



# The Economic and Ecological Value of Mountain Lions and Bobcats in the West

---

by Jim Keen, D.V.M., Ph.D.  
*Animal Wellness Action* director of veterinary sciences



January 2024

## Background

---

A coalition of animal sanctuaries, wildlife rehabbers, animal protectionists, scientists, veterinarians, conservationists, ethical hunters, and concerned private citizens have their sights set on mountain lions — specifically by taking aim at trophy hunting of the big cats. This set of unlikely allies has coalesced behind the principle that killing mountain lions for trophies and bobcats for their pelts is ethically suspect, unsporting, cruel, and scientifically dubious. They also believe it runs at crosscurrents with the collective will of most Coloradans.

To this end, the [Cats Aren't Trophies \(CATs\) campaign](#) was launched in September 2023. The goal of CATs is to bring the issue of trophy hunting and trapping of Colorado wild cats to the states' voters via a ballot measure in Fall 2024. The ballot measure, if passed, would ban trophy hunting of mountain lions and the hunting and trapping of bobcats and lynx as trophies or for their pelts.

Mountain lion hunting is legal in many states in the West. In Colorado, mountain lions are usually hunted with hired packs of hounds who tree the lion or trap it on a rock ledge. The cornered lion is then killed by bow and arrow or firearm. (See [Can You Hunt and Eat a Mountain Lion](#)).

In recent years, Colorado Parks and Wildlife (CPW) has allowed the recreational killing of about 500 mountain lions annually, with the cats targeted during a three-month season stretching from late November through the end of February. (The Colorado mountain lion population is estimated at 3,000 to 7,000 animals by CPW.) The agency adjusts the mountain lion kill limits every year, with the 2023-24 hunting season capped at 674 animals. (The number of mountain lions killed by hunters during the current Nov. 27, 2023, to March 31, 2024, season can be accessed [here](#).) There are no seasonal limits for bobcats, who can be hunted day or night. The annual toll typically reaches 2,000.

The pelts of many of these bobcats are sold to China, Russia, and Ukraine. [Top Western bobcat pelts sell in the \\$200-\\$300 range, while lower-end pelts sell for \\$30-\\$60](#). While global demand for fur continues to wane, bobcat pelts are considered to be relatively valuable, especially compared to other furbearer pelts. This is due to the international demand for bobcat fur in the fashion industry, where it is used to make coats, hats, and other garments.



# Part I

---

## The benefits of wild cats on the Colorado landscape and arguments for human-wild cat coexistence without trophy hunting or commercial trapping

### *Benefits of mountain lions and bobcats*

---

Mountain lions are apex (or top) predators, defined as a predator at the top of a food chain without natural predators of their own. They play a crucial role in maintaining the health and balance of ecosystems by controlling prey populations and keeping other, smaller predators in check. In varying terrestrial and marine habitats and ecosystems in North America, mountain lions, grizzly bears, polar bears, American alligators, bald eagles, wolverines, gray wolves, and orcas are considered apex predators.

Bobcats and lynx are considered to be meso-predators, that is, medium-sized carnivores that occupy a mid-ranking level in a trophic system. Meso-predators are typically omnivorous or carnivorous animals that prey on smaller animals (e.g. rabbits, rodents) and regulate their populations. They also can be a source of food for larger predators. Raccoons, foxes, coyotes, skunks, and opossums are other examples of Colorado meso-predators. When apex predator populations decline, meso-predator populations can increase dramatically, a phenomenon called “meso-predator release.” This can harm ecosystem stability, as meso-predators may then prey too heavily on smaller animals that are important for plant pollination or seed dispersal.

Ecosystem services provided by Colorado wild cats. [Mountain lions are considered ecological engineers](#) because they help Colorado’s natural areas hum. The presence of top predators is perhaps the best single indicator of a healthy ecosystem, and the benefits lions and bobcats deliver include:

***Maintaining healthy prey populations.*** Mountain lions hunt coyotes, raccoons, rodents, wild pigs, and wild horses and burros. But their favored prey are deer and elk, the two most abundant ungulate species in Colorado, with each adult mountain lion consuming about 50 mule deer per year. Thus, they help regulate prey species abundance and herbivore pressure on the flora, preventing deforestation and erosion, and strengthening the fitness of surviving populations by culling weakened or otherwise vulnerable animals.

***Preventing disease introduction and spread in prey species.*** Mountain lions and bobcats prevent the spread and lessen infection and disease prevalence. For example, there is quality evidence that both mountain lions and wolves are “first responders” to Chronic Wasting Disease of deer and elk, a fatal potentially zoonotic transmissible encephalopathy of cervids that is currently prevalent in many Colorado mule deer and elk populations. Both mountain lions and wolves appear to [preferentially target CWD-infected and symptomatic deer and elk](#). [Some ecologists, such as renowned Princeton disease biologist Andrew Dobson](#), believe that CWD emerged in the late 1960s and [spread across the U.S.](#) in the past half-century precisely because of the absence of apex predators from most North American landscapes. Bobcats are also important in disease control. For example, they prey heavily on rodents that carry zoonotic Lyme bacterial disease and hantavirus.

***Promoting biodiversity.*** By controlling prey populations, apex predators indirectly create

opportunities for other species. They enrich soil and plant communities: Nutrients from the remains of a mountain lion's prey are released back into the environment, creating locations where animals like elk and deer more frequently forage. Seeds are dispersed in mountain lion and bobcat scat. Mountain lions prey on smaller predators such as coyotes, raccoons, and bobcats. This predation can help to control meso-predator populations, preventing them from overexploiting smaller prey species, such as rabbits, squirrels, and birds. Mountain lions and bobcats often leave uneaten portions of their prey, providing a valuable source of food for scavengers such as bears, ravens, and vultures. Mountain lion carrion provides food sources for hundreds of species.

Human ecosystem services provided by Colorado wild cats. How important are apex and meso-predators to human well-being? Multiple lines of evidence suggest that mountain lions and bobcats are economically and socially valuable to people. These are some of the benefits they provide to human society:

- ***Livestock and crop protection:*** Mountain lions keep deer numbers in check and keep deer moving, which reduces herd size and prevents overgrazing and loss of habitat (or crop) flora. This enables greater crop yields and more robust foraging by livestock to the benefit of farmers and ranchers.
- ***Reduced deer-vehicle collisions:*** Despite large apex predators being capable of threatening the safety of people, pets, and livestock, that safety cost is offset by broader benefits provided by their functional top-down control. Over-abundant populations of prey species in the absence of apex predators can negatively affect human well-being.

Though equipped with sharp teeth, claws, and incredible physical capabilities, moun-

tain lions are far from the most dangerous wild animals to humans in North America. In the United States, this distinction goes to the mountain lion's primary prey, deer. [Around 2.1 million deer-vehicle collisions occur in the U.S. annually](#), causing more than \$10 billion in economic losses, 59,000 human injuries, and 440 human deaths. These accidents are most frequent in the East, where mountain lions and wolves are absent, and deer have reached unnaturally high densities. On the other hand, lions cause virtually no automobile damage and the death toll on humans is about one a decade in the entire western United States.

Wildlife ecologist Sophie Gilbert and her University of Idaho colleagues [estimated the economic value provided by mountain lions by reducing deer-vehicle collisions](#). First, the economic contributions of the nascent population of mountain lions in the Black Hills of South Dakota were calculated by comparing the number of deer-vehicle strikes before and after mountain lions re-established a breeding population. They found resident mountain lions reduced deer collisions by 9% (158 crashes), preventing \$1.1 million in collision costs annually.

Gilbert's team also predicted human benefits if mountain lions were re-established in the Eastern U.S., where mountain lions are currently absent. They predicted that mountain lions would reduce deer numbers by 22%, prevent 21,400 human injuries and 155 fatalities, and avert \$2.13 billion in avoided costs in damages within 30 years of establishment, after which the deer density would stabilize again at a reduced (and healthier) number.

There are two proposed mechanisms as to how mountain lions (as well as wolves) prevent deer-vehicle collisions. First, mountain lions and wolves directly decrease deer population numbers by predation, with each mountain lion killing about 50 mule deer per year. Second, these apex predators induce fear

in prey species, causing them to modify their behavior, keep moving, and avoid roads.

- **Tourism.** As a symbol of the wild and wilderness, mountain lions are a draw for tourists to Colorado, generating millions of dollars in revenue each year, especially in the state's more rural reaches. They are a popular subject of photography, hiking, and wildlife viewing.
- **Cultural, recreational, educational, and spiritual value.** Mountain lions symbolize Colorado's wild and rugged nature and are an important part of the state's cultural identity. Mountain lions are revered by many Native American tribes as powerful and sacred animals.

Mountain lions and bobcats are primary actors in Colorado's natural and human ecosystems, providing a cascade of benefits that shape the structure, function, and resilience of these landscapes. Their presence as apex and meso-predators contributes to the overall health and biodiversity of the environment, highlighting the importance of halting the cruel treatment and unwarranted killing of these much-revered creatures. Unfortunately, mountain lions are more prone to be persecuted for the problems they are perceived to present (e.g., occasional attacks on humans, livestock, and pets) than lauded for the ecosystem benefits that they provide.

The natural and human society ecosystem services of Colorado's wild cats are here.

## Figure 1

### The benefits of free-ranging wild mountain lions as apex predators & bobcats as meso-predators in the Colorado landscape

#### Natural ecosystem services

- Guide evolution of their cervid or other prey to better fit their habitats
- Manage disease outbreaks in prey e.g. Chronic Wasting Disease (CWD) of cervids via "predator cleansing"
- Regulate distribution & numbers of prey; Mountain lions control cervid populations esp mule deer; Bobcats control rodent & small mammal numbers
- Promote biodiversity e.g. via seed dispersal; enrich soil and plant communities; control the flow of carbon & nutrients in the food web via predation & scavenging
- These services are not easily replaced by human hunting or trapping of mountain lions & bobcats



"8th Place - Mountain Lion" by USFWS Mountain Prairie is licensed under [CC BY 2.0](#).  
Bobcat, Public domain, NPS-Yellowstone

#### Human health & safety benefits

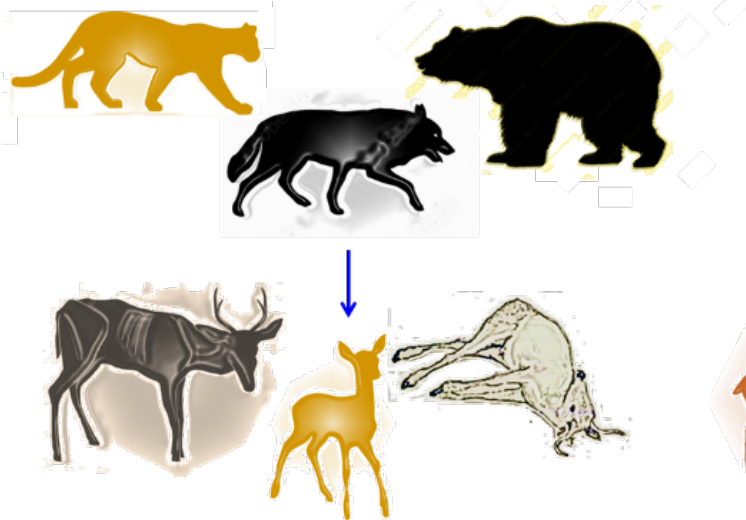
- Reduce deer vehicle collision risk by lowering prey densities & changing deer behavior to avoid roads
- Diminish zoonotic disease risk to people by preying disease carriers e.g. bobcats control rodent which carry Hanta virus & Lyme disease bacteria
- Cultural, recreational, educational, & tourism value as charismatic species
- Livestock & crop protection - Mountain lions help to control herbivory by deer, elk, and other ungulates; bobcats control small mammals which can prevent overgrazing and vegetation damage.
- These services can save ranchers and farmers millions of dollars in lost revenue each year while public health is also enhanced by big cats

Below we can see how apex predators such as mountain lions can help to “cleanse” the prey population of disease and select for prey fitness. In general, human hunting is selective, too, but in a way that has an inverse effect — making deer and elk herds less healthy, as human hunters select the healthiest animals available to kill and thereby may create less eco-evolutionarily fit prey populations.

## Figure 2

### “Predator cleansing” of disease in prey vs cervid (deer, elk, moose) hunting

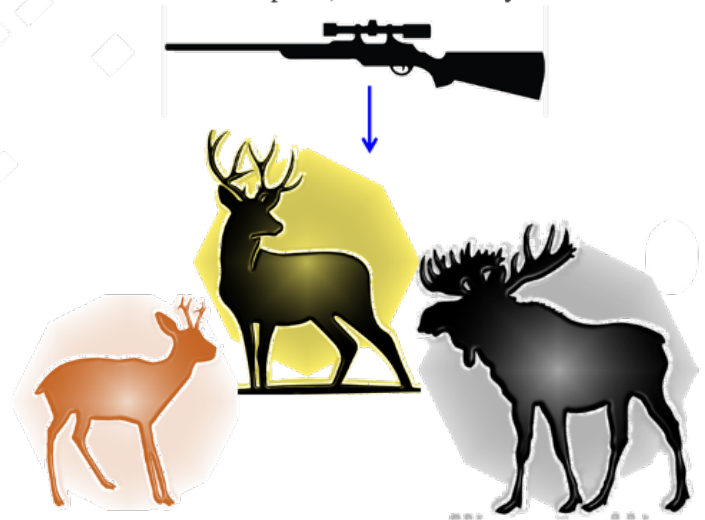
**Apex predators** – target *sick, weak, injured, very young, very old or otherwise vulnerable deer or elk* that are easiest to kill without injuring the predator



**End result** - *Healthier* cervid populations

- Survival of the fittest cervids

**Hunters** – target *healthy young deer* for venison (meat) & *large healthy antlered adult bucks* for trophies; avoid obviously sick deer



**End result** - *Less healthy* cervid populations

- Death of the fittest cervids

## *The dubious ethics of hunting and trapping Colorado's wild cats: fair chase, NAMWC, electronic calls, and trophy hunting*

---

Ethical hunters follow guidelines derived from the harsh lessons of the past. For example, through the 1800s and into the early 1900s, unsustainable commercial and private hunting of fish and game was essentially unregulated in North America. At this time there were few laws or regulations governing the taking of game for food or sport. The result was predictable: extinction of some species (e.g., the passenger pigeon and Carolina parakeet), near extinction, and broad geographic extirpation of many species (e.g., the bison and wolf), and greatly reduced numbers of most hunter-targeted species (e.g., deer and elk).

For example, “deer jacking” (water-killing of deer) was a common practice in the Adirondacks and other parts of upstate New York from the late 18th century to the early 20th century. This method involved using packs of hounds, loud noises, and human chains to drive deer herds from forests towards frozen lakes, where they would be trapped and slaughtered (by shooting, clubbing, or throat cutting) on the ice, a ruthlessly efficient way to take large numbers of deer.

The North American Model of Wildlife Conservation ([NAMWC](#)) is a set of principles that guide wildlife management and conservation in the United States and Canada derived from tragic and cruel unsustainable practices such as “deer jacking.” The NAMWC is based on the idea that wildlife is a public trust resource that should be managed for the benefit of all citizens. The NAMWC also emphasizes the importance of science-based management and public participation in wildlife decision-making. (Note: The CATs campaign is an example of this NAMWC principle of public participation in wildlife management decisions in action). The core principles of the Model are

elaborated upon in seven major tenets. Two of those seven are germane to this discussion.

*2nd Tenet: Elimination of Markets for Game.* Commercial hunting and the sale of wildlife is prohibited to ensure the sustainability of wildlife populations. The hunting and trapping of ~2,000 bobcats per year in Colorado and the commercial sale of their pelts to make luxury garments in Asia is an obvious violation of this tenet.

*4th Tenet: Wildlife Should Only be Killed for a Legitimate Purpose.* The killing of game must be done only for food, fur, self-defense, and the protection of property (including livestock and pets).

Up to 674 mountain lions will be killed for recreation and sport in Colorado this winter and spring. The primary purpose of the mountain lion hunt is to obtain apex predator body parts as trophies. This is also a self-evident breach of this NAMWC tenet.

Colorado law requires mountain lion hunters to harvest the large muscles (meat) from the upper legs (four quarters) and back muscles from all harvested mountain lions, presumably to address the 2nd tenet of the NAMWC.

The amount of mountain lion meat consumed is difficult to estimate, as there is no data available on how much of the harvested meat is consumed. Indeed, there is no tradition of eating cats in the United States, and the federal Animal Welfare Act forbids the trade in domesticated dogs or cats for meat — and wild cats are just smaller versions of the wild cats that inhabit Colorado.

Humans generally refrain from eating the meat of land mammal carnivores. It is axi-

omatic that very few mountain lion hunters in Colorado are interested in eating the animals they kill; that's not the point of the hunt. Thus, the CPW policy of mandated use of mountain lion meat is an unenforceable requirement that is of very limited relevance or practical value. It may just prove to be a talking point for an agency and a special interest group that sanction inhumane and unsporting killing for no good reason. The provision is, at best, a public-relations ploy so that lion hunting retains sufficient support to persist and so that it is not viewed as violative of the North American Model and inconsistent with the norms that govern the utilization of other wildlife, such as deer and elk.

Most cultures, including many in America, have taboos against eating large apex predators. This is in part due to the zoonotic disease risk from wild carnivores if the meat is improperly cooked. For example, mountain lion meat can carry [trichinellosis](#) and [toxoplasmosis](#), two parasitic infections found in raw muscle tissue that can cause serious human illness or even death. The meat of carnivores is often tough, stringy, and gamy, making it generally unpalatable. This is because carnivores have large amounts of connective tissue embedded in their muscle tissue and their meat diet can give their flesh a strong flavor.

The Fair Chase Principle is a hunting ethic that mandates hunters not use methods or technologies that give them an unfair advantage over the animals they are seeking and that the hunted animal has the opportunity to escape the hunter. The earliest known use of the term "Fair Chase" is in the fifth article of the Boone and Crockett Club's constitution, adopted in February 1888.

The [Boone and Crockett Club](#) defines fair chase as the ethical, sportsmanlike, and lawful pursuit of wild, native free-ranging North American big game animals. Fair chase does not give the hunter an improper advantage

over the animals. Fair chase rules include balancing the hunter's skills and equipment with the animal's ability to escape, not using electronic calling, and not shooting in a fenced-in enclosure.

When in the field, the initial question for every fair chase hunter is whether the animal has a reasonable opportunity to elude the hunter. If the animal does not, the hunt can never be a "fair chase." For example, a fair chase hunter does not shoot an animal hampered by deep snow or entangled in a barbed-wire fence.

The [Pope and Young Club](#), a U.S.-based organization that promotes bowhunting, declares that a fair chase shall not use a bow and arrow with any electronic device to attract, locate, or pursue game or guide the hunter.

Listed below are the typical events in a Colorado mountain lion hunt, which most often costs several thousand dollars to outfit. Hunting mountain lions with hounds in Colorado is regulated, requires a valid hunting license, a mountain lion permit, and adherence to specific rules and guidelines set by Colorado Parks and Wildlife. The process typically involves the following steps:

1. Obtaining permits and licenses. Hunters must purchase a valid hunting license and a mountain lion permit through CPW's licensing system. They may also need to obtain additional permits depending on the specific area they intend to hunt.
2. Identifying lion sign. Hunters scout potential hunting areas to locate fresh mountain lion tracks or other signs, such as scat or scrapes. Fresh snow can make tracking easier.
3. Releasing hounds. Once a fresh track is found, hunters release a pack of trained hounds, typically houndsmen or lion dogs, to follow the lion's scent. The hounds



chase the lion, keeping it on the move and barking loudly to signal its location.

4. Pursuing the lion. Hunters follow the hounds' barks to track the lion's progress. They may use GPS collars or radios to monitor the hounds' movements.
5. Treering the lion. The lion, often exhausted from the chase, will typically either [climb a tree or bay up in rocks](#) to avoid the hounds.
6. Making the kill. Once the lion is treed or bayed up, hunters approach and shoot the animals off of a tree limb using a firearm or archery equipment.
7. Tagging and reporting. Hunters must tag the harvested lion and report the harvest to CPW within 48 hours.

Go [here to view a 10-minute video](#) of a mountain lion hunt in Western Colorado using hound dogs with GPS showing most of the above steps.

The use of GPS and radio-collared hound dogs violates the Fair Chase Principle. Furthermore,

the mountain lion is, for all practical purposes, trapped and unable to escape once it is exhausted from the chase and treed, another violation of the Fair Chase Principle. Until late fall 2023, Colorado Parks and Wildlife permitted the use of electronic calls in certain wildlife management units to lure mountain lions, yet another breach of Fair Chase.

These principles are not abstractions but have animated voting behavior in the West. In fact, in five of five plebiscites, voters have favored the idea of protecting mountain lions from trophy hunting and hounding. California voters approved Prop 117 to ban lion hunting in 1990, and then handily rejected an attempt to overturn that ballot measure six years later. Oregonians passed a ban on hounding of lions in 1994, and then turned back a repeal effort on the ballot just two years later. And in Washington, voters passed a ban on hounding of lions in 1996 in a landslide vote of nearly two-to-one. The Colorado ballot measure will be the sixth statewide vote in the issue in the American West.



## Part II

---

### *Do human hunters occupy the role of mountain lions as apex predators in Colorado?*

There has been long-running controversy over the trophy hunting of mountain lions in the West, and to a lesser degree, the same holds true for commercial trapping of bobcats.

Polling of the general population indicates that the majority hold the view that hunting and trapping of these apex and meso-predators are inhumane, unsporting, and unnecessary, while others believe that hunting is a necessary tool for managing mountain lion and bobcat populations and constitutes an acceptable use of wildlife.

The issue has been put to the test multiple times with up-or-down votes on the issue, and in every circumstance, voters have sided with the idea of imposing stricter limits on hunting lions. Voters supported a total ban on trophy hunting of lions in California twice (1990 and 1996) and outlawed hounding in Oregon twice (1994 and 1996) and in Washington (1996).

We know that mountain lions and bobcats provide many natural ecological and human societal benefits (see Part I of this document). According to some proponents, when humans hunt apex predators, they functionally replace these predators. So, the question arises: Can humans replace the ecological roles of apex predators like mountain lions?

[Ecologist RJ Lennox and colleagues](#) (2022) tried to address this question. They compared how human hunters and apex predators af-

ected ecosystem structure and function. The underlying idea was to assess whether humans can generate or simulate the ecosystem benefits of apex carnivores. They defined the five major effects of predators as:

1. Guiding the evolution of their prey
2. Managing disease outbreaks in prey
3. Regulating the distribution of prey
4. Controlling the flow of carbon and nutrients in the food web
5. Effects on human health and safety.

**Table 1** summarizes their findings.

**Table 1**

**Tendencies of apex predators vs human prey harvesting**

Humans target animals of different ages & phenotypes vs carnivore apex predators & impose widespread & significant ecological & evolutionary change. (Modified from Lennox et al 2022)

Apex predators	Human hunters	Effects
Kill younger or older animals (often non-reproducing)	Kill reproductively prime individuals often with a male bias	Unnatural human selection pressure on prey; Humans change prey reproduction patterns.
Kill small, inexperienced or otherwise disadvantaged animals	Kill large or heavily ornamented (trophy) animals	Humans drive evolution of <i>undesirable prey traits</i> e.g. smaller size, smaller antlers,
<i>Detect</i> weakness or illness in compromised prey & exploit it	<i>Ignore or fail to detect</i> weakness or illness in compromised prey	Predators prefer easy target to avoid injury & limit energy expenditure
<i>Capture</i> diseased prey w/ compromised detection or escape	<i>Avoid</i> diseased prey or <i>discard</i> individual prey w/ signs of illness	Predators exert a <i>sanitation effect</i> on prey populations e.g. CWD control by mountain lions
Chase prey until one becomes exhausted	Chase prey w/ vehicles or kill from distance	Predators calculate prey choice based on their energy budget
Are ineffective at exploiting rare prey	Can sustain exploitation of rare prey via market supply & demand	Predators allow rare prey to recover; humans continue to exploit rare prey
Switch to alternative prey when primary species are depleted	Adjust market prices for depleted species to maintain demand despite poor supply	Sustained human exploitation on rare species drives <i>depensation</i> i.e. prey population can no longer sustain itself
Exert non-consumptive effects on prey distribution e.g. change prey behavior via fear	Exert even stronger non-consumptive effects on prey distribution via <i>extreme fear</i> of hunters	Humans may increase vulnerability of prey to predators due to their strong fear effect
Return energy & cycle nutrients from prey to the ecosystem	Concentrate energy & nutrients acquired from prey	Predators support scavengers, decomposers & a circle of life; humans create local eco-extremes
Limit release (“blooms”) of herbivores & meso-predators	Fail to limit herbivore or meso-predator release i.e. their populations bloom	<i>Predators naturally maintain ecosystem order</i> that is difficult for humans to emulate
<i>Reduce vehicle collisions w/ prey &amp; herbivory</i>	Fail to effectively limit large herbivore damage	<i>Predators provide immense economic value to people</i>

**Mountain lions vs. human hunters.** Mountain lions and humans are both successful apex predators, but they approach prey selection and hunting differently. The different prey preferences and carcass consumption habits of human hunters and mountain lions result in dramatically different effects on the health of deer populations.

- Mountain lions are primarily opportunistic hunters who prey on whatever is available and easiest to catch and kill, which means their diet varies depending on the time of year, location, and prey availability. They typically target ungulates (e.g., deer, elk, and bighorn sheep), but they also will eat smaller animals like rabbits, rodents, and birds. Mountain lions are ambush predators relying on stealth and surprise to take down prey. They will patiently stalk their quarry and then launch a quick attack, using their quickness, leaping ability, and sharp claws and teeth to kill.
  - Human hunters are more selective and more flexible in their prey choice with specific preferences based on taste, trophy value (e.g., large body size, large antlers), and hunting regulations. With a wider range of low-risk hunting methods at their disposal (firearms, archery, and traps), humans can target prey from a distance or in difficult terrain.
  - Human hunters typically target larger adult males while mountain lions prefer smaller younger females. This prey selection difference is due to the different hunting strategies and energy requirements of the two apex predators.
- Human hunters use firearms or archery to kill their prey from a distance at low energy cost, permitting the targeting of larger, stronger animals without putting themselves at risk. Mountain lions are solitary predators relying on stealth and ambush to capture their prey so they are more likely to target smaller, weaker animals who are easier to subdue without causing serious injury.
- Human hunters and mountain lions have different carcass consumption habits due to differing nutritional needs. Humans typically consume a portion of the cervids they kill. Mountain lions often consume the entire carcass. Humans have a diverse diet and can obtain necessary nutrients from many sources. Mountain lions are obligate carnivores relying heavily on deer and elk.
  - Human hunters often target deer in good physical condition, as these animals are more likely to produce high-quality meat or higher trophy status. Mountain lions are opportunistic predators and will prey on any deer whom they encounter, regardless of its condition or location. However, they are more likely to target deer who are young, weak, or sick, as these animals are easier to catch and kill.

**“The wildlife and its habitat cannot speak. So we must and we will.”**

*— President Theodore Roosevelt*

**Table 2****Key differences in prey selection between mountain lions and human hunters in Colorado**

Feature	Mountain lion	Human hunter
Predation type	Opportunistic	Selective
Prey choice	Cervids, small mammals, birds	Varies; depends on hunter preferences & wildlife regulations
Primary prey species	Mule deer, white-tailed deer, elk	White-tailed deer, mule deer, elk
Prey age & sex preference	Fawns & juveniles, females (does)	Adults & juveniles, males (bucks)
Body size preference	Smaller individuals	Larger individuals
Hunting & killing method	Stalk or ambush; kill via suffocation	Stalk or ambush; kill w/ firearms or archery
Factors influencing prey selection	Prey availability, ease of capture	<i>Trophy value or status</i> , meat taste, regulations
Prey carcass consumption	Complete	Partial or none

**Human hunters cannot replace apex predators.** [Lennox and colleagues](#) concluded that there is little evidence that human hunters can replace the beneficial services that wild predators like wolves and mountain lions provide to human society and to the environment. This is likely because humans and wild predators are targeting and removing different individuals from the prey population and, over time, driving very different outcomes on the prey population and the larger ecosystem.

The contrasts between humans and apex carnivore predators suggest consistently different patterns of prey selection with implications for predator-prey evolution, disease dynamics, prey distributions, carbon and nutrient cycles, and human societies. Human hunters drive an undesirable evolution by selecting large, fit, and dominant prey phenotypes out of the population. Thus, human hunters select for evolutionarily less fit cervid prey populations: slower, smaller, weaker, more disease-prone, less ornamented males. Mountain-lion hunting selects deer with high ecological fitness to their habitat.

[Lennox and colleagues](#) propose a better accounting of the value predators provide to

improve conservation efforts, guide better wildlife management, and inspire human harvesting strategies that better imitate the positive impacts of apex predators.

**Note:** Just as human hunters are likely driving decreased fitness in the prey deer and elk populations, the sport and trophy hunting of predators like mountain lions in Colorado is almost certainly making predator populations less fit.

Since hunting is a major cause of death of both mountain lions and their primary cervid prey, human hunters are likely driving the increase of undesirable traits in both predator and prey via non-adaptive harvest-induced evolution.

All predators are agents of natural selection who shape prey phenotypes, or characteristics, over time. [The arms race between predators and prey is a major driver of prey phenotypes.](#) Apex predators like mountain lions tend to impose selection against prey phenotypes that are slow, weak, disease-prone, or otherwise vulnerable to attack as dictated by the predator's skills. Human hunters have escaped most of these constraints that drive prey species

evolution because they exploit prey in fundamentally different ways by using tools, such as ammunition, firearms, GPS technology, electronic lures, and game cameras. Theoretical modeling suggests that predation by humans can lead to morphological (e.g., smaller size-at-age, growth rates, ornament size), life history (e.g., reproduction at younger ages and sizes), and behavioral changes to prey populations in ways that are different from outcomes from apex predator hunting.

### **The loss of apex predators from persecution, hunting, and habitat conversion.**

The hyper-exploitation of lions—with trophy hunters killing 500 lions and houndsmen changing hundreds or thousands more and causing massive energy expenditures, animal fights, and stress—inevitably has major consequences on prey populations by decreasing selective pressure on them, disrupting the delicate balance of ecosystems and leading to a cascade of negative effects.

Halting trophy hunting of lions is not just about sparing individual lions from the effect of cruel chases and killing, but also about safeguarding the health and resilience of the larger community of native species in Colorado. The decline of top carnivores has released (i.e., caused their populations to bloom) large herbivore populations and meso-predators around the world, incurring socio-economic costs such as increased animal–vehicle collisions, elevated zoonotic disease risk, and loss of biodiversity. Human hunting of deer does not resolve these ecological problems. Particularly in the East, where wolves and lions are not absent, deer hunting has failed to control overabundant deer, and deer–vehicle collisions continue to rise at alarming rates.

Because mountain lions occur in naturally low population densities, even in optimal habitats (estimates are about 2 mountain lions per 100 square km), additional sources of unnecessary and unnatural mortality, such as trophy hunting, can alter and destabilize population

dynamics over large areas.

The most common causes of mortality of mountain lions and bobcats are shown below. Note that human activities (vehicle collisions, lethal conflicts with people or their property, habitat loss and fragmentation, hunting and trapping) are the major drivers of both bobcat and mountain lion deaths.

*The major causes of mountain lion mortality in Colorado are:*

- ***Human-caused mortality.*** This is the leading cause of mountain lion mortality in Colorado. It includes trophy hunting, attacks by packs of dogs, vehicle collisions, and depredation or public safety control (killing mountain lions who have attacked people, livestock, or pets).
- ***Disease.*** Mountain lions can contract several diseases, including viral, bacterial, and parasitic diseases. Disease weakens mountain lions and makes them more susceptible to other threats.
- ***Injury.*** Mountain lions can be injured in many ways, including fighting with other mountain lions over mates, prey, or territory, falling from cliffs, and being hit by vehicles. These injuries can be fatal.
- ***Starvation.*** Mountain lions can starve to death if they are unable to find enough food or are injured and unable to hunt. This can also happen if their prey populations are declining or if they are displaced from their habitat.

*The primary causes of bobcat mortality in Colorado include:*

- ***Vehicle-related collisions.*** Bobcats are frequently struck and killed by vehicles, particularly on highways and roads that bisect their habitats.
- ***Predation.*** Bobcats are preyed upon by still larger predators such as coyotes, mountain lions, and wolves.

- *Disease.* Bobcats are susceptible to a variety of diseases, including rabies, feline distemper, and toxoplasmosis. These diseases can weaken bobcats and make them more vulnerable to other threats.
- *Trapping and hunting.* Bobcats are hunted and trapped for their winter fur pelts or nuisance control purposes. Trapping and hunting cause direct mortality, or indirectly by injuring or stressing bobcats, making them more susceptible to other threats.
- *Habitat loss and fragmentation.* As human development encroaches on bobcat habitat, these wild cats are more likely to come into conflict with humans, their pets, and their livestock. Additionally, habitat fragmentation makes it more difficult for bobcats to find food, shelter, and mates.

## ***Risk Factors Posed by Mountain Lions and Bobcats in Colorado***

---

Around the world, apex predators are declining due to habitat loss, direct hunting, or persecution. Significant roadblocks impede large carnivore conservation. Large carnivores are harassed worldwide. Much of their natural habitat is gone or fragmented. They sometimes kill owned or coveted animals, including pets and livestock and hunting ungulates. Traditional old-school thinkers celebrate the elimination of top predators for reducing predation pressure on prey populations that can release greater yields for human taking.

Until 1965, the State of Colorado sought to exterminate mountain lions, offering bounties

for hides. Today's long and permissive trophy hunting seasons, including the use of ruthless and unsporting methods, are a vestige of those long-standing anti-predator sentiments, driven by the desires of some ranchers, trophy hunters, and the commercial guiding industry who typically charge large fees for a guaranteed kill of a lion by their clients.

Predators are more prone to be persecuted for perceived threats or nuisances rather than praised for the ecosystem services they provide. Human-predator conflict commonly arises from a belief that the resources required by predators to carry out their beneficial effects exceed the value they provide.

## ***Potential Downsides of Mountain Lions and Bobcats in Colorado***

---

1. *Predation on livestock.* Mountain lions and bobcats are opportunistic predators and may prey on livestock, such as sheep, goats, and cattle, causing economic losses for ranchers and farmers. The majority of mountain lion removals in Colorado are related to livestock depredation, meaning that the mountain lion had been confirmed to have killed or injured livestock, and removal was deemed necessary to protect livestock owners.

Nationwide, based on USDA Wildlife Services reports, the average annual number of livestock losses attributed to mountain lions is around 450-500. This suggests a possible total of 2,250-2,500 livestock attacks over the past five years. From 2000 to 2021, USDA Wildlife Services killed, on average, 340 mountain lions each year in the United States. These kills were in addition to those permitted by various state wildlife agencies. That number does not include depredation kills by personnel

from state fish and wildlife and agriculture departments.

2. *Predation on pets.* Mountain lions are [known to prey on pets](#), such as dogs and cats. This can be a devastating loss for pet owners and can create tension between mountain lions and humans. Pets left outside at night are at risk in Colorado in mountain lion habitats. There are no readily available statistics on mountain lion attacks on pets in Colorado, but at least one lion did kill dozens of pets in Nederland in 2023 before he was killed

Colorado Parks and Wildlife conducted an [extensive study](#) between 2007 and 2015 in which it captured and collared 102 mountain lions in five counties with resident mountain lion populations. The study found that 39% of collared mountain lions consumed domestic animals such as dogs, cats, and hobby livestock.

3. *Human safety.* Mountain lion attacks on humans are rare, in part because these apex predators do not normally perceive two-legged animals as prey species. Mountain lions are also generally fearful of humans. However, mountain lion encounters can be dangerous for children and solo hikers.

In the United States, between 1890 and 2022, there were [126 attacks on people by mountain lions](#), causing 27 fatalities, according to data compiled by the Mountain Lion Foundation and other sources. This represents an average of about 1.3 mountain lion attacks on humans per year and two fatalities every decade

Between 1990 and 2023, there were 25 confirmed mountain lion attacks on humans in Colorado, resulting in three fatalities. In the most recent attack in March of 2023, an 11-year-old girl was attacked by

a mountain lion while walking home from school in El Paso County. The girl was able to fight off the lion and sustained only minor injuries.

**As a relative risk reference point, according to [DogsBite.org](#)**, there have been 34 fatal dog attacks in Colorado since 1990. Pit bull-type dogs were responsible for 22 of these attacks, followed by Rottweilers, with four attacks. According to the Colorado Department of Public Health and Environment, there were 15,645 reported dog bites in Colorado between 1990 and 2021. Statistically speaking, then, the risk of attack and death from domestic dogs is of a different order of magnitude than lion attacks. The policy response to the dog attacks is often to kill the offending animal, but there are no calls for random or mass killing of dogs or vengeful acts against non-offenders.

- CPW will remove (trap and relocate or sometimes euthanize) mountain lions who pose a direct threat to human safety. This could include instances where a mountain lion has attacked someone or is exhibiting aggressive behavior toward humans.
  - According to [Colorado Parks and Wildlife 2022 reporting](#), there were 787 mountain lion incident reports which include alleged or supposed sightings, aggressive behavior, and property damage. The state allowed wildlife officials and property owners (and deemed justified) to kill 20 lions, with most of those kills on the Western Slope
4. *Habitat loss and fragmentation.* Mountain lions are losing habitat due to human development, which can lead to increased conflicts with humans. Habitat fragmentation also makes it more difficult for mountain lions to find prey and mates, which can further strain and stress lion populations.



5. *Disease transmission.* Mountain lions can transmit diseases to humans and domestic animals, such as rabies and tularemia. While the risk of disease transmission is extremely low, it is still a concern for some people, especially hunters.
6. *Public perception.* Mountain lions are sometimes perceived as dangerous or threatening animals, which can lead to fear and hostility towards them. This can make it difficult to manage mountain lion populations effective-

ly and can also lead to unnecessary persecution of these animals.

Public education, responsible recreation, and effective management practices are all important for minimizing conflicts with mountain lions (or bobcats) and ensuring that these majestic animals can continue to thrive in Colorado. Banning trophy hunting of mountain lions will help to ensure their long-term survival and lessen the risk of human-mountain lion conflicts.

### ***Bottom Line: Will Trophy and Sport Hunting of Mountain Lions Improve the Safety of People, Pets, and Livestock?***

---

Colorado is one of 14 states that allow mountain lion hunting. Others are Arizona, Idaho, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oregon, South Dakota, Texas, Utah, Washington, and Wyoming. About 500 adult mountain lions are killed each year in Colorado, out of an adult population of an estimated 3,000 to 7,000 animals. According to the [Mountain Lion Foundation](#) (MLF), the best available evidence indicates that trophy hunting of mountain lions will not decrease public safety or livestock and pet depredation risk from mountain lions and may increase human conflict risk.

According to the MLF, an overwhelming number of [studies](#) demonstrate that trophy hunting of mountain lions not only does not

increase the public's safety, but it also does not reduce depredation on livestock or other domestic animals and appears to be responsible for the increase in human/lion conflicts in regions where lion mortality is excessive.

The claim that sport and trophy hunting is a necessary and effective strategy for reducing mountain lion attacks on people, pets, and livestock remains widespread in the mainstream media, the hunting community, and the popular hunting literature. According to the MLF, "While some state wildlife agencies, such as in California and Wyoming, state that sport hunting cannot be expected to increase public safety, other state agencies have claimed the opposite, apparently to garner public support for sport hunting."

## Conclusion

---

A ban on mountain lion and bobcat hunting and trapping would benefit Colorado economically, ecologically, and ethically.

Mountain lion hunters as well as bobcat hunters and trappers drain Colorado's natural resources solely for personal benefit (trophies) or commercial profit (e.g., mountain lion hound outfitters, bobcat pelt sales).

Perhaps counterintuitively, big cat hunting and trapping bans in Colorado would likely improve public safety and reduce livestock and pet depredations by maintaining the stability of local mountain lion populations and families of females raising cubs. [Widespread](#)

[indiscriminate mountain lion hunting does not appear to be an effective preventative and remedial method](#) for reducing predator complaints and livestock depredations.

Colorado is large enough and the people are compassionate and wise enough for mountain lions and bobcats to co-exist with humans without unnecessary and destructive trophy hunting and trapping of these beautiful and beneficial wild cats. California's experience proves that, given that it has the lowest per capita rate of lion incidents with people in the nation, and the state has outlawed trophy hunting for more than five decades.

## About the Author

---



Jim Keen, D.V.M., Ph.D., earned his veterinary medicine and epidemiology doctorate degrees from the University of Illinois at Urbana-Champaign. He was a senior veterinary researcher focused on livestock and zoonotic infections with the USDA Agricultural Research Service in Nebraska for 15 years and later faculty at the University of Nebraska-Lincoln School of Veterinary Medicine for 13 years. His specific expertise is emerging and zoonotic infectious diseases of farmed animals.

He has broad field experience in outbreak investigation and animal disease control including enteric zoonotic bacteria from livestock in the U.S., Foot and Mouth Disease in the United Kingdom, and African Swine Fever in the Caucasus. Keen lives on his family's 140-year old grain farm in South Dakota. He is Director of Veterinary Sciences at the Center for a Humane Economy.