



Thirteen-year results

Growth and yield after pre-commercial thinning of Douglas-fir in the IDF

by Alan M. Wiensczyk, Extension Specialist, Ecosystems and Stand Management; Peter Marshall, Professor and Associate Dean, Faculty of Forestry, University of British Columbia; Taehee Lee, Masters of Forestry Candidate, University of British Columbia; Ken Day, Manager, and Cathy Koot, Research Co-ordinator, Alex Fraser Research Forest

Uneven-aged Interior Douglas-fir stands are an important source of timber, wildlife, recreation, and scenic values in the Central and Southern Interior regions of British Columbia. One of the key wildlife values associated with these stands is mule deer (*Odocoileus hemionus hemionus* Raf.) winter habitat, which has been studied for many years by staff of the B.C. Ministry of Forests. These stands are typically structurally complex as a result of a history of disturbances from partial cutting, insects, and fire.

At present, very little is known about the dynamics of these stands, especially in regard to the relationship between stand structure, stand density, individual tree height and diameter growth, and mortality and recruitment. A project currently underway in the Knife Creek Block of the Alex Fraser Research Forest near Williams Lake is gathering information on stand structure, and on growth and yield following pre-commercial thinning treatments.

The replicated trial, which has received funding from the Forest Investment Account, Forest Science Program as well as from a variety of other sources since its inception in 1988, consists of three thinning treatments and an untreated control. The three thinning treatments are a standard prescription (S), in which most of the larger trees (12.5 cm diameter breast height [DBH]) were left uncut and smaller trees were spaced to 2.5 or 2.8 m depending on species, and two clumped thinning treatments (C1 and C2).


The objective of the clumped treatments was to hasten the development of mule deer habitat by leaving trees in clumps according to height class. Four height classes were used. A clump was defined as three to nine trees in the same height class within a circle of radius 3 m. Spacing within the clumps could vary between 0.5 m and 2.5 m. Trees less than 25 cm dbh in the same or lower height classes were removed within either 3 m (C1) or 5 m (C2) of each clump.

Although the growth response to the treatments

was partially confounded by the variable levels of mortality of lodgepole pine in all treatments caused by the mountain pine beetle, the researchers were able to address this issue during the analysis of the results. Results from the trial were consistent with prior expectations, but the magnitude of the responses was not. Thinned plots averaged higher levels of in-growth, considerably less mortality, greater basal area per ha of growth, larger changes in quadratic mean diameter, and higher increases in relative density than did control plots. Average total volume per ha of growth was similar between two of the thinning treatments (S and C2) and the control.

However, in the control, a much larger proportion of the volume growth has accumulated on trees that will not become merchantable. The greatest periodic annual increment was found in treatment C1, which has averaged 7.6 m³/ha per year (total volume) since thinning, which was consistently the highest (by more than 1 m³/ha per year) compared to the other treatments. Over the same time period, the unthinned control has grown an average of 6.22 m³/ha per year (total volume).

The results from this trial indicate that pre-commercial thinning can be used as an effective management tool in Interior Douglas-fir stands that comprise dense patches of relatively slow growing sapling-sized trees, which remain after a legacy of diameter-limit logging or other disturbance. These treatments can be used effectively to increase the diameter growth of the residual trees without sacrificing volume growth. Increased diameter growth will benefit both timber production and mule deer winter range by producing larger trees within a shorter time frame than would occur naturally in these types of stands.

If you would like more detailed information on the establishment and results of this trial, please refer to the *University Research Forests Extension Note Series-Quicksheet #22*, which is available in the publications section of the Alex Fraser Research Forest Web site (www.forestry.ubc.ca/resfor/afrf/index.htm), or contact the authors via the Web site. A signed interpretive trail has also been developed for those wishing to view the trial results, and planning is currently underway for a field tour of this site in the summer/fall of 2005. 

Related information

Mule deer ecology and habitat management in the Cariboo:

www.for.gov.bc.ca/hfd/pubs/RSI/FSP/Cariboopublications.htm

Opax Mountain Silviculture Systems Research Project: www.for.gov.bc.ca/rsi/research/opax/index.htm

Pothole Creek Study: www.for.gov.bc.ca/hre/pothole