FIA-FSP

Forest Science Board

Sustainability Program

Eligible Research Topics 2007/08

September 2006

NOTE: The 2007/08 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—
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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 2007/08. For simplicity of presentation, this document includes only the research topics and priorities eligible for funding in 2007/08. 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) with other information related to the Call for Proposals.

Note that no priority ranking is implied by the numbering of research topics.

As previously, research topics are organized by theme, and 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 Research

Research related to high-priority mountain pine beetle (MPB) issues is funded separately. Research related to MPB is supported through funding provided by the Government of Canada to the Province, and is administered separately from the regular FIA-FSP. Research topics and priorities eligible only for MPB funding are listed in *Mountain Pine Beetle Research – Eligible Research Topics 2007/08*. **Note that this year, only proposals for single-year projects are being considered for MPB research funding.**

Submitting proposals

Proposals for regular and MPB research must be submitted using the appropriate proposal templates, which are available on www.bcfsp.com. Note that proposals submitted for regular FIA-FSP funding will not be disqualified if incidentally relevant to MPB. Some topics may be eligible for funding under the regular FIA-FSP or MPB research funding, depending on the focus of the research (Table 1).

Table 1. Sustainability program eligible topics in the Regular and MPB Research Call for Proposals for 2007/08

	Theme/Topic	Regular	MPB
1	**Ecosystem structure, function and processes, and biodiversity related to forest management**		
	1.1 Riparian ecology and management of small streams	✓	✓
	1.3 Coarse filter approaches to maintaining biodiversity at landscape scale	✓	✓
	1.4 Effectiveness of stand-level structures and habitat in maintaining biodiversity	✓	✓
	1.5 Natural disturbance ecology		✓
	1.6 Watershed function		✓
2	**Decision support tools for sustainable forest management**		
	2.1 Habitat supply modeling	✓	✓
	2.3 Watershed response		✓
	2.6 Ecological risk assessment framework		✓
3	**Indicators, thresholds and monitoring systems**		
	3.2 Indicator thresholds of sustainability	✓	
	3.3 Indicators for economic and social sustainability	✓	
	3.4 Methods for balancing social, econ. and environ. indicators of sustainability	✓	
4	**Scientific information to inform policy, regulations, FRPA requirements**		
	4.1 Species at Risk recovery research	✓	

Eligible Sustainability Research Topics and Priorities for 2007/08

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-FSP Forest Science Board (FSB). It serves as reference material to support the FIA-FSP Call for Proposals in September 2006. The research topics and priorities eligible for funding in 2007/08 are a subset of those identified in the Sustainability Program ten-year strategy. The FSB felt it necessary to focus spending as a means of ensuring that the FIA-FSP funds are used efficiently and effectively.

Proposals addressing topics identified in the ten-year strategy that are not identified as priorities for 2007/08 will also be considered under the "proponent-driven" category in the Call for Proposals. Funding for long-term research installation (LTRI) infrastructure and maintenance is carried out as a separate program under the 2007/08 Call for Proposals.

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 harvesting and/or alternative silvicultural systems as a treatment framework for experimental research will be considered eligible for funding in all topics in this 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 2007/08 include:

	Research priorities for topic 1.1	C	N I	S I
a	Sensitivity of small stream ecosystems to alternative riparian management strategies including livestock use (e.g., water quality; channel morphology; biological effects).	✓	✓	✓
b	Biodiversity value of the riparian zones of small streams.	✓		
c	Consequences of MPB salvage and management on riparian character and function of small streams and wetlands, and other aquatic habitats (e.g., channel morph, stream temperature, organic matter dynamics). **(Also eligible for MPB funding – please refer to the MPB research funding document.)**		✓	✓
d	Sensitivity of wetland ecosystems to alternative riparian management strategies including livestock use.			✓
e	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 2007/08 include:

	Research priorities for topic 1.3	C	N I	S I
a	How do various landscape-level attributes contribute to achieving coarse-filter biodiversity conservation goals (e.g., seral stage distribution, patch size distribution, ecosystem representation in reserves, riparian networks)?	✓	✓	✓
b	Can current management practices, such as MPB salvage operations and variable-retention harvesting, create or maintain structures and processes that are effective in maintaining key elements of biodiversity at landscape scales? **(Also eligible for MPB funding – please refer to the MPB research funding document.)**	✓	✓	✓
c	How do different landscape level management approaches affect different species?	✓	✓	✓
d	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 2007/08 include:

	Research priorities for topic 1.4	C	N I	S I
a	What stand-level attributes are required to meet wildlife habitat needs and maintain biodiversity?	✓		
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 MPB funding – please refer to the MPB research funding document.)**	✓	✓	✓
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 MPB funding – please refer to the MPB research funding document.)**			✓

d	How effective are management strategies in creating stand-level structures and how effective are these in maintaining stand-level biodiversity, non-timber forest values and rangeland habitat? **(Also eligible for MPB funding – please refer to the MPB research funding document.)**	✓	✓	✓
e	How do riparian buffers and their design contribute to maintenance of stand-level wildlife habitat and biodiversity (aquatic, upland and riparian)? **(Also eligible for MPB funding – please refer to the MPB research funding document.)**	✓	✓	✓

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 B.C. Priority is to be given to those species or communities designated under the *Forest and Range Practices Act* and regulations as "at risk", and to non-timber forest products (NTFPs), as they affect forest management. Other species at risk and hunted and trapped species are also applicable. Areas of research eligible for funding in 2007/08 include:

	Research priorities for topic 2.1	C	N I	S I
a	Developing, calibrating and validating habitat models related to priorities identified in Section 1.0 (Ecosystem structure, function and processes…), Section 3.2 (Thresholds...) and for decision support related to priorities in Section 4 (Species at risk…). NTFPs may also be treated in this manner. **(Also eligible for MPB funding – please refer to the MPB research funding document.)**	✓	✓	✓
b	Evaluating the effectiveness of fish habitat capability models in identifying high-value fish habitat.	✓	✓	✓

Theme 3.0 Indicators, thresholds, and monitoring systems

3.2 Indicator 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 is 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 range of 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 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 2007/08 include:

	Research priorities for topic 3.2	C	N I	S I
a	Defining the response curves for biodiversity indicators to assist in identifying thresholds for maintaining ecological resilience.	✓	✓	✓
b	Determining the likely range of natural variability (biological and biophysical) of coarse- through fine-filter indicators to aid in the determination of 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 4.1 – Species-at-risk recovery research.)	✓	✓	✓
e	Clarifying and/or refining thresholds for indicators of change in 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 2007/08 include:

	Research priorities for topic 3.3	C	N I	S I
a	Devising appropriate methods for valuing non-timber economic values (consumptive and non-consumptive) for effective inclusion in forest and land management plans.	✓	✓	✓
b	Mechanisms for aggregating social and economic data for use in land-use planning processes.	✓	✓	✓
c	Quantifying impacts on affected parties, and identifying socially acceptable mechanisms for compensation.	✓	✓	✓

3.4 Methods for balancing social, economic, and environmental indicators of sustainability

There is a need for reliable and cost-effective indicators that are representative of social, economic and environmental values. Collectively, these indicators provide a measure of the degree to which values are being maintained. Sustainable forestry is a matter of balance. It involves making valuation and trade-off decisions about environmental, economic, and social values. These decisions are reflected in strategic land-use plans developed through public planning processes and implemented by government, licensees and other stakeholders through operational plans. Areas of research eligible for funding in 2007/08 include:

	Research priorities for topic 3.4	C	N I	S I
a	Process and criteria for setting thresholds, establishing targets and examining trade-offs between ecological and socio-economic indicators, especially in multi-stakeholder planning processes.	✓	✓	✓

b	Implications and management of changing access patterns on non-timber resource use (e.g. fish, wildlife, recreation).	✓	✓	✓

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.

Research should address knowledge gaps for species and ecological communities named under FRPA; 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, threatened, or extirpated; and on the B.C. Conservation Data Centre (CDC) Red and Blue Lists.

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.

Consideration will also be given to proposals dealing with COSEWIC-candidate species or species that are designated "Data Deficient" and that are named in the CDC Red or Blue Lists.

Areas of research eligible for funding in 2007/08 include:

	Research priorities for topic 4.1	C	N I	S I
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.	✓	✓	✓