

Use of a wildlife overpass by roe deer: What are the effects of human co-use?

Edgar A. van der Grift, Tom Denayère, Jasper Willemsen, Martin Waanders & Dennis R. Lammertsma

Background

In the Netherlands over 70 wildlife overpasses have been built across the country aiming to reduce the barrier effect of (rail)roads and facilitate animal movements across the landscape. At some of these overpasses, human co-use is facilitated through the installation of cycling, hiking and/or horseback riding trails. Currently, little is known about the effects of such human co-use on the functioning of the overpass as corridor for wildlife.

Objective

- Our objective is to study the effects of human co-use on the use by roe deer (*Capreolus capreolus*) of a recently constructed wildlife overpass – green bridge Laarderhoogt – in the Netherlands. The overpass is open for cyclists, hikers and horseback riders.



Figure 1. Green bridge Laarderhoogt is 30 m wide at its narrowest point.



Figure 2. Combined trail for cyclists, pedestrians and horseback riders on top of the overpass.

Methods

At the overpass we surveyed crossing rates, crossing times and behaviour of roe deer with the help of camera traps. Simultaneously we registered the number of people that used the overpass. Crossing rates were also measured at 12 control plots, randomly placed in the surrounding natural area, no further than 2 km from the overpass.



Figure 3. The overpass is frequently used by cyclists, joggers and other pedestrians, especially in the weekend.



Conclusions

- Differences in the intensity of human use of the overpass have no effect on habitat connectivity as crossing rates did not differ but does affect daily activity patterns as the animals delay their use of the overpass on crowded days.
- Our study may help to improve decision-making on opening wildlife overpasses for human co-use and provide guidelines for the design of such multi-functional crossing structures.

Results

- People crossed the overpass about 65,000 times per year. Mean number of crossings per day was 179. Most people crossed by bicycle.
- Roe deer crossed over 700 times during the year of research, hence on average about two times per day.
- Roe deer crossed the overpass nine times more often than at the control plots, indicating a funneling effect.

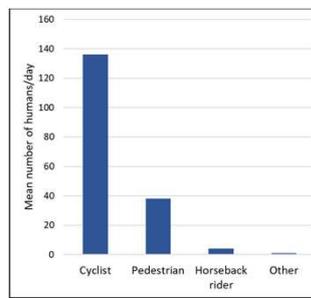


Figure 4. Human use of the overpass.



Figure 5. Roe deer buck on top of the overpass.

- We found no effect of the intensity of human use on roe deer crossing rates (Pearson's Correlation Coefficient; $r=0.071$, $t=0.787$, $df=123$, $p=0.433$).
- We found a weak positive correlation between the intensity of human use and the time of crossing by roe deer (Pearson's Correlation Coefficient; $r=0.244$, $t=2.626$, $df=109$, $p=0.019$).
- On crowded days (>250 humans) the deer passed on average three hours later than on quiet days (<100 humans) ($t=-3.90$, $df=45$, $p<0.001$).

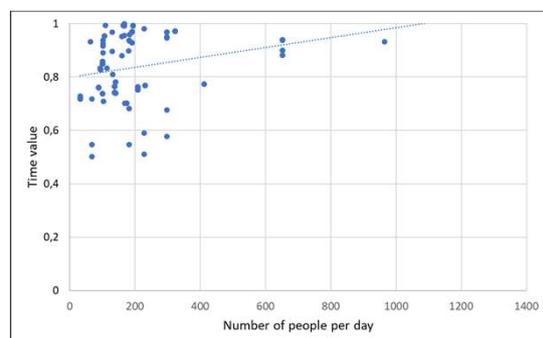


Figure 6. Time of crossing by roe deer between 12:00 and 24:00 h as a function of the number of people that passed between 0:00 and 24:00 h.

