



HIGHWAY EFFECTS ON MULE DEER MOVEMENT AND SURVIVAL

Fact Sheet #3

OVERVIEW

Mule deer need open landscapes to make a living. They move long distances daily and seasonally, and highways that cross mule deer ranges can be an obstacle to those movements. Many mule deer are killed on highways and many more have restricted their daily and seasonal ranges to avoid crossing busy highways. State and provincial wildlife and transportation agencies are working to keep deer off the roadway, while allowing them to get to the other side safely with specially designed crossing structures.



AZGFD - George Andrejko

BACKGROUND

Mule deer populations are stable or declining in many of the western states and provinces. The causes for declines are varied and can be difficult to identify, but often are habitat related. High traffic roads can reduce habitat quality through the isolation of valuable resources. They can also be a source of direct mortality. If we can reduce highway mortalities while maintaining or restoring quality connected habitat, populations could reverse their decline and begin to grow.

EFFECTS OF HIGHWAYS ON MULE DEER

Highways affect mule deer in two critical ways; directly through mortality caused by vehicle strikes, and indirectly through fragmentation of habitat that can keep mule deer from acquiring needed resources and reduce genetic interchange. Fenced highways fragment the habitat, disrupt seasonal and daily movements, and can isolate breeding populations. Wide, unfenced highways with large traffic volumes can also be obstacles to deer movement. These disruptions to habitat and travel often decrease the survival or reproduction rates of individuals, which can lead to population declines.

To be effective, wildlife and highway managers have to solve 2 fundamental problems. First, keep deer away from vehicles, and second, ensure that the highway remains permeable enough that the natural daily and seasonal movements of deer are not significantly impacted by the highway. Exclusionary fencing, used together with proper crossing structures, are the preferred and most successful methods to reduce vehicle-caused mortality and allow deer populations to move freely through the landscape.

COST OF DEER-VEHICLE COLLISIONS TO SOCIETY

Researchers have identified that each deer-vehicle collision costs society over \$8,000. These costs include vehicle damage, insurance claims, medical bills, removal of carcasses, and recreational value of deer. These costs help justify mitigation measures such as wildlife crossings and fencing by illustrating the long-term cost-benefit of such structures.

CROSSING STRUCTURES

There are 2 basic types of wildlife crossing structures: overpasses and underpasses. Overpasses facilitate wildlife passage above a roadway, while underpasses are structures that allow wildlife to cross underneath a roadway.

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Overpasses can be thought of as bridges which cross over a road. They contain a continuous strip of vegetation which connects the natural landscape on one side of the road to the other side. There are less than 100 overpasses worldwide. The oldest overpass in North America was built for mule deer over I-15 in Utah. The best known and most studied overpasses occur in Banff National Park in Canada.



Underpasses allow wildlife to pass under the road. There are primarily 2 types: bridges and culverts. Single-span bridges rest only on abutments at each end of the bridge, and multi-span bridges have intermediate support columns between abutments. Culverts pass under the road surface, and are entirely surrounded by the roadbed. Culverts come in a variety of sizes and shapes, including square, rectangular, elliptical, and cylindrical, and are commonly made of concrete or steel. Both deer and elk prefer to use overpasses or large, open underpasses.

FACTORS AFFECTING MULE DEER CROSSING SUCCESS

The size, type, and location of mule deer crossing structures are important attributes to their success because not all species or even all populations use these structures in the same way. Researchers have learned that deer prefer wildlife crossings that are open and spacious because the openness allows a better view of potential predators. The most important roadway attribute affecting use of crossing structures by large ungulates is road width. Wider paved roads require larger crossing structures to effectively pass deer. The location of mule deer crossing structures is the most important factor in their success. Knowledge of movement patterns of mule deer is an important prerequisite to the placement of these structures. Deer tend to use the same routes year after year, so the most effective crossing structures are those placed where deer traditionally cross roads.

Locations of movement corridors can be identified through movement studies, roadkill, data or expert-based knowledge. Once movement corridors are identified, biologists and engineers should use landscape features when placing wildlife crossings, including

- Natural draws or ridge tops which help guide an animal to a crossing
- Areas covered with vegetation to help an animal feel safe, but that also allow some visual openness to look for ambush predators (i.e., mountain lion)
- Distant from human use
- Devoid of, or having minimal, snow cover
- Location of food and water sources
- Land ownership for long-term conservation
- Large habitat blocks on both sides of the highway



FENCING - Fencing is an integral part in reducing deer mortality on highways. Fencing keeps deer off the road and away from vehicles, and it funnels animals into specially designed crossing structures. Without fencing, mule deer will not use crossing structures. Fencing must receive regular maintenance in order to retain its effectiveness in keeping wildlife off the highway. Fences must also be built with appropriate escape gates or jump outs so animals that end up on the wrong side of the fence can escape. Long stretches of fencing without crossing structures will reduce vehicle strikes, but are not recommended because they fragment the habitat and disrupt animal movement.

More information on mule deer can be found at www.muledeerworkinggroup.com