BRITISH COLUMBIA

File: 10117-20

February 24, 2005

Re: **Forest Inventory and Monitoring Strategy for the Mountain Pine Beetle Areas**

Dear Colleague: (list attached)

The Ministry of Forests has initiated the development of a **Forest Inventory and Monitoring Strategy for the Mountain Pine Beetle Areas,** which is an important component of the broader strategy required to address the current mountain pine beetle infestation. We have retained D.R. Systems Inc. to undertake the development of this strategy. D.R. Systems and their consulting team will be utilizing a Challenge Dialogue process (see Eight Keys and Challenge Paper attached) as a tool to gather information necessary for the strategy. At this time, I would like to invite you to participate in this Challenge Dialogue aimed at informing the development of the inventory strategy.

At this formative stage of the Challenge Dialogue, staff envision the inventory and monitoring strategy to focus on the following —

> **The development of a strategic plan for forest inventory and monitoring activities in mountain pine beetle areas that meets the short and long term business needs of government agencies, the forest industry and other key stakeholders. The plan must:**
>
> 1. **consider information requirements of forest managers and of the chief forester for AAC determinations;**
> 2. **address, to the extent feasible, the information requirements for management for other forest and resource values by government, industry and communities;**
> 3. **be achievable and sustainable in appropriate timeframes under existing and foreseeable technology, institutional and resourcing conditions.**

VANCOUVER 2010

Staff are championing the development of an inventory and monitoring strategy because data and information about the infestation is so critical to making knowledgeable decisions about the infestation and its impact on the provincial forest and associated ecosystems. Whether you're a resource manager, forest professional, or BC citizen, the development of a strategic inventory plan is vital to ensure we have the best data to make current and future decisions about how the province manages its forests at risk. Ultimately these decisions will have impacts on the province's economy and resource-dependant communities.

Ministry of Forests Forest Analysis Branch

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We are inviting a diverse group[1]: of practitioners and innovative thinkers to explore this Challenge with us, following a disciplined process called the Challenge Dialogue System™ (CDS). Dialogue in this context isn't "just talk", but rather is purposeful conversation among a diverse set of players whose individual views and collaborative thoughts are essential for addressing the challenge. This conversation is designed to unleash innovative thinking that will lead to a collaborative strategy - including options for innovation solutions that are relevant and will have tangible benefits to all who have a stake in the application and/or use of forest inventory and monitoring data.

You have been invited to participate in this Challenge Dialogue because the Organizing Team:

- believes you have a clear interest and possibly a direct stake in the outcomes.
- respects your opinion and believe you have many relevant and good ideas to contribute.
- believes you are open to exploring new ideas and engaging in some out-of-the-box thinking that will be beneficial for addressing this rather large and daunting challenge.

The Challenge Dialogue process is a flexible approach that will nurture creative thinking and reactions to the Key Challenge stated above. The process has sufficient structure to ensure that our limited time together at a face-to-face workshop[2], tentatively scheduled for **March 30th**, will be highly focused and productive. More details on the workshop will be made available in the next few weeks.

Assuming you are able to participate in the process, here is what is involved:

- **Please provide your response to the attached *Challenge Paper* using the Feedback document. You will have 12 days to provide your input — your feedback is required by the end-of-day Monday, March 7th. This Challenge Paper and your feedback to it sets important context for the face-to-face Workshop[2].**
  - Please send your completed feedback document directly to Don Reimer at dreimer@drsystemsinc.com.
  - Your feedback will be synthesized by the Organizing Team into a ***Workshop Workbook***, which will be provided electronically to the Dialogue participants a few days before the workshop. (Note: In this synthesis, your comments will not be attributed to you by name or affiliation.)
  - Your response to this pre-Dialogue will also help us structure the workshop to maximize the efficiency of our interactions.
- **Participation in a one-day, face-to-face workshop tentatively set for March 30, 2005 (location to be determined). The goal of the workshop will be to:**
  - Confirm where there is an alignment of views.
  - Reach or move closer to alignment in areas of difference.
  - Obtain clarity where there is confusion and fill in any gaps in understanding.
  - Develop the main elements and options for the Recommended Strategy (Note - the initial expectations for this Dialogue and the Workshop are contained in the Challenge Paper).
- **Commit to doing your part in making sure we collectively practice the "Eight Keys to Productive Dialogue" (attached).**

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[1] Note, over 100 stakeholders and other professionals representing both the business need and technical side of this challenge have been invited to participate.

[2] Please note, due to practical constraints, we regret that only a representative subset of the Challenge Paper participants will be able to attend this workshop. This underscores the importance for people to provide their perspectives via the feedback document. These views will be brought forward in the ongoing Dialogue and workshop sessions.

As mentioned earlier, we have retained the assistance of D.R.Systems Inc[3]. They and their consulting team will be working closely with us on the Challenge Dialogue process to complete the development of the strategy. Please note, if there are other people you think would also have an interest in responding to this Challenge Paper or who you feel may be more appropriate, please pass the documents along.

This is your chance to provide input and future direction regarding inventory activities in the areas affected by the mountain pine beetles.

In advance, thank you for your contribution!

Yours truly,

Melanie Boyce, Director
Forest Analysis Branch
Ministry of Forests

Attachments (4)

- *List of Participants*
- *Eight Keys to Productive Dialogue*
- *Challenge Paper*
- *Challenge Paper appendices*

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[3] Don Reimer, D.R. systems inc.; Keith Jones, R. Keith Jones & Associates; Warren Eng, Atticus Resource Consulting Ltd.; Michal Lodin, GeoSpatial International; and James Ramsay, AeroLight Imaging Inc.

Distribution List Name: Challenge Dialogue

"Challenge Dialogue" Distribution List - Re: MPB

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Innovation Expedition

Eight Keys to Productive Dialogue[1]

1. Treat dialogue as a journey rather than an event.

Workable solutions to complex challenges rarely emerge full-blown from one meeting or conversation. They more often grow over time as people exchange ideas, go away and think about them, do some research to fill in knowledge gaps, exchange further ideas, do some focused planning and thinking together, and so on. In this Dialogue, we will

- Stay disciplined and inclusive, keeping the momentum building
- Be explicit about the purpose and the outcomes of each interaction, ensuring that each builds on what came before and sets the stage for the next one.

2: Invest in defining the challenge clearly, creating and documenting shared understanding.

Sometimes teams are so anxious to get going they leap into action without making sure they share an understanding of their task – only to find that subsequent discussions seem to be going around in circles. We intend to:

- Invest in developing shared understanding of what the challenge is and why it's important
- Surface assumptions, learning when and how to say things that we think "go without saying"
- Use the process of actually writing things down to confirm shared understanding and/or surface areas of misalignment.

3. Learn how to collaborate and co-create.

Complex challenges involving multiple, diverse players require high levels of collaboration focused on co-creating solutions. The best way to learn how to collaborate is to actually practice it – keeping part of our brains focused on tracking what's happening while it's happening. To do this, we will:

- Establish initial "rules of the road" to guide our collaborative effort
- Assess in real time what's working well, what we want to do better or differently, what we want to stop doing
- Build trust and have fun.

4. Embrace diverse thinking as a foundation for innovation.

Many of us are naturally inclined or have been trained to avoid contention, preferring not to raise topics or ideas that will threaten the harmony of a gathering or conversation. There are times when this is a good strategy. But breakthrough thinking and innovative solutions are often born in the interplay between radically divergent perspectives and opinions. To encourage this, we will:

- Include people with diverse perspectives and experience in the Dialogue
- Work hard to avoid "group think"
- Learn how to constructively talk about differences, disagree with an idea without attacking the individual expressing it, question assumptions and easy answers, and stretch our own and others' thinking.

5. Know when to move to action.

The process of addressing a complex challenge involves both expansive exploration (creative thinking about what's possible) and focus (practical thinking about where to start). In this Dialogue, we will:

- Understand the current state as a prerequisite for determining how to move from what is to what could be
- Engage in out-of-the-box thinking about how to address the challenge
- Establish criteria for assessing options and achieving team alignment
- Create action plans that include objectives and timelines (linked to measures), resource requirements, potential barriers and strategies to overcome them
- Engage key players in implementation through effective communication strategies.

6. Use technology wisely.

Communication technologies made possible by the Internet expand the team's ability to collaborate on the challenge anytime, anywhere. We will decide how to take best advantage of available technology for the purposes of this Dialogue.

7. Agree on how success will be measured.

Early clarity on how we will know we've succeeded in addressing the challenge will help us focus, assess priorities, and move effectively from planning to action. In this Dialogue, we will:

- Choose the right indicators to make up our "scorecard" (e.g. funder/shareholder return, customer/client satisfaction, process efficacy, team member productivity/learning) and agree on desired results and timelines
- Track performance data and use the data to improve performance.

8. Plan ahead to sustain the achievement.

Sustaining the change coming out of the challenge requires integration into ongoing infrastructure, systems, and processes. All dialogues produce good ideas and learning that could benefit others; some dialogues result in significant change. We will strive to:

- Build the leadership systems required to sustain success
- Develop environments that foster ongoing innovation
- Capture the knowledge created by the dialogue, integrate the new knowledge with existing knowledge, and make this knowledge available to others
- Identify key processes impacted by the change and re-design processes to reflect the change.

[1] *The Eight Keys to Productive Dialogue* represent some of the essential principles that underpin the Innovation Expedition's *Challenge Dialogue System*^{TM} (CDS), an efficient and effective vehicle for engaging diverse stakeholders and helping them collaborate and innovate in order to accomplish a complex task. CDS is a structured but flexible methodology for moving a team of people from ideas to action quickly and effectively. For more information on CDS please visit the Innovation Expeditions website at www.innovationexpedition.com .

Challenge Paper *The Challenge Dialogue System™*

Development of a Strategic Plan for Forest Inventory and Monitoring Activities in Mountain Pine Beetle Areas

Forest Analysis Branch
BC Ministry of Forests

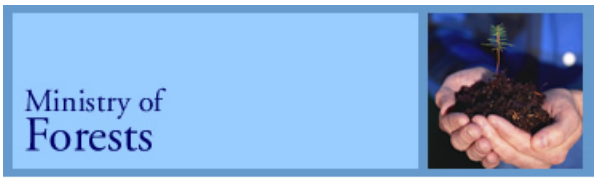
Prepared for and Co-Championed by —

Melanie Boyce, Forest Analysis Branch, Ministry of Forests

Fern Schultz, Resource Information Branch, Ministry of Sustainable Resource Management

Prepared by —

Don Reimer, Keith Jones, James Ramsay, Michal Lodin and Warren Eng



February 23, 2005

Response due: March 7, 2005

The Challenge Dialogue System

We are using the Challenge Dialogue System™ (CDS) developed by the *Innovation Expedition* to guide our Dialogue prior to and during the face-to-face workshop on the Forest Inventory and Monitoring Strategy for the Mountain Pine Beetle Areas.

CDS is an efficient and effective vehicle for engaging diverse stakeholders and assisting them to collaborate and innovate in order to accomplish a complex task. CDS is a structured but flexible methodology for moving a team of people from ideas to action quickly and effectively. More information on CDS is available at the Innovation Expedition's website at: www.innovationexpedition.com.

Don Simpson and Keith Jones, Innovation Expedition

A few words about this *Challenge Paper*…

This Challenge Paper is not the Inventory and Monitoring Strategy. It is also not meant to be a fully polished business report or rigourous "technical paper". Rather, it is intended to be a working document which, in a short period of time, has cobbled together different pieces of information from a variety of sources to help get everyone on the same page, and to serve as a basis to begin a purposeful Dialogue around this important topic.

We have little doubt that the Challenge Paper contains some errors and misinterpretations. That's OK and we are counting on you, the participant in the electronic Dialogue, to note these and to set us straight. In fact we even planted a few errors just to see if you are paying attention! The Challenge Paper also has tried to advance some important assumptions — you know, the things that "go without saying" — and some initial questions and ideas regarding our Key Challenge. Appendix 1 provides a descriptive graphic of the full Challenge Dialogue process.

Have fun working your way through this. We really appreciate your help and look forward to receiving your important ideas to help us craft an innovative and practical strategy.

The Consulting Team

"I don't exactly know what it means, but I love the action."

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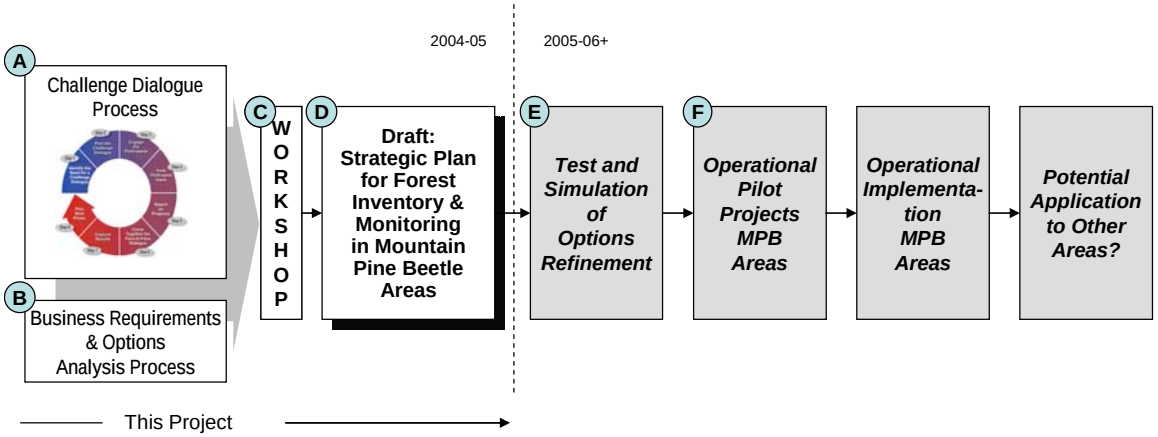
APPENDICES UNDER SEPARATE COVER

Project Context — Inventory and Monitoring Strategic Plan

Overview of Major Steps in Strategic Plan Development and Implementation (from Project Work Plan)



Challenge Paper

Development of a Strategic Plan for Forest Inventory and Monitoring Activities in Mountain Pine Beetle Areas

Purpose of the Challenge Paper

The purpose of this Challenge Paper[1] is to prompt a meaningful conversation among the users of forest inventory information and inventory and resource management specialists, **in advance** of a March 30 face-to-face Workshop, around the Key Challenge stated below. In doing this we wish to:

- To build a baseline of understanding among participants regarding:
  - The Key Challenge that has brought us together
  - Why it is important that we address it now
  - How we will collaborate to address it (Challenge Dialogue System)
- To initiate an exchange of ideas and questions electronically before the Workshop (e-mail and attached documents) that will allow us to make the most effective use of limited time together at a face-to-face Workshop Session on March 30, 2005.

Please note, due to practical constraints, we regret only a representative subset of the Challenge Paper participants will be able to attend this workshop[2]. This underscores the importance for people to provide their perspectives via their response to this Challenge Paper. These views will be brought forward in the ongoing Dialogue and workshop sessions.

At various points in the paper you will be asked for your reaction and further input. The Feedback Document (a separate file) lists these input requests to make it easy for you to record and e-mail your contribution to Don Reimer, dreimer@drsystemsinc.com **by end-of-day March 7, 2005.**

The Key Challenge Statement

At the initial stages of this Challenge Dialogue, ministry staff envision the inventory and monitoring strategy will need to focus on the following —

The development of a strategic plan for forest inventory and monitoring activities in mountain pine beetle areas that meets the short and long term business needs of government agencies, the forest industry and other key stakeholders. The plan must:

1. **consider information requirements of forest managers and of the Chief Forester for AAC determinations;**
2. **address, to the extent feasible, the information requirements for management for other forest and resource values by government, industry and communities; and**
3. **be achievable and sustainable in appropriate timeframes under existing and foreseeable technology, institutional and resourcing conditions.**

[1] The *Challenge Paper* is one of a number of tools developed by the Innovation Expedition for its *Challenge Dialogue System™* — a disciplined process that engages diverse groups on discovering collaborative and innovative solutions to complex challenges.
[2] Note, over 100 stakeholders and other professionals representing both the business need and technical side of this challenge have been invited to participate.

Background

Many events have led us to our Key Challenge. Some of the background highlights are summarized below. They are included to help ensure that the Dialogue participants are all more or less on the same page in terms of the history of how we got to this point. A review of this information may prompt some participants to point out other important background information or documents that will inform this Dialogue or that will prompt further assumptions, questions, issues or ideas that warrant consideration.

The Background statements have been broken down into four themes: (a) information regarding **current resources inventory and monitoring**; (b) information regarding **related inventory and monitoring initiatives and changes**; (c) information regarding **business requirements for timber supply analysis for AAC determination**; (d) information regarding **MPB and resource information needs**.

In Appendix 2, under separate cover, additional background information has been provided for any participants that are less familiar with the MPB outbreak and the management response to the MPB outbreak thus far.

Background Regarding Current Resource Inventory and Monitoring

1. **The change in provincial government in 2001** significantly changed mandates, organizational structures, roles and responsibilities, resourcing levels, and priorities which in turn have affected how resource information is collected, interpreted and reported. The government's natural resources-environmental portfolio and the formation of MSRM consolidated most of the land and resource information capacity at the provincial level with the aim to make it more consistent, corporate, integrated and accessible. Most, but not all, of the information staff and resources from the contributing ministries were united under MSRM.

2. **Land Information BC.** Land Information BC is the flagship information service initiative of the MSRM[3]. It is a new vision for the effective delivery of integrated, science-based land, resource and geographic information in support of government's vision of economic development and a vibrant provincial economy, a sustainable environment and healthy communities. Key features include: (a) single window to the land and resource information, products and services for business, industry, academia, governments and the public; (b) delivery through partnerships, agreements and alliances with other businesses, industry and governments; (c) easy access to natural resource, land ownership and legal interest information to enable economic opportunity and development efforts, various levels of planning, First Nation opportunities and Treaty negotiations, business and citizens activities through e-services and the protection and stewardship of provincial resources; (d) broaden to enable integration of social and economic information over the long-term; (e) transformation of MSRM's business to a client focused service.

3. **The Resource Information Branch** was created within the Ministry of Sustainable Resource Management (MSRM) in 2003, with people and functions drawn together from a variety of inventory and information agencies. Today, it is one of seven components of Land Information BC. It is predominantly a headquarters branch, with one section (Forest Cover Update) located in Kamloops. In addition, there are Resource Information specialists located in various Contact Centres and the Kamloops Service Centre within the Business Solutions Branch (BSB). Business responsibilities and contributions by

[3] http://srmwww.gov.bc.ca/g/libcfacts.html

these BSB staff to the delivery of the resource information mandate are included in this business plan, within the appropriate section plans. The primary responsibility of the resource information business area is managing provincial natural resource and biophysical information.

4. **Forest Inventories** have been conducted in BC since the turn of the century and have focused primarily on quantifying the standing green timber resource for harvesting purposes. In 1991, the Forest Resources Commission caused a change in focus of inventories to include other resource values and to use standardized methods as directed by the Resource Inventory Committee (RIC; now called Resource Information Standards Committee). RIC in turn established a Vegetation Inventory Working Group (VIWG) to develop the procedures and standards for the Vegetation Resources Inventory (VRI). Refer to Appendix 2 for a "Quick walk through of Forest History in BC."

5. **Vegetation Resources Inventory.** The VRI quantifies both the timber and non-timber vegetation forest resources. Providing stand level information based on mid-scale photography/digital imagery, VRI has two broad phases (a) photo interpretation of photographs or digital images to identify different forest stands and estimating the quantity and characteristics of different timber and non-timber attributes within the forest stand; and (b) ground sampling a portion of the stands identified within a management unit during the photo interpretation phase. The ground samples are used to develop a relationship between the photo interpreted polygon estimates and the ground samples. This relationship is used to adjust the photo interpreted polygon estimates and then to calculate a statistically valid estimate of any given attribute for the entire management unit.

   Photo interpretation phase provides stand level estimates based upon general stand characteristics and not individual trees. The inventory file adjustment quantifies a specific attribute for the entire management unit and cannot be considered statistically valid for an individual stand nor should it be considered more accurate than the photo estimates for the same given stand.

   The degree of disturbances (e.g., logging, fire, insect, disease, etc.) for a stand can be estimated during the photo interpretation phase and maintained in the inventory file.

6. The **VRI lifecycle** typically requires three (3) field seasons. During the first field season, acquisition of photos or digital images occurs with processing completed in the fall and delineation carried out in the winter and spring months. In the second field season, the photo interpretation fieldwork is completed with estimation of attributes and mapping completed in the fall and winter months. In the following spring, sampling design for the ground-sampling phase is carried out. In the third field season, ground sampling is completed with the adjustment factors developed and inventory file adjustments made in the winter months. Note — it may be possible to shorten this VRI life cycle by combining the photo acquisition and photo interpretation field seasons.

7. Currently, the VRI is implemented by industry at their discretion to meet their business needs. The Resource Information Branch's (MSRM) role is around standards and taking receipt of final, adjusted inventory.

8. There is currently no inventory cycle in BC. The inventory cycle (a new inventory on a regular cycle) concept was introduced in the late 1980s and a number of inventories were done to pre-VRI standards. With the implementation of the VRI in the mid 1990s and the with loss of program control via Forest Renewal BC and now the Forest Investment

Account, this concept is not in place. When the VRI was designed, it was assumed it would implement over the province within 10 or so years for the full suite of protocols. In reality, the province has (only) about 45 percent completed for VRI photo interpretation and about 30 percent for ground sampling. The VRI is predicated on using estimation techniques, and adjusting with a limited amount of measured ground data. The longevity of an adjustment has never been tested. There has been little interest by industry for anything but tree inventories (of the 4500 or so ground samples, fewer than 500 are installed to include the full suite of attributes (ecosystem attributes, CWD, etc.).

9. There is a gap in good inventory information between the period of free-to-grow (10 to 20 years) to early to mid rotation. The "free-to-grow" label comes from the silviculture surveys. These polygons are not ground truthed until age 30 and even then, with very limited sampling. In short, the VRI is not addressing young second growth stands adequately. This needs to be addressed, regardless of the MPB event.

10. There are no Resource Information Standards Committee[4]-approved provincial forest inventory vegetation monitoring protocols in place, although there is interest in having them. There have been about a dozen monitoring pilots put in[5]. They typically install about 50 National Forest Inventory fixed area tree plots on a grid in selected young strata and use the data mainly to check TASS output. There is the assumption the plots will be re-measured to get growth data after five to ten years. VRI staff in government are wondering if this MPB strategy will result in a greater need and interest in this area. Whatever direction is taken, inventory monitoring needs to be either linked or embedded within the basic inventory design and be statistically reliable.

11. National Forest Inventory. The VRI Section, MSRM is currently developing a proposal to seek federal funding to develop and implement an "enhanced" MPB NFI. The current NFI design will be stratified by large federal ecoregions. This will not meet the needs at the management unit level however.

12. Site productivity is estimated from photo interpretation for each polygon using estimated age and site height (the term "top height" is not used). Ground sampling later adjusts the age and height and a new Site Index is calculated. If there is nothing to use but dead trees resulting from MPB, this method will have to be replaced, at least for standing volume of partially damaged/dying stands. For young stands with reasonable regeneration, other estimators can be used such as SIBEC or growth intercept methods. This area will need some examination.

13. **Terrestrial Ecosystem Mapping and Predictive Ecosystem Mapping.** Since the early to mid-1990s Terrestrial Ecosystem Map (TEM) involving the mapping of site series mainly at a 1: 15,840 – 1: 20,000 scale, has been undertaken on a number of forest areas in the province. Due largely to challenges with cost and rate of progress, Predictive Ecosystem Mapping was introduced as a more automated approach to TEM in the mid-late 1990s. Both field and polygon delineation processes with PEM have included a frequent use of some elements of the VRI process in different ways. At the same time, some VRI work has incorporated more ecological attributes and in some cases has tried to integrated forest cover mapping with ecosystem mapping. In the last few years, many of the first generation "overlay" PEM mapping approaches have moved to using more automated second generation approaches to predicting the distribution of site series and soil conditions. This new generation of PEM is realizing greater accuracy and has been

[4] Formerly the Resource Inventory Committee (RIC).
[5] Mainly by J.S. Thrower and Associates.

made possible with improved mapping and modeling techniques and new data sources. This ability to map ecosystem conditions in a more automated manner and more accurately for large areas may provide important opportunities for new inventory and monitoring approaches, particularly where forest ecosystem features (understorey, moisture regime, soil materials, aspect, slope, etc.) need to be factored-in to an interpretation (e.g., the possible influence of site factors on shelf life).

Background Regarding Related Inventory and Monitoring Initiatives and Changes

14. Under the new FRPA legislation, licensees have the responsibility for defining management strategies that will achieve the objectives set by government (results). The province in turn has taken on the responsibility for setting objectives (Objectives Set by Government) for 11 values and is now leading the development and testing of appropriate science-based C&I for their effectiveness evaluation framework and indicator protocol under the FRPA Resource Evaluation Program (FREP). Forest Stewardship Plans as they are introduced will be closely tied to the FREP initiative.

15. A key challenge with FSPs is that industry requires timely access to key information in support of FSP development. Licensees are trying to obtain data in order to develop and submit their FSPs to meet FRPA requirements by December 2005. In order to do so, they need data now. There is an FSP information access Project Charter and Working Plan under development. Data needs to be collated locally as well as corporately (from the Land and Resource Data Warehouse), checked for currency and accuracy with any data QA issues or gaps noted, reviewed and signed-off and loaded for ready access. Much of this is data under the custodianship of the Resource Information Branch, MSRM.

16. A Biodiversity Monitoring and Reporting (BM&R) Strategy has been developed by MWLAP under the guidance of a BM&R Strategy Working Group which involves head office and regional staff and other ministry representatives. The three "business"-related goals are: (1) to inform and support policy, practices and decisions (effectiveness monitoring); (2) to assess the state of risk-based biodiversity priorities; and (3) to assess general biodiversity trends and condition (ambient monitoring).

17. Key leaders from industry, government, and academia met in the spring of 2004 to begin to identify common ground for Sustainable Forest Management criteria and indicators initiatives — "Common Ground Initiative." The workshop was facilitated by FORREX with the support of the Forest Practices Board. The goal in the longer term is to see the collaborative development of common set of indicators and protocols among the parties. At a follow-up workshop held on February 17-18, 2005, with the benefit of several supporting studies since April, the group worked on moving the development ahead more substantively.

Background Regarding Overview of Business Requirements for Timber Supply Analysis for AAC Determination

This list was compiled quickly to inform the Dialogue process[6]. More detailed analysis of these requirements will be done over the next few weeks, so please consider this just an overview at this time.

This list is to provide a general overview of the types of information used in timber supply analysis. It is not comprehensive. It does not capture the manner in which some of the variables are managed or used to derive related information. In this list, it is simply recorded that timber supply analysis requires information on tree species, heights and ages.

18. First, it must be recognized that the current VRI Life Cycle was not designed with respect to information needs relative to the rapid and complex forest changes occurring due to the MPB epidemic:
    a. The complexity of the current VRI procedure (75 attributes per polygon) and incompatibility of the VRI completion and TSA review cycle do not meet the needs of the forestry sector for infestation mapping and update (minimum of 1 year).
    b. Albeit possibly sharing common data inputs (aerial photographs), the VRI and forest health detection and mapping employ different procedures, standards and time frames.
    c. Any proposed approach must enable efficient sharing of both attribute data and a spatial database between various agencies, for a variety of resource management applications.
19. Information is needed to:
    a. Define the area available for forest management and timber supply and to define those areas being managed for other resources and other objectives.
    b. Project the growth and yield of existing and future stands with sufficient detail to provide adequate representation for mixed-species stands and mixed-stand conditions — e.g., partial beetle-killed stands.
    c. Model management in the area including silviculture, harvesting, and non-timber objectives.
20. To perform these tasks, the following steps need to be performed:
    a. Characterize the current state of the land and forest (defining productive forest and the THLB, provide inputs for growth and yield projections) for forest management and other non-timber resources and objectives.
    b. Define inputs for projecting growth of stands over time (site productivity, silvicultural regimes, stand structures)
    c. Define management practices (reforestation, harvesting priorities, harvest types (clearcut, thinnings, selection cuts/partial cuts/variable retention systems) forest cover requirements for biodiversity, wildlife, visual quality, water quality, archaeological resources, etc.)

[6] The consulting team wishes to acknowledge with thanks the assistance of Christine Fletcher with this input.

21. Some of the specific data needs are:

    a. Current state of the forest stand by both stand averages as well as by individual species within mixed-species stands, tree size classes and tree condition classes (live, dead, etc.)

    b. Good spatial location/boundary data for the forest stand

        - Land cover class – used in conjunction with site index, crown closure, management history and other information to define the productive forest (defined for timber supply analysis as the forest that can contribute to forest management objectives such as values for biodiversity and wildlife habitat).
        - Tree species (all species occupying the site, and their proportionate contribution to volume)
        - Tree heights (normally a "top" height is defined)
        - Tree ages
        - Site productivity (site index) – normally derived from inventory height and age; sometimes from field surveys
        - Stand volumes – can be derived using yield models (inputs are height, age, crown closure, stocking class, decay factors)
        - Stocking class (used to define merchantability)
        - Crown closure (used to define merchantability)
        - Basal area (for modeling growth and yield and different silvicultural systems, like variable retention)
        - Number of stems per hectare

    c. Characteristics of the land

        - Ownership
        - Terrain (slope, sensitivity)
        - Rivers, streams, lakes (usually from TRIM or other source)
        - Environmental sensitivity (ESAs) – being replaced by specific classifications (terrain assessments, wildlife habitat, etc.)
        - Roaded area
        - Operability (harvest systems required)

    d. Timber management

    e. Silvicultural history and plans

    f. Time when stand density management began (distinguish managed from non-managed stands)

    g. Planned reforestation regimes (species, planting or natural density, spacing)

    h. Fertilization

    i. Use of improved seed (genetic worth)

    j. Non-timber objectives (including good spatial location/boundary data for every landuse polygon and all spatial attributes)

        - Biodiversity
        - Wildlife
        - Visual quality

- Recreation
- Water quality concerns (e.g., community watershed intakes)
- Archaeological
- Range
- Seismic

Background Regarding MPB and Resource Information Needs

22. **Mountain Pine Beetle — A strategy regarding the resource information needs** associated with implementation of the Mountain Pine Beetle Action Plan (2005-2010) is currently under development. The Action Plan identified seven strategies with objectives for each strategy. Resource information requirements are either explicitly stated or implied in each strategy. The resource information strategy should identify the questions to be answered and information required to do so. Resource information (in addition to the forest/vegetation information) needed in addressing the impacts of the Mountain Pine Beetle epidemic includes, but is not limited to:

    - Vegetation Resources Inventory
    - Wildlife and Wildlife Habitat
    - Terrain Stability
    - Water Quality
    - Water Quantity
    - Recreation/Tourism
    - Biodiversity

■ **INPUT REQUEST #1: Please review the Key Challenge and, Background Statements and provide your responses in writing in the accompanying Feedback document. Please refer to the Background Statement numbers when appropriate — *Thank you!***

- **Are you aligned with our Key Challenge? What is missing? What is included but is not relevant in your view?**
- **In your view, are there any Background Statements that need clarification, should be added, or that are not relevant?**
- **Please remember the intent here is to get everyone on the same page.**

Expectations

Organizing Team's Expectations

The Organizing Team's[7] expectations for the Challenge Dialogue[8] in supporting the development of the Strategic Plan for Forest Inventory and Monitoring Activities in Mountain Pine Beetle Areas are that the participants in this dialogue:

- **will understand the full intent of the Strategy including the reasons for its development (background), the assumptions being made with its development, and expectations of what the Strategy will achieve — the Key Challenge;**
- **Will want to contribute and explore different ideas that are focused on possible solutions to this large and complex inventory and monitoring challenge; and**
- **Will feel that they have had a meaningful opportunity to engage in crafting aspects of the Strategy and will therefore feel they have ownership and a clear stake with its subsequent implementation.**

The third point covers the interest to have the participants discuss all of their business needs related to the infestation when responding to this Challenge Dialogue. While the infestation presents a high profile and critical challenge, there are other issues for which currently available tools probably do not provide an ideal response regarding contemporary forestland information needs. That is, we would prefer that participants who are the information clients to focus less on inventory solutions and more on outline what they need to do; what they need the better quality, more current information for. In fact, having a comprehensive listing and discussion of business needs for the inventory and monitoring information may be one of the most important outputs from this Dialogue. This kind of discussion can form the basis for a lot of further work beyond just the inventory and monitoring challenge we face.

Consulting Team's Expectations

The consultant team's initial expectations of the process are that it should result in:

1. A rational, practical, affordable approach to inventory and monitoring of forest and vegetation conditions that address the rapid dynamics of MPB events.
2. In conjunction with '1', the process will result in a preliminary investigation of closely related opportunities to address inventory and monitoring of other resource values in an integrated manner.
3. The outcome should:
   - be a better way to characterize and monitor forest resource values in BC;
   - be able to deal with highly dynamic phenomena, e.g., MPB, fire events;
   - be flexible and therefore able to answer new questions and meet new business requirements (for example, climate change);
   - be opportunistic (i.e., able to capitalize on multi-source, multi-timeframe, multi-precision, multi-purpose, multi-scale inputs);
   - give the spatial resolution appropriate to both biological and physical forecasting.

[7] Melanie Boyce, Christine Fletcher, Fern Schultz, Jon Vivian and the consulting team members.
[8] The Challenge Dialogue includes (a) the pre-workshop responses to the Challenge Paper and (b) the outputs of the face-to-face workshop planned for March 30, 2005.

■ **INPUT REQUEST #2: EXPECTATIONS — Please review the Expectations and provide your responses in writing in the accompanying Feedback document — *Thank you!***

- **What expectations do you have for this Challenge Dialogue (as in "I would consider this Dialogue a success if….")**
- **What expectations do you have for the face-to-face workshop (as in "I would consider the workshop a success if….")**
- **What suggestions do you have to make the workshop more effective?**

Assumptions

The following assumption topics are presented to help the participants in this Dialogue appreciate some of the key perspectives that are driving this Dialogue. They are meant to stimulate our discussions and will be revised based on participant reactions.

The following set of assumption topics serve as a starting point for the Dialogue. Some of the points are included to be a bit provocative and force a response. The assumptions have been divided roughly into four groupings: (a) assumptions related mainly to **beetle biology and management**; (b) assumptions related to **business drivers**; (c) assumptions of an **organizational and resources nature**; (d) assumptions related to **inventory and monitoring technology/methodologies**.

Assumptions Related to Beetle Biology and Management

1. The MPB outbreak will continue – current model outputs show up to 80% of merchantable pine will be affected over the next two decades. What happens after that remains to be seen. Some feel that if all the mature pine is not kill in this current outbreak then the next one will complete the job.
2. Leading edge control seems to be ineffective thus far with respect to controlling spread.
3. By and large, we are must now focus most of our attention on how best to deal with the consequences – i.e., salvage rates, shelf life and potential product usage. We need to plan for the future forest — life after the beetle. For example, we need to know about actual levels of mortality, natural regeneration possibilities in beetle killed wood (the nature of the understorey) and the shelf life of beetle killed wood for dimension lumber, pulp, OSB and power generation, etc.
4. "The extreme range of sites and climates within which lodgepole pine is found in BC confounds shelf life of beetle-infested lodgepole pine. Paprican has utilized the Biogeoclimatic Ecosystem Classification System (BEC) information in association with intrinsic wood and fibre quality data and has shown that site quality factors can be used to predict both wood and fibre quality."[9] A Paprican project titled A Wood and Fibre Quality Deterioration Model for MPB Infested Trees by Biogeoclimatic Subzone (8-15)" will develop a preliminary model for predicting shelf life by Biogeoclimatic subzone across the lodgepole pine resource.

Assumptions Related to Business Drivers

Important Contextual Note — Today the resource information business area operates in an environment where no single agency has control over the collective resources. As such, the effective delivery of resource information is dependent on a collaborative and coordinated approach. In this regard and as an example, the Resource Information Branch of MSRM plays an important role in helping to facilitate and coordinate various transactions between governments, industry, NGOs and others from across the resource information business area.

5. The average VRI lifecycle is 3 to 4 years. Any new standards will take time (and money) to develop, test, train contractors and build HQ infrastructure. It would seem practical that we try and use, as much as possible, what has already been developed. For example,

[9] Paul Watson, Paprican, Vancouver, BC — http://mpb.cfs.nrcan.gc.ca/research/Spring/8-15_e.html

VRI has a fixed area plot option that might be suited for monitoring as well as basic inventory.

6. Current forest inventory data and the entire timber management system focuses on green/standing volumes and 'products' – now we must focus on primary versus secondary versus tertiary 'products' as related to applicable volumes and shelf life of MPB-killed timber.

7. Current AAC/timber supply determination system vs monitoring of rapidly changing factors/ impacts/allowances for other resource values.

8. Resource management trends – how will the information by which trends are determined going to be updated, monitored and reported?
    - habitats;
    - water resources;
    - ecosystem management;
    - certification;

9. Resource information implications:
    - Precision (forest cover type averages vs stand-level/polygon-level averages vs sub-polygon levels of information;
    - Timing (multi-year, periodic inventory updates vs annual activity updates vs with-in year resource changes);
    - Data capture cycles(precision, applications requirements);
    - Accuracy/reliability (Provincial level, TSA level, forest cover types, polygon-level data, sub-polygon data);
    - Data and information storage and archiving systems (date stamps/versions). We will have to have a system to address these requirements for intermediate and final levels of reporting and summarization as well as the raw data.

10. Detailed second growth inventories will be needed to assess things such as the potential for stand treatment. There will be big "holes" in LRSY down the road and options to accelerate growth, through fertilization and potentially other silvicultural practices, will need good inventories to locate candidate stands. Further, these stands will need to be monitored to ensure they are performing as to the model's expectation (link to Background Statement #9).

11. **Shelf life (decay).** Potentially the deterioration in the form of checking and decay loss could be best handled with ground samples that were periodically re-measured. The re-measurement period would have to be fairly short and limited to attributes that would not be prone to a lot of measurement error. The tracking of the change over time in gross and net volume would be critical as well as the trees economic condition in terms of log grade, caused by checking, decay, windfall and breakage. Stratification criteria should be something linked to soil moisture so BEC unit and site unit would be suitable. Likely an extensive network of small samples over the soil moisture gradient would be best; the National Forest Inventory sample may or may not be suitable. Destructive sampling could be used to establish baseline factors for net volume adjustments but would have to be done apart from these monitoring plots. The deliverable could be a series of graphs showing volume and value (grade?) declines over time (months?) by BEC unit or site

unit. This in turn would be used to guide the MOF for the priorization of the location of harvest[10].

12. Clearly the rapidly changing state of the forest condition in the MPB affected areas is having and will have a significant impact on various resource planning documents. Closely tied to the inventory and monitoring strategy will be the need to understand how these changes will affect previous plans and future planning processes.

Assumptions Related to Organizational and Resources Challenges

13. In light of the complex and broad nature of the MPB problem, a multi-disciplinary and multi-organizational approach will be required to find a solution to the inventory and monitoring challenge and for its implementation. Options that are generated will probably need to consider a blend of conventional and new innovative approaches. Collaborative thinking and actions will be critical factors for achieving success quickly.

14. While the fiscal situation has improved as of late, the government and industry nonetheless continue to operate in an environment of fiscal prudence. All options for a solution will need to carefully balance the benefits of any new protocols with financial realism and sustainability.

15. It is possible that the inventory, monitoring and update protocols that are decided upon will venture into new somewhat uncharted territory each with their own set of inherent risks and while the "MPB clock" continues tick. This likely means that executives, managers and practitioners will need to embrace and manage these risks with due consideration of the reality of the circumstance. Staff charged with implementing these protocols will need to be open to operating within a "Risk Management Environment", learning and applying quickly what could be quite different methodologies. Rapid new skills training will probably be another important component of the whole solution.

16. It is anticipated that some solutions may necessarily require new and different kinds of partnerships with the forest and other sectors, technology firms and data suppliers such as those for some remote sensing platforms. Among many factors, flexibility, fairness, timeliness, data ownership, data sharing, and public access, will be important elements in defining these partnerships and for their success.

Assumptions Related to Inventory and Monitoring Technology/Methodologies

17. A strategy to consider incorporating the monitoring activities of recent MPB activity into the inventory should focus on how to update the degree of disturbance attribute for a given stand without fieldwork. This strategy would reduce the inventory life cycle significantly (possibly to a year).

18. Remote sensing tools are a good way to obtain data on features like extent, crown condition, etc., but will not address, in their entirety, a number of the issues identified in, for example Background Statement #11 and Assumption Statements #11 and #12.

19. Keeping Assumption #19 close in mind, following are some assumptions regarding the general "state of the remote sensing-related art".

[10] These thoughts kindly provided by Will Smith (via Jon Vivian) Volume and Decay Sampling Officer, Resource Information Branch, MSRM.

19a. Numerous research projects involving remote sensing in detecting and mapping of the state of forest health have been completed over the past two decades in British Columbia. Results are often inconclusive as few studies have been supported by field sampling and laboratory research[11,12]. In summary, using multi- and hyper-spectral airborne imagers was not successful for detecting green attack (vegetation stress detectable prior to discoloration of foliage). Recent studies at the Pacific Forestry Center and studies of anatomical evidence of damage symptoms in needles of red spruce from New Hampshire and Central Europe show some promise in early detection of the damage. Successful mapping of infested stands (by definition 10, or more red-attacked trees/ha) has been documented mostly by aerial photography, preferably color infrared, acquired at scales from 1:10–1:20,000.

19b. Information exchange between research and operational projects has not been particularly effective. Research on satellite, multi-spectral and hyper-spectral imagery applications has been carried out at the reconnaissance level (single date and change detection). Resolution is the main limiting factor of using satellite imagery. Large clusters of red-attacked and dead trees can be mapped, while infested stands cannot. Operationally, acquisition of infrared photography has been carried out at the stand level using traditional airborne surveys. Chlorophyll's reflectance in the infrared spectral range is greater than in the visible spectrum. This makes the infrared region more sensitive to changes in chlorophyll response to stress (e.g., red colour). Integration with field and laboratory measurements at the anatomic tree level is needed to design optimal spectral and spatial characteristics of imagery suitable for infestation detection and mapping.

19c. Remote sensing technologies other than more conventional forms are not well utilized in BC at this time to support operational resource inventories and monitoring. Jurisdictions in the US, Europe, Australia and elsewhere are using these technologies operationally to decrease costs and increase the currency, quality and speed of acquiring data. Some of these approaches might be adopted or adapted for BC's situation.

19d. Predictive mapping, including some approaches being use for PEM in BC, is capitalizing increasingly on the use of multiple data sources, both vector and raster, for modelling and predicting ecosystem features for large areas with acceptable accuracies at more affordable prices. These techniques, which have moved beyond the realm of research, can generate new kinds of interpretive products increase our ability to delineate and characterize forest and ecosystem features in greater detail and with greater resolution than was previously possible[13].

19e. There is a move towards the greater use of multi-temporal data sets and often data sets of differing spatial resolutions. Multi-temporal data is becoming increasingly available and more affordable. Multi-temporal

[11] A remote sensing strategic plan that was prepared for the Ministry of Forests in 2002 by Arthur Roberts and Jim Northrup, Department of Geography, Simon Fraser University, 34p

[12] Detecting and Mapping Mountain Pine Beetle Infestations: Defining the Role of Remote Sensing and Establishing Research Priorities. Workshop Summary Report, August 8, 2003. Workshop on June 26-27, 2003 in Vancouver facilitated by R.J. Wiart & Associates, 24p.

[13] Personal communication — Bob MacMillan, LandMapper Environmental Solutions Inc., Edmonton

imagery offers promising capabilities for looking at patterns of change in reflection throughout the entire growing cycle which can significantly help with the identification of different land covers and land uses[13].

19f. LiDAR (Light Detection and Ranging) will revolutionize what we can do with such profile data once it becomes ubiquitous, affordable and with clean which it is rapidly working towards. It can provide highly accurate data on tree heights and shapes, canopy structure and bare ground shape and context that will dramatically increase our ability to quantitatively describe and classify objects on the surface. There remain challenges with interpreting the data and with data volumes (e.g., e.g., 1,000 to 10,000 times the data volumes we are accustomed to)[13].

19g. Recent advances in digital aerial imaging using manned and unmanned vehicles and may hold promise in the acquisition of digital infrared imagery at a resolution allowing individual tree detection (sub-meter pixel size). These images allow reliable detection and mapping of red attack and die-back. Cost/benefit advantage of these techniques over sketch mapping may lie in the greater value of the imagery for a multiple applications.

INPUT REQUEST 3.0: ASSUMPTIONS — Please review the Assumption Statements and provide your responses in writing in the accompanying Feedback Response document. Please refer to the Assumption Statement numbers when appropriate — *Thank you!*

- **Which assumptions require more clarification for you to understand?**
- **Do you strongly disagree with any of these assumptions?**
- **What assumptions, if any, would you add to the list?**

Initial Questions, Scenarios and Ideas to Stimulate the Dialogue

The Background Statements highlight key steps and elements in the path to the Key Challenge. The Assumptions build on this background by advancing an additional set of statements that further help to inform and evoke the Dialogue as we look for ways to address the Key Challenge.

We now move to the part of the Challenge Paper where we will layout some key questions and scenarios for your reaction. At this point in the dialogue, any and all creative ideas are especially encouraged.

Some Key Questions

1. **To what extent is this challenge a forest vegetation inventory challenge versus a monitoring of a forest health problem, or both? What are the data collection, information management and resource information product (output) implications (pros and cons) when taking an inventory, monitoring or "both" perspective?**

2. **Are we not dealing with at least two lines of questions regarding inventory and monitoring of these MPB affected areas?**

    A. The need to describe the current state and geographical extent of **forest areas that are under infestation** and monitor their state and geographical extent over time? The inventory and monitoring efforts would be directed at forest stands that are under green or red attack, and recently dead. Current MoF infestation categories are described as either: (i) containment areas — large infested areas currently harvested; and, (ii) suppression areas — small patches of red attack where sanitation measures are possible.

    - These data would need to be collected and analysed within a very short time frame in order to guide salvage operations and may help answer questions regarding the estimated shelf life of dead trees on different sites (i.e., how many years are remaining for obtaining a marketable forest product — a key factor in Timber Supply Analysis).

    B. The need to describe the current state and geographical extent of **forest areas that have been already severely damaged** and for which the MPB has already peaked. .

        i. These data would be used to update existing inventory information. This activity would need to occur within a reasonable amount of time like, say 2-4 years (i.e., not conventional VRI cycles), so that new timber supply and growing stock estimates can be calculated and new forest plans can be prepared and acted upon for timber and other forest values.

3. **How will different time frames for activities 2A and 2B be coordinated?**

4. **With reference to question 2B above, how do we handle the problem of updating the information when the new information (about the pine damaged areas) does not jibe with the previous inventory polygon information which may indicate there was no pine present?**

5. **Do we need to consider how other forest health-specific inventories and surveys would be integrated to with a new/re-inventory, monitoring of MPB affected areas and Timber Supply Analysis?**

   A. The ad hoc forest health survey/mapping (sketch) activities conducted by MOF
   B. The MPB infestation mapping initiative
   C. Independent mapping efforts conducted by licensees using largely private contactors.
   D. Standards and procedures used to incorporate the state of forest health into existing Timber Supply Analysis

6. **What features needs to be detected and mapped for situation 2A and 2B?**

   Clear definitions are needed to establish standards. For example, what is a hot spot? How are its boundaries defined? What is the definition of severity levels? What other attributes are needed?

7. **Which remote sensing techniques hold the most potential to become operational?**

   Understanding of all major operational limitations should be considered. These include:

   - Detection limitations, single data set and repeatable
   - Mapping accuracy
   - Cost
   - Availability
   - Processing effort and cost
   - Use for other applications
   - Technology transfer
   - Residual value (aerial sketch vs. image)

8. **How will the added value of digital imagery over sketch mapping be assessed in strategic and tactical planning?**

9. **Would newly acquired imagery be used for other resource management applications and if so, for what, and to what extent? If shared across programs and applications, specifications of the imagery would be designed to meet these applications. For example, if imagery would be shared by VRI and TRIM, optimal scale, stereo coverage and photography specifications will be determined by combining the needs of these programs.** Presumably this creates a stronger business case for these investments.

10. **Growth and yield — what will be the role for:**

    - Existing PSPs in these stands? Do we need to identify them, classify by attack stage and remeasure?
    - New PSPs: will we need these and if so do they need to be stratified by things like dry vs. wet sites?
    - Models: do we need to develop modules to address the changing stand profile?
    - The MOF Research Branch and their researchers (e.g., the TASS model, Experimental Plot data, site productivity models and information, etc.)?

11. **There is presently a limited contractor community. Many have been laying off staff rather than building up their personnel. Will this be a factor with some strategic options?**

12. Is there a need to factor in any considerations for forest fires? Some say it will not be an issue; but what about the seemingly wild swings we are seeing with weather patterns?

13. What are the pros/cons regarding Area based vs. volume-based AAC in terms of timber supply calculations and allocations, and with respect to the development and monitoring of operational and forest stewardship plans?

14. Tenure impacts – tenures will be unevenly impacted. How will this be handled; what information will be needed?

Some Thoughts on Possible Scenarios

Scenario 1: Enhancement of current inventory and update models with some improvements.

This scenario would involve reliance on low resolution satellite imagery for reconnaissance, selected aerial surveys for stand level data and cruise information for tree-level data. It would address the following basic needs:

- Temporal discrepancies between currency of existing inventories and the need for current information on infestations.
- Maintaining inventory at stand level and insect damage at polygon level.
- Developing standards, procedures and metadata for mapping of infested stands.
- Reliance on sketch mapping will be reduced.
- Integration (update) of infestation information into existing inventory (VRI).
- Data inputs and outputs will be specific to forest health information.

Scenario 2: Strong reliance on aerial photography, some hyperspectral sub-sampling and cruising.

- Planning of acquisition of aerial photography will be coordinated with the needs of other applications (e.g., VRI). Specific needs of VRI (stereo imagery), not essential for forest health surveys, will be accommodated.
- Optimal type and resolution of imagery (e.g., colour infrared 1:15,000, or finer) will satisfy the needs for current operational inventory programs in BC.
- Hyperspectral sampling will help to assess spectral characteristics of outbreak

Scenario 3: Full multi-scale, multi-source approach involving satellite imagery

Examples for this scenario might include Landsat, Aster, Hyperion, SPOT; airborne drone- or manned- infrared and hyperspectral. It would involve full use of existing and newly acquired field data.

- Most complete and complex option.
- Significant technology transfer and training component.
- Will enable incorporation of summaries of mortality by location, species, causal agent and severity into existing inventory.

Scenario X: What other scenarios can you envision?

■ INPUT REQUEST 4.0: INITIAL IDEAS and SCENARIOS TO STIMULATE THE DIALOGUE

- **What questions, concerns, and opportunities do these items raise in your mind?**
- **What new ideas do they suggest to you that need to be addressed?**
- **What additional work do you think should be done to flesh out these ideas (perhaps ahead of the workshop so we are further prepared with resources for a productive face-to-face workshop session)?**

Next Steps

The above material establishes a starting point for our Dialogue. Consider all of this information very much as a work in progress at this stage. Your reaction and feedback on this information is now very important. The following information outlines the next steps in the Dialogue. Please note carefully the deadlines for receiving your feedback as we are anxious to stick to our schedule that will lead us to action.

- Please think about what has been presented here and contribute your reaction and input using the separate **Feedback Document** sent along with this Challenge Paper and Challenge Paper Appendices documents. **Your input is very important and will strongly influence the success of the face-to-face workshop outcomes and the quality of the resulting Strategic Plan.**

- Please send your feedback to **Don Reimer** by email — **dreimer@drsystemsinc.com** — by the **end-of-day, March 7, 2005 (Monday).**

- The reactions and input from the participants will be organized, synthesized and delivered to you electronically by **March 14** as a **Quick Response Compilation and Synthesis** document.

- We will use the Quick Response Compilation and Synthesis and any further feedback received to design the March 30 Workshop Agenda and flow of activities over the course of this one-day face-to-face session.

- Workshop participants will receive a **Workshop Workbook** electronically on **March 18**. The Workbook will provide the "Rules for the Road" for the workshop and will include a synthesis of the Dialogue to this point and other key information and resource materials. We will highlight in particular in which areas the Dialogue participants (1) are aligned, (2) are not well aligned, and (3) where there is confusion that will need attention. The feedback will also be used to start identifying what areas are a priority and possible inventory and monitoring options.

- The **Face-to-Face Workshop** is planned for **March 30** in Victoria. Please note, due to practical constraints, we regret that only a representative subset of the Challenge Paper participants will be able to attend this workshop. This underscores the importance for people to provide their perspectives via their response to this Challenge Paper. These views will be brought forward in the ongoing Dialogue and workshop sessions.

- The workshop findings will provide the basis for the preparation of a **draft Strategy Report** by **April 18**.

- Finally, if you need any further information or documents that may have been referred or alluded to, please contact Don Reimer at dreimer@drsystemsinc.com.

Many thanks for your anticipated contribution!

Challenge Paper Appendices

The Challenge Dialogue System™

Development of a Strategic Plan for Forest Inventory and Monitoring Activities in Mountain Pine Beetle Areas

Forest Analysis Branch
BC Ministry of Forests

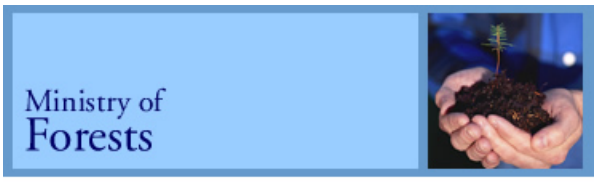
Prepared for and Co-Championed by —

Melanie Boyce, Forest Analysis Branch, Ministry of Forests

Fern Schultz, Resource Information Branch, Ministry of Sustainable Resource Management

Prepared by —

Don Reimer, Keith Jones, James Ramsay, Michal Lodin and Warren Eng



February 23, 2005

Response due: March 7, 2005

The Challenge Dialogue System

We are using the Challenge Dialogue System™ (CDS) developed by the *Innovation Expedition* to guide our Dialogue prior to and during the face-to-face workshop on the Forest Inventory and Monitoring Strategy for the Mountain Pine Beetle Areas.

CDS is an efficient and effective vehicle for engaging diverse stakeholders and assisting them to collaborate and innovate in order to accomplish a complex task. CDS is a structured but flexible methodology for moving a team of people from ideas to action quickly and effectively. More information on CDS is available at the Innovation Expedition's website at: www.innovationexpedition.com.

Don Simpson and Keith Jones, Innovation Expedition

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APPENDIX 1: The Challenge Dialogue Process for This Project

Challenge Dialogue[1] for Developing A Strategic Plan for Forest Inventory & Monitoring Activities in Mountain Pine Beetle Areas[2]

Identify and enlist the roles of project ***Co-Champions*** **— Melanie Boyce & Fern Schultz,** ***Facilitator*** **— Keith Jones;** ***Reporter*** **— Jamie Ramsay; and** ***Project Manager*** **— Don Reimer.**

Ensure **Organizing Team** is aligned with the purpose, scope and Challenge Dialogue process **[February 3-05].**

Decide on communication protocols for the Dialogue.

Prepare a **Process Planning Memo** (Work Plan) to guide the entire Challenge Dialogue process **[draft February 3-05, final February 7-05]**.

Identify key client-stakeholder groups and profile the type of people you need to engage.

Champions issue formal **Invitation** for engagement of the participants in the Dialogue from the Champion(s) **[February 22-05]**.

Consider key characteristics of the participant list in establishing appropriate communication protocols and technology support needs.

Define the **Key Challenge.**

Decide whether CDS is the right approach.

Evaluate the performance of Challenge Dialogue process identify areas for improvement.

Assess readiness to begin implementation of the Strategic Plan.

Plan for other follow-up work as identified in the Dialogue, as appropriate.

Continue to nurture the collaborative Team that has developed through this Dialogue process, sharing new insights and knowledge and ensuring everyone continues to be engaged with the progress and/or is kept well informed of it.

Write the **Challenge Paper** including the *Key Challenge*, *Background Statements*, *Assumptions*, *Expected Outcomes*, *Questions-Ideas-Action Options*, *Scenarios, etc.* and *Next Steps.*

Assemble supporting documents (often in the form of a "digital library").

Distribute Challenge Paper on **February 24-05** to the participants inviting their feedback electronically using a **Feedback Document** by a **March 07-05.**

Compile and undertake an initial summarization of the participant feedback incorporating it into a **Quick Response Compilation & Synthesis** document. Champions provide their reflections and further thinking sparked by the participant input.

The **Quick Response Compilation & Synthesis** document is sent to participants with the invitation for them to provide further feedback ahead of the Workshop.

Dialogue during the Face-to-Face Workshop is captured by the Facilitator, Recorder and other assistants.

The Recorder synthesizes the Workshop results in the context of the full Dialogue process.

The workshop findings in conjunction with the other Challenge Dialogue documents provides the basis for the preparation of a **Draft Strategy Report** by **April 18-06**.

Design and plan the **Face-to-Face Workshop** so it reflects the Challenge Paper response of the participants.

Design a **Workshop Workbook** which provides a complete guide to a series of progressive *Workshop Sessions*, includes a synthesis of the Dialogue to this point, and provides the *Rules for the Road* for Workshop and includes other key information support materials. The Workbook is distributed to the Workshop participants electronically on **March 18-05.**

Face-to-Face Workshop on **March 30-05** which is focused on (1) acknowledging areas where there is alignment already, (2) areas of confusion that need further clarification, (3) areas of mis-alignment that need further Dialogue, (4) confirming key learnings, and (5) identifying, evaluating and refining key strategic options.

[1] The Challenge Dialogue was developed by the Innovation Expedition. It is an application of the Challenge Dialogue System™ (CDS) — a flexible comprehensive, organizational performance improvement system with the capacity to help diverse stakeholders collaborate and innovate in order to accomplish complex tasks.

[2] Note — concurrent with the Challenge Dialogue process there will be a parallel **Business Requirements & Options Analysis.** While some of these initial requirements will be noted in the Challenge Paper, this work will ultimately inform and be summarized in the Workshop Workbook (Step 6).

APPENDIX 2: Additional General Background Statements

Background Regarding the Mountain Pine Beetle Outbreak

App #1. British Columbia is currently experiencing a MPB epidemic which is spreading at an unprecedented rate throughout lodgepole pine stands of the province's interior. The epidemic is the result of natural beetle population cycles; successive mild winters; and, an abundance of mature pine stands as a result of long term fire suppression programs. The MPB kills lodgepole pine, one of BC's most important commercial tree species. Management of the MPB epidemic presents an assortment of ecological, technical, social and economic challenges. Information on infested stands' location, extent and severity needs to be incorporated into established inventory and growth and yield procedures. This information is critical to the determination of the Annual Allowable Cut (AAC), for development of operational forest management plans and for assessment of impacts on and risks to non-timber resources.

Previous MPB epidemics occurred from the mid-1970s to 1980s in the Flathead Valley of southeastern British Columbia. During the peak in 1981, about 18,000 hectares were infested (less than two million cubic metres of timber). This infestation was over by 1983[1].

App #2. **Extent of the incident.** As stated in the *Mountain Pine Beetle Action Plan Update 2004* (Appendix 4), the mountain pine beetle infestation has expanded from an area of approximately 165,000 hectares in 1999 to about 4.2 Mha in 2003. As most trees attacked by the MPB inevitably die, the epidemic is currently estimated to create approximately 500 million m^3 of "grey wood" over the next one to three years, of which 200 million m^3 could potentially remain unharvested. In October 2003, the Chief Forester released the report, *Timber Supply and the Mountain Pine Beetle Infestation in BC*, which assesses the implications of the beetle epidemic in 12 management units (five tree farm licences and seven timber supply areas: Morice, Lakes, Prince George, Quesnel, Williams Lake, 100 Mile House and Kamloops) that represent the more severely infested areas in south-central BC from Houston to Kamloops.

App #3. **MPB incident – size, shape, projections[2].** "The uncertainties in the system make it difficult to provide exact and unequivocal conclusions. Nonetheless we can conclude the following:

3a. "Previous research has shown that mountain pine beetle outbreaks are stopped by severe winter weather or depletion of the host. The vast spatial extent of the outbreak implies that a weather-stopping event is unlikely. Current model projections forecast that the current outbreak will continue to grow for three to four more years and then gradually decline over a period of 10 or more years. The model projects, as a worst case, that virtually all of the mature pine susceptible to mountain pine beetle attack will be killed by 2020. Based on sensitivity analysis done to date we have no reason to expect that less than 80% of the pine will be affected.

[1] http://mpb.cfs.nrcan.gc.ca/introduction_e.html
[2] Eng et al. 2004: *Provincial Level Projection of the Current Mountain Pine Beetle Outbreak: An Overview of the Model (BCMPB) and Draft Results of Year 1 of the Project, April 2004*. See Appendix 3 for Map and Figure.

3b. "Forest management, as modeled, does not alter the provincial scale and temporal characteristics of the outbreak. In all scenarios the growing stock of pine in the province appears to be at substantial risk over the next two decades due to the combined effect of mountain pine beetle attack and harvesting. Forest management has the potential to reduce the volumes killed by beetles by increasing the volume of green pine that is harvested. Focusing harvesting on salvage has the potential to reduce non-recovered losses."

3c. "Our overall conclusion about the expected level of non-recovered losses is extremely sensitive to the annual rate of decay of useable dead pine volume. Losses a low as 10% per year have been reported for some areas on the Chilcotin Plateau with cold, dry climates (Taylor, pers. comm.). Feedback at a recent workshop on the modeling approach described here indicated that we should adopt a concept of "shelf life" for a given product (e.g. sawlogs, pulp, biofuels, etc.) rather than use a decay rate. It was suggested that "shelf life" is a step function in which there is no little or no loss of "utility" for some period of time and after that there is no "utility". It has been suggested that the shelf life for sawlogs may be a little as 2 years and as great as 10 years depending on climatic conditions."

3d. The report concludes that:

- "Across the 12 management units, it is possible that an average of 50 per cent of pine stands could be affected by mountain pine beetle over the next one to three years;
- About 15 years from now (when it is assumed that beetle-killed trees might have deteriorated to the point where they're no longer merchantable as saw logs), the timber supply across the 12 units could be reduced by about 19 per cent, relative to the AAC that was in place before the epidemic (pre-uplift AAC). The impacts are expected to vary greatly between and across management units;
- In the Quesnel TSA (one of the most severely infested areas), the timber supply may decline by about 29 per cent, compared to the pre-uplift AAC; and
- At the Provincial level, if harvest levels remain at today's levels, about 200 million cubic metres of beetle-killed pine would ultimately remain unharvested."

App #4. **Timber supply and community impact**[3] While the true impact cannot yet and may never be fully determined, the following statements from the COFI MPB Task Force provide sense of the infestation's magnitude:

- The **value of lumber products** that can be produced from the 173.5 million m^3 of timber infested to the end of 2003 is just under $18 billion (based on average lumber price December 5, 2003 $CDN 415/Mfbm). Stumpage value of this volume to the province is in excess of $2.7 billion (approximate average interior stumpage 2003 $16.00/$m^3$).
- At risk is the **disruption of a stable supply of adequate and affordable timber**. Without stable supply, the ability of the industry to maintain market share by being a secure and cost-effective source of products for our customers is compromised.

[3] Source — www.mountainpinebeetle.com/epidemic_impact.html

These factors combine to create a risk of **reduced stability of employment, and reduced source of revenue at both community and provincial levels.**

- Given the magnitude and extent of area affected, **environmental values** may be degraded, as vast forested areas important for terrain stability, riparian areas, water temperature and quality, and wildlife habitat are rapidly changed.
- Other **commercial resource values** such as wilderness tourism, hunting, fishing, and our own local outdoor recreation enjoyment are diminished.
- Much of the **planning** at the Land Use Planning tables over the last decade is greatly re-complicated. The beetles' spread disregards the many land use compromises made in achieving a balance of resource uses across the landscape.

Background Regarding Management Response to MPB Outbreak

App #5. The provincial government's strategic response[4] to the MPB situation in BC is committed to ensuring the sustainability of forests, the livelihoods of workers and communities, and the well-being of the economy. Through its **MPB Action Plan** government is committed to: (1) fostering new and emerging forest-based activities; (2) limiting further damage to forests and the environment; (3) recovering value from damaged timber; (4) Supporting and encouraging economic development and diversity in affected communities as guided by a *Minister's Community Advisory Group*.

App #6. Another major initiative is the formation in 1999 of the *Council of Forest Industries Mountain Pine Beetle Task Force*. The Task Force's aim is to help affected forest industry member companies and the Ministry of Forests work in a collaborative effort to increase public awareness, and to battle the spread of the beetles. The Task Force has become a major COFI initiative. The COFI website provides considerable information on the epidemic including reports on its severity, outbreak factors, impacts, actions to mitigate its impact and background on the beetle's biology.

App #7. **Mitigation Strategies.** Industry considers two fundamental situations in their management efforts[5]: (a) strategies and actions for mitigating the epidemic **at the leading edge**; and (b) strategies and actions for mitigating the epidemic **after the leading edge has passed**. Leading edge strategies and actions focus on detecting and removing those stands and trees that still have beetles in them, the *green attack* stands. Taking action to remove these trees and thereby reducing the beetle population will reduce the rate of spread until Mother Nature can come to our assistance with a killing cold event. Following Strategies, for after the leading edge has passed, will help mitigate the medium and longer term timber supply impacts. For those areas of the province where the leading edge of the epidemic has passed through, a significant amount of attention needs to be shifted to "life after beetles" strategies, to manage timber supply and community-level economic development issues. At issue are long-term economic and community stability.

App #8. **The Government of Canada** responded by a series of initiatives coordinated by the Pacific Forestry Centre and the Canadian Forest Service's *Mountain Pine Beetle Initiative*. In October 2002, the federal government announced it would invest $40 M in improving research on mountain pine beetle outbreaks and the rehabilitation of federal and private forest lands impacted by the beetle infestation. The research component of the

[4] www.for.gov.bc.ca/hfp/mountain_pine_beetle/#action
[5] www.mountainpinebeetle.com/action_activities.html

Mountain Pine Beetle Initiative consists of both short and long term project themes. Two broad groups of objectives are:

- MPB epidemic risk reduction and value capture; and,
- Federal forest lands rehabilitation program.

The objectives of the first R&D effort are to develop and demonstrate (a) forest management options to reduce the risk of future MPB epidemics; (b) increase understanding of the factors that influence the magnitude and geographic distribution of MPB in order to support a more efficient deployment of control options on future beetle outbreaks; and (c) research on product and market options, timber supply and economic modeling to enhance community and manufacturing stability. Since the magnitude of the infestation is such that **direct intervention to gain control does not appear feasible**, the **short-term R&D priorities include:** (i) socio-economic impacts; (ii) rate and geographic character of spread; (iii) definition of current attack boundaries; (iv) beetle control and salvage; (v) impacts on and options for product mix; (vi) increased efficiency and reduced ecological 'footprint' for control and salvage; and, (vii) forest health risk assessment of transporting beetle-kill salvage.

Long-term R&D priorities are broader in scope and will focus on reducing the risk of MPB epidemics including **more efficient and cost-effective monitoring**, **early detection**, rapid response options, and modeling for potential changes in macro-level environmental conditions.

APPENDIX 3: A Walk-Through of Forest Inventory History in BC

Forest Inventories have been conducted in BC since the turn of the century. The inventories completed up to 1994 focused primarily on quantifying the timber resource and are categorized into four time periods:

1. 1910 to 1950 – Compilation Inventories - Inventories completed in this time period were generally compilations of existing survey information for large forested areas with the primary objective to estimate the amount of wood available for harvesting.

2. 1951 to 1960 – The First Complete Inventory – The first complete inventory was completed in seven years from 1951 to 1957. Military 40 chain photos were used in the earlier years and from 1957 to 1960 were replaced with higher resolution 20 chain photos specifically designed for enhance the classification of and supplement the inventory. Polygons or stands were large in size and general in nature.

3. 1961 to 1977 – The Second Complete Inventory – The second complete inventory was completed between 1961 and 1977 and focused on management units known as Public Sustained Yield Units (PSYU). The surveys completed during this time period were known as unit surveys and provided estimated total volume +/- 10% for each PSYU.

4. 1978 to 1994 –Inventory Update and Periodic Inventories – Subunit surveys were introduced in 1978 followed by 70mm photography in 1979 to 1981. Conversion of forest inventories to digital format and to new Timber supply Area (TSA) Management Units were completed from 1982 to 1987. In 1988, TSA re-inventory on a 10 year cycle was introduced but limited to only reclassification of new photos with supporting air and ground calls. Mid-scale (1:15,000/20,000) black and white photography was generally used for these inventories and satellite imagery was often used for depletion updates (harvested areas, roads, etc.). Volumes were assigned to each stand using prediction equations (VDYP).

In 1991, the Forest Resources Commission (FRC) completed its report "***The Future of our Forests."*** As a means to provide sufficient information to meet the needs of the changing forest management approach in BC, the report recommended the provincial government complete inventories for all renewable forest resource values using standardized compatible systems. The provincial government adopted this recommendation and formed the Resources Inventory Standards Committee (RISC). The RISC focused initially on developing standards for the many different inventories required (more than 200 documents produced) and more recently have focused on change management standards, as the implementation of inventories has been operational for several years now.

RISC established several task forces including the Terrestrial Ecosystems Task Force, which then set up the Vegetation Inventory Working Group (VIWG) to make recommendation pertaining to the vegetation inventory design and standards. VIWG made recommendation pertaining to the vegetation inventory and the design, which lead to the Vegetation Resources Inventory (VRI). VRI focuses on timber and non-timber vegetation forest resources.

VRI has two phases. The photo interpretation phase involves estimating vegetation polygon attributes/characteristic from various mediums and provides the location of the resource. The

ground sampling phase provides the information necessary to determine the quantity of a given vegetation characteristic within an inventory unit. The data collected from the ground samples is used to develop a relationship between the photo interpreted polygon estimates and the ground samples. This relationship is used to adjust the photo interpreted polygon estimates to calculate a statistical estimate of any given attribute in the inventory unit.

Funding of inventories over the past decade has come from various sources. Initially inventories were funded through the four-year (1991-1995) $200 million Canada-British Columbia Partnership Agreement on Forest Resources Development (FRDA II). In the late 1990s, Forest Renewal BC (FRBC) was the primary funding source and more recently the Forest Investment Account (FIA).

Technology has also played an important role in the history of inventories. The introduction of aerial photography in 1950 was one of the first significant technological advancements that made it possible to identify and map homogeneous portions of the forest. The usage of mid-scale photography, 70 mm, color & infrared photography and satellite imagery have all assisted in improving the accuracy, detail and affordability of completing inventories. Computers have also played an important role in completing inventories by allowing large amounts of data to be stored and manipulated. With increased computer power and memory and the Internet, the method in which we collect, store and manage inventories has improved significantly to increase accuracy and volume of inventory information. The ability to manipulate and store data has exceeded our ability to collect data.

Currently, there are several new technologies that are influencing how inventories are completed and the information available for end users. Digital images have become the acceptable medium for completing inventories over the traditional hard-copy aerial photography. Digital cameras have advanced to the point that they are being used to collect the images and as these cameras now have the ability to geo-reference images during flight, photo processing time and cost have been reduced significantly. Inventories can now be completed in less time and with digital images flown with greater resolution, the detail is improving accuracy of inventories. Furthermore, acquisition of digital images for different purposes can be completed with one flight as using several cameras to take different imagery types (infrared, panchromatic, color, etc) has proven to be operational.

The procedures for completing inventories in BC has been relative the same up until the late 1990s but with the extensive advancements in technology and the need for more detailed information, the approach to how we complete inventories in BC will change substantially to meet the need to have more accurate and more detailed inventory information quicker at a lower cost.

APPENDIX 4: Expansion Rate

Epidemic Expansion Facts

The mountain pine bark beetle population has seen an unprecedented explosion, growing from less than 100,000 cubic meters volume of attacked timber in 1994, to 173.5 million cubic metres of cumulative grey, red and green attack in the working forest alone by the end of 2003. The volume is now about 3½ times the interior's annual harvest level.

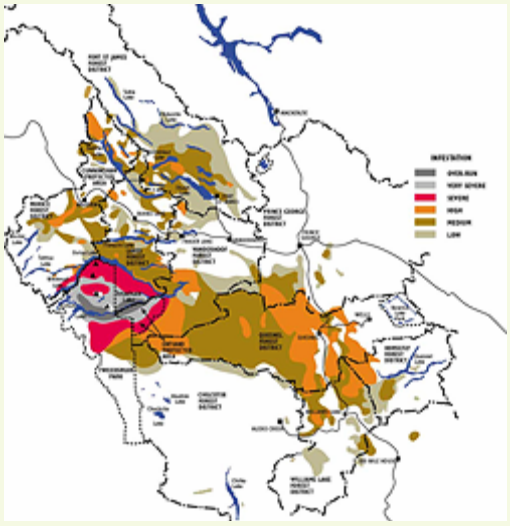
This is by far the largest insect epidemic in Canada's history.

The table below shows the rapid spread beyond endemic levels over the past decade.

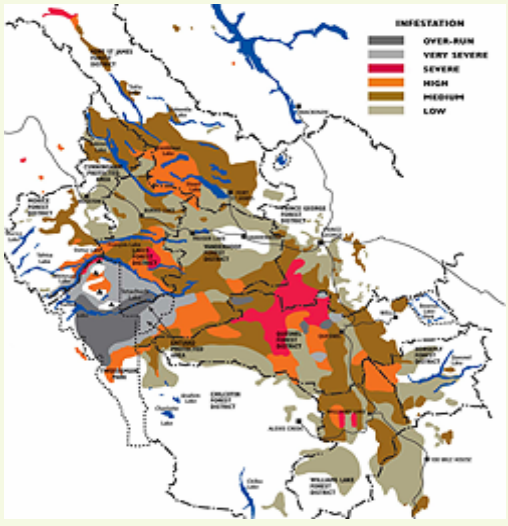
Year	Geographical Location of Spread	Area of spread (km²)	Volume (million m³)*
1994	Tweedsmuir/Ootsa	25	0.1
1995	Tweedsmuir/Ootsa	50	0.2
1996	Tweedsmuir/Ootsa	75	0.3
1997	Tweedsmuir/Ootsa	225	0.5
1998	Houston to Entiako	1,225	2.5
1999	Houston to Quesnel	3,225	6.0
2000	Takla Lake/Houston to Williams Lake	57,000	41.1
2001	Takla Lake/Smithers to 100 Mile	80,000	71.8
2002	Takla Lake/Smithers to Cranbrook	89,000	107.7
2003	Williston Lake/Smithers to Cranbrook	101,000	173.5

Source: COFI Mountain Pine Beetle Task Force annual survey.
*Cumulative volume of dead timber.

Fall 2000

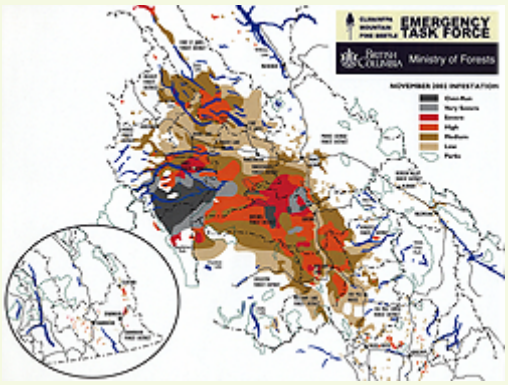


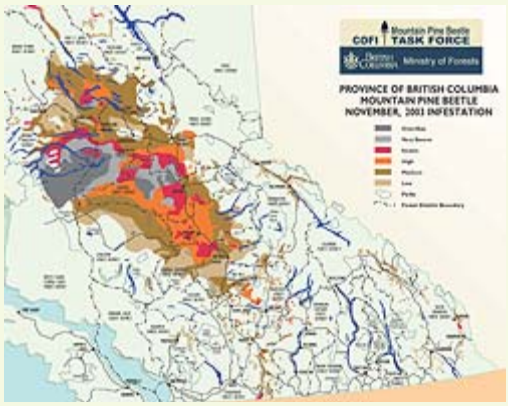
Fall 2001



Fall 2002

Fall 2003





Source: COFI Mountain Pine Beetle Task Force annual survey.
Note: Within the mapped infestation perimeters, there are varying degrees of attack as indicated:

	Low: 1-3 percent
	Medium: 4-20 percent
	High: 21–40 percent
	Severe: 41–60 percent
	Very severe: 61–80 percent
	Overrun: 61–80 percent

As of fall, 2003:

• Ranging from 1% to 90% attack the epidemic is 1,150 km long and 550 km wide at its widest point, over three quarters the size of Sweden.
• Volume infested by fall 2003: 173.5 million m^3 spread over 10.1 million ha (in the working forest; this does not include volumes in parks and protected areas which are estimated to exceed 30 million m3).
• Volume infested 2002: 107.7 million m^3 spread over 8.9 million ha.
• Volume infested 2001: 71.8 million m^3 spread over 8.0 million ha.
• Provincial Allowable Annual Cut (AAC) in BC: approximately 74 million m^3 (source Ministry of Forests).
• Value of lumber products that can be produced from 173.5 million m^3 of timber is just under $18 billion (based on average lumber price December 5, 2003 $CDN 415/Mfbm). Stumpage value to the province is in excess of $2.7 billion (approximate average interior stumpage 2003 $16.00/$m^3$).
• 173 million cubic meters of wood will produce 43 billion board feet of lumber, nearly 1.4 times Canada's total annual softwood lumber production.
• 43 billion board feet of lumber is enough lumber to build 5.2 million homes.
• US housing starts total 1.7 million per year on average.
• Harvesting directed at the beetle in 2003/2004 is expected to be 26 million m^3, up from the 23 million m^3 achieved in the 2002/2003 harvest season. This is over 80% of available harvest capacity.

APPENDIX 5: Mountain Pine Beetle: Latest Predictions

Marvin Eng's material? *Provincial Level Projection of the Current Mountain Pine Beetle Outbreak: An Overview of the Model (BCMPB) and Draft Results of Year 1 of the Project*, April 2004.

Marvin Eng's website: http://www.for.gov.bc.ca/hre/bcmpb/

Figure 7 illustrates the effect of the mountain pine beetle outbreak and associated management activities on pine volume within the timber harvesting landbase. As a worst case scenario, we project that less than 20% of the total pine volume in the province will remain living after 20 years. That is, only the non-susceptible pine will remain living. A significant proportion of the remainder will be harvested, either as green volume or as salvage, but almost half the volume will become "non-recovered" losses.

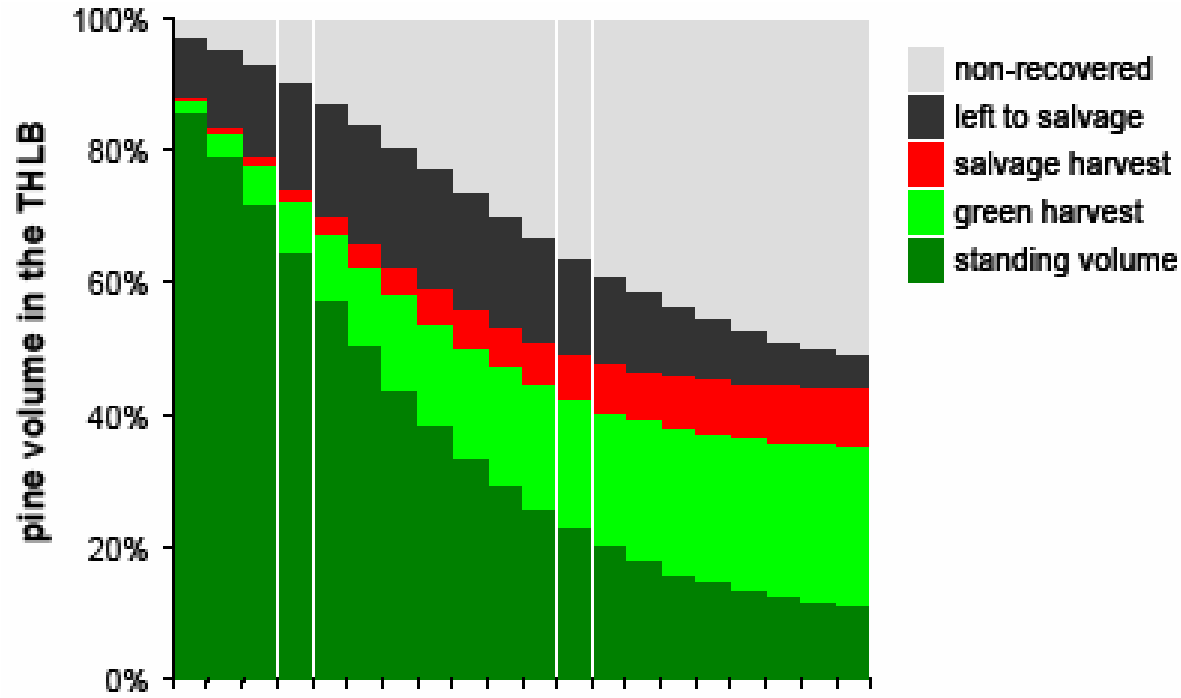
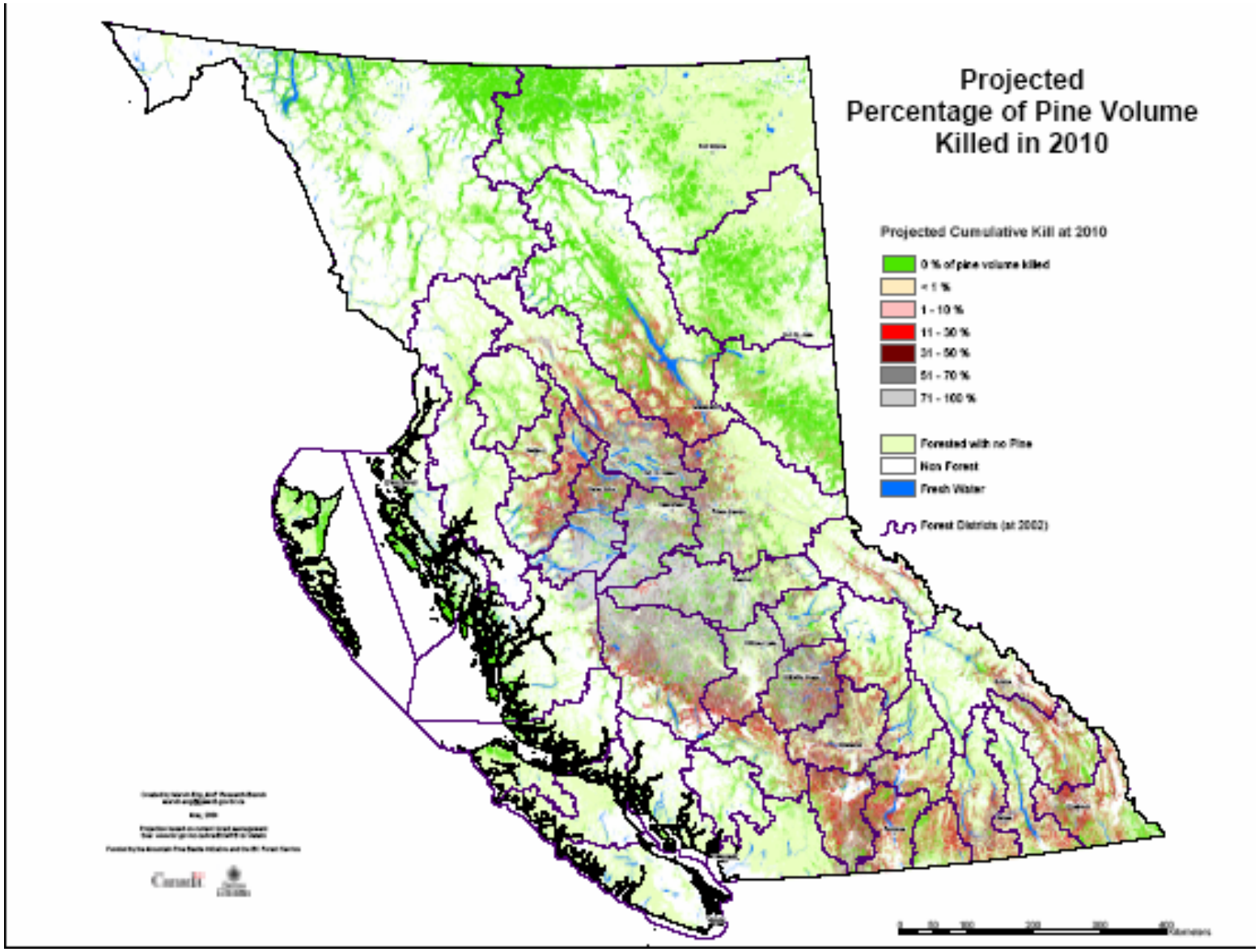


Figure 7. Projected proportion of pine volume on the timber harvesting landbase in various categories under the Reference Scenario

Map: Projected Percentage of Pine Volume Killed in 2010 (overleaf)


Projected
Percentage of Pine Volume
Killed in 2010
Projected Cumulative Kill at 2010
0 % of pine volume killed
< 1 %
1 - 10 %
11 - 30 %
31 - 50 %
51 - 70 %
71 - 100 %
Forested with no Pine
Non Forest
Fresh Water
Forest Districts (at 2002)

APPENDIX 6: Mountain Pine Beetle: Action Plan Update 2004

MINISTRY OF FORESTS

Mountain Pine Beetle Action Plan Update 2004

SITUATION OVERVIEW

The pine beetle is a natural phenomenon that only sustained cold weather can stop. This Update builds on strategies contained in the 2001 mountain pine beetle action plan, which was itself, the result of an MLA task force. Since 2001, this government has taken many actions to combat the mountain pine beetle epidemic:

- Appointed Beetle Management Coordinator
- Established management zones
- Made regulatory changes to streamline beetle harvest
- Increased the AAC in beetle-affected areas by 7.8 million cubic metres per year
- Slowed the spread at the epidemic's perimeter by removing small patches of infested trees.

The mountain pine beetle infestation continues to grow. It has expanded from an area of approximately 165,000 hectares in 1999 to about 4.2 million hectares in 2003. As most trees attacked by the mountain pine beetle inevitably die, the epidemic is currently estimated to create approximately 500 million cubic metres of grey wood over the next one to three years, of which 200 million cubic metres could potentially remain unharvested. In October 2003, the Chief Forester released the report, Timber Supply and the Mountain Pine Beetle Infestation in B.C., which assesses the implications of the beetle epidemic in 12 management units (five tree farm licences and seven timber supply areas: Morice, Lakes, Prince George, Quesnel, Williams Lake, 100 Mile House and Kamloops) that represent the more severely infested areas in south-central B.C. from Houston to Kamloops.

The report concludes that:

- Across the 12 management units, it is possible that an average of 50 per cent of pine stands could be affected by mountain pine beetle over the next one to three years;
- About 15 years from now (when it is assumed that beetle-killed trees might have deteriorated to the point where they're no longer merchantable as saw logs), the timber supply across the 12 units could be reduced by about 19 per cent, relative to the AAC that was in place before the epidemic (pre-uplift AAC). The impacts are expected to vary greatly amongst management units;
- In the Quesnel TSA (one of the most severely infested areas), the timber supply may decline by about 29 per cent, compared to the pre-uplift AAC; and
- If harvest levels remain at today's levels, about 200 million cubic metres of beetle-killed pine would ultimately remain unharvested.

In November 2003, the Premier hosted a symposium in Quesnel, bringing together community leaders, First Nations, scientists, forest health experts, industry representatives and environmentalists. The symposium was an opportunity to review previous and existing management strategies, and to look for ways to lessen the beetle's long-term impact on jobs.

ACTION PLAN UPDATE

In response to the issues identified at the Quesnel symposium and in response to the beetle epidemic this updated action plan has the following objectives:

- foster new and emerging forest-based activities;
- limit further damage to forests and the environment;
- recover value from damaged timber; and,
- support and encourage economic development and diversity in affected communities.

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KEY CONSIDERATIONS

It is important to understand that while there is much we can do, there are some important constraints we cannot ignore. Key among these are:

- The biology of the bark beetle is such that the only way to address it in older, mature forests is to remove the infested trees.
- There is vast and mostly uninterrupted areas of mature, beetle susceptible timber in the Interior.
- Nature's way of keeping the beetle in check is cold (-40C) winters. The last decade has seen winter temperatures consistently warmer than historical averages.
- Forest products markets are limited in their capacity to take up large quantities of additional timber, especially where quality is reduced.

MANAGEMENT FRAMEWORK

Roger Harris, Minister of State for Forestry Operations, will lead the action plan on behalf of government. He will be supported by the Deputy Ministers' Committee on Environment and Resource Development to ensure a co-ordinated approach across government. A Beetle Management Coordinator and Director of Economic Diversification will also lend support.

MINISTER'S COMMUNITY ADVISORY GROUP

A Minister's Community Advisory Group, representing key stakeholder groups will provide advice on the action plan as it is implemented. Members have been appointed for a two-year term April 2004 to April 2006. Members include representatives from communities, First Nations, forest industry, scientific community, logging contractors, environmental sector and the federal government. Minister's Community Advisory Group Members:

- Paul Addison, Regional Director General, Canadian Forest Service
- Ric Careless, Executive Director, BC Wilderness Tourism Association
- Jim Engleson, Group Vice President, Wood Products, Canfor
- Len Fox, Mayor, District of Vanderhoof
- Rick Gibson, Mayor, City of Williams Lake
- Greg Halseth, Assoc. Prof., Geography and Canada Research Chair in Rural and Small Town Studies, UNBC
- George Hoberg, Professor and Head, Department of Forest Resources Management, UBC
- Hank Ketchum, Chair, President and CEO, West Fraser Timber
- Rosanne Murray, Chair, Bulkley Nechako Regional District
- Roy Nagel, General Manager, Central Interior Logging Association
- Dave Neads, Chair, BC Environmental Network
- Mike Robertson, Band Manager, Cheslatta Carrier Nation
- Barry Seymour, Chief, Lheidli T'enneh

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FOREST MANAGEMENT

The Beetle Management Coordinator will continue to oversee mountain pine beetle management efforts. Harvesting the leading edge of the infestation has proven to slow the spread of the mountain pine beetle. Therefore government will:

- continue to redirect harvest from green timber to beetle-damaged wood;
- extend cutting permits to redirect harvest to beetle wood;
- develop new tenure opportunities;
- conduct expedited allowable annual cut reviews in the hardest hit areas. The Chief Forester is currently reviewing the allowable annual cuts in the Quesnel, Vanderhoof and Lakes timber supply areas;
- investigate ways to transport beetle wood so that it provides the greatest economic benefit; and
- consult with Land and Resource Management Planning tables about making provisions in existing land use plans to address the spreading beetle infestation.

Government will also implement Filmon report recommendations for forest health, including prescribed burns, tree removal, falling/burning beetle-infested trees and reducing fuels in parks.

COMMUNITIES

To support communities, a director of economic diversification will interact with the Northern Development Initiative. He will work to ensure that local governments, First Nations, and industry in the beetle-infested areas are aware of medium and long-term economic impacts; their role in mitigating the impacts and working to ensure communities can readily access the support available from senior governments to facilitate economic diversification.

The economic diversification director will also ensure all regions and communities impacted by the pine beetle epidemic are included and participate in economic development activities that recognize their individual strengths and challenges.

With the beetle management coordinator, the economic diversification director will ensure all timber and non-timber economic development opportunities, regardless of their size, are explored for their potential to contribute to more diversified local economies.

The Minister's Community Advisory Group will also provide their advice and recommendations as the fight to minimize the spread of the mountain pine beetle continues.

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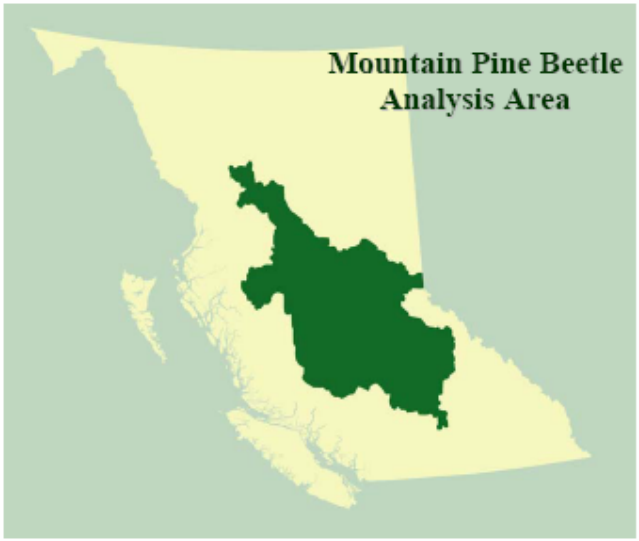
NEW MARKETS

The Ministry of Forests will issue an "expressions of interest" to seek new uses of beetle wood. With a deadline of May 31, 2004, the "expressions of interest" is designed to solicit viable business proposals from British Columbia's talented entrepreneurs on new uses of beetle-wood – uses that will not compete with traditional markets. Some ideas already put forward include using beetle wood in OSB plants, for pellets and for power co-generation facilities.

High-quality wood can be harvested for a number of years after the beetles have killed a tree. It remains structurally sound although it may have a blue or grey stain as a result of the fungus carried by the beetles. Research has found that the fungus stain does not affect the wood's strength, gluing characteristics or ability to be finished. The wood can still be used for B.C.'s wide variety of high-quality construction grade products.

Blue-stained wood will also be promoted through a combination of efforts to support access to international markets, and then to accelerate the use of beetle wood in those markets. In November 2003 the Premier witnessed the signing of a letter of intent with the Chinese Academy of Forestry, which will enable the use of beetle wood in structural applications in subsequent phases of the Dream Home China project. As well, Forestry Innovation Investment is working with forest companies to address "healthy home" concerns important to the Japanese market; and exploring potential opportunities to use beetle wood in Korea.



For more information on the mountain pine beetle, visit www.for.gov.bc.ca

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