

**Effects of soil compaction on conifer performance  
in the boreal forests of Alberta: A progress report**

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Soil compaction is the most common form of soil disturbance in summer logged boreal forests. However, the effects of soil compaction on survival and growth of conifer seedlings are site specific (McNabb and Campbell 1985). The stress on young conifer seedlings in the boreal forest is hypothesized to be less than it is on new aspen suckers because conifers do not rely on an established root system and conifer seedlings grow more slowly. Site preparation could alleviate some of the potentially detrimental aspects of soil compaction. The increasing demand that larger trees place on the soil over time may be met as natural decompaction ameliorates the initial changes in soil physical properties caused by soil compaction. The study was designed to determine the effect of soil compaction on seedling performance, including the effect on seedlings growing adjacent to areas of contrasting amounts of compacted soil, i. e., seedlings planted in undisturbed soil adjacent to severely compacted skid trails.

Treatment blocks at most sites were site prepared as part of the standard practice applied to the entire cutblock (Table 1). The goal was to evaluate seedling performance under operational conditions; any deviations from standard practices could jeopardize the study by producing atypical results, i.e., reforestation failure or unusual mortality patterns. Site preparation was done across the skidding corridors to maximize the number of planting sites in each treatment. Research staff was present during site

preparation at most sites to insure that the integrity of the research blocks is maintained. Five sites were not site prepared; two of those were left to regenerate naturally.

Depending on the site, lodgepole pine or white spruce were planted in the following microsites created in each block: control, centre of wheel track, and outside edge of track (Table 1). Each seedling was tagged and measured for diameter (at 2 cm) and height; all live seedlings are to be remeasured annually.

The first year survival and growth do not show an obvious effect of compaction at four sites planted in 1995 (Table 2). Seedling performance needs to be measured for at least five years on all sites before meaningful comparisons of treatments can be analyzed and the results from field studies published in the scientific literature.

McNabb, D. H. and R. G. Campbell 1985. Quantifying the impacts of forestry activities on soil productivity, p.116-120. In *Foresters' future: Leaders or Followers?* Proc., Soc. Amer. Foresters Natl. Conv., Fort Collins, CO. 445 p.

Table 1. Site preparation and planting at the study sites.

Site	Site preparation		Planting	
	Date	Type	Date	Species
1	June 3, 1995	patch mounding	July 11, 1996	lodgepole pine
2	August, 1995	disc trenching	June, 1996	lodgepole pine
3	October 25, 1994	patch mounding	May 5, 1995	white spruce
4	July, 1995	dragging	August, 1996	white spruce
5	May 24, 1995	disc trenching	July 27, 1995	lodgepole pine
6	May 24, 1995	disc trenching	July 27, 1995	lodgepole pine
7	-	none	August 9, 1995	lodgepole pine
8	-	none	-	none
9	-	none	July 27, 1995	white spruce
10	-	none	July 11, 1996	white spruce
11	-	none	-	none
12	June, 1996	patch mounding	August, 1996	white spruce
13	-	none	May, 1996	lodgepole pine
14	June, 1996	dragging	July 11, 1996	white spruce