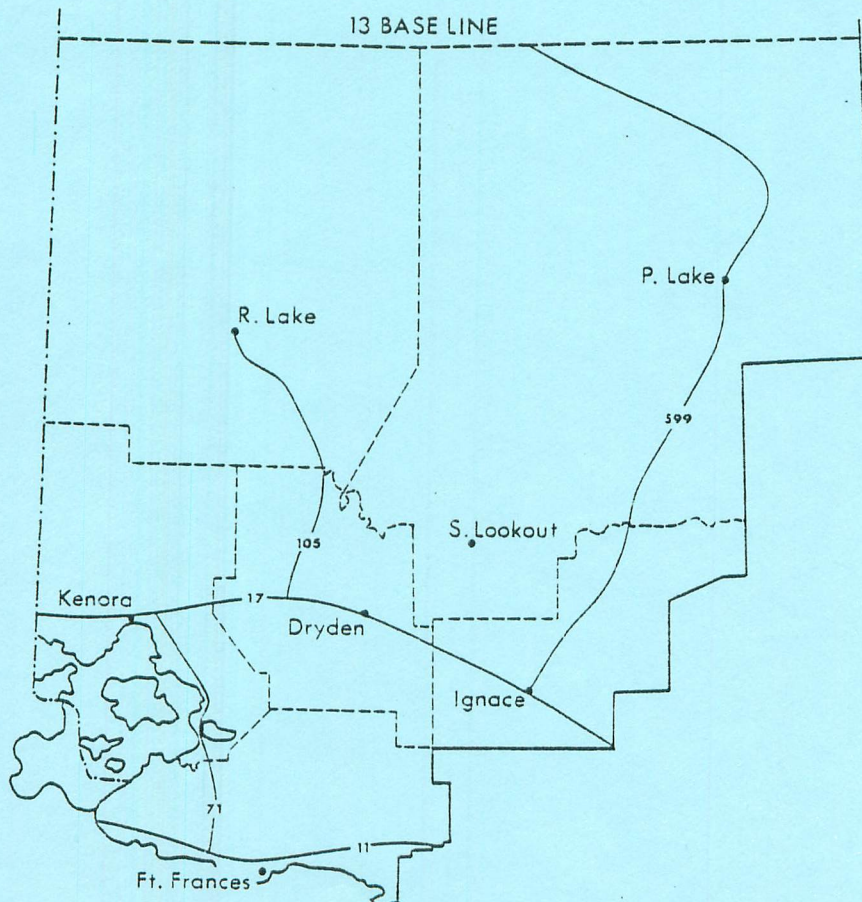


Results of forest insect and disease surveys in the NORTH WESTERN REGION of Ontario, 1981



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

SURVEY HIGHLIGHTS

This report describes the status of the more important forest insect and disease conditions in the Northwestern Region in 1981. The information contained herein was obtained by aerial and ground surveys.

Although the area infested by the spruce budworm decreased slightly in the southern portion of the Region, an increase in distribution was recorded for the second consecutive year when a pocket of light infestation was discovered at Moar Lake in the western part of the Red Lake District. An eightfold increase in the area infested by the bronze birch borer was recorded in the Red Lake District. Populations of the aspen leafblotch miner, a birch leafminer and the birch skeletonizer increased in intensity and infested host stands throughout large areas of forested land. The known ranges of the mountain-ash sawfly and the introduced pine sawfly were extended when the former was recorded for the first time in the Region and the latter was found in the Dryden District. Adult sawyer beetle damage on fringes of cutover areas increased in the Red Lake District. Populations of the forest tent caterpillar collapsed in the early spring, leaving the Region essentially free of caterpillar infestation for the first time in more than a decade.

Annual surveys for Dutch elm disease revealed that, although no change in distribution could be determined, there was a marked increase in the incidence of infection. Aerial and ground surveys disclosed no change in numbers of areas infested by *Scleroderris* canker of pines; however, a decrease in mortality in areas previously infested was evident. There was a marked increase in the incidence of needle rusts of spruce in the southern half of the Region. Drought conditions over an extended period caused early foliage deterioration and leaf drop on trees of some deciduous species in a large area in the southern half of the Region.

In recent years special surveys have been conducted in high-value spruce or pine stands to determine the incidence of damage caused by specific insects or diseases. In 1981, a survey was conducted in white spruce stands at randomly selected locations in the Region to determine the incidence of damage caused by five insects and five diseases known to affect white spruce.

In this report, the following categories are used to describe the importance of insects or diseases:

Major Insects or Diseases

Capable of causing serious injury to or death of living trees or shrubs (formerly categories A and B)

Minor Insects or Diseases

Capable of sporadic or localized injury but not usually a serious threat to living trees or shrubs (formerly category C)

Other Forest Insects/Diseases (Tables)

These tables provide information on two types of pest: 1) those which are of minor importance and have not been known to cause serious damage to forest trees, and 2) those which are capable of causing serious damage but, because of low populations or for other reasons, did not cause serious damage in 1981.

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

The assistance and excellent cooperation extended to the authors by the Ontario Ministry of Natural Resources, forest industry and private individuals during the 1981 field season are gratefully acknowledged.

M. J. Thomson

C. G. Jones

Frontispiece



Birch skeletonizer
(*Bucculatrix*
canadensisella Cham.)
damage

Sawyer beetle (*Monochamus* spp.)
larvae predation by an unknown
predator. NOTE: Pieces of
bark removed from infested trees



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INSECTS

Major Insects

Bronze Birch Borer, *Agriilus anxius* Gory

Surveys and aerial mapping in the northern part of the Red Lake District in late August revealed high populations of this insect for the second consecutive year. It caused damage in white birch (*Betula papyrifera* Marsh.) stands over approximately 1,700 km² of forested land, an eightfold increase over the area infested in 1980. The current infestation encompassed the area previously infested in the vicinity of Cairns and Pikangikum lakes and extended eastward to near the west side of Mamakwash Lake. Small pockets of damage were also observed at points to the northwest and south of the Cairns-Pikangikum lakes area (Fig. 1).

The surveys also revealed heavy mortality of host trees in the older part of the infested area. High larval populations were found on trees as small as 7 cm in diameter at two points where ground checks were made; consequently, additional mortality can be expected in the future. Ground cruising at scattered points to determine the percentage of tree mortality in the area is planned for the 1982 field season.

Birch Skeletonizer, *Bucculatrix canadensisella* Cham.

The two small pockets of infestation recorded in 1980 in the Fort Frances District increased in 1981 and now total approximately 1,832 km² of forested land in the Northwestern Region (Fig. 2).

Drought conditions and the resultant leaf discoloration in the southern part of the Region made it impossible to estimate defoliation or map the infestations from the air. Therefore, many ground checks were instituted to assess defoliation and to give some idea of the distribution and size of the infestations.

The heaviest defoliation in the western infestation in the Fort Frances District occurred in the townships of Dobie, Shenston, Mather, Potts, Sifton and Tovell. In the east the heaviest damage occurred in Watten and Farrington townships and in the Wernekos Landing area along Highway 502.

A moderate infestation was recorded in the Ontario Ministry of Natural Resources (OMNR) Forest Station near Dryden. Elsewhere in the Region trace populations were observed south of the town of Dryden, in Forgie Township in the Kenora District, along Highway 105 south of Ear Falls in the Red Lake District, and at Echo Township and Hamilton Lake in the Sioux Lookout District.

Repeated high populations of this insect can seriously weaken trees, predisposing them to attack by other pests. They also lessen the aesthetic value of ornamental trees (see Frontispiece).

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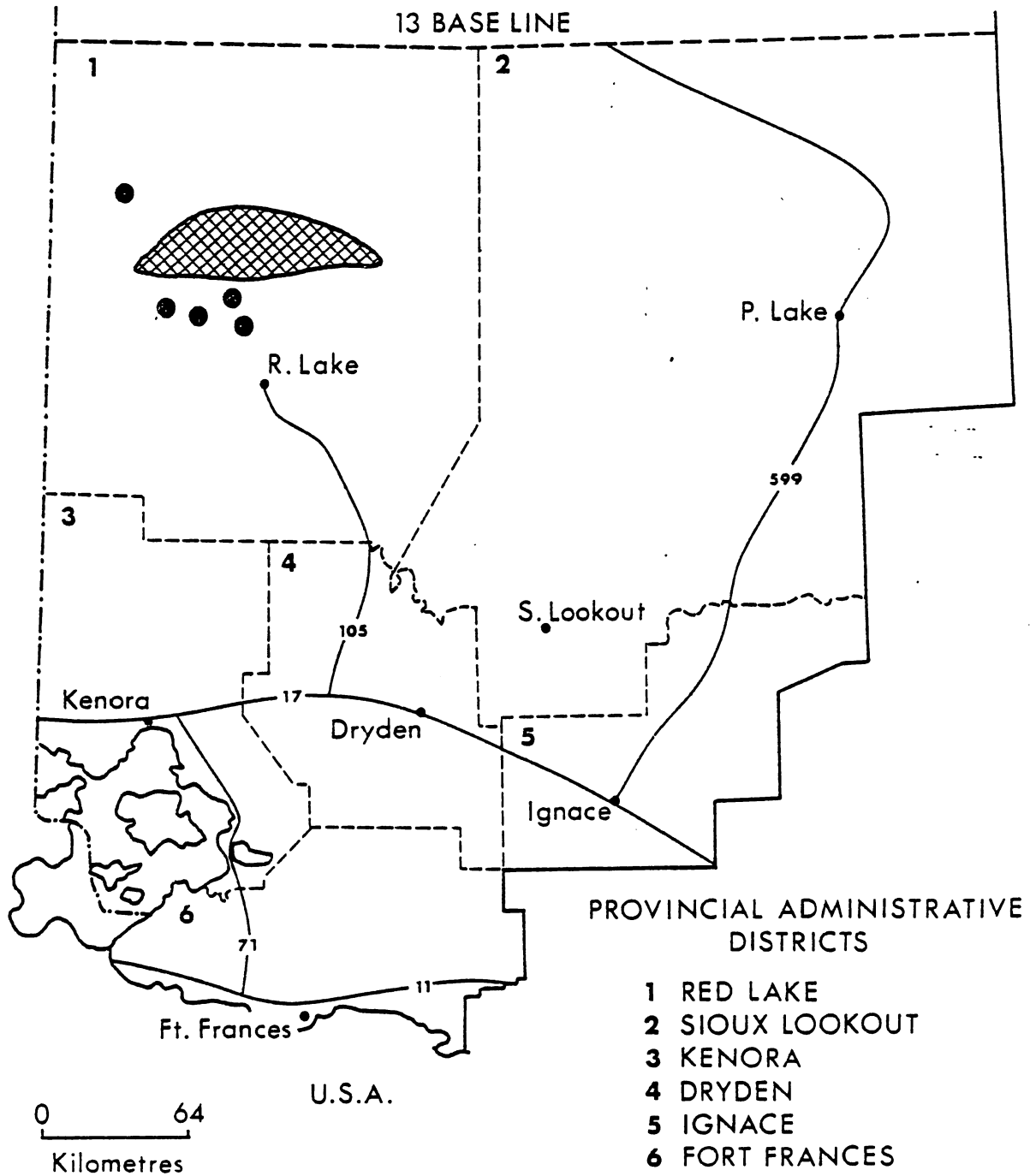


Figure 1. Bronze birch borer (*Agrius anxius* Gory)
Locations in which severe damage occurred
in 1981 ● or ▣

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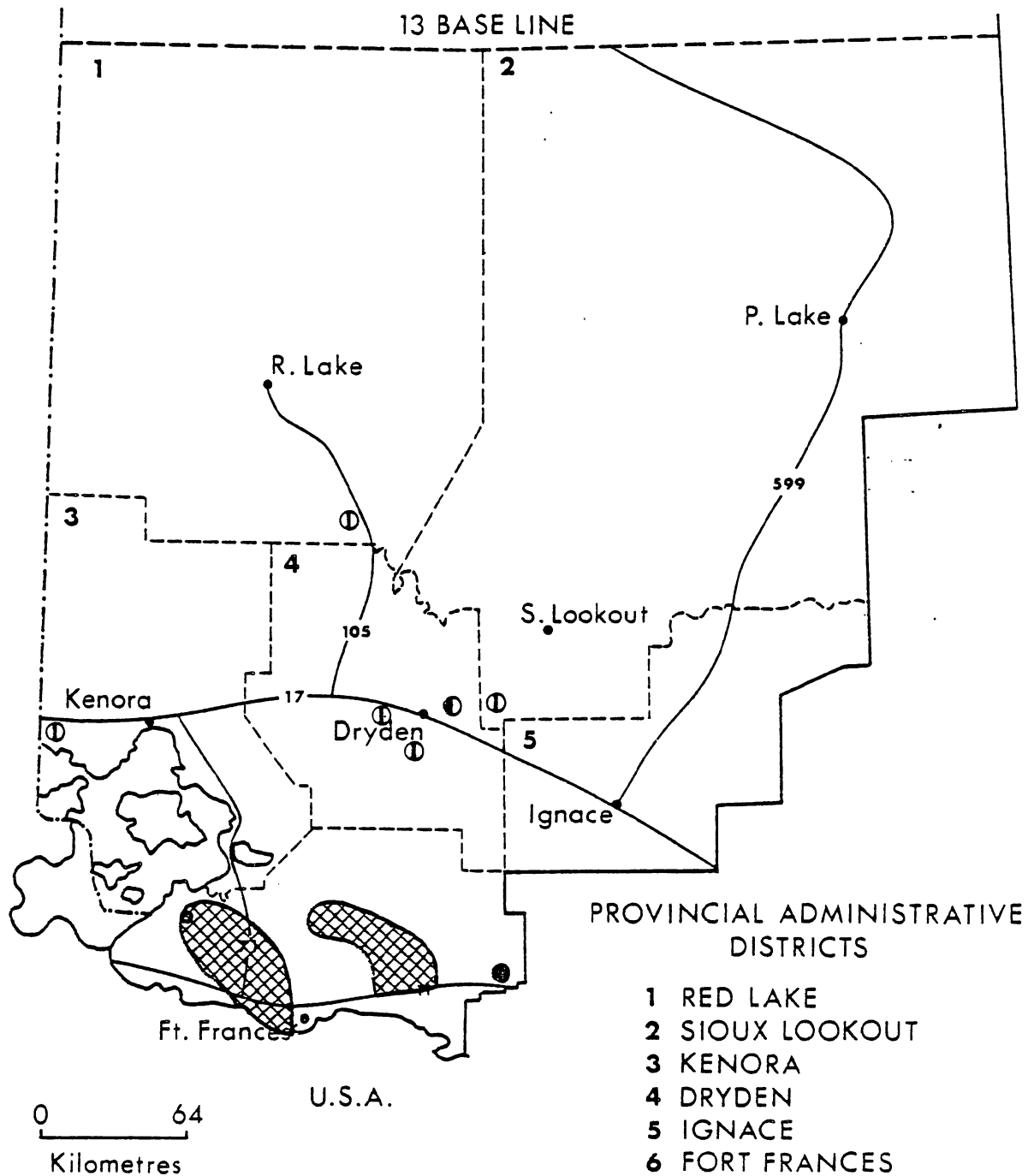



Figure 2. Birch skeletonizer (*Bucculatrix canadensisella* Cham.)

Areas in which defoliation of white birch (*Betula papyrifera* Marsh.) occurred in 1981.

- | | | |
|--------------------|------|---|
| Severe | ● or |  |
| Moderate | ● | |
| Light | ⊖ | |

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 will provide a complete description and analysis of developments in the spruce budworm situation in Ontario in 1981 and will give infestation forecasts for the province for 1982.

Eastern Pine Shoot Borer, *Eucosma gloriola* Heinr.

After four consecutive years of low population levels of this insect on jack pine (*Pinus banksiana* Lamb.), an increase was recorded in 1981. Results of quantitative sampling at 10 widely separated locations (Fig. 3) showed that the average number of terminal leaders destroyed by the insect more than doubled over the previous year--7.1% in 1981 in comparison with 3.0% in 1980. Numbers of terminal shoots destroyed ranged from 1% in the Red Lake and Ignace districts to 23% in a plantation in McMeekin Township, Kenora District (Table 1). Surveys at scattered points elsewhere in the Region revealed only trace populations in regenerated areas.

The insect attacks the current shoots of host trees. The larvae feed in the pith of the shoot and when nearly full grown they girdle the attacked shoot from the inside, thereby killing it. Although damage caused by the killing of lateral shoots is considered negligible, repeated terminal attacks retard the height growth of trees and cause crooked stems.

Forest Tent Caterpillar, *Malacosoma disstria* Hbn.

In 1981 populations of this insect collapsed throughout the western part of the Fort Frances District where a light-to-moderate infestation was recorded in 1980.

Quantitative sampling on trembling aspen (*Populus tremuloides* Michx.) in the Lake of the Woods Provincial Park in early June revealed only a trace population in that area. Aerial and ground surveillance failed to detect any defoliation attributable to this forest insect anywhere in the Northwestern Region.

Results of quantitative sampling in August to determine the presence of egg bands were negative.

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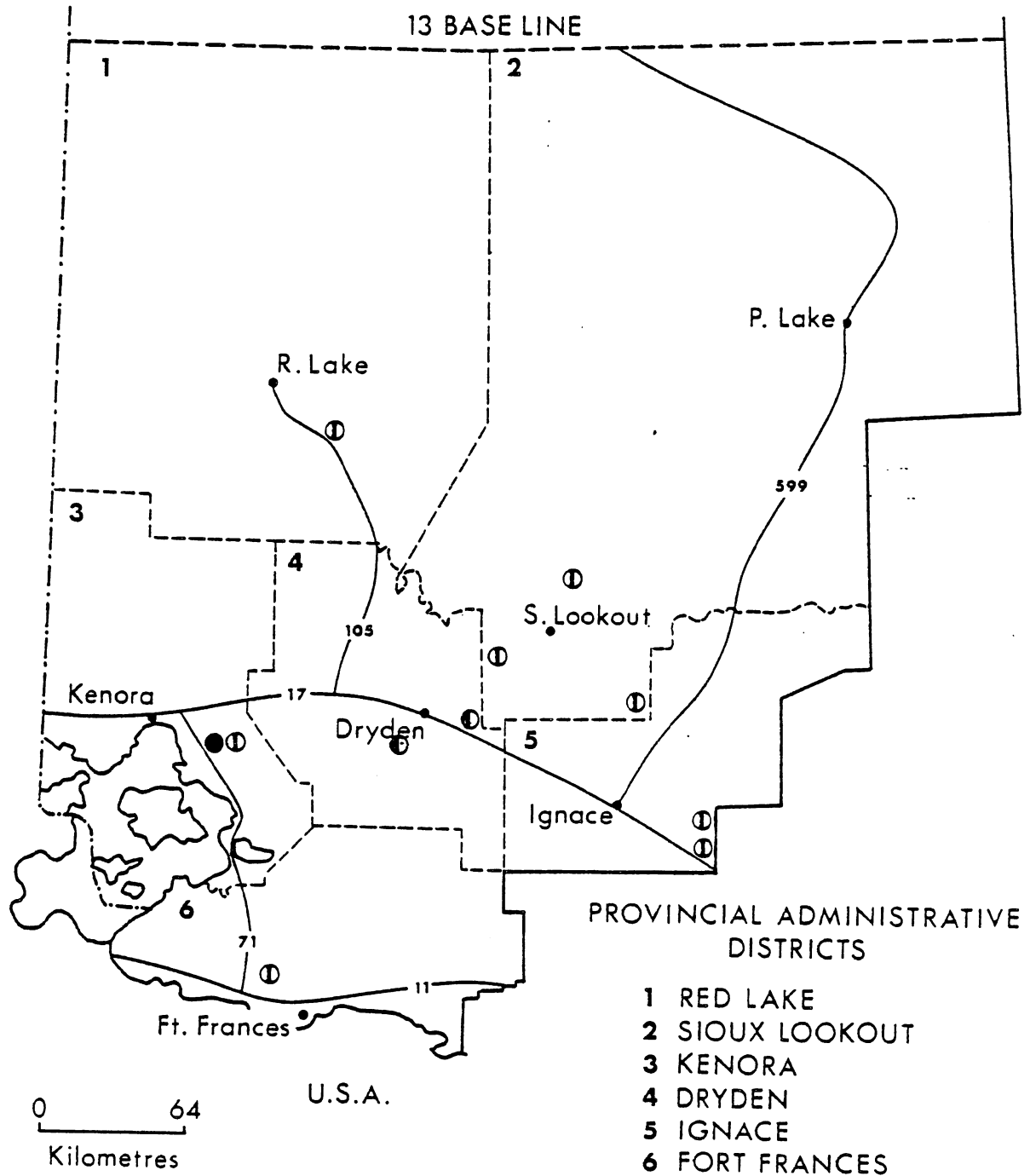


Figure 3. Eastern pine shoot borer (*Eucosma gloriola* Heinr.)

Locations in which damage occurred in 1981.

- Severe ●
- Moderate ⊙
- Light ⊖

Table 1. Summary of damage by the eastern pine shoot borer in the North-western Region in 1981 (counts based on the examination of 150 randomly selected jack pine regeneration trees at each location).

Location	Estimated area infested (ha)	Estimated no. of trees/ha	Trees with lateral shoot damage (%)	Trees with terminal shoot damage (%)
Red Lake District				
Chukuni R. Access Rd.	500	15,000	0	1
Sioux Lookout District				
Goodie Lake Access Rd.	20	5,000	0	2
Vermilion River	85	3,000	0	4
Ignace District				
Martin Siding Area	500	15,000	0	1
Kenora District				
314 Road (Km 24)	50	6,000	1	0
McMeekin Twp	3	3,000	31	23
Dryden District				
South of Melgund Twp	50	5,000	5	0
Aubrey Twp	50	5,000	3	7
MacFie Twp	50	10,000	3	12
Fort Frances District				
Carpenter Twp	3	3,000	1	0

Sawyer Beetles, *Monochamus* spp.

Aerial surveys of recent cutover areas in the Northwestern Region during the latter part of August revealed that damage caused by adult sawyer beetles feeding on branches and twigs of jack pine and black spruce (*Picea mariana* [Mill.] B.S.P.) decreased in the Ignace and Sioux Lookout districts; however, there was an increase in the Red Lake District.

Examination of cutover areas near the east end of Red Lake and in the vicinity of Coli and Anderson lakes approximately 32 km northeast of the town of Red Lake revealed extensive damage on the fringes of nearly

mature jack pine stands at three points west of Anderson Lake. Damage extended an estimated 0.75 km along the fringe and penetrated approximately 40 m into the most heavily damaged stand. It was noted that spring-cut wood in tree-length units remained piled in the area adjacent to the most seriously damaged stand.

Trace damage was noted at one point approximately 1.5 km north of Coli Lake and at one point in a cutover near the northeast end of Red Lake in the Red Lake District. Elsewhere, small numbers of damaged trees were observed on the fringes of cutover areas west of the town of Hudson in the Sioux Lookout District, and north of Burk Township and west of Basket Lake in the Ignace District.

In the Fort Frances District, jack pine regeneration trees (avg ht 1 m) growing in an area adjacent to a stock pile of wood beside an access road near Barker Lake were seriously damaged. A quantitative sample in a small-diameter mixed pine and spruce stand in the area revealed that 72% of the trees in a strip approximately 40 m deep x 1.2 km long had been attacked, and considerable mortality was evident by late summer. Observations over the past several years indicate that heavily damaged trees very often die during the winter following sawyer beetle attack; therefore, varying amounts of mortality will likely occur in these damaged areas by the spring of 1982.

High populations of this insect are usually found in pine and spruce stands damaged by fire. Examination in the spring of 1981 of some of the stands which had burned the previous year revealed that populations were extremely high; however, there was evidence that many larvae had been destroyed by woodpecker feeding prior to penetration into the bole of the infested trees in late fall (see Frontispiece).

Although sawyer beetles in this area normally require two years to complete their life cycle from larva to adult, many completed this cycle in much less time. Surveys in late August of 1981 in an area burned in the latter part of June, 1980 near Ten Mile Lake in the Ignace District revealed that there had been considerable adult emergence 14 months or less after the fire.

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

Population levels of this leafblotch miner increased sharply for the second consecutive year on trembling aspen regeneration throughout approximately 100,000 km² of forested land in the southern half of the Region. Severe leafmining and early foliage discoloration were general on roadside and regeneration stands throughout Kenora, Dryden and Fort Frances districts. Similar damage was observed at scattered locations in Red Lake, Sioux Lookout and Ignace districts (Fig. 4). Pockets of moderate and light damage were recorded at several points in the latter three districts as well.

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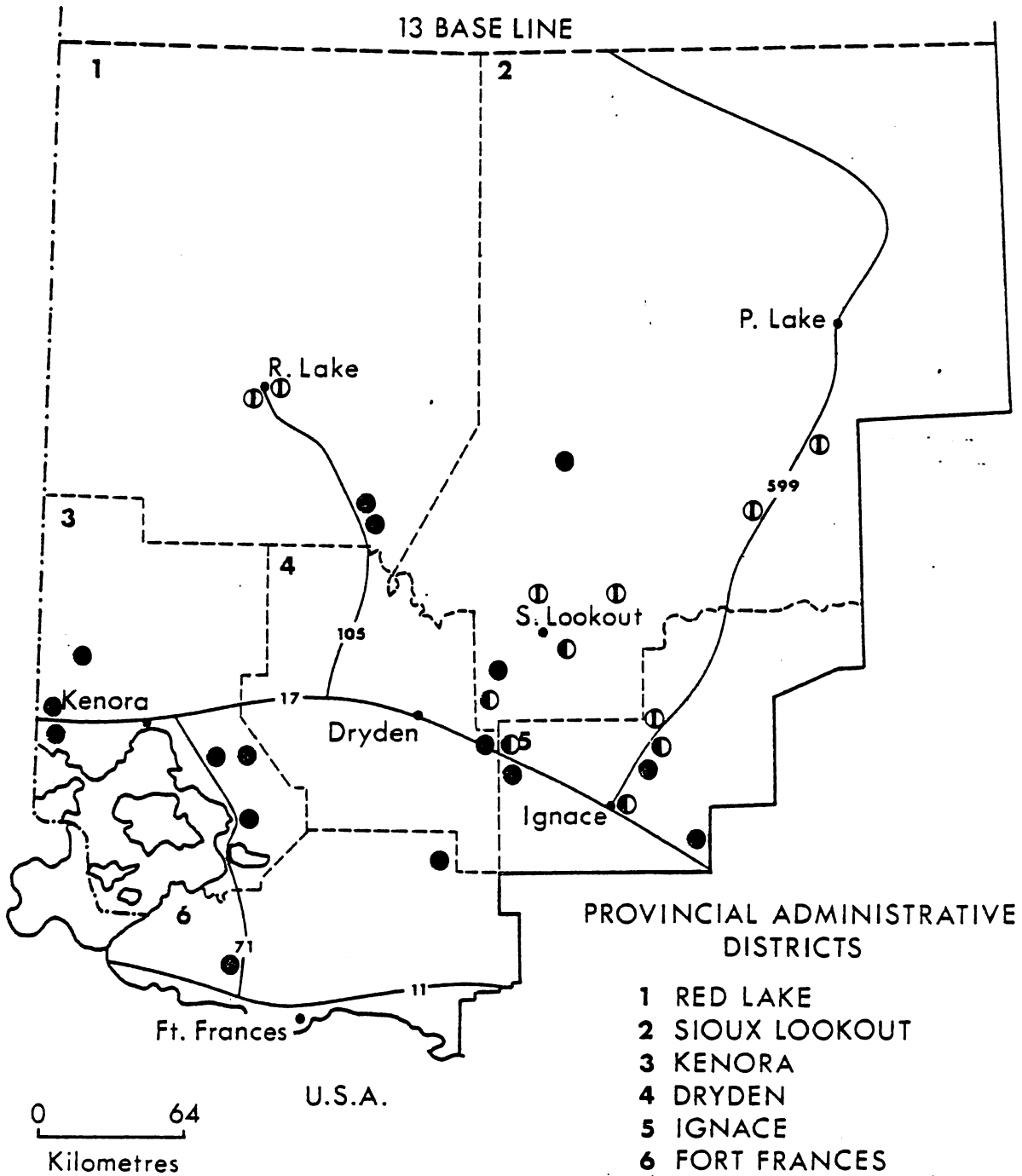


Figure 4. Aspen leafblotch miner (*Phyllonorycter ontario* (Free.))

Locations in which damage occurred in 1981.

- Severe ●
- Moderate ⊙
- Light ⊕

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

Populations of this sawfly were high on white spruce (*Picea glauca* [Moench] Voss) for the sixth consecutive year at widely scattered points in the southern half of the Region (Fig. 5).

Small, open-growing trees along Highway 72 near Butterfly Lake in Sioux Lookout District were heavily infested. Trees on the pipeline right-of-way east of Gulliver River in Ignace District were severely damaged. In the Fort Frances District, white spruce along Highway 600 north of Rainy River suffered similar damage. Numerous severely defoliated trees were also observed along the Minitaki Road in Dryden District. Small numbers of lightly to moderately defoliated trees were found at scattered points elsewhere in the Region.

Light tree mortality was observed on roadside regeneration along Highway 72 near Laval Lake and in a plantation in Britton Township in the Dryden District.

In conjunction with the high-value white spruce survey conducted in the Region, sawfly damage was evaluated in eight randomly selected areas. A high population of yellowheaded spruce sawfly was present in a 6.5 ha white spruce plantation in Britton Township in the Dryden District. A spray operation with the chemical Malathion was instituted by OMNR personnel, and a post-spray evaluation revealed an average defoliation of 10% in the plantation. In a mixed plantation of red pine (*Pinus resinosa* Ait.), jack pine and white spruce in Farrington Township, Fort Frances District, white spruce defoliation averaged 14% over all. No spray operation was carried out.

Repeated, severe defoliation of small planted or natural regeneration white spruce by this sawfly over a period of two to five years causes retarded tree growth and mortality.

White Pine Weevil, *Pissodes strobi* (Peck)

Population levels of this weevil have remained low over the past several years. Quantitative sampling was carried out in jack pine regeneration stands or in planted areas at 10 locations to determine the incidence of weevil attack in each area (Fig. 6). Data obtained from these samples revealed that two points were negative and low populations at the remaining eight points destroyed an average of 1.6 of the leaders per sample point (Table 2). General surveys elsewhere in the Region revealed that the weevil was widely distributed at population levels comparable with those observed at the quantitative sample points.

An unknown species of predator attacked and destroyed high numbers of weevil pupae near Pakwash Lake in the Red Lake District and at

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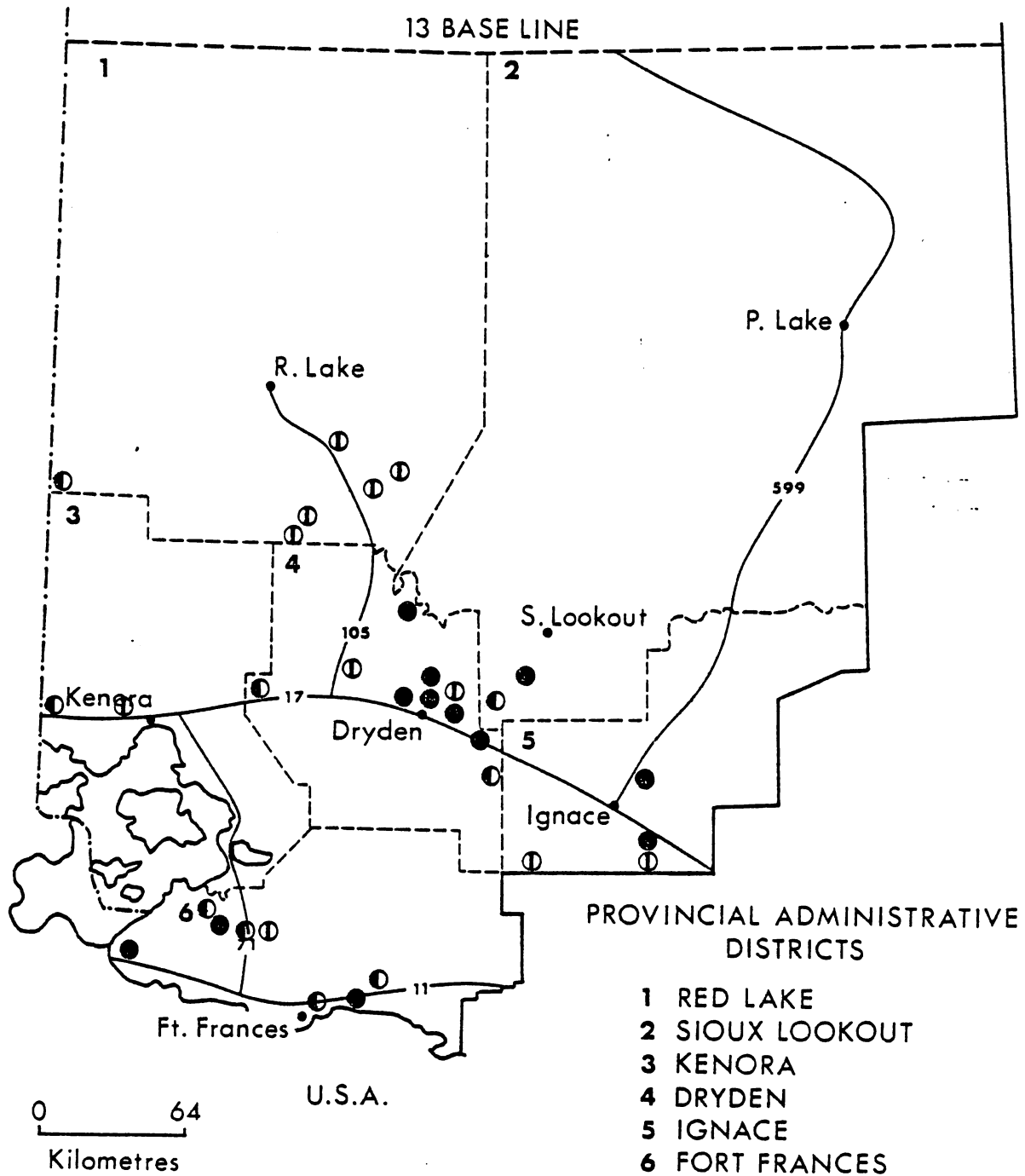


Figure 5. Yellowheaded spruce sawfly (*Pikonema alaskensis* [Roh.])
Locations in which defoliation of spruce (*Picea* spp.)
occurred in 1981.

- Severe ●
- Moderate ○
- Light ⊙

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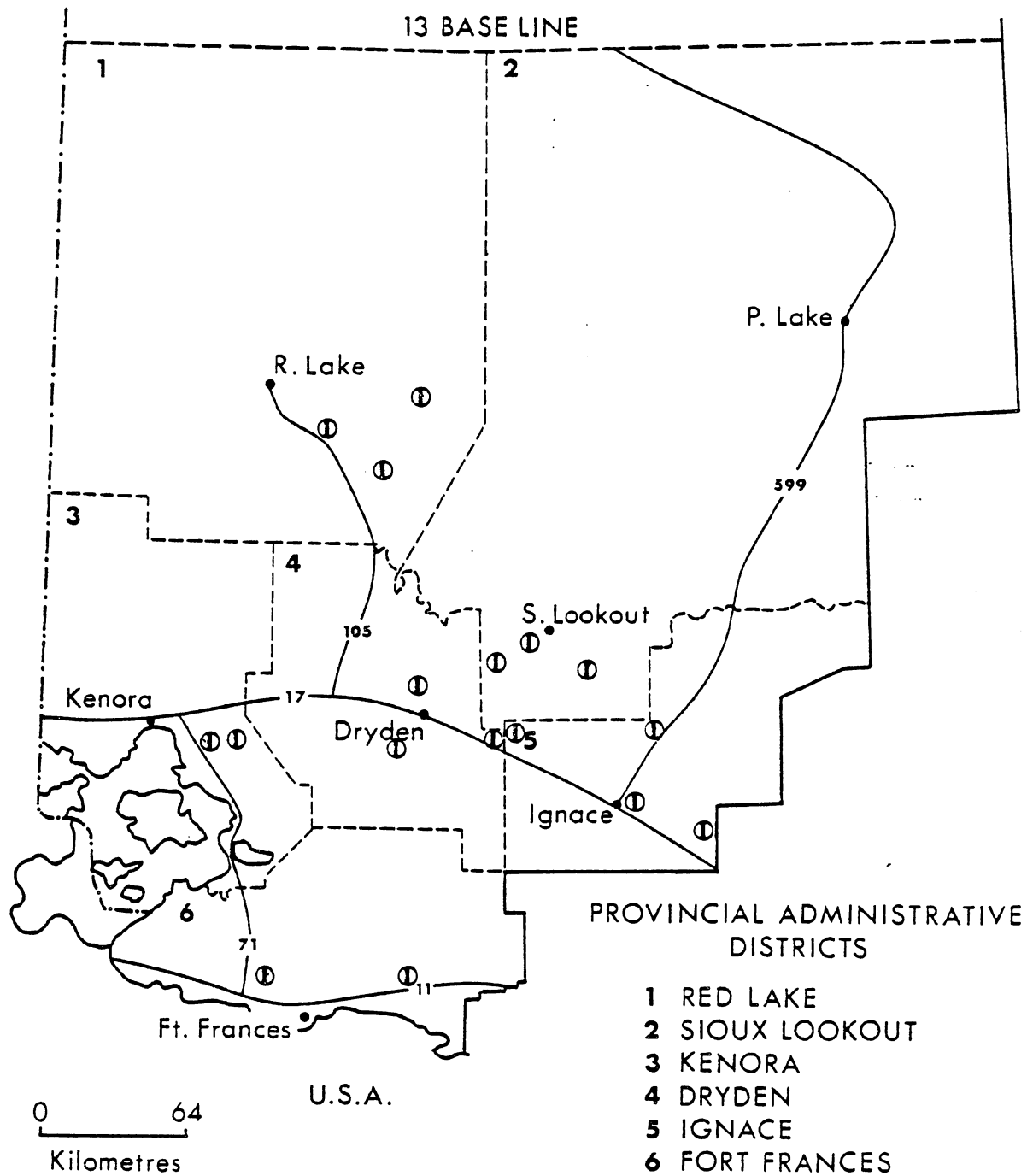


Figure 6. White pine weevil (*Pissodes strobi* [Peck])
 Locations in which light damage occurred
 in 1981 ①

Pinafore Lake in the Ignace District. Examination of 25 weevil-infested trees at each point revealed that 100% and 6%, respectively, of the trees examined had been attacked by the predator. In some instances 100% of the weevils had been destroyed. The stripping of bark and penetration into the pupal cells by the predator indicated that woodpeckers were probably responsible.

Table 2. Summary of damage by the white pine weevil in the Northwestern Region in 1981 (counts based on the examination of 150 randomly selected jack pine regeneration trees at each location).

Location	Estimated area infested (ha)	Estimated no. of trees/ha	Avg ht of trees (m)	Trees weeviled (%)
Red Lake District				
Chukuni River Access Rd	500	15,000	1.9	1
Sioux Lookout District				
Vermilion River	85	3,000	1.4	0
Snag Lake	50	10,000	1.6	2
Goodie Lake	20	5,000	1.7	1
Ignace District				
Martin Siding Area	500	15,000	2.6	1
Kenora District				
314 Road (Km 24)	50	6,000	1.1	0
McMeekin Twp	3	3,000	2.2	5
Dryden District				
MacFie Twp	50	10,000	1.7	1
Aubrey Twp	50	5,000	1.4	1
Fort Frances District				
Carpenter Twp	3	3,000	2.3	1

Larch Sawfly, *Pristiphora erichsonii* (Htg.)

Generally, population levels of this sawfly decreased in 1981, except in the southernmost part of the Region where a new medium-to-heavy infestation was noted in a 1 ha tamarack (*Larix laricina* [Du Roi] K. Koch) stand in Morley Township, Fort Frances District. Pockets of medium-to-heavy infestation reported for two consecutive years in the Ignace District and at one location in the Sioux Lookout District decreased to reach low population levels on scattered trees in 1981. General surveys at numerous locations elsewhere in the Region revealed the presence of small numbers of larval colonies on regeneration trees along roadsides, in cutover areas or on fringes of stands at scattered locations. In the Red Lake District, however, no larval colonies or defoliation could be found.

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

The collection of this insect within the town of Fort Frances is a new record for the Northwestern Region and represents a 100 km westward extension of its known range. The insect caused light-to-moderate defoliation on occasional ornamentals but was not found outside the immediate townsite.

Serious foliar damage to ornamental and shade trees can result, and subsequently the aesthetic value of these trees is reduced. The damaged trees will usually survive complete defoliation.

The principal hosts are American mountain-ash (*Sorbus americana* Marsh.), European mountain-ash (*S. aucuparia* L.) and occasionally showy mountain-ash (*S. decora* [Sarg.] Schneid.).

Ambermarked Birch Leafminer, *Profenusa thomsoni* (Konow)

Aerial surveys revealed unusually high populations of this leafminer in the Sioux Lookout and Red Lake districts. Foliar damage was heavy in white birch stands on islands, along lakeshores and occasionally on hilltops through approximately 870 km² of forested land in the Sioux Lookout District. The major area of infestation was bounded by Greenbush, Minchin and Doran lakes and the northeast end of Lake St. Joseph. Damage was also heavy in stands in a small area on the north side of Pickle Lake. In the Red Lake District, heavy foliar damage was observed on shoreline trees at Wyman and Murfitt lakes, approximately 75 km north of Red Lake (Fig. 7). Examination of infested trees in the Minchin and Pickle lakes infestations showed that more than 90% of the foliage was mined by one or more leafminers. Trace populations were observed at four widely scattered points elsewhere in the Region.

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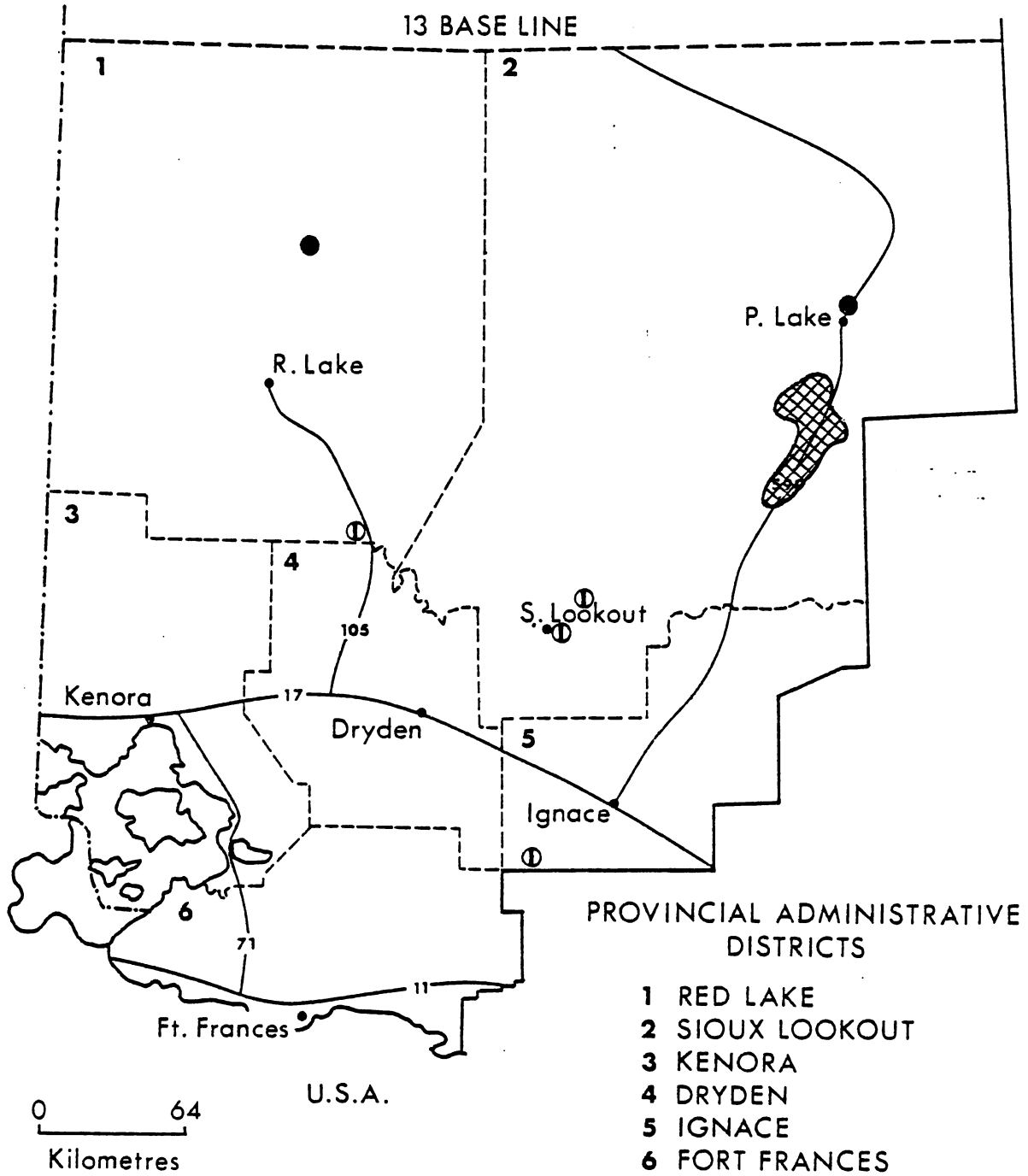



Figure 7. Ambermarked birch leafminer (*Profenusa thomsoni* [Konow])
 Locations in which leafmining occurred in 1981.
 Severe ● or 
 Light ①

Introduced Pine Sawfly, *Diprion similis* (Htg.)

This sawfly was collected for the first time in 1970 in the Fort Frances District, Northwestern Region. It was recorded in stands of mature and immature white pine (*Pinus strobus* L.) within an 8,000 ha triangular area bounded by the town of Fort Frances in the west, Bear Pass in the east and Rice Bay in the north. In 1979 the sawfly was recorded farther north in Caliper Lake Provincial Park and at Kaiarskons Lake in Fort Frances District.

This northern boundary was extended 120 km in 1981. Larvae were collected in the Sioux Narrows area in Kenora District and farther north in the town of Dryden (Fig. 8). The recorded populations of *D. similis* were low and the insect was observed feeding on red pine, white pine and jack pine, with white pine appearing to be the preferred host.

There are two generations of the introduced pine sawfly and, because of overlap, all stages of the sawfly may be found throughout the summer. The first generation feeds on the old needles, while the second feeds on both new and old foliage. Cocoons of the first generation are spun among the needles or in bark crevices while those of the second generation are spun on the tree or in the ground.

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

Population levels of this insect increased this year. Quantitative sampling in small-diameter jack pine regeneration stands at six locations revealed that, over all, an average of 7% of the trees were attacked at the base of growing terminals and 6% had infested branches. The highest population was recorded in Carpenter Township in the Fort Frances District where the growing terminals of 20% of the trees and one or more branches on 31% of the trees had been attacked (Table 3).

This insect requires two years to complete its life cycle. It spends winter as a larva in the pitch nodule and also pupates within the nodule. Small trees suffer the most serious damage, when the base of a growing terminal is attacked. The feeding larva may completely girdle the growing terminal, thereby killing it, or may girdle it partially and cause a crooked stem.

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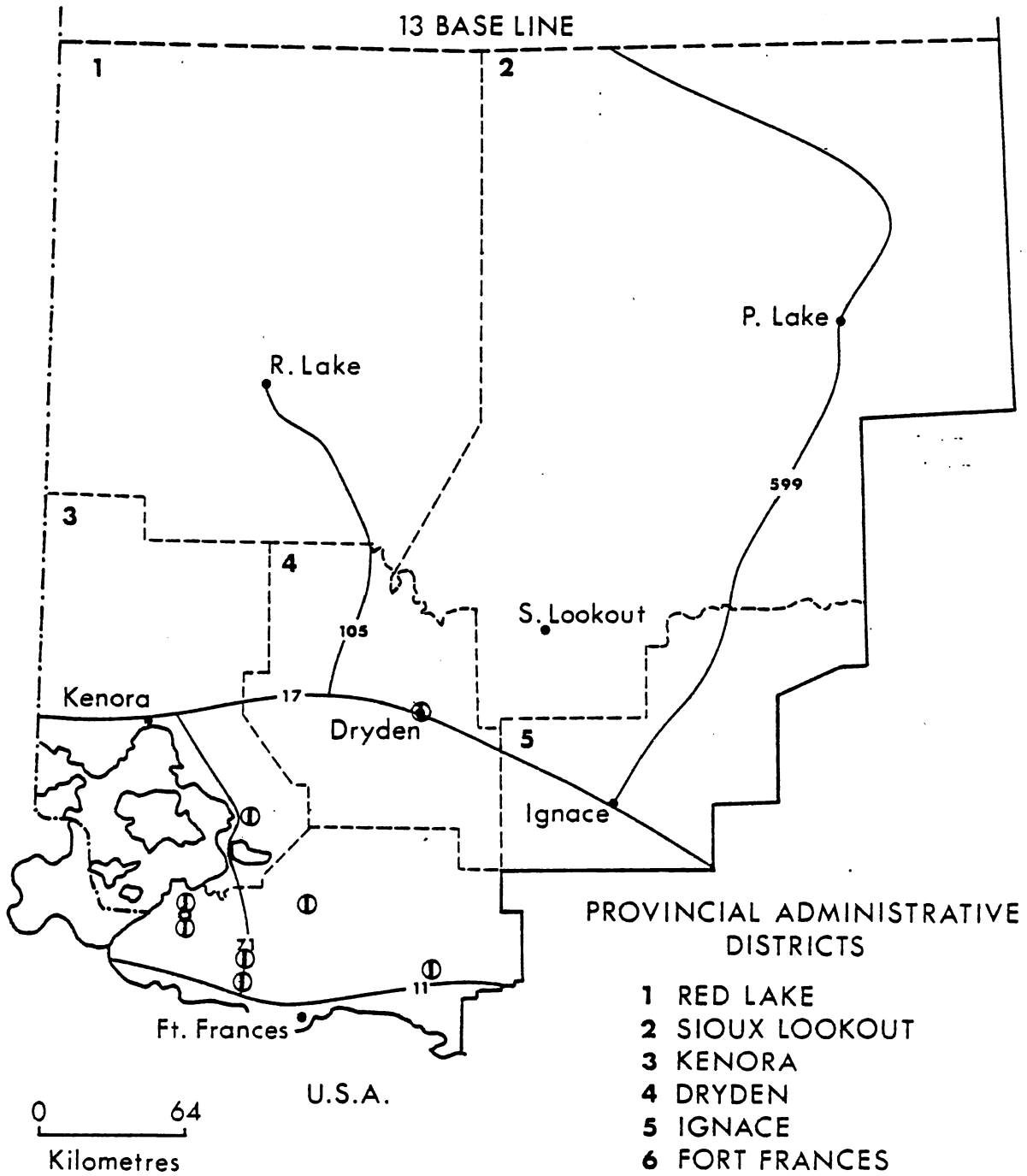


Figure 8. Introduced pine sawfly (*Diprion similis* [Htg.])
 Locations in which light defoliation occurred
 in 1981 ①

Table 3. Summary of damage by the northern pitch twig moth in the Northwestern Region in 1981 (counts based on the examination of 150 randomly selected jack pine regeneration trees at each location).

Location	Estimated area infested (ha)	Estimated no. of trees per ha	Avg ht of trees (m)	Trees with growing terminals attacked (%)	Trees with lateral branches attacked (%)
Red Lake District					
Chukuni River Access Rd	500	15,000	1.9	2	2
Sioux Lookout District					
Goodie Lake Access Rd	20	5,000	1.7	2	0
Vermilion River	85	3,000	1.4	5	1
Dryden District					
Aubrey Twp	100	5,000	1.4	7	3
MacFie Twp	100	10,000	1.7	7	3
Fort Frances District					
Carpenter Twp	20	3,000	2.3	20	31

Table 4. Other forest insects.

Insect	Host(s)	Remarks
<i>Acantholyda</i> sp. Webspinning sawfly	jP	scattered colonies on regeneration in Fort Frances, Dryden and Kenora districts
<i>Acleris variana</i> (Fern.) Eastern blackheaded budworm	wS	trace populations detected in Drayton Twp, Sioux Lookout District and in Britton Twp, Fort Frances District during high-value spruce surveys
<i>Adelges abietis</i> (Linn.) Eastern spruce gall adelgid	wS	low populations recorded for the first time in Fort Frances, Dryden, Kenora and Sioux Lookout districts

(continued)

Table 4. Other forest insects (continued).

Insect	Host(s)	Remarks
<i>Adelges lariciatus</i> (Patch) Spruce gall adelgid	wS	low numbers detected at scattered locations in Fort Frances, Dryden, Sioux Lookout and Red Lake districts
<i>Adelges strobilobius</i> (Kalt.) Pale spruce gall adelgid	bS	moderate-to-high populations collected on fringe trees at Zizania Lake, Red Lake District and at Otatakan Lake, Sioux Lookout District
<i>Alsophila pometaria</i> (Harr.) Fall cankerworm	E,mM	High populations within the towns of Fort Frances and Dryden caused heavy defoliation of many shade trees.
<i>Archips negundanus</i> (Dyar) Larger boxelder leafroller	mM	light-to-moderate defoliation observed on trees in the towns of Fort Frances and Sioux Lookout
<i>Caloptilia cuculipennella</i> (Hbn.) Privet leafminer	bAs	small numbers near Moar Lake, Red Lake District
<i>Cecidomyia resinicola</i> (O.S.) Jack pine resin midge	jP	high populations recorded at scattered points along the Basket Lake Road, Ignace District
<i>Conophthorus banksianae</i> McPherson Jack pine tip beetle	jP	small numbers on regeneration along the Chukuni River access road, Red Lake District, and in Drayton Twp and the Vermilion River area, Sioux Lookout District
<i>Datana contracta</i> Wlk. Oak caterpillar	bO	trace damage observed in the Sioux Narrows area, Kenora District

(continued)

Table 4. Other forest insects (continued).

Insect	Host(s)	Remarks
<i>Datana ministra</i> (Dru.) Yellownecked caterpillar	wB	low numbers collected in Burriss and Farrington Twps, Fort Frances District and in Hartman Twp, Dryden District
<i>Dryocampa rubicunda rubicunda</i> (Fabr.) Greenstriped mapleworm	rM	low populations in Watten Twp, Fort Frances District
<i>Fenusa pusilla</i> (Lep.) Birch leafminer	wB	light incidence at Deception Bay and in Drayton Twp, Sioux Lookout District, and in Watten Twp, Fort Frances District
<i>Gilpinia hercyniae</i> (Htg.) European spruce sawfly	wS	As part of the high-value white spruce survey, trace populations were detected in Kingsford Twp, Fort Frances District
<i>Hyphantria cunea</i> (Dru.) Fall webworm	wB, Al	scattered colonies at Stranger Lake, Ignace District and in Claxton Twp, Fort Frances District
<i>Microrapteryx</i> sp. Willow leafminer	W	heavy leafmining along waterways in the northern half of Red Lake and Sioux Lookout districts
<i>Neodiprion virginianus</i> complex Redheaded jack pine sawfly	jP	medium infestation on several trees in McIrvine Twp, Fort Frances District and low populations in Corman Twp, Ignace District and in Kingsford Twp, Fort Frances District
<i>Nymphalis antiopa</i> (L.) Mourningcloak butterfly	W, tA	isolated populations observed in Fort Frances and Dryden districts
<i>Paraprociophilus tessellatus</i> (Fitch) Woolly alder aphid	siM	High populations within the towns of Fort Frances, Dryden and Kenora caused little foliar damage but were responsible for the staining of streets and automobiles.

(continued)

Table 4. Other forest insects (concluded).

Insect	Host(s)	Remarks
<i>Phyllonorycter kenora</i> (Free.) Willow leafblotch miner	W	small numbers recorded near Goldpines and Snakeweed Lake, Red Lake District
<i>Phyllonorycter nipigon</i> (Free.) Balsam poplar leafblotch miner	bPo	small numbers recorded at Stone Lake, Red Lake District and near Savant Lake, Sioux Lookout District
<i>Physokermes piceae</i> (Schr.) Spruce bud scale	wS	low populations at several sample points throughout the Region
<i>Pikonema dimmockii</i> (Cress.) Greenheaded spruce sawfly	wS	As part of the high-value white spruce plantation survey, trace populations were detected in Mutrie Twp, Dryden District.
<i>Schizura concinna</i> (J.E. Smith) Redhumped caterpillar	tA	scattered colonies in LeMay and MacNicol Twps, Kenora District

TREE DISEASES

Major Diseases

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

Armillaria root rot caused trace mortality in small-diameter natural and planted jack pine throughout the Northwestern Region. Damage levels in 1981 were similar to those recorded over the past several years (Table 5).

Table 5. Summary of damage caused by *Armillaria* root rot in jack pine regeneration examined in the Northwestern Region in 1981 (counts based on the examination of 150 randomly selected trees at each location).

Location	Estimated area affected (ha)	Estimated no. of trees per ha	Avg ht of trees (m)	Current mortality (%)
Red Lake District				
Bruce Lake	5	3,000	3.0	1
Sioux Lookout District				
Marchington Rd	75	-	1.0	1
Vermilion River	85	3,000	1.1	0
Lomond Twp	20	5,000	1.7	1
Ignace District				
Ilsley Twp	10	15,000	1.5	2
Kenora District				
Gundy Twp	3	-	2.0	1
314 Road (Km 24)	50	6,000	1.1	0
Dryden District				
Aubrey Twp	50	5,000	1.0	1
MacFie Twp	50	10,000	1.7	1
Snake Bay	2	5,000	1.0	0

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

Surveys in 1981 revealed a marked increase in the incidence of Dutch elm disease in the southern part of the Region. Examination of 565 trees in the town of Fort Frances disclosed that 8% of the trees were infected (5% more than in 1980). A 100-tree sample in Rainy River revealed a 5% increase in infection over 1980. A survey in Lake of the Woods Provincial Park showed that 32% of the white elm (*Ulmus americana* L.) displayed characteristic symptoms of *C. ulmi*. No new evidence of the disease was detected in the town of Kenora in 1981.

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

A special survey of high-value white spruce stands or plantations and general surveys in spruce stands in 1981 revealed a marked increase in the incidence of these foliar diseases over the previous year. Infection was found at each of the 10 evaluation points sampled, whereas it had been found at only two points in 1980. Although foliar damage levels were low at infected sites, evaluations revealed that an average of 71% of the trees examined were diseased (Table 6).

Elsewhere in the Region, light infections were easily found on fringes of stands as far north as Pickle Lake (Fig. 9).

Table 6. Summary of damage caused by needle rusts of spruce in planted or regeneration stands examined in the Northwestern Region in 1981 (counts based on the examination of 150 randomly selected trees at each location).

Location	Estimated area affected (ha)	Estimated no. of trees per ha	Tree species	Avg ht of trees (m)	Trees affected (%)	Foliar damage (%)
Red Lake District						
Hwy 105 at Ear Falls	10	5,000	bs	2.0	70	1.0
Sioux Lookout District						
Deception Bay	20	3,000	ws	1.5	66	1.0
Drayton Twp	3	3,000	ws	1.4	43	1.0
Ignace District						
Victoria Lake	10	3,000	bs	1.5	66	1.0
Dryden District						
Colenso Twp	50	3,000	ws	2.2	97	1.0
Mutrie Twp	4	3,000	ws	2.6	47	1.0
Britton Twp	7	3,000	ws	1.3	69	1.0
Fort Frances District						
Farrington Twp	80	3,000	ws	1.3	85	1.0
Dance Twp	1	3,000	ws	7.5	72	1.0
Kingsford Twp	3	3,000	ws	2.6	92	1.0

NORTHWESTERN REGION

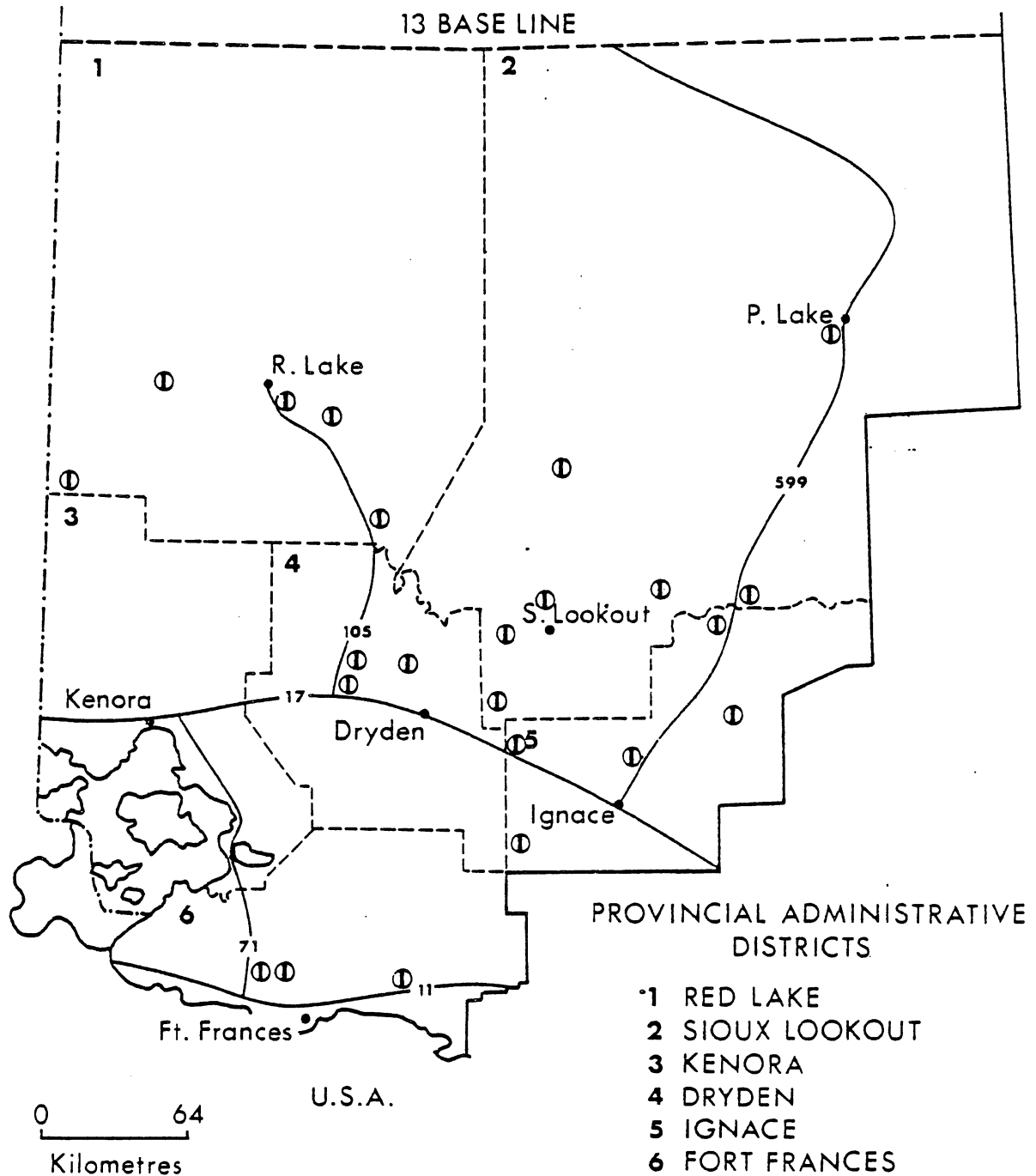


Figure 9. Needle rusts of spruce
(*Chrysomyxa ledi* (Alb. and Schw.) d By.
and *C. ledicola* Lagh.)

Locations in which light damage occurred
in 1981 ①

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

This gall-forming rust of hard pines is prevalent in many stands containing natural or planted jack pine regeneration through the southern two-thirds of the Northwestern Region. In 1981, disease evaluations performed at 12 locations revealed that infected trees ranged from 2% to 34% and averaged 13%. The highest numbers of trees affected, as well as the highest numbers of trees severely infected (i.e., those with stem galls) were recorded in Sioux Lookout and Dryden districts (Table 7). The disease is particularly damaging to seedlings and small-diameter trees. Considerable mortality occurs when the stems of such trees become infected.

Table 7. Summary of damage caused by western gall rust of hard pines in the Northwestern Region in 1981 (counts based on the examination of 150 randomly selected trees at each location).

Location	Estimated area affected (ha)	Estimated no. of trees per ha	Avg ht of trees (m)	Trees affected (%)	Trees severely infected ^a (%)	Current mortality (%)
Red Lake District						
Hwy 105 at Bruce Lake	5	3,000	3.0	2	1	0
Sioux Lookout District						
Marchington Access Rd	85	-	1.0	4	1	0
Lomond Twp	20	3,000	1.7	28	17	1
Vermilion River	85	3,000	1.1	5	4	1
Ignace District						
Ilsley Twp	10	15,000	1.5	11	8	1
Kenora District						
Gundy Twp	3	-	2.0	5	1	1
314 Road (Km 24)	50	6,000	1.1	11	7	0
Dryden District						
Aubrey Twp	50	5,000	1.0	27	19	1
Rugby Twp	3	-	4.0	34	1	0
Snake Bay	2	5,000	1.0	7	7	2
Fort Frances District						
Farrington Twp	1	1,000	2.5	17	3	0
Carpenter Twp	3	3,000	2.3	7	2	0

^a Stem galls

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

Surveys conducted in both planted stands and natural pine regeneration did not reveal any increase in the range of the North American race of this disease in the Northwestern Region in 1981.

Aerial or ground surveys were conducted in known infection centres near Wavell Lake, Red Lake District and in the Buddell, Lysander and Wendigo lakes and Pineimuta River areas of the Sioux Lookout District. The surveys revealed that, although infections are still common in each area, there was a marked decrease from the previous year in tree mortality in the Pineimuta River area. Only trace mortality was observed in the other infection centres.

Past observations have indicated that mortality decreases markedly after trees reach a height of 1 m. Trees in each of the above areas have reached this size and it was noted that the current growth rate was comparable with that of uninfested stands in the area.

A ground survey conducted for the second consecutive year in planted red pine in Aubrey Township, Dryden District where sanitation was carried out by OMNR in 1979 did not reveal any new infection in 1981.

Minor Diseases

Stem Rusts, *Cronartium* sp.

Six areas were evaluated in 1981 for stem rusts. Aeciospores or infected alternate hosts are required for positive identification of the stem rusts, but in most cases these were unattainable because of timing. All cankers were therefore identified as *Cronartium* sp. It was assumed that the majority of cankers found were caused by the sweetfern blister rust (*C. comptoniae* Arth.).

Generally, infection levels of the stem rusts remained low throughout the Region except in an area in the eastern part of the Fort Frances District. There, high incidence can be attributed to the presence of large quantities of the alternate host, sweetfern (*Comptonia peregrina* [L.] Coult.) (Table 8).

Table 8. Summary of damage caused by stem rusts (*Cronartium* sp.) in jack pine stands examined in the Northwestern Region in 1981 (counts based on the examination of 150 randomly selected trees at each location).

Location	Estimated area affected (ha)	Estimated no. of trees per ha	Avg ht of trees (m)	Trees severely affected (%) ^a
Sioux Lookout District				
Goodie Lake Access Rd	20	5,000	16.0	0
Vermilion River	85	3,000	1.1	1
Kenora District				
Gundy Twp	3	-	2.0	3
Kirkup Twp	10	2,000	15.1	2
Dryden District				
Wabigoon Twp	5	2,000	14.6	1
Fort Frances District				
Bad Vermilion Lake	10	2,000	16.2	8

^a Stem cankers

Leaf and Twig Blight of Aspen, *Venturia macularis* (Fr.) Müller & Arx
(= *Pollaccia radiosa* [Lib.] Bald. & Cif.)

The highest incidence of diseased trees and terminal shoot mortality occurred in the Goodie Lake and Vermilion River areas of Sioux Lookout District and along the Turtle Lake Road in Fort Frances District (Fig. 10). Infection levels remained fairly low elsewhere in the Region (Table 9).

Damaged terminals form a "shepherd's crook" and club tops may result from repeated terminal kill. The black leaves and curled shoots are unsightly on regeneration along highways and on shade trees in built-up areas.

NORTHWESTERN REGION

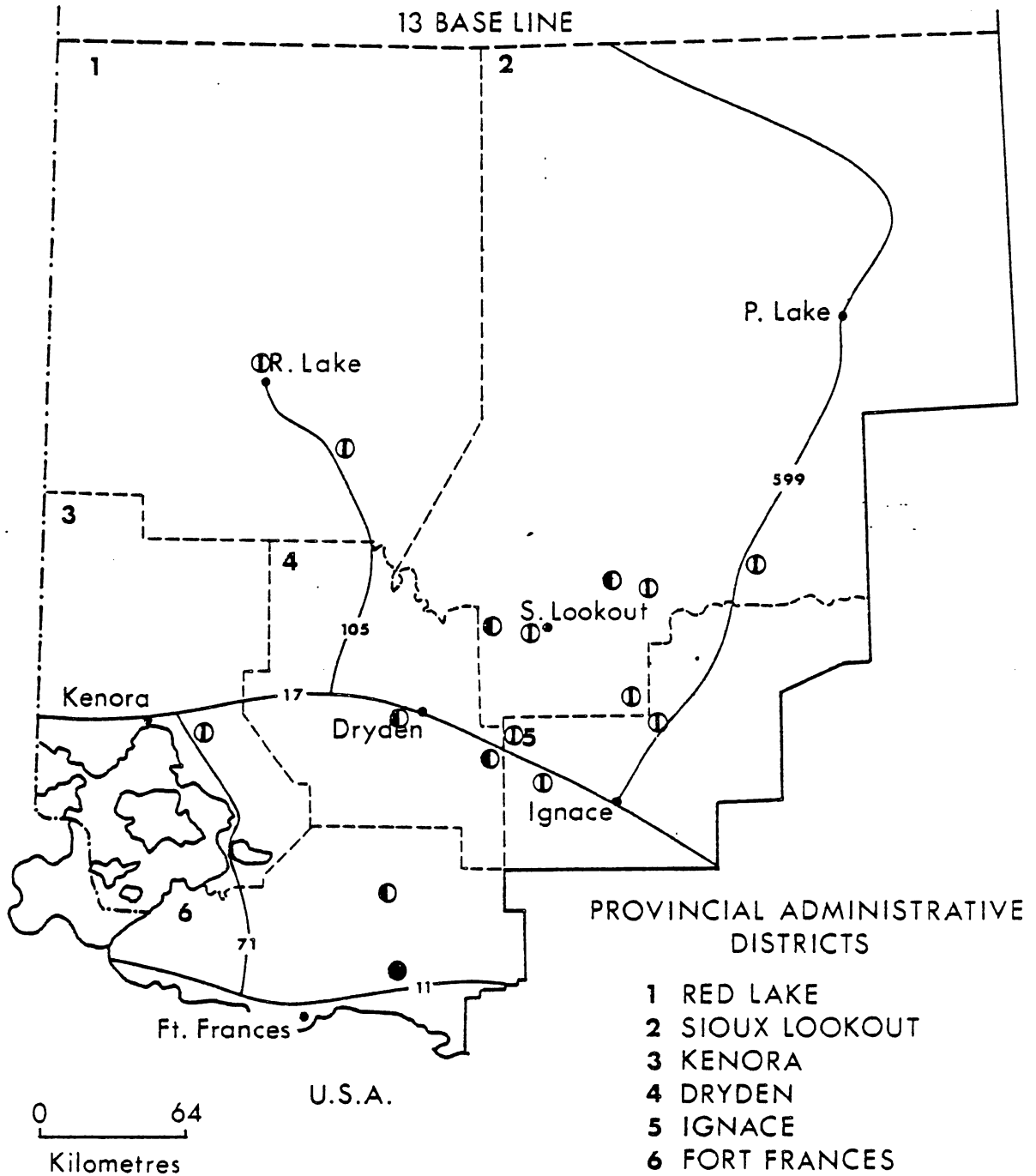


Figure 10. Leaf and twig blight of aspen
(Venturia macularis [Fr.] Müller and Arx)
 (= *Pollaccia radiosa* [Lib.] Bald. & Cif.)
 Locations in which damage occurred in 1981.

- Severe ●
- Moderate ◐
- Light ◑

Table 9. Summary of damage caused by leaf and twig blight of aspen in the Northwestern Region in 1981 (counts based on the examination of 150 randomly selected trees at each location).

Location	Estimated area affected (ha)	Estimated no. of trees per ha	Avg ht of trees (m)	Trees affected (%)	Terminal shoot mortality (%)
Sioux Lookout District					
Snag Lake	50	3,000	2.0	5	0
Marchington Access Rd	4	3,000	2.0	4	1
Vermilion River	100	5,000	1.5	50	25
Goodie Lake Access Rd	4	2,000	1.9	67	23
Ignace District					
Pinafore Lake	10	3,000	2.0	1	0
Suzanne Lake	10	2,000	1.5	3	2
Kenora District					
le May Twp	25	-	2.0	6	2
Dryden District					
Aubrey Twp	25	-	1.7	9	1
Melgund Twp	10	-	2.0	20	5
Fort Frances District					
Cedar Narrows Rd	50	-	3.1	13	3
Turtle River Rd	20	-	2.0	38	11

Table 10. Other forest diseases.

Organism	Host(s)	Remarks
<i>Ciborinia whetzeli</i> (Seaver) Seaver Ink spot of aspen	tA	one isolated pocket of infection in Dobie Twp, Fort Frances District
<i>Coleosporium asterum</i> (Diet.) Syd. Pine needle rust	jP	light foliar damage evident on 72% of trees examined in a roadside plantation near Lower Manitou Falls, Red Lake District
<i>Gymnosporangium cornutum</i> Arth. ex Kern Leaf rust of mountain-ash	aMo	low incidence throughout the Fort Frances District
<i>Hypoxylon mammatum</i> (Wahl.) J.H. Miller Hypoxylon canker	tA	low incidence of stem cankers and tree mortality common throughout the Region
<i>Melampsorella caryophyllacearum</i> Schroet. Fir broom rust	bF	trace level detected at Ear Falls, Red Lake District, in Mather Twp, Fort Frances District and in Hartman Twp, Dryden District
<i>Rhizina undulata</i> Fr. Rhizina root rot	ground	collected at site of 1980 burns in Desmond Twp, Kenora District, and at Fire 9 along the Cedar Narrows Road, Fort Frances District (A 2 m ² plot was established in 1980 south of Savant Lake in Ignace District. No damage was observed in 1981 on young jack pine regeneration located within 30 cm of the fruiting bodies.)
<i>Venturia populina</i> (Vuill.) Fabric. Leaf and twig blight of poplar	bPo	light damage to three trees at Emarton Lake, Red Lake District

Abiotic Damage

Drought

Two successive years of drought as evidenced by below normal rainfall over the past two years (Table 11) have had a noticeable effect on the deciduous trees in the southern two-thirds of the Region. Many stands experienced premature foliage discoloration. White birch underwent the most striking change in response to the drought condition. Many stands evinced autumn colors in early August and by the first part of September some trees had suffered premature leaf drop in the upper crown. This condition was most typical of trees on high, rocky sites.

Table 11. A comparison of the percentages of normal precipitation through the years 1979 to 1981 inclusive at four locations in the Region.

Location	Percentages of normal precipitation		
	1979 (%)	1980 (%)	1981 (%)
Sioux Lookout	99	73	67
Kenora	101	83	93
Dryden	102	71	80
Fort Frances	115	86	86

Four 150-tree evaluations were carried out to assess the extent of upper-crown defoliation and the percentage of trees affected (Table 12).

Table 12. Summary of crown defoliation as a result of drought conditions in white birch stands examined in the Northwestern Region in 1980 (counts based on the examination of 150 randomly selected trees at each location).

Location	Estimated size of stand (ha)	Estimated no. of trees per ha	Avg ht of trees (m)	Trees affected (%)	Avg crown defoliation (%)
Sioux Lookout District					
Vermilion Additional Twp	2	1,000	12.9	5.3	17
Ignace District					
Ignace Twp	3	2,000	12.9	9.3	10
Dryden District					
Aaron Provincial Park	3	2,000	12.0	33	4
Fort Frances District					
4.8 km S of Rattlesnake Creek	50	2,000	11.7	29	4

Frost Damage

The survey of high-value white spruce revealed that frost damage was minimal across the Northwestern Region. Eight areas were examined and five experienced trace damage. The percentage of trees affected averaged 9% with only 1% of the foliage damaged in all sample locations. Frost damage was confined mainly to the current lateral shoots. However, trees in the cedar (*Thuja* sp.) windbreaks planted in 1980 at the Dryden Forest Station suffered severe frost damage, likely as a result of frost combined with insufficient snow cover.

Special Surveys

White Spruce Flower and Cone Insect and Disease Survey

A survey of insects and diseases causing damage to white spruce female flowers and developed cones was conducted in the Northwestern Region in 1981. All flowers and cones that displayed evidence of insect feeding on the exterior surface or in the interior were classed as damaged.

Samples consisting of 197 and 220 female flowers were submitted from Sioux Lookout and Dryden districts, respectively, to the Great Lakes Forest Research Centre for damage analysis. No damage was found in the sample from the Sioux Lookout District; however, light damage was evident in the Fort Frances District sample. The analysis revealed that 0.4% of the flowers were attacked by spruce budworm, 1.3% by a spruce micro moth, *Eucordylea atrupictella* Dietz., and 2.7% by Lepidopterous species that could not be identified because they were absent from the sample.

Cone samples containing 105 and 100 developed cones were submitted from Sioux Lookout and Fort Frances districts, respectively, for insect damage analysis. The analysis revealed that 64% of the cones from the Sioux Lookout District and 45% from the Dryden District had been damaged by one or more species of insects feeding either on the exterior or within the cones. Although the insects causing the damage could not be identified in many instances because they were absent from the sample, it was determined by the type of feeding present that Lepidopterous species were responsible for a high percentage of the damage. The results of this survey are summarized in Table 13.

Table 13. A summary of the percentages of damaged white spruce female flowers collected between 1 and 3 June and damaged white spruce cones collected between 27 July and 13 August in the Northwestern Region in 1981.

Location	No. of female flowers examined	Flowers damaged ^a (%)	No. of cones examined	Cones damaged (%)	No. of cones damaged by ^a	
					Lepidoptera	Other insects
Sioux Lookout District						
Marchington Rd at Deception Bay	197	0.0	105	64	43	24
Dryden District						
Van Horne Twp	220	4.5	-	-	-	-
Fort Frances District						
Dance Twp	-	-	100	45	21	24

^a Damage to an individual cone or flower may be caused by one or more insects.

Survey of White Spruce Plantations

In 1981, a special survey was conducted throughout Ontario to determine the incidence and impact of insects and diseases in high-value white spruce plantations. Eight areas were surveyed in selected stands < 2 m, 2-6 m and > 6 m in height where available. Each stand was evaluated by means of a standard sampling procedure during the periods of 20-29 June and 15-21 July. The more notable insects and diseases expected to be encountered in the course of this survey were:

Insects: spruce budworm, yellowheaded spruce sawfly, spruce coneworm (*Dioryctria reniculelloides* Mut. & Mun.), white pine weevil, and shootworms (*Zeiraphera* sp.).

Diseases: Armillaria root rot, needle rusts, cone rusts, broom rusts, mistletoe and frost injury.

Insects and diseases not found were:

Insects: white pine weevil.

Diseases: Armillaria root rot, broom rusts and mistletoe

Positive results are summarized in Table 14.

It is notable that small numbers of budworm were found at six of the sample areas even though each area is remote from any known budworm infestation in the Region.

The survey also revealed low populations of eight miscellaneous insect species as follows: European spruce sawfly, greenheaded spruce sawfly, eastern blackheaded budworm, eastern spruce gall adelgid, spruce gall adelgid, ragged spruce gall adelgid (*Pineus similis* [Gill.]), spruce bud scale, and redstriped needleworm (*Griselda radicana* Wlshm.).

In conjunction with the special survey, two of the stands with trees over 6 m high were investigated for internal rot and stain. In each area 10 trees were sampled by taking increment cores extending to the pith of the tree at three levels: (a) as close to ground level as possible (b) 0.3 m above (a) sample, and (c) 1.3 m above ground level. Each sample was submitted to the Great Lakes Forest Research Centre where analysis revealed no evidence of disease.

Table 14. Incidence of, and damage caused by, insects and diseases noted in a special survey of planted white spruce in the Northwestern Region (counts based on the examination of 150 trees at each location).

Location	Stand area (ha)	Esti- mated no. of trees per ha	Avg ht of trees (m)	Spruce budworm		Yellowheaded spruce sawfly		<i>Zeiraphera</i> sp.		Spruce coneworm	
				Trees attacked (%)	Defolia- tion (%)	Trees attacked (%)	Defolia- tion (%)	Trees attacked (%)	Defolia- tion (%)	Trees attacked (%)	Defolia- tion (%)
Sioux Lookout District											
Deception Bay	20.0	3,000	1.5	1.0	1.0	22.6	2.0	1.3	1.0	0.0	0.0
Drayton Twp	3.0	3,000	1.3	0.0	0.0	20.6	2.0	2.0	1.0	0.0	0.0
Dryden District											
Britton Twp	6.5	3,000	1.3	1.0	1.0	93.3	10.0	0.0	0.0	1.0	1.0
Colenso Twp	120.0	3,000	2.2	0.0	0.0	6.6	1.0	1.0	1.0	0.0	0.0
Mutrie Twp	4.0	3,000	7.4	6.0	1.0	7.3	1.0	16.6	1.0	0.0	0.0
Fort Frances District											
Dance Twp	0.5	3,000	7.5	4.6	1.0	17.3	1.0	85.3	1.0	0.0	0.0
Farrington Twp	80.0	3,000	1.3	4.6	1.0	65.3	14.0	0.0	0.0	0.0	0.0
Kingsford Twp	2.0	3,000	2.6	6.0	1.0	25.3	1.0	2.0	1.0	0.0	0.0

(continued)

Table 14. Incidence of, and damage caused by, insects and diseases noted in a special survey of planted white spruce in the Northwestern Region (counts based on the examination of 150 trees at each location). (concluded)

Location	Frost		Needle rust		Cone rust	
	Trees affected (%)	Foliage damaged (%)	Trees affected (%)	Foliage damaged (%)	Trees affected (%)	Cones damaged (%)
Sioux Lookout District						
Deception Bay	0.0	0.0	66.0	1.0	0.0	0.0
Drayton Twp	38.0	1.0	43.3	1.0	0.0	0.0
Dryden District						
Britton Twp	94.0	1.0	69.3	1.0	0.0	0.0
Colenso Twp	71.3	1.0	96.6	1.0	0.0	0.0
Mutrie Twp	0.0	0.0	47.3	1.0	0.0	0.0
Fort Frances District						
Dance Twp	0.0	0.0	72.0	1.0	0.0	0.0
Farrington Twp	14.6	1.0	85.3	1.0	0.0	0.0
Kingsford Twp	68.6	1.0	92.0	1.0	1.0	1.0