

Predicting habitat for mammal species across a gradient of urbanization to reduce human conflict and promote wildlife conservation in the Phoenix Valley



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INTRODUCTION

- Mammal species respond to the effects of urbanization in contrasting ways, where species can be classified as urban exploiters, urban avoiders, or suburban adaptable.
- For example, coyotes (Fig. 1) are highly adaptable to human development and can persist in areas of relatively intense urbanization, which can lead to elevated conflicts with people.

Fig 1.
Coyote
near
urban
area



Fig 2.
Puma
along
human
trail



- In contrast, other mammals are sensitive to the effects of urbanization and will avoid human development and activities. For example, many carnivores (Fig. 2) can be negatively impacted by urbanization due to their life history characteristics.
- Relatively few studies have focused on understanding the mammal community across the gradient of urbanization in the Phoenix Valley. This is especially surprising given that Phoenix is the sixth largest city in the US, has an extensive network of natural and semi-natural areas across the valley that support wildlife populations, and many neighborhoods experience human-wildlife conflicts for a variety of species, including coyotes and javelina.

RESEARCH OBJECTIVES

To understand how wildlife populations and wildlife-human conflict zones occur across the gradient of urbanization, we propose to study a suite of natural and semi-natural areas throughout the Phoenix Valley across multiple seasons. Our specific objectives are to:

1. Inventory the diversity of wildlife species present
2. Evaluate habitat relationships for urban exploiters, urban avoiders, and suburban adapters in relation to landscape characteristics
3. Create predictive maps of habitat for species and wildlife conflict zones across the Phoenix Valley

METHODS

- We will set up wildlife cameras (Fig. 3) throughout the Phoenix Valley (Fig. 4), using as many CAP LTER sites as possible.

Fig. 3. Wildlife camera used to document wildlife. We plan to deploy approximately 50 wildlife cameras across the Phoenix Valley in 2018.

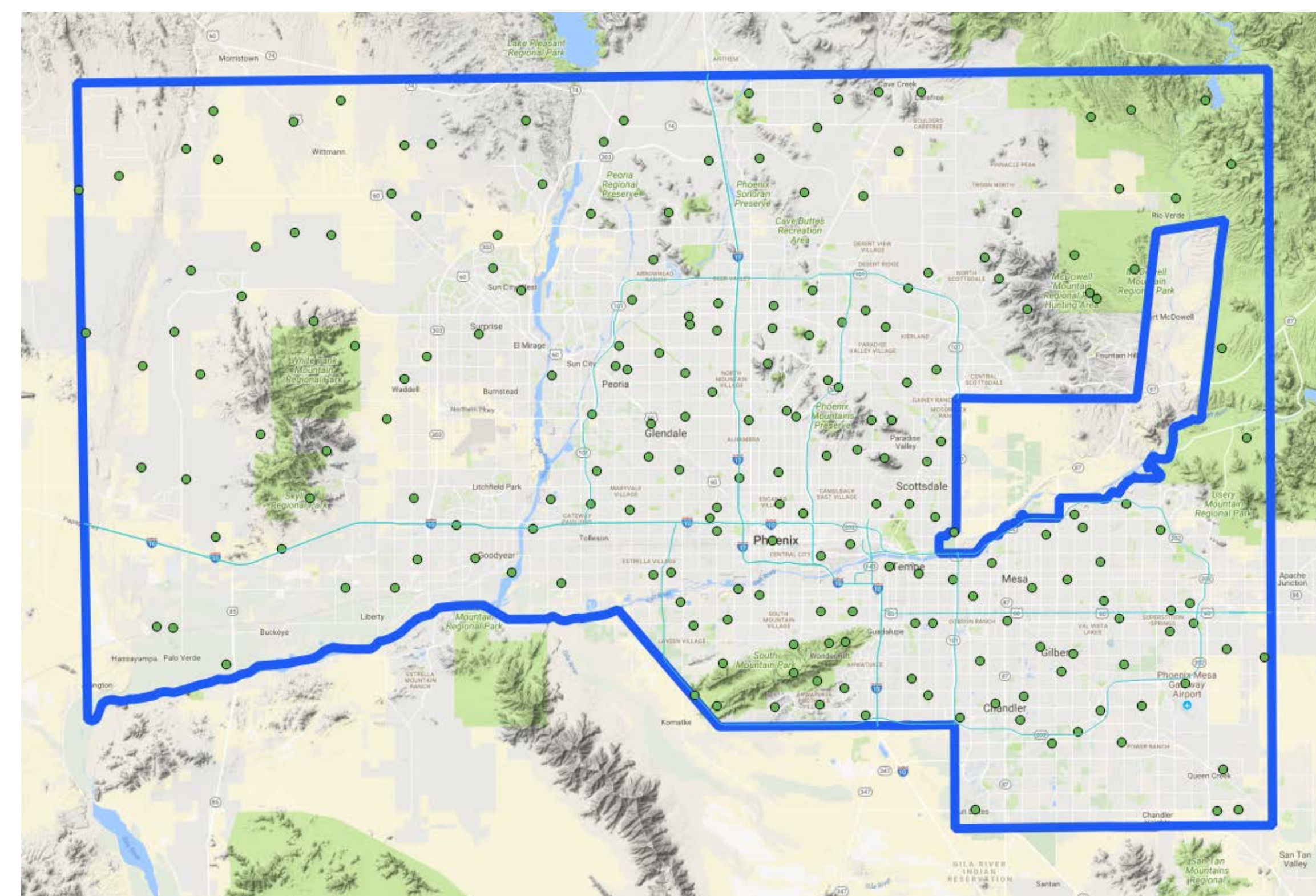


Fig. 4. Study area across the Phoenix Valley. The blue outline shows the boundary for the CAP LTER. Green dots indicate established sampling locations for CAP. We aim to place wildlife cameras at up to 50 of these locations across the gradient of urbanization.

- Wildlife cameras will be placed in natural areas, semi-natural areas, and small residential parks to capture the gradient of urbanization throughout the Valley.
- Wildlife cameras will be deployed in the spring and summer of 2018 and operate during the entire year across summer, fall, winter, and spring.
- Habitat relationships for mammals will be evaluated using occupancy modeling to understand how species respond to a suite of biotic and abiotic factors. This information will be used to predict habitat quality for a suite of species, including coyote, javelina, raccoon, deer, bobcat, gray fox, rabbit species, striped skunk, ringtail, mountain lion, small mammal species, and other wildlife.
- We will also evaluate daily activity patterns for each species across seasons.

HYPOTHESES AND PREDICTIONS

- We expect that urban exploiters, such as coyote, rabbit species, and raccoon, will most likely occupy areas with moderate to high levels of urbanization. In contrast, we expect that urban avoiders, such as mountain lion and bobcat, will most likely occupy areas with low levels of urbanization.
- It is predicted that riparian corridors and larger open space properties will support the greatest diversity of mammals.
- As consistent with previous research in urbanized areas, we expect that mammals will be more active during the day in less urbanized areas and in places experiencing less disturbance from human activities (Fig. 5).

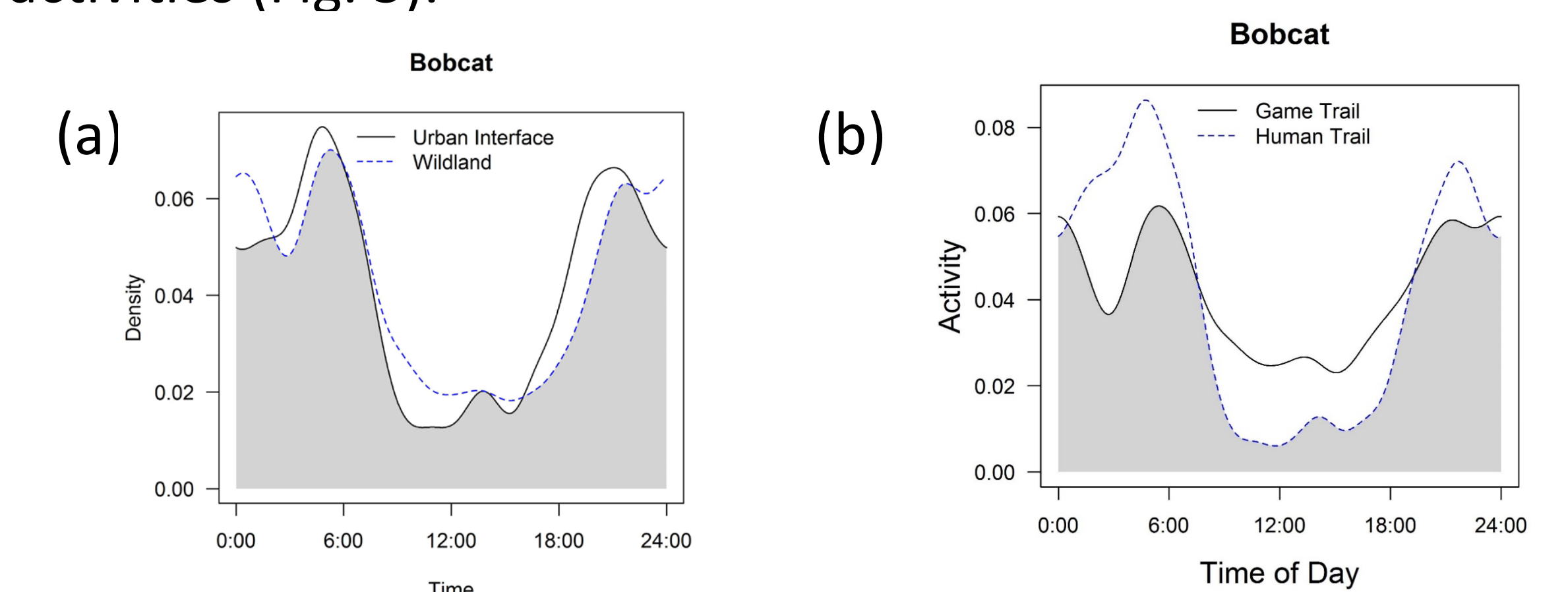


Fig. 5. Daily activity patterns of bobcats in urbanized and wildland habitat (a) and on human recreation and game trails (b). This data is from a study in urbanized Colorado from Jesse Lewis.

APPLICATIONS TO MANAGEMENT AND CONSERVATION

- Our research results will be used as a foundation to educate the public about areas and types of urbanization that are most likely to experience human-wildlife conflicts for key focal species.
- In addition, our results can be used to conserve wildlife populations in areas experiencing urbanization.

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