

Natural History

Predation Attempt by a Golden Eagle (*Aquila chrysaetos*) on a Pronghorn (*Antilocapra americana*) in Southeastern Alberta, Canada.

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Abstract

Pronghorn (*Antilocapra americana*) is a native grassland species that shares its range with a number of sympatric predators including the golden eagle (*Aquila chrysaetos*). This paper reports on the photographic documentation of a predation attempt by a female adult golden eagle on a female pronghorn fawn in southeastern Alberta, Canada. A series of images captured by our trail cameras show that the eagle inflicted significant wounds to the fawn's side and rump, and based on circumstantial evidence, we believe the fawn succumbed to its injuries. Unique to this predation event is the role that a fence line played by either assisting the fawn to escape the eagle, or alternatively, helping the eagle in its predation attempt. Additional research is required to determine the level of predation by golden eagles on pronghorn, the timing of such events, and the hunting behaviour of eagles involved in such predation attempts.

Key Words: Camera Trap, Fence, Golden Eagle, Predation, Pronghorn.

Pronghorn (*Antilocapra americana*) is a native grassland species that shares its range with a number of sympatric predators. Mammalian predators such as coyotes (*Canis latrans*), bobcats (*Lynx rufus*), wolves (*Canis lupus*), black bears (*Ursus americanus*), and cougars (*Felis concolor*) prey upon pronghorn (O’Gara and Shaw 2004; Jacques *et al.* 2007; Barnowe-Meyer *et al.* 2009; Kolar *et al.* 2012; Keller *et al.* 2013). Predators tend to focus on fawns during spring/early summer (May – July) when they are most susceptible (Gregg *et al.* 2001; O’Gara and Shaw 2004; Sievers 2004; Keller *et al.* 2013). Adults are occasionally preyed upon but their speed and eyesight tends to make them less susceptible to most mammalian predators (O’Gara and Shaw 2004). Golden eagles (*Aquila chrysaetos*) are known to prey upon pronghorn fawns (Barrett 1978; Gregg *et al.* 2001; O’Gara and Shaw 2004; Barnowe-Meyer *et al.* 2009). In addition, golden eagles have the ability to kill small ungulates (Cooper 1969; Nette *et al.* 1984; Phillips *et al.* 1996; Nybakk *et al.* 1999; Nieminen *et al.* 2013) including pronghorn juveniles and adults (Deblinger and Alldredge 1996; O’Gara and Shaw 2004; Beckmann and Berger 2005). The number of adults actually killed by golden eagles is largely unknown. Previous accounts of golden eagles preying on pronghorn were based on visual observations of attacks or examination of fresh carcasses for cause of death (Bruns 1969; Tigner 1973; Goodwin 1977; Beckmann and Berger 2005). We are only aware of 1 case where the predation attempt was photographed (Wildlife Management Pro. 2012). This paper reports on the photographic documentation of a predation attempt by a golden eagle on a pronghorn in southeastern Alberta, Canada, its potential outcome, and the role a fence line played in the attack.

In a study where we assessed fence enhancements (e.g., goat-bars, double stranded smooth wire, and clips) to allow easier passage by pronghorn under the bottom wire, we deployed 54 trail cameras of different models: Bushnell Trophy Cam XLT (model 119436, Bushnell Outdoor Products, Overland Park, Kansas, USA), Reconyx Hyperfire High Performance Trail Camera (models HC600 and PC800, Reconyx Inc., Holmen, Wisconsin, USA), and Uway Trail Camera (model VH200HD, Uway Outdoors Canada Inc., Lethbridge, Alberta, Canada). Cameras were placed along a fence line in our study area during 1-17 October, 2014. The study area encompassed a fence line in the eastern portion of the Canadian Forces Base Suffield in the National Wildlife Area (50°20’N, 110° 44’W). We deployed cameras predominately in sets of 3, with 1 camera at a known fence crossing location historically used by pronghorn, 1 at the next fence section (either to the east or west) to act as our enhancement site, and lastly a third camera at the section on the other side of the known site not occupied by the enhancement camera to serve as our control site (Figure 1). There were a total of 15 sets of 3 cameras. We also installed 5 additional cameras by themselves at known crossing sites to serve as a second set of control sites, and 4 cameras at gates. We programmed the

cameras to take 3 photographs per trigger, with a 1 second delay between triggers. Cameras were regularly checked to ensure operation, and change batteries and memory cards. On November 24, 2014, on our fourth visit to the study area, we noticed at the site occupied by camera C75 a considerable amount of pronghorn hair on the ground, including some that was covered with blood. Camera C75 was deployed at a known crossing location used by pronghorn.

After reviewing the images from 4 trail cameras (Reconyx Hyperfire High Performance Trail Camera model HC600) (Figure 1), we were able to determine the cause of hair loss and blood seen at site C75, and piece together the following time sequence of events. Hereafter, event refers to a series of consecutive images from 1 camera. On November 9, between 03h30 and 04h30, cameras C75 and C76 captured a group of pronghorn (~10-20 individuals) lingering and paralleling the fence line. These cameras also recoded a similar group of animals between 09h47 and 09h57. Within this event, 2 images showed a group of 3 pronghorn paralleling the fence, with the last animal in the group showing blood-stained hair on its rump and side. Then, between 10h47 and 10h48, cameras C75 and C76 captured an attempted predation by a golden eagle on a pronghorn fawn, which we believe to be the same individual photographed the hour before based on similar wound patterns (rump and side).

Based on the tail banding and the fact that the terminal band is thick with a single, wide, grey sub-terminal band, the eagle was likely a female adult of 5 or 6 years of age (Wheeler 2003). We believe the pronghorn was a female fawn (approximately 6 months old) based on size, and lack of horn development and black neck patch. Figure 2a depicts the eagle, with a blood-stained beak at the fence, followed by images of the pronghorn fawn (Figure 2b-d) with significant injuries to its rump and side crossing under the fence. While these images were being captured by camera C75, camera C76 captured 3 images (Figure 3a-c) of the eagle perched on the back of the pronghorn trying to maintain its grip by using its wings for balance. These are the only images captured of the attack, and they do not allow us to conclude on the outcome. On November 10, 2014, at 02h26, camera C73 (west of cameras C75 and C76; Figure 1), captured the image of a coyote with a pronghorn leg bone in its mouth, leading us to believe that the individual attacked by the eagle eventually died.

The series of images captured the typical behaviour of golden eagles preying on small ungulates. Golden eagles try to separate their intended victim from a group of animals and once perched upon their victim’s back, they use their wings to maintain balance and inflict multiple wounds with their talons (O’Gara 1978; Goodwin 1977; Nybakk *et al.* 1999; O’Gara and Shaw 2004). By inflicting multiple stab wounds to the neck, back and rear of their victim, including punctures through the ribs, the golden eagle is attempting to sever the aorta below the spinal cord, or

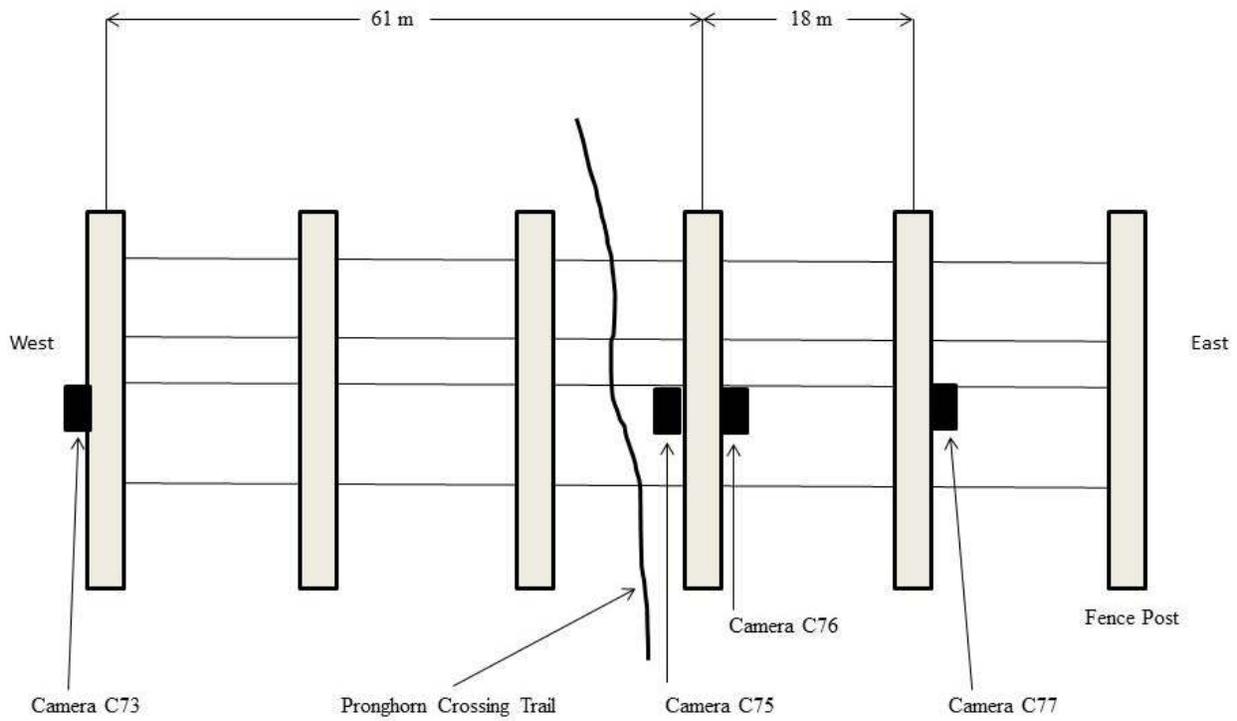


Figure 1. Location of 4 trail cameras along the fence line at the east end of the study area on the Canadian Forces Base Suffield, which captured the attempted predation by a golden eagle on a pronghorn, November 2014. Note that cameras C75 and C76 are mounted on the same fence post. This figure is not drawn to scale.

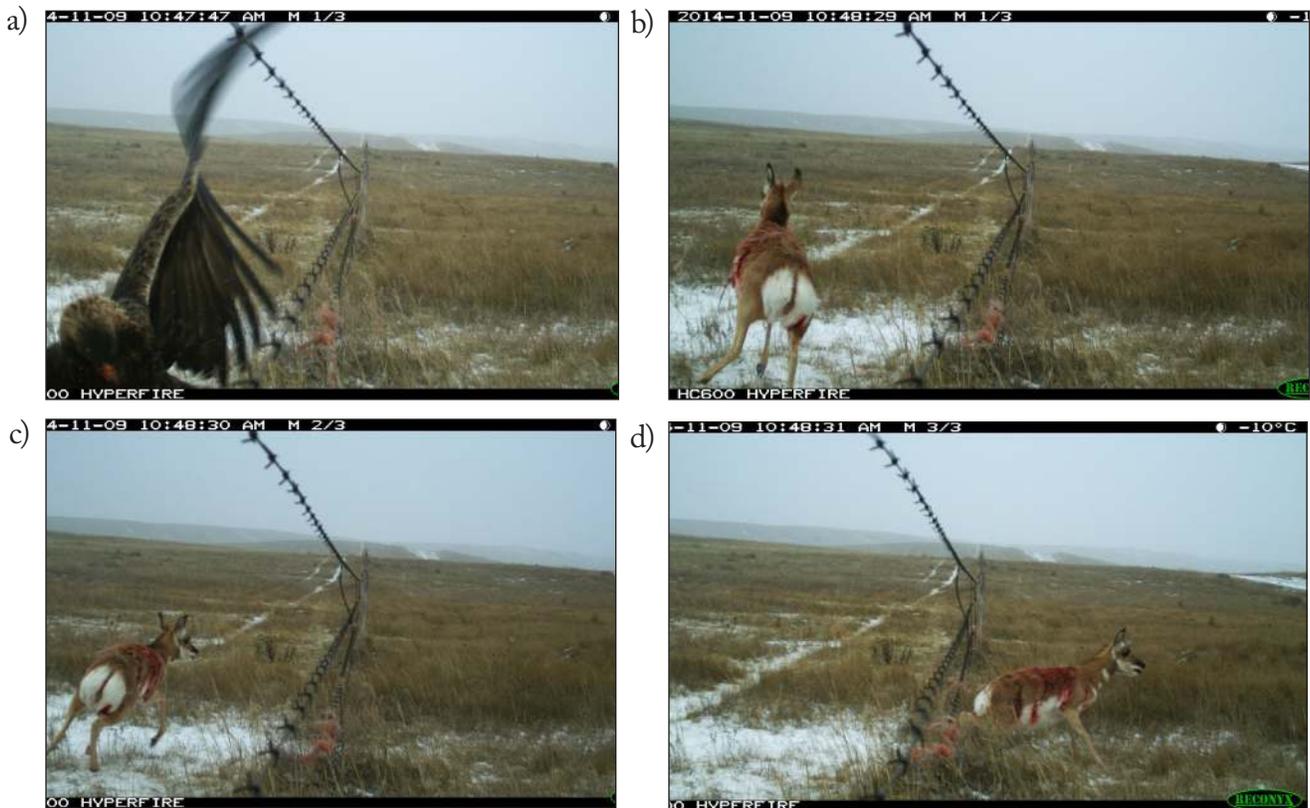


Figure 2. Attempted predation by a golden eagle on a pronghorn fawn on the Canadian Forces Base Suffield: a) eagle with a blood-stained beak; b-d) pronghorn fawn with significant injuries to its rump and sides.



Figure 3. Series of images depicting a golden eagle perched on the back of a pronghorn fawn and using its wings for balance, Canadian Forces Base Suffield, 2014.

large unprotected arteries, particularly those in the vicinity of the kidneys (O’Gara 1978; Phillips *et al.* 1996; Nybakk *et al.* 1999; O’Gara and Shaw 2004). The eagles talons are shaped to encircle a pronghorn or small mammal’s spinal cord and puncture the aorta, thus causing internal bleeding and hemorrhaging, leading to the eventual immobilization of the victim (O’Gara 1978).

Unique to this documented predation attempt is the timing (seasonality and length of event) and the role played by the fence line. Previous studies suggested that most eagle predation events were on pronghorn fawns during the first few months of life (Barrett 1978; O’Gara and Shaw 2004; Sievers, 2004; Zimmer 2004). Recorded predation events on older fawns (juveniles) and adult pronghorn are usually restricted to winter (Bruns 1970; Goodwin 1977; Deblinger and Alldredge 1996; Beckmann and Berger 2005) due to snow depths or animal condition facilitating easier capture. The fact that this predation attempt occurred during late fall with little snow cover suggests that golden eagles may opportunistically prey upon pronghorn year round. We believe the injuries observed on the pronghorn 50 min before the capture of the images were caused by the eagle, not by the fence. Jones (2014) provides examples of injuries caused by crawling under fences, which were distinctly different than those observed here. As previously documented, predation by eagles usually

involves multiple attacks over an extended period of time (10-20 min) (Bruns 1970; Goodwin 1977). The length of our event is the longest documented to date, lasting just under an hour (though likely longer as we cannot determine the exact time of death) and supports the belief that the intended victim is usually attacked multiple times. The pronghorn is severely stressed during the event and finally succumbs to its wounds (Bruns 1970; O’Gara 1978; O’Gara and Shaw 2004).

Our ability to capture the images of the predation event was facilitated by the fact that we placed our cameras around a location traditionally used by pronghorn to crawl under the fence. Pronghorn do not typically jump over fences but instead have evolved to crawl under the bottom wire (Gates *et al.* 2012; Jones 2014; Yoakum *et al.* 2014). Therefore fences play an important role in the daily and seasonal lives of pronghorn, acting as barriers to movement, and in certain cases a direct cause of mortality (Gates *et al.* 2012; Jones 2014; Yoakum *et al.* 2014). In addition, if the bottom wire is barbed with a height <45 cm from the ground, the fence can remove a significant amount of hair from the neck, back and rump areas of pronghorn with possible negative implications (Jones 2014). In all of the previous accounts of predation by golden eagles on pronghorn fawns, juveniles or adults, none mentioned fence lines as being involved in the incident (Bruns 1970; Tigner

1973; Goodwin 1977; Beckmann and Berger 2005; Wildlife Management Pro. 2012), though the fence line in our account clearly played a role. We hypothesize 2 contrasting roles for the fence line in this predation attempt. The first is the pronghorn crossed the fence line and used the barbed wire to dislodge the eagle from its back. The alternative hypothesis is that the eagle, potentially placing its life in danger, used the fence line to capture the pronghorn. In order to cross under the fence, the pronghorn fawn would have to reduce its speed and drop to its knees, in so doing making it easier for the eagle to land on its back and inflict deadly wounds. Anecdotal accounts from landowners in southern Alberta and a personal observation by B. Downey of a golden eagle chasing a group of pronghorn towards a fence, supports the hypothesis that the eagle used the fence line to assist in the predation of the pronghorn.

Capturing an attempted predation event by a golden eagle on a pronghorn through the use of trail cameras is an additional example of how remote cameras may be used to document wildlife behaviour. Our account of the event provides insight into the behavioural ecology of both golden eagles and pronghorn. Additional research is required to determine the level of predation by golden eagles on pronghorn, the timing of such events, and the hunting behaviour of eagles involved in such predation attempts.

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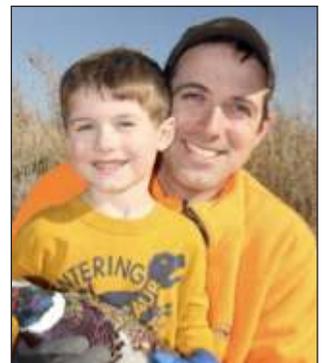
Blair Seward is a biologist with Alberta Conservation Association. Blair was born and raised in Foremost, Alberta. He attended Lethbridge College and obtained a diploma in environmental Assessment and Restoration before completing a degree in Environmental Science at the University of Lethbridge.



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Brad A. Downey grew up in rural southwestern Manitoba where he gained an appreciation for the native grasslands and the wildlife that reside there. He followed that passion and attended Lethbridge Community College where he obtained his Renewable Resource Diploma and Fish and Wildlife Specialization Certificate. From there he attended Athabasca University where he obtained his BSc (Biology). Brad is employed with Alberta Conservation Association where he is the project lead for the MULTISAR Project, which works with ranchers in southern Alberta to develop ranch plans for species at risk.



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