

Progress Report – Challenge Paper Feedback The Challenge Dialogue System™

Forest-Tree Genetic Resource Conservation and Management (GRM) in British Columbia

An Initial Challenge Dialogue with GRM Community of Practice

This Progress Report describes and assesses the feedback received from *Forest Tree Genetic Resource Conservation and Management (GRM) in British Columbia: An Initial Challenge Dialogue with GRM Community of Practice*. A complete list of all comments received is available in a separate document: *Challenge Paper Consolidated Feedback*. Documents and other background material regarding the GRM Challenge Dialogue are available at:

http://www.for.gov.bc.ca/hti/grm_dialogue.htm

Your comments on this Progress Report are appreciated by Feb 26, 2007.

Please send them by email to officelink@shaw.ca.

The Progress Report along with your comments will be used to help focus the Level 2 Dialogue with GRM stakeholders and interest groups in early 2007.

The Executive Sponsor is Jim Snetsinger, Chief Forester, BC Ministry of Forests and Range. The Co-Champions are Dale Draper, Tree Improvement Branch; Alvin Yanchuk, Research Branch; and John Elmslie, Co-Chair, Forest Genetics Council of British Columbia.

The Action Team members guiding and supporting the project are Brian Barber, Jack Woods, Keith Jones, Terje Vold, George Sranko, and Michele Baker. Significant early support from key staff in the Tree Improvement Branch is also gratefully acknowledged.



Tree Improvement Branch

Research Branch

FGC

Forest Genetics Council
of British Columbia

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Executive Summary

The focus of the Challenge Dialogue is on Forest-Tree Genetic Resource Conservation and Management (or “GRM” for short). Forests are biologically diverse ecosystems that contain many species and populations. This Dialogue is about tree species with a focus on those of economic importance.

In November 2006, an initial Challenge Paper was distributed to prompt a conversation around a Key Challenge within the GRM community of practice (COP) that includes GRM practitioners, government policy staff and researchers, industry, private sector firms, and academia. The Challenge Paper was organized using a conceptual “Three Pillar Model” which has three GRM objectives; gene conservation, genetic gain (breeding, seed production), and risk reduction (adaptation, resilience, and seed transfer).

This Progress Report is intended to provide an overview of the feedback received in response to the Challenge Paper, including areas of agreement, as well as additional questions, ideas and suggestions that respondents felt needed addressing. This report also replaces the initially intended workshop with the COP. The representative array of feedback to the Challenge Paper now allows the project to move to the next level of Dialogue (Level 2) involving the GRM stakeholders.

Key Messages from Feedback

The following key messages emerged from the feedback received to the Level 1 Challenge Paper:

- Climate change appears to be the top threat or driver, in the view of the GRM COP. There is strong alignment around the urgency of the challenges facing GRM with respect to climate change and the risks (i.e., extreme weather events, extension of ranges for pests, biological stress, etc). A strong majority of the respondents identified “risk reduction” in the face of changing environments as the top activity in need of more resources.
- Respondents emphasized that there are no simple answers to the complexity of the challenges confronting the forests and people of British Columbia. There was general agreement that the current strategy has served us well, but is in need of renewal through the development of a comprehensive, cohesive, and adaptive GRM vision and strategy. Many respondents viewed this Challenge Dialogue as an important step forward in developing the much-needed strategic framework.
- Some respondents expressed concern that relationships among various stakeholders, primarily industry and the current MoFR initiatives (e.g., Future Forest Ecosystems), could be improved through better communication, by breaking down “silos,” and by more recognition of the role industry plays in GRM.
- Some respondents felt that the Level 1 Dialogue with the COP was too lengthy and detailed. This underscores the importance of ensuring the Level 2 Dialogue with stakeholders is appropriately focused and clear. The thoughtful feedback from the COP will help the Action Team attain this focus.

Revised Key Challenge Statement

Considering the feedback received, it is proposed that the Key Challenge Statement for the next level of dialogue with GRM stakeholders be revised to read as follows:

Through a focused, open, dialogue with stakeholders, to create a collective vision and strategy for GRM that supports sustainable forest management (SFM) in BC, and considers the range of values outlined in the Provincial Chief Forester's SFM framework.

As we develop the Level 2 Dialogue with GRM stakeholders, it will be important to incorporate the feedback provided about clarifying linkages with SFM, government's goals, and other key initiatives. In addition, the need to increase understanding of climate-change impacts and response will receive emphasis.

Next Steps in the Dialogue

Our intended next steps are to engage GRM stakeholders in a Level 2 Dialogue that includes:

- A focused and shorter Challenge Paper coupled with targeted interviews in February-March;
- A GRM stakeholder workshop with a cross-section from the COP in March 2007 (or later in the Spring); and
- The preparation of a Workshop Synopsis that, along with the other material and feedback received during the overall Level 1 and 2 Dialogue, will then provide the basis for the completion of a GRM vision and strategy later in 2007.

Key Focus for Level 2 Dialogue

In moving to the Level 2 Dialogue we are mindful of the fact that we will need to be very focused, since most stakeholders spend limited time thinking about GRM. The key linkages between the GRM program and stakeholders, many of whom are customers or clients, and how they can be improved or better understood, will be a key focus rather than the technical aspects of the program.

1. 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;
- Some initial reactions from the gene resource management (GRM) Co-Champions and Action Team to the feedback received as they position us to move forward with the Dialogue;
- A first effort to refine the key components of the Challenge Paper for the Level 2 Dialogue with GRM stakeholders — Key Challenge, Background and Assumption statements, Expected Outcomes, Concepts and Critical Questions — considering participant feedback from the Level 1 Dialogue with the Community of Practice (COP);
- An indication of proposed next steps in the upcoming Level 2 Dialogue; and,
- To encourage further feedback and ideas from the COP on all of the above points so that the Level 2 Dialogue with stakeholders is better informed by the views within the COP.

2. Background and Scope of Challenge Dialogue

Purpose of the Challenge Paper

The purpose of the Challenge Paper was to prompt a conversation around the Key Challenge (see Section 5.1) within a community of practice (COP) including the British Columbia tree improvement community and others. The COP includes GRM practitioners and researchers with government (provincial and federal), industry, private sector firms, and academia.

The intent of the initial Level 1 Dialogue is to lay the groundwork for the development of a well thought-out Level 2 Dialogue with GRM stakeholders that will ultimately lead to the development of a GRM Vision and Strategy.

The next Level 2 Dialogue will involve a broad range of stakeholders, individuals, and organizations that may not be engaged in GRM work on a day-to-day basis but are, nonetheless, affected by the current and future management of forest-tree gene resources.

Scope, Schedule and Workshop for Level 1 Dialogue

This section of the Challenge Paper included its proposed *scope* and some *starting perspectives* of the Action Team.

The proposed focus of the Challenge Dialogue was on Forest-Tree Genetic Resource Conservation and Management (or “GRM” for short). Forests are biologically diverse

ecosystems that contain many species and populations. This Dialogue is about tree species with a focus on those of economic importance.

GRM seeks to protect and conserve the genetic foundation of the primary native tree species in BC's public forests, to provide for their continued evolution, improvement, and adaptation in order to meet current and future human needs, and to provide environmental services.

The Challenge Paper was organized using a conceptual "Three Pillar Model" which has three GRM objectives; gene conservation, genetic gain (breeding, seed production), and risk reduction (adaptation, resilience, and seed transfer). Respondent's views on the Three Pillar Model are discussed in section 5.4.

This Progress Report replaces the initially intended workshop with the COP. As noted in a separate letter from the Co-Champions, the representative array of feedback from the COP now allows us to move forward with an effective Level 2 Dialogue with GRM stakeholders. Any feedback you can provide us on this Progress Report will further help to inform that next Dialogue. We expect that a GRM stakeholder workshop will occur and involve a cross-section of the COP so that there is meaningful exchange of ideas.

3. Feedback Received

The amount and quality of the feedback from 35 individuals or groups has been most encouraging. The breakdown of the responses is 18 BC government, 13 BC non-government (i.e. 4 industry, 6 private/consulting sector, 3 academia), and 4 external BC. All of the Challenge Paper feedback has been compiled un-attributed into a document titled *Challenge Paper Consolidated Feedback* available on the GRM website at www.for.gov.bc.ca/hti/grm_dialogue.htm.

For the Champions this suggests that we have made a meaningful opening connection with a significant number of interested members of the COP. 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 it 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 areas of alignment, where there are some areas of confusion, and where there are differences in views.

The feedback received during the Dialogue will also provide valuable input to various organizations and government initiatives (see page 30).

We commit to honour and respect your contribution by:

- Using your feedback to shape the next Level 2 Dialogue with GRM stakeholders;
- Further assessing and prioritizing issues raised;
- Working creatively to expand and sustain an open, frank Dialogue; and,
- Assisting participants as they develop and gain alignment around a GRM vision and strategy that effectively guides the overall program.

We invite you to hold us to this commitment.

4. 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 Level 2 Dialogue with GRM stakeholders.

- Climate change appears to be the top threat or driver in the view of the GRM COP. There is strong alignment around the urgency of the challenges facing GRM with respect to climate change and the risks (i.e., extreme weather events, extension of ranges for pests, biological stress, etc). A strong majority of the respondents identified “risk reduction” in the face of changing environments as the top activity in need of more resources.
- Respondents emphasized that there are no simple answers to the complexity of the challenges confronting the forests and people of British Columbia. There was general agreement that the current strategy has served us well, but is in need of renewal through the development of a comprehensive, cohesive, and adaptive GRM vision and strategy. Many respondents viewed this Challenge Dialogue as an important step forward in developing the much-needed strategic framework.
- Some respondents expressed concern that relationships among various stakeholders, primarily industry and the current MoFR initiatives (e.g., Future Forest Ecosystems), could be improved through better communication, by breaking down “silos”, and by more recognition of the role industry plays in GRM.
- Some respondents felt that the Level 1 Dialogue with the COP was too lengthy and detailed. This underscores the importance of ensuring the Level 2 Dialogue with stakeholders is appropriately focused and clear. The thoughtful feedback from the COP will help the Action Team attain that needed focus.

5. Challenge Paper Feedback by Input Request

This section summarizes feedback from those who responded to requests for input based on the content of the Challenge Paper.

5.1 Key Challenge and Background Statements

Original Key Challenge Statement

The following Key Challenge was advanced for consideration:

Through a focused, open, two-stage dialogue —

1. ***With the GRM Community of Practice, to develop a common understanding of what is meant by forest tree gene resource management, and to create a collective vision and strategy for GRM in BC that is clearly positioned within the full context of sustainable forest management.***

- 2. With GRM Stakeholders, to refine the GRM vision and strategy (from '1') to meet the needs of the GRM Community of Practice and GRM Stakeholders aiming to practice sustainable forest management in BC.**

Feedback on Key Challenge

There was a wide range of reactions to the Key Challenge Statement. The overall impression was that the Challenge Statement raises many questions, which can be considered a positive response in light of its role to “challenge” participants in the dialogue. The reactions confirmed the complexity of the concepts under discussion and the need to continuously seek to clarify how GRM fits within the overall context, including ecological, socio-political, economic, and governance contexts. The responses fall into the following high-level categories:

1. There was uncertainty over what is meant by “sustainable forest management (SFM),” along with several questions and suggestions regarding the linkages between GRM and SFM, government’s goals and related initiatives, as well as the overall ecological context.

“FGR management could be directly linked to the “Key Challenge” and “Important Context” statements i.e. there seems to be a lack of clear reference to genetic resources as important context statement; e.g. could this be achieved by linking FG resources and their management directly to SFM possibly through a quote from the Forest Accord, CCFM C&I, State of the Forest Report etc.?”

“I do not understand what is intended under the heading of “sustainable forest management”. Many definitions center on yield, some could focus on species composition, others on reduced pest impact, etc. One can envision, at the extremes, GRM in clonal forests tied to cycles of intensive breeding or “old growth forests” largely untouched by humans.”

“What is sustainable forest management? Until we agree on this concept it is difficult to determine what an appropriate GRM strategy that supports SFM would look like. Generally in BC our sustainable management focuses on producing forests for a sustainable flow of volume (and possibly a few other resources) but should we be focusing more on managing forest ecosystems and the genetic resources within?”

“...need to ensure that GRM is linked to overall forest management and sustainability of the forest resource.”

“While this is a complex and contentious issue, some understanding of a more or less common goal(s) is important. Note that a provincial Great Goal is “To lead then world in sustainable “environmental management...”. This might be interpreted as maintenance of species composition in forest management.”

“Will this initiative be incorporated within FFEI?”

“Being an ecologist, rather than a geneticist, my main concern is that linkages to ecological realities are maintained in this discussion.”

2. Some endorsed the Challenge Statement and/or the Dialogue and viewed the Dialogue as an opportunity to spark further collaboration.

“It is gratifying to see British Columbia take the lead in building a well thought out approach to managing forest genetic resources. The proposed process is logical and the challenge paper is well written.”

“The Challenge statement is very complex but sounds reasonable.”

“The Key Challenge statement sparked in my mind a cooperative effort is necessary to achieve the goals of the challenge.”

“It is positive to see that gene resource management is identified as a key responsibility of the Chief Forester.”

3. Others questioned why the Challenge Dialogue is occurring and how it fits within government's administrative framework.

“What is the need for this whole dialogue? What's the evidence that what is in place now is broken, or not yielding satisfactory results?...Having a good strategy, and alignment with it, is a good idea. If that's the main reason for this exercise, why not say so?”

“That there is misconception about the need to review GRM at this level of detail. The current program is incredibly advanced, very productive and highly complex compared to anywhere else in the world.”

“It really is not totally clear why this is happening? Will it be a piece of FFEI? Will it direct MOFR activities in GRM based on gaps identified? Will it be the basis of new policy or legislation?”

“This survey (Challenge Dialogue) raises some bigger issues. Does the MoFR have a coordinated system in place to regularly evaluate its programs and identify emerging concerns? If so, what has it concluded regarding GRM? Piecemeal review of individual issues such as GRM seems like an inefficient way to run a large organization, and could detract attention from other more urgent issues. The effort placed on this survey seems disproportionate to any GRM concerns.”

4. The view was expressed that the Challenge Paper doesn't give a high enough priority to managing genetics for timber production, or needs to explicitly address other issues like funding, climate change and use of exotics.

“The background material and high-level context de-emphasize industrial applications of tree breeding and forestry in general. The impression given is that managing genetics for timber production is a comparatively low priority.”

“There are two things missing from the “Key Challenge”. The Challenge should address the funding issues and should specifically relate to SFM “over time” – i.e. include climate change issues as they relate to SFM.”

“A little more on tree species and the use (or non use) of exotic tree species to ensure this issue is addressed. How to encourage the establishment of more valuable tree species available even though the costs to do so are higher.”

5. Some thought that the COP is too narrow, and that, while we may understand the Challenge Statements within our COP, they would not be understood by those not directly involved in forest genetics programs.

“Most people at any workshop would need a course in Tree Improvement to understand much of it. I suspect that if you asked them you would find that the majority of the COP only see a piece of GRM or only interact occasionally with small portions of it in their work lives. Most are content to know that it is working properly.....”

For those who do not know about the FGC and the business plan, I am not sure if they would understand the linkages between the private/crown partnership. There are still people in the MOFR that think the nurseries are all government owned, and I think they believe the same about seed orchards.”

“One of our first challenges will be to develop a new COP that brings new stakeholders and practitioners to the table, without alienating the old TI COP.”

Revised Key Challenge Statement for GRM stakeholders

Considering the feedback received, it is proposed that the Key Challenge Statement for the Level 2 Dialogue with GRM stakeholders be as follows:

Through a focused, open, dialogue with stakeholders, to create a collective vision and strategy for GRM that supports sustainable forest management¹ in BC, and considers the range of values outlined in the Provincial Chief Forester’s SFM framework.

As we build the Level 2 Dialogue with GRM stakeholders, the feedback provided by the COP that the Dialogue clarify linkages with SFM, government’s goals and other key initiatives will be particularly important. In addition, the need to increase understanding of climate-change impacts and response will receive emphasis. There are many accepted definitions of SFM internationally (e.g. see footnote below), in Canada and BC and we will ensure that an appropriate description is provided. The links between the need for a GRM vision and strategy (via the Dialogue) to government goals and key initiatives like Future Forests Ecosystems will need to be more clearly and succinctly explained. The Co-Champions view the Dialogue as an effective way to review the overall GRM program in a manner that can effectively guide and coordinate various parts of the program led by various organizations so that we have clear sense of working together.

INPUT REQUEST 1:

Please use the separate Progress Report Feedback Form to provide any reactions you may have to the revised Key Challenge statement.

Feedback on Background Statements

A number of useful comments were offered in response to background issues and events that instigated the Challenge Dialogue. While the detailed feedback for each numbered background statement is provided in the separate *Challenge Paper Consolidated Feedback* document, following are some ‘high level’ observations noted by the Action Team.

The long list of background issues and events was considered helpful in getting everyone on the same page. Some noted that the complexity of the material underscores the need to develop a vision and strategy for GRM. Input was requested on a) background issues that needed clarification, and b) information that was missing. The following quotes reflect some of the feedback in a number of the topic areas under background events noted in the Challenge Paper.

¹ The UN Food and Agriculture Organization (FAO) describes Sustainable Forest Management as: the stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biological diversity, productivity, regeneration capacity, vitality and their potential to fulfill, now and in the future, relevant ecological economic and social functions, at local, national and global levels, and that does not cause damage on other ecosystems. Also see <http://www.fao.org/forestry/site/24447/en/>

General background

“... clarification of the term “genetic foundation” would help to understand the objective e.g. does this refer to naturally evolved gene pools?”

“Resource allocation/funding may not be adequately aligned with the key responsibilities of the Chief Forester’s vision and framework....and with the current emphasis on ‘seed supply’ for MPB areas.”

“Background information is clear. However, I would like to see a better indication of how nursery capacity, in the context of anticipated future recruitment and succession will fit into dialogue.”

“What about non-indigenous tree species, such as non-natural hybrids and exotics? Some are in use in BC. How do they affect natural forests?”

Governance and policy

“FGC was initially set up to provide advice on tree improvement, not GRM. Hence, the lack of a GRM focus business plan and investment lens. The FGC should be encouraged to revise/re-develop their Strategic Plan (2004-2008) with a GRM focus.”

“FRPA only applies to Crown land (and insignificant amounts of private land). What roles does GRM COP see for itself regarding private land?”

Gene conservation

“Conservation biologists will tell you strategies based solely on protection are ineffective. The cornerstone of effective genetic conservation efforts is to integrate diversity concerns into operational management decisions. From this perspective, protection would be viewed as insurance for those populations / species with high susceptibility to genetic erosion. But, even for these species, the focus should be on promoting persistence in the operational forest.”

“Gene conservation strategies per se, are not, to my knowledge, documented....A GC catalogue (research publication) is not a strategy.”

“Tension, perhaps conflict between “species of commercial importance” and other values?”

“Currently, the potential ties to forest genetics within GAR (FRPA’s Government Actions Regulation) are the research installations. This may be a new policy area we may wish to re-visit.”

Genetic gain

“Industry programs are on-going, some past industry programs were very large (i.e. plus-tree selections). Underestimating the contributions of the cooperators is counter-productive to our long-term goals.”

“Little if any reference to wild stand seed sources that still comprise just over half of the seed used for Crown land reforestation.”

Risk reduction

“I don’t think it is correct to say: “Adaptation is necessary to effectively respond to the effects of climate change ...” Having genetic diversity allows us to respond”. I think widely adapted genetic material for reforestation is the key rather than “adaptation”.

““Adaptation is necessary to...’– what does adaptation mean here? Adaptive management? Ecosystem, species, and population evolution?”

“Significant forest health issues may continue to arise (secondary pests moving in after MPB, new pest infestations), particularly in light of climate change. Potential impacts to GRM remain unaddressed.”

Decision support systems

“While specific location of the planting activities are retained on file, the opening spatial information is reported to RESULTS and can be accessed through the Land Resource Data Warehouse.”

“...need to mention connections and ease of update within and between systems (e.g. seed supply and demand profiles). SPAR (and its linkages to CONSEP) is substantially more than a sowing request entry system and it plays a significant role just as FGC Species Plans do. SPAR’s utility could be greatly enhanced if one system to administer seed zones/units was in place.”

“SeedMap also supports effectiveness evaluation and monitoring (generation of maps/map queries) and compliance monitoring and enforcement.”

“A sample schematic of a Seed Planning Zone and how we look at seed supply needs (e.g. What’s in storage, what’s forecasted to be produced in orchards, and what seed need is for that SPZ as per the business plan.”

Monitoring and performance

“Many indicators for GRM are...’ should read: ‘Many indicators relevant to GRM are....’ I suggest separating provincial (SOF), national (CCFM) and international (MP) into three separately numbered items. Perhaps note that the Montreal Process (MP) does not specifically address GRM, whereas SOF and CCFM do.”

“The search for meaningful indicators of genetic diversity is the search for the Holy Grail! And we haven’t made much progress, in part because we haven’t reached a consensus on a systematic approach (analogous to the breeding cycle concept) to conserving genetic systems. That we’re trying to conserve the capacity of populations and species to change – adaptively. The primary factors associated with genetic erosion include, inbreeding, genetic drift, and high grading. The first two factors are most strongly associated with small effective population sizes, the first at a local level and the second at a landscape scale. High grading can be managed effectively through tree-marking protocols.”

Revising the background statements for the Level 2 Dialogue

We appreciate these and many of the other comments on the Background Statements provided in the Challenge Paper. We intend to focus the Level 2 GRM Dialogue at a less technical level than was undertaken with the COP, while still touching on the broad scope of the GRM program. As we prepare Background Statement for the Dialogue with Stakeholders, we will be mindful of the many comments provided by the COP including several suggestions where clarification is needed. For example, we need to consider, among other points raised:

- Recognition of industry inputs to tree improvement programs;
- Giving more consideration to managing genetics for timber production;
- Further clarification about gene conservation and what we mean by terms like ‘genetic foundation’ and ‘adaptation;’
- Issues related to the use of non-indigenous tree species;
- Whether Crown land (not private land) is an assumed focus;
- Providing a clearer overview of existing decision support tools; and,

- A short description of the current use of SFM indicators relevant to GRM provincially and nationally.

INPUT REQUEST 2:

Please use the separate Progress Report Feedback Form to provide any reactions you may have to the feedback on and discussion of Background statements.

5.2 *Expected Outcomes*

Original Expected Outcomes

1. **Better understanding of the role and importance of GRM in SFM among the community of practice and its stakeholders.**
2. **Identification of gaps and opportunities in the GRM system with respect to its ability to respond to current and future issues and to support current and future SFM initiatives.**
3. **Alignment and shared ownership on a vision and goals for GRM in BC — i.e., a common GRM Strategy and Implementation Plan (actions).**
4. **Improved partnerships and strengthened leadership within and between MOFR, FGC, and other key GRM stakeholders leading to more effective conservation and management of the forest tree gene resources of BC.**

Feedback on Expected Outcomes

There was general support for, along with several constructive comments regarding, the four anticipated Expected Outcomes. There was generally strong support for, and emphasis on, outcome 3: *Alignment and shared ownership on a vision and goals for GRM in BC*. A couple of respondents suggested that this model would be useful to other provinces.

“Both industry and government professionals develop a better understanding of GRM and a strategy to better communicate the importance of GRM to all practicing forest professionals.”

“The Community of Practice comes to see GRM as integrating the Three Pillar Model; there are actions initiated on at least some identified gaps and opportunities; there are advances in monitoring and reporting GRM.”

“I think your expected outcomes are very well put and achievable especially when you’re involving such a wide audience. If you could achieve these outcomes the Challenge dialogue would be a success. I think outcome number 3 is the most important” (alignment on GRM vision, goals, strategy and implementation plan).”

“...we would expect a better outcome for [objectives] 2 through 3 if the objectives of 1 are successfully achieved.”

Regarding “I would consider this Dialogue a success if....”, ideas offered included:

“...the various levels of government, industry and research actually created a framework to discuss practical solutions to the genetic challenges facing us all.”

"...we moved beyond the systemic barriers and organizational silos that exist within the current TI COP."

"... it focused on connecting GRM with the Chief Foresters vision..."

"...a success if the role and importance of all contributors and contributions from the community of practice and it's stakeholders were clearly valued."

"...there is a broad range of input from a variety of stakeholders and clients that demonstrates the level of importance they attach to GRM and SFM."

"... we could come to some agreement among COP regarding a vision for GRM."

"...it increases awareness of all issues to participants, which I believe it has already in completing this Challenge at the elementary level."

"... those who initiated this recognized that there is a continued need for selling our program to higher level decision makers and not in the other direction."

"...an effective strategy and implementation plan is developed and implemented so that we see results on the ground."

"...synergy among members of the COP and its stakeholders is fostered."

"...it sparks interest and provides a view on the 'bigger picture'."

"... this is more than an exercise in 'talking to ourselves'."

"...nursery and seedling health issues are part of the consideration."

"...it advances change management protocols for seed transfer rules."

Revised Expected Outcomes

Based on the feedback, it is proposed that the Expected Outcomes for the Level 2 Dialogue with GRM stakeholders be revised as follows (primarily re-ordering and merging original expected outcomes #3 + #1):

- 1. Alignment and shared ownership of a vision and strategy for GRM in BC [i.e., a common GRM Strategy and Implementation Plan (actions)] through better understanding of the role and importance of GRM in SFM among the community of practice and its stakeholders.**
- 2. Identification of gaps and opportunities in the GRM system with respect to its ability to respond to current and future issues and to support current and future SFM initiatives.**
- 3. Improved partnerships and strengthened leadership within and between MOFR, industry, universities and other key GRM stakeholders through the FGC, leading to more effective conservation and management of the forest tree gene resources of BC.**

INPUT REQUEST 3:

Please use the separate Progress Report Feedback Form to provide any reactions you may have to the feedback on and discussion of the Expected Outcomes for the Dialogue.

5.3. Assumptions

A number of key assumptions (27) were outlined in the Challenge Paper, and respondents were asked to state which assumptions require more clarification, those they strongly disagree with, and new ones that need to be recognized.

Assumptions which require more clarification

The impression from the comments received is that most of the assumptions are understandable and clearly stated. There were many comments regarding specific assumptions (see examples below by stated or best fit assumption #) and these will be considered and integrated as we move the Dialogue forward to GRM stakeholders with a more focused set of assumptions.

#2 - *“GRM is a concept with a generally recognized place in SFM but without (to date) a demonstrable mechanism influencing practice, professional accountability, identified values (e.g., a FRPA value) on the forest landscape. It’s a good idea that needs legs to be real.”*

#3 - *“This may be true, but this support has never been put to the test. The public may not have a clear understanding of what is meant by the SFM of the province’s genetic resource asset.”*

#9 - *“I think this under-represents BC’s efforts in gene conservation. Some indication should be made that 13% of BC’s forest land is in protected areas. This in-situ ‘investment’ is an important part of gene conservation as we not only protect the tree genetic resources, but also all of the other organisms in these ecosystems as well.”*

#10 - *“Require more clarification regarding Climate Change, are we sure of the magnitude of the change? Time line for the change?”*

#12 - *“What is meant by “high genetic quality”. From an ecological point of view, a genotype cannot be poor or good in terms of quality. My assumption is that this relates primarily to rate of growth and form, i.e., the statement has a commercial, but no ecological, basis.”*

#14 - *“Should the focus be on genetic gain estimates or on strategic assumption about breeding program? For example, is there a commitment to maintain a continuing breeding program?”*

#19 - *“This statement should include reference to climate change.”*

#24 - *“also...modeling and analysis.”*

#26 - *“How do we monitor and report to the public that genetic integrity and diversity of BC managed forest are not being compromised through current forest practices and tree improvement activities?”*

Assumptions with which you strongly disagree

There was support for many of the assumptions as well as some disagreements with some of the assumptions or their wording, for example:

Assumption 4: The “state of the forest” and hence its genetic composition and gene pools are constantly changing and need thoughtful management. Recent disturbance events such as the MPB infestation underscore this reality.

“Yes, the forests are constantly changing – as a result of complex ecosystem changes. “Thoughtful management” could sometimes mean that humans shouldn’t intervene in those ecosystem changes.”

“The reference to MPB is misplaced. The MPB situation has its basis in ecological processes and would have occurred regardless of the genetic makeup of the trees. I think the whole MPB issue should be minimized as a driver for this discussion.”

Assumption 5: There is a need for a more encompassing and cohesive GRM vision and strategy. It will be important to capitalize on existing GRM-related organizational units (FGC and its support committees) and business activities to strengthen linkages with other initiatives such as the FFEI, FFT, and the MPB Action Plan.

“To some extent, it may be that we need to do more than capitalizing on the existing FGC and its support committees. This may be too restrictive in moving GRM vision and strategy forward...FGC (TACS) and species committees were largely set up to provide guidance on the expansion of the provincial tree improvement program – they are currently orchard-centric, aimed at allocating funds on an annual basis for operational tree improvement. They work well at meeting this objective... Stronger times to MoFR Forest and Operations Division are needed, as well as MOE and other NGOs, FPB.”

Assumption 6: Implementation of a provincial GRM strategy...is critical to achieving sustainable forest management in BC.

“I don’t know that the word “critical” should be there. It makes it sound like sustainable forest management can’t be achieved without a provincial GRM strategy.”

“We already have a strategic plan (FGC). It may be dated but it does not need a lot of updating to be in place.”

Assumption 10: Climate change could result in increased risk to other tree species and populations, and careful monitoring and management will have to be in place.

“The wording is too soft – climate change will have a huge impact on our high elevation species as they really will have no where to migrate to and they will be outcompeted in areas they currently occupy.”

Assumption 12: Both public and privately-owned seed orchards play an important role in providing seed of high genetic quality....

“...the dual agency delivery model has proven strategic strengths that outweigh the tactical complications that can arise.”

“Past experience highlighted seed supply vulnerability, specifically when unique orchards are solely owned by the private sector. This calls for some acceptable redundancy.”

“Not sure this is the right venue to promote public or private delivery systems.”

Assumption 13: Tree breeding program are best housed in the MoFR, and should continue to operate in support of stakeholder and MoFR objectives.

“...it’s possible that all the tree breeding required for foreseeable crown land deployment has been done. Ministry role should shift more to gene conservation, climate change and other applications of genetic science to real stewardship problems. Tree breeding is currently driven by momentum not by need and should be substantially re-rationalized as an obligation of the MoFR. This reflects the maturity of the science – it is not meant as a comment on the dedicated individuals in the program.”

“Not sure I agree this is the only model for success. Private sector development may provide opportunity for more innovative and timely solutions.”

“Why? Could be private, academic, co-op, etc.”

“Yes, tree breeding should be directed at the MoFR, but efficiencies might be realized if contracting was a larger part of the program.”

“should tree breeding not be separated from forest genetics research so expertise and resources can be better utilized?”

Assumption 14: The ministry’s tree breeding program have been very successful....However, genetic gain targets and performance measures need to be constantly re-evaluated in light of pests and disease, climate change, market shifts, technical capacity, expertise and funding.

“assumes and intimates that breeding program are flexible enough to make changes in any one of a number of directions stated quickly. Breeding programs are long-term and changes need to be considered carefully.”

Assumption 15: MoFR seed orchards are needed to provide a stable supply of seed of high genetic quality to BCTS and licensees that do not have access to improve seed.

“Are MOFR orchards any more stable than the private sector given MPB threats, other potential health threats, wildfires, economic impacts due to market fluctuations?”

“Why? Could be private, like nurseries.”

“The statement licensees that do not have access to improved seed’ is disingenuous, as anyone can invest in seed orchards if they make it a priority, and surplus improved seed is continually available at market prices. It is provincial legislation, policy and practice that have made this an unfavourable investment, as the private investor may not realize the benefit of the investment in the present tenure framework.”

Assumptions 17 to 20 under Risk Reduction:

“...none of the issues listed address Risk but more address the need to keep things current. This has nothing to do with risk. That’s business as usual.”

Assumption 19: Species selection should consider opportunities identified through genetic testing, such as the movement of seed outside species ranges where supported by scientific information.

“This is a very bold assumption, with large implications for ecosystem function.”

Assumption 21: Standards established by the Chief Forester are the most appropriate means to regulate the use of seed.

“Not sure administrative burdens will out weigh biological gains. We should be focused on the best science.”

“Not necessarily....should move towards a decision support system that supports professional reliance, innovation and results-based polices and practices.”

“CF Standards do a very good job of regulating but do a poorer job of promoting best practices in seed deployment.”

Assumption 22: Changing seed transfer rules and SPZs will have significant implications for both seed producers and users. Change management protocols will have to be well in place to evaluate any proposed changes, since the administrative burdens could outweigh any biological losses.

“Change management protocols under this assumption may not be responsive enough to changes in the environment. Administrative burdens may need to be removed if we are moving through a

period of rapid change in the environment. Many mistakes may be made, but biological losses (the more critical issue) may be minimized.”

“If science shows that changes to the seed transfer rules and SPZ’s are required, they should be changed regardless of the administrative burden (get rid of some of that!). Seed transfer rules and SPZ’s have changed a number of times over my career and we have managed. Assumption should be that in this climate of change, producers and users will adapt to changing policy.”

“Not sure administrative burdens will outweigh biological gains. We should be focused on the best science.”

Assumption 23: The FGC is the primary and appropriate stakeholder group providing advice to the provincial Chief Forester on public governance and policy related to gene resources.

“Support a broader more open concept of advisory roles taken up by a number of agencies and public interest groups.”

Assumption 24: Integrated GRM information and decision-support systems are important to support seed users, seed producers, nurseries, compliance monitoring, planning, and policy development.

“Seed processing facilities are also an important (very important) stakeholder group in GRM and need to be included. I disagree with their exclusion. Ditto for cone collectors.”

“Lack of reference to seed processing and distribution.”

Assumption 26: Public interest regarding the monitoring and reporting GRM activities, status and performance will increase over time.

“Assumption 26 is unlikely.”

“No. Public interest will only increase if you do something that disturbs their sense that everything is OK.”

Additional assumptions to add

Genetic gain

“More assumptions with respect to genetic gain especially around the area of pest resistance.”

“Under 6.3 is it assumed that gain can be maintained under present practices e.g. with selection and breeding using existing native populations and species as well as use for current silvicultural practices.”

“Under 6.3 Is there any perceived role for use of biotechnology in maintaining productivity/value/gain?”

Risk Reduction

“6.4 – 18: Introduction of some “relaxation” to the seed transfer guidelines to accommodate adaptive changes associated with climate change. This is very risky, thus a cap might be considered and that maybe restricted to the northern range of some species.”

Reforestation

“There is an unstated assumption that reforestation in BC will always be by planting and mostly with improved seed. If that is one element in “sustainable forest management”, the reliance on human manipulation of seed sources is largely complete and the implications for GRM are substantial.”

Other

“Specific mention of exotic species, including range extension of native BC trees.”

“6.1.7. Broader representation and/or participation may require a new advisory mechanism that considers the full range of GRM stakeholders (MoFR, MOE, industry associations, NGOs, academia, FN) with FGC as one of the participants. Consider creating an advisory body that has a more strategic and policy-oriented role and less of a funding allocation role.”

“Increased opportunities in applying GRM or expanding its scope need to be addressed. Vision for the future.”

“6.1.8. Need to address ‘expectations of the general public’.”

“6.1.6. This is key along with tree species strategies. This section relates to species deployment again. I think it is important to talk about species explicitly when talking about GRM. At the stand, landscape and management unit level. As well as species mixtures within these different units....GRM and tree species strategies are linked and interconnected.”

“Introduced species must be included here somewhere, as our present programs reflect a significant underlying assumption that we do not currently need them. Additionally, GM assumptions are not addressed, but the same assumption applies.”

Revising the assumptions for the Level 2 Dialogue with stakeholders

All of the ideas and feedback on the assumptions, including suggested clarifications, areas of disagreement, and suggested additional assumptions, will be carefully considered by the Action Team, as we now begin to construct a Level 2 Dialogue with GRM stakeholders. We will be mindful of the need to reduce the number of assumptions and keep them focused on a different kind of dialogue that is less technical with stakeholders.

INPUT REQUEST 4:

Please use the separate Progress Report Feedback Form to provide any reactions you may have to the feedback and discussion on the assumption including the new assumption statements.

5.4 Key Concepts, Ideas and Critical Questions

The following requests for input were made in the Challenge Paper:

Input Request 4: Key Concepts, Ideas and Critical Questions

- **Provide your reactions to the 3 constructs described and illustrated in Section 7.1.**
 - **“Three Pillars” Model of GRM**
 - **GRM System schematic**
 - **GRM Strategy Logic Model (Strategic Framework)**
- **Are these constructs useful for us to get a sense of how all the GRM pieces fit together? How would you improve them? What other constructs would be useful?**

Are these constructs useful? How would you improve them?

Although the constructs (see thumbnails below) appear to be well supported, there were several constructive comments related to each of them. There were also more specific detailed comments that will be taken into account as the constructs are revised.

“The 3 constructs are useful and interact with each other.”

“The GRM system schematic and strategy logic models seem well thought out.”

“#1 and #2 are useful; #3 isn't. #3 is not at all visual and doesn't show relationships. What is the difference between an outcome, output, impact?”

“A clearer idea would result with simplification of some of the diagrams.”

“Yes they're all useful – good to present three depictions at this point.”

“All three would be useful in developing a GRM strategy. I suggest a hybrid between Figs 2 and 3 would best suit educating the non-COP GRM stakeholder groups.”

“Constructs are useful. Risk reduction needs to consider climate change effects on forest heath.”

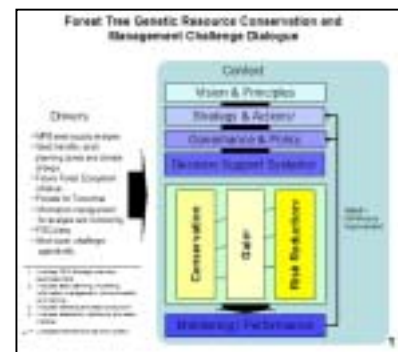
#1 “Three Pillars” Model of GRM

“The three pillars approach to describing GRM is very useful and helps put GRM into perspective.”

“The text (7.1.1) talks about the ‘supports’ for the three pillars and then illustrates them on top. What does this mean? The separation of “Monitoring/ Performance” from other supports not really clear. ... I don't think it adequately describes GRM and can be improved upon.”

“Three Pillars = Strategic Directions (i.e., long term business direction). Reword to set direction.” [Examples provided for genetic diversity, risk management, tree improvement and adaptive management.]

“Perhaps an additional pillar for research and innovation in the “Three Pillars” model as this is implied but not explicitly stated.”



"This is a useful schematic but a couple of updates would be useful. Under #5, includes "Species Selection" as one of the system requirements. Under #6, "seed planning by licensees" would be better than FSPs. The FSP does not specifically address seed planning but it is a very important phase that should be highlighted."

#3 GRM Strategy Logic Model

"The first sentence of this challenge dialogue discusses drivers such as MPB, but they barely make it into the drivers column. MPB and climate change should be front and centre. The column makes me nervous as to what is driving what. Are the actual drivers (MPB / CC) driving us or the BC government initiatives [?]"



"The GRM logic model may be logical but it's hard to digest."

"...for outputs – need some reference to RESULTS as this would be the actuals reflected – data source to determine baseline information to assess field performance."

"Logic model helps to put GRM activities in a provincial context and describes its outcomes and impacts – which the others diagrams do not."

"Logic model is useful and needs continual attention."

"Stronger focus needed on forest genetic modeling and analysis outputs. Required to support adaptive management principles, risk management and decision support systems."

"the list of Drivers is mostly a list of governance responses (that fit better under Activities). In my view, Drivers are things like increasing human population, timber harvests, fossil fuel consumption and species loss..."

"The Outcomes column starts with the 3 pillars from the first construct, and adds 4 more things. I would prefer consistency between the two constructs. Policy and practices, decision support systems and performance are all outputs, not outcomes. Community of Practice is a secondary outcome.....Public trust is a desired outcome that requires more explicit attention throughout the document."

"The table is also useful but I find the Outputs section a little confusing as there is overlap between "operational" and "operations" – e.g. is there a difference between 'seedling request' and 'selection and acquisition of seed'. There should also be reference to the BEC reviews as it relates to species selection."

What other constructs would be useful?

"Good old strengths-weaknesses-opportunities-threats analysis."

"The Tree Improvement Delivery System and Seed Handling System are useful constructs (already available) for discussing GRM."

"A flow chart or something similar showing the structure of GRM in BC (i.e. all the players and how they are connected)."

"Can the GRM work be linked more directly to the CF's Stewardship Framework?"

Revising the constructs for the Level 2 Dialogue with stakeholders

Our overall impression, based on the considerable feedback provided, is that the three proposed constructs, the “Three Pillars Model” of GRM, the GRM System schematic, and the GRM Strategy Logic Model, were all helpful constructs. As we move the Dialogue forward with stakeholders, we will simplify these construct diagrams.

INPUT REQUEST 5:

Please use the separate Progress Report Feedback Form to provide any further reactions you may have to the feedback on 3 constructs and further discussion of these constructs..

5.5 Critical Questions

The following requests for input were made in the Challenge Paper:

Input Request 5: Critical Questions

- ***Provide your reactions to any of the critical questions that interest you. Please refer to the question number so we know which one you are responding to.***
- ***Are there any other questions that you think need to be asked?***

Reactions to the critical questions

There were thirty-six critical questions posed in the Challenge Paper and there were many useful comments offered in response. While the detailed feedback for each numbered question is provided in the separate *Challenge Paper Consolidated Feedback* document, following are some ‘high level’ observations noted by the Action Team, along with some specific examples of related comments.

Figure 1, below, shows the number of responses received for each question, as a quick way of gauging the level of interest (not, of course, the salience of responses).

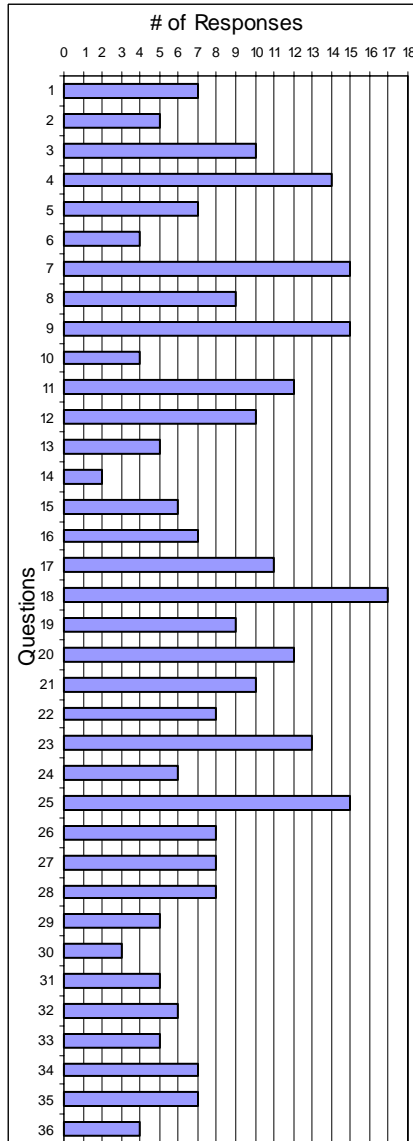
Questions 3, 4, 7, 9, 11, 17, 18, 20, 23 and 25 received a proportionally higher number of responses than the other questions. In the interests of conciseness, this section focuses primarily on the responses to these questions that provide examples of the thoughtful feedback received. Responses to the other questions are also important, and once again, have been compiled in the companion *Consolidated Feedback* document.

It is worth mentioning, re questions 1 and 2, that there was **general agreement that current GRM strategic vision and objectives are inadequate (e.g., FGC, TIB) and that this process (Challenge Dialogue) is expected to improve the situation.**

Question 3 asked: *What areas of GRM are in most need of improvement as we face issues such as the mountain pine beetle and climate change, and new initiatives such as Future Forest*

Ecosystems? Seed transfer rules and standards were repeatedly raised in this context as well as species selection. Knowledge gaps and strategic approach were also mentioned.

Figure 1: Number of Responses by Question



“Knowledge Gaps e.g. population differentiation and relationship to the landscape and climate, adaptive traits (biotic and abiotic stress related traits), variation and heritability of these traits etc.”

“Integration of species selection guidelines and seed selection and seed transfer standards.”

“The area of greatest need of improvement is in seed transfer rules. The rules (which could be framed as incentives) need to be modified to incorporate our understanding of climate change. ... This is not a simple task since species selection needs to be considered in this context as well as our current and future dependence on natural regeneration silviculture systems.”

“Strategic planning (MPB Seed Strategy), policy (results-based, objectives, resource features), forest modeling and analysis; decision support systems and resource information mgmt.”

“Advancing change management protocols for seed transfer rules.”

“Risk mgt. Facilitated migration of species for both MPB and CC issues is of top priority.....appropriate research initiated ASAP is very important. Also, reconsideration of acceptable and preferred species for reforestation at the district level very important....”

Question 4 asked: *What future biological concerns and issues do you feel we need to begin to address now to support GRM and future forests? The top concerns all revolve around future uncertainties related in some way to climate change; i.e., extreme weather events, substantial changes in environment, extension of ranges for pests, biological stress, etc. For example:*

“Very rapid growing trees with high genetic worth in terms of volume may be more susceptible to extreme weather events (20 year snow storm, ice storm, drought etc). This needs to be addressed as part of risk reduction.”

“Given future uncertainty [climate change], it appears that increased diversity (more species; more seedlots / species) is an important element of the future forests.”

“...genetic performance in environments of the recent past and present will be unlikely to correspond well with future performance [climate change].”

“The biggest question may be where, when, and how to intervene to mitigate the biological stress resulting from climate change.”

“...key, in my opinion, are improved information management systems to address issues like climate change in future.”

“...trees will be put under more stress and therefore more susceptible to insects, disease and abiotic factors.”

“Wildfires- increased threat to in-situ genetic resources/assets resources. Forest health – new/ secondary pests; new epidemics. Land use conversion – due to climate change – what portion of the land base will support forests in the future? New drought/moisture stressed conditions impacting seed crop maturity, production, seed efficacy.”

“Facilitated migration of species for both MPB and CC issues is of top priority...appropriate research initiated ASAP is very important.”

“Changes in seedlot management – presume more seedlots, species, family forestry will occur.”

“Species selection as it related to climate change is also a concern that needs to be addressed.”

“Improved understanding of BEC and how climate change may required new BEC units to be described and identified.”

Question 7 asked: *Considering the three ‘pillars’ – genetic gain, risk reduction and genetic conservation – which of these activity areas needs more resources and why?* **Most of the responses identified “risk reduction” in the face of changing environments** as the top activity area in need of more resources, in keeping with the responses to question 4. Genetic gain and conservation both received some support along with balanced program delivery of each three pillar.

“The risk reduction element will need additional resources to deal with climate change and arising issues (i.e. increased pest problems) and changes that will be required for seed deployment to maximize value of the forest resource.”

“Risk reduction probably needs more resources because current performance data may be invalid in changed environments.”

“The “pillar” requiring more resources is Risk Reduction. The other two are, and have been, taken care of adequately. As noted... the seed transfer decisions we make today will affect us long into the future, and climate change is increasing the risk associated with those decisions.”

“Risk reduction is the most uncertain pillar mostly due to the timing and magnitude of any future climate change.”

“Gene conservation requires more resources and attention.”

“risk reduction needs more resources to include climate change effects on forest health.”

“Genetic gain in my opinion requires more resources. The gene conservation efforts seem to be well looked after via the gene conservation centre and risk reduction does not require as much resources as does the gain aspect. Resistance to pests and diseases will be key in the future.”

“All three activity areas need new GRM resources and skill sets (results-based, professional reliance policy and practices, adaptive management principles, GIS-based modeling and analysis, evaluation & monitoring); resources in each activity area (pillar) should be re-allocated/developed to move us from an existing to a new state.”

“risk reduction as in #3 above”

“All of these fundamental areas need to continue to be well-resourced. None should receive more resources at the expense of the other. The resources currently in place might be better deployed.”

Question 8 asked, *“How can the respective roles of the Forest Genetics Council, the Ministry of Forests and Range, the forest industry, academia and others be improved to better deliver GRM?”* The responses ranged from secure long-term funding to strengthening FGC policy role and improving linkages to the full range of organizations.

“Secured long-term funding will improve the quality and quantity of output from all players in GRM... Trust among all agencies needs to be improved to improve efficiencies in the delivery of GRM.”

“...continue to focus coordination thru the FGC....it's working!”

“FGC needs to strengthen its policy/advisory role to meet its CF mandate. Too much focus on being a funding allocation body; too many resources currently applied to management of technical aspects of tree improvement (breeding & orchard development). Need to develop new partnerships/relationships with other agencies to deliver /monitor GRM (academia, NGOs, Forest Practices Board).

“...improved linkages between [tree improvement] as practiced by these organizations and external forces”

“Structure should follow function. a) Design the program; b) Identify resources; c) develop a structure (roles in this case) to minimize overlap and help identify who provides information to whom.”

Question 9 asked, *“What GRM costs should fall to the public and to the private sector? What incentives could increase private sector investment?”* The response was not unified. Most respondents felt there was a suitable role for both the public and private sector based on specific goals and requirements. The following responses sum it up well:

“Industry will be most receptive to assuming costs for which investment analysis shows a positive net present value. The public must take the lead on the larger (macro-economic / social goals).”

“At present, substantial costs of GRM deployment are carried by the private sector. Much of the cost of research and development is carried by MOFR and FIA funding. Early arguments for seed orchards included secure seed supply, improve quality of seed, and cheaper seed. That third argument has not been proven in practice. Licensees are mindful of the AAC take-back without accompanying tenure security...and realize that return on investments made in the growing stock on tenures presently managed by them may very well be realized by another party. The agency that realizes the return on the investment should make the investment.”

“Private sector not likely to invest further given land tenure system....Gov't must do...stewardship responsibility.”

“Given our current forest ownership system in BC, i.e. Crown ownership, most of the GRM costs should fall to government since the rewards are ultimately reaped by the public.”

“The whole idea of incentives has gone up and down with softwood lumber with fears/accusations of subsidization of our forest industry. This needs to be understood or cleared off the table first before considering additional, large-scale incentives. I think that there could be incentives for the increased provincial return of the forest resource by maximizing GW and site index combinations.”

Question 11 asked, *“What do you feel are the key genetic conservation issues that we are facing in BC?”* Respondents addressed a range of issues. In general, the focus was on the importance of *in situ* and *ex situ* gene conservation for specific vulnerable species, including those with fragmented distribution, as well as non-commercial species. The threats to *in situ* reserves (such as parks) due to climate change were also noted. With respect to what genes need to be conserved, some respondents noted the greater risk for high elevation species due to climate change, although this is not simply a gene conservation issue.

“The larger issues will be the broad-leaved species as we have limited information on variability patterns, seed storage is expected to be poor in some species and initial results indicate that these species represent the majority of gaps in our coverage of gene conservation by BEC in BC.”

“If we are not careful we may lose some species and therefore gene conservation is more important for these species.”

“Conservation issues are related to impacts of climate change. Do we have adequate protection of in situ reserves and ex situ samples of vulnerable species and populations?”

“Land use conversion – existing threats (harvesting, urban encroachment,...) and potentially new threats under CC. Increased wildfire – threaten in-situ and inter-situ genetic resources....”

“Likely only the high elevation 5-needled pines.”

“Effective population size – for example is a N_e of 10 appropriate for all wild stand seed collections?”

“What happens with climate change? If we don’t anticipate and manage this adequately, we could lose the utility of our in situ reserves.”

“Species survival (whitebark pine). Population survival for genetic diversity (high elevation populations – Fdc HE). Wild stock population survival at all elevations for genetic diversity – we assume we have significant natural regeneration in our plantations, but we know that some species this level of regeneration is not significant. Climate change and the migration of species, specifically assisted migration...”

Question 17 asked, *“What might be done to increase the quality and quantity of select seed in a cost effective manner to meet reforestation needs and enhance timber supply? For example, are their incentives that could be used to increase private investment in tree improvement?”* A range of specific solutions was proposed: to expand seed orchard capacity, and long-term forest management agreements. With regard to the incentives question, one response cautioned about spending too much effort on incentives for private investment in tree improvement, while another felt that a study that documents the benefits that have accrued would in itself become an incentive.

“Well the simple answer is to expand seed orchard capacity to increase the quantity of seed and to continue breeding to increase quality.”

“Worry less about gene contamination – place seed orchards in the areas where the seed is needed.”

“Unlikely given the current tenure system;”

“I do not think it wise to spend much time or effort in trying to build more incentives for private investment in tree improvement. Such investments must have a positive return to the investor, and the current tenure system is the main structural disincentive for any such long-term investments. Without structural change to the tenure system, more private investment will not occur.”

“Adjust focus of TI to GRM – incentive becomes SFM-based forest mgmt objectives and reporting. Develop species –based GRM plans (results and strategies). Develop direct linkages to genetic gain assumptions....”

“Seed processing and use efficiencies can positively or negatively impact seed quality and quantity – some good initiatives and partnerships underway that deserve credit and mention.”

“I believe that we must demonstrate to forest practitioners and the public that using improved seed is effective. We have been using the seed for years (e.g. Sx in the interior) but have not quantified the impacts of this. A study of this nature would help to encourage investment and support of GRM activities.”

“Forest trust, cooperation, and synergies among the COP. Use public funds where they are needed...Look for trade-offs in forest management costs that are cost-neutral to the private sector but increase deployment of gain seed and increase the quantity and quality of wood at rotation.”

Question 18 asked, *“Do you agree that the focus of tree improvement should be on increased volume and pest resistance (versus wood quality or other characteristics)?”* **Most responses agreed with the question posed, that the focus should be on “increased volume and pest resistance.”** However, most saw this as a complex issue requiring custom solutions based on specific objectives. One respondent seemed to sum it up for everyone; *“There is no blanket solution, or shouldn’t be to this question.”* Although most responses agreed with focus on volume and pest resistance, many also stated that wood quality must also be considered..

“I agree that the focus should be on volume and pest resistance but wood quality is also very important and should be at least maintained and not decrease.”

“The focus should firstly be on volume growth unless there is a significant pest problem we have selected resistance to for that pest. Wood quality or other trait decisions are best left to individual species committees and the respective breeder to determine appropriateness.”

“...the answer, changes a little depending on whether it is a seed orchard or a breeding population. But, product quality should be the criteria for judging trait selection and weighting. The best method may be to use structural equation models to determine the strength of the causal relationship between candidate traits and product quality. Then use a decision tree for selecting superior trees.”

“...volume and resistance for 1st gen SO and other attributes for 2nd gen SO.”

“Increased volume and pest resistance are more important, because we do want a forest in place for harvest in the future. Wood quality is a desirable attribute but we still need the tree to stay alive with decent growth to rotation.”

“There should be an increased focus on forest health.- pest and disease tolerant/resistant genetic reforestation stock. Develop efforts for genetically-based marking of in-situ stands/reserves; identify superior provenances/gene pools/hybridization/ tie to performance/adaptation.”

“all of these traits are coming into most of today’s programs....second generation and beyond.”

“I support the focus on increased volume and pest resistance although we always have to be cognizant of the impacts on tree quality.”

“No, wood volume should be the main driver on the coast, but wood quality should not be sacrificed. Costs on the coast are high, thus the product must be a high value product, or the coast will not be competitive in the global market.”

Question 20 asked, *“What is the appropriate balance of public and private participation in seed production?”* **The majority of respondents favoured a balanced approach, which was also referred to as “equal” or “dual,” with consideration for private economic imperatives.** One respondent felt there *“is strength in this diversified portfolio of producers.”* Some respondents felt that a more market-based system would help encourage greater private sector involvement. One respondent felt that this question, and others related to private and public participation were not appropriate, as responses would only capture (people’s) private philosophies and not how the sector should provide a service.

“...there should be an equal split in public and private seed production. Industry would be responsible for seed for their tenures and obligations but government should produce seed for BCTS as well as seed needed for FFT or FIA related activities.”

“Evidence to date is that only a limited segment of the industry is willing to invest their own dollars in long term tree improvement production for their own use – much less for any competitors use. This, along with stewardship commitments, creates the need for the dual delivery mechanism for a broad sector of users. We have strategically relied on one supply sector while the other is in a period of restraint to good effect over many years. Select Seed company represents a continuation of the notion that tree improvement has to be subsidized with public money under current conditions.”

“The government is probably the one to take the lead on research but production could be completed by anyone. This is a separate business and is basically farming, I could see efficiencies by utilizing people who specialize in running fruit orchards.”

“what the market promotes/encourages...about what we see today in the interior.”

“Don’t know but do think a combination of private and public participation is a good thing.”

“The central issue in these questions (#19-22) is not just about an appropriate public/private balance. The underlying issue is how prices are set in an administrative framework, and whether it is possible to structure a quasi-market that can help to provide price signals to help guide allocation of resources.”

“In order to develop true and fair market prices for seed in BC, the public sector should not provide more than 20% of the seed in any region. If the public sector seed producer was a Crown corporation...playing on the same field as industry orchards with regard to access to information, etc, this might be increased to 30%.”

Question 23 asked, *“How can we better ensure seed demand is met and, in particular, address requirements arising from the MPB epidemic?”* Respondents provided a range of constructive comments, including specific solutions such as protection of seed orchards, multi-year supply seed bank, strategic collections of species, use of progeny test stock, and possibly a northern seed orchard. One called for *“a better and often-updated vision of what AAC will be harvested and what amount of harvested land will actually be regenerated via planting.”*

“Look at alternative species (ie seed transfer guidelines), apply appropriate species mix across the landscape, in the case of MPB invest in protection of seed orchards, increase production of seed from seed orchards”

“...a key point in these rapidly changing times is the rates at which our assumptions expire and need to be redefined. A year ago MPB was only able to hit larger Pli trees and there was little concern with it being a seed orchard problem. Well a year later, MPB is attacking young trees and spruce and has attacked over 1000 orchard trees, so we need to be very open in questioning our long held assumptions.”

“...can’t in an absolute way. Can set overall priorities and encourage investments that mitigate – not much more.”

“Make strategic collections for species and areas potentially at risk in advance of the epidemic. Make use of FFT monies for this.”

“Develop a multi-year MPB Seed Strategy. Develop and monitor species/seed use trends, status and inventories (in-situ/ex-situ). Develop updateable, land-based strategic planning & analysis standards and methodologies, new GRM/MPB datasets and summaries.”

“We first need a better understanding of what the short, mid and longer-term demands are, the impact of climate change and acceptable species/planting densities.”

Question 25 asked, *“What more can we do to promote continuous improvement, whereby we learn from our actions and reduce future risk through adaptive management?”* One respondent

commented, *“I believe that this is the key question in this whole Challenge Dialogue process.”* Nearly every response revolved around the need to recognize and address the risks associated with climate change. Once again, there appear to be no simple answers, and **the complexity of the challenge demands a cohesive and adaptive GRM vision and strategy**. Several respondents suggested adjusting the seed transfer rules to allow more flexibility, as a way to address this issue. Other suggestions emphasized the importance of focused research and testing, closer liaison with climate experts to better anticipate the magnitude and timing of climate change, and greater consideration of associated pest impacts due to that change.

“Modification of seed transfer rules to address climate change is the biggest challenge we face in GRM. Resources must be put to this.”

“We can better adapt to climate change by utilizing more predictive modeling as well as doing more provenance trials in areas where climate change is predicted by the models.”

“In artificial regeneration programs, the application of intensive silviculture, with its associated substantial shortening of rotation lengths may be the most effective way of addressing changing climate. Recent work by Rehfeldt (e.g., Rehfeldt, et al. 2002. Intraspecific responses to climate change in Pinus sylvestris. Global Change Biology 8:912-929) outlines an effective approach to identifying management protocols for addressing climate change.”²

“Adjust the seed transfer rules such that licensees and BCTS can, without penalty, exceed the seed transfer guidelines.”

“It might worth to consider allowing a small proportion of seed to be transferred across the current SPUs based on the results from genecology studies before new or modified seed transfer rules are formulated. For example, the seed of lodgepole pine from the SPU NE_low is predicted to perform better in both current and future climates (Wang et al. 2006).”

“Seed transfer rules may need to be changed every few years and we may also need to change our preferred and acceptable species for various eco systems, maybe we should be accepting a certain component of more southerly growing trees into the mix.”

“Consider alignment with species ranges, forest inventory updates and BEC. Consider development of climate change management areas (CCMA) – for innovative practices, pilots, testing and monitoring.”

“GRM can better adapt to climate change by considering how pests and disease may impact trees many years after seed selection and trees are group –VIP.”

“more research into facilitated migration of species.”

² Rehfeldt, GE; et al, 2002. *Abstract*. Five population-specific response functions were developed from quadratic models for 110 populations of Pinus sylvestris growing at 47 planting sites in Eurasia and North America. The functions predict 13 year height from climate: degree-days > 5 degree C; mean annual temperature; degree-days < 0 degree C; summer-winter temperature differential; and a moisture index, the ratio of degree-days > 5 degree C to mean annual precipitation. The response functions described the widely different growth potentials typical of natural populations and demonstrated that these growth potentials have different climatic optima. Populations nonetheless tend to inhabit climates colder than their optima, with the disparity between the optimal and inhabited climates becoming greater as the climate becomes more severe. When driven by a global warming scenario of the Hadley Center, the functions described short-term physiologic and long-term evolutionary effects that were geographically complex. The short-term effects should be negative in the warmest climates but strongly positive in the coldest. Long-term effects eventually should ameliorate the negative short-term impacts, enhance the positive, and in time, substantially increase productivity throughout most of the contemporary pine forests of Eurasia. Realizing the long-term gains will require redistribution of genotypes across the landscape, a process that should take up to 13 generations and therefore many years.

“The problem is that climate change must be anticipated, and its hard to predict. Nonetheless, it should be attempted and rational ways to adjust for it need to be implemented e.g. seed transfer rules could anticipate the climate half a rotation from now, so that seedlings planted now are at the edge of or even outside their current zone...”

“GRM managers must work closely with the climate change experts to include their modeling projections in the business plans. This should include a consensus amongst these experts as to the BEC changes expected as a result of climate change.”

“We have models that indicate where populations should be moving. We need to test those models repeatedly over the next decades. We rarely put in trials that absolutely push the boundaries – where up to 50% of the trial stock perishes. We need this to establish tolerances. We should manage risk by encouraging planting of small percentages of stock in its predicted deployment zone, outside of its present deployment zone.”

Additional comments: In addition to the comments referenced above, a number of comments about breeding programs were scattered throughout the responses. Suggestions included refocusing MoFR efforts to more research and out-sourcing some of the breeding, streamlining MoFR programs, and more timely and transparent progeny and provenance test data management.

Are there any other questions that you think need to be asked?

There was a limited set of responses to this request for input and some offered additional ideas. Other questions, some with suggested answers, included:

“Under a potentially rapidly changing climate how able are we to maintain forest land base/productivity/gain/value with existing GRs”

“What is your best current method of obtaining information on GRM and what method would you prefer in the future?”

“...how GRM fits in with any trend toward reduced planting numbers. Last time I checked the sowing request numbers were low. I am not sure what the numbers look like now but this together with the species of those request should have a target related to a strategy that we could monitor against.”

“Should BC consider deploying non-native species in operational regeneration programs? Yes, if we wish to maintain forested ecosystems and an industrial forestry sector we may need to include non-native species.”

Other ideas included:

“We need to examine how changing conditions i.e. climate; influences the products of tree breeding in a broader sense. If climate or silvicultural treatments change plant communities and site ecology then presumably that will affect how genetic selections perform.”

“The GRM business mapping, requirements and business case should build on the momentum initiated through the Challenge Dialogue – good work! Note: The information developed here could also form the basis for the new GRM training and extension module – consider as one of the next steps?”

Revising the questions for the Level 2 Dialogue with stakeholders

The Action Team had a difficult time deciding which questions to ask the COP; on one hand we wanted to pose questions that we felt at least some key players in the COP who likely be interested in addressing, on the other hand we were concerned we were asking too many questions. Therefore we did emphasize in the Challenge Paper the need only to respond to the questions you felt appropriate.

The collective responses provided on all 36 questions (as provided in the Consolidated Feedback document) by at least some of you in our opinion represents an important body of ideas as we move the Dialogue forward. We now have a better sense of what issues are most important to you, and your take on the challenges posed. With your feedback, and with a lens to a more focused Level 2 Dialogue, we feel we can develop a set of far fewer and less technical questions that are more appropriately asked GRM stakeholders.

INPUT REQUEST 6:

Please use the separate Progress Report Feedback Form to provide any further reactions you may have to the feedback on Questions and further discussion of these.

5.6 Next Steps, Workshop, Other Comments

Next Steps

The majority were supportive of the process and next steps; with one respondent referring to “a very ambitious plan with quick turn around which will allow the momentum to continue.” There were some constructive suggestions, such as structuring a workshop around the three pillars.

Many respondents acknowledged the ambitiousness of the Challenge Dialogue, although some felt that the process of reading the Challenge Paper and responding to it was too big an exercise and somewhat overwhelming. One respondent identified a number of other issues that need to be better defined such as roles and responsibilities between government, industry and academia on a wide range of GRM initiatives such as training, extension, monitoring and audits, seed acquisition, etc.

“Perhaps the document and possibly the workshop should be structured around the three pillars. It “may have” been better to present Outcomes, Assumptions, Key Concepts, and Critical Questions together under each of these main groups. I think some redundancy can be removed, but it is a toss-up on whether this or the current presentation is better. I suspect that it would be difficult to separate the gain and risk reduction issues, but those commenting on gene conservation are probably a different group of people?”

“A general comment is that this phase one set of assumptions and questions to the COP is much too lengthy and difficult to expect even members of the community to fill in. We will have to refine the important questions for the subsequent steps and audiences if we are to hope for a significant number of responses.”

"I think there is too much to address, so it becomes overwhelming. I think the outcome would be better if the detailed feedback was first categorized into focus areas, i.e., more or less specific areas would be discussed by focus groups, similar to what was done for the Forest for the Future exercise. I found this too broad."

"I think this is an enormous undertaking and I would like to congratulate the Champions and the project team for all the work that has already gone into this Challenge Dialogue. It is obvious that the organizations involved in this process sincerely want to improve the GRM of BC."

"Hope this flow of information continues and particularly for those of use who are unable to participate in the January workshop."

"We might need to feedback the results of the workshop to the COP once more before going to stakeholders."

"It was an unduly long exercise. I think you scared off more people than you recruited."

"A better lens needs to be applied on the level of detail that has gone into this work. Complex and good detail if you put together a group of people who are from the field to go through this process again that you would get an entirely different focus."

"The term 'Tree Improvement' is still best understood by our COP. I am not sure why there is the wish to change this to GRM as it will only end up creating confusion with our clients. We wear the 'Brand' and change should be considered carefully."

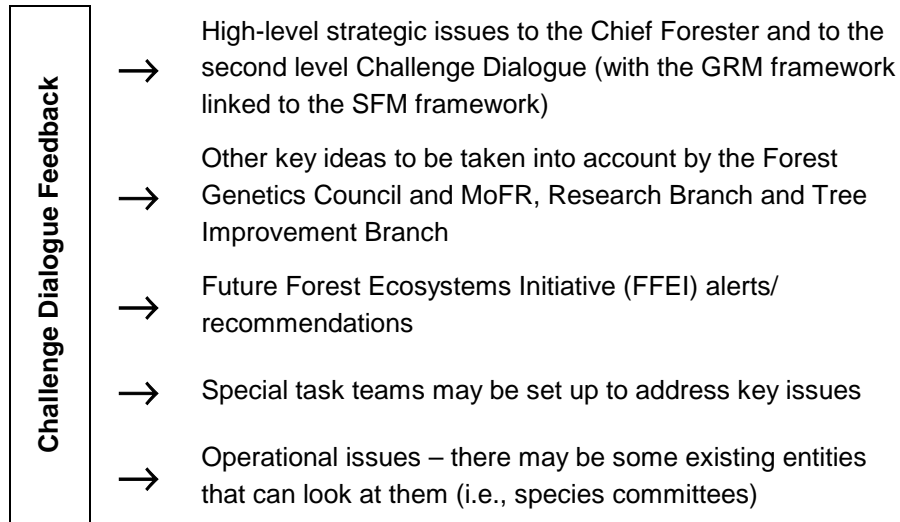
"Good, comprehensive effort!"

As noted earlier, given the quality of the feedback from the COP from this Level 1 Dialogue, and general convergence on many issues, the Co-Champions reached the conclusion that time can be most effectively spent now in preparing for the Level 2 Dialogue with GRM stakeholders, and that GRM COP workshop, as initially intended, is now not needed. That said, the expected workshop with the GRM stakeholders will involve a cross-section of the COP so that there is a good exchange of ideas and a collective development and alignment towards a GRM vision and strategy.

As we move now to the Level 2 Dialogue with stakeholders, we are very mindful of the fact that the Level 1 Dialogue may have been too lengthy even for the engaged COP, and that we will have to be very focused on in our Dialogue with stakeholders particularly since the time they can spend thinking about GRM is more limited than the COP. The key linkages between the GRM program and stakeholders, many of whom are customers or clients, and how they can be improved or better understood, will need to be a key focus rather than the technical aspects of the program.

Despite the 'overwhelming' material we provided in the Level 1 COP Dialogue, that admittedly might have resulted in non-response from some we wanted to hear from, we heard from many of you – 35 at last count – and received a very rich and rewarding set of ideas, comments, suggestions, and opinions. We can now harness that feedback to help us focus our Dialogue with GRM stakeholders.

The feedback received will also provide valuable input to various organizations and government initiatives:



Expectations for the GRM COP Workshop

In this section, **the prevailing view from respondents was that the GRM COP workshop would be considered a success if a GRM vision and strategy can be developed with clear objectives.** Several respondents specifically mentioned a need to consider the protocols for managing seed transfer rules. Some specific comments provide additional detail:

“The workshop would be a success if clear strategic statements (vision, guiding principles, mission, mandate, strategic directions, and at least qualitative goals) have been crafted and accepted (ideally with consensus).”

“...the workshop would be a success if you can come away with very clear objectives to move this challenge forward.”

“The workshop would be a success if it framed a comprehensive process for addressing climate change in seed transfer rules.”

“Advancing change management protocols for seed transfer rules.”

“A draft strategy could be formulated – it might not have all the linkages and pieces but the key ones would be there.”

“Identify research gaps, and generate a strategy to address those gaps.”

“The number of issues are condensed and kept at a high level. We won’t find solutions to all the issues raised, strive to acknowledge issues exist and that measures should be put in place to address over the next few years.”

“Emergence of a new GRM COP; evolution of GRM vision, goals and objectives; alignment of GRM key challenges; dialogue to set the stage for the development of GRM Resource Strategy; development of key components of GRM Action Plan; and scoping of GRM priorities (short, mid and long term).”

“We were to recognize the GRM system/organization that we now have in place as world class!”

The Co-champions felt that many of these outcomes could not be realized without first seeking stakeholder input, and in the case of seed transfer and climate change, that on-going technical dialogue will be required to advance this. Although the GRM COP practice workshop did not proceed, these ideas will assist us when we are ready to engage the GRM stakeholders in a workshop, which as noted earlier, will also involve a cross-section of interests from the COP. Many respondents expressed interest in attending a workshop and we will be mindful of that interest when inviting participation at that workshop.

Other Comments

One respondent provided extensive additional comments, beginning with the statement,

“It is gratifying to see British Columbia take the lead in building a well thought out approach to managing forest genetic resources. The proposed process is logical and the challenge paper is well written.”

The comments cover a wide range of issues, with constructive comments on how the Challenge Dialogue could take better advantage of strategic planning principles and terminology. The comments are developed based on a general view of the current state of GRM, summarized as follows (see *Consolidated Feedback* for full set of comments):

The scientific principles and best practices for seed transfer and tree breeding are well developed, especially in B.C. The key challenges in this area are related to - if, how, where and when to intervene to mitigate climate change effects, and a re-examination of breeding theory from a marginal-benefits perspective to improve efficiency in continuing breeding efforts. Fostering a common framework for addressing these challenges will shorten the learning curve and foster greater inter-provincial efficiency.

There are also a number of scientific principles for addressing conservation of genetic diversity. The key challenge in this area is that these principles have been developed in a number of different scientific disciplines and not yet been pull together by the forest genetics community of practitioners to develop best practices.

6. Next Steps in the Dialogue

As noted several times in this Progress Report, the Co-Champions and Action Team are extremely grateful for the many thoughtful responses provided by the Community of Practice (COP) in this Level 1 Dialogue. The co-champions commit to further assessing the issues raised through this dialogue with the intent of determining their priorities and how best to address them. We appreciate you reviewing this Progress Report, even if you did not have a chance to respond to the Challenge Paper, and providing us with any further ideas and suggestions with particular focus on how they may better inform the Level 2 Dialogue that we will be embarking on with GRM stakeholders. For example, what do you feel are the critical questions we should be asking stakeholders?

We would also appreciate your ideas on who you think are the key stakeholders we should be contacting being as specific as you can where possible by providing the names of individuals and organizations.

Your comments on this Progress Report are appreciated by **February 26, 2007**.

Please send comments by email to officelink@shaw.ca.

The Progress Report along with your comments will be used to help focus the Level 2 Dialogue with GRM stakeholders and interest groups in early 2007.

Our intended next steps are to engage GRM stakeholders in a Level 2 Dialogue that includes:

- A focused and shorter Challenge Paper coupled with targeted interviews in February-March;
- A GRM stakeholder workshop with a cross-section from the COP in March 2007 (or later in the Spring); and
- The preparation of a Workshop Synopsis that, along with the other material and feedback received during the overall Level 1 and 2 Dialogue, will then provide the basis for the completion of a GRM vision and strategy later in 2007.

Once again, many thanks for your interest and participation in this Dialogue!

INPUT REQUEST 7:

Please use the separate Progress Report Feedback Form to provide any further reactions you may have to the feedback on Next Steps in the Dialogue and further discussion of these.