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Humaneness and Selectivity of Killing Neck Snares Used to Capture Canids in Canada: A Review

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Abstract

Although killing neck snares are used on traplines in Canada to capture gray wolves (*Canis lupus*), coyotes (*C. latrans*), and red foxes (*Vulpes vulpes*), they are not subject to trap performance criteria set out in the Agreement on International Humane Trapping Standards (AIHTS). This paper reviews scientific information related to the humaneness and selectivity of killing neck snares used to capture canids. All past studies demonstrated that manual and power killing neck snares were inadequate to consistently and quickly render canids unconscious. Furthermore, killing neck snares are non-selective, and impact seriously on the welfare of non-target animals. We recommend that the AIHTS be modified to allow only killing neck snares that kill quickly and consistently, and in the absence of such snares, to phase-out all killing snares for which efficient and more humane alternatives exist.

Key Words: *Canis latrans*, *Canis lupus*, Coyote, Gray Wolf, Humaneness, Killing Neck Snares, Red Fox, Standards, Trapping, *Vulpes vulpes*.

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INTRODUCTION

To address animal welfare concerns about trapping in Canada, intensive research was conducted in Canada during the 1970s through the 1990s (Federal Provincial Committee for Humane Trapping – FPCHT – 1981; Proulx 1999). This research identified and developed several humane trapping devices for killing or restraining furbearers (Proulx *et al.* 2012). Yet, despite significant technological improvements, many antiquated trapping systems are still used today (Proulx and Santos-Reis 2012). Killing neck snares are one example. They are popular in Canada where they are set on traplines to harvest canids, i.e., gray wolves (*Canis lupus*), coyotes (*Canis latrans*) and red foxes (*Vulpes vulpes*) (Proulx *et al.* 2012; Fédération des Trappeurs Gestionnaires du Québec – FTGQ – 2014; Sinnema 2014). Killing neck snares are commercially available (e.g., Halford's 2014) and their use is being taught by professional trappers (e.g., Trapper Gord 2014). They are popular among trappers because they are cheap, lightweight, easy to set and camouflage (except power snares), and efficient at capturing a diversity of furbearers. Furthermore, some trappers claim that they are humane, as they compress the carotid arteries, thereby reducing blood flow to the brain, quickly leading to unconsciousness and then death (Sinnema 2014). In this paper, we review research related to the humaneness and capture selectivity of killing neck snares used to capture and kill canids.

KILLING NECK SNARE TECHNOLOGY

There are 2 types of killing neck snares. Both are usually made of braided, galvanized stainless steel wire (diameter: 1/16 to 1/8 inch – 1.6 to 3.2 mm). They are placed on animal trails or in enclosed areas with lures or baits. Ten or more killing neck snares may be set around large draw baits (“saturation snaring”) to catch most of a wolf pack.

Manual killing neck snares – for which an animal provides the energy necessary to tighten the noose. One end of the snare is formed into a loop with a one-way locking tab that only allows the loop to tighten (Figure 1a). The more a captured animal struggles, the tighter the loop becomes, if the lock functions properly (e.g., malfunction may result from the animal's hair being pulled into the lock as the snare tightens). The other end of the snare is anchored to a fixed object (e.g., a tree) or, because the trapper wants to minimize disturbance at the trap site, to a “drag” that allows the snared animal to leave the location. Specific loop diameters and heights are recommended to capture canids in open or in forested sites (e.g., FTGQ 2014). The efficacy of killing neck snares to kill animals may be improved by using the smallest possible cable wire diameter for the target species, better one-way locking tabs that only allow the loop to tighten, locks with compression or quick kill springs to increase clamping force, and swivels to avoid cable torsion and breaking (FTGQ 2014; Klassen 2014) (Figure 1b).

Power killing neck snares – for which one or two springs provide the energy necessary to tighten the noose. No locks are needed because the clamping force is supplied by the spring pulling on the snare wire (Figure 2). Manufacturers of power killing neck snares claim without providing data that these devices are more selective than manual snares, and captured animals cannot chew the wire (e.g., Ram Power Snare Systems 2014).

KILLING NECK SNARES VS. TRAPPING STANDARDS

According to trapping performance requirements set out in the Agreement on International Humane Trapping Standards (AIHTS) signed by the European Community, Canada, and Russia in 1997, killing devices used for the capture of canids should render the animals irreversibly unconscious within 300 sec (Official Journal of the European Communities 1998). A killing trap would meet the standard if at least 80% of 12 animals are unconscious and insensitive within the time limit, and remain in this state until death. Therefore, at a 95% confidence level (one-tailed binomial test), such a killing trap would render $\geq 58\%$ of target animals irreversibly unconscious in ≤ 5 min (Powel and Proulx 2003). However, a footnote to Article 7 in the AIHTS stipulates that the standards do not prevent individuals from constructing and using traps (which may not pass the 300 sec test), provided that such traps comply with designs approved by the relevant competent authority. Although killing neck snares are commonly manufactured and sold on the open market, they are deemed by all relevant Canadian competent agencies to be non-commercial devices and therefore not subject to the AIHTS. As a result, they may be used throughout Canada in accordance with provincial and territorial regulations. For example, in Alberta, Environment and Sustainable Resource Development (ESRD) is the relevant competent authority and it dictates the appropriate design for neck snares as: “Neck snares must be equipped with a locking device that is designed and set to prevent the snare loop from loosening again after it has tightened on the neck of the fur-bearing animal” (Craig Brown, Information Officer, ESRD, personal communication, April 22, 2014).

Proulx and Barrett's (1994) stricter standards for killing devices is considered to be the most representative of state-of-the-art technology (Powell and Proulx 2003; Proulx *et al.* 2012). This standard requires that, at a 95% confidence level, humane killing traps render $\geq 70\%$ of target animals irreversibly unconscious in ≤ 3 min. It has been used in the past to test traditional trap designs, and to develop new trapping devices (Proulx 1999). Killing neck snares have not been evaluated according to Proulx and Barrett's (1994) standard.

A trap selectivity standard has also been developed by the International Organization for Standardization (ISO 1999a, b). The selectivity of a trap for a particular species is based on

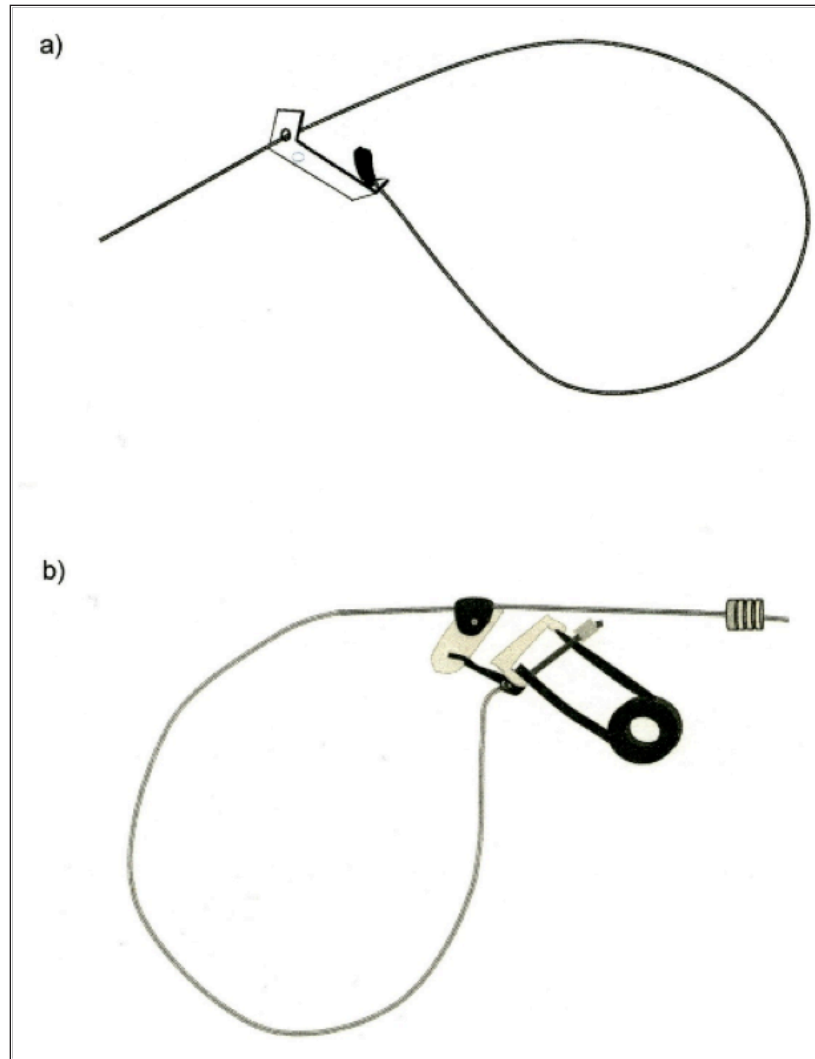


Figure 1. Manual killing neck snares: a) basic construction with a one-way lock; b) improved device with a Cam-Lock and a Senneker Stinger (<http://martysenneker.com/>) kill spring.

a comparison with the selectivity level of control (commonly used) traps (ISO 1999a, b). Trap selectivity is calculated as the number of captured target animals divided by the total number of captured animals. There is no minimum acceptable percentage of selectivity.

SCIENTIFIC ASSESSMENTS OF KILLING NECK SNARES TO HUMANELY KILL CANIDS

Manual killing neck snares

FPCHT (1981) first assessed the ability of manual killing neck snares to kill anaesthetized red foxes quickly. Researchers provided the power required to tighten the nooses, and although they attempted to simulate snare actions as described by an experienced trapper, the animals continued to breathe for 30-40 min after

snaring. Even after tightening the snare to 2-3 cm less than the diameter of an animal's neck, researchers were able to push a swab into the trachea of animals while the snare was still tight. On the basis of laboratory kill tests, FPCHT (1981) concluded that killing neck snares could not be condoned as humane trapping devices for foxes. While it is best to snare canids behind the jaw where the carotid artery and the trachea are maximally exposed, FPCHT researchers failed to achieve exact positioning in the laboratory, and concluded that it would be even more difficult to accomplish in the field. Although trapper experience and expertise on the proper use and placement of snares is important in capturing animals properly, previous studies showed that it was impossible to restrict captures to the neck area. Guthery and Beasom (1978) reported that of 65 snared coyotes, 59% were neck catches, 20% flank, and 10% foot. Also, nearly half of the animals were alive the morning after being snared. Phillips' (1996) evaluation of killing

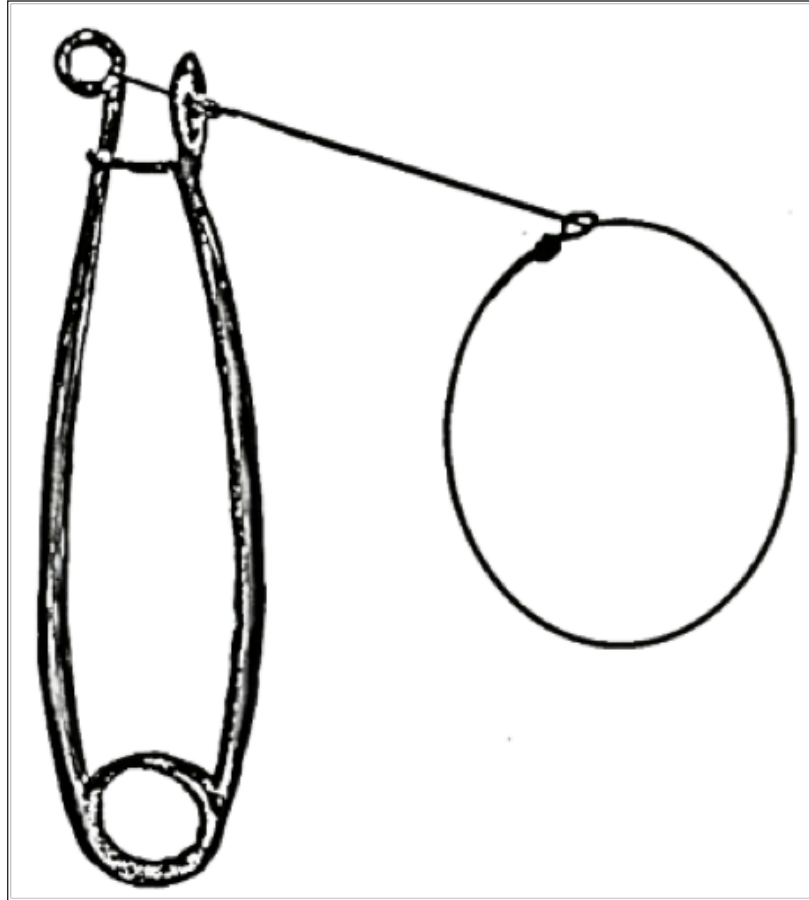


Figure 2. A power killing neck snare.

neck snares showed that out of 301 snared coyotes, 25 (7%) were captured by the body, and 12 (4%) by the leg. Phillips (1996) also reported that 5% to 32% of the animals captured in various snare models were still alive when found. Snare location on an animal is influenced by many factors such as the behaviour of the animal when entering the loop (Proulx and Barrett 1990), snare height and loop diameter, positioning of the lock, preload on the loop (i.e., a little tension is put into the loop to force it to close quicker), and environmental and maintenance factors (rust, twists in the snare cable, snowfall), etc. (G. Proulx and D. Rodtka, personal observations).

To gain more information on snared canids, FPCHT (1981) also examined 3 red foxes, 25 coyotes and 12 wolves captured on traplines in manual killing neck snares. Whereas many animals were still alive when found, some ≥ 12 h after being captured, post mortem examinations and observations by the trapper suggested that, in most cases, animals did not die within 300 sec. The pathologist on the Committee could not estimate the time to irreversible loss of consciousness.

It is often claimed that capture sites that show little disturbance are indicative of a quick death by asphyxiation (e.g.,

Phillips 1996). Nonetheless, FPCHT (1981) observed that snared animals could, in fact, react quite violently to capture without causing significant disturbance to the capture site. On traplines, Proulx also observed cases where captured animals remained conscious for several hours without disturbing the trapping site. Captured animals may remain conscious but physically inactive due to distress, shock, injury or pain.

Power killing neck snares

FPCHT (1981) tested the King Power Snare (Western Creative Services Ltd., Winnipeg, Manitoba) with 2 red foxes in enclosures. One fox remained conscious after 5 min, while the other had a weak corneal reflex at 5 min and was euthanized.

A more thorough evaluation of power killing neck snares was conducted by Proulx and Barrett (1990) who evaluated the King (1.6 mm diameter cable), Mosher (1.6 mm diameter cable; W. C. Mosher, Mayerthorpe, Alberta), and Olecko (1.2 mm diameter cable; R. Olecko, Winnipeg, Manitoba) power killing neck snares. All 3 models rendered at least 4 out of 5 anaesthetized red foxes irreversibly unconscious within 10 min, and were selected for tests with non-anaesthetized animals in semi-natural environments. Proulx and Barrett (1994) found it was difficult to capture foxes

behind the jaw with power killing neck snares, and to cause an irreversible loss of consciousness within 300 sec. Both the King and Mosher power killing neck snares failed, i.e., they did not render irreversibly unconscious 2 neck-captured foxes in ≤ 5 min or they did not consistently capture the animals by the neck. Out of 7 tests with the Olecko killing neck snares, 2 animals lost consciousness within 5 min, 2 within 6 min, and 3 animals were euthanized. Proulx and Barrett (1990) questioned the ability of power killing neck snares to humanely kill canids, and they did not recommend them as humane trapping devices. As in FPCHT's (1981) studies with manual killing neck snares, Proulx and Barrett (1990) were unable to consistently capture the animals by the neck.

Anatomical and physiological considerations – It is difficult to constrict the trachea of a fox because of its rigid cartilaginous rings and adjacent musculature. In fact, the percentage of compression achieved by power killing neck snares as opposed to manual snares is not significantly different (FPCHT 1981). Rowsell (1981) noted that, although a 2-mm probe could not be passed down the trachea of 2 foxes captured in power killing neck snares, good aeration was present in the inflated lungs of each animal as evidenced by the organ's pinkish-red colour. Like many terrestrial mammals, foxes will gasp reflexively when carbon-dioxide levels in the blood rise and oxygen levels fall (Loufbourrow *et al.* 1957; Barrett *et al.* 2009). Gasping is a normal physiological response to stimulate a return to regular breathing (Guntheroth and Kawabori 1975; Coleridge and Coleridge 1994). Any slight passage left in the trachea allows air to reach the lungs in response to the reflexive gasp (FPCHT 1981).

Laboratory tests with dogs show that canids have the ability to continue to circulate blood to the brain after bilateral ligation of the common carotid arteries because of the ability of other arteries (e.g., vertebral arteries) situated more deeply within the neck to compensate (Moss 1974; Clendenin and Conrad 1979a, b). Collateral circulation also occurs within the venous blood flow

from the brain such that drainage can continue if the internal jugular veins are occluded (Andeweg 1996; Daoust and Nicholson 2004). Because of collateral blood circulation, it is difficult, if not impossible, to stop blood flow to and from the brain by tightening a snare on the neck. To reinforce this point, Daoust and Nicholson (2004) reported the case of a 2-year-old male coyote found in a moribund state on Prince Edward Island, 1 month after the official end of the trapping season, with a snare deeply embedded in the ventral portion of its neck. The killing neck snare had presumably malfunctioned and the cable had cut through the soft tissues of the neck, transecting the full diameter of the trachea, and was embedded in scar tissue between the trachea and the esophagus. The snare had also completely obstructed both jugular veins and both common carotid arteries.

Coyotes captured in snares may break the lock or chew through the cable if the lock does not tighten sufficiently to cause death (Phillips 1996). Repanshek (2008) reported the case of 2 wolves that had been snared outside Denali National Park and Preserve, Alaska, and had then escaped with the tightened loops around their necks. Both wolves were spotted by park staff a few days before 1 of them was immobilized with a tranquilizer dart. The snare was deeply embedded in the wolf's neck (Figure 3). The other wolf was not relocated. Injuries and animal suffering resulting from escapes from a snare are known to occur (Table 1), but the majority of animals that escape killing neck snares and subsequently die likely go undetected by people.

CAPTURE SELECTIVITY

Killing neck snares are efficient at capturing canids (Haber 1996; Phillips 1996) but they are not selective. Selectivity rates of 52% (Guthery and Beasom 1978) and 77% (Phillips 1996) have been reported for coyote snares. Moose (*Alces alces*), caribou (*Rangifer tarandus*), and Sitka black-tailed deer (*Odocoileus hemionus sitkensis*)



Figure 3. Gray wolf that escaped from a killing snare and was found alive days after in Denali National Park and Preserve. The snare was deeply embedded in the neck of the animal (Photo: Denali National Park and Preserve).

Table 1. Specimens submitted to the Canadian Wildlife Health Cooperative from 1990–2014 that either were injured or died as a consequence of capture by killing neck snares. Canids had escaped from killing neck snares. All other specimens were by-catches.

Species		Number of cases		
Common name	Latin Name	Injured by snare	Killing by snare	Total snared
Mammals				
<i>Target species</i>				
Coyote	<i>Canis latrans</i>	2	0	2
Gray wolf	<i>Canis lupus</i>	4	0	4
Red Fox	<i>Vulpes vulpes</i>	1	0	1
<i>Non-target species</i>				
American black bear ^a	<i>Ursus americanus</i>	1	0	1
Bobcat ^b	<i>Lynx rufus</i>	0	1	1
Canada lynx ^c	<i>Lynx canadensis</i>	0	8	8
Fisher	<i>Pekania pennanti</i>	0	2	2
Mountain lion	<i>Puma concolor</i>	0	4	4
Snowshoe hare	<i>Lepus americanus</i>	0	1	1
White-tailed deer	<i>Odocoileus virginianus</i>	0	4	4
Wolverine ^b	<i>Gulo gulo</i>	0	1	1
Total		8	21	29
Birds				
Bald eagle	<i>Haliaeetus leucocephalus</i>	4	75	79
Barred owl	<i>Strix varia</i>	0	2	2
Common raven	<i>Corvus corax</i>	0	2	2
Golden eagle	<i>Aquila chrysaetos</i>	2	25	27
Goshawk	<i>Accipiter gentilis</i>	0	3	3
Great horned owl	<i>Bubo virginianus</i>	2	2	4
Red-tailed hawk	<i>Buteo jamaicensis</i>	1	10	11
Rough-legged hawk	<i>Buteo lagopus</i>	0	7	7
Total		9	126	135
Total specimens		17	147	164

are often caught in killing neck snares set for gray wolves (Gardner 2007). Cougars (*Puma concolor*) are susceptible to killing neck snares placed near carrion bait to harvest gray wolves. Knopff *et al.* (2010) reported that 11% of a cougar population in west-central Alberta was removed annually as a result of incidental snaring. Guthery and Beasom (1978) reported that a population of collared peccaries (*Pecari tacaju*) was largely extirpated due to coyote snaring. In February 2011, near Rocky Mountain House, Alberta, Rodtka (unpublished data) noticed that a trapper had set 8 wolf killing neck snares around a draw bait on a registered trapline.

In 1 month the trapper captured 1 white-tailed deer (*Odocoileus virginianus*), 1 cougar, and 2 wolves. In August 2011, Rodtka also noted that a trapper had set 10–15 killing neck snares to capture wolves that had depredated livestock. Within 1 week, 1 white-tailed deer (*Odocoileus virginianus*), 1 black bear (*Ursus americanus*), and 1 grizzly bear (*Ursus arctos horribilis*), a threatened species in Alberta, were snared. The Canadian Wildlife Health Cooperative received 157 submissions of non-target snare captures between 1990 and 2014, representing 8 species of mammals and 8 species of birds (Table 1). Again, this probably represents a small proportion

of the snared animals that die and go undetected or unreported by people. Non-target captures included a wolverine (*Gulo gulo*) and a Canada lynx (*Lynx canadensis*), which are designated species at risk in Quebec (Fortin *et al.* 2005) and Nova Scotia (Nova Scotia Lynx Recovery Team 2006), respectively.

DISCUSSION

Currently available manual and power killing neck snares do not meet the AIHTS' humaneness standards (although these standards do not apply to snares), or Proulx and Barrett's (1994) standard. The work conducted by FPCHT (1981) and Proulx and Barrett (1990) confirmed the original concerns of some wildlife biologists (e.g., Guthery and Beasom 1978) about the cruelty of killing neck snares, and it gives credibility to the recurrent reports of moribund, snared wild and domestic animals rescued by the public (e.g., Perkel 2004; McShane 2014). Neck killing snares with one-way locking tabs were made illegal in the United Kingdom in 1981 (Wildlife and Countryside Act 1981). Killing snares are not used to catch any of the 11 AIHTS species found in the European Union (Talling and Inglis 2009). They are, however, still being used in some US states (Association of Fish and Wildlife Agencies Furbearer Conservation Technical Work Group 2009) and Russia (Talling and Inglis 2009).

The poor performance of manual and power killing neck snares

at killing canids was demonstrated in scientific studies where state-of-the-art equipment and set procedures were employed. On traplines, however, many trappers see little or no value in improved locks and swivels (Figure 4) because their snares catch the target animals anyway, albeit in an inhumane manner. Also, trappers are not legally required to update their equipment. In some provinces, e.g., Saskatchewan, killing snares must be visited within a certain period of time, i.e., 48-72 h depending on the proximity from urban areas. In British Columbia, killing snares must be checked at least once every 14 days. In Alberta, there are no mandated checking times for snares. Consequently, snared animals can die slowly from their injuries, but also from exposure, exhaustion, dehydration, or starvation.

The ISO standards are the result of compromises between participating governments and agencies, and they may not be stringent due to a lack of will among some participants to either pursue further technological development or implement state-of-the-art technology (G. Proulx, personal observations at ISO meetings in Brussels, Belgium). Nonetheless, killing neck snares impact significantly on the welfare of captured animals, in a manner similar to that of steel leghold traps, which have been judged unacceptable at the international level (Proulx and Barrett 1989). It is therefore difficult to understand how killing neck snares became an exception in AIHTS's standards,



Figure 4. Basic manual killing neck snare set on a canid trail in northwestern Saskatchewan, February 2009. Note the absence of all possible improvements (e.g., locking tab, lock with compression spring, and swivel) (Photos: Gilbert Proulx).

particularly because alternative restraining devices are available for capturing canids such as modified foothold traps and foot snares (Proulx *et al.* 2012) and cable restraints (Garvey and Patterson 2014). These alternative trapping devices were found to be humane for capturing canids without compromising capture efficiency (Linhart and Dasch 1992; Pruss *et al.* 2002; Garvey and Patterson 2014). Even these restraining devices should, of course, be monitored within a 24-h period to minimize pain and discomfort. Reducing the time animals spend in restraining devices greatly reduces injuries (Proulx *et al.* 1994; Garvey and Patterson 2014).

The snaring of non-target species can be minimized with the use of an additional wire (diverter) placed at a height that allows ungulates taller than the set height of a wolf snare to contact and push the snare away prior to contact (Gardner 2010). Snares may be equipped with a ferrule to stop the noose from closing below a specific size (Guthery and Beasom 1978), or a breakaway system that releases larger animals such as adult ungulates, though they may still capture fawns (Phillips 1996). Snaring may become more selective through better selection of trap sites, lures, and loop diameters (Knopff *et al.* 2010; FTGQ 2014). In spite of all this, however, non-target species will continue to be snared because concealed snares are set on trails or close to baits that attract an array of species and have the potential to capture any individual entering the loop.

In light of the scientific evidence regarding the lack of humaneness and the non-selectivity of snares for capturing canids, we recommend that the relevant authorities in the international community:

- Modify AIHTS to accept only killing (commercial and non-commercial) neck snares that quickly render canids irreversibly unconscious, insofar as the state of the science or the art will allow; and
- In the absence of killing neck snares that kill quickly, phase-out all snares for which efficient and more humane alternatives exist.

If wildlife managers believe that killing neck snares must remain available to trappers, then intensive research must be conducted to develop reliable and selective sets to consistently snare canids by the neck (Proulx and Barrett 1990) and to minimize non-target capture, and a thorough research program with strict assessment criteria must be implemented (Proulx *et al.* 2012).

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ABOUT THE AUTHORS

Gilbert Proulx is Director of Science at Alpha Wildlife Research & Management, Editor-in Chief of the Canadian Wildlife Biology & Management journal, and Chair of the *Martes* Working Group. Gilbert has 39 years of field experience as a wildlife biologist. He has published more than 120 scientific articles, 5 textbooks, and 8 field guides (species at risk). Since 1985, Gilbert has been involved in the evaluation and development of humane trapping devices, and published extensively on techniques to capture and handle mammals. His main research interest focuses on mammals, particularly in forest and agriculture ecosystems, and on technology development, mainly on mammal trapping and detection methods.

Dwight Rodtka – I was raised in the bush and on the trapline with my grandfather as soon as I could walk, with some rest breaks in his back pack fairly often. Then, all too soon, we moved out of the bush to a small farm and school. I was an Agricultural Fieldman for the Alberta Department of Agriculture for 39 years. My responsibilities were primarily to assist producers with predator problems both directly and through extension. The coyotes taste for sheep kept us busy using and teaching others about management, toxicants, and snares to reduce loss. During this time, we updated the snaring policy to reduce non-target catches and increase humaneness somewhat. I also began



making all the snares used in the province, which were under Agricultural control. When jurisdiction for game farming and aquaculture transferred from Fish and Wildlife to Agriculture, I became a licensing inspector for both, in addition to my regular responsibilities. Today, my wife Glenda and I still live in the “bush”, on a small farm a few kilometres southwest of Rocky Mountain House, Alberta.

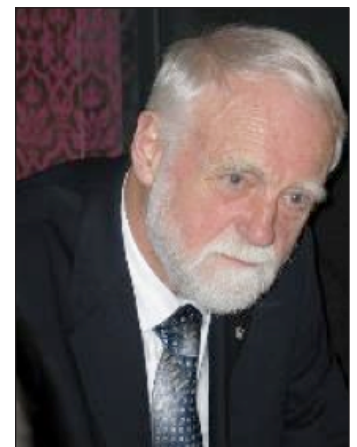
Morley W. Barrett worked as a wildlife biologist for the province of Alberta for 32 years and subsequently worked for Ducks Unlimited Canada for 5 years. He has held management, research and executive positions during his career. His professional focus has included extensive work on pronghorns (*Antilocapra americana*), humane trapping and wildlife diseases. Dr. Barrett is currently retired and lives in the Rocky Mountain House area of Alberta.



Marc Cattet is a senior research scientist and a wildlife veterinarian with the Canadian Wildlife Health Cooperative at the Western College of Veterinary Medicine, University of Saskatchewan. He provides technical expertise in the areas of wildlife capture and handling to government wildlife agencies in Canada, and serves as project veterinarian for the Foothills Research Institute Grizzly Bear Research Program. His research is focused toward detecting, understanding, and reducing the effects of a range of human activities on the health of wild species.



Dick Dekker is an independent wildlife ecologist with a PhD from Wageningen University, The Netherlands. From 1964 to the present, he has recorded long-term wolf-ungulate dynamics in Jasper National Park, and detailed predator-prey interactions of falcons and waterbirds in central Alberta and along the Pacific west coast of British



Columbia. His publications include 260 titles in a wide variety of print media in English and Dutch, including 9 different refereed journals. He has written the scripts of 4 wildlife TV specials and is the author of 14 books published in Canada and The Netherlands.

Erin Moffatt received both BSc and MSc through the University of Saskatchewan, Departments of Biology and Veterinary Pathology, respectively. She has spent much of her career studying populations of mule deer (*Odocoileus hemionus*) in southern Saskatchewan. These populations were the focus of her graduate research, which looked at movement patterns and social dynamics in relation to chronic wasting disease spread. Erin is currently employed as a Data and Communications Technologist for the Canadian Wildlife Health Cooperative, where her interests in data quality and scientific communication are put to good use.

Roger A. Powell - Over the past 40 years, my research has emphasized how limiting resources affect animals. I have studied energy budgets, sexual dimorphism, population stability, coexistence of competitors, and territoriality of fishers, weasels, black bears and pine voles (*Microtus pinetorum*). My field research has emphasized animals' home ranges and spacing. I now envision animals living in a fitness landscape where the habitat value at each place is the potential contribution of that place to an animal's fitness. I still do not know what a home range is but am convinced that animals give us critical clues. Studying my own home ranges has provided me with important insights. As a kid, I read field guides with a flashlight under the covers after my parents told me to put out the lights. Did that destine me to become a field biologist or was I just a crazy kid? Since then I have held a frightened fisher by the tail, had a weasel urinate on my head, watched a mother black bear nurse her cubs in their den, and have spent too many hours in front of a computer monitor. In the end, I still don't know what I shall be when I grow up. Shall I be a biologist who builds wood/canvas canoes, does photography, runs, trains dogs

and loves to camp, or shall I be a canoe builder who is also a biologist who does photography, runs and trains dogs, or shall I be a photographer who . . .

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