Responses of lodgepole pine and the *Fireweed* complex to manual cutting: A summary of 5 year PROBE results

About the *Fireweed* complex

This community is widespread across British Columbia, wherever moisture is sufficient. In the southern interior, it occurs most abundantly in the ICH, ESSF, and MS zones. It is associated with sites where forest floor disturbance has prepared a suitable seedbed, and therefore tends to be more common on summer- than winter-logged sites. Where abundant, the *Fireweed* complex reduces light to understory conifers, and it may also physically damage them through snow- and vegetation-press. However, fireweed is also an important early seral species that contributes to forest floor development through the annual turnover of foliage and nutrients. On some sites, it also reduces the incidence of insect damage to seedling leaders. (Full complex description)

Results

This section summarizes 5-year results from the fully replicated PROBE experiment that studies lodgepole pine and vegetation responses to manual cutting of the *Fireweed* complex in 1-3 year-old plantations in the ICH and ESSF zones. Study sites were submesic, flat to steeply sloping (0-60%), with northerly or easterly aspect. Elevation ranged from 800-1500 m, and fireweed cover averaged 48% at the time of treatment. (Full Methods description)

Table 1. A summary of 5-year lodgepole pine responses

Was there a significant[a] improvement in conifer performance 5 years after treatment?	
Survival	No
Basal stem diameter	No
Stem diameter increment	No
Height	No
Leader length	No
Height:diameter ratio	No

a Differences are significant where $p \leq 0.05$ according to ANOVA.

Lodgepole pine responses 5 years after brushing

- ***Survival*** - After 5 years, there was no significant difference in lodgepole pine survival between the manual brushing treatment and the control. Survival averaged 88% when lodgepole pine were 6-8 years-old.
- ***Vigour*** - Five years after manual brushing, the majority of pine in the treatment and the control were of moderate or good vigour (Figure 1)
- ***Stem diameter*** - A single manual cutting treatment had no effect on lodgepole pine stem diameter (Figure 2a).
- ***Height*** - Manual cutting had no effect on lodgepole pine height (Figure 2b).
- ***Height:diameter ratio*** - Lodgepole pine height:diameter ratio was unaffected by a the manual cutting treatment. It averaged 50 when pine were 6-8 years-old.

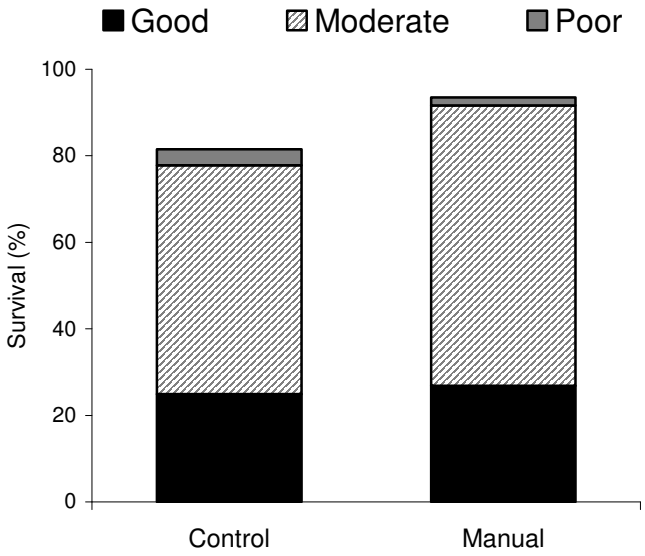

Figure 1. A comparison of lodgepole pine survival and vigour in the control and treatment 5 years after manual cutting.

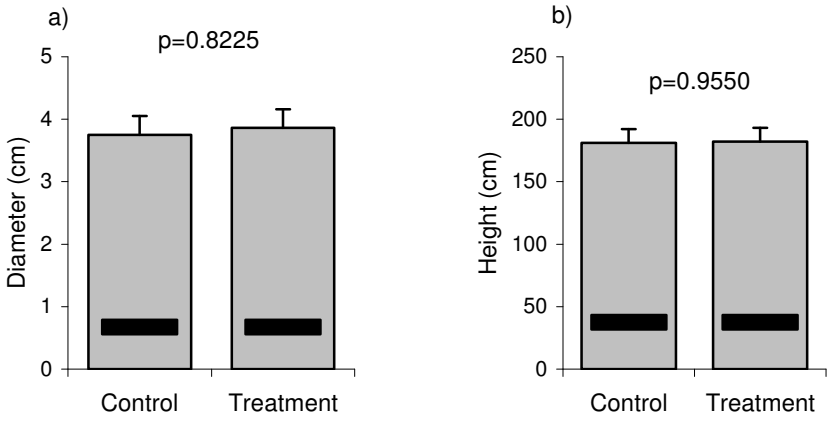

Figure 2. Cmparisons of lodgepole pine (a) basal stem diameter and (b) height in the control and treatment 5 years after manual cutting. Horizontal bands represent lodgepole pine size at the time of treatment. Error bars represent 1 standard error.

Vegetation responses

Table 2. Duration of vegetation responses

Years of significant[a] vegetation reduction	
Fireweed cover	None
Fireweed height	None
Shrub cover	None
Shrub height	None

a Differences are significant where $p \leq 0.05$ according to ANOVA.

Manual cutting had no effect on height or cover of fireweed, all vegetation, herbs, or shrubs. Vegetation completely recovered to pre-treatment levels within 1 year of treatment. Pine naturally grew through the fireweed canopy by the time they were 4-6 years-old (Figure 3). There were no significant treatment effects on the richness or diversity of vascular plant species within within 5 years of treatment.

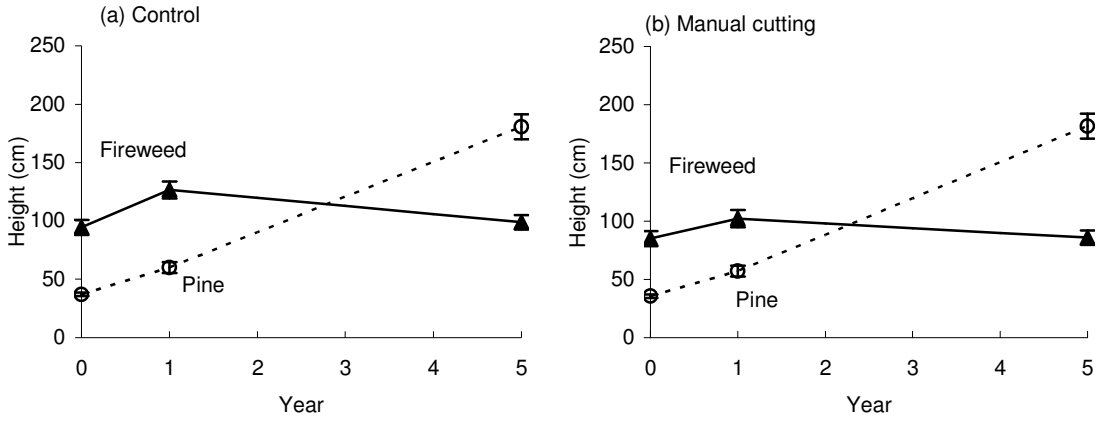

Figure 3. A comparison of average lodgepole pine and fireweed height profiles in (a) the control and (b) the manual cutting treatment.

Management interpretations

Survival - There is no need to brush the *Fireweed* complex on mesic or drier sites in order to obtain good survival of lodgepole pine.

Conifer growth - Competition from the *Fireweed* complex on mesic or drier sites is not intense enough to reduce any aspect of lodgepole pine stem growth. Lodgepole pine growing on these sites do not require brushing in order to perform well.

Effects of brushing on free-growing status - Lodgepole pine will naturally grow through the fireweed canopy on submesic sites by the time they are 4-6 years-old.

Treatment efficacy – A single manual cutting treatment has no effect on the *Fireweed* complex where it is growing on submesic sites in the ICH and ESSF zones. No brushing treatments are necessary on these sites.

Richness and diversity - Manual cutting applied to the *Fireweed* complex did not affect species richness or species diversity. Full results are described in LMH 48 (Simard et al. 2001).

References

Lindeburgh, S. 1995. Effects of fireweed and associated vegetationon conifer survival and growth in the southern interior- fifth year results. For. Can. and B.C. Min. For., Victoria, B.C. FRDA Memo No. 226.

Simard, S.W., J.L. Heineman, W.J. Mather, D.L. Sachs, and A. Vyse. 2001. Effects of operational brushing on conifers and plant communities in the southern interior of British Columbia: Results from PROBE 1991-2000. Res. Br., Min. For., Victoria, B.C. Land Manage. Handb. No. 48.

Prepared March 2005
J. Heineman Forestry Consulting