



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

for Ted Baker
Director
Research Branch

Attachment



SILVICULTURE

Interior Seed Transfer Guidelines for Cone Collection Planning and Seedlot Selection



Natural Stands

Seed Orchards



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;
Horsefly + 1 500m;
Louis Creek + 2 000m;
Fly Hills + 2 000m;
- (p.8) 4. Bl 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 no 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 no 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 Pli 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:

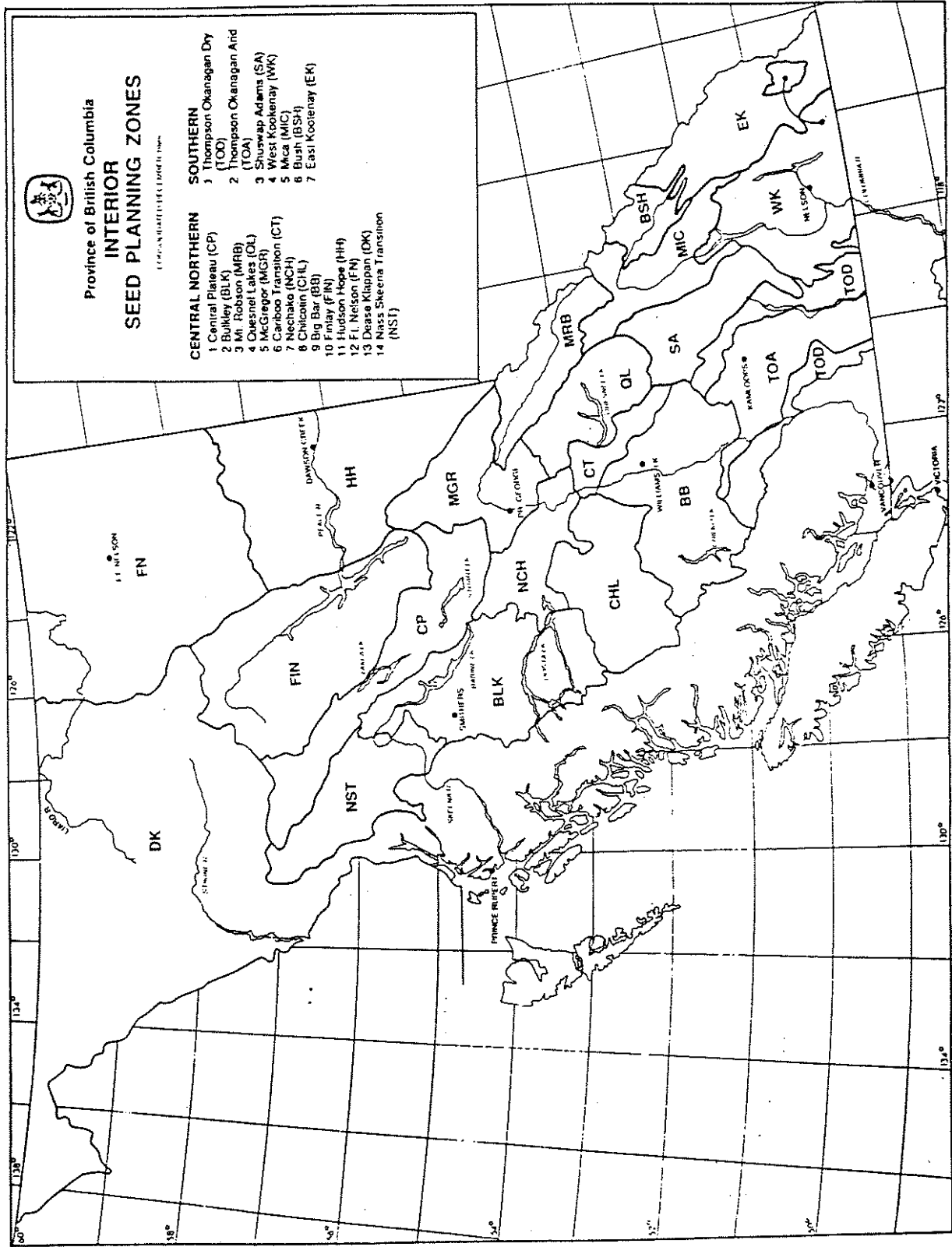
- a seed planning zone map for the interior;
- transfer guidelines for natural stand seed, including special provisions for superior provenances, and seed orchard seed;
- location of superior provenances and seedlot eligibility requirements;
- anticipated annual seedling production from interior seed 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.

Interior Seed Planning Zone Map



JUNE 1993 - TRANSFER GUIDELINES

INTERIOR SEED TRANSFER GUIDELINES FOR CONE COLLECTION PLANNING & SEEDLOT SELECTION

WITH INTERIM REVISIONS WRITTEN IN.

Transfer Guidelines For Natural Stand Seed

Lodgepole Pine

Standard Provenances:

Recommended Maximum Transfer from Source *within* a Seed Planning Zone

Latitude	2° south to north 1° north to south
Longitude	3° east to west 2° west to east

Elevation of Planting Site

Latitude	Upwards(m)	Downwards(m)
56°-60°	100 150	50 100
49°-56°	300	100 200

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

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

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

Latitude	2° south to north 1° north to south
Longitude	5° east to west 2° west to east

Elevation of Planting Site

Latitude	Upwards(m)	Downwards(m)
58°-60°	100	50
56°-58°	200	100
49°-56°	300	100
49°-53° ^a	400	200

} 400
} 200

^a 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

Location	Origin			Recommended Area of Use	
	Elevation (m)	Latitude	Longitude	Seed Planning Zone	Upper Elevation Limit (m)
Birch Island	425	51°37'	119°30'	SA BSH MRB QL MGR	1000
Horsefly	900	52°25'	121°25'	SA BSH MRB QL MGR CP BLK	no limit +1500
Louis Ck.	1280	50°50'	119°55'	SA BSH MRB QL MGR CP BLK	no limit +2000
Fly Hills	1280	50°42'	119°30'	SA BSH MRB QL MGR CP BLK	no limit +2000

*changed
400 m
up.*

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

Latitude	2° south to north 1° north to south
Longitude	3° east to west 2° west to east

Elevation	Species	Upwards(m)	Downwards(m)
	Subalpine Fir	200 300	100 200
	a) Douglas-fir	200	100
	Western Red Cedar	300	200
	Western Hemlock	200	100
	Western Larch	300	150 200
	Tamarack	200	100
	Yellow Pine	300	150 200
	Western White Pine	700	700
	Grand fir	200	200
	Amabilis fir	300	200
	b) Douglas fir	300	200

NOTES:

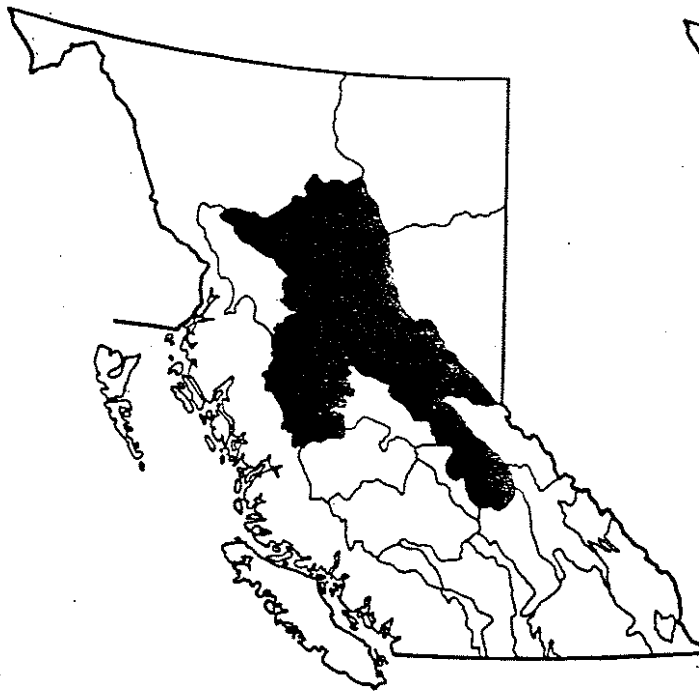
1. No superior provenances identified.
2. Seed may be transferred *across* zone boundaries providing the above guidelines are followed and movement is within the same biogeoclimatic zone.
3. For Fdi, no transfer wet to dry or vice versa.
Eg. no transfer between SA and TOD or CT and QL.
- a) Applies to 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

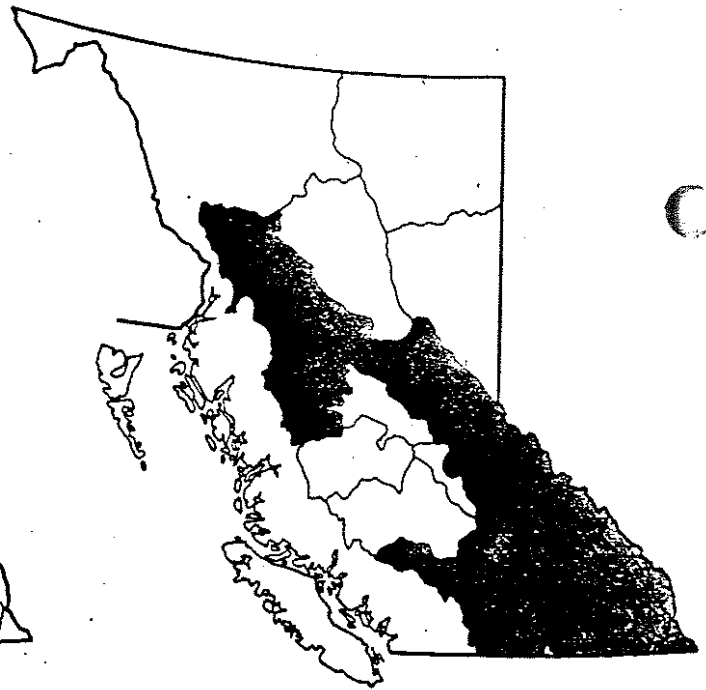
This section includes (1) all Interior orchards that will have produced seed by 1995 and (2) breeding arboreta currently managed to yield seedlots for reforestation purposes.

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

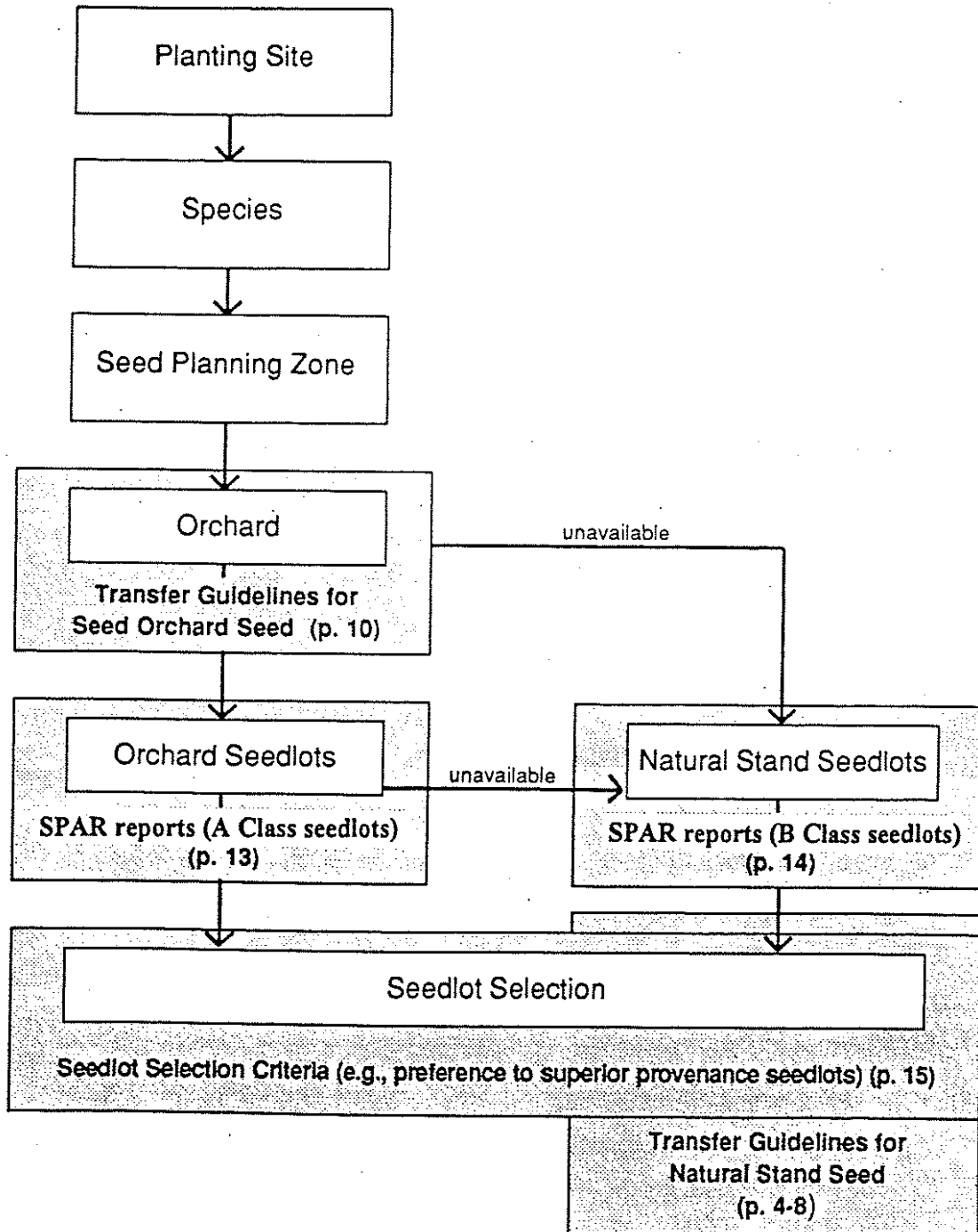
Orchard		Agency	Recommended Area of Use		Production Target	
No.	Name		Seed Planning Zone(s)	Elevation (m)	Annual Seedling Target (millions)	Target Year
Lodgepole Pine						
----- Central Interior -----						
201	Omineca-Pinchi	MOF	CP, FIN lower	650	0.49	1989
			higher	910	1.96	1989
202	Dawson-Peace	MOF	CP, FIN	710	1.83	1993
203	Willow Bowron	MOF	MGR, QL	920	1.29	1993
204	Smithers	MOF	BLK	900	1.94	1994
Interior Spruce						
----- Central Interior -----						
205	Central Plateau Low	MOF	CP	750	3.36	1994
206	Central Plateau Hi	MOF	CP	950	2.73	1994
207	Bulkley Valley Low	MOF	BLK	740	2.46	1995
208	Bulkley Valley High	MOF	BLK	970	2.72	1995
209	Quesnel Lake	MOF	QL	1020	2.23	1997
216	Bowron Lakes	MOF	MGR, MRB, QL	880	1.02	1992
217	North Central	BALCAN	CP, BLK	860	2.29	1999
610	P. Rupert Breed. Arb.	MOF	BLK, NST	790	0.68	1987
611	P. George Breed. Arb.	MOF	CP, MGR, MRB, QL	890	0.95	1987
----- Southern Interior -----						
301	W. Kootenay Low	MOF	WK, BSH	1110	2.69	1995
302	W. Kootenay High	MOF	WK, BSH	1610	1.68	1995
303	Thompson-Okanagan	FCC	TOA, TOD	1350	3.93	1999
304	Mica-E. Kootenay	MOF	MIC, EK	1320	7.76	1999
305	Shuswap Adams Low	MOF	SA lower	770	0.29	1996
			higher	1290	1.11	1996
306	Shuswap Adams High	MOF	SA	1660	1.40	1996
612	E. Kootenay Breeding Arboreta	MOF	EK	1280	1.62	1987

NOTES:

- Seed can be used throughout zone indicated. Give preference to productive sites.
- To determine upwards/downwards movement, apply elevation transfer guidelines for natural stand seed (p. 4 or 6) to elevation given.
- Target Year - year that annual seedling target was, or is expected to be, reached.
- MOF - Ministry of Forests; FCC - Fletcher Challenge Canada Ltd.; BALCAN - Balco Canfor Reforestation Centre.
- For Pli 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 seeds. 11

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.



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.