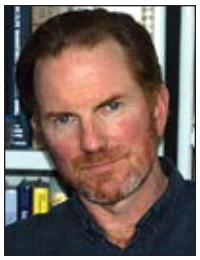
ASSESSING THE SCIENCE BEHIND OPPOSITION TO MOUNTAIN LION HUNTING



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In 2017, the Humane Society of the United States (HSUS) released a report titled "State of the Mountain Lion—A Call to End Trophy Hunting of America's Lion." In the report, HSUS calls for an end to mountain lion hunting in the United States based on several scientific arguments. These arguments range from citing available literature on demography, ecology, and sociality of mountain lions, to the protection of potential habitat and population sizes across 16 states where breeding populations exist.

The U.S. Geological Survey (USGS), Cooperative Fish and Wildlife Research Unit Program, was asked to review the science presented in the report (both linked at the bottom of this article), focusing on subjects key to conclusions of the report. Specifically, the USGS was asked to provide a full and unbiased assessment of the recommendations presented in the document.

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The HSUS listed six recommendations (with some excerpts below from the text for each one):

- **Protection from direct human intervention**

  Protection from trophy hunting, trapping and other unnecessary killing must be a top priority for improving policies at the state level.

- **State wildlife agency reform**

  Funding for state agencies and composition of boards and commissions comes from hunting interests, and those interests do not have the support of the majority of the public.

- **Protected species designation**

  Protected species status should be established or maintained in those states where mountain lions currently do not exist to support reduced persecution and promote future expansion into their historic range.

- **Improved habitat protection and safe passages**

  Ensuring mountain lions have access to large, contiguous habitat without the threat of human persecution or development should be a priority for state lawmakers and the general public.

- **Humane mountain lion response**

  Potential conflicts can be easily prevented or reduced. Moreover, agencies can adopt humane policies to improve how conflicts are managed, saving the lives of mountain lions who pose little or no threat to humans, pets and livestock.

- **Improved public perception and management**

  Public support for mountain lion conservation is essential for the species' long-term persistence in the U.S. Support for wildlife conservation at the state and federal level requires strong public backing to achieve beneficial legislative and regulatory action.

The HSUS report contains an appendix that identifies potential mountain lion habitat in 15 states, using geographic information system technology to estimate lion habitat through interpretation of coarse map layers of estimates of available prey, terrain ruggedness and human footprint. As the title of the HSUS report implies, it calls for an end to mountain lion hunting based on the report's findings.

The USGS limited its review to assessing the science put forth in the report. The findings of USGS include: "Positions stated in the Humane Society of the United States (2017) are based on human values; in this case, an opposition to "trophy hunting" in general and specifically the harvest of mountain lions. Although inherently subjective, these values are as legitimate as those of any other stakeholder in the effective conservation of wildlife in the United States. The report cites numerous polls to illustrate that these values are shared by a diversity of people. Indeed, these values may be increasingly prevalent in the United States as constituencies that have traditionally taken part in hunting and fishing decline (Manfredo and others, 2003; but see Butler and others, 2003 for an alternative finding).

"All decisions in wildlife management are based on human values, including the value placed on science. Care must be taken, however, when scientific arguments are used to support recommendations based on other values. Science is easily misused on behalf of non-scientific agendas, becoming a seemingly objective but diversionary proxy for the subjective values behind the agendas (Mitchell and others, 2018). The HSUS report falls short on four standards that would lend it scientific credibility: (1) an assumption that hunting limits mountain lion populations, (2) pertinent scientific literature either was ignored or selectively cited and interpreted, (3) imprecise and inadequate demographic measures were used to illustrate the detrimental effects of hunting, and (4) a scientifically inadequate estimate of potential lion densities was used to argue that hunting keeps densities of mountain lions below acceptable limits."

The USGS review found the HSUS based its report on the inherent presumption that hunting limits mountain

lion populations and then attempted to build a scientific case to support this belief. As the review states, "seeking evidence to argue a preconceived conclusion is inherently unscientific."

The review goes on to state: "The report cites but then ignores factors other than hunting that could influence lion populations across their range (that is, habitat loss and fragmentation, poaching, disease, starvation, inbreeding, intraspecific strife, poisoning and climate change; Humane Society of the United States, 2017, p. 36–37). The scientific remedy for confirmation bias is to evaluate the evidence for alternative explanatory causes for observed phenomena (Sells and others, 2018). Without an objective evaluation of all factors potentially influencing mountain lion populations, it cannot be concluded that hunting is the dominant limiting factor, as the report claims. The evidence needed to objectively evaluate factors influencing demography of mountain lions is rare and sparse across the full range of mountain lion populations in the United States. An analysis of all available information almost certainly would have shown much more ambiguous and uncertain patterns than the report currently presents."

The review noted that the HSUS report selectively cited and interpreted literature. "The report cites numerous peer-reviewed publications to support its recommendation against hunting of mountain lions. In building this case, the report frequently fails to reference relevant publications offering contrary conclusions, or offers selective interpretations, thereby failing to thoroughly assess all pertinent results, assumptions, and critical caveats detailed in the original peer-reviewed papers. Selective use of peer-reviewed scientific literature is misinformative, particularly for readers unfamiliar with published research, which diminishes the credibility of the report."

The review found that the HSUS report used imprecise and inadequate demographic measures in concluding that "trophy hunting mortality" is the main cause of a decline in mountain lion abundance. Identifying and measuring demographic parameters for large carnivores such as the mountain lion is extremely difficult, because they occur at low densities, range widely, and are highly elusive. HSUS used imprecise concepts and definitions along with misleading figures and discussion of mountain lion mortality, and then drew inappropriate conclusions.

The HSUS report provided estimates of potential mountain lion densities to build further support for the position that mountain lions are overharvested. The review found a host of problems with the science behind their approach, for example: "Overall, the data and modeling approach used to estimate potential mountain lion density in the report are problematic. There are critical issues with the nature of prey data selected, the use of relatively small female home range sizes for delineating habitat classifications, vague classifications of habitat quality, use of a fixed lion density estimate across the western United States, questionable assumptions in the modeling process, and the use of the derived abundance estimates without an assessment (either formal or informal) of associated uncertainty."

The USGS review ends with the following section titled "Management Implications":"Humane Society of the United States (2017) argues against hunting of mountain lions based on human values, while attempting to demonstrate scientific support for those values. The science used to support the foregone conclusion that mountain lions generally are over-hunted is of insufficient logical and methodological rigor to be credible. Importantly, the unsubstantiated contentions distract from two important points made in the report that are difficult for anybody to argue: (1) parts of American society are decreasingly tolerant of hunting mountain lions and (2) harvest decisions made by state agencies would benefit from more rigorous measures of population estimation. Few managers would disagree with either of those points. The question then becomes, what are the realistic approaches management agencies can take to address them? Failing to adapt to societal changes can lead to loss of management authority by state agencies (for example, ballot initiatives that led to the ban on mountain lion hunting in California; Bleich and Pierce, 2005), but the reasonable means of adaptation may be unclear. Management of mountain lion hunting would be more transparent and quantitatively defensible if it were based on rigorous population estimates, but reasonable means of support and methodological approaches for doing such monitoring are yet to be discovered or widely adopted. Quasi-scientific arguments based on preordained, value-based conclusions are not likely to provide clarity to either of these issues."

Peer review is integral to the scientific process. When data and recommendations are put forward, it is important to know that they have undergone such scrutiny and can be considered reliable. In the absence of such information coming forth in a true peer-reviewed outlet, the findings should be interpreted with caution, regardless how professional the appearance is. When in doubt, ask the experts! ■

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The HSUS report can be found at: https://blog.humanesociety.org/wp-content/uploads/2017/04/Final_Mountain-Lions_-DIGITAL_final.pdf

The USGS review, which went through internal agency peer review itself, can be found at: https://doi.org/10.3133/ofr20181128