



Shelterwood silviculture

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What are the relationships between levels of basal area retention and harvesting systems, and the survival and growth of natural and planted regeneration? Researchers are currently investigating this question at two long-term shelterwood silvicultural systems research trials in British Columbia. Data from these trials are also being used to address issues pertaining to growth and yield, root rot, wildlife, and biodiversity.

The first trial was established in 1991 in the Sub-Boreal Spruce (SBS) biogeoclimatic zone northeast of Williams Lake to address the issue of the conversion of mature Douglas-fir-leading forests to lodgepole pine as a result of Douglas-fir seedling mortality in clearcuts due to frost. The second trial, initiated in 1993 in the Interior Cedar-Hemlock (ICH) zone in the former Nelson Forest Region, was designed to investigate the issue of root disease, most notably *Armillaria ostoyae* and *Inonotus tomentosus*, in partially-harvested stands. The project is currently funded by the Forest Investment Account, Forest Science Program.

In the SBS trial, treatments consist of five levels of basal area retention ranging from 15 m²/ha to 60m²/ha. For the ICH trial, the two types of harvesting being tested, push-over and conventional handfelling, each have four levels of residual basal area retention: 0, 15, 30 and 60 m²/ha. For each trial,

data is collected on regeneration, residual over-story, and vegetation.

At the ICH trial, information is also gathered on the response of the seedlings to root disease while at the SBS site, data on windthrow, snow interception, seedfall, and microclimate are being collected. Data on vegetation and snow interception response to residual basal area will be used to help develop silvicultural systems appropriate for use in areas designated as mule deer winter range. It is hoped that the results from both trials will be used to help guide stocking and free growing policy standards.

Additional reading

Details on the trials and some preliminary results can be found in the following reports and extension notes:

SBS trial

Burton, P.J., D.C. Sutherland, N.M. Daintith, M.J. Waterhouse, and T. Newsome. 2000. Factors influencing the density of natural regeneration in uniform shelterwoods dominated by Douglas-fir in the sub-boreal spruce zone. B.C. Ministry of Forests Research Program, Working Paper 47. URL: www.for.gov.bc.ca/hfd/pubs/Docs/Wp/Wp47.htm

Sutherland, C. 1994. Uniform shelterwood systems for Douglas-fir/lodgepole pine stands. Research Section, Cariboo Forest Region, B.C. Ministry of Forests. Extension Note EN-11. URL: www.for.gov.bc.ca/rsi/research/cextnotes/extnot11.pdf

Waterhouse, M.J. 1999. Uniform shelterwood systems for Douglas-fir and lodgepole pine stands –update–year 8. Research Section, Cariboo Forest Region, B.C. Ministry of Forests. Extension Note EN-28. URL: www.for.gov.bc.ca/rsi/research/cextnotes/extnot28.pdf

ICH trial

DeLong, D. 1995. Shelterwoods in root disease infected stands: Preliminary results–EP 1186. Forest Sciences Section, Nelson Forest Region, B.C. Ministry of Forests. Extension Note RS-023. URL: www.for.gov.bc.ca/rsi/research/nextnotes/rs023.htm

Hawe, A. 1996. Shelterwood harvesting in root disease infected stands: EP1186 Preliminary results–Ice Road Site. Forest Sciences Section, Nelson Forest Region, B.C. Ministry of Forests. Extension Note RS-030. URL: www.for.gov.bc.ca/rsi/research/nextnotes/rs030.htm

Heavy retention shelterwood (24 m² RBA) created by pushover logging, at year 9 post-harvest, in the ICHmk1 near Golden, B.C. (Mount Seven).



Michaela Waterhouse photo



trials address resource issues

Quesnel, H. and M. Curran. 1999. Shelterwood harvesting in root disease infected stands in South-eastern British Columbia: Post-harvest soil disturbance—EP1186. Forest Sciences Section, Nelson Forest Region, B.C. Ministry of Forests. Extension Note RS-043. URL: www.for.gov.bc.ca/rsi/research/nextnotes/En043.htm

DeLong, D., P. Comeau, and C. Prescott. 2000. Partial cutting in root disease infected stands in the Interior Cedar–Hemlock biogeoclimatic zone. *In* Proceedings From science to management and back: a science forum for southern interior ecosystems of British Columbia. C. Hollstedt, K. Sutherland, and T. Innes (editors). Southern Interior Forest Extension and Research Partnership, Kamloops, B.C., pp. 105–112. URL: www.forrex.org/publications/FORREXSeries/ss1/paper30.pdf

DeLong, D., P. Comeau, and C. Prescott. 2000. Shelterwood harvesting in root disease infected stands in Southeastern British Columbia: Three year results—EP1186. Forest Sciences Section, Nelson Forest Region, B.C. Ministry of Forests, Extension Note RS-051 URL: www.for.gov.bc.ca/rsi/research/nextnotes/En051.htm

Quesnel, H. and M. Curran. 2000. Shelterwood harvesting in root disease infected stands in South-eastern British Columbia: Post-harvest soil compaction—EP1186. Forest Sciences Section, Nelson Forest Region, B.C. Ministry of Forests. Extension Note RS-048 URL: www.for.gov.bc.ca/rsi/research/nextnotes/En048.htm

Quesnel, H.J. and M.P. Curran. 2000. Shelterwood harvesting in root-disease infected stands—post-harvest soil disturbance and compaction. *Forest Ecology and Management* 133:89–113.

DeLong, D.L., S.W. Simard, P.G. Comeau, P.R. Dykstra, and S.J. Mitchell. 2005. Survival and growth response of seedlings in root disease infected partial cuts in the Interior Cedar–Hemlock zone of southeastern British Columbia. *Forest Ecology and Management* 206:365–379.

Over the next couple of years, a range of publications resulting from this project on the following topics is anticipated: natural and planted regeneration, vegetation, micro-climate, growth and yield, and guideline standards for regeneration. In addition, formal field tours are planned for summer/fall 2005 (SBS trial) and summer/fall 2006 (ICH trial). 