

FOREST INSECTS AND TREE DISEASES IN NATIONAL PARKS IN THE
MARITIME PROVINCES, 1971

by

E. G. Kettela and G. V. Moran

MARITIMES FOREST RESEARCH CENTRE
FREDERICTON, NEW BRUNSWICK

INFORMATION REPORT M-X-30

CANADIAN FORESTRY SERVICE
Department of the Environment

May 1972

CONTENTS

INTRODUCTION	1
CAPE BRETON HIGHLANDS NATIONAL PARK	2
FUNDY NATIONAL PARK	3
KEJIMKUJIK NATIONAL PARK	9
PRINCE EDWARD ISLAND NATIONAL PARK	12
APPENDIX: Results of moth trapping at Fundy and Kejimkujik National Parks	13

INTRODUCTION

The Forest Insect and Disease Survey of the Canadian Forestry Service has long been concerned with monitoring pest populations and with locating and defining the distribution of insect and disease outbreaks in forested areas. In recent years, increasing emphasis has been given to pest problems associated with parks and recreational areas. There is every reason to believe that this trend will continue and intensify since stress factors and disturbances associated with opening up the forest, mechanical damage caused by construction, soil compaction, and intensive use of facilities by large numbers of people are known to predispose forests to varying kinds of pest problems and damage.

This report includes the results of observations, sampling, and special surveys in 1971 in Cape Breton Highlands National Park, Fundy National Park, Kejimikujik National Park, and Prince Edward Island National Park. Within each park, the pests are treated in alphabetical order.

In 1971, the spruce budworm continued to be the most important pest in National Parks in the Maritimes and for Fundy Park a detailed account is given of its current status, control program, and future prospects. Black-light moth traps were operated by parks' staff in Fundy and Kejimikujik Parks during June, July, and August, and the numbers of the more common forest insects taken are listed in an appendix to this report.

The cooperation and assistance of Parks' staffs are much appreciated.

CAPE BRETON HIGHLANDS NATIONAL PARK

Anthracnose of Maple, *Kabatiella apocrypta* and Anthracnose of Ash, *Discula quercina*. Severe leaf browning and defoliation of sugar maple and of white ash occurred over a 2-acre area of Rigwash Valley, Inverness County.

Birch Casebearer, *Coleophora fuscedinella*. Very low population levels occurred on white birch throughout the Park and no noticeable browning of foliage was observed.

Cherry Blight. Browning and subsequent shrivelling of pin cherry foliage was light between Ingonish and Neil's Harbour, Victoria County.

Condition of Balsam Fir at Black Brook Camp Ground. Most of the older balsam fir trees in this area have been severely damaged by chronic balsam woolly aphid attacks; dead tops and dead and dying branches are common. Many of these trees have few living branches.

Eastern Hemlock Looper, *Lambdina fiscellaria fiscellaria*. Larvae were found in low numbers on balsam fir trees at French Mountain and North Mountain.

Larch Sawfly, *Pristiphora erichsonii*. Light defoliation of tamarack occurred for the first time in recent years within the Park, between French Mountain and MacKenzie Mountain, Inverness County.

Spruce Budworm, *Choristoneura fumiferana*. A few larvae were taken during regular sampling early in the season at Ingonish, North Mountain, and French Mountain. Later in the season, moths were common in the French Mountain area but only a few were observed at North Mountain. Although egg-mass sampling carried out in August in the French Mountain and McGregor Brook areas produced negative results, counts of overwintering larvae indicated that budworms were present. The counts of budworm obtained in the fall of 1971 were lower than in 1970 (1.7 per branch versus 4.3 per branch) but all six points sampled in 1971 were positive while only three were positive in 1970. This suggests only scattered trace to light defoliation in the Park in 1972 and this does not pose any immediate threat to trees.

FUNDY NATIONAL PARK

Balsam Twig Aphid, *Mindarus abietinus*. This insect, which feeds during the early half of the growing season causing the ends of the shoots to twist and the needles to curl, rarely causes noticeable permanent damage to the new shoots of balsam fir. Infestations were moderate at Lakeview and near the entrance to Chignecto camp grounds and light near Bennett Lake and at the junction of the Point Wolfe and Herring Cove roads.

Birch Leaf Miners. The foliage of birch trees, especially wire birch, was lightly browned at several points within the Park as a result of miners feeding between the surfaces of the leaves. Population levels of birch leaf miners increased noticeably in southern New Brunswick in 1971 over 1970 and further increases are expected in 1972.

Cherry Blight. Leaf browning was light on a few pin cherry trees near the trailer park and at Lakeview and Bennett Lake.

Gypsy Moth, *Porthetria dispar*. This insect, an introduced pest from Europe, has devastated many forest stands in the eastern United States. In recent years, this pest has spread into eastern Maine. One of its primary modes of spread is through transport of cocoons and egg masses by cars, trucks, and travel trailers. With the increase in tourist travel to the Maritimes from the U.S.A., the chances of this pest spreading into the Maritimes have increased. In baited traps, distributed mainly in southern New Brunswick and in western Nova Scotia, 11 male adults were taken in 1971, 1 in Fundy Park in the campground near Park headquarters. As a result, Fundy Park was selected for an egg-mass survey in the late autumn, but none were found. Because of the potential of this insect, the F.I.D.S., in collaboration with the Plant Protection Division of the Canada Department of Agriculture, intends to conduct more detailed surveys for this pest in 1972 in Fundy Park and elsewhere.

Needle Rust of Balsam Fir, *Pucciniastrum goeppertianum*. Infections on the new needles of balsam fir were of light intensity at scattered points on the Shepody and Fortyfive roads.

Spruce Budworm, *Choristoneura fumiferana*. Based on surveys of egg masses and hazard to trees conducted in 1970, the National and Historic Parks Branch arranged with Forest Protection Limited of New Brunswick to have the Park included in the 1971 aerial spraying operation.

Surveys in 1970 indicated a high egg-mass population and high to extreme hazard to trees. A survey of third-instar larvae in the spring of 1971 showed a large population. Subsequently, the Park was sprayed with two applications of fenitrothion, an organo-phosphate insecticide. The first application was at a dosage of 3 ounces of fenitrothion per acre in 0.15 U.S. gal of formulation and the second application was at 2 ounces per acre in 0.15 U.S. gal of formulation. The second application of poison was recommended in mid-June when further information on tree conditions became available. The spray blocks and dates of spraying are listed below but more detailed information on the spray program can be obtained from Forest Protection Limited.

First application		Second application	
Spray block	Date sprayed	Spray block	Date sprayed
562	7 June AM	940	25 June AM
563	7 June AM	941	25 June AM
564	11 June AM	942	25 June AM
565	11 June AM	943	25 June AM
566	11 June AM		
567	13 June AM		
568	11 June AM		

Before spraying, 20 plots were established in spray block 566. Each plot consisted of two balsam fir and two red spruce trees. On 7 June, one 18-inch branch tip was taken from each tree. The numbers of budworms were tallied and the average population was computed for the spray block. These trees were resampled on 19 July for surviving pupae. The sampling regime was two 18-inch branch tips from each balsam fir tree and four 18-inch branch tips from each spruce tree. Pupae and sound pupal cases were tallied and defoliation on balsam fir was recorded. Percentage reduction in survival due to spraying was calculated from pre- and post-spray counts of budworms and the relationship of the counts to data collected from 25 unsprayed plots near Petitcodiac. The survival

on balsam fir and red spruce was reduced by 77% and 47% respectively. Neither figure is impressive, however, due to the low survival rate as determined from the unsprayed areas.

Tree species	Plots	Pre-spray		Post-spray		Survival	
		18-inch branch tips	Mean larvae per tip	18-inch branch tips	Mean pupae per tip	Ratio pupae: larvae	% reduction ^a
Balsam fir	20	40	21.6	80	1.3	0.06	77
Red spruce	20	40	25.7	160	2.1	.08	47

a. Expected survival from unsprayed areas: Balsam fir, 0.26; red spruce, 0.16. Percentage reduction in survival from (expected - observed) x 100/ expected.

Protection to the foliage crop, however, was generally excellent. In the monitored spray block, defoliation was severe on one plot, moderate on three plots, and only a trace on 16 plots. Defoliation and areas of gray or dead trees were mapped during an aerial survey (Fig. 1). The gray areas portray the end results of budworm feeding in 1968 and 1969 and generally over 50% of the balsam fir trees are dead. Two small patches of severe defoliation were detected; one just west of Bennett Lake and one in the Fortyfive River Valley (Fig. 1). Elsewhere defoliation was trace, light, or moderate and generally the condition of the living softwood forest improved over 1970, primarily as a result of spraying.

Spruce Budworm Forecast for 1972. In August 1971, budworm egg-mass samples and estimates of current defoliation, previous defoliation, and tree condition were taken at eight locations in and near Fundy National Park (Fig. 2). Hazard to trees was determined from these data. Egg-mass populations in 1971 ranged from 320 to 2,572 egg masses per 100 ft² which is a large increase over the average count of 554 recorded in 1970. Consequently, in the spring of 1972, there should be a high larval population and defoliation is expected to be severe throughout the Park. This

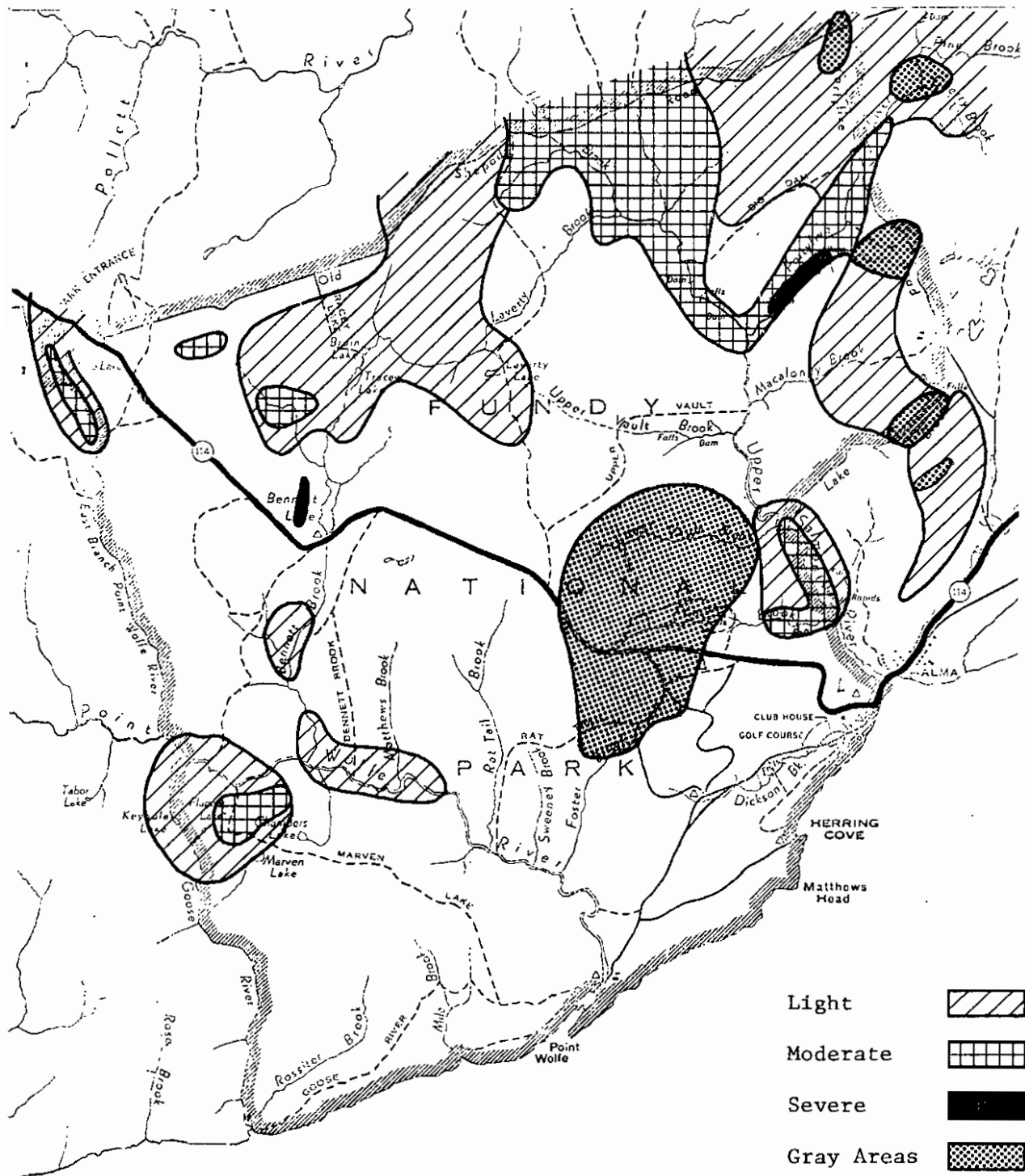


Figure 1. Fundy National Park showing the results of aerial survey for spruce budworm damage and areas where more than 50% of balsam fir trees have been killed (gray areas), 1971

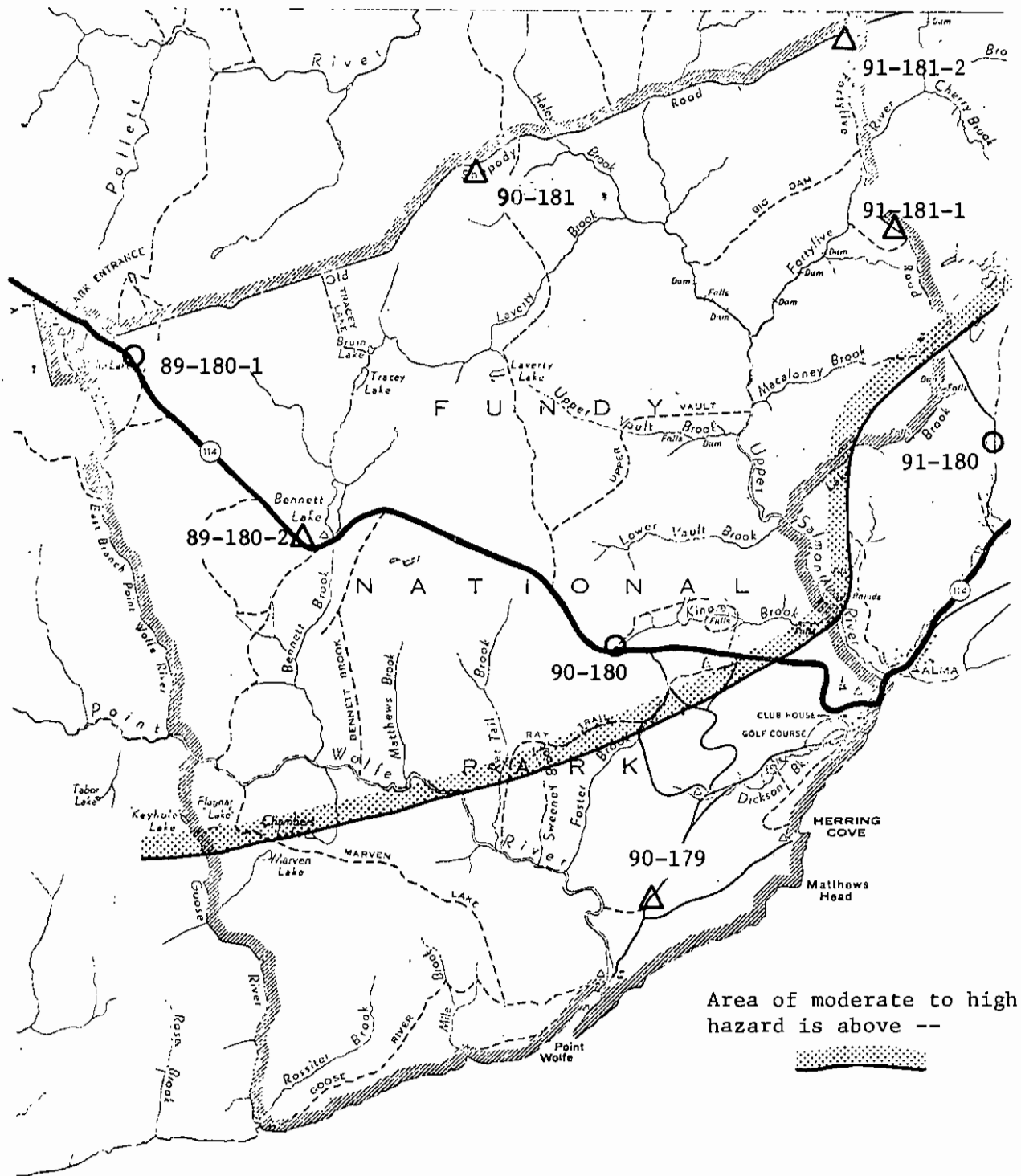


Figure 2. Fundy National Park showing area of moderate to high hazard from budworm attack in 1972 and locations in 1971 of sample plots for egg masses alone (Δ) and for egg masses and overwintering larvae (○).

is supported by samples at plots 89-180-1, 90-180 and 91-180 where counts of overwintering larvae per branch are high to extreme (Table 1).

Table 1. Spruce budworm egg-mass and overwintering larval counts in Fundy National Park, 1971, and hazard, 1972

Grid	Egg masses per 100 ft ² of foliage ^a			Overwintering larvae per branch, 1971 ^b	Hazard, 1972
	1969	1970	1971		
90-179	857	386	900	- ^c	low
89-180-1	548	273	1267	93	high
89-180-2	3528	454	491	-	moderate
90-180	682	1132	450	48	high
91-180	1061	235	320	102	moderate
90-181	783	718	2572	-	high
91-181-1	1500	559	869	-	high
91-181-2	1423	678	2108	-	moderate
Average	1289	554	1122	81	mod-high

a. Egg-masses/100 ft² of fir foliage

0 - 99	-	low
100 - 239	-	medium
240 - 399	-	high
400+	-	extreme

Infestation

b. Overwintering larvae per branch - 22 - 49 - high
50+ - extreme

c. No sample taken.

Willow Blight, *Venturia saliciperda* and *Physalospora miyabeana*. Damage to shoots and leaves of willows was mostly light on a few shade trees near the Park Headquarters.

KEJIMKUJIK NATIONAL PARK

A detailed ground survey for insects and diseases was conducted on 29 and 30 July when 14 locations in the Park were visited. Also, overflights were made during regular aerial surveys in western Nova Scotia.

Alder Flea Beetle, *Altica ambiens alni*. Alder bushes were severely defoliated by this beetle about 2 miles from the Park entrance and near the fish hatchery.

Balsam Woolly Aphid, *Adelges piceae*. This was the most destructive insect within the Park area at the time of the survey. This insect was common in two general areas; the entrance road as far as Jacques Landing, and in the George Lake - Puzzle Lake area. On the entrance road beginning about mile 1.3, the few mature balsam fir trees present were lightly 'gouted' from twig attacks; at about mile 2.2, infestations were moderate on branches, killing some as well as tree tops, and 'gout' was severe; and at mile 2.5, attacks were severe on branches over about 1 acre, causing dead limbs and trees. Near Jacques Landing, balsam fir trees along the roadsides were dying from the effects of severe attacks on branches. In the second area, just south of George Lake, most balsam fir trees were dead or dying from the combined effects of aphid attacks on the branches and twigs and of branch cankers. Near the head of North Cranberry Lake, 'gouted' twigs and tops were of light intensity.

Beech Bark Disease, *Cryptococcus fagi* and *Nectria coccinea* var. *faginata*. The stems of beech trees were severely cankered and the scale insect was numerous near Jacques Landing. Near the fish hatchery and at the end of North Cranberry Lake Road, past attacks by this disease have left beech trees severely cankered but current attacks by the scale were light.

Birch Leaf Miner, *Fenusa pusilla*. Browning of wire birch foliage was generally light except at a point 1.5 miles south of the hatchery where it was moderate.

Eastern Dwarf Mistletoe, *Arceuthobium pusillum*. This parasitic plant was observed on black spruce at scattered locations and witches' brooms, a symptom of this disease, were most numerous in swampy areas along the road from near Loon Lake to the road's end near Pebbleloggitch Lake.

Frost Damage. The new foliage of balsam fir, black spruce, and red oak in scattered patches of reproduction was killed at four widely separated locations. Damage was most common on balsam fir on the Big Dam Lake road where it was severe on scattered trees.

Larch Casebearer, *Coleophora laricella*. Defoliation by this insect was negligible.

Larch Sawfly, *Pristiphora erichsonii*. Defoliation of tamarack by this sawfly was observed at several locations but it did not exceed very light. Larch sawfly is common throughout much of western Nova Scotia.

Miscellaneous Diseases. Light or very light incidence of or damage from the following diseases was observed within the Park: needle casts on eastern hemlock, needle rust on black spruce, fungal mats and bleeding cankers on eastern white pine, dieback in mature red oaks, and sapsucker and porcupine damage.

Miscellaneous Insects. Other insects found in very low numbers included: balsam twig aphid, leaf tiers on oak and beech, aphids on the stems of eastern white pine, larch twig borer, fall webworm, gall aphids on spruce, spittle bugs, spruce bud midge, and mites on maple leaves.

Poplar Leaf and Twig Blight, *Venturia macularis*. The incidence of this blight was very light on largetooth aspen near the end of Big Dam Lake road and light on trembling aspen at the north end of North Cranberry Lake.

Spruce Budworm, *Choristoneura fumiferana*. Traces of spruce budworm defoliation occurred within the Park in 1971. The results of egg-mass sampling and counts of overwintering larvae in western Nova Scotia showed that spruce budworm larvae will be more common in 1972 than in 1971 in areas near the Park, and therefore probably within it. Additional evidence of this comes from the capture in 1971 of 1,549 spruce budworm moths at the light trap compared with 278 in 1970.

White Pine Blister Rust, *Cronartium ribicola*. Symptoms of this disease were found on scattered trees about 1.5 miles south of the fish hatchery and on Big Dam Lake road. One tree at each location was killed.

White-pine Weevil, *Pissodes strobi*. Dead leaders on eastern white pine reproduction, typical of damage by this insect, were found at several locations. Infestations were light about 2 miles from the Park entrance, near Jacques Landing, and on the Big Dam Lake road. Dead leaders were

common on eastern white pine along the Pebbleloggitch Lake road, and a few small red spruce trees were infested near the head of North Cranberry Lake.

PRINCE EDWARD ISLAND NATIONAL PARK

Birch Leaf Miner, *Fenusa pusilla*. Leaf miner attacks varied from moderate to severe on wire birch and white birch trees along roadsides within the Park area.

Cherry Blight. Leaf browning was light on scattered pin cherry trees.
Horse-chestnut Leaf Blotch, *Guignardia aesculi*. The leaves of two horse-chestnut shade trees at Cavendish were lightly browned, as they were in 1970.

Hypoxyton Canker of Poplar, *Hypoxyton mammatum*. Symptoms of this disease were common on trembling aspen trees within the camp grounds on Rustico Island where 8 of 30 trees examined were infected but living and 5 were dead. The rate of spread of this disease within the stand, and hazard to campers from tree and branch breakage, could be reduced considerably by removal of those trees presently infected.

Larch Sawfly, *Pristiphora erichsonii*. Severe defoliation of tamarack trees occurred in patches in 1971 throughout most of Prince Edward Island from mid Queens County east, including those tamarack trees growing in the eastern half of the Park. Light to moderate defoliation was common elsewhere in the Park. Infestations of similar intensities will probably occur in 1972. Twig and branch mortality is expected to occur in the older, severely infested areas.

Spruce Budworm, *Choristoneura fumiferana*. Trace to light defoliation of spruce and balsam fir occurred in and near the Park in 1971, as predicted from surveys conducted in 1970. Counts of overwintering larvae on balsam fir foliage near Cavendish and Stanhope indicate that low to medium populations will occur in 1972. Near New Glasgow, about 5 miles from the Park, larvae are expected to be numerous and defoliation severe in patches in several woodlots.

APPENDIX. Results of moth trapping at Fundy and Kejimikujik National Parks

Species	Fundy		Kejimikujik	
	1971	1970	1971	1970
<i>Acrionicta</i> spp., dagger moths	412	-	192	345
<i>Cenopsis acerivorana</i> , a maple leaf roller	631	-	52	25
<i>Choristoneura fumiferana</i> , spruce budworm	24,092	11,480	1,543	278
<i>Datana ministra</i> , yellow-necked caterpillar	-	-	204	441
<i>Hyphantria cunea</i> , fall webworm	-	-	412	399
<i>Lambdina fiscellaria fiscellaria</i> , eastern hemlock looper	-	-	7	-
<i>Malacosoma disstria</i> , forest tent caterpillar	15	-	269	155
<i>Sphinx</i> spp., sphinx moths	22	-	225	169
<i>Stilpnotia salicis</i> , satin moth	15	-	-	-
<i>Orgyia leucostigma</i> , white-marked tussock moth	-	-	1	-