**Comparing Fence Modeling and Mapping Approaches to Support Wildlife Management and Research in Southwest Montana

Simon Buzzard*, University of Montana, Environmental Studies Program
Andrew Jakes, National Wildlife Federation
Amy Pearson, The Nature Conservancy
Len Broberg, University of Montana, Environmental Studies Program, Missoula

*Indicates Presenter
**Indicates Student Presentation

Fences pose significant challenges to wildlife movement, but their effects are difficult to quantify because fence location and fence type data are lacking on a global scale. We developed a fence location and density model in southwest Montana, USA to provide data to researchers and managers, and test whether previous models could be applied to a new region and retain suitable levels of statistical accuracy. Our model used local expert opinion to inform how road, land cover, and ownership spatial layers interacted to predict fence locations. We validated the model against fence data collected on random 3.2 km road transects (n = 330). The model predicted 37,687 km of fences across the study area, with a mean fence density of 1.6 km/km^2 and a maximum density of 11.3 km/km^2. Additionally, we manually digitized fences in Google Earth Pro in a random sample of 50 survey townships (roughly 4,650 km^2) within the study area and validated the accuracy of this method to compare results against the fence model predictions. Our fence model showed lower agreement (Cohen's Kappa = 0.56) with known samples than manually-digitized fences in Google Earth (Cohen's Kappa = 0.76), yet had an improved level of accuracy over previous models. The fence model outputs are likely most useful for large scale analyses of ecological influences of fence densities, whereas the Google Earth digitizing method is likely useful to locate individual fences for fine-scale analyses.