THE EFFECTS OF A CONIFER RELEASE AND JUVENILE SPACE ON NORTHERN INTERIOR SPRUCE UNDER A WILLOW-ASPEN-BIRCH CANOPY IN THE FORT NELSON TSA

INTRODUCTION:

Along the Fort Liard-Fort Simpson highway there are a number of stands that are comprised of age class 1 or 2 Populus Tremuloides (Trembling Aspen) or Non-Commercial Brush that have a dense understory of Picea glauca (Interior White Spruce). Upon seeing this condition, the assumption can be made that the spruce is suffering from competition in two forms. The first form of competition is the aspen, birch, willow and/or alder is limiting the amount of direct light and its intensity (amount of photosynthetic radiation), the amount of moisture and nutrients available to the understory spruce. The second form of competition is created by the high density of the spruce under the aspen, this creates a number of limiting factors to the growth of spruce (lack of light, moisture and nutrients). With this type of two-layered competition a trial will be established to determine the effect of a conifer release and juvenile space on the understory spruce and its response to a total and partial removal of the hardwood canopy coupled with various spacing regimes.

OBJECTIVES:

The objectives of this specific Sx trial are as follows:

1) Determine the physical effect of a total conifer release and partial conifer release (maintain 75%-50% hardwood cover) on the understory spruce.

2) Determine the effect of a juvenile space on the understory spruce following a conifer release.

3) Monitor the response of the understory spruce to the conifer release and juvenile space.

4) Monitor the amount of direct light, its intensity, the amount and quality of photosynthetic radiation that is made available via the various treatments to the spruce.

5) Establish growth plots to provide ongoing valuable growth information on the response of spruce to the conifer release and juvenile space.

6) Provided with the above information, be able to further understand and interpret the ecology of the aspen-spruce interaction in the Boreal Forest.
MATERIALS:

1) Spacing crew and equipment.
2) Light sensors to determine the amount, intensity, and quality of light.
3) Thermometers to determine air temperatures at three levels throughout the canopy.
4) Equipment necessary to determine the soil climate profile.
5) Equipment necessary to establish permanent growth plots.
6) Pictures of single trees, over a period of years, to provide a visible growth history of the treated versus untreated.

EXPERIMENTAL DESIGN:

The trial consist of three levels:

<table>
<thead>
<tr>
<th>Level</th>
<th>Total Hardwood Removal:</th>
<th>Partial Hardwood Removal (25-50% Hardwood Canopy Removed).</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Treatment #1 3.0 m. X 3.0 m. spacing</td>
<td>Treatment #1 3.0 m. X 3.0 m. spacing</td>
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<td></td>
<td>Treatment #2 2.5 m. X 2.5 m. spacing</td>
<td>Treatment #2 2.5 m. X 2.5 m. spacing</td>
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<td>Treatment #3 2.0 m. X 2.0 m. spacing</td>
<td>Treatment #3 2.0 m. X 2.0 m. spacing</td>
<td>Treatment #3 2.0 m. X 2.0 m. spacing</td>
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<tr>
<td>B</td>
<td>Partial Hardwood Removal (25-50% Hardwood Canopy Removed).</td>
<td>Treatment #1 3.0 m. X 3.0 m. spacing</td>
<td>Control</td>
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<td>C</td>
<td>Control</td>
<td>Treatment #1 3.0 m. X 3.0 m. spacing</td>
<td>Control</td>
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Each treatment is one hectare in size (100 m. X 100 m.) with a corresponding control of the same dimensions. Each treatment will have two growth plots established and all data will be collected at these plots.

DATA COLLECTION:

Data Collection will be performed by Ministry of Forests personnel (ie. District Silviculturist). Height and diameter growth information will be collected once a year, preferably in the fall (after the cessation of growth). Data collection within the growth plots will be very similar to data collection in growth and yield plots. The light and air temperature data will be collected at three levels within the stand (1) upper canopy (2) mid-canopy (3) lower canopy. This will be performed three times throughout the growing season (early spring, late June and late August) and based on a clear day/normal overcast day scenario. Soil temperature and climate data will be collected simultaneously with light and air temperature data.
MAINTENANCE:

The brush reinvasion (via suckering and sprouting of hardwoods species) will be monitored and an assessment will be made when to brush the various treatments out. This will be carried out by the Ministry of Forests in Fort Nelson through hired summer staff and/or permanent staff.

RESPONSIBILITIES:

The District Silviculturist in Fort Nelson District will be responsible for the project layout, to monitor the conifer release and juvenile space, establish growth plots and be involved with the data collection. The assimilation of the data will be organized and accumulated by the District Silviculturist.