



Boreal Ecosystem
Recovery & Assessment
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ECOLOGICAL TEAM FALL 2018: *MONITORING RESPONSES OF BIRDS TO ANTHROPOGENIC HABITAT DISTURBANCES USING SOUND LOCALIZATION*

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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 various bird species.

Progress to date

I used existing data from playback experiments to test the localization accuracy of two localization algorithms: an older, commonly-used program called XBAT, and a newer algorithm called MSRP. Results showed that the MSRP method was far more accurate, localizing sound sources to within 2m of their true location. This algorithm has since been efficiently incorporated into our workflows via Matlab. On the hardware front, I will soon be receiving new recording units from a company in Australia, which promise to miniaturize our localization apparatus by a factor of five. This will allow localization to be deployed more widely and with less effort. Testing this new equipment will occur in the coming year. In terms of fieldwork, I have primarily used existing data collected by Jocelyn Gregoire to explore the responses of Red-eyed Vireos to seismic lines. Data processing is ongoing, but preliminary results show that birds regularly cross seismic lines, but rarely sing from the line itself.

Management implications

Localization can increase the spatial resolution and temporal coverage of bird survey data, 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. The finding that Red-eyed Vireos seldom sing from seismic lines suggests that seismic lines may represent a small-scale, yet geographically widespread, form of habitat degradation for this species.

Geographic location

Field work has taken place in the lower Athabasca region, in the area between Lac La Biche and Conklin, AB.