

PREDATOR-MEDIATED COMPETITION

*What happens when there is a
second, alternative prey in a system?*

BY DR. CHARLES KAY

“In my opinion, only one factor can account for the observed data...elk-fueled mountain lions are keeping the more vulnerable mule deer from recovering. Today, a single lion on Elk Ridge will kill more deer in a year than all archery, muzzleloader, and rifle hunters combined.”

In systems with a single predator and single prey, the predator cannot generally take the prey to extinction due to declining return rates—that is the predators usually starve to death before they can find the last few prey. So while mountain lions, for example, can have a negative impact on mule deer, the cats can only take the deer population so low before the lions begin to run out of food and increasingly turn to killing each other. But what happens when there is a second, alternative prey in a system? Counter intuitively, the additional prey species does not buffer, or reduce, the predation pressure on the first prey animal. Instead, fueled by alternative prey, the predator takes the more vulnerable species to even lower levels. This is called predator-mediated or apparent competition, and where this occurs, habitat and habitat improvements are largely irrelevant, contrary to what most biologists would have you believe.

A classic example of predator-mediated competition is now playing itself out in Yellowstone National Park. For over 60 years, 600 to 700 food-limited elk wintered in the thermal areas along the Firehole, Gibbon, and Madison Rivers in the west-central portion of the park. With the arrival of introduced wolves, however, the elk population began a precipitous decline with researchers predicting extinction, see [The Ecology of Large Mammals in Central Yellowstone]. The wolves have been able to do this because they have bison as an alternative prey. In fact, if the elk did not have a partial refugia by fleeing into the depths of the Madison River when confronted by wolves, the elk

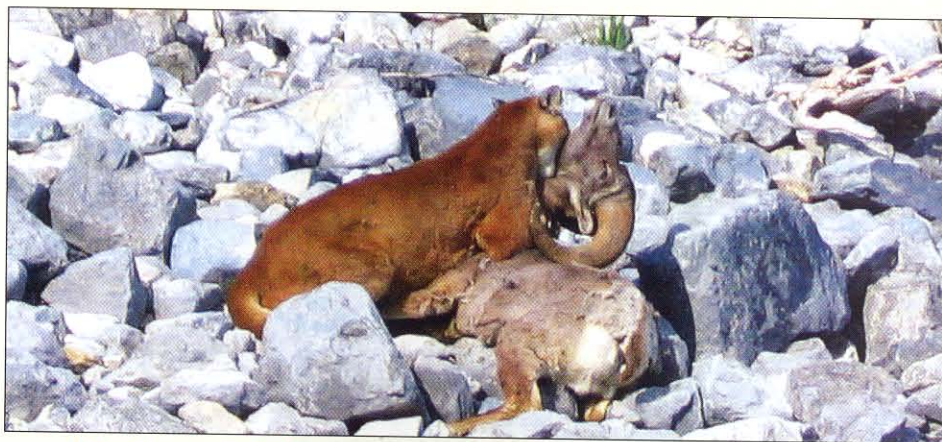


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would already be extinct. The habitat is still there, after all this is a national park, but the elk are all but gone. Similarly, moose-fueled wolves are in the process of eliminating mountain and woodland caribou across the length and breadth of Canada. While in Alaska, wolves fueled by salmon, yes salmon, have taken black-tailed deer, moose, and caribou to very low levels—much lower than if the wolves did not have salmon as an alternative prey. In Nevada, mountain lions that prey on wild horses have a much greater impact on mule deer than cougar populations without feral equines as alternative

prey. It has also been reported that mountain lions have taken bighorn sheep to near extinction on several western ranges where the cats subsist on alternative prey.

In many parts of the West, white-tailed deer and mule deer are sympatric; that is the two species occupy the same areas. Researchers in Alberta have identified predator-mediated competition as a key reason mule deer are declining. Due to behavioral differences, mule deer are more vulnerable to coyote predation than are whitetails. But by preying on both mule deer and whitetails,



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the coyotes are able to exert much greater predation pressure on mule deer, than if mule deer were the canids only prey. Again, the addition of a second prey species, whitetail deer, allowed the predator, coyotes in this case, to have a much greater impact on the more vulnerable prey, mule deer. While in British Columbia, predator-mediated competition between white-tails, mule deer, and mountain lions has been documented. Again, mule deer are the more vulnerable prey, but by subsisting mainly on whitetails, the cats are able to take mule deer populations to very low levels—much lower than if whitetails were not present. Whitetail-fueled cougars have also been identified as the factor driving British Columbia's southern, mountain caribou to extinction. Similarly, in Canada's Banff National Park, elk-fueled wolves have been instrumental in the elimination of both mountain caribou and moose.

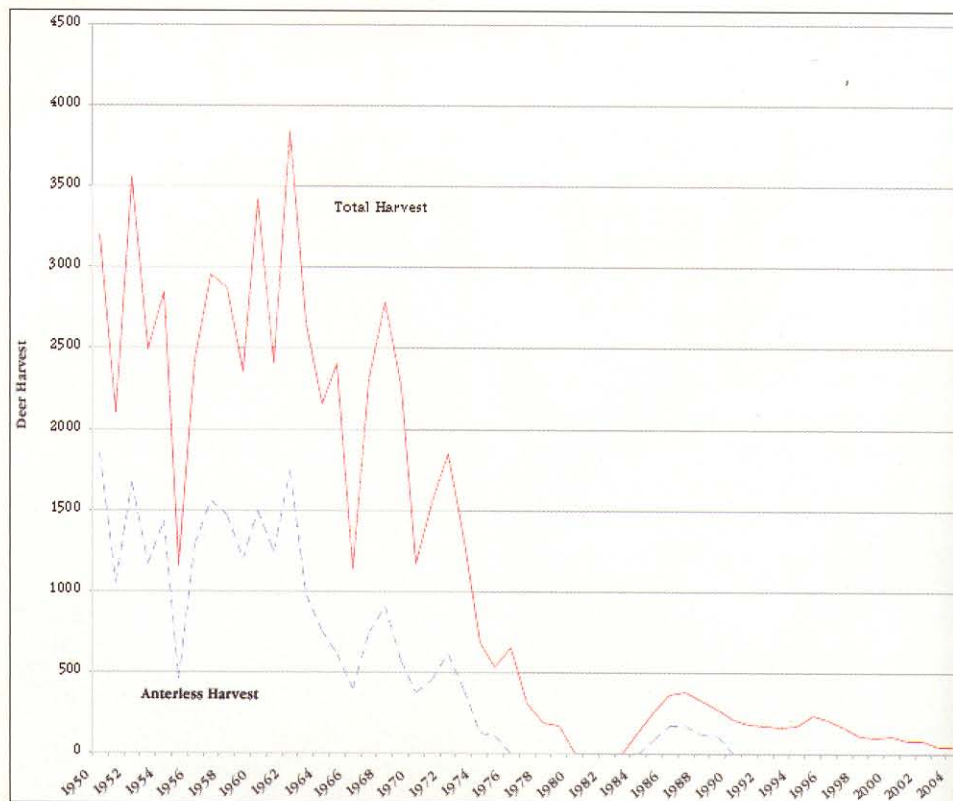
Which brings us to the question of predator-mediated competition between ever-increasing numbers to elk in the West and declining mule deer populations. By subsisting on elk, could mountain lions be taking mule deer numbers even lower? Given the fact that mule deer are easier for cougars to kill than elk, predator-mediated competition is certainly possible. Although no one has specifically studied this problem, work that I have been doing for San Juan County in southeastern Utah does shed some light on this issue.

Elk Ridge lies to the west of the Abajo Mountains in an exceedingly remote

part of one of the largest, and least populated, counties in the entire United States. Except for a few scattered parcels of private ground, the entire area is administered by the federal government, either the Bureau of Land Management (BLM) or the Forest Service. The ranch on the north is owned by The Nature Conservancy, while the allotments on the south are owned by the Southern Ute Tribe and have not been grazed by livestock in many years. There have been no new roads, no subdivisions, no

oil or gas development, and just about no new anything on Elk Ridge over the last 50 years. In short, there is nothing on Elk Ridge that game departments habitually blame for the decline of mule deer. And finally, and most importantly, Elk Ridge is really not elk ridge, but E.L.K. Ridge named after an early Texas outfit that ran cattle in the area during the late 1800's. Elk did not arrive until they were put there by the Utah Division of Wildlife Resources (DWR)—illegally, according to locals.

As part of my work for San Juan County, I summarized all the available mule deer harvest data for Elk Ridge—please see the accompanying graph below. Between 1950 and 1970, hunters killed an average of just over 2,500 deer a year—1,500 bucks and 1,000 does. But hunter harvest declined precipitously during the 1970's after mountain lions were protected and effective predator control eliminated with the ban on 1080. This was also



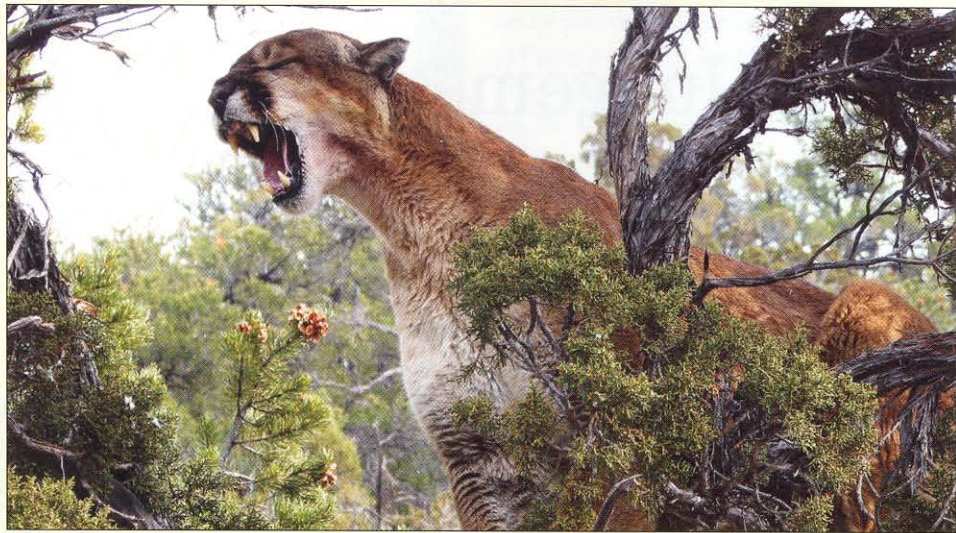
Yearly harvest of mule deer on Elk Ridge. Harvest declined during the 1970's after mountain lions were protected and effective predator control eliminated with the ban on 1080. In response to falling mule deer numbers, the season on Elk Ridge was closed from 1980 to 1983. The area reopened in 1984 as a limited-entry, bucks-only unit, yet the deer herd has never recovered.

Harvest data from DWR Annual Big Game Reports.

about the time that elk first appeared in the area.

In response to declining mule deer numbers, DWR closed the season on Elk Ridge from 1980 to 1983. Elk Ridge reopened in 1984 as a limited-entry, bucks-only unit, yet the deer herd has never recovered, instead it has tracked ever downward. This past season only 40 permits were issued for Elk Ridge, an area where 2,500 deer a year had been harvested for over 20 years. As mule deer numbers fell, the elk population doubled and then doubled again. When I first moved to Utah back in 1986, I drew a limited-entry deer permit on Elk Ridge and during that hunt I never saw an elk. I drew a limited-entry permit for the same area last Fall and this time I saw more elk than deer. In 1986, I shot a nice 4-point buck, while in 2009 I never saw a deer worth shooting.

In addition, I have measured mule deer use on winter ranges throughout San Juan County and the deer simply are not there. On permanent plots in the



Elk Ridge unit where DWR recorded substantial deer use in the recent past, deer use, last Spring, was exceedingly low. Moreover, it is not as if the mule deer moved someplace else, because I measured all possible wintering areas identified by DWR and BLM. In my opinion, only one factor can account for the observed data—elk-fueled mountain lions are keeping the more vulnerable mule deer from recovering. Today, a single lion on Elk Ridge will kill more

deer in a year than all archery, muzzle-loader, and rifle hunters combined. Coyotes and black bears are also abundant on Elk Ridge.

Will the mule deer on Elk Ridge ever recover? In Banff National Park where wolves and other predators have significantly reduced the elk population, 80 square miles of prescribed burns did not translate into increasing elk numbers. Despite an abundance of high-quality forage following the fires, burning actually reduced the elk population even further by making it easier for wolves to find the remaining elk. To reiterate, contrary to what most agency biologists will try and tell you, habitat and habitat improvements are largely irrelevant if the underlying problem is excessive predation or predator-mediated competition. And, as we have seen, predator-mediated competition is more the norm than the exception. There is one solution and one solution only and it certainly is not increasing the elk population by one-third as recently proposed by certain groups in Utah. In Nevada, a few mule deer hunters have been trying to get mountain lions reclassified as a predator, but to date their pleas have fallen on deaf ears. In Texas, mountain lions have always been classified as a predator and everyone is free to do their own predator control.



Contrary to what most agency biologists will try and tell you, habitat and habitat improvements are largely irrelevant if the underlying problem is excessive predation or predator-mediated competition. There is one solution and one solution only and the photo above says it all.