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Mountain Pine Beetle Ecology Program Quicknote #7

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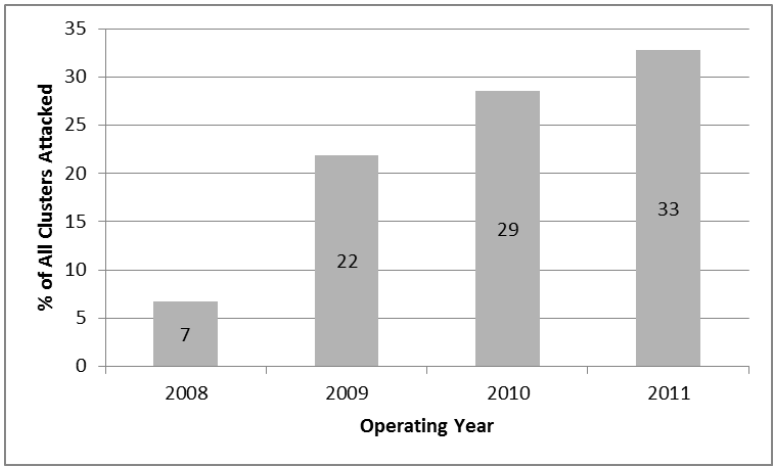
February 2012: Regeneration Management in an MPB Environment - Rates of Infestation and Tree Mortality

Introduction

In 2008 the Mountain Pine Beetle Ecology Program and the Foothills Growth and Yield Association (FGYA), working in cooperation with industry and government partners, established a monitoring framework to assess impacts of mountain pine beetle (MPB) attack on stand development, using approximately 120 clusters containing a total of 240 permanent sample plots (PSPs) already installed by the Alberta government and forest industry. (Each cluster contains either 1 or 4 individual plots.) Since baseline measurements were made in 2008, clusters have been selected annually for monitoring. The Alberta government's mapped status assessments of the MPB population provided the main basis for prioritizing and selecting plots for field inspection. Clusters confirmed in the field as attacked were scheduled for measurement of tree mortality and stand development at intervals of 2 years or less. This note summarizes rates of infestation and tree mortality up to and including 2011.

Stand Infestation Rates



The figure to the left shows the overall trend by operating year (May 1 to April 30) in the percentage of clusters detected as attacked.

The table below shows the total number of PSP clusters in the monitoring network, and the cumulative number of clusters attacked by MPB each year, broken down by forest management area.

Forest Management Area	# of Clusters	Cumulative # of Clusters Attacked			
		2008	2009	2010	2011
Alberta Newsprint Company	3	0	0	2	2
Blue Ridge Lumber	8	0	0	0	0
Canadian Forest Products	5	1	5	5	5
Hinton Wood Products	25	0	0	0	0
Millar Western Forest Products	8	0	1	1	4
Sundance Forest Industries	6	0	0	0	0
Sundre Forest Products	9	0	0	0	0
Spray Lake Sawmills	6	1	1	2	2
Weyerhaeuser (Grande Prairie)	35	5	18	21	23
Crown Units	14	1	1	3	3
Total	119	8	26	34	39

The areas fall into 3 categories:

1. Forest management areas with plot clusters already attacked during or following the main northern epidemic (Alberta Newsprint, Canfor, Millar Western and Weyerhaeuser);
2. Northern and central areas with no plots yet detected as attacked (Blue Ridge, Hinton, Sundance and Sundre);
3. Southern Crown units and the Spray Lake FMA where a number of plots have been subject to probably insipient levels of attack.

Tree Mortality Rates

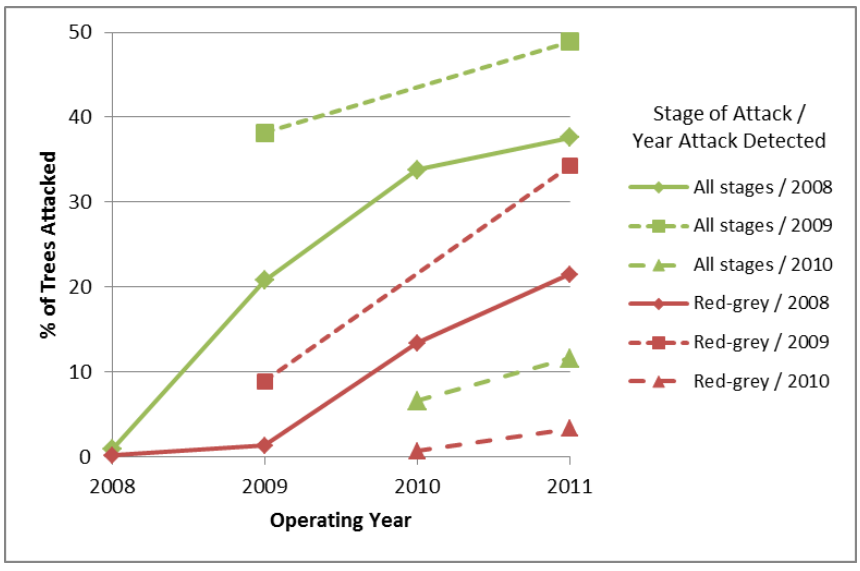
The table above shows the latest mortality status of the 39 clusters so far attacked by MPB (based on observations taken in 2011 except for 2 clusters last checked in 2010).

Forest Management Area	# of Clusters	% of Trees Attacked (all stages)			% of Trees at Red or Grey Stage		
		Average	Minimum	Maximum	Average	Minimum	Maximum
Alberta Newsprint Company	2	2.5	2.3	2.6	1.6	1.6	1.6
Canadian Forest Products	5	41.5	0.6	83.3	25.0	0.0	68.5
Millar Western Forest Products	4	3.3	0.7	6.4	1.8	0.0	6.4
Spray Lake Sawmills	2	4.8	0.6	9.1	0.3	0.0	0.6
Weyerhaeuser (Grande Prairie)	23	37.5	0.5	100.0	24.9	0.0	100.0
Crown Units	3	1.8	0.6	3.3	0.2	0.0	0.6
Total	39	28.3	0.5	100.0	18.2	0.0	100.0

Even though MPB was detected in them several years ago, the southern Crown and Spray Lake clusters show low levels of attack and mortality, consistent with the presence of an endemic MPB population and insipient attack. The northern clusters show much more variable, and generally much higher, levels of attack and mortality. All statistics are based on only the pine component of the stands.

Variable	Correlated Stand Variable	Correlation Coefficient
% of trees attacked (allstages)	Mean DBH	0.34
	Stems per ha	-0.38
	Years since attack	0.45
% of trees at red or grey stage	Basal area per ha	-0.33
	Stems per ha	-0.33
	Years since attack	0.34

The variation in attack levels appears to be more related to the regional and local MPB population status over the last few years than to other stand variables measured at the PSPs. However, correlations (statistically significant at the 95% probability level) were found between levels of attack, mean tree DBH (diameter at breast-height), stand density, basal area and years since attack (see table at left).



Trends over time in the average percentage of trees attacked and killed are shown for the attacked northern plot clusters (see figure at left). Trends are shown separately for each group of clusters detected as attacked in 2008, 2009 and 2010 respectively. There is some indication that the increase in total attack may be approaching culmination in the group of plots attacked in or before 2008 (indicated by the solid green line). However, levels of total and red-grey attack continue to increase in all groups.

Continued monitoring will provide crucial information on ultimate mortality levels. It will also allow assessment of how vegetation responds to changes in stand conditions resulting from the mortality.

For more information on this or other Mountain Pine Beetle Ecology publications, please contact: Don Podlubny, Foothills Research Institute, Email: dpodlubny@foothillsri.ca or visit www.foothillsresearchinstitute.ca.