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Early dynamics of tended mixedwood stands

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The Western Boreal Growth and Yield Association (WESBOGY) is a regional cooperative including members from the four western provinces and the Northwest Territories. The WESBOGY long term study was initiated in 1990 to advance our understanding of the dynamics of mixedwood stands following tending.

In the Long-Term Study white spruce were planted in recently clearcut areas where aspen regeneration had already been established. For the first 5 years vegetation was controlled by clipping or using plastic mulch mats within a 40 to 50 cm radius of the spruce. After 5 years, both the spruce and aspen were thinned to desired treatment densities. Three spruce densities (0, 500 and 1000 sph) and six aspen densities (0, 200, 500, 1500, 4000, and natural) have been created (Table 1).

| Sw\Aw density (stems/ha) | 0 | 200 | 500 | 1500 | 4000 | Natural |
|-----------------------------|---|-----|-----|------|------|---------|
| 1000 | 1 | 2 | 3 | 4 | 5 | 6 |
| 500 | 7 | 8 | 9 | 10 | 11 | 12 |
| 0 | x | x | x | 13 | 14 | 15 |

Table 1: Treatment densities associated with the 15 combinations of aspen and spruce.

The study uses a randomized block design with each agency establishing one or more blocks. Each block consists of two installations of the above matrix, one on a superior site and one on a medium site.

| Agency | Province/Territory | Year spruce planted |
|--|-----------------------|--------------------------|
| Weyerhaeuser Company, Prince Albert - PA | Saskatchewan | 1990 |
| Weyerhaeuser Company, Grande Prairie | Alberta | 1991 |
| Weldwood of Canada Ltd. | Alberta | 1992 |
| Weyerhaeuser Company, Prince Albert - BR | Saskatchewan | 1992 |
| Alberta Sustainable Resource Development | Alberta | 1992 |
| Daishowa-Marubeni International Ltd. | Alberta | 1992 |
| Northwest Territories - Resources, Wildlife and Economic Development | Northwest Territories | 1993 |
| Alberta-Pacific Forest Industries Inc. | Alberta | 1995 |
| Louisiana-Pacific Canada Ltd. - Swan River | Manitoba | 1998 |
| Canadian Forest Products Ltd. - Fox Creek | Alberta | 2000 |
| Louisiana-Pacific Canada Ltd. - Dawson Creek | British Columbia | 2001 |
| Manning Diversified Forest Products | Alberta | No installations to date |
| Saskatchewan Environment and Resource Management | Saskatchewan | No installations to date |

Table 2: WESBOGY members and year of establishment of Long-Term Study Installations.

Self-thinning of aspen

Aspen densities converged to 20-30 thousand stem/ha by 11 years (Fig. 1), regardless of initial establishment

densities. The steepest declines in density were in stands with the highest starting densities.

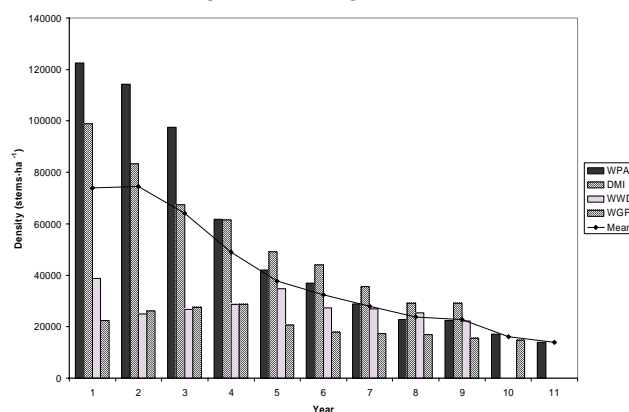


Figure 1: Trends in aspen density for un-thinned plots by age for four blocks.

Spruce growth following spacing of aspen

Effect of aspen density on spruce growth was assessed three to four years after spacing (Table 3). White spruce height growth was unaffected by aspen density. Spruce RCD was significantly lower in the un-spaced treatment compared to the spaced plots. However, spruce RCD did not differ significantly among the four densities created by spacing. HDR of white spruce was sensitive to aspen density with data indicating 4 groups: 1) a low aspen density group (0, 200 and 500), 2) a 500 and 1500 stems/ha group, 3) a 4000 stems/ha group, and 4) a natural density group.

| Aspen Density (sph) | 0 | 200 | 500 | 1500 | 4000 | Unspaced |
|---------------------------|-------|-------|--------|-------|-------|----------|
| Height (m) | 1.02 | 1.01 | 1.02 | 1.05 | 1.05 | 0.99 |
| Root Collar Diameter (cm) | 2.16a | 2.13a | 2.08a | 2.03a | 1.89a | 1.57b |
| Height:Diameter Ratio | 0.47a | 0.48a | 0.50ab | 0.52b | 0.57c | 0.64d |

Table 3: Effects of aspen density on white spruce 9 years after planting (overall means for the four locations 3 or 4 years after spacing of aspen). Letters indicate where significant ($P < 0.05$) differences occur between aspen densities.

Re-measurement of all installations is continuing and further results will be presented.

Further Information:

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