Monitoring of an Animal-Activated Electronic Wildlife-Crossing-System

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Landesbetrieb Straßenbau und Verkehr Schleswig-Holstein

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Introduction

Landscape dissection, habitat fragmentation and the isolation of populations are well recognised issues in wildlife management, nature conservation and even in transportation planning. For decades, wildlife crossings such as viaducts or tunnels were the only ones available to restore habitat connectivity. Animal-activated electronic wildlife-crossing-systems are a relatively new development. These systems detect animals in a defined area at the roadside and will then warn the drivers by lightening up warning signs. Although there are six of these systems in Germany (Summer 2014) little is known about their potential. In September 2011 the first animal-activated electronic wildlife-crossing-system in Northern Germany was set into operation along the federal road B202.

Due to a high amount of deer-vehicle-collisions a game protection fence was erected along the B202 in 2005. The fence cut of traditional game passes and led to habitat fragmentation. To restore habitat connectivity, an animal-activated electronic wildlife-crossing-system was build. Since the initial start-up the system is monitored permanently to determine the date and time of crossings, species, amount and behaviour of the crossing animals as well as traffic density and speed at the time of the crossing.

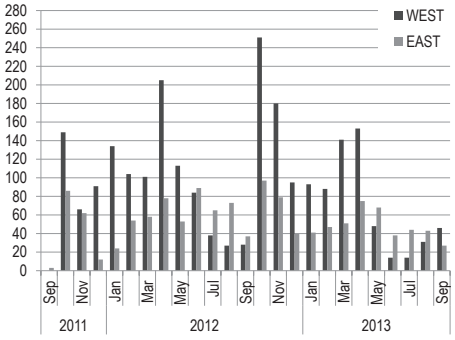

Fig. 1: Number of crossings in the first two years of operation for both crossing sites.

The System

The entire system consists of 3.5 km game protection fence on both sides of road and two crossing sites (West & East), integrated in the fencing. Both crossing sites have two detection areas of 50 m breadth and 20 m depth. Each of these areas is surveilled by 6 passive infrared sensors. In case one of the sensors detects a heat signature combined with movement of the heat source LED warning signals along the road are activated. Additionally a light barrier was installed (Fig. 3). If the light beam is being interrupted, the footage of the surveillance cameras will be recorded on DVR.

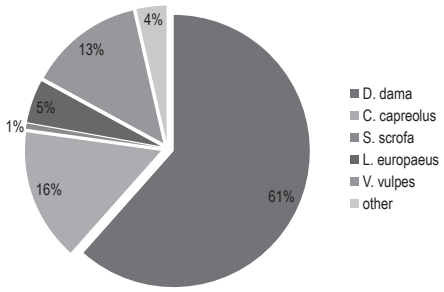

Fig. 2: Percentage distribution of wild game species using the crossing sites

Crossings – When to cross

The first crossing took place in the Eastern crossing site on September 23rd - only 11 days after the initial start-up.

As early as October 2011 both crossing sites were used frequently. The amount of crossing decreases in wintertime, with a low between November and January. After an increase in autumn, the amount of crossings declines in summer and rises again in late summer / early fall (Fig. 1).

Most of the crossing took place between the 18:00 hrs and 06:00 hrs (GMT+1). However every sixth to seventh crossing occurred from 08:00 hrs to 18:00 hrs (Fig. 4).

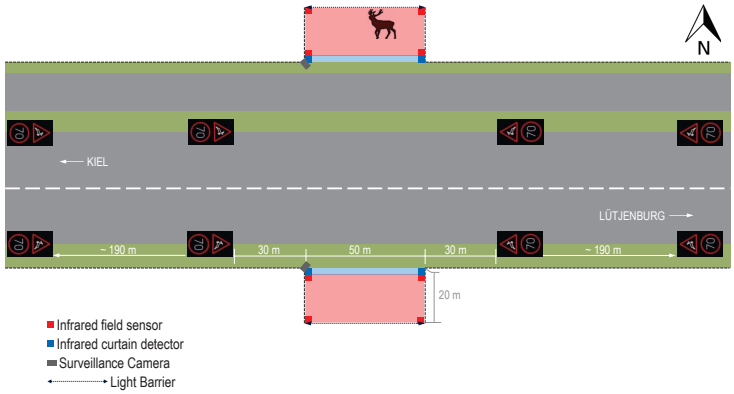

Fig. 3: Schematic illustration of the wildlife-crossing system. Shown are crossing-site with detection areas and warning signals.

Crossings – Who is who?

During the first year of operation we identified 1,724 crossings (crossing site West: 1,040, crossing site East: 684). The second year of operation showed more or less the same usage of the crossing sites – with 1,154 crossing in the Western and 650 crossings in the Eastern crossing site.

Most of all fallow deer (*Dama dama*) use the crossing sites, followed by roe deer (*Capreolus capreolus*), fox (*Vulpes vulpes*) and European hare (*Lepus europaeus*). Wild boar (*Sus scrofa*), European badger (*Meles meles*) and marten (*Martes spec.*) also were identified (Fig. 2).

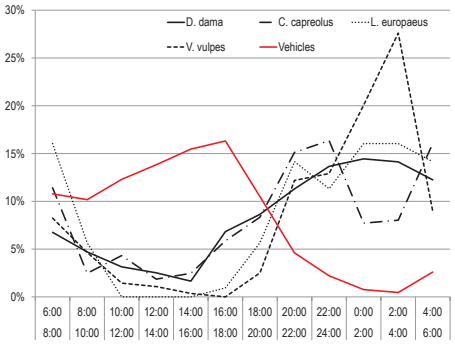

Fig. 4: Percentage distribution of crossings of the 4 species crossing the most and traffic by time.

Toll of Traffic?

The federal road B202 is one the most important West-East-connections in the region. On average 10,000 vehicles per day pass through the wildlife warning system (Fig. 5).

Despite the high amount of crossings and traffic only 5 deer-vehicle-collisions (DVC) occured in the first year of operation, all of which with fallow deer (*Dama dama*). In the second year 11 DVC took place. The species involved were fallow deer and roe deer (*Capreolus capreolus*).

Taking the number of crossings into account, the proportion of DVC to crossings is less than 0.1 percent.

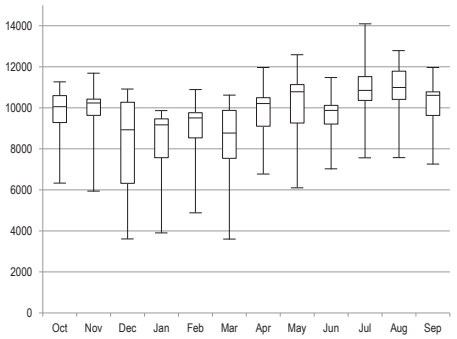

Fig. 5: Number of vehicles per 24 hrs passing the Animal-Activated Wildlife-Crossing System on federal road B202.

Discussion

Habitat fragmentation is one of the major causes of species extinction and loss of biodiversity. If landscape permeability is reduced by barriers such as wildlife fencing along roads the immigration rate may sink under the extinction rate and suitable habitats may stay unpopulated. Without fencing there is a perpetual danger of DVC.

Animal-activated wildlife-crossing systems provide the opportunity for wild animals to cross roads without huge and expensive constructional mitigation measures like wildlife viaducts. The monitoring of the wildlife-crossing systems along the B202 showed the capability of such systems. Very soon after the start-up both crossing sites were used frequently with just a small proportion of DVC of less than one permille.

For large mammals an animal-activated wildlife-crossing system may fulfil the ecological profile of a wildlife viaduct, given that it is build with the proper specifications and at the right location. Such systems constitute an effective compromise between habitat connectivity and traffic safety. They are relatively inexpensive, can easily be integrated in an existing wildlife fencing and will only warn drivers if there is a real risk that wild animals might be on the road.

Acknowledgements

The monitoring is financed by the State Company for Road Construction and Transport of Schleswig-Holstein, branch Rendsburg.

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