



## MARYLAND ORNITHOLOGICAL SOCIETY

February 27, 2024

The Honorable Brian J. Feldman  
Chair, Senate Education, Energy, and the Environment Committee  
Maryland General Assembly  
Annapolis, MD 21401

The Honorable Cheryl C. Kagan  
Vice Chair, Senate Education, Energy, and the Environment Committee  
Maryland General Assembly  
Annapolis, MD 21401

### **RE: SB 983 - Lead Ammunition Phase-Out - SUPPORT**

Dear Chairman Feldman, Vice Chair Kagan, Members of the Committee:

The Maryland Ornithological Society (MOS) whole heartedly supports SB983, which would lead to the banning of lead ammunition in Maryland.

#### **Impact of Lead Shot on Birds**

The presence of lead in the environment, whether from spent ammunition or discarded fishing tackle, is deleterious to many forms of wildlife, but particularly to raptors and water birds.

Lead has been shown to reduce populations of Bald Eagles by 4.8% and those of Golden Eagles by 0.8%<sup>i</sup>. Other studies have concluded that lead suppresses the vigor of Bald Eagle populations<sup>ii</sup> and decreases the resilience of Golden Eagle populations to other environmental toxins<sup>iii</sup> and interferes with their motor and immune systems<sup>iv</sup>. Both species are protected under the Bald and Golden Eagle Protection Act which prohibits 'take' of either species, where take is defined as harming them in various ways, including poisoning<sup>v</sup>. Regardless, both species are still poisoned whenever they eat wildfowl or fish containing lead.

In addition to eagles, carrion eating birds, namely vultures, condors and corvids, are poisoned by the lead in carcasses. Exposure to lead causes lethal and sub-lethal impacts in these and other bird species.<sup>vi</sup>

### **Impacts on humans**

The use of lead ammunition is not a threat only to birds, people who eat birds or wild game hunted with lead ammunition are at risk. Thus in a 2009 study of 742 volunteers from 6 North Dakota cities, it was found that consumption of hunter-killed wild game was associated with higher lead levels. Specifically those who ate such game had lead blood levels averaging 1.27 µg/dl as compared to 0.84 µg/dl in those who had not.

### **Bans Do Work**

Bans on the use of lead have already shown promising results. The 1991 ban on lead shot for hunting waterfowl was followed by reduced numbers of crippled ducks and geese<sup>x</sup>, and lower detectable levels of lead in the blood of ducks,<sup>xi</sup> and less non-hunting mortality among ducks.<sup>xii</sup>

Following a lead shot ban in the California Condor's range in 2008, lead exposure to birds of prey fell as hunters obeyed the new ordinance<sup>xiii</sup>.

Banning lead would also have positive impacts on human health since, according to the World Health Organization, there is no safe level of lead<sup>xiv</sup>. The ban will thus also protect those who eat wildfowl.

### **MOS**

MOS is an 2000-strong member volunteer organization that is dedicated to the study, conservation and enjoyment of birds in Maryland and beyond. We were founded in 1945 and are organized into 15 chapters throughout the state. We lead field trips, organize lectures, have an active youth sector, conduct period bird counts, have an annual convention and own 10 sanctuaries in various parts of state.

In closing I thank you for considering our request..

Sincerely,



Robin G. Todd PhD, Conservation Chair  
Maryland Ornithological Society  
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### **References Cited**

<sup>i</sup> Slabe et al. (2022). Demographic implications of lead poisoning for eagles across North America. Science, 375. Pp. 779-782.

- ii Hanley, B. J. et al. (2021). Environmental lead reduces the resilience of bald eagle populations. *The Journal of Wildlife Management*, 86(22177).
- iii Watson, J.W., and Davies, R.W. (2015). Lead, Mercury, and DDE in the Blood of Nesting Golden Eagles in the Columbia Basin, Washington. *The Journal of Raptor Research*, 49(2). Pp.217-221.
- iv Golden, N.H., Warner, S.E., and Coffey, M.J. (2016). A Review and Assessment of Spent Lead Ammunition and Its Exposure and Effects to Scavenging Birds in the United States. *Reviews of Environmental Contamination and Toxicology*, 237. Pp. 123-191.
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- vi Palmer, A.G. et al. (2022). Blood Lead Concentrations of Free-ranging North Florida Raptors: 2008-2017. *Journal of Wildlife Diseases*, 58(2).
- vii Michael, P. (2006). *Fish and Wildlife Issues Related to the Use of Lead Fishing Gear*. Washington Department of Fish and Wildlife: Fish Program.
- viii Grade, T.G., Pokras, M., et al. (2019). Lead poisoning from ingestion of fishing gear: A review. *Ambio*, 48(0). Pp. 1023-1038.
- ix The Trumpeter Swan Society (October 21, 2021). *Position Statement: Lead in the Environment is a Significant Threat to Trumpeter Swans and Other Wildlife*.
- x Ellis, M.B., and Miller, C.A. (2021). The effect of a ban on the use of lead ammunition for waterfowl hunting on duck and goose crippling rates in Illinois. *Wildlife Biology*, e01001.
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- xii Havera, A.W., and Zercher, B. (2000) Ingestion of lead and nontoxic shotgun pellets by ducks in the Mississippi flyway. *Journal of Wildlife Management* 64. Pp. 848–857.
- xiii Kelly, R.T. et al. (2011). Impact of the California Lead Ammunition Ban on Reducing Lead Exposure in Golden Eagles and Turkey Vultures. *PLoS One*, 6(4).
- xiv <https://www.who.int/news-room/fact-sheets/detail/lead-poisoning-and-health#:~:text=There%20is%20no%20known%20safe,symptoms%20and%20effects%20also%20increase.>



# Cummings School of Veterinary Medicine

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The Honorable Brian J. Feldman  
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Maryland General Assembly  
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The Honorable Cheryl C. Kagan  
Vice Chair, Senate Education, Energy, and the Environment Committee  
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**RE: SB 983 - Lead Ammunition Phase-Out - SUPPORT**

Dear Chairman Feldman, Vice Chair Kagan, Members of the Committee:

I am submitting testimony today wearing several hats. One is that of a lifelong outdoorsman. One is in my role as a health professional. And one is my role as a scientist who has spent over 50 years in environmental conservation; nearly 40 of those years studying health and disease in wildlife. I am an Emeritus Associate Professor of Wildlife Medicine at The Cummings Veterinary School, Tufts University, and former director of both Tufts Wildlife Clinic, and Tufts Center for Conservation Medicine.

Since 1987 my students and I have performed necropsies (post-mortem examinations) on thousands of wild birds from all over the eastern United States. Our work has documented a wide variety of causes of death including disease, predators, human caused problems (including gunshot, entanglement, oil spills, etc.). But I can unequivocally say that a very significant cause of death in many wild birds is lead poisoning. We continue to exhaustively document lead toxicosis from ingested bullet fragments and shotgun ammunition in a wide variety of species including bald and golden eagles, and a great many aquatic birds. As an example, I've been involved in investigating five cases of wildlife lead poisoning in the last week.

As a life-long outdoors person, I deeply appreciate that sportsmen (and women) have a long and distinguished history as committed conservationists. Hunters and anglers play important roles in protecting the biodiversity and health of our natural ecosystems. I say this, because it is very important to understand that the large majority of proponents of this bill are NOT anti-sportsmen. But we are asking hunters, and anyone involved in the shooting sports, as concerned conservationists, to help eliminate the use of lead ammunition. I would ask them to join in taking this important step in adapting their practices and equipment for the good of protecting the environment, human health, and the species we all cherish. Over 30 years ago, waterfowl hunters took a similar step when they changed from using toxic lead shot to non-toxic products. At that time, concerns were expressed about the cost and performance of the non-toxic

alternatives, but hunters all over the U.S. successfully made the change. Now we're asking others to take a similar step.

As a health professional I feel that it is important to emphasize that for both human and veterinary medicine, there is overwhelming scientific consensus that lead is profoundly toxic. **NO** level of exposure is considered safe for people, domestic animals, or wildlife species. Whether the lead comes from paint, gasoline, mining, industrial processes, or sporting goods, this metal is toxic and cumulative. The websites and publications of such agencies as the CDC, OSHA, US EPA, US Fish & Wildlife Service, USGS and many others emphasize the toxicity of lead. Shouldn't we ask ourselves if there ANY reason to put large amounts of such a long-acting, persistent poison into our environment?

Traditionally, wildlife managers have primarily been concerned about threats to animal health in two circumstances. First, if such threats are shown to have population level effects on the species in question, and second, if these threats may serve a sentinel function to protect human health. There is no doubt that both of these are good reasons to replace lead in ammunition with non-toxic alternatives.

But I would be remiss if I did not point out the significant benefits to individual animals of switching to non-toxic ammunition. Hunters have long been some of our most ardent conservationists and traditionally abhor the unnecessary killing of non-target animals. Even if lead poisoning is not having a population level effect on a particular species, it is killing large numbers of animals in a manner that is prolonged, painful, and cruel. This flies in the face of two of the historic central tenets of sporting traditions: first, that we should avoid harm to non-target species, and second, that wild animals being taken for food or sport should, whenever possible, be afforded a quick death. Lead poisoning is inhumane and causes unnecessary stress, pain, and suffering in a wide variety of species including people, dogs, horses, ruminants, and birds. There is abundant literature over many years to demonstrate acute abdominal pain, peripheral muscle pain and weakness, incoordination, seizures, anemia, gout, and other clinical problems seen in many species. It is worth considerable money and effort to eliminate this poison from our outdoors activities.

Eliminating lead from ammunition and other sporting goods also directly benefits human health. In the process of making and using ammunition, people are exposed to lead in many ways. Mining, smelting, manufacturing, and use of lead products, including ammunition, contaminates people and the environment. Meat taken from animals shot with lead projectiles regularly contains small lead particles, and an increasing number of agencies and organizations caution that sensitive populations, like children or women of child-bearing age, should not eat meat harvested with lead bullets or shot. In most of the U.S., few food assistance programs screen donated game meat for lead. And of course "the needy" often have other significant sources of lead in their lives — including housing, drinking water, or occupational exposures.

### Conclusion

From our years of work I can categorically state that lead toxicosis from ingested ammunition is a serious problem for eagles and other wildlife in Maryland, the U.S. and abroad. I am in frequent contact with biologists studying eagles throughout the country, and can testify to the

consistency of their findings and ours over time. It is especially serious that much of the mortality is in breeding, adult animals, a critical group from the standpoint of population stability – especially as we consider the other threats that face eagles and other wildlife in our changing world.

I would strongly recommend that committee members as well as anyone interested issues of lead poisoning take the time to examine the following publications, available full text on the internet:

1. Proceedings of an international meeting, 2008. **Ingestion of Lead from Spent Ammunition: Implications for Wildlife and Humans.**

[https://science.peregrinefund.org/legacy-sites/conference-lead/2008PbConf\\_Proceedings.htm](https://science.peregrinefund.org/legacy-sites/conference-lead/2008PbConf_Proceedings.htm)

2. Ambio 48 (9), Sept. 2019 -- **Special Issue: Lead in Hunting Ammunition: Persistent Problems and Solutions.** <https://link.springer.com/journal/13280/volumes-and-issues/48-9>

Thank you for your attention. I would be happy to provide any additional information that the committee might need.



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Attachment: Pokras, MA and MR Kneeland. 2008. Lead poisoning: using transdisciplinary approaches to solve an ancient problem. *EcoHealth* 5(3): 379-385.

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**RE: SB 983 - Lead Ammunition Phase-Out - SUPPORT**

Dear Chairman Feldman, Vice Chair Kagan, Members of the Committee:

My name is Brian Millsap, and I am writing in support of Maryland Senate Bill 983, which would require the development of regulations that would phase out the use of lead ammunition for hunting in Maryland by a future date to be determined by the Department of Natural Resources.

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 Research Assistant Professor 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 90 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 eagles<sup>1</sup>. 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 likely on the cusp of a range-wide population decline in North America due to excessive human-caused mortality<sup>2</sup>.

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<sup>3,4</sup>. 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 range<sup>5</sup>. 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.<sup>6</sup> Over time, this action has also resulted in declines in blood-lead levels in condors as well<sup>6</sup>.

Maryland supports important populations of both bald and golden eagles, so the fate of Senate Bill 983 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.<sup>7</sup> 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 983 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 983.

Brian A. Millsap, PhD

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<sup>1</sup> 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.

<sup>2</sup> 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>.

<sup>3</sup> 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>.

<sup>4</sup> 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.

<sup>5</sup> 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.

<sup>6</sup> 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.

<sup>7</sup> 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.



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**RE: SB 983 - Lead Ammunition Phase-Out - SUPPORT**

Dear Chairman Feldman, Vice Chair Kagan, Members of the Committee:

The National Wildlife Refuge Association is a non-profit organization focused on protecting and promoting the National Wildlife Refuge System, the world's largest network of lands and waters set aside for wildlife conservation. Founded in 1975, the Refuge Association's mission is to conserve America's wildlife for future generations through programs that protect, enhance, and expand the National Wildlife Refuge System and the landscapes beyond its boundaries. We appreciate the opportunity to express our support for SB0983 and HB1473 to phase out the use of lead or lead-based ammunition for hunting in the state of Maryland.

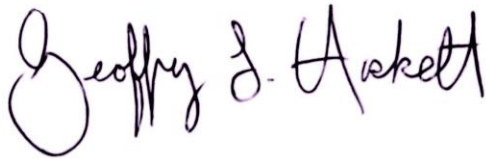
The use of non-lead ammunition helps to protect vulnerable wildlife from lead poisoning and enables hunters and their families to safely eat the game they've killed. Waterfowl and other birds accidentally ingest lead ammunition alongside the pebbles they swallow to aid digestion and suffer harmful – often fatal – lead poisoning, as do eagles, vultures, and other wildlife that scavenge on animals shot with lead ammunition. Lead ammunition shatters inside game animals, potentially harming not only scavenging wildlife but also hunters and their families who eat the meat. Studies have shown that lead fragments can be found in wild game meat despite best attempts to remove sections surrounding a bullet wound. In 2013, scientists with expertise in lead and environmental health published a consensus statement on the toxic effects of lead ammunition on human health and the environment, and the need to reduce and eventually eliminate the use of lead ammunition. The science unequivocally supports ending use of lead ammunition in hunting. Unlike some of the great challenges facing wildlife, there is a solution to

wildlife lead toxicity from ammunition and fishing tackle. Viable lead alternatives are already available to sportspeople, which means no interruption in recreation.

Non-toxic steel, copper, and alloy bullets and non-lead fishing tackle are affordable and available in all 50 states. Hunters and anglers in states and areas that have restrictions or have already banned lead have made successful transitions to non-toxic ammunition and tackle. Over a dozen manufacturers of bullets have designed and now market many varieties of non-lead, non-toxic bullets and shot with satisfactory to superior ballistic characteristics. Moreover, sportspeople who use non-lead ammunition carry on the tradition of wildlife conservation by preventing animals from being exposed to lead.

We believe the pathway to less-toxic environments and fewer wildlife poisonings is paved not just with legislation and regulation to phase out lead ammunition and tackle, but also with more sportsperson education, widely accessible non-toxic ammunition and tackle exchange programs, and informed decisions by individuals and communities. We encourage the swift passage of these bills as an important step to encourage the transition away from lead ammunition across the country.

Sincerely,

A handwritten signature in black ink that reads "Geoffrey L. Haskett". The signature is written in a cursive style with a large initial 'G'.

Geoffrey L. Haskett  
President  
National Wildlife Refuge Association