**Acoustic monitoring with occupancy modelling: biodiversity hotspot mapping for conservation management**

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# Abstract

# Introduction

Objective 1: Provide a biodiversity hotspot map based on acoustic monitoring and occupancy modelling, demonstrating the potential of passive acoustic monitoring in large scale landscape management

Objective 2: Provide a framework for how to process such dataset

# Methods

## Study area, acoustic monitoring and data processing

Introduction of JPRF, ARU effort and BirdNET processing parameters

ARU data were collected from 2020, 2021, and 2022 between April to July, with consistent time schedule 4 am to 7 am, 1 min on, 4 min off. There were in total 66 ARU set up across the JPRF forest station. The number of functioning ARUs varies given the time needed to set up ARUs in sites, and ARU failures (batteries dead, unites taken down by wild animals). ARU data were analyzed by BirdNET-Lite version, with parameters set (lon, lat, week).

## Target bird species and validated detections

1. How did we get the total number of species based on all detections – use the general high threshold and then manual validation – provide a species list
2. How to set BirdNET species-specific threshold to reach precision higher than 0.95 for all species – provide the protocol of how we do the species-specific threshold setting

Verification of the ARU species list was done by three steps: (1) listening to at least 1 – 5 recordings for each species with confidence score higher than 0.85, (2) reviewing the species distribution range from the breeding bird atlas in the Prince George area, and from eBird species occurrence report, and (3) local expert opinions. Only species that verified through these three standard were true. ARU species were re-categorized by the Cornell lab of Ornithology clement species.

## Extract detection-nondetection Data

Create the weekly observation and make the species detection metrics

## Detection and occurrence covariates

Lidar data for the site-specific covariates, and include other observation specific covariates

## Occupancy modelling

The use of the spOccupancy package – using single or multiple species occupancy modelling

# Result

# Discussion

# Conclusion

# Literature cited