

Habituation, Taming, Social Dominance Assertions, and “Freedom of the Woods”

Valerius Geist

Professor Emeritus of Environmental Science, The University of Calgary, Calgary, Alberta, Canada

ABSTRACT: Habituation of wildlife, deliberate or accidental, can be a useful tool in research, a profitable tourist attraction, a serious nuisance, and even a mortal danger. It is the first stage of an animal gaining familiarity with humans and is always a state of unconsummated interest by the animal in us. The next stage following habituation, taming, is always initiated by a habituated animal, which thereby continues gaining information about us. In some carnivores this may be an attack to test for edibility. Even tame animals may continue to explore humans by addressing us in their species-specific sign language as if we were social companions of their own species. In my work with free-living but tame bighorn sheep, females began to treat me as a super-female, while males addressed me with dominance displays and attacked me. Since the sign language of different species of mammals may be unintelligible to us, it has led to “unpredictable” fatal attacks in zoological gardens and national parks. In reality, species that are testing us for dominance will signal the intention to attack redundantly and long before it happens. Inability to read the body language, coupled with ignorance of a species’ biology can have fatal consequences. Exemplary is a large and rather safe tourist industry that has developed around habituated and tame bears in North America, while some persons have lived with tamed black and grizzly bears for decades. Negative conditioning to habitat can lead to deliberate or inadvertent population crashes. The survival of large predators may depend on systematic conditioning to avoid humans. Cannibalism among predators involves larger stalking smaller, with predators made wary of being stalked. It is proposed that by targeting stimuli to which large carnivores cannot habituate, such as the sounds of stalking or the bold behavior of armed humans, they can be systematically conditioned to avoid humans. Inefficient and enduring hunting does that, generating a “Freedom of the Woods” – that is, safety for all outdoor users.

KEY WORDS: animal behavior, bears, Freedom of the Woods, habituation, human safety, large mammals, mammalian predators, taming, ungulates

Proc. 27th Vertebr. Pest Conf. (R. M. Timm and R. A. Baldwin, Eds.)
Published at Univ. of Calif., Davis. 2016. Pp. 38-43.

INTRODUCTION

This is an essay on *habituation* and its consequences. It is based on the experiences gathered over decades by myself and my students during ethological studies, mostly on large mammals. Habituation has non-trivial ramifications for the safety of the observer, for that of visitors who are naive about habituated or tame wildlife, as well as for the animals being studied. Habituated or tame wildlife is never safe. It can lead to attacks on the observer or visitors, which leads ultimately to the demise of the habituated animals (Tsong 2010). These are ongoing concerns when supervising graduate students, for habituated animals will signal attacks well before they happen and the observer must be able to interpret such signals correctly. Failure to do so has led to injuries and to deaths. Habituation and its ramifications are, therefore, almost constantly on one’s mind when doing field observations. Mistreatment of habituated animals can have dire consequence as illustrated by the demise of Timothy Treadwell and his girlfriend Amie Huguenard, killed and eaten by grizzly bears (Medred 2003, Jans 2005).

While in my career as an animal behaviorist I had to worry about habituation only while in the field, I have had to worry about it in retirement on a daily basis for over two decades. We live in a rural area close to a large provincial park and the matter of how to handle numerous black bears that are attracted to orchards and salmon streams close to our residence, so as to minimize killing, is a daily family concern. We also lived with wolves and cougars. I have had to handle attacks by black bear males twice, I have been brazenly investigated several times by wolves, and

my wife has been harassed twice by wolves, once on our very doorstep. Our neighbor had to fight off attacks by five wolves twice, about a quarter mile from our residence, and was once chased home on his motorcycle by two wolves over a distance of about half a mile. During my field work I have been attacked by wolves twice, by coyotes once, was treed by a grizzly bear, and attacked by a mountain goat male. My students and I have been attacked by bighorn rams repeatedly.

THE GRADIENT OF INCREASING EXPLORATION OR FAMILIARIZATION OF THE ANIMAL TO HUMANS: HABITUATION, TAMING, AND ASSERTING DOMINANCE OVER HUMANS

Habituation begins when the animal begins to tolerate the observer at a distance. As it learns that the observer does not address it (looks at it, walks towards it or pursues it), the animal allows the observer closer and closer approaches. The animal’s security adaptations, however, prevent rapid habituation. During the process of habituation, which can take many days, the animal learns about the images, the smells, the sounds, and the movement patterns of the observer. That habituation is but an unstable state of unconsummated interest is revealed quite dramatically: the animal suddenly turns towards the observer, closes the distance, and begins to explore him physically. When I studied bighorn sheep, this allowed me to proceed with taming (conditioning through some positive reinforcement such as food or salt). One can of course also consummate habituation with deliberate negative conditioning, by inflicting noxious stimuli. Thus, habituation

progresses via the animal's own initiative to de-habituation as it consummates its curiosity about the observer. This exploration is, of course, species specific. However, in all cases I observed, it deals in the first instance with whether the observer is edible. That is one reason why the observer may not survive the explorations of a merely habituated large carnivore. The observer can work with that animal only if he or she survives the exploratory attack and still dominates the animals, as demonstrated in the classical studies of Woolpy and Ginsburg (1967) taming freshly captive wolves. With free-living bears, however, we have ample evidence that skillful taming may lead to a long and safe association between humans and bears (Stringham 2002, Stringham 2008, Stringham 2010a, Stringham 2010b, Rogers and Mansfield 2011, Stringham 2011).

Following taming, the animal may begin treating humans as conspecifics. This third phase can be highly dangerous! In my case with tame bighorn sheep, after two years of being in close proximity, female bighorns began treating me as a member of the nursery group, trying to hold me back when I tried to leave in the evening, by physically blocking me in direct body contact in a manner identical to lambs trying to stop their dam before nursing. Alternatively, they followed me closely, so that I could lead them wherever I wanted to, including into areas unknown to them. In the meantime, rams began showing dominance displays to me and attacked me. Fortunately, I could handle that. Herding cultures are well aware of male ungulates trying to usurp social dominance over herders and have traditional means of thwarting such males (Lott and Hart 1979).

THEORETICAL BASIS FOR HABITUATION

A fundamental characteristic of all living beings is to search for predictable conditions. It allows the organism to live at the lowest maintenance costs, allowing it to save a maximum of energy and nutrients for reproduction. This goes back to elementary bioenergetics, which shows that food-energy is costly to procure, that it is digested inefficiently and metabolized even more inefficiently into work. A simple calculation shows just how little work energy may be obtained from food, how rapidly the cost of locomotion increases with speed or with lift, and how expensive mere excitation can be. In order to minimize maintenance costs an animal must, consequently, live in surroundings it is familiar with, so that it can minimize travel, running, climbing, excitement, or costly interactions with conspecifics (Geist 1978:2-13). The requirement for predictability generates the Law or Principle of Least Effort, or Zipf's Law (Zipf 1949), which is fundamental to life. We too are subject to it, except when consciously opposed. Zipf's Law can be readily demonstrated whenever there are measurements made of energy or its proxy, such as heart-rate: acts are used in an inverse relationship to their size and complexity, so that the cheapest actions dominate daily behavior (MacArthur et al. 1982).

Zipf's Law interacts, however, with another fundamental law governing all life, namely that of maintaining security. The animal must act so as to protect itself against predators, parasites, pathogens, and against any breakdown of the body. Because security has priority over other life-strategies, security adaptations can even segregate

sympatric species ecologically, as found in the deer family (Geist 1998). However, to comply with Zipf's Law, as well as with security, an individual must have mechanisms of exploration that allow it to create a predictable environment, but at a reasonable cost. It cannot, for instance, run from any potential danger, as this would increase the cost of living and thus reduce reproduction. Consequently, it must explore potential danger so as to minimize the high cost of escaping, be the costs direct (such as the high costs of running and climbing), or indirect (such as vacating good feeding areas for secure escape terrain, or replacing feeding time with time being alert and watching). This is incompatible with maximizing energy and nutrients toward reproduction. Consequently, all organisms have ongoing sophisticated ways of exploring and making predictable their environments – physical, social, commensal (Geist 1978:24-40).

However, not every animal that tolerates humans is habituated. Some may already be tame, that is, engaged in predictable, voluntary reciprocal interactions, even body contact, with humans. Others may have had negative experiences with humans at close range and tolerate such only at a distance before moving off. Some may do so due to a maternal tradition or mimicry of avoidance by conspecifics. There is no way to tell *a priori* why the animal in question tolerates humans. Negatively conditioned animals are usually not dangerous. Unfortunately, habituated animals are potentially dangerous, because habituation is a state of unconsummated interest on the part of the animal, expressing itself as tolerance of humans. One discovers this only through systematic habituation and taming.

BEYOND TAMING

As noted above, this exploration, this process of making the unfamiliar familiar, proceeds in stages. The exploration that can happen after years of total tameness begins when the tame animal suddenly challenges the observer socially. In essence, it tests if it can dominate the observer. The challenge comes in the form of a dominance display, an exceedingly dangerous challenge! Therefore, habituation is always, and tameness is sometimes, a state of unconsummated interest by the animal in the observer.

Consequently, large-bodied species need to be negatively conditioned when they approach the observer. That is, they must learn that getting close to a human is somehow painful or unpleasant: the skunk strategy! Running away is not an option, as such is likely to trigger an attack.

However, complications do arise. For instance, animals do discover that in the presence of humans they are secure from predation and so ungulates, notoriously, seek out human habitations. There is evidence to suggest that predators are more security-sensitive than ungulates, which is why the latter can enjoy the safety of human settlements that most predators are reluctant to enter, at least initially. Females with young are especially affected. Little wonder that even cub-leading grizzly bear females will seek out the safety of visiting humans at salmon fishing grounds, since boars, a perpetual danger to cubs, are reluctant to approach humans (Herrero et al. 2005).

NEGATIVE CONDITIONING, POPULATION REDUCTION, AND CONSERVATION ACTIONS

Negative conditioning is the flip side of the coin to habituation and taming. Disturbance is so potent that it can lead, inadvertently or deliberately, to the destruction of populations by making the affected animals avoid large areas of their habitat.

Here is how negative conditioning was used to destroy a deer population. It was done in an experimental study in New Zealand by Les Batcheler (1968). His experiment aimed to alienate red deer from valuable forests in order to reduce forest damage. His chosen noxious stimulus was stalking. However, Batcheler limited stalking to high quality habitats only. This made surviving deer shift to low quality habitats. Subsequently, the deer shrank in body size, reduced reproduction, declined in numbers, and for some years stayed faithful to the poor habitat without recolonizing the good habitat. Small body size, low reproduction, lack of exploration, and spookiness are linked features, typical of extreme maintenance or efficiency phenotypes. This is an epigenetic response to low quality living conditions (Geist 1978:116-144, Geist 1998:4-6), in this case, experimentally induced by persistent stalking.

Observations on mountain sheep led to the conclusion that each population's home ranges were maintained as living tradition passed on from generation to generation (Geist 1967). Consequently, harassment could alienate sheep permanently from crucial habitat. We suspected that populations were lost because of this, leaving large areas of empty sheep habitat. Unlike deer or moose, mountain sheep were not able to colonize distant empty habitat. Consequently, an aggressive policy of re-introduction was the logical antidote to such losses due to negative conditioning (Geist 1975). This was actualized, resulting in an increase in mountain sheep continentally in a quarter-century by almost 50 percent (Toweill and Geist 1999).

DANGER SIGNALS

To stay out of trouble, it is imperative that the observer be able to read the silent signals of the habituated species and avoid the animal in time, so that it never approaches the observer. I know how to handle the challenges of mountain sheep rams. I do not know how to handle those of an elk, grizzly, or even a deer! I have worked closely for years with habituated, but also tamed, mule deer in the field, but I was careful to leave the moment I noticed the slightest interest of bucks in my person. I have handled the attacks of bighorn rams; I could never handle those of buck-deer! I do not think a human can!

What danger signals must the observer look for in habituated or tame animals? In predators, in the first instance, it is a noticeable attention to, and following of, the observer. I have experienced this personally by wolves about my home on Vancouver Island. These wolves began following riders, and they confronted or even attacked persons. Visual investigations are thus the beginning of a drawn-out prelude to predatory attacks (Geist 2007). Such were described for urban coyotes targeting humans by Baker and Timm (1998) and Timm et al. (2004) and were a factor in the killing of a university student by wolves in Saskatchewan (Geist 2008).

Observers approaching wildlife deliberately and brazenly may see behaviors, some of which the encroached animal emits in order to deter the observer from coming closer. Herrero et al. (2005) published a detailed list of signals denoting anxiety or threat from bears approached by humans. The authors drew attention to the likelihood that the animal will exhibit internal stress reactions well before it shows such in its overt behavior. They also suggested to re-label individual distance, personal space, or critical distance into overt reaction distance (ORD), so as to keep in mind the hidden cost of excitement to the approached animal that sets in well before it shows an overt behavioral response. We documented hidden alarm responses via the heart rate of instrumented bighorn sheep (MacArthur et al. 1982). A point to note: brown bears tend to treat humans like conspecifics, while black bears may treat humans as prey. Brown bears here and in Siberia (Stubbe 2009) rise into an attack on bears and humans alike aiming for the jaws of the opponent, a defensive tactic to grab hold of the opponent's weapons (jaws and teeth) and prevent their use. Old male bears, consequently, have broken canines.

DOMINANCE DISPLAYS

In ungulates, but also bears, the most important signal to watch for is the dominance display. Unfortunately, we humans, due to our primate origins, have a very difficult time recognizing this signal, let alone recognizing it as a signal of high danger. Primate communication focuses on the face and rear, a legacy of our ancient arboreal existence in the Tertiary. In most terrestrial vertebrates, however, communication focuses on the broadside of the body. Face-to-face signaling tends to be avoided, so that eyes in the dominance display of ungulates are averted from the individual addressed. That's the problem for us. A bear, mule deer buck, or mountain goat in a dominance display intended for us, look away from us. And with that, their intentions are concealed from us. We fail to recognize them as communication. We do not recognize it as an addressed display, as a dangerous challenge or threat. We have to learn that the usual dominance display of terrestrial larger mammals, primates excluded, is a broadside display with eyes averted. In dominance displays, various attention-getting mechanisms are used to arrest the onlooker's attention to the broadside picture plane in which size and mass of the displayer is emphasized (Geist 1978:86-98, Geist 2011a, Geist 2011b). In addition, the relaxed normal motions of everyday life are replaced, usually, by slower, stiffer motions. During the display the head of the displayer is averted and the object of the displayer is viewed through the rear of the eye. The displayer does not approach directly, but at a tangent. That is, it circles onto the object of display. The naive human observer, normally, interprets the scene as an animal walking slowly past and not paying attention to the observer. The attack comes suddenly from the dominance display, and is judged by those affected as "unpredictable." It may be triggered by the human observer losing interest and looking away. I have never permitted myself to lose eye contact when close to a potentially dangerous large mammal, except when deliberately triggering attacks by male deer as a demonstration, while onlookers were protected by an adequate fence.

There are exceptions to the body-display, as the dominance display may focus on horns as it does in bighorns, so that the displaying ram turns and twists his horns so as to show them off to an opponent or to a prospective mate (Geist 1971). The subordinate-to-be may counter display, and close the eye towards the displayer. Dominance displays are discussed in detail and context by Walther (1984) and Geist (1978:86-115, Geist 2011a). For bears, Stringham (2010a, 2010b) labeled the dominance display “sumo display.” The illegibility of this dominance display to us, especially when performed subtly as it is much of the time, is illustrated by the fact that two highly experienced observers of black bears, Rogers and Mansfield (2011), were not aware of it. Stringham (2011) has never been addressed with sumo display by a grizzly. This speaks vividly to the great care and skills developed by Rogers, Mansfield, and Stringham in dealing with deliberately habituated and tamed bears (see also Stringham 2002, Stringham 2008, Stringham 2010a, Stringham 2010b). It stands in total contrast with how I treated black bears about my home for over two decades. I ruthlessly imposed my dominance, and while most bears fled, some large males moved off ahead of me at a walk, reluctantly, and I received then and in subsequent meetings sumo displays. They pushed back! Similar experiences were reported for polar bears by Ovsyanikov (1996). When my wife and I were attacked by a large black bear male, I imitated, rifle in hand, the dominance display of a dominant black bear (slow, swagger, tangential approach). The attacking bear slid to a halt about five paces off, snapped teeth at me, went into a sumo display, ran off several paces, made another sumo display, and then bolted.

In North America, a large and rather safe tourist industry has developed around habituated and tame bears on the Pacific coast and national parks, while some persons have tamed black and grizzly bears deliberately and have lived with such (Van Tighem 1997, Stringham 2002, Stringham 2008). Stephen Stringham (2008) gives a most informative annotated bibliography of 19(!) books dealing with bear attacks, and this does not cover books in which bear attacks are described incidentally to bear biology. In contrast are the killings of photographers Michio Hoshino, Vitaly Nikolayenko, and Timothy Treadwell by the bears they followed. Bears recognize individual humans and thus acted differently towards the photographers that followed them continually, as opposed to casual visitors. The photographers could approach the habituated bears closer than could other people. The animals acted indifferently, fed, and rested in view of the photographers. Most troublesome was the fact that a large Kamchatka brown bear was filmed performing sumo displays close to and addressed to a human. The photographers were killed by the habituated bears probably while being treated as bears. The bear which had been followed by Michio Hoshino on Kamchatka found him during a night in camp, killed him in the tent, then carried him away and devoured the body in the shrubs. In this case, the bear demonstrated a typical bear behavior (cannibalism) toward a human. In Nikolayenko’s case, the bear was apparently looking for his winter den during a snow storm. Nikolayenko followed him. Grizzly bears choose snowstorms to slip away unobserved to occupy their wintering dens (Craighead et al. 1995) as

bears in dens may be killed by other bears. The bear probably recognized the photographer personally, and reacted as it would towards another bear following, with a lethal attack. Habituated or tame animals may also resent being followed, as I experienced with tame, free-living mule deer bucks. This may have also been a factor in Vitaly Nikolayenko’s death (Mosolov and Gordienko 2004).

The classical attack by a habituated or tame ungulate male occurs after displaying and displaying, with the human signaled to paying little if any attention, and then judging the attack as “unpredictable.” I was told of such incidents in zoological gardens, involving people I knew (Geist 2011b). Such an attack is described for a habituated or tame mountain goat male in Glacier National Park by Chadwick (1983:148) which, fortunately, was not fatal. A hiker in Olympic National Park was less fortunate (Tsong 2010). He was killed on October 16, 2010 by an exceptionally large male mountain goat, which as court records showed, had been addressing dominance displays to hikers for a very long time. Although park personnel were repeatedly warned about this male’s behavior, they failed to grasp the significance of what was happening.

FREEDOM OF THE WOODS

Predatory attacks on humans are a reality (Capstick 1981:108-114, Pavlov 1982, Herrero 1985, Patterson 1986, Corbett 1991, Zavatsky 1993, Shelton 1994, Pavlov 2002, Loe and Röskeft 2004, Patterson 2004, Lappalainen 2005, Frump 2006, Graves 2007, Moriceau 2007, Pavlov 2007, Geist 2008, Stubbe 2008, Hart and Sussmann 2009). I would like to end with a hypothesis to minimize attacks by predators on humans, which I have labeled *Freedom of the Woods*.

“Fear” offers hope in carnivore conservation. If humans can be linked systematically to something that predators fear innately, which they cannot habituate to, then predators will avoid humans and their habitation systematically. For bears and wolves, there are indeed such innate fears that we can manipulate to our mutual advantage.

We know that large bears kill small bears, and that large bears are a constant danger to small bears. Consequently, small bears, in order to survive, must be highly sensitive to sounds resembling another bear stalking them, and to bold, brazen, fearless-acting by potential foes. We thus can expect bears to be very sensitive to being stalked. How sensitive even large grizzly bear males are to being followed is revealed by the observations of William H. Wright, who, over a century ago systematically tracked grizzly bears for years, initially for hunting and then for photography (Wright 1909). Moreover, he was exceptionally accurate in his observations and deductions, as emphasized in the foreword to his book by Frank Craighead. Wright found that even large grizzly bear males during normal travel would every so often detour and check on their tracks, as if checking if someone followed. That grizzly bears are sensitive about their tracks is suggested by grizzly bears going into hibernation during snow storms. Large males have been known to kill other bears in their dens. From the above, it follows that bears ought to be very difficult to hunt, since they are expected to be exceptionally sensitive to being stalked, as well as being

very capable of avoiding humans once they detect such. Wright makes a point of stressing just that (see his Chapter 9 on trailing). Consequently, we can make bears shun humans if they encounter systematically humans that stalk and follow them, and which in encounters act boldly. This suggests that inefficient hunting of bears makes bears very weary, so that they avoid humans. If so, then hunting inefficiently by many hunters over long time spans, generates a protection for both the bears and the public. Such hunting generates a free public good, which I would label *The Freedom of the Woods*, which allows the general public to enjoy the out-of-doors without fear of predatory attacks. I experienced such conditions in the 1950s and 60s when wilderness users such as prospectors, trappers, hunters, outfitters, and biologists were armed, and unarmed recreational hiking in the back country was in its infancy. The contrast between the behavior of grizzly bears in Banff National Park and in wilderness where people went armed, was palpable. Only in national parks were my students and I treed, experienced equipment destruction by grizzly bears, or had to kill bears in self-defense. Little wonder that concern for public safety made Lake Louise in Banff National Park the prime area in North America for the killing of grizzly bears (Nielsen et al. 2004). Ironically, we can use our human innate capacity for stalking (Geist 1978:252-254, Merker 1984) to generate innate panic in predators, for the lasting benefit of both!

LITERATURE CITED

- Baker, R. O., and R. M. Timm. 1998. Management of conflict between urban coyotes and humans in southern California. *Proc. Vertebr. Pest Conf.* 18:229-312.
- Batcheler, C. L. 1968. Compensatory responses of artificially controlled mammalian populations. *Proc. NZ Ecol. Soc.* 15: 25-30.
- Capstick, P. H. 1981. *Maneaters*. Safari Press, Long Beach, CA.
- Chadwick, D. H. 1983. *A Beast the Colour of Winter*. Random House, New York, NY. 208 pp.
- Corbett, J. 1991. *The Jim Corbett Omnibus: the Man-Eaters of Kumaon, The Temple Tiger, The Man-Eating Leopard of Rudraprayag*. Oxford University Press, New Delhi, India. 189 pp.
- Craighead, J. J., J. S. Sumner, and J. A. Mitchell. 1995. *The Grizzly Bears of Yellowstone: Their Ecology in the Yellowstone Ecosystem*. Island Press, Washington, D.C. 556 pp.
- Frumpt, R. 2006. *The Man-Eaters of Eden: Life and Death in Kruger National Park*. Lyons Press, Guilford, CT. 240 pp.
- Geist, V. 1967. A consequence of togetherness. *Nat. History* 76(8):24-30.
- Geist, V. 1971. *Mountain Sheep*. University of Chicago Press, Chicago, IL. 400 pp.
- Geist, V. 1975. On the management of mountain sheep. Theoretical considerations. Pp. 77-105 in: J. B. Trefethen (Ed.), *The Wild Sheep in Modern North America*. Winchester Press, New York, NY.
- Geist, V. 1978. *Life Strategies, Human Evolution, Environmental Design*. Springer-Verlag, New York, NY. 495 pp.
- Geist, V. 1998. *Deer of the World: Their Evolution, Behaviour, and Ecology*. Stackpole Books, Mechanicsburg, PA. 427 pp.
- Geist, V. 2007. An American wolf pack turns Russian. Appendix B (pp. 195-197) in Graves, W. N. *Wolves in Russia: Anxiety through the Ages*. Detselig Enterprises Ltd., Calgary, AB, Canada.
- Geist, V. 2008. Death by wolves and the power of myths: the Kenton Carnegie tragedy. *Fair Chase* 33:29-33.
- Geist, V. 2011a. Wildlife habituation: advances in understanding and management application. *Human-Wildl. Interact.* 5:9-12.
- Geist, V. 2011b. Responses to Rogers and Mansfield (2011) and Stringham (2011). *Human-Wildl. Interact.* 5:192-196.
- Graves, W. N. 2007. *Wolves in Russia*. Detselig Enterprises Ltd., Calgary, AB, Canada.
- Hart, D., and R. W. Sussman. 2009. *Man the Hunted*. Westview Press, Philadelphia, PA. 357 pp.
- Herrero, S. 1985. *Bear Attacks: their Causes and Avoidance*, First ed. Lyons Books / Winchester Press, Piscataway, NJ. 287 pp.
- Herrero, S. 2002. *Bear Attacks: their Causes and Avoidance*. Lyons Press, Guilford, CT. 304 pp.
- Herrero, S., T. Smith, T. D. DeBruyn, K. Gunther, and C. A. Matt. 2005. From the field: brown bear habituation to people – safety, risks and benefits. *Wildl. Soc. Bull.* 33:362-373.
- Jans, N. 2005. *The grizzly maze: Tim Treadwell's fatal obsession with Alaskan bears*. Dutton, New York, NY. 274 pp.
- Lappalainen, A. 2005. *Suden jäljet (The Tracks of the Wolf)*. Karisto Oy, Hämeenlinna, Finland. 168 pp.
- Loe, J. and E. Röskeft. 2004. Large carnivores and human safety. *Ambio* 33:283-288.
- Lott, D. F., and B. L. Hart. 1979. Applied ethology in a nomadic cattle culture. *Appl. An. Ethol.* 5:309-319.
- MacArthur, R. A., V. Geist, and R. H. Johnson. 1982. Cardiac and behavioral responses of mountain sheep to human disturbance. *J. Wildl. Manage.* 46:432-442.
- Medred, C. 2003. Wildlife author killed, eaten by bears he loved. *Anchorage Daily News*, Oct. 9, 2003.
- Merker, B. 1984. A note on hunting and hominid origins. *Amer. Anthropol.* 86:112-114.
- Moriceau, Jean-Marc. 2007. *Histoire du méchant loup: 3 000 attaques sur l'homme en France*. Fayard, Paris, France. 623 pp.
- Mosolov, V., and T. Gordienko. 2004. In memory of Vitaly Nikolayenko—his 33rd field season. *Intl. Bear News* 13:6.
- Nielsen, S. E., S. Herrero, M. S. Boyce, R. D. Mace, B. Benn, M. L. Gibeau, and S. Jevons. 2004. Modeling the spatial distribution of human caused grizzly bear mortalities in the Central Rockies ecosystem of Canada. *Biol. Conserv.* 120:101-113.
- Ovsyanikov, N. 1996. *Polar bears: Living with the White Bear*. Voyageur Press, Minneapolis, MN. 144 pp.
- Patterson, B. D. 2004. *The Lions of Tsavo: Exploration of the Legacy of Africa's Notorious Man-Eaters*. McGraw-Hill, New York, NY. 231 pp.
- Patterson, J. H. 1986. *The man-eaters of Tsavo*. St. Martin's Press, New York, NY. 347 pp.
- Pavlov, M. P. 1982. *The Wolf*. Lesnaya Promyshkennost, Moscow, USSR.
- Pavlov, M. P. 2007. The danger of wolves to humans. Other cases of aggression. Appendix A (pp. 173-194) in: Graves, W. N. *Wolves in Russia*. Detselig Enterprises Ltd., Calgary, AB, Canada.

- Rogers, L. L., and S. A. Mansfield. 2011. Misconceptions about black bears: a response to Geist (2011). *Human-Wildl. Interact.* 5:173-176.
- Shelton, J. G. 1994. *Bear Encounter Survival Guide*. Pogany Productions, Hagensborg, British Columbia, Canada. 230 pp.
- Stringham, S. F. 2002. *Beauty within the Beast*. Seven Locks Press, Santa Ana, CA. 304 pp.
- Stringham, S. F. 2008. *Alaska Magnum Bear Safety Manual*. WildWatch, Soldotna, AK. 194 pp.
- Stringham, S. F. 2010a. When Bears Whisper, Do You Listen? WildWatch, Soldotna, AK. 238 pp.
- Stringham S. F. 2010b. *Ghost Grizzlies and Other Rare Bruins: The Art and Adventure of Knowing Wild Bears*. WildWatch, Soldotna, AK.
- Stringham, S. F. 2011. Aggressive body language of bears and wildlife viewing: a response to Geist (2011). *Human-Wildl. Interact.* 5:177-191.
- Stubbe, C. 2008. Der Wolf in Russland – historische Entwicklung und Probleme. *Beiträge zur Jagd-und Wildforschung* 33:325-364.
- Stubbe, C. 2009. *Kein Pulver – keine Feder. Ni pucha – Ni pera. Ein Jahr unter sibirischen Berufsjägern*. Nimrod-Verlag, JANA Melsungen.
- Timm, R. M., R. O. Baker, J. R. Bennett, and C. C. Coolahan. 2004. Coyote attacks: an increasing suburban problem. *Trans. No. Amer. Wildl. Nat. Res. Conf.* 69:67-88.
- Tsong, N. 2010. Mountain goat kills man in Olympic National Park. *Seattle Times, Local News*. Oct. 18, 2010.
- Toweill, D. E., and V. Geist (Editors). 1999. *Return of Royalty*. Boone and Crockett Club, Missoula, MT. 224 pp.
- Van Tighem, K. J. 1997. *Bears*. Altitude Publishing, Vancouver, BC, Canada. 160 pp.
- Walther, F. R. 1984. *Communication and expression in hoofed mammals*. Indiana University Press, Bloomington, IN. 423 pp.
- Woolpy, J. H., and B. E. Ginsburg. 1967. Wolf socialization: a study of temperament in a wild social species. *Am. Zool.* 7:357-363.
- Wright, W. H. 1909. *The Grizzly Bear*. Charles Scribner's Sons. Reprint (1977), University of Nebraska Press, Lincoln, NE. 274 pp.
- Zavatsky, B. P. 1993. Brown bear. Middle Siberia. Pp. 249-275 in: M. A. Vaisfeld and I. Chestin (Eds.), *Bears. Brown Bear, Polar Bear, Black Bear*. Nauka, Moscow, Russia.
- Zipf, G. K. 1949. *Human behavior and the principle of least effort*. Addison-Wesley, Cambridge, MA. 573 pp.