

Forest Tree Gene Resource Management in British Columbia

Note: The intent of this extension note is to provide a brief rationale to the proposed Gene Resources management regime described within the discussion paper, “A Results-Based Forest and Range Practices Regime for British Columbia”, released for public review and comment on May 1, 2002. A summary of this new direction in Gene Resource Management was presented to the Forests Genetics Council of British Columbia on March 7, 2002 as a likely outcome of the Results-Based Code under development at that time. For more information, please refer to the following web sites: <http://www.resultsbasedcode.ca> and <http://www.fgcouncil.bc.ca>.

Establishment of a comprehensive provincial forest tree gene resource management (GRM) model, for implementation at both a *stand* and *landscape* level, is critical to achieving sustainable forest tree gene resources within British Columbia. A viable and effective GRM model should be broad enough in scope to meet the:

- Stewardship responsibilities of BC’s forest tree gene resource managers,
- Goals and objectives identified by the Forest Genetics Council of British Columbia,
- New results-based policy requirements for land-based decision makers,
- Monitoring requirements for policy/program implementation, and the requirements of
- Higher-level forestry initiatives (e.g. Criteria and Indicators, Forest Certification Schemes).

Gene Resource Management – New Directions

Over the past decade, the development of technical standards for genetic diversity at the *stand level* has ensured that stock used in reforestation has high genetic quality, and is well adapted to its planting site. The standards are based on the premise that if registered seedlots have sufficient levels of genetic diversity plantations will be no more susceptible to biotic or abiotic risks than those of naturally regenerated stands. However, having built this strong foundation, further development of a GRM model for implementation across a spatial-temporal scale is needed to encompass broader land-based gene resource objectives. These objectives should also be fully integrated with other land use zones and objectives. The development of *landscape level* goals and objectives is, thus, proposed to enable the sustainable management of British Columbia’s complex forest tree gene resources over the long term.

Impact of High Level Initiatives/ Policy Changes

Recently, there has been an industry-wide response to trade agreements, international market pressures, environmental pressures, and, in BC, economic downsizing. Three broad, high level initiatives and/or impending policy changes are part of this response: 1) Results Based Code, 2) Zonation (Land Use Zones) and 3) Certification. Implementation of these initiatives and/or changes will have a major impact on how land-based resources are managed in British Columbia over the coming years.

Results Based Code

The Results Based Code (RBC) will impact policy implementation for sustainable forest management and stewardship objectives. Under the Forest Practices Code, policies and technical standards were developed for implementation at the stand level. With RBC, the focus is on a results-based framework allowing for flexibility, reduction in regulatory burden and while encouraging more innovative forest practices. A key component of the RBC is the framework in which resource value/management regimes are tied to land use zones and objectives.

Genetic quality and diversity standards are currently implemented through the process of seed and vegetative lot registration and deployment limitations identified through seed transfer guidelines. This approach, although successful in capturing genetic quality and diversity at the point of registration and at the stand level, is considered less successful in tracking genetic diversity across the landscape and in establishing and monitoring spatially explicit GRM objectives over time.

Land Use Zones

Land Use zones and objectives provide spatially explicit and measurable targets for a number of forest resource values where management is effected at the landscape level. Land use zones (e.g. Management Unit (MU) or Landscape Unit (LU)) are often tied directly to higher level plans such as LRMP's, LUP's, and SFMP's. Resource development plans, for which legislated requirements are met through results-based RBC regimes, must also be consistent with the landscape level objectives set out for that land use zone. *Note: Examples of Management Units (MU's): - Timber Supply Areas, Tree Farm Licenses and Woodlots.*

Gene resource management (GRM) progress has been slow due to a lack of planning strategies and insufficient spatial data. Under the new RBC/Land Use Zonation framework, GRM goals and objectives will be developed to integrate with existing land use/resource management zones. This will provide the ability to track genetic histories of planted stands and wild populations and monitor genetic diversity across the landscape. Landscape level forest genetic objectives, such as those tied to gene conservation, could then be addressed in both a spatial and temporal framework.

Certification

Over the past few years, participation by both government and industry stakeholders in nationally and internationally recognized “Certification schemes” has increased substantially within British Columbia. This rise in participation is expected to continue, with increased scrutiny of land use management and results. Under certification, we can expect to face new challenges on how best to manage our forest tree gene resources as sustainable forest management objectives.

Genetic diversity is directly, or indirectly, identified under some certification schemes as a criterion to assess sustainable forest management. Indicators, such as the use of seed transfer rules and seed zones in planting native species, are also identified as measures of this criterion. In the next few years certification will likely require the ability to track and report on GRM criteria and indicators at the landscape level.

A New Delivery Model

As the focus on GRM shifts to include both the *stand* and the *landscape* levels, implementation of a new GRM delivery model is critical to our success in meeting long term stewardship goals and objectives.

Two key points describe the expected outcomes from delivery of a new GRM model:

1. The ability to track genetic diversity, allowing
 - Integration of GRM with sustainable forest management plans,
 - Response to the requirements of Certification schemes, and
 - Greater ability to monitor and assess risks to forest tree gene resources due to forest management practices, forest health threats, urban encroachment, or climate change.

Tracking genetic diversity across the landscape will minimize risks for those management units in which objectives are established for the management of exotics and material derived from biotechnology sources (i.e. emblings). Note: Seedlot registration must also be approved.

Deployment of resistant stock (e.g. weevil-resistant spruce, rust-resistant white pine), where it is most effective, while remaining integrated with other resource values across the landscape, could be established as a GRM objective.

AND

2. Provision of a framework in which to move science-based information and principles forward, aiding:

- Integration of GRM with other land-based resource objectives (e.g. Biodiversity, Wildlife Tree Retention, Land Use/ Landscape Planning) and,
- Incorporation of existing, and identification of new ‘set aside’ areas or reserves for gene conservation within a meaningful planning framework.

Aspects of the Biodiversity Emphasis within the Landscape Unit Planning framework could be utilized to incorporate landscape level GRM objectives. The effective management and integration of in-situ (e.g. Land-based inventories, Parks and Reserves) and ex-situ (e.g. Seed bank and clone bank inventories) gene resource values will also be made possible.

GRM - Goals & Objectives

To move GRM forward, *landscape level* goals and objectives should be developed for gene resource values. A key priority is the need to develop GRM guidelines for consideration within higher level plans and land-use-planning frameworks (e.g. landscape units). It is anticipated that landscape level GRM objectives will generally be broad in scope, and aligned with the principles and goals of the Forest Genetics Council of BC. *Note: Draft landscape unit objectives may be used to test objectives to gain a better understanding of their implications before proceeding to legal establishment.*

Over the past five years, the development of GRM-related spatial data (e.g. SPZ, SPU, SL) has improved our ability to assess and monitor the genetic quality and diversity of seed deployed through stand level reforestation efforts. However, further work is required to delineate more comprehensive GRM boundaries that will consider spatial and temporal connectivity with other resource values. Existing units and/or boundaries (e.g. Protected Areas, Old Growth Management Areas and Wildlife Trees) will likely provide the context in which to deliver a gene conservation component of GRM.

A GRM land use plan (or component) would likely include goals and objectives that define permitted uses and/or levels of intensity in the following areas: 1) Diversity, 2) Gain, and 3) Preservation Areas (where needed). GRM land use objectives would be tied to other resource values and permitted uses/intensities (including timber resource values). Temporal issues would also require consideration for monitoring GRM objectives over time.

Interim GRM Objectives:

The proposed RBC requires that in the absence of legally established objectives, there will be interim objectives to direct forest development planning. Interim GRM objectives are proposed through the application of conditions attached to registration.

For the most part, the conditions currently identified under seed and vegetative lot registration (e.g. SPZ, Intended Use Ranges (min/max latitude, longitude and/or elevation ranges)) should be adequate. However, where management of genetic resources has impact at the landscape level and poses an immediate risk, further conditions may apply regarding deployment and intensity guidelines (e.g. percentage of clonal row embling plantings; use of exotics).

Benefits of a Landscape-based GRM Model

Implementation of a provincial GRM model at the landscape level will allow us to:

- Provide the strategic plan and framework to integrate GRM with Forest Genetics Council goals and objectives;
- Fully identify the roles and responsibilities necessary for stewardship of the province's forest tree gene resources;
- Integrate the use of GRM within the existing landscape level (MU/LU) framework;
- Develop GRM objectives in keeping with other resource management objectives (Biodiversity, Visual Quality, Recreation, Cultural Heritage)
- Integrate GRM with Certification requirements based on C&I standards (genetic diversity);
- Deliver GRM tools at the operational level to aid in the development of sustainable forest management plans (SFMP's);
- Provide adequate records to assess population response to environmental change and/or disturbance brought about through forest management practices; and
- Provide adequate records for *in-situ* and *ex-situ* gene bank/reserve management strategies due to disturbance factors, pest infestations and other gene conservation needs.

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