

Processing Remote-sensed Environmental Data to Inform Habitat Selection Models for Pronghorn in Southwest Montana

Job Listing: #34139

Western Partner Organizations: National Wildlife Federation, Southwest Montana Sagebrush Partnership

Short Project Description:

The successful applicant will assist the National Wildlife Federation (NWF) and Southwest Montana Sagebrush Partnership (SMSP), a network of partners including federal and state land managers and nonprofits, to assemble a suite of remotely-sensed habitat variables in a GIS framework that will be used to model pronghorn habitat selection in southwest Montana. These models will be used to identify existing and potential pronghorn movement corridors, and will inform where habitat connectivity efforts, namely wildlife-friendly fencing projects, should be prioritized.

Long Project Description

Pronghorn (*Antilocapra americana*) are an ungulate species that often undergo vast seasonal migrations, and are sensitive to habitat fragmentation from linear infrastructure such as roads and fencing. Pronghorn are maladapted towards leaping fences and are often entangled, injured, or blocked from accessing important habitat due to traditional livestock fencing. Since 2021, NWF and SMSP have been working with private landowners and government agencies in southwest Montana to remove traditional fencing and replace it with [wildlife-friendly fencing](#), allowing for safer ungulate passage. These efforts have largely been prioritized in areas where data from GPS-collared pronghorn have been collected. However, this approach may overlook areas where collar data are lacking. For this reason, our goal is to use an existing pronghorn GPS-collar dataset to develop habitat selection models in the form of resource selection functions (RSFs) or step selection functions (SSFs) to identify important habitat for pronghorn movement. These models could be extrapolated over a vast landscape, informing where conservation efforts should be prioritized when collar data are lacking. Further, these models would allow us to assess the efficacy of wildlife-friendly fencing projects by quantifying how the ability of pronghorn to access high-quality habitat is affected by barrier removal.

The successful applicant will help achieve the preliminary steps of habitat selection modeling by assembling a suite of remotely-sensed GIS layers that are ecologically relevant to pronghorn behavior. This will include summarizing time-varying geospatial data such as NDVI and snow depth, creating rasters of continuous variables like road density, distance to water, and topographic characteristics, and aggregating vegetation cover-type data derived from products like the [Rangeland Analysis Platform](#), among other variables. If desired, the applicant may also have the opportunity to work with pronghorn GPS-collar data to classify behavioral states and construct home ranges or Brownian bridge movement pathways. This will serve as an opportunity for the successful applicant to engage in collaborative conservation with multiple NGOs, state and federal agencies, and private landowners, and gain exposure to strategies used in wildlife research and management and large-scale landscape conservation.

Objectives

- Review scientific literature on pronghorn ecology and methods for modeling wildlife behavior to develop an understanding of what variables should be assessed and how remote-sensed data should be processed.
- Download and process remote-sensed variables using software including ArcGIS and R.

- If these tasks are completed before May and more time is available, then the student(s) may collaborate with the team to complete additional analysis to support our work to identify priority areas for fencing projects.

Deliverables

- A package of ≥ 10 rasters of the same extent and projection that are relevant to pronghorn movement and behavior.
- A written summary of methods used for data processing, including figures, maps, and citations that communicate how the methods were executed and what end-products they led to.
- If these tasks are completed before May and more time is available, then the student(s) may collaborate with the team to complete additional analysis to support our work to identify priority areas for fencing projects.

Qualifications Needed

- Quantitative skills and the ability to analyze and summarize complex datasets.
- Proficiency with geospatial analysis and remote sensing using GIS software such as ArcGIS and R for spatial analysis and mapping is required.
- Experience with oral and written communication of technical and scientific methods and concepts to natural resource professionals is preferred.
- Interest in wildlife biology and conservation and an understanding of natural resource and wildlife management in the western United States is preferred.

Commitment: 5-10 hours/week during September 23, 2024 - May 9, 2025

Pay Rate: \$16.75/hour

How to Apply:

Apply using the central [Yale Student Employment application systems](#) and search for **job listing # 34139**.

- You will be asked to upload your resume, statement of interest, and an additional document.
- In your statement of interest we would like to learn more about 1) why you are interested in this opportunity and 2) what makes you a good fit for this role.
- In the addition document, please answer these two question concisely:

1. Describe the specific skills, traits, and/or experience you would bring to the project? For skills, please state skill level (e.g., novice, some experience, extensive experience, expert).

2. Describe your learning style.