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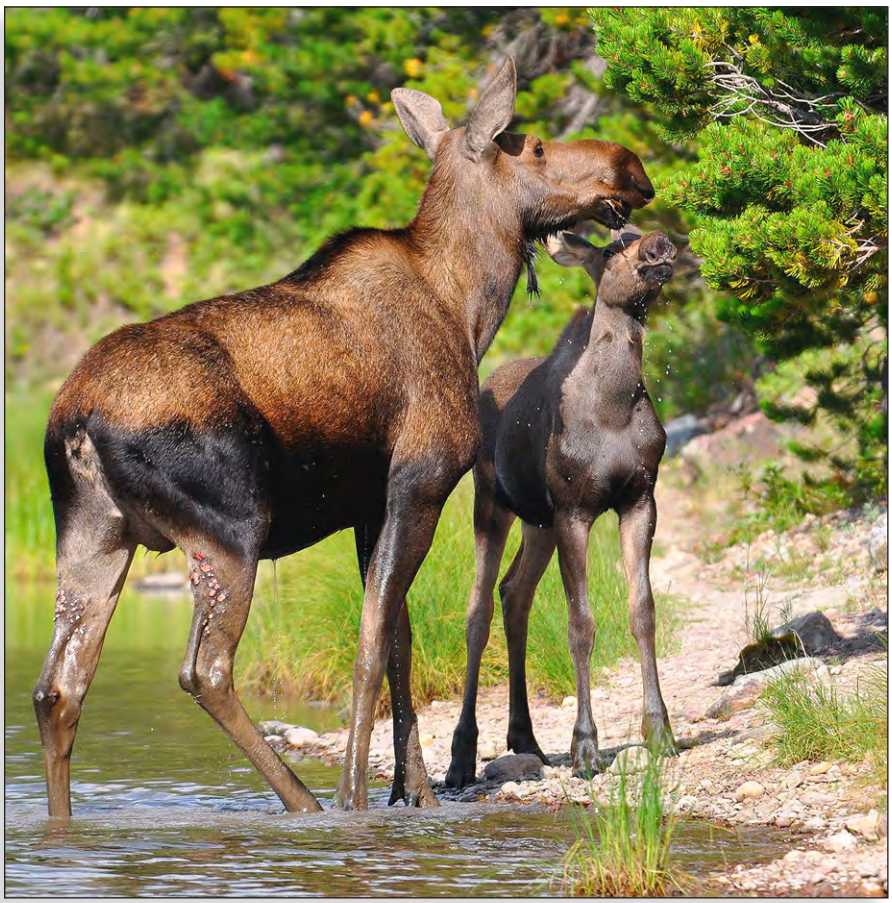
Case Study: Agitation and Hyperactivity of Moose and Elk at a Wildlife Rehabilitation Shelter in Response to Removal of Temporary Feeding Stations

Roy V. Rea and Marshall S. Schneider



MOOSE *(ALCES ALCES)*. PHOTO ©CHUCK HILLIARD. USED WITH PERMISSION.

IN YOUR PRACTICE: Rea and Schneider offer observations that can be used by rehabilitators to reduce stress for wild ungulates in captive or near-captive settings while potentially reducing handler risk as well.

ABSTRACT: This case study reports on agitation and hyperactivity as observed in two human-habituated moose *(Alces alces)* in February of 2009 and in one elk (*Cervus elaphus*) on February 2010 at a wildlife shelter in northern British Columbia, Canada. The behavior occurred following the removal of temporary feeding structures that had held tree boughs and branches during feeding experiments. Activities recorded and discussed include stiff-legged stomping, rearing, posturing, back arching, bluff charging, snorting, and barking; the raising of guard hairs on the neck and withers is also reported. Such activities had never before been observed in these circumstances by caretakers throughout the 20 years of operations at the shelter. To mitigate the occurrence of such behaviors, possible approaches could be to dismantle feeding stations only after animals have become accustomed to the absence of food, or to distract animals with additional food items while dismantling the feeding stations.

KEY WORDS: Agitation, *Alces alces*, behavior, *Cervus elaphus*, feeding trials

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Introduction

Like many ungulates, moose and elk are known to bed, walk, or pace slowly about when undisturbed (Bubenik 1998). However, neutral behaviors can change in response to real or perceived danger, fright, crowding, and startling.

Although animals becoming agitated and displaying imminent aggression in response to various stimuli has been recorded (Bubenik 1998; Grandin and Johnson 2005), and anyone who has observed social interactions amongst moose and elk know how aggressive they can become if provoked (Bogomolova *et al*. 2002), few studies have been conducted on potential stressors and how such stressors may effect captive animals (Moberg and Mench 2000). As such, biologists rely heavily on anecdotal information about how animals, such as those raised in shelters, respond to various forms of stress (Moberg and Mench 2000).

Case study

Here, we report on the behavior of a 3-yr-old cow, a 9-mo-old moose calf, and a 9-mo-old elk calf that had been hand-reared at the Northern Lights Wildlife Shelter in Smithers,

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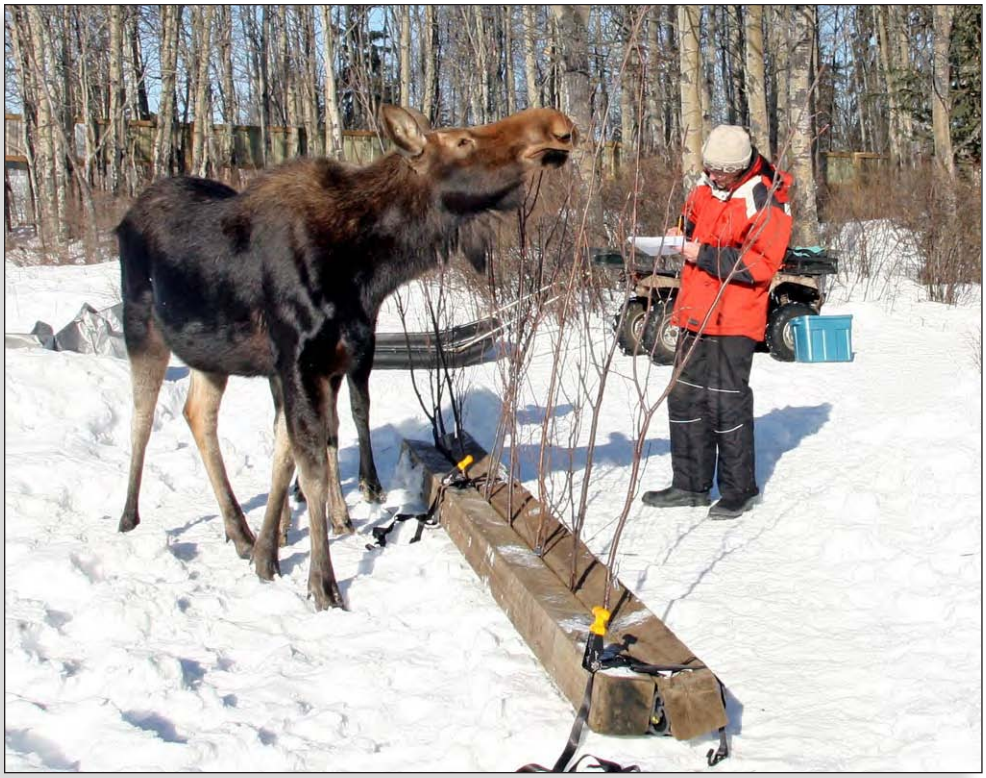

FIGURE 1. The feeding station constructed to feed willow and birch saplings to moose at the wildlife shelter over a 3-day period in February 2009.

British Columbia. These animals displayed agitation and hyperactivity directed towards experimenters in response to our removal of temporary feeding stations. Feeding stations were constructed to facilitate cafeteria-style feeding trials, over a 3-day period in 2009 and a 2-day period in 2010, as part of two different experiments we were conducting to learn about the feeding preferences of ungulates (specifically moose) in northern British Columbia.

All moose and elk at the wildlife shelter had been orphaned and subsequently bottle-raised and, as such, were considered habituated to human presence. All animals were free to feed from the feeding station at the shelter, but also used the surrounding and unfenced wilderness areas where they were able to mix with, and behave as, wild animals.

First Encounter

On 27 February 2009, after a 3-day experiment in which we fed willow (*Salix scouleriana*) and birch (*Betula papyrifera*) saplings to three semi-tame moose at the shelter, we had begun to disassemble a feeding station that had been built for the purpose of our experiment. The station had two 6" × 6" pine (*Pinus contorta* var. *latifolia*) beams, each 16 ft long, and two ratchet straps that bound the two beams together in order to pinch and hold the browse plants in a stationary and upright position so that the moose could feed (Fig. 1). This system was our design and was simply used to feed entire plants to moose in a way that more-closely mimicked how they feed on such plants in nature—that is, vegetation in an upright position and not lying on the ground.

When we finished our experiment on the third day of testing, we removed the ratchet straps and carried one beam back to the compound from which we had collected them earlier. When we returned to retrieve the second remaining beam, one of two moose calves that had been feeding there began to display aggressive behaviors (the other moose calf had wandered off into the surrounding woodlands). This aggression toward us matched interactions we and the caretakers had previously observed at the shelter, when moose become irritated with each other or with deer and elk with which they share resources. However, such interactions had not occurred over the course of our experiment, nor had any aggression been directed at caretakers. Activities of the calf included stiff-legged posturing, kicking, back arching, bluff charging, snorting, and barking, all of which are reported aggression behaviors of moose (Bubenik 1998). Additionally, the calf in question appeared disgruntled and stood in a protective stance between us and the remaining beam.

After about 3 min of this hyperactivity display, the moose calf resumed its normal behavior and wandered off toward a salt block about 30 m east of the feeding station we had erected. We discounted the behavior and carried the second beam to where we had put the first beam some 40 m to the north.

When we returned to the feeding station site, we found the 3-yr-old cow had arisen from her bed, about 15 m from the station, where she had been lying for the past hour during our deconstruction activities. She was rearing and stomping in a stiff-legged fashion around the area where the feeding station had been, sniffing the ground with her ears back and the guard hairs of her neck and withers erect. Additionally, she was roaring, coughing, and snorting in an apparent bout of hyperactivity that lasted for at least 5 min; roughly half of her behavior was directed at us, while the rest of the behavior appeared to be directed outwardly at nothing in particular. Following the hyperactivity, the cow remained preoccupied with the area of the removed station for at least 20 min.

Upon discussion, we were able to connect the behavior of the two animals and speculate at the cause. These aggressive behaviors could have been linked to other stimuli in the environment. However, we had not observed such activity over the 3-day period in which the feeding station had been available for the animals. In addition, beyond removing the station, there were no apparent

changes in the environment to which we could attribute such behavior. Therefore, we concluded that both animals became stressed in response to our dismantling and removal of the station, which had served as a constant supply of hand-picked, very palatable browse for several days.

Second Encounter

In mid-February 2010, we set up a cafeteria-style feeding trial with the boughs of several conifers (*Pinus contorta*, *Pinus sylvestris*, *Abies lasiocarpa*, *Pseudotsuga menziesii* var. *glauca*, *Picea abies*, and *Picea glauca*) in an effort to determine feeding preferences for various conifer species by moose and elk. These materials were provided to the animals over a 2-day period (20 hr in total) by placing three replicates of the boughs of different species into piles; these piles were separated from one another by approx. 3 m (Fig. 2). Upon completion of the experiment, we began to collect uneaten materials for transport back to our laboratory at the University of Northern BC in Prince George, British Columbia. Although the moose appeared unaffected by our removal of the boughs from the feeding piles that had been established the previous day, the lone elk that had been feeding there began to exhibit signs of stress when approximately half of the materials had been collected. In this instance, the elk charged at us with its head held high and its neck and chest stretched out in front of it. Along with charging, it kicked out with its front legs; this continued for approx. 6–7 min, during which we were required to retreat behind trees and a portion of the fenced shelter. Ultimately, we were required to leave the feeding station for about an hour, after which we returned to collect the left-over materials with an all-terrain vehicle we strategically parked between the plant materials and the elk.

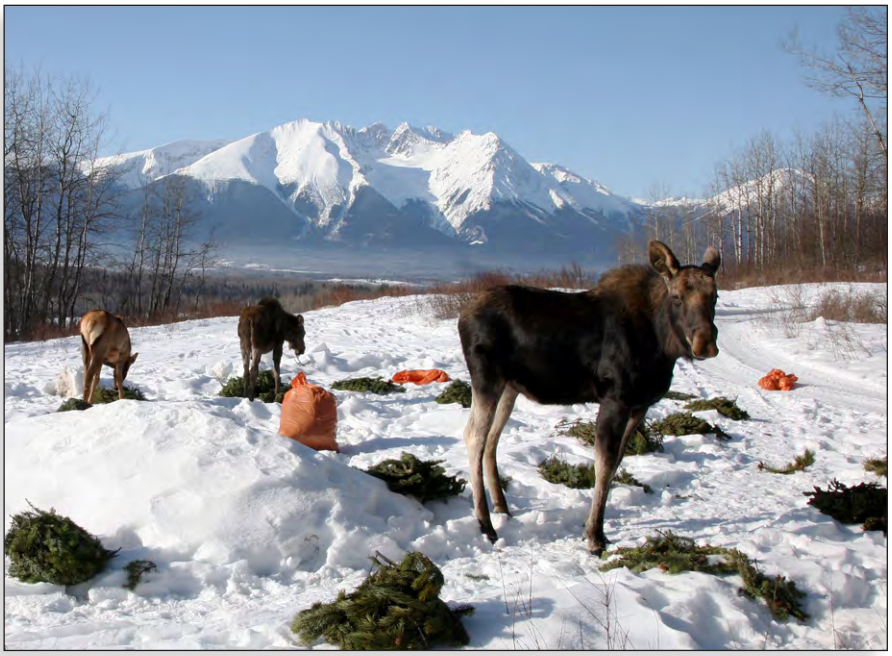

FIGURE 2. Moose and elk (far left) foraging on the boughs of different coniferous trees that were set out in a cafeteria-style feeding trial on February 18, 2010. This photograph was taken as we were completing the set up of the station and shows the bags (one still full) that were used to transport boughs to and from the site.

Conclusions

No prior experiences with human-habituated ungulates at the shelter over the past 8 yr of research prepared us for the reaction of those animals to our activities on these two occasions. We have also been unable to find any reports of similar activities against humans in the literature, albeit all of those behaviors have been observed in members of the deer family interacting with other wildlife in the wild and denote stress under a variety of circumstances (Cowan and Geist 1961; Bubenik 1998). Our recounting of the animal's behavior surprised Peter and Angelika Langen, who own and operate the shelter and have worked there since 1990 to rehabilitate animals from throughout northern British Columbia. Such behaviors do occasionally occur between animals when competing for food during normal feedings at the station. They also occurred between animals feeding during the cafeteria-style trials. The difference in this case study is that such actions were directed at humans, not during the construction of the station or during the feeding trials, but only when we were removing station components and food resources.

Presumably, differences in forage intake between individual animals could have had an effect on how animals reacted to our removal of food resources. However, our assessment of intake rates by different animals in both trials revealed no significant differences in browse consumption between those animals under apparent stress and those that appeared oblivious to our removal of the station materials. Moose, deer, and elk all fed in the 2010 trial, but only the elk acted out when we removed the coniferous forage items. A preference for birch shoots over conifer boughs may help to explain why moose acted out more in year 1 than in year 2, but we could find no literature supporting this hypothesis, and our sample sizes are too small to draw any such conclusions.

Based on our observations of how animals react to one another during regularly scheduled feedings at the shelter, we do not believe that the amount of time that the feeding station is operational would alter the outcomes we report here—many animals react to competition over resources at their troughs with explosive aggression and dominance over one another before the food is even loaded into the troughs. However, plant quality may influence behavior if the provided experimental foods are of high quality and are normally difficult to locate around the shelter; animals may consider such resources rare and worth fighting over.

Interestingly, the cow that became aggressive in 2009 was also

present in the 2010 experiment, but happened to have wandered off into the nearby woodlands before we packed up the conifer boughs. Therefore, we could not test whether or not this reaction was possibly tied to simply one individual's behavioral repertoire. Because stressors can influence different species, or even different individuals of the same species, in different ways (Moberg and Mench 2000), it is difficult to predict how other animals might react to the removal of a feeding station. Again, more research is need to clarify individual and species-specific reactions to what we observed and now report here.

Management recommendations

To mitigate the occurrence of such behaviors, one possible approach could be to remove temporary feeding stations only after animals have adapted to the concept of an empty feeding station. Therefore, in the future, we plan to provide alternative food for animals when nearing the completion of our experiments. Extra food materials brought to the experiment could be used by researchers to direct animals away from the feeding stations while they are being dismantled. Waiting for regularly scheduled feeding times at the shelter before distributing extra food, and then dismantling the feeding station, may also allow for a quick and stress-free removal of the station while the animals are otherwise occupied. This method may mitigate the likelihood of animals reacting in a similar fashion and may reduce the stress that appeared to be caused by the removal of food resources and feeding paraphernalia from animals.

The ability to identify—and rectify—various sources of stress for human-habituated animals living in zoos and wildlife shelters is a challenge for animal keepers (Moberg and Mench 2000). As such, our challenge is to continue to seek all possible methods to minimize both undue stress and any potential harm to researchers and animals alike. We recommend that similar considerations be made for others contemplating similar experiments. Finding ways to reduce stress on animals involved in such experiments is paramount to appropriate animal care, but also respects the time and effort contributed by those operating shelters whom, in many cases, devote their lives to the health and safety of those animals for which they care and rehabilitate.

Acknowledgments

We'd like to thank Peter and Angelika Langen who own and operate the Northern Lights Wildlife Shelter in Smithers, British Columbia, Canada. Thanks to their dedication and the long hours spent bottle-raising moose, we have a wonderful resource at our fingertips that will assist us in future efforts to answer various questions on the biology and ecology of ungulates.

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About the Authors

Roy V. Rea is a Senior Laboratory Instructor at the University of Northern British Columbia in Prince George, British Columbia, Canada where he teaches General Biology, Field Applications in Resource Management, and labs in Plant Systematics and Animal Physiology. Roy has been studying various aspects of moose ecology for 16 years and has worked on several projects with Peter and Angelika Langen at the Northern Lights Wildlife Shelter since 2003.


Roy Rea

Marshall S. Schneider was a Research Associate with Roy at the time of the study. Both have worked together on several projects related to moose foraging ecology.

Marshall and Roy are brothers and grew up in the wilderness of Northern British Columbia, where they both gained a great appreciation for moose and the environment in which they live.


Marshall Schneider