Boreal Ecosystem Recovery & Assessment
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INFLUENCE OF MICROTOPOGRAPHIC COMPLEXITY AND DEPRESSION ON SEISMIC LINE FOREST REGENERATION

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Project summary

The mechanized creation of seismic lines is thought to depress and simplify the microtopography leading to a reduction in tree regeneration through removal of microsites. These alterations to microtopography are likely a main contributor for arrested regeneration observed in treed peatlands that are prone to flooding. The objectives of this study are to compare microtopography between seismic lines and adjacent forest controls and assess whether it affected patterns in forest regeneration. We used a ZIPLEVEL PRO-2000 High Precision Altimeter to measure the elevation profile (25 cm increments) along the main seismic line axis, its perpendicular profile and respective adjacent transects. Tree regeneration was measured within 1-m wide belt quadrats along these same transects. Results show that seismic lines on average lose ~20% of their microtopographic variation and become depressed in topography by 8 cm on average. Fires do alter both the microtopography and depressions observed, but not to a significant degree. Microtopography does influence tree regeneration, but not in a direct or easily observed manner. Microtopography is more influential in fens and likely alters areas initially dominated by trees to that of shrubs depending on several factors, but most likely depth-to-water level.

Progress to date

In 2017, we assessed microtopography and tree regeneration at 102 paired treed peatland sites (seismic vs. adjacent forest control) in northeastern Alberta. Analysis is complete and a manuscript is in preparation and is anticipated to be submitted by the end of 2018.

Management implications

Seismic lines in treed peatlands are a major concern as they are the ecosites with the poorest, if any, leave-for-natural regeneration, in many cases staying open (treeless) for over 50 years. Results from this study will have the ability to inform government and industry regarding where attention to microtopography should be focused and if leave-for-natural regeneration will occur or whether silvicultural restoration treatments that manipulate microtopography are required. One form of restoration now commonly used is to add microtopographic variability is through artificial mounding, but these treatments are difficult to apply and expensive (in excess of $12,000 per km). It is our hope that results from this study can be utilized to decide where such treatments need to be applied and where restoration efforts may be reduced and where restoration dollars may be used most effectively.

Geographic location

The study area stretches from Wandering River in the south to McClelland Lake in the north (area along Hwy 63) and from Conklin to Fort McMurray (area along Hwy 881) in northeastern Alberta.