

# **Approach of the inventory program in 2012-13 to improve inventory information in MPB-affected management units**

**June 8, 2012**

Improving inventory information in management units affected by the mountain pine beetle (MPB) is a priority for the inventory program. This document briefly outlines the approach of the inventory program in 2012 to this large, complex problem.

## **The goal for inventory information in MPB-affected management units**

For MPB-affected management units, our goal is to provide current, accurate, relevant and accessible inventory information characterizing forest cover (including forest cover polygon spatial coverage and attributes, non-spatial plot sample data sets, and supporting data, imagery, analyses and products).

## **Scope of this document**

For the purpose of this document, we define MPB units as the 12 TSAs (and associated areas such as included TFLs) identified in the Land Based Investment Strategy (Lakes, Quesnel, Prince George, Williams Lake, 100 Mile House, Merritt, Morice, Okanagan, Cranbrook, Kamloops, Invermere, and Arrow). Our approach in MPB units is part of the larger provincial inventory program that is not fully described here but is detailed in other documents such as the FAIB Business Plan (available at <http://www.for.gov.bc.ca/hts/vri/>). Some inventory programs, such as the site productivity and stand growth modeling programs, are excluded from this discussion to simplify presentation.

## **Current situation**

Aspects of the current situation that are relevant to the development of our strategy include the following.

1. Forest conditions
  - Within the MPB-affected area, forest cover conditions vary widely, and include stands with a dead overstory (formerly mature, pine-leading stands), green mature stands where pine was a lesser (or non-existent) component, young stands, and more.
  - Conditions in MPB-affected forests are dynamic. MPB mortality is continuing in some areas, dead overstory will deteriorate and fall, understory trees (secondary structure) are releasing, and additional seedlings are re-establishing in some areas.
2. Information needs and management questions
  - MPB has created some new information needs and increased the importance of some conventional inventory information.

- Information on the amount and location of green mature timber remains important.
  - In many MPB-affected units, estimates of the growth and future yield of young stands are critical to mid-term timber supply.
  - Where the overstory is dead, understory trees are critical to the future development of MPB-impacted stands and important for an assessment of stocking condition.
  - Information on the characteristics of dead overstories is important.
3. Inventory methods
- Several inventory methods are available, each having unique characteristics of cost, information provided, length of time to complete a project, and so on.
  - Conventional photo-interpretation cannot detect very small trees beneath a screening cover of dead overstory.
4. Timing
- Given the large area affected, a standard re-inventory of all MPB units will take many years to complete.
  - Information may be required before VRI re-inventory can be completed.
  - The value derived from re-inventory is increased when the information has a long shelf-life. Due to rapid change in MPB areas, and difficulty photo-interpreting areas of extensive mortality, recent VRI projects have avoided areas of extensive MPB attack.
5. State of inventory and inventory systems
- Within the MPB-affected area, the forest inventory varies in vintage, known or suspected problems, and risks posed to decision-making.
  - A backlog of harvest depletion, silviculture, and fire updates has accumulated.
  - To account for MPB, a preliminary adjustment of pine volumes in the inventory is conducted each year.
  - Photo-interpretation procedures, inventory databases, and software applications were not designed to observe, store, estimate volume, and report on stands of dead trees.

### **Our approach in 2012**

By considering our goal for inventory information in MPB areas, and salient aspects of the current situation (described above), we developed the following nine strategies that we will pursue in 2012 to improve inventory information in MPB units.

1. Focus on MPB and carefully select areas to undertake conventional VRI re-inventory
  - Within the provincial inventory program, we will maintain an emphasis on MPB-impacted management units.

- We will continue conventional (VRI) re-inventory projects, targeting management units (or portions of units) where photo-interpretation will provide information of greatest net benefit and long-term utility.
- 2. Undertake non-traditional inventory projects to provide interim inventory information in select areas
  - We will undertake non-traditional inventory projects (such as LVI and possibly targeted ground and/or photo sampling) to provide interim, inventory data for some MPB units.
- 3. Test and refine the pine kill algorithm applied in the annual projection
  - We will test and refine the adjustment to pine volume that is applied to the provincial inventory to account for MPB mortality during the annual projection.
- 4. Catch up on update
  - We will reduce the backlog of harvest depletion and silviculture updates, fix the software problems that contribute to the backlog, improve the tracking of the status of update, and test new technology for fire updates.
- 5. Monitor young stands
  - We will establish young stand growth monitoring plots in high priority MBP units.
- 6. Improve handling of dead overstory
  - We will improve how our inventory system handles dead overstories, resolving photo-interpretation, database, and yield estimation issues, to ensure that stands with a high proportion of dead trees can be adequately characterized in the inventory.
- 7. Provide information on small trees
  - We will ensure that inventory sampling projects include the sampling of small trees.
  - We will develop and test new methods to estimate small tree cover and characteristics.
- 8. Continue to innovate
  - We will continue to test, develop, and adopt new methods and technology in forest inventory including predictive inventory, automated attribution, new types of imagery, and coordinating data acquisition with other programs.
- 9. Enhance inventory planning
  - We will enhance inventory planning to deploy a broader mix of inventory methods, in a deliberate sequence over time, to deliver improved inventory information.

### **Specific projects and activities planned for 2012**

Table 1 lists the projects and activities that are planned for 2012 to action the nine strategies.

**Table 1. Projects and project leaders by strategy.**

<b>Projects by strategy</b>	<b>Project lead(s)</b>
<b>1. Focus on MPB and carefully select areas to undertake conventional VRI re-inventory</b>	
• VRI photo-interpretation in 100 Mile House	Matt Makar
• VRI photo-interpretation in TFL 14	Cathy Taylor
• VRI photo-interpretation in TFL 23	Chris Mulvihill
• VRI photo-interpretation in TFL 35	Matt Makar
• VRI photo-interpretation in Kamloops north	Cathy Taylor
• VRI photo-interpretation in Kamloops south	Matt Makar
• VRI ground sampling (phase 2) in Kootenay Lake	Chris Mulvihill
• VRI ground sampling (phase 2) in Morice	Roman Bilek
• NVAF sampling in Mackenzie and Prince George	Will Smith
• Air photo acquisition in Lakes and Vanderhoof	Ann Morrison
• Inventory audit analyses (Mackenzie, TFL 18, and TFL 53).	Graham Hawkins
• 2013 phase 1 and 2 implementation plans (Lakes, Vanderhoof, Williams Lake)	Graham Hawkins, Roman Bilek, Chris Mulvihill
<b>2. Undertake non-traditional inventory projects to provide interim inventory information in select areas</b>	
• LVI in western Williams Lake TSA.	Xiaoping Yuan
• Re-measure NFI photo-plots in Prince George TSA	Xiaoping Yuan
<b>3. Test and refine the pine kill applied in the annual projection</b>	
• Gather relevant data sets, test and suggest refinements to the adjustment to pine volume (and other parameters) that is invoked to account for MPB mortality during the annual projection, and document in a technical report.	Pat Martin
<b>4. Catch up on update</b>	
• Reduce the backlog of harvest depletion and silviculture updates.	Marc Rousseau
• Fix the RESULTS Reader.	Marc Rousseau
• Work with RPB to reduce the likelihood of future update problems.	Marc Rousseau
• Develop and track a set of status indicators for update.	Marc Rousseau

<ul style="list-style-type: none"> <li>Undertake a pilot test of high resolution satellite for mini-VRI for fire updates.</li> </ul>	Marc Rousseau // Ann Morrison
<ul style="list-style-type: none"> <li>Continue Landsat-based harvest change detection.</li> </ul>	Ann Morrison
<b>5. Monitor young stands</b>	
<ul style="list-style-type: none"> <li>Establish young stand growth monitoring plots in Morice</li> </ul>	Roman Bilek // Kevin Hardy
<ul style="list-style-type: none"> <li>Establish young stand growth monitoring plots in Kootenay Lake</li> </ul>	Chris Mulvihill
<ul style="list-style-type: none"> <li>Establish young stand growth monitoring plots in Quesnel</li> </ul>	Tamara Brierley
<ul style="list-style-type: none"> <li>Produce establishment reports.</li> </ul>	Tamara Brierley
<ul style="list-style-type: none"> <li>Plan 2013 implementation.</li> </ul>	Tamara Brierley, Chris Mulvihill
<b>6. Improve handling of dead overstory</b>	
<ul style="list-style-type: none"> <li>Implement changes to inventory system, resolving photo-interpretation, database, and yield estimation issues, to better record and manage information on stands with a high proportion of dead overstory trees.</li> </ul>	Photo-interpreters, Marc Rousseau, Tim Salkeld
<b>7. Provide information on small trees</b>	
<ul style="list-style-type: none"> <li>Review all inventory sampling projects to ensure that they include the sampling of small trees.</li> </ul>	Pat Martin
<ul style="list-style-type: none"> <li>Enhance LVI sampling of small trees and mapping of understory.</li> </ul>	Xiaoping Yuan // Matt Makar
<ul style="list-style-type: none"> <li>Test the use of large scale photos (DCS photos) to estimate stocking condition in MPB-affected areas</li> </ul>	Graham Hawkins
<b>8. Continue to innovate</b>	
<ul style="list-style-type: none"> <li>Evaluate a predictive inventory system.</li> </ul>	Kevin Johnston
<ul style="list-style-type: none"> <li>Explore automated attribution.</li> </ul>	Xiaoping Yuan
<ul style="list-style-type: none"> <li>Enhance LVI.</li> </ul>	Xiaoping Yuan
<ul style="list-style-type: none"> <li>Acquire and test new types of imagery.</li> </ul>	Ann Morrison
<ul style="list-style-type: none"> <li>Co-coordinate data acquisition with other programs.</li> </ul>	
<b>9. Enhance inventory planning</b>	
<ul style="list-style-type: none"> <li>Develop a plan guiding the deployment and sequencing of a mix of traditional (i.e., VRI) and non-traditional inventory projects in MPB areas</li> </ul>	Gary Johansen