

THE 1972 SPRUCE BUDWORM SITUATION
IN ONTARIO

PART A: DAMAGE AND FORECASTS

PART B: AERIAL SPRAYING OPERATIONS

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Finally, we wish to remind all management or unit foresters (industrial or provincial) that if they require more specific information about spruce budworm conditions in their districts than is contained in this report, they should contact the appropriate Forest Research Technician, or write to the Head, Forest Insect and Disease Survey Unit, Great Lakes Forest Research Centre.



Frontispiece. Upper photograph illustrates Micronair spraying units mounted on underwing of Stearman spray plane.

Lower photograph shows drums of Zectran FS 15 insecticide.

(Photographs by C. A. Barnes)

ABSTRACT

The spruce budworm situation in Ontario continued to worsen in two of the three regions in which outbreaks have been occurring and it is likely that the amount of damage will increase further in 1973. Part A of this report describes changes in the infestations in 1972 and forecasts, in cartographic and tabular form, the damage liable to occur in 1973. Part B describes aerial spraying operations covering 46,500 acres which were conducted against the spruce budworm in Ontario in 1972 as part of a joint strategy developed by the Canadian Forestry Service and the Ontario Ministry of Natural Resources.

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Cover photograph shows accumulative severe defoliation of balsam fir by the spruce budworm over a period of 4 years.

PART A: DAMAGE AND FORECASTS

INTRODUCTION

In 1971, because of an obviously worsening spruce budworm picture throughout Ontario, the Forest Insect and Disease Survey Unit of the Great Lakes Forest Research Centre published the first of an annual series of information reports on this forest insect pest. This report is the third in this series. It describes the spruce budworm situation in 1972 and provides damage forecasts for 1973 on an overall and integrated basis for the Province of Ontario.

OVERALL SITUATION - 1972

There are three distinct outbreaks in Ontario (Fig. 1) as described in previous reports of this series (Howse *et al.* 1971, 1972). Two of these three outbreaks, i.e., those in southeastern and northeastern Ontario, increased considerably in 1972 from 13.1 million acres to 19.2 million acres. The third outbreak, in northwestern Ontario, was reduced in size from 130,000 acres in 1971 to 70,000 acres in 1972. The following data summarize the acreage within which moderate-to-severe defoliation occurred on the current shoots of balsam fir (*Abies balsamea* [L.] Mill.) and white spruce (*Picea glauca* [Moench] Voss) in 1971 and 1972.

<u>Outbreak segment</u>	<u>Area within which moderate-to-severe defoliation occurred (Million acres)</u>	
	<u>1971</u>	<u>1972</u>
Southeastern Ontario	4.5	5.8
Northeastern Ontario	8.6	13.4
Northwestern Ontario	.13	.07
	<u>13.23</u>	<u>19.27</u>

Thus, the spruce budworm situation appears brighter now in northwestern Ontario, particularly in comparison with northeastern or southeastern Ontario, than at any time since these outbreaks developed. However, it should be kept in mind that budworm infestations totalling 1.5 million acres were mapped in 1972 in north central Minnesota (Erickson and Hecht 1972) which, of course, adjoins northwestern Ontario. Therefore, the threat of spread from these infestations is obvious and constant vigilance must be maintained to monitor present population levels and to detect the presence of budworm in northwestern Ontario in areas other than those where it is currently established.

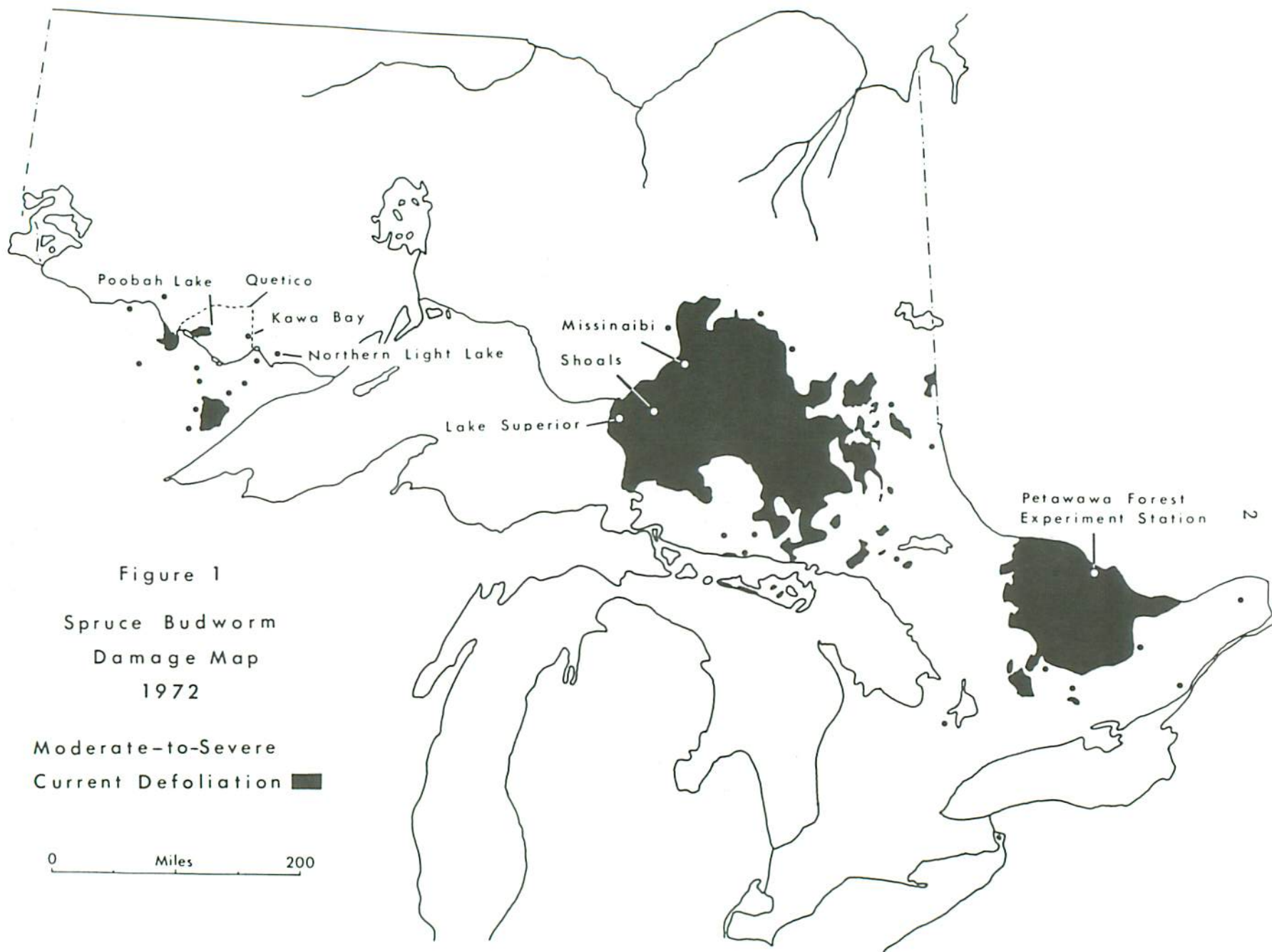


Figure 1
 Spruce Budworm
 Damage Map
 1972

Moderate-to-Severe
 Current Defoliation ■

0 Miles 200

SOUTHEASTERN ONTARIO

Situation in 1972

The total area within which moderate-to-severe defoliation of the current foliage of balsam fir and white spruce occurred in southeastern Ontario increased from 4,500,000 acres in 1971 to 5,800,000 acres in 1972 (Fig. 2).

Most of the increase in extent of the main infestation occurred in a southerly direction into the Lindsay and Tweed districts but minor changes occurred on the western boundary with several small extensions being recorded. Thus, the main infestation in southeastern Ontario, comprising well over 5,000,000 acres, is located in the eastern three quarters of the Pembroke District; the northeast corner of the Lindsay District along with a large infestation in the center of the Lindsay District, north of Peterborough in Harvey and Galway townships; the upper half of the Tweed District and the northwest corner of the Kemptville District, west of Ottawa. Small, scattered pockets of defoliation were detected in the remainder of southeastern Ontario.

An infestation, approximately 20,000 acres in extent, was detected on the south side of the French River in Blair and McConkey townships in the Parry Sound District. However, population levels were quite low elsewhere in this district. In the Lake Huron District budworm populations declined in St. Edmunds and Lindsay townships in the upper portion of the Bruce Peninsula and light populations were common in white spruce plantations elsewhere in the district. Similarly, low but widespread budworm populations, primarily on white spruce trees, were detected throughout Lake Simcoe and Lake Erie districts in 1972.

Mortality of host trees is expected to occur after 4-5 years of heavy feeding by budworm. Locations with dead tops and/or dead white spruce and balsam fir trees are becoming numerous. In addition to the extensive area of damage in the Bonnechère Valley west of Renfrew, mortality and/or top kill was noted in Ross Township, south of Pembroke; in Stratton, Preston and Bower townships in Algonquin Park (Pembroke District); and in Galway, Harvey and Bruton townships in the Lindsay District.

Damage Forecast for 1973

The results of an egg-mass survey conducted in southern Ontario in 1972 indicate a continuance of high damage levels in areas currently infested, accompanied by additional, modest enlargements of the outbreak in 1973 (Fig. 3 and Table 1). Further expansion of the western boundary is not probable. The infestation has moved in this direction into

Figure 2. Spruce Budworm Damage in Southeastern Ontario, 1972

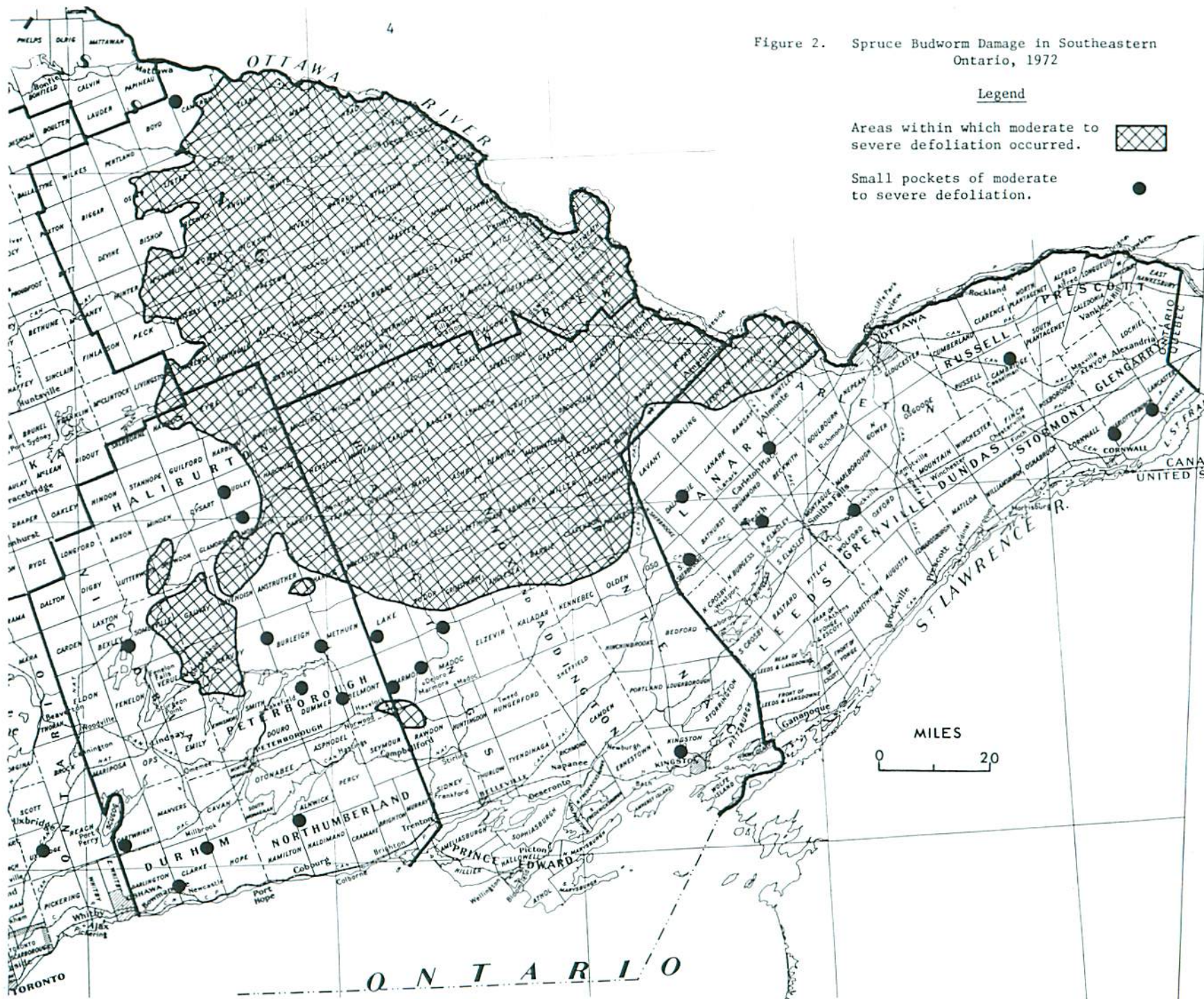


Figure 3. Spruce Budworm Damage Forecasts for 1973 in Southeastern Ontario



virtually all of the susceptible stand types and is prevented from moving farther westward by a broad band of hardwood forest extending from Mattawa to Huntsville on the west side of the Pembroke District. There may, however, be some extension of the infestation to the south and southeast, i.e., in the Lindsay, Tweed and Kemptville districts, where suitable host stands are present.

The infestation in McConkey Township in the Parry Sound District will likely spread into any nearby, uninfested, susceptible stands and additional new but isolated infestations may be found in the northern part of the Parry Sound District. Elsewhere in southern Ontario budworm damage will occur at no greater than a trace or light level.

Generally speaking, egg-mass densities were only slightly lower in 1972 than in 1971. As a result, additional damage can be expected in the infested areas with an increase in the extent and intensity of tree and/or top mortality.

NORTHEASTERN ONTARIO

Situation in 1972

Figure 4 shows the location of moderate-to-severe defoliation in northeastern Ontario caused by spruce budworm or, in many areas, by a combination of spruce budworm and frost. The total area within which damage occurred increased in 1972 to 13,400,000 acres from 8,600,000 acres in 1971.

With respect to weather, the 1972 spring season will be recorded as one of the most unusual on record for Ontario, especially in the northeast. Emergence of spruce budworm larvae from overwintering hibernaculae occurred throughout northern Ontario on or about May 14-15. This event was followed by 2 weeks of unusually warm and dry weather, during which temperatures frequently reached the 80's. However, heavy rain started on the evening of May 29. During the early morning hours of May 30, temperatures fell below 32°F and the rain changed to snow with 3-4 in. being recorded. The area affected extended in a northeasterly direction from the western boundary of the Chapleau District in a broad band up to 60-70 miles wide through the heart of the Chapleau infestation, at least as far eastward as Timmins which lies outside of the outbreak area. This sequence of rain, followed by snow and freezing temperatures, encased the new shoots of balsam fir and white spruce in a layer of ice and resulted in the destruction of the new shoots and in most cases of the budworm larvae inside them. Consequently, most of the 1972 foliage on balsam fir and to a lesser extent on white spruce was killed over approximately 6.0 million acres containing very high budworm populations. Undoubtedly many budworm larvae were killed by the direct effects of temperature at this time and many others died later of starvation caused by a lack of new foliage. Thus, an outline of the area affected by

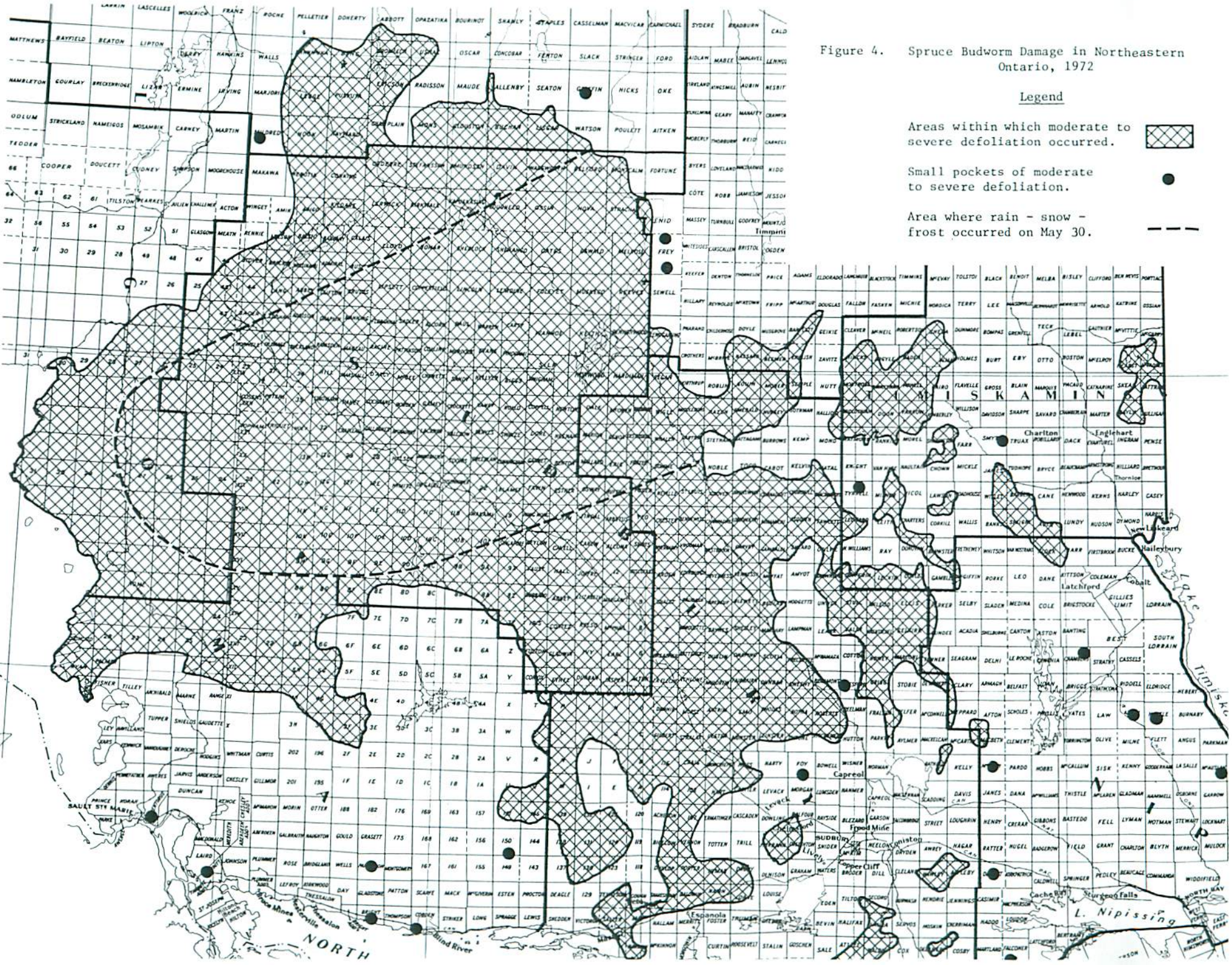


Figure 4. Spruce Budworm Damage in Northeastern Ontario, 1972

Legend

Areas within which moderate to severe defoliation occurred.



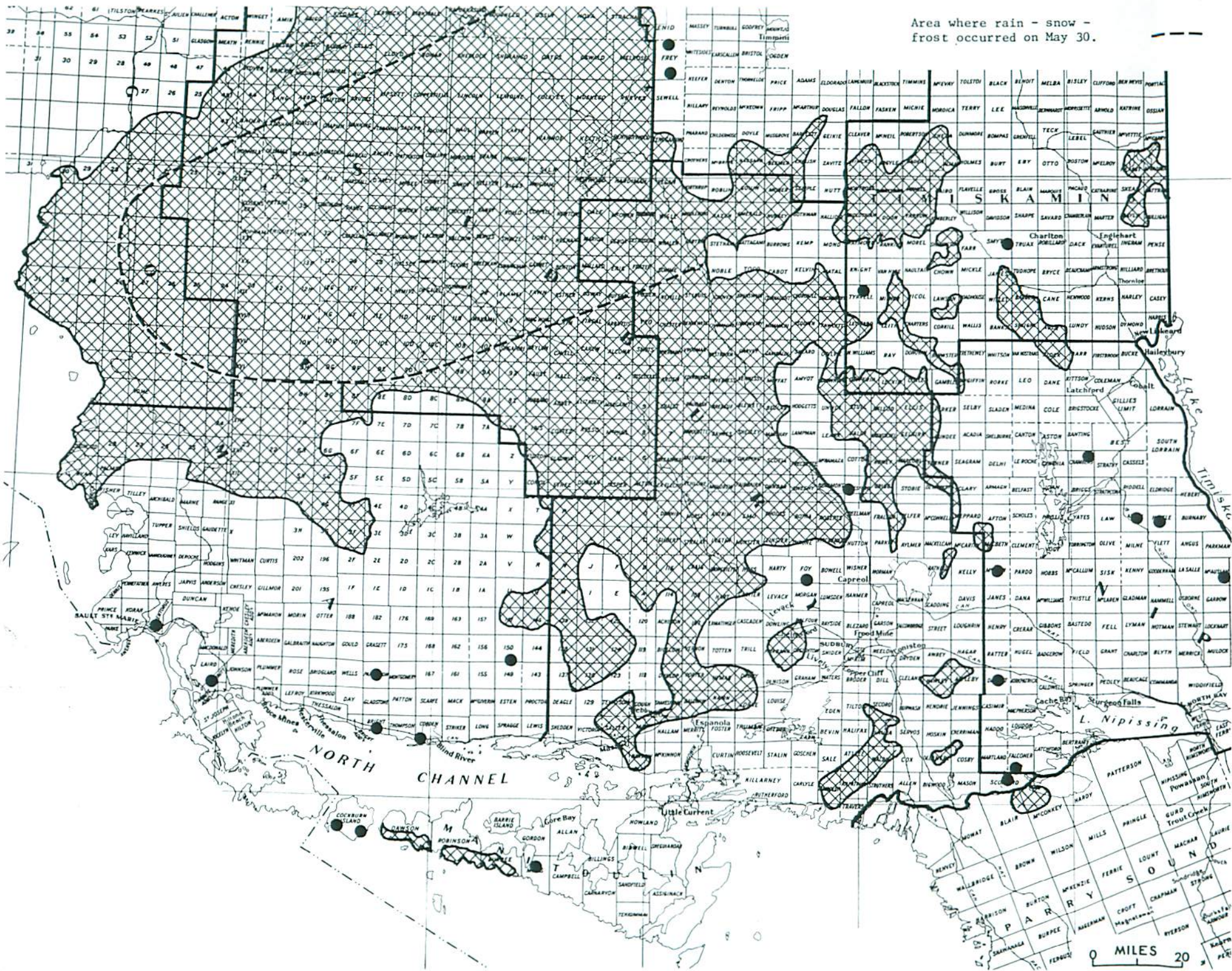
Small pockets of moderate to severe defoliation.



Area where rain - snow - frost occurred on May 30.



Area where rain - snow -
frost occurred on May 30.



the May 30 snowstorm has been superimposed on Figure 4. The east side has been left open because it is not certain how far the conditions described extended in this direction.

On June 10 and 11, 1972 frost again occurred throughout most of northeastern Ontario and indeed throughout most of the Province. However, the results of this second cold spell were not as drastic or severe as those of the earlier one. Current foliage of balsam fir and white spruce was killed in lowlying areas that had not been affected by the snowfall at the end of May. Fir and spruce in higher areas or adjacent to bodies of water escaped frost damage. Furthermore, there is evidence that budworm larvae were not killed at this time by the direct action of frost, at least not in any appreciable numbers. Thus, a variety of conditions occurred in 1972 in northeastern Ontario: i.e., budworm defoliation only, frost damage only (May 29-30 or June 10-11) and combinations of frost damage and budworm defoliation. Figure 4 depicts areas where moderate-to-severe defoliation was caused by budworm and areas that were known to have high budworm populations (prior to the May 29-30 or June 10-11 frosts) and would have suffered moderate-to-severe defoliation by budworm in the absence of the more-or-less catastrophic effects of frost on current foliage. Frost damage (June 10-11) occurred in many areas outside of those mapped in Figure 4 but these areas are not shown because they are not yet infested by budworm.

The major changes in the northeastern Ontario infestations that became evident in 1972 were considerable expansion of the outbreak to the south into the northern part of the Sault Ste. Marie District, the first appearance of defoliation on Manitoulin and Cockburn islands, new infestations in the southwestern part of the Sudbury District in the vicinity of Espanola, enlargement of other infestations in the Sudbury and Swastika districts and the appearance of new, small infestations in the North Bay District. The greatest enlargement of the outbreak occurred where the Chapleau infestation merged with the Onaping outbreak. There were no major changes in the northern boundary of the outbreak which is in the southern part of the Kapuskasing and Cochrane districts.

Balsam fir mortality was noted in several locations in the Sudbury District. Some of the more significant locations are Shelley Township (north end of Onaping Lake), Sweeny Township (Rome Lake), Scotia, Dunbar, Frechette, Rhodes and Botha townships. Balsam fir trees are dying in several areas in the Chapleau District.

One final note of interest in this year of unusual occurrences was the high budworm larval population found to be infesting the Ontario Provincial Nursery at Chapleau. In late May several acres of small white spruce seedling beds were found to be heavily infested. It was speculated that the infestation occurred as a result of larval dispersal although the possibility that female moths laid eggs in the nursery stock in 1971 cannot

be ruled out. In any case, the nursery beds were sprayed with Malathion which did not give satisfactory results and a second time with Dipel, a commercial preparation of *Bacillus thuringiensis*, which reportedly provided excellent results.¹

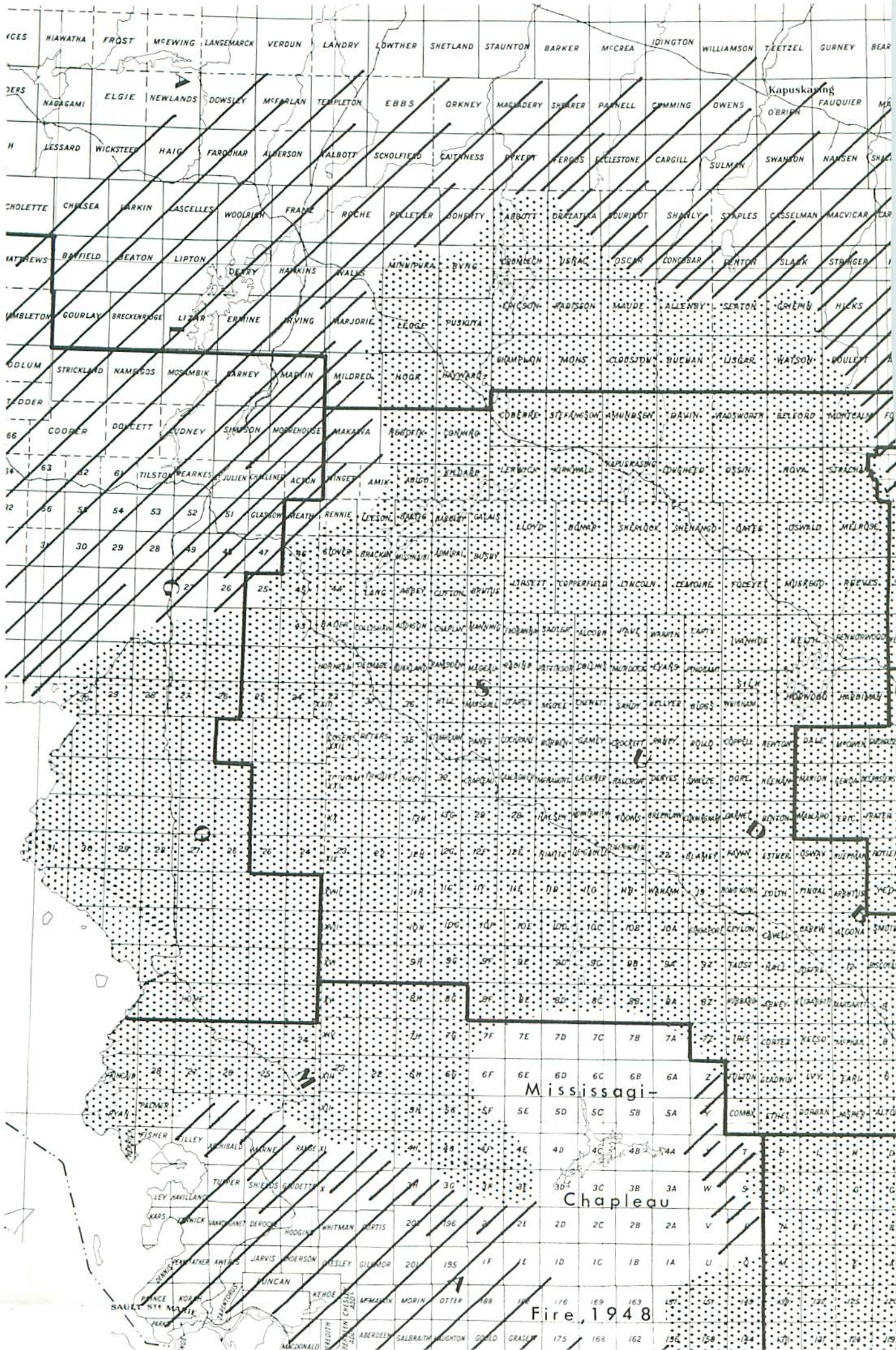
Damage Forecast for 1973

Spruce budworm egg-mass counts from more than 175 locations throughout northeastern Ontario forecast high population levels for 1973 for all areas infested in 1972 including the area of heavy frost damage (Fig. 5 and Table 2). However, the average egg-mass densities for most of the districts, but notably Chapleau and Sudbury, are reduced considerably over counts made in 1971. Egg-mass densities have increased only in the Sault Ste. Marie and North Bay districts. In summary, the 1972 egg-mass counts for northeastern Ontario are lower, by about 50%, than the 1971 counts. However, the overall egg-mass density is still high enough to call for a forecast of moderate-to-severe defoliation in 1973 over most of the area damaged in 1972 (Fig. 5).

There appears to be no prospect of major changes for 1973 except that the large scattered infestations in eastern Sudbury and Swastika districts may continue to expand and coalesce into one or two large infestations. In addition, more pockets of defoliation may be found in the North Bay District. No appreciable spread of the outbreak is likely in 1973 to the northwest in the White River District, to the north in the Kapuskasing District or to the northeast in the Cochrane District.

Despite high egg-mass numbers, population collapses could occur in the heart of the Chapleau outbreak. Population collapses or reductions would be a result of the balsam fir mortality that may occur by 1973 combined with the ability of living trees which remain to produce new foliage. The reader will note that these forecasts are made with caution. However, with reduced egg-mass counts in 1972 and a possibility that the 1972 egg-masses were smaller than normal, a single deleterious factor such as weather unfavorable to budworm survival in 1973 could bring about a general population collapse in northeastern Ontario. Of course, the reverse is just as likely to happen, in which case the outbreak could regain momentum in future years and kill a large proportion of the white spruce and fir in northeastern Ontario. In other words, 1972 was a critical year and 1973 may be even more so, in determining the course of events in northeastern Ontario.

¹ H. A. Tripp, Insect Pathology Research Institute, Sault Ste. Marie, Ontario (personal communication).

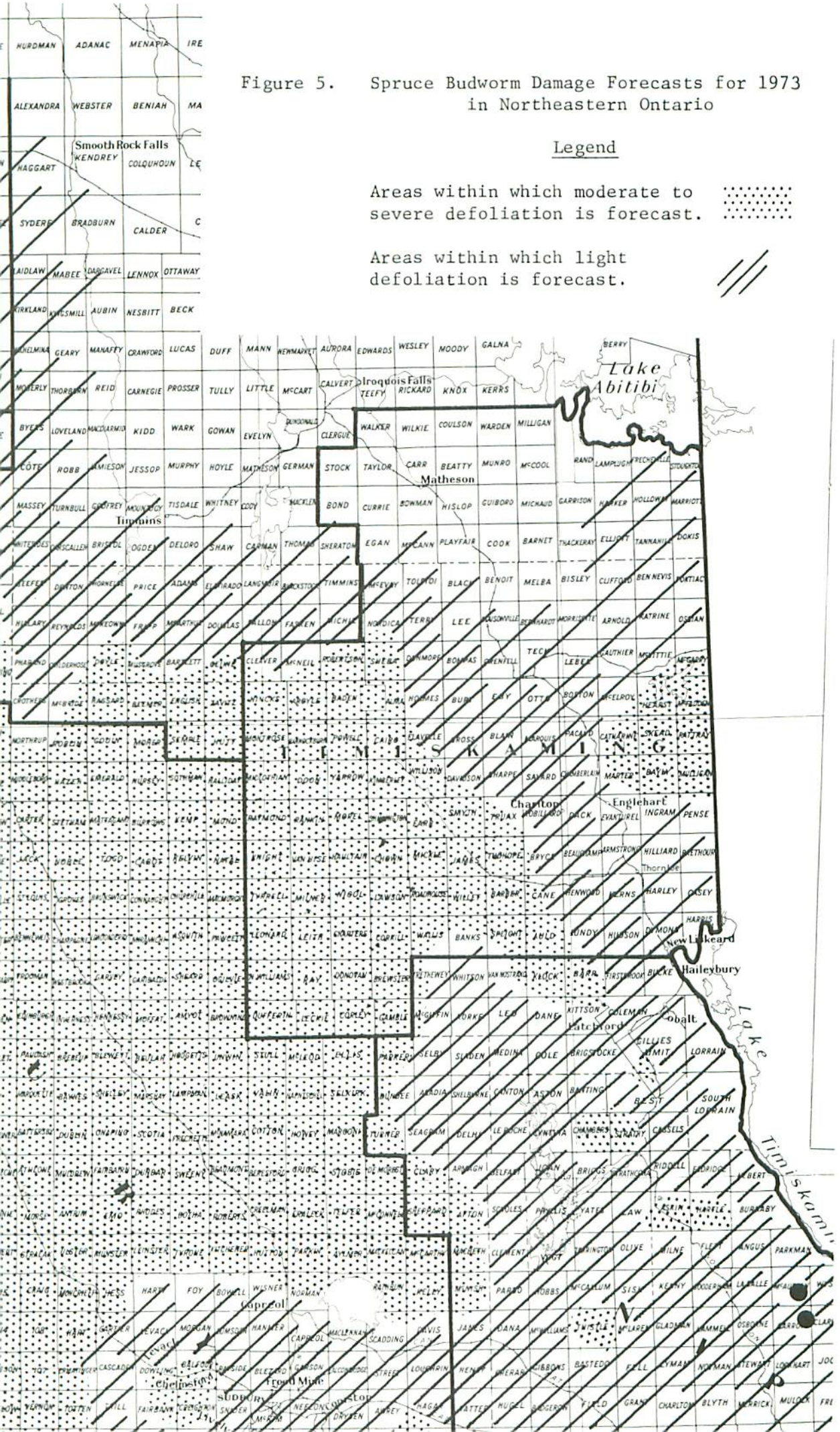


Mississagi

Chapleau

Fire, 1948

Figure 5. Spruce Budworm Damage Forecasts for 1973 in Northeastern Ontario



NORTHWESTERN ONTARIO

Situation in 1972

In 1972, 70,000 acres of moderate-to-severe defoliation were mapped in northwestern Ontario compared with 130,000 acres in 1971 (Fig. 6). All of this defoliation occurred in Quetico Provincial Park in the Fort Frances District with the exception of several small pockets of defoliation in the southwest corner of the Thunder Bay District.

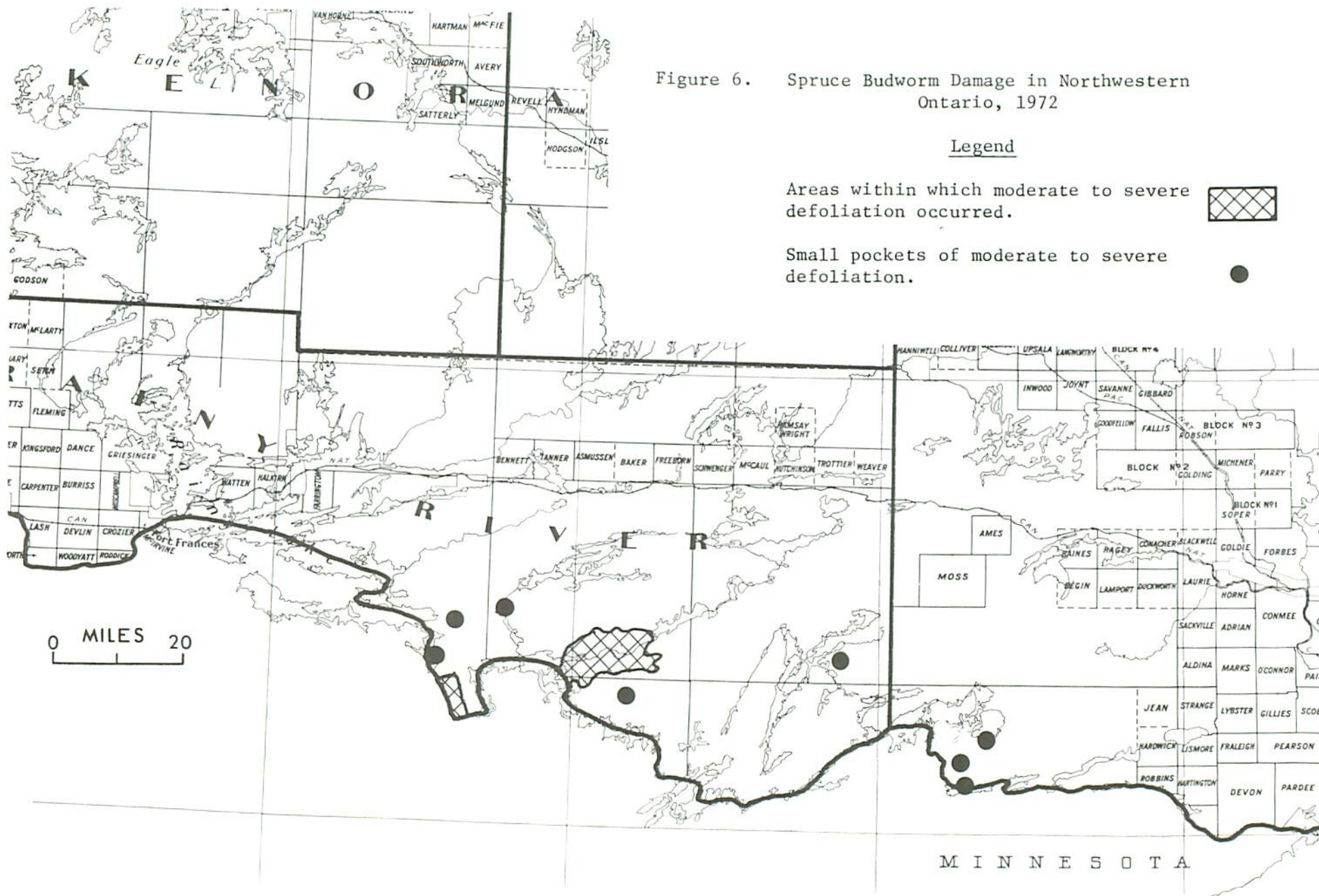
The main infestation in Quetico consists of 55,000 acres lying between Poohbah Lake and Lac La Croix on the international border. This infested area includes Wink Lake, Tanner Lake, Maligne River and Martin Bay. Several small pockets of defoliation were mapped south of Kawa Bay on Kawnipi Lake. The remainder of the defoliation in Fort Frances District consisted of many pockets located from Namakan Lake in the west along the international boundary to Bayley Bay in the east. Many of these pockets of defoliation were in the same location as in 1971 but were reduced considerably in size.

In Thunder Bay District, several small pockets of defoliation were recorded at Northern Light Lake, Granite Lake and along the north shore of the west end of Gunflint Lake. The infestation at Mountain Lake disappeared in 1972. Other potential outbreaks in Inwood Township near Upsala in the Thunder Bay District and in the area east of Atikokan and north of Highway 11 in the Fort Frances District also failed to materialize.

Some frost damage occurred in the Fort Frances and Thunder Bay districts but probably had no impact on budworm populations. Although the frost damage was quite general, it was very light and spotty and confined mainly to low spots.

Damage Forecast for 1973

Egg-mass counts were obtained for 185 locations in northwestern Ontario including the Geraldton, Thunder Bay and Fort Frances districts. On the basis of these egg-mass surveys, very little change is forecast in infestation boundaries for 1973 (Fig. 7 and Table 3). Thus, it is expected that 70,000-75,000 acres of moderate-to-severe defoliation will occur in 1973 essentially in the same areas damaged in 1972. Egg-mass counts from some of the small pockets of defoliation such as those at Northern Light Lake, Granite Lake or Gunflint Lake in the Thunder Bay District would indicate that only trace or light damage will occur in 1973 at these locations.



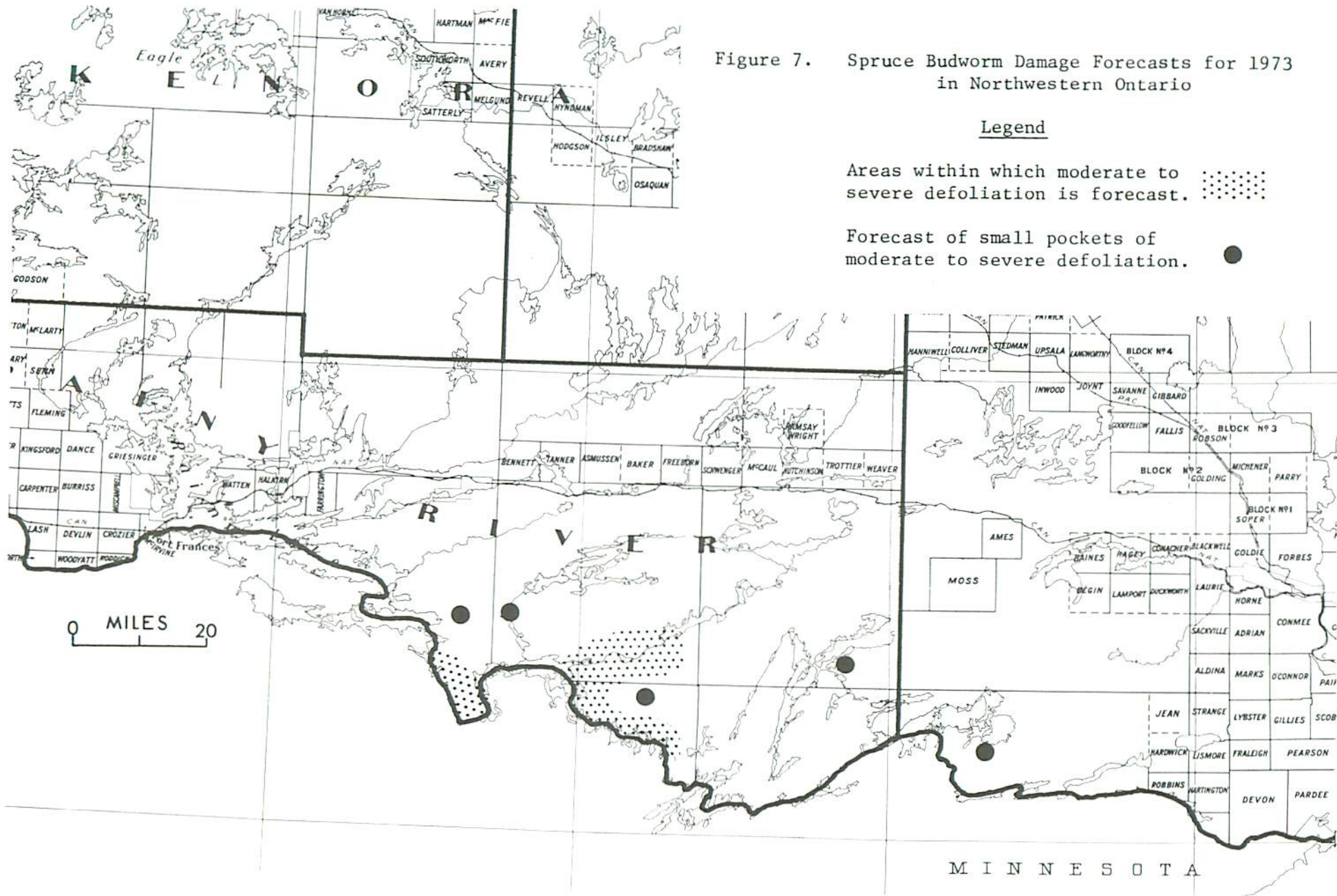


Figure 7. Spruce Budworm Damage Forecasts for 1973 in Northwestern Ontario

Legend

Areas within which moderate to severe defoliation is forecast.

Forecast of small pockets of moderate to severe defoliation.

MINNESOTA

Outside of the known infested areas, egg-mass counts are extremely low. For example, the areas surrounding Burchell Lake and Lac des Mille Lacs appear to be virtually free of budworm infestation and egg-mass densities are at their lowest level in the last 6 years.

SUMMARY

The outbreak in southeastern Ontario expanded to 5,800,000 acres in 1972 from 4,500,000 acres in 1971. It is expected that budworm populations will remain high in 1973 and that modest extensions may occur in a southerly or southeasterly direction into adjacent susceptible stands.

In northeastern Ontario, approximately 13,400,000 acres were moderately to severely damaged in 1972 compared with 8,600,000 acres in 1971. This included a sizeable area (about 6,000,000 acres) of heavy damage caused by a late snowstorm to 1972 shoots on balsam fir and to a lesser degree on white spruce within the budworm outbreak area. Despite high egg-mass counts throughout all areas damaged in 1972, including those affected by frost, forecasts for 1973 must be made with caution. Population collapses could possibly occur in the heart of the Chapleau outbreak where the effects of frost were particularly severe, depending on the amount of new foliage produced by host trees in 1973 and on the amount of balsam fir mortality. In any case, the outbreak will likely continue to expand into adjacent susceptible stands to the south and east.

In northwestern Ontario, the spruce budworm situation appears brighter now than at any other time in the last 5 years. Defoliation in this region amounted to only 70,000 acres in 1972. Little change in infestation boundaries is forecast for 1973. In addition, the areas surrounding Burchell Lake and Lac des Mille Lacs appear to be virtually free of infestation.

Table 1 Southeastern Ontario - Spruce Budworm: Summary of defoliation estimates and egg-mass counts in 1972, and infestation forecasts for 1973

Location	Host	Estimated per cent of defoliation 1972	No. of egg masses per 100 sq. ft of foliage	Infestation forecasts for 1973
<u>Pembroke District</u>				
<u>(36 locations)</u>				
Airy Twp - East Gate	wS	98	276	S*
Alice Twp	bF	68	175	S
Biggar Twp	bF	3	0	0
Bishop Twp	bF	0	0	0
Bower Twp - Penaish Lake	wS	52	162	S-M
Bromley Twp	wS	90	500	S
Cameron Twp - Rankin Creek	bF	3	0	0
Canisbay Twp	wS	100	930	S
Clara Twp - Deux Rivières	bF	19	0	0
Deacon Twp	bF	7	17	L
Dickson Twp	bF	100	1287	S
Guthrie Twp - near Basin Depot	wS	60	394	S
Head Twp - Grant Creek	wS	82	311	S
Peck Twp - Smoke Lake	bF	0	0	0
Petawawa Twp - Brindle Road	wS	83	441	S
Preston Twp	bF	100	298	S
Rolph Twp - Rolphton	wS	93	778	S
Ross Twp - district boundary	wS	60	575	S
Ross Twp - Garage	wS	40	477	S
Sabine Twp - McCoy Lake	wS	33	101	M-S
Sherwood Twp	wS	6	404	S
Stafford Twp - Mixburg	wS	83	356	S
- Rankin (N.P.V. Plot) ^a	bF	16	193	M-S
- Rankin (N.P.V. Plot) ^a	wS	75	474	S
Stratton Twp				
- Achray (Plot C)	bF	89	97	M
- Lone Creek	bF	100	423	S

* S - severe, M - moderate, L - light, 0 - nil

(cont'd.)

^a Aerial sprayed, N.P.V. Virus, 1972

Table 1 Southeastern Ontario - Spruce Budworm: Summary of defoliation estimates and egg-mass counts in 1972, and infestation forecasts for 1973 (cont'd.)

Location	Host	Estimated per cent of defoliation 1972	No. of egg masses per 100 sq. ft of foliage	Infestation forecasts for 1973
<u>Pembroke District</u> (cont'd.)				
Wilberforce Twp				
- 3.5 miles northwest of Douglas	wS	83	342	S*
- 1 mile north of Rankin	wS	100	449	S
Wilkes Twp	bF	0	0	0
Petawawa Forest Exp. Stn.				
- Wylie and Buchanan twp (Baseline Control)	bF	90	189	M-S
(By-Pass Road)	wS	95	225	S
(Deluthier Road-Plot G)	wS	62	295	S
(Orange Road-Control)	wS	85	356	S
(Spray No. 3) ^a	wS	83	1297	S
(Spray No. 4) ^a	wS	77	725	S
(Spray No. 6-Thomas L. Block) ^a	bF	4	69	M
<u>Parry Sound District</u> (eight locations)				
Blair Twp - Blair Camp	wS	15	0	0
Blair Twp - Lost Channel	bF	23	62	M
Butt Twp	bF	0	0	0
Joly Twp	bF	0	0	0
McConkey Twp	wS	78	675	S
Mowat Twp	bF	5	7	L
Sinclair Twp	bF	0	0	0
South Himsworth	bF	0	0	0
<u>Kemptville District</u> (six locations)				
Cambridge Twp - Lot 9, Con. I	wS	5	61	M

* S - severe, M - moderate, L - light, 0 - nil

(cont'd.)

^a Aerial sprayed, Fenitrothion, 1972

Table 1 Southeastern Ontario - Spruce Budworm: Summary of defoliation estimates and egg-mass counts in 1972, and infestation forecasts for 1973 (cont'd.)

Location	Host	Estimated per cent of defoliation 1972	No. of egg masses per 100 sq. ft of foliage	Infesta- tion forecasts for 1973
<u>Kemptville District (cont'd.)</u>				
Clarence Twp - Larose Forest	wS	20	109	M-S*
Dalhousie Twp - Lot 25, Con. V	bF	5	4	L
Fitzroy Twp - Lot 6, Con. IV	wS	28	356	S
Huntley Twp - Lot 25, Con. VIII	wS	67	933	S
Oxford Twp - Kemptville Nursery	wS	28	127	M-S
<u>Tweed District (10 locations)</u>				
Adamaston Twp - Bonnechère River	wS	32	607	S
Adamaston Twp - Mt. St. Patrick Road	bF	73	660	S
Brougham Twp	bF	15	43	M
Denbigh Twp	bF	93	236	S
Gratton Twp	wS	79	590	S
Griffith Twp	wS	48	1105	S
Matawatchan Twp	bF	43	46	M
McNab Twp	wS	28	545	S
Raglan Twp	wS	95	610	S
Wicklów Twp	bF	73	1395	S
<u>Lindsay District (11 locations)</u>				
Bruton Twp	bF	13	5	L
Cardiff Twp	bF	91	53	L-M

* S - severe, M - moderate, L - light, 0 - nil

(cont'd.)

Table 1 Southeastern Ontario - Spruce Budworm: Summary of defoliation estimates and egg-mass counts in 1972, and infestation forecasts for 1973 (concl.)

Location	Host	Estimated per cent of defoliation 1972	No. of egg masses per 100 sq. ft of foliage	Infesta- tion forecasts for 1973
<u>Lindsay District</u> (cont'd.)				
Cartwright Twp	wS	12	24	L-M*
Cavendish Twp - Pencil Lake	bF	42	106	M-S
Chandos Twp	bF	43	59	M
Clyde Twp	bF	100	239	S
Glamorgan Twp - Koshlong Lake	bF	11	0	0
Guilford Twp - Lot 18, Con. VII	bF	6	8	L
Harvey Twp - Nogies Creek	bF	95	130	M-S
Minden Twp	bF	4	21	L
Somerville Twp	bF	33	47	L-M
<u>Lake Simcoe District</u> (three locations)				
Essa Twp	wS	12	0	0
Uxbridge Twp	wS	25	45	M
Vespra Twp - Midhurst	wS	5	51	M
<u>Lake Huron District</u> (two locations)				
Glenelg Twp	wS	7	25	L-M
St. Edmunds Twp	wS	14	0	0

* S - severe, M - moderate, L - light, 0 - nil

Table 2 Northeastern Ontario - Spruce Budworm: Summary of defoliation estimates caused by spring frost and spruce budworm, and egg-mass counts in 1972, and infestation forecasts for 1973

Location	Host	Estimated total defoliation in 1972 due to frost + budworm (damage due to frost only in parentheses)		No. of egg masses per 100 sq. ft of foliage 1972	Infestation forecasts for 1972
<u>Chapleau District</u>					
(38 locations)					
Abney Twp - Spanish Lake	bF	L*	(0)*	546	S*
Barclay Twp					
- Missinaibi Provincial Park ^a	bF	H	(L)	402	S
- Missinaibi Provincial Park ^a	wS	H	(L)	693	S
Borden Twp					
- Entomopoxvirus-Plot Q ^b	wS	S	(S)	482	S
- Entomopoxvirus-Plot Q ^b	bF	S	(S)	107	M-S
Carew Twp	bF	H	(0)	279	S
Comox Twp	bF	L	(0)	316	S
Denyes Twp	bF	M	(L)	143	M-S
Fawn Twp	bF	S	(M)	230	S
Halsey Twp	bF	S	(H)	496	S
Hill Twp	bF	S	(H)	872	S
Horwood Twp	bF	S	(S)	408	S
Ivanhoe Twp					
- Provincial Park	bF	S	(H)	223	S
- Provincial Park	wS	S	(L)	878	S
Ivy Twp	bF	L	(0)	64	M
Kapuskasing Twp	bF	S	(M)	248	S
Leeson Twp	bF	M	(L)	25	L-M
Lloyd Twp	bF	S	(L)	212	S
Margaret Twp	bF	H	(0)	496	S

* S - severe, M - moderate, L - light, T - trace, 0 - nil

(cont'd.)

^a Aerial sprayed, Zectran, 1972

^b Aerial sprayed, Entomopoxvirus, 1972

Table 2 Northeastern Ontario - Spruce Budworm: Summary of defoliation estimates caused by spring frost and spruce budworm, and egg-mass counts in 1972, and infestation forecasts for 1973 (cont'd.)

Location	Host	Estimated total defoliation in 1972 due to frost + budworm (damage due to frost only in parentheses)		No. of egg masses per 100 sq. ft of foliage 1972	Infestation forecasts for 1972
<u>Chapleau District</u> (cont'd.)					
Montcalm Twp	bF	H*	(H)*	0	0*
Ossin Twp	bF	S	(M)	75	M
Penhorwood Twp	bF	S	(S)	690	S
Peters Twp - Shoals Provincial Park	bF	S	(S)	409	S
Sadler Twp	bF	S	(T)	164	M-S
Twp 8B	bF	L	(T)	70	M
Twp 8F	bF	H	(M)	284	S
Twp 9D	bF	S	(M)	289	S
Twp 9H	bF	S	(S)	749	S
Twp 10F	bF	S	(S)	669	S
Twp 11B - Wakami Provincial Park	bF	S	(H)	173	S
Twp 11D - Five Mile Provincial Park	bF	S	(S)	469	S
Twp 12G	bF	S	(H)	417	S
Twp 12H	bF	S	(H)	260	S
Twp 23, Rge. 16	bF	S	(H)	566	S
Twp 25, Rge. 23	bF	S	(T)	379	S
Twp 43	bF	H	(L)	215	S
Twp 46	bF	L	(T)	153	M-S
Whigham Twp	bF	S	(S)	507	S
<u>Cochrane District</u> (eight locations)					
Bartlett Twp - Termont Road	bF	M	(L)	145	S
English Twp - English Lake	bF	M	(L)	202	S
Hassard Twp	bF	S	(S)	584	S

*S - severe, M - moderate, L - light, T - trace, 0 - nil

(cont'd.)

Table 2 Northeastern Ontario - Spruce Budworm: Summary of defoliation estimates caused by spring frost and spruce budworm, and egg-mass counts in 1972, and infestation forecasts for 1973 (cont'd.)

Location	Host	Estimated total defoliation in 1972 due to frost + budworm (damage due to frost only in parentheses)		No. of egg masses per 100 sq. ft of foliage 1972	Infestation forecasts for 1972
<u>Cochrane District</u> (cont'd.)					
Langmuir Twp	bF	T*	(T)*	5	L*
McKeown Twp	bF	L	(L)	39	L-M
Pharand Twp	bF	S	(S)	5	L
Sewell Twp - Lapierre Road	bF	M	(L)	18	L
Sydere Twp - Mile 8	bF	0	(0)	0	0
<u>Kapuskasing District</u> (21 locations)					
Bourinot Twp - Mile 23	bF	T	(T)	0	0
Buchan Twp - Mile 6	bF	S	(S)	200	S
Caithness Twp - Big Pike Lake	bF	L	(L)	10	L
ChAMPLAIN Twp	bF	M	(L)	29	L-M
Clouston Twp	bF	L	(L)	31	L-M
Cromlech Twp - Brunswick Lake	bF	H	(T)	600	S
Derry Twp - Bullmoose Lake	bF	0	(0)	0	0
Farquhar Twp	bF	T	(T)	0	0
Farquier Twp - Remi Lake	bF	T	(T)	10	0
Fergus Twp	bF	L	(L)	7	0
Gourlay Twp	bF	T	(T)	8	L
Griffin Twp	bF	S	(H)	54	M
Lisgar Twp - Chain of Lakes Road	bF	H	(L)	257	S
Mildred Twp - Fire Lake	bF	T	(0)	17	L
Mons Twp	bF	L	(L)	16	L
Opasatika Twp	bF	L	(L)	34	L-M

* S - Severe, M - moderate, L - light, T - trace, 0 - nil

(cont'd.)

Table 2 Northeastern Ontario - Spruce Budworm: Summary of defoliation estimates caused by spring frost and spruce budworm, and egg-mass counts in 1972, and infestation forecasts for 1973 (cont'd.)

Location	Host	Estimated defoliation in 1972 due to frost + budworm (damage due to frost only in parentheses)		No. of egg masses per 100 sq. ft of foliage 1972	Infestation forecasts for 1972
<u>Kapuskasing District (cont'd.)</u>					
Puskuta Twp	bF	L*	(L)*	5	L*
Seaton Twp - Mile 34	bF	M	(L)	0	0
Shanly Twp - Camp 15	bF	L	(L)	13	L
Stringer Twp - Groundhog River	bF	M	(M)	8	L
Wicksteed Twp - 1.2 miles south of Hornepayne	bF	L	(L)	5	L
<u>North Bay District (10 locations)</u>					
Askin Twp	bF	H	(H)	93	M-S
Aston Twp	bF	H	(H)	35	L-M
Barr Twp	bF	H	(H)	98	M-S
Calvin Twp	bF	M	(L)	31	L-M
Commanda Twp	bF	L	(L)	12	L
Dunnett Twp	bF	S	(L)	322	S
Gillies Limit	bF	L	(T)	13	L
Jocko Twp	bF	H	(H)	0	0
Strathy Twp	bF	H	(H)	85	M
Thistle Twp	bF	H	(H)	62	M
<u>Sault Ste. Marie District (13 locations)</u>					
Bright Twp	bF	S	(T)	83	M-S
Herrick Twp - Pancake Bay Provincial Park	bF	L	(T)	0	0
Palmer Twp	bF	0	(0)	0	0
Parkinson Twp	wS	S	(T)	413	S
Tarbutt Additional Twp	bF	S	(0)	43	M

S - Severe, M - moderate, L - light, T - trace, 0 - nil

(cont'd.)

Table 2 Northeastern Ontario - Spruce Budworm: Summary of defoliation estimates caused by spring frost and spruce budworm, and egg-mass counts in 1972, and infestation forecasts for 1973 (cont'd.)

Location	Host	Estimated total defoliation in 1972 due to frost + budworm (damage due to frost only in parentheses)		No. of egg masses per 100 sq. ft of foliage 1972	Infestation forecasts for 1972
<u>Sault Ste. Marie District (cont'd.)</u>					
Twp 3F	bF	S*	(T)*	281	S*
Twp 5H	bF	H	(T)	257	S
Twp 7H - Goulais Lake	bF	S	(H)	1019	S
Twp 23 Rge. 13 - Hanes Lake	bF	H	(L)	873	S
Twp 25 Rge. 14	bF	S	(H)	74	M
Twp 26 Rge. 13 - Adelaide Lake	bF	L	(0)	0	0
Twp 150	bF	H	(T)	335	S
Twp 157	bF	L	(T)	7	L
<u>Sudbury District</u> (46 locations)					
Antrim Twp	bF	H	(0)	86	M-S
Baldwin Twp	bF	L	(0)	22	L
Beaumont Twp - Helen Lake	bF	H	(0)	10	L
Beulah Twp	bF	S	(0)	85	M
Burpee Twp	bF	M	(0)	92	M
Botha Twp	bF	S	(0)	73	M
Cockburn Island	bF	T	(0)	13	L
Craig Twp - Bluewater Lake	bF	S	(0)	201	S
Creelman Twp - Bessie Lake	bF	L	(0)	0	0
Dawson Twp	bF	H	(0)	165	S
Delamere Twp	wS	S	(0)	615	S
Demorset Twp	bF	S	(H)	177	S
Edinburgh Twp	bF	S	(L)	118	M-S
Fairbank Twp	bF	M	(0)	31	L-M

* S - Severe, M - moderate, L - light, T - trace, 0 - nil (cont'd.)

Table 2 Northeastern Ontario - Spruce Budworm: Summary of defoliation estimates caused by spring frost and spruce budworm, and egg-mass counts in 1972, and infestation forecasts for 1973 (cont'd.)

Location	Host	Estimated total defoliation in 1972 due to frost + budworm (damage in parentheses)		No. of egg masses per 100 sq. ft of foliage 1972	Infestation forecasts for 1972
<u>Sudbury District (cont'd.)</u>					
Genoa Twp - Rush Lake	bF	M*	(L)*	397	S*
Gilbert Twp	bF	S	(T)	787	S
Gough Twp	bF	M	(0)	6	L
Hazen Twp	bF	S	(L)	248	S
Hess Twp	bF	M	(0)	65	M
Howey Twp	bF	S	(0)	126	M-S
Hawley Twp	bF	H	(M)	176	S
Hyman Twp	bF	H	(0)	113	M-S
Inverness Twp - Donnegana Lake	bF	S	(0)	359	S
Killarney Twp - Killarney Provincial Park	bF	L	(0)	0	0
MacMurphy Twp	bF	L	(0)	0	0
Marquette Twp	bF	S	(0)	102	M-S
Middleboro Twp	bF	H	(M)	77	M
Mirimachi Twp	bF	S	(0)	88	M
Muldrew Twp	bF	S	(0)	214	S
Potier Twp	bF	M	(T)	159	M-S
Scotia Twp	bF	S	(0)	92	M-S
Selkirk Twp - Solace Lake	bF	M	(0)	69	M
Shelley Twp	bF	S	(0)	54	M
St. Louis Twp	bF	H	(M)	128	M-S
Stull Twp	bF	S	(0)	55	M
Togo Twp	bF	L	(T)	54	M
Tyrone Twp - Michaud Lake	bF	S	(0)	157	M-S
Waldie Twp	bF	S	(0)	189	S
Westbrook Twp	bF	M	(T)	137	M-S
Twp 107	bF	S	(0)	233	S
Twp 119	bF	S	(T)	146	M-S
Twp 125	bF	M	(0)	47	M

* S - Severe, M - moderate, L - light, T - trace, 0 - nil

(cont'd.)

Table 2 Northeastern Ontario - Spruce Budworm: Summary of defoliation estimates caused by spring frost and spruce budworm, and egg-mass counts in 1972, and infestation forecasts for 1973 (cont'd.)

Location	Host	Estimated total defoliation in 1972 due to frost + budworm (damage due to frost only in parentheses)		No. of egg-masses per 100 sq. ft of foliage 1972	Infestation forecasts for 1972
<u>Sudbury District</u> (cont'd.)					
Twp A	bF	S*	(T)*	150	M-S*
Twp B	bF	H	(0)	80	M
Twp J	bF	L	(0)	30	L-M
Twp M	bF	M	(0)	93	M-S
<u>Swastika District</u> (14 locations)					
Alma Twp	bF	S	(H)	25	L-M
Ben Nevis Twp	bF	H	(H)	9	L
Corkill Twp	bF	S	(M)	275	S
Gamble Twp	bF	M	(M)	80	M
James Twp	bF	S	(H)	46	M
Lamplugh Twp	bF	H	(H)	0	0
Marriott Twp	bF	H	(H)	0	0
Milner Twp	bF	S	(H)	228	S
Montrose Twp	bF	H	(M)	182	S
Mulligan Twp	bF	L	(0)	20	L
Pacaud Twp	bF	H	(H)	0	0
Truax	bF	M	(L)	69	M
Tyrell Twp	bF	H	(H)	48	M
Yarrow Twp	bF	S	(H)	88	M-S
<u>White River District</u> (27 locations)					
Amwri - Manitowadge Road	bF	M	(M)	0	0
Challener Twp	bF	L	(T)	9	L
Gertrude Twp	bF	T	(T)	0	0
Home Twp	bF	S	(H)	108	M-S

* S - Severe, M - moderate, L - light, T - trace, 0 - nil

(cont'd.)

Table 2 Northeastern Ontario - Spruce Budworm: Summary of defoliation estimates caused by spring frost and spruce budworm, and egg-mass counts in 1972, and infestation forecasts for 1973 (cont'd.)

Location	Host	Estimated total defoliation in 1972 due to frost + budworm (damage due to frost only in parentheses)	No. of egg masses per 100 sq. ft of foliage 1972	Infestation forecasts for 1972
<u>White River District</u> (cont'd.)				
Manitouwadge Road - Mile 1½	bF	L* (L)*	0	0*
Manitouwadge Road - Mile 28	bF	T (T)	0	0
Simpson Twp	bF	T (O)	17	L
Twp 25, Rge. 18 - Tikamaganda Lake	bF	S (H)	732	S
Twp 26, Rge. 25 - Manitowik Lake	bF	H (T)	198	M-S
Twp 27, Rge. 23	bF	S (L)	885	S
Twp 28, Rge. 15 - Crescent Lake ^a	bF	L (T)	0	0
Twp 28, Rge. 15 - Park Boundary	bF	L (L)	0	0
Twp 28, Rge. 18 - Callahan Lake	bF	S (H)	389	S
Twp 28, Rge. 20 - Sand Lake	bF	S (M)	1159	S
Twp 28, Rge. 24 - Hawk Jct	bF	S (M)	180	M-S
Twp 29, Rge. 16 - Agawa ^a	bF	M (L)	57	M
Twp 30, Rge. 19 - Bald-head R. Spray Plot ^a	bF	S (H)	542	S
Twp 30, Rge. 19 - Bald-head R. Spray Plot	wS	S (H)	606	S
Twp 30, Rge. 20 - Control Plot	bF	S (H)	294	S
Twp 30, Rge. 20 - Control Plot	wS	S (H)	862	S
Twp 30, Rge. 21 - Rabbit Blanket Provincial Park	bF	S (M)	148	M-S

* S - severe, M - moderate, L - light, T - trace, 0 - nil

^a Aerial sprayed, Zectran, 1972

(cont'd.)

Table 2 Northeastern Ontario - Spruce Budworm: Summary of defoliation estimates caused by spring frost and spruce budworm, and egg-mass counts in 1972, and infestation forecasts for 1973 (concl.)

Location	Host	Estimated total defoliation in 1972 due to frost + budworm (damage due to frost only in parentheses)	No. of egg masses per 100 sq. ft of foliage 1972	Infesta- tion forecasts for 1972
<u>White River District</u> (cont'd.)				
Twp 30, Rge. 24 - Black Trout Lake	bF	M* (0)*	72	M*
Twp 30, Rge. 26	bF	L (0)	12	L
Twp 32, Rge. 27 - Obatanga Provincial Park	bF	T (0)	0	0
Twp 66 - Hornepayne Road Mile 9	bF	L (T)	7	L
Twp 70 - Access Road	bF	L (T)	0	0
Twp 74 - Rouse Lake	bF	L (L)	0	0

S - severe, M - moderate, L - light, T - trace, 0 - nil

Table 3 Northwestern Ontario - Spruce Budworm: Summary of defoliation estimates and egg-mass counts in 1972, and infestation forecasts for 1973

Location	Host	Estimated per cent of defoliation 1972	No. of egg masses per 100 sq. ft of foliage 1972	Infesta- tion forecasts for 1973
<u>Fort Frances District</u>				
<u>(101 locations)</u>				
Agnes Lake - middle	bF	0	0	0*
Airport Road	bF	0	0	0
Allen Lake ^a	bF	20	4	L
Argo Lake	bF	35	92	M
Bayley Bay	bF	2	4	L
Bear Pass	bF	0	5	L
Beaverhouse Lake	bF	8	4	L
Bentpine Lake	bF	3	3	L
Bottle Lake	bF	33	26	L
Brent Lake ^a	bF	2	0	0
Buckingham Lake	bF	0	0	0
Cache Lake	bF	0	0	0
Cache Bay	bF	0	0	0
Cairn Lake	bF	3	8	L
Camel Lake	bF	0	0	0
Canadian Point	bF	0	0	0
Captain Tom Lake	bF	0	0	0
Carp Lake	bF	0	0	0
Clearwater Lake	bF	0	0	0
Conmee Lake ^a	bF	2	0	0
Darky Lake	bF	2	0	0
David Lake	bF	3	0	0
Delahey Lake	bF	0	0	0
Devine Creek	bF	3	10	L
Emerald Lake	bF	2	6	L
Eva Lake	bF	0	0	0
Eye Lake	bF	0	0	0
Factor Lake	bF	0	0	0
Ferguson Lake	bF	0	0	0
Findlayson Lake	bF	3	0	0

* S - severe, M - moderate, L - light, 0 - nil

(cont'd.)

^a Aerial sprayed, Zectran, 1972

Table 3 Northwestern Ontario - Spruce Budworm: Summary of defoliation estimates and egg-mass counts in 1972, and infestation forecasts for 1973 (cont'd.)

Location	Host	Estimated per cent of defoliation 1972	No. of egg masses per 100 sq. ft of foliage 1972	Infesta- tion forecasts for 1973
<u>Fort Frances District</u> (cont'd.)				
Flanders Road	bF	0	0	0*
Fred Lake	bF	0	5	L
French Lake	wS	2	5	L
French Lake	bF	0	4	L
Gardiner Bay	bF	9	22	L
Gehl Lake	bF	0	0	0
Hale Bay	bF	2	6	L
Heronshaw Lake	bF	0	3	L
Hillyer Creek	bF	0	0	0
Hydro Line	bF	0	0	0
Joyce Lake	bF	2	0	0
Kawa Bay				
- 115 ^a	bF	0	4	L
- 116 ^a	bF	7	0	0
- 117 ^a	bF	0	0	0
- 181 ^a	bF	51	110	M
- 182	bF	3	12	L
Kawene	bF	0	0	0
Kingpoint	bF	2	0	0
Lac La Croix - Campbell's	bF	3	7	L
Lac La Croix - I.R 25D	bF	3	0	0
Lilac Lake	bF	13	8	L
Little Eva Lake	bF	8	0	0
Little MacCaulay Lake	bF	0	5	L
Loon Lake	bF	28	22	L-M
Louisa Lake	bF	0	0	0
Maligne River - west of Tanner Lake	bF	80	119	M-S
Maligne River - Poohbah Creek	bF	38	48	L-M
Martin Bay	bF	43	122	M-S

* S - severe, M - moderate, L - light, 0 - nil

(cont'd.)

^a Aerial sprayed, Zectran, 1972

Table 3 Northwestern Ontario - Spruce Budworm: Summary of defoliation estimates and egg-mass counts in 1972, and infestation forecasts for 1973 (cont'd.)

Location	Host	Estimated per cent of defoliation 1972	No. of egg masses per 100 sq. ft of foliage 1972	Infesta- tion forecasts for 1973
<u>Fort Francis District</u> (cont'd.)				
Mather Twp	bF	0	7	L*
McAree Lake - Portage	bF	23	34	L-M
McAree Lake - Lookout	bF	4	0	0
McEwen Lake	bF	0	0	0
McKenzie Lake ^a				
- southwest end	bF	4	0	0
McKenzie Lake				
- Tower	bF	2	0	0
Melema Lake	bF	0	0	0
Mercutio Lake	bF	0	0	0
Minn Lake	bF	67	186	M-S
Namakin Lake - middle	bF	2	0	0
Namakin Lake - Moose Island	bF	2	0	0
North Bay - Basswood Lake	bF	7	7	L
Northland Gateway	bF	0	0	0
Nydia Lake	bF	0	0	0
Nym Lake	bF	0	0	0
Olifaunt Lake	bF	0	0	0
Orion Lake	bF	7	6	L
Oriana Lake	bF	0	4	L
Poohbah Lake - east end ^a	bF	17	21	L
Poohbah Lake - west end	bF	27	220	S
Poohbah Lake - south side ^a	bF	3	25	L
Potts Twp	bF	0	0	0
Quetico Lake - east bay	bF	6	16	L
Robinson Lake	bF	73	49	L-M
Sawbill Bay	bF	0	0	0
Seine River - Hwy 11	bF	2	6	L
Shade Lake	bF	0	8	L
Shoal Lake	bF	0	0	0

* S - severe, M - moderate, L - light, 0 - nil

(cont'd.)

^a Aerial sprayed, Zectran, 1972

Table 3 Northwestern Ontario - Spruce Budworm: Summary of defoliation estimates and egg-mass counts in 1972, and infestation forecasts for 1973 (cont'd.)

Location	Host	Estimated per cent of defoliation 1972	No. of egg masses per 100 sq. ft of foliage 1972	Infesta- tion forecasts for 1973
<u>Fort Francis District</u> (cont'd.)				
Stokes Bay	bF	0	0	0*
Sturgeon Lake - west end ^a	bF	11	16	L
Sturgeon Lake - southwest side	bF	10	7	L
Sturgeon Lake - east end	bF	0	0	0
Susanette Lake ^a	bF	2	7	L
Tanner Lake - dam	bF	67	79	M
Ted Lake - north of MacIntyre Lake	bF	2	3	L
Thompson Lake	bF	0	8	L
Tower - Hwy 11	bF	0	0	0
Trail Lake	bF	12	11	L
Tuck Lake	bF	8	3	L
Wickstead Lake	bF	0	9	L
William Lake - west	bF	0	0	0
William Lake - east	bF	2	9	L
Wolseley Lake	bF	0	0	0
<u>Thunder Bay District</u> (74 locations)				
Armstrong Road - Mile 7	bF	0	0	0
Arrow Lake	bF	0	0	0
Athelstane Lake	bF	0	0	0
Batwing Lake	bF	0	0	0
Bedivere Lake	bF	0	0	0
Bemar Lake	bF	0	0	0
Black Sturgeon Lake	bF	0	0	0
Blackwell Twp	bF	0	0	0
Burchell Lake	bF	0	0	0
Clovenhoof Lake	bF	0	0	0

* S - severe, M - moderate, L - light, 0 - nil

(cont'd.)

^a Aerial sprayed, Zectran, 1972

Table 3 Northwestern Ontario - Spruce Budworm: Summary of defoliation estimates and egg-mass counts in 1972, and infestation forecasts for 1973 (cont'd.)

Location	Host	Estimated per cent of defoliation 1972	No. of egg masses per 100 sq. ft of foliage 1972	Infesta- tion forecasts for 1973
<u>Thunder Bay District</u> (cont'd.)				
Crayfish Lake	bF	0	7	L*
Cushing Lake	bF	0	0	0
Devil's Elbow	bF	0	0	0
Drift Lake	bF	0	0	0
Fountain Lake	bF	0	0	0
Granite Lake - north side ^a	bF	10	3	L
Granite Lake - south side ^a	bF	0	0	0
Granite Lake - pocket	bF	3	3	L
Greenwater Lake - east	bF	0	0	0
Greenwater Lake - Shelter Island	bF	0	0	0
Greenwood Lake	bF	0	0	0
Gunflint Lake - east	bF	2	11	L
Gunflint Lake - west	bF	22	4	L
Gunflint Lake - central	bF	3	0	0
Hagey twp	bF	0	0	0
Haines Twp	bF	0	0	0
Heaven Lake Road	wS	0	6	L
Hwy 11 - west of Burchell Lake Road	bF	0	0	0
Hood Lake	bF	0	0	0
Hoof Lake	bF	0	0	0
Huronian Lake	bF	0	0	0
Icarus Lake	bF	0	0	0
Inwood Park	wS	0	0	0
Inwood Park	bF	2	0	0
Kashabowie Lake	bF	0	0	0
Lac des Mille Lacs				
- Baril Bay	bF	0	0	0
- Blind Bay	bF	0	0	0
- Bolton Bay	bF	0	0	0

* S - severe, M - moderate, L - light, 0 - nil

(cont'd.)

^a Aerial sprayed, Zectran, 1972

Table 3 Northwestern Ontario - Spruce Budworm: Summary of defoliation estimates and egg-mass counts in 1972, and infestation forecasts for 1973 (cont'd.)

Location	Host	Estimated per cent of defoliation 1972	No. of egg masses per 100 sq. ft of foliage 1972	Infesta- tion forecasts for 1973
<u>Thunder Bay District</u> (cont'd.)				
Lac des Mille Lacs				
- Pine Point	bF	0	0	0*
- Poplar Point	bF	0	0	0
- Portage Bay	bF	0	0	0
Lily Lake	bF	0	0	0
Marks Lake	bF	0	12	L
McGinnis Lake	bF	0	0	0
Melvin Lake	bF	0	10	L
Moss Lake	bF	0	0	0
Mountain Lake - west	bF	2	14	L
Mountain Lake - east	wS	13	4	L
Nelson Lake	bF	0	0	0
Northern Light Lake				
- Curran Bay	bF	0	5	L
- Gravel Pit ^a	bF	0	0	0
- Savage Bay	bF	0	0	0
- South Island ^a	bF	23	59	M
- Trafalgar Bay	bF	3	0	0
- Trout Bay	bF	5	0	0
- Weather Stn. (1970) ^a	bF	6	13	L
Pigeon River	bF	0	0	0
Plummes Lake	bF	0	0	0
Poshkokogan River	bF	0	0	0
Powell Lake	bF	0	0	0
Prelate Lake	bF	3	0	0
Purdon Twp	wS	0	0	0
Ross Lake	bF	0	8	L
Sandstone Lake	bF	9	6	L
Shebandowan Lake - upper	bF	0	0	0
Shekak Lake	bF	0	0	0
Sleigh Lake	bF	0	0	0

* S - severe, M - moderate, L - light, 0 - nil

(cont'd.)

^a Aerial sprayed, Zectran, 1972

Table 3 Northwestern Ontario - Spruce Budworm: Summary of defoliation estimates and egg-mass counts in 1972, and infestation forecasts for 1973 (concl.)

Location	Host	Estimated per cent of defoliation 1972	No. of egg masses per 100 sq. ft of foliage 1972	Infesta- tion forecasts for 1973
<u>Thunder Bay District</u> (cont'd.)				
Spruce River Road - Mile 26	bF	0	0	0*
Squeers Lake	bF	0	0	0
Sunbow Lake	bF	4	0	0
Swallow Lake	bF	0	0	0
Tilly Lake	bF	0	0	0
Titmarsh Lake	bF	0	0	0
Whitefish Lake	bF	0	0	0
<u>Geraldton District</u> (11 locations)				
Caramat Road - Mile 15	bF	3	0	0
Croll Twp	bF	0	0	0
Ledger Twp - Gas line	bF	3	0	0
Legault Twp	bF	3	0	0
Jct. of Industrial and Camp - 5 roads	bF	3	0	0
Marathon - ½ mile north of Hwy 17	bF	2	0	0
Martinet Lake	bF	2	0	0
Twp 82	bF	0	0	0
Twp 86 - Rainbow Falls Park	bF	2	0	0
Stevens - C.N.R. (Monitoring and pheromone plots)	bF	3	0	0
Summers Twp	bF	2	0	0

S - severe, M - moderate, L - light, 0 - nil

PART B: AERIAL SPRAYING OPERATIONS

INTRODUCTION

Aerial spraying operations covering some 46,500 acres were carried out against spruce budworm in 1972 by the Ontario Ministry of Natural Resources. The Canadian Forestry Service (Great Lakes Forest Research Centre) participated in planning the operations and was responsible for timing the spray applications and assessing the results. The following description of the operations and results is taken from a report by Howse, Sippell and Turner (1972).

Two major changes were introduced into provincial aerial spraying operations in 1972. The first involved the use of Zectran (in place of fenitrothion) at a rate of 1.2 oz of active ingredient in .15 U.S. gallons of spray mixture per acre. The diluent was Arotex. The second change involved the installation of four Micronair units on each of three Stearman and on one Agcat aircraft used on the operations by the contractor, General Airspray Ltd. of St. Thomas.

Aerial spraying of 2,000 acres was carried out by the Canadian Forestry Service in order to protect white spruce plantations and high-value research stands at the Petawawa Forest Experiment Station. This operation and the results have been reported by Armstrong (1972) and Howse and Sippell (1972) and the following information is abstracted from these reports.

SOUTHEASTERN ONTARIO OPERATIONS

Background

Spraying, for the purpose of protecting white spruce research plantations and high-value natural stands, had been carried out at Petawawa Forest Experiment Station by Great Lakes Forest Research Centre with technical advice provided by Chemical Control Research Institute in 1970 and 1971. The results demonstrated clearly a previously unrecognized problem, that of obtaining adequate protection of white spruce using the conventional equipment and dosage that have proven successful in Ontario and elsewhere against the spruce budworm on balsam fir. It was proposed jointly that in 1972 the Chemical Control Research Institute attempt to resolve this problem of protecting spruce by applying more highly developed application techniques (Micronairs) to obtain finer spray breakup. The Great Lakes Forest Research Centre was responsible for timing the spray applications and assessing the results.

Pre-spray Larval Surveys and Insect Development

Budworm emergence started on May 11. Pre- and post-emergence counts confirmed the presence of high larval populations throughout the station. Spraying started on the morning of May 26 when the budworm were primarily fourth instar on white spruce and 40% third instar and 60% fourth instar on balsam fir.

Pre-spray larval counts were made from branch samples collected from the midcrowns of trees throughout the various white spruce plantations and from balsam fir in the natural stands. Final post-spray counts were made during the pupal stage in the same locations as the pre-spray counts and the degree of defoliation of each sample branch was estimated.

Results

In general, the data showed that good results were obtained for the sprayed balsam fir in natural stands. The overall population reduction was at least 65% (attributable to spraying) and the average degree of defoliation was limited to 20% compared with 70% in the controls. In the white spruce plantations, an overall population reduction of about 50% was achieved with an average degree of defoliation of 50% compared with 90% in the controls. These results are from 9 oz fenitrothion per acre applied in three applications of 3 oz each, using a Stearman equipped with Micronairs.

An aerial survey of the station made on June 27 by experienced observers revealed that many of the treated white spruce plantations showed light-to-moderate defoliation with streaks and/or patches of heavy-to-severe defoliation. By comparison the natural stands with a high balsam fir content that were sprayed appeared green, or at most suffered light defoliation. White spruce trees within these natural areas, particularly along roads, appeared moderately to heavily defoliated.

Conclusions

Although these results represent an improvement over 1970 and 1971, it remains doubtful that the level of protection achieved in the white spruce plantations is sufficient to prevent either leader and branch tip mortality or increment loss.

Proposed Aerial Spraying Operations for 1973

Egg-mass counts from throughout the station forecast high levels of spruce budworm larval populations in 1973. Proposals for protecting

up to 10,000 acres on the station and for finding ways of improving the degree of protection of the white spruce plantations are being formulated by Chemical Control Research Institute and Great Lakes Forest Research Centre, in consultation with Petawawa Forest Experiment Station.

Elsewhere in southeastern Ontario, high egg-mass counts and unusually severe defoliation over the past 2 years require that spraying be considered in parts of Algonquin Provincial Park. The question of spraying in this area raises many issues, but if plans do proceed, spraying is not likely to exceed 3,000-4,000 acres.

NORTHEASTERN ONTARIO OPERATIONS

1972 Operations

A total of 9,600 acres was sprayed using an Agcat fitted with Micronairs. Applications were timed to start at the peak of the fourth instar. The sprayed acreage was located in the Lake Superior Provincial Park (3,600 acres) of the White River District and Missinaibi Provincial Park (6,000 acres) of the Chapleau District. The purpose of spraying in northeastern Ontario was again to reduce the intensity of damage caused by budworm feeding on balsam fir and white spruce within selected high-value recreational areas. It was originally planned to spray an additional 2,500 acres in the Shoals Provincial Park but severe damage to host trees caused by a snowstorm in this area during late May resulted in the cancellation of this part of the operation.

Results

An assessment was conducted in Lake Superior Provincial Park to obtain detailed information about the effects on budworm of 1.2 oz of Zectran per acre when applied to balsam fir and white spruce. Unfortunately, the occurrence of frost after the spraying complicated what would normally have been a straightforward assessment of the operation. However, if it is assumed that the effects of frost were similar in the sprayed and unsprayed areas, then the application rate of 1.2 oz of Zectran in Arotex in .15 gal (U.S.) of spray per acre caused a population reduction of 80% on balsam fir and 35% on white spruce. Damage to current foliage due to both frost and budworm was very severe in both sprayed and unsprayed areas for both host species. However, there was little backfeeding present in the sprayed area compared with heavy backfeeding in the unsprayed area.

Proposed Aerial Spraying Operations for 1973

If the policy to minimize defoliation and to prevent mortality in the highly susceptible and highly valued areas of provincial parks

in northeastern Ontario is to be maintained, spraying should be considered in the following parks: Missinaibi, Shoals, Lake Superior, Ivanhoe, Wakami and Five-Mile.

NORTHWESTERN ONTARIO OPERATIONS

1972 Operations

The largest operation in Ontario in 1972 was in northwestern Ontario with spray headquarters and the airstrip located at Atikokan.

The purpose of this operation was to continue the program of abatement spraying begun in 1971 to prevent the spread of budworm into highly susceptible and valuable forests in the vicinity of Burchell Lake and Lac des Mille Lacs. Most of the acreage sprayed in 1972 was located in Quetico Provincial Park (Fig. 1) where 9,000 acres lying south of Kawa Bay on Kawnipi Lake and another 26,000 acres lying between Allan Lake and Poohbah Lake in central Quetico were treated in June using three Stearman spray planes. The spraying started at the peak of the fourth instar. It had originally been planned to spray a total of some 70,000 acres in Quetico but poor weather conditions throughout June which prevented spraying forced the termination of this operation when a large proportion of the budworm reached the pupal stage. An additional 1,900 acres were sprayed at Northern Light Lake and Granite Lake in the southwestern part of the Thunder Bay District.

Results

Generally speaking, the results appear to be good. A few small pockets of defoliation were mapped within the sprayed areas but pupal counts and egg-mass counts show that in the sprayed areas budworm populations are much reduced from 1971.

Proposed Aerial Spraying Operations for 1973

The province is expected to continue its present policy of abatement and to spray as much of the main infestation in Quetico Park as resources will permit. It is also anticipated that chronic infestations at Northern Light Lake and Granite Lake will be checked for budworm abundance in the spring of 1973 after emergence has occurred, and that these areas will be sprayed again if necessary. The area south of Kawa Bay in Quetico Park that was sprayed in 1972 will also be checked in the spring of 1973 and sprayed if necessary.

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