



Wildlife-Vehicle Conflict, Crossing Structures, and Cost Estimates

By: Rob Ament, Renee Callahan, and Elizabeth Fairbank

Human Safety:

- A 2008 *Report to the U.S. Congress* found that wildlife-vehicle collisions “are a growing problem and represent an increasing percentage of the accidents on our roads” (Huijser *et al.* 2008).
- Over the most recently reported 15-year period, wildlife-vehicle collisions have increased by 50%, from roughly 200,000 to 300,000, even though the overall number of collisions remained roughly steady over the same period (*id.*).
- Reported collisions between motorists and wildlife cause more than 200 human fatalities and over 26,000 injuries each year, at an annual cost to Americans of more than \$8 billion (*id.*).
- Numerous research studies show that wildlife crossing structures that guide animals over or under our nation’s highways reduce wildlife-vehicle collisions by up to 97%, when placed in areas of known wildlife movement and combined with associated fencing and jump-out structures that allow wildlife caught on the highway to exit.
- Numerous studies have shown that the use of wildlife crossing infrastructure with fencing to physically separate motorists from wildlife can radically reduce the number of collisions to make our roads safer for people and wildlife and can provide safe passage for all species large and small.

Wildlife Conservation & Ecological Connectivity:

- In addition to the human toll, an estimated 1-2 million large animals are killed by motorists every year, or roughly one animal every 26 seconds (Huijser *et al.* 2008).
- In addition to direct wildlife mortality, research has shown that roads can create a barrier to wildlife moving to locate water, food, mates, and shelter, and to fulfill other needs, which may reduce gene dispersal and undermine long-term population viability (*id.*).
- Most national, regional, and state data do not include smaller wildlife that do not pose a safety risk to motorists but that still may be experiencing population level declines due to conflicts with roads (*id.*).
- Road mortality is documented as one of the major threats to the survival of 21 federally-listed threatened or endangered species in North America (*id.*).

- Every one of the 11 states covered by the U.S. Department of Interior Secretarial Order 3362, *Improving Habitat Quality in Western Big-Game Winter Range and Migration Corridors*, concluded that roads were an impediment to the migration and movement of iconic western big game species such as elk, pronghorn, and mule deer.
- Research studies show that wildlife crossing structures that guide animals over or under our nation's highways reduce wildlife-vehicle collisions by up to 97%, when placed in areas of known wildlife movement and combined with associated fencing and jump-out structures that allow wildlife caught on the highway to exit.

Economic & Environmental Benefits:

- Researchers have estimated that the average cost of a deer-vehicle collision is \$8,190, an elk-vehicle collision is \$25,319 and a moose-vehicle collision is \$44,546 in U.S. dollars (2018) (Huijser *et al.* 2009).
- Studies have shown that, properly sited wildlife crossing structures can pay for themselves where situated along highways that, on average, experience an average of five or more collisions between motorists and deer per mile per year (3.2 deer-vehicle crashes/km/yr), an average of two or more collisions with elk per mile per year (1.2 elk-vehicle collisions/km/yr), or an average of one or more collisions with moose per mile per year (0.7 moose-vehicle collisions/km/yr) (*id.*).
- In cases in which the total economic costs associated with wildlife-vehicle collisions along a given highway segment exceed the expense of building a structure that allows animals to safely cross the road, **it actually costs society less to solve the problem of wildlife-vehicle collisions than it costs to do nothing** (*id.*).
- Dedicating federal funding to infrastructure projects that at the same time reduce wildlife-vehicle collisions and maintain or improve ecological connectivity provide benefits in the form of job creation, infrastructure resiliency, and sustainable natural resources.
- A 2016 report by the U.S. Fish and Wildlife Service found that over 100 million Americans participated annually in wildlife-related recreation including hunting, fishing, and wildlife-viewing. During the same year, expenditures for wildlife-related recreation exceeded \$150 billion, bolstering local economies, delivering nutritional sustenance, and providing countless hours of enjoyment for Americans of all socioeconomic backgrounds.
- Expanding culverts and bridges to allow for aquatic and terrestrial passage not only benefits wildlife, but also makes our infrastructure more resilient to climate change and extreme weather events, such as flooding. This protects our infrastructure investments in the long-term and ultimately saves taxpayers money.
- In a review of over 2 decades of research, scientists have found that the best way to combat biodiversity loss is to keep landscapes connected. This is especially critical for wildlife to respond to shifting vegetation patterns and climatic conditions associated with climate change.

Case Study: Highway 191, Trapper's Point, Wyoming

In 2012, the Wyoming Department of Transportation completed construction of wildlife crossing infrastructure on Highway 191 outside of Pinedale, WY. The project was built to address a wildlife-vehicle collision hotspot for pronghorn and mule deer, as well as to protect connectivity along the Path of the Pronghorn, an age-old pronghorn migration route and the first federally designated wildlife corridor. The project consisted of two overpasses, six underpasses, and wildlife exclusion fencing along a 12-mile stretch of the highway. By the third year following construction, the total number of wildlife-vehicle collisions dropped by 81%, and pronghorn-vehicle collisions were completely eliminated. In addition, habitat connectivity was improved, and back-and-forth movements increased by >60% for mule deer and >300% for pronghorn.

Before construction, Wyoming Department of Transportation estimated that wildlife-vehicle collisions at Trapper's Point were costing over \$500,000 each year. Now, the crossing structures are used by over 5,000 pronghorn and mule deer as they move from winter to summer range, and the state estimates that the crossings will pay for themselves in about 17 years, 50+ years before their estimated 75-year lifespan.



Photo: One of the Overpasses at Trapper's Point with Highway 191 running underneath

Sources:

Sawyer, H., Rodgers, P. A., & Hart, T. (2016). Pronghorn and mule deer use of underpasses and overpasses along US Highway 191. *Wildlife Society Bulletin*, 40(2), 211-216.

New Crossings Help Wildlife. (2012). WY Game and Fish Department, WY Dept. of Transportation. Available at: <http://www.pinedaleonline.com/news/2012/11/Newcrossingshelpwild.htm>

Crossing Structure Cost Estimates:

Although construction costs for wildlife crossing infrastructure can vary widely depending on the terrain, soils, hydrology, number of lanes of traffic, structure dimensions, construction materials, and other variables, we have put together some general estimates based on projects built in the U.S. since 2010.

Wildlife Infrastructure	Price Range	Description
Large Mammal Wildlife Underpass	\$250,000-\$600,000	This depends primarily on the size and materials (bridge span, metal arch, concrete box, etc). Crossings suitable for a range of large mammals should be at least 7m wide x 3.5m high.
Single Span Overpass	\$1-\$2.5 Million	This type of overpass is for two-lane highways and can vary in price depending on the width of the structure, and terrain.
Double Span Overpass	\$2.75-\$7 Million	This type of overpass can span four or more lanes of traffic. This price varies depending on terrain, structure width, and the number of lanes spanned. For example, a double span overpass in NV spanning four lanes cost \$2.75M, while a double span overpass in WA spanning six lanes and a median with difficult terrain cost \$6.2M.
8' Ungulate-proof fencing	\$42,000-\$64,000 per mile	This price includes escape ramps or "jump outs."
Cattle guards	~\$30,000 each	Cattle guards are used to limit some animals from entering the highway at access roads and driveways. *They are not effective for all species (like bears), and may be a safety concern for target ungulate species.*