Predicting Habitat Shifts of High-Alpine Amphibians in the Southern Rocky Mountain Region

Megan Locher1, Derek Houston2,3, Madelon Van de Kerk3, Leland Pierce4 and Hannah Carroll2,3,5
1Western Colorado University, Center for Public Lands EMPLOYS Student, Colorado, USA 2Western Colorado University, Natural and Environmental Sciences, Department, Colorado, USA 3Western Colorado University, Clark Family School of Environment and Sustainability, Colorado, USA 4New Mexico Department of Game and Fish, Herpetologist, New Mexico, USA 5University of California, Los Angeles, Bioscience Postdoctoral Affairs, California, USA

Global biodiversity is diminishing rapidly. The number of accepted “background” extinction rates range from 0.1 to 4 species per million per year. However, some authors have noted an increase in extinctions to 150–260 species per million per year since 1500. As the largely anthropogenic-induced global biodiversity crisis progresses, an abundance of taxa are faced with changing environments, decreasing population sizes, and/or extinction. Concerning amphibians, at least 43% of all species are experiencing population declines, with the 2008 Global Amphibian Assessment showing that 32% of all amphibian species are threatened or extinct. Populations of high-alpine amphibians in the southern Rocky Mountain region (i.e., Boreal toads [Anaxyrus boreas boreas], Tiger salamanders [Ambystoma mavortium], and Boreal chorus frogs [Pseudacris maculata]) have swiftly declined in recent decades due to high 649 susceptibility to diseases (e.g., Batrachochytrium dendrobatidis and ranaviruses) and changing environmental conditions. This study will focus on the effects of climate change by examining the habitat of these three amphibious species. A Maximum Entropy (MaxEnt) model is a commonly used machine-learning method of creating SDMs by accounting for the most uniform distribution and the provided predictors. Well-fitted models can be produced for different climatic scenarios by including climatic and environmental factors, or predictors, relevant to the species of interest, appropriately adjusting the regularization parameter and active feature classes for each model, and properly evaluating the models. By adopting this method of SDMs along with a decadal time-series approach, we demonstrate a larger-scale pattern of potential habitat shifts over time in this alpine habitat caused by climate change.

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