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How people should respond when encountering a large carnivore: opinions of wildlife professionals

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Abstract: We conducted telephone surveys of wildlife professionals who work with large carnivores to ask their opinions about how people should respond to avoid being injured when confronted by a black bear (*Ursus americana*), grizzly bear (*Ursus arctos*), mountain lion (*Puma concolor*), or gray wolf (*Canis lupus*). The respondents agreed that the most appropriate response was to try to increase the distance between a person and the carnivore. In the event of an attack by a black bear, mountain lion, or wolf, most respondents said to fight back. Opinion was divided over the best response for an individual who was being attacked by a grizzly bear, but a slight majority of professionals said to fight back if the attack was predatory and be passive if the attack was defensive; however, respondents also noted that many victims would be unable to identify the bear's motive. If a black bear came into camp, most respondents said that a person should aggressively encourage the bear to leave and to fight back against a bear that enters a tent at night, regardless of species. Respondents unanimously agreed that bear pepper-spray is effective in defending against an attack. While any encounter with a large carnivore can be fatal to the person involved, we believe that selecting the right course of action increases the odds that the victim can escape without injury.

Key words: animal attacks, black bear, carnivores, grizzly bear, human–wildlife conflicts, mountain lion, predator attacks, wolf

ATTACKS BY LARGE CARNIVORES on humans constitute a rare, but serious form of human–wildlife conflict (Worthy and Foggin 2008). Black bears (*Ursus americana*), grizzly bears (*Ursus arctos*), mountain lions (*Puma concolor*), and gray wolves (*Canis lupus*) have all been documented to attack humans; in recent decades wildlife attacks have increased in North America (Herrero and Higgins 1999, Conover 2002, Herrero and Higgins 2003, Conover 2008). Possible explanations for the growing number of attacks include increasing human and wildlife populations, development near wilderness areas, increased numbers of people recreating or working in the back country, and carnivore habituation to humans (Herrero and Higgins 1999, Conover 2002, Herrero and Higgins 2003, Lemelin 2008, Madison 2008, Wolfe 2008). Bears attack about 30 people annually in North America, with black bears accounting for most of the attacks (Conover 2002). Although most bear attacks can be attributed to black bears, grizzly bears are generally thought to be more dangerous. In British Columbia and Alberta, Canada, for example, grizzly bears inflicted between 2 and 3 times as many serious or fatal injuries as black bears did from 1960–1998, even though black bears greatly outnumber grizzly

bears in these provinces (Herrero and Higgins 1999, 2003).

Mountain lion attacks in North America during the twentieth century occurred less frequently, at a rate of about 0.6 attacks per year, than did bear attacks (Torres 1997). However, the number of attacks appeared to be increasing (Beier 1991, Torres 1997). Wolf attacks are extremely rare; only 1 human is known to have been killed by a healthy wolf in North America (Associated Press 2007). This attack occurred in northern Saskatchewan in 2005 and is the first documented case. However, this is not the only instance where wolves exhibited aggressive behavior toward humans in North America. In his review of human–wolf encounters in Alaska and Canada, McNay (2002) found 39 cases where healthy wolves exhibited aggression toward people, including 16 cases where wolves either bit humans or their clothing.

Although the chances of being attacked by a large carnivore are very remote, understanding what can be done to prevent an attack from occurring or to prevent serious injury during an attack is useful for people who work or recreate in areas inhabited by large carnivores. Yet, such information is not readily available. Hence, we conducted a survey of wildlife professionals

throughout the western United States, Canada, and Alaska to seek their advice on what to do in the event of an attack or encounter with a large carnivore.

Methods

We developed a telephone survey of 22 open-ended questions about what approach people should take to minimize their chances of personal injury when encountering a large carnivore (grizzly bear, black bear, mountain lion, or wolf). We gave the survey between January and April to as many professional wildlife biologists as possible who administer large carnivore programs or manage carnivores for state, federal or provincial governments. We asked questions regarding how to respond to an attack or an encounter and what deterrent methods a victim may use for defense. Respondents worked in the Canadian provinces of Alberta, British Columbia, or the Yukon Territory in Canada and in Alaska, Arizona, California, Colorado, Idaho, Montana, Nevada, Oregon, Utah, Washington, and Wyoming. Individuals were asked the same questions in the same order. Responses to each question were recorded and grouped into categories.

Results

Response to attack

We surveyed 53 different wildlife biologists and managers from various state, provincial, and federal agencies. We contacted wildlife professionals throughout the western U.S., Canada, and Alaska to acquire a representative sample of professionals throughout western North America. Of the wildlife professionals we were able to contact, 96% (53 of 55) agreed to take our survey.

When asked what to do in the event of being physically attacked by a black bear, 87% of respondents said to fight back, 2% said to be passive, and 11% said to either fight back or be passive depending upon the circumstances. When asked if their answer would change depending on if the attack is either predatory or defensive (i.e., if the person being attacked came between a mother bear and her cubs), 49% of respondents said the victim should fight the animal regardless of the type of attack, 49% said to fight if the attack is predatory and be passive if the attack is defensive, and 2% said to

be passive during any attack, regardless of the type. When asked how to respond to an attack by a grizzly bear, 4% of participants said to fight back, 55% said to fight if the attack is predatory and be passive if the attack is defensive, and 41% said to be passive in all circumstances. When asked what the proper response would be in the case of an attacking mountain lion or wolf, 100% of respondents said to fight back.

Response to encounters

We asked wildlife biologists what people should do when encountering a bear if taking shelter in a building or vehicle is not an option. When asked what is the best course of action for a person who is walking down a trail and encounters a nonaggressive black bear, 35% said to back away slowly without trying to draw the bear's attention, 33% said to alert the bear of your presence and slowly back away, 24% said to alert the bear of your presence and evaluate what the bear is doing before moving away, and 8% said to stop, keep the bear in sight, and evaluate its behavior. When we asked what a person who encounters a grizzly under the same scenario should do, 41% of respondents said to slowly back away without drawing the bear's attention, 41% said to alert the bear of your presence and slowly back away, 12% said to stop, alert the bear of your presence, and evaluate what the bear is doing, and 6% said to stop, keep the bear in sight, and evaluate its behavior.

When asked if climbing a tree is an appropriate response to a charging large carnivore, responses varied depending on the attacking species. For black bears and mountain lions most professionals said that climbing a tree was not an appropriate response. However, for grizzly bears most professionals said that climbing a tree was an appropriate response (Figure 1).

When asked what a person should do if a nonaggressive black bear comes into camp during the day and does not leave, 83% of respondents said to aggressively encourage the bear to leave, while 17% said to abandon the camp. When asked what to do if a bear attempts to enter a person's tent during the night, 60% said to fight back, 26% said to alert the bear of your presence and fight if necessary, 6% said to alert the bear of your presence but

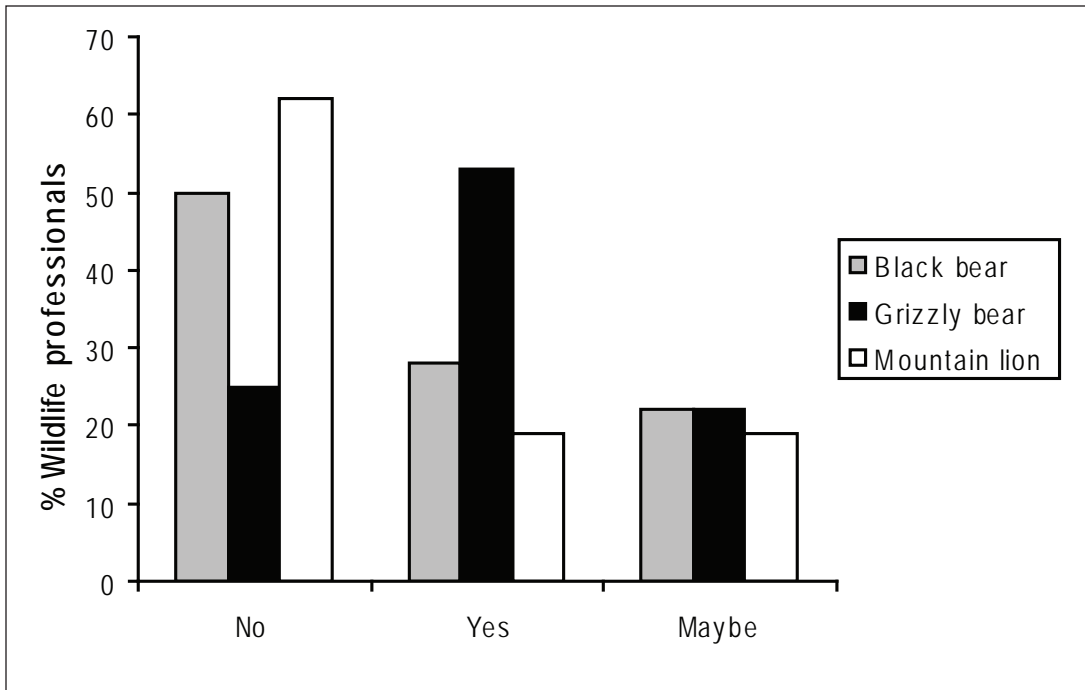


Figure 1. Percentage of wildlife professionals giving the answer “no,” “yes,” or “maybe” when asked whether climbing a tree is an appropriate response to a charging grizzly bear, black bear, or mountain lion.

remain passive, 4% said to get out of the tent, and 4% said to remain still but fight if necessary.

Deterrents

When asked how effective pepper spray is in defending against an attack, all respondents said that it was either effective or very effective. When asked if pepper spray’s effectiveness varied among carnivore species, 69% said there was no difference among species, 37% said it may be less effective for black bears. When asked if a person is worse off by shooting and wounding an attacking grizzly, black bear, or mountain lion than not shooting the animal, 49% said the person would not be worse off by shooting the animal, 44% said the person may be worse off for it, and 7% said the person would be worse off for shooting a grizzly but not for shooting a black bear or mountain lion.

Discussion

Study limitations

We were motivated to conduct this study when people asked us what to do if they are attacked by a bear. We realized that we did not know the answer and that it was unavailable in the scientific literature. Hence, we asked

the recognized carnivore authorities in North America how they would answer this and similar questions. Their opinions were the basis of our data. The information contained in this document is intended for use by wildlife biologists. We hope that they will take this information, combine it with their own knowledge and local conditions, and develop their own suggestions for how people should respond to local encounters with large carnivores.

We recognize 3 major limitations of our work. First, there is nothing that a person being attacked by a bear, cougar, or wolf can do that will guarantee that they will survive or avoid injury. Rather, the respondents’ suggested courses of action can only reduce a victim’s risk of injury or death. Still, some people who fear being attacked by predators desperately seek such information.

The second limitation of our study is that we surveyed wildlife biologists from across the U.S. and Canada and therefore ascertained continent-wide opinions about how to respond to a carnivore–human encounter. We were, thus, unable to capture local nuances about how one should respond. The optimal response

to a black bear encounter in Yosemite National Park may vary from the optimal response to an encounter in the Yukon wilderness. Hence, people should always follow the advice of local wildlife biologists.

The third limitation is that an optimal response to a carnivore–human encounter varies with the circumstances. For example, our respondents said that people should try to scare away a bear that enters a camping area but only if they are familiar with bears and are comfortable doing so. They recommended that other people should abandon the campsite and leave the area until the bear is gone. Our respondents also stated that a person's behavior should change based on what the carnivore is doing. For instance, they suggested that even campers experienced with bears leave the camp if their initial efforts to scare off the bear fail.

While hundreds of people are attacked by large carnivores worldwide each year, such attacks are rare in North America (Conover 2002). Despite their rarity, many people are haunted by the possibility that they might become the victim of an attack by a carnivore. People who are scared of large carnivores are less able to enjoy outdoor activities and are less tolerant of large carnivores that might be around them. We believe that a person's perceived fear of carnivores is exacerbated when he or she does not know how to respond if threatened or attacked. By providing such information to concerned people, we hope that local wildlife biologists and land managers can help both local residents and visitors deal with their fears and anxieties about large carnivores.

Response to attack

Our survey revealed some general agreement among wildlife biologists in western North America about how one should respond to an encounter with a large carnivore, as well as some differences in opinion. Reasons for variations in opinion include differences in experience among respondents, differences in respondents' perceptions and attitudes, and variations in local conditions within the widely various geographic regions where respondents reside.

Answers varied based on what carnivore species was being encountered and the carnivore's motivation for making the attack.

When asked what victims should do in the event of their being mauled by a black bear, most professionals (87%) said to fight back. However, when asked as a follow-up question if their answer would change depending on if the attack was predatory or defensive, many respondents changed their answer; 49% said to fight back regardless of the type of attack, and 49% said to fight if the attack was predatory but remain passive if the attack was defensive. How can we explain these varying responses? Several of the professionals mentioned that a large percentage of black bear attacks are predatory, a view shared by Herrero and Higgins (1999, 2003). Several of our respondents believed that it is very difficult for the victim of a carnivore attack to determine if the attack is predatory or defensive. They, therefore, argued that a person should assume that the attack is predatory and, going with the odds, attempt to fight off the black bear.

Unlike the various responses participants gave when they were asked how to react to a bear attack, all the professionals agreed that in the event of a mountain lion attack the proper response would be to fight back. This can probably be attributed to the fact that mountain lions are not known to protect their young or defend kills aggressively (Torres 1997). Beier (1991) found that when humans fought back during a mountain lion attack, they were often able to cause the mountain lion to end the attack and leave.

Response to encounters

People should always seek safety from large carnivores in a building or vehicle when one is available. When that is not an option, most respondents believed that increasing the distance between the person and the animal is the best thing to do during an encounter with any large carnivore. Several professionals said that, if possible, a person should leave without alerting the bear of their presence; this would be the best course of action. Many participants also indicated that if a black bear approaches or follows a person who has begun to back away, the person should become aggressive.

One possible response to a charging bear or other large carnivore is to climb a tree. Much disagreement exists among wildlife professionals on whether climbing a tree is

an appropriate response. Answers varied depending on which species of carnivore was charging. Many of our respondents also mentioned that climbing a tree would not be their first choice and that this should be done only if a person is close to a tree and has the ability and the time to climb high enough to avoid being caught.

Respondents also disagree about whether a person should make eye contact with a bear. A slight majority (54%) said no, but several mentioned that during an encounter with a bear or other large carnivore, it is extremely important to watch the animal in order to know where it is and to be able to evaluate what the animal is doing. Some respondents believe that staring directly at a large carnivore may not be wise, but it is possible to observe an animal without staring at it for a prolonged time. Losing sight of a large carnivore during an encounter is undesirable. Several respondents mentioned that knowing where the animal is and what it is doing is more important than totally averting eye contact.

Deterrents

Bear pepper spray has become a popular deterrent among a variety of outdoors enthusiasts. However, debate exists on how effective bear spray is at deterring a bear and that it may be less effective on black bears (Herrero and Higgins 1998, Smith 2006, Cramer 2007). When asked how effective bear spray is in defending against an attack all professionals agreed that bear spray was either effective or very effective. When asked whether bear spray's effectiveness differs among species most professionals (69%) said that its effectiveness does not differ among species. This agreement is in accordance with recent research that found bear spray to be >90% effective at stopping undesirable behavior in both black bears and grizzly bears (Smith et al. 2008).

Firearms often are carried by outdoor enthusiasts to use as a deterrent. In some instances people have successfully used firearms to defend themselves against attacking bears. However, people have also been unsuccessful in defending themselves with firearms and subsequently have been seriously injured or even killed by bears (U.S. Fish and Wildlife Service 2003). It has been suggested by

some that hunters who use firearms to defend themselves against bears are more likely to be injured or killed than those who use bear spray (U.S. Fish and Wildlife Service 2003, Smith et al. 2005). It has also been suggested that by wounding a charging bear a person may be worse off than if they did not shoot the animal (U.S. Fish and Wildlife Service 2003). However, when we asked professionals if a person shoots and wounds an attacking grizzly, black bear, or mountain lion whether the person is worse off than if they did not shoot the animal, more of the professionals (49%) said no, than yes (22%), but a number of them (22%) said maybe. These variations in responses suggests that a good deal of disagreement exists among professionals on whether firearms are an appropriate defense against large carnivores. However, several of those we interviewed mentioned that in order for firearms to be effective, the user must be very proficient with the firearm and be able to shoot accurately under the extreme stress that accompanies being charged by a large carnivore. Several professionals also mentioned that, while they did not believe a person was worse off by wounding a charging animal, they believed pepper spray was a better choice for use by the general public.

Encounters between large carnivores and humans will probably continue to increase in North America (Conover 2008, Cotton 2008, Leigh and Chamberlain 2008, Thiemann 2008). Free-ranging animals possess individual characteristics and nothing can guarantee a person's safety when recreating or working in areas inhabited by large carnivores. However, public education is an important tool that can be used to minimize the number of such attacks and the severity of injuries. We hope that our study will encourage wildlife managers to develop local guidelines for residents and visitors to their area. The information in this paper summarizes the opinions of a group of wildlife biologists. We hope that our study will encourage a debate about what people should do when they encounter a large carnivore or are attacked by one.

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