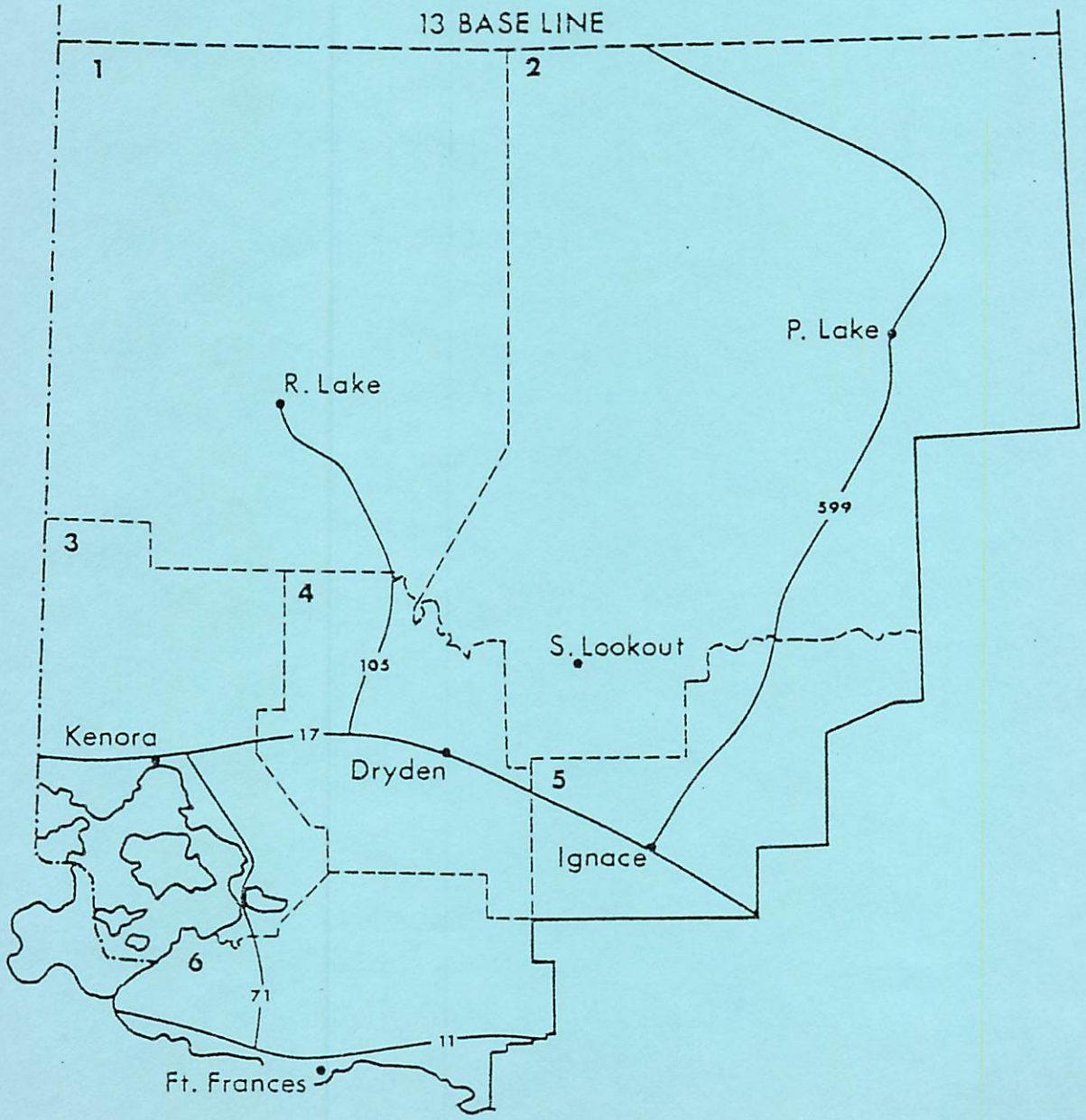
Results of forest insect and disease surveys in the NORTHWESTERN REGION of Ontario, 1980

Thomson, Jansons.



CARRIED OUT BY THE GREAT LAKES FOREST RESEARCH CENTRE IN CO-OPERATION WITH THE ONTARIO MINISTRY OF NATURAL RESOURCES

SURVEY HIGHLIGHTS

The following information deals with the most important insect and disease conditions in the Northwestern Region in 1980.

The area within which moderate-to-severe defoliation by the forest tent caterpillar was reported declined by more than 95% over the previous year, and further reductions can be expected in 1981. Although little change occurred in the area infested by spruce budworm in the southern part of the Region, an increase in distribution was recorded when a pocket of new heavy infestation was discovered in the northwestern part of Kenora District. Populations of the jack pine budworm did not occur along the Ontario-Manitoba border as expected. Adult sawyer beetle damage on fringes of cutover areas in Sioux Lookout and Ignace districts decreased. An infestation of the bronze birch borer caused serious damage in white birch stands in the Cairns-Pikanjikum lakes area, Red Lake District.

Annual surveys for Dutch elm disease revealed a marked increase in distribution. Infected trees were found as far north as the town of Kenora. Samples of Scleroderris canker of pine from infection centres in Red Lake and Sioux Lookout districts were submitted to the Great Lakes Forest Research Centre for cultures to determine if the disease present in the infected areas was the European race of the fungus. A pocket of hail damage was detected in the Pickle Lake area, Sioux Lookout District, and damage probably occurred in Dryden District as a result of a serious hailstorm which occurred in midsummer. Late spring frosts caused extensive damage to small-diameter trees of several species at scattered locations.

A special survey was conducted in black spruce stands at 10 randomly selected locations in the Region to determine the incidence of leader damage caused by four specific insects and five diseases known to cause damage in black spruce stands.

In 1980, in a change in report format, the following categories are used to describe the importance of insects or diseases:

A - of major importance, capable of killing or severely damaging trees or shrubs;

B - of moderate importance, capable of sporadic or localized injury to trees or shrubs;

C - of minor importance, not known to present a threat to living trees or shrubs.

Note: Forest districts affected by specific insects or diseases are listed beneath the names of those insects or diseases in the Table of Contents.

M.J. Thomson

V. Jansons

Frontispiece

Bronze birch borer (*Agrilus anxius* Gory) damage

Hail damage

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INSECTS

Category A

Birch Skeletonizer, *Bucculatrix canadensisella* Cham.

Following a six-year period of endemic populations, an increase in numbers of this insect was observed in the Fort Frances District. In 1980 a small pocket (2.5 ha or 6 acres of heavy infestation occurred in a stand of white birch (*Betula papyrifera* Marsh.) along Highway 11 west of the Seine River where tops of large trees were severely defoliated. High numbers of larvae caused moderate defoliation at four points in Devlin Township and low populations were common at numerous other locations in the Fort Frances District. No trace of this insect was found elsewhere in the Region.

Spruce Budworm, *Choristoneura fumiferana* (Clem.)

The results of damage surveys, population sampling, and egg-mass counts will be included with those of other regions in a special report to be published later this year. This report provides a complete description and analysis of developments in the spruce budworm situation in Ontario in 1980 and gives infestation forecasts for the province for 1981.

Jack Pine Budworm, *Choristoneura pinus pinus* Free.

On the basis of egg-mass surveys in 1979, when egg masses were found at five of the 10 locations examined, it was predicted that light-to-medium infestations of this insect could be expected in 1980 in the western part of Kenora District. However, aerial and ground surveys in 1980 at each of these locations, as well as at numerous points elsewhere, revealed only a trace population on an island on High Lake in Ewart Township.

Forest Tent Caterpillar, *Malacosoma disstria* Hbn.

In 1980 populations of this insect collapsed throughout most of the 21 200 km^2 (8,200 mi^2) area in the Region where medium-to-heavy infestations were recorded during the previous years (Fig. 1). In the Fort Frances District only light-to-moderate defoliation of trembling aspen (*Populus tremuloides* Michx.) remained west of a line from Lake of the Woods Provincial Park to Highway 11 in Morley Township, an area of approximately 647 km^2 (250 mi^2). In addition, oak (*Quercus* spp.), black ash (*Fraxinus nigra* Marsh.) and willows (*Salix* spp.) were damaged in the towns of Fort Frances and Emo. Light defoliation was observed on ridge tops at several locations in the Ignace District and at one location northeast of Savant Lake in the Sioux Lookout District.

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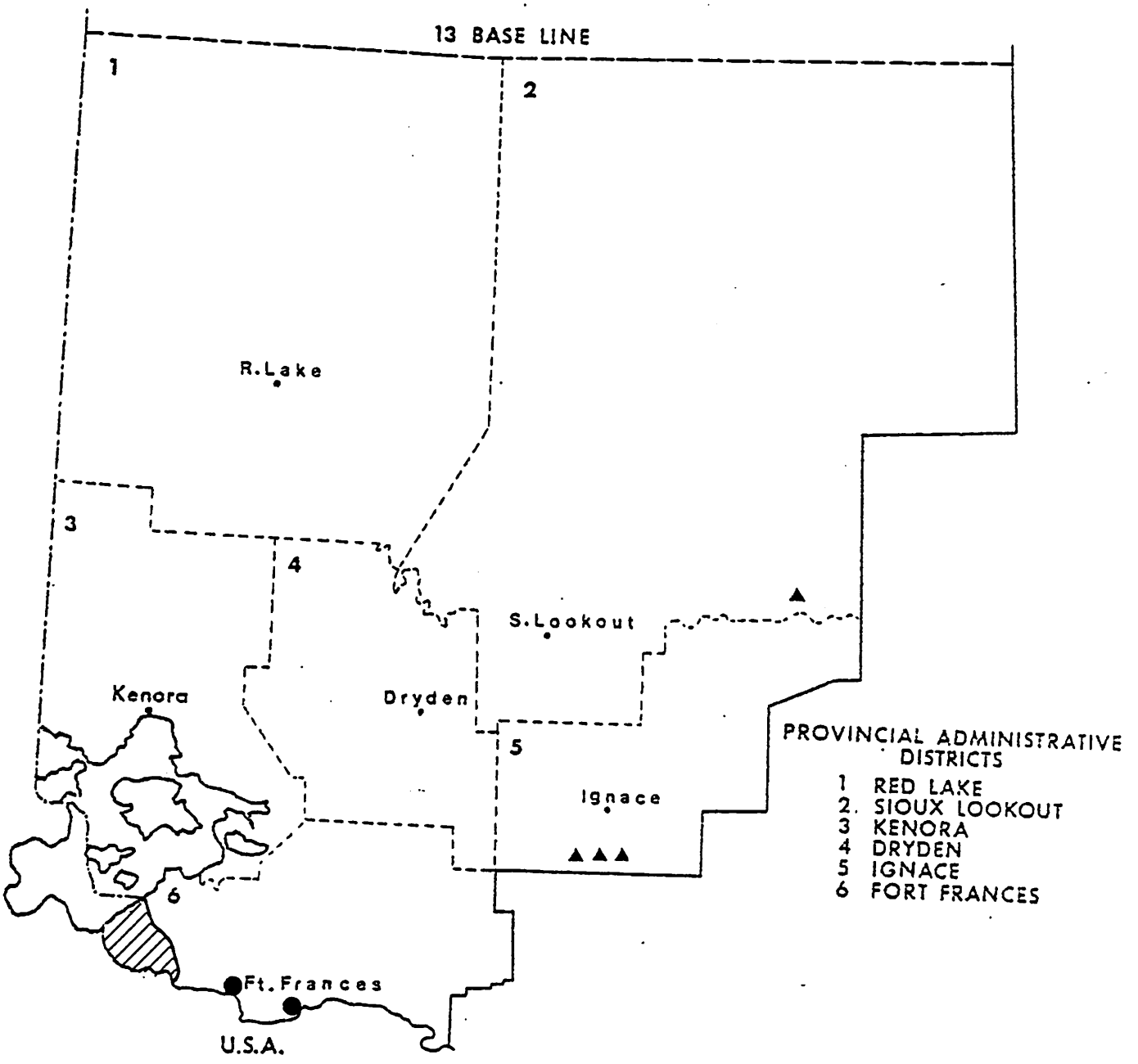

Fig. 1. FOREST TENT CATERPILLAR

Areas where defoliation of aspen occurred in 1980.

Light to moderate . . . . ● or ▨

Light . . . . . ▲

Although larval hatches ranged from 48 to 90% at several locations examined, weather conditions were thought to have influenced the sharp decline in populations. Above-normal temperatures during the latter part of April and early May were conducive to successful larval hatch; however, these were followed by several days of below-freezing temperatures which undoubtedly influenced larval survival. Other factors contributing to the decline may have been mortality of early-instar larvae killed by an unknown species of parasite observed at several sample locations in Ignace District and a high rate of infection of caterpillars by the *Nosema microsporidia* virus.

High numbers of the parasite *Sarcophaga aldrichi* Park. were again present in the infested area west of Fort Frances. Caterpillar cocoon dissections revealed parasitism rates of 83% in the Lake of the Woods Provincial Park and 88% in Worthington Township.

Counts of overwintering egg bands were made on trembling aspen at 11 locations in the Region. Results of these counts indicate that a light-to-moderate infestation can be expected in the western part of Fort Frances District. No egg bands were present at four sample points in the Ignace District (Table 1).

Sawyer Beetles, *Monochamus* spp.

Aerial surveys of recent cutover areas in Ignace and Sioux Lookout districts revealed that damage caused by adult sawyer beetle feeding on branches and twigs of jack pine (*Pinus banksiana* Lamb.) and black spruce (*Picea mariana* [Mill.] B.S.P.) recurred for the fourth consecutive year. However, a decrease over previous years was noted in the amount of damage in affected areas. As reported previously, the preferred host was jack pine.

Current damage was observed on fringes of jack pine stands beside clear-cut areas south and southeast of Sowden Lake and in an area between Queens and Wellington lakes approximately 18 km (11 mi) southeast of Savant Lake village in Ignace District. The area affected was approximately 10 ha (25 acres) at each location. Damage was also observed on scattered small-diameter black spruce and on jack pine approximately 8 km (5 mi) directly east of Savant Lake village in Sioux Lookout District. No damage was found northwest of Savant Lake village in the area where damage was reported the previous year. Damage caused by beetle feeding on branches and twigs was usually confined to a band 10 to 20 m (33 to 66 ft) deep along exposed fringes of stands or shoreline reserves. Some tree mortality is likely by the spring of 1981.

A survey to determine the species of sawyer beetle present in the vicinity of previously damaged areas in the Sioux Lookout District and in cutover areas in Fort Frances District was carried out in

mid-June. The white spotted sawyer beetle, *Monochamus scutellatus* (Say), was the only species found when over 100 adults were examined at a log dump near Houghton Lake and when several spot checks were made elsewhere in the Sioux Lookout District. Spot checks of adult beetles in cutover areas in Fort Frances District revealed that the aforementioned species and the northeastern sawyer beetle, *Monochamus notatus* (Drury), were present in the area, with the latter being more common.

Table 1. Summary of forest tent caterpillar egg-band counts and infestation forecasts for 1981 in the Northwestern Region (counts based on the examination of one to three trembling aspen trees at each location).

Location	Avg DBH of sample trees (cm)[a]	No. of trees examined	Avg no. of egg bands per tree	Infestation forecast for 1981
Ignace District				
Smirch Lake	20	3	0	negative
Raven Lake	15	3	0	negative
Savant Lake	15	3	0	negative
Suzanne Lake	10	3	0	negative
Fort Frances District				
McCrosson Twp	13	2	5	light
Aylsworth Twp	18	3	5	light
Dance Twp	25	2	1	light
Potts Twp	18	3	1	light
Sifton Twp	15	2	4	light
Atwood Twp	13	3	3	light
Dilke Twp	15	3	10	medium

[a] 1 cm = 0.39 in.

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

Damage caused by high populations of this sawfly recurred for the fifth consecutive year at widely scattered points in the southern half of the Region (Fig. 2).

Small pockets of heavy infestation on scattered groups of trees caused moderate-to-severe defoliation on small white spruce (*Picea glauca* [Moench] Voss) in the vicinity of Sioux Lookout and Ojibway Provincial Park in Sioux Lookout District. In Fort Frances District, hedgerows in

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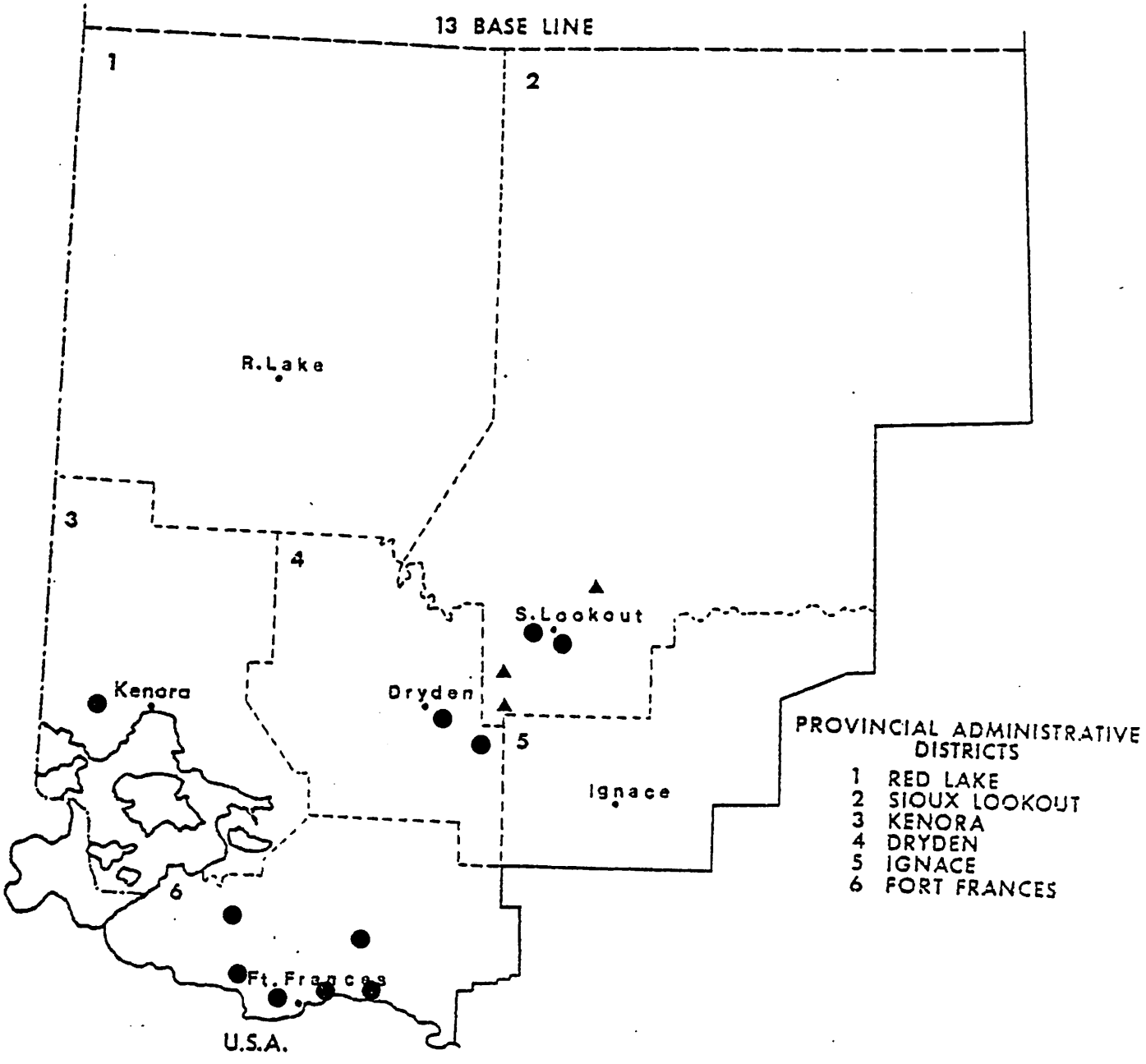

Fig. 2. YELLOWHEADED SPRUCE SAWFLY

Locations where defoliation of spruce occurred in 1980.

Moderate to severe. . . . . ●

Light . . . . . ▲

Potts Township were again heavily infested and for the third consecutive year tree mortality was recorded. Numerous severely defoliated trees averaging 2 m (6.5 ft) in height were observed in Burriss and Crozier townships. Severe defoliation was also observed on roadside regeneration at numerous points along Highway 11, east of Fort Frances.

Pockets of moderate defoliation were found on shoreline trees at Turtle Lake in Fort Frances District, at Rushing River Provincial Park, and at numerous points along Highway 17 west of Kenora in Kenora District and east of Dryden in Dryden District. Elsewhere in the southern half of the Region trace or light defoliation was observed at numerous points.

Repeated severe defoliation by this sawfly over a period of two to five years on small planted or natural regeneration white spruce causes severe retardation of tree growth as well as considerable mortality on some sites.

White Pine Weevil, *Pissodes strobi* (Peck)

Populations of this insect have remained at a fairly low level for several years in the Northwestern Region. Surveys and quantitative sampling in jack pine regeneration stands and planted areas in 1980 showed a decrease in the incidence of weevil attack over the previous two years. The average numbers of leaders killed at 10 scattered quantitative sample points was 2% in comparison with 2.7% and 3.0% in 1978 and 1979, respectively. The incidence of damage ranged from 1% to 3% (Table 2). General surveys elsewhere in the Region revealed that the weevil was widely distributed at levels comparable with those found at quantitative sample points (Fig. 3). Small numbers of attacks were also observed on open-growing regeneration white spruce and black spruce along Highway 11, east of Fort Frances, Fort Frances District.

Larch Sawfly, *Pristiphora erichsonii* (Htg.)

Although there was little change in population levels of this sawfly, an increase in distribution was recorded in 1980 when larval colonies were found as far north as the Otoskwin River, approximately 64 km (40 mi) northeast of Pickle Lake in Sioux Lookout District (Fig. 4). Small pockets ranging from 2.5 to 5 ha (6 to 12 acres) of medium-to-heavy infestation recurred in Ignace District and a new medium-to-heavy infestation was found on scattered trees in Drayton Township, Sioux Lookout District. Severe defoliation occurred in these areas. Elsewhere in the Region light infestations or larval colonies were easily found in Ignace District, in the southern part of Sioux Lookout District and in the vicinity of Dryden in Dryden District.

Table 2. Summary of damage by the white pine weevil in the Northwestern Region in 1980 (counts based on the examination of 100+ randomly selected jack pine regeneration trees at each location).

Location	Avg ht of trees (m)[a]	Trees weeviled (%)
Red Lake District		
Chukuni River Access Rd	1.5	1
Pakwash Lake	3.3	2
Sioux Lookout District		
Goodie Lake Access Rd	2.0	1
Kenora District		
Gundy Twp	1.8	3
Dryden District		
Zealand Twp	1.8	2
Colenso Twp	2.0	2
Ignace District		
Pinafore Lake	1.5	2
Martin Siding	3.5	2
Penassi Lake	2.0	2
Fort Frances District		
Essox Lake Rd	1.8	3

[a] 1 m = 3.28 ft

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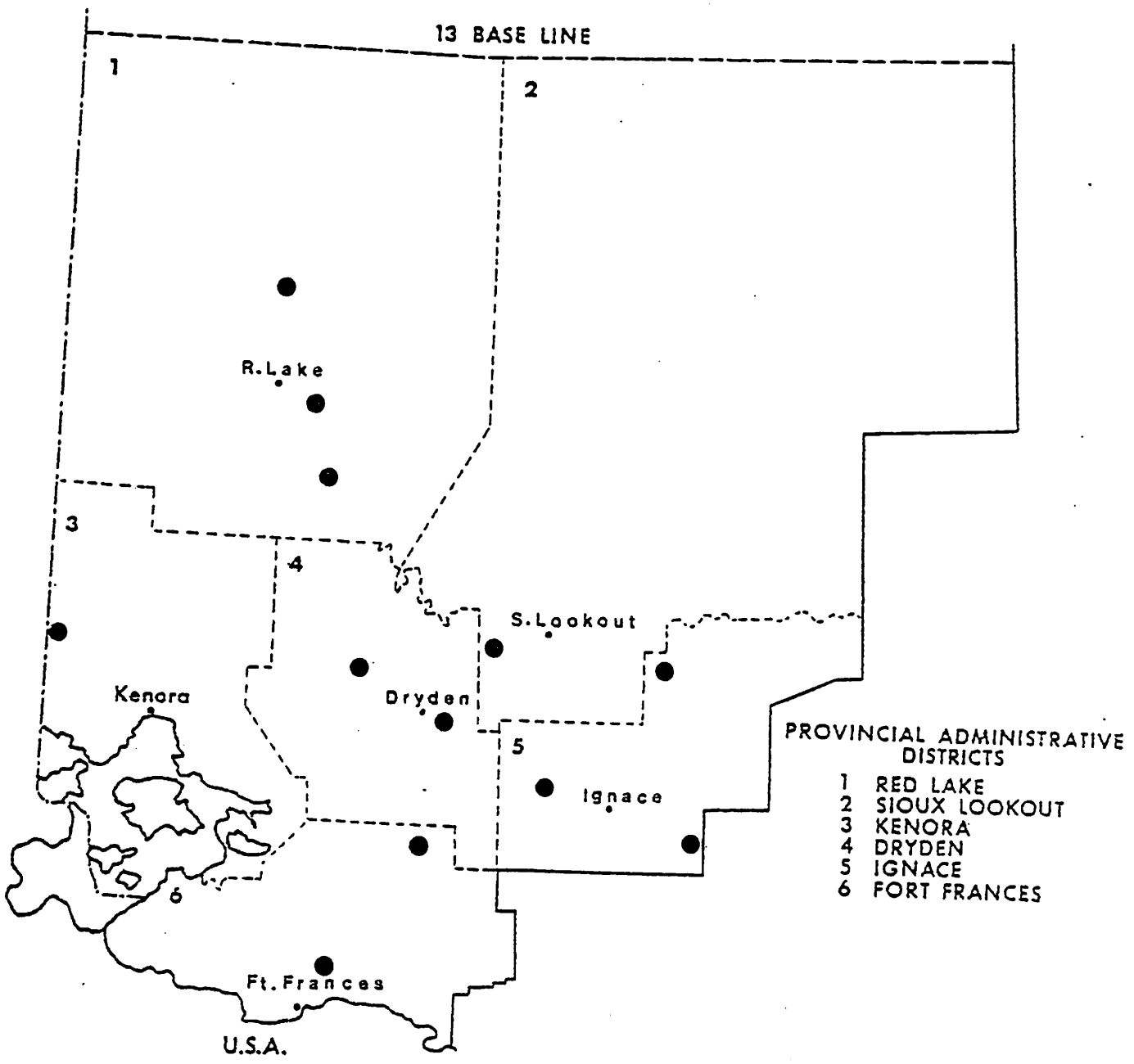

Fig. 3. WHITE PINE WEEVIL

Locations where damage occurred in 1980 . . . . . ●

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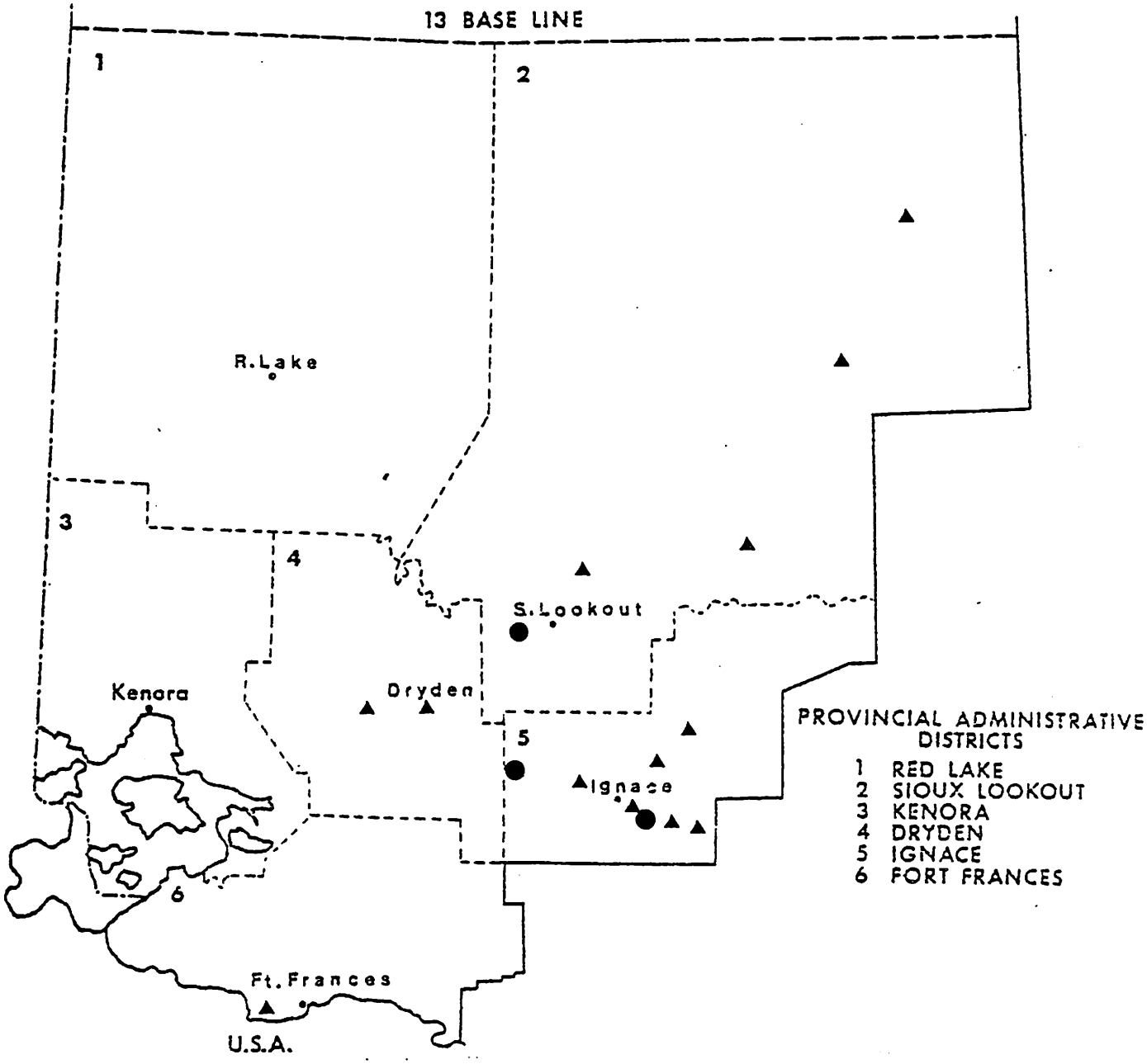

Fig. 4. LARCH SAWFLY

Areas where defoliation of larch occurred in 1980.

Moderate to severe . . . . . ●

Light . . . . . ▲

Category B

Bronze Birch Borer, *Agrilus anxius* Gory

Aerial surveys in the northern part of the Northwestern Region in June revealed serious damage and considerable tree mortality in white birch stands in the Cairns-Pikanjikum lakes area, Red Lake District. Foliage on affected trees was discolored or absent in many areas (see Frontispiece). Ground checks and sampling revealed that this insect was responsible for the recent damage when it was found that high numbers were infesting tree branches and stems to near ground level. Aerial mapping in mid-August revealed damaged trees and considerable mortality through approximately 194 km^2 (75 mi^2) of forested land (Fig. 5).

The bronze birch borer prefers trees in a weakened condition such as that caused by drought or severe defoliation, both of which have occurred in the area in recent years. The larvae of the insect feed on the cambium layer of host trees, forming galleries between the bark and the wood. These galleries wind back and forth, usually across the grain of the wood, destroying the cambium layer, and thereby causing mortality distally to the injury. In the northern part of the province two years are required by the insect to complete its life cycle.

Boxelder Leafroller, *Archips negundana* Dyar

Populations of this leafroller have been spreading and increasing in intensity for the past three years. In 1980 light-to-moderate defoliation of open-growing Manitoba maple (*Acer negundo* L.) was common in the towns of Fort Frances, Kenora, Dryden and Emo. In Fort Frances numerous scattered trees were completely defoliated. Heavy infestations on numerous shade trees occurred for the first time throughout the town of Sioux Lookout. Several of the infested trees were almost completely defoliated.

Repeated severe defoliation over a number of years can cause serious deterioration of the affected trees. This insect is host-specific on Manitoba maple.

Eastern Pineshoot Borer, *Eucosma gloriola* Heinrich

Although this insect was readily found, populations remained low, at much the same level as in the previous three years. Results of quantitative sampling at 10 scattered locations (Fig. 6) showed little change in numbers of leaders destroyed by the insect over the previous year--3.0% in 1980 in comparison with 2.8% in 1979. Attacks ranged from 1 to 6% (Table 3). General surveys in Dryden and Fort Frances districts revealed low populations comparable with those at quantitative sample points.

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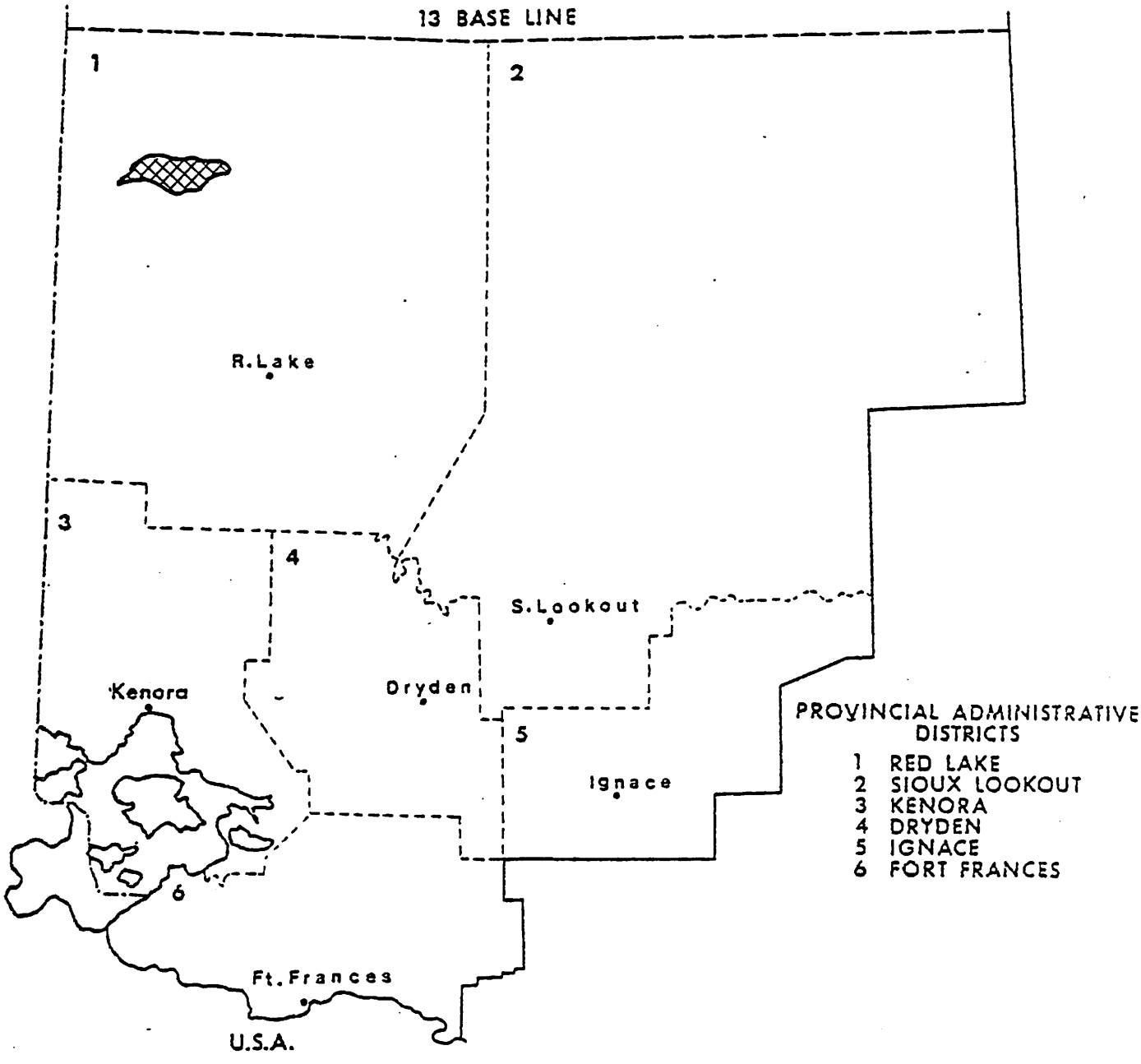

Fig. 5. BRONZE BIRCH BORER

Location where damage occurred to white birch in 1980.

Moderate to severe . . . .

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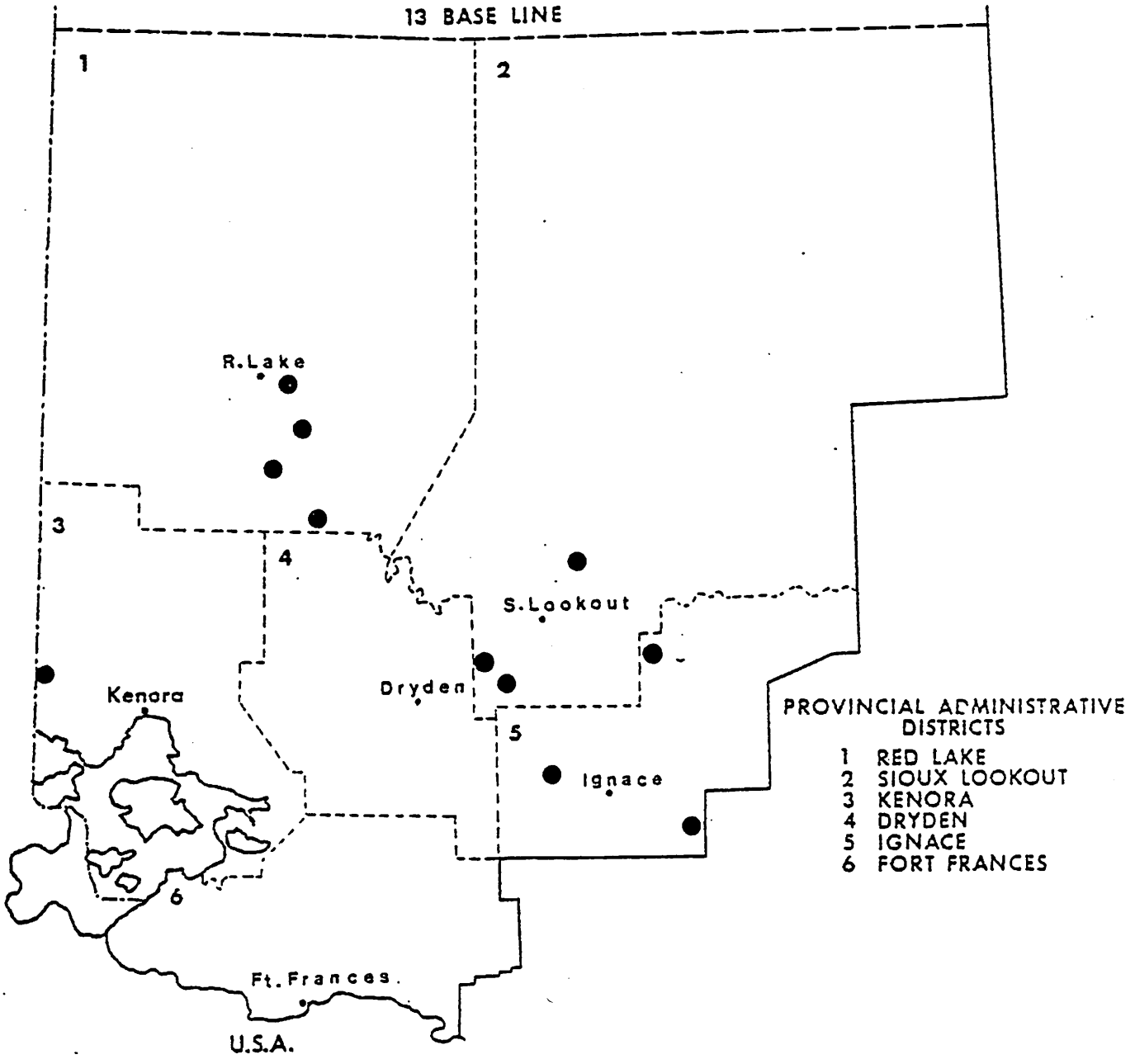

Fig. 6. EASTERN PINESHOOT BORER

Locations where damage occurred in 1980. . . . . ●

Table 3. Summary of damage by the eastern pineshoot borer in the Northwestern Region in 1980 (counts based on the examination of 100+ randomly selected jack pine regeneration trees at each location).

Location	Avg ht of trees (m)[a]	Trees with terminal shoot damage (%)
Red Lake District		
Pakwash Lake	3.3	1
Chukuni River Access Rd	1.5	1
Sioux Lookout District		
Goodie Lake Access Rd	2.0	2
Vermilion River	1.0	6
Kenora District		
Gundy Twp	1.8	3
Ignace District		
Pinafore Lake	1.5	2
Martin Siding	3.5	6
Penassi Lake	2.0	3

[a] 1 m = 3.28 ft

Aspen Leafblotch Miner, *Lithocolletis ontario* Free.

After a marked decline in 1979, population levels of this leafblotch miner increased sharply in 1980 on trembling aspen regeneration in the southern half of the Region. Severe leafmining and early browning of foliage were observed along roadsides at numerous locations in Kenora, Dryden and Fort Frances districts. Small new heavy infestations were recorded on fringes of stands and along roadsides near Sandy Creek and at Lower Manitou Falls in Red Lake District and in Echo Township, Sioux Lookout District. A heavy infestation also occurred along roadsides north of Martin Siding in the eastern part of the Ignace District. Elsewhere in the Region, light leafmining was observed at numerous points as far north as Nungesser Lake, Red Lake District.

Table 4. Other forest insects.

Insect	Host(s)	Remarks	Rating
Acleris variana Fern. Blackheaded budworm	blue spruce	light infestation on several ornamental trees in the town of Fort Frances	B
Adelges strobilobius Kalt. Woolly larch aphid	bS	light incidence, Shibag Lake, Ignace District	C
Aceria sp. Poplar bud gall mite	tA	damage common in the western part of Fort Frances District	C
Altica ambiens alni Harr. Alder flea beetle	Al	moderate defoliation on numerous clumps, Gundy Twp, Kenora District	B
Altica ulmi Wood Elm flea beetle	wE	light defoliation of several trees in the town of Fort Frances	B
Anisota virginiensis Dru. Pinkstriped oakworm	bO	small numbers, Nestor Falls, Kenora District	C
Archips cerasivoranus (Fitch) Uglynest caterpillar	ecCh	scattered colonies, Kingsford Twp, Fort Frances District	B
Coleophora laricella Hbn. Larch casebearer	tL	trace population, Lash Twp, Fort Frances District	B
Conophthorus banksianae McPherson Jack pine tip beetle	jP	common on young planted trees at Lower Manitou Lake, Red Lake District; small numbers in Gundy Twp, Kenora District	C
Dasineura rachiphaga Tripp Spruce cone axis midge	bS	trace in cone collections from Kingsford Twp, Fort Frances District and Britton Twp, Dryden District	C
Datana ministra Dru. Yellownecked caterpillar	wB	small numbers common in Willingdon Twp, Kenora District	C

(continued)

Table 4. Other forest insects (continued).

Insect	Host(s)		Rating
Dioryctria abietivorella Grt. Fir coneworm	bS	trace damage in cone collection from Kingsford Twp, Fort Frances District	C
Dryocampa rubicunda rubicunda Fabr. Greenstriped mapleworm	rM	scattered colonies, Watten Twp, Fort Frances District	A
Fenusa pusilla (Lep.) Birch leafminer	wB	low population on scattered trees, McAree Twp, Sioux Lookout District	A
Gilpinia hercyniae (Htg.) European spruce sawfly	wS	small numbers of second-generation larvae in beating sample in Mather Twp, Fort Frances District	C
Gracillaria sp. Birch leafroller	wB	heavy localized area affected at Sumach Lake, Red Lake District	C
Hylurgopinus rufipes Eich. Native elm bark beetle	wE	galleries of this main vector of Dutch elm disease common in infected trees, Fort Frances District	A
Hyphantria cunea Dru. Fall webworm	Al	scattered single colonies, McIrvine Twp, Fort Frances District	B
Micurapteryx salicifoliella Cham. Willow leafblotch miner	W	severe leafmining along Otoskwin River, Sioux Lookout District; light incidence at other scattered locations in the Region	C
Monoctenus sp. Cedar sawfly	eC	small numbers at scattered locations in the Region	C
Neodiprion abietis complex Balsam fir sawfly	wS	low populations at Smirch Lake, Ignace District, and in Halkirk Twp, Fort Frances District	A

(continued)

Table 4. Other forest insects (continued).

Insect	Host(s)	Remarks	Rating
Neodiprion nanulus nanulus Schedl Red pine sawfly	jP, rP	light defoliation on fringe trees, Caliper Lake Provincial Park, Claxton Twp, Fort Frances District	B
Neodiprion pratti banksianae Roh. Jack pine sawfly	jP	light population along Vermilion River, Sioux Lookout District	A
Neodiprion virginianus complex Redheaded jack pine sawfly	jP	low population at English River, Ignace District; scattered colonies at Nestor Falls, Kenora District	B
Nycteola cinereana N. & D. Poplar leaftier	bPo	light tip defoliation on small trees, Rice Bay Rd, Fort Frances District	C
Paraprociphilus tessellatus (Fitch) Woolly alder aphid	Al, siM	heavily infested clumps of shore alders at Catherine Lake, Pelican Twp and Crow Lake, Godson Twp, Kenora District; high aphid adult populations were observed on numerous silver maple trees in the town of Fort Frances	B
Petrova albicapitana (Busck.) Pitch nodule maker	jP	Populations declined to a low level at Vermilion River, Sioux Lookout District, where an infestation was reported in 1979; elsewhere in the Region populations remained low.	C
Phenacaspis pinifoliae (Fitch) Pine needle scale	wS	medium infestation on several trees, LeMay Twp, Kenora District	C
Pineus floccus Patch Redspruce aphid	bS	several scattered heavily infested young trees in Echo Twp, Sioux Lookout District	C

(continued)

Table 4. Other forest insects (concluded).

Insect	Host(s)	Remarks	Rating
Pseudexentera oregonana Wlshm. Aspen leafroller	tA	low populations, Sandbar Lake Provincial Park, Ignace District	A
Psilocorsis reflexella Clem. Birch leaftier	wB	low populations at several sample points in Kenora District	C
Pulicalvaria thujaella (Kft.) Cedar leafminer	eC	small numbers along Sandy Beach Camp Road, Sioux Lookout District	A
Zeiraphera canadensis Mut. & Free. Spruce bud moth	wS	medium infestation on several large, open-growing trees, Ewart Twp, Kenora District	B

TREE DISEASES

Category A

Armillaria Root Rot, *Armillaria mellea* (Vahl ex Fr.) Kumm.

General surveys are carried out each year to determine the incidence of mortality caused by this disease in small-diameter natural regeneration or planted pine and spruce stands in the Northwestern Region. Over the past several years the disease has commonly been found causing trace levels of mortality in jack pine stands; however, it has rarely been found in spruce stands. In 1980, evaluations carried out in four jack pine stands showed that trace levels of mortality were present in each (Table 5). No damaged trees or current mortality could be found in 10 black spruce stands evaluated as part of a special survey of diseases or insects occurring on black spruce in the Region.

Table 5. Summary of damage caused by Armillaria root rot in jack pine regeneration examined in the Northwestern Region in 1980 (counts based on the examination of 100+ randomly selected trees at each location).

Location	Avg ht of trees (m)[a]	Current mortality (%)
Sioux Lookout District		
Vermilion River	1.0	1
Lomond Twp	2.3	1
Dryden District		
Mutrie Twp	0.8	2
Ignace District		
Pinafore Lake	1.0	1

[a] 1 m = 3.28 ft

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

Surveys conducted in the southern part of the Region showed a marked extension in the distribution of this disease in 1980. Samples from trees showing symptoms of the disease were collected in the town

of Rainy River, in Lake of the Woods Provincial Park and in the town of Kenora, and were sent to the Great Lakes Forest Research Centre in Sault Ste. Marie for culturing. The presence of the disease at each location was confirmed when the fungus was recovered from the samples. This represents a 140 km (90 mi) northwesterly extension of the known range of this disease in Ontario.

In conjunction with the sanitation program being carried out annually by the town of Fort Frances, 1189 white elm (*Ulmus americana* L.) trees were examined. Symptoms of the disease, i.e., premature browning of foliage and branch mortality, were observed on 39 trees which were marked for removal. Random samples were made on 10% of the trees showing symptoms, and each was positively identified as infected by *C. ulmi*.

Needle Rusts of Spruce, *Chrysomyxa ledi* (Alb. and Schw.) d By., and *C. ledicola* Lagh.

General surveys and a special survey of high-value black spruce stands in 1980 revealed a marked decrease in the incidence of these foliar diseases over the previous year when foliar damage was rarely found. As part of the special survey, evaluations were conducted at 10 randomly selected locations to determine the incidence and damage caused by the rusts. Infection was found at only two of the 10 locations. Trace foliar damage was found on 12% of trees examined at a sample point near Stranger Lake, Sioux Lookout District and on 3% of the trees in a sample point near Victoria Lake, Ignace District. Elsewhere in the Region, general surveys in Red Lake revealed infection in black spruce regeneration on a powerline right-of-way. An evaluation in the area showed that although 42% of the trees were infected, only trace damage occurred.

Western Gall Rust of Hard Pines, *Endocronartium harknessii* (J.P. Moore) Y. Hirat.

This gall-forming fungus of hard pines is commonly detected in jack pine stands through the southern two-thirds of the Northwestern Region. The most serious damage occurs when stems of small-diameter jack pine regeneration or planted trees are affected by one or more galls. These galls often girdle the stem, causing mortality of the part of the stem above the infection centre. The percentage of trees affected by stem galls at four points evaluated in 1980 ranged from 33% in Mutrie Township, Dryden District to 12% in Lomond Township, Sioux Lookout District (Table 6). Current mortality ranged from 1% to 2.6%.

Table 6. Summary of damage caused by western gall rust of hard pines in the Northwestern Region in 1980 (counts based on the examination of 100+ randomly selected trees at each location).

Location	Avg ht of trees (m)[a]	Trees affected (%)	Trees severely affected[b] (%)	Current mortality (%)
Sioux Lookout District				
Lomond Twp	2.3	20.0	12.0	2.6
Dryden District				
Aubrey Twp	1.1	8.7	8.7	1.0
Mutrie Twp	1.0	3.3	3.3	1.3
Ignace District				
Ilsley Twp	1.5	13.0	11.0	0.0

[a] 1 m = 3.28 ft

[b] Stem galls

Scleroderris Canker of Pine, *Gremmeniella abietina* (Lagerb.) Morelet

Annual surveys conducted in both planted and natural pine regeneration revealed an increase in the known range of the North American race of this disease. Small numbers of infected jack pine (*Pinus banksiana* Lamb.) were found on a low-lying site approximately 6.5 km (4 mi) south of the 13th baseline in the Windigo lakes area, Sioux Lookout District. This infection centre is approximately 65 km (40 mi) northwest of the Pipestone River, the most northerly range of the disease recorded previous to 1980.

In the Pineimuta River area, considerable mortality is still occurring in heavily overstocked jack pine regeneration stands. However, there is still an overabundance of stems that have survived to reach a height of approximately 1 m (3.28 ft) in these stands. Growth rate of infected stock appears to be the same as that of healthy trees. In the Lysander Lake area, where infection and heavy mortality were first detected in 0.5 m (1.6 ft) trees in 1970, the rate of mortality has decreased over the past several years and the incidence is now relatively low. Tree height averages 2 to 3 m (6.5 to 10 ft), and growth rates of healthy and infected pines are comparable.

Elsewhere in the Region, aerial observations indicated no apparent change in damage levels or area affected in the infection centre previously reported in the vicinity of Wavell Lake, Red Lake District. A ground survey in planted red pine (*Pinus resinosa* Ait.) in Aubrey Township, Dryden District where a sanitation program to eradicate infected stock was carried out by the Ontario Ministry of Natural Resources in 1979 did not detect any new infection in 1980.

Samples of infected trees from infection centres in Red Lake and Sioux Lookout districts were submitted to the Great Lakes Forest Research Centre for culturing to determine if the European race of this disease was present in the area. These proved negative in each instance.

Category B

Rhizina Root Rot, *Rhizina undulata* Fr.

An extensive survey to determine the incidence and distribution of this root-rotting fungus was conducted in the latter part of the summer in the Northwestern Region. Past records indicate that this pathogen is likely to be found in recently burned areas where coniferous species occur, and therefore such areas were examined in Red Lake, Kenora and Ignace districts.

Surveys conducted in 14 well drained and 12 low-lying sites at scattered locations indicated that the disease was widely distributed over the burned areas. Fruiting bodies were found at 13 of the locations examined. In each instance, they were found on well drained sites where mineral soil was exposed after fire damage. Reports from western Canada indicate that this disease is capable of killing seedlings up to five years of age. It is also known to cause serious damage to pine regeneration in Europe.

Table 7. Other forest diseases.

Organism	Host(s)	Remarks	Rating
Aureobasidium pullulans (d By.) Arn. A foliar disease	rP	secondary fungus appearing on dead shoots in Ojibway Provincial Park and in Echo Twp, Sioux Lookout District	C
Chrysomyxa arctostaphyli Diet. Spruce broom rust	bS	one infected windbreak tree, Dryden Nursery, Dryden District	B

(continued)

Table 7. Other forest diseases (continued).

Organism	Host(s)	Remarks	Rating
Cytospora chrysosperma (Pers.) Fr. Cytospora canker	Lombardy poplar	high incidence of branch mortality common on shade trees, town of Fort Frances	B
Hypoxylon mammatum (Wahl.) J.H. Miller Hypoxylon canker	tA	light incidence of stem cankers and tree mortality common throughout the Region; highest incidence, 4.6% of trees infected, observed in McCrosson Twp, Fort Frances District	A
Lophodermium pinastri (Schrad. ex Hook.) Chev. Needle cast of pine	rP	light incidence of infection on 2 m (6 ft) high plantings at one location in the Dryden Nursery, Dryden District	B
Melampsorella caryophyllacearum Schroet. Fir broom rust	bF	scattered infected trees at Cloven Lake, Ignace District, and in Forgie Twp, Kenora District	B
Sirococcus strobilinus Preuss Shoot blight of red pine	rP	no apparent change in status at Butterfly Lake and in Echo Twp, Sioux Lookout District; numerous dead branch tips on small understory trees at Caliper Lake Provincial Park and trace infection observed at Lawrence Lake, Fort Frances District	B
Venturia macularis (Fr.) Müller & Arx Leaf and twig blight of aspen	tA	small pocket of high incidence of infection on young regeneration at one location in Farrington Twp, Fort Frances District; trace infections at Stormer Lake and Chukuni River, Red Lake District	B

Table 7. Other forest diseases (concluded).

Organism	Host(s)	Remarks	Rating
Winter browning	rP	57% of trees affected in a 5-ha (12-acre) plantation in Gundy Twp, Kenora District	B

Abiotic Damage

Hail Damage

Aerial and ground surveys in the Pickle Lake area, Sioux Lookout District revealed that a hailstorm which occurred during the first week of September 1979 caused severe damage to tree species through an area of approximately 10 km^2 (6.2 mi^2) of forested land. Serious injury to branches of larger trees and branches and stems of small trees occurred on parts of the trees exposed to the west. Considerable branch mortality as well as some tree mortality in small-diameter trees was evident by midsummer 1980 (see Frontispiece). Similar damage reported in the Fork Lake area of Sioux Lookout District in 1979 caused heavy tree mortality in the area by midsummer 1980. A similar situation is expected in the Pickle Lake area over the next 1-2 years. In Fort Frances District, trees of several species growing on an island in Essox Lake and along shorelines were severely damaged by a hailstorm which probably occurred in late 1979 or early 1980. Considerable mortality of small-diameter trees and branch mortality of larger trees had occurred by late summer.

During the first week of July 1980, a severe hailstorm occurred in the vicinity of Dryden, Dryden District. The hailstones were reported to be as large as baseballs, and caused serious damage to buildings, automobiles, etc.; therefore, severe damage to forested areas in the path of this storm can be expected.

Frost Damage

As part of the survey of high-value black spruce, evaluations were conducted at 10 sample points to determine the incidence of frost damage in the Region.

This survey revealed that frost damage occurred at five of the areas examined. The most severe damage was recorded in a small-diameter black spruce plantation in the Stranger Lake area, Sioux Lookout District, where 42% of the current leaders were damaged. Elsewhere, damage was confined to lateral current shoots (Table 8).

Table 8. Summary of damage caused by frost in the Northwestern Region in 1979 (counts based on the examination of 100+ randomly selected trees at each location).

Location	Tree species	Avg ht of trees (m)[a]	Trees affected (%)	Trees severely affected (%)	Foliage damaged (%)
Sioux Lookout District					
Stranger Lake	bS	0.8	42	42	13
Vermilion River	bS	1.0	1	0	1
Dryden District					
Britton Twp	bS	1.2	5	0	5
Ignace District					
Victoria Lake	bS	1.3	2	0	1
Fort Frances District					
Kingsford Twp	bS	1.4	25	0	5
Kingsford Twp	wS	1.4	50	0	5

[a] 1 m = 3.28 ft

Special Surveys

Survey of High-value Black Spruce

In 1980, a special survey was conducted in high-value black spruce stands at 10 locations in the Northwestern Region to determine the incidence of damage caused by insect attack or disease infection (Fig. 7). Four evaluations were completed in each of three height classes where available: <2 m (6 ft), 2-6 m (6-20 ft), >6 m (20 ft+).

Insects Surveyed

1. Spruce Budworm — *Choristoneura fumiferana* (Clem.)
2. Yellowheaded Spruce Sawfly — *Pikonema alaskensis* (Roh.)
3. Adult Sawyer Beetle spp. — *Monochamus* spp.
4. White Pine Weevil — *Pissodes strobi* (Peck)

NORTHWESTERN REGION

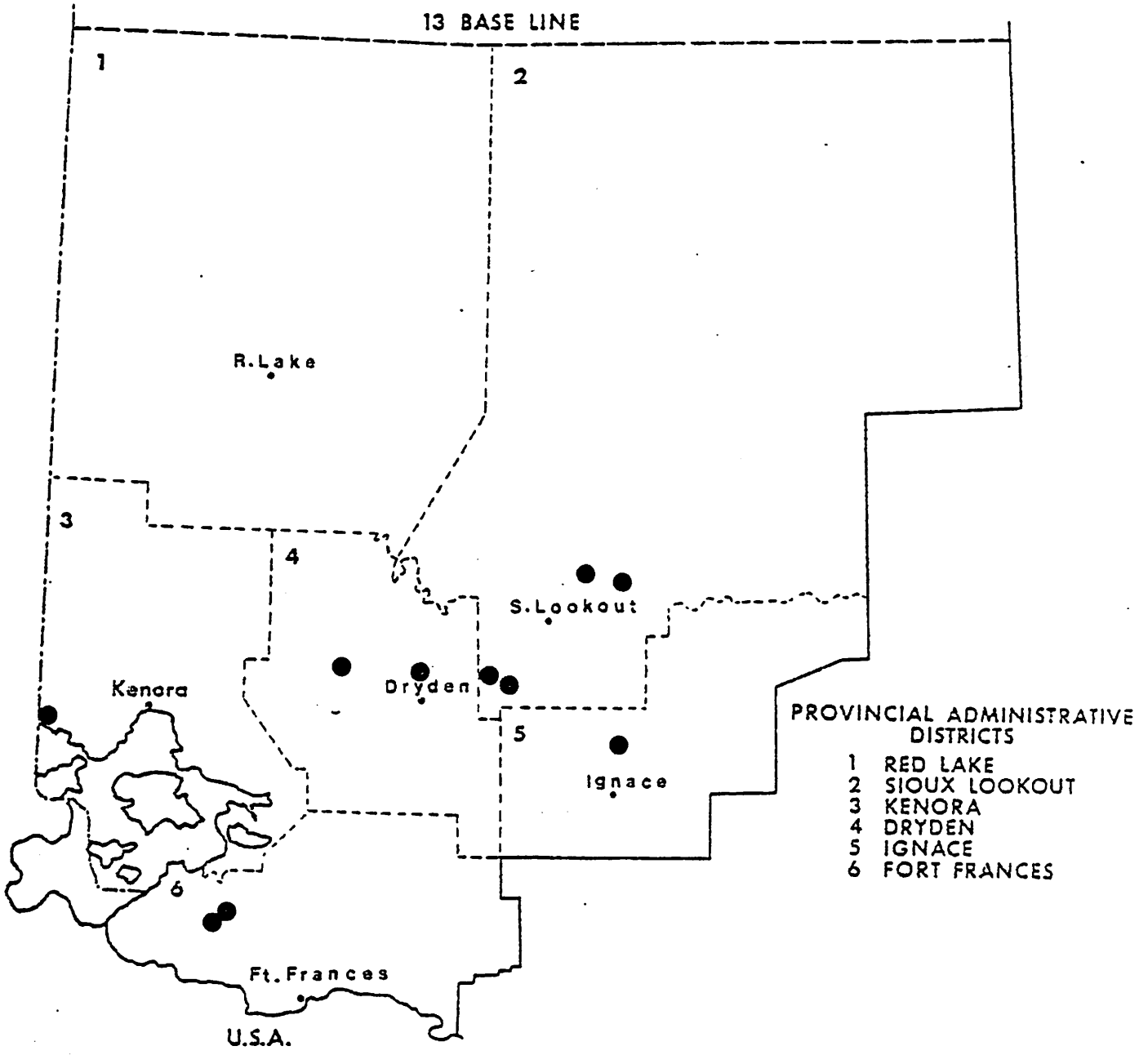

Fig. 7 BLACK SPRUCE SURVEY

Locations where spruce stands were sampled in 1980 . . . . . ●

Insects Surveyed (cont'd)

5. Miscellaneous Insects

Needletier	*Sparganothis sulfureana* Clem.
Spruce Bud Midge	*Rhabdophaga swainei* Felt

Diseases Surveyed

1.	Armillaria Root Rot	*Armillaria mellea* (Vahl ex Fr.) Kumm.
2.	Spruce Needle Rusts	*Chrysomyxa ledi* (Alb. & Schw.) d By.) and *C. ledicola*
3.	Frost Injury	
4.	Dwarf Mistletoe	
5.	Miscellaneous Diseases	

The results of this survey, summarized in Table 9, show that very little insect damage was occurring when none of the species listed were found. Three of the four important disease pathogens listed were present at one or more of the sample points. Serious frost damage occurred at the Stranger Lake site. Damage from other causes was low or absent.

Black Spruce Flower and Cone Survey

In 1980, a survey of black spruce flowers and cones was conducted throughout northern Ontario to determine if insects (or diseases) were causing damage, to identify the insects and to determine the resulting incidence of damage. Flower and cone samples were collected from upland and lowland stands within and outside of spruce budworm-infested areas. The difference in the incidence of damage within and outside of infested areas was also considered because budworm feeding does cause serious damage to white spruce and balsam fir cones. Samples of male and female flowers from six points and cones from seven points in the Northwestern Region were submitted to the Great Lakes Forest Research Centre for damage analysis. The results showed that although only small numbers of flowers were damaged, a relatively high incidence of damage had occurred to developing cones; however, there did not appear to be any significant differences in numbers damaged whether from within or outside of budworm-infested areas (Table 10).

In addition to the above, damaged cones from each sample area were dissected and examined to determine the incidence of seed damage. These dissections showed that, over all, approximately 50% of the seeds in damaged cones had been destroyed or seriously damaged.

Table 9. Summary of results of the black spruce survey conducted at 10 locations in the Northwestern Region (counts based on the examination of 150 randomly selected trees at each location).

Location[a]	Avg ht of trees (m)[b]	Trees affected: Insect: Bud midge (%)	Trees affected: Insect: Needle-tier (%)	Trees affected: Disease: Armillaria root rot (%)	Trees affected: Disease: Needle rust (%)	Trees affected: Disease: Frost (%)
Sioux Lookout District						
Vermilion R.	0.9	0.0	0.7	0.7	12.0	0.7
Stranger Lake	0.8	0.0	0.0	0.0	0.0	42
Echo Twp	2.7	0.7	0.7	0.0	0.0	0.0
Kenora District						
Forgie Twp	1.6	0.0	0.0	0.7	0.0	0.0
Ignace District						
Victoria Lake	1.3	1.3	0.0	0.0	0.0	2.0

[a] Sample points where affected trees were found

[b] 1 m = 3.28 ft

Table 10. A summary of the percentages of damaged black spruce male and female flowers collected between 26 May and 3 June and damaged black spruce cones collected between 21 July and 29 July in four districts in 1980.

Site and location	No. of flowers examined		Flowers damaged (%)		Developed cones examined	Developed cones damaged (%)	No. of cones damaged by[a]	
	Male	Female	Male	Female			Lepidoptera	Other insects
Lowland - not within spruce budworm infestation								
Ignace District								
Hwy 17 at Revelle R.	236	148	0	2	100	37	10	22
Kenora District								
Lemay Twp	217	263	8	4	100	23	6	20
Average			4.0	3.0		30.0		
Upland - not within spruce budworm infestation								
Ignace District								
Hwy 17 at Raven Lake	288	282	0	2	100	82	45	13
Dryden District								
Dryden Forest Station	176	245	3	4	100	14	0	7
Average			1.5	3.0		48.0		
Lowland - within spruce budworm infestation								
Fort Frances District								
Farrington Twp	216	306	2	2	100	15	0	11
Average			2.0	2.0		15.0		
Upland - within budworm infestation								
Fort Frances District								
Vista Lake	-	-	-	-	100	65	41	2
Mine Centre	290	392	6	4	100	30	14	26
Average			3.0	2.0		47.5		

[a]Damage to an individual cone may be caused by more than one insect.