2020 Project Summaries
Boreal Ecosystem Recovery & Assessment
An NSERC Collaborative Research & Development Program

Wildlife Team: Multi-source Remote Sensing Improves Bird-Habitat Models

Lionel Leston, PhD
University of Alberta, Department of Biological Sciences
leston@ualberta.ca

Research Team:
Gustavo Lopez Quieroz[1], Mustafizur, Silvia Losada[1], Erin Bayne[2], Julia Linke[1], Greg McDermid[1]
[1]University of Calgary, Department of Geography
[2]University of Alberta, Department of Biological Sciences

Project Summary

Different remote sensing products described various elements of vegetation conditions. In many cases, ecologist use a single remote sensing product under the premise the approach is consistent. However, no one remote sensing layer describes all the properties of forest stands and there may be benefits in using more than one remote sensing product when modelling species-habitat relationships. We evaluated how effectively three remotely sensed products predicted bird abundance including:

1) Alberta Vegetation Inventory which provides fine-grained descriptions of forests at large extents but are very costly to update;
2) Remotely sensed MODIS data that is frequently updated and available over large extents but usually at coarser grains;
3) Aerial Light Detection and Ranging (LiDAR) that is very fine-grained but is not always available at broad extents.

We used *N*-mixture models and Akaike's Information Criterion to evaluate how well different kinds of spatial data (AVI, MODIS, LiDAR) predicted abundance of 21 boreal forest bird species in northern Alberta, and whether or not a composite model using predictors from the three products predicted abundance better than any single spatial layer. We found that for most analyzed species, composite models with at least 1 variable from each of 2 or more layers were more parsimonious in predicting bird abundance.

Management Implications and Lessons Learned

There are different advantages and disadvantages to using AVI, MODIS, and LiDAR to measure habitat availability for different species of wildlife. LiDAR was most commonly the additional layer that improved models for birds. Satellite-based data are cheaper to collect and process but regularly provided information that AVI did not. To effectively assess the overall state of the oilsands region for birds, a regular and standardized collection of LiDAR is needed.

Publication(s)

A publication is in preparation for submission Fall 2020.