

R E S U L T S   O F   F O R E S T   I N S E C T   A N D  
D I S E A S E   S U R V E Y S   I N   T H E  
N O R T H W E S T E R N   R E G I O N   O F  
O N T A R I O ,   1 9 8 3

(FOREST DISTRICTS: RED LAKE, SIOUX LOOKOUT,  
KENORA, DRYDEN, IGNACE and FORT FRANCES)

R.J. SAJAN and D.C. CONSTABLE

GREAT LAKES FOREST RESEARCH CENTRE

CANADIAN FORESTRY SERVICE

DEPARTMENT OF THE ENVIRONMENT

1984

MISCELLANEOUS REPORT NO. 1

©Minister of Supply and Services Canada 1984  
Catalogue No. Fo29-8/1E  
ISBN 0-662-13090-1  
ISSN 0826-0222

*Copies of this report may be obtained from:*

*Great Lakes Forest Research Centre  
Canadian Forestry Service  
Department of the Environment  
P.O. Box 490  
Sault Ste. Marie, Ontario  
P6A 5M7*

## SURVEY HIGHLIGHTS

This report deals with the more important insect and disease conditions encountered during aerial and ground surveys in the North-western Region of Ontario in 1983.

The area of moderate-to-severe defoliation by the spruce budworm increased from approximately 3,430 km<sup>2</sup> in 1982 to 7,746 km<sup>2</sup> this season. The introduced pine sawfly defoliated some 1,200 ha of white pine in the southeastern portion of the Kenora District and the birch skeletonizer increased in distribution, especially in the northern portion of the Region. The red pine sawfly caused moderate-to-severe defoliation along Highway 17 in the Ignace District, and for the fourth consecutive year infestations of the aspen leafblotch miner were extremely heavy across the Region. Adult sawyer beetle damage was detected on the fringes of cutovers in Sioux Lookout, Red Lake and Dryden districts.

Drought damage was very common on shallow-soil sites and rocky ridges throughout Kenora, Ignace and Fort Frances districts. Spruce needle rusts were commonly found in the northern portion of the Region, and balsam poplar across the entire Region was heavily defoliated by two leaf spot diseases. Eight areas damaged by sawyer beetles were sampled for pinewood nematodes.

Special surveys were conducted in 12 black spruce plantations to identify insects and diseases having an impact on growth. Black spruce cones were collected from lowland and upland sites to determine the organisms causing seed damage and to estimate seed loss.

In this report, the following categories are used to determine the importance of insects and 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



Severe defoliation and tree mortality caused by spruce budworm, *Choristoneura fumiferana* (Clem.)



Mature spruce budworm

*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,
- 2) those which are capable of causing serious damage but, because of low populations or for other reasons, did not cause serious damage in 1983.

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 authors would like to express their appreciation to personnel of the Ontario Ministry of Natural Resources (OMNR), wood-using industries and private individuals for their excellent cooperation during the 1983 field season.

R.J. Sajan

D.C. Constable

# TABLE OF CONTENTS

Page

## INSECTS

### Major Insects

Fall Cankerworm, <i>Alsophila pometaria</i> . . . . .	1
(Sioux Lookout, Kenora, Fort Frances and Dryden districts)	
Birch Skeletonizer, <i>Bucculatrix canadensisella</i> . . . . .	1
(All districts)	
Spruce Budworm, <i>Choristoneura fumiferana</i> . . . . .	3
(All districts)	
Sawyer Beetles, <i>Monochamus</i> spp. . . . .	3
(Sioux Lookout, Red Lake, Kenora and Dryden districts) . . .	
Red Pine Sawfly, <i>Neodiprion nanulus nanulus</i> . . . . .	5
(All districts)	
Aspen Leafblotch Miner, <i>Phyllonorycter ontario</i> . . . . .	7
(All districts)	
Yellowheaded Spruce Sawfly, <i>Pikonema alaskensis</i> . . . . .	7
(All districts)	
White Pine Weevil, <i>Pissodes strobi</i> . . . . .	9
(All districts)	
Larch Sawfly, <i>Pristiphora erichsonii</i> . . . . .	10
(All districts)	

### Minor Insects

Introduced Pine Sawfly, <i>Diprion similis</i> . . . . .	10
(Kenora and Fort Frances districts)	
Northern Pitch Twig Moth, <i>Petrova albicapitana</i> . . . . .	10
(Sioux Lookout, Red Lake, Ignace, Fort Frances and Dryden districts)	
Redhumped Caterpillar, <i>Schizura concinna</i> . . . . .	12
(All districts)	
Pine Webworm, <i>Tetralopha robustella</i> . . . . .	12
(Kenora and Fort Frances districts)	
Other forest insects . . . . .	14

(continued)

# TABLE OF CONTENTS (concluded)

Page

## TREE DISEASES

### Major Diseases

Armillaria Root Rot, <i>Armillaria mellea</i> . . . . .	21
(All districts)	
Dutch Elm Disease, <i>Ceratocystis ulmi</i> . . . . .	21
(All districts)	
Spruce Needle Rusts, <i>Chrysomyxa ledi</i> and <i>C. ledicola</i> . . . . .	22
(All districts)	
Tar Spot Needle Cast, <i>Davisonmycella ampla</i> . . . . .	23
(All districts)	

### Minor Diseases

Leaf Spot, <i>Mycosphaerella populicola</i> and <i>M. populorum</i> . . . . .	24
(All districts)	
Shoot Blight, <i>Venturia macularis</i> . . . . .	24
(All districts)	

Other forest diseases . . . . .	25
---------------------------------	----

### Abiotic Damage

Needle Droop . . . . .	26
Wind . . . . .	26
Drought . . . . .	26

### Special Surveys

Black Spruce Plantation Survey . . . . .	28
Semi-permanent Jack Pine Plots . . . . .	29
Black Spruce Seed and Cone Pests . . . . .	35
Seed Orchards . . . . .	35
Pinewood Nematode, <i>Bursaphelenchus xylophilus</i> . . . . .	40

### Nursery Report

Insects . . . . .	41
Diseases . . . . .	41

## INSECTS

### Major Insects

#### Fall Cankerworm, *Alsophila pometaria* (Harr.)

Young larvae of this defoliator usually hatch from the overwintering eggs in early or late May and initially skeletonize new leaves of host trees. As the larvae mature, they consume the entire leaves, leaving only the midribs. Feeding is normally completed by the end of June. Tree mortality rarely occurs and the infestations are generally shortlived, lasting two to three years.

During the period from 1970 to 1973, varying degrees of defoliation occurred at numerous points throughout Dryden, Kenora and Fort Frances districts. Since 1974 infestations have not occurred within the Region. However, in 1983, severe defoliation was observed on a wide variety of deciduous hosts such as Manitoba maple (*Acer negundo* L.), white ash (*Fraxinus americana* L.), basswood (*Tilia americana* L.), and white elm (*Ulmus americana* L.).

Varying degrees of defoliation were evident on ornamental shade trees throughout Sioux Lookout, Dryden, Kenora and Fort Frances districts. This insect was not detected in natural forest stands.

#### Birch Skeletonizer, *Bucculatrix canadensisella* Cham.

The distribution and area defoliated by this pest of white birch (*Betula papyrifera* Marsh.) increased across the Region for the fourth consecutive year. The total area infested was very difficult to determine, especially throughout the southern portion of the Region, because of the drought conditions this season. Birch leaves that had fallen to the ground because of the drought in early August were examined at numerous sites, and often showed signs of skeletonizer feeding. In the northern portion of the Region drought was not as widespread and the areas infested were more easily ascertained.

In Sioux Lookout and Red Lake districts, a total of approximately 149 km<sup>2</sup>, consisting of numerous small pockets of moderate-to-severe defoliation, was aerially mapped between the 9th and 11th baselines (Fig. 1). In the extreme northern portion of the Dryden District approximately 1,335 km<sup>2</sup> sustained similar levels of defoliation. Throughout Kenora, Ignace and Fort Frances districts, some 20,000 km<sup>2</sup> that were severely affected by drought were found to have various population levels of this insect. High populations were detected in the Mameigwess Lake area of Ignace District, and on the islands in Rainy Lake, east of the town of Fort Frances, Fort Frances District.

Leaves that had fallen to the ground early in August were examined at numerous sites and often showed signs of early skeletonizer activity. However, because of the drought condition and premature leaf drop, the life cycle of the insect could not be completed and this may result in a marked reduction in next year's population.



## NORTHWESTERN REGION

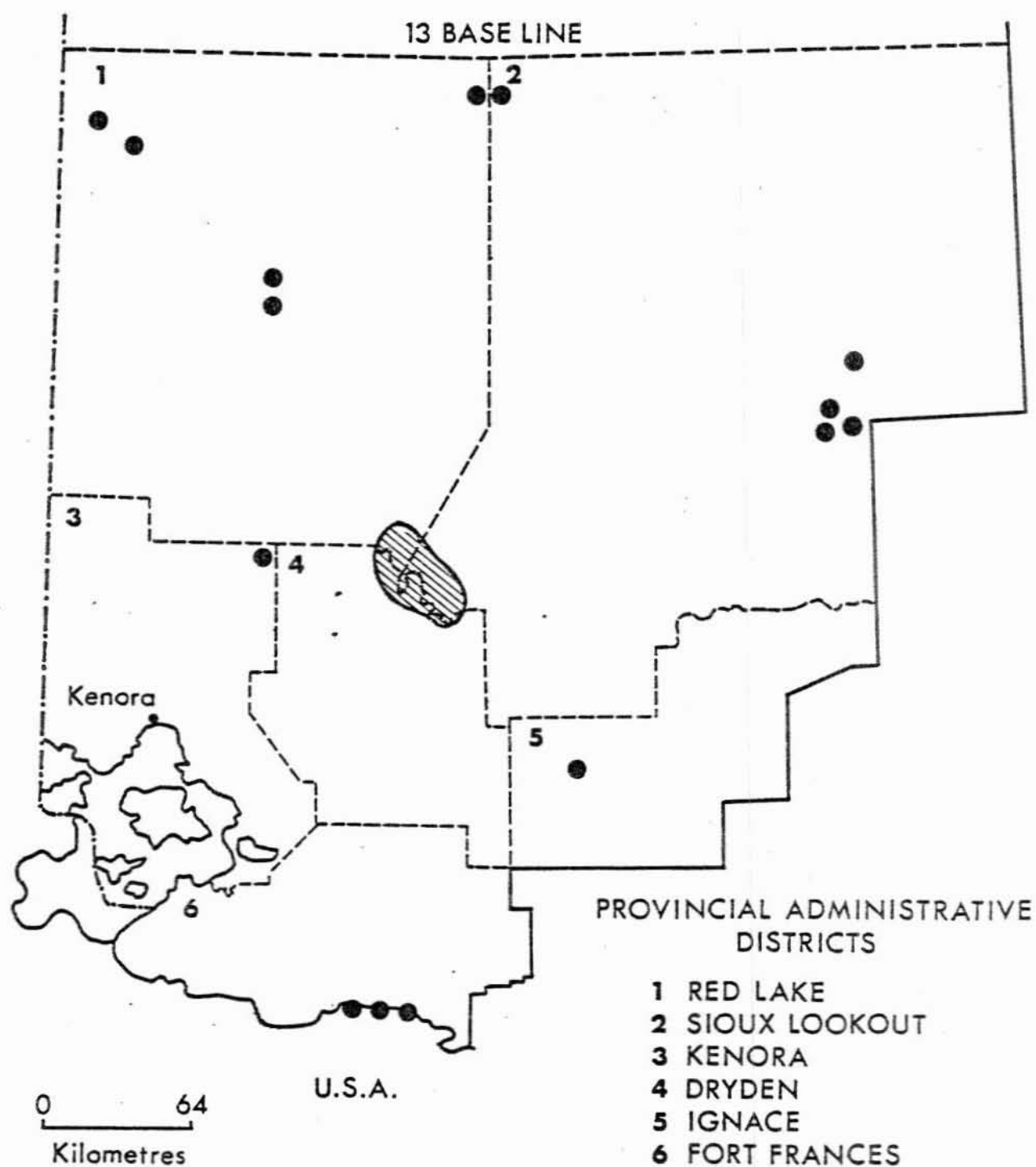


Figure 1. Birch Skeletonizer, *Bucculatrix canadensisella* Cham.

Areas in which severe defoliation of white birch (*Betula papyrifera* Marsh.) occurred in 1983

Severe . . . . . ● or 

Spruce Budworm, *Choristoneura fumiferana* (Clem.)

Results of damage surveys, population sampling and egg-mass counts of this perennial pest will be published with those of other regions at a later date in a report specifically devoted to this insect. That report will provide a complete description and analysis of developments in the spruce budworm situation in Ontario in 1983 and will give infestation forecasts for the province for 1984.

Sawyer Beetles, *Monochamus* spp.

Aerial and ground surveys of recent cutover areas revealed severe damage, caused by adult sawyer beetle feeding, on residual trees along the edges of cutovers in the Sioux Lookout, Red Lake and Dryden districts (Fig. 2). Branch and twig mortality of jack pine (*Pinus banksiana* Lamb.) and to a much lesser extent black spruce (*Picea mariana* [Mill.] B.S.P.) was detected most often; however, entire tree mortality did occur.

The most severe damage was observed on the fringe of jack pine stands in the Moose Lake Operating Unit of the Sioux Lookout Crown Management Unit, Working Circle 1A, Sioux Lookout District. Damage extending approximately 40 m into each side of all blocks resulted in a total of 18.6 ha of dying pine. In the Clear and Caribou lakes areas, a total of 10.5 ha of damaged jack pine was aerially mapped. However, not only were fringe trees affected at these two locations but small pockets up to 1 ha in size within the residual stands showed symptoms of heavy adult feeding. In the Schroenl Lake area of the Red Lake District, approximately 4 ha of overmature fringe jack pine were found to be affected, and approximately 5 ha were detected at both the Langton and the Fluke Lake areas of Dryden District. At the Dryden Forest Station in Zealand Township, jack pine and black spruce adjacent to the newly cleared seed orchard blocks sustained damage over an estimated area of 2 ha.

In 1981 a semi-permanent sample plot was established near Percy Lake, Kenora District, in an area of the 1980 Kenora 23 fire, to monitor sawyer beetle development, to follow survival of trees that were or were not affected by the fire, and to determine the suitability of fire-affected trees as host material for sawyer beetles. The plot consisted of 150 trees, of which 50 were alive (green crowns), 50 had crowns that were visibly fire-damaged (scorched) but may still have been alive, and 50 were dead, killed during the fire. In 1982 and 1983, the 50 living and 50 fire-damaged trees were retallied; Table 1 summarizes the data collected. In the original table the living trees averaged 14.4 m in height and 17.5 cm DBH, and the fire-damaged trees averaged 13.9 m in height and 14.7 cm DBH. In general, it appears that subsequent mortality among trees classified as living in 1981 was very low, amounting to

# NORTHWESTERN REGION

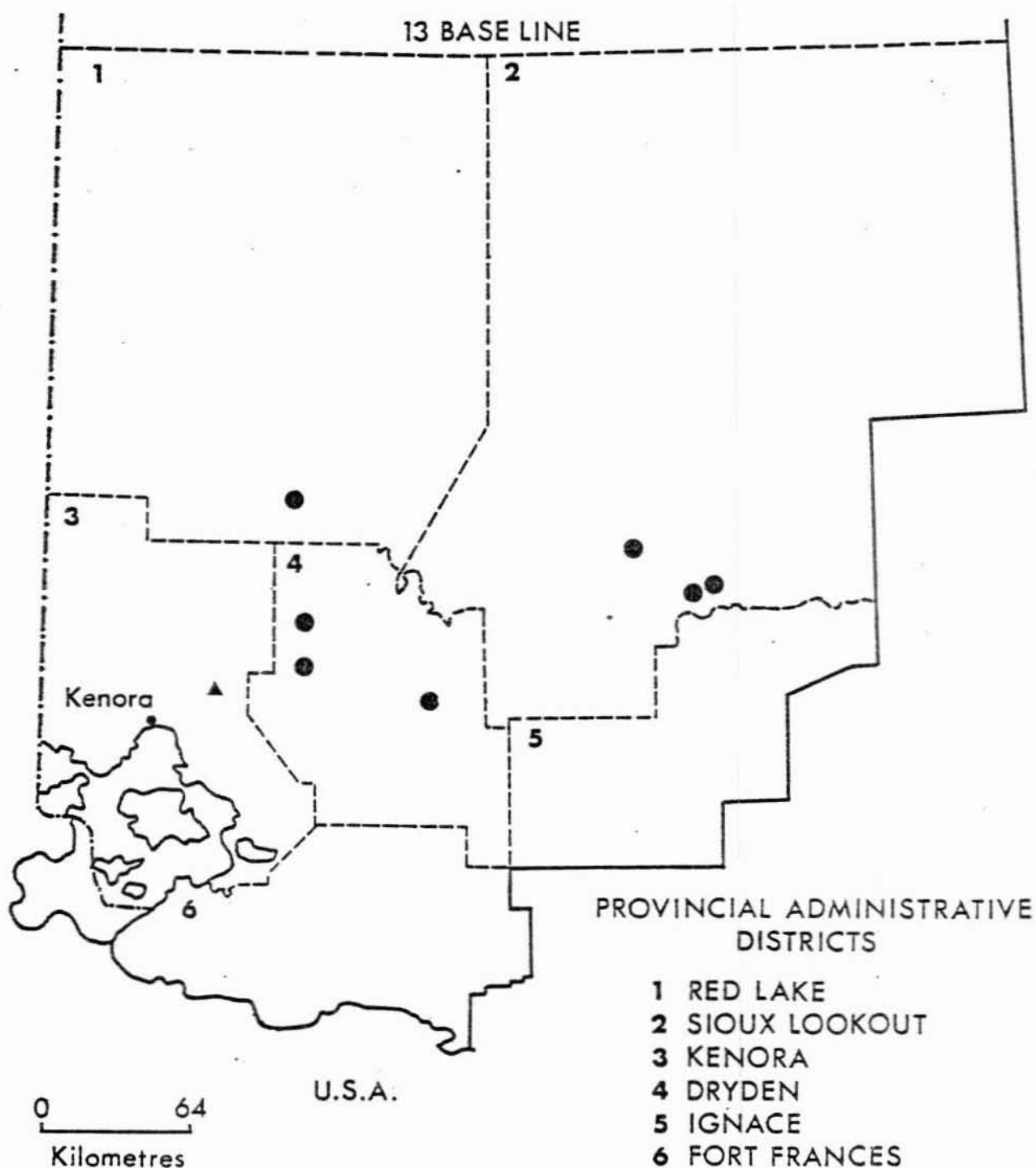


Figure 2. Sawyer Beetles, *Monochamus* spp.

Locations in which damage to jack pine  
(*Pinus banksiana* Lamb.) occurred in 1983

Moderate-to-severe . . . . . ●

Sample plot . . . . . ▲

Table 1. Summary of the results of a special survey conducted at Percy Lake, Kenora District, on 50 living and 50 fire-damaged trees to monitor sawyer beetle (*Monochamus* spp.) activity.

Location	Year	Living trees			Fire-damaged trees <sup>a</sup>		
		% of trees alive	% of trees with entrance holes	% of trees with exit holes	% of trees alive	% of trees with entrance holes	% of trees with exit holes
Kenora District							
Percy Lake	1981	100	0	0	a	46	0
	1982	100	0	0	4	96	68
	1983	98	2	0	0	96	86

<sup>a</sup> not certain at time of plot establishment (August 1981) if trees were alive or dead

only 2% by 1983. Furthermore, these trees were not attractive to sawyer beetles. The 50 trees, originally classed as fire-damaged but possibly alive, suffered complete mortality by 1983 and the majority served successfully as brood material for sawyer beetles. It is not clear whether these trees were killed by fire, sawyer beetles, or a combination of the two factors. The 50 trees that were considered dead in 1981 had generally been attacked by sawyer beetles in 1980. Only three trees were unaffected, whereas 47 trees had both entrance and exit holes as of August, 1981. Although these results are based on a very limited sample, they may have implications in terms of salvage programs following fires.

#### Red Pine Sawfly, *Neodiprion nanulus nanulus* Schedl.

In the past, only trace-to-light defoliation by this sawfly has been reported. However, in 1983, moderate-to-severe defoliation was observed at numerous points in the Region (Fig. 3).

The most significant areas of damage occurred in the Ignace District along Highway 17 throughout the townships of Corman, McNevin and Cathcart where a total of approximately 3.5 km<sup>2</sup> was moderately to severely defoliated. In these areas severe feeding was observed on the upper crowns of the fringes of mature jack pine stands and the understory trees. Pockets of moderate-to-severe damage up to 1 ha in size were observed along Highway 599 from Highway 17 north to Silver Dollar. Light-to-moderate defoliation was noted along Highway 17 from Ignace to the border of the Dryden District.

# NORTHWESTERN REGION

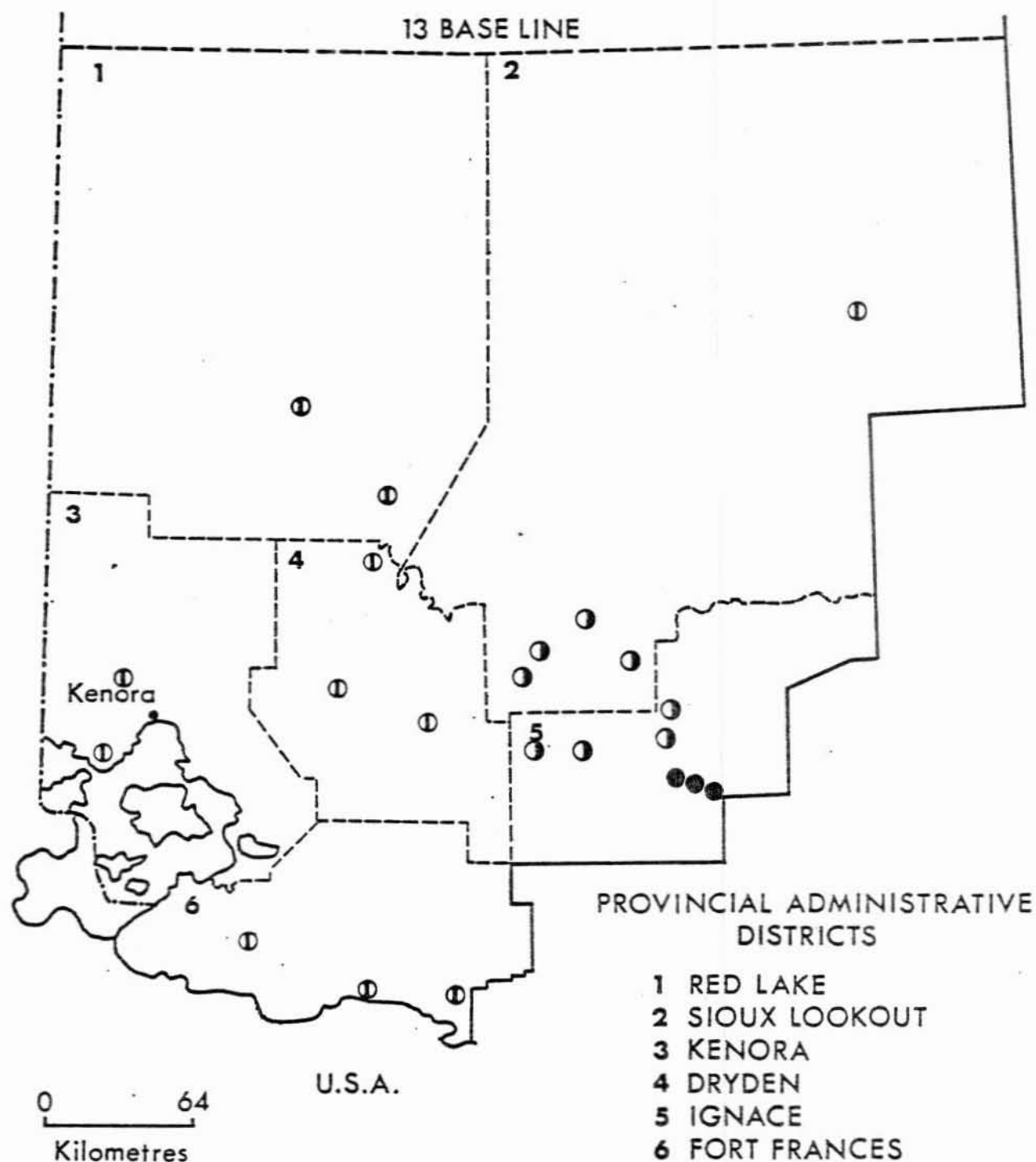


Figure 3. Red Pine Sawfly, *Neodiprion nanulus nanulus* Schedl.  
Locations in which damage occurred in 1983  
Severe . . . . . ●  
Moderate . . . . . ●  
Light . . . . . ①

In the Sioux Lookout District moderate-to-severe feeding was observed in the Umfreville and Smock Lake areas along Highway 642 and at several points along Highway 72. Damage in these areas was confined mainly to fringe and open-grown regeneration on rocky sites.

Elsewhere in the Region, numerous colonies were observed but only a trace of defoliation or light defoliation occurred.

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

High populations of this leafblotch miner persisted for the fourth consecutive year on trembling aspen (*Populus tremuloides* [Michx.]) regeneration. Severe leafmining was observed over the entire working area. Upwards of 10 to 15 mines per leaf were observed and, as a result, severe browning and premature leaf drop occurred over vast areas. In the Arc and Vincent lakes area of the Sioux Lookout District, damage to mature aspen stands was so extensive that it was mapped aerially. Approximately 3,038 ha of aspen were involved. Damage was observed as far north as the 12th baseline during aerial surveys.

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

General surveys revealed high populations at numerous points throughout the Region on black spruce and white spruce (*Picea glauca* [Moench] Voss) (Fig. 4). Damage was confined mainly to open-grown roadside trees in the 1- to 2-m range and in many areas 100% of the foliage was consumed. The most conspicuous areas of heavy feeding were observed on ornamental plantings in Ojibway Provincial Park and on natural regeneration along Highway 72 in the Sioux Lookout District and along highways 17 and 71 in the Fort Frances and Dryden districts. Once again, severe defoliation was common along the gas pipeline plantings on Highway 17 east and west of Ignace.

Throughout the towns of Kenora, Fort Frances and Dryden, there were varying degrees of defoliation and, as a result, numerous enquiries were received from landowners and the general public concerning the fate of trees.

# NORTHWESTERN REGION

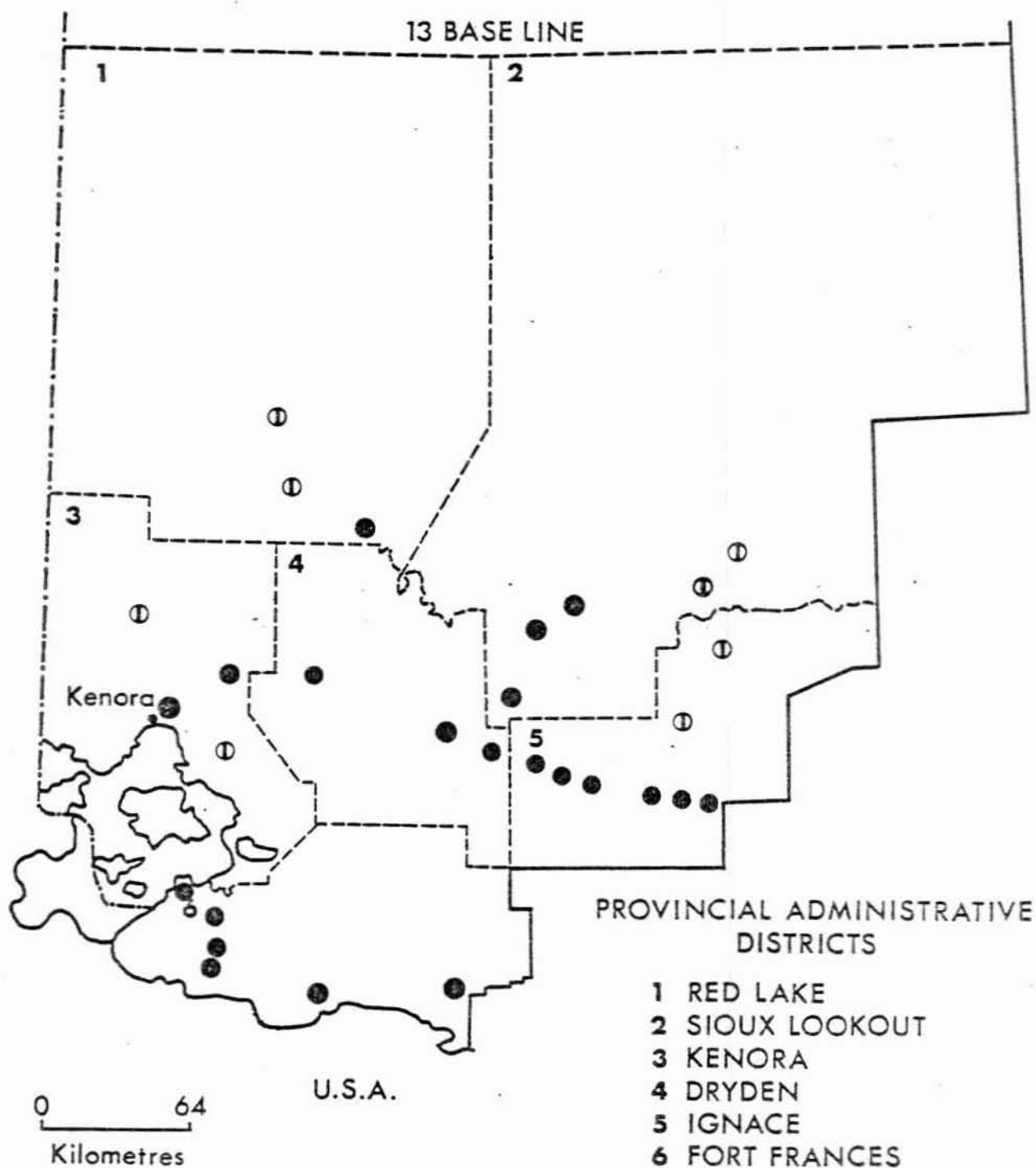


Figure 4. Yellowheaded Spruce Sawfly, *Pikonema alaskensis* (Roh.)

Locations in which defoliation of spruce (*Picea* spp.) occurred in 1983

Moderate-to-severe . . . . . ●

Light . . . . . ○

White Pine Weevil, *Pissodes strobi* (Peck)

In 1982, very low levels of leader damage were recorded in the Region. The highest count obtained was 2.0% incidence along the 314 Road in the Kenora District. However, in 1983, at a jack pine clonal trial plantation in Hartman Township, Dryden District, 20.7% of the leaders were destroyed. Elsewhere in the Region, leader damage ranged from 0.7% to 11.3% at 11 quantitative sample points (Table 2).

Table 2. Summary of damage by the white pine weevil in the Northwestern Region in 1983 (counts based on the examination of 150 randomly selected trees at each location).

Location	Esti- mated area infested (ha)	Esti- mated no. of trees per ha	Avg ht of trees (m)	Leaders attacked (%)
<u>Sioux Lookout District</u>				
Lomond Twp	85	3,000	1.3	0.7
Lomond Twp	200	4,000	1.8	2.0
Island Lake	131	1,210	1.8	2.0
Echo Twp	20	1,000	1.8	2.0
<u>Red Lake District</u>				
Beauregard Lake	20	2,722	1.5	2.6
Chukuni R. Access Rd	500	8,000	1.9	3.3
<u>Ignace District</u>				
Sowden Lake Rd	200	11,000	1.7	7.3
<u>Fort Frances District</u>				
Hwy 502, Big Sawbill Lake	10	5,000	1.7	11.3
<u>Dryden District</u>				
Wainwright Twp	3	3,000	2.0	1.3
Sanford Twp	15	4,000	3.0	4.6
Hartman Twp	1	1,100	1.8	20.7



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

Population levels of this sawfly remained low throughout the Region. The infestation reported in 1982, which severely defoliated approximately 10 ha of tamarack (*Larix laricina* [Du Roi] K. Koch) in Morley Township in Fort Frances District, declined in size to 1 ha of severe defoliation. In Corman Township, Ignace District a small pocket of larch (approx. 1 ha) was again severely defoliated. Elsewhere in the working areas, only a trace of defoliation or light defoliation was evident during aerial and road surveys.

### Minor Insects

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

Population levels of this pine sawfly continue to increase in the southern portion of the Region. The heaviest defoliation occurred on white pine (*Pinus strobus* L.) growing on the islands in the southeast corner of Lake of the Woods, Kenora District (Fig. 5). An aerial survey of the area revealed approximately 1,200 ha of severe defoliation, ranging from pockets of less than 1 ha to 100 ha, as was the case in the Miles Bay area.

Ground surveys conducted along Highway 71 in the vicinity of Nestor Falls in the Kenora District revealed that all age classes of white pine were heavily attacked. Defoliation levels of 75-80% were observed on trees from 2.5 m to 18 m high (see photo, page 19).

White pine, jack pine and red pine (*Pinus resinosa* Ait.) occurring on islands in Rainy Lake, Fort Frances District, from Rocky Inlet to Windy Point, were found to be harboring low populations.

The most common result of this level of defoliation of white pine late in the season would normally be some branch and twig mortality. However, coupled with the extreme drought during the past season, entire tree mortality may occur throughout the rocky islands in 1984.

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

This nodule maker was detected in a jack pine clonal test area in Hartman Township, Dryden District, at an unusually high incidence. A standard 150-tree evaluation completed across the planted area of 1 ha revealed that 55% of the 1.8-m trees had one or more pitch nodules on the main stem. In a control program conducted by the Dryden District Office of the Ontario Ministry of Natural Resources, the nodules were broken open and removed by hand from the main stems and branches.

# NORTHWESTERN REGION

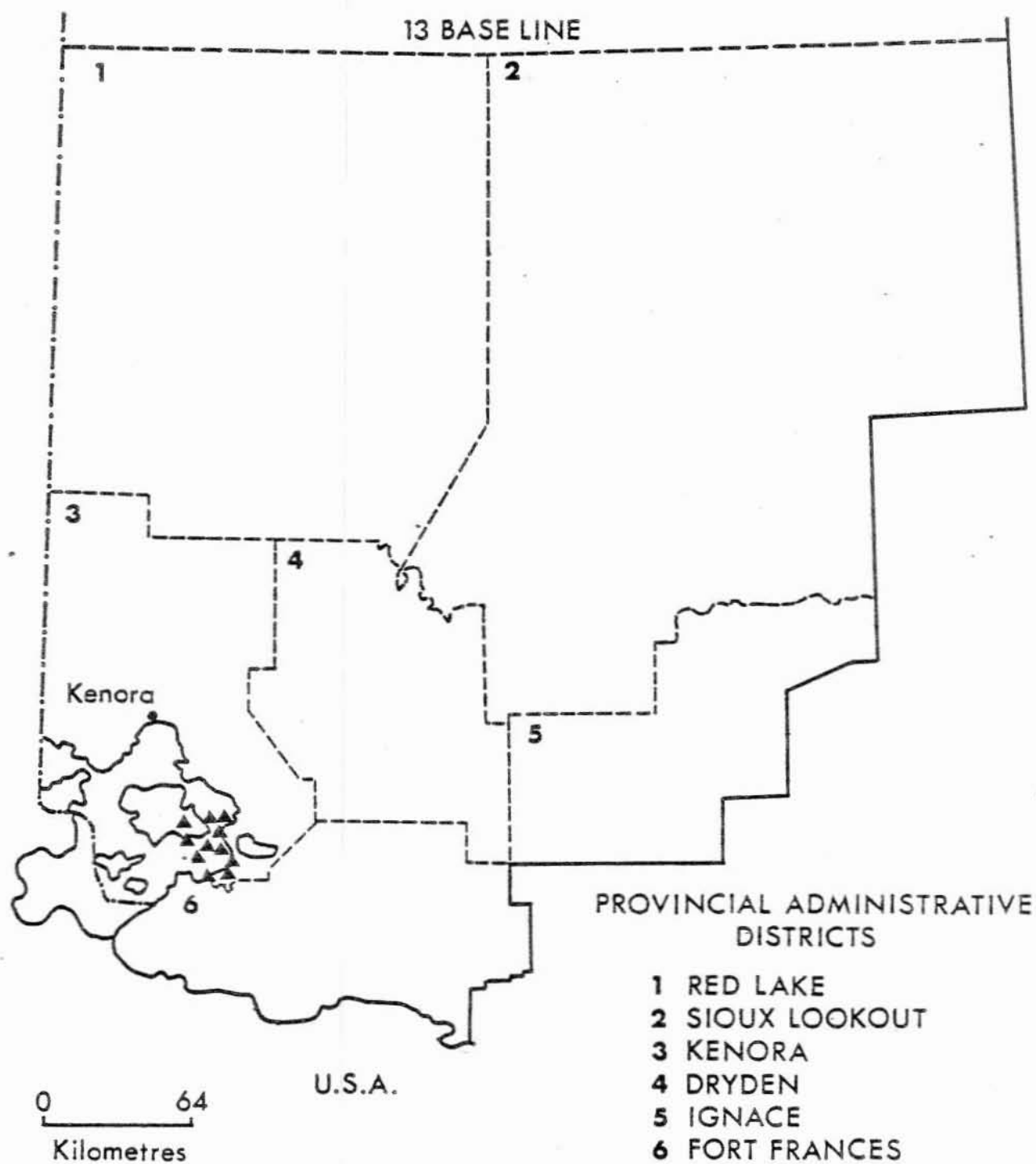


Figure 5. Introduced Pine Sawfly,  
*Diprion similis* (Htg.)  
Areas within which severe defoliation  
occurred in 1983

Severe . . . . . ▲

In Lomond Township, Sioux Lookout District, a similar evaluation was conducted in a 0.8-ha planting of Scots pine (*Pinus sylvestris* L.). At this location it was determined that only 4% of the trees had nodules on the main stem.

Elsewhere in the Region, this insect was commonly observed at low incidence in various age classes of both naturally and artificially regenerated jack pine. Additional information on this pest may be found in the section entitled "Semi-permanent Jack Pine Plots".

#### Redhumped Caterpillar, *Schizura concinna* (J.E. Smith)

In 1981, scattered colonies of this insect were reported on trembling aspen in le May and MacNicol townships in the Kenora District. Again in 1982, single colonies were observed in MacNicol and Broderick townships, Kenora District, Crozier Township, Fort Frances District and at several locations along the Marchington Road of the Sioux Lookout District. However, in 1983, populations reached high levels at numerous locations in the Region (Fig. 6). Although this insect feeds on a wide variety of deciduous hosts, damage was confined mainly to trembling aspen and willow (*Salix* spp.). Occasional colonies were also observed on apple (*Malus* spp.) and on white birch.

Moderate-to-severe defoliation was observed on roadside regeneration along the Marchington Road, along Highway 72 from Dinorwic to the town of Sioux Lookout and along Highway 599 from Highway 17 to Cobb Bay in the Ignace District. Similar levels were recorded between the towns of Dryden and Eagle River in the Dryden District. High numbers were observed along Highway 17 from the town of Ignace west to the town of Kenora. The frequency of heavily defoliated trees declined throughout the southeastern and western portions of the Fort Frances District and across the southern half of Lake-of-the-Woods in the Kenora District. Prior to 1981, this insect was rarely found in the Region.

#### Pine Webworm, *Tetralopha robustella* Zell.

This webworm was detected at a high incidence level in a semi-mature 8-ha natural jack pine stand that averaged 7.9 m in height in Forgie Township, Kenora District. A standard 150-tree evaluation was conducted across the stand and it was determined that 80% of the trees were infested, with an average of seven webmasses per tree, causing light defoliation.

Very low populations were commonly found along the edges of large stands of pine around the Rush Bay and Sherwood Lake roads in Forgie Township, in a 10-ha stand in the Barnes Lake area of Coyle Township, and in a 2-ha area of open-grown pine south of the Winnipeg

# NORTHWESTERN REGION

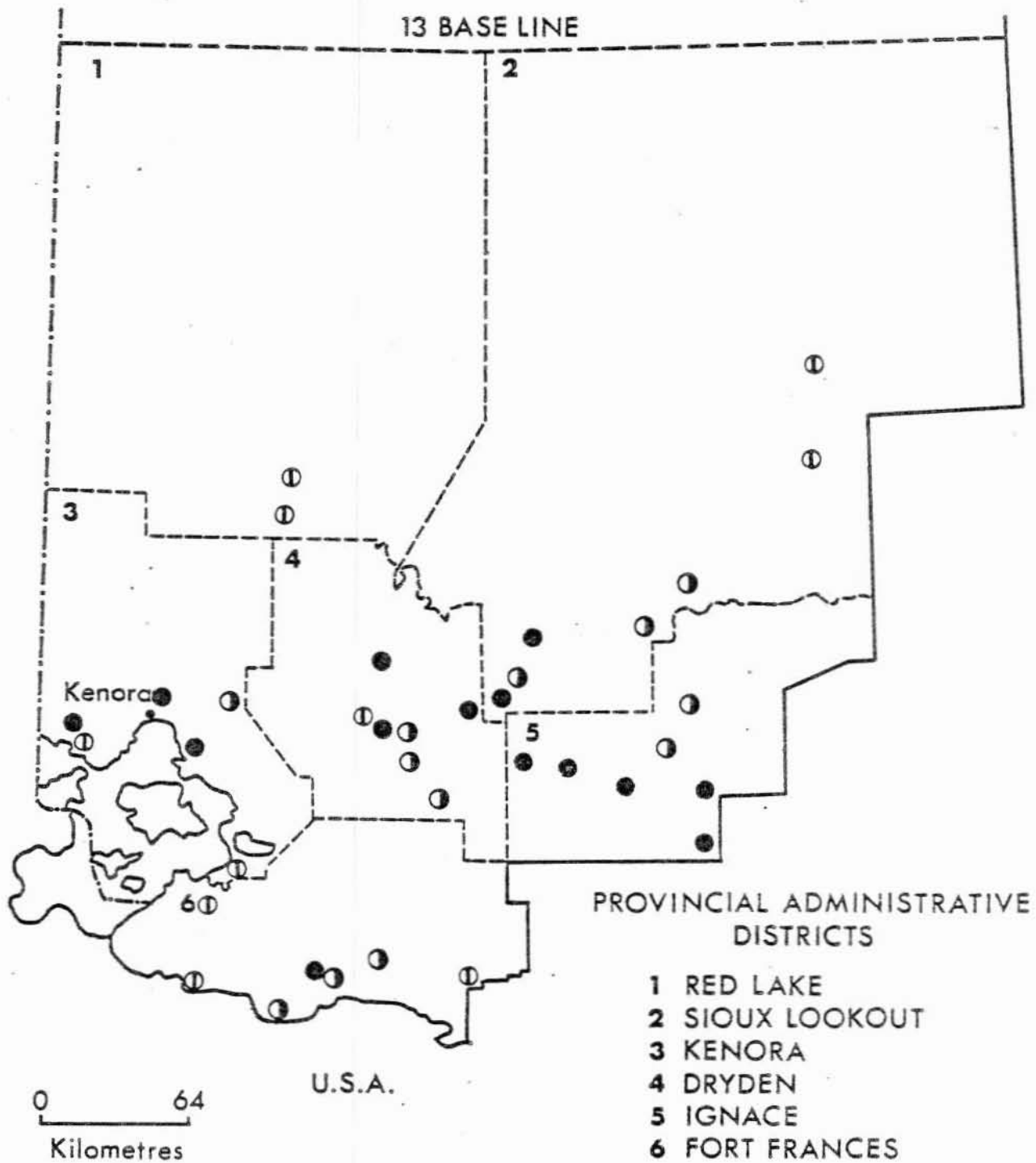


Figure 6. Redhumped Caterpillar, *Schizura concinna* (J.E. Smith)

Areas in which defoliation occurred in 1983

Severe . . . . . ●  
Moderate . . . . . ◐  
Light . . . . . ○

River in Melick Township, Kenora District. Similar levels were found in a 3-ha stand of jack pine along Highway 71 in Claxton Township, Fort Frances District. The larvae of this webworm live in silken tubes which extend through globular masses of brown, coarse frass webbed together by silk threads, constructed usually between two mature cones (see photo, page 19). The foliage on either side of the cone is clipped off, brought into the webmass and consumed.

Table 3. Other forest insects.

Insect	Host(s)	Remarks
<i>Acleris variana</i> (Fern.) Eastern blackheaded budworm	wS	commonly found but in low numbers across the Region
<i>Adelges strobilobius</i> (Kalt.) Pale spruce gall adelgid	bS	4.6% of trees affected at cone collecting area in McAree Twp, Sioux Lookout District and low populations found in Zealand Twp, Dryden District and Woodyatt Twp, Fort Frances District
<i>Altica ambiens alni</i> Harr. Alder flea beetle	Al	causing 100% defoliation on single and roadside trees, Hwy 17, Ilesley Twp, Ignace District
<i>Anisota virginienensis</i> <i>virginienensis</i> (Dru.) Pinkstriped oakworm		several trees moderately defoliated along McKenzie Portage Rd, Kenora District
<i>Archips cerasivoranus</i> (Fitch) Uglynest caterpillar	pCh	commonly observed on regeneration in Kenora and Fort Frances districts
<i>Callirhytis punctata</i> (O. & S.) Gouty oak gall wasp	rO	approximately .5 ha of trees affected in Atwood Twp, Fort Frances District
<i>Chionaspis pinifoliae</i> (Fitch) Pine needle scale	wS	moderate levels observed on single trees, Abram Lake, Sioux Lookout District

(continued)

Table 3. Other forest insects (continued).

Insect	Host(s)	Remarks
<i>Datana ministra</i> (Dru.) Yellownecked caterpillar	deciduous	barely discernible levels detected at Boffin Lake, Mackenzie Portage, and Mather Twp, Fort Frances District; low populations on single trees along Gundy Rd, Kenora District
<i>Dioryctria abietivorella</i> (Grt.) Fir coneworm	bS	13% of the trees in the 2-ha Centennial Plantation, Red Lake District affected; 5% affected in a 2-ha area at Franciscan Lake, Echo Twp, Sioux Lookout District
<i>Dryocampa rubicunda rubicunda</i> (Fabr.) Greenstriped mapleworm	rM	commonly found in low numbers defoliating single trees in the Windy Point and Bear Pass areas, Fort Frances District
<i>Epinotia solandriana</i> Linn. Birch-aspen leafroller	wB	light-to-moderate damage on occasional trees in the Mainville Lake area, and along Hwy 71 in Potts Twp, Fort Frances District
<i>Eriosoma lanigerum</i> (Hausm.) Woolly apple aphid	wE	31% of elms affected near Ear Falls, Red Lake District
<i>Eucosma gloriola</i> Heinr. Eastern pine shoot borer	jP	causing less than 6% terminal shoot damage in the Region
<i>Fenusa pusilla</i> (Lep.) Birch leafminer	wB	low populations observed on single and open-grown trees in the Region
<i>Gracillaria</i> sp. (prob. <i>G. strictella</i> Wlk.) Birch leafroller	wB	approximately 0.8 ha of moderate damage, Lomond Twp, Sioux Lookout District

(continued)

Table 3. Other forest insects.

Insect	Host(s)	Remarks
<i>Hemichroa crocea</i> (Geoff.) Striped alder sawfly	Al	found in isolated pockets of less than 50 m <sup>2</sup> where it was causing 100% defoliation on small clumps of trees along Boffin Lake Rd, Fort Frances District and in the Stevens Bay area, Kenora District
<i>Hylurgops pinifex</i> (Fitch) Bark beetles	jP	low numbers found in trees killed by <i>Monochamus scutellatus</i> (Say), Schroenl Lake area, Red Lake District
<i>Hyphantria cunea</i> (Dru.) Fall webworm	wB, Al W	scattered colonies observed on roadside regeneration in Claxton and Miscampbell twps, Fort Frances District, Melick Twp, Kenora District and along Marchington Rd, Sioux Lookout District
<i>Malacosoma californicum pluviale</i> Dyar Northern tent caterpillar	tA	occasional tents observed in the Kimmewin Lake area, Sioux Lookout District
<i>Neodiprion pratti banksianae</i> Roh., <i>N. swaini</i> Midd., <i>N. virginianus</i> complex Jack pine sawflies	jP	low populations observed defoliating single and open-grown trees at widely scattered points
<i>Nymphalis antiopa</i> (L.) Mourningcloak butterfly	tA	causing 100% defoliation of single trees, Ojibway Provincial Park, Sioux Lookout District
<i>Phyllonorycter kenora</i> (Free.) Willow leafblotch miner	W	moderate-to-severe leafmining on regeneration throughout the Region

(continued)

Table 3. Other forest insects (concluded).

Insect	Host(s)	Remarks
<i>Phyllonorycter nipigon</i> (Free.) Balsam poplar leafblotch miner	bPo	moderate damage observed from Dryden north to Red Lake
<i>Pristiphora geniculata</i> (Htg.) Mountain-ash sawfly	mAs	single colonies found for the first time at Ojibway Prov- incial Park, Sioux Lookout District and varying degrees of defoliation observed else- where, especially on roadside and ornamental trees
<i>Rheumaptera subhastata</i> (Linn.) Spearmarked black moth	wB	a trace of defoliation observed on roadside regeneration in Lomond Twp, Sioux Lookout District and on occasional trees along Cabin Bay Rd, Red Lake District

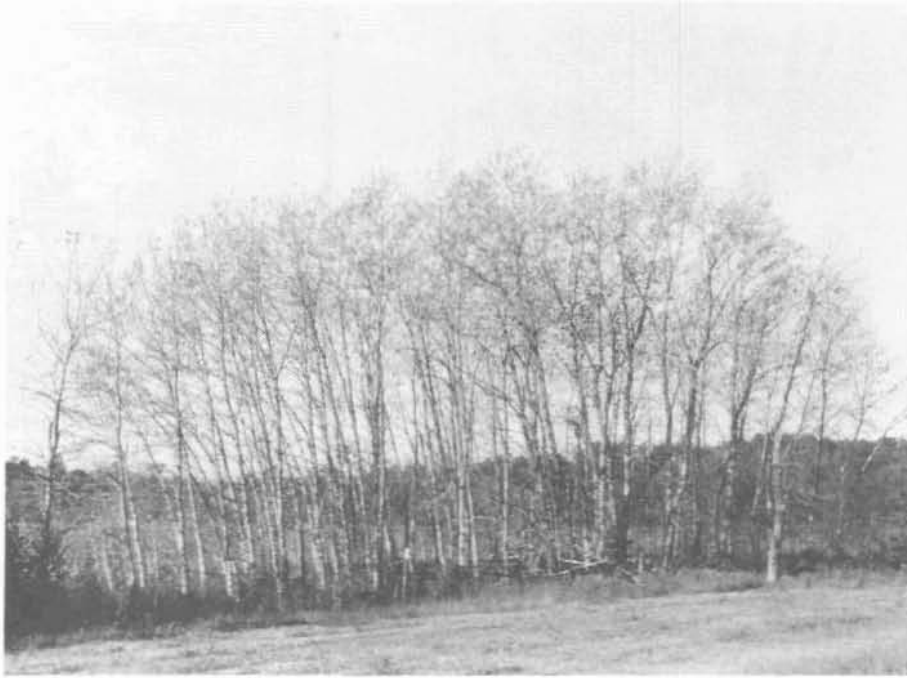




Severe defoliation of white pine (*Pinus strobus* L.) caused by the introduced pine sawfly, *Diprion similis* (Htg.)



Webmass constructed from silken threads and frass by the pine webworm, *Tetralopha robustella* Zell.



Severe defoliation of balsam poplar (*Populus balsamifera* L.) caused by a leaf spot disease



Severe drought damage to open-grown trees on a high rocky site

## TREE DISEASES

### *Major Diseases*

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

Armillaria root rot often kills trees previously stressed by drought, insects and other disease pathogens, but the fungus is capable of killing healthy trees as well. Both deciduous and coniferous hosts are affected.

The disease has commonly been detected at low levels in young jack pine and spruce stands and plantations across the Region. Average tree mortality during the period 1970 to 1982 has not exceeded 3%. In 1983, there was no significant change in the status of the Disease (Table 4).

At the request of the Petawawa National Forestry Institute, Chalk River, Ontario, a black spruce progeny test area at Turtle Lake, Fort Frances District was evaluated. Current mortality among 250 trees examined was 3.6%. The accumulated mortality, current and old, was evaluated at 11.6%. Natural jack pine adjacent to the test area was also evaluated and 0.7% mortality was detected.

Old pine stumps with heavily decayed root systems are believed to be the source of inoculum for the infection of younger trees.

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

This disease has spread rapidly throughout the southern portion of the Region, especially along the Rainy River, since the initial find of a single infected tree in the town of Fort Frances in 1977. Annual surveys since then have shown a steady increase in the incidence of the disease along this corridor.

In 1983, an urban survey conducted within the town of Emo, in the Fort Frances District, encountered a total of 59 trees, of which 14% were considered to be severely affected and 35% recently killed by this pathogen. Further west in the town of Pinewood, 95% of the elms in a 1-ha municipal park were dead, with many exhibiting typical symptoms of *C. ulmi*.

General surveys conducted in the towns of Sioux Lookout, Red Lake, Kenora, Ignace and Dryden revealed very low densities of elm (*Ulmus* sp.) trees, with no evidence of infection.

Table 4. Summary of damage caused by *Armillaria* root rot at five locations in the Northwestern Region in 1983 (counts based on the examination of 150 or 250 randomly selected trees at each location).

Location	Estimated area affected (ha)	Host	Estimated no. of trees per ha	Avg ht of trees (m)	Current mortality (%)
<u>Sioux Lookout District</u>					
Marchington Rd	20	jP	9,900	1.7	2.6
Island Lake	131	jP	1,210	1.8	2.6
<u>Fort Frances District</u>					
*Black spruce progeny test - Turtle Lake	1	bs	1,600	2.0	3.6
Turtle Lake	2	jP	2,000	2.0	0.7
<u>Red Lake District</u>					
Beauregard Lake	20	jP	2,700	1.5	1.3

\* 250-tree sample

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

General surveys and a special survey of high-value black spruce stands in 1983 revealed that these foliar rusts were present at high levels at scattered locations across the northeastern portion of the Region. Standard foliar disease evaluations were performed at eight randomly selected locations to determine the incidence and amount of foliar damage caused by these rusts. In all of the areas examined, 100% of the trees were affected and foliar damage ranged from 8% to a high of 100% (Table 5).

Elsewhere in the Region, the disease was occasionally observed and foliar damage ranged from trace to light. Additional information on these rusts may be found in the section entitled Black Spruce Plantation Survey.

Table 5. Summary of damage caused by needle rusts of spruce in three districts of the Region in 1983 (counts based on the examination of 150 randomly selected trees at each location).

Location	Estimated area affected (ha)	Avg ht of trees (m)	Trees affected (%)	Foliar damage (%)
<u>Sioux Lookout District</u>				
McCubbin Twp	5	2.0	100	90
Shoehorn Road	131	1.2	100	95
Vermillion River	4	1.5	100	25
Block 10	5	2.8	100	8
<u>Ignace District</u>				
Revell Twp	2	3.0	100	100
Hwy 699 .(20 km north)	3	3.0	100	25
<u>Red Lake District</u>				
Hwy 105, Ear Falls	50	3.5	100	50
Pakwash Prov. Pk	hedgerow	2.5	100	62

Tar Spot Needle Cast, *Davisomycella ampla* (Davis) Darker

A high incidence of this needle cast was detected in a 20-ha jack pine plantation in Lomond Township, Sioux Lookout District. A standard 150-tree foliar disease evaluation revealed that 87% of the trees were affected, resulting in a loss of 28% of the old foliage.

High incidence rates, causing trace defoliation, were detected on a very narrow band of fringe, shoreline trees at Mainville and Loonhaunt lakes in the Fort Frances District. Numerous trees were examined and in many of these only the outward, exposed side of the tree was affected.

Low levels of defoliation were detected on single, open-grown trees in the Nestor Falls area of Godson Township, Kenora District and in the Dyment area of Melgund Township, Dryden District. Additional information about this needle cast may be found in the section entitled Permanent Jack Pine Plots.

### Minor Diseases

Leaf Spot, *Mycosphaerella populicola* G.E. Thomps. and *M. populorum* G.E. Thomps.

Balsam poplar (*Populus balsamifera* L.) growing in small pockets bordering low, wet areas across the Region were heavily defoliated by these leaf spotting fungi. The symptoms of the two organisms are very similar and it is difficult to distinguish between them in the field.

Damaged trees in pockets ranging from less than 1 ha to several hectares were completely denuded of foliage by early September at many locations in the western portion of the Fort Frances District (see photo, page 20). Similar levels of defoliation were observed and samples were taken along Highway 17 from the town of Dryden in the Dryden District eastward to the town of Ignace in the Ignace District.

Light-to-moderate defoliation was encountered along Highway 72, south of Sioux Lookout, along Highway 664 from Highway 72 to the town of Hudson in the Sioux Lookout District, and along Highway 105 from Perrault Falls, Dryden District, to the town of Ear Falls in the Red Lake District. Smaller, isolated pockets of damage were commonly detected in the Kenora District from Sioux Narrows westward to the Ontario-Manitoba border.

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

General surveys conducted throughout the Region revealed that this shoot blight was common on aspen regeneration. Every year since 1975 this disorder has been reported causing various levels of damage at numerous locations. The incidence of shoot blight and the amount of terminal shoot mortality have been as high as 100%, as was the case in 1977 in Melgund Township, Dryden District.

This season in a 20-ha cutover area along the Weller Lake Road in the Fort Frances District, it was estimated that 50% of the natural regeneration was affected. Similar levels were sampled in 30- and 40-ha cutovers in the Clarkson and Gundy lakes areas of the Kenora District. Total defoliation was less than 10% in each of these three areas.

Moderate-to-heavy levels of terminal damage were detected along the Vermilion River Road and in the Moose Lake area of Sioux Lookout District, and along the right-of-way of concession roads throughout Miscampbell Township in Fort Frances District.

Light-to-moderate incidence rates were recorded along the Longlegged Road in Red Lake District, and along Highway 105, south of Perrault Falls in Dryden District.

Table 6. Other forest diseases.

Organism	Host(s)	Remarks
<i>Botrytis cinerea</i> Pers. ex Fr. Gray mold blight	bS	slight mortality in container stock at a commercial greenhouse at Ear Falls, Red Lake District
<i>Cronartium ribicola</i> J.C. Fisch. White pine blister rust	jP	Five ornamental trees were severely affected in Sandbar Prov. Pk, Ignace District.
<i>Hypoxyylon mammatum</i> (Wahl.) J.H. Miller Hypoxyylon canker	tA	high percentage of trees affected in a 1-ha stand at Regina Bay, Kenora District; very common elsewhere in the Region
<i>Isthmiella faullii</i> (Darker) Darker Needle cast	bF	approximately .25 ha of understory trees heavily affected in Tweedsmuir Twp, Kenora District; a trace of damage on single trees at Sandbar Prov. Pk, Ignace District
<i>Pucciniastrum epilobii</i> Otth Needle rust	bF	Along the Vermilion River, Sioux Lookout District, 100% of the roadside trees were affected, with about 68% foliar damage. Traces of needle rust were occasionally found in the eastern part of Docker Twp, Dryden District, and in the southern part of Woodyatt Twp, Fort Frances District.
<i>Sirococcus strobilinus</i> Preuss Shoot blight	rP	Of 50 natural regeneration understory trees examined, 10% were found to be affected along the Timber Edge Lodge Road, Jordan Twp, Sioux Lookout District.

(continued)



Table 6. Other forest diseases (concluded).

Organism	Host(s)	Remarks
<i>Venturia populina</i> (Vuill.) Fabric. Leaf and twig blight of balsam poplar	bPo	60% foliar damage observed on roadside trees in Ojibway Prov. Pk, Sioux Lookout District

*Abiotic Damage*

## Needle Droop

At Beaugard Lake, Red Lake District, 1% infection was found in a 10-ha red pine plantation.

## Wind

Heavy winds on the night of 6 June caused scattered single-tree blowdown of trembling aspen, balsam poplar, balsam fir and jack pine trees in Fort Frances District, south of Highway 11 and east of the town of Fort Frances, to the Atikokan District boundary. Similar damage levels were recorded at Hut and Shanty lakes and in Corman Township, Ignace District.

## Drought

Aerial and ground surveys revealed that drought conditions occurred across some 23,695 km<sup>2</sup> in the Region in 1983 (Fig. 7). This condition resulted from below-normal rainfall and above-normal temperatures as was the case in July when precipitation was some 25% less than normal and temperatures were 20% above normal.

The damage was confined mainly to the high, rocky ridge tops or shallow-soil sites throughout this large area (see photo, page 20). White birch, trembling aspen, jack pine and, to a much lesser extent, oaks (*Quercus* spp.) were the tree species most often affected. By mid-to-late August the various hardwoods on these sites had either completely yellowed or lost their foliage. Single-tree mortality was scattered through jack pine stands from Shoal Lake in the Kenora District to Little Turtle Lake in the Fort Frances District. Two to three hectares of dead pine were observed on ridge tops at several locations on islands across Lake-of-the-Woods and Rainy Lake. Shoreline red oak (*Quercus rubra* L.) at Brule Point on Lake-of-the-Woods were severely browned, and on examination many were found dead.



# NORTHWESTERN REGION

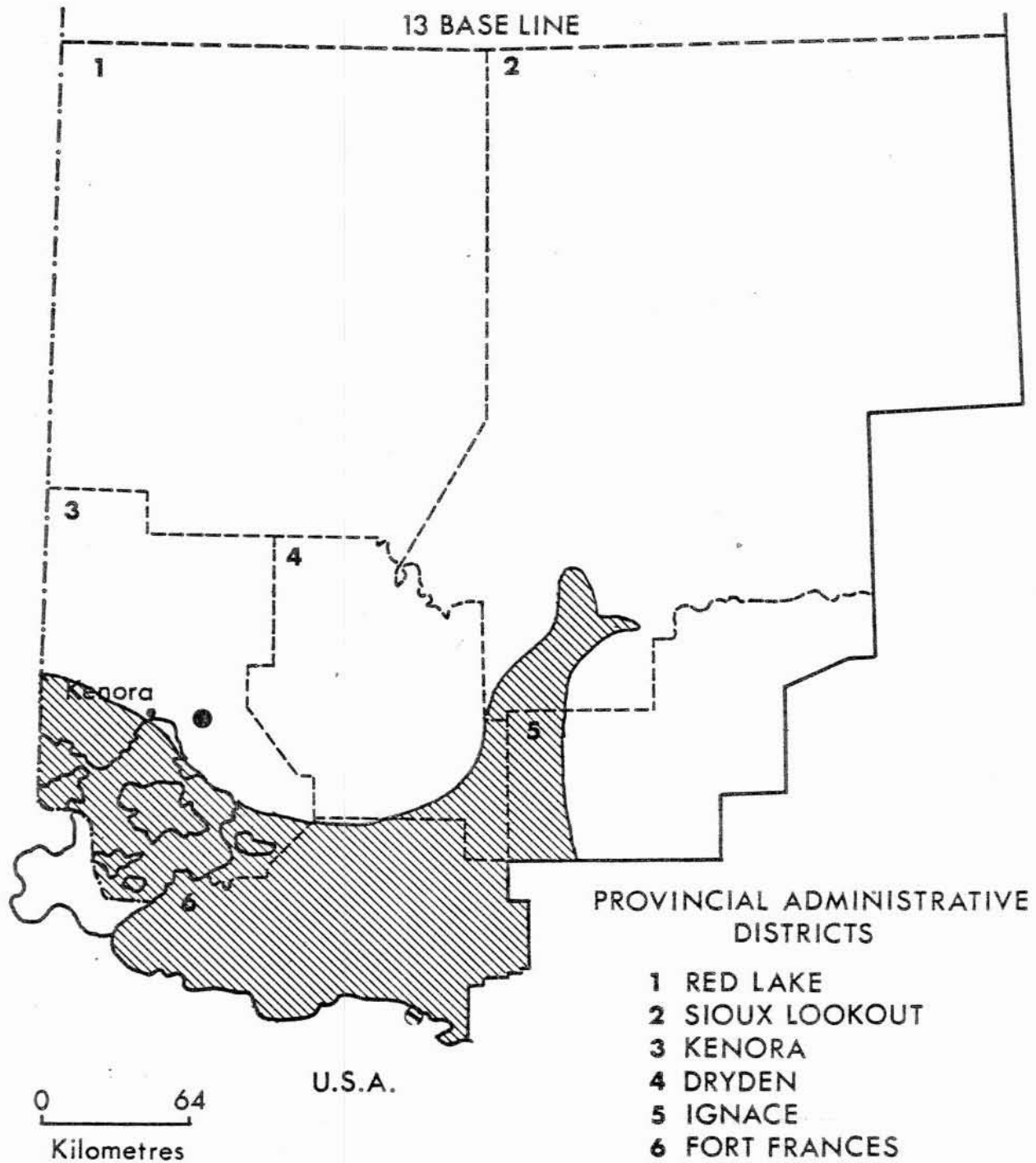


Figure 7. Drought Damage

Areas in which drought  
damage occurred in 1983

Table 7 summarizes the actual mean daily temperature and total precipitation recorded during the months of June, July and August, and compares the 1983 condition to the 20-year average for northwestern Ontario.

Table 7. Summary of weather conditions for the months of June, July and August from four locations across the Northwestern Region in 1983.

Location	Month	Temperature (°)		Precipitation (mm)	
		Actual	Normal	Actual	Normal
Red Lake	June	21.0	21.0	96.1	83.3
	July	26.5	23.7	55.9	87.9
	Aug.	26.7	22.1	76.4	81.3
Kenora	June	16.4	16.1	79.3	83.4
	July	22.1	19.2	63.9	91.8
	Aug.	21.8	17.6	39.7	85.9
Ignace	June	20.9	14.9	128.1	90.1
	July	25.6	17.7	85.8	97.6
	Aug.	26.7	16.0	80.5	96.0
International Falls	June	16.6	16.2	127.5	93.0
	July	20.9	18.9	75.7	98.8
	Aug.	20.3	17.3	93.0	74.9

### *Special Surveys*

#### **Black Spruce Plantation Survey**

A special survey was conducted at 12 randomly located black spruce plantations across the Region in 1983 (Fig. 8). To comply with the objectives of the survey, four plots were to be established in each of three height categories, < 2 m, 2-6 m, and > 6 m. However, because of the lack of high-value black spruce plantations, only two plots were located in plantations > 6 m in height and therefore two additional plots in the < 2 category were sampled.

Each plantation was inspected and evaluated at two specific time periods during the season, 15-21 June and 25-27 July. The data collected are summarized in Table 8. Yellowheaded spruce sawfly was found in seven plantations, needle rust, *Chrysomyxa* spp., in six, spruce budworm in five, and white pine weevil in only one. In all cases damage was quite minor. Expected, but not found, were such pests as the spruce coneworm, *Dioryctria reniculelloides* Mut. & Mun., *Monochamus* sp., mistle toe, *Arceuthobium* sp., spruce broom rust, *Chrysomyxa arctostaphyli* Diet., *Armillaria* root rot, and possibly frost injury.

In 1980, a similar survey of black spruce stands was conducted at 12 locations throughout the Region. At that time no insects were detected causing damage in the stands evaluated; however, *Armillaria* root rot was detected causing trace levels of damage at two of the locations, and frost injury, which was common in the Region that year, was found at three of the locations.

#### Semi-permanent Jack Pine Plots

In 1982, a special survey was conducted to determine the incidence and impact of several specific insects and diseases in 12 high-value jack pine stands across the Region. At four of these locations, where the trees were < 2 m in height, a total of 250 trees were tagged to establish semi-permanent plots to follow the impact of these particular insects and diseases on jack pine regeneration in northwestern Ontario (Fig. 9). These four stands were retallied between 7 and 10 June and between 11 and 16 August, and, as in 1982, the following insects and diseases were evaluated:

Insects: Jack pine budworm, jack pine sawflies, white pine weevil, eastern pine shoot borer, jack pine tip beetle, *Conophthorus banksianae* McPherson, and northern pitch twig moth, *Petrova albicapitana* (Busck.)

Diseases: Needle rusts, *Scleroderris* canker, *Gremmeniella abietina* (Lagerb.) Morelet, gall rust, *Endocronartium harknessii* (J.P. Moore) Y. Hirat., stem rusts, *Cronartium* spp., needle casts, and *Armillaria* root rot

No evidence of damage caused by the following pests was detected in 1983: jack pine budworm, jack pine sawflies, needle rust, *Scleroderris* canker, and stem rusts. The results of the data collected on the remaining pests and a review of the data collected in 1982 are given in Table 9.

# NORTHWESTERN REGION

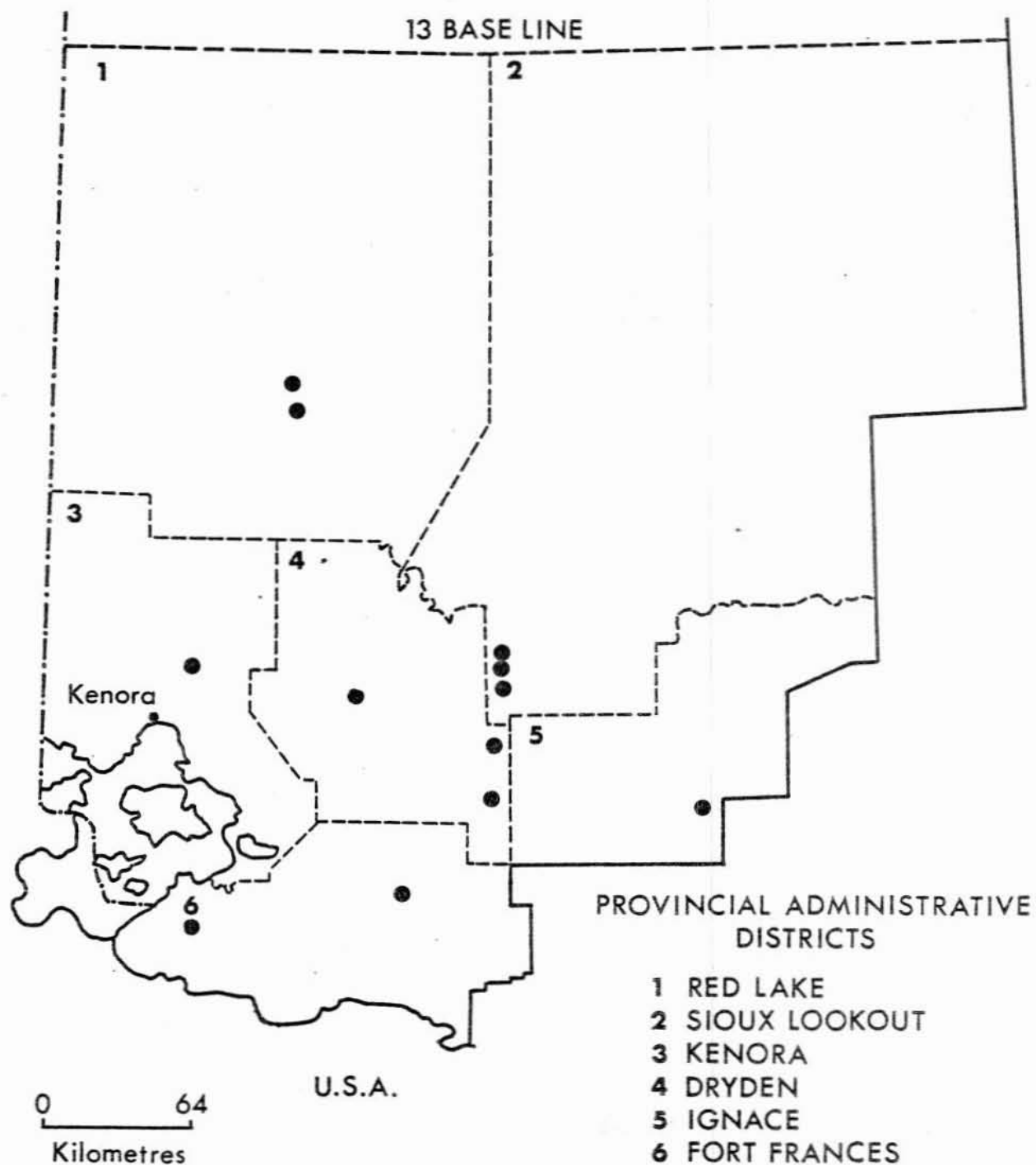


Figure 8. High-value black spruce  
(*Picea mariana* [Mill.] B.S.P.)  
locations . . . . . ●

Table 8. Summary of the results of a special survey of black spruce plantations in 12 randomly located stands across the Northwestern Region in 1983 (counts based on the examination of 150 trees at each location).

Location	Estimated area of stand (ha)	Estimated no. of trees per ha	Avg ht of trees (m)	Spruce budworm		Yellowhead spruce sawfly		White pine weevil	Needle rust	
				Trees affected (%)	Foliage damaged (%)	Trees affected (%)	Foliage damaged (%)	Trees weeviled (%)	Trees affected (%)	Foliage damaged (%)
<u>Sioux Lookout District</u>										
Goodie Lake South	5	3,200	0.4	4.0	1.0	3.3	1.0	0.0	2.7	1.0
McAree Twp	14	2,200	9.0	0.0	0.0	2.6	1.0	0.0	66.7	1.0
Skurbon Lake	5	3,200	0.3	0.0	0.0	4.0	1.0	0.0	6.6	1.0
<u>Red Lake District</u>										
Beauregard Seed Orchard	5	3,000	0.4	0.0	0.0	7.3	1.0	0.0	88.0	4.0
Dixie Lake Road	10	1,000	3.0	0.0	0.0	2.6	1.0	0.0	100.0	5.0
<u>Kenora District</u>										
Ena Lake Road	10	2,700	3.5	21.0	1.0	0.0	0.0	0.0	0.0	0.0
<u>Ignace District</u>										
Furniss Twp	5	3,000	0.4	0.0	0.0	4.6	1.0	0.0	27.0	1.0
<u>Fort Frances District</u>										
Dewart Twp	100	5,000	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Kawawia Creek	8	4,400	0.5	12.0	1.0	2.6	1.0	0.0	0.0	0.0
<u>Dryden District</u>										
Melgund Twp	4	4,000	0.5	14.0	1.0	0.0	0.0	0.0	0.0	0.0
Sanford Twp	15	4,000	3.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0
Snake Bay Road	3	1,500	15.0	59.0	2.0	0.0	0.0	0.0	0.0	0.0

Table 9. Summary of the results of surveys of semi-permanent jack pine plots in the Northwestern Region in 1982 and 1983.

Location	No. of trees examined	Estim. area of stand (ha)	Estim. trees per ha	Avg ht of trees (m)		White pine 'weevil Trees weeviled (%)		Eastern pine shoot borer		Trees with lateral shoot damage (%)		Jack pine tip beetle Trees damaged (%)		Northern pitch twig moth Trees damaged (%)	
								Trees with terminal shoot damage (%)		Trees with lateral shoot damage (%)		Jack pine tip beetle Trees damaged (%)		Northern pitch twig moth Trees damaged (%)	
				1982	1983	1982	1983	1982	1983	1982	1983	1982	1983	1982	1983
				1982	1983	1982	1983	1982	1983	1982	1983	1982	1983	1982	1983
<u>Sioux Lookout District</u>															
Vermillion River	250	100	3,000	1.4	2.2	0.0	1.3	8.8	5.6	2.8	4.4	2.4	1.2	18.0	0.4
<u>Kenora District</u>															
Broderick Twp	225	3,600	8,000	0.9	1.7	0.0	0.0	1.2	4.0	0.4	0.0	0.8	0.0	0.4	0.4
<u>Ignace District</u>															
Furniss Twp	250	876	7,500	1.0	1.7	0.8	4.0	3.6	2.8	0.8	0.4	0.0	0.8	5.2	0.4
<u>Dryden District</u>															
Aubrey Twp	250	150	7,000	1.0	1.8	0.0	0.4	4.0	1.2	1.2	0.0	2.0	0.0	6.0	2.4

(continued)

Table 9. Summary of the results of surveys of semi-permanent jack pine plots in the Northwestern Region in 1982 and 1983 (concluded).

Location	No. of trees examined	Estim. area of stand (ha)	Estim. trees per ha	Avg ht of trees (m)	Needle Rust		Stem rusts		Globose gall rusts				Needle cast				Armillaria root rot						
					Trees	Foliage	Trees	Trees	Trees	Trees	Trees	Foliage	Trees	Foliage	Trees	Tree							
					affected	damaged	affected	affected	affected	severely affected	affected	damage	affected	damage	affected	Mortality							
					(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)							
				1982	1983	1982	1983	1982	1983	1982	1983	1982	1983	1982	1983	1982	1983	1982	1983	1982	1983	1982	1983
<u>Sioux Lookout District</u>																							
Vermillion River	250	100	3,000	1.4	2.2	0.0	0.0	0.0	0.0	0.4	0.0	13.2	12.0	5.2	4.4	0.0	0.0	0.0	0.0	0.8	0.4	0.8	0.4
<u>Kenora District</u>																							
Broderick Twp	225	3,600	8,000	0.9	1.7	0.0	0.0	0.0	0.0	0.4	0.0	3.2	1.8	1.2	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<u>Ignace District</u>																							
Furniss Twp	250	876	7,500	1.0	1.7	1.6	0.0	1.0	0.0	0.8	0.0	10.9	9.6	9.2	7.6	0.0	0.8	0.0	4.0	0.0	0.0	0.0	0.0
<u>Dryden District</u>																							
Aubrey Twp	250	150	7,000	1.0	1.8	3.3	0.0	1.0	0.0	7.2	0.0	19.2	14.8	11.2	8.8	0.0	44.0	0.0	3.0	0.0	0.0	0.0	0.0

# NORTHWESTERN REGION

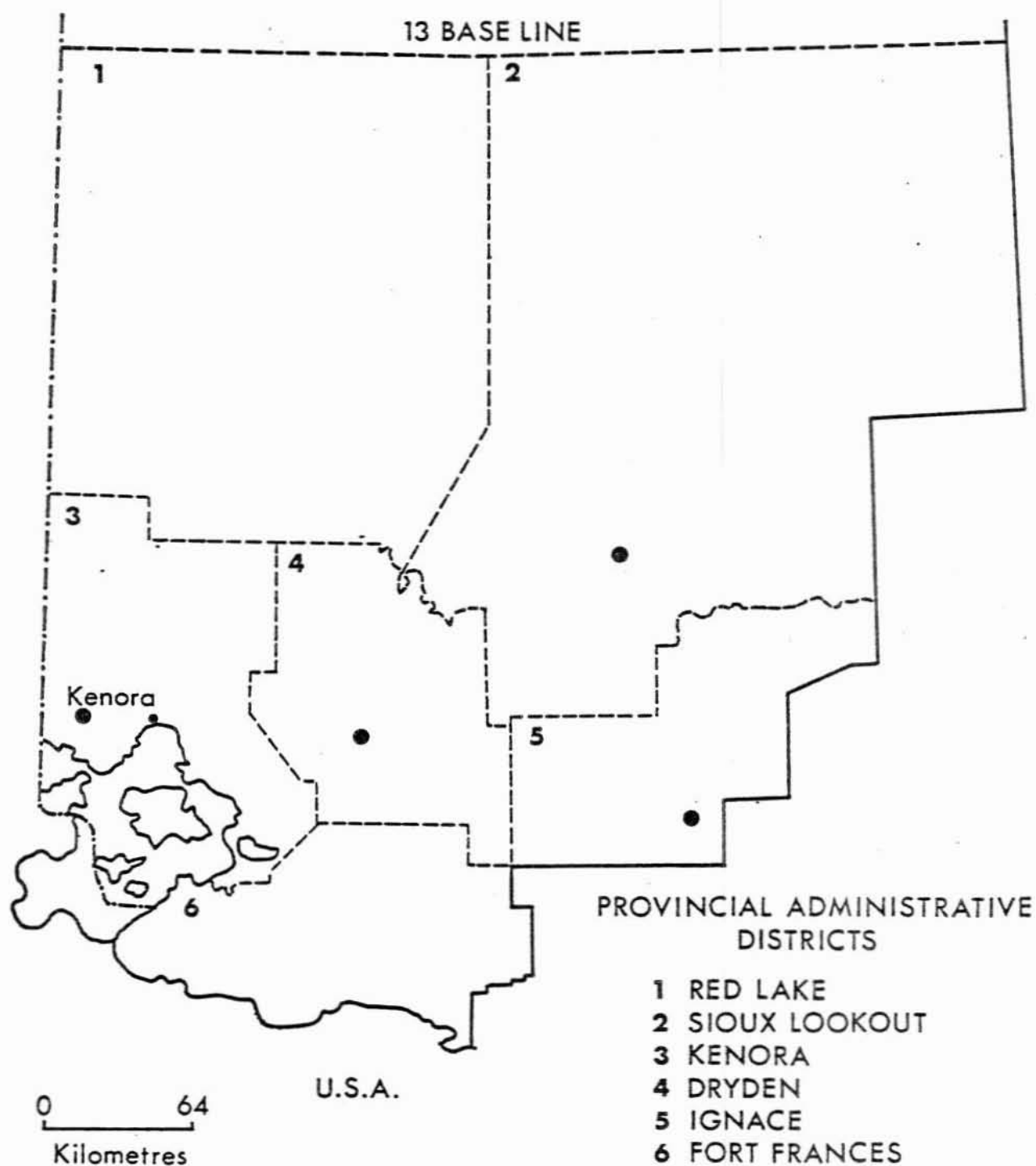


Figure 9. Semi-permanent jack pine (*Pinus banksiana* Lamb.) plot locations . . . . . ●



## Black Spruce Seed and Cone Pests

A special survey was conducted at two upland and two lowland black spruce sites in the Region to determine the insects that were damaging cones and causing seed loss. The two upland sites were seed production areas, one located in McAree Township, Sioux Lookout District and the other along the Snake Bay Road in the Dryden District. The two lowland sites were typical representatives of lowland black spruce stands across the Region. The stands were located along the Marchington Road in the Sioux Lookout District, and south of the town of Dryden on Highway 502, in the Dryden District. At each location, 100 current-year cones were collected from branches that represented the entire flowering portion of the crowns of a minimum of three trees. The sample was collected during the last week of July.

Table 10 summarizes the results of this survey.

## Seed Orchards

In 1982, 11 black spruce seedling seed orchards and four white spruce clonal seed orchards were established across the Region (Table 11). The black spruce orchards were matched with an additional 11 black spruce family test sites. On each of these sites, two different families were planted, one duplicating the seed orchard planted in that particular district and one from an adjacent district (Fig. 10).

The stock originated from the Dryden, Thunder Bay and Orono forest stations. The majority of the black spruce seedlings are accelerated nursery stock, that is, grown in greenhouses for three months, then moved to transplant beds at the nursery for approximately  $1\frac{1}{2}$  years before outplanting. However, because of planting failures, container stock which had been grown in greenhouses at the Orono Forest Station for three months was added, where required, throughout the test areas. The white spruce was 3-year-old rootstock on which scions had been grafted and tended for 2 years (1 year in the greenhouse and 1 year outside the greenhouse). Similar material received from the Thunder Bay Forest Station had been tended outside the greenhouse for an additional 3 years.

Estimated heights from throughout the test sites at the end of the 1983 growing season averaged 35.6 cm for the accelerated black spruce stock and 15.2 cm for the black spruce container stock, and ranged from 45.7 cm to 152.4 cm for the grafted white spruce.

During the 1983 field season 18 of the 26 test areas were examined on at least one occasion; 11 of these were seed orchards. Six of the areas, five orchards and one family test area, were examined during mid-June and again in late July as part of the high-value black spruce plantation survey. The results of this survey and the pests evaluated may be found in the preceding text.

## NORTHWESTERN REGION

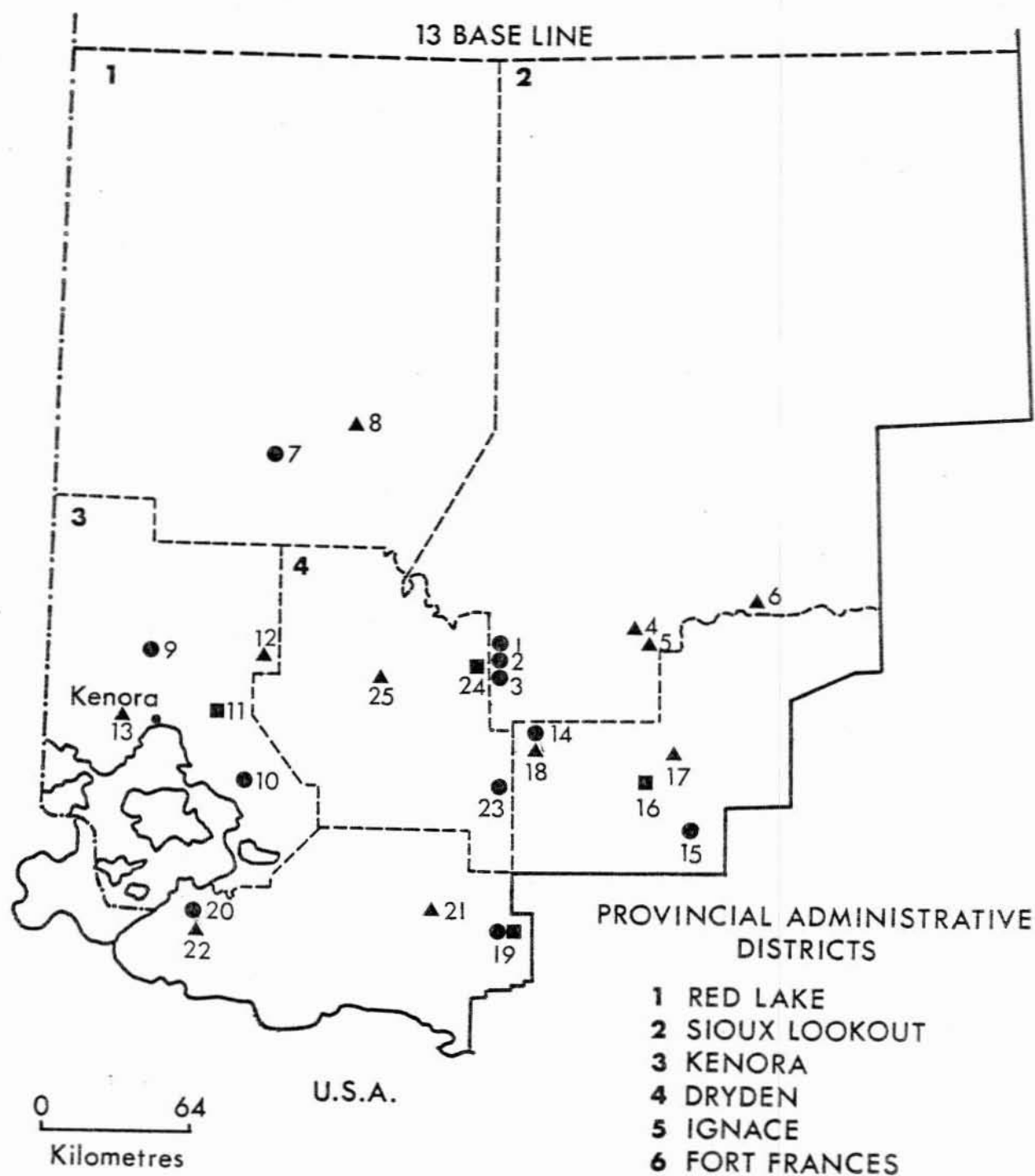


Figure 10. Tree Improvement Sites

- Black spruce (*Picea mariana* [Mill.] B.S.P.)  
seedling seed orchard . . . . . ●
- White spruce (*P. glauca* [Moench] Voss)  
clonal seed orchard . . . . . ■
- Black spruce family test . . . . . ▲

Table 10. Summary of the percentage of cones damaged by, and percentage seed loss attributable to, various insects at four locations in the Northwestern Region.

Location	No. of cones examined	Damaged cones (%)	Seed loss within damaged cones (%)	Site	Principal cause of seed loss in descending order of occurrence
Sioux Lookout District McAree Twp	99	46.5	20.9	upland	Spruce cone maggot, <i>Hylemya anthracina</i> (Czerny) Spruce cone axis midge, <i>Dasineura rachiphaga</i> Tripp Fir coneworm Spruce micro moth, <i>Paralobesia piceana</i> Free. <i>Reselliella</i> sp. Lepidopterous larvae
Marchington Road	100	75.0	19.1	lowland	Spruce cone maggot Spruce cone axis midge Fir coneworm <i>Reselliella</i> sp. White pine coneworm, <i>Eucosma tocullionana</i> Heinr. Spruce micro moth Lepidopterous larvae
Dryden District Snake Bay Road	100	27.0	6.0	upland	Spruce cone maggot Spruce cone axis midge Lepidopterous larvae
Highway 502	100	25.0	32.0	lowland	Spruce cone maggot Spruce cone axis midge Lepidopterous larvae

Table 11. Summary of locations and data pertaining to black spruce seedling seed orchards, white spruce clonal seed orchards and black spruce family test areas established in 1982 by OMNR in the Northwestern Region.

Location	Species <sup>a</sup>	Area (ha)	Total no. of trees
<u>Sioux Lookout District</u>			
(seed orchards)			
1 - Goodie Lake North*	bs	5	16,000
2 - Goodie Lake South*	bs	5	16,000
3 - Skurban Lake*	bs	5	16,000
(family tests)			
4 - Marchington Road	bs	20	23,000
5 - Dominion Lake	bs	20	23,000
6 - Savant Lake	bs	20	23,000
<u>Red Lake District</u>			
(seed orchard)			
7 - Beaugard Lake*	bs	5	16,000
(family test)			
8 - Chukuni River	bs	24	23,000
<u>Kenora District</u>			
(seed orchard)			
9 - Minnesabic	bs	5	16,000
10 - Ulster Lake	bs	5	16,000
(clonal seed orchard)			
11 - High Lake	ws	8	600
(family test)			
12 - Colonna Lake	bs	23	23,000
13 - Sandy Lake	bs	23	23,000
<u>Ignace District</u>			
(seed orchard)			
14 - Vermeersch	bs*	5	16,000
15 - Ferguson	bs*	5	16,000

(continued)

Table 11. Summary of locations and data pertaining to black spruce seedling seed orchards, white spruce clonal seed orchards and black spruce family test areas established in 1982 by OMNR in the Northwestern Region (concluded).

Location	Species	Area (ha)	Total no. of trees
<u>Ignace District (cont'd)</u>			
(clonal seed orchard)			
16 - Dawe	WS	8	240
(progeny test)			
17 - Crystal River	BS	20	23,000
18 - Keikewabik	BS	25	23,000
<u>Fort Frances District</u>			
(seed orchards)			
19 - Manion Lake	BS*	5	16,000
20 - Morson Township	BS	5	16,000
(clonal seed orchard)			
19 - Manion Lake	WS*	8	600
(family test)			
21 - Kawawia Creek	BS	17	23,000
22 - Tovell Township	BS	17	23,000
<u>Dryden District</u>			
(seed orchard)			
23 - Melgund Township	BS*	5	16,000
(clonal seed orchard)			
24 - Sunstrom	WS	8	712
(family test)			
25 - Rugby Township	BS	20	23,000

\*Spruce budworm egg-mass samples

At the request of the OMNR regional timber office in Kenora, a special spruce budworm egg-mass survey was conducted during the first week of September at eight of the seed orchards (Table 11). Only the orchards in close proximity to the current spruce budworm infestation in the Region were sampled. At each site, 50 randomly selected seedlings were examined visually for the presence of egg masses. Egg masses were detected at only one area, the Manion Lake seed orchard, one on the black spruce seedlings and two on the white spruce seedlings. Low numbers such as these should not result in a serious impact by spruce budworm on the orchard. However, the surrounding stand, consisting mainly of balsam fir, will likely sustain severe defoliation in 1984; therefore, early-instar larvae may drift or be blown into the orchard from the surrounding trees. A similar situation could occur in orchards within infested areas; hence, close observation is warranted during next spring and early summer.

A control program to reduce low spruce budworm populations in certain test areas with a single application of the insecticide malathion was successfully completed by OMNR during the last week of June and the first week of July. The areas treated were: High Lake white spruce orchard, Kenora District; Dawe white spruce orchard and Crystal River black spruce family test, Ignace District; Manion Lake black and white spruce orchards, Melgund black spruce orchard and Sunstrum white spruce orchard, Dryden District. At the Manion Lake black spruce orchard, a boom sprayer was used to spray the entire orchard, whereas at all the other locations, individual infested seedlings were sprayed by hand.

In late July, the Skurban Lake black spruce orchard, Sioux Lookout District was examined, and trace mortality caused by fertilizer burn was detected. *Monochamus* damage was detected on the leaders of 3% of the extra stock planted adjacent to the Beaugard black spruce orchard in the Red Lake District. Drought conditions and heavy weed competition caused approximately 15% mortality at the Minnesabic black spruce orchard, Kenora District, in late August.

Seven additional test areas across the Region were routinely visited at least once during July, August and September, but no serious pest problems were encountered.

#### Pinewood Nematode, *Bursaphelenchus xylophilus* (Steiner & Buhrer) Nickle

As part of the general surveys in the Region, efforts were made to sample recently dead or dying pines for the presence of nematodes in areas damaged mainly by sawyer beetles (*Monochamus* spp.). Increment cores were obtained at eight scattered locations in the Region and were submitted to the laboratory for examination for the presence of pinewood nematodes.

All samples submitted and examined in 1983 were negative. Surveys will continue in 1984.

The nematodes are transferred from infested to healthy trees by sawyer beetles. Nematodes kill the host tree by rapidly multiplying in the sapwood of branches and main stems, thereby disrupting the water flow within the tree. Needle discoloration, a change from green to yellow and finally to brown, is one of the first visible symptoms expressed by infested pines. The symptom is preceded by a marked decrease in resin flow. Trees invaded by nematodes in the spring ultimately wilt and mortality occurs by late summer, but some trees may wilt within three months of becoming infected.

#### *Nursery Report - Dryden Forest Station*

Insects: Very low populations of spruce budworm were found causing a trace of defoliation on white spruce windbreaks throughout the nursery. These windbreaks were also lightly defoliated by the yellowheaded spruce sawfly. Very low numbers of the armyworm, *Pseudaletia unipuncta* (Haw.), were found on black spruce seedlings in one of the greenhouses. A single treatment with the insecticide malathion was applied, and effectively controlled the cutworm. Springtails, *Collembola* Fam. *Sminthuridae*, were also detected in a greenhouse on a few trays of black spruce seedlings that had died as a result of the extreme heat in August.

Diseases: Weather was the main cause of severe losses sustained at the nursery this past season. It was estimated that 75% of the jack pine and 40% of the black spruce container stock was killed as a result of winter drying. A loss of 5% of the rising 2-0 black spruce seedlings in compartments E7, 8, 9 and 10 was caused by frost heaving. These two problems were the result of lack of snow cover during the winter of 1982-1983. Rising 3-0 red pine in compartment E4 sustained a 1% loss, probably as a result of root pruning the previous fall.