



Research project update

Competitive effects of performance over a

Data from the first study, a retrospective initiated in 1992, has already been used to update the free-growing guidelines for some of the Interior Douglas-fir (IDF) and Sub-Boreal Spruce (SBS) sub-zones.

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Interest in managing broadleaf tree species, including trembling aspen (*Populus tremuloides*), paper birch (*Betula papyrifera*), and black cottonwood (*Populus balsamifera* spp. *trichocarpa*) is growing. A common component of the forest landscape in the Cariboo-Chilcotin region, these trees are valued for maintaining biodiversity and habitat values, and contribute about 2% to the region's total mature forest volume (BC Ministry of Forests 1990).

Researchers have conducted five studies in various ecosystems in the Cariboo-Chilcotin to examine the competitive relationships between lodgepole pine (*Pinus contorta*) and trembling aspen, and to gather operationally useful information about managing mixed stands. Since their inception in the early 1990s, these studies have received funding from a variety of sources, including, most recently, the Forest Investment Account, Forest Science Program.

Data from the first study, a retrospective initiated in 1992, has already been used to update the free-growing guidelines for some of the Interior Douglas-fir (IDF) and Sub-Boreal Spruce (SBS) subzones. Also, the study's nine-year results have been published (Newsome *et al.* 2003). Data collected in 2004 continue to provide long-term information on pine response to aspen competition in older stands and also indicated that trial results still differ by zone. The retrospective study results also indicated the need for more long-term trial data to help refine these guidelines and to help modify the guidelines for other subzones.

To get this long-term trial data, two studies have been established, each in different years and at different stages of assessment. One is a variable density study where aspen in a mixed pine-aspen stand is spaced to different densities and the other is a variable radius study where aspen is removed within a given radius around the pine. Variable density is addressed in the SBSdw1, IDFXm, and in the SBPSxc (Sub-Boreal Pine–Spruce) and variable

radius is examined in the SBSdw2 and SBPSxc. These trials are designed to study the effects of different levels of aspen retention on pine growth. Growth and yield data are also being collected in the variable density studies, which can be used in tree growth models to predict the growth of mixed species stands. Technical reports have been produced for a couple of the trials (SBSdw2—Newsome *et al.* 2004a and IDFXm—Newsome *et al.* 2004b) while reports on the results from the other three subzones are in progress. Data from the trials have shown that the response of pine to aspen competition varies across subzones and indicate that variations in management strategies may be necessary to deal with these differences.

In 1993, a fourth study on “broadleaf species” was established to compare the growth and performance of broadleaf trees versus conifers over a range of ecosystems (SBSdw1, SBSdw2, ICHwk2 [Interior Cedar–Hemlock], IDFDk4, and SBSwk1). Paper birch, trembling aspen, and black cottonwood seedlings were planted along with lodgepole pine, interior spruce (*Picea glauca* x *engelmannii*) or Douglas-fir (*Pseudotsuga menziesii* var. *glauca*) on five sites in the Cariboo-Chilcotin region. Early results from the trial were published in Extension Note 31 (Daintith and Newsome 2000) with more recent results published in Extension Note 73 (Newsome *et al.* 2005). Results from these studies indicate that, unlike the other two broadleaf species, aspen grows well on the drier sites of the Cariboo-Chilcotin, increasing the range of areas that will need to be managed for aspen-pine mixtures.

The fifth component of this project was a study designed to investigate the relationship between aspen basal area and light availability in aspen stands of different ages across a range of subzones. The study aimed to determine whether the models developed by Comeau (2001) to predict understorey and canopy-light availability from aspen abundance in young Boreal-White and Black spruce (BWBS) and SBS stands in northern British Columbia can be applied in the Cariboo-Chilcotin SBS, IDF, and SBPS stands. Conducted in 2003 and 2004, results indicate differences in light availability across a range of ecological conditions.



broadleaf trees on conifer range of ecosystems

The following are recent reports on the results of these studies:

Daintith, N and T. Newsome. 2000. Suitability of native hardwoods for reforestation in the Cariboo Forest Region. BC Ministry of Forests, Cariboo Forest Region. Extension Note 31. <http://www.for.gov.bc.ca/rsi/research/cextnotes/extnot31.pdf>

Newsome, T. 1997. Assessing the effects of aspen competition on lodgepole pine growth. BC Ministry of Forests, Cariboo Forest Region. Extension Note #20. <http://www.for.gov.bc.ca/rsi/research/cextnotes/extnot20.htm>

Newsome, T., J.L. Heineman, and A. Nemec. 2003. Competitive effects of trembling aspen on lodgepole pine performance in the SBS and IDF zones of the Cariboo-Chilcotin region of south-central British Columbia. BC Ministry of Forests, Research Branch, Victoria, B.C. Technical Report 005. www.for.gov.bc.ca/hfd/pubs/Docs/Tr/Tr005.htm

Newsome, T., J.L. Heineman, and A. Nemec. 2004a. Lodgepole pine response to aspen removal in variable radii in the SBSdw2 variant near Williams Lake, B.C. BC Ministry of Forests, Research Branch, Victoria, B.C. Technical Report 014. <http://www.for.gov.bc.ca/hfd/pubs/Docs/Tr/Tr014.htm>

Newsome, T., J.L. Heineman, and A. Nemec. 2004b. Early effects of manipulating aspen density on lodgepole pine performance, aspen sucker production, and stand development in the ID-Fxm subzone near Williams Lake. BC Ministry of Forests, Research Branch, Victoria, B.C. Technical Report 015. <http://www.for.gov.bc.ca/hfd/pubs/Docs/Tr/Tr015.htm>

Newsome, T.A., J.L. Heineman, and N. Daintith. 2005. Suitability of native broadleaf species for reforestation in the Cariboo area of the Southern Interior Forest Region. BC Ministry of Forests, Southern Interior Region. Extension Note 73.



Teresa Newsome photo

<http://www.for.gov.bc.ca/hfd/pubs/docs/en/en73.htm>

A range of publications is anticipated over the next couple of years including two draft reports that have been written to summarize the second- and fourth-year results from the pine-aspen competition studies in the SBPSxc and SBSdw1 respectively. In addition, a draft manuscript for journal publication documenting the results of the light study has been prepared.

Additional literature cited

BC Ministry of Forests. 1990. TSA reports for Williams Lake TSA No. 29, Quesnel TSA No. 26 and 100 Mile House TSA No. 23. BC Ministry of Forests, Inventory Branch, Victoria, B.C.

Comeau, P.G.. 2001 Relationships between stand parameters and understory light in boreal aspen stands. B.C. Journal of Ecosystems and Management 1(2):103-110)

A 12-year-old naturally regenerated pine aspen stand in the SBPSxc where an aspen free radius of 1m was created.