FINAL TECHNICAL REPORT

Overview and Introduction

Forest Innovation Investment Number:  R04-007CFS

Project Title:  Development of hazard rating systems for the western hemlock looper, western blackheaded budworm and forest tent caterpillar.

Award Recipient's Name:  Imre S. Otvos

Organization:  Natural Resources Canada, Canadian Forest Service

Team Members:  Kangakola Omendja (current term)
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Report for the Period from:  April 1, 2003 to March 31, 2004
The Final Technical Report is comprised of the enclosed four parts:

Part A: “Landscape Level Hazard Rating for Western Blackheaded Budworm in British Columbia”.


Part C: “Monitoring Western Hemlock Looper Populations in British Columbia”.

Part D: This is the forest tent caterpillar component of the project and is comprised of the following subsections:

D1: A PowerPoint presentation on the “Stand Level Hazard Rating for the Forest Tent Caterpillar (*Malacosoma disstria*) and Predicting the Probability of Occurrence of Future Outbreaks.” The talk summarizes the work done on the Forest Tent Caterpillar from the landscape to the stand level. The stand level hazard rating is much more useful to forest managers in their efforts to minimize impact of this defoliator. This talk given at the Pacific Forestry Centre to its personnel and visiting forest entomologists from the BC Ministry of Forests will also be written up as a scientific publication and will be made available to people interested in the management of this insect. This is mostly based on the work we did on developing stand level and risk rating for the forest tent caterpillar (an important pest mainly of *Populus* spp.) in the Prince George Forest District where most of the outbreaks occurred in the past.

D2: Mr. Jeff Beal (Woodlands Manager, Slocan – LP OSB Corp. approached us and inquired if we could provide some help in an Integrated Forest Health Management for Northern BC, a committee of experts charged with developing Forest Health Management Guidelines and Recommendations. He specifically wanted to know the location, frequency, and severity of forest tent caterpillar infestations, the probability of tree mortality (of both immature and mature seral stages), as well as the stand characteristics of infested stands regarding aspect, elevation or understory (spruce) in the Fort St. John TSA, Dawson Creek TSA 94A, 94B, 94G, 94H and 94I. This exercise was a test case or pilot project to show how useful the GIS hazard and risk rating can be to Forest Managers. The results of this work are given as a series of individual maps in the folder labels “Final Technical Report Part D2”.
Figure 1 shows that past outbreaks occurred in the Fort Nelson area, Dawson Creek area and the Fort St. John area (TSA 94).

Figure 2 presents the forest tent caterpillar defoliation frequency the longer the defoliation is the more concerned forest managers should be i.e. the greater is the damage. From this figure we generated Figure 3.

Figure 3 shows the stand level hazard rating of aspen stands within the Fort St. John TSA. In the high and moderate hazard areas the proportion of aspen could either be reduced to minimize outbreak frequency or perhaps could be cut first when the rotation age is approaching.

Figure 4, shows aspen density – the higher the proportion of aspen in the stand the outbreaks are more frequent and damage is more intense as indicated in Figure 5.

Figure 5 shows Defoliation Risk.

Figure 6 shows the stand level hazard rating in the Prince George Forest Districts.

Figure 7 presents the forest tent caterpillar defoliation probability surface based on information from outbreak 4. This was used to test the accuracy of the defoliation probability surface in the next outbreak (outbreak 5).

Figure 8 shows the area actually defoliated during outbreak 5 plotted over the defoliation probability surface area calculated from outbreak 4.

When actual defoliation from outbreak 5 was plotted over the probability surface generated from outbreak 4, about 90-95% of the stands defoliated by the forest tent caterpillar in outbreak 5 occurred in the areas predicted. This clearly suggests that location of future outbreaks can be predicted. The next step in the process, logistic regression analysis, will be used on the same data to compare the accuracy of the two methods. If the logistic regression gives the same or very similar results that will be a further verification of using these statistical methods to predict the location of future outbreaks with good accuracy.

For the practical value and usefulness of these techniques in forest management and policy FII or FIA personnel may contact Mr. Jeff Beale by telephone (250) 261-6464 or by e-mail jbeale@slocanlp.com