

FOREST HEALTH NETWORK
PEST REPORT ON SPECIAL PROJECTS
QUEEN CHARLOTTE ISLANDS
1997

Prepared for:
South Moresby Forest Replacement Account (SMFRA)

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INTRODUCTION

A Memorandum of Understanding (MOU) initiated in 1991, between the Ministry of Forests (MOF) and Canadian Forest Service (CFS)-Natural Resources Canada (NRCan) continued in 1997. This year, special focus was directed to the damage caused by the western blackheaded budworm, and the establishment of forest health monitoring plots. Initially, due to staff reductions and a changed mandate in the Forest Health Network (FHN) of CFS, there was some hesitation in implementing a survey of the Queen Charlotte Islands. However, support from the South Moresby Forest Replacement Fund and concern for the potential for further expansion of western blackheaded budworm infestations, prompted the subsequent survey.

In 1997 the main emphasis was on assessment of damage caused by blackheaded budworm and determining population levels of this insect to aid in predicting defoliation potential in 1998. Two days of aerial surveys were conducted to document the budworm outbreak, as well as other pests, followed by some limited ground sampling of larvae to verify insect activity. Budworm populations assessed with the aid of pheromone trapping and egg sampling, was done cooperatively with Dr. Vince Nealis and Mr. Rod Turnquist of the CFS in Victoria as part of their research project. In addition, four Extensive Monitoring (EM) plots were established and assessed as part of a national network to monitor and report on changes to national forest health. Based on an ecosystem classification, three of the plots were established on Graham Island and one on Moresby Island.

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PEST SURVEYS

Western blackheaded budworm

Acleris gloverana

The infestation area of western blackheaded budworm, *Acleris gloverana*, on the Queen Charlotte Islands, expanded to 37 000 hectares in 174 infestations, an increase from 9460 ha and 133 infestations in 1996. Defoliation in mixed western hemlock forests was classified as severe on 7200 ha, moderate over 14 800 ha and light on 15 000 ha. The previous outbreak of 1985 to 1988 peaked at 44 300 ha, over much the same area as the present infestation.

Two days of aerial surveys totaling 6.5 hours, helped delineate budworm defoliation as red-brown discoloration in scattered locations from the southern tip of Moresby Island at Kunghit Island, north to Naikoon Provincial Park and Beresford Creek on the east and west sides of Graham Island respectively. This is a substantial expansion in area from 1996 when infestations were only noted on Moresby Island, most of which occurred in the South Moresby National Park Reserve of Gwaii Haanas. More than 23 000 ha of hemlock forest were defoliated in Gwaii Haanas in 1997, where the most severely affected stands were concentrated.



Fig 1. Huxley Island and a portion of Burnaby Island showing moderate and severe defoliation by western blackheaded budworm, August, 1997.

Budworm populations were assessed with the aid of pheromone trapping and egg sampling as part of a research project and also to make projections for potential damage in 1998. Five pheromone traps were distributed to catch male moths at each of 10 road accessible areas during mid-August. This was followed by egg sampling at 9 of the same locations in late September after egg laying had been completed. At this time the pheromone traps were also retrieved.

Table 1. Western blackheaded budworm population assessments, defoliation estimates and predictions for 1998, Queen Charlotte Islands.

Location	Avg. # moths/trap	Avg. # eggs/branch	Defoliation - 1997	Defoliation ¹ predicted - 1998
Copper Bay Rd	147	8	none	Light
Heather Lake	270	24	none	Light
Moresby Camp	82	7	none	Light
Gregory Beach	384	26	Light	Light-Moderate
Riley Creek	363	9	Light	Light
Masset - east	155	6	trace	Light
Alliford Bay	483	8	Light	Light
Kagan Bay	118	no sample	none	---
QC Mainline	274	6	none	Light
QC City	195	5	none	Trace-Light

¹ Avg.# eggs/branch

Trace defoliation - 1 - 5

Light defoliation- 6 - 26

Moderate defoliation - 27 - 59

Severe defoliation - 60+

While there is presently insufficient data, part of the on-going research by Dr. Nealis will be to determine the correlation, if any, between numbers of moths caught in pheromone traps and the average number of eggs per 45 cm branch sample, as presented in Table 1. Hopefully over time, sufficient data can be obtained to develop criteria that would make pheromone trapping useful as a tool for predicting population trends.

While the defoliation predicted in 1998, primarily represents the central portion of the Queen Charlotte Islands, historical records indicate that most areas defoliated in 1997 should experience at least continued light defoliation in 1998, particularly on Graham Island. As this is the second year of defoliation on Moresby Island (and throughout Gwaii Hannas) and adjacent smaller islands, populations may decline somewhat in those areas. Experience from previous outbreaks suggests that the impacts of defoliation are generally short-lived and that initial damage usually appears worse than it is.

In areas such as Lyell Island, Huxley Island and at Jedway, where two years of severe defoliation has occurred, some top-kill and occasional mortality of western hemlock may begin to appear in 1998. However, most trees are expected to recover if there is little or no additional defoliation. In the past, significant tree mortality has only occurred when damage is the result of simultaneous feeding by high populations of both blackheaded budworm and conifer sawfly, *Neodiprion spp.* This combination feeding is particularly serious, as budworm larvae feed on the new foliage and sawfly on the previous years and older needles. This is currently not a problem, as larval sampling indicated much lower populations of sawfly relative to budworm. Populations are expected to decline substantially in 1999.

EXTENSIVE MONITORING PLOTS

Extensive Monitoring Plots were established in 1997 at four locations on the Queen Charlotte Islands, representing the two ecoregions, Queen Charlotte Range and Queen Charlotte Lowland. They form part of a national forest health monitoring system to evaluate the status of forest health and other ecological indicators. These plots are to provide baseline evidence on forest health conditions, the quantity and quality of the forest resource affected, and other indicators which in turn can be extrapolated to forecast future forest health conditions. This will include predicting and monitoring changes related to ecosystem diversity, species diversity, incidences of disturbance and stress, occurrence of detrimental exotic pests, etc, in order for Canada to successfully report on the ecological indicators under the criteria and indicators for sustainable forest management across the country.

Each plot consisted of a minimum of 3 rectangular (4x25m) sub-plots with a total of at least 40 trees of the predominant species $\geq 10\text{cm}$ DBH. Of the nearly 200 trees assessed, 80% were healthy, showing no signs of any pest or abiotic damage (Table 2). The most common pest found was hemlock dwarf mistletoe, *Arceuthobium tsugense*, infecting 15% (<10% of all species) of western hemlock examined; 16 of 19 infected trees were from the Moresby Camp plot. Pine needle cast, *Lophodermella concolor*, occurred on 75% (3% of all species) of shore pine, mostly from Mayer Lake.



Fig 2. Plot assessment at Mayer Lake

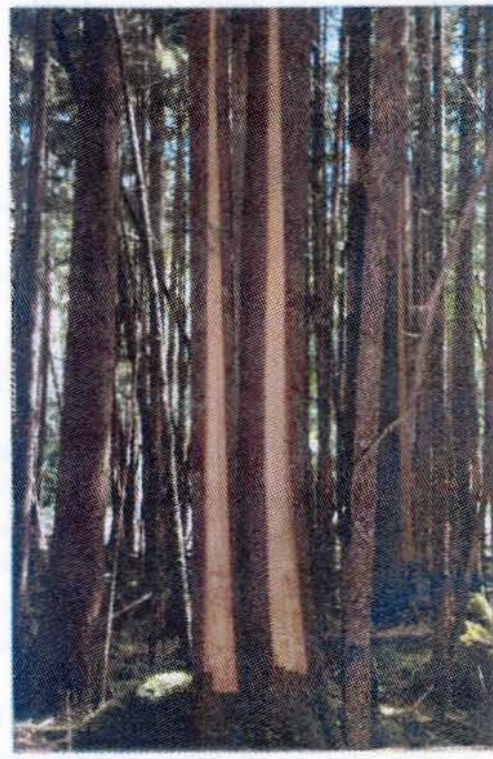


Fig 3. Examples of culturally modified western red cedar near Pure Lake.

A brown cubical rot infected 23% (4% of all species) of western red cedar, nearly all at Pure Lake. At Mayer and Pure lakes 14% (3% of all species) of western red cedar were *culturally modified*, as exhibited by removal of long tapered strips of bark (*Fig. 3*) used by the Haida people for crafts and cultural purposes.

One immature hemlock exhibited animal damage (rubbing) at Mayer Lake. Apart from occasional minor feeding on individual needles, none of the plots showed any measurable indication of blackheaded budworm defoliation.

Table 2. Forest health conditions at four locations on the Queen Charlotte Islands, 1997.

Pest Type	NUMBER TREES/PLOT					
	Mamin River	Mayer Lake	Moresby Camp	Pure Lake	Grand total	% Total
Healthy	54	39	27	37	157	80
Foliage disease	0	5	0	1	6	3
Insect defoliation	0	0	0	0	0	0
Root rot	0	0	0	0	0	0
Decay	0	2	0	6	8	4
Cankers	0	0	0	0	0	0
Dwarf mistletoe	3	0	16	0	19	10
Sucking/Gall insects	0	0	0	0	0	0
Tip/shoot borers	0	0	0	0	0	0
Bark beetles	0	0	0	0	0	0
Root insects	0	0	0	0	0	0
Animal damage	0	1	0	0	1	1
Mechanical damage	0	2	0	3	5	3
Total no. trees	57	49	43	47	196	100

PROPOSALS FOR 1998

1. Aerial overview flights are recommended for all of the Queen Charlotte Islands, focusing mainly on blackheaded budworm defoliation, but mapping all pests encountered. The aerial overview should be done in August and represent the stands most susceptible to budworm feeding, including all of Gwaai Haanas.
2. It is recommended that the research trial of Dr. Vince Nealis which studies the population dynamics of blackheaded budworm be continued and utilized as a tool for forecasting population trends.
3. To better represent protected areas, at least two Extensive Monitoring Plots should be assessed in Gwaai Haanas to supplement the four already established outside of the park.

REFERENCES

- Vallentgoed J. 1994. History of Population Fluctuations and Infestations of Important Forest Insects in the Queen Charlotte Islands Forest District, 1994. FIDS Report 94-10. 37p.
- Vallentgoed J. 1996. Forest Insect and Disease Survey Pest Report on Special Projects, Queen Charlotte Islands, 1995. FIDS Report 96-7. 33p.
- Vallentgoed J. 1996. Forest Health Network Pest Report on Special Projects, Queen Charlotte Islands, 1996. FHN Report 96-1. 9p.