Mountain Pine Beetle Initiative
Epidemic Risk Reduction &
Value Capture R&D Strategy
The Pacific Forestry Centre, Victoria, British Columbia

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Natural Resources Canada
Canadian Forest Service
Victoria, British Columbia

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Introduction

Background

The mountain pine beetle (MPB) epidemic continues to spread among the lodgepole pine forests of western Canada. The abundance of mature lodgepole pine stands and the relatively benign weather in recent years afford ideal conditions for the beetle. The BC Ministry of Forests estimates the beetle infestation has spread over an area of 4.2 million hectares – more than double the 2002 area, and the current estimate does not include the successful beetle flight in 2003. The scale of BC’s beetle infestation is in record proportions and there are MPB ‘hot-spots’ in Alberta, Washington, Idaho and Montana lodgepole pine forests.

The BC government has increased the annual allowable cut (AAC) 6.2 million cubic metres in an effort to capture value from beetle-kill timber. In addition, the provincial government has built a program of short-term tactical measures to address immediate operational needs. Action plans encompass early detection technologies, beetle control harvesting, options for adjusting timber flows across mills, and management practices for salvage operations.

At the operational level the BC epidemic is causing the forest industry to redirect planned timber development over the next five years to prevent both short-term and long-term AAC losses. For example, undercut forest license volumes are being carried to support the forest industry’s aggressive targeting of high priority MPB-infested timber for harvest during the 2002–2006 cut control period.

In response to a provincial request in October 2002, the federal government announced the Mountain Pine Beetle Initiative (MPBI). The Initiative was included within a suite of federal programs targeted at the forest sector. The MPBI is administered by Natural Resources Canada, Canadian Forest Service (CFS). The CFS has well-established strength in forest health issues and a history of effective cooperation with provincial ministries, universities and other research bodies.

MPBI Epidemic Risk Reduction & Value Capture R&D Program

The MPBI research agenda is intended to be strategic, scientifically sound and a complement to operational needs. The initiative will deliver research and will also focus on the deployment and transfer of knowledge gained from this research. Benchmarks to measure program benefits will include:

- Strengthened forest health strategic planning and increased collaboration among sector stakeholders;
- Improved market knowledge on challenges and opportunities;
- Capacity development in strategic research and technology areas; and
- Effective transfer of the program information and technologies to forest managers and policy-makers.

All MPBI research is subject to a peer-review process and public reporting via the MPBI web site (mpb.cfs.nrcan.gc.ca). The research agenda is defined and all research is assessed against the basic objectives established for the MPBI.
The objectives of the MPBI are:

1. To reduce the impacts of the current epidemic; and
2. To reduce the risk of future beetle epidemics.

Objective 1 – Reduce impacts of current epidemic

Given the scale of the current epidemic and the character of the factors contributing to it, direct control options are, except for emerging beetle hot-spots, overwhelmed. Thus, major ecological, economic and social impacts from the epidemic are inevitable. Although many of the epidemic impacts cannot be eliminated some can be mitigated. One program focus is to reduce the adjustment costs (economic, environmental and social) by analyses of impacts and options.

A. Ecological Processes

The current large areas of beetle-attacked forest and subsequent salvage operations will necessarily affect the ecological character of BC interior forest ecosystems. The focus of beetle management activity will, in large part, shift from conservation of ecosystem function within managed forest landscapes to maintenance of ecosystem function across unmanaged forest landscapes. Key ecological questions include:

- Can/should ecological integrity be maintained in beetle-damaged landscapes?
- What is the post-beetle ecological character of stands?
- What are the ecological risks and opportunities associated with alternative management regimes? What are the beetle impacts on regeneration?
- What is the role of fire in restoring post-beetle landscapes? What are the fuels and fire risk impacts of the beetle?
- What ecological legacies should be sought post-beetle?

Ecological Strategic Objective

Contribute to improved ecological integrity of post-beetle forest landscapes.
Strategic Initiative 1
Development and delivery of decision support tools to evaluate the impacts of various MPB management scenarios on post-beetle landscapes.

Specific Projects
A.1. Landscape level assessments of the density and distribution of damage in post-beetle areas. Data collected will include:
   • Pre-attack age class distribution;
   • History of previous control measures;
   • Frequency distribution of the number of stands with different damage severity;
   • Density and distribution of advanced regeneration in damaged stands; and
   • The influence of spatial and temporal stand attributes on the severity of damage.

A.2. Landscape level assessments of post-beetle changes in hydrological variables (e.g., quantity, quality).

Strategic Initiative 2
Determination of the environmental risks and opportunities associated with regeneration and ecological impacts.

Specific Projects

A.4. Refinement of fire models to reflect post-beetle impacts and examination of historic fire intervals, area distribution and severity in relation to the fire/beetle interaction.

Strategic Initiative 3
Development of stand level decision support tools to improve the ecological effectiveness of post-beetle management prescriptions.

Specific Projects
A.5. Assessment of post-beetle impacts on natural regeneration and improvement options for regeneration.

A.6. Calibration of avian habitat models (as ecological status proxies) in salvaged and un-salvaged beetle damaged stands.
B. Economic Processes

Lodgepole pine is the largest component of the AAC in the interior of BC and this volume will be further augmented by harvest increases in response to beetle-kill. Despite harvest adjustments, BC conservatively estimates a further 200 million cubic metres of beetle-kill timber will remain outside the economic margin for traditional forest products. Unfortunately, the surge in supply is at odds with an increasingly challenging market situation. Timber supply and economic activity will improve in the short to medium term but both will be reduced in the long term.

Adjusting to the beetle’s economic impacts on production, revenues and the economy will require, among other things, information on a number of key questions, including the following:

- What is the timeframe for post-beetle timber recovery from affected stands?
- What will be the impact of post-beetle product profile on continued access to current markets?
- What are the aesthetic, physical and chemical properties at risk and what is the likely market response?

Economic Strategic Objective

Provide information to complement harvesting and production decisions and to maintain markets for manufactured products from post-beetle timber.

Strategic Initiative 1

Development and delivery of market support information on the aesthetic and performance properties of post-beetle wood.

Specific Projects

B.1. Estimation of potential value degrades by product type for post-beetle wood.

B.2. Market analyses of potential response, by product type, to the increasing volume of post-beetle wood.

B.3. Investigation of options and information requirements to absorb post-beetle timber.
**Strategic Initiative 2**

Development and delivery of market support information on the physical properties of post-beetle wood.

**Specific Projects**

B.4. Determination of processing and product performance properties of beetle-killed timber for panel products and lumber.


**Strategic Initiative 3**

Development and delivery of product and market support information on the chemical properties of post-beetle wood.

**Specific Projects**

B.7. Determination of the chemical and processing properties of post-beetle wood for pulp and paper.


**C. Social Processes**

Many BC interior communities are heavily dependent on forest sector performance. In some of these communities 40% or more of after tax revenues is directly derived from forestry. The additional post-beetle timber supply will initially contribute to economic activity but this will inevitably be challenged by the fall-down in timber supply. Resource-dependent communities will be forced to adapt to change as the forest industry restructures to address the reduced timber supply. Adjustment pressures will challenge the sustainability and structure of communities.

The MPBI is not intended to, nor could it, insulate communities from this pressure, but it can provide information on the key questions communities will need to deal with. These will include:

- Can current communities be maintained with an industry restructured to compete in a post-beetle outbreak world?
- What is the socioeconomic resiliency of communities in various parts of the BC interior?
- What is the current structure of the industrial base?
- What externalities (both non-timber and non-market values) are currently at risk?
Social Strategic Objective

Provide analyses and information to assist the province and communities in the post-beetle transition.

Strategic Initiative 1

Development and delivery of information on the potential impacts of the current beetle infestation on resource-based communities.

Specific Projects

C.1. Assessment of the economic resiliency of resource-based communities in the BC interior.

C.2. Assessment of the current and future structure of the forest sector in BC and Alberta.

C.3. Assessment of the relationship of externalities to the forest industry and the beetle damaged resource within different areas of the beetle zone.
Objective 2 – Reduce risk of future epidemics

The reality of much of Canada’s forests, including those in BC, is a mature inventory with a significant vulnerability to forest pests. The large inventory of mature timber limits the effective deployment of pest risk reduction options such as stand thinning, altering the species and/or age mix, and increased harvesting of mature timber. Instead, a more realistic option is to pursue risk reduction by improving the efficiency of forest pest monitoring, risk modeling, response timing and tools for direct control.

The MPBI strategy to reduce the risk of future pest epidemics is to focus on the development and deployment of decision-support tools and models to assist in early detection of pest ‘hot-spots’, improved stand risk estimates, beetle dispersal models, and analyses of economic risks.

Risk Reduction Strategic Objective

Provide decision-support systems that will combine resource inventories and information management with scientifically credible forecasting models to reduce the risk of future large-scale epidemics.

Strategic Initiative 1

Analyses of MPB population response across a hierarchy of scales.

Specific Projects

D.1. Stand-level assessments of MPB population response to natural enemy and competitor complexes and to stand characteristics.

D.2. Landscape-level assessments of population response of MPB to various silviculture regimes.

D.3. Landscape-level assessments of population response of MPB to climate change.

Strategic Initiative 2

Spatial modeling of MPB populations across a hierarchy of scales.

Specific Projects


D.6. Development of a system of integrated risk assessment models based on population dynamics and potential spatial distribution across a range of forest conditions.
Strategic Initiative 3
Enhanced tools to identify, monitor and assess response to MPB populations across forest landscapes.

Specific Projects

D.7. Development of remote sensing technologies to provide improved ‘red-attack’ detection and monitoring capabilities.

D.8. Calibration of risk assessment models across a variety of forest landscapes to determine critical population thresholds that will trigger a suppression response.

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