

Correlating the quantity of animal attractants to the frequency of coyote and fox camera trap detections

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Introduction

Urban coyotes (*Canis latrans*) and urban red foxes (*Vulpes vulpes*) have become an increasingly prominent issue throughout the world, especially in urbanized and residential areas, because of growing comfortability with humans. One potential factor could be food conditioning from anthropogenic (man-made) attractants (Keller & St. Clair, 2025), including unsecure or overflowing trash cans, small outdoor pets, small children, and birdseed. This has been an issue on Aberdeen Proving Ground with numerous reports of concerning animal behavior, such as escorting behavior where the animal seems to follow an individual. This issue shaped the study's objective of convincing APG residents, through data, that human-provided attractants are a key factor in the growing problems associated with coyotes and foxes.

One way to track wildlife is through camera traps, which provide high quality images and an opportunity to see true behavior of animals without interrupting day-to-day activities (Larrucea et al., 2007). Based on numerous studies, red foxes and coyotes exhibit nocturnal behavior, meaning that infrared cameras are needed to gather data during nighttime hours when humans are not as active.

However, because these two species have almost identical behavioral patterns, it is crucial to be able to differentiate them in photos. Coyotes are more dog-like with bushy tails that are angled down towards the ground instead of upwards like a dog. Red foxes tend to be smaller with black markings on the paws and a white-tipped tail, which is pointed outwards at a flatter angle. Red foxes also typically have a longer snout than coyotes.

Methods and Materials

The cameras used in this study were trail cameras, which were also used in a study done with free-ranging domestic cats in 2016 (Elizondo et al., 2016). These were placed around residential areas on APG: Patriot Village, Bayside, Plum Point, and the control area, which is mostly wooded area and has less human traffic. Cameras were placed on trees three feet from the ground, locked to the tree with a cable lock, and placed where open space was visible through the camera lens. Cameras were not pointed directly toward homes, or with an obstructed view. A note was placed asking residents not to touch the camera and contact information was included. These cameras were left for two weeks at a time, then batteries were replaced, SD cards were switched, and cameras were moved to new locations. Coordinates were recorded for each location. During the two-week period, the previous footage was analyzed

Methods and Materials (continued)

to determine sighting data (shown in Figure 1), and SD cards were reformatted. Out of roughly 320,000 total captures, approximately 1,500 contained target species.

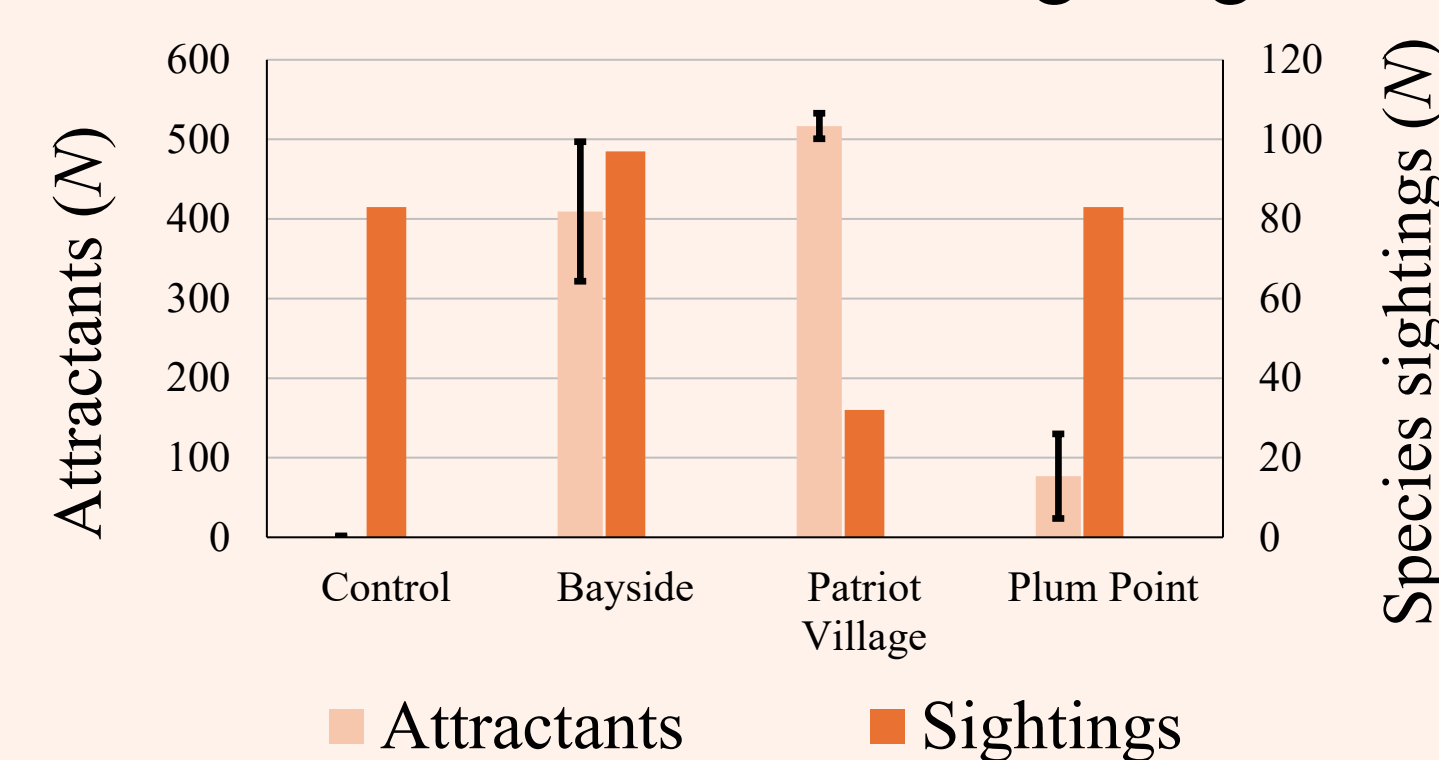
Each month, a drive-through of each area was conducted, assuming that unsecured garbage cans were present at each home unless it was unoccupied. House number, type of attractants, and quantity of attractants were noted. Attractants analyzed included bird feeders, small pets, small children, and pumpkins.



Figure 1 (left): This is a red fox spotted on March 22, 2026, in the control area. This was the only fox detected at this location. A Browning Spec Ops Elite HP5 trail camera was used.

Results

Mean attractants in residential and control areas vs. total sightings



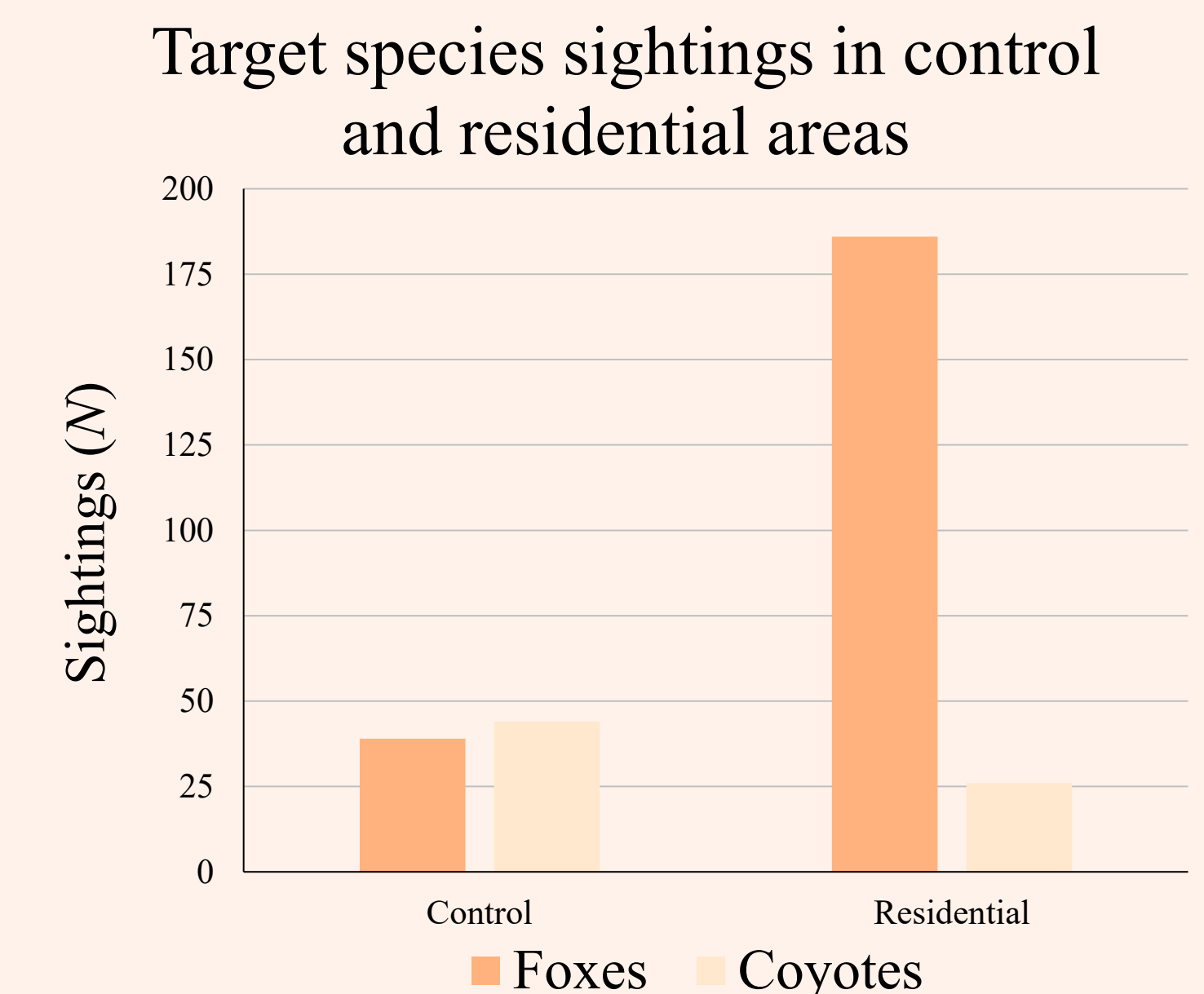
Graph 1 (left): Mean anthropogenic attractants and total red fox and coyote sightings. Error bars represent standard deviation across five drive-through surveys per area: Control ($SD = 1$), Bayside ($SD = 88$), Patriot Village ($SD = 16$), and Plum Point ($SD = 53$).

Urban red foxes and coyotes show similar behavioral patterns such as nocturnal movement; however, the relative frequency of target species captured in residential and control areas differed. Roughly 83% of red foxes were captured on trail cameras in residential areas while 17% were captured in the control area and roughly 37% of coyotes were captured in the residential areas while 63% were captured in the control area. There was a large difference between the number of camera locations in residential areas where foxes were sighted ($N = 20$) and the number of locations where coyotes were sighted ($N = 10$). Despite this, there was a small difference between the number of red fox or coyote captures

Results (continued)

(shown in Graph 1) in the residential and control areas (shown in Graph 2). Attractants, excluding garbage cans, were present at more than fifty percent of homes out of 739 total homes.

Graph 2 (right): Comparison of the total number of foxes and coyotes sighted in the control area and in the residential areas of APG. There was a large difference between the number of captures of coyotes ($N = 26$) and foxes ($N = 186$) in the residential area.



Conclusions

The results of this study do not provide convincing evidence that anthropogenic attractants alone influence red fox or coyote behavior in residential areas of APG. Although greater red fox activity in urban areas was expected due to preference for this habitat and decreased competition, animals were observed only moving along roads and grassy areas, not approaching residences, regardless of area type. Data limitations (e.g. restricted seasonal sampling, weather impacts, non-independent camera placement, and limited detection range) may have reduced accuracy when estimating movement frequency. Further research including longer sampling durations, additional independent sites, and inferential analyses is recommended to better assess the factors contributing to human-wildlife interactions in urban areas.

References

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- Larrucea, E. S. Q., Brussard, P. F., Jaegar, M. M., & Barrett, R. H. (2007). Cameras, coyotes, and the assumption of equal detectability. *The Journal of Wildlife Management*, 71(5), 1682–1689. <https://doi.org/10.2193/2006-407>