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AN ASSESSMENT OF WOODBORER HAZARD IN MERCHANTABLE TIMBER AFTER  
THE 1972 'MARTIN HILLS BURN' (FIRE NO. DS 2-18), SLAVE LAKE  
FOREST, ALBERTA.

Northern Forest Research Centre  
Environnement Canada  
Edmonton

An Assessment of Woodborer Hazard in Merchantable Timber After  
the 1972 'Martin Hills Burn' (Fire No. DS 2-18),  
Slave Lake Forest, Alberta

by

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Summary

A survey of woodborers in the 'Martin Hills Burn', conducted in late August, 1972, indicated that merchantable fire-killed white spruce (moderately charred) are infested by the long-horned woodborer (Monochamus scutellatus (Say)) at an average density of 1.29 larvae per square foot of log surface. This density falls into a 'Moderate Infestation Class' that can result in a maximum value-loss of 11.5 to 18.0% in dimension lumber due to down-grading from 'worm-hole' damage. About one-quarter of the merchantable logs salvaged in the area sampled were classed as 'Moderate Burn Type' and therefore, can be expected to be down-graded the maximum amount, if not processed promptly. Logs which were charred less and more severely than Moderate Burn Type are only lightly attacked and present less hazard. Overall value-loss due to worm-hole damage will be reduced, however, if the logs can be processed into lumber by May, 1973, particularly Moderate Burn type trees. Although only a small portion of the burn was surveyed, the results are probably indicative of the infestation level in a large portion of the burn. Because of the size of the burn and infestation level, large populations of adult Monochamus will be available for re-infestation in 1973 and 1974. Therefore, all newly-felled green timber should not be held over more than one summer before processing into lumber.

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## Introduction

A survey of the hazard of woodborers in fire-killed timber in the 'Martin Hills Burn' (May - June, 1972) was conducted during late August, 1972. The survey was restricted to one area accessible by road, and therefore cannot be regarded as representative of the entire burn. Sampling for woodborers was confined to the area within Sections 4, 9 and 10, Township 75, Range 3, west of the 5th Meridian, where salvage logging is currently underway. This portion of the burn represents a variety of burn conditions, ranging from lightly-charred live trees to severely-charred trees having all foliage and some bark consumed. Since the sampling was extended more than a mile from the burn periphery the results may be indicative of the level of infestation expected over a large portion of the burn.

## Method of Sampling

Sampling for woodborers was carried out on 25 exposed tree-length logs piled on log decks. The logs were selected as falling into a 'Moderate Burn Type' as defined by Ross (1960); i.e., trees were burned severely at the base with lighter charring to top of tree. Most of the trees in this burn type probably died at the time of the fire or within a month after. Trees in this burn type were chosen as being the most representative of average burn conditions in the area sampled and because they are known to support the most numerous successful attacks.

On each of the 25 logs, four 1-foot-square bark samples were removed from the upper surface of the log, one from the mid-point of each quarter-length of log. All woodborer larvae found under the square-foot samples were recorded as either Monochamus (long-horned woodborer and account for most worm-hole damage in lumber) or other woodborer larvae (included at least three species of lesser economic importance). At the time of sampling most of the Monochamus larvae had penetrated into the wood so that either larvae or holes were tallied, not both. In selecting the square-foot bark samples, it was assumed that the attack pattern was evenly distributed around the log, since previous studies have shown this to be generally the case in standing timber. However, the attack pattern may vary considerably between trees and on different parts of the stem because of different burn intensities and bark characteristics. Sampling was limited to white spruce logs, the most abundant species being cut, although balsam fir, jack pine and black spruce are also distributed throughout the burn.

The average number of Monochamus larvae per square-foot of log surface was computed for each tree and for each of the four quarter-length positions of logs. The total number of Monochamus attacks were pooled to provide an estimate of the average attack density expected in the area sampled. The proportion of decked logs to which the average attack density applies was estimated by walking over the surface of 9 log decks and counting all exposed logs which could have been easily sampled. Included in this tally were those logs classed as Moderate Burn type of which a separate count was made.

### Estimation of Timber Losses

The diameter (b.h.) of the sampled trees inside bark averaged 11.5 inches and ranged from 7.5 to 18.0 inches. The mean density of Monochamus larvae (= larval entry holes) per square foot of log surface varied from zero to 6.0 but averaged 1.29 per square foot for all 25 logs. No relation was evident between density of Monochamus holes and log size. When the number of Monochamus holes was summed for each quarter-log-position there was a slight indication that attack density may be highest towards the top of the tree, although this could have been due to the more severe charring at the base of trees. The mean densities of Monochamus holes from the lower-quarter log position to top-quarter position were respectively 1.28, 1.24, 1.24 and 1.40 holes per square foot of log surface. Thus, the overall average of 1.29 holes per square foot can be regarded as a reasonable estimate of the density expected on Moderate Burn type trees. According to previous studies of Monochamus in lodgepole pine in Alberta, this density falls into a 'Moderate Infestation Class' established by Safranyik and Raske (1970), and can account for 11.5 to 18.0% value-loss of the lumber down-graded from worm holes. The relationship between Infestation Class and expected value-loss, as determined for lodgepole pine logs, appears to be applicable to white spruce logs as well. Although the percentage value-loss estimates of woodborer-damaged lodgepole pine logs were calculated from lumber graded under the old lumber grading rules and 1968 prices, the 11.5 - 18.0% loss still provides a fair estimate under the current grading rules and lumber prices.

The proportion of logs in the sampled area to which the loss

estimate applies was determined from a count of 544 trees on nine decks, of which 26.3% (range 10.3 to 39.1%) were classed as Moderate Type Burn. Therefore, about one quarter of the merchantable trees can be expected to have a maximum value-loss of 11.5 to 18.0%. Trees which were charred less and more severely than Moderate Burn Type may be infested by woodborers but at much lower levels.

The density of other woodborer species combined from the log samples was greater than that of Monochamus but nearly all of these were under the bark and present little hazard.

Most Monochamus larvae collected were about three-quarters of an inch long and had excavated a hole an inch or more deep. This suggests that their development was less than normal for late August, probably due to the cool summer conditions. These larvae, however, will continue excavating into the logs until freeze-up and may penetrate to a maximum depth of three to four inches. Because of their relatively small size, most will require two years to complete development. Overall value-loss will therefore be lessened if the timber can be felled and cut into lumber by May, 1973.

During sampling there was no evidence from the limited data that woodborer density decreased with distance from the burn periphery. However, because of the size of the burn some dilution of attacks may occur toward the centre of the burn. Two live adult Monochamus females were found on the log decks, suggesting that adults were available for attack in the area since at least mid-June; most attacks, however, probably occurred during July and early August. White and black spruces and jack pine appeared to

be attacked equally by Monochamus while balsam fir was less preferred in the study area.

The moderate infestation level determined in the area sampled indicates that large populations of adult Monochamus will be available for re-infestation in that portion of the Slave Lake Forest District during 1973 and 1974. Every attempt should therefore be made to process all newly-felled green timber as soon as possible before the end of the first summer season after felling; maximum damage will result if the logs are held over to the second summer after felling.

#### Selected References

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