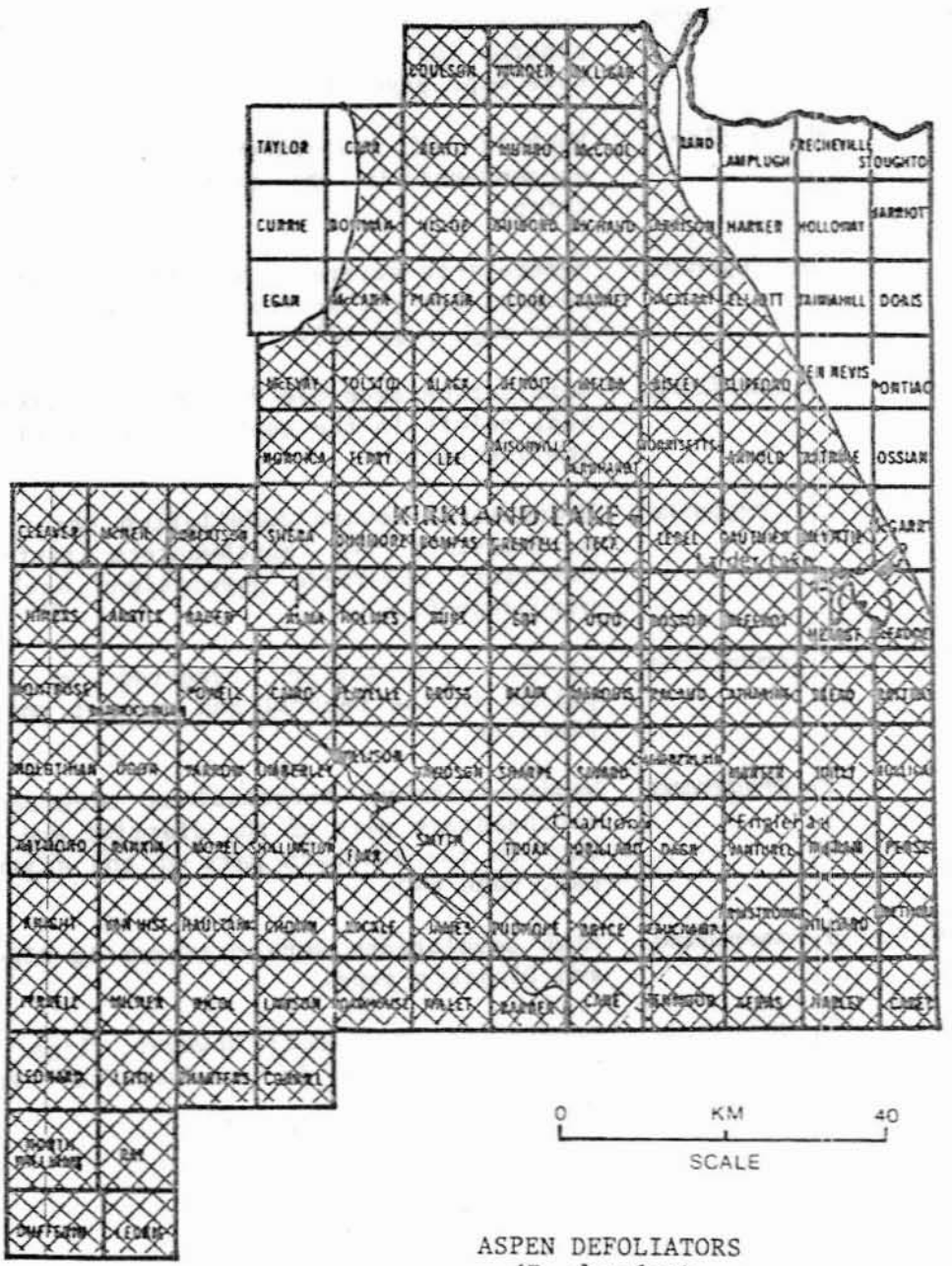
Year		Remarks
1967	*P. oregonana*	A pocket of light defoliation occurred in Casey Twp, and light damage was encountered at numerous points elsewhere.
1968	*G. americana*	Light defoliation occurred in Benoit Twp.
1969	*E. decolor*	low numbers found in Grenfell and Otto twps
1970	*E. decolor*	High populations occurred through more than 75% of the District (see map, page 60).
1971	*E. decolor*	Moderate-to-heavy infestations recurred through a large part of the District.
	G. americana	Severely defoliated trees were observed at scattered points.
1972	*E. decolor*	Populations declined sharply to reach a low level.
1973	*E. decolor*	Only trace populations could be found.
	G. americana	light defoliation observed at scattered points
1974	*G. americana*	Small pockets of severe defoliation were recorded in Ossian, Farr, Lawson and Otto twps.
	P. oregonana	Pockets of light infestation were found in Teck and Lebel twps.
1975	*G. americana*	Pockets of light defoliation were observed in the Elk Lake, Charlton, Matheson and Larder Lake areas.
1976	*G. americana*	A pocket of severe defoliation occurred in Black Twp and small pockets of moderate-to-severe damage were recorded at several points elsewhere.
	E. decolor	Light damage was found in Skead and Carr twps.

(cont'd)

Aspen Defoliators, *Enargia decolor* (Wlk.), *Gonioctena americana* (Schaef.), and *Pseudexentera oregonana* Wlsh. (concl.)

Year		Remarks
1976	*P. oregonana*	Moderate-to-severe defoliation occurred in the central and north-central parts of the District (see map, page 61).
1977	*E. decolor*	Pockets of moderate-to-severe damage were encountered in the central part of the District.
	P. oregonana	Moderate-to-severe defoliation recurred in the central and north-central parts of the District (see map, page 62).
1978	*G. americana*	Defoliation exceeded 90% on small trees at several points in the central and western parts of the District.
	P. oregonana	Moderate-to-severe defoliation occurred in the southeastern and northwestern parts of the District; elsewhere populations declined (see map, page 63).
1979	*G. americana*	Severe defoliation recurred at scattered points in the central and western parts of the District.
	P. oregonana	Medium-to-heavy infestations occurred in the southeastern part of the district and in Hislop Twp in the northern part of the district (see map, page 64).
1980	*G. americana*	High populations were observed in Black, Cook, and Playfair twps.
	P. oregonana	Populations declined; however, light defoliation was observed in the Swastika, Larder Lake and Matheson areas.

KIRKLAND LAKE DISTRICT



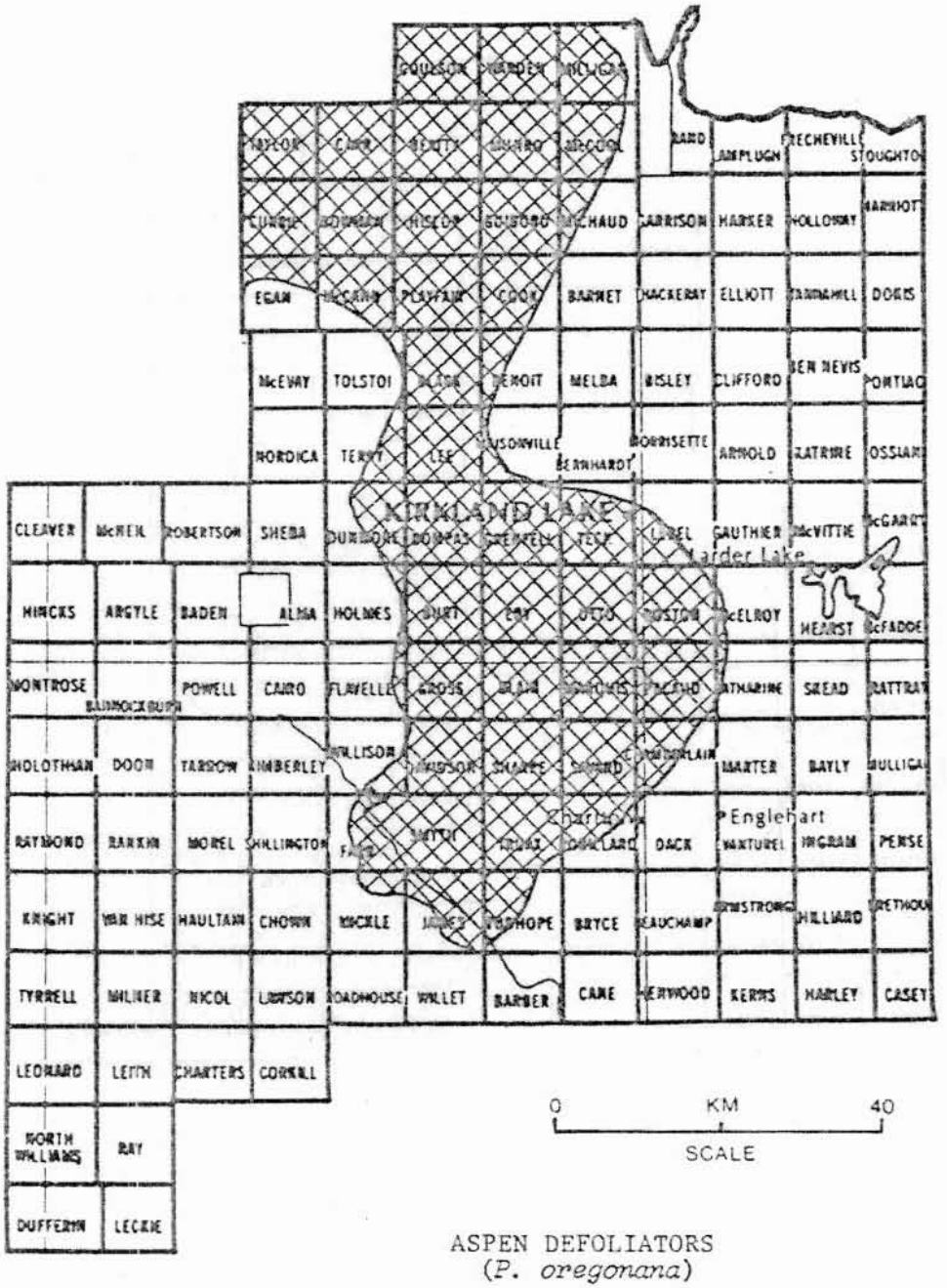
ASPEN DEFOLIATORS
(*E. decolor*)

Areas within which defoliation occurred in 1970

LEGEND

Moderate-to-severe defoliation

KIRKLAND LAKE DISTRICT

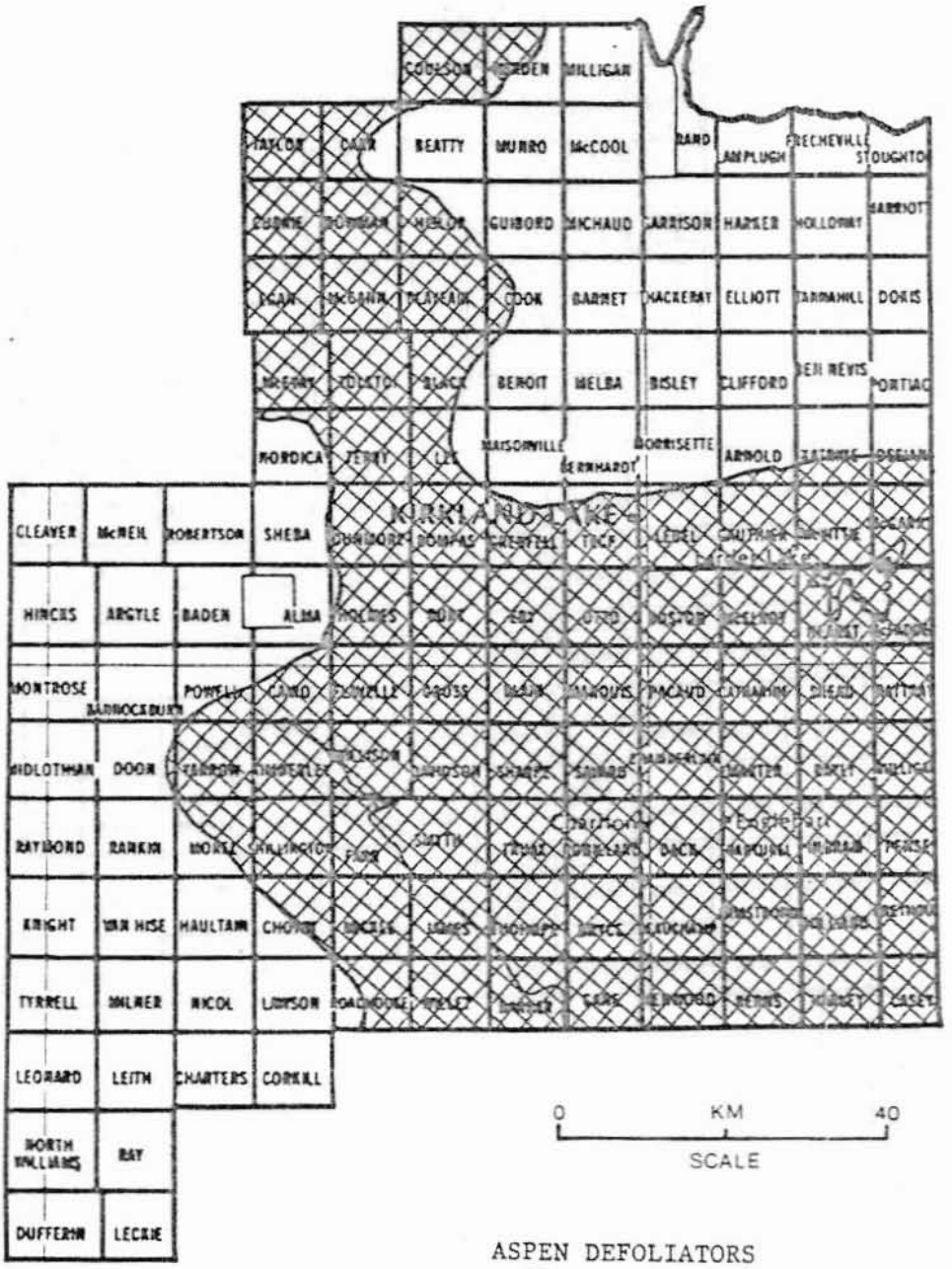


ASPEN DEFOLIATORS
(*P. oregonana*)
Areas within which defoliation occurred in 1976

LEGEND

Moderate-to-severe defoliation

KIRKLAND LAKE DISTRICT



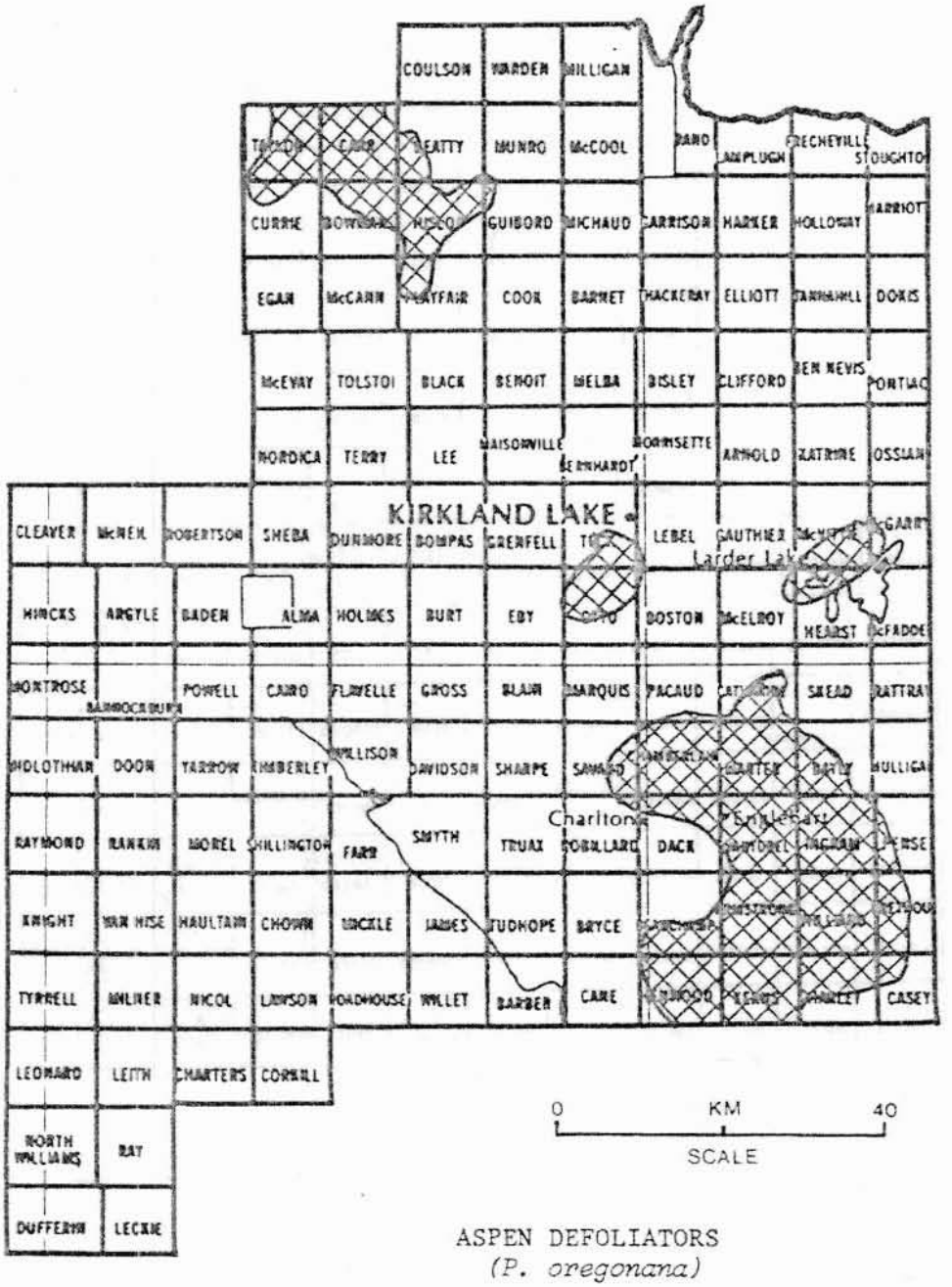
ASPEN DEFOLIATORS
(*P. oregonana*)

Areas within which defoliation occurred in 1977

LEGEND

Light defoliation

KIRKLAND LAKE DISTRICT



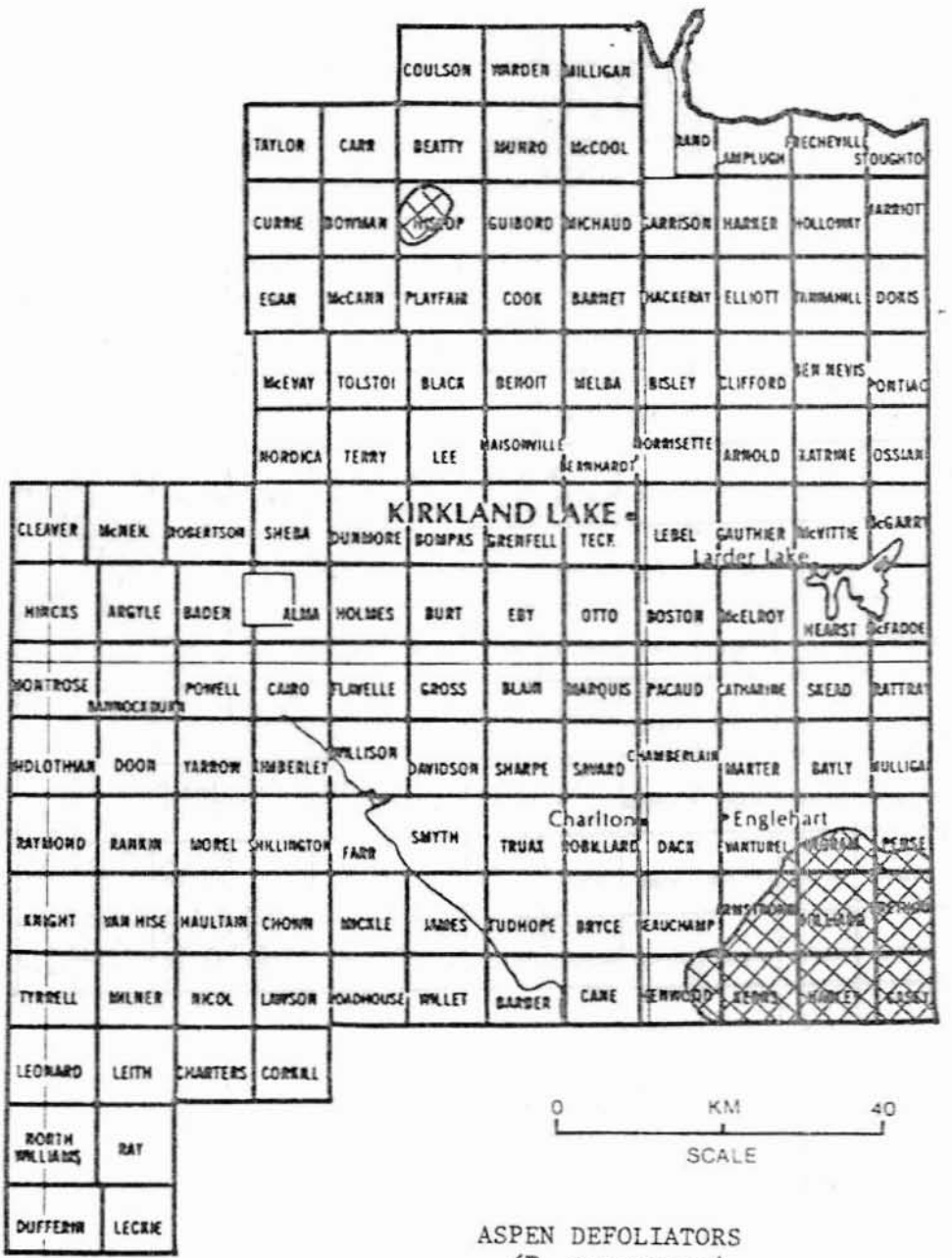
ASPEN DEFOLIATORS
(P. oregonana)

Areas within which defoliation occurred in 1978

LEGEND

Moderate-to-severe defoliation

KIRKLAND LAKE DISTRICT



ASPEN DEFOLIATORS
(P. oregonana)

Areas within which defoliation occurred in 1979

LEGEND

Moderate-to-severe defoliation

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

Host(s): birch

Year	Remarks
1950-1960	not reported
1961	low numbers observed at one point
1962	light damage observed in Marter Twp
1963	Populations increased, and light damage occurred in Pacaud and Marter twps. Small numbers were observed at numerous points elsewhere in the eastern half of the District.
1964	Populations continued to increase; there was heavy leaf mining in Otto and Eby twps, and moderate damage in McFadden and McElroy twps. Small numbers were observed at numerous points elsewhere.
1965	High populations were recorded in Teck, Eby and Grenfell twps. Low numbers were commonly observed elsewhere.
1966	Heavy infestations recurred in Teck and Eby twps and new heavy infestations were found in Armstrong and Dack twps. A pocket of moderate-to-severe damage was recorded in North Williams Twp and low numbers were observed at many points elsewhere.
1967	High populations recurred in Teck and Eby twps and light damage was observed at several points in the northern half of the District.
1968	Heavy infestations were recorded in Bompas, Grenfell, Burt, Eby, McFadden and Lamplugh twps. Light damage occurred at numerous points elsewhere.
1969	Moderate-to-severe damage was observed at numerous points in the western part of the District.
1970	Light leaf mining was observed at several points in the southern half of the District.
1971-1972	Pockets of light damage occurred at scattered points throughout the District.
1973-1974	Numerous small heavy infestations were observed throughout the District.

(cont'd)

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

Year	Remarks
1975-1976	High populations caused approximately 75% foliar damage on small birches in urban areas.
1977	Severe defoliation was common in urban and rural areas in forest stands at scattered points. Heavy leaf mining through successive years has caused considerable deterioration of host trees in some urban areas.
1978-1979	Heavy damage persisted in urban, rural and forested areas.
1980	High populations persisted in urban areas and deterioration of host trees continued in areas where repeated defoliation has occurred over a period of years.

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

Host(s): aspen, deciduous

Year	Remarks
1950	Light infestations occurred in Guibord and Milner twps. Low numbers of larvae were observed at scattered locations elsewhere (see map, page 69).
1951	Populations increased and caused varying degrees of defoliation at seven points. The infestation previously reported in Guibord Twp increased in area and caused moderate-to-severe defoliation in stands through approximately 240 km^2 in eight townships. Small pockets of moderate-to-severe defoliation were also found in the Kirkland Lake-Larder Lake area and in Milner, Nicol, Chamberlain and Armstrong twps. Small numbers of larvae were commonly observed at numerous points elsewhere (see map, page 70).
1952	Generally, infestations increased in size and intensity, until there was nearly 100% defoliation in some stands. The infestation previously reported in the northern part of the District increased to include stands through

(cont'd)

Forest Tent Caterpillar, *Malacosoma disstria* Hbn. (cont'd) [Major]

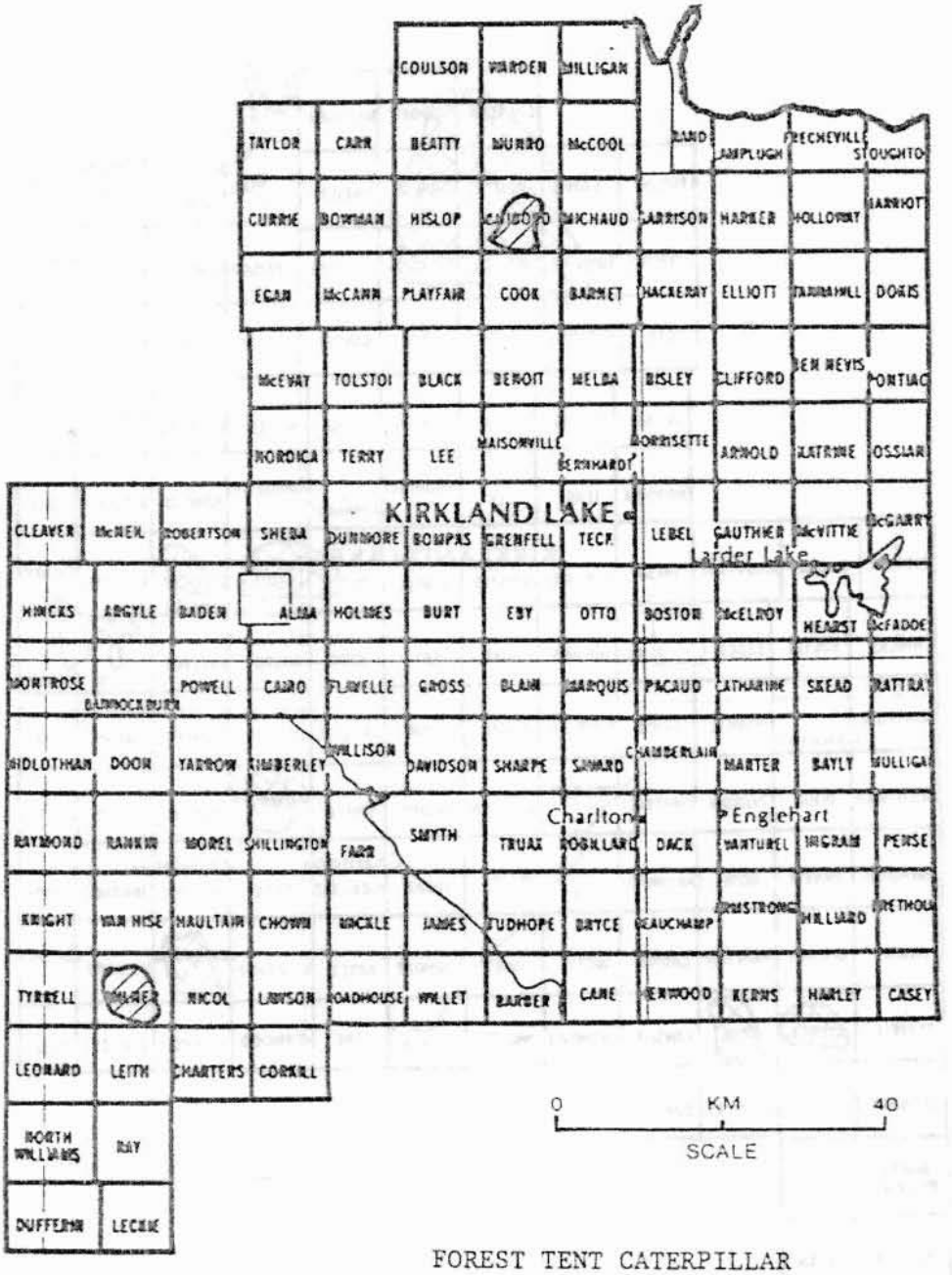
Year	Remarks
1952 (cont'd)	approximately 360 km^2 in nine townships. Small heavy infestations also occurred in the Gowganda area and in Kimberley, Farr and Egan twps. Light defoliation was observed in the southeastern part of the District (see map, page 71).
1953	Larval populations and the area of infestation increased markedly to embrace the entire District. Moderate-to-severe defoliation occurred in large areas in the northern and eastern parts and in smaller areas in the western half of the District (see map, page 72).
1954	Populations continued to increase and caused moderate-to-severe defoliation of host trees through almost the entire District (see map, page 73).
1955	Moderate-to-severe defoliation continued through most of the southern half of the District. Light defoliation was present along the western boundary and in the northern part (see map, page 74).
1956	Although populations continued to decrease, leaving only one small area of medium-to-heavy infestation south of Gowganda, light damage was commonly observed through most of the remainder of the District (see map, page 75).
1957	Infestations collapsed, and no caterpillars were found.
1958-1962	not reported
1963	Small pockets of light-to-moderate infestation occurred in Harley, Otto, James, Bernhardt, Black, Bowman and Taylor twps.
1964	Little change in population levels was noted; however, light defoliation recurred in Harley, Bowman and Taylor twps and a new light infestation was found in Rand Twp (see map, page 76).
1965	Populations declined; only small numbers were found at a few points in the southeastern part of the District.
1966-1971	not reported

(cont'd)

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

Year	Remarks
1972	Small numbers of larvae were observed in Bowman, James and Otto twps.
1973	Populations increased and caused moderate-to-severe defoliation in Casey, Harley, Kerns and parts of Armstrong, Hilliard and Henwood twps (see map, page 77).
1974	Moderate-to-severe defoliation persisted in the same general area as in 1973 (see map, page 78).
1975	The area of infestation increased and there was moderate-to-severe defoliation through approximately 800 km^2 of forested land in the southeastern part of the District (see map, page 79).
1976	Populations decreased sharply, leaving only small pockets of damage in Dack, Evanturel, Harley and Casey twps (see map, page 80).
1977	Populations continued to decrease. Only small numbers were found in Dack and Evanturel twps.
1978	Small numbers persisted in Dack and Evanturel twps.
1979	Populations increased and caused moderate-to-severe defoliation in parts of Dack and Evanturel twps (see map, page 81).
1980	Populations expanded, causing moderate-to-severe defoliation in parts of Chamberlain, Evanturel and Marter twps and throughout Dack Twp. A small area of light infestation was found in Beatty Twp in the northern part of the District (see map, page 82).

KIRKLAND LAKE DISTRICT



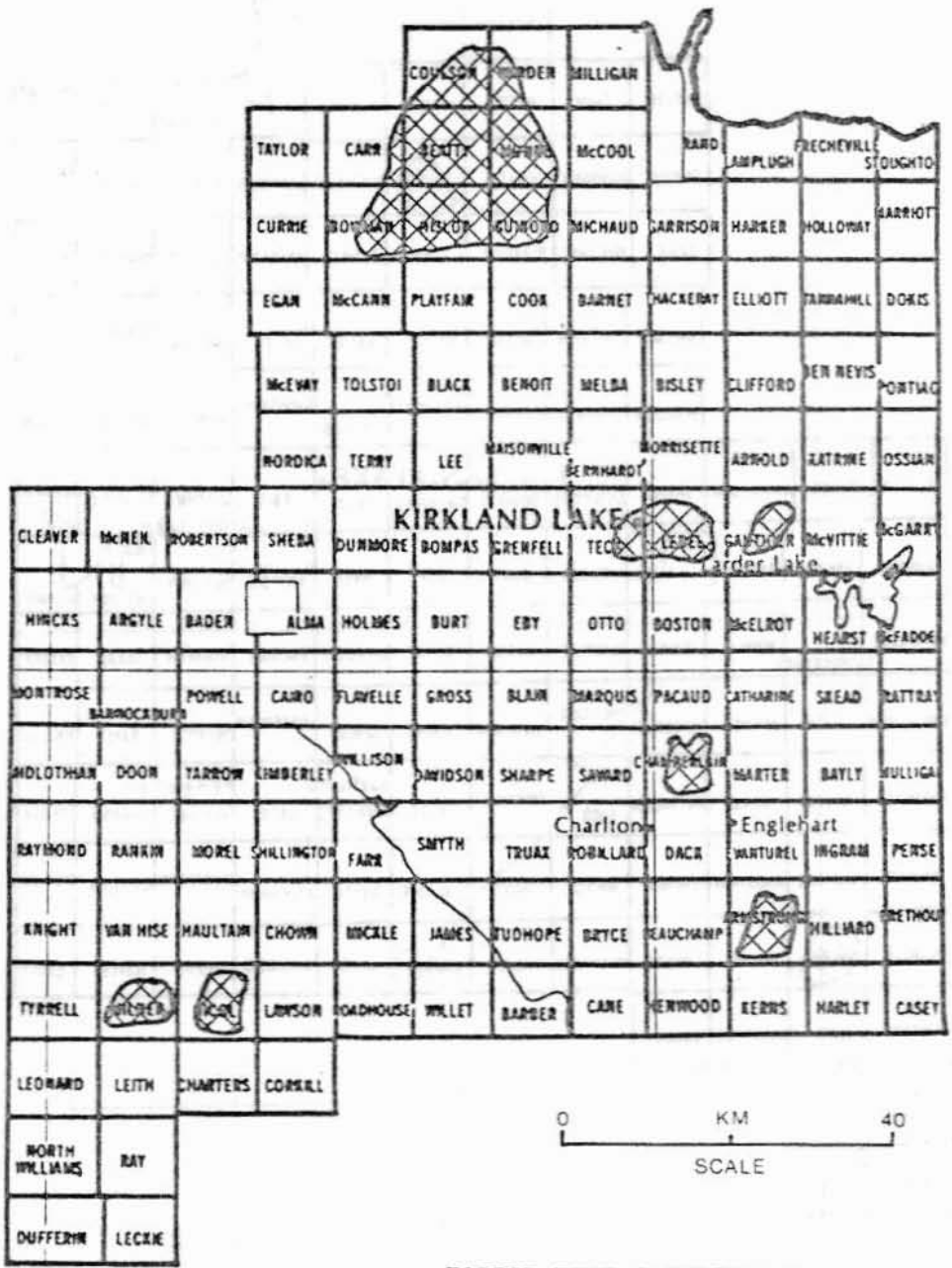
FOREST TENT CATERPILLAR

Areas within which defoliation occurred in 1950

LEGEND

Light defoliation

KIRKLAND LAKE DISTRICT



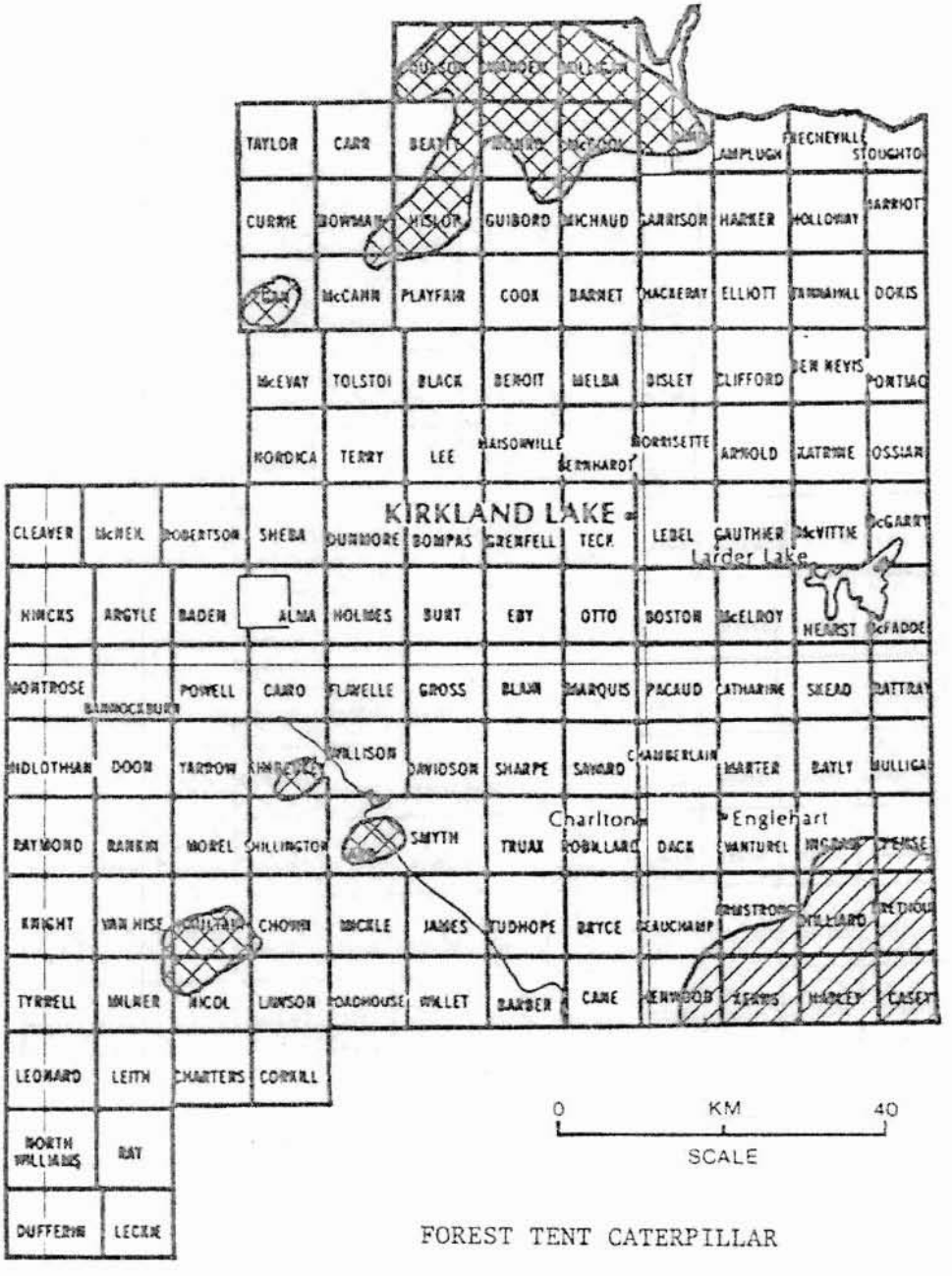
FOREST TENT CATERPILLAR

Areas within which defoliation occurred in 1951

LEGEND

Moderate-to-severe defoliation

KIRKLAND LAKE DISTRICT



FOREST TENT CATERPILLAR

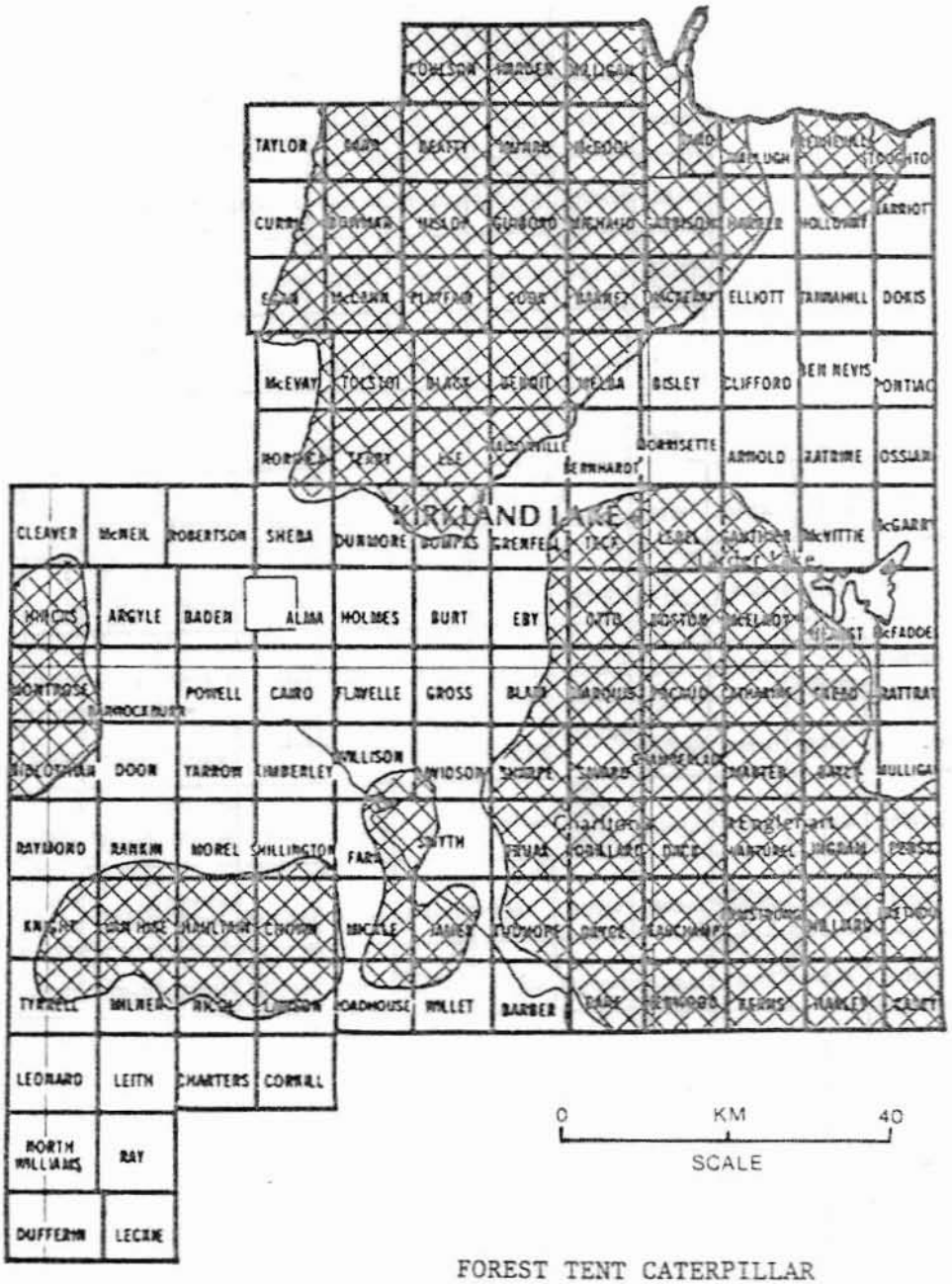
Areas within which defoliation occurred in 1952

LEGEND

Light defoliation

Moderate-to-severe defoliation

KIRKLAND LAKE DISTRICT



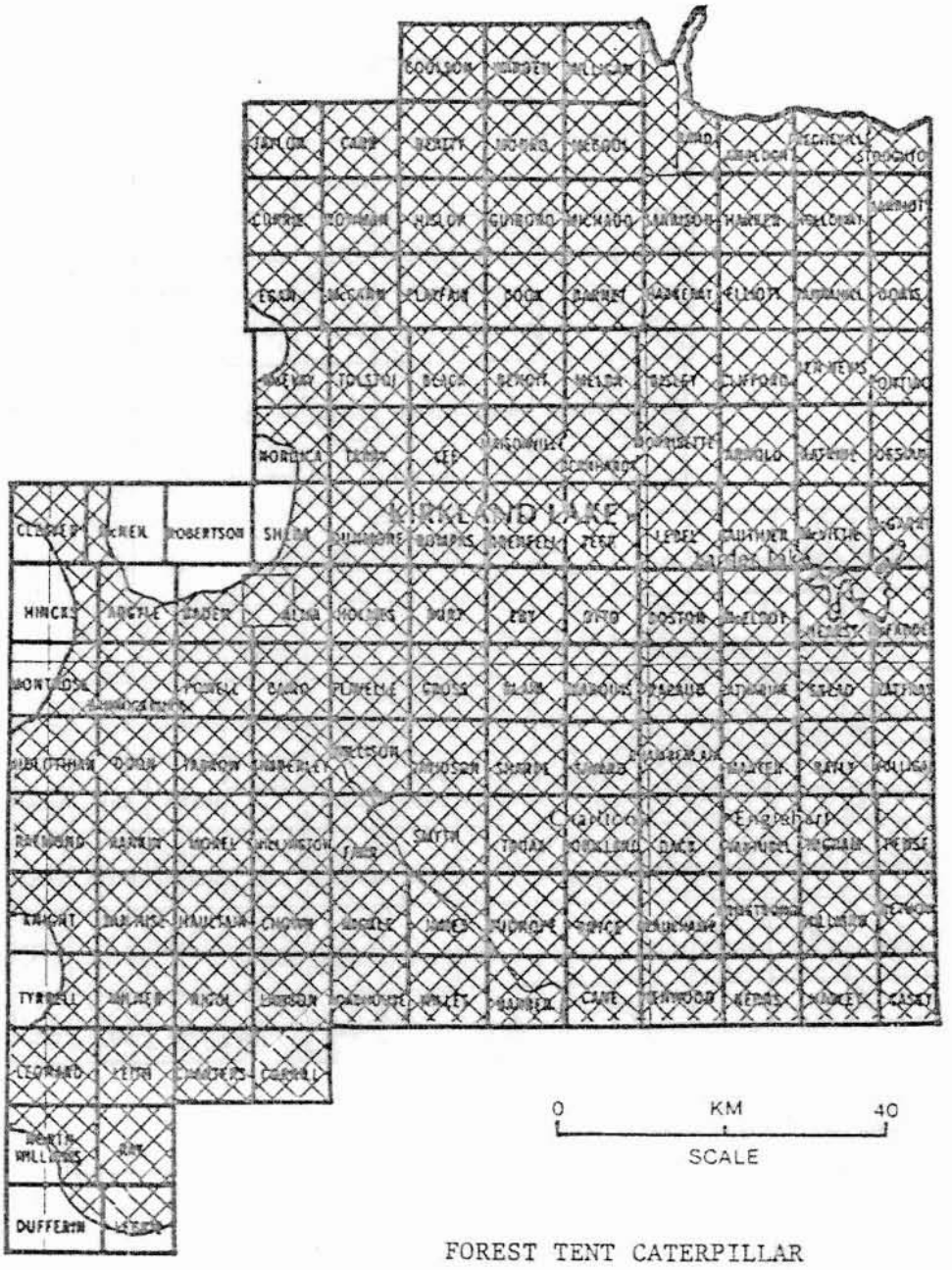
FOREST TENT CATERPILLAR

Areas within which defoliation occurred in 1953

LEGEND

Moderate-to-severe defoliation

KIRKLAND LAKE DISTRICT



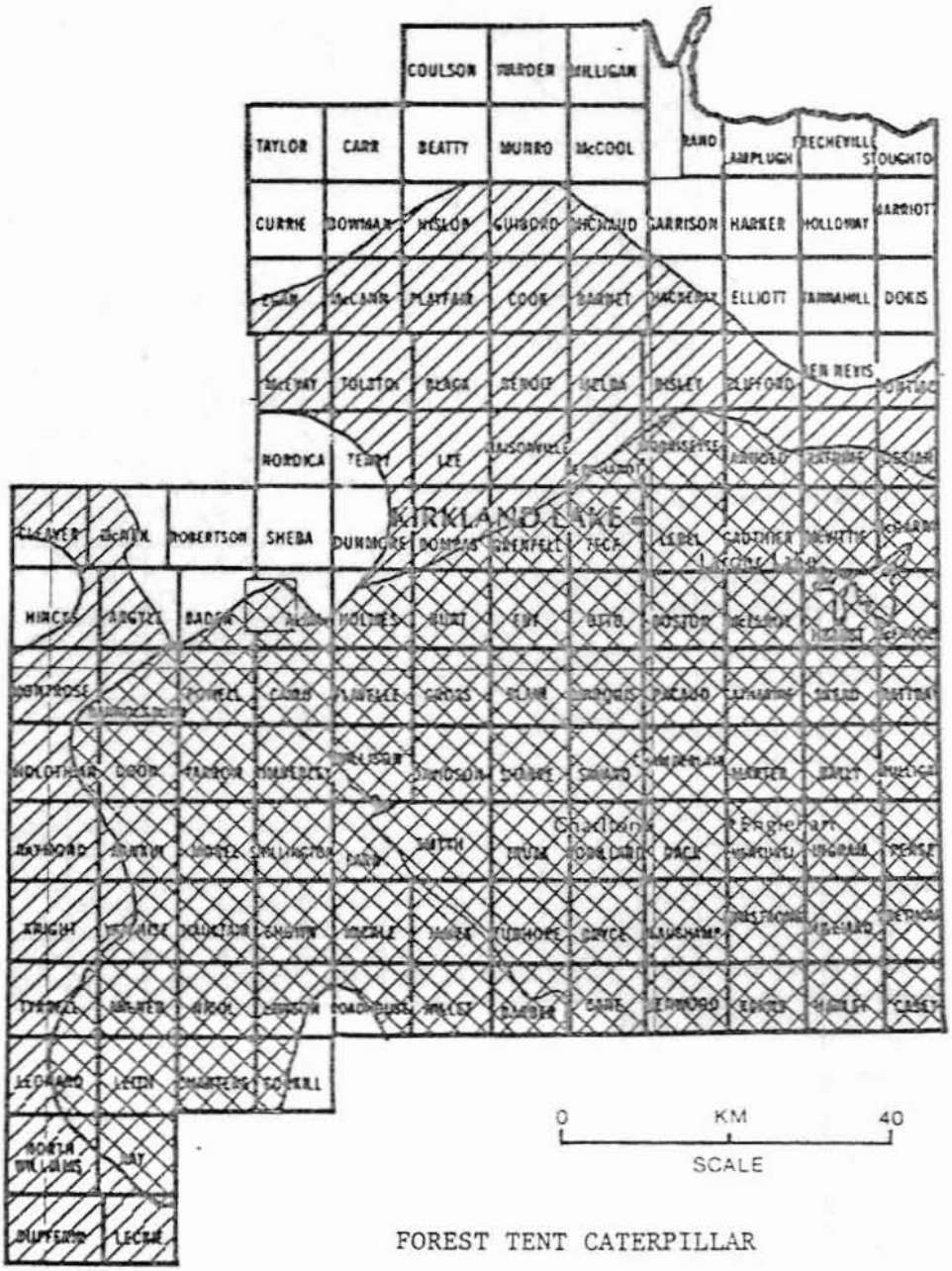
FOREST TENT CATERPILLAR

Areas within which defoliation occurred in 1954

LEGEND

Moderate-to-severe defoliation

KIRKLAND LAKE DISTRICT



FOREST TENT CATERPILLAR

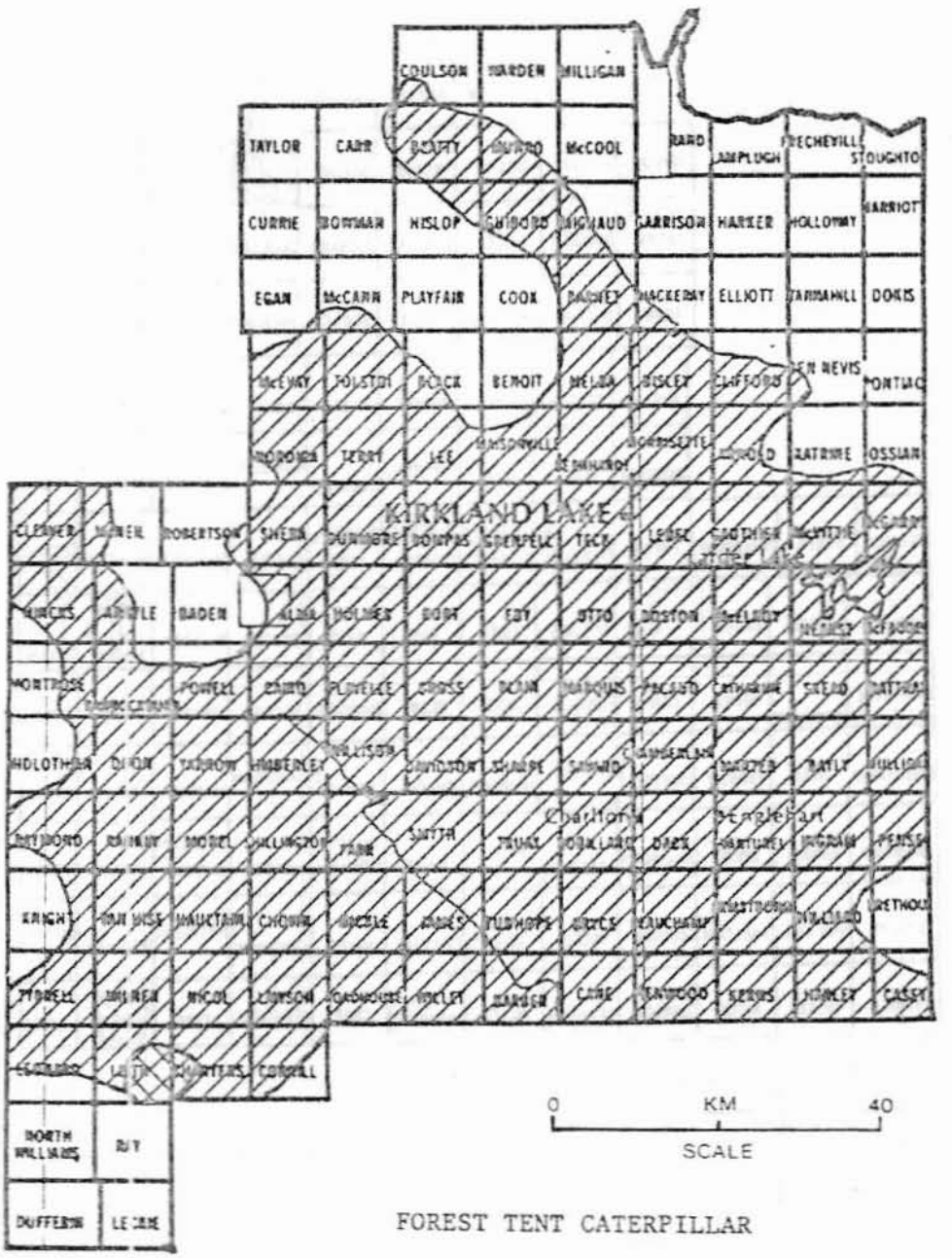
Areas within which defoliation occurred in 1955

LEGEND

Light defoliation

Moderate-to-severe defoliation

KIRKLAND LAKE DISTRICT



FOREST TENT CATERPILLAR

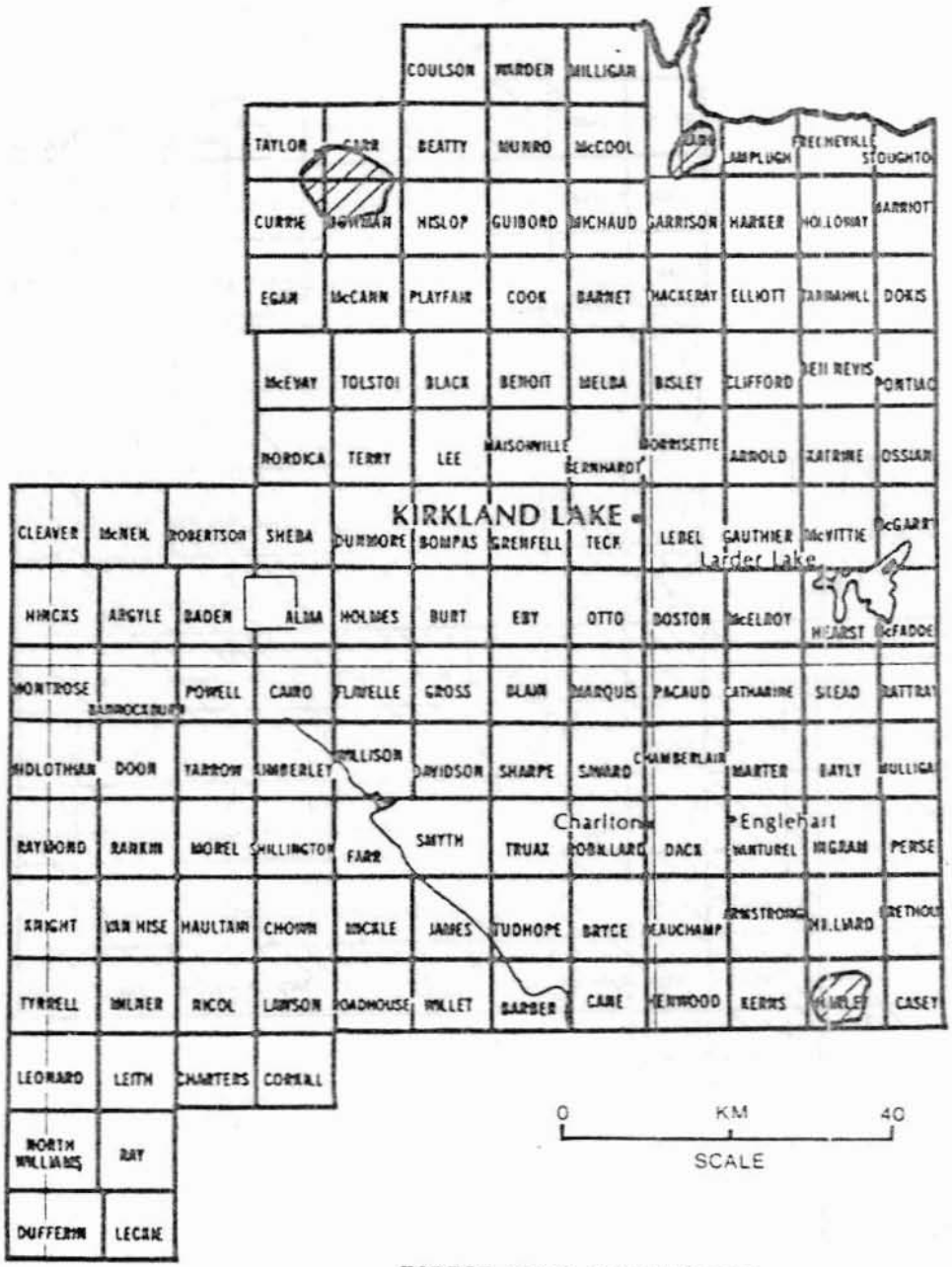
Areas within which defoliation occurred in 1956

LEGEND

Light defoliation

Moderate-to-severe defoliation

KIRKLAND LAKE DISTRICT



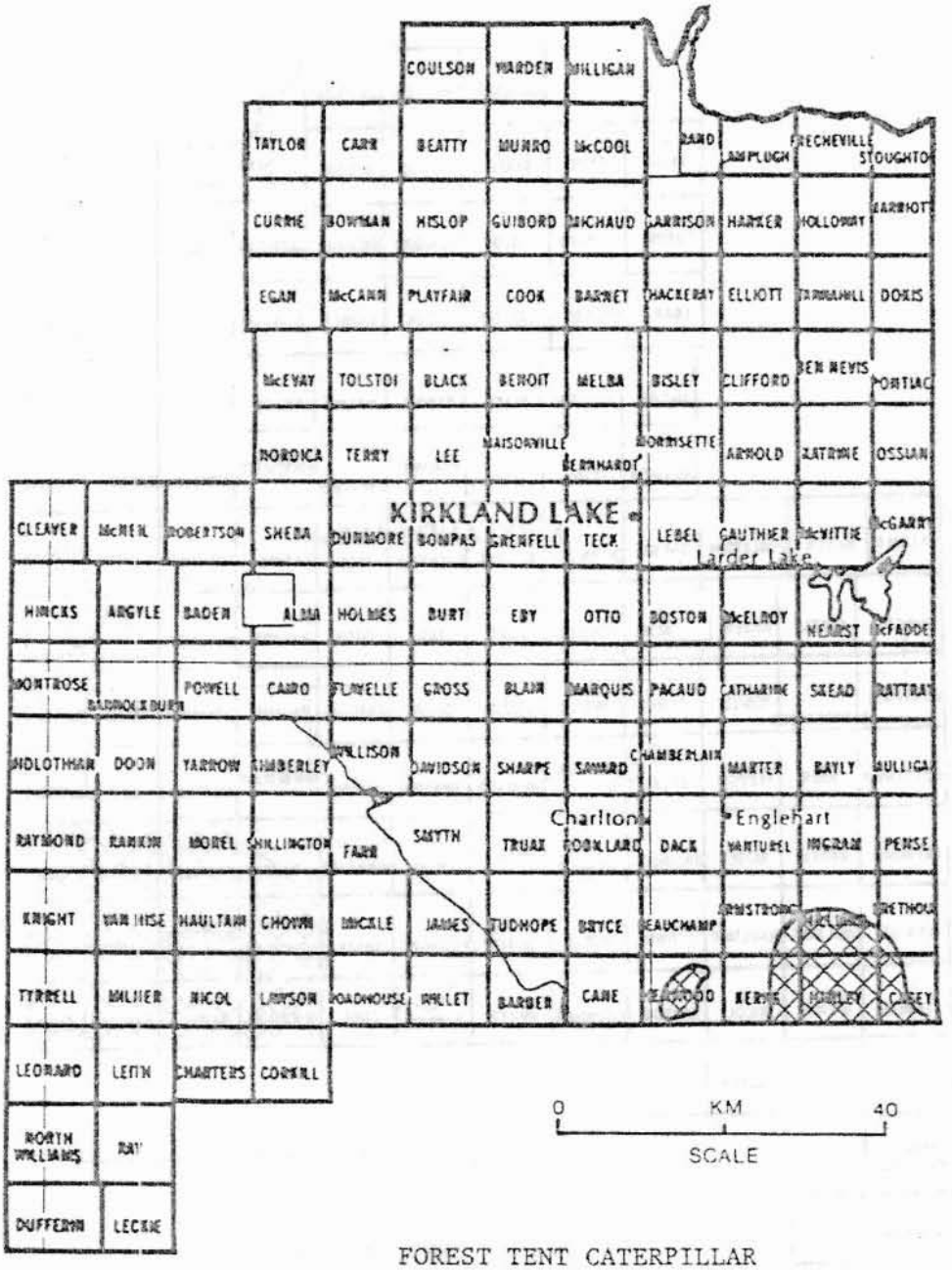
FOREST TENT CATERPILLAR

Areas within which defoliation occurred in 1964

LEGEND

Light defoliation

KIRKLAND LAKE DISTRICT



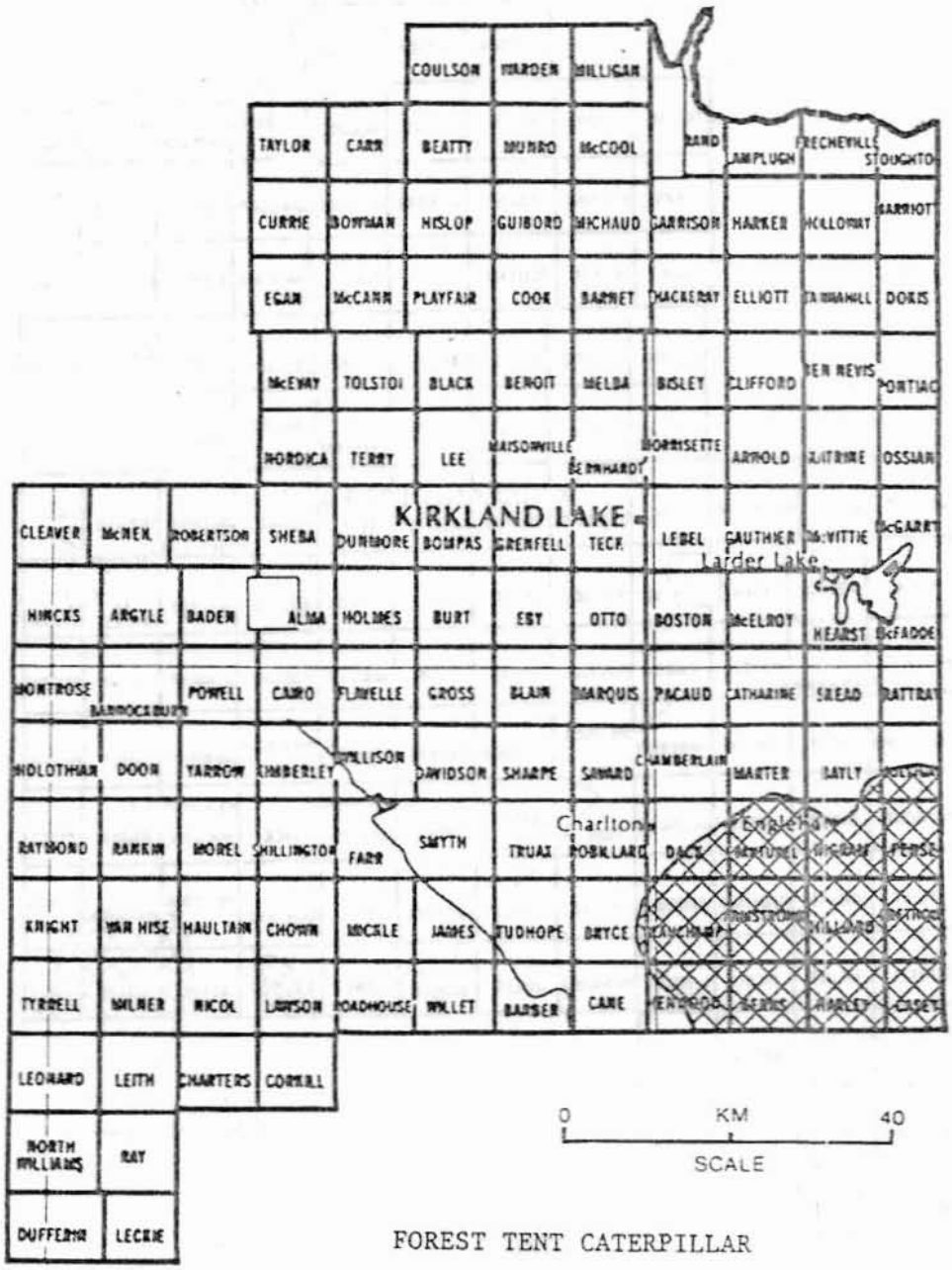
FOREST TENT CATERPILLAR

Areas within which defoliation occurred in 1973

LEGEND

Moderate-to-severe defoliation

KIRKLAND LAKE DISTRICT



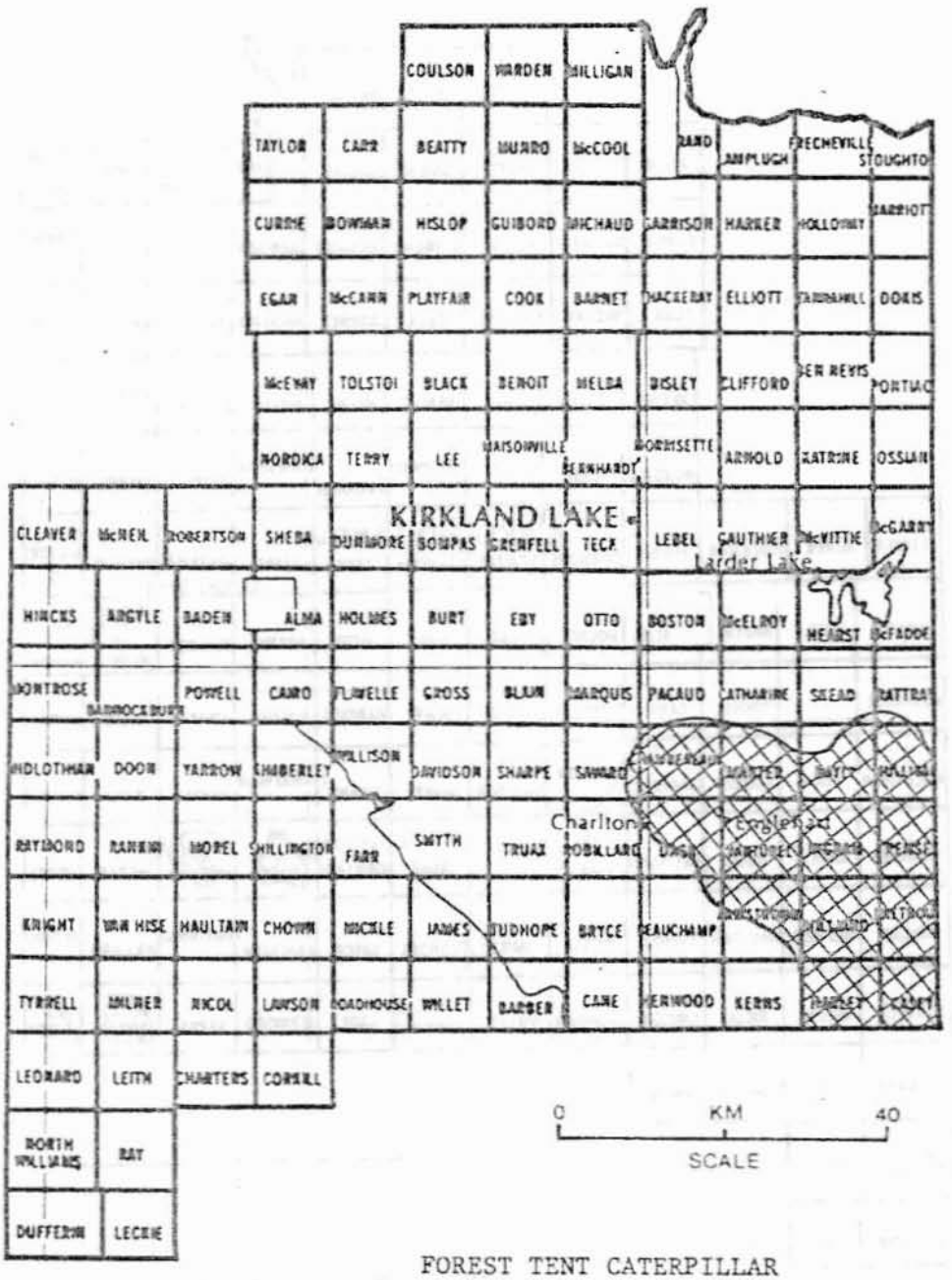
FOREST TENT CATERPILLAR

Areas within which defoliation occurred in 1974

LEGEND

Moderate-to-severe defoliation

KIRKLAND LAKE DISTRICT



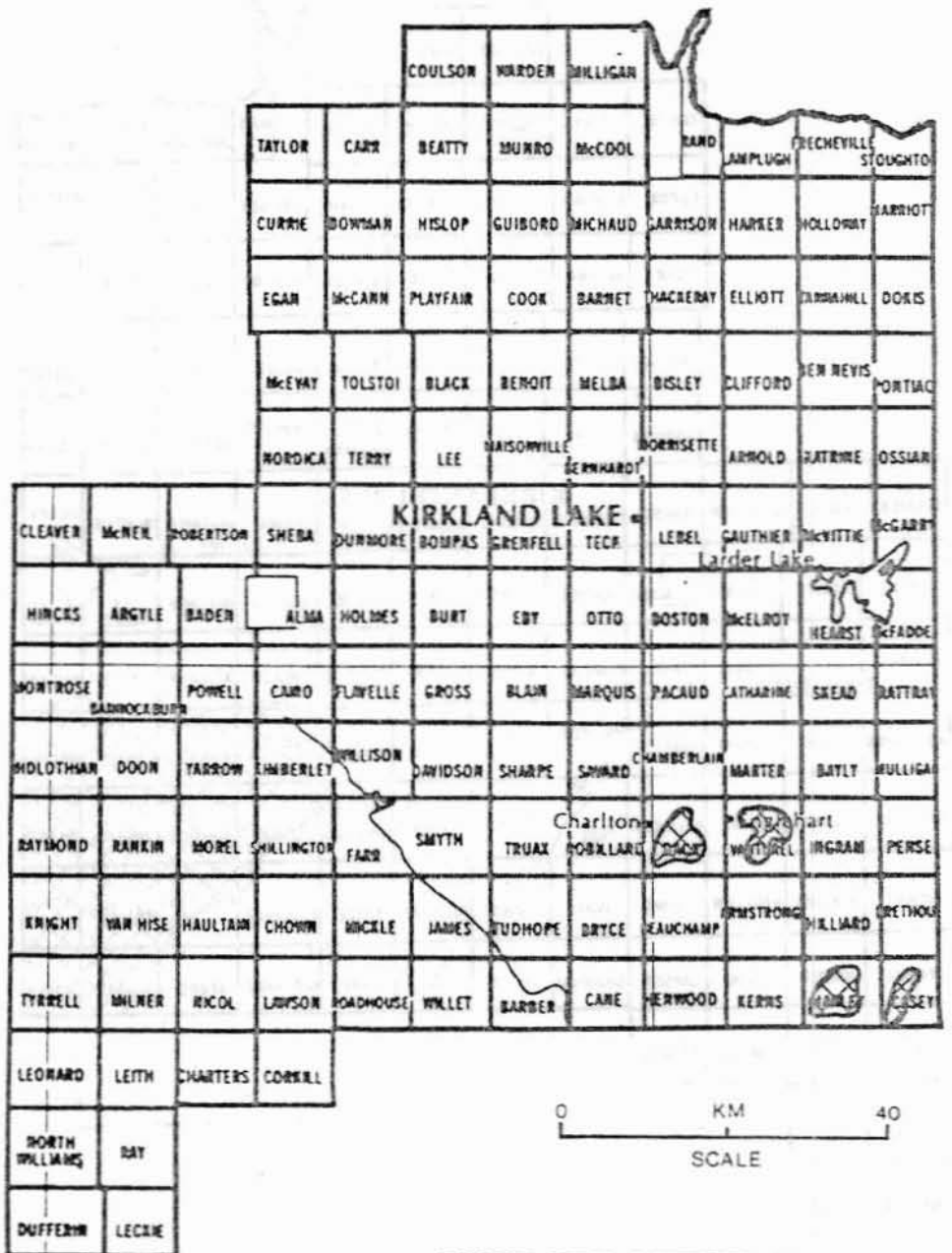
FOREST TENT CATERPILLAR

Areas within which defoliation occurred in 1975

LEGEND

Moderate-to-severe defoliation

KIRKLAND LAKE DISTRICT



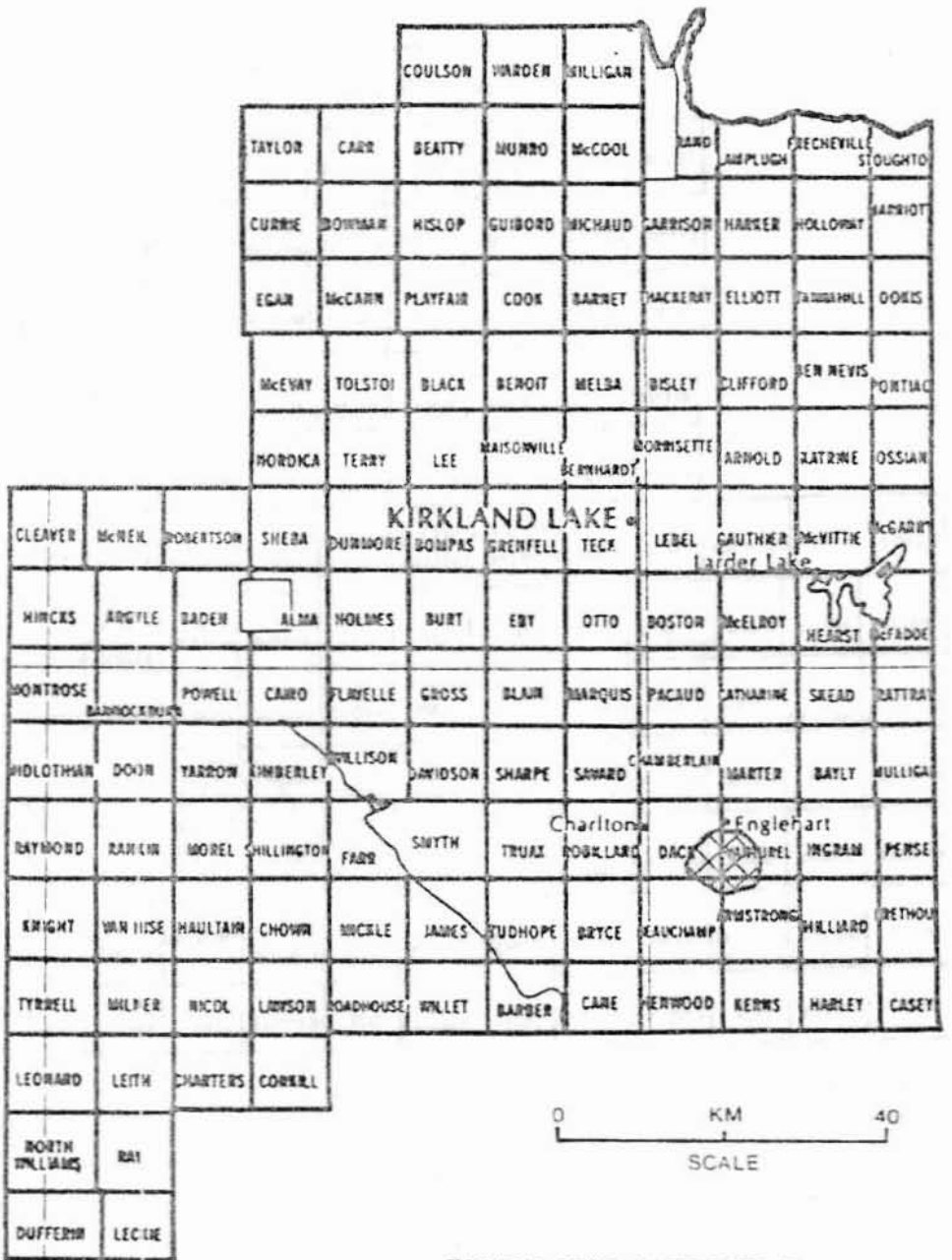
FOREST TENT CATERPILLAR

Areas within which defoliation occurred in 1976

LEGEND

Moderate-to-severe defoliation

KIRKLAND LAKE DISTRICT



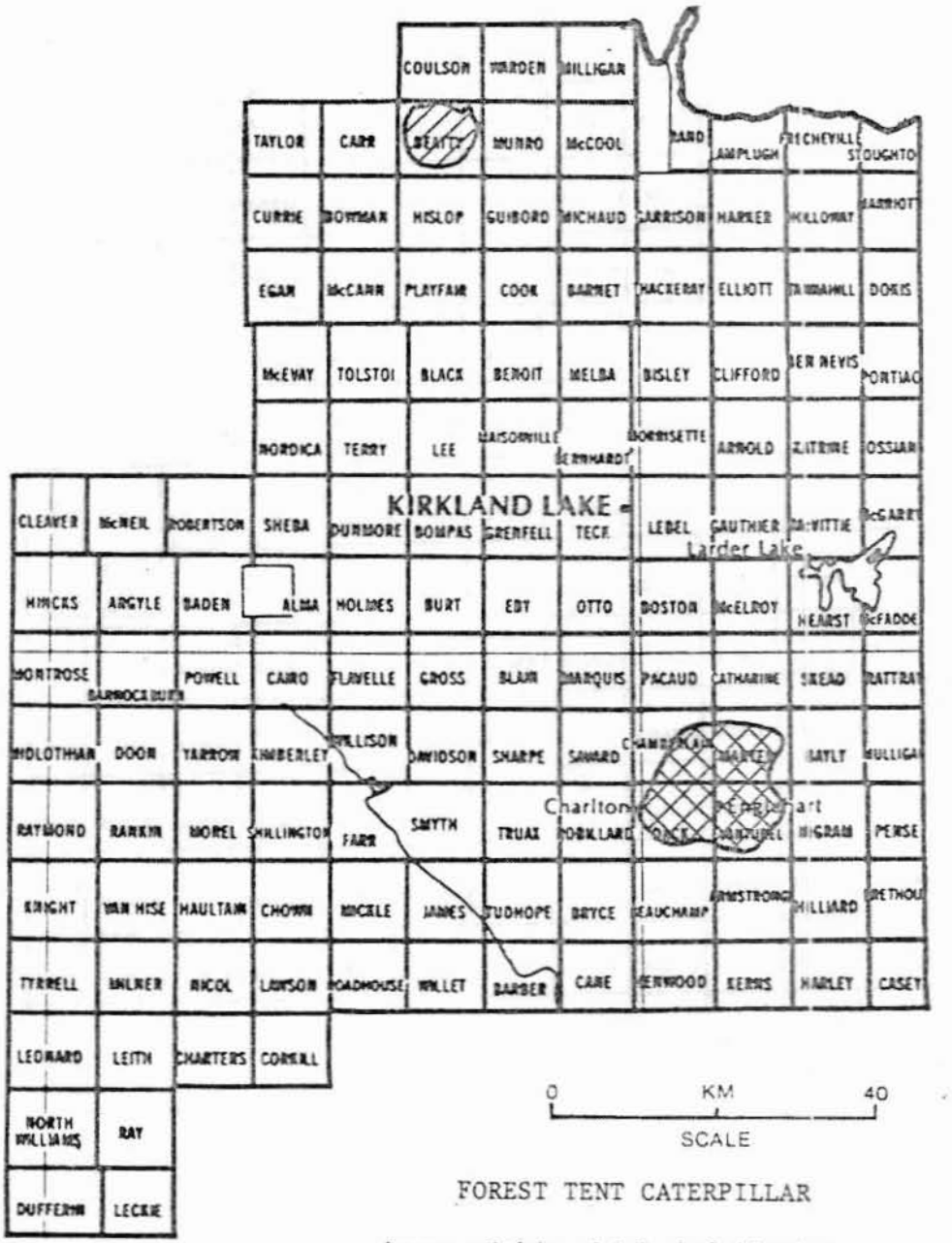
FOREST TENT CATERPILLAR

Areas within which defoliation occurred in 1979

LEGEND

Moderate-to-severe defoliation

KIRKLAND LAKE DISTRICT



FOREST TENT CATERPILLAR

Areas within which defoliation occurred in 1980

LEGEND

Light defoliation

Moderate-to-severe defoliation

Balsam Fir Sawfly, *Neodiprion abietis* complex

Host(s): bF, wS, bS [Major]

Year	Remarks
1950-1951	not reported
1952	low numbers found on white spruce at eight points
1953-1959	not reported
1960-1961	trace population
1962-1963	not reported
1964-1969	low numbers at scattered points
1970-1971	not reported
1972	trace population at one point
1973	not reported
1974	low numbers observed
1975-1980	not reported

Swaine Jack Pine Sawfly, *Neodiprion swainei* Midd.

Host(s): jP [Major]

Year	Remarks
1950	Light defoliation occurred in Corkill, Roadhouse, Willet and Barber twps.
1951-1954	not reported
1955	A small light infestation was found in Barber Twp.
1956	not reported
1957	A pocket of heavy infestation occurred in Barber Twp. Low numbers were observed in Cane Twp.

(cont'd)

Swaine Jack Pine Sawfly, *Neodiprion swainei* Midd. (concl.)

Year	Remarks
1958	not reported
1959	A heavy infestation occurred in Barber Twp. Light damage was recorded in Cane Twp.
1960	Populations declined to moderate intensity in Barber Twp. Low populations persisted in Cane Twp.
1961	Populations declined for the second consecutive year.
1962	no larval colonies found
1963	A trace population occurred in Cane Twp.
1964-1980	not reported

Pine Sawflies, *Neodiprion nanulus nanulus* Schedl., *N. pratti banksianae* Roh., and *N. virginianus* complex [Major]

Host(s): jP, rP

Year		Remarks
1950	*N. virginianus* complex	low populations in Benoit, Melba and Robillard twps
1951	*N. virginianus* complex	scattered colonies observed in Benoit, Melba, Robillard, Eby, Otto and Currie twps
1952	*N. virginianus* complex	low numbers of colonies observed in the western part of the District
1953	*N. virginianus* complex	Pockets of medium and light infestation occurred in Eby and Playfair twps, respectively.
	N. nanulus nanulus	scattered colonies observed in the western part of the District

(cont'd)

Pine Sawflies, *Neodiprion virginianus* complex, *N. nanulus nanulus* Schedl., and *N. pratti banksianae* Roh. (cont'd)

Year		Remarks
1954	*N. virginianus* complex	Populations decreased to reach a trace level.
	N. pratti banksianae	Trace populations were observed in the western part of the District.
1955-1959	*N. virginianus* complex	Low numbers of colonies were observed at widely separated points.
1960	*N. virginianus*	Light infestations were observed in Eby and Yarrow twps, and low numbers elsewhere.
	N. nanulus nanulus	scattered colonies observed
1961	*N. virginianus* complex	a general decrease in numbers
1962	*N. virginianus* complex	Populations remained at a trace level.
	N. nanulus nanulus	Light damage occurred in Smythe and Lebel twps; small numbers were observed at a few points elsewhere.
1963	*N. nanulus nanulus*	Light defoliation was observed in Farr Twp.
	N. pratti banksianae	Low numbers observed in Morrisette Twp.
1964	*N. virginianus* complex	Populations increased; small numbers were observed at 16 points.
	N. nanulus nanulus	Light defoliation recurred in Farr Twp and a new light infestation was observed in Grenfell Twp. Small numbers were observed elsewhere.
	N. pratti banksianae	A trace population was observed in Grenfell Twp.

Pine Sawflies, *Neodiprion virginianus* complex, *N. nanulus nanulus* Schedl., and *N. pratti banksianae* Roh. (cont'd)

Year		Remarks
1965	*N. virginianus* complex	Light infestations occurred in Chamberlain and Brethour twps.
1966	*N. virginianus* complex	Populations increased. A pocket of heavy infestation occurred in Maisonville Twp. Medium infestations were found in Tolstoi, Brethour, Playfair, Henwood and Chamberlain twps. Small numbers were observed elsewhere.
	N. nanulus nanulus	Light defoliation occurred in Terry, Nordica and Farr twps and at scattered points along Hwy 65. Trace populations were observed in the Matheson and Kirkland Lake areas.
1967	*N. virginianus* complex	Populations decreased to a low level.
	N. nanulus nanulus	Scattered colonies were observed at numerous points.
1968	*N. virginianus* complex	Populations increased and moderate damage occurred in Chamberlain Twp. Small numbers were observed elsewhere.
1969	*N. virginianus* complex	Light defoliation occurred in Gauthier, Marriott and McGarry twps. Small numbers were observed elsewhere.
1970	*N. virginianus* complex	Small numbers were observed at a few points.
1971		not reported
1972-1973	*N. nanulus nanulus*	low numbers observed at a few points.

(cont'd)

Pine Sawflies, *Neodiprion virginianus* complex, *N. nanulus nanulus* Schedl., and *N. pratti banksianae* Roh. (concl.)

Year		Remarks
1974		not reported
1975	*N. virginianus* complex	high populations observed at scattered points.
1976	*N. virginianus* complex	High populations persisted at a few points.
	N. nanulus nanulus	trace populations observed at a few points.
1977	*N. virginianus* complex	small pockets of light infestation observed
	N. nanulus nanulus	Trace populations occurred at scattered points.
1978	*N. virginianus* complex	only low numbers of colonies observed.
1979	not reported	
1980	*N. virginianus* complex	Light defoliation occurred in Clifford Twp.
	N. nanulus nanulus	trace numbers at a few points

Northern Pitch Twig Moth, *Petrova albicapitana* (Busck)

Host(s): jP [Minor]

Year	Remarks
1950-1954	not reported
1955-1956	Trace populations were observed at numerous points.
1957	not reported
1958-1960	Low numbers were commonly observed throughout the District.

(cont'd)

Northern Pitch Twig Moth, *Petrova albicapitana* (Busck) (concl.)

Year	Remarks
1961	not reported
1962-1963	Light damage occurred at numerous points.
1964	Medium-to-heavy infestations were recorded in Playfair and Eby twps and low numbers were observed at many points elsewhere.
1965	Populations decreased to a low level.
1966	A medium-to-heavy infestation was encountered in Tolstoi Twp and light damage was evident in Chamberlain Twp.
1967	Low numbers were observed at widely separated points.
1968	Moderate damage was noted at Munro Twp; elsewhere low numbers were common.
1969	A light infestation was recorded in Munro Twp; trace damage was noted elsewhere.
1970-1973	not reported
1974-1978	Low numbers were observed at numerous points.
1979-1980	not reported

Aspen Leafblotch Miner, *Phyllonorycter ontario* (Free.)

Host(s): aspen [Major]

Year	Remarks
1950	not reported
1951	Medium-to-heavy infestations occurred in the northern half of the District.
1952	Medium-to-heavy infestations occurred throughout the District.
1953	A marked decrease in population levels occurred.

(cont'd)

Aspen Leafblotch Miner, *Phyllonorycter ontario* (Free.) (concl.)

Host(s): Aspen [Major]

Year	Remarks
1954-1956	not reported
1957-1958	low numbers at one point
1959-1960	not reported
1961	Light leaf mining observed at many points
1962	A heavy infestation occurred in Kimberley Twp and pockets of medium infestation were recorded in Dunmore and Chamberlain twps; the insect was found commonly throughout the District.
1963	Little change in population levels occurred. Heavy infestations were observed in Raymond, Grenfell and Holmes twps. Light damage was recorded at numerous points elsewhere.
1964	Generally, populations declined to a low level except in Pense and Hilliard twps where light damage was observed.
1965	A pocket of heavy infestation was found in Dunmore Twp. Low numbers were observed at numerous points elsewhere.
1966	Populations declined and reached a low level.
1967	Populations remained low.
1968	not reported
1969	low numbers at scattered points
1970-1973	not reported
1974-1977	moderate-to-heavy infestations observed at numerous points
1978	Populations declined; however, light infestations were widely distributed through the District.
1979-1980	Light defoliation persisted at numerous points.

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

Host(s): spruce [Major]

Year	Remarks
1950	light defoliation observed at numerous points in the District
1951	not reported
1952	low numbers observed at numerous points
1953	Populations increased and caused moderate-to-severe defoliation of small-diameter spruce in Eby, Maisonville, James, Carr and Taylor twps.
1954	Pockets of severe defoliation occurred in Otto, Eby and Taylor twps. Light damage was observed at numerous points elsewhere.
1955	Small heavy infestations persisted and caused as much as 90% defoliation of small-diameter trees in seven townships. Light damage was observed at three points elsewhere.
1956	Severe defoliation occurred in Marquis, Pacaud, Chamberlain, Evanturel, Harley, James and Nicol twps. Light defoliation was observed at several points elsewhere.
1957	A heavy infestation persisted in Pacaud Twp. Light damage occurred at several points elsewhere.
1958	Small heavy infestations were observed in Eby, Pacaud and Barber twps. Low numbers were common at many points elsewhere.
1959	Heavy infestations persisted; there was severe defoliation of small-diameter spruce in Eby, Pacaud and Barber twps and new heavy infestations were found in Carr and Tudhope twps.
1960	High populations persisted and caused severe defoliation at a few points.
1961	Populations declined to a low level.

(cont'd)

Yellowheaded Spruce Sawfly, *Pikonema alaskensis* (Roh.) (cont'd)

Year	Remarks
1962-1964	Populations remained at a low level.
1965	Populations increased and caused moderate-to-severe defoliation in Harley, Henwood, Eby, Dack, Maisonville, Teck and Evanturel twps. Light defoliation occurred at numerous points elsewhere.
1966	Severe defoliation recurred in Eby, Harley, Evanturel and Teck twps and a new medium infestation occurred in Bryce Twp.
1967	Heavy infestations persisted in Harley, Eby and Evanturel twps. Severe damage also occurred in Cane Twp and small numbers were widely distributed elsewhere.
1968	moderate-to-severe defoliation observed at numerous points
1969	A heavy infestation recurred in Harley Twp, giving rise to approximately 65% defoliation. Light damage was observed at numerous points elsewhere.
1970-1971	Severe defoliation occurred in plantations and on windbreaks in Harley and Cane twps.
1972	High populations recurred in Harley and Cane twps and a new heavy infestation was found in Casey Twp.
1973	Heavy damage persisted in Harley, Cane and Casey twps and new infestations were found in Evanturel and Marquis twps.
1974-1975	High populations recurred and caused serious defoliation on windbreaks along Hwys 11 and 65 in the southern part of the District. Light damage was observed at numerous points elsewhere.
1976	Heavy infestations persisted on windbreaks along Hwy 11 and some tree mortality was evident.
1977	High populations persisted along Hwy 11 and a new heavy infestation occurred on hedgerows at the Swastika Forest Station.

(cont'd)

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

Year	Remarks
1978	Severe damage recurred on windbreaks along Hwy 11 and considerable tree mortality was evident after four consecutive years of severe defoliation.
1979-1980	High populations occurred on windbreaks and in plantations at several points.

White Pine Weevil, *Pissodes strobi* (Peck)

Host(s): pines, spruce [Major]

Year	Remarks
1950-1955	not reported
1956	low numbers observed at eight points
1957	Low populations occurred in jack pine reproduction areas at several points.
1958	not reported
1959	Populations increased. Evaluations in five small-diameter jack pine stands revealed an incidence of leader damage ranging from 4 to 14% in Nordica and Benoit twps, respectively.
1960	Populations decreased; leader damage ranged from 1 to 4%.
1961	Populations remained at a low level.
1962	Numbers of weeviled trees increased. Evaluations in six areas revealed an incidence of leader damage ranging from 2 to 42% in Bayley and Grenfell twps, respectively. Low numbers were also observed on small-diameter white and black spruce.
1963	The incidence of damage decreased from that of the previous year at each of six evaluation points.
1964	Populations increased and leader mortality ranged from 5 to 26% at six points evaluated.

(cont'd)

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

Year	Remarks
1965-1966	little change in population levels
1967	Populations decreased to a low level except in Grenfell Twp, where 14% of the trees in a white pine plantation were attacked.
1968	Populations remained low except in Grenfell Twp, where 20% leader mortality was recorded.
1969-1971	low numbers observed throughout the District
1972	Populations increased and caused as much as 15% leader damage in reproduction stands.
1973	little change in numbers over the previous year
1974	The incidence of damaged leaders ranged from 1 to 9% in jack pine reproduction areas.
1975	Populations remained at much the same level as in the previous year.
1976-1977	Between 1% and 18% of the leaders were damaged in pine reproduction areas.
1978	little change in population levels
1979	Numbers increased; there was 8 to 26% leader damage in pine reproduction areas.
1980	Populations remained at much the same level as in the previous year.

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

Host(s): birch

Year	Remarks
1950	Light defoliation occurred in larch stands in Benoit, Grenfell, Eby, Otto, Teck and McVittie twps.

(cont'd)

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

Year	Remarks
1951	Populations increased and caused as much as 80% defoliation of small trees in Grenfell Twp. Small numbers of larval colonies were observed elsewhere.
1952	not reported
1953	Populations increased and caused moderate-to-severe defoliation in Taylor, Currie and Hislop twps. Light damage or small numbers of colonies were observed elsewhere.
1954	Populations continued to increase and caused as much as 50% defoliation in a few stands in the Matheson area. Light defoliation occurred at many points elswhere.
1955	Populations increased sharply and caused moderate-to-severe defoliation in many stands in the District. Numerous light-to-medium infestations were observed as well.
1956	High populations persisted and caused moderate-to-severe defoliation in many stands.
1957	There were heavy infestations, and damage recurred in many stands.
1958	Heavy infestations persisted in many stands, and severe defoliation resulted.
1959	Although population densities declined, moderate-to-severe defoliation was widespread through the District.
1960	Populations declined sharply, leaving three small pockets of medium-to-heavy infestation in the District. Scattered larval colonies were observed at numerous points elsewhere.
1961	Populations continued to decline; however, light infestations occurred at numerous points.
1962	Moderate-to-severe defoliation occurred at four points and light-to-medium infestations persisted at many points elsewhere.

(cont'd)

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

Year	Remarks
1963	Light infestations persisted at numerous points.
1964	A small pocket of moderate-to-severe defoliation was observed at one point and numerous light infestations persisted.
1965	Small numbers of colonies were commonly observed at numerous points.
1966	There was little change over the previous year; however, individual open-grown trees were severely defoliated in Benoit, Lee and Ingram twps.
1967	Scattered open-grown and fringe trees were moderately to severely defoliated in Currie, Powell and Gross twps. Small numbers of colonies were observed at scattered points elsewhere.
1968	Populations increased and caused moderate-to-severe defoliation in Eby, Powell, Milner and Garrison twps.
1969	A pocket of heavy infestation occurred in Willet Twp; elsewhere, scattered colonies were commonly observed.
1970	Lightly defoliated open-grown trees were observed at numerous points.
1971	Populations increased and caused moderate-to-severe defoliation at several points in the northern and central parts of the District. Lightly defoliated trees were observed at numerous points elsewhere.
1972	Populations declined sharply; only low numbers of colonies were reported.
1973	Populations remained at a low level.
1974	An increase in population levels resulted in light defoliation at scattered points.

(cont'd)

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

Year	Remarks
1975	little change in population levels over those of the previous year
1976	Populations declined and only trace defoliation could be found.
1977-1980	low numbers of larval colonies observed at a few points

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

Host(s): mountain-ash [Major]

Year	Remarks
1950-1957	not reported
1958	High populations caused severe defoliation in Brethour, Harley and Eby twps.
1959	light defoliation noted in McGarry, Evanturel, Brethour and Hilliard twps.
1960	Populations caused 10 to 40% defoliation in Corley, Evanturel, Brethour and Gamble twps. Scattered colonies were observed in Teck and McGarry twps.
1961	populations distributed through the entire District
1962	moderate-to-severe infestations, with 10 to 100% defoliation in Teck Twp; light damage at numerous points elsewhere
1963	High populations caused severe defoliation in Eby, Grenfell, Pacaud and Boston twps.
1964	Moderate-to-severe defoliation was observed in Eby, Otto, Grenfell, Boston, James and Mickle twps. Scattered colonies occurred at numerous points elsewhere.
1965	pockets of infestation, with severe defoliation in Eby, Dufferin, Melba and Nicol twps; light-to-moderate damage at several points elsewhere

(cont'd)

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

Year	Remarks
1966	There was little change in population levels. Pockets of heavy damage were encountered at five points. Light defoliation was observed at numerous points elsewhere.
1967	Severe defoliation occurred in Chown, Lawson and Teck twps. Light infestations were widely distributed elsewhere in the District.
1968	High populations persisted in Teck Twp and new heavy infestations were found in Eby, Grenfell and Lebel twps.
1969	Populations collapsed except in Teck and Eby twps, where low numbers persisted.
1970-1973	low numbers of severely defoliated trees observed at scattered points
1974-1977	not reported
1978-1980	high populations encountered at numerous points

Ambermarked Birch Leafminer, *Profenusa thomsonii* (Konow)

Host(s): birch [Major]

Year	Remarks
1950-1956	not reported
1957	low numbers observed at four locations
1958	Populations increased and caused severe leaf mining in James Twp. Light damage occurred at numerous points elsewhere.

(cont'd)

Ambermarked Birch Leafminer, *Profenusa thomsonii* (Konow) (cont'd)

Year	Remarks
1959	Populations continued to increase; heavy infestations were found in James, Stock, Playfair and Arnold twps and moderate damage occurred in Skead and Clifford twps.
1960	High populations recurred and damaged 80 to 100% of birch foliage in James and Stock twps. Moderate damage was recorded in Playfair and Arnold twps.
1961	High populations persisted in James and Stock twps and moderate damage recurred for the second consecutive year in Playfair and Arnold twps.
1962	A new heavy infestation was found in Otto Twp; however, numbers decreased elsewhere.
1963	New heavy infestations were found in Arnold and Burt twps and high populations recurred in Otto Twp. Moderate damage was noted in James, Clifford and Playfair twps.
1964	Generally, populations declined except in Doon and Knight twps where new heavy infestations were found.
1965	A new heavy infestation was found in Tolstoi Twp and light damage was recorded in Arnold Twp.
1966	High populations persisted in Tolstoi Twp and moderate damage was found in Rand, McCann and Mickle twps.
1967	Numbers decreased to light intensity.
1968	Marked increases in populations occurred in Stock, Barber, McGarry, Maisonville and Eby twps. The incidence of leaf mining was close to 100% in these areas.

(cont'd)

Ambermarked Birch Leafminer, *Profenusa thomsonii* (Konow) (concl.)

Year	Remarks
1969	High populations caused severe leaf mining in Hincks, Argyle, Bannockburn, Yarrow and Kimberley twps.
1970	Marked decreases in population levels were recorded.
1971-1972	light damage observed at scattered points
1973	trace populations observed at a few points
1974	not reported
1975	low numbers observed
1976	Light damage occurred in Eby Twp; small numbers of insects were found elsewhere.
1977-1978	light damage observed at many points throughout the District
1979	only small numbers observed
1980	not reported

Other Noteworthy Insects

Eastern Blackheaded Budworm, *Acleris variana* (Fern.)

Host(s): spruce, bF. [Major]

Year	Remarks
1950-1955	not reported
1956-1961	Trace populations were common at widely separated points.
1962-1964	not reported
1965	Light defoliation occurred in Boston, Ingram and Pacaud twps.

(cont'd)

Eastern Blackheaded Budworm, *Acleris variana* (Fern.) (concl.)

Year	Remarks
1966	not reported
1967	Trace populations were found in Eby and Garrison twps.
1968	Light defoliation was evident in Munro Twp and low numbers were observed at scattered points elsewhere.
1969-1980	not reported

Birch Sawfly, *Arge pectoralis* (Leach)

Host(s): birch [Major]

Year	Remarks
1950	not reported
1951	approximately 60% defoliation observed on shoreline trees at Round Lake in Otto and Marquis twps; low numbers at scattered points elsewhere
1952	A light infestation was recorded in Nicol Twp and scattered colonies were observed at numerous points elsewhere.
1953	Light infestations occurred at several points.
1954	Light damage occurred in Warden Twp and light infestations persisted at several points elsewhere.
1955	Populations increased and caused approximately 30% defoliation on white birch in five townships in the northern part of the District. Light damage and scattered colonies were observed at numerous points elsewhere.
1956	Populations increased for the second consecutive year and caused moderate-to-severe defoliation in six townships. Light damage or scattered colonies were observed at several points elsewhere.

(cont'd)

Birch Sawfly, *Arge pectoralis* (Leach) (concl.)

Year	Remarks
1957	Numbers of larval colonies decreased; however, light damage was observed in Playfair, Hislop, McCool and Currie twps.
1958	Populations increased in Playfair Twp and caused moderate damage. Trace or light defoliation was observed at numerous points elsewhere.
1959	Populations decreased; however, trace defoliation persisted at several points.
1960	Populations decreased for the second consecutive year to a trace level at scattered points.
1961	Populations declined for the third consecutive year; few larvae could be found.
1962	low numbers at two points
1963	low numbers in Eby and Nordica twps
1964-1973	not reported
1974	trace population in Truax Twp
1975-1980	not reported

Yellownecked Caterpillar, *Datana ministra* (Dru.)

Host(s): deciduous [Minor]

Year	Remarks
1950-1956	not reported
1957	low numbers observed at one point
1958-1966	not reported

(cont'd)

Yellownecked Caterpillar, *Datana ministra* (Dru.) (concl.)

Year	Remarks
1967	Colonies were commonly observed in Hilliard and Brethour twps
1968	Small numbers of colonies were encountered in Eby and Otto twps.
1969-1980	not reported

Fir Coneworm, *Dioryctria abietivorella* (Grt.)

Host(s): coniferous [Minor]

Year	Remarks
1950-1964	not reported
1965	High populations occurred in Bernhardt and Arnold twps.
1966	Light infestations were found in Rand Twp.
1967	not reported
1968	Low numbers occurred in Grenfell Twp.
1969-1980	not reported

Spruce Coneworm, *Dioryctria reniculelloides* Mut. & Mun.

Host(s): spruce, bF [Minor]

Year	Remarks
1950-1976	not reported
1977	High populations caused serious damage to the spruce cone crop in Burt Twp.

(cont'd)

Spruce Coneworm, *Dioryctria reniculelloides* Mut. & Mun. (concl.)

Year	Remarks
1978	not reported
1979	High populations damaged spruce cones at several points.
1980	not reported

Birch-aspen Leafroller, *Epinotia solandriana* (L.)

Host(s): birch, poplar [Major]

Year	Remarks
1950-1955	not reported
1956	light defoliation observed at numerous points in the District
1957-1961	not reported
1962	Moderate-to-heavy infestations were found in Clifford and Cairo twps.
1963	Populations declined to low levels throughout the District.
1964	Small numbers persisted at many points.
1965	not reported
1966	Low numbers were observed at scattered points.
1967-1969	not reported
1970-1971	Light defoliation occurred at numerous points.
1972-1973	not reported
1974	Light defoliation was observed at several points.
1975	Low numbers were encountered at scattered points.
1976-1980	not reported

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

Host(s): spruce [Minor]

Year	Remarks
1950	Trace populations were recorded at 13 points.
1951	not reported
1952	Low numbers were observed through the eastern part of the District.
1953	Trace populations were observed.
1954	not reported
1955-1956	Trace populations were observed.
1957	Light defoliation occurred in Pacaud, Sharpe and Marter twps.
1958-1959	Low numbers occurred at numerous points.
1960-1961	Trace populations were recorded at a few points.
1962	Light defoliation occurred in Harley and Beauchamp twps.
1963-1964	Only low numbers could be found.
1965	Minor increases in populations were evident in the southern part of the District.
1966-1970	Only trace populations could be found.
1971-1980	not reported

Late Birchleaf Edgeminer, *Heterarthrus nemoratus* (Fall.)

Host(s): birch [Minor]

Year	Remarks
1950-1960	not reported

(cont'd)

Late Birchleaf Edgeminer, *Heterarthrus nemoratus* (Fall.) (concl.)

Year	Remarks
1961	Light infestations occurred at four points in the north-eastern part of the District.
1962	Low populations were encountered in McGarry Twp.
1963-1964	not reported
1965	Low numbers were observed at scattered points.
1966	High populations occurred in Dack, Evanturel, Walker and Chamberlain twps.
1967	Medium infestations were found in Arnold, Pontiac and Dunmore twps; low numbers were commonly observed elsewhere.
1968-1970	not reported
1971	Low numbers occurred through the District.
1972-1973	not reported
1974-1975	Only trace populations could be found.
1976-1980	not reported

Native Elm Bark Beetle, *Hylurgopinus rufipes* (Eich.)

Host(s): elm [Major]

Year	Remarks
1950-1962	not reported
1963	This insect is a vector of Dutch elm disease. The first record in the District was found in association with dead and dying elm trees in Harley Twp.
1964	High numbers were found in decadent trees in Kerns Twp.

(cont'd)

Native Elm Bark Beetle, *Hylurgopinus rufipes* (Eich.) (concl.)

Year	Remarks
1965	common in Kerns, Casey and Harley twps
1966	Populations persisted in Harley Twp.
1971-1980	not reported

Fall Webworm, *Hyphantria cunea* (Dru.)

Host(s): deciduous [Major]

Year	Remarks
1950	A light infestation occurred in Hilliard Twp.
1951	low numbers observed in Powell and Argyle twps
1952	Scattered colonies were encountered at several points.
1953	not reported
1954	Colonies were commonly observed in the eastern part of the District.
1955	not reported
1956	Low populations were found in the eastern part of the District.
1957-1960	not reported
1961	Low numbers of colonies were observed in the western part of the District.
1962	Trace populations were encountered in Eby and Marter twps.
1963	Light infestations occurred at three widely separated points.

(cont'd)

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

Year	Remarks
1964	Only a trace population could be found.
1965	Populations increased and a moderate-to-high infestation was recorded in Armstrong Twp.
1966	Populations decreased to a low level in Armstrong Twp.
1967-1970	not reported
1971	Populations increased at several points.
1972-1980	not reported

Pine Engraver, *Ips pini* (Say)

Host(s): pine, spruce [Major]

Year	Remarks
1950-1961	not reported
1962	Low populations attacked decadent trees in Bannockburn and Gauthier twps.
1963	A moderate-to-heavy infestation was noted in a fire-damaged stand at one point.
1964	High populations occurred at several widely separated points.
1965-1967	not reported
1968	Low populations were encountered in James Twp.
1969-1980	not reported

Northern Tent Caterpillar, *Malacosoma californicum pluviale* Dyar

Host(s): cherry [Major]

Year	Remarks
1950	light damage observed in the northern and eastern parts of the District
1951-1952	not reported
1953	low numbers of colonies observed at numerous points
1954	not reported
1955	low numbers of colonies observed at scattered points
1956-1957	not reported
1958	Scattered colonies occurred throughout the District.
1959	low numbers observed at one location
1960-1961	Numbers of colonies increased.
1962	Populations declined to a trace level.
1963	Populations increased to a high level in Michaud, Cook, Munro and Guibord twps.
1964	Populations increased and caused heavy defoliation at seven points.
1965	High numbers occurred in Walker, Lee and McEvay twps.
1966	Populations remained at a high level at several points.
1967	High populations occurred in Harker Twp and scattered colonies were common elsewhere.
1968	Populations declined to a trace level.
1969	Light infestations were commonly observed.
1970-1972	not reported
1973-1978	Light infestations occurred at numerous points.

(cont'd)

Northern Tent Caterpillar, *Malacosoma californicum pluviale* Dyar (concl.)

Year	Remarks
1979	High populations were observed at scattered locations.
1980	Populations declined to a low level.

Sawyer Beetles, *Monochamus* spp.

Host(s): coniferous [Major]

Year	Remarks
1950-1978	not reported
1979	Adults feeding on branches and twigs caused serious damage to trees on fringes of stands beside a cutover area in Davidson Twp.
1980	Heavy damage occurred to trees adjacent to log storage dumps in the District.

Spiny Elm Caterpillar, *Nymphalis antiopa* (L.)

Host(s): deciduous [Minor]

Year	Remarks
1950-1952	not reported
1953	Scattered colonies were observed in the northern and eastern parts of the District.
1954	not reported
1955-1956	Only trace populations could be found.
1957-1961	not reported

(cont'd)

Spiny Elm Caterpillar, *Nymphalis antiopa* (L.) (concl.)

Year	Remarks
1962-1965	low numbers were observed at scattered points.
1966-1967	not reported
1968	Light infestations were encountered in Eby, Teck and Savard twps.
1969-1971	not reported
1972	pockets of high population observed at a few points
1973	Populations decreased to a low level.
1974-1978	not reported
1979	Larval colonies were observed at numerous points.
1980	not reported

Northern Pine Weevil, *Pissodes approximatus* Hopk.

Host(s): pine [Major]

Year	Remarks
1950-1964	not reported
1965	High populations caused light mortality in red pine reproduction at three points.
1966	Light damage was observed in Marquis and Grenfell twps.
1967-1980	not reported

Balsam Shootboring Sawfly, *Pleroneura brunneicornis* Roh.

Host(s): bF [Minor]

Year	Remarks
1950-1959	not reported
1960	Moderate-to-heavy damage occurred in Ossian and Marquis twps and light damage was encountered at several points elsewhere.
1961	Only trace populations could be found.
1962	High populations were evident in Benoit, Farr and Ben Nevis twps.
1963	Populations declined to a trace level.
1964	High populations occurred in Benoit, Eby, Marquis and Ben Nevis twps.
1965	not reported
1966	Light damage was evident in Tudhope, Holloway, Marquis and Farr twps.
1967-1968	not reported
1969	Light infestations were present in the western part of the District.
1970	Low populations occurred at scattered points.
1971-1972	not reported
1973	High populations were observed at many points through the District.
1974	High populations were recorded in Pacaud, Harker and Gauthier twps.
1975	not reported
1976	A pocket of heavy infestation occurred in Taylor Twp.
1977-1980	not reported

Spruce Bud Midge, *Rhabdophaga swainei* Felt

Host(s): spruce [Minor]

Year	Remarks
1950-1960	not reported
1961-1963	low numbers found
1964	Moderate damage was recorded in Dunmore and Eby twps; low numbers were observed elsewhere.
1965	Low numbers were found at scattered points.
1966-1969	not reported
1970	Low numbers were observed at many points.
1971	not reported
1972	Low numbers were common throughout the District.
1973	Populations increased to high intensity at numerous points.
1974	Populations declined to a low level.
1975-1980	not reported

Pine Tortoise Scale, *Toumeyella parvicornis* (Ckll.)

Host(s): jP, scP [Major]

Year	Remarks
1950-1961	not reported
1962	Light damage was encountered in Mickle Twp.
1963	Light infestations were noted at five widely scattered points.

(cont'd)

Pine Tortoise Scale, *Toumeyella parvicornis* (Ckll.) (concl.)

Year	Remarks
1965	Small pockets of heavy damage were evident in Willet and Beauchamp twps.
1966-1971	not reported
1972	Small pockets of heavy infestations were found at scattered points.
1973	High populations occurred at a few points.
1974-1978	High populations occurred at a few widely scattered points.
1979-1980	not reported

Spruce Bud Moth, *Zeiraphera canadensis* Mut. & Free.

Host(s): spruce [Major]

Year	Remarks
1950-1963	not reported
1964	High populations were observed in Harley and Burt twps.
1965	High populations persisted in Harley Twp.
1966-1980	not reported

Pine Needle Sheathminer, *Zelleria haimbachi* Busck

Host(s): jP [Minor]

Year	Remarks
1950-1969	not reported
1970-1971	Low populations were observed at numerous points.
1972	Populations increased to a high level at several points.
1973	not reported
1974	A medium infestation was noted in Beauchamp Twp and small numbers were common elsewhere.
1975	not reported
1976	Light populations occurred at numerous points.
1977	Light infestations were widely distributed throughout the District.
1978-1979	Populations declined to a trace level.
1980	not reported

DISEASES

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

Host(s): all species [Major]

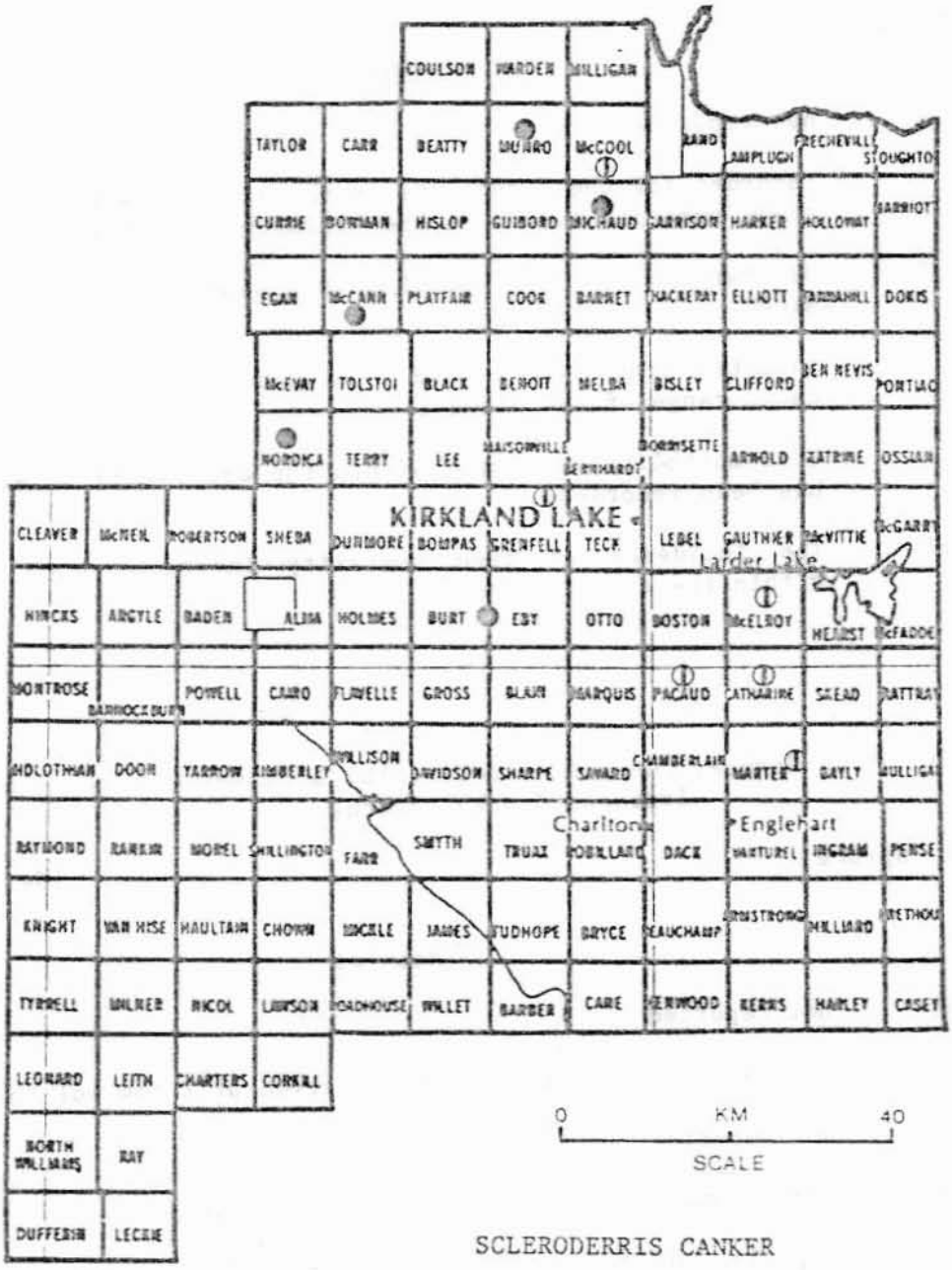
Year	Remarks
1950-1954	not reported
1955	first records in the District; trace infection observed at a small number of points
1956	not reported
1957-1958	Trace levels of infection were observed at a few points.
1959-1962	not reported
1963	tamarack trees damaged in Gauthier and Holmes twps
1964	not reported
1965	Light tree mortality was encountered in white spruce and black spruce stands at a few points.
1966	Light tree mortality was observed in small-diameter jack pine in Cane Twp and red pine plantations in Cane, Grenfell, Teck and Nordica twps.
1967-1971	not reported
1972	A damage evaluation in a 20-ha^2 jack pine plantation in Burt Twp revealed a heavy incidence of infection and 33% mortality.
1973	Surveys in pine plantations at several points showed that infection levels ranged from 3 to 6%.
1974-1976	Light damage was observed in several jack pine plantations.
1977	not reported
1978	No important change in the incidence of this disease could be determined; light damage was observed at scattered points.
1979-1980	not reported

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

Host(s): pines [Major]

Year	Remarks
1950-1964	not reported
1965	The disease was recorded for the first time in the District. Severe damage occurred in the Swastika Forest Station.
1966	Surveys revealed infection centers of this disease and severe damage in red pine plantations in Nordica, McCann, Burt, Munro and Michaud twps. Light damage was recorded in a new infection center in McCool Twp as well as in Pacaud, McElroy, Catharine and Martin Twps (see map, page 119).
1967	Serious damage continued in previously recorded infection center .
1968	Moderate damage was recorded in a newly discovered infection center in a jack pine plantation in Munro Twp.
1969	Moderate damage occurred in a jack pine plantation in Michaud Twp.
1970	Light damage was recorded in the Swastika Forest Station.
1971	Light damage was recorded in a jack pine plantation in the vicinity of the Swastika Forest Station.
1972	Trace levels of infection were found in Arnold Twp.
1973	Infection center were discovered in Bowman and Guibord twps.
1974	Infection center were discovered in eight pine reproduction areas and an average of 8% current mortality was recorded.
1975-1978	No change in the status of this pathogen could be determined.
1979	Light levels of infection were observed at numerous points in the District.
1980	Trace levels of damage were noted in Black, Munro and McCool twps.

KIRKLAND LAKE DISTRICT



SCLERODERRIS CANKER

Locations where infections occurred in 1966

LEGEND

Light infection ◐

Mediume-to-heavy infection ●

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

Host(s): elm [Major]

Year	Remarks
1950-1972	not reported
1973	recorded for the first time in the District when infected trees were discovered in the vicinity of Englehart
1974-1975	No change in the status of this disease could be determined.
1976	Infected trees were found 2 km north of the previously known range of the disease.
1977	Tree mortality was noted within the area where infection has been recorded.
1978-1980	The incidence of tree mortality increased each year within the area infected.

Needle Rusts of Spruce, *Chrysomyxa ledi* (Alb. & Schwein.) de Bary and *C. ledicola* (Peck) Lagerh.

Host(s): spruce [Major]

Year	Remarks
1950-1954	not reported
1955	Low levels of infection were observed at a few points.
1956	not reported
1957-1958	Light damage occurred throughout the District.
1959	Lightly infected trees were observed in the Larder Lake area.
1960-1961	not reported

(cont'd)

Needle Rusts of Spruce, *Chrysomyxa ledi* (Alb. & Schwein.) de Bary and *C. ledicola* (Peck) Lagerh. (concl.)

Year	Remarks
1962-1963	Trace-to-light levels of infection were observed at scattered points in the District.
1964	not reported
1965	Light damage was recorded in Milner Twp.
1966-1968	Low levels of infection occurred at a few points.
1969-1972	not reported
1973	moderate damage in Tudhope Twp; trace damage at a few points elsewhere
1974	Moderate levels of infection occurred in Hislop Twp, and light damage was recorded in Ingram Twp.
1975-1977	Low levels of infection were observed at numerous points.
1978	not reported
1979-1980	Low levels of infection occurred at numerous points.

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

Host(s): aspen [Major]

Year	Remarks
1950-1958	not reported
1959-1960	Light foliar damage was observed at numerous points in the District.
1961	not reported
1962	Heavy foliar damage occurred in many stands in the eastern and northern parts of the District.

(cont'd)

Ink Spot of Aspen, *Ciborinia whetzelii* (Seaver) Seaver (cont'd)

Year	Remarks
1963	Severe defoliation was encountered in Chamberlain, Bowman and Marriott twps and moderate damage was evident in numerous stands elsewhere.
1964	High levels of infection were observed in Cook, Michaud and Garrison twps.
1965	Moderate-to-heavy damage occurred at numerous points in the District.
1966	A general decline in infection levels was noted.
1967	A moderate-to-severe level of infection was present in Gauthier and Arnold twps. Elsewhere trace damage was commonly observed.
1968	Moderate-to-severe defoliation occurred in Marquis Twp and light damage was evident in McElroy, Catharine and Gauthier twps.
1969	Severe defoliation was noted in Hislop Twp and light damage was evident in James, Munro, Beatty, Farr and Barber twps.
1970	Light defoliation was observed in Grenfell, Holloway, Marquis, Playfair and Truax twps.
1971-1972	The incidence of this disease declined to a low level.
1973	Levels of infection remained low except in Barber Twp where moderate defoliation was encountered.
1974	Levels of infection increased and there was moderate-to-severe damage at numerous points.
1975	Moderate-to-severe damage was noted in Tudhope Twp; elsewhere only trace or light infections could be found.
1976	Little change in infection levels occurred. Moderate damage was observed in Gauthier Twp and light defoliation was noted at five points elsewhere.
1977	not reported

(cont'd)

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

Year	Remarks
1978	Light defoliation was noted in Eby, Marriott, Ossian, McVittie and Gross twps.
1979	Light levels of infection were evident at numerous points.
1980	The incidence of infection declined to a low level in the District.

Sweet Fern Blister Rust, *Cronartium comptoniae* Arthur

Host(s): jP [Major]

Year	Remarks
1950-1954	not reported
1955	Light infection occurred in Lundy Twp.
1956-1962	not reported
1963	Light infection was observed in a stand in Michaud and Dunmore twps.
1964	Pockets of medium-to-heavy infection were observed in Michaud, Gross, Cairo and McCann twps. A lightly infected stand was found in Mickle Twp.
1965	Light infection and damage were observed in Clifford Twp.
1966	Lightly infected stands were found in Arnold, Charters, Burt and Willison twps.
1967	Infection persisted in Arnold, Charters, Burt and Willison twps.
1968	High infection levels were found in stands in Cairo and Michaud twps, and moderate damage was recorded in Henwood Twp.

(cont'd)

Sweet Fern Blister Rust, *Cronartium comptoniae* Arthur (concl.)

Year	Remarks
1969	Continuing surveys revealed the occurrence of light infection levels of this pathogen in McCann, McEvoy, Nordica, Sheba and Dunmore twps.
1970	A severely infected stand was found in Beauchamp Twp. Light infection levels were observed in Lawson, Mickle, Munro and Willison twps.
1971	A high incidence of infection occurred at one point in Cairo Twp.
1972	No change in the incidence or level of infection of this pathogen could be determined.
1973	Moderate levels of damage occurred in several townships and mortality ranged up to 5%.
1974	not reported
1975	Moderate infection levels were recorded in Garrison, Kimberley and Lebel twps.
1976	No change in status could be determined.
1977	A high incidence of infection occurred in Willison Twp.
1978	No change in status could be determined.
1979	A lightly infected stand was observed in Beauchamp Twp.
1980	not reported

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

Host(s): wP [Major]

Year	Remarks
1950-1959	not reported
1960	The first record of this disease in the District was obtained when infected trees were found in Bayley Twp.
1961	not reported
1962	A pocket of severe damage was found in Tyrrell Twp and light damage recurred in Bayley Twp.
1963	Continuing surveys revealed a high incidence of damage in Eby Twp and moderate damage in Milner and Grenfell twps.
1964	Heavy damage was noted in Grenfell Twp where 28% of the trees were infected. Light damage was recorded in Dunmore and Tyrrell twps.
1965	Moderate damage occurred in Grenfell Twp and pockets of light damage were observed at several points elsewhere.
1966	Light damage was observed in Grenfell and Tyrrell twps.
1967	Light damage occurred at numerous scattered points in the District.
1968-1971	not reported
1972-1973	light damage common at several points in the District
1974-1978	not reported
1979	Heavy damage was noted in Dack, Evanturel and Beauchamp twps.
1980	High levels of infection persisted in Dack and Evanturel twps.

Jack Pine Needle Cast, *Davisomycella ampla* (J. Davis) Darker

Host(s): jP [Major]

Year	Remarks
1950-1959	not reported
1960	Light foliar damage was widely distributed through the District.
1961-1963	not reported
1964	Trace levels of infection were encountered at widely separated points.
1965	High levels of infection occurred in Morrisette and Bannockburn twps.
1966-1970	not reported
1971-1973	Low levels of infection were commonly observed throughout the District.
1974-1975	not reported
1976-1977	Trace levels of infection were noted at scattered points.
1978-1979	not reported
1980	Trace levels of infection were widely distributed through the District.

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

Host(s): jP [Major]

Year	Remarks
1950-1961	not reported
1962	first time recorded in the District; low numbers of infected trees found in Michaud Twp

(cont'd)

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

Year	Remarks
1963	Light infection occurred in Flavelle, Michaud, Nordica and Cook twps.
1964-1968	not reported
1969	Light damage was observed in Michaud Twp.
1970	not reported
1971-1973	Light infection was noted through the District.
1974-1976	not reported
1977	Light infection occurred through the District. Some branch mortality was noted in Clifford Twp.
1978	not reported
1979-1980	Low levels of infection were commonly observed in the District.

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

Host(s): aspen [Major]

Year	Remarks
1950-1952	not reported
1953	This is the first record of the disease in the District. Moderately to severely infected stands were found in James, Barber, Truax and Robillard townships; some tree mortality was noted as well. Low numbers of infected trees were observed at numerous points elsewhere.
1954	Infected trees and light tree mortality were observed in 21 townships.
1955	Continuing surveys show that the pathogen is widely distributed through the District and that the incidence of mortality ranges from 1 to 8%.

(cont'd)

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

Year	Remarks
1956-1961	not reported
1962	widely distributed through the District; considerable mortality in many stands
1963	not reported
1964	The disease was common in most stands. Evaluations in Guibord and Otto townships revealed an incidence of infection amounting to 36% and 19%, respectively, in these areas.
1965-1967	Surveys revealed the occurrence of appreciable mortality.
1968	Sampling in numerous stands revealed an incidence of infection ranging from 1 to 38% and appreciable mortality.
1969-1970	not reported
1971	Infection and appreciable mortality were commonly observed throughout the District.
1972	not reported
1973	wide distribution throughout the District, incidence of infection more than 25%, and mortality ranging up to 15% at some of the points examined
1974	not reported
1975-1980	No important change in the incidence of infection or mortality could be determined.

Leaf and Twig Blight, *Venturia macularis* (Fr.) E. Müller & v. Arx

Host(s): aspen [Major]

Year	Remarks
1950-1959	not reported
1960	Light damage was observed on aspen regeneration at a few points.
1961	not reported
1962	Moderate damage occurred in Maisonville Twp.
1963	The incidence of infection increased and there was moderate damage in Maisonville and Milner twps.
1964	An increase in the incidence of infection recurred for the second consecutive year and there was severe damage at five locations.
1965	Severe damage was recorded in Sheba, Grenfell and Evanturel twps.
1966	An increase in distribution was noted when severe damage was found in Montrose, Corkill, Garrison, Grenfell, Rand and Marter twps.
1967	Heavy damage was found in McCool Twp. Elsewhere, the incidence of blight decreased.
1968	The incidence of infection declined for the second consecutive year to reach a low level.
1969	not reported
1970	Low levels of infection were observed at widely scattered points.
1971-1972	not reported
1973	Trace damage was observed at a few scattered points.
1974-1976	not reported
1977	Trace levels of infection were encountered at a few points.

(cont'd)

Leaf and Twig Blight, *Venturia macularis* (Fr.) E. Müller & v. Arx (concl.)

Year	Remarks
1978	Levels of infection increased and there was moderate-to-severe damage in Ossian and Davidson twps. Light damage was noted at two points elsewhere in the District.
1979	Little change in infection levels could be determined. Severe damage was noted in Harker Twp and light damage was recorded in Nordica, Tudhope and Clifford twps.
1980	not reported

Other Noteworthy Diseases

Needle Rust, *Melampsora medusae* Thüm.

Host(s): tL, tA [Major]

Year	Remarks
1950-1962	not reported
1963	Light damage occurred in tamarack stands in Holmes, Harker and Holloway twps.
1964	not reported
1965	Moderate-to-severe infection levels were recorded in Holloway, Harker, Milner, Holmes, Bond and Lee twps. Light damage was observed at widely scattered points elsewhere.
1966	A general decline in infection occurred, except in Lee Twp where moderate-to-severe damage recurred.
1967	Light damage occurred in Gross, Hilliard and Lee twps.
1968	Only trace levels of infection could be found.
1969-1972	not reported

(cont'd)

Needle Rust, *Melampsora medusae* Thüm. (concl.)

Year	Remarks
1973	Light damage was observed at a few points.
1974-1977	not reported
1978	Light infection occurred in the southern part of the District; however, only trembling aspen, the alternate host of this pathogen, was infected.
1979	Light levels of infection were observed at scattered points in the southern part of the District.
1980	not reported

White Trunk Rot, *Phellinus igniarius* (L. : Fr.) Quélet

Host(s): deciduous [Major]

Year	Remarks
1950-1953	not reported
1954	infection found in white birch or trembling aspen stands at five points in the District
1955	High infection levels occurred in overmature poplar stands in Harker Twp.
1956-1958	not reported
1959	common in poplar stands at numerous points
1960-1962	not reported
1963	commonly observed on mature trees in Thackeray and Milner twps
1964-1965	common on mature trees at numerous points
1966-1980	not reported

Red Ring Rot, *Phellinus pini* (Brot. : Fr.) A. Ames

Host(s): coniferous [Major]

Year	Remarks
1950-1953	not reported
1954	Infected jack pine trees were found in Montrose and Robertson twps.
1955	Low numbers of infected trees were observed in Lawson Twp.
1956-1967	not reported
1968	found at one point
1969-1980	not reported

Leaf and Twig Blight, *Venturia populina* (Vuill.) Fabric.

Host(s): bPo [Major]

Year	Remarks
1950-1957	not reported
1958	Light shoot damage was noted in the southern part of the District.
1959	not reported
1960	Light infection was observed at scattered points in the District.
1961	not reported
1962-1963	Light damage was noted at several points.
1964	A high level of infection was noted in Pacaud Twp.
1965	High infection levels were recorded in Yarrow, Evanturel, Pacaud and McVittie twps and light damage was encountered at numerous points elsewhere.

(cont'd)

Leaf and Twig Blight, *Venturia populina* (Vuill.) Fabric. (concl.)

Host(s): bPo [Major]

Year	Remarks
1966	A high level of infection persisted in McVittie Twp; elsewhere the incidence of infection declined.
1967	The incidence of infection declined to a low level.
1968	Only traces of this disease could be found.
1969-1976	not reported
1977-1978	Light damage occurred commonly on young trees.
1979-1980	not reported

ABIOTIC DAMAGE

Frost

Year	Remarks
1950-1963	not reported
1964	Freezing temperatures in May and June caused considerable damage to new shoots of several species of conifers.
1965	Light shoot mortality occurred in several white spruce and balsam fir stands in the District.
1966	Severe damage occurred in white spruce and balsam fir stands in Bernhardt Twp, and moderate damage was common in stands of balsam fir in Benoit, Eby and Garrison twps.
1967	Light damage was noted in balsam fir stands east of Matheson and in white spruce shelterbelts at the Swastika Forest Station.
1968-1971	not reported
1972	Moderate-to-severe damage was noted on several tree species at numerous points in the District.
1973-1976	not reported
1977	varying degrees of damage observed at scattered points
1978	severe damage observed on new shoots of several tree species in Burt Twp
1979	not reported
1980	severe damage to many species throughout the District

Hail

Year	Remarks
1950-1963	not reported
1964	Light damage occurred in a spruce stand in Pacaud Twp.
1965-1980	not reported

Wind

Year	Remarks
1950-1974	not reported
1975	Moderate-to-severe damage occurred in jack pine and poplar stands in the Charlton and Larder Lake areas.
1976-1980	not reported

APPENDICES

APPENDIX A

DECIDUOUS HOST

Common Name	Scientific Name	Abbreviations
Alder	*Alnus* spp.	Al
Apple	*Malnus* spp.	Ap
Ash, black	*Fraxinus nigra* Marsh.	As
Aspen, largetooth	*Populus grandidentata* Michx.	lA
trembling	*tremuloides* Michx.	tA
Basswood	*Tilia* spp.	Ba
Beech	*Fagus grandifolia* Ehrh.	Be
Birch, white	*Betula papyrifera* Marsh.	wB
yellow	*alleghaniensis* Britt.	yB
Butternut	*Juglans cinerea* L.	Bu
Cherry, eastern choke	*Prunus virginiana* L.	eaCH
pin	*pensylvanica* L.f.	pCh
Elm, white	*Ulmus americana* L.	wE
Horse-chestnut	*Aesculus hippocastanum* L.	hChe
Ironwood	*Ostrya* spp.	I
Maple, Manitoba	*Acer negundo* L.	mM
red	*rubrum* L.	rM
sugar	*saccharum* Marsh.	sM
Mountain-ash, American	*Sorbus americana* Marsh.	aMo
Oak, bur	*Quercus macrocarpa* Michx.	bO
red	*rubra* L.	rO
Poplar, balsam	*Populus balsamifera* L.	bPo
Carolina	*eugenei* Simon-Louis	cPo
Lombardy	*nigra* L.	lPo
silver	*alba* L.	sPo
Willow	*Salix* spp.	W

APPENDIX B

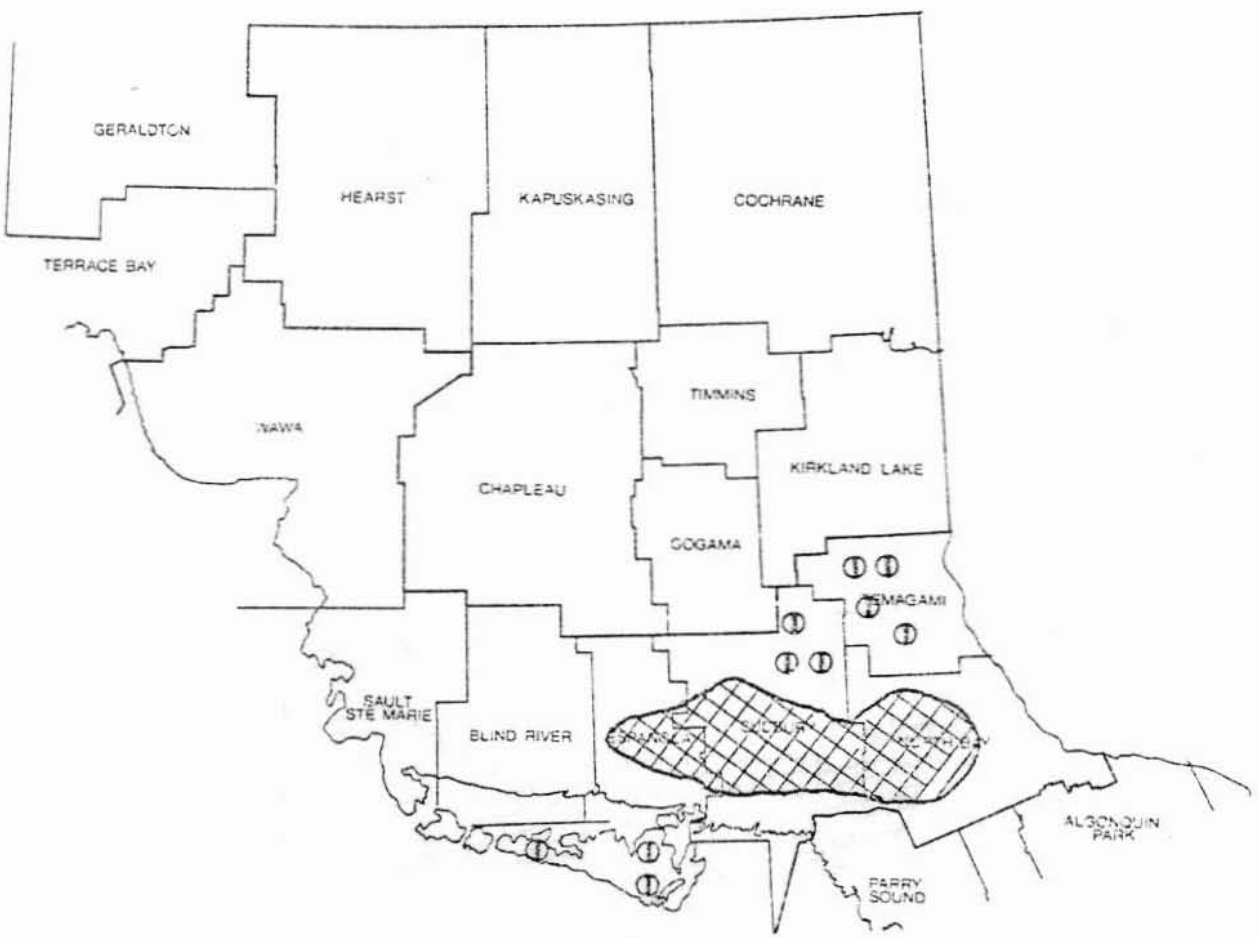
CONIFEROUS HOST

Common Name	Scientific Name	Abbreviations
Cedar, eastern white	*Thuja occidentalis* L.	eC
Fir, balsam	*Abies balsamea* (L.) Mill.	bF
Larch	*Larix laricina* (Du Roi) K. Koch	tL
Pine, Austrian	*Pinus nigra* Arn.	aP
eastern white	*strobus* L.	wP
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

APPENDIX C

MAPS - NORTHEASTERN ONTARIO

NORTHEASTERN ONTARIO



0 Miles 60

0 Kilometres 96

Birch Skeletonizer

Areas within which defoliation occurred in 1950

LEGEND

Light defoliation ①

Moderate-to-severe defoliation

NORTHEASTERN ONTARIO

Birch Skeletonizer

0 Miles 60

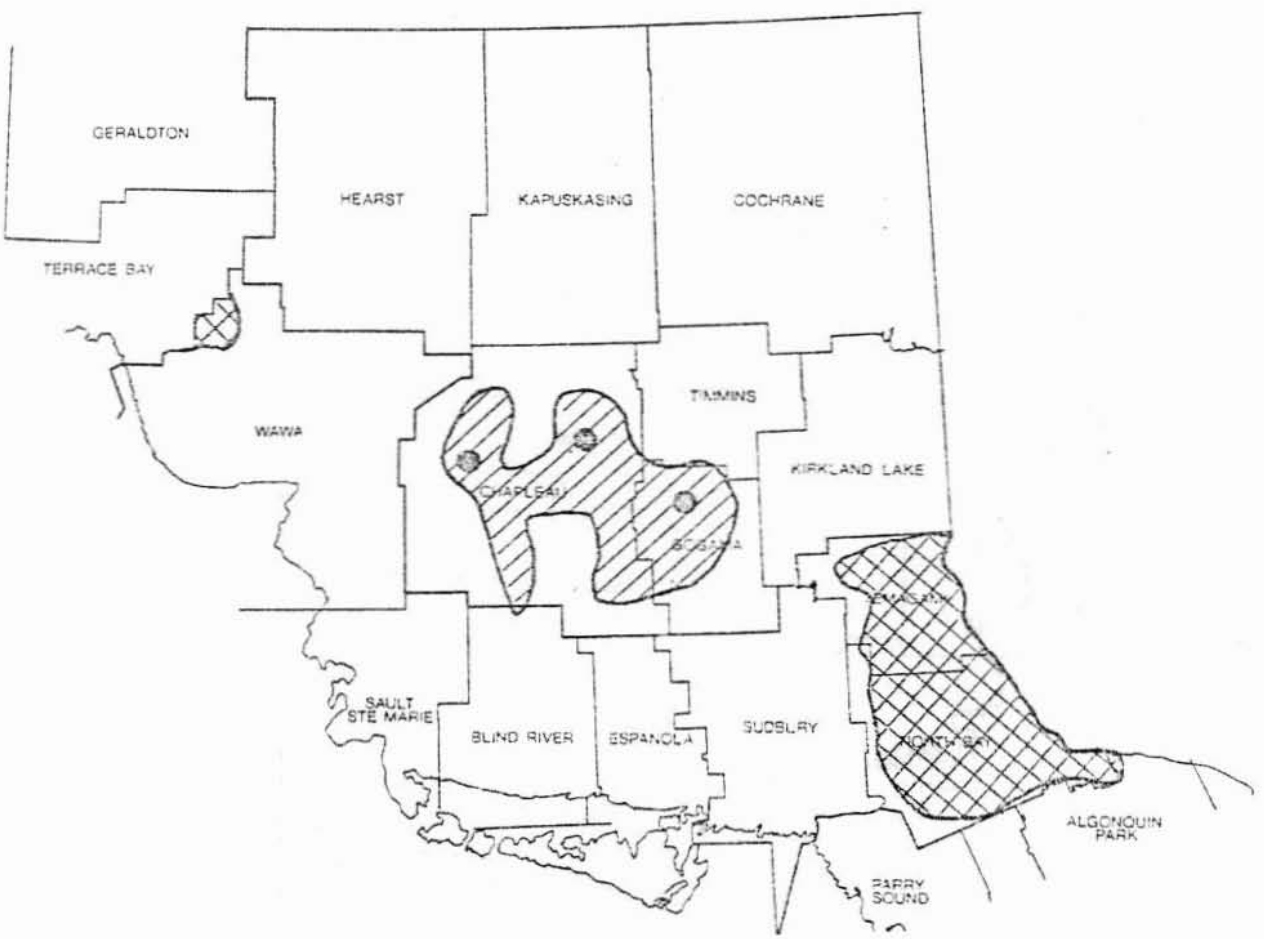
0 Kilometres 96

Areas within which defoliation occurred in 1961

LEGEND

Moderate-to-severe defoliation

NORTHEASTERN ONTARIO



0 Miles 60

0 Kilometres 96

Birch Skeletonizer

Areas within which defoliation occurred in 1963

LEGEND

Light defoliation

Moderate-to-severe defoliation or

NORTHEASTERN ONTARIO

Birch Skeletonizer

Areas within which defoliation occurred in 1970

0 Miles 60

0 Kilometres 96

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO

Birch Skeletonizer

Areas within which defoliation occurred in 1971

0 Miles 60

0 Kilometres 96

LEGEND

Moderate-to-severe defoliation

NORTHEASTERN ONTARIO

Birch Skeletonizer

Areas within which defoliation occurred in 1972

0 Miles 60

0 Kilometres 96

LEGEND

Light defoliation ◐ or

Moderate-to-severe defoliation

NORTHEASTERN ONTARIO

Birch Skeletonizer

Areas within which defoliation occurred in 1973

0 Miles 60

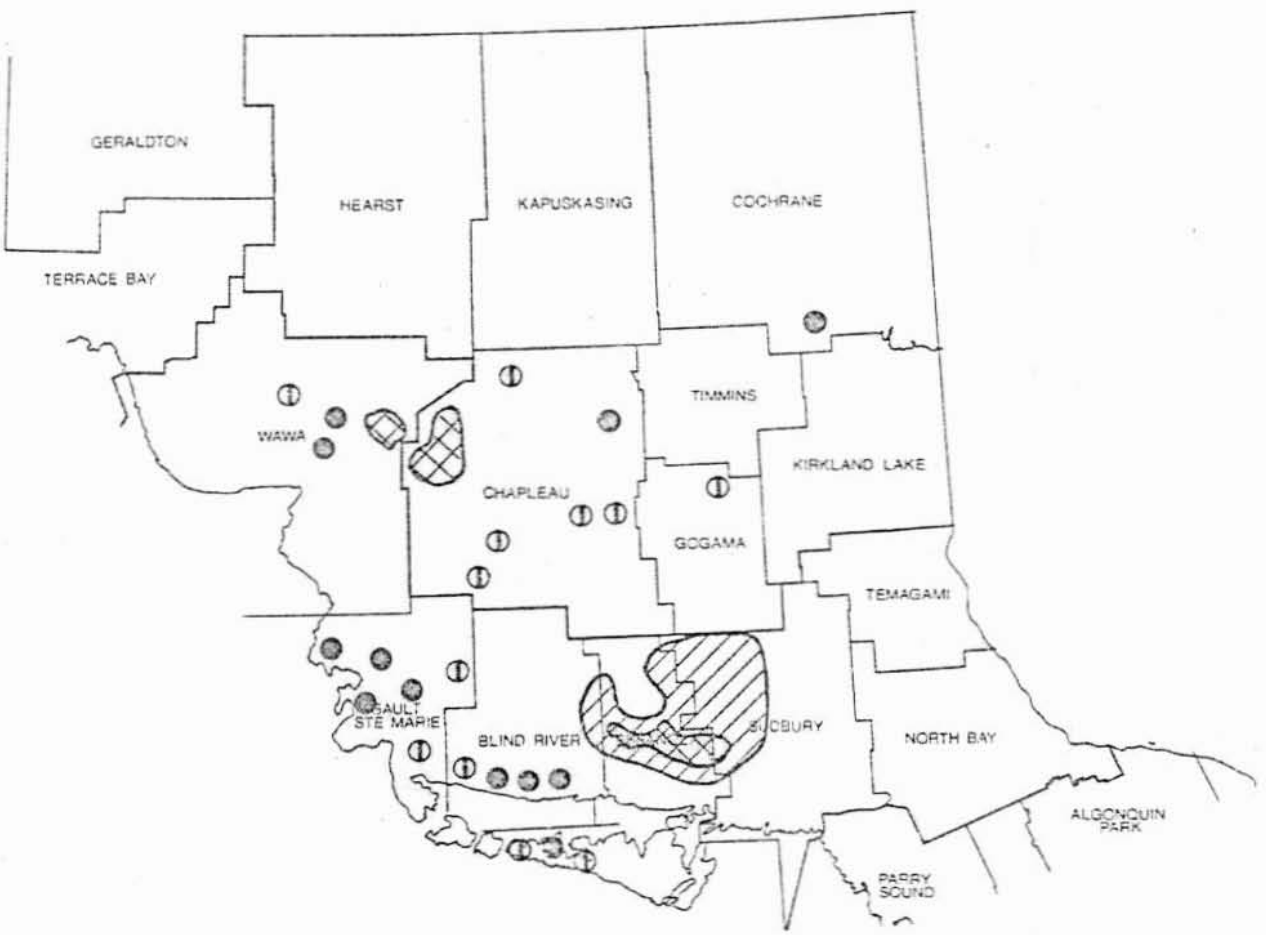
0 Kilometres 96

LEGEND

Light defoliation ◐ or

Moderate-to-severe defoliation ● or

NORTHEASTERN ONTARIO



Large Aspen Tortrix

Areas within which defoliation occurred in 1957

0 Miles 60

0 Kilometres 96

LEGEND

Light defoliation ◐ or ▨

Moderate-to-severe defoliation ● or ▩

NORTHEASTERN ONTARIO

Large Aspen Tortrix

Areas within which defoliation occurred in 1958

0 Miles 60

0 Kilometres 96

LEGEND

Light defoliation ◐ or ▨

Moderate-to-severe defoliation ● or ▩

NORTHEASTERN ONTARIO

Large Aspen Tortrix

Areas within which defoliation occurred in 1959

0 Miles 60

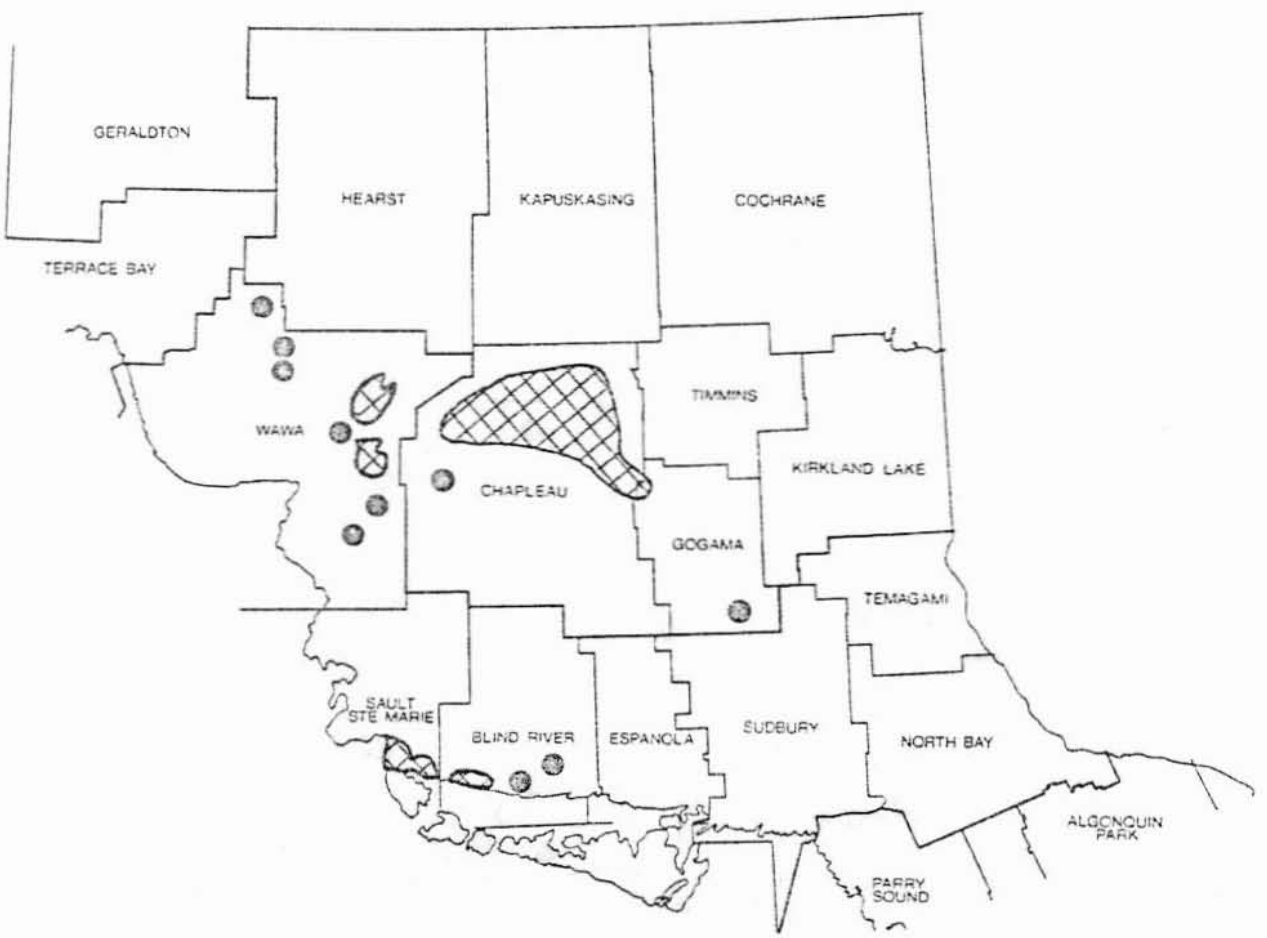
0 Kilometres 96

LEGEND

Light defoliation ◐ or ▨

Moderate-to-severe defoliation ● or ▩

NORTHEASTERN ONTARIO



0 Miles 60

0 Kilometres 96

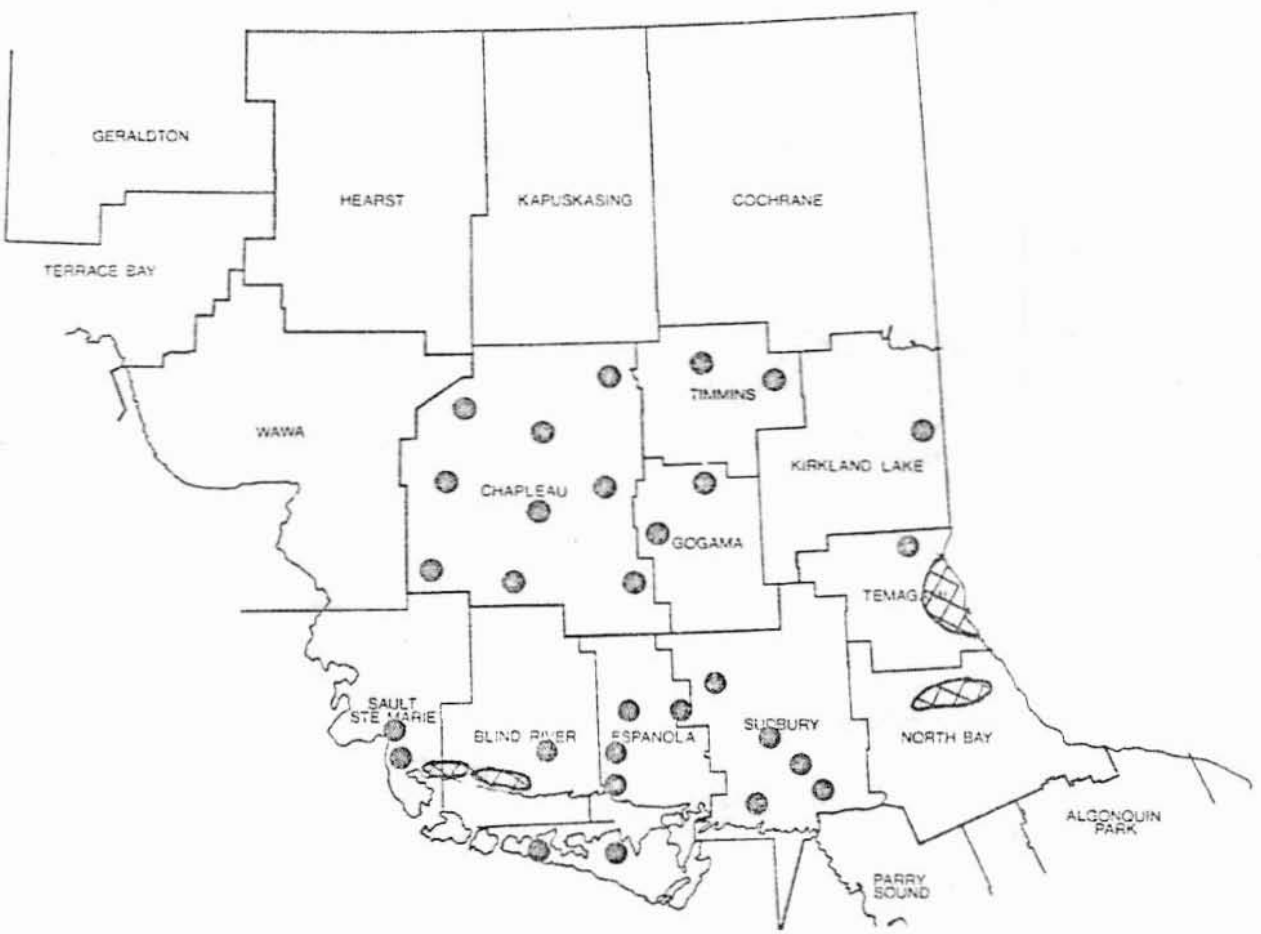
Large Aspen Tortrix

Areas within which defoliation occurred in 1970

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



Large Aspen Tortrix

Areas within which defoliation occurred in 1971

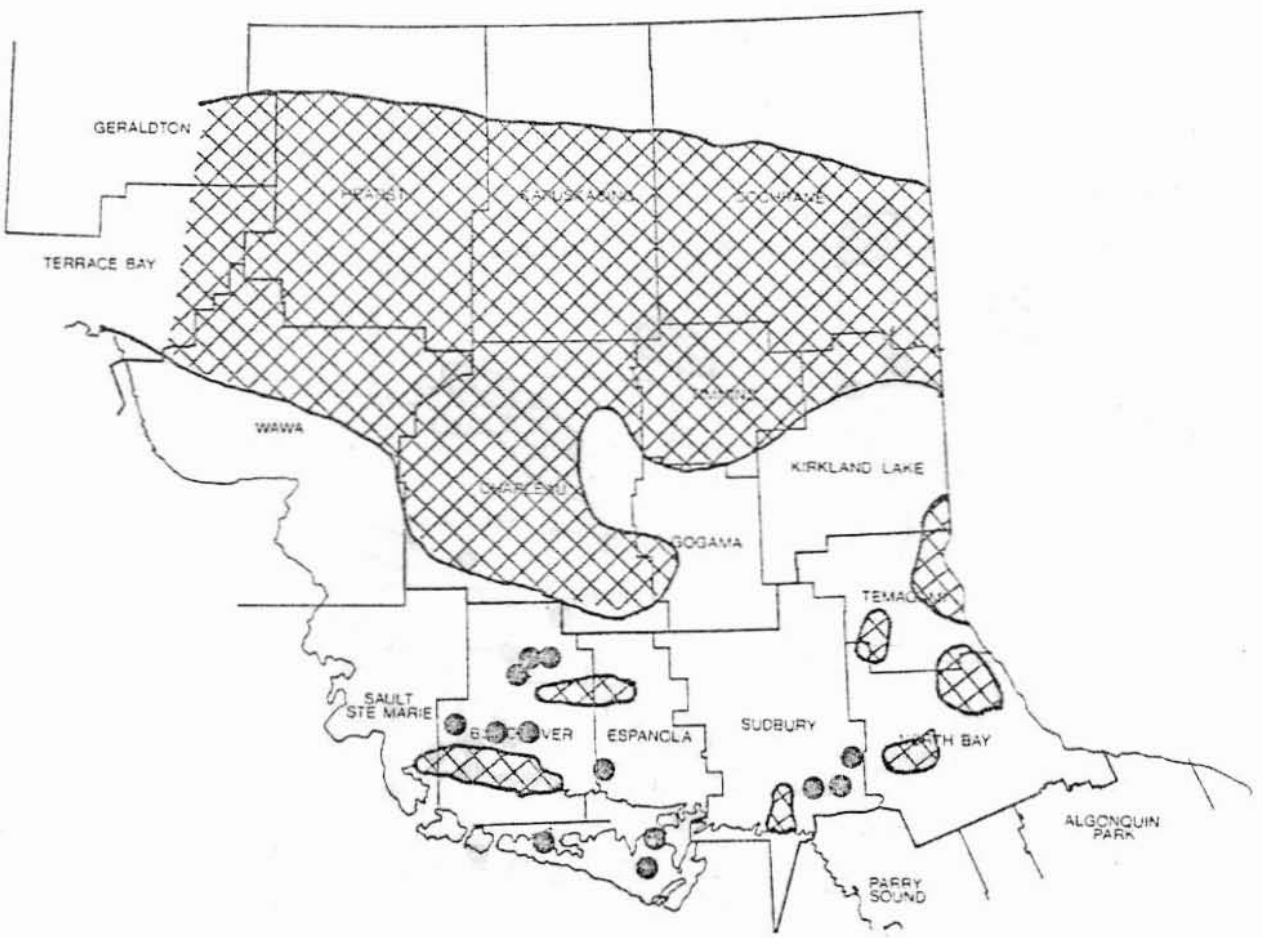
0 Miles 60

0 Kilometres 96

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



Large Aspen Tortrix

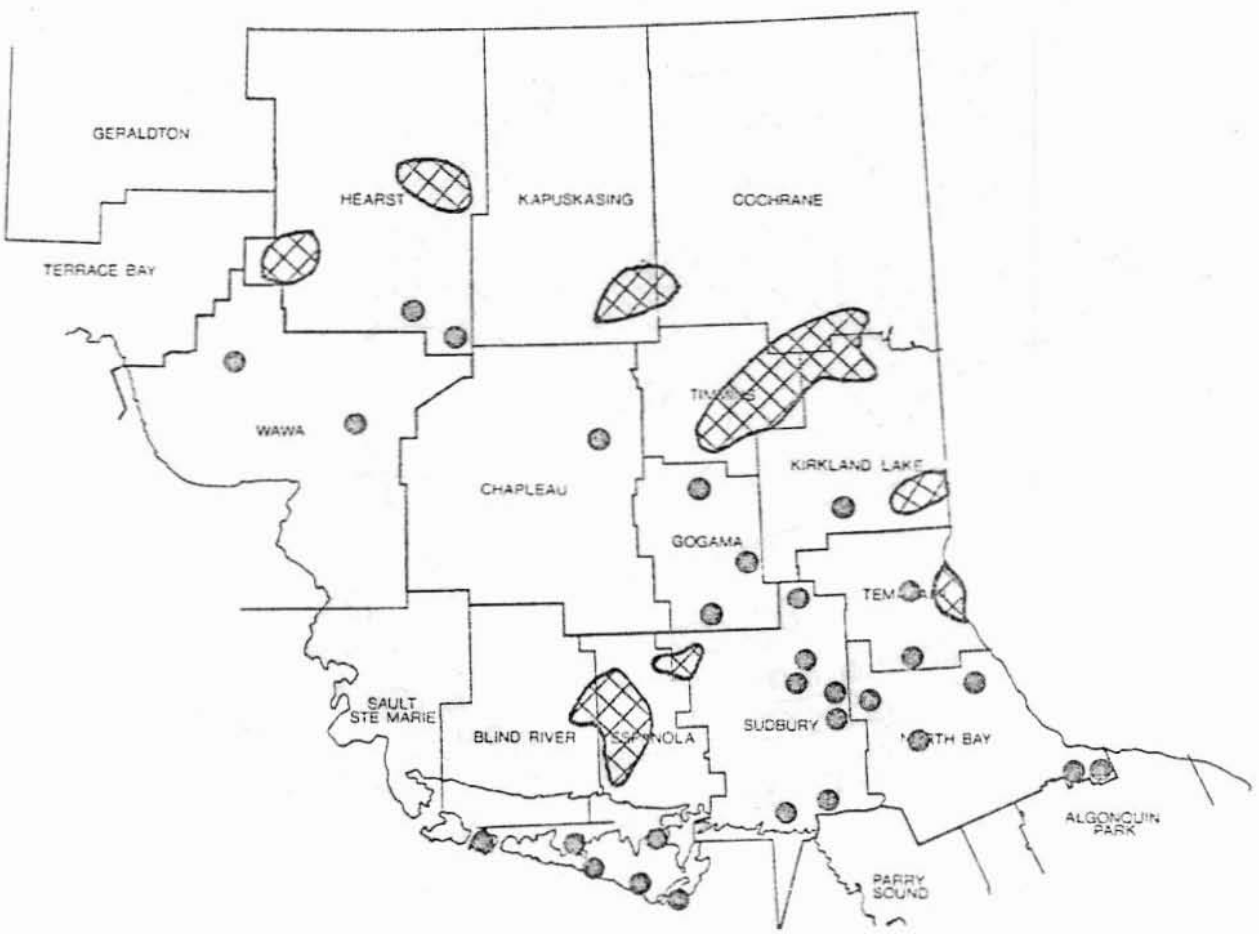
0 Miles 60
0 Kilometres 96

Areas within which defoliation occurred in 1972

LEGEND

Moderate-to-severe defoliation or

NORTHEASTERN ONTARIO



Large Aspen Tortrix

Areas within which defoliation occurred in 1973

0 Miles 60

0 Kilometres 96

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO

Large Aspen Tortrix

Areas within which defoliation occurred in 1974

0 Miles 60

0 Kilometres 96

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO

Large Aspen Tortrix

Areas within which defoliation occurred in 1975

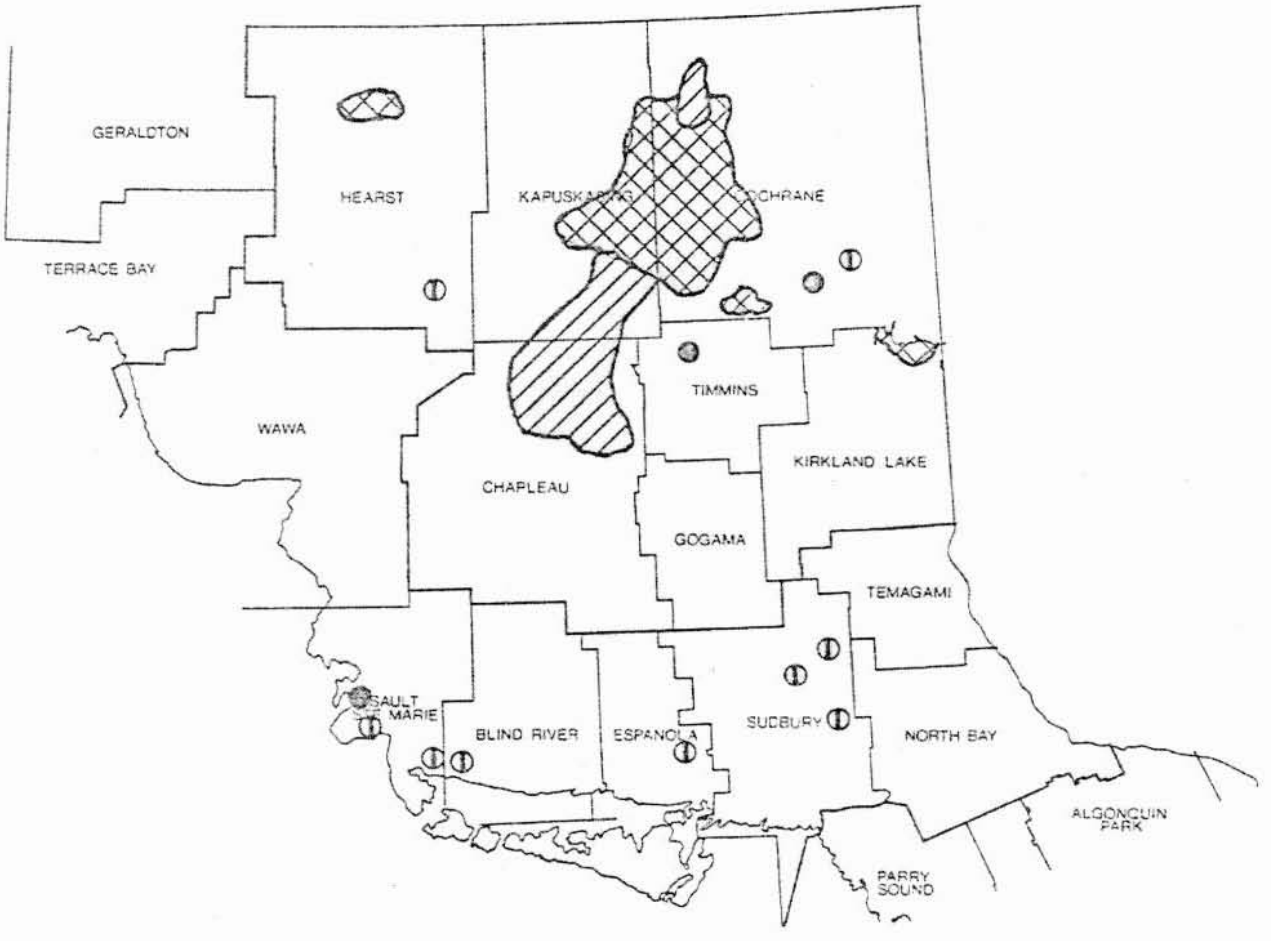
0 Miles 60

0 Kilometres 96

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



Spruce Budworm

Areas within which defoliation occurred in 1950

0 Miles 60

0 Kilometres 96

LEGEND

Light defoliation ◐ or ▨

Moderate-to-severe defoliation ● or ▩

NORTHEASTERN ONTARIO

Spruce Budworm

Areas within which balsam fir whole tree and top mortality occurred in 1950

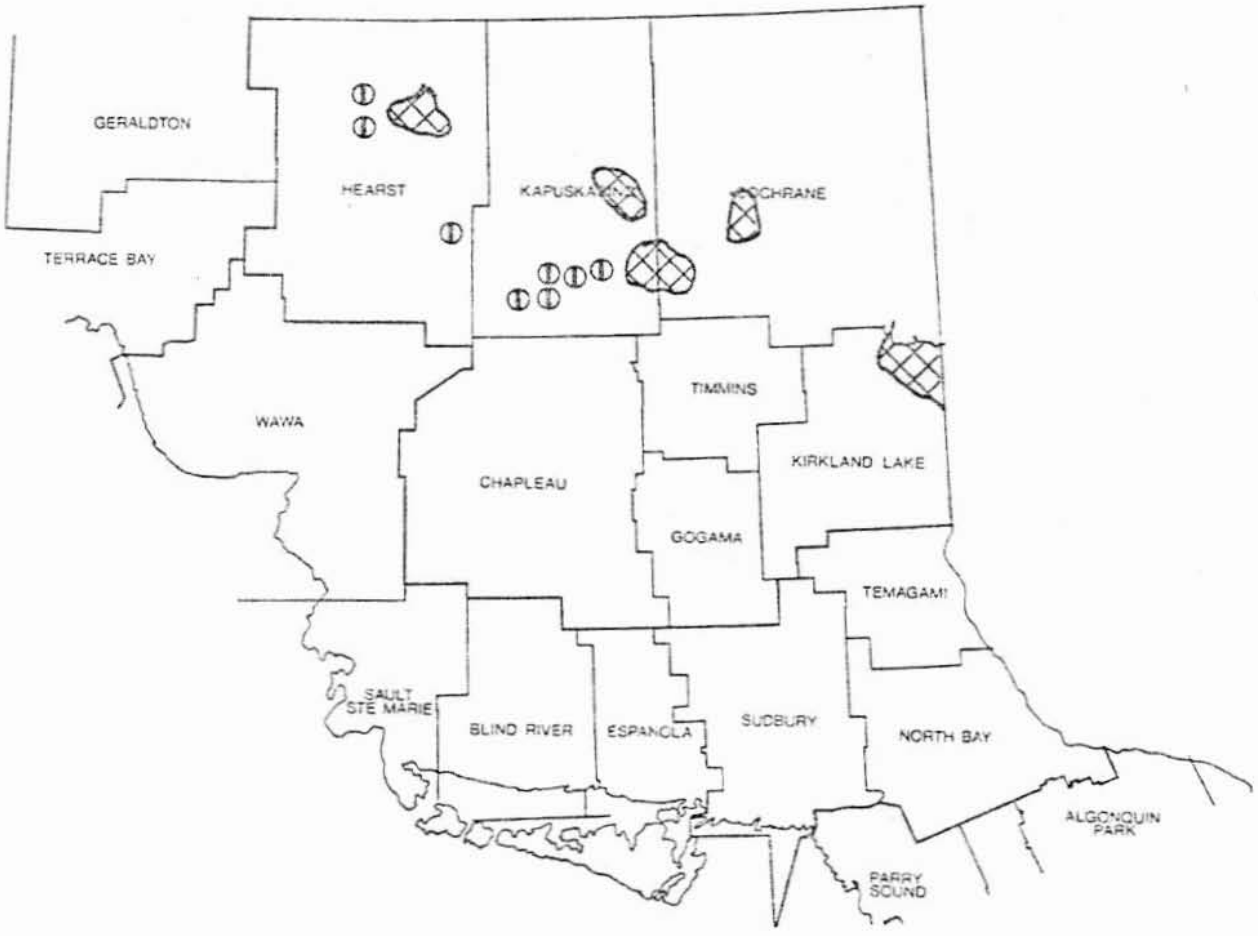
0 Miles 60

0 Kilometres 96

LEGEND

Mortality

NORTHEASTERN ONTARIO



Spruce Budworm

Areas within which defoliation occurred in 1951

0 Miles 60

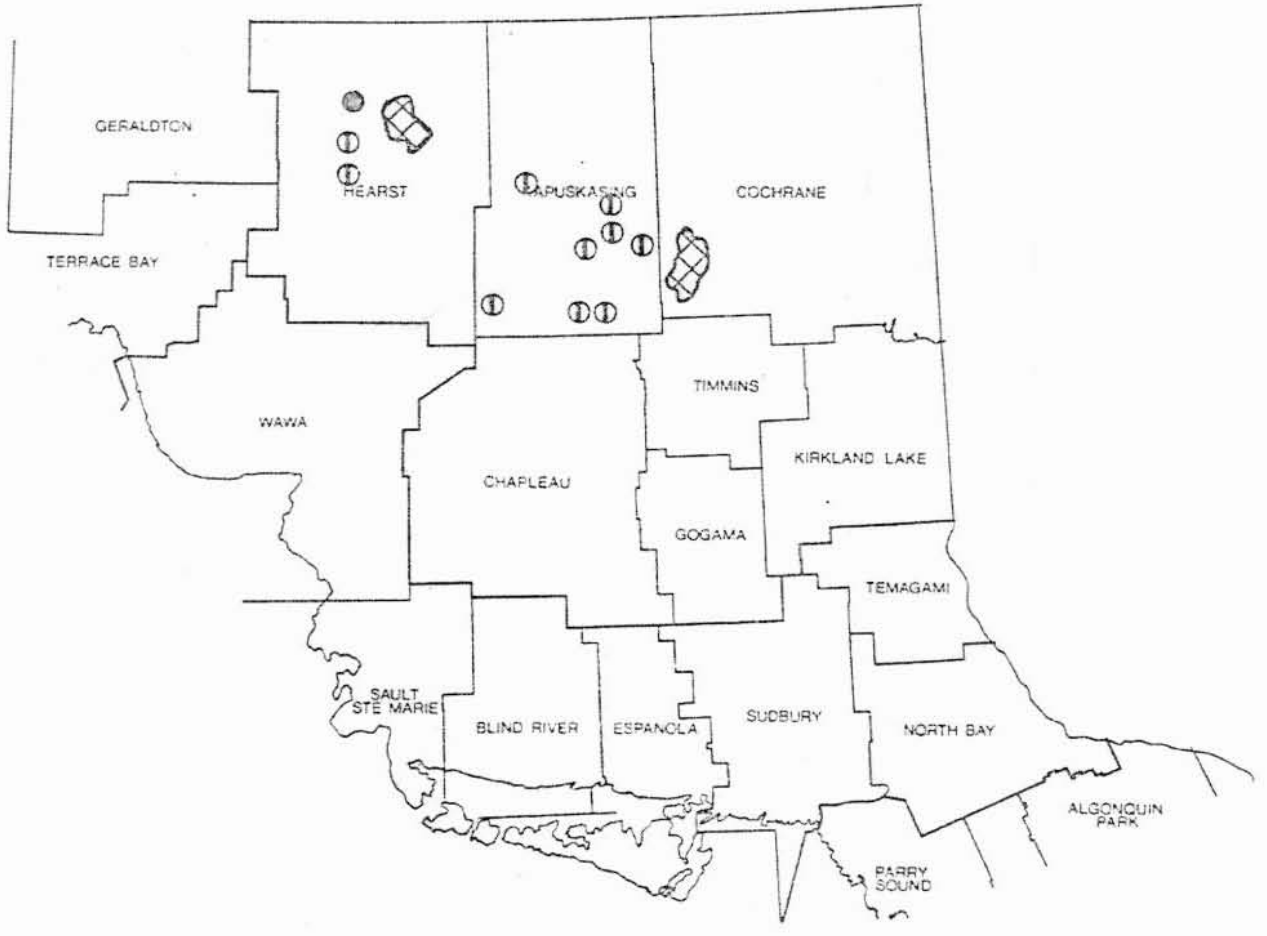
0 Kilometres 96

LEGEND

Light defoliation

Moderate-to-severe defoliation

NORTHEASTERN ONTARIO



0 Miles 60

0 Kilometres 96

Spruce Budworm

Areas within which defoliation occurred in 1952

LEGEND

Light defoliation ◑

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO

Spruce Budworm

Areas within which defoliation occurred in 1953

0 Miles 60

0 Kilometres 96

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO

Spruce Budworm

Areas within which defoliation occurred in 1954

0 Miles 60

0 Kilometres 96

LEGEND

Light defoliation ①

Moderate-to-severe defoliation

NORTHEASTERN ONTARIO

0 Miles 60

0 Kilometres 96

Spruce Budworm

Areas within which defoliation occurred in 1955

LEGEND

Light defoliation ① or

NORTHEASTERN ONTARIO

0 Miles 60

0 Kilometres 96

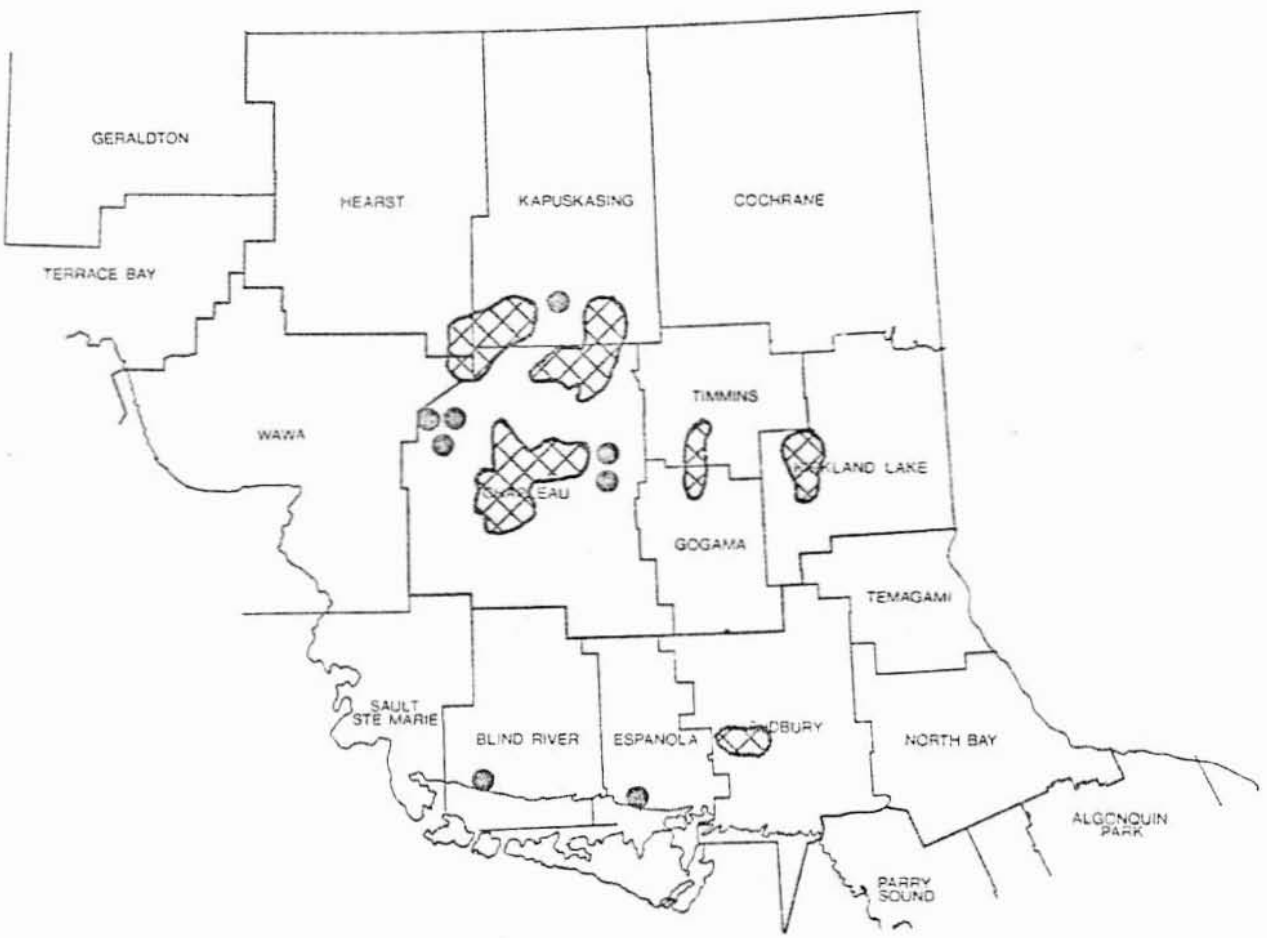
Spruce Budworm

Areas within which defoliation occurred in 1956

LEGEND

Light defoliation

NORTHEASTERN ONTARIO



0 Miles 60

0 Kilometres 96

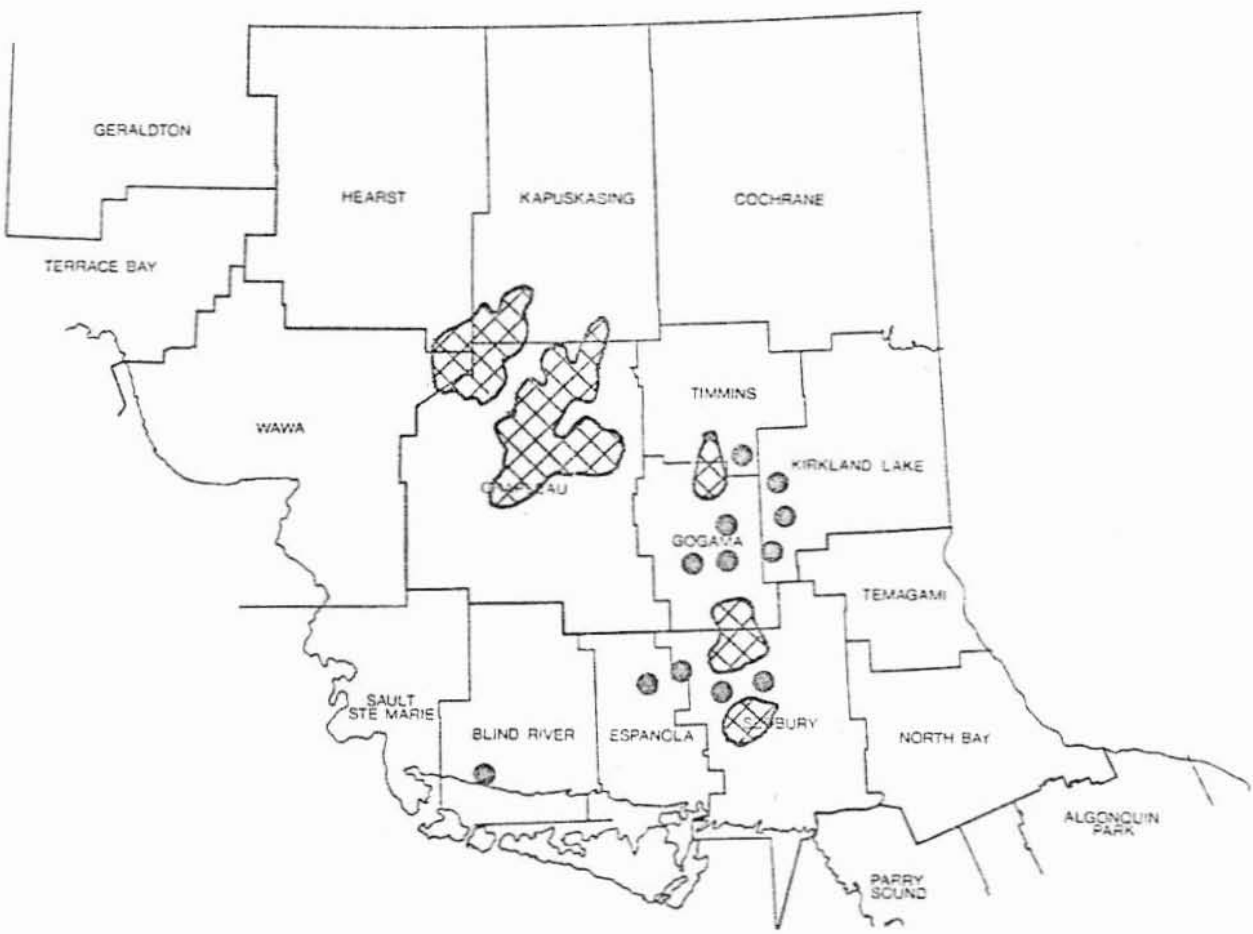
Spruce Budworm

Areas within which defoliation occurred in 1968

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



0 Miles 60

0 Kilometres 96

Spruce Budworm

Areas within which defoliation occurred in 1969

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO

0 Miles 60

0 Kilometres 96

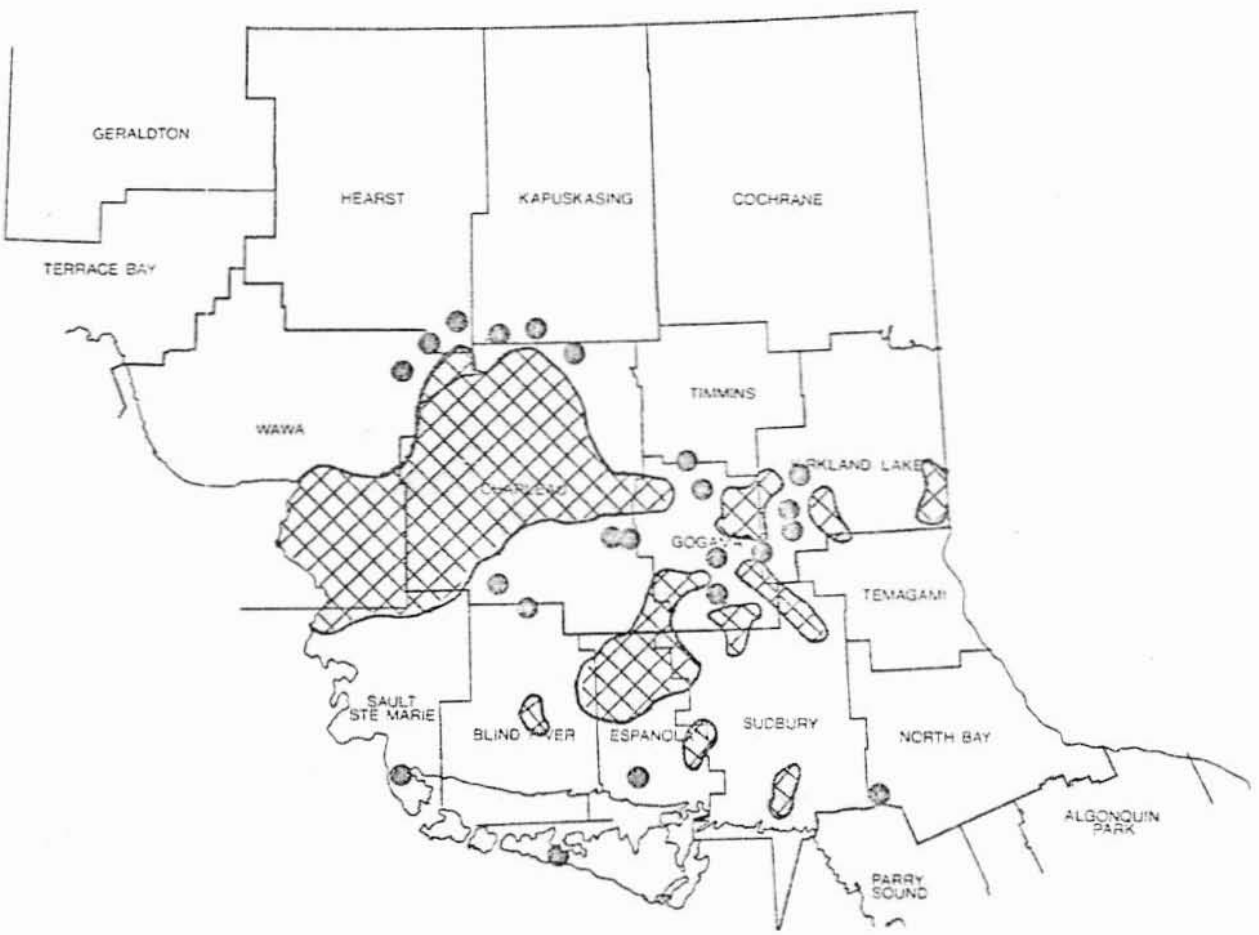
Spruce Budworm

Areas within which defoliation occurred in 1970

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



Spruce Budworm

Areas within which defoliation occurred in 1971

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO

0 Miles 60

0 Kilometres 96

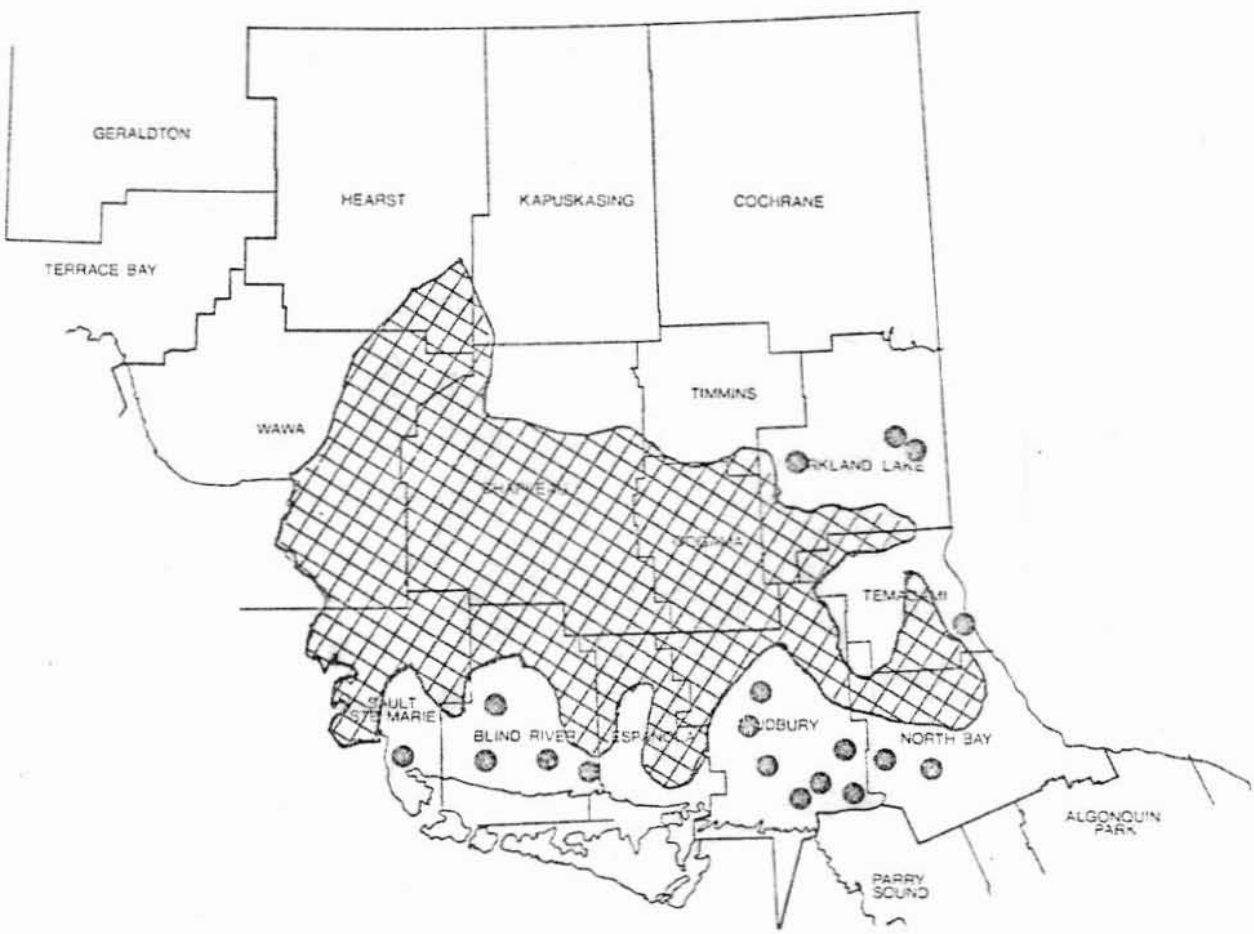
Spruce Budworm

Areas within which defoliation occurred in 1972

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



0 Miles 60

0 Kilometres 96

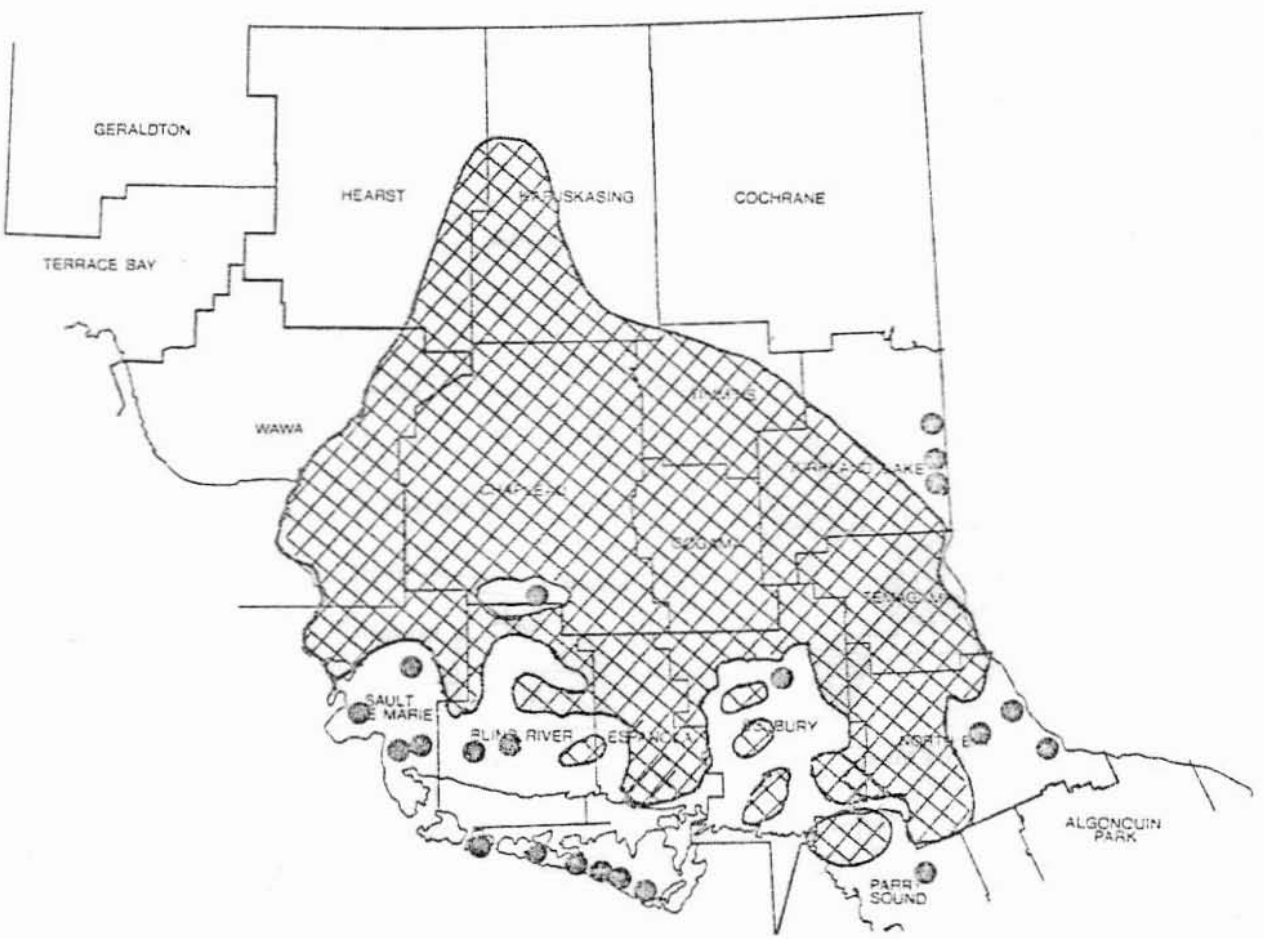
Spruce Budworm

Areas within which defoliation occurred in 1973

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



Spruce Budworm

Areas within which defoliation occurred in 1974

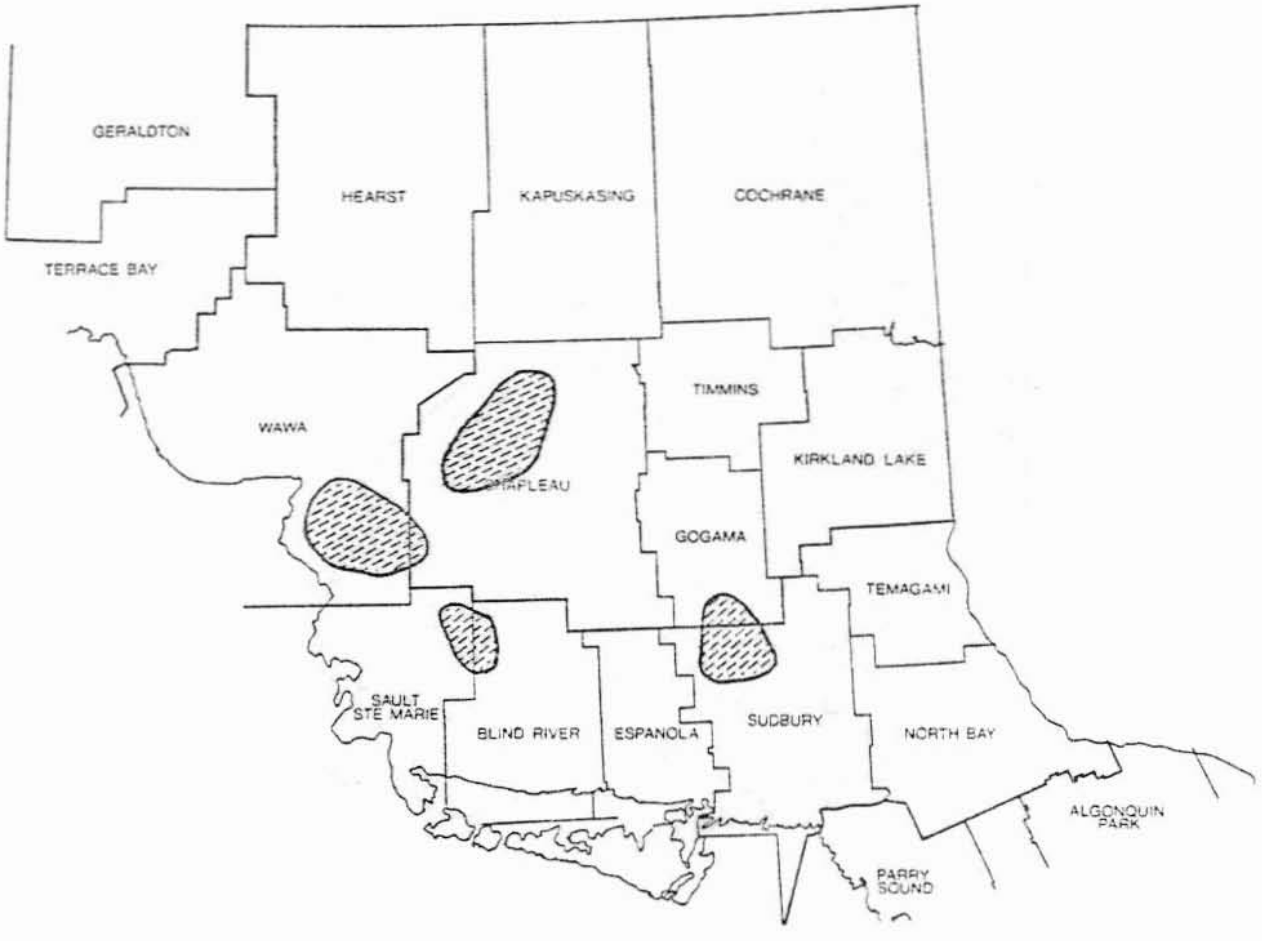
0 Miles 60

0 Kilometres 96

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



Spruce Budworm

Areas within which balsam fir whole tree and top mortality occurred in 1974

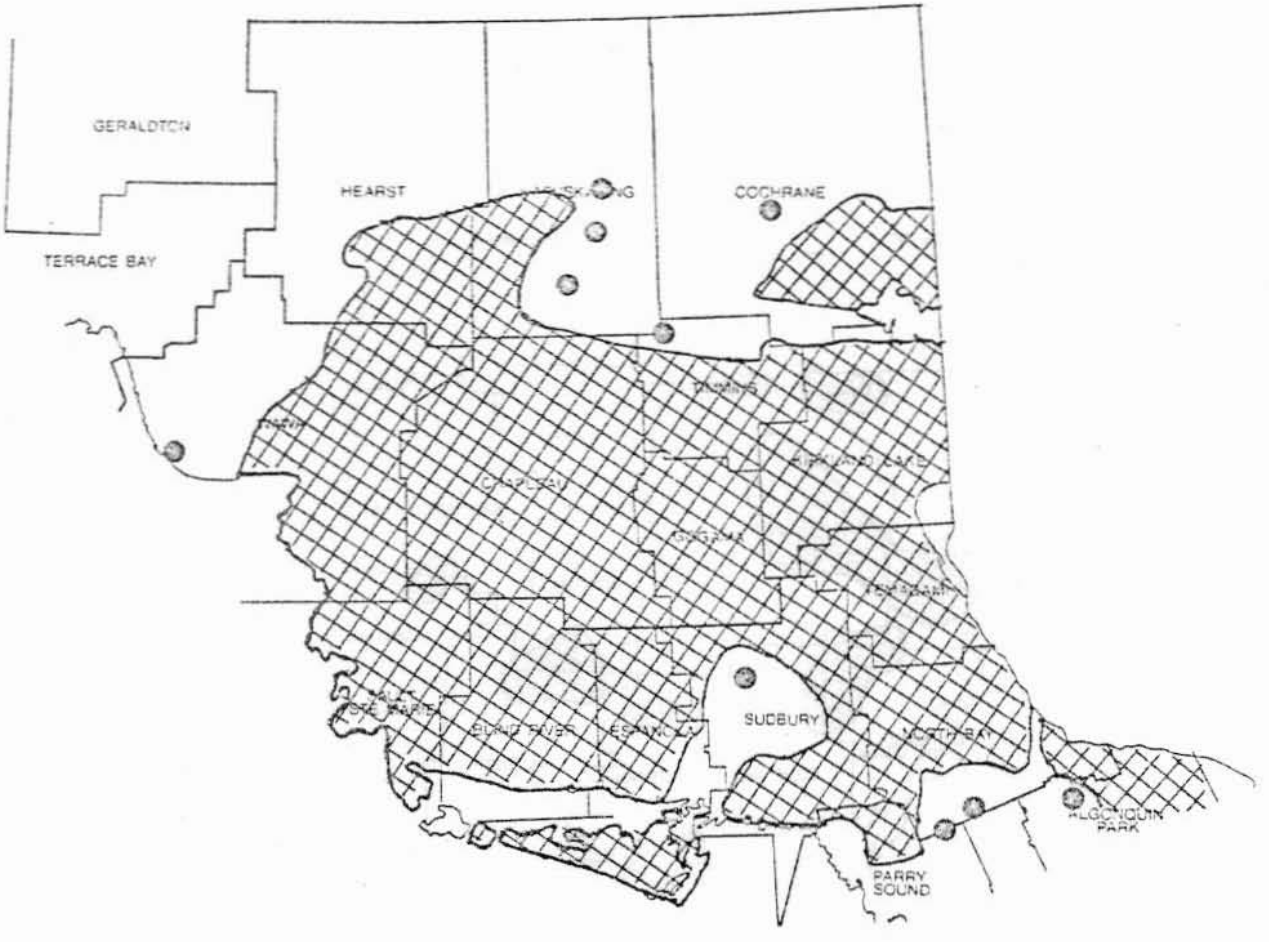
LEGEND

Mortality

0 Miles 60

0 Kilometres 96

NORTHEASTERN ONTARIO



0 Miles 60

0 Kilometres 96

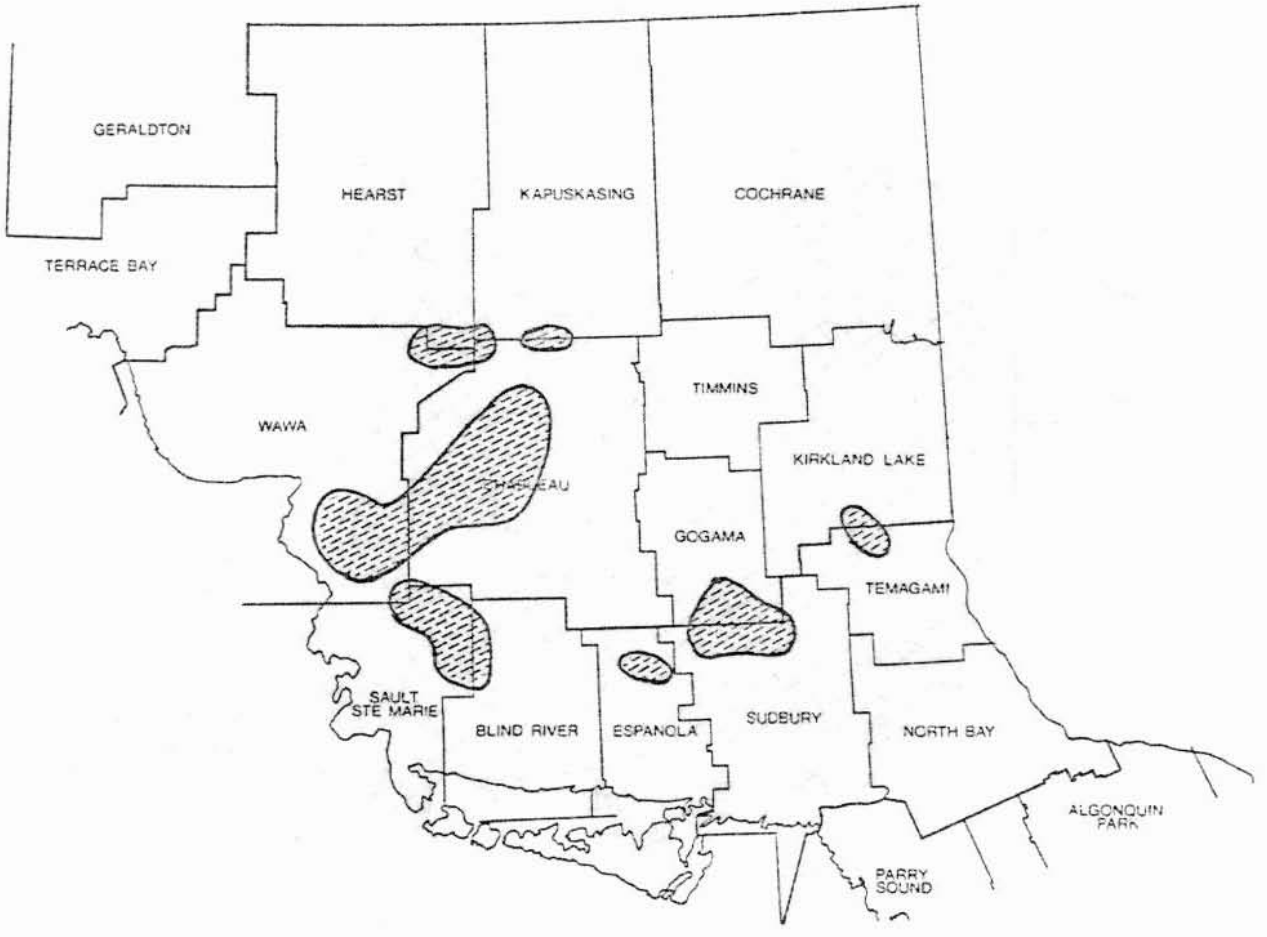
Spruce Budworm

Areas within which defoliation occurred in 1975

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



Spruce Budworm

Areas within which balsam fir whole tree and top mortality occurred in 1975

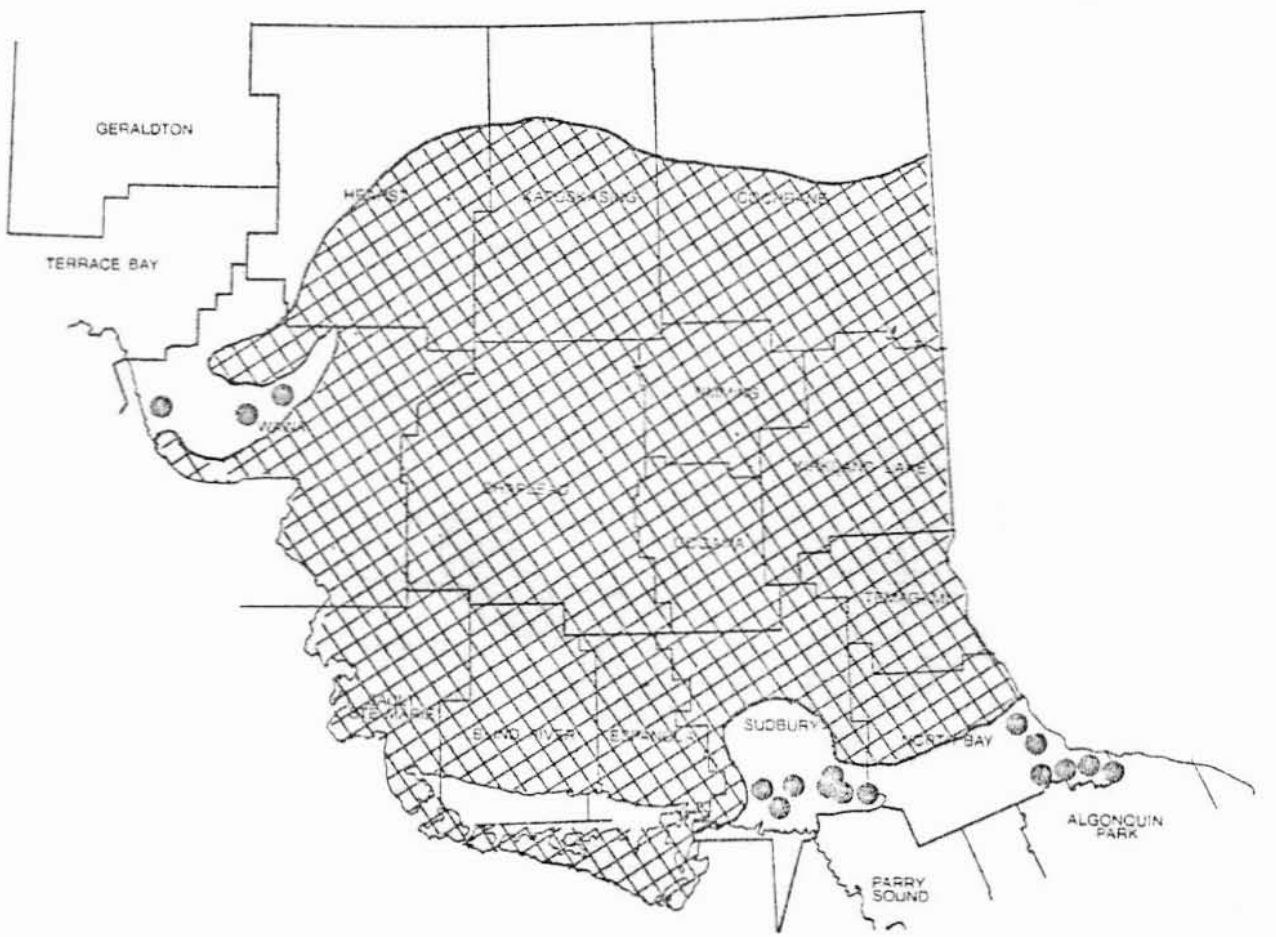
0 Miles 60

0 Kilometres 96

LEGEND

Mortality

NORTHEASTERN ONTARIO



0 Miles 60

0 Kilometres 96

Spruce Budworm

Areas within which defoliation occurred in 1976

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO

Spruce Budworm

Areas within which balsam fir whole tree and top mortality occurred in 1976

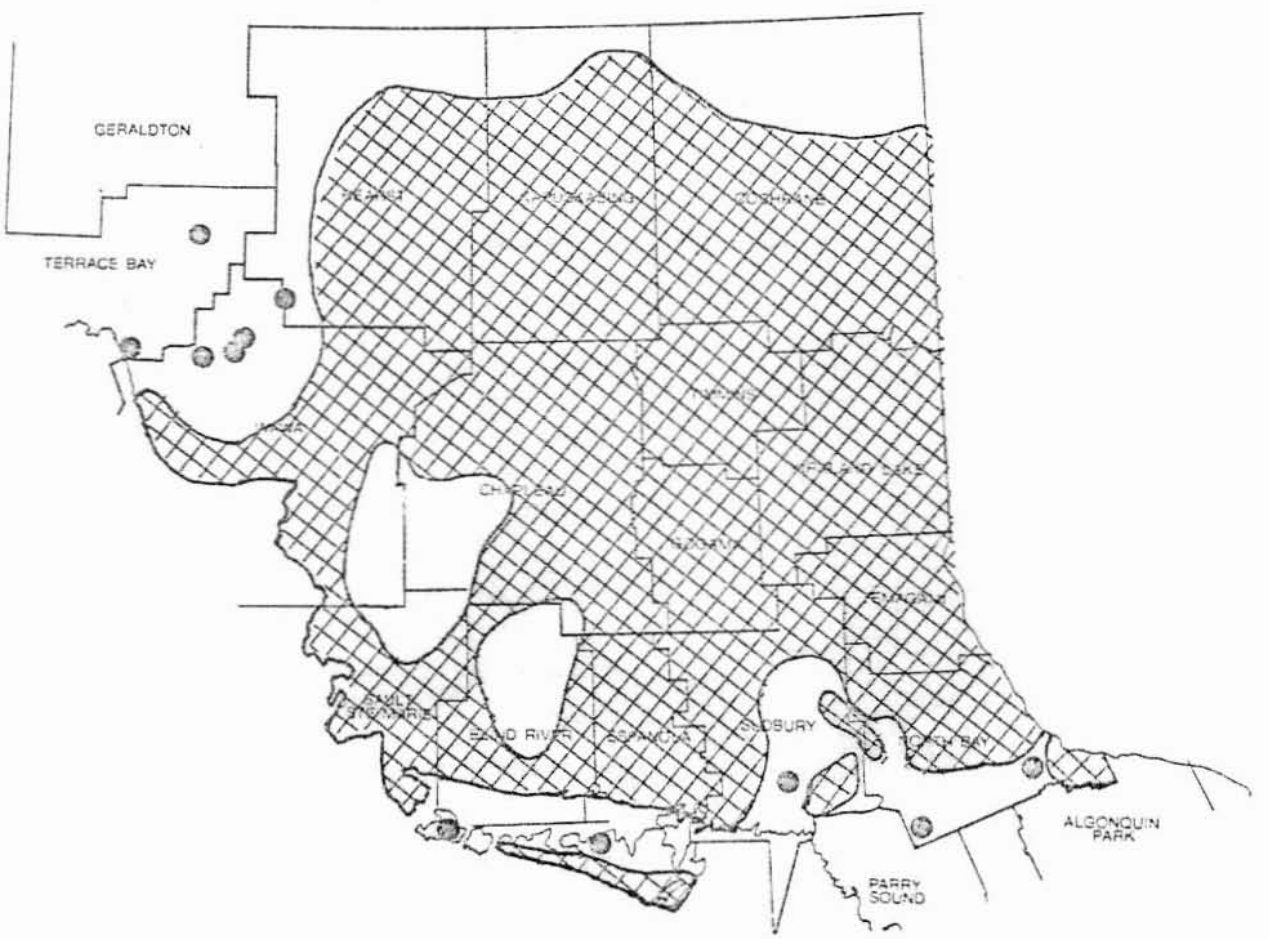
LEGEND

Mortality

0 Miles 60

0 Kilometres 96

NORTHEASTERN ONTARIO



0 Miles 60

0 Kilometres 96

Spruce Budworm

Areas within which defoliation occurred in 1977

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO

Spruce Budworm

Areas within which balsam fir whole tree and top mortality occurred in 1977

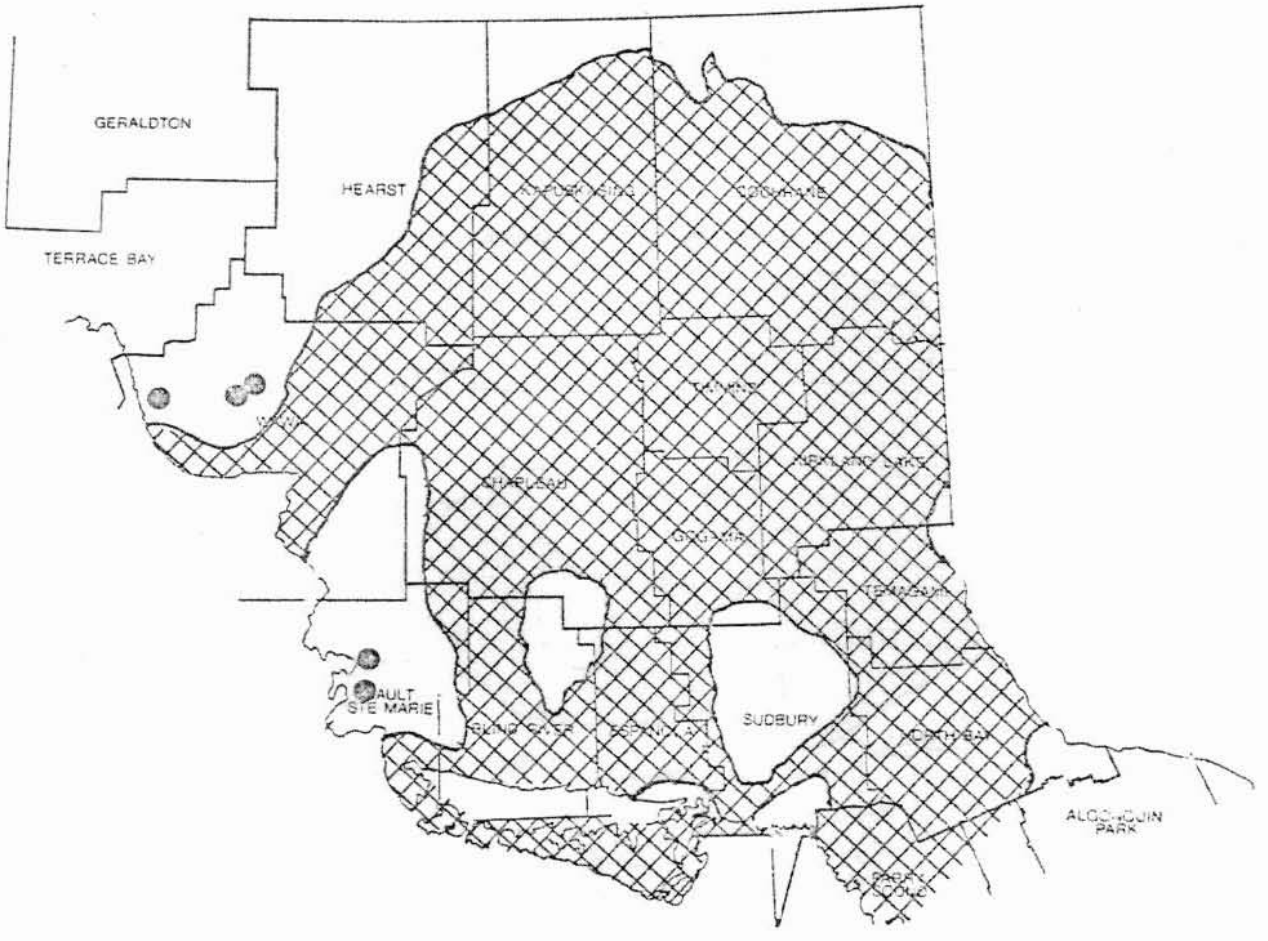
LEGEND

Mortality

0 Miles 60

0 Kilometres 96

NORTHEASTERN ONTARIO



0 Miles 60

0 Kilometres 96

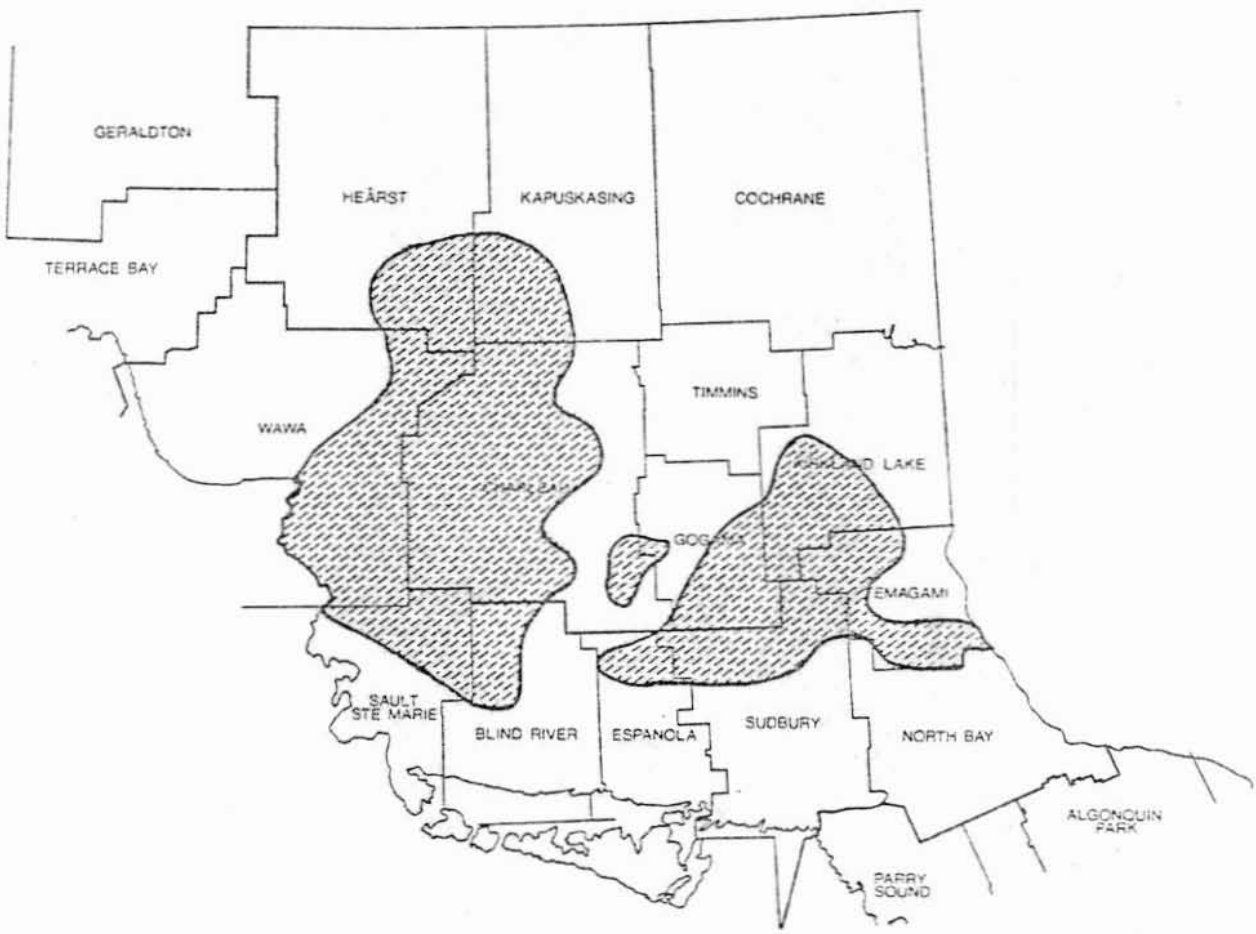
Spruce Budworm

Areas within which defoliation occurred in 1978

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



Spruce Budworm

Areas within which balsam fir whole tree and top mortality occurred in 1978

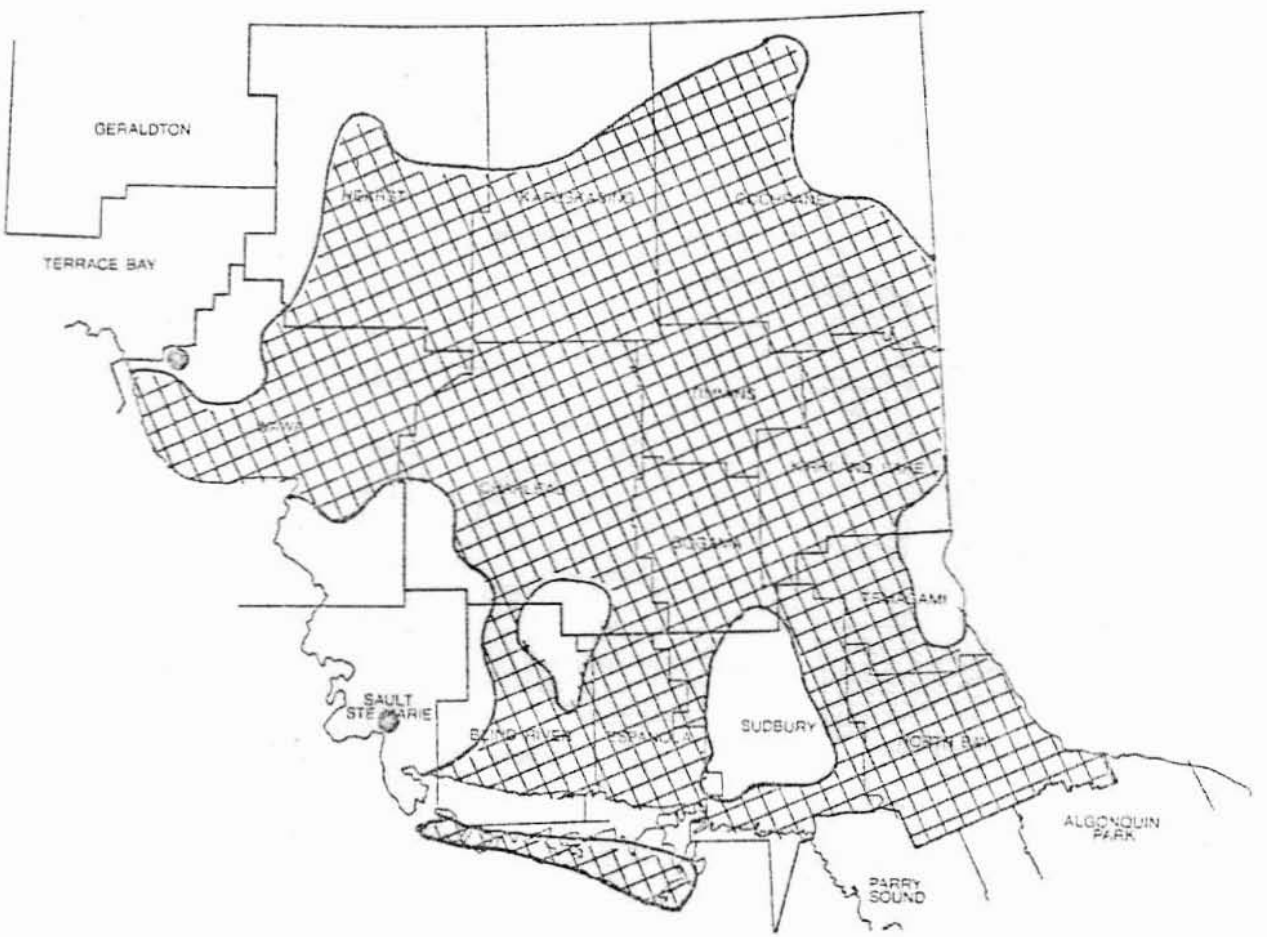
0 Miles 60

0 Kilometres 96

LEGEND

Mortality

NORTHEASTERN ONTARIO



0 Miles 60

0 Kilometres 96

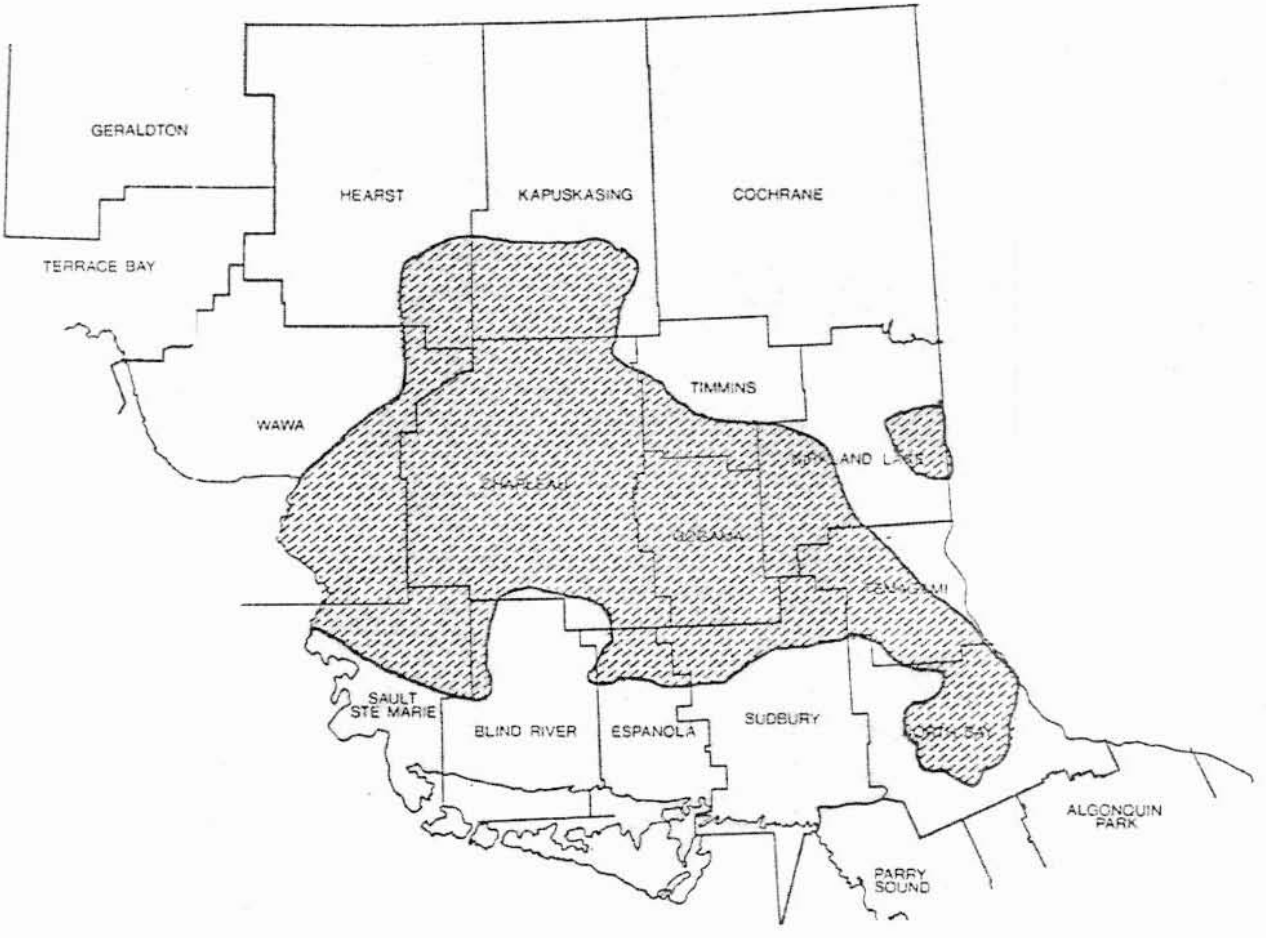
Spruce Budworm

Areas within which defoliation occurred in 1979

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



Spruce Budworm

Areas within which balsam fir whole tree and top mortality occurred in 1979

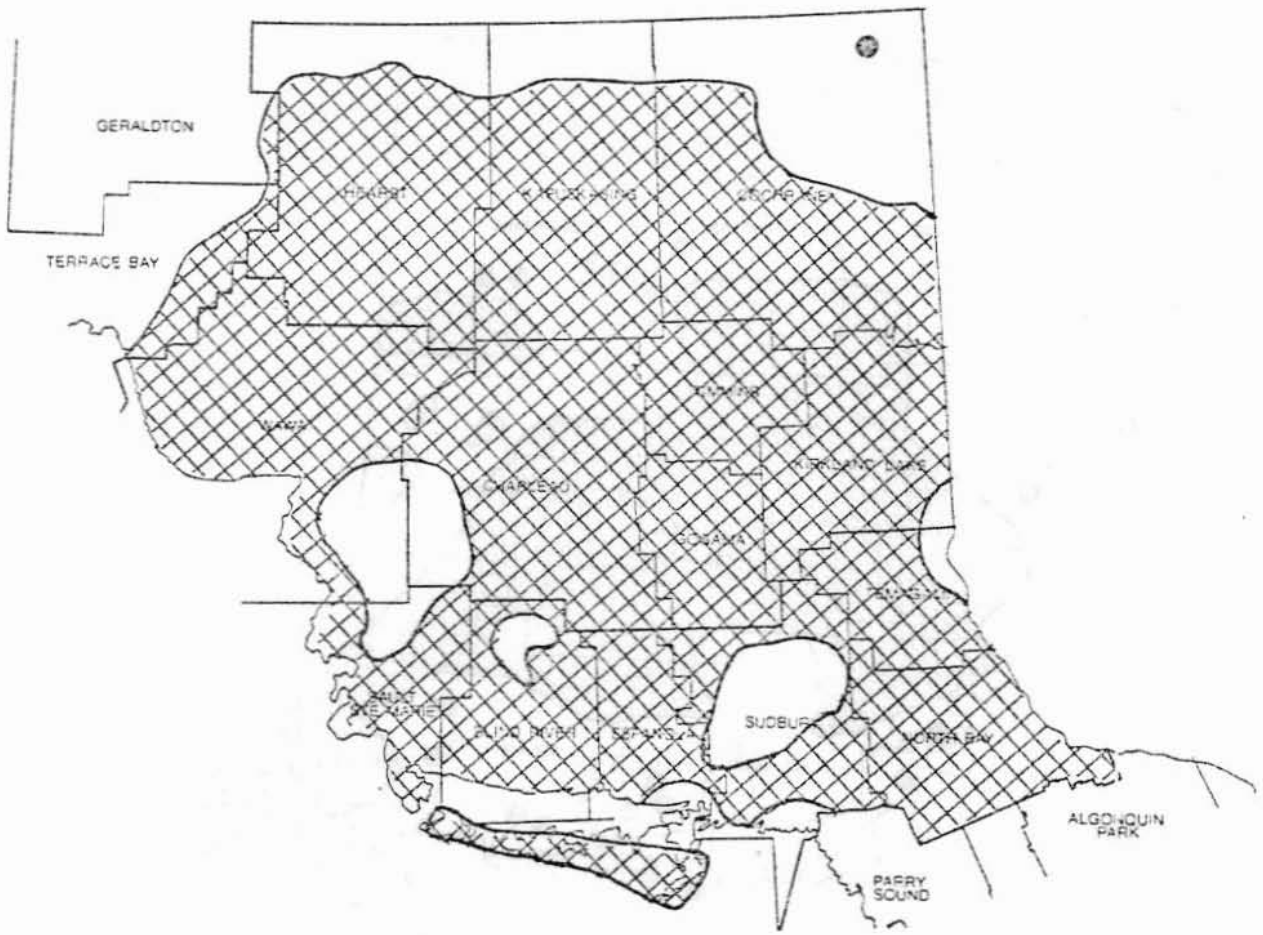
LEGEND

Mortality

0 Miles 60

0 Kilometres 96

NORTHEASTERN ONTARIO



0 Miles 60

0 Kilometres 96

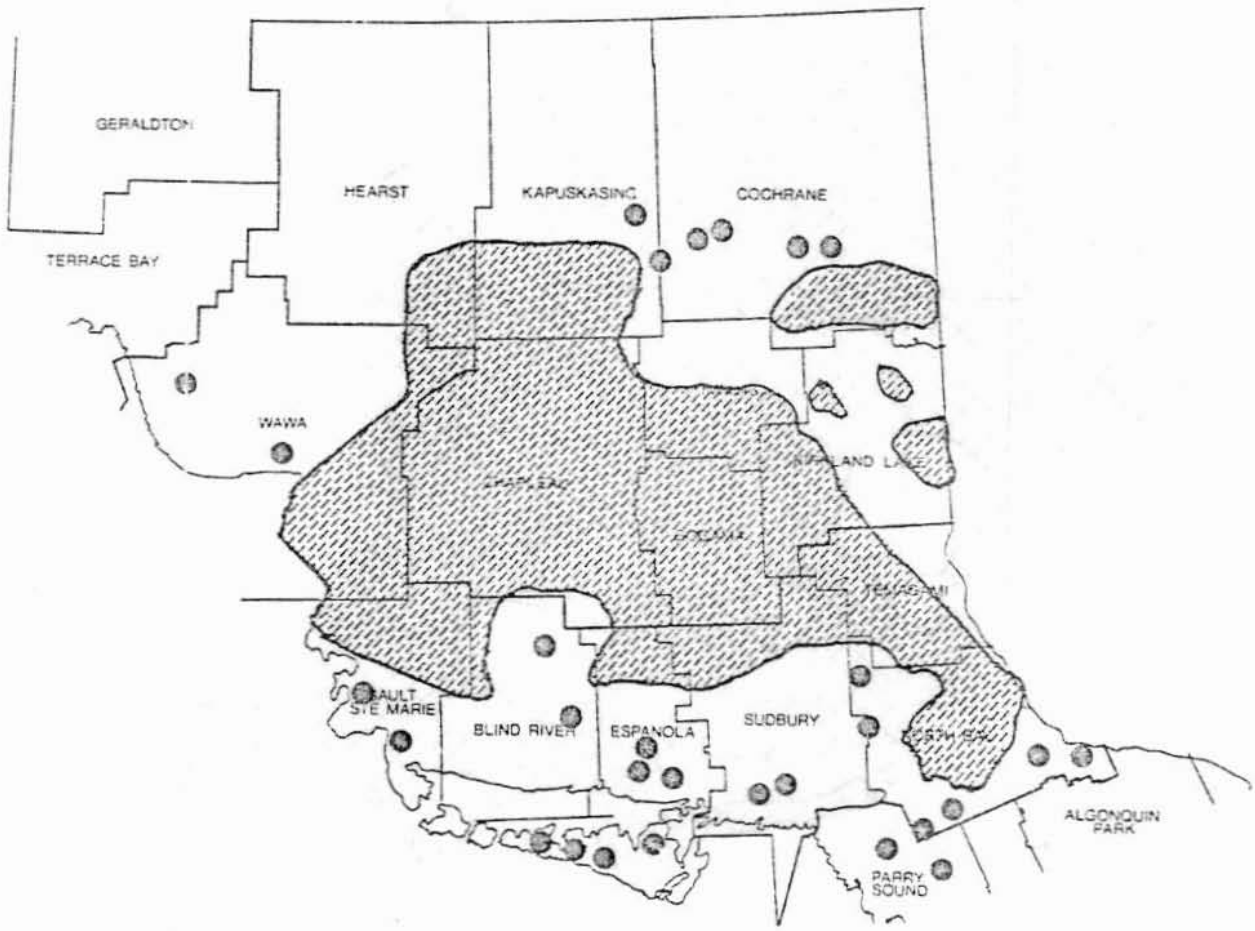
Spruce Budworm

Areas within which defoliation occurred in 1980

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



Spruce Budworm

Areas within which balsam fir whole tree and top mortality occurred in 1980

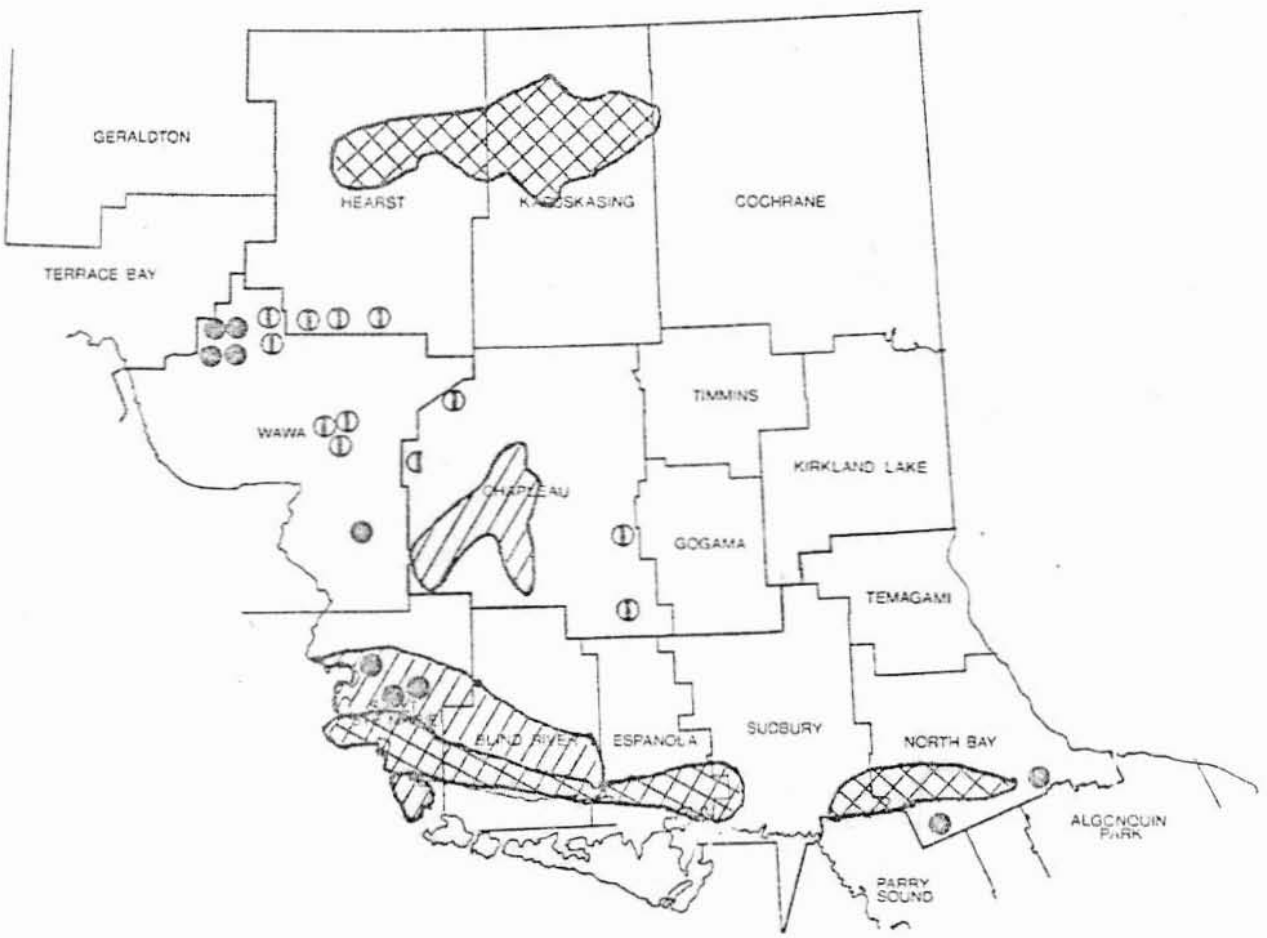
LEGEND

Mortality ▨ or ●

0 Miles 60

0 Kilometres 96

NORTHEASTERN ONTARIO



0 Miles 60

0 Kilometres 96

Forest Tent Caterpillar

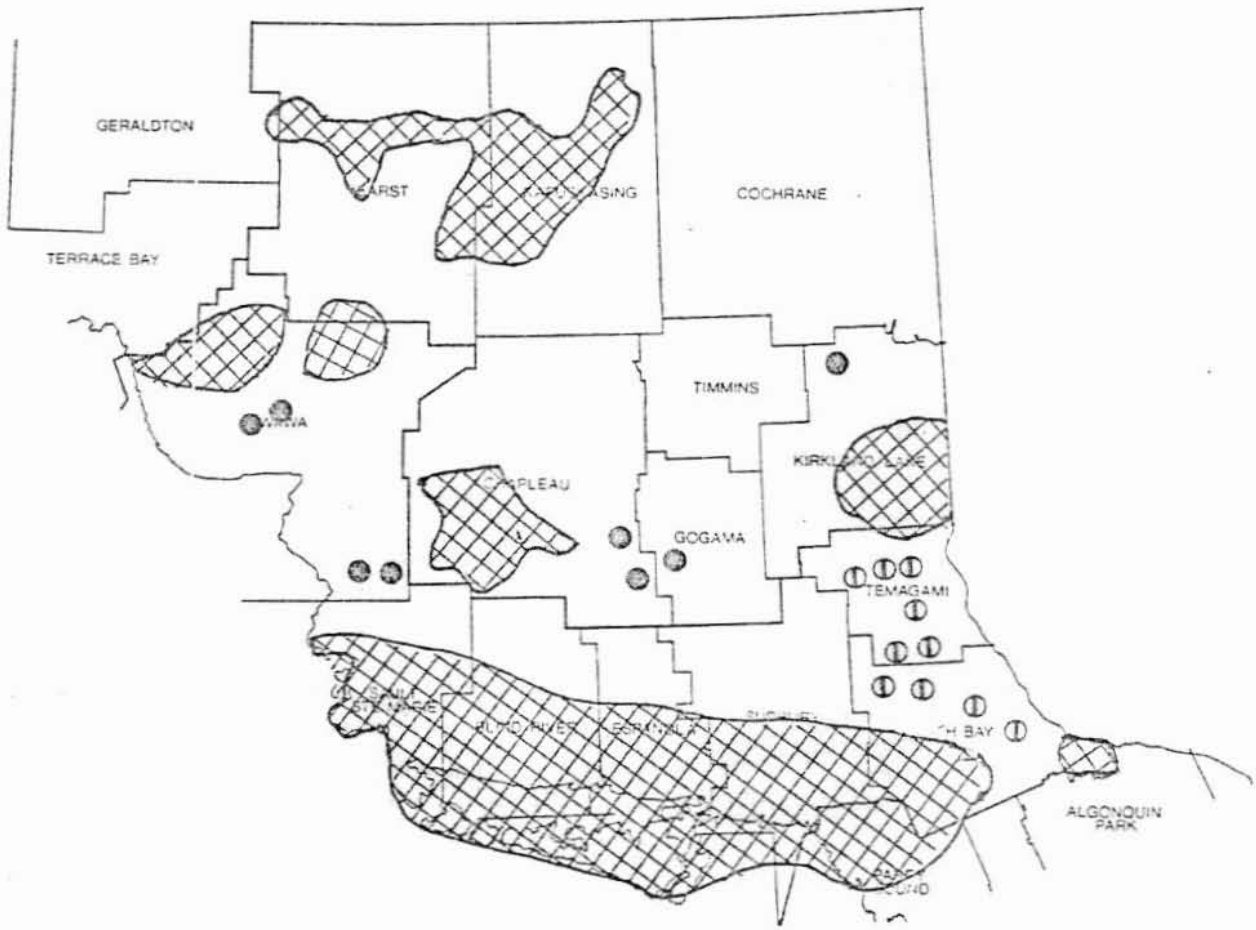
Areas within which defoliation occurred in 1950

LEGEND

Light defoliation ◐ or ▨

Moderate-to-severe defoliation ● or ▩

NORTHEASTERN ONTARIO



Forest Tent Caterpillar

Areas within which defoliation occurred in 1951

LEGEND

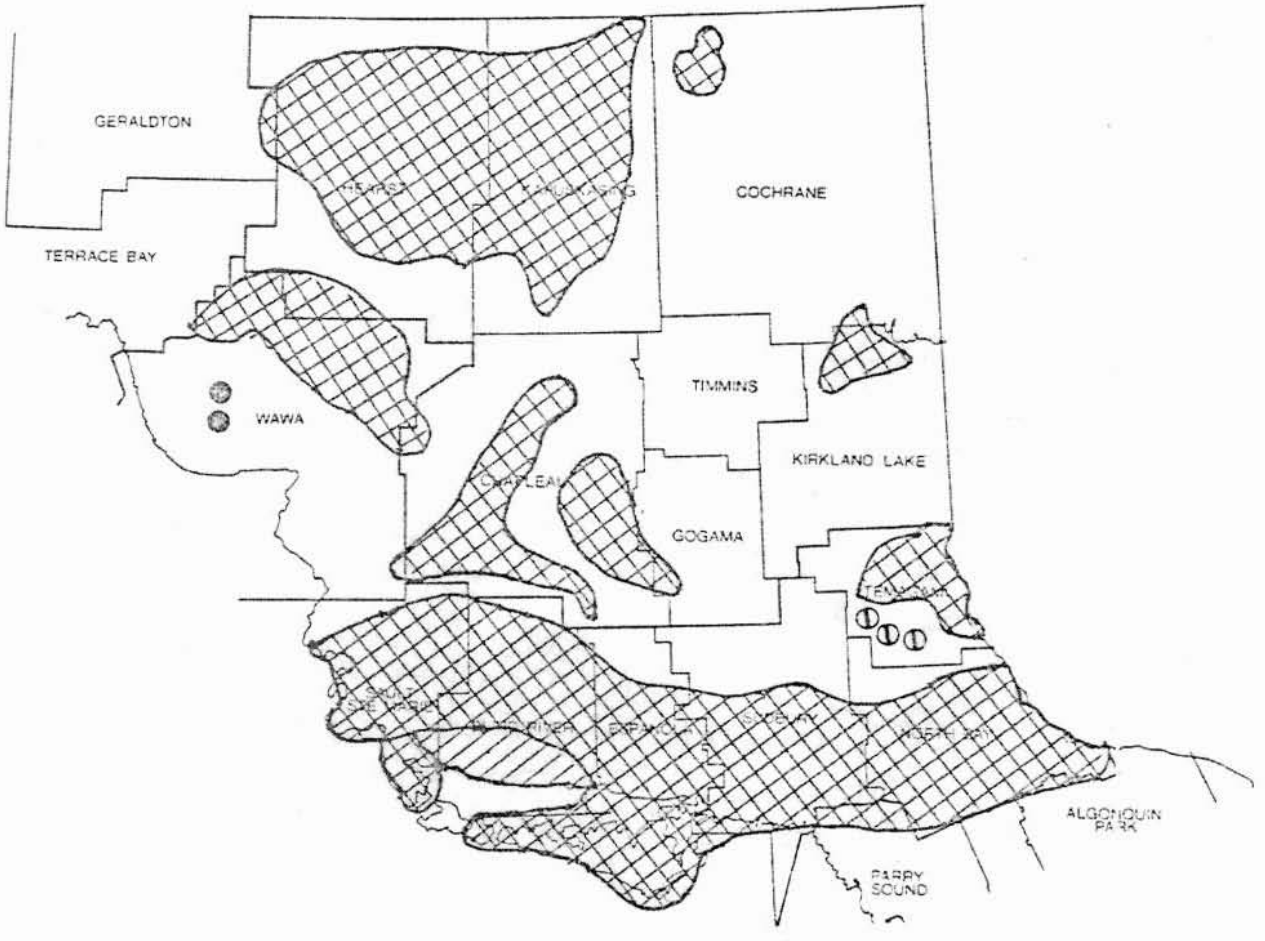
Light defoliation ◐

Moderate-to-severe defoliation ● or ▨

0 Miles 60

0 Kilometres 96

NORTHEASTERN ONTARIO



Forest Tent Caterpillar

Areas within which defoliation occurred in 1952

LEGEND

Light defoliation ◐ or

Moderate-to-severe defoliation ● or

0 Miles 60

0 Kilometres 96

NORTHEASTERN ONTARIO

Forest Tent Caterpillar

Areas within which defoliation occurred in 1953

0 Miles 60

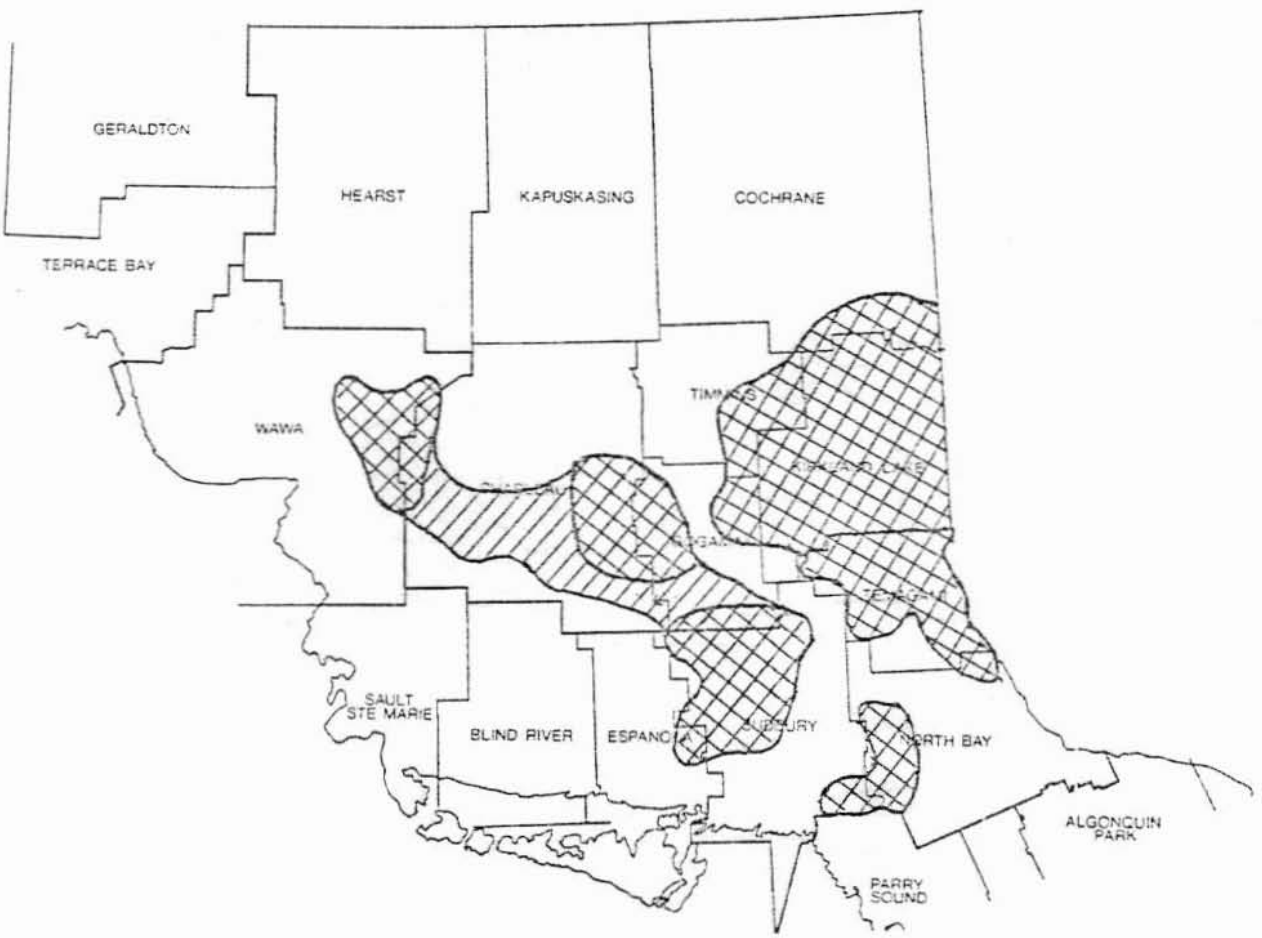
0 Kilometres 96

LEGEND

Light defoliation ◑ or ▨

Moderate-to-severe defoliation ● or ▩

NORTHEASTERN ONTARIO



Forest Tent Caterpillar

Areas within which defoliation occurred in 1954

0 Miles 60

0 Kilometres 96

LEGEND

Light defoliation

Moderate-to-severe defoliation

NORTHEASTERN ONTARIO

0 Miles 60

0 Kilometres 96

Forest Tent Caterpillar

Areas within which defoliation occurred in 1955

LEGEND

Light defoliation ① or

Moderate-to-severe defoliation

NORTHEASTERN ONTARIO

Forest Tent Caterpillar

Areas within which defoliation occurred in 1956

0 Miles 60

0 Kilometres 96

LEGEND

Light defoliation

Moderate-to-severe defoliation or

NORTHEASTERN ONTARIO

Forest Tent Caterpillar

Areas within which defoliation occurred in 1957

0 Miles 60

0 Kilometres 96

LEGEND

Light defoliation ◑

Moderate-to-severe defoliation ●

NORTHEASTERN ONTARIO

0 Miles 60

0 Kilometres 96

Forest Tent Caterpillar

Areas within which defoliation occurred in 1960

LEGEND

Light defoliation

Moderate-to-severe defoliation

NORTHEASTERN ONTARIO

Forest Tent Caterpillar

Areas within which defoliation occurred in 1961

LEGEND

Light defoliation ◑

Moderate-to-severe defoliation ●

0 Miles 60

0 Kilometres 96

NORTHEASTERN ONTARIO

Forest Tent Caterpillar

Areas within which defoliation occurred in 1962

0 Miles 60

0 Kilometres 96

LEGEND

Light defoliation ◐

Moderate-to-severe defoliation ▨

NORTHEASTERN ONTARIO

0 Miles 60

0 Kilometres 96

Forest Tent Caterpillar

Areas within which defoliation occurred in 1963

LEGEND

Light defoliation ◑

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO

Forest Tent Caterpillar

Areas within which defoliation occurred in 1964

0 Miles 60

0 Kilometres 96

LEGEND

Light defoliation ◐ or ▨

Moderate-to-severe defoliation ● or ▩

NORTHEASTERN ONTARIO

Forest Tent Caterpillar

Areas within which defoliation occurred in 1965

0 Miles 60

0 Kilometres 96

LEGEND

Light defoliation ◐ or

Moderate-to-severe defoliation

NORTHEASTERN ONTARIO

0 Miles 60

0 Kilometres 96

Forest Tent Caterpillar

Areas within which defoliation occurred in 1966

LEGEND

Light defoliation

Moderate-to-severe defoliation or

NORTHEASTERN ONTARIO

0 Miles 60

0 Kilometres 96

Forest Tent Caterpillar

Areas within which defoliation occurred in 1967

LEGEND

Light defoliation ◑

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO

0 Miles 60

0 Kilometres 96

Forest Tent Caterpillar

Areas within which defoliation occurred in 1968

LEGEND

Light defoliation

Moderate-to-severe defoliation

NORTHEASTERN ONTARIO

Forest Tent Caterpillar

Areas within which defoliation occurred in 1969

0 Miles 60

0 Kilometres 96

LEGEND

Light defoliation ◑

Moderate-to-severe defoliation ●

NORTHEASTERN ONTARIO

0 Miles 60

0 Kilometres 96

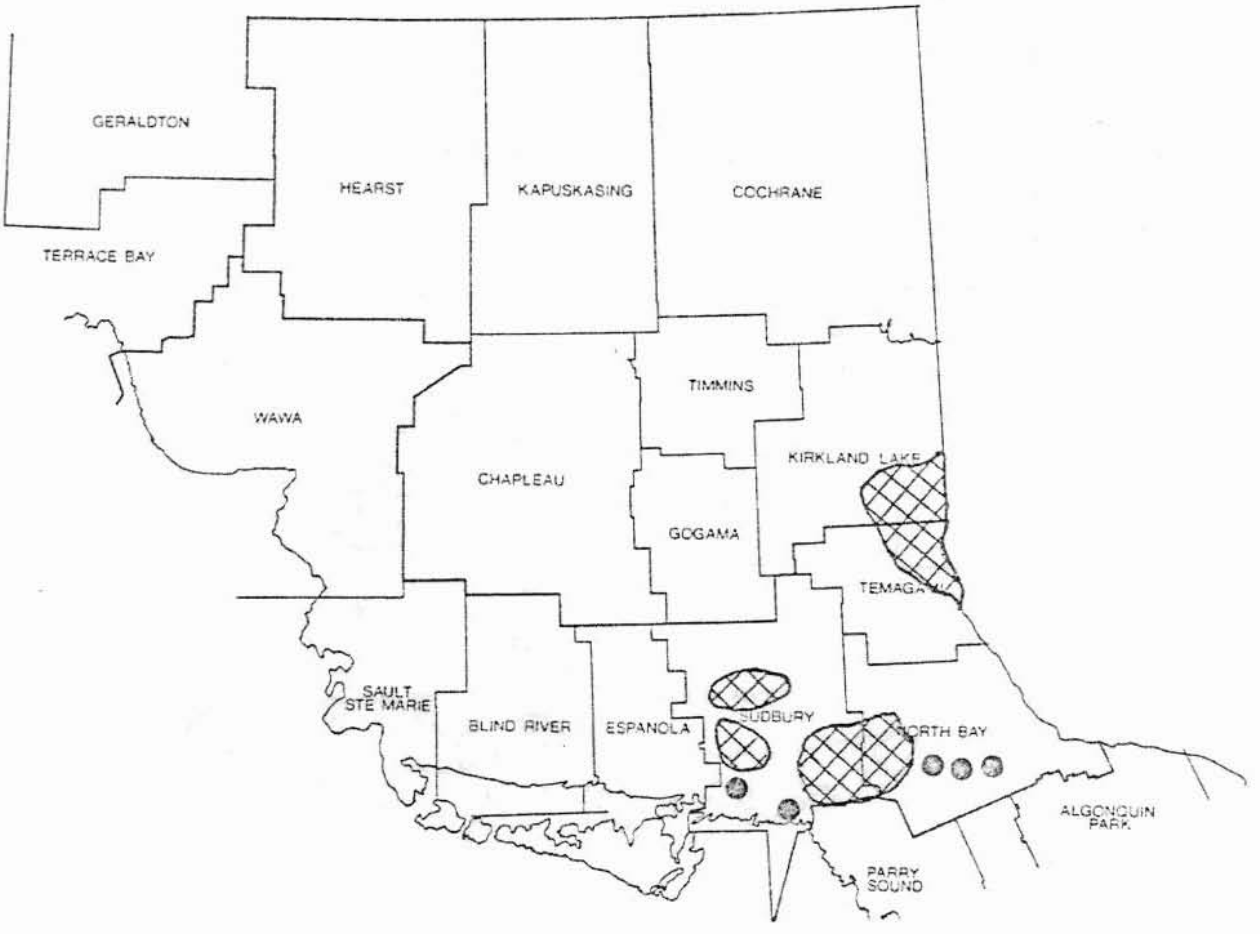
Forest Tent Caterpillar

Areas within which defoliation occurred in 1973

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO



Forest Tent Caterpillar

Areas within which defoliation occurred in 1974

0 Miles 60

0 Kilometres 96

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO

0 Miles 60

0 Kilometres 96

Forest Tent Caterpillar

Areas within which defoliation occurred in 1975

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO

0 Miles 60

0 Kilometres 96

Forest Tent Caterpillar

Areas within which defoliation occurred in 1976

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO

0 Miles 60

0 Kilometres 96

Forest Tent Caterpillar

Areas within which defoliation occurred in 1977

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO

0 Miles 60

0 Kilometres 96

Forest Tent Caterpillar

Areas within which defoliation occurred in 1978

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO

Forest Tent Caterpillar

Areas within which defoliation occurred in 1979

LEGEND

Moderate-to-severe defoliation

0 Miles 60

0 Kilometres 96

NORTHEASTERN ONTARIO

0 Miles 60

0 Kilometres 96

Forest Tent Caterpillar

Areas within which defoliation occurred in 1980

LEGEND

Moderate-to-severe defoliation

NORTHEASTERN ONTARIO

0 Miles 60

0 Kilometres 96

Ambermarked Birch Leafminer

Areas with which defoliation occurred in 1958

LEGEND

Moderate-to-severe defoliation ● or ▨

NORTHEASTERN ONTARIO

0 Miles 60

0 Kilometres 96

Ambermarked Birch Leafminer

Areas within which defoliation occurred in 1960

LEGEND

Light defoliation

Moderate-to-severe defoliation