Screening Trial for Herbicides used for Repression Spacing in Lodgepole Pine.

Officer i/c: R. Dominy
Location: Ram Fire
Region/District or Nursery: Nelson/Invermere Forest District

Objective: To test three herbicides (Release in oil, Release in water, Vision in water) for repression spacing in excessively dense lodgepole pine that regenerated after wildfire.


Next Scheduled Assessment /Treatment: Second and final assessment planned for Fall 1995.

Invermere District
Nelson Region Silviculture
Nelson Region Forest Sciences
Silviculture Branch

Incomplete:
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Report Prepared by: .................................. (Signature)
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Report & distribution approved by: .................. (Signature)
(for Regions - Silviculture Officer)
 .................................. (Typed)

(a) Wide Distribution [ ]

(b) Limited Distribution [ ]
   (i) Internal - Branch only [x]
   (ii) External - Designated [ ]
   (iii) Ministry only [x]

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Nelson Region Silviculture
Nelson Region Forest Sciences
Silviculture Branch

Approved:

Manager - .......................... (Signature)
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Working Plan

1 Introduction

Large areas of the 1985 wildfires in the Invermere District regenerated to excessive densities of primarily lodgepole pine. These densities, which often exceed 40,000 spha, must be spaced to about 2,000 spha. before they can be expected to produce useful stands. Various methods have been tried, including hand pulling, hand-held power tools, large ploughs etc all of which produced unsatisfactory results, in that either too much site disturbance was produced, or too many trees were left behind. Killing unwanted trees with herbicides, would cause little site disturbance, and if done aerially, could treat sites that were unworkable with machinery. Additional hand work may be required, but the amount required would be considerably less after chemical spacing, and thus less expensive.

2 Objectives

To test three herbicides for repression spacing in excessively dense lodgepole pine, by:
   2.1 applying herbicides in strips, and
   2.2 counting the killed and damaged seedlings.

3 Methods of Investigation

3.1 Location

One location in the Lussier River drainage that was burned by the 1985 fires will be selected that is representative of the problem areas, and is sufficiently uniform to permit the installation of a 0.5 ha test block.

3.2 Description of Treatments

3.2.1 Herbicide treatments

Three herbicide treatments plus a no-treatment control will be tested. These treatments are:
- Vision in Water, applied at the rate of 6 l (product) in 100 l carrier per ha.
- Release in Water, applied at the rate of 8 l (product) in 100 l carrier per ha.
- Release in Oil, applied at the rate of 8 l (product) in 100 l carrier per ha.
- Control (no treatment).

An appropriate dye will be added to each treatment to help identify treated areas.
All treatments will be ground applications using backpack sprayers. Treatment will be conducted in early summer, while the pine is still in active growth, after needle development for the current year, but before full cuticular development.

3.2.2 Experimental Design

The trial will be laid out as a completely randomized block, with three replications of each of the four treatments.

3.3 Layout

One 0.48 ha (100 m x 48 m) block will be established. That block will be divided into twelve strips 3 m wide and 100 m long, with a buffer of 1 m between each strip. Treatments will be randomly applied to each strip, according to the randomization scheme in Table 1. The four corners of each strip will be marked by wooden posts.

<table>
<thead>
<tr>
<th>Strip</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Vision</td>
</tr>
<tr>
<td>2</td>
<td>Control</td>
</tr>
<tr>
<td>3</td>
<td>Release (oil)</td>
</tr>
<tr>
<td>4</td>
<td>Control</td>
</tr>
<tr>
<td>5</td>
<td>Vision</td>
</tr>
<tr>
<td>6</td>
<td>Release (water)</td>
</tr>
<tr>
<td>7</td>
<td>Release (oil)</td>
</tr>
<tr>
<td>8</td>
<td>Release (oil)</td>
</tr>
<tr>
<td>9</td>
<td>Release (water)</td>
</tr>
<tr>
<td>10</td>
<td>Vision</td>
</tr>
<tr>
<td>11</td>
<td>Control</td>
</tr>
<tr>
<td>12</td>
<td>Release (water)</td>
</tr>
</tbody>
</table>

3.4 Establishment

The strips will be marked clearly before any spray application occurs. Twenty 5 m² assessment plots (r = 1.26 m) will be established down the centre of each strip, starting 2.5 m from the end, and located every 5 m. The centres of each plot will be marked with short wire seedling markers for easy relocation. Plots will be numbered from 1 to 20 for each strip. Strips will be numbered from 1 to 12 starting on the left when looking up-hill.
4 Measures and Records

4.1 Seedling Assessments

Every seedling in every plot will be counted. Assessments will be conducted before the spray, and again in the fall. A second assessment will be conducted in the fall in the next year. At each assessment the count will be divided into three height classes; \(<20 \text{ cm}\), \(<40 \text{ cm}\), and \(>40 \text{ cm}\). These classes can be adjusted before treatment, so that roughly one-third of the trees fall into each class. The two post-treatment assessments will also assess the herbicide damage by categorizing the seedlings into damage classes. These will be: DEAD, POOR (>50% necrotic foliage), FAIR (10 to 50% necrotic foliage), and GOOD (<10% necrotic foliage).

This is a screening trial, with the objective of testing methods of chemical repression spacing. Once an appropriate technique is developed, additional trials may be needed to refine application rates and possibly timing. These trials may provide a medium for assessing tree response to spacing. However, it is expected that response to chemical spacing will not differ from those trials using more conventional spacing methods. No significant growth response is expected unless the leave strips between the herbicided strips are also spaced.

4.2 Vegetation Assessment

No vegetation assessments are planned, but provision of randomly selected control strips will provide a opportunity for retrospective examination.

4.3 Records

Records will be collected on modified plot cards. Data will be kept separate by strip and by plot thus the post-treatment data for one plot will consist of 12 counts (3 tree sizes * 4 damage classes). Subtotals for each plot will be used for data analysis.

Herbicide damage to seedlings will be highly dependent on the phenological state of the seedlings at the time of treatment. Thus notes on the range of phenological condition of the target trees at the time of treatment, (and photographs) will be an essential component of the project records.

4.4 Reports

Two reports are planned. The first, at the end of the first year will act as a combined establishment report and
progress report. It will thus contain site description information and location and "as-installed" layout maps, as well as summarizing the first year’s data. The second will be a final report at the end of the second year, containing results, analyses and conclusions.

4.5 Photo points

One photograph will be taken from the centre point of each end of each strip, looking along the strip. Photographs will be taken at each assessment.

5 Proposed Analysis

Preliminary analysis will consist of descriptive statistics and graphical techniques. Additional analytical techniques will be employed as required.

6 Maintenance

Maintenance of all plots markers will be carried out at each assessment.

7 Communication of Results

Results from this trial will be disseminated through the SX Trial Process, SISCO, ECW, and through other meetings such as those of the Silviculture section.

8 Roles and Responsibilities

District Silviculture:
  Trial coordination
  Site selection
  Permit application
  Trial layout
  Herbicide application
  All assessments
  Report preparation

Regional Silviculture:
  Assist in site selection
  Assist in permit application
  Assist in trial layout
  Assist in herbicide application
  Assist in assessments

Regional Silviculture Research:
  Working Plan Preparation
  Advice on installation
  Assist in analysis and report