

TECHNICAL NOTE

NO.
18

A SYNOPSIS OF RESULTS OF BUDWORM SPRAYING IN NEW BRUNSWICK IN 1980 AND A FORECAST OF INFESTATIONS AND HAZARD FOR 1981

This report was prepared to provide an overview of the results of spraying and spruce budworm surveys conducted in 1980.

Factors Affecting the Conduct of Spraying and the Results

The predominant factor affecting the conduct of the spray program was weather. For the past two years very unusual weather conditions have prevailed prior to and during the spray operations. In 1980, the month of April was extremely warm and caused the rapid development of trees and early emergence of spruce budworm larvae. However this trend changed and the months of May and June were decidedly cool. This had the effect of retarding spruce budworm larval development but enhancing the growth of fir and spruce shoots thus exposing spruce budworm larvae and increasing the effect of the sprays. Unlike 1979, the phenological zones in New Brunswick remained intact and permitted for the orderly conduct of the spray program and the application of two doses of insecticide to most of the area (see Fig. 1).

Area Sprayed

Spray operations conducted by Forest Protection Limited in 1980 covered some 1 614 000 hectares. Two insecticides and 3 types of aircraft were used in the

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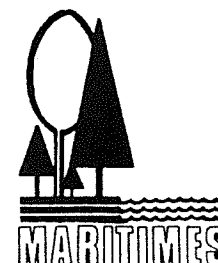
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operations (Table 1) with the largest area (1317 ha) being treated with Fenitrothion from TBM (Grumman Avenger) aircraft. Spray operations commenced on 24 May and ended on 20 June 1980.

Results of Spraying

a) In general, the results of the 1980 spray program can be rated as good to excellent, with some minor exceptions. The percent of foliage saved was higher than in the past two years. Examination of the maps of spraying and defoliation shows just how effective this year's program was. Of the 673 000 hectares of moderate to severe defoliation recorded in N.B. only 93 000 were inside the treatment area (Table 2). On closer examination most of this defoliation inside the spray area coincided with areas that F.P.L. was required to shut off for while spraying.

b) Both insecticides, Matacil and Fenitrothion, gave similar results.

c) The degree of protection was similar on both balsam fir and spruce.

d) There was no significant difference between areas treated with either TBM or Thrush Commander aircraft.

e) The results of spraying in block 24, which was initially removed from treatment then placed back in the operation, were variable and reflect the single treatment with Bt over part of the area and Fenitrothion over part of the area as well as the late timing of the treatment.

Results of Defoliation Surveys

A cooperative aerial survey to map the nature and extent of spruce budworm defoliation was conducted (Fig. 2) and involved personnel of Forest Protection Ltd., Dept. Natural Resources and the Maritimes Forest Research Centre. Some 849 000 hectares of defoliation were identified in N.B. (see map) and of this some 673 000 hectares were classified in the moderate to severe categories. Some 93 000 hectares of moderate to severe defoliation were identified inside the boundary of the spray area. The amount of defoliation recorded in 1980 is considerably less than that recorded in 1979 and reflects the forecasts of a year ago and the results of the spray operation.

Results of Surveys for Egg-mass Infestations and Hazard

As the result of a meeting between representatives of D.N.R., F.P.L. and the M.F.R.C. a major re-location of egg-mass sample points took place. In the past some 45% of the sample points were located in

the "one mile set-back zone". Most of these were re-located inside the zone of protection and this has hopefully enhanced our accuracy in predicting infestations and hazard in the protection zone. A map was prepared showing areas in moderate to high hazard and moderate to high egg-mass infestation inside the zone of protection (Fig. 3). In all some 1.5 million hectares inside the protection zone are in a moderate to high hazard category and an additional 1.1 million hectares have low hazard but moderate to high egg-mass infestations. Examination of the map shows that the areas of hazard and egg infestation are concentrated in the northern half and west-central regions of the Province. Essentially, there has been an increase in the extent and intensity of egg-mass infestations in the western and northern regions of the Province and is in keeping with similar increases of infestations in adjacent areas of Quebec. Most of the increases in infestations are located in forest areas not treated in 1980 and reflect the general high survival of budworm in non-treated areas.

Damage Appraisal Survey

An aerial survey to determine the extent of severely damaged timber in New Brunswick was conducted by F.P.L. at the request of D.N.R. Analysis of data generated by this survey is currently underway and should be available soon.

Experimental Spraying

Operational Trials With Bt: An operational-experimental program with Bt was conducted by F.P.L. to assess the feasibility of using Bt in preventing spruce budworm damage on woodlots. Over 150 of the woodlots were examined for pre- and post spray populations of budworm and resultant damage. Analysis of the data shows no clear difference in performance between the three spray systems used (fixed wing with boom and nozzle, fixed wing aircraft with Micronair nozzles, and helicopter with boom and nozzle). Further, only about one-third of the blocks treated received visibly adequate protection, one-third received marginal protection and one-third received no visible protection at all. This fits into the general result pattern of Bt and is of no surprise to the author.

Trials With Low Drift Materials and Fenitrothion: A series of 40.5 hectare blocks was treated each with one application of Fenitrothion. One-half were treated with Fenitrothion emulsion alone and one-half with Fenitrothion emulsion and an anti-drift agent. Two spray systems were used in each set: boom and nozzle equipment and Micronair spray nozzles. The results show no real difference between any of the treatments and in fact all treatments offered only marginal protection to the forested areas sprayed. This is probably a direct result of the small size of the areas treated and the low volume of spray used per unit of land.

- E.G. Kettela
Technical and Information Services

November, 1980

Table 1. Operational Spray Area, 1980

Treatment	Hectares	Acres
	thousands	thousands
<u>One Application</u>		
(A) 210 g/Ha Fenitrothion - TBM	8	20
<u>Two Applications</u>		
(B) 1. 210 g/Ha Fenitrothion - TBM	1317	3255
2. 210 g/Ha Fenitrothion - TBM		
(C) 1. 210 g/Ha Fenitrothion - Thrush*	36	89
2. 210 g/Ha Fenitrothion - Thrush		
(D) 1. 70 g/Ha Matacil - DC-6	123	303
2. 70 g/Ha Matacil - TBM		
(E) 1. 70 g/Ha Matacil - DC-6	127	315
2. 70 g/Ha Matacil - DC-6		
(F) 1. 210 g/Ha Fenitrothion - TBM	3	8
2. 70 g/Ha Matacil - TBM		
Total	1614	3990

*Thrush areas were sprayed by Forest Patrol Limited under contract to Forest Protection Limited.

Table 2. Summary of spruce budworm defoliation in New Brunswick from 1978 to 1980 (hectares x 1000).

Defoliation category	Year			
	1978	1979	1980	
			Total province	In sprayed area
light	141	105	176	46
moderate	219	235	226	49
severe	450	1085	447	44
total moderate and severe	669	1320	673	93
total all categories	810	1425	849	139

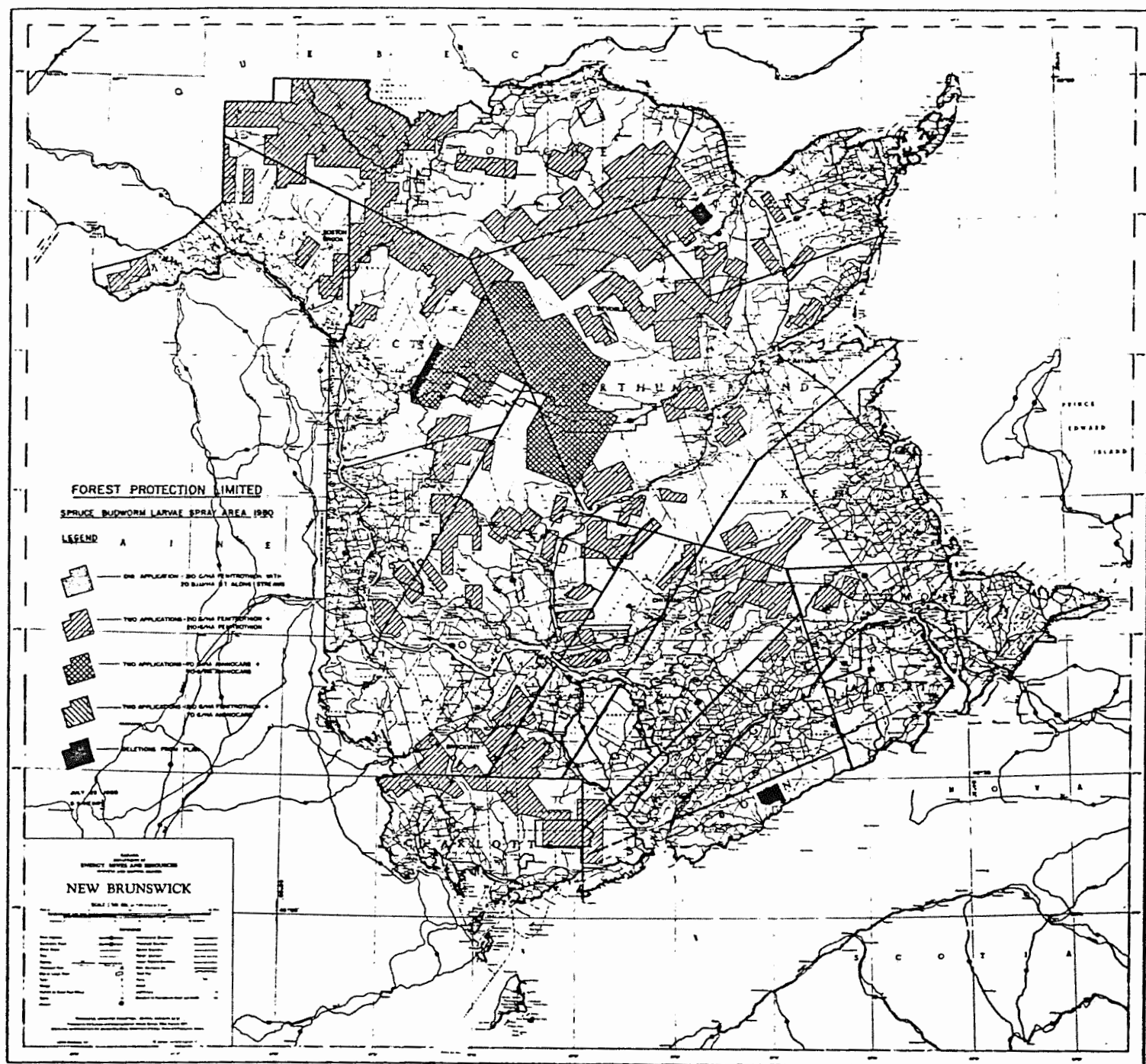


Figure 1. Map showing areas in New Brunswick sprayed for spruce budworm larvae in 1980. (Courtesy of Forest Protection Limited, Fredericton, N.B.)

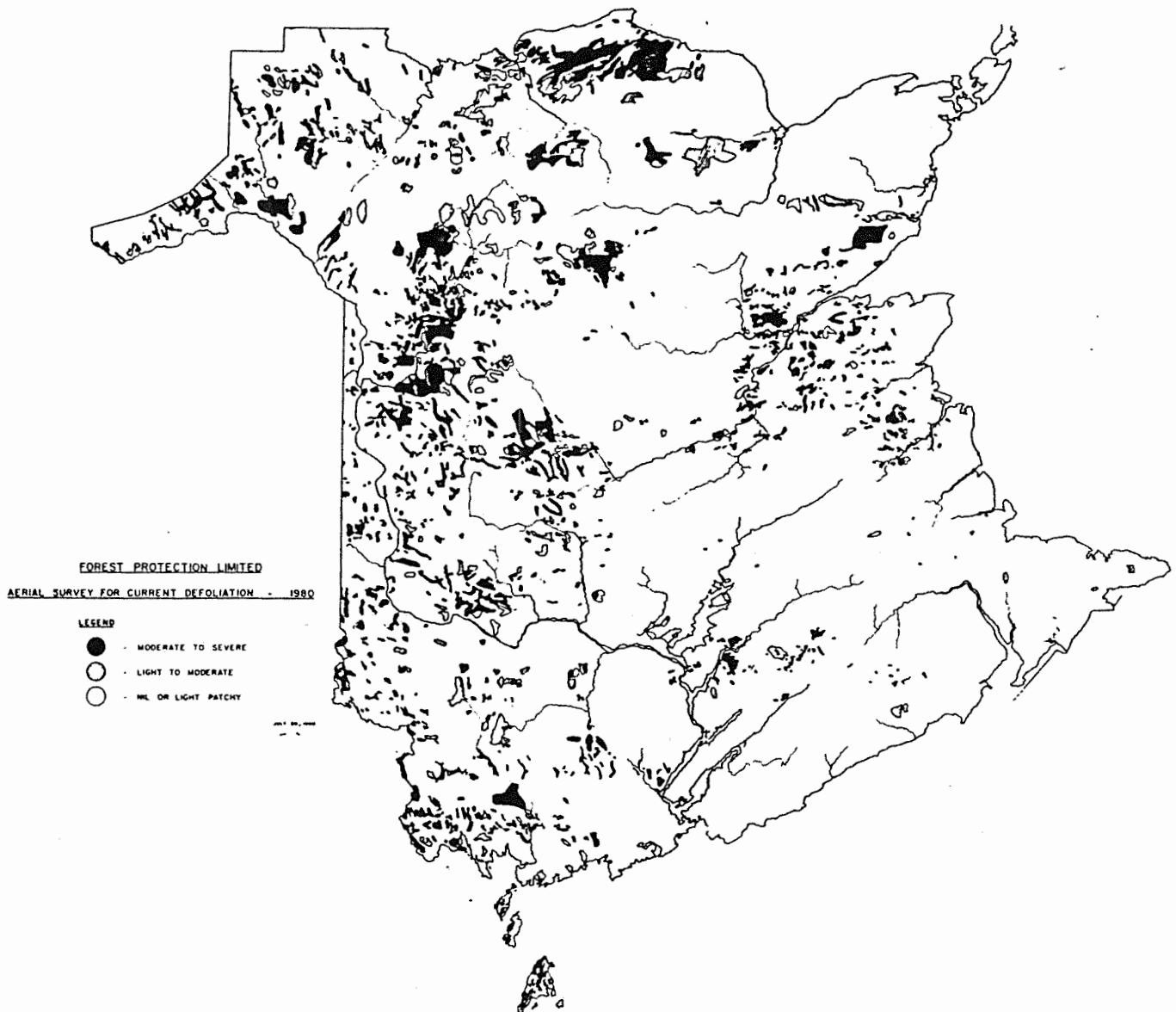


Figure 2. Aerial survey of New Brunswick for current defoliation by spruce budworm in 1980. (Courtesy of Forest Protection Ltd., Fredericton, N.B.)

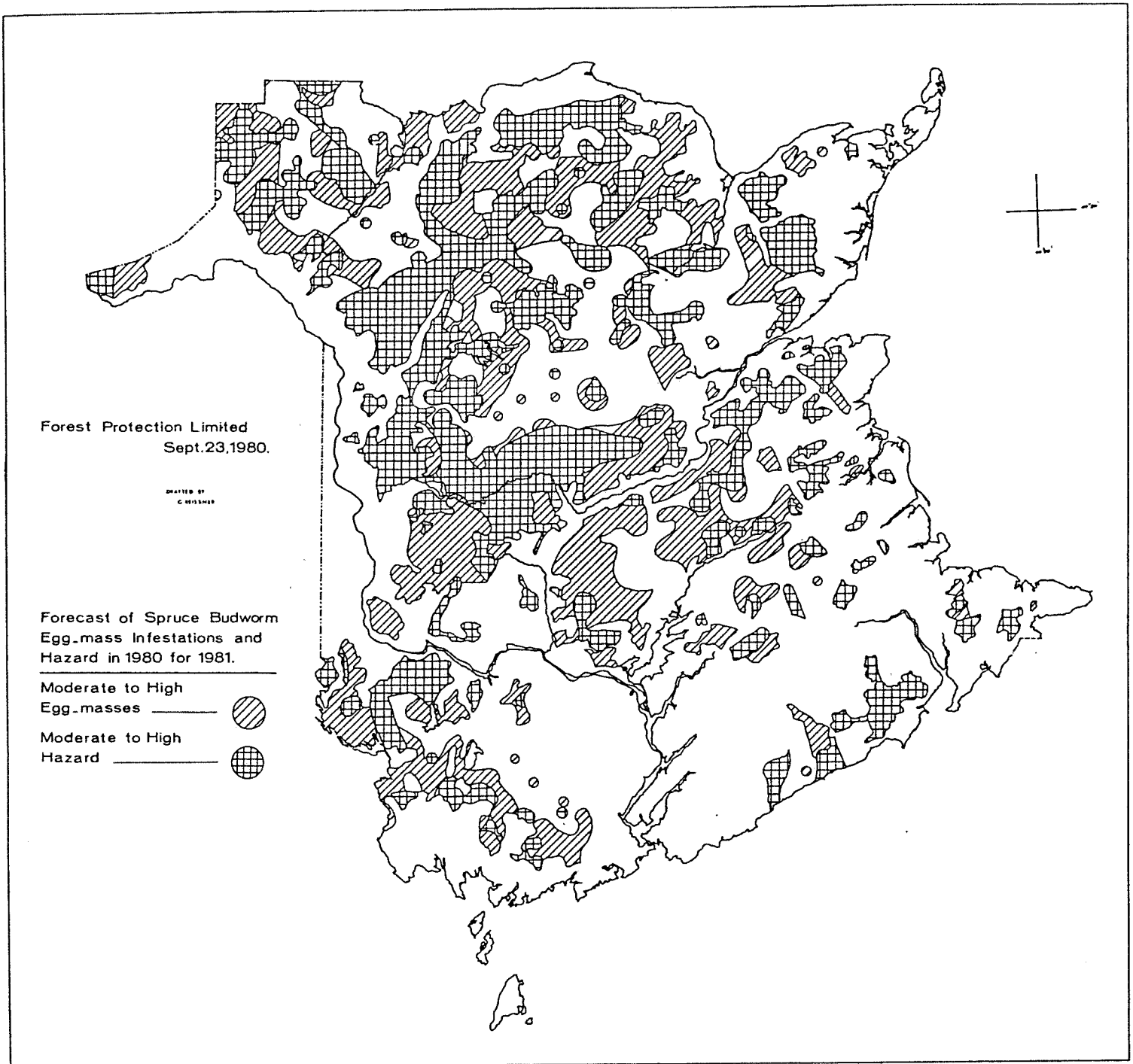


Figure 3. Map showing forecast of egg-mass infestations and hazard in 1980 for 1981. (Courtesy of Forest Protection Ltd., Fredericton, N.B.)