



TREE SEEDLING DAMAGE ON GRAZED CLEARCUTS

1.0 INTRODUCTION

Until the early 1960s there were few conflicts between the livestock and forest industries on mid- and high- elevation forested sites. There was little logging in most of these areas and the understories had limited value as range.

The onset of extensive clearcut logging in the Interior of the province in the early 1960s opened up access to new areas and provided opportunities for use of forestland that was not previously available to cattle.

Range seeding programs were introduced to offset initial forage losses on these cutblocks and to provide high quality forage for livestock until canopy closure.

Forest range now provides 6.5 million hectares of summer and fall forage and accounts for nearly 80% of the total area of Crown land grazed. However, much of this same area is productive forestland where the primary land management goal is reforestation. And this has led to conflicts.

Foresters became concerned that seeding and grazing on clearcuts may result in unacceptable reductions in growth and survival of planted stock due to physical damage from trampling and browsing, and increased competition from seeded forage species. Concerns were also expressed over the possibility of increased incidence of disease and fire hazard due to accumulations of unused forage.

2.0 RESEARCH UNDERTAKEN FORAGE/CATTLE/CONIFER INTERACTIONS

A project was initiated in 1986 to address some of these concerns by examining the relationships between cattle grazing, forage seeding, and growth and survival of tree seedlings.

The project is a cooperative effort among:

The Ministry of Forests, Research Branch - Brian Wikeem and Reg Newman;
Kamloops Forest Region - Phil Youwe;
Agriculture Canada - Dee Quinton;
and the University of British Columbia - Michael Pitt

The project is comprised of two components. The first, "Forage Seeding and Cattle Grazing" is a large scale operational-style study using as many as 330 cow/calf pairs each year.

The second, "Basal Scarring and Leader Damage" is a small scale experimental trial which simulates cattle damage on tree seedlings while controlling other factors.

The study intended to examine the effects of different seeding rates and grazing intensities on tree seedling survival and growth, forage production, the suppression of native vegetation and cow and calf weight gains.

Three cutblocks with a total area of 120 ha were aerially seeded to a seed mix of 35% orchardgrass, 5% timothy, 40% alsike clover and 20% white dutch clover at two rates of 3 and 12 kg/ha (an equivalent area was left unseeded).

Immediately after, the cutblocks were planted with one year old lodgepole pine at 1600 stems/ha. The areas were then cross fenced into 18 five hectare pastures to be grazed at either 50 or 80% forage use. Nine ungrazed exclosures were constructed as controls.

Two of the cutblocks used are located near Tunkwa Lake about 50 km south-west of Kamloops. The third cutblock is located mid-way between Kamloops and Merritt.

by hand at different levels of severity. We also cut off terminal buds and leaders and combined the different types of damage.

Tree seedlings were treated at two different tree ages and at two different phenological growth stages. The most significant result was that we were unable to kill any tree seedlings, even with our most severe treatments. Young lodgepole pine seedlings proved to be extremely resistant to the effects of physical damage.

The seedlings can withstand extensive damage and still recover. Some trees survive by regrowing from a lateral bud. What was most surprising, was that these seedlings can regrow even in the absence of any live buds.

While lodgepole pine survival is not affected by scarring, there are significant reductions in growth due to larger scars. Diameters can be reduced by 22% and height can be reduced by 30% when trees are scarred at 75% of stem circumference.

Getting back to the grazing trial. Trees are indeed dying in the pastures and the increased mortality of tree seedlings is due to increased stocking rate. Yet we were unable to induce mortality in our simulated damage trial, even using scars more severe than those which cattle commonly produce through trampling. Since vegetative competition was controlled in the simulated damage trial, the most likely explanation for this apparent discrepancy is that vegetative competition is an important additional stress on trampled tree seedlings in the pastures. Again, I should stress that we have many pastures with acceptable levels of mortality.

- Mortality ranges = 3% to 60%
- ONLY three pastures have unacceptable levels of mortality
- In contrast, 13 of the pastures have < 20% mortality.
- Average mortality over 18 pastures = 17 %
- This is in addition to a background mortality (as measured in ungrazed exclosures) of about 10%.

3.122 Browsing

Cattle rarely browse lodgepole pine seedlings when other forage species are available. Brows-

ing damage is very minor under normal conditions, usually about two percent of all trees. In fact cattle select against lodgepole pine. We've observed that it's one of the last species eaten by cattle on these sites. Generally any browsing damage that does occur is accidental.

In the absence of other forages, however, cattle will use lodgepole pine. This type of damage does not occur until forage use is greater than 95%.

Browsing on lodgepole pine remains very low until remaining forage drops below 100 kg/ha. At that point there is a sharp increase in browsed trees.

3.123 Bull Damage

Although we're not actively researching damage by bulls, we have observed rubbing behaviour on pole sized trees - and the results can be devastating.

3.13 Vole Damage

Small mammal damage proved to be a surprisingly large factor on the clearcuts. Data collected this spring show that, as much as 77% of all trees in one pasture were damaged by voles. Some trees were completely girdled by voles feeding on the lower bark. Voles can also totally defoliate a tree seedling or clip off the terminal.

Most vole damage occurs over-winter when other forage species are not available. Damage was particularly severe this past winter because the vole population was at its peak.

We must be careful not to put the blame for vole damaged trees on cattle. The distinction between the two types of damage is often very subtle and it takes a fair bit of training to be able to distinguish between these two types of damage. I have no doubt that cattle have been blamed for vole damaged trees in the past.

3.14 Wildlife

Tree seedling damage by wild ungulates was very minor in our study even though we have resident populations of moose and deer. The seeded forage species (especially clover) may in fact protect tree seedlings from browsing in early spring by providing an alternate forage choice.