

Deer in Infrared Lights: An Analysis of Deer Detection Rates in Relation to Roadways in Southern New Hampshire

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Introduction

Goal: To determine whether road distance influences abundance of white-tailed deer (*Odocoileus virginianus*).

- Human infrastructure (specifically roads) have been found to influence wildlife, road avoidance seen in ungulate populations (Rost and Bailey 1979).
- Majority of deer population estimates involving roads are by direct observation (spotlighting) (Fafarman and DeYoung 1986).
- Few studies have evaluated effects of roadways on wildlife using camera traps, not focused on deer (Bietti et. al. 2014, Mann et. Al. 2015).
- **Hypothesis:** Deer abundance will decrease at camera trap sites placed closer to roads due to road avoidance behavior.



Methods

Study location: Southeastern New Hampshire. The primary land cover is Appalachian oak-pine forest. Camera traps were placed using a spatially balanced design and were randomly deployed.

Data collection: Images were taken from the summers of 2021 and 2022 and processed in the software Timelapse2. This was used to calculate deer abundance.

Analysis: ArcGIS was used to visualize camera sites and determine distance from road, R was used to run a linear regression using data on road distance and deer abundance.



Results

Coefficient	Estimate	Standard Error	T value	P value
Intercept	4.74	0.97	4.91	<0.01
Log Distance to Road	-0.29	0.18	-1.59	0.12

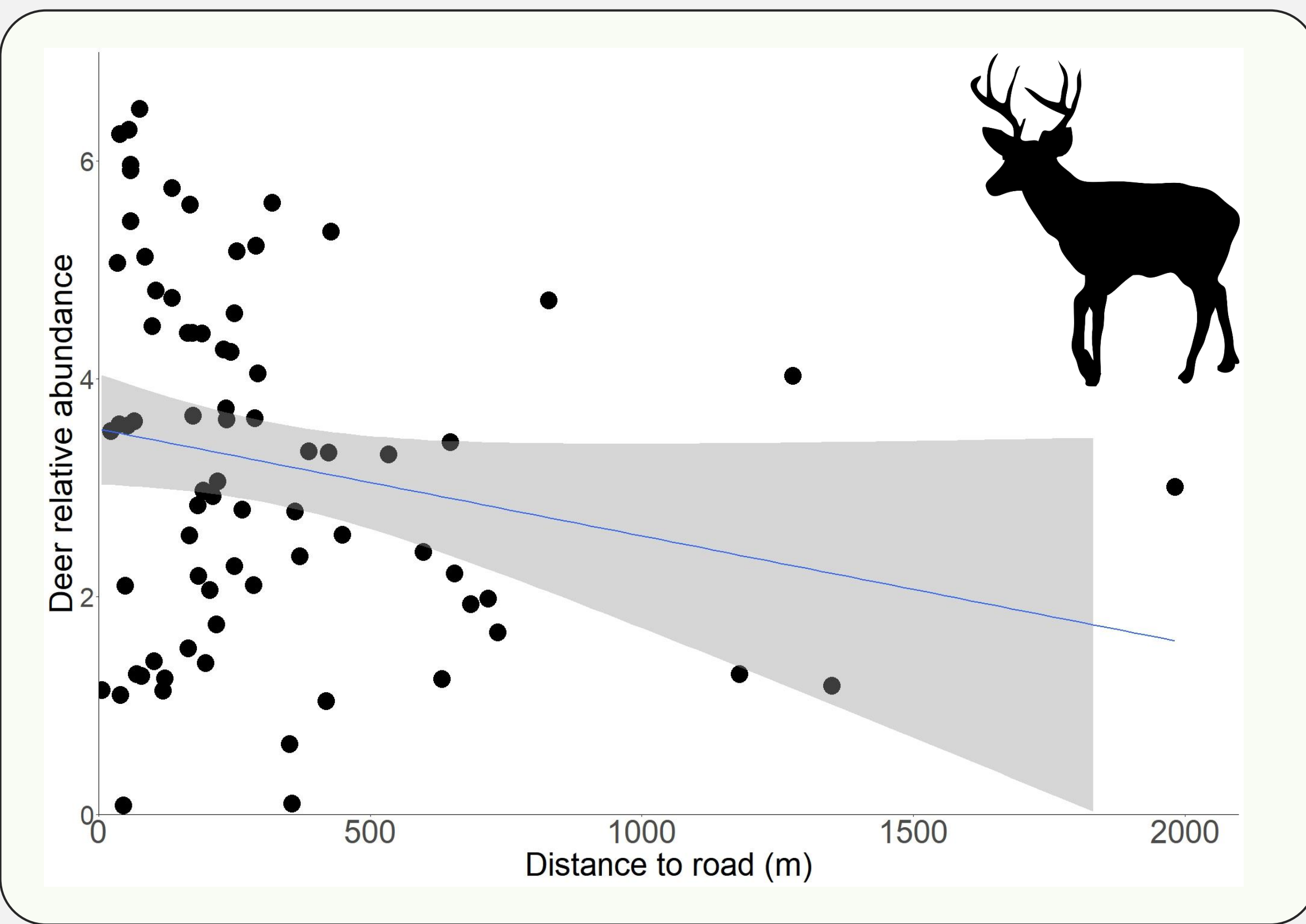


Figure 1: A linear regression showing the correlation between road distance and deer abundance.

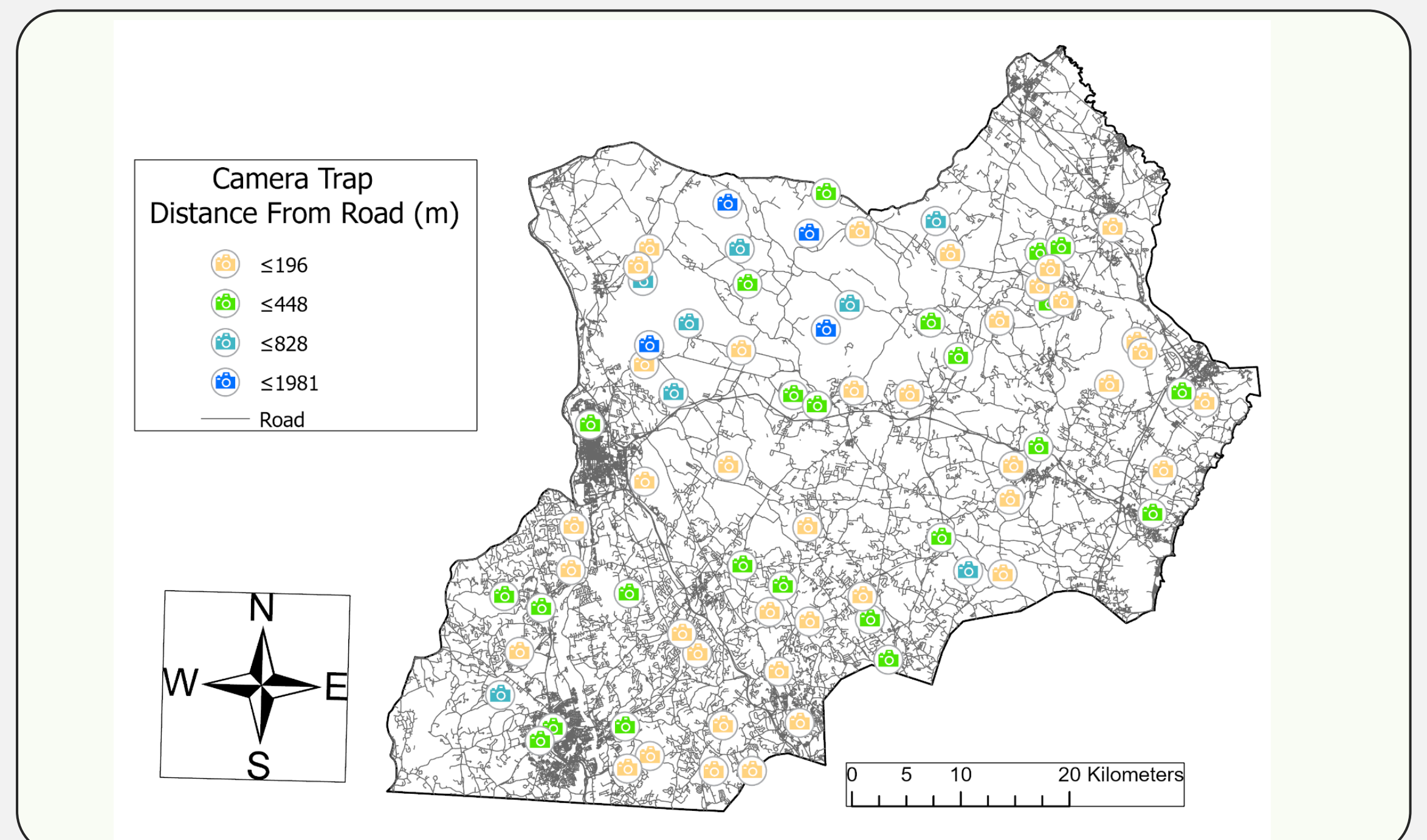
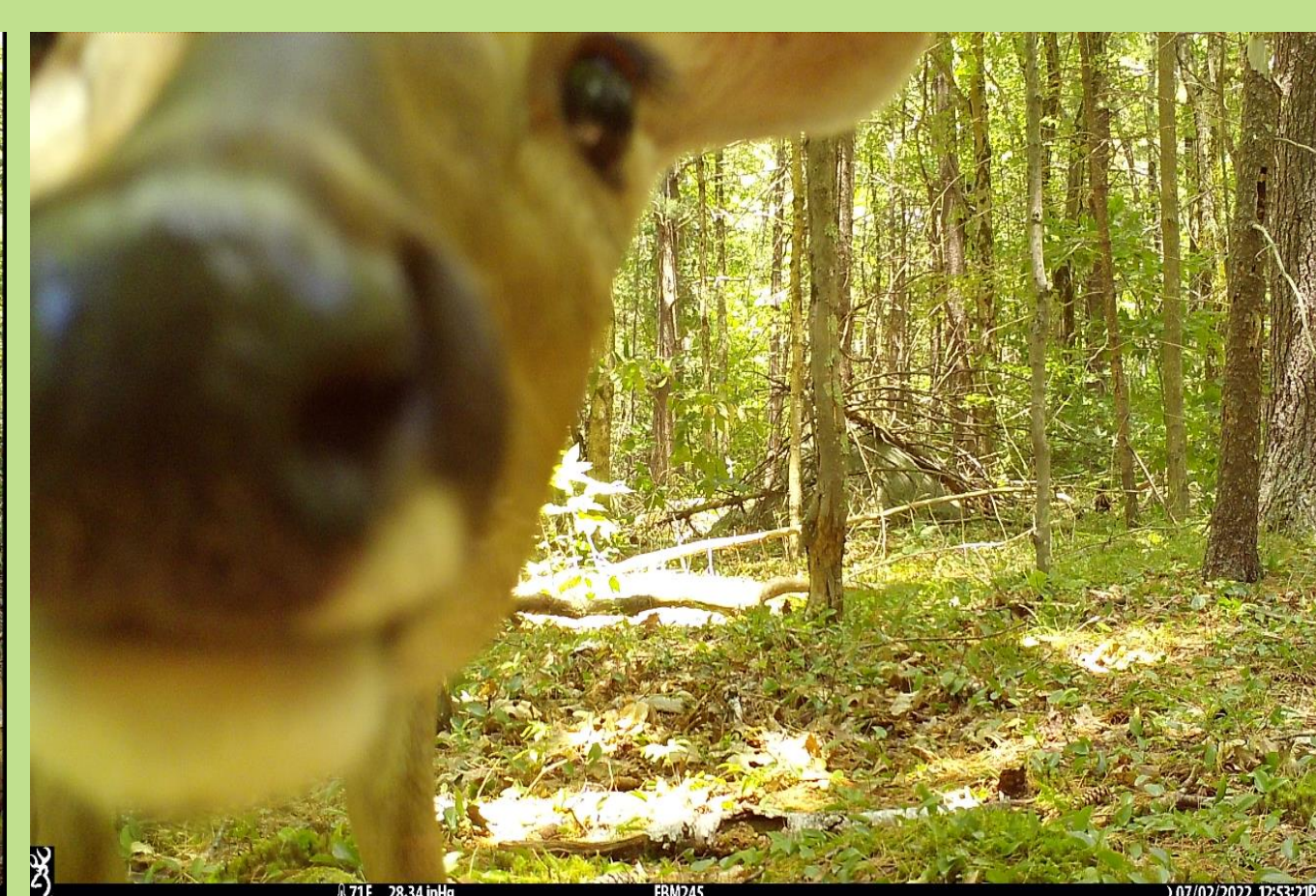


Figure 2: A map showing the camera trap sites deployed and their distances from a road.

Discussion

- Results show slight negative correlation between road distance and deer abundance, but this trend is not significant. Results did not show higher deer abundance closer to roads. Hypothesis not supported.
- Most sites are close to road; possible bias.
- Different sampling techniques provide different population estimates (camera traps, spotlight surveys), possible bias presented in each technique (Roberts et al 2016).
- Accurate population estimates are crucial for wildlife management (Smart et. al. 2013).
- If more deer are near roads, more deer-vehicle collisions will occur (McCance et al 2015). Important for management and to reduce human-wildlife conflict.
- Future studies should incorporate more sites 2000m or farther from roads.



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