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GREAT LAKES FOREST RESEARCH CENTRE
CENTRE DE RECHERCHE FORESTIÈRE DES GRANDS LACS

Results of forest insect and disease surveys in the NORTHWESTERN REGION of Ontario, 1982

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

Canada

SURVEY HIGHLIGHTS

The following report describes the status of the more important insect and disease conditions affecting the forests in the Northwestern Region in 1982. The information contained herein was obtained by aerial and ground surveys.

The overall area infested by the spruce budworm increased by approximately 20% over the previous year. An increase in distribution was recorded for the third consecutive year when newly infested areas were mapped in Kenora and Dryden districts. High populations of the bronze birch borer recurred and heavy tree mortality was evident in numerous stands in the Red Lake District. Populations of the birch skeletonizer and the aspen leafblotch miner increased in intensity and infested host stands through much of the southern half of the Region. The known range of the mountain-ash sawfly and the larch casebearer was extended when the former was recorded for the first time in the towns of Kenora, Dryden and Ignace and the latter was found in the town of Sioux Lookout.

Annual surveys for Dutch elm disease did not reveal any change in the distribution of the disease; however, a marked increase in the incidence of infection was recorded. A decrease in mortality caused by Scleroderris canker of pines in known infection centres was evident. A snow storm in the early fall of 1981 caused serious damage in many stands. High winds caused considerable blowdown in two areas in the southeastern part of the Region.

In 1982, a special survey was conducted in high-value jack pine regeneration stands at 12 randomly selected locations to determine the amount of damage caused by six insects and six diseases known to affect this species.

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

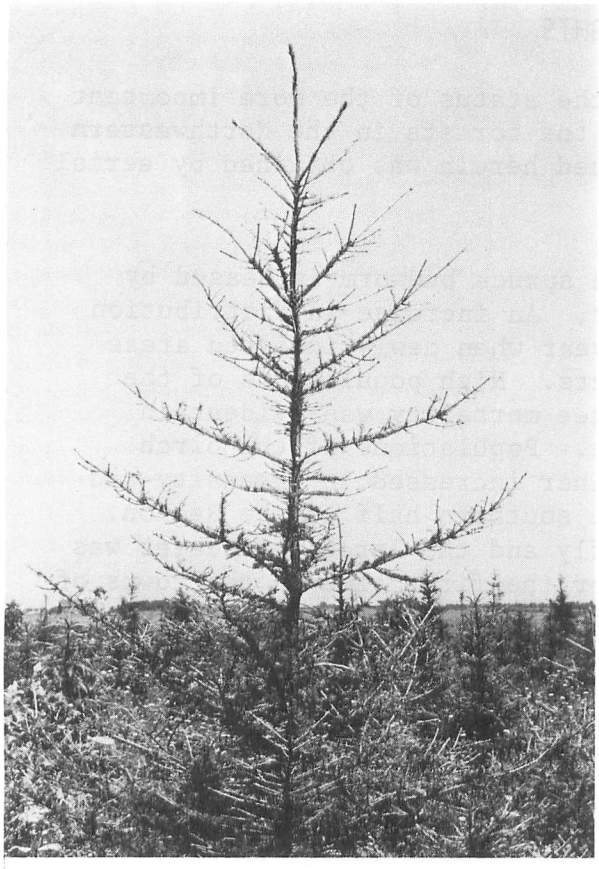
Major Insects or Diseases

Capable of causing serious injury to or death of living trees or shrubs.

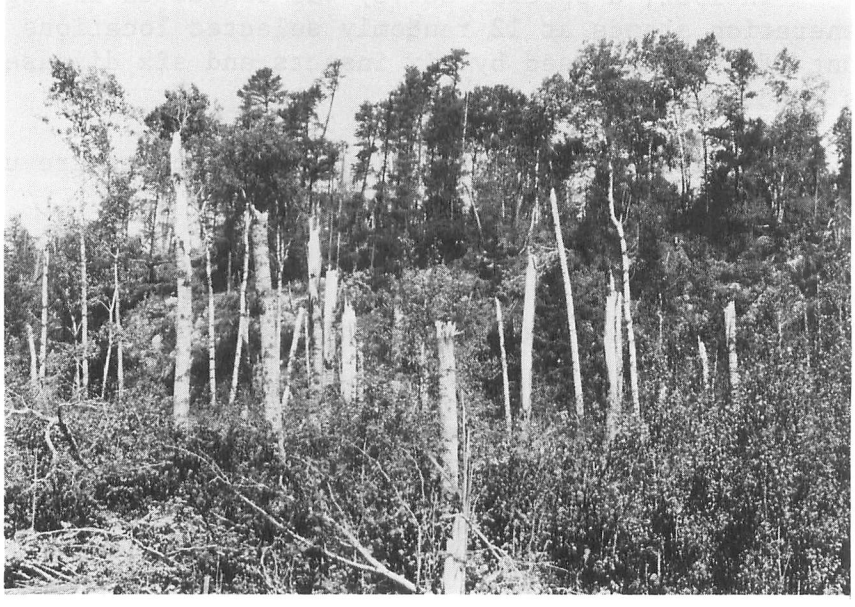
Minor Insects or Diseases

Capable of sporadic or localized injury but not usually a serious threat to living trees or shrubs.

Frontispiece



Yellowheaded spruce sawfly, *Pikonema alaskensis* (Roh.) damage



Abiotic damage (wind)

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 shown 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 1982.

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 valuable assistance and cooperation extended to the authors by the Ontario Ministry of Natural Resources (OMNR), wood-using industries and private individuals during the 1982 field season are gratefully acknowledged.

M. J. Thomson

C. G. Jones

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INSECTS

Major Insects

Bronze Birch Borer, *Agrilus anxius* Gory

Ground surveys in mid-June and an aerial survey in early September in the Cairns and Pikangikum lakes area revealed high populations of this insect, marking the third consecutive year of heavy infestation in the area. Damage evaluations in white birch (*Betula papyrifera* Marsh.) stands at two locations in the vicinity of Cairns Lake revealed an incidence of 100% host mortality in a shoreline stand. Serious damage also occurred in the second stand examined, where 49% tree mortality was recorded. Heavy branch or top mortality was evident in the remainder of the sample area; in some instances all but a small number of the lateral branches were dead. Undoubtedly many of these trees will expire in the near future.

The overall forested area through which infestations occurred in 1982 could not be accurately determined during the aerial survey in September because of early foliage discoloration and inclement weather conditions in the form of a dense ground haze. However, it is likely that infestations recurred through much the same area (1700 km^2 of forested land) as that recorded in 1981.

Birch Skeletonizer, *Bucculatrix canadensisella* Cham.

A marked increase occurred in the distribution and intensity of the birch skeletonizer in 1982. White birch within an area of approximately 12,000 km^2 suffered moderate-to-severe defoliation (Fig. 1).

The principal area of moderate-to-severe defoliation in 1982 included the entire Fort Frances District, southern parts of the Dryden District in the Upper Manitou area and portions of the Kenora District including Big Island in Lake of the Woods, north of Nestor Falls and the Atikwa Lake area. Isolated and scattered pockets of infested trees were found on islands and along the shores of the following lakes in the eastern part of the Sioux Lookout District: Pickle, Osnaburg, McCrea, Little Savant and Savant. Fringe trees around Beak Lake in Ignace District, along the shores of Dryberry Lake in Kenora District and in the Stormy Lake area of Dryden District experienced moderate-to-severe defoliation.

This is the third consecutive year that the birch skeletonizer has been recorded at infestation levels in northwestern Ontario. The 1980 infestation consisted of scattered pockets and a 2.5-ha area in the Fort Frances District. The area infested increased to 1,832 km^2 in 1981.

The last infestation of *B. canadensisella* occurred in 1970 and lasted four years. The entire Northwestern Region was infested in 1972.

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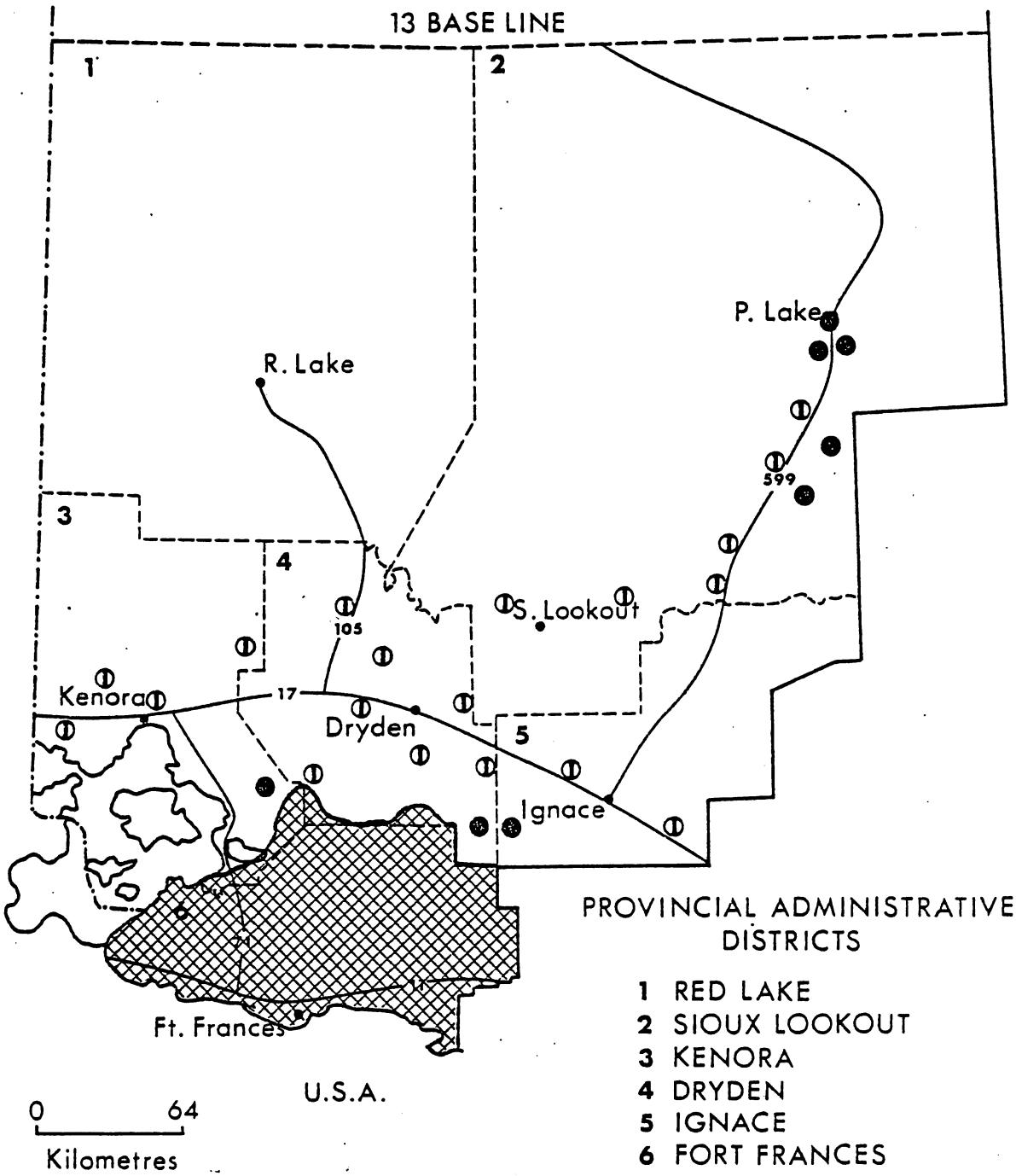

Figure 1. Birch Skeletonizer, *Bucculatrix canadensisella* Cham.

Areas in which defoliation of white birch occurred in 1982

Severe . . . . . ● or ▨

Light . . . . . ◑

Defoliation may be severe but will seldom cause tree mortality although the resultant stress may cause the trees to become more vulnerable to other insects and diseases.

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. That report will provide a complete description and analysis of developments in the spruce budworm situation in Ontario in 1982 and will give infestation forecasts for the province for 1983.

Eastern Pine Shoot Borer, *Eucosma gloriola* Heinr.

Population levels of this shoot borer on jack pine (*Pinus banksiana* Lamb.) decreased slightly in 1982. Results of quantitative sampling at 14 widely separated locations (Fig. 2) showed that the average percentage of terminal shoots destroyed by the insect was 5.1% in 1982 in comparison with 7.1% in 1981. Data obtained in these samples also revealed that, generally, the population decrease occurred in the Kenora and Dryden districts. Percentages of terminal shoots destroyed ranged from 0.7% to 16.7% (Table 1).

The insect attacks and destroys the current shoots of host trees. The destruction of terminal shoots retards the height growth of trees and causes crooked stems.

Sawyer Beetles, *Monochamus* spp.

Severe damage and tree mortality caused by the feeding of adult sawyer beetles on jack pine and black spruce (*Picea mariana* [Mill.] B.S.P.) were observed in a cutover area north of Redditt in the Kenora District. Approximately 10 ha of trees exhibited typical beetle-induced damage. This feeding was confined to fringe trees bordering the harvested area and along the edge of shoreline reserves. Damage seldom exceeded one chain in depth along the exposed fringes of the affected stands.

The initial population buildup of this wood-boring insect is probably attributable to forest fires in the area. The population is then sustained by logging slash and stockpiled timber. This recently dead material is necessary for larval development.

A permanent sample plot was established in 1981 near Percy Lake in the 1980 Kenora burn to monitor sawyer beetle development and feeding habits. The plot consisted of 50 living trees, 50 recently dead and 50 dead trees. Only the living and the recently dead trees were re-examined on the return visit in August 1982.

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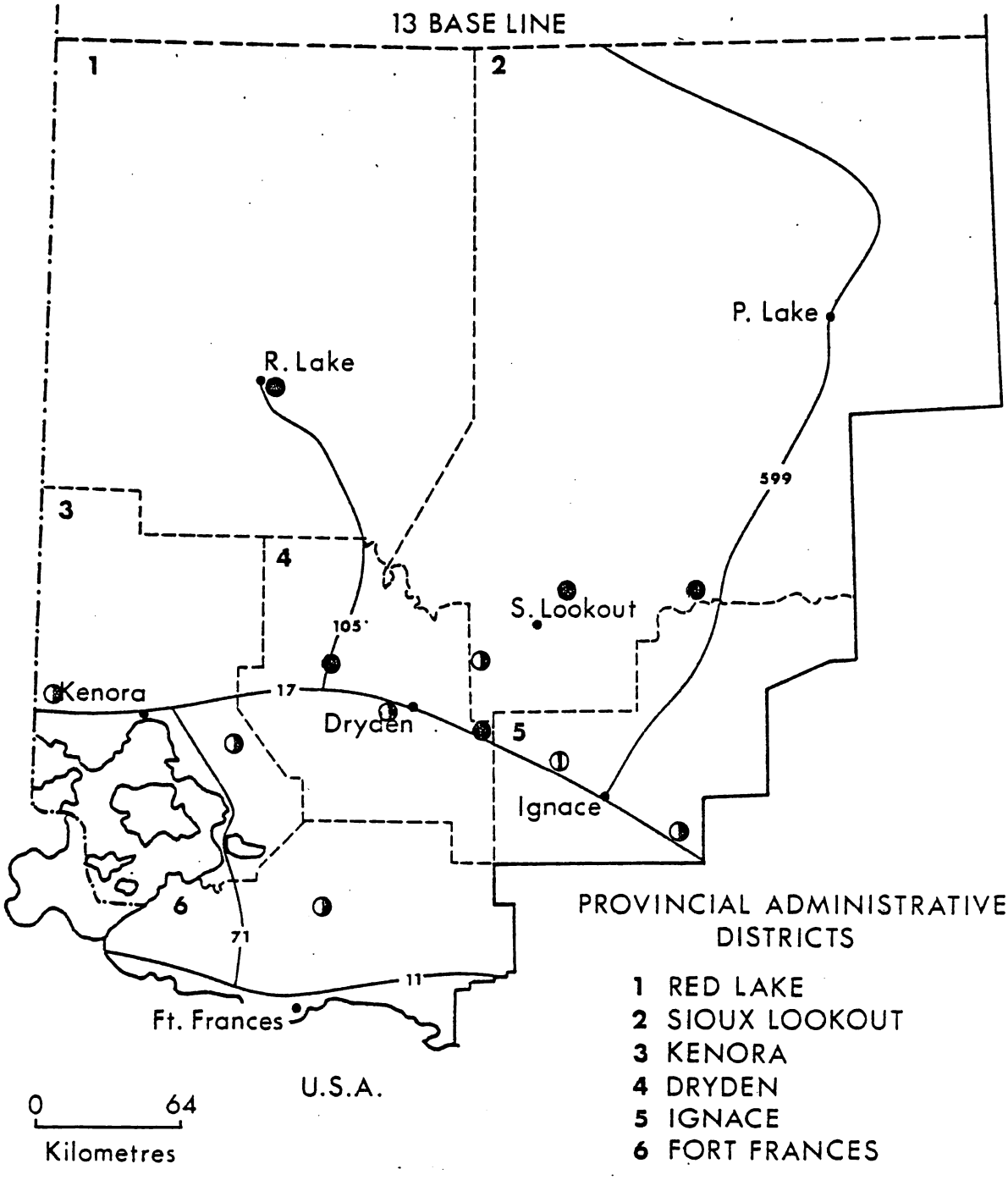

Figure 2. Eastern Pine Shoot Borer, *Eucosma gloriola* Heinr.

Locations in which damage occurred in 1982

Severe . . . . . ●

Moderate . . . . . ◑

Light . . . . . ◑

Table 1. Summary of damage by the eastern pine shoot borer in the Northwestern Region in 1982 (counts based on the examination of 150 or 250 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 terminal shoot damage (%)	Trees with lateral shoot damage (%)
Red Lake District					
Chukuni R. Access Rd	500	8,000	1.6	7.0	0.0
Sioux Lookout District					
Houghton Lake	200	12,000	1.2	10.7	0.7
Lomond Twp	20	5,000	2.8	3.3	0.0
*Vermilion R.	100	3,000	1.4	8.8	2.8
Ignace District					
Pinafore Lake	10	15,000	1.4	1.3	0.0
*Furniss Twp	876	7,500	1.0	3.6	0.8
Kenora District					
Broderick Twp	3,600	8,000	0.9	1.2	0.4
314 Road (Km 26)	25	6,000	3.2	5.3	0.7
Dryden District					
*Aubrey Twp	150	7,000	1.0	4.0	1.2
Buller Twp	25	3,000	5.5	0.7	6.0
MacFie Twp	120	5,500	2.0	16.7	2.0
Colenso Twp	40	4,000	1.9	6.0	2.7
Fort Frances District					
Dance Twp	3	3,000	2.8	0.0	0.0
Weller Lake	50	7,000	1.5	2.0	2.7

* 250-tree sample

All 50 'recently dead' trees had larvae feeding under the bark in August 1981. Twenty-three of these trees also contained typical entrance holes where larvae had penetrated the bole of the tree. This is significant because it reveals that eggs were probably laid at different intervals on the same tree. The remaining 37 trees had only larvae and no visible evidence of entrance holes in the area of the tree examined in 1981. The return visit in 1982 disclosed that 67% of these remaining 27 trees had exit holes. Thus it can be assumed that, 12 months or less after the larvae had penetrated the wood, they had completed their life cycle and emerged as adults. This would indicate that the insects had completed their life cycle from egg to adult in approximately 15 months.

The 50 living trees were re-examined in 1982. All 50 trees were green and seemingly unaffected by the site disturbance, and there was no indication of adult branch feeding or larvae feeding under the bark. This raises the question of where the emerging adults went since there was no sign of heavy feeding in the immediate area. They may have been attracted to other areas of the burn where large numbers of trees were dying as a result of site change, to recently cut-over areas, or perhaps towards another fire.

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

High populations of this leafblotch miner occurred for the third consecutive year on trembling aspen (*Populus tremuloides* [Michx.]) regeneration. Surveys revealed severe leafmining and premature foliage discoloration through approximately 120,000 km^2 of forested land, marking a 20% increase in the area infested over the previous year. Damage was noted through the southern part of the Region to as far north as Moar Lake on the Ontario-Manitoba boundary in the Red Lake District and the Menako Lakes area 100 km north of Pickle Lake in the Sioux Lookout District (Fig. 3). Examination of aspen foliage at scattered locations when larvae were in their early instars revealed as many as 10 mines in a single leaf.

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

High populations of this pest affected white spruce (*Picea glauca* [Moench] Voss) throughout the southern half of the Region in 1982 (Fig. 4).

Severe defoliation in the Fort Frances, Kenora, Sioux Lookout and Red Lake districts was sporadic and confined mainly to occasional roadside white spruce. The most serious and widespread damage occurred on pipeline, roadside, and plantation trees in Skey Township, Ignace District and in Britton Township, Dryden District (Table 2).

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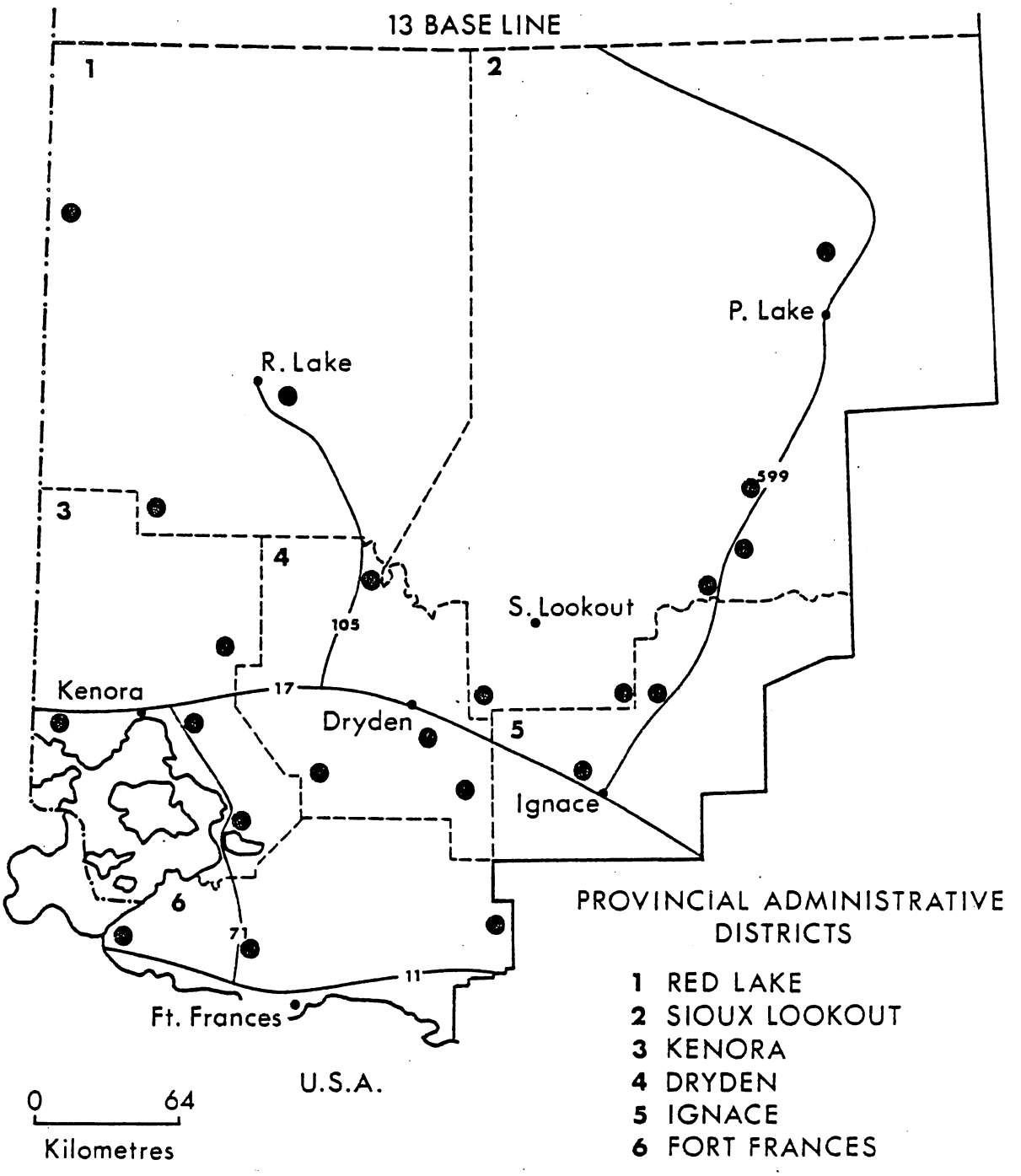

Figure 3. Aspen Leafblotch Miner, *Phyllonorycter ontario* (Free.)

Locations in which damage occurred in 1982

Severe . . . . . ●

NORTHWESTERN REGION

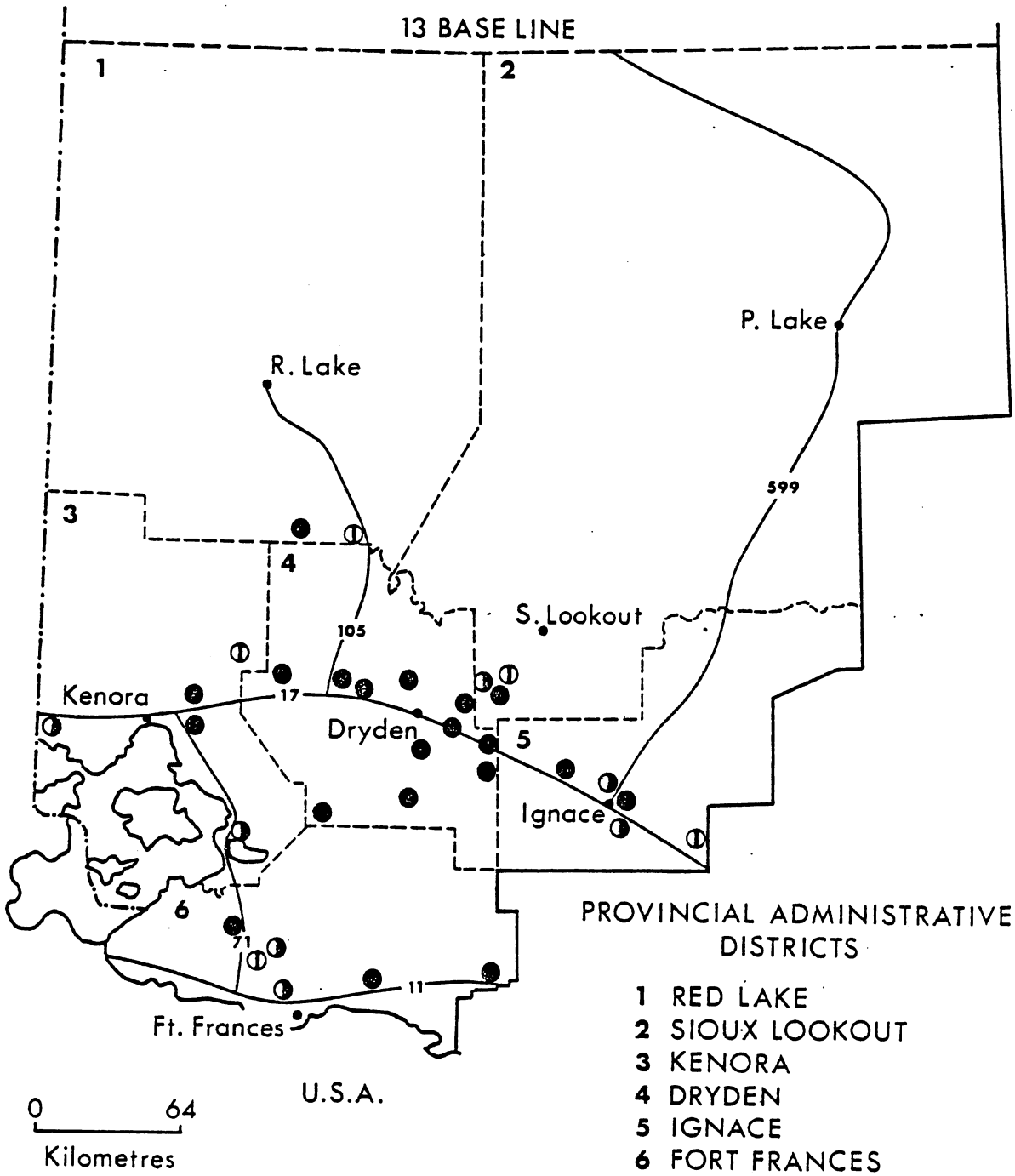

Figure 4. Yellowheaded Spruce Sawfly, *Pikonema alaskensis* (Roh.)

Locations in which defoliation of spruce occurred in 1982

Severe . . . . . ●

Moderate . . . . . ◑

Light . . . . . ◔

Table 2. Summary of damage by the yellowheaded spruce sawfly in the Northwestern Region in 1982 (counts based on the examination of randomly selected white spruce regeneration trees at each location).

Location	No. of trees examined	Estimated area infested (ha)	Estimated no. of trees per ha	Avg ht of trees (m)	Trees damaged (%)	Estimated defoliation (%)
Ignace District						
*Skey Twp	71	.5	1,000	2.5	100	48
Dryden District						
Britton Twp	150	6.5	3,000	1.6	77	3
*Laval Twp	150	.5	-	1.0	100	66
Kenora District						
Colonna Lake	100	25	2,000	3.0	13	<1
Fort Frances District						
Kingsford Twp	150	2.0	4,500	2.1	11	<1

* roadside or pipeline evaluation

High numbers of larvae reinfested a plantation in Britton Township in the Dryden District. Two separate spray operations with the chemical malathion were instituted. A post-spray evaluation disclosed an average defoliation of 3% in the plantation.

A spray operation was also carried out in Aaron Provincial Park to limit defoliation by a high population of the sawfly. Ojibway Provincial Park in the Sioux Lookout District and Sandbar Provincial Park in the Ignace District experienced moderate-to-severe damage on small numbers of trees.

Heavy defoliation was recorded on roadside white spruce in Jordan Township, Sioux Lookout District, Isley Township, Ignace District, Laval Township, Dryden District and near Lower Manitou Falls in the Red Lake District. High populations of this insect and associated heavy defoliation were observed on planted white spruce on a gas pipeline right-of-way in Skey Township, Ignace District.

Repeated moderate-to-severe defoliation over a period of two to five years can retard tree development and cause tree mortality (see Frontispiece). Those trees in forested areas with sufficient cover are less susceptible to attack by this sawfly.

White Pine Weevil, *Pissodes strobi* (Peck)

Populations of this weevil declined to reach the lowest level recorded over the past several years in the Region. Quantitative sampling was carried out in jack pine regeneration stands or in planted areas at 12 locations to determine population levels in each. Records from these samples revealed that weevils destroyed an average of 1.2% of the leaders at nine points and three others were negative (Table 3). Surveys elsewhere in the Region revealed low populations at widely separated locations.

Larch Sawfly, *Pristiphora erichsonii* (Htg.)

Except for two areas, population levels of this insect remained low in the Region in 1982. Approximately 10 ha of tamarack (*Larix laricina* [Du Roi] K. Koch) in Morley Township in the Fort Frances District experienced severe defoliation. One hectare of tamarack in Corman Township in the Ignace District suffered moderate damage by the sawfly. General surveys throughout the Region disclosed small numbers of larval colonies as far north as Pickle Lake in the Sioux Lookout District and in the southern part of the Red Lake District.

Table 3. Summary of damage by the white pine weevil in the Northwestern Region in 1982 (counts based on the examination of 150 or 250 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 weeviled (%)
Red Lake District				
Chukuni R. Access Rd	500	8,000	1.6	1.3
Sioux Lookout District				
Houghton Lake	200	12,000	1.2	1.3
Lomond Twp	20	5,000	2.8	0.7
*Vermilion R.	100	3,000	1.4	0.0
Ignace District				
Pinafore Lake	10	15,000	1.4	2.0
*Furniss Twp	876	7,500	1.0	0.8
Kenora District				
*Broderick Twp	3,600	8,000	0.9	0.0
314 Road (Km 26)	25	6,000	3.2	2.0
Dryden District				
*Aubrey Twp	150	7,000	1.0	0.0
Colenso Twp	40	4,000	1.9	0.7
MacFie Twp	120	5,500	2.0	0.7
Fort Frances District				
Dance Twp	3	3,000	2.8	2.0

* 250-tree sample

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

This insect was first recorded in the Northwestern Region in 1981 within the town of Fort Frances. An extension of this record was established in 1982. The introduced pest was collected along Highway 812 between Dryden and Fort Frances, in the towns of Dryden and Ignace and as far west as the town of Kenora. Second-generation larvae were recorded along the shore of Redgut Bay on Rainy Lake in the Fort Frances District.

Outside the built-up areas defoliation was light, and within the above four town centres damage was more noticeable but still within the low damage category.

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.).

Minor Insects

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

Trace populations of first-generation larvae on white pine (*Pinus strobus* L.) were recorded in parts of the Fort Frances and Kenora districts (Fig. 5). A high population of second-generation larvae was reported by OMNR officials from Kenora on mature white pine in the Splitrock Island and Miles Bay areas of Lake of the Woods.

Heavy defoliation late in the season after the buds are formed can cause branch mortality and, occasionally, when combined with other factors (e.g., drought), can kill trees.

A previous heavy infestation was recorded in 1970 on numerous islands in Rainy Lake in the Fort Frances District. This infestation lasted two years.

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

Eight areas were examined in 1982 (Table 4). A substantial decrease in population levels of this insect was recorded in most areas. One exception occurred in a stand of jack pine regeneration near the Vermilion River bridge in the Sioux Lookout District, where quantitative sampling revealed a 12% increase in the number of trees attacked.

Three areas examined in 1981 were re-evaluated in 1982. Quantitative data disclosed a 19% decrease in the number of trees affected in 1982.

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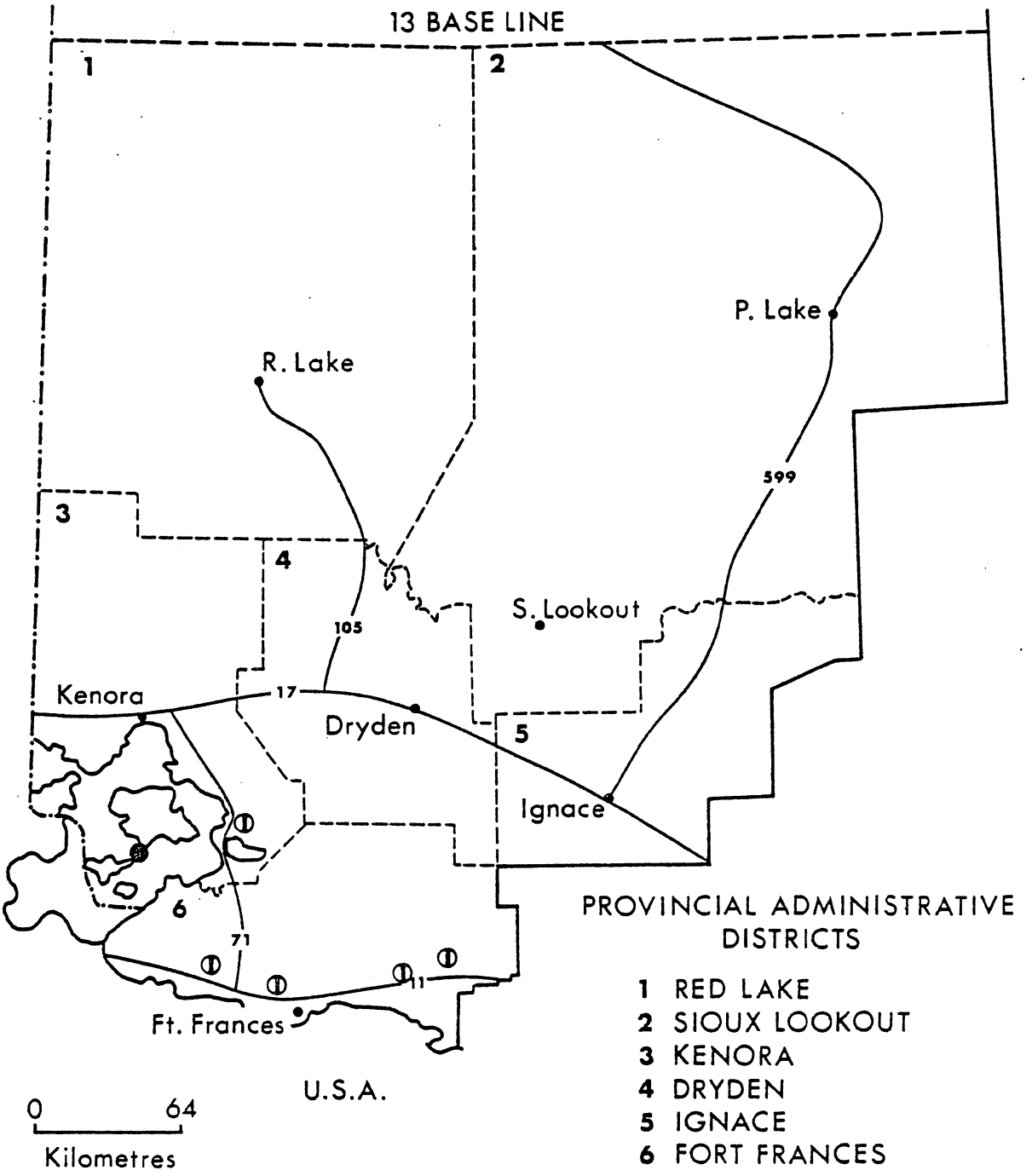

Figure 5. Introduced Pine Sawfly, *Diprion similis* (Htg.)

Locations in which defoliation occurred in 1982

Severe . . . . . ●

Light . . . . . ◑

Table 4. Summary of damage by the northern pitch twig moth in the Northwestern Region in 1981 and 1982 (counts based on the examination of 150 or 250 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 (%)	
				1981	1982	1981	1982
Sioux Lookout District							
*Vermilion R.	100	3,000	1.4	5.0	9.2	1.0	10.0
Ignace District							
*Furniss Twp	876	7,500	1.0		4.4		0.8
Dryden District							
*Aubrey Twp	150	7,000	1.0	7.0	6.0	3.0	0.0
Colenso Twp	40	4,000	1.9		0.7		2.7
MacFie Twp	120	5,500	2.0	7.0	4.7	3.0	1.3
Kenora District							
*Broderick Twp	3,600	8,000	.88		0.4		0.0
Fort Frances District							
Weller Lake	50	7,000	1.5		0.7		0.0
Dance Twp	30	3,000	2.8		7.3		3.3

* 250-tree sample

Table 5. Other forest insects.

Insect	Host(s)	Remarks
Acleris variana (Fern.) Eastern blackheaded budworm	wS	low populations recorded in the Dryden, Kenora, Fort Frances and Red Lake districts
Adelges lariciatus (Patch) Spruce gall adelgid	wS	Evaluations revealed that 39% of the trees were infested in a plantation in Kingsford Twp, Fort Frances District and 7% were infested in Britton Twp, Dryden District.
Alsophila pometaria (Harr.) Fall cankerworm	W, wE, nM	caused moderate-to-severe defoliation of many shade trees within the towns of Dryden, Fort Frances and Kenora
Cephalcia sp. Webspinning sawflies	bS, wS, jP	low numbers detected in the Dryden, Kenora and Fort Frances districts
Coleophora laricella (Hbn.) Larch casebearer	tL	The low population found within the town of Sioux Lookout represents a new extension in the range of this insect.
Conophthorus banksianae McPherson Jack pine tip beetle	jP	As part of the special jack pine survey, light damage to terminal and lateral shoots was recorded throughout the Region.
Croesus latitarsus Nort. Dusky birch sawfly	wB	one colony collected in Lake of the Woods Provincial Park, Fort Frances District
Datana ministra (Dru.) Yellownecked caterpillar	wB	low numbers detected in Willingdon Twp, Kenora District, near Ingall Lake, Dryden District and in Claxton Twp, Watten Twp, and the Wild Land Reserve, Fort Frances District

(continued)

Table 5. Other forest insects (continued).

Insect	Host(s)	Remarks
Dryocampa rubicunda rubicunda (Fabr.) Greenstriped mapleworm	rM	low populations observed within the town of Fort Frances and in the Reef Point area, Fort Frances District
Eriosoma americanum (Riley) Woolly elm aphid	wE	moderate-to-high populations collected on shade trees within the towns of Dryden and Fort Frances
Fenusa pusilla (Lep.) Birch leafminer	wB	low numbers detected on young regeneration at scattered locations in the Fort Frances and Dryden districts and high populations on some ornamentals within the town of Fort Frances
Gracillaria sp. Birch leafrollers	wB	Approximately 10 ha of moderate infestation were observed east of Sandbar Provincial Park, Ignace District and light damage was recorded in the rest of Ignace District and the central part of Sioux Lookout District.
Halysidota tessellaris (J.E. Smith) Pale tussock moth	Ba	low-to-moderate populations observed defoliating trees in Lake of the Woods Provincial Park, Fort Frances District
Hemichroa crocea (Geoff.) Striped alder sawfly	Al	moderate-to-severe defoliation of occasional trees in the Burditt Lake area, Fort Frances District

(continued)

Table 5. Other forest insects (continued).

Insect	Host(s)	Remarks
Heterocampa manteo (Dbldy.) Variable oakleaf caterpillar	Ba	high numbers observed causing heavy defoliation of some trees in Lake of the Woods Provincial Park, Fort Frances District
Hyphantria cunea (Dru.) Fall webworm	wB, Al, W	scattered colonies collected in Broderick Twp, Kenora District and in McCrosson and Watten twps and at Weller Lake in the Fort Frances District
Neodiprion nanulus nanulus Schedl. *N. pratti banksianae* Roh. *N. swainei* Midd. *N. virginianus* complex Pine sawflies	jP	low numbers detected in Dryden, Fort Frances, Kenora, Ignace and Red Lake districts
Nymphalis antiopa (L.) Mourningcloak butterfly	tA	isolated populations detected at Kawashegamuk Lake, Dryden District and in Farrington Twp, Fort Frances District
Paraprociphilus tessellatus (Fitch) Woolly alder aphid	siM	low-to-moderate populations recorded within the towns of Fort Frances, Rainy River and Kenora
Phyllonorycter nipigon (Free.) Balsam poplar leafblotch miner	bPo	small numbers observed throughout the Red Lake, Sioux Lookout and Ignace districts
Profenusa thomsoni (Konow) Ambermarked birch leafminer	wB	The infestation of 1981 in the Pickle and Greenbush lakes area collapsed and only low numbers were observed in 1982.

(continued)

Table 5. Other forest insects (concluded).

Insect	Host(s)	Remarks
Schizura concinna (J.E. Smith) Redhumped caterpillar	tA, wB	scattered colonies collected in Broderick and MacNicol twps, Kenora District, Crozier Twp, Fort Frances District and along the Marchington River, Sioux Lookout District
Symmerista canicosta Francl. Redhumped oakworm	Ba	low-to-moderate numbers recorded in Lake of the Woods Provincial Park, Fort Frances District
Toumeyella parvicornis (Ckll.) Pine tortoise scale	jP	low populations detected on roadside trees along Hwy 599 near the Crystal River in Ignace District

TREE DISEASES

Major Diseases

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

Low levels of mortality caused by this root rot were detected in areas of small-diameter jack pine regeneration throughout the Region. Sixteen evaluations were carried out to determine damage levels. The disease was confirmed in six of these assessments (Table 6). Damage levels ranged from 0.6% to 1.3% of the trees examined in 37.5% of the areas sampled. The disease is not spectacular but each year continues to kill trees.

Weakened trees appear to be more susceptible to attack. Plantations are especially vulnerable since they are growing under unnatural conditions.

Table 6. Summary of damage caused by Armillaria root rot in jack pine regeneration examined in the Northwestern Region in 1982 (counts based on the examination of 150 or 250 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				
Chukuni R. Access Rd.	500	8,000	1.6	0.6
Sioux Lookout District				
*Vermilion R.	100	3,000	1.4	0.8
Snag Lake	200	12,000	1.7	0.6
Houghton Lake	200	12,000	1.2	0.6
Ignace District				
Pinafore Lake	10	15,000	1.4	1.3
Dryden District				
MacFie Twp	120	5,500	2.0	1.3

* 250-tree sample

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

Surveys for this disease were conducted at eight locations in 1982 in the Kenora, Dryden and Fort Frances districts (Table 7). A significant and expected increase in the incidence of the disease was recorded at all sites that had been evaluated the previous year. Repeated surveys in the areas revealed the following increase in infection: 7% in the town of Fort Frances, 3% in the town of Rainy River and 10% in Lake of the Woods Provincial Park. A rural evaluation along Highway 602 in the Fort Frances District disclosed that 42% of the living elms displayed characteristic symptoms of the disease. There was no evidence that the pathogen was affecting elm trees in the town of Dryden.

Surveys with elm trap logs and pheromone-baited traps failed to detect the presence of the European elm bark beetle, *Scolytus multistriatus* Marsh., the introduced vector of *C. ulmi*.

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

Surveys in 1982 revealed that, although foliar damage caused by these pathogens remained at approximately the same low level as in the previous year, there was a marked decrease in the percentage of trees affected. Disease evaluations at nine randomly selected points revealed an average incidence of 13% compared with 71% in 1981. The highest incidence recorded in 1982 occurred in a white spruce plantation in Britton Township, Dryden District (Table 8) where 70% of the trees were affected but less than 1% of the foliage was infected.

Damaged trees were found as far north as Pickle Lake (Fig. 6).

Globose Gall Rust, *Endocronartium harknessii* (J.P. Moore) Y. Hirat.

This pathogen of hard pines can be found in most natural or planted jack pine regeneration through the southern part of the Region (Fig. 7). The disease is capable of causing mortality when stem infections occur on seedlings or small-diameter trees. Infected trees have been observed as far north as the Pipestone River, northwest of Pickle Lake in the Sioux Lookout District. Quantitative sampling at 13 locations revealed that the incidence of infection ranged from 3.2% to 28.0% and averaged 14.5% (Table 9), marking a slight increase over the previous year when an average infection rate of 13% was recorded. The average number of trees severely infected (i.e., those with stem galls) increased by 1.2% in 1982.

Table 7. Summary of infection caused by Dutch elm disease in rural areas in the Northwestern Region in 1982 (Data apply to white elms exhibiting typical symptoms of the disease.)

Location	No. of trees examined	Avg ht of trees (m)	Trees unaffected	Trees affected	Trees dead	% of trees affected
Fort Frances District						
Curran Twp	100	6.0	96	4	0	4.0
McCrosson Twp	200	17.0	114	84	2	43.0
Roddick Twp	200	10.0	84	100	16	58.0
Total	500		294	188	18	41.2

Summary of infection caused by Dutch elm disease in urban areas in the Northwestern Region in 1982 (Data apply to living* white elms exhibiting typical symptoms of the disease.)

Location	No. of trees examined	Avg ht of trees (m)	Trees unaffected	Trees affected	Trees dead	% of trees affected
Dryden District						
Dryden	100	10.0	100	0	0	0
Fort Frances District						
Fort Frances	250	14.8	222	28	0	11.2
Rainy River	150	9.8	139	11	0	7.3
Kenora District						
Keewatin	90	11.0	76	14	0	15.5
Kenora	100	12.0	98	2	0	2.0
Total	690		635	55	0	8.0

* Only living trees were considered since recently dead trees were being removed at the time of the survey.

Table 8. Summary of damage caused by needle rusts of spruce in planted or regeneration stands examined in the Northwestern Region in 1982 (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						
Dixie Lake Seed Orchard	-	-	bS	0.5	6.0	<1
Sioux Lookout District						
Goodie Lake Seed Orchard	-	-	bS	0.5	2.0	<1
Ignace District						
Furniss Twp Seed Orchard	-	-	bS	0.5	1.3	<1
Dryden District						
Britton Twp	25	3,000	wS	1.6	70.0	<1
Melgund Twp Seed Orchard	-	-	bS	0.3	6.0	<1
Rugby Twp Progeny Test	-	-	bS	0.3	2.0	<1
Kenora District						
Work Twp Seed Orchard	-	-	bS	0.3	20.0	<1
Minnesabic Lake Seed Orchard	-	-	bS	0.3	4.0	<1
Fort Frances District						
Bowes Rd Seed Orchard	-	-	bS	0.5	2.0	1

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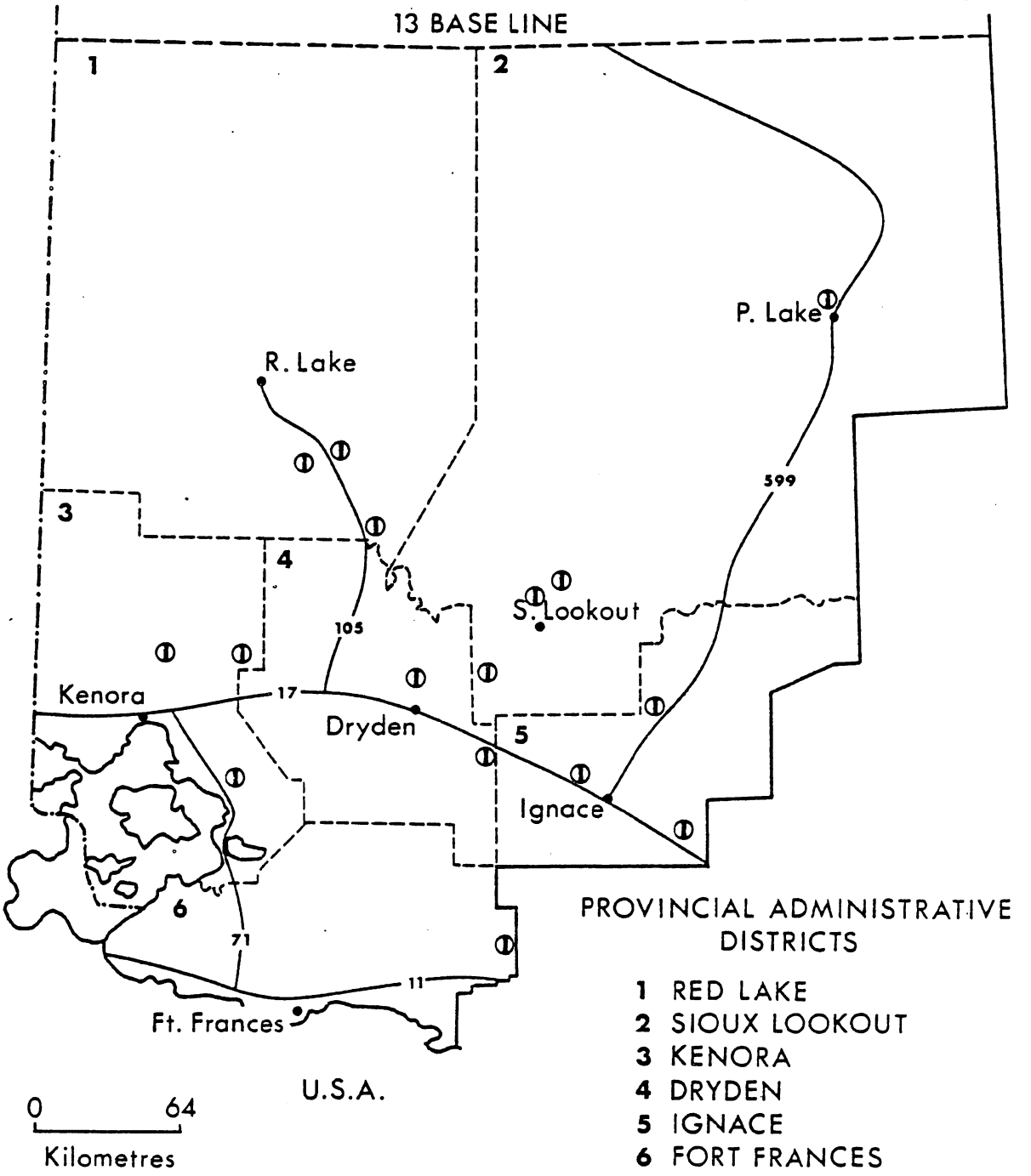

Figure 6. Needle Rusts of Spruce, *Chrysomyxa ledi* (Alb. and Schw.) d By. and *C. ledicola* Lagh.

Locations in which light damage occurred in 1982 . . . . . ①

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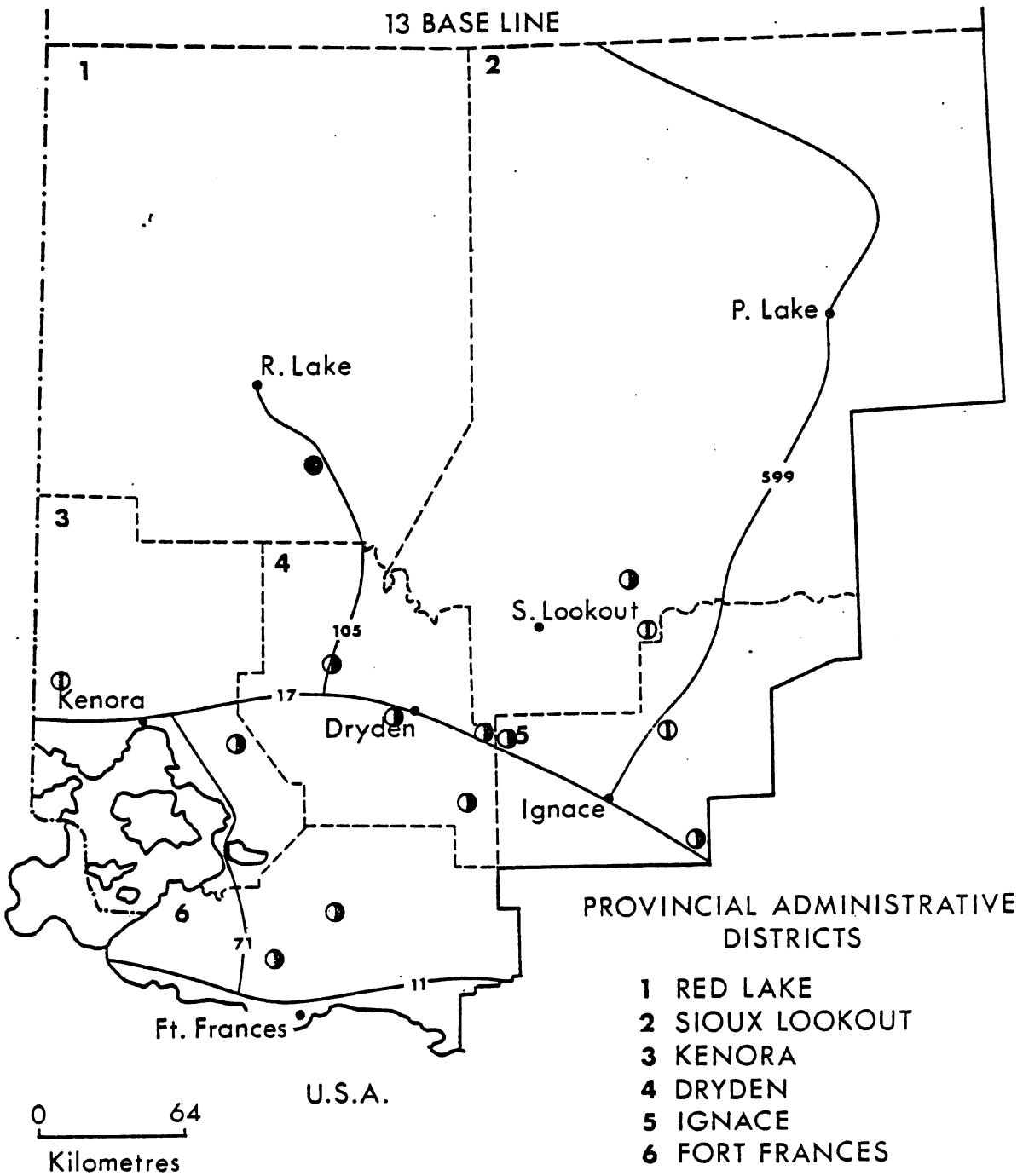

Figure 7. Globose Gall Rust, *Endocronartium harknessii* (J.P. Moore) Y. Hirat.

Locations in which damage occurred in 1982

Heavy . . . . . ●

Moderate . . . . . ◑

Light . . . . . ①

Table 9. Summary of damage caused by globose gall rust on jack pine in the Northwestern Region in 1982 (counts based on the examination of 150 or 250 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						
Chukuni R. Access Rd	500	8,000	1.6	28.0	13.0	0.0
Sioux Lookout District						
Snag Lake	200	12,000	1.7	3.2	2.6	1.3
Lomond Twp	20	5,000	2.8	17.3	5.3	0.0
*Vermilion R.	100	3,000	1.4	13.2	5.2	0.0
Ignace District						
*Furniss Twp	876	7,500	1.0	10.8	9.2	0.0
Pinafore Lake	10	15,000	1.4	4.6	3.3	0.0
Crystal R.	500	8,500	4.0	8.6	4.0	0.0
Dryden District						
*Aubrey Twp	150	7,000	1.0	19.2	11.2	0.0
MacFie Twp	120	5,500	2.0	23.0	18.0	0.0
Kenora District						
*Broderick Twp	3,600	8,000	.88	3.2	1.2	0.0
314 Road (Km 26)	25	6,000	3.2	10.0	5.0	0.7
Fort Frances District						
Dance Twp	3	3,000	2.8	6.6	2.6	0.0
Weller Lake	50	7,000	1.5	17.0	12.0	0.7

[a] Stem galls

* 250-tree sample

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

Surveys are carried out each year to detect any increase in the range of this pathogen in the Northwestern Region. In 1982, surveys in numerous jack pine regeneration stands and plantations, including a special survey at 12 locations in the southern half of the Region, did not detect the disease.

Aerial or ground surveys in previously recorded infection centres in the Red Lake and Sioux Lookout districts revealed that, although infection was evident in each area, very little current tree mortality could be found.

A survey conducted for the third consecutive year in a red pine (*Pinus resinosa* Ait.) plantation in Aubrey Township, Dryden District where infected trees were found and destroyed in 1979 did not reveal any evidence of infection in 1982.

Minor Diseases

Stem Rusts, *Cronartium* sp.

No change occurred in the status of stem rust infections in natural jack pine regeneration or in plantations over the previous year. Surveys carried out in 1981 revealed an average incidence of 2.5%. In 1982, disease evaluations performed at seven locations revealed that infection ranged from 0.5% to 7.2% in the sample areas. The highest level of infection was recorded in the Dryden District (Table 10).

Positive identification of stem rusts normally depends on gall morphology or infected alternate hosts. Aeciospores, which can be used to distinguish stem rusts causing globose galls, were unobtainable in 1982, because fruiting occurs for only a brief period. The absence of spores and infected alternate hosts results in all stem rusts being identified as *Cronartium* sp. Past records indicate that the majority of stem rust cankers found in northwestern Ontario were caused by sweetfern blister rust, *C. comptoniae* (Arth.).

Shoot Blight, *Venturia macularis* (Fr.) E. Muell. & Arx
(= *Pollaccia radiosa* [Lib.] Bald. & Cif.)

Six areas were examined in 1982 to evaluate damage to aspen regeneration by this blight. Infection levels of this disease increased significantly in all areas examined. Evaluations disclosed a 39% increase in trees diseased and a 32% increase in terminal shoot mortality over the previous year. Surveys revealed that two locations, one in the Kenora District, the other in the Fort Frances District, had infection rates over 90% (Table 11).

Table 10. Summary of damage caused by stem rusts in jack pine regeneration stands in the Northwestern Region in 1982 (counts based on the examination of 150 or 250 trees at each location).

Location	Estimated area affected (ha)	Estimated no. of trees per ha	Avg ht of trees (m)	Trees severely infected[a] (%)
Sioux Lookout District				
Lomond Twp	20	5,000	2.8	1.3
*Vermilion R.	100	3,000	1.4	0.4
Ignace District				
*Furniss Twp	876	7,500	1.0	0.8
Molzan Lake	200	12,000	6.5	1.3
Dryden District				
*Aubrey Twp	150	7,000	1.0	7.2
Aubrey Twp	130	1,300	11.3	6.0
Kenora District				
*Broderick Twp	3,600	8,000	0.88	0.4

[a] Stem cankers

* 250-tree sample

Table 11. Summary of damage caused by shoot blight of aspen in the Northwestern Region in 1982 (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					
Lomond Twp	20	1,000	1.4	32	17
Dryden District					
Colenso Twp	150	15,000	3.2	33	10
Kenora District					
Lemay Twp	100	5,600	3.0	25	4
Wolf Is., Lake of the Woods	.5	6,000	2.0	98	79
Fort Frances District					
Woodyatt Twp	10	15,000	1.0	93	67
Potts Twp	10	40,000	2.0	72	55

Table 12. Other forest diseases.

Organism	Host(s)	Remarks
Ciborinia whetzelii (Seaver) Seaver Ink spot	tA	low incidence recorded in the west end of the Fort Frances District and in the Vermilion Bay and Colenso Twp areas of Dryden District
Coleosporium asterum (Diet.) Syd.	jP	trace defoliation observed on trees in Aubrey and Buller twps, Dryden District, in Dance Twp, Fort Frances District and in Furniss Twp, Ignace District
Hypoxylon mammatum (Wahl.) J.H. Miller Hypoxylon canker	tA	no apparent change in the status of this disease, which is found throughout the Region
Marssonina brunnea (Ell. & Ev.) Magn. Leaf spot	tA	Early leaf browning and premature defoliation were observed in stands in the western part of the Fort Frances District.
Melampsora medusae Thuem. Leaf rust	tL, Po	Many ornamentals suffered severe browning and premature defoliation within the town of Fort Frances.
Phyllosticta sorbi West. Leaf spot	aMo	trace damage south of Ear Falls on Hwy 105
Pollaccia saliciperda (Alleach. & Tub.) Arx Willow scab	W	Numerous severely infected trees were detected within the town of Fort Frances.
Sirococcus strobilinus Preuss Shoot blight	rP	low incidence of infection detected in Jordan and Echo twps, Sioux Lookout District and in Tustin Twp, Dryden District

(continued)

Table 12. Other forest diseases (concluded).

Organism	Host(s)	Remarks
Taphrina communis (Sadeb.) Gies. Plum pocket	Plum	high incidence of this disease and the associated hollow fruit recorded in the town of Fort Frances

Rodent Damage

Five percent of the jack pine trees in an area in Aubrey Township, Dryden District experienced rodent girdling and 2% of the trees in an area near Molzan Lake, Ignace District suffered rodent-related mortality.

Abiotic Damage

Frost Damage

Two 150-tree evaluations revealed 130 and 137 trees, respectively, to be affected in Britton Twp, Dryden District and Kingsford Twp, Fort Frances District, with only 1% of the foliage damaged in both instances.

Snow Damage

On the night of 30 September 1981 a wet, heavy snowfall occurred in an area in the southern part of the Region (Fig. 8). This moisture-laden snow caused broken stems and limbs on jack pine and aspen (*Populus* spp.) throughout approximately 9,000 km^2 of forested land. Aerial and ground surveys revealed that jack pine sustained the most serious and widespread damage.

Five evaluations were instituted to assess the amount of damage. The highest incidence of damage was recorded in McNevin Township, Ignace District (Table 13).

Extensive damage also occurred in small-diameter jack pine stands. Effects of the storm were evidenced by bent trees, some with the tops touching the ground.

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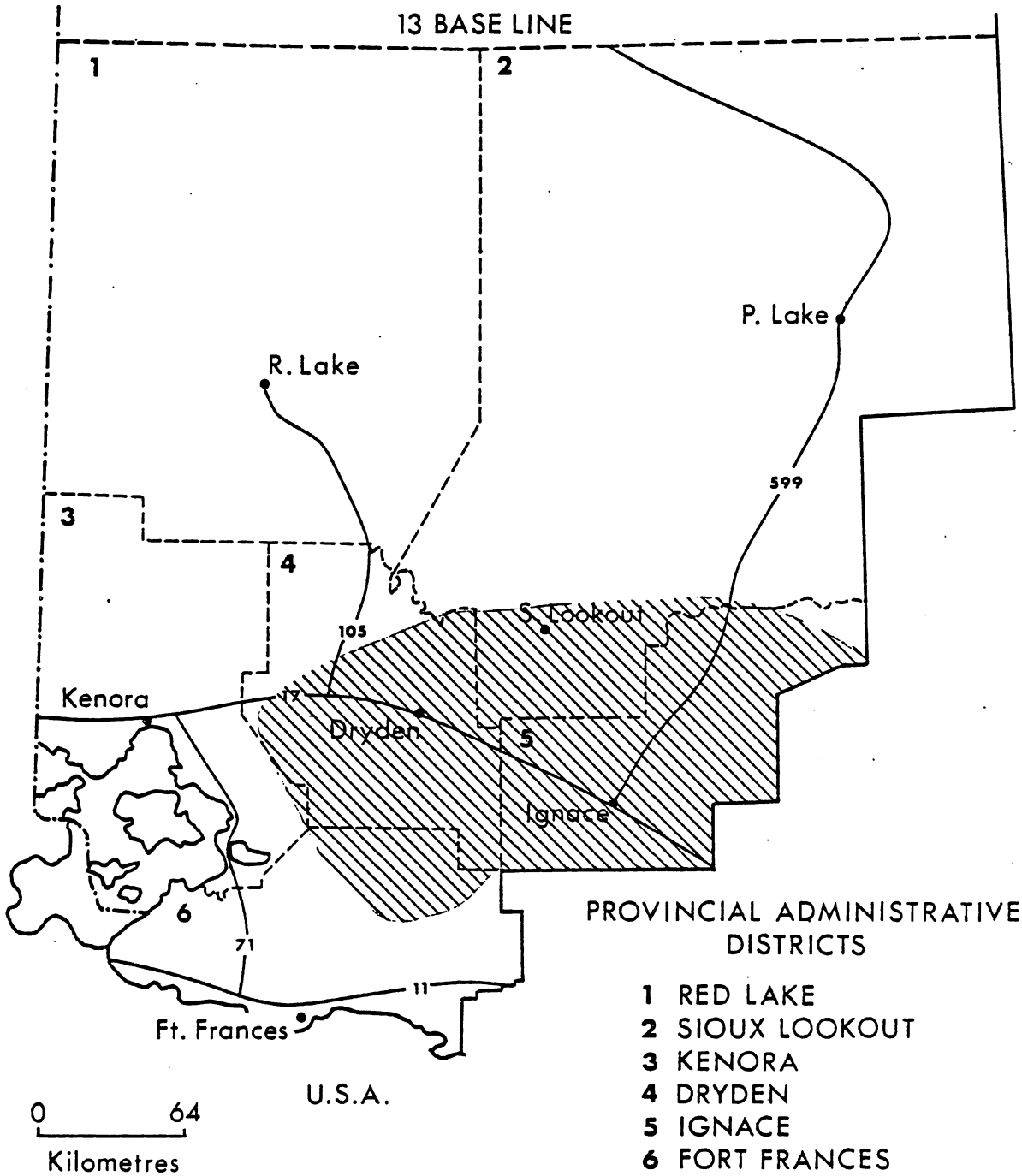

Figure 8. Abiotic Damage (Snow)

Area where snow damage was mapped in 1982 . . . . . ▨

Table 13. Summary of damage caused by snow in jack pine stands examined in the Northwestern Region in 1982 (counts based on 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 with broken branches (%)	Trees with broken stems (%)
Sioux Lookout District						
Lomond Twp	180	9,000	6.2	8.0	6.0	2.0
Ignace District						
McNevin Twp	500	3,000	15.6	17.9	12.6	5.3
Dryden District						
Aubrey Twp	130	1,300	11.3	4.0	3.0	1.0
Snake Bay Rd	5	2,000	9.6	2.0	2.0	0.0
Fort Frances District						
Winkle Lake	100	1,400	13.3	5.0	4.0	1.0

Wind Damage

On the night of 5 July 1982, a severe windstorm was responsible for creating two large areas of broken and uprooted timber (see Frontispiece). The largest area of blowdown occurred in the Seseganaga Lake area in the Ignace District; the other was located in the Bernadine and Jones lakes area in the Fort Frances District (Fig. 9).

The area of blowdown in the Fort Frances District encompassed approximately 1,700 ha while 2,800 ha of forest were affected in the Ignace District. In the smaller area of blowdown the species of fallen timber consisted of jack pine (86%), black spruce (12%), aspen (1%) and white birch (1%). Jack pine, aspen and black spruce were the tree species that suffered the most damage in the larger area of blowdown.

Approximately 63,800 cunits* (net merchantable) of wood were damaged in the Fort Frances District. A salvage operation is planned by Boise Cascade of Canada.

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* Figures provided by OMNR.

NORTHWESTERN REGION

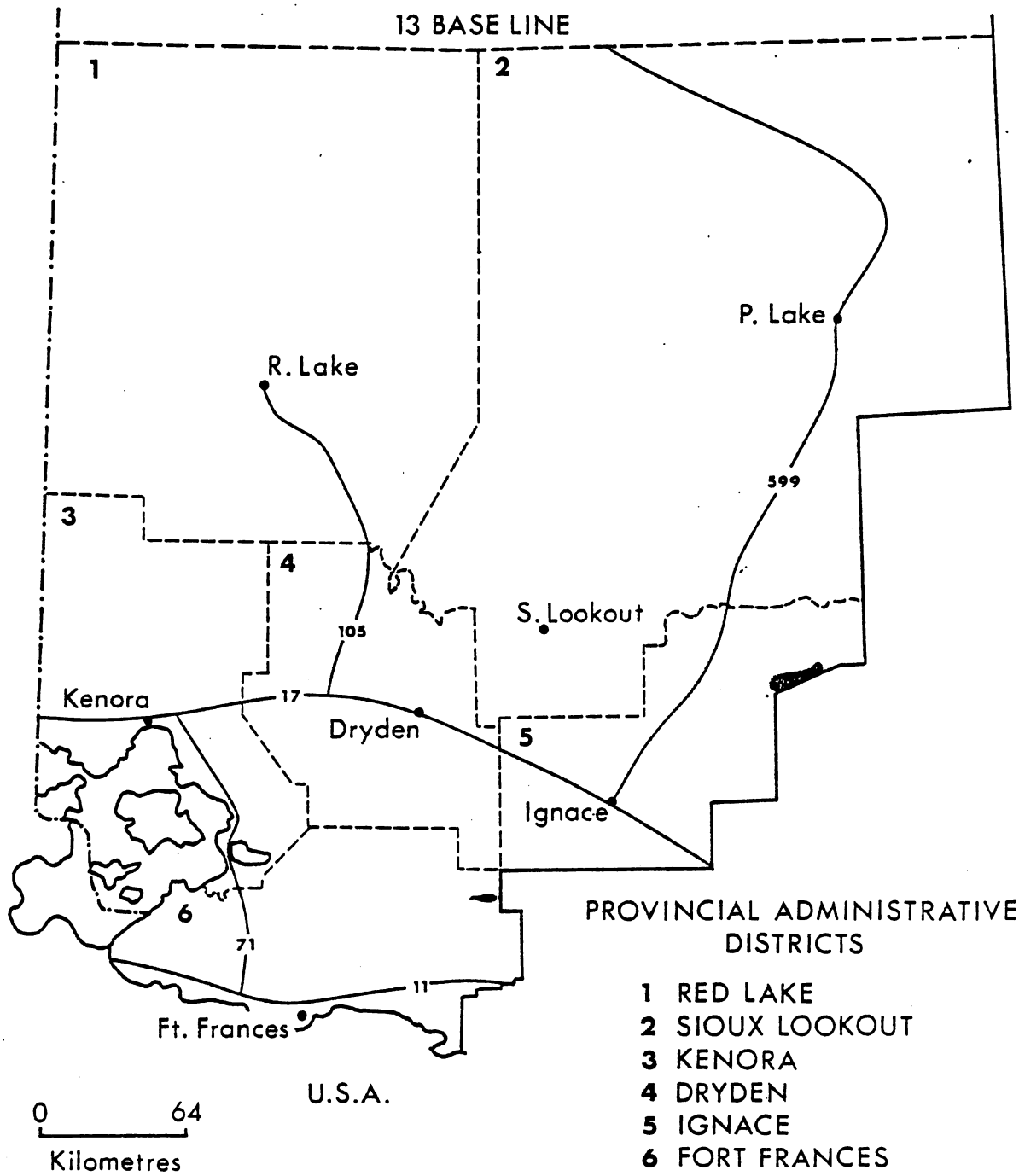

Figure 9. Abiotic Damage (Wind)

Areas where wind damage was mapped in 1982 . . . . . ▓

Special Surveys

High-value Jack Pine Stands

In 1982, a special survey was conducted throughout northern Ontario to determine the incidence and impact of insects and diseases in high-value regenerated jack pine stands. Twelve areas in the Northwestern Region were surveyed in selected stands <2 m, 2-6 m and >6 m in height. Each stand was evaluated by means of a standard sampling procedure during the periods of 7-14 June and 12-23 August. The insects and diseases selected to be evaluated in the course of the survey were:

Insects: Jack pine sawflies, jack pine budworm, white pine weevil, eastern pine shoot borer and jack pine tip beetle.

Diseases: Needle rusts, stem rusts, needle cast, globose gall rust, Scleroderris canker and Armillaria root rot.

Insects and diseases not found were:

Insects: Jack pine sawflies and jack pine budworm.

Diseases: Needle cast and Scleroderris canker.

Positive results are summarized in Table 14.

The survey also revealed a population of the northern pitch twig moth in six of the stands examined. Although this insect rarely injures taller trees, juvenile trees <1 m to 2 m in height often were damaged. When an attack occurs at the base of a growing terminal, the shoot may be girdled and killed, or it may survive as a weakened crooked stem.

Low populations of white pine weevil were detected in the survey. This insect kills the leader, destroying tree form and decreasing a tree's commercial value (and aesthetic appeal).

The eastern pine shoot borer kills the lateral or terminal current growth. It is interesting to note that, in all areas evaluated, more terminal shoots than lateral shoots were infested. Again, poor tree form and increment reduction are the results of damage to the terminal by this insect.

The jack pine tip beetle bores into the tips of jack pine twigs early in the spring. This causes the new growth to die. This insect is not considered a serious pest.

Table 14. Summary of the results of a special survey of high-value jack pine stands in the Northwestern Region in 1982 (counts based on the examination of 250 or 150 trees at each location).

Location	Estimated area of stand (ha)	Estimated no. of trees per ha	Avg ht of trees (m)	White pine weevil	Eastern pine shoot borer		Jack pine tip beetle	Northern pitch twig moth
				Trees weeviled (%)	Trees with terminal shoot damage (%)	Trees with lateral shoot damage (%)	Trees damaged (%)	Trees damaged (%)
Sioux Lookout District								
*Vermilion R.	100	3,000	1.4	0.0	8.8	2.8	2.4	18.0
Lomond Twp	20	5,000	2.8	0.7	3.3	0.0	0.0	0.0
Lomond Twp	200	8,600	6.2	0.0	0.0	0.0	0.0	0.0
Ignace District								
*Furniss Twp	876	7,500	1.0	0.8	3.6	0.8	0.0	5.2
Crystal R.	500	8,500	4.0	0.0	0.0	0.0	0.0	0.0
Molzan L.	200	12,000	6.1	0.0	0.0	0.0	0.0	0.0
Dryden District								
*Aubrey Twp	150	7,000	1.0	0.0	4.0	1.2	2.0	6.0
Buller Twp	120	3,000	5.5	0.0	0.0	0.0	10.0	5.3
Aubrey Twp	130	1,300	11.3	0.0	0.0	0.0	0.0	0.0
Snake Bay Rd	5	3,000	6.1	0.0	0.6	0.0	0.0	0.0
Kenora District								
*Broderick Twp	3,600	8,000	0.9	0.0	1.2	0.4	0.8	0.4
Fort Frances District								
Dance Twp	2	3,000	2.8	0.0	0.0	0.0	2.0	10.6

* 250-tree sample

(continued)

Table 14. Summary of the results of a special survey of high-value jack pine stands in the Northwestern Region in 1982 (counts based on the examination of 250 or 150 trees at each location) (concluded).

Location	Estimated area of stand (ha)	Estimated no. of trees per ha	Avg ht of trees (m)	Needle rust		Stem rusts	Armillaria root rot		Globose gall rust	
				Trees affected (%)	Foliage damaged (%)	Trees affected (%)	Trees affected (%)	Tree mortality (%)	Trees affected (%)	Trees severely[a] affected (%)
Sioux Lookout District										
*Vermilion R.	100	3,000	1.4	0.0	0.0	0.4	0.8	0.8	13.2	5.2
Lomond Twp	20	5,000	2.8	0.0	0.0	1.3	0.0	0.0	17.3	5.3
Lomond Twp	200	8,600	6.2	0.0	0.0	0.0	0.0	0.0	25.3	11.3
Ignace District										
*Furniss Twp	876	7,500	1.0	1.6	1.0	0.8	0.0	0.0	10.9	9.2
Crystal R.	500	8,500	4.0	0.6	1.0	0.0	0.0	0.0	8.6	4.0
Molzan L.	200	12,000	6.1	0.0	0.0	1.3	0.0	0.0	15.3	6.6
Dryden District										
*Aubrey Twp	150	7,000	1.0	3.3	1.0	7.2	0.0	0.0	19.2	11.2
Buller Twp	120	3,000	5.5	62.0	1.0	0.0	0.0	0.0	18.6	2.6
Aubrey Twp	130	1,300	11.3	0.0	0.0	0.0	0.0	0.0	20.0	0.0
Snake Bay Rd	5	3,000	6.1	0.0	0.0	0.0	0.0	0.0	23.3	4.0
Kenora District										
*Broderick Twp	3,600	8,000	0.9	0.0	0.0	0.4	0.0	0.0	3.2	1.2
Fort Frances District										
Dance Twp	2	3,000	2.8	92.0	2.0	0.0	0.0	0.0	6.6	2.6

[a] Stem galls

* 250-tree sample

The pine needle rust can kill small trees if infection is high enough; however, in the current survey the disease was detected at very low levels in all areas examined. Although a high percentage of trees were affected in two areas, the disease occurred at low levels. (One infected needle on a tree constitutes an affected tree.)

Once a tree reaches 8 cm in diameter a stem rust does not pose a serious threat to the tree's survival. Its growth rate, though, will certainly be affected.

Globose gall rust is a serious problem when the gall occurs on the stem. On small-diameter trees a stem gall can cause mortality. Heavily infected trees tend to suffer a growth reduction.

Armillaria root rot may occur at low levels but its presence usually causes tree mortality.

In conjunction with the special survey for insect and disease related problems permanent sample plots were established. Four areas were selected, and visited in early June and mid-August. The following variables were measured: 1) tree height to the base of the growing terminal, 2) terminal growth (on the second visit), 3) pest and disease levels, 4) mortality. A total of 250 randomly selected trees were examined at each sample location. These plots are to be measured and evaluated annually until 1985. Analysis of the accumulated information revealed that the average current growth for jack pine regeneration under 2 m in the Region ranged from 37 cm to 55 cm (Table 15).

Table 15. Summary of the current height growth of jack pine in the Northwestern Region in 1982 (measurements based on the examination of 250 randomly selected jack pine regeneration trees at each location).

Location	Estimated area of stand (ha)	Estimated no. of trees per ha	Avg ht of trees (m)	Avg current growth (cm)
Sioux Lookout District				
Vermilion R.	100	3,000	1.4	55
Ignace District				
Furniss Twp	876	7,500	1.0	46
Dryden District				
Aubrey Twp	150	7,000	1.0	37
Kenora District				
Broderick Twp	3,600	8,000	0.9	42

Jack Pine Seed and Cone Pests

A survey of cone-damaging insects and diseases was conducted at two locations in the Region. Cones displaying any evidence of insect activity were classed as damaged.

One hundred cones from each of the two natural stands, one in Aubrey Township in Dryden District and the other in Lomond Township in Sioux Lookout District, were collected during the first week of July. Second-year cones in the green succulent stage were sampled. The cones were removed from the entire foliated portion of the tree. A minimum of five trees were sampled at each location.

Dissection revealed that 39% of the cones from Lomond Township were damaged by an unidentified Lepidopterous species, with a resultant seed loss of 63%. Analysis of the Aubrey Township sample disclosed 33% of the cones to be damaged by an undetermined Lepidopterous species, with an accompanying 39% seed loss. The Lepidopterous species could not be positively identified because insects were absent from the sample.

Elm Bark Beetles, *Hylurgopinus rufipes* (Eich.)
Scolytus multistriatus (Marsh.)

A survey was instituted across Ontario to determine the presence and level of the two major vectors of the Dutch elm disease fungus, the native elm bark beetle, *Hylurgopinus rufipes* (Eich.), and the smaller European elm bark beetle, *Scolytus multistriatus* (Marsh.). This survey was part of a national program of information collecting.

Two types of traps were deployed to monitor the presence and distribution of the elm bark beetles. A sticky pheromone trap was used to attract the introduced vector of *C. ulmi* and elm trap logs, 1 m long, were used to serve as breeding material for both bark beetles. The distinctive galleries of each insect were then recorded. Two sets of two logs each were set out at five locations, the first pair in May and the second in July (Table 16). No evidence of *S. multistriatus* was produced by either type of trap; however, the native elm bark beetle was found in trap logs at three locations.

Table 16. Summary of data collected from elm trap logs set out in May and July at five locations in the Northwestern Region (information based on the examination of two 1-m-long elm logs at each location).

Location	Avg log diam (cm) 1st set	Avg log diam (cm) 2nd set	Trap log no.	May - July 1st set: Total no. of galleries *N.E.B.B. successful/aborted	May - July 1st set: Total no. of galleries +S.E.E.B.B. successful/aborted	July - Sept. 2nd set: Total no. of galleries N.E.B.B. successful/aborted	July - Sept. 2nd set: Total no. of galleries S.E.E.B.B. successful/aborted
Kenora District							
Town of Kenora	17.9	15.0	1	54 / 0	0 / 0	0 / 0	0 / 0
			2	76 / 2	0 / 0	0 / 0	0 / 0
Fort Frances District							
Town of Fort Frances	16.1	15.5	1	4 / 5	0 / 0	2 / 0	0 / 0
			2	0 / 0	0 / 0	0 / 0	0 / 0
Town of Rainy River	15.8	15.4	1	0 / 0	0 / 0	0 / 0	0 / 0
			2	0 / 0	0 / 0	0 / 0	0 / 0
Morley Twp	16.8	15.6	1	0 / 0	0 / 0	0 / 0	0 / 0
			2	35 / 3	0 / 0	0 / 0	0 / 0
Lake of the Woods Prov. Pk.	21.5	17.3	1	0 / 0	0 / 0	0 / 0	0 / 0
			2	0 / 0	0 / 0	0 / 0	0 / 0

* Native elm bark beetle

\+ Smaller European elm bark beetle