POSTER PRESENTATION

EFFECTIVENESS OF WILDLIFE GUARDS AS A BARRIER TO WILDLIFE AT ACCESS ROADS

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ABSTRACT

The reconstruction of 90.6 km of U.S. Highway 93 from Evaro to Polson, Montana, USA, includes 41 wildlife crossing structures and 13.4 km of road with wildlife fencing. These measures are aimed at reducing wildlife–vehicle collisions and increasing human safety, while allowing wildlife to traverse the landscape. In the fenced road sections, gaps in the fence for side roads are mitigated by wildlife guards (similar to cattle guards). We monitored wildlife movements with cameras for 2 years from mid-July 2008 to mid-July 2010 at 2 wildlife guards and in 1 large crossing structure adjacent to one of the wildlife guards. We investigated how effective these wildlife guards were as a barrier to deer (*Odocoileus* spp.), black bear (*Ursus americanus*), and coyotes (*Canis latrans*). We also compared movements across a wildlife guard with movements through an adjacent crossing structure. The wildlife guards were 85% effective in keeping deer from accessing the road and 93.5% of deer used the crossing structure instead of the adjacent wildlife guard when crossing the road. The wildlife guards were less effective in keeping black bear and coyotes from accessing the road (33–55%). However, all black bears and 94.7% of coyotes used the crossing structure instead of the adjacent wildlife guard when crossing the road. Though the wildlife guards were not an absolute barrier to these species, the results indicate wildlife guards are a substantial barrier to deer and can be considered effective in mitigating gaps in a fence at access roads for these species. (DOI: 10.1002/wsb.253)

BIOGRAPHICAL SKETCHES

Tiffany Allen received a MSc in ecology from Montana State University in Bozeman, MT and a BM in music theory from Furman University in Greenville, SC. Her master‘s research was on the effectiveness of wildlife mitigation measures, including wildlife underpasses and wildlife guards, along Hwy 93 in Montana. She currently works with the Western Transportation Institute as a research associate and in the lab at Montana Fish, Wildlife, and Parks.

Marcel Huijser received his M.S. in population ecology (1992) and his Ph.D. in road ecology (2000) at Wageningen University in Wageningen, The Netherlands. He studied plant-herbivore interactions in wetlands for the Dutch Ministry of Transport, Public Works and Water Management (1992-1995), hedgehog traffic victims and mitigation strategies in an

anthropogenic landscape for the Dutch Society for the Study and Conservation of Mammals (1995-1999), and multifunctional land use issues on agricultural lands for the Research Institute for Animal Husbandry at Wageningen University and Research Centre (1999-2002). For more than a decade now Marcel has worked on wildlife-transportation issues at the Western Transportation Institute at Montana State University (2002-present).

David W. Willey is a Research Assistant Professor in the Department of Ecology, Montana State University. His research focuses on the ecology of Mexican Spotted Owls that inhabit arid canyon habitats within the Colorado Plateau, including an emphasis on the owl's prey, habitat use, and conservation. In addition to his research, he teaches undergraduate and graduate courses in biology and ecology at MSU.

Western Transportation INSTITUTE

Effectiveness of Wildlife Guards at Access Roads

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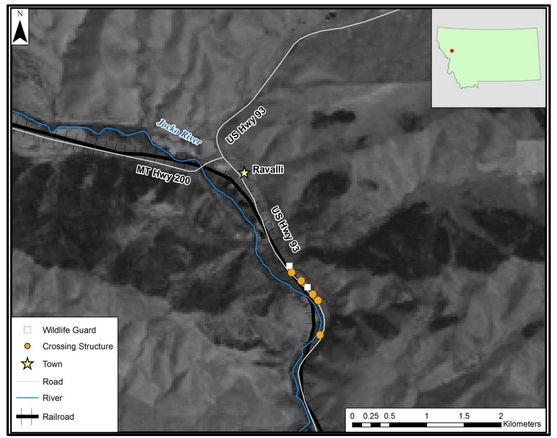
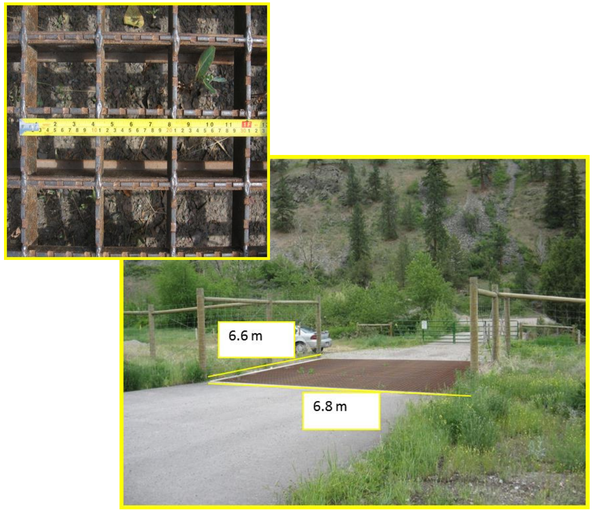
Introduction

We investigated how effective a particular type of wildlife guard design was as a barrier to mule deer (*Odocoileus hemionus*) and white-tailed deer (*O. virginianus*) movement. The wildlife guards were designed to keep deer from accessing the right-of-way along a fenced section of U.S. Highway 93 on the Flathead Indian Reservation. We also opportunistically investigated the effectiveness of the wildlife guard design as a barrier to other medium to large mammal species for which we had a sample size of ≥10: black bear (*Ursus americanus*) and coyotes (*Canis latrans*).



Wildlife Guard Design



Both wildlife guards had 2.4-m-high fencing on each side, parallel and perpendicular to U.S. Highway 93. Each wildlife guard consisted of a steel grate placed over a backfilled depression supported by concrete foundation walls. The grates were 6.8 m wide in the direction parallel to the traffic on U.S. Highway 93 by 6.6 m long in the direction perpendicular to traffic. Each grate was formed by smaller 8-cm x 10-cm rectangles, made of a combination of 6-mm and 130-mm steel. The depressions were approximately 76 cm deep and were filled with approximately 46 cm of backfill, effectively leaving about a 45-cm-deep pit after the steel grate was placed on top. This pit served to discourage animals from placing their feet on the ground between the grates. Foundation walls of the depression were 20 cm wide, surrounded the metal grate on all sides, and both were manufactured by L.B. Foster Company (Pittsburgh, PA, USA).

Methods

To evaluate the effectiveness of the wildlife guards as a barrier to wildlife movements, we monitored wildlife movements for 2 years with cameras; one camera was placed at each of the 2 wildlife guards and one in a large culvert (about 7.7 m wide, 3.5 m high) near a wildlife guard (61 m south).

Results

Number of wildlife that crossed guards after approaching within 2 m

Species	Approached	Crossed	% crossed	Did not cross	% effective
mule deer	32	2	6.3	30	93.8
white-tailed deer	5	2	40.0	3	60.0
deer spp.*	38	4	10.5	34	89.5
black bear	11	6	54.5	5	45.5
coyote	22	10	45.5	12	54.5

*Mule deer and white-tailed deer, combined. One deer was not identifiable to the species level.

Number of wildlife that crossed guards after showing intent to cross

Species	Approached	Crossed	% crossed	Did not cross	% effective
mule deer	21	2	9.5	19	90.5
white-tailed deer	4	2	50.0	2	50.0
deer spp.*	26	4	15.4	22	84.6
black bear	9	6	66.7	3	33.3
coyote	15	10	66.7	5	33.3

*Mule deer and white-tailed deer, combined. One deer was not identifiable to the species level.

Most deer (93.5%, n = 46), black bear (100%, n = 48), and coyote (94.7%, n = 57) crossed the road using the crossing structure instead of the wildlife guard.

Management Implications

- Wildlife guards can substantially reduce deer intrusions into the fenced right-of-way.
- Installing a wildlife crossing structure in the immediate vicinity of wildlife guards may increase the effectiveness of the wildlife guard.
- The guard design was of sufficient length; no animals jumped across a guard in one leap.
- Concrete ledges may be mitigated by adding chain-link fencing or mesh at a diagonal to cover the concrete ledge or bringing the fence over the concrete ledge in its entirety.

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