2010 IENE International Conference on Ecology and transportation

Improving Connections in a changing environment

27th September - 1st October, 2010
Velence, Hungary

Programme and Book of Abstracts

The barrier effect of twin tracked, non fenced railroads in Sweden

Mattias Olsson, Evelina Augustsson, Andreas Seiler, Per Widén, J-O Helldin
mattias.olsson@enviroplanning.se, eve_aug@hotmail.com, andreas.seiler@ekol.slu.se, perw@kau.se, j-o.helldin@cbm.slu.se
Corresponding author: Mattias Olsson, EnviroPlanning AB, Lilla Bommen 5c, 411 04 Göteborg

Keywords: Barrier effect, railroads, ungulates, Sweden

Fenced infrastructure composes an almost total barrier for larger wildlife, and movements across the road or railroad are thus restricted to fauna passages, fence openings and other mitigation measures. However, the strength of the barrier caused by non fenced railroad systems is not sufficiently studied. The present Swedish railroad system is mostly single tracked and poorly mitigated for wildlife connectivity, but as new larger lines with high traffic volumes are planned, this question has to be evaluated.

In theory, the barrier effect caused by a railroad may vary depending on the traffic volume, railroad width and other characteristics of the embankment, and be species specific. The aim of the study was to quantify moose and roe deer movements across and near railroad systems, and to quantify the barrier effect caused by non fenced railroads with different traffic volumes. The snow track survey was conducted at two transects parallel to the railroad. The transect near the railroad were used to control movements across the embankment and movements near the railroad, and the transect 200 meters from the railroad were used as a reference.

In total, 152 km of railroads and an equal length of reference transects were studied. Moose and roe deer crossed the railroad in average 0,065 and 0,46 times per day and km respectively during the study. No structural effects of single or twin tracked railroad systems could be found on moose and roe deer movements across the embankment. However a significant effect from train volume was found for both moose and roe deer. The results indicated that an increased traffic volume effects ungulate movements across the railroad and thus connectivity plans for wildlife should be used on present high volume lines and when planning new high volume lines.

A quantitative comparison of the reliability of animal detection systems and recommended requirements for system reliability

Marcel P. Huijser, Tiffany D.H. Allen, Matt Blank, Mark C. Greenwood, Shaowei Wang
mhuijser@coe.montana.edu, tiffany.holland@coe.montana.edu, mblank@coe.montana.edu, greenwood@math.montana.edu, swang@coe.montana.edu
Corresponding author: Western Transportation Institute at Montana State University (WTI-MSU), PO Box 174250, Bozeman MT 59717-4250, USA. Phone: 406-543-2377.

Keywords: Animal detection systems, Mitigation measures, Reliability requirements, Safe crossing opportunities, Wildlife-vehicle collisions

Animal detection systems have the potential to reduce collisions with large mammals and improve human safety while not blocking or confining animal movements across the road. However, reliable warning signs are essential as the effectiveness of these systems depends on driver response. To investigate the reliability of the systems we constructed a controlled access test facility near Lewistown, Montana, USA. Nine systems were installed to detect horses and llamas that roamed in an enclosure. The llamas and horses served as a model for wild ungulates. Data loggers recorded the date and time of each detection for each system. Animal movements were also recorded by six infrared cameras with a date and time stamp. By analyzing the images and the detection data, we were able to investigate the reliability for each system. The percentage of false positives (i.e., a detection is reported by a system but there is no large animal present in the detection zone) was relatively low for all systems (≤1%). The percentage of false negatives (i.e., an animal is present in the detection zone but a system failed to detect it) was highly variable (0–31%). The percentage of intrusions (i.e., animal intrusions in the detection area) that were detected varied between 73 and 100 percent. The results suggest that some animal detection systems are quite reliable in detecting large mammals with few false positives and false negatives, whereas other systems have relatively many false negatives. In addition we investigated how the reliability of individual systems was influenced by environmental conditions. Finally we surveyed three stakeholder groups—employees of transportation agencies, employees of natural resource management agencies, and the traveling public—with regard to their expectations on the reliability of animal detection systems and compared the reliability of the nine systems to these expectations.