

# Provincial-Level Projection of the Current Mountain Pine Beetle Outbreak:

Documentation of revisions to the model  
resulting in BCMPB.v6

**by:**

Adrian Walton, Research Branch, BC Forest Service  
Huapeng Chen, Research Branch, BC Forest Service

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## 1.0 Introduction and Purpose of this Document

For each of the past five years, the Ministry of Forests and Range has led development of a model that produces a provincial-level projection of the current mountain pine beetle outbreak (BCMPB). The model is intended to produce output that can inform provincial-level, strategic decision-making. Documentation from previous years describes the basis of the model. Here, we focus on aspects that have changed over the past year, and refer interested readers to documents from prior years for the description of the core model, which remains unchanged.

This document, which describes the changes to the beetle projection model, is intended for potential users of BCMPB. This description is provided for completeness of understanding the model, rather than with the intention that the model might be modified by users of the model. People interested in learning about model behaviour, as well as potential users of BCMPB, should consult the documents from prior years, which describe the core model.

During the first year of the project, we concentrated on developing a management model that represented “leading edge” beetle control efforts. In the second year of the project, we began to more fully specify the salvage harvesting components of the model in an attempt to better understand non-recovered loss implications. The third year, we introduced additional detail that we believed was needed to adequately reflect the response of the existing forest industry and possible “new” industries to the outbreak.

This year (the sixth year), we only changed how areas of forest harvesting (cut blocks) are mapped and assigned a year of harvest. We did **not** run a management scenario this year.

Please consult the following documents for a complete description of the current model (BCMPB.v6).

- Description of the core model produced in year 2 (resulting in BCMPB.v2):  
[http://www.for.gov.bc.ca/hre/bcmpb/BCMPB\\_MainReport\\_2004.pdf](http://www.for.gov.bc.ca/hre/bcmpb/BCMPB_MainReport_2004.pdf) with appendices (<http://www.for.gov.bc.ca/hre/bcmpb/Appendices.htm>)
- Revisions and enhancements made during year 3 (resulting in BCMPB.v3):  
<http://www.for.gov.bc.ca/hre/bcmpb/BCMPB.v3.ModelDocumentation.Update.pdf>
- Revisions and enhancements made during year 4 (resulting in BCMPB.v4):  
<http://www.for.gov.bc.ca/hre/bcmpb/BCMPB.v4.ModelDocumentation.Update.pdf>
- Revisions and enhancements made during year 5 (resulting in BCMPB.v5):  
<http://www.for.gov.bc.ca/hre/bcmpb/BCMPB.v5.ModelDocumentation.Update.pdf>
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## **2.0 Mapping Forest Harvest Locations and Year**

Maps of forest harvesting since 1999 are used by BCMPPB to ensure that the logged volume recorded by the harvest billing system is allocated to the correct locations on the land base. The model has been updated to handle two forest harvesting (cut block) layers; one where the year of harvest is known and one where the year of harvest is unknown.

The data sources for creating the two harvest layers were the RESULTS and TENURE datasets in the LRDW, and cut block maps derived from Landsat satellite imagery (created by the Ministry of Forests and Range, Forest Analysis and Inventory Branch).

Unfortunately, direct conversion from the vector data to the raster data with a cell of 400 metres using ESRI ArcGIS 9.2 results in either a gross overestimation or underestimation of total area harvested, depending on conversion tool used. To resolve this problem, a “master” point layer with 400 metre point spacing was created to cover the entire province. Points overlapping with cut blocks were randomly selected based on the total area of the cut blocks. A buffer of 15 metres was first applied to the cut block layers to include those points close to the boundary of the cut blocks, making the selected points more evenly distributed. The selected points were subsequently used to identify areas of harvest in the resulting 400 metre raster layer.

Assigning harvest date depended on the process used to identify a specific area of harvest. For the areas of forest harvesting derived from satellite imagery, the end year was used as the harvesting date when overlapping satellite images with one year lag were used to detect the cut blocks. For example, if spatially coincident satellite images from 2006 and 2007 were used, the year 2007 was picked up as a harvesting date. No harvest date was assigned if a pair of satellite images had more than one year lag, for example, between 2005 and 2007. For the RESULTS and TENURE cut blocks datasets, the database field “disturbance start date” was used to assign harvesting date.