Treatments for Rehabilitating ESSF Backlog Brushfields Phase I: Problem Analysis and Selection of Study Sites - Project No. 1.17

The Engelmann Spruce - Subalpine Fir (ESSF) Biogeoclimatic Zone presents a silvicultural challenge for backlog and current reforestation. Silviculture history records indicate that more than 39,000 hectares of NSR exist in the ESSF of northern interior B.C. This NSR accounts for almost 50 percent of the total ESSF denuded within the northern interior during the past 35 years. This extremely poor regeneration record led the Northern Interior Technical Advisory Committee (NITAC) to initiate a major project aimed at developing treatments for rehabilitating backlog areas in the northern ESSF.

Phase I of Project 1.17 (now completed) was a problem analysis to examine the scope and causes of the backlog reforestation problem in the northern ESSF, to recommend research needs, and to locate suitable sites for a subsequent rehabilitation trial and demonstration area.

Anna Scagel, of Pacific Phytometric Consultants, was hired to carry out the analysis that involved three distinct activities:

1. sampling and classification of NSR vegetation communities;
2. examination of silviculture history records to determine land status; and
3. meetings with silviculturists to discuss site treatments and rehabilitation problems in the ESSF.

Information on land status and silvicultural experience within the ESSF was drawn from the Prince George and Prince Rupert Forest Regions, and Quesnel District of the Cariboo Forest Region, but field sampling for the study was restricted to the northern ESSFh1 variant in the Quesnel and Prince George East Forest Districts.

NSR vegetation communities in the ESSFh1

Vegetation sampling identified 10 NSR herbaceous and shrub communities in the northern ESSFh1. These communities occur both on untreated areas and on areas receiving a variety of site treatments.

Herbaceous communities (fireweed dominant; shrubs <10% cover)

1. *Epilobium* fireweed
2. *Epilobium-Athyrium* fireweed-lady fern
3. *Epilobium-Equisetum* fireweed-horsetail

Mixed herb and shrub communities (fireweed dominant; shrubs >10% cover)

4. *Epilobium-Rubus parviflorus* fireweed-thimbleberry
5. *Epilobium-Lonicera involucrata*

Shrub communities (shrubs dominant)

6. *Rhododendron-Vaccinium membranaceum* rhododendron-black huckleberry
7. *Alnus viridis* Sitka alder
8. *Populus tremuloides* aspen
9. *Rubus parviflorus* thimbleberry
10. *Salix* willow

Causes of ESSF backlog brushfields

Four major causes of backlog NSR in the northern ESSF were identified. These were:

- reliance on natural regeneration;
- lack of effective site preparation;
- failure to deal with competing vegetation; and
- seedling and planting quality problems.

Environmental constraints to successful reforestation

The severe environment of the ESSF contributes to plantation failure by placing severe climatic stresses on young seedlings. Examples of these stresses include wet soils from snowmelt and heavy summer rains, low soil and air temperatures, and physical damage to seedlings from heavy snow. The climate also greatly limits the range of treatment options available to silviculturists. The short, wet growing season provides only narrow windows for burning and spraying, restricts the planting season, and causes poor machine trafficability on wet soils. Physical site characteristics within the ESSF further limit silvicultural options. Examples include steep terrain and shallow, erodable or easily compacted soils that restrict machine use, and frequent water courses that limit the use of chemicals.

Management constraints to successful reforestation

NSR problems within the northern ESSF can also be blamed on lack of knowledge, shortages of resources, and
poor reforestation planning. Silvicultural experience at high elevations is limited, and extending experience from the lower elevation SBS zone is not always effective. In the past, silviculturists often underestimated the rate at which competing vegetation develops within the ESSF. This led to a lack of site preparation, delayed planting, and an absence of follow-up brushing treatment. Poorly conditioned stock and poor stock handling and planting practices also contributed to regeneration failure.

Effectiveness of rehabilitation efforts

The study found few examples of silvicultural treatments to rehabilitate NSR brushfields in the northern ESSF. However, early results indicate that some treatments show promise for reforesting these harsh sites.

Planting without site preparation

Attempts to establish plantations without site preparation have generally failed.

Mechanical

V-plows, C&H plows, brush blades, and large mounders have been used to provide plantable spots and reduce vegetation competition. Revegetation occurs within 2 to 5 years depending on severity of site treatment and site characteristics. Soil degradation is a common problem. Brush blading followed by grass and legume seeding has been reported as effective for plantation establishment on some sites. Mechanical treatment in combination with herbicide application has also been used.

Herbicides

Experience with herbicide application in the northern ESSF is too limited to draw firm conclusions. Glyphosate and 2,4-D have both controlled common ESSF brushfield species.

Burning

Slash-and-burn and pile-and-burn treatments have had variable success on NSR sites with abundant tall woody vegetation or residual subalpine fir. Brown-and-burn treatments (using glyphosate) have been used for vegetation control on a few sites with variable success.

Grazing

Managed sheep grazing shows promise for control of some herbaceous species, especially fireweed. Additional study of long-term effects is needed.

Silviculturists practising within the northern ESSF contributed a variety of suggestions for rehabilitating existing backlog areas and for preventing future NSR. A series of research recommendations were also produced. Using this information, a plan was developed for Phase II of the project. Phase II is designed as a benchmark trial to test, evaluate, and demonstrate a wide variety of possible options for achieving free-growing plantations on backlog brushfields in the northern ESSF zone. This trial is described in Research Memo No. 054.

For further information on Phase I, contact:

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