Enhancing Evaluation of Wildlife Detection Systems

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$40,000

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Tran-SET
University of New Mexico

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$80,000

Exploration of detection technologies and game fencing in prevention of wildlife-vehicle collisions

Every year in the U.S., wildlife-vehicle collisions (WVCs) cause 200 human fatalities, 26,000 human injuries, considerable property damage, and substantial harm to wildlife populations, resulting in approximately $8.4 billion in total costs. One way to prevent these collisions is through the use of wildlife crossing structures. To ensure that wildlife utilize these structures, crossing designs typically include game fencing to channel wildlife to the structure. However, how much game fencing is needed to effectively direct wildlife to a crossing structure? To answer the research question, the research team will examine a wildlife crossing structure located near Lumberton, New Mexico. Novel wildlife detection technologies (i.e. Reconyx PC800 HyperFire Professional Semi-Covert Infrared Camera) will allow us to understand how much and what type of wildlife is utilizing the crossing and how we might better channel animals to crossings. By placing these cameras throughout the corridor, we will be able to determine whether different species, ages, and genders of wildlife are crossing the road at the ends of the fence, jumping the fence, or actually using the crossing. Observations will be supplemented with crash and carcass counts that date back to the 1990s. Past research performed by NMDOT provides us with knowledge of the wildlife present in the area and its behavior relative to roadway environments. We will work with NMDOT and the Arizona Game and Fish Department to develop best practices for wildlife-vehicle collision mitigation, sharing those lessons nationwide to save lives (both human and wildlife) and enhance wildlife conservation efforts.

Problem Statement

The over four million miles of public roads in the United States (U.S.) comprise the largest road network in the world (FHWA 2011). This vast network connects diverse communities across the country and enables our economy to prosper. However, the road network also disrupts native wildlife populations both in terms of their habitats and their movements (Figure 1). In addition to natural wildlife movement disruption, vegetation promoted by landscape disturbance can attract additional wildlife to roadside environments, further increasing the likelihood of wildlife-human interaction.

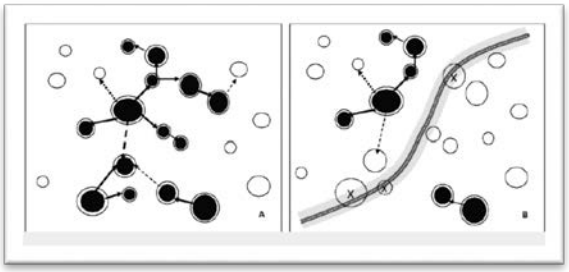

Figure 1. Wildlife populations are linked to each other through movements along migratory corridors (left). When a roadway is installed, populations' natural habitats and movements are disrupted (right). When populations are divided, the entire population risks extinction.

Every year in the U.S., wildlife-vehicle collisions (WVCs) cause 200 human fatalities, 26,000 human injuries, considerable property damage, and substantial harm to wild life populations, resulting in approximately $8.4 billion in total costs. For many highways in rural New Mexico, WVCs are the most prevalent type of collision. In addition to direct collisions with wildlife, it is common for vehicles to swerve to avoid a WVC and collide with another vehicle or a roadside object. To avoid wildlife-related collisions, roadway engineers have two choices: 1) warn motorists of the presence of wildlife on the roadway or 2) provided wildlife with a way to avoid entering the travel way. To achieve the former, methods of detecting wildlife and warning motorists must be utilized. To achieve the more-popular latter approach, a variety of wildlife crossing structures are typically used. These structures include wildlife underpasses, multi-use underpasses, culverts, landscape bridges, wildlife overpasses, and multi-use overpasses. To ensure that wildlife utilize these crossing structures, crossing designs typically include game fencing to channel wildlife to the structure.

The New Mexico Department of Transportation (NMDOT) has designed and constructed WVC mitigation projects since 2004 and seeks to answer an important question that they have encountered in so doing: how much game fencing is needed to effectively direct wildlife to a crossing structure? With a variety of crossing structures available and a variety of animals of different species, ages, and genders needing to use the structures, the question of how to best direct wildlife to different crossing structures requires further investigation.

Objectives

The objective of this project is to develop a cost-effective solution to WVCs. To achieve this objective, the project will include a literature review of current WVC avoidance strategies, wildlife crossing structures, game fencing practices, and wildlife detection methods. We will then analyze novel detection technologies and crossing treatments in the field. Results of the analysis will inform guidance and best practice recommendations.

Intended Implementation of Research

Education, workforce development and outreach activities: The project will employ a graduate student who will become a future member of the transportation workforce. In addition, the report will inform current best practices in wildlife detection and WVC avoidance and can be used for education and training of the current workforce. I will also integrate lessons learned into two courses that I teach at the University of New Mexico: CE482-582 Highway and Traffic Engineering and CE 491-598 Transportation Safety.

Coordination will occur with the New Mexico Local Technical Assistance Program (NM-LTAP) to disseminate findings to local communities, thereby sharing innovation and cost savings. Other collaborators that will aid with and benefit from the project include NMDOT, AFGD, NMDGF, and other state and local DOTs.

Findings will be disseminated through meetings and webinars with project stakeholders, a final project report, an implementation report, faculty and/or project websites, a published journal article, the Transportation Research Board Annual Meeting, and the Tran-SET conference.

Anticipated Impacts/Benefits of Implementation

The potential implementation of this research is high as this project will develop guidelines that can be used immediately by DOTs to avoid WVCs. The expected benefit is the preservation of the transportation system and environment. Reduced wildlife-vehicle collisions, decreased maintenance, lives saved, injuries reduced, decreased property damage, wildlife population conservation, education and training, technology development and transfer are anticipated benefits of this study.

Web Links

- TranSET's website (https://transet.lsu.edu/research-in-progress/)
- TRB's Research in Progress (RIP) database (https://rip.trb.org/View/1644244)

Tran-SET

Tran-SET is Region 6's University Transportation Center. It is a collaborative partnership between 11 institutions (see below) across 5 states (AR, LA, NM, OK, and TX). Tran-SET is led by Louisiana State University. It was established in late November 2016 "to address the accelerated deterioration of transportation infrastructure through the development, evaluation, and implementation of cutting-edge technologies, novel materials, and innovative construction management processes".

Learn More

For more information about Tran-SET, please visit our website, LinkedIn, Twitter, Facebook, and YouTube pages. Also, please feel free to contact Mr. Christopher Melson (Tran-SET Program Manager) directly at transet@lsu.edu.