PRELIMINARY WORKING PLAN AND REPORT

Companion Sheep Grazing Research Trial (R8902)

Effects of sheep grazing on competing vegetation and spruce seedlings on a recent cut-over.

Introduction

The negative effects of competing vegetation has now been recognized as a major factor in conifer plantation survival and success. In many cases, some form of vegetation control has been prescribed to alleviate associated problems. While herbicide application has provided the primary means of control, Forest Districts staff in the Prince Rupert Region wish to also investigate alternative means, particularly for sensitive areas such as the Pesticide Free Zones. Vegetation control by sheep grazing has been proposed and conducted at the research level in the U.S. (Sharrow, et al, 1989) and has now been tried at the operational and research trial levels in B.C. Early results have been described as successful for Clearwater (Ellen, 1989), but unacceptable amounts of seedling damage have occurred in the Cariboo trials (Sutherland and Newsome, 1989). Ecological and growing conditions, especially photoperiod are significantly different in the north central part of the province (Russell, 1989) and the focus on small block grazing potential to simulate the Pesticide Free Zones both have resulted in the need for a separate investigation via this research trial project.*

Objectives

To measure and quantify the effects of the following treatments on competing vegetation and on the growth and survival of planted spruce (Sx).

- grazed by sheep on a 2-pass, one intensity basis over three years commencing in 1990. To be grazed with a grazing cell system of approximately 12 cells, using moveable electric fencing (illustrated ahead).
- ungrazed

Ellen Geoff, 1989, personnal communication (Resource Officer, Range, Clearwater Forest District.
Russell, Don, 1989, personnal communication (Range Officer, Prince Rupert Forest Region

* Additional operating conditions for our north-central area include the common inclusion of lodgepole pine within spruce plantations, or vice-versa, which will require a higher level of grazing management.
Discussion and Methods

The Lawson site, suggested as a threatened, high brush hazard site by Gary Hanson of Pacific Inland Resources, was selected from seven sites which were reviewed. Eight treatment plots of 0.06 hectare were established. The remainder of the 40 ha. block portion (see map) will serve as a demonstration area. The eight treatment plots were selected as a relatively homogeneous representatives of the mesic to subhygric (SBSd/01 SBSd/08) ecosystem. The primary competing species of fireweed (Epilobium angustifolium) and thimble berry (Rubus parviflorus) were dominant in all, as was pea vine (Lathyrus nevadensis). Vegetative competition was judged to be moderate to heavy (Erickson and Coates, Dave, Silviculture Research Officer, Prince Rupert Forest Region).

The 8 treatment plots were randomly selected and assigned from an initial grouping of 12 identified representative sites. Plot locations and their assigned treatments are illustrated ahead.

Subplot assignment within the eight plots was conducted randomly, but used a replacement method for samples which would overlap. Six 30 m transect lines were assigned six plots each. The same randomized sampling design was applied to all of the units. Sampling consisted of 36 sub-plots of 7 m² per plot, with subplot centres on metre points along the transect line, as illustrated ahead.

The sheep grazing treatment is to be conducted under contract over a three year period commencing in 1990. The contractors will provide and manage the sheep to provide the grazing treatment for control of competing vegetation. The block portion will be grazed on a 2-pass - one intensity basis, using moveable electric fencing through 12 grazing cells. These 12 grazing cells will have an area of approximately 3.3 ha. each (approximately 220 m x 150 m, or equivalent). First pass will begin on May 19 or thereabouts, and the second pass will be completed on approximately September 5, with a prescription of 3 days per grazing cell per pass. Further stock control will be achieved through the use of dogs and herders. The initial grazing prescription will be for 80% utilization of the stand and 10 cm stubble height on the target brush species. These grazing system details will be subject to refinement as the project proceeds.*

The ungrazed treatment plots will be protected as fenced enclosures with fencing to be completed in the spring of 1990.

* radius = 1.59 m.
* The present grazing prescription calls for a stocking intensity averaging 227 sheep days per hectare, but this may vary from 303 (4 days, first pass) to 151 (2 days, second pass).
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Subplot locations within each main plot.

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WORKING PLAN

SX

The site, Unit D of C.P. EM7-517, Block 4, was harvested and broadcast-burned in 1986.

Hybrid (glauc a x engelmannii) spruce (Sx) plugs, from seedlots 4181, 4151 and stock types 312 and 313, were planted on the trial area in the spring of 1988 by contractors for Pacific Inland Resources. The spacing objective was for 2.7 m, but this was varied for the selection of desirable substrate (drier spots in wetter micro-sites, moister spots in drier micro-sites). A portion of the demonstration area will be planted in 1990.

Measurements

Peak vegetation cover class and height class by dominant species was measured in 1989, and will be measured in 1990, 1991, 1992 and 1995. Measurements of competing vegetation to the spruce seedlings were also made and will be continued. Utilization and residue measurements after the grazing treatment will also be taken. Other observations will be made within the demonstration area.

Height, diameter, damage and survivorship will be measured in the Fall for the spruce seedlings on the same plots. The design used is intended to randomly include approximately 133 seedlings per treatment. Separate spring seedling damage and mortality measurements will also be taken.

Analyses

Proposed analyses include analyses of variance. Regression analyses will be considered for any defineable relationships. Both will use standard statistical packages.

Suggested Review Committee

Dave Coates or Phil LePage, Smithers
Craig Sutherland or Teresa Newsome, Williams Lake
Phil Youwe, Kamloops

Copy to Brian Wikeem, Kamloops

Wayne Brickson
Range Development Agrologist
Prince Rupert Forest Region

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(1. 'peak' will probably be within three weeks of actual peak)