Appendix 4. Incorrect Selection of Leave Trees During Spacing May Result in Potential Productivity Losses (MoF Memo)

BRITISH COLUMBIA **Ministry of Forests**

Forest Practices Branch

MEMORANDUM

February 28, 1997

To: All Regional Managers
        All District Managers

From: Henry J. Benskin, R.P.F.
        Director
        Silviculture Practices Branch

Re: Incorrect selection of leave trees during spacing may result in potential productivity losses

In an operational spacing activity overall stand height may be significantly reduced due to the removal of dominant or top height trees. The reduction in overall stand height due to spacing is known as the "chainsaw effect."

By only focusing on maintaining an even stem distribution on a site (square or triangular spacing) during operational spacing, some of the largest and best trees may be removed. This has severe implications on the overall merchantable volume projections of the stand and the subsequent return on investment at harvest.

Two examples attached demonstrate the potential losses in productivity due to stand height reduction due to poor leave tree selection during spacing. TASS (Tree and Stand Simulator), was used to compare merchantable volumes between a stand spaced to a specific inter-tree distance (leaving the tree closest to the square metre grid intersection) and selecting the best (tallest) crop tree closest to the gridline intersection.

The coastal example simulated the growth of a natural stand of Douglas-fir spaced from 3200 sph to 600 sph. The first simulated thinning method left the closest tree to the 4 metre grid. This is an example of very rigid spacing requirements. The second simulated thinning method favoured leaving the best (tallest, healthiest, best form) crop tree within the 4 m grid with a minimum inter-tree distance of 2 m. This provides flexibility to select the best crop trees yet still meet target spacing densities per hectare.

The difference in merchantable volume between the first and second simulated thinning methods at a 100 year rotation was 113 m^3/ha. The "chainsaw effect" had reduced this stand's top height by 1.9 m and subsequent merchantable volume at rotation by 113m^3/ha or 15.4%.

The interior example simulated the growth of a natural stand of lodgepole pine spaced from 10,000 sph down to 1113 sph. The first simulated thinning method left the closest tree to the 3 m grid intersection point. The second simulated thinning method favoured leaving the best (tallest) crop tree within the 3 m grid with a minimum inter-tree distance of 1 m. The difference in merchantable

..../2

volume between the first and second simulated thinning methods at a 100 year was 56 m^3/ha. The "chainsaw effect" had reduced this stand's top height by 1 m and subsequent merchantable volume at rotation by 56 m^3/ha or 14.7%.

To avoid or minimize the chainsaw effect, minimum inter-tree distances should be flexible enough to leave two large dominant crop trees growing close together. In most cases both trees will continue to grow until harvest. To avoid spaced stands from having clumped distributions and voids due to specifying smaller minimum inter-tree distances it is also important to include a range (minimum and maximum number of well-spaced crop trees per hectare.

Both minimum inter-tree distance and a range of well-spaced stems/ha parameters should be used to describe your desired post spacing target stand. By using both minimum inter-tree distance and target well-spaced stems/ha this will provide the necessary flexibility to meet the desired post spacing stand density and still allow for the retention of large dominant crop trees.

For example, with proper on-site administration, prescribing a target spacing density of 1200 stems/ha (± 100 stems/ha) for lodgepole pine and specifying a fairly flexible 1.0–2.0 m minimum inter-tree distance would result in the desired post spacing stand density as well as the ability to leave two crop trees growing close together.

In all spacing operations the largest, healthiest crop trees should have the highest priority for retention. These trees are large for a reason. Be it microsite, genetics or other reasons, these large trees will continue to outperform smaller trees, thus maximizing the return on your investment.

If you have any questions or require more information please contact:

> Frank Barber, R.P.F.
> Stand Management Specialist
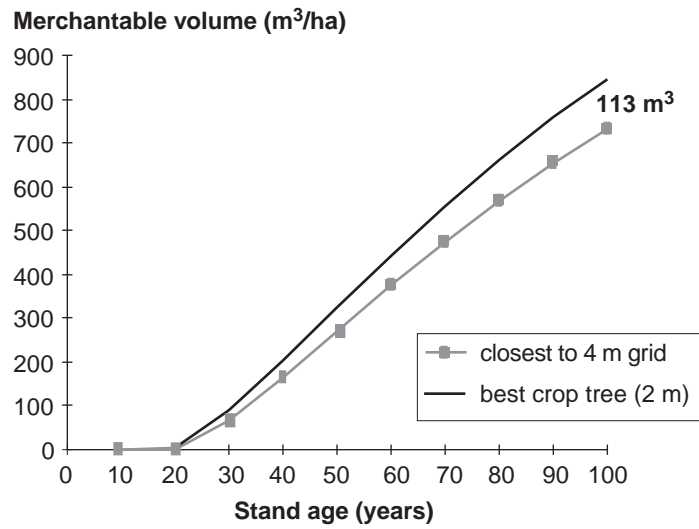> Forest Practices Branch
>
> Ph: (250) 387-8910
> Fax: (250) 387-1467
> e-mail: frank.barber@gems6.gov.bc.ca

(original signed by)

Henry J. Benskin, R.P.F.
Director
Silviculture Practices Branch

Coastal Example

Merchantable Volume Loss Due to "Chainsaw Effect" in Coastal Douglas-fir

Interior Example

Merchantable Volume Loss Due to "Chainsaw Effect" in Interior Lodgepole Pine