Chief Forester's Standards for Seed Use

Ministry of Forests, Lands, Natural Resource Operations
and Rural Development

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1. DEFINITIONS

1 In these standards:

"Act" means the *Forest and Range Practices Act*;

"area of use" means the area of use determined for a tested parent tree under section 5.3.2 (d) (ii);

"**BEC unit**" means the Province of British Columbia's Biogeoclimatic Ecosystem Classification zone, subzone and variant (where variant is applicable), as published by DataBC at: https://catalogue.data.gov.bc.ca/dataset/biogeoclimatic-ecosystem-classification-bec-map, and as amended from time to time;

"Branch" means Forest Improvement and Research Management Branch of the Ministry of Forests, Lands, Natural Resource Operations and Rural Development;

"breeding value" means a comparative measure of genetic value for a specific trait of a parent tree, based on the observed or predicted performance of the parent tree's progeny relative to the average performance of the progeny of other trees of the same species, as determined in accordance with section 5.4;

"**CBST**" means climate based seed transfer;

"CBST area of use" means an area of use composed of one or more BEC units where a lot may be planted;

"clonal value" means a comparative measure of genetic value for a specific trait of a parent tree, based on the observed performance of cuttings produced from the parent tree relative to the average performance of cuttings produced from other trees of the same species, as determined in accordance with section 5.4;

"collection area" means the area within a natural stand from which seeds or vegetative material are collected for the purpose of producing a lot;

"custom lot" means a lot that qualifies for registration as a lot collected from tested parent trees, where an election is made to register it as a custom lot;

"cutting" means a tree grown from vegetative material;

"donor plant" means a seedling grown from seeds that are either collected from a parent tree or taken from a registered seedlot, where the seedling is used to produce vegetative material;

"effective population size" means a measure of the genetic diversity of a lot collected from parent trees, based on the respective parental contributions of the parent trees to the lot;

"family" means seedlings grown from seeds collected from a single tree;

"genetic worth" means a measure of a lot's genetic worth, with respect to a specific trait, as determined in accordance with section 7.2 (a);

"lot" means a seedlot or vegetative lot;

"natural stand" means a stand of trees that was established through natural regeneration;

"natural stand seed planning zone" means a seed planning zone identified in Table 2.1 of Appendix 2;

"origin" means the following:

a) in the case of a lot registered as a lot collected from a natural stand within British Columbia, the location of the collection area, as denoted by
   i) the natural stand seed planning zone in which the collection area is located,
   ii) the mean elevation of the collection area, recorded in metres,
   iii) the mean latitude of the collection area, recorded in degrees, minutes and seconds,
   iv) the mean longitude of the collection area, recorded in degrees, minutes and seconds, and
   v) the BEC unit in which the collection area is located;

b) in the case of a lot registered as a lot collected from a superior provenance,
   i) the collection area criteria specified in Appendix 5 for the species and provenance of the lot, and
   ii) the mean elevation of the collection area, recorded in metres;

c) in the case of a lot registered as a lot collected from untested parent trees within British Columbia, the location of the natural stands from which the parent trees were selected, as denoted by
   i) the natural stand seed planning zone in which the stands are located,
   ii) the mean elevation of the stands weighted by the proportional parental contribution to the lot of the parent trees selected from these stands, recorded in metres, and
   iii) the mean latitude of the stands weighted by the proportional parental contribution to the lot of the parent trees selected from these stands, recorded in degrees, minutes and seconds;

d) in the case of a lot registered as a lot collected from tested parent trees within British Columbia,
   i) if the parent trees have at least one area of use that is the same for all of the parent trees, the area of use that is the same for all of the parent trees, or
   ii) if parent trees do not have at least one area of use that is the same for all of the parent trees, the area denoted by
      A) the tested parent tree seed planning zone, or latitude range within a tested parent tree planning zone, referred to in section 5.2.2.1 (e) (ii) (A), and
      B) the overlap in the elevation ranges referred to in section 5.2.2.1 (e) (ii) (B);

e) in the case of a lot registered as a custom lot,
   i) the tested parent tree seed planning zone that
      A) applies to the area of use that is the same for all of the tested parent trees that contributed to the lot, or
      B) applies under section 5.2.2.1 (e) (ii) (A) to all of the tested parent trees that contributed to the lot,
   ii) the mean elevation of
      A) the natural stands from which those parent trees that were not bred from other parent trees were selected, and
      B) the areas of use determined for those parent trees that were bred from other parent trees,

      weighted by the proportional parental contribution to the lot of those parent trees, recorded in metres, and
   iii) the mean latitude of
      A) the natural stands from which those parent trees that were not bred from other parent trees were selected, and
      B) the areas of use determined for those parent trees that were bred from other parent trees

      weighted by the proportional parental contribution to the lot of those parent trees, recorded in degrees, minutes and seconds;

f) in the case of a lot registered as a lot collected from a natural stand outside of British Columbia,
   i) the collection area criteria specified in Table 6.1 of Appendix 6 for the species of the lot, and
   ii) the mean elevation of the collection area, recorded in metres;

g) in the case of a lot registered as a lot collected from parent trees outside of British Columbia, the parent tree criteria specified in Table 6.2 of Appendix 6 for the species of the lot and the seed orchard at which it was collected;

"parent tree" means a genetically unique tree of a known source that is

a) selected for specific traits, and

b) bred or cloned for the purpose of producing seeds or vegetative material;

"parental contribution" means the genetic contribution of a parent tree to a lot, based on

a) the male or female gametic contribution of the parent tree to a seedlot, or

b) the proportion of the vegetative material in a vegetative lot that comes from the parent tree;

"person" means a person referred to in section 2.1, unless the context requires otherwise;

"plantation" means a stand of trees established by planting;

"production facility" means a facility at which vegetative material is produced, collected or stored, and includes cutting hedges, stool beds, nurseries and laboratories;

"ramet" means a cutting grown from vegetative material collected from a parent tree, where the cutting is used to produce seeds or vegetative material;

"register" means to register a lot under Part 5, in order to use that lot to establish a stand under section 29 of the Act, and **"registered"** has a corresponding meaning;

"seed" means germplasm derived through sexual reproduction that is used to grow a tree;

"Seed BEC unit" means:

a) for lots collected from natural stands within BC, the BEC unit of origin for the stand, and,

b) for lots collected from:

i. natural stands located outside of BC,

ii. parent trees located within BC; and

iii. parent trees located outside of BC,

the BEC unit assigned by the Branch;

"seed orchard" means a collection of parent trees maintained for the purposes of producing seeds;

"Seed Planning and Registry System" means the information system maintained by the Branch to record information respecting lots;

"seed planning zone" means a natural stand seed planning zone or a tested parent tree seed planning zone;

"seedling" means a tree grown from seed**;**

"seedlot" means seeds that are collected and assembled as a lot for the purposes of registration under Part 5;

"stand" means a natural stand or a plantation;

"superior provenance" means a collection area within a natural stand identified in Appendix 5;

"tested parent tree" means a parent tree, of a species identified in Table 2.2 of Appendix 2, that falls within one of the following categories:

a) a parent tree from which seeds were collected to grow seedlings, where these seedlings have been tested in accordance with the requirements of sections 5.3. and 5.4 to determine

i) an area of use for the parent tree, based on the genetic suitability of the seedlings for the area, and

ii) breeding values for the traits for which the parent tree was selected, based on the performance of the seedlings;

b) a parent tree from which vegetative material was collected to grow cuttings, where these cuttings have been tested in accordance with the requirements of sections 5.3. and 5.4 to determine

i) an area of use for the parent tree, based on the genetic suitability of the cuttings for the area, and

ii) clonal values for the traits for which the parent tree was selected, based on the performance of the cuttings;

c) a parent tree that is a seedling selected from a family, where the parent tree and its family have been tested in accordance with the requirements of section 5.3 and 5.4 to determine

i) an area of use for the parent tree, based on the genetic suitability of the parent tree and its family for the area, and

ii) breeding values for the traits for which the parent tree was selected, based on the predicted performance of the parent tree's progeny, extrapolating from its own performance and the performance of its family;

"tested parent tree seed planning zone" means a seed planning zone identified in Table 2.2 of Appendix 2;
"transfer limits" means the limits referred to in Part 8 that determine where seedlings or cuttings may be planted, based on the registered lot from which the seedlings or cuttings originated;
"Tree Seed Centre" means the Tree Seed Centre maintained by the Branch;
"untested parent tree" means a parent tree that is not a tested parent tree;
"vegetative lot" means vegetative material that is collected and assembled as a lot for the purposes of registration under Part 5;
"vegetative material" means plant tissue or a plant part, derived through asexual reproduction, that is used to grow a tree.

2. APPLICATION

2.1 These standards apply to

a) a person who uses seeds or vegetative material for the purposes of establishing a stand under section 29 of the Act,

b) a person who registers seeds or vegetative material for use by a person referred to in paragraph (a), or

c) a person who requests an identification number for a parent tree, or submits information regarding a parent tree, so that seeds or vegetative material collected from that parent tree may be registered.

3. PURPOSE

3.1 The purpose of these standards is to maintain the identity, adaptability, diversity and productivity of the Province's tree gene resources by

a) establishing criteria for the registration of seedlots and vegetative lots used to establish a stand under section 29 of the Act, and

b) regulating the storage, selection, use and transfer of registered lots.

4. EFFECTIVE DATE

4.1 These standards take effect four months after the later of

a) December 1, 2004, or

b) the date on which notice of these standards is published in the *Gazette*.

5. REGISTRATION

5.1 General Requirements

5.1.1 A person may apply to have a lot registered by

a) submitting an application form to the Branch, which form must

i) contain the applicable information specified in Appendix 1, and

ii) be signed by the person who owns the lot, or a person authorized to act on that person's behalf, and

b) in the case of a seedlot, submitting the seedlot itself to the Tree Seed Centre for storage and testing in accordance with Part 6.

5.1.2 A seedlot referred to in section 5.1.1 (b) must be submitted in a container that has a tag on both the inside and outside of the container clearly identifying the species of the lot and the application form to which it relates.

5.1.3 Subject to this Part, upon receipt of an application form submitted under section 5.1.1,

a) the Branch may assign a pending registration number to the lot in respect of which the application form was submitted, and

b) if the requirements referred to in section 5.1.4 are met, the Branch must

i) register the lot in respect of which the application form was submitted by either assigning a registration number to the lot, or confirming the pending registration number, if any, referred to in paragraph (a), and

ii) maintain a record of the registration number of the lot, the information contained in the application form and, in the case of seedlots, the results of tests conducted by the Tree Seed Centre under section 6.4 or 6.5.

5.1.4 The Branch must assign or confirm a registration number under section 5.1.3 (b) if the following requirements are met:

a) the information contained in the application form is complete and accurate;

b) the lot complies with the requirements of this Part and Part 6;

c) in the case of a seedlot, the tests conducted by the Tree Seed Centre under section 6.4 confirm that

i) the seeds in the lot have a moisture content greater than or equal to 4 per cent and less than or equal to 9.9 per cent, and

ii) the lot contains at least 97 per cent pure seed by weight.

5.1.41 The Branch must assign a Seed BEC unit for lots collected from:

a) natural stands outside of BC,

b) parent trees located within BC; and

c) parent trees located outside of BC.

5.1.42 The Branch must assign or confirm an orchard identification number for lots collected from an orchard or production facility located within or outside BC.

5.1.43 The Branch must make available information assigned in 5.1.41 and 5.1.42, in the Seed Planning and Registry System.

5.1.5 The Branch must make information recorded under section 5.1.3 (b) (ii) available to a person who requests this information.

5.1.6 The owner of a registered lot, a person authorized to act on that person's behalf, or a person employed by the Ministry of Forests, Lands, Natural Resource Operations and Rural Development, may request an amendment to information respecting that lot recorded under section 5.1.3 (b) (ii), if

a) the person identifies an error in the recorded information and provides information to verify the error, or

b) the ownership of the lot changes and the person provides information respecting the change in ownership.

5.1.7 Upon receipt of a request under section 5.1.6, the Branch must

a) amend the information recorded under section 5.1.3 (b) (ii), if the Branch is satisfied that the amendment is necessary or appropriate having regard to the information provided in support of the request, and

b) record the nature of the amendment and the date on which it was made.

5.1.8 The following types of lots must not be registered:

a) a lot consisting of both seeds and vegetative material;

b) a lot consisting of seeds or vegetative material collected from a plantation that consists of trees other than parent trees;

c) a lot consisting of seeds or vegetative material collected from both

i) natural stands, and

ii) plantations, seed orchards or production facilities;

d) a vegetative lot that consists of both vegetative material collected directly from a parent tree, without using donor plants, and vegetative material collected from donor plants grown from seeds collected from a parent tree;

e) a lot consisting of seeds or vegetative material that has been subjected to genetic modification through mutagenesis, a recombinant DNA technique or other related methods;

f) a lot that is collected from outside of British Columbia that does not meet the requirements in Appendix 6.

5.1.9 A lot collected from both tested parent trees and untested parent trees may only be registered as either

a) a lot collected from tested parent trees, or

b) a lot collected from untested parent trees,

depending on whether the requirements of section 5.2.2.1 (g) (i) or (ii) have been met.

5.1.10 A lot that consists of seeds or vegetative material multiplied through the application of somatic embryogenesis, tissue culture or other biotechnological processes may only be registered if seedlings or cuttings produced through these biotechnological processes have been tested and evaluated in the field for adaptability, survival, health, quality and growth, in accordance with generally accepted scientific methodology over a period of time that is consistent with this methodology.

5.1.11 Vegetative material taken from donor plants grown from a registered seedlot is deemed to be part of the registered seedlot and does not have to be registered as a vegetative lot.

5.1.12 If a seedlot submitted under section 5.1.1 (b) is not registered under this Part, it must be returned to the person who submitted it for registration.

5.1.13 A lot that was registered under section 3 of the Tree Cone, Seed and Vegetative Material Regulation, prior to its repeal, continues to be registered as if it meets the requirements of this Part.

5.2 Collection Criteria

5.2.1 Lots collected from natural stands within British Columbia

5.2.1.1 In order to be registered as a lot collected from a natural stand within British Columbia, the lot must consist of seeds or vegetative material collected from trees other than parent trees in accordance with the following requirements:

a) the seeds or vegetative material, as applicable, must have been collected from a minimum of 10 trees, of the same species, that are located in a natural stand within British Columbia;

b) the trees referred to in paragraph (a) must all be located within

i) a single BEC unit, and

iii) a collection area with a radius no greater than 8 kilometres.

5.2.1.2 Despite section 5.2.1.1 (b) and (c), at the request of a person who submits an application under section 5.1.1, a lot consisting of seeds or vegetative material collected from a natural stand may be registered as a lot collected from a superior provenance if

a) the requirement in section 5.2.1.1 (a) has been met, and

b) the collection area from which the lot was collected meets the following criteria:

i) the elevation range of the collection area must fall within the range specified in Table 5.1 or 5.2 of Appendix 5 for the species and provenance of the lot;

ii) if applicable, the latitude and longitude of the centre point of the collection area must meet the requirements specified in Table 5.1 or 5.2 of Appendix 5 for the species and provenance of the lot;

iii) the collection area must meet the additional criteria specified in Table 5.1 or 5.2 of Appendix 5 for the species and provenance of the lot.

5.2.2 Lots collected from parent trees within British Columbia

5.2.2.1 In order to be registered as a lot collected from parent trees within British Columbia, the lot must consist of seeds or vegetative material collected in accordance with the following requirements:

a) the seeds or vegetative material, as applicable, must have been collected from parent trees, of the same species, to which identification numbers have been assigned under section 5.3.3 (b);

b) in the case of a seedlot, the seeds must have been collected from the minimum number of parent trees required to achieve an effective population size of 10 or greater, calculated in accordance with the applicable formulas in Appendix 7;

c) in the case of a vegetative lot collected directly from parent trees, without using donor plants, the number of parent trees must not be less than the greater of

i) whichever of the following applies:

A) 20 parent trees, if the vegetative material is collected from tested parent trees;

B) 40 parent trees, if the vegetative material is collected from untested parent trees or a combination of tested and untested parent trees, and

ii) the minimum number of parent trees required to achieve an effective population size of 10 or greater, calculated in accordance with the applicable formulas in Appendix 7;

d) in the case of a vegetative lot consisting of vegetative material collected from donor plants grown from seeds collected from parent trees,

i) the vegetative material must have been collected from at least

A) 30 donor plants, if the donor plants were produced from seed collected from tested parent trees, or

B) 200 donor plants, if the donor plants were produced from seed collected from untested parent trees or a combination of tested and untested parent trees, and

ii) the number of parent trees from which the donor plants were produced must not be less than the minimum number of parent trees required to achieve an effective population size of 10 or greater, calculated in accordance with the applicable formulas in Appendix 7;

e) in the case of a lot entirely collected from tested parent trees,

i) the parent trees must have at least one area of use that is the same for all of the parent trees, or

ii) if the parent trees do not have at least one area of use that is the same for all of the parent trees,

A) each parent tree must have at least one area of use located within

I) a tested parent tree seed planning zone, or

II) a latitude range within a tested parent tree planning zone,

that is the same as the zone or latitude range within which at least one area of use for the other parent trees is also located, and

B) the elevation ranges for the areas of use referred to in clause (A) must overlap;

f) in the case of a lot collected entirely from untested parent trees, the parent trees must have been selected from natural stands meeting the following criteria:
   i) all of the stands must be located within the same natural stand seed planning zone;
   ii) the range between the lowest and highest elevation of each of the stands must be no greater than the range specified in Appendix 4 for
      A) the species referred to in paragraph (a), and
      B) the natural stand seed planning zone referred to in subparagraph (i);
   iii) the range between the northernmost and southernmost latitude of each of the stands must be no greater than the range specified in Appendix 4 for
      A) the species referred to in paragraph (a), and
      B) the natural stand seed planning zone referred to in subparagraph (i);

g) in the case of a lot collected from both tested and untested parent trees,
   i) to register it as a lot collected from tested parent trees, the following requirements must be met:
      A) the parental contribution of the tested parent trees must represent at least 70 per cent of the total parental contribution of all parent trees to the lot;
      B) the requirements of paragraph (e) must have been met with respect to the tested parent trees;
      C) the locations of the stands from which the untested parent trees were selected, as specified under section 5.3.2 (c) (i), must all be within
         I) the area of use that is the same for all of the tested parent trees, if paragraph (e) (i) applies to the tested parent trees, or
         II) the area of use and elevation range that complies with the requirements of paragraph (e) (ii), if that paragraph applies to the tested parent trees, and
   ii) to register it as a lot collected from untested parent trees, the following requirements must be met:
      A) the parental contribution of the tested parent trees must represent less than 70 per cent of total parental contribution of all parent trees to the seedlot;
      B) the requirements of paragraph (f) have been met with respect to the untested parent trees;
      C) the areas of use for the tested parent trees, as specified under section 5.3.2 (d) (ii), must encompass the locations of the stands from which the untested parent trees were selected.

5.2.2.2 A person who submits an application under section 5.1.1 may elect to have a lot registered as a custom lot if the lot meets the requirements in section 5.2.2.1 for registration as a lot collected from tested parent trees within British Columbia, in which case the lot will be subject to the standards that apply to custom lots instead of the standards that apply to lots registered as lots collected from tested parent trees within British Columbia.

5.2.2.3 If a lot has been registered as a custom lot, the person who submitted the application under section 5.1.1 in respect of that lot may elect to have the lot re-registered as a lot collected from tested parent trees within British Columbia, in which case the lot will no longer be registered as a custom lot.

5.2.2.4 If a lot has been registered as a lot collected from tested parents tree within British Columbia, the person who submitted the application under section 5.1.1 in respect of that lot may elect to have the lot re-registered as a custom lot, in which case the lot will no longer be registered as a lot collected from tested parent trees within British Columbia.

5.2.2.5 Despite section 5.2.2.1 (c) and (d), the requirements of those paragraphs do not apply to a vegetative lot collected solely from tested parent trees that are hybrid poplar (Ax).

5.2.2.6 Despite section 5.2.2.1 (f) (i), seeds or vegetative material collected entirely from untested parent trees, of the same species, that are

a) Grand fir (Bg), Coastal Douglas-fir (Fdc), or Western white pine (Pw), selected from natural stands within the Georgia Lowlands (GL) Natural Stand Seed Planning Zone and the Maritime (M) Natural Stand Seed Planning Zone, may be included in the same lot, or

b) Sitka spruce (Ss) selected from natural stands within the Georgia Lowlands (GL) Natural Stand Seed Planning Zone and the Maritime (M) Natural Stand Seed Planning Zone, outside of the Haida Gwaii, may be included in the same lot.

5.2.3 Lots collected from outside of British Columbia

5.2.3.1 In order to be registered as a lot collected from outside of British Columbia, the lot must consist of seeds or vegetative material collected in accordance with the following requirements:

a) the seeds or vegetative material, as applicable, must be collected from
   i) a natural stand of a species identified in Table 6.1 of Appendix 6, or
   ii) parent trees of a species identified in Table 6.2 of Appendix 6, located at a seed orchard specified in Table 6.2 for that species, where the parent trees
      A) have been assigned unique parent tree identifiers, and
      B) meet the parent tree criteria specified in Table 6.2 for the applicable species and seed orchard;

b) in the case of a lot collected from a natural stand, the seeds or vegetative material, as applicable, must have been collected from a minimum of 10 trees of the same species located within a collection area meeting the following requirements:
   i) the collection area must have a radius no greater than 8 kilometres,
   ii) the collection area must fall with the elevation limits specified in Table 6.1 of Appendix 6 for the applicable species,
   iii) the range between the lowest and highest elevation of the collection area must be no greater than the range specified in Table 6.1 of Appendix 6 for the applicable species,
   iv) the collection area must meet the additional criteria specified in Table 6.1 of Appendix 6 for the applicable species;

c) in the case of a seedlot collected from parent trees, the seeds must have been collected from the minimum number of parent trees required to achieve an effective population size of 10 or greater, calculated in accordance with the applicable formulas in Appendix 7;

d) in the case of a vegetative lot collected from parent trees,
   i) the parent trees must be tested parent trees,
   ii) if the vegetative material was collected directly from parent trees, without using donor plants, the number of parent trees must not be less than the greater of
      A) 20 parent trees, or
      B) the minimum number of parent trees required to achieve an effective population size of 10 or greater, calculated in accordance with the applicable formulas in Appendix 7;
   iii) if the vegetative material was collected from donor plants grown from seeds collected from parent trees,
      A) the vegetative material must have been collected from at least 30 donor plants, and
      B) the number of parent trees from which the donor plants were produced must not be less than the minimum number required to achieve an effective

population size of 10 or greater, calculated in accordance with the applicable formulas in Appendix 7.

5.3 Parent Tree Information and Identification Numbers

5.3.1 A person may apply to have an identification number assigned to a parent tree by submitting an application form to the Branch, which form must

a) contain the information required under section 5.3.2, and
b) be signed by the person submitting the application form.

5.3.2 An application submitted under section 5.3.1 must contain the following information:

a) the species of the parent tree and whether it is an untested parent tree or a tested parent tree;
b) the specific traits for which the parent tree was selected and the breeding values or clonal values for those traits, as determined in accordance with section 5.4;
c) in the case of an untested parent tree,
    i) the location of the natural stand from which the parent tree was selected, which location must be within British Columbia, as denoted by the following:
        A) the natural stand seed planning zone within which the stand is located;
        B) the elevation of the stand, recorded in metres;
        C) the latitude and longitude of the stand, recorded in degrees, minutes and seconds,
    ii) the methodology used to determine the breeding values referred to in paragraph (b),
    iii) the date on which the parent tree was selected, and
    iv) the age of the parent tree on the date referred to in subparagraph (iii);
d) in the case of a tested parent tree,
    i) either
        A) the location of the natural stand from which the parent tree was selected, if the parent tree was not bred from other parent trees, as denoted by
            I) the information referred to in paragraph (c) (i), in the case of a tested parent tree selected from a natural stand located within British Columbia, or
            II) the elevation of the stand, recorded in metres, and the latitude and longitude of the stand, recorded in degrees, minutes and seconds, in the case of a tested parent tree selected from a natural stand located outside of British Columbia, or
        B) the pedigree of the parent tree, if the parent tree was bred from other parent trees, as denoted by
            I) the identification numbers assigned to the parent trees from which it was bred, if identification numbers have been assigned to those parent trees under this Part, or
            II) the unique parent tree identifiers assigned to the parent trees from which it was bred, if identification numbers have not been assigned to those parent trees under this Part,
    ii) one or more areas of use determined for the parent tree, based on field trials of the genetic suitability of seedlings grown from seeds or cuttings grown from vegetative material collected from the parent tree, each of which areas of use must be denoted by
        A) either
            I) a single tested parent tree seed planning zone, or
            II) a latitude range within a single tested parent tree seed planning zone, and
        B) an elevation range, recorded in metres,
    iii) the methodology used to determine
        A) the breeding values or clonal values referred to in paragraph (b), and
        B) the areas of use referred to in subparagraph (ii),
    iv) the locations at which the field trials referred to in subparagraph (ii) were conducted, as denoted by

A) the mean latitude and mean longitude of the area on which the field trials were conducted, recorded in degrees, minutes and seconds, and
B) the mean elevation of this area recorded in metres,

v) the year in which seedlings or cuttings used in the field trials referred to in subparagraph (ii) were planted, the year in which these seedlings or cuttings were measured, and the age of the seedling or cuttings at the time they were measured, recorded as the number of years from sowing, in the case of seedlings, or rooting, in the case of cuttings, and

e) the name of, and contact information for, the person who
   i) selected the parent tree,
   ii) determined the breeding values or clonal values referred to in paragraph (b),
   iii) determined the areas of use referred to in paragraph (d) (ii),
   iv) conducted the area of use field trials referred to in paragraph (d) (ii), and
   v) conducted the breeding value or clonal value field trials referred to in section 5.4.2.

5.3.3 Upon receipt of an application form submitted under section 5.3.1,
   a) the Branch may assign a pending identification number to the parent tree in respect of which the application form was submitted, and
   b) if the requirements of section 5.3.4 are met, the Branch must
      i) assign an identification number to the parent tree in respect of which the application form was submitted, or confirm the pending identification number, if any, referred to in paragraph (a), and
      ii) maintain a record of the identification number referred to in subparagraph (i) and the information referred to in section 5.3.2.

5.3.4 The Branch must assign or confirm an identification number under section 5.3.3 (b) if
   a) the information contained in the application form is complete and accurate, and
   b) the methodology referred to in section 5.3.2 (c) (ii) or 5.3.2 (d) (iii), as applicable, is consistent with generally accepted scientific methodology.

5.3.5 The Branch must make information recorded under section 5.3.3 (b) (ii) available to a person who requests this information.

5.3.6 The person who submits an application under section 5.3.1, a person authorized to act on that person's behalf, or a person employed by the Ministry of Forests, may request an amendment to information recorded under section 5.3.3 (b) (ii), in respect of that application, if
   a) the person identifies an error in the recorded information and provides information to verify the error,
   b) the person wishes to change the status of an untested parent tree to that of a tested parent tree and the information required under section 5.3.2 (d) is submitted in support of the request, or
   c) new test results are available respecting a tested parent tree that affects the information previously submitted under section 5.3.2 (d) and these results are submitted in support of the request.

5.3.7 Upon receipt of a request under section 5.3.6, the Branch must
   a) amend the information recorded under section 5.3.3 (b) (ii), if the Branch is satisfied that the amendment is necessary or appropriate having regard to the information provided in support of the request, and
   b) record the nature of the amendment and the date on which it was made.

5.3.8 For the purposes of these standards, a parent tree and its ramets are deemed to be the same parent tree.

5.3.9 If an identification number was assigned to a parent tree before these standards come into force,

a) the identification number will continue to apply to that parent tree as if it were assigned under section 5.3.3 (b), and
b) information recorded by the Branch with respect to that parent tree is deemed to have been recorded under section 5.3.3 (b) (ii).

5.4 Determining Breeding Values or Clonal Values

5.4.1 Subject to section 5.4.8, a breeding value for a trait of an untested parent tree must be determined by predicting the performance of the parent tree's progeny, based on all available information about

a) the traits for which the parent tree was selected, including, if applicable, field trials conducted with respect to these traits for tested parent trees of the same species,
b) the environment of the natural stand from which the parent tree was selected, and
c) the quantitative or population genetics of the parent tree's species, including the species' reproductive strategies,

and comparing this predicted performance to the average performance of progeny of other trees of the same species growing in the area denoted by the transfer limits in Appendix 4 that apply to

d) the species of the parent tree, and
e) the natural stand seed planning zone in which the stand from which the parent tree was selected is located, as if this zone is the zone of origin referred to in Appendix 4.

5.4.2 Subject to section 5.4.6 and 5.4.8, a breeding value or clonal value, as applicable, for a trait of a tested parent tree must be determined through field trials in accordance with generally accepted scientific methodology, over a period of time consistent with the methodology, based on the applicable criteria in sections 5.4.3 through 5.4.5.

5.4.3 In the case of a tested parent tree from which seeds were collected and grown into seedlings for the purpose of testing the parent tree, a breeding value must be based on the observed performance of the seedlings in field trials conducted in British Columbia, within the parent tree's area of use, relative to the average performance of seedlings grown from seeds collected from other trees of the same species growing in natural stands located within the parent tree's area of use.

5.4.4 In the case of a tested parent tree that was selected from a family, a breeding value must be based on the predicted performance of the parent tree's progeny, extrapolating from its own observed performance and the observed performance of its family in field trials conducted in British Columbia, within the parent tree's area of use, relative to the average performance of seedlings grown from seeds collected from other trees of the same species growing in natural stands located within the parent tree's area of use.

5.4.5 In the case of a tested parent tree from which vegetative material was collected and grown into cuttings for the purpose of testing the parent tree, a clonal value must be based on the observed performance of the cuttings in field trials conducted in British Columbia, within the parent tree's area of use, relative to the average performance of cuttings grown from vegetative material collected from other trees of the same species growing in natural stands located within the parent tree's area of use.

5.4.6 In the case of a tested parent tree that contributes to a custom lot, breeding values must be determined in accordance with section 5.4.1 as if the tree is an untested parent tree, for the purpose of determining the genetic worth of the custom lot under section 7.

5.4.7 Despite sections 5.4.3 through 5.4.5, when determining a breeding value or clonal value for a trait of a tested parent tree from outside of British Columbia, performance may be assessed in field trials conducted outside of British Columbia, provided the results of the field trials can be used to assess performance relative to the average performance of seedlings grown from seeds, or cuttings grown from vegetative material, as applicable, collected from other trees of the same species growing in

natural stands located within the area denoted by the transfer limits that apply under section 8.7 to a lot collected from those parent trees.

5.4.8 If a breeding value or clonal value for a trait of a parent tree cannot be determined in accordance with sections 5.4.1 through 5.4.7, then, for the purpose of determining genetic worth under section 7, the trait is deemed to have a breeding value and clonal value of zero.

6. STORAGE AND TESTING OF REGISTERED LOTS

6.1 In order to register a vegetative lot, a person must ensure that before registration, and after registration until such time as the vegetative material is used to establish a stand under section 29 of the Act, the lot is stored at a production facility that

a) uses storage methods that maintain the identity and integrity of the lot, including the applicable collection criteria, and
b) keeps accurate records with respect to the lot.

6.2 In order to register a seedlot, a person must ensure that

a) the manner in which the cones containing the seeds are stored, prior to and during processing, including the methods used to process the cones, maintains the identity and integrity of the lot, including the applicable collection criteria,
b) the manner in which the seeds themselves are processed maintains the identity and integrity of the lot, including the applicable collection criteria, and
c) the facility at which the seedlot is stored, prior to submission to the Tree Seed Centre under section 5.1.1 (b),
    i) uses storage methods that maintain the identity and integrity of the lot, including the applicable collection criteria, and
    ii) keeps accurate records with respect to the lot.

6.3 If a seedlot submitted to the Tree Seed Centre under section 5.1.1 (b) is registered under Part 5, the registered seedlot must continue to be stored at the Tree Seed Centre and continue to undergo testing in accordance with section 6.6 (b).

6.4 The Tree Seed Centre must, in accordance with generally accepted scientific methodology, test a seedlot submitted under 5.1.1 (b) for the following:

a) the total weight of the lot, and
b) based on samples taken from the lot,
    i) the percentage of pure seeds in the lot,
    ii) the average weight of seeds in the lot,
    iii) the average moisture content of seeds in the lot, and
    iv) the germination capacity of the seeds in the lot.

6.5 In addition to the tests referred to in section 6.4, the Tree Seed Centre may test a seedlot submitted under 5.1.1 (b) for the presence of fungi, disease or pests, if such tests are considered necessary, having regard to the species of the lot, the size of the lot, the collection or processing methods used to produce the lot, or other applicable criteria.

6.6 While a registered seedlot is stored at the Tree Seed Centre, the Tree Seed Centre must

a) ensure the storage conditions at the Tree Seed Centre maintain the optimum physical quality of the seeds in the lot,
b) conduct such tests referred to in sections 6.4 and 6.5 as are required, on an ongoing basis, to assess the physical quality of the seeds in the lot, and
c) update the information recorded under section 5.1.3 (b) (ii) to reflect the latest results of tests conducted under paragraph (b).

6.7 A person who stores a registered seedlot at the Tree Seed Centre, or a person who purchases or obtains the seedlot or a portion of the seedlot from that person, may withdraw the seedlot, or a portion of the seedlot, by submitting a request to the Tree Seed Centre either

a) in writing, or
b) through the Seed Planning and Registry System.

6.8 If a person

a) withdraws a seedlot, or portion of a seedlot, under section 6.7,
b) does not use all of the withdrawn seeds to establish a stand under section 29 of the Act, and
c) proposes to use the unused seeds at a later date to establish a stand under section 29 of the Act,

then that person must return the unused seeds to the Tree Seed Centre.

7. SELECTION AND USE OF SEEDS AND VEGETATIVE MATERIAL

7.1 In this Part, **"time of selection"** means

a) in the case of seeds, the time at which a person submits a request under section 6.7 to withdraw a registered seedlot, or a portion of registered seedlot, from the Tree Seed Centre, and
b) in the case of vegetative material, the time at which a person removes a registered vegetative lot, or portion of a registered vegetative lot, from the production facility at which it is stored.

7.2 For the purposes of section 7.3,

a) the genetic worth of a lot is
    i) the genetic worth determined in accordance with Appendix 7, based on the parental contribution and breeding values or clonal values of the parent trees, if the lot was collected from parent trees,
    ii) zero, if the lot was collected from trees other than parent trees, unless subparagraph (iii) applies, or
    iii) the applicable genetic worth specified in Appendix 5, if the lot was collected from a superior provenance, and
b) a person is able to acquire a registered lot, or portion of a registered lot, referred to in section 7.3 (a) (ii) if
    i) the lot or portion of a lot is identified in the Seed Planning and Registry System as
        A) surplus, and
        B) having a genetic worth of 5 per cent or greater, and
    ii) the cost of acquiring the lot or portion of a lot would be considered fair by a reasonable, knowledgeable person.

7.3 For the purpose of establishing a stand under section 29 of the Act, a person must select a registered lot, or portion of a registered lot, that, at the time of selection, has a genetic worth of 5 per cent or greater for the species and trait that best achieves the forest management objectives for the stand, if

a) at the time of selection, that person either
    i) owns, or
    ii) is able to acquire,

    a registered lot, or a portion of a registered lot, that has the requisite genetic worth,
b) the lot or portion of a lot contains sufficient seeds or vegetative material, as applicable, to produce enough seedlings or cuttings to plant the area on which the stand is to be established, and
c) the area on which seedlings or cuttings are to be planted complies with the transfer limits that apply to the lot under Part 8.

7.4 When using seeds or vegetative material from a registered lot collected from parent trees, for the purposes of establishing a stand under section 29 of the Act, a person must use seeds or vegetative material, as applicable, that are representative of the contribution of the parent trees to the lot.

7.5 Despite section 7.4, a person may use vegetative material collected from a single parent tree to establish a hybrid poplar stand, if the stand does not exceed 10 hectares.

7.6 When using seeds from a registered seedlot for the purposes of growing donor plants to produce cuttings for the purpose of establishing a free growing stand under section 29 of the Act, a person must use at least 200 seeds that are representative of the lot to grow those donor plants.

8. SEED TRANSFER

8.1 In this Part:

a) **"area"** means the net area to be reforested referred to in section 29 of the Act;

b) **"agreement"** means

i) a major licence or community forest agreement to which section 29 (1) of the Act applies, or

ii) a woodlot licence to which section 29 (3) of the Act applies;

c) **"fiscal year"** means the period beginning on April 1st of one year and ending on March 31st of the following year;

d) **"management unit"** means a tree farm licence area or timber supply area;

e) **"small operator"** means the holder of an agreement with an annual allowable cut of 5,000 cubic metres or less;

f) **"timber sales licence"** means a timber sales licence to which section 29 (2) of the Act applies.

8.2 General Requirements

8.2.1 Seedlings or cuttings must be planted on areas that comply with either the geographically based seed transfer standards described in section 8.3 or the climate based seed transfer standards described in section 8.4.

8.2.2 Despite this Part, a person, other than a timber sales manager, who is required to establish a stand under section 29 of the Act is required to ensure that 95 per cent of the combined total of the number of seedlings and the number of cuttings that are planted during each fiscal year, by or on behalf of that person with respect to all agreements held by that person in a single management unit, comply with the requirements of sections 8.3 or 8.4.

8.2.3 Despite this Part, a timber sales manager who is required to establish a stand under section 29 of the Act is required to ensure that 95 per cent of the combined total of the number of seedlings and the number of cuttings that are planted during each fiscal year, by or on behalf of the timber sales manager,

a) with respect to all timber sale licences located within a single management unit, or

b) with respect to a specific timber sales licence, if it is not located within a management unit,

comply with the requirements of sections 8.3 or 8.4.

8.3 Requirements that apply if Geographically Based Seed Transfer Standards will be used under 8.2.1

8.3.1 Seedlings or cuttings grown from a lot registered as a lot collected from a natural stand within British Columbia must be planted on areas that comply with the transfer limits in Appendix 3 that apply to the lot, based on its species and origin.

8.3.2 Seedlings or cuttings grown from a lot registered as a lot collected from untested parent trees within British Columbia must be planted on areas that comply with the transfer limits in Appendix 4 that apply to the lot, based on its species and origin.

8.3.3 Seedlings or cuttings grown from a lot registered as a lot collected from a superior provenance must be planted on areas that comply with the transfer limits in Appendix 5 that apply to the lot, based on its species and origin.

8.3.4 Seedlings or cuttings grown from a lot registered as a lot collected from tested parent trees within British Columbia must be planted on areas within

a) the area of use in Appendix 2, or
b) the tested parent tree seed planning zone, or latitude range within a tested parent tree planning zone, and the overlap in elevation ranges,

that constitute the origin of the lot.

8.3.5 Seedlings or cuttings grown from a lot registered as a custom lot must be planted within

a) the tested parent tree seed planning zone referred to in paragraph (e) (i) of the definition of "origin," and
b) the elevation and latitude transfer limits in Appendix 4 that apply to
    i) the species of the lot, and
    ii) the natural stand seed planning zone that encompasses the largest proportion of the tested parent tree seed planning zone referred to in paragraph (a), as if this natural stand seed planning zone is the zone of origin referred to in Appendix 4,

applied to the weighted mean elevation and weighted mean latitude referred to in paragraph (e) (ii) and (iii) of the definition of "origin."

8.3.6 Seedlings or cuttings grown from a lot registered as a lot collected from

a) a natural stand, or
b) parent trees,

outside of British Columbia must be planted on areas that comply with the transfer limits in Table 6.1 or 6.2 of Appendix 6 that apply to the lot, based on its species and origin.

8.3.7 Despite this Part, if a lot collected from parent trees within British Columbia was registered under section 3 of the Tree Cone, Seed and Vegetative Material Regulation, prior to its repeal, a person, at his or her sole discretion, may choose to follow either

a) the applicable transfer limits referred to in this Part, or
b) the transfer limits that applied to the lot at the time it was registered.

8.3.8 Despite this Part, in areas of use within LW1 and LW2 tested parent tree seed planning zones as identified on the Chief Forester's Standards for Seed Use website at https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/tree-seed/legislation-standards/chief-forester-s-standards-for-seed-use

a) a person, other than a timber sales manager, who is required to establish a stand under section 29 of the Act, may plant up to 10 per cent western larch seedlings, of the combined total of the number of seedlings and the number of cuttings that are planted during each fiscal year, by or on behalf of that person, with respect to all agreements held by that person in a single management unit, and
b) a small operator may plant up to 10 percent or 5,000 western larch seedlings, whichever is greater, of the combined total of the number of seedlings and the number of cuttings that are planted during each fiscal year, by or on behalf of that person with respect to that agreement.

8.3.9 Despite this Part, a timber sales manager who is required to establish a stand under section 29 of the Act may plant up to 10 per cent western larch seedlings of the combined total of the number of seedlings and the number of cuttings that are planted during each fiscal year, by or on behalf of the timber sales manager,

a) with respect to all timber sale licences located within a single management unit, or

b) with respect to a specific timber sales licence, if it is not located within a management unit, in areas of use within LW1 and LW2 tested parent tree seed planning zones as identified on the *Chief Forester's Standards for Seed Use* website at: https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/tree-seed/legislation-standards/chief-forester-s-standards-for-seed-use

8.4 Requirements that apply if Climate Based Seed Transfer Standards will be used under 8.2.1

8.4.1 Seedlings or cuttings grown from a registered lot must be planted on the CBST Area of Use identified for the tree species and Seed BEC unit in the "CBST Areas of Use for British Columbia" document located at the *Chief Forester's Standards for Seed Use* website at https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/tree-seed/legislation-standards/chief-forester-s-standards-for-seed-use.

8.4.2 The Branch must make available "CBST Areas of Use for British Columbia" referenced in 8.4.1, in the Seed Planning and Registry System.

APPENDIX 1 – REGISTRATION INFORMATION

The following information must be included in an application form submitted under section 5.1.1 for the purpose of registering a lot.

1 Applicant and owner

1. Name, address and phone number of individual submitting application
2. Name, address and phone number of person (individual or corporate) owning the lot or a portion of the lot
3. In the case of multiple owners, portion of the lot owned by each

2 General information about lot

2.1 Description of lot

1. Species
2. Type of lot: (a) seedlot or (b) vegetative lot
3. Registration sought: (a) lot collected from a natural stand within British Columbia; (b) lot collected from a superior provenance; (c) lot collected from untested parent trees within British Columbia; (d) lot collected from tested parent trees within British Columbia; (e) custom lot; (f) lot collected from a natural stand outside of British Columbia; (g) lot collected from parent trees outside of British Columbia

2.2 Cone storage and processing, seed processing and interim storage for seedlots

1. Name and address of facility at which the cones containing the seeds were stored
2. Dates on which the cones were stored at the facility referred to in #1
3. Name and address of facility at which the cones and seeds were processed
4. Dates on which the processing of the cones and seeds was carried out
5. Name and address of the facility at which the seedlot was stored prior to registration
6. Dates on which the seedlot was stored at the facility referred to in #5

3 Lots collected from natural stands within British Columbia

3.1 Collection area information for lots collected from natural stands, including superior provenances

1. Provenance name of collection area or closest geographic feature identified on a map (e.g., Birch Island)
2. Radius of collection area in kilometres
3. Mean latitude of collection area in degrees, minutes and seconds
4. Mean longitude of collection area in degrees, minutes and seconds
5. Collection area map in digital spatial format
6. Mean, lowest and highest elevation of collection area in metres
7. BEC unit in which collection area is located
8. Natural stand seed planning zone in which collection area is located
9. If the answer to #8 is the Maritime (M) Natural Stand Seed Planning Zone, is collection area on Haida Gwaii, the Mainland or Vancouver Island?

3.2 Additional collection area information for superior provenances

1. Does the collection area meet the criteria set out in Appendix 5? Yes or No

3.3 Collection information

1. Start and end dates of collection
2. Collection method: (a) felled trees; (b) squirrel caches; (c) tree climbing; (d) aerial
3. Number of trees from which the lot was collected
4. If the lot is a seedlot, volume of cones collected in hectolitres
5. If the lot is a vegetative lot, number of cuttings
6. Name and address of person (individual or corporate) who collected the lot

3.4 Storage of vegetative material from natural stands

1. Name, address and phone number of the facility at which the lot is being stored

4 Lots collected from parent trees within British Columbia

4.1 All lots collected from parent trees

1. Identification numbers of all parent trees contributing to the lot
2. Effective population size of the lot
3. Does the lot consist of seeds or vegetative material multiplied through the application of biotechnological processes? Yes or No
4. If the answer to #3 is Yes, confirm the following:
   - seedlings grown or cuttings derived from seeds or vegetative material produced through these biotechnological processes were tested and evaluated in the field (describe the methodology used)
   - the seeds or vegetative material, as applicable, were not subjected to genetic modification

4.2 Seedlots collected from parent trees

1. Name, address, phone number and identification number of the seed orchard at which the lot was collected
2. Start and end dates of collection
3. Volume of cones collected in hectolitres
4. The female and male gametic contribution of each parent tree contributing to the lot
5. The methodology used to determine the female and male gametic contribution of each parent tree
6. Was pollen contamination present in the seed orchard? Yes or No
7. If the answer to #6 is Yes, provide the following:
   - Proportion of contaminant pollen, expressed as a percentage of the total amount of pollen pollinating the parent trees
   - Methodology used to determine the proportion of contaminant pollen
8. Was the lot produced through controlled crosses? Yes or No

4.3 Vegetative lots collected from parent trees

1. Name, address, phone number and identification number of the production facility at which the lot was collected
2. Name, address and phone number of the production facility at which the lot is being stored, if different from the facility referred to in #1
3. Start date of collection
4. If the lot was collected directly from parent trees, without using donor plants, the number of parent trees
5. If the lot was collected from donor plants grown from seeds collected from parent trees, the number of donor plants
6. The total number of cuttings or propagules collected from each parent tree
7. The total number of all cuttings or propagules in the lot

5 Lots collected from outside British Columbia

5.1 Lots collected from natural stands

1. Does the collection area meet the criteria set out in Table 6.1 of Appendix 6? Yes or No
2. Provenance name of collection area or closest geographic feature identified on a map (e.g., French Butte)
3. Mean latitude of collection area in degrees, minutes and seconds
4. Mean longitude of collection area in degrees, minutes and seconds
5. Mean, lowest and highest elevation of collection area in metres
6. Start and end dates of collection
7. Collection method: (a) felled trees; (b) squirrel caches; (c) tree climbing; (d) aerial
8. Number of trees from which the lot was collected
9. If the lot is a seedlot, volume of cones collected in hectolitres
10. If the lot is a vegetative lot, number of cuttings
11. In the case of a vegetative lot, the name, address and phone number of the facility at which the lot is being stored
12. Name and address of person (individual or corporate) who collected the lot

5.2 Seedlots collected from parent trees

1. Does the seedlot consist of seeds collected from parent trees located at a seed orchard identified in Table 6.2 of Appendix 6? Yes or No (Identify orchard by orchard identification number, if one has been assigned)
2. Do the parent trees meet the parent tree criteria set out in Table 6.2 of Appendix 6? Yes or No
3. Description of the parent trees contributing to the lot, including their unique parent tree identifiers
4. Start and end dates of collection
5. The female and male gametic contribution of each parent tree contributing to the lot
6. The methodology used to determine the female and male gametic contribution of each parent tree
7. Effective population size of the lot
8. Has a breeding value been determined for a trait of the parent tree using the applicable criteria set out in section 5.4 of the standards? Yes or No
9. If the answer to #8 is Yes, specify trait, the breeding value for that trait and the methodology used to determine the breeding value
10. Was pollen contamination present in the orchard? Yes or No
11. If the answer to #10 is Yes, provide the following:
    - Proportion of contaminant pollen, expressed as a percentage of the total amount of pollen pollinating the parent trees
    - Methodology used to determine the proportion of contaminant pollen
12. Was the lot produced through controlled crosses? Yes or No
13. Does the lot consist of seeds multiplied through the application of biotechnological processes? Yes or No
14. If the answer to #13 is Yes, confirm the following:
    - seedlings grown or cuttings derived from seeds produced through these biotechnological processes were tested and evaluated in the field (describe the methodology used)
    - the seeds were not subjected to genetic modification

5.3 Vegetative lots collected from parent trees

1. Does the vegetative lot consist of vegetative material collected directly from parent trees, or from donor plants grown from seeds collected from parent trees, located in a seed orchard identified in Table 6.2 of Appendix 6? Yes or No (Identify orchard by orchard identification number, if one has been assigned)
2. Name, address and phone number of the facility at which the lot is being stored, if different from the seed orchard referred to in #1

3. Do the parent trees meet the parent tree criteria set out in Table 6.2 of Appendix 6? Yes or No
4. Description of the parent trees contributing to the lot, including their unique parent tree identifiers
5. Start and end dates of collection
6. The total number of cuttings or propagules collected from each parent tree
7. The total number of all cuttings or propagules in the lot
8. Effective population size of the lot
9. If the lot was collected directly from parent trees, without using donor plants, the number of parent trees
10. If the lot was collected from donor plants grown from seeds collected from parent trees, the number of donor plants
11. Does the lot consist of vegetative material multiplied through the application of biotechnological processes? Yes or No
12. If the answer to #11 is Yes, confirm the following:
    - cuttings grown from vegetative material produced through these biotechnological processes were tested and evaluated in the field (describe the methodology used)
    - the vegetative material was not subjected to genetic modification

APPENDIX 2 – SEED PLANNING ZONES

Seed planning zone (SPZ) spatial data may be downloaded or viewed on the DataBC website at: https://data.gov.bc.ca/ except for tested parent tree seed planning zones LW1 and LW2 which are found at the *Chief Forester's Standards for Seed Use* website at https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/tree-seed/legislation-standards/chief-forester-s-standards-for-seed-use

Natural Stand Seed Planning Zones

The seed planning zones for all species of natural stands are identified by the codes and names set out by region in Table 2.1.

Table 2.1 Natural Stand Seed Planning Zones

Region	SPZ Code	SPZ Name
Coast	GL	Georgia Lowlands
	M	Maritime
	SM	Submaritime
Interior	BB	Big Bar
	BLK	Bulkley
	BSH	Bush
	CHL	Chilcotin
	CP	Central Plateau
	CT	Cariboo Transition
	DK	Dease Klappan
	EK	East Kootenay
	FIN	Finlay
	FN	Fort Nelson
	HH	Hudson Hope
	MGR	McGregor
	MIC	Mica
	MRB	Mt. Robson
	NCH	Nechako
	NST	Nass Skeena Transition
	QL	Quesnel Lakes
	SA	Shuswap Adams
	TOA	Thompson Okanagan Arid
	TOD	Thompson Okanagan Dry
	WK	West Kootenay

Tested Parent Tree Seed Planning Zones

The areas of use determined for tested parent trees for use within British Columbia are located within a Tested Parent Tree Seed Planning Zone. The tested parent tree seed planning zones are identified by the codes and names set out in Table 2.2 and Table 2.3.

Tested parent tree areas of use are described at the *Chief Forester's Standards for Seed Use* website at https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/tree-seed/legislation-standards/chief-forester-s-standards-for-seed-use

Tested parent tree area of use spatial data (also known as seed planning units) may be downloaded or viewed on the DataBC website at: https://data.gov.bc.ca/

Table 2.2 Tested Parent Tree Seed Planning Zones

Species		SPZ Code	SPZ Name
Code	**Name**		
Cw	Western Redcedar	M	Maritime
Dr	Red Alder	M	Maritime
Fdc	Coastal Douglas-fir	GL	Georgia Lowlands
		M	Maritime
		SM	Submaritime
Fdi	Interior Douglas-fir	CT	Cariboo Transition
		EK	East Kootenay
		NE	Nelson
		PG	Prince George
		QL	Quesnel Lakes
		PGC	Prince George / Cariboo Transition
		QLN	Quesnel Lakes / Nelson
Hw	Western Hemlock	GL	Georgia Lowlands
		M	Maritime
Lw	Western Larch	EK	East Kootenay
		NE	Nelson
		NEK	Nelson / East Kootenay
Pli	Interior Lodgepole Pine	BV	Bulkley Valley
		CP	Central Plateau
		EK	East Kootenay
		NE	Nelson
		PG	Prince George
		TO	Thompson Okanagan
		BVC	Bulkley Valley / Central Plateau
		BVP	Bulkley Valley / Prince George
		CPP	Central Plateau / Prince George
		PGN	Prince George / Nelson
		TON	Thompson Okanagan / Nelson
Pw	Western White Pine	GL	Georgia Lowlands
		M	Maritime
		KQ	Kootenay Quesnel
Py	Ponderosa Pine	SI	Southern Interior
Ss	Sitka Spruce	GL	Georgia Lowlands
		M	Maritime

Table 2.2 Tested Parent Tree Seed Planning Zones

Species		SPZ Code	SPZ Name
Code	**Name**		
Sx	Interior Spruce (White, Englemann and their hybrids)	BV	Bulkley Valley
		EK	East Kootenay
		NE	Nelson
		PG	Prince George
		PR	Peace River
		TO	Thompson Okanagan
		BVP	Bulkley Valley / Prince George
		NEK	Nelson / East Kootenay
		PGN	Prince George / Nelson
		TON	Thompson Okanagan / Nelson
Yc	Yellow-cedar	M	Maritime

Table 2.3 Tested Parent Tree Seed Planning Zones for Climate Change

Species		SPZ Code	SPZ Name
Code	**Name**		
Lw	Western Larch	LW1	Lw Climate Change 1
		LW2	Lw Climate Change 2

APPENDIX 3 – LOTS FROM NATURAL STANDS

In this Table:
"SPZ" means natural stand seed planning zone;
"BGC zone" means biogeoclimatic zone;
"QCI" means Queen Charlotte Islands.

Species			Maximum range between lowest and highest elevation of collection area *(metres)*	Transfer Limits Section 8.2			
Code	**Common name**	**SPZ of Origin**	**Sections 5.2.1.1(c)**	**May be used within the following range (up/down) from mean elevation of origin** *(metres)*	**May be used within the following range (north/south) from mean latitude of origin** *(degrees)*	**May be used within the following range (east/west) from mean longitude of origin** *(degrees)*	**May be used within the SPZ of origin. In addition, may be used in other SPZs identified below, subject to any specified conditions**
Ba[1]	Amabilis fir	M	300	+400 / -300	2°N / 2°S	No limit	SPZ of origin only
		SM	300	+400 / -300	2°N / 2°S	No limit	Interior SPZ if used within the BGC zone of origin
		All Other SPZs	250	+400 / -200	2°N / 1°S	3°W / 2°E	Interior SPZ if used within the BGC zone of origin
Bg	Grand fir	GL	250	+300 / -200	2°N / 2°S	No limit	M
		M	250	+300 / -200	2°N / 2°S	No limit	GL
		SM	200	+200 / -200	2°N / 2°S	No limit W / 2°E	Interior SPZ if used within the BGC zone of origin
		All Other SPZs	250	+300 / -200	2°N / 1°S	3°W / 2°E	Interior SPZ if used within the BGC zone of origin
Bl	Subalpine fir	M	200	+400 / -200	2°N / 2°S	No limit	SPZ of origin only
		SM	250	+500 / -200	2°N / 2°S	No limit	SPZ of origin only
		All Other SPZs	250	+500 / -200	2°N / 1°S	3°W / 2°E	Interior SPZ if used within the BGC zone of origin
Cw[2]	Western redcedar	GL	No limit	No limit	No limit	No limit	SPZ of origin only
		M	400	+600 / -400	3°N / 3°S	No limit	GL
		SM	300	+500 / -300	2°N / 2°S	No limit W / 2°E	Interior SPZ if used within the BGC zone of origin
		All Other SPZs	250	+500 / -200	2°N / 1°S	3°W / 2°E	Interior SPZ if used within the BGC zone of origin
Fdc	Coastal Douglas-fir	GL	350	+350 / -350	3°N / 2°S	No limit	M
		M	350	+350 / -350	3°N / 2°S	No limit	GL
		SM	350	+350 / -350	2°N / 1°S	No limit W / 2°E	Interior SPZ if used within the BGC zone of origin

Species			Maximum range between lowest and highest elevation of collection area *(metres)*	Transfer Limits Section 8.2			
Code	**Common name**	**SPZ of Origin**	**Sections 5.2.1.1(c)**	**May be used within the following range (up/down) from mean elevation of origin** *(metres)*	**May be used within the following range (north/south) from mean latitude of origin** *(degrees)*	**May be used within the following range (east/west) from mean longitude of origin** *(degrees)*	**May be used within the SPZ of origin. In addition, may be used in other SPZs identified below, subject to any specified conditions**
Fdi	Interior Douglas-fir	All Interior SPZs South of 52°, except EK	250	+500 / -200	2°N / 1°S	3°W / 2°E	Interior SPZ if used within the BGC zone of origin
		All Interior SPZs North of 52° and EK	150	+400 / -100	2°N / 1°S	3°W / 2°E	Interior SPZ if used within the BGC zone of origin
Hw[1]	Western hemlock	GL	No limit	No limit	No limit	No limit	SPZ of origin only
		M – other than QCI	300	+300 / -300	3°N / 3°S	No limit	SPZ of origin only
		M – QCI	300	+300 / -300	3°N / 3°S and no further north than latitude 54°30'	No limit	SPZ of origin only
		SM	200	+200 / -200	2°N / 2°S	No limit W / 2°E	Interior SPZ if used within the BGC zone of origin
		All Other SPZs	250	+300 / -200	2°N / 1°S	3°W / 2°E	Interior SPZ if used within the BGC zone of origin
Lw	Western larch	All SPZs	250	+500 / -200	2°N / 1°S	3°W / 2°E	Interior SPZ
Plc	Coastal lodgepole pine	GL	No limit	No limit	No limit	No limit	SPZ of origin only
		M	250	+300 / -200	2°N / 2°S	No limit	GL
		SM	150	+200 / -100	2°N / 1°S	No limit W / 2°E	Interior SPZ if used within the BGC zone of origin
Pli	Interior lodgepole pine	SM	200	+500 / -100	2°N / 1°S	3°W / 2°E	Interior SPZ if used within the BGC zone of origin
		Interior SPZ South of 56°	200	+500 / -100	2°N / 1°S	3°W / 2°E	Interior SPZ if used within the BGC zone of origin
		TOA	[between 1300 to 1600 m elevation]	+500 / -100	No limit	No limit	BB
		TOD	[between 1200 to 1400 m elevation]	+500 / -100	No limit	No limit	BB
		Interior SPZ North of 56°	125	+350 / -100	2°N / 1°S	3°W / 2°E	Interior SPZ if used within the BGC zone of origin
Py	Ponderosa pine	All SPZs	250	+500 / -200	2°N / 1°S	3°W / 2°E	SM and Interior SPZ if used within the BGC zone of origin

Species		SPZ of Origin	Maximum range between lowest and highest elevation of collection area *(metres)* Sections 5.2.1.1(c)	Transfer Limits Section 8.2			
Code	Common name			May be used within the following range (up/down) from mean elevation of origin *(metres)*	May be used within the following range (north/south) from mean latitude of origin *(degrees)*	May be used within the following range (east/west) from mean longitude of origin *(degrees)*	May be used within the SPZ of origin. In addition, may be used in other SPZs identified below, subject to any specified conditions
Pw	Western white pine	GL	700	+700 / -700	No limit	No limit	M
		M	700	+700 / -700	No limit	No limit	GL
		SM	700	+700 / -700	No limit	No limit W / 2°E	Interior SPZ if used within the BGC zone of origin
		All Other SPZs	700	+700 / -700	2°N / 1°S	3°W / 2°E	Interior SPZ if used within the BGC zone of origin
Ss	Sitka spruce	GL	250	+400 / -200	4°N / 1°S	No limit	M
		M – other than QCI	250	+400 / -200	4°N / 1°S	No limit	GL
		M - QCI	250	+400 / -200	No limit	No limit	SPZ of origin only and only on QCI
		SM	200	+300 / -200	2°N / 1°S	No limit W / 2°E	Interior SPZ if used within the BGC zone of origin
Sx	Interior Spruce (White, Englemann and their hybrids)	SM	300	+600 / -200	2°N / 1°S	No limit W / 2°E	Interior SPZ if used within the BGC zone of origin
		All Other SPZs	300	+600 / -200	2°N / 1°S	5°W / 2°E	Interior SPZ if used within the BGC zone of origin
Sxs	Sitka x interior spruce	All SPZs	200	+200 / -200	2°N / 1°S	No limit	SPZ of origin only
Yc	Yellow-cedar	M (≤ 1100 m)	300	+600 / no limit down	4°N / 3°S	No limit	SPZ of origin only
		M (> 1100 m)	300	+ 500 / - 300	4°N / 3°S	No limit	SPZ of origin only
		SM	300	+500 / -300	2°N / 2°S	No limit	SPZ of origin only
		All Other SPZs	250	+500 / -200	2°N / 1°S	3°W / 2°E	Interior SPZ if used within the BGC zone of origin
Other	Other species	GL	No limit	No limit	No limit	No limit	SPZ of origin only
		M	250	+300 / -200	3°N / 2°S	No limit	SPZ of origin only
		SM	200	+200 / -200	1.5°N / 1.5°S	No limit W / 2°E	Interior SPZ if used within the BGC zone of origin
		All Other SPZs	250	+300 / -200	2°N / 1°S	3°W / 2°E	Interior SPZ if used within the BGC zone of origin

[1] Ba and Hw – transfer of seed more than 200 m downward is discouraged
[2] Cw – transfer of seed more than 300 m downward is discouraged

APPENDIX 4 – LOTS FROM UNTESTED PARENT TREES

In this Table,
"SPZ" means natural stand seed planning zone;
"QCI" means Queen Charlotte Islands.

Species			Natural Stand Criteria Section 5.2.2.1 (f)		Transfer Limits Section 8.3		
Code	**Common name**	**SPZ of Origin**	**Maximum range between lowest and highest elevation** *(metres)*	**Maximum range between northernmost and southern-most latitude** *(degrees)*	**May be used within the following range (up/down) from weighted mean elevation of origin** *(metres)*	**May be used within the following range (north/south) from weighted mean latitude of origin** *(degrees)*	**May be used within the following SPZs, subject to any specified conditions**
Ba	Amabilis fir	M	600	4	+300 / -300	2°N / 2°S	M
		SM	600	4	+300 / -300	2°N / 2°S	SM
		All Other SPZs	500	No limit	+300 / -200	No limit	SPZ of origin only
Bg	Grand fir	GL	500	4	+300 / -200	2°N / 2°S	GL or M
		M	500	4	+300 / -200	2°N / 2°S	M or GL
		SM	400	4	+200 / -200	2°N / 2°S	SM
		All Other SPZs	500	No limit	+300 / -200	No limit	SPZ of origin only
Bl	Subalpine fir	M	400	4	+200 / -200	2°N / 2°S	M
		SM	500	4	+300 / -200	2°N / 2°S	SM
		All Other SPZs	500	No limit	+300 / -200	No limit	SPZ of origin only
Cw	Western redcedar	GL	No limit	No limit	No limit	No limit	GL
		M	800	6	+400 / -400	3°N / 3°S	M
		SM	600	4	+300 / -300	2°N / 2°S	SM
		All Other SPZs	500	No limit	+300 / -200	No limit	SPZ of origin only
Fdc	Coastal Douglas-fir	GL	700	5	+350 / -350	3°N / 2°S	GL or M
		M	700	5	+350 / -350	3°N / 2°S	M or GL
		SM	700	3	+350 / -350	2°N / 1°S	SM
Fdi	Interior Douglas-fir	All Interior SPZs South of 52°, except EK	500	No limit	+300 / -200	No limit	SPZ of origin only
		All Interior SPZs North of 52° and EK	300	No limit	+200 / -100	No limit	SPZ of origin only

Species			Natural Stand Criteria Section 5.2.2.1 (f)		Transfer Limits Section 8.3		
Code	**Common name**	**SPZ of Origin**	**Maximum range between lowest and highest elevation** *(metres)*	**Maximum range between northernmost and southern-most latitude** *(degrees)*	**May be used within the following range (up/down) from weighted mean elevation of origin** *(metres)*	**May be used within the following range (north/south) from weighted mean latitude of origin** *(degrees)*	**May be used within the following SPZs, subject to any specified conditions**
Hw	Western hemlock	GL	600	6	+300 / -300	3°N / 3°S	GL
		M – other than QCI	600	6	+300 / -300	3°N / 3°S	M
		M – QCI	600	No limit	+300 / -300	3°N / 3°S and no further north than latitude 54°30'	M
		SM	400	4	+200 / -200	2°N / 2°S	SM
		All Other SPZs	500	No limit	+300 / -200	No limit	SPZ of origin only
Lw	Western larch	All SPZs	500	No limit	+300 / -200	No limit	SPZ of origin only
Plc	Coastal lodgepole pine	GL	500	4	+300 / -200	2°N / 2°S	GL
		M	500	4	+300 / -200	2°N / 2°S	M
		SM	300	3	+200 / -100	2°N / 1°S	SM
Pli	Interior lodgepole pine	Interior SPZ South of 56°4'	400	No limit	+300 / -100	No limit	SPZ of origin only
		Interior SPZ North of 56°	250	No limit	+150 / -100	No limit	SPZ of origin only
Py	Ponderosa pine	All SPZs	500	No limit	+300 / -200	No limit	SPZ of origin only
Pw	Western white pine	GL	1400	No limit	+700 / -700	No limit	GL or M
		M	1400	No limit	+700 / -700	No limit	M or GL
		SM	1400	No limit	+700 / -700	No limit	SM
		All Other SPZs	1400	No limit	+700 / -700	No limit	SPZ of origin only
Ss	Sitka spruce	GL	500	5	+300 / -200	4°N / 1°S	GL or M
		M – other than QCI	500	5	+300 / -200	4°N / 1°S	M or GL
		M – QCI	500	No limit	+300 / -200	No limit	M and only in QCI
		SM	400	3	+200 / -200	2°N / 1°S	SM
Sx	Interior Spruce (White, Englemann and their hybrids)	SM	600	3	+400 / -200	2°N / 1°S	SM
		All Other SPZs	600	No limit	+400 / -200	No limit	SPZ of origin only
Sxs	Sitka x interior spruce	M, SM	400	3	+200 / -200	2°N / 1°S	SPZ of origin only
		All Other SPZs	400	No limit		No limit	SPZ of origin only

Species			Natural Stand Criteria Section 5.2.2.1 (f)		Transfer Limits Section 8.3		
Code	**Common name**	**SPZ of Origin**	**Maximum range between lowest and highest elevation** *(metres)*	**Maximum range between northernmost and southern-most latitude** *(degrees)*	**May be used within the following range (up/down) from weighted mean elevation of origin** *(metres)*	**May be used within the following range (north/south) from weighted mean latitude of origin** *(degrees)*	**May be used within the following SPZs, subject to any specified conditions**
Yc	Yellow-cedar	M (≤ 1100 m)	600	7	+400 / no limit down	4°N / 3°S	M
		M (> 1100 m)	600	7	+300 / -300	4°N / 3°S	M
		SM	600	4	+300 / -300	2°N / 2°S	SM
		All Other SPZs	500	No limit	+300 / -200	No limit	SPZ of origin only
Other	Other species	GL	500	5	+300 / -200	3°N / 2°S	GL
		M	500	5	+300 / -200	3°N / 2°S	M
		SM	200	3	+200 / -200	1.5°N / 1.5°S	SM
		All Other SPZs	500	No limit	+300 / -200	No limit	SPZ of origin only

APPENDIX 5 – SUPERIOR PROVENANCES

In Tables 5.1 and 5.2, with respect to genetic worth:
"G" means growth;
"R" means pest resistance.

Table 5.1 Lodgepole Pine Superior Provenances

Species		Provenance	Collection Area Criteria Section 5.2.1.2 (b)				Genetic Worth Section 7.2 (a) (iii)	Transfer Limits Section 8.4	
Code	**Common name**	**Provenance**	**Located within the following elevation range** *(metres)*	**Latitude of centre point of area** *(degrees / minutes)*	**Longitude of centre point of area** *(degrees / minutes)*	**Additional criteria**		**May be used within the following natural stand seed planning zones**	**May be used within the following range (up/down) from mean elevation of origin** *(metres)*
Pli	Interior Lodgepole Pine	Bowron River	620 – 720	53° 54'	122° 00'	Within natural stands located within an 8 km radius of the latitude and longitude of centre point of area	G+03	MGR*	+500 / -200
								CHL, CP, CT, MGR*, MRB, NCH, QL	+300 / -200
		Canoe Creek	840 – 940	50° 42'	119° 11'			SA*	+500 / -200
								SA,* TOA, TOD, WK	+300 / -200
		Cartwright Lake	1120 – 1220	50° 49'	116° 26"			EK*	+500 / -200
								BSH, EK*, MRB, SA, TOA, TOD, WK	+300 / -200
		Champion Lakes	950 – 1050	49° 11'	117° 35'			WK*	+500 / -200
								BSH, EK, TOA, TOD, WK*	+300 / -200
		China Valley	1080 – 1180	50° 44'	119° 30'			TOD*	+500 / -200
								SA, TOD*, TOA	+300 / -200
		Inonoaklin Creek	530 – 630	49° 54'	118° 12'			WK*	+500 / -200
								BSH, EK, SA, TOD, WK*	+300 / -200
		Jackfish Creek	410 – 510	58° 32'	122° 42'			FN*	+400 / -200
								DK, FN*	+200 / -200
		Joe Rich Creek	1020 – 1120	49° 48'	119° 05'			SA*	+500 / -200
								SA*, TOA, TOD	+300 / -200
		Larch Hills	730 – 830	50° 42'	119° 11'			SA*	+600 / -200
								BSH, EK, SA*, TOD, WK	+400 / -200

Species			Collection Area Criteria Section 5.2.1.2 (b)				Genetic Worth Section 7.2 (a) (iii)	Transfer Limits Section 8.4	
Code	**Common name**	**Provenance**	**Located within the following elevation range** *(metres)*	**Latitude of centre point of area** *(degrees / minutes)*	**Longitude of centre point of area** *(degrees / minutes)*	**Additional criteria**		**May be used within the following natural stand seed planning zones**	**May be used within the following range (up/down) from mean elevation of origin** *(metres)*
		Marl Creek	900 – 1000	51° 31'	117° 11'			BSH*	+500 / -200
								BSH*, EK, MRB, SA, TOA, TOD, WK	+300 / -200
		Lossie Creek	1110 – 1210	50° 27'	118° 54'			SA*	+500 / -200
								SA*, TOA, TOD, WK	+300 / -200
		Nechako River	680 – 780	54° 01'	124° 31'			NCH*	+500 / -200
								BLK, CP, MGR, MRB, NCH*, QL	+300 / -200
		Oie Lake	940 – 1040	52° 00'	121° 12'			CT*	+500 / -200
								BB, BLK, CHL, CT*, MGR, MRB, NCH, QL	+300 / -200
		Settlers Road	990 – 1090	50° 31'	115° 44'			EK*	+500 / -200
								BSH, EK*, MRB, SA, TOA, TOD, WK	+300 / -200
		Telkwa Low	470 – 570	54° 39'	127° 03'			BLK*	+500 / -200
		Udy Creek	1050 – 1150	53° 01'	123° 14'			CHL*	+500 / -200
								BB, BLK, CHL*, CT, MRB, NCH, QL	+300 / -200
		Wentworth Creek	1010 – 1110	50° 58'	120° 20'			TOD*	+500 / -200
								BB, TOA, TOD*	+300 / -200
		Whittier Creek	710 – 810	53° 07'	122° 42'			NCH*	+500 / -200
								CHL, CT, MGR, MRB, NCH*, QL	+300 / -200

*Seed planning zone of origin

Table 5.2 Interior Spruce, Sitka Spruce and Yellow-cedar Superior Provenances

Species			Collection Area Criteria Section 5.2.1.2 (b)					Transfer Limits Section 8.4		
Code	**Common name**	**Provenance**	**Located within the following elevation range** *(metres)*	**Latitude of centre point of area** *(degrees / minutes)*	**Longitude of centre point of area** *(degrees / minutes)*	**Additional criteria**	**Genetic Worth Section 7.2 (a) (iii)**	**May be used within the following natural stand seed planning zones**	**May be used within the following elevation range** *(metres)*	**May be used within the following latitude range** *(degrees)*
Ss	Sitka spruce	Big Qualicum	1 – 100	n/a	n/a	Within natural stands located in coastal plain drainages between 49° 42' (Comox) and 49° 12' (Nanoose Bay) on Vancouver Island	R+64	M, GL	1 – 500	48° – 55°
		Haney	1 – 300	n/a	n/a	Within natural stands located within the UBC Malcolm Knapp Forest and between Kanaka Creek and Alouette River north of Haney	R+64	M, GL	1 – 500	48° – 55°
Sx	Interior Spruce (White, Englemann and their hybrids)	Birch Island	400 – 500	n/a	n/a	Within natural stands located along the North Thompson River between 51°35' (Vavenby) and 51°39' (Clearwater)	G+03	BSH, MGR, MIC, MRB, SA, QL	1 – 1000	No limit
		Horsefly	800 – 1000	52° 25'	121° 25'	Within natural stands located within a 15 km radius of the latitude and longitude of centre point	G+02	BSH, CP, MGR, MRB, SA, QL	400 – 1000	No limit
Yc	Yellow-cedar	Waukwass	700 – 800	50° 29'	127° 18'	Within natural stands located within a 2 km radius of the latitude and longitude centre point	G+02	M	0 – 1100	48° – 52°

APPENDIX 6 – NON-BC SEED SOURCES

Table 6.1 Non-BC Natural Stands

Species		Collection Area Criteria Section 5.2.3.1 (b)			Transfer Limits Section 8.7 (a)		
Code	**Common name**	**Elevation limits** *(metres)*	**Maximum range between lowest and highest elevation** *(metres)*	**Additional criteria**	**May be used within the following natural stand seed planning zones**	**May be used within the following range (up/down) from mean elevation of origin** *(metres)*	**May be used within the following latitude range** *(degrees)*
Bp (Bn)	Noble fir	≥ 700	300	Within natural stands located north of 45° in Washington or Oregon, USA	M, SM	+300 / -400	48° – 52°
Fdc	Coastal Douglas-fir	No limit	350	Within natural stands located north of 46° in Washington or Oregon, USA	GL, M	+350 / -350	48° – 52°
Ss	Sitka spruce	≤ 200	250	Within natural stands located within 30 km of Pacific Ocean in Washington or Oregon, USA	M Queen Charlotte Islands only	+300 / no limit down	No limit

Table 6.2 Non-BC Parent Trees (Seed Orchards)

Species		Seed Orchard	Parent Tree Criteria Section 5.2.3.1 (a) (ii) (B)	Transfer Limits Section 8.7 (b)		
Code	**Common name**			**May be used within the following parent tree seed planning zones**	**May be used within the following elevation range** *(metres)*	**May be used within the following latitude range** *(degrees)*
Bp (Bn)	Noble fir	Weyerhaeuser's Sequim Seed Orchard in Washington, USA	Tested or untested parent tree selected from natural stands located north of 45° at an elevation ≥ 700 m	M	+300 / -400 from the weighted mean elevation of parent tree stands*	48° – 52°
Fdc	Coastal Douglas-fir	Weyerhaeuser's Rochester Seed Orchard and Sequim Seed Orchard in, Washington, USA and its Medford Seed Orchard in Oregon, USA	Tested parent tree selected from natural stands located north of 46° or bred from other tested parent trees that have been tested and found suitable north of 46°, °and established in the Cascade low, Longview Low, Vale Low and Twin Harbors Low blocks at the identified Weyerhaeuser seed orchards	GL, M	0– 700	48° – 52°
		Weyerhaeuser's Sequim Seed Orchard in, Washington, USA, and its Turner Seed Orchard in Oregon, USA	Tested parent tree selected from natural stands located north of 46° or bred from other tested parent trees that have been tested and found suitable north of 46°, and established in the Longview High, Cascade High and Cascade -Vale High blocks at the identified Weyerhaeuser seed orchards.	M	700-1200]	48° – 52°
Pw	Western white pine	Dorena Seed Orchards, Oregon, USA	Tested or untested parent tree selected from natural stands located in Washington or Oregon	M	0 – 1000	No limit
		Bingham Seed Orchards, Moscow, Idaho, USA	Tested or untested parent tree selected from natural stands located in Washington or Idaho	KQ	400 – 1400	No limit
				M	1000 – 1400	No limit

* The elevation range transfer limit for Noble fir is based on the mean elevation of the natural stands from which the parent trees were selected, weighted by the proportional parental contribution to the lot of the parent trees, recorded in metres.

APPENDIX 7 – PARENTAL CONTRIBUTION, EFFECTIVE POPULATION SIZE AND GENETIC WORTH

1. Parental Contribution

1.1 Vegetative lot

The parental contribution (P_i) of a particular parent tree to a vegetative lot is determined in accordance with the following formula:

$P_i = X_i / X_n$

where:

X_i = total number of cuttings or propagules collected from parent tree *i* in the lot
X_n = total number of cuttings or propagules collected from all parent trees *n* in the lot

1.2 Seedlots

The parental contribution (P_i) of a particular parent tree to a seedlot is determined in accordance with the following formula:

$P_i = (F_i + M_i) / 2$

where:

F_i = female gametic contribution for parent tree *i* as determined below
M_i = male gametic contribution for parent tree *i* as determined below

Determining F_i

The female gametic contribution of a particular parent tree is determined in accordance with the following formula:

$F_i = X_i / X_n$

where:

X_i = seed contribution of parent tree *i* as determined in accordance with generally accepted scientific methodology
X_n = total seed contribution of all parent trees *n*

Determining M_i

The male gametic contribution of a particular parent tree is determined in accordance with the following formula:

$M_i = Y_i / Y_n$

where:

Y_i = pollen contribution of parent tree *i* as determined in accordance with generally accepted scientific methodology
Y_n = total pollen contribution of all parent trees *n*

2. Effective Population Size

The effective population size (*Ne*) for a lot collected from parent trees is determined in accordance with the applicable formula set out below.

2.1 Unrelated parent trees

The *Ne* for lots collected from parent trees that are not related to each other is determined in accordance with the following formula:

$Ne = 1 / \sum(P_i^2)$

where:

P_i = parental contribution for parent tree *i* as determined in accordance with the formula set out in
(a) section 1.1 if the lot is a vegetative lot, or
(b) section 1.2 if the lot is a seedlot

2.2 Related parent trees

The *Ne* for lots collected from parent trees where two or more of the parent trees are related to each other is determined in accordance with the following formula:

$Ne = 0.5 / \sum(P_i P_j c_{ij})$

where:

P_i = parental contribution for parent tree *i* as determined in accordance with the formula set out in
(a) section 1.1 if the lot is a vegetative lot, or
(b) section 1.2 if the lot is a seedlot

P_j = parental contribution for parent tree *j* as determined in accordance with the formula set out
(a) section 1.1 if the lot is a vegetative lot, or
(b) section 1.2 if the lot is a seedlot

c_{ij} = coefficient of relatedness (co-ancestry) between parent tree *i* and parent tree *j* as determined below

Determining c_{ij}

If parent tree *i* and parent tree *j* are the same, then $c_{ij} = 0.50$

If parent tree *i* and parent tree *j* have the same parent trees, or if parent tree *i* is the parent of parent tree *j* or vice versa, then $c_{ij} = 0.25$

If parent tree *i* and parent tree *j* share one common parent tree, then $c_{ij} = 0.125$

If parent tree *i* and parent tree *j* are not related in any way, then $c_{ij} = 0$

3. Genetic Worth

In this section, **"pollen contamination"** means pollen, originating from a natural stand outside a seed orchard, that contributes to the pollination of female cones on parent trees in the orchard.

The genetic worth (*GW*) for lots collected from parent trees is determined in accordance with the applicable formula set out below.

3.1 Vegetative lots

The *GW* for a vegetative lot collected from parent trees is determined in accordance with whichever of the following formulas applies:

$GW = \sum P_i CV_i$ or $GW = \sum P_i BV_i$

where:

P_i = parental contribution for parent tree *i* as determined in accordance with section 1.1
CV_i = clonal value of parent tree *i*
BV_i = breeding value of parent tree *i*

In the case of a vegetative lot registered as a custom lot, a breeding value determined in accordance with the requirements of section 5.4.6 of the standards is always used to calculate *GW*.

3.2 Seedlots

The *GW* of seedlots collected from parent trees is calculated in accordance with the applicable formula set out in sections 3.2.1 through 3.2.3 below.

In the case of a seedlot registered as a custom lot, a breeding value determined in accordance with the requirements of section 5.4.6 of the standards is always used to calculate *GW*.

3.2.1 Seedlots produced in a seed orchard without pollen contamination

The *GW* for seedlots produced in seed orchards not subject to pollen contamination is determined in accordance with the following formula:

$GW = \sum BV_i (F_i + M_i) / 2$

where:

BV_i = breeding value of parent tree *i*
F_i = female gametic contribution of parent tree *i*
M_i = male gametic contribution of parent tree *i*

3.2.2 Seedlots produced in a seed orchard with pollen contamination

The *GW* for seedlots produced in seed orchards subject to pollen contamination is determined in accordance with the following formula:

$GW = \sum\{(PC \times BVCP) + BV_i [F_i + M_i (1\text{-}PC)]\} / 2$

where:

PC = the proportion of contaminant pollen, expressed as a percentage of the total amount of pollen pollinating parent tree *i*, as determined in accordance with generally accepted scientific methodology
BVCP = breeding value of contaminant pollen as determined in accordance with generally accepted scientific methodology
BV_i = breeding value of parent tree *i*
F_i = female gametic contribution of parent tree *i*
M_i = male gametic contribution of parent tree *i*

3.2.3 Seedlots produced through a controlled cross of parent trees in a seed orchard

The *GW* for seedlots produced through a controlled cross where two or more parent trees are mated, and pollen from all other sources is excluded, is determined in accordance with the following formula:

$$GW = \sum n_{ij} [(BV_i + BV_j) / 2] / n$$

where:

BV_i = breeding value of parent tree *i* from which cones or seeds are collected
BV_j = breeding value of parent tree *j* contributing to the pollen mix as determined below
n_{ij} = number of cones or seeds from parent tree *i* crossed with pollen from parent tree *j*
n = total number of seeds or cones of all parent trees

Determining BV_j

If the pollen used in the controlled cross is collected from a single parent tree, BV_j is the breeding value of that parent tree.

If the pollen used in the controlled cross is collected from two or more parent trees, BV_j is the mean breeding value of the pollen mix, as determined in accordance with the following formula:

$$BV_j = \sum BV_k \, w_k / w$$

where:

BV_k = breeding value of parent *k* contributing to the pollen mix
w_k = the volume or weight of parent *k* contributing to the pollen mix
w = the total volume or weight of the pollen mix