

# Developing Rigorous Approaches to Estimating Abundance of Black-tailed Jackrabbits in the

## Sagebrush Steppe

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### Background

Across the western United States, Leporidae are key prey to several medium and large size predators. Despite their significance across a multitude of ecosystems, little is known about their current distribution or demographic responses to the rapid and ongoing landscape changes, resulting from increased fires, climate change, and invasion of introduced vegetation species, and diseases (ex: RHD). Rigorous field techniques to estimate Leporid abundance have remained elusive, partly due to the difficulty in capturing them with traditional trapping methods, or detecting them using non-invasive techniques.

### Objectives

- (1) Develop rigorous methodology to estimate black-tailed jackrabbit (BTJR) abundances in sagebrush dominant ecosystems and open grassland regions.
- (2) Estimate BTJR abundance for the Morley Nelson Birds of Prey National Conservation Area (NCA).

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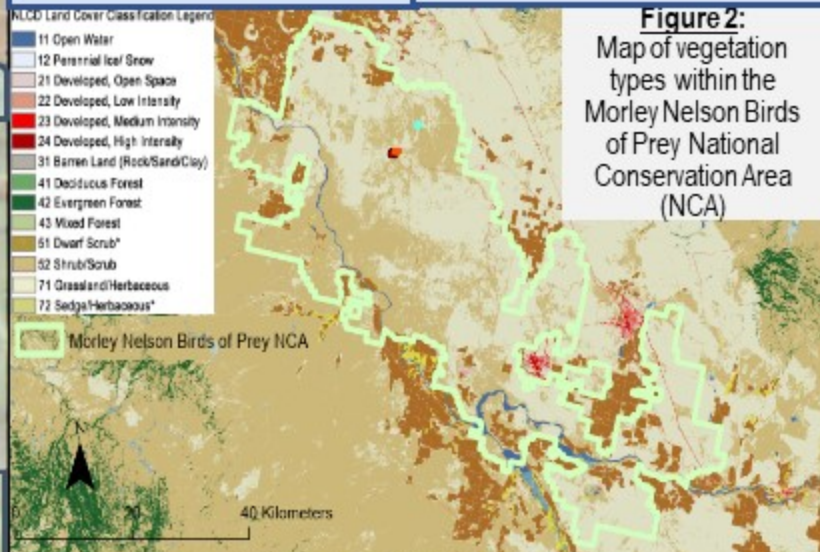


1.) Sagebrush with native understory (10 % cover respectively).



Figure 1:  
Proposed  
habitat types

2.) Sagebrush (<1 % cover) and native understory (10 % cover).



### Proposed Methods

Satellite-derived vegetation maps of 30 m resolution (NCLD, Fig.2), & historical records of areas occupied by jackrabbits will be used to select sites within two habitat types (Fig. 1):

Optimize protocols for two survey methods: (1) commonly used spotlight transects from vehicles driving along small track roads, and (2) Drones (UAS), an emerging survey method that remains untested on small mammals<sup>2,3</sup>.

- Test impacts of time of day, distance from road, number of repeat surveys and habitat type have on our ability to derive reliable estimates of jackrabbit abundance.

The method deemed to be most effective will be used in year two, to get a spatial map of jackrabbit abundance that extends to other habitat types at the NCA. Our analysis will rely on cutting-edge statistical models (Bayesian N-mixture models) to disentangle abundance from imperfect detection.

### Expected Results

- (1) Evaluation of influence of various factors on the effectiveness of two survey methods (UAS vs. spotlights) and recommendations on implementation at a landscape level.
- (2) Estimates of abundance for black-tailed jackrabbits at the NCA and of habitat relationships.