

Workshop Resource Compendium

INVENTORY PROGRAM REVIEW

A Challenge Dialogue with Stakeholders

1. Progress Report – Challenge Paper Feedback
2. Selected Forestry Initiatives and their Inventory Implications
3. Challenge Paper Consolidated Feedback
4. Challenge Paper
5. Review of Inventory Issues Identified in Timber Supply Review AAC Rationales



May 24-25, 2006

Progress Report – Challenge Paper Feedback The Challenge Dialogue System™

INVENTORY PROGRAM REVIEW

A Challenge Dialogue with Stakeholders

This Progress Report describes and assesses the feedback received from *Inventory Program Review: A Challenge Dialogue with Stakeholders*. A complete list of all comments received is available in *Challenge Paper Consolidated Feedback*. Both documents and other background material regarding the Inventory Program Review are available at:

www.for.gov.bc.ca/hts/inventory_prog_rev.htm

Your comments on this Progress Report are appreciated by May 31st, 2006. Please send to <mailto:forests.forestanalysisbranchoffice@gov.bc.ca>

The Progress Report along with your comments will be used to help focus discussions at an action-oriented workshop with client-stakeholders scheduled for May 24-25, 2006 in Richmond, BC.

The BC Ministry of Forests and Range Executive Co-Sponsors for the Inventory Program Review are Jim Snetsinger, Chief Forester, Forest Stewardship Division and Tim Sheldon, Assistant Deputy Minister, Operations Division.

The Action Team members guiding the IPR are Melanie Boyce, Don Gosnell, Jon Vivian, Rick Baker, Graham Hawkins, Eric Fisher, Steve Stearns-Smith, Ray Addison and Keith Jones.



May 9, 2006

Table of Contents

| | |
|-------------------------------------------------------------------------------------------|----------|
| TABLE OF CONTENTS | I |
| PURPOSE OF THIS REPORT | 3 |
| FEEDBACK RECEIVED | 3 |
| SUMMARY OF KEY MESSAGES FROM THE DIALOGUE¹ | 4 |
| DELIVERY MODEL, FUNDING AND CAPACITY | 4 |
| PURPOSE OF INVENTORY | 4 |
| SCOPE OF INVENTORY PROGRAM REVIEW..... | 5 |
| SEAMLESS PROVINCIAL COVERAGE | 5 |
| INVENTORY FOR SUB-STRATEGIC APPLICATIONS..... | 6 |
| VRI STANDARDS..... | 6 |
| GROWTH AND YIELD AND SITE PRODUCTIVITY | 6 |
| CONCURRENT REVIEW OF INVENTORY IMPLICATIONS OF SOME KEY FORESTRY INITIATIVES | 7 |
| CHALLENGE PAPER FEEDBACK BY SECTION | 7 |
| 1. FOREWORD..... | 7 |
| 2. KEY CHALLENGE STATEMENT | 10 |
| 3. EXPECTED OUTCOMES AND DIALOGUE SUCCESS FACTORS | 11 |
| 4. BACKGROUND ISSUES AND EVENTS | 14 |
| 4.1 <i>IPR-Related Initiatives</i> | 15 |
| 4.2 <i>Vegetation Inventory</i> | 15 |
| 4.3 <i>Growth and Yield</i> | 15 |
| 4.4 <i>Related Inventories</i> | 16 |
| 5. ASSUMPTIONS | 16 |
| 5.1 <i>Mandate</i> | 16 |
| 5.2 <i>Clients and Business Drivers</i> | 17 |
| 5.3 <i>Delivery Model vs. Funding</i> | 17 |
| 5.4 <i>Roles and Responsibilities</i> | 17 |
| 5.5 <i>Use of VRI</i> | 17 |
| 5.6 <i>VRI and ecological data/mapping</i> | 18 |
| 5.7 <i>VRI coverage</i> | 18 |

¹ This *Progress Report* 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. www.innovationexpedition.com.

| | | |
|------|------------------------------------------------------------------------------|-----------|
| 5.8 | <i>VRI fine-tuning vs. overhaul</i> | 18 |
| 5.9 | <i>G&Y</i> | 18 |
| 5.10 | <i>Loss of expertise</i> | 18 |
| 6. | CRITICAL QUESTIONS | 19 |
| 6.1 | <i>Inventory Program Review</i> | 19 |
| 6.2 | <i>Today's Priority Business Needs</i> | 20 |
| 6.3 | <i>Future Business Needs</i> | 21 |
| 6.4 | <i>Priority Inventory Services and Products</i> | 21 |
| 6.5 | <i>Risks and Gaps in Existing Inventory</i> | 21 |
| 6.6 | <i>TFL, Park & Private Land Inventories – Seamless Inventory</i> | 22 |
| 6.7 | <i>Accuracy Expectations</i> | 23 |
| 6.8 | <i>Information Access</i> | 23 |
| 6.9 | <i>Delivery Model, Roles, Coordination</i> | 24 |
| 6.10 | <i>Incremental Improvements, Technology, Innovation</i> | 25 |
| 6.11 | <i>Value of Inventory Information</i> | 26 |
| 6.12 | <i>Capacity, Succession, Training</i> | 26 |
| 6.13 | <i>Preliminary Inventory Issues Identified by FAIB Inventory Staff</i> | 27 |
| 6.14 | <i>Are there other points you would like to make?</i> | 27 |
| | NEXT STEPS | 28 |

Purpose of this Report

This Progress Report is intended to provide:

- an overview synthesis of the range of feedback on the Challenge Paper (with sample quotes)
- a sense of where participants expressed significant alignment with ideas in the Challenge Paper and areas where there is confusion or disagreement or a desire for more information
- additional critical questions, ideas and suggestions that participants feel need addressing
- observations from a review of various forestry initiatives with inventory implications
- some initial reactions from the Inventory Program Review (IPR) Action Team to the feedback received and initiatives reviewed
- a first effort to refine the key components of the Challenge Paper — Key Challenge, Expected Outcomes, Critical Questions — based on participant feedback
- an introduction of some proposed Issues for moving the Dialogue forward in the next phase including the planned IPR workshop in Richmond on May 24-25, 2006.

Feedback Received

The amount and quality of the feedback from 49 individuals or groups has been most encouraging. The breakdown of the responses is 25 government (20 MOFR, 2 MOE, 2 ILMB, 1 Oil and Gas Commission), 7 industry, 13 consulting sector and 1 academia. All of the Challenge Paper feedback has been compiled un-attributed into a document titled *Challenge Paper Consolidated Feedback*. It is available on the IPR website http://www.for.gov.bc.ca/hts/inventory_prog_rev.htm.

For the Action Team, this suggests that we have made a meaningful opening connection with a significant number of interested stakeholders and have attracted their initial involvement in this important review. We assume that among those who have not yet provided feedback, most if not all of you will still follow the Dialogue and will be interested in seeing how this journey evolves and where it might take us. Your comments on this Progress Report, like the Challenge Paper, would also be appreciated so we can see where there are clear areas of alignment, remaining areas of confusion and where there are clear differences in views.

We commit to honour and respect your contribution by:

- using your feedback to shape the next steps of the Dialogue
- working creatively to expand and sustain an open, frank Dialogue
- assisting participants to gain alignment around some priority ideas and action options and to build a plan to start implementing these ideas.

We invite you to hold us to this commitment.

Summary of Key Messages from the Dialogue

Reflecting overall on the Dialogue thus far, the following perspectives are advanced for your consideration as we turn our attention now to designing an effective IPR workshop on May 24-25, 2006 at the Executive Inn in Richmond.

Delivery Model, Funding and Capacity

The issues of mandate, governance model, roles and responsibilities between government, licensees and consultants, and funding are of universal concern to all Dialogue participants. They need to be addressed by the MOFR Executive and the Forest Investment Council, among possibly other key stakeholder beneficiaries of the inventory information. While these are important delivery model challenges that need to be dealt with, it is expected that the upcoming May 24-25, 2006 workshop is best to focus its attention more narrowly. The discussion will address the strategic direction the inventory should take to address current and near future priority business needs, the inventory content, approaches and tools. In other words what it will take to make sure we will have a healthy responsive inventory “system.” These content ideas need to draw upon, as with this electronic Dialogue, from the collective expertise in industry, consultants and government. Being clear on the purpose of and vision for the inventory will then help inform discussions on the delivery model and funding.

Through this Dialogue, it is clear that stable funding is closely linked to improved capacity, training and the management of succession. These issues will be better addressed when clarity is provided on the inventory goals and delivery model.

The following themes are likely to form some of the main topics for the workshop and the focus of some post-workshop issue/opportunity teams.

Purpose of Inventory

Recurring questions from the Dialogue related to the purpose of the inventory included — who are the key clients?; what are their business needs?; what questions do they need answers to? what key vegetation inventory and G&Y information is needed to address these questions?; what scales of planning and decision-making is this information needed for? The Action Team suggests the following client categories.

1. Provincial Corporate Initiatives such as MPB, The New Relationship with Aboriginal People and Strategic Land Use Plan Implementation. In these cases the inventory is requested to provide decision-support for senior government officials. These initiatives invariably involve multiple government agencies and stakeholders at various levels in their organizations.
2. The Chief Forester when making AAC determinations including FAIB and licensees involved in TSR.

3. Licensees who prepare FSPs under FRPA and district managers who approve these plans, for example, to ensure landscape-level objectives are addressed.
4. MOFR staff responsible for State of Forests Reporting; various MOFR operational needs including protection, revenue, TIB, etc.; licensees who prepare SFMPs and provide C&I and targets; other agencies who need the inventory to support delivery of their Service Plan such as MOE regarding wildlife management and biodiversity conservation

Addressing most of the above topics involves “layering” the vegetation inventory with other resource inventories and information in order to obtain a more complete biophysical picture and subsequently a more complete analysis to support resource management decisions. Concerns were expressed in the Dialogue that the links between VRI and other inventories need improvement or that they be more fully integrated.

It will be important at the workshop to confirm and fine-tune the purpose of the inventory, to define key inventory clients and to understand the value of the inventory to these clients. This information will in turn help to inform decisions about the delivery model, funding and capacity. Another important topic will be how to improve linkages with other resource inventories.

Scope of Inventory Program Review

There was general support that the IPR address VRI, G&Y and site productivity but that it not address other inventories or related classification systems such as TEM or PEM. Nonetheless there is recognition of role of ecosystem mapping in estimating site productivity. In this regard, the Challenge Paper noted another companion Challenge Dialogue on ecosystem mapping that will be focused more on these topics in the next few months.

Seamless Provincial Coverage

There was general support that the VRI provide seamless coverage for the entire province including TFLs, parks and private land. Such a seamless coverage is needed for a variety of reasons including corporate-level resource questions that must cover large areas like MPB-affected areas, province-wide SOF reporting, land use plans for large regions and the like.

It is recognized that there are several key challenges in obtaining a seamless coverage including the acquisition of TFL data in a manner that is fair and equitable to tenure holders who may have paid for the inventory in whole or in part. There may be a need to consider innovative cost-effective ways to obtain perhaps a more limited ‘core’ set of attribute information for parks and private land. Options to address these challenges will be explored at the workshop.

Inventory for Sub-Strategic Applications

While the vegetation inventory has been implemented to support strategic, management unit-level applications, it is very clear from the responses that the inventory is and will continue to be used for sub-strategic applications such as for spatially explicit landscape unit-level planning. Legal requirements under FRPA are a key driver for these applications, for example, to assess the achievement of old growth retention targets. In no uncertain terms, many who responded stressed the importance of improving the inventory for these kinds of applications. Several innovative suggestions were offered regarding how this could be accomplished cost-effectively. These included the use of cruise data and satellite imagery. The need to “brainstorm” ideas and to identify pilot projects to test these ideas will be of great value at the workshop.

VRI Standards

A number of respondents felt some of the existing VRI standards are inflexible or inappropriate and that they need revision. There was also the question raised as to whether the standards should be more results-based and less prescriptive. Other perspectives included — that the standard is too expensive to apply and is not financially sustainable even if there is a substantial increase in funding (i.e., it is a “Cadillac” and a VRI “lite” option is needed); that the need, purpose and use of Phase 2 samples needs re-examination; that provisions for eco-attributes may be unnecessary as they seem to have limited use. If the VRI standard is to be revised, what are the key issues, what are the opportunities and who should be involved in changing the standard, asked some respondents. A workshop session that examines these kinds of issues and identifies solution options will help to move these challenges ahead.

Growth and Yield and Site Productivity

Strengthening G&Y and site productivity efforts in the province through some form of bona fide provincial program seems to be supported by several respondents. PSP re-measurement provides important information for G&Y models for unmanaged stands such as VDYP. The need to improve site productivity estimates for managed stands (that use the TIPSY model) based on local management unit-sampling is a key challenge often raised by the Chief Forester in TSR. Various tools have been used to assess the inherent productive capacity of forest sites including SIBEC and Site Index Adjustments (SIA), however there appears to be considerable confusion regarding what data and tools should be used for what purpose. There is also the issue of getting better assessments of Operational Adjustment Factors (OAFs) for managed stands.

A number of ideas have been offered in the Dialogue regarding these and other related G&Y-site productivity topics. A focused workshop session will be devoted to these important topic areas.

Action for Participants #1

Please use the separate IPR Progress Report Feedback Form to provide any additional reactions you might have prompted by the summary information above.

Concurrent Review of Inventory Implications of Some Key Forestry Initiatives

Concurrent with the Challenge Paper process, the Action Team also examined a range of forestry initiatives and their inventory implications. These included ecosystem-based management; coast forest challenges; interior log grade changes; FRPA developments; developments regarding Defined Forest Management Area (DFAM); FIA funding, Sustainable Forest Management Planning (SFMP); State of Forest Reporting (SOF); the Future Forest Ecosystems of BC initiative of the Chief Forester; and, few miscellaneous items. The findings from this study are in a report titled *Selected Forestry Initiatives with Inventory Implications*. It is posted on the IPR website at: http://www.for.gov.bc.ca/hts/inventory_prog_rev.htm.

You are also reminded of the findings of an earlier *Review of Inventory Issues Identified in Timber Supply Review AAC Rationales*. This document is also on the IPR website at: [Inventory Program Review\TSR Inventory Issues Report.pdf](#)

Challenge Paper Feedback by Section

1. Foreword

The Challenge Paper –Foreword Section that provided background on the IPR including its proposed *scope* and some *starting perspectives* of the Action Team.

There was general support for the proposed “vegetation” scope of the review namely the Vegetation Resource Inventory (VRI) including growth and yield (G&Y), site productivity and related vegetation assessments. It was pointed out that the VRI maps and describes non-forested areas so these areas should also be in-scope.

Some respondents stressed the need to link-in other inventories more explicitly and related to this that the concept of total [multiple] resource inventories should be explored.

“What about the concept of total resource inventories rather than just vegetation inventories. Managers today need to consider all resources affected by their planning not just vegetation. With new technology, it is possible to inventory all resources so that a more integrated approach to resource management is facilitated. This approach is more cost effective than people might imagine.”

“... Does not include rangelands” Last time I looked, MoFR has broad definitions of forest land and range land, such that they overlap considerably. Although current VRI efforts may not focus on rangelands, they most certainly map and classify them.”

Also noted was the importance to link the IPR with other initiatives such as Mountain Pine Beetle-related activities and any climate change work.

There was concern by some that the Challenge Dialogue seems to speak mainly to high level “program delivery issues” such as governance, funding, delivery model, user needs and applications. They feel there should be an opportunity at some point (if not with the IPR then when?) to review detailed “technical issues” related to VRI like Phase 1 photo interpretation, Phase 2 ground sampling, Net Volume Adjustment Factors (NVAF), etc. In this regard, many technical issues and ideas were provided.

“FAIB should consider some methodology to apply more intensive sampling in some circumstances to provide higher resolution data for stand level use.”

“[need to]..identify the impact of obsolete or inadequate products, inventory methodologies and assumptions on optimum and usable products and current short-falls in inventory deliverables.”

“(VRI) standards should set targets in terms of results rather than prescribe a specified method of producing an outcome. What is more important? The process or the quality, contents and usefulness of the resultant products?”

Several respondents had considerable background in VRI and provided a number of important comments that helped clarify the *starting perspectives* in the Foreword Section.

“Usually people do not have much success in trying to be all things to all people. So I do not like the chances of the Inventory Program doing so. Let’s decide what is our core business and let the “nice to do” stuff to be funded by the periodic funding bonanzas that come along like FRDA, FRBC etc.”

We grow and log trees. We can see trees from the air. Let the inventory speak to their location, size and the productivity of the site to which they are growing.

“I think the problem with the current inventory model is that there is no clarity around what the inventory is to be used for. If we knew what it was intended to be used for it is relatively easy to develop a program to address the stated needs. Do we want polygon, landscape unit or management unit resolution to answer what questions?”

“The business case that I would prefer is one that assesses the real risk to the province stewardship mandate without an adequate, technically sound, well funded provincial inventory. The technical model exists – it is the implementation and financial commitment that is lacking.”

“A huge issue is not mentioned at all, and that is access to the inventories collected. In general there seems to be an unstated assumption that the primary users are for the most part found with MOFR (and mostly focused on TSR). In fact I would suggest that VRI is the only province-wide vegetation inventory we have and as such it is the defacto choice for all agencies, industries, interest groups, First Nations, etc., for which vegetation cover is relevant to their business.”

“VRI is not only important to the forest sector, i.e. industry, but also to the entire spectrum of planning, operations, economic development, research, conservation and protection of all provincial forest lands. It is the key foundation along with spatial map base....and most other derived data/inventories, analysis and decision-making depend.”

The statement — “The inventory therefore must be regularly updated and periodically re-inventoried when and where there is a demand for the inventory to be more current.” provoked the following reaction.

“The notion that an inventory needs to be redone to be more current is very old thinking. Given that the original inventory was well done, that we maintain the currency of the inventory for change through an annual or biannual update cycle, that we project the inventory for yield changes with reasonable yield models, then currency is not an issue.”

Some participants strongly disagreed with the assertion that the “delivery model is not well suited...to vegetation inventory.” The view here is that limited funding, not the delivery model per se, was the key issue in the past that hampered support for the inventory. And, licensees have done the best they could under difficult fiscal circumstances to address the inventory where possible. Further it was suggested that a recent decision to dedicate FIA funds “off the top” to ensure a more coordinated inventory effort provincially, would provide more stable funding to better support the existing delivery model.

The Challenge Paper stated that licensees are responsible for funding inventory on TFLs. However, it was pointed out that TFL inventory activity has often been directly related to various government funding programs over the years including section 88, FRBC and FIA. It was noted that the initial FRBC requirement for industry cost-sharing of inventories on TFLs was dropped early on in the process. Related to this, other feedback noted that “*access to licensees’ inventories*” ... “*is an important issue for land use planning.*”

In consideration of this feedback, the Action Team proposes to continue to focus the scope of the IPR on the “vegetation” inventory, as proposed in the Challenge Dialogue, but being aware of the important linkages to other inventories and data sets that are needed by resource managers. We recognize that the VRI often must be used with other resource information data sets to support decision-making.

It is clear from the feedback that a key aspect of the IPR is to clearly identify who the primary “clients” are. The inventory might be better designed and delivered to support their needs first. Having said that, there it is also recognized that there are other important clients, an example being where there is a legislative requirement to use the inventory to make substantive sustainability decisions such as the Chief Foresters’ determinations of an AAC in TSAs and TFLs. And there are many other users whose inventory requirements need to be prioritized when making a balanced decision about where and how to improve the inventory.

The Action Team acknowledges that the IPR needs to examine program delivery issues — governance and coordination, funding, roles and responsibilities, etc. — but it should also address technical issues, that when resolved will make the inventory more useful, usable, accessible and cost effective. These technical, programmatic and organizational challenges are often interlinked.

Action for Participants #2

Please use the separate IPR Progress Report Feedback Form to provide any further reactions to the responses to the Challenge Paper Foreward Section.

2. Key Challenge Statement

There was general alignment among the participants with the Key Challenge Statement.

"...I think it is a good starting point." "... the concerns and needs of the Protection program can be met."

There were suggestions for improving the Key Challenge.

"The Challenge Statement is clear and well written but appears to assume the stakeholders' prior knowledge and understanding of the framework and structure of the existing VRI system including the scope and limitation of use affecting different resource management objectives and planning decision levels."

"...nothing be thrown out until all major stakeholders really appreciate and understand what the current VRI 'baby' is."

"Some times a review of an existing process, with the goal to 'make it better', establishes unnecessary sideboards and reduces the chance of coming up with revolutionary improvements."

"The Key Challenge statement gives me the idea you are really only looking at a "tweaking" of the inventory program, rather than critically looking at whether it truly meets the requirements of today and the future."

"The Challenge Statement may just want to state that the inventory system will be designed to meet today's and future business need in the most cost effective manner."

"If through the review it is decided that improvements are needed, an achievable but useable time-frame should be identified for the work so that it does not become an unending project."

"Our challenge should be: focus scarce resources on a targeted and specific inventory. We do not want to make the focus too broad or too costly."

"Looking at the history of episodic and fluctuating funding for inventory (i.e. feast or famine) infers that cost is all important and that we should plan for fluctuating funding rather than hope and wish for a more stable funding world."

"A major component of the program review and Challenge Paper is dedicated to Growth and Yield" [and this needs to be reflected in Challenge Statement.

A few are concerned that the Challenge Dialogue will not produce meaningful results.

"...unless there is the willingness to follow through on recommendations, i.e. resource issues and executive support for change – then all this is simply dialogue among peers."

"As it stands I think the Key Challenge statement should stand as is – its fine. However ...both the Forest Resources Inventory Committee (FRIC) and the succeeding Business Information Management Group (BIMG) ...had fine opening statements too – but neither went anywhere. It seems that when the "rubber is ready to hit the road" on these things the process fizzles out."

The responses generally imply that the vegetation inventory design is reasonably solid and likely can answer the business needs but lack of funds have hindered delivery of the inventory. The vegetation inventory itself is not well understood however. Training and extension to create a better understanding of the inventory along with the provision of more stable funding should address these key obstacles.

Alternative views are that the design should be revisited in order to better meet the needs of today's and tomorrow's many users. Likely both views have merit, namely that the current system does need to be better understood and resourced, while innovative ways to improve it should also be explored particularly in light of some of the new resource questions being asked.

Funding for inventory has fluctuated widely. A number of responses stressed the importance of having more stable funding. This was seen to be a key factor for obtaining a more effective inventory program. Recently, the Forest Investment Council has endorsed in-principle a more stable funding model using FIA funding.

Revised Key Challenge Statement — Based on the feedback, the Key Challenge Statement is revised as follows (the main changes are underlined):

To undertake a full and open review of the current implementation of the vegetation inventory program, including growth and yield, in order to examine how well it meets current and future information needs and how it can be improved to address these needs better:

- **by engaging a range of inventory stakeholders in a structured dialogue to establish a common understanding of the vegetation inventory, test assumptions, ask important questions, identify specific issues and opportunities;**
- **by drawing upon the expertise of technical inventory professionals in the public and private sector to respond to opportunities to improve processes and products and to address identified gaps in a cost-effective manner;**
- **by striking a balance between thinking outside the box and recognizing where current systems continue to serve our needs well (not throwing the baby out with the bath water);**
- **by balancing desired change with affordability to meet today's and future business needs. We will never eliminate risk, but we must manage it;**
- **by using the feedback of the dialogue to determine the priority action options and recommendations of the inventory community (users and providers) that are achievable within a clear timeframe.**

Action for Participants #3

Please use the separate IPR Progress Report Feedback Form to provide any additional reactions prompted by the revised Key Challenge Statement.

3. Expected Outcomes and Dialogue Success Factors

Expected Outcomes — Several constructive comments were provided on the five Expected Outcomes. There was generally strong support for and emphasis on outcome #5 — a renewed strategic direction (vision, mission and mandate) for the province’s vegetation inventory program.

“The expected outcomes do not appear to address the paradigm of ‘results-based’ forest management...the focus is not on the managing the how we do it but on the results generated from the actions. If we apply this model to resource inventory...how would that affect the capturing of a province wide data set and how would government pull this together, or would they have to?”

“The expected outcomes are confusing as they seem to overlap with one another. Outcome #1 is a broad, all encompassing statement, outcomes #2 and 4 state similar things and outcome #3 is a component of #1. Revised wording of outcomes kindly provided.

“What will be the vegetation inventory standards and specifications, the scheduling/timing and funding vehicle?”

“Item 1 would be more informative if emphasis shifts from acquiring a ‘broad view...information needs’, to a compartmentalized case by case comprehensive picture of information needs of stakeholders as well as, definition of program delivery option.”

“... would love to see a renewed strategic direction – financially supported with a commitment to make it happen.”

Revised Expected Outcomes — Based on the feedback, the Expected Outcomes are revised as follows.

1. **A clear objective assessment of current and anticipated vegetation inventory information needs, issues and opportunities;**
2. **Identification and assessment of action options, including results-based approaches to address the needs, issues and opportunities (from ‘1’);**
3. **A business case for vegetation inventory investments considering a range of inventory stakeholder benefits; and**
4. **A renewed strategic direction (vision, principles and collective mandate) and action (implementation) plan for the BC’s vegetation inventory program in the near- (1-2 year), medium (3-5 year) and long-term (5+).**

Action for Participants #4

Please use the separate IPR Progress Report Feedback Form to provide any further reactions you have to this revised Expected Outcomes.

Challenge Dialogue Success Factors — Several important and interesting responses surfaced from the question: “I would consider this Dialogue a success if...”

There is strong desire to have a clear champion for the inventory program and that this should probably be the Chief Forester. A common refrain is that the inventory ‘seamlessly’

cover the entire province — all forms of public and private land, and that there should be a specified time-table and action plan to accomplish this with stable funding and resourcing.

A recurring view from many is that there needs to very specific reasons articulated as to why we have a vegetation inventory and who it is to primarily serve (i.e., who are the key clients?). Being explicit about this will provide a clear scope for the business case for the inventory. There is universal recognition that the inventory is vital for supporting of strategic questions such as for land use planning and TSR. There are also strong views that the inventory needs to become more capable of supporting operational planning and decision-making.

Virtually everyone feels that the roles and responsibilities of the inventory community — licensees, consultants and government (district, region and branch) — need to be clarified for all functions of the inventory system.

While this dialogue is a good start, some emphasize that such a discourse should be more regular. There is skepticism however that dialogue alone will not lead to effective changes and that success needs to be measured by clear actions and time-lines with tangible improvements to inventory processes and products.

“...the Chief Forester, as the primary client of the VRI through TSR – AAC determinations, takes responsibility for the inventory of the province...to secure regular, steady staffing and funding to deliver a provincial VRI that is current, complete and statistically robust. The inventory needs a champion.”

“...the inventory program can be streamlined to give cost effective, relevant information for all aspects of forest management, including issues at an operational scale.”

“...it leads to all major stakeholders in BC forest and vegetation inventory being truly aware of the benefits and weaknesses of the current VRI program.”

[there is] *“...clarification and definition of policy on joint stewardship responsibilities and obligations related to inventory and relative initiatives (G&Y, monitoring)...”*

“...government and industry recognize that this VRI Inventory Program must be for all lands (crown, private, parks, TFL) of the province”

“...it resulted in a more consistent and functional inventory as well as stable funding for maintenance and updates of the inventory.”

“...the end result was a list of realistic objectives that could be achieve in a reasonable time frame, to better support strategic initiatives such as TSR and land use planning.”

“..opportunity to provide input extends beyond (the) Challenge Dialogue.”

“..the real issues and barriers facing the province’s vegetation inventory program in fulfilling the stewardship responsibilities...were linked more consistently with business drivers (considered part of the same rather than separate entities).”

“...you get a large number of responses with good feedback from a wide cross-section of the natural resource community including industry, government, academia and others.”

“...it is recognized that to be successful inventories must be designed for both strategic and operational applications, not just strategic uses.”

"...it resulted in a recognition of the crucial importance of up-to-date, reliable, consistent forest inventory across the entire land base....(and lead to)..adequate, stable funding and resourcing being dedicated to its achievement over the next 5 to 10 years."

"...it leads to agreement regarding identification and document of the mission and mandate of MOFR in regards to Vegetation Inventory and G&Y and its responsibilities and roles."

"...and when change takes place. Until that point the dialogue is simply dialogue (lip service) and can be too easily forgotten and/or ignored."

Action for Participants #5

Please use the separate IPR Progress Report Feedback Form to provide any further reactions you have to this summary of Challenge Dialogue Success Factors.

4. Background Issues and Events

A number of useful comments were offered in response to background issues and events that instigated the IPR. While the detailed feedback for each numbered background statement is provided in the separate *Challenge Paper Consolidated Feedback* document, which includes some suggested corrections where there were 'errors in fact', following are some 'high level' observations noted by the Action Team.

General comments

The long list of background issues and events was viewed to be helpful for a number of the respondents to get everyone on the same page. Some noted that the complexity of the material underscores the need for the IPR and an ensuing inventory strategy that would see the inventory community collaborating better towards a common vision and set of goals.

Some feedback noted missing information items that warrant further discussion. These included FRPA, FREP (FRPA Resource Evaluation Program), FRPA-related designations such as ungulate winter ranges, old growth management areas, scenic areas/VQOs. It was suggested that the Inventory Audits conducted in the 1990's should be mentioned since they report on inventory accuracy and note the strengths and weaknesses of the inventories at a management unit level.

One respondent felt that the long list of background events tended to mask the real problems with the inventory program such as — declining funding and staffing; removal of operational funding and reliance on "soft" incremental funding; the Core Review decision in 2001 that government would no longer conduct inventories; and organizational changes when the inventory function was moved from MOF to MSRM.

4.1 IPR-Related Initiatives

Related initiatives to the IPR that might warrant consideration included — ecosystem based management in the Central and North Coast LRMP areas, species-at-risk, SOF reporting, criteria and indicators, oil and gas activities, links to genetic resource inventories, critical importance for inventory and monitoring in MPB impacted areas, and the concern that MPB impacts may dilute attention away from non-MPB impacted areas that need inventory attention. It was noted that many of the concerns about the adequacy of the inventory to support key initiatives such as Timber Supply Review boil down to being a funding issue.

4.2 Vegetation Inventory

A number of reactions and ideas were stimulated by the discussion in the vegetation inventory background information including — need for updated VRI for all districts; that BC-wide issues requires consistent BC-wide information (i.e., a seamless provincial coverage); inventory and updates might employ remote sensing and image processing capabilities more; viewing the inventory as an operational support requirement just like cruising or cutblock layout; need to reconcile strategic purpose of the inventory and its use for sub-strategic applications; questioning why Phase 2 polygon variation (WPV) sampling is not employed in VRI; need to capture impacts of other sectors such as oil and gas on the inventory; updating the inventory due to small scale salvage and links to RESULTS; use/non-use of eco-attributes in VRI (are they needed?).

A number of respondents feel strongly that spatially explicit modeling, analysis and planning is increasing in importance and that the vegetation inventory information — the “best available information” — is being used for more operational planning even though it was designed for strategic, management unit-level applications. The view is that there is no point trying to get users to not use the inventory for sub-strategic, landscape level purposes. Rather they would say the inventory has to recognize this reality and improve its accuracy accordingly.

Other miscellaneous items included more direction on site index or productivity — for example, definitions of ‘height’; questions regarding the number of ground samples; the need to monitor G&Y model outputs based on genetic gains; the need for improved descriptions of young stands; and a monitoring program for OAFs using phase 2-like plots. Some respondents supported legislation in the Forest Act to return the requirement to maintain the inventory to the Chief Forester. Eco-attribute data are not often collected due to their expense and unclear application, it was suggested by some.

4.3 Growth and Yield

G&Y did not garner many comments in relation to inventory. There was general recognition of the importance of G&Y information, including Permanent Sample Plots (PSPs), to improve stand models such as VDYP. It appears there is general confusion in some cases over G&Y terms and applications and a lack of awareness of the current G&Y situation. While little G&Y investment has occurred recently within the inventory program, Research Branch and other institutions have continued to work on G&Y through other support such as the FIA-Forest

Science Program. These activities and accomplishments appear not to have been communicated well to the inventory community. Some of the comments indicate the Challenge Paper may have been biased toward the FAIB G&Y program (VDYP, PSPs) as evidenced by fewer references to managed stand components.

Issues that were raised included — concern about possible bias of G&Y plots in well stocked stands that may not be representative of the forest; the need to use TIPS models to project inventories in managed stands (as done in TSR); the need to better address mortality losses and growth in mixed wood stands; philosophical differences with respect to the role of PSPs; industry view that TSA G&Y is a government responsibility; and the updating of G&Y models based on genetic gain assumptions.

4.4 Related Inventories

A number of respondents recognized the importance of linking VRI to allied inventories for analysis purposes; for example, to ecological mapping (TEM and PEM), road mapping and land use inventories.

Action for Participants #6

Please use the separate IPR Progress Report Feedback Form to provide any further reactions you have to responses to the Background Issues and Events in the Challenge Paper.

5. Assumptions

The list of assumptions was designed to stimulate a wide variety of reactions and suggestions and to surface differing experiences, perceptions, priorities and knowledge from the participants. In order to get alignment as a group around some action options, we need to understand these differences and how they can be used gain greater insights. As we had hoped, the list of assumptions stimulated a vigorous expression of ideas, questions, concerns and suggestions. While the detailed feedback for each numbered assumption is provided in the separate *Challenge Paper Consolidated Feedback*, following are some 'high level' observations noted by the Action Team.

5.1 Mandate

There is clear interest in clarifying who is responsible for the inventory with suggestions that the legislative responsibility be restored in the *Forest Act*.

“..the removal of the legislative mandate under Section 2 of the Forest Act, “The Chief Forester shall develop and maintain an inventory of the forest and lands of the Province” meant that no one was ultimately responsible or in charge of this function any more and this sent out the message that it was not of much significance to the business of government.”

5.2 Clients and Business Drivers

There is general support that the IPR process should clarify who the key clients are for which the inventory should be designed to serve. Knowing explicitly who the client group(s) are should help focus the inventory effort. We know there are many varied current users and we know there are many unknown users. The IPR team sees at least four broad categories of users/applications of the inventory information: (a) provincial corporate-level initiatives such as questions around the state of MPB areas and their management; (b) TSR and AAC determinations; (c) FRPA decisions regarding FSPs and government objectives where landscape-level information may be vital; and (d) non-legal but province-wide and regional applications such as SOF/SOE reporting, strategic land use plans, tactical-level SFMPs by licensees, and operational-level development plans. We encourage your reaction to these categories.

5.3 Delivery Model vs. Funding

Some feel the FIA delivery model has not worked particularly well. Others feel that the real issue has been the inadequacy of funding. There is a view that recent FIA program decisions regarding the inventory have addressed key deficiencies in the delivery model. One option is to continue with FIA Land Base Investment Rationale (LBIR) approach by licensees/BCTS for MU-level decision-making while leaving some funds available to address any key inventory gaps. Identification of these gaps would be guided by some form of multi-stakeholder governance model and decision process that reconciles provincial-, regional- and district-level priorities.

5.4 Roles and Responsibilities

There is a strongly expressed need to clarify roles and responsibilities of government, industry, inventory consultants and other stakeholders in all aspects of the inventory process. Also there is a need to clarify roles and responsibilities within MOFR at the district, regional and Branch level. Roles and responsibilities should flow logically with a better understanding of who the primary clients are, the business needs and the responsibilities for inventory mandate.

5.5 Use of VRI

It seems clear that the VRI, whether it should be or not, will be used to support spatially explicit planning and timber supply review at the landscape-level for a variety of important reasons. This suggests that we need to examine innovative ways to improve the reliability of the inventory to support these applications in a cost-effective manner. These applications should help to improve and refine strategic resource objectives that may not discernable in individual operational plans (e.g., old growth retention targets). Tied to this, it will also be important to make sure that users are well aware of the reliability of the inventory information in their area.

5.6 VRI and ecological data/mapping

There has been little collection of ecological data in Phase 2 sampling for a number of reasons. At the same time, there is recognition that VRI is a very important information source for BEC, TEM and PEM mapping and that these in turn help to support the interpretation of site productivity and non-timber values. Clarity is needed on the linkages between these systems to avoid duplication and optimize the complementarities of their information content.

5.7 VRI coverage

While support was expressed for a seamless provincial inventory that includes all Crown lands and private lands, a number of potential barriers were identified not the least of which is — “who pays for this?” The IPR needs to examine this issue carefully to identify fair and workable options.

5.8 VRI fine-tuning vs. overhaul

Some feel the original VRI design includes considerable flexibility and, perhaps with a little fine-tuning, can address today’s needs. Others are not so sure. They feel the IPR should be open to approaches that are radically different, provided they focus on client needs and are cost-effective. We feel both views have merit. In the short-term we need to make VRI more responsive to immediate needs and the current situation. For the medium- to longer-term, it is also probably worth taking a fresh look at current methods in relation to a number of new and emerging questions and technologies. We should be open to quickly piloting different approaches to test their feasibility.

5.9 G&Y

There is generally strong support for G&Y work but also the recognition that this important function needs to be reviewed carefully to ensure it supports the overall inventory program and the questions it must be able to answer now and in the foreseeable future. It is clear that there is still considerable confusion with how all the various G&Y, site productivity and adjustment factor components are supposed to work together.

5.10 Loss of expertise

There is the prevailing view that we have lost considerable expertise in government, industry and the consulting community in recent years. This is due to factors such as lack of funding, downsizing and retirements. Proactive planning and renewed efforts to recruit and train personnel will be needed. Increased funding should help address this but it nevertheless will remain a key challenge.

Action for Participants #7

Please use the separate IPR Progress Report Feedback Form to provide any further reactions you have to responses to the Assumptions in the Challenge Paper.

Critical Questions

The Critical Questions listed in the Challenge Paper were intended to elicit further ideas from the participants and strengthen the focus of the IPR. There was considerable feedback on the 14 questions asked, and those responses are provided in the separate *Challenge Paper Consolidated Feedback* document. Highlights from the feedback are provided below.

6.1 Inventory Program Review

There was general support that the IPR is appropriate, timely and useful, and that it should include G&Y. There is an expectation that the review will lead to real results that improve the inventory in terms of quality (accuracy) and cost-effectiveness.

Concern was raised, based on past experience, that the review may only be talk and that it will not lead to effective change. An important outcome of the review should be a stakeholder-supported action plan with clear timeframes.

There was some concern about a possible government bias in the review process and of the importance to undertake the review with 'open eyes'.

Related to scope, some expressed the importance of considering PEM and TEM and MPB inventory work, since there are synergies to be gained in doing so. Better linkages are needed to oil and gas activities in NE BC given the extensive area of forests disturbed. There is also a need for improved knowledge about mixedwood stands, Call Grade Net Factor (CGNF) appraisal cruising and the evolving role of the (ASTT – Applied Science Technologists and Technicians) Forest Measurements Registration Board.

Related to question, *"this review would be worthwhile if...?"*, feedback included:

- inventory data becomes more accurate and up-to-date;
- an action plan is developed to streamline the inventory program and provide cost-effective, relevant information in support of forest management including the operational scale;
- an action plan with an acceptable timeframe is supported by the major stakeholders;
- clarity is provided on what questions we need to answer with a plan to make it happen;
- decision-makers realize the benefits to inventories;
- the inventory is funded to a level that will achieve provincial coverage updated over time;

- the need is recognized that the inventory must be designed for both strategic and operational applications (particularly since strategic objectives can drive operational activity and therefore need to be based on realistic information and evaluated for their cumulative effects at several scales); and
- there is clear accountability for the program.

6.2 Today's Priority Business Needs

Feedback included the need to define what the program should be province-wide for next 15+ years and then get a long-term commitment from government to fund that program.

In terms of priority business needs, feedback comments included:

- reliable projections of wood supply for AAC determinations including mixed stands and stands affected by the MPB;
- information that supports legal/quasi-legal obligations such as FRPA/FSPs and SFM C&I;
- information that can be used operational particularly at the landscape-level;
- better information about expected timber attributes such as piece size and quality;
- information in support of ecosystem-based management, habitat supply analysis, harvest planning, growth and yield;
- sufficient information to facilitate all major forest activities including protection, silviculture, engineering, planning, modeling;
- spatially accurate information for management of non-timber resource values;
- reliable information to support several critical MPB decisions (e.g., short- and mid-term timber supply, where to harvest, what to retain);
- information in support of PEM/TEM;
- complete provincial coverage including parks and TFLs;
- upgraded information for older inventoried areas;
- capability to move the inventory from strategic (MU) to landscape-level;
- information to support important issues and initiatives such as climate change and ecosystem-based management; and
- continuing to establish long-term G&Y monitoring plots.

More specifically regarding inventory data needs, feedback included:

- knowing the age of the inventory and when it was last updated;
- accurate species, age and height information on a drainage basis with accurate volumes on stands over 40 years old;
- good description of disturbed stands in the interior and partially harvested stands on coast;
- assessing areas and volumes impacted by other activities such as oil and gas;
- change in inventory due to dead trees and in-growth in MPB areas; and
- integrating tree-level (stand and stock table) information into the inventory.

6.3 Future Business Needs

In terms of future business needs, feedback comments included:

- need for a fully automated real-time system of updating the inventory within 5 years;
- using inventory to help make projections for non-timber values;
- continually improving the inventory by assessing weaknesses;
- G&Y on mixed wood stands in MPB areas in 5 years; providing accuracy below the MU level;
- rebuilding the inventory expertise in BC;
- rationalizing vegetation classifications given climate change;
- better integrating G&Y into VRI to better assess timber supply;
- better understanding the MPB outbreak including understory stocking and monitoring; improved communication and sharing of resource inventories between resource users;
- better understanding ecosystem services (carbon credits, genetic diversity, tree improvement);
- keeping inventory process flexible to consider different products from the forest;
- supporting both operational and strategic decisions that affect forests and communities; and
- merging ecosystem and VRI mapping and monitoring plots that track change.

6.4 Priority Inventory Services and Products

Feedback identified need for:

- reliable watershed-level estimates for use in planning as well as for serving strategic AAC decisions;
- up-to-date inventories with new inventories where needed, and new provincial G&Y systems;
- user-friendly access to data, revitalized site productivity, G&Y, NVAF and ecological mapping activities; and
- clear accountability and improved funding for the inventory and descriptions of what it is and how it is being used.

6.5 Risks and Gaps in Existing Inventory

Ideas provided in the feedback included:

- a central user-friendly depository for all inventory information where updates could be provided by different users (government and licensees) to a similar standard by qualified staff;
- need for more detail to allow for spatial planning at a local level;
- considering user needs in the nature and frequency of updates;
- filling gaps in G&Y regionally and/or provincially;
- addressing “gaps” in the inventory strategically at the provincial level;

- deciding what is “core” information that users need province-wide as a government obligation to fund, whereas other needs are funded by the user interest group;
- drive assessment needs based on management unit needs not by a provincial standard;
- address gaps in inventory such as disturbances by oil and gas;
- better link inventory to tree improvement (e.g. genetic gains, genetic diversity);
- consider layering/linking other data such as linework for fires and RESULTS to inventory rather than incorporating that work directly into the inventory (e.g. it wasn't done to same standard); and
- improving other inventories such as wildlife where needed.

6.6 TFL, Park & Private Land Inventories – Seamless Inventory

Feedback generally strongly supported the need for having a seamless provincial inventory for the entire province including TFLs, parks and protected areas, and private land. Ideas to get there included:

- don't download the funding responsibility to industry;
- identify “core” TFL data to be included leaving additional data as proprietary to licensee and/or as supplemental to the provincial VRI database;
- compensate the TFL holder for the inventory data that they paid for (i.e. where public funds were not used);
- recognition of importance of basic inventory information in parks from a wildlife and biodiversity perspective and better coordinating with BC Parks to acquire this information; exploring ways MOE/BC Parks could help fund the inventory in parks.

One respondent noted the need for a seamless provincial inventory was a key recommendation of both the Forest Resources Commission in 1991 and the Timber Inventory Task Force in 1992 yet was never implemented over the ensuing 15 years.

To help ensure we get seamless provincial coverage in a cost effective manner, some feel the “standards” should be flexible (“lighter”) related to data collected in larger parks and private land including extended update schedules to reduce costs (e.g., consider satellite algorithms for creating and updating inventories on private land and parks; photo-interpreted larger polygon delineations with no or little field work unless BC Parks pays for it). Others feel the entire province should be covered to same VRI standard regardless of land status, and that this will help save time and money later by avoiding data incompatibilities that might arise.

Other feedback felt that the goal of a provincial seamless inventory is too large a step at this time. The view is that many land use planning issues are at the landscape unit (LU) level and that prioritization of seamless coverage should be on this LU-level based on need. Finally, there was the perspective that we should focus the seamless coverage effort on all Crown lands, but not private lands.

6.7 Accuracy Expectations

Expectations included:

- realization that the inventory will be used for landscape unit planning applications so efforts need to be made to improve its accuracy for these applications;
- accuracy sufficient to undertake and assess plans at the watershed or landscape-level, for example, related to age and species composition;
- include metadata information that states reliability; and
- assess inventory to identify and address areas in need of improvement.

In order to provide a more accurate inventory at the watershed level, suggestions included

- more emphasis in the Phase 1 on key data such as species, age and height when polygons (stands) are delineated and described;
- not undertaking Phase 2 but using those funds to improve Phase 1 (e.g., enabling the photo-interpreters in Phase 1 to undertake more field observations;
- using higher quality photos;
- having more plots and incorporating local information over time to continually improve the inventory (as opposed to replacing the inventory every 20-40 years);
- using imagery (such as SPOT 5) to update inventory for cutbacks, roads and other disturbances;
- capturing cruise data (particularly given that they are becoming more similar to VRI standards) to model improvements in the inventory;
- using cruise and scale information to test the accuracy of the inventory (e.g. related to volume yield predictions) so that areas of improvement can be identified and addressed.

Although most responses support the inventory being reliable for sub-strategic (landscape/watershed-level) planning and not for stand-level applications, some feel efforts should be made to promote accuracy at the stand (polygon) level. Others feel that this can not be achieved at reasonable costs.

For G&Y and NVAF, suggestions are for more samples. Innovative ways to reduce costs seem harder to find in this area.

6.8 Information Access

General feedback is that access to information has improved for those who have been technically trained to do so and regularly use the data. However for occasional or new non-technical users, the required training can be a formidable obstacle to the effective use of the inventories.

Responses included:

- how can we direct staff and users to find the data easily (e.g., there do not appear to be MOFR regional or district web-links to inventory websites);

- how can we access other government data such as oil and gas where it effects the inventory; free access for all inventories and data on LRDW (i.e., the cost/ benefit of fees for information should be compared to the revenue that government receives);
- improving data sharing agreements;
- ensuring more timely access to information so that it is current and not already out-of-date;
- providing information about the VRI program and how users can access the data;
- having a newsletter article for FORREX's LINK that describes how data can be accessed;
- allowing the data on the internet to be accessible for use and manipulation to better serve client-needs.

"Access has greatly improved with the advent of the LRDW. While some tweaks could be done to the system this is generally a success story."

"There still seems to be some unnecessary barriers when trying to acquire forest inventory information."

"As a licensee access to data is difficult and bureaucratic.... However, once access is arranged the LRDW actually works quite efficiently."

"It is very difficult to access data."

6.9 Delivery Model, Roles, Coordination

Some feel the FIA delivery model using DFAM groups at the management unit level basically works and has improved with recent changes by the Forest Investment Council related to inventory funding. Others feel the delivery model needs to be more fundamentally changed. Some comments note the importance of a collaborative delivery model that fosters and supports stable funding through collective buy-in. One view put forward was to provide specified funds for industry to address their inventory needs, with other funds specified for government to address their additional needs.

Local management unit-level coordination is supported to help ensure the inventory is in fact useful to industry to support business tasks and that there is local-level buy-in and support for needed inventory work. Comments note the importance of providing incentives, such as via IFPAs, to ensure that funds needed for inventory are secured. There is some recognition that the participation in management unit level LBIR processes about inventory needs could be improved — for example, by involving inventory staff along with licensees and BCTS.

Others are concerned that the licensee interest in addressing inventory needs may not equate to the public interest to do so (i.e., there are many other users) and that province-wide coordination of inventory is needed with government having more of a hand in setting priorities. Some suggest that improved coordination can be more effectively done using regional centres or at the district level. Some note that management unit decisions with inventory expertise sometimes results in inefficient decisions. The example offered was where a re-inventory was supported and paid for using FIA funding when in fact a robust inventory update for disturbance was all that was needed.

There is a common desire to clarify the roles and responsibilities of everyone involved in the inventory at both the agency-level (MOFR, ILMB, MOE, etc.), relative to licensees/BCTS and with respect to consultants. Key questions are — who decides inventory priorities, who pays for the inventory, who owns the inventory, who is responsible for the inventory and its condition, who sets the standards, who should do quality assurance and audits, who should manage inventory contracts, who conducts inventory projects, who updates the inventory due to forest and non-forest uses like oil and gas, etc? Regarding who actually does the inventory, some responses indicate that inventory work should remain where capacity exists, namely with the consulting sector and that contract management standards (e.g., open bidding) be set to foster competitive capacity.

Clarifying all of these different roles and responsibilities will help to inform the delivery model discussion. For example, a number of responses feel that government is ultimately responsible for the state of the inventory and therefore it needs to play an important role in deciding inventory priorities and setting standards. The suggestion is that this be done in partnership with key stakeholders like forest licensees.

Others feel Phase 1 and 2 of the VRI should be managed by industry with co-administration support from MOFR at the regional level, but with specialized programs such as site index/productivity, G&Y and NVAF being administered provincially by the MoFR.

There is a similar desire to clarify roles and responsibilities within specified organizations. For example, within MOFR, what are the roles of Branch, regional and district staff? Some responses suggest district MOFR staff be more involved in the inventory to help improve its accuracy, ensure its access and proper use (operationally) and to assist with updating.

6.10 Incremental Improvements, Technology, Innovation

Several responses believe that we need to better utilize remote sensing technology to improve the inventory and identify barriers to moving forward. Some responses note the need to exercise caution in the use of new technologies to ensure that they are in fact cost-effective. Other responses include:

- the need to embrace new technology where it is cost effective and provides better resultant data needed at the sub-strategic level, with concern expressed that inflexible adherence to RISC standards has been a barrier to innovation for unique challenges, like mapping MPB infestation levels;
- that satellite imagery should be considered for updates with district staff providing some limited ground sample verification;
- that the lack of capacity and expertise has sorely limited staff to even consider innovative approaches in the past;
- that VRI standards are an impediment to improving the inventory using new creative approaches and that there is the need for pilot projects;
- that standards that control the process for doing inventory rather than outcomes is a barrier to innovatively improve the inventory;

- that VRI be reviewed when completed to assess weaknesses and gaps with targeted projects that address those concerns leading to small, annual incremental projects that enable the inventory to be continuously improved;
- that we target projects to known issues in the inventory rather than doing more than that (e.g., if inventory is old and needs to be updated for disturbance, that we use satellite imagery to do that and not do a complete new inventory);
- the use of cruise plots and other known point data to improve the inventory;
- improving G&Y models as they apply to inventory attributes;
- streamlining the content requirements for VRI to ensure “core” needs are met; and
- consider using a modeling approach to Phase 1 polygon delineation (similar to PEM) with Phase 2 ground samples and monitoring assessing the delineations.

6.11 Value of Inventory Information

A prevailing view is that the inventory has huge value and provides fundamental information for resource management and therefore needs adequate funding. For example, AAC determinations which have substantial ramifications for the provincial and local economy, including jobs and revenue, rely heavily on accurate inventory information including G&Y plus site index/productivity.

It is further noted by several responses that the value of the inventory is not fully appreciated and that it is underutilized relative to its potential to support a diversity of business needs. It was emphasized that VRI is one important inventory among several that need to be linked and used with other information systems in order for it to be used most effectively.

At the same time, there is concern with the accuracy of the inventory particularly as it is used increasingly for sub-strategic applications. This strongly indicates that there is a need to make the inventory more accurate at the watershed-level and that it is kept up-to-date to support these spatial modeling and planning uses. Tied to this reality is the concern that the inventory is being misused at the operational level for stand-level decision-making for which it was never designed to support (e.g. stand-level cruises should do this). Proper communication is needed to make this clear.

6.12 Capacity, Succession, Training

There is a strongly held view that the lack of adequate capacity, succession planning and training are substantial barriers to improving the inventory program. Several responses note that the root cause of this is inadequate and unstable funding. Very simply, it is suggested that the capacity will build and people will be trained if they know there is work out there. It is pointed out that the lack of interest in training in the past is because there have been relatively few inventory projects and therefore few jobs and consulting opportunities.

With more funding and projects, more interest in training can be expected. It is acknowledged that the number of skilled and trained inventory specialists has dwindled due to down-sizing and lack of funding in government and industry. A number of respondents feel that the critical

mass still exists to ramp up to the challenge to revitalize the inventory, however they point out that secure long-term (e.g., 10 year) funding may be needed to facilitate this re-growth.

As with many programs, inventory is faced with an aging workforce where seasoned employees and consultants will soon be lost to retirement. Clearly there is a need for better succession planning. This must include a plan to capture and transfer existing know-how to new employees. Thought will also have to be given to how to attract employees to the inventory business area.

6.13 Preliminary Inventory Issues Identified by FAIB Inventory Staff

There were relatively few responses to this item. Some feedback indicated agreement with the issues raised while a few comments disagreed with some of the issues raised.

Responses included:

- belief that business drivers come and go and therefore the need to develop a long-term vision for the inventory;
- need to support strategic and sub-strategic-level uses such as planning;
- disagreement with the view that the existing delivery model is not working noting the Branch staff can be involved in the process and that the real concern is less the model but more the provision of adequate funding;
- that consultants should be “doing” the inventories not government staff; that “non-timber” VRI attributes often have not been sampled because there is little value to justify the additional expense;
- that it is not necessary for government to set standards for the inventory, oversee quality assurance and audits, or to set priorities for inventory work – that these tasks can be done by the private sector with more streamlined involvement by government;
- that downsizing, loss of corporate memory and succession challenges are not just government issues, but also impact industry and consulting – and that assured funding is needed to provide adequate capacity;
- that the VRI standard needs to be revisited to better address business needs and the delivery of a sustainable program; and
- that linkages are needed to other data sets like cruising to help improve the inventory.

6.14 Are there other points you would like to make?

Feedback included:

- the need to better address forest health issues in the inventory and be responsive to climate change;
- identify barriers to moving forward, substitutes, strengths, opportunities or weakness;
- revisit the VRI standard due to concern that it is a ‘Cadillac’ standard which may be a disservice relative to supporting overall business needs;

- upgrade the forest cover inventory to VRI standard and concern why this has not happened in many areas;
- recognize that all funding decisions are about 'balance' so that funding directed at inventory does not impact funding needs in other areas;
- concern that the program consists of silos that need to work more closely together.

One respondent listed 14 specific points which are itemized in the separate *Challenge Paper Consolidated Feedback* document.

Action for Participants #8

Please use the separate IPR Progress Report Feedback Form to provide any further reactions you have to responses to the Critical Questions the Challenge Paper.

Next Steps

The following provides an approximate chart of the next steps in the IPR.

1. If you wish to provide feedback to this Progress Report it is **due on May 17, 2006**. Please use the separate **IPR Progress Report Feedback Form** provided on the website and send it by email attachment to <mailto:forests.forestanalysisbranchoffice@gov.bc.ca>. Your responses will be used to further shape the design of the Workshop and its supporting Workshop Workbook.
2. A Workshop Workbook will be prepared to complement and inform the Workshop process. We hope to have the Workbook completed a day or two ahead of the Workshop and sent you electronically. The Workbook will also be posted on the IPR website. Hard copies of the Workbook will be available for you at the Workshop as will some copies of the original Challenge Paper, the Consolidated Responses to the Challenge Paper and the Progress Report. Please bring your own copies of these documents if you have made your own notes.
3. The IPR Workshop starts on May 24th at 9AM and will end no later than 4PM on May 25th. The Workshop is by invitation (no drop-ins please) and is being held at the Executive Inn, Richmond. Please see your Workshop invitation for further details. Please confirm your attendance with Don Gosnell (don.gosnell@gov.bc.ca) if you have not done so already.
4. A Workshop Synopsis prepared by early June and will be posted on the IPR website with email notification.
5. "Issue/Opportunity Teams" will carry-on completing their assignments following the Workshop. They will identify action-options and develop their respective business cases in early summer.
6. The Issue/Opportunity Team outputs will be synthesized and packaged into a consistent set of recommendations for MOFR executive and other executive groups such as FIC by mid-summer.

In closing, the Action Team wishes to thank you for your continued interest and ideas regarding this important Dialogue.

Action for Participants #9

Please use the separate IPR Progress Report Feedback Form to provide any questions you may have about the Next Steps or other comments you would like to make.

**Selected Forestry Initiatives
and their
Inventory Implications**

Draft Version 1

April 17, 2006

Table of Contents

| | |
|-----------------------------------------------------------------------------------------------------------------------------------|----|
| Summary of Key Issues | 2 |
| Forestry Initiatives | 7 |
| 1. Ecosystem-Based Management (EBM) | 7 |
| 2. Coastal Forest Challenges..... | 11 |
| 3. Interior Log Grade Changes..... | 12 |
| 4. Forest and Range Practices Act | 13 |
| 5. Defined Forest Area Management (DFAM), Forest Investment Account (FIA) and Sustainable Forest Management Planning (SFMP) | 15 |
| 6. State of Forests Reporting | 17 |
| 7. Future Forests | 17 |
| 8. Other initiatives | 19 |

This study is one of several support studies undertaken to inform the Inventory Program Review¹ Challenge Dialogue being led by the Ministry of Forests and Range with stakeholders.

The following initiatives were examined by Terje Vold with respect to their inventory implications using support documents, personal knowledge and interviews.

1. Ecosystem-Based Management (EBM)
2. Coast Forest challenges
3. Interior Log Grade Changes
4. *Forest and Range Practices Act*
5. Defined Forest Area Management (DFAM), Forest Investment Account (FIA) and Sustainable Forest Management Planning (SFMP)
6. State of Forests Reporting
7. Future Forests
8. Other

Additional interviews and support material review, as well as any comments received, will result in refinements to this initial draft.

¹ Copies of this report and other IPR documents can be obtained at: www.for.gov.bc.ca/hts/inventory_prog_rev.htm.

Summary of Key Issues

Based on an initial review of the above initiatives, the following are some key issues that emerged with an inventory focus:

TFL inventories (need for seamless coverage)

Legal provisions under FRPA, or expected under FRPA such as ecosystem-based management (EBM), and assessments and reporting on sustainable forest management, require a seamless forest inventory across the province including TSA and TFLs. Three issues related to TFLs is (1) accessing the inventories; (2) adjusting the inventories to match TSA inventories; and (3) obtaining the inventories in new parks that have/are being deleted from TFLs.

- (1) Currently, it is very difficult for the Crown to access forest inventories on TFLs that were often paid for using public funds and/or were required as part of tenure agreement.
- (2) Where TFL inventories are available, they are often done to a different standard than TSA inventories making assessments across Crown lands difficult; there is a need to both (a) adjust existing TFL inventories to match TSA inventories to enable seamless reporting (e.g., regarding age class), and (b) examine and revise TFL standards that are a particular problem (e.g., where >250 year old forest are not mapped yet required for EBM planning and reporting).
- (3) Many newly established or announced protected areas were or are in TFLs and there is a risk that this information will be lost without efforts being made by government to retain these inventories.

Examples of the need for seamless forest inventory coverage including TFLs:

- assessing if legal government objectives have been met in support of Forest Stewardship Plans under the FRPA where the spatial area covered by the objective is shared by TSAs and TFLs (e.g., where a TFL and TSA share a landscape unit boundary subject to a non-spatial old growth retention requirement);
- undertaking subregional, landscape-level and watershed EBM planning in the Central and North Coasts and the QCI where a legal requirement is expected under FRPA to address EBM-related old forest retention requirements across a variety of scales;

- reporting on the state of BC's forests across the province (e.g., how much old forests do we have by ecosystem type and how much is protected? What is the seral stage and species composition and how is it changing?)
- reporting on sustainable forest management over a plan area (e.g., Kootenay-Boundary; Vancouver Island) or ecological unit (e.g., ecoprovince/ecoregion and/or biogeoclimatic unit) in addition to a management unit (TSA or TFL).

Inventory all lands (including parks and inoperable areas)

Legal provisions under FRPA, or expected under FRPA such as ecosystem-based management (EBM), and assessments and reporting on sustainable forest management, require a seamless forest inventory across the province including parks and protected areas, inoperable lands and other lands outside the timber harvesting land base, and private lands. Issues related to this are: (1) updating very poor and out-of-date inventory coverage in many older very large parks; (2) obtaining and retaining inventory coverage for newer protected areas (e.g., that were in TFLs or are being withdrawn out of the TFL as discussed earlier); (3) obtaining vegetation inventories in national parks; (4) refining or correcting coarse or inaccurate inventory coverage in areas believed to be inoperable when the inventory was last undertaken; (5) ensuring new inventory projects address all lands including parks and private lands, and (6) modeling disturbance in non-timber harvesting land base (projecting the inventory).

- (1) Large older parks like Strathcona and Tweedsmuir have very poor inventory coverage yet contribute to meeting landscape unit objectives for old growth retention and other forest cover objectives that can impact access to the timber harvesting land base;
- (2) As previously discussed, existing TFL inventories in new protected areas may be lost without an active effort by government to obtain this coverage from licensees;
- (3) National parks in BC have relatively detailed vegetation inventories that need to be obtained to provide seamless inventory coverage and address forest cover objectives as discussed above;
- (4) Many forest inventories were undertaken in the 1970s when very large general polygon mapping was undertaken for areas believed to be inoperable. In some areas, age class assignments are known to be inaccurate. Some of these areas are now contributing to timber supply, and these areas contribute towards meeting forest cover and old forest objectives. Refined mapping in these areas is needed given current forest management realities including legislative requirements under FRPA;

- (5) New inventory projects should cover all lands in a given area including operable and inoperable areas, parks and protected areas, and private land. This will help ensure accurate reporting of the state of BC's forests provincially, regionally and locally where required.
- (6) Areas not contributing to timber supply outside of the timber harvesting land base such as in inoperable areas and protected areas can be subject to natural disturbances such as fire and insects. Projecting the inventory to account for disturbance is important when assessing how these areas might contribute to meeting forest cover objectives, such as old forest retention, in the future.

Retaining the inventory “snapshot” (and refining objectives using the inventory)

BC's forests are dynamic with continuous changes due to fire, insects, harvesting and other disturbances. Existing forest cover objectives (e.g., old forest retention) and potential future objectives (e.g., tree species diversity) can be informed by pre-harvest forest cover inventory assessments. Existing forest cover objectives, and supporting Range of Natural Variation (RONV) estimates, have not always made good use of inventories as part of the assessment process. Part of the reason is lack of seamless coverage as discussed in the previous issues. If these issues can be resolved, and seamless coverage provided, forest cover objectives may be refined or developed based on more accurate information-based assessments using the inventory. For example, improved assessments of RONV for old forest retention, seral stage distribution and tree species composition using the inventory in relatively undisturbed areas (due to harvesting) by BEC to help refine or develop legal or policy-oriented objectives or targets that may be applied in FSPs or SFMPs.

When forest inventories are updated due to disturbance or growth, the pre-existing inventory information should not be lost. It is important to retain the historical record or “snapshot” of the inventory. This may be useful for a variety of assessment and reporting purposes now and in the future to monitor and assess trends (e.g., is tree species diversity changing in BC in 20 years across the landscape post-MPB in 2025 versus what it was before the epidemic occurred?)

Stand-level vs landscape-level inventory (coordinate use of ground samples)

The forest cover inventory was designed to be a landscape-level (or management unit-level) inventory rather than a stand-level inventory. Cost was a key reason where the number of ground samples (about 100 to 200) relative to entire management unit meant few stands were sampled in the field. A landscape-level forest inventory may be sufficient to support aspatial assessments but may be inadequate to address spatially explicit issues that are now more frequently arising.

Forest planning and timber supply assessments are now more sophisticated using GIS support tools that enable spatially explicit analysis based on individual forest cover polygons. In the absence of better information, stand-level or polygon-specific assessments are made using the landscape-level forest cover inventory.

Given the need for spatially explicit assessments and decision-making, consideration should be given to developing inventories that are more accurate at the stand-level. To reduce costs, this may be more readily possible if a variety of different ground-related sampling programs are reviewed and coordinated so that they support improvements to the inventory. For example:

- Cruise data where about \$5 to 10 MM are spent each year for appraisal purposes in support of stumpage calculations;
- Permanent sample plots of which there are about 9,000 in BC;
- National forest inventory grid intersections of which there are about 2,400 including about 1,200 on forest lands;
- Site productivity field data in support of SIBEC, site productivity adjustments, etc;
- Inventory audit and VRI phase 2 ground samples;
- Stand level data in support of site plans and pre-harvest prescriptions;
- RESULTS data post-harvest to free-growing;
- Forest Resource Evaluation Program (FREP) ground samples that support effectiveness evaluations;
- Terrestrial Ecosystem Mapping (TEM) ground samples; and
- Other ground sampling and monitoring data.

Given GPS and relative ease now to permanently mark the location of sample plots for future data collection, a coordinated and integrated data collection approach could be designed to help ensure the above ground sample information is used to improve the stand-level accuracy of the forest inventory now and in the future.

Multi-layer inventory

Forest disturbances due to harvesting and insects are creating multi-layer stands where each layer in the forest needs to be inventoried and projected for growth and yield. Throughout BC, wildlife tree patches are frequently identified and reserved following clearcutting, and need to be mapped. On the coast, there is increasing use of variable retention where relatively high levels of stand retention are prescribed. Under “take or pay” policy, some licensees prefer to leave uneconomic trees and pay for them as part of the waste assessment. In MPB affected areas that are not harvested, the portion of

the mature forest that survives the epidemic needs to be tracked along with areas being regenerated.

Some MPB harvested areas may be very small (e.g., less than one hectare through small scale salvage) or selectively or surgically harvested to remove dead or susceptible mature pine, thereby leaving a multi-layer forest within a forest cover polygon. The need to track multiple-layers as part of the inventory suggests that more of a stand-level inventory as discussed previously may be needed in the future.

Other information critical to decision-making

The forest inventory needs to include, or be accurately aligned with, other key information that may be critical to forest management decision-making. For example, the location of resource roads which may help define those stands which are economically operable and those that are not. At-built roads reported under FRPA, other resource roads, and existing non-status roads need to either be part of the forest inventory or available in a format (such as the Digital Road Atlas) where it can be readily used with the forest inventory to undertake assessments including timber supply analysis.

Another example is legal government objectives under FRPA and policy objectives that guide current practice (e.g., from land use plans). Having a map layer(s) that show existing objectives is important to overlay with forest cover maps to support timber supply analysis, forest stewardship planning, sustainable forest management planning, site planning and decision-making.

Forestry Initiatives

Ideas or notes from reviewing documents and interviews.

1. Ecosystem-Based Management (EBM)

Background

In 2001, the 5 MM ha Central Coast LRMP table agreements included a commitment to ecosystem-based management (EBM) and the establishment of a Coast Information Team (CIT). The 2 MM ha North Coast LRMP and 1 MM ha Haida Gwaii/Queen Charlotte Islands Land Use Plan have also committed to EBM. There are a wide variety of interpretations of what EBM means where the concept has been applied in resource management.

In 2004, in order to develop a consistent approach to EBM in support of all three plan areas which total 8 MM ha, CIT prepared an *EBM Planning Handbook*. The EBM Planning Handbook and other EBM support documents are available at the CIT website: www.citbc.org/. The key tenets of EBM according to CIT: maintaining ecological integrity and improving human wellbeing. The CIT defines EBM as:

...an adaptive approach to managing human activities that seeks to ensure the coexistence of healthy, fully functioning ecosystems and human communities. The intent is to maintain those spatial and temporal characteristics of ecosystems such that component species and ecological processes can be sustained, and human well-being supported and improved.

The EBM planning framework integrates conservation and socio-economic considerations. EBM planning is collaborative involving First Nations, local communities and stakeholders where information sharing is stressed.

EBM management direction includes (with example provided):

- *Goal* – protect ecological integrity
- *Objective* -maintain ecosystem and seral stage representation
- *Requirement*- assess current distribution of ecosystem types & seral stages
- *Target*- maintain 70% of the natural distribution of old forest in each ecosystem type
- *Indicator*- seral distribution in each ecosystem type.

EBM management direction is to be provided across planning scales:

- Territory/Subregion – LRMP area, First Nations land use plans
- Landscape –tactical planning over several watersheds through SRMPs or FSPs
- Watershed – tactical planning in a specific drainage (e.g., riparian reserves)
- Site – site plans where stand-level reserves are identified

The overall framework seeks low risk (precaution) at the territory/subregion while recognizing landscapes can be managed within low to moderate risk thresholds, and individual watersheds can be managed within low risk to high risk thresholds. For example, at the territory/subregion, at least 70% of natural distribution of old forest must be retained for each ecosystem type (low risk) at the site series level, at least 50% must be retained across all landscapes (moderate risk), and at least 30% must be retained across all watersheds (high risk).

Integral to EBM is adaptive co-management (ACM) involving monitoring and evaluating actions taken to implement the EBM plans, and making adjustments as required (e.g., if targets are not delivering the objectives).

Forest inventory (VEG/forest cover) implications based on review of documents:

- Forest cover, BEC, PEM (or TEM) mapping is identified in EBM as key information sources to support various levels of planning.
- Describing natural conditions through Range of Natural Variability (RONV) estimates for old forest retention and seral stage distribution is basis for identifying thresholds of risk (low, moderate and high).
- RONV estimates for old forests were based on estimates of natural disturbance intervals rather than use of forest cover
 - Estimates of RONV of structure and disturbance in forest ecosystems vary by up to 29% depending on author.
 - They are also sensitive to choice of ecosystem classification where some express greater confidence in Site Series based on Predictive Ecosystem Mapping (SPEM) whereas other use BEC variants and analysis units.
- Forest inventories help defined what's available for timber harvesting; for example, comparing current old forest retention with old forest retention target.
- Having reliable attribute information, such as age, species composition, etc. helps improve estimates of old forests (i.e. that exceed 250 years of age) and can improved TEM/PEM.
- EBM promotes use of spatially explicit timber supply analysis which depends more heavily on relatively reliable forest cover information at the stand-level than a non-spatial analysis.
- Forest cover mapping and site productivity estimates support timber supply impact assessments related to EBM alternatives at each planning scale that are an important part of the socio-economic assessment of implications on human wellbeing.

Forest inventory issues based on interview with A. MacKinnon and A. Hall:

1. EBM planning is at a variety of scales (e.g., subregional, landscape, watershed) where a seamless forest cover inventory is needed for the entire land base

(TFL/TSA, parks, operable/inoperable) so that the reporting out at each scale is using a common inventory data set

- The TFL inventories are done to a different standard than the TSA inventory and vary between TFLs (e.g., with different attributes for age class), and the TFL inventory is very difficult to access from TFL licensees in support of EBM planning. MOUs/use agreements with licensees to access TFL inventory can be difficult. Even if obtained, merging TFL with TSA data becomes a huge challenge given the different standards and attributes in place. For example, in one TFL, the “oldest” age class is over 200 years, whereas EBM requires old forest representation of stands >250 years of age.
 - Licensee can effectively undertake EBM planning at the watershed level using their TFL inventory, but can’t relate this to landscape or subregional EBM planning, which is required, without use of the TFL data sets (otherwise different inventory data sets are used, leading to inconsistent reporting)
2. TSA inventories were done about 30 years ago and are very generalized in areas believed at that time to be unmerchantable or inoperable such as low volume stands in the Hecate Lowland and higher elevations, and were not done in large parks like Tweedsmuir. Some of these non-park areas are now being harvested. EBM requires all stands to be reviewed at site series level with respect to meeting old forest targets and lack of information about these stands will hamper implementation.

The lack of inventories in parks on Vancouver Island meant the landscape level planning for old forest retention required an inventory-like assessment be done in parks which added considerably to time and costs in completing the landscape level plans; a similar issues confronts EBM implementation

3. Over 1 MM ha of new protected areas are being designated as one outcome of the CC and NC LRMPs; many of these areas are in TFLs. The TFL deletion process (via s. 60 of Forest Act) or other arrangement needs to be made to secure the TFL inventories for these new protected areas as they will be needed to do EBM planning. (Note: the TFL inventory for the over 0.3 MM ha Kitlope protected area may have been irretrievably lost).
4. About \$2.5 MM over 5 years, in large part using FIA funds, is being directed at TEM mapping for the Central and North Coast areas, to provide site series mapping. Site series is basis for old forest and seral stage representation, and also to identify red and blue listed ecosystems at risk (using CDC).

5. One critical attribute that VRI needs to provide is age class (e.g., which stands are over 250 years of age). Some of the older TSA mapping of lower productivity stands labeled them as less than 250 years of age whereas more recent TFL inventories are calling many of these stands over 250 years of age – if true, this significantly increases the amount of forests that can be harvested – which directly impacts timber supply review.
6. Another critical attribute in species composition. How good is the inventory in locating cedar, which is important to forest licensees and First Nations, and in locating hemlock/balsam stands which may be unmerchantable? Better information likely needed to address this key concern.
7. Concerns also existing about how accurate the inventory, based on mapping over 30 years ago, is in identifying the age and volume of second growth stands (since a number of coastal valleys were harvested many years ago) and their rate of growth.
8. TRIM base and forest inventory on QCI is generally poor which may hamper LRMP planning and EBM implementation.

2. 2. Coastal Forest Challenges

(Interview with Albert Nussbaum)

As the coast forest industry transitions from harvesting old growth to second growth, the level of information needed becomes more demanding, spatial, and stand-level. The challenge is to find economically operable old forest and second growth stands to operate in during the transition period.

Remaining old growth forests are relatively poorer quality and more costly to harvest and therefore increasingly on the “margin” of operability/merchantability. Identifying old growth stands that can be economically harvested requires better stand-level information on species composition and location of stand as it relates to accessibility (e.g., nearest road, distance to mill, slope/aspect). This spatial modeling can in turn improve timber supply review. For example, certain poor quality hemlock stands may need to be removed from the timber harvesting land base. Stands with cedar need to be relatively accurately identified given their importance for a variety of reasons. Helicopter logging has slowed down since the price of cedar is not as high as it was in the past, but markets could improve.

Similar stand-level information is needed to identify potential second growth stands that may be merchantable. Licensees are looking for particular stand characteristics including species composition and accessibility for these stands to be economically utilizable. For example, some of the older A-frame logging operations at the turn of the century (often adjacent to tidewater) may have second growth of merchantable age, but it may no longer be ecologically appropriate to haul these stands over coastal beaches and building new roads to access these isolated stands may be uneconomic.

Where harvesting is occurring on the Coast, there is increasing reliance on variable retention systems. This underscores importance of retaining in the inventory better information on both layers in the stand: the retained forest, and the regenerated forest.

(Note: a similar issue exists for MPB-impacted stands: continuing to characterize the stand that survived the epidemic, while characterizing the new growth).

(Note: particular challenges in Hypermartime Forests of Coastal BC have been recently documented www.for.gov.bc.ca/rni/Research/HYP3/hyp3-pg1.htm)

3. 3. Interior Log Grade Changes

(Interview with Grant Loeb and Keith Tudor)

Interior log grades were changed effective April 1, 2006 to reflect the potential value of the log scaled rather than whether the log came from a dead or live tree. (www.for.gov.bc.ca/mof/loggrade/). These changes were made because it was virtually impossible to determine at the scale if a log came from a dead or live tree, and the value at the mill of a log coming from a dead tree could be as great if not greater than a log coming from a live tree. Log grades now look more objectively at log-dependent attributes like checking. A substantive province-wide training program has promoted implementation of the new log grade system by scalers, industry and government.

The log grade changes meant that, on average, logs from MPB-killed stands would be charged more than minimum stumpage; whereas before only minimum stumpage was charged. The new log grade system, however, means that overall log grade prices are reduced to achieve similar revenue targets; so that licensees in general should not be paying more stumpage in the interior.

Stumpage is based not only on the value of scaled logged, but also on other factors such as the lumber recovery. It is recognized that lumber recovery decreases from green-attacked, to red-attack, to grey (killed) stands due to increased handling costs, breakage losses, etc. Lumber recovery factors are reduced by \$1 for green-attacked stands, \$10 for red-attacked stands, and \$25 for grey (killed) stands which effectively means only \$0.25 minimum stumpage is paid for grey stands. The condition of stands is based on cruise data.

Currently, industry relies heavily on red and green-attacked stands as a large part of fibre processed at mills. As the MPB epidemic continues, there is uncertainty regarding the extent to which the mills will be able to operate on lower quality grey stands – although the wood is firm, it may not be possible to economically make lumber from many of these stands.

The Net Volume Adjustment Factor (NVAF) destructive sampling is very important to Revenue Branch as part of appraisal system; this work needs to be supported.

About \$5-10 MM is spent on cruising each year. There have been discussions in past in using this information to improve the forest inventory. Thinking outside the box, in theory it should not be a technical problem to do this, but it would be a huge information capacity issue. If cruise information or dollars could create more accurate, reliable stand level forest inventories, then cruising and related costs might not be necessary. There are models where inventory data, where reasonably reliable at the stand level, is relied on to address lumber recovery rather than the collection of additional cruise information.

About 60% of harvest in the interior is pine, and in some areas about 40% is hemlock/balsam. Yet some of the hemlock/balsam stands may not be economically harvestable; getting reliable stand-level information on these stands may be critical to realistically assess future timber supply.

The model for making decisions about inventory priorities has widely fluctuated creating instability and uncertainty as well as less than optimal funding decisions. A model similar to what FRBC had eventually developed, where government and industry work together to collectively determine priorities is needed.

4. Forest and Range Practices Act

The key forest operational plan under FRPA is the Forest Stewardship Plan (FSP). One of the key content requirements of the FSP is to provide measurable or verifiable results or strategies consistent with established objectives. There are four kinds of established objectives:

- Grandparent objectives established under the Code;
- Land use objective under the *Land Use Objective Regulation* of the *Land Act*;
- Objectives in sections 5 to 10 of the *Forest Planning and Practices Regulation*;
- Objectives established under the *Government Actions Regulation*.

Established objectives may be qualitative (e.g., that a value is to be conserved) or quantitative (e.g., that so much of this attribute must be maintained). Values for which objectives are or may be provided include soils, timber, wildlife, biodiversity, fish, water, forage and associated plant communities, recreation, visual quality, resource features and cultural heritage resources.

An example of the interplay between established objectives, the FSP and the forest inventory is the Provincial Non-Spatial Old Growth Order

http://ilmbwww.gov.bc.ca/ilmb/lup/policies_guides/oldgrowth/index.html

Each landscape unit is given a high, intermediate or low biodiversity emphasis option (BEO) for which there is a corresponding requirement to retain a minimum percent old forest by biogeoclimatic zone by natural disturbance type (NDT) by age. For example, at least 14% of ICH in NDT 3 must be over 140 years of age in Moderate BEO landscape units.

In order to demonstrate this in their FSP, forest licenses will either have to spatially show the location of old forests retained to be consistent with this objective, or provide analysis that areas intended for harvesting would not cause the minimum targets to be breached. Either approach will likely require use of a relatively reliable and up-to-date forest inventory. The MOFR district manager will likely need to see this evidence before approving the FSP – and so too will equally want to ensure that the inventory is satisfactory.

Portions of some landscape units are in TFLs, TSAs and parks (national or provincial) – all of which contribute towards meeting the retention target. The boundaries of landscape units are usually based on heights of land and include inoperable areas. Where more than one licensee operates in a landscape unit (as is commonly the case in TSAs), the district manager may need to proportionally assigned old growth retention targets to each licensee (as provided for under FRPA). Having a reasonably seamless, consistent and accurate forest inventory throughout the landscape unit will be important to help ensure FSP consistency with the Provincial Non-Spatial Old Growth Order and to allow the district manager (where needed) to proportionally set targets in a reasonable and fair manner.

Other objectives related to wildlife and visual quality often include forest cover retention targets sometimes over very large areas where reliance on the forest inventory may be important to licensees who prepare the FSP and MOFR district managers who approve the FSP.

5. Defined Forest Area Management (DFAM), Forest Investment Account (FIA) and Sustainable Forest Management Planning (SFMP)²

The general intent of DFAM www.for.gov.bc.ca/hfp/dfam-website/ is to require and encourage volume-based forest licensees on TSAs to manage resource values under an area based approach. TSA forest licensee currently can voluntarily elect to use FIA www.for.gov.bc.ca/hcp/fia/ funding to undertake a timber supply analysis in support to Timber Supply Review; this is expected to be an obligation beginning in April 2007. The possibility of bringing key resource inventories as a core element under DFAM is being considered in part given strong links to timber supply analysis. If so, FIA would fund the necessary resource inventories as well as the timber supply analysis given direction to ensure any transfer of responsibilities is cost-neutral to industry.

To make this work, there would likely need to be defined minimum standards for the inventory, below which licensee(s) would be required to use FIA funds to improve the inventory.

In addition to the core obligations, DFAM is intended to provide a framework through incentives for collaborative management by TSA licensees and BCTS. Outside of legal framework of FRPA, many forest licensees prepare SFMPs using FIA funding, often in an effort to obtain certification (e.g., CSA SFM system requires a SFMP to be prepared and this system is recognized by SFI). SFMPs in TFLs often also serve as the Management Plan (MP) required under the *Forest Act*. SFMPs provide objectives for values (considering the strategic plan for the area) as well as measurable indicators and targets. www.for.gov.bc.ca/hcp/fia/landbase/strategic_resources_eligible_act.htm

² This draft material has not yet been updated with information obtain from interviews held with Rick Brand and Dave Bodak of the Forest Sector Initiatives Section of the Ministry of Forests and Range. A later draft will include these perspectives.

A number of indicators have been used in SFMPs in BC; a “common ground for C&I of sustainable forests for BC” initiative www.forrex.org/bcci/default.asp with FORREX, Forest Practices Board, Tolko and many other agencies and licensees are reviewing approaches taken in an effort to develop a fewer number of accepted C&I. Many of the initially identified “common ground” C&I, which are linked to Canadian Council of Forest Ministers (CCFM) C&I framework for SFM, can directly involve forest inventory information including:

- Area of forest, by type and age class, in each ecozone
- Area of forest, by type and age class, soil types, and geomorphological feature types in protected areas
- Total growing stock of both merchantable and non-merchantable tree species on forest land
- Additions and deletions of forest area by cause
- Area of forest disturbed by fire, insects, pests, disease and timber harvest
- Proportion of timber harvest area successfully regenerated
- Net change in forest ecosystem carbon
- Forest ecosystem carbon storage by forest type and age class
- Forest area by timber tenure
- Coverage, attributes, frequency, and statistical reliability of forest inventories

Indirectly, or along with TEM/PEM, forest inventories can help address a number of other proposed “common ground” C&I including (e.g., by mapping extent of suitable habitat now and projected in future)

- The status of forest-associated species at risk
- Distribution of selected forest-associated species

One option being considered is for DFAM/FIA to provide more support or encouragement for licensees to develop SFMP given link to future forests initiative (see below). Some core C&I could be identified under FIA to help ensure key considerations are being consistently reported on in each management unit. The above “common ground” work could assist that effort.

6. State of Forests Reporting

The 1975 Royal Commission on Forest Resources recommended major changes to forest legislation which led to the 1979 *Forest Act* and *Ministry of Forests Act*. The later Act required that MOF undertake a comprehensive forest and range resource analysis every 10 years. The last one completed, the 1994 Forest, Range and Recreation Resource Analysis www.for.gov.bc.ca/hfd/library/frra/1994/index.htm made extensive use of the forest inventory. The Act was amended to delete this requirement replacing the intent with a policy requirement that MOFR develop report on the State of Forests in BC.

The in-progress 2004 State of BC's Forests report www.for.gov.bc.ca/hfp/sof/index.htm follows the CCFM C&I approach and needs a seamless provincial forest inventory coverage throughout the province, on TSAs, TFLs, parks, etc., in order to best describe forest conditions and trends in BC. A major obstacle in preparing the work to date was in the absence of forest inventory information for many TFLs and protected areas. This contributed significantly to the delay in getting the report more fully completed.

7. Future Forests

In December 2005, the Chief Forester hosted an inter-agency and multi-stakeholder workshop, including First Nations, on Future Forest Ecosystems in BC www.for.gov.bc.ca/hts/Future_Forests/. The workshop explored the ecological challenges associated with factors such as climate change, insect infestations, forest pathogens and wildfires (while recognizing the need to link this to future social, cultural and economic circumstances). With workshop participants and others, the Chief Forester committed to carry out a high-level analysis of concepts and recommendations arising from the workshop and making the results available in February 2006, and to incorporating the results of the analysis into work plans.

The Chief Forester stated his vision for forest management in BC is that:

British Columbia is widely respected as a leader in the management of natural forest and range landscapes to maintain diverse values and provide an array of products that are valued in the marketplace.

Key themes that emerged from the workshop included:

- Emergence of a new framework or model for managing that carries forward the best attributes of our current approach, but is better able to deal with the uncertainty and risk inherent in making decisions today that have consequences for decades to come.

Some common messages included:

- The need to adopt a principle of managing for resilience of systems (where diversity begets resilience);
- Building adaptive management into forest management practices and decision-making models as an essential strategy for dealing with uncertainty;
- Need to constantly track the interactions between changes to ecosystems, human communities and economies and respond with a mind to balance and resilience.

Some highlights from Working Group Discussions include:

- Move toward managing for variability and away from our current focus on simplicity,
- Provide incentives for ecosystem modeling and adaptive management in new forest management models. (Note: likely need for TEM/PEM)
- Move away from arbitrary thresholds (e.g., free-to-grow) to more flexible approaches
- Close the gap between LRMP level plans and FSPs or similar plans with comprehensive forest-level (multiple landscape) spatially defined plans. (Note: this can be provided in a SFMP) (Note: likely need for more accurate stand-level information to support spatially defined plans; and need for seamless coverage to address multiple landscapes such as TSA/TFL inventories).

Observation:

- It seems the flavor of the workshop was less oriented towards defining future forest conditions (e.g., using indicators and targets) given the many uncertainties that we likely face due do change agents (like global warming, forest health, fire, etc) --- but more that we should design our new regenerated forests today to be more resilient to change agents by encouraging diversity and discouraging simplicity in our future forests.

- This requires a shift in thinking from meeting stand-level rules (like free growing) to assessing overall forest conditions at the landscape and management unit level – and making stand-level decisions in that context that promotes diversity. (Note: need to report on the status of forests using inventories over broad landscapes)

SFMP can address long-term values in 50 to 100 years associated with future forests, address forest conditions now and in the future at the landscape level, and other forest values important to communities and First Nations. (Note: need to project or model inventory over time)

One project associated with the Future Forest initiative is tree species composition and diversity. The Chief Forester and MOFR executive have asked Pat Martin, Forest Practices Branch, to explore alternative policy options in developing and implementing targets for tree species diversity. The development and tracking of science-based targets will undoubtedly involve an analysis of the forest inventory and related information systems such as RESULTS.

8. Other initiatives³

Other initiatives that could be reviewed with respect to forest inventory implications include:

- FRPA Resource Evaluation Program (FREP)
www.for.gov.bc.ca/hfp/frep/index.html
- Streamlining Forest Information Project
www.for.gov.bc.ca/hfp/streamlining/index.htm
- Business Information Management Group (BIMG)
<http://srmwww.gov.bc.ca/rib/bimg/>
- FRPA/FSP information support efforts www.for.gov.bc.ca/code/

³ Further material will be added to this section in a later draft.

Challenge Paper Consolidated Feedback

The Challenge Dialogue System™

Inventory Program Review: A Challenge Dialogue with Stakeholders

Executive Co-Sponsors —

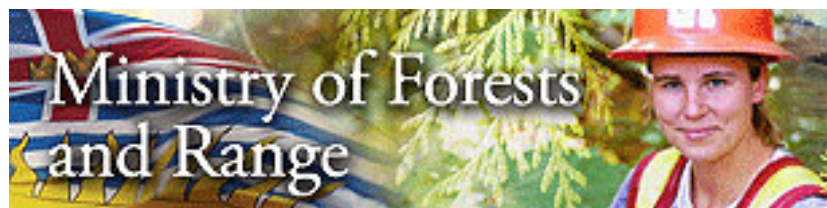
Jim Snetsinger, Chief Forester, Forest Stewardship Division

Tim Sheldan, Assistant Deputy Minister, Operations Division

Prepared by —

Inventory Program Review Action Team, Forest Analysis and Inventory Branch

Process Facilitation Support by R. Keith Jones & Associates and Michele Baker,
Officelink



March 31, 2006

Inventory Program Review: A Challenge Dialogue¹ with Stakeholders

Table of Contents

INPUT REQUEST 1: KEY CHALLENGE AND BACKGROUND 1

INPUT REQUEST 2: EXPECTED OUTCOMES..... 19

INPUT REQUEST 3: ASSUMPTION STATEMENTS..... 37

INPUT REQUEST 4: CRITICAL QUESTIONS 61

INPUT REQUEST 5: NEXT STEPS 88

OTHER COMMENTS AND FEEDBACK 95

¹ This Challenge Dialogue System™ was developed by the Innovation Expedition — it is a disciplined process that engages diverse groups on discovering collaborative and innovative solutions to complex challenges. www.innovationexpedition.com.

Input Request 1: Key Challenge and Background

| | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>INPUT REQUEST 1: Please provide your feedback (reactions, questions, suggestions) to the Key Challenge and Background statements.</p> <ul style="list-style-type: none"> ▪ Do you have any comments you would like to make about our Forward section regarding terms, current scope and assertions? ▪ What questions do you wish to raise about the Key Challenge statement? ▪ What ideas did the Key Challenge statement spark in your mind? ▪ What reactions, questions or suggestions do you have with regard to the Expected Outcomes? ▪ What expectations do you have for this Challenge Dialogue (as in: "I would consider this Dialogue a success if...")? | |
| P1 | <p>Agree, we need better inventory data/remeasurement/understanding of what is on the landbase. Key management decisions/determinations are made on this data and we need to have the best, must up to date data that is possible. Funding and responsibility issues are critical, as the "stewards" of the forest we need the funding and resources to carry out this challenge</p> |
| P3 | <p>It is March 28th and we just received a copy of this information. We have 15 GIS analysts and 30 forest professionals in our office that work with the forest inventory data daily. However we were just notified of this program today. A day before the deadline for submissions. We think you need to have a couple meetings with users. Possibly in Kamloops and the Peace. Invite the licensees, consultants and government users to comment. An e-mail and a slew of files on the internet isn't a great way to co-ordinate change management. You have an oil tanker moving through the ocean and you are trying to move it with a sailboat. I think to get buy-in you will need to talk to people in person.</p> <p>There is no use in co-ordinating a train the trainer workshop and additional training workshops if there is no work. We have attended workshops and week-long training programs several times, to only have no opportunities to apply the skills learned. Within 2 years you tend to forget what you learned. There are some better approaches to making this work that have been successful in other ministries.</p> <p>There was no discussion on Barriers to moving forward, Substitutes, Strengths, Opportunities or Weakness that should be considered. This might be a more effective way of opening up the discussion.</p> |

| | |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>P4</p> | <p>Scope. The first paragraph about Scope is very specific in including all the technical aspects of VRI. (Phase I, II, NVAF, G& Y etc...) However, the rest of the challenge document deals with these technical issues at an extremely high level, or not at all.</p> <p>The Challenge paper scope, as interpreted from the challenge paper it self, is more to do with Governance, funding model, delivery model, user needs and applications (appropriate and inappropriate) for the inventory data. These are “program delivery issues”, not technical issues.</p> <p>Perhaps this process is high level and focused on program delivery.</p> <p>At what time will there be a discussion on the technical details of the VRI? Particularly issues like inventory reporting.</p> <p>I would consider the Challenge Paper process a success if the Chief Forester, as the primary client of the VRI through TSR – AAC determinations, takes responsibility for the inventory of the province and uses his position to secure regular steady staffing and funding to deliver a provincial VRI that is current, complete, and statistically robust. The inventory needs a champion.</p> |
| <p>P5</p> | <p>The key challenge statement tells me that if Inventory branch proceeds as discussed, the concerns/needs of the Protection program can be met. My expected outcome of all this will be to establish a good working relationship with Inventory branch and provide for a mechanism that allows for timely transfer and sharing of information/data to meet both the needs of Inventory and Protection Branch.</p> |
| <p>P6</p> | <p>First, I agree that the focus should be limited to vegetation. But, I do not agree that it should be limited to forested areas and nothing else. There are so many impacts on the entire landbase within a TSA or district that are real concerns for those having responsibility to manage it. For example, range burns reduce the forested component of the landscape to provide range. This also impacts the structure of FRPA values such as biodiversity. As another example, energy exploitation on the landscape, whether it be simple 3-D seismic programs to major changes in the landscape in the form of strip mining. Especially for North-East BC and South-East BC.</p> <p>As to the Key Challenge, I think it is a good starting point. But, unless there is the willingness to follow through on recommendations, i.e. resourcing issues and executive support for change – then all this is simply a dialogue among peers.</p> <p>Regarding expected outcomes, the VRI update program will need to develop a very good working relationship with the OGC to update harvesting in NE BC from O&G activities that provide timelier updates while at the same time maintaining the confidentiality of OGC licensees. [FYI...it is estimated on an annual basis that there is more land permanently “lost” to O&G activities than is harvested and reforested by MoFR licensees in NE BC.] This info is needed for the TSR process. I understand that this process will be starting in April 2006.</p> |

| | |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>To compare and contrast, the case of area impact by the MPB is similar to the situation in NE BC with seismic impacts. Except that in MPB areas most areas will probably regenerate and be modeled that way in TSR (either planted or naturally). Areas lost to seismic activities (and other O&G impacts) do not contemplate regeneration potential in TSR.</p> |
| <p>P7</p> | <ol style="list-style-type: none"> 1) Forward Section: There was a similar challenge paper about a year ago dealing with inventory requirements for MPB. How does the current challenge paper relate to the previous challenge paper? It seems the two should be intimately related. 2) No questions about the Key Challenge statement. 3) The Key Challenge statement gives me the idea that you are really only looking at a “tweaking” of the inventory program, rather than critically looking at whether it truly meets the requirements of today and the future. There also seems to be a pre-determined expectation that the only way to “fix” the program is for government to take back the delivery of the program. 4) The expected outcomes appear to be concerned mainly about “understandings”, rather than “actions”. 5) I would consider this Dialogue a success if the inventory program can be streamlined to give cost effective, relevant information for all aspects of forest management, including issues at an operational scale. |
| <p>P8</p> | <p>Under Section 2:</p> <p>Governance – TFL holders are also obligated to meet inventory requirements as per their tenure agreement terms and conditions.</p> <p>Delivery model – For TSA’s, isn’t there a government responsibility for planning and quality assurance also?</p> <p>Funding model – From 2002 to present, FIA allocates funding directly to forest tenure holders who then determine the ‘optimum’ mix of investments – I would qualify this as being based on their own interpretation of optimum.</p> <p>Decision making at different scales warrants different degrees of quality. VRI has been implemented to support MU level decision-making. So, how does stand level info such as oil & gas disturbance get captured, since it has a significant presence at the MU level?</p> <p>FAIB should consider some methodology to apply more intensive sampling in some circumstances to provide higher resolution data for stand level use.</p> <p>I agree, we could benefit from having local update staff in districts, especially in the NE because of various overlapping tenures and uses.</p> |

| | |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>P10</p> | <p>The expectations are reasonable and cover a lot of areas. However, from a District our expectations would include.</p> <ul style="list-style-type: none"> ▪ District Roles and Responsibilities ▪ District and Regional Resources to maintain and understand the data inventory ▪ Consistent funding to allow for proper long term planning to address inventory gaps. May require District Wide Gap Analysis to identify weaknesses in the inventory and deficiencies in the information ▪ Addressing links to other data sources, i.e. MoE, ILMB, MTSA, and industry, specifically in areas of TFLs. Ability to merge datasets without error and duplication. ▪ Quality Assurance – for example the accuracy and reliability of RESULTS data is highly suspect due to lack of quality assurance and ability of Districts to correct errors, review and reconcile data with history file (i.e. opening hardcopy file) <p>Should be broader than just Vegetation Inventory. Need to consciously link/bring in inventory requirements now and in the future</p> |
| <p>P12</p> | <p>The Challenge statement is clear and well written but appears to assume the stakeholders' prior knowledge and understanding of the framework and structure of the existing VRI system including the scope and limitation of use affecting different resource management objectives and planning decision levels. Furthermore it assumes that the reader has knowledge about the strength and weakness of the policy structures of existing VRI program. While this could be true for provincial and federal subject matter experts and technicians the majority of stakeholders may lack sufficient information about the "loopholes" and gaps within the current framework and structure of the VRI system.</p> <p>The scope should be extended to include panel sessions to examine and:</p> <ul style="list-style-type: none"> ▪ identify policy gaps impacting expected program delivery schedules; ▪ identify the impact of obsolete or inadequate products, inventory methodologies and assumptions on optimum and usable products and current short-falls in inventory deliverables. ▪ survey stakeholders value preference for the VRI delivery options should be included. This will assist in capturing and quantifying stakeholders' perception of the changing needs of the industry and the community. <p>Governance section implies that decisions are not required to be made based on sound information – is this a concern which is to be addressed?</p> <p>Standards should set targets in terms of results rather than prescribe a specified method of producing an outcome. What is more important? The process or the quality, contents and usefulness of the resultant products?</p> |

Comment on Expected Outcomes for 1. Key Challenge

The Action Team's expectation item 1 would be more informative if emphasis shifts from acquiring a "broad view... information needs", to a compartmentalized case by case comprehensive picture of information needs of stakeholders as well as, definition of program delivery option

What is critical vegetation information and is this the same for all stakeholders? How important is the accuracy of the information? What is timely and is this the same for all stakeholders? What are current inventories being used for? What could they be used for if more detailed, accurate and precise information was available? How could the inventories become more useful to resource managers as a whole if they were more comprehensive in content. What about the concept of total resource inventories rather than just vegetation inventories. Managers today need to consider all resources affected by their planning not just vegetation. With new technology, it is possible to inventory all resources so that a more integrated approach to resource management is facilitated. This approach is more cost effective than people might imagine.

Comment on 3.2 Vegetation Inventory

Background information is well written and very informative. Even though the discourse raises issue of potential concerns, it does not emphasize any problem areas requiring special policy intervention. It would be more informative to discover what bottlenecks (administrative, operational, financial) impede the timely delivery of VRI information to stakeholders.

It will also be beneficial to provide a ranking of the issues in some order to reflect the levels of severity of impact of the attainment of VRI objectives.

The underlying causes of the issues of concern raised do not come through very well with regards to the intended response for instance:

- sub-paragraph 8 & 16 (c), are these issues that requires policy intervention?
- sub-paragraph 8 (e), what is the impact and relevance of this under-capacity on the goals of VRI
- sub-paragraph 8 (g), again the relevance factor; is this impacting a government policy or impeding the attainment of VRI objectives to provide useful services to the stakeholder.

3.2 8a) many attributes are known to be very poorly estimated (e.g., basal area) objective measures should replace where technically possible to generate measurements with known confidence limits

3.2 8b) how often are phase 2 adjustments actually implemented?

| | |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>3.2 8e) tracking is further complicated by discrepancies of spatial units where stand boundaries change through the years with different sources of generating the lines GPS, API, Free Growing survey data etc.</p> <p>11. there are other options to shorten the time required as well</p> <p>12. Are there any timelines for completing the first cycle?</p> <p>Comment on 3.3 Growth & Yield</p> <p>Traditionally, growth and yield and inventory are considered separate disciplines requiring unique varying multi-disciplinary expertise. Consequently, the issue about Growth & Yield should be treated separately outside the scope of current VRI review. This will eliminate the potential to mask and confuse the real issues of concern around VRI.</p> |
| <p>P13</p> | <p>Comments Regarding the Forward Section in regards to Stage 3 Future Workshop:</p> <p>The Northern Interior Region would like several of its District staff participate in the May workshop. The Northern Interior Region currently has but one Inventory staff. The NIR contains a varied landscape and resource interests. Representation and participation from the Western portion; the Peace-Ft. Nelson and the Central (MPB impacted) at a minimum might be considered. We strongly believe representation and participation geographically from across the province will provide a stronger review and developing recommendations.</p> |
| <p>P14</p> | <p><u>Forward Section Comments</u></p> <p>While most of the forward is fine I do issue the following statements:</p> <p>Funding Model</p> <p>I strongly disagree with the assertion 'The delivery model is not well suited ... to vegetation inventory.' This may be the perception at FAIB but not elsewhere. Through Industry/BCTS DFAM/LBIR groups, and without big budgets, over time we are managing to fund full VRI work in the Strathcona, Sunshine Coast, and Soo TSAs. We have also managed to form other partnerships to get VRI work implemented - like the current VRI Phase 1 work in the Indian Landscape Unit with the cooperation of the Burrard 1st Nation (they funded the helicopter time from their funding sources).</p> <p>While some areas, like the Mid-Coast TSA have not had a lot of work done in them, with the change of the FIA funding model to an AAC-based model from an economic activity model in the coming fiscal, there should be more opportunity to implement inventories there too.</p> <p>I think FAIB has not been engaged in the activity actually happening in the field and this reflects the assertions made in the front of the document.</p> |

| | |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>Delivery Model</p> <p>One point of clarification:</p> <p>While it is true that TFL holders are responsible for funding forest inventories under section 9, this requirement was quietly dropped under FIA rules.</p> <p>In the past, under FRBC rules, government (through ministry line budgets) and industry were required to fund 60% of the VRI Phase 1 costs with the other 40% eligible for FRBC reimbursement. The problem was that the Ministry was never able to secure line budget funding for VRI inventories, so little VRI work was done in the TSAs for a few years. When this was recognized as an issue FRBC allowed the 100% funding of inventories to let VRI work to proceed. For fairness TFL holders were also allowed to use 100% of funding on their TFLs too.</p> <p>Under FIA there is no funding restriction like the 60/40 FRBC split inferred in the Delivery model statement.</p> <p><u>Key Challenge Statement</u></p> <p>As it stands I think the Key Challenge statement should stand as is – its fine. However I was involved in both the Forest Resources Inventory Committee (FRIC) and the succeeding Business Information Management Group (BIMG) and they both had fine opening statements too – but neither went anywhere. It seems that when the “rubber is ready to hit the road” on these things the process fizzles out. My perception is that the fizzle point happens when the real work needs to be done and real funding is needed to do the work.</p> |
| <p>P15</p> | <ul style="list-style-type: none"> • Challenge Statement – Some times a review of an existing process, with the goal to ‘make it better’, establishes unnecessary sideboards and reduces the chance of coming up with revolutionary improvements. The challenge statement may just want to state that the inventory system will be designed to meet today’s and future business need in the most cost effective manner. • Scope – Page v – IPR talks to all aspects of the VRI process but does not mention the inventory (photo interpreted) adjustment phase after the ground sampling. A lot of work has been done around the adjustment phase. We need to ensure it provides value to all users of the inventory. <ul style="list-style-type: none"> ○ Keeping it focused on vegetation inventory at this point is a good idea. • Page vii – Inventories don’t become out-of-date over night. Ongoing depletion and silviculture updates will go along way in keeping inventories more useable. Some priority around improving inventories over time (working on specific localized issues) will greatly reduce the need to re-inventory large areas. An upcoming emphasis area is stand characteristics in mixed stands post mountain pine beetle. • Local field knowledge of inventory may have diminished in recent years, but this should not be mixed up with the level of operational accuracy and acceptance of the inventory. VRI has focused on the TSA statistical validity with less focus on operational (stand and sub landscape) accuracy. This has lead to people “trusting” the inventory less and this may be incorrectly construed as less knowledge. |

| | |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>P16</p> | <p>I think the problem with the current inventory model is that there is no clarity around what the inventory is to be used for. If we knew what it was intended to be used for it is relatively easy to develop a program to address the stated needs.</p> <p>Do we want polygon, landscape unit or Management unit resolution and to answer what questions?</p> |
| <p>P18</p> | <p>Terms: It was made clear but needs to be emphasized that this review is focused on vegetation inventory only, not on all of the numerous inventories that exist.</p> <p>Key Challenge Statement: If through the review it is decided that improvements are needed, an achievable but useable time-frame should be identified for the work so that it does not become an unending project.</p> |
| <p>P19</p> | <p>Forward Section</p> <p>Currently VRI Phase 1 does include description of the trees, vegetation and non-vegetated types on so called range lands. A separate range inventory may be done but this will overlap somewhat with the VRI.</p> <p>Scope – for the last 5 years the VRI activities have been managed by Industry (MOF & MSRM have been lookie-lews) so your comment of looking beyond government is a slap on the cheek to forest companies that have picked up the inventory ball under FRBC and FIA and run with it.</p> <p>Funding Model – under FIA, individual forest companies were very restricted when it came to having the ‘flexibility to move funding from one area of the province to another with minimal government involvement’. The licensees in many TSAs did not have enough TSA FIA dollars to do a new inventory but were unable to pool their FIA dollars within the company from other TSAs.</p> <p>Key Challenge Statement</p> <p>Footnote 1 states: ‘most people involved with the current inventory program feel it is neither complete nor cohesive’. Perhaps the real situation is that most people involved with the current program do not fully understand how everything is supposed to work. I suggest absolutely nothing be thrown out until all major Stakeholders really appreciate and understand what the current vegetation inventory program ‘baby’ is. Why fix it if it ain’t broke?</p> <p>Expected Outcomes</p> <p>Comment number 5 is the key one. What will be the vegetation inventory standards and specifications, the scheduling/timing and the funding vehicle?</p> |

| | |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>I will consider this Dialogue a success if ‘it leads to all major stakeholders in BC forest and vegetation inventory being truly aware of the benefits and weaknesses of the current VRI program. This includes: appreciating the capabilities of experienced photo interpreters working in the softcopy environment and using the excellent scanned film and digital photography that is available; understanding the Phase II sampling plan and how it can be improved; being aware of new technology that is available to improve the accuracy and/or cost of fieldwork and photo interpretation (LiDAR, digital photography, airborne scanners, computer-assisted or semi-automated classification software, satellite imagery); understanding the need for ongoing G&Y and NVAF programs within government’.</p> |
| <p>P20</p> | <p>“Vegetation Inventory Does not include rangelands” Last time I looked, MoFR has broad definitions of forest land and range land, such that they overlap considerably. Although current VRI efforts may not focus on rangelands, they most certainly map and classify them</p> <p>“dependent inventories, studies and assessments” – This would include PEM and TEM that may rely on VRI information for identification of tree species and age class; Habitat supply modeling;</p> <p>My expectations:</p> <ul style="list-style-type: none"> ▪ Underscore the importance of some level of vegetation information available province-wide for analysis, model input, monitoring and reporting (“seamless forest cover” – VRI augmented by generalized information from TFLs and Parks and Protected Areas) ▪ What aspects of VRI should be implemented within PPA to provide seamless tactical information for Pest and Fuel management strategies? ▪ Harmonize classifications – Land Cover Classification (VRI) Land Use Classification (BTM) National Vegetation Classification; structural and seral stage classifications (P&TEM, BEI) ▪ Benefits of additional development of integrated TEM/VRI and Terrain-based VRI. ▪ Use of LIDAR and other airborne sensors for Forest Structure ▪ Look to the USDA FS Forest Inventory and Analysis group to better understand what VRI-based information can be generated to benefit non-timber resource management |
| <p>P21</p> | <p>My primary expectation for the Challenge Dialogue is to see clarification and definition of policy on joint stewardship responsibilities and obligations related to inventory and related initiatives (G&Y, monitoring) of the public resource</p> |
| <p>P23</p> | <ol style="list-style-type: none"> 1) Is the data collected accurate enough 2) To what standards will the data be collected to (we have lots of data that is not accurate enough for the stand level planning it is being used for). 3) We have a lot of PEM and tem done on the old inventory- pre VRI why are we using this? |

| | |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P24 | <p>The opening pages of the document have some misunderstood assumptions:</p> <p>On governance, volume based tenure holders have little or no vested interest in strategic level inventories at the TSA. Any expectation that they will become actively involved unless as a surrogate for government and at no costs is misguided. The failed DFAMS experiment was a step in the right direction and if it had remained coupled to a forest stewardship plan for the management unit and subsequent FIA allocations it might have worked. Unfortunately, the ministry lost it way and any hope that volume based tenure holders would step up to the plate has been lost.</p> <p>Based upon my observation of a number of my private sector clients, that there is frustration to the point of desperation with the administrative procedures around FIA and FIFT funding that has wrung out of the system any incentive to do things differently.</p> <p>The assertion that TFL holders pay for their own inventory is on the surface correct, when you look under the covers, it is different. If you track inventory activity on TFLs as the function of available government funds. You will observe that TFL inventory activity is directly related to those funding programs. Whether it be, Forestry Cost write offs of the 50's & 60's, Section 88 of the 70's & 80's or FRBC, FIA or FFT of the 90's, TFLs have been funded by these programs. In some cases there may have been a requirement for the industry to pay some fraction of the base, but these as costs to the industry where subject to the tax laws of the time and were write-off's as well.</p> <p>Having just finished an engagement for a client, I have had an opportunity to review all of the coastal TFL resource information holdings. Most of these were completed to VRI standards of the day and paid for by FRBC. The only exception to this was Cascadia, which has had a long tradition of sampling and perhaps the finest data base of representative ground samples of their old growth but particularly the second growth, where they actual know what is out there.</p> <p>The comment that "The inventory therefore must be regularly updated and periodically re-inventoried when and where there is a demand for the inventory to be more current." The notion that an inventory need to be redone 'to be more current' is very old thinking that returns to the origin of periodic inventories pioneered by Franco German foresters of the late 1800's. The broader assessment of clients based needs must drive this determination not age. Given that the original inventory was well done, that we maintain the currency of the inventory for change through an annual or biannual update cycle, that we project the inventory for yield changes with reasonable yield models then currency is not an issue. One only needs to review the audit of the 76 management units to review how well the inventory had performed.</p> <p>The expected outcomes do not appear to address the paradigm of 'results based' forest management' that we have either entered or are about to enter. In this paradigm, the focus is not on the managing the how we do it but on the results generated from the actions. If we apply this model to resource inventory within the constraint set of a common set of definitions DBH, Top height But provide decision space to proponents to under take inventory activities under the principle of professional reliance how would that affect the capturing of a province wide data set and how would government pull this together, or would they have to?</p> |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| | |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P26 | <p>I would consider this dialogue a success if government (Politicians and Forest Service Management) and industry recognize that this VRI Inventory Program must be for all lands (crown, private, parks, TFL) of the province(this is for the people)and that it should be the responsibility of government VRI staff to ensure that the Standards for this Inventory, the prioritization of needs (when to do VRI and to what level of detail) for this VRI and the direction of funds for this VRI Inventory are controlled, administered by MoF VRI staff that have a vested interest in ensuring that a quality product is provided and in a timely manner.</p> <p>Whether the VRI Inventory needs to be re-address, so that only critical data is collected and whether there is a need to improve the accuracy (localization) of the inventory must be determined by all stakeholders, but only government can remain impartial to determine these needs. There is way more than just TSR Analysis interested in the Forest Inventory data and they similar to Forest Licensees should not be the only considerations for a VRI.</p> |
| P29 | <p>My apologies – the comments will be brief. The timing unfortunately does not work. The brevity of my comments do not indicated a lack of interest or concern.</p> <p>Generally I like what I see. The problems have been well articulated and topic areas seem appropriate. In short I support the paper and look forward to the actual review process.</p> <p>I have been away from the day to day use of inventory for some time now so I am not directly familiar with the implementation specifics. Any comments that I may have will be based on what I consider to be principles which perhaps should be the guiding tools anyway.</p> <p>Input request 1.</p> <p>This looks pretty much like the expected outcomes from the process which developed the current VRI.</p> <p>I have a view of inventory (as a provincial responsibility for a public resource) that suggests that the objectives, process and technical model are not necessarily the result of dialogue, consensus nor the current version of business case.</p> <p>The business case that I would prefer is one that assesses the real risk to the province stewardship mandate without an adequate, technically sound, well funded provincial inventory. That technical model exists – it is the implementation and financial commitment that is lacking.</p> <p>So – would love to see a renewed strategic direction – financially supported with a commitment to make it happen.</p> |
| P30 | <p>If we get response from a wide audience... I would consider that a success</p> |

| | |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P31 | <p>We have 15 GIS analysts and 30 forest professionals in our office that work with the forest inventory data daily. We agree with your plan to have a couple meetings with users, possibly in Kamloops and the Peace. Invite the licensees, consultants and government users to comment. To get buy-in you will need to talk to people in person.</p> <p>There is no use in co-ordinating a train the trainer workshop and additional training workshops if there is no work. We have attended workshops and week-long training programs several times, and then had no opportunities to apply the skills learned. Within 2 years you tend to forget what you learned. There are some better approaches to making this work that have been successful in other ministries.</p> <p>There was no discussion on Barriers to moving forward, Substitutes, Strengths, Opportunities or Weakness that should be considered. This might be a more effective way of opening up the discussion.</p> |
| P32 | <p>I believe you got the Request No. titles mixed up, as the points above call for feedback on outcomes, so the following are comments related to the expected outcomes...</p> <p>I agree that with limited funds we must focus on the timber inventory as it needs updating and expansion into previously un-inventoried regions. Of particular interest to the oil and gas sector is improved VRI information for the northeast (Fort Nelson and Peace Districts).</p> <p>It would also be useful to have understory vegetation inventoried and mapped (via PEM/TEM) because for oil and gas, those values are as important as timber values in many watersheds.</p> <p>I would consider this dialogue a success if it resulted in a more consistent and functional inventory as well as stable funding for maintenance and updates of the inventory.</p> |
| P33 | <p>Our challenge should be: to focus scarce resources on a targeted and specific inventory. We do not want to make the focus too broad and too costly. The current inventory as envisaged by VRI Is mostly strategic in focus: need to outline costs in making operational if that is an expectation.</p> |
| P34 | <p>Terms – OK</p> <p>Current Scope – I am pleased to see that the scope of this review extends beyond government. Access to licensees' inventories, and the quality of those inventories, is an important issue for land use planning.</p> <p>Key Challenge Statement – Questions and Ideas:</p> <ul style="list-style-type: none"> • How can licensees' input be utilized to meet government requirements as opposed to their own? (this may be a question of funding, custodianship) • will future funding be sufficient to provide adequate solutions to problems? Will we be forced to manage, and live with, excessive risk? <p>I would consider this Challenge Dialogue a success if the end result was a list of realistic objectives that could be achieved in a reasonable time frame, to better support strategic initiatives such as TSR and land use planning</p> |

| | |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>P36</p> | <p>Consider also - linkages with ministry's Climate Change initiative – may wish to provide ministry CC Task Team opportunity to respond to this CR</p> <p>Very informative Forward section. Consider posting/publishing.</p> <p>Of particular interest – Data quality & decision making (e.g. VRI designed to support MU level decision-making) ; interested in stand-level roll-ups; not clear how much of VRI is supported thru stand level assessments</p> <p>VRI information used in gene resource management / monitoring of in-situ genetic diversity / climate change modeling wrt species & genetic diversity</p> <p>Aligned with expected outcomes.</p> <p>I would consider dialogue a success if opportunity to provide input extends beyond CD.</p> |
| <p>P37</p> | <ul style="list-style-type: none"> • In redeveloping a renewed strategic direction for the province's vegetation inventory program it is important not to lose sight of the "core roles and responsibilities that are considered to be essential elements of the program in order to fulfill government's stewardship responsibilities". This is key since at the end of the day the box that gets defined must fit within the box/boxes it was made for. • What happens if and when business drivers conflict with "stewardship responsibilities" – what process will be used to deal with this? • With the revitalization program (20% take back) there is an expectation that there will be a broader array of managers/players on the landbase (e.g., First Nations, Communities, etc) with various information needs and methods to access that information how will their needs be met • We live in a highly regulated forestry environment and determining a mandate for a governmental organization that doesn't coincide or blend with the mandate that it has been given or to place expectations on others who don't have the same mandate as you creates problems. • Expectations that I have for this Challenge Dialogue – I would consider this dialogue a success if the real issues and barriers facing the province's vegetation inventory program in fulfilling the stewardship responsibilities that government were linked more consistently with business drivers (considered part of the same rather than separate entities). |
| <p>P38</p> | <p>No, terms, scope and assertions seem fine.</p> <p>No questions about the Key Challenge statement come to mind.</p> <p>None really.</p> <p>Expected outcomes seem reasonable.</p> <p>I would consider this Dialogue a success if you get a large number of responses with good feedback from a wide cross-section of the natural resource management community including industry, government, academia and others.</p> |

| | |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>P40</p> | <p>1. Governance – no mention of government’s overall fiduciary responsibilities for the public forest resource and how this impacts inventory issues.</p> <p>2. page vii, 5th paragraph – It would be more useful to articulate the differences between “update” and “re-inventory” rather than suggest they both are responses to a need for more “current” inventory. These processes are very different in cost, methodology, timing and business drivers.</p> <p>3. A huge issue is not mentioned at all, and that is access to the inventories collected.</p> <p>4. In general there seems to be an unstated assumption that the primary users are for the most part only to be found within MoFR (and mostly focused on TSR). In fact I would suggest that the VRI is the only province-wide vegetation inventory we have and as such it is the de facto choice for all agencies, industries, interest groups, First Nations, etc, for which vegetation cover is relevant to their business.</p> <p>5. Another general impression I am left with is that often (but not always) the point of view seems to be from an inventory producer’s or data manger’s point of view rather than a broad based user’s perspective. This impression is reinforced in Critical Questions # 6, “should TFL, Park and Private Land be included”? Is the answer not obvious? How can BC claim to have the world’s best forest management regime and likewise a world leader in managing our fishery, biodiversity, and species at risk with these very large gaps in the availability of the information required to manage these resources?</p> <p>Ideas sparked by Key Challenge</p> <p>1st bullet – Wonder how broad a range of inventory stakeholders have been engaged. If you agree that VRI is the de facto vegetation inventory for BC then legitimate stakeholders are all groups who require this kind of information.</p> <p>2nd bullet – Hope the technical experts can keep the big picture in mind when the are making recommendations</p> <p>3rd bullet – This is a pragmatic approach.</p> <p>4th bullet – Looking at the history of episodic and fluctuating funding for inventory (i.e. feast or famine) infers that cost is all important and that we should plan for fluctuating funding rather than hope and wish for a more stable funding world.</p> <p>Expected Outcomes</p> <p>I hope we can achieve these, particularly #5: a renewed strategic direction.</p> |
| <p>P41</p> | <p>The aging of the inventory over time is an important point. We need a viable re-inventory program that is implemented in a coordinated manner across the province. The changing dynamics of the forest need to be reflected in the inventory over time. Inventories should only be static for reasonable periods of time, and then they should be re-visited. The present delivery model does not allow for a coordinated approach to inventories over time.</p> |

| | |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>P42</p> | <p>I would consider this dialogue a success if:</p> <ol style="list-style-type: none"> 1. It is recognized that we cannot possibly do ecosystem based management (EBM), nor can we fulfill the criteria for sustainability, without the use of inventories to compare how we have progressed and to assess where we are going. Stand level management policies and guidelines does not - good forest management - make. 2. It is recognized that to be successful inventories must be designed for both strategic and operational applications, not just strategic uses. Currently strategic plans are conceived using highly abstract and generalized kinds of inventory information. When it comes time for implementation, the operational realities often overwhelm any further consideration of such strategic goals and objectives, making it difficult to follow through on them. 3. It is recognized that the answer to Doug Konkin's question is no. We do not have anyone who is responsible or accountable for the management of specific forest management areas in the Province – i.e. there are no Forest Managers (District Managers manage people and implementation of policy, not Forests). If we did, there would be no discussion about the need for up-to-date inventories, first and foremost as evidence that the Manager was doing his or her job. 4. There is recognition of the need to educate foresters in the uses of inventory information. |
| <p>P43</p> | <p>3. The forest industry has a different focus on managing the VRI; it is a timber focus as their business is timber products. Few proponents have the longer term vision that Inventory branch has to do complete Vegetation resource plots with the Timber emphasis plots as there have been a lack of funding to do both. Industry will shift now that Forest Stewardship Plans are required and Industry is now fully required to report on such content under the FSP.</p> <p>Some TSA's have completed PEM with Eco plots to help build the PEM. It would be good to know that such BEC plots in the province are being included in the Library of VRI / Ecosystem</p> |
| <p>P44</p> | <ul style="list-style-type: none"> • <u>Scope:</u> VRI is not only important to the forest sector, i.e. industry, but also to the entire spectrum of planning, operations, economic development, research, conservation and protection of the all provincial forest lands. It is the <u>key</u> foundation along with spatial map base and ecosystem mapping upon which most other derived data/inventories, analysis and decision-making depend. Therefore it is important to gov't, NGOs, First Nations, industry, and to the owners of the resource – the citizens of the province. • There is no cohesive "program" only elements or fragments of a program dispersed between MOFR, other agencies, licencees and contractors/consultants. Gov't mandate to prioritize, undertake and ensure the quality of new inventories has been removed, along with significant numbers of staff and operational funds. Current delivery model leads to ad hoc and poorly informed decisions because of the lack of familiarity and expertise with existing state of the inventories. Heavy reliance on consultants who do not always have the necessary institutional/historical/technical background or long-term responsibility for the outcomes has only exacerbated these problems. |

| | |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <ul style="list-style-type: none"> • in the “Starting Perspectives” section there is the statement which begins, “For TFLs: the licencees are responsible for funding inventory requirements.....”. This information is incorrect. TFL licencees rarely use their own funds for inventories and primarily access FIA funds. Also, there is only one standard, VRI, for new forest cover inventories. The Chief Forester does not specify different standards for upgrading inventories. • I would consider this dialogue a success if it resulted in a recognition of the crucial importance of up-to-date, reliable, consistent forest inventory across the entire land base, and the recognition that this desirable goal should be a high priority for MOFR/gov’t leading to adequate, stable funding and resourcing being dedicated to its achievement over the next 5 to 10 years. |
| <p>P45</p> | <p>The Key Challenge statement “To undertake a full and open review of the current implementation of the vegetation inventory program... “A major component of the Program Review and Challenge Paper is dedicated to G&Y. The statement should remove “vegetation” so that it doesn’t leave the impression that it’s solely a Vegetation (VRI) Review.</p> <p>Missing from the Challenge Review objectives is identification of service delivery gaps and Challenges and improvements of services to the stewards of the Resource.</p> <p>Agree and support the Expected Outcomes.</p> <p>I would consider the review a success if it leads to agreement regarding identification and documentation of the mission and mandate of the Ministry of Forests and Range in regards to Vegetation Inventory and G&Y and its responsibilities and role.</p> |
| <p>P46</p> | <p>The Expected outcomes are confusing as they seem to overlap with one another. Outcome #1 is a broad, all encompassing statement, outcomes #2 and 4 state similar things and outcome #3 is a component of #1. I think the outcomes would be better stated as: 1) assessment of current and anticipated needs/issues; 2) identification and assessment of options, opportunities and solutions relative to the needs/issues; 3) business case (cost/benefit analysis) in relation to the barriers for investment from gov and licensee perspectives; 4) renewed strategic direction and action/implementation plan (strategic direction alone is not enough – there needs to be a clear implementation plan developed in order to set change in motion)</p> <p>I would consider this dialogue a success if and when change takes place. Until that point the dialogue is simply a dialogue (lip service) and can be too easily forgotten and/or ignored.</p> |

| | |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>P47²</p> | <p>Usually people do not have much success in trying to be all things to all people. So I do not like the chances of the Inventory Program doing so. Let's decide what is our core business and let the "nice to do" stuff to be funded be the periodic funding bonanza's that come along like FRDA, FRBC etc.</p> <p>We grow and log trees. We can see trees from the air. Let the inventory speak to their location, size and the productivity of the site to which they are growing. Let the FRPA resource evaluation program go out on the ground and assess whether we have left enough CWD or suitable habitat for some animal of interest and use there information to maintain access to markets.</p> |
| <p>P48³</p> | <p><u>Scope:</u> Will this cover VRI retrofit?</p> <p><u>Starting Perspectives:</u></p> <p>Governance: TSA Licensees (FIA recipients) have already accepted their role to administer inventory projects and have so far, been quite successful in directing resources on a priority basis.</p> <p>Funding Model: We do not expect that there can be a less volatile funding model. That is a red herring. Regional or provincial programs work if a strategic plan is presented and weighed against other priorities for each management unit.</p> <p>MoFR has discouraged the implementation of operational-level information at the strategic-level inventory (i.e., VRI). Utilizing data sources from old inventories, cruises, etc. is where we would like to go as well, but this is a departure from the basic standard. Besides, this is not an allowable funding mechanism.</p> <p>The forest industry and those who actually operate on the landbase are most appropriate to provide local field knowledge. We get the sense that the biggest concern tabled is that government personnel feel like they are spectators rather than participants. In our observation, this was actually a key driver/benefit of the FIA delivery model because inventories were being supported.</p> <p>Every time a significant change is made to this program, current and recently updated inventories require additional work. Focus on flexibility rather than changing requirements.</p> <p>What is meant by the inventory "mandate" on page 1?</p> <p>Consider the Government – FIA – PwC model (i.e., third party accountability) for addressing this inventory mandate.</p> <p>Business cases: need to appreciate that management units are not all the same. Each has its own priorities in many disciplines. This is the appropriate basis for allocating funds.</p> |

² Delayed response—received after first compilation.

³ Delayed Response—received after first compilation.

| | |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>Rather than heading in a new direction, perhaps we should first seek to clarify the current one.</p> <p>We would consider this dialogue a success if it becomes apparent that our interests center on addressing issues and fine-tuning things rather than supporting a movement to re-create an inventory branch/bureaucracy within the MoFR.</p> <p>Expectedly, this is significantly biased towards government.</p> |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Input Request 2: Expected Outcomes

| | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>INPUT REQUEST 2: Please provide your feedback (reactions, questions, suggestions) to the Expected Outcomes.</p> <ul style="list-style-type: none"> ▪ What critical information or perspectives on the Background are confusing to you? Are there any other issues or events that you feel should be added or that are not relevant? ▪ Please refer to the Background statements by their number. | |
| P1 | <p>Agree with the numbered background issues listed in the section. Good coverage of the info out there, where it is and where it is heading.</p> <p>3) inventory and monitoring plan critical for the districts hit by MPB</p> <p>Section 3.2 6) through 16) Need to get updated VRI data in place for all districts, not just converted inventory data. With accelerated harvests on landbase due to MPB this is critical knowledge. We are potentially loosing sample areas to harvest where we may not be able to obtain same date (Pure pine areas). Again we are making critical management decisions based on this information.</p> <p>Section 3.3 we need to enhance and maintain our growth and yield information. Critical data for modeling and future conditions. Need to monitor and perhaps reestablish function back into the district</p> |
| P3 | <p>The information isn't confusing, but it's an example of how diverse the skill sets are and how many different persons are controlling the data. This justifies the need for a strategy, and why they need to be working together towards a common vision – goal.</p> |
| P4 | <p>6. Glad to see the VRI implementation date as 1998. It initially went off half-cocked in 1995 before we had the training program in place.</p> <p>8. I believe there are 4 tools that answer "How Much?"</p> <ul style="list-style-type: none"> a. Phase 1 b. VDYP – After the photo interpretation is complete, the VDYP is used to calculate stand volumes. Phase 1 + VDYP = the Estimated inventory. c. Phase 2 d. NVAF. <p>8. To the question "Where is it?"</p> <p>Phase1– the delineation and digitizing of polygons and their storage as a layer on a GIS is how we answer "Where it is"... Phase 2 has nothing to do with "Where it is"</p> <p>The Map – in a GIS - answers Where.</p> <p>9. VRI has been implemented to support management unit level decision-making...We run into problems again and again with people expecting polygon accuracy...This expectation is a major source of our credibility problems.</p> |

| | |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>11. timeframes for completing VRI.</p> <p>Three to 4 years is optimistic. My experience with 2005 image acquisition is that the processing will not be complete until May 2006. This throws the tentative schedule in the challenge paper out by 6 months in the first year.</p> <p>We need to speed up the processing of photography / digital imagery.</p> <p>16. b. This describes the legislative and policy framework – current paradigm very well.</p> <p>The conclusion – Put responsibility for Inventory back into the MOF Act. Is a very important conclusion – change to the current paradigm.</p> <p>c Loss of expertise due to reorganization and retirements has been significant. The inventory program and a parallel training initiative will need to be ramped up and maintained for several years just to return to the capacity we had achieved in 2000.</p> <p>17. Timber emphasis. The challenge paper talks about Benefit over Cost analysis again and again... The VRI eco sampling program has been small because an eco data user with the money to pay for it didn't step up to the plate. Eco sampling may re-emerge, but I believe it can be pared down to a plant list and BEC site series determination. This will support SIBEC and other site tools. I don't think the money to pay for all the eco data in the current sampling design is going to be available in the future.</p> <p>Coarse Woody Debris, which sits in the never never land between eco and timber will emerge as very important information as the MPB volume goes through its decay cycle.</p> <p>23. What have you got? Where is it? HOW IS IT CHANGING...? VDYP 7 and other growth tools will need to be supported by strong field program.</p> |
| <p>P5</p> | <p>It all makes sense to me. I have a good background in working with G&Y, SIBEC, PEM, TEM, etc.</p> |
| <p>P6</p> | <p>My comment is not about any particular item that is listed in the Background statements. But, it is about what I think may be the missing link to the new FRPA legislation, i.e. the 11 FRPA values. It is hinted at in background statements 4, 7, 10, 14, 16, 23 and probably 24 & 25 as well. Is there a thought to linking the FREP program to the Inventory program?</p> <p>When looking at the development of the FRPA mandated FREP program it has very many similarities to the VRI Ground Sampling program (CWD and timber plots). It might be worthwhile to investigate whether some links could be developed between VRI and FREP initiatives...?! Just an idea. Maybe just for training exercises to realize some synergies?!</p> |

| | |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>P7</p> | <p><u>Background 8(e), 8(f), 8(g).</u> In other sections of the challenge paper, it has been indicated that the VRI standard was designed to address both timber and non-timber values. However, for inventory update (8e), site productivity (8f), yield projection (8g), the focus appears to be only on timber values. This is evident from the reference to forest cover polygons, site index etc. Very little thought seems to have been given to the process for updating the non-timber attributes. We have found this to be an issue for update of our TFL VRI inventory where no one seems to know how to update this information. If it isn't going to be updated to reflect changes to vegetation from harvest and silviculture activities, why was it collected in the first place?</p> <p><u>Background 9 & 10.</u> It is stated that VRI has been implemented to support management unit level decision making and that it is inadequate for spatial analyses. However, most of us operate at the stand level. Most modeling exercises that guide decision making at a watershed level require stand level information since these are by nature spatial exercises. These watershed level analyses need to be compatible with direction provided from the strategic analysis. Perhaps more attention should be given to developing an inventory system that addresses requirements beyond the 5 year requirement for AAC determinations. If the inventory is only intended to address strategic level decision making, is it necessary to go to the expense of collecting all of the additional non-timber attributes?</p> <p><u>Background 12.</u> What was the thinking around the 10 year update cycle when each inventory requires three years to complete? This means that roughly 1/3 of the province will have one of the inventory phases occurring in any given year. Were the resources required to undertake a project of this magnitude fully understood? It should be no surprise that the first cycle has not been completed.</p> <p><u>Background 16.</u> I believe you need to look beyond the three reasons you have listed (competition, legislation/policy, capacity) for the reason that the inventory has not been completed. You should also at least ask the question about whether the inventory has had value for all stakeholders? Projects that give useful results for the stakeholders will generally rate higher on the priority list for funding.</p> <p><u>Background 24.</u> How is the NFI funded? Would there be more value to the province if these funds were directed to provincial inventory? Can the data collected serve both inventories?</p> |
| <p>P8</p> | <p>Item 8, e. Although the emphasis is on forestry related activities, in the NE there are other stakeholders operating on the land base causing sometimes even more significant disturbances, and ideally these need to be captured as well (Oil & Gas, wind farms, coal mines, etc.)</p> |

| | |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>P10</p> | <p>#8, 11 What about the use of digital photography and satellite imagery – inventory work and updating through remote sensing and image processing</p> <p>#8 Are we collecting and storing the right data, i.e. year of establishment rather than age, calculate volume on the fly rather than continuously updating and storing the data.</p> <p>#13 Ability to capture and use RESULTS data on second growth information. Caution must be exercised in the use of this data at the present time as the quality and accuracy of the information is suspect due to the number of people inputting data and the lack of District ability to deal with inaccurate information efficiently.</p> <p>#15 Ability to use RESULTS data and improvement to G&Y tables for each species. More research is required, but projected values could be base on G&Y tables, possibly reducing time in inventory updating and data storage.</p> <p>#19 Where does terrain, UWR, OGMA, VLI, etc fit into the picture, this could play a role in OAFs but definitely affects decision making, resource stewardship monitoring, and C&E.</p> <p>#23 G&Y is not the only sector to suffer because of government decisions, updating, VRI completions, ensuring quality products in all areas of data capture and inventory have suffered due to lack of District and Regional Support and direction. PEM data difficult to achieve quality and statistics because of poor inventory, lack of knowledge on the process, reliance on outside expertise and limited time or knowledge from District Staff on inventory and standard procedures and information prerequisites (i.e., it is preferable to have VRI prior to commencing with PEM).</p> |
| <p>P11</p> | <p>8b: The original concept of VRI included sub-sampling phase 2 samples using within polygon variation (WPV) sampling. What happened to this sample, and what is the impact of not sampling for variation when adjusting inventories?</p> <p>8c: States that NVAF requires that phase 2 samples have been installed, but a concurrent sampling method exists that doesn't require pre-installation of phase 2 samples.</p> <p>The NVAF process is increasingly important, as it will replace DWB factors (excepting breakage) for coastal call grade appraisal cruising.</p> <p>16a (or perhaps 16d): The combined cost of full-phase VRI contributes to a lack of VRI investment, as discussed at MSRM/TFL inventory meeting, October 2003.</p> |
| <p>P13</p> | <p>3. Mountain Pine Beetle</p> <p>Recent interest in Inventory has been generated as a result of the MPB epidemic in the interior of the province. A negative side effect of this overwhelming event is that other parts of the province receive less attention. The non MPB impacted forests and the TSAs not affected are the future timber supply for the province. Hopefully the Inventory Program is able to fund new inventories to other parts of the province. We need a Program that works for all part of the province.</p> |

| | |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>21. G&Y Knowledge and Tools</p> <p>In the late 1990's considerable interest for Mixedwood modeling existed. Under MSRM it fell off the agenda. With the effects of MPB in the Interior and Deciduous –Coniferous mixed forest in the Northeast Mixedwood Growth Modelling has again risen in interest. Is any provision being considered to Mixedwood modeling?</p> <p>Updating and Maintaining the Inventory for disturbances should be included in the Review.</p> <p>Timely mapping for harvesting but also for other disturbance types from oil & gas activities; fires; mining and range require address. How often the information is updated needs to be decided, as it may not all reside in RESULTS.</p> |
| <p>P14</p> | <p><u>Expected Outcomes</u></p> <p>Without being flippant, I think another goal should be for FAIB to have a clearing understanding of the current processes. The whole tone of the front of the paper makes me believe they don't (and I hope the "not throwing out the baby with the bath water" is true).</p> <p><u>Background</u></p> <p>As background information it is fine but section 3.2 point 10 <u>VRI as a spatially explicit inventory</u> I think it is a bit leading to say "polygon-specific may be unreliable". A conclusion might be to make it more reliable so more general users can trust using it.</p> |
| <p>P15</p> | <p>Sec 3.2 - #8 & 9 - Page 4 – Inventory information must have greater credibility at the sub-strategic level. Stand level accuracy may be too costly to guarantee but more priority must be given to the sub strategic accuracy of the inventory. Drainage and landscape unit analysis will be more important as we move into FSPs and stand level data will be the basis for this. Stratification and photo scale standards do not meet this business need. A vehicle to communicate and update inventory data from on the ground observations must be made available to field practitioners. Too many barriers are in place to efficiently capture this information. On the ground observations with a little bit of rigor is more accurate than 1:30,000 photo interpretation.</p> <p>Section 3.3 – Inventory volume predictions should incorporate methodologies employed in timber supply analysis. Managed stand yield equations (TIPSY) should be used for managed stands and VDYP used only for unmanaged stands. VDYP and TIPSY yield curves should be audited and adjusted as necessary.</p> |
| <p>P16</p> | <p>8d. Are the phase 1 photo estimates really improved by adjusting them. I do not think this has been proven and therefore should be tested. If it is true, is it true only at the management unit level and if so who cares?</p> <p>9. With regard to the use of VRI for strategic analysis, strategic analysis at what scale? We are going more spatial with all we do. Is the VRI going to come with us or is it only useful at a scale no one cares about?</p> <p>10. If it is spatially explicit we should strive to make it as accurate as possible.</p> <p>14. The reason there has been no monitoring is a lack of leadership by government on this</p> |

| | |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>and the value has not be demonstrated.</p> <p>16. Yes put responsibility for inventory back in Forest Act.</p> <p>17. You only get timber emphasis plots as the utility of the other attributes has not been demonstrated relative to the cost of collection.</p> <p>19. OAFs and site productivity. I have never made this connection.</p> |
| <p>P19</p> | <p>3.1 IPR and Related Initiatives</p> <p>3. <u>Mountain Pine Beetle Area Inventory & Monitoring Action Plan</u></p> <p>The September 19, 2005 <i>Plan for Pine Beetle Dollars Release</i> indicated that \$10.9 million of the \$100 million federal funds (Mountain Pine Beetle Emergency Response: Canada-B.C. Implementation Strategy) would be used for forest cover data. Uh-huh? It doesn't seem that any of the five priority theme planned actually areas involve forest cover data or 'Mountain Pine Beetle Area Inventory & Monitoring Action Plan' as in the title of this section. Monitoring, yes – Inventory, no.</p> <p>The assumption is that Uplifts in the AAC in beetle infested TSAs are being determined without good forest inventory information.</p> <p>4. <u>Timber Supply Determinations and Inventory Issues</u></p> <p>It seems that most of these issues follow a good description of the land base (VRI Phase 1 and Phase 2). Haven't they become inventory issues because funding has not been there rather than because of deficiencies in the basic inventory?</p> <p>5. <u>ABCFP Resource Inventory Review</u></p> <p>Having two separate initiatives going on is probably good but also much work will be duplicated.</p> <p>Not sure if the general consensus of the ABCFP respondents meant that are serious problems with the inventory methodology or just a serious lack of inventory work being done.</p> <p>3.2 Vegetation Inventory</p> <p>6. <u>Genesis of the VRI</u></p> <p>First VRI pilot project was Fraser TSA (1993-96). A key point here is that the VRI was 'a statistically sound inventory standard'.</p> <p>7. <u>Defining the VRI</u></p> |

Also key point is '**at a strategic, management unit level**'. At the end of all this IPR, MOFR must determine the unit level or application of the next round of the provincial vegetation inventory program.

8. How much, Where is it, How does it change

This is a good summary of activities that Inventory Branch is responsible for. Definitely support the need for increased staffing and expertise at the Branch level.

9 & 10. VRI Supports Management Unit Level/Spatially Explicit

The VRI provides the vehicle for describing a great deal of forest cover attributes at the polygon level or stand level including species composition, age and height of first two species, crown closure, stand structure, density, basal area, site index. The key is how well has it been photo interpreted and how has it been adjusted.

With the significant decrease in funding for VRI work in recent years, the quality of the final VRI product may have suffered for several reasons.

- a) There has been less classification or calibration fieldwork done by the photo interpreters to assist them in their final attribute interpretations. Classifiers should and would like to do more Phase 1 fieldwork then has been funded in recent years.
- b) Phase 1 prices have fallen to an all-time low because there have been too few projects to bid on. Contractors may have been cutting corners to stay in business. In the past 4 years, many have gone out of business or have ceased doing VRI mapping.
- c) Phase 2 sampling has not been fully completed in most units.
- d) The design of the Phase 2 sampling system may be fundamentally wrong. Key attributes of the main forest inventory types are adjusted on a TSA wide basis not on an individual photo interpreter basis. Some TSAs have had over 15 interpreters involved having a wide range of ability and local photo interpretation experience. How can a few Phase 2 samples in a widely occurring forest inventory type be used to statistically adjust that type for an entire TSA if in that unit it occurs on a wide range of slopes, aspects and elevations and has been interpreted by several different classifiers? Perhaps less information should be collected during Phase 2 sampling but for many more polygons.

11. VRI Timeframe

Agree with the timing comments but funding needs to be in place to complete an entire unit once it has started. This has not been the case in recently (some examples are: Ft. Nelson, Dawson Creek, Mackenzie, Kamloops, Lakes/Morice, and Okanagan TSAs). Completing the inventory of a TSA over many years by several different companies and interpreters will result in an inconsistent VRI. Many TSAs have has some VRI work done in them but never completed.

12. Lifecycle

Correction, the inventory cycle was in effect since the 1960's but dropped in 1980. No unit inventories were done from 1980-87 until the re-inventory program was started in 1988. The VRI program was phased in from 1995-98 to take over the re-inventory program. However, there has been no inventory cycle to speak of since 1980.

13. Site Index

More direction is required on site index or productivity. The terms top height, stand height and site height have gone around and around in circles. Consequently, photo interpreters are somewhat confused on what trees to sample during classification ground calls, what height to estimate during classification air calls and what height to photo interpret during final polygon attributing. May not also been enough understanding by or attention given by the interpreters when assigning site index to young stands.

14. Vegetation Monitoring

Agree that this area needs direction.

15. Young Stands

The key here is the VRI system does provide the mechanism to describe young stands very well. However, I agree that the implementation may have been wrong. The silviculture survey information should be used by the interpreters as a guide only to assign attributes to free growing polygons. Phase 1 contractors should be encouraged (and funded) to establish more multi-point ground call in young stands in order to provide good information.

16. Current VRI Coverage

Agree that forest inventories should once again be the legislated responsibility of MOFR. Funding to carry out this responsibility must be consistently provided.

Agree that government and industry inventory expertise has been reduced to 'endangered species' levels. So low, that it may be difficult to find enough people that understand and appreciate the current VRI system let alone re-design it.

17. Timber Emphasis

The cost and benefits of current Phase II sampling need to be determined along with

| | |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>affordable alternatives.</p> <p>18. <u>Volume and Decay</u></p> <p>Is there enough expertise left in government to carry out an effective V&D/NVAF function? Certainly the 100,000 historic tree records must be utilized.</p> <p>19. <u>OAFs</u></p> <p>The common question might be: 'What are OAFs?'</p> <p>3.3 Growth & Yield</p> <p>20-23 <u>G&Y</u></p> <p>Given the current reality, there is no easy solution here. Hopefully enough funds will be made available to properly assess the G&Y need and to develop an on-going program.</p> <p>3.4 Related Inventories</p> <p>24-24. <u>NFI and TEM</u></p> <p>As stated, many of the NFI standards were adapted from BC's VRI model and the two inventories are quite compatible. Both ecological mapping and bio-terrain mapping have been integrated with VRI mapping by some forest companies. For those who have taken the initiative, the attributes or detail of the VRI Phase 1 system have proven to be very useful in PEM and wildlife habitat/capability mapping. The beauty of the VRI system is that it was originally planned by experts to be integrated with many other types of resource mapping. The downfall is that it has never been properly utilized by the many groups that were involved in its design.</p> |
| P20 | All is clear. |
| P21 | Background #3: More clarification is needed on how the IPR ties into, or complements, the MPB Area Inventory and Monitoring Action Plan. The 'Scope' section states that the IPR will include "vegetation information specific to management of the MPB". This suggests that there may be overlap/duplication with the work described as being done for the MPB Area Inventory. |
| P23 | <p>3) MPB inventory and monitoring: need a methodology to identify stands with advanced regeneration in it need the guts and or legislation to keep logging companies out of these area for mid term timber supply.</p> <p>8) I have heard of satellites being used for forest more accurate inventories in other countries; have we looked at this technology?</p> <p>15) How are we dealing with the 10 to 20 year old stands that have been attacked by MPB?</p> |

| | |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>16) b) Legislative and policy “Freedom to Manage and Professional Reliance” . If we have lost and are losing our working knowledge of inventory does the ABCFP really understand the needs of the provincial, landscape and stand level inventory or do we cut until it is gone? See part ‘c’.</p> <p>20) G&Y; So where are the managed stand programs? Where is the mixed wood modeling? How about climate change? Post MPB model? And associated mid term and long term timber supply models?</p> <p>24) Related inventories; Can we add to the NFI and create a Provincial/TSA timber supply model and forget about the landscape- stand level inventories? Can we legislate the landscape and lower level stand inventories to the licensees? Can we assign their associated risks?</p> |
| <p>P24</p> | <p>9. The longevity (change in accuracy over time) of an adjustment has never been tested.</p> <p>I find this comment to be almost amusing. Adjustments are done at a point in time to reflect the changes in either inventory attributes height and age sometime species as well as required adjustment to yield models, if any. Most adjustments are of inventory attributes to deal with the consistent errors from either new or original photo interpretations that have projected for yield changes.</p> <p>10. VRI as a spatially explicit inventory. VRI was never intended to be spatially explicit. The desire of timber supply modellers to believe that it is or to ignore its short comings does not make an inventory spatial explicit. One of the most significant dis-services done to the inventory by timber supply modellers to mis-utilize the inventory in spatially explicit models, ‘blocking models’.</p> <p>12. ...it was planned that the entire province would be covered on a cycle of about 10 years. This is not so! There was never any intention to enter into a ten year cycle. The objective was to complete the installation of new VRI inventories in management units that need information to that level and then to maintain those inventories through an update program, a yield projection program and a monitoring program by revisiting the phase II samples. Any new inventory activity would be clients needs driven and with rare exception would be focused on particular strata. The work on soft copy technology in the late 90’s was an early investigation of this technology as a tool to maintain existing inventory coverages while manipulating the strata of interest.</p> <p>14 Government has not articulated a clear business driver for monitoring at the management unit level, hence there are no Resource Information Standards Committee (RISC)-approved provincial vegetation monitoring protocols in place..... Not so. Unless they have been withdrawn there were approved Change Monitoring Inventory standards in place. See previous comment.</p> <p>16. Competition for funding: many other resource information needs now compete for the scarce funding that historically was targeted at the forest cover inventory. This may be how it appears but it was never the case. Through out the 90’s funding for the vegetation inventory program remained isolated from other funding envelops. As new funding sources were generated like CRII (Corporate Resource Inventory Initiative), these funds by and large went to other inventories to try and bring them up to the level of the Forest Inventory. The real funding problem started with the decision of the government of the day to ‘balance the budget by transfer base funding programs to FRBC. Once that happened everyone’s goose was cooked in short order!</p> <p>18. This section is superficial at best and self serving at worst. We now know that the V&D data base for sample gathered prior to the 90’s was by and large biased and non representative of the population. Since the early 90’s every V&D study, all of which</p> |

| | |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>used a statistically unbiased sampling frame, has found that the old V&D estimated over estimate the amount of decay by as much as 100%. Let's not use this as a plea to maintain this program or its samples. The NVAF replaces this old dog and the recent announcement by Revenue Branch of the adoption of CGNF for revenue cruising on the coast is the correct decision.</p> <p>19. Operational Adjustment Factors (OAFs). A clear need for a monitoring program using phase II like plots.</p> <p>3.3 Growth & Yield</p> <p>Much of what is called growth and yield is only yield. Many of the models utilized in the inventory deal with changes in attribute quantum and the new resultant volume. As far as I am aware, the only inventory model that has been implement that has a growth, species change over time, is Prognosis which has had limited implementation. One wonders with the majority of BC forest stands whether the issue of growth is important. Clearly in IDF stands and the hardwood/softwood stands of the Peace, this maybe of importance but the majority of forest stands will not experience a change in species composition unless under the intervention of a catastrophic change.</p> |
| <p>P25</p> | <p>As part of the background – I'm not sure if it was missed or overlooked on purpose – there was no mention of the Inventory Audits which were conducted in the late 1990's – to put an accuracy perspective on the inventory. These were good to note the shortcomings and strengths in the inventories that existed for a MU.</p> <p>Sorry, I hadn't had a chance to read this document all the way through (still haven't) and I know the March 29th deadline is over, but I'm not sure when I will get a moment to get to the rest of the document so wanted to just send this minor one off now, then when I get a chance again -soon - I will provide any other comments I have then...</p> |
| <p>P29</p> | <p>I think the background statements do a good job of articulating the problems and challenges.</p> <p>Generally speaking I think many of the implementation issues have come through a rigidity of process and a need to have "Inventory data" fit existing models needs. The inventory design allows for considerable flexibility and processes to accommodate many of concerns.</p> <p>Much of this has been suggested and discussed. Perhaps the review will provide another opportunity.</p> |
| <p>P30</p> | <p>17. There is nothing wrong that most of the samples are timber emphasis. It shows that there is not a lot of use in the way the eco portion was designed. The timber side was designed to adjust the photo dataset. What was the eco side designed to do? You can't use it to adjust anything, because there is no dataset to adjust.</p> <p>19. What are OAFs doing with VRI? They are a planning tool, not part of inventory.</p> |

| | |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P31 | The information isn't confusing, but it's an example of how diverse the skill sets are and how many different persons are controlling the data. This justifies the need for a strategy, and why they need to be working together towards a common vision – goal. |
| P32 | <p>I believe you got the Request No. titles mixed up, as the points above call for feedback on background statements, so the following are comments related to the background statements...</p> <p>2. From an oil and gas perspective, we need an improved inventory of northeast stands so we can determine timber volumes and vegetation cover without expensive and unnecessary appraisals and/or studies. We need a way to monitor impacts and performance (eg. Rehabilitation success).</p> <p>3. Big changes expected in inventory over next few years as a result of beetle activity, so there's a need to update information continually into the near future.</p> <p>14. What about all the old forest industry G and Y data (MB and BCFP on coast, Weyerhaeuser, etc. in interior); can't we use that data?</p> <p>16. OGC focus should be to inventory stands in the northeast and improve information so we can refine our planning and our stumpage charges.</p> <p>17. Timber emphasis is understood, given limited resources; OGC agrees that this is critical inventory information, but would encourage VRI to consider including non-timer resources in inventory updates where these are considered as important as or more critical than timber information (eg. biodiversity or habitat or cover values for areas of high recreation or wildlife interest).</p> |
| P33 | Interesting historical material in the background. The expected outcomes have not been articulated in this section. This is our task I expect. Clear direction and vision could come from the Chief Forester. |
| P35 | <p>8b: The original concept of VRI included sub-sampling phase 2 samples using within polygon variation (WPV) sampling. What happened to this sample, and what is the impact of not sampling for variation when adjusting inventories?</p> <p>8c: States that NVAF requires that phase 2 samples have been installed, but a concurrent sampling method exists that doesn't require pre-installation of phase 2 samples.</p> <p>The NVAF process is increasingly important, as it will replace DWB factors (excepting breakage) for coastal call grade appraisal cruising.</p> <p>16a (or perhaps 16d): The combined cost of full-phase VRI contributes to a lack of VRI investment, as discussed at MSRM/TFL inventory meeting, October 2003.</p> |
| P36 | <p>Section 3.1</p> <p>2.b.TSA level index maps – consider extending to include GR (Genetic Resource) inventories (genetic source/seed use/genetic gain) to support TSR (G&Y models)</p> <p>2.c. suggest you inform broader stakeholders of outcomes of business process mapping; was not notified beforehand</p> |

| | |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>3. TIB working on spatially explicit GR mapping (seed deployment / genetic gain reporting)</p> <p>4. Only recently (this week) came across “Review of Inventory Issues Identified in Timber Supply Review AAC Rationales”, Jan 2006</p> <p>TIB was not given opportunity to provide input / review; genetic gain assumptions are a not adequately modeled / applied inconsistently in TSR / linkages to inventory update process not in place;</p> <p><u>Section 3.2</u></p> <p>8. g. TIPS Y models genetic gains for some species; spatially explicit adjustment factors may not be adequately validated, or considered at all?</p> <p>14. consider monitoring data for use in checking G&Y model outputs based on genetic gains; monitoring genetic diversity indicators over time?</p> <p>15. sampling of young stands wrt timber volume & genetic gains?</p> <p>19. OAFs – have seen use of OAF adjustments to consider genetic gains</p> <p><u>Section 3.3</u></p> <p>21. requires updating wrt genetic gain assumptions and timber volume estimates; genetic gains are routinely considered in base case and sensitivity analyses to support AAC rationales – initiated in TSR2, routine in TSR3</p> |
| <p>P37</p> | <p>Who will take ownership of this context especially what lays outside of the legislative framework or mandates that we exist in – this ownership question may raise barriers to achieving the expected outcomes.</p> |
| <p>P38</p> | <p>There were no critical info or perspectives on the Background that were confusing to me. All seemed clear. I think that you’ve done a good job in including all of the relevant issues.</p> <p>I think that issue 23 – current reality is key. PSP remeasurement is critical in helping to determine how forests develop and change over time, especially in mixed species stands.</p> |
| <p>P40</p> | <p>3.1 Tight emphasis of MoFR’s concerns and initiatives, what about Ecosystem Based Management (Central & North Coast LRMP), SARA, biodiversity, watershed concerns in the MPB, Criteria & Indicators / SOF reporting, etc.?</p> <p>3.2, #19 VRI coverage - BC-wide issues require BC-wide information, this is a primary concern for many VRI users.</p> <p>3.4 Related inventories – Would suggest that provincial road and land use inventories are also relevant.</p> |
| <p>P41</p> | <p>9. The VRI needs to re-affirm its purpose. It was designed to be rolled up for strategic level reporting, not stand level. If this is still the case, the inventory needs to focus on that objective and not try to be everything to everyone.</p> <p>This brings up the question as to why the inventory adjustments are being applied by polygon and not by strata? If the overall objective of the inventory is to be accurate at the strategic level, polygon level accuracies are not guaranteed and therefore the adjusted polygon values are extremely questionable. There is a very large danger of adjusting individual polygons based on strata level adjustment values which could make individual</p> |

| | |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>polygon values worse than the original interpreted value. And the worse part is you won't know.</p> <p>16. Section 4 should be added back in to the Ministry of Forests Act.</p> |
| <p>P42</p> | <p>I take exception to the continued reference to “Timber Emphasis” (item 17). Collecting all kinds of inventory information may be nice, but the fact is that trees, their vertical (tree size) and horizontal (clumpiness) distribution and their species composition is germane to almost every forest resource management decision we make. Most certainly these attributes are things over which we have the most direct control or alternatively are the things that we are most concerned about when we are not controlling them (e.g. effects of natural disturbance agents such as fire and bark beetles or for that matter tree and stand development patterns through growth and mortality due to competition). Of course there are indeed other inventories (particularly aquatic resources and access) that are of equal importance, but to simply label plots established for the purpose of measuring trees as having a timber bias suggests that we could do a better job of managing the forest by focusing on other aspects of the inventory. That is very far from the truth.</p> <p>It is implicit in the comments made that the inventory is not really designed as a system; rather it is a set of components that are constantly being re-rationalized. So for example, we designed a new VRI inventory with Phase I and II components, but we failed to consider from the outset how this information was going to be updated. How will we account for changes in shrub components or coarse woody debris for example? Where is the system of plots needed to check forecasts of such changes against realities and make adjustments? An inventory is not an inventory if it does not have these features. We need to think about the inventory as though it is part of what we must do routinely and to a consistent set of standards – it is not something that is to be started and then kind of figured out as we go. Building and maintaining inventories should be viewed as being operational to the same degree as cruising or cutblock layout and harvesting for example. The perspective offered in this section is of the pieces rather than the whole and that is a big part of the problem.</p> <p>In terms of the growth and yield program there is some history that warrants mentioning. The growth and yield program was established as a stand alone program, initially for the purpose of producing “normalized yield” tables which today is described in terms of VDYP. These plots were established according to a matrix in “well stocked stands” and so are in no way representative of a population of stands such as those that occur in the inventory. So the fact is that while we have a substantial number of growth and yield plots, another set of plots is needed for forest growth and mortality monitoring.</p> <p>The growth and yield section does not discuss the development of models and their use in relation to the inventory to any great extent and yet growth and yield modeling is a vital component of managing and maintaining inventories. It can be argued that yield models are insufficient to address many kinds of forest management issues, and growth models that do not take account of actual stand structures (tree species and size distributions) are unrealistic. Growth and mortality modeling deserves much more attention than was given in the discussion document (this also relates to the use of height over age curves, site index and assessments of forest productivity).</p> |

| | |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>P44</p> | <p>8a. Accuracy of the Phase 1 is suspect by the industry. The VRI Branch continues to indicate that the use of VRI is a strategic tool yet the industry and MOFR continue to drill down a product that should be used with reliance off information at the MU level (i.e., 1:2,000,000 scale) yet the application of land use decisions / compliance with landscape unit planning drills down the Phase 1 to 1:20,000 or even 1:10,000. The industry is suspect as ages and heights are often non operational when the MOFR staff assume the VRI is best information available and there are huge known gaps in the attribute reliability.</p> <p>8a. Photos to be used for future VRI should be 1:15,000</p> <p>8b Addresses the reliability of the VRI for MU level decision . it Works . Better that the confusion over Phase 1</p> <p>9. Weakness in the system exists where VRI for a MU management decision based on minimal field observations leadings to inaccurate stand level attributes yet MOF District level expects to use VRI Phase 1 polygons to evaluate the reporting of impacts on LU objectives.</p> <p>10polygon – specific level may likely be unreliable ...</p> <p>11. Gov't incentives through increased AAC / mitigate AAC to get industry partnerships through IFPAs can move the progress forward</p> <p>12. Ground sampling for Site index at the Site series level is not possible based on 15 ground plots per mapsheet</p> <p>13. Where is the business plan for PSPs to be re-measured.....industry has little interest to delivering on Government's responsibility to shape yield curves on TSA landbases.</p> <p>16. Defined Forest Area concept has proven successful in the MU's with IFPAs and in TFLs. In both cases the Licensees have an incentive to manage for the AAC for the MU. Provide such incentives across the province where any increases will be awarded to the participating industry licensees, will likely lead to further progress in VRI.</p> <p>17 What is the ROI of ecosystem plots? There is none under an IFPA is in place and any uplifts are allocated to the participating IFPA holder.</p> <p>22. Industry has seen little value on TSA's to do PSPs</p> <p>25. TEM is too expensive. PEM has been adopted to identify increases on Long Term Harvest Level and as such increases in AAC by active Licensees. Funding was available and industry (IFPA holder) rose to the challenge to do PEM as there seemed to be an incentive to secure increases in AAC by doing so</p> |
| <p>P44</p> | <p><u>Expected Outcomes:</u></p> <ol style="list-style-type: none"> 1. well-formulated recommendations for a clear, comprehensive mandate, mission statement, and vision for the VRI program. Also, evaluation of options and recommendations for effective program delivery over the long term which identify roles and responsibilities of the various participants. 2. recognition of the serious succession problems which will soon occur. At least 50% of remaining gov't inventory staff will retire over the next 5 years taking their knowledge and expertise with them. A similar situation will also affect the private sector. The ability to bring in new staff and provide the training they will need can only happen if there is an active field component of the program. Learning the business only happens by "doing" the work, it cannot be done by sitting someone in front of a computer screen. The loss of remaining expertise poses the greatest risk to rebuilding and maintaining a program into the future. |

| | |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p><u>Background Issues and Events:</u></p> <p>1. Lost within the long list of issues and events are an indication of the main causes of the demise of the forest inventory program. Statement #16 discusses some of them, but more accurately they are: i) steadily declining funding for both staffing and delivery of new inventories which started in the FRBC era (1996 onwards) with more and more of the program becoming reliant on “soft” funding; ii) a whittling away of ministry capability to deliver a program which could meet the need for current, reliable inventories; iii) decisions reached through Core Review” in 2001 that gov’t would no longer “do” inventories and be left with a minimal role; iv) the creation of MSRM which then failed to understand the importance of a forest inventory program; v) removal of all operational funding. Together these were key factors in crippling a program which was essentially sound and effective. The loss of many trained staff and end of any presence at a district level rendered what was left of the program more or less invisible to the users of the inventory. The downward slide was further compounded by the licencees also “downsizing” their inventory capability, largely focusing on their short-term needs on “their” part of the land base and then hiring consultants to manage this responsibility for them. Lastly, the removal of the legislative mandate under Section 2 of the Forest Act, “The Chief Forester shall develop and maintain an inventory of the forest and lands of the Province”, meant that no-one was ultimately responsible or in charge of this function any more and this sent out the message that it was not of much significance to the business of gov’t (note that the reference to removal of Section 4 of the Ministry of Forests Act is incorrect; only Section 2 of the Forest Act is relevant here). The overall impact of the above events cannot be overstated as they are root causes of the current crisis!</p> |
| <p>P45</p> | <p>Issue 8. The VRI process also includes a tool to answer the question how much variation exists in a polygon? WPV sampling was designed to measure or quantify variation within a polygon This type of sampling hasn’t ever been implemented however it does exist. This form of sampling will provide valuable data for those who apply the vegetation inventory in an operational context or purpose.</p> <p>Missing from the Review Statements is the Inventory Update Activity. The issue regarding capture of block size resulting from small scale salvage of MPB killed PI and the frequency of the update for disturbances along with the linkage to Results should be clarified. Under MSRM the Inventory Update Function was centralized from Forest Districts across the province to Kamloops. The District Inventory staff were either moved or removed from the Forest District The local knowledge (Inventory staff) regarding the Resource and Inventory activities within the District was lost. Additionally under reorganization and WFA Forest Districts amalgamated, further compounding the problem creating vast areas to manage with the same or fewer staff.</p> |
| <p>P47⁴</p> | <p>8d. Money spent on phase two may be better spent on more ground calls to better calibrate the photo interpreter eye.</p> <p>9. Phase two adjustments have often created more questions for Timber Supply Analysts than answers.</p> |

⁴ Delayed Response—received after first compilation

| | |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>14 & 15. We log plant trees, track them to about age 15 then essentially ignore them until they are at least 30. Yet in analysis we assume these stands will grow to perfection and (pre-pine beetle at least) this influenced the time period over which existing mature and old growing stock is liquidated. Today approximately 25-30% of the provinces THLB are under 30 years. Post beetle (i.e.: within a decade) that figure will be far higher. In those areas that are not salvaged we will need to inventory what is left, and when and how much regeneration is coming in.</p> <p>17. Industry does not log CWD.</p> <p>18. It is probably about time (if not long overdue) that we actually develop and implement a program to derive empirically derived OAFs to apply to TIPSy. Surely we can do better than just knocking 20% off the projected yields.</p> |
| <p>P48⁵</p> | <p>8a,b,c. How much do we have: We suggest adjustment methodology be added as a separate and important tool / component for answering the question, “How much do we have”.</p> <p>8g. How does it change: Yield projection tools in BC are typically separated between natural and managed stands.</p> <p>10. VRI as a spatially explicit inventory: This is definitely a key issue from our perspective.</p> <p>11. Timeframe for completing a VRI: Without a phase 1 in place, one would be unable to initially stratify the ground sampling. Is this referring to some post-stratification system?</p> <p>13. Site Index: Unclear how the SI adjustment carried on the inventory file is used. We were unaware of this.</p> <p>14. Vegetation Monitoring: Can we imagine a circumstance where monitoring could lead to an inventory or yield model adjustment?</p> <p>16. Current VRI Coverage: From the onset, VRI for the entire province was estimated to be a mammoth exercise that would be extremely costly. We expected this performance given requirements associated with an inventory to this standard. We would be interested in comparing this with the cost and timelines for the forest inventories prior to 1996. Is the problem associated with the delivery or is it the standard itself? What did MoFR staff do then that isn't being done now?</p> <p>17. Timber Emphasis: This does not surprise us at all. Has anyone been able to step up to with the business case for full VRI? We would be interested in knowing who has really used non-timber components of the current inventories available and for what purposes.</p> <p>18. Volume and Decay: This is confusing. Does this suggest that data associated NVAFs have no application for estimating volume and decay? There has been considerable debate over the appropriateness of previous V&D information.</p> <p>22. Legacy: Which PSPs are really worth keeping? How many really need to go beyond their typical rotation?</p> |

⁵ Delayed Response—received after first compilation

| | |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>23. Current Reality: When was the G&Y program well coordinated? What were the conditions? Have alternatives been considered? Are our standard models driving this program? Industry, and We suspect MoFR, is very concerned with how their landbase has diminished and adjusted in recent years. This certainly distracts anyone from looking at long-term monitoring.</p> <p>24. National Forest Inventory: Indeed, this is where government is best suited.</p> <p>Other: What has been accomplished through the change management process? What training programs are in place?</p> <p>There is a lot of speculation in this document that cannot, we suspect, be supported. This is probably appropriate at this stage, but we should be cautious about making assertions without the back-up.</p> |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Input Request 3: Assumption Statements

| | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>INPUT REQUEST 3: Please use the separate Feedback Document to provide your feedback (reactions, questions, suggestions) to the Assumption statements.</p> <ul style="list-style-type: none"> ▪ What assumptions which require more clarification for you to understand? ▪ What assumptions do you strongly disagree with? ▪ What assumptions would you like to add? ▪ Please refer to the Assumption statements by their number. | |
| P1 | <p>A little confused on all the assumptions discussed around the inventory components and the uses of the information in models and the complexity of changing inputs/data.</p> <p>Discussions around seamless inventory and VRI updates. Why can the original VRI model as designed not accomplish these tasks? Not clear from the discussions.</p> <p>There was some discussion on climate change but how does bec/species/climate shift changes impact our current inventory programs/remeasurements/models and assumptions current, short term and long term? Can we react and model predictions in for forest management decisions?</p> <p>PEM and TEM need to be completed in a timely manner to correct standards.</p> <p>OAF adjustments have been calculated from certain IFPAs in the province and are considerably lower than TSR assumptions. Can we extrapolate and model these province wide to incorporate in with the inventory data?</p> <p>Agree with the staffing and funding shortfalls for the inventory programs. Huge management decisions and future conditions of stands are based on our existing information. Need to adequately resource inventory function to ensure most accurate up to date information is available.</p> |
| P3 | <p>We are looking at this from only a Ministry of Forests and Range perspective, which should be opened up. There are other ministries also affecting the data.</p> |
| P4 | <p>2. a. We need to teach users about the reliability of the inventory at a stand level. We need some effective demonstrations to teach the risk of utilizing the inventory in stand level applications.</p> <p>Woodlot inventories and Community Forest Inventories are a case in point. A tiny piece of a management unit inventory is plucked out of the data base and is assumed to be correct.</p> <p>2. b. iii. Current governance, funding and delivery models combine to create a paradigm that does not support inventory of whole province. A new paradigm is required if we are to achieve this goal.</p> <p>2. f. This is not just an issue of number of people. The Forest Service needs staff with the right skill set. To get that we require a staffing strategy that includes recruitment, training, and retention.</p> |

| | |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>6. “This model assumes that where stand level accuracy is critical, additional stand level sampling will occur.” The answer to the need for stand level accuracy will not come from sampling. The answer is in Phase I. Improve the estimates through field visitation.</p> <p>19. PEM is a predictor. It says “what we expect to find there”, not “what is there”. Unfortunately, users miss that distinction. They believe PEM is “what is there”</p> |
| P5 | <p>I agree with the assumptions statements as a whole and think they are fine as is.</p> |
| P6 | <p>Assumption 3.b) Forest Districts need to have communication about where the inventory lies at the district level, i.e. which BA – Business Area. The assumption is it lies in the Stewardship BA. The question then is: “What is the districts role in inventory?” Or “Will there be a role for the Forest District?”</p> <p>Some concern about Assumption 10), i.e. RISC standards and the LIBC Data Custodian Council. Could not a gentlemen’s agreement be put in place to continue with the protocols used by the LIBC Data Custodian Council on a voluntary basis until a formal decision is agreed upon regarding the future looks of a similar council or protocol or...??</p> <p>Assumption 11) discusses the seamless inventory. Is there a thought to reviving this initiative? Or is it a “fait accompli”? What are the issues created by not completing the seamless inventory? Can we accomplish the desired end result by some other means?</p> <p>Assumption 12) – a great deal of discussion can be generated on this assumption alone. It appears that the funding model has shifted too far to the side of being proponent driven. MoFR or other ministries should ask to be considered as proponents as well. To bring some balance as to where funding is allocated and hopefully fill in the information gaps so that a more complete picture can be provided for any AOI at any time. The issue of better coordination can possibly be provided by developing regional committees involving regional inventory staff, designated district staff and interested licensees to prioritize investment decisions. The regional inventory staff then report back to the VRI Steering Committee with recommendations.</p> <p>Assumptions 20, 21 & 22) – SFM and G&Y, what is envisioned with using G&Y for SFM? Is it a better answer or equal to the monitoring protocol designed a few years ago to be used in conjunction with VRI data? Could the monitoring protocols be designed to feed into the FREP RSM process for biodiversity? Is it useful to provide some communication to MoFR licensees about using G&Y for SFM monitoring? ...?!</p> |
| P7 | <p><u>Assumptions that require clarification:</u></p> <p>4(a). What is meant by inventory requirements of forest managers? Are you talking about managers at the operations level, or managers at a more strategic level?</p> <p>8). What led to the database being so large and complex? Who uses this data and does it have value?</p> <p>15) How do you see coordination of funding leading to better probability of achieving objectives? Is there this much extra overhead involved?</p> |

| | |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p><u>Assumptions that I disagree with:</u></p> <p>2(a). The inventory should also be implemented for operational use. Decisions made at the stand or watershed level need to be compatible with direction provided at the strategic level.</p> <p>6). Stand level accuracy is critical for many exercises long before operational cruises and silvicultural prescriptions are available. We routinely conduct analyses at a watershed level to guide how harvesting will proceed in order to meet objectives such as old growth, ungulate winter range, etc. These analyses require confidence in having reasonable stand level data. Operational cruises and/or reccees will not be carried out to collect this information.</p> <p>12) There are at least two TSAs in the province where FIA has been delivering VRI information so the model can work. VRI has also been delivered successfully on TFLs. I think there is a bigger policy issue here. Inventory projects will be delivered when there is a benefit to the stakeholders. DFAM or area based tenures where there are some benefits to the participants will result in inventories being completed. However, if DFAM is merely a way to offload the administration of a government program without participants receiving benefits or having a say in standards will not yield results. This clearly ties in with assumption 13). Is there something wrong with directing funds to inventory projects that provide a short term benefit? Just because there is a short term benefit to industry doesn't diminish the overall longer term value of the inventory investment. Why does government perceive that a benefit to industry is an undesirable outcome?</p> <p><u>Assumptions I would add:</u></p> <p>VRI in its current form does not meet the inventory needs of industry. By this I mean that it does not provide a cost effective product with the accuracy and resolution necessary to make decisions at the level we operate at. We do not need this information just for making decisions about which stands to log to get the products we need. Today's operating environment requires us to undertake spatial analyses at a watershed or landscape unit level to ensure we are meeting all of the non-timber requirements as spelled out by landuse plans or government policy. The data we use must be consistent with the data used at the strategic level. Strategic plans will often set targets for things like old growth – in some cases we cannot achieve these at a landscape unit level because they don't exist on the ground (i.e. the strategic inventory has provided inadequate direction).</p> |
| <p>P8</p> | <p>Forestry in BC continues to experience unprecedented, new challenges including other industrial uses impacting the forest land base. In the Peace, inventory requirements of forest managers and of the chief forester for AAC determinations are significantly affected by other forest resource values. What is more important is to ensure we're using a common inventory so we can compare and assess costs, benefits and impacts appropriately.</p> <p>I sincerely hope that the IPR will be able to strike a balance between current methods and systems and new approaches and needs.</p> <p>Assumption 8: add oil and gas disturbance to MPB attack, as it has a similar affect</p> |

| | |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>Assumption 11: gaps in data between different MU's and admin areas such as parks are a big problem.</p> <p>Assumption 12: suggest re-introducing TSA or district-level strategic plans that include inventory, front and center.</p> <p>Assumption 14: begs the question; should the inventory reflect all sources of disturbance or only those created by forestry?</p> <p>Assumption 17: should we be thinking 'all users of the forest' or only forests and environment? Look at the business case – who needs the data to plan and undertake their work? Expand to include IMPR and OGC, and their clients.</p> <p>Assumption 20: need to include mixedwood modeling and management as a driver.</p> <p>Assumption 21: look to NE BC for the reality of multi-stakeholders, overlapping tenures, and the challenge of maintaining G&Y plots. They provide important info to Forests, but their relative importance to other users varies with the type of user.</p> <p>Assumption 22: add oil and gas, other industry to 'd.' . . optimistic that reforestation for oil and gas disturbances will one day become required practice.</p> |
| <p>P9</p> | <p>Item 10: According to Evert Kenk, RISC is the responsibility of ILMB. He will be looking at the RISC issue in the near future.</p> <p>With the recent changes in government, i.e., the demise of MSRM and Inventories moving back to the MoFR and MoE there is a need to revisit who has the custodial responsibility of specific Inventories.</p> <p>Item 11: We need to look at the notion of getting in all Inventories that licensees hold. As they are operating on crown land, government should have unfettered access to these Inventories. We need to fill in the gaps.</p> |
| <p>P10</p> | <p>I believe the assumptions provide enough details and for the most part are representative and accurate.</p> <p>#2b (iii) I do not believe it is acceptable to ignore land designations or inoperable areas which is currently being done under the current FIA format. Licensee want to focus on operable areas for verification of data, this does not address non timber values or could apply more pressure on the operable areas for designation of UWR, WHA etc because we have accurate and reliable inventory for this area.</p> <p>#2d-g totally agree with these statements. This is causing poor management decisions, inaccuracy in TSR etc.</p> <p>#8 Yes the dataset is large and requires continuous updating for such things as age and volume. The datasets could be reduced if for example age was replaced by year of establishment, volume is eliminated. These items could be calculated on the fly as required by the user and as a result save data storage.</p> <p>#9 The use of VRI data for stand level decision demonstrates a need to incorporate and link the data to the silviculture data found in RESULTS. With the transfer of data entry to licensees and the inability of MoF to monitor quality of the data RESULTS information is</p> |

| | |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>questionable and at this point caution must be exercised when using this data.</p> <p>#11 Efforts must be made to get agreement of data sharing with other stakeholders. Under the FIA funding model there is the opportunity to ensure data standards and data capture efficiencies are achieved. This also provides for the ability to share and merge datasets. In addition the FIA funding model may also allow for cost sharing of maintenance and storage.</p> <p>#13 Based on a recent FIA meeting I understand there is now targeted funding for inventory works to be managed out of Region. This could provide a more stable environment for inventory work. However, schedule, availability, and cost of such inventories are expensive and the ability to ensure the entire province achieves the same quality of information in a timely and effective manner is a challenge. New approaches and use of new technologies and techniques should be reviewed and explored.</p> <p>#17 Totally agree, we need to inventory the entire landbase to address all values including timber, wildlife, FN, recreation, mining etc. This potential increases the number of stakeholders (i.e. MoFR, MoTSA, MoE, MoEMR, First Nations, and industry) involved in the process but could also allow for cost sharing and data sharing.</p> <p>#18 This would allow for the opportunity to ensure we are collecting the right data, avoid duplication of collecting data and generate cost and time efficiencies.</p> |
| <p>P11</p> | <p>2a: Most planners and managers understand the uncertainty of using inventory at the stand level, but it's the only spatial tool widely available. Cost-effective improvements or alternatives for planning purposes are not apparent.</p> <p>2g: Questionable statement. A lack of government leadership, funding, and support in recent years shouldn't be confused with a lack of inventory expertise or capacity in the private sector. The issue in Appendix 1 regarding consultant capacity and consolidation (page 21, paragraph 5) is an incorrect assumption. The lack of involvement by many existing VRI consultants is caused by concentration of VRI contract management and restrictive bidding opportunities (e.g. select tender) in recent years.</p> |
| <p>P12</p> | <p>4.1 2 a) this is a critical problem as the information generated for MU level is not meant to answer stand level questions. Quantifying error sources and qualifying estimates with error bars seems appropriate.</p> <p>4.1 2 g) disagree fairly strongly with at least one aspect of this statement.</p> <p>4.1 4 In addition to the identified three points it is essential to include in the IPR focus a component on:</p> <ul style="list-style-type: none"> d) Stakeholder education and knowledge transfer to address the problem of misuse of VRI information. e) Institutional infrastructure and capacity building to handle the VRI and associated linkage programs <p>4.2 14 The degree of imperfection must be better understood to identify areas where estimates are especially variable</p> <p>4.2 15 agree – at times different parts of government seem to work against each other making it problematic to implement anything</p> |

| | |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>4.2 17 agree</p> |
| <p>P13</p> | <p>4.2 Vegetation Inventory</p> <p>Lack of a Standard regarding shelf life of a Timber or Vegetation Inventory</p> <p>Some very northern parts of the NIR have very old (30+ years) timber inventories. Places like the Liard; Kechika; Sikanni’, and the Cassiar were also photointerpreted from 1:40 chain photography. These old inventories are undefendable in my opinion. Although these areas may contain a high proportion of NonTHLB area they are important to First Nations; as Wildlife habitat; contain potential for mineral exploration; oil and gas activities.</p> <p>11. Agreement with the statement regarding differences between TFL and TSA inventories. Unless TFL and TSAs use the same standards, there will exist an inability or a problem to merge data between the two Management units. Data compatibility problems aggravate data analysis for First Nation and wildlife habitat issues that cross administrative boundaries.</p> <p>The situation is somewhat similar for Parks and Protected Areas adjacent to TSAs. Who is responsible for conducting the VRI over these Areas? Some very large Parks and Protected Areas exist receiving no funding for VRI inventory.</p> <p>This issue is also number 6 under Critical Questions</p> <p>12 & 13 There is a need for setting provincial or at least Regional priorities for VRI.</p> <p>Vast areas exist with very old inventories which aren’t being addressed for VRI. The current FIA model using a business logic favors new inventory over THLB at the expense of the nonTHLB. A true Provincial Program would identify gaps and deficiencies and look to find a way how to address the deficiencies.</p> |
| <p>P14</p> | <p><u>4.1.2.a to g</u></p> <p>In the TSAs I deal with (Mid-Coast to Hope) I do not think all these statements are reflective of reality. Of the 7 TSAs I deal with 5 have VRIs either completed or actively implemented. While FAIB hasn’t been directly engaged in the decision process, contrary to their perception, there is no restriction to their participation. Every few months there are regular meetings between industry, BCTS and local provincial government and FAIB personnel are welcome to attend. If they have a capacity issue then they should deal with it – but don’t blame the whole process.</p> <p>For the other 2 TSAs one has a G&Y SIA project being implemented (Arrowsmith) and the other (Mid-Coast) should benefit from the change of the FIA funding model to an AAC basis. The old model was based on direct harvesting activity and the Mid-Coast, with CCLRMP and “Great Bear” restrictions, would lose out on funding.</p> <p>At the risk of being rude I find this whole section a bit self-serving to FAIBs perceived needs and does not reflect what is really going on, at least in my region.</p> <p><u>4.1.2.b.ii</u></p> <p>This item laments the fact that only 500 of 4500 plots had the ‘full suite’ of ‘designed’ attributes collected. The other side of the coin is that if only full plots were established probably only 2000 plots may be implemented because of the substantial increased cost of the full plot attributing. Extra time is needed to collect ‘full’ information on the plots usually</p> |

requiring repeat visits to the same location on different days. This is a fantastically expensive proposition when you factor in helicopter and crew-day costs – especially on the coast.

More fundamentally, are these extra attributes really useful? When I discuss this with other individuals involved in ecosystem and habitat supply modeling they feel the sampling is far too light for what they need and there are important gaps that make the information not too useful (e.g. Shrub information is not too useful to habitat modelers unless the species of shrub, not included in the VRI, is collected too).

4.1.3.c

I understand that when the VRI was being designed a range of beneficiaries (mostly government) of the vegetation side of the attributes were invited to participate. As the designing went on many of these participants dropped out or lost interest in completing the final design work. Maybe its time to reevaluate the usefulness of the extra attributes in light of this and the fact the TEM seems to be more useful for habitat and ecological processes. I believe this is an important statement.

4.1.3.d

I feel the use of VRI in business decisions is one of the most important issues here.

4.1.4 a, b & c

I can't stress the importance of focusing on the content of the latter 2 statements (inventory requirements for other values and have progressive improvements). Sometimes I think blinders are put on in this justification for TSR needs only.

4.1.5

This assumption starts out well but the “too disruptive and too expensive” statement makes it look like how FAIB may presuppose reaction to change proposals.

4.2.6 & 7

Scale should not be thought-of so statically. I think it should be more thought-of as a first step. Point 6 is the first step and point 7 is a way to get to succeeding – better information. The adjustment of the VRI after Phase 2 and NVAF should not be looked-on as the last steps. The information should continue to evolve.

4.2. 8 & 10

Mostly internal FAIB issues that FAIB has to deal with.

4.2.9

A strategic inventory it may well be in the beginning but, with some forward thinking, it could evolve to something else over time.

4.2.11

Our company's position is that if the government want to make our information freely available then it should pay for our share of the collection of the VRI data (unless we get direction from our executive to do otherwise). The inventory was done under FRBC and we had provided the 60% of funding that was required at the time.

Woodlots, small private holdings, small and medium sized parks are generally inventoried for VRI under LBIR. Larger parks could be considered if a case is made at the LBIR meetings. FAIB should actively seek out the meetings and attend – they are not, and never have been, restricted from attending.

4.2.12

While some programs (like growth & yield) have fallen off and do need a regional and/or provincial strategy, I do not think this is the case with VRI (see my comment above 4.1.2.a to g). On the south coast the Mid Coast TSA is the only special case not having the inventory work it desperately needs. The new AAC-based funding model, however, should start to help this situation.

4.2.13

I think statements like this (LBIR funds only directed to short term benefits and “uplifts”) just confirms the bias I think exists in FAIB. At all the LBIR meetings I attend (which FAIB people can attend too and district MoFR employees usually do) most participants at these meetings just want better information to do sustainable forestry! Sometimes there are uplifts and sometimes there are downward pressures - but better bases inventories (VRI & TEM) are wanted by all.

4.2.15

While I can agree that a coordinated rationalized plan is needed on a regional and provincial basis for Growth & Yield, for VRI, which is a standard inventory, most work is being covered off within the LBIR / DFAM groups. That is where I think it should stay except for some tweaking of group membership.

4.2.17 - 19

I know there are always moves afoot to combine VRI & TEM for more perceived efficiency and decrease cost. While ideally this is an attractive goal, there is a danger, however, that this can lead to too much compromise on the part of the professionals doing the work. When I interview the ecologists and VRI classifiers establishing these inventories whoever is second to the photo, and forced to work with the first's linework, always laments the compromise they feel they have to make in doing their interpretations.

Also there is a danger in trying to automate inventory collection too much. In one recent attempt on the coast called ssPEM I compared a TEM on our TFL with ssPEM over the same area I found a 20% agreement rate for 1st decile site series. Also second and third decile site series, which I believe PEM type inventories have the most trouble with, are quite often what is wanted by wildlife habitat and ecological professionals.

4.3 In General

I agree with most of the statements here except for the statement “licensees do not have an incentive to make long term G&Y goals”. Most industry is under some sort of forest certification these days (SFI, FSC, etc) and by definition must adhere to sustainable forestry concepts that include G&Y.

I do agree, however, that regional and provincial participation in G&Y programs is a necessity.

| | |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>P15</p> | <ul style="list-style-type: none"> • Section 4.1 <ul style="list-style-type: none"> ○ 2-b-(ii) – VRI Phase 2 may have been designed to collect attributes other than timber but the fact that only 10% have done so leads to the question around business value. This information is not accurate at the photo interpretation stage and augmenting the information with a few ground samples over a large area (i.e. TSA) does not seem to make business sense. If this data is truly important it would have been collected. ○ 2-c – Industry and Government business drivers are not completely aligned. This process needs to clearly identify what each parties “business” is. ○ 2-e – Capacity issue is also a factor of un-realistic standards and expectations. ○ 2-f – Inventory personnel’s perceived tasks need to be challenged and clearly defined in this process. See comment for 2-c. ○ 2-g – The statement around “work that government wants to have delegated” needs to be understood. Is that “want” a true need? ○ 3-b – “. . . inventory related roles and responsibilities” truly need to be understood. ○ 3-c – “. . . test and re-affirm” should be replaced with “challenge” ○ 3-e – These key areas need to be fully supported by stakeholders. Stakeholders also need to be defined. Using the inventory periodically for one use may not warrant expensive additions to the program, which in the long run, will not be sustainable. • Section 4.2 <ul style="list-style-type: none"> ○ 6 – The examples of additional stand level sampling that would occur where stand level accuracy is critical do not assist the inventory in any way. In today’s business environment, the data collected in these sampling techniques is gone in a very short period of time (usually harvested) and do not lend well to updating and inventory. ○ 7 – This option needs to be explored further. ○ 17 – This is an honorable approach, but it can not be at the expense of timely, sub-strategic level accuracy. |
| <p>P16</p> | <p>2a. Planners and managers are often aware of the uncertainties in using the inventory below the management unit level but what is the alternative? No decision? Again, most decisions are made well below the MU level and this will only become more prevalent as time goes on. We are going spatial, how are you going to respond?</p> <p>3a Who uses the VRI at the MU level? The latest timber supply analysis for the 100 mile TSA track individual polygons so are you really meeting the Chief Foresters needs. I think Timber Supply Review requires accuracy well below the Management unit level now.</p> <p>3c. It is time to re-affirm all assumptions with regard to the VRI, particularly the utility of Phase 2 sampling and the adjustment procedures.</p> <p>6. Why not use cruise information to adjust the VRI. Am I to assume that 50 polygons extrapolated to one million is more reliable?</p> <p>22. What about GY and post beetle growth expectations. This is going to get real important.</p> |

| | |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>P18</p> | <p>4.1 (2)(a): I disagree somewhat with this statement. In general, where stand-level analysis is occurring, more detailed stand information has been collected either through cruises, photographs or silviculture records. However, VRI is being used for spatial analysis at the landscape unit and drainage level, and this may be inappropriate based on its sampling but what options do planners have?</p> <p>4.1 (2)(b): I have a concern that VRI was created to be a one-stop inventory, in its effort “to collect a suite of vegetation attributes”. In many instances, what has happened is there is not a business driver nor money to collect all this information so only the “timber emphasis” information is collected. Perhaps the reality is that VRI cannot do a suitable job collecting enough ecological and wildlife information to negate the need for these other inventory sampling programs. Combining efforts would be efficient but only if we can use the data and from what I have seen this is not the case.</p> <p>4.1 (4): Strongly agree with the IPR focus statement.</p> <p>4.2 (7): If “local” information was ever planned to be incorporated into the VRI dataset, it was not documented in a readily accessible place.</p> <p>4.2 (11): A provincially seamless database may never be possible as changing formats and data structures is not an expense that TFL holders wish to incur often and certainly not external to their control. I have been involved in a TFL which followed provincial VRI standards and have had nothing but confusion and limited support on it (with the exception of some of the wonderful local MOFR Inventory personnel who tried their best to help).</p> <p>4.2 (17): I disagree that VRI should be holistic. I think that VRI is one component of a holistic approach. VRI should be what it is, one inventory.</p> <p>Overall: It is very evident that the province (government & industry) has lost a lot of expertise in inventory and growth & yield. This will be difficult to address without one organizational body taking up the lead, and I would suggest that will likely have to be government as it has been identified that industry is driven by short-term targets.</p> |
| <p>P19</p> | <p>4.1 Inventory Program Review</p> <p><u>2. ‘Inventory staff feel that important improvements can be made to the inventory program’</u></p> <p>a. - this really emphasizes how good the current VRI (Phase 1) really is.....that is, it is being used for even more than it was designed to be used for!</p> <p>b through g. - all of this section merely laments that there hasn’t been enough funding to carry out the VRI program as designed.</p> <p><u>3. Overarching Assumptions</u></p> <p>a. The VRI was designed for much more than just AAC determinations.</p> <p>b. A review has to be made of the existing inventory expertise within the newly formed</p> |

FAIB. In order to develop a new and improved inventory program, MOFR will have to hire some inventory experts.

e. Appendix 1 provides a good insight into the real issues caused by lack of government funding that is required to keep a purposeful inventory program going. Each needs to be addressed in the next stage of this review.

4 & 5. IPR Focus and Aim

Commendable but again, where is the expertise in government to do this?

4.2 Vegetation Inventory

Comments

Phase 1 – The current Phase 1 involves delineation, classification fieldwork, polygon attributing and digital mapping. The delineation and attributing standards and specifications of VRI were designed by a Classification Team (subgroup of Vegetation Inventory Working Group) made up of a team of many professional inventory foresters, ecologists, geologists, pedologists, wildlife biologists as well as range and recreation specialists. Consequently, the current delineation and polygon attributes of VRI are very sound for a vegetation inventory. Actually, the BC VRI attributes are very close to the Alberta AVI system and a combination of the VRI and AVI have been copied by Saskatchewan, Manitoba, Yukon and NWT for their vegetation inventory systems.

The only question with the Phase 1 attributes is if they are all necessary or are some additional ones needed. The current attribute system could be very easily modified by simply turning off some fields or by adding a couple of additional fields. In this way all of the manuals, standards and specifications could be quickly updated. New data entry and editing software would not have to be completely re-written and newly interpreted maps would be 'compatible' with the existing VRI maps.

Phase 1 Fieldwork – the current classification air call and ground call procedures are good.

Spatial Accuracy – all VRI mapping is done on TRIM base maps to TRIM digital mapping standards and is definitely accurate enough for VRI.

Phase 2 – Similarly, Phase 2 was designed by a Sampling Team (another subgroup of VIWG) made up of many forest inventory and sampling specialists. However, Phase 2 has always been questioned: Does it really work properly to adjust and validate Phase 1 and is it worth the expense?

Growth and Yield – G&Y is a very specialized field and expertise within government is almost all gone. Red flag here is to develop a highly experienced G&Y team in FAIB. This team will need work closely with forest companies, universities, federal government and neighboring provinces and states.

| | |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>P20</p> | <p>2Biii, 11 - information gaps in TFLs, PPA, and Private land impact the use of VRI information for strategic analysis, reporting and decisions.</p> <p>2Biv - licensees who have opted to allocate public funds to inventory rather than other investment opportunities should not be penalized if government comes in to address the gaps.</p> <p>17 strongly support. There are efficiencies to be realized in the phase 1 of VRI by strongly linking the delineation and identification of present vegetation map units to the more permanent and causal factors represented by physical features (topography, terrain and soils) and biological features (ecosystems, i.e., site potential)</p> <p>18. An aspect of ecosystem inventory that needs to be strengthened is the characterization of succession pathways for commercially important or frequently disturbed site series; (both natural and managed succession)</p> <p>Add assumption: Remote sensing technology is maturing (including satellite and airborne sensors) and should figure prominently as a third phase (or new first phase) approach to vegetation inventory</p> |
| <p>P21</p> | <p>Assumption 17. Clarification is needed around the phrase ‘holistic terms’ and this assumption overall.</p> <p>Assumption 12. Needs to be clarification around the comment that “poor overall coordination has caused inconsistent investment decisions” under the FIA delivery model.</p> <p>Using FIA to fund forest inventories could work if enough base funding is available for a longer term, and if some portion of the funding could be targeted at the MU level rather than individual licensees. The FIA weakness is that there is little incentive for licensees to use their own allocated funding to collaborate with other licensees on MU or regional -level projects. Funding decisions under FIA are up to the individual licensee, they must “use the funding or lose” and having it tied to stumpage/AAC encourages them to spend on their own short-term interests. If one or two licensees are championing an MU level project, they may eventually abandon the idea if other licensees don’t come on board because they believe that non-subscribers should not benefit from the product(s) without sharing the costs.</p> |
| <p>P23</p> | <p>2) Can we change the cruise methodology and mandate the use of technology to get results accurate enough to verify or actually support the inventory program?</p> <p>See the above comments on the ABCFP and the lack of inventory knowledge.</p> <p>12) “FIA Land Base Investment Program ...is ineffective.. you summarized all of the past and current programs, lets not repeat our mistakes.</p> <p>16) Once again where is the Managed stand and the MPB impacted stand information.</p> <p>19) I think that you should redesign the inventory around the PEM - TEM idea. As listed in your discussion a lot of work has been done in this area and a lot more will be done in this area as we deal more with SARA and other values.</p> |

| | |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P24 | <p>Before starting this section we should question the role of government in maintaining the forest inventory of the province. Reading through this document including the appendices, it appear that staff wish to return past and become the sole arbiters of when and how inventory gets done. They wish to do so in spite of their diminished capacity due to previous downsizing decision and current and soon to be retirements of key staff.</p> <p>The role for government in the future should be to maintain the definition standards such as top height, dbh, species id's etc but not the procedures. They must develop the capability to integrate data from well documented models into either their own data repositories or create a logical data repositories through the linking of many data holders to provide an integrated picture for a web client.</p> <p>The control of how should no longer be their purview nor should they be the sole arbiter. The paper has argued to continue and strengthen this role. From personal observation, I have witnessed extensive delays caused by this process. In one case as much as 6 weeks added to seeking permission to proceed. The project only took four weeks to complete and as the project was nearing conclusion bureaucratic ineptitude took over requiring the sanitation of documents to meet funding rules.</p> <p>The bottom line, get staff out of approval of process. Get them solidly onto maintenance of definition standards, data models and create the ability to integrate data from well documented data models into their data sets or create a logical view of that environment for a web client.</p> <p>i. The inventory was designed assuming all components would be completed on each management unit. This is not the design. The design was referred to as a tool box with clients specifying their business needs and then utilizing the appropriate tools from the box. At the very least, my expectation was that the Phase II plots would be installed so that the existing photo interpreted inventory could be adjusted.</p> <p>iv. The Timber Supply Rationales from the Chief Forester indicate a continuing trend of the investment model in not responding adequately to his vegetation inventory concerns. This is clearly not acceptable, but who is accountable for remediation? Actually this is not the case. If you review the Terje Vold paper "Review of Inventory Issues Identified in Timber Supply Rationales, January 13, 2006. Prepared for John Wakelin you will find that site productivity is the most significant issue of concern of the Chief. Clearly there is a call for Phase II inventories in the Prince George, Quesnel, Kamloops, Merritt & Mackenzie TSA and Phase 1 on the Okanagan, 100 Mile, Merritt & TFLs 46 & 47. The question is clearly rhetorical, the Chief has the responsibility.</p> <p>We shouldn't forget how we got to this point. In the 80's TSA steering committees were charged with managing and to a large extent doing TSRs. In many cases, some time for the right reason & sometimes to delay the process, these committees pursued perfect information to feed the linear programs of the day. As a result TSRs were not completed. In the early 90's the then RSM of Forestry from the Cariboo region, one Larry Pedersen</p> |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

and Darryl Errico, undertook a review of the TSR process and the rest is history.

The major change in this period was to move from a calculation of an AAC to a determination of an AAC by the Chief forester with the Chief assuming the responsibility to deal with imperfect information. Through the use of sensitivity analysis and other techniques the variability in the quality and of the information to inform the TSR process has been well handled. Ultimately, if the Chief is not satisfied with the state of an inventory, he is the only one that also has the ability to alter the situation.

f. There are too few government personnel to fully carry out the custodial responsibilities they are tasked with. Is it custodial responsibility or is it process control. These are different. It is my sense that custodians are trying to manage their custodial responsibility by managing the process used to capture and manage the information rather than focus on the definition and data model aspects of their business.

7. The original designers of the VRI envisioned the ability for local “new” information to be used to adjust the inventory. However this feature has not been accommodated in the existing design. I don’t understand this comment? Clearly existing or new Phase II information can be integrated into the existing phase I estimate. What is the problem?

14. For many reasons, managers in all parts of the sector must rely on less than perfect inventory information. However, there does not appear to be a minimum quality standard that must be achieved before a decision-maker can consider it. While this situation can be rationalized as being in the best short term interests of the public, it begs the question: Is it in the public’s long term interest and if not, what minimum standard must we achieve and by when? See my comments on iv.

15. If all sources of Provincial and Federal Government and industry funding for inventory and G&Y activities were rationalized, coordinated and planned cooperatively there is a greater probability of achieving the quality objectives of the inventory users. Governance and delivery activities should involve major providers of inventory and G&Y information, with direct or indirect means for participation by stakeholders. I really don’t see this happening. Unless the FS moves to mandatory DFAM for all volume based tenure holders what is the interest of these tenure holders in participating. In most cases they no longer possess staff with inventory experience. The only real time we have had industry engagement in a process like this was during the Section 88 days when committees actually allocated funding to projects. So is this really a plea to return to the days of an HQ delivered program?

20. Our claims to sustainability rest on our ability to predict future forest values under alternate management regimes. Not so. Our claims about sustainability rest on our ability to demonstrate that we in fact are sustainable. Predicting future forest values is about establishing a range of future possible baselines. Determining sustainability is about monitoring those predicted future conditions and comparing them to a predicted sustainable baseline.

| | |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>The rest of this section argues that we need G&Y and PSP sample plots lets go back and do more. My answer is plots by all means but monitoring plots established in a statistically unbiased fashion such that measurements and remeasurements from those plots will talk to state and rate of change of variables of interest. That is about sustainability.</p> |
| <p>P26</p> | <p>I think I agree with most of the assumptions outlined, but don't know if the language needs to be stronger to emphasize the need for more government control of where when and how much VRI will cost.</p> <p>Assumption # 2 - c: I would suggest that in some case where Licensees are running VRI Photo Interp. Projects, they are expecting a local level of accuracy in the Inventory that they will not get using traditional costs for VRI and in some cases may become disillusioned to the value of a VRI because of this or pour more money into field work and still not improve the VRI at a local level.</p> <p>Assumption # 2 – d: Under the current funding model, Licensees look after what meets their needs first and in some cases VRI may not be considered at all. Funding must consider the needs of all and not just a few.</p> <p>Assumption # 2 – e, f, g: These 3 assumptions are very correct. But potential utilization of government VRI staff in the right areas; prior zing VRI and directing licensees and contractors could be improved.</p> |
| <p>P29</p> | <p>It is not just global competition that is at stake – it is global participation.</p> <p>I am not sure why it is an inventory “problem” that planners do not understand the limitations of inventory information for operational planning. Perhaps a shift in responsibility and accountability.</p> <p>The issue of incomplete phase I estimates should not be a surprise given that the process sums up stand attributes to the total rather than simply estimating the total and allowing the user to distribute that “policy” total as they see fit. This was recognized as a significant weakness in a structured 2 phase inventory.</p> <p>The assumptions in this section are well considered and accurate. It is apparent that the authors concerns are in line with the intent of the original VRI design and recommendations.</p> |
| <p>P30</p> | <p>2.b.ii. The VRI was designed so that the eco and timber could be done independently. There is no issue with not doing the eco data collection.</p> <p>2c... Maybe govt needs should be more aligned with the needs of industry.</p> <p>2e.f.g... there are definitely capacity concerns in the consulting community.</p> <p>3d... There is nothing we can do about that except educate the users about the limitations of the data. People will continue to use it this way because it is the only dataset of its kind. There is nothing else to use that is this good, and this cheap.</p> <p>12... Seems to be getting better.</p> |

| | |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>14... Inventory information will always be less than perfect. It is based on estimation and sampling. it will never be perfect. But again... it is the best we have.</p> <p>17... How do we do this?</p> |
| P31 | <p>We are looking at this from only a Ministry of Forests and Range perspective, which should be opened up. There are other ministries also affecting the data.</p> <p>Correct, - The FIA model of funding doesn't work well for have stability in the work force completing the tasks because it is an annual program. These projects are longer term.</p> |
| P32 | <p>Do we need and can we afford to include a full suite of data? Timber is the most significant factor, so let's make sure we keep that up to a usable standard for now. The multi-resource inventory should only be done where justified by intensive use or high resource values.</p> <p>We should focus on areas of current and planned future activity so we get the most out of our efforts.</p> <p>Considering the relative value of forage/cover/biodiversity, the case for non-timber inventory in the northeast is stronger than for the rest of the province.</p> <p style="padding-left: 40px;">12. FIA funding is too variable. We need stable funding and regularly scheduled updates. Industry should be required to contribute as the information supports their activities.</p> <p style="padding-left: 40px;">21. Agree with need for non-even-aged g and y information.</p> |
| P33 | <p>There are a lot of assumptions here. Outside of the VRI am not aware of a Provincial Inventory Program although I am aware of numerous initiatives. These assumptions seem to apply to all the initiatives.</p> |
| P35 | <p>2a: Most planners and managers understand the uncertainty of using inventory at the stand level, but it's the only spatial tool widely available. Cost-effective improvements or alternatives for planning purposes are not apparent.</p> <p>2g: Questionable statement. A lack of government leadership, funding, and support in recent years shouldn't be confused with a lack of inventory expertise or capacity in the private sector. The issue in Appendix 1 regarding consultant capacity and consolidation (page 21, paragraph 5) is an incorrect assumption. The lack of involvement by many existing VRI consultants is caused by concentration of VRI contract management and restrictive bidding opportunities (e.g. select tender) in recent years.</p> |
| P36 | <p>4.1</p> <p>1. stakeholders with tree improvement investments also want to market TI products – wood quality, growth form, pest resistance...</p> <p>2. agree; uncertainty wrt genetic gain assumptions; report roll-ups</p> <p>3. a. and 4. a thru c. require new VRI / genetic source/gain linkages to provide CF decision support in TSR, FFE, CC, MPB,...</p> <p>4.2</p> <p>9. and 10. new and /or emerging stakeholders currently need to be brought into loop</p> |

| | |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>4.3</p> <p>14. minimum stds not in place for G&Y modeling of genetic gains</p> <p>22. add – tree improvement investment decisions</p> <p>22. d, e, f - seed use, genetic gains;</p> <p>h. genetic diversity</p> <p>j. SPAR</p> |
| <p>P37</p> | <p>Under item 21 – it seems that besides variable retention and EBM (as well as partial cutting), we are not only looking at complex stand conditions, but also complex species conditions as well (mixed species stands (including various conifer mixes as well as conifer/deciduous mixes))</p> <p>Under item 22 – there have been many perceived drivers identified – but the issue has always been the lack of a linkage to key decision making processes that have a direct impact on land manage practices and eventually – industries bottom line. We have never been able to link taking care of the inventory on a public landbase to those having the licenses on that landbase. It is a challenge and will always be a challenge if this linkage between the inventory (what our future supply will be) and how we take care and monitor what we are doing to it over the long run (other than viewing the management as a legal liability) is not made. Within the existing political framework this linkage is even more fragile.</p> |
| <p>P38</p> | <ul style="list-style-type: none"> ▪ none ▪ I don't disagree with any of your assumptions ▪ None to add ▪ I strongly agree with your assumptions 2c and 2d and agree with assumptions 18, 19 and 20. ▪ I also very strongly agree with assumption 21. This is critical, especially in light of the current MPB infestation as is mentioned in this assumption. |

| | |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P40 | 4.1.4 (a.) seems to suggest a timber focus, while (b.) mentions “other forest and resource values”. Why the separation? Given the requirements of modern forest management shouldn’t we be envisioning an inventory that meets both requirements? |
| P41 | Agree with all the assumptions. |
| P42 | <p>I strongly agree that model based projections such as PEM (19) are useful in building inventories in the first place, but the system should promote the use of operationally collected data for the purpose of making ground-level updates.</p> <p>I agree with 17, but what does this really mean. It means that we have a series of classifications that can be used to describe the resource that are reliable and stable over the long term. We have a significant issue with SIBEC since this was constructed on the basis of representing Climax Forests and since the plots used to build the classification were themselves subjectively located leaving much of the variety of ecosystems unexplained (i.e. we took a platonic point of view). Furthermore, not enough attention has been given to soils and soil series mapping which is critical to many forest management decisions and modeling frameworks, and is in fact the ultimate forest resource. So while SIBEC has been extremely useful in raising consciousness of ecosystems and their management, it is a limited concept in a changing world – particularly one undergoing rapid global warming. This simply underlines the need for longer term monitoring plots, use of models to extrapolate from known locations to unknown locations in the inventory using related sources of information, and the need to formalize the updating of this information through operational data collection mechanisms.</p> <p>My own bias is as follows: We need to integrate tree-level kinds of information (back – we used to have stand and stock table information in the 70’s albeit it was not at the level of precision that we need to underwrite the various kinds of forest and stand management decisions we are making today) into the inventory, since the biggest decision that we continue to be concerned about are which trees to cut and which stands, when, versus which ones to leave behind. This is true both at the strategic and operational levels of detail. Our strategic level plans do not give adequate guidance on this front and as a result such plans are out of step with operational realities. Inventories need this higher level of detail, also as the basis for making growth, mortality and ingress forecasts since we seek to influence these processes through silviculture and harvesting practices. Such details need to be supported by the establishment of plots that can be relied upon to monitor growth, mortality and ingress over the longer term, so that we can update the inventory in such a way that it is reasonably consistent with reality.</p> |
| P43 | <p>2a. Plan to fund more access to height and age of samples trees and operational cruise plots to strengthen the attribute files of the VRI. Operational cruise plots have be data mined in the Okanagan for \$2 a tree.</p> <p>2bii. What is the incentive for industry to get involved when the TSR uplifts are allocated at the direction of the Minister....a weakness of DFAM model</p> <p>2bii. SIBEC...Why has the samples by Site Series increased from 4 samples to 7 samples thus increasing the cost of the project by 175%</p> |

| |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>2bii There appears to be concerns of get ecosystem data at time of VRI, is this ecosystem data truly needed?</p> <p>2biii. Who pays for delineation of Private lands when FIA \$\$\$ do not cover this.</p> <p>2e. MOF Inventory downsizing is not the only reason there is a capacity issue, aging workforce and attrition is accounting for a lot of this.</p> <p>2g. ...and the MOF does? Provide the funding to do the work and it will create a demand and job will be created with industry and constants.</p> <p>4. What AAC strategies or ground rules are needed to extend info at appropriate scale to provide GIS data at stand level???</p> <p>5. Talk to FIA</p> <p>11. Fix the eligibility criteria through FIA funding.</p> <p>12 This can be resolved by providing incentives to make private public partnerships</p> <p>13. and are supported by a strong business case</p> <p>14. Who know?</p> <p>15.</p> <p>16. Agree</p> <p>17. At what scale 1:20,000??</p> <p>18. Why has SIBEC sample intensity increased from 4 per Site series to 7 per site series</p> <p>19. No here is a loaded gun. I have heard so many complaints about the accuracy of computer generated contour maps at an operational level. Now PEM is being automated on TRIM at \$0.06 per ha and based on limited field verification. While the system works fast, it is a product that can only be used properly at the MU level. (i.e., Caribou) I expect some significant problems coming out of this when trying to use it to balance CCLUP land use usage accounts</p> <p>21. Province is the land owner and the province should do G&Y on TSA as the steward of the forest.</p> <p>22. Agreed</p> <p>23. The government has lost many VRI practitioners largely to attrition and retirements. OR</p> <p>Non available contracts as during the period 1990 – 1995 the low bid contracting system forced many practitioners out of province just to get work.</p> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| | |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>P44</p> | <p>One assumption that is missing is that developing and maintaining inventories is a long term undertaking and thus responsibility must reside with those who understand the need to plan and manage publicly owned forests for the long term. Forest inventories have a life span of at least 15 to 20 years. The forest industry, especially on the coast, is presently engaged in a massive restructuring, with huge shifts in tenure, buy-outs, sell-offs and disappearance of long time players. This is reflected in a continuing decline in industry capability to handle inventory matters. This situation of “tenure musical chairs “ will continue for perhaps the next 10 years and bring a host of new tenure holders to the scene. Many of these will be smaller tenures such as community forests, and most of the tenure holders will have <u>no</u> inventory knowledge or capacity. Gov’t is the only entity that is here for the long term and can protect the public’s interests in its forests. Elsewhere, the attempt to place responsibility with a special interest group, i.e. licencees, has completely failed. The B.C. experience of privatizing the forest inventory function is proving to be no different.</p> |
| <p>P45</p> | <p>2d. Provincially the TSAs that will not likely see investment in a VRI could be identified.</p> <p>In addition there are some very large Forest Districts (Ft. Nelson, Cassiar, Mackenzie) that are problematic in attaining border to border complete coverage in a timely manner.</p> <p>2. The VRI process and design doesn’t work well for small area based management units such as woodlots and community forests.</p> <p>13. Disagree with statement. There are cases but generally the bulk of Inventory funding has been directed to VRI without AAC uplift bias but rather to promote improved resource stewardship. This has been my experience.</p> <p>2 b iv. The issue of identifying who is responsible (mandate question) for conducting and maintaining the inventory on Crown Lands on TSAs; Parks; PAs should be written in legislation.</p> <p>By answering the mandate question accountability can be assigned to the appropriate body.</p> <p>If it decided that it’s the government mandate to carry-out and maintain the inventory, it would enable change to roles and responsibilities, staffing levels; delivery of services to occur within the Program much quicker.</p> <p>22. Mixed wood growth modeling is overlooked as a business driver for G&Y.</p> |
| <p>P46</p> | <p>4.1.2a – so what can be done? I don’t think you can expect to control how your data/information will be used; you can only expect influence the user. Two solutions: 1) better inform your users (educate); 2) new inventory so that it is suitable for analysis at the stand level (I do not think this is feasible given the resources required for such an undertaking). The simple solution here is extension/communication with users.</p> <p>4.1.2bi – what are the risks associated with only phase 1 complete? This obviously meets industry so are there options to completing phase 2? Maybe adopt an accuracy assessment program (would this be anymore cost effective?)?</p> |

4.1.2bii – maybe this suggests too much is required? Should the inventory truly aim to collect information for multiple needs or should it rather use a tool box approach where users can select from standard suite of attributes.

4.1.2biii – the current status does work for some users, partial coverage still allows for estimation and analysis of certain attributes. However if the true intent of the inventory is to capture info irrespective of ownership, **and for multiple users**, than no, this is not acceptable. Bottom line question which needs to be addressed is “who is this inventory serving?”

4.1.2c – the business needs of government and industry will never be aligned but there will always be some level of common ground. The same can be said for government reorganization and industry consolidation, the problem will never go away. Maybe the best way to address this is to use the middle ground between the needs of the two to solidify the core of the program. Having a solid, balanced program core, that is understood and the meets the needs of all involved, will reduce the impacts of the ever changing personnel.

4.1.2d – so what? What is the risk? What is the business case for the unit in question? There is obviously a business driver lacking here...why invest in something that is not going to be used?

4a and b – why are the inventory requirements of forest managers and of the chief forester listed separate from the inventory requirements for management of other resource values? This is crux of the problem...inventory is inventory? Why is there a division between forestry needs and those of other resource values? There needs to be a shift in thinking here if we truly want to change the way the inventory program works. It shouldn't be about forests first.

4.1.5 – I find the following statement:

“Some approaches to improving the program may be too disruptive or too expensive to be implemented.”

to be a significant statement in that it suggests there are limits to the degree of change that will be allowed. If you are not willing to accept that change may involve flipping something upside down and inside out than I don't think you are truly open to change? The “too expensive” statement I can agree with as you can tie this to a business case analysis.

4.2.10 – “...data custodians are no longer bound by that decision” but they should still use the RISC procedures for standards creation and maintenance as they represent an accepted, proven process. I'm not entirely sure what the intent of this assumption statement was but in my mind why move away from a process that worked?

4.2.12 – where is this ineffective statement coming from? Some background here would be useful to support such a claim.

4.2.13 – true but they do have some long term benefit to other users and could be made more useful if additional funds were made available to support additional work. Could a separate pot of money (like the current FIA inventory pot - \$7mil) be used to top up inventory projects in order that more complete inventories get done (this may be how this

| | |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>money is being used, I'm not sure)? This way the "funding recipients" can continue to direct their inventory projects towards short term goals and gov't could direct additional funds towards making the inventory more complete, and ultimately valuable for a greater number of users.</p> <p>4.2.17 – yes</p> <p>4.2.18 – yes</p> <p>New assumption – what about the BEC program? Inventory in BC relies heavily on the BEC system. The inventory program can only succeed if the BEC program is sufficiently maintained and supported. Currently there are many challenges and unanswered questions facing the BEC program including: climate change – how will these change the system?- local knowledge and expertise – succession mgt?, limited resources, etc... So I think there is an assumption being made in this document that the BEC system will continue to supported and enhanced in such a way to allow the inventory program to succeed.</p> |
| <p>P47⁶</p> | <p>2a. Inventory staff have not done a good job in communicating the strengths and weaknesses on a particular inventory in a particular unit. A globally accessible website (well advertised) to convey such information and further, how the inventory has evolved and changed over time (and why) would be very useful.</p> <p>2bii. Again industry was not convinced the benefit to them in collecting the full suit of attributes was worth the additional cost.</p> <p>2biii. I suspect only government would only be interested in collecting information within protected areas. Further, from a timber supply prospective we are only concerned with the extent, age and health of forest within parks, not the dimensions of the trees.</p> <p>2 f and g. You cannot pretend to regulate/manage a resource you know little about. Put responsibility for inventory back in the forest act. Consultants would still collect the data but inventory specialists should know the basic inventory and growth statistics by unit. Better still, that summary information could be posted on a website.</p> <p>Answering questions like "how much cedar is there on the coast?" would then be relatively straight forward.</p> <p>4.2.11. Perhaps a seamless inventory of a small subset of critical attributes could be achieved but I'm not sure a seamless full (all attributes) VRI inventory across parks and TFLs is worth the expense.</p> <p>4.3. GY under a partial overstorey will become really important post MPB epidemic. Once inventoried we will need to be able to project subsequent regeneration and residual stand structure. But perhaps more important than this GY effort will be describing what is there post MPB.</p> |

⁶ Delayed Response—received after first compilation

| | |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P48 ⁷ | <p>Clarification needed:</p> <p>2biv. What's meant by "his vegetation inventory concerns"? TSRs are done every 5 to 10 years.</p> <p>2c. We feel that the most important area in this process is for government to clearly define its business needs.</p> <p>2g. What work does government want delegated to the private sector? Typically the private sector responds to the expertise or capacity that is requested. So what's the issue?</p> <p>3c. This is way too general. What assumptions need to be tested and re-affirmed?</p> <p>Disagree with aspects of these assumptions:</p> <p>1. First, I'm not convinced that the situation today was much different from when the VRI was developed except the MoF Inventory Audits identified certain weaknesses with inventories at that time. Second, we must not charge ahead in addressing these perceived challenges without preparing the business cases for doing so. Government must decide whether they really want to manage the forest sector because that will require investment that this industry can no longer afford to contribute towards.</p> <p>2bii. It appears to us that the vegetation attributes in addition to timber do not have utility and should be removed. Soils and ecology are better reflected in TEM and TSM. There are too many variables and uncertainty with wildlife needs to identify the types of vegetation attributes to classify. Wildlife habitat models are based on features we have only begun to consider – many of which cannot be identified from an aerial photograph. This just points out that these attributes are better obtained elsewhere.</p> <p>2biii. The NFI should be the mechanism for reporting out on the provincial forest (otherwise it should be scrapped). VRI was always targeted at management units. Whoever had the idea of patching this together for the entire province should stand up and explain why.</p> <p>2d. It's better to be last. Yet again, licensees and districts that directed their scarce funding allocations towards inventories in the past will be penalized if current funding is redirected towards those who elected to spend their money on other projects. Meanwhile others take a back seat.</p> <p>Assuming funding decisions were made on a priority basis, 30% of the province felt over the past few years, that VRI was not important enough or too costly to undertake. That means that 70% did! Try not to forget that.</p> <p>The FIA delivery model goes a long way to resolve this trend, but we fear that players coming into the game late are trying to change that.</p> |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

⁷ Delayed Response—received after first compilation

2f. Why is it assumed that only government personnel can carry out these custodial responsibilities?

2g. Who is suggesting that industry and consulting does not have the expertise? What is this based on?

3d. The current inventory is not designed to support business decisions but we have no choice if it's the standard that's in place. The inventory can be retrofitted with another model that does support business decisions but most likely for the industry involved, not government. Plus, policy changes could facilitate this further (e.g., appraisal cruising) but government is too fixed on its own needs.

3e. We only made it as far as looking over the issues identified by FAIB staff (Appendix 1), became discouraged and stopped. This IPR just seems to be the vehicle for FAIB staff to regroup and launch its ideas for a new direction. We are not entirely convinced that industry presence or comment will influence this process but we need to be involved. Again, our involvement will only be recognized as another stakeholder at the table when in reality, WE are the forest managers and data custodians.

4. Is the forest inventory really a significant issue with recent TSRs?

11. Why do we need a seamless inventory for the entire province? What province-wide assessments are being contemplated? What issues would arise from that approach?

12. We feel strongly that the FIA delivery model is effective at both the management unit and regional level. Government's failure has been in describing its regional and provincial strategies along with business drivers that provide incentives.

It disturbs us that people forget that prior to VRI, inventories were in dire need of attention with little done about it for many years. Government then brought in an extremely expensive inventory standard that even then would have required hundreds of millions of dollars to implement. We feel progress towards full provincial coverage, if that was indeed the target, has been going very well considering the challenges the forest sector faced. The FIA delivery model has directed funds appropriately to the areas the required it.

13. ...and here we understood that AAC uplifts (all long-term) were good for everyone in the province.

Other:

I'm concerned that the money spent on this initiative to design a better mousetrap could be better spent conducting an inventory somewhere.

Input Request 4: Critical Questions

| | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>INPUT REQUEST 4: Please provide your feedback (answers, reactions, further questions, suggestions) to the critical questions.</p> <ul style="list-style-type: none"> ▪ What other questions would you to raise? ▪ ? Please refer to the Questions by their number. | |
| P1 | <p>The forest health question. Current pest outbreaks and disease outbreaks across all age class and biogeo zones. Will this increase in the future, how does our existing inventory of plantations compound or add to the problem due to management decisions?</p> <p>Delivery model. Centralized/regional centers or at the district level.</p> |
| P3 | <p>Where are the persons trained going to find work to apply their new skills?</p> <p>Is there work out there? and money to enable it to be completed?</p> <p>A strategy is a great idea; and fundamental to what meet your challenge, but funds will be needed to implement it. If there are no funds the strategy and any effort to train persons will be lost.</p> <p>The feedback form is very limiting. There was no discussion on Barriers to moving forward, Substitutes, Strengths, Opportunities or Weakness that should be considered. This might be a more effective way of opening up the discussion. Eg. Focus on your strengths, reduce your weakness.</p> |
| P5 | <ol style="list-style-type: none"> 1) Yes. A review is appropriate and necessary. I agree it needs to be linked to G &Y. This review will be worthwhile if the new information provided is more accurate and up to date than the existing data. 2) It would be nice to know the age of the data we are working with. I.e. how old is it? When was it last updated? Protection needs a simple method for providing digital data (shapefiles) to Inventory branch for updating existing data bases. In return Protection needs timely Inventory information-sps, vol/ha, \$\$/ha. 3) Well, I hope it's not 5 years away but in the future I would like to see a fully automated real-time system that takes a shapefile (fire perimeter) and sends that shapefile to the appropriate forest cover/veg map. The shapefile then interrogates that map and provides information such as damages to timber by species, volume and \$\$ to all land managers that need this information. History records would also be updated automatically. This is similar to what I typed for question 2 but I will assume that for question 2 the process would not yet be automated as I am hoping for here. 4) No comment. 5) I think it important that there be one central depository for all Inventory information, both crown and private. It could be updated by different users (government and licensees) as long as similar standards are adhered to and qualified staff do the updating. One stop shopping would be nice. The LRDW was/is a good idea; it just seems like all the data didn't hasn't made it there yet. The data that is there is very difficult to navigate through to get to what you want as some of the naming conventions for maps/folders make no sense to a forest tech like me. 6) Yes. Kinda ties in with what I typed for question #5 |

| | |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>7) As far as the protection programs needs goes for accuracy, I'm sure they'll be met as other users of the inventory data will have a need for a higher degree of accuracy then would protection. I would expect as a minimum that accuracy would improve from what is currently out there.</p> <p>8) No. See comments for question #5.</p> <p>9) No comment. I don't know enough about this.</p> <p>10) See question #3</p> <p>11) I think that the inventory information has huge value. I believe there is a lot of skepticism around the accuracy of the data. I don't think we're extracting full value from the inventory data. Protection would benefit huge from an up to date and accurate data base that has been built based on the latest technology. Inventory needs to be more than just a data base. It needs to link and work with other systems out there in a way that provides for real time information. Inventory is important for proper fire mgmt planning, fire sciences and fire behavior, fire reporting of damages, fuel mgmt, prescribed fire planning and for Protections geomatics program.</p> <p>12) No comment</p> |
| <p>P6</p> | <p>General concerns: The most critical need is to have a better grasp of impacts on the forested resource and THLB by other programs or activities, e.g.) O&G activities in Northeastern BC. [This will be started in April, 2006.]</p> <p>Another critical issue has to do with knowledge concerning mixed wood forests/stands. Granted, there probably is a greater need for targeted research first. But, there does appear to be a dearth of information available for TSR purposes?!</p> <p>Question 11) the value and purpose of inventory information appears to be quite misunderstood. It appears that many people inside gov't still consider the [VRI] inventory an operational inventory when it is not. It is an inventory to be used for planning purposes. Stand level cruises are an example of an operational inventory. More communication is needed about this on a more regular basis. Probably directed to the level of a lay person for ease of explanation between different groups within the forestry community and outside...!</p> <p>General thought/question for all of us: "How do district staff, in particular new to MoFR staff, access inventory data in a one or two stop shop sort of process...?! In other words, how or where do we inventory contacts in the district direct staff, colleagues and other ministries to – to easily find data?" I don't see any region links to inventory websites...? There are a few district webpages - and of course Branch. And iMap. ...?!</p> |

| | |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P7 | <p>1) Yes, the review is appropriate. The scope could possibly be expanded to include related inventory projects such as PEM or MPB updates since there may be synergies to be gained from looking at everything as a package. I would finish the sentence as “This review will be worthwhile if an action plan is developed to streamline the inventory program provide cost effective, relevant information for all aspects of forest management, including issues at an operational scale.</p> <p>2) The top expectations from the inventory are:</p> <ul style="list-style-type: none"> ▪ be able to provide data that can be used reliably for more than strategic AAC applications (i.e. be more operational) ▪ be able to provide better information about expected timber attributes such as piece size, quality, etc. ▪ provide reliable projections for future wood supply (i.e. AAC) in areas that will be heavily impacted by MPB, considering different management options that may exist. <p>An additional expectation that I believe is worthwhile is the need to account for forest health factors. What are the volume projections for mixed stands where the pine has died out? What is the regeneration delay and impacts on future stand yields for pine stands that die and are not harvested/reforested right away? What are the impacts on current and future stand volumes in root rot infested stands?</p> <p>3) Some things that I believe the inventory must be able to address in the future include projections for biodiversity, habitat, hydrology and other non-timber values. This will be critical in adjusting to “life after beetle” and still being able to operate.</p> <p>4) The most critical requirement now is to have an inventory that meets our day to day needs as well as serving the strategic AAC function. We need to have reliable typing, as well as predictions of size, quality, and species composition. Predictions of future stand volumes & profile for different management options is another critical component. The ability to generate reliable, watershed level estimates for use in planning is also a priority.</p> <p>5) The lack of sufficient detail to allow for spatial planning at a localized level is a serious data gap.</p> <p>6) The inventory program should include TFLs, Parks, and private land provided that the intent is not to download the funding for this onto industry. There should be a minimum standard for these lands that the data would be provided in. Additional data would remain proprietary.</p> <p>7) I would expect sufficient accuracy that we could count on it for planning purposes when assessing plans at a watershed level. For example, the age, species composition, and volume should not be grossly different for a stand than what the inventory indicates. An inventory that indicates a stand as Fd when it is in reality spruce is not acceptable. We must be able to guide operational plans with the inventory data so that they can be rationalized against strategic plans, and have value to our business. Metadata that could help would be a statement of confidence relative to a specified attribute at different scales: e.g. volume accurate to +/- 5% at TSA level, +/- 10% at watershed, and +/- 15% for an individual stand.</p> |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| | |
|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>8) No comment. I believe it is easy to access, but my own personal access is through an in-house database. The database structure is such that it is difficult for non-technical people to use it.</p> <p>9) This depends on the tenure system. Funding should be provided by government since it is a public resource. I believe coordination at a local level is possible through processes such as IFPAs, etc. There is more probability of the inventory being useful to industry if it is coordinated locally.</p> <p>10) I would like to see improvement to the accuracy to allow it to be used at a level other than strategic. I don't believe it is capitalizing on new technology appropriately. There was an opportunity to use new technology by licensees for mapping MPB under DFAM. However, the program was not allowed because it did not meet the RISC standards. It is unfortunate, because it would have been a cost effective way to collect the necessary information regarding MPB infestation levels, as well as providing a tool for operational use. As far as providing funding, it will ultimately come down to providing some form of area based tenure with some security attached. We should only embrace new technology if it is cost effective and gives better results.</p> <p>11) I don't believe we are extracting the full value out of the inventory. I also don't believe there is a strong business case for the inventory in its current form, unless we can address some of the shortcomings such as updating non-timber attributes following harvest and silviculture, providing data that can be used in spatial models, etc.</p> <p>12) No comment.</p> <p>13) <i>Inventory needs and business drivers:</i> Is it necessary for district staff to be intimately familiar with the inventory? Under FRPA, they will have less need to be looking at the inventory on a regular basis.</p> <p><i>Inventory program planning and delivery model (options):</i> Why is FAIB increasingly uncomfortable with data quality? There are standards in place and the contracts require data assurance. Is there evidence that the system is not working with respect to quality? If so, this should be dealt with through the associations that govern the practice of the professionals signing off the data assurance. With respect to the concern that funding is being diverted to other priorities: If funding is being diverted, then either the funding available is not adequate, or the inventory is not providing value when compared with the other projects. I am concerned that this statement implies that inventory should be funded off the top with no concern for what else falls off the plate. I am particularly concerned that this is another attempt to download more onto licensees. Government must be prepared to provide adequate funding for "their" resource.</p> <p><i>Inventory Capacity.</i> I find it troubling that you believe having government employees complete the work would be more cost effective than having consultants complete the work. If there is a sizable inventory program in place, it will attract more consultants and there will still be competition. With respect to the statement about VRI focusing on core timber values: I don't believe it has been shown yet that the additional attributes are providing the necessary value to justify the additional expense. If the value was there, then they would be collected. These non-timber attributes must be able to be updated and projected along with timber values if they are to be of any continued use beyond the year in which the inventory was completed.</p> |
|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| | |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>14) Additional points:</p> <ul style="list-style-type: none"> ▪ I believe the VRI standard needs revisiting so that we can get the information we need with more accuracy. I am concerned we currently have a Cadillac inventory standard without the resources to support it. As a result, we may be unintentionally creating a substandard product to what we could accomplish if the standard were revised to reflect reality. ▪ Where does inventory fit within the overall priorities for land based activities? We all agree inventory is important, but so are other activities. I get the sense from working through this challenge that FAIB is trying to ensure funding of the inventory program at the expense of other programs. There needs to be a balance. Either funding needs to be increased to meet the requirements that government envisions, or the program needs to |
| <p>P8</p> | <p>Item 5: consider multiple stakeholders, overlapping tenures, and what this implies for content, attribution, and frequency of updates.</p> <p>Item 6: not an easy question since different uses, different scales mean different business drivers, perhaps different standards, update cycles, etc.</p> <p>Item 7: consider including in metadata information that states reliability by scale.</p> <p>Item 8: info access is reasonably good providing the info exists. For oil and gas data, is a problem.</p> <p>Item 9: inventory activities don't appear to be coordinated at the appropriate level/scale. For forest inventory, MoFR should be responsible to manage VRI, and ILMB to warehouse, both to fund, and depending on inventory in question (whether it is oil and gas disturbances or forest harvesting), the respective regulating agency should conduct/maintain the inventory info.</p> <p>Item 10: consider using satellite images for updates. Districts could provide some limited ground sample verification. Collectively, should have the resources and ability to support new technology. Is worth the investment.</p> <p>Item 11: no, don't believe we're extracting full value from the inventory.</p> <p>Item 12: Capacity issue is presently large.</p> <p>Item 13, Appendix 1:</p> <ul style="list-style-type: none"> ▪ Business drivers will come and go, but what is the long-term future vision for inventory? ▪ Need strategic planning, including inventory, at the district level. Licensee priorities are not necessarily shared. ▪ If eco info is collected, will it not be for strategic level uses? Still need inventory reliability to support more operational multi-stand level uses. ▪ Agree, for some geographic areas such as the Peace, it is important to verify AUM allocations as sustainable. ▪ For many areas in the Forest Service, succession planning will be a challenge. |

| | |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <ul style="list-style-type: none"> ▪ Standards for oil and gas are not covered presently. As a first step, perhaps capture the information corporately, examine user standards, and determine what info is important to retain and how it will be incorporated in/with VRI. <p>Page 23: totally agree with the statement concerning data management.</p> |
| <p>P9</p> | <p>6. Yes, The provincial VRI should include all lands in the province irrespective of ownership and tenure. Inventory should be done to the same standards and at the same level as a current VRI over a TSA.</p> <p>8. Information access should be free for all inventories and data on the LRDW. We need to look at the cost/benefit of fees for information compared to the revenue that government receives.</p> <p>9. I don't think that current model is adequate. It relies on licensee interest to determine if an inventory is conducted or not. If it is in the best interest of the licensee then an inventory is considered. Licensee interest does mean in the public interest. The current delivery model is flawed. FIA in its current form does not allow for coordination of inventories across the province. Government need to have that role in determining where inventory activity should be taking place be government is suppose to act in the best interest of the public.</p> <p>10. Currently it is difficult to look at innovation as it is necessary to have the right qualified staff and the budget to look at this technology to determine where it is appropriate to incorporate within data collection standards. Over the last four years we have not been given the opportunity nor the funds to look at new innovative technology. If innovation is important to government then it must be appropriately resourced.</p> <p>I would support innovation if we have the appropriate resources to initiate, and review and implement as appropriate innovative ideas.</p> <p>12. Yes there are significant inventory capacity and succession issues. Recent downsizing has hurt current VRI staff in that a large amount of intellectual knowledge has left. Inventory capacity also has been affected because much of the expertise has moved out of the province because of the lack of inventory work over the last 4 years.</p> <p>Training is also an issue. Government currently doesn't put on training.</p> <p>On the RISC website (http://ilmbwww.gov.bc.ca/risc/training.htm) it states:</p> <p><i>On July 19th, 2004, the Forestry Continuing Studies Network (FCSN) announced that it is no longer providing training related services in the resource information business area.</i></p> <p><i>At this time, the most prevalent model has the ad hoc market presenting a demand on qualified trainers to provide RISC approved training leading to government certification of trainees.</i></p> <p><i>In order for the province to provide for quality, control and consistency in the data collection and analysis involved in the inventory, the provincial Resources and Information and Standards Committee (RISC) has developed standards and procedures, specifications and methodology for the various</i></p> |

| | |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p><i>aspects of the inventory.</i></p> <p><i>Trainers are invited to use Ministry training material and conduct training courses to qualify individuals for employment in the inventory initiative. The Ministry will not pay for the training courses but the trainer is permitted to recoup the costs of training through fees charged for the training course.</i></p> <p>Trainers will need to secure access to RISC training materials and the approval of the appropriate data custodians to meet this market demand. Trainers must demonstrate to the data custodian that they are qualified to train individuals.</p> <p>This has not resulted in a whole lot of training recently.</p> |
| <p>P10</p> | <ul style="list-style-type: none"> ▪ Consistency between private sector and government on data collection, standards. May require the reestablishment of RIC, or a body that ensures consistency of data collection, data format, storage and data structure ▪ Scheduling of data capture between TFL and TSA to capture efficiencies and ensure above standards are achieved. Need to address standards regarding acceptable age of the data – how old can the data be before it becomes unreliable. Are there levels of reliability based on age, amount of disturbance, etc ▪ Why is the expectation only focused on VIR and not other data sets such as wildlife, TRIM, PEM, TEM, historical information, Soil inventory ▪ What about the data management – garbage in garbage out, who will be responsible for data quality control and how will this be achieved ▪ Would like to see improved access and ability to incorporate TFL and TSA datasets together for landscape level analysis ▪ What is the status of TIPSYS, TASS, TIPSYS Economy, updates and changes recommended in the TASS/TIPSYS Topics For Review... June 2002. ▪ Accessibility to data for new partners – easy exchange of data, improved data compatibility. ▪ Metadata – need to ensure this provides the necessary information and is accurate. Build into framework, assuming new people and a lot of people will be using it we need consistent structure to the Metadata form, and quality documentation. ▪ Technology and Flexibility – we need to be flexible to our approach, ensuring easy access and compatibility with outside sources (i.e. earthgoogle) ▪ Data Storage, the north is not being adequately served by the LRDW, a local data service centre similar to the Bulkley Valley Model may be appropriate to establish within each District or Region. ▪ How will all this fit with the bigger data management strategy for MOF – i.e. avoiding duplication of data, ensuring information from one database can be linked easily to another to avoid duplication of data entry and reduce errors and inconsistency in the information. |

| | |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <ul style="list-style-type: none"> ▪ Ability to merge data in a seamless database at all scales. The data is not only important at the Provincial Level but is also important at the District level on a day to day basis. ▪ Ability to capture multi-layer data, for example mixed wood inventories ▪ Require District involvement to field test across programs. Need to ensure data is easily accessed and staff, other agencies or outside groups are able to generate both spatial and tabular reports when needed to address local issues around strategic planning, resource stewardship monitoring, silviculture, forest health, C&E etc |
| <p>P11</p> | <p>1: There are links to other programs that have not been addressed, including the overlap of standards, training capacity, and certification of MOFR CGNF appraisal cruising and the evolving role of the (ASTT) Forest Measurements Registration Board.</p> <p>9: Conducting inventories should remain where capacity exists: consultants. The MOFR should have a bigger hand in managing the inventory (e.g. setting priorities, etc.), including contract management standards (e.g. open bidding) to ensure an appropriately sized and competitive capacity is maintained in the province.</p> <p>12: Depending on outcome of review, phase 1 training, and phase 2 ecology sampling capacity is lacking immediately.</p> <p>13 (Appendix 1 Comments):</p> <p>Missing linkage to MOFR coastal appraisal cruising (CGNF standards, NVAF replacing DWB factors).</p> <p>Inventory capacity and succession challenges are bigger than competing with other jurisdictions or planning for retirements. The looming demographic problem of retirements is intersecting with a downward trend of forestry graduates. The Foresters Act now includes RFTs, and that has increased demand for educated and experienced technologists throughout the industry. VRI photo interpretation and sampling specialists are usually the most experienced of the technical community, and these people will be in high demand by many employers outside of inventory. Consistent, long-term funding of VRI is the only way to maintain capacity in government, industry, and consultants.</p> <p>Corporate memory and specialized knowledge aren't the same thing, nor are they exclusive to companies or government. Program memory, including specialized knowledge and limited corporate memory, exists in individuals in all three sectors of forestry. Down-sizing in one sector (e.g. gov't) usually leads to a build-up of capacity in another (e.g. consulting), and vice-versa. Government inventory is definitely understaffed, but care should be taken that a build-up in capacity for support and monitoring doesn't come at the expense of delivery capacity. Assured funding will do more for maintaining program memory and specialties than just a build-up in one sector, and will also ensure the build-up remains built over time.</p> |

| | |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>P12</p> | <p>Question #10 The inventory to date has not been capitalizing on new technology appropriately. The implementation of better tools for data capture are blocked by current government standards which do not include digital aerial photography as a legitimate data source. Similarly the lack of standards for lidar also impede the implementation of approaches which capitalize on advances in technology. A pilot project to demonstrate the value of alternate approaches may provide an opportunity to better quantify the value of approaches which do capitalize on new technology as opposed to doing things the way they've always been done with a heavy reliance on conventional aerial (film based) photography.</p> |
| <p>P13</p> | <p>9. Delivery Model, Roles and Coordination</p> <p>The Review will have to examine and investigate Staff Roles at the District and Regional Levels. The issue is delivery of services internal to the District and Regional staff in other programs.</p> <p>14. Other points to make</p> <p>Forest Health /Climate Change Issues</p> <p>The winter of 2005/06 was one of the warmest on record. MPB and Dothestroma are possible Indicators of climate changing. Development of a Monitoring Strategy is supported. The effects of climate change may have greater effects in the north, as it is forecasted to warm higher in the northern latitude along with wetter summers in the central interior. Performance Monitoring of Young stands (which are the mid and long term timber supply) is an issue.</p> |
| <p>P14</p> | <p><u>5.1</u></p> <p>While I do think the review is appropriate, I find a lot of preconceived notions within the text of this document about what's going on in the FIA / LBIR system that I find not true. I think some FAIB personnel need to be more involved with outer processes to educate themselves how they truly work so they are "not throwing the baby out with the bath water". To finish the statement <i>"This review would be worthwhile if ... FAIB staff truly go into the review with open eyes."</i></p> <p><u>5.2</u></p> <p>Top Priorities</p> <ul style="list-style-type: none"> ▪ Ecosystem – based management ▪ Habitat Supply Analysis ▪ Harvest Planning (still is important) & 2nd Growth Analysis & Harvesting ▪ Growth & Yield initiatives ▪ TSR <p><u>5.3</u></p> <p>I see in the next 5 years finally finishing off the VRI and TEM inventories on the whole coast and then moving to addressing known weakness in the final product.</p> |

5.4

Priority Inventory Services & Products

- Up-to-date inventory information (all updates complete to present)
- New inventories where they are really needed (e.g. Mid Coast - should work with the cooperation of local LBIR group) – for instance I recently worked with Mid-Coast data where some of the Reference Years (year of data collection) were in the 1950's)
- New Provincial / Regional Growth & Yield Systems

5.5

There is a gap in the Growth & Yield processes that should be filled regionally and/or provincially.

5.6

As current legislation stands TFLs should be the responsibility of the TFL holder. If the holder's real money has paid for the inventory then it belongs to the TFL holder and negotiations should commence with them if the government wants the data. On the other hand if 100% FIA funding went into the TFL inventory then it is public domain data.

Parks and private land, while important to have – especially at a landscape unit level – should be either done to a lighter standard or put off until areas with more active planning processes are completed.

5.7

While you may never be able to approach the accuracy of an operational cruise, the program should be modified to accomplish something other than a 'strategic level' accuracy level, at least for the long run. The end of the VRI inventory program after the adjustment is done should not be the end of the inventory work. The inventory should be revisited and analyzed for areas of improvement (e.g. 2nd growth, deciduous, etc.)

5.8

Access has greatly improved with the advent of the LRDW. While some tweaks could be done to the system this is generally a success story.

5.9

While there can be some small modifications to participation in the LBIR processes, I think it is important to have local level buy-in for feelings of ownership and generation of support. Again "don't throw the baby out with the bath water".

5.10

I believe the key to incremental improvements is not so much the reliance on technology to improve information. A better solution is to have a long term program that doesn't end at the calculation of the VRI adjustment. Immediately upon completion of the VRI a review should be implemented that identifies weaknesses and gaps in components. A long term plan should then be devised to address those weaknesses and gaps. The key at that point is to plan small, annual, "incremental" projects that don't require major annual budgets.

| | |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p><u>5.11</u></p> <p>My impression is that the forest community outside FAIB does understand the value of forest inventory information. This is reflected in the support for VRI / TEM programs in the DFAM / LBIR groups.</p> <p><u>5.12</u></p> <p>Capacity, succession, and training can only succeed if there is a long term financial commitment for annual VRI work.</p> <p>This was identified as a problem with VRI Phase 2 training. Training was offered up in the nineties and many did take the courses. At the time, though, there wasn't a lot of Phase 2 work so many felt they wasted time and money on the training effort.</p> <p><u>5.13</u></p> <p>Most of my comments up to this point address the government issues stated here.</p> <p>The main point in all this is that I believe FAIB has a misconception about what types of decisions are being made and the type of participation in the local DFAM / LBIR groups. In all the meetings I've attended MoFR district and/or FAIB (usually from the analysis side) staff are there and they help with the decisions (many of the meetings are held at the district offices). It is incorrect to suggest "MoFR has little input into investment priorities". If VRI FAIB personnel want to attend these meetings they are welcome to come.</p> <p><u>5.14</u></p> <p>Most of my points have been made throughout this document.</p> |
| <p>P15</p> | <ul style="list-style-type: none"> • The review will be worthwhile if, a clear plan of action is developed that is supported by the major stakeholders and the plan is acted upon within an acceptable time frame. We have done these reviews before and very little of the recommendations, actual come to fruition. • Top 3 needs of inventory that should be met; AAC determination, Accurate Species/Age/Height information on a drainage basis, Accurate volume on stands that are greater than 40 years old. • In 5 years and beyond we must be ready to accurately reflect the impact of insect damage (MPB in particular) within the inventory. Much of the PI dominant stands will be harvested in the next 5 years, but mixed wood stands with a minor component of PI will not be. . . what will this stand look like in 5 years? We can not rely on a full re-inventory (cost) to accomplish this. • A major gap in the inventory is the level of confidence in using the inventory on sub-strategic level analysis. Drainage or stand based analysis is probably the largest use of the inventory yet the number one priority is TSA level "statistical validity" . . . this does not equate to accuracy . . . • TFLs, Parks and Private land forest inventories should be part of the overall mosaic, but emphasis should not be placed on these areas. What ever data is readily available for TFLs could be adopted. Photo interpreted information on Parks should be all that is needed. Due to the nature of private land it may not be cost beneficial to spend dollars inventorying something that could change tomorrow and would then not be reflected correctly in the inventory. Simple satellite algorithms may be useful in creating and or updating private land and park inventories. |

| | |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <ul style="list-style-type: none"> • Although this inventory should not try and take the place of specific stand level assessments, it should also, not rely on these assessments to pretend they augment its data. These stand level assessments are captured at a time in the business process when the information is not relevant for long periods of time. More emphasis needs to be put on photo interpretation and stratum size when initial establishment of the inventory polygons is happening. There needs to be more emphasis put on key stand level data – Species, age and height, to allow users to feel more comfortable using the data for sub-landscape analysis. • There still seems to be some unnecessary barriers when trying to acquire forest inventory information. • At this stage the roles and responsibilities of everyone involved in inventory are not clearly understood. This IPR needs to address that. • We haven't done a good job in the past dealing with known issues in the inventory. When we know there is an issue somewhere we tend to try and fix more than that (sometimes doing a complete new inventory). This approach waters down the benefit. Satellite imagery and image analysis tools could go a long way in addressing some suspect information in many TSA's. • Appendix 1: <ul style="list-style-type: none"> ○ It seems there are many ideas discussed in this appendix that tend to make many assumptions based on how things used to be. The inventory capacity section makes a bunch of assumptions that are not necessarily government's role moving forward. For example items listed as (2)-(5) do not have to be government's role. ○ Using consultants may not increase cost in inventory creation if items 2-5 above, were streamlined ○ The business climate today is vastly different than 15 years ago with the Forest Resources Commission. Business has clearly shown what is important to them when collecting new inventory information. The VRI standard needs to be curtailed to what has proven to be a need and one that is sustainable going forward. |
| <p>P16</p> | <ol style="list-style-type: none"> 1. This review would be worthwhile if it provides some clarity on what questions we need to answer with this inventory, results in the development of a plan to acquire that inventory and resources to make it happen. 2. The priority is an inventory that provides a good description of a disturbed stand in the interior and a partially harvested stand on the coast. 3-4. We need an inventory that has accuracy below the MU level as we will be using it that way regardless of whether that is appropriate or not. 5. The land holder should be responsible for the inventory and gaps should be addresses strategically at the provincial level. 6. The inventory should cover the entire province with no exceptions, and use best available information. 7. I think the inventory needs to be accurate at a subunit level, maybe landscape level. That said, I think the current phase 2 inventory adjustments are of very limited utility and the dollars spent might better go into a better phase 1. 8. Coordination, there is none as it is currently totally haphazard. The landholder (Gov.) should manage and conduct inventories that reflect provincial scale priorities. |

| | |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>11. You cannot manage and get the most value out of something you know nothing about, so an inventory is critical. The value of this inventory is very limited if you believe it is only useful at the Management Unit level.</p> <p>14. Why has the utility of the VRI been so limited that the MOF and Industry have not felt the need to upgrade from FCI to VRI? Is there no benefit to the change? Ask Staff what they think.</p> |
| <p>P18</p> | <p>4: User friendly access to data is important.</p> <p>6: A provincially seamless inventory may be too large of a step. Depending on the district or region, many land use planning issues are on a landscape unit (LU) or district/TSA basis and depending on the licence holders they may have all the necessary data (i.e. many TFLs are made up of a number of whole LUs). Perhaps, look to the districts and see where seamless inventories currently exist or could exist with minimal effort and start prioritizing at a smaller unit level. The province is too big to expect that data will ever be at one standard or one level of currency but district-level info might be within a tolerable level.</p> <p>6: Getting basic inventory on parks would be beneficial from a wildlife and biodiversity perspective. Some of the new parks have this information but there is not good coordination with Parks Branch to ensure that it is the current info or if they have better data.</p> <p>7: It is recognized that VRI is a management unit inventory, but we do push its use to other purposes because we have not alternatives. During the review, it would be interesting to identify how it could be improved to be used more accurately at a landscape unit level. The answer is simple (I think), more plots but can they be done over a number of years? Can local information be incorporated back in (as was originally planned) to improve the inventory? If we could create a base, that is continually improved as opposed to replaced (every 20-40 years), we would truly be improving the inventory program.</p> <p>8: As a licensee access to data is difficult and bureaucratic. The data sharing agreements have been so difficult that often they are not attempted and different routes for the data are followed (i.e. buying it) but this does not achieve the exchange of information back into the system. In the current world of electronic submission from licencees through FTA, ABR & RESULTS it would seem that information is going in so that simple access to resulting data should be made available. However, once access is arranged the LRDW actually works quite efficiently.</p> <p>9: What has happened in the past 5 years with inventory is unacceptable, inventory has been pushed around between both government and industry. Industry has done some work through FIA funding but ownership of the data was always muddled. It needs to be decided who owns the data and then move on. If it is industry (which I do not believe is a logical choice) then government needs to not set rules regarding it. If government owns it, then they must make it the priority that it is and perhaps through partnerships work on improving it or just do it acknowledging that the province is the long-term beneficiary of the data.</p> |

| | |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P19 | <p>Critical Questions</p> <p>1. <u>Inventory Program Review</u></p> <p>Getting input from many stakeholders is a great idea at an early stage of the process. In the end, the details of the vegetation inventory and G&Y will have to be done by a very select group of highly experienced inventory persons that are very familiar with what has been done historically in the province. They will also have to wade through all the dialogue and draft a convincing inventory plan that will satisfy the real forestry needs in BC.</p> <p>2. <u>Today's Top Business Needs</u></p> <p>Need to define the provincial-wide vegetation inventory program that will be in place for the next 15+ years and then get a long-term commitment from the government to fund that program.</p> <p><u>No. 1 need</u> is to map the productive forest land in the province and to describe it accurately to facilitate sustainable timber harvesting and adequate reforestation/rehabilitation.</p> <p><u>No. 2 need</u> is to have a vegetation inventory that will provide sufficient information about the BC's forest resource to facilitate all major forest activities including protection, silviculture, engineering, recreation, planning, modeling.....</p> <p><u>No. 3 need</u> is to provide spatially accurate vegetated and non-vegetated land cover information that will support the planning of other resource values including wildlife, hydrology, fisheries, recreation, urban/wildland interface, tourism, wetlands, other industries.....</p> <p>All forest activities should be based on good information about the forest...it all starts with inventory. In the late 50's through the mid 70's, almost all new BCFS forestry recruits from universities started out in the Inventory Branch and they all did inventory fieldwork. Why is it today we seem to think so differently? During the past 35 years, I have seen the Inventory Branch go from a force of dedicated and very knowledgeable inventory experts (many of them European), all with years of field experience to a small group of individuals that hardly ever see the bush and many counting the days until they retire. And where is the leadership? At one time, most Regional Managers, Branch Directors and Forest Executives had been through the Inventory Branch early in their career thereby having great appreciation for good forest information.</p> |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

3. Future Business Needs

Do we need quicker and more accurate information, semi-automated classification, a better understanding of what technology such as remotely sensed and analyzed data can do for us, super-models.....or do we need to start by rebuilding the inventory expertise in the province? **Me thinks the latter.**

4. Priority Inventory Services & Products

- a) Finish the inventory coverage of the province to a consistent standard.
- b) Revitalize effective site productivity, G&Y, NVAF and ecological mapping programs. These programs must be closely linked with the basic provincial inventory database.
- c) Decide how the inventory is to be kept current or updated.

5. Different Inventories

A provincial-wide inventory cannot and will not provide all of the information for all circumstances. Being stewards of the crown forest land base, the government must decide what level of information is needed (by government and by industry) to adequately manage the forest resource. Needs beyond this will have to be designed and funded by the other interest groups.

6. TFL, Park & Private Land

TFL – Should meet or exceed VRI standard on crown land. If more detailed attribute information is provided for a TFL, it should be designed in a manner that can be fed into the provincial VRI database.

Private Land - Outside of major cities, inventory of the private land in BC is not a big issue. It should be done at the same time as the TSA inventory but perhaps have broader typing (larger polygons) and have no fieldwork (the classifiers can photo interpret private land using field information from adjacent crown land).

Parks – Small Parks should be done at the same time as the surrounding TSA. Again, with no fieldwork (unless BC Parks pays for it) and perhaps broader polygon delineation. Each larger provincial park should be done as a separate inventory to the VRI standard of photo interpretation but with BC Parks funding.

7. Accuracy

I feel current TRIM **mapping accuracy** is more than sufficient. SPOT 5 or better scale photo/imagery is good for updating cutblocks, fire boundaries and roads. Red attack needs at least 1:25,000 scale color or CIR photo to map.

Attribute levels of VRI Phase 1 allow for as accurate as ever needed. Species to nearest percent, age to nearest year, height to nearest 0.1 meter, crown closure to nearest %, density to nearest stem, basal area to nearest sq m. This accuracy can only be approached by very experienced interpreters, lots of fieldwork and very good photo. This in turn will cost more \$/ha.

Site productivity, G&Y, NVAF – answers are harder and more expensive.

8. Information Access

Rumor has it by the time the information is accessible from MoFR, it is out of date. FAIB has to become more proactive in getting the message out about when the information is available, how it can be accessed and then how to use it (or at least what the VRI program is). Since 1995, very little information has ever come out of the Branch pertaining to the VRI program.

9. Delivery Model, Roles, Coordination

Delivery model will have to be addressed after the program design is finalized. Ultimately the government is responsible for vegetation inventory on crown land. Therefore, MoFR must define the standards and specifications of all aspects of vegetation inventory.

Phase 1 and Phase 2 of VRI (or equivalent) may be managed by industry but needs to be co-administered with a MoFR regional inventory expert. Other highly specialized inventory programs (site index/productivity, G&Y, NVAF) should be administered by FAIB in Victoria.

10. Improvements, Technology, Innovation

Yes, there is lots of room for new technology and innovation and yes, we can easily have the expertise if all those who benefit from the forest resource contribute accordingly. The government is the recipient of harvesting revenues and forest companies are in the business of making money out of trees. Forestry is big business and vegetation inventory is a necessary cost of doing business.

11. Value of Inventory

Wow..... BC is blessed with the greatest forest resource in the world. The government must fund the inventory programs required to properly manage this resource. It's all about stewardship and accountability

12. Capacity, Succession, Training

Dwindled but still alive and well in the consultant world. Government needs to ramp up staff and expertise. With a guarantee of a 10 year funded program, consultants will be there to get the work done. VRI training programs must be continued with appropriate modifications.

| | |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>13. <u>Appendix 1</u></p> <p>Generally, agree with the issues and their comments.</p> <p>Final Comments</p> <p>I commend the Chief Forester and the Assistant Deputy Minister in sponsoring this Dialogue. BC has always been a world leader in forest inventory but the current government has put inventory on the back burner. The current VRI program is actually a very good one. It was designed over several years by scores of forest and other resource specialists. Yes, it needs some improvements and injection of innovation, but in order to start the process, it needs more leadership, expertise and continuous financial support at the Inventory Branch level.</p> <p>Since the Crown owns most of the forest land in the province, MoFR needs to determine the inventory program and funding vehicle. At the same time, the forest companies need to have input as is happening in this dialogue.</p> |
| <p>P20</p> | <p>Review worthwhile if more decision makers realize the benefits of holistic and integrated approach to (terrestrial) physical and biological inventories</p> <p>Priority business needs:</p> <p>Total cost accounting of relative benefits of fibre harvest vs. provision of ecosystem services in the global context.</p> <p>Impact of harvesting scenarios and other forest management decisions on non-target resources and processes</p> <p>Ecosystem resiliency – where are the sustainably harvestable surpluses?</p> <p>Derived information from VRI – age-class themes, productivity themes by species, species distribution models (maps) structural classifications ...</p> <p>Future business needs:</p> <p>Rationalization of ecosystem and vegetation classifications at a variety of scales to better deal with anticipated redistribution of biota caused in part by climate change</p> <p>6. there must be a way to derive useful information from TFLs, PPA and private, generalized to the point where it doesn't unduly impact proprietary information critical to maintaining fair competition in the Forest Industry</p> <p>10. Remote sensing technology is maturing (including satellite and airborne sensors) and should figure prominently as a third phase (or new first phase) approach to vegetation inventory</p> |

| | |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>P21</p> | <p>Question 2: Our critical planning and decision support needs revolve around MPB-killed stands, and where/how to allocate them for harvest opportunities and retention (deferred harvest, conservation). Volume is being allocated based on the old inventory, yet field checks are revealing that the volume may not be there for the licenses. We need relatively up-to-date information on what is there, what condition it is in, and how it is being depleted. Minimizing the timber supply falldown that will come in 5-10 years absolutely requires good information on the condition and location of our non-pine stands, immature natural stands and plantations. This information needs to be gathered and available to government and forest managers ASAP.</p> <p>Question 3: Growth and yield programs will play a big role in assessing the timber supply of the future, particularly with the uncertainty of future forest health concerns, climate change, etc. Consideration needs to be given to how to better integrate G&Y into VRI, to create efficiencies. There is much opportunity with MPB/wildfires and subsequent harvesting to rebuild G&Y into managed landscapes.</p> <p>Question 6: All Crown land should be included in a single provincial vegetation inventory. Efficiencies and economies of scale should be taken advantage of at any opportunity where public funding is involved. Data acquisition, standards and level of standard application should be applied consistently in order to save time and money later, to avoid data incompatibilities that could happen if parks and TFLs are dealt with separately.</p> |
| <p>P23</p> | <p>3) Future business needs; MPB and under story stocking. Long term loss from lack of knowledge of the current MPB out break.</p> <p>4) Most limiting factors: no-one is accountable to have an inventory; Nor do we have a description of what an inventory is. Or what the current uses are. The continued lack of budget.</p> <p>6) Yes the TFLs should be held accountable for the same standards or they may exceed it as long as the data that we receive can be entered into our current computer compilation program.</p> <p>10) Pease use new technology.</p> <p>12) Very Very Funny!</p> |
| <p>P24</p> | <p>1. In the 90's we missed the significance of TEM & PEM to our future needs. I would add TEM/PEM to the IPR. Ecosystem mapping is absolutely critical to future management actions.</p> <p>3. We need to develop the responsive to deal with emergent issue like the MPB. In this context, a sampling solution to capture existing state and monitor changes on year to year bases is critical. The issue is the 'system' response enough to permit this to happen. Recent experience suggests that it is not.</p> <p>5. Drive these assessments based upon the local needs of the TSA/TFL not on a common provincial model. Why would you invest money in the Cassiar TSA?</p> |

| | |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>7. Given the movement of cruising standards towards VRI standards , CGNF should we not move our thinking to capturing of these data referenced by ecosystems to develop future models of inventories based upon actual cruise information,?</p> <p>10. Incremental improvements will not happen under the current paradigm of controlling the process of inventory rather than the outcomes. If you continue to duck walk partners through endless months of reviews and consultation, no one will be interested.</p> |
| P26 | <p>Critical Issues 5.1: I think this review is critical. Are you including TEM, PEM, Bio-Terrain, etc inventories that licensees are building new VRI Inventories on and whether these are beneficial and possible cost efficient?</p> |
| P30 | <p>1. It is definitely appropriate and will be useful.</p> <p>8... It is very difficult to access data.</p> <p>9. A partnership of industry and gov't staff. Gov't staff should set priorities and assist in management of projects.</p> |
| P31 | <p>Where are the persons trained going to find work to apply their new skills?</p> <p>Is there work out there? and money to enable it to be completed?</p> <p>A strategy is a great idea; and fundamental to meet your challenge, but funds will be needed to implement it. If there are no funds the strategy and any effort to train persons will be wasted as they people go on to find different jobs.</p> <p>The feedback form is very limiting. There was no discussion on Barriers to moving forward, Substitutes, Strengths, Opportunities or Weakness that should be considered. This might be a more effective way of opening up the discussion. Eg. Focus on your strengths, reduce your weakness. Perhaps this is the next step in the Challenge process</p> <p>Access to data is difficult- unless someone comes to us with a project of greater than \$2000 we aren't interested in doing the works because of the effort it takes to access the data. The data is openly accessible to view on the internet, can it not be accessible to use and manipulate as well, or is there a conspiracy theory/security concern?</p> |
| P32 | <p>1. Inventory program review is timely. Focus on timber, but include non-timber resources where they are of significant value.</p> <p>2. The top planning and decision-support needs are...</p> <ul style="list-style-type: none"> a. timber types and volumes and areas. b. PEM/TEM c. areas and volumes impacted by oil and gas activities. <p>3. There is great uncertainty of inventories now and poor communication between resource users since they currently have their own data; this needs to be standardized, rationalized, and shared between resource users and stakeholders.</p> |

| | |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>5. One gap in current inventory is the area impacted by oil and gas.</p> <p>6. Call for consistent standards on all lands.</p> <p>10. Oil and gas industry and ministries may contribute towards inventory costs if it can be shown that updated information will facilitate resource development and reduce risks.</p> |
| P33 | <p>It is always worth reviewing progress here. I cannot find a good description of the actual steps involved in the VRI through all phases including change over time on the web site so it is hard to examine all the critical questions.</p> |
| P35 | <p>1: There are links to other programs that have not been addressed, including the overlap of standards, training capacity, and certification of MOFR CGNF appraisal cruising and the evolving role of the (ASTT) Forest Measurements Registration Board.</p> <p>9: Conducting inventories should remain where capacity exists: consultants. The MOFR should have a bigger hand in managing the inventory (e.g. setting priorities, etc.), including contract management standards (e.g. open bidding) to ensure an appropriately sized and competitive capacity is maintained in the province.</p> <p>12: Depending on outcome of review, phase 1 training, and phase 2 ecology sampling capacity is lacking immediately.</p> <p>13 (Appendix 1 Comments):</p> <p>Missing linkage to MOFR coastal appraisal cruising (CGNF standards, NVAF replacing DWB factors).</p> <p>Inventory capacity and succession challenges are bigger than competing with other jurisdictions or planning for retirements. The looming demographic problem of retirements is intersecting with a downward trend of forestry graduates. The Foresters Act now includes RFTs, and that has increased demand for educated and experienced technologists throughout the industry. VRI photo interpretation and sampling specialists are usually the most experienced of the technical community, and these people will be in high demand by many employers outside of inventory. Consistent, long-term funding of VRI is the only way to maintain capacity in government, industry, and consultants.</p> <p>Corporate memory and specialized knowledge aren't the same thing, nor are they exclusive to companies or government. Program memory, including specialized knowledge and limited corporate memory, exists in individuals in all three sectors of forestry. Down-sizing in one sector (e.g. gov't) usually leads to a build-up of capacity in another (e.g. consulting), and vice-versa. Government inventory is definitely understaffed, but care should be taken that a build-up in capacity for support and monitoring doesn't come at the expense of delivery capacity. Assured funding will do more for maintaining program memory and specialties than just a build-up in one sector, and will also ensure the build-up remains built over time.</p> |

| | |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P36 | <p>3. Climate Change, Monitoring GD, Ecosystem services (carbon credits, genetic diversity; tree improvement); Access & Benefits (GR)</p> <p>5. linkages to tree improvement, genetic gains, genetic diversity, in-situ gene conservation</p> |
| P37 | <p>The answers to many of the questions asked will be as diverse as the number of stakeholders sampled. We can certainly try to focus on future business needs, products, services, etc, but perhaps the focus should be on what are essential or basic information needs that will be required to meet legal provincial obligations (BC has signed on to many accords as well as having a stewardship responsibility) and then expand outwards with different options and scenario's based on user feedback more specific than I am able to provide ☺.</p> |
| P38 | <ol style="list-style-type: none"> 1. This review will be worthwhile if it leads to action and improvements in the inventory program. 2. How will mixed stands in which the pine has been killed by MPB (but not salvaged) develop? (G&Y component of inventory). How will the advance regen and new regen develop in stands of dead MPB which are not salvaged? 3. I think that we might be looking at getting different products from the forest (both timber related and non timber) (different meaning other products besides sawlogs and pulp due to development in other countries and changes in the values we expect from our forests). Keeping the inventory process flexible enough to consider these developments is key. 4. N/A 5. I think this is what I was thinking of in answering question 3 above. There could be lots of other inventories (mushrooms for example) that would rely on the broad forest inventory to identify key areas for closer/more focused inventories. i.e., pine mushrooms tend to grow in a forest with these kinds of attributes. So someone could look on the forest inventory for stands that meet those criteria and then go and get more detailed info from them. (narrowing down the focus) 6. Yes, TFLs, parks and private lands should be included. (Private land may not be quite as critical but definitely TFLs and certainly parks. Yes, they should use the same standards as those used in the non TFL or Park area. If they would like more detail for different purposes then they can collect that info but there should be some basic info that corresponds to what is collected outside of these areas. 7. Not sure. Also not sure about the metadata requirements. 8. Not dealing with accessing inventory info on a daily basis so I can't really answer this question. How to access info might make a good newsletter article for FORREX's LINK. 9. Government should have the bulk of the responsibility since they are the stewards of the land. I think that industry should lend a hand though – maybe a 75 G/25 I split. I agree with the comment by inventory staff that the district folks should be involved. That would help them to be more familiar with the land base and would be good for the inventory since they would be more familiar with the land base. 10. Not sure 11. I don't think so. No we're not. Very strong. 12. Described well by inventory staff in the appendix |

| | |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>13. Agree with them all</p> <p>14. No</p> |
| <p>P40</p> | <p>6. A seamless BC-wide product is an essential requirement for many users.</p> <p>11. No the value is not always recognized; more wide spread use could be encouraged with simpler value-added products.</p> |
| <p>P41</p> | <p>1. I think the IPR will be worthwhile if it actually brings the inventory program back to the government and is funded to a level that will achieve a provincial coverage updated over time.</p> <p>2. - Obvious need is to address the change in the inventory due to dead trees. It will be important to conduct new inventories maybe 5 or 10 years after the bugs have wiped out an area in order to assess the ingrowth.</p> <ul style="list-style-type: none"> - Complete coverage, including parks and TFLs - Upgrade older inventories that have fallen off the table due to the change in delivery mechanisms these past few years. <p>5. We need to be able to layer data for analysis purposes. We shouldn't try and cram data for every possible use into the VRI. We have collected linework for large fires for example, but they do not need to be cut into the VRI as they weren't done to VRI standards. But they are a very useful layer for analysis purposes at the TSA level. There was also a push originally to take all the RESULTS data and cut every internal polygon into the VRI. The RESULTS data is far too detailed for VRI needs. The VRI needs to avoid being a data dump inventory.</p> <p>6. Yes, but they don't have to be to the same standard. Parks could be a modified VRI (tree emphasis). But there needs to be a provincial VRI fabric for reporting purposes.</p> <p>7. The inventory needs to be statistically defensible at the TSA or strata level, not at the polygon level. We would never achieve that level of accuracy within reasonable costs.</p> <p>8. I am familiar and used to accessing data from the LRDW. However it can be a learning curve for some folks. Also the upcoming change in the VRI data model is going to need to be widely communicated.</p> <p>9. It isn't working!!!! There are major information gaps being created because the inventory program is no longer being driven provincially. Areas have been reinventoried that didn't need it, and others are being left out. This needs to change. Government, with all its warts, at least has no hidden agenda when it comes to where inventories happen.</p> <p>10. We should be a little careful here. New technologies can be pushed too fast by consultants without a complete look at the improvements the technology may or may not bring as well as the cost. The cost seems to be left out of the equation quite often. I'm all for investigating new technologies, but we have to keep in mind fiscal realities as well as the purpose of the VRI. Perhaps something like lidar could be useful for sampling situations, but I think proposals to map entire TSAs using it to collect new polygon attributes isn't a cost effective use of the technology.</p> |

| | |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>We certainly need to take advantage of large format digital cameras. It looks like there could be some major time savings achieved when it comes to data delivery. We are still waiting for some of the traditional orthophotography to be delivered from our 2005 flying season. This turn around time is too long.</p> <p>12. The capacity, training and succession issues are huge. Over the past years the program has been crushed, both in government and in the private sector. A lot of our inventory companies went to Ontario so we have very little capacity right now. The government inventory staff was gutted across the province leaving very little capacity. Some of those left will be retiring in the next few years, creating an even larger hole.</p> <p>14. The VRI program could use re-structuring. The silos need to be broken down. There needs to be much closer connect between the present data loading group and the update group in Kamloops for example. VRI is ONE program with many working parts. The parts need to know and have a basic understanding of the other parts to work effectively. At the moment there isn't enough synergy between the three silos. They are being treated as three separate programs almost.</p> |
| <p>P42</p> | <p>The review will be worthwhile if ... please see comments at the outset.</p> <p>Today's priorities – Services and Products:</p> <ol style="list-style-type: none"> 1. Integrating tree-level (stand and stock table) information into the inventory. 2. Continuing to establish long-term growth and yield monitoring plots that are generally representative of the populations of managed plus natural stands; moving from the traditional growth and yield program toward this kind of forest monitoring program. 3. Integrating the use of plots in 2 into a formal system of updates. 4. Identifying the core components of the inventory that are needed to be maintained and updated on a routine basis. 5. Develop a more stable system of inventory management that includes a strong education component as it relates to the use of inventories and their application to strategic and operational issues. <p>Current Business Needs:</p> <ol style="list-style-type: none"> 1. Determining which trees and which stands to cut, when, and which to leave behind in the face of natural disturbances, the need for water and habitat protection, the need to provide employment and benefits in an industry that is faced with significant global competition, and the need to provide for the greater well-being of our communities. <p>Different Inventories for Different Circumstances</p> <ol style="list-style-type: none"> 1. We need to understand what is core to a Provincial inventory and what additional kinds of information are needed to deal with more local issues. <p>Future business needs:</p> <ol style="list-style-type: none"> 1. An increasing demand to be held accountable for what we do in terms of forest and community level impacts, which requires that both operational and strategic planning and management be accommodated within the inventory management framework. <p>TFLs, Parks, Private Land</p> |

| | |
|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>1. Yes the information should be included in the Provincial inventory. Yes there should be basic Provincial standards for data collection.</p> <p>Accuracy</p> <p>1. ... But operational cruise data should and could be used to better understand the inventory and its estimates. This includes reconciling inventory, cruise and scale-based volumes. If we do not start coming to an understanding of the inventory at an operational scale, then we will continue to proliferate policies and practices that are out of step with operational realities. If we find that certain strata have for example a 30% fall down in certain kinds of volume, then we may be setting ourselves up for a situation where we think there is a good supply of timber available for harvesting, but we can't find it. Such issues impact on our ability to manage all resources, not just timber, particularly since we are reluctant to shut mills and communities down. Our inability to understand the inventory at this level of detail is really impeding us in terms of responding to the bark beetle. Instead we keep trying to address the issue by driving around in pick ups and flying around in helicopters, but this is still not enough to gain a real appreciation for the kinds or varieties of stands we have available to manage, because neither of these modes of transportation allow us to properly reconcile tree, stand and landscape level details from the perspective of the inventory as a whole.</p> <p>Delivery Model</p> <p>1. This may be the # 1 issue. We need to collectively understand the importance of the inventory and thereby be committed to maintaining and utilizing it across all sectors. If there is not a collective will, understanding and participation in developing, managing and utilizing inventory information, then we will continue to rely on erratic funding and we will continue to produce piece-meal results.</p> <p>Incremental Improvements, Technology, Innovation</p> <p>1. I have been working within the TOLKO (formerly Lignum) IFPA since 1998 developing tools for enhancing inventories such that the latter may be used for both operational and strategic purposes. These tools include:</p> <ol style="list-style-type: none"> a) Stand structure classification b) The development of an open source stand structure compiler enabling people to compile their own plot data in terms of 1 of 2 stand structure classifications – the TOLKO system which is independent of species and the CANFOR system that is dependent on species. Both classifications distinguish stand according to differences in the numbers of trees by diameter class. c) Methods for extrapolating stand structures from known points in the inventory to unknown points and subsequent methods for deriving stand and stock tables for each polygon (TOLKO Williams Lake). d) Methods for inferring inventory polygon stand structures and associated stand and stock table information using cruise plots data (CANFOR Prince George). e) Using the information in C (200000 + polygons in the Cariboo) developed a bark beetle simulation model that bridges operational and strategic kinds of decisions by simulating the impacts of beetles on tree, stand and landscape levels for a period extending to 2020 (or beyond). While the model is not supported with a growth model, it does simulate the impact of bark beetles at the tree-level of detail by accounting for expected log degrade and losses in recoverable volume with time from individual tree |
|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| | |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>mortality. In combination with stand structure classification, the resultant data set could be used to develop a harvest priority rating system, thereby identifying the kinds of stands that should be of highest priority for harvesting so as to recover as much value as possible while at the same time maximizing the potentially viable wood supply for the longer term (conservation of resources).</p> <p>f) The potential to incorporate growth and yield forecasts into the model, such that the trajectory of stand development is more realistically modeled as being dependent on stand structure characteristic details; such a model could be used to more effectively address wood and habitat supply issues in conjunction with the development of silviculture and harvesting prescriptions.</p> <p>g) Consideration for inventory updates through the growth and yield projection of the underlying plot information, along with the ability to check these projections relative to plot remeasurements, thereby leading toward an integrated inventory and management planning system.</p> <p>Value of Information:</p> <ol style="list-style-type: none"> 1. I do not think that the value of inventory information is understood, let alone appreciated for reasons that I have already highlighted. |
| <p>P43</p> | <ol style="list-style-type: none"> 1. ...links a sampling system that can move from strategic inventory -> stand level with minimal RISK and acceptance by industry, government practitioners 2. account for accurate height and age; being able to move the inventory for use at both the MU level and landscape level 5. Wildlife inventory 6. IF the province wants to include private land in the VRI, then the province needs pay for it 7. Big run here since the program is not expected to replace stand level assessments from Victoria's view point however when it gets down to the Districts, the VRI is being used for stand level monitoring for landscape unit planning accounts 9. Government responsible to deliver but unable to provide incentives to attract further buy in by industry 11. Strong value as it is tied to increase/decrease in AAC. Weak value to SFM as there is little incentive to get non timber values monitored. Who pays for non Timber values? <p>Similar to most forestry related professional attracted to the forest inventory& forest cruising is not as attractive to entry level labour force compared to computer video games. If the crown desires to create new opportunities to continue to deliver forest inventory to meet its SFM and be adopted and accepted by both gov't, industry , incentives must be offered to industry to set a business plan by the forest sector to carry on doing what the MOF is not able to do. If industry comes on board, they will hire consultants as well to get the job done.</p> <p>The FIA model works, The IFPA model works, providing incentives to leverage additional dollars to do the task .</p> |

| | |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>It is important for the province to set the objective and stream line the content of what is needed for VRI.</p> |
| <p>P44</p> | <p>Q.5: The present inability to create seamless inventories must be addressed. As 95% of the land base is public land, all funding being devoted to this work is also public, and gov't is responsible for conducting all large-scale planning, it is logical that data is available to a common standard across all ownerships/tenures. This was a key recommendation of both the Forest Resources Commission(1991) and the Timber Inventory Task Force (1992), and one that was never implemented over the intervening 15 years.</p> |
| <p>P45</p> | <p>Missing is the Question regarding Forest Health Inventory Challenges.</p> <p>It is expected that insect and disease problems will increase as the climate warms. The Inventory program has an important monitoring role to measure and record changes to the Forests.</p> |
| <p>P46</p> | <p>5.1 - yes the review is worthwhile and it will be worthwhile if and when an implementation plan is developed and put into action. We also need to see the forest centric mindset fade away.</p> <p>5.2 – new management needs: Inventory program needs to improve its ability to address MPB, Climate Change, Fire, and EBM. Answer – more ecologically based approach.</p> <p>5.3 – EBM – need for an ecosystem base map with monitoring and permanent sample plots as a means of tracking and managing the effects of NDTs, MPB and climate change. There is also a need to easily grow ecosystem maps (model structural stage for habitat) which means the forest inventory and ecosystems need to use the same lines. We will need to simplify the product as there will be a greater demand for our products from a much more diverse user group.</p> <p>5.5 – too much focus on the forest – there are many other resource values that are not currently being adequately inventoried. In order to effectively manage the land base it should be managed in a more ecological manner. Related to this is the issue of private vs public lands and the gaps which are currently present in the inventory. An effective inventory should not be restricted by administrative boundaries.</p> <p>5.6 – yes see above.</p> <p>5.9 – in order to better address the needs of government, could the funding model be shifted slightly to allow industry to focus project dollars on mtg only their needs. Government would then require a greater portion of the funding in order to top up project dollars, as a means of meeting additional government needs? Or simply give government more control over how and where money is spent on individual projects?</p> <p>5.10 – innovation, with the advancement of modeling techniques, can phase 1 be modeled (similar to PEM)? This could then be supported through phase 2 sampling and continued monitoring. And yes the collective resources are available to support technological advancements.</p> <p>5.11 – No the inventory is not being used to its full capacity...users do not understand or recognize the full extent to which the data can be used. The business case is definitely there (especially if the program makes a shift to a more ecological base) and simply</p> |

| | |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>needs a more focused, coordinated effort put forth to get the message out to users.</p> <p>5.12 – in house capacity to do the work required is decreasing, external capacity is decreasing, there is a huge risk of loss of local knowledge and expertise – need for a succession plan?</p> |
| <p>P47⁸</p> | <p>1) The IPR will be worthwhile if it can separate the “must knows” from the “nice to knows”. Presumably you will then have better chances with Treasury Board.</p> <p>2 & 3) The inventory needs to be able to describe a “disturbed stand” either by bugs or partial cutting—both the residual structure and the regeneration.</p> <p>4) summarize the inventory and explain how it has evolved over time and what are its strengths and weaknesses for an MU.</p> <p>5 & 6) strive to achieve a smaller core set of attributes across the entire landbase—extent, age and health (within parks etc) and tree dimensions on the THLB. Changing circumstances could be tracked by a comprehensive monitoring program.</p> <p>7) the inventory needs to be as accurate as the budget allows across all age classes. This may be better achieved by more ground calls across all age classes rather than a single ratio adjustment by leading species.</p> <p>8) Yep</p> <p>9) Industry should be able to lobby government for what gets reinventoried but I think the responsibility for doing so best resides with government. We do not need any more Lignums.</p> <p>10) You could do worse than experimenting with “LIDAR”.</p> <p>11) You cannot claim to manage what you do not know.</p> <p>12) The succession challenges within inventory are actually an opportunity to pump new blood into the program. Embrace that opportunity and empower your staff, give them the training they need, encourage them to think, let them become the recognized experts. While data collection would continued to be done by contractors, foster an environment where analysis is done in house.</p> <p>13) Involvement of district folk in the delivery of the inventory would be a good thing. Presumably better knowledge of the inventory would help them better regulate the harvesting of the resource.</p> <p>14) Unless the volumes are guaranteed to go up industry would likely have little interest. The loss of cultural handles in full blown VRI inventories makes VRI more difficult to use.</p> |

⁸ Delayed Response—received after first compilation

Input Request 5: Next Steps

| | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>INPUT REQUEST 5: Please provide your feedback on the Next Steps and use this space to make additional comments or raise other questions.</p> <ul style="list-style-type: none"> ▪ Do you have any comments regarding the Next Steps? ▪ What other perspectives would you like to add to this Dialogue? | |
| P1 | <p>Good start. Need to reestablish sound inventory component within the organization. Need to update to current VRI standards all districts, especially those with accelerated harvest due to beetle.</p> <p>G&Y info and our permanent sample plots critical for management assumptions. Need to implement reestablishment and remeasure program and follow through with it.</p> <p>Need to examine the climate change issue and factor in BEC and species shifts and potentials for increased forest health issues.</p> <p>Need consistency and accuracy in our info. Need to ensure QA in place and standardize to ensure integrity of data. This will give confidence in management decisions.</p> |
| P3 | <p>We have been working in forest inventory for 12 years and 15 of our 70 full-time staff work in this particular area. Currently we are working for several government agencies and different ministries. We feel we could provide better insight in a less structured forum, where we are provided more background information.</p> <p>As a forest professional the future in inventory does not look positive, and there appears to be an exit out of this sector. The companies that used to be involved have mostly left, downsized or are working out of province or country. Inventory doesn't seem to be a priority for funding, hence the variability in the funding.</p> <p>There needs to be better co-ordination with the oil and gas sector. A few different groups in government are doing this, but the activity is slow as the dollars don't seem to be there.</p> <p>There are several 'empires' within the provincial government that control the inventory. This is typical of any large bureaucracy. The reduction in the size of government has been good because the empires have started to shrink and have been forced to work together. I am not sure if new funds invested in the government work force would help the situation, or if those funds should be awarded to licensees or private companies on 3 or 5 year contracts. The longer-term contracts create some stability and enable new skills sets to be developed – outside of one of the government empires.</p> <p>We have developed skills sets in inventory that we provide to several different government agencies and Ministries, but the funding is variable and it is difficult to keep the skilled staff that we develop as we jump from one agency program to another to try find some stability. If a strategy can show where work will be in the future, you will quickly find many service providers developing their existing skills and experience to complete the task.</p> <p>GOVERNANCE: The more recent ministry role of regulator/contract monitor has worked very well on several of the projects that we work on. We provide the horsepower to get the work done and the ministry steers the ship.</p> |

| | |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P4 | <p>This process seems to be extremely high level and focused on the business model or paradigm of the current funding, governance and delivery models.</p> <p>I hope that the next steps open up avenues for discussion about the highly technical issues that inventory also faces.</p> |
| P5 | <p>Works for me.</p> |
| P6 | <p>I notice nothing specifically discussing communication in the Next Steps. Is this on purpose or...? A communication plan or newsletter might be something that could aid in informing ministry, non-ministry, licensees and consultants alike what is going on.</p> <p>Maybe ask for submitted articles from various inventory practitioners or users?!</p> <p>Especially now that the inventory program is back with MoFR, communication would probably be something good to do!!!!</p> |
| P7 | <p>No comments regarding the next steps.</p> |
| P10 | <p>Need to develop a communication plan which establishes what the inventory group provides, and who they are. Defines the roles and responsibilities of the District, Region and Branch. Defines the expectations of the inventory – it's applications and limitations etc.</p> <p>Working group should be open to other agencies and industry, to get buy-in and share resources and recognize efficiencies. After-all inventory can serve more than timber supply needs. I believe the working group should be made up of Provincial and Regional/District Reps from both government and industry who would be responsible for establishing standards, priorities, ensuring compatibilities of data, researching alternatives collection methods and technologies.</p> <p>I would be interested in participating in the Inventory Workshop to be held in May 2006</p> |
| P12 | <p>Work in small “break out” groups at the workshops should be facilitated but not pre-determined or overly influenced by moderators.</p> <p>The focus of the inventory review should be on the desired results in response to clearly identified information needs of different stakeholder groups and different time horizons. To maximize the return on investment in the vegetation resources inventory a high degree of coordination is required. This is a role government could and should fulfill. The implementation of the inventory should be left to industry and the private sector to stimulate the development of an innovative technologically advanced forest inventory sector. The role of government should be to create an environment in which innovation is at least encouraged so that the value of its investment is maximized. An overseeing role rather than a controlling and implementing role seems more appropriate for the MoF.</p> |

| | |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>This point is perhaps better phrased as a question – what is the envisioned role of government in the design, implementation and quality assurance of a new inventory program? This may apply to other stakeholders as well including industry, academia and the consulting community which supports forest management in B.C.</p> |
| <p>P13</p> | <p>Communication Strategy: Districts would appreciate being kept informed of developments and progress as the IPR is conducted</p> |
| <p>P15</p> | <ul style="list-style-type: none"> • For steps 5 and 7, there should be money made available to help fund the face to face workshops. • Reading through this paper, I get the impression that some people may take this opportunity to justify an increase in inventory personnel based on past business and expectations. It is imperative that we re-design an inventory system that meets the important business needs (may not meet all needs) and does so in a sustainable manner. In my opinion, the current system can be made more efficient and still deliver a valuable product. |
| <p>P16</p> | <p>I think the VRI will have limited relevance as long as its purpose is solely to assist in decision making at the MU level. Scrap the Phase 2? Get more flexible on the data that can be used to adjust the inventory (cruise plots). Start Monitoring the inventory.</p> |
| <p>P21</p> | <ul style="list-style-type: none"> • Need to consider the role of G&Y Co-ops and IFPAs. They are valuable resources for providing insight and experience into inventory-related problems and solutions. The Forest Resource Evaluation Program may also be a valuable tool in monitoring long-term inventory values. <p><u>Input from district tenures staff:</u></p> <ul style="list-style-type: none"> • Need better VEG inventory for spatial fit of new tenures or transfers (E.g. finding shortfalls in inventory that will not meet licence volume requirements, therefore necessitating finding the volume elsewhere). Accurate inventory and depletions will provide better guidance for tenuring success. • Site productivity mapping required to allow prioritizing Forests for Tomorrow rehabilitation/reforestation projects on wildfires, MPB-killed stands and marginal stands • Issues: Age class 2/3/4 mortality, deteriorated stand fall down rates and mid-term timber supply falldown mitigation strategy (Dave Coates' Basal Area Mid-term timber supply) – each of these studies could necessitate changes to inventories and have TSR implications • Growth and Yield studies are not relevant in a dead forest, albeit MAI of immature stands for next TSR will be of continuing future interest • Non-timber resource interests and inventories will be of importance to Vanderhoof (i.e. deferred harvests, conservation/retention areas) |

| | |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>P23</p> | <p>I have a couple of things in general to add to the excellent job that you have done on this paper. Out of every review of the program I have read each review comes back to 3 main themes.</p> <ol style="list-style-type: none"> 1) What standard of accuracy do you require for the inventory. You need to pick it and get on with it. Licencees are using the current inventory for cut block planning, and gov't employees are using it for landscape level plans. In both case the data is not accurate enough to do either. Read other reviews for data accuracy. They will include heights, species, crown cover, etc. 2) Funding. Prior to MPB we had a continuous source of revenue to the Province of British Columbia from forestry to fund just about any inventory program. Now we are on borrowed time. If you do not commit and start the inventory program while we still have pine revenue coming in we will not have the where with all to complete any inventory program within the next 40 years. So whatever the province decides to do get on with it or just call it done. But stop fooling around with band aid inventories. 3) You have to start integrating the new inventory with other needs such as SARA, UWRs, PEM and TEM etc.. <p>Unless you are really committed to accomplishing an inventory DO not include me on your provincial committee. If you are going some where with the program I will participate in your working group.</p> |
| <p>P29</p> | <ol style="list-style-type: none"> 1. It is appropriate – will only be useful if recommendations are somehow based on a real desire to have a sound provincial inventory and can be supported and funded just for that purpose. 2. no comment 3. no comment 4. no comment 5. I think the inventory as designed (if properly implemented) is able to fill the 'inventory' needs. It will not fulfill monitoring or change management needs – was not designed to do so. Will not fulfill specific population needs but is designed to accommodate their inclusion. 6. Should apply to the province – not necessary for the inventories to be to same "standard" – they can serve as the Phase I estimate – sample to adjust to provincial standard. 7. Accuracy should appropriate for an "inventory" – OK at the sampling unit but highly variable at the polygon. There are processes to help this in phase I as well as in sample selection, sub sampling, etc. etc – they simply need to be allowed and somehow accommodated. |

| | |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>P31</p> | <p>Electronic update is feasible and innovative, but also limiting as it is difficult to automate entirely. Where do we want to move it from here. I am aware of some initiatives, but not sure if they are getting a true business analysis?</p> <p>I think we need to look at alternatives to what we have. There are so many specialists in the current inventory programs that it may become difficult to sustain once they retire. We need to simplify the methods and work with other ministry's, which I believe is underway, but currently the innovation seems to have slowed. Please understand that being on the outside we tend to be left in the dark a bit unless we are actually involved in a project.</p> <p>Focus and challenge options; identify and evaluate risks, assess and evaluate the financial impact, identify the intangible benefits.</p> <p>We have been working in forest inventory for 12 years and 15 of our 70 full-time staff work in this particular area. Currently we are working for several government agencies and different ministries. We feel we could provide better insight in a less structured forum, where we are provided more background information.</p> <p>As a forest professional the future in inventory does not look positive, and there appears to be an exit out of this sector. The companies that used to be involved have mostly left, downsized or are working out of province or country. Inventory doesn't seem to be a priority for funding, hence the variability in the funding.</p> <p>There needs to be better co-ordination with the oil and gas sector. A few different groups in government are doing this, but the activity is slow as the dollars don't seem to be there.</p> <p>There are several empires within the provincial government that control the inventory. This is typical of any large bureaucracy. The reduction in the size of government has been good because the empires have started to shrink and have been forced to work together. I am not sure if new funds invested in the government work force would help the situation, or if those funds should be awarded to licensees or private companies on 3 or 5 year contracts. The longer-term contracts create some stability and enable new skills sets to be developed – outside of government. The existing government employees are doing an excellent job of quality control and regulating the works.</p> <p>We have developed skills sets in inventory that we provide to several different government agencies and Ministries, but the funding is variable and it is difficult to keep the skilled staff that we develop as we jump from one agency program to another to try find some stability. If a strategy can show where work will be in the future, you will quickly find many service providers developing their existing skills and experience to complete the task.</p> <p>GOVERNANCE: The more recent ministry role of regulator/contract monitor has worked very well on several of the projects that we work on. We provide the horsepower to get the work done and the ministry steers the ship.</p> <p><u>Your exercise is timely and we support your intent.</u></p> |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| | |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P32 | <p>I would be happy to represent the OGC on any working groups to provide direction for inventory initiatives.</p> <p>There is a critical need for multi-resource stakeholders to have a common inventory and information base to plan multiple uses of the same landbase.</p> |
| P33 | Funding is an issue and the actual costs involved and benefits gained. |
| P35 | How will the IPR ensure linkages to other (incl. new) provincial resource strategies are adequately considered? |
| P37 | Be realistic in your next steps. |
| P38 | Next steps look fine to me. |
| P40 | Looking forward to participating in the face-to-face workshops. |
| P41 | <p>There are some high expectations for this IPR review. Presently as issues arise a common statement is “wait for the IPR review”. I hope the review is up to the challenge. I sincerely hope this review brings about some positive changes in the inventory program that will re-focus the program and get it back on track.</p> |
| P42 | <p>In general thank you for this opportunity to respond to this issue. I have spent ½ a day responding in what is an extremely busy time of the year and as a result my answers are not as comprehensive and well thought out as I would like them to be. I feel that this topic is extremely important to the proper management of BC’s forests and yet at the same time, feel that this opinion is not widely held. It is up to all of us to raise the profile of inventories and it is my opinion that the best way to do so is by making them operationally useful. When people can see the day-to-day applications then there will be a greater willingness to support investment in maintaining and upgrading them from amongst a much broader community. If this does not happen, then inventories will continue to be considered as the responsibility of a few specialists working in a somewhat arcane subject area ... with the result that they will continue to ask the question – who needs it anyway. This is a legitimate question, since obviously it is not of much use to most practitioners as far as they can see, other than perhaps the calculation/determination of AAC, and other than for making nice reports on the state of the forest, the interpretation of which is all very vague in any event. This to me seems the harsh reality.</p> <p>I have done the best I can in the time available. This is such a big topic. I was in a bit of a hurry so that my remarks may not be altogether in the right places. I have included a paper I wrote in 2003 (not for anyone in particular but for anyone who would be willing to listen ... I thought <i>someone</i> might be interested. Thanks again for giving me the opportunity to respond. I would be happy to assist in any follow up workshop discussions.</p> <p>Note: PDF Document “Inventory Design Concepts” part of this submission</p> |

| | |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P44 | A cautionary note about handling the outputs from the face-to-face workshops: a distinction will need to be made between interests of stakeholders/users of inventory data which are limited to the areas in which they operate and those interests of gov't which are larger in scope, must represent all users, and reach further into the future. Any recommendations and options must properly account for the big picture, especially as only public funds are likely to be spent on forest inventories on TFLs, TSAs, and Parks/Protected areas in the future. |
| P45 | Communication Feedback process required to keep respondents to IPR informed. Suggest an e- information bulletin following each step. |
| P46 | <p>6.4 – will there be an opportunity to submit responses/comments on the progress report #1 prior to the workshop?</p> <p>7.8 will the options and recommendations be communicated out? Will the MoFR executive decision be communicated out? What about an action plan post executive decision? What about a timeframe for this executive decision? Without a goal post this step has the potential to drag on and on, fading in our memories.</p> |
| P47⁹ | <p>Large meetings ensure the most vocal people are heard but not necessarily the most knowledgeable. Further, not everyone has great enthusiasm for “Challenge Papers”. Have you considered face to face interviews in small groups.</p> <p>In summary,</p> <ol style="list-style-type: none"> 1) Plough phase 2 dollars into more ground calls for phase one. 2) Start a CFI/monitoring program. 3) Just collect a subset of attributes on parks etc. 4) Finally, don't try to be all things to all people. |

⁹ Delayed Response—received after first compilation.

Other Comments and Feedback

| OTHER COMMENTS | |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P31 | <p>There was no discussion on Barriers to moving forward, Substitutes, Strengths, Opportunities or Weakness that should be considered. This might be a more effective way of opening up the discussion.</p> <p>We have been working in the forest inventory for 12 years and 15 of our 70 full-time staff work in this particular area. Currently we are working for several government agencies and different ministries. We feel we could provide better insight in a less structured forum.</p> <p>I will edit my comments as I did some more reading and noted that more meetings are planned. SWOT works well, but if we are also developing strategy we should incorporate some of Porter's 5 forces (barriers, threats, and substitutes).</p> <p>I believe that accurate inventories are a cornerstone of sustainable resource management. They also overlap with monitoring - another important topic.</p> <p>The problem with inventories of dynamic values is that the inventories quickly become dated - not so much for trees, but certainly for the vegetation as a whole. Consequently, I believe that inventory, and monitoring, should be closely linked to ecosystem-level models (not tree population models) that can give you expected vegetation development, at the site series level, of stand structure and vegetation composition (by life form and dominant species). Such models can be used to create probable trajectories of vegetation development between re-inventories, and provide improved input for planning. These models should be capable of predicting in general terms herbs, shrubs and trees in even or unevenage stands, monocultures or mixtures, various scales of mixtures, and incorporate the consequences of management of natural disturbance. Where bryophytes are important - for ecosystem function of wildlife habitat - the models should be able to represent this. There are few models available that can do all this, but there are some and I believe that your review should include a consideration of this class of decision support tool and plan to link one or more to inventory and monitoring programs.</p> <p>I have a manuscript that I hope to submit to the Forestry Chronicle soon entitled "Smart Monitoring" This was developed for the Saskatchewan Forest Impacts Monitoring Board when I chaired this. It specifically addresses the linkage of inventory and monitoring to models and decision support tools.</p> |

| | |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>P5</p> | <p>Here is my IPR feedback form. My comments/answers speak specifically to the needs of the Protection program and some ideas as to how we can work with Inventory Branch to develop a strong partnership that meets both agencies needs. I see this partnership as a win/win as both agencies have a need to acquire and share information.</p> <p>Although I have a strong background in G&Y and SIBEC I have not commented too much on these topics as Protection would be an end-user of the data.</p> <p>The Protection program looks forward to working with Inventory Branch and I am definitely interested in attending the workshop scheduled for the week of May 15th.</p> |
| <p>P35</p> | <p>I would be interested in participating in future discussions, if the need arises for a consultant with experience in VRI phase 1, 2, and NVAF, as well as growth & yield and appraisal cruising.</p> |
| <p>P14</p> | <p>My only comment is that I hope this process is not just a course of action to justify predetermined outcomes based on preconceived notions.</p> <p>Thanks for this opportunity to address your Challenge paper on the VRI.</p> <p>I wanted to forward a copy of the feedback form to you as I do have some criticisms (hopefully constructive) about some of the tone of the paper. I'm hoping that the end of this course of action results in both improvements in the VRI process and a wider understanding by FAIB staff of current local planning initiatives.</p> |
| <p>P17</p> | <p>Following our conversation on the VRI adjustment yesterday, after giving it some thoughts, I think I need to clarify my position.</p> <p>On your question: "Do we need to adjust at all?"</p> <p>A VRI program on an average size management unit (1 million ha) would cost (roughly):</p> <p>Phase 1: \$1,000k Phase 2: \$200k NVAF: \$50k Total: \$1,250k</p> <p>That means the adjustment (Phase 2 + NVAF) costs about 20% of the total cost Would that money be better spent on extra work for Phase 1? The adjustment doesn't help the licensee or the timber supply analyst. It gives the tax-payer the fuzzy warm feeling that things are OK. The question we need to ask: "15 years after the Peele Commission, does the tax-payer still care?"</p> <p>On your question: "Do we do more harm than good by adjusting?"</p> |

| | |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>Let me remind you that the VRI is supposed to answer two questions: i) How much? and ii) Where? It is an Inventory Branch imposed constraint that the same tool (the ratio of means) is used to answer both questions. That doesn't need to be. The design committee knew this. Once we have the answer to "How much", we should use professional judgment (with various mathematical tools) to answer "Where". Inventory Branch's constraint might have done more harm than good. But this is not the VRI design's fault. The question we need to ask is: "Do we do more harm than good by adjusting the way Inventory Branch is recommending?"</p> <p>On a final note, let me suggest something. Interestingly enough, the MoFR has never done any research on the VRI adjustment. All the questions we have could easily be answered by doing an extensive simulation project. It would probably cost \$50k-\$100k to generate a realistic management unit and simulate different sampling and adjustment scenarios. We are talking peanuts compared to what is spent annually on inventory projects in BC.</p> |
| <p>P22</p> | <p>I do not have time to thoroughly review the paper and fill out the response form at this time. However, I would like to raise the issue that we would like to discuss opportunities to discuss how plants of significance to First Nations can be incorporated in the inventory system (e.g. level of detail to collect, format for distribution of data to be useful to FN for LUP processes and addressing forestry referrals etc.)</p> <p>Please send us an invitation to the mid-May workshop.</p> |
| <p>P27</p> | <p>I have several views I would like to get across, and I hope I will be able to communicate them without being long-winded. I have some comments below.</p> <p>Comments:</p> <p>On page 2; Expected outcomes: I think we should add two more points to the list of expectations, i.e.,</p> <p>Provide a clear statement on the relationship between monitoring and inventory. Does inventory have to be separate and different from Monitoring? (I provide a more detailed comment on this.)</p> <p>Explain the role of Inventory/Monitoring in sustainable forest resource management.</p> <p>I would consider this dialogue a success if it will result in an efficient system of data gathering that will encompass critical forest resource attributes, which may not necessarily be aligned. By this I mean a system that will allow the collection of data on timber attributes, but also provide an understanding of what factors can adversely affect the resources in an expected way, and can be tracked to provide early warning of potential disasters such as Mountain Pine Beetle attacks.</p> |

Page 4, section 3.2, sub-section 7c – defining the vegetation Inventory: The current inventory system does not track how the resources change through time. It only states how much is there and where it is. The update system projects three inventory attributes: Stand Height, Stand Age, and Stand Volume. In addition update maps harvest & catastrophic depletions. There is no major reconciliation between projection and depletion, so it is difficult to tell if we are achieving sustainable timber resources management.

Page 5, section 3.2, sub-section 9: The attribute adjustment process is fairly new and quite innovative. BC is probably one of the few jurisdictions doing it. The purpose of the adjustment is to remove bias in the photo-interpreted attributes. It is beneficial and provides information which is more accurate than what is provided by photo interpretation at a reasonable cost.

Page 5, sub-section 3.2, sub-section 12: There are three types of inventory, i.e., point-in-time inventories, where new data is collected every 20 to 30 years. At each cycle, the old data is abandoned and is replaced by the new data.

Continuous forest inventory, based on permanent sample plots, which are remeasured periodically

A combination of b) and a), where the inventory is founded on permanent sample plots, but new ones are added periodically.

In BC we have been implementing option a). The first major inventory was initiated in the 1950s and never covered the entire BC forested land base. The emphasis in that inventory was commercially viable species and areas which could be harvested by the technology of that time.

The second more comprehensive inventory occurred between 1961 and 1977. It was a very intensive exercise and data was collected from 50,000 different sample locations. Even then, only mature stands were considered, and was not totally completed due to high cost. Due to the massive nature of the undertaking the sample locations were not selected randomly to reduce cost. This in fact is the main criticism of that inventory.

The VRI was implemented in 1996 approximately 19 years after the last completed inventory of 1961 to 77. The similarity of the VRI to the previous two inventories is that it too is a point-in-time exercise. In most cases, these inventories become obsolete in a very short time. They are not amenable to constantly changing resource information needs. As a case in point, the VRI cannot answer some of the questions arising from the MBP epidemic.

In the US forest service, they have implemented option b) and rather than visit their sample locations once every, 10 years or so, they annualised it so that they can visit 10% of the locations every year. For budgeting purposes, this works out well, because they have conditioned their executive to spend a fixed amount of money every year for inventory.

Option c) is what has been called sampling with partial replacement. It was severely criticized in the 1980s, but increasingly, people are seeing its potential benefits.

Option c) combines monitoring using permanent sample plots visited regularly with inventory estimation, which is a point-in-time exercise. In my opinion, moving to this combination of inventory & monitoring would be an ideal situation because it is efficient and could save a lot of money in the long run, while allowing for monitoring of long term resource use. It would also allow us to address issues raised in sub-section #14

Page 6, sub-section #16 b): The issue of legislation has been over-complicated. It may not be necessary to modify the Forest Practices Act to achieve what is required. It could be as simple as an internal communication defining the roles of different agencies, be they private or public in delivering the inventory program. A change in the Forest Practices Act might take years to accomplish.

Page 7, sub-section #17: The mountain pine beetle epidemic was not a major issue when the VRI was developed. As such, the collection of data on dead trees was not a main objective. Now dead wood is as important as live tree wood. This means the VRI has to enhance dead wood data collection even in inventory units where MPB attacks are not an issue.

Page 7, sub-section #19: OAFs are used to adjust outputs from models developed using biased or superficial data. They adjust the model outputs to reflect reality. Surprisingly, the OAFs used to adjust the TASS model are not based on data collected here in BC. There is a need to localize these OAFs, but I am not sure of jurisdictional responsibilities.

I would suggest adding a sub-section #20: Adjusting inventory attributes for completed VRI. The VRI design committed us to adjusting photo interpreted timber attributes based on data collected from ground sample locations. The IPR should confirm this commitment. In this regard, I would suggest that the providers of inventory information be required to provide adjusted inventory attributes to meet the VRI standard.

Minor suggestion: For sections chapters 3 & 4, it would have been a good idea to ask questions of the reviewers after each sub-section. For instance, for section 3.3, sub-section #1, it would have been a good idea to ask the readers one or two question, e.g., "Do you have any other ideas on what role this sort of review might serve? ...just a thought.

On the issue of Monitoring: This should have been given more detailed coverage, possibly in section 3.3. We need to ask some very fundamental questions about monitoring. There are many issues that need to be clarified. Please consider the following:

Is our current definition of monitoring, which is “checking a prediction” appropriate? What does checking a prediction mean?

What should we be monitoring and for what purpose? There are several areas where monitoring could be helpful. These include reconciling depletion with growth. If depletion exceeds growth, then resources are not being managed sustainably. In any given year some management units experience several types of resource depletion, e.g., fires, harvesting, insect attacks, blow-down. In fortunately, we do not a system in place that balances what was in a management unit at the beginning of the year, and what is left after all the depletions have occurred. The only thing the inventory captures is the opening created by depletion. The data associated with depleted resources may or may not be maintained by a number of agencies outside the inventory program and never gets back to us. There is not reconciliation between loss and what was there before, and information on growth is not available to allow a check to see if what was depleted is less than or equal to what was added as growth.

Whose responsibility is it to monitor pest infestations and estimate the potential effects of major out breaks? There is lack of clarity on this. Is it possible to build an early warning system through a monitoring program? The current outbreak of MPB got out of hand because we have no systematic way of verifying impending pest hazards. When this outbreak started, we relied on anecdotal information to make decisions. People in the field were encouraged to do nothing about the outbreak because an earlier one in the 1980s had started and ended naturally without human intervention. When it became clear this particular outbreak was more serious, the global warming was blamed for the spread, but in reality, some preventive measures could have been taken to reduce the rate of spread and perhaps prevent the current tragic circumstances.

Considerable resources are invested in replanting depleted areas, weeding and spacing to ensure success of new forests. Is it possible to check if the return on investment is worth the effort going into it? How can we establish a mechanism for checking on growth rates for second growth forests? The document should provide more discussion on this.

Who is responsible for collecting inventory data or monitoring the state of resources in Parks, Reserves and other public lands that are not under timber supply management? Are these areas eligible for resource use/depletion and pest infestation monitoring?

How do we track sustainable resource use at the provincial level? Do we use the National Forest Inventory plots to do this, or should we establish management unit level monitoring systems?

The extent or scope of the provincial land resources inventory is not clearly defined. What lands are eligible for inventory? Should we be just concentrating on timber harvest areas only? Should we be collecting data from swamps, alpine areas, hay fields, and pasture lands? If the inventory branch does not collect that data who does? Do these areas of no commercial interest have business drivers? If so what are these drivers?

Integration of forest and non-forest resource monitoring: A discussion paper on this issue was started sometime in 2002, but due restructuring, the initiative stalled. A copy of the discussion paper is attached as Appendix A

Page 9, Assumption #2: The debate on strategic vs operational inventory is a bit misleading. It is really a debate on the size of unit being considered. If one is establishing a cut-block which is 5 ha in size, it is possible to establish 10 ground plots per hectare thus obtaining very precise information on the cut-block. If one has 1 million hectares of land to do an inventory on, however, it is not economically feasible to apply the 10 plots per hectare sampling intensity. Surprisingly, 50 plots locations in 5 hectares might produce the same sampling error as 50 plots in 1 million hectares if the variability of the attribute of interest is the same for the two situations. The accuracy, of inventory data at a polygon level is mostly limited by lack technology to capture accurate estimates of attributes on a large scale. But even with the current technology, the lack of accuracy should not preclude the use of the data for spatial analysis. In this regard, some investment in more sophisticated remote sensing technologies might be worthwhile. Unfortunately, it is difficult to venture into experimentation when benefits are unknown and competition for limited resources is intense.

~~~~~

APPENDIX A

Project Announcement  
Ministry of Sustainable Resource Management  
in Partnership with  
Other Provincial Ministries

An Integrated Environmental Monitoring System (IEMS)  
for British Columbia

Phase I: Strategy Framework

January 30, 2002  
Project Title

A Strategy Framework to Support the Development of Integrated Environmental Monitoring System (IEMS) for British Columbia (Phase 1)

The term environmental is being applied here in the broadest sense and from an environmental sustainability perspective. As such, along with the consideration of ecological or biophysical qualities, there is the need to address the monitoring of some social and economic factors. For example, in sustainable forest management there is the goal to maintain and enhance the long-term health of forests while providing ecological,

economic, social and cultural opportunities for the benefit of present and future generations<sup>10</sup>.

#### Background

This project has been initiated in response to the widely recognized need within government, across the province and nationally to take a more “corporate” approach to environmental monitoring. Currently there is a plethora of monitoring and monitoring-related activities within government, the private sector and non-government organizations. While all well intended, there is an opportunity and necessity to consolidate these efforts. There is a need to design and implement a more rational, coordinated and integrated system that will be more effective and efficient.

More specifically, this initiative is in response to the findings of a study titled — Environmental Monitoring: Business and Information Needs<sup>11</sup>. Some of the key issues identified in the study include: monitoring information supply – demand imbalance, lack of formalized business drivers, technical capacity shortfalls, indicator proliferation, lack of coordination, weak linkages to decision-making processes and the need for more effective partnering to support the monitoring function.

#### Purpose

Development of a strategy framework for the design, development, implementation and performance assessment of a province-wide, integrated environmental monitoring system (IEMS). The framework will provide context and linkages to the closely allied support functions provided by resource inventories, surveys and research.

#### Project Scope

The strategy framework needs to address province-wide needs for environmental monitoring. It also needs to embrace a broad range of monitoring requirements including the assessment of the effects of resource development, management activities and natural events that affect the environmental quality and quantity of water, land, air, biota and human well-being.

The framework will embrace all aspects (functions) relating to environmental monitoring. Following the adaptive management construct, these include: assessment (of the monitoring requirement); design; implementation; monitoring; evaluation; reporting and communications; and adjustment (of policy and practices).

Resource inventories and resource surveys provide important information to support the environmental monitoring system. Research activities likewise support the environmental

<sup>10</sup> Canadian Council of Forest Ministers (1992) definition of sustainable forest management.

<sup>11</sup> Prepared for Land Information and Inventory Coordinating Committee, Province of British Columbia by Daryl Brown, Daryl Brown and Associates Inc. and John Dick, Sustainable Visions, March 30, 2001.

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>monitoring system. They provide an understanding of the causes and consequences of changing conditions including an understanding of the significance of interactions among resources, their linkages to variations in the natural and human environment and their response to multiple drivers of change.</p> <p>IEMS Initiative Phases</p> <p>Phase I will create a strategy framework for developing an Integrated Environmental Monitoring System. This phase will be internal to government but will nonetheless embrace a wide scope, as noted above. Phase I will be completed by March 31, 2002.</p> <p>Phase II, guided by the strategy framework, will widen the consultative process and engage a wider set of client-stakeholders beyond just government. It will include obtaining feedback on and refining the framework components, developing the IEMS Strategy for BC and developing an overall and near-term (more detailed) IEMS Implementation Plan.</p> <p>Phase III will begin the incremental implementation of the IEMS. It will likely start with some pilots and testing of key components of the IEMS; rationalization, integration and coordination of existing environmental monitoring activities; development of important partnerships and infrastructure, etc. A key component of the IEMS will be the monitoring of the IEMS itself in terms of first, progress with the implementation, and second, the regular assessment and reporting of the systems' effectiveness.</p> <p>Key Tasks &amp; Schedule:</p> <p>Situation analysis update — at a strategic level, assess and update various situation analyses regarding the state of current monitoring; assess implications of government restructuring, and the effect of changed mandates and delivery models on monitoring business drivers, functions, roles and responsibilities, etc.</p> <p>Research other environmental monitoring models and frameworks — undertake a cursory scan of other jurisdictional activities that can offer possible frameworks, structures, definitions, processes, etc. for this initiative (e.g., Ontario, US, Australia, elsewhere)</p> <p>Prepare a Discussion Paper outlining the current circumstance and envisioned requirement in the short-, medium- and long-term; the anticipated process, major components, roles and responsibilities; and related elements (late February)</p> <p>Conduct a Workshop with key government client-stakeholders to — confirm scope, definitions, principles, vision, strategic objectives — i.e., an agreed upon strategy development framework; confirm process steps to March 31, 2002; discussion paper will serve to structure and guide these outputs of the work</p> <p>Develop Strategy Framework document — transform the Discussion Paper into the Strategy Framework with the benefit of the workshop input on the major components/elements, processes, issues, opportunities, schedule, roles and responsibilities, and overall integrating model.</p> |
|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>Example of Strategy Framework Components:</p> <ul style="list-style-type: none"> <li>Purpose, Background Scope</li> <li>Definitions</li> <li>Principles and Vision</li> <li>Strategic Objectives</li> <li>Governance</li> <li>Establishing Priorities Process</li> <li>Resources, Roles and Responsibilities</li> <li>Performance Management, Change Management &amp; Accountability</li> <li>Implementation Plan — near term (April – September 2002), medium-term (September 2002 – March 2004), Long-term (2004+)</li> </ul> |
|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**P28 Memo To: Inventory Program Review (IPR Responses) Committee**

As the and **Challenge Paper**, *Eight Keys to Productive Dialogue*, suggested engaging in “out of the box thinking”, please accept this format of placing our comments into boxes of our own.

| Item # | Pages | Topic                                       | Comments: Challenge Key Expected Outcomes Assumption Statements Critical Questions                                                                                                                                                                                                                                                                                                                        |
|--------|-------|---------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1      | vi    | <b>Ecosystem Mapping Challenge Dialogue</b> | The report mentions an MOE, Ecosystem Mapping Challenge Dialogue .. (PEM)?with a similar timeline as the Inventory. When will this occur?                                                                                                                                                                                                                                                                 |
| 2      | 2     | <b>Clear Strategic Direction</b>            | There is a call for a renewed <i>Vision, Mission Statement and Mandate</i> for the Inventory Program... Where can we find copies of the current strategic direction? These should be posted on the home page of the FAIB web-site                                                                                                                                                                         |
| 3      | 3     | <b>Recreation</b>                           | <p>The <i>Review of Inventory Issues in the TSR Process</i> identified the need to clearly define the Roles and Responsibilities regarding inventory, between MOFR, MOAL (ILMB) and MOTSA.</p> <p>This statement should be expanded to include the MOE (PARKS Branch), as Recreational Inventories within Parks contribute to the assessment of the entire Recreational Opportunities Spectrum (ROS).</p> |

|   |   |                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---|---|-------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   |   |                                                 | <p>The statement should also be expanded to include need to clearly define all the Roles and Responsibilities MOFR, MOAL (ILMB),MOTSA and MOE (Parks Branch), as currently there seems to be a great deal of confusion amongst the Public and Government Employees.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 4 | 5 | <b>VRI Time-frames</b>                          | <p>Timeframes may be shortened by overlapping photo and field work.</p> <p>Time and Costs efficiencies may also be gained by awarding Multi-year, Multi-Phase contracts, but the current funding model does not allow for this. Managing a Multi-year, Multi-Phase program based on Annual Vote Funding, is challenging, time consuming, and inefficient.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 6 | 7 | <b>VRI_NVAF Net Volume Adjustment Factoring</b> | <p>Recently, <i>Revenue Branch</i> has approved the use of a valuation fix for all balsam stands in the Interior subject to a further verification study.</p> <p>One component of this study is to review the feasibility of collecting interior log grades during NVAF sampling.</p> <p>Currently, the NVAF portion of VRI sampling only collects coastal log grade information on the destructive samples. The relevance of NVAF sampling would be enhanced, if the data collected is compatible with BC's interior log grades. This would then essentially be compatible with BC's stumpage system, which is predicated upon estimating the sawlog vs. pulp volumes of stands. Adjusting the net merchantable volume estimates of a stand via NVAF is only useful if the sawlog vs. pulp split is collected at the same time.</p> <p>This is another example of where Revenue Branch and FAIB, could increase their levels of collaboration and cooperation, in order to meet mutually beneficial goals and objectives.</p> <p>Recommend:</p> <ol style="list-style-type: none"> <li>1: Collect interior log grades on all future VRI_NVAF sampling</li> <li>2: Change VRI_NVAF standards to facilitate this.</li> <li>3: Investigate the feasibility of converting coastal log grades to interior log grades for completed NVAF samples</li> </ol> |

|     |             |                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----|-------------|-------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7 a | 5<br><br>16 | <b>PEM and SIBEC</b>                            | <p>Recommend:</p> <p>The VRI polygon delineation process should be enhanced to address critical bio-terrain breaks, to ensure efficient and effective field data collection for the VRI, as well aid in facilitating further Predictive Ecosystem Modeling (PEM) processes. This process should reduce or eliminate cross product (VRI /PEM) polygon slivers, and enhance the likelihood of the PEM product meeting the 65 % accuracy standard.</p> <p>This PEM product can then be used to update productivity curves for growth and yield modeling using SIBEC adjustments for each site series.</p> |
| 7b  |             | <b>Base Mapping Geomatics Systems Standards</b> | <p>There is a need to clarify, document the standards relating to the Air-Photo scale is correlated to the standards required for their end use. These standards must be clearly communicated to all parties at the earlier possible stage of all inventory related projects, including TRIM updates, Orthophotos, PEM and VRI. i.e., 1:35,000 color photos do not meet the standard for VRI, but may be acceptable for Orthophotos and TRIM 2.</p>                                                                                                                                                    |

**P49**<sup>12</sup> I thought about what I might contribute to the dialogue about updating the methodology for conducting vegetation inventory in BC and came to pretty much the same conclusion as you outlined in your e-mail. I have already said pretty much anything relevant that I have to say via that MPB submission I made previously. As you suggested, I have dusted this off and resent it with this little bit of a covering explanation.

Basically, my position is that this dialogue should consider designing a forest inventory system that was temporally dynamic and utilized transactional updating to maintain a constantly updated and relevant inventory of forest cover site conditions at the stand level. My contention is that a one-time effort to define fixed spatial entities of relevance for forest management (let s call then forest stands) could form the basis for an on-going effort to maintain this spatial database through transactional update procedures. In many ways, this one-time effort to define stands has already been done as VRI and/or FC. With respect to this activity, I direct your attention to a paper that just came out this week in PERS by Michael Chuby, Steven Franklin and Mike Wulder, who I am sure are already contributing to this Challenge Dialogue. I thought that this paper did an excellent job of outlining the benefits of extracting, characterizing and classifying spatial objects identified as forest stands and of showing how this can be accomplished automatically (here using

<sup>12</sup> Delayed Response—received after first compilation



e-Cognition). I would strongly support any suggestions contributed to your challenge dialogue by these authors that involved extraction and characterization of forest stand spatial objects. This concept is entirely in keeping with the suggestions that I included in my contribution to the previous Challenge Dialogue.

You then need to be able to update (change) the boundaries of any defined stand that has its boundaries radically changed (e.g. by harvesting or by natural disturbance such as fire or disease). Generally speaking, you would expect that only a small proportion of stands would experience changes in their boundaries in any given year. You want a procedure for identifying all stands that experience significant changes in stand boundaries and for updating the boundaries of these objects to define new boundaries (and new objects if only a part of a stand experiences change). I could see analyzing coarse resolution (MODIS or ASTER), multi-date (monthly or 15 day cycle) satellite imagery analyses on a yearly basis to identify spatial objects (forest stands) whose characteristic signatures had changed so dramatically that they had obviously undergone a severe disturbance (e.g. harvesting or natural disturbance). Based on this initial screening, I could see obtaining higher resolution imagery for these changed stands and using this higher-resolution imagery to inform a process in which the boundaries of the new changed entities were recorded and the new spatial entities were entered into the spatial database (with their new characteristic signature attributes) for on-going monitoring.

You then also need a mechanism for monitoring continuous and incremental change in stand characteristics for those stands whose boundaries have not yet experienced any major change. For these stands (or objects), you really want something that will act like a growth and yield monitor to support or corroborate estimates of the change in stand characteristics that you might be making based on some growth and yield model. I think that this could be accomplished by collecting and analyzing coarse resolution (MODIS or ASTER), multi-date (monthly or 15 day cycle) satellite imagery on a yearly basis to get an idea of the change in stand density and vigor as inferred from this multi-date imagery rolled up within each defined forest stand object. This approach lets you try to keep track of the pace and magnitude of on-going, incremental changes in stand characteristics for all those stands that have not experienced a dramatic change in any given year (e.g. been harvested, burned or infected). I actually think this could work.

That pretty well summarizes my main ideas on what I would suggest be considered when discussing new approaches for forest inventory in BC.

I hope that you can find some use for this contribution. I am not looking for work in this area and really have not established any presence or reputation in the area of analysis of satellite imagery for forest classification. I just thought that I might be able to provide a different perspective than someone who is more heavily involved in traditional forest inventory operations. I do not work in this area but it has peripheral relevance and interest to what I mostly do with automated classification of landforms and ecological spatial entities. I tend to be a bit of a lateral thinker and I would say that this is an example of my thinking laterally to explain how I would try to approach a problem that I

would not normally tend to deal with using ideas and approaches that I do tend to use in addressing the other different problems that I do regularly address.

I hope that you can find some way to include this submission in your discussion and problem analysis. I am basically arguing that you should try to define an inventory methodology that is ongoing and that involves maintenance on an on-going basis of up-to-date information on forest cover at a stand level through continuous monitoring and transactional update of a database of forest stand information. I argue for no more one-of-snapshot forest inventory projects but rather for a systematic and on-going program for constantly monitoring and updating the characteristics of forest stands (for whatever my opinions are worth).

## **Changes in Land Use or Land Cover**

### **Introduction**

The challenge of how to create, maintain and update spatial databases that provide information on changes in patterns of land use and land cover across very large areas is one that has interested me for some time.

I began thinking about this challenge quite seriously in about 2000. My interest at this time was in devising a mostly automated system that could recognize, classify and map changes in agricultural land use for an entire province in a manner that was technically feasible, accurate, efficient, and affordable. To my mind, a spatially explicit database of land use was perhaps the single most important spatial database that was not available in any reasonable form for Alberta, or for that matter for any other Canadian province.

The design I initially conceptualized for that database addressed many of the same needs and challenges that are encountered in designing a spatial database to track changes in forest vegetative cover at the level of either cut blocks versus forest stands or healthy versus diseased forested stands.

In December, 2004, I was asked if I could provide any ideas for a system that would enable the province of Alberta to automatically recognize and extract forest cut blocks in order to automate the process of developing and maintaining a spatial database of changes in forest cover due to harvesting, human disturbance and fire activity.

In my view, the problem of identifying and mapping the spatial extent of areas affected by Mountain Pine Beetle is not terribly different from the problem of monitoring change in forest cover from forested to non-forested cut blocks or fire scars. There is a difference in degree of difference where forest to non-forest is virtually a binary operation from dark (forest) to white (non-forest) while pine beetle damage is somewhat more subtle, but otherwise the problems are conceptually similar.

I provide below a short description of a generic design for addressing the challenge of monitoring and transactionally updating a spatially explicit data base of information on forest cover status.

## **4.4 Problem Analysis**

The main features of the problem can be identified as follows:

Firstly, the problem requires an ability to assess land cover and/or land use over very large areas up to an entire province in extent. The requirement for continuous coverage over a very large area imposes a number of significant challenges in terms of simply acquiring and processing very large volumes of information. It has proven very difficult to produce cloud-free mosaics of satellite imagery for entire provinces even when images could be selected from archives that stretched over several years. Obtaining cloud-free high resolution imagery for an entire province for two or more time periods of similar dates in a single year is likely to be highly problematic. Even if two or more cloud free composite images could be produced for an entire for two different time periods in a single year, the volume of data processing might well prove to be prohibitive in terms of costs and time requirements.

Secondly, the problem of detecting the presence of areas affected by Mountain Pine Beetle and, more generally, of detecting changes in the health and vigor of forest stands affected by Mountain Pine Beetle is complex and is not likely to be well served by analysis of just two different image mosaics produced by compositing multiple images taken at different dates and different times of day and under different lighting conditions and different stages of seasonal growth. Relying on an analysis of differences in simple reflectance values between two images taken at two different dates (or more likely taken over a series of dates in two different seasons) is fraught with hazards. Pixel by pixel comparisons are subject to error caused by registration errors and displacement of pixels in space from their true position so that observed differences arise as much from comparing two different locations as from detecting change in forest cover condition at the same location. Comparisons of change in pixel values between only two dates is likely to be sub-optimal as significant changes may not be readily obvious for all locations at exactly the same two dates. The types of changes that are of interest are far more likely to be discernable in terms of yearly patterns of growth and reflectance for each site than in terms of a simple difference in reflectance values between two dates.

Thirdly, it is important to conceptualize and identify the size, scale and attributes of the object that is of interest for monitoring and change detection. If the object of interest is an individual tree and the desire is to be able to monitor the forest across the entire province to detect and identify individual trees that have been attacked by Mountain Pine Beetle, then the solution must target the recognition of objects as small as individual trees. While this may be a legitimate desire, it is unlikely that anything this ambitious would be feasible to accomplish given limitations of time, budget and available technology. One then has to ask what other objects might be profitably identified and monitored that are feasible and cost-effective to recognize. I would argue that a suitable object to identify and monitor

might be defined as a forest stand, or a defined portion of a forest stand. A forest stand can be compared to a farm field. It can be thought of as displaying a relatively uniform composition in terms of type and pattern (density, age, height) of forest cover. Forest stands tend to behave similarly (e.g. age at a similar rate, be attacked by pests at the same time, etc). Forest stands also have the desirable attribute of being relatively large. Let us assume that most forest stands have horizontal dimensions of at least 500 m by 500 m and more commonly are up to 1 km by 1 km in size. If such stands can be identified and spatially located once, they can then form the basis for relatively large objects whose behavior over time can be monitored quite affordably using lower spatial resolution but high temporal resolution imagery.

In analyzing the problem, it is important to consider the utility and cost of using relatively coarse resolution cloud-free multi-temporal imagery that can be obtained frequently, on a short repeat cycle and at low cost versus using higher resolution imagery for which it may be difficult to obtain cloud free images for more than one or two periods of several months duration during a given year. Lower resolution, multi-date imagery, such as MODIS, has several distinct advantages as a data source for monitoring and detecting change in vegetation or other land uses at the scale of interest to the Mountain Pine Beetle problem.

To begin with, MODIS imagery is compiled and distributed at very low cost as 8 and 16 day composites of daily images selected in such a way as to minimize the amount of cloud cover in each 8 or 16 day composite image. An image mosaic can be constructed for an entire province of relatively cloud free images that are all taken within a short 8-16 day interval. The relatively large footprint of MODIS imagery (250 m) means that it is both feasible and affordable to obtain and process MODIS imagery for an entire province on a weekly, or perhaps bi-weekly, cycle. The ground footprint of a MODIS image (250 m) represents a reasonable trade-off between spatial detail and processing volume. If we accept that the target objects of interest are forest stands, and that forest stands are typically at least 500 m by 500 m in horizontal dimensions, MODIS imagery at 250 m footprint will provide a reasonable measure of aggregated surface cover characteristics within most forest stands of interest.

Next, one MODIS imagery product that is distributed is a Normalized Difference Vegetation Index (NDVI) that can be interpreted as a measure of relative "greenness" of the objects that occur within each MODIS pixel. The specific problem of identifying forest stands that are potentially affected by Mountain Pine Beetle, as well as more general problem of identifying changes in type and density of forest cover, are well served by analysis of multi-date images of "greenness index". One can consider that, for example, 12 monthly images of "greenness index" can be thought of as defining a characteristic graph or curve that identifies a yearly cycle of relative "greenness" for each object. This annual greenness graph can be interpreted in terms of kind of ground cover, vigor or health of the ground cover and density of the vegetative ground cover. Over a complete cycle of one year, a relatively treeless forest cut block will display a very different temporal pattern of "greenness" than will a thick healthy forest stand. Similarly, a forest stand whose health and vigor were adversely impacted by infestation by Mountain Pine Beetle would be expected to exhibit a different annual cycle of variation in "greenness

index” than a healthy stand. Since the objects we are interested in monitoring are conceptualized as forest stands, the annual cycle of greenness values can be computed for each identified forest stand by computing mean values for greenness index rolled up for each stand at each image date. These mean greenness index values taken together over a yearly cycle form a characteristic curve that describes the cycle of variation in greenness within the object of interest over a year. These curves can be used in a manner that is similar to signature libraries used to identify organic compounds. The yearly greenness curve for any given object can be compared with a library of curves that represent typical cycles of greenness for different cover types. The cover type whose curve in the library most closely resembles the curve observed for a given object will be identified as the most likely cover type for that object. It should be intuitively obvious that a forest cut block will exhibit a different temporal sequence of greenness values than will a mature forest stand. Likewise a stand infested with Mountain Pine Beetle is expected to exhibit a different temporal pattern than a healthy stand.

A key advantage of using multi-temporal image data sets is that the analysis is flexible enough to deal with differences in dates and rates at which greenness (growth) occurs at different locations. Differences in the greenness value observed at different locations with the same cover type at the same date can arise due to differences in climate (temperature and moisture), latitude, longitude, sun angle and illumination and many other factors. Use of an approach that compares the yearly cycle in variation in greenness to a library of reference standards means that different locations can have very different greenness values at similar times and still be recognized as having a similar cover type, if both display graphs of variation in greenness that have similar shapes. The shapes of the graphs can be offset in the time dimension (horizontal axis) or in the vertical dimension (absolute value of greenness) but they can still be judged to be similar and to represent the same cover type, with differences in time due to differences in timing at which growth becomes active and differences in absolute value due perhaps to illumination, shading or even relative vigor of the vegetation.

The problem of detecting and mapping changes in forest cover (or forest health) can be broken down into three main sub-problems. In the first instance, it is necessary to identify and spatially locate objects that one wishes to monitor for change. In the second instance, it is necessary to monitor these objects to identify when they exhibit a marked change in cover pattern, which we here recommend be identified using analysis of low resolution, multi-date imagery. In the third instance, it is necessary to confirm (or reject) the existence of an anticipated change and to update the boundaries of any objects of interest (forest stands, cut blocks) that have been confirmed to have undergone a change in cover type in part or in whole. These problems are not all well addressed by the same data sets.

The first requirement is to identify the objects that are to be monitored for change. The objects can be as simple as a single pixel in an image dataset. For various reasons, it is recommended that detection of change not be attempted on an individual cell basis. For one thing, there is the problem of spatial off-set due to image registration errors. For another, cell by cell comparisons create inordinately high volumes of data and increase processing time. For another, it is the characteristics and behavior of the larger objects of

interest (e.g. forest stands, cut blocks) that is of importance for this problem and not that of individual cells. Working with pixel data aggregated within larger object areas equivalent to forest stands provides some leeway for accommodating errors due to mis-registration of images. It also greatly reduces the volumes of data that have to be stored, processed and interpreted. The actual process of identifying, outlining and classifying the spatial objects of interest is time consuming, may require a significant amount of manual human interpretation and will certainly require the use of high spatial resolution imagery. The good news is that this process of identifying initial objects for classification and monitoring only has to be done once. After the initial objects are defined, all subsequent efforts are directed at transactionally updating the object data base by identifying only locations where there has been a change in the character of the object and updating the spatial extent and attribute classification of the changed object. In the case of BC, it may well be feasible to use existing vector data on forest cover (FC or VRI) as an initial starting point for identifying forest stands, non-forest areas, cut-blocks and other spatial entities that will define the objects to be monitored. Existing manually interpreted spatial databases may be supplemented, or revised, through the use of automated techniques for identifying and extracting features or objects from image data (as per e-Cognition).

Once the objects that are to be monitored are defined, mapped and in place, the second part of the equation is to devise an effective and cost-efficient mechanism for monitoring those objects to identify if they have undergone a significant change in cover type or in the characteristics (health and vigor) of the cover type. This part of the problem can best be addressed using high temporal frequency, low spatial resolution image data such as MODIS. It is simply not feasible to acquire, process and interpret moderate to high spatial resolution image data for an entire province on a repeat cycle of several images per year. It is sub-optimum to attempt meaningful change detection using only one or two difference images per year of moderate to fine spatial resolution image data. Finally, it is not necessary, for the purposes of detecting change in objects the size of forest stands, to process moderate to high spatial resolution imagery for each object for each time period. All of these reasons argue for adoption of a monitoring methodology that makes use of lower resolution image data that can be obtained and processed at a high temporal frequency. The point of the monitoring data sets is not to identify the boundaries or extent of changes in land cover precisely, it is only to identify whether a significant change has occurred within a defined spatial object (e.g. a forest stand) that may indicate a significant change in health, condition or cover type. The monitoring acts as a screening mechanism to raise flags for locations where a defined and mapped object has demonstrated a likely change in cover density, type or pattern. Once the broad brush monitoring has raised a red flag, the areas of concern need to be reviewed using higher resolution imagery to determine if a significant change has occurred and, if so, the nature and spatial extent of the change.

The third main sub-problem is that of transactionally updating the database of spatial objects to reflect any changes in cover type, pattern, health or other attributes that are identified by the screening process described above. Objects whose cover type has significantly changed need to be reviewed. New boundaries need to be drawn to partition an original object into two or more new objects if the observed change has only affected part of the previously defined object (e.g. part of a previously healthy forest stand is now

infested with Mountain Pine Beetle and part remains unaffected or part of a forest stand has been harvested and part remains). If the entire object has undergone a uniform change, then only the attributes recorded for the object need to be updated. In order to conserve space and in order to make it easier to track and identify changes in the object data base, it is recommended that only changes to the spatial object data base be recorded for any given time interval. All locations that have not been associated with a change do not need to record updated spatial information. Only those locations where an object has changed its boundaries are recorded, along with the date and nature of the change and the identity of the new spatial object that the location now belongs to. This time-stamped spatial database should be fairly easy to query to identify and display changes in status of the forest between any two dates or to display the current status of the forest at any current date. Since the spatial database consists of a series of relatively large spatial objects (forest stands and the like) it will be smaller and more feasible to manipulate and display than a pixel database of billions of cells. Attribute data need only be maintained for larger spatial objects and not for the individual pixel elements that make up each object.

## **4.4 Implementation details**

1. You need to first define, delineate and attribute spatial objects that are not single pixels but are rather something closer in concept to the objects that you want to monitor for change. In the forest environment, the objects of interest are:

- a) Forested stands
- b) Cut Blocks
- c) Fire Scars
- d) Non-forested exception areas (urban, water, roads, rock, etc. - all pretty easy to isolate once and they stay that class thereafter).
- e) Pine Beetle affected stands

2. To define these objects, you can certainly avail yourself of existing vector data sources such as VRI, FC and AVI (in Alberta). You probably need to verify these visually against a backdrop of background imagery. This is a big job and might be time consuming and costly but it can be done. JMJ has done manual on-screen recognition and digitizing of readily visible objects for me for pennies a hectare (< 3 cents per hectare). This job could theoretically be automated but it may not be cheaper or faster to look for automated methods of feature identification and extraction.

Where manually interpreted vector maps do not already exist, you can certainly look to using automated feature extraction or object recognition software to automatically recognize and extract spatial objects that exhibit a characteristic spatial pattern in image data. Many people are now familiar with the concept of object extraction from imagery as

performed by e-Cognition software. The idea here is to draw boundaries around known or obviously visible areas of non-forest (cut blocks or fire scars) so that you know which areas are in forest (and so can practically change from forest to non-forest in the case of monitoring harvesting activity or from healthy forest into pine beetle affected forest in the case of monitoring Mountain Pine Beetle activity).

3. Once you have these initial objects recognized, extracted and attributed the problem becomes one of monitoring the remaining areas that are designated as forested (at the level of forest stands and not individual trees) to check for dramatic changes in the spectral pattern within the mapped forested entities. In the reverse sense, you can also monitor the non-forest areas to look for dramatic changes that may indicate a return to forest cover from non-forest status. In your case, the problem is a bit more difficult since the changes may not be as dramatic as from forest to non-forest or vice versa. Still, the key is to define the objects first in any case as these objects become the things that you monitor for change (and not the individual pixels in a satellite image).

4. My suggestion here in Alberta (and it would be the same for you) would be to set up a monitoring program that made extensive use of lower resolution, multi-date imagery such as MODIS rather than to try to acquire, process and interpret the many hundreds of satellite imagery scenes that would be required to cover all of BC (or Alberta) periodically. The MODIS ground footprint is only 250 m as opposed to 20-30 for satellite imagery. However, most of the spatial objects that Alberta is interested in monitoring (cut blocks) are larger than 250 m in both directions, 500 m to 1 km would be about normal. So a MODIS image can have its digital values (NDVI greenness level values in the case of MODIS) rolled up to compute a sum within the bounds of each polygonal entity quite effectively. MODIS is cheap to acquire. You can get weekly mean value MODIS images that have been created using the parts of daily images that have the least cloud cover to create a weekly composite "cloud-free" greenness image. Because the images have 250 m ground footprints you can affordably process a composite image for the entire province in a few minutes to perhaps an hour. At this rate you can process images weekly throughout the year in a way that is both feasible and affordable. You cannot hope to do this with any finer resolution imagery (satellite or airborne).

5. Because you roll up the weekly values within mapped polygons, the exercise becomes one of looking for significant (or dramatic) changes in values within any given polygon. Because you have acquired and processed weekly data sets, the process also becomes one of looking at temporal patterns that can be equated to "signatures" that are characteristic of the phenological behavior of the ground cover through time (e.g. through a full year growing cycle). In the case of cut blocks, the yearly greenness pattern is very characteristic with white snow reflected in the winter, rapid and strong greenness in the initial spring flush and then rapid senescence to a brown cover by perhaps August. Forest stands will show a very different greenness curve. I can imagine that a healthy forest stand will have a very different temporal curve than an un-healthy stand affected by Mountain Pine Beetle. These signatures and patterns are observed and recorded at the level of the spatial objects (such as stands or cut blocks) and not at the level of an individual pixel or tree. This makes it feasible to go for province wide coverage on a weekly (or bi-weekly) basis. The temporal signature concept also allows for relative



classifications and comparisons such that the shape of the curve is of greater importance in comparing like objects than the absolute values of the digital numbers. This makes the process much less sensitive to variations in image quality, climate induced differences in growth rates and dates and other elements that will cause confusion if single date satellite imagery is used for change detection.

6. Your MODIS NDVI multi-temporal analysis becomes your tool for screening the entire area (province) to pick out indications of locations where a change may be occurring. It may not be of sufficient spatial resolution to let you map the change, but it may well be enough to tell you a change is occurring within a particular defined polygonal entity. If your screening sends out a red flag that tells you a change may be happening within an object you have defined (e.g. a stand or a cut-block) now is the time to obtain finer resolution imagery for this particular location and use it to examine and verify or reject the postulated change. If a change has occurred, you then need to transactionally update your data base of objects that define stands, cut-blocks, fire scars, etc to break the previous object (e.g. a stand) down into its new components (e.g. a stand and a cut-block or perhaps a healthy stand and an infected stand). You then go back to your weekly monitoring for change with the new objects entered in your database along with their spectral and temporal signature patterns.

7. A fairly efficient way to store changes for only for those areas that experience a change in cover pattern is needed. So, instead of having to maintain maps of cover type at every time for every pixel, you only maintain a record of 2 things. One is the rolled up value within each object which is stored as a data base record tied to the object for a particular date. The second is a database of grid cells that have changed from being associated with one object to another. Only grid cells that change assignment are recorded with the date the change was implemented and the nature of the change (from polygon N of type forest to polygon X of type cut-block). This makes it quite feasible to maintain a very reasonably sized data base of temporally changing conditions.

## **4.4 Conclusions**

The above design is quite generic and could be applied to monitor, for example, changes in agricultural land use of types such as permanent pasture, forages, cereal crops, oilseed crops, crop-fallow rotations, continuous cropping, no till versus minimum till, etc. All of these are patterns that apply to objects (here farm fields) and that can only be recognized through reference to temporal variation in land cover patterns within these objects (and not within individual pixels). This issue is of great interest for monitoring land use practices for conformance to Kyoto agreements. I fully expect to see something like this become required to monitor for conformance to Kyoto agreements.

From the point of view of forest cover mapping and monitoring, you want to flag locations where changes in the previously mapped condition of the forest has occurred. Once flagged, you want to go to the locations of potential change and review the latest image

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>information to compare it to previous image information for the same location. If a change can be verified, you need to record the kind of change and the extent of the new area that it applies to. In this way, you create a time-stamped map and record of what changes have occurred in the forest cover, when they occurred and where they occurred. This time-stamped spatial data base can be queried to create multi-temporal maps that depict change through time.</p> <p>You might like to visit the web page for TimeMap (<a href="http://www.Timemap.net">www.Timemap.net</a>) to get an impression of what a temporally variable map can look like.</p> |
|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Inventory Program Review: A Challenge Dialogue with Stakeholders

---

BC Ministry of Forests and Range

---

*Executive Co-Sponsors —*

**Jim Snetsinger, Chief Forester, Forest Stewardship Division**

**Tim Sheldan, Assistant Deputy Minister, Operations Division**

*Prepared by —*

**Inventory Program Review Action Team, Forest Analysis and  
Inventory Branch**

**Process Facilitation Support by R. Keith Jones & Associates and  
Michele Baker, Officelink**

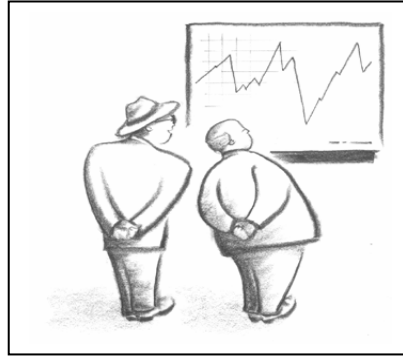


**March 8, 2006**

Note to Participants: Please use the accompanying IPR Challenge Paper Feedback Form to provide your response to this Challenge Paper. Your response is required as soon as possible and no later than March 29<sup>th</sup>, 2006

Copies of this Paper and the Feedback form may be downloaded until March 29<sup>th</sup> from [http://www.for.gov.bc.ca/hts/inventory\\_prog\\_rev.htm](http://www.for.gov.bc.ca/hts/inventory_prog_rev.htm)

## Tracking the progress of the IPR



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

## Table of Contents

|                                                                                 |           |
|---------------------------------------------------------------------------------|-----------|
| <b>ABBREVIATIONS .....</b>                                                      | <b>II</b> |
| <b>FORWARD — THIS CHALLENGE PAPER.....</b>                                      | <b>IV</b> |
| SPONSORS .....                                                                  | IV        |
| TERMS.....                                                                      | V         |
| SCOPE.....                                                                      | V         |
| STARTING PERSPECTIVES .....                                                     | VI        |
| <b>1. KEY CHALLENGE BEING ADDRESSED IN THIS CHALLENGE DIALOGUE .....</b>        | <b>1</b>  |
| <b>2. EXPECTED OUTCOMES AT THE END OF THE CHALLENGE DIALOGUE.....</b>           | <b>2</b>  |
| <b>3. BACKGROUND ISSUES AND EVENTS THAT HAVE LED TO THIS KEY CHALLENGE... 2</b> | <b>2</b>  |
| 3.1 IPR AND RELATED INITIATIVES.....                                            | 2         |
| 3.2 VEGETATION INVENTORY.....                                                   | 4         |
| 3.3 GROWTH & YIELD.....                                                         | 7         |
| 3.4 RELATED INVENTORIES .....                                                   | 8         |
| <b>4. ASSUMPTIONS DRIVING THIS CHALLENGE DIALOGUE .....</b>                     | <b>9</b>  |
| 4.1 INVENTORY PROGRAM REVIEW.....                                               | 9         |
| 4.2 VEGETATION INVENTORY.....                                                   | 11        |
| 4.3 GROWTH & YIELD.....                                                         | 13        |
| <b>5. CRITICAL QUESTIONS.....</b>                                               | <b>15</b> |
| <b>6. NEXT STEPS.....</b>                                                       | <b>17</b> |
| <b>APPENDICES .....</b>                                                         | <b>18</b> |
| APPENDIX 1: PRELIMINARY INVENTORY ISSUES IDENTIFIED BY INVENTORY STAFF.....     | 19        |
| APPENDIX 2. BACKGROUND TO THE VRI “PROGRAM” .....                               | 24        |

## Abbreviations

|           |                                                       |
|-----------|-------------------------------------------------------|
| AAC       | Allowable Annual Cut                                  |
| AOAs      | Archaeological Overview Assessments                   |
| CDS       | Challenge Dialogue System                             |
| CWD       | Course Woody Debris                                   |
| EBA       | Ecosystem Based Management                            |
| FG        | Free Growing                                          |
| FAIB      | Forest Analysis and Inventory Branch (MOFR)           |
| FREP      | FRPA Resource Evaluation Program                      |
| FRPA      | Forest and Range Practices Act                        |
| FIA       | Forest Investment Account                             |
| G&Y       | Growth and Yield                                      |
| IPR       | Inventory Program Review                              |
| LIBC      | Land Information BC (formerly)                        |
| LRDW      | Land and Resource Data Warehouse                      |
| LUP       | Land Use Plan                                         |
| MOE       | BC Ministry of Environment                            |
| MOFR      | BC Ministry of Forests and Range                      |
| MPB       | Mountain Pine Beetle                                  |
| NFI       | National Forest Inventory                             |
| NVAF      | Net Volume Adjustment Factors                         |
| OAF       | Operational Adjustment Factors                        |
| PEM       | Predictive Ecosystem Mapping                          |
| PSP       | Permanent Sample Plot                                 |
| RISC      | Resource Information Standards Committee              |
| SIBEC     | Site Index – Biogeoclimatic Ecological Classification |
| SIGY      | Southern Interior Growth and Yield Co-operative       |
| SFM, SFMP | Sustainable Forest Management/Plan, SFM Plan          |
| TASS      | Tree and Stand Simulator                              |
| TEM       | Terrestrial Ecosystem Mapping                         |
| THLB      | Timber Harvesting Land Base                           |
| TFL       | Tree Farm License                                     |
| TRIM      | Terrain Resource Information Management               |
| TSA       | Timber Supply Area                                    |
| TSR       | Timber Supply Review                                  |
| VDYP      | Variable Density Yield Prediction                     |

VRIMS           Vegetation Resource Information Management System  
VRI             Vegetation Resource Inventory

## Forward — This Challenge Paper

The Inventory Program Review (IPR) is following the *Challenge Dialogue System (CDS)* — a flexible but disciplined process for engaging diverse stakeholders to collaborate and innovate in accomplishing complex tasks. In this instance the process consists of 5 steps: (1) initial scoping by the project Action Team, (2) expanded dialogue with a wide range of stakeholders, (3) workshops with stakeholders to clarify the challenge and identify some key action options, (4) options development and analysis, and (5) recommendations to executive and direction to implement. The outputs from Step 1 are in Appendix 1. We are now beginning Step 2 with the distribution of this *Challenge Paper*.

The purpose of this Challenge Paper is to prompt a meaningful electronic conversation around the Key Challenge stated in the first section among those stakeholders in industry, government, First Nations and private sector firms who represent largely the users and, in some cases, providers of vegetation information in the province. This initial Dialogue will set the scene for one or more focused workshops planned for the first quarter of fiscal 2006.

The Challenge Paper is not meant to be a fully polished business report or rigorous “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 review.

We have little doubt that the Challenge Paper contains errors and misinterpretations. That's alright and in fact we are counting on you, the participant in the electronic Dialogue, to note them and to set us straight. This paper advances some important assumptions that we want to test with you — the things that “go without saying” — and some initial questions concerning the Key Challenge. Have fun thinking about the challenge. We appreciate your help and look forward to receiving your reactions and ideas for improving the inventory for the present and as we prepare for new challenges and opportunities in the future.

### Sponsors

Jim Snetsinger, Chief Forester and Tim Sheldan, Assistant Deputy Minister, Operations Division, serve as executive sponsors of the Inventory Program Review. The Operations Division Management Team has given its endorsement of the project.

The Forest Analysis and Inventory Branch (FAIB) and the project Action Team will provide project leadership with appropriate involvement of Operations Division personnel. FAIB will be responsible for reporting out to both ADMs as the review progresses. It will also ensure that the process provides the opportunity for continued input from a wide spectrum of stakeholders.

## *Terms*

The term "inventory" is used in this Challenge Paper to imply a range of information types including, point-in-time (snapshot) inventory, often in map form; inventory updating activities; time-series monitoring; models forecasting future conditions, particularly growth and yield; and associated sampling for these activities.

The focus of this Challenge Paper is on the vegetation inventory. The vegetation inventory currently is focused on forested areas and does not include range lands. A parallel Dialogue later on will look at range land inventory. The Vegetation Resource Inventory (VRI) is the current data standard that supports vegetation inventory in BC.

The vegetation inventory forms an information layer that is georeferenced to TRIM. The inventory information is typically presented in conjunction with other information such as base map features — roads, rivers, settlements, etc. — in order to provide important geographic context. The vegetation inventory is manifested in different forms: map (GIS), database including polygon attributes, orthophotos with vegetation cover delineations, standard reports, sample reports such as stand and stock tables or volume and decay analysis.

## *Scope*

The IPR encompasses all facets of the vegetation inventory program as supported by the VRI standard. It consists of forest/vegetation cover, done to VRI standards; VRI update; Phase 1 VRI (photo interpretation) and Phase 2 VRI (ground sampling); Net Volume Adjustment Factoring sampling (NVAF); growth and yield; site productivity; vegetation information specific to management of the Mountain Pine Beetle; and all related or dependent inventories, studies and assessments.

The scope of this review is not limited to the activities of FAIB, MoFR or government. We want to take a broad perspective beyond government to ensure all aspects of the program are included and the needs and roles of the principle stakeholders are considered.

We are focusing on the vegetation inventory because of its prevalence and importance to the forest sector. It was our opinion that to broaden the scope of the project to include all resource inventories would have reduced the effectiveness of the review given the resources available. However we are interested in comments related to other related resource inventories and will either use them in this process or pass them on to the appropriate custodians.

MOFR is initiating or contemplating separate reviews of other inventories within its jurisdiction including Forest Recreation Inventories, Traditional Use Studies, Range Inventories and the National Forest Inventory (monitoring). We also recognize the close linkages if not dependencies between the vegetation inventory and ecosystem mapping (terrestrial ecosystem mapping (TEM) and predictive ecosystem mapping (PEM)). In this regard, we look forward to the results of a



---

complementary Ecosystem Mapping Challenge Dialogue that is currently being planned by the Ministry of Environment within a similar timeframe as the IPR.

Finally, we welcome feedback on the governance and delivery models for the inventory program and on how they might better articulate goals and objectives, assign roles and responsibilities and capitalize on available resources from multiple sources.

## *Starting Perspectives*

### Governance:

- Current legislation sets inventory requirements differently for different forests within the province:
  - TFL holders must meet inventory requirements set by the Chief Forester.
  - Licensees outside of TFL have no such requirement, although there is an expectation that comments in TSR Determinations regarding the inventory will impact future inventory investments.
  - In both cases, due diligence under FRPA infers decision-making based upon sound information.
- Government sets the standards for inventories which are funded by government.

### Delivery Model:

- For TFLs: the licensees are responsible for funding inventory requirements set by the Chief Forester (Forest Act Section 9). Where Government standards as set by Government Data Custodians exceed the requirements of the Chief Forester, the TFL Holders may choose to augment their inventories to meet the Government standards using government funding.
- For TSAs: Government funds the collection of inventory information. Government also houses and provides access to the information subject to various constraints. Government relies on a subset of forest tenure holders to plan, collect, quality assure and submit to government, forest inventory data.

### Funding Model:

- Prior to 1995, the funding and delivery of inventories outside of TFLs were undertaken directly by government. The forest cover inventory was by far the largest data set in existence at the time,

- From 1995 – 2001, Forest Renewal BC provided funding to ministries and industry to undertake inventory work. In 2002 FRBC was replaced by the Forest Investment Account (FIA). Funding was allocated first at the regional level and then at the management unit level and required government and industry to collaborate on investment planning and project delivery. FRBC funding levels were highly volatile and therefore not well suited to effective inventory program planning and implementation.
- From 2002 to the present, FIA allocates funding directly to individual forest tenure holding “recipients” who then determine the optimum mix of investments. Local decision-making and flexibility to move funding from one area of the province to another with minimal government involvement are seen as the primary benefits of this model. The delivery model is not well suited to regional or provincial programs such as forest health, Growth and Yield and it appears, vegetation inventory. Unfortunately, as with all government programs, FIA funding has also been very volatile ranging from a high of \$146 million to a low of \$85 million.

Decision-making at different scales warrants different degrees of quality (spatial & attribute accuracy, currency), The VRI has been implemented to support management unit (TFL or TSA) level decision-making. This assumes that only a subset of any given MU will require stand level information appropriate for spatial analysis and for those stands that do, stand level assessments such as timber cruises will be done by those that require the higher resolution information.

However, with the advent of GIS, spatial modeling at that stands level based upon the VRI has become very popular with forest managers even in the absence of stand level assessments. The VRI standards for more intensive sampling could be applied to provide higher resolution data for these uses, however this is seldom done for cost reasons. Alternatively, a more intensive operational cruise methodology may be used, but this is not tied to the inventory.

Vegetation condition changes over time causing the inventory database to “age” and become out-of-date. The inventory therefore must be regularly updated and periodically re-inventoried when and where there is a demand for the inventory to be more current.

Many planning and management decisions in today’s work environment rely almost exclusively on the maps that are updated and maintained by staff with limited knowledge of local conditions. Local field knowledge of the inventory has diminished significantly. Further, there is an increasing reliance on the forest industry and other third parties to help maintain the inventory.

In advance, we wish to thank you for whatever time you are able to contribute to this important review.

*IPR Action Team*

When reviewing the many changes and challenges in the forests and in forestry at the December 6, 2006 [Future Forests Symposium](#), Doug Konkin, Deputy Minister of Forests and Range, asked —

***I'm left with the question, is our current forest management paradigm responsive enough to the rapidly changing world we find ourselves in? And what is the risk associated with changing our current management paradigm? Or, not changing it?***

---

# Challenge Paper

## Inventory Program Review (IPR): A Challenge Dialogue with Stakeholders Who Need Critical and Timely Vegetation Information

### 1. Key Challenge Being Addressed in this Challenge Dialogue

To undertake a full and open review of the current implementation of the vegetation inventory program<sup>1</sup> in order to examine how well it meets current and future<sup>2</sup> information needs and how it can be improved to address these needs better:

- by engaging a range of inventory stakeholders in a structured dialogue to establish common background, test assumptions, ask important questions and identify other issues and opportunities;
- by drawing upon the expertise of technical inventory professionals in the public and private sector to respond to opportunities to improve processes and products and to address identified gaps; and
- by striking a balance between thinking outside the box and recognizing where current systems continue to serve our needs well (not throwing the baby out with the bath water).
- by balancing desired change with affordability. We will never eliminate risk, but we must manage it.

Addressing this Key Challenge will help to affirm/refine and build a rational, stakeholder-based case for the inventory “mandate.” It will also provide a basis to re-examine the effectiveness and efficiency of the current delivery model.

**At various points in the Challenge Paper you will be asked for your reaction and further input. The separate *Challenge Paper Feedback Form* (MS-Word) pulls together all these input requests and invites you to e-mail your contribution to the [IPR Responses](#) by March 29, 2006**

---

<sup>1</sup> While the term “program” is used here, it implies that an existing cohesive program current exists. Most people involved with the current inventory “program” feel it is neither complete nor cohesive.

<sup>2</sup> For, example the next 10-15 years.

## 2. Expected Outcomes at the End of the Challenge Dialogue

The Action Team guiding this dialogue offers the following expectations for the participant's consideration. Resulting from the IPR the following outcomes will be realized.

1. A clear, broad view of current and anticipated vegetation inventory information needs and program delivery issues and opportunities from those that require and use the information to support decisions and planning from policy through to practices on-the-ground;;
2. The development and assessment of technical and program delivery options that will best address the issues; and
3. Clearer understanding and statement of the business case and barriers for vegetation inventory investments from both government and licensee perspectives.
4. A better understanding of the range of practical solutions to the issues and opportunities identified; and
5. A renewed strategic direction (vision, mission and mandate) for the province's vegetation inventory program.

**INPUT REQUEST 1: Please use the separate *Feedback Form* to provide your feedback (reactions, questions, suggestions) to the Expected Outcomes.**

Do you have any comments you would like to make about our Forward section regarding terms, current scope and assertions.

What questions do you wish to raise about the Key Challenge statement?

What ideas did the Key Challenge statement spark in your mind?

What reactions, questions or suggestions do you have with regard to the Expected Outcomes?

What expectations do you have for this Challenge Dialogue (as in: "I would consider this Dialogue a success if...")?

## 3. Background Issues and Events That Have Led to This Key Challenge

### 3.1 IPR and Related Initiatives

1. **The purpose of the IPR is assess the following:**
  - a. needs and expectations for the program now and in the foreseeable future,
  - b. strengths and vulnerabilities of the program related to those expectations,
  - c. opportunities for improving the program, and

- d. stakeholder support and executive endorsement for implementing the necessary improvements.
2. IPR Initiatives: Parallel to or supporting the IPR are the following inventory reviews and supporting studies that are ongoing or planned.
    - a. Other inventories: A range inventory program review is being led by Laura Blonski, Range Ecologist in Operations Division, Prince George (Contact: [Laura.Blonski@gov.bc.ca](mailto:Laura.Blonski@gov.bc.ca)) and a recreation inventory review will be led collaboratively by John Wakelin, FAIB and Jacques Marc, Forest Practices Branch, MOFR (Contacts: [John.Wakelin@gov.bc.ca](mailto:John.Wakelin@gov.bc.ca) and [Jacques.Marc@gov.bc.ca](mailto:Jacques.Marc@gov.bc.ca));
    - b. [Mapping of Inventories](#) (TSA level index maps showing the extend of each inventory including VRI, TRIM, PEM, TEM and Visual Landscape Inventory (VLI):
    - c. A VRI business process mapping exercise will begin in April. (Contact: [Don.Gosnell@gov.bc.ca](mailto:Don.Gosnell@gov.bc.ca)). This will be used to inform any process re-engineering that results from the IPR.
  3. [Mountain Pine Beetle Area Inventory & Monitoring Action Plan](#). The provincially funded Forests for Tomorrow (FFT) program, and the federally funded Mountain Pine Beetle Emergency Response – Canada-BC Implementation Strategy, provide opportunities to address inventory and monitoring knowledge gaps in MPB affected areas. Building on the June 2005 report *Strategies for Forest Inventory and Monitoring in MPB Areas*, a MPB Inventory and Monitoring Action Plan is now in final stages of completion under the guidance of a government and industry working group. This plan will guide the investment of funds on critical and timely information needs in direct support of *BC Mountain Pine Beetle Action Plan 2005-2010*. At a January 2006 workshop hosted by FAIB in cooperation with the Council of Forest Industries and MOE, some 30 participants developed a draft set of plans across five priority theme areas: Beetle Attack and Other Pathogens; Decay (mortality, declining value), G&Y and Succession; AAC (strategic) & Harvest Scheduling (spatially explicit); Silviculture – Strategic & Spatially explicit Planning; and Non-Timber Values. A draft integrated set of priority projects have now been identified within and across these theme areas with budget estimates for fiscal year 2006-07. Contact: Graham Hawkins [Graham.Hawkins@gov.bc.ca](mailto:Graham.Hawkins@gov.bc.ca) .
  4. **Timber Supply Determinations and Inventory Issues.** As part of the preparation for the IPR, FAIB undertook a study to review the inventory and G&Y issues that affect timber supply forecasts and subsequent AAC determinations identified in Timber Supply Review AAC Rationale reports. The study identified eleven (11) issues including the topics of site productivity; existing unmanaged stand volumes; priority areas for VRI Phase 1; decay, waste and breakage (NVAF); site productivity from alternative silviculture systems; forest health affects on site productivity (OAFs); stand dynamics outside the timber harvesting land base – e.g., inoperable areas, parks (THLB); better handling of NSR; treatment of values stemming from traditional use studies and archaeological overview assessments (AOAs); roles and responsibilities regarding in particular other inventories that affect timber supply analysis.
  5. **ABC FP Resource Inventory Review.** As a result of concerns expressed by some foresters and others regarding the state of the resources inventories in BC, the Council of the Association of BC Forest Professionals (ABC FP) directed association staff to put out a call to the membership to solicit comments on the state of the inventories. An initial set of comments

were received in late October 2005. The general consensus among the respondents was that there are serious problems with resource inventories. The Association's current plan is to undertake a more thorough examination guided by a task force. The ABCFP is aware of the IPR work and the two initiatives have agreed to share their findings so that a more complete picture of the situation can be attained from both perspectives. It is important that the Association maintain independence from the government, hence the continuation of the two somewhat parallel processes. Contact Dwight Yochim for more information: [dyochim@abcfp.ca](mailto:dyochim@abcfp.ca).

### 3.2 *Vegetation Inventory*

6. **Genesis of the VRI** — The Forest Resources Commission report of 1991 led to the development of the VRI standard, a statistically sound inventory standard for timber and other vegetation attributes. The VRI standard was implemented in 1998.
7. **Defining the Vegetation Inventory** — there are three questions that the vegetation inventory attempts to answer:
  - a. How much do we have?
  - b. Where is it located?
  - c. How does it change through time?

The VRI standard was designed to address these questions for both timber and non-timber vegetation and associated ecological attributes at a strategic, management unit level.

8. Seven inventory activities address these three questions:

**To the question — *how much do we have, we use three tools:***

- a. Phase 1 photo interpretation delineates vegetation and also estimates several attributes of the vegetation within each polygon from which we can estimate “how much”.
- b. Phase 2 ground samples provide the descriptive statistics of the inventory. Only a small sub-set of polygons are sampled in Phase 2. Stratification of polygons and rigorous sampling methodology ensures that the desired statistical reliability is achieved.
- c. NVAF, Net Volume Adjustment Factor sampling, validates the estimates from Phase 2 sampling of net volume in each sample tree. NVAF sampling requires that the Phase 2 samples have been installed.

**To the question — *where is it, we deploy a single tool:***

- d. Phase 1 photo interpreted inventory includes the acquisition of appropriate photography, delineation of vegetation polygons and estimation of several vegetation attributes. Phase 1 photo interpreted estimates are adjusted using the Phase 2 sample data to improve the reliability of the resultant information.

**To the question — *how does it change through time, we need four tools:***

- e. Update, a process of tracking ongoing change to forest cover polygons due to logging activities, catastrophic fire and insect/diseases infestation. Historically the

emphasis has been placed on updating the inventory for harvest related depletions. Natural disturbance tracking has been intermittent at best.

- f. Site Productivity, a process to determine the site productivity of a polygon, and to audit/monitor that the estimates of site indices for young stands within a TSA are correct.
  - g. Yield projection, a process that uses site index along with the attributes of the polygon to estimate future stand conditions, including timber volume. Validation of spatially explicit adjustment factors is also a component of yield projection.
  - h. Monitoring, a process to validate our assumptions and estimates in the field through a series of representative plots that provide for repeated measures over time of the variables of interest.
- 9. VRI has been implemented to support management unit level decision-making.** The primary reason for this is cost. While VRI attempts to estimate stand level information, it is meant to be rolled up for strategic level analysis. It designed to give general answers over a large area. The accuracy of the polygon estimates depends on the quality of the photo interpretation, the statistical validity of the ground sampling and the accuracy of site index curves used to project growth. The VRI is predicated on using estimation and adjustment techniques with a limited amount of measured ground data. The longevity (change in accuracy over time) of an adjustment has never been tested.
- 10. VRI as a spatially explicit inventory.** Although the VRI is designed to be implemented at any level, most implementations (1:20,000 - 30,000 scale imagery) support strategic level decision making processes, e.g., TSR, Land Use Plans, etc. Any applications of VRI that depend on the information being correct at stand or polygon-specific level may be unreliable for the reasons stated above.
- 11. Timeframe for completing a VRI.** The timeframe required to complete all phases of a VRI for a management unit typically requires three to four 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 Phase 2 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. The timeframe might be shortened by combining or overlapping the photo and field work.
- 12. Lifecycle of the VRI.** Currently, there is no re-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 with the previously noted changes in government policy, it was planned that the entire province would be covered on a cycle of about 10 years. To date, the first cycle is far from complete.
- 13. Site Index.** Site productivity is estimated from photo interpretation for each VRI polygon using estimated age and site height (the term “top height” is not used) and models maintained by the MOFR Research Branch (SITETOOLS). Ground sampling later adjusts the



age and height for each polygon and a new Site Index is calculated. For young stands with reasonable regeneration, other tools are used such as SIBEC or growth intercept methods. These young stand estimates are carried on the inventory file and are not changed.

- 14. Vegetation Monitoring.** Government has not articulated a clear business driver for monitoring at the management unit level, hence there are no Resource Information Standards Committee (RISC)-approved provincial vegetation monitoring protocols in place. The consulting community has undertaken about a dozen monitoring pilots to date, largely implemented on second growth managed stands. The intent of these pilots is to supply data suitable to test (validate) output from G&Y and site productivity models, but no decision to provincially adopt the procedures has been made. These pilots are referred to as “change monitoring inventories” and utilize the National Forest Inventory (NFI) standards. Typically a proponent will install about 50 fixed area tree plots on a grid in selected strata. The data are intended mainly to check managed stand yield output from models such as TIPSYS. There is an assumption that the plots will be re-measured to get growth data after five to ten years. Monitoring data uses could include: checking G&Y model output, checking VRI adjustment longevity, observing general trends in the inventory, biodiversity change, climate change, changes in the land base, etc. Observing differences between successive inventories does not, for the most part, qualify as “true” monitoring due to differing inventory standards, sampling issues, etc., that may have been applied between inventories. Whatever future direction is taken, forest monitoring needs to be either linked or embedded within the basic inventory design.
- 15. Young stands.** There is a gap in good inventory information between the period of free-growing (10 to 20 years) and early to mid rotation. The inventory label assigned at free-growing comes from the silviculture surveys. These polygons are not ground truthed until after age 30 and even then, with very limited sampling. The VRI, as it has been implemented, may not adequately address growth of young stands.
- 16. Current VRI Coverage.** Although made spatially explicit in 1998, only about 1/3<sup>rd</sup> of the province has been re-inventoried to VRI standards. The remainder has either the old forest cover inventory with data converted to look like VRI data or it is within the TFLs where a number of companies maintain their inventories to their own vegetation inventory standards. Factors for lack of VRI investment include:
- a. Competition for funding: many other resource information needs now compete for the scarce funding that historically was targeted at the forest cover inventory.
  - b. Legislative and Policy Change: The major impacts from legislative and policy change are associated with government policies such as “freedom to manage”, “professional reliance” and optional participation in the Defined Forest Area Management initiative. Each of these added to the fragmentation of the program. Removing the legislated responsibility for inventories from the *Forest Act* in 2001 was more a matter of housekeeping than policy. The removal was in reaction to the reorganization of government which included the consolidation of resource inventory programs to another agency. Now that MOFR is again responsible for VRI, the question of adding the former Section 4 back into the Ministry of Forests Act should be considered,

- c. The rationalization of government and industry capacity has also compromised the program in recent years. The team directly supporting the inventory within government was reduced by 60% in 2002-03. Most companies now rely heavily on contracted expertise to support their information needs. The effect in both situations is a significant loss of local and corporate knowledge about the inventory.

- 17. Timber Emphasis.** Of the 4500+ VRI or so ground samples established since 1998, fewer than 500 are installed to include the full suite of attributes (ecosystem attributes, CWD, etc.) resulting in a timber inventory focus only.
- 18. Volume and Decay.** The Provincial Forest Inventory Program maintained an active volume and decay function since the 1950's. This program area was responsible for developing tree-level models and factors to estimate volume and losses from decay. V&D databases are comprised of over 100,000 historic tree records that are used for developing new products such as taper models. With the introduction of the VRI, the emphasis of this work area shifted to supporting the sampling and developing of Net Volume Adjustment Factors.
- 19. Operational Adjustment Factors (OAFs).** Most predictive tools are developed from data with unknown sampling probabilities and as a result are considered to be biased. OAFs are developed from unbiased sampling and are used to adjust model outputs to reflect "reality". There is no consolidated government standard or program support for OAFs, however, industry often retains consultants to develop OAFs, often in the area of site productivity, forest health or managed stand yields.

Appendix 2 provides further background to the current VRI Program.

### 3.3 Growth & Yield

- 20. Genesis of G&Y.** In BC, recognition of G&Y's role in crown forest management began early: *"No thorough study has yet been made of the rate of growth of our timber on difficult sites. I propose paying some attention to this work during the coming year, in order that some opinion may be formed as to the length of time necessary to grow a second crop in logged and burned districts"*. H.R. MacMillan, BC's first Chief Forester; Annual Report, Forest Branch, 1915.

A G&Y function was established in the inventory program in 1961 with the start of the Permanent Sample Plot (PSP) Program that is still active. Interest in G&Y research began even earlier (1920's). G&Y modeling arrived in the 1970's with an emphasis on supporting forest estate modeling efforts. G&Y activity is largely restricted to government, academia and a few large companies.

**21. Components.** G&Y represents a suite of tools, data and knowledge used to predict current and future tree-based characteristics at the tree, stand, or forest level. G&Y's main applications are in forest planning, silviculture, forest health and inventory. Within inventory, G&Y provides predictions of current inventory attributes that are not (easily) estimated directly (e.g., timber volume, site index, etc). G&Y is also used to project the inventory into the future under various management scenarios to support AAC determinations, SFM planning and silviculture investment decisions.

**22. Legacy.** Before obligation transfers to licensees began in 1987 (reforestation), government held primary responsibility for forest management on crown lands and accepted the role of primary steward and custodian for G&Y. Forest industry's early G&Y investments were largely confined to private land and area-based tenures, reflecting associated forest management responsibilities and incentives (e.g., timber supply analysis and silviculture investment). Today, the province's accumulated G&Y investment legacy includes over 9,000 active permanent sample plots and hundreds of research installations that continue to contribute to the refinement of G&Y models and knowledge to address evolving SFM business needs in BC.

**23. Current Reality:** In the late 1990s, budget pressures and other factors caused government to downsize its G&Y staff and investments. At the same time, government forestry funding initiatives (FRBC, FIA, etc) radically reconfigured G&Y funding and delivery models. A previously centralized G&Y program was fragmented and its components distributed across several funding (sub) programs, each with a unique niche and delivery model. As strategic management capability and linkages among program components deteriorated, stakeholders with G&Y business needs found themselves increasingly isolated from G&Y investment decisions. With the current lack of G&Y investment, over 2,000 PSPs have not been re-measured to schedule and most work in the areas of site productivity and new model development has suffered.

### **3.4 Related Inventories**

**24. National Forest Inventory.** BC continues to contribute to the National Forest Inventory (NFI) coordinated by Natural Resources Canada. The NFI is a national level vegetation inventory and monitoring program designed to supply information at the provincial/national level. Many of the National Forest Inventory (NFI) ground sampling standards were adapted from BC's VRI model. The NFI has a plot location design based on a 20 km grid system. In British Columbia there are approximately 2,400 grid intersections, about 1,200 of which fall on either forested areas or areas that have the potential to be forested (the population of interest). At each grid intersection point, a vegetation cover photo sample has been established within a 2km x 2km plot. Within approximately 10% of the photo samples, a detailed ground sample is established. BC has now completed the establishment phase and is investigating re-measurement procedures. The NFI photo and ground plots re-measurement cycle is 10 years.

**25. Terrestrial Ecosystem Mapping (TEM)** of site series has been undertaken on a number of forest areas. Driven largely by challenges with cost plus the allure of technologies, Predictive Ecosystem Mapping (PEM) was introduced as a semi-automated and more repeatable approach to TEM. Both field and polygon delineation processes with PEM use vegetation inventory information. At the same time, some vegetation inventory work has incorporated more ecological attributes and in some cases has attempted to integrate the mapping of vegetation with the delineation of ecosystems. Joint VRI/TEM standards are available.

**INPUT REQUEST 2:** Please use the separate *Feedback Form* to provide your feedback (reactions, questions, suggestions) to the Forward, Key Challenge and Background statements.

What critical information or perspectives on the Background are confusing to you? Are there any other issues or events that you feel should be added or that are not relevant? When responding, please refer to the Background statements by their number.

## 4. Assumptions Driving this Challenge Dialogue

### 4.1 Inventory Program Review

1. **Forestry in BC continues to experience unprecedented and new challenges.** The challenges are many including heightened global competition, access to markets, community expectations and First Nations interests; managing the right balance of ecosystem values – water, habitat, species, soils, etc.; predicting the affect of changing economic conditions on fibre utilization, mill strategies; bioenergy opportunities; tenure systems; and forest management models; etc. And, overlaid on top of this are the catastrophic effects of the natural agents of fire, insects and pathogens and the increasing evidence of a changing climate. Against this new forest reality at the Future Forests Symposium on December 6, 2005, the Chief Forester and Deputy Minister of MOFR challenged the participants to *evaluate the current management paradigm to determine how we can prepare to manage our forests in the future*. We are assuming that this IPR is therefore one, among a number of dialogues that need to occur to surface some concrete responses to this challenge. We in turn must ask — are we providing the right, critical and timely information to inform planning and decision-making today and what improvements in our approaches and what new inventory information do we need in the future?
2. Inventory staff feels that important improvements can be made to the inventory program to make it more effective and efficient.
  - a. The inventory is being implemented to support management unit level decision-making yet is being used for spatial analysis at the stand level, resulting in risky decisions. It is

- not apparent that planners and managers are aware of how much uncertainty there is in using the inventory in this way.
- b. There are many gaps in the information (coverage and content) and many of the assumptions used to support the projections are of unknown accuracy. For example:
    - i. The inventory was designed assuming all components would be completed on each management unit. But in practice many units have only one or two components completed or planned for completion. For example:
      - i. A Phase 1, but no Phase 2;
      - ii. Phase 2, but no NVAF;
      - iii. Site productivity data gaps and/or Growth and Yield data gaps which result in uncertainty of projected changes to the inventory over time.
    - ii. The Phase 2 component was design to collect a suite of vegetation attributes in addition to timber (soils, ecology and wildlife). In practice, only 500 of 4500 ground plot samples collected to date include the full suite of attributes. How has this practice affected the utility of the inventory?
    - iii. The objective for the inventory was to provide an estimate of the extent and nature of vegetation across the province irrespective of ownership. Yet 10 year after the inventory was initiated, less than 30% of the province has been covered and many areas including protected areas and private land is excluded. Is this acceptable?
    - iv. The Timber Supply Rationales from the Chief Forester indicate a continuing trend of the investment model in not responding adequately to his vegetation inventory concerns. This is clearly not acceptable, but who is accountable for remediation?
  - c. The business needs of industry are not completely aligned with those of government. Further, with government reorganization, industry consolidation and tenure reallocation, changes there is a constant change of personnel. These factors challenge the creation and maintenance of good working relationships between inventory practitioners.
  - d. Under the current funding model, some management units will not likely see investment in a vegetation inventory.
  - e. Recent inventory program downsizing has created a severe capacity issue both in government and industry.
  - f. There are too few government personnel to fully carry out the custodial responsibilities they are tasked with.
  - g. The forest industry and consulting sector do not have all of the necessary expertise and capacity to carry out inventory work that government wants to have delegated to the private sector.
3. MOFR is leading the IPR at this time because of several overarching assumptions.

- a. The VRI was designed primarily to support the responsibilities of the Chief Forester while acknowledging that it would be of benefit to other forest managers inside and outside of government.
  - b. The recent return of vegetation inventory staff and resources to MOFR from the Integrated Land Management Bureau (MSRM) means some inventory-related roles and responsibilities need to be affirmed or sorted out a little further.
  - c. There is a need to test and re-affirm a number of the assumptions on which current inventory systems were designed and/or implemented.
  - d. The current inventory is being used in the absence of local field knowledge to support business decisions it was not designed and/or implemented for.
  - e. As custodian of the information, FAIB staff think they have identified a number of key areas that need attention but we need to test and affirm these with stakeholders before taking any action. Appendix 1 provides a summary of some of issues identified by inventory staff based on a cursory evaluation in December 2005.
  - f. The value of inventory information is recognized as being significant enough to warrant support for change where a clear business case can be demonstrated.
4. The IPR will focus on the following.
    - a. Inventory requirements of forest managers and of the chief forester for AAC determinations.
    - b. Inventory requirements for management of other forest and resource values by government, industry and communities.
    - c. Developing and implementing an achievable and sustainable program to that sees progressive improvements being made within a realistic timeframe and foreseeable resources, technologies and delivery model.
  5. The IPR will aim to strike a balance between identifying where current methods and systems continue to serve needs well versus where new possibly innovative approaches will be needed. Some approaches to improving the program may be too disruptive or too expensive to be implemented. As MoFR is ultimately accountable for the funding and implementation of the vegetation inventory, a thorough benefit over costs analysis will need to be completed for each approach before a recommendation is taken to Executive for decision.

## **4.2 Vegetation Inventory**

6. The VRI standards can be applied at any scale. Due to cost and capacity considerations, it has been implemented utilizing 1:20,000 – 1:30,000 scale photography and minimal stratified ground sampling (100 – 200 plots per MU) to provide for statistical reliability at a management unit level. This model assumes that where stand level accuracy is critical, additional stand level sampling will occur. Typical examples of such sampling are operational cruises and silviculture prescriptions.

7. The original designers of the VRI envisioned the ability for local “new” information to be used to adjust the inventory<sup>3</sup>. However this feature has not been accommodated in the existing design.
8. The vegetation inventory database is very large and complex such that any change to existing standards has significant time and financial implications. Any proposed changes to data models and underlying databases must have a benefit over cost ratio of greater than 1 and must be affordable. Imminent changes with computer systems (workstation refresh within government) and the implementation of the Vegetation Resource Information Management System — VRIMS (from INCOSADA) add additional data management challenges and uncertainties. The inventory information demands caused by the MPB attack also suggest that more efficient data management protocols are necessary. Although it remains unclear what the solutions are.
9. The VRI will continue to be a key data set used for both strategic and, in the absence of more appropriate information - stand-level decision-making, Knowledge of the processes used to produce the polygons and their attribute labels and associated data is critical for ensuring appropriate judgment is applied when using the information.
10. The Resource Inventory Standards Committee (RISC) committee has not been active for the past 3+ years, however, the RISC website is still an important tool for government and industry to access RISC approved standards. RISC was disbanded as there were very few standards being brought forward and those that were generated no comment. The other duties of the committee had also become redundant. Note: under the former LIBC Data Custodian Council, a decision was made that bound all custodians (in LIBC) to adhere to RISC procedures when amending an existing, or creating a new, data standard. With the demise of LIBC, [data custodians](#) are no longer bound by that decision.
11. The original designers of the VRI envisioned a seamless inventory for the entire province<sup>4</sup>. The implementation however, has not accomplished this objective. TFLs may or may not adhere to VRI standards and the basic components of the inventory are often the private property of the TFL licensee and therefore not available for integration purposes. Gaps in TSAs, woodlots, parks and managed forest lands will continue to restrict objective assessments of the state of the province’s forests and comparisons of performance from one management unit to another.
12. The current FIA Land Base Investment Program local delivery model is ineffective for implementing regional or provincial investment strategies and will not provide government with the inventory information it needs to carry out its stewardship responsibilities. Poor overall coordination has caused inconsistent investment decisions.

---

<sup>3</sup> [Final Report from the Vegetation Inventory Working Group on a Proposed New Inventory](#). p. 45 .

<sup>4</sup> Final Report from the Vegetation Inventory Working Group on a Proposed New Inventory. p. 8

13. FIA Land Base Investment Program funds are generally directed to inventory projects which will have a short term benefit to the “funding recipient” (e.g., AAC uplift potential or mitigation of a constraint).
14. For many reasons, managers in all parts of the sector must rely on less than perfect inventory information. However, there does not appear to be a minimum quality standard that must be achieved before a decision-maker can consider it. While this situation can be rationalized as being in the best short term interests of the public, it begs the question: Is it in the public's long term interest and if not, what minimum standard must we achieve and by when?
15. If all sources of Provincial and Federal Government and industry funding for inventory and G&Y activities were rationalized, coordinated and planned cooperatively there is a greater probability of achieving the quality objectives of the inventory users. Governance and delivery activities should involve major providers of inventory and G&Y information, with direct or indirect means for participation by stakeholders.
16. A business case for investment in inventory and G&Y information will require analysis of the risks inherent in the current information, and their implications for good forest stewardship. Until we do this we will not be able to assess value for money nor provide the appropriate incentives for Treasury Board or other stakeholders to make these investments.
17. As we develop the new vision of the VRI, should we be thinking in more holistic terms towards the management of timber and ecosystems? We think so.
18. Projection of the inventory requires estimates of growth and these estimates come these days largely from G&Y information. Ecosystem mapping (TEM or PEM) and tools like SIBEC, together with VRI contribute to answering the what, where and how much questions referred to earlier. It therefore stands to reason that each forms one component of the vegetation inventory program and should be managed as such (that is, together, not in isolation).
19. In recent years, better approaches to PEM and TEM are realizing improved accuracies and greater consistency. They now use enhanced modeling techniques, image interpretation tools and more reliable data sources. The ability to map ecosystem conditions in a more automated manner with higher accuracies and with lower costs over offers the potential for better interpretation and prediction of timber and non-timber values to support ecosystem-based management (EBM). These include interpretations in the areas of site productivity, silviculture strategies and planning (species selection and diversity, climate change scenarios), terrain-hydrology-related interpretations, wildlife habitat, species at risk, etc.

### **4.3 Growth & Yield**

20. Our claims to sustainability rest on our ability to predict future forest values under alternate management regimes. G&Y knowledge and predictions play a central role in the practice of sustainable forest management (SFM) in many business areas. G&Y is not just about timber anymore – it includes an understanding of forest dynamics from the perspective of multiple



resources. Stand structure predictions from G&Y models are key inputs for predictions of many future non-timber values including habitat, bio-diversity, visual quality, etc.

21. The rapid evolution of SFM practices continues to increase expectations for G&Y knowledge and tools. Early G&Y work focused mainly on yesterday's clear-cut paradigm. However, the MPB epidemic and ecosystem-based management practices, such as variable retention, require estimates of G&Y under complex stand conditions. The number of stakeholders and G&Y business drivers continues to expand and tax existing tools and knowledge. The business case for G&Y has never been stronger or more diverse.
22. As Crown land steward, government is publicly accountable for SFM. Long-term G&Y investments (e.g., permanent sample plots and modeling programs) align with government's long-term stewardship and SFM responsibilities. In contrast, licensees do not have an incentive to make long-term G&Y investments except where they are able to capture the benefits of those investments. Government and licensees may have different investment perspectives, but they share many of the same G&Y business drivers:
  - a. Today's high-profile SFM issues including mountain pine beetle, ecosystem-based management and Aboriginal treaty settlements.
  - b. Timber supply planning: AACs, harvest scheduling, mill supply.
  - c. Silviculture investment decisions:
  - d. Reforestation: licensee obligations; Forests for Tomorrow.
  - e. Stand tending: mitigate/enhance timber and non-timber supplies.
  - f. FRPA Forest Stewardship Plans: stocking standards
  - g. Wood quality and value implications.
  - h. SFM planning and validation processes: SFMPs, land-use plans, C&I, certification, FRPA-FREP, etc.
  - i. Research, Extension and Education applications.
  - j. Linkages with resource inventories and other business data systems (*RESULTS*, *GENUS*, etc).

**INPUT REQUEST 3:** Please use the separate *Feedback Form* to provide your feedback (reactions, questions, suggestions) to the Assumption statements.

What assumptions require more clarification for you to understand?

What assumptions do you strongly disagree with? What is your position on the issue?

What assumptions would you like to add?

Please refer to the Assumption statements by their number.

## 5. Critical Questions

1. **Inventory Program Review** — we are at early stage of the review process; do you think this kind of review is appropriate and that it will be useful? What are your thoughts on its scope? Note – we see inventory and G&Y being integrally linked. Are there other related or influencing initiatives we should be aware of that should be linked? How would you finish the sentence: *This review will be worthwhile if....?*
2. **Today's Priority Business Needs** — Within the context of this review (topic and scope), what you rate as your top 3-5 most important and critical planning and decision support needs that you would expect to have met from the vegetation inventory today? What new management questions does the inventory need to address now?
3. **Future Business Needs** — if you think to the future, 5 years from now and beyond, what changing or new inventory requirements do you anticipate needing? What specific changes to your business do you see causing these changes?
4. **Priority Inventory Services & Products** — what are the top 3-5 services and products most critical to your business needs now? I.e. if we were to change anything, what do we need to keep? What do you see as the most limiting factors with the provision of these?
5. **Different Inventories for Different Circumstances** — Thinking about the diverse nature of both our forests, how they are managed and by whom, what risks or gaps are inherent in the existing inventory that you think must be addressed?
6. **TFL, Park & Private Land Inventories** — should a provincial vegetation inventory program include TFLs, parks and private forest land to facilitate land use planning, optimizing biodiversity opportunities and taking a systems approach to resource management (e.g. MPB)? If so, what is the best approach for acquiring the data and creating a seamless inventory? Should they use the same standards? At what level? Note – for example, the standards for certain attributes within a park may apply a different level of precision than a private forest since the inventories may have a different primary objective. But once attributes are mapped, or summarized to the same standards, would the resultant not meet most business needs?
7. **Accuracy Expectations** — Considering that this program is not intended to replace stand level assessments such as operational cruises, for the items you listed in questions 2, 3 and 4, what data quality<sup>5</sup> are you expecting of this inventory? What information about the inventory (AKA metadata) would improve the way the inventory is used?

---

<sup>5</sup> Quality includes: spatial accuracy (is it mapped properly), attribute correctness (is it labeled correctly?), statistical accuracy (where sampling and estimation exist) and currency (where change over time is a factor)

8. **Information Access** — are you finding that you are able to access inventory information reasonably easily and in a timely manner, for example from the Land and Resource Data Warehouse or other access points?
9. **Delivery Model, Roles, Coordination** — How efficient and effective is the current inventory delivery model? Are the roles and responsibilities<sup>6</sup> of government, industry, the consulting sector and NGOs sufficiently clear and coordinated? Are inventory activities coordinated at the appropriate scale/level – e.g., province, region, management unit, etc? Who should be responsible to manage, fund and conduct the inventories?
10. **Incremental Improvements, Technology, Innovation** — considering question 6 and 7, what incremental improvements would you want to see in the inventory? Is the inventory program capitalizing on new technology appropriately? In what areas could the program be more innovative to improve its effectiveness and efficiencies? Depending on your organizational situation, would you be prepared to help support incremental improvements or innovations with funding support, provision of expertise or other in-kind contributions? Do we collectively have the resources and ability to support new technology?
11. **Value of Inventory Information** — is the value of the inventory understood and recognized by those who benefit from it and is the worth commensurate with the value of resources inventoried? Are we extracting the full value out of the inventory information? How strong is the business case for the inventory?
12. **Capacity, Succession, Training** — what are the inventory capacity, succession and training challenges that are must be addressed in the short term?
13. **Preliminary Inventory Issues Identified by Inventory Staff** — In December 2005, government inventory staff developed a cursory list of some important issues. They are listed in Appendix 1. Please take a moment to review these and share with us you reactions.
14. **Are there other points you would like to make?**

**INPUT REQUEST 4:** Please use the separate *Feedback Form* to provide your feedback (answers, reactions, further questions, suggestions) to the critical questions.

What other questions would you to raise?

Please refer to the Questions by their number.

<sup>6</sup> For example, standards, data collection/capture, data sharing and ownership, access, and innovation.

## 6. Next Steps

The above material establishes a starting point for our Dialogue. Consider all of this information as a work-in-progress. Your reaction to this information is very important. The following outlines the next steps in the Dialogue. Please note carefully the deadlines for receiving feedback.

1. This Challenge Paper (PDF) and Challenge Paper Feedback Form (MS-Word) are posted along with supporting documents to [MOFR IPR website](http://www.for.gov.bc.ca/hts/inventory_prog_rev.htm) — [http://www.for.gov.bc.ca/hts/inventory\\_prog\\_rev.htm](http://www.for.gov.bc.ca/hts/inventory_prog_rev.htm)
2. Closing date for responses March 29, 2006. Please send your responses using the feedback form directly to [IPR Responses \(Forests.ForestAnalysisBranchOffice@gov.bc.ca\)](mailto:Forests.ForestAnalysisBranchOffice@gov.bc.ca)
3. Response Compilation “as-is” and un-attributed posted to MOFR IPR Challenge Dialogue website on approximately April 5th, 2006.
4. Collation and analysis of submissions April 6 – 30, 2006. Synthesis of responses, key learnings and reaction of Champions in the form of Progress Report #1. Progress Report posted to MOFR IPR Challenge Dialogue website on approximately April 31, 2006.
5. Step 3 of the overall IPR process commences — face-to-face workshop(s) design, preparation of Workshop Workbook and delivery of Workshop(s) in May 2006.
6. Key outputs from the Workshop(s) will be posted mid-June 2006.
7. Issue teams will be formed following the workshop(s) to develop options and recommendations for MoFR Executive decision.

**INPUT REQUEST 5:** Please use the separate *Feedback Form* to provide any other miscellaneous comments or raise other questions.

Do you have any comments regarding the Next Steps?

What other perspectives would you like to add to this Dialogue?

**APPENDICES**

---

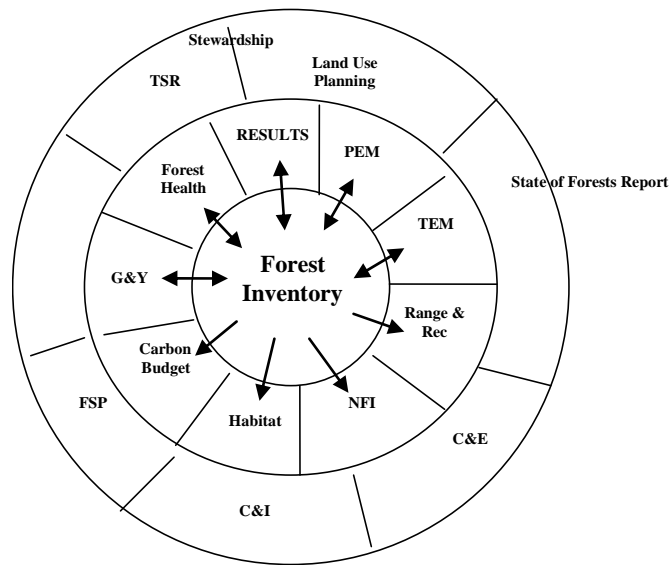
## **Appendix 1: Preliminary Inventory Issues Identified by Inventory Staff**

In early December 2005, FAIB staff were asked to provide feedback on some inventory program issues. Following is a sampling of these preliminary discussions.

**Inventory needs and business drivers** — Change is a constant for the inventory program as new challenges unfold. Existing responsibilities (TSR, Phase 2 sampling) coupled with new business drivers such as the MPB and Treaty Negotiations are some of the current drivers. Many business drivers have been addressed independently such as the MPB inventory strategy and have not been considered particularly well in relation to the other “standard” drivers. The program needs to review all business drivers as in aggregate to determine where we are most at risk and what the priorities are overall. One major observation is that those who rely daily on the inventory no longer have any attachment to it. For example, district staff are not involved in its creation nor its maintenance and as a result no longer have any feel for the data’s condition. They also face serious barriers with accessing and using these data.

**Funding models and the financial stability of the program** — The Land Base Investment Program model assumes that all investments decisions can be made at the made at a sub-management unit level and that industry recipients will be guided effectively by government objectives when making these investments with no further government involvement being required. The model also assumes that funding will be stable and at a sufficient level to ensure effective forest stewardship. Government’s objectives for LBIP have not proven to be effective at ensuring that government’s inventory needs are met. LBIP funding has not been stable and has seen a 50% reduction since 2002. A different funding mechanism is needed to support inventory for regional or broader planning needs. Where industry is unable or unwilling to participate in these often broader stewardship drivers for inventory, government needs to take a lead role and have a say, particularly where decision risks are significant.

**Linkages with other resource information and business areas** — Linkages may be characterized as internal or external and either dependent or independent. These relationships are illustrated in the figure below. The middle ring around the centre “forest inventory” circle represents the main linked data sets — PEM, TEM, Range and Recreation, the National Forest Inventory (NFI), etc. The outermost ring represents the different business applications of these data. Each application may combine different combinations of middle ring and the forest inventory. The forest inventory has two-way relationships (shown as double-ended arrows) with some datasets while other datasets have relationships which do not feed back to the forest inventory. The growth and yield linkages need to consider both the collection and application of data to other resource information business needs. The inventory may be a source of surrogate data which will introduce a level of undetermined risk.



When considering internal linkages we need to consider how to limit our support for integrated data as it may detrimentally affect the capacity of the program to deliver its core business needs. Linkages to external users will generate different demands. Easy to use products, such as forest cover maps, must be readily available to meet external user needs. Other resource business needs may require more complex spatial and attribute information.

**Roles and Responsibilities** — Government has a stewardship obligation to maintain an inventory of the forest resources on Crown Land. Government has delegated authority to determine where and what type of investments will be made in forest inventories. This decision has not served the public well. The current funding model does not align well with “maintaining an inventory”.

With the new and extensive MPB business driver, there is an opportunity to reconfirm the business model for identifying, prioritizing and resourcing inventory investments as well as the infrastructure and governance processes which will support it. Some opportunities areas include: (1) FC Update and VRI business areas need to be co-designed and co-located to ensure an effective program is realized; (2) the roles and responsibilities of all inventory program staff need to be examined and realigned to reflect the reality of the demographic trend (see succession below); (3) certification of staff, particularly in regions, needs to be reviewed and enhanced.

**Inventory program planning and delivery model (options)** — Currently FAIB, MOFR has little input into investment priorities. With little direct involvement in delivery, FAIB has become increasingly uncomfortable with data quality. Current investment decisions through LBIP are made locally at the management unit level. There are no linkages to provincial-scale strategies in this model and as a result, provincial strategies have not been maintained. Further, application of planning guidelines has been inconsistent. Strategic gaps persist in provincial VRI coverage.

Timber supply enhancement potential has become the main driver in many local investment decisions. On the other hand, investments to improve resource information that might reduce timber supply (e.g., forest health) tend to be avoided. Multi-licensee management units often have difficulty making joint investment decisions. DFAM has provided no new investment incentives, fiscal or policy. Local investors may opt for minimum sample sizes in order to allocate scarce FIA funds to other priorities.

Delivery capacity and expertise has been eroded by inventory staff reductions in all sectors. This erosion has been driven by industry cost-control, government re-alignment and loss of contractors due to a reduced and inconsistent flow of investments toward inventory.

**Inventory Capacity** — Prior to completion of the IPR, it is premature to identify what products are needed and hence what capacity. However, there are certain core roles and responsibilities that are considered to be essential elements of the program in order to fulfill government's stewardship responsibilities: (1) maintaining in-house expertise for advice to policy-makers and provincial and regional clients; (2) setting appropriate standards for inventories; (3) overseeing quality assurance; (4) undertaking audits; and (5) setting priorities for inventory work and for expenditures of public funds. These and other requirements established by the IPR will determine required skills and numbers, so that areas of surpluses and deficiencies can be defined.

An appropriate response to the capacity issue is seen as the biggest challenge facing the inventory program. Inventory is a very specialized activity that requires knowledgeable, experienced people not only in component technical fields but also as generalists. Capacity in all organizations province-wide is not documented but is believed to be at a much reduced level compared to a decade ago. There has already been a significant loss of specialists through elimination of inventory staff in the forest industry, and through staff reductions as part of government down-sizing. Staff in MOFR's inventory program now number less than 25% of a decade ago. The consulting community continues to have a sizeable but reduced capacity (down about 25% over the past 5 years) to undertake inventory activities, especially at the operational level, where they provide services to licensees who have eliminated their own internal staff.

Consultants could potentially expand to provide provincial-level inventory services, if there was a proven, consistent demand to justify the costs of training and retaining a specialized workforce. Reliance on consultants, however, may increase costs of doing inventory work because consolidations of consulting firms have reduced competition.

A challenge in rebuilding inventory capacity is competition for experienced staff with other jurisdictions. For example, following down-sizing in BC, numbers of experienced photo interpreters have taken positions in Ontario where government has been attempting to restore its inventory capacity. This follows an earlier unsuccessful attempt to transfer inventory responsibilities to the forest industry.



There are two questions that need to be answered as part of the capacity/succession issue: First, is the VRI going to address the “eco” side of inventory including coarse woody debris and eco attributes as recommended by the Forest Resources Commission? As a result of downsizing, VRI is now tending to focus on core timber values, with other attributes relegated to lesser importance. Returning to a full spectrum VRI will require substantial capacity-building. Second, will range management information take on a higher priority in future inventory activities?

**Succession challenges with inventory expertise** — whereas capacity deals with required staff levels and skills in relation to the job to be accomplished, succession focuses on retention of staff and replacement of key incumbents when they leave a position. It includes training, career-pathing, planned transitions for scheduled events such as retirements, and contingencies for unscheduled events such as employment changes or accidents. A case in point is the new VDYP7 initiative where retirements have created a critical gap in knowledge and the ability to support users. Other imminent retirements will lead not only to reduction in specialized knowledge throughout the program, but also to a loss of corporate memory. The first step in developing a succession plan will be to document and prioritize the key positions needed to meet the goals of the inventory program as defined through the Inventory Program Review. Succession strategies may include backup positions where resources are available, cross-training in critical functions and a formal process for knowledge transfer and continuation of on-going projects. The strategy must also address the loss of junior staff during down-sizing and the resultant vulnerability of the program to retirements.

**Training and certification** — an immediate need is for MOFR to step up its capability to undertake a training and certification program that is aligned with capacity building and the succession strategy. Because this role has been badly eroded in recent years in the absence of recruitments into entry-level inventory positions in government and in the consulting industry, it will be necessary to “train the trainers” as a starting point.

**Standards** — Data collection and capture standards exist for inventory and monitoring. We should continue to work with these standards as we explore and address changing business needs that are not adequately covered at the present time (e.g., MPB, remote sensing, digital camera standards). There is no government-required mandate for monitoring at the TSA level. We need to explore two approaches to determine which will best meet program needs and capacity: (1) results-based inventory with an audit function or, (2) standards or process-based inventory (government standards or user standards?). We may not have the capacity to address client requests to change existing government standards as there are often many implications. We may be unable to store information corporately if user standards differ significantly from the corporate warehouse standards – or face significant costs to change corporate storage standards. We will need to determine what non-standard information is or is not important for retention and how it will be retained – i.e. how it will be accessed for utilization with standard information on the corporate warehouse.

**Data management** — there is a need to re-confirm data management governance now that this function is back in MOFR but also need to sort out what the corporate strategy should now be, who is accountable, and who pays. Many challenges exist in the short and long term. In the short term we must — prevent loss of existing data, find ways to mitigate loss of corporate knowledge; recognize and manage both corporate and local data, and rebuild relationships with other business areas (e.g. Information Management Group). Longer term challenges include developing a more robust, flexible infrastructure and data structure that will efficiently accommodate integration of data as standards change over time.

## Appendix 2. Background to the VRI “Program”

The following table prepared by Rick Baker, Eric Fisher and Jon Vivian provides a high-level appreciation of the Forest Analysis and Inventory Branch (FAIB) Vegetation Resources Inventory (VRI) Program to include Update and Loading functions. This material is intended to provide background information to assist the Inventory Program Review Team with their assignment.

| High-level function                        | Program Component                                                               | Program Sub-Components                                                                                                                                       | Comments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------------------------|---------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>“Getting” the inventory (Capturing)</b> | VRI<br><br>Manager responsible:<br>Vivian                                       | <ul style="list-style-type: none"> <li>Phase 1 (photo interpretation)</li> <li>Phase 2 (ground sampling &amp; adjustment)</li> <li>Phase 1 (NVAF)</li> </ul> | <ul style="list-style-type: none"> <li>Photo data collection standards stable; database standards changing (see ‘loading’ below); most expensive aspect of VRI.</li> <li>Ground data collection standards essentially stable; new adjustment standards to be implemented in 06; this will require us to re-evaluate some units to bring them to the new standard.</li> <li>NVAF data collection standards stable; limited contractor base, especially for Q/A.</li> </ul>                                                                                                                                  |
| <b>“Projecting” the inventory</b>          | Growth and Yield<br><br>Manager responsible:<br>Vivian                          | <ul style="list-style-type: none"> <li>PSP</li> <li>Modeling</li> </ul>                                                                                      | <ul style="list-style-type: none"> <li>Extensive history in program going back 80 years; data collection largely inactive in last four years due to lack of industrial interest; they claim this is a gov’t function; only two G&amp;Y foresters remaining; HQ efforts confined to managing the data. Without gov’t taking this program over, may completely disappear. Data of high value for developing GY models.</li> <li>VRI Section to release new VDYP7 model and adjustment protocols in 2006 that link to inventory; succession a big issue. Modeling efforts restricted to VDYP only.</li> </ul> |
| <b>“Loading” new inventory</b>             | Branch Operations:<br>Inventory Load Unit<br><br>Manager responsible:<br>Fisher | Incorporation of VRI inventory information including re-inventory information and loading of adjusted inventory following ground sampling and analysis.      | Data collection priorities and projects determined by licensees through FIA program funding model.<br><br>VRI Branch Operations Section responsible for validation and processing of photo-based data to LRDW. VRI Section responsible for validation and processing of ground sample inventory attributes (non-corporate repository) and adjustment process.<br><br>Load includes spatially explicit database and publishing data to the LRDW.                                                                                                                                                            |

| <b>High-level function</b>          | <b>Program Component</b>                              | <b>Program Sub-Components</b>                                                                                                                                                                       | <b>Comments</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------------------------------------|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>“Updating”<br/>the inventory</b> | Inventory Update<br><br>Manager responsible:<br>Baker | Inventory maintenance including: depletion update support from RESULTS, updating for natural disturbances.<br><br>Updating for Free Growing stands<br><br>Data clean up for errors in the data set. | <p>Depletion Update is an Industry/MoFR partnership using RESULTS. It is characterized by:</p> <p>MoFR setting standards for update with input from industry partners;</p> <p>industry completing the data collection for harvesting-related disturbances and silvicultural activities;</p> <p>RESULTS and the Electronic Submission Framework (ESF) being implemented by the MoFR and used by all forest tenure holders;</p> <p>MoFR monitoring and auditing data that comes from RESULTS; and MoFR making sure that the updated VRI file is available for use by government decision-makers and third party stakeholders.</p> <p>It is envisioned that MoFR will meet the requirements to capture the backlog (pre-1987) Free-Growing (FG) stands, new FG stands, and the catastrophic natural disturbances with the expected efficiencies created by the partnership with the forest industry data collectors.</p> <p>MoFR updating and completing the data processing and data integration annually for problems inherent in the VRI data files (including but not limited to spatial and attribute ties).</p> |

| <b>High-level function</b>        | <b>Program Component</b>                                  | <b>Program Sub-Components</b>                                                                                             | <b>Comments</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>“Monitoring” the inventory</b> | Not yet defined<br><br>Manager responsible:<br>Vivian +?? | <ul style="list-style-type: none"> <li>• National Forest Inventory</li> <br/> <li>• Management Unit Monitoring</li> </ul> | <ul style="list-style-type: none"> <li>• BC has committed to establish and re-measure the NFI photo and ground plots (re-measurement currently based on a 10-year schedule.) The establishment phase is essentially complete. Funding for this has come from both the feds (30 cents on the \$) and from FIA.</li> <li>• This is a “grey” area as gov’t has not made any effort to force monitoring at this level. Monitoring data uses could include: <ul style="list-style-type: none"> <li>○ Checking GY model output</li> <li>○ Checking VRI adjustment longevity</li> <li>○ Observing general trends in the inventory.</li> <li>○ Biodiversity issues</li> <li>○ Climate change, etc.</li> <li>○ Changes in the land base</li> </ul> </li> <li>• Note: observing differences between successive inventories does not, for the most part, qualify as “true” monitoring due to differing inventory standards; sampling issues, etc. It might be desirable to embed monitoring protocols into the VRI but this would be expensive and require legislation/industrial interest to effect.</li> </ul> |

| High-level function              | Program Component                                                                                         | Program Sub-Components                                                                                                                                                                                                                                                                                           | Comments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------|-----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>“Managing” the data</b>       | Data and Systems<br><br>Manager responsible:<br>all                                                       | VRI: includes:<br><br><ul style="list-style-type: none"> <li>• Electronic field recorders (EFRs)</li> <li>• Oracle databases and LRDW:               <ol style="list-style-type: none"> <li>1. Spatial &amp; Attributes</li> <li>2. Ground sample</li> </ol> </li> <li>• Results Data Warehouse (RDW)</li> </ul> | Management of the data is the most problematic area our program has to deal with due to highly complex gov't corporate procedures around managing data. <ul style="list-style-type: none"> <li>• EFRs: we have primitive (in current terms) tools for all field sampling programs but a new platform needs to be developed in a current language (such as Windows CE) for all sampling programs. We do not want to work with any paper field sheets.</li> <li>• 1. Spatial &amp; attribute data: handled by Eric's group; data stored on production Oracle d/b and a copy made once a year and put on LRDW. Expect extra activity from TFL Take-back and MPB. Rick/Tim: comments.</li> <li>• 2. Ground sample data: handled by VRI Section. Raw data are validated and loaded to production Oracle dbs. Data are then extracted for processing within the RDW.</li> <li>• The RDW is a SAS-based system of data processing used to compile sample data. All data requests for both raw and compiled come from this system.</li> </ul>                                                                                          |
| <b>“Accessing” the inventory</b> | Ministry of Agriculture (LIBC) manages the LRDW<br><br>Eric Fisher and Jon Vivian manage the VRI data set | <ul style="list-style-type: none"> <li>o Management Unit</li> <li>o Provincial level</li> <li>o National level</li> </ul>                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>• VRI Information on Timber Supply Areas (TSAs) is currently accessible on the Land Information Data Warehouse (LRDW) through the online, <a href="#">Land Information BC</a> (LIBC) Discovery Service used to search the Corporate Metadata Service.</li> <li>• Information on what base mapping information and air photography is available can also be found on the LIBC site. Access to the actual base mapping and air photography is through data exchange agreements or a cost to the requester.</li> <li>• The branch maintains a substantial sample data set which is maintained internally and not made publicly accessible.</li> <li>• The branch inventory staff provide expert advice and guidance on the data capture tools, the VRI data sets and models to users of the VRI</li> <li>• Major clients include forest service staff, forest consultants, forest industry, Ministry of Environment staff</li> <li>• As more tools such as Mapview, i-Map and GIS are made available at the district and regional offices we can expect more requests on how to</li> </ul> |

| High-level function                  | Program Component                                                     | Program Sub-Components                                                                                                           | Comments                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                      |                                                                       |                                                                                                                                  | <p>access and use the VRI and associated data sets.</p> <ul style="list-style-type: none"> <li>Stakeholders are using the VRI and associated data at the stand or local level even though the VRI was never designed to be utilized at this scale.</li> </ul>                                                                                                                                                          |
| <b>“Reporting”<br/>the inventory</b> | <p>Not yet defined</p> <p>Manager responsible:<br/>Fisher, Vivian</p> | <ul style="list-style-type: none"> <li>Management Unit level monitoring</li> <li>Provincial/National level monitoring</li> </ul> | <ul style="list-style-type: none"> <li>In the past, the former RIB had a defined function to report out at the management unit level (TSAs). Currently, this function has not been defined nor resourced and done ad hoc basis.</li> <li>The NFI is designed to report out at this level; over the next two years the NFI Project Office will work with VRI staff to develop some baseline reporting tools.</li> </ul> |

**Review of Inventory Issues  
Identified in  
Timber Supply Review  
AAC Rationales**

*Prepared for*

John Wakelin, RPF  
VRI Section Head  
Forest Analysis and Inventory Branch  
BC Ministry of Forests and Range

*--January 2, 2006 draft--*

*Prepared by*

Terje Vold, RPF, RPBio  
Terje Vold & Associates Consulting



# Table of Contents

|                                                                                      |           |
|--------------------------------------------------------------------------------------|-----------|
| <b>Summary of Suggestions.....</b>                                                   | <b>1</b>  |
| <b>Methods.....</b>                                                                  | <b>2</b>  |
| <b>Issue 1: Site productivity (managed stand yields, site index).....</b>            | <b>3</b>  |
| <b>Issue 2: Existing unmanaged stand volumes (inventory audit; VRI phase 2).....</b> | <b>6</b>  |
| <b>Issue 3: Vegetation Resource Inventory.....</b>                                   | <b>8</b>  |
| <b>Issue 4: Decay, waste and breakage.....</b>                                       | <b>8</b>  |
| <b>Issue 5: Site productivity: alternative silviculture systems.....</b>             | <b>9</b>  |
| <b>Issue 6: Site productivity: forest health and OAFs.....</b>                       | <b>10</b> |
| <b>Issue 7: Stand dynamics outside timber harvesting land base.....</b>              | <b>11</b> |
| <b>Issue 8: NSR.....</b>                                                             | <b>12</b> |
| <b>Issue 9: Other forest inventory issues.....</b>                                   | <b>13</b> |
| <b>Issue 10: Traditional use studies and related issues.....</b>                     | <b>13</b> |
| <b>Issue 11: Recreation and landscape inventory.....</b>                             | <b>14</b> |
| <b>Appendix 1: Detailed Summary of Inventory Issues by TSA/TFL.....</b>              | <b>15</b> |
| <b>Appendix 2: AAC Rationale Reports used to identify Inventory Issues.....</b>      | <b>32</b> |

## Summary of Suggestions

The suggestions below are based on a review of implementation recommendations in AAC rationale reports related to inventory and growth and yield issues as they can affect timber supply forecasts and subsequent AAC determinations.

Incentives to encourage licensees to use FIA or other funds to undertake the work needed to address the outstanding issues noted in the report by management unit (TSA/TFLs) needs to be explored. Even with improved incentives, however, there could be incomplete or spotty efforts made to address the concerns. Alternative or complementary provincial approaches are noted below for consideration where applicable.

### **Issue 1: Site productivity** (managed stand yields, site index)

Assess (or use any existing assessments) of the provincial SIBEC data base to initiate a provincial project to improve expected reliability of site productivity estimates for regenerated managed stands particularly for those ecosystem types that contribute most to timber supply.

### **Issue 2: Existing unmanaged stand volumes** (inventory audit; VRI phase 2)

Give high priority consideration for undertaking VRI phase 2 in Prince George, Quesnel, Kamloops and Mackenzie TSAs as the issue of existing stand volumes has been raised in these TSAs and they collectively represent about 33% of the current provincial AAC.

### **Issue 3: Vegetation Resource Inventory**

High priority consideration should be given to undertaking VRI phase 1 for the Okanagan, 100 Mile and Merritt TSAs and TFL 46 and 47 with particular focus on the Okanagan TSA as the forest cover inventory is considered one of the oldest in the province.

### **Issue 4: Decay, waste and breakage**

High priority consideration should be given to undertaking NVAF for the Merritt, Arrowsmith and Soo TSAs and TFL 30.

### **Issue 5: Site productivity: alternative silviculture systems**

Develop (or further develop) a provincial data base on the productivity of forests due to use of alternative silvicultural systems with focus on those management units where uncertainty in this factor can have the greatest impact on timber supply.

### **Issue 6: Site productivity: forest health and OAFs**

Initiate a provincial study or regional studies to refine OAF reductions with focus on those management units where uncertainty in this factor (due to concerns such as root rot) can have the greatest impact on timber supply.

**Issue 7: Stand dynamics outside timber harvesting land base**

Initiate a provincial study or regional studies that better allow disturbances in the non-timber harvesting land base (e.g. inoperable areas, parks) to be modeled with focus on those management units where uncertainty in this factor can have the greatest impact on timber supply.

**Issue 8: NSR**

Initiate a provincial study on ways to confirm or update the inventory files related to NSR, for example, using databases such as RESULTS.

**Issue 9: Other forest inventory issues**

Address the other forest inventory issues noted in Appendix 1 as resources allow.

**Issue 10: Traditional use studies and related issues**

That FIA and other funding mechanism be made available to support traditional use studies, AOAs and other related cultural heritage resource studies to help ensure these values are better addressed in timber supply review.

**Issue 11: Recreation and landscape inventory**

If not already underway, specific roles and responsibilities regarding the inventory should be clearly established between MOFR, MOAL and MOTSA with one task being to identify those inventories in greatest need for updating in support of timber supply review.

**Methods**

The inventory and growth and yield issues identified in 6 regional summaries of timber supply review (from AAC rationale reports) completed in March 2001 were compiled and collated by type of inventory-related issue. The regional summaries cover 83 rationale documents largely in TSR 1 but also some from TSR 2.

This initial compilation and collation of issues was augmented by reviewing all remaining newer AAC rationale reports not covered by the 2001 regional summaries – i.e. an additional 70 AAC rationales from TSR 2 and 3. The focus of the review were on “implementation” issues identified by the chief forester or deputy chief forester where additional inventory-related information was needed to improve subsequent AAC determinations.

The compiled issues from 153 AAC (see Appendix 1 and 2) rationale reports were compared with AAC rationale statements that the issue had or had not been resolved; and with *Copy of Inventory Status and Priorities November 2005* provided by the Forest Analysis and Inventory Branch which summarizes by TSA/TFL the status of inventory audits, inventory updates, VRI phase 1 and 2 work, FIA projects, forest inventory issues and priorities, and related information.

Each issue type is described below, in relative priority (in context of importance of issue with respect to timber supply and how many times the issue is raised in AAC rationale reports), with respect to:

- the *nature* of the issue and why it is important to timber supply review;
- *trends* in the issue from TSR 1 to TSR 3, and how or if the issue has been actioned and resolved;
- *outstanding issues* and status (description of required action, action underway, responsibility, and impact if left unactioned); and a
- *suggestion(s)* on how to resolve the outstanding issue.

The 2001 regional summaries identified issues as being inventory or growth and yield-related, and similar types of issues were addressed when reviewing post-2001 AAC rationales. However many issues that were not tagged as inventory or growth and yield-related do have a large connection with forest inventories. For example:

- estimates of unsalvaged losses;
- spread and severity of mountain pine beetle infestation;
- environmental sensitivity areas (ESAs);
- harvesting performance in problem forest types and their identification; and
- availability of old growth forests to achieve legal targets.

These inventory-related issues are not directly addressed in this review unless they were tagged as being an inventory issue in the regional summaries or in the implementation section of the AAC rationale reports.

## **Issue 1: Site productivity (managed stand yields, site index)**

### **Nature of the Issue**

The productivity of a site largely determines how quickly trees will grow. This in turn affects the time seedlings will take to reach green-up conditions (i.e. to achieve forest cover adjacency constraints in timber supply review), the volume of timber that can be produced, and the ages at which a stand will satisfy mature forest cover requirements and reach a merchantable size. If regenerating managed stands can reach merchantable age at an earlier age than originally estimated due to refined work showing that sites have higher site productivity, then the time interval to harvest existing mature unmanaged stands can be correspondingly shortened and the short-term AAC can often be increased. In addition, the previously estimated “falldown” in mid- to long-term timber supply can be reduced or often eliminated in many TSAs or TFLs should estimated site productivity increase.

### **Trends**

Because of the vital importance of site productivity estimates to timber supply review, 45 AAC rationales in TSR 1 (about 73% of all TSR 1 rationales) emphasized the importance of assessing the implications of the then on-going provincial paired plot study on timber supply prior to the next determination. In TSR 1, site productivity was largely based on the estimates of volume growth from mature stands (using VDYP) whose ages had often exceeded culmination of mean annual increment and therefore was believed to

significantly underestimate site productivity. Paired plot studies (e.g. Old Growth Site Index or OGSi project) looked at the site productivity of younger managed stands between 30 and 150 years of age in comparison to comparable old-growth stands on similar sites. The studies confirmed that when old stands are harvested and regenerated, site productivity is generally higher than inventory-based site index estimates of older stands would predict.

The OGSi study led to the Site Index Biogeoclimatic Ecosystem Classification (SIBEC) work where site productivity estimates were provided, based on field samples, to distinctive biogeoclimatic units that could be identified using forest cover inventory or VRI based on Predictive Ecosystem Mapping (PEM) for analysis purposes in timber supply review.

In TSR 2 and 3, refined site productivity estimates using OGSi or SIBEC/PEM were used in most TSAs/TFLs which showed substantial improvements in the timber supply forecast in the mid- to long-term, and in some units also in the short-term.

Nevertheless, even with this refined information, the need for improved estimates for site productivity was raised in 49 TSR 2 AAC rationale reports (about 71%) and in 12 TSR 3 rationales (about 55% of those available for review). The main concern raised was that the substantive increases in site productivity now estimated should be confirmed or revised based on local sampling within the applicable TSA or TFL to augment the provincial OGSi or SIBEC work. Additional sample plots collected in TSAs/TFLs is also used to annually revise the provincial SIBEC thereby improving estimates overall. A limiting factor in some management units in providing additional sample plots may be the relative difficulty of finding suitable managed stands between 30 and 150 years of age; for example, where harvest history is relatively recent. Also, in some units, the need for PEM mapping, or improved PEM mapping, is also identified.

### Outstanding Issues

The TSAs/TFLs in TSR 3 or 2 where it is recommended that additional local sampling be undertaken to confirm/refined site productivity estimates are listed below where the status of this work is unknown at this time.

| TSAs in TSR 3 | TFLs in TSR 3 | TSAs in TSR 2* | TFLs in TSR 2* |
|---------------|---------------|----------------|----------------|
| Arrow         | 8             | Arrowsmith     | 10             |
| Fraser        | 15            | Boundary       | 19             |
| Golden        | 53            | Bulkley        | 26             |
| Invermere     | 57            | Cassiar        | 30             |
| Prince George |               | Cranberry      | 35             |
| Quesnel       |               | Cranbrook      | 39             |
| Revelstoke    |               | Kalum          | 43             |
|               |               | Kingcome       | 47             |
|               |               | Kispiox        | 48             |
|               |               | Lakes          | 55             |
|               |               | Lillooet       | 56             |

|  |  |                |  |
|--|--|----------------|--|
|  |  | Mackenzie      |  |
|  |  | Merritt        |  |
|  |  | Mid-Coast      |  |
|  |  | Morice         |  |
|  |  | Nass           |  |
|  |  | North Coast    |  |
|  |  | 100 Mile House |  |
|  |  | Robson Valley  |  |
|  |  | Soo            |  |
|  |  | Strathcona     |  |
|  |  | Sunshine Coast |  |
|  |  | Williams Lake  |  |

\*if raised in TSR 2 and 3 only listed in TSR 3

The majority of the management units (45, or about 66%) are explicitly mentioned in AAC rationales as in need of additional site productivity work at the local level to improve estimates in support of timber supply review. Although SIBEC has greatly improved estimates of site productivity in support of timber supply review, there remains some uncertainty and this uncertainty not only can cause substantial effects on mid- to long-term timber supply but also to short-term timber supply in some management units. A particular concern is some units is where the short-term timber supply has been substantially increased (e.g. due to beetle uplifts or increased estimates of existing stand volumes) with expectation that forecasted mid-term levels are acceptable but predicated on existing site productivity estimates using provincial SIBEC or OGSi data without significant sampling within the unit itself. This causes angst regarding future timber supply and the possibility that necessary adjustments from the short-to mid-term levels may result in larger decreases than currently forecasted.

**Suggestion(s)**

Incentives to encourage licensees to use FIA or other funds to undertake the recommended local site productivity sampling work needs to be explored to help ensure the outstanding concerns raised in AAC rationale reports are addressed.

Even with improved incentives, however, there could be incomplete or spotty efforts made to address the concerns. An alternative or complementary approach may be to assess (or use any existing assessment of) the provincial SIBEC data base to initiate a provincial project to improve expected reliability of site productivity estimates particularly for those ecosystem types that contribute most to timber supply.

## **Issue 2: Existing unmanaged stand volumes (inventory audit; VRI phase 2)**

### **Nature of the Issue**

Uncertainty in the volumes in existing unmanaged stands as determined from inventory attributes (such as age and height by species and site index) can affect short-term timber supply which is the primary focus of an AAC determination over a 5-year time period. Sensitivity analysis in many management units (TSAs/TFLs) show a general direct relationship between a possible increase or decrease in existing unmanaged stand volumes and available short-term timber supply (e.g. a 10% increase or decrease in volumes often affects short-term timber supply by a corresponding 10%).

### **Trends**

Because of the vital importance of this issue to timber supply, and because of uncertainties with respect to existing forest cover inventories in enabling accurate estimates to be provided, 38 AAC rationales in TSR 1 (just over 60% of all 62 TSR 1 rationales) specifically highlighted the need to get more accurate estimates of existing unmanaged stand volumes.

The Inventory Audits largely completed between 1994 and 1999 helped to address this issue. In some TSA/TFLs, the audits found volume estimates based on the inventory to be reasonable accurate, in other units, volume estimates were under- or over-estimated.

In TSR 2, the results of the inventory audits were considered in AAC determinations when available. As a consequence the issue of existing unmanaged stand volumes was less frequently raised (i.e. in 11 rationales, or about 16% of the 69 total number of TSR 2 rationales). Where the issue remained a concern, this was often because the inventory audit showed strong trends that estimated volumes were either under- or over-estimated but the results were not statistically significant for the portion of the land base that contributes to timber supply (i.e. the timber harvesting land base). As a consequence, a request was sometimes made in these rationales that additional work be carried out.

The Vegetation Resource Inventory (VRI) is replacing the older forest cover inventory mapping for TSAs and TFLs over time. VRI phase 2 ground sampling can be conducted prior to phase 1 photo-interpretation work. Phase 2 work provides a basis for verifying or adjusting inventory attributes as it relates to estimating existing unmanaged stand volumes (i.e. it has replaced the forest cover inventory audits).

In TSR 3, the need for phase 2 work to be completed in order to provide better estimates for existing unmanaged stand volumes was raised in 6 rationales (about 27% of the 22 TSR rationales reviewed). Also, where phase 2 sampling has been completed, particularly where the work indicates substantial increases in volumes for existing unmanaged stands and this up-dated information has been used to increase the AAC – there has been the occasional request in AAC rationales to confirm or refine the estimated increased volumes through monitoring of the phase 2 work (e.g. in the TFL 49).

The issue therefore can be viewed as a critical concern in TSR 1 (prior to inventory audit program), a moderate issue during TSR 2 (with inventory audits largely completed), to an important concern in TSR 3 for many TSAs/TFLs where VRI phase 2 is deemed necessary to improve subsequent AAC determinations.

The management units in TSR 2 and 3 where the issue remains an important concern and the extent to which the issue has been addressed is summarized below:

Issue raised but appears to be actioned (completed or in-progress):

|                     |                         |
|---------------------|-------------------------|
| Sunshine Coast-TSR2 | VRI phase 2 done        |
| Fort Nelson – TSR 2 | VRI phase 2 done        |
| 100 Mile House-TSR2 | VRI phase 2 done        |
| Golden –TSR3        | VRI phase 2 in-progress |
| TFL 45 – TSR2       | VRI phase 2 in-progress |
| TFL 48 – TSR2       | VRI phase 2 in-progress |
| TFL 52 – TSR2       | VRI phase 2 in-progress |

### **Outstanding Issues**

Issue raised but appears to remain an outstanding concern:

|                      |                                                                                               |
|----------------------|-----------------------------------------------------------------------------------------------|
| Quesnel – TSR3       | No VRI work including phase 2                                                                 |
| Prince George – TSR3 | No VRI phase 2                                                                                |
| Mackenzie- TSR2      | No VRI phase 2                                                                                |
| Kamloops- TSR2       | No VRI phase 2                                                                                |
| Revelstoke – TSR3    | No VRI phase 2                                                                                |
| TFL 15 – TSR3        | No VRI phase 2                                                                                |
| TFL 49 – TSR3        | VRI phase 2 complete but estimated increases in volume need to monitored to confirm or refine |
| Cassiar – TSR2       | No VRI phase 2                                                                                |
| Kispiox – TSR 2      | No VRI phase 2                                                                                |
| Mid Coast – TSR 2    | No VRI phase 2                                                                                |

### **Suggestion(s)**

The Prince George, Quesnel, Kamloops and Mackenzie TSAs represent a total AAC of 27.6 million cubic metres – or about 33% of the current provincial AAC of 83 million cubic metres. If up to a 10% uncertainty exists in existing stand volumes for just these four TSAs, resolving this uncertainty could increase or decrease the AAC by up to 3 million cubic metres. This uncertainty therefore can represent a substantive impact on the local, regional and provincial economy. Consideration therefore should be given to giving high priority focus to these four TSAs.



## Issue 3: Vegetation Resource Inventory

### Nature of the Issue

The existing forest cover inventory in several TSAs and TFLs is old and needs to be replaced with a more up-to-date VRI. Older forest cover inventories not only result in uncertainties with respect to existing unmanaged stand volumes (as discussed above in issue 2), but also result in uncertainty with respect other inventory attributes that have a direct bearing on timber supply (such as the age of forests that determine when various mature or old forest cover targets have been achieved).

### Trends

The need for a re-inventory and current status of this effort is summarized in table below by TSR (where the issues has not already been raised in context of phase 2 work under Issue 2 above).

Issue raised but appears to be actioned (completed or substantially completed):

|                    |                                                         |
|--------------------|---------------------------------------------------------|
| TFL 15 – TSR2      | Phase 1 complete and 2 in progress                      |
| Golden-TSR2        | Phase 1 complete and 2 in progress                      |
| Arrow- TSR2        | Phase 1 complete and 2 in progress                      |
| Fraser – TSR3      | Phase 1 and 2 complete; need to update VRI done to 2001 |
| Dawson Creek-TSR2  | 40% phase 1; phase 2 done                               |
| Fort Nelson-TSR2   | Phase 1 done for operable land base                     |
| Fort St. John-TSR2 | 45% phase complete                                      |

### Outstanding Issues

Issue raised but appears to remain an outstanding concern or only partially completed:

|                     |                                                 |
|---------------------|-------------------------------------------------|
| 100 Mile House-TSR2 | No phase 1; phase 2 completed                   |
| Okanagan-TSR3       | 3% phase 1; phase 2 completed                   |
| Merritt – TSR2      | No phase 1; phase 2 done                        |
| TFL 46 – TSR2       | Not available                                   |
| TFL 47 – TSR2       | Portions of TFL are high priority for inventory |

### Suggestion(s)

High priority consideration should be given to undertaking VRI phase 1 for the Okanagan, 100 Mile and Merritt TSAs and TFL 46 and 47 - with particular focus on the Okanagan TSA as the forest cover inventory is considered one of the oldest in the province.

## Issue 4: Decay, waste and breakage

### Nature of the Issue

“Allowance for decay, waste and breakage expected to be applied with respect to timber harvesting on the area” is specifically mentioned in the *Forest Act* as one of the considerations that the chief forester must take into account when making AAC

determinations. Stand volumes available to support timber supply are therefore adjusted to account for decay, waste and breakage (DWB) in timber supply analysis.

### Trends

In TSR 1, 19 of the rationales (about 30%) noted the need to improve allowances for DWB and often mentioned the need to incorporate new provincial DWB factors.

Under VRI, Net Volume Adjustment Factors (NVAF) sampling for a TSA or TFL is currently considered to provide measures of net merchantable volume of stands after reductions for decay and other factors that are more accurate than the standard 1976 provincial loss factors. NVAF is the ratio of a tree’s actual net merchantable volume (measure using destructive sampling) to the volume estimated by a timber cruiser.

In TSR 2 and 3, the issue was only raised in 6 rationales (about 7%) with current status of work noted below:

Issue raised but appears to be actioned (completed or underway):

|                |                       |
|----------------|-----------------------|
| Kamloops- TSR2 | NVAF planned for 2005 |
| Golden – TSR2  | NVAP in progress      |

### Outstanding Issues

Issue raised but appears to remain an outstanding concern:

|                   |              |
|-------------------|--------------|
| Merritt – TSR 3   | No NVAF      |
| Arrowsmith – TSR2 | NVAF unknown |
| Soo-TSR2          | NVAF unknown |
| TFL 30            | No NVAF      |

### Suggestion(s)

High priority consideration should be given to undertaking NVAF for the Merritt, Arrowsmith and Soo TSAs and TFL 30.

## Issue 5: Site productivity: alternative silviculture systems

### Nature of the Issue

Alternative silvicultural systems such as partial cutting or variable retention are often promoted in order to better provide for non-timber values such as visuals or biodiversity, or were undertaken decades ago with residual stands remaining. There is less information about growth and yield in these stands, many of which are uneven aged, following harvest and consequently concern that their productivity may not be appropriately modeled in timber supply analysis. Better information about stand dynamics following alternate harvest systems should facilitate improved operational decisions about when and where these systems should be used.

## Trends

The need for improved information was cited in 15 rationales in TSR 1 (about 25%), 10 in TSR 2 (about 15%), and so far in 2 TSR 3 rationales (about 10%).

## Outstanding Issues

The need for this information appears to remain an outstanding issue in the following TSAs and TFLs from TSR 2 and 3:

- TSAs: Merritt and Cranbrook;
- TFLs: 18, 46, 47, 48, 56, 57

## Suggestion(s)

Incentives to encourage licensees to use FIA or other funds to undertake the recommended local site productivity sampling work for alternative silviculture systems needs to be explored to help ensure the outstanding concerns raised in current and future AAC rationale reports are addressed.

Even with improved incentives, however, there could be incomplete or spotty efforts made to address the concerns. Another or complementary approach may be to develop (or further develop) a provincial data base on the productivity of forests due to use of alternative silvicultural systems (such as uneven aged stands) with focus on those management units where uncertainty in this factor can have the greatest impact on timber supply. This can be assessed by reviewing available sensitivity analyses in timber supply analyses documents.

## Issue 6: Site productivity: forest health and OAFs

### Nature of the Issue

In timber supply analysis, the standard BCFS growth and yield model Table Interpolation Program for Stand Yields or TIPSYS are used to estimate the timber volumes for regenerated managed stands. The TIPSYS projections are initially based on ideal conditions, assuming full site occupancy and the absence of pests, diseases and significant brush competition. However, certain operational conditions, such as a less-than-ideal distribution of trees, the presence of small non-productive areas, endemic pests and diseases, or age-dependent factors such as decay, waste and breakage, may cause yields to be reduced over time. Two operational adjustment factors (OAFs) are therefore applied to yields generated using TIPSYS, to account for losses of timber volume resulting from these operational conditions. OAF 1 is designed to account for factors affecting the yield curve across all ages, such as small stand openings. OAF 2 accounts for factors whose impacts tend to increase over time such as pests, disease, decay, waste and breakage. In most timber supply analysis, the standard provincial modeling reductions of 15 percent for OAF1 and 5 percent for OAF2 are applied.

Several AAC rationales express concern that the standard OAF reductions may not be applicable to a particular TSA or TFL because of unusually severe forest health issues affecting some regenerating stands such the impacts of *Armillaria* root rot.

## **Trends**

The concern was raised in 16 TSR 1 AAC rationales (about 26%), 14 TSR 2 rationales (about 20%), and so far about 5 TSR 3 rationales (about 23%). Although some limited work has been undertaken in some TSAs, the concern remains in many management units and/or the nature of the studies undertaken need further refinement to improve the estimated reduction factor to be applied.

## **Outstanding Issues**

The following TSAs and TFLs listed in TSR 2 and 3 where the issue appears to remain outstanding:

- TSAs: Arrow, Arrowsmith, Cranberry, Kispiox, Kootenay Lake, Merritt, 100 Mile House, Revelstoke
- TFLs: 10, 15, 18, 33, 35, 49 and 56.

## **Suggestion(s)**

Incentives to encourage licensees to use FIA or other funds to undertake the recommended local sampling work to refine OAF adjustments needs to be explored to help ensure the outstanding concerns raised in current and future AAC rationale reports are addressed.

Even with improved incentives, however, there could be incomplete or spotty efforts made to address the concerns. Another or complementary approach may be to initiate a provincial study or regional studies with focus on those management units where uncertainty in this factor can have the greatest impact on timber supply. This can be assessed by reviewing available sensitivity analyses in timber supply analyses documents.

## **Issue 7: Stand dynamics outside timber harvesting land base**

### **Nature of the Issue**

Forest stands outside the timber harvesting land base, including inoperable areas and parks, do not contribute to timber supply, but are used in timber supply analyses to help achieve forest cover objectives that would otherwise constrain access to the timber harvesting land base. For example, mature and old growth stands in inoperable areas can contribute to attainment of the non-spatial old growth order – which is a legal objective under the *Forest and Range Practices Act (FRPA)*, and to forest cover requirements for visuals and wildlife such as ungulate winter range which may also be legal objectives under FRPA.

Some timber supply analyses have continued to age non-contributing areas over time in the model – which overestimates the contribution of these areas to achieving forest cover objectives since some disturbances (such as fire) do occur.

## **Trends**

The issue was not raised in TSR 1, but has been raised in 6 rationales in TSR 2 (about 10%) and so far 4 in TSR 3 (about 18%). The trend therefore is increasing reference to this concern particularly in TSAs or TFLs with a relatively large area outside the timber harvesting land base and/or with large adjacent parks where their contribution to achieving forest cover objectives has a significant impact on timber supply

## **Outstanding Issues**

The issue appears to remain outstanding in the following TSAs and TFLs:

- TSAs: Arrow, Cranbrook, Golden, Invermere, Merritt, Kamloops, Revelstoke
- TFLs: 53.

## **Suggestion(s)**

Incentives to encourage licensees to use FIA or other funds to undertake the recommended local work to better model disturbances in the non-timber harvesting land base need to be examined.

Even with improved incentives, however, there could be incomplete or spotty efforts made to address the concerns. Another or complementary approach may be to initiate a provincial study or regional studies with focus on those management units where uncertainty in this factor can have the greatest impact on timber supply. This can be assessed by reviewing available sensitivity analyses in timber supply analyses documents.

## **Issue 8: NSR**

### **Nature of the Issue**

The issue of the size and contribution of not-satisfactorily-restocked (NSR) areas in TSAs and TFLs causes uncertainty in timber supply analysis. The age of existing inventories and the lack of recent updates can lead to questions regarding the nature of NSR areas that are labeled in existing inventory files. (Note: this issue was likely also raised as a “NSR” issue rather than an “inventory” issue and therefore may be a bigger issue than noted below).

### **Trends**

The need to confirm the area of NSR and their contribution over time to timber supply has been raised in 7 rationales in TSR 2 (about 11%) and the concern was repeated in 1 rationale in TSR 3.

### **Outstanding Issues**

The issue appears to remain outstanding in the following units:

- TSAs: Dawson Creek, Quesnel, Revelstoke and Williams Lake
- TFLs: 42, 48 and 55.

### **Suggestion(s)**

Incentives to encourage licensees to use FIA or other funds to undertake the recommended local work to confirm the area of NSR needs to be examined.

Even with improved incentives, however, there could be incomplete or spotty efforts made to address the concerns. Another or complementary approach may be to initiate a provincial study on ways to confirm or update the inventory files related to NSR, for example, using databases such as RESULTS.

## **Issue 9: Other forest inventory issues**

Several other forest inventory issues are noted in Appendix 1 and these should be reviewed and addressed as resources allow.

## **Issue 10: Traditional use studies and related issues**

### **Nature of the Issue**

In the context of AAC determinations, accurate information on aboriginal interests and uses, and archaeological sites, can help ensure that cultural heritage and archaeological resources are appropriately factored into timber supply review. This helps reduce uncertainty in timber supply modeling and can help demonstrate respect for and responsiveness to aboriginal interests and uses.

### **Trends**

The need for improved information about cultural heritage and archaeological resources through inventories such as traditional use studies (TUSs) and archaeological overview assessments (AOAs) has been mentioned in 14 TSR 1 rationales (about 23%), 5 TSR 2 rationales (about 7%), and so far in 1 TSR 3 rationale. Several TUSs or AOAs were underway during TSR1 or were completed after TSR 1 which helped address the concern.

### **Outstanding Issues**

Some recent rationales have expressed need that TUSs be completed in areas where they have not been undertaken and/or that cultural heritage resource information be provided in a manner where its impact on timber supply can be more appropriately modeled to account for First Nations interests. For example, the recent TSR 3 rationale for the Merritt TSA recommends completion of the TUS. Under FIA, however, TUSs are not an eligible activity.

### **Suggestion(s)**

That FIA and other funding mechanism be made available to support traditional use studies, AOAs and other related cultural heritage resource studies to help ensure these values are better addressed in timber supply review. It is also important that existing

studies are readily maintained as part of the inventory data base and not get inadvertently lost.

## **Issue 11: Recreation and visual landscape inventory**

### **Nature of the Issue**

In the context of timber supply review, an accurate visual landscape inventory is particularly needed to help ensure that visual resource values are adequately accounted for in AAC determinations. Accounting for visual resources tends to have a greater impact on timber supply than recreation resources. However, an accurate recreation inventory is also useful to improve the accounting for this value particularly in those management units where much older ESA mapping for recreation (Er) have been used in timber supply analysis.

### **Trends**

The need to improve the recreation or landscape inventory for TSAs or TFLs was mentioned in 7 TSR 1 rationales (about 11%) and 6 TSR 2 rationales (about 9%). Based on TSR 2 implementation recommendations, this appears to be an outstanding issue in the following units (or portions of those units):

- TSAs: Mid Coast, Merritt and Cranberry
- TFLs: 42 and 44

### **Suggestion(s)**

Incentives should be explored for licensees to utilize FIA or other funding sources to improve recreation and landscape inventories particularly where recommended in AAC rationales as an important implementation task. It is also important that existing inventories remain readily maintained as part of the inventory data base and not get inadvertently lost. If not already underway, specific roles and responsibilities regarding the inventory should be clearly established between MOFR, MOAL and MOTSA with one task being to identify those inventories in greatest need for updating in support of timber supply review.

## Appendix 1:

### Detailed Summary of Inventory Issues by TSA/TFL

#### Issue 1: Site productivity (managed stand yields, site index)

*Regional summaries (March 2001)*

| Type       | Issue                                                                                                                | TSA/TFL        | TSR | Status   |
|------------|----------------------------------------------------------------------------------------------------------------------|----------------|-----|----------|
| Urgent     | Examination of the data that supports TIPSYP to ensure it reasonably estimates regenerated stand volumes in the TSA. | Mackenzie      | 1   | -        |
| Urgent     | Assess and examine ways to localize VDYP to reduce uncertainties.                                                    | Lillooet       | 1   | Complete |
| High       | Assess the implications of the paired plot study                                                                     | Prince George  | 1   | -        |
| High       | Assess the implications of the paired plot study.                                                                    | Quesnel        | 1   | Yes      |
|            |                                                                                                                      |                |     |          |
| High       | Assess the implications on the paired plot study.                                                                    | Lillooet       | 1   | Yes      |
| High       | Assess the implications on the paired plot study.                                                                    | Arrow          | 1   | Yes      |
| High       | Assess the implications on the paired plot study.                                                                    | Kootenay Lake  | 1   | Yes      |
| High       | Assess the implications on the paired plot study.                                                                    | Revelstoke     | 1   | Yes      |
| High       | Assess the implications of the paired plot study.                                                                    | Kingcome       | 1   | Yes      |
| High       | Assess the implications on the paired plot and SIBEC study                                                           | Cassiar        | 1   | -        |
| High       | Assess the implications on the paired plot study.                                                                    | Kalum          | 1   | -        |
| High       | Assess the site productivity on small diameter pine                                                                  | Lakes          | 1   | -        |
| High       | Assess the implications on the paired plot study.                                                                    | Lillooet       | 1   | Yes      |
| High       | Assess the implications on the paired plot study                                                                     | North Coast    | 1   | Yes      |
| Info Need  | Resolve potential for increased site index to augment timber supply                                                  | 100 Mile House | 1   | Yes      |
| Info. Need | Assess the implications on the paired plot study.                                                                    | 100 Mile House | 1   | Yes      |
| Info. Need | Assess the implications on the paired plot study.                                                                    | Williams Lake  | 1   | Yes      |
| Info. Need | Assess the implications on the paired plot study.                                                                    | Robson Valley  | 1   | -        |
| Info. Need | Assess the implications on the paired plot study.                                                                    | Kamloops       | 1   | Yes      |
| Info. Need | Assess the implications on the paired plot study.                                                                    | Merritt        | 1   | Yes      |
| Info. Need | Assess the implications on the paired plot study.                                                                    | Okanagan       | 1   | Yes      |
| Info. Need | Assess the implications of the paired plot study and other findings and incorporate into next determination.         | Strathcona     | 1   | Yes      |
| Info. Need | Site productivity work required in all managed stands for both single and mixed species.                             | Kispiox        | 1   | Yes      |
| Info. Need | Assess the implications on the paired plot study.                                                                    | Boundary       | 1   | Yes      |
| Info. Need | Assess the implications on the paired plot study.                                                                    | Invermere      | 1   | Yes      |
| Info. Need | Assess the implications on the paired plot and SIBEC study                                                           | Bulkley        | 1   | Yes      |
| Info. Need | Assess the implications on the paired plot study                                                                     | Nass           | 1   | -        |
| Info. Need | Use managed stand yield tables to establish regenerated stand volumes                                                | Kootenay Lake  | 1   | Complete |
| Info. Need | Assess the implications of the paired plot study                                                                     | Soo            | 1   | Yes      |
| Issue      | Use managed stand yield tables to establish regenerated stand                                                        | Arrow          | 1   | Complete |



|            |                                                                                                                                                                                                                                                             |             |   |     |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|---|-----|
| Statement  | volumes                                                                                                                                                                                                                                                     |             |   |     |
| High       | Assess the implications of the paired plot study and licensee's study                                                                                                                                                                                       | TFL 19      | 1 | -   |
| High       | Further improvements in managed cottonwood stand yield.                                                                                                                                                                                                     | TFL 43      | 1 | -   |
| High       | Assess the implications on the paired plot study.                                                                                                                                                                                                           | TFL 52      | 1 | ?   |
| High       | Licensee to prepare yield curves which more accurately reflect the conditions of the stands being modeled                                                                                                                                                   | TFL 6       | 1 | -   |
| Info Need  | Examine the possibility that site productivity is underestimated.                                                                                                                                                                                           | TFL 30      | 1 | -   |
| Info. Need | Examine uncertainty of assignment of managed stands for stands between 30 and 40 years of age.                                                                                                                                                              | TFL 47      | 1 | -   |
| Info. Need | Have methods reviewed by Research and Resource Inventory Branches. Complete necessary work prior to MP No. 9                                                                                                                                                | TFL 6       | 1 | -   |
| Info. Need | Continue exploring methods to assess/adjust site index                                                                                                                                                                                                      | TFL 10      | 1 | -   |
| Info. Need | Additional studies for ecosite classification required.                                                                                                                                                                                                     | TFL 24      | 1 | -   |
| Info. Need | Better quantify effects of stand conversion on site index.                                                                                                                                                                                                  | TFL 24      | 1 | -   |
| Info. Need | Develop appropriate methodology to deal with site index estimates.                                                                                                                                                                                          | TFL 25      | 1 | -   |
| Info. Need | Assess the implications of the paired plot study and other findings and incorporate into next determination                                                                                                                                                 | TFL 45      | 1 | -   |
| Info. Need | Assess the implications on the paired plot study.                                                                                                                                                                                                           | TFL 18      | 1 | -   |
| Info. Need | Assess the implications on the paired plot study.                                                                                                                                                                                                           | TFL 33      | 1 | -   |
| Info. Need | Assess the implications on the paired pilot study.                                                                                                                                                                                                          | TFL 14      | 1 | -   |
| High       | Monitor performance in regenerated stands with field-based plots to determine whether the increases in site productivity suggested by the old growth site index studies are in fact warranted.                                                              | Golden      | 2 | -   |
| High       | Assess the implications of the paired plot study particularly the uncertainty with respect to Sitka spruce                                                                                                                                                  | QCI         | 2 | Yes |
| Info. Need | Obtain localized data to provide better estimates of site productivity.                                                                                                                                                                                     | Soo         | 2 | -   |
| Info. Need | Site productivity studies to assess the appropriate adjustments to incorporate in future timber supply analyses.                                                                                                                                            | Mid Coast   | 2 | -   |
| Info. Need | Obtain improved site productivity information for the managed stands in the TSA                                                                                                                                                                             | North Coast | 2 | -   |
| Info. Need | In consultation with Research Branch staff, validate an appropriate site index adjustment for the TSA, for single and mixed species.                                                                                                                        | Cranberry   | 2 | -   |
| Info. Need | Performance in regenerated stands should be monitored with field-based plots to determine if the increases in site productivity suggested by the old growth site index studies are fully warranted.                                                         | Revelstoke  | 2 | -   |
| Info. Need | Collect improved site productivity data for the stands in the TSA, including involvement as appropriate in the ongoing project under the IFPA.                                                                                                              | Arrow       | 2 | -   |
| Info. Need | Study and report on the specific implications of old growth site adjustments in the TSA, and the extent to which these have already been accounted for in the inventory.                                                                                    | Strathcona  | 2 | -   |
| -          | Work with Research Branch staff to assess the degree of applicability of provincial site index adjustments to the TSA, as well as the indications that inventory inaccuracies have led to underestimation of site productivity in 20- to 60 year old stands | Kalum       | 2 | -   |
| High       | Test accuracy of site indexes applied in current analysis.                                                                                                                                                                                                  | TFL 8       | 2 | -   |
| Info. Need | Continue monitoring the permanent G&Y sampling plots,                                                                                                                                                                                                       | TFL 43      | 2 | -   |

|   |                                                                                                                                                                                                     |        |   |   |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---|---|
|   | which will provide information that is reflective of the growing conditions within the TFL and install new PSPs                                                                                     |        |   |   |
| - | The licensee work with BCFS staff to monitor managed stand yields, in particular with regard to the yields attributed to genetic gain and site productivity estimates as projected in the analysis. | TFL 53 | 2 | - |

*Rationales since regional summaries (post March 2001)*

| Type      | Issue                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | TSA/TFL        | TSR | Status |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----|--------|
| Implement | To maintain accurate projections of future timber supplies, carry out field studies to refine estimates of the site indices for those zones and species not already addressed in the previous study (i.e. completed in CWH but not IDF, MH, or ESSF).                                                                                                                                                                                                                                                  | Fraser         | 3   | -      |
| Implement | Collect local site productivity data since no local studies have been undertaken in TSA.                                                                                                                                                                                                                                                                                                                                                                                                               | Sunshine Coast | 2   | -      |
| Implement | Collect the necessary data through the TEM project to allow for more precise estimates of site productivity using SIBEC                                                                                                                                                                                                                                                                                                                                                                                | TFL 39         | 2   | -      |
| Implement | In view of the potential benefits to timber supply projections, as identified in other parts of the province, I encourage licencees to apply for FIA funding to carry out local field studies to refine estimates of site indices specific to the TSA for direction application in future timber supply analyses, rather than relying on the provincial OGSI or veteran figures. It is possible that underestimated OAFs could be offset by underestimated site indices. (OGSI plots were outside TSA) | Golden         | 3   | -      |
| Implement | Initiate work in the district to confirm site productivity in view of the high sensitivity of the mid-term timber supply to increases in site index.                                                                                                                                                                                                                                                                                                                                                   | Quesnel        | 2   | -      |
| Implement | Initiate work in the district to confirm site productivity, in view of the corresponding potential to increase the mid-term timber supply.                                                                                                                                                                                                                                                                                                                                                             | Quesnel        | 3   | -      |
| Implement | Collect data from stands within the TSA to provide better certainty around the magnitude of site productivity adjustments                                                                                                                                                                                                                                                                                                                                                                              | Prince George  | 2   | -      |
| Implement | Continue work to confirm site productivity, in view of the potential increase to the mid- and long-term timber supply                                                                                                                                                                                                                                                                                                                                                                                  | Prince George  | 3   | -      |
| Implement | Collect information on appropriate site index adjustments for species other than pine                                                                                                                                                                                                                                                                                                                                                                                                                  | Lake           | 2   | -      |
| Implement | Conduct a study on site productivity specific to the TSA                                                                                                                                                                                                                                                                                                                                                                                                                                               | Mackenzie      | 2   | -      |
| Implement | Consider doing Site Index/BEC (SIBEC) work or ground sampling to improve estimates of productivity because of its impact on minimum harvestable ages                                                                                                                                                                                                                                                                                                                                                   | TFL 57         | 3   | -      |
| Implement | Site productivity for existing and future managed stands based on PEM/SIBEC. Given sensitivity of timber supply in TSA to uncertainty in site index, monitoring growth of young stands would be useful as part of IFPA                                                                                                                                                                                                                                                                                 | Arrow          | 3   | -      |
| Implement | Collect site productivity data from stands within the TSA to determine if adjustments are appropriate                                                                                                                                                                                                                                                                                                                                                                                                  | Arrowsmith     | 2   | -      |
| Implement | Review the assumptions to decrease the uncertainty about site productivity estimates                                                                                                                                                                                                                                                                                                                                                                                                                   | Boundary       | 2   | -      |
| Implement | Improve site index information for the OASIS approach to estimating site index                                                                                                                                                                                                                                                                                                                                                                                                                         | Bulkley        | 2   | -      |
| Implement | Clarify site productivity issues and associated issues of green-up by reviewing SIBEC and inventory data                                                                                                                                                                                                                                                                                                                                                                                               | Cassiar        | 2   | -      |

|           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                |   |                   |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|---|-------------------|
| Implement | Licensees encouraged to develop PEM for use in SIBEC assessment of managed stand site indices given large potential impact on timber supply relative to use of inventory derived site indices                                                                                                                                                                                                                                                                                                                                              | Cranbrook      | 2 | -                 |
| Implement | The use of SIBEC-derived site indices for managed stands has a large impact on timber supply. I acknowledge the significant research behind these estimates showing that first and second approx. SIBEC estimates are suitable for supporting AAC determinations. I ask licensees to continue to monitor growth and yield from their second growth stands to track against expected productivity as predicted from SIBEC. I also ask licensees to continue to refine PEM to allow continued improvement and better estimates of site index | Invermere      | 3 | -                 |
| Implement | Collect local data to better define the site productivity of second growth stands                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Kingcome       | 2 | -                 |
| Implement | Collect local site productivity data to enable an assessment of the applicability of provincial site index adjustments to managed stands in the TSA                                                                                                                                                                                                                                                                                                                                                                                        | Kispiox        | 2 | -                 |
| Implement | Collect data on site productivity from stands within the TSA                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Lillooet       | 2 | -                 |
| Implement | Collect local data to improve confidence about the magnitude of site productivity adjustments appropriate for the TSA                                                                                                                                                                                                                                                                                                                                                                                                                      | Merritt        | 2 | -                 |
| Implement | District staff should pursue funding for site productivity studies to assess the appropriate adjustments to incorporate in future timber supply analysis                                                                                                                                                                                                                                                                                                                                                                                   | Mid Coast      | 2 | -                 |
| Implement | Collect data on site productivity from stands within the TSA                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Morice         | 2 | -                 |
| Implement | Collect data from the Nass TSA to confirm appropriate estimates of site productivity                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Nass           | 2 | -                 |
| Implement | Obtain improved site productivity information for the managed stands in the TSA                                                                                                                                                                                                                                                                                                                                                                                                                                                            | North Coast    | 2 | -                 |
| Implement | Work with licensee staff to collect improved site productivity data for stands in the TSA                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Okanagan       | 2 | Work done in 2002 |
| Implement | Collect and analyze more local data regarding site productivity estimates in the TSA                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 100 Mile House | 2 | -                 |
| Implement | Performance in regenerated stands should be monitored with field-based plots to determine if the increases in site productivity suggested by the OGSi studies are fully warranted                                                                                                                                                                                                                                                                                                                                                          | Revelstoke     | 2 | -                 |
| Implement | That district and licensee staff work to gather local data to better quantify the site productivity in old growth stands                                                                                                                                                                                                                                                                                                                                                                                                                   | Revelstoke     | 3 | -                 |
| Implement | Resolve the appropriate adjustments to make to site indices in the TSA and monitor growth in second growth stands                                                                                                                                                                                                                                                                                                                                                                                                                          | Robson Valley  | 2 | -                 |
| Implement | Obtain localized data to provide better estimates of site productivity                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Soo            | 2 | -                 |
| Implement | Study and report on the specific implications of OGSi adjustments in the TSA and the extent to which these have already been accounted for in the inventory                                                                                                                                                                                                                                                                                                                                                                                | Strathcona     | 2 | -                 |
| Implement | In view of the associated potential for large increases in the projected timber supply, I encourage the collection of locally-based estimates of site productivity for consideration in the next determination                                                                                                                                                                                                                                                                                                                             | Williams Lake  | 2 | -                 |
| Implement | If possible, improve site index estimates in the ESSF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | TFL 8          | 3 | -                 |
| Implement | Collect localized site productivity information                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | TFL 10         | 2 | -                 |
| Implement | Develop local site index estimates for interior Douglas-fir and                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | TFL 15         | 3 | -                 |

|           |                                                                                                                                                                                                                              |        |   |   |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---|---|
|           | spruce to reduce the uncertainty regarding the application of the provincial site index conversions                                                                                                                          |        |   |   |
| Implement | Strengthen the basis for site index assumptions                                                                                                                                                                              | TFL 19 | 2 | - |
| Implement | Collect localized site productivity estimates                                                                                                                                                                                | TFL 26 | 2 | - |
| Implement | Examine and refine site index estimates applied in higher elevation stands                                                                                                                                                   | TFL 30 | 2 | - |
| Implement | Confirm or refine the estimates of site index for high elevation areas and for spruce generally                                                                                                                              | TFL 35 | 2 | - |
| Implement | Continue monitoring the permanent G&Y sampling plots, which will provide information that is reflective of the growing conditions within the TFL, and install new permanent sample plots in the Kingcome and Homathko Blocks | TFL 43 | 2 | - |
| Implement | Investigate site indices on the Bonanza Lake and Moresby Island MUs by establishing local studies to validate the SIBEC work already completed                                                                               | TFL 47 | 2 | - |
| Implement | Obtain localized site productivity information                                                                                                                                                                               | TFL 48 | 2 | - |
| Implement | Monitor improved site index estimates for next analysis                                                                                                                                                                      | TFL 49 | 3 | - |
| Implement | Collect data to obtain better site productivity estimates                                                                                                                                                                    | TFL 55 | 2 | - |
| Implement | Monitor actual stand volume realized in comparison to predicted volumes in managed stands                                                                                                                                    | TFL 53 | 3 | - |
| Implement | Continue to collect site productivity data and compare estimates derived from the inventory data to field values                                                                                                             | TFL 56 | 2 | - |

## Issue 2: Existing unmanaged stand volumes (inventory audit; VRI phase 2)

*Regional summaries (March 2001)*

| Type   | Issue                                                                                                       | TSA/TFL        | TSR | Status                                                   |
|--------|-------------------------------------------------------------------------------------------------------------|----------------|-----|----------------------------------------------------------|
| Urgent | Check volume estimates for existing stands                                                                  | Kootenay Lake  | 1   | Complete; audit 1994                                     |
| Urgent | Check volume estimates for existing stands. If significant problems found, may revisit determination early. | Kispiox        | 1   | Audit 1997                                               |
| Urgent | Check volume estimates for existing stands                                                                  | North Coast    | 1   | Audit 1994                                               |
| Urgent | Check volume estimates for existing stands                                                                  | Bulkley        | 1   | Audit 1994                                               |
| Urgent | Check volume estimates for existing stands                                                                  | Kalum          | 1   | Audit 1996                                               |
| High   | Check volume estimates for existing stands                                                                  | Prince George  | 1   | Audit 1997/98                                            |
| High   | Check volume estimates for existing stands                                                                  | Arrow          | 1   | Complete; Audit 1995                                     |
| High   | Check volume estimates for existing stands                                                                  | Boundary       | 1   | Complete; Audit 1997                                     |
| High   | Check volume estimates for existing stands                                                                  | Cranbrook      | 1   | Complete; Audit 1996                                     |
| High   | Check volume estimates for existing stands                                                                  | Golden         | 1   | Complete; Audit 1994                                     |
| High   | Evaluate discrepancy between actual harvested and expected volumes.                                         | Kootenay Lake  | 1   | Complete; Audit 1994                                     |
| High   | Check volume estimates for existing stands                                                                  | Lakes          | 1   | Audit 1998                                               |
| High   | Check volume estimates for existing stands                                                                  | Kingcome       | 1   | Complete; Audit 1995                                     |
| High   | Check volume estimates for existing stands                                                                  | Sunshine Coast | 1   | Complete; Audit not completed (but phase 2 VRI complete) |

|                 |                                                                                                                                                               |                |   |                                                       |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|---|-------------------------------------------------------|
| Info. Need      | Check volume estimates for existing stands                                                                                                                    | Kamloops       | 1 | Complete;<br>Audit 1996                               |
| Info. Need      | Check volume estimates for existing stands                                                                                                                    | Merritt        | 1 | Complete;<br>Audit 1996                               |
| Info. Need      | Check volume estimates for existing stands                                                                                                                    | Okanagan       | 1 | Complete;<br>Audit 1996                               |
| Info. Need      | Check volume estimates for existing stands                                                                                                                    | 100 Mile House | 1 | Complete;<br>Audit 1994                               |
| Info. Need      | Check volume estimates for existing stands                                                                                                                    | Fort St John   | 1 | Audit 1994                                            |
| Info. Need      | Check volume estimates for existing stands                                                                                                                    | Robson Valley  | 1 | Audit 1998                                            |
| Info. Need      | Check volume estimates for existing stands                                                                                                                    | Mid Coast      | 1 | Complete;<br>audit 1994                               |
| Info. Need      | Check volume estimates for existing stands                                                                                                                    | Cassiar        | 1 | Audit 1996                                            |
| Info. Need      | Check volume estimates for existing stands                                                                                                                    | Nass           | 1 | Audit 1996                                            |
| Info. Need      | Explore the possibilities of the addition of more sample plots within the timber harvesting land base                                                         | QCI            | 1 | Complete;<br>audit 1993/97                            |
| Issue Statement | Discrepancy between actual harvested and expected volumes (inventory overestimated).                                                                          | Revelstoke     | 1 | Complete;<br>Audit 1997                               |
| Issue statement | Check volume estimates for existing stands                                                                                                                    | Soo            | 1 | Complete;<br>audit 1997                               |
| Urgent          | Check volume estimates for existing stands                                                                                                                    | TFL 18         | 1 | Audit 1995                                            |
| Urgent          | Reassess the inventory for existing stand volumes                                                                                                             | TFL 14         | 1 | Audit 1994                                            |
| High            | Check volume estimates for existing stands                                                                                                                    | TFL 55         | 1 | Audit 1996                                            |
| High            | Check volume estimates for existing stands                                                                                                                    | TFL 56         | 1 | Audit 1996                                            |
| High            | Resolve and correct the discrepancy of actual v. expected volumes as identified in the inventory audit.                                                       | TFL 30         | 1 | Audit 1994                                            |
| High            | Any further conclusions of the inventory audit will be considered in the next determination.                                                                  | TFL 42         | 1 | Audit 1996                                            |
| High            | Check volume estimates for existing stands                                                                                                                    | TFL 19         | 1 | Audit 1999                                            |
| High            | Check volume estimates for existing stands                                                                                                                    | TFL 43         | 1 | Unknown                                               |
| Info. Need      | Check volume estimates for existing stands                                                                                                                    | TFL 6          | 1 | No audit                                              |
| Info. Need      | Check volume estimates for existing stands                                                                                                                    | TFL 25         | 1 | No audit                                              |
| Info. Need      | Check volume estimates for existing stands                                                                                                                    | TFL 45         | 1 | No audit completed                                    |
| Info. Need      | Check volume estimates for existing stands                                                                                                                    | TFL 47         | 1 | Audit 1995/97                                         |
| Urgent          | Check volume estimates for existing stands.                                                                                                                   | Fraser         | 2 | Complete;<br>Audit 1994 and 1995;<br>Phase 2 complete |
| -               | Undertake further work in cooperation with Resources Inventory Branch to attempt to isolate concern regarding operational timber volumes for existing stands. | Kalum          | 2 | Audit 1996;<br>VRI phase 2 complete                   |

*Rationales since regional summaries (post March 2001)*

|           |                                                                                                                                                                                                                                                                          |         |   |                                                         |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|---|---------------------------------------------------------|
| Implement | Document the volume of cedar harvested relative to the volume of cedar in the inventory profile. (Note: Not really an inventory issue but more one to assess if profile assumed to be harvested in the analysis supporting the determination is in fact being harvested) | TFL 44  | 3 | Unknown;<br>internal audit completed ; phase 2 not done |
| Note      | High uncertainty remains in existing stand volumes despite audit (i.e. from 0 to 16% overestimation)                                                                                                                                                                     | Cassiar | 2 | Audit 1996;<br>phase 2 unknown                          |

|           |                                                                                                                                                                                                                                                                                                              |                |   |                                                  |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|---|--------------------------------------------------|
| Implement | Ministry staff and licensees should work to explain and reduce discrepancies between stand volumes estimated by VDYP and those measured in the field (cruises) or during scaling                                                                                                                             | Fort Nelson    | 2 | No audit; phase 2 complete                       |
| Implement | Clarify whether the inventory data does indeed overestimate volume estimates for existing stands. Note: 1996 audit suggests this but needs to be confirmed/refined.                                                                                                                                          | Kispiox        | 2 | Audit 1997; Phase 2 unknown                      |
| Implement | If funding permits, a second phase of the audit should be carried out, with emphasis on collecting data to resolve questions about the volume estimates for existing natural stands for the operable land base in the outer and inner coast areas                                                            | Mid Coast      | 2 | Unknown; Audit 1994; Phase 2 unknown             |
| Implement | Fully review the concern that the forest inventory may overestimate forest ages (as indicated by the 1999 inventory audit) and hence affect assumptions regarding the achievement of the seral stage distribution for landscape-level biodiversity                                                           | 100 Mile House | 2 | Audit 1994; phase 2 complete                     |
| Implement | Reduce uncertainty in VRI data (i.e. address VRI phase 2 volume adjustments using Fraser Protocol)                                                                                                                                                                                                           | Sunshine Coast | 2 | VRI phase 2 done                                 |
| Implement | Completing Phase 2 of VRI, which is FIA funded, is very important with respect to confirming appropriate volume assignments to the inventory figures for existing mature stands. (VRI Phase 1 completed in 2001. Recompiled 1994 audit ground samples suggest 4-10% volume overestimation in new phase VRI.) | Golden         | 3 | VRI phase 2 IP                                   |
| Implement | Initiate work in the district to more accurately estimate existing stand volumes. (1999 audit suggests existing mature stands overestimated in inventory by about 12%).                                                                                                                                      | Quesnel        | 3 | No VRI work incl. phase 2                        |
| Implement | Initiate work in the TSA to more accurately estimate existing stand volumes. (Earlier audits and initial VRI phase 2 samples suggest volume overestimation)                                                                                                                                                  | Prince George  | 3 | No VRI phase 2                                   |
| Implement | Complete the VRI in order to provide data which will help to evaluate existing stand volumes                                                                                                                                                                                                                 | Mackenzie      | 2 | 15% VRI Phase 1; no phase 2                      |
| Implement | Work with MSRM to complete VRI work in the TSA to assess the reliability of existing stand volume estimates                                                                                                                                                                                                  | Kamloops       | 2 | 15% VRI phase 1; no phase 2                      |
| Implement | BCFS staff and licensees collaborate to undertake VRI phase 2 prior to next determination in order to provide a better volume estimates for existing stands                                                                                                                                                  | Revelstoke     | 3 | Phase 1 complete; no phase 2                     |
| Implement | Undertake work to improve the inventory in order to reduce uncertainty, in particular volume estimates for existing stands, and preferably using the standard methodology supported by MOFR FAIB, formerly with MSRM                                                                                         | TFL 15         | 3 | Phase 1 complete; phase 2 sampling not completed |
| Implement | Complete ground sampling (Phase 2) of VRI well before the next timber supply analysis                                                                                                                                                                                                                        | TFL 45         | 2 | Phase 1 complete; phase 2 IP                     |
| Implement | Complete Phase 2 of the VRI                                                                                                                                                                                                                                                                                  | TFL 48         | 2 | 100% VRI phase 1; phase 2 IP                     |
| Implement | Monitor VRI phase 2 estimated volume increases for mature natural stands to confirm/refine                                                                                                                                                                                                                   | TFL 49         | 3 | Phase 1 and 2 complete                           |
| Implement | Complete phase 2 of VRI in order to refine estimates of existing stand volumes                                                                                                                                                                                                                               | TFL 52         | 2 | VRI phase 1 and 2 IP                             |

### Issue 3: Vegetation Resource Inventory

*Regional summaries (March 2001)*

| Type       | Issue                                                                                                                    | TSA/TFL      | TSR | Status<br>Nov. 2005          |
|------------|--------------------------------------------------------------------------------------------------------------------------|--------------|-----|------------------------------|
| Urgent     | Re-inventory required particularly in the northern portion of the TSA                                                    | Mackenzie    | 1   | 15% VRI Phase 1              |
| Info Need  | It would be very beneficial to conduct a re-inventory prior to the next determination                                    | Fort St John | 1   | 45% VRI phase 1              |
| Info Need  | Re-inventory for TSA recommended. Focus on Moberly PSYU first.                                                           | Dawson Creek | 1   | 40% VRI phase 1; phase 2     |
| Info. Need | Re-inventory information to be incorporated into TSR 2.                                                                  | Kamloops     | 1   | 15% VRI phase 1              |
| Info Need  | A re-inventory of the TSA is underway                                                                                    | Quesnel      | 1   | Update but no VRI            |
| High       | Licensee required to update inventory (as per Chief Forester letter of August 23, 1994) prior to next determination      | TFL 41       | 1   | No VRI                       |
| High       | Re-inventory required before next determination; re-inventory plan to be approved by BCFS.                               | TFL 52       | 1   | VRI phase 1 and 2 IP         |
| High       | Complete a comprehensive inventory for the TFL prior to next determination                                               | TFL 48       | 1   | 100% VRI phase 1; phase 2 IP |
| Info. Need | Any required volume adjustment to be made after VRI completed, and if required a suitable revision to the AAC determined | TFL 54       | 1   | 100% VRI phase 1             |
| High       | Complete VRI before TSR 3                                                                                                | Fraser       | 2   | 100% VRI phase 1; phase 2    |
| High       | Strongly encourage licensee to complete the Phase 2 VRI                                                                  | TFL 15       | 2   | 100% VRI phase 1; phase 2 IP |
| Info. Need | Undertake a new forest inventory for the TSA                                                                             | Golden       | 2   | 100% VRI phase 1; phase 2 IP |
| Info. Need | Pursue funding for a new forest inventory                                                                                | Arrow        | 2   | 100% VRI phase 1; phase 2 IP |

*Rationales since regional summaries (post March 2001)*

|           |                                                                                                                                                                                                                                                                                                                                     |              |   |                                                        |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|---|--------------------------------------------------------|
| Implement | Need to update VRI based on depletions and other volume-related inventory attributes in a timely manner                                                                                                                                                                                                                             | Fraser       | 3 | Updated to 2001                                        |
| Implement | Encourage licensee to update the TFL forest inventory (i.e. to undertake a VRI given age of the inventory (1967-70 with some updates 1976-77))                                                                                                                                                                                      | TFL 46       | 2 | NA                                                     |
| Implement | Continue to update forest inventories of the TSA including VRI phase 1                                                                                                                                                                                                                                                              | Dawson Creek | 2 | 40% VRI phase 1; phase 2                               |
| Implement | MOF staff should continue to work with Slocan to implement 5-year re-inventory plan                                                                                                                                                                                                                                                 | Fort Nelson  | 2 | VRI phase 1 for operable land base; phase 2 incomplete |
| Implement | Encourage completion of the VRI project                                                                                                                                                                                                                                                                                             | Fort St John | 2 | 45% VRI phase 1                                        |
| Implement | Standard procedures (Fraser Protocol) for adjusting inventory attributes based on phase 2 VRI ground samples in the TSA led to problems and were therefore not used in the timber supply analysis. The problems with the use of the procedures needs to be better understood and addressed prior to the next timber supply analysis | Merritt      | 2 | No phase 1 VRI; phase 2 done                           |

|           |                                                                                                                                                                        |                |   |                                   |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|---|-----------------------------------|
| Implement | Pursue funding for a new forest inventory for the TSA                                                                                                                  | Okanagan       | 2 | 3% VRI phase 1; phase 2 completed |
| Implement | The Okanagan TSA has one of the oldest forest inventories in the province; VRI phase 1 re-inventory work needs to be completed given the age of the existing inventory | Okanagan       | 3 | 3% VRI phase 1; phase 2 completed |
| Implement | Completed a VRI for the TSA in particular to improve the forest cover attributes                                                                                       | 100 Mile House | 2 | No phase 1; phase 2 completed     |
| Implement | Give a high priority to completing a forest cover re-inventory of the Johnstone Strait and Moresby Island MUs                                                          | TFL 47         | 2 | NA                                |

## Issue 4: Decay, waste and breakage

### *Regional summaries (March 2001)*

| Type       | Issue                                                                                                                                   | TSA/TFL       | TSR | Status                  |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------|---------------|-----|-------------------------|
| Urgent     | Determine relationship between trees identified for high stumping as wildlife trees and assumed losses due to decay, waste and breakage | Lillooet      | 1   | Complete; NVAF complete |
| High       | Incorporate new provincial decay, waste and breakage factors where feasible.                                                            | Arrow         | 1   | Complete; NVAF IP       |
| High       | Incorporate new provincial decay, waste and breakage factors where feasible.                                                            | Golden        | 1   | Complete; NVAF IP       |
| High       | Clarify cedar and hemlock factors in Longworth PSYU                                                                                     | Robson Valley | 1   | Unknown; no NVAF        |
| High       | Investigate for red cedar in Kyuquout supply block                                                                                      | Strathcona    | 1   | Yes; no NVAF            |
| High       | Incorporate new provincial decay, waste and breakage factors where feasible.                                                            | Kalum         | 1   | Complete; NVAF complete |
| Info. Need | Monitor losses in balsam leading stands and refine OAF2 if required.                                                                    | Morice        | 1   | Yes; no NVAF            |
| Info. Need | Incorporate new provincial decay, waste and breakage factors where feasible.                                                            | North Coast   | 1   | Complete; no NVAF       |
| Info. Need | Incorporate new provincial decay, waste and breakage factors where feasible.                                                            | Merritt       | 1   | No; no NVAF             |
| Info Need  | Incorporate new provincial decay, waste and breakage factors where feasible.                                                            | Quesnel       | 1   | Complete; no NVAF       |
| Info Need  | Incorporate new provincial decay, waste and breakage factors where feasible.                                                            | Williams Lake | 1   | Complete; NVAF complete |
| Info Need  | Decay, waste and breakage factors require better allowances for deciduous stands within this TSA                                        | Fort St John  | 1   | Unknown; no NVAF        |
| Info. Need | Inventory may be improved through collection of more localized data.                                                                    | Mid Coast     | 1   | Complete; no NVAF       |
| Info. Need | Complete compilation and review of information for next determination                                                                   | QCI           | 1   | Complete; no NVAF       |
| High       | Quantify factors for further volume-based analysis.                                                                                     | TFL 43        | 1   | Unknown                 |
| Info. Need | Review factor for next management plan                                                                                                  | TFL 39        | 1   | Unknown                 |
| Info. Need | Use provincial zonal factors for next determination.                                                                                    | TFL 19        | 1   | Unknown;                |



|            |                                                                                                                                                                         |        |   |                        |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---|------------------------|
|            |                                                                                                                                                                         |        |   | NVAF complete          |
| Info. Need | Review and refine deduction factors based on Provincial review.                                                                                                         | TFL 18 | 1 | Unknown                |
| Info Need  | Incorporate new provincial decay, waste and breakage factors where feasible or further analysis by licensee may be useful.                                              | TFL 52 | 1 | Unknown; NVAF complete |
| Info. Need | Refine estimates for stands in Pemberton Supply Block with high levels of decay.                                                                                        | Soo    | 2 | Unknown; no NVAF       |
| Info. Need | Complete and determine the relevance at the stand level of ongoing studies of cedar and hemlock loss factors, in consultation with staff of Resources Inventory Branch. | Golden | 2 | Unknown; NVAF IP       |

*Rationales since regional summaries (post March 2001)*

|           |                                                                                                                                                                          |            |   |                       |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|---|-----------------------|
| Implement | Undertake studies to resolve the concern about appropriate loss factors to account for decay, waste and breakage in existing redcedar stands                             | Arrowsmith | 2 | Unknown NVAF          |
| Implement | Gather data to assess decay, waste and breakage in cedar and hemlock stands                                                                                              | Kamloops   | 2 | NVAF planned for 2005 |
| Implement | I encourage completion of NVAF sampling in the TSA as these results can be used to better account for decay and waste losses in support of future timber supply analyses | Merritt    | 3 | No NVAF               |
| Implement | Work with Resources Inventory Branch staff to refine decay, waste and breakage estimates for stands in the Pemberton Supply Block with high levels of decay              | Soo        | 2 | Unknown NVAF          |
| Implement | Complete sampling necessary to develop Net Volume Adjustment Factors to replace the existing loss factors                                                                | TFL 30     | 2 | No NVAF               |

## Issue 5: Site productivity: alternative silviculture systems

*Regional summaries (March 2001)*

| Type       | Issue                                                                                                                                                            | TSA/TFL       | TSR | Status |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----|--------|
| High       | Timber supply implications of uneven-aged, mixed species and silviculturally treated stands.                                                                     | Boundary      | 1   | ?      |
| High       | Evaluate alternative analytical approaches to assessing the timber supply implications of uneven aged silvicultural systems and mixed species management.        | Cranbrook     | 1   | Yes    |
| High       | Evaluate alternative analytical approaches for assessing the timber supply implications of uneven-aged silvicultural systems and mixed species management        | Invermere     | 1   | Yes    |
| High       | Quantify effects of intensive silvicultural activities.                                                                                                          | Lillooet      | 1   | -      |
| Info. Need | Evaluate success of intensive silvicultural activities on stand volumes.                                                                                         | Revelstoke    | 1   | -      |
| Info Need  | Review the partial cut regime and confirm the appropriate method of projecting stand volume estimates for regenerated stands.                                    | Robson Valley | 1   | -      |
| Info. Need | Provide improved information for the next analysis with respect to site index adjustments, alternative silvicultural systems and associated patch-distributions. | Fraser        | 2   | -      |
| Info. Need | Determine/quantify timber yield implications of employing alternative silviculture (including genetically improved stock) systems                                | TFL 47        | 1   | -      |

|                 |                                                                                                                                        |                |   |     |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------|----------------|---|-----|
| Info. Need      | Quantify growth and yield under alternative silviculture conditions.                                                                   | TFL 39         | 1 | -   |
| Info. Need      | Impact to timber supply by using alternative and intensive silvicultural systems.                                                      | Cassiar        | 1 | Yes |
| Info. Need      | Quantify impacts of alternative silviculture, such as wildlife trees and patch retention, on timber supply and G&Y                     | Bulkley        | 1 | -   |
| Info. Need      | Modeling required for alternative harvesting systems.                                                                                  | Kamloops       | 1 | Yes |
| Info. Need      | New model(s) required for uneven aged stands.                                                                                          | Kamloops       | 1 | Yes |
| Issue statement | Incorporation of changes to available information for dry-belt Douglas-fir stands managed on an uneven-aged basis.                     | Williams Lake  | 1 | Yes |
| Issue statement | Prediction of long term timber supplies for uneven aged management.                                                                    | 100 Mile House | 1 | Yes |
| High            | Better models required to assess implications of alternative silvicultural systems. Evaluate alternative analytical approaches.        | TFL 14         | 1 | -   |
| Info. Need      | Further investigate the growth and yield and stand dynamics of residual balsam stands that are proposed to be managed as future crops. | TFL 18         | 2 | -   |
| Info. Need      | Quantify effects of intensive and alternative silvicultural activities where possible                                                  | TFL 18         | 2 | -   |

*Rationales since regional summaries (post March 2001)*

|           |                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |   |   |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|---|---|
| Implement | Monitor the impact that variable retention is having on timber availability including the productivity of regenerating stands                                                                                                                                                                                                                                                                                                                  | TFL 46    | 2 | - |
| Implement | Monitor the impact that variable retention is having on timber availability including the productivity of regenerating stands                                                                                                                                                                                                                                                                                                                  | TFL 57    | 3 | - |
| Implement | Licensees need to monitor their use of various silvicultural systems and the associated growth and yield implications                                                                                                                                                                                                                                                                                                                          | Cranbrook | 2 | - |
| Implement | Monitor characteristics of partly harvested forest cover polygons to improve information on species composition and assess the importance of possible volume reductions                                                                                                                                                                                                                                                                        | Merritt   | 2 | - |
| Implement | District staff and licensees need to work together to improve information on retention levels and growth and yield, particularly in lodgepole pine- Douglas-fir stands so that timber supply implications can be better accounted for                                                                                                                                                                                                          | Merritt   | 3 | - |
| Implement | The BCFS Research Branch is currently examining and reviewing expected productivity changes at varying levels of retention. It will be important to combine the emerging information with an assessment by district staff of the expected use of these systems, the extent of the areas affected, the amounts of expected retention, and the frequency of harvesting entries, for incorporation in the next timber supply analysis for the TSA | Mid Coast | 2 | - |
| Implement | Assess volume and growth losses attributable to variable retention harvesting (e.g. blowdown losses)                                                                                                                                                                                                                                                                                                                                           | TFL 47    | 2 | - |
| Implement | Monitor the productivity of regenerating and advanced regeneration stands in areas managed under the irregular shelterwood silvicultural system                                                                                                                                                                                                                                                                                                | TFL 48    | 2 | - |
| Implement | Continue to refine the site productivity loss estimates for areas subject to group selection                                                                                                                                                                                                                                                                                                                                                   | TFL 56    | 2 | - |

## Issue 6: Site productivity: forest health and OAFs

### *Regional summaries (March 2001)*

| Type            | Issue                                                                                                                                                      | TSA/TFL        | TSR | Status |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----|--------|
| Urgent          | Quantify impacts on volume due to pests, disease (root rot), decay, waste and breakage                                                                     | Lillooet       | 1   | Yes    |
| High            | Quantify impacts of pests, such as root rot, terminal weevil, western gall rust, spruce budworm, tussock moth, aphids and cattle grazing on stand volume.  | Kamloops       | 1   | Yes    |
| High            | Quantify impacts of root rot on stand volume and green-up.                                                                                                 | Okanagan       | 1   | Yes    |
| High            | Quantify impacts on volume and green-up periods due to root rot                                                                                            | Arrow          | 1   | ?      |
| High            | Investigate the use of additional adjustments (10-15% for stands over 200 years)                                                                           | Arrow          | 1   | Yes    |
| High            | Review and confirm or updated the estimated losses due to root rot                                                                                         | Boundary       | 1   | No     |
| High            | Finalize studies on the effects of stand yields and green-up of root rot.                                                                                  | Kootenay Lake  | 1   | Yes    |
| Info. Need      | Initiate studies on the losses from balsam bark beetle infected stands.                                                                                    | Kispiox        | 1   | Yes    |
| Info. Need      | Study more fully the impacts on volumes resulting from bark beetle infestations.                                                                           | Bulkley        | 1   | -      |
| Info. Need      | Clarify root rot losses and its relationship to OAF2 and unsalvaged losses.                                                                                | Merritt        | 1   | No     |
| Info Need       | Monitor the occurrence of root disease and stem rusts with a view to further assess the accuracy of the OAF values.                                        | Dawson Creek   | 1   | Yes    |
| Issue statement | Provincial committee is examining tools for quantifying the impacts due to root rot, etc. With understanding, losses due to these agents may be mitigated. | Sunshine Coast | 1   | -      |
| High            | OAF1: develop a more appropriate yield estimation procedure for balsam prior to next determination                                                         | TFL 25         | 1   | -      |
| High            | OAFs: re-examine for Douglas-fir plantations                                                                                                               | TFL 26         | 1   | -      |
| High            | OAFs: re-evaluate reduction factors prior to next determination.                                                                                           | TFL 46         | 1   | -      |
| Info. Need      | OAFs: review procedures for defining OAFs and provide more detailed rationale for their selection                                                          | TFL 10         | 1   | -      |
| Info Need       | Attempt to better quantify timber supply impacts as a result of armillaria infestation, as well as those expected from leader weevils.                     | Arrow          | 2   | -      |
| Info. Need      | OAFs: In consultation with Research Branch staff, refined OAFs for the TSA                                                                                 | Cranberry      | 2   | -      |
| Info. Need      | OAF: Determine if larger OAFs are required to account for volume losses arising from root disease.                                                         | TFL 33         | 2   | -      |
| Info. Need      | OAFs: review and refine                                                                                                                                    | TFL 18         | 2   | -      |
| Info. Need      | OAFs: review and refine                                                                                                                                    | TFL 49         | 2   | -      |

### *Rationales since regional summaries (post March 2001)*

|           |                                                                                                                                                  |            |   |   |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------|------------|---|---|
| Implement | Potential impacts of Armillaria root rot on regenerated managed stands can be significant and estimated volume losses need to be further refined | Arrow      | 3 | - |
| Implement | Continue to assess and monitor losses from laminated root disease to confirm appropriate OAFs                                                    | Arrowsmith | 2 | - |

|           |                                                                                                                                                                                                                                                                         |                |   |   |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|---|---|
| Implement | Monitor the impact of tomentosus root disease in managed stands and the extent to which volume losses are accounted for within existing OAFs                                                                                                                            | Kispiox        | 2 | - |
| Implement | Monitor impacts of Dothistroma foliar disease, balsam bark beetle and tomentosus root disease on stand volumes                                                                                                                                                          | Kispiox        | 2 | - |
| Implement | Evaluate existing and projected impacts of various forest heath agents such as armillaria root disease                                                                                                                                                                  | Kootenay Lake  | 2 | - |
| Implement | Improve local knowledge with respect to small stocking gaps and other stand-level limits to productivity that are represented by OAF1s in managed stand yield estimation. This is a province-wide issue, however, local information is required to improve information. | Merritt        | 2 | - |
| Implement | Continue to review OAF adjustments using local data                                                                                                                                                                                                                     | 100 Mile House | 2 | - |
| Implement | OAFs: that district and licensee staff investigate if the available free growing data may be used to refine OAFs. I also request that the OAF2 values continue to be refined so that any changes in the assumptions can be incorporated into future analyses            | Revelstoke     | 3 | - |
| Implement | Provide justification for the use of increased OAF2 values for confers other than Douglas-fir                                                                                                                                                                           | TFL 10         | 2 | - |
| Implement | Monitor OAF 1 and 2 assumptions about forest health losses and the effects of management practices (e.g. stocking survey methods) and reflect these findings in the OAF assumptions for the next TSR                                                                    | TFL 15         | 3 | - |
| Implement | Review the OAFs used to generate yield estimates for managed stands                                                                                                                                                                                                     | TFL 35         | 2 | - |
| Implement | Licensee applied non-standard OAFs yet provided not explicit documentation substantiating the lower OAF 1 reductions. Request licensee further examine and refine OAF adjustments                                                                                       | TFL 49         | 3 | - |
| Implement | Licensee work to compile more explicit information on root rots specific to the TFL before the next analysis                                                                                                                                                            | TFL 49         | 3 | - |
| Implement | Collect data to better estimate volume losses resulting from armillaria, and refine OAFs correspondingly                                                                                                                                                                | TFL 56         | 2 | - |

## Issue 7: Stand dynamics outside timber harvesting land base

### *Regional summaries (March 2001)*

| Type       | Issue                                                                                                                                                                      | TSA/TFL    | TSR | Status |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----|--------|
| Info. Need | Park inventories: Obtain any relevant vegetation inventories from Parks Canada so that the best available information can be used to support future timber supply reviews. | Golden     | 2   | -      |
| Info. Need | Aging of stands in inoperable areas: provincial issue that requires an assessment of how to best model disturbance patterns and succession in inoperable areas             | Revelstoke | 2   | -      |

### *Rationales since regional summaries (post March 2001)*

|           |                                                                                                                                                                                                                                                                                                       |       |   |   |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---|---|
| Implement | A more appropriate method needs to be developed by licensees to account for natural disturbances such as fire in stands outside the timber harvesting land based since these stands contribute to achievement of forest cover requirements for several non-timber values and thereby affecting timber | Arrow | 3 | - |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---|---|

|           |                                                                                                                                                                                                                                                                         |            |   |   |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|---|---|
|           | supply                                                                                                                                                                                                                                                                  |            |   |   |
| Implement | A more refined method for disturbing and regenerating the non-timber harvesting land base is needed to assess if landscape-level biodiversity objectives are being met.                                                                                                 | Cranbrook  | 2 | - |
| Implement | Work with Parks Canada to obtain relevant data to assess potential contributions to landscape level biodiversity from Kootenay National Park                                                                                                                            | Invermere  | 2 | - |
| Implement | A more refined method for disturbing and regenerating the non-THLB will assist in assessing if landscape-level biodiversity objectives are being met. FAIB with assistance from other Brances needs to take on this task                                                | Invermere  | 3 | - |
| Implement | Examine the contribution of forests within Wells Gray Park to landscape-level biodiversity requirements                                                                                                                                                                 | Kamloops   | 2 | - |
| Implement | A more appropriate accounting of disturbance of forests outside the land base is needed to support the next timber supply analysis given the role of these forests in achieving forest cover objectives for non-timber values and associated timber supply implications | Merritt    | 3 | - |
| Implement | Aging of stands in inoperable areas: this is a provincial issue that requires assessment of how to best model disturbance patterns and succession in areas outside the THLB                                                                                             | Revelstoke | 2 | - |
| Implement | Collect data on the actual disturbance in the non-timber harvesting land base, and the implications of this disturbance on the contribution of the forest to old seral objectives                                                                                       | TFL 53     | 3 | - |

## Issue 8: NSR

*Rationales since regional summaries (post March 2001)*

| Type      | Issue                                                                                                                                                                                                                      | TSA/TFL       | TSR | Status |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----|--------|
| Implement | Assess the potential contribution of NSR stands to timber supply                                                                                                                                                           | Quesnel       | 2   | -      |
| Implement | Develop a strategy for identifying and managing backlog NSR areas and investigate FIA funding opportunities                                                                                                                | Dawson Creek  | 2   | -      |
| Implement | NSR: prior to next determination, staff should reassess the areas classified as current and backlog NSR                                                                                                                    | Revelstoke    | 2   | -      |
| Implement | NSR: the BCFS and licensee staff review NSR records as time and resources permit, enlisting the assistance of former MSRM staff as required, so that better information is available for future determinations for the TSA | Revelstoke    | 3   | -      |
| Implement | NSR: I encourage BCFS staff to reconcile the area logged with regeneration delay, the area reported as NSR on the inventory file, and the NSR areas reported through ISIS                                                  | Williams Lake | 2   | -      |
| Implement | NSR: provide a comprehensive accounting for all NSR areas on TFL 42 and ensure that the mgt objectives for these areas are clarified in time for the next determination                                                    | TFL 42        | 2   | -      |
| Implement | NSR: confirm the area of NSR land                                                                                                                                                                                          | TFL 48        | 2   | -      |
| Implement | Clarify expected classification of the remaining backlog NSR                                                                                                                                                               | TFL 55        | 2   | -      |

## Issue 9: Other forest inventory issues

### *Regional summaries (March 2001)*

| Type       | Issue                                                                                                                                                                                                                                 | TSA/TFL       | TSR | Status   |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----|----------|
| Info. Need | Low productivity sites: Undertake field assessments to determine which sites can realistically contribute to the timber harvesting land base.                                                                                         | Golden        | 2   | -        |
| High       | Investigate the residual stand volumes left on site after harvesting and review the practice in respect to achieving specific objectives.                                                                                             | Cranbrook     | 1   | Yes      |
| High       | Develop verification strategy to check the silvicultural labels that were assigned to the inventory                                                                                                                                   | TFL 35        | 1   | Yes      |
| High       | Determine extent to which stands are being converted to different species                                                                                                                                                             | Quesnel       | 1   | Yes      |
| High       | Update timber inventory for the area previously covered by TFL 13 and for insect- and disease- attacked areas.                                                                                                                        | Cranbrook     | 1   | Complete |
| Info. Need | Monitor stand impacts from bark beetle infestations and the ramifications of the associated volume losses in terms of non-recoverable losses.                                                                                         | Arrow         | 2   | -        |
| High       | Models: the degree to which mature volumes may be over-estimated by the G&Y model used in the analysis                                                                                                                                | North Coast   | 1   | -        |
| High       | Check minimum rotation lengths for high elevation stands                                                                                                                                                                              | Golden        | 1   | -        |
| Info Need  | Green-up: Monitor progress of young (spruce) stands and provide information to next TSR                                                                                                                                               | Williams Lake | 1   | Yes      |
| Info. Need | Fertilization: effects on timber supply harvest levels                                                                                                                                                                                | Kamloops      | 1   | No       |
| Info. Need | Unmerchantable forest types: improve inventory for these types. A management strategy could then be developed to incorporate these stands into the timber harvesting land base.                                                       | Merritt       | 1   | Yes      |
| Info. Need | Species conversion: assumption of species conversion (good site fir/spruce to good site pine) at harvest needs to be verified with MOF Research Branch if to be used in the next determination.                                       | TFL 35        | 1   | Yes      |
| Info. Need | Green-up: In conjunction with district, quantify green-up periods prior to next determination.                                                                                                                                        | TFL 39        | 1   | -        |
| High       | Recompile the inventory, by addition operational cruises completed since 1987, recompiling the 1970's inventory to exclude logged samples and samples in operationally cruised areas, and using the latest Kozak 4.0 taper equations. | TFL 44        | 2   | -        |

### *Rationales since regional summaries (post March 2001)*

|           |                                                                                                                                            |           |   |                             |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------|-----------|---|-----------------------------|
| Implement | Verify stand age/seral stage classes in landscape units/BEC areas with identified concerns                                                 | Quesnel   | 2 | -                           |
| Implement | Timber cruise volumes from fire maintained NDT4 areas of TSA are often only about half shown in inventory; NDT4 inventory needs refinement | Cranbrook | 2 | -                           |
| Implement | Classify areas with the TFL that do not currently have an inventory label                                                                  | TFL 48    | 2 | -                           |
| Implement | Monitor availability of old growth forest relative to targeted objectives                                                                  | TFL 53    | 3 | -                           |
| Implement | Work with licensees to bring inventory depletions up-to-date                                                                               | Morice    | 2 | Update current to Aug. 2001 |
| Implement | Track and quantify the area of forested land on the TFL that is                                                                            | TFL 48    | 2 | -                           |

|           |                                                                                                                                                                                                 |               |   |   |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---|---|
|           | denuded as a result of energy exploration and development activities                                                                                                                            |               |   |   |
| Implement | Monitor harvesting activities and mortality due the MPB in the problem forest types (PFTs)                                                                                                      | Quesnel       | 3 | - |
| Implement | Regeneration and stocking on unsalvaged 2003 fire areas need to be monitored to assess areas are coming back in a repressed state due to overstocking and areas that have insufficient stocking | Cranbrook     | 2 | - |
| Implement | Monitor MPB infestation levels and salvaging activities                                                                                                                                         | Kamloops      | 2 | - |
| Implement | Assess G&Y impacts of managing stands to minimum stocking standards and not reforesting smaller openings created to salvage damaged timber                                                      | Prince George | 2 | - |
| Implement | Continue to collect data and monitor advanced balsam growth                                                                                                                                     | Bulkley       | 2 | - |
| Implement | Determine the extent of the area to which managed stand yield tables should be applied                                                                                                          | TFL 26        | 2 |   |

## Issue 10: Traditional use studies and related issues

*Regional summaries (March 2001)*

| Type            | Issue                                                                                                                                                                      | TSA/TFL        | TSR | Status |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----|--------|
| Issue statement | Archaeological/cultural heritage: use new information when available                                                                                                       | Soo            | 1   | No     |
| High            | Culturally modified trees: continue efforts to map locations                                                                                                               | QCI            | 1   | No     |
| Info. Need      | Traditional use: incorporate information into future determination.                                                                                                        | Kingcome       | 1   | Yes    |
| High            | Cultural heritage resources: complete inventory and develop management prescriptions to assess impacts on the land base.                                                   | TFL 44         | 2   | -      |
| High            | Integrated Archaeological Overview Assessment into next AAC determination                                                                                                  | Nass           | 1   | -      |
| Issue Statement | A Traditional Use Survey may be conducted prior to next determination. Revisit management plan once information is collected.                                              | TFL 41         | 1   | -      |
| High            | Conduct impact assessment medium to high potential sites identified through AOAs.                                                                                          | Kamloops       | 1   | Yes    |
| Issue Statement | When the timber supply implications of traditional use surveys are quantified, they will be considered.                                                                    | Invermere      | 1   | Yes    |
| Info. Need      | BCFS staff to conduct an archaeological overview assessment of TFL 8.                                                                                                      | TFL 8          | 2   | -      |
| Info Need       | Under the TFL agreement, the licensee is required to include archaeological mapping as part of the development plan. This information will be incorporated once completed. | TFL 55         | 1   | -      |
| Info Need       | Under the TFL agreement, the licensee is required to include archaeological mapping as part of the development plan. This information will be incorporated once completed. | TFL 56         | 1   | -      |
| Info Need       | Cultural heritage inventory proposed or underway                                                                                                                           | Williams Lake  | 1   | Yes    |
| Info Need       | Traditional use inventory underway in 1996; use information in future analyses.                                                                                            | Quesnel        | 1   | Yes    |
| Issue Statement | Require information on archaeological resources and traditional use                                                                                                        | 100 Mile House | 1   | Yes    |
| Info Need       | Incorporate AOA into future determinations                                                                                                                                 | Mackenzie      | 1   | -      |
| Issue statement | As new traditional use information becomes available, it will be considered in future determinations                                                                       | Prince George  | 1   | -      |

*Rationales since regional summaries (post March 2001)*

|           |                                                                                                                                                                                                   |               |   |   |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---|---|
| Implement | Undertake the work to collect information to address data gaps around cultural heritage resources                                                                                                 | Lillooet      | 2 | - |
| Implement | Completion of TUS in the TSA is encouraged so that this information can be factored into future timber supply reviews, for example, through the identification of additional archaeological sites | Merritt       | 3 | - |
| Implement | Work to improve available data on the occurrence of and mgt practices for cultural heritage resources                                                                                             | North Coast   | 2 | - |
| Implement | Promptly report any new information with respect to FN's rights and titles that might affect the timber supply                                                                                    | Williams Lake | 2 | - |

## Issue 11: Recreation and landscape inventory

*Regional summaries (March 2001)*

| Type by priority | Issue                                                                                                                                                                                                                                                                                                                      | TSA/TFL       | TSR | Status |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----|--------|
| Info. need       | Verify the recreation inventory for consistency of information between the component parts and to ensure all exclusions are valid and all overlaps accounted for. It should be ensured that the interpretation of the inventory for strategic planning purposes including timber supply reviews is consistent and logical. | Mid Coast     | 2   | -      |
| Info. Need       | Maintain and update recreation inventories and be sensitive to public concerns in planning harvesting operations.                                                                                                                                                                                                          | TFL 47        | 1   | -      |
| High             | Complete recreation features mapping for Block 5                                                                                                                                                                                                                                                                           | TFL 25        | 1   | -      |
| Info Need        | Complete digitization so that recreation areas can be accounted for in future determinations.                                                                                                                                                                                                                              | Fort St. John | 1   | -      |
| Info Need        | Complete digitization so that recreation areas can be accounted for in future determinations.                                                                                                                                                                                                                              | Mackenzie     | 1   | -      |
| High             | Review landscape inventories by mid-1977                                                                                                                                                                                                                                                                                   | TFL 39        | 1   | -      |
| High             | Fulfill the commitment to review and update landscape inventories and VQO recommendations prior to next timber supply analysis                                                                                                                                                                                             | TFL 44        | 2   | -      |
| Info. Need       | Discuss with BCFS staff the need for a more comprehensive assessment in Toba River area                                                                                                                                                                                                                                    | TFL 10        | 1   | -      |
| Info. Need       | Complete mapping for the Derrick and Bonus Lakes scenic areas in order to ensure these are included as visually sensitive areas in future timber supply analyses                                                                                                                                                           | Cranberry     | 2   | -      |
| High             | Complete visual resource mapping for Blocks 2 and 5                                                                                                                                                                                                                                                                        | TFL 25        | 1   | -      |

*Rationales since regional summaries (post March 2001)*

|           |                                                                                                                                                                                                                                                                                                                                                                                                          |           |   |   |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|---|---|
| Implement | The recreation inventory should be verified for consistency of information between the component parts and to ensure all exclusions are valid and all overlaps are accounted for. Errors identified in the inventory as part of this process should be corrected. It should be ensured that the interpretation of the inventory for strategic planning purposes including TSRs is consistent and logical | Mid Coast | 2 | - |
| Implement | Collect improved visual inventory information                                                                                                                                                                                                                                                                                                                                                            | Merritt   | 2 | - |
| Implement | Include a visual landscape inventory of Tanizul and McKelvey Lakes as part of its commitment to update the visual landscape inventory                                                                                                                                                                                                                                                                    | TFL 42    | 2 | - |



## Appendix 2:

### AAC Rationale Reports used to identify Inventory Issues

**Timber Supply Area (TSA) AAC rationales:**

| <b>TSA</b>      | <b>TSR 1</b> | <b>TSR 2</b> | <b>TSR 3</b> |
|-----------------|--------------|--------------|--------------|
| Arrow           | Summary      | Summary      | Available    |
| Arrowsmith      | Summary      | Available    | NA           |
| Boundary        | Summary      | Available    | NA           |
| Bulkley         | Summary      | Available    | NA           |
| Cassiar         | Summary      | Available    | NA           |
| Cranberry       | NA           | Summary      | NA           |
| Cranbrook       | Summary      | Summary      | Available    |
| Dawson Creek    | Summary      | Available    | NA           |
| Fort Nelson     | Summary      | Available    | NA           |
| Fort St. John   | Summary      | Available    | NA           |
| Fraser          | Summary      | Summary      | Available    |
| Golden          | Summary      | Summary      | Available    |
| Invermere       | Summary      | Available    | Available    |
| Kalum           | Summary      | Summary      | NA           |
| Kamloops        | Summary      | Available    | Available    |
| Kingcome        | Summary      | Available    | NA           |
| Kispiox         | Summary      | Available    | NA           |
| Kootenay Lake   | Summary      | Available    | NA           |
| Lakes           | Summary      | Available    | Available    |
| Lillooet        | Summary      | Available    | NA           |
| Mackenzie       | Summary      | Available    | NA           |
| Merritt         | Summary      | Available    | Available    |
| Mid Coast       | Summary      | Available    | NA           |
| Morice          | Summary      | Available    | NA           |
| Nass            | Summary      | Available    | NA           |
| North Coast     | Summary      | Available    | NA           |
| Okanagan        | Summary      | Available    | Available    |
| 100 Mile House  | Summary      | Available    | NA           |
| Prince George   | Summary      | Available    | Available    |
| Queen Charlotte | Summary      | Available    | NA           |
| Quesnel         | Summary      | Available    | Available    |
| Revelstoke      | Summary      | Available    | Available    |
| Robson Valley   | Summary      | Available    | NA           |
| Soo             | Summary      | Available    | NA           |
| Strathcona      | Summary      | Available    | Available    |
| Sunshine Coast  | Summary      | Available    | NA           |
| Williams Lake   | Summary      | Available    | NA           |

Summary = 2001 regional summaries

Available = rationales reviewed post-2001 regional summaries  
 NA = not available

**Tree Farm License (TFL) AAC rationales:**

| <b>TFL</b> | <b>TSR 1</b> | <b>TSR 2</b> | <b>TSR 3</b> |
|------------|--------------|--------------|--------------|
| 1          | NA           | Summary      | NA           |
| 3          | NA           | Summary      | NA           |
| 5          | NA           | Summary      | Available    |
| 6          | Summary      | Summary      | NA           |
| 8          | NA           | Summary      | Available    |
| 10         | Summary      | Available    | NA           |
| 14         | Summary      | Available    | NA           |
| 15         | NA           | Summary      | Available    |
| 18         | Summary      | Summary      | NA           |
| 19         | Summary      | Available    | NA           |
| 23         | Summary      | Available    | NA           |
| 24         | Summary      | NA           | NA           |
| 25         | Summary      | NA           | NA           |
| 26         | Summary      | Available    | NA           |
| 30         | Summary      | Available    | NA           |
| 33         | Summary      | Summary      | NA           |
| 35         | Summary      | Available    | Available    |
| 37         | NA           | Summary      | NA           |
| 38         | NA           | Summary      | NA           |
| 39         | Summary      | Available    | Available    |
| 41         | Summary      | Summary      | NA           |
| 42         | Summary      | Available    | NA           |
| 43         | Summary      | Available    | NA           |
| 44         | Summary      | Summary      | Available    |
| 45         | Summary      | Available    | NA           |
| 46         | Summary      | Available    | NA           |
| 47         | Summary      | Available    | NA           |
| 48         | Summary      | Available    | NA           |
| 49         | NA           | Summary      | Available    |
| 52         | Summary      | Available    | NA           |
| 53         | Summary      | Summary      | Available    |
| 54         | Summary      | Summary      | NA           |
| 55         | Summary      | Available    | NA           |
| 56         | Summary      | Available    | NA           |
| 57         | NA           | NA           | Available    |

Summary = 2001 regional summaries  
 Available = rationales reviewed post-2001 regional summaries  
 NA = not available

**Summary of AAC rationales reviewed:**

| <b>Mgt Unit</b> | <b>TSR 1</b> | <b>TSR 2</b> | <b>TSR 3</b> | <b>Total</b> |
|-----------------|--------------|--------------|--------------|--------------|
| <b>TSAs</b>     | 36           | 37           | 13           | 86           |
| <b>TFLs</b>     | 26           | 32           | 9            | 67           |
| <b>Total</b>    | 62           | 69           | 22           | 153          |