Boreal Ecosystem Recovery & Assessment
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ECOLOGICAL TEAM FALL 2017: *SOUND LOCALIZATION FOR ACOUSTIC MONITORING OF BIRD POPULATIONS IN RESPONSE TO FIRE AND OIL EXTRACTION*

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Project summary

Assessing the impact of natural and anthropogenic habitat alteration on bird populations requires approaches at various spatial scales. Sound localization is a promising technology for assessing these impacts at small spatial scales. Localization uses an array of multiple microphones to triangulate the precise location of a singing bird. In doing so, it allows birds to be tracked throughout the day without the presence of a human observer. Localization technology remains an emerging technology, and various methodological questions remain before it can be widely adopted. For instance, localization methods differ in their accuracy and equipment requirements, so assessing the strengths and weaknesses of the different methods is of great practical importance. My research has two goals: 1) to streamline the sound localization process by refining the hardware and software involved; and 2) to apply this technology to assess how energy sector activity and forest fires influence the habitat use and movements of two species of conservation concern: the Rusty Blackbird and the Yellow Rail.

Progress to date

I began work on this project in October, 2017. Thus far, I have conducted a survey of sound localization techniques to assess the potential strengths and weaknesses of different approaches. There appears to be no "free lunch", in that more accurate methods appear to require bulkier recording equipment. However, this is more of a reflection of current commercially-available hardware that is poorly designed for localization. I am exploring alternative hardware options to arrive at a solution that will be accurate, lightweight, field-hardy, and easy to use. Once hardware has been selected, I will collect experimental recordings and focus on streamlining the analysis of the data. Field deployments to survey birds will begin in summer, 2018.

Management implications

Most bird survey methods require humans to be present in the field. These methods have various shortcomings, including being restricted to very short periods of time, providing coarse estimates of habitat use, and being potentially biased by the presence of a human. Localization can increase the spatial resolution and temporal coverage of location estimates, while removing the need for human observers. In doing so, localization promises to provide unprecedented insights into the responses of birds to anthropogenic disturbances, which is crucial for designing appropriate mitigation and remediation strategies.

Geographic location

The field component of this research will take place in the lower Athabasca region of Alberta in suitable Yellow Rail and Rusty Blackbird habitat.