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|---|------------------------|--------------------|-------------------------------------|
| SPU # 40 mid | Interior Spruce | Peace River | 650 - 1200m |
| Breeding and Orchard Production | | | |
| Program category: First-generation | | | Seedling need (million): 8.5 |
| | | | Program rank: 22 |
| filename: 40 M Sx PR mid Sept 2017.xlsx | | | |

STRATEGY Parent tree selection from wild stands in the PR zone. Progeny tests using open-pollinated seed from selected parents. Focus on stem volume. Best parents, based on offspring performance on progeny tests, are selected for seed production in an open-pollinated seed orchard.

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|---------------|-----------------------------|--|
| TRAITS | Primary: Stem volume | Secondary: Wood density, weevil |
|---------------|-----------------------------|--|

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|-------------------------------|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| TESTING AND PRODUCTION | Production Year (July 1 to June 30) -- (Cone harvest year shown) | | | | | | | | | | | | | | | | | | | |
| | '17 | '18 | '19 | '20 | '21 | '22 | '23 | '24 | '25 | '26 | '27 | '28 | '29 | '30 | '31 | '32 | '33 | '34 | '35 | '36 |

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|---------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Parents in progeny test: | | | | | | | | | | | | | | | | | | | | |
| Open pollin. | 351 | 351 | 351 | 351 | 351 | 351 | 351 | 351 | 351 | 351 | 351 | 351 | 351 | 351 | 351 | 351 | 351 | 351 | 351 | 351 |
| Polycross | | | | | | | | | | | | | | | | | | | | |
| Clonal | | | | | | | | | | | | | | | | | | | | |
| F1 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 |
| F2 | | | | | | | | | | | | | | | | | | | | |
| F3 | | | | | | | | | | | | | | | | | | | | |

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|---|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Production forecast (million plantables) | | | | | | | | | | | | | | | | | | | | |
| Orchards (#, owner) | | | | | | | | | | | | | | | | | | | | |
| 212 FLNRO (Skimikin) | 15.8 | 15.9 | 15.9 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 |

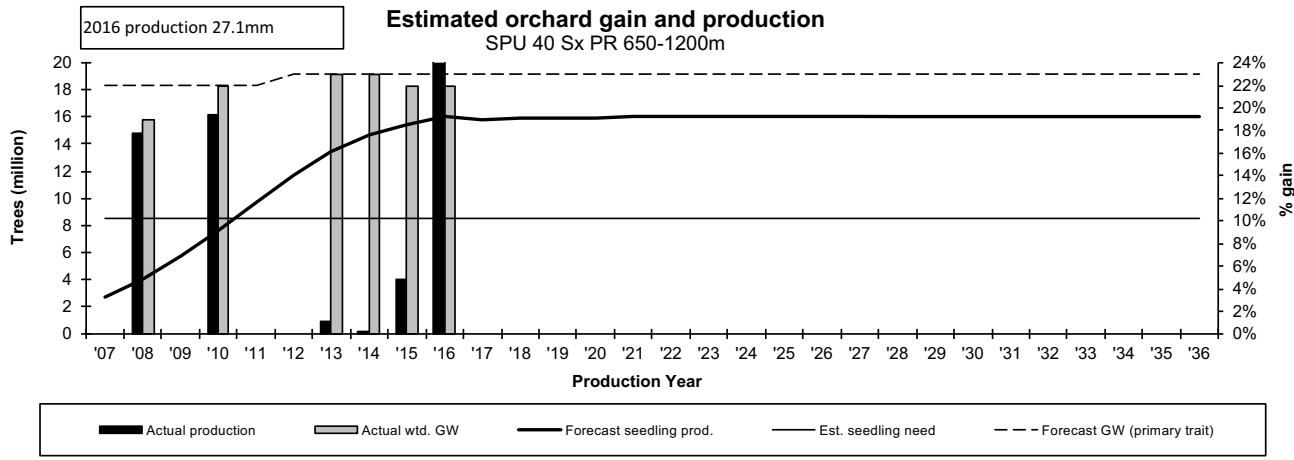
Also see SPU 40 Low for elevations below 650m

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|--------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Vegetative prod.: | | | | | | | | | | | | | | | | | | | | |
| Phase 1 | | | | | | | | | | | | | | | | | | | | |
| Phase 2 | | | | | | | | | | | | | | | | | | | | |

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|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Estimated gain in primary trait | | | | | | | | | | | | | | | | | | | | |
| Orchards (#, owner) | | | | | | | | | | | | | | | | | | | | |
| 212 FLNRO (Skimikin) | 23% | 23% | 23% | 23% | 23% | 23% | 23% | 23% | 23% | 23% | 23% | 23% | 23% | 23% | 23% | 23% | 23% | 23% | 23% | 23% |

| | | | | | | | | | | | | | | | | | | | | |
|--------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Vegetative prod.: | | | | | | | | | | | | | | | | | | | | |
| Phase 1 | | | | | | | | | | | | | | | | | | | | |
| Phase 2 | | | | | | | | | | | | | | | | | | | | |

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|-------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Total Production | 15.8 | 15.9 | 15.9 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 |
| Total gain | 23% | 23% | 23% | 23% | 23% | 23% | 23% | 23% | 23% | 23% | 23% | 23% | 23% | 23% | 23% | 23% | 23% | 23% | 23% | 23% |



The above forecasts are based on orchard status, seed inventories and seed use as of June, the year of publication, and are subject to change. Refer to the seed Planning and Registry System (SPAR) or contact the orchard manager for current seed inventories. Contact the Forest Improvement and Research Mgt. Branch, Ministry of Forests, Lands, Natural Resource Operations and Rural Development, to confirm data if used for silviculture or timber-supply planning.

Interior Spruce Peace River 650 - 1200m
Conservation -- Seed Orchards -- Seedling Use

SPU #40 mid

GENETIC CONSERVATION STATUS

Conservation statistics

| | | |
|---|-------------------|-----------|
| Seed planning unit (SPU) area | 11,644,978 | ha |
| Area protected within SPU | 255,930 | ha |
| Percentage of SPU area protected | 2% | |
| Estimated genetic reserves with >5000 mature trees based on botanical sample data | 0 | |
| Confirmed genetic reserves with >5000 mature trees based on forest inventory data | 3 | |

Conservation status

Current in-situ protection status: **Acceptable**
Probability of maintaining > 3 protected areas with adequate population size given natural disturbance regimes: **Uncertain**

For further information visit <http://www.genetics.forestry.ubc.ca/cfgc/>

ORCHARD STATUS

| Orchard location | Orchard number | Number of parents | Mean BV | # of ramets currently established | # of ramets planned for final orchard size | Target Seed production kg/y at maturity | Total Seedling Prod. million seedlings | |
|------------------------|----------------|-------------------|---------|-----------------------------------|--|---|--|---------------------------|
| FLNRO (Skimikin) | 212 | 39 | 23% | 2,672 | 2,875 | 96.3 | 17.25 | Mid elevation (650-1200m) |
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| | | | | | | | | |
| Total ramets | | | | 2,672 | 2,875 | Total production | 17.3 | |
| Vegetative propagation | | | | | | Stecklings/Emblings | 0.0 | |
| | | | | | | Total production | 17.3 | |

Seed and Nursery Factors

Estimate of Required Orchard Capacity

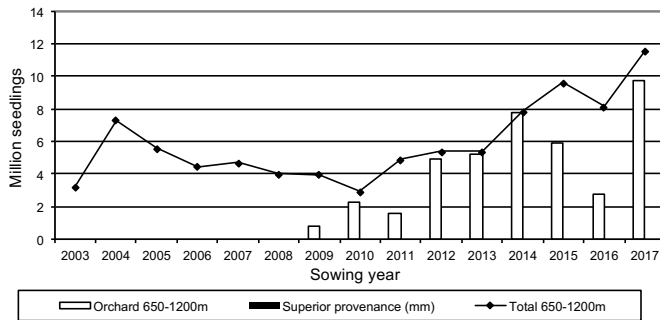
| | |
|--|---|
| Expected annual average seedling production per ramet = 6,000 | Annual planting (million seedlings) = 8.5 |
| Seed weight (seeds/gram) = 394 | Planned over-production factor = 1.2 |
| Seedling recovery factor (seedlings/seed) = 0.45 | Ramets required = 1,420 |
| Seedling recovery factor (seeds/seedling) = 2.20 | Ramets required with over-capacity = 1,704 |
| | Projected necessary expansion = 0 |

Progeny test data will determine whether the low-elevation need should be developed in conjunction with mid-elevation, or as a separate orchard.

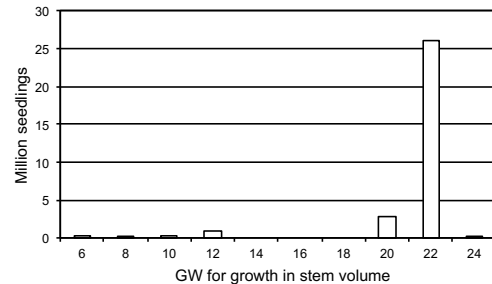
SEEDLING USE AND SEED IN STORAGE

5-year average seedling requests to SPAR (2013 - 2017) 8.5 million
Estimated years of class-A seed in storage 3.6 years

Seedling Use Trend - 2003 to 2017 for 650-1200m



Seed in Storage by GW class



Notes:

- "Reserve" and "Available" seed in the Seed Planning and Registry System (SPAR) are included.
- Class A = seed orchard; Class B+ = superior provenance; Class B = wild stand seed.
- Genetic Wroth (GW) for growth means the projected additional wood volume available at rotation compared to using Class B seed.

Seedling use data include 1/2 of adjacent overlap zones, where applicable
Sowing year: Aug 1 to July 31 (i.e. 2017 sowing year starts Aug 1, 2017)

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