

Control of spruce weevil damage by introduction of alternate commercial species. FRDA II

Planting Prescriptions

Research Project #93-03

Quick Sheet
#2

This trial was established to look at the practicality of establishing spruce plantations, with a mixture of other commercial species, as a foil for spruce weevils. While research to date has concentrated on stands planted in 1985 which already exhibit significant weevil damage, it seems prudent to examine alternative stand establishment regimes.

January, 95

Two small blocks will be planted as part of this study. The areas are described as:

Unit D	Opening 92A042-361	Logged 1970, burned '71, planted '73, mech. '92, plant 93	6.3 ha
Unit E	Opening 92A042-358	Burned 1971, logged '72, mech. '92, plant 93	4.6 ha

The units will each be divided in half, and planted with two treatments. The treatments are described below. The two planting units were site prepared with a brush blade in summer 1992, and contain round piles. Extensive areas of exposed mineral soil and suckering from stumps and roots will result in aggressive colonization by willow and cottonwood, and to a lesser extent aspen, birch, and alder.

Planting stock for this trial are:

Pli -- PSB313B 1+0 Seedlot 8379, grown at PRT Chilliwack.

Sx -- PSB313B 1+0 Seedlot 6911, grown at HiGro Quesnel

Treatment 1: Mixed Bag Planting

Planting

The treatment will be block planting with an intimate mixture of lodgepole pine and spruce, at a density of 1800 stems/ha. Optimum inter-tree spacing will be 2.5 m and minimum distance will be 1.5 m.

The anticipated benefits of this treatment are:

- spruce will be overtopped by the lodgepole pine, resulting in smaller leader diameters and reduced heat sums on the leader;

- the taller lodgepole pine will hide the shorter spruce trees, rendering them less apparent to the weevils;
- the rapid nutrient uptake and cycling by the pine will benefit the spruce, since these sites are relatively nutrient degraded by burning in 1971/72 and mechanical site prep in 1992.

Stand Tending

Year	Age	Treatment
1996	3	Manual brushing
2008	15	Juvenile spacing
2023	30	Commercial thin to 800 stems per hectare, retaining 30% Pl
2043	50	Commercial thin to 350 stems per hectare, pure spruce.
2073	80	Final harvest, 300 stems per hectare @ 50 cm dbh

Treatment 2: Mixed Clump Planting

Planting

Trees will be planted in clumps of seven trees, at 300 clumps per hectare. Each clump will consist of 4 Pl and 3 Sx, planted in the arrangements shown at Figure 1. Spacing within the clumps is 1 m between trees, with minimum planting distance set at .75 m. Planting densities are based upon the following assumptions and calculations:

Assumptions and Calculations:

Basal Area capacity = 60 m²/ha
 Desired final crop = 50 cm dbh spruce trees at 80 years
 Inter tree distance (within clumps) = 1m
 Clumps established at final crop density.

$$\text{Radius of final crop tree: } r = \frac{50\text{cm}}{200} = 0.25\text{m}$$

$$\text{Basal area of one 50cm crop tree: } BA = \Pi r^2 = \Pi \times .25^2 = 0.1963\text{m}^2$$

$$\text{Number of stems per hectare at final crop spacing: } sph = \frac{60\text{m}^2 / \text{ha}}{.1963\text{m}^2} = 305.65 / \text{ha}$$

$$\text{Distance between clumps: } d = \sqrt{\frac{10,000\text{m}^2 / \text{ha}}{305.6 / \text{ha}}} = 5.7\text{m}$$

$$\text{Clump diameter (assuming intertree distance of 1m): } cd = \frac{\text{Circumference}}{\Pi} = \frac{6\text{m}}{\Pi} = 1.91\text{m}$$

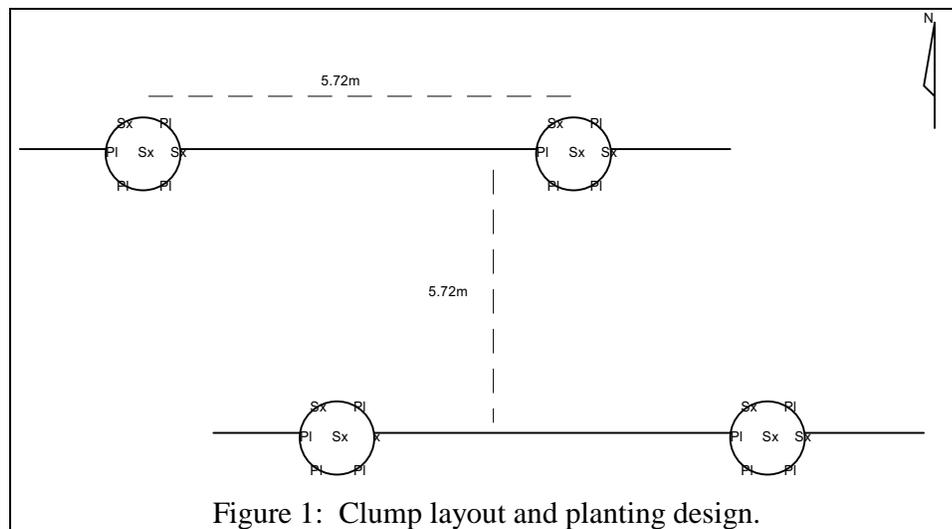


Figure 1: Clump layout and planting design.

The anticipated benefits of this treatment are:

- spruce will be overtopped by the lodgepole pine and adjacent deciduous, resulting in smaller leader diameters and reduced heat sums on the leader;
- the taller lodgepole pine and adjacent deciduous will hide the shorter spruce trees, rendering them less apparent to the weevils;
- the rapid nutrient uptake and cycling by the pine and deciduous will benefit the spruce, since these sites are relatively nutrient degraded by burning in 1971/72 and mechanical site prep in 1992;
- brush control need only take place within clumps, and the intervening space will be left in deciduous cover;

- increased component of deciduous will provide biodiversity in forest cover;
- deciduous trees such as birch, aspen and cottonwood will be available for harvest in commercial thinnings.

Stand Tending

Year	Age	Treatment
1996	3	Manual brushing within clumps
2008	15	Juvenile spacing within clumps, leaving 4 trees per clump
2023	30	Commercial thin to 2 trees per clump, retaining 1 PI and some deciduous in intervening space.
2043	50	Commercial thin to 300 stems per hectare, pure spruce.
2073	80	Final harvest, 280 stems per hectare @ 50 cm dbh

Vegetation Monitoring Plots

Transects will be established in each treatment area to monitor tree growth and spruce weevil attack over time on permanently tagged sample trees.

NIVMA vegetation monitoring plots will also be established in each treatment area to measure and compare vegetation response to the two treatments.

This prescription was prepared by:

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March 2, 1994