

Mountain Pine Beetle Research

Eligible Research Topics 2006/07

September 2005

NOTE: Research related to Mountain Pine Beetle is funded through the \$100 million provided by the Government of Canada to the Province to help mitigate impacts of the mountain pine beetle infestation, and must be administered separately from the regular FIA-FSP. This document identifies research topics and priorities that are eligible for funding only under this program.

Research topics eligible for funding under the regular Forest Investment Account Forest Science Program 2006/07 Call for Proposals are identified in two other documents--*Sustainability Program Eligible Research Topics 2006/07*, and *Timber Growth and Value Program Eligible Research Topics 2006/07*.

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Note: Numbering of topics corresponds to that of the Sustainability and Timber Program documents.

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Mountain Pine Beetle Research Eligible Research Topics 2006/07

Introduction

Research related to MPB is funded through the \$100 million provided by the Government of Canada to the Province to help mitigate impacts of the mountain pine beetle (MPB) infestation, and must be administered separately from the regular FIA-FSP. Research topics and priorities eligible for MPB funding are listed in this document.

For research topics eligible for regular FIA-FSP funding, please refer to the *Sustainability Program Eligible Research Topics 2006/07*, and *Timber Growth and Value Program Eligible Research Topics 2006/07*.

Proposals for MPB research must be submitted using the appropriate proposal template, which is available on the PricewaterhouseCoopers website (www.bcfsp.com) under the Call for Proposals tab.

Research topics are organized by theme, with priorities within research topics specified by geographic region. The regions used are those of the Ministry of Forests and Range: Coast (C), Northern Interior (NI), and Southern Interior (SI). A map showing these regions is available at:

<http://www.for.gov.bc.ca/mof/maps/regdis/>

Mountain Pine Beetle Research Eligible Topics and Priorities for 2006/07

This list of research priorities for Mountain Pine Beetle (MPB) funding serves as reference material to support the Forest Science Program Call for Proposals in September 2005 for funding in 2006/07.

The research topics and priorities eligible for MPB funding are listed below. Some priorities drawn from the priorities of the Sustainability and Timber Programs are described in general terms; only their application with respect to, and on areas affected by, MPB (e.g., 1.4) is relevant for funding under this program.

Sustainability Program Topics

Theme 1.0 Ecosystem structure, function and processes, and biodiversity related to forest management

Note that, in addition to other experimental approaches, research that utilizes variable retention and/or alternative silvicultural systems as a treatment framework for experimental research will be considered eligible for funding in all topics in this sub-theme, and may be considered especially appropriate in some cases.

1.1 Riparian ecology and management of small streams

Small streams comprise the majority of total channel length in a stream network, and play a critical function in providing water, nutrients, sediment and energy to downstream reaches. Considerable uncertainty and controversy surrounds the impacts of roads, access management and forest harvesting around small streams, particularly in the requirements and specifications for riparian buffers. Priority areas for research in 2006/07 include:

MPB research priorities for topic 1.1		C	NI	SI
d	Riparian processes altered by MPB and salvage management, and the consequences for stream channel morphology and aquatic habitats.		✓	✓

1.3 Coarse filter approaches to maintaining biodiversity at the landscape scale

Maintenance of biodiversity at a broad scale is related to the maintenance of habitat attributes for a broad array of species using a "coarse filter approach" of allocating representative ecosystems across the landscape and providing connectivity between these patches. The scientific/technical basis for allocating these patches across the landscape is poorly established. A common theme or question is "single large or several small" (SLOSS) in reference to the trade-off inherent in distributing small patches across the landscape (potentially improving representation, but fragmenting the area) versus amalgamating patches into one large unit (thus providing relatively larger areas of undisturbed habitat that may be required by some species). The issue of scale further complicates this question in that different organisms require different areas of suitable

habitat -- so what is a large patch for one species might only be a small patch for another. There is currently little authoritative information to guide selection of scale, amount, or distribution of desired habitats across the landscape, so different consultative processes in B.C. are prescribing different approaches. Areas of research eligible for funding in 2006/07 include:

Research priorities for topic 1.3		C	NI	SI
a	Can current management practices such as MPB salvage operations, retention and partial cutting, create or maintain structures and processes that are effective in maintaining key elements of biodiversity at landscape scales? (Also eligible for regular FSP funding for projects not related to MPB. Please refer to the regular FSP funding documents for the Sustainability Program.)		✓	✓

1.4 Effectiveness of stand-level structures and habitat in maintaining biodiversity

Current stand-level harvesting practices in both old and immature stands include the retention of old-growth attributes and wildlife habitats such as green trees, wildlife tree patches, downed wood, riparian reserves, patches of residual advanced regeneration, and high stumps (created with feller-bunchers). In addition, silvicultural treatments may be used to create old-growth attributes in immature stands; for example: simulating advanced decomposition by halving and hollowing variable diameter logs or hollowing out stumps; creating openings by felling stems; inoculating stems with decay pathogens; thinning around stems; and fertilizing residual trees to encourage accelerated growth. The intent of these practices is to provide or maintain habitat at the stand level, thus enhancing stand-level biodiversity and contributing to landscape biodiversity over time. Areas of research eligible for funding in 2006/07 include:

Research priorities for topic 1.4		C	NI	SI
a	How effective are management strategies in creating and maintaining stand-level attributes or structures needed by wildlife or for biodiversity? (Also eligible for regular FSP funding for projects not related to MPB. Please refer to the regular FSP funding documents for the Sustainability Program.)		✓	✓
b	What are appropriate stand-level targets and configurations of stand-level structures in cutblocks in order to maintain biodiversity (e.g., in MPB attacked areas)? (Also eligible for regular FSP funding for projects not related to MPB. Please refer to the regular FSP funding documents for the Sustainability Program.)		✓	✓
c	What are appropriate targets and configurations of stand level structures in dry forest and open range (grassland, shrubland) in order to maintain biodiversity? (Also eligible for regular FSP funding for projects not related to MPB. Please refer to the regular FSP funding documents for the Sustainability Program.)		✓	✓
d	How effective are such derived structures in maintaining stand-level biodiversity? Effects of management practices on some NTFPs are also of interest in this context. (Also eligible for regular FSP funding for projects not related to MPB. Please refer to the regular FSP funding documents for the Sustainability Program.)		✓	✓
e	How do riparian buffers and their design contribute to maintenance of stand-level wildlife habitat and biodiversity (aquatic, riparian, and upland)? (Also eligible for regular FSP funding for projects not related to MPB. Please refer to the regular FSP funding documents for the Sustainability Program.)		✓	✓

1.6 Watershed Function

Forest practices can significantly influence the movement of water, sediment, woody debris, and energy through a watershed and ultimately influence streamwater quantity, quality and flow timing, as well as stream channel geomorphology and the quality of aquatic habitat.

Watershed processes are complex and many are still poorly understood, particularly in relation to the connection between upslope and stream channel processes. Relevant and effective research may be carried out at both watershed and site specific scales – in the latter case, providing there are ways to extrapolate results accurately to the watershed scale. Information obtained from studies of watershed processes will be used to build and improve watershed response models which in turn will assist decision-makers in selection of appropriate management regimes to meet objectives. Areas of research eligible for funding in 2006/07 include:

Research priorities for topic 1.6		C	NI	SI
a	Evaluating the effects of large-scale tree mortality, salvage logging, and/or accelerated harvesting on watershed processes including peak flows, low flows, water quality, water supplies, and water table response.		✓	✓

Theme 2.0 Decision Support Tools for Sustainable Forest Management

2.6 Ecological Risk Assessment Frameworks

In the absence of adequate empirical information about the effects of MPB and MPB salvage harvesting on resource values and processes across the variety of BEC zones, reliance must be placed on modeling, projections and analysis to provide a basis for planning and management in the shorter term. Modeling of potential impacts and risk analysis relative to hydrological, geophysical and riparian resources is of particular relevance, and insights are needed urgently at both watershed and landscape scales. It is expected that this topic area will be informed by existing empirical information, and that models and analyses would be refined as additional empirical information becomes available. Areas of research eligible for funding in 2006/07 include:

Research priorities for topic 2.6		C	NI	SI
a	Developing frameworks and models for evaluating the resilience and sensitivity of ecosystems to change with emphasis on the hydrological, geophysical, and aquatic resources of MPB infested areas at the watershed and landscape scales.		✓	✓

Timber Growth and Value Program Topics

Theme 4.0 Timber losses to MPB

Description

Finding methods to predict and mitigate timber losses due to MPB.

Note: This theme does not include growth and yield modeling, which is being treated under a separate growth and yield modeling business planning process. For more information, contact the FSB Secretariat (jtanz@cortex.ca).

4.1 Stand and forest dynamics following MPB

Research aimed at understanding and quantifying how stands will develop following MPB attack. Basic research regarding post-attack stand dynamics and succession. Research under this topic may involve the use of growth and yield models, but should not be mainly about growth and yield model development.

Areas of research eligible for funding in 2006/07 include:

Research priorities for topic 4.1		C	NI	SI
a	Quantification of stand and forest change and development following MPB attack (not including growth and yield (GY) modeling, which is being handled in the new GY modeling business planning process) , and impacts on timber supply. Evaluating and estimating timber growth implications on residual trees and regenerated stands, in the understory and in clearcut openings. Includes species interactions related to the scale and pattern of harvesting.		✓	✓
b	Residual stand development with and without treatments (including small and large-scale salvage) under various levels of attack; includes mitigating losses.		✓	✓
c	Growth, development, and health of residual stands (overstory and understory) across a wide range of post-attack stand types and conditions (i.e., mixed species – salvaged; mixed species – unsalvaged; pine dominant – unsalvaged) in different BEC zones.		✓	✓

4.3 Mitigating losses

Strategies and management practices that mitigate losses at an appropriate operational scale and in a cost effective manner. Research under this topic may involve the use of growth and yield models, but should not be mainly about growth and yield model development. Areas of research eligible for funding in 2006/07 include:

Research priorities for topic 4.3		C	NI	SI
b	Mountain pine beetle losses: Silvicultural treatments and regimes, such as fertilization of non-lodgepole pine stands and treatment of repressed lodgepole pine stands, to accelerate operability and enhance mid-term timber supply.		✓	✓

Theme 5.0 Analytical techniques and models for strategic analysis

Description

Development of new tools and the improvement of existing tools to support analysis of timber and non-timber forest product (NTFP) supply, or the joint production of timber and non-timber values for resource analysis or local land-use planning.

5.3 Techniques for scheduling harvesting after MPB attack

This topic, which was a high priority in the MOFR MPB Stewardship Research Strategy, includes research to create and implement tools and information to facilitate landscape-level planning.

Areas of research eligible for funding in 2006/07 include:

Research priorities for topic 5.3		C	NI	SI
a	Allocation of post-attack live volumes to harvesting schedules		✓	✓
b	Design of retention and salvage harvesting at scales ranging from individual cutblocks through landscape units to entire management units		✓	✓

Forest harvesting and engineering studies on salvaging MPB-killed timber

This topic includes forest engineering research aimed at enabling cost-effective and environmentally appropriate salvaging of timber killed by MPB. This topic does not include research related to manufacturing with timber killed by MPB, i.e., utilization of the MPB-killed logs after they reach the mill. Areas of research eligible for funding in 2006/07 include:

Research priorities		C	NI	SI
a	Forest engineering studies relating to designing efficient, cost-effective and environmentally appropriate methods of harvesting and hauling MPB-killed timber.		✓	✓
b	Studies to quantify the rates and amount of deterioration of MPB-killed timber, and to mitigate potential losses.		✓	✓