

Distribution and co-occurrence of carnivores in Big Bend National Park

Caitlin Camp, Sky Stevens, Louis Harveson, Thomas Athens, Amanda Veals, Patricia Moody Harveson

Borderlands Research Institute, Sul Ross State University, Alpine, TX 79830

cxc20qo@sulross.edu



INTRODUCTION

- Carnivores are essential for the structure and function of ecosystems as they have a significant impact on lower trophic levels.
- Big Bend National Park (BBNP) is inhabited by 13 carnivore species.
- Large carnivores include mountain lions (*Puma concolor*) and black bears (*Ursus americanus*).
- Mesocarnivores include bobcats (*Lynx rufus*), badgers (*Taxidea taxus*), coyotes (*Canis latrans*), gray fox (*Urocyon cinereoargenteus*), raccoons (*Procyon lotor*), ringtails (*Bascariscus astutus*), long-tailed weasels (*Mustela frenata*), hooded skunks (*Mephitis macroura*), hog-nosed skunks (*Conepatus lecontei*), spotted skunks (*Spilogale gracilis*), and striped skunks (*Mephitis mephitis*).
- To better understand these species interactions, cameras were placed within and surrounding the Chisos Mountains.

OBJECTIVES

- Survey carnivore species in BBNP with remote camera traps.
- Monitor detections and further determine habitat characteristics that could influence a species presence, such as habitat type and elevation.

METHODS

- Data was collected from 55 of 58 remote cameras within and surrounding the Chisos Basin.
- ~800,000 photos were collected between 2014-2016.
- Cameras set at taking 3 photos with a 5-minute interval when triggered by movement.
- MegaDetector was used on all photos to produce image recognition data.
- Timelapse2 was used to identify and label species.



Figure 1. Map of study area in the Chisos Basin of Big Bend National Park, Texas.

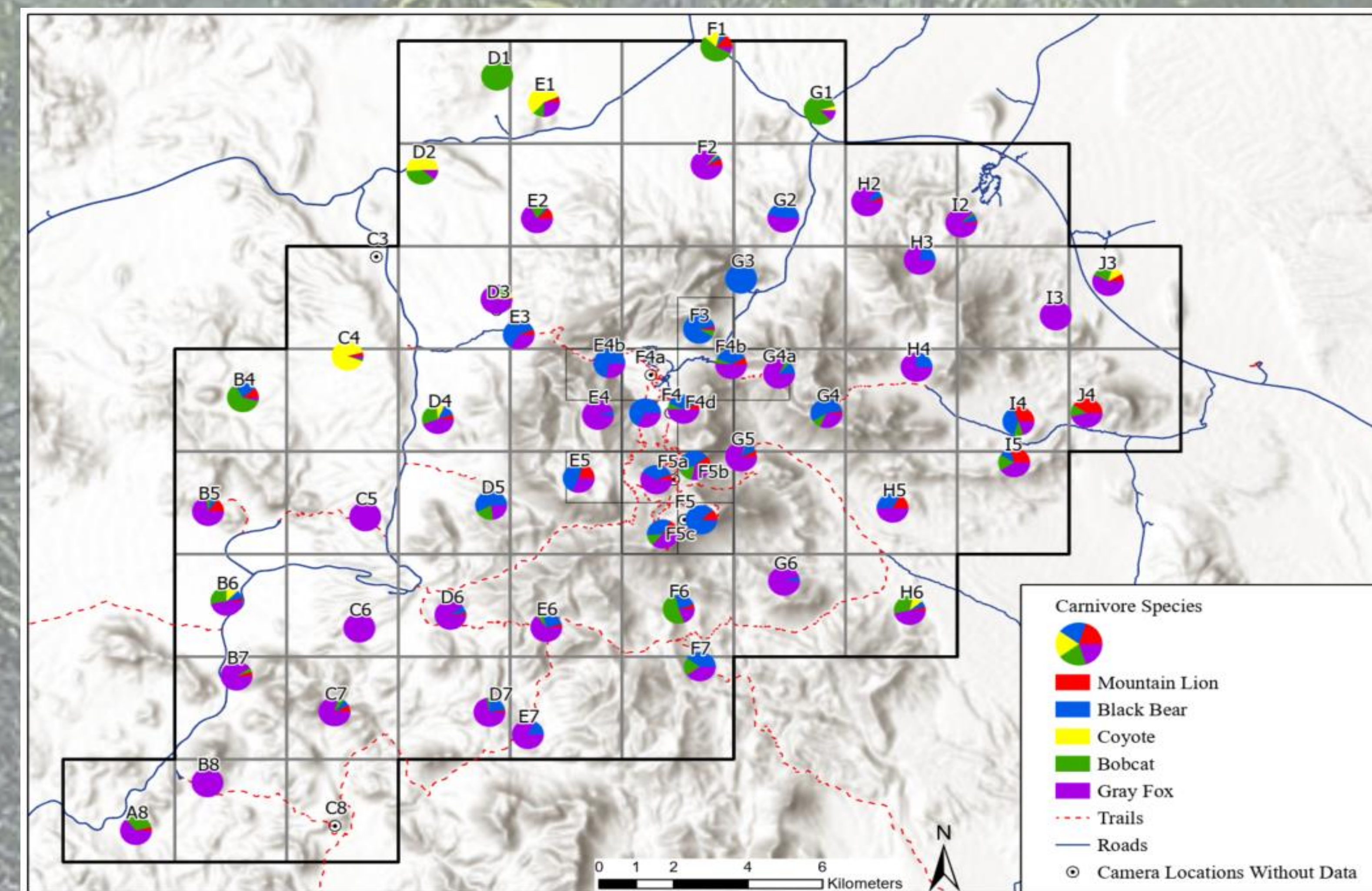


Figure 2. Map of co-occurring carnivores detected at each camera location between 1 Feb 2014 to 28 Apr 2016.

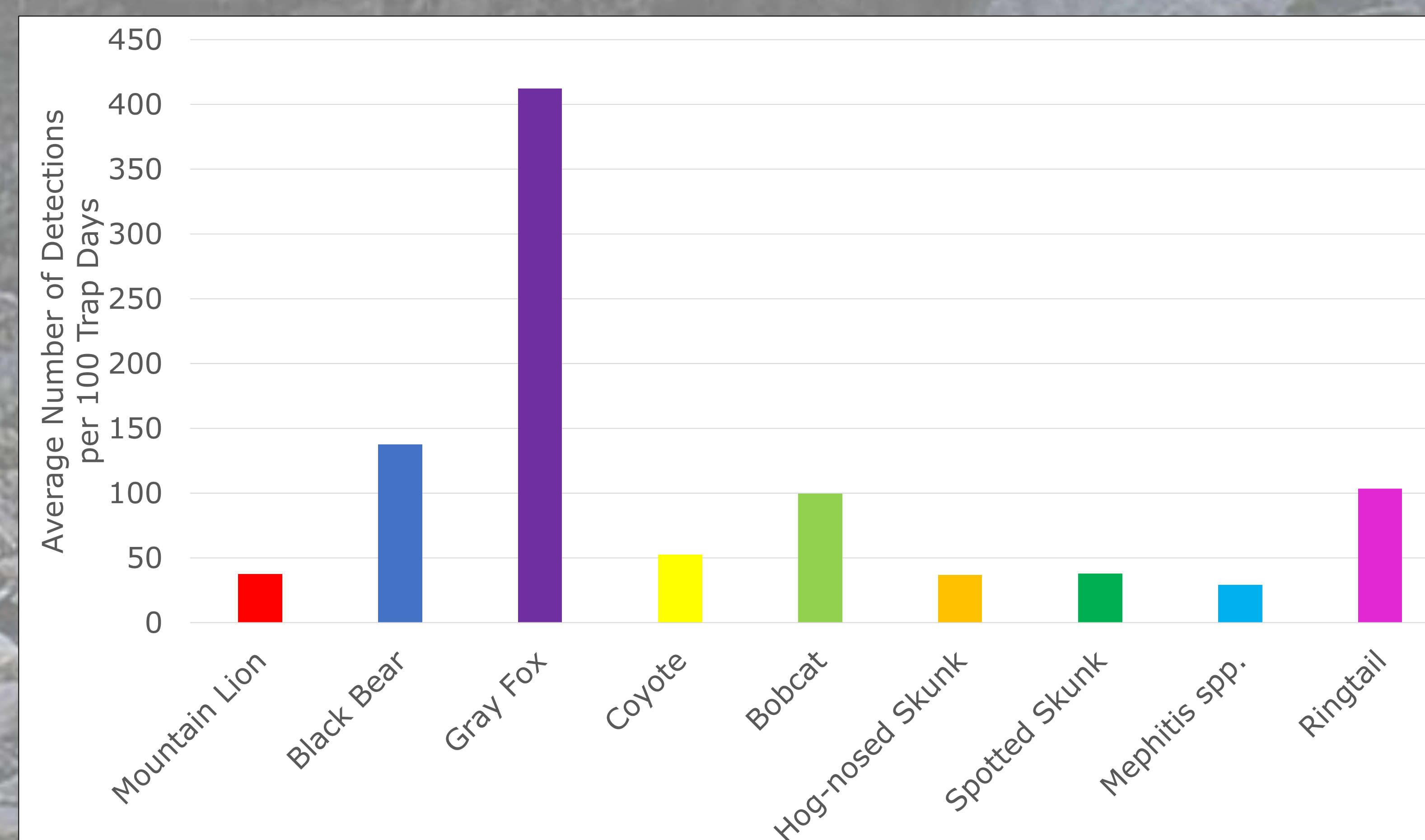


Figure 3. Relative carnivore abundance across study site between 1 Feb 2014 to 28 Apr 2016.

RESULTS

- Black bears co-occurred with all other species of carnivore.
- Gray foxes were photographed at 53 of the 55 camera locations.
- Coyotes were photographed at 11 camera locations.
- Mountain lions were photographed at 36 locations.
- Black bear detections occurred mostly in riparian and woodland habitat types and mid- to higher elevations (1,201-2,385m).
- Mountain lion detections occurred mostly in desert wash and woodland habitat types and ranged from low- to high elevations ($\leq 1,000$ -2,385m).

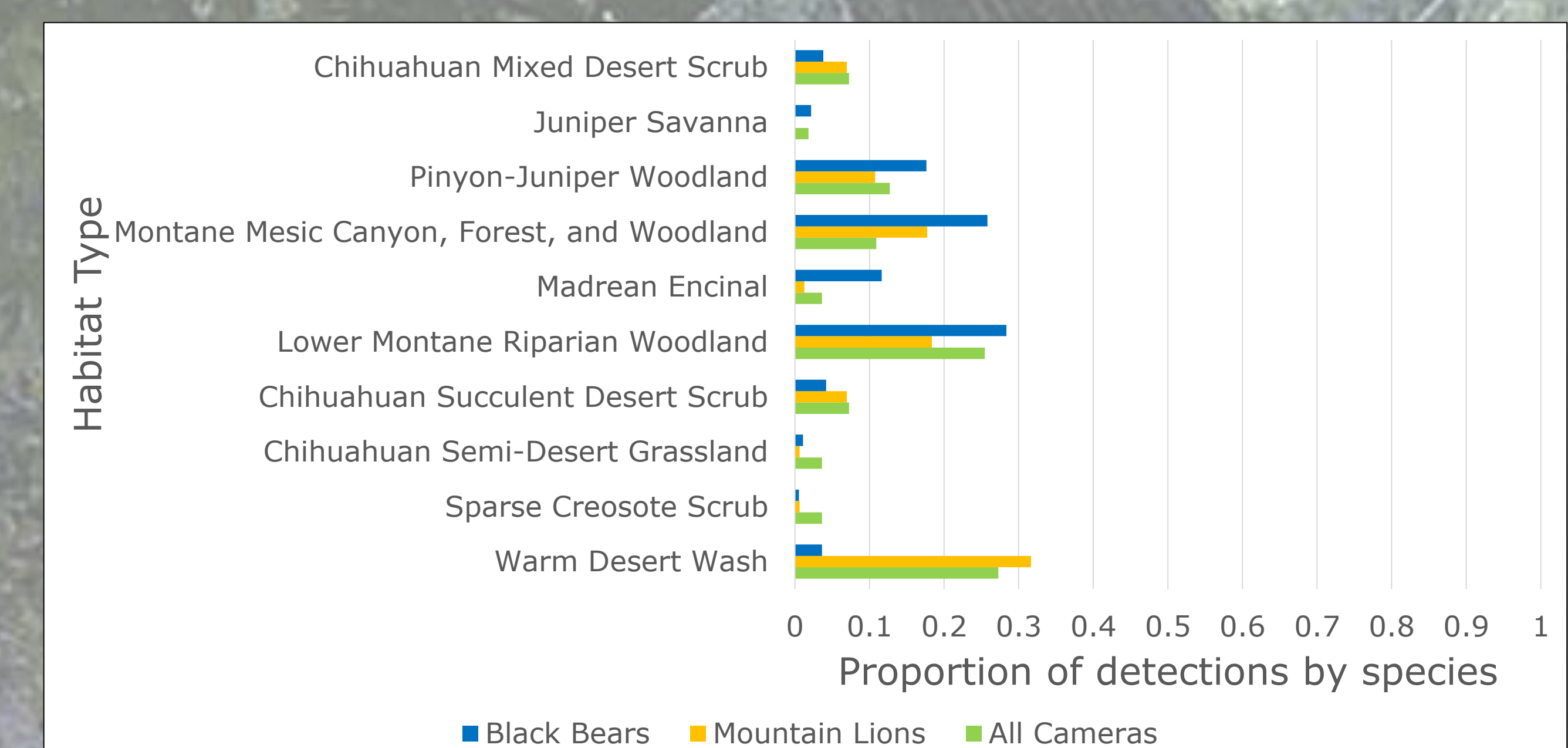


Figure 4. Habitat use by mountain lions and black bears across study site.

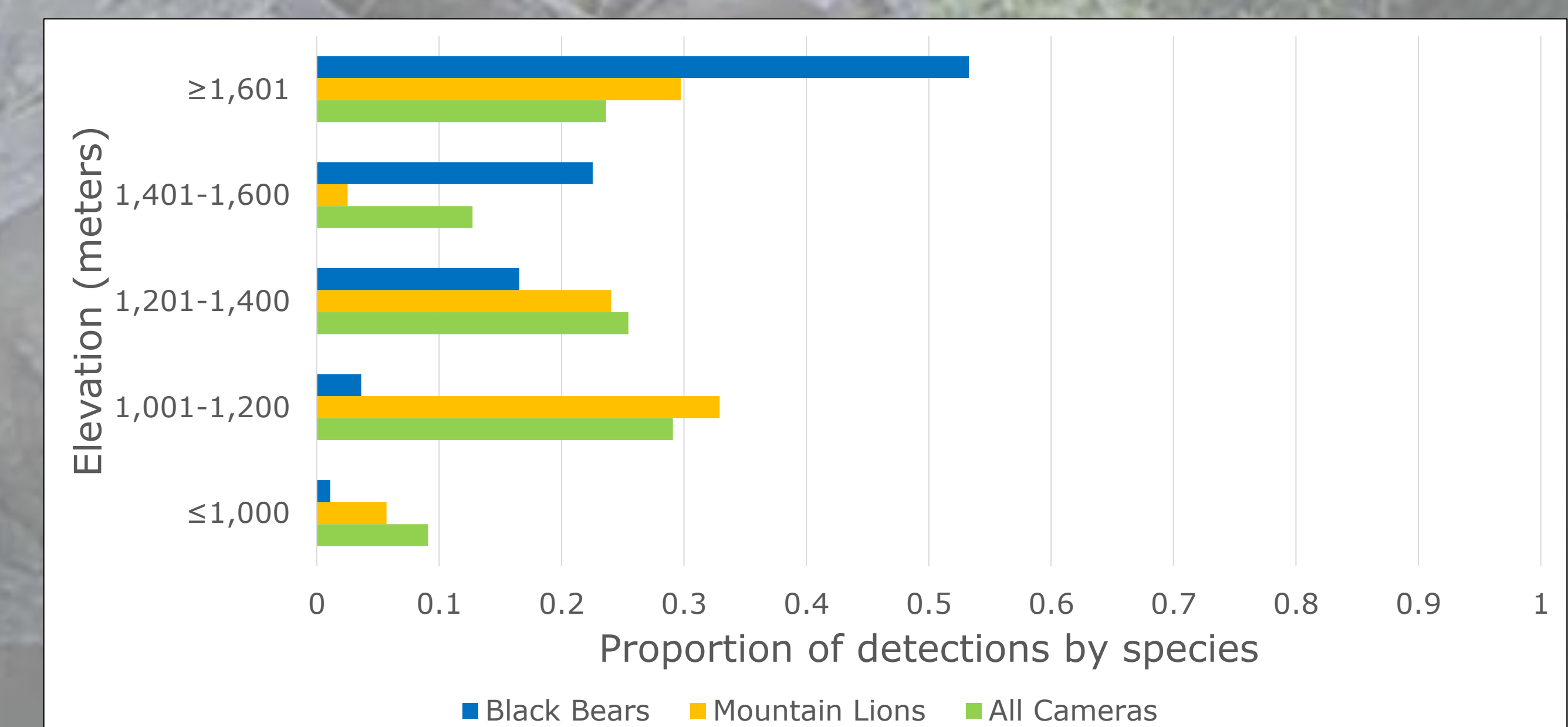


Figure 5. Mountain lion and black bear detections at different elevation classes across study site.

DISCUSSION

Gray foxes and black bears had the widest distribution, with each occurring at 55 and 43 camera locations, respectively. Black bears and mountain lions were detected in all elevation classes, with black bears detected more often at higher elevations than mountain lions. Mountain lions and black bears co-occurred in 31 of 55 locations. This high number could be attributed to their differing diets and active temporal patterns. Bobcats co-occurred with coyotes at all 11 locations that coyotes were found, indicating they do not exhibit competitive exclusion. Further research will include habitat characteristics such as slope, tree canopy cover, and human impact that can give biologists at BBNP a baseline in monitoring these species as well as a better understanding of the potential competition and coexistence strategies of intraguild species.