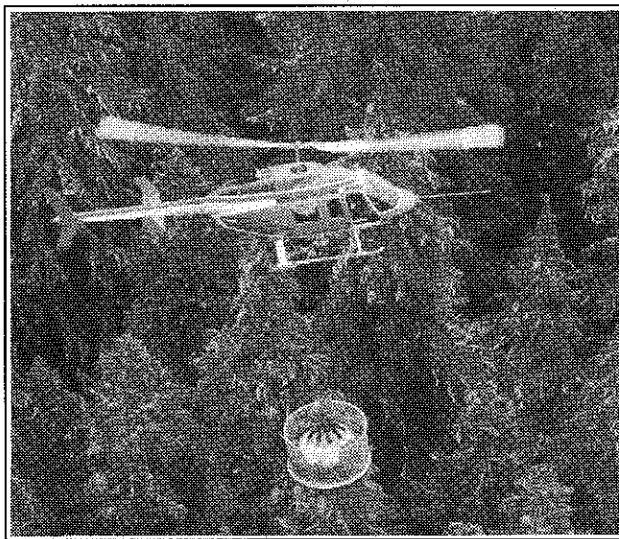




# Interior Seed Transfer Guidelines for Cone Collection Planning and Seedlot Selection



Natural Stands

Seed Orchards



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B.C. MINISTRY OF FORESTS.  
INTERIOR SEED TRANSFER  
GUIDELINES FOR CONE  
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## Introduction

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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:

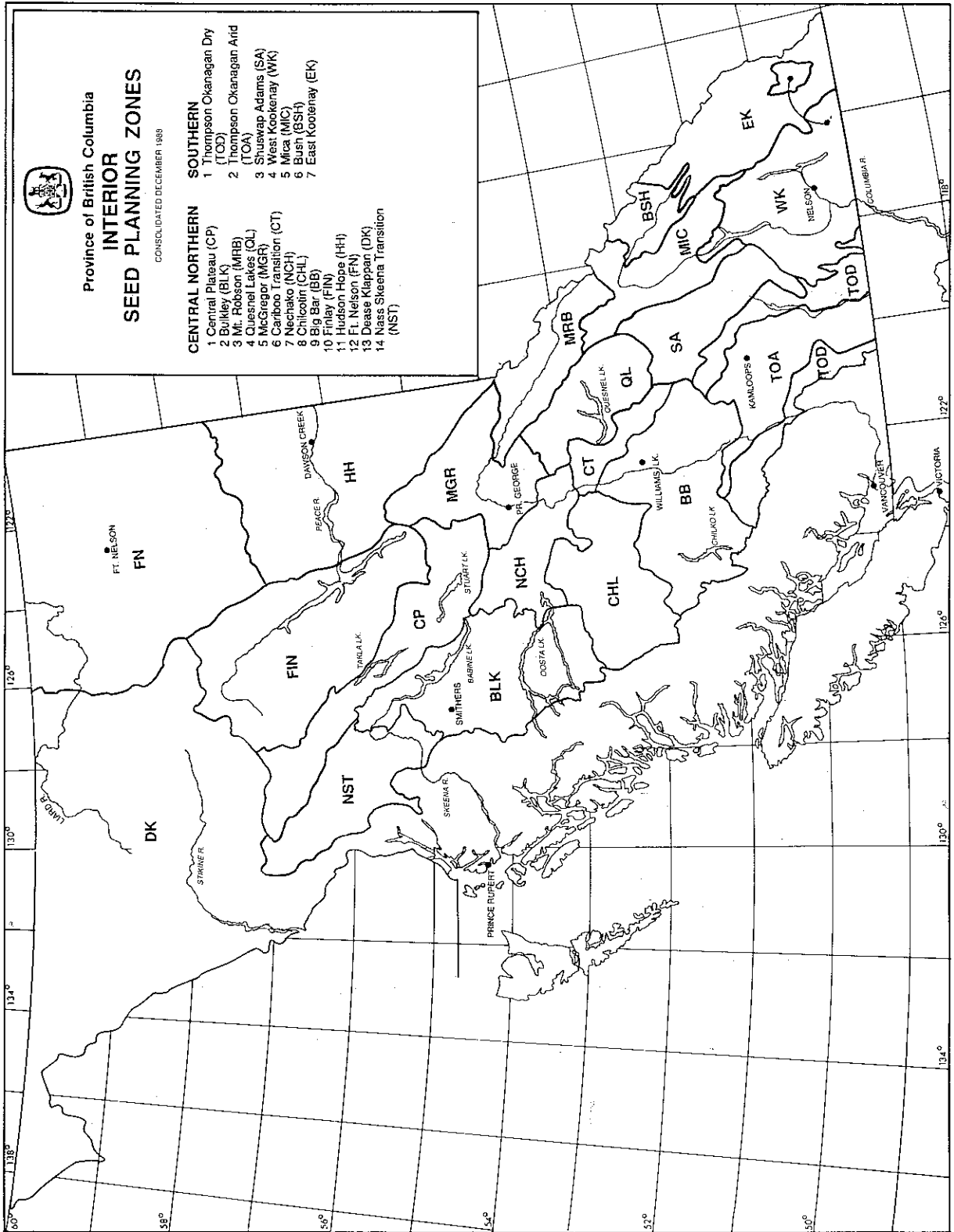
- a seed planning zone map for the interior;
- transfer guidelines for natural stand seed, including special provisions for superior provenances, and seed orchard seed;
- location of superior provenances and seedlot eligibility requirements;
- anticipated annual seedling production from interior seed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



## Transfer Guidelines For Natural Stand Seed

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### Lodgepole Pine

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

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

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Elevation of Planting Site

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

---

**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

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### Interior Spruce

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

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

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Elevation of Planting Site

Latitude	Upwards(m)	Downwards(m)
58°-60°	100	50
56°-58°	200	100
49°-56°	300	100
49°-53° <sup>a</sup>	400	200

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<sup>a</sup> 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
Louis Ck.	1280	50°50'	119°55'	SA BSH MRB QL MGR CP BLK	no limit
Fly Hills	1280	50°42'	119°30'	SA BSH MRB QL MGR CP BLK	no limit

#### 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

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### Other Interior Species

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

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

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

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**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.



## **Transfer Guidelines For Seed Orchard Seed**

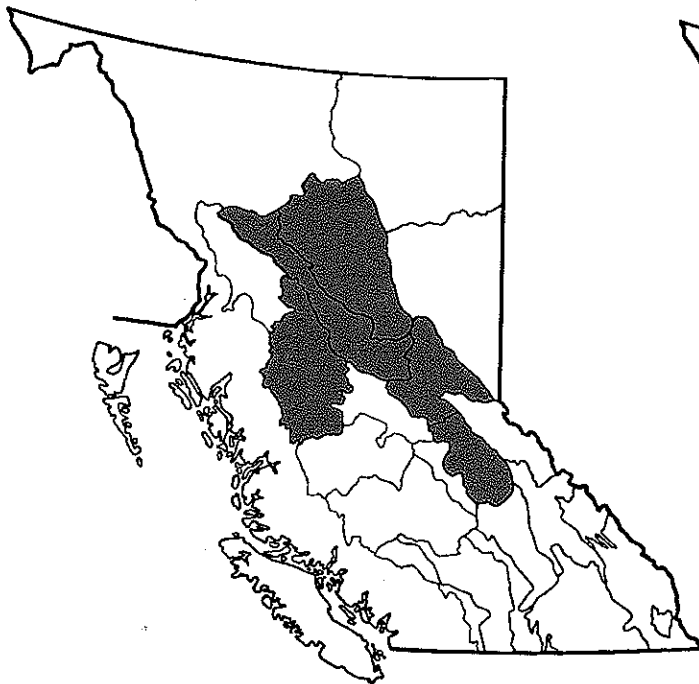
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This section includes (1) all Interior orchards that will have produced seed by 1995 and (2) breeding arboreta currently managed to yield seedlots for reforestation purposes.

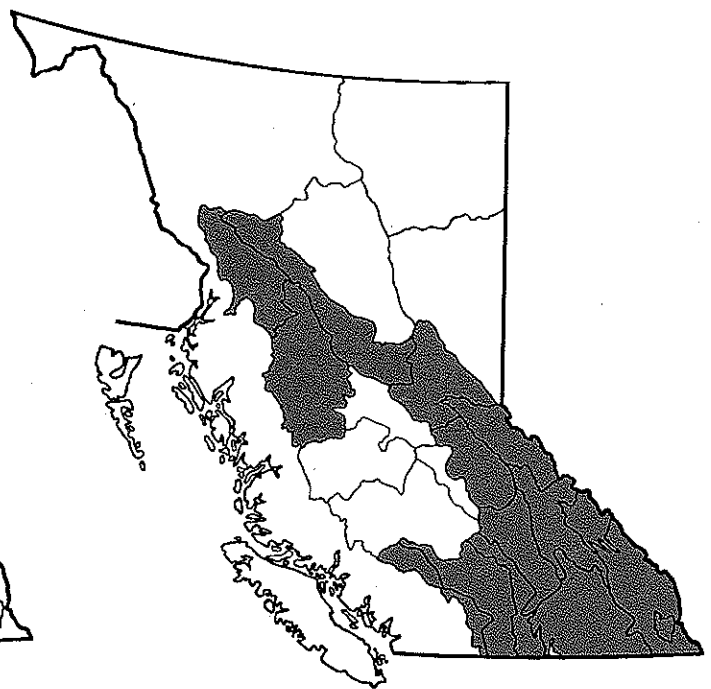
**Overview: Seed Planning Zones presently covered by Interior Seed Orchards**

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**Lodgepole Pine**



**Interior Spruce**



## Transfer Guidelines For Seed Orchard Seed

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

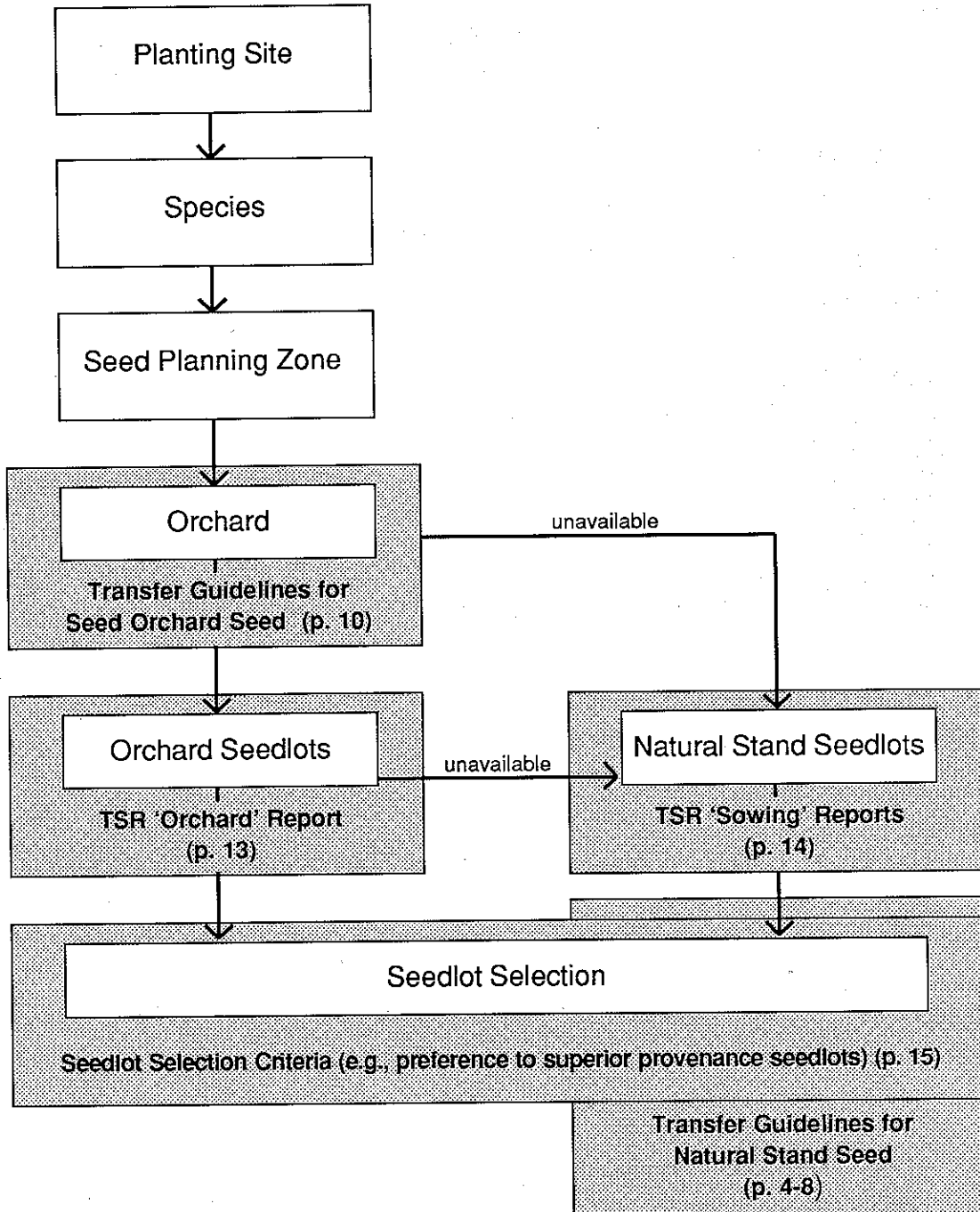
Orchard		Agency	Recommended Area of Use		Production Target	
No.	Name		Seed Planning Zone(s)	Elevation (m)	Annual Seedling Target (millions)	Target Year
<b>Lodgepole Pine</b>			----- Central Interior -----			
201	Omineca-Pinchi	MOF	CP lower	650	0.49	1989
			higher	910	1.96	1989
202	Dawson-Peace	MOF	CP,FIN	710	1.83	1993
203	Willow Bowron	MOF	MGR,QL	920	1.29	1993
204	Smithers	MOF	BLK	900	1.94	1994
<b>Interior Spruce</b>			----- 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:**

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 Challenge Canada Ltd.; BALCAN - Balco Canfor Reforestation Centre.

## 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. 'TSR' refers to the Tree Seed Register and Inventory System; reports are available from Regional Offices and, in the near future, District Offices also.



## Format of the ORCHARD Report

JUL 18, 1988

MINISTRY OF FORESTS - SILVICULTURE BRANCH  
TREE SEED REGISTER SYSTEM  
ORCHARD REPORT - Orchard seedlots sorted by species  
Active seedlots only

PAGE 8

SPECIES: SX

ORCH NO.	ORCHARD NAME	GEN CLASS	SEEDLOT NO.	GEN NO.	AGENCY	D W N	R W E	COLL YEAR	PLANNING ZONES	ELEV (M)	GERM %	AVAILABLE BALANCE	POTENTIAL CO TREES (1000'S)	SEED USE PRIORITY
205	CENTRAL PLATEAU LOW	A4	04411		BCFS	C	G	83	CP		77	510	46.7	
			06305		BCFS	C	G	86	CP		70	710	61.3	
			06306		BCFS	C	G	87	CP		87	6500	877.5	
206	CENTRAL PLATEAU HIGH	A4	06307		BCFS	C	G	87	CP		91	1970	306.7	
207	BULKLEY VALLEY LOW	A4	06303		BCFS	C	R	86	BLK		72	1585	143.1	
			06308		BCFS	C	R	87	BLK		86	12995	1942.3	
			06631		BCFS	C	R	88	BLK		86	685	83.0	
208	BULKLEY VALLEY HIGH	A4	06304		BCFS	C	R	86	BLK		77	315	27.3	
			06309		BCFS	C	R	87	BLK		81	8555	974.2	
209	QUESNEL LAKES	A4	06270		BCFS	C	C	87	QL		89	90	15.3	
301	W. KOOTENAY LOW	A4	06310		BCFS	C	N	87	WK BSH		86	2155	334.6	
302	W. KOOTENAY HIGH	A4	06273		BCFS	C	N	87	WK BSH		90	2055	332.2	
304	MICA/E. KOOTENAY 1.5	A4	06373		BCFS	C	N	87	MIC EK		86	205	29.3	
305	SHUSHAP ADAMS LOW	A4	06271		BCFS	C	G	87	SA		90	4745	809.8	
			06374		BCFS	C	K	87	SA		91	535	97.4	
306	SHUSHAP ADAMS HIGH	A4	06272		BCFS	C	K	87	SA		90	1215	198.0	
			06375		BCFS	C	K	87	SA		92	1165	194.2	
610	*	A4	06378		BCFS	C	R	87	BV NST		88	360	58.8	
			06379		BCFS	C	R	87	BV NST		89	7980	1282.5	
611	*	A4	06376		BCFS	C	G	87	CP MGR MRB		97	585	75.4	
			06377		BCFS	C	G	87	CP MGR MRB		96	3320	540.2	
			06380		BCFS	C	G	87	CP MGR MRB		92	7405	1162.6	
			06381		BCFS	C	G	87	CP MGR MRB		91	26360	4182.5	

(Missing information currently being derived)

## Format of SOWING6 Report

JUL 18, 1989

MINISTRY OF FORESTS - SILVICULTURE BRANCH  
 TREE SEED REGISTER SYSTEM  
 SOWING6 REPORT - Seed Inventory and Seedling Potential  
 Active seedlots only - sorted by Region, Planning Zone, Species, Agency, Elevation, Seedlot

PAGE 3

Planning zone and elevation are printed as \*\*\*\* for orchard seedlots. See ORCHARD report.

REGION: NELSON

SPECIES	O W N	AGENCY	ELEV	SEEDLOT	GEN CLASS	DISTRICT	LOCATION	LAT	LONG	BGC UNIT	COLL YEAR	GERM %	AVAILABLE BALANCE	POTENTIAL CO TREES (1000'S)	
PLANNING ZONE: BSH															
PW	C	BCFS	1128	00635	B3		COLUMBIA R				64	2	590	0.0	
	C	BCFS	1219	00633	B3		WHITE PINE CR.				64	25	1595	0.0	
PLANNING ZONE: EK															
FDI	C	BCFS	914	00697	B4		WINDERMERE				61	96	1505	48.8	
PY	C	BCFS	945	00244	B3		ELK NURSER				58	73	19600	89.6	
	C	BCFS	975	00233	B2		ST MARY PR				58	80	17990	81.2	
SE	P	GALLOW	1524	00636	B2		SUMMER LK				64	85	245	25.9	
PLANNING ZONE: TOD															
FDI	C	BCFS	1250	00713	B2		BRIDESVILL				61	95	2762	85.2	
PLANNING ZONE: WK															
BL	P	CCINT	1158	00584	B3		SHELTERBAY				64	17	320	0.0	
FDI	C	BCFS	427	00574	B3		NAKUSP				64	83	3425	91.5	
	C	BCFS	427	00870	B2		FOSTHALLCR				64	90	1010	36.4	
	C	BCFS	671	00848	B5		INONOAKLIN				64	95	58005	2007.9	
	C	BCFS	701	00884	B5		ENE LAKE				64	89	1035	29.9	
	C	BCFS	762	00886	B5		U SLOCAN L				64	82	3485	81.7	
	C	BCFS	762	00887	B2		MCDONALD C				64	94	860	33.6	
	C	BCFS	945	00867	B5		BELL CREEK				64	91	25715	857.2	
	C	BCFS	1067	00897	B2		BOWSER CRK				64	95	5530	193.3	
	PH	P	CCINT	1341	00733	B3		TROUT LAKE				61	52	295	2.3
	SE	C	BCFS	1158	00575	B3		SHELTER BAY				64	56	100	6.5

(District and Lat/Long currently being entered against each seedlot)

## Seedlot Selection Criteria

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### I Quality - Genetic

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#### 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

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- 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

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- 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

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- 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

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- 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.