

Great Grey Owls at the range-edge: Population genomics and ecology of an elusive boreal raptor

Beth Mendelsohn

University of Wyoming, Wildlife Genetics and Disease Ecology Lab

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Executive Summary

The Great Gray Owl (*Strix nebulosa*) is a forest owl that inhabits boreal regions of North America. Habitat dependence, climate conditions, and breeding philopatry limit their distribution. In northwest Wyoming, the Great Gray Owls are at the edge of the species' range (Figure 1).

Imminent threats to boreal forests, including climate change, development, and logging, could have a high impact on the Great Gray Owl. Habitat fragmentation can cause low genetic diversity, leading to isolation and low adaptability. Given the species' dependence on sensitive habitat, it is important to consider potential range effects on the species, which can affect genetic mechanisms. Understanding the combination of evolutionary and ecological processes that shape the population will help predict their resilience to habitat and environmental changes. This study assesses the population on a genetic level, serving an important first step to studying the potential range-edge effects on genetic health of Great Gray Owls. Genomics is used to determine population structure and smaller scale individual genetic measures that will help answer important questions about the population. Genomic techniques will be integrated with field ecology data to learn about dispersal strategy, kinship, reproductive success, and future population health of the species in Wyoming.

Initial results indicate distinctive, genetically differentiated population clusters separated by geography. Low genetic diversity and inbreeding is higher in isolated and range-edge populations, suggesting that connectivity plays an important role in maintaining the species genetic diversity and future health. These are preliminary results that will be expanded upon with further data analysis. Answering the question of how geographic distance relates to genetic similarity within the Wyoming population is also in progress. Further, I will be looking at natal and breeding dispersal biology within the Wyoming population as part of this project.

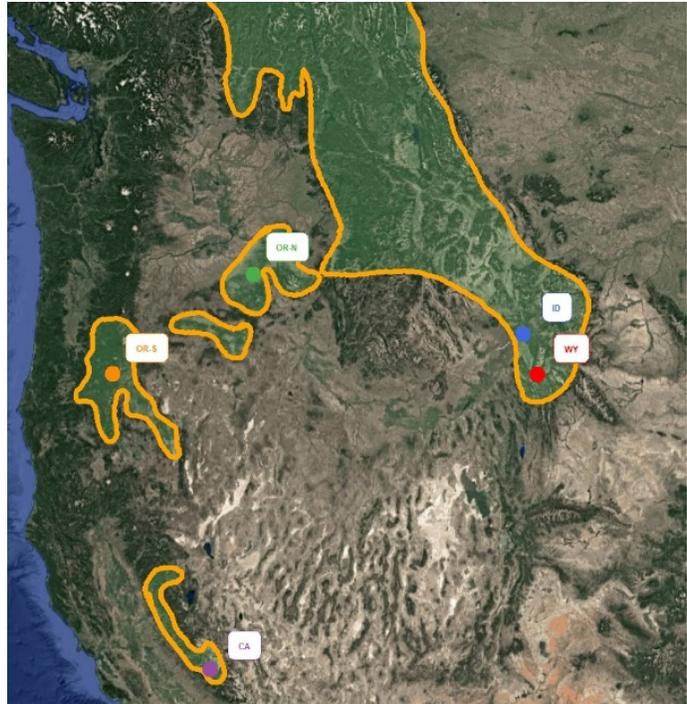


Figure 1. Map of current documented Great Gray Owl breeding range in western North America, showing sampled populations in California, southern Oregon, Northern Oregon, southeast Idaho and northwest Wyoming.

