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FIA-FSP

Forest Science Board

**Sustainability Program**

**Eligible Research Topics**

**2006/07**

September 2005

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NOTE : The 2006/07 Call for Proposals is focused on a subset of the program themes and topics. Please refer to the *Sustainability Program Research Strategy 2006-2016* for the complete set of themes and topics.

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## Sustainability Program— Eligible Research Topics 2006/07

### Introduction

The research topics and priorities described in this document are those eligible for funding under the Sustainability funding category of the Forest Investment Account Forest Science Program (FIA-FSP) in 2006/07. For simplicity of presentation, this document includes only the research topics and priorities eligible for funding in 2006/07. The ten-year research strategy of the Sustainability Program Advisory Committee (SPAC), *Sustainability PAC Research Strategy 2006-2016*, includes the complete list of research topics and provides context for understanding this year's priorities. It is available from the PricewaterhouseCoopers website ([www.bcfsp.com](http://www.bcfsp.com)) with other information related to the Call for proposals.

Research related to high-priority mountain pine beetle (MPB) issues is funded separately; see the section below on submitting proposals for MPB research. Proposals for regular and MPB research must be submitted using the appropriate proposal templates, which are available on the PricewaterhouseCoopers website. Note that proposals submitted for regular FSP funding will not be disqualified if incidentally relevant to MPB. Some topics may be eligible for funding under either the regular FSP or MPB funding, depending on whether the focus of the research is MPB.

The research topics and priorities described in this document are those eligible for research funding under the 2006/07 Call for Proposals. Proponents interested in funding for long-term research installation (LTRI) infrastructure should refer to the ten-year strategies of the Sustainability and Timber Programs, which identify long-term research priorities.

Note that range-related proposals in any of the eligible research areas will be considered eligible for funding. Note that no priority ranking is implied by the numbering of research topics.

This year the SPAC's determination of research priorities was more detailed than in 2004/05. As previously, research topics are organized by theme, but this year priorities within research topics are specified individually and 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/>

### MPB-Related Research

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 infestation, and must be administered separately from the regular FIA-FSP. Research topics and priorities eligible only for MPB funding are listed in the MPB priorities document: *Mountain Pine Beetle Research – Eligible Research Topics 2006/07*.

## Research Topics and Priorities for 2006/07

This list of research priorities is a compilation and synthesis of input provided by the Sustainability Program Advisory Committee (SPAC) at the request of the FIA Forest Science Program Forest Science Board (FSB). It serves as reference material to support the Forest Science Program Call for Proposals in September 2005. Proponents interested in funding for long-term research installation (LTRI) infrastructure should refer to the ten-year strategies of the Sustainability and Timber Programs.

The research topics and priorities eligible for funding in 2006/07 are a subset of those identified in the SPAC's ten-year strategy. This narrowing of focus was felt necessary by the FSB to ensure that the scarce funds of the FIA-FSP are used efficiently and effectively.

### 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:

Research priorities for topic 1.1		C	NI	SI
a	Sensitivity of small stream ecosystems to alternative riparian management strategies including livestock use (e.g., water quality; channel morphology; biological effects).	✓	✓	✓
b	Sensitivity of wetland ecosystems to alternative riparian management strategies including livestock use.			✓
c	Biodiversity value of wetland riparian zones, especially in dry Interior ecosystems.			✓

#### 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? <b>(Also eligible for MPB funding for MPB-related projects. Please refer to the MPB funding documents.)</b>	✓	✓	✓
b	How do different landscape level management approaches affect different species?	✓	✓	✓
c	Are there species or groups of species that can be used to infer habitat condition for a variety of other species – if so, which ones?	✓	✓	✓

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? <b>(Also eligible for MPB funding for MPB-related projects. Please refer to the MPB funding documents.)</b>	✓	✓	✓
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)? <b>(Also eligible for MPB funding for MPB-related projects. Please refer to the MPB funding documents.)</b>	✓	✓	✓
c	What are appropriate targets and configurations of stand level structures in dry forest and open range (grassland, shrubland) in order to maintain biodiversity? <b>(Also eligible for MPB funding for MPB-related projects. Please refer to the MPB funding documents.)</b>			✓
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. <b>(Also eligible for MPB funding for MPB-related projects. Please refer to the MPB funding documents.)</b>	✓	✓	✓
e	How do riparian buffers and their design contribute to maintenance of stand-level wildlife habitat and biodiversity (aquatic, riparian, and upland)? <b>(Also eligible for MPB funding for MPB-related projects. Please refer to the MPB funding documents.)</b>	✓	✓	✓

## Theme 2.0 Decision Support Tools for Sustainable Forest Management

### 2.1 Habitat Supply Modeling

Habitat supply models are computer-driven tools that provide decision makers with information about the potential habitat-related impacts of various land use management options, including trends into the medium and long term. Habitat supply modeling research is generally needed to improve the interpretation of habitat values derived from forest-, landscape- and stand-level ecological attributes by identifying, evaluating and/or constructing habitat supply models relevant to flora and fauna in BC. Priority is to be given to those species or communities designated under the Forest and Range Practices Act and regulations as "at risk", "regionally significant", or "specified ungulates", and to non-timber forest products (NTFPs) as they affect forest management. Areas of research eligible for funding in 2006/07 include:

Research priorities for topic 2.1		C	NI	SI
a	Developing, calibrating and validating habitat models related to priorities identified in Theme 1.0 (Ecosystem structure and processes, and biodiversity related to forest management), Topic 3.2 (Indicator targets and thresholds of sustainability) and for decision support related to priorities in Theme 4.0 (Scientific information to inform policy, regulations, and standards development). Nontimber forest products may also be treated in this manner.	✓	✓	✓
b	Evaluating the effectiveness of fish habitat capability models in identifying high value fish habitat.	✓	✓	✓

## Theme 3.0 Sustainable Forest Management Indicators, Targets, and Monitoring Systems

### 3.1 Development of Indicators and monitoring systems

Sustainable forest management involves the application of criteria and indicators. To be appropriate as management tools, variables used as indicators must be sensitive to the state of a system and provide unambiguous information about the system's response to forest management. They must also be measurable using cost-effective monitoring systems that are technically sound, scientifically based, and have adequate resolution in time and space to accurately document the range of variability and the impacts of forest practices. Areas of research eligible for funding in 2006/07 include:

Research priorities for topic 3.1		C	NI	SI
a	Indicators and monitoring systems are needed for each of the 11 FRPA values (i.e., soils, visual quality, timber, forage and associated plant communities, water, fish, wildlife, biodiversity, recreation resources, resource features, cultural heritage values). A non-restrictive list of examples: riparian function, watershed function, ecological representation, habitat quality.	✓	✓	✓
b	Range health (upland and riparian).	✓	✓	✓
c	Identifying aquatic species (benthic invertebrates, algae, fish, etc.) that can be used as indicators of watershed health.	✓	✓	✓
d	Developing and evaluating uses of remote sensing, information systems, and innovative technology to assess landscape and stand level characteristics.	✓	✓	✓

### 3.2 Indicator targets and thresholds of sustainability

Having reliable and quantifiable indicators of sustainability for resource values provides for the ability to establish targets for each value. However, given the natural dynamics of ecological systems, it's unlikely that management will always be able to accomplish targets exactly or to maintain target levels with any degree of stability. It is important therefore to identify appropriate targets and thresholds within which, or in relation to which, management can be concluded to achieve the desired results (i.e., relatively stable equilibria that allow for some degree of dynamics). This research will contribute toward the identification of methods to derive scientifically based targets and thresholds for key indicators of forest resource values. It will also contribute to the actual definition of thresholds and targets.

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

Research priorities for topic 3.2		C	NI	SI
a	Identifying thresholds for biodiversity indicators at all coarse and fine filter levels.	✓	✓	✓
b	Determining the likely range of natural variation of coarse- through fine-filter indicators as a means to assess potential targets and management thresholds.	✓	✓	✓
c	Defining criteria suitable for assessing the ecological representation, landscape, and site attributes needed to maintain wildlife and biodiversity, and how best to allocate them across the landscape.	✓	✓	✓
d	Assessing potential indicator targets and management thresholds for sensitive species and ecological communities, especially those species and communities designated under the Forest and Range Practices Act and regulations as: "at risk", "regionally significant", or "specified ungulates". (Also see the <i>Sustainability PAC Research Strategy 2006-2016</i> topic 2.2 - Population viability and spatially explicit population models, and 4.1 – Species-at-risk recovery research.)	✓	✓	✓
e	Clarify and/or refine thresholds for indicators of watershed functioning (e.g., road density, equivalent clear-cut area).	✓	✓	✓

### 3.3 Indicators for economic and social sustainability

Some important areas of research could help address the need for indicators of economic and social sustainability in land-use planning. These include development of social and economic indicators, and frameworks and techniques for projecting such indicators. Areas of research eligible for funding in 2006/07 include:

Research priorities for topic 3.3		C	NI	SI
a	Devising appropriate methods for valuing non-timber economic values (consumptive and non-consumptive) for effective inclusion in forest and land management plans.	✓	✓	✓
b	Identifying patterns of values and perceptions of various stakeholder/public groups about the relative importance of social, economic and ecological factors.	✓	✓	✓
c	Mechanisms for aggregating social and economic data for use in land-use planning processes.	✓	✓	✓
d	Identifying socially acceptable mechanisms for compensating companies if required changes in forest practices negatively affect them.	✓	✓	✓

**Theme 4.0 Scientific information to inform policy, regulations, and FRPA practice requirements**

4.1 Species at Risk- Recovery Research

Species at Risk represent a significant and immediate challenge to the goal of sustainability. Their high visibility and the irreversible nature of their loss make listed species a high and urgent priority for sustainability research. First priority is to address knowledge gaps for species (1) named under FRPA, or (2) species without recovery plans.

Priority species (in order) are those listed in the federal Species at Risk Act (SARA) Schedule 1, listed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as endangered or threatened, on the B.C. Conservation Data Centre (CDC) "red list", COSEWIC-listed species of "Special Concern", and CDC "blue list" species.

Research should also focus on knowledge gaps related to (but not limited to) the following species of immediate concern to forest managers in B.C.: Spotted Owl, Mountain Caribou, Queen Charlotte Islands Goshawk, Marbled Murrelet, Grizzly Bear, Tailed Frog, Coho/Cutthroat Trout (small stream species), and Bull Trout. Areas of research eligible for funding in 2006/07 include:

Research priorities for topic 4.1		C	NI	SI
a	Determining critical habitat requirements for species at risk, defined at the appropriate scale.	✓	✓	✓
b	Clarifying and/or assessing threats to species or ecosystems at risk, particularly those with cumulative effects or where evidence is conflicting.	✓	✓	✓
c	Understanding the effects of management practices (particularly forest roads, harvesting, livestock use, exclusion/re-introduction of fire, large-scale salvage) on the ecology of species at risk.	✓	✓	✓
d	Determining how specific threats may be mitigated or recovery mechanisms developed to assist recovery.	✓	✓	✓