Boreal Ecosystem Recovery & Assessment
An NSERC Collaborative Research & Development Program

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Project summary

Linear disturbances have implications for species at risk in the boreal forest due to habitat removal, degradation and fragmentation. The Canada Warbler (CAWA) is a federally threatened songbird which has had population declines of over 43% since 1997. This project will determine the behavioral response of CAWAs to seismic lines at different stages of recovery and assess the bioacoustic techniques used to measure this response at the local scale. The objectives are to: (1) Determine how CAWAs use space around seismic lines, (2) identify how vegetation regeneration influences this response, and (3) verify whether novel approaches to bioacoustic analysis are necessary to determine responses at a local scale. We conducted acoustic localization by deploying 46 grids of GPS time-synchronized SM3 song meters across seismic lines at different stages of regeneration. This achieved precise locations of singing events with minimal human disturbance. Vegetation surveys were conducted along the disturbance and in the adjacent forest to assess regeneration. In comparison with acoustic triangulation, the filtered root-means-squared amplitude of CAWA vocalizations detected by the same grids will be used to identify position relative to the disturbance. Localization results to date shows that proximity to the linear feature increases with cover of beaked hazelnut and deciduous tree species (ie. Trembling Aspen and Balsam Poplar).

Progress to date

Local scale bioacoustic and vegetation data was collected from 2016-2017. 105 rapid point counts were conducted, and 46 grids were deployed with detailed vegetation surveys. All rapid point counts have been validated for CAWA presence and site photos reviewed to assess level of regeneration and the severity of a human disturbance pathway. Over 9000 CAWA vocalizations were detected using a species-specific recognizer across 29 of the grids. Localization was completed for all detections within a single day for each site. From this, distance to the linear feature and percent of detections within 5m buffers was calculated and compared against a random distribution of points. Vegetation variables were assessed and summarized using Pearson's correlation and PCA. Next steps are to complete the analysis and finalize a draft for the first chapter

Management implications

Linear features are a challenge to environmental managers because of their unnatural design and extensive footprint. The resulting lag between the creation and restoration of linear features causes a persistent disturbance on the landscape which will continue into the conceivable future. Species conservation requires that critical habitat be defined within the industrialized zone to promote mindful land-use planning concurrent with industry growth. Understanding edge use by Canada Warblers will contribute to this goal and inform reclamation standards by helping to define when a linear feature is recovered from an ecological perspective.

Geographic location
Lac La Biche and Lesser Slave Lake