

## Comparing Plant Ecology and Seedling Survival and Growth In a Landscape altered by Wildfire

### Project Summary and Preliminary Findings

**INTRODUCTION:** With the continuing increase in global temperatures, the frequency and intensity of forest wildfires is a concern across British Columbia. Although wildfires are a key natural disturbance, facilitating the regeneration of many forests, the impacts these disturbances can have on seedling regeneration are of interest to the College of New Caledonia’s Research Forest.

**OBJECTIVES:** This study is intended to increase the understanding of differences in plant ecology and conifer seedling survival and growth within a wildfire area. This project examines response in differing tree species, including novel species that may be selected for future reforestation within the current SBS wk1 subzone based on climate change predictions.

**METHODS:** In summer 2018, a research trial, consisting of seven species of seedlings planted in an area impacted by wildfire (mesic soil regime), was established within Research Forest Unit D, cutblock D-1, north of Prince George. Expanded in 2019 to include a hygric soil regime, six native tree species of British Columbia were planted. Both a wildfire and control treatment (natural, clearcut site) with similar slope, aspect, and elevation were established to monitor seedling growth, survival/vigour, vegetation regeneration (abundance, diversity) and microclimate differences.

Mesic Site (2018)	Hygric Site (2019)
Spruce	Spruce
Lodgepole Pine	Lodgepole Pine
Douglas-fir	Douglas-fir
Western Larch	Western Red Cedar
Subalpine Fir	Subalpine Fir
Western White Pine	Western White Pine
Ponderosa Pine	

**RESULTS:** Early data collections shows the following:

- **Mesic Trials:** In 2018, a mean annual increment growth comparison across treatments within the mesic site showed greater growth among spruce, Douglas-fir, lodgepole pine, and subalpine fir ( $P < 0.05$ ) within the wildfire treatment. No significant differences were detected among western larch ( $P = 0.6558$ ), western white pine ( $P = 0.9215$ ) and Ponderosa pine ( $P = 0.7877$ ) seedlings. In 2019, significant differences were detected among all species ( $P < 0.05$ ), with greater growth in the wildfire treatment. Overall survival among seedlings planted within the wildfire and control treatment (mesic site) was 94.7% and 88.2% respectively, with lowest survival rates detected among western larch (66%) in the control treatment.
- **Hygric Trials:** Significant differences among spruce seedlings ( $P = 0.0314$ ) between the wildfire and control treatment were detected within the hygric site. No further significant differences were noted. Cumulative survival among all species planted in the wildfire and control treatment was 97.7% and 98.3% respectively. No notable mortality events were detected
- Highest diversity of vegetation species was noted in the hygric control treatments (26 species recorded). Bare ground, fireweed and red elderberry coverage dominated both wildfire treatments.
- Highest soil moisture content was recorded within the control area at both the mesic (2018, 2019) and hygric sites, while highest soil temperatures were recorded in the wildfire treatments (1-2°C warmer)
- Relative humidity values obtained were highest within the control areas in both the mesic and hygric sites, although a notable increase in relative humidity from 2018-2019 was observed to occur at the mesic wildfire treatment.
- Temperatures, obtained at 0.2m above ground, were highest among the mesic wildfire treatment in 2018. In 2019, higher temperatures were observed at the mesic control treatment. Temperatures obtained at the hygric site indicated temperatures at the wildfire treatment were higher at 0.2m (1-2°C warmer). While little variation among temperatures at 2.4m was recorded across all sites, slightly higher maximum daily temperatures were noted at the control treatment located within the hygric soil regime



Western Larch seedling planted among the mesic wildfire treatment