Effects of Wolf Reintroduction on Coyote Temporal Activity

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Background Information and Motivation:

After wolves (Canis lupus) were driven to extinction in the United States, coyotes (Canis latrans) expanded into niches previously occupied by wolves.

1990's - efforts were made to reintroduce wolves; led to successful re-establishment of several wolf packs and a return to their status as the dominant predator

In areas where wolves and coyotes now coexist, coyotes experience increased pressure - they have to contend with the risk of wolf-caused mortalities and resource competition against a more dominant predator.

We want to determine if coyotes living in the same area as wolves have experienced a temporal niche shift as a response to the increased pressure - if a shift has occurred, it could lead to an increase in potentially harmful coyote-human interactions.

Hypothesis and Prediction:

We hypothesize that there is a relationship between wolf reintroduction and coyote temporal niche shifts. We predict that the reintroduction of wolves to the U.S. has resulted in a temporal niche shift for coyotes living in areas with wolves in order to minimize coyote-wolf interactions.

Literature Cited:

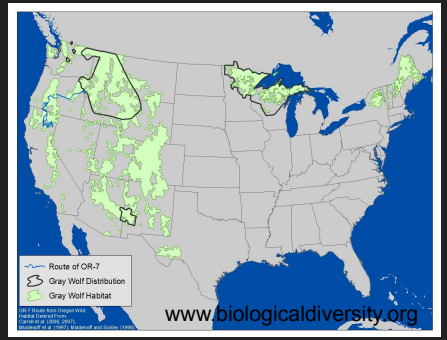
Frey, S., Fisher, J.T., Burton, A.C. and Volpe, J.P. (2017), Investigating animal activity patterns and temporal niche partitioning using camera-trap data: challenges and opportunities. Remote Sens Ecol Conserv, 3: 123-132. https://doi.org/10.1002/rse2.60

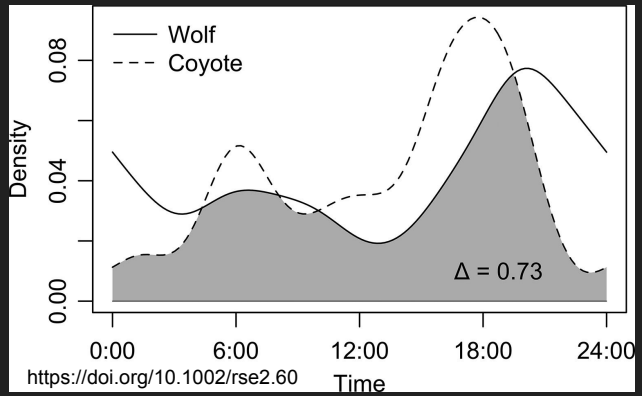
Morey, P. S., Gese, E. M., Gehrt, S. (2007). Spatial and Temporal Variation in the Diet of Coyotes in the Chicago Metropolitan Area. *The American Midland Naturalist*. 158(1), 147-161. https://doi.org/10.1674/0003-0031(2007)158[147:SATVIT]2.0.CO;2

Shores, C. R., Dellinger, J. A., Newkirk, E. S., Kachel, S. M., & Wirsing, A. J. (2019). Mesopredators change temporal activity in response to a recolonizing apex predator. *Behavioral Ecology. 30*(5), 1324–1335. https://doi.org/10.1093/beheco/arz080

Wang, Y., Allen, M. L., Wilmers, C. C. (2015). Mesopredator Spatial and Temporal Responses to Large Predators and Human Development in the Santa Cruz Mountains of California. *Biological Conservation*. 190, 23-33. https://doi.org/10.1016/j.biocon.2015.05.007

Way, J. G., Ortega, I. M., Strauss, E. G. (2004). Movement and Activity Patterns of Eastern Coyotes in a Coastal, Suburban Environment, *Northeastern Naturalist*. 11(3), 237-254. https://doi.org/10.1656/1092-6194(2004)011[0237:MAAPOE]2.0.CO;2





Study Design:

We will conduct an observational study in Montana, Wisconsin, and Maine, which are spread out over the U.S. - In each of these states we will have three control groups and three experimental groups where we study the temporal activity of both wolves and coyotes.

As a control group, we will study areas where coyotes live, but wolves have yet to be reintroduced.

We plan on monitoring temporal activity through the use of radio collars to track coyote movement. If movement is occurring primarily at night with no motion during the day, it can be reasoned that the coyotes in the area are primarily nocturnal and if movement is during the day with no motion at night, it can be reasoned that they are primarily diurnal. Wolf temporal activity will also be monitored to determine how different the activity timing of wolves and coyotes are in areas where they coexist.

Intended Analysis

Because our independent variable is categorical with two groups (wolves present or wolves absent) and our response variable is continuous (timing of activity), a T-Test will be used to analyze results.

If our calculated p-value is smaller than 0.05, we will conclude that wolf reintroduction has resulted in a shift in the temporal niche of coyotes.

Due to the spatial variety of our study sites, we expect that our results are applicable to the general population of coyotes in areas where wolves have been reintroduced, rather than just at the study sites.