FGC Forest Genetics Council of British Columbia

STRATEGIC PLAN 2009–2014







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Cover Photos:

Western larch orchard operated by the MFR and supplying seed for the Nelson seed zone.
Chris Walsh

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Jack Woods

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FGC Strategic Plan 2009–2014 Statement of Purpose

This Strategic Plan outlines the vision, scope, objectives, roles and responsibilities, and operating principles for conserving and managing BC's forest tree genetic resources for the period 2009 to 2014. It also sets out a business planning structure and goals for the Forest Genetics Council of British Columbia (FGC), a multi-stakeholder advisory group reporting to the provincial Chief Forester.

Background

Forest genetic resource conservation and management (GRM) in British Columbia is a shared responsibility between the government of the province of BC, private forest companies operating on Crown land, academia, and the federal government.

GRM has historically been coordinated through cooperative councils, beginning with the Plus Tree Board in the 1960s. GRM activities are presently led by the Forest Genetics Council of British Columbia (FGC), which consists of representatives from the BC Ministry of Forests and Range, forest industry, universities, and the Canadian Forest Service. The FGC advises the Provincial Chief Forester on policy, priorities and business planning for publicly-funded GRM investments, and coordinates GRM-related activities among stakeholders.

This strategic plan is informed by an extensive dialogue undertaken with members of the GRM community of practice, stakeholders, and the public between 2006 and 2008. Background information and outcomes from this dialogue may be viewed at::
http://www.for.gov.bc.ca/hti/grm/grm_dialogue.htm



Douglas-fir orchard operated by Vernon Seed Orchard Company in partnership with SelectSeed Ltd., and supplying seed for the Quesnel Lakes seed zone.

Photo Jack Woods



"The genetic resource of forest trees is the foundation for all economic and ecological values that flow from BC's forests"

Genetic Resource Conservation and Management

Genetic resource conservation and management (GRM) seeks to protect and conserve the genetic foundation of BC's public forests to provide for their continued evolution and development to meet human needs and to provide environmental services. The genetic resource of forest trees is the foundation for all economic and ecological values that flow from BC's forests.

GRM consists of three primary and integrated components (Figure 1):

- **Conservation,** the maintenance of natural levels of genetic diversity for all tree species indigenous to BC;
- **Resilience,** matching seed (genotypes) to planted sites (environments), and maintaining natural genetic diversity in planted populations of trees; and
- **Value,** increasing the timber and non-timber economic value of planted forests.

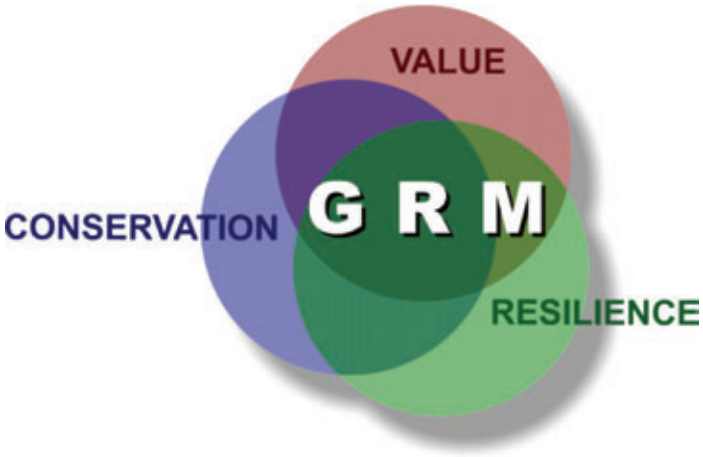


Figure 1
Three primary components of Genetic Resource Management

Stewardship of the province's forest tree genetic resources is vested with the Ministry of Forests and Range, and the province's Chief Forester. The *Forest and Range Practices Act* and regulations, and the *Chief Forester's Standards for Seed Use* govern tree seed use for the establishment of free growing stands on Crown land. These include requirements for seed collection, production, registration, storage, selection, transfer and reporting.

To fulfill their respective mandates, the Ministry of Forests and Range and the Chief Forester sponsor GRM activities through the FGC, internal programs, and other institutions. Support for GRM activities is also provided by the Forest Investment Council of BC through the provincial Forest Investment Account.

GRM as part of sustainable forest management

Sustainable forest management (SFM) maintains and enhances the long-term health of forest ecosystems for the benefit of all living things, while providing environmental, economic, social, and cultural opportunities for present and future generations. SFM sets the broad context for GRM goals and objectives, while GRM is one of the essential components of SFM . As such, this strategy is linked with other SFM-related initiatives, such as Biodiversity BC and the Ecosystem Conservation Framework.

Scope

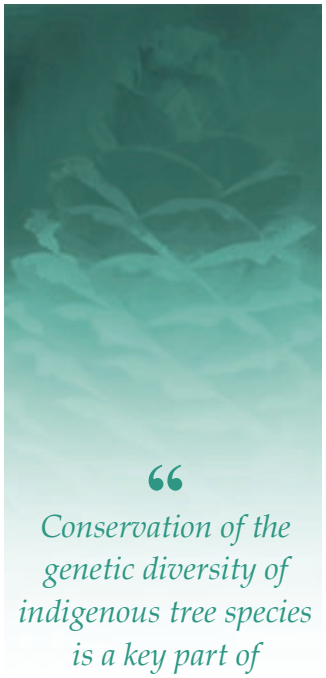
The following outlines the scope of this Strategy with respect to land base, species, values, new technologies, and timeframe.

- **Landbase:** This strategy applies to all forest land in BC (public and private), with a primary focus on Crown lands within the provincial forest. It also recognizes that areas outside the timber harvesting land base on Crown land, such as parks and protected areas, and private land conservancies, contribute to provincial genetic conservation objectives.
- **Tree species:** As trees are the leading flora influencing ecosystem processes in forests, conservation of the genetic diversity of indigenous tree species is a key part of maintaining the long-term economic and ecosystem services provided by forests. This strategy focuses on BC's 50 indigenous tree species, including 15 commercial timber species and 35 non-timber species. Some non-indigenous species are also considered.

  Indigenous and non-indigenous species are defined as follows:

  - **Indigenous species** – are species native to BC, within their present natural range.
  - **Non-indigenous species** are defined in two categories; **indigenous non-local** - species indigenous to western North America whose range could naturally expand or be moved to new geographic areas (i.e. noble fir range expansion into British Columbia, or the northerly migration of Douglas-fir or western larch to areas in BC where they are not currently found), and **exotic species** - species not native to western North America (i.e. Siberian larch).

  Some non-indigenous tree species may be suitable for use on Crown lands where they offer exceptional timber or ecosystem values, and the benefits, costs, and environmental risks have been fully assessed. The use of non-indigenous species, however, is a land-use issue which is beyond the scope of this strategy and the mandate of the FGC.



"Conservation of the genetic diversity of indigenous tree species is a key part of maintaining the long-term economic and ecosystem services provided by forests"

- **Timber and non-timber values:** The genetic characteristics of tree species support important timber and non-timber values. They can also provide other important ecological and societal services such as bioenergy and carbon sequestration. This GRM strategy, acknowledges values other than timber and is responsive to broader SFM objectives in this context.
- **New technologies:** The development and application of new technologies is within the scope of this GRM strategy, however, this strategy will focus on technologies close to the implementation phase, with clear linkages to ongoing activities such as tree breeding and field testing. The development of plants with novel traits (PNTs), including genetically modified organisms, is not within the scope of this plan. However, should PNT opportunities arise through other research, controlled testing may be carried out with due consideration for environmental and ethical issues and for existing federal law concerning the testing and release of PNTs.
- **Timeframe:** Program development under this strategy will consider the impacts of management activities over long timeframes (100+ years). Timeframes for specific GRM strategies must be sufficiently flexible to support short- and longer-term objectives, as follows:
  - FGC strategic plans and business cycles will be established and evaluated on 5-year cycles
  - Support for breeding programs and seed orchard production must follow approximately 20 year cycles
  - Evaluation of program impacts on timber production and future forest conditions is required on approximately 50-100 year (rotation age) cycles

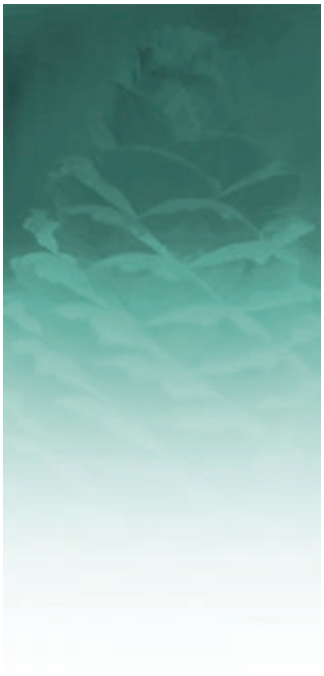
> *"The development of trees with novel traits, including genetically modified trees, is not within the scope of this plan"*



Lodgepole pine cones harvested from an orchard in the Kettle Valley.

Photo Jack Woods

Vision and Objectives



Vision statement

BC's forest genetic resources are diverse, resilient, and managed to provide multiple values for the benefit of present and future generations.

Conservation outcome and objective

Outcome: The genetic structure and diversity of all indigenous tree species are adequately maintained to support their continued evolution while providing environmental services and social and economic values.

OBJECTIVE 1

Adequately conserve the genetic diversity of key populations of all forest tree species native to BC by 2015, through a combination of *in situ*, *ex situ*, and *inter situ* conservation.

Effective genetic conservation requires knowledge of population, ecological, and quantitative genetics, a comprehensive inventory of the forest-tree genetic resource, and the systematic identification of species and population priorities for additional conservation. The FGC will support the development and maintenance of a catalogue of the conservation status for all 50 naturally occurring tree species across scientifically defined seed zones. Where the genetic diversity of a species within a zone is determined to be at risk, appropriate measures for *in situ*, *ex situ*, *inter situ*[1] genetic conservation will be supported, or recommendations made to appropriate agencies. To meet this objective, the following will be undertaken in the period of this plan:

- Complete the cataloguing of the *in situ*, *ex situ* and *inter situ* status of BC's 50 native tree species,
- Develop conservation priorities and conservation strategies for species whose genetic diversity is determined to be at risk,
- Implement conservation measures for species or populations of concern.

Reporting: Progress towards achieving adequate conservation of 100% of indigenous tree species within key subdivisions of genetic diversity, such as seed zones and biogeoclimatic subzones, will be assessed and reported annually.

[1] *In situ* genetic conservation is the maintenance of genetic diversity within naturally occurring tree populations. *Ex situ* genetic conservation is the long-term storage of germplasm, typically seeds, in a seed bank, or the maintenance of clonebanks of selected tree populations. *Inter situ* genetic conservation is the maintenance of tree populations established in progeny, provenance, and other genetic tests, for which there is specific genetic information available.

Resilience outcome and objective

Outcome: Trees are well adapted to the projected climate of the areas in which they are planted, contain adequate genetic diversity, and form part of diverse forest ecosystems across the landscape.

OBJECTIVE 2

By 2020, high-quality genecology research information will guide operationally efficient climate-based seed transfer policy and practice for all trees planted in BC.

Tree populations are adapted to climatic envelopes. Seed transfer policy developed by the Ministry of Forests and Range embodies the breadth of available information on patterns of genetic diversity, adaptation, and climatic conditions. This policy supports the planting of seedlots in climatic areas to which they are properly adapted, maintaining and enhancing stand resilience and long-term timber supply. Seed transfer policy must also be operationally efficient to reduce seed inventory and seedling procurement costs.

“Information needs for scientifically-based and operationally-efficient seed transfer policy require investments in genecology research and climate modeling.”

Information needs for scientifically-based and operationally-efficient seed transfer policy require investments in genecology research, climate modeling, and seed transfer system development. The following activities will be undertaken to achieve this objective:

- Implement a province-wide climate-based seed transfer system,
- Adjust FGC programs and information systems to support priority operational seed production under new seed zones,
- Conduct progressive, field-based research on the natural patterns of genetic diversity for all species planted in BC
- Model climates to understand how climate envelopes currently occupied by indigenous tree populations will change over time

Reporting: Progress on the implementation of science-based seed transfer standards, that consider climate change, will be tracked and reported annually. The performance indicator will be the percentage of seedlings planted under climate-based seed transfer standards.

Value outcome and objectives

Outcome: Sufficient seed of high genetic value is produced through tree breeding, seed-orchard production, and related activities to meet reforestation objectives and enhance timber supply and quality.

OBJECTIVE 3

Increase the average volume gain of select seed used for Crown land reforestation to 20% by the year 2020.

Gains in commercial traits require effective tree improvement programs, including tree breeding and the coordination of breeding with seed orchard[2] operations. Tree improvement activities will be carried out only in seed planning units[3] with sufficient seed demand and timber-production capacity to warrant investment. The following activities will be undertaken in support of this objective:

- Science-based tree breeding and testing programs for seed planning units meeting investment criteria,
- Development of human resources in the Ministry of Forests and Range Research Branch to ensure programs are supported by capable expertise,
- Coordination of planning between breeding programs and seed orchards to ensure the timely upgrading of seed orchards to incorporate the best available selections from breeding programs.

Reporting: Progress towards objective 3 will continue to be tracked using the weighted average genetic worth for growth for all orchard seedlots sown in a given year (Figure 2).

“Gains in commercial traits require effective tree improvement programs, including tree breeding and seed orchards.”

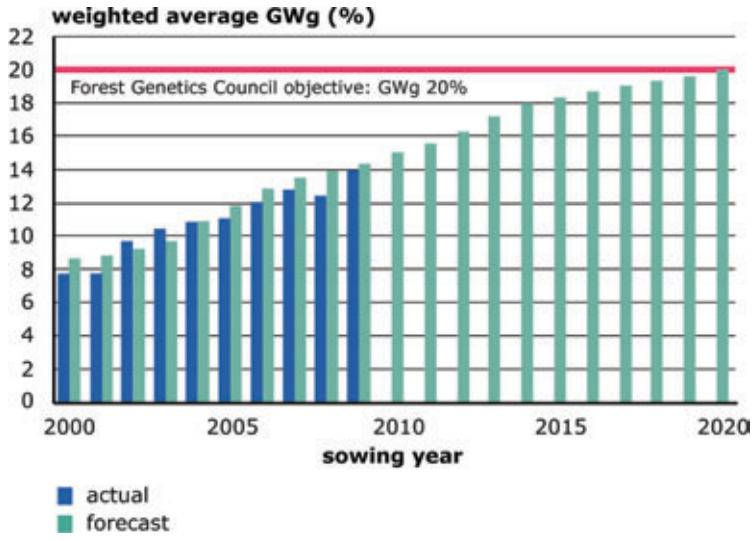


Figure 2
Actual and forecast gain in volume (GWg) of orchard seed used (2000–2020).

[2] Seed orchards are the predominant means for producing select material in British Columbia, however, vegetative production systems are included (primarily yellow cedar).

[3] Seed planning units (SPU) are defined as a specific species / seed zone / elevation band combination. Each breeding program and seed orchard targets a specific SPU.

OBJECTIVE 4

Increase select seed use to 75% of the provincial total sown by 2014.

Select material[4] developed in breeding programs attains value through operational seed production, seedling production, and planting. The FGC will facilitate operational seed production and its coordination with seed use and seedling procurement processes through business planning and policy development, and through support of seed orchard quality improvements. The following activities will be undertaken in support of this objective:

- Development and sharing of technical information on seed orchards and breeding programs,
- Support for needed seed orchard quality improvements,
- Development and maintenance of information systems for seed inventory, ordering, and marketing,
- Facilitation of tree improvement delivery options that maintain and enhance provincial seed production capacity.

Reporting: Progress towards objective 4 will continue to be tracked using the percentage of select seed use relative to total provincial sowing (Figure 3).

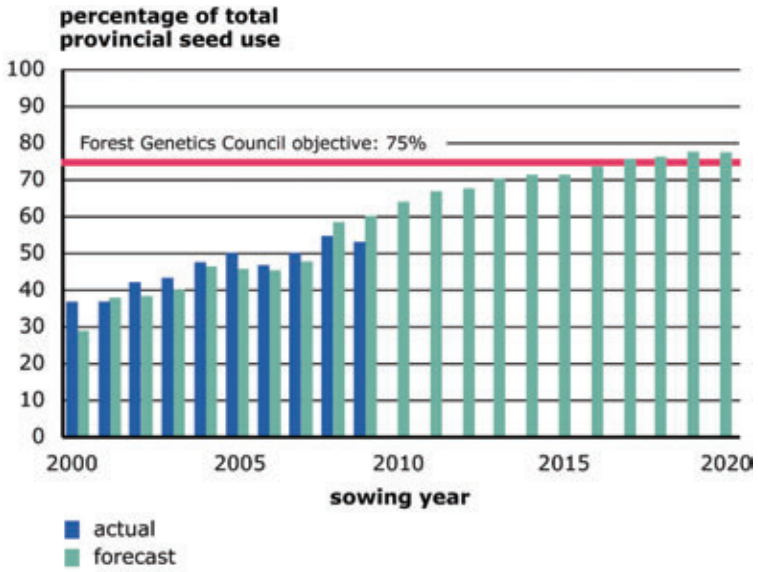


Figure 3
Actual and forecast select seed use in British Columbia (2000–2020).

[4] Select seed includes all seed and cutting material with a genetic worth of greater than 0, including orchard seed (class A) and superior provenance seed (class B+).

Enabling objectives

Achievement of objectives for Conservation, Resilience, and Value will require activities in support of business planning, communication, extension, information management, and policy development. It is intended that such activities will remain an integral part of all projects and that specific activities will be developed as needed in support of the primary program objectives.

OBJECTIVE 5

Coordinate stakeholder activities and secure the resources needed to meet Business Plan priorities.

By setting clear strategic goals and objectives and by annual business planning, the FGC will:

- Anticipate and procure the resources needed to meet objectives,
- Develop program structure and resourcing to minimize reliance on annual program funding sources,
- Strive for select-seed production to be self-financed through seed sales.

Reporting: Annual FGC reports will summarize overall activities and reflect on progress and needs relative to measurable objectives one to four.

OBJECTIVE 6

Monitor and report progress in genetic resource management activities.

Business planning will include systems for monitoring and annually reporting progress at the provincial and project levels. Provincial-level performance indicators are set out above for Objectives 1 to 4. Project level performance indicators will also be used, where appropriate. Such indicators facilitate budget planning and project reporting.

The following activities will be undertaken in support of this objective:

- Develop and publish a comprehensive annual Business Plan,
- Compile and annually report on performance indicators, and on project-level activities.

“Business planning will include systems for monitoring and annually reporting progress.”

Guiding Principles

The following principles will guide GRM strategies, programs, and the development of annual business plans:

- **Foster a cooperative approach and nurture collaboration among stakeholders:** Address GRM components of conservation, resilience and value in a balanced and integrated manner through stakeholder collaboration, communication, and cooperation.
- **Recognize GRM as an integral element of SFM.**
- **Respond proactively to environmental, social, economic, and technological changes:** Encourage a culture of innovation while respecting the values of various groups.
- **Pursue the best science:** Inform and guide policy and practices.
- **Apply adaptive management:** Embrace uncertainty and experimentation, accelerate learning, close the feedback loop.
- **Exercise open and inclusive communication**: Keep all colleagues and stakeholders well informed.
- **Measure and manage performance:** Monitor and assess progress; continuously improve policy and practices.
- **Employ best business practices:** Document, share, and evolve knowledge; make timely and transparent decisions.
- **Stakeholder independence:** Respect the independence of collaborating stakeholders and seek program advancement in ways that will enhance stakeholder business objectives.



Lodgepole pine orchard supplying seed for the Thompson Okanagan zone. Operated by Tolko Ltd. in partnership with SelectSeed Ltd.

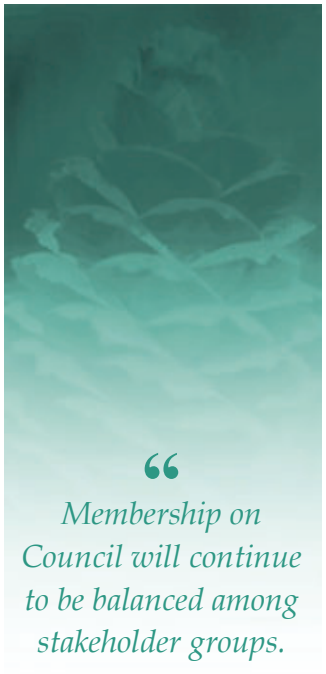
Photo Jack Woods

Structure and Membership

The Forest Genetics Council will remain formally structured, with bylaws that govern membership, meetings, and decision-making. Membership on Council will continue to be balanced among stakeholder groups, with representation from seed producers and seed users.

Table 1: Council membership structure

Stakeholder		No. of members
Co-chairs	- industry	1
	- Ministry of Forests	1
Ministry of Forests		3
Industry	- interior seed producer	1
	- interior seed users (north and south)	2
	- Coast seed user	1
	- Coast seed producer	1
Coastal and Interior TAC Chairs		2
University		1
Canadian Forest Service		1
FIA *(non-voting)*		*1*
Voting members		**14**

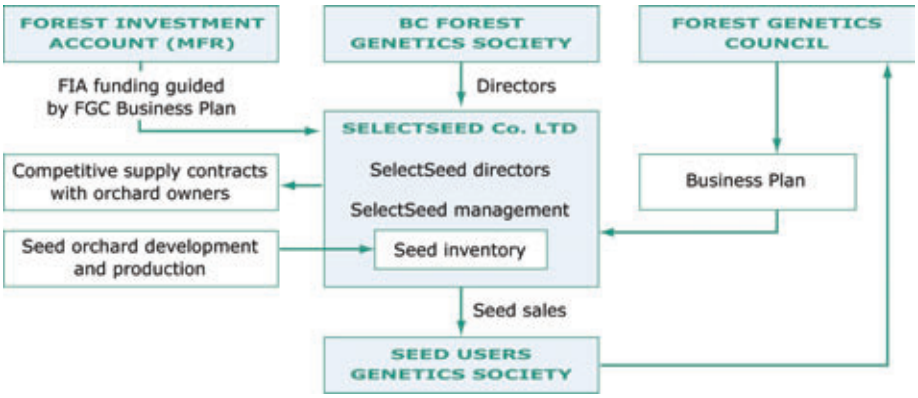


"Membership on Council will continue to be balanced among stakeholder groups."

Society and SelectSeed Company Ltd.

Provincial seed production objectives require sufficient seed orchard capacity. This was originally noted in Council's 1998 Strategic Plan, and resulted in the establishment of the BC Forest Genetics Society (Society) and SelectSeed Company Ltd. (SelectSeed). Figure 4 shows the relationship between Council, the Society, SelectSeed, and the Forest Investment Account (FIA). SelectSeed is mandated by Council to develop and operate seed orchards needed to fill seed supply gaps. This mandate continues. SelectSeed will become increasingly self-funded through seed sales, with the goal of becoming financially independent in about 2014.

Figure 4
BC Forest Genetics Society and SelectSeed Company Ltd. organizational structure.



SELECTSEED MISSION STATEMENT

SelectSeed supports FGC objectives for the development of seed orchard facilities to meet the provincial demand for high quality, genetically-adapted tree seed through investments, cooperative work with FGC members, and effective program management.



Lodgepole pine and spruce forest in the west Chilcotin.

Photo Jack Woods

Strategic Issues

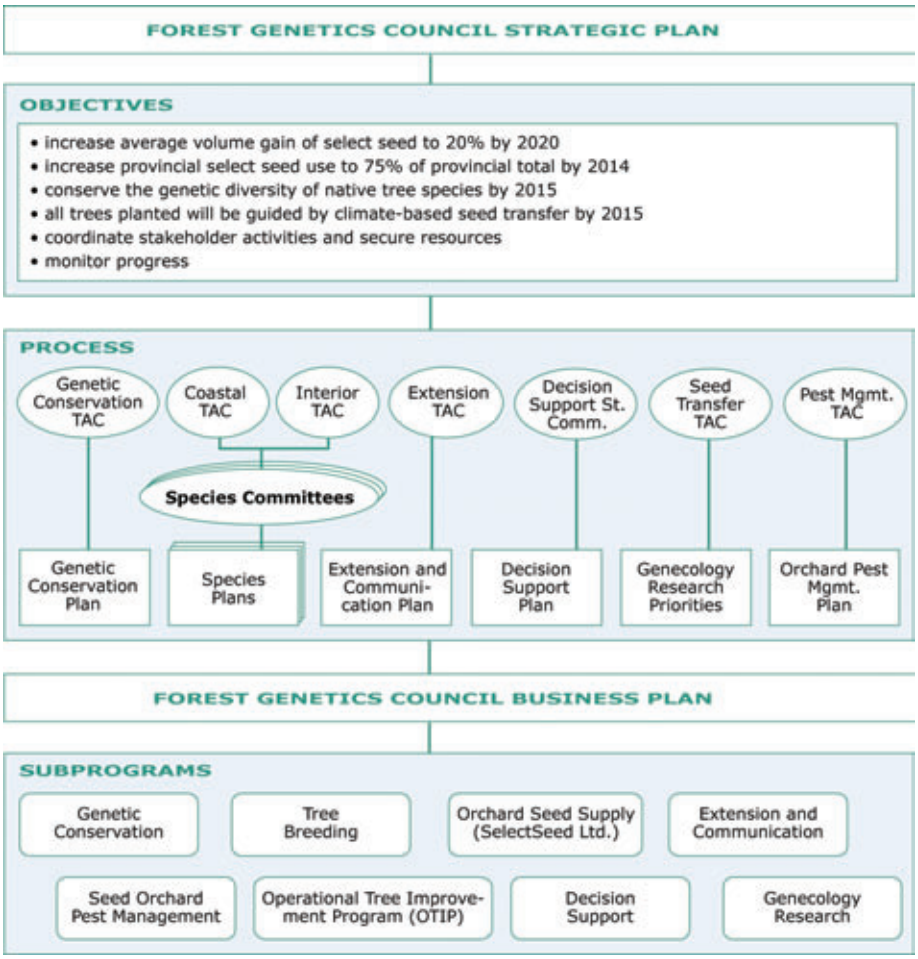
Changing circumstances result in challenges to the ongoing development and management of a provincial genetic resource management program. From time to time, issues will arise that impact the ability of Council to meet stated objectives. Through regular business planning, monitoring, and communication, Council is positioned to respond to new issues.

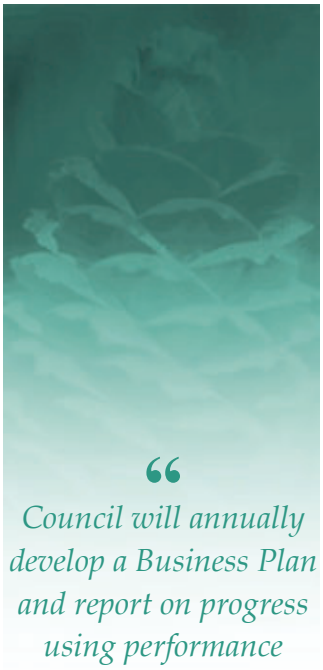


Business Planning

FGC Business Plan development

Council will annually develop a Business Plan and report on progress using performance indicators. Figure 5 illustrates the relationship among Council, subcommittees, and Business Plan development.





“Council will annually develop a Business Plan and report on progress using performance indicators.”

Figure 5
Committee structure and development of annual FGC Business Plans.

