

## ***Vegetation Team: Seismic Line Geometry Affects Microclimate and Tree Regeneration***

### **Caroline Franklin, PhD**

University of Alberta, Department of Renewable Resources  
cfrankli@ualberta.ca

### **Research Team:**

Scott E. Nielsen and Angelo T. Filicetti  
University of Alberta, Department of Renewable Resources



### **Project Summary**

Abiotic factors associated with seismic lines could alter biotic responses, including tree recruitment. Here we examine light intensity, air temperature, and relative humidity within seismic lines and adjacent forests: 1) to compare abiotic conditions between the centrelines of wide (6-8 m) and narrow (3-4 m) seismic lines; 2) to quantify microclimatic edge-effects of seismic lines of different widths and orientations; and 3) to relate patterns in tree regeneration density to local patterns in the abiotic environment altered from these disturbances. Our results demonstrate that edge effects on the microclimate of seismic lines were most pronounced in wider seismic lines and along north (south-facing edges on east-west lines) and east (west-facing edges on north-south line) forest edges. Light intensity on north edges of wide and narrow seismic lines was 2.8 times and 1.7 times, respectively, higher than light intensity on south (north-facing) edges. Edge effects on light intensity extended up to 5 m into the forest for wide lines, but were restricted to the forest edge of narrow lines. Tree regeneration was highest where light intensity was highest (the centrelines of wide north-south seismic lines) with a 10-fold increase in light intensity resulting in 5.8 times more regenerating trees.

### **Management Implications and Lessons Learned**

Seismic line width and orientation affect abiotic factors within linear disturbances and up to 10 m into the adjacent forest. Patterns in tree regeneration are most relating to local patterns of light associated with orientation and width of these lines. This research contributes to a better understanding of the effects of seismic line width, orientation, and edge creation on light, temperature, humidity, and tree regeneration. Results provide insight into the abiotic factors influencing natural forest regeneration patterns and processes on seismic lines.

### **Publication(s)**

Caroline M.A. Franklin, Angelo T. Filicetti, Scott E. Nielsen. (2020). Seismic line width and orientation influence microclimatic forest edge gradients and tree regeneration. [in prep.]