Sheltercone Seeding Trial in the Invermere District

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SHELTERCONE DIRECT SEEDING TRIAL

An Interim Report

November 9, 1983
Please note that this is an interim report. The final report will be completed following survival surveys and sheltercone/seedling comparisons in 1985.

OBJECTIVE

1. To bring the treated areas to a satisfactorily stocked condition.
2. To determine the effectiveness of Sheltercone Direct Seeding as an alternative to planting seedlings.

METHOD

1. Site Selection and Layout

   Three cutblocks, or portions thereof, scheduled for planting in 1983, were chosen as the experimental sites for this project. The layout was done according to the following criteria:

   a. A 20 meter buffer strip was left between the sheltercone area boundaries and any timber, to minimize rodent damage.

   b. A variety of slopes (0 - 65%) were represented over the three chosen cutblocks.

   c. Areas with moderate brush competition were selected, as seeds could rot, or fungus grow under the sheltercones if placed under too much shade. Almost the whole area had relatively heavy grass competition.

2. Rodent Survey

   A rodent survey was conducted to estimate the population ratio of rodents and their significance in the three cutblocks scheduled for the Sheltercone Direct Seeding project. See the Rodent Sampling Report (attached). The population ratios were determined to be very low or medium-sized and therefore should not have a significant effect on seeding success.

3. Seeding Procedures

   Talking Tree Forestry Contracting Ltd. completed the seeding, as well as the planting on the same openings. Douglas Fir and Lodgepole Pine PS313 plugs were planted in two of the three cutblocks, adjacent to the sheltercone sites, as a comparison, and in those areas determined to be unsuitable for sheltercone establishment due to heavy brush.
Sheltercones were established at 2.5 meter spacing. However, spot selection was of greater importance than spacing, so the 2.5 meters was deviated from, when necessary, to avoid unsuitable spots.

The stratified Douglas Fir seed (seedlot 2350) was kept cool, at 31°F, and dry until the time of seeding. The cutblocks were kept clean at all times (ie. no seed was left lying around) in order to discourage birds and rodents from discovering a new food source.

A 20 centimeter square screef to mineral soil was made with mattock or shovel. Within the screef, a very slight depression was made for the sheltercone to sit in. The mineral soil was then packed around the lip of the cone to secure it. On steeper ground, a larger screef was needed to ensure a flat spot without shade and the cone was placed at the outer edge of the screef in order to avoid damage from sluffing. Natural depressions were also avoided for the same reason. As mentioned above, cones were not placed in the shade or under heavy vegetation, if at all possible.

Three or four seeds were placed in each Cerkon transparent plastic sheltercone. A germination of 77% dictated the number of seeds per cone. The seed was dispensed into the cone from hand garden seeders.

The Cerbo Planting Tool, made by K.B.M. Forestry Consultants, was tested during the project.

4. Sampling Method

Sheltercone sample lines were set up as straight lines, delineated on the ground with yellow ribbon, and noted on maps (attached). A minimum of two hundred sheltercones per cutblock were sampled, and each of these was marked with a blue cedar stake. Every tenth stake was marked with yellow ribbon and stake number, eg. 10, 20, 30,..., and the end of the line was marked with a red stake and yellow ribbon. Sampled cones were not always directly on the line due to planting spot selection. A maximum offset of three meters was allowed. In the larger sheltercone areas, the sample line was established with space between groups of five or twenty sample cones in order to provide coverage for the total area, eg. 20 samples along the line, space, 20 samples,...

Germination and survival were checked at three weeks, six weeks, nine weeks and twenty weeks. Future survival checks and sheltercone/seedling comparisons will yield results which will be presented in the final report.

The planting contractor and Revelstoke Sawmill staff, involved in the project, were asked for their comments about operational problems encountered during their participation.
OBSERVATIONS

1. Operational

Sheltercones were not divided into rolls of a given number. Since planters are paid by the number of sheltercones used, they had to count each individual cone. This, of course, proved to be extremely time consuming.

Since scarification was not performed before direct seeding, a screef had to be made to provide a mineral soil seedbed. This precluded use of the Cerbo planting tool since a separate screefing tool would have had to be carried as well. The tool also did not compact the soil around the lip of the cone.

The 20 centimeter screef was not large enough, on these sites, to reduce competition from surrounding vegetation sufficiently, nor did it provide enough soil to pack around the lip of the cone. However, this screef of only 20 centimeters was a major time consumer.

The mattock made a screef quite easily, but did not make a good depression within the screef for the cone to sit in. The shovel was more difficult to screef with, but easily made a nice spot for the cone by twirling the tip of the shovel in the screef.

Sheltercones were not stable on road cutbanks and landings. On cutbanks, some cones were knocked off their screefs by sluffing soil, and on landings, the soil was so compacted and dry, the soil would not pack around the lip of the cone. Loose rock and pebbles on other sites did not pack well either.

The hand garden seeder became almost useless during rainy weather as any moisture at all caused the seeds to stick together. It was also very difficult to control the number of seeds dispensed per cone, no matter what the weather.

The most common observation was that the whole seeding procedure was much too time consuming. Too many steps were involved. First the planters had to locate a suitable spot with little vegetation and no shade, then screef, then prepare a slight depression for the cone to sit on, then place the cone, then shake three or four seeds into the cone, and finally, pack the dirt around the lip of the cone.

2. Germination and Survival

Sheltercones placed in exposed, flat, sunny areas had a higher percent germination than those placed on shady, northern and northwestern slopes. Seeds also germinated more quickly on these sunny sites.

Areas with more competition from vegetation had a much lower percent germination than open areas.
Seeds rarely germinated on the landings and steep roadbanks.

Sheltercones with dirt build-up inside the cone, had a lower percent germination than those free of dirt inside the cone.

Some cones had as many as six germinants in them, which supports the earlier comment that the planters had problems dispensing the correct number of seed from the hand seeder.

RESULTS

1. Germination and Survival Data
See Table 1 on page 5.

2. Discussion

Most of the sheltercones were still intact at the time of the fourth examination, although they had already begun to disintegrate and were quite brittle.

The small area on the southeastern portion of cutblock 82K16b-3 had a much higher germination percent and a corresponding higher rate of survival than the other areas in all three cutblocks. This particular area was very flat and exposed to the sun. There was a low to moderate amount of grass competition and little shrub growth.
### TABLE 1
SHELTERCONE SEEDING GERMINATION SURVEYS
SUMMARY

<table>
<thead>
<tr>
<th>PROJECT #</th>
<th>LOCATION</th>
<th>SP</th>
<th># PLANTED</th>
<th>SEEDS/CONES MIN.</th>
<th>SEEDLOT #</th>
<th>% GERMINATION OF SEEDLOT</th>
<th>% OF CONES INTACT</th>
<th>% OF INTACT CONES WITH GERMINANTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>82K16b-2</td>
<td>Pinnacle Creek</td>
<td>FD</td>
<td>7,188</td>
<td>3 - 4</td>
<td>2350</td>
<td>77%</td>
<td>96%</td>
<td>16%</td>
</tr>
<tr>
<td>82K16b-3</td>
<td>Pinnacle Creek</td>
<td>FD</td>
<td>30,295</td>
<td>3 - 4</td>
<td>2350</td>
<td>77%</td>
<td>98%</td>
<td>29%</td>
</tr>
<tr>
<td>82K16b-3</td>
<td>Pinnacle Creek</td>
<td>FD</td>
<td>20,553</td>
<td>3 - 4</td>
<td>2350</td>
<td>77%</td>
<td>99%</td>
<td>11%</td>
</tr>
</tbody>
</table>
CONCLUSIONS

Flat terrain or gentle slopes with southern exposure are more suited to Sheltercone Direct Seeding than steep, or north and northwestern slopes because of the greater amount of sunlight on the former.

The effects of scarification on Sheltercone Direct Seeding should be examined in a future study to determine if it will improve germination. Competition from heavy vegetation and slash would, of course, be reduced, if not removed entirely, and the Cerbo planting tool could then be given a fair trial.

To use the Cerbo tool, any loose duff is kicked away by the planter's boot. The tool places the cone and dispenses the seeds into the cone in one movement. Before lifting the tool away from the cone, soil is kicked up against the tool so that about one centimeter of soil remains around the lip of the cone. All this is done without the planter needing to bend over.

The procedure would still have to incorporate a method for compacting the soil around the lip of the cone.

The Cerkon system includes a sheltercone carrier which holds 300 cones. The cones should be purchased from the supplier in packages of 300 per roll.

Planters should be instructed to place the cones on spots where the dirt won't build up inside the cone and to avoid landings and steep cutbanks. They should also avoid spots where the soil won't compact around the cone.

To summarize, the project was successful in that it has shown at least one kind of site on which germination was very successful. It has shown that the Sheltercone Direct Seeding method has potential and also where improvements would make the operation more efficient.

The results of comparing direct seeding survival with planted seedling survival will be presented in a report, following final sampling in 1985.
Sheltercone Sampling Method

Sample lines were set up as straight lines.
Lines are ribboned on ground with yellow ribbon and noted on map.
Each sample cone is marked with a blue cedar stake.
Minimum 200 samples per block.
Every 10th stake has yellow ribbon with stake number. e.g. 10,20,30
End of line marked with red stake and yellow ribbon.
Due to planting spot selection sample cones may not be exactly on line. May be off by 3 m.
On larger areas there may be gaps between sampling units in order to provide coverage for total area. e.g. 20 samples along line - space - 20 samples
RODENT SAMPLING

Purpose: To estimate the population ratio of rodents and their significance in three blocks scheduled for a special sheltercone direct seeding project.

Theory: According to the Ministry of Forests Silviculture Manual, a population ratio of 1 rodent: 10 or less trap-nights is high, and 1.5 will probably have a serious effect on the success of the seeding project.

Method: Fifty (50) household-type mousetraps were baited with peanut butter and set in representative spots of each designated sheltercone area. The traps were checked each day for three (3) successive days and the catch recorded. Any sprung traps were rebaited and reset.

Calculations: Population Ratio = Total no. of rodents caught / No. of trap nights (where No. of trap nights = no. of traps x no. of nights)

Refer to Rodent Sampling Results for actual results and calculations.

Conclusions: The following population ratios were obtained:

- C.P. 37 BLK 2 (P82K16B-2) - 1:15 (medium-sized population)
- C.P. 37 BLK 3 (P82K16B-3) - 1:50 (very low population)
- C.P. 37 BLK 4 (P82K16B-4) - 1:14 (medium-sized population)

The results of this survey indicate that rodents should not have a serious effect of seeding success, especially in C.P. 37 BLK 3.