FY 2009 RESEARCH PROBLEM STATEMENT

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TITLE

GHE-09-23 Characterizing Wildlife and Roadway Corridors for Mitigating Animal-Vehicle Collisions

PROBLEM (Description of need)

The Insurance Institute for Highway Safety reports an estimated 1.5 million animal-vehicle collisions (AVC) annually in the United States, causing more than 150 fatalities and $1.1 billion in property damage each year. AVC are known to occur where roadways intersect wildlife movement corridors. A recent study of ODOT's dispatch records in Maintenance District 10 found that more than 10,000 dead deer and elk were recorded over a recent five-year period on the District's 800 + miles highways. The analysis of these reports shows that they are clustered at distinct locations on the highway or "hotspots." As yet, ODOT does not have an operational model to explain and predict landscape or highway features attributed to AVC hotspots like these.

PROPOSED RESEARCH, DEVELOPMENT OR TECHNOLOGY TRANSFER ACTIVITY

The objectives of this project are to investigate the factors that determine the locations of animal-vehicle collision (AVC) hotspots and develop numerical models for assessing roadway mitigation alternatives on Oregon highways. Literatures show that AVC occurs in spatially and temporally clustered hotspots influenced by road design, traffic flow, land use, land cover, and wildlife movement patterns. These AVC factors act collectively and their interactions vary with animal species and geographical regions. This project seeks to analyze AVC factors at local scale through a holistic approach based on GIS, remote sensing, spatial analysis, and statistical models. The major tasks include: 1) compiling a comprehensive environmental GIS database along roadway corridors, 2) classifying homogeneous roadway segments based on design and usage variables, 3) characterizing environmental variables that relate to deer/elks movements for each roadway segment, 4) building statistical models that examine what kinds of roadway type and environmental variable combinations are associated with AVC hotspots. Specific methods to be used include distance-weighted landscape pattern analysis, Principal Components Analysis, Cluster Analysis, Discriminant Analysis, and regression analysis.

BENEFITS

This proposal is an important contribution to the Oregon Wildlife Movement Strategy, and requested by several key stakeholders (ODFW, FHWA, USFWS, ODOT). The numerical models developed could answer questions such as what road widths or traffic volumes are associated with what levels of AVC risk or whether certain bridge types were associated with significantly reduced risk of AVC. Effective roadway mitigation improves traffic safety and, at the same time, reduces roadway induced wildlife habitat separation. The outcome of this project is fundamental to developing effective mitigation approaches. The comprehensive environmental GIS database could be used for other ODOT roadway management applications. Results of this project could also benefit wildlife-friendly and safety roadway design.

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