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Project summary

There is growing awareness that environmental effects can be created by human caused noise. Noise generated by road traffic, construction, and production by energy infrastructure can reduce the quality of adjacent forest. For songbirds, the transmission of their song is fundamental for their breeding success and survival, since their communication relies on acoustic cues. How important noise is relative to physical disturbance of habitat remains unclear. As well, some species seem to be far more tolerant of noise than others. Why is not fully understood. Some urban species seem to adjust their songs, usually by shifting to higher frequencies or the production of louder songs. There is evidence supporting the idea of song structure adaptations to deal with urban noise, but there is little research addressing the effect of chronic industrial noise in bird songs. Using common songbirds species that inhabits the Alberta boreal forest during the breeding season, I will study their vocal characteristics and their preference establishing territories close or far from noise sources (e.g. compressor stations) and industrial sites (Big Grids) created by the oil sands industry in Northern Alberta. A focal species, the Lincoln's Sparrow, seems to have stable populations in the boreal forest in areas with high physical footprint but whether they are impacted by noise is less clear. I plan to create a tool that assess which species are impacted by noise and the relative importance of noise relative to physical footprint to help in identifying appropriate mitigation options.

Progress to date

Using data from our 14 BIG GRIDS (areas of 36 km² with 100 sampling locations in each grid), I have analyzed the occupancy for two songbird species. I also studied the song features of eight species and how the morphology of their beaks could explain sensitivity to chronic noise. Several experiments have been designed to assess if and how Lincoln's Sparrows adapt to noise.

Management implications

Some species of birds are negatively affected by energy sector footprint while some actively use pipe lines, well pads, and seismic lines as habitat. This is to be expected as some species of birds prefer early seral conditions. However, activities related to the oil gas industry that are adding noise, such as compressor stations, roads, and construction might be affecting communication which is more likely to have a generalized negative effect. To date we have found large effects of noise on birds in mature aspen forest, limited effects of noise on owls, and limited effects on amphibians. This study will focus on bird species that use early seral habitats and wetland environments which should help us generalize the impacts on noise.

Geographic location

Lac La Biche and Conklin, Alberta, Canada.

