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Forest Grazing: Effects of Cattle Trampling and Browsing on Lodgepole Pine Plantations

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This project was established to determine the effects of cattle grazing on regenerating lodgepole pine. A second objective was to examine how the seeding of domestic forage species would influence tree growth and interact with the effects of grazing. The study was repeated on three sites so that results could be applied over a wide area. Two sites are located on the Guichon Creek Road above Tunkwa Lake in the Kamloops Forest District. The third site is near Helmer Lake off the Coquihalla Highway in the Merritt Forest District.

The Tunkwa Lake sites were harvested in November 1986 and were windrowed, burned and drag-scarified during November 1987. The majority of the Helmer Lake site was harvested in 1985 with an additional

10 ha harvested in October 1987. The Helmer site was rough-piled and track-and-blade-scarified, and the piles were burnt after the first snowfall.

All sites were aerially seeded in May 1988 to a forage seed mix of 35% orchardgrass, 5% timothy, 40% alsike clover, and 20% white Dutch clover. Seed was applied at rates of 3 and 12 kg/ha, and equal areas were left unseeded. One-year-old container-grown lodgepole pine seedlings were then planted at a density of 1400 stems/ha. The sites were fenced into 5-ha pastures.

Grazing was initiated in 1989, the year following planting, and has continued for eight years. Grazing is applied at 50% and 80% forage use with an ungrazed control. The grazing period is kept constant at about



FIGURE 1 *Forest grazing near Helmer Lake, B.C.*



FIGURE 2 Extensive browsing can indicate poor grazing management.

30 days. Cattle numbers are modified to achieve the different levels of forage use. For example, a 50% use area may be stocked with six cow/calf pairs for 30 days while an 80% use area may be stocked with 10 cow/calf pairs for the same period, depending on forage availability.

Browsing

Browsing damage was found to be minimal. On average, only about 2% of lodgepole pine seedlings are browsed. Most browsing is accidental. Cattle rarely browse lodgepole pine intentionally. High levels of browsing damage can occur, however, if forage plants become scarce. When available forage is reduced to less than 100 kg/ha at moderate cattle stocking, browsing damage increases dramatically. Therefore, if there is evidence of



FIGURE 4 Livestock management is a key to successful integrated use.



FIGURE 5 Moderate cattle stocking and delayed use on young plantations minimizes conifer trampling.

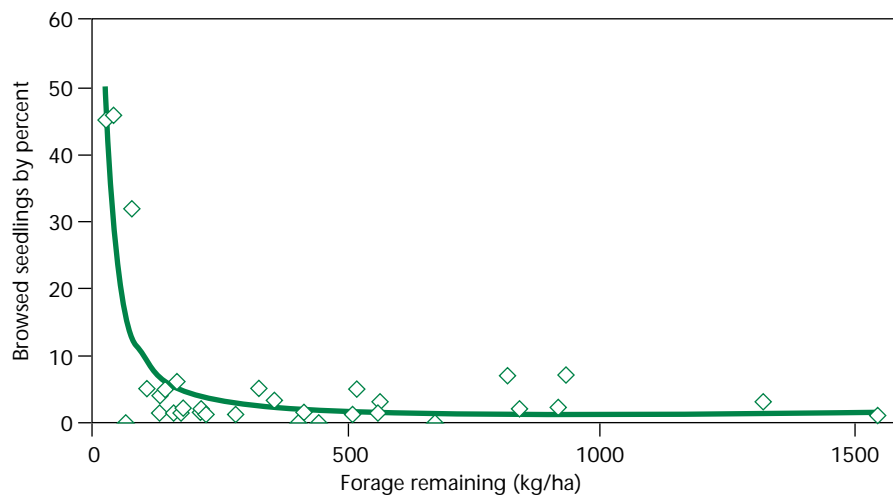


FIGURE 3 Cattle browsing of lodgepole pine relative to remaining forage.

extensive browsing in a lodgepole pine plantation, poor grazing management practices should be suspected.

Trampling

Unlike browsing damage, trampling damage occurs commonly. The number of trees trampled varies depending on the number of cattle in the area and the size of the tree. Trampling damage is highest in the first two to three years after planting. Trampling damage drops well below 10% by the fourth year after planting. The decrease in damage as trees age is due to the greater visibility of

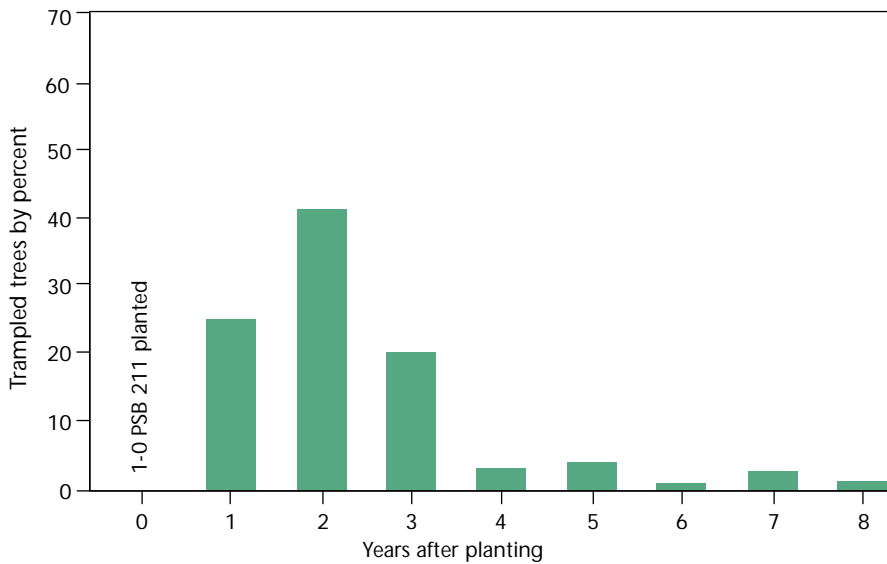


FIGURE 6 *Lodgepole pine trampled by livestock—unseeded cutblock.*

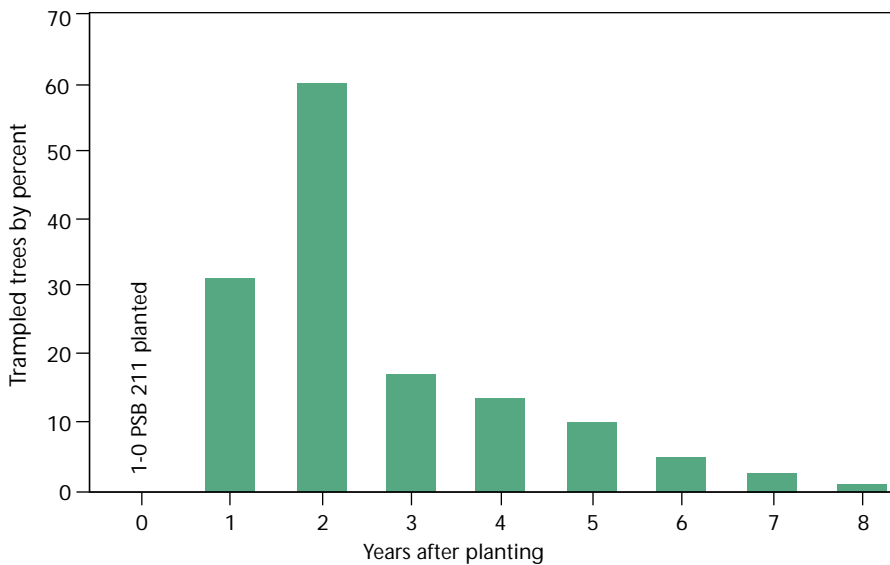


FIGURE 7 *Lodgepole pine trampled by livestock—seeded cutblock.*



FIGURE 8 *Roundup at the Tunkwa Lake Research Site.*



FIGURE 9 *Trampling damage does not always result in mortality.*

larger trees. Cattle will seldom step on trees if the trees are large enough to be a physical hindrance.

Increased forage production results when cutblocks are seeded to domestic forage species. Trampling damage increases because increased amounts of palatable forage will attract and hold greater numbers of cattle. Trampling damage on seeded cutblocks can be expected to be 20% to 30% more in the first two years after planting, compared to damage on unseeded cutblocks grazed at the same level of use.

The more cattle in an area, the greater the probability that trees will be trampled. It also follows that the longer cattle remain in a cutblock, the greater the chance that a tree will be stepped on.

Operationally prescribed cattle stocking rates result in moderate trampling damage in the first few years after planting. Damage can reach as high as 60% of trees if cattle are allowed to concentrate. Improper distribution, not prescribed stocking rate, is the usual cause of excessive trampling damage.

Not all trampled seedlings die. About 27% of two-year-old tree seedlings that are trampled subsequently die. By age six only 5% of trampled

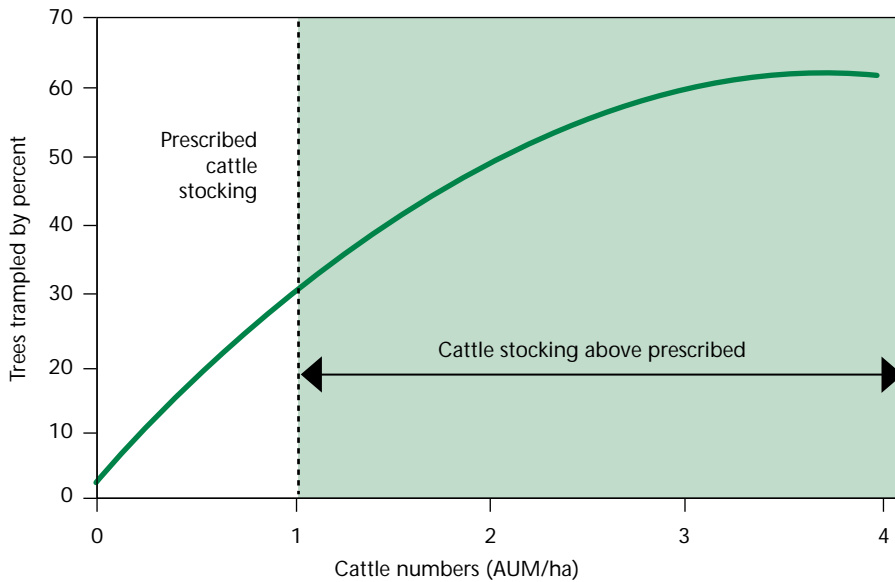


FIGURE 10 *Lodgepole pine trampled by cattle in the first two years after planting.*

trees die. In cases of continued high cattle concentrations over several years, however, mortality can accumulate. To date, five of the 18 grazed areas in the study are considered not satisfactorily restocked (NSR). Moderate grazing, however, maintains adequate tree stocking.

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