

February 28, 2026

The Honorable Brian Feldman, Chair
Chairman, Senate Education, Energy & Environment Committee
2 West Miller Senate Office Building
Annapolis, MD 21401

Re: SB 181 – Lead Ammunition – Phase-Out – FAVORABLE

Dear Chairman Feldman and Members of the Committee:

My name is Brian Millsap, and I am a Senior Research Scientist writing in strong support of SB 181, the phase-out of lead ammunition for hunting.

I believe I am qualified to provide meaningful testimony in support of this bill given my background and experience. I have a Bachelor of Science degree in Wildlife Biology, and Masters of Science and PhD degrees in Biology. I have been employed as a wildlife biologist in state and federal natural resource management agencies for 46 years, and currently am employed as a Senior Research Scientist in the Department of Fish, Wildlife, and Conservation Ecology at New Mexico State University. In my current position and in my last twelve years as an agency wildlife biologist I focused on the study and conservation of birds of prey, in particular bald and golden eagles. I have published over 100 peer-reviewed scientific papers.

In 2022 I was one of the lead authors of a study published in the peer-reviewed journal *Science* that provide an overview of the extent of lead poisoning in bald and golden eagles in North America, as well as an assessment of population-level impacts of lead poisoning on eagles¹. In this analysis, we examined blood- and bone-lead levels in over 1200 bald and golden eagles and found evidence of chronic lead exposure in nearly half of the eagles tested and acute levels of lead in up to 35% of the eagles sampled. We were able to predict population-level fatality rates from lead poisoning from these data, and we concluded that mortality from lead poisoning was depressing the bald eagle population growth rate by about 3% nationwide. We determined that the population growth rate for golden eagles was depressed by lead poisoning by about 1% nationwide, which while lower is more biologically significant because golden eagles are in a range-wide population decline in North America due to excessive human-caused mortality².

There is strong scientific evidence that the primary source of lead exposure in eagles in North America today is ingestion of bullet fragments in the remains of hunter-killed game animals left in the field after field dressing^{3,4}. This evidence comes both from the fact that the frequency of encounters of eagles suffering from acute lead poisoning peaks at the end and immediately following the gun-hunting seasons, as well as from an analysis of the stable isotope signatures of the lead found in eagles suffering or having died from lead toxicosis. Wildlife managers and regulators have long sought an effective means of reducing or eliminating this threat, but the politically charged nature of the issue has made implementing an effective solution challenging. There is no better example of this than with respect to attempts to reduce lead poisoning in the critically endangered California condor in California, Arizona, and Utah. Lead poisoning is the primary obstacle to recovery of the California condor, and for many years voluntary lead ammunition exchange programs were employed in an attempt to reduce lead exposure and condor deaths. Despite high hunter compliance with use of non-lead ammunition in the target distribution zones and some local evidence of success, lead-levels in condors remained high, as did deaths, likely because the wide-ranging behavior of condors exposed them to lead in other areas of their annual range⁵. In contrast, California implemented a ban on the use of lead ammunition for most hunting activity in the range of the California condor in 2008, and that action resulted in an immediate reduction in blood lead levels in two California condor surrogates, the turkey vulture and golden eagle.⁶ Over time, this action has also resulted in declines in blood-lead levels in condors as well⁶.

Maryland supports important populations of both bald and golden eagles, so the fate of Senate Bill 181 has important implications for conservation and well-being of both species of eagle in the state. While Maryland's bald eagle population is large and healthy, it is still likely compromised by lead poisoning, just as we found elsewhere in North America. For golden eagles, however, Maryland's coastal plain and interior mountains provide important wintering habitat for a small and potentially imperiled eastern North American population of golden eagles that originates from breeding grounds in eastern Canada.⁷ This population of golden eagles relies heavily on scavenging the remains of hunter-killed white-tailed deer during the winter. Lead poisoning is thus a matter of great conservation concern for the eastern North American population of golden eagles.

There is no scientific doubt that SB 181 would provide important conservation benefits to Maryland's bald and golden eagle populations. I hope you will take this information into account as you debate this important piece of legislation.

I urge a favorable report on SB 181.

Brian A. Millsap, PhD

Research Assistant Professor
New Mexico State University
Department of Fish, Wildlife and Conservation Ecology
(505) 818-9219
bmillsap@nmsu.edu

¹ Slabe, V. A., J. T. Anderson, B. A. Millsap, et al. 2022. Demographic implications of lead poisoning for eagles across North America. *Science* 375:779–782.

² Millsap, B. A., G. S. Zimmerman, W. L. Kendall, et al. 2022. Age-specific survival rates, causes of death, and allowable take of golden eagles in the western United States. *Ecological Applications*. <https://onlinelibrary.wiley.com/doi/abs/10.1002/eap.2544>.

³ Katzner, T. E., M. J. Stuber, V. A. Slabe, J. T. Anderson, J. L. Cooper, L. L. Rhea, and B. A. Millsap. 2017. Origins of lead in populations of raptors. *Animal Conservation*. <http://doi.wiley.com/10.1111/acv.12379>.

⁴ Stauber, E., N. Finch, P. A. Talcott, and J. M. Gay. 2010. Lead Poisoning of Bald (*Haliaeetus leucocephalus*) and Golden (*Aquila chrysaetos*) Eagles in the US Inland Pacific Northwest Region—An 18-year Retrospective Study: 1991–2008. *Journal of Avian Medicine and Surgery* 24:279–287.

⁵ Schulz, J. H., S. Totoni, S. A. W. Stanis, C. J. Li, M. Morgan, D. M. Hall, E. B. Webb, and R. M. Rotman. 2023. Policy comparison of lead hunting ammunition bans and voluntary nonlead programs for California condors. *Wildlife Society Bulletin* 47:e1448.

⁶ Kelly, T. R., P. H. Bloom, S. G. Torres, Y. Z. Hernandez, R. H. Poppenga, W. M. Boyce, and C. K. Johnson. 2011. Impact of the California Lead Ammunition Ban on Reducing Lead Exposure in Golden Eagles and Turkey Vultures. A. Iwaniuk, editor. *PLoS ONE* 6:e17656.

⁷ Katzner, T., B. W. Smith, T. A. Miller, et al. 2012. Status, biology, and conservation priorities for North America's eastern Golden Eagle (*Aquila chrysaetos*) population. *The Auk* 129:168–176.