THE HUMANE SOCIETY OF THE UNITED STATES

August 16, 2024

Stephanie Rissler, Commission Chair
South Dakota Game, Fish and Parks
501 Bulow Street
Vermillion, SD 57069

Tom Kirschenmann, Director of Wildlife
South Dakota Game, Fish and Parks
523 East Capitol Ave
Pierre, SD 57501

RE: Draft 2024–2028 Mountain Lion Action Plan

Dear Chair Rissler, Director Kirschenmann and Members of the Commission:

On behalf of the Humane Society of the United States and our supporters in South Dakota, I thank you for this opportunity to submit comments on South Dakota Game, Fish and Parks' (GFP) Draft 2024-2028 Mountain Lion Action Plan. We oppose the use of hounding to pursue mountain lions, the arbitrary population objective, and the year-round season outside of the Black Hills Fire Protection District (BHFPD). These practices harm the small mountain lion population in South Dakota and potentially increase conflicts with livestock. We urge you to revise the Draft Action Plan to end, or at the very least significantly reduce, these practices so that hunting opportunity is not privileged to the detriment of conflict reduction and the ecological and social value of mountain lions.

The Humane Society of the United States is categorically opposed to the trophy hunting of mountain lions in South Dakota. This practice is not only cruel and unnecessary, but researchers have found that excessive hunting of mountain lions leads to increased conflicts with humans, pets and livestock.[1] Furthermore, trophy hunting and predator control of mountain lions indirectly harms ungulates because predators target sick animals, including those with chronic wasting disease.[2] Finally, a national survey conducted by the National Shooting Sports Foundation and Responsive Management show that only 29% of Americans approve of trophy hunting.[3]

For these reasons, and those outlined in Appendix A of these comments, we request that SDGFP revise the Draft Mountain Lion Action Plan, end the use of hounds to pursue or hunt mountain lions, and protect mountain lions from trophy hunting now and in perpetuity.

If GFP is to continue allowing the trophy hunting of mountain lions, we request the agency limit the practice to sustainable levels (defined below) to protect South Dakota's iconic mountain lion population from excessive killing and to limit conflicts caused by indiscriminate hunting of these native cats. Specifically, we request the following changes:

1.) Lift the arbitrary population objective of 200-300 total mountain lions. The annual hunting limit should not exceed 14% of South Dakota's adult and subadult mountain lion population. This amounts to no more than 38 mountain lions based on GFP's recent – and quite imprecise – population count, as is acknowledged by GFP itself in the 2023 Mountain Lion Status report.[4] GFP currently allows 40 females or 60 total mountain lions to be killed; 47 have been killed so far in 2024. GFP estimates that 275 adult and subadult lions live in South Dakota. GFP should count its lions using contemporary methods and not allow hunters to kill more than South Dakota's mountain lion population growth rate. Non-spatial population models

overestimate mountain lion populations by an average of 63%, and many jurisdictions count dependent kittens in their estimates.[5]

Beausoliel et al. (2013) suggest that in the absence of population data, agencies should not set quotas that exceed 14% of the mountain lion population to avoid harm.[6] Colorado Parks and Wildlife (CPW) recently adopted a cap of 14% on mountain lion hunting quotas as part of their new West Slope Mountain Lion Management Plan.[7] Additionally, CPW has adopted a cap of 16% on total human-caused mortality to account for other sources of lion deaths. Washington state has also recently adopted a conservative more conservative mountain lion quota in order to maintain stable mountain lion social structures to minimize conflicts.[8]

GFP's Draft Action Plan continues to authorize trophy hunting of mountain lions that exceed sustainable levels, threatening the stability of South Dakota's mountain lion population as well as their range expansion to their historic range where they had been extirpated. GFP's own Andy Lindbloom acknowledged of South Dakota's current hunting limit at the July 2023 Commission meeting, "If we met this every year, we would not be able to manage for our management objective of two- to three-hundred lions. We just don't have enough lions that could meet that every year."[9] If current hunter kill rates continue, South Dakota's mountain lion population is projected to come dangerously close to falling below GFP's population objective. Any additional mortality of female mountain lions would likely lead to a disastrous decline below GFP's objectives. To quote directly from materials provided by GFP itself to the Commission at its July 2023 meeting:

> If the four-year average of 26 females is harvested next year, the population is expected to decrease to just over 200 by December of 2024.... Alternatively, if the harvest limit is achieved and 40 females are harvested next year, the population is expected to decrease to under 200 mountain lions, and below the population objective of 200 to 300.[10]

As of August 14, 2024, 30 female mountain lions have been killed in South Dakota during the 2024 season, as well as 17 males. We therefore call on the agency to count South Dakota's mountain lions using contemporary spatial-model methods, implement a 14% cap on hunting mortality and a 16% cap on total human-caused mortality based on adult/subadult population estimates while doing away with the agency's arbitrary population objective of 200-300 total mountain lions.

2.) Implement a 20% sublimit on female hunting mortality as a proportion of total hunting mortality. Multiple studies across the western U.S. demonstrate that limiting female mortality to approximately 20% of total hunting mortality is necessary to ensure a stable population.[11] Based on the current adult/subadult population and an estimated sustainable hunting limit of 38 total mountain lions, GFP must limit the female hunting limit to no more than eight individuals.

As the biological bank account of the population, GFP must take steps to protect resident females and ensure hunting of females does not exceed sustainable levels. The current subquota of 40 female mountain lions out of a total hunting limit of 60 lions is far too high.

3.) Prohibit the hunting of mountain lions with hounds throughout South Dakota and reject any proposed rule that would expand hound hunting.

As detailed in Appendix A, using radio-collared hounds to chase mountain lions and bay them into trees or rock ledges so a trophy hunter can shoot at close range is unsporting, unethical and inhumane.[12] Hounds kill kittens, and mountain lions often injure or kill hounds.[13] The practice is exceedingly stressful and energetically taxing to mountain lions.[14] Furthermore, hound hunting is not considered "fair chase" hunting by most.[15] Hounds also chase and stress non-target wildlife, from porcupines to deer,[16] trespass onto private lands,[17] and have adverse interactions with the public.[18]If GFP is to continue allowing the hunting of mountain lions, the agency must prohibit the use of hounds and reject hound hunting in the Black Hills Fire Protection District.

In conclusion, the Humane Society of the United States strongly urges GFP to revise its Draft Mountain Lion Action Plan as it seeks only to maximize trophy hunting opportunities, not conserve mountain lions. South Dakota's mountain lions are a vital component of our natural wild heritage and deserve reasoned management for long-term conservation.[19] If GFP is to continue allowing hunting of mountain lions, the agency must limit the practice to no more than 14% of the adult/subadult population so that it does not exceed sustainable levels and implement a female sublimit of 20% of total hunting mortality. Additionally, total human-caused mortality must be limited to no more than 16% of the mountain lion population. Lastly, hound hunting of mountain lions must be prohibited throughout South Dakota. Thank you for your consideration.

Sincerely,

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Appendix A

1. Mountain lion trophy hunting is unsustainable, cruel and harmful to family groups

Trophy hunting is the greatest source of mortality for mountain lions throughout their range in the United States.[20] The practice is harmful to more than just the wild cats who are killed. Conservation biologists have condemned this practice as unnecessary and wasteful. Batavia et al. (2018) write that compelling evidence shows that the animals hunted as trophies have sophisticated levels of "intelligence, emotion and sociality," which is "profoundly disrupted" by trophy hunting.[21] For these reasons, GFP must not allow trophy hunting of mountain lions in South Dakota.

A. *Trophy hunting is unsustainable and cruel:* Large-bodied carnivores are sparsely populated across vast areas, invest in few offspring, provide extended parental care to their young, have a tendency towards infanticide, females limit reproduction and social stability promotes their resiliency.[22] Human persecution affects their social structure,[23] and harms their persistence.[24]

   Conservation biologists have shown that trophy hunting results in *additive mortality,* meaning that trophy hunting and even other human-caused mortality increases the total mortality to levels that far exceed what would occur in nature.[25] In fact, the effect of human persecution is "super additive," meaning that hunter kill rates on large carnivores has a multiplier effect on the ultimate increase in total mortality over what would occur in nature due to breeder loss, social disruption and its indirect effects including increased infanticide and decreased recruitment of their young.[26] When trophy hunters remove the stable adult mountain lions from a population, it encourages subadult males to immigrate, leading to greater aggression between cats and mortalities to adult females and subsequent infanticide.[27]

   Biologists Wolfe et al. (2015) recommend that states manage mountain lions at a metapopulation level rather than at the single population level—which is critical for South Dakota's tiny mountain lion population that is reliant on dispersers from Wyoming. They further add, "We recommend a conservative management approach be adopted to preclude potential over-harvest in future years."[28] Instead, South Dakota's mountain lions experience *additive* levels of mortality.[29] Extensive research shows that this additive mortality caused by high levels of hunting results in population sinks.[30] High hunting mortality does not result in decreased numbers and densities of mountain lions because of compensatory emigration and immigration responses, typically by dispersing subadult males.[31]

B. *Trophy hunting is particularly harmful to kittens and their mothers:* In heavily hunted populations, female mountain lions experience higher levels of intraspecific aggression (fights with other cats) resulting in predation on themselves and their kittens.[32] Over-hunting harms a population's ability to recruit new members if too many adult females are removed.[33] A Utah study shows that trophy hunting adult females orphans their kittens, leaving them to die of dehydration, malnutrition, and/or exposure.[34] Kittens are reliant upon their mothers beyond 12 months of age.[35]

C. *Trophy hunting harms entire mountain lion communities:* A recent study on mountain lions shows that mountain lions are quite social and live in "communities," with females sharing kills with other females, their kittens and even with the territorial males. In return for these meals, the adult males

protect the females and their kittens from incoming males.[36] Disrupting these communities leads to deadly intraspecific strife, including infanticide and social chaos within the family groups.[37] Trophy hunting destabilizes mountain lion populations, which may cause increased conflicts with humans, pets and livestock.[38]

D. *Trophy hunting is unnecessary, as mountain lions are a self-regulating species*: Mountain lions occur at low densities relative to their primary prey, making them sensitive to bottom-up (prey declines) and top-down (human persecution) influences.[39] Their populations necessarily stay at a much smaller size relative to their prey's biomass or risk starvation.[40] They do this by regulating their own numbers.[41] When prey populations decline, so do mountain lion populations.[42] Mountain lion populations also require expansive habitat, with individual cats maintaining large home ranges that overlap with one another.[43]

E. *Killing large numbers of mountain lions halts their ability to create trophic cascades in their ecosystems, which benefits a wide range of flora, fauna and people:* Mountain lions serve important ecological roles, including providing a variety of ecosystem services.[44] As such, conserving these large cats on the landscape creates a socio-ecological benefit that far offsets any societal costs.[45] Their protection and conservation has ripple effects throughout their natural communities. Researchers have found that by modulating deer populations, mountain lions prevented overgrazing near fragile riparian systems, resulting in greater biodiversity.[46] Additionally, carrion left from mountain lion kills feeds scavengers, beetles, foxes, bears and other wildlife species, further enhancing biodiversity.[47]

F. *Hound hunting is harmful to mountain lions, hounds and non-target wildlife:* Using radio-collared trailing hounds to chase mountain lions and bay them into trees or rock ledges so a trophy hunter can shoot them at close range is unsporting, unethical and inhumane.[48] Hounds kill kittens, and mountain lions often injure or kill hounds.[49] The practice is exceedingly stressful and energetically taxing to mountain lions.[50]

To escape from the hounds, mountain lions use evasive maneuvers such as running in figure eights, scrambling up trees or steep hillsides and using quick turns to evade the pursuing pack of barking hounds. As a result, mountain lions could exceed their aerobic budgets causing their muscles to go anaerobic—while hounds are capable of running a steady pace with little ill effect.[51] For every one minute the hounds chased a mountain lion, it cost the cat approximately five times what would have been expended if the cat had been hunting. A 3.5-minute chase, according to Bryce et al. (2017), likely equaled 18 minutes of energy the mountain lion would have expended on hunting activities necessary to find prey.[52]

Hounding is not considered "fair chase" hunting by most.[53] Fair chase hunting is predicated upon giving the animal an equal opportunity to escape from the hunter.[54] The use of hounds provides an unfair advantage to trophy hunters who rely on hounds to do the bulk of the work in finding and baying a mountain lion. GFP Wildlife Program Administrator Andrew Norton stated to the Commission in 2023, "As you can imagine, success is much higher with hounds. We see on average about twenty times as high success when hounds are used compared to boot hunting in South Dakota."[55] In Custer State Park, hunters relying on hounds experience an astounding 63% success rate in killing mountain lions, compared to a success rate of 3.5% for boot hunters.[56] Hounds also chase

and stress non-target wildlife, from porcupines to deer,[57] cause adverse interactions with bystanders, and trespass onto private lands.[58]

Grignolio et al. (2011) found that hounding was highly costly to non-target deer. Hounding changed deer behaviors, including deer inside a protected refuge.[59] While the hounds were chasing other species, they caused non-target deer, especially younger animals, to panic and huddle in an inferior habitat (in this case: a protected, high-elevation, snow-covered reserve during the wintertime hunting season when foraging was difficult). Hounds also significantly increased deer home range sizes—meaning deer had to expend extra energy to distance themselves from the hounds. Furthermore, Grignolio et al. (2011), citing several others, indicated that hounding highly disturbs deer, likely reducing individual fitness and reproductive success while harming deer populations on the whole. If GFP's conservation goals include conserving deer populations, then unleashing packs of loose dogs in their habitat to spook, harass, and chase wildlife during a sensitive time of the year is quite counter to that goal.

2. Hunting mountain lions does not boost prey populations

Research shows that ungulates are ultimately limited more by their food resources and other habitat factors ("bottom-up" limitations) than by their predators ("top down" regulators).[60] However, when herds lose their predators, they suffer poorer health and body condition, as well as more degraded habitats.[61] With a healthy assemblage of native carnivores, ecosystems enjoy the benefits from top-down regulation, which increases the health of ungulate herds with which they are integrally coevolved.[62]

The best available science demonstrates that killing native carnivores to increase ungulate populations is unlikely to produce positive results. Numerous recent studies demonstrate that predator removal actions "generally had no effect" in the long term on ungulate populations.[63] Because ecological systems are complex, heavily persecuting mountain lions will fail to address the underlying malnutrition problems that deer face. Research also shows that disruption by oil and gas drilling does, in fact, greatly harm mule deer populations.[64] If South Dakota wants to grow its ungulate populations, then GFP must foster survival of adult female mule deer and elk to stem declines; and it must improve nutritional conditions for ungulates as these factors are the most important for mule deer survival.[65] It must also eliminate hound hunting of mountains lions as it is an unnatural stressor on deer.[66]

Persecuting mountain lions will not help bighorn sheep recruitment, either. It is clear from the literature that bighorn sheep populations are in decline in the U.S. because of unregulated market hunting, trophy hunting, disease from domestic sheep,[67] resource competition by livestock, and loss of habitat.[68] Sawyer and Lindzey (2002) surveyed more than 60 peer-reviewed articles concerning predator-prey relationships involving bighorn sheep and mountain lions, concluding that while predator control is often politically expedient, it often does not address underlying environmental issues including habitat loss, loss of migration corridors, and inadequate nutrition.[69] The best available science suggests that persecuting mountain lion populations is not a solution for enhancing bighorn sheep numbers. That is because mountain lion predation upon bighorn sheep is a learned behavior conducted by a few individuals who may not repeat their behavior.[70] Similar behavior has been documented on endangered mountain caribou in the southern Selkirk Mountains, where trophy hunting disrupted sensitive mountain lion communities, female lions took to higher altitudes to avoid incoming, infanticidal young males, and preyed upon mountain caribou there.[71]

South Dakota can better plan for bighorn sheep management by selecting relocation sites for bighorn sheep that have little stalking cover.[72] Escape terrain that contains cliffs, rocks, and foliage makes excellent ambush cover for a mountain lion and should be avoided.[73] The amount of mountain lion predation is also generally greater on small-sized bighorn sheep populations (those with fewer than 100 individuals) than on other larger bighorn sheep populations.[74] A host of authors reviewed by McKinney et al. (2006) and Ruth and Murphy (2010) recommend only limited mountain lion removals to benefit bighorn sheep populations.[75]

3. Mountain lions provide significant ecosystem benefits to their prey and other wildlife, as well as economic benefits to South Dakotans

Mountain lions help prevent deadly deer-vehicle strikes[76] that can result in numerous human mortalities and pose significant financial and ecological costs to society.[77] In fact, by reducing vehicle collisions with deer, mountain lions saved drivers $1.1 million in collision costs annually in South Dakota.[78] Additionally, highways fragment wildlife habitats, which can lead to both genetic inbreeding problems and direct mortality from vehicle collisions.[79] The cost of vehicle-animal collisions can be mitigated with the construction of highway structures that are designed to draw specific species such as deer across them, not only preventing vehicle strikes but protecting species and people while saving millions of dollars annually.[80]

Moreover, mountain lions help maintain the health and viability of ungulate populations by preying on sick individuals, reducing the spread of disease such as chronic wasting disease (CWD) and brucellosis.[81] For example, during a study in Rocky Mountain National Park, researchers found mountain lions preyed on deer infected with CWD.[82] The study concluded that adult deer preyed upon by mountain lions were more likely to have CWD than deer shot by hunters. According to the study, "The subtle behaviour changes in prion-infected deer may be better signals of vulnerability than body condition, and these cues may occur well before body condition noticeably declines."[83] This demonstrates that mountain lions select for infected prey and may be more effective at culling animals with CWD, including during the early stages of the disease when they are less infectious, than hunters who rely on more obvious signs of emaciation that occur in later stages of the disease, when they are more infectious. Moreover, the mountain lions consumed more than 85% of carcasses, thereby removing a significant amount of the disease from the environment.[84]

This ecosystem benefit is increasingly important as CWD infection continues to grow in prevalence and distribution in South Dakota[85] and neighboring states. Hammering our state's mountain lion population through extremely high and irresponsible levels of trophy hunting relative to the estimated population, and the setting of an arbitrarily low population objective for mountain lions, undermine one of our best defenses against the spread of this deadly disease.

4. Trophy hunting increases human-mountain lion conflict and livestock losses

Trophy hunting and predator control of mountain lions results in increased conflicts because lions' social structure are destabilized.[86] A review of predator-removal studies found that the practice is "typically an ineffective and costly approach to conflicts between humans and predators" and, as a long-term strategy, will result in failure.[87] Instead, the authors concluded, non-lethal alternatives to predator removal, coupled with coexistence (husbandry techniques) may resolve conflicts.[88]

A Washington state study shows that as mountain lion complaints increased, wildlife officials lengthened seasons and increased quotas to respond to what they believed was a growing lion population. However, the public's perception of an increasing population and greater number of livestock depredations was actually the result of a declining female and increasing male population.[89] Heavy hunting of mountain lions skewed the ratio of young males in the population by causing compensatory immigration and emigration, even though it resulted in no net change in the population.[90]

Study authors found that the trophy hunting of mountain lions to reduce complaints and livestock losses had the opposite effect. Killing mountain lions disrupts their social structure and increases both complaints and livestock losses.[91] Peebles et al. (2013) write:

> . . . each additional cougar [i.e. mountain lion] on the landscape increased the odds of a complaint of livestock depredation by about 5%. However, contrary to expectations, each additional cougar killed on the landscape increased the odds by about 50%, or an order of magnitude higher. By far, hunting of cougars had the greatest effects, but not as expected. Very heavy hunting (100% removal of resident adults in 1 year) increased the odds of complaints and depredations in year 2 by 150% to 340%.[92]

Similarly, a study published recently shows the very same result – lethal removal of mountain lions is associated with increased conflicts, especially on small hoofstock including sheep and goats.[93] Dellinger et al. (2021) state:

> Removals can thus create a negative-feedback loop that leads to increasing conflict and lethal removal, which could begin to negatively impact the mountain lion population via reduced gene flow and population viability (Hiller et al. 2015, Vickers et al. 2015, Benson et al. 2019). Thus, maintaining an older age structure by reducing lethal removal of resident adults could mitigate depredations (Logan 2019).[94]

Hunting disrupts mountain lions' sex-age structure and tilts a population to one that is composed of younger males, who are more likely to engage in livestock predation than animals in stable, older populations.[95] In 2019, the Humane Society of the United States published a report on livestock losses from mountain lions using the U.S. Department of Agriculture's data.[96] For South Dakota's cattle and sheep ranchers, 2015 data show that most livestock losses came from illnesses, birthing problems, weather and theft, with far fewer losses coming from native carnivores and domestic dogs combined.[97] In 2015, nearly 96% of unwanted cattle losses in South Dakota were from maladies with only 0.17% coming from mountain lions, according to the USDA.[98] And USDA data show that in 2014, zero sheep were lost to mountain lions in South Dakota.[99]

Rather than allowing mountain lion trophy hunting, GFP must make a concerted effort to utilize non-lethal methods (described below) when rare conflicts occur, prioritizing these tools above lethal removal of mountain lions. The current reliance on lethal removal of mountain lions that enter a human community is cruel, unsustainable, and not in line with best management practices for mountain lion conservation.[100] A recent Utah study found that mountain lions selected for native prey even within urban-wildland interface habitat, with only 2% of 540 prey animals consisting of domestic animals.[101] Techniques such as hazing and relocation are viable options that prevent unnecessary killing and are largely supported by the majority of South Dakotans, as detailed within the Plan.[102] According to surveys of South Dakota residents in 2018, public

education, relocation and hazing are by far the most widely supported methods for addressing human, pet and livestock conflicts with mountain lions.[103]

Furthermore, GFP must work with livestock owners to ensure they are adequately and appropriately employing nonlethal predator deterrence techniques. Installing predator-proof enclosures, using livestock guardian animals, or utilizing frightening devices are all effective strategies to prevent conflicts with mountain lions and other carnivores. Other livestock husbandry practices are also essential at reducing conflicts with carnivores. Livestock operators should:

- Practice sanitary livestock carcass removal to avoid scavenging and habituation.
- Keep livestock, especially in maternity pastures, away from areas where wild cats have access to ambush cover.[104]
- Keep livestock, especially the most vulnerable—young animals, mothers during birthing seasons and hobby-farm animals—behind barriers such as electric fencing and/or in barns or pens, or kennels with a top.[105] The type of enclosure needs to be specific to the native carnivore to prevent climbing, digging or jumping.[106]
- Move calves from pastures with chronic predation problems and replace them with older, less vulnerable animals.[107]
- Concentrate calving season (i.e., via artificial insemination) to synchronize births with wild ungulate birth periods.[108]
- In large landscapes, use human herders, range riders and/or guard animals.[109] Guard dogs work better when sheep and lambs are contained in a fenced enclosure rather than on open range lands where they can wander unrestrained.[110]
- Suspended human clothing, LED flashing lights (sold as "Foxlights") and radio alarm boxes set off to make alarm sounds/noises near pastures are some of the low-cost sound and/or visual equipment that deters wild cats.[111]
- Studded leather collars can be very effective at protecting cattle from big cats.[112]

According to USDA data from 2015, only an estimated 11.2% of cattle and calf operations in South Dakota used any nonlethal predator control methods.[113] Expanding the use of suitable techniques that are landscape and animal specific is essential to reducing conflicts and preventing the death of livestock as well as wild carnivores. We urge GFP to focus resources on further educating the public on how to share the landscape with carnivores, rather than only attempting to maximize trophy hunting opportunity.

5. Trophy hunting of mountain lions is not economically sound or supported by the majority of Americans who want to see wildlife protected

Trophy hunting of mountain lions is not in the best interest of this iconic species, nor does it represent the interests of the public majority. The practice deprives citizens of their ability to see, view tracks of, or photograph wild mountain lions, and deprives them of the important ecosystem services mountain lions provide in our landscapes. Nonconsumptive users are a rapidly growing stakeholder group that provides

immense economic contributions to the communities in which they visit.[114] The U.S. Fish and Wildlife Service's 2016 survey on wildlife recreation indicates that wildlife watchers nationwide have increased 20 percent from 2011, numbering 86 million and spending $75.9 billion, while all hunters declined by 16 percent, with the biggest decline in big game hunter numbers, from 11.6 million in 2011 to 9.2 million in 2016.[115] Altogether, hunters spent $25.6 billion in 2016, about one-third that spent by wildlife watchers (Fig. 2).[116]

Figure 2: Wildlife recreation participation & expenditures, 2011 vs. 2016 data			
Numbers	**2011**	**2016**	**Change**
Wildlife watchers	71.8M	86.0M	+14.2M (+20%)
All hunters	13.7M	11.5M	-2.2M (-16%)
Big game	11.6M	9.2M	-2.4M (-20%)
Small game	4.5M	3.5M	-1M (-22%)
Migratory birds	2.6M	2.4M	-0.2M (-8%)
Other animals	2.2M	1.3M	-0.9M (-41%)
Expenditures	**2011**	**2016**	**Change**
Wildlife watchers	$59.1B	$75.9B	+$16.8B (+28%)
All hunters	$36.3B	$25.6B	-$10.7B (-29%)

The public values mountain lions and views them as an indicator of healthy environments while posing little risk to people living near them.[117] A new study indicates that Americans highly value wildlife, including top carnivores such as mountain lions, and are concerned about their welfare and conservation.[118] The landmark America's Wildlife Values report found that the percentage of South Dakotans who fall into the traditionalist values system – those who view wildlife as a resource to be used for human benefit – decreased by four percent between 2004 and 2018, while the percent of mutualists – those who value living alongside wildlife - rose significantly, with an increase of 7.5% in the same time period.[119] South Dakotans increasingly value their wildlife alive and thriving. Surveys also show that the majority of Americans do not support trophy hunting.[120] An additional study showed that most believe mountain lions are the best representative of the Southern Rockies heritage and landscape.[121] A continued trophy hunting and hounding season is not in the best interest of South Dakotans who prefer that these large cats remain on the landscape, without threat of persecution.

Andelt, W. F. "Effectiveness of Livestock Guarding Dogs for Reducing Predation on Domestic Sheep." *Wildlife Society Bulletin* 20 (1992): 55-62.

Andelt, W. F., and S. N. Hopper. "Livestock Guard Dogs Reduce Predation on Domestic Sheep in Colorado." *Journal of Range Management* (2000): 259-67.

Andelt, William F. "Carnivores." In *Rangeland Wildlife*, edited by P. R. Krausman, 133-55. Denver: Society for Range Management, 1996.

Anderson, C. R., and F. G. Lindzey. "Experimental Evaluation of Population Trend and Harvest Composition in a Wyoming Cougar Population." *Wildlife Society Bulletin* 33, no. 1 (Spr 2005): 179-88.

Arizona Game & Fish Department. "Hunt Arizona, 2017 Edition: Survey, Harvest and Hunt Data for Big and Small Game." 153-54, 2017.

Ausband, D. E., C. R. Stansbury, J. L. Stenglein, J. L. Struthers, and L. P. Waits. "Recruitment in a Social Carnivore before and after Harvest." [In English]. *Animal Conservation* 18, no. 5 (Oct 2015): 415-23.

Beausoleil, R. A., G. M. Koehler, B.T. Maletzke, B.N. Kertson, and R.G. Wielgus. "Research to Regulation: Cougar Social Behavior as a Guide for Management." *Wildlife Society Bulletin* 37, no. 3 (2013): 680-88.

Beschta, R., and W. Ripple. "Large Predators and Trophic Cascades in Terrestrial Ecosystems of the Western United States." *Biological Conservation* 42, no. 11 (2009): 2401-14.

Bonier, F., H. Quigley, and S. N. Austad. "A Technique for Non-Invasively Detecting Stress Response in Cougars." *Wildlife Society Bulletin* 32, no. 3 (2004): 711-17.

Brandell, Ellen E., Paul C. Cross, Douglas W. Smith, Will Rogers, Nathan L. Galloway, Daniel R. MacNulty, Daniel R. Stahler, John Treanor, and Peter J. Hudson. "Examination of the Interaction between Age-Specific Predation and Chronic Disease in the Greater Yellowstone Ecosystem." *Journal of Animal Ecology* (2022).

Bryce, C. M., C. C. Wilmers, and T. M. Williams. "Energetics and Evasion Dynamics of Large Predators and Prey: Pumas Vs. Hounds." *PeerJ* e3701 (2017).

Cooley, H. S., R. B. Wielgus, G. M. Koehler, H. S. Robinson, and B. T. Maletzke. "Does Hunting Regulate Cougar Populations? A Test of the Compensatory Mortality Hypothesis." *Ecology* 90, no. 10 (Oct 2009): 2913-21.

Cooley, H. S., R. B. Wielgus, G. Koehler, and B. Maletzke. "Source Populations in Carnivore Management: Cougar Demography and Emigration in a Lightly Hunted Population." *Animal Conservation* 12, no. 4 (Aug 2009): 321-28.

Cougar Management Guidelines. *Cougar Management Guidelines.* Bainbridge Island, WA: WildFutures, 2005.

Creel, S., M. Becker, D. Christianson, E. Droge, N. Hammerschlag, M. W. Hayward, U. Karanth, *et al.* "Questionable Policy for Large Carnivore Hunting." *Science* 350, no. 6267 (Dec 2015): 1473-75.

Creel, Scott, and Jay Rotella. "Meta-Analysis of Relationships between Human Offtake, Total Mortality and Population Dynamics of Gray Wolves (*Canis Lupus*)." *PLoS ONE* 5, no. 9 (2010).

Darimont, C. T., S. M. Carlson, M. T. Kinnison, P. C. Paquet, T. E. Reimchen, and C. C. Wilmers. "Human Predators Outpace Other Agents of Trait Change in the Wild." *Proceedings of the National Academy of Sciences of the United States of America* 106, no. 3 (Jan 2009): 952-54.

Darimont, Chris T., Caroline H. Fox, Heather M. Bryan, and Thomas E. Reimchen. "The Unique Ecology of Human Predators." *Science* 349, no. 6250 (2015): 858-60.

Decision Research. "Southern Rockies Wildlife and Wilderness Survey Report." (2001).

Dellinger, J. A., D. K. Macon, J. L. Rudd, D. L. Clifford, and S. G. Torres. "Temporal Trends and Drivers of Mountain Lion Depredation in California, USA ". *Human–Wildlife Interactions* 15, no. 1 (2021).

Downs, J., M. Horner, R. Loraamm, J. Anderson, H. Kim, and D. Onorato. "Strategically Locating Wildlife Crossing Structures for Florida Panthers Using Maximal Covering Approaches." [In English]. *Transactions in Gis* 18, no. 1 (Feb 2014): 46-65.

Eberhardt, L. L., P. J. White, R. A. Garrott, and D. B. Houston. "A Seventy-Year History of Trends in Yellowstone's Northern Elk Herd." *Journal of Wildlife Management* 71, no. 2 (Apr 2007): 594-602.

Eklund, A., J. V. Lopez-Bao, M. Tourani, G. Chapron, and J. Frank. "Limited Evidence on the Effectiveness of Interventions to Reduce Livestock Predation by Large Carnivores." *Scientific Reports* 7 (May 2017).

Elbroch, L. M., B. D. Jansen, M. M. Grigione, R. J. Sarno, and H. U. Wittmer. "Trailing Hounds Vs Foot Snares: Comparing Injuries to Pumas Puma Concolor Captured in Chilean Patagonia." *Wildlife Biology* 19, no. 2 (Jun 2013): 210-16.

Elbroch, L. M., C. O'Malley, M. Peziol, and H. B. Quigley. "Vertebrate Diversity Benefiting from Carrion Provided by Pumas and Other Subordinate Apex Felids." *Biological Conservation* 215 (2017): 123-31.

Elbroch, L. M., and H. Quigley. "Observations of Wild Cougar (Puma Concolor) Kittens with Live Prey: Implications for Learning and Survival." *Canadian Field-Naturalist* 126, no. 4 (Oct-Dec 2012): 333-35.

Elbroch, L. Mark, Jennifer Feltner, and H. B. Quigley. "Stage-Dependent Puma Predation on Dangerous Prey." *Journal of Zoology* 302 (07/01 2017).

Elbroch, L. Mark, Patrick E. Lendrum, Maximilian L. Allen, and Heiko U. Wittmer. "Nowhere to Hide: Pumas, Black Bears, and Competition Refuges." [In English]. *Behavioral Ecology* 26, no. 1 (2015): 247-54.

Elbroch, L. Mark, Michael Levy, Mark Lubell, Howard Quigley, and Anthony Caragiulo. "Adaptive Social Strategies in a Solitary Carnivore." *Science Advances* 3, no. 10 (2017).

Elbroch, L. Mark, and Howard Quigley. "Social Interactions in a Solitary Carnivore." *Current Zoology* 63, no. 4 (2017): 357-62.

Elbroch, L. Mark, and Heiko U. Wittmer. "Table Scraps: Inter-Trophic Food Provisioning by Pumas." [In English]. *Biology letters* 8, no. 5 (2012 Oct 23 2012): 776-79.

Elbroch, M. L. , L. Robertson, K. Combs, and J. Fitzgerald. "Contrasting Bobcat Values." *Biodiversity and Conservation* (2017).

Estes, J. A., J. Terborgh, J. S. Brashares, M. E. Power, J. Berger, W. J. Bond, S. R. Carpenter, *et al.* "Trophic Downgrading of Planet Earth." *Science* 333, no. 6040 (Jul 2011): 301-06.

Forrester, T. D., and H. U. Wittmer. "A Review of the Population Dynamics of Mule Deer and Black-Tailed Deer Odocoileus Hemionus in North America." *Mammal Review* 43, no. 4 (Oct 2013): 292-308.

George, Kelly A., Kristina M. Slagle, Robyn S. Wilson, Steven J. Moeller, and Jeremy T. Bruskotter. "Changes in Attitudes toward Animals in the United States from 1978 to 2014." *Biological Conservation* 201 (9// 2016): 237-42.

Gilbert, Sophie L., Kelly J. Sivy, Casey B. Pozzanghera, Adam DuBour, Kelly Overduijn, Matthew M. Smith, Jiake Zhou, Joseph M. Little, and Laura R. Prugh. "Socioeconomic Benefits of Large Carnivore Recolonization through Reduced Wildlife-Vehicle Collisions." *Conservation Letters* (2016): n/a-n/a.

———. "Socioeconomic Benefits of Large Carnivore Recolonization through Reduced Wildlife-Vehicle Collisions." *Conservation Letters* (2016).

Grignolio, S., E. Merli, P. Bongi, S. Ciuti, and M. Apollonio. "Effects of Hunting with Hounds on a Non-Target Species Living on the Edge of a Protected Area." *Biological Conservation* 144, no. 1 (2011): 641-49.

Hansen, K. *Cougar: The American Lion.* Flagstaff, AZ: Northland Publishing, 1992.

Harlow, H. J., F. G. Lindzey, W. D. Van Sickle, and W. A. Gern. "Stress Response of Cougars to Nonlethal Pursuit by Hunters." *Canadian Journal of Zoology* 70, no. 1 (1992): 136-39.

Hatton, I. A., K. S. McCann, J. M. Fryxell, T. J. Davies, M. Smerlak, A. R. E. Sinclair, and M. Loreau. "The Predator-Prey Power Law: Biomass Scaling across Terrestrial and Aquatic Biomes." *Science* 349, no. 6252 (2015): doi:http://0-dx.doi.org.libraries.colorado.edu/10.1126/science.aac6284.

Hristienko, Hank, and Jr. McDonald, John E. "Going into the 21st Century: A Perspective on Trends and Controversies in the Management of the Black Bear". *Ursus* 18, no. 1 (2007): 72-88.

Jacobson, Cynthia, John F. Organ, Daniel Decker, Gordon R. Batcheller, and Len Carpenter. "A Conservation Institution for the 21st Century: Implications for State Wildlife Agencies." *Journal of Wildlife Management* 74, no. 2 (2010): 203-09.

Johnson, Heather E., Jessica R. Sushinsky, Andrew Holland, Eric J. Bergman, Trevor Balzer, James Garner, and Sarah E. Reed. "Increases in Residential and Energy Development Are Associated with Reductions in Recruitment for a Large Ungulate." *Global Change Biology* (2016).

Katnik, D. D. "Predation and Habitat Ecology of Mountain Lions (Puma Concolor) in the Southern Selkirk Mountains [Dissertation]." Washington State University, 2002.

Kitchener, A. . *The Natural History of the Wild Cats.* Ithaca, New York: Cornell University Press, 1991.

Krumm, C. E., M. M. Conner, N. T. Hobbs, D. O. Hunter, and M. W. Miller. "Mountain Lions Prey Selectively on Prion-Infected Mule Deer." *Biology Letters* 6, no. 2 (2009): 209-11.

Lambert, C. M. S., R.B. Wielgus, H.S. Robinson, D.D. Katnik, H.S. Cruickshank, R. Clarke, and J. Almack. "Cougar Population Dynamics and Viability in the Pacific Northwest." *Journal of Wildlife Management* 70 (2006): 246-54.

Lance, N. J., S. W. Breck, C. Sime, P. Callahan, and J. A. Shivik. "Biological, Technical, and Social Aspects of Applying Electrified Fladry for Livestock Protection from Wolves (Canis Lupus)." [In English]. *Wildlife Research* 37, no. 8 (2010): 708-14.

Lennox, R. J., A. J. Gallagher, S. Cooke, and E. G. Ritchie. "Evaluating the Efficacy of Predator Removal in a Conflict-Prone World." *Biological Conservation* 224 (2018): 277–89.

Lindzey, F. G., W. D. Vansickle, S. P. Laing, and C. S. Mecham. "Cougar Population Response to Manipulation in Southern Utah." *Wildlife Society Bulletin* 20, no. 2 (Sum 1992): 224-27.

Logan, Kenneth A., and Linda L. Sweanor. *Desert Puma: Evolutionary Ecology and Conservation of an Enduring Carnivore.* Washington, DC: Island Press, 2001.

Lomax, Becky. "Tracking the Bighorns." *Smithsonian* 38, no. 12 (2008): 21-24.

McCollister, M. F., and F. T. van Manen. "Effectiveness of Wildlife Underpasses and Fencing to Reduce Wildlife-Vehicle Collisions." *Journal of Wildlife Management* 74, no. 8 (Nov 2010): 1722-31.

McKinney, Ted, James C. deVOS, Warren B. Ballard, and Sue R. Boe. "Mountain Lion Predation of Translocated Desert Bighorn Sheep in Arizona." *Wildlife Society Bulletin* 34, no. 5 (2006): 1255-63.

McKinney, Ted, Thorry W. Smith, and James C. deVOS. "Evaluation of Factors Potentially Influencing a Desert Bighorn Sheep Population." *Wildlife Monographs* 164 (2006): 1-36.

Miller, Sterling D., John W. Schoen, Jim Faro, and David R. Klein. "Trends in Intensive Management of Alaska's Grizzly Bears, 1980-2010." [In English]. *Journal of Wildlife Management* 75, no. 6 (Aug 2011 2011): 1243-52.

Monteith, K. L., V. C. Bleich, T. R. Stephenson, B. M. Pierce, M. M. Conner, J. G. Kie, and R. T. Bowyer. "Life-History Characteristics of Mule Deer: Effects of Nutrition in a Variable Environment." *Wildlife Monographs* 186, no. 1 (Jul 2014): 1-62.

Monteith, K. L., R. A. Long, V. C. Bleich, J. R. Heffelfinger, P. R. Krausman, and R. T. Bowyer. "Effects of Harvest, Culture, and Climate on Trends in Size of Horn-Like Structures in Trophy Ungulates." *Wildlife Monographs* 183, no. 1 (Feb 2013): 1-28.

Mori, E. "Porcupines in the Landscape of Fear: Effect of Hunting with Dogs on the Behaviour of a Non-Target Species." *Mammal Research* 62, no. 3 (2017): 251-58.

Murphy, Kerry, and Toni Ruth. "Diet and Prey Selection of a Perfect Predator." Chap. 9 In *Cougar: Ecology and Conservation*, edited by Maurice Hornocker and Sharon Negri, 118-37. Chicago and London: University of Chicago Press, 2010.

Nelson, Michael P., J.A. Vucetich, P.C. Paquet, and JK Bump. "An Inadequate Construct? North American Model: What's Missing, What's Needed." *The Wildlife Professional*, no. Summer 2011 (2011): 58-60.

O'Malley, Connor, L. Mark Elbroch, Patrick E. Lendrum, and Howard Quigley. "Motion-Triggered Video Cameras Reveal Spatial and Temporal Patterns of Red Fox Foraging on Carrion Provided by Mountain Lions." [In eng]. *PeerJ* 6 (2018): e5324-e24.

O'Bryan, Christopher J., Alexander R. Braczkowski, Hawthorne L. Beyer, Neil H. Carter, James E. M. Watson, and Eve McDonald-Madden. "The Contribution of Predators and Scavengers to Human Well-Being." *Nature Ecology & Evolution* 2, no. 2 (2018/02/01 2018): 229-36.

Parks, M., and T. Messmer. "Participant Perceptions of Range Rider Programs Operating to Mitigate Wolf-Livestock Conflicts in the Western United States." *Wildlife Society Bulletin* 40, no. 3 (Sep 2016): 514-24.

Peebles, Kaylie A., Robert B. Wielgus, Benjamin T. Maletzke, and Mark E. Swanson. "Effects of Remedial Sport Hunting on Cougar Complaints and Livestock Depredations." *Plos One* 8, no. 11 (Nov 19 2013).

Polisar, J., I. Matix, D. Scognamillo, L. Farrell, M. E. Sunquist, and J. F. Eisenberg. "Jaguars, Pumas, Their Prey Base, and Cattle Ranching: Ecological Interpretations of a Management Problem." *Biol Conserv* 109 (2003).

Posewitz, J. *Beyond Fair Chase: The Ethic and Tradition of Hunting.* Helena, Montana: Falcon Press, 1994.

Raynor, Jennifer L., Corbett A. Grainger, and Dominic P. Parker. "Wolves Make Roadways Safer, Generating Large Economic Returns to Predator Conservation." *Proceedings of the National Academy of Sciences* 118, no. 22 (2021): e2023251118.

Remington Research Group. "Trophy Hunting: U.S. National Survey." (2015).

Riley, S. P. D., L. E. K. Serieys, J. P. Pollinger, J. A. Sikich, L. Dalbeck, R. K. Wayne, and H. B. Ernest. "Individual Behaviors Dominate the Dynamics of an Urban Mountain Lion Population Isolated by Roads." [In English]. *Current Biology* 24, no. 17 (Sep 2014): 1989-94.

Ripple, W.J., and R.L. Beschta. "Linking a Cougar Decline, Trophic Cascade, and Catastrophic Regime Shift in Zion National Park." *Biological Conservation* 133 (2006): 397-408.

Robinson, H. S., and R. Desimone. "The Garnet Range Mountain Lion Study: Characteristics of a Hunted Population in West-Central Montana: Final Report." *Montana Fish, Wildlife & Parks* (2011): 102pp.

Robinson, H. S., R. Desimone, C. Hartway, J. A. Gude, M. J. Thompson, M. S. Mitchell, and M. Hebblewhite. "A Test of the Compensatory Mortality Hypothesis in Mountain Lions: A Management Experiment in West-Central Montana." *Journal of Wildlife Management* 78, no. 5 (Jul 2014): 791-807.

Robinson, H. S., R. B. Wielgus, H. S. Cooley, and S. W. Cooley. "Sink Populations in Carnivore Management: Cougar Demography and Immigration in a Hunted Population." *Ecological Applications* 18, no. 4 (Jun 2008): 1028-37.

Robinson, K. F., D. R. Diefenbach, A. K. Fuller, J. E. Hurst, and C. S. Rosenberry. "Can Managers Compensate for Coyote Predation of White-Tailed Deer?". *Journal of Wildlife Management* 78, no. 4 (May 2014): 571-79.

Ruth, Toni, and Kerry Murphy. "Cougar-Prey Relationships." In *Cougar: Ecology and Conservation*, edited by Maurice Hornocker and Sharon Negri, 138-62. Chicago and London: University of Chicago Press, 2010.

S. M. Murphy, D. T. Wilckens, B. C. Augustine, M. A. Peyton and G. C. Harper. "Improving Estimation of Puma (Puma Concolor) Population Density: Clustered Camera-Trapping, Telemetry Data, and Generalized Spatial Mark-Resight Models." *Scientific Reports* 9, no. 1 (2019): 4590.

S. M. Murphy, R. A. Beausoleil, H. Stewart and J. J. Cox. "Review of Puma Density Estimates Reveals Sources of Bias and Variation, and the Need for Standardization." *Global Ecology and Conservation* 35 (2022).

Sawyer, Hall, Nicole M. Korfanta, Ryan M. Nielson, Kevin L. Monteith, and Dale Strickland. "Mule Deer and Energy Development—Long-Term Trends of Habituation and Abundance." *Global Change Biology* (2017): n/a-n/a.

Sawyer, Hall, and Frederick Lindzey. "Review of Predation on Bighorn Sheep (Ovis Canadensis)." *Prepared for Wyoming Animal Damage Management Board, Wyoming Domestic Sheep and Bighorn Sheep Interaction Working Group, Wyoming Game and Fish Department.* (2002).

Shivik, J. A., A. Treves, and P. Callahan. "Nonlethal Techniques for Managing Predation: Primary and Secondary Repellents." [In English]. *Conservation Biology* 17, no. 6 (Dec 2003): 1531-37.

South Dakota Game Fish and Parks. "South Dakota Mountain Lion Management Plan, 2019-2029, Draft." Pierre, South Dakota, 2019.

Stone, S. A., S. W. Breck, J. Timberlake, P. M. Haswell, F. Najera, B. S. Bean, and D. J. Thornhill. "Adaptive Use of Nonlethal Strategies for Minimizing Wolf-Sheep Conflict in Idaho." *Journal of Mammalogy* 98, no. 1 (Feb 2017): 33-44.

Stoner, D. C., M. L. Wolfe, C. Mecham, M. B. Mecham, S. L. Durham, and D. M. Choate. "Dispersal Behaviour of a Polygynous Carnivore: Do Cougars Puma Concolor Follow Source-Sink Predictions?". *Wildlife Biology* 19, no. 3 (Sep 2013): 289-301.

Stoner, D., M. , M.L. Wolfe, and D. Choate. "Cougar Exploitation Levels in Utah: Implications for Demographic Structure, Population Recovery, and Metapopulation Dynamics." *Journal of Wildlife Management* 70 (2006): 1588-600.

Teel, T. L., R. S. Krannich, and R. H. Schmidt. "Utah Stakeholders' Attitudes toward Selected Cougar and Black Bear Management Practices." *Wildlife Society Bulletin* 30, no. 1 (Spr 2002): 2-15.

Teichman, Kristine J., Bogdan Cristescu, and Chris T. Darimont. "Hunting as a Management Tool? Cougar-Human Conflict Is Positively Related to Trophy Hunting." *BMC Ecology* 16, no. 1 (2016): 44.

The Economist/YouGov. "Moral Acceptability of Various Behaviors - Hunting Animals for Sport." edited by The Economist, 2018.

The Humane Society of the United States. "Government Data Confirm That Cougars Have a Negligible Effect on U.S. Cattle & Sheep Industries." 2019.

———. "New Poll Reveals Majority of Americans Oppose Trophy Hunting Following Death of Cecil the Lion." news release, 2015, http://www.humanesociety.org/news/press_releases/2015/10/poll-americans-oppose-trophy-hunting-100715.html?referrer=https://www.google.com/.

———. "State of the Mountain Lion: A Call to End Trophy Hunting of America's Lion." Washington, DC, 2017.

Treves, A., and K. U. Karanth. "Human-Carnivore Conflict and Perspectives on Carnivore Management Worldwide." *Conservation Biology* 17, no. 6 (Dec 2003): 1491-99.

———. "Special Section: Human-Carnivore Conflict: Local Solutions with Global Applications." *Conservation Biology* 17, no. 6 (Dec 2003): 1489-90.

U.S. Department of Agriculture - Animal and Plant Health Inspection Service. "Death Loss in U.S. Cattle and Calves Due to Predator and Nonpredator Causes, 2015." edited by National Animal Health Monitoring System. Fort Collins, CO, 2017.

U.S. Department of Transportation. "Wildlife-Vehicle Reduction Study: Report to Congress." *https://www.fhwa.dot.gov/publications/research/safety/08034/08034.pdf* (2008).

U.S. Fish and Wildlife Service. "2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation." edited by U.S. Department of the Interior, 2011.

———. "2016 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation." edited by U.S. Department of the Interior, 2016.

———. "2016 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation: National Overview." edited by U.S. Fish and Wildlife Service, 2017.

Vucetich, J. A., D. W. Smith, and D. R. Stahler. "Influence of Harvest, Climate and Wolf Predation on Yellowstone Elk, 1961-2004." *Oikos* 111, no. 2 (Nov 2005): 259-70.

Wallach, A. D., I. Izhaki, J. D. Toms, W. J. Ripple, and U. Shanas. "What Is an Apex Predator?". *Oikos* 124, no. 11 (Nov 2015): 1453-61.

Warren, Luis S. *The Hunter's Game: Poachers and Conservationists in Twentieth-Century America.* New Haven: Yale University Press, 1997.

Weaver, J. L., P. C. Paquet, and L. F. Ruggiero. "Resilience and Conservation of Large Carnivores in the Rocky Mountains." *Conservation Biology* 10, no. 4 (Aug 1996): 964-76.

Wielgus, R. B., D. E. Morrison, H. S. Cooley, and B. Maletzke. "Effects of Male Trophy Hunting on Female Carnivore Population Growth and Persistence." [In English]. *Biological Conservation* 167 (Nov 2013): 69-75.

Wolfe, M. L., D.N. Koons, D. C. Stoner, P. Terletzky, E.M Gese, D. M. Choate, and L.M. Aubry. "Is Anthropogenic Cougar Mortality Compensated by Changes in Natural Mortality in Utah? Insight from Long-Term Studies." *Biological Conservation* 182 (2015): 187-96.

Wright, G. J., R. O. Peterson, D. W. Smith, and T. O. Lemke. "Selection of Northern Yellowstone Elk by Gray Wolves and Hunters." *Journal of Wildlife Management* 70, no. 4 (Aug 2006): 1070-78.

Zarco-Gonzalez, M. M., and O. Monroy-Vilchis. "Effectiveness of Low-Cost Deterrents in Decreasing Livestock Predation by Felids: A Case in Central Mexico." *Animal Conservation* 17, no. 4 (Aug 2014): 371-78.

Zinn, Harry C., Michael J. Manfredo, Jim Jones, and Linda Sikorowski. "Societal Preferences for Mountain Lion Management Along Colorado's Front Range. Colorado State University, Human Dimensions in Natural Resources Unit." *5th Mountain Lion Workshop Proceedings* (1996).

---

[1] Elbroch et al, "Perspective: Why might removing carnivores maintain or increase risks for domestic animals?" Biological Conservation, Volume 283 (2023); J. A. Dellinger et al., "Temporal Trends and Drivers of Mountain Lion Depredation in California, USA" *Human–Wildlife Interactions* 15, no. 1 (2021); Kaylie A. Peebles et al., "Effects of Remedial Sport Hunting on Cougar Complaints and Livestock Depredations," *Plos One* 8, no. 11 (2013); Kristine J. Teichman, Bogdan Cristescu, and Chris T. Darimont, "Hunting as a Management Tool? Cougar-Human Conflict Is Positively Related to Trophy Hunting," *BMC Ecology* 16, no. 1 (2016); H. S. Robinson and R. Desimone, "The Garnet Range Mountain Lion Study: Characteristics of a Hunted Population in West-Central Montana: Final Report," *Montana Fish, Wildlife & Parks* (2011).

[2] Ellen E. Brandell et al., "Examination of the Interaction between Age-Specific Predation and Chronic Disease in the Greater Yellowstone Ecosystem," *Journal of Animal Ecology* (2022); C. E. Krumm et al., "Mountain Lions Prey Selectively on Prion-Infected Mule Deer," *Biology Letters* 6, no. 2 (2009).; Escobar LE, Pritzkow S, Winter SN, Grear DA, Kirchgessner MS, Dominguez-Villegas E, Machado G, Townsend Peterson A, Soto C. The ecology of chronic wasting disease in wildlife. Biol Rev Camb Philos Soc. 2020 Apr;95(2):393-408. doi: 10.1111/brv.12568. Epub 2019 Nov 21. PMID: 31750623; PMCID: PMC7085120; Barrile, G. M., Cross, P. C., Stewart, C., Malmberg, J., Jakopak, R. P., Binfet, J., Monteith, K. L., Werner, B., Jennings-Gaines, J., & Merkle, J. A. (2024). Chronic wasting disease alters the movement behavior and habitat use of mule deer during clinical stages of infection. *Ecology and Evolution*, 14, e11418. https://doi.org/10.1002/ece3.11418

[3] National Shooting Sports Foundation and Responsive Management. "Americans' Attitudes toward Hunting, Fishing, Sport Shooting and Trapping 2019." https://asafishing.org/wp-content/uploads/2019/04/Americans-Attitudes-Survey-Report-2019.pdf (2019).

[4] *Mountain Lion Population Status Update 2023 Biennial Report*, South Dakota Department of Game, Fish, and Parks (July 2023). https://gfp.sd.gov/userdocs/docs/mountain_lion_status_report_2023.pdf

[5] R. A. Beausoleil S. M. Murphy, H. Stewart and J. J. Cox, "Review of Puma Density Estimates Reveals Sources of Bias and Variation, and the Need for Standardization," *Global Ecology and Conservation* 35 (2022); D. T. Wilckens S. M. Murphy, B. C. Augustine, M. A. Peyton and G. C. Harper, "Improving Estimation of Puma (Puma Concolor) Population Density: Clustered Camera-Trapping, Telemetry Data, and Generalized Spatial Mark-Resight Models," *Scientific Reports* 9, no. 1 (2019).

[6] R. A. Beausoleil et al., "Research to Regulation: Cougar Social Behavior as a Guide for Management," *Wildlife Society Bulletin* 37, no. 3 (2013).

[7] Colorado Parks & Wildlife, "Colorado West Slope Mountain Lion (Puma Concolor) Management Plan: Northwest and Southwest Regions," ed. Colorado Department of Natural Resources (2020).

[8]Cougar Hunting Seasons 2024, Washington Department of Fish and Wildlife https://wdfw.wa.gov/about/regulations/adopted/2024/cougar-hunting-seasons

[9] GAME, FISH, AND PARKS COMMISSION ACTION PROPOSAL, Mountain Lion Hunting Season Chapter 41:06:61, Commission Meeting July 20, 2023 Chamberlain, South Dakota. https://gfp.sd.gov/UserDocs/nav/PRO_2023_Mountain_Lion_BHdogs.pdf
[10] Ibid.
[11] {Laundre, 2007 #1606}{Logan, 2015 #953}{Logan, 2021 #1603}C. R. Anderson and F. G. Lindzey, "Experimental Evaluation of Population Trend and Harvest Composition in a Wyoming Cougar Population," *Wildlife Society Bulletin* 33, no. 1 (2005).
[12] T. L. Teel, R. S. Krannich, and R. H. Schmidt, "Utah Stakeholders' Attitudes toward Selected Cougar and Black Bear Management Practices," *Wildlife Society Bulletin* 30, no. 1 (2002).
[13] F. G. Lindzey et al., "Cougar Population Response to Manipulation in Southern Utah," ibid.20, no. 2 (1992); Kenneth A. Logan and Linda L. Sweanor, *Desert Puma: Evolutionary Ecology and Conservation of an Enduring Carnivore* (Washington, DC: Island Press, 2001); L. M. Elbroch et al., "Trailing Hounds Vs Foot Snares: Comparing Injuries to Pumas Puma Concolor Captured in Chilean Patagonia," *Wildlife Biology* 19, no. 2 (2013).
[14] H. J. Harlow et al., "Stress Response of Cougars to Nonlethal Pursuit by Hunters," *Canadian Journal of Zoology* 70, no. 1 (1992); C. M. Bryce, C. C. Wilmers, and T. M. Williams, "Energetics and Evasion Dynamics of Large Predators and Prey: Pumas Vs. Hounds," *PeerJ* e3701 (2017); F. Bonier, H. Quigley, and S. N. Austad, "A Technique for Non-Invasively Detecting Stress Response in Cougars," *Wildlife Society Bulletin* 32, no. 3 (2004).
[15] J. Posewitz, *Beyond Fair Chase: The Ethic and Tradition of Hunting* (Helena, Montana: Falcon Press, 1994); Teel, Krannich, and Schmidt, "Utah Stakeholders' Attitudes toward Selected Cougar and Black Bear Management Practices."; Cougar Management Guidelines, *Cougar Management Guidelines* (Bainbridge Island, WA: WildFutures, 2005).
[16] S. Grignolio et al., "Effects of Hunting with Hounds on a Non-Target Species Living on the Edge of a Protected Area," *Biological Conservation* 144, no. 1 (2011); E. Mori, "Porcupines in the Landscape of Fear: Effect of Hunting with Dogs on the Behaviour of a Non-Target Species," *Mammal Research* 62, no. 3 (2017).
[17] Hank Hristienko and Jr. McDonald, John E., "Going into the 21st Century: A Perspective on Trends and Controversies in the Management of the Black Bear " *Ursus* 18, no. 1 (2007).
[18] Treves, Adrian, and Laura Menefee. "Adverse Effects of Hunting with Hounds on Participants and Bystanders." bioRxiv (2022).
[19] Cynthia Jacobson et al., "A Conservation Institution for the 21st Century: Implications for State Wildlife Agencies," *Journal of Wildlife Management* 74, no. 2 (2010); Michael P. Nelson et al., "An Inadequate Construct? North American Model: What's Missing, What's Needed," *The Wildlife Professional*, no. Summer 2011 (2011).
[20] See e.g., The Humane Society of the United States, "State of the Mountain Lion: A Call to End Trophy Hunting of America's Lion," (Washington, DC2017); Cougar Management Guidelines, *Cougar Management Guidelines*.
[21] Batavia et al. (2018) write: "...nonhuman animals are not only physically, socially, and emotionally disrupted [by trophy hunters], but also debased by the act of trophy hunting. Commoditized, killed, and dismembered, these individuals are relegated to the sphere of mere things when they are turned into souvenirs, oddities, and collectibles. We argue this is morally indefensible. Nonhuman animals are not mere objects but living beings with interests of their own, to whom we owe at least some basic modicum of respect (Regan, 1983). To transform them into trophies of human conquest is a violation of duty and common decency; and to accept, affirm, and even institutionalize trophy hunting, as the international conservation community seems to have done, is to aid and abet an immoral practice." Authors then argue that trophy hunting cannot be "presumed [to be] integral to conservation success."
[22] e.g., A. D. Wallach et al., "What Is an Apex Predator?," *Oikos* 124, no. 11 (2015); R. B. Wielgus et al., "Effects of Male Trophy Hunting on Female Carnivore Population Growth and Persistence," *Biological Conservation* 167 (2013); D. Stoner, M. , M.L. Wolfe, and D. Choate, "Cougar Exploitation Levels in Utah: Implications for Demographic Structure, Population Recovery, and Metapopulation Dynamics," *Journal of Wildlife Management* 70 (2006); S. Creel et al., "Questionable Policy for Large Carnivore Hunting," *Science* 350, no. 6267 (2015); J. L. Weaver, P. C. Paquet, and L. F. Ruggiero, "Resilience and Conservation of Large Carnivores in the Rocky Mountains," *Conservation Biology* 10, no. 4 (1996).
[23] Benson, John F., et al. "The ecology of human-caused mortality for a protected large carnivore." Proceedings of the National Academy of Sciences 120.13 (2023): e2220030120; Stoner, Wolfe, and Choate, "Cougar Exploitation Levels in Utah: Implications for Demographic Structure, Population Recovery, and Metapopulation Dynamics."; Peebles et al., "Effects of Remedial Sport Hunting on Cougar Complaints and Livestock Depredations."; Wallach et al., "What Is an Apex Predator?."; C. T. Darimont et al., "Human Predators Outpace Other Agents of Trait Change in the Wild," *Proceedings of the National Academy of Sciences of the United States of America* 106, no. 3 (2009); Sterling D. Miller et al., "Trends in Intensive Management of Alaska's Grizzly Bears, 1980-2010," *Journal of Wildlife Management* 75, no. 6 (2011); L. Mark Elbroch et al., "Adaptive Social Strategies in a Solitary Carnivore," *Science Advances* 3, no. 10 (2017).
[24] Chris T. Darimont et al., "The Unique Ecology of Human Predators," *Science* 349, no. 6250 (2015).

[25] Benson, John F., et al. "The ecology of human-caused mortality for a protected large carnivore." Proceedings of the National Academy of Sciences 120.13 (2023): e2220030120; J. A. Vucetich, D. W. Smith, and D. R. Stahler, "Influence of Harvest, Climate and Wolf Predation on Yellowstone Elk, 1961-2004," *Oikos* 111, no. 2 (2005); G. J. Wright et al., "Selection of Northern Yellowstone Elk by Gray Wolves and Hunters," *Journal of Wildlife Management* 70, no. 4 (2006); L. L. Eberhardt et al., "A Seventy-Year History of Trends in Yellowstone's Northern Elk Herd," ibid.71, no. 2 (2007); Darimont et al., "The Unique Ecology of Human Predators."
[26] Scott Creel and Jay Rotella, "Meta-Analysis of Relationships between Human Offtake, Total Mortality and Population Dynamics of Gray Wolves (*Canis Lupus*)," *PLoS ONE* 5, no. 9 (2010); D. E. Ausband et al., "Recruitment in a Social Carnivore before and after Harvest," *Animal Conservation* 18, no. 5 (2015); Darimont et al., "The Unique Ecology of Human Predators."
[27] Robinson and Desimone, "The Garnet Range Mountain Lion Study: Characteristics of a Hunted Population in West-Central Montana: Final Report."; H. S. Robinson et al., "A Test of the Compensatory Mortality Hypothesis in Mountain Lions: A Management Experiment in West-Central Montana," *Journal of Wildlife Management* 78, no. 5 (2014); H. S. Cooley et al., "Does Hunting Regulate Cougar Populations? A Test of the Compensatory Mortality Hypothesis," *Ecology* 90, no. 10 (2009); Wielgus et al., "Effects of Male Trophy Hunting on Female Carnivore Population Growth and Persistence."; C. M. S. Lambert et al., "Cougar Population Dynamics and Viability in the Pacific Northwest," *Journal of Wildlife Management* 70 (2006); Teichman, Cristescu, and Darimont, "Hunting as a Management Tool? Cougar-Human Conflict Is Positively Related to Trophy Hunting."
[28] M. L. Wolfe et al., "Is Anthropogenic Cougar Mortality Compensated by Changes in Natural Mortality in Utah? Insight from Long-Term Studies," *Biological Conservation* 182 (2015)., p. 195
[29] Ibid.; Robinson and Desimone, "The Garnet Range Mountain Lion Study: Characteristics of a Hunted Population in West-Central Montana: Final Report."; Robinson et al., "A Test of the Compensatory Mortality Hypothesis in Mountain Lions: A Management Experiment in West-Central Montana."; H. S. Robinson et al., "Sink Populations in Carnivore Management: Cougar Demography and Immigration in a Hunted Population," *Ecological Applications* 18, no. 4 (2008).
[30] Wolfe et al., "Is Anthropogenic Cougar Mortality Compensated by Changes in Natural Mortality in Utah? Insight from Long-Term Studies."; Robinson et al., "Sink Populations in Carnivore Management: Cougar Demography and Immigration in a Hunted Population."; H. S. Cooley et al., "Source Populations in Carnivore Management: Cougar Demography and Emigration in a Lightly Hunted Population," *Animal Conservation* 12, no. 4 (2009); Cooley et al., "Does Hunting Regulate Cougar Populations? A Test of the Compensatory Mortality Hypothesis."
[31] Cooley et al., "Source Populations in Carnivore Management: Cougar Demography and Emigration in a Lightly Hunted Population."; Robinson et al., "Sink Populations in Carnivore Management: Cougar Demography and Immigration in a Hunted Population."
[32] D. C. Stoner et al., "Dispersal Behaviour of a Polygynous Carnivore: Do Cougars Puma Concolor Follow Source-Sink Predictions?," *Wildlife Biology* 19, no. 3 (2013); Wielgus et al., "Effects of Male Trophy Hunting on Female Carnivore Population Growth and Persistence."; Stoner et al., "Dispersal Behaviour of a Polygynous Carnivore: Do Cougars Puma Concolor Follow Source-Sink Predictions?."
[33] Anderson and Lindzey, "Experimental Evaluation of Population Trend and Harvest Composition in a Wyoming Cougar Population."
[34] Stoner, Wolfe, and Choate, "Cougar Exploitation Levels in Utah: Implications for Demographic Structure, Population Recovery, and Metapopulation Dynamics."
[35] L. M. Elbroch and H. Quigley, "Observations of Wild Cougar (Puma Concolor) Kittens with Live Prey: Implications for Learning and Survival," *Canadian Field-Naturalist* 126, no. 4 (2012); Elbroch et al., "Adaptive Social Strategies in a Solitary Carnivore."; L. Mark Elbroch, Jennifer Feltner, and H. B. Quigley, "Stage-Dependent Puma Predation on Dangerous Prey," *Journal of Zoology* 302 (2017).
[36] Elbroch et al., "Adaptive Social Strategies in a Solitary Carnivore."
[37] Robinson and Desimone, "The Garnet Range Mountain Lion Study: Characteristics of a Hunted Population in West-Central Montana: Final Report."; Robinson et al., "A Test of the Compensatory Mortality Hypothesis in Mountain Lions: A Management Experiment in West-Central Montana."; Cooley et al., "Does Hunting Regulate Cougar Populations? A Test of the Compensatory Mortality Hypothesis."; Wielgus et al., "Effects of Male Trophy Hunting on Female Carnivore Population Growth and Persistence."; Lambert et al., "Cougar Population Dynamics and Viability in the Pacific Northwest."; Creel et al., "Questionable Policy for Large Carnivore Hunting."; Ausband et al., "Recruitment in a Social Carnivore before and after Harvest."; Darimont et al., "The Unique Ecology of Human Predators."
[38] Elbroch et al, "Perspective: Why might removing carnivores maintain or increase risks for domestic animals?" Biological Conservation, Volume 283 (2023); Peebles et al., "Effects of Remedial Sport Hunting on Cougar Complaints and Livestock Depredations."; Teichman, Cristescu, and Darimont, "Hunting as a Management Tool? Cougar-Human Conflict Is Positively Related to Trophy Hunting."
[39] Stoner, Wolfe, and Choate, "Cougar Exploitation Levels in Utah: Implications for Demographic Structure, Population Recovery, and Metapopulation Dynamics."

[40] I. A. Hatton et al., "The Predator-Prey Power Law: Biomass Scaling across Terrestrial and Aquatic Biomes," *Science* 349, no. 6252 (2015).
[41] Wallach et al., "What Is an Apex Predator?."
[42] Stoner, Wolfe, and Choate, "Cougar Exploitation Levels in Utah: Implications for Demographic Structure, Population Recovery, and Metapopulation Dynamics."
[43] K. Hansen, *Cougar: The American Lion* (Flagstaff, AZ: Northland Publishing, 1992); A. Kitchener, *The Natural History of the Wild Cats* (Ithaca, New York: Cornell University Press, 1991).
[44] e.g., Weaver, Paquet, and Ruggiero, "Resilience and Conservation of Large Carnivores in the Rocky Mountains."; W.J. Ripple and R.L. Beschta, "Linking a Cougar Decline, Trophic Cascade, and Catastrophic Regime Shift in Zion National Park," *Biological Conservation* 133 (2006); J. A. Estes et al., "Trophic Downgrading of Planet Earth," *Science* 333, no. 6040 (2011); L. Mark Elbroch and Heiko U. Wittmer, "Table Scraps: Inter-Trophic Food Provisioning by Pumas," *Biology letters* 8, no. 5 (2012); L. Mark Elbroch et al., "Nowhere to Hide: Pumas, Black Bears, and Competition Refuges," *Behavioral Ecology* 26, no. 1 (2015); L. M. Elbroch et al., "Vertebrate Diversity Benefiting from Carrion Provided by Pumas and Other Subordinate Apex Felids," *Biological Conservation* 215 (2017); Christopher J. O'Bryan et al., "The Contribution of Predators and Scavengers to Human Well-Being," *Nature Ecology & Evolution* 2, no. 2 (2018).
[45] Sophie L. Gilbert et al., "Socioeconomic Benefits of Large Carnivore Recolonization through Reduced Wildlife-Vehicle Collisions," *Conservation Letters* (2016); O'Bryan et al., "The Contribution of Predators and Scavengers to Human Well-Being."
[46] Ripple and Beschta, "Linking a Cougar Decline, Trophic Cascade, and Catastrophic Regime Shift in Zion National Park."; Elbroch and Wittmer, "Table Scraps: Inter-Trophic Food Provisioning by Pumas."
[47] Elbroch et al., "Vertebrate Diversity Benefiting from Carrion Provided by Pumas and Other Subordinate Apex Felids." Connor O'Malley et al., "Motion-Triggered Video Cameras Reveal Spatial and Temporal Patterns of Red Fox Foraging on Carrion Provided by Mountain Lions," *PeerJ* 6 (2018); Elbroch and Wittmer, "Table Scraps: Inter-Trophic Food Provisioning by Pumas." Peziol, M., Elbroch, L.M., Shipley, L.A. *et al.* Large carnivore foraging contributes to heterogeneity in nutrient cycling. *Landsc Ecol* **38**, 1497–1509 (2023). https://doi.org/10.1007/s10980-023-01630-0
Download citation
[48] Teel, Krannich, and Schmidt, "Utah Stakeholders' Attitudes toward Selected Cougar and Black Bear Management Practices."
[49] Lindzey et al., "Cougar Population Response to Manipulation in Southern Utah."; Logan and Sweanor, *Desert Puma: Evolutionary Ecology and Conservation of an Enduring Carnivore*; Elbroch et al., "Trailing Hounds Vs Foot Snares: Comparing Injuries to Pumas Puma Concolor Captured in Chilean Patagonia."
[50] Harlow et al., "Stress Response of Cougars to Nonlethal Pursuit by Hunters."; Bryce, Wilmers, and Williams, "Energetics and Evasion Dynamics of Large Predators and Prey: Pumas Vs. Hounds."; Bonier, Quigley, and Austad, "A Technique for Non-Invasively Detecting Stress Response in Cougars."
[51] Bryce, Wilmers, and Williams, "Energetics and Evasion Dynamics of Large Predators and Prey: Pumas Vs. Hounds."
[52] Ibid.
[53] Posewitz, *Beyond Fair Chase: The Ethic and Tradition of Hunting*; Teel, Krannich, and Schmidt, "Utah Stakeholders' Attitudes toward Selected Cougar and Black Bear Management Practices."; Cougar Management Guidelines, *Cougar Management Guidelines*.
[54] Posewitz, *Beyond Fair Chase: The Ethic and Tradition of Hunting*.
[55] "GFP commission denies expanding mountain lion hunting for hound hunters," SDPB Radio, September 8, 2023 https://www.sdpb.org/sports-rec/2023-09-08/gfp-commission-denies-expanding-mountain-lion-hunting-for-hound-hunters
[56] GAME, FISH, AND PARKS COMMISSION ACTION PROPOSAL, Mountain Lion Hunting Season Chapter 41:06:61, Commission Meeting July 20, 2023 Chamberlain, South Dakota. https://gfp.sd.gov/UserDocs/nav/PRO_2023_Mountain_Lion_BHdogs.pdf
[57] Grignolio et al., "Effects of Hunting with Hounds on a Non-Target Species Living on the Edge of a Protected Area."; Mori, "Porcupines in the Landscape of Fear: Effect of Hunting with Dogs on the Behaviour of a Non-Target Species."
[58] Treves, Adrian, and Laura Menefee. "Adverse Effects of Hunting with Hounds on Participants and Bystanders." bioRxiv (2022); Hristienko and McDonald, "Going into the 21st Century: A Perspective on Trends and Controversies in the Management of the Black Bear ".
[59] Stefano Grignolio et al., "Effects of Hunting with Hounds on a Non-Target Species Living on the Edge of a Protected Area," Biological Conservation 144, no. 1 (2011), http://dx.doi.org/http://dx.doi.org/10.1016/j.biocon.2010.10.022.
[60] R. J. Lennox et al., "Evaluating the Efficacy of Predator Removal in a Conflict-Prone World," *Biological Conservation* 224 (2018).
[61] R. Beschta and W. Ripple, "Large Predators and Trophic Cascades in Terrestrial Ecosystems of the Western United States," ibid.42, no. 11 (2009); T. D. Forrester and H. U. Wittmer, "A Review of the Population Dynamics of Mule Deer and Black-Tailed Deer Odocoileus Hemionus in North America," *Mammal Review* 43, no. 4 (2013).
[62] Beschta and Ripple, "Large Predators and Trophic Cascades in Terrestrial Ecosystems of the Western United States."

[63] Trump, T. , K. Knopff, A. Morehouse, and M. Boyce. "Sustainable Elk Harvests in Alberta with Increasing Predator Populations." PLoS ONE 17, no. 10 (2022). https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0269407; Clark, T. J., and Mark Hebblewhite. "Predator Control May Not Increase Ungulate Populations in the Future: A Formal Meta-Analysis." Journal of Applied Ecology 58, no. 4 (2021): 812-24. https://doi.org/https://doi.org/10.1111/1365-2664.13810; Forrester and Wittmer, "A Review of the Population Dynamics of Mule Deer and Black-Tailed Deer Odocoileus Hemionus in North America.", p. 300, Lennox et al., "Evaluating the Efficacy of Predator Removal in a Conflict-Prone World."
[64] Hall Sawyer et al., "Mule Deer and Energy Development—Long-Term Trends of Habituation and Abundance," *Global Change Biology* (2017). Heather E. Johnson et al., "Increases in Residential and Energy Development Are Associated with Reductions in Recruitment for a Large Ungulate," ibid. (2016).
[65] e.g. K. L. Monteith et al., "Life-History Characteristics of Mule Deer: Effects of Nutrition in a Variable Environment," *Wildlife Monographs* 186, no. 1 (2014); Forrester and Wittmer, "A Review of the Population Dynamics of Mule Deer and Black-Tailed Deer Odocoileus Hemionus in North America."; K. F. Robinson et al., "Can Managers Compensate for Coyote Predation of White-Tailed Deer?," *Journal of Wildlife Management* 78, no. 4 (2014).
[66] Stefano Grignolio et al., "Effects of Hunting with Hounds on a Non-Target Species Living on the Edge of a Protected Area," Biological Conservation 144, no. 1 (2011), http://dx.doi.org/http://dx.doi.org/10.1016/j.biocon.2010.10.022.
[67] "Severe pneumonia outbreak kills bighorn sheep: Lamb survival to be closely monitored for several years" http://www.avma.org/onlnews/javma/may10/100501c.asp
[68] Kerry Murphy and Toni Ruth, "Diet and Prey Selection of a Perfect Predator," in *Cougar: Ecology and Conservation*, ed. Maurice Hornocker and Sharon Negri (Chicago and London: University of Chicago Press, 2010); Logan and Sweanor, *Desert Puma: Evolutionary Ecology and Conservation of an Enduring Carnivore*; K. L. Monteith et al., "Effects of Harvest, Culture, and Climate on Trends in Size of Horn-Like Structures in Trophy Ungulates," *Wildlife Monographs* 183, no. 1 (2013); Becky Lomax, "Tracking the Bighorns," *Smithsonian* 38, no. 12 (2008); Luis S. Warren, *The Hunter's Game: Poachers and Conservationists in Twentieth-Century America* (New Haven: Yale University Press, 1997).
[69] Hall Sawyer and Frederick Lindzey, "Review of Predation on Bighorn Sheep (Ovis Canadensis)," *Prepared for Wyoming Animal Damage Management Board, Wyoming Domestic Sheep and Bighorn Sheep Interaction Working Group, Wyoming Game and Fish Department.* (2002).
[70] Logan and Sweanor, *Desert Puma: Evolutionary Ecology and Conservation of an Enduring Carnivore*; Ted McKinney, Thorry W. Smith, and James C. deVOS, "Evaluation of Factors Potentially Influencing a Desert Bighorn Sheep Population," *Wildlife Monographs* 164 (2006); Toni Ruth and Kerry Murphy, "Cougar-Prey Relationships," in *Cougar: Ecology and Conservation*, ed. Maurice Hornocker and Sharon Negri (Chicago and London: University of Chicago Press, 2010).
[71] D. D. Katnik, "Predation and Habitat Ecology of Mountain Lions (Puma Concolor) in the Southern Selkirk Mountains [Dissertation]" (Washington State University, 2002).
[72] Murphy and Ruth, "Diet and Prey Selection of a Perfect Predator."; McKinney, Smith, and deVOS, "Evaluation of Factors Potentially Influencing a Desert Bighorn Sheep Population.", Sawyer et al., "Mule Deer and Energy Development—Long-Term Trends of Habituation and Abundance."
[73] Ted McKinney et al., "Mountain Lion Predation of Translocated Desert Bighorn Sheep in Arizona," *Wildlife Society Bulletin* 34, no. 5 (2006).
[74] Sawyer and Lindzey, "Review of Predation on Bighorn Sheep (Ovis Canadensis)."; McKinney, Smith, and deVOS, "Evaluation of Factors Potentially Influencing a Desert Bighorn Sheep Population."; Ruth and Murphy, "Cougar-Prey Relationships."
[75] "Cougar-Prey Relationships.", McKinney, Smith, and deVOS, "Evaluation of Factors Potentially Influencing a Desert Bighorn Sheep Population."; McKinney et al., "Mountain Lion Predation of Translocated Desert Bighorn Sheep in Arizona."
[76] Jennifer L. Raynor, Corbett A. Grainger, and Dominic P. Parker, "Wolves Make Roadways Safer, Generating Large Economic Returns to Predator Conservation," *Proceedings of the National Academy of Sciences* 118, no. 22 (2021); Sophie L. Gilbert et al., "Socioeconomic Benefits of Large Carnivore Recolonization through Reduced Wildlife-Vehicle Collisions," *Conservation Letters* (2016).
[77] U.S. Department of Transportation, "Wildlife-Vehicle Reduction Study: Report to Congress," *https://www.fhwa.dot.gov/publications/research/safety/08034/08034.pdf* (2008); M. F. McCollister and F. T. van Manen, "Effectiveness of Wildlife Underpasses and Fencing to Reduce Wildlife-Vehicle Collisions," *Journal of Wildlife Management* 74, no. 8 (2010).
[78] Gilbert et al., "Socioeconomic Benefits of Large Carnivore Recolonization through Reduced Wildlife-Vehicle Collisions."
[79] J. Downs et al., "Strategically Locating Wildlife Crossing Structures for Florida Panthers Using Maximal Covering Approaches," *Transactions in Gis* 18, no. 1 (2014); S. P. D. Riley et al., "Individual Behaviors Dominate the Dynamics of an Urban Mountain Lion Population Isolated by Roads," *Current Biology* 24, no. 17 (2014).

[80] U.S. Department of Transportation, "Wildlife-Vehicle Reduction Study: Report to Congress."
[81] Ellen E. Brandell et al., "Examination of the interaction between age-specific predation and chronic disease in the Greater Yellowstone Ecosystem," *Journal of Animal Ecology* (2022); Escobar LE, Pritzkow S, Winter SN, Grear DA, Kirchgessner MS, Dominguez-Villegas E, Machado G, Townsend Peterson A, Soto C. The ecology of chronic wasting disease in wildlife. Biol Rev Camb Philos Soc. 2020 Apr;95(2):393-408. doi: 10.1111/brv.12568. Epub 2019 Nov 21. PMID: 31750623; PMCID: PMC7085120; Barrile, G. M., Cross, P. C., Stewart, C., Malmberg, J., Jakopak, R. P., Binfet, J., Monteith, K. L., Werner, B., Jennings-Gaines, J., & Merkle, J. A. (2024). Chronic wasting disease alters the movement behavior and habitat use of mule deer during clinical stages of infection. *Ecology and Evolution*, 14, e11418. https://doi.org/10.1002/ece3.11418
[82] Krumm et al., "Mountain Lions Prey Selectively on Prion-Infected Mule Deer."
[83] Ibid., p. 210
[84] Krumm et al.
[85] Nebraska Game and Parks. 2017. Chronic Wasting Disease (CWD). Retrieved from http://outdoornebraska.gov/cwd/.
[86] Elbroch et al, "Perspective: Why might removing carnivores maintain or increase risks for domestic animals?" Biological Conservation, Volume 283 (2023); Peebles et al., "Effects of Remedial Sport Hunting on Cougar Complaints and Livestock Depredations."; Teichman, Cristescu, and Darimont, "Hunting as a Management Tool? Cougar-Human Conflict Is Positively Related to Trophy Hunting."; L. Mark Elbroch and Howard Quigley, "Social Interactions in a Solitary Carnivore," *Current Zoology* 63, no. 4 (2017); Dellinger et al., "Temporal Trends and Drivers of Mountain Lion Depredation in California, USA ".
[87] Lennox et al., "Evaluating the Efficacy of Predator Removal in a Conflict-Prone World."
[88] Lennox et al.
[89] Peebles et al., "Effects of Remedial Sport Hunting on Cougar Complaints and Livestock Depredations.", citing Lambert et al. 2006 and Robinson et al. 2008
[90] Teichman, Cristescu, and Darimont, "Hunting as a Management Tool? Cougar-Human Conflict Is Positively Related to Trophy Hunting."
[91] Peebles et al., "Effects of Remedial Sport Hunting on Cougar Complaints and Livestock Depredations."
[92] Peebles et al., p.6
[93] Dellinger et al.
[94] Dellinger et al.
[95] Peebles et al.
[96] The Humane Society of the United States, "Government Data Confirm That Cougars Have a Negligible Effect on U.S. Cattle & Sheep Industries," (2019).
[97] Ibid.
[98] Ibid.
[99] Ibid.
[100] Stoner, D.C., M.A. Ditmer, D.L. Mitchell, J.K. Young, and M.L. Wolfe. 2021. Conflict, coexistence, or both? Cougar habitat selection, prey composition, and mortality in a multiple-use landscape. California Fish and Wildlife 107(3):147-172, doi: 10.51492/cfwj.hwisi.2
[101] Stoner, D.C., M.A. Ditmer, D.L. Mitchell, J.K. Young, and M.L. Wolfe. 2021. Conflict, coexistence, or both? Cougar habitat selection, prey composition, and mortality in a multiple-use landscape. California Fish and Wildlife 107(3):147-172, doi: 10.51492/cfwj.hwisi.2
[102] South Dakota Game Fish and Parks, "South Dakota Mountain Lion Management Plan, 2019-2029, Draft," (Pierre, South Dakota2019).
[103] Ibid.
[104] J. Polisar et al., "Jaguars, Pumas, Their Prey Base, and Cattle Ranching: Ecological Interpretations of a Management Problem," *Biol Conserv* 109 (2003); J. A. Shivik, A. Treves, and P. Callahan, "Nonlethal Techniques for Managing Predation: Primary and Secondary Repellents," *Conservation Biology* 17, no. 6 (2003); A. Treves and K. U. Karanth, "Special Section: Human-Carnivore Conflict: Local Solutions with Global Applications," ibid.; "Human-Carnivore Conflict and Perspectives on Carnivore Management Worldwide," *Conservation Biology* 17, no. 6 (2003).
[105] S. A. Stone et al., "Adaptive Use of Nonlethal Strategies for Minimizing Wolf-Sheep Conflict in Idaho," *Journal of Mammalogy* 98, no. 1 (2017); Treves and Karanth, "Human-Carnivore Conflict and Perspectives on Carnivore Management Worldwide."; William F. Andelt, "Carnivores," in *Rangeland Wildlife*, ed. P. R. Krausman (Denver: Society for Range Management, 1996).
[106] A. Eklund et al., "Limited Evidence on the Effectiveness of Interventions to Reduce Livestock Predation by Large Carnivores," *Scientific Reports* 7 (2017).
[107] Polisar, J., I. Matix, D. Scognamillo, L. Farrell, M. E. Sunquist, and J. F. Eisenberg. 2003. Jaguars, pumas, their prey base, and cattle ranching: ecological interpretations of a management problem. Biol Conserv 109

[108] Ibid.
[109] Treves and Karanth, "Special Section: Human-Carnivore Conflict: Local Solutions with Global Applications."; "Human-Carnivore Conflict and Perspectives on Carnivore Management Worldwide." Eklund et al., "Limited Evidence on the Effectiveness of Interventions to Reduce Livestock Predation by Large Carnivores." Stone et al., "Adaptive Use of Nonlethal Strategies for Minimizing Wolf-Sheep Conflict in Idaho." M. Parks and T. Messmer, "Participant Perceptions of Range Rider Programs Operating to Mitigate Wolf-Livestock Conflicts in the Western United States," *Wildlife Society Bulletin* 40, no. 3 (2016); W. F. Andelt, "Effectiveness of Livestock Guarding Dogs for Reducing Predation on Domestic Sheep," ibid.20 (1992); W. F. Andelt and S. N. Hopper, "Livestock Guard Dogs Reduce Predation on Domestic Sheep in Colorado," *Journal of Range Management* (2000).
[110] Eklund et al., "Limited Evidence on the Effectiveness of Interventions to Reduce Livestock Predation by Large Carnivores."
[111] M. M. Zarco-Gonzalez and O. Monroy-Vilchis, "Effectiveness of Low-Cost Deterrents in Decreasing Livestock Predation by Felids: A Case in Central Mexico," *Animal Conservation* 17, no. 4 (2014). Stone et al., "Adaptive Use of Nonlethal Strategies for Minimizing Wolf-Sheep Conflict in Idaho." N. J. Lance et al., "Biological, Technical, and Social Aspects of Applying Electrified Fladry for Livestock Protection from Wolves (Canis Lupus)," *Wildlife Research* 37, no. 8 (2010); Shivik, Treves, and Callahan, "Nonlethal Techniques for Managing Predation: Primary and Secondary Repellents."
[112] Khorozyan I, Ghoddousi S, Soufi M, Soofi M, Waltert M. Studded leather collars are very effective in protecting cattle from leopard (*Panthera pardus*) attacks. *Ecol Solut Evidence*. 2020; 00:e12013. https://doi.org/10.1002/eso3.12013
[113] U.S. Department of Agriculture - Animal and Plant Health Inspection Service, "Death Loss in U.S. Cattle and Calves Due to Predator and Nonpredator Causes, 2015," ed. National Animal Health Monitoring System (Fort Collins, CO2017).
[114] M. L. Elbroch et al., "Contrasting Bobcat Values," *Biodiversity and Conservation* (2017); U.S. Fish and Wildlife Service, "2016 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation: National Overview," ed. U.S. Fish and Wildlife Service (2017).
[115] "2016 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation," ed. U.S. Department of the Interior (2016); "2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation," ed. U.S. Department of the Interior (2011).
[116] Ibid
[117] Harry C. Zinn et al., "Societal Preferences for Mountain Lion Management Along Colorado's Front Range. Colorado State University, Human Dimensions in Natural Resources Unit," *5th Mountain Lion Workshop Proceedings* (1996).
[118] Kelly A. George et al., "Changes in Attitudes toward Animals in the United States from 1978 to 2014," *Biological Conservation* 201 (2016).
[119] J. A. Dellinger et al., "Temporal Trends and Drivers of Mountain Lion Depredation in California, USA " Human–Wildlife Interactions 15, no. 1 (2021)
[120] Remington Research Group, "Trophy Hunting: U.S. National Survey," (2015); The Humane Society of the United States, "State of the Mountain Lion: A Call to End Trophy Hunting of America's Lion."; "New Poll Reveals Majority of Americans Oppose Trophy Hunting Following Death of Cecil the Lion," news release, 2015, http://www.humanesociety.org/news/press_releases/2015/10/poll-americans-oppose-trophy-hunting-100715.html?referrer=https://www.google.com/; The Economist/YouGov, "Moral Acceptability of Various Behaviors - Hunting Animals for Sport," ed. The Economist (2018).
[121] Decision Research, "Southern Rockies Wildlife and Wilderness Survey Report," (2001).

I'm writing with feedback on the 2024-2028 South Dakota Mountain Lion Plan, as a life-long resident of South Dakota:

1) **Remove "maximum" from "Manage mountain lion populations for both maximum and quality recreational hunting opportunities."** Providing recreational hunting opportunities must be balanced with ecology and keeping a sustainable mountain lion population. Care should be taken that hunting does not impede the public's enjoyment of public lands. Wildlife watchers exceed hunters in U.S. Fish and Wildlife Service studies that count wildlife associated recreators nationwide at-home and away from home. A hunted lion or its tracks are not available for watching. The locally generated statistics the SDGFP uses for number of wildlife watchers vs. hunters in SD does not count wildlife watchers at home, while it counts hunters at home - thus it is unfairly biased and inadequate.

2) **Remove "Modify and adopt hunting season structure as needed to minimize regulation complexity.** Simplifying regulations should not take priority over letting the public have a voice in regulations that affect public lands and animals.

In addition to the above two items from the draft plan, **I object to hound hunting on any lands in South Dakota**:

1) Hound hunting is inhumane – it not only results in the injury and death of the wild animal, but sometimes the dogs themselves. Animals are run to exhaustion and can be mauled if unable to climb a tree in time. Hound hunting of raccoons is animal cruelty, and hound hunting by groups of hunters in competitions creates cumulative cruelty.

2) Packs of dogs chasing wild animals are also a public safety and private property issue - dogs can run miles away from their handlers and are not under their control.

Please don't let the agenda of a special interest group dictate the policy of our wildlife. South Dakota wildlife and public lands belong to all South Dakotans to enjoy, not just a select few.

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https://gfp.sd.gov/forms/positions/

Comments on SDGFP's Mountain Lion Action Plan – Draft July 2024.

The Department had a mt lion stakeholder meeting on Mt Lion Plan Amendments – May 28th, 2024 and invited attendees, who included PHAS. The invitees were skewed towards hunters -- invited were 8 hunter groups, 2 environmentalists, 1 landowner, 1 Rosebud Sioux Tribe Wildlife Biologist & 1 BHNF biologist. This is an unfair concentration of one type of interest group.

Page 6-page 9, Summary of surveys
Hunters are a subgroup of the general public. Why do you just limit interest groups surveyed to hunters? Why not also survey tourists, wildlife watchers, hikers, nature observers, nature photographers, OHVers, homeowners, & livestock owners? Tourism is a very important economic engine in South Dakota.

You write at page 10:
"The Black Hills population objective is 200-300 total mountain lions"

We thank you for keeping the population objectives in the Black Hills Fire Protection District at 200-300.

You write at page 10:

"Population objectives for mountain lions on the prairie habitats of South Dakota have not been established. Survey data are lacking for mountain lions on the prairie and these areas are managed primarily to abate potential livestock losses on private property while at the same time to provide recreational hunting opportunity."

We completely disagree on your objectives for the prairie/statewide unit. We believe that Rosebud Sioux Tribe and Oglala Sioux Tribe have habitats to support small populations of lions. There may be habitat over by the Missouri River, near Yankton Sioux Tribe or along the Cheyenne River at Cheyenne River Sioux Tribe or at Custer-Gallatin National Forest lands. You need to develop a better attitude & concern toward tribal lions.

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We specifically focus our comments on pages 10-11 on Strategies and Objectives.

Please refer to page 10:
You write for Objective 1:
"Monitor and assess mountain lion populations by conducting scientifically based
biological surveys within South Dakota.....
d) Estimate abundance of mountain lion population in the Black Hills.
• Evaluate alternative methods to improve estimate of abundance.
• Evaluate alternative indices to improve detection of population trend."

Please Collect Population Data on Tribal Mt. Lions.

We believe there are breeding populations on Rosebud Sioux Tribe (RST) and Oglala Sioux Tribe's (OST) lands. Both allow hunting of mountain lions. We believe both Tribes wish to keep mt. lions and don't seek to extirpate them.

In the late 19th Century and early 20th Century various Allotment Acts were passed that allowed Native American Reservations to be broken up, with pieces of them kept for tribal members and pieces given to Caucasian settlers. The Native's unfamiliarity with taxes and Caucasian ways

contributed to even further & substantial transfers of Native owned lands to Caucasians.

Reservations in SD can have checker boarded area's with jurisdictions mixed. Take Mellette County, which is about half Native and half Caucasian. A female lion with proof of lactation was killed there in Mellette just over the border from Todd County. The management of mountain lions in and around Reservations, would ideally require cooperation and SDGP has more resources for collection of population data than tribes do.

You should have an objective to work with tribes to collect population data, especially in any checker board ownership areas or in nearby areas, if the tribes request or want such.

Connectivity Corridors

GFP should provide for connectivity corridors between the Black Hills with Reservation properties -- because small populations need immigrant mt. lions to refresh their population genetics

Transparency

There should be an objective to be transparent with population and mortality data you have collected. This should be especially true for the prairie/statewide unit, where you have less population data.

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Please refer to page 11:

You write for the title of Objective 2:
"*Manage mountain lion populations for both maximum and quality recreational*
hunting opportunities, considering all social and biological inputs."

We find this sentence to be deeply offensive. Hunting means death. You are managing lions to be killed by people – recreational sacrifice is their purpose to your agency.

Mountain lions are an apex predator and as such they are a keystone species. They are an iconic & symbolic species. They deserve more respect. You need a more balanced statement -- that you manage for mountain lions to serve their vital function in the ecosystem as an apex predator, while providing for quality recreational experiences for wildlife watchers and for hunters and being sensitive to the social tolerance. The social and biological inputs should not be secondary to recreation use of hunting but rather the multiple uses should be more balanced. At the very least, the word maximum needs to be dropped.

Wildlife watchers exceed hunters in USFWS studies that counts wildlife associated recreators nationwide at-home and away from home. (https://digitalmedia.fws.gov/digital/collection/document/id/2321/). A "harvested" lion or its' tracks are not available for watching. The locally derived statistics the SDGFP uses for number of wildlife watchers vs. hunters in SD, does not count wildlife watchers at home, while it counts hunters at home – thus it is unfairly biased & is inadequate. (Southwick Study - SD-Fish-Wildlife-Boating-Economics-Southwick-6-30-22.pdf)

Various studies show that intense and maximized hunting of lions can increase young male lion ratios and increase conflicts with livestock/humans. Maximizing hunting can lead to greater social intolerance. We refer you to Wielgus's video: https://www.youtube.com/watch?v=2_ZD-PAKhSo You should not have an objective to maximize hunting.

You write for part b) of Objective 2:

"b) Modify and adopt hunting season structure as needed to minimize regulation complexity:"

This is another clause that displays your absolute and total bias towards hunting/hunters. When Prairie Hills Audubon Society (PHAS) proposes rule changes designed to mitigate cruelty to animals related to hunting, staff normally objects -- because any new complexity is a constraint on hunting!

State statutes on animal welfare allow that any hunting practices approved by SDGFP are not animal cruelty. You have a fiduciary duty to wildlife to

create mitigations that make hunting/trapping less cruel – those mitigations might make hunting regulations more complex.

You write for part b) of Objective 2:

• *In the Black Hills Fire Protection District (BHFPD), excluding Custer State Park*
(CSP): maximize hunting opportunity for unique hunters allowing unlimited boot
hunting with harvest regulated primarily through restricted season lengths and
harvest limits.

Thanks

We opposed allowing hound hunting of lions in the rest of the BHFPD. Here is a link to PHAS reasons for opposing hound hunting: https://phas-wsd.org/wp-content/uploads/Hound-hunting-objections.pdf

We would like to thank staff and the Commission for deciding to oppose adding hound hunting of mountain lions to the Black Hills Fire Protection District outside of CSP.

Your harvest limit for female lions in the BHFPD is too high and needs to be lowered.

You write for part b) of Objective 2:

• *In CSP: maximize hunting opportunity for hunters with dogs with harvest regulated primarily through limited permits and restricted season lengths.*

We object to hound hunting of lions, so we disagree with an objective to maximize hound hunting opportunity. Custer State Park is a State Park and serves recreators some who don't hunt and some of whom will object to hunting wildlife with hounds.

You write for part b) of Objective 2:

• *Outside BHFPD: emphasis to minimize potential human conflicts with mountain*

lions and maximize hunting opportunity for hunters with dogs allowing unlimited
permits and a year-round season.

We totally disagree with your prairie/statewide unit's objectives. We object to the 365-day hunting season.

We object to the use of dogs, especially in areas where there may be few trees or rock out-cropping for the lions to escape the dogs. Lions are not designed for long runs and need to escape dogs by climbing above them.

We believe the prairie unit needs to be divided up into smaller sets -- in areas with better cougar habitat, a different hunting season would be approved. For example, the Caucasian areas in and around RST and OST Reservations could have different harvest limits and season length than the rest of prairie/statewide unit. Custer-Gallatin National Forest or banks of the Missouri River could have different harvest limits and season lengths. You could recognize the better cougar habitat in some areas in the prairie/statewide unit and manage those sub-sets differently.

Sincerely

Nancy Hilding
President
Prairie Hills Audubon Society