

| | | | |
|---|--------------------|--------------------|--------------------------------------|
| SPU # 19 | Douglas Fir | Submaritime | 200-1000m |
| Breeding and orchard production | | | |
| Program Category: First-generation | | | Seedling need (million)*: 1.5 |
| * Need south of 51 degrees only filename: 19 Fdc SM all Sept 2017.xlsx | | | |

STRATEGY First generation orchards based on provenance/family trials. Genecology testing to refine seed transfer guidelines and zone boundaries. Orchards focus on areas south of 51 degrees latitude, and up to 1200 m elevation.

| | | | | |
|---------------|-----------------|--------------------|-------------------|-------------------------------------|
| TRAITS | Primary: | Stem volume | Secondary: | Adaptive (frost and drought) |
|---------------|-----------------|--------------------|-------------------|-------------------------------------|

| | | | | | | | | | | | | | | | | | | | | |
|-------------------------------|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 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 |

Parents in progeny test:

| | | | | | | | | | | | | | | | | | | | | |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Open pollin. | | | | | | | | | | | | | | | | | | | | |
| Polycross | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 |
| Clonal | | | | | | | | | | | | | | | | | | | | |
| F1 | | | | | | | | | | | | | | | | | | | | |
| F2 | | | | | | | | | | | | | | | | | | | | |
| F3 | | | | | | | | | | | | | | | | | | | | |

Production forecast (million plantables)

Orchards (#, owner)

| | | | | | | | | | | | | | | | | | | | | |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 181 FLNRO (Puckle Rd) | 0.8 | 1.1 | 1.3 | 1.4 | 1.5 | 1.5 | 1.6 | 1.6 | 1.7 | 1.7 | 1.8 | 1.9 | 1.9 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|

Vegetative prod.:
Phase 1
Phase 2

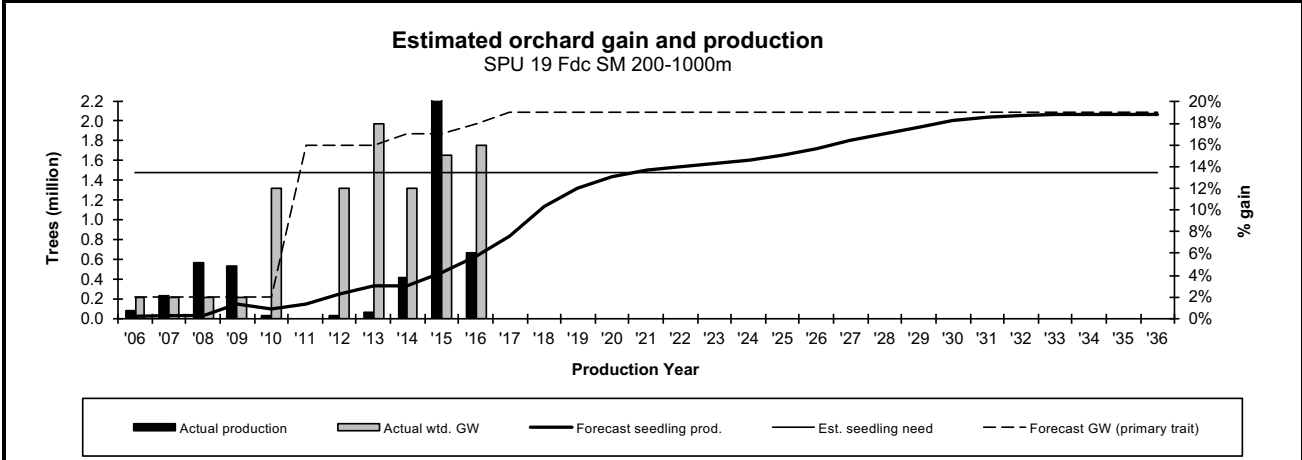
Estimated gain in primary trait

Orchards (#, owner)

| | | | | | | | | | | | | | | | | | | | | |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 181 FLNRO (Puckle Rd) | 19% | 19% | 19% | 19% | 19% | 19% | 19% | 19% | 19% | 19% | 19% | 19% | 19% | 19% | 19% | 19% | 19% | 19% | 19% | 19% |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|

Vegetative prod.:
Phase 1
Phase 2

| | | | | | | | | | | | | | | | | | | | | | |
|-------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Total Production | 0.8 | 1.1 | 1.3 | 1.4 | 1.5 | 1.5 | 1.6 | 1.6 | 1.7 | 1.7 | 1.8 | 1.9 | 1.9 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | |
| Total gain | 19% | 19% | 19% | 19% | 19% | 19% | 19% | 19% | 19% | 19% | 19% | 19% | 19% | 19% | 19% | 19% | 19% | 19% | 19% | 19% | 19% |



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.

Douglas Fir Submaritime 200-1000m
 Conservation -- Seed Orchards -- Seedling Use

SPU #19

* Need south of 51 degrees only

GENETIC CONSERVATION STATUS

Conservation statistics

| | | |
|---|------------------|-----------|
| Seed planning unit (SPU) area | 2,319,423 | ha |
| Area protected within SPU | 406,038 | ha |
| Percentage of SPU area protected | 18% | |
| Estimated genetic reserves with >5000 mature trees based on botanical sample data | >2 | |
| Confirmed genetic reserves with >5000 mature trees based on forest inventory data | 32 | |

Conservation status

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

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 | Target seedling production (mm/yr) at full production |
|------------------------|----------------|-------------------|---------|-----------------------------------|--|---|---|
| FLNRO (Puckle Rd) | 181 | 28 | 19% | 869 | 1,010 | 46.1 | 2.09 |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| Total ramets | | | | 869 | 1,010 | Total production | 2.09 |
| Vegetative propagation | | | | | | Stecklings/Emblings | 0.0 |
| | | | | | | Total production | 2.1 |

Seed and Nursery Factors

| | |
|---|--------------|
| Expected annual average seedling production per ramet = | 2.068 |
| Seed weight (seeds/gram) = | 86 |
| Seedling recovery factor (seedlings/seed) = | 0.53 |
| Seedling recovery factor (seeds/seedling) = | 1.90 |

Estimate of Required Orchard Capacity

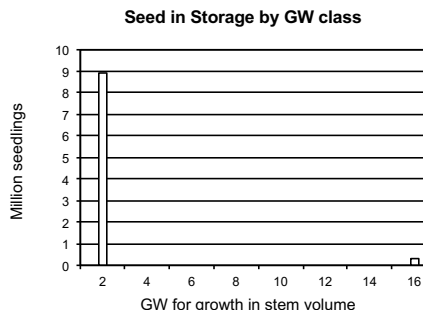
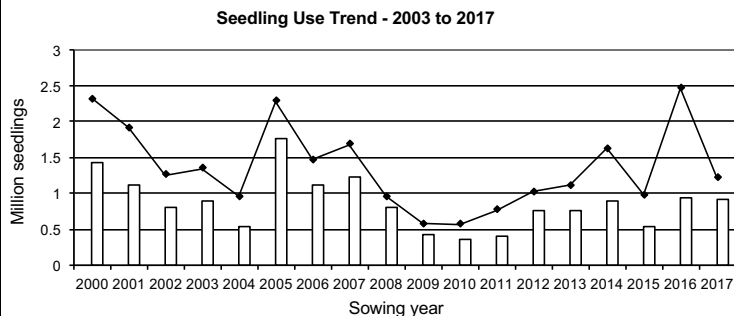
| | |
|-------------------------------------|-----|
| Annual planting (million seedlings) | 1.5 |
| Planned over-production factor | 1.3 |
| Ramets required | 715 |
| Ramets required with over-capacity | 930 |
| Projected necessary expansion | 0 |

SEEDLING USE AND SEED IN STORAGE

Average 5-year seedling use from SPAR (2013 - 2017)
 Estimated years of class-A seed in storage

1.5 million
6.2 years

Seedling use value adjusted to show usage south of 51 degrees latitude only.



Notes:
 - 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 July 1, 2017)

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.

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.