

Human Encroachment Effects on Birds of the Kilpisjärvi Biological Station

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Research Question

How does the noise and human disturbance from the E-8 highway impact the local bird diversity and abundance in the immediate area of the Kilpisjärvi Biological Station?

Hypothesis

We hypothesize that as the distance from the road increases, so will bird diversity and abundance.



Figure 1. Survey area; view from the E-8

Introduction:

- Bird abundance is impacted by a variety of factors which include the availability of suitable habitat and access to food. Human encroachment, such as a road, noise pollution and litter impact different species of birds in different ways.
- We want to study the current effects of the E-8 highway on the local bird diversity and abundances in the immediate area of the Kilpisjärvi Biological Station in northern Finland, above the Arctic Circle (see Figures 1 and 2). The E-8, also known as the Northern Lights Route, is the major highway (about 1400 km) connecting northern Norway to southern Finland.
- One study examined the impacts of road construction on bird populations in Helsinki, Finland. The number of species and territories increased during and after construction, but bird populations declined slightly several years later, likely because of habitat succession (Yrjölä and Jarkko 2015).



Figure 2. Unidentified bird in a silver birch tree

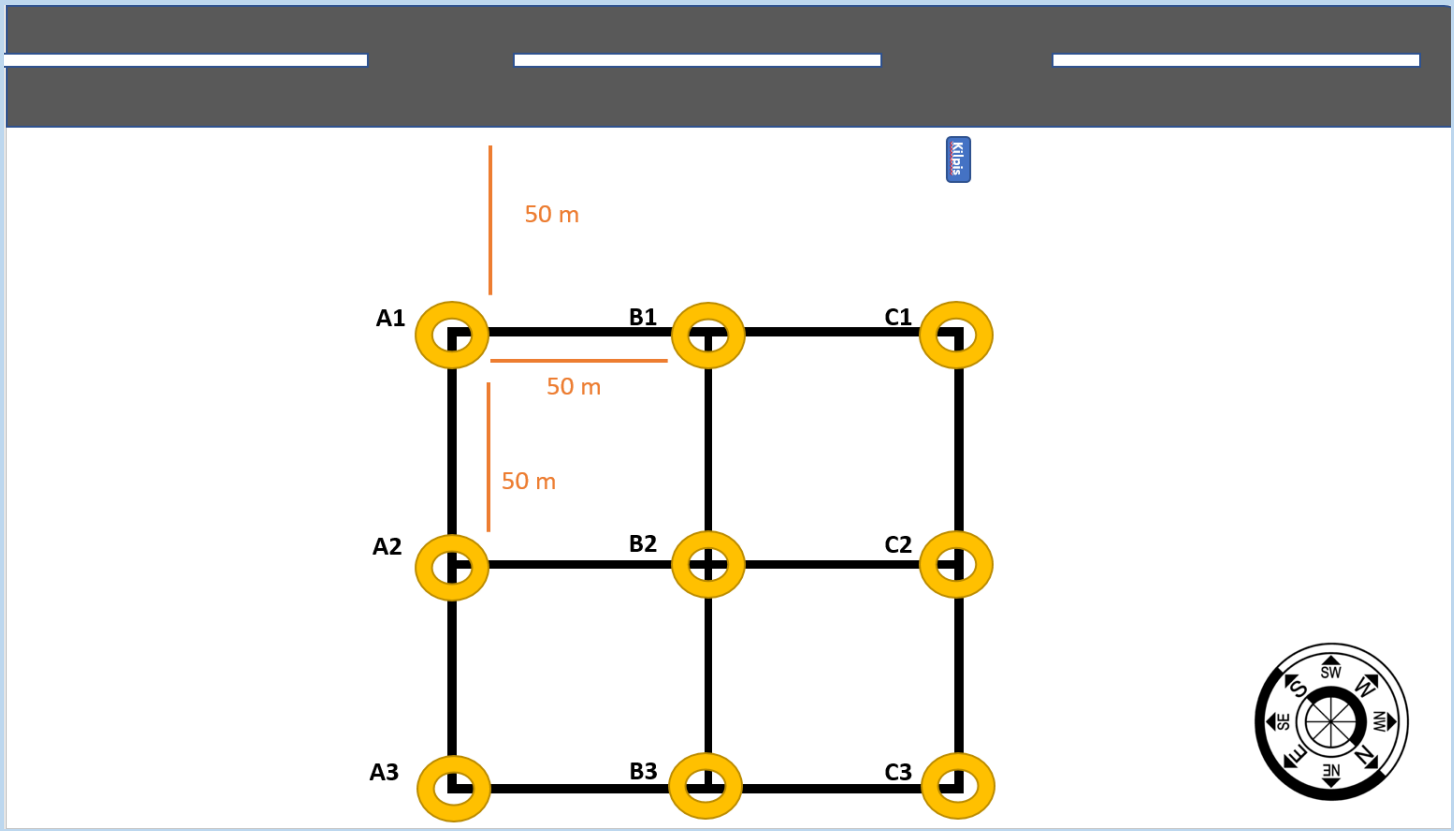


Figure 3. A diagram of the survey area

Methods

- In the surveyed area, there were nine plots 50 meters apart and organized in three parallel transects. Each transect contained three bird survey points, and the whole grid started 50 meters from the road (see Figures 3 and 4).
- Birds were given 5 minutes of silence to let them adjust to our presence.
- For each of the three treatment surveys (one control of sitting in silence, one after a loud yell, and one after the iPhone 4 alarm noise), all birds seen in 15 minutes were counted regardless of whether they were in the air, in a tree or bush, or on the ground.
- If possible, the birds observed were identified by species (see Figure 5).



Figure 4. Brooke and Andrew measuring the survey area



Figure 5. Christina trying to attract birds

Results

- Based on Chi square analysis, there is no statistical difference in the observed number of birds in response to the human noises; the control, the yell (The Mighty Yopp), or the iPhone 4 alarm (P-value = 0.613, 0.454, and 0.057, respectively) (see Figure 6).
- This implies that the birds are no more disturbed by the human activity from the road than the usual human disturbance in the Kilpisjärvi Biological Station forest area.
- We attempted to identify which species of bird we saw, but there were too many marked as unidentified to run any statistical tests for diversity. The majority of bird calls that we heard were identified to come from the Redpoll and the Brambling (see Figures 7 and 8).

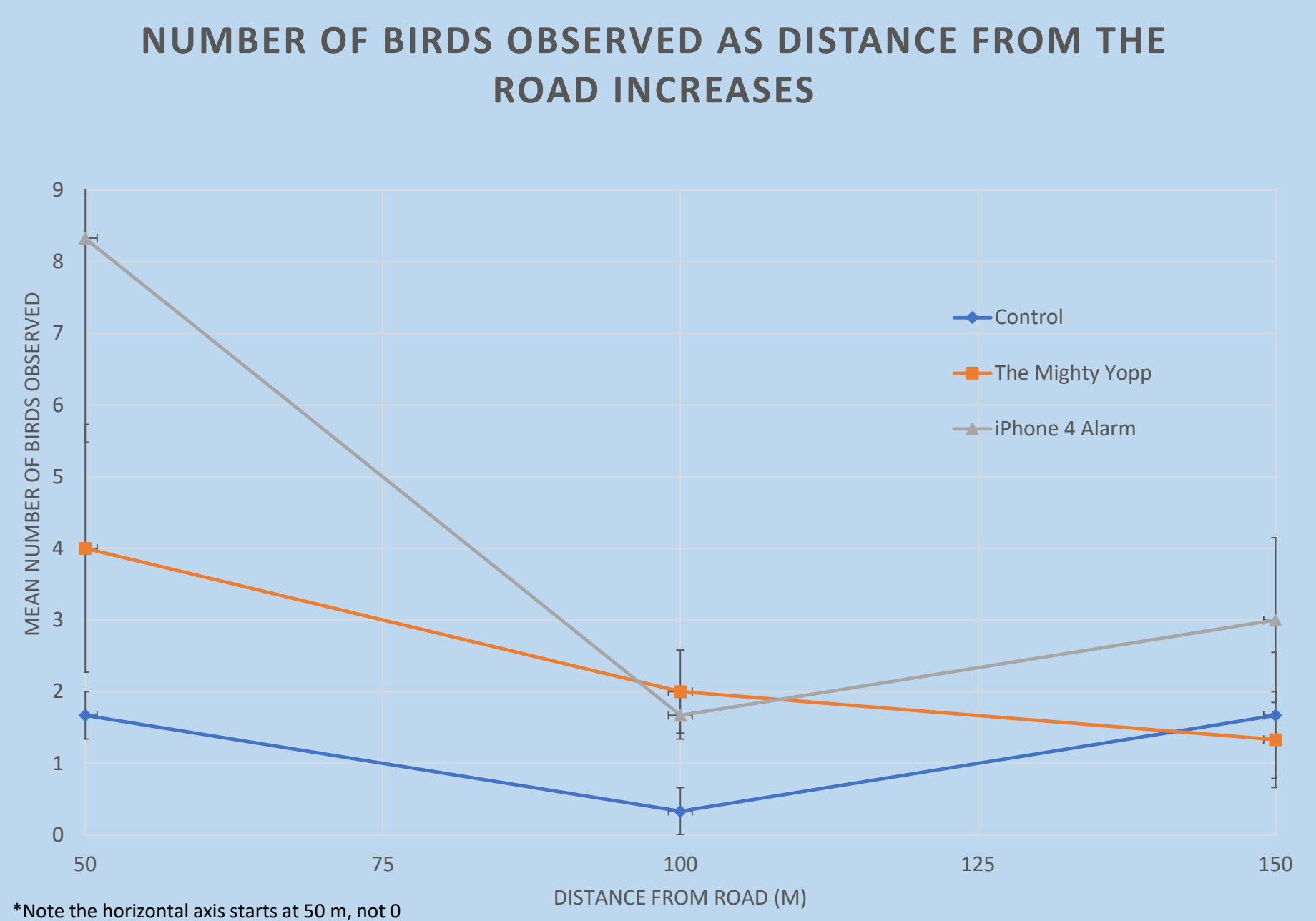


Figure 6. Graph of the results



Figure 7. Redpoll



Figure 8. Brambling

Conclusions

- As the population of Kilpisjärvi continues to grow, the site-specific actions in the town such as shrub and tree planting, water restoration, and increasing vegetation diversity can change bird diversity and human-wildlife contacts (Clergeau, Jokimäki, and Savard 2001).
- However, since the town has a very small population, recorded at about 110 permanent residents, and is located amid a large silver birch forest, human impact is likely very low.
- Another reason for our result may be the low density of birds in the Kilpisjärvi region, as the total populations are still rather large and widely distributed in the boreal taiga (Väisänen, Järvinen, and Rauhalä 1986).
- With a low human impact, low bird density, and plenty of food to go around with all the seeds and berries in the forest, the road is not a factor impacting the bird abundance in the area of the Kilpisjärvi Biological Station.



Figure 9. Crow with food in beak flying over the survey area. The transmission line and light post seen are along the E-8.

Literature Cited

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