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Final Project Topic

2024-09-12

**Title:** Influence of hiking trails on temporal and spatial activity of two carnivores

**Focal Species:** Coyote (*Canis latrans*, n = 34) and Bobcat (*Lynx rufus*, n = 36)

**Datasets:** GPS data originally collected by Prugh (2023) were obtained in CSV format from Movebank. The data file includes timestamps, lat/long locations, UTM headings, collar identifiers, among other information. The associated reference file includes information on each study subject including age, morphometric data, capture lat/long, fate, and cause of death (where applicable). The study examined the movements and fates of the focal species across rural landscapes of northern Washington in the presence of substantial human influences.

Hiking trails located within the study areas will be downloaded from AllTrails in CSV format (including lat/long coordinates and elevation).

**Objectives:** Measure the spatial and temporal association of coyotes and bobcats with hiking trails in northern Washington across seasons. I will use a binomial generalized linear model to estimate presence/absence of these two species in relation to distance from hiking trails.

**Reference:** Prugh LR. 2023. Data from: Study "GPS tracking of bobcats and coyotes in northern Washington". Movebank Data Repository. <https://www.doi.org/10.5441/001/1.gm93267b>

Javan Feedback:

I like the project idea as long as you can get spatial data on the trails (i.e., convert the trails data into a SpatVector or SpatRaster object).

In addition to **distance from trails**, a nice comparison would be **trail density** (i.e., the length of trails or proportion of trail pixels within some buffer around each telemetry point).

Since the data are GPS I would lean towards **a step-selection function which measures the available habitats (e.g., distance to nearest trail, trail density) for each step (the path between consecutive points) and then compares the used features at each step with the corresponding available steps. The amt package allows one to do the data organization and extraction pretty seamlessly.**

* *Look into atm R package*

I would also think about **including other landscape features**, depending on what the landscape looks like. If the landscape is a fairly homogeneous forest landscape then it may not matter but **if the landscape is very heterogeneous it might be good to "control" for a feature like forest cover to make sure that estimated effects of trails aren't really reflecting an avoidance/selection for forest**.

* *Define study area parameters (map extent – consider ctmm buffer for movement between coordinates) and look at landcover within the area to determine whether or not to include this covariate*

We can look at the trail data at some point to make sure it can be converted into the proper spatial object.

* *Send Javan an example of a trail CSV and mention issue when tried to plot over study area.*

Should be a cool project!