Lodgepole Pine Pruning Trial

Officer i/c: R. Gray
Location: Community Lake
Region/District: Kamloops/Kamloops

Objective:
1. Monitor growth impacts to various levels of crown removal.
2. Monitor growth impacts to the pruning of approx. 50% of the stems in a stand. It’s thought that the dominance relationship between pruned and unpruned stems will remain the approx. the same and could lead to CT opportunities of the untreated stems in the future.
3. Provide demonstration areas.

Progress:
1. In the fall of 1991, a 16 year old, 6-7m P1 stand was chosen and pruned to remove 3, 4 and 5m of crown. Density is approx. 1600 SPH.
2. At the same time a further 14 year old P1 stand at approx. the same density and 4-5m in height was chosen and 3m of crown was pruned from 50% of the stems.
3. Inventory intensive forestry plots were established in both areas.


Report Distribution: All regions - Stand Tending Forester
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PRUNING SX TRIAL

Introduction

The 1991/92 fiscal year is the first year for formal pruning goals in the Kamloops Forest Region. These goals will increase from 316 ha in 91/92 to 800 ha in 95/96. This is not to say that pruning has not been done before; make-work crews have been used in this activity for some years having pruned perhaps 100-200 ha.

While the goals are relatively small, there is time for trial and error in fine tuning what type of stand we should be targeting and operational aspects of doing the actual pruning. There is little local information to utilize.

Objectives of Pruning Trial

Questions or problems arise when we try to operationally apply two of the axioms of pruning.

a) **Prune when the trees are young:**

This principle suggests minimizing the knotty, juvenile wood core is important. A goal of 7.5 to 10 cm DBH has been suggested. This goal may be difficult to attain if we must also adhere to two other constraints:

1) Maintaining 50% of the live crown:

   - the assumption is that particularly diameter growth will suffer if radical amounts of live crown are removed;

   - it is assumed that the diameter growth loss at this level will not be unduly affected because of lower photosynthetic efficiencies in lower branches and that in relative terms, new height growth will quickly replenish crown mass.
2) Minimizing pruning costs:

- there is a risk that for whatever reasons, subsequent pruning entries will not occur, therefore we should produce wherever possible a length of clear wood in a bole that can in itself form a value-added product. The needs of mills in the future is impossible to predict, but at present this minimum is 9 feet (0.5 foot stump plus 8.5 foot bolt). There is a danger in pruning to only 4 feet, for example, if a mill cannot produce a product requiring clear wood of only that length.

For this trial, it is assumed that maintaining a small limby core and pruning to at least 9 feet are over-riding factors. The problem we see in lodgepole pine stands, particularly those spaced some time ago, is that it is not possible to also remove less than 50% of live crown. This trial will look at the effects of different levels of crown removal to diameter and height growth.

b) Prune a maximum of 800 SPH

Pruning is expensive. In wanting to maximize the amount of clear wood on a given tree, we need to pay attention to stem density. The maximum suggested is 800 SPH. Current spacing standards include only a very small % of area at this density. Current post spacing densities average 1400 to 1600 SPH. We have a large inventory at this level.

At this higher density, large branches are prevalent and natural pruning even at 8 m in total height is minimal in lodgepole pine stands. The question is then, how to produce clear wood off a site with high post spacing densities, but at the same time obtain a good dollar return on pruning costs.
One solution is to prune say, 800 well spaced SPH, leave the rest unpruned, remove the latter stems 15 years later with a commercial thinning to leave the pruned trees to grow high value wood.

A problem arises. One school of thought suggests pruned trees will be suppressed as the unpruned trees grow into dominant positions. The effects of pruning may then be lost. Another school suggests the last form of growth a tree will sacrifice is height, in order to survive, and thus pruned trees will maintain their dominance.

In a separate area to (a), this trial will look at the practicality of this solution and which school is correct.

**Methods**

Stands for the trials have been selected in the vicinity of Community Lake, Kamloops Forest District.

a) **Prune when trees are young:**

**Treatment**

Four sites of approximately 1.2 ha each will be located. Three of the sites will be pruned to leave the following live crown:

- 50%
- 30%
- 15-20% (whatever is practical)

The remaining site will be a control.

**Plots**

Four circular plots containing at least 25 trees each will be located in each treatment (4 treatments x 100 trees = 400 total trees minimum). Once a radius is chosen to ensure the capture of the minimum number of stems, the radius will remain the same across all 16 plots.
The plot centers will be moved to ensure no stem galls of Western Gall Dust occur in the plots. Stem galls includes branch galls located very close to the stem, that cannot be pruned to leave the stems free of this pathogen.

See Appendices A & B.

**Pruning**

To determine the height of the tree to which will be pruned, first the "effective" live crown height will be determined. Measurements will be made on a number of dominant and co-dominant trees to determine this height and once established, will remain consistent across each treatment.

Effective crown height is the live crown from the top of the tree down to the branches where branch diameter starts to decline. The % criteria of crown removal will apply to this effective crown. All branches (living and dead) will be pruned from ground level to this height.

During pruning all "ingress" trees (0.5 m to approximately 2.5 m) will be cut with a stump no higher than 15 cm and with a horizontal cut.

Following completion of the treatments, a walking trail will be cleared to each plot center. At the roadside, the trail will be well ribboned and an aluminum tag will be stapled to a tree indicating the type and year of treatment.

**Tree Measurements**

Tree measurement will correspond with the Ministry of Forests, Inventory Branch's "Intensive Forestry Plot" system.

When locating the DBH paint line, care should be taken to avoid placing it within 5 cm of a whorl.

**Timing of Measurements**

Baseline measurements (establishment) will be done in September 1991. Subsequent measurements will be done in 1994 and 1996.