

## Mountain Pine Beetle Ecology Program Quicknote #4

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### August 2011: Regeneration Management in an MPB Environment - Project Update

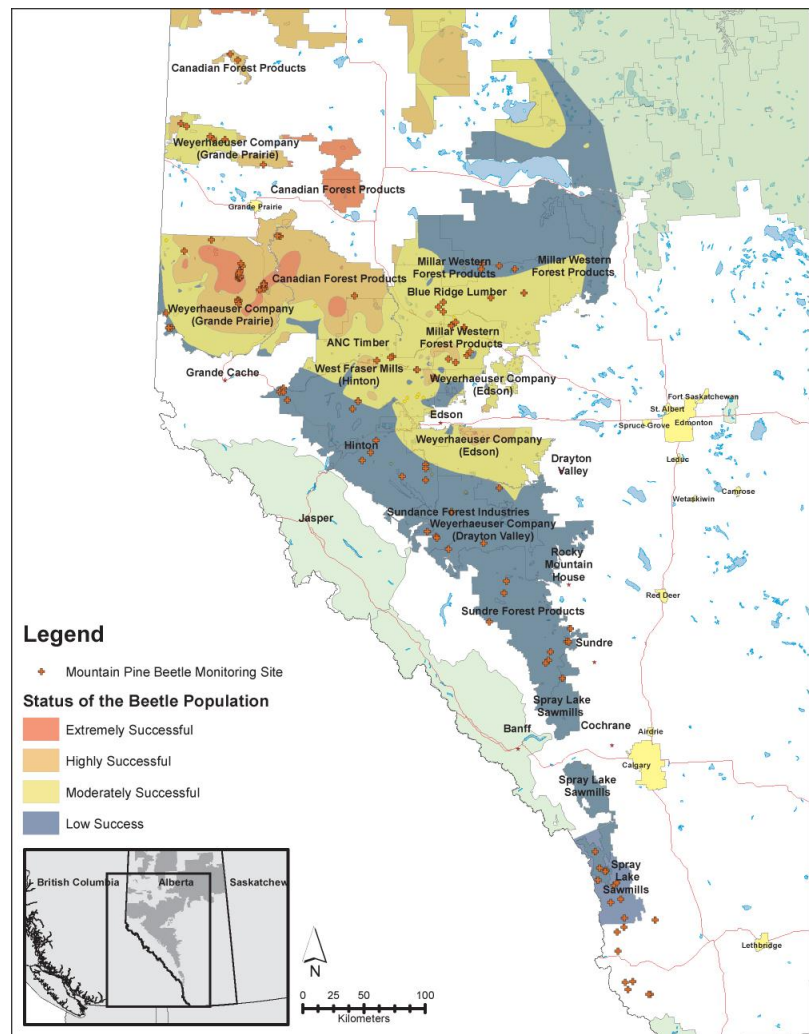
#### Background

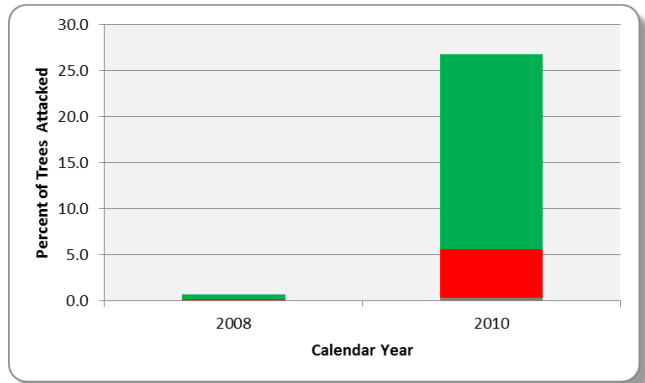
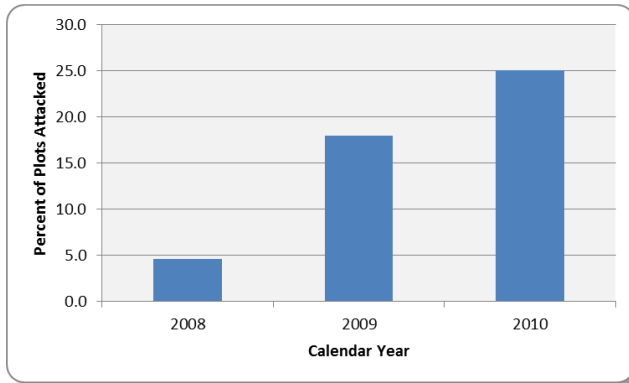


During the last 5 years the Alberta government and industrial partners of the Foothills Research Institute have stressed the need to understand the impact of mountain pine beetle (MPB) attack on habitat, regeneration and timber supply. MPB infestation and resulting mortality in the lodgepole pine forests of Alberta are occurring and expected to increase, yet the knowledge with which to address post-infestation treatment is rudimentary. The objective of this project is to provide tools for assessing treatment options and their growth and yield implications, in lodgepole pine stands attacked by MPB. This is being achieved by monitoring stands attacked by MPB, and incorporating the best currently available information into decision support tools.

#### Monitoring

The Mountain Pine Beetle Ecology Program and the Foothills Growth and Yield Association (FGYA), working in cooperation with industry and government partners, have established a network of 240 permanent sample plots to monitor impacts of beetle attack on stand development. Plots already installed by the Alberta government and forest industry, some over 50 years ago, are being used for this purpose, thus providing essential historical data for benchmarking pre-attack conditions. The map to the right shows the distribution of plots relative to the Alberta government's latest status assessment of the MPB population (2010-11 overwintering success). Plots are selected, on the basis of the annual assessment, to be checked each year on the ground for infestation. Plots in stands confirmed as attacked are then placed on a schedule for detailed monitoring of tree mortality and stand development every 2 years.

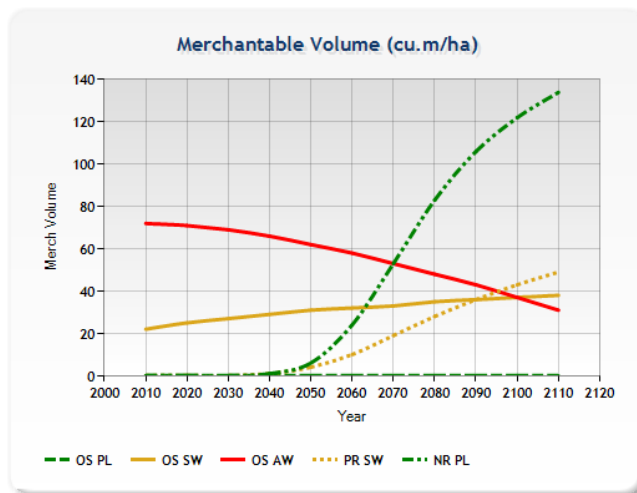




As of 2010, MPB attack was confirmed in 60 (25%) of the 240 plots (see chart above left), mostly in areas shown on the map as having high or extreme MPB overwintering success. In 2010 the first 2-year post-attack re-measurements were made in 21 of the plots. The average percent of pine trees attacked in these plots are shown (see chart above right) by attack stage (green, red and grey). Note that the initial proportion of trees attacked (as of 2008) was very low (less than 1%), but within 2 years was averaging more than 25%. The actual tree kill (red and grey attack) is slower, averaging just over 5% by 2010. Attack and kill rates during the 2-year period varied greatly between the 21 plots, with the cumulative kill around the 5% average ranging from zero to over 70%.

### Decision Support Tool

It will be several years before we have sufficient data from the monitoring network, and other important studies initiated by Mountain Pine Beetle Ecology Program and the FGYA, to comprehensively forecast post-attack stand development. But in the meantime important decisions have to be made about where, when and how to treat attacked stands in order to minimize the loss of timber, habitat and other values from the forest. We have assembled the best currently available information on pre-attack conditions, “shelf-life” of killed trees, growth response of the residual stand, and regeneration dynamics to support such decisions.



The resulting decision-support tool will help managers assess the impacts of different levels of mountain pine beetle infestation, and various silvicultural interventions, on post-attack stand development. Users define simulation scenarios by specifying a growth model, ecological site class, stand structure, species composition, stand age, mountain pine beetle severity, and silviculture intervention. For each defined scenario, the decision support tool searches and reports from a database containing the best available stand growth projections. Simulation results include tabular and graphical reports (see example at left) of standard mensurational stand growth attributes, and post-beetle wood quality

metrics, for 100 years and 10 years post-attack, respectively.

A preliminary version of the tool was completed and reviewed by potential users in 2010. It is currently undergoing enhancement based on data and other feedback provided by the user group.