REPORT SX 86107 N

INTERIM
FINAL
DATE 1986-08-19

TITLE Aerial Seeding of Gipsy Fire

Report prepared by: [Signature]
C. Newsome

Report & Distribution approved by: [Signature]
B. McNaughton

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Invermere District
Nelson Region
Silviculture Branch

Approved:
Manager - [Signature]
D.L. Oswald

(Typed)
To: C. Thompson
Nelson

Date: November 26, 1985

File: SX Trial

RE: Aerial Direct Seeding SX Trial No. $4x{86107N}$
Giby Fire - North White River

Technician I/C: G.A. Newsome, R.P.F., Ministry of Forests, Invermere
Location: Giby Fire on the North White River
Region/District: Nelson/Invermere

Objective

Reforestation of high elevation inaccessible sites with Lodgepole Pine (Pinus contorta) via a helicopter aerial seeder.

Status

Spraying of seed took place between October 30 and November 6, 1985, but germination and reforestation surveys are still outstanding.

Purpose

The purpose of this project is to test the operational feasibility of high elevation aerial seeding of recent wildfires. To compare the germination of the Lodgepole Pine over the various ecological associations encountered on the sidehill.

Site Description

The GIBY FIRE burnt during the summer of 1985. Fire intensity was hot over most of the area, and gained in intensity as it moved up the slope. The direct seeding area is located on the east side of the North White River, near the top of the slope. The area lies above the salvage line indicated by Crestbrook Forest Industries, but below the Forest Service operability line.

The original timber types were primarily large diameter Spruce, with a minor Balsam and Lodgepole Pine component. Understories consisted of small Spruce and Balsam, with a dense Menziesia Ferruginea brush layer. The fire was intense enough to kill all the timber and remove practically all of the duff layer. All of the brush layer was removed as well as a major portion of the coarse materials.

...2
Site Description (con't)

Please refer to the attached map for location of the aerial direct seeding trial.

Mineral Soil Surveys

Mineral soil surveys were completed over two portions of the seeding area, using the FS 738 Seedbed Assessment Form. Seedbed was assessed based on six categories:

a) Mineral soil and duff less than 1 cm.
b) Burned – burned duff layer greater than 1 cm.
c) Disturbed – upturned tree roots and soil mixing.
d) Other – moss, rotten wood, etc.
e) Undisturbed
f) No seedbed – rock, water, etc.

Total mineral soil exposure, category a), as measured from the surveys was 82.2%. The duff layer over most of these plots was reduced to a greasy black ash. An additional 4% of the plots had red wood exposed. Coarse materials were reduced to a few scattered accumulations.

Method

Aerial seeding using a helicopter was decided as the best means due to the contours of the area to be seeded, and also the availability of the seeding equipment. The Fire Rehabilitation program was using a prototype belt feed seeder from the Kamloops Region. The seeder has a fully adjustable belt speed, so seed application rates can be fine tuned.

Seeding rate

Flying speeds were discussed with the pilot, Ron Hall of Frontier Helicopters, with consideration to terrain and uniform coverage. A speed of 40 mph or 64 kmph was agreed upon. Initial test swathes with the seeder at the 40 mph speed showed widths of 13 and 16 meters. A width of 15 m. was used for determining application rates.
Seeding rate (con't)

64 kmph = 1066 metres/min. with 15 metre width = 1.6 ha/min. so an application rate of .5 kg/ha., as outlined by Silviculture manual would take:

\[
\frac{.5 \text{ kg/ha.}}{1 \text{ ha}} = \frac{X}{1.6 \text{ ha}} = .5 \times 1.6 = .8 \text{ kg/min.}
\]

So a 20.7 kg box of seed should take 25 minutes and 53 seconds to spread.

Initial loads of seed had high losses due to helicopter rotor turbulence blowing seed out through the front trap gate, even when the gate was fully closed due to an uneven base on the trap door. A minor modification of the gate mechanism allowed for full closure of the gate and a substantial reduction in wind loss. Belt speed was adjusted to arrive at our desired application rate.

Seed

The dispersed seed was the balance from two Golden seedlots.

<table>
<thead>
<tr>
<th>Seedlot</th>
<th>Weight</th>
<th>Elevation</th>
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</thead>
<tbody>
<tr>
<td>2167</td>
<td>63 kg</td>
<td>1311 m</td>
</tr>
<tr>
<td>2272</td>
<td>134 kg</td>
<td>1128 m</td>
</tr>
<tr>
<td>Total</td>
<td>197 kg</td>
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</table>

The seed is elevationally low for this site, but was felt to be within a reasonable difference. The seed was collected in 1972 and 1973 for seedlots 2167 and 2272 respectively, and was classified as B5 seed. As this seed is the balance of the two seedlots, and the increased difficulty of seeding separate areas, no delineation of seedlots was maintained. Generally the low elevation seed was seeded on the lower portions, but some mixing may have occurred.

Pre-Treatment of Seed

As the seed was dispersed onto the snow pack in the fall, no special pre-treatment of the seed was necessary. Natural stratification of the seed should occur in the snowpack, and the seed should be ready for germination in the spring following snow melt.
Ecological Association

The Gibly Fire is located in the Dry Southern Cordilleran Forested Englemann-Subalpine Fir subzone, ESSFa. The associations were difficult to determine due to the lack of indicator species. It was felt that three associations exist over the seeding area.

1) ESSFa1 Menziesic-Orthillia along the moister creek draw. Total area of approximately 24 ha.
2) ESSFa2 Juniperus-Calamagrostis along the upper portions of the creek draw. Total area of approximately 158 ha.
3) ESSFa3 Shepherdia-Arncia along a major portion of the ridge faces. Total area of approximately 227 ha.

Total area is 409 ha. Refer to attached map for the location of the Ecological Associations.

Sampling Procedures

During seeding, two seed traps were laid out consisting of thirteen circular drums. The drums were spaced at intervals of one metre between drums and placed in the form of a cross. Each drum has a diameter of 29 cm. and an area of 660 cm² or 0.0000066 ha. Multiplier for seeds per drum to seeds per hectare is 151,515.

Sample Drum Calculation

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<tr>
<th>Drum</th>
<th>Sample 1</th>
<th>Density (Seeds/Ha)</th>
<th>Sample 2</th>
<th>Density (Seeds/Ha)</th>
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</tbody>
</table>
C. Thompson  
November 26, 1985  
Page 5  

Sample Drum Calculation (con't)  

Sample 1 - Average Density 279,720 seeds/ha = .85 kg/ha  
Sample 2 - Average Density 69,930 seeds/ha = .21 kg/ha  
Average between plots = 174,825 seeds/ha = .53 kg/ha.  

Follow Up Surveys  

Follow up germination and regeneration surveys will be scheduled for 
this area. Germination surveys will be established in late spring and 
early fall of 1986 at an intensity of 1 plot per 5 hectares. A 
germination survey will be established in 1988 to assess stocking 
status.  

A summary by ecological association for germination and for regeneration 
will be compiled.  

Project Costs  

For daily cost breakdown refer to attached summary.  

Total cost  
Manpower $ 1,441.70  
Helicopter 10.3 hr x $350.00 3,605.00  
Helicopter fuel 1030 l. x .49  504.70  
Expenses - chaincase oil 16.95  
Tree Seed $635.00 x 197 kg.  125,095.00  
Total $130,663.35  

Total area seeded 409 ha. 
Cost/ha $319.47 including seed costs. 
Cost/ha $13.62 for spraying seed.  

Summarization and Comments  

The cyclone belt fed seeder was quite effective for our seeding purposes, 
and was felt that it could be used for application rates less than .5 
kg/ha. Helicopter costs could have been reduced somewhat, if weather 
conditions had not deteriorated, causing us to abandon seeding on a 
couple of occasions.  

Using the seed costs provided by Victoria, this type of project appears 
to be in the same area as planting, but I believe future seed 
collections will cost substantially more. The main measure of 
effectiveness is percentage germination and survival.  

\[Signature\]  

Guy Newsome  
R/A Silviculture  
/gk  

attachment
August 25, 1987

File: 995

Ministry of Forests & Lands
Silviculture Branch
1450 Government St.
Victoria, B.C.

Attention: C. Clarke, SX Trial Coordinator

Dear Sir:

Re: SX 86107 N Aerial Seeding of Giby Fire

Germination surveys on the aerial seeded area were conducted during August 24, 1987 on openings 82J034 - 21/22/23.

No germination was observed during walkthrough and survey of the area. A follow-up walkthrough and low intensity survey of the aerial seeded area is recommended for 1989.

If you require any information on this SX trial, please do not hesitate to contact me.

Yours truly,

C. Beliveau
Resource Officer Silviculture

CE/Id

:0416A

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SEP 01 1987
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