Effects of Cattle Grazing, Forage Seeding, Basal Scarring and Shoot Damage on Forest Regeneration - Project No. 3.55

In the Southern Interior, the B.C. Forest Service often seeds harvested or burned forest land with forage plants to improve forage availability and quality for the local ranching industry. Seeded forage can compete with planted conifers for site resources, but may also benefit tree growth by suppressing native plant competitors. Grazing reduces vegetation competition, but cattle can damage plantations by trampling and browsing the seedlings. The net effects of seeding and grazing on tree growth and the interactions of these practices with silvicultural treatments applied to NSR backlog sites are unclear, but the potential exists for a positive balance.

A cooperative project has been designed to investigate these effects. The research group includes Brian Wikeem and Reg Newman (Research Branch), Phil Youwe (Kamloops Region), Ministry of Forests and Lands; Michael Pitt, Dept. of Plant Science, UBC; and Dee Quinton, Agriculture Canada Range Research Station. The BCFS Kamloops District Office and the local ranching industry are also involved.

The project consists of two parts. The first addresses the effects of forage seeding and subsequent grazing and has three main objectives:

1. to determine the effects of three seeding rates and three levels of grazing intensity on the growth and survival of both planted lodgepole pine seedlings and native vegetation;
2. to determine the relationships between forage seeding rate and subsequent cover, frequency, and density of domestic or native forage species; and
3. to determine how cattle weight gain is influenced by grazing intensity and different levels of forage production.

The second part focusses on the effects of seedling damage and has the following objectives:

1. to determine the effects of simulated cattle damage (different degrees of stem girdling and shoot removal), and
2. to study the influence of the timing of such damage, in relation to seedling age and phenological stage.

This research will help determine the immediate and long-term impacts of seeding and livestock grazing on reforestation, and the best combinations of seeding and grazing intensities to benefit both tree and livestock production. Based on the results, management prescriptions for grass seeding rates and cattle grazing control on seeded forest plantations will be developed to minimize resource conflicts in similar areas where integrated resource use is prescribed.

The study sites are located at three 40-hectare cutblocks in the MSc subzone in the Kamloops Forest Region. Blocks 1 and 2 are near Tunkwa Lake and Block 3 is near Helmer Lake. The two blocks at Tunkwa were clearcut and windrowed in the fall of 1986, and drag scarified with shark fins in the fall of 1987 to create a uniform degree of soil disturbance. The Helmer Lake block was clearcut in 1985, with 10 additional hectares logged in 1987 to accommodate this study. That fall, the entire area was rough piled, track and blade scarified, and the piles burnt after snowfall.

For the first part of the project, each of the three blocks will represent one replication of the experiment. Three equal-sized areas in each block will be seeded with a mixture of domestic grasses and legumes; one area at 3 kg/ha, one area at 12 kg/ha, and one area left unseeded as a control. Each area will then be planted with 140 lodgepole pine plugs (seedlot 8263). The seeded treatments will be fenced, and grazed at three levels of utilization: 50% removal of current season’s growth, 80% removal, and an ungrazed control. Cows and calves will graze for a 4-week period each year for three years. Pine growth, survival and damage, and the frequency, cover, and production of native and domestic plants in the treatments and controls will be assessed annually before, during and after each grazing period.

For the second part of the project, a separate area at Tunkwa Lake will be planted with pine seedlings and fenced to exclude cattle and wildlife. Seedlings will be girdled 25, 50 and 75% of their circumference at the base of the stem and will be subjected to different degrees of shoot damage. These treatments will be applied during periods of both active shoot growth and dormancy, and to seedlings of two different ages. Seedling vigour, survival, basal diameter and height growth in these treatment plots will be measured annually for three to five years.
Forage seeding, planting, fencing, and installation of watering facilities will be completed in 1988, and grazing will commence in July of 1989. Progress reports will be produced regularly, and the results communicated in operational and scientific reports and presented at meetings and workshops. Guidelines for forage seeding rates and grazing on cutblocks will be produced, and the experimental sites will serve as effective demonstration areas showing the impacts of different utilization levels.

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