Christopher T. Rota, Marco A.R. Ferreira, Roland W. Kays, Tavis D. Forrester, Elizabeth L. Kalies, William J. McShea, Arielle W. Parsons, Joshua J. Millspaugh. A multi-species occupancy model for two or more interacting species. Methods in Ecology and Evolution.

File List

- model3.R

- Formatting Data.R

- Bobcat.csv

- Coyote.csv

- Gray Fox.csv

- Red Fox.csv

- psi covariates.csv

- p covariates.csv

- Design Matrix.xlsx

- model3.stan

File Descriptions

- **model3.R:** The only file you need to open. Runs "Formatting Data.R", executes the Stan model, and has code for calculating WAIC and summarizing posterior distributions for slope parameters.

- **Formatting Data.R:** Read from "model3.R". Loads data and puts it in the appropriate format for Stan.

- **Bobcat.csv:** Detection / non-detection data for bobcats. 1 row for each site, 1 column for each replicate survey. 1 indicates detection, 0 indicates non-detection, *NA* indicates no sampling.

- **Coyote.csv:** Detection / non-detection data for coyotes. 1 row for each site, 1 column for each replicate survey. 1 indicates detection, 0 indicates non-detection, *NA* indicates no sampling.

- **Gray Fox.csv:** Detection / non-detection data for gray foxes. 1 row for each site, 1 column for each replicate survey. 1 indicates detection, 0 indicates non-detection, *NA* indicates no sampling.

- **Red Fox.csv:** Detection / non-detection data for red foxes. 1 row for each site, 1 column for each replicate survey. 1 indicates detection, 0 indicates non-detection, *NA* indicates no sampling.

- **psi covariates.csv:** Covariates for probability of occurrence models. 1 row for each site. "Dist_5km" is the proportion of area disturbed or modified within a 5km radius between 2001 and 2006; "HDens_5km" is housing density in the surrounding 5km; "People_site" is the total number of hikers photographed at a site divided by 1000; "Latitude" and "Longitude" are in decimal degrees divided by 100; "Trail" $= 1$ if a camera is situated on a trail, $= 0$ if a camera is off-trail.

- **p covariates.csv:** Covariates for detection probability models. 1 row for each site. "Det_dist" is the maximum distance in meters a camera will trigger at a person.

- **Design Matrix.xlsx:** Template for the general form of the design matrix for the occupancy model linear predictor. Each row is a unique combination of latent species presence and absence and each column represents a parameter. A value of 1 indicates the parameter in the column is included in the linear predictor associated with the combination of latent presence and absence represented by the row; a value of 0 indicates the parameter is not included in the linear predictor for that particular combination of latent presence and absence. The values of the design matrix are filled in for each site within the "Formatting Data.R" script.

- **model3.stan:** Stan code for model 3, described in the body of the manuscript.

Instructions

Include all files in the same directory. Make sure you have "rstan" and "xlsx" packages installed in R. Open "model3.R" and enter the directory containing all the files into "setwd()". Execute code line by line. Annotations are provided in all files.