Alberta Conservation Association

2020/21 Project Summary Report

Project Name: Pronghorn Movement and Enhancement (Fence Trials)

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Partnerships

Alberta Environment and Parks
Alberta Fish & Game Association
Bushnell
Cabelas Canada
Canadian Forces Base Suffield
National Wildlife Federation
Safari Club International – Northern Alberta Chapter (Hunting Heritage Fund)
TD Friends of the Environment
The Nature Conservancy

Key Findings

- We processed trail camera images from our fence-crossing trials taken from July 2018 to September 2020 at Canadian Forces Base Suffield in southern Alberta. Pronghorn were the most common species captured on camera, followed by mule deer and white-tailed jack rabbits.
- Coyotes and mule deer had the highest mean fence permeability index (successful attempts / total attempts) while pronghorn and elk had the lowest.

- We published three papers in peer reviewed journals, submitted a fourth for consideration, and drafted and submitted a book chapter to the editors.

Abstract

Having evolved on the wide-open prairies of North America, pronghorn did not develop an instinct to jump vertical obstacles. The proliferation of fencing that followed cattle ranching since the 1880s poses a serious barrier to pronghorn movement. Pronghorn may cross under fencelines in some locations, but it slows down their movement, making them susceptible to predators and in some cases strips hair off their back, causing lacerations and making them vulnerable to infection and frostbite. Between 2018 – 2020, we evaluated fence modifications proposed for ungulates to make crossing over a fence easier to assess if the modifications potentially impact pronghorn and deer fence-crossing behaviours. We have processed all images captured between 2018 – 2020 from CFB Suffield. Our results from this study will be published in 2021 – 2022. We will ensure to disseminate our results and conclusions to stakeholders, wildlife managers, and conservation groups.

Introduction

Having evolved on the prairies of North America, pronghorn (*Antilocapra americana)* have not developed an instinct to jump vertical obstacles. The proliferation of fencing that followed cattle ranching into Alberta poses a serious barrier to pronghorn movement (Gates et al. 2012). Pronghorn may cross under fencelines in some locations, but it slows down their movement, making them susceptible to predators and in some cases strips hair off their back, causing lacerations and making them vulnerable to infection and frostbite (Jones 2014). Pronghorn also may become entangled in fences and perhaps become trapped and die (Jones 2014). A solution is to replace the bottom wire with smooth wire and move it up to 45 centimetres; however, this is expensive and takes a lot of effort. There are alternatives that should allow pronghorn to freely cross a fence, though most are in need of evaluation. We are identifying fences that need to be modified, exploring different ways to do this more efficiently, and increasing the public's understanding of the conservation challenges pronghorn face in Alberta.

Primary objectives for this work are to 1) test whether lowering the top wire facilitates deer (*Odocoileus sp.*) crossing over fences while not impeding the movement of pronghorn, 2) finalize the publication on our evaluation of fence modifications proposed for ungulates and sage grouse (*Centrocercus urophasianus*) and the potential impact these modifications might have on pronghorn and deer fence crossing success, 3) share our information with our partners, particularly those working to modify existing fencelines along key migration routes across the Northern Sagebrush Steppe, and 4) increase the profile of pronghorn and communicate the conservation challenges they face in Alberta through presentations, publications, and social media.

Methods

We began our fence-modification field trials in July 2018, deploying 30 trail cameras at known pronghorn crossing sites on CFB Suffield. The purpose of these trials was to assess how pronghorn and deer react to modifications installed on fences to lower the top wire. We also continued our collaboration with the National Wildlife Federation and the Nature Conservancy in Montana by deploying 20 cameras on the Matador Ranch in October 2018. We processed all images captured in Alberta between 2018 – 2020 and continue to process images from Montana. We classified images into six behaviours: 1) successfully crossed under, 2) successfully crossed over, 3) successfully crossed through, 4) failed attempt to cross, 5) lingering at the site, and 6) paralleling fence. We used a study design that looks at the difference before and after at control sites (known-crossing sites left unchanged) to those with modifications (either carabiners or white pvc pipe on the top two wires) to determine if there was a difference in mean failed and mean successful attempts per day. We used generalized linear models, and a time-to-event analysis techniques to assess the impacts of the modifications on pronghorn and deer crossing behavior.

Results

Based on images processed from CFB Suffield, pronghorn were the most detected species, followed by mule deer (*O. hemionus*), white-tailed jack rabbit (*Lepus townsendii Bachman*), white-tailed deer (*O. virginianus*), coyote (*Canis latrans*), and elk (*Cervus elaphus*) (Figure 1). Other notable species detected were moose (*Alces alces*; n=2), burrowing owl (*Athene*

cunicularia; n=2), ferruginous hawk (*Buteo regalis*; n=2), bobcat (*Lynx rufus*; n=1), and badger (*Taxidea taxus*; n=1). Mule deer and coyotes were able to successfully cross the fences more often than pronghorn and elk (Figure 2). We published our paper from the previous analysis showing that sage grouse reflectors and the white PVC pipe on top did not affect pronghorn, mule deer, or white-tailed deer's ability to cross a fence in the journal *Wildlife Society Bulletin* (Jones et al. 2020*a*). In addition, we published a paper on pronghorn survival in *The Journal of Wildlife Management* (Jones et al. 2020*b*) and coauthored a paper on pronghorn resource selection during migration in the journal *Plos ONE* (Jakes et al. 2020). We submitted a paper for consideration to *Movement Ecology* that examined the selection pattern of pronghorn in relation to fences and roads (Jones et al. 2021*a*). Lastly, we drafted a chapter on pronghorn for the book *Rangeland Wildlife Ecology & Conservation* (Jones et al. 2021*b*; draft) and coauthored a second chapter on roads and fences for the book *Road Ecology: Synthesis and Perspectives* (Jakes et al. 2021; draft)

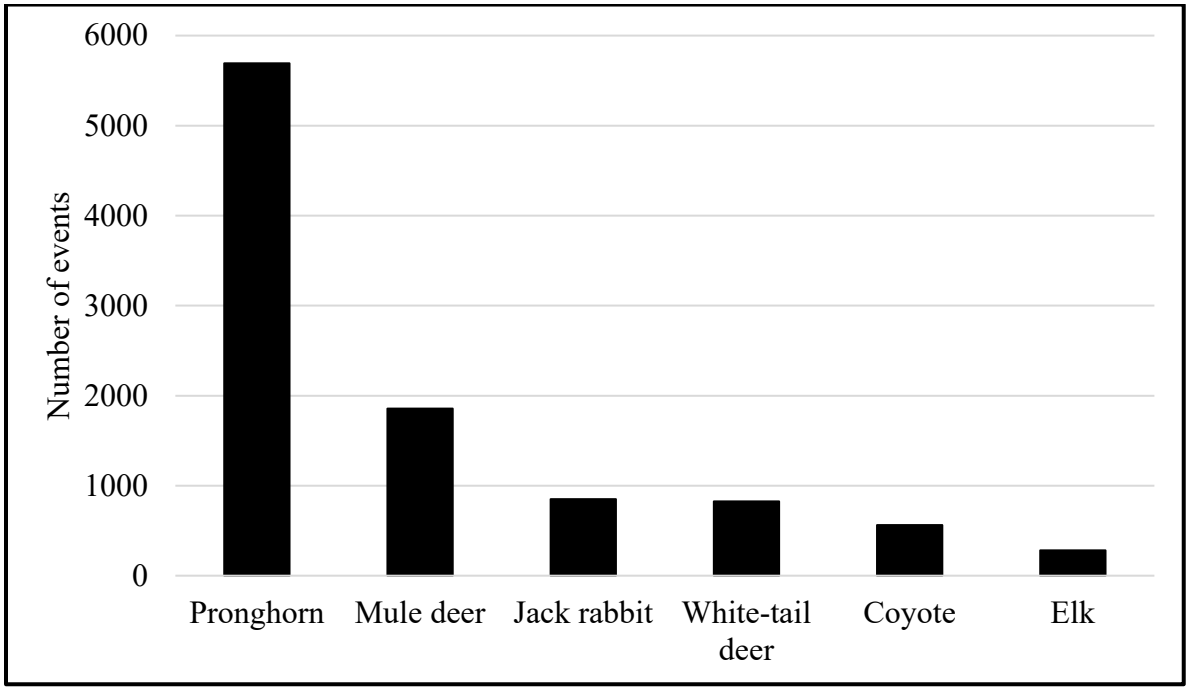

Figure 1. Number of events detected by species captured by remote trail cameras at known crossing sites on CFB Suffield, Alberta, July 2018 – September 2020.

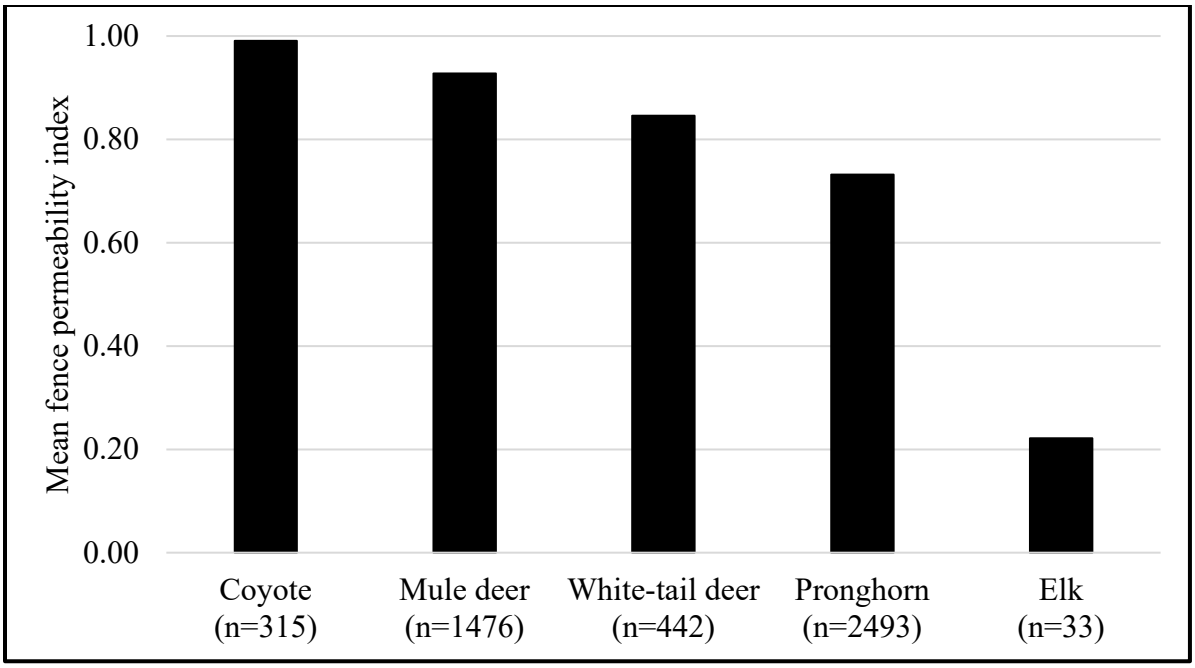

Figure 2. Mean fence permeability for five ungulates and one carnivore captured crossing fences on CFB Suffield, Alberta, July 2018 – September 2020. Fence permeability was calculated as the number of successful fence crossings/number of attempts. Number in brackets represents the number of events for each species attempting to cross the fence.

Conclusions

Our work has created an increased awareness of the impacts fences and roads have on prairie wildlife. Our studies of proposed fence modifications are the first real scientific evaluation of modifications to test whether they increase fence permeability for pronghorn and deer. We have demonstrated that carabiners and smooth wire on the bottom facilitate passage by pronghorn and deer under the bottom wire. We have also determined that placing sage-grouse reflectors and white PVC pipe on the top wire does not impede the movement of pronghorn or deer. As further results become available, information will be disseminated to stakeholders, wildlife managers, and conservation groups to support efforts to restore movement patterns that have been relied on for thousands of years by pronghorn.

Communications

Publications

Jones, P. F., A. F. Jakes, D. R. Eacker, and M. Hebblewhite. 2020b. Annual pronghorn survival of a partially migratory population. *Journal of Wildlife Management* 84:1114-1126.

Jones, P. F., A. F. Jakes, A. M. MacDonald, J. A. Hanlon, D. R. Eacker, B. H. Martin, and M. Hebblewhite. 2020a. Evaluating responses by sympatric ungulates to fence modifications across the Northern Great Plains. *Wildlife Society Bulletin* 44:130–141.

Jakes, A. F., N. J. DeCesare, P. F Jones, C. C. Gates, S. J. Story, S. K. Olimb, K. E. Kunkel, and M. Hebblewhite. 2020. Multi-scale habitat assessment of pronghorn migration routes. *PLoS ONE* 15:e0241042.

Jones, P. F., A. F. Jakes, S. E. Vegter, and M. S. Verhage. 2021. Is it the road or the fence? effects of linear anthropogenic disturbances on the movement and distribution of an endemic ungulate. *Movement Ecology* (submitted 2021).

Jones, P. F, A. K. Reinking, A. F. Jakes, M. M. Miller, T. Creekmore, and R. Guenzel. 2021. Chapter 20 Pronghorn. *in* L. B. McNew, D. K. Dahlgren, and J. L. Beck, editors. *Rangeland Wildlife Ecology and Conservation*. Springer. (submitted to editors' March 2021).

Jakes, A. F., et al. 2021. Chapter 56. Road ecology and fence ecology: similarities and differences. *in* M. D'Amico, R. Barrientos, F. Ascensão, editors. *Road ecology: synthesis and perspectives*. Springer. (submitted to editors' March 2021).

Media

- "Montana-Canada study identifies pronghorn migration habitat." Brett French Dec 24, 2020. Billings Gazette.
- "Montana-Canada study identifies pronghorn migration habitat." Brett French Dec 24, 2020. Helena Independent Record.

- "Montana-Canada study identifies pronghorn migration habitat." Brett French Dec 24, 2020. Missoulian.

Key Contacts

- Dr. Andrew Jakes – National Wildlife Federation
- Dr. Carl Schwarz – Simon Fraser University

Literature Cited

Gates, C.C., P. Jones, M. Suitor, A. Jakes, M.S. Boyce, K. Kunkel, and K. Wilson. 2012. The influence of land use and fences on habitat effectiveness, movements, and distribution of pronghorn in the grasslands of North America. Pages 277–294. *In:* M.J. Somers and M. Hayward, editors. *Fencing for conservation: restrictions of evolutionary potential or a riposte to threatening processed?* Springer-US, New York, New York USA.

Jones, P.F. 2014. Scarred for life; the other side of the fence debate. *Human-Wildlife Interactions* 8:150–154.

Photos

Mass exodus; large group of pronghorn cross under a fence all at the same time. Photo: Alberta Conservation Association

White-tailed deer buck easily jumps over the fence. Photo: Alberta Conservation Association

A bull elk surveys the fence at a site designed to allow easier passage over the top wire by clipping it to the wire below using a piece of white PVC pipe. Photo: Alberta Conservation Association