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

Compiled by

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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. 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  $\rm km^2$  = area (sq. mi.) x 2.59 = area  $\rm km^2$ ]. 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.

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

1950-1953 D.F. Lynn

1954-1958 F.A. Bricault

1959 D.F. Lynn

1960-1961 D.G. Grisdale

1962-1969 H.R. Foster

1970-1973 H.R. Foster and J. Hook

1974 L.S. MacLeod, J. Hook, F. Livesey

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

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#### INTRODUCTION

This report is a review of significant forest insects and diseases that have occurred in the Cochrane District throughout the period 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 area, namely deciduous (poplar and birch) and coniferous (white, jack and red pine, balsam fir, tamarack, black and white spruce). Also included are some pests that cause damage to ornamental trees. 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, i.e., frost, hail and snow damage.

#### SUMMARY

FOREST INSECTS

Birch Skeletonizer, Bucculatrix canadensisella Cham. pages 11-14

[Major]

Defoliation by this insect seldom caused mortality of the host but weakened trees are subject to attack by secondary insects and diseases. Large outbreaks usually last 3 to 4 years, then decline rapidly. Since the Insect Survey began in 1936, outbreaks were recorded in the years 1941-1942, 1951-1954, 1962-1965 and 1972-1973.

Large Aspen Tortix, Choristoneura conflictana (Wlk.)
pages 15-19

[Major]

There are no records of this insect causing tree mortality. Prior to 1950 no infestations had been reported. Severe infestations occurred in 1957, from 1972 to 1974 and in 1978.

Spruce Budworm, Choristoneura fumiferana Clem.) pages 20-37

[Major]

This insect is considered the most destructive insect pest of several coniferous hosts in eastern Canada, the main hosts being white spruce and balsam fir. Though not major hosts, black spruce, eastern hemlock and tamarack are attacked and considerable tree mortality can occur. The first infestation recorded by the Insect Survey lasted from 1940 to 1956. During the years 1957-1974, population levels were generally low but from 1975 to 1980 high population levels persisted. Extensive mortality was recorded from 1950 to 1954 and from 1979 to 1980.

Birch Leafminer, Fenusa pusilla (Lep.) page 38

[Major]

Although this insect has not been recorded as causing mortality, weakened trees are susceptible to secondary insects and diseases and may be a predisposing factor in birch decline. As a rule this insect attacks single trees, but when populations build up, stands are severely defoliated. Yearly fluctuations in populations have occurred since 1968.

Hemlock Looper, Lambdina fiscellaria fiscellaria Gn. pages 39-44

[Major]

This destructive pest of hemlock, cedar and balsam fir can cause mortality of mature trees after one year of severe defoliation. High population levels occurred from 1950 to 1953 in the Lower Abitibi Lake area and caused almost 75% mortality in balsam fir. Since that time no infestations have occurred in the district.

Forest Tent Caterpillar, Malacosoma disstria Hbn. pages 45-60

[Major]

Outbreaks of this insect occurred from 1941 to 1948, from 1950 to 1956, and from 1975 to 1980. The time between the start of outbreaks can vary but it is approximately 12 years, and outbreaks last for approximately 6 years. Trembling aspen, the preferred host, is seldom killed in outbreaks. Depending on the range of hosts, sugar maple and red oak can be severely weakened and may suffer mortality if an infestation persists or as a result of secondary factors.

Whitespotted Sawyer, Monochamus scutellatus (Say) page 61

[Major]

The whitespotted sawyer beetle is one of the most common and widely distributed borer species in North America. Damage seldom occurs except on decadent trees. However, in recent years populations have increased, and in 1978 severe damage to mature jack pine trees adjacent to log storage piles occurred in Freele Twp.

Balsam Fir Sawfly, Neodiprion abietis complex pages 61-62

[Major]

Severe defoliation can cause mortality of balsam fir and white spruce trees when an infestation persists over a period of years. Since 1950 trace-to-low population levels have occurred, but there has been no mortality.

Redheaded Jack Pine Sawfly, Neodiprion virginianus complex pages 63-64

[Major]

This sawfly is capable of causing mortality of semimature and plantation jack pine trees when population levels are high. However, population levels have varied over the past 30 years and no significant tree mortality has occurred.

Pine Sawflies, Neodiprion spp. pages 64-66

[Major]

The species listed in this report are capable of causing mortality of semimature and plantation trees when populations are high.

Aspen Leafblotch Miner, Phyllonorycter ontario Free. pages 66-67

[Major]

Although this insect has not been known to cause tree mortality, severe mining of foliage over a period of years can cause a reduction in growth. Varying degrees of damage were noted for most years in which the insect was found. This insect was first recorded in the District in 1949.

Yellowheaded Spruce Sawfly, Pikonema alaskensis (Roh.) pages 67-69

[Major]

This serious pest of spruce plantations is capable of killing trees if infestations persist following several years of severe defoliation. Since 1950, varying degrees of defoliation have occurred and have resulted in single-tree mortality. This insect has been recorded in the Cochrane District since 1946.

White Pine Weevil, Pissodes strobi (Peck) page 69-70

[Major]

This weevil is considered the most destructive pest of white pine of North America. By attacking leaders of small pine and spruce trees it causes "cabbaging" of host trees after several years of infestations. High populations were recorded in 1957 and caused 24% leader damage. In addition, since 1957 low populations have been general at numerous locations.

Larch Sawfly, Pristiphora erichsonii (Htg.) pages 70-72

[Major]

Severe defoliation causes a loss of increment after 4 or 5 years and mortality usually occurs after 6 to 9 years. Severe defoliation was reported from 1953 to 1960, in 1965, and from 1967 to 1968. Infestations have been reported since 1938.

Mountain-ash Sawfly, Pristiphora geniculata (Htg.) page 72-73

[Major]

Although mountain—ash trees are not considered merchantable, many 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 first record of its occurrence was in 1962. Varying degrees of defoliation have occurred since that time.

Ambermarked Birch Leafminer, Profesusa thomsoni (Konow) pages 73-74

[Major]

As a result of severe leafmining over a period of years, this insect can cause a reduction in growth. No tree mortality has been recorded since the insect is a late-season feeder. Varying degrees of foliar damage have been reported since 1956.

Aspen Leafroller, Pseudexentera oregonana Wlshm. pages 75-79

[Major]

There are no records of this leafroller causing tree mortality. Heavy infestations occurred from 1965 to 1966 and from 1975 to 1977. Prior to 1965 no infestations had been reported.

Other Noteworthy Insects pages 80-92

[Major and Minor]

Insects with the potential for causing varying amounts of damage to stands, regeneration and plantations.

#### FOREST DISEASES

Armillaria Root Rot, Armillaria mellea (Vahl: Fr.) Kummer page 95

[Major]

This root rot is capable of killing both weakened and healthy trees. The fungus has been reported at low levels periodically from 1963 to 1980.

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

[Major]
pages 95-96

These rusts are the most widely spread rusts in the Canadian boreal forest and cause little damage to mature trees, although the potential for damage in nurseries is high. Infection rates and damage levels have fluctuated greatly throughout the district.

Ink Spot of Aspen, Ciborinia whetzelii (Seaver) Seaver page 97

[Major]

Although ink spot is not an extremely damaging disease, loss of increment during severe infections is damaging to aspen stands. Varying degrees of foliar damage have occurred since 1959. This disease was reported as early as 1940 when severe browning of foliage was observed in the Iroquois Falls area.

Sweet Fern Blister Rust, Cronartium comptoniae Arthur. page 98 [Major]

This fungus causes stem cankers on jack pine but tree mortality is usually restricted to trees under 7 cm DBH. Stem cankers on larger trees can cause volume loss up to 11%. The disease is not as serious in natural stands as in plantations because a number of trees survive infection. In 1955, infections ranged up to 40% in infected areas. Prior to 1954, this rust was not reported in the district.

Tar Spot Needle Cast, Davisomycella ampla (J. Davis) Darker [Minor] page 99

This disease causes severe defoliation when incidence is high. In years of severe defoliation, trees are significantly weakened and growth is reduced. Infection can be so severe that only the current year's needles are left, and this gives the host a very sparse appearance. Since 1960 foliar damage has been generally light in the district.

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

[Major]

pages 99-100

This disease causes globose galls or swellings at the site of infection and can be a serious problem in tree nurseries. The rust is capable of killing the entire seedling, or that portion distal to the infection. On older trees, twig and branch mortality can occur. Varying degrees of damage have occurred in natural stands since 1962.

Scleroderris Canker, Gremmeniella abietina (Lagerb.) Morelet [Major] pages 100-101

This disease can cause mortality of young trees up to 1.5 m in height. The pathogen was first reported in 1966 and has remained fairly static.

Hypoxylon Canker, Hypoxylon mammatum (Wahlenb.) J. Miller [Major] page 103

This disease usually attacks the stems of immature trees in the 7 to 13 cm class, generally growing on poor sites, but can cause branch and top mortality on larger trees. The disease was first reported in the district in 1953, and has been widespread since then.

Larch-poplar Rust, Melampsora medusae Thüm. pages 103-104

[Major]

Although needle rust is not an extremely damaging disease, loss of increment during severe infections is damaging to larch stands. Moderate-to-severe browning of foliage occurred from 1965 to 1967 in several townships in the district. Larch-poplar rust requires two hosts, namely poplar and larch, to complete its life cycle.

Shoot Blight, Venturia macularis (Fr.) Müller & v. Arx [Major] pages 104-105

Reduced stocking of reproduction aspen occurs when the incidence of this disease is high. A high incidence was reported from 1965 to 1967, and in 1976 the disease was found at scattered points in the district. It was not reported prior to 1959.

ABIOTIC DAMAGE pages 109-110

This condition is caused by a wide variety of influences, i.e., salt, frost, winter drying, etc. Weakened trees are then susceptible to other diseases. Varying degrees of damage have been reported since 1963.

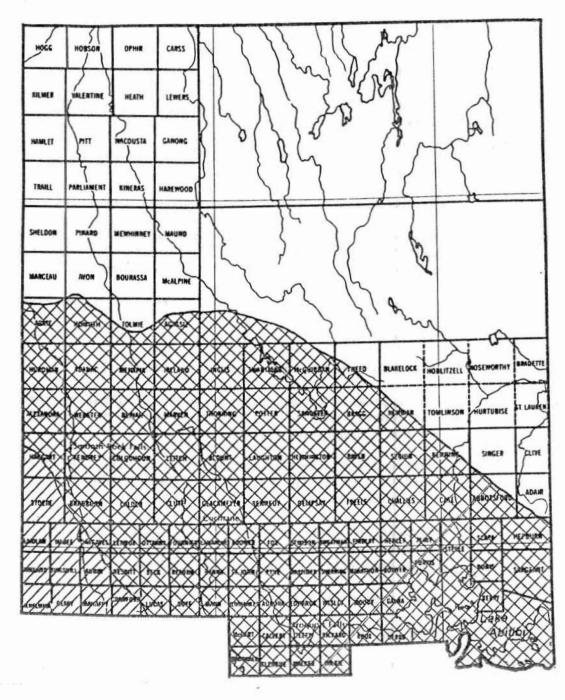
# INSECTS

[Major]

Birch Skeletonizer, Bucculatrix canadensisella Cham.

Host(s): hirch

Year	Remarks
1950	not reported
1951	severe defoliation on islands in the Lower Abitibi Lake area
1952	heavy infestations on white birch trees at Red Pine Point in Abitibi Lake
1953	Severe damage occurred throughout the district.
1954	Severe defoliation occurred throughout the Smooth Rock Falls area, northeastward to Little Abitibi Lake in Sangster Twp, and over to the Quebec border.
1955	Population levels virtually disappeared in the district.
1956-1961	not reported
1962	light-to-moderate defoliation in Calder Twp
1963	small pockets of moderate-to-heavy defoliation throughout the central part of the District and in a few small areas in the vicinity of Abitibi Lake
1964	severe defoliation extending from Abitibi Lake northeastward to Homuth Twp and into the Kapuskasing District (see map, page 12)
1965	Population levels declined to light intensity. Light infestations occurred in most of the district south of a line from Abitibi Lake to Homuth Twp.
1966	low population levels in the district
1967-1968	not reported
1969-1971	low population levels in the district
1972	heavy infestations in the Iroquois Falls area south into the Timmins District (see map, page 13)
1973	Population levels in the Iroquois Falls area south into the Timmins District declined to light intensity (see map, page 14).
1974-1980	not reported



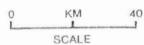
BIRCH SKELETONIZER

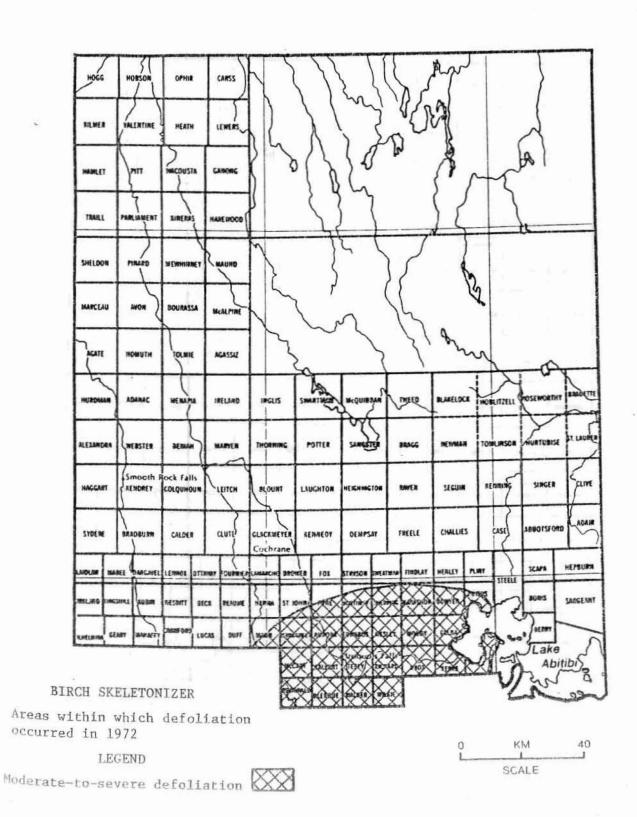
Areas within which defoliation occurred in 1964

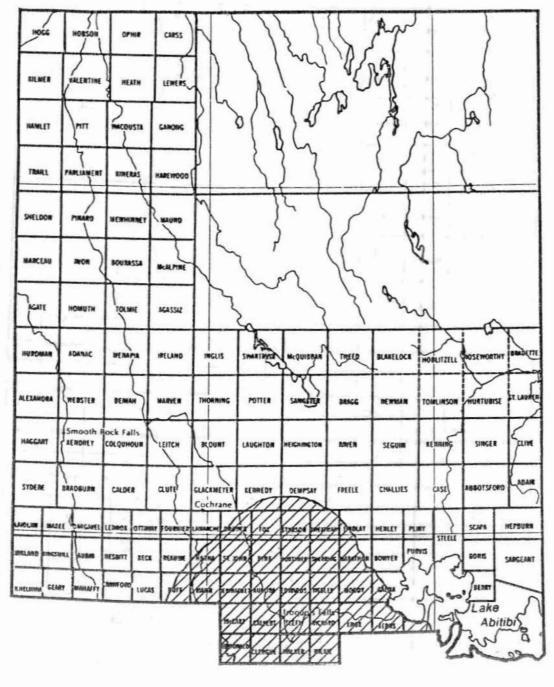
LEGEND

Light defoliation Moderate-to-severe defoliation









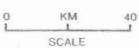
BIRCH SKELETONIZER

Areas within which defoliation occurred in 1973

LEGEND

Light defoliation



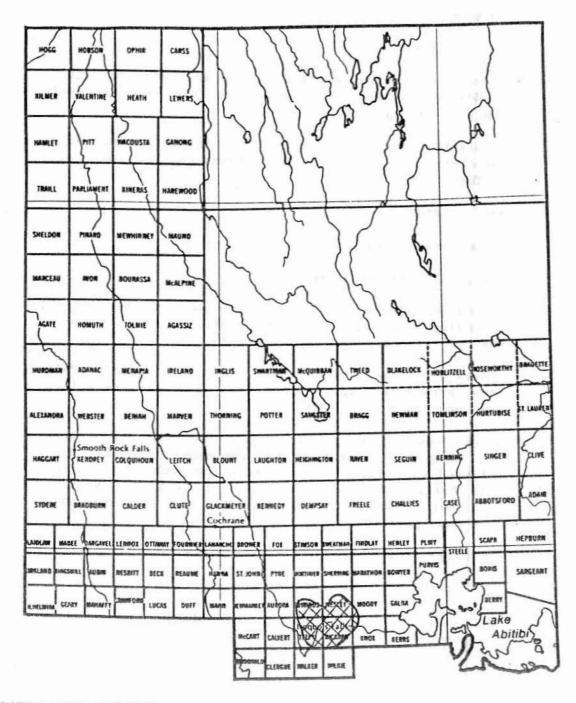


Large Aspen Tortrix, Choristoneura conflictana (Wlk.)

Host(s): poplar

[Major]

Year	Remarks
1950-1956	not reported
1957	Severe defoliation occurred in the southwestern section of Edwards Twp and southeastward to Twin Falls in Teefy Twp (see map, page 16).
1958	Population levels declined in the district. Only light infestations occurred in aspen stands east of Twin Falls in Teefy Twp.
1959-1968	not reported
1969	found commonly in beating mat samples
1970-1971	low population levels reported
1972	severe defoliation in the southern part of the district extending from the Kapuskasing District and eastward to the Quebec border (see map, page 17)
1973	moderate-to-severe defoliation in the Iroquois Falls area, extending eastward to the east side of Lake Abitibi (see map, page 18)
1974	Large areas of poplar were again severely defoliated. The largest infestation, approximately 72 km wide, extended over four districts from the Quebec border near Lake Abitibi west through parts of Cochrane, Kirkland Lake and Timmins districts to the town of Kapuskasing (see map, page 19).
1975	Population levels declined in the district.
1976-1977	very low population levels in the district
1978	One small pocket of severe defoliation occurred in Colquboun Twp.
1979-1980	not reported



LARGE ASPEN TORTRIX

Areas within which defoliation occurred in 1957

KM 40 SCALE

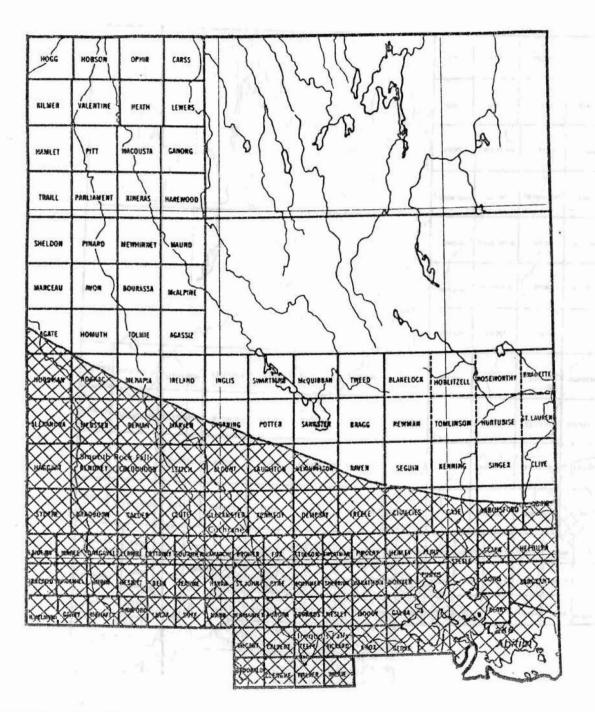
Areas occur

LEGEND

Moderate-to-severe defoliation



Moder



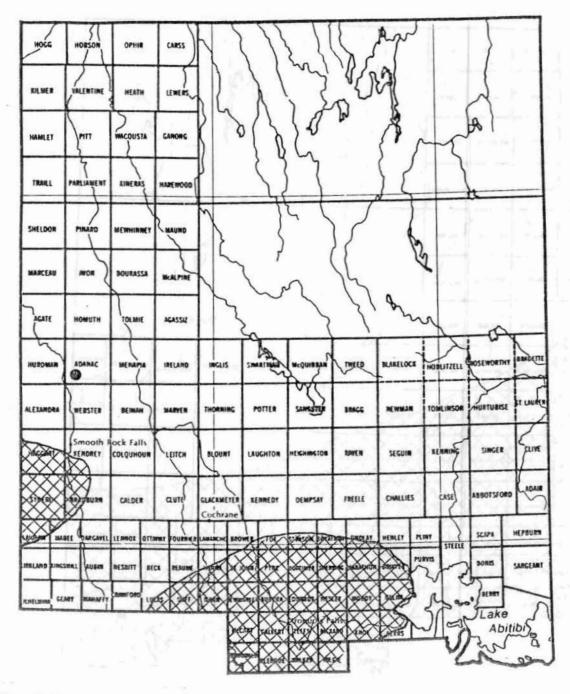
LARGE ASPEN TORTRIX

Areas within which defoliation occurred in 1972

0 KM 40 SCALE

LEGEND

Moderate-to-severe defoliation



LARGE ASPEN TORTRIX

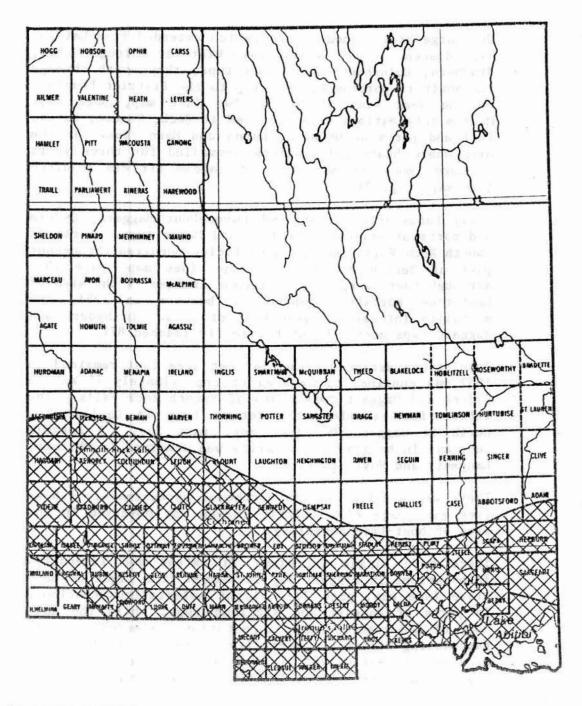
Areas within which defoliation occurred in 1973

40 KM SCALE

Area occu

LEGEND





40

SCALE

LARGE ASPEN TORTRIX

Areas within which defoliation occurred in 1974

LEGEND

Spruce Budworm, Choristoneura fumiferana (Clem.)

Host(s): spruce, bF

[Major]

Year

#### Remarks

1950

One large area of heavy infestation extended from Laidlaw Twp adjacent to the Kapuskasing District through Mabee, Bradburn, Colquhoun and Leitch twps, then north through the southern portion of Avon Twp to the District boundary on the west side of Homuth Twp (see map, page 23). Medium infestations also occurred in Beck, Reaume, Lucas, Duff and parts of Ottaway, Hanna and Mann twps. In the area where heavy infestations prevailed for three years or more, moderate mortality of balsam fir has resulted (see map, page 24).

1951

Heavy infestations continued throughout Haggart, Sydere and parts of Bradburn, Laidlaw and Mabee twps. North of Smooth Rock Falls, severe defoliation occurred throughout part of Beniah and Menapia twps (see map, page 25). Although there were no significant changes in the area of host-tree mortality caused by budworm in 1951, the mortality intensified over that of 1950. In Sydere and Haggart twps mortality of balsam fir reached 87%.

1952

Populations declined. The largest area that remained in 1952 was confined to an area of approximately 75 km² in Sydere and Haggart twps south of Smooth Rock Falls. The infestation extended from Return Lake in Laidlaw Twp north to Haggart Twp (see map, page 26). A notable increase in balsam fir mortality was observed in Whitney, Langmuir and Hoyle twps.

1953

There was a slight spread northeast approximately 1.8 km (see map, page 27). Little change was observed in the area of host-tree mortality.

1954

There were slight increases in extent and intensity. Infestations in Haggart Twp increased from light to moderate (see map, page 28). Light infestations continued in parts of Haggart and Kirkland twps, while the main body of moderate-to-heavy infestations extended into the Kapuskasing District. Mortality of balsam fir increased from 84% in 1951 to 99% in 1954, and white spruce mortality increased from 15 to 33% in the same period.

(cont'd)

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

Host(s): spruce, bF

[Major]

Year	Remarks
1955	Populations declined along the Cochrane-Kapuskasing border to light intensity (see map, page 29).
1956	Populations declined to trace levels along the Cochrane-Kapuskasing boundary.
1957-1959	not reported
1960-1961	small numbers collected from white spruce and balsam fir at scattered locations
1962	low population levels
1963	not reported
1964-1965	low population levels on open-grown white spruce at Departure Lake in Haggart Twp and Sydere Twp
1966	light infestations on white spruce at Departure Lake, Haggart Twp
1967	low population levels in Haggart and Calder twps
1968	low population levels at widely scattered points in the district.
1969	A reduction in population levels occurred as a result of severe frosts on 13 June, 1968. Only trace levels were observed.
1970-1974	not reported
1975	A large new infestation covered the area from Wesley Twp eastward to the Ontario-Quebec border north of Lake Abitibi. A smaller infestation was found 26 km northeast of Cochrane in Laughton. Heighington and Dempsay twps (see map, page 30).
1976	moderate-to-severe defoliation throughout the entire southern part of Cochrane District up to Hurdman Twp in the northwestern part and over to Bradette Twp in the northeastern part (see map, page 31)

(cont'd)

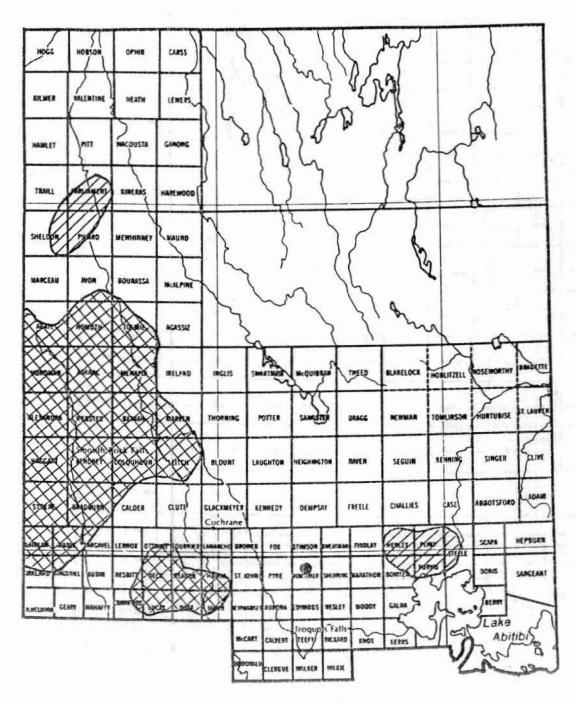
Spruce Budworm, Choristoneura fumiferana (Clem.) (concl.)

Host(s): spruce, bF

[Major]

Year	Remarks
1977	Moderate-to-severe defoliation continued throughout most of the Cochrane District (see map, page 32).
1978	continued to spread throughout the district, with infestations extending 65 km to the north into the Moosonee District (see map, page 33)
1979	severe defoliation throughout most of the Cochrane District (see map, page 34); small pockets of new mortality around Abitibi Lake in Moody, Galina, Knox and Kerrs twps (see map, page 35)
1980	Infestations were comparable to those of 1979 (see map, page 36). New areas of mortality continued to occur in the district (see map, page 37). Ground checks revealed that balsam fir mortality was 7% in the Abitibi Lake area and 19% in Stimson Twp.

A:



SPRUCE BUDWORM

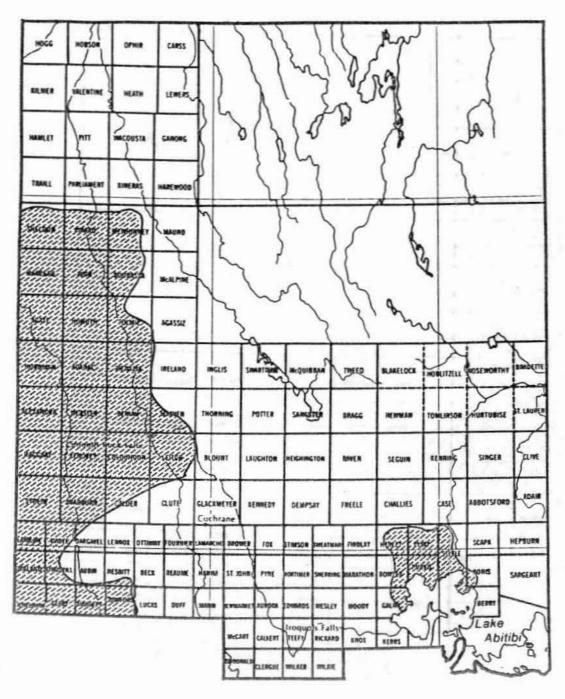
Areas within which defoliation occurred in 1950

0 KM 40 SCALE

LEGEND

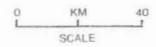
Light defoliation Moderate-to-severe defoliation





#### SPRUCE BUDWORM

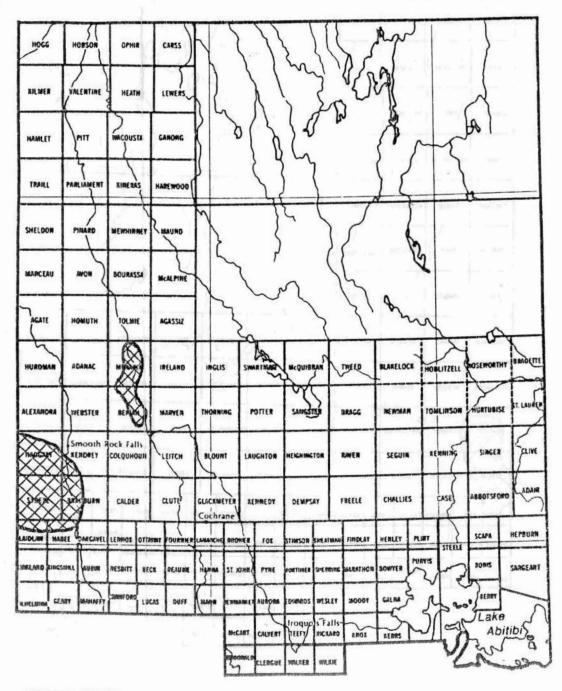
Areas within which balsam fir whole tree and top mortality occurred in 1950



LEGEND

Mortality



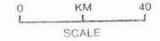


#### SPRUCE BUDWORM

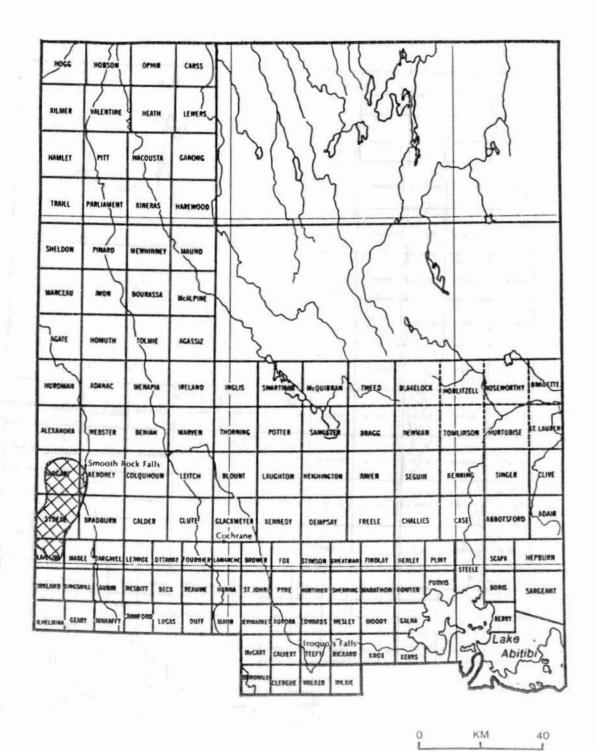
Areas within which defoliation occurred in 1951

LEGEND

Moderate-to-severe defoliation





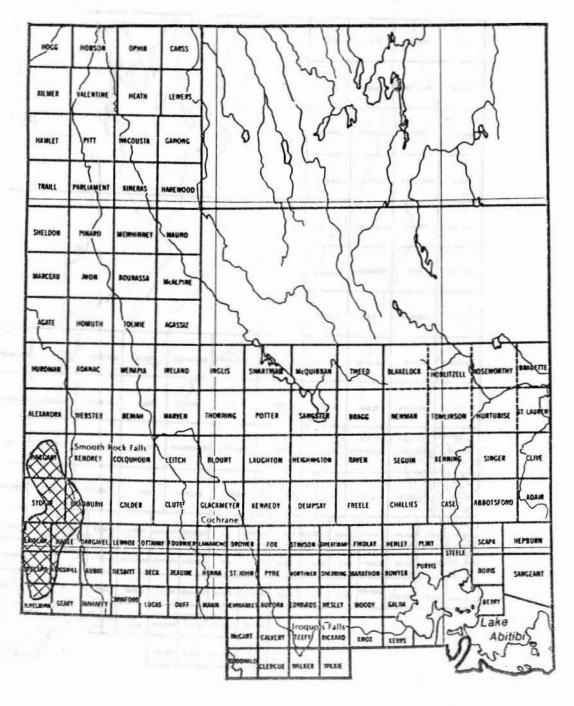


SCALE

SPRUCE BUDWORM

Areas within which defoliation occurred in 1952

LEGEND



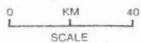
SPRUCE BUDWORM

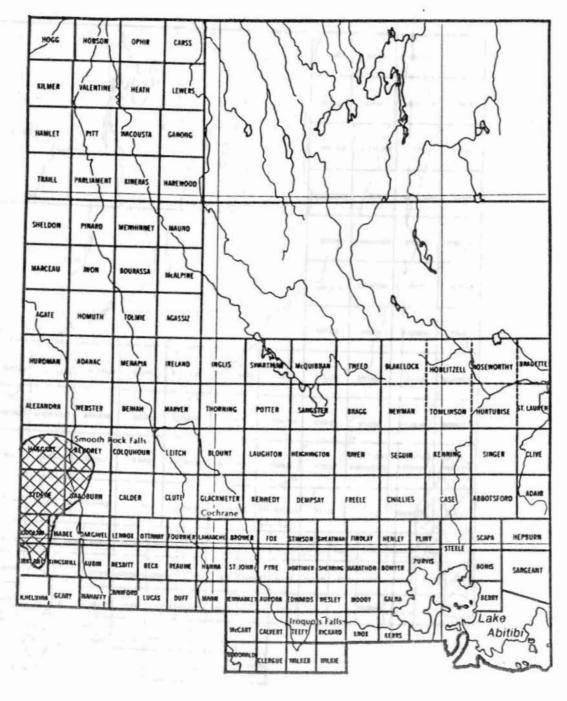
Areas within which defoliation occurred in 1953

LEGEND

Moderate-to-severe defoliation







40 SCALE

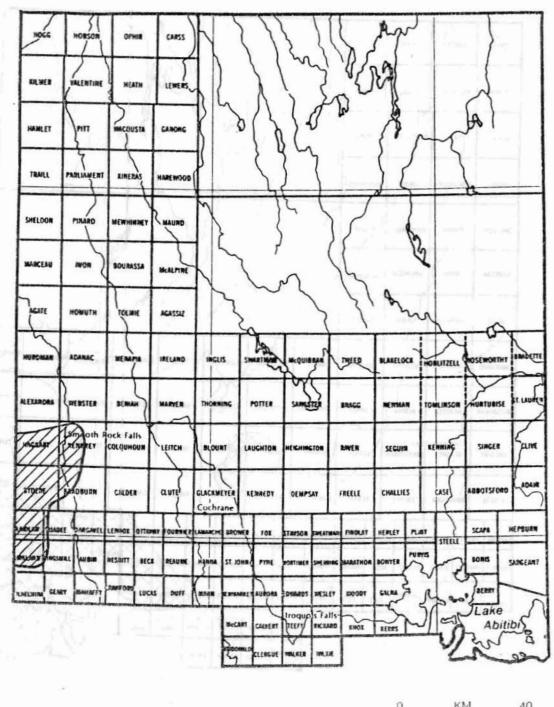
#### SPRUCE BUDWORM

Areas within which defoliation occurred in 1954

LEGEND

Moderate-to-severe defoliation





40 KM SCALE

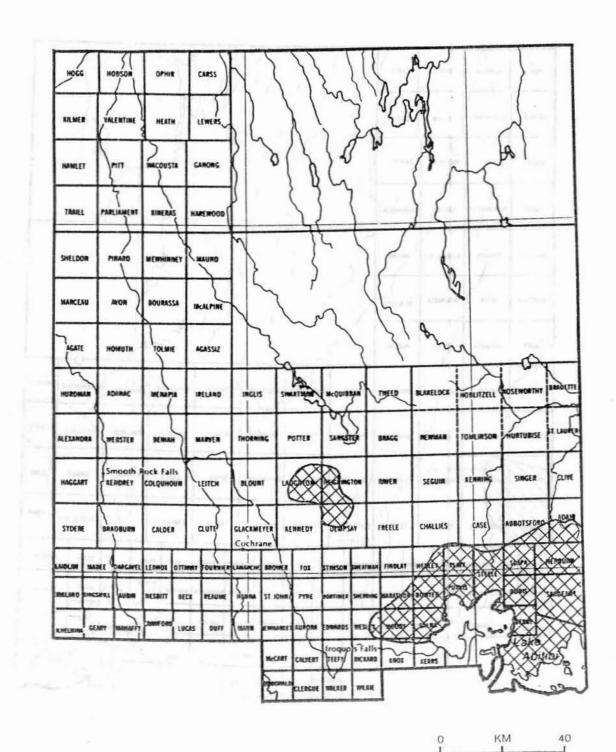
SPRUCE BUDWORM

Areas within which defoliation occurred in 1955

LEGEND

light defoliation





SPRUCE BUDWORM

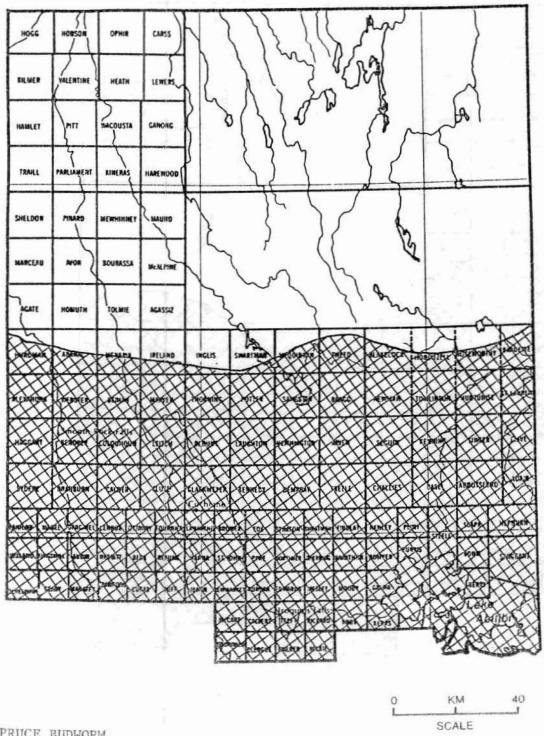
Areas within which defoliation occurred in 1975

LEGEND

Are

OCC

SCALE



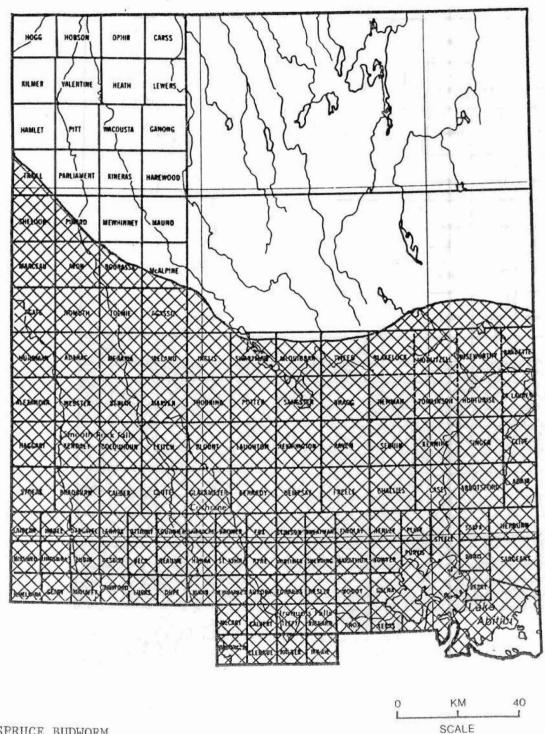
SPRUCE BUDWORM

Areas within which defoliation occurred in 1976

1.EGEND

Moderate-to-severe defoliation

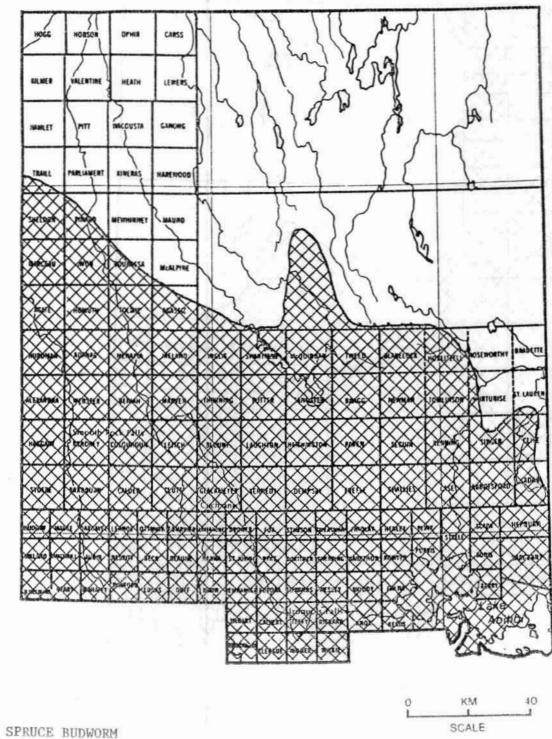




SPRUCE BUDWORM

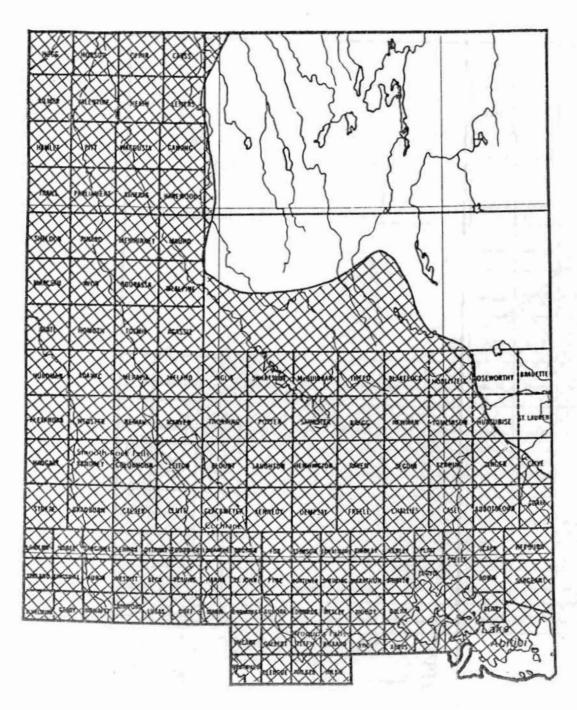
Areas within which defoliation occurred in 1977

LEGEND



eas within which defoliation curred in 1978

LEGEND

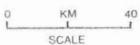


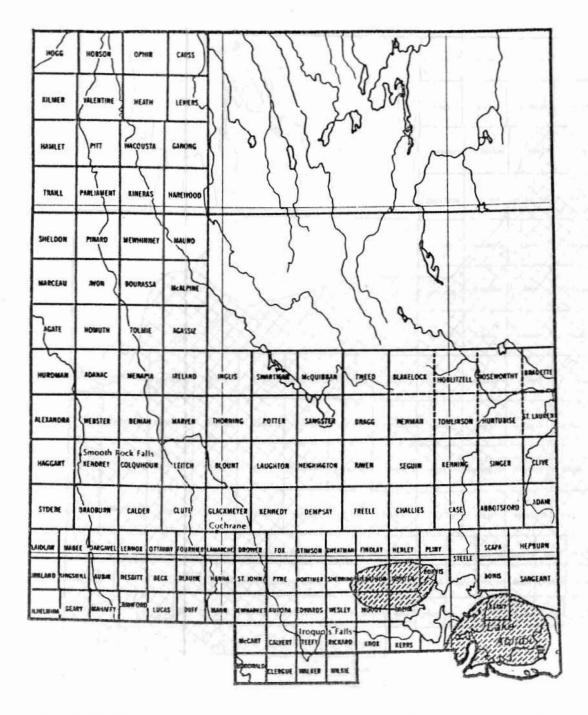
SPRUCE BUDWORM

Areas within which defoliation occurred in 1979

LEGEND







KM

SCALE

40

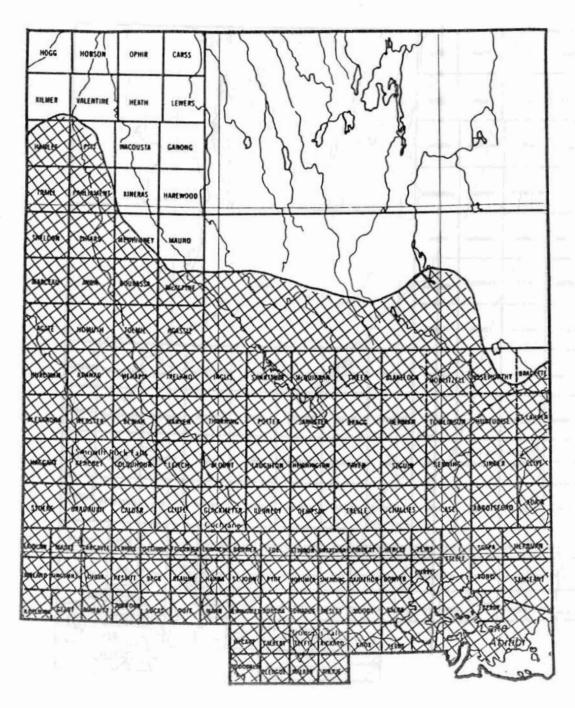
SPRUCE BUDWORM

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

LEGEND

Mortality



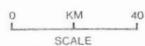


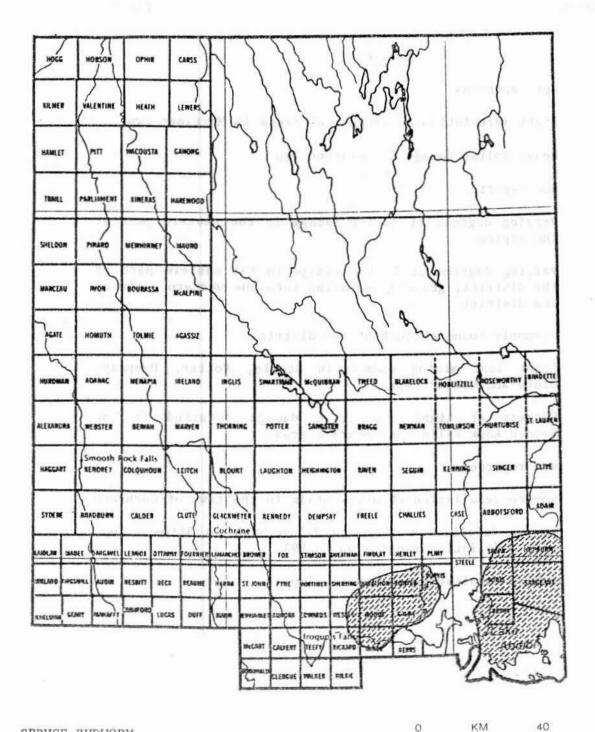
SPRUCE BUDWORM

Areas within which defoliation occurred in 1980

LEGEND







SCALE

SPRUCE BUDWORM

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

LEGEND

Mortality ////



Birch Leafminer, Fenusa pusilla (Lep.)

Host(s): birch

[Major]

Year	Remarks
1950-1967	not reported
1968	light infestation on ornamental trees in Mortimer Twp
1969	heavy foliar damage in Marathon Twp
1970	not reported
1971-1972	varying degrees of foliar damage in the eastern part of the Region
1973	varying degrees of foliar damage in the eastern part of the district; gradual spreading into the western parts of the district
1974	commonly found throughout the district
1975	light leaf mining common in Steele, Potter, Dempsay, Clute and Calder twps
1976	Pockets of light-to-moderate damage occurred in the Smooth Rock Falls and Cochrane areas.
1977	not reported
1978	severe defoliation of ornamentals in the town of Cochrane
1979	severe defoliation of trees 2.5 m high in Stimson Twp, with defoliation ranging up to 99%
1980	severe defoliation in Kendrey Twp

Hemlock Looper, Lambdina fiscellaria fiscellaria (Gn.)

Host(s): General feeder

[Major]

Year	Remarks
1950	Severe defoliation of balsam fir occurred at Long Point, a peninsula in Lake Abitibi, and covered approximately 25 km <sup>2</sup> (see map, page 41). Balsam fir was approximately 80% defoliated and deciduous trees were as much as 40% defoliated.
1951	Population levels declined on Long Point in the Lake Abitibi area. The infestation was confined to the western shore of the peninsula. Small numbers of larvae were collected at widely scattered points elsewhere in the district (see map, page 42).
1952	There was a decline in population levels at Long Point in the Lake Abitibi area. The infestation was confined to an area of approximately 3.8 km² along the shores of McChesney Bay. A new infestation approximately 1.6 ha in size occurred on an island southeast of Iroquois Point in Lower Abitibi Lake (see map, page 43). Defoliation of balsam fir ranged up to 100%, while that of white birch and poplar trees ranged up to approximately 75%.
1953	The infestation on an island southeast of Iroquois Point in Lower Abitibi Lake continued (see map, page 44). For the second consecutive year defoliation on coniferous trees was 80%. Mortality that began in 1952 continued in 1953.
1954	The infestation in Lower Abitibi Lake declined. The decrease was due to lack of food caused by mortality of balsam fir. An estimated 75% of balsam fir trees were killed in this area. Small numbers were collected in Sargeant, Bonis, Sydere, Bowyer and Matheson twps.
1955	Populations were low in Lower Abitibi Lake. Approximately 90% of overstory balsam fir was killed on a 1.6-ha island.
1956	Populations virtually disappeared in the district.
1957-1959	not reported
1960	two larvae collected

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

Host(s): General feeder

[Major]

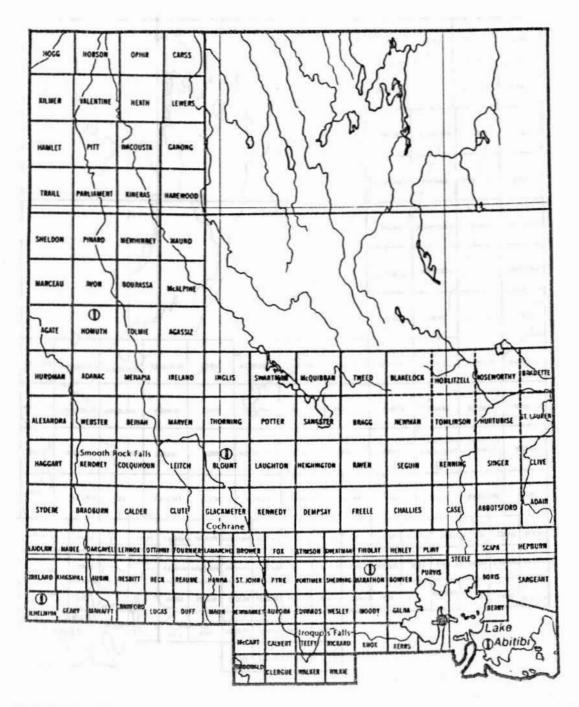
Year	Remarks
1961	trace levels obtained in beating tray samples
1962	not reported
1963-1965	trace levels on islands in Lake Abitibi
1966-1980	not reported we have the state of the state
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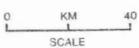


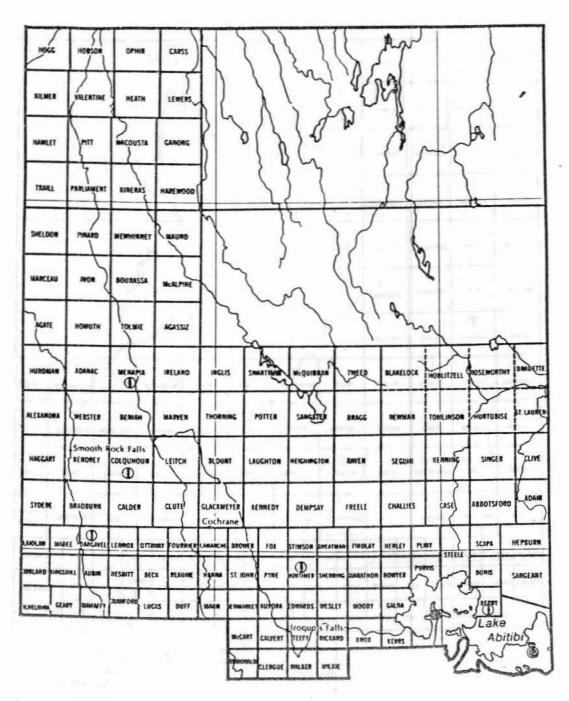
#### HEMLOCK LOOPER

Areas within which defoliation occurred in 1950

#### LEGEND

Light defoliation ①





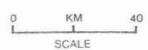
HEMLOCK LOOPER

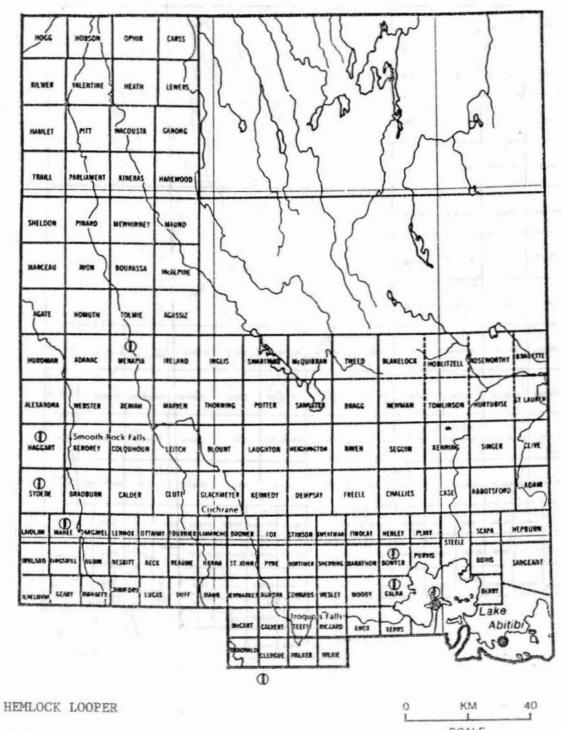
Areas within which defoliation occurred in 1951

LEGEND

Light defoliation ①

Moderate-to-severe defoliation ②

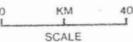


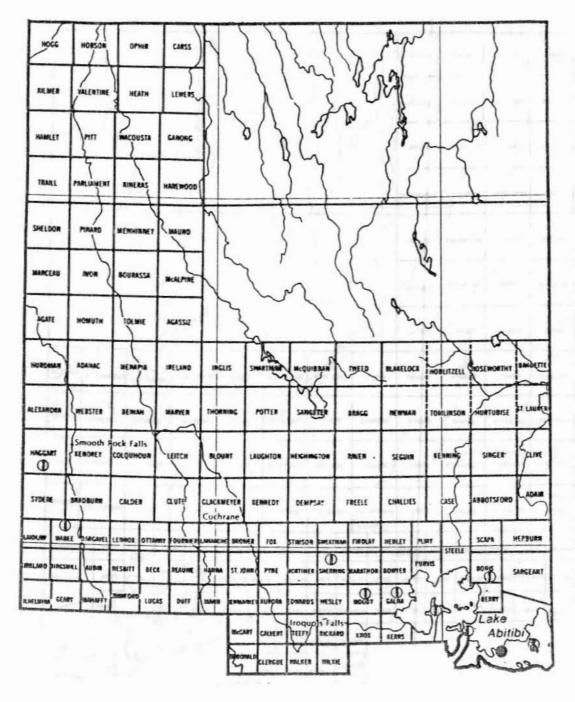


Areas within which defoliation occurred in 1952

LEGEND

Light defoliation (1)





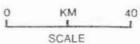
HEMLOCK LOOPER

Areas within which defoliation occurred in 1953

LEGEND

Light defoliation ①

Moderate-to-severe defoliation ③



Forest Tent Caterpillar, Malacosoma disstria Hbn.

Host(s	):	deciduous
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[Major]

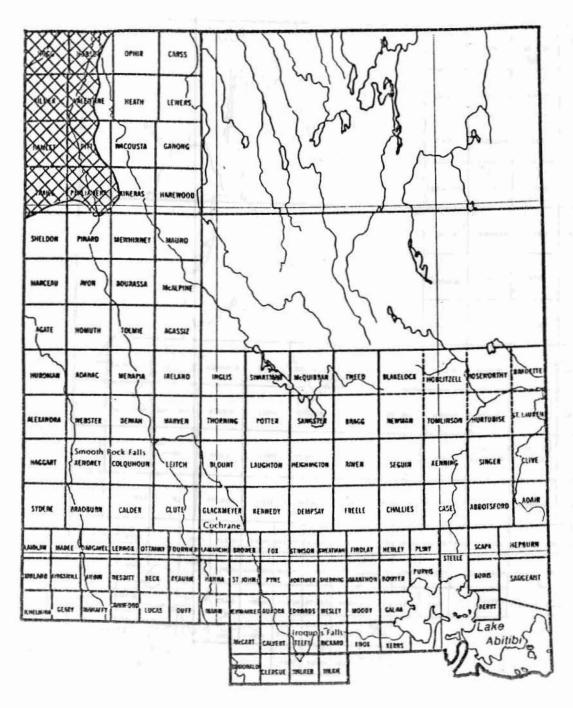
Year	Remarks
1950	Heavy infestations occurred in the northwest corner of the District and extended from Sheldon Twp northeast into Hobson Twp and into the Moosonee District (see map, page 47).
1951	Population levels in the northwestern part of the District declined to medium. A small pocket of moderate defoliation occurred throughout McCart Twp (see map, page 48).
1952	All areas in the previously infested southern part of the District increased, both in intensity and in size (see map, page 49).
1953	Populations increased considerably in the District and pockets of moderate-to-severe defoliation occurred at widely scattered points (see map, page 50).
1954	Populations declined. The decline was evident in the northern and northwestern parts of the district. The infestations in the vicinity of Abitibi Lake increased in extent (see map, page 51).
1955	Population levels declined sharply in the district. Small tracts of aspen were lightly defoliated in the vicinity of Abitibi Lake (see map, page 52).
1956	light infestations throughout part of Calder and Clute twps west of the town of Cochrane (see map, page 53)
1957-1963	not reported
1964	trace levels in Calder and Kendrey twps and light intens- ity at the "Narrows" on Abitibi Lake (see map, page 54)
1965	trace levels in the District
1966-1974	not reported
1975	moderate-to-severe defoliation around the Smooth Rock Falls area, extending west into the Kapuskasing District (see map, page 55)

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

Host(s): deciduous

[Major]

Year	Remarks
1976	Population levels increased, especially in areas from Agate Twp in a northwesterly direction into Kapuskasing District and north into the Moosonee District (see map, page 56).
1977	Infestations increased in size and intensity. Approximately half of the Cochrane District is now included within the infestation boundaries (see map, page 57).
1978	A decline in population levels occurred in the northern parts of Cochrane District as a result of heavy frosts in early June but increased in the Southern part (see map, page 58).
1979	A major decline in population levels occurred in the District (see map, page 59). Pockets of defoliation of aspen extended from Strickland in the Kapuskasing District through Greenwater Provincial Park to Clute Twp in the Cochrane District.
1980	Severe defoliation was recorded in Clute Twp and north of Gardiner Crossing on the Abitibi River. The infestation was centered in Greenwater Provincial Park and covered an area of approximately 132,866 ha (see map, page 60).

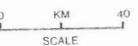


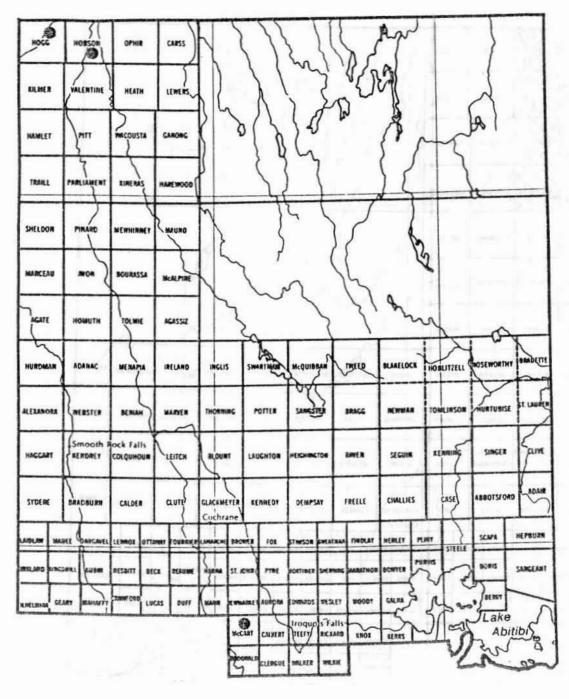
FOREST TENT CATERPILLAR

Areas within which defoliation occurred to 1950

LEGEND



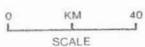


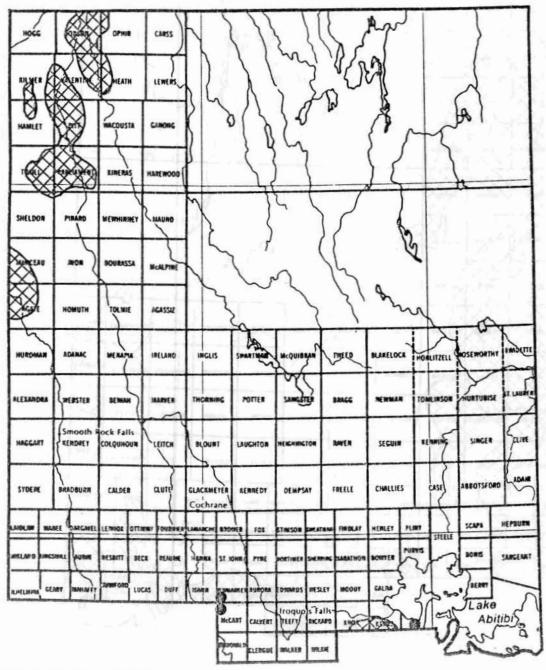


FOREST TENT CATERPILLAR

Areas within which defoliation occurred in 1951

LEGEND





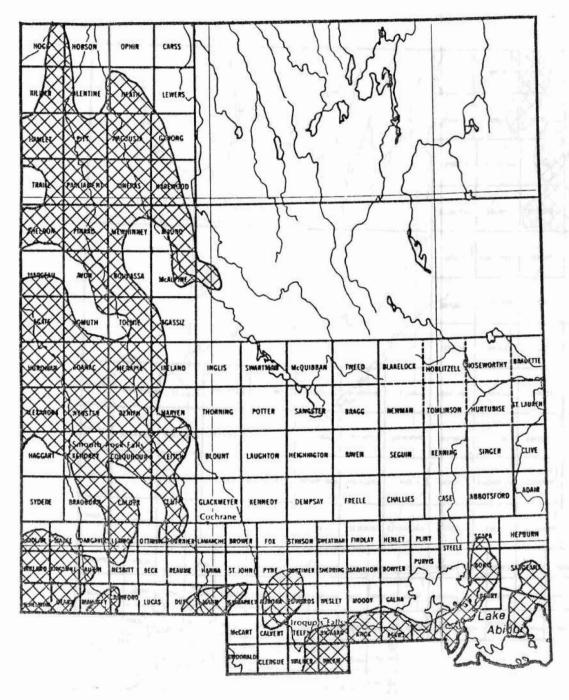
FOREST TENT CATERPILLAR

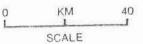
Areas within which defoliation occurred in 1952

LEGEND

40 KM SCALE







#### FOREST TENT CATERPILLAR

Areas within which defoliation occurred in 1953

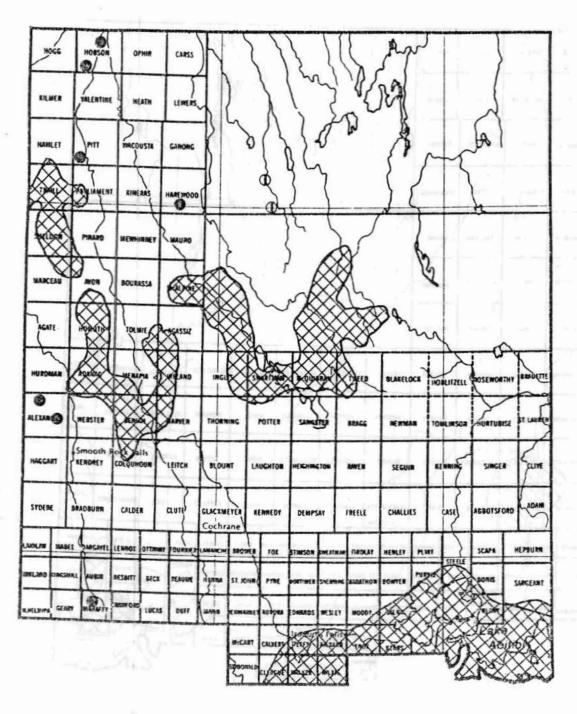
LEGEND

Moderate-to-severe defoliation



Areas occur

Light Moder



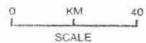
#### FOREST TENT CATERPILLAR

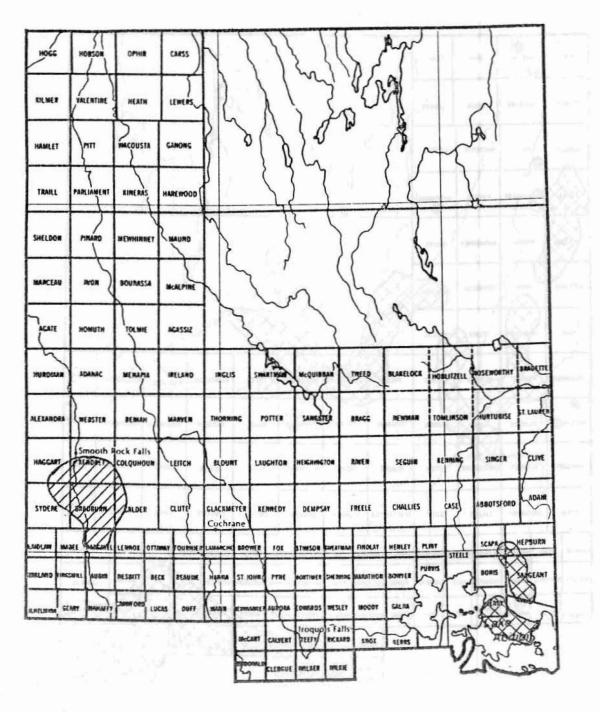
Areas within which defoliation occurred in 1954

LEGEND

Light defoliation ①

Moderate-to-severe defoliation ② or



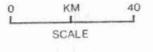


FOREST TENT CATERPILLAR

Areas within which defoliation occurred in 1955

LEGEND

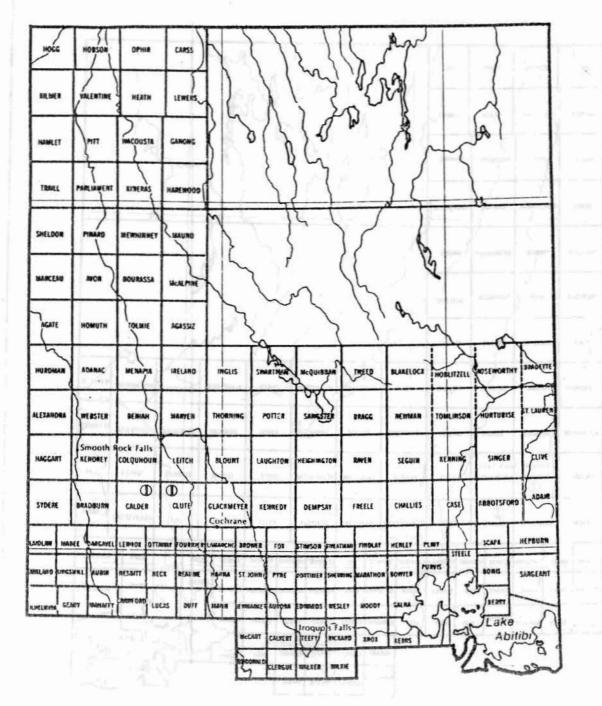
Light defoliation Moderate-to-severe defoliation



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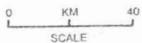
FOREST TENT CATERPILLAR

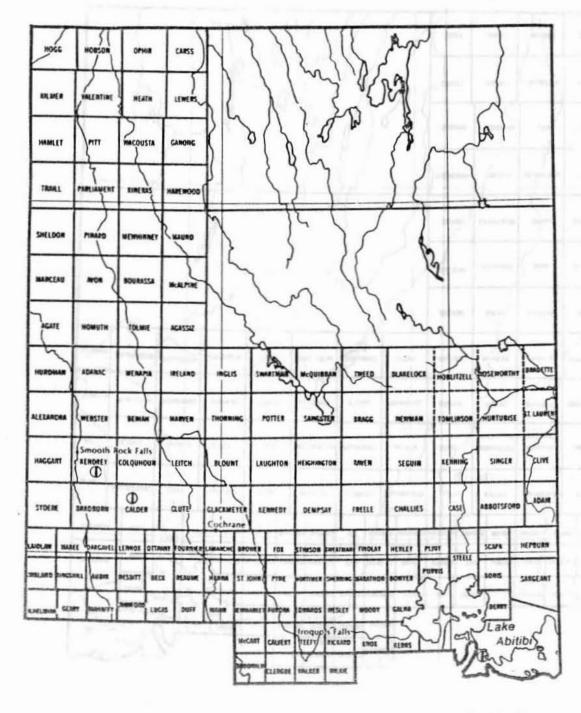
Areas within which defoliation occurred in 1956

LEGEND

Light defoliation

(I)



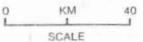


FOREST TENT CATERPILLAR

Areas within which defoliation occurred in 1964

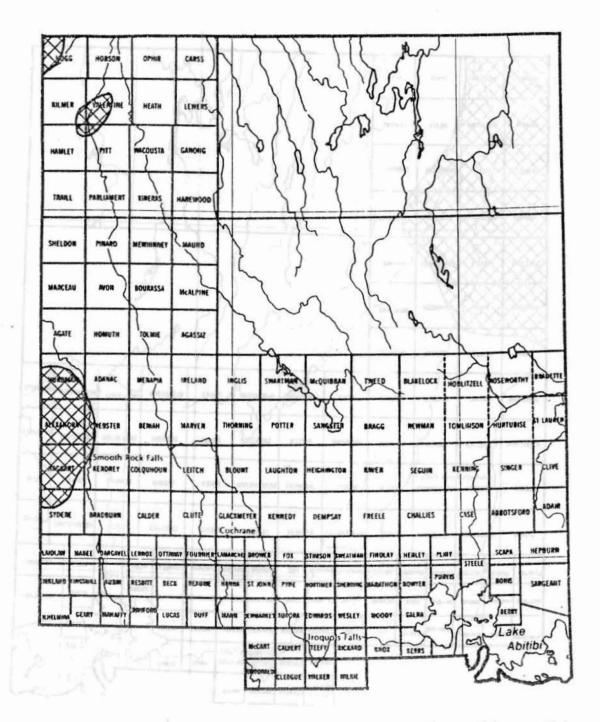
LEGEND

Light defoliation (D



Are

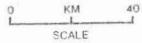
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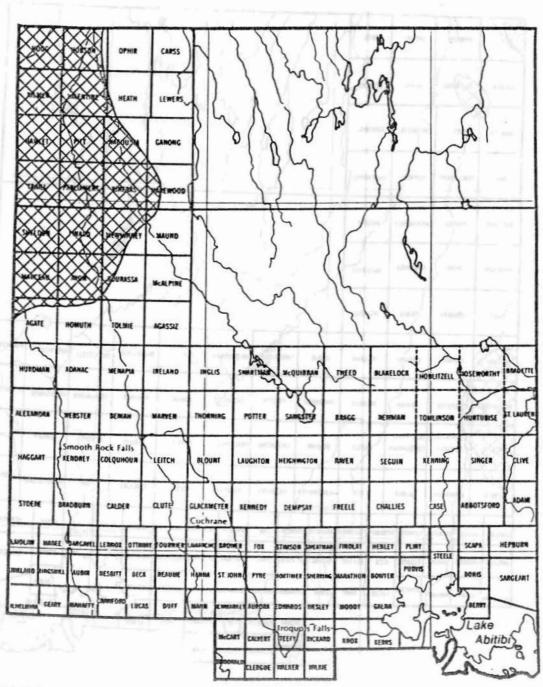
FOREST TENT CATERPILLAR

Areas within which defoliation occurred in 1975

LEGEND





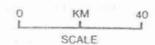


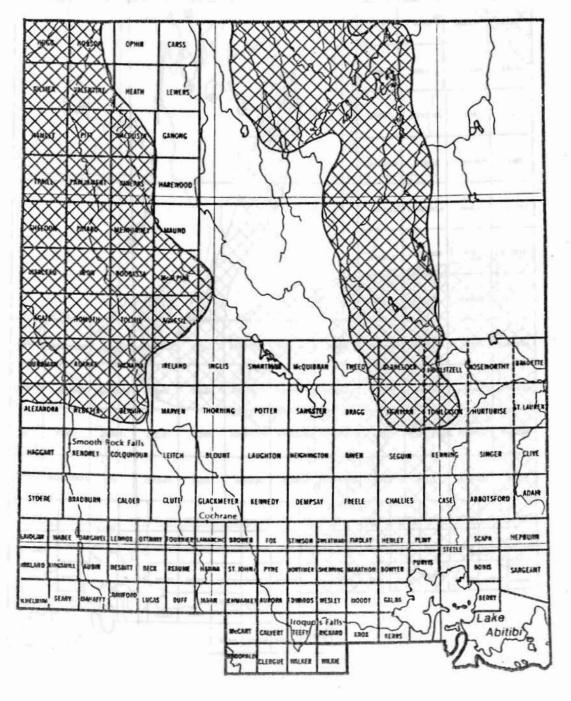
FOREST TENT CATERPILLAR

Areas within which defolication occurred in 1976

LEGEND





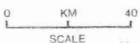


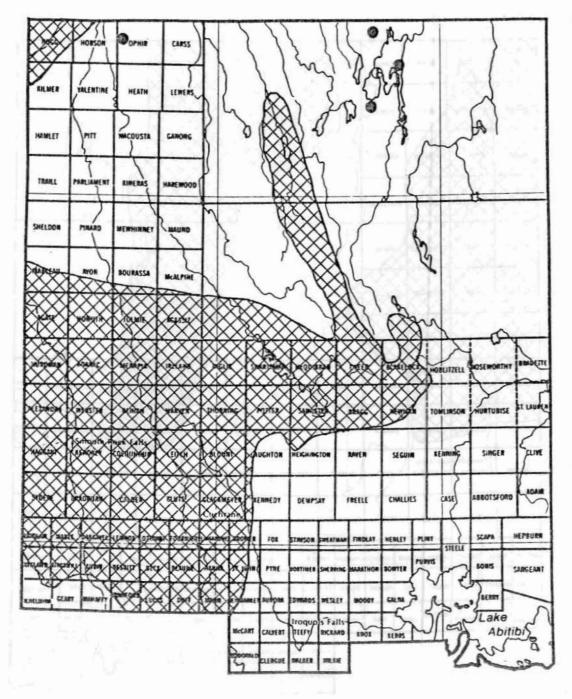
FOREST TENT CATERPILLAR

Areas within which defoliation occurred in 1977

LEGEND





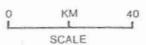


FOREST TENT CATERPILLAR

Areas within which defoliation occurred in 1978

LEGEND

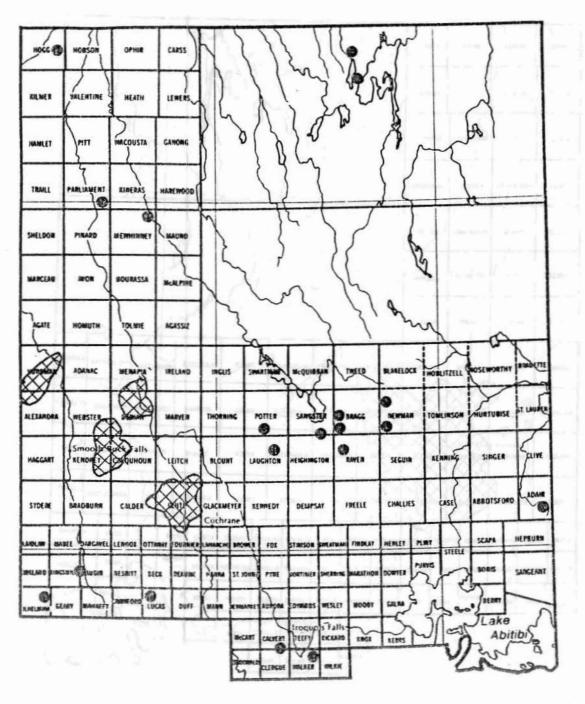
Moderate-to-severe defoliation ● or



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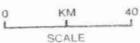
FOREST TENT CATERPILLAR

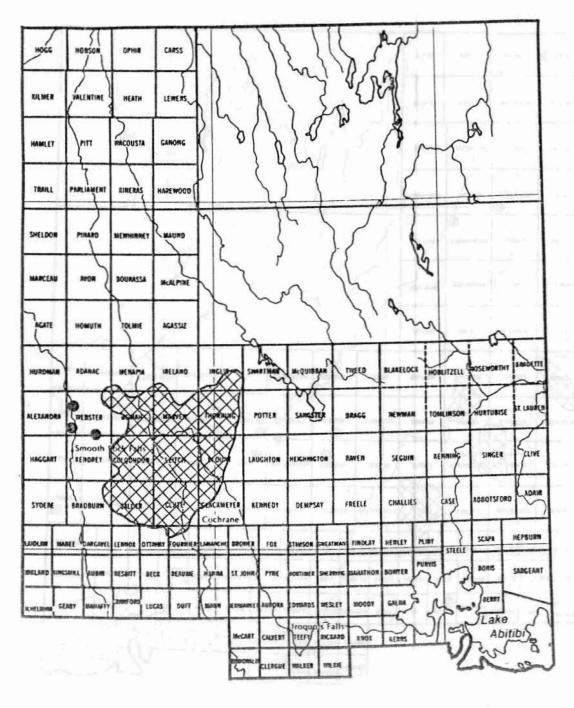
teas within which defoliation occurred in 1979

LEGEND

derate-to-severe defoliation \* or \*\*



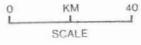




FOREST TENT CATERPILLAR

Areas within which defoliation occurred in 1980

LEGEND



Whitespotted Sawyer, Monochamus scutellatus (Say)

Host(s): coniferous

[Major]

Year	Remarks
1950-1955	not reported
1956	trace levels reported
1957-1961	not reported
1962	adults found at several points in the district
	not reported was to
1964	adults found at several points in the district
1965-1966	not reported and same it is a state of the same it
1967	larvae obtained from trap logs
1968-1977	not reported
1978	severe damage to mature jack pine in areas bordering cut- overs in Freele Twp
1979	numerous adults in log piles near Wade Lake in Stimson Twp
1980	heavy damage observed on trees adjacent to log storage dumps at several location in the district

Balsam Fir Sawfly, Neodiprion abietis complex

Host(s): bF, wS, bS

[Major]

Year Remarks

1950 trace populations in Blakelock Twp

1951-1953 not reported

1954 endemic levels in Sydere and Clute twps

Balsam Fir Sawfly, Neodiprion abietis complex (concl.)

Host(s): bF, wS, bS

[Major]

Year	Remarks				
1955-1958	not reported				
1959	light infestation on young open-grown white spruce along CNR tracks in Purvis Twp				
1960	Small pockets of balsam fir were heavily defoliated along ONR tracks in Homuth and Avon twps.				
light population levels at intervals along ONR trac from Cochrane north to district boundary, and in Kirkla Twp south of Smooth Rock Falls					
1962	high population levels in Newman Twp, and light damage in Pinard Twp				
1963	increased population levels along ONR tracks from Homuth Twp to district boundary				
1964	Pockets of heavy infestations persisted along ONR tracks from Homuth Twp to district boundary.				
1965	pockets of severe defoliation in Adanac Twp, and light defoliation in Webster and Homuth twps				
1966	light defoliation in Adanac Twp and moderate defoliation along the hydro development road north of Smooth Rock Falls				
1967	not reported				
1968	light population levels in Fournier and Calder twps				
1969-1973	not reported				
1974	low numbers obtained in beating tray samples				
1975	trace levels obtained in Potter and Homuth twps				
1976-1980	not reported				

### Redheaded Jack Pine Sawfly, Neodiprion virginianus complex

Host(s):	jP	[Major]

Year	Remarks
1950	trace populations in southern part of district
1951-1952	not reported
1953	light infestations on Twin Islands in lower Abitibi Lake, and moderate foliar damage near Montieth in Clergue Twp
1954	moderate-to-heavy defoliation of single trees in Stimson
1955	low population levels in Marathon and trace levels in Stimson, Hepburn and Bonis twps
1956	jack pine windbreaks lightly defoliated in Newmarket Twp
1957	light infestations on windbreak trees in Newmarket Twp and in a jack pine stand in Purvis Twp
1958	Population levels increased. Severe defoliation occurred in Purvis Twp and moderate defoliation in Newmarket Twp.
1959	Severe defoliation occurred in Newmarket Twp, and light defoliation in Bonis Twp.
1960	Severe defoliation of jack pine trees continued in Newmarket Twp and at many points along the ONR tracks from Avon Twp north to the district boundary.
1961	small pockets of severe defoliation along the ONR tracks in Pinard and Parliament twps; trace populations elsewhere in the district
1962	Population levels in Parliament and Pinard twps subsided. A small pocket of light defoliation occurred in Fournier Twp.
1963-1965	low population levels in the district
1966	not reported
1967	light defoliation in Clergue and Fournier twps

Redheaded Jack Pine Sawfly, Neodiprion virginianus complex (concl.)

Host(s): jP [Major]

Year	Remarks			
1968-1969	low population levels in the district			
1970-1971	not reported . Inlings FM 2			
1972	light population levels in Avon and Clute twps			
1973-1976	not reported			
1977	light defoliation at widely scattered points in the district			
1978-1980	trace population levels and box wandqua .commute			

Pine Sawflies, Neodiprion pratti banksianae Roh., N. nanulus nanulus Schedl.

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Host(s): pine [Major]

Year		Re Re	ema	arks compo notakila an apassa
1950-1953	N	banksianae	-	not reported
1950-1952	N.	nanulus nanulus		not reported
1953			-	light infestation causing 5% defoliation in Kirkland Twp
1954		banksianae nanulus nanulus		light defoliation in Steele Twp trace levels, Abitibi Lake area
1955	N.	banksianae	-	low population levels in Clive and Bonis twps
1955-1959	N.	nanulus nanulus	-	not reported
1956	N.	banksianae	-	low population levels

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

Year	Remarks
1957-1959	N. banksianae - not reported
1960	N. banksianae - light infestation in the Nellie
1960	N. nanulus nanulus - light damage in Calvert Twp
1961	N. banksianae - trace population levels in Dun- donald Twp
1961	N. nanulus - Populations remained light in Calvert Twp.
1962	N. banksianae - trace population levels
1962	N. nanulus - not reported
1963	N. banksianae - not reported
	N. nanulus nanulus - Light infestations occurred in Calvert, Dundonald and Clergue twps.
1964	N. banksianae - trace population levels
	N. nanulus nanulus - trace population levels in Clergue and Dundonald twps
1965	N. banksianae - trace population levels
	N. nanulus nanulus - light foliar damage on scattered trees in Dundonald Twp
1966	N. banksianae - trace population levels in Dundonald Twp
	N. nanulus nanulus - trace population levels
1967-1980	N. banksianae - not reported
1967	N. nanulus nanulus - commonly found in Clergue, Calvert and Dundonald twps
	(cont'd)

Pine Sawflies, Neodiprion pratti banksianae Roh.,
N. nanulus nanulus Schedl. (concl.)

Host(s): Pine

Host(s): aspen

[Major]

[Major]

ing Store author and the

Year Remarks

1968 N. nanulus nanulus - trace population levels

1969-1980 N. nanulus nanulus - not reported

Aspen Leafblotch Miner, Phyllonorycter ontario Free.

principle growing the bar and the same and t

Year Remarks 1 1 1 Editorial Editori

1950 not reported

1951 varying degrees of defoliation throughout the district

1952-1956 not reported

1957 trace levels reported

1958 light defoliation in the district

1959 not reported

low population levels throughout the southern and central parts of the district and as far north as Valentine Twp

along the ONR tracks

1961 low population levels at scattered points

high population levels in the Smooth Rock Falls area and

at several areas in Haggart Twp

high population levels in the western parts of the

district and areas around Abitibi Lake

low populations in Pitt Twp in the northern part of the

district

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

Year	Remarks
1965	severe defoliation north of Smooth Rock Falls in Homuth Twp; low population levels elsewhere in the district
1966	Population levels decreased. Defoliation decreased from severe to moderate in the Smooth Rock Falls area.
1967-1969	light foliar damage in the district
1970	not reported
1971	severe defoliation in Clute Twp and moderate defoliation in Potter Twp
1972-1973	varying degrees of defoliation at numerous locations
1974	severe defoliation at many points in ane district
1975-1977	high population levels reported in the district
1978-1979	not reported
1980	light leaf mining observed in the district
Yellowheaded S	pruce Sawfly, Pikonema alaskensis (Roh.)
Host(s): spru	ce [Major]
Year	Remarks
1950	low populations levels at numerous points
1951	approximately 20 trees severely defoliated in Kendrey Twp; light defoliation reported in Dargavel, Mabee and Aubin twps
1952	moderate-to-severe defoliation of ornamental and hedgerow trees in the town of Smooth Rock Falls
	(cont'd)

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

Year	Remarks
1953	moderate-to-severe defoliation of ornamental trees in Hanna Twp
1954	light defoliation along the ONR tracks north of Cochrane
1955	light defoliation in Brower and Pyne twps
1956	severe defoliation in a 1.6-ha white spruce plantation north of Cochrane in Blount Twp; moderate defoliation in Avon and Pinard twps
1957	The heavy infestation in Blount Twp declined to medium intensity. Heavy foliar damage was recorded in Thorning and Marven twps, and moderate damage in Fox and Brower twps.
1958	Population levels were comparable to those of 1957.
1959	Population levels remained high in several areas. Severe defoliation occurred at numerous points along the ONR tracks between Cochrane and Moosonee and light-to-moderate defoliation along the town line in Leitch and Blount twps.
1960	heavy infestations along the ONR track in Pinard and Parliament twps
1961	In Finard and Parliament twps population levels along the ONR tracks declined to light infestations.
1962	trace population levels in Pinard and Parliament twps; light-to-moderate population levels observed in Fox, Brower and Kennedy twps
1963	Population levels in Fox, Brower and Kennedy twps collapsed.
1964-1965	light damage at Greenwater Provincial Park in Colquhoun Twp
1966	severe defoliation in a white spruce plantation in Calder Twp; varying degrees of defoliation in the Cochrane and Smooth Rock Falls areas

Remarks

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

Year

1950

1957

1951-1956

	Account to the second to the s
1967-1970	Heavy infestations occurred in a white spruce plantation in Calder Twp and there was moderate damage in Greenwater Lake Provincial Park in Colquhoun Twp. Severe defoliation was also reported in the Cochrane and Smooth Rock Falls areas.
1971	Population levels in Calder and Colquboun twps declined to low levels. Varying degrees of foliar damage occurred at scattered points in the district.
1972-1973	low population levels in the district
1974-1975	severe defoliation of open-grown white spruce trees in Cochrane and Smooth Rock Falls areas
1976	severe defoliation in a 2.5-ha white spruce plantation east of Driftwood
1977	Severe defoliation continued in the plantation at Driftwood.
1978	severe defoliation in Calder Twp and at Driftwood
1979	Populations declined to low levels in the Calder Twp and Driftwood areas.
1980	low population levels at scattered points
White Pine Weev	il, Pissodes strobi (Peck)
Host(s): pine,	spruce [Major]
Year	Remarks

trace population levels in Teefy Twp

caused 24% leader damage in a black spruce plantation in

not reported

Steele Twp

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

Year	Remarks
1958	low population levels at widely scattered points
1959	A light infestation occurred on five open-grown black spruce trees in Blount Twp. Trace populations also occurred along the ONR tracks from Cochrane north to the district boundary.
1960	Damage to leaders ranged from 4 to 11% in three townships.
1961	Damage to leaders ranged from 5 to 9% in four townships.
1962	an average of 10% leader damage in four townships
1963-1980	low population levels in the district, with leader damage averaging 1-5%

Larch Sawfly, Pristiphora erichsonii (Htg.)

Host	(s):	1	larc	h	

[Major]

Year	Remarks
1950-1951	not reported
1952	low population levels in Leitch, Brower, Clute and Sydere twps
1953	Heavy infestations occurred along the ONR tracks from Homuth Twp north to the district boundary.
1954-1955	Population levels increased at numerous points.

## Larch Sawfly, Pristiphora erichsonii (Htg.) (cont'd)

Year	Remarks
1956	severe defoliation throughout most larch stands in the central part of the District and north along the ONR tracks to the district boundary
1957-1958	varying degrees of foliar damage at numerous locations
1959	Moderate-to-severe defoliation occurred along the ONR tracks from Clute Twp north of the district boundary. Varying degrees of defoliation occurred at widely scattered points.
1960	Severe defoliation occurred along the ONR tracks from Parliament Twp north to the district boundary. Elsewhere in the District population levels were light.
1961	not reported
1962	Defoliation was generally light throughout the District except for a small pocket of heavily infested trees in Parliament Twp.
1963-1964	not reported
1965	There was severe defoliation in Heighington Twp. Elsewhere in the District infestations were light and were restricted to single trees or groups of trees.
1966	low populations in the district
1967	severe defoliation in McQuibban, Newman and Seguin twps; light defoliation elsewhere in the district
1968	severe defoliation in Heightington Twp
1969	trace-to-light infestations in the district
1970	scattered pockets of heavy damage in areas east of Lake Abitibi to the Quebec border
1971-1973	low populations in the district
1974-1975	light-moderate defoliation observed along the Wade Lake road

#### Larch Sawfly, Pristiphora erichsonii (Htg.) (concl.)

Year	Remarks
1976	moderate-to-severe defoliation common throughout the district
1977	moderate damage at scattered points along the Wade Lake road
1978-1980	low population levels in the district

Mountain-ash Sawfly, Pristiphora geniculata (Htg.)

Host(s): aMo	[Major]
nost(s). and	[IId Jot ]

Vaar	Remarks
1950-1961	not reported
1962	found for the first time in the District; light defoliation at scattered points in the Abitibi Lake area
1963	not reported
1964	Light foliar damage occurred north of Abitibi Lake in Challies Twp and to the west in Leitch Twp.
1965	low populations at 17 locations in the district
1966	moderate foliar damage in Bonis Twp and light damage in St. Laurent and Clive twps
1967-1968	Moderate foliar damage occurred in Scapa, Hepburn and Adair twps.
1969	varying degrees of foliar damage in the areas north of Abitibi Lake and west of Cochrane
1970	severe foliar damage in Scapa and Steele twps
1971	individual trees severely defoliated at widely scattered points

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

Year	Remarks
1972-1973	high population levels at widely scattered locations
1974	high population levels from Smooth Rock Falls to Kipling Dam and along the Wade Lake road to the Quebec border
1975	not reported
1976	Severe damage occurred along highways and in the town of Cochrane.
1977	Moderate foliar damage occurred along the Wade Lake and Quebec border roads
1978-1980	high population levels at widely scattered points

#### Ambermarked Birch Leafminer, Profenusa thomsoni (Konow)

Host(s):	birch [Major]
Year	Remarks
1950-1955	not reported
1956	trace population in the district
1957	not reported
1958	low population levels at Genier north of Cochrane
1959	pockets of severe foliar damage in the Porquis Junction area
1960	severe browning of foliage in the town of Cochrane, and in the southern part of the district
1961	high population levels in the town of Cochrane, in the Withington Lake area in Mortimer Twp, and north near Coral Rapids in Pitt Twp

### Ambermarked Birch Leafminer, Profenusa thomsoni (Konow) (concl.)

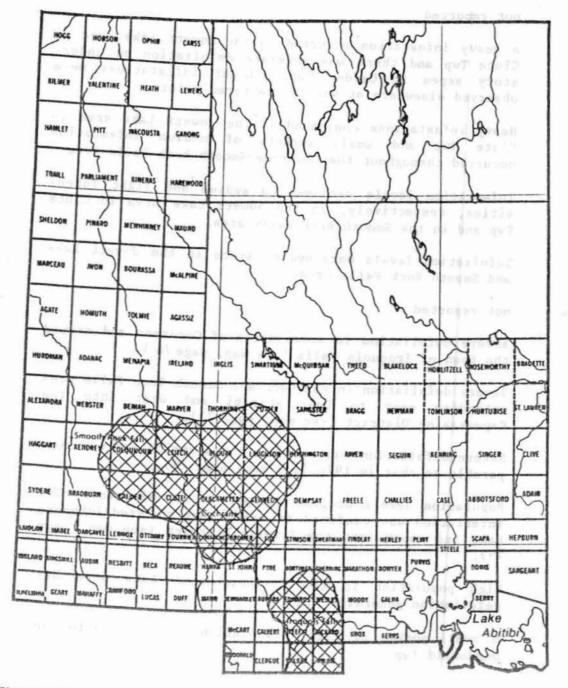
Year	Remarks was not talinged its in
1962	High population levels continued throughout the district. Severe defoliation persisted in the town of Cochrane, in the Withington Lake area in Mortimer Twp, and at severeal points around the west end of Abitibi Lake and north in Pitt Twp.
1963	high population levels in the Waddington and Abitibi lakes areas
1964	Population levels declined to moderate in the Waddington and Abitibi lakes areas.
1965	light population levels in the Abitibi Lake area and light-to-moderate foliar damage in areas northwest of Cochrane and Smooth Rock Falls
1966	There was a decline in population levels. High populations were restricted to small open-grown trees in Purvis Twp and north to Smooth Rock Falls.
1967	Pockets of heavy infestations occurred west of Harris Lake, north of Smooth Rock Falls to Abitibi Canyon and west to Mortimer Twp.
1968	High populations continued. Severe defoliation occurred between Harris Lake and Abitibi Canyon. Pockets of light-to-moderate defoliation were common in the central and northern sections of the district.
1969	There was severe defoliation in the Abitibi Canyon-Abitibi Lake area. Infestations declined to low intensities in the southern and eastern parts of the distict.
1970	Populations of this insect declined to low levels in the district.
1971-1972	trace-to-low population levels in the district
1973-1976	not reported
1977	commonly found on regeneration
1978	not reported
1979-1980	trace-to-low population levels in the district

Aspen Leafroller, Pseudexentera oregonana Wlshm.

Host(s): poplar

[Major]

Year	Remarks
1950-1964	not reported
1965	A heavy infestation occurred in the Jowett Lake area in Clute Twp and there was moderate defoliation on understory aspen in Calder Twp. Light infestations were observed elsewhere at widely scattered points.
1966	Heavy infestations continued in the Jowett Lake area in Clute Twp and small pockets of medium infestation occurred throughout the Cochrane-Smooth Rock Falls area.
1967	Infestation levels declined to medium and light intensities, respectively, in the Jowett Lake area in Clute Twp and in the Smooth Rock Falls area.
1968	Defoliation levels declined to trace in the Jowett Lake and Smooth Rock Falls area.
1969-1974	not reported
1975	severe defoliation in areas north of Cochrane and around the town of Iroquois Falls (see map, page 76).
1976	Severe defoliation in the Cochrane-Smooth Rock Falls area extending east to Lake Abitibi and west into the Kapuskasing District (see map, page 77).
1977	Severe defoliation continued in the district and was comparable to that in 1976 (see map, page 78).
1978	Population levels dropped sharply in the district. The infestation was confined to areas east of Fredrickhouse Lake and south into the Timmins District (see map, page 79).
1979	high population in the Frederickhouse Lake area but defoliation generally light
1980	a small pocket of light infestation at one location in Dundonald Twp



ASPEN LEAFROLLER (P. oregonana)

Areas within which defoliation occurred in 1975

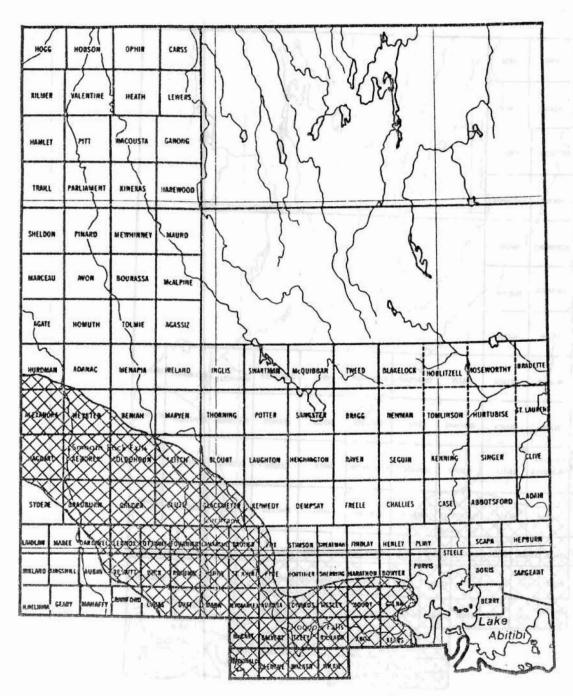
LEGEND

KM 40 SCALE

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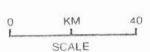


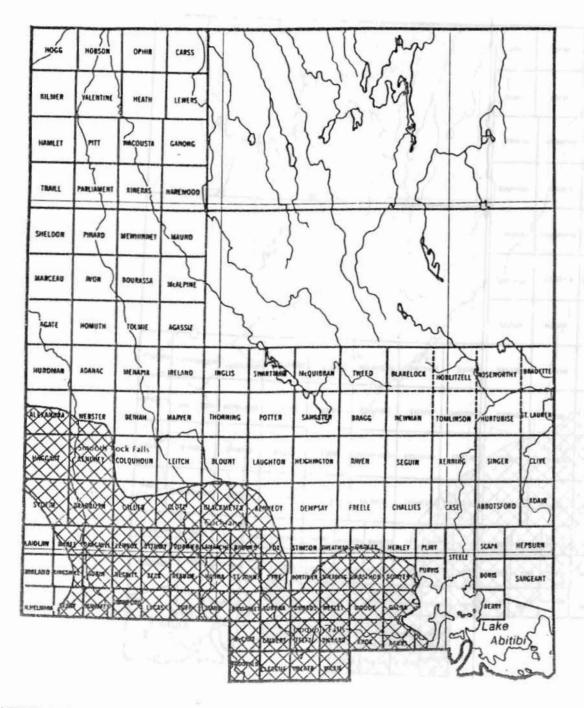
ASPEN LEAFROLLER (P. oregonana)

eas within which defoliation curred in 1976

LEGEND

derate-to-severe defoliation





ASPEN LEAFROLLER (P. oregonana)

Areas within which defoliation occurred in 1977

LEGEND

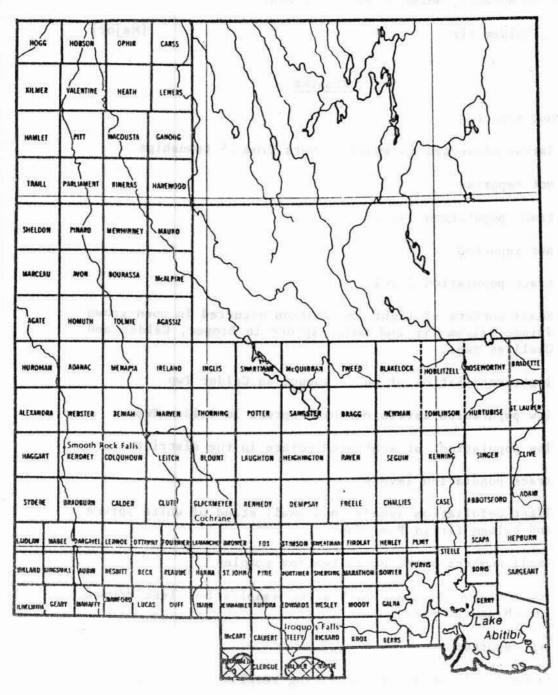
Moderate-to-severe defoliation



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ASPEN LEAFROLLER (P. oregonana)

KM 40 SCALE

Areas within which defoliation occurred in 1978

LEGEND

Moderate-to-severe defoliation



#### Other Noteworthy Insects

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

Host(s): spruce, balsam fir

[Major]

Year	Remarks
1950	not reported
1951	larvae collected in small numbers from 15 townships
1952-1953	not reported
1954-1955	trace population levels
1956	not reported
1957-1959	trace population levels
1960	Small pockets of light infestation occurred in open-grown fringe balsam fir and white spruce in Brower, Calder and Challies twps.
1961	light defoliation of white spruce in Calder Twp
1962	low population levels on white spruce in Calder Twp
1963	low populations at scattered points in the district
1964	trace population levels
1965-1966	light defoliation levels in a small stand of white spruce and balsam fir in Pyne Twp
1967	small numbers obtained in beating samples
1968	low numbers obtained in beating samples but less common in subsequent years
1969	not reported
1970	trace levels obtained in beating samples
1971	low population levels at scattered points
1971-1980	not reported

Birch Sawfly, Arge pectoralis (Leach)

Host(s): birch

[Major]

Year	Remarks
1950	low populations on islands in southern parts of Abitibi Lake
1951	trace population levels on islands in Abitibi Lake area
1952	light defoliation on shoreline trees in Galna and Kerrs twps
1953	light infestation on Sand Point in Galna Twp
1954	low population levels in District
1955	medium infestation observed in Lamarche Twp; light defoliation elsewhere
1956	moderate-to-severe defoliation in Dundonald Twp
1957	light defoliation in Dundonald Twp
1958-1960	trace population levels
1961-1980	not reported

Larch Casebearer, Coleophora laricella (Hbn.)

Host(s): larch

[Major]

Year	Remarks		
1950-1953	not reported		
1954	trace levels in Clergue Twp		
1955-1964	not reported		
1965	small numbers found in Calvert, twps	Lamarche and	Fournier

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

Host(s): larch

[Major]

Year	Remarks
1966	light infestation in a tamarack swamp south of Iroquois Falls in Calvert Twp
1967-1969	light defoliation in Calvert Twp; trace levels in Clute and Haggart twps
1970	low population levels in Calvert Twp
1971-1977	trace population levels in Clute and Haggart twps
1978	not reported
1979	trace population levels in Calder Twp
1980	trace population levels in Fournier Twp
1980	trace population levels in the District, with counts of larval cases ranging from 1.7 to 3.4 per 46-cm branch tip

Jack Pine Tip Beetle, Conophthorus banksianae McPherson

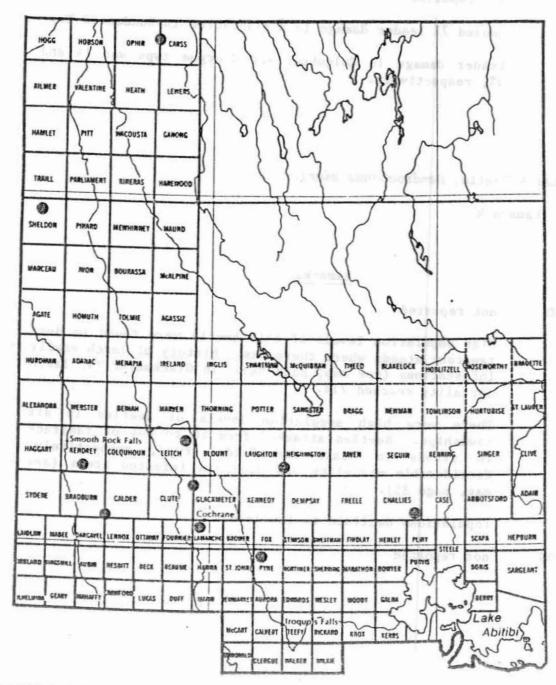
Host(s): jP

[Minor]

Year	Remarks
1950-1960	not reported
1961-1962	low population levels in the district
1963-1966	light infestations at widely scattered points, extending north to Valentine Twp
1967-1968	trace levels reported
1969-1972	not reported
1973	moderate shoot damage near Porquis Junction

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

Year	Remarks
1974-1978	not reported
1979	caused 7% leader damage in a plantation in Dundonald Twp
1980	Leader damage in Colquhoun and Clergue twps was 14 and 3%, respectively.
Eastern L	arch Beetle, Dendroctonus simplex Lec.
Host(s): [Minor]	tanarack
Year	Remarks
1950-1960	not reported
1961	High population levels of this beetle were found in dead tamarack stands where there was a history of larch sawfly infestations (see map, page 84). In Glackmeyer Twp larch mortality reached 71%.
1962	There were high population levels of beetles in six townships. Beetles attacked from 10 to 80% of tamarack in stands in Adair and Calder twps, respectively. Considerable mortality was noted in infested areas (see map, page 85).
1963	Populations declined to low levels.
1964-1980	not reported



## EASTERN LARCH BEETLE

Areas within which collections were made in 1961

KM 40 SCALE

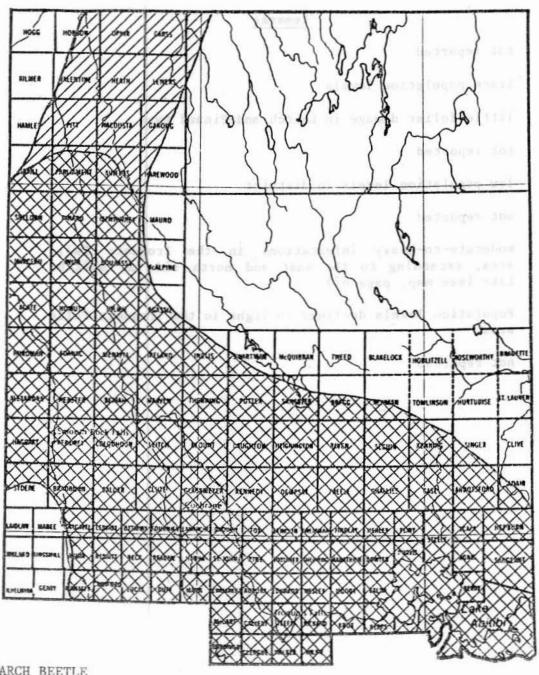
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EASTERN LARCH BEETLE

<sup>
§</sup> Within which tree mortality Wred in 1962

SCALE

LEGEND

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Aspen Twoleaf Tier, Enargia decolor (Wlk.)

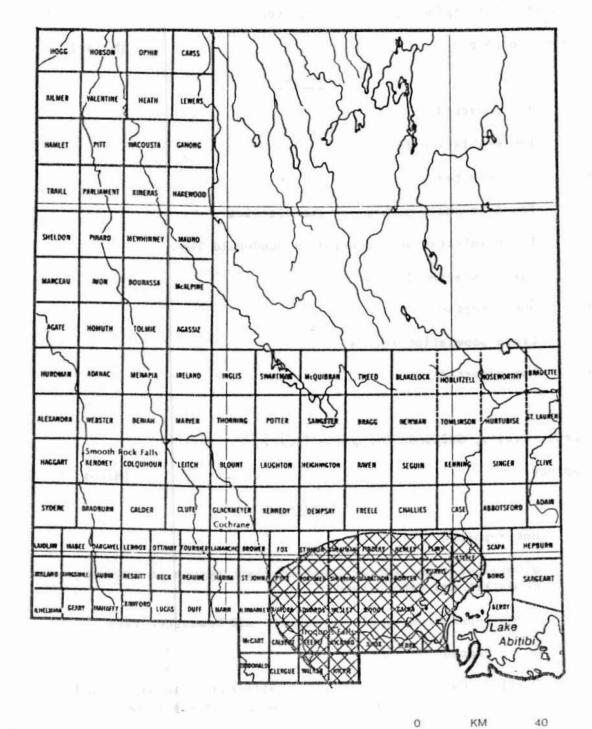
Host(s): poplar

[Major]

Year	Remarks
1950-1959	not reported
1960-1961	trace population levels
1962	little foliar damage in Leitch and Pinard twps
1963	not reported
1964	low population levels in district
1965-1969	not reported
1970	moderate-to-heavy infestations in the Iroquois Falls area, extending to the east and north side of Abitibi Lake (see map, page 87)
1971	Population levels declined to light in the Iroquois Falls area.
1972-1980	not reported

Areas t

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SCALE

ASPEN TWOLEAF TIER

Areas within which defoliation occurred in 1970

LEGEND

Moderate-to-severe defoliation



Birch Aspen Leafroller, Epinotia solandriana Linn.

Host(s): bin	rch, poplar	[Major]
Year	Remarks	
1950-1955	not reported	
1956	low population levels	
1957-1958	not reported	
1959	found in small numbers in the district	
1960	Light infestations occurred in Dundonald	Twp.
1961	low population levels	
1962-1963	not reported	
1964	trace population levels	
1965-1980	not reported	
European Spri	uce Sawfly, Gilpinia hercyniae (Htg.)	
Host(s): spi	ruce	[Minor]
Year	Remarks	
1950	not reported	
1951	a total of eight larvae found on black sp Newmarket and Aurora twps	oruce in Calvert,
1952	trace population levels in Calvert and Ne	ewmarket twps
1953-1959	not reported	
1960	Small numbers of larvae were collected black spruce trees in the central and sthe district.	
1961	a total of 35 larvae collected from B. Newmarket twps	lount, Hanna and
		(cont'd)

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

Year	Remarks
1962	a total of 48 larvae collected from black and white spruce in Leitch, Hanna, Teefy and Calvert twps
1963	a total of 39 larvae collected in four townships
1964	trace population levels; a total of five larvae collected in four townships
1965	occurred commonly in beating tray samples in the Cochrane-Smooth Rock Falls area
1966	a total of 40 larvae collected in four townships
1967-1968	trace population levels in the district
1969	low population levels in areas north of Little Abitibi Lake
1970-1971	not reported
1972-1973	low population levels in Haggart and Clute twps
1974-1980	not reported

American Aspen Beetle, Gonioctena americana (Schaef.)

Host(s): poplar

Year	Remarks	
1950	not reported	
1951	low population levels reported in 15 townships	
1952	severe defoliation of small-diameter trees along Hwy 67	
1953	not reported	
1954-1958	low populations at numerous points in the district	
	(cont'd)	

[Major]

### American Aspen Beetle, Gonioctena americana (Schaef.) (concl.)

Year	Remarks
1959	severe defoliation of small single trees in Glackmeyer, Ottaway and Freele twps
1960	trace-to-light defoliation along the ONR tracks between Cochrane and the district boundary
1961	light defoliation of open-grown trees in the Cochrane-Smooth Rock Falls area
1962-1964	low population levels in the district
1965	light infestation on mature trees near Smooth Rock Falls; trace levels elsewhere in the district
1966	light-to-moderate defoliation in the Abitibi Limits south of Smooth Rock Falls and north to the Fraserdale area
1967-1972	not reported
1973	moderate defoliation at scattered points in the district
1974-1980	not reported

Fall Webworm, Hyphantria cunae (Dru.)

Host(s): deciduous

[Major]

Year	Remarks
1950-1953	not reported
1954	light foliar damage in Edwards, Mortimer and Mann twps
1955-1956	not reported
1957	trace population levels at widely scattered points
1958	numerous tents observed in Edwards and Mortimer twps
1959	not reported

Fall Webworm, Hyphantria cunae (Dru.) (concl.)

<u>Year</u> Remarks

1960 trace levels reported

1961-1980 not reported

Pine Engraver, Ips pini (Say)

Host(s): pine [Major]

Year Remarks

1950-1961 not reported the land to the lan

1962 heavy infestations in a red pine plantation in the

Abitibi Power and Paper Company limits in Dempsay Twp

1963 Populations of the beetle declined to low levels in

Dempsay Twp.

1964 trace levels in Abitibi Lake area

1965-1980 not reported

Northern Pitch Twig Moth, Petrova albicapitana (Busck.)

Host(s): jP [Minor]

Year seek and the small and the Remarks with the seek

1950-1955 not reported

1956 trace population levels

1957 There was heavy damage to shoots in Newmarket Twp.

Approximately 60% of the trees were attacked. Light dam-

age was noted in Dempsay Twp north of Wade Lake.

1958 light shoot damage in Dempsay and Newmarket twps

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

Year	Remarks
1959	low population levels in Newmarket, Hanna, Case and Clive twps
1960	light damage on regeneration in Stimson and Dundonald twps
1961	not reported
1962-1967	light damage at many points in the district
1968-1970	not reported
1971-1980	trace population levels in most natural and planted jack pine stands

#### Spruce Bud Midge, Rhabdophaga swainei Felt

#### Host(s): spruce

[Minor]

Year	Remarks
1950-1959	not reported
1960	trace population levels in Kendrey Twp
1961	trace population levels in Kendrey and Hanna twps; no more than 2% of buds infested.
1962-1963	trace population levels in Stimson, Hanna and Kendrey twps
1964-1966	negative counts obtained in quantitative sample plots in the District
1967	trace population levels at quantitative sample plots in Kendrey, Hanna and Stimson twps
1968-1970	not reported
1971-1974	low population levels
1975-1980	not reported

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Armillaria Root Rot, Armillaria mellea (Vahl: Fr.) Kumm.

Host(s): coniferous

[Major]

Year	Remarks
1950-1962	not reported
1963	commonly found damaging red pine, Dempsay Twp
1964	not reported
1965	light damage reported at widely scattered locations
1966	increased mortality in plantations in Adair Twp
1967-1970	not reported
1971	moderate damage levels in Adanac and Sheldon twps
1972	not reported
1973	light tree mortality in Homuth and Sydere twps
1974-1977	light damage in jack pine plantations in the district
1978	commonly found killing trees in plantations
1979	trace levels of damage in Freele Twp
1980	not reported

Spruce Needle Rusts, Chrysomyrxa 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	
1956	not reported	

### Spruce Needle Rusts, Chrysomyrxa ledi (Alb. & Schwein.) de Bary C. ledicola Peck (Lagerh.) (concl.)

Year	Remarks
1957	trace levels of infection in the district
1958	common in the region
1959	light damage levels at Yesterday and Aubrey lakes, north of Cochrane
1960	severe foliar damage in Abitibi, Cochrane and Evelyn lakes areas
1961-1963	low infestations in the district
1964	low incidence at three locations
1965	light-to-moderate damage in Smooth Rock Falls area
1966	light damage in Smooth Rock Falls area
1967-1969	low levels in the district
1969	trace levels of infection
1970	light infections in Stimson Twp and Smooth Rock Falls areas
1971	not reported
1972	moderate incidence in Potter Twp and high in Steele Twp
1973	severe infections on black spruce in Dargavel and Brad- burn twps
1974	moderate damage levels in Potter and Marathon twps
1975-1977	low levels of infection in district
1978	moderate defoliation in Adanac and Fournier twps and light in Calder Twp
1978-1980	low levels of infection in the district

Ink Spot of Aspen, Ciborinia whetzelii (Seaver) Seaver

Host(s): tA [Major]

Year	Remarks
1950-1958	not reported
1959	light infections in the district
1960	commonly found in the district
1961	moderate damage levels in six townships
1962-1963	severe foliar damage, widespread in the district
1964	light-to-moderate damage in the district
1965	heavy damage in Homuth Twp
1966-1967	severe foliar damage in St. Laurent, Clive and Singer twps
1968	low infection levels in the district
1969	moderate-to-severe infections in Haggart, Leitch and Laughton twps
1970	moderate-to-heavy damage in Smooth Rock Falls, Iroquois Falls and Cochrane areas
1971	light foliar damage in the district
1972-1974	not reported
1975	light damage in the district
1976-1977	not reported
1978	light foliar damage in Fournier Twp
1979	light foliar damage in Hepburn and Leitch twps
1980	light foliar damage in the district

## Sweet Fern Blister Rust, Cronartium comptoniae Arthur

Host(s): jP

[Major]

Year	Remarks
1950-1954	not reported
1955	an average of 40% infections in Calvert and Macklem twps
1956-1957	not reported
1958	light-to-moderate infections in Calvert Twp
1959	not reported
1960	light damage in the district
1961	commonly found in the district
1962	not reported
1963	varying degrees of infections in the southwestern part of the district
1964	not reported
1965-1968	heavy infections near Nellie Lake
1969-1970	no change in levels of infections
1971-1972	high levels of infections at Nellie Lake and Avon Twp
1973	moderate damage levels, Calvert and Aurora twps
1974-1975	not reported
1976-1979	low infections in the district
1980	not reported

Tar Spot Needle Cast, Davisomycella ampla (J. Davis) Darker

Host(s): jP	[Minor]
11036(3).	

Year	Remarks
1950-1959	not reported
1960	light defoliation in the district
1961-1963	not reported
1964	heavy infections along ONR tracks at Fraserville
1965	light foliar damage in Freele Twp
1966	light foliar damage in the district
1967	light foliar damage in Freele and Swartman twps
1968	light foliar damage in Freele Twp
1969-1975	not reported
1976-1978	trace infection levels in the district
1979	trace infections in Dundonald Twp
1980	light foliar damage in the district

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

Host(s): jP [Major]

Year	Remarks	
1950-1961	not reported	
1962	occasional galls found in Challies Twp	
1963	light infections, Stimson Twp	
1964-1970	not reported	

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

Year	Remarks
1971	trace damage levels, McCart Twp
1972	moderate damage levels in Marathon, Moody and Dundonald twps
1973	moderate damage levels in Marathon and light damage in Steele Twp
1974	moderate levels of infection in Avon, Marathon and Steele twps
1975-1976	38% infection, Avon Twp
1977-1979	not reported
1980	low levels of infection at widely scattered points

Scleroderris Canker, Gremmeniella abietina (Lagerb.) Morelet

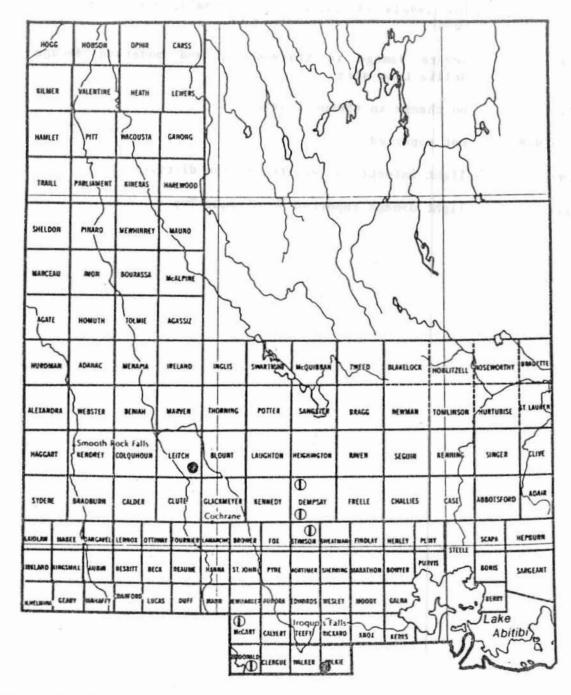
Host(s): pine

[Major]

Year	Remarks
1950-1965	not reported
1966	Severe infections were observed in Dundonald and Dempsay twps and light damage in Leitch Twp (see map, page 102).
1967	Severe infections continued (see map, page 102).
1968	high levels of damage to red pine plantations in McCart
1969	high levels of cankers on jack pine in Stimson and Dundonald twps
1970	light damage reported in Stimson Twp
1971	high levels of damage in Avon Twp

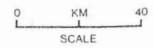
Scleroderris Canker, Gremmeniella abietina (Lagerb.) Morelet (concl.)

Year	Remarks
1972	low levels of damage in Dundonald, McCart and Stims
	twps
1973	severe damage in Stimson Twp and moderate damage : Nellie Lake area
1974	no change in status levels
1975-1978	not reported
1979	light infections reported in the district
1980	light damage reported in Clerque Twp
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#### SCLERODERRIS CANKER

Locations where infections were observed in 1966-1967



#### LEGEND

Several records @

Single record 1

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

Host(s): tA

[Major]

Year	Remarks	
1950-1952	not reported	
1953-1954	low levels in Teefy, Purvis and Boyer twps	
1955	low levels of infection	
1956-1959	not reported	
1960	low levels in the district	
1961	not reported	
1962-1963	extensive damage in the district	
1964-1969	Damage levels remained high.	
1970-1972	not reported	
1973	high damage in Lamarche Twp and light damage in	
1974-1978	light damage in the district	
1979	moderate damage in Hanna Twp	
	DR STORES TOX	
1980	light damage throughout the district	

Larch-poplar Rust, Melampsora medusae Thüm.

Host(s): tL

[Major]

. - 01-1961

Year	Remarks
1950-1962	not reported
1963	light foliar damage in Clute, Kendrey, Colquhoun, Fournier and Lamarche twps

Larch-poplar Rust, Melampsora medusae Thüm. (concl.)

Year	Remarks
1964	not reported
1965	moderate-to-severe foliar damage in Clute, Calder, Lamarche, Calvert and Ogden twps
1966	severe browning of foliage in Clute and Calder twps and light elsewhere in the district
1967	moderate levels of damage in Clute and Calder twps
1968	trace damage levels in Clute and Calder twps
1969	trace damage levels in Clute Twp
1970-1980	not reported
	COLUMN TO SERVE A CHARACT MARKET GOOD COMP.

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

Host(s): tA [Major]

Year	Remarks
1950-1959	not reported
1960	low levels of damage in the district
1961-1962	not reported
1963	low levels of infection in the district
1964	moderate foliar damage in southern part of the district; light damage elsewhere
1965-1967	severe shoot damage in Homuth, Clute and Clerque twps
1968	light infections throughout the district
1969-1973	trace levels of infection observed at widely scattered points

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

Year	Remarks
1974-1975	not reported
1976	heavy shoot mortality in Marathon Twp
1977	light damage at widely scattered points
1978	not reported
1979	light foliar damage at numerous locations
1980	not reported



# ABIOTIC DAMAGE

#### Frost

Host(s): deciduous, coniferous

Year	Remarks
1950-1963	not reported
1964	Early frosts during May and June caused damage to a wide variety of hosts in the district.
1965	light damage reported in white spruce and balsam fir
1966	Light damage occurred on balsam fir in Adair, Heighington and Hepburn twps.
1967	light damage on balsam fir adjacent to Abitibi Lake
1968	severe damage in the central and northern parts of the district
1969-1970	not reported
1977	varying degrees of damage in the district
1978	severe damage to white spruce shoots in Calder and Fournier twps
1979	not reported
1980	severe damage to a wide variety of hosts in the southern part of the district

#### Storms

Host(s): coniferous, deciduous

Year	Remarks
1950-1962	not reported
1963	Heavy sleet caused twig mortality on jack pine in Stimson Twp.

(cont'd)

Storms (concl.)

Host(s): coniferous, deciduous

Year	Remarks
1964-1966	not reported
1967	hail damage to a wide variety of hosts in five townships northeast of Abitibi Lake
1968-1969	not reported
1980	severe snow damage in the southern part of the district

# APPENDICES

#### APPENDIX A

#### DECIDUOUS HOST

Common Name	Scientific Name	Abbreviations
Alder	Alnus spp.	Al
Apple	Malus spp.	Ap
Ash, black	Frazinus nigra Marsh.	As
Aspen, largetooth	Populus grandidentata Michx.	lA
trembling	tremuloides Michx.	tA
Basswood	Tilia spp.	Ва
Beech	Fagus grandifolia Ehrh.	Be
Birch, white	Betula papyrifera Marsh.	wB
yellow	alleghaniensis Britt.	уВ
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.	$\mathrm{mM}$
red	rubrum L.	rM
sugar	saccharum Marsh.	sM
Mountain-ash, American	Sorbus americana Marsh.	aMo
Oak, bur	Quercus macrocarpa Michx.	ю
red	rubra L.	r0
Poplar, balsam	Populus balsamifera L.	bPo
Carolina	eugenei Simon-Louis	сРо
Lombardy	nigra L.	1Po
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. Koc	h tL
Pine, Austria	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

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Page 1980 September 1

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Birch Skeletonizer

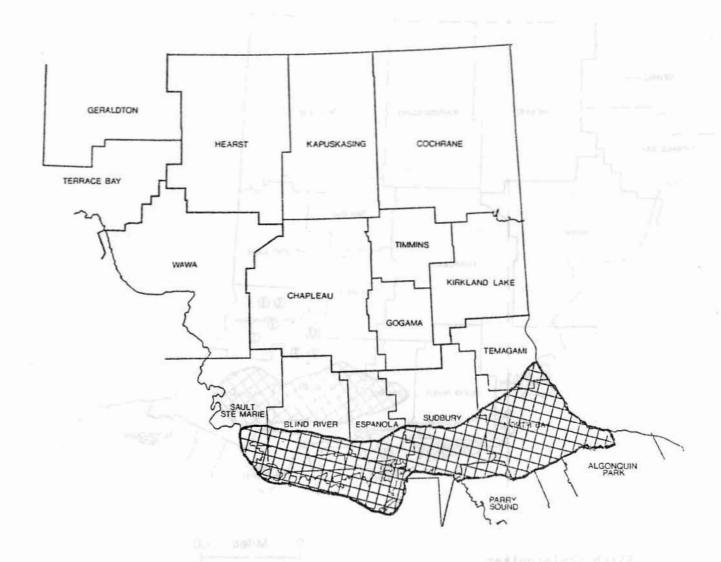
Areas within which defoliation occurred in 1950

LEGEND

Light defoliation (D Moderate-to-severe defoliation



Miles 60 0 Kilometres 96



Birch Skeletonizer

Areas within which defoliation occurred in 1961

0 Kilometres 96

LEGEND

Moderate-to-severe defoliation





Birch Skeletonizer

0 Miles 60 0 Kilometres 96

Areas within which defoliation occurred in 1963

LEGEND

Light defoliation Moderate-to-severe defoliation or



Birch Skeletonizer

Areas within which defoliation occurred in 1970

0 Miles 60 0 Kilometres 96

LEGEND

Moderate-to-severe defoliation or



Birch Skeletonizer

Areas within which defoliation occurred in 1971

Miles 0 Kilometres 96

LEGEND

Moderate-to-severe defoliation





Birch Skeletonizer

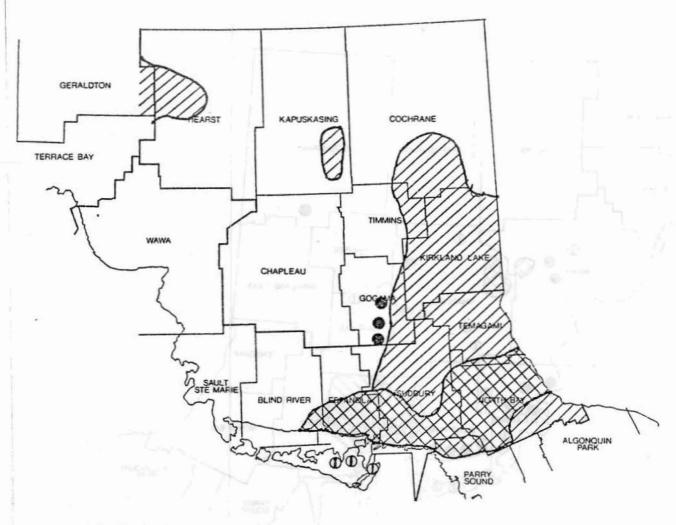
Areas within which defoliation occurred in 1972

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LEGEND

Light defoliation ① or Moderate-to-severe defoliation





Birch Skeletonizer

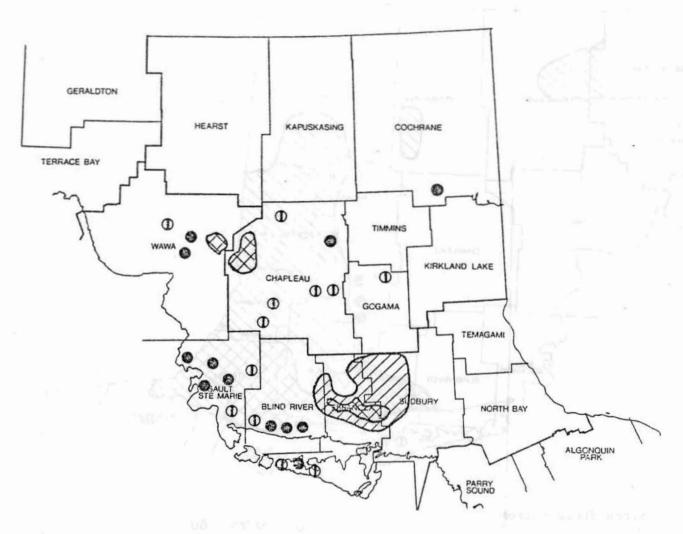
Areas within which defoliation occurred in 1973

LEGEND AS SETUMOUND

Light defoliation ① or 

Moderate-to-severe defoliation ② or

0 Miles 60 0 Kilometres 96



Large Aspen Tortrix

Areas within which defoliation occurred in 1957

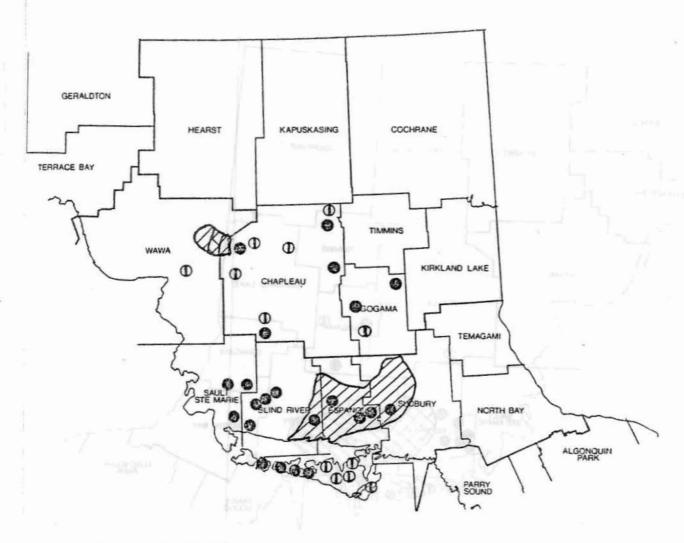
#### O Miles 60 O Kilometres 96

LEGEND

Light defoliation ① or Moderate-to-severe defoliation ② or

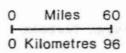
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Large Aspen Tortrix

Areas within which defoliation occurred in 1958

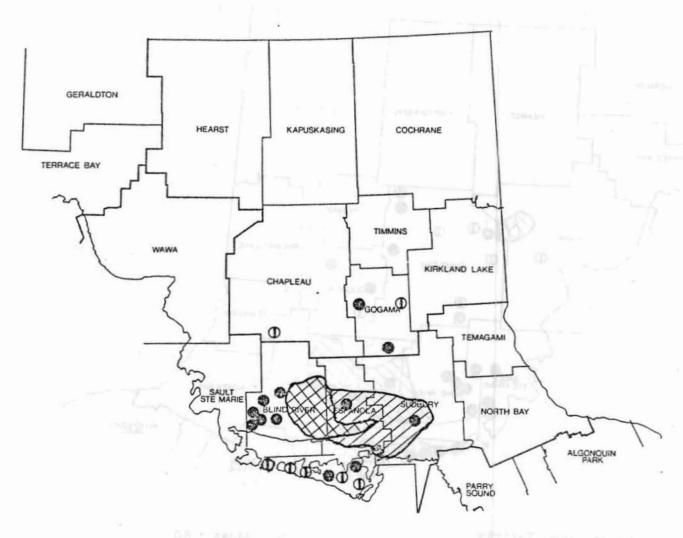


LEGEND

Light defoliation ① or 2000

Moderate-to-severe defoliation ② or





Large Aspen Tortrix

Areas within which defoliation occurred in 1959

Miles 0 Kilometres 96

LEGEND

Light defoliation ① or Moderate-to-severe defoliation or



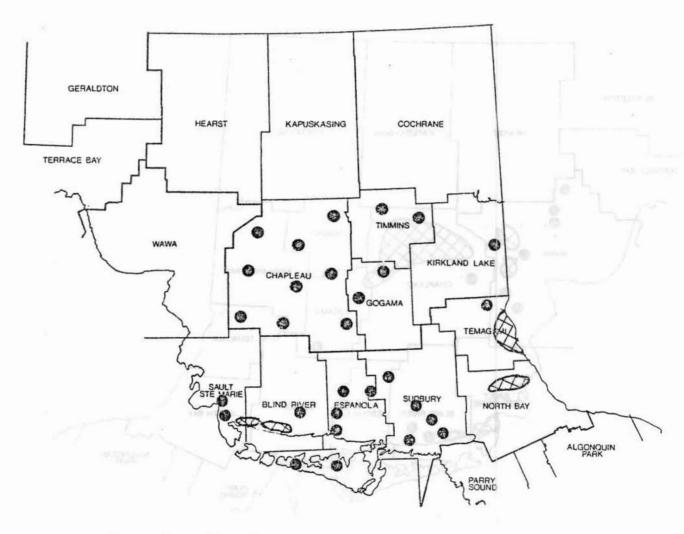


Large Aspen Tortrix

Areas within which defoliation occurred in 1970

LEGEND

Moderate-to-severe defoliation \* or \*\*



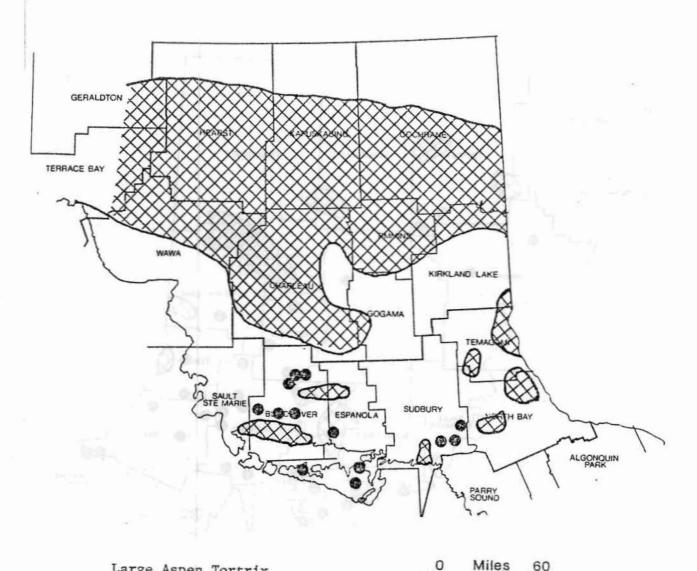
Large Aspen Tortrix

Areas within which defoliation occurred in 1971

0 Miles 60 0 Kilometres 96

LEGEND

Moderate-to-severe defoliation 🔵 or



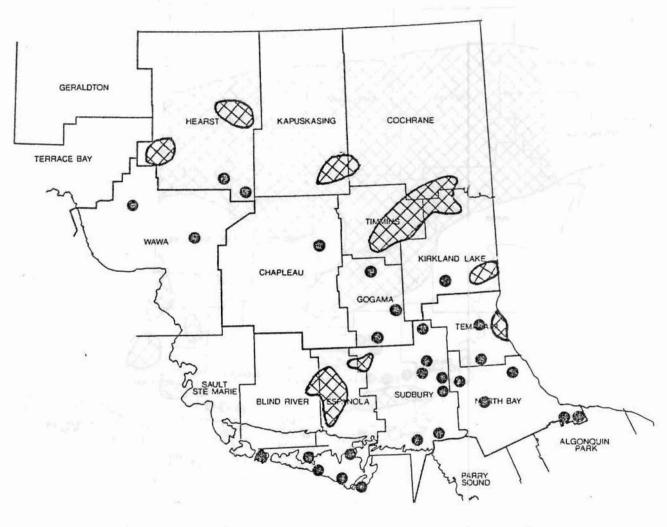
Large Aspen Tortrix

Areas within which defoliation occurred in 1972

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LEGEND

Moderate-to-severe defoliation or

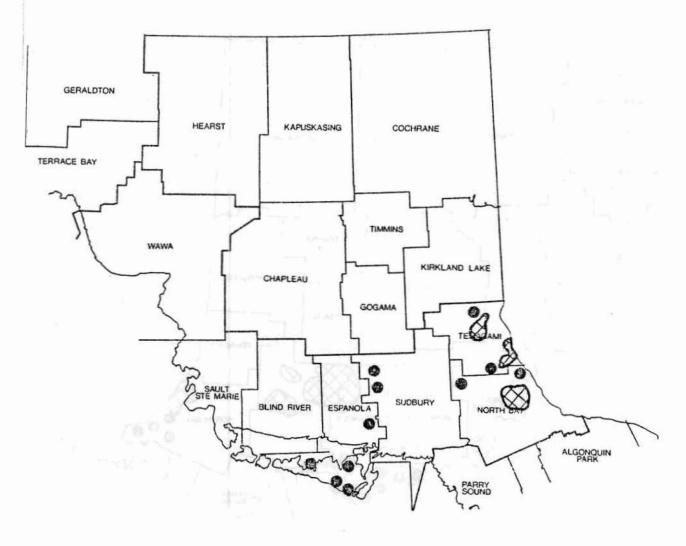


Large Aspen Tortrix

Areas within which defoliation occurred in 1973

LEGEND

Moderate-to-severe defoliation or



Large Aspen Tortrix

Areas within which defoliation occurred in 1974

LEGEND

Moderate-to-severe defoliation 6 or

0 Miles 60 0 Kilometres 96



Large Aspen Tortrix

Areas within which defoliation occurred in 1975

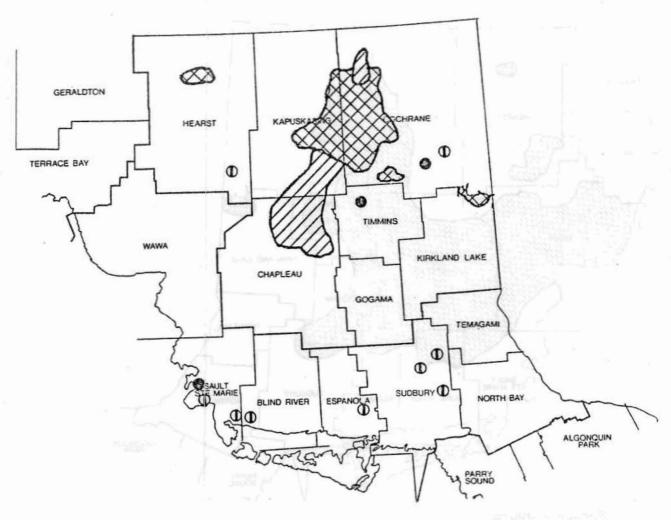
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LEGEND

Moderate-to-severe defoliation o or





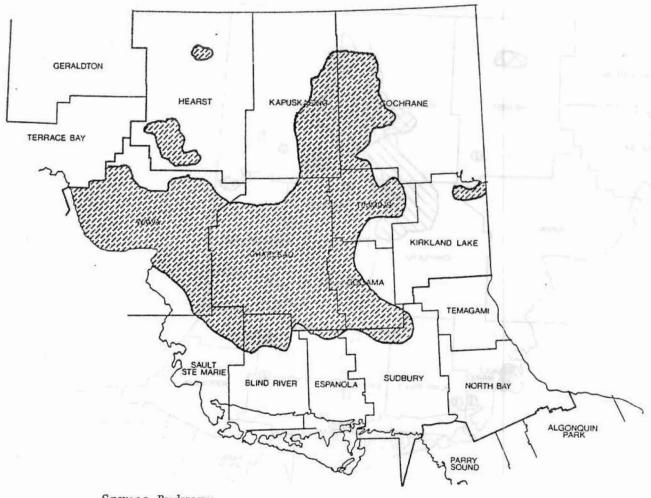


Spruce Budworm

Areas within which defoliation occurred in 1950

LEGEND

Light defoliation ① or Moderate-to-severe defoliation ② or



Spruce Budworm

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

0 Miles 60 1 0 Kilometres 96

LEGEND

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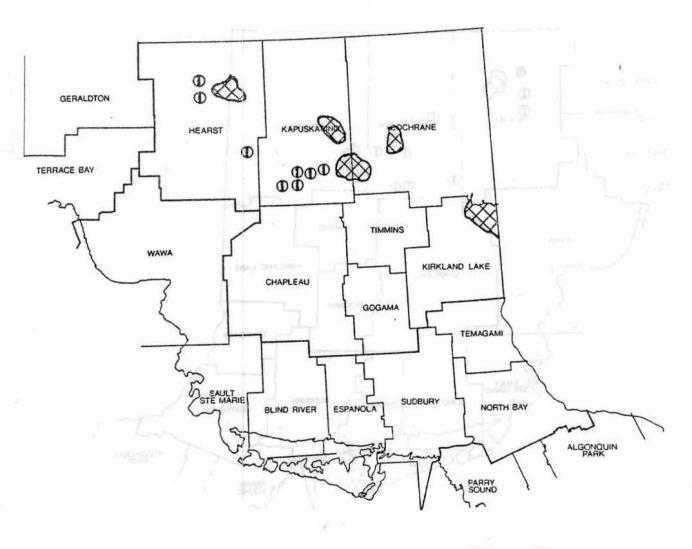


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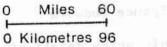
Spruce Budworm

Areas within which defoliation occurred in 1951

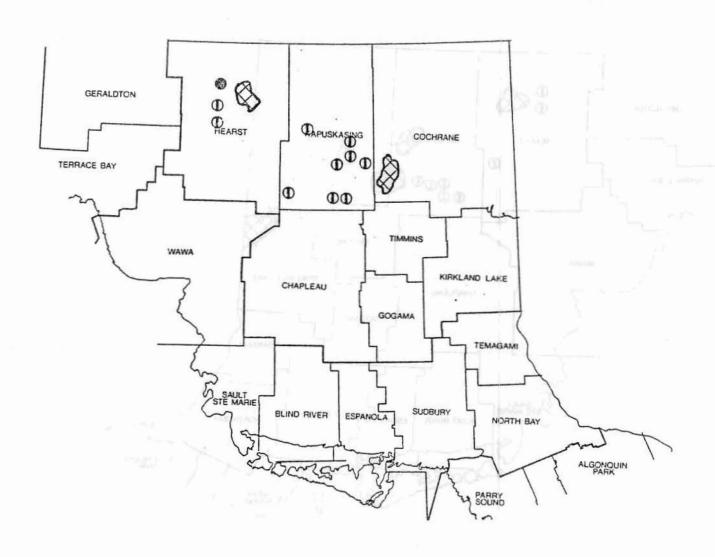
LEGEND

Light defoliation ①

Moderate-to-severe defoliation



# NORTHEASTERN ONTARIO TROM



Spruce Budworm

Areas within which defoliation occurred in 1952

LEGEND

Light defoliation ① Moderate-to-severe defoliation or or

Miles

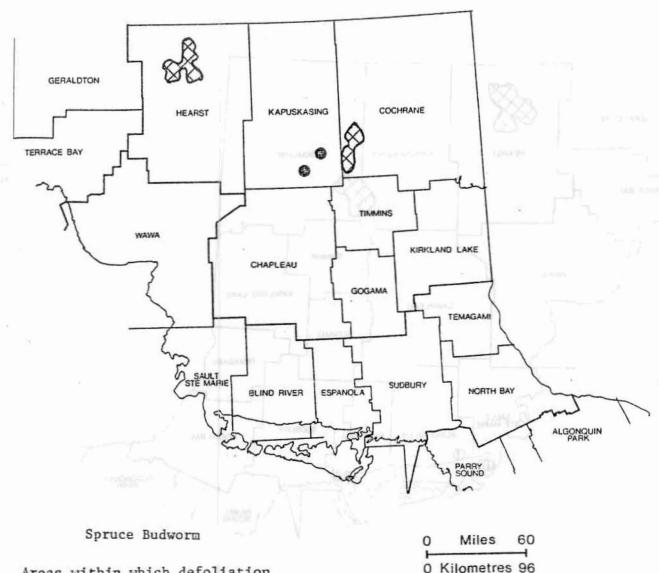
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Areas within which defoliation occurred in 1953

LEGEND . 493 9 molt × 0

Moderate-to-severe defoliation ♠ or ◯◯





Spruce Budworm

Areas within which defoliation occurred in 1954

LEGEND

Light defoliation ① Moderate-to-severe defoliation



0 Kilometres 96

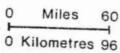


Spruce Budworm

Areas within which defoliation occurred in 1955

LEGEND

Light defoliation ① or



GERALDTON



Spruce Budworm

Areas within which defoliation occurred in 1956

LEGEND

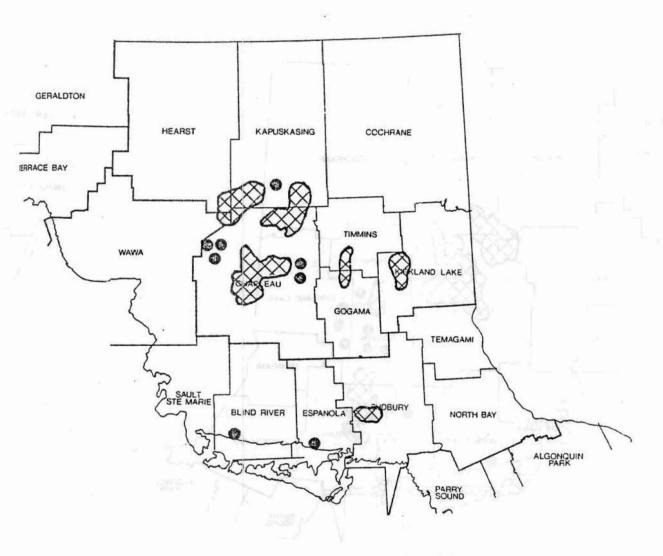
Light defoliation



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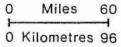


Spruce Budworm

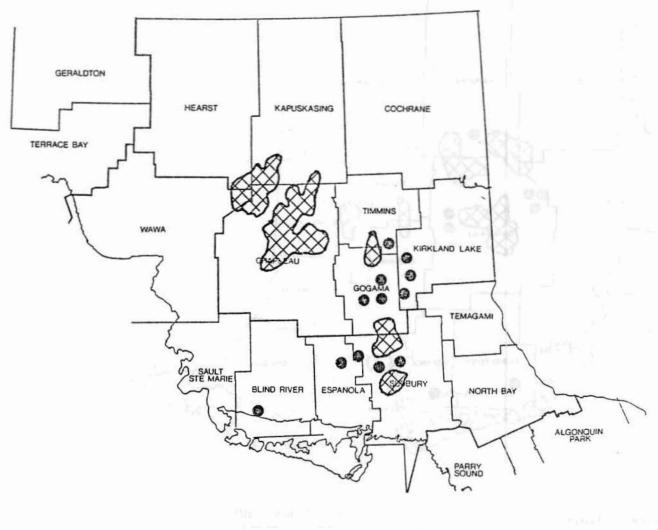
teas within which defoliation curred in 1968

LEGEND

derate-to-severe defoliation 🛭 or







Spruce Budworm

Miles 60 O Kilometres 96

Areas within which defoliation occurred in 1969

LEGEND

Moderate-to-severe defoliation or

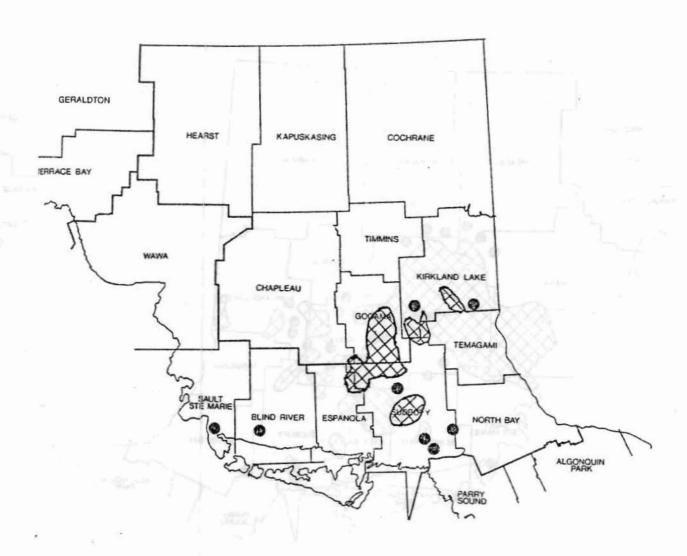


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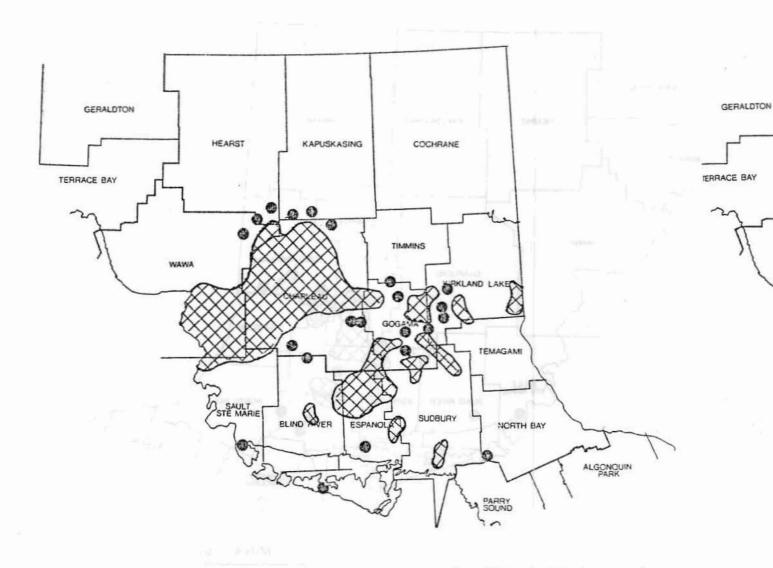
Spruce Budworm

0 Miles 60 0 Kilometres 96

Areas within which defoliation occurred in 1970

LEGEND

Moderate-to-severe defoliation @ or



Spruce Budworm

Miles 60 0 Kilometres 96

Areas within which defoliation occurred in 1971

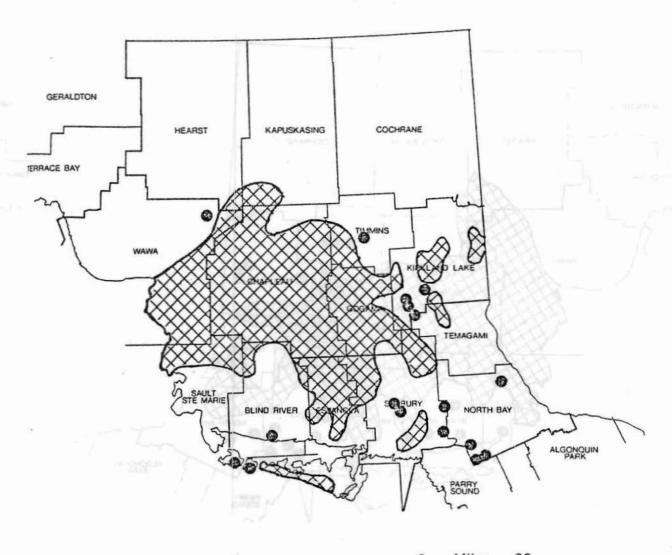
LEGEND

Moderate-to-severe defoliation 🏶 or



Areas occurr

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Spruce Budworm

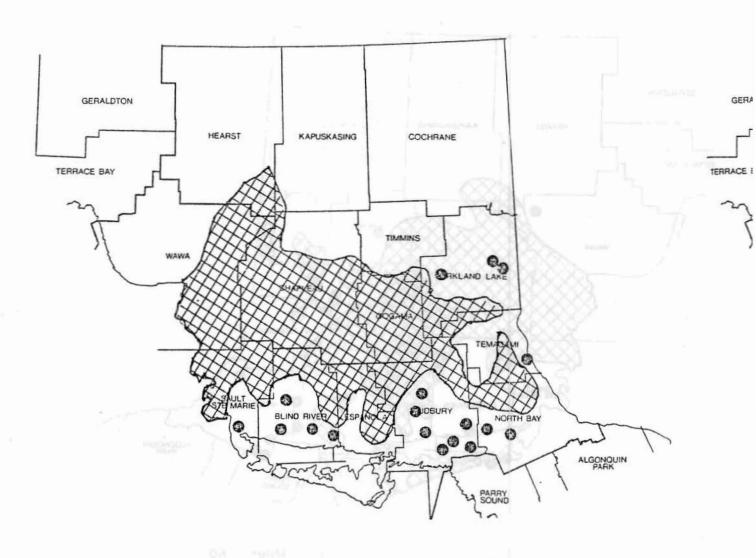
60 Miles 0 Kilometres 96

Areas within which defoliation occurred in 1972

LEGEND

Moderate-to-severe defoliation or or





Spruce Budworm

Areas within which defoliation occurred in 1973

LEGEND

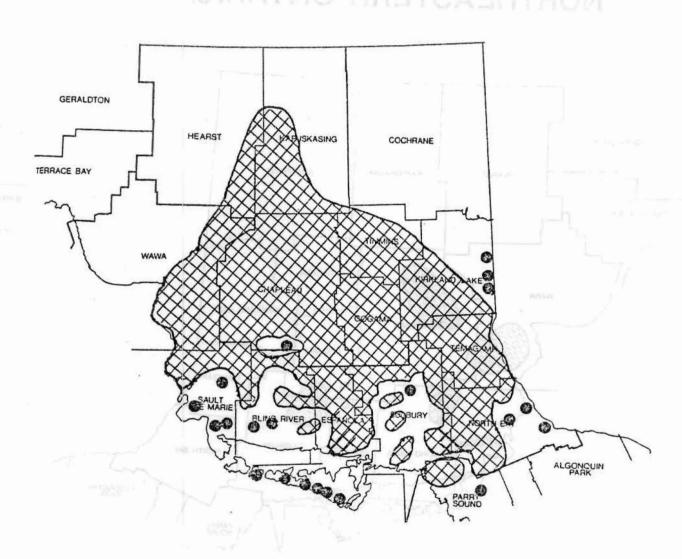
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Spruce Budworm

Areas within which defoliation occurred in 1974

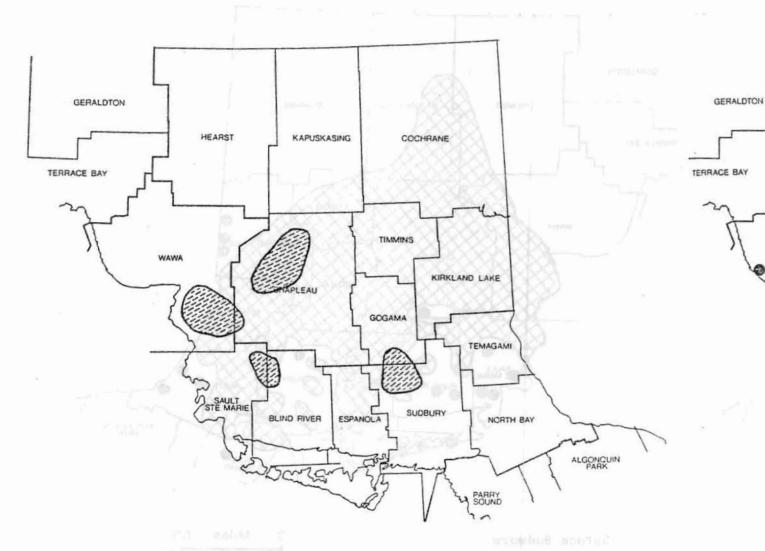
defoliation 0 Kilometres 96

Miles

LEGEND

Moderate-to-severe defoliation 6 or

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Spruce Budworm

Areas within which balsam fir whole tree and top mortality occurred in 1974 O Miles 60
O Kilometres 96

Areas wit

LEGEND

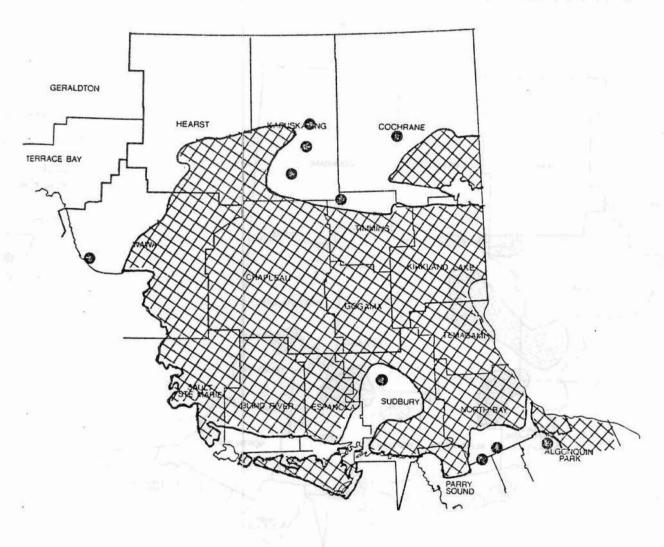
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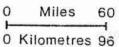


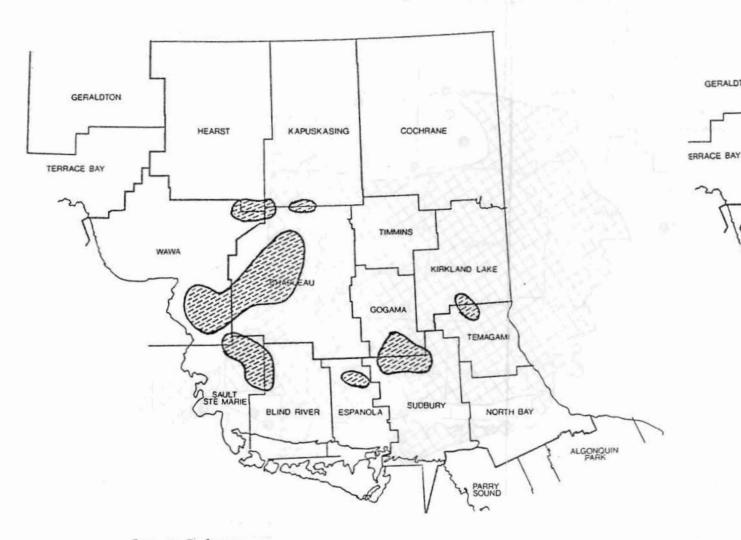
Spruce Budworm

reas within which defoliation

LEGEND

loderate-to-severe defoliation \* or \*\*





Spruce Budworm

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

60 Miles O Kilometres 96

LEGEND

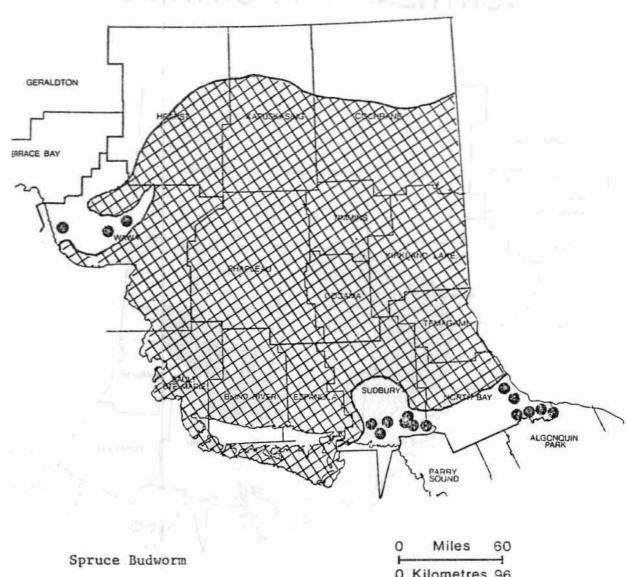
Mortality



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Areas within which defoliation occurred in 1976

LEGEND

Moderate-to-severe defoliation \* or \*\*



Spruce Budworm

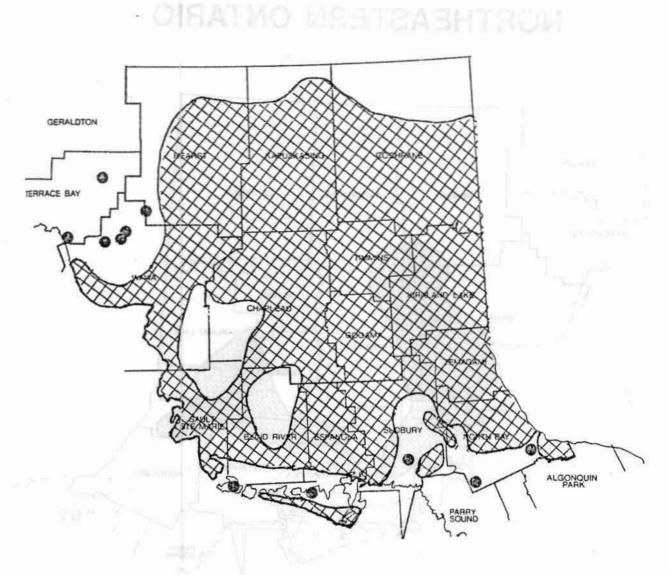
Areas within which balsam fir whole tree and top mortality occurred in 1976

LEGEND

Mortality



0 Miles 60 0 Kilometres 96



Spruce Budworm

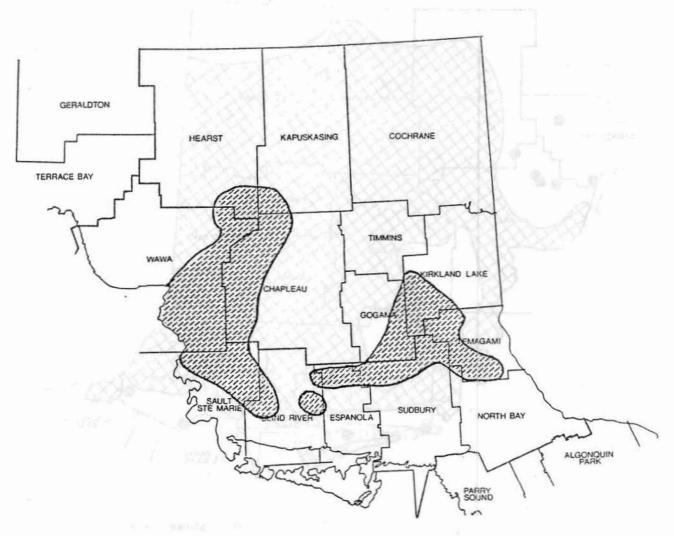
Areas within which defoliation occurred in 1977

LEGEND.

Moderate-to-severe defoliation 0 or

0 Miles 60 0 Kilometres 96

NORTHEASTERN DUTARIO



Spruce Budworm

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

Mortality



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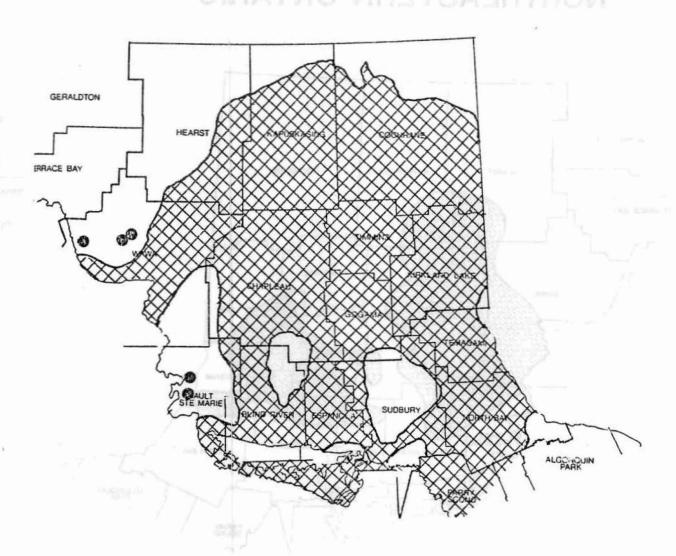
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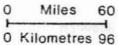


Spruce Budworm

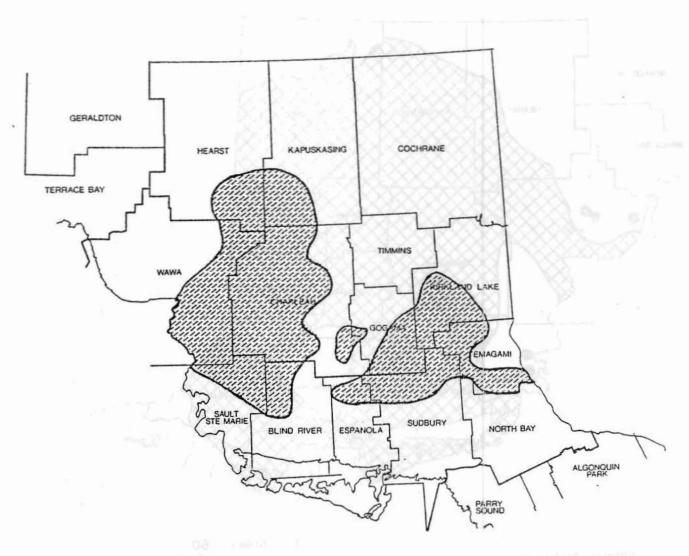
Areas within which defoliation occurred in 1978

LEGEND

Moderate-to-severe defoliation ② or



NORTHEASTERN OF ARIO



Spruce Budworm

Areas within which balsam fir whole tree and top mortality occurred in 1978 0 Miles 60 0 Kilometres 96

LEGEND

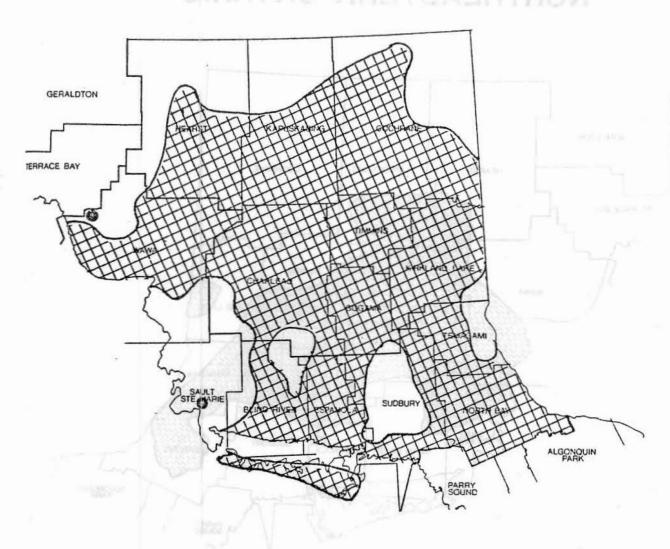
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Spruce Budworm

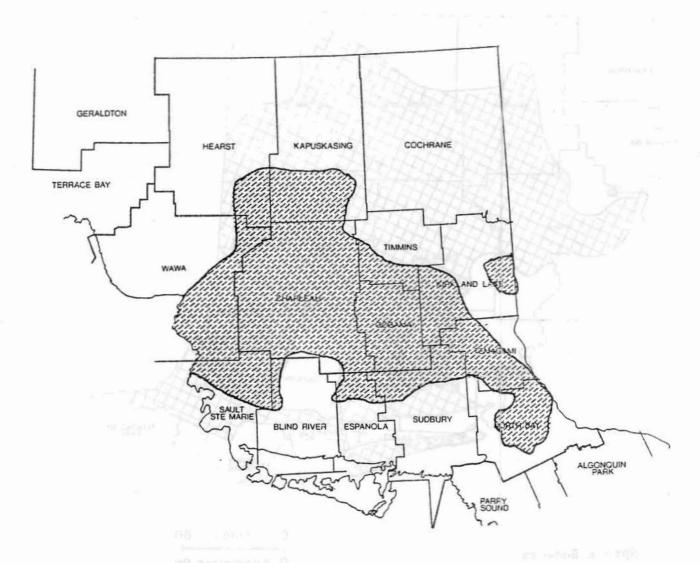
reas within which defoliation coursed in 1979

LEGEND

bderate-to-severe defoliation o or

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Spruce Budworm

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

LEGEND

Mortality



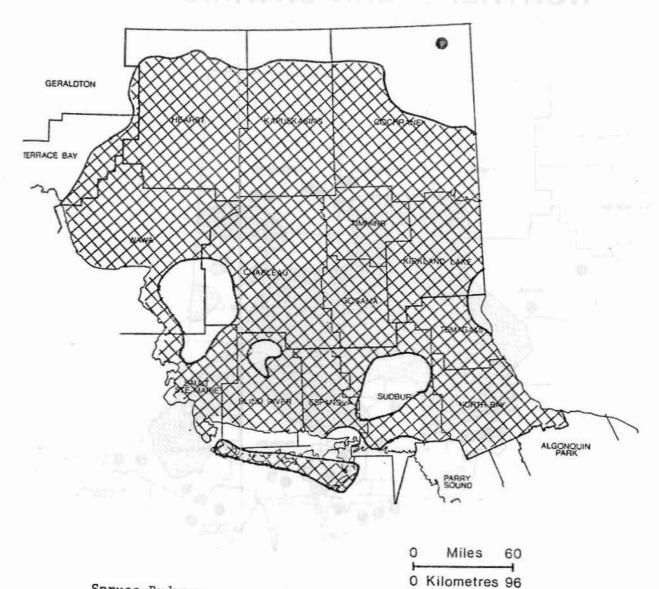
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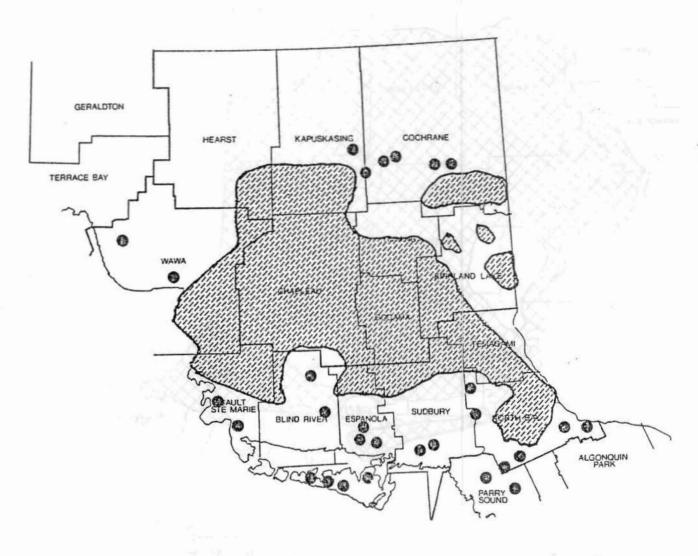


Spruce Budworm

Areas within which defoliation occurred in 1980

LEGEND

Moderate-to-severe defoliation or or



Spruce Budworm

0 Miles 60 1 O Kilometres 96

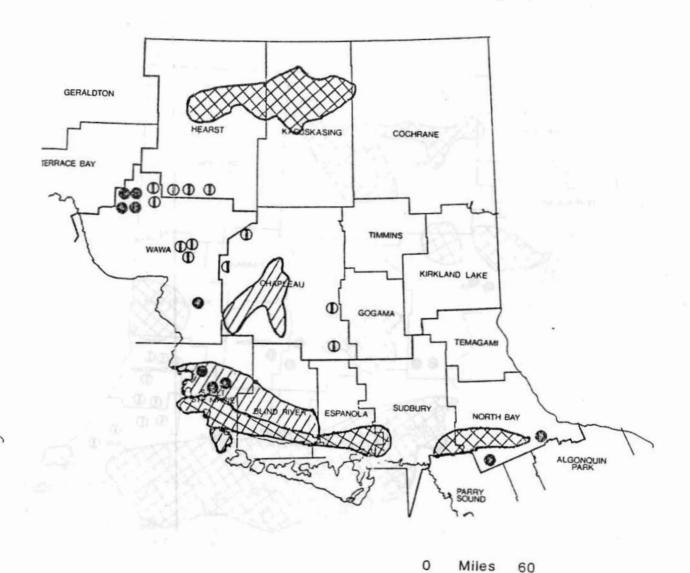
Areas within which balsam fir whole tree and top mortality occurred in 1980

LEGEND

Mortality



or.



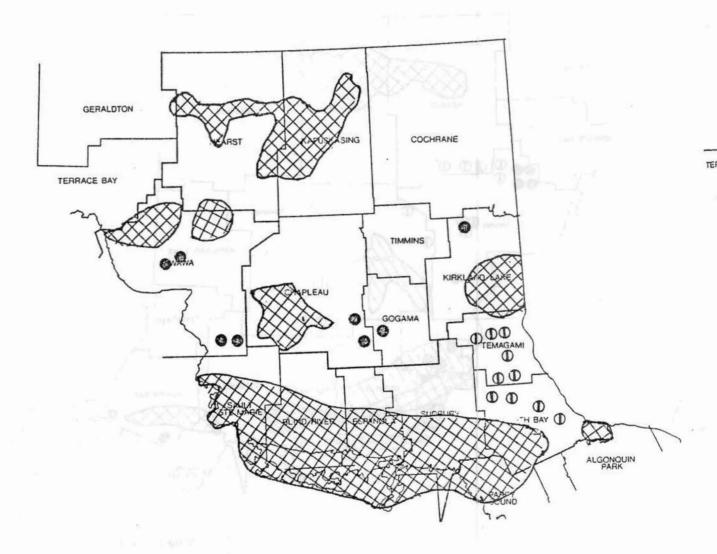
0 Kilometres 96

Forest Tent Caterpillar

Areas within which defoliation occurred in 1950

LEGEND

Light defoliation ⊕ or Moderate-to-severe defoliation ⊕ or W



Forest Tent Caterpillar

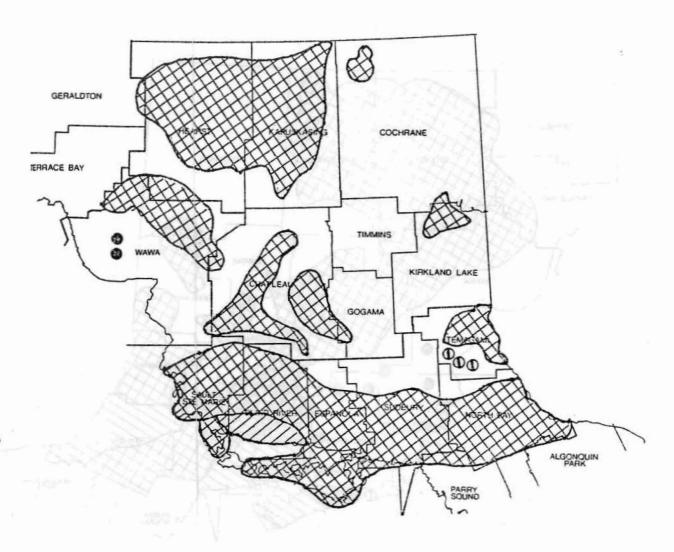
Areas within which defoliation occurred in 1951

LEGEND

Light defoliation ①

Moderate-to-severe defoliation or

O Miles 60 O Kilometres 96



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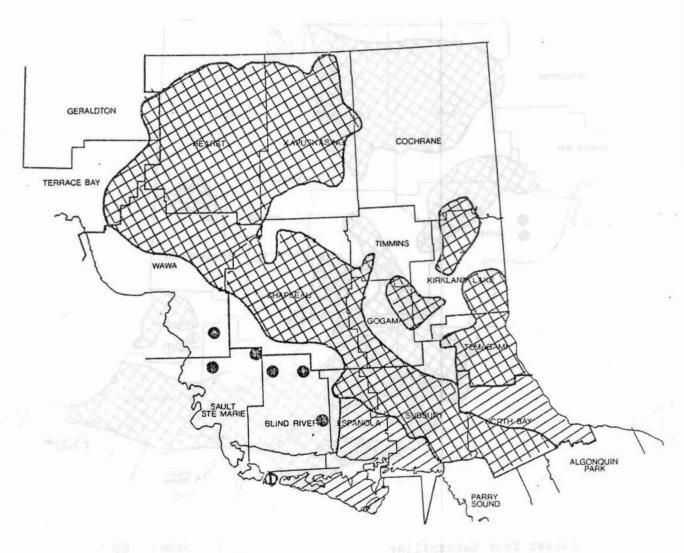
O Kilometres 96

Forest Tent Caterpillar

Areas within which defoliation occurred in 1952

LEGEND

Light defoliation ① or 
Moderate-to-severe defoliation ② or



Forest Tent Caterpillar

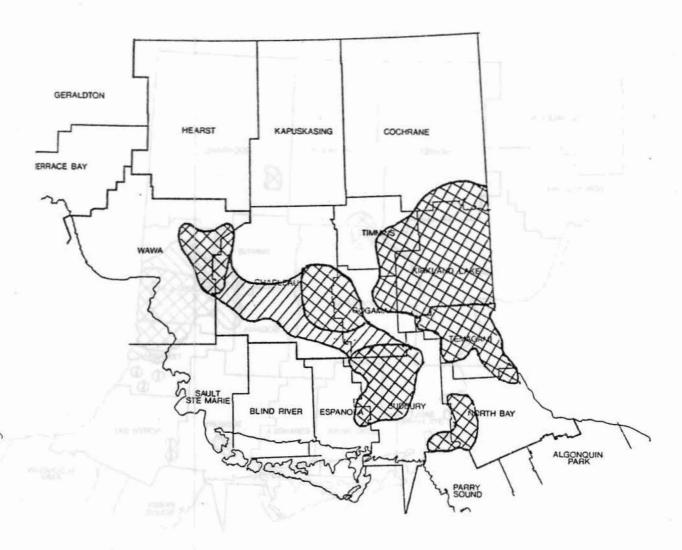
Areas within which defoliation occurred in 1953

0 Miles 60 1 Miles 60 0 Kilometres 96

LEGEND

Light defoliation ⊕ or

Moderate-to-severe defoliation or or



Forest Tent Caterpillar

Areas within which defoliation occurred in 1954

LEGEND

Light defoliation Moderate-to-severe defoliation





Forest Tent Caterpillar

Areas within which defoliation occurred in 1955

#### LEGEND

Light defoliation ① or Moderate-to-severe defoliation



Addfollation H

60

0 Kilometres 96



Forest Tent Caterpillar

Areas within which defoliation occurred in 1956

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LEGEND

Light defoliation



Moderate-to-severe defoliation or







Forest Tent Caterpillar

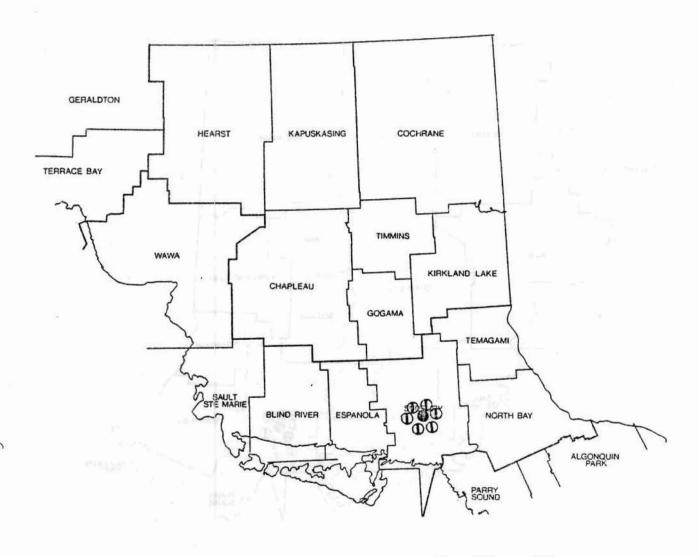
Areas within which defoliation occurred in 1957

LEGEND

Light defoliation ①

Moderate-to-severe defoliation 《

0 Miles 60 0 Kilometres 96 GE



Forest Tent Caterpillar

0 Miles 60 0 Kilometres 96

Areas within which defoliation occurred in 1960

LEGEND

Light defoliation  $\Phi$  Moderate-to-severe defoliation  $\Phi$ 



Forest Tent Caterpillar

Areas within which defoliation occurred in 1961

0 Miles 60 0 Kilometres 96

LEGEND

Light defoliation ⊕

Moderate-to-severe defoliation ●



Forest Tent Caterpillar

Areas within which defoliation occurred in 1962

LEGEND

Light defoliation ①

Moderate-to-severe defoliation

0 Miles 60 0 Kilometres 96

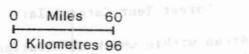


Forest Tent Caterpillar

Areas within which defoliation occurred in 1963

#### LEGEND

Light defoliation ① Moderate-to-severe defoliation or or



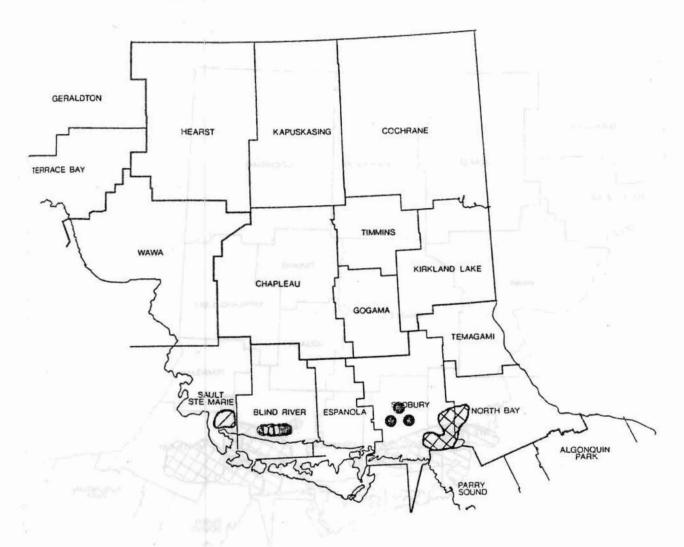
OC

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GE



Forest Tent Caterpillar

Areas within which defoliation occurred in 1964

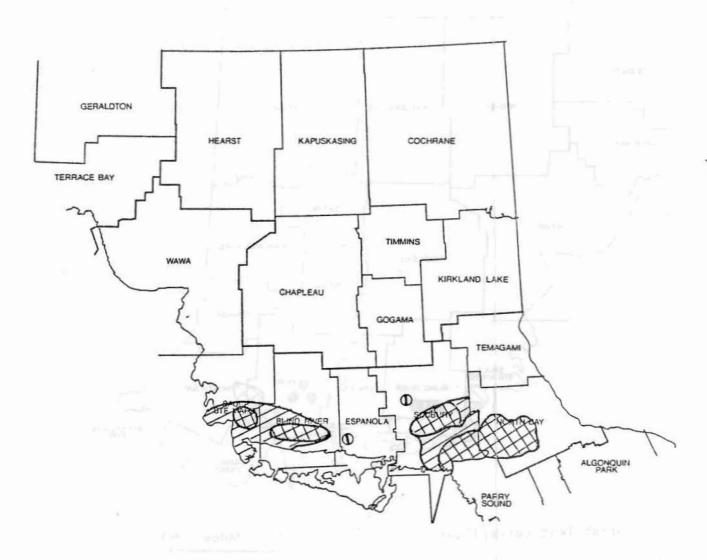
60 Miles 0 Kilometres 96

LEGEND

Light defoliation (1) or Moderate-to-severe defoliation @ or



NORTHEASTERN CNIARIO



Forest Tent Caterpillar

Areas within which defoliation occurred in 1965

LEGEND

Light defoliation ① or ///
Moderate-to-severe defoliation



Forest Tent Caterpillar

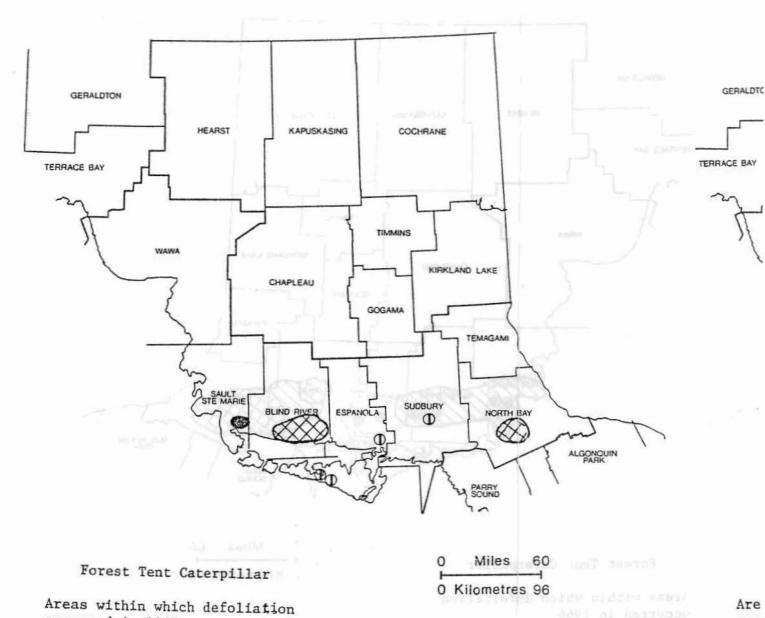
Miles 0 Kilometres 96

Areas within which defoliation occurred in 1966

LEGEND

Light defoliation Moderate-to-severe defoliation or





occurred in 1967

LEGEND

Light defoliation ① Moderate-to-severe defoliation 8

Lig Mod

Are

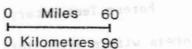
occ



Forest Tent Caterpillar

Areas within which defoliation occurred in 1968

LEGEND





Forest Tent Caterpillar

Areas within which defoliation occurred in 1969

O Miles 60 O Kilometres 96

LEGEND

Light defoliation  $\Phi$ 

Moderate-to-severe defoliation



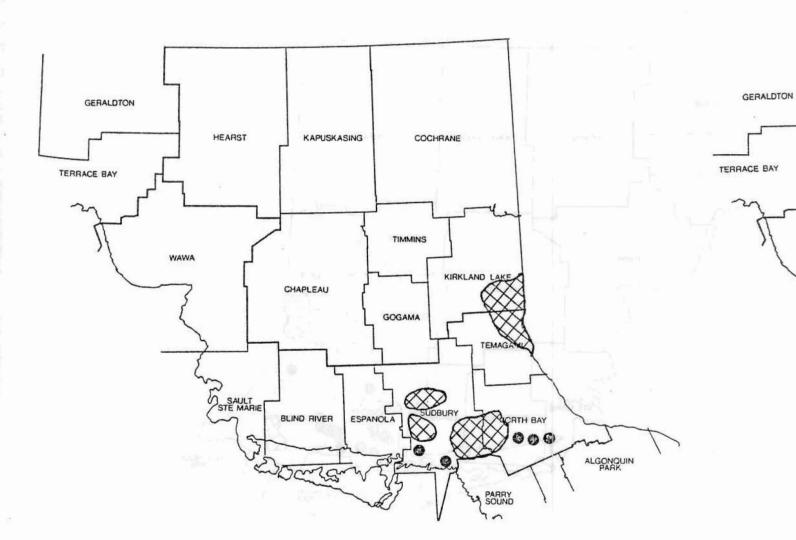
Forest Tent Caterpillar

0 Miles 60 0 Kilometres 96

Areas within which defoliation occurred in 1973

LEGEND

Moderate-to-severe defoliation o or



Forest Tent Caterpillar

Areas within which defoliation occurred in 1974

Miles 60 0 Kilometres 96

LEGEND

Moderate-to-severe defoliation or



For

Areas W occurre

Moderat



Forest Tent Caterpillar

Areas within which defoliation occurred in 1975

LEGEND

Moderate-to-severe defoliation @ or





0 Kilometres 96



Forest Tent Caterpillar

Areas within which defoliation occurred in 1976

LEGEND

Moderate-to-severe defoliation or



Miles

O Kilometres 96

Are oco

Mod



Forest Tent Caterpillar

Areas within which defoliation occurred in 1977

LEGEND

Moderate-to-severe defoliation @ or

O Kilometres 96



Forest Tent Caterpillar

Areas within which defoliation occurred in 1978

LEGEND

Moderate-to-severe defoliation ◎ or



Miles

60

0 Kilometres 96



Forest Tent Caterpillar

Areas within which defoliation occurred in 1979

LEGEND

Moderate-to-severe defoliation 0

0 Miles 60 L 1 0 Kilometres 96



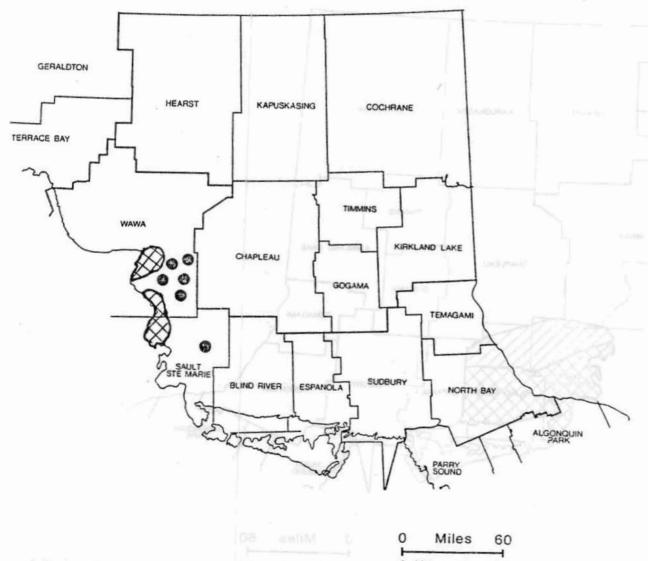
Forest Tent Caterpillar

0 Kilometres 96 Areas within which defoliation occurred in 1980

LEGEND

Moderate-to-severe defoliation





Ambermarked Birch Leafminer

Areas with which defoliation occurred in 1958

LEGEND

Moderate-to-severe defoliation or

0 Kilometres 96



Areas within which defoliation occurred in 1960

LEGEND

Light defoliation Moderate-to-severe defoliation

