Determining criteria to evaluate mitigation measures to reduce wildlife-vehicle collisions: Teton County, Wyoming

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DETERMINING CRITERIA TO EVALUATE MITIGATION MEASURES TO REDUCE WILDLIFE-VEHICLE COLLISIONS: TETON COUNTY, WYOMING

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Abstract: Animal-vehicle crashes are a serious threat to health and human safety in many areas of the United States. Just in Teton County, Wyoming, between 1990 and 2001 there were 1,970 known vehicle crashes with deer, elk, and moose. While various mitigation measures are available to reduce animal-vehicle crashes, there are no definitive criteria that have been utilized to evaluate the many options available to experts of both transportation and wildlife. Some criteria that should be used are obvious, such as if the particular mitigation measure is actually effective at reducing animal-vehicle crashes. However, if effectiveness is an obvious concern, why is the ineffective leaping deer sign the most popular technique still being used in an attempt to reduce animal-vehicle crashes? There are obviously other considerations to be made when agencies are choosing among the many techniques and policies that are available to reduce wildlife-vehicle collisions.

Objective
The objective of this project is to compile criteria for evaluating the various known mitigation measures for reducing wildlife-vehicle crashes in Teton County, Wyoming. This information will then be used in the policy analysis aspect of planning for road expansion and improvement projects, for new roadway construction, or when trying to make roads more safe for motorists by implementing techniques to reduce animal-vehicle crashes in high density crash areas.

Funding
The Jackson Hole Wildlife Foundation, a non-profit organization in Teton County, Wyoming has initiated a Roadway and Wildlife Study to examine the problem of wildlife-vehicle crashes in Jackson Hole. This project is a portion of the larger study, and is being funded entirely by the Jackson Hole Wildlife Foundation. The total budget for my portion of the project is $5,000.

Methodology
The author interviewed twenty-two experts in the fields of transportation, planning, engineering, environmental services, project development, civil engineering, wildlife biology and management, as well as citizen transportation groups and representatives. The experts represent the various agencies found within Teton County and Wyoming in general and include: Federal Highway Administration, Wyoming Department of Transportation, Teton County Planning and Engineering, U.S. Fish and Wildlife Service, National Park Service, and U.S. Forest Service, as well as professors in civil engineering and zoology from the University of Wyoming, and non-agency experts in transportation planning and wildlife biology. The interviews consisted of descriptions of all known mitigation measures, followed by the author asking the experts to list three to five criteria that they believe are the most important in deciding which policies and techniques should be implemented. The author then analyzed the results and compiled the most common responses from the various experts.

Conclusion
A total of 102 criteria were submitted and fit into ten broad categories: (1) economic possibility, (2) technical feasibility, (3) political viability, (4) measurable/monitorable results, (5) effectiveness, (6) deer, elk, and moose biology, (7) human safety, (8) extent of the problem, (9) long-term solution, and (10) administrative operability. The most commonly stated criteria were mentioned a minimum of ten times (greater than 10%) of the 102 responses. The top six criteria are listed in the order of most frequently mentioned to the least frequently mentioned:

1) Economic possibility (17%):
   • Cost of the alternative
   • Cost-benefit
   • Long-term maintenance

2) Technical feasibility (15%):
   • Engineering/practical constraints such as grade separation, roadway design, speed, use level, configuration, winter plowing operations in target areas, and landform/vegetation/soils complex
   • Land ownership constraints
   • Necessity of a suite of techniques for success (e.g., driver education with crosswalk; fences with over/underpasses)

3) Political viability (13%):
   • The technique must be politically feasible and comply with federal, state, and local regulatory framework
   • The technique must be acceptable to the driving public and motorists must comply if the technique requires
4) Measurable/monitorable results (13%):
   • The technique must allow for monitoring to evaluate measurable results
   • New techniques should be tried (particularly regarding National Park Service and U.S. Forest Service) that present opportunities for creativity and research

5) Effectiveness (12%):
   • The ultimate goal of any alternative is to reduce the frequency of wildlife-vehicle collisions
   • The alternative must contribute to a reduction in deer, elk, and moose collisions with vehicles

6) Deer, elk, and moose biology (11%):
   • Viable alternatives must preserve the integrity of the habitat and must minimize disruptions to the behavioral patterns of deer, elk, and moose
   • Any technique should be strategically placed in a functional ecological corridor
   • Alternatives must allow deer, elk, and moose to cross roadway corridors so they can access available habitat throughout Teton County
   • Additionally, a solid understanding of why the problem is occurring there should be ascertained: Is it a migration route, food source, or travel between habitat components?

From a land-use perspective it is imperative to consider potential build-out so a permanent and expensive technique is not rendered useless if current land-use patterns change. The spatial relationship of how the surrounding environment is influencing where animals move across roadways needs to be considered before implementing any mitigation measures. Also, if any technique were to degrade highway safety, it would run counter to agency goals. The author believes that the two following criteria, which were mentioned by five percent of the experts, are worthy of consideration:

1) The technique should be a long-term solution and not become invalid if land use changes occur
2) The technique must not be harmful to motorists

If any of the techniques to reduce wildlife-vehicle collisions do not meet the above two or the top six criteria, they will be considered “fatally flawed” and removed from further consideration. The alternative strategy of using a suite of techniques ought to be considered for any highway segment. Combining public service announcements with signage displaying roadkill tallies to heighten public awareness, would be a logical complement to lower speed limits, for example, and may result in greater motorist understanding and, therefore, compliance with reduced speed zones.

There is no one-size-fits-all approach for selecting mitigation measures to reduce wildlife-vehicle crashes. What may benefit one species may inadvertently harm another. It is recommended that each location in need of mitigation be considered individually, using the evaluation criteria determined in this study.

**Implications for Future Policy Development**

The transportation community is facing incredible environmental challenges. Increased traffic is overwhelming many of our roadway systems, particularly those in the Rocky Mountain West where rural two-lane roads have sufficed until recent population growth sparked congestion problems. With more people moving near large expanses of public lands, wildlife populations will be susceptible to the effects of habitat loss and fragmentation, and rural highway systems will be pushed to their limits. This will likely result in multi-lane highways, increased vehicle speeds, and, consequently, increased wildlife-vehicle collisions.

Many areas in the Mountain West and beyond could benefit from developing effective strategies to mitigate wildlife-vehicle collisions. Using evaluation criteria to determine the best mitigation strategy for a particular road segment is essential for making objective, informed decisions. It is hoped that the results obtained from this study will set a standard for evaluating the choices of mitigation measures that are available to transportation planners in Teton County, as well as throughout the United States where animal-vehicle crashes are endangering both human lives and wildlife populations.

**Further Information**

Additional Information about this project and the Jackson Hole Wildlife Foundation can be found at www.jhwildlife.org.

**Biographical Sketch:** Susan Wells Johnson received her B.A. in anthropology from the University of Connecticut, Storrs, in 1992. Upon graduation she began work as an interpretive ranger at Mesa Verde National Park in Colorado. After two years of interpreting the human history of the Southwest, she became more focused on the natural history of the Greater Yellowstone area and worked for seven summers as a naturalist in Grand Teton National Park. While living in Jackson Hole, Wyoming, and interpreting the issues associated with human and wildlife interactions, she decided the most effective way to become directly involved was through environmental planning. She obtained a master of planning degree from the University of Wyoming, Laramie, in May 2003, returned to Jackson, and currently works as a planner for Teton County Planning and Development.