Title: Assessment of Alder Girdling Operations

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Report & Distribution Approved By: [Signature]

a) Wide Distribution □

b) Limited:
   1) Internal - Branch only □
   2) External - Designated □
   3) Ministry Only X

Date: November 22, 1985
Introduction:

Manual girdling was performed on stands of Alnus rubra (red alder) in the Kalum Forest District throughout 1983. This SX trial evaluates the effectiveness of several girdling techniques used at various times of the year in the Kitimat Provincial Forest.

OBJECTIVES:

The objectives of the SX trial are:

A. To evaluate the effect of time of year on the success of girdling of red alder.

B. To evaluate the effect of method of girdling on success.

LOCATION:

The trial was established in the Kitimat Forest. The sites were situated near Humphreys Creek, Deception Creek, Big Wedeene River and the Kitimat River (see attached maps).

DESIGN & LAYOUT:

The project is an ex post facto study because the operational work has already been completed. Randomization and formal experimental layout are not possible. Nonetheless the study will be broken down into two assessments in which objectives A and B are evaluated separately.

A. Timing Study

<table>
<thead>
<tr>
<th>FACTOR</th>
<th>LEVELS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time of girdling</td>
<td>9 (Jan/Feb, Mar-Oct.)</td>
</tr>
</tbody>
</table>

Conditions:
- 40 trees per time of girdling will be assessed
- stands will be approximately the same age (sites harvested between 1965-67)
- only one method of girdling is assessed (the most common)

B. Girdling Method Study:

<table>
<thead>
<tr>
<th>FACTOR</th>
<th>LEVELS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method of Girdling</td>
<td>6 (felled, sandvik, double ring with saw, single ring with saw, slab with rings, and 6 - 12&quot; of bark removed with saw)</td>
</tr>
</tbody>
</table>
Condition:  40 trees per method of girdling will be assessed
-one or two adjacent stands are used in which all
methods are present
-stands are of equal age

ASSESSMENT PROCEDURES:

A. Identify the appropriate stands for each study.
B. Run a line through each stand and select 40
dominant/condominant red alder stem which meet the timing
or method of girdling criteria for each study.
C. Permanently mark the stems so relocation is possible.
D. Assess as noted in section V.

SECTION V. ASSESSMENT

Each girdled red alder was assessed for:
1. dbh
2. # of stumps suckers
3. condition of the tree ( 0 to 5 where 0 = dead w/o leaves
   and 5 = apparently normal)
4. bark bridging ( 0 to 10 where 1 = 10% of cambium intact, 2
   = 20% of cambium intact, etc.)

Assessments were conducted in the spring of 1984 when the trees
flushed (1st assessment) and in the fall of 1984 prior to leaf
drop (2nd assessment). A final assessment was completed in the
fall of 1985.

The fall assessments were conducted from September 11 to 13

Table I summarizes the field data collected throughout the
trial.

See Table I

Mortality of the treated stems after three years ranged
from 16% to 100%. The variation in mortality was associated
with the timing of girdling (month) rather than method.

During the months of January to April and August to October
100% mortality occurred. However during May, June & July
mortality varied from 14% to 99%.
### TABLE 1

**SUMMARY OF MORTALITY ASSESSMENT OF RED ALDER**

#### A TIMING

<table>
<thead>
<tr>
<th>Treatment</th>
<th>% Mortality</th>
<th>% Sprouting</th>
<th>% Bridging</th>
<th>Tree Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan/Feb</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A 01</td>
<td>97</td>
<td>100</td>
<td>13</td>
<td>1</td>
</tr>
<tr>
<td>March</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A 02</td>
<td>100</td>
<td>100</td>
<td>68</td>
<td>0</td>
</tr>
<tr>
<td>April</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A 03</td>
<td>100</td>
<td>100</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>May</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A 04</td>
<td>5</td>
<td>16</td>
<td>0</td>
<td>40</td>
</tr>
<tr>
<td>June 1</td>
<td>37</td>
<td>99</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>June 11</td>
<td>7</td>
<td>14</td>
<td>13</td>
<td>9</td>
</tr>
<tr>
<td>July</td>
<td>3</td>
<td>51</td>
<td>0</td>
<td>35</td>
</tr>
<tr>
<td>August</td>
<td>3</td>
<td>100</td>
<td>0</td>
<td>95</td>
</tr>
<tr>
<td>September</td>
<td>0</td>
<td>100</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>October</td>
<td>0</td>
<td>100</td>
<td>0</td>
<td>100</td>
</tr>
</tbody>
</table>

#### B METHOD

<table>
<thead>
<tr>
<th>Method</th>
<th>% Mortality</th>
<th>% Sprouting</th>
<th>% Bridging</th>
<th>Tree Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>B 02</td>
<td>100</td>
<td>100</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>B 04</td>
<td>100</td>
<td>100</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>B 05</td>
<td>100</td>
<td>100</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>B 06</td>
<td>100</td>
<td>100</td>
<td>10</td>
<td>0</td>
</tr>
</tbody>
</table>

**Tree Condition:**
- 0 = Dead
- 5 = Healthy

**Mark Bridging:**
- 0 = 0% Bridging
- 10 = 100% Bridging

**Method Study:**
- B2 - Sandvik
- B4 - Double rings w/saw
- B5 - Slabs 2/rings
- B6 - 6/12” bark removed w/saw
Recommendations & Conclusions

When girdling was prescribed it was anticipated that there would be 90% mortality over 3 years. Upon completion of the trial 78% mortality over 3 years was attained.

Timing

The collated data indicates that girdling is more effective during the months of January, February, March, April, August, September and October. 100% mortality was attained after 3 years (refer to Table I).

No data was collected for November and December. However, it would be reasonable to hypothesize that 100% mortality is attainable during these months.

Two sample areas were established for the month of June. Varying results were compiled as follows:

1. Block A 99% mortality over 3 years.
2. Block B 14% mortality over 3 years.

Both trial sites were similar in eco type and time of logging. Therefore the mortality variation may be attributed to the quality of girdling (A mean of 60% bridging occurred on Block B). It may be possible to deduce that the quality of girdling is critical at this time. Consequently, a high quality standard must be achieved or else girdling will not be feasible during this time period. It takes longer to girdle into the wood (which creates an unstable tree, subject to blowdown) and the quality has to be 100%.

Methods

Four methods of girdling were assessed. The mortality of all the trial trees were 100%.

The method trial as was established in stands of alder girdled between January and April. It may be beneficial to set up a method trial in an area where girdling is completed during the months of May, June or July. The quality of girdling is critical during this time period. Different methods may prove to be more effective than others.
Bridging

Bridging appears to be influenced by the "timing" of girdling. No bridging occurred during the months of January, to April, September and October. During the months of May, June and July bridging was very notable. The tree vigor was good and bridging seemed to be the apparent factor (bridging varied from 10% to 90% bridging with mean of 60% bridged).

Overall the quality of work was good. However the results of the trial indicated girdling during May, June and July will be less effective unless the quality of work is 100%. To ensure the cambium has been severed the cuts should extend slightly into the wood.

The results of this trial have shown that manual girdling of red alder is an effective method of killing this species. The months of May, June and July should be avoided.

Spruce Underplanting

Nine girdled areas were fill planted with Ss Br 2+0. The first two years of growth the spruce did very poorly. A brush explosion occurred in 2 of the richer sites as a result of the girdling. Consequently the survival for these areas was less than 59%.

The survival rate for the remaining seven blocks of fill planting was over 88%. There is some brush competition therefore the trees require further brushing and weeding.

In one block where brush became a major problem an intensive brushing and weeding project was initiated. This summer (1985) a FWAP Crew (Forestry Workers Assistant Program) brushed out the immediate areas around each planted spruce tree. It was time consuming, however if each tree is staked the subsequent annual treatments will be quicker. Brushing shall continue annually until the Spruce are established.

In the future if fill planting was to occur two things should be considered. First, each tree should be staked at time of planting to aid in subsequent treatment and help protect the tree. Secondly, Hemlock and Cedar should be considered as a preferred species as they are both shade tolerant and should not take as long to establish themselves.