

STORY BY DR. CHARLES E. KAY

PREDATION

AND THE ECOLOGY OF FEAR

As we all know, predators can have a significant impact on ungulate numbers by killing individual members of the prey population. This is termed lethal or direct mortality. What is generally not recognized by biologists, sportsmen, and the general public, however, is that predators also have major non-lethal, or indirect, effects on prey species. This is called the ecology of fear or the landscape of fear and is an emerging topic in predator-prey studies, with an outpouring of scientific publications in recent years. Fear of

predation has been shown to greatly reduce the effectiveness of habitat. You can have the best wildlife habitat in the world, but if animals are afraid to use it due to the fear of being killed, or of their young being killed, then that habitat is of little practical value.

To one degree or another, we all live in landscapes of fear. There are places we all fear to go due to heightened criminal activity, or if you will, predation. This is especially true at night, in large cities, or



along the U.S./Mexico border. We fear being robbed, mugged, car-jacked, or even killed. Well, all prey species, including mule deer and elk, react the same way when faced with wolves, mountain lions, or other predators.

Moreover, prey animals do not have a second amendment, concealed carry permits, or a police force to protect them from criminals; i.e., predators.

“Mule deer are now living near people year-round to avoid predators—such is the landscape of fear the ungulates face.”

Prey species react to predator-induced fear in two main ways—by changing their behavior and through physiological or psychic stress. Studies have shown that deer and elk increase the time they spend scanning for danger when those animals are subject to predation. This is known as vigilance and the more time that deer or elk spend looking for predators, the less time those ungulates have to feed, thus lowering energy and nutri-

ent intake. In addition, it has been shown that elk and other prey species will abandon high-quality habitats, like meadows, when they are subjected to wolf predation. The ungulates move into lower-quality, timbered areas where

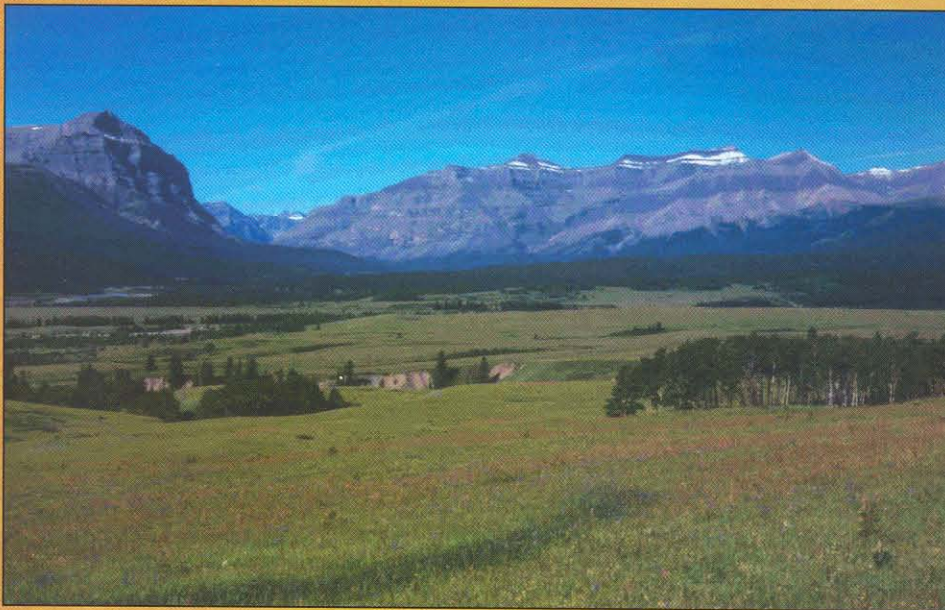
they have less chance of being killed. Again, this forces the animals onto a reduced nutritional plane and suppresses both growth and reproduction. The physiological and psychic stress of being hunted 24/7/365 only makes the situation worse. Even if individual animals do not flee, their heart rates increase dramatically, as adrenaline and other stress-related hormones flood their systems. In humans, a constant state of

fear can cause traumatic stress disorder.

This is all bad enough, but there is an even bigger problem in that most biologists do not realize what is happening and, more importantly, they invariably fail to recognize what it means. If you just look at the declining nutritional condition of the deer or elk, combined with low pregnancy rates and low fawn/calf birth weights, as agency biologists

commonly do, you are drawn to the conclusion that poor habitat is the cause, when nothing could be further from the truth. Instead, the real problem is that deer and elk are being forced to use low-quality, but somewhat safer habitats if the animals want to stay alive. In other words, a landscape of fear can, on the surface, manifest itself as a habitat problem, when the real issue is predation. Counter intuitive, but nonethe-





Shown above is the Ya Ha Tinda grasslands with Banff National Park in the distance. To avoid predators in the national park, the majority of the elk no longer migrate to the pristine and healthy, high-elevation summer range of Banff.

less true. Or, to quote Montana State University professors Dr. Scott Creel and Dr. David Christianson, "When risk effects reduce reproduction [in prey species]...they are easily mistaken for limitation by food supply."

Unfortunately, little research on the ecology of fear specific to mule deer has been conducted, but there have been a number of studies on how elk respond to a landscape of fear created by introduced or colonizing wolves. In southern Canada, elk winter on the Ya Ha Tinda just outside Banff National Park. The Ya Ha Tinda is owned by Parks Canada but is not part of the national park. Hence, the elk on the Ya Ha Tinda are subjected to sport hunting regulated by the providence of Alberta and unregulated, year-round hunting by First Nations, the politically correct Canadian term for native peoples, and Métis, individuals with some aboriginal blood.

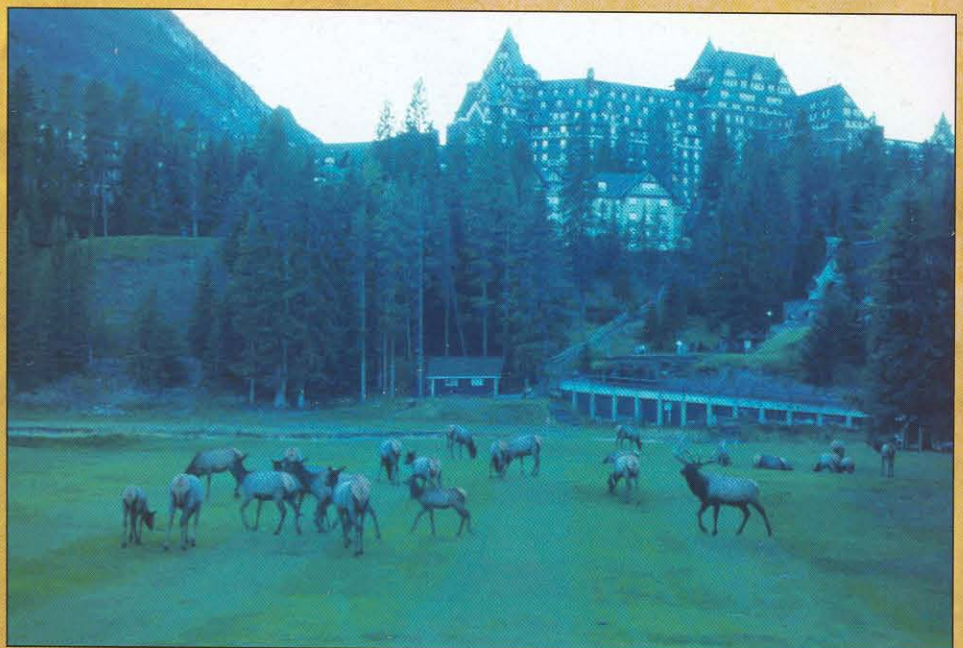
When elk on the Ya Ha Tinda were first studied, the animals wintered on the area's grasslands and then, for the most part, migrated to higher elevations in Banff National Park where the elk summered. Since that original research, however, wolves have naturally re-colonized the southern Canadian Rockies.

This has greatly increased predation in the park but when the wolves leave the confines of Banff, they can be, and are, legally shot. So the national park is full of predators, including grizzlies, black bears, and mountain lions, in addition to wolves, while there is much less carnivore predation on the Ya Ha Tinda. How have the elk responded? Today, the majority of elk no longer migrate into the national park, but live year-long

on the Ya Ha Tinda, despite being hunted by humans on the Ya Ha Tinda, but not in the park. The high-quality summer habitat is still there, after all, it is in a national park, but the elk no longer are, opting instead for the Ya Ha Tinda, which is poorer summer range but where the cows and their newborn calves are much safer from predators.

The elk in Banff National Park's Bow Valley, also stopped migrating to predator-filled, high-elevation summer ranges and instead chose to remain in the town of Banff where the animals were generally safe from wolves, bears, and mountain lions. In Canada's Jasper National Park, elk now give birth in developed areas near humans to protect their newborn calves. Similarly, mule deer have moved into towns and cities throughout the West to reduce the risk of mountain lion predation. Mule deer are now living near people year-round to avoid predators—such is the landscape of fear the ungulates face. Unfortunately, some mountain lions have followed the deer into town, which has led to increasing lion attacks on humans, usually small children and women, often with fatal results.

People who make a living promoting



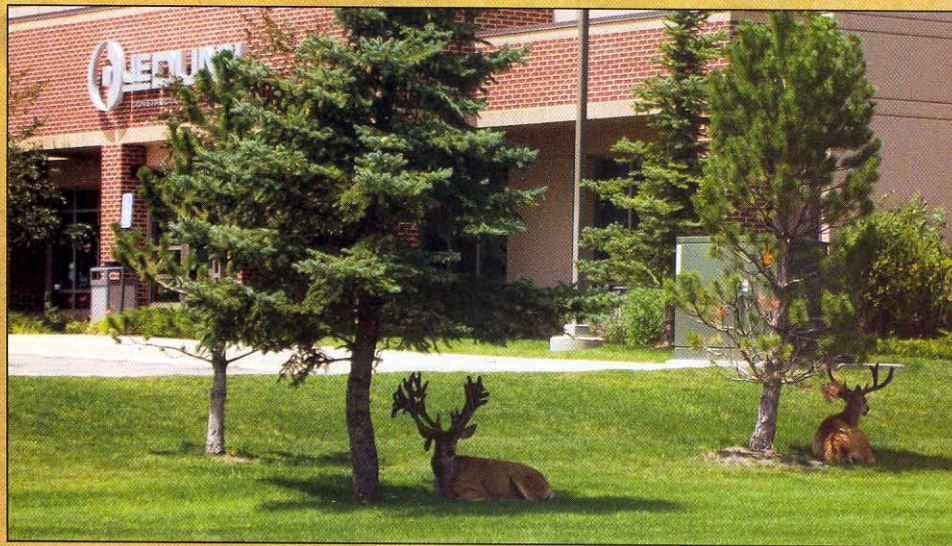
For the handful of elk that choose to remain in Banff, the heart of town is their only safe haven within the national park. The photo above shows elk rutting on the Banff Springs Hotel golf course, one of the few places where they can avoid the predators who roam the outlying areas!

predators, including many state and federal biologists, like to claim that predators only kill the weak, the sick, or the otherwise naturally infirm. But are the elk and deer in poor condition because there is little food or because the ungulates are being constantly harassed by predators? Similarly, did that mule deer killed by wolves come by its limp on its own, or because it constantly had to flee from predators? In Canada's Wood Buffalo National Park, bison confronted by wolves have moved as much as 100 miles within 24 hours to avoid further attack. In addition to all the energy the bison spend moving, the fleeing animals are forced to forgo foraging. Moreover, fleeing into poor-quality timbered areas to avoid wolves, as deer and elk do, subjects those ungulates to increased attack by mountain lions and bears, which need stalking cover to ambush their prey. In short, if humans harassed wildlife the way predators do, the people would be in jail.

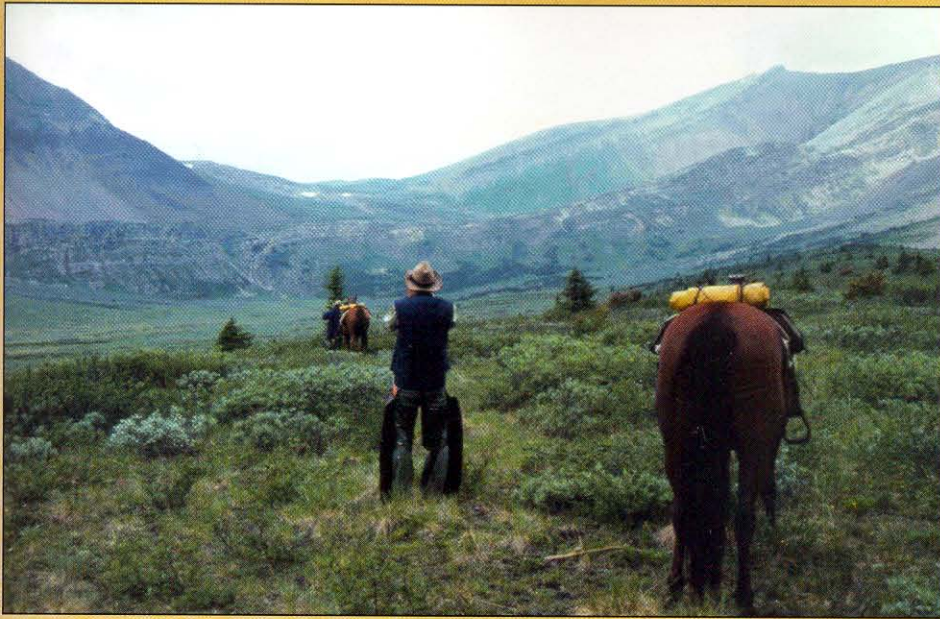
Dick Dekker, who ran the Canadian

Wolf Defenders for many years, has described deer and elk as being terrified, his word, by wolves. According to Dr. Dekker, who is the only rational wolf-advocate I have ever met, he can tell the last time wolves ran a herd of elk in Jasper National Park by the

behavior of the elk. If the elk spend more time alert than the animals do foraging, and if the elk appear flighty and nervous, wolves have recently attacked the herd. Moreover, just the scent of wolves will send the elk into panicked flight.



To reduce the risk of mountain lion predation, mule deer have moved into towns and cities throughout the West. The landscape of fear that ungulates now face is so drastic, that they would actually prefer to live near people year-round as opposed to gambling their lives amongst predators.



Shown above are the two park wardens that the author was with during the encounter stated in the paragraphs below. The wild doe jumped up from the stunted conifers in the near distance on the right, and ran all the way up and over the far snowbank, seen on the skyline, without stopping once to look back.

Dr. Val Geist reported a similar situation in Canada's Waterton National Park where he studied mule deer behavior for many years. The mule deer in Waterton are habituated to humans and generally occupy the valley floor, which is the best habitat, especially during winter. But when coyotes formed packs and began hunting like wolves, the mule deer abandoned their preferred habitat and attempted to save themselves by climbing through deep snow to treeline and hiding under the low branches of subalpine fir. After a few days of not feeding, though, the deer were forced to leave their safe sites. The mule deer, however, did not return to their former home ranges but instead moved to parts of the park where there were few coyotes. In short, prime winter habitat was abandoned, "as soon as coyotes were effective in hunting by forming packs." At the time of Dr. Geist's studies, there were no wolves in Waterton.

Which brings me to the wildest mule deer I have ever seen. As part of my ecological research for Parks Canada, I was on a horseback trip into the northern part of Jasper National Park. We were 56 miles from the trailhead with the Wilmore Wilderness on our north

when we jumped a mule deer doe in a large alpine basin. The deer was lying down in a dense growth of stunted conifers and fled our approach at over 300 yards, a highly unusual flight distance for an un hunted mule deer. If the deer had remained bedded, we never would have seen her, as she was not near our line of off-trail travel. But once up, the deer ran and ran, and ran—never stopping to look back even once over a distance of three miles.



During the entire time, I and the two park wardens, whom I was with, remained stationary, as did our horses. Because of our location, this mule deer most likely had never seen a human before, but she apparently had seen more than her fair share of wolves and grizzlies, and knew that her survival depended on her ability to out-distance any would-be attacker.

Normally, mule deer will stop and look back after a certain distance to see if the predator is still in pursuit. After all, there is no reason to expend energy if you are not being chased. Just think of all the energy that doe in Jasper wasted fleeing something that was not even chasing her. This is why experimental "research has shown that the risk effects on prey dynamics can be as large as direct [mortality] effects, or even larger." While most empirical work has been done on non-ungulates, there is little question that the ecology of fear is a heretofore unrecognized threat to mule deer and other game animals throughout western North America.