File: 18140-04/STG

June 17, 1993

To: All Regional Managers
   All Regional Silviculture Officers

From: Henry J. Benskin, R.P.F.
      Director
      Silviculture Branch

Re: Interim Revisions to Seed Transfer Guidelines

Recent Ministry of Forests audits of Pre-Harvest Silviculture Prescriptions indicate that in a considerable number of cases transfer beyond the guidelines has occurred. In establishing the current Seed Transfer Guidelines (1987 for the interior and 1990 for the coast), a conservative approach was taken, especially with regard to elevational transfer. To overcome some of the minor elevational deviations from the current Seed Transfer Guidelines, interim revisions were recommended by Research Branch (Breeders and Provenance Officer) and Silviculture Branch (Seed Section) and were presented and discussed at the Regional Silviculture Officers meeting in Richmond on May 13, 1993.

Regional comments were received and the attached interim revisions have been agreed to for use in 1993 cone collection planning and future seed use while further review by the Tree Seed Transfer Review Task Group is carried out.

Ministry staff are currently working on enforcement procedures relating to the Seed Transfer Guidelines.

Please make the attached Interim Seed Transfer Revisions as an addendum to the current Interior and Coastal Seed Transfer Guideline Publications (9 pp.) Please distribute these interim revisions to all applicable forest district and licensees forthwith.

Henry J. Benskin
Director
Silviculture Branch

Attachment

Ted Baker
Director
Research Branch
Interior Seed Transfer Guidelines for Cone Collection Planning and Seedlot Selection
Interim Seed Transfer Revisions: (June 15, 1993)

Interior  
(Page number refer to Interior Seed Transfer Guidelines...)

(p.4) 1. Pl  
latitude 56 to 60,  +150m - 100m;  
latitude 49 to 56, (+300m)* - 200m;

(p.6) 2. Si  
elevational limits for standard provenances;  
set all at 400m upwards and 200m downwards.

(p.7) 3. Si  
upper elevational limit for superior provenances;  
Birch Island  no change;  
Horseshy  +1 500m;  
Louis Creek  +2 000m;  
Fly Hills  +2 000m;

(p.8) 4. Bi  
change elevation to  +300m and -200m;

Bg  add from source  +200m and -200m;  
Ba  add from source  +300m and -200m;

Py  elevational transfer  (+300m) and -200m;

5. No change to Cw, Hw, Lt, and Pw.

6. Fdi  
nos transfer wet to dry or vice versa,  
e.g. no transfer between SA and TOD or CT and QL.

a) applies to EK and all seed planning zones north of 52 latitude  
Fdi (+200m) and (-100m);

b) applies to all seed planning zones south of 52 latitude, except EK.  
add Fdi elevational transfer  +300m and -200m;

7. Lw  
nos transfer EK to WK zone or vice versa;  
elevational transfer  (+300m) and -200m;

(p.11) 8. Add footnote #5 to Transfer Guidelines for orchard seed Pl and Sx.  
Seed from a planning zone can be used in an adjacent planning  
provided it is in the same biogeoclimatic zone and elevational,  
latitudinal and longitudinal restraints for natural seeds are followed.

*(those numbers in parenthesis are the same as in the original text)
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Introduction

This pamphlet has been prepared to assist silviculture staff plan for cone collection activities and select appropriate registered seedlots, already in storage, for reforestation projects. The following information is provided:

- A seed planning zone map for the interior;
- Transfer guidelines for natural stand seed, including special provisions for superior provenances, and seed orchard seed;
- Location of superior provenances and seedlot eligibility requirements;
- Anticipated annual seedling production from interior seed orchards; and
- A seedlot selection flow diagram.

The transfer guidelines given here are based largely on early results from provenance and progeny tests established by Research Branch. These guidelines will be updated as new information becomes available.

Less restrictive movement of superior provenance seed, over other natural stand provenances, is recommended because of demonstrated top performance in wide-ranging field tests. Seed orchard seed movement is based on parent tree origin, which commonly occurs throughout the seed-planning zone(s) specified for each orchard.

It is important that emphasis be given to the use of seed from seed orchards and superior provenance sources when available to achieve genetic gains as soon as possible through planting programs. In both cases estimates of volume gains are significant, even for seed from first generation orchards. In addition, orchard and superior provenance seed should be used on productive sites to maximize benefits.
Transfer Guidelines For Natural Stand Seed

Lodgepole Pine

Standard Provenances:
Recommended Maximum Transfer from Source within a Seed Planning Zone

<table>
<thead>
<tr>
<th>Latitude</th>
<th>2° south to north</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1° north to south</td>
</tr>
<tr>
<td>Longitude</td>
<td>3° east to west</td>
</tr>
<tr>
<td></td>
<td>2° west to east</td>
</tr>
</tbody>
</table>

Elevation of Planting Site

<table>
<thead>
<tr>
<th>Latitude</th>
<th>Upwards(m)</th>
<th>Downwards(m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>56°-60°</td>
<td>1000.150</td>
<td>500.100</td>
</tr>
<tr>
<td>49°-56°</td>
<td>300</td>
<td>100.200</td>
</tr>
</tbody>
</table>

NOTES:
1. South to north and east to west movement preferred.
2. Upward movement preferred.
3. In the interior cedar-hemlock (ICH) subzones, local low elevation provenances should be utilized. Higher elevation provenances planted at lower elevations are highly susceptible to needle cast disease infection.
4. Seed may be transferred across zone boundaries providing the above guidelines are followed and movement is within the same biogeoclimatic zone.
Transfer Guidelines For Natural Stand Seed

Lodgepole Pine

Superior Provenances and Recommended Usage Areas

<table>
<thead>
<tr>
<th>Location</th>
<th>Elevation (m)</th>
<th>Latitude</th>
<th>Longitude</th>
<th>Origin</th>
<th>Recommended Area of Use</th>
<th>Seed Planning Zone</th>
<th>Upper Elevation Limit (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jackfish Cr</td>
<td>457</td>
<td>58°32'</td>
<td>122°42'</td>
<td>FN DK</td>
<td></td>
<td></td>
<td>700</td>
</tr>
<tr>
<td>Telkwa Low</td>
<td>518</td>
<td>54°39'</td>
<td>127°03'</td>
<td>BLK</td>
<td></td>
<td></td>
<td>800</td>
</tr>
<tr>
<td>Larch Hill</td>
<td>777</td>
<td>50°42'</td>
<td>119°11'</td>
<td>SA BSH EK WK</td>
<td>TOD BSH</td>
<td></td>
<td>1000</td>
</tr>
<tr>
<td>Inonoaklin</td>
<td>579</td>
<td>49°54'</td>
<td>118°12'</td>
<td>SA BSH EK WK</td>
<td></td>
<td></td>
<td>800</td>
</tr>
<tr>
<td>Champion Lk</td>
<td>998</td>
<td>49°11'</td>
<td>117°35'</td>
<td>WK EK TOD BSH</td>
<td></td>
<td></td>
<td>1200</td>
</tr>
<tr>
<td>Udy Creek</td>
<td>983</td>
<td>53°01'</td>
<td>123°14'</td>
<td>CHL NCH CT QL MRB</td>
<td></td>
<td></td>
<td>1200</td>
</tr>
<tr>
<td>Rocky Mt Trench</td>
<td>see below</td>
<td></td>
<td></td>
<td>BSH EK WK MRB SA TOD</td>
<td></td>
<td></td>
<td>1300</td>
</tr>
</tbody>
</table>

NOTES:

1. To qualify as a superior provenance the majority of a seedlot must originate from a natural stand that is within an 8K radius and 50 m above and 100 m below the origin given.

2. The strip along the Rocky Mountain Trench from 50°30' and 51°30' and between 900 to 1200 m elevation can be considered one provenance.

3. Seed can be used throughout the zones indicated up to the elevation limit, and in any additional areas covered off by guidelines on page 4. Give preference to productive sites. Planting in heavy snow load areas should be avoided.
Transfer Guidelines For Natural Stand Seed

Interior Spruce

Standard Provenances:
Recommended Maximum Transfer from Source within a Seed Planning Zone

<table>
<thead>
<tr>
<th>Latitude</th>
<th>2° south to north</th>
<th>1° north to south</th>
</tr>
</thead>
<tbody>
<tr>
<td>Longitude</td>
<td>5° east to west</td>
<td>2° west to east</td>
</tr>
</tbody>
</table>

Elevation of Planting Site

<table>
<thead>
<tr>
<th>Latitude</th>
<th>Upwards(m)</th>
<th>Downwards(m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>58°-60°</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>56°-58°</td>
<td>200</td>
<td>100</td>
</tr>
<tr>
<td>49°-56°</td>
<td>300</td>
<td>100</td>
</tr>
<tr>
<td>49°-53°</td>
<td>400</td>
<td>200</td>
</tr>
</tbody>
</table>

* Nelson Forest Region only.

NOTES:
1. South to north and east to west movement preferred.
2. Upward movement preferred.
3. Seed may be transferred across zone boundaries providing the above guidelines are followed and movement is within the same biogeoclimatic zone.
Transfer Guidelines For Natural Stand Seed

Interior Spruce

Superior Provenances and Recommended Usage Areas

<table>
<thead>
<tr>
<th>Location</th>
<th>Elevation (m)</th>
<th>Latitude</th>
<th>Longitude</th>
<th>Seed Planning Zone</th>
<th>Upper Elevation Limit (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birch Island</td>
<td>425</td>
<td>51°37'</td>
<td>119°30'</td>
<td>SA BSH MRB QL MGR</td>
<td>1000</td>
</tr>
<tr>
<td>Horsefly</td>
<td>900</td>
<td>52°25'</td>
<td>121°25'</td>
<td>SA BSH MRB QL MGR CP BLK</td>
<td>no-limit +1500</td>
</tr>
<tr>
<td>Louis Ck.</td>
<td>1280</td>
<td>50°50'</td>
<td>119°55'</td>
<td>SA BSH MRB QL MGR CP BLK</td>
<td>no-limit +2000</td>
</tr>
<tr>
<td>Fly Hills</td>
<td>1280</td>
<td>50°42'</td>
<td>119°30'</td>
<td>SA BSH MRB QL MGR CP BLK</td>
<td>no-limit +2000</td>
</tr>
</tbody>
</table>

NOTES:

1. To qualify as a superior provenance the majority of a seedlot must originate from a natural stand as follows:
   Birch Island - the flood plain along North Thompson River from Kamloops north to Blue River.
   Other locations - within a 15 K radius, and 100 m above and 100 m below the origin given.

2. Seed can be used throughout the zones indicated up to the elevation limit, and in any additional areas covered off by guidelines on page 6. Give preference to productive sites.
Transfer Guidelines For Natural Stand Seed

Other Interior Species

Recommended Maximum Transfer from Source within a Seed Planning Zone

<table>
<thead>
<tr>
<th>Latitude</th>
<th>2° south to north</th>
<th>1° north to south</th>
</tr>
</thead>
<tbody>
<tr>
<td>Longitude</td>
<td>3° east to west</td>
<td>2° west to east</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Elevation</th>
<th>Species</th>
<th>Upwards(m)</th>
<th>Downwards(m)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Subalpine Fir</td>
<td>200-300</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>a) Douglas-fir</td>
<td>200</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Western Red Cedar</td>
<td>300</td>
<td>200</td>
</tr>
<tr>
<td></td>
<td>Western Hemlock</td>
<td>200</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Western Larch</td>
<td>300</td>
<td>150-200</td>
</tr>
<tr>
<td></td>
<td>Tamarack</td>
<td>200</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Yellow Pine</td>
<td>300</td>
<td>180-200</td>
</tr>
<tr>
<td></td>
<td>Western White Pine</td>
<td>700</td>
<td>700</td>
</tr>
<tr>
<td></td>
<td>Grand fir</td>
<td>300</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td>Amabilis fir</td>
<td>300</td>
<td>200</td>
</tr>
<tr>
<td></td>
<td>b) Douglas fir</td>
<td>300</td>
<td>200</td>
</tr>
</tbody>
</table>

NOTES:

1. No superior provenances identified.
2. Seed may be transferred across zone boundaries providing the above guidelines are followed and movement is within the same biogeoclimatic zone.
3. For fdi, no transfer wet to dry or vice versa. Eg. no transfer between SA and TOC or CT and GL.
   a) Applies to EK and all seed planning zones north of 52° latitude.
   b) Applies to all seed planning zones south of 52° latitude, except EK.
4. For lw, no transfer EK to WK or vice versa.
Transfer Guidelines For Seed Orchard Seed

This section includes (1) all Interior orchards that will have produced seed by 1995 and (2) breeding arboreta currently managed to yield seedlots for reforestation purposes.

Overview: Seed Planning Zones presently covered by Interior Seed Orchards

Lodgepole Pine

Interior Spruce
Transfer Guidelines For Seed Orchard Seed

**Detail: Recommended Area Use and Production Target for Each Orchard**

<table>
<thead>
<tr>
<th>Orchard</th>
<th>No.</th>
<th>Name</th>
<th>Agency</th>
<th>Recommended Area of Use Seed Planning Zone(s)</th>
<th>Production Target Annual Target Seedling Year Target (millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lodgepole Pine</strong></td>
<td>201</td>
<td>Omineca-Pinchin</td>
<td>MOF</td>
<td>CP, FIN lower</td>
<td>Central Interior</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CP, FIN higher</td>
<td></td>
</tr>
<tr>
<td></td>
<td>202</td>
<td>Dawson-Peace</td>
<td>MOF</td>
<td>CP, FIN</td>
<td></td>
</tr>
<tr>
<td></td>
<td>203</td>
<td>Willow Bowron</td>
<td>MOF</td>
<td>MGR,QL</td>
<td></td>
</tr>
<tr>
<td></td>
<td>204</td>
<td>Smithers</td>
<td>MOF</td>
<td>BLK</td>
<td></td>
</tr>
<tr>
<td><strong>Interior Spruce</strong></td>
<td>205</td>
<td>Central Plateau Low</td>
<td>MOF</td>
<td>CP</td>
<td>Central Interior</td>
</tr>
<tr>
<td></td>
<td>206</td>
<td>Central Plateau Hi</td>
<td>MOF</td>
<td>CP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>207</td>
<td>Bulkley Valley Low</td>
<td>MOF</td>
<td>BLK</td>
<td></td>
</tr>
<tr>
<td></td>
<td>208</td>
<td>Bulkley Valley High</td>
<td>MOF</td>
<td>BLK</td>
<td></td>
</tr>
<tr>
<td></td>
<td>209</td>
<td>Quesnel Lake</td>
<td>MOF</td>
<td>QL</td>
<td></td>
</tr>
<tr>
<td></td>
<td>216</td>
<td>Bowron Lakes</td>
<td>MOF</td>
<td>MGR,MRB,QL</td>
<td></td>
</tr>
<tr>
<td></td>
<td>217</td>
<td>North Central</td>
<td>BALCAN</td>
<td>CP,BLK</td>
<td></td>
</tr>
<tr>
<td></td>
<td>610</td>
<td>F. Rupert Breed. Arb.</td>
<td>MOF</td>
<td>BLK,NST</td>
<td></td>
</tr>
<tr>
<td></td>
<td>611</td>
<td>F. George Breed. Arb.</td>
<td>MOF</td>
<td>CP,MGR,MRB</td>
<td></td>
</tr>
<tr>
<td><strong>Shuswap Adams Low</strong></td>
<td>301</td>
<td>W. Kootenay Low</td>
<td>MOF</td>
<td>WK,BSH</td>
<td>Southern Interior</td>
</tr>
<tr>
<td></td>
<td>302</td>
<td>W. Kootenay High</td>
<td>MOF</td>
<td>WK,BSH</td>
<td></td>
</tr>
<tr>
<td></td>
<td>303</td>
<td>Thompson-Okanagan</td>
<td>FCC</td>
<td>TOA,TOD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>304</td>
<td>Mica-E. Kootenay</td>
<td>MOF</td>
<td>MIC,EK</td>
<td></td>
</tr>
<tr>
<td></td>
<td>305</td>
<td>Shuswap Adams Low</td>
<td>MOF</td>
<td>SA lower</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>higher</td>
<td></td>
</tr>
<tr>
<td></td>
<td>306</td>
<td>Shuswap Adams High</td>
<td>MOF</td>
<td>SA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>612</td>
<td>E. Kootenay Breeding Arborea</td>
<td>MOF</td>
<td>EK</td>
<td></td>
</tr>
</tbody>
</table>

**NOTES:**
1. Seed can be used throughout zone indicated. Give preference to productive sites.
2. To determine upwards/downwards movement, apply elevation transfer guidelines for natural stand seed (p. 4 or 6) to elevation given.
3. Target Year - year that annual seedling target was, or is expected to be, reached.
4. MOF - Ministry of Forests; FCC - Fletcher Challange Canada Ltd.; BALCAN - Balco Canfor Reforestation Centre.
5. For P. and Sx, orchard seed, seed from a planning zone can be moved to an adjacent planning zone provided it is in the same biogeoclimatic zone and elevational lat-long as for natural stand seed.
Seedlot Selection Flow Diagram

The following diagram illustrates the steps leading to the selection of an appropriate seedlot for reforestation purposes. Sources of information required are given in the shaded boxes. 'SPAR' refers to the Seed Planning and Registry System; reports are available from Regional Offices and, in the near future, District Offices also.

1. Planting Site
2. Species
3. Seed Planning Zone
4. Orchard
   - Transfer Guidelines for Seed Orchard Seed (p. 10)
5. Orchard Seedlots
   - SPAR reports (A Class seedlots) (p. 13)
6. Natural Stand Seedlots
   - SPAR reports (B Class seedlots) (p. 14)
7. Seedlot Selection
   - Seedlot Selection Criteria (e.g., preference to superior provenance seedlots) (p. 15)
   - Transfer Guidelines for Natural Stand Seed (p. 4-8)
Seedlot Selection Criteria

I Quality - Genetic

1. Natural stand/plantation seedlots

   • GENETIC CLASS

   B1 - Seed Production Area (S.P.A.), a natural stand which has been treated and the undesirable phenotypes removed prior to pollination of current crop.

   B2 - Pre-selected seed stands and/or selected single trees within natural stands. Collections must be made under direct supervision.

   B3 - Normal stands. Stand of normal appearance and no effort made to select desirable phenotypes from within this stand.

   B4 - Natural stand on which there is no information.

   B5 - Squirrel caches and/or cuttings.

   B6 - Plantations.

   If seedlot qualifies as a superior provenance, a '+' will be appended (e.g., B3+).

2. Orchard Seedlots

   • GENERATION

   1.0 - Seed orchard consisting of first generation parent trees selected in natural stands for which no, or limited, genetic test information is available.

   1.5 - Seed orchard consisting of genetically superior, first generation parent trees, as identified from genetic tests. A 1.0 generation orchard will become 1.5 if a significant portion of the original parents are removed, based on genetic test results.

   1.75 - Seed orchard propagated from selections made within provenance tests in which individual families are identified.

   2.0 - Seed orchard propagated from selections made within full-sib progeny tests of first generation parent trees.

   Genetic gain increases as generation number increases.
Seedlot Selection Criteria

- **SEED USE PRIORITY**
  
  This ranking, based on parental contribution and pollen contamination estimates, indicates which seedlots from the same orchard should be used first, when excess seed is available.

- **GENETIC CLASS**
  
  All orchards in the interior are clonal and rated as A4.

II **Quality - Physiological**

- **GERM %**
  
  The percentage of seed that produced germinants, classified as normal, within the test period. Separate stratified and unstratified tests are done for lodgepole pine and interior spruce seedlots. In most cases, the best test result is given in TSR.

- **GERMINATION VALUE (GV)**
  
  An index which combines speed and completeness of germination. GV has no units, it is simply a number. The higher the GV the faster and/or the more complete the germination. GVs are useful for comparing seedlots within a species.

III **Quantity**

- **AVAILABLE BALANCE**
  
  Actual seed balance net of any commitments against the seedlot.

- **POTENTIAL CO TREES (1000's)**
  
  Equivalent number of plantable trees using the Ministry Sowing Rules (available on request from Silviculture Branch).

IV **Availability**

- **OWN**
  
  C - Crown owned seed
  P - Private seed

  All agencies wishing to use Crown seed for privately funded reforestation projects must obtain approval from the Regional Manager.