



Urban wildlife use of existing highway crossings and fence gaps

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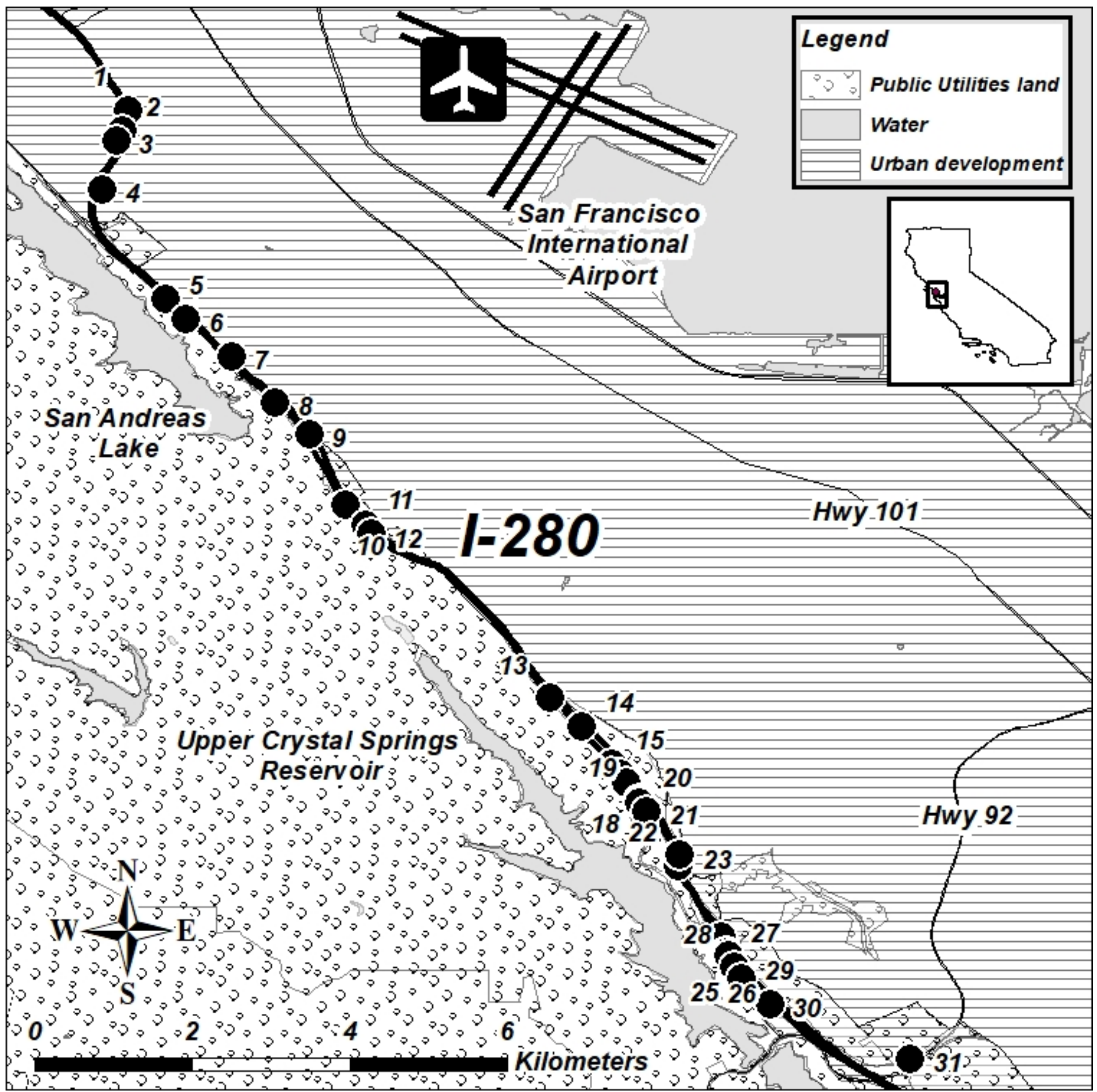
Felidae Conservation Fund

INTRODUCTION

- Wildlife-vehicle collisions in California resulted in damages that totaled ~ \$232 million in 2018, and ~ \$1 billion in the US between 2015-2018
- Interstate 280 in San Mateo County, CA has among the highest reported frequencies of wildlife-vehicle collisions; one occurs approximately every 3 days .
- Here we have quantified the extent to which 6 common mammal species in the region use available underpasses and culverts, and whether these species access gaps in exclusionary fencing along I-280, with the goal of making recommendations to increase vehicular and wildlife safety.

OBJECTIVES

- Identify overall and species-specific preferences for certain locations and site types (i.e., fence gaps, culverts, or underpasses) for 6 focal species – bobcat, coyote, deer, grey fox, puma, and raccoon
- Determine whether physical variables such as distance to highway, gap size, and vegetation cover were correlated with species detection at fence gaps.



METHODS

- Between 19 October 2017 and 29 June 2018, we monitored 30 locations on I-280 with 31 Bushnell trail cameras along a 15 km stretch of the highway.
 - 21 fence gaps , 7 underpasses, and 2 culverts
- Fencing included 4-strand barbed-wire and 15 cm x 16 cm chain link fencing (height range = 1.2 m - 1.4 m)
- Neither culverts nor underpasses were retrofitted for wildlife use
 - Culverts were (0.9 m diameter)
- Underpasses were secondary roads consisting of 2 or 4 lanes of traffic with sidewalks present at 6 of the 7 underpass sites.



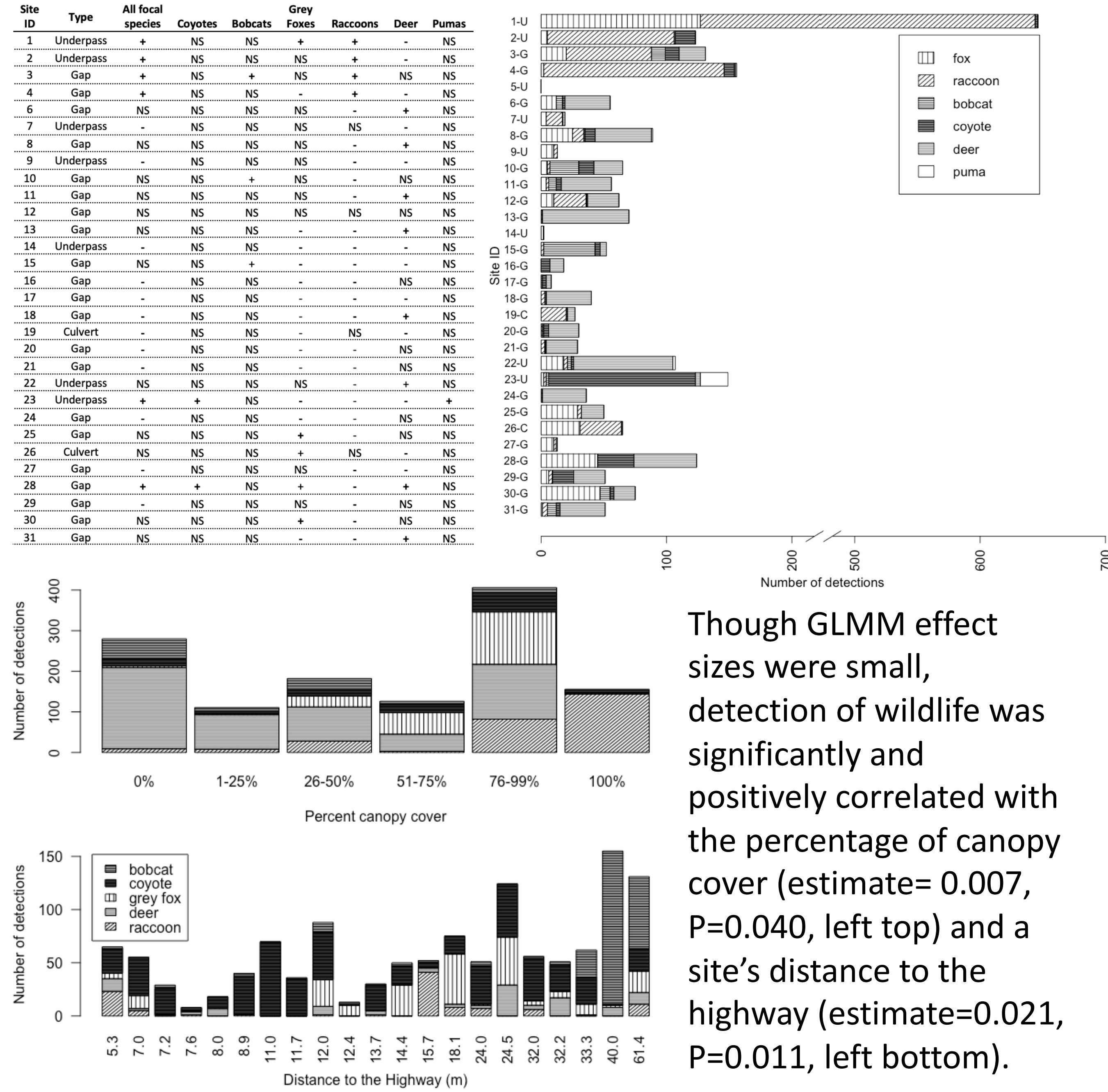
- For each focal species, we used Bonferroni-corrected, Chi-square tests to compare expected proportions of detections to observed proportions of detections by:
 - Camera location
 - Site type (fence gap, culvert or underpass)
 - Level of safety – fence gaps (unsafe) vs. culverts and underpasses combined (safe)
- For fence gaps, we examined total detections as a function of gap entrance size, canopy and ground cover, or distance from the highway using GLMMs with a Poisson distribution.
- All statistical analyses were performed in R.

ACKNOWLEDGEMENTS

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RESULTS

Results of the chi-square tests (below left) and figure (below right) showing the number of detections of focal species. In the table, “NS” indicates no significant difference between observed counts and expected counts after Bonferroni correction while a “+” indicates a significantly higher and a “–” indicates a significantly lower count than expected. Note: broken x-axis in figure which influences the raccoon count for Site 1. On the y-axis, U is for underpass, G indicates a fence gap, and C is for culvert.



DISCUSSION

- All sites were visited by at least one of the focal species.
- Species detections were spatially segregated likely due to avoidance or preference of human disturbance and predators, and species-specific habitat preferences:
 - Raccoon and bobcat detections were primarily in the northern part of the study area whereas coyotes and grey foxes were mostly in the southern.
 - Pumas were almost exclusively detected at one location whereas deer were detected at nearly every camera trapping location.
- Distance to highway and canopy cover were both significantly positively correlated with species detection.
- Given the broad use of all structures by focal species, we suggest more effective exclusionary fencing along I-280.