

Assessing the relationships between habitat, geographic isolation and genetic structure in *Picoides arcticus*



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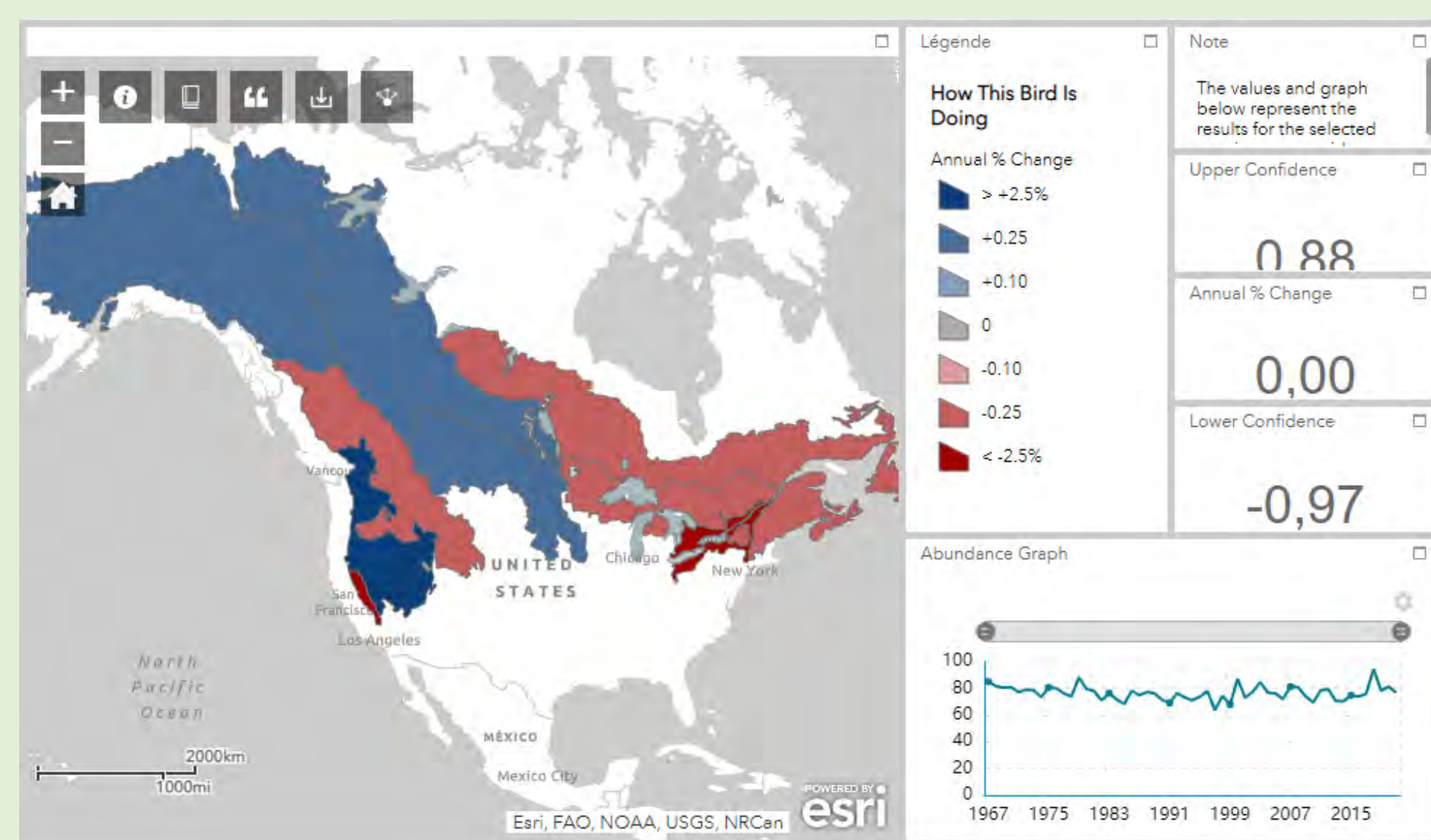
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Context

Timber harvesting of boreal forests has facilitated the expansion of young forests, resulting in habitat loss and **fragmentation** for avian species that are specialists of mature coniferous forests, such as the black-backed woodpecker (*Picoides arcticus*) [1-2].

Reproductive isolation between populations can lead to **bottlenecks** and loss of haplotypes.

Various population trends are observed across the Black-backed Woodpecker's range[3]. Different habitat uses are also observed across the specie [4-5].

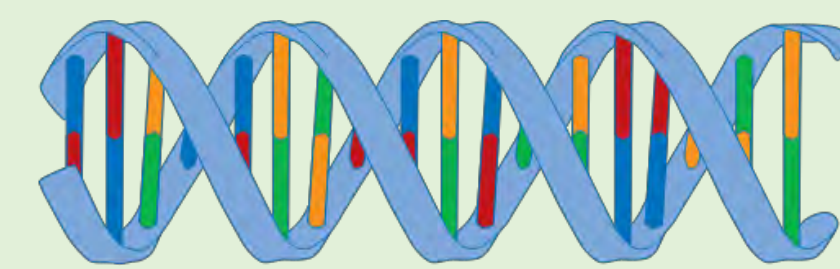


Objectives

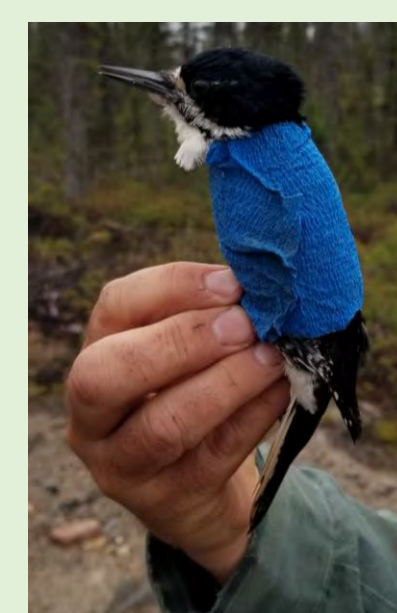
Evaluate **genetic distance** and potential **geographic isolation** between populations from east to west in order to determine the possible presence of genetic **bottlenecks**.

Determine if there are any significant genetic differences between eastern and western populations that could account for the observed behavioral differences in habitat selection [4-5].

Method



- Tissue has been collected from captured birds
- We also requested tissue samples from various **museums**
- A **low coverage whole genome sequencing** will be made on samples to obtain the genotype likelihood
- The genotype likelihood will be compared among geographical provenance and habitat selection
- The distribution of genetic diversity will be used to study the territorial fragmentation between populations
- The results will allow us to measure and compare the proportion of total genetic variance in subpopulation (**Fst**)



Expected results

A **reproductive isolation** gradient going from eastern to western population.

A relation between genetic structure and **habitat selection** is expected. We expect individuals found in post-perturbation habitats to possess a higher degree of relatedness between each others than individuals captured in mature forest.

We anticipate finding similar to previous study that identified isolated populations in Oregon and California [6] using mtDNA. We also expect to find higher genetic similarities between samples that are geographically closer.



Previous studies have also hypothesized a stronger dependence of perturbation in the west than in eastern populations of Black-backed Woodpeckers [4-5].

Impact

As the initial project of the program, the approach developed in this project is expected to be replicated in other projects of the team. This project may play a crucial role in establishing the foundational structure of the research program.

By studying the territorial fragmentation of boreal bird, this project could also identify potential reproductive isolation-induced bottleneck in populations.

The applied information provided by the research program could be used to support decisions that may impact boreal birds' conservation in Canada.

References

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